

Equipment Specsheets/Datasheet

Below are the specifications for all the equipment. We have consolidated all the necessary spec sheets or data sheets. The first section contains the luminaires spec sheet, followed by the receptacles section, and the last part includes the general spec sheet, which covers safety equipment.



Catalog Number
Notes
Type

Contractor Select™

CPX™ LED

Flat Panel

The CPX is an LED edge-lit flat panel offered in industry standard wattages. The cost effective and reliable luminaire features a diffuse lens for even illumination over the surface of the panel. It is ideal for applications such as small offices, schools and retail.

FEATURES:

- Industry standard wattages
- Long-life LEDs maintain greater than 70% of their lumen output at 50,000 hours
- 0-10V dimming driver, dims to 10%



Catalog Number	UPC	Description	Lumens	Input Watts	CCT	CRI	Voltage	Pallet qty.
CPX 2X2 3200LM 35K M4	00191848338537	2x2 Flat Panel	3200	30	3500K	80	120-277V	48
CPX 2X2 3200LM 40K M4	00191848338650	2x2 Flat Panel	3200	30	4000K	80	120-277V	48
CPX 2X4 4000LM 35K M2	00191848338490	2x4 Flat Panel	4000	40	3500K	80	120-277V	24
CPX 2X4 4000LM 40K M2	00191848338506	2x4 Flat Panel	4000	40	4000K	80	120-277V	24

Accessories: Order as separate catalog number.

2X2SMKSH	2'x2' Surface Mount Troffer Kit
2X4SMKSH	2'x4' Surface Mount Troffer Kit
PS1055CP	10W constant power ¹
DGA22	Drywall grid adapter for 2x2 recessed fixture.
DGA24	Drywall grid adapter for 2x4 recessed fixture.



Specifications

INTENDED USE:

The CPX Series LED is a low-glare panel featuring an external driver. This cost-effective, reliable flat panel is visually comfortable and can be recessed, or Surface Box mounted. Suitable for many applications such as schools, offices, retail, convenience stores, hospitals, healthcare facilities and other commercial spaces. **Certain airborne contaminants can diminish integrity of acrylic.**

CONSTRUCTION:

The extruded aluminum frame with satin white lens provides excellent shielding and uniform luminance. CPX's low-profile design provides increased installation flexibility especially in restricted plenum spaces. The back plate includes integral T-bar clips for installation into T-grid ceilings.

ELECTRICAL:

Long-life LEDs, coupled with a high-efficiency driver, provide superior illumination for extended service life. Greater than 70% LED lumen maintenance at 50,000 hours (L₇₀>50,000).

0-10V dimming driver, dims to 10%.

LISTINGS:

CSA certified to meet US and Canadian standards. Damp location listed. IC rated.

DesignLights Consortium® (DLC) qualified product. Not all versions of this product may be DLC qualified.

WARRANTY:

5-year limited warranty.

Note: Actual performance may differ as a result of end-user environment and application. All values are design or typical values, measured under laboratory conditions at 25 °C. Specifications subject to change without notice.

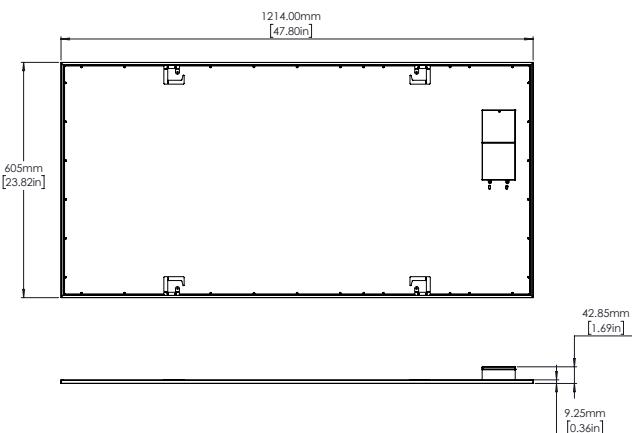
Dimensions

Length: 47.80 (121.4)

Width: 23.82 (60.5)

Depth: 1.68 (4.3)

Weight: 6 lbs

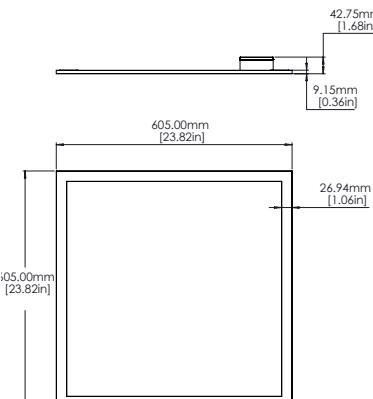


Length: 23.82 (60.5)

Width: 23.82 (60.5)

Depth: 1.68 (4.3)

Weight: 12.02 lbs



All dimensions are inches (centimeters) unless otherwise indicated.

PHILIPS

Centris 2-spot ceiling light

Hue White and Colour Ambiance

Integrated LED

Bluetooth control via app

Control with app or voice*

Add Hue Bridge to unlock more



50610/30/P7



Easy smart lighting

Get both functional and mood lighting in a single fixture. The black Centris has a fixed ceiling light and two spotlights that can be angled individually. Set each light in the fixture to any of millions of colours for a truly unique look.

Limitless possibilities

- Mix functional and mood lighting with one fixture

Easy smart lighting

- Control up to 10 lights with the Bluetooth app
- Control lights with your voice*
- Create a personalised experience with colourful smart light
- Set the right mood with warm to cool white light
- Get the perfect light recipes for your daily activities
- Unlock the full suite of smart lighting features with the Bridge



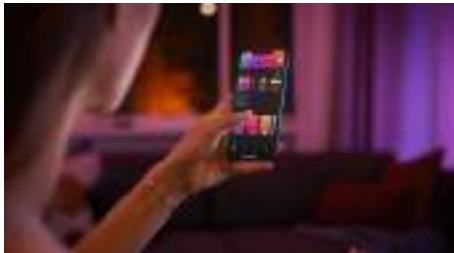
Highlights

Mix functional and mood lighting with one fixture



The Philips Hue Centris blends function with aesthetics in a ceiling light that combines a central fixture with spotlights that can be individually angled to highlight different parts of the room. Set the Centris to one of millions of colours or any shade of warm-to-cool white light – or set each light in the lamp to its own individual shade for a livelier look.

Control up to 10 lights with the Bluetooth app



With the Hue Bluetooth app, you can control your Hue smart lights in a single room of your home. Add up to 10 smart lights and control them all with just the touch of a button on your mobile device.

Control lights with your voice*



Philips Hue works with Amazon Alexa and the Google Assistant when paired with a compatible Google Nest or Amazon Echo device. Simple voice commands allow you to control multiple lights in a room, or just a single lamp.

Create a personalised experience with colourful smart light



Transform your home with over 16 million colours, instantly creating the right atmosphere for any event. With the touch of a button, you can set a festive mood for a party, turn your living room into a movie theatre, enhance your home decor with colour accents, and much more.

Set the right mood with warm to cool white light



These bulbs and light fixtures offer different shades of warm to cool white light. With complete dimmability from bright to low nightlights, you can tune your lights to the perfect shade and brightness of light for your daily needs.

Get the perfect light recipes for your daily activities



Make your day easier and more pleasant with four pre-set light recipes handcrafted especially for your daily tasks: Energise, Concentrate, Read and Relax. The two cool-toned scenes, Energise and Concentrate, help you get going in the morning or keep your focus, while the warmer scenes of Read and Relax help support comfortable reading or calm a busy mind.

Unlock the full suite of smart lighting features with the Bridge



The Bridge unlocks the features that make smart lighting truly smart – away-from-home control, voice control, automated lighting and much more. Add a Bridge to your setup to create immersive experiences, tap into technology that's secure and reliable, and more. The Bridge is the key to smart lighting like you've never seen before.

Specifications

Design and finishing

- Colour: Black
- Material: Metal

Extra feature/accessory incl.

- Four light recipes: Yes
- Adjustable spot head: Yes
- Dimmable with the Hue app and switches: Yes
- LED lamp(s) included: Yes
- Perfectly suited for creating ambience: Yes
- Upgradeable with Philips Hue Bridge: Yes
- ZigBee Light Link: Yes

Miscellaneous

- Especially designed for: Living Room and Bedroom, Kitchen
- Style: Contemporary
- Type: Spot Light
- EyeComfort: No

Product dimensions and weight

- Net weight: 1.910 kg
- Height: 12.8 cm
- Length: 40.8 cm
- Width: 8.5 cm

Service

- Warranty: 2 year(s)

Technical specifications

- Lumen output at 4000K: 1,560 lm
- Lifetime up to: 15,000 h
- Light source equivalent to traditional bulb of: 42 W
- Light source 2 equivalent to traditional bulb of: 50 W
- Bulb technology: LED, Safety Extra Low Voltage
- Light colour: 2000-6500 Hue White Colour Ambiance
- Bulb technology 2: LED, 230 V
- Number of bulbs 2: 2
- Wattage bulb included 2: 5.7 W
- Maximum wattage replacement bulb 2: 6 W
- Mains power: 50-60 Hz
- LED: Yes
- Built-in LED: Yes
- Number of bulbs: 1
- Fitting/cap: GU10
- Wattage bulb included: 11 W
- IP code: IP20
- Class of protection: I - earthed
- Replaceability of light source: Replaceable LED light source by a professional
- Replaceability of control gears: Replaceable control gear by a professional
- Lumen output at 2700K: 1,170 lm

What's supported

- Compatible with Effects feature: Yes
- Philips Hue App: IOS 15 and above, Android 10.0 and above

Packaging dimensions and weight

- EAN/UPC - product: 8718696175989
- Net weight: 1.91 kg
- Gross weight: 2.33 kg
- Height: 143 mm
- Length: 110 mm
- Width: 487 mm
- Material number (12NC): 915005928101



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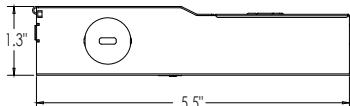
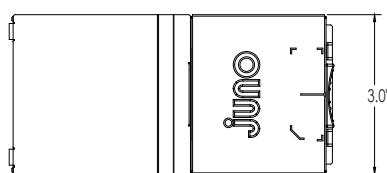
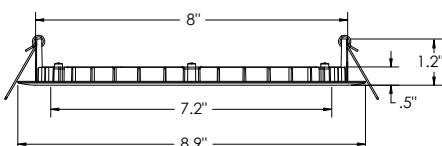
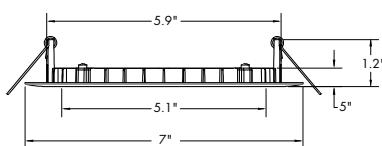
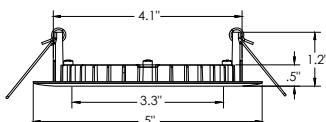
Juno Wafer™ LED Downlight Series

4", 6" & 8" LED Ultra-Thin Wafer Switchable Downlight
5CCT Switchable White Downlight

WF4/WF6/WF8 SWW5 Series



Dimensions



Project:

Fixture Type:

Location:

Contact/Phone:

Product Features

The 4", 6" & 8" round smooth with 5CCT Switchable White technology provide high-quality light output and efficiency featuring a switch for easy color temperature adjustment to choose between 2700K, 3000K, 3500K, 4000K, or 5000K - while eliminating the need for recessed housings.

- Round smooth lens trim designed to distribute precise even illumination for general purpose areas
- Canless - no can required; equals easy to install and less labor
- 5 selectable color temperatures to choose with a switch ranging from warm (2700K) to daylight (5000K) allowing customization for endless applications

Applications

- Residential and light commercial applications including multi-family, hospitality, assisted living, dormitories and other multi-level construction
- Shallow slim profile allows for easy remodel or new construction insulated and drop ceiling installations
- Wet rated and airtight: perfect for showers, bathrooms, and outdoor soffits

Performance

Delivered Lumens	670L (WF4), 970L (WF6) and 1640L (WF8) Nominal at 3000K
LED Color Temperature	Switchable White (27K, 30K, 35K, 40K, 50K) Default set at 3000K
CRI	90+
Voltage	Dedicated 120V
Dimming	Dimmable to 10% with triac (120v)

For a list of compatible dimmers see [JUNO-WAFERS-DIM](#)

Specifications

	WF4	WF6	WF8
Aperture:	3.3"	5.1"	7.2"
Ceiling Opening:	4.25"	6.25"	8.25"
Overlap Trim:	5"	7"	8.9"
Height:	1.2"	1.2"	1.2"



Juno Wafer™ LED Downlight Series

4", 6" & 8" LED Ultra-Thin Wafer Switchable Downlight
5CCT Switchable White Downlight



ORDERING INFORMATION

Downlight

Example: WF4 SWW5 90CRI MW M6

Series	Trim Style	Color Temperature	Rendering Index	Finish	
WF4	4" Wafer-Thin LED Downlight	(BLANK) Round	SWW5 Switchable White (2700K, 3000K, 3500K, 4000K, 5000K)	90CRI 90+ CRI	MW Matte White
WF6	6" Wafer-Thin LED Downlight				MB Matte Black
WF8*	8" Wafer-Thin LED Downlight				BN Brushed Nickel
					ORB Oil Rubbed Bronze

1. WF8 only offered in a Matte White finish.

Accessories: Order as separate catalog number.

Series	Description
WF8643 PAN	Universal New Construction Pan
WF4 PAN R12	4" New construction pan, retail pack of 12
WF4GR MW JZ	4" Wafer Goof Ring 4.2" ID x 6.2" OD
WF6 PAN R12	6" New construction pan, retail pack of 12
WF6GR MW JZ	6" Wafer Goof Ring 6" ID x 8" OD
WF8GR MW JZ	8" Wafer Goof Ring 8.1" ID x 10.1 OD
WFJB U	Remodel Joist Bar
WFEXC6 SW3PIN FT4	3-Pin 6ft Cable
WFEXC10 SW3PIN FT4	3-Pin 10ft Cable
WFEXC20 SW3PIN FT4	3-Pin 20ft Cable

*Goof rings are made of 22 gauge steel and painted white.



WF8643 UNIVERSAL
New Construction Pan



WF4 PAN
4" New Construction Pan



Remodel Joist Bar



WFEXC_
3-Pin Extension
Cable



WF6 PAN
6" New Construction Pan

PERFORMANCE DATA

	WF4 SWW5	WF6 SWW5	WF8 SWW5
Input Voltage	120V	120V	120V
Input Power Typical	9W (+/-5%)	13W (+/-5%)	19W (+/-5%)
Frequency	60 Hz	60Hz	60Hz
EMI/RFI	FCC Title 47, Part 15 Class B (consumer)	FCC Title 47, Part 15 Class B (consumer)	FCC Title 47, Part 15 Class B (consumer)
Minimum Starting Temp	-40°F (-40°C)	-40°F (-40°C)	-40°F (-40°C)

Note: Actual performance may differ as a result of end-user environment and application. All values are design or typical values, measured under laboratory conditions at 25°C.

LIGHTING PERFORMANCE DATA DONNÉES SUR LE RENDEMENT DE L'ÉCLAIRAGE	
Light Appearance (CCT) Aspect de la lumière (CCT)	
2700K soft white blanc doux	
665 lumens 74 lumens per watt	
3000K warm white blanc chaud	
670 lumens 74 lumens per watt	
3500K neutral white blanc neutre	
680 lumens 76 lumens per watt	
4000K cool white blanc froid	
685 lumens 76 lumens per watt	
5000K daylight blanc neutre	
690 lumens 76 lumens per watt	
Watts	9
Color Accuracy (CRI) Précision des couleurs (CRI)	90

LIGHTING PERFORMANCE DATA DONNÉES SUR LE RENDEMENT DE L'ÉCLAIRAGE	
Light Appearance (CCT) Aspect de la lumière (CCT)	
2700K soft white blanc doux	
955 lumens 73 lumens per watt	
3000K warm white blanc chaud	
970 lumens 74 lumens per watt	
3500K neutral white blanc neutre	
990 lumens 76 lumens per watt	
4000K cool white blanc froid	
1000 lumens 76 lumens per watt	
5000K daylight blanc neutre	
1005 lumens 77 lumens per watt	
Watts	13
Color Accuracy (CRI) Précision des couleurs (CRI)	90

LIGHTING PERFORMANCE DATA DONNÉES SUR LE RENDEMENT DE L'ÉCLAIRAGE	
Light Appearance (CCT) Aspect de la lumière (CCT)	
2700K soft white blanc doux	
1615 lumens 85 lumens per watt	
3000K warm white blanc chaud	
1640 lumens 86 lumens per watt	
3500K neutral white blanc neutre	
1670 lumens 88 lumens per watt	
4000K cool white blanc froid	
1690 lumens 89 lumens per watt	
5000K daylight blanc neutre	
1700 lumens 89 lumens per watt	
Watts	19
Color Accuracy (CRI) Précision des couleurs (CRI)	90



Juno Wafer™ LED Downlight Series

4", 6" & 8" LED Ultra-Thin Wafer Switchable Downlight
5CCT Switchable White Downlight



Specifications

Housing

Polycarbonate injection molded outer frame, with steel back plate. Non-conductive dead-front trim design suitable for a wide range of applications and codes requiring a non-conductive lens • FT4 3-pin plenum rated cable connector to connect from module to remote driver box • Steel spring clip for easy installation. 4", 6" or 8" cut out template is provided to ensure a correct sized hole is cut into ceiling for proper installation of the trim. Size of hole should not exceed 4-1/4" for the WF4, 6-1/4" for the WF6 and 8-1/4" for the WF8 • Can be installed from 3/8" to 1 1/2" ceiling thickness • Can be removed from below the ceiling for service or replacement.

LED Light Engine

Switchable white color temperature from 2700K, 3000K, 3500K, 4000K, 5000K • 90 CRI minimum • Color accuracy within 4 step McAdams Ellipse at the end CCT (2700K and 5000K), within 6 step McAdams Ellipse in the middle CCT (3000K, 3500K, and 4000K) • Dimming 100% to 10% with most standard incandescent dimmers (see list of approved dimmers).

Driver

Connect directly to 120V Class-2 (CAN ICES-005 (B) / NMB-005 (B)) LED driver • 120V 60 Hz constant current driver provides noise free operation • IC rated driver with convenience of a switch to choose between 5 selectable color temperature options ranging from 2700K (warm white), 3000K, 3500K, 4000K, or 5000K (daylight) • The isolated driver integrated inside steel remote box with four 7/8" knockouts with slots for pryout. Suitable for pulling wires with the 12 cubic-inch wiring compartment to accommodate up to (6) 14 gauge insulated conductor or (4) 12 gauge insulated conductors, making the Wafer LED Downlights much easier to wire in 2in/2out (plus ground) daisy-chain applications and contractor friendly • 2" plenum space required for the installation of the WF6 and WF8 driver boxes; 3"plenum space required for the installation of the WF4 driver box • Suitable for installation in t-grid and drop ceiling applications with universal new construction pan.

Optical System

Edge-lit LED technology uses light guided plate to distribute light • Polycarbonate lens provides even illumination throughout the space • Efficient system that can produce over 670 lumens while using 9W (WF4), 970 lumens while using 13W (WF6) and 1640 lumens while using 19W (WF8) • Replaces 65W incandescent (WF4), 75W incandescent (WF6) and 100W incandescent (WF8).

Life

Rated for 50,000 hours at 70% lumen maintenance.

Labels

CSA certified to US and Canadian safety standards • ENERGY STAR® certified product • Suitable for wet location, covered ceiling • Air-Loc certified in accordance with ASTM E283-2004 • NOM Certified • Can be used to comply with California Title 24 Part 6 High Efficacy LED light Source Requirements • U.S. Patent No. 10,681,784.

Testing

All reports are based on published industry procedures; field performance may differ from laboratory performance.

Warranty

3-year limited warranty. This is the only warranty provided and no other statements in this specification sheet create any warranty of any kind. All other express and implied warranties are disclaimed. Complete warranty terms located at: www.acuitybrands.com/support/warranty/terms-and-conditions

Note: Actual performance may differ as a result of end-user environment and application.

All values are design or typical values, measured under laboratory conditions at 25 °C.

Specifications subject to change without notice.



Juno Wafer™ LED Downlight Series

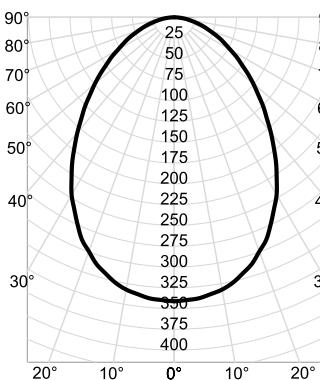
4", 6" & 8" LED Ultra-Thin Wafer Switchable Downlight 5CCT Switchable White Downlight



PHOTOMETRICS

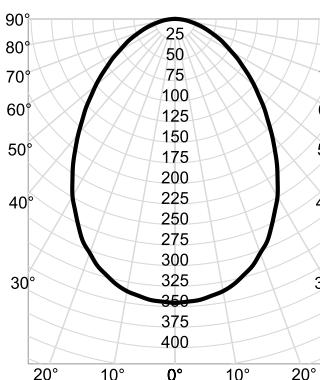
Distribution Curve	Distribution Data	Output Data	Coefficient of Utilization	Illuminance Data at 30° Above Floor for a Single Luminaire
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WF4 SWW5 90CRI 2700K Input Watts: 8.9, Delivered Lumens: 670, LPW: 75.3, S/MH: 1.09, Test No: ISF 202630P11



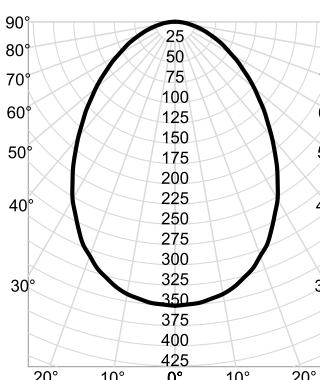
CP Summary	Zonal Lumen Summary				Coefficients of Utilization								Cone of Light			Luminance (cd/sq.m)		
	Zone	Lumens	%	Fixture	pf		20%			50%			Mounting Height	Initial FC Center	Beam Diameter	Average Luminance		
					pc	pw	50%	30%	10%	50%	30%	10%						
0°	341	0° - 30°	243	36%	0	119	119	119	116	116	116	111	111	111	6.0	9.5	10.7	0° 42,950
5°	339	0° - 40°	369	55%	1	106	102	98	104	100	97	99	96	94	8.0	5.3	14.2	45° 26,951
15°	319	0° - 60°	568	85%	2	94	88	82	92	86	81	88	84	80	10.0	3.4	17.8	55° 21,820
25°	275	0° - 90°	670	100%	3	84	76	70	82	75	70	79	73	68	12.0	2.4	21.3	65° 18,172
35°	214	90° - 180°	0	0%	4	75	67	61	74	66	60	71	65	60	14.0	1.7	24.9	75° 14,836
45°	151	0° - 180°	670	100%	5	68	60	53	67	59	53	65	58	53				85° 11,422
55°	99				6	62	53	47	61	53	47	59	52	47	Beam Angle: 83.2°			
65°	61				7	57	48	43	56	48	42	54	47	42	Field Angle: 147.3°			
75°	31				8	52	44	39	51	44	38	50	43	38				
85°	8				9	48	40	35	48	40	35	46	40	35				
90°	0				10	45	37	32	44	37	32	43	37	32				

WF4 SWW5 90CRI 3000K Input Watts: 8.9, Delivered Lumens: 678, LPW: 76.2, S/MH: 1.09, Test No: ISF 202630P2



CP Summary	Zonal Lumen Summary			Coefficients of Utilization										Cone of Light			Luminance (cd/sq.m)			
				pf					20%					Mounting Height	Initial FC Center	Beam Diameter	Average Luminance			
				pc		80%			70%		50%									
	0°	Zone	Lumens	% Fixture	pw	50%	30%	10%	50%	30%	10%	50%	30%	10%						
0°	345	0° - 30°	246	36%	0	119	119	119	116	116	116	111	111	111	6.0	9.6	10.7	0° 43,464		
5°	343	0° - 40°	374	55%	1	106	102	98	104	100	97	99	96	94	8.0	5.4	14.2	45° 27,273		
15°	322	0° - 60°	575	85%	2	94	88	82	92	86	81	88	84	80	10.0	3.5	17.8	55° 22,081		
25°	278	0° - 90°	678	100%	3	84	76	70	82	75	70	79	73	68	12.0	2.4	21.3	65° 18,389		
35°	216	90° - 180°	0	0%	4	75	67	61	74	66	60	71	65	60	14.0	1.8	24.9	75° 15,014		
45°	153	0° - 180°	678	100%	5	68	60	53	67	59	53	65	58	53				85° 11,559		
55°	101				6	62	53	47	61	53	47	59	52	47	Beam Angle: 83.2°					
65°	62				7	57	48	43	56	48	42	54	47	42	Field Angle: 147.3°					
75°	31				8	52	44	39	51	44	38	50	43	38						
85°	8				9	48	40	35	48	40	35	46	40	35						
90°	0				10	45	37	32	44	37	32	43	37	32						

WF4 SWW5 90CRI 3500K Input Watts: 8.9, Delivered Lumens: 688, LPW: 77.3, S/MH: 1.09, Test No: ISF 202630P3



CP Summary	Zonal Lumen Summary				Coefficients of Utilization								Cone of Light			Luminance (cd/sq.m)		
	Zone	Lumens	% Fixture	pw	pf		20%			50%			Mounting Height	Initial FC Center	Beam Diameter	Average Luminance		
					pc	80%	70%		50%									
					pw	50%	30%	10%	50%	30%	10%	50%	30%	10%				
0°	350	0° - 30°	249	36%	0	119	119	119	116	116	116	111	111	111	6.0	9.7	10.7	0° 44,106
5°	348	0° - 40°	379	55%	1	106	102	98	104	100	97	99	96	94	8.0	5.5	14.2	45° 27,676
15°	327	0° - 60°	583	85%	2	94	88	82	92	86	81	88	84	80	10.0	3.5	17.8	55° 22,407
25°	282	0° - 90°	688	100%	3	84	76	70	82	75	70	79	73	68	12.0	2.4	21.3	65° 18,661
35°	219	90° - 180°	0	0%	4	75	67	61	74	66	60	71	65	60	14.0	1.8	24.9	75° 15,235
45°	156	0° - 180°	688	100%	5	68	60	53	67	59	53	65	58	53				85° 11,730
55°	102				6	62	53	47	61	53	47	59	52	47	Beam Angle: 83.2°			
65°	63				7	57	48	43	56	48	42	54	47	42	Field Angle: 147.3°			
75°	31				8	52	44	39	51	44	38	50	43	38				
85°	8				9	48	40	35	48	40	35	46	40	35				
90°	0				10	45	37	32	44	37	32	43	37	32				



Juno Wafer™ LED Downlight Series

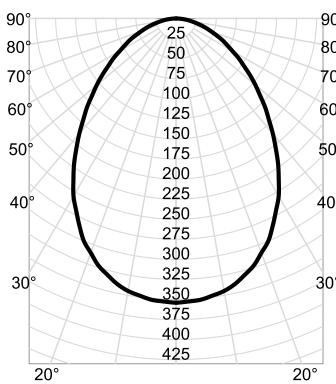
4", 6" & 8" LED Ultra-Thin Wafer Switchable Downlight
5CCT Switchable White Downlight



PHOTOMETRICS

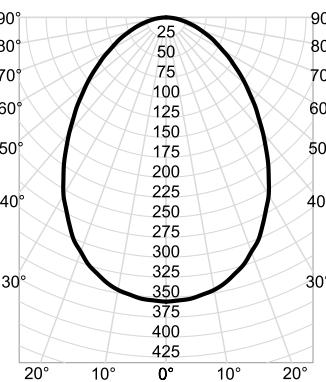
Distribution Curve	Distribution Data	Output Data	Coefficient of Utilization	Illuminance Data at 30" Above Floor for a Single Luminaire
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WF4 SWW5 90CRI 4000K Input Watts: 8.9, Delivered Lumens: 695, LPW: 78.1, S/MH: 1.09, Test No: ISF 202630P4



CP Summary		Zonal Lumen Summary			Coefficients of Utilization									Cone of Light			Luminance (cd/sq.m)	
Angle	Lumens	Zone	Lumens %	Fixture	pf			20%			50%			Mounting Height	Initial FC	Beam Diameter	Average Luminance	
					pc	80%	pcw	50%	30%	10%	50%	30%	10%					
0°	354	0° - 30°	252	36%	0	119	119	119	116	116	116	111	111	111	6.0	9.8	10.7	0° 44,555
5°	352	0° - 40°	383	55%	1	106	102	98	104	100	97	99	96	94	8.0	5.5	14.2	45° 27,958
15°	331	0° - 60°	589	85%	2	94	88	82	92	86	81	88	84	80	10.0	3.5	17.8	55° 22,635
25°	285	0° - 90°	695	100%	3	84	76	70	82	75	70	79	73	68	12.0	2.5	21.3	65° 18,851
35°	222	90° - 180°	0	0%	4	75	67	61	74	66	60	71	65	60	14.0	1.8	24.9	75° 15,391
45°	157	0° - 180°	695	100%	5	68	60	53	67	59	53	65	58	53				85° 11,849
55°	103				6	62	53	47	61	53	47	59	52	47	Beam Angle: 83.2°			
65°	63				7	57	48	43	56	48	42	54	47	42	Field Angle: 147.3°			
75°	32				8	52	44	39	51	44	38	50	43	38				
85°	8				9	48	40	35	48	40	35	46	40	35				
90°	0				10	45	37	32	44	37	32	43	37	32				

WF4 SWW5 90CRI 5000K Input Watts: 8.9, Delivered Lumens: 698, LPW: 78.4, S/MH: 1.09, Test No: ISF 202630P5



CP Summary		Zonal Lumen Summary			Coefficients of Utilization									Cone of Light			Luminance (cd/sq.m)	
Angle	Lumens	Zone	Lumens %	Fixture	pf			20%			50%			Mounting Height	Initial FC	Beam Diameter	Average Luminance	
					pc	80%	pcw	50%	30%	10%	50%	30%	10%					
0°	356	0° - 30°	253	36%	0	119	119	119	116	116	116	111	111	111	6.0	9.9	10.7	0° 44,748
5°	353	0° - 40°	385	55%	1	106	102	98	104	100	97	99	96	94	8.0	5.6	14.2	45° 28,079
15°	332	0° - 60°	592	85%	2	94	88	82	92	86	81	88	84	80	10.0	3.6	17.8	55° 22,733
25°	286	0° - 90°	698	100%	3	84	76	70	82	75	70	79	73	68	12.0	2.5	21.3	65° 18,933
35°	223	90° - 180°	0	0%	4	75	67	61	74	66	60	71	65	60	14.0	1.8	24.9	75° 15,457
45°	158	0° - 180°	698	100%	5	68	60	53	67	59	53	65	58	53				85° 11,901
55°	104				6	62	53	47	61	53	47	59	52	47	Beam Angle: 83.2°			
65°	64				7	57	48	43	56	48	42	54	47	42	Field Angle: 147.3°			
75°	32				8	52	44	39	51	44	38	50	43	38				
85°	8				9	48	40	35	48	40	35	46	40	35				
90°	0				10	45	37	32	44	37	32	43	37	32				



Juno Wafer™ LED Downlight Series

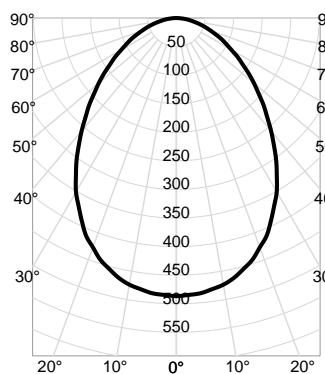
4", 6" & 8" LED Ultra-Thin Wafer Switchable Downlight
5CCT Switchable White Downlight



PHOTOMETRICS

Distribution Curve	Distribution Data	Output Data	Coefficient of Utilization	Illuminance Data at 30" Above Floor for a Single Luminaire
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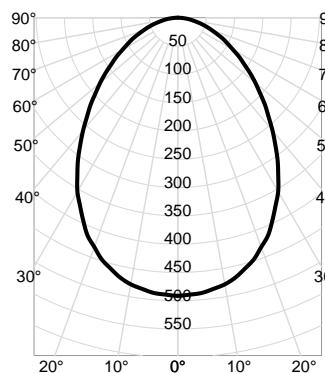
WF6 SWW5 90CRI 2700K Input Watts: 13.1, Delivered Lumens: 955, LPW: 72.9, S/MH: 1.09, Test No: ISF 202630P6



Zone	Lumens %	Fixture	Coefficients of Utilization										Mounting Height	Initial FC Center Beam	Beam Diameter	Average Luminance
			pf	pc	80%			20%			70%					
pw	50%	30%	10%	50%	30%	10%	50%	30%	10%	50%	30%	10%	pw	50%	30%	10%
0°	119	119	119	116	116	116	111	111	111	111	111	111	6.0	13.5	10.7	0° 61,247
5°	106	102	98	104	100	97	99	96	94	94	94	94	8.0	7.6	14.2	45° 38,433
15°	94	88	82	92	86	81	88	84	80	80	80	80	10.0	4.9	17.8	55° 31,115
25°	84	76	70	82	75	70	79	73	68	68	68	68	12.0	3.4	21.3	65° 25,913
35°	75	67	61	74	66	60	71	65	60	60	60	60	14.0	2.5	24.9	75° 21,157
45°	68	60	53	67	59	53	65	58	53	58	53	53	14.0	2.5	24.9	85° 16,288
55°	62	53	47	61	53	47	59	52	47	52	47	47	8.0	7.6	14.2	45° 38,433
65°	57	48	43	56	48	42	54	47	42	47	42	42	10.0	4.9	17.8	55° 31,115
75°	52	44	39	51	44	38	50	43	38	43	38	38	12.0	3.4	21.3	65° 25,913
85°	48	40	35	48	40	35	46	40	35	46	40	35	14.0	2.5	24.9	75° 21,157
90°	45	37	32	44	37	32	43	37	32	43	37	32	8.0	7.6	14.2	45° 38,433

Beam Angle: 83.2°
Field Angle: 147.3°

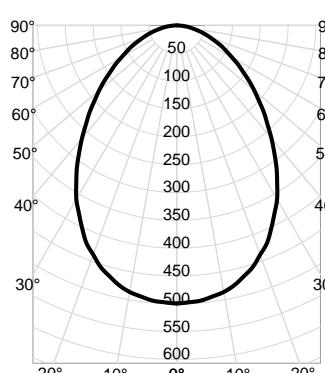
WF6 SWW5 90CRI 3000K Input Watts: 13.1, Delivered Lumens: 964, LPW: 73.6, S/MH: 1.09, Test No: ISF 202630P7



Zone	Lumens %	Fixture	Coefficients of Utilization										Mounting Height	Initial FC Center Beam	Beam Diameter	Average Luminance
			pf	pc	80%			20%			70%					
pw	50%	30%	10%	50%	30%	10%	50%	30%	10%	50%	30%	10%	pw	50%	30%	10%
0°	119	119	119	116	116	116	111	111	111	111	111	111	6.0	13.6	10.7	0° 61,825
5°	106	102	98	104	100	97	99	96	94	94	94	94	8.0	7.7	14.2	45° 38,795
15°	94	88	82	92	86	81	88	84	80	80	80	80	10.0	4.9	17.8	55° 31,409
25°	84	76	70	82	75	70	79	73	68	68	68	68	12.0	3.4	21.3	65° 26,158
35°	75	67	61	74	66	60	71	65	60	60	60	60	14.0	2.5	24.9	75° 21,356
45°	68	60	53	67	59	53	65	58	53	58	53	53	14.0	2.5	24.9	85° 16,442
55°	62	53	47	61	53	47	59	52	47	52	47	47	8.0	7.7	14.2	45° 38,795
65°	57	48	43	56	48	42	54	47	42	47	42	42	10.0	4.9	17.8	55° 31,409
75°	52	44	39	51	44	38	50	43	38	43	38	38	12.0	3.4	21.3	65° 26,158
85°	48	40	35	48	40	35	46	40	35	46	40	35	14.0	2.5	24.9	75° 21,356
90°	45	37	32	44	37	32	43	37	32	43	37	32	8.0	7.7	14.2	45° 38,795

Beam Angle: 83.2°
Field Angle: 147.3°

WF6 SWW5 90CRI 3500K Input Watts: 13.1, Delivered Lumens: 980, LPW: 74.8, S/MH: 1.09, Test No: ISF 202630P8



Zone	Lumens %	Fixture	Coefficients of Utilization										Mounting Height	Initial FC Center Beam	Beam Diameter	Average Luminance
			pf	pc	80%			20%			70%					
pw	50%	30%	10%	50%	30%	10%	50%	30%	10%	50%	30%	10%	pw	50%	30%	10%
0°	119	119	119	116	116	116	111	111	111	111	111	111	6.0	13.9	10.7	0° 62,852
5°	106	102	98	104	100	97	99	96	94	94	94	94	8.0	7.8	14.2	45° 39,440
15°	94	88	82	92	86	81	88	84	80	80	80	80	10.0	5.0	17.8	55° 31,930
25°	84	76	70	82	75	70	79	73	68	68	68	68	12.0	3.5	21.3	65° 26,592
35°	75	67	61	74	66	60	71	65	60	60	60	60	14.0	2.5	24.9	75° 21,711
45°	68	60	53	67	59	53	65	58	53	58	53	53	14.0	2.5	24.9	85° 16,715
55°	62	53	47	61	53	47	59	52	47	52	47	47	8.0	7.8	14.2	45° 39,440
65°	57	48	43	56	48	42	54	47	42	47	42	42	10.0	5.0	17.8	55° 31,930
75°	52	44	39	51	44	38	50	43	38	43	38	38	12.0	3.5	21.3	65° 26,592
85°	48	40	35	48	40	35	46	40	35	46	40	35	14.0	2.5	24.9	75° 21,711
90°	45	37	32	44	37	32	43	37	32	43	37	32	8.0	7.8	14.2	45° 39,440

Beam Angle: 83.2°
Field Angle: 147.3°



Juno Wafer™ LED Downlight Series

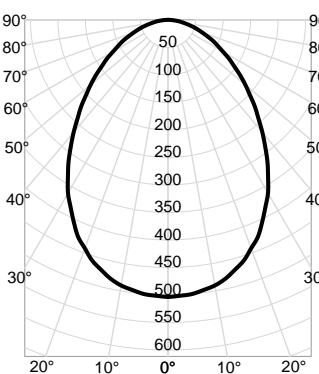
4", 6" & 8" LED Ultra-Thin Wafer Switchable Downlight
5CCT Switchable White Downlight



PHOTOMETRICS

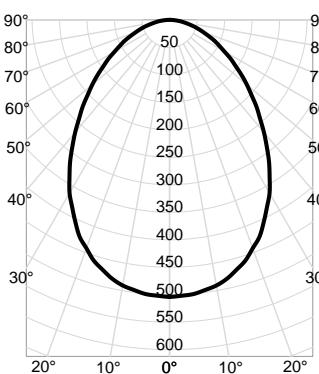
Distribution Curve	Distribution Data	Output Data	Coefficient of Utilization	Illuminance Data at 30" Above Floor for a Single Luminaire
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WF6 SWW5 90CRI 4000K Input Watts: 13.1, Delivered Lumens: 988, LPW: 75.4, S/MH: 1.09, Test No: ISF 202630P9



CP Summary	Zonal Lumen Summary			Coefficients of Utilization										Cone of Light			Luminance (cd/sq.m)	
	0°	Zone	Lumens	% Fixture	pf		20%			50%			Mounting Height	Initial FC	Beam Diameter			
					pc	pw	50%	30%	10%	50%	30%	10%						
	0°	504	0° - 30°	358	36%	0	119	119	119	116	116	111	111	6.0	14.0	10.7	0° 63,366	
	5°	500	0° - 40°	545	55%	1	106	102	98	104	100	97	99	8.0	7.9	14.2	45° 39,762	
	15°	470	0° - 60°	838	85%	2	94	88	82	92	86	81	88	10.0	5.0	17.8	55° 32,191	
	25°	405	0° - 90°	988	100%	3	84	76	70	82	75	70	79	12.0	3.5	21.3	65° 26,810	
	35°	315	90° - 180°	0	0%	4	75	67	61	74	66	60	71	14.0	2.6	24.9	75° 21,888	
	45°	223	0° - 180°	988	100%	5	68	60	53	67	59	53	65	14.0	2.6	24.9	85° 16,852	
	55°	147				6	62	53	47	61	53	47	59	8.0	7.9	14.2	Beam Angle: 83.2°	
	65°	90				7	57	48	43	56	48	42	54	10.0	5.0	17.8	Field Angle: 147.3°	
	75°	45				8	52	44	39	51	44	38	50	12.0	3.5	21.3		
	85°	12				9	48	40	35	48	40	35	46	14.0	40	35		
	90°	0				10	45	37	32	44	37	32	43	14.0	37	32		

WF6 SWW5 90CRI 5000K Input Watts: 13.1, Delivered Lumens: 989, LPW: 75.5, S/MH: 1.09, Test No: ISF 202630P10



CP Summary	Zonal Lumen Summary			Coefficients of Utilization										Cone of Light			Luminance (cd/sq.m)	
	0°	Zone	Lumens	% Fixture	pf		20%			50%			Mounting Height	Initial FC	Beam Diameter			
					pc	pw	50%	30%	10%	50%	30%	10%						
	0°	504	0° - 30°	359	36%	0	119	119	119	116	116	111	111	6.0	14.0	10.7	0° 63,430	
	5°	501	0° - 40°	545	55%	1	106	102	98	104	100	97	99	8.0	7.9	14.2	45° 39,802	
	15°	471	0° - 60°	838	85%	2	94	88	82	92	86	81	88	10.0	5.0	17.8	55° 32,224	
	25°	406	0° - 90°	989	100%	3	84	76	70	82	75	70	79	12.0	3.5	21.3	65° 26,837	
	35°	315	90° - 180°	0	0%	4	75	67	61	74	66	60	71	14.0	2.6	24.9	75° 21,911	
	45°	224	0° - 180°	989	100%	5	68	60	53	67	59	53	65	14.0	37	32	85° 16,869	
	55°	147				6	62	53	47	61	53	47	59	8.0	7.9	14.2	Beam Angle: 83.2°	
	65°	90				7	57	48	43	56	48	42	54	10.0	5.0	17.8	Field Angle: 147.3°	
	75°	45				8	52	44	39	51	44	38	50	12.0	3.5	21.3		
	85°	12				9	48	40	35	48	40	35	46	14.0	40	35		
	90°	0				10	45	37	32	44	37	32	43	14.0	37	32		



Juno Wafer™ LED Downlight Series

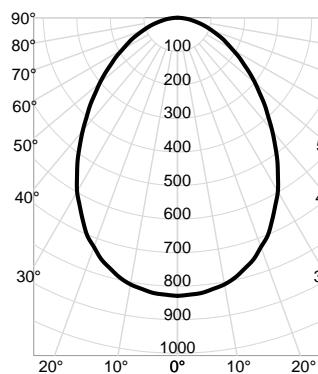
4", 6" & 8" LED Ultra-Thin Wafer Switchable Downlight
5CCT Switchable White Downlight



PHOTOMETRICS

Distribution Curve	Distribution Data	Output Data	Coefficient of Utilization	Illuminance Data at 30" Above Floor for a Single Lumenaire
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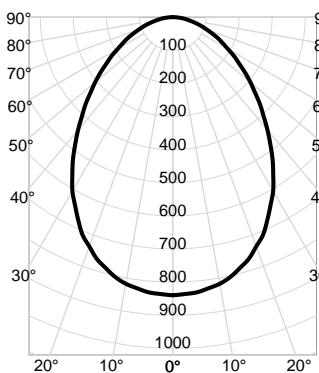
WF8 SWW5 90CRI 2700K Input Watts: 19.7, Delivered Lumens: 1627, LPW: 82.6, S/MH: 1.09, Test No: ISF 202630P11



CP Summary	Zone	Lumens	% Fixture	Coefficients of Utilization				Mounting Height	Initial FC Center Beam	Beam Diameter	Luminance (cd/sq.m)
				pf	20%	70%	50%				
0°	829	0° - 30°	590 36%	0	119	119	116	116	111	111	0° 104,326
5°	823	0° - 40°	897 55%	1	106	102	98	104	100	97	99
15°	774	0° - 60°	1,379 85%	2	94	88	82	92	86	81	88
25°	667	0° - 90°	1,627 100%	3	84	76	70	82	75	70	79
35°	519	90° - 180°	0 0%	4	75	67	61	74	66	60	71
45°	368	0° - 180°	1,627 100%	5	68	60	53	67	59	53	65
55°	242			6	62	53	47	61	53	47	59
65°	148			7	57	48	43	56	48	42	54
75°	74			8	52	44	39	51	44	38	50
85°	19			9	48	40	35	48	40	35	46
90°	0			10	45	37	32	44	37	32	43

Beam Angle: 83.2°
Field Angle: 147.3°

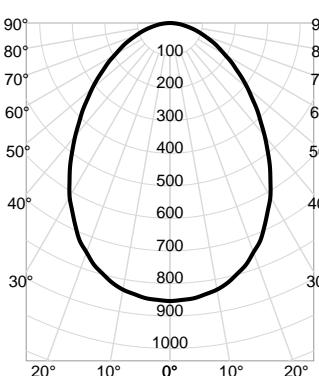
WF8 SWW5 90CRI 3000K Input Watts: 19.7, Delivered Lumens: 1648, LPW: 83.7, S/MH: 1.09, Test No: ISF 202630P12



CP Summary	Zone	Lumens	% Fixture	Coefficients of Utilization				Mounting Height	Initial FC Center Beam	Beam Diameter	Luminance (cd/sq.m)	
				pf	20%	70%	50%					
0°	840	0° - 30°	598 36%	0	119	119	119	116	116	111	111	0° 105,674
5°	834	0° - 40°	908 55%	1	106	102	98	104	100	97	99	8.0 13.1 14.2 45° 66,310
15°	784	0° - 60°	1,397 85%	2	94	88	82	92	86	81	88	10.0 8.4 17.8 55° 53,685
25°	676	0° - 90°	1,648 100%	3	84	76	70	82	75	70	79	12.0 5.8 21.3 65° 44,710
35°	525	90° - 180°	0 0%	4	75	67	61	74	66	60	71	14.0 4.3 24.9 75° 36,503
45°	373	0° - 180°	1,648 100%	5	68	60	53	67	59	53	65	14.0 4.3 24.9 75° 36,503
55°	245			6	62	53	47	61	53	47	59	14.0 4.3 24.9 75° 36,503
65°	150			7	57	48	43	56	48	42	54	14.0 4.3 24.9 75° 36,503
75°	75			8	52	44	39	51	44	38	50	14.0 4.3 24.9 75° 36,503
85°	19			9	48	40	35	48	40	35	46	14.0 4.3 24.9 75° 36,503
90°	0			10	45	37	32	44	37	32	43	14.0 4.3 24.9 75° 36,503

Beam Angle: 83.2°
Field Angle: 147.3°

WF8 SWW5 90CRI 3500K Input Watts: 19.7, Delivered Lumens: 1677, LPW: 85.1, S/MH: 1.09, Test No: ISF 202630P13



CP Summary	Zone	Lumens	% Fixture	Coefficients of Utilization				Mounting Height	Initial FC Center Beam	Beam Diameter	Luminance (cd/sq.m)	
				pf	20%	70%	50%					
0°	854	0° - 30°	608 36%	0	119	119	119	116	116	111	111	0° 107,536
5°	849	0° - 40°	924 55%	1	106	102	98	104	100	97	99	8.0 13.4 14.2 45° 67,478
15°	798	0° - 60°	1,422 85%	2	94	88	82	92	86	81	88	10.0 8.5 17.8 55° 54,631
25°	688	0° - 90°	1,677 100%	3	84	76	70	82	75	70	79	12.0 5.9 21.3 65° 45,498
35°	535	90° - 180°	0 0%	4	75	67	61	74	66	60	71	14.0 4.4 24.9 75° 37,146
45°	379	0° - 180°	1,677 100%	5	68	60	53	67	59	53	65	14.0 4.4 24.9 75° 37,146
55°	249			6	62	53	47	61	53	47	59	14.0 4.4 24.9 75° 37,146
65°	153			7	57	48	43	56	48	42	54	14.0 4.4 24.9 75° 37,146
75°	76			8	52	44	39	51	44	38	50	14.0 4.4 24.9 75° 37,146
85°	20			9	48	40	35	48	40	35	46	14.0 4.4 24.9 75° 37,146
90°	0			10	45	37	32	44	37	32	43	14.0 4.4 24.9 75° 37,146

Beam Angle: 83.2°
Field Angle: 147.3°



Juno Wafer™ LED Downlight Series

4", 6" & 8" LED Ultra-Thin Wafer Switchable Downlight
5CCT Switchable White Downlight



PHOTOMETRICS

Distribution Curve

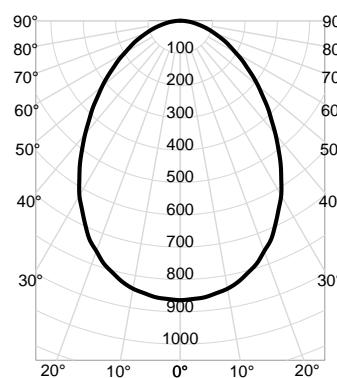
Distribution Data

Output Data

Coefficient of Utilization

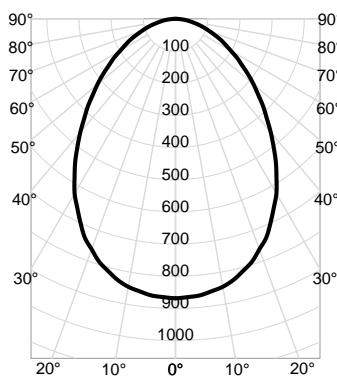
Illuminance Data at 30" Above Floor for a Single Luminaire

WF8 SWW5 90CRI 4000K Input Watts: 19.7, Delivered Lumens: 1696, LPW: 86.1, S/MH: 1.09, Test No: ISF 202630P14



Zone	Lumens	% Fixture	Coefficients of Utilization										Mounting Height	Initial FC Center Beam	Beam Diameter	Average Luminance			
			pf			20%			50%										
			pc	pw	50%	30%	10%	50%	30%	10%	50%	30%	10%						
0°	864	36%	0	119	119	119	116	116	116	111	111	111	111	6.0	24.0	10.7	0° 108,755		
5°	858	55%	1	106	102	98	104	100	97	99	96	94	94	8.0	13.5	14.2	45° 68,244		
15°	807	85%	2	94	88	82	92	86	81	88	84	80	80	10.0	8.6	17.8	55° 55,250		
25°	695	100%	3	84	76	70	82	75	70	79	73	68	68	12.0	6.0	21.3	65° 46,014		
35°	541	0%	4	75	67	61	74	66	60	71	65	60	60	14.0	4.4	24.9	75° 37,567		
45°	383	100%	5	68	60	53	67	59	53	65	58	53	53	14.0	4.4	24.9	85° 28,923		
55°	252		6	62	53	47	61	53	47	59	52	47	47	Beam Angle: 83.2°					
65°	155		7	57	48	43	56	48	42	54	47	42	42	Field Angle: 147.3°					
75°	77		8	52	44	39	51	44	38	50	43	38	38						
85°	20		9	48	40	35	48	40	35	46	40	35	35						
90°	0		10	45	37	32	44	37	32	43	37	32	32						

WF8 SWW5 90CRI 5000K Input Watts: 19.7, Delivered Lumens: 1705, LPW: 86.5, S/MH: 1.09, Test No: ISF 202630P15



Zone	Lumens	% Fixture	Coefficients of Utilization										Mounting Height	Initial FC Center Beam	Beam Diameter	Average Luminance			
			pf			20%			50%										
			pc	pw	50%	30%	10%	50%	30%	10%	50%	30%	10%						
0°	869	36%	0	119	119	119	116	116	116	111	111	111	111	6.0	24.1	10.7	0° 109,333		
5°	863	55%	1	106	102	98	104	100	97	99	96	94	94	8.0	13.6	14.2	45° 68,606		
15°	811	85%	2	94	88	82	92	86	81	88	84	80	80	10.0	8.7	17.8	55° 55,544		
25°	699	100%	3	84	76	70	82	75	70	79	73	68	68	12.0	6.0	21.3	65° 46,258		
35°	544	0%	4	75	67	61	74	66	60	71	65	60	60	14.0	4.4	24.9	75° 37,767		
45°	385	100%	5	68	60	53	67	59	53	65	58	53	53	14.0	4.4	24.9	85° 29,077		
55°	253		6	62	53	47	61	53	47	59	52	47	47	Beam Angle: 83.2°					
65°	155		7	57	48	43	56	48	42	54	47	42	42	Field Angle: 147.3°					
75°	78		8	52	44	39	51	44	38	50	43	38	38						
85°	20		9	48	40	35	48	40	35	46	40	35	35						
90°	0		10	45	37	32	44	37	32	43	37	32	32						

KR4™ Series

LED Specification Downlight – Round 4" Aperture

Product Description

The KR4™ LED specification downlight features Cree TrueWhite® Technology and delivers beautiful, high-quality light with efficacy up to 75 lumens per watt. Designed for new construction applications, the KR Series is available in variety of color temperatures, round and square trims with high-quality anodized aluminum reflector finishes, a sloped ceiling adapter and a variety of dimming options including Cree Sunset Dimming Technology providing rich, warm light that transitions from 2700K to 1800K as naturally as an incandescent source.

Performance Summary

Utilizes Cree TrueWhite® Technology

Made in the U.S.A. of U.S. and imported parts

Delivered Light Output: 665-3199 lumens; Delivered lumen output is typical when using a SSGC type reflector

Input Power: 13-44 Watts

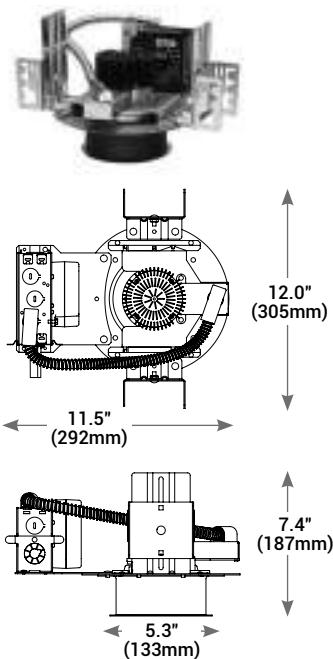
Emergency Performance: Up to 1210 Lumens; 10W; Minimum 90 Minutes

CRI: 90

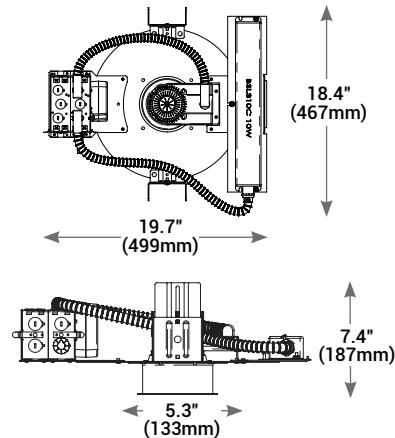
CCT: 2700K, 3000K, 3500K, 4000K

Dimming: Triac, 0/1-10V, Cree SmartCast™ Technology, Lutron EcoSystem® Dimming, Lutron® Forward Phase Dimming; See control availability chart on page 3

Limited Warranty: 10 years on KR4™ luminaire/5 years on KR4™ luminaire with Cree SmartCast™ Technology/1 year on emergency battery pack



Emergency Backup



Field-Installed

Sloped Ceiling Adaptor KRKS4**WW ** 0-35 (order in 5 degree increments)	C-Channel Hanger Bars RBH30C - Pair of 30" (762mm) rigid 3/4" x 1/2" (19mm x 13mm) C-Channel bars	T-Bar Clips RARC7 - Set of four
Control Module CIF-10VC1-CWC-SNSR - Cree SmartCast™ Technology with ambient light and motion sensors	Trim Ring KR4TA - White	

Ordering Information

Fully assembled luminaire is composed of two components that must be ordered separately:

Example: **Housing:** KR4 20L 35K 120V 10V + **Reflector:** KR4T SSGC FF

Reflector (Housing must be ordered separately)		
Series	Reflector Finish	Flange Finish
KR4T	SSGC Soft Satin Glow, Clear SSGCG Soft Satin Glow, Champagne Gold	FF Matches Reflector WF White Paint

Housing (Reflector must be ordered separately)

KR4		Reflector	Initial Delivered Lumens	Optic	CCT	Voltage	Controls		Options
Series	Size						Controls	Options	
KR	4 4 inch	Blank Round	9L 13W, 665 Lumens - 51 LPW 13L 18W, 977 Lumens - 54 LPW 20L 30W, 1546 Lumens - 52 LPW 30L 39W, 2348 Lumens - 60 LPW 40L 44W, 3199 Lumens - 73 LPW	Blank 70° Beam Angle (Standard)	27K 2700K - 9L thru 40L Only 30K 3000K 35K 3500K 40K 4000K	120V 120 Volts 277V 277 Volts 347V 347 Volts	Blank - For standard control offering refer to control availability chart on page 3 LES Lutron EcoSystem® Dimming - Refer to control availability chart on page 3	10V 0/1-10V Dimming - Refer to control availability chart on page 3 LFP Lutron Forward Phase Dimming - Refer to control availability chart on page 3	WD Sunset Dim - 9L and 13L @ 27K with Triac Dimming only 10R Cree SmartCast™ Technology** EB7* Emergency Backup - Minimum 90 minutes - 120V, 277V only

* See www.cree.com/lighting/products/warranty for warranty terms

** Available for U.S. only.

** Not available in 40L and 60L

Rev. Date: V6 09/25/2014



US: www.cree.com/lighting

T (800) 236-6800 F (262) 504-5415

Canada: www.cree.com/canada



T (800) 473-1234 F (800) 890-7507

KR4™ Series - Round 4" Aperature

Product Specifications

CREE SMARTCAST™ TECHNOLOGY

Cree SmartCast™ Technology changes the paradigm of lighting control. With the press of a single button, Cree SmartCast™ Technology enabled luminaires and controls create their own secure network and auto-associate to form logical groups throughout every space. Integrated sensors and robust wireless communication included in every luminaire combined with revolutionary OneButton™ Setup enables automated setup and configuration of luminaires and wall controls. With no extra wires or interfaces, Cree SmartCast™ Technology products reduce installation time and complexity.

CREE TRUEWHITE® TECHNOLOGY

A revolutionary way to generate high-quality white light, Cree TrueWhite® Technology is a patented approach that delivers an exclusive combination of 90+ CRI, beautiful light characteristics, and lifelong color consistency, all while maintaining high luminous efficacy – a true no compromise solution.

CONSTRUCTION & MATERIAL

- Initial color within a 3-step MacAdam Ellipse
- Low brightness parabolic spun Alzak aluminum cone, 0.06" (2mm) thick with polished radius and continuous self-flange
- Soft Satin Glow Clear finish, standard
- 2" (51mm) aperture throat to accommodate all standard and up to 3" (76mm) thick ceilings and provide flexibility in mounting within grid
- Provided with quick mounting brackets for optional carrying channels
- Light engine, optics, and driver accessible from below ceiling

ELECTRICAL SYSTEM

- Power Factor:** > 0.9 for 120V and 277V
- Input Power:** 120, 277V, or 347V, 50/60Hz

REGULATORY & VOLUNTARY QUALIFICATIONS

- cULus Listed
- Suitable for thru-wiring 8#12AWG-90°C
- Suitable for damp locations
- Thermally protected Type NON-IC in accordance with Article 410 of the NEC and UL 1598
- Meets Buy American requirements within ARRA
- EnergyStar® Qualified. Please refer to <http://www.energystar.gov> for most current information

Recommended Cree® KR Series Lumen Maintenance Factors (LMF)¹

Ambient	Initial Delivered Lumens	Initial LMF	25K hr Projected ² LMF	50K hr Projected ² LMF	75K hr Calculated ³ LMF	100K hr Calculated ³ LMF
5°C (41°F)	9L and 13L	1.05	1.04	1.03	1.03	1.02
	20L and 30L	1.03	0.99	0.94	0.90	0.86
	40L	1.03	0.96	0.90	0.83	0.77
10°C (50°F)	9L and 13L	1.04	1.03	1.03	1.02	1.02
	20L and 30L	1.02	0.97	0.93	0.89	0.85
	40L	1.03	0.95	0.88	0.82	0.76
15°C (59°F)	9L and 13L	1.03	1.02	1.02	1.01	1.01
	20L and 30L	1.01	0.96	0.91	0.88	0.84
	40L	1.02	0.94	0.87	0.81	0.75
20°C (68°F)	9L and 13L	1.02	1.01	1.00	1.00	0.99
	20L and 30L	1.01	0.95	0.90	0.87	0.83
	40L	1.01	0.93	0.86	0.80	0.74
25°C (77°F)	9L and 13L	1.00	1.00	0.99	0.99	0.99
	20L and 30L	1.00	0.94	0.89	0.86	0.82
	40L	1.00	0.92	0.85	0.79	0.74
30°C (86°F)	9L and 13L	0.99	0.99	0.98	0.98	0.98
	20L and 30L	0.97	0.93	0.88	0.85	0.81
	40L	0.98	0.91	0.84	0.78	0.73
35°C (95°F)	9L and 13L	0.98	0.97	0.97	0.97	0.97
	20L and 30L	0.96	0.92	0.87	0.84	0.80
	40L	0.96	0.90	0.83	0.77	0.72

¹Lumen maintenance values at 25°C (77°F) are calculated per TM-21 based on LM-80 data and in-situ luminaire testing

²In accordance with IESNA TM-21-11, Projected Values represent interpolated value based on time durations that are within six times (6X) the IESNA LM-80-08 total test duration (in hours) for the device under testing ((DUT) i.e. the packaged LED chip)

³In accordance with IESNA TM-21-11, Calculated Values represent time durations that exceed six times (6X) the IESNA LM-80-08 total test duration (in hours) for the device under testing ((DUT) i.e. the packaged LED chip)

Installation

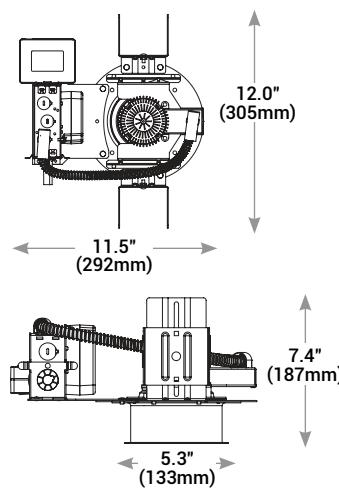
- Recommended ceiling cutout 4.25" (108mm)



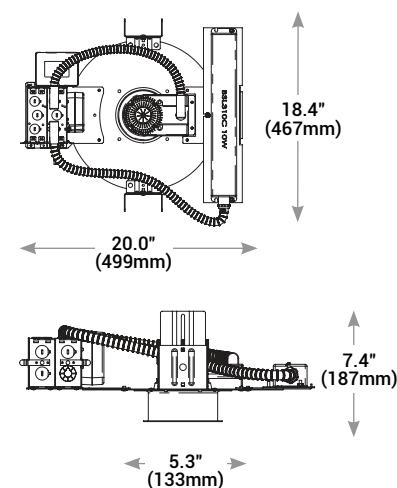
Note: 30L versions require marked spacing: 24" (600mm) X 12" (300mm) X 1 1/2" (12mm). 24" (600mm) luminaire to luminaire, 12" (300mm) luminaire to side wall, 1 1/2" (12mm) above luminaire

60L versions require marked spacing: 48" (1219mm) X 24" (600mm) X 1" (25mm). 48" (1219mm) luminaire to luminaire, 24" (600mm) luminaire to side wall, 1" (25mm) above luminaire

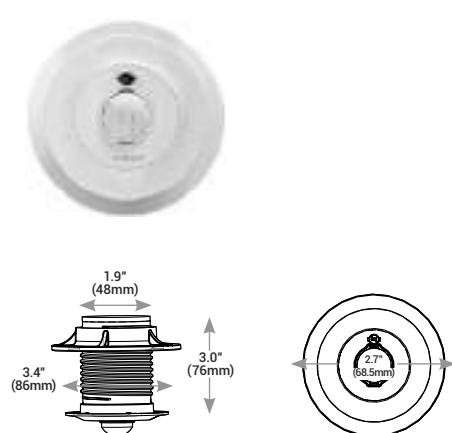
Cree SmartCast™ Technology



Emergency Backup and Cree SmartCast™ Technology



Occupancy Sensor included with Cree SmartCast™ Technology

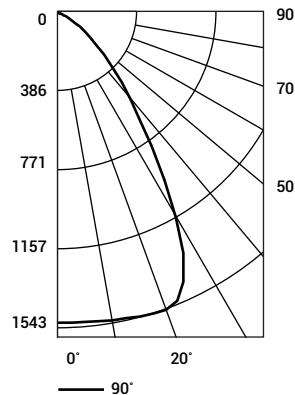


KR4™ Series - Round 4" Aperature

Photometry

KR4 30L 27K 120V W/KR4T SSGC WF BASED ON UL REPORT TEST #: 157461

Fixture photometry has been conducted in accordance with IESNA LM-79-08. IESNA LM-79-08 specifies the entire luminaire as the source resulting in a fixture efficiency of 100%.



UL Test Report #: 157461
KR4 30L 27K 120V SSGC FF
Initial Delivered Lumens: 2235
Efficacy: 59.0 LPW
S/M: 1.16

Coefficients Of Utilization – Zonal Cavity Method					
RC %:	80				
RW %:	70	50	30	10	
RCR: 0	119	119	119	119	
1	112	109	106	104	
2	106	100	95	91	
3	99	91	86	81	
4	93	84	77	73	
5	87	77	71	66	
6	82	72	65	60	
7	77	66	59	54	
8	73	62	55	50	
9	69	58	51	46	
10	65	54	47	43	

Effective Floor Cavity Reflectance: 20%

Average Luminance Table (cd/m ²)				
Vertical Angle	Horizontal Angle			
	0°	45°	90°	45°
45°	59,182	59,182	59,182	
55°	30,926	30,926	30,926	
65°	12,854	12,854	12,854	
75°	6,046	6,046	6,046	
85°	1,795	1,795	1,795	

Zonal Lumen Summary			
Zone	Lumens	% Lamp	Luminaire
0-30	1,228	N/A	54.8%
0-40	1,733	N/A	77.4%
0-60	2,170	N/A	96.9%
0-90	2,239	N/A	100.0%
0-180	2,239	N/A	100.0%

Cone of Light		
Distance from Workplane	Footcandles	Beam Diameter
6' (1.8m)	42	6.9' (2.1m)
8' (2.4m)	24	9.1' (2.8m)
10' (3.0m)	15	11.5' (3.5m)
12' (3.7m)	11	13.5' (4.1m)
14' (4.3m)	8	15.8' (4.8m)

For exact photometric data, please reference our available IES and LM-79 test results at <http://www.cree.com/Lighting/Products/Indoor/Architectural-Downlights/KR-Series>

Application Reference

Based on KR4 30L 27K 120V W/KR4T SSGC FF Luminaire

Open Space					
Spacing	Lumens	Wattage	LPW	w/ft ²	Average FC
4 x 4	2348	39	60	2.34	137
6 x 6				1.09	65
8 x 8				0.59	36
10 x 10				0.39	26

10' Ceiling, 80/50/20 Reflectances, 2.5 workplane. LLF: 1.0 Initial. Open Space: 50' x 40' x 10'

Corridor					
Spacing	Lumens	Wattage	LPW	w/ft ²	Average FC
4' on Center	2348	39	60	1.63	69
6' on Center				1.11	47
8' on Center				0.78	34
10' on Center				0.65	28

10' Ceiling, 80/20/50 Reflectances, Light levels on the ground. LLF: 1.0 Initial. Corridor: 6' Wide x 100' Long

Control Availability Chart

Initial Delivered Lumens	Non Dimming			Triac Dimming to 5%			0/1-10V Dimming to 10%			LES Dimming to 1%			LFP Dimming to 1%		
	120V	277V	347V	120V	277V	347V	120V	277V	347V	120V	277V	347V	120V	277V	347V
9L	N/A	S	N/A	S	N/A	N/A	0	0	N/A	N/A	0	N/A	N/A	N/A	N/A
13L	N/A	S	N/A	S	N/A	N/A	0	0	0	0	0	0	N/A	N/A	N/A
20L	N/A	N/A	N/A	N/A	N/A	N/A	S	S	S	0	0	0	0	N/A	N/A
30L	N/A	N/A	N/A	N/A	N/A	N/A	S	S	S	0	0	0	0	N/A	N/A
40L	N/A	N/A	N/A	N/A	N/A	N/A	S	S	S	0	0	0	N/A	N/A	N/A
60L	N/A	N/A	N/A	N/A	N/A	N/A	S	S	S	0	0	0	N/A	N/A	N/A

S = Standard Offering

O = Optional Offering

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Project		Catalog #		Type	
Prepared by		Notes		Date	



HALO

RL56 | Selectable CCT

5-inch/6-inch All-purpose LED retrofit module with SeleCCTable switch

Typical Applications

Residential

Interactive Menu

- Order Information page 2
- Product Specifications page 3
- Photometric Data page 4
- Energy & Performance Data page 4
- Product Warranty
- Dimming Guide

Top Product Features

- Select from 5 CCTs via switch; 2700K, 3000K, 3500K, 4000K, 5000K CCT; 90 CRI
- Lumens: 600, 900, 1200
- Use with 5" or 6" housings with screwbase adapter included
- Dimmable down to 5%
- Dual-mount:Torsion Spring and Push-N-Twist clip models

Product Certification



Refer to ENERGY STAR® Certified Products List.

Can be used to comply with California Title 24 High Efficacy requirements.

Certified to California Appliance Efficiency Database under JAB.

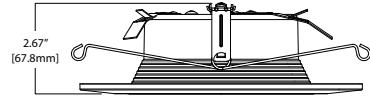
Note: Due to T20 change, as of July 1, 2019 consult factory on correct catalog number and availability for T20 compliant California product.

Product Features

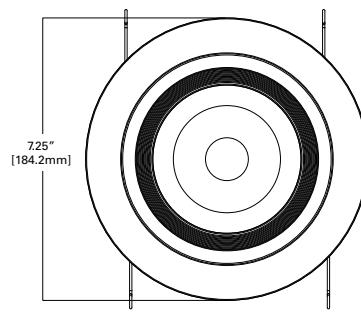
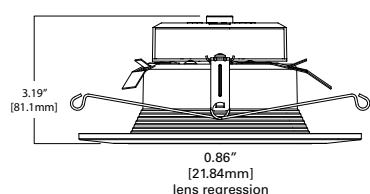


Dimensional and Mounting Details

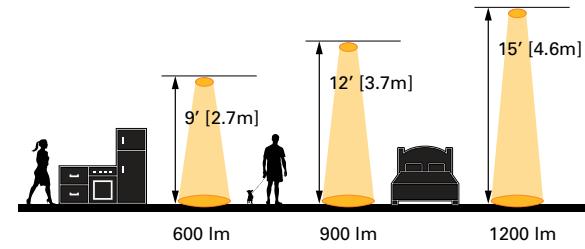
600/900 Lumen



1200 Lumen



Scale



Order Information*

SAMPLE ORDER NUMBER: **RL56069S1EWHR**

Models	Lumens	CRI/CCT	Driver	Finish	Packaging	T20 Compliant
RL56 = 5"/6" all-purpose retrofit LED module	06 = 600 lumens (nominal) 09 = 900 lumens (nominal) 12 = 1200 lumens (nominal)	9S = 90 CRI minimum, white tuning, selectable CCT 2700K-5000K	1E = 120V 60Hz leading or trailing edge phase cut 1% dimming	WH = Matte white baffle	R = Recyclable	-CA
Notes	Notes	Notes	Notes	Notes	Notes	Notes

Accessories	
Accessories	
Designer Trims	
RL56TRMWHB = 5"/6" decorative overlay, white paintable, Baffle	
RL56TRMMBB = 5"/6" decorative overlay, matte black, Baffle	
RL56TRMSNB = 5"/6" decorative overlay, satin nickel, Baffle	
RL56TRMTBZB = 5"/6" decorative overlay, tuscan bronze, Baffle	
RL56TRMWH = 5"/6" decorative overlay, white paintable, trim ring	
RL56TRMB = 5"/6" decorative overlay, matte black, trim ring	
RL56TRMSN = 5"/6" decorative overlay, satin nickel, trim ring	
RL56TRMTBZ = 5"/6" decorative overlay, tuscan bronze, trim ring	
Notes	



Housings	
Halo LED 5-inch H550ICAT = 5" LED, Insulated Ceiling, Air-Tite, New Construction Housing H550RICAT = 5" LED, Insulated Ceiling, Air-Tite, Remodel Housing E550ICAT = 5" LED, Insulated Ceiling, Air-Tite, New Construction Housing E550RICAT = 5" LED, Insulated Ceiling, Air-Tite, Remodel Housing	Halo Standard Housings 5-inch H5ICAT = 5" Insulated Ceiling, Air-Tite New Construction Housing H5RICAT = 5" Insulated Ceiling, Air-Tite Remodel Housing H5ICATNB = 5" Insulated Ceiling, Air-Tite New Construction Housing, No Socket Bracket H5T = 5" Non-IC, New Construction Housing H5RT = 5" Non-IC, Remodel Housing H5TNB = 5" Non-IC, New Construction Housing, No Socket Bracket E5ICAT = 5" Insulated Ceiling, Air-Tite New Construction Housing E5RICAT = 5" Insulated Ceiling, Air-Tite Remodel Housing E5ICATNB = 5" Insulated Ceiling, Air-Tite New Construction Housing, No Socket Bracket E5STAT = 5" Non-IC, New Construction Housing E5RTAT = 5" Non-IC, Remodel Housing E5TATNB = 5" Non-IC, New Construction Housing, No Socket Bracket
Halo LED 6-inch H750ICAT = 6" LED, Insulated Ceiling, Air-Tite, New Construction Housing H750RICAT = 6" LED, Insulated Ceiling, Air-Tite, Remodel Housing H750T = 6" LED, Non-IC, Air-Tite, New Construction Housing H750TCP = 6" LED, Non-IC, New Construction/Remodel Chicago Plenum Housing H2750ICAT = 6" LED, Shallow, Insulated Ceiling, Air-Tite, New Construction (use with 691X, 694X, 696X trims only) H2750RICAT = 6" LED, Shallow, Insulated Ceiling, Air-Tite, Remodel (use with 691X, 694X, 696X trims only) E750ICAT = 6" LED, Insulated Ceiling, Air-Tite, New Construction Housing E750RICAT = 6" LED, Insulated Ceiling, Air-Tite, Remodel Housing	Halo Standard Housings 6-inch H7ICAT = 6" Insulated Ceiling, Air-Tite New Construction Housing H7RICAT = 6" Insulated Ceiling, Air-Tite Remodel Housing H7ICT = 6" Insulated Ceiling, New Construction Housing H7RICT = 6" Insulated Ceiling, Remodel Housing H7ICATNB = 6" Insulated Ceiling, Air-Tite New Construction Housing, No Socket Bracket H7ICTNB = 6" Insulated Ceiling, New Construction Housing, No Socket Bracket H7T = 6" Non-IC, New Construction Housing H7RT = 6" Non-IC, Remodel Housing H7TNB = 6" Non-IC, New Construction Housing, No Socket Bracket H7TCP = 6" Non-IC, Chicago Plenum, New Construction/Remodel Housing H7UICAT = 6" Insulated Ceiling, Universal, Air-Tite, New Construction Housing E7ICAT = 6" Insulated Ceiling, Air-Tite New Construction Housing E7RICAT = 6" Insulated Ceiling, Air-Tite Remodel Housing E7ICATNB = 6" Insulated Ceiling, Air-Tite New Construction Housing, No Socket Bracket E7TAT = 6" Non-IC, New Construction Housing E7RTAT = 6" Non-IC, Remodel Housing E7TATNB = 6" Non-IC, New Construction Housing, No Socket Bracket
Halo Shallow Housings 5-inch H25ICAT = 5" Shallow, Insulated Ceiling, Air-Tite New Construction H25RICAT = 5" Shallow, Insulated Ceiling, Air-Tite Remodel H25ICATNB = 5" Shallow, Insulated Ceiling, Air-Tite New Construction, No Socket Bracket	Halo Shallow Housings 6-inch H27ICAT = 6" Shallow, Insulated Ceiling, Air-Tite New Construction H27RICAT = 6" Shallow, Insulated Ceiling, Air-Tite Remodel Housing H27T = 6" Shallow, Non-IC, New Construction Housing H27RT = 6" Shallow, Non-IC, Remodel Housing E27ICAT = 6" Shallow, Insulated Ceiling, Air-Tite New Construction E27RICAT = 6" Shallow, Insulated Ceiling, Air-Tite Remodel Housing E27TAT = 6" Shallow, Non-IC, New Construction Housing E27RTAT = 6" Shallow, Non-IC, Remodel Housing
Notes	

Product Specifications

CCT Select System

- Use the switch to choose between 2700K, 3000K, 3500K, 4000K, and 5000K CCT.

Module - Trim

- Module construction includes LED array, heat sink, reflector, lens, baffle and trim ring.
- Regressed baffle
- Heat sink designed to conduct heat away from the LED array, keeping the junction temperatures below specified maximums, even when installed in insulated ceiling environments.

LED Array

- Mid power LED array provides a uniform source with high efficiency and no pixilation.
- 90 CRI minimum, R9 greater than 50
- Color accuracy at 4 SDCM in between endpoints, provide color accuracy and uniformity.
- Color Temperature (CCT) has a selectable range from 2700K to 5000K (factory default 3000K)

Optical Assembly

- Regressed lens
- Impact-resistant polycarbonate
- Convex form and lamp-like appearance
- Diffuse for even illumination

Driver

- Integral 120V 60 Hz constant current driver provides noise free operation
- Continuous, flicker-free dimming from 100% to 5%.
- Inline electrical quick connect and E26 adapter (provided) provides mains connections
- See Dimming Guide for compatible dimmers

Retention

- Integral torsion springs and Push-N-Twist clips offer two mounting options
- Torsion springs are pre-installed and adjust to fit 5" or 6" compatible housings
- Push-N-Twist universal installation clips are pre-installed and designed to fit 5" or 6" compatible housings

Designer Skins (sold separately)

- RL56 skins are accessory rings that attach to the RL56 for a permanent finish. Refer to the RL56 accessories specification sheet for details.
 - White (Paintable)
 - Satin Nickel
 - Tuscan Bronze

Gaskets

- Closed cell gaskets achieve restrictive airflow requirements without additional caulking

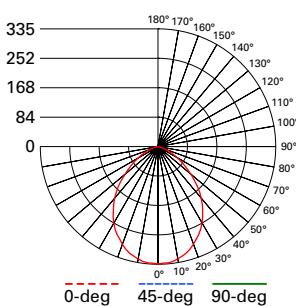
Compliance

- UL Certified
- Wet and Damp location listed.
- Airtight certified per ASTM-E283
- Suitable for use in clothes closets when installed in accordance with the NEC 410.16 spacing requirements
- EMI/RFI emissions per FCC 47CFR Part 15 consumer limits
- Contains no mercury or lead and RoHS compliant
- Photometric testing in accordance with IES LM-79-08
- Lumen maintenance projections in accordance with IES LM-80-08 and TM-21-11
- Can be used for State of California Title 24 high efficacy luminaire compliance. Complies with Title 24 JA8-2016-E.
- Can be used International Energy Conservation Code (IECC) high efficiency luminaire compliance.
- ENERGY STAR® listed, reference database for current listings

Warranty

- Five year limited warranty, consult website for details. www.cooperlighting.com/warranty

Photometric Data

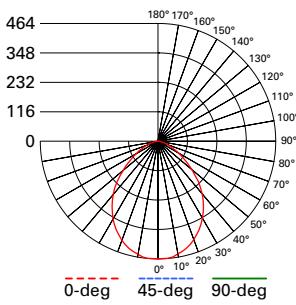
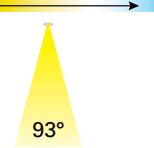
[View IES files](#)


RL56069S1EWHR-3000K
 Spacing criterion: (0-180) 1.14
 (90-270) 1.14
 (Diagonal) 1.22
 Beam Angle: 87.8°
 Field Angle: 139°
 Lumens: 693
 Input Watts: 7.9 W
 Efficacy: 87.7 LPW
 Test Report:
 RL56069S1EWHR-3000K.ies

Zonal Lumen	Lumens	% Lumens
0-30	247	37.2
0-40	387	58.2
0-60	595	89.4
0-90	665	100

TM-30-15	Rf = 89.8
Rg	= 98
CRI/CIE	Ra = 93.7
	R9 = 69.1

CCT - Range of 2700K- 5000K

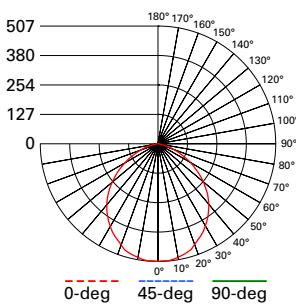
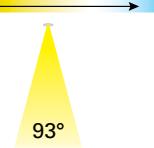


RL56099S1EWHR-3000K
 Spacing criterion: (0-180) 1.16
 (90-270) 1.16
 (Diagonal) 1.22
 Beam Angle: 88.9°
 Field Angle: 140°
 Lumens: 957
 Input Watts: 11.5 W
 Efficacy: 83.2 LPW
 Test Report:
 RL56099S1EWHR-3000K.ies

Zonal Lumen	Lumens	% Lumens
0-30	345	36.7
0-40	541	57.5
0-60	838	89.1
0-90	940	100

TM-30-15	Rf = 89.8
Rg	= 97.7
CRI/CIE	Ra = 93.1
	R9 = 64.6

CCT - Range of 2700K- 5000K

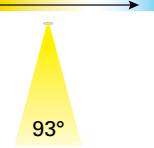


RL56129S1EWHR-3000K
 Spacing criterion: (0-180) 1.21
 (90-270) 1.21
 (Diagonal) 1.31
 Beam Angle: 93°
 Field Angle: 140°
 Lumens: 1399
 Input Watts: 14.2 W
 Efficacy: 91.5 LPW
 Test Report:
 RL56129S1EWHR-3000K.ies

Zonal Lumen	Lumens	% Lumens
0-30	345	31.7
0-40	541	51.5
0-60	838	85.5
0-90	940	100

TM-30-15	Rf = 89.8
Rg	= 97.7
CRI/CIE	Ra = 93.1
	R9 = 64.6

CCT - Range of 2700K- 5000K



Energy and Performance Data

RL56069S1EWHR	
Max. Lumens	736 @ 5000K
Input Voltage	120V
Input Frequency	50/60 Hz
Input Power	7.9W
Input Current	0.15 A
Power Factor	>0.90
THD	<20%
EMI/RFI	FCC Title 47 CFR, Part 15, Class B (Consumer)
Sound Rating	Class A
Minimum Starting Temp	-30°C (-22°F)

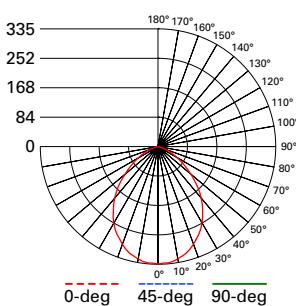
RL56099S1EWHR	
Max. Lumens	1012 @ 5000K
Input Voltage	120V
Input Frequency	50/60 Hz
Input Power	11.4W
Input Current	0.15 A
Power Factor	>0.90
THD	<20%
EMI/RFI	FCC Title 47 CFR, Part 15, Class B (Consumer)
Sound Rating	Class A
Minimum Starting Temp	-30°C (-22°F)

RL56129S1EWHR	
Max. Lumens	1399 @ 5000K
Input Voltage	120V
Input Frequency	50/60 Hz
Input Power	14.1W
Input Current	0.15 A
Power Factor	>0.90
THD	<20%
EMI/RFI	FCC Title 47 CFR, Part 15, Class B (Consumer)
Sound Rating	Class A
Minimum Starting Temp	-30°C (-22°F)

Tested in accordance with IES LM63. Field results may vary.

Note: Refer to IES files for more product data.

Photometric Data

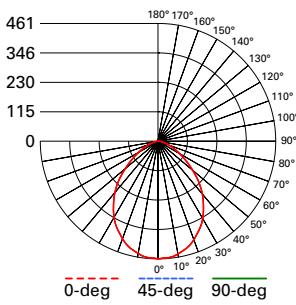
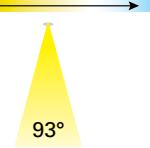
 View IES files


RL56069S1EWHR-CA-3000K
 Spacing criterion: (0-180) 1.14
 (90-270) 1.14
 (Diagonal) 1.22
 Beam Angle: 87.8°
 Field Angle: 139°
 Lumens: 665
 Input Watts: 7.6 W
 Efficacy: 87.5 LPW
 Test Report:
 RL56069S1EWHR-CA-3000K.ies

Zonal Lumen	Lumens	% Lumens
0-30	247	37.2
0-40	387	58.2
0-60	595	89.4
0-90	665	100

TM-30-15	Rf = 89.8
	Rg = 98
CRI/CIE	Ra = 93.7
	R9 = 69.1

CCT - Range of 2700K- 5000K

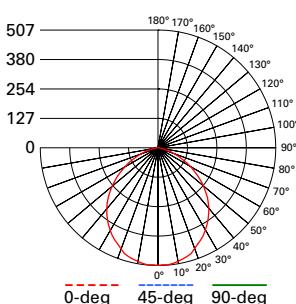
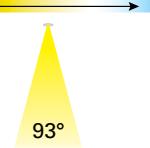


RL56099S1EWHR-CA-3000K
 Spacing criterion: (0-180) 1.13
 (90-270) 1.13
 (Diagonal) 1.21
 Beam Angle: 88.9°
 Field Angle: 140°
 Lumens: 923
 Input Watts: 9.9 W
 Efficacy: 93.1 LPW
 Test Report:
 RL56099S1EWHR-CA-3000K.ies

Zonal Lumen	Lumens	% Lumens
0-30	343	37.2
0-40	536	58.1
0-60	824	89.4
0-90	922	100

TM-30-15	Rf = 89.8
	Rg = 97.7
CRI/CIE	Ra = 93.1
	R9 = 64.6

CCT - Range of 2700K- 5000K

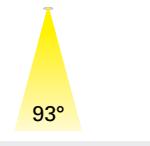


RL56129S1EWHR-CA-3000K
 Spacing criterion: (0-180) 1.21
 (90-270) 1.21
 (Diagonal) 1.31
 Beam Angle: 93°
 Field Angle: 140°
 Lumens: 1221
 Input Watts: 14 W
 Efficacy: 87.2 LPW
 Test Report:
 RL56129S1EWHR-CA-3000K.ies

Zonal Lumen	Lumens	% Lumens
0-30	345	31.7
0-40	541	51.5
0-60	838	85.5
0-90	940	100

TM-30-15	Rf = 89.8
	Rg = 97.7
CRI/CIE	Ra = 93.1
	R9 = 64.6

CCT - Range of 2700K- 5000K



Energy and Performance Data

RL56069S1EWHR-CA	
Max. Lumens	712 @ 4000K
Input Voltage	120V
Input Frequency	50/60 Hz
Input Power	7.6W
Input Current	0.15 A
Power Factor	>0.90
THD	<20%
EMI/RFI	FCC Title 47 CFR, Part 15, Class B (Consumer)
Sound Rating	Class A
Minimum Starting Temp	-30°C (-22°F)

RL56099S1EWHR-CA	
Max. Lumens	946 @ 4000K
Input Voltage	120V
Input Frequency	50/60 Hz
Input Power	9.9W
Input Current	0.15 A
Power Factor	>0.90
THD	<20%
EMI/RFI	FCC Title 47 CFR, Part 15, Class B (Consumer)
Sound Rating	Class A
Minimum Starting Temp	-30°C (-22°F)

RL56129S1EWHR-CA	
Max. Lumens	1272 @ 5000K
Input Voltage	120V
Input Frequency	50/60 Hz
Input Power	14W
Input Current	0.15 A
Power Factor	>0.90
THD	<20%
EMI/RFI	FCC Title 47 CFR, Part 15, Class B (Consumer)
Sound Rating	Class A
Minimum Starting Temp	-30°C (-22°F)

WPLED10

LED 10W & 13 Wallpacks. 3 cutoff options. Patent Pending thermal management system. 100,000 hour L70 lifespan. 5 Year Warranty.

Color: Bronze

Weight: 3.3 lbs



LED Info

Watts:	10W	Type:	Constant Current
Color Temp:	5000K (Cool)	120V:	0.21A
Color Accuracy:	92	208V:	0.14A
L70 Lifespan:	100000	240V:	0.12A
LM79 Lumens:	548	277V:	N/A
Efficacy:	42 LPW	Input Watts:	13W
		Efficiency:	76%

Driver Info

Technical Specifications

UL Listing:

Suitable for Wet Locations as a Downlight. Suitable for Damp Locations as an Uplight. Wall Mount only. Suitable for Mounting within 4ft. of ground.

Lifespan:

100,000-hour LED lifespan based on IES LM-80 results and TM-21 calculations.

Finish:

Our environmentally friendly polyester powder coatings are formulated for high-durability and long-lasting color, and contains no VOC or toxic heavy metals.

Color Consistency:

7-step MacAdam Ellipse binning to achieve consistent fixture-to-fixture color.

Color Stability:

LED color temperature is warrantied to shift no more than 200K in CCT over a 5 year period.

Color Uniformity:

RAB's of CCT (Correlated color temperature) follows the guidelines of the American National Standard for Specifications for the Chromaticity of Solid State Lighting (SSL) Products, ANSI C78.377-2008.

Cold Weather Starting:

The minimum starting temperature is -40°F/-40°C.

Ambient Temperature:

Suitable for use in 40°C (104°F) ambient temperatures.</SPECDriver

Thermal Management:

Cast aluminum Thermal Management system for optimal heat sinking. The LPACK is designed for cool operation, most efficient output and maximum LED life by minimizing LED junction temperature.

Lumen Maintenance:

The LED will deliver 70% of its initial lumens at 100,000 hours of operation.

Housing:

Precision die cast aluminum housing, lens frame.

Mounting:

Junction box.

California Title 24:

LPACK complies with California Title 24 building and electrical codes.

Green Technology:

RAB LEDs are Mercury, Arsenic and UV free.

Patents:

The LPACK design is protected under patents in the U.S. Pat. D608,040, Canada Pat. 130,243, China Pat. 200930183252.2, and pending patents in Taiwan and Mexico.

Dark Sky Approved:

The International Dark Sky Association has approved this product as a full cutoff, fully shielded luminaire.

For use on LEED Buildings:

IDA Dark Sky Approval means that this fixture can be used to achieve LEED Credits for Light Pollution Reduction.



Tech Help Line: 888 RAB-1000

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Email: sales@rabweb.com

Note: Specifications are subject to change without notice

On the web at: www.rabweb.com

Page 1 of 2

WPLED10 - continued

IESNA LM-79 & IESNA LM-80 Testing:

RAB LED luminaires have been tested by an independent laboratory in accordance with IESNA LM-79 and 80, and have received the Department of Energy "Lighting Facts" label.

Gaskets:

High Temperature Silicone.

Warranty:

RAB warrants that our LED products will be free from defects in materials and workmanship for a period of five (5) years from the date of delivery to the end user, including coverage of light output, color stability, driver performance and fixture finish. See our full warranty .

Equivalency:

The WPLED10 is Equivalent in delivered lumens to a 70W Metal Halide Wallpack.

HID Replacement Range:

The WPLED10 can be used to replace 35-100W Metal Halide Wallpacks based on delivered lumens.



Tech Help Line: 888 RAB-1000

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Page 2 of 2



DIGITAL NAVIGATION

[Ordering Tree](#) [Platform](#) [Photometrics](#) [Performance Data](#)

FEATURES & SPECIFICATIONS

INTENDED USE — The CPX Series LED is a low-glare panel featuring an external driver. This cost-effective, reliable flat panel is visually comfortable and can be recessed mounted. Suitable for many applications such as schools, offices, retail, convenience stores, hospitals, healthcare facilities and other commercial spaces. Certain airborne contaminants can diminish integrity of acrylic. [Click here for Acrylic Environmental Compatibility table for suitable uses](#). Adjustable Lumen (AL07, AL08) and Switchable White (SWW7) configurations available.

U.S. Patent No. 10,681,784.

CONSTRUCTION — The extruded Metal frame with satin white lens provides excellent shielding and uniform luminance. CPX's low-profile design provides increased installation flexibility especially in restricted plenum spaces. The back plate includes integral T-bar clips for installation into T-grid ceilings.

ELECTRICAL — Direct-lit Panel with Long-Life LEDs, coupled with a high-efficiency driver, provide superior illumination for extended service life. Greater than 70% LED lumen maintenance at 60,000 hours ($L70>60,000$). 0-10V dimming driver, dims to 10% and contains non-isolated dimming leads.

LISTINGS — CSA certified to meet US and Canadian standards. Damp location listed. IC rated. IP5X Rated. DesignLights Consortium® (DLC) Premium qualified product and DLC qualified product. Not all versions of this product may be DLC Premium qualified or DLC qualified. Please check the DLC Qualified Products List at [www.designlights.org/QPL](#) to confirm which versions are qualified. Rated for NSF/ANSI Standard 2 - Light Fixture for Splash Zone and Non Food Zone. NOM Certified.

WARRANTY — 5-year limited warranty. This is the only warranty provided and no other statements in this specification sheet create any warranty of any kind. All other express and implied warranties are disclaimed.

Complete warranty terms located at: [www.acuitybrands.com/support/warranty/terms-and-conditions](#)

Note: Actual performance may differ as a result of end-user environment and application.

All values are design or typical values, measured under laboratory conditions at 25 °C.

Specifications subject to change without notice.

Catalog Number
Notes
Type

CPX LED PANEL

Non-Configurable

1' x 4', 2' x 2' and 2' x 4'



[†] Tested in accordance with ISO 14644-1; suitable in ISO Class 5-9 positive and negative pressure clean rooms.

Non-Configurable FIXTURES

ORDERING INFORMATION

Catalog Number	UPC	Description	Lumens	Color Temperature	CRI	Voltage	Wattage	Efficacy	Pallet Qty.
CPX 2X4 4000LM 40K M2	191848338506	2x4 LED Panel	4692	4000K	80	120-277	38.9	121	20
CPX 1X4 AL07 SWW7 M4	194994568063	1X4 Switchable Panel	See Switchable Table	3500K/4000K/5000K	>80	120-277	See Switchable Table	See Switchable Table	40
CPX 1X4 AL07HE SWW7 UVOLT M4 [‡]	194994625926	1X4 Switchable Panel	See Premium Switchable Table	3500K/4000K/5000K	>80	120-347	See Premium Switchable Table	See Premium Switchable Table	40
CPX 1X4 AL07 SWW7 IE10WCP	194995604456	1X4 Switchable Panel with Battery [‡]	See Switchable Table	3500K/4000K/5000K	>80	120-277	See Switchable Table	See Switchable Table	26
CPX 2X2 AL07 SWW7 M4	193048542806	2X2 Switchable Panel	See Switchable Table	3500K/4000K/5000K	>80	120-277	See Switchable Table	See Switchable Table	40
CPX 2X2 AL07HE SWW7 UVOLT M4 [‡]	194994371854	2X2 Switchable Panel	See Premium Switchable Table	3500K/4000K/5000K	>80	120-347	See Premium Switchable Table	See Premium Switchable Table	40
CPX 2X2 AL07 SWW7 IE10WCP	194995604494	2X2 Switchable Panel with Battery [‡]	See Switchable Table	3500K/4000K/5000K	>80	120-277	See Switchable Table	See Switchable Table	26
CPX 2X4 AL08 SWW7 M2	193048542844	2X4 Switchable Panel	See Switchable Table	3500K/4000K/5000K	>80	120-277	See Switchable Table	See Switchable Table	20
CPX 2X4 AL08HE SWW7 UVOLT M2 [‡]	194994371861	2X4 Switchable Panel	See Premium Switchable Table	3500K/4000K/5000K	>80	120-347	See Premium Switchable Table	See Premium Switchable Table	20
CPX 2X4 AL08 SWW7 IE10WCP	194995604319	2X4 Switchable Panel with Battery [‡]	See Switchable Table	3500K/4000K/5000K	>80	120-277	See Switchable Table	See Switchable Table	13

[‡] Switchable CPX fixtures with IE10WCP will default to 5000K when in emergency mode.

[‡] CPX UVOLT DLC Premium

SWITCHABLE PERFORMANCE DATA

CPX Switchable Table						
Size(ft)	Nomenclature	Lumen Package	CCT	Lumen	Wattage	Efficacy
1x4	CPX 1x4 AL07 SWW7 M4	Low Lumen	3500K	2430	19.7	123.4
			4000K	2594	19.7	131.7
			5000K	2483	19.5	127.3
		Med Lumen	3500K	3289	28.4	115.8
			4000K	3583	27.2	131.7
			5000K	3369	28.2	119.5
		High Lumen	3500K	3914	35.7	109.6
			4000K	4280	33.7	127
			5000K	4009	35.5	112.9
2x2	CPX 2x2 AL07 SWW7 M4	Low Lumen	3500K	2399	19.1	125.6
			4000K	2570	18.5	138.9
			5000K	2456	19.1	128.6
		Med Lumen	3500K	3356	28.7	116.9
			4000K	3649	27.5	132.7
			5000K	3427	28.5	120.2
		High Lumen	3500K	4131	37.5	110.2
			4000K	4564	35.8	127.5
			5000K	4212	37.3	112.9
2x4	CPX 2x4 AL08 SWW7 M2	Low Lumen	3500K	3813	28.94	131.8
			4000K	4033	28.1	143.5
			5000K	3938	28.86	136.5
		Med Lumen	3500K	4677	36.8	127.1
			4000K	5009	35.55	140.9
			5000K	4834	36.65	131.9
		High Lumen	3500K	6048	50.56	119.6
			4000K	6563	48.53	135.2
			5000K	6241	50.24	124.2

Product Type	Size(ft)	Nomenclature	Lumen Package	CCT(K)	Lumen	Wattage	Lumen/Wattage
CPX G2 Switchable CCT and Lumen Select UVOLT Premium	2x2	CPX 2x2 AL07HE SWW7 UVOLT M4	Low Lumen	3500K	2258	15.8	142.9
				4000K	2323	15.4	150.8
				5000K	2278	15.8	144.2
			Med Lumen	3500K	3307	24.1	137.2
				4000K	3429	23.2	147.8
				5000K	3325	24.0	138.6
	2x4	CPX 2x4 AL08HE SWW7 UVOLT M2	High Lumen	3500K	4168	31.9	130.6
				4000K	4401	30.5	144.3
				5000K	4208	31.7	132.7
			Low Lumen	3500K	3939	27.6	142.7
				4000K	4060	27	150.4
				5000K	3980	27.5	144.7
	1x4	CPX 1x4 AL07HE SWW7 UVOLT M4	Med Lumen	3500K	3500	35.1	99.7
				4000K	5070	34	149.1
				5000K	4950	35	141.4
			High Lumen	3500K	6321	47.2	133.9
				4000K	6590	45.5	144.8
				5000K	6420	47	136.6
			Low Lumen	3500K	2305	15.9	144.9
				4000K	2350	15.5	151.6
				5000K	2324	15.8	147.1
			Med Lumen	3500K	3368	23.9	140.9
				4000K	3474	23.1	150.4
				5000K	3404	24	141.8
			High Lumen	3500K	4242	31.3	135.5
				4000K	4445	30.1	147.7
				5000K	4297	31.3	137.3

ACCESSORIES

Accessories: Order as separate catalog number.	
ILBLP CP10 HE SD A	IOTA 10 Watt Constant Power, High Efficiency LED Emergency Driver for CA Title 20 ‡
ELA PSDMT	Remote mount tray for ILBLP battery.
DGA14	Drywall grid adapter for 1x4 recessed fixture.
DGA22	Drywall grid adapter for 2x2 recessed fixture.
DGA24	Drywall grid adapter for 2x4 recessed fixture.
1X4SMKSH	Multi-Use Surface Mount Kit 1x4, Shallow Depth
2X2SMKSH	Multi-Use Surface Mount Kit 2x2, Shallow Depth
2X4SMKSH	Multi-Use Surface Mount Kit 2x4, Shallow Depth
1X4SMKSH PAF	Multi-Use Surface Mount Kit 1X4 Post-Paint
2X2SMKSH PAF	Multi-Use Surface Mount Kit 2X2 Post-Paint
2X4SMKSH PAF	Multi-Use Surface Mount Kit 2X4 Post-Paint
PAC 2DNF 36	Panel Air Craft Kit, 2 cables with Y splitter, No Power Feed, 36 inches. Recommended for 2X2 or 1X4 Panel Fixture.
PAC 2DF 36	Panel Air Craft Kit, 2 cables with Y splitter, with Power Feed, 36 inches. Recommended for 2X2 or 1X4 Panel Fixture. ¹
PAC 4DNF 36	Panel Air Craft Kit, 4 cables, No Power Feed, 36 inches. Recommended for 2X4 or 2X2 or 1X4 Panel Fixtures.
PAC 4DF 36	Panel Air Craft Kit, 4 cables, with Power Feed, 36 inches. Recommended for 2X4 or 2X2 or 1X4 Panel Fixtures. ¹
PAC 2DNF 72	Panel Air Craft Kit, 2 cables with Y splitter, No Power Feed 72 inches. Recommended for 2X2 or 1X4 Panel Fixture.
PAC 2DF 72	Panel Air Craft Kit, 2 cables with Y splitter, with Power Feed, 72 inches. Recommended for 2X2 or 1X4 Panel Fixture. ¹
PAC 4DNF 72	Panel Air Craft Kit, 4 cables, No Power Feed, 72 inches. Recommended for 2X4 or 2X2 or 1X4 Panel Fixtures.
PAC 4DF 72	Panel Air Craft Kit, 4 cables, with Power Feed, 72 inches. Recommended for 2X4 or 2X2 or 1X4 Panel Fixtures. ¹
RK8BDP 2P U	Disconnect Plug (BDP), 2 Pole, Package of 1
RK8BDP 3P U	Disconnect Plug (BDP), 3 Pole, Package of 1
RK8BDP 2P J10	Disconnect Plug (BDP), 2 Pole, Package of 10
RK8BDP 2P J40	Disconnect Plug (BDP), 2 Pole, Package of 40

Emergency Battery Delivered Lumens

Use the formula below to determine the delivered lumens in emergency mode

$$\text{Delivered Lumens} = 1.25 \times P \times LPW$$

P = Output power of emergency driver (10W for PS1055)

LPW = Lumen per watt rating of the luminaire.

Notes

¹ For MVOLT only, not available with 347V.

Emergency Battery Pack Options - Field Installable

Battery Model Number	Wattage	Runtime (Minutes)	Lumen Output* @ 120 Lumens/Watt	Other
ILB CP07 2H A	7W	120	840	Storm Shelter/ 2-hour Runtime
ILB CP10 A	10W	90	1200	
ILBLP CP10 HE SD A	10W	90	1200	Title 20, Self Diagnostic
ILBLP CP15 HE SD A	15W	90	1800	Title 20, Self Diagnostic
ILB CP20 HE A	20W	90	2400	Title 20
ILB CP20 HE SD A	20W	90	2400	Title 20, Self Diagnostic

All the above are UL Listed products that are certified for field install external/remote to the fixture.

*Minimum delivered lumen output to assist in product selection for increased fixture mounting height.

The CP10 delivered emergency illumination outperforms legacy 1400 lumen fluorescent emergency ballast.

Please contact us at techsupport@iotaengineering.com for any Emergency Battery related questions.

Lumen Maintenance

Reported Lumen Maintenance	Forecasted Lumen Maintenance
L90 @ 52k Hrs / L80 @ >60k Hrs / L70 @ >60k Hrs	L90 @ 52k Hrs / L80 @ 108k Hrs / L70 @ 170k Hrs

*Note - Reported LM based on IES standard 6X test period for LM-80 report. Forecasted LM based on TM-21 report extrapolation past 6X LM-80 testing.

CPX compatible with
Sensor Switch™
[WSX-D](#) and [SPOD](#)
wall switches.

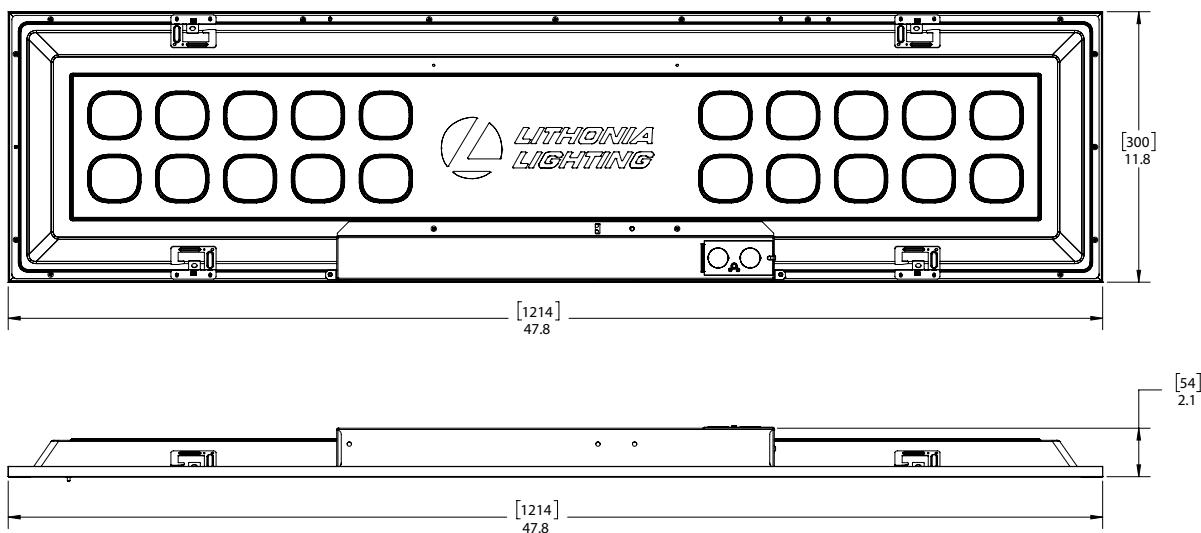


PHOTOMETRICS

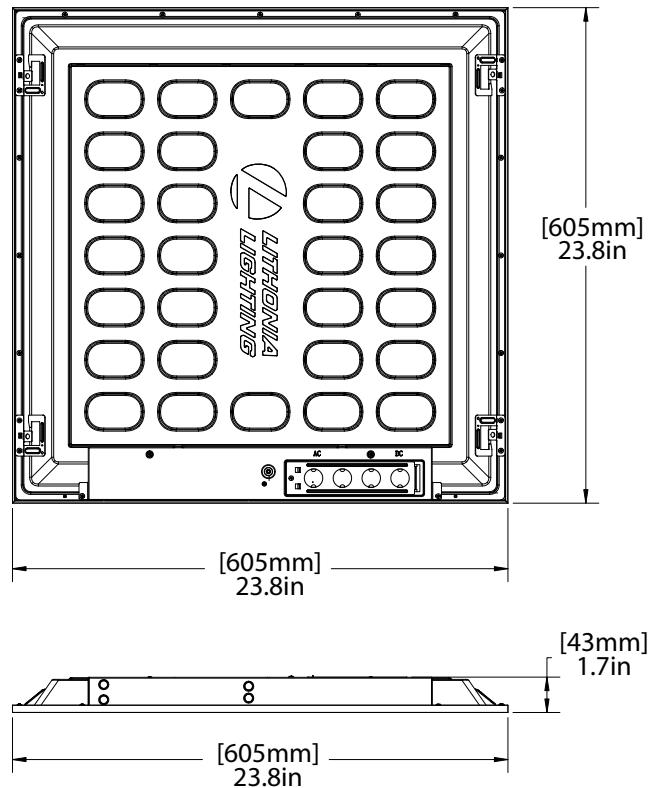
See www.lithonia.com for photometry reports.

DIMENSIONS

Length: 47.8" 121.4cm
Width: 11.8" 30.0cm
Depth: 2.1" 5.4cm
Weight:
Unit: 8.11lbs
Unit Carton: 15.1lbs

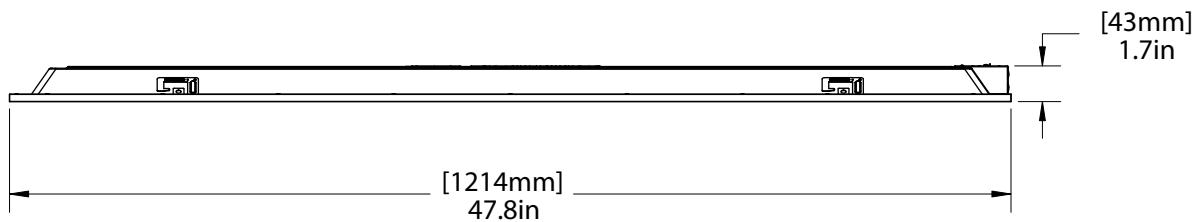
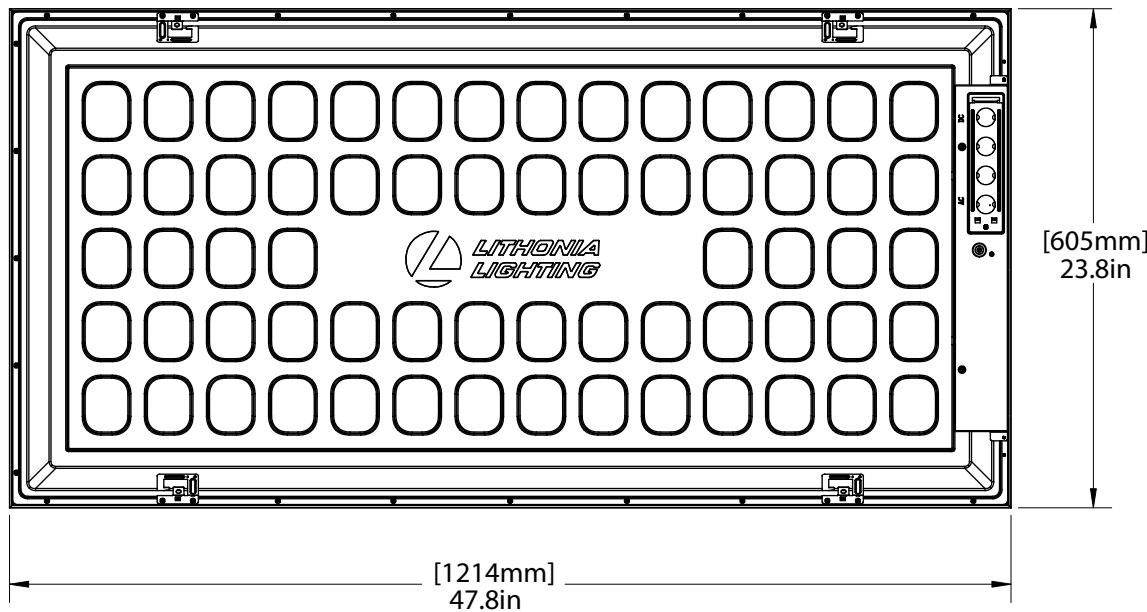


Length: 23.8" 60.5cm
Width: 23.8" 60.5cm
Depth: 1.7" 4.3cm
Weight:
Unit: 9.45lbs
Unit Carton: 10.45lbs
Master Carton: 39.5lbs



DIMENSIONS

Length: 47.8 (121.4)
Width: 23.8" 60.5cm
Depth: 1.7" 4.3CM
Weight:
Unit: 17.05lbs
Unit Carton: 19.05lbs
Master Carton: 36.55lbs



PHILIPS**Lighting**

CoreLine Panel gen6

RC132V G6 40_43S/830_40 WIA 60x60 OC

CoreLine Panel gen6, All-in, 31 W, 600x600 mm, VPC, 4000 lm, 4300 lm, 3000 K, 3500 K, 4000 K, Wireless, Interact Ready

Philips CoreLine panel Gen6 delivers on the CoreLine promise of innovation, easy installation, and excellent illumination. Designed as a direct replacement for functional luminaires in general lighting applications, this LED panel light's innovative All-in feature offers a choice of three lumen packages and three-color temperatures in a single luminaire. This makes it easy to select the right product, gives you the flexibility respond to customer preferences on site, and means fewer product codes on stock. Installing the CoreLine RC132V LED panel is quick and easy, using the product's quick connector or flywire. The CoreLine range includes Interact Ready luminaires with integrated wireless communications, ready to be used with Interact gateways, sensors, and software.

Product data

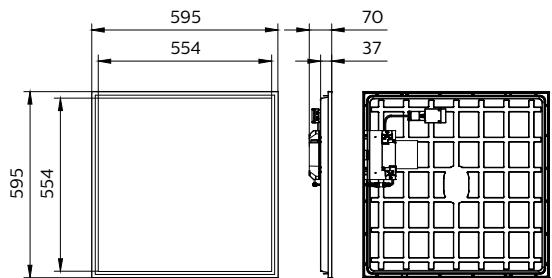
General Information		
Number of gear units	1 unit	
Driver included	Yes	
Service tag	Yes	
Value ladder	Performance	
Warranty period	5 years	
Sustainability rating	-	
Light Technical		
Luminous Flux	4,000 4,300 lm	
Correlated Color Temperature (Nom)	3000 3500 4000 K	
Luminous Efficacy (rated) (Nom)	139 129 lm/W	
Color rendering index (CRI)	>80	
Operating and Electrical		
Input Voltage	220 to 240 V	
Line Frequency	50 or 60 Hz	
Inrush current	4.8 A	
Inrush time	0.056 ms	
Power Consumption	31 W	

CoreLine Panel gen6

Power Factor (Fraction)	0.9	Flammability mark	For mounting on normally flammable surfaces
Connection	Push-in connector 2-pole	CE mark	Yes
Cable	-	ENEC mark	ENEC mark
Number of products on MCB of 16 A type B	50	Photobiological risk	Photobiological risk group 0 @200mm to EN62778
Suitable for random switching	Not applicable	Photobiological risk specification	0.2 m
Protection class IEC	Safety class II	EU RoHS compliant	Yes
Total harmonic distortion	20 %	Performance ambient temperature Tq	25 °C
Controls and Dimming			
Dimmable	Yes	Flickering value (PstLM) - Flickering value as per EN 61000-3-3	1
Driver/power unit/transformer	Wireless driver Interact System ready	Stroboscopic effect visibility measure (SVM)	0.4
Control interface	Wireless	Ambient temperature range	-10 to +35 °C
Constant light output	No		
Maximum dim level	1%		
Connectivity	Interact Ready		
Mechanical and Housing			
Housing Material	Steel	Luminous flux tolerance	-10% / +10%
Reflector material	Acrylate	Initial chromaticity	(0.38, 0.38) SDCM ≤3
Optic material	Polystyrene	Power consumption tolerance	+/-10%
Optical cover material	Polystyrene		
Fixation material	-		
Housing Color	White		
Optical cover finish	Diamond		
Overall length	595 mm		
Overall width	595 mm		
Overall height	70 mm		
Dimensions (Height x Width x Depth)	70 x 595 x 595 mm		
Compatible ceiling or ceiling installation	Visible profile ceiling version		
accessory type			
Ingress protection code	IP20/44 [Finger-protected; wire-protected, splash-proof]		
Mech. impact protection code	IK02 [0.2 J standard]		
Safety device	SC [Safety cable]		
Net Weight (Piece)	2.350 kg		
Emergency Operation			
Central Emergency	No		
Approval and Application			
Glow-wire test	Temperature 650 °C, duration 30 s		
Initial Performance (IEC Compliant)			
Control gear failure rate at median useful life	5 %		
50000 h			
Lumen maintenance (EN-IEC 62722-2-1) at median useful life* 50000 h	L90 L85		
Lumen maintenance (EN-IEC 62722-2-1) at median useful life* 100000 h	L75 L80		
Over Time Performance (IEC Compliant)			
Order product name	RC132V G6 40_43S/830_40 WIA 60x60 OC		
Full product name	RC132V G6 40_43S/830_40 WIA 60x60 OC		
Full product code	872016975131699		
Order code	911401807387		
Material Nr. (12NC)	911401807387		
Numerator - Quantity Per Pack	1		
EAN/UPC - Product/Case	8720169751316		
Numerator - Packs per outer box	4		
EAN/UPC - Case	8720169751392		

CoreLine Panel gen6

Dimensional drawing



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www.lighting.philips.com
2025, March 17 - data subject to change

PHILIPS



CorePro LED PLC
CorePro LED PLL
compatibility list
Professional Q1 2022



Table of content

Philips CorePro LED PLC

-
- Philips CorePro LED PLC 4.5W 8xx 4P G24q-1 2
 - Philips CorePro LED PLC 6.5W 8xx 4P G24q-2 3
 - Philips CorePro LED PLC 9.0W 8xx 4P G24q-3 4

Philips CorePro LED PLL

-
- Philips CorePro LED PLL HF 16W 8xx 4P 2G11 5
 - Philips CorePro LED PLL HF 24W (55) 8xx 4P 2G11 7

Philips CorePro LED PLC 4.5W 8xx 4P G24q-1



Ballast Compatibility

KEY

 	Ballast is compatible
 	Ballast is not compatible, will not work according to Philips claimed specifications

This document is for information purposes and must be treated as recommendation. Philips attempted to provide best results, results are generated in lab controlled environment and may differ from actual application conditions

	Ballast type	10nc	Lamps on ballast
PHILIPS	HF-M 113 TL/PLS/PLC SH	9137004137	1
	HF-M 113 TL/PLS/PLC LH	9137004139	1
	BLUE 114 LH TL/PLS/PLC	9137004217	1
	RED 114 SH TL/TL5/PLC/S	9137004232	1
	HF-P 113-17 PL-T/C/R EII	9137006311	1
	HF-P 2 13-17 PL-T/C/R EII	9137006312	2
	EB-C 113 PL-T/C 220	9137131984	1
OSRAM	QT-ECO 1X4-16/220-240 L		1
	QT-ECO 1X4-16/220-240 S		1
	QTP-D/E 1X10-13		1
	QTP-D/E 2X10-13		2
VOSSLOH-SCHWABE	ELXc 213.870	188698	2
	ELXc 213.870	188698	1
	ELXs 121.901	188663	1
	ELXs 121.904	188664	1
TRIDONIC	PCA 1x11/13 TC EXCEL one4all	22185134	1
	PCA 1x11/13 TC ECO	22185126	1
	PCA 2x11/13 TC EXCEL one4all	22185135	2
	PCA 2x11/13 TC ECO	22185127	2
	PC 1x5-16W BASIC	24138830	1
	PC 1x5-16W BASIC sl	24138833	1
	PC 1/2x9-13 TC PRO	22176405	2
BAG HUECO	BCD13.1-2Q-01/220-240/1-10V	10096393	2
	BCD13.1-2Q-01/220-240/1-10V	10096393	1
	BCS21.1-2LS-01/220-240	10095043	2
	BCS21.1-2LS-01/220-240	10095043	1
	BCS21.1-2Q-01/220-240	10097543	2
	BCS21.1-2Q-01/220-240	10097543	1
	BCS21.1-2QI-01/220-240	10095743	2
	BCS21.1-2QI-01/220-240	10095743	1
	EBS21.1C-01/220-240	10050990	1
	EBS21.1M-01/220-240	10050994	1
TCI	EBS16.1C-01/220-240	10050989	1
	BCC 121	137946HTC	1
	BCC 121/2	137969/21MM	1
	BCC 121/2 SL	137944/21H	1
	BCC 121 SL	137944B/21H	1
	BCC 121 IP54	137969IP21MM	1
	MBQ 113/2	137968/113	1
	MB213	137988/213	2
	MB213/2	137988/2132	2
	MBQ 213/2	137968/213	2

CorePro LED PLC 4.5W 8xx 4P G24q-1 Model number / EOC code: 9290013510 / 871869670663300 9290013511 / 871869670665700
AC (50Hz) on HF Ballast Compatible

General note Philips CorePro LED PLC

General notes: Refer to the product reference number in the header of the columns to use this product-ballast compatibility list.

Please note that Philips CorePro LED PLC 4P are only tested with HF ballast on AC operation. The performance of Philips CorePro LED PLC 4P on HF ballasts with DC operation is not tested and is therefore not guaranteed. Philips CorePro LED PLC 4P range is designed to work on HF ballasts only. For EM ballasts configuration, please contact a Philips sales representative for more information on our EM compatible range.

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Always check the latest update of the compatibility list on www.philips.com/ledtube

Dimming: Philips CorePro LED PLC 4P are not developed for dimming therefore the performance cannot be guaranteed in a dimming application. In case of usage of a non-dimmable product in a dimmable application, warranty does not apply.

Philips CorePro LED PLC 6.5W 8xx 4P G24q-2



Ballast Compatibility

KEY

Ballast is compatible
Ballast is not compatible, will not work according to Philips claimed specifications

This document is for information purposes and must be treated as recommendation. Philips attempted to provide best results, results are generated in lab controlled environment and may differ from actual application conditions

	Ballast type	10nc	Lamps on ballast
PHILIPS	HF-P 118 PL-T/C III 220-240V 50/60Hz	9137006485	1
	HF-P 1/218 PL-T/C III 220-240V 50/60Hz	9137006486	1
	HF-P 218 PL-T/C III 220-240V 50/60Hz	9137006486	2
	Philips HF-M RED 118 SH PLC/PL-T 230-240V	9137004234	1
	HF-S 218 PL-T/C II SR 220-240V 50/60Hz	9137130358	2
	HF-S 1/218 PL-T/C II SR 220-240V 50/60Hz	9137130358	1
	HF-S 118 PL-T/C II SR 220-240V 50/60Hz	9137130359	1
	HF-P 218 PL-T/C 220-240	9137001553	2
	HF-P 118 PL-T/C EII	9137006309	1
	HF-P 218 PL-T/C EII	9137006310	2
OSRAM	QTP-T/E 1X18, 2X18 - Single		1
	QTP-T/E 1X18, 2X18 - Dual		2
	QT-ECO T/E 2X18/220-240		2
	Quicktronic QT-D/E 1x18 / 230-240		1
	QTP-T/E 2x18		2
VOSSLOH-SCHWABE	ELXs 121.901 1x13/18W	188663	1
	ELXs 121.904 1x13/18W	188664	1
	ELXc 218.871 1/2x18W - Single	188699	1
	ELXc 218.871 1/2x18W - Dual	188699	2
TRIDONIC	PC 1/2x18 TC PRO sr - Single	22176416	1
	PC 1/2x18 TC PRO sr - Dual	22176416	2
	PC 1/2x18 TC PRO - Single	1307239	1
	PC 1/2x18 TC PRO - Dual	1307239	2
	PC 1x18 TC TOP	280000073	1
	PC 2x18 TC TOP	280000074	2
	PC 1/2x18 TC PRO sr - Single	22176412	1
	PC 1/2x18 TC PRO sr - Dual	22176412	2
BAG HUECO	BCS18.1-2Q-01 / 220-240 1/2x TC-DEL/-TEL 18W - Single	10097544	1
	BCS18.1-2Q-01 / 220-240 1/2x TC-DEL/-TEL 18W - Dual	10097544	2
	BCS18.1-2LS-01 / 220-240 1/2x TC-DEL/-TEL 18W - Single	10095044	1
	BCS18.1-2LS-01 / 220-240 1/2x TC-DEL/-TEL 18W - Dual	10095044	2
HELVAR	EL1/2x18TCs - Single		1
	EL1/2x18TCs - Dual		2
TCI	MBQ 118/2	137968/118	1
	MBQ 218/2	137968/218	2
	BCC 121	137946HTC	1

CorePro LED PLC 6.5W 8xx 4P G24q-2
Model number / EOC code:
9290012010 / 871869654119700
9290012011 / 871869654121000

Model number / EOC code:
9290012010 / 871869654119700
9290012011 / 871869654121000

9290012010 / 871869654119700
9290012011 / 871869654121000

9290012010 / 871869654119700
9290012011 / 871869654121000

AC (50Hz) on HF Ballast Compatible

CorePro LED PLC 6.5W 8xx 4P G24q-2
Model number / EOC code:
9290012010 / 871869654119700
9290012011 / 871869654121000

AC (50Hz) on HF Ballast Compatible

General note Philips CorePro LED PLC

General notes: Refer to the product reference number in the header of the columns to use this product-ballast compatibility list.

Please note that Philips CorePro LED PLC 4P are only tested with HF ballast on AC operation. The performance of Philips CorePro LED PLC 4P with electronic ballasts (e.g. EM, EM-H, EM-HP, EM-M, EM-MP) is not guaranteed. Philips CorePro LED PLC 4P is not tested and is therefore not guaranteed with DC operation.

PLC 4P range is designed to work on HF ballasts only. For EM ballasts configuration, please contact a Philips sales representative for more information on our EM compatible range. This document is for information purposes only and must be treated as recommendation. Philips will not accept claims for any damage caused by not implementing the recommendations in this document. Philips does not accept any responsibility, warranty or liability when using Philips CorePro LED PLC 4P with ballasts not mentioned in this list, or when using successor models of the tested ballasts. Although Philips aims to provide the most accurate information and test results from controlled experiments the results may vary in different applications. This document focuses on the behaviour of above mentioned Philips CorePro LED PLC 4P. Please also check and follow the instructions of HF ballast

Philips CorePro LED PLC 9.0W 8xx 4P G24q-3



Ballast Compatibility

KEY

 	Ballast is compatible
 	Ballast is not compatible, will not work according to Philips claimed specifications

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	Ballast type	10nc	Lamps on ballast
PHILIPS	HF-P 226 PL-T/C III 220-240V 50/60Hz	9137006488	2
	HF-P 126 PL-T/C III 220-240V 50/60Hz	9137006487	1
	HF-P 1 22-42 PL-T/C/L/TL5C EII 220-240V	9137006307	1
	HF-P 2 22-42 PL-T/C/L/TL5C EII 220-240V	9137006308	2
	HF-S 226 PL-T/C II SR 220-240V		2
	HF-S 226 PL-T/C/L/TL5C II SR 220-240V		2
	HF-S 126 PL-T/C/L/TL5C II SR 220-240V	9137130357	1
	HF-P 126 PL-T/C 26		1
	HF-P 226 PL-T/C 220-240		2
	HF-P 26-42 PL-T/C 220-240		2
OSRAM	QTP-M 1x26-42		1
	QTP-M 2x26-32 - Dual		2
	QTP-M 2x26-32 - Single		1
	QT-M 2x26-42/220-240 S		2
	QTP-T/E 1x26-42, 2x26 - Dual		2
	QTP-T/E 1x26-42, 2x26 - Single		1
	QT-ECO T/E 2X26/220-240		2
	QT-ECO 1X26/220...240 S		1
	Quicktronic QT-T/E 2x26 / 230-240		2
	QT-M 2x26-32/230-240 S		2
VOSELH-SCHWABE	ELXc 142.872 2x26W 1x26/32/42W - Dual	188700	2
	ELXc 142.872 2x26W 1x26/32/42W - Single	188700	1
	ELXc 242.837 2x26/32/42W	188643	2
	ELXs 126.906 1x26	188667	1
TRIDONIC	PC 1/2x26 TC PRO sr - Single	22176417	1
	PC 1/2x26 TC PRO sr - Dual	22176417	2
	PC 1/2 x 26-42 TC PRO - Single	22176408	1
	PC 1/2 x 26-42 TC PRO - Dual	22176408	2
	PC 2x26-42 TC PRO	22176410	2
	PC 1x26-42 TC TOP	28000075	1
	PC 2x26 TC TOP	28000076	2
BAG HUECO	BCS42.1/26.2LS-01/220-240 1/2x TC-DEL/-TEL 26W - Single	10095045	1
	BCS42.1/26.2LS-01/220-240 1/2x TC-DEL/-TEL 26W - Dual	10095045	2
	BCS42.1/26.2Q-01/220-240 1/2x TC-DEL/-TEL 26W - Single	10097545	1
	BCS42.1/26.2Q-01/220-240 1/2x TC-DEL/-TEL 26W - Dual	10097545	2
	BCS70.1/42.2Q-01/220-240 1/2x TC-DEL/-TEL 26W - Single	10097546	1
	BCS70.1/42.2Q-01/220-240 1/2x TC-DEL/-TEL 26W - Dual	10097546	2
HELVAR	EL1/2x18-42TCs - Single		1
	EL1/2x18-42TCs - Dual		2
	EL2x32/42TCs		1
TCI	MBQ 226/2	137968/226	2
	MBQ 142/2	137968/142	1
	MBQ 242/2 - Single	137962/242	1
	MBQ 242/2 - Dual	137962/242	2
	BCC 126	137949HTC	1

CorePro LED PLC 9W 8xx 4P G24q-3
Model number / EOC code:
9290012008 / 871869654115900
9290012009 / 871869654117300

AC (50Hz) on HF Ballast Compatible



General note Philips CorePro LED PLC

General notes: Refer to the product reference number in the header of the columns to use this product-ballast compatibility list.
Please note that Philips CorePro LED PLC 4P are only tested with HF ballast on AC operation. The performance of Philips CorePro LED PLC 4P on HF ballasts with DC operation is not tested and is therefore not guaranteed. Philips CorePro LED PLC 4P range is designed to work on HF ballasts only. For EM ballasts configuration, please contact a Philips sales representative for more information on our EM compatible range.
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Always check the latest update of the compatibility list on www.philips.com/ledtube

Dimming: Philips CorePro LED PLC 4P are not developed for dimming therefore the performance cannot be guaranteed in a dimming application. In case of usage of a non-dimmable product in a dimmable application, warranty does not apply.

Philips CorePro LED PLL HF 16W 8xx 4P 2G11



Ballast Compatibility

KEY

	Ballast is compatible
 *	Ballast is compatible, light output may differ >10% compared to specifications
	Ballast is not compatible

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	Ballast type	10nc	Lamps on ballast	
PHILIPS	HF-P 136 TL-D III 220-240V 50/60Hz IDC	913713031566	1	
	HF-P 236 TL-D III 220-240V 50/60Hz IDC	913713031666	2	
	HF-S 136 TL-D II 220-240V 50/60Hz	913713032166	1	
	HF-S 236 TL-D II 220-240V 50/60Hz	913713032466	2	
	HF-E 136 TL-D II 220-240 50/60Hz	913713041066	1	
	HF-E 236 TL-D II 220-240 50/60Hz	913713041166	2	
	HF-S 336 TL-D II 220-240V 50/60Hz	913713032766	3	
	HF-Pi 114/21/24/39 TL5 EII 220-240V	913700624066	1	
	HF-Pi 2 14/21/24/39 TL5 EII 220-240V	913700624266	2	
	HF-P 136 PLL EII 220-240V 50/60Hz	913700192066	1	
	HF-P 236 PLL EII 220-240V 50/60Hz	913700192366	2	
	HF-P 136 PLL III 220-240V 50/60Hz	913713028466	1	
	HF-P 236 PLL III 220-240V 50/60Hz	913713028566	2	
	HF-P 136 PLL 220-240	9137001145	1	
	HF-R 236 TL-D EII 220-240V 50/60Hz	913700609366	2	
	HF-Regulator 236 PLL EII 220-240V 50/60Hz	913700620066	2	
	HF-R 136 PLL 220-240	9137001156	1	
	HF-R 236 PLL 220-240	9137001157	2	
	HF-Ri TD I 14/21/24/39 TL5 E+	9137006983	1	
	HF-B 136 TLD 220-240	9137001122	1	
	HF-B 136 TLD EII 220-240	9137001926	1	
	HF-B 236 TLD EII 220-240	9137001928	2	
	OSRAM	Qti 1x14/21/39 GII		1
		Qti 2x14/21/39 GII		2
		QT-M 2x26-42/220-240 S		2
QTP-DL 1x36-40			1	
QTP-DL 2x36-40			2	
QTP-M 1x26-42			1	
QTP-M 2x26-32			2	
QTP-OPTIMAL 2x18-40			2	
Quictronic QT 1x36/230			1	
QT-M 1x26-42/230-240 S			1	
QT-M 2x26-32/230-240 S		2		
HELVAR	EL1x39/36ngn5		1	
	EL2x39/36ngn5		2	
	EL2x39/36s		2	
	EL1/2x36/38TCs - Single		1	
	EL1/2x36/38TCs - Single		1	
	EL1/2x18-42TCs - Single		1	
VOSSLOH SCHWABE	ELXc 140.862	188140	1	
	ELXc 240.863	188616	2	
	ELXc 142.872	188700	1	
	ELXc 242.837	188643	2	
	ELXc 236.208	188705	2	
	ELXc 142.876	188888	1	
	ELXc 242.877	188889	2	
TRIDONIC	PC 1/36 TCL PRO	22176141	1	
	PC 2/36 TCL PRO	22176170	2	
	PC 3/36 T8 PRO	22176231	3	
	PC 1/14-35/24/39 T5 PRO-M lp	22176182	1	
	PC 2/14-21/24/39 T5 PRO-M lp	22176185	2	
	PC 1x36 T8 TEC	87500258	1	
	PC 2x36 T8 TEC	87500259	2	
	PC 2x36/4x18 T8 TEC	87500260	2	
PCA 2/36 TCL ECO	22085516	2		

CorePro LED PLL HF 16W 8xx 4P 2G11 Model number / EOC code: 9290013815 / 871869673966200 9290013816 / 871869673974700 9290013817 / 871869673976100
AC (50Hz) on HF Ballast Compatible

Philips CorePro LED PLL HF 16W 8xx 4P 2G11



Ballast Compatibility

KEY

	Ballast is compatible
*	Ballast is compatible, light output may differ >10% compared to specifications
	Ballast is not compatible

This document is for information purposes and must be treated as recommendation. Philips attempted to provide best results, results are generated in lab controlled environment and may differ from actual application conditions

			CorePro LED PLL HF 16W 8xx 4P 2G11 Model number / EOC code: 9290013815 / 871869673966200 9290013816 / 871869673974700 9290013817 / 871869673976100
			AC (50Hz) on HF Ballast Compatible
BAG HUECO	Ballast type	10nc	Lamps on ballast
	BCS38.1LS-01/220-240	10097427	1
	BCS38.1Q-01/220-240	10097437	1
	BCS39.1FX-11/220-240	10077581	1
	BCS42.1Q-01/220-240	10097535	1
	MLS39.1-2FR-11/220-240 - Single	10092026	1
	MLS39.1-2FR-11/220-240 - Single	10092026	1
	BCS39.2FX-11/220-240	10077582	2
Trilux	D58.1-23021 E	166072	1
Others	Direct Mains	10051000	1
	Electro Magnetic Ballast		

General note Philips CorePro LED PLL

General notes: Refer to the product reference number in the header of the columns to use this product-ballast compatibility list.

Please note that Philips CorePro LED PLL 4P are only tested with HF ballast on AC operation. The performance of Philips CorePro LED PLL 4P on HF ballasts with DC operation is not tested and is therefore not guaranteed. Philips CorePro LED PLL 4P range is designed to work on HF ballasts only.

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Always check the latest update of the compatibility list on www.philips.com/ledtube

Dimming: Philips CorePro LED PLL 4P are not developed for dimming therefore the performance cannot be guaranteed in a dimming application. In case of usage of a non-dimmable product in a dimmable application, warranty does not apply.

Philips CorePro LED PLL HF 24W (55) 8xx 4P 2G11

Ballast Compatibility



KEY

	Ballast is compatible
 *	Ballast is compatible, light output may differ >10% compared to specifications
	Ballast is not compatible

This document is for information purposes and must be treated as recommendation. Philips attempted to provide best results, results are generated in lab controlled environment and may differ from actual application conditions

			CorePro LED PLL HF 24W 8xx 4P 2G11 Model number: 9290019204 / 871869682839700 9290019205 / 871869682841000 9290019206 / 871869682843400
			AC (50Hz) on HF Ballast Compatible
PHILIPS	Ballast type	10nc	Lamps on ballast
	HF-E 1/2 54 TL5 II 220-240 50/60Hz	913713040866	1
	HF-E 1/2 54 TL5 II 220-240 50/60Hz	913713040866	2
	HF-E 1/2 58 TL-D II 220-240 50/60Hz	913713040966	1
	HF-E 1/2 58 TL-D II 220-240 50/60Hz	913713040966	2
	HF-P 158 TL-D III 220-240V 50/60Hz IDC	913713031866	1
	HF-P 158 TL-D III 220-240V 50/60Hz IDC UBA 2013T	913713031866	1
	HF-P 258 TL-D III 220-240V 50/60Hz IDC	913713031966	2
	HF-P 154/155 TL5 HO/PL-L III IDC	913713028266	1
	HF-P 254/255 TL5 HO/PL-L III IDC	913713028366	2
	HF-S 154 TL5 II 220-240V 50/60Hz	913713033666	1
	HF-S 254 TL5 II 220-240V 50/60Hz	913713033766	2
	HF-S 158 TL-D II 220-240V 50/60Hz	913713032266	1
	HF-S 258 TL-D II 220-240V 50/60Hz	913713032566	2
	HF-S 258 TL-D II HT 220-240V 50/60Hz	913700689966	2
	HF-B 158 TLD EII 220-240	9137001927	1
	HF-B 258 TLD EII 220-240	913700929	2
	HF-Pi 1 28/35/49/54 TL5 EII 220-240V	913700624166	1
	HF-Pi 2 28/35/49/54 TL5 EII 220-240V	913700624366	2
OSRAM	HF-P 155 PLL EII 220-240 50/60Hz	913700192266	1
	HF-P 255 PLL EII 220-240V 50/60Hz	913700192566	2
	HF-P 255 PLL EII 220-240 50/60Hz	9137006513	2
	HF-P 155 PLL III IDC 220-240V 50/60Hz	913713028866	1
	HF-P 155 PLL 220-240	9137001218	1
	HF-P 255 PLL 220-240	9137001150	2
	QT-FQ 2x80		2
	Qt1 1x35/49/80 GII		1
	Qt1 2x35/49/80 GII		2
	QTP-DL 2x55 GII		2
HELVAR	QTP-DL 1x55 GII		1
	QTP-DL 2x55		2
	QTP-FC 1x55		1
	QT 2x55 / 230		2
VOSSLOH SCHWABE	QTP-OPTIMAL 1x54-58		1
	QTP-OPTIMAL 2x54-58		2
TRIDONIC	EL1x55ngn5		1
	EL2x55ngn5		2
	EL1x55s		1
	EL2x55s		2
ELXc	ELXc 180.866	188144	1
	ELXc 254.865	188618	2
	ELXc 280.538	188619	2
	ELXc 155.378	188680	1
PC	PC 1x80 T5 PRO lp	22185209	1
	PC 2x55 TCL PRO lp	22185286	2
	PC 1/55 TCL PRO	22176169	1
	PC 2/55 TCL PRO	22176233	2
	PC 1/14-35/49/80 T5 PRO-M lp	22176184	1
	PC 1x58 T8 PRO lp	22185215	1
	PC 2x58 T8 PRO sl	22185218	2
	PC 1x58 T8 TEC	87500150	1
	PC 2x58 T8 TEC	87500151	2

Philips CorePro LED PLL HF 24W (55) 8xx 4P 2G11

Ballast Compatibility



KEY

	Ballast is compatible
*	Ballast is compatible, light output may differ >10% compared to specifications
	Ballast is not compatible

This document is for information purposes and must be treated as recommendation. Philips attempted to provide best results, results are generated in lab controlled environment and may differ from actual application conditions

	Ballast type	10nc	Lamps on ballast
BAG HUECO	BCS54.1FX-11/220-240	10077585	1
	BCS55.1Q-01/220-240/T5C	10097634	1
	BCS54.2FX-11/220-240	10077586	2
	MLS80.1/54.2FR-11/220-240	10071609	1
	MLS80.1/54.2FR-11/220-240	10071609	2
	BCS54.1FR-01/220/240	10075881	1
	D58.1-23021 E	166072	1
	D58.2-23021 E	166082	2
Trilux	BCS58.1SR-01/220-240	10051002	1
	D58.1-23021 E		1
TCI	BTLT 154	137998/154	1
	BTLT 254	137999/54	2
Others	Direct Mains		
	Electro Magitic Ballast		

CorePro LED PLL HF 24W 8xx 4P 2G11 Model number: 9290019204 / 871869682839700 9290019205 / 871869682841000 9290019206 / 871869682843400
AC (50Hz) on HF Ballast Compatible
*
*
*
*
*
*

General note Philips CorePro LED PLL

General notes: Refer to the product reference number in the header of the columns to use this product-ballast compatibility list.

Please note that Philips CorePro LED PLL 4P are only tested with HF ballast on AC operation. The performance of Philips CorePro LED PLL 4P on HF ballasts with DC operation is not tested and is therefore not guaranteed. Philips CorePro LED PLL 4P range is designed to work on HF ballasts only.

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Always check the latest update of the compatibility list on www.philips.com/ledtube

Dimming: Philips CorePro LED PLL 4P are not developed for dimming therefore the performance cannot be guaranteed in a dimming application. In case of usage of a non-dimmable product in a dimmable application, warranty does not apply. warranty does not apply.



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LED lamps

CorePro Glass
LED HID lamps

For a range of indoor
and outdoor applications



Easy upgrade from HID lamps to LED with a perfect-fit solution

The new Philips CorePro Glass LED HID lamps offer an easy and short payback solution to replace High Intensity Discharge (HID) lamps. They bring all the energy efficiency and long-life benefits of LED to HID replacement, while providing instant savings from a low initial investment.

These lamps are designed with an optimal lamp size as well as light distribution with a familiar look and feel as conventional HID lamps. The unique High-Power LED filament technology in a full glass bulb makes this possible. Easily retrofit for outdoor and indoor applications.

Benefits

- Compact design that is the perfect fit with existing HID fixtures
- Frosted Glass Housing for same look and feel as conventional HID
- Patented High Power LED filament design for superior light quality and uniformity
- Suitable for indoor and outdoor applications
- Suitable for both Enclosed and open fixtures
- Low initial investment and short payback time

Features

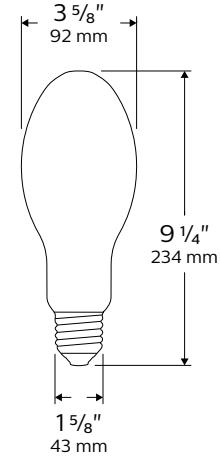
- Operational temperature range of -20-45°C
- 2KV Surge protection
- CRI 80 enable suitability for both indoor and outdoor applications
- Flexible product for use in multiple applications:
 - Public streets and roads
 - Parks, Squares, Plazas and public areas
 - Industrial buildings and warehouses

Philips CorePro Glass LED HID lamps

Ordering, electrical and technical data (Subject to change without notice)



Product No.	Model No. (6nc)	Description	Watts (W)	Replace Watts (W)	Lumens (lm)	CRI (min)	CCT (K)	Lifetime ¹ (hrs)	Dimension (HxL inches)	Dimension (W diameter)	Qty per pallet	
CorePro Corn Cob Glass (120/277V) - Launched November 2021												
W E	577593	929003150604	32GC/LED/850/ND E39 BB 6/1	32	100	5000	80	5000	25,000	9.21	3.6	510
W E	577601	929003150704	36GC/LED/850/ND E39 BB 6/1	36	150	5900	80	5000	25,000	9.21	3.6	510
W E	577577	929003154804	32GC/LED/830/ND E39 BB 6/1	32	100	4600	80	3000	25,000	9.21	3.6	510
W E	577585	929003154904	36GC/LED/830/ND E39 BB 6/1	36	150	5200	80	3000	25,000	9.21	3.6	384
CorePro Corn Cob Glass E26 (120/277V) - Pending Launch 2022												
W E	578815	929003507404	14GC/LED/830/ND E26 BB 6/1	14	70	2000	80	3000	25000	7.2	2.99	480
W E	578823	929003507504	14GC/LED/840/ND E26 BB 6/1	14	70	2000	80	4000	25000	7.2	2.99	480
W E	578831	929003507604	14GC/LED/850/ND E26 BB 6/1	14	70	2000	80	5000	25000	7.2	2.99	480
W E	578849	929003507704	19GC/LED/830/ND E26 BB 6/1	19	100	3000	80	3000	25000	7.2	2.99	480
W E	578856	929003507804	19GC/LED/840/ND E26 BB 6/1	19	100	3000	80	4000	25000	7.2	2.99	480
W E	578864	929003507904	19GC/LED/850/ND E26 BB 6/1	19	100	3000	80	5000	25000	7.2	2.99	480
W E	578872	929003508004	28GC/LED/830/ND E26 BB 6/1	28	125	4000	80	3000	25000	7.72	2.99	480
W E	578880	929003508104	28GC/LED/840/ND E26 BB 6/1	28	125	4000	80	4000	25000	7.72	2.99	480
W E	578898	929003508204	28GC/LED/850/ND E26 BB 6/1	28	125	4000	80	5000	25000	7.72	2.99	480
CorePro Corn Cob Glass EX39 (120/277V) - Pending Launch 2022												
W E	578914	929003508304	34GC/LED/830/ND EX39 BB 6/1	34	150	5000	80	3000	25000	8.58	3.6	240
W E	578922	929003508404	34GC/LED/840/ND EX39 BB 6/1	34	150	5000	80	4000	25000	8.58	3.6	240
W E	578930	929003508504	34GC/LED/850/ND EX39 BB 6/1	34	150	5000	80	5000	25000	8.58	3.6	240
W E	578948	929003508604	38GC/LED/830/ND EX39 BB 6/1	38	175	6000	80	3000	25000	8.58	3.6	240
W E	578954	929003508704	38GC/LED/840/ND EX39 BB 6/1	38	175	6000	80	4000	25000	8.58	3.6	240
W E	578962	929003508804	38GC/LED/850/ND EX39 BB 6/1	38	175	6000	80	5000	25000	8.58	3.6	240



1. Tested to B50 L70 requirement. LED lifetime means the length of time (in hours) until half of the LED light sources maintain at least 70% of their initial lumen output (B50, L70).

W = Wet location
E = Suitable for enclosed fixtures

Energy saving solution

For Glas LED	
Estimated lighting costs using a 150w MH lamp with ballast	using a 100w MH lamp with ballast
Present Wattage	195 watts
× Annual operating hours	4,000 hours
=	780,000 watt-hours
÷ 1,000	= 780 kWh per year
× kWh rate of \$0.11	= \$85.80 per year
× 100 lamps	= \$8,580.00 annual energy cost
Total estimated savings	\$6,996.00 annual savings
Estimated lighting costs using a Philips High bay LED lamp	
Present Wattage	36 watts
× Annual operating hours	4,000 hours
=	144,000 watt-hours
÷ 1,000	= 144 kWh per year
× kWh rate of \$0.11	= \$15.84 per year
× 100 lamps	= \$1,584.00 annual energy cost
using a Philips Corn cob LED lamp	
Present Wattage	32 watts
× Annual operating hours	4,000 hours
=	128,000 watt-hours
÷ 1,000	= 128 kWh per year
× kWh rate of \$0.11	= \$14.08 per year
× 100 lamps	= \$1,408.00 annual energy cost
Total estimated savings	
\$4,312.00 annual savings	

Based on 100 lamps per space operating at 4000 hours per year.

1. LED lifetime means the length of time (in hours) until half of the LED light sources maintain at least 70% of their initial lumen output (B50, L70). Lamps rated 50,000 hours is for bare lamp without fixture.

This example shows an application of 100 lamps accenting a space, operating 4,000 hours. Your actual savings may vary depending on the energy costs in your geographic location.

WARNINGS AND CAUTIONS

Risk of property damage or personal injury – The weight of the lamp is within the UL weight specification of a mogul (E39) base. However, before installing the lamp please ensure that the lamp holder (or socket) is not damaged or loose. The lamp holder (or socket) must be secured firmly to the fixture. If the lamp holder is damaged, corroded, charred or blackened, it must be replaced.

CAUTION: Risk of electric shock— do not use where directly exposed to water.

NOTES: This device complies with Part 15 of the FCC rule. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation. This Class B digital apparatus complies with Canadian ICES-005. Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment. This lamp is suitable for dry and/or damp locations (indoor & outdoor applications). Suitable for use in outdoor luminaires as these luminaires provide a damp location for the lamp. This lamp is suitable for use in totally enclosed luminaires.



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Signify North America Corporation
400 Crossing Blvd, Suite 600
Bridgewater, NJ 08807
Telephone: 855-486-2216

Signify Canada Ltd.
281 Hillmount Road,
Markham, ON, Canada L6C 2S3
Telephone: 800-668-9008

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PHILIPS

Lighting



Trueforce Core LED SON-T

TForce Core LED road 40W 740 E40 MV

The new Philips Trueforce Core LED SON-T lamps offer you an easy, short-payback LED solution to replace High Intensity Discharge (HID) lamps. This new generation of products brings all the energy-efficiency and long-lifetime benefits of LED to HID replacement, while providing instant saving with a low initial investment.

Furthermore, they're designed to have the same lamp size and light distribution as other HID lamps, so you will never know the difference. All thanks to our High-Power LED filament technology. Plus, its unique IP65 design means it can be used for outdoor applications.

Warnings and Safety

- Please refer to the installation guide or consult a Philips Lighting representative for the wiring diagram and instructions.

Product data

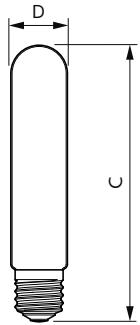
General Information		Operating and Electrical	
Cap base	E40	Luminous efficacy (rated) (nom.)	187.00 lm/W
Nominal lifetime	25,000 h	Colour consistency	<6
Switching Cycle	15,000	Colour rendering index (CRI)	70
Lighting Technology	LED	LLMF at end of nominal lifetime (nom.)	70 %
Flux measurement reference	Sphere	Flickering value (PstLM)	1
CE mark	Yes	Stroboscopic effect	2
EU RoHS compliant	Yes	Photobiological safety according to EN 62471	RG1
Light Technical			
Colour Code	740 [CCT of 4000K]	Line Frequency	50 to 60 Hz
Luminous Flux	7,500 lm	Input frequency	50 to 60 Hz
Colour designation	Cool White (CW)	Power Consumption	40 W
Correlated Colour Temperature	4000 K	Lamp current (nom.)	178 mA
		Starting time (nom.)	0.5 s

Trueforce Core LED SON-T

Warm-up time to 60% light	0.5 s
Power Factor (Fraction)	0.9
Voltage (nom.)	220-240 V
Ballast Compatibility	Mains
Temperature	
Ambient temperature range	-30 to +45 °C
T-Case maximum (nom.)	26 °C
Controls and Dimming	
Dimmable	No
Mechanical and Housing	
Lamp Finish	Clear
Bulb shape	T-shape
Approval and Application	
Energy Efficiency Class	B

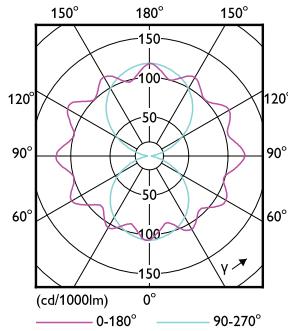
Energy consumption kWh/1,000 hours	40 kWh
EPREL registration number	574360
Product Data	
Order product name	TForce Core LED road 40W 740 E40 MV
Full product name	TForce Core LED road 40W 740 E40 MV
Full EOC	871951431635500
Order code	31635500
Material no. (12 NC)	929002485302
SAP numerator – quantity per pack	1
EAN/UPC — Product/Case	8719514316355
Numerator – packs per outer box	6
EAN/UPC - Case	8719514316362

Dimensional drawing

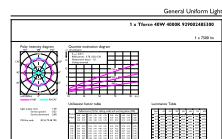


Product	D	C
TForce Core LED road 40W 740 E40 MV	46 mm	225 mm

Photometric data



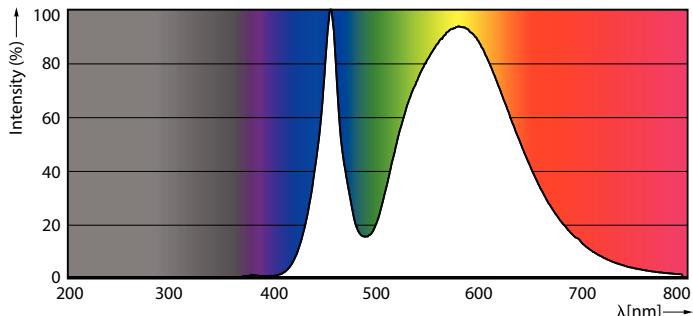
Light Distribution Diagram - TForce Core LED road 40W 740 E40 MV



General uniform lighting - TForce Core LED road 40W 740 E40 MV

Trueforce Core LED SON-T

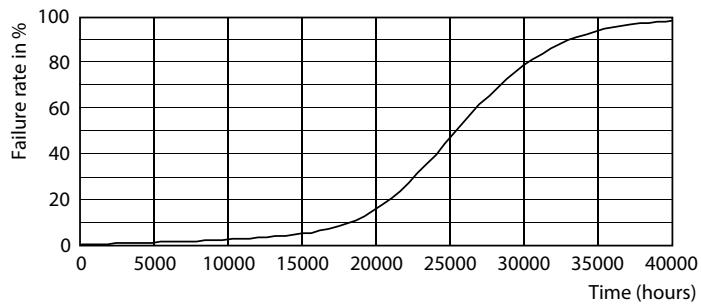
Photometric data



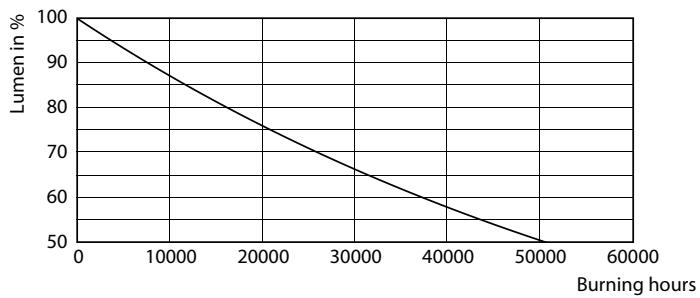
Spectral Power Distribution Colour - TForce Core LED road 40W 740 E40

MV

Lifetime



Life Expectancy Diagram - TForce Core LED road 40W 740 E40 MV



Lumen Maintenance Diagram - TForce Core LED road 40W 740 E40 MV



PHILIPS

Lighting



CorePro LED Downlight

6" CorePro LED Downlight 1000lm 90 CRI 30K 120V WH

6" CorePro LED Downlight 1000lm 90 CRI 30K 120V WH - 63 lm/W

The CorePro LED downlight family is Philips Lightolier's low cost LED recessed downlight that meets Energy Star and Title-24 compliance for residential and light commercial spaces. The family's complete offering of IC/Airseal remodeler and IC/Airseal new construction frame-in kit allows CorePro to go beyond retrofit applications.

Product data

General Information	
Colour Temperature	3000K
CRI	90
Downlight Type	Open Downlight
Photometric Distribution Type	Direct
Mounting	Recessed fransje vertaling
Operating and Electrical	
Luminaire Input Watts	16
Voltages	120 V
Mechanical and Housing	
Aperture Size Code	6 in
Shape	Round

Initial Performance (IEC Compliant)	
Luminaire Lumens	1000
Efficacy	63 lm/W
Product Data	
Order product name	6" CorePro LED Downlight 1000lm 90 CRI 30K 120V WH
Commercial Code	CP6RB10930W
Order code	CP6RB10930W
Catalog Number Description	6" CorePro LED Downlight 1000lm 90 CRI 30K 120V WH
Service / Spec Smart	-
Material Nr. (12NC)	LIGU60013941



Catalog Number
Notes
Type

Contractor Select™

CPX™ LED

Flat Panel

The CPX is an LED edge-lit flat panel offered in industry standard wattages. The cost effective and reliable luminaire features a diffuse lens for even illumination over the surface of the panel. It is ideal for applications such as small offices, schools and retail.

FEATURES:

- Industry standard wattages
- Long-life LEDs maintain greater than 70% of their lumen output at 50,000 hours
- 0-10V dimming driver, dims to 10%



Catalog Number	UPC	Description	Lumens	Input Watts	CCT	CRI	Voltage	Pallet qty.
CPX 2X2 3200LM 35K M4	00191848338537	2x2 Flat Panel	3200	30	3500K	80	120-277V	48
CPX 2X2 3200LM 40K M4	00191848338650	2x2 Flat Panel	3200	30	4000K	80	120-277V	48
CPX 2X4 4000LM 35K M2	00191848338490	2x4 Flat Panel	4000	40	3500K	80	120-277V	24
CPX 2X4 4000LM 40K M2	00191848338506	2x4 Flat Panel	4000	40	4000K	80	120-277V	24

Accessories: Order as separate catalog number.

2X2SMKSH	2'x2' Surface Mount Troffer Kit
2X4SMKSH	2'x4' Surface Mount Troffer Kit
PS1055CP	10W constant power ¹
DGA22	Drywall grid adapter for 2x2 recessed fixture.
DGA24	Drywall grid adapter for 2x4 recessed fixture.



Specifications

INTENDED USE:

The CPX Series LED is a low-glare panel featuring an external driver. This cost-effective, reliable flat panel is visually comfortable and can be recessed, or Surface Box mounted. Suitable for many applications such as schools, offices, retail, convenience stores, hospitals, healthcare facilities and other commercial spaces. **Certain airborne contaminants can diminish integrity of acrylic.**

CONSTRUCTION:

The extruded aluminum frame with satin white lens provides excellent shielding and uniform luminance. CPX's low-profile design provides increased installation flexibility especially in restricted plenum spaces. The back plate includes integral T-bar clips for installation into T-grid ceilings.

ELECTRICAL:

Long-life LEDs, coupled with a high-efficiency driver, provide superior illumination for extended service life. Greater than 70% LED lumen maintenance at 50,000 hours (L₇₀>50,000).

0-10V dimming driver, dims to 10%.

LISTINGS:

CSA certified to meet US and Canadian standards. Damp location listed. IC rated.

DesignLights Consortium® (DLC) qualified product. Not all versions of this product may be DLC qualified.

WARRANTY:

5-year limited warranty.

Note: Actual performance may differ as a result of end-user environment and application. All values are design or typical values, measured under laboratory conditions at 25 °C. Specifications subject to change without notice.

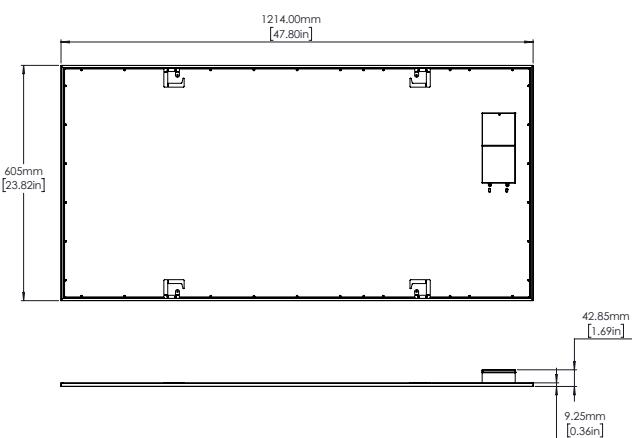
Dimensions

Length: 47.80 (121.4)

Width: 23.82 (60.5)

Depth: 1.68 (4.3)

Weight: 6 lbs

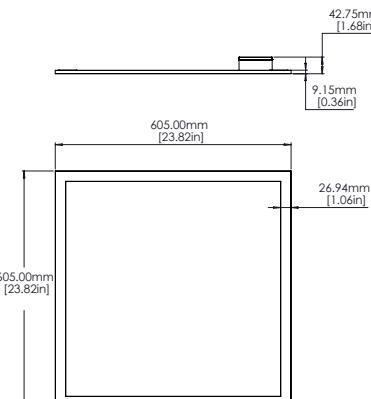


Length: 23.82 (60.5)

Width: 23.82 (60.5)

Depth: 1.68 (4.3)

Weight: 12.02 lbs



All dimensions are inches (centimeters) unless otherwise indicated.

PHILIPS**Lighting**

CoreLine panel

RC132V LED36S/840 PSD W60L60 ELB3 OC

CoreLine panel, 40 W, 600x600 mm, 3600 lm, 4000 K, DALI, UGR19, ELB3h

Philips CoreLine panel Gen5 delivers on the CoreLine promise of innovation, easy installation and excellent illumination. Designed as a direct replacement for functional luminaires in general lighting applications, this LED panel light's innovative MultiLumen feature offers a choice of three lumen packages in a single luminaire. This makes it easy to select the right product, gives you the flexibility respond to customer preferences on site, and means fewer product codes on stock. Installing this CoreLine RC132V LED panel is quick and easy too, thanks to a quick connector or Wieland connector. Interact Ready luminaires with integrated wireless communications are also available in this CoreLine range, ready to be used with Interact gateways, sensors and software.

Product data

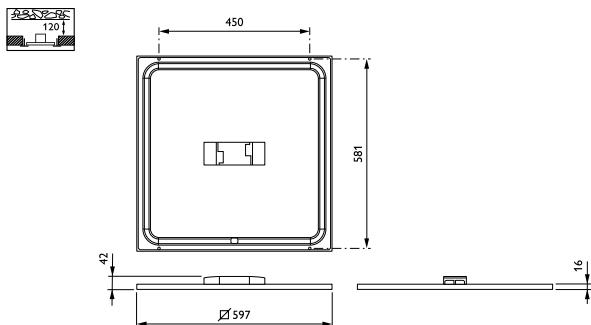
General Information		Value ladder	Performance
Lamp family code	LED36 [LED module 3600 lm]	CE mark	Yes
Cap-Base	- [-]	Warranty period	3 years + 2 years upon registration
Light source replaceable	No	Flammability mark	For mounting on normally flammable surfaces
Number of gear units	1 unit	ENEC mark	-
Gear	-	Glow-wire test	Temperature 650 °C, duration 30 s
Driver included	Yes	EU RoHS compliant	Yes
Remarks	Please download the Lighting - Product Data Sheet for more information and ordering options	Light Technical	
Service tag	Yes	Luminous Flux	3,600 lm
Product family code	RC132V [CORELINE PANEL]	Correlated Color Temperature (Nom)	4000 K
Lighting Technology	LED	Luminous Efficacy (rated) (Nom)	100 lm/W

CoreLine panel

Color rendering index (CRI)	≥80	Dimensions (Height x Width x Depth)	28 x 597 x 597 mm
Beam angle of light source	120 degree(s)	Ingress protection code	IP20/44 [Finger-protected; wire-protected, splash-proof]
Light source color	840 neutral white	Mech. impact protection code	IK02 [0.2 J standard]
Optic type	-	Sustainability rating	-
Luminaire light beam spread	100°	Protection class IEC	Safety class I
Unified glare rating CEN	19		
Operating and Electrical			
Input Voltage	220–240 V	Initial Performance (IEC Compliant)	
Line Frequency	50 to 60 Hz	Luminous flux tolerance	+/-10%
Average CLO power consumption	35 W	Initial chromaticity	(0.38, 0.38) SDCM <3
End CLO power consumption	- W	Power consumption tolerance	+/-10%
Inrush current	20.4 A		
Inrush time	0.195 ms	Over Time Performance (IEC Compliant)	
Power Consumption	40 W	Driver failure rate at 5000 h	1 %
Power Factor (Fraction)	0.9	Control gear failure rate at median useful life 50000 h	5 %
Connection	Push-in connector and pull relief	Lumen maintenance at median useful life* 50000 h	L80
Cable	-		
Number of products on MCB of 16 A type B	24		
Temperature			
Ambient temperature range	+10 to +40 °C	Application Conditions	
Controls and Dimming			
Dimmable	Yes	Performance ambient temperature Tq	25 °C
Driver/power unit/transformer	Power supply unit with DALI interface	Maximum dim level	1%
Control interface	DALI	Suitable for random switching	Yes
Constant light output	No		
Mechanical and Housing			
Housing Material	Aluminum	Product Data	
Reflector material	-	Order product name	RC132V LED36S/840 PSD W60L60 ELB3 OC
Optic material	Polymethyl methacrylate	Full product name	RC132V LED36S/840 PSD W60L60 ELB3 OC
Optical cover material	Polymethyl methacrylate	Full product code	871869940130600
Fixation material	Aluminum	Order code	910500465357
Housing Color	White	Material Nr. (12NC)	910500465357
Optical cover finish	Opal	Numerator - Quantity Per Pack	1
Overall length	597 mm	EAN/UPC - Product/Case	8718699401306
Overall width	597 mm	Numerator - Packs per outer box	1
Overall height	28 mm	EAN/UPC - Case	8718699401306

CoreLine panel

Dimensional drawing



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www.lighting.philips.com
2023, December 5 - data subject to change



Linear

TruGroove

Suspended



TruGroove suspended, surface & wall is driving performance beyond the edge. Innovative optics deliver exceptional uniformity and wide row spacing from a 3" aperture continuous line of light. An extended family and refined design are perfect for lighting any professional space.

TruGroove suspended now includes AccuRender technology for the highest color quality at the highest efficacy

Project:		
Location:		
Cat.No:		
Type:		
Line ID:	Qty:	
Notes:		

Ordering guide

example: 2905L93535QQ08DS1RCST, A6-1-24

Family 29	Version 0	Distribution	Source L	CRI/CCT ¹	
29 TruGroove	0 Suspended	1 Direct 3 Indirect 5 Indirect / Direct 6 Direct / Indirect	L LED	950 CRI 90, 5000K 940 CRI 90, 4000K 935 CRI 90, 3500K	930 CRI 90, 3000K 927 CRI 90, 2700K 8T2 CRI 80, 2700-6500K 2ch Tunable White (confirm controls) ⁵
Lumens¹		Optics (Direct/Indirect)			
40 4000 lm/4ft	QN Performance Symmetric Flush MesoOptics Lens (Dn)			02 2ft	
30 3000 lm/4ft	LN Definition Symmetric Flush Slik Lens (Dn)			03 3ft ¹²	
22 2200 lm/4ft	WN Performance Asymmetric Wall Wash Flush MesoOptics Lens (Dn)			04 4ft	
15 1500 lm/4ft				05 5ft ¹²	
48 4800 lm/4ft	NQ Performance Symmetric Lens (Up)			06 6ft	
32 3200 lm/4ft	NW Performance Asymmetric Lens (Up)			08 8ft	
	QQ Performance Symmetric MesoOptics Lens (Dn)			XX Continuous run in 1ft increments (please specify length) ⁷	
68 6800 lm/4ft (70% Up)	Performance Symmetric Lens (Up)			Suspended Patterns⁸:	
52 5200 lm/4ft (60% Up)	LQ Definition Symmetric Flush Silk Lens (Dn)			A4 2 ft x 2 ft Flat Corner (90°)	
46 4600 lm/4ft (70% Up)	Performance Symmetric Lens (Up)				
35 3500 lm/4ft (60% Up)	WW Performance Asymmetric Wall Wash MesoOptics Lens (Dn)				
68 6800 lm/4ft (60% Down)	Performance Asymmetric Lens (Up)				
52 5200 lm/4ft (60% Down)					
46 4600 lm/4ft (70% Down)					
35 3500 lm/4ft (60% Down)					
Voltage	Driver	Circuit ^{2,10}	Wiring Option ^{2,10}	System / Controls ⁹	
D UNV 120-277V 3 347V ³	E Advance Xitanium 0-10V (1% Dim)	1 Single Circuit C Single Circuit + 1 Thru Wire (BP Trigger) ¹¹ F Single Circuit + 4 Thru Wires (Mains & Dimming) ¹¹ G Dual Circuit (Up/Down) L Dual Circuit (Up/Down) + 1 Thru Wire (BP Trigger) ¹¹ J Dual Circuit + 4 Thru Wires (Mains & Dimming) ¹¹	N None B Battery Pack ³ E Aux. Wiring ⁶ G GTD ³ (please specify voltage)	NN None	
D UNV 120-277V	D Advance Xitanium DALI (5% Dim) ³				
	H Lutron EcoSystem LDE1 (<1% Dim, Fade-to-Black) ³				
D UNV 120-277V	S Advance Xitanium SR (1% Dim) ³	1 Single Circuit C Single Circuit + 1 Thru Wire (BP Trigger) ¹¹	N None B Battery Pack ³ R UL924 Sensor Bypass Relay ¹³	NN None CS Interact Pro scalable wireless sensor with integral daylight & occupancy sensing, advanced grouping with dwell time ^{4,14} SB Interact Pro Enterprise advanced wireless sensor bundle, Integral SC1500 with IoT capabilities for enterprise scale projects ^{4,12,14}	
Finish	Mount Type			Suspension	
W Standard White T Titanium Silver B Black G Graphite Grey C Custom (please specify color)	A1 Non-accessible ceiling, 0'-15' Slope Mount A2 T-Grid, Fixed Position Mount A3 Non-accessible ceiling, 0'-90' Slope Mount A5 T-Grid 24" Span Mount (non tegular tile only)	A6-1 T-Grid On-Grid Mount 15/16" (non tegular tile only) A6-2 T-Grid On-Grid Mount 9/16" (non tegular tile only) A6-3 T-Grid On-Grid Mount 9/16" x 5/16" (slot tee & tegular tile)	24 24" 48 48" 96 96"	144 144" 192 192" 240 240"	

See footnotes on page 2.

DLC Note: Not all product variations listed on this page are DLC qualified. To ensure that a specific model is qualified, visit www.designlights.org/search



interact ready.

TruGroove suspended

Ordering guide footnotes

1. Nominal values within a range. Not all lumen packages are available with all configurations. Consult photometry data for CRI, color temp, lumens & distribution of chosen configuration.
2. Not all wiring types are available with all configurations. Consult Ledalite for a complete list of available options.
3. 347V not available with Battery Pack, GTD, DALI, Lutron EcoSystem or Sensor Ready drivers or Interact Pro options. Battery packs available in modules > 4ft (lumen package limits may apply, check with Ledalite).
4. Interact Pro options require separate controls hardware by Signify.
5. Please enquire about options for Tunable White with DALI (DT6 or DT8), 0-10V, or DMX control (extended lead times may apply).
6. Auxiliary Wiring not available with Interact Pro luminaires. Aux sections are wired to one fixture end only.
7. Available in continuous run lengths in increments of 1ft. Please enquire about options for smaller increments.
8. Flat corners are 90°. No asymmetric lens optics in corners. Please enquire about options for custom angles and intersections (extended lead times may apply).
9. Sensors are only available in white, but can be combined with any luminaire finish. Signify sensor options shown in the order guide. Third party sensors also available, please enquire about options for Lutron Athena, Vive, or others.
10. Luminaires are pre-wired to both ends with quick wire connectors at one end for standard circuit & battery pack trigger wire (if applicable). Each circuit has its own neutral conductor. All circuits are clearly labelled at each end.
11. Thru Wire options can provide either one additional set of (4) power and dimming wires (Black/White/Purple/Grey or Pink) or one additional battery pack trigger wire (Orange) through a selected module, please consult factory for other Thru Wire options.
12. This option is available on request. Other options not shown here may also be possible via a custom request. Extended lead times and minimum order quantities may apply, please consult factory.
13. UL924 listed sensor bypass relay is factory installed between driver & sensor. Must be ordered in same module as integral sensing option. Must be installed in conjunction with a UL1008 device.
14. Must order IRT9015 Interact commissioning remote with each system order.

Note: Due to continuing product improvements, Ledalite reserves the right to change the specifications without notice.

TruGroove suspended

Options and dimensions

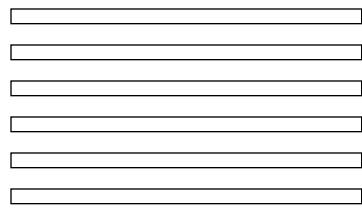
Standalone

Keep it simple with standalone modules, available in 6 standard lengths (consult Ledalite for custom lengths).

2ft	
3ft	
4ft	
5ft	
6ft	
8ft	

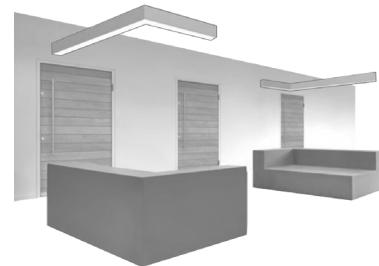
Continuous Run

Continuous Run in 1ft increments (enquire about smaller increments)



Patterns

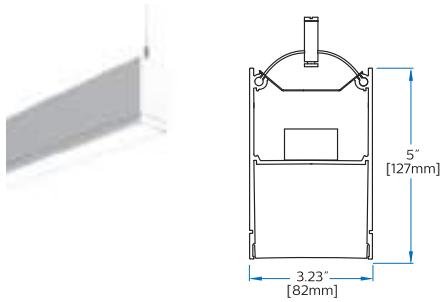
Seamlessly create any pattern imaginable (flat corners are 90°, contact Ledalite for custom angles and intersections).



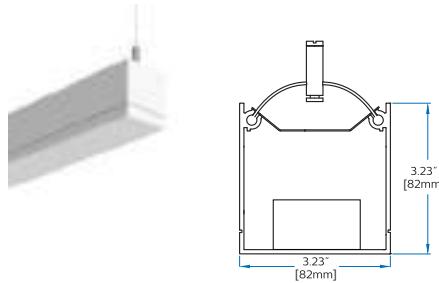
Flush lens

TruGroove suspended with 3" wide Flush MesoOptics or Silk lens.

Direct & Direct/Indirect



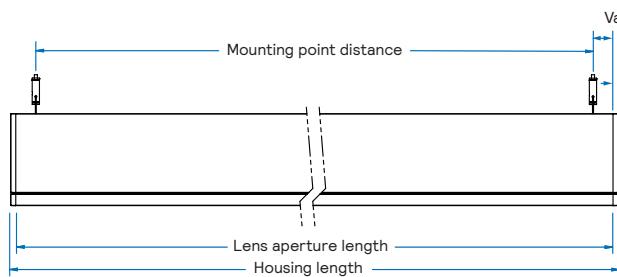
Indirect



TruGroove suspended

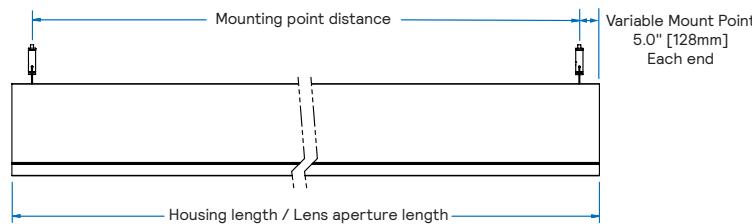
Side Views

Standalone



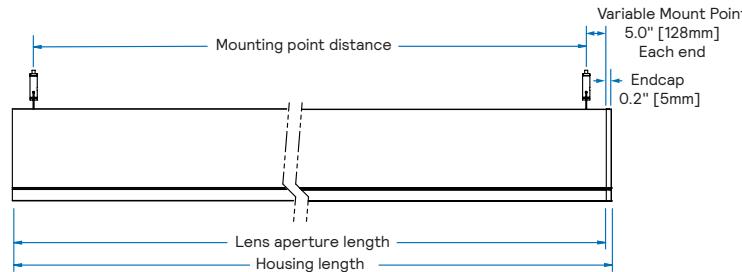
Nominal	Housing	Lens Aperture	Mounting Points
2ft	24.4" [620mm]	24.0" [610mm]	14.0" [559mm] to 23.5" [597mm]
3ft	36.4" [925mm]	36.0" [914mm]	26.0" [864mm] to 35.5" [902mm]
4ft	48.4" [1230mm]	48.0" [1219mm]	38.0" [1168mm] to 47.5" [1207mm]
5ft	60.4" [1535mm]	60.0" [1524mm]	50.0" [1473mm] to 59.5" [1511mm]
6ft	72.4" [1840mm]	72.0" [1829mm]	62.0" [1718mm] to 71.5" [1816mm]
8ft	96.4" [2449mm]	96.0" [2438mm]	86.0" [2388mm] to 95.5" [2426mm]

Continuous Run (Mid-run)



Nominal	Housing	Lens Aperture	Mounting Points
2ft	24.0" [610mm]	24.0" [610mm]	14.0" [559mm] to 23.5" [597mm]
3ft	36.0" [914mm]	36.0" [914mm]	26.0" [864mm] to 35.5" [902mm]
4ft	48.0" [1219mm]	48.0" [1219mm]	38.0" [1168mm] to 47.5" [1207mm]
5ft	60.0" [1524mm]	60.0" [1524mm]	50.0" [1473mm] to 59.5" [1511mm]
6ft	72.0" [1829mm]	72.0" [1829mm]	62.0" [1718mm] to 71.5" [1816mm]
8ft	96.0" [2438mm]	96.0" [2438mm]	86.0" [2388mm] to 95.5" [2426mm]

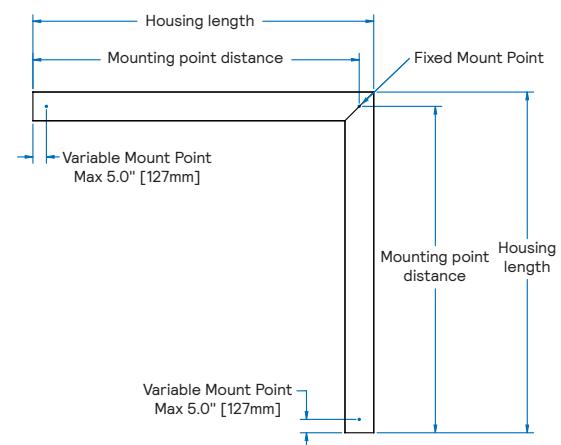
Continuous Run (End-run)



Nominal	Housing	Lens Aperture	Mounting Points
2ft	24.2" [610mm]	24.0" [610mm]	14.0" [559mm] to 23.5" [597mm]
3ft	36.2" [914mm]	36.0" [914mm]	26.0" [864mm] to 35.5" [902mm]
4ft	48.2" [1219mm]	48.0" [1219mm]	38.0" [1168mm] to 47.5" [1207mm]
5ft	60.2" [1524mm]	60.0" [1524mm]	50.0" [1473mm] to 59.5" [1511mm]
6ft	72.2" [1829mm]	72.0" [1829mm]	62.0" [1718mm] to 71.5" [1816mm]
8ft	96.2" [2438mm]	96.0" [2438mm]	86.0" [2388mm] to 95.5" [2426mm]

Top View

Flat Corner 90°



Nominal	Housing	Mounting Points
2ft x 2ft	25.6" [651mm]	24.0" [610mm]

Flat corners are 2ft x 2ft and can be used to create suspended patterns. Flat corners are 90°, contact Ledalite for custom angles and intersections.

Note: In corners, the upper hemisphere is always symmetric.

TruGroove suspended

Specifications

Optical System

Direct hemisphere: White light emitted from a linear array of downward-facing LEDs is laterally redirected using optical microstructures embedded in a layer of MesoOptics DX film. An extruded acrylic lens and MesoOptics film assembly then generates an optimal batwing distribution and a uniform continuum of light. The available Flush Silk Lens optics is a value-oriented option that provides a lambertian distribution while maintaining a uniform continuum of light.

Indirect hemisphere: White light emitted from a linear array of upward-facing LEDs is shaped into a homogeneous, wide-throw batwing distribution or a low peak angle asymmetric throw using either a freeform elliptical lens or an engineered light guide panel.

Housing

Post painted precision aluminum extrusion.

Endcaps

Diecast flat aluminum endcaps with integral groove to match housing.

Finish

High quality powder coated, available in standard Matte White, Black, Titanium Silver or Graphite Grey. TruGroove can also be specified in any custom color upon request for a one-time setup charge. Optional sensors (such as Interact Pro) available in white only.

Mounting

Suspended: Variable sling mount allows $\pm 5"$ of horizontal adjustment from joint or end. Aircraft cable and tamper-resistant gripper provide unlimited vertical adjustment and are independently tested to stringent safety standards.

Joints

Self-aligning joining system with hands-free pre-joining wire access.

Weight

Maximum 3.9lbs/ft (suspended), 21lb (2ft x 2ft suspended corner)

Electrical

Fixtures are factory pre-wired to section ends with quick-wire connectors and tested for all circuits and backup battery packs. LED boards and drivers are easily field replaceable with access from below the ceiling.

Standard Drivers

Advance Xitanium 0-10V, 1% Dimming.

Advance Xitanium DALI, 5% Dimming.

Advance Xitanium Sensor Ready, 1% Dimming.

Lutron EcoSystem LDE1, 1% Dimming with Soft-On and Fade-to-Black.

Class 2 rated output. Consult Ledalite for other available drivers.

Standard Battery Packs

Bodine Battery Pack, 90 min, 10W, Class 2 rated output.

Lumen output = 10W x luminaire efficacy x 1.1. Typical output ~1200lm.

Lumen Maintenance

LEDs have been tested by the manufacturer in accordance with IESNA LM-80-15. At an ambient temperature of 25°C, the LED lumen maintenance expectation according to IES TM-21-11 is:
 $L_{80} (10k) > 60,000$ hours (Reported methodology).

Source Color

LEDs rated for color rendering of:
CRI $R_a \geq 90$, $R_g \geq 50$, $C_u \geq 90$
IES TM-30-18 : $R_f \geq 90$, $R_{f,h1} \geq 89$, $R_g \geq 99$, $R_{cs,h1} \geq -5\%$

SPD and TM-30-18 reports available upon request

Fixture to fixture color accuracy within:

2 SDCM for Static White luminaires

3 SDCM for Tunable White luminaires

Approvals

Certified to UL, IES & CSA Standards.

Certain versions without battery packs are DesignLights Consortium® qualified. Please see the DLC QPL list for exact catalog numbers.
www.designlights.org/QPL

Select TruGroove configurations contribute toward satisfying features L03, L04, L06, L07 and L08 under the WELL v2 Building Standard®.

Environment

Rated for dry or damp locations in operating ambient temperatures of 0-25°C (32-77°F).

Many luminaire components, such as reflectors, refractors, lenses, and LEDs are made from various types of plastics which can be adversely affected by airborne contaminants. If sulfur-based chemicals, petroleum-based products, cleaning solutions, or other contaminants are expected in the intended area of use, consult factory for compatibility. Damage caused by sulfur, chlorine, petroleum-based solution or other contaminants are not covered under warranty. Not suitable for natatorium environments.

Warranty

Five-year luminaire limited warranty including LED boards and driver:
www.signify.com/warranties

QuickShip

10-day QuickShip available for most configurations upon request. More information available at:
www.signify.com/en-us/brands/ledalite/quickship

TruGroove suspended

Wireless Controls Options

Interact Pro scalable sensor for Foundation, Advanced & Enterprise tiers (CS an evolution of SpaceWise):

- CS is a connected sensor with integral occupancy and daylight sensing and supports wireless mesh connectivity.
- The sensor works in the Foundation mode (similar to SpaceWise) when configured without a gateway or in an Interact Pro Advanced or Enterprise mode if a compatible gateway is used.
- Interact Pro includes an App, a portal and a broad portfolio of wireless luminaires, lamps and retrofit kits all working on the same system.
- Startup is implemented via Interact Pro App (Android or iPhone) & Bluetooth connectivity. The App provides flexibility to choose between a gateway or non gateway mode for setup.
- Setup with the gateway requires wired internet access to the gateway. It is possible to add a gateway at a later point.
- Prepare project configuration steps remotely and use IRT9015 remote onsite to identify and group devices together.
- Compatible with UID8451/10 wireless dimmer switch, SWS200 wireless scene switch, wireless Occ sensor (OCC SENSOR IA CM IP42 WH 10/1) and wireless Day/Occ sensor (OCC MULTI SENSOR IA CM WH 10/1).
- For more information on Interact Pro visit:
www.interact-lighting.com/interactproscalablesystem

Emergency Options (R):

- Power Sensing (Factory default) – Recommended
- UL924 option requires unswitched power sense line, absence of voltage on the normal circuit triggers luminaire to 100% output.
- Power Interruption Detection (Field option)
- Detects AC power interruption >30ms triggers 90 minute emergency mode with luminaire at 100% output.

Interact Pro scalable sensor bundles for Enterprise tier (SB):

- SB option, in addition to occupancy and daylight sensing, supports advanced IoT capabilities such as people estimation analysis, desk level temperature & humidity sensing, noise classification, and BLE beacon.
- Compatible with UID8451/10 wireless dimmer switch, SWS200 wireless scene switch, wireless Occ sensor (OCC SENSOR IA CM IP42 WH 10/1) and wireless Day/Occ sensor (OCC MULTI SENSOR IA CM WH 10/1).
- Use Interact software and insights to increase building efficiency, achieve building wide integration and optimize space through occupancy analytics.
- Requires compatible Gateway and internet connectivity for commissioning.

For more information, visit:

www.interact-lighting.com/office

Wired Controls Options

Tunable White:

- Other control options for Tunable White with DALI (DT6 or DT8), 0-10V, or DMX control are available via an Engineered-to-Order (ETO) request.
- Signify Tunable White solutions are designed to help maximize the influence of lighting on your daily life.
- Dynamic behaviors via scheduled lighting recipes mimicking daylight patterns or supporting biorhythms.
- Scene setting via lighting pre-sets based on various combinations of lighting color temperature and intensity.

TruGroove suspended

Functionalities overview

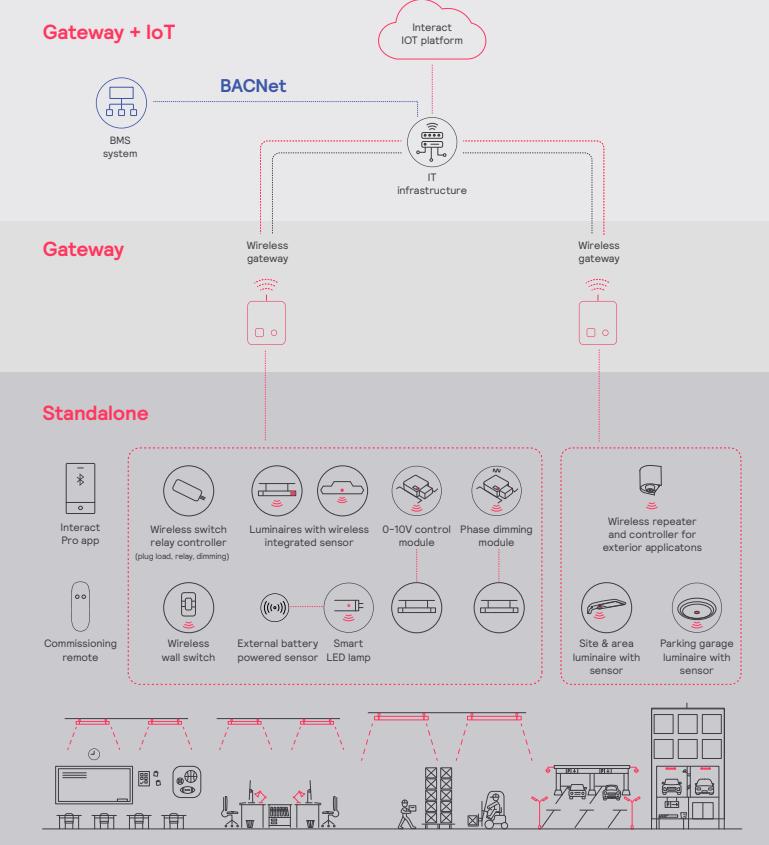
	The three tiers of Interact		
	Standalone	Gateway	Gateway + IoT
Dimming, grouping, and zoning	✓	✓	✓
Bluetooth and ZigBee enabled	✓	✓	✓
Motion sensing and daylight harvesting	✓	✓	✓
Integration with 0-10V and phase dimming fixtures	✓	✓	✓
Code compliance	✓	✓	✓
Granular dimming and dwell time	✓	✓	✓
New Correlated color temperature (CCT) tuning by switch	✓	✓	✓
New Support for sensor-based Tunable White luminaires	✓	✓	✓
Energy reporting and monitoring		✓	✓
Scheduling		✓	✓
Demand response		✓	✓
BMS integration (BACnet)			✓
Floor plan visualization			✓
IoT sensors for wellness			✓
IoT Apps for productivity			✓

Currently supported maximum system size

To be able to design the lighting system correctly for the customer, it is important to know the prime characteristics of the system, its possibilities and limitations.

System level	
Total number of gateways	Unlimited
Total number of devices	200 per network
• luminaires with integrated sensors	150
• smart TLEDS	150
Total number of ZGP devices (sensors and switches)	50
• sensors	30
• switches	50
• zones and groups	64
Group level	
Recommended number of lights	40 (recommended 25)
Number of ZGP devices	5
Number of scenes	16

Interact system architecture for office, education, healthcare, retail, industrial and parking applications



TruGroove suspended

Colorimetry

TruGroove suspended (29xx) AccuRender Static White

Nominal CRI & CCT		CRI 90, 2700K	CRI 90, 3000K	CRI 90, 3500K	CRI 90, 4000K	CRI 90, 5000K
CIE 013.3-1995 ¹	CRI R _a	94	93	93	93	93
	R ₉	55	57	59	64	68
	G _a	99	99	99	99	99
	C ₉	93	93	93	93	94
IES TM-30-18 ²	R _f	92	91	91	91	90
	R _f , h ₁	90	90	90	91	89
	R _g	100	100	99	100	100
	R _{cs} , h ₁	-6%	-5%	-6%	-5%	-5%
MDER ³		0.45	0.51	0.58	0.65	0.81

1. Color Rendering Index (CRI Ra) and Strong Red (R9) are calculated in accordance with CIE 013.3-1995. Color Gamut index (Ga) and red chroma Index (C9) are CIE based properties using the Global Lighting Association's calculation tool.

2. Fidelity Index (Rf), Red Fidelity Index (Rf,h1), Gamut Index (Rg), and Red Local Chroma Shift (Rcs,h1) are calculated in accordance with IES TM-30-18.-18.

3. Melanopic Daylight Efficacy Ratio (MDER) is the measure for "spectral melanopic efficiency" as defined in CIE S 026-2018.

TruGroove suspended

Photometry

Direct (2901) Performance Symmetric Flush MesoOptic Lens - QN

Click "PDF" or "IES" text to download

Nominal CRI & CCT		CRI 90, 2700K				CRI 90, 3000K				CRI 90, 3500K				CRI 90, 4000K				CRI 90, 5000K								
Nominal Lumen Package (lm/4ft)	Watts	Flux (lm/4ft) ¹	Efficacy (LPW) ¹	UGR ²	Photometry Report	IES File	Flux (lm/4ft) ¹	Efficacy (LPW) ¹	UGR ²	Photometry Report	IES File	Flux (lm/4ft) ¹	Efficacy (LPW) ¹	UGR ²	Photometry Report	IES File	Flux (lm/4ft) ¹	Efficacy (LPW) ¹	UGR ²	Photometry Report	IES File	Flux (lm/4ft) ¹	Efficacy (LPW) ¹	UGR ²	Photometry Report	IES File
4000	42.0	3,747	89.2	23.9	PDF	IES	3,854	91.8	24.0	PDF	IES	4,003	95.3	24.1	PDF	IES	4,060	96.7	24.2	PDF	IES	4,151	98.8	24.2	PDF	IES
3000	32.9	2,998	91.1	23.1	PDF	IES	3,082	93.7	23.2	PDF	IES	3,192	97.0	23.3	PDF	IES	3,244	98.5	23.4	PDF	IES	3,316	100.8	23.5	PDF	IES
2200	22.2	2,023	91.1	21.8	PDF	IES	2,082	93.8	21.9	PDF	IES	2,148	96.8	22.0	PDF	IES	2,186	98.5	22.0	PDF	IES	2,234	100.6	22.1	PDF	IES
1500	14.7	1,361	92.6	20.4	PDF	IES	1,403	95.4	20.5	PDF	IES	1,444	98.2	20.6	PDF	IES	1,471	100.1	20.6	PDF	IES	1,500	102.0	20.7	PDF	IES

Direct (2901) Performance Asymmetric Flush MesoOptics Lens - WN

Click "PDF" or "IES" text to download

Nominal CRI & CCT		CRI 90, 2700K				CRI 90, 3000K				CRI 90, 3500K				CRI 90, 4000K				CRI 90, 5000K								
Nominal Lumen Package (lm/4ft)	Watts	Flux (lm/4ft) ¹	Efficacy (LPW) ¹	UGR ²	Photometry Report	IES File	Flux (lm/4ft) ¹	Efficacy (LPW) ¹	UGR ²	Photometry Report	IES File	Flux (lm/4ft) ¹	Efficacy (LPW) ¹	UGR ²	Photometry Report	IES File	Flux (lm/4ft) ¹	Efficacy (LPW) ¹	UGR ²	Photometry Report	IES File					
4000	42.0	3,434	81.8	23.2	PDF	IES	3,532	84.1	23.3	PDF	IES	3,669	87.4	23.4	PDF	IES	3,721	88.6	23.5	PDF	IES	3,804	90.6	23.5	PDF	IES
3000	32.9	2,747	83.5	22.4	PDF	IES	2,825	85.9	22.5	PDF	IES	2,925	88.9	22.6	PDF	IES	2,971	90.3	22.7	PDF	IES	3,039	92.4	22.8	PDF	IES
2200	22.2	1,854	83.5	21.0	PDF	IES	1,908	85.9	21.1	PDF	IES	1,969	88.7	21.3	PDF	IES	2,003	90.2	21.3	PDF	IES	2,047	92.2	21.4	PDF	IES
1500	14.7	1,247	84.8	19.7	PDF	IES	1,286	87.5	19.8	PDF	IES	1,323	90.0	19.9	PDF	IES	1,348	91.7	19.9	PDF	IES	1,375	93.5	20.0	PDF	IES

Direct (2901) Definition Symmetric Flush Silk Lens - LN

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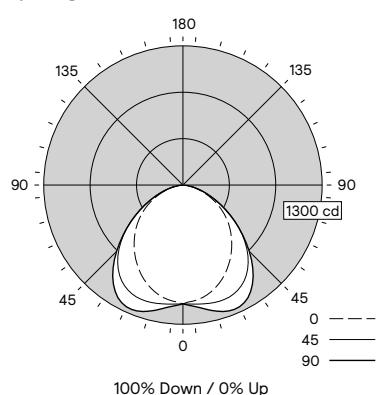
Nominal CRI & CCT		CRI 90, 2700K				CRI 90, 3000K				CRI 90, 3500K				CRI 90, 4000K				CRI 90, 5000K								
Nominal Lumen Package (lm/4ft)	Watts	Flux (lm/4ft) ¹	Efficacy (LPW) ¹	UGR ²	Photometry Report	IES File	Flux (lm/4ft) ¹	Efficacy (LPW) ¹	UGR ²	Photometry Report	IES File	Flux (lm/4ft) ¹	Efficacy (LPW) ¹	UGR ²	Photometry Report	IES File	Flux (lm/4ft) ¹	Efficacy (LPW) ¹	UGR ²	Photometry Report	IES File					
4000	42.0	3,919	93.3	25.3	PDF	IES	4,031	96.0	25.4	PDF	IES	4,187	99.7	25.6	PDF	IES	4,247	101.1	25.6	PDF	IES	4,342	103.4	25.7	PDF	IES
3000	32.9	3,136	95.3	24.6	PDF	IES	3,224	98.0	24.7	PDF	IES	3,339	101.5	24.8	PDF	IES	3,391	103.1	24.8	PDF	IES	3,469	105.4	24.9	PDF	IES
2200	22.2	2,116	95.3	23.2	PDF	IES	2,178	98.1	23.3	PDF	IES	2,247	101.2	23.4	PDF	IES	2,286	103.0	23.5	PDF	IES	2,336	105.2	23.5	PDF	IES
1500	14.7	1,423	96.8	21.8	PDF	IES	1,468	99.9	21.9	PDF	IES	1,510	102.7	22.0	PDF	IES	1,539	104.7	22.1	PDF	IES	1,569	106.7	22.2	PDF	IES

1. 4ft Luminaire photometry has been conducted in accordance with IES LM-79-08. IES files can be downloaded by clicking the links in the table above, or online at ledalight.com. Luminaires with finishes other than standard white may result in a drop in flux and efficacy.

2. Unified Glare Ratio (UGR) is calculated in accordance with CIE 117-1995. Reference conditions of 4Hx8Hx1H and reflectances of 70/50/20% have been applied using the procedure described in CIE 190-2010.

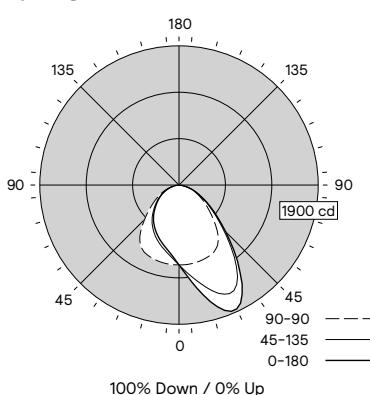
Performance Symmetric Batwing Flush MesoOptic Lens - QN

Spacing Criteria: 1.16/1.51



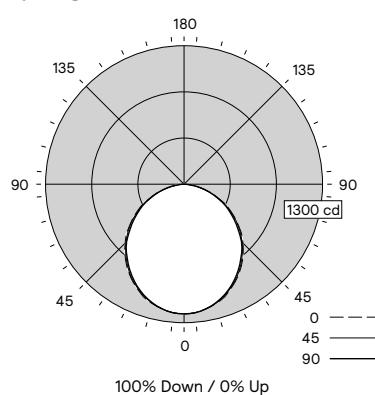
Performance Asymmetric Flush MesoOptic Lens - WN

Spacing Criteria: 1.66/1.34



Definition Symmetric Flush Silk Lens - LN

Spacing Criteria: 1.23/1.21



Candela plots shown are for 3000lm/4ft, CRI 90, 3500K configurations.

TruGroove suspended

Photometry

Indirect (2903) Performance Symmetric Lens – NQ

Click "PDF" or "IES" text to download

Nominal CRI & CCT		CRI 90, 2700K					CRI 90, 3000K					CRI 90, 3500K					CRI 90, 4000K					CRI 90, 5000K				
Nominal Lumen Package (lm/4ft)	Watts	Flux (lm/4ft) ¹	Efficacy (LPW) ¹	UGR ²	Photometry Report	IES File	Flux (lm/4ft) ¹	Efficacy (LPW) ¹	UGR ²	Photometry Report	IES File	Flux (lm/4ft) ¹	Efficacy (LPW) ¹	UGR ²	Photometry Report	IES File	Flux (lm/4ft) ¹	Efficacy (LPW) ¹	UGR ²	Photometry Report	IES File	Flux (lm/4ft) ¹	Efficacy (LPW) ¹	UGR ²	Photometry Report	IES File
4800	35.9	4,499	125.3	N/A	PDF	IES	4,626	128.9	N/A	PDF	IES	4,795	133.6	N/A	PDF	IES	4,868	135.6	N/A	PDF	IES	4,979	138.7	N/A	PDF	IES
3200	23.6	3,002	127.2	N/A	PDF	IES	3,089	130.9	N/A	PDF	IES	3,189	135.1	N/A	PDF	IES	3,243	137.4	N/A	PDF	IES	3,315	140.5	N/A	PDF	IES

Indirect (2903) Performance Asymmetric Lens – NW

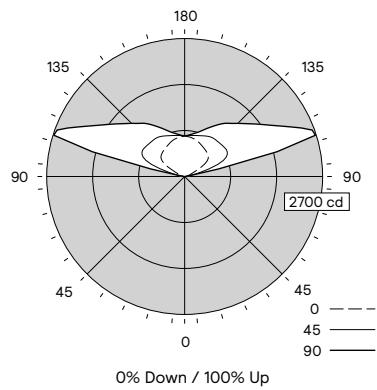
Click "PDF" or "IES" text to download

Nominal CRI & CCT		CRI 90, 2700K					CRI 90, 3000K					CRI 90, 3500K					CRI 90, 4000K					CRI 90, 5000K				
Nominal Lumen Package (lm/4ft)	Watts	Flux (lm/4ft) ¹	Efficacy (LPW) ¹	UGR ²	Photometry Report	IES File	Flux (lm/4ft) ¹	Efficacy (LPW) ¹	UGR ²	Photometry Report	IES File	Flux (lm/4ft) ¹	Efficacy (LPW) ¹	UGR ²	Photometry Report	IES File	Flux (lm/4ft) ¹	Efficacy (LPW) ¹	UGR ²	Photometry Report	IES File	Flux (lm/4ft) ¹	Efficacy (LPW) ¹	UGR ²	Photometry Report	IES File
4800	35.9	4,212	117.3	N/A	PDF	IES	4,330	120.6	N/A	PDF	IES	4,488	125.0	N/A	PDF	IES	4,557	126.9	N/A	PDF	IES	4,661	129.8	N/A	PDF	IES
3200	23.6	2,810	119.1	N/A	PDF	IES	2,891	122.5	N/A	PDF	IES	2,985	126.5	N/A	PDF	IES	3,036	128.6	N/A	PDF	IES	3,103	131.5	N/A	PDF	IES

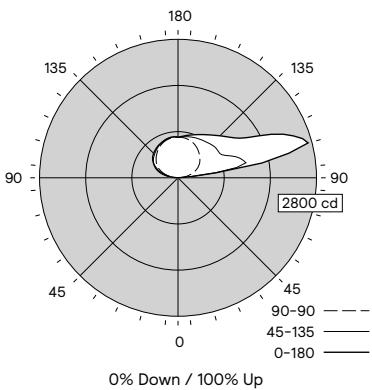
1. 4ft Luminaire photometry has been conducted in accordance with IES LM-79-08. IES files can be downloaded by clicking the links in the table above, or online at ledalite.com. Luminaires with finishes other than standard white may result in a drop in flux and efficacy.

2. Unified Glare Ratio (UGR) is calculated in accordance with CIE 117-1995. Reference conditions of 4Hx8Hx1H and reflectances of 70/50/20% have been applied using the procedure described in CIE 190-2010.

Performance Symmetric Lens – NQ



Performance Asymmetric Lens – NW



Candela plots shown are for 4800lm/4ft, CRI 90, 3500K configurations.

TruGroove suspended

Photometry

Indirect/Direct (2905) Performance Symmetric MesoOptics Lens - QQ

Click "PDF" or "IES" text to download

Nominal CRI & CCT		CRI 90, 2700K					CRI 90, 3000K					CRI 90, 3500K					CRI 90, 4000K					CRI 90, 5000K					
Nominal Lumen Package (lm/4ft)	Watts	Flux (lm/4ft) ¹	Efficacy (LPW) ¹	UGR ²	Photometry Report	IES File	Flux (lm/4ft) ¹	Efficacy (LPW) ¹	UGR ²	Photometry Report	IES File	Flux (lm/4ft) ¹	Efficacy (LPW) ¹	UGR ²	Photometry Report	IES File	Flux (lm/4ft) ¹	Efficacy (LPW) ¹	UGR ²	Photometry Report	IES File	Flux (lm/4ft) ¹	Efficacy (LPW) ¹	UGR ²	Photometry Report	IES File	
6800	70% Up	57.8	6,523	112.9	15.5	PDF	IES	6,708	116.1	15.6	PDF	IES	6,944	120.1	15.7	PDF	IES	7,054	122.0	15.8	PDF	IES	7,213	124.8	15.9	PDF	IES
5200	60% Up	42.0	4,840	115.2	16.9	PDF	IES	4,981	118.6	17.0	PDF	IES	5,139	122.4	17.1	PDF	IES	5,228	124.5	17.2	PDF	IES	5,343	127.2	17.2	PDF	IES
4600	70% Up	38.2	4,363	114.2	14.2	PDF	IES	4,492	117.6	14.3	PDF	IES	4,633	121.3	14.4	PDF	IES	4,714	123.4	14.5	PDF	IES	4,816	126.1	14.6	PDF	IES
3500	60% Up	28.2	3,255	115.4	15.5	PDF	IES	3,357	119.0	15.6	PDF	IES	3,454	122.5	15.7	PDF	IES	3,520	124.8	15.8	PDF	IES	3,588	127.2	15.8	PDF	IES

Indirect/Direct (2905) Performance Asymmetric MesoOptics Lens - WW

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Nominal CRI & CCT		CRI 90, 2700K					CRI 90, 3000K					CRI 90, 3500K					CRI 90, 4000K					CRI 90, 5000K					
Nominal Lumen Package (lm/4ft)	Watts	Flux (lm/4ft) ¹	Efficacy (LPW) ¹	UGR ²	Photometry Report	IES File	Flux (lm/4ft) ¹	Efficacy (LPW) ¹	UGR ²	Photometry Report	IES File	Flux (lm/4ft) ¹	Efficacy (LPW) ¹	UGR ²	Photometry Report	IES File	Flux (lm/4ft) ¹	Efficacy (LPW) ¹	UGR ²	Photometry Report	IES File	Flux (lm/4ft) ¹	Efficacy (LPW) ¹	UGR ²	Photometry Report	IES File	
6800	70% Up	57.8	6,066	104.9	14.8	PDF	IES	6,238	107.9	14.9	PDF	IES	6,457	111.7	15.0	PDF	IES	6,559	113.5	15.0	PDF	IES	6,708	116.1	15.1	PDF	IES
5200	60% Up	42.0	4,491	106.9	16.0	PDF	IES	4,621	110.0	16.1	PDF	IES	4,768	113.5	16.2	PDF	IES	4,851	115.5	16.3	PDF	IES	4,958	118.0	16.4	PDF	IES
4600	70% Up	38.2	4,057	106.2	13.4	PDF	IES	4,177	109.3	13.5	PDF	IES	4,308	112.8	13.6	PDF	IES	4,384	114.8	13.6	PDF	IES	4,478	117.2	13.7	PDF	IES
3500	60% Up	28.2	3,020	107.1	14.6	PDF	IES	3,114	110.4	14.8	PDF	IES	3,205	113.7	14.9	PDF	IES	3,266	115.8	14.9	PDF	IES	3,329	118.0	15.0	PDF	IES

Indirect/Direct (2905) Definition Symmetric Flush Silk Lens - LQ

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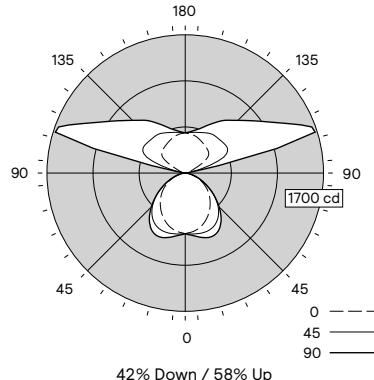
Nominal CRI & CCT		CRI 90, 2700K					CRI 90, 3000K					CRI 90, 3500K					CRI 90, 4000K					CRI 90, 5000K					
Nominal Lumen Package (lm/4ft)	Watts	Flux (lm/4ft) ¹	Efficacy (LPW) ¹	UGR ²	Photometry Report	IES File	Flux (lm/4ft) ¹	Efficacy (LPW) ¹	UGR ²	Photometry Report	IES File	Flux (lm/4ft) ¹	Efficacy (LPW) ¹	UGR ²	Photometry Report	IES File	Flux (lm/4ft) ¹	Efficacy (LPW) ¹	UGR ²	Photometry Report	IES File	Flux (lm/4ft) ¹	Efficacy (LPW) ¹	UGR ²	Photometry Report	IES File	
6800	70% Up	57.8	6,616	114.5	17.1	PDF	IES	6,804	117.7	17.3	PDF	IES	7,042	121.8	17.3	PDF	IES	7,154	123.8	17.3	PDF	IES	7,316	126.6	17.4	PDF	IES
5200	60% Up	42.0	4,933	117.5	18.4	PDF	IES	5,077	120.9	18.4	PDF	IES	5,238	124.7	18.6	PDF	IES	5,329	126.9	18.7	PDF	IES	5,446	129.7	18.7	PDF	IES
4600	70% Up	38.2	4,426	115.9	15.8	PDF	IES	4,557	119.3	15.9	PDF	IES	4,699	123.0	16.0	PDF	IES	4,782	125.2	16.0	PDF	IES	4,885	127.9	16.1	PDF	IES
3500	60% Up	28.2	3,318	117.7	17.1	PDF	IES	3,421	121.3	17.1	PDF	IES	3,521	124.9	17.3	PDF	IES	3,587	127.2	17.2	PDF	IES	3,657	129.7	17.4	PDF	IES

1. 4ft Luminaire photometry has been conducted in accordance with IES LM-79-08. IES files can be downloaded by clicking the links in the table above, or online at ledalite.com. Luminaires with finishes other than standard white may result in a drop in flux and efficacy.

2. Unified Glare Ratio (UGR) is calculated in accordance with CIE 117-1995. Reference conditions of 4Hx8Hx1H and reflectances of 70/50/20% have been applied using the procedure described in CIE 190-2010.

Performance Symmetric MesoOptic Lens - QQ

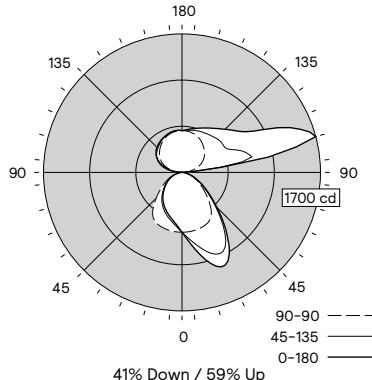
Spacing Criteria: 1.16/1.51



42% Down / 58% Up

Performance Asymmetric MesoOptic Lens - WW

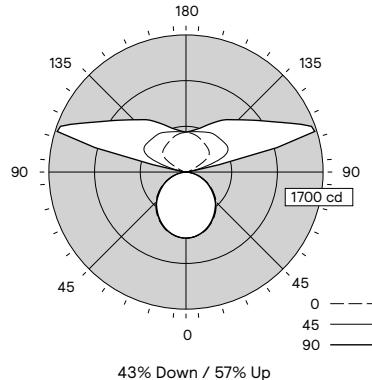
Spacing Criteria: 1.66/1.34



41% Down / 59% Up

Definition Symmetric Flush Silk Lens - LQ

Spacing Criteria: 1.23/1.21



43% Down / 57% Up

Candela plots shown are for 5200lm/4ft, CRI 90, 3500K configurations.

TruGroove suspended

Photometry

Direct/Indirect (2906) Performance Symmetric MesoOptic Lens - QQ

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Nominal CRI & CCT		CRI 90, 2700K					CRI 90, 3000K					CRI 90, 3500K					CRI 90, 4000K					CRI 90, 5000K					
Nominal Lumen Package (lm/4ft)	Watts	Flux (lm/4ft) ¹	Efficacy (LPW) ¹	UGR ²	Photometry Report	IES File	Flux (lm/4ft) ¹	Efficacy (LPW) ¹	UGR ²	Photometry Report	IES File	Flux (lm/4ft) ¹	Efficacy (LPW) ¹	UGR ²	Photometry Report	IES File	Flux (lm/4ft) ¹	Efficacy (LPW) ¹	UGR ²	Photometry Report	IES File	Flux (lm/4ft) ¹	Efficacy (LPW) ¹	UGR ²	Photometry Report	IES File	
6800	60% Down	63.9	6,564	102.7	20.4	PDF	IES	6,753	105.7	20.5	PDF	IES	6,994	109.5	20.7	PDF	IES	7,103	111.2	20.7	PDF	IES	7,261	113.6	20.8	PDF	IES
5200	60% Down	47.5	4,892	103.0	20.0	PDF	IES	5,036	106.0	20.1	PDF	IES	5,202	109.5	20.2	PDF	IES	5,290	111.4	20.3	PDF	IES	5,405	113.8	20.4	PDF	IES
4600	70% Down	43.6	4,313	98.9	20.7	PDF	IES	4,440	101.8	20.8	PDF	IES	4,586	105.2	21.0	PDF	IES	4,665	107.0	21.0	PDF	IES	4,764	109.3	21.1	PDF	IES
3500	60% Down	33.0	3,338	101.2	18.7	PDF	IES	3,440	104.2	18.7	PDF	IES	3,543	107.4	18.9	PDF	IES	3,609	109.4	18.9	PDF	IES	3,682	111.6	19.0	PDF	IES

Direct/Indirect (2906) Performance Asymmetric MesoOptics Lens - WW

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Nominal CRI & CCT		CRI 90, 2700K					CRI 90, 3000K					CRI 90, 3500K					CRI 90, 4000K					CRI 90, 5000K					
Nominal Lumen Package (lm/4ft)	Watts	Flux (lm/4ft) ¹	Efficacy (LPW) ¹	UGR ²	Photometry Report	IES File	Flux (lm/4ft) ¹	Efficacy (LPW) ¹	UGR ²	Photometry Report	IES File	Flux (lm/4ft) ¹	Efficacy (LPW) ¹	UGR ²	Photometry Report	IES File	Flux (lm/4ft) ¹	Efficacy (LPW) ¹	UGR ²	Photometry Report	IES File	Flux (lm/4ft) ¹	Efficacy (LPW) ¹	UGR ²	Photometry Report	IES File	
6800	60% Down	63.9	6,070	95.0	19.8	PDF	IES	6,245	97.7	19.8	PDF	IES	6,468	101.2	20.0	PDF	IES	6,569	102.8	20.0	PDF	IES	6,715	105.1	20.1	PDF	IES
5200	60% Down	47.5	4,520	95.2	19.3	PDF	IES	4,653	98.0	19.4	PDF	IES	4,807	101.2	19.6	PDF	IES	4,888	102.9	19.6	PDF	IES	4,994	105.1	19.7	PDF	IES
4600	70% Down	43.6	3,978	91.2	20.0	PDF	IES	4,096	93.9	20.1	PDF	IES	4,230	97.0	20.2	PDF	IES	4,303	98.7	20.3	PDF	IES	4,394	100.8	20.3	PDF	IES
3500	60% Down	33.0	3,085	93.5	17.9	PDF	IES	3,179	96.3	17.9	PDF	IES	3,274	99.2	18.1	PDF	IES	3,335	101.1	18.1	PDF	IES	3,402	103.1	18.3	PDF	IES

Direct/Indirect (2906) Definition Symmetric Flush Silk Lens - LQ

Click "PDF" or "IES" text to download

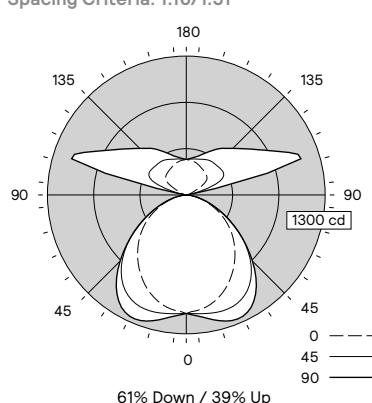
Nominal CRI & CCT		CRI 90, 2700K					CRI 90, 3000K					CRI 90, 3500K					CRI 90, 4000K					CRI 90, 5000K					
Nominal Lumen Package (lm/4ft)	Watts	Flux (lm/4ft) ¹	Efficacy (LPW) ¹	UGR ²	Photometry Report	IES File	Flux (lm/4ft) ¹	Efficacy (LPW) ¹	UGR ²	Photometry Report	IES File	Flux (lm/4ft) ¹	Efficacy (LPW) ¹	UGR ²	Photometry Report	IES File	Flux (lm/4ft) ¹	Efficacy (LPW) ¹	UGR ²	Photometry Report	IES File	Flux (lm/4ft) ¹	Efficacy (LPW) ¹	UGR ²	Photometry Report	IES File	
6800	60% Down	63.9	6,736	105.4	22.0	PDF	IES	6,930	108.5	22.1	PDF	IES	7,178	112.3	22.2	PDF	IES	7,290	114.1	22.3	PDF	IES	7,451	116.6	22.4	PDF	IES
5200	60% Down	47.5	5,030	105.9	21.6	PDF	IES	5,177	109.0	21.6	PDF	IES	5,349	112.6	21.8	PDF	IES	5,439	114.5	21.9	PDF	IES	5,557	117.0	22.0	PDF	IES
4600	70% Down	43.6	4,451	102.1	22.3	PDF	IES	4,582	105.1	22.3	PDF	IES	4,733	108.6	22.5	PDF	IES	4,814	110.4	22.5	PDF	IES	4,917	112.8	22.6	PDF	IES
3500	60% Down	33.0	3,431	104.0	20.2	PDF	IES	3,536	107.2	20.3	PDF	IES	3,642	110.4	20.4	PDF	IES	3,710	112.4	20.5	PDF	IES	3,784	114.7	20.5	PDF	IES

1. 4ft Luminaire photometry has been conducted in accordance with IES LM-79-08. IES files can be downloaded by clicking the links in the table above, or online at ledalite.com. Luminaires with finishes other than standard white may result in a drop in flux and efficacy.

2. Unified Glare Ratio (UGR) is calculated in accordance with CIE 117-1995. Reference conditions of 4Hx8Hx1H and reflectances of 70/50/20% have been applied using the procedure described in CIE 190-2010.

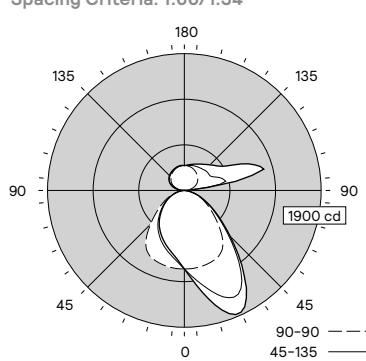
Performance Symmetric MesoOptic Lens - QQ

Spacing Criteria: 1.16/1.51



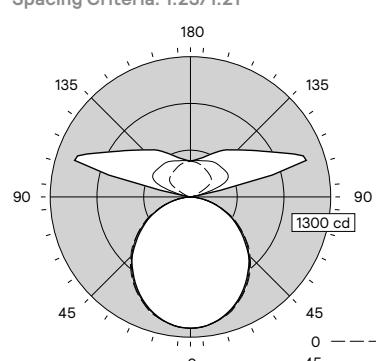
Performance Asymmetric MesoOptic Lens - WW

Spacing Criteria: 1.66/1.34



Definition Symmetric Flush Silk Lens - LQ

Spacing Criteria: 1.23/1.21



Candela plots shown are for 5200lm/4ft, CRI 90, 3500K configurations.

Day-Brite



by (S)ignify

Industrial

Vaporlume LED DW

4' sealed industrial
4300 to 7000 lm



Control options available

Day-Brite / CFI Vaporlume LED sealed industrial DW is a specialized wet location, IP rated product designed for use in both indoor and outdoor environments. It is a wet location listed, non-corrosive luminaire available in both fluorescent and LED light sources.

Project:

Location:

Cat.No:

Type:

Lumens:

Qty:

Notes:

Ordering guide

Example: DWAE51L840-4-UNV-MD360W

Family	Application	Lens	Hubs Installed	Lumen Package	Color Temp.	Length	Voltage	Driver	Options	
D	W		E		-	-	-	-		
D Sealed industrial	W Wet Location	A DR Acrylic P Polycarbonate L Enhanced LED Acrylic	E Ends only	35L 3500 nominal lumens 43L 4300 nominal lumens 51L 5100 nominal lumens (25°C ambient) 51LH 5100 nominal lumens (-35°C to 40°C) 70L 7000 nominal lumens Other lumen packages may be ordered in increments of 100lm up to 7000 lumens.	830 80 CRI, 3000K 835 80 CRI, 3500K 840 80 CRI, 4000K 850 80 CRI, 5000K 347 ¹ 347V 480 ¹ 480V	4 4'	UNV Universal Voltage, 120-277V	blank SDIM ²	0-10V Step dimming to 40% input power	MD360W ⁵ Wet location occupancy sensor, external MD360WD ⁵ Wet location occupancy sensor, (ON/DIM to 10%) WHP Wide beam optic EMLED ³ Integral emergency IP67 Protection against effects of immersion GLR Fusing, fast blow SWZCSH ⁴ Interact Pro scalable high bay sensor with integral daylight & occupancy sensing, advanced grouping with dwell time SNH200 ⁴ Integral EasySense occupancy & daylight sensor, with advanced SpaceWise type wireless grouping SSL Stainless steel latches

Footnotes

1 All 347V and 480V models available only for (-20°C to 25°C) ambient. Not available for use with 51LH or SDIM options.

2 Step dim (SDIM) option not available on 51LH.

3 EMLED option not available on 347V or 480V models.

4 High bay motion detector. Motion sensing zone is extremely limited if used below 15' mounting height.

5 Not available with SWZCSH or SNH200 option.

Accessories (order separately)

- TBK – Stainless Steel Top Bracket Kit (pair of brackets plus hardware)
- EBK – Stainless Steel End Bracket Kit (pair of brackets plus hardware)
- WBK – Stainless Steel Wraparound Bracket Kit (pair of brackets)
- FKR-126 – Chain Hanger Set (requires TBK)
- V2/DW-4ARL-CS – 4' Acrylic Replacement Lens
- V2/DW-4PRL – 4' Polycarbonate Replacement Lens
- V2/DW-4LRA – 4' LED Frosted Acrylic Replacement Lens



interact
ready.

DW Vaporlume LED sealed industrial

4', 3500 to 7000 lumens

Application

- Ideally suited for use in refrigerated cold storage, industrial, parking garage, and canopy applications.
- Acceptable for outdoor as well as indoor installations.
- Can be surface (wall/ceiling) or suspended mounted unless otherwise specified.
- Wet Location – Areas of high humidity, water vapor, rain, incidental water spray, or other non-corrosive or nonflammable liquid.
- Excellent for applications such as garages, stairwells, storage areas, horizontal shelf-mount refrigerated cases, and cold storage.
- Mounting brackets available, order separately.
- IP65 rating standard. IP67 configuration available.
- LED sources provide excellent low temperature performance. This product can replace a fluorescent model in cold environments with significant energy savings.
- 51LH model listed for use in -35°C to 40°C ambient. 50,000 hour L70 lumen maintenance.
- 35L/43L models listed for use in -20°C to 40°C ambient. 100,000 hour L70 lumen main-tenance.
- 51L/70L models listed for use in -20°C to 25°C ambient. L70 lumen maintenance is 100,000 hours for 51L model, and 50,000 hours for 70L.
- NSF Certified for Non-Food Zone Installations.
- EMLED 1100lm nominal in DC mode
- WHP wide optic is an acrylic lens factory installed on the LED arrays, provides compliance to DLC requirements for parking garage luminaires

Construction/Finish

- Non-conductive, non-corrosive housing.
- Smooth exterior surface for easy cleaning.
- White one piece, molded fiberglass reinforced polyester body. No rusting, no oxidation, and no corrosion.
- Standard acrylic lens (A) is stippled sheet of .130" nominal thickness.
- Optional LED lens (L) designed specifically to further reduce pixilated glare from LED's. Linear rib profile.
- Optional polycarbonate lens (P) will not be yellowed by LED sources because they do not produce UV.

- Continuous compressible closed cell gasket provides tight seal between plastic enclosure and luminaire body.
- White ABS cam action latches standard.
- Pre-painted steel lighting channel.
- Two gasketed threaded (½" trade size) wet location hubs installed on ends.

Electrical

- High efficiency LEDs provide up to 100,000 hour rated life (L70, defined as 70% lumen maintenance @ rated maximum ambient).
- Dimming to 5% on 0-10V controls standard. Step dim (SDIM) option available, 100/40% levels.
- Driver and LED boards are accessible from below. LED boards are individually re-placeable if required.
- Combinations are available providing as much as 117 delivered lumens per Watt.
- Nominal lumen packages range from 3,500 to 7,000 lumens, providing flexibility to optimize light levels for a specific application.
- LED sources provide full illumination in low temperature applications, unlike fluorescent sources that provide reduced light levels in very cold environments.
- LED sources can be frequently switched with no negative impact on life.
- Minimum 80 CRI provides smooth color rendering that rivals or exceeds performance of fluorescent lamps.
- Light output from the luminaire contains no infrared or ultraviolet energy, so the light won't heat or fade the objects being lit.
- Available motion sensor further increases energy savings in areas where occupancy is not continuous.

Labels

- cETLus listed to UL 1598. Suitable for use in wet locations.
- 5 Year Limited Warranty, www.signify.com/warranties
- Certain luminaire components may be adversely affected by contaminants. If sulfur, chlorine, or petroleum based solutions, or other contaminants will be in the area of operation, please consult factory as damage caused by these contaminants are not covered under our limited warranty.

Interact Pro scalable sensor for Foundation, Advanced & Enterprise tiers (SWZCSH and an evolution of SpaceWise)

- SWZCSH is a connected sensor with integral occupancy and daylight sensing and supports wireless mesh connectivity.

- The sensor works in the Foundation mode (similar to SpaceWise) when configured without a gateway or in an Interact Pro Advanced or Enterprise mode if a compatible gateway is used.

- Interact Pro includes an App, a portal and a broad portfolio of wireless luminaires, lamps and retrofit kits all working on the same system.

- Startup is implemented via Interact Pro App (Android or iPhone) & BlueTooth connectivity. The App provides flexibility to choose between a gateway or non gateway mode for setup.

- Setup with the gateway requires wired internet access to the gateway. It is possible to add a gateway at a later point.

- Prepare project configuration steps remotely and use IRT9015 remote

onsite to identify and group devices together.

- Compatible with:

- UID8451/10 wireless dimmer switch

- SWS200 wireless scene switch

- Battery powered IP42 presence sensor OCC sensor IA CM WH 10/1

- Battery powered IP42 presence & daylight sensor OCC-DL sensor IA CM IP42 WH

- LCN3110/05 battery powered IP65 presence sensor OCC sensor IA CM IP65 WH

- LCN3120/05 battery powered IP65 presence & daylight sensor OCC-DL sensor IA CM IP65 WH

- For more information on Interact Pro visit: www.interact-lighting.com/interactproscalablesystem

SNH200 EasySense

- Philips field apps allow programming of occupancy & daylight sensing parameters and fine-tuning of light levels during installation. It can also be used for grouping of fixtures.
- Download "Philips field apps" from the Google Play Store.
- Register for the commissioning app at <http://registration.componentcloud.philips.com/appregistration/>.
- The app works on certain Android phones with NFC or IR. See Recommended Phones and the EasySense App User Manual in the download section at <http://www.usa.lighting.philips.com/products/lighting-components/easysense> and follow the "View Downloads" link to register for access to the download area. Navigate to Connected-Lighting-Components and then Philips-EasySense-Sensors to find downloads.

DW Vaporlume LED sealed industrial

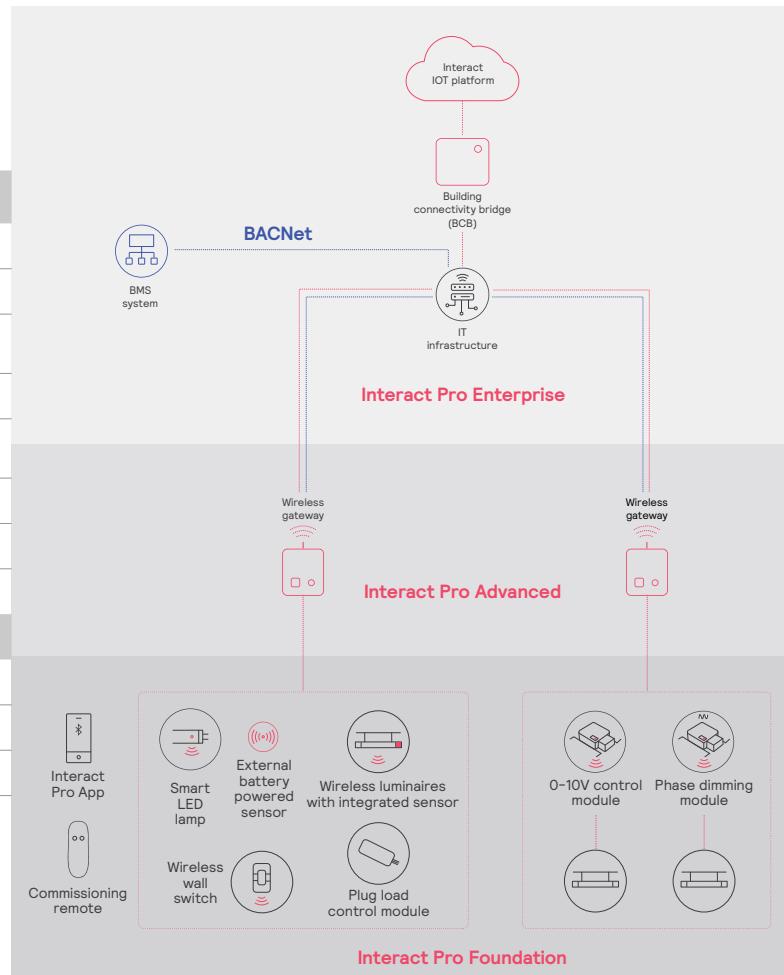
4', 3500 to 7000 lumens

Interact Pro scalable system			
	Foundation	Advanced	Enterprise
Dimming, grouping, and zoning	✓	✓	✓
Bluetooth and ZigBee enabled	✓	✓	✓
Motion sensing and daylight harvesting	✓	✓	✓
Integration with 0-10V and phase dimming fixtures	✓	✓	✓
Code compliance	✓	✓	✓
Granular dimming and dwell time	✓	✓	✓
Energy reporting and monitoring		✓	✓
Scheduling		✓	✓
Demand response		✓	✓
BMS integration (BACnet)			✓
Floor plan visualization			✓
IoT sensors for wellness			✓
IoT Apps for productivity			✓

Currently supported maximum system size

To be able to design the lighting system correctly for the customer, it is important to know the prime characteristics of the system, its possibilities and limitations.

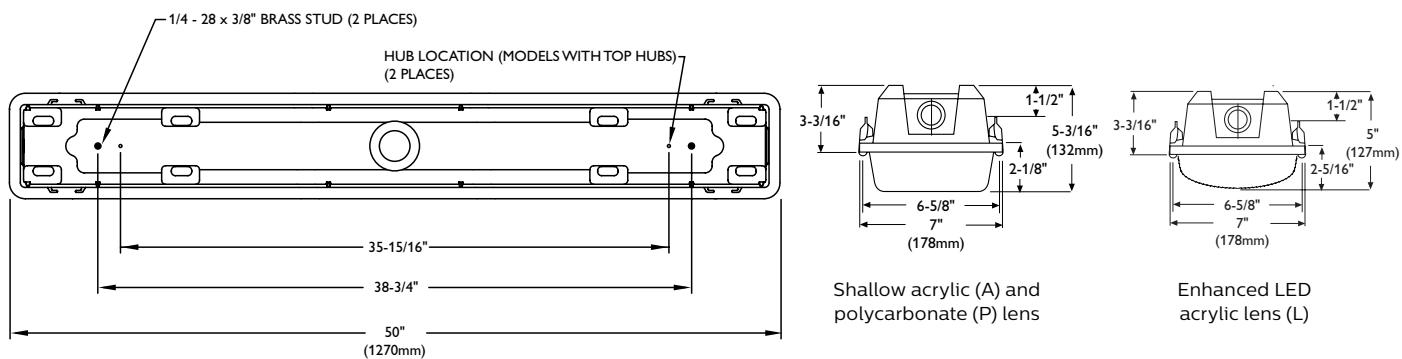
System level	
Total number of gateways	Unlimited
Total number of devices	200 per network
• luminaires with integrated sensors	150
• smart TLEDS	150
Total number of ZGP devices (sensors and switches)	50
• sensors	30
• switches	50
• zones and groups	64
Group level	
Recommended number of lights	40 (recommended 25)
Number of ZGP devices	5
Number of scenes	16



DW Vaporlume LED sealed industrial

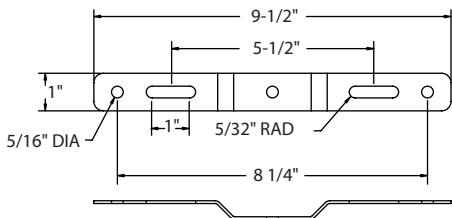
4', 3500 to 7000 lumens

Dimensions

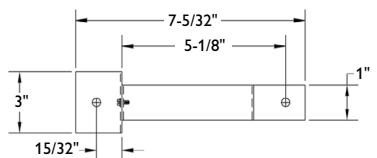


Mounting Brackets

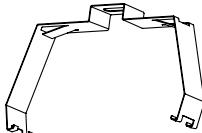
TBK - Top Mounting Bracket



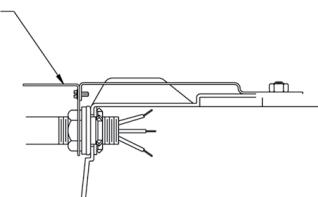
EBK - End Mounting Bracket



WBK - Wraparound Mounting Bracket



EBK - End Mounting Bracket



Acrylic Lens



Polycarbonate Lens



LED Frosted Acrylic Lens

DW Vaporlume LED sealed industrial

4', 3500 to 7000 lumens

4' Vaporlume LED DW, 3500 nominal lumens

LER-117

Catalog No.	DWAE35L840-4
Test No.	32643
S/MH	1.2
Source	LED
Input Watts	32
Delivered Lumens	3699

Comparative yearly lighting energy cost per 1000 lumens – \$2.03 based on 3000 hrs. and \$.08 pwr KWH.

Photometric values based upon tests performed in compliance with LM-79.

Candlepower

Angle	End	45	Cross	Back-45
0	1250	1250	1250	1250
5	1244	1239	1243	1239
15	1204	1201	1199	1201
25	1112	1114	1106	1114
35	966	964	949	964
45	778	777	841	777
55	576	685	708	685
65	371	509	472	509
75	193	250	271	250
85	49	91	96	91
95	19	36	28	36
105	17	30	20	30
115	10	28	20	28
125	4	19	19	19
135	2	10	17	10
145	1	3	9	3
155	1	1	2	1
165	1	1	1	1
175	1	1	1	1

Coefficients of Utilization

EFFECTIVE FLOOR CAVITY REFLECTANCE 20 PER (pfc=0.20)				
pcc	80	70	70	50
pw	70	50	30	50
RCR				
0	117	117	117	114
1	108	103	97	105
2	97	89	81	94
3	89	78	69	86
4	81	68	59	80
5	75	61	53	71
6	68	55	46	67
7	64	50	40	61
8	58	46	36	57
9	56	41	34	54
10	52	39	30	51

Light Distribution

Degrees	Lumens	% Luminaire	Angle	End	45°	Cross
0-30	969	26.1	45	5069	4222	4360
0-40	1569	42.3	55	4543	4228	4105
0-60	2772	74.8	65	865	3770	3222
0-90	3602	97.1	75	3096	2402	2333
90-120	81	2.2	85	1821	1312	1164
90-130	95	2.6				
90-150	105	2.8				
90-180	106	2.9				
0-180	3708	100.0				

4' Vaporlume LED DW, 4300 nominal lumens

LER-116

Catalog No.	DWAE43L840-4
Test No.	32642
S/MH	1.2
Source	LED
Input Watts	38
Delivered Lumens	4431

Comparative yearly lighting energy cost per 1000 lumens – \$2.07 based on 3000 hrs. and \$.08 pwr KWH.

Photometric values based upon tests performed in compliance with LM-79.

Candlepower

Angle	End	45	Cross	Back-45
0	1496	1496	1496	1496
5	1491	1487	1485	1487
15	1443	1439	1441	1439
25	1332	1338	1323	1338
35	1158	1151	1132	1151
45	933	926	1000	926
55	688	819	854	819
65	444	611	566	611
75	231	300	324	300
85	58	110	118	110
95	23	43	35	43
105	20	36	25	36
115	12	34	24	34
125	5	24	24	24
135	3	12	21	12
145	2	4	11	4
155	1	1	3	1
165	1	1	1	1
175	1	1	1	1

Coefficients of Utilization

EFFECTIVE FLOOR CAVITY REFLECTANCE 20 PER (pfc=0.20)				
pcc	80	70	70	50
pw	70	50	30	50
RCR				
0	117	117	117	114
1	108	103	97	104
2	97	89	81	94
3	89	78	69	85
4	81	68	59	79
5	75	61	53	71
6	68	55	46	67
7	64	50	40	61
8	58	46	36	57
9	56	41	34	54
10	52	39	30	51

Light Distribution

Degrees	Lumens	% Luminaire	Angle	End	45°	Cross
0-30	1161	26.1	45	6078	5034	5182
0-40	1880	42.3	55	5434	5059	4955
0-60	3318	74.7	65	4626	4531	3867
0-90	4313	97.1	75	3704	2883	2786
90-120	99	2.2	85	2173	1578	1433
90-130	116	2.6				
90-150	128	2.9				
90-180	129	2.9				
0-180	4442	100.0				

DW Vaporlume LED sealed industrial

4', 3500 to 7000 lumens

4' Vaporlume LED DW, 5100 nominal lumens LER-111

Catalog No.	DWAE51L840-4	Candlepower					Coefficients of Utilization											
		Angle	End	45	Cross	Back-45	pcc	EFFECTIVE FLOOR CAVITY REFLECTANCE 20 PER (pfc=0.20)			RCR				50	30		
Test No.	32640	0	1729	1729	1729	1729	pw	80	70	50	30	70	50	30	50	30		
S/MH	1.2	5	1722	1716	1709	1716												
Source	LED	15	1666	1651	1632	1651												
Input Watts	46	25	1542	1523	1494	1523												
Delivered Lumens	5129	35	1340	1307	1250	1307												
		45	1091	1039	1117	1039												
		55	817	909	884	909												
		65	533	670	574	670												
		75	280	309	286	309												
		85	75	107	86	107												
		95	26	47	34	47												
		105	24	42	30	42												
Comparative yearly lighting energy cost per 1000 lumens – \$2.16 based on 3000 hrs. and \$.08 pwr KWH.																		
Photometric values based upon tests performed in compliance with LM-79.																		
		115	14	39	29	39												
		125	6	28	28	28												
		135	4	16	24	16												
		145	3	5	12	5												
		155	2	2	3	2												
		165	2	2	2	2												
		175	2	2	2	2												

4' Vaporlume LED DW, 7000 nominal lumens LER-107

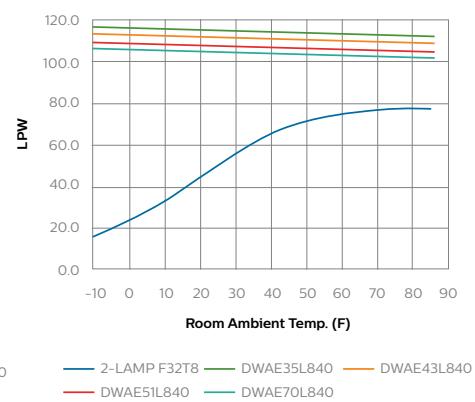
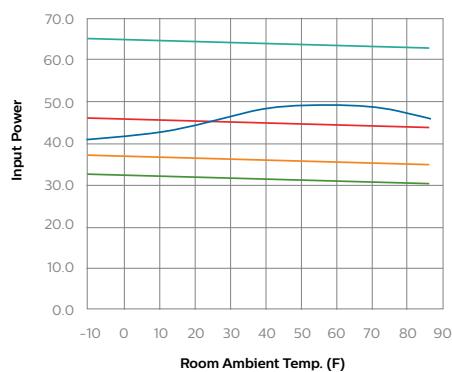
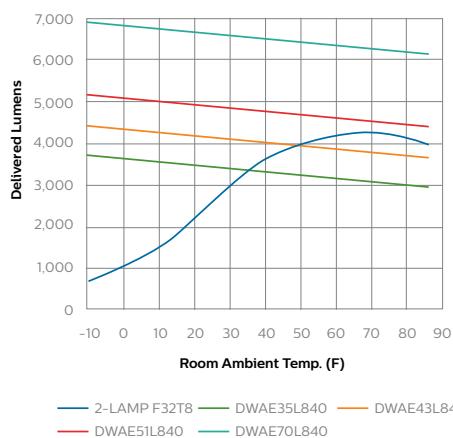
Catalog No.	DWAE70L840-4	Candlepower					Coefficients of Utilization									
		Angle	End	45	Cross	Back-45	pcc	EFFECTIVE FLOOR CAVITY REFLECTANCE 20 PER (pfc=0.20)			RCR				50	30
Test No.	32614	0	2357	2357	2357	2357	pw	80	70	50	30	70	50	30	50	30
S/MH	1.2	5	2351	2342	2345	2342										
Source	LED	15	2274	2271	2270	2271										
Input Watts	65	25	2101	2105	2089	2105										
Delivered Lumens	6985	35	1818	1814	1784	1814										
		45	1467	1462	1586	1462										
Comparative yearly lighting energy cost per 1000 lumens – \$2.24 based on 3000 hrs. and \$.08 pwr KWH.		55	1085	1302	1345	1302										
Photometric values based upon tests performed in compliance with LM-79.		65	701	959	891	959										
		75	365	469	503	469										
		85	92	170	176	170										
		95	36	67	53	67										
		105	33	57	39	57										
		115	19	53	39	53										
		125	8	38	38	38										
		135	4	20	33	20										
		145	3	6	18	6										
		155	2	2	4	2										
		165	2	2	2	2										
		175	2	2	2	2										

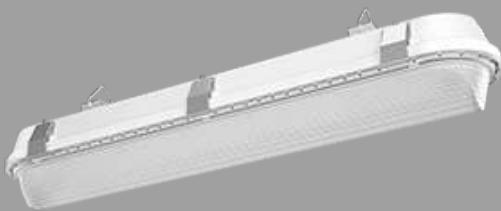
DW Vaporlume LED sealed industrial

4', 3500 to 7000 lumens

Energy Data

Model	Initial Delivered Lumens @ 25°C Ambient	Input Power	Lumens per Watt	Application notes
DWAE35L840-4-UNV	3,699	32W	117 LPW	<ul style="list-style-type: none"> Slightly less than 2 lamp F32T8 at room temperature, 35% energy savings. Equivalent to 2 lamp F32T8 in refrigerator (40°F), 35% energy savings.
DWAE43L840-4-UNV	4,431	38W	116 LPW	<ul style="list-style-type: none"> Equivalent to 2 lamp F32T8 at room temperature, 15% energy savings. Double the output of 2 lamp F32T8 in freezer (25°F) at the SAME energy use.
DWAE51L840-4-UNV	5,129	46W	111 LPW	<ul style="list-style-type: none"> Equivalent to high ballast factor 2 lamp F32T8 at room temperature, 15% energy savings.
DWAE70L840-4-UNV	6,985	65W	107 LPW	<ul style="list-style-type: none"> Equivalent to 3 lamp F32T8 at room temperature, 30% energy savings.





Color: White

Weight: 0.0 lbs

Project:

Type:

Prepared By:

Date:

Driver Info

Type	Constant Current	Watts	25/20/15W
120V	0.21A/0.17A/0.13A	Color Temp	3500/4000/5000K
208V	0.12A/0.10A/0.09A	Color Accuracy	83-85 CRI
240V	0.11A/0.09A/0.08A	L70 Lifespan	100,000 Hours
277V	0.10A/0.08A/0.07A	Lumens	2,270-3,683 lm
Input Watts	16-25.7W	Efficacy	137.6-148.2 lm/W

LED Info**Technical Specifications****Compliance****UL Listed:**

Suitable for wet locations

UL 746C:

F1 weatherability rating for UV resistance, water exposure, and extreme temperature conditions.

NSF:

NSF Certified by Public Health and Safety

NEMA Rating:

4X, protected against corrosion

IP Rating:

Ingress protection rating of IP66 for dust and water

DLC Listed:

This product is on the Design Lights Consortium (DLC) Qualified Products List and is eligible for rebates from DLC Member Utilities. Designed to meet DLC 5.1 requirements.

DLC Product Code: S-V3CE02 (Direct Linear Ambient Luminaires)

DLC Product Code: S-W04BEC (Stairwell and Passageway Luminaires)

Electrical**Dimming Driver:**

Driver includes dimming control wiring for 0-10V dimming systems. Requires separate 0-10V DC dimming circuit. Dims down to 10%.

THD:

2.15% at 120V, 3.37% 277V

Power Factor:

99.8% at 120V, 95.6% at 277V

Surge Protection:

2.5kV

Construction**Housing:**

IK09 impact-resistant polycarbonate with 5VA flame rating*

1/2" openings for conduit and bushing/cord entry

*Polycarbonate is affected by cleaning agents or other liquids containing partial solvents such as low molecular weight aldehydes and ethers, ketones, esters, aromatic hydrocarbons and perchlorinated hydrocarbons. [Click here for a detailed list of damaging chemicals.](#)**Lens:**

Diffuse polycarbonate lens for low glare and maximum protection

Maximum Ambient Temperature:

Suitable for use in up to 40°C (104°F)

Cold Weather Starting:

The minimum starting temperature is -40°C (-40°F)

Green Technology:

Mercury and UV free. RoHS-compliant components.

Finish:

Formulated for high durability and long-lasting color

Installation**Mounting:**

Quick-mount, surface, stainless steel spring clips supplied. 4 additional mounting accessory kits available.

LED Characteristics**LEDs:**

Long-life, high-efficacy, surface-mount LEDs

Color Stability:

LED color temperature is warranted to shift no more than 200K in color temperature over a 5-year period

Technical Specifications (continued)

Color Uniformity:

RAB's range of Correlated Color Temperature follows the guidelines of the American National Standard for Specifications for the Chromaticity of Solid State Lighting (SSL) Products, ANSI C78.377-2017.

Performance

Lifespan:

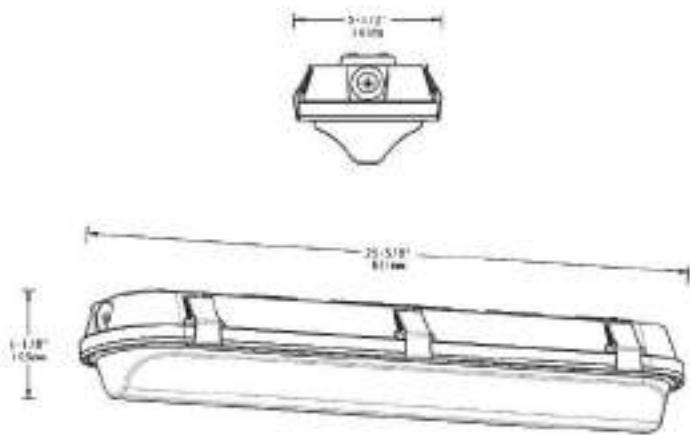
100,000-Hour LED lifespan based on IES LM-80 results and TM-21 calculations

Other

Warranty:

RAB warrants that our LED products will be free from defects in materials and workmanship for a period of five (5) years from the date of delivery to the end user, including coverage of light output, color stability, driver performance and fixture finish. RAB's warranty is subject to all terms and conditions found at rablighting.com/warranty.

Dimensions



Features

Impact-resistant linear washdown

Ideal for tunnels and stairwells

Mounting options: Chain, junction box, angled surface mount or vandal-resistant surface mount

IP66 Rating protects against dust & water ingress

5-Year, No-Compromise Warranty

100,000-Hour LED lifespan

Ordering Matrix

Family	Size/Wattage	Mounting	Color Temp	Finish	Driver	Options
SHARK	2	Blank = Metal Bracket with hooks	Blank = 3500/4000/5000K CCT Adjustable	Blank = White	Blank = 120-277V, 0-10V Dimming	/LCBS/MVS/E = Lightcloud Blue w/MVS Sensor & Battery Backup /LCBS/E = Lightcloud Blue w/PIR Sensor & Battery Backup /PIR/E = Passive Infrared Occupancy Sensor w/Battery Back Up /MVS/E = Microwave Occupancy Sensor w/Battery Backup /LCBS/MVS = Lightcloud Blue w/MVS Sensor /LCBS = Lightcloud Blue w/PIR Sensor /PIR = Passive Infrared Occupancy Sensor /MVS = Microwave Occupancy Sensor /LC = Lightcloud /E = Battery Backup Blank = No Option

Make the move to Philips Lightolier CorePro LED Downlights.

CP630K10 – CP630K6
6" COREPRO



**LED DOWNLIGHT RETROFIT KIT 6" APERTURE
CP630K6 (600 lm) AND CP630K10 (1000 lm)**

Core value LED retrofit downlight

For retrofit, new construction and remodel applications

Installs in many existing residential and commercial applications

Project:

Location:

Catalog No:

Fixture Type:

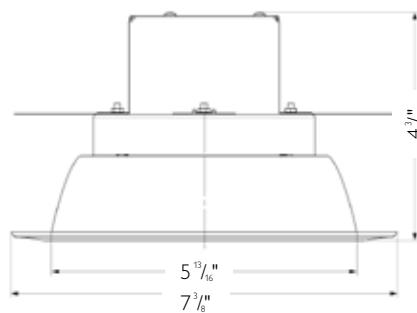
Mfg: Lamps: Qty:

Notes:

Retrofit Kit

CP630K6 – 6" 600lm, 3000k, White Splay

CP630K10 – 6" 1000lm, 3000k, White Splay



Features

- 1. Reflector/Flange:** One piece self flange aluminum, .032" thick, (20ga.). Powder coated, non yellowing, white splay and flange.
- 2. Lens:** PMMA 1.5mm thick. High transmittance lens allowing for smooth, diffused light pattern.
- 3. Power supply:** Class 2 driver. Factory wired electronic LED driver (see Electrical section for specifications)
Enclosed in a .032" thick (21 ga.) painted steel housing.
- 4. LED board:** Utilizes Philips LEDs.
- 5. Friction spring:** Stainless steel.
- 6. Power connection:** E26 medium base whip connector (included) for retrofit.
- 7. Frame in kit/housing:** Refer to appropriate frame in kit/housing specification sheets for complete information.
- 8. Labels:** cULus wet location classified, Energy Star.
- 9. Lifetime:** Expected lifetime 50,000 hours and backed by a 5-year warranty (see Philips.com/warranties for details).

Electrical

Electronic power supply: RoHS compliant* Class 2 power unit for use in a dry location. Unit tolerates sustained open circuit and short circuit output conditions without damage.

Dimming: All luminaires are intended for use with TRIAC type dimmers. Go to <http://www.lightolier.com/MKACatpdfs/LED-DIM.PDF> for the latest dimming switch capability information. 10%-100% dimming range.

Compatible Housings

1104IC – Philips Lightolier

CR1NBQP, QL6NBQP – Philips Capri

PR75ASIC, PRR75ICX – Philips Capri

L7X – Lithonia

H7ICAT – Halo

IC22 – Juno

P87-A1 – Progress

Lumen Output	Input Voltage	Input Frequency	Max Input Current	Max Input Power	Max THD	Power Factor	Minimum Operating Temp.
647 lm	120V	50/60Hz	0.07A	8W	< 30%	> .9	-18° C
1110 lm	120V	50/60Hz	0.11A	13W	< 30%	> .9	-18° C

* Restrictions on Hazardous Substances (RoHS) is a European directive (2002/95/EC) designed to limit the content of 6 substances [lead, mercury, cadmium, hexavalent chromium, polybrominated biphenyls (PBB), and polybrominated diphenyl ethers (PBDE)] in electrical and electronic products. For products used in North America compliance to RoHS is voluntary and self-certified.



CP630K10 – CP630K6 6" COREPRO

New Construction

PR75ASICNB – C Plus 6" IC / Airseal Housing



Remodeler

PRR75ICX – C Plus 6" IC Remodeler Housing

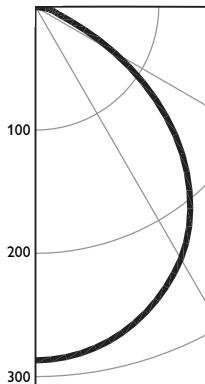


CP630K10 – CP630K6 6" COREPRO

6" CorePro DL – LVE23088

Coefficients of Utilization

Output lumens: 648 lm
Correlated Color Temp: 3000K
Input Watts: 8.2 W
Efficacy: 79.4 lm/W
CRI: >80
Spacing Criterion: 1.2



Ceiling Wall	80				70		50		30		0	
	70	50	30	10	50	10	50	10	50	10	0	
RCR Zonal Cavity Method – Effective Floor Cavity Reflectance = 20%												
0	119	119	119	119	116	116	111	111	106	106	100	
1	110	106	103	100	104	98	100	95	96	92	87	
2	102	95	89	84	93	83	89	81	86	79	75	
3	94	84	77	71	83	71	80	70	77	68	65	
4	86	76	68	62	74	61	72	60	70	60	57	
5	80	68	60	54	67	54	65	53	63	53	50	
6	74	62	54	48	61	47	59	47	58	47	44	
7	69	56	48	42	56	42	54	42	53	42	40	
8	64	52	44	38	51	38	50	38	48	38	36	
9	60	47	40	34	47	34	46	34	45	34	32	
10	56	44	36	31	43	31	42	31	42	31	29	

Candlepower

Angle	Mean CP	Lumens
0	287	
5	285	27
10	281	
15	273	77
20	263	
25	251	115
30	236	
35	217	136
40	194	
45	168	129
50	138	
55	106	95
60	74	
65	44	45
70	24	
75	17	18
80	11	
85	5	6
90	0	

Zonal Lumens and Percentages

Zone	Lumens	% Luminaire
0-30	220	33.9%
0-40	355	54.8%
0-60	579	89.4%
0-90	648	100.0%

Single Unit Data

Height to Lighted Plane	Initial Footcandles	Beam Diameter
5'	11	6.0'
6'	8	7.2'
7'	6	8.4'
8'	4	9.6'
9'	4	10.8'

Multiple Unit Data

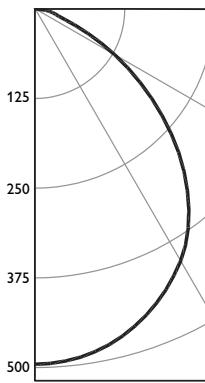
Spacing On Ctr.	Initial Footcandles	Watts/Sq.Ft.
5'	27.1	0.36
6'	17.8	0.24
7'	12.7	0.17
8'	10.6	0.14
9'	8.5	0.11

38' x 38' x 10' Room, Workplane 2 1/2' above floor, 80/50/20% Reflectances

6" CorePro DL – LVE23089

Coefficients of Utilization

Output lumens: 1110 lm
Correlated Color Temp: 3000K
Input Watts: 12.8 W
Efficacy: 87.0 lm/W
CRI: >80
Spacing Criterion: 1.2



Ceiling Wall	80				70		50		30		0	
	70	50	30	10	50	10	50	10	50	10	0	
RCR Zonal Cavity Method – Effective Floor Cavity Reflectance = 20%												
0	119	119	119	119	116	116	111	111	106	106	100	
1	110	106	103	99	104	98	100	95	96	92	87	
2	102	95	89	84	93	83	89	81	86	79	75	
3	94	84	77	71	83	71	80	69	77	68	65	
4	86	76	68	62	74	61	72	60	70	60	57	
5	80	68	60	54	67	54	65	53	63	52	50	
6	74	62	54	48	61	47	59	47	58	47	44	
7	69	56	48	42	56	42	54	42	53	42	40	
8	64	52	44	38	51	38	50	38	48	38	36	
9	60	48	40	35	47	34	46	34	45	34	32	
10	57	44	36	31	43	31	43	31	42	31	29	

Candlepower

Angle	Mean CP	Lumens
0	495	
5	493	47
10	485	
15	472	133
20	454	
25	432	199
30	406	
35	372	232
40	330	
45	283	217
50	230	
55	178	159
60	128	
65	81	82
70	45	
75	29	32
80	20	
85	9	10
90	0	

Zonal Lumens and Percentages

Zone	Lumens	% Luminaire
0-30	379	34.1%
0-40	610	55.0%
0-60	987	88.9%
0-90	1110	100.0%

Single Unit Data

Height to Lighted Plane	Initial Footcandles	Beam Diameter
5'	20	6.0'
6'	14	7.2'
7'	10	8.4'
8'	8	9.6'
9'	6	10.8'

Multiple Unit Data

Spacing On Ctr.	Initial Footcandles	Watts/Sq.Ft.
5'	46.5	0.57
6'	30.5	0.37
7'	21.8	0.27
8'	18.2	0.22
9'	14.5	0.18

38' x 38' x 10' Room, Workplane 2 1/2' above floor, 80/50/20% Reflectances



30A & 32A IEC 309 Watertight pin & sleeve devices

Project Name:	Prepared By:
Project Number:	Date:
Catalog Number:	Type:



AH430R7W

IP69K
certified



AH430P9WDR



AH430C7W



AH330B7W

Product Description - North American & International

30A & 32A;
2-pole, 3-wire grounding;
3-pole, 4-wire grounding;
4-pole, 5-wire grounding

Pin & sleeve plugs features & benefits

- Products with a DR suffix are dual rated for International and North American amperages
- Mechanical cord clamp with silicone rubber grommet seal and locking screw ensures a positive and watertight strain relief system
- Tri-combo cord grip screws for convenience
- Durable impact resistant thermoplastic body
- Color-coded front housing for easy and accurate identification of voltages
- Oversized grounding pin assures mating only with oversized female grounding sleeve; staggered contact to ensure ground makes first and breaks last
- Engineered thermoplastic material improves cold impact performance for 60A & 100A devices
- Spring-loaded self-closing cap with silicone rubber gasket protects contacts when not in use. Watertight cap meets IP67 and IP69K protection standards
- Rugged materials selected for use in wet locations; provides corrosion resistance
- Standard mounting footprints and blind holes provide interchangeability with major brands
- Nickel plated pins offer long life corrosion protection
- Pins fully shrouded for mechanical protection; lockout hole for plugs
- Threaded NPT cable entry provides efficient means of attaching flexible conduit or wire mesh grips
- Tapered wiring pockets to ease insertion of stranded wire; deep pockets with clear markings keep bare conductors isolated

Compliances, specifications and availability are subject to change without notice.

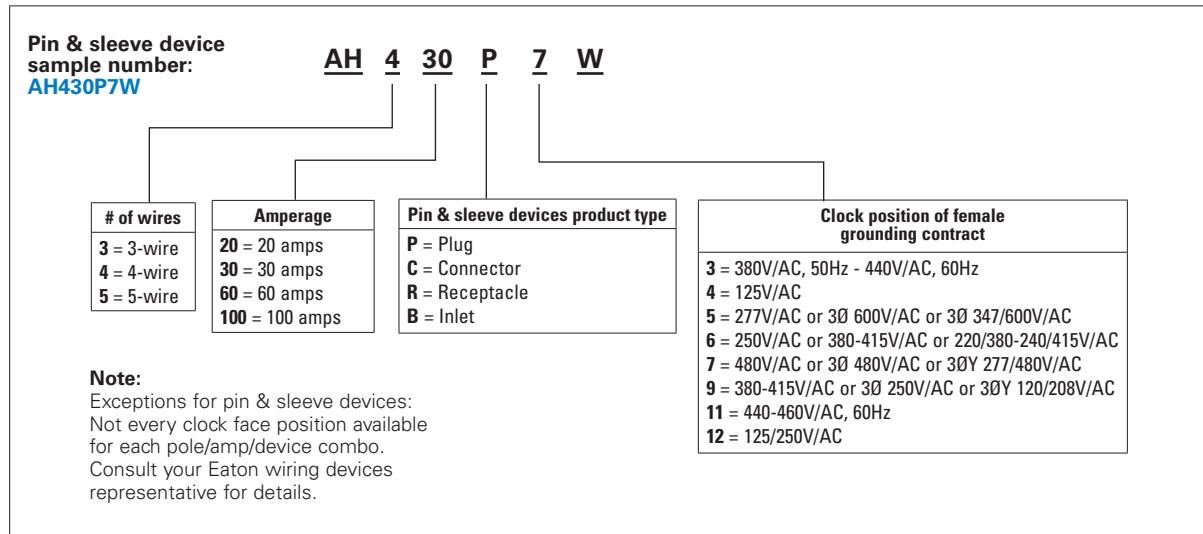
Project Name:	Prepared By:
Project Number:	Date:
Catalog Number:	Type:

Table 1. 30A & 32A Pin & sleeve devices for receptacles, plugs, connectors & inlets

Poles/ wires	Rating A	V/AC, color coding & configurations	Receptacle catalog no.	Plug catalog no.	Connector catalog no.	Inlet catalog no.	15° Angled Receptacle catalog no.	
2-P, 3-W	30	125		<input type="checkbox"/> AH330R4W	<input type="checkbox"/> AH330P4W	<input type="checkbox"/> AH330C4W	<input type="checkbox"/> AH330B4W	—
	30A/32A	250		<input type="checkbox"/> AH330R6WDR	<input type="checkbox"/> AH330P6WDR	<input type="checkbox"/> AH330C6WDR	<input type="checkbox"/> AH330B6WDR	—
	30A	480		<input type="checkbox"/> AH330R7W	<input type="checkbox"/> AH330P7W	<input type="checkbox"/> AH330C7W	<input type="checkbox"/> AH330B7W	—
3-P, 4-W	30A	125/250		<input type="checkbox"/> AH430R12W	<input type="checkbox"/> AH430P12W	<input type="checkbox"/> AH430C12W	<input type="checkbox"/> AH430B12W	—
	30A/32A	30 250		<input type="checkbox"/> AH430R9WDR	<input type="checkbox"/> AH430P9WDR	<input type="checkbox"/> AH430C9WDR	<input type="checkbox"/> AH430B9WDR	—
	30A/32A	380-415V		<input type="checkbox"/> AH430R6WDR	<input type="checkbox"/> AH430P6WDR	<input type="checkbox"/> AH430C6WDR	<input type="checkbox"/> AH430B6WDR	—
	30A	30 480		<input type="checkbox"/> AH430R7W	<input type="checkbox"/> AH430P7W	<input type="checkbox"/> AH430C7W	<input type="checkbox"/> AH430B7W	—
4-P, 5-W	30A/32A	30Y 120/208		<input type="checkbox"/> AH530R9WDR	<input type="checkbox"/> AH530P9WDR	<input type="checkbox"/> AH530C9WDR	<input type="checkbox"/> AH530B9WDR	—
	30A/32A	220/380 - 200/415		<input type="checkbox"/> AH530R6WDR	<input type="checkbox"/> AH530P6WDR	<input type="checkbox"/> AH530C6WDR	<input type="checkbox"/> AH530B6WDR	—
	30A	30Y 277/480		<input type="checkbox"/> AH530R7W	<input type="checkbox"/> AH530P7W	<input type="checkbox"/> AH530C7W	<input type="checkbox"/> AH530B7W	—
	30A	30Y 347/600		<input type="checkbox"/> AH530R5W	<input type="checkbox"/> AH530P5W	<input type="checkbox"/> AH530C5W	<input type="checkbox"/> AH530B5W	—

Catalog numbers with a DR suffix are certified for dual rating at North American and International amperages

Table 2. Ordering matrix



Project Name:	Prepared By:
Project Number:	Date:
Catalog Number:	Type:

Applications

Eaton's Arrow Hart series of Pin & Sleeve products have been expanded to include dual rating for both North American and European amperages. These products are ideal for the data center industry as customers now only need one part number to power server assemblies in the US and overseas. Our dual rated devices carry an IP69K rating and Arrow Hart's signature features that make installation fast and reliable. Arrow Hart's pin and sleeve devices were unlike other brands – our devices were the industry's first to offer IP69K rated protection. Each device has been carefully engineered to offer reliability, efficiency, and added safety protection in demanding wet locations, particularly where harsh washdowns are a must!

Table 3. Specifications

Device Type	30A & 32A pin & sleeve receptacles	30A & 32A pin & sleeve plugs	30A & 32A pin & sleeve connectors	30A & 32A pin & sleeve inlets
Testing & code compliance	Base device: <ul style="list-style-type: none"> Classified to IEC standards 60309-1 and 60309-2 cULus listed to UL1682 & UL1686 and CSA 22.2 no. 182.1 Dual rated devices are TUV listed 	Base device: <ul style="list-style-type: none"> Classified to IEC standards 60309-1 and 60309-2 cULus listed to UL1682 & UL1686 and CSA 22.2 no. 182.1 Dual rated devices are TUV listed 	Base device: <ul style="list-style-type: none"> Classified to IEC standards 60309-1 and 60309-2 cULus listed to UL1682 & UL1686 and CSA 22.2 no. 182.1 Dual rated devices are TUV listed 	Base device: <ul style="list-style-type: none"> Classified to IEC standards 60309-1 and 60309-2 cULus listed to UL1682 & UL1686 and CSA 22.2 no. 182.1 Dual rated devices are TUV listed
Environmental specifications	Flammability: Meets UL94 requirements; HB rated (housing), V0 rated (contact carriers) Protection: Watertight to IP67 per IEC 60529 & IP69K to DIN 40050 Part 9	Flammability: Meets UL94 requirements; HB rated (housing), V0 rated (contact carriers) Protection: Watertight to IP67 per IEC 60529 & IP69K to DIN 40050 Part 9	Flammability: Meets UL94 requirements; HB rated (housing), V0 rated (contact carriers) Protection: Watertight to IP67 per IEC 60529 & IP69K to DIN 40050 Part 9	Flammability: Meets UL94 requirements; V2 rated (housing), V2 rated (contact carriers) Protection: Watertight to IP67 per IEC 60529 & IP69K to DIN 40050 Part 9
Electrical specifications	Dielectric voltage: <300V:2000V - 1 minute. >300V:3000V - 1 minute Maximum working voltage: 600V (rms) Current interrupting: Yes, at full-rated current & voltage Temperature rise: Max. 30°C (86°F) after 50 cycles of overload @150% of rated current Endurance: <20A:5000 cycles >20A:1000 cycles	Dielectric voltage: 1000V plus 2x rated V - 1 minute Maximum working voltage: 600V (rms) Current interrupting: Yes, at full-rated current & voltage Temperature rise: Max. 30°C (86°F) after 50 cycles of overload @150% of rated current Endurance: <20A:5000 cycles >20A:1000 cycles	Dielectric voltage: 1000V plus 2x rated V - 1 minute Maximum working voltage: 600V (rms) Current interrupting: Yes, at full-rated current & voltage Temperature rise: Max. 30°C (86°F) after 50 cycles of overload @150% of rated current Endurance: <20A:5000 cycles >20A:1000 cycles	Dielectric voltage: <300V:2000V - 1 minute. >300V:3000V - 1 minute Maximum working voltage: 600V (rms) Current interrupting: Yes, at full-rated current & voltage Temperature rise: Max. 30°C (86°F) after 50 cycles of overload @150% of rated current Endurance: <20A:5000 cycles >20A:1000 cycles
Mechanical Specifications	Voltage ratings: Marked on device Impact resistance: UL1682 Cable grip retention: UL1682	Voltage ratings: Marked on device Impact resistance: UL1682 Cable grip retention: UL1682	Voltage ratings: Marked on device Impact resistance: UL1682 Cable grip retention: UL1682	Voltage ratings: Marked on device Impact resistance: UL1682 Cable grip retention: UL1682

Table 4. Materials

Device Type	30A & 32A pin & sleeve receptacles	30A & 32A pin & sleeve plugs	30A & 32A pin & sleeve connectors	30A & 32A pin & sleeve inlets
Housing & flange	Nylon PA6-GF30	Nylon PA6-GF30	Nylon PA6-GF30	Nylon PA6
Back body	N/A	Nylon PA6-GF30	Nylon PA6-GF30	N/A
Contact carrier	Nylon PA6	Nylon PA6	Nylon PA6	Nylon PA6
Sleeves	Nickel plated brass	N/A	Nickel plated brass	N/A
Contact spring on sleeves	Nickel plated spring steel	N/A	Nickel plated spring steel	N/A
Pins	N/A	Nickel plated brass	N/A	Nickel plated brass
External strain relief clamp	N/A	Nylon PA6-GF30	Nylon PA6-GF30	N/A
Cable seal	N/A	Silicon rubber	Silicon rubber	N/A
Support washer for cord grip	N/A	Plated steel	Plated steel	N/A
Cover	Nylon PA6-GF30	N/A	Nylon PA6-GF30	N/A
Hinge pin	Nylon PA6-GF30	N/A	Nylon PA6-GF30	N/A
Cover spring	Stainless steel	N/A	Stainless steel	N/A
Cover gasket	Silicon rubber	N/A	Silicon rubber	N/A
Flange gasket	Silicon rubber	N/A	N/A	Silicon rubber
Terminal screws	Nickel plated steel	Nickel plated steel	Nickel plated steel	Nickel plated steel
Assembly screws	Stainless steel	Stainless steel	Stainless steel	Stainless steel

Project Name:	Prepared By:
Project Number:	Date:
Catalog Number:	Type:

30A & 32A Receptacles

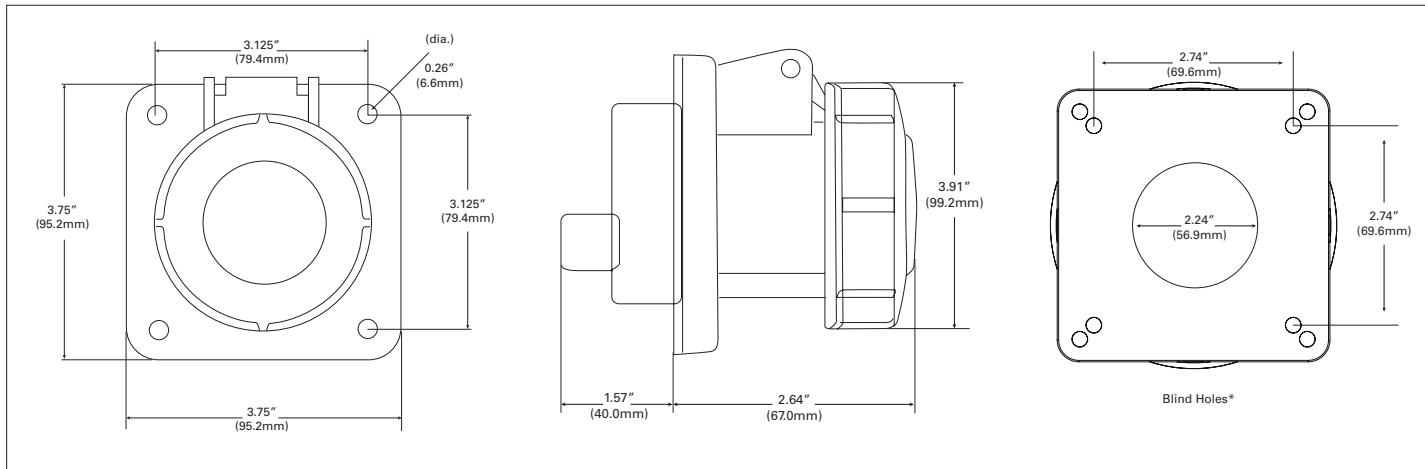


Figure 1. 30A & 32A 2-P, 3-W & 3-P, 4-W Receptacles, Front, Side & Back Views

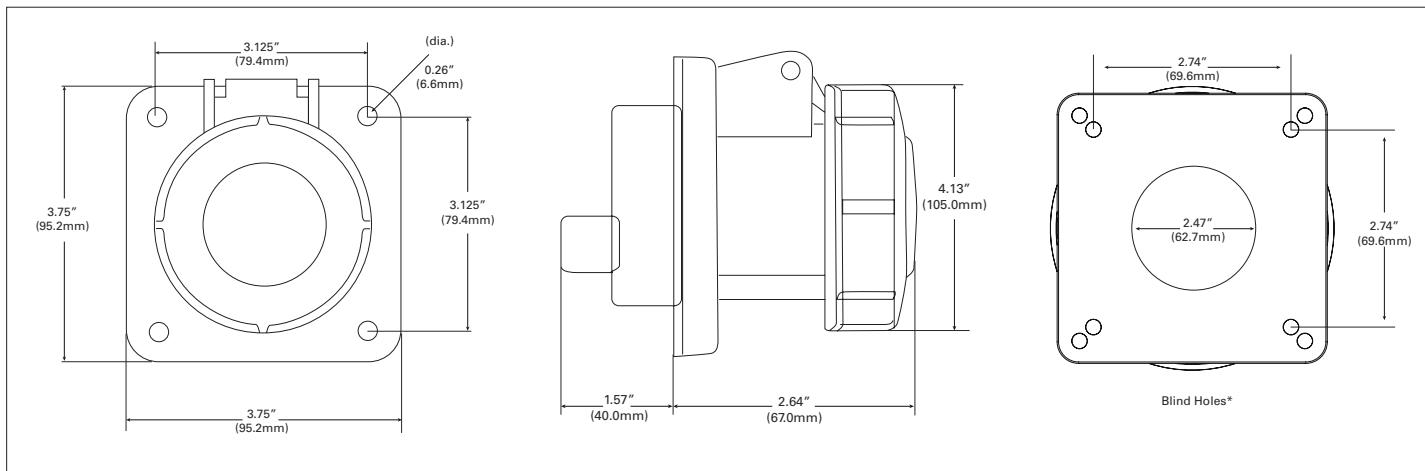


Figure 2. 30A & 32A 4-P, 5-W Receptacles, Front, Side & Back Views

Project Name:	Prepared By:
Project Number:	Date:
Catalog Number:	Type:

Product Dimensions

30A & 32A Plugs

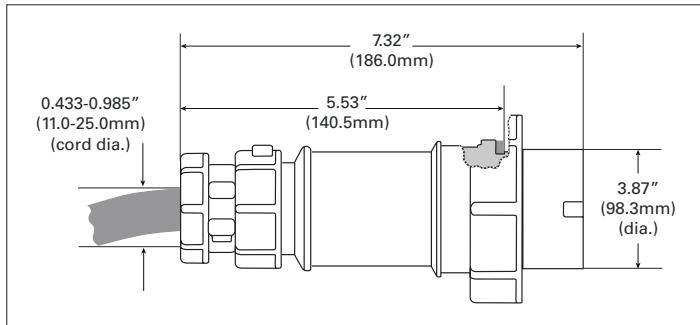


Figure 3. 30A & 32A 2-P, 3-W & 3-P, 4-W Plugs

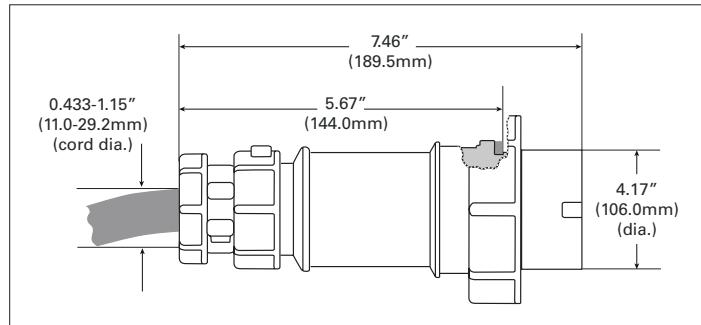


Figure 4. 30A & 32A 4-P, 5-W Plugs

30A & 32A Connectors

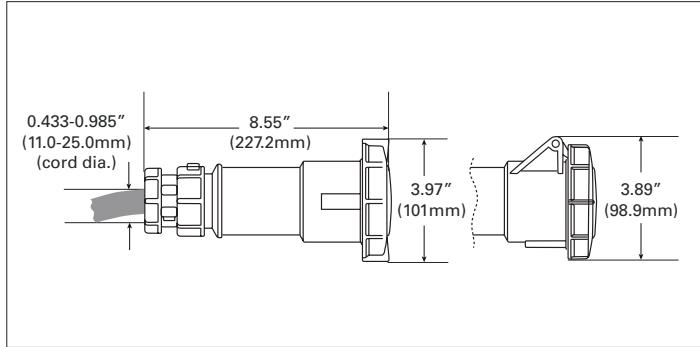


Figure 5. 30A & 32A 2-P, 3-W & 3-P, 4-W Underside & Side View Connectors

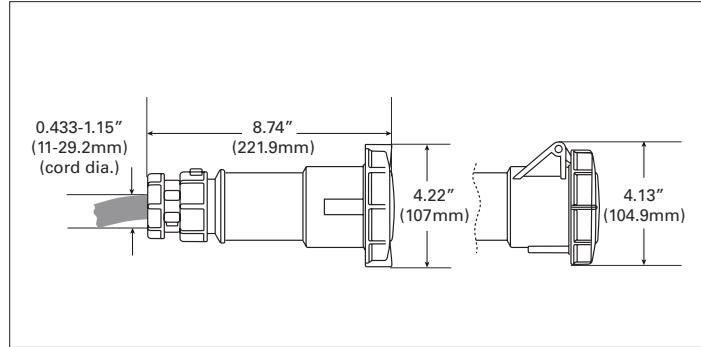


Figure 6. 30A & 32A 4-P, 5-W Underside & Side View Connectors

30A & 32A Inlets

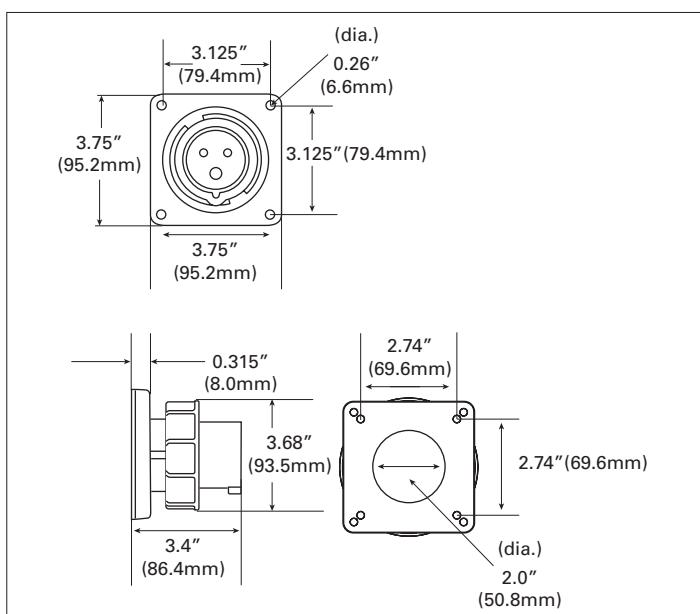


Figure 7. 30A & 32A 2-P, 3-W & 3-P, 4, Front, Side & Back View Inlets

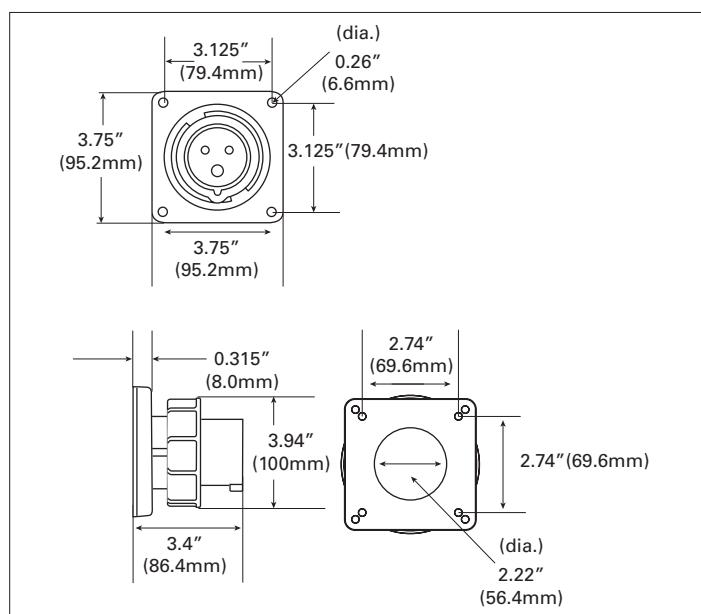


Figure 8. 30A & 32A 4-P, 5-W Front, Side & Back View Inlets

Project Name:	Prepared By:
Project Number:	Date:
Catalog Number:	Type:

Certifications & Compliances

Catalog No.	AH330R4W	AH330P4W	AH330C4W	AH330B4W	cULus	CE	TÜV Rheinland
AH330R6WDR	AH330P6WDR	AH330C6WDR	AH330B6WDR	•	•	•	
AH330R7W	AH330P7W	AH330C7W	AH330B7W	•	•		
AH430R12W	AH430P12W	AH430C12W	AH430B12W	•	•		
AH430R9WDR	AH430P9WDR	AH430C9WDR	AH430B9WDR	•	•	•	
AH430R6WDR	AH430P6WDR	AH430C6WDR	AH430B6WDR	•	•	•	
AH430R7W	AH430P7W	AH430C7W	AH430B7W	•	•		
AH430R5W	AH430P5W	AH430C5W	AH430B5W	•	•		
AH530R9WDR	AH530P9WDR	AH530C9WDR	AH530B9WDR	•	•	•	
AH530R6WDR	AH530P6WDR	AH530C6WDR	AH530B6WDR	•	•	•	
AH530R7W	AH530P7W	AH530C7W	AH530B7W	•	•		
AH530R5W	AH530P5W	AH530C5W	AH530B5W	•	•		

KEY: cULus European conformity TÜV Rheinland

Compliances, specifications and availability are subject to change without notice.

Electrical Sector
1123 Hwy 74 S
Peachtree City, GA 30269
United States
Eaton.com
Eaton.com/ArrowHart

Electrical Sector
Canada Operations
5925 McLaughlin Road
Mississauga, Ontario, L5R 1B8
Canada
EatonCanada.ca
Eaton.com/ArrowHart

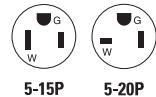
Electrical Sector
Mexico Operations
Carr. Tlalnepantla -
Cuautitlan Km 178 s/n
Col. Villa Jardin esq.
Cerrada 8 de Mayo
Cuautitlan, Mexico CP 54800
Mexico
Eaton.mx
Eaton.com/ArrowHart

Duplex receptacles

Project Name:	Prepared By:
Project Number:	Date:
Catalog Number:	Type:

Description

2-pole, 3-wire grounding
15A, 125V/AC
20A, 125V/AC



270



4270



1107



1107-9

Design features

- Durable impact-resistant thermoplastic face and back body is virtually unbreakable
- Terminal screws are backed out and ready to wire
- Extra-long and extra-wide mounting straps
- Side-wire terminals accept up to #10 solid or stranded wire
- Copper or Copper Clad Aluminum #10-14 AWG wire is UL approved: TR270 (all models) & TR1107 (all models). Side wire Only.

Table 1. Duplex receptacles

Catalog no.	Description	Rating			NEMA	Color suffix
		A	V/AC			
□ 270_	Duplex receptacle	15	125	5-15R	A, B, BK, LA, V, W	
□ 270-9_	Duplex receptacle, auto grounding	15	125	5-15R	A, B, LA, V, W	
□ 4270_	Duplex receptacle	15	125	5-15R	A, B, BK, LA, V, W	
□ 1107_	Decorator duplex receptacle	15	125	5-15R	A, B, BK, GY, LA, V, W	
□ 1107-9_	Decorator duplex receptacle, auto grounding	15	125	5-15R	A, BK, LA, V, W	

Compliances, specifications and availability are subject to change without notice.

Project Name:	Prepared By:
Project Number:	Date:
Catalog Number:	Type:

Applications

For installations where tamper resistant receptacles are NOT required by 2017 NEC Article 406.12.

Table 2. Specifications

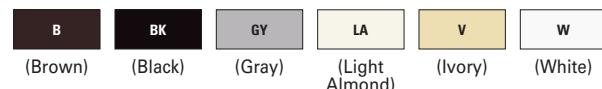
Catalog no.	270, 270-9, 4270, 1107, 1107-9 series
Receptacle type	Residential grade duplex
Wiring type	Push and Side wire
Testing & code compliance	<ul style="list-style-type: none"> • cULus Listed to UL498, file no. E15058 • UL certified to CSA C22.2, no. 42 • NOM/ANSI certified.
Environmental specifications	Flammability: Meets UL 94 requirements; TR1107, TR270 V0 rated Temperature rating: -TR1107, TR270 -20°C to 60°C (-4°F to 140°F);
Electrical specifications	Dielectric voltage: Withstands 2000V per UL 498 Current interrupting: Yes, at full-rated current Temperature rise: Max. 30°C (86°F) after 100 cycles of overload @ 150% of rated current (DC)
Mechanical specifications	Terminal accommodation: #14 - 10 AWG Voltage ratings: Permanently marked on device

Table 3. Materials

Catalog no.	270, 270-9, 4270, 1107, 1107-9 series
Receptacle type	Residential grade duplex
Body top & bottom	TR1107, TR270, PVC
Strap	Galvanized steel TR1107, TR270
Contacts	Brass alloy
Terminal screws	Brass/nickel-plated steel

Table 4. Color ordering information

For ordering devices, include Cat. no. followed by the color code: A (Almond), B (Brown), BK (Black), GY (Gray), LA (Light Almond), V (Ivory), W (White)



Project Name:	Prepared By:
Project Number:	Date:
Catalog Number:	Type:

Product Dimensions

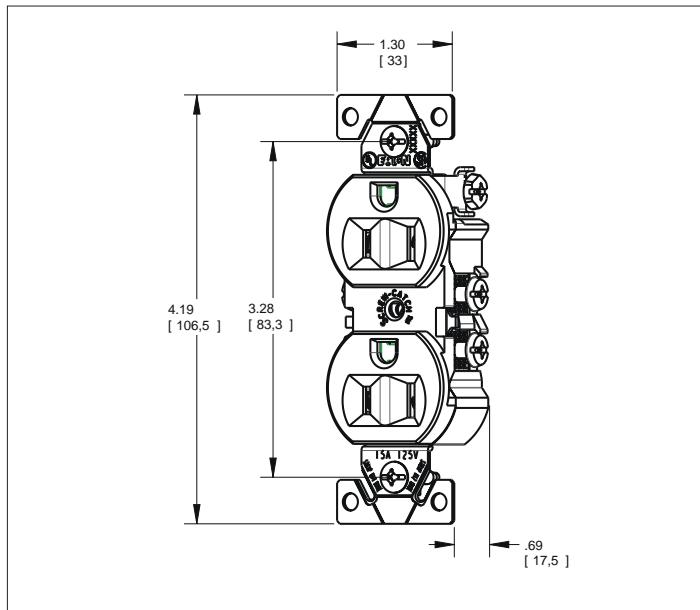


Figure 1. 270, 270-9 Line Art with Dimensions

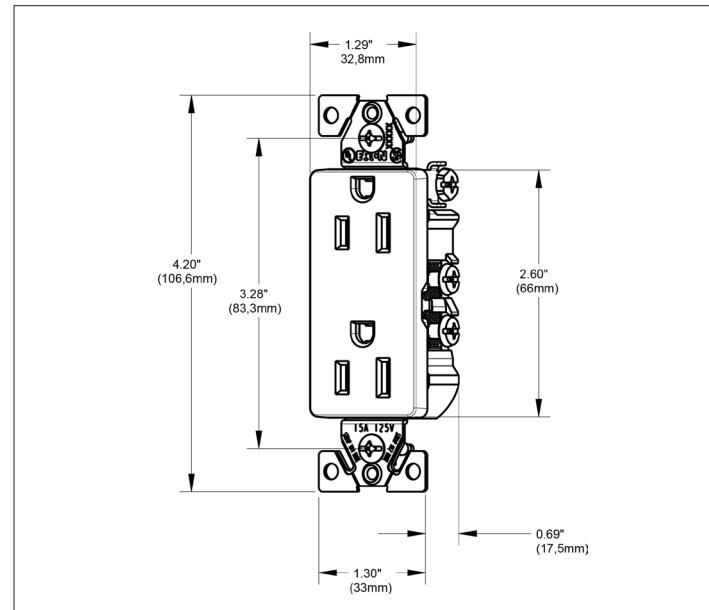


Figure 2. 1107, 1107-9 Line Art with Dimensions

Certifications & compliances

Catalog no.			
270	•	•	
270-9	•	•	
4270	•	•	
1107	•	•	
1107-9	•	•	

KEY: NOM

Compliances, specifications and availability are subject to change without notice.

Electrical Sector
203 Cooper Circle
Peachtree City, GA 30269
United States
Eaton.com
Eaton.com/wiringdevices

Electrical Sector
Canada Operations
5925 McLaughlin Road
Mississauga, Ontario, L5R 1B8
Canada
EatonCanada.ca
Eaton.com/wiringdevices

Electrical Sector
Mexico Operations
Carr. Tlalnepantla -
Cuautitlán Km 17.8 s/n
Col. Villa Jardín esq.
Cerrada 8 de Mayo
Cuautitlán, México CP 54800
México
Eaton.mx
Eaton.com/wiringdevices

Industry-Leading Ground-Fault Protection.



SmartlockPro® Self-Test GFCIs. Protection You Can Trust.

Industry-leading quality, professional grade lockout action, and the slimmest profile on the market make SmartlockPro Self-Test GFCIs a smart choice in ground-fault circuit interrupter protection. Engineered to meet the latest UL standard for auto-monitoring (self-test), our complete line of self-test GFCIs periodically conduct an automatic internal test to confirm that protected power is available. If the GFCI detects a problem, one or more of the following will occur:

- Power will be denied (trip with the inability to reset)
- Trip with the ability to reset, subject to the next auto-monitoring test cycle or repeatedly trip
- Visual and/or audible indication

Faster and easier to install in any wallbox because the depth is reduced, our slim Self-Test GFCIs flush mount to the wall with minimal protrusion for a sleek, finished look.

Applications

Residential - Kitchens, bathrooms, garages, basements, laundry rooms, wet sink and other wet locations around the home

Educational Facilities - Classrooms, restrooms, laboratories, dormitories and kitchens

Airports - Public bathrooms, general use and maintenance areas

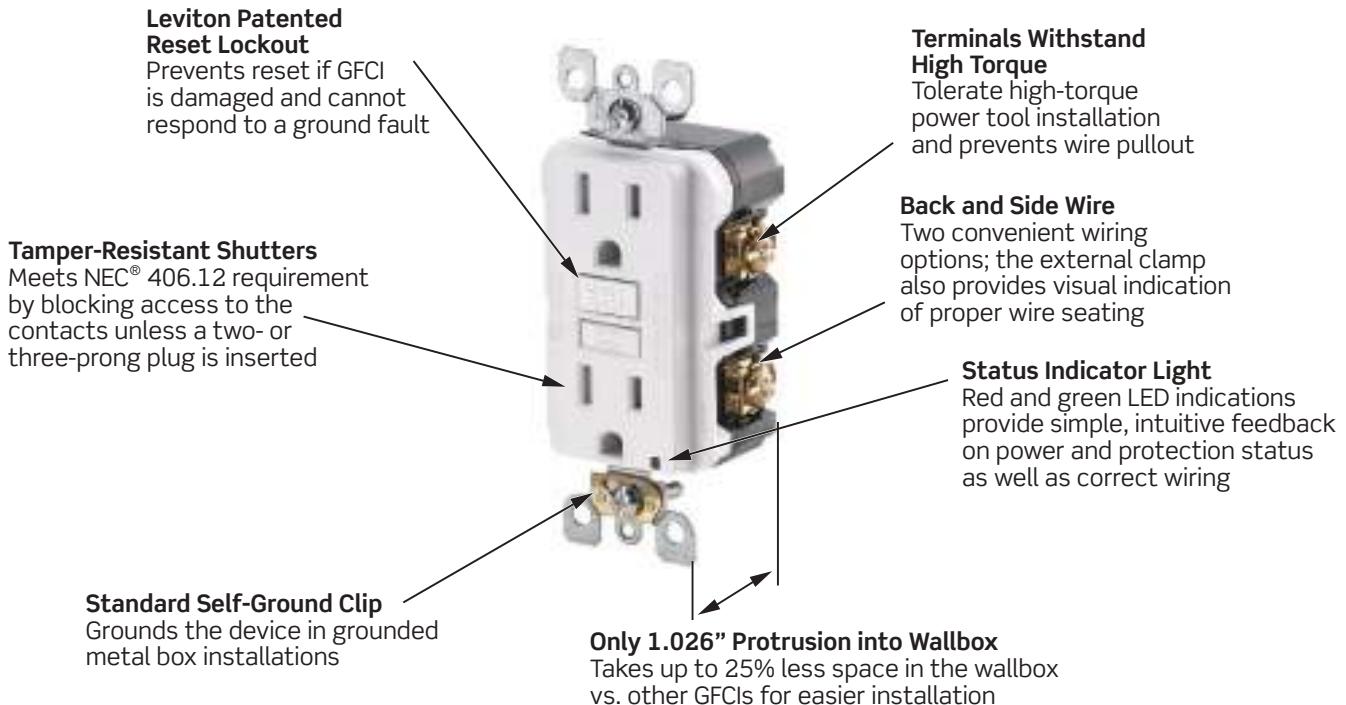
Restaurants, Lodging and Retail Malls - Public bathrooms, general use and maintenance areas

Commercial Offices - Bathrooms, basement areas, hallways and kitchen facilities

Public Areas - Wherever receptacles are located near wet or damp locations



Features and Benefits



Self-Test

- Provides continuous ground-fault protection - detects and trips on actual ground-fault even when self-test is being conducted
- On initial power up, tests the GFCI within 3 seconds
- Auto-monitoring exceeds the UL requirement
- Auto adapts and shifts to more frequent testing if potential problem is detected
- Testing frequency regularly updates protection status
- Electronics are designed to minimize any false triggers

General Features

- Patented bridge contact provides individual sets of contacts for GFCI receptacle face and downstream receptacles; no power will be delivered to receptacle face if improperly wired (line-load reversed)
- Trip threshold meets or exceeds UL requirements for tripping time
- Improved immunity to high frequency noise reduces nuisance tripping
- Advanced electronics provides superior resistance to electrical surges and over-voltages
- Patented Lockout Action prevents reset if GFCI is damaged and cannot respond to a ground-fault
- Status Indicator Light provides simple, intuitive feedback on power and protection status as well as indication of line/load reversal
- Silver alloy contacts
- Impact-resistant thermoplastic cover and body
- One-piece T-design trip latch mechanism provides efficient operation
- Available in 15A and 20A versions, all with Fed Spec rating
- TEST and RESET button colors match device face
- Compatible with all Decora® devices and wallplates; available in select Decora colors
- Limited Two-Year Product Warranty

Tamper-Resistant (TR) Models

- Complies with NEC® requirement mandating that all 15A and 20A receptacles installed in dwelling units be listed as tamper-resistant
- Shutter mechanism inside the receptacle blocks access to the contacts unless a two- or three-prong plug is inserted

Duplex Guide Light Models

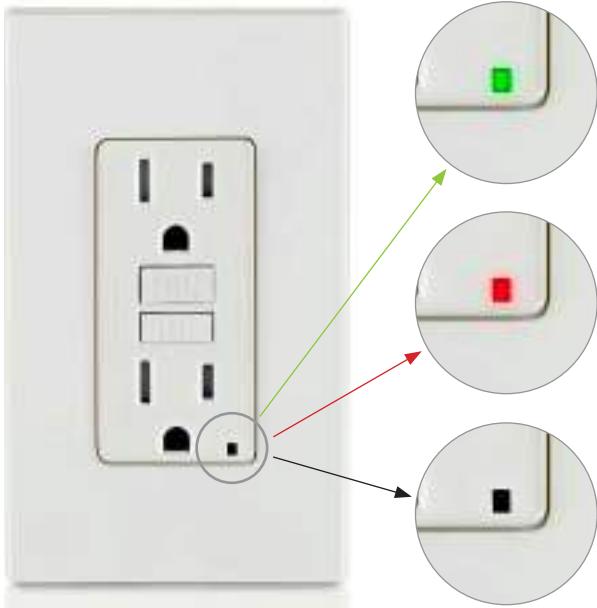
- Sensor provides automatic ON/OFF based on ambient lighting
- Dual lens provides visible light with a variety of plugs or transformers
- Custom designed lenses with edge-mounted LEDs improve light dispersion
- Energy-efficient (~1W of electricity). No bulbs to replace
- Saves space by eliminating the need to use an outlet for a plug-in night light

Weather-Resistant Models

- Designed for wet and damp locations to meet the requirements of NEC Section 406.8
- Stainless steel strap and screws
- Conformal coated PC board to protect critical components from moisture
- Cold impact resistant face and buttons
- UV stabilized plastics

Audible Models

- Audible alarm sounds when the GFCI trips, providing an alert that power has been disconnected from load(s) plugged into or fed from the GFCI
- Indicator light provides visual status



Status Indicator Light

Leviton GFCI devices feature an LED Status Indicator Light which provides a visual indication to the user of the status of GFCI protection. This is a convenient way to check the level of protection at-a-glance.

GREEN LED - NORMAL OPERATION

- GFCI has passed self-test and is providing power

RED LED - ALERT!

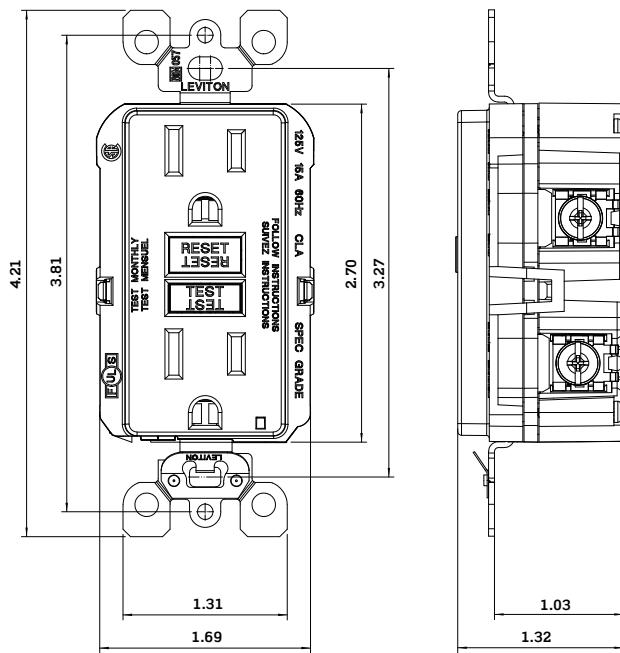
- Blinking - Initial self-test upon first power up
- Solid or blinking - Press TEST and RESET buttons to reset GFCI
- If GFCI will not reset OR solid or blinking red continues, replace device

NO LED - NO POWER

- GFCI in tripped state
- Press RESET button
- If GFCI will not reset, no power on the circuit

Agency Standards and Compliance

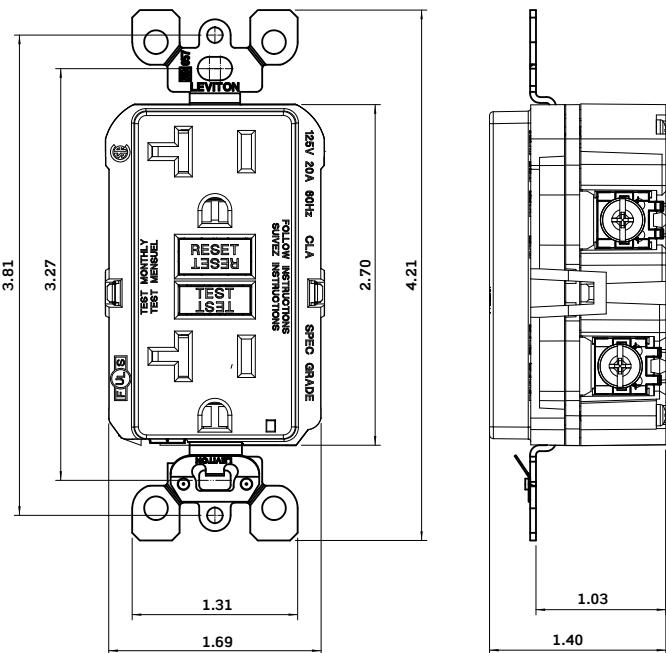
- Meets the latest UL and CSA requirements
- UL Standard 943 Class A (GFCI) and 498 (Receptacles)
- UL Listed (File #E-48380)
- CSA Standard C22.2 - 144.1 (GFCI) and 42 (Receptacles)
- CSA Certified (File #LR-57811)
- NOM Certified
- Meets Federal Specification W-C-596G (blank face - exception)



15A SmartlockPro® Self-Test GFCI

Material Characteristics

- Environmental: Flammability UL-94 V2 Rating
- Operating Temperature: -35°C to 66°C
- Material: Face, Thermoplastic; Body, Polycarbonate



20A SmartlockPro® Self-Test GFCI

Ordering Information

Commercial Spec Grade - Back and Side Wired

Description	Color	Cat. No.		Cat. No.	
NEMA		NEMA 5-15R		NEMA 5-20R	
Rating		15A-125V @ Receptacle 20A-125V Feed-Through		20A-125V @ Receptacle 20A-125V Feed-Through	
		TR	Non-TR	TR	Non-TR
Duplex with LED Indicator (with self-grounding clip)	White	GFTR1-W GFTR1-WBK*	GFNT1-W	GFTR2-W GFTR2-WBK*	GFNT2-W
	Ivory	GFTR1-I	GFNT1-I	GFTR2-I	GFNT2-I
	Light Almond	GFTR1-T	GFNT1-T	GFTR2-T	GFNT2-T
	Gray	GFTR1-GY	GFNT1-GY	GFTR2-GY	GFNT2-GY
	Black	GFTR1-E	GFNT1-E	GFTR2-E	GFNT2-E
	Brown	GFTR1	GFNT1	GFTR2	GFNT2
	Red	-	-	-	GFNT2-R
Duplex Weather-Resistant/ Outdoor Grade with LED Indicator	White	GFWT1-W	GFWR1-W	GFWT2-W	GFWR2-W
	Ivory	GFWT1-I	GFWR1-I	GFWT2-I	GFWR2-I
	Light Almond	GFWT1-T	-	GFWT2-T	-
	Gray	GFWT1-GY	-	GFWT2-GY	-
	Black	GFWT1-E	GFWR1-E	GFWT2-E	GFWR2-E
	Brown	GFWT1	-	-	-
Duplex Guide Light with LED Indicator (with self-grounding clip)	White	GFNL1-W	-	GFNL2-W	-
	Ivory	GFNL1-I	-	GFNL2-I	-
	Light Almond	GFNL1-T	-	GFNL2-T	-
	Black	GFNL1-E	-	-	-
Duplex with Audible Trip Alert with LED Indicator (with self-grounding clip)	White	GFTA1-W	-	GFTA2-W	-
	Ivory	GFTA1-I	-	GFTA2-I	-
	Light Almond	GFTA1-T	-	GFTA2-T	-
Combination Switch with LED Indicator (with self-grounding clip) (15 Amp @ 120 VAC Switch rating)	White	GFSW1-W	-	-	-
	Ivory	GFSW1-I	-	-	-
	Light Almond	GFSW1-T	-	-	-
Blank Face with LED Indicator (with self-grounding clip) (20A feedthrough rating only)	White	GFRBF-W			
	Ivory	GFRBF-I			
	Light Almond	GFRBF-T			

*20pc bulk pack without wallplates



Leviton Manufacturing Co., Inc.

Tech Line: 1-800-824-3005

Mon-Fri 8am-10pm EST, Saturday 9am-7pm EST, Sunday 9am-5pm EST

For 24/7 product support visit www.leviton.com/support

Visit our Website at: www.leviton.com/gfci

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**Pass and Seymour
20A 125V Specification Grade Tamper-Resistant Duplex Receptacle, Back and Side Wire, Gray**
Part No. TR5352GRY



Tamper-Resistant Specification Grade Duplex Receptacle, Back and Side Wire, 20A, 125V. For detailed Tamper-Resistant receptacle information, visit our Tamper-Resistant Receptacles page.

Features & Benefits

Dual mechanical shutter system to help prevent insertion of foreign objects. AC receptacles available in 15 and 20A, 125V.

Easily accessed break-off line-contact connecting tab for fast and easy split-circuit wiring.

High impact-resistant nylon face and thermoplastic back body.

Back and side wire capability

For covering patents, see www.legrand.us/patents.

Specifications

General Info

Product Line	Pass & Seymour	Color	Gray
Finish	Matte	UPC Number	785007034912
Country Of Origin	Mexico	Number of Receptacles	2
Outlet Type	Tamper-Resistant	Application Sector	Commercial
Type	Outlet		

Dimensions

Product Width US	1.37 in	Product Depth US	0.93 in
Product Height US	3.28 in		

Listing Agencies / 3rd Party Agencies

cULus Listed	Yes
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Technical Information

Is Tamper-Resistant	Yes	Amperage	20 A
Number of Poles	Double Pole	Indoor/Outdoor	Indoor



Photoelectric Smoke Detectors

System Sensor i³™ series smoke detectors represent significant advancement in conventional detection.

The i³ family is founded on three principles: installation ease, intelligence, and instant inspection.



Features

- Plug-in detector line, mounting base included
- Large wire entry port
- In-line terminals with SEMS screws
- Mounts to octagonal and single-gang back boxes, 4-square back boxes, or direct to ceiling
- Stop-Drop 'N Lock attachment to base
- Removable detector cover and chamber
- Built-in remote maintenance signaling
- Drift compensation and smoothing algorithms
- Simplified sensitivity measurement
- Wide-angle, dual-color LED indication
- Loop testing via EZ Walk feature
- Built-in test switch

Installation ease. The i³ line redefines installation ease with its plug-in design. This allows an installer to pre-wire bases (included with heads). The large wire entry port and in-line terminals provide ample room for neatly routing the wiring inside the base. The base accommodates a variety of back box mounting methods as well as direct mounting with drywall anchors. To complete the installation, i³ heads plug into the base with a simple Stop-Drop 'N Lock™ action.

Intelligence. i³ detectors offer a number of intelligent features to simplify testing and maintenance. Drift compensation and smoothing algorithms are standard with the i³ line to minimize nuisance alarms. 2-wire i³ detectors can generate a remote LED-indicated maintenance signal when connected to the 2W-MOD2 loop test/maintenance module or a panel equipped with the i³ protocol. The SENS-RDR, a wireless device, displays the sensitivity of i³ detectors in terms of percent-per-foot obscuration.

Instant inspection. The i³ series provides wide-angle red and green LED indicators for instant inspection of the detector's condition: normal standby, out-of-sensitivity, alarm, or freeze trouble. When connected to the 2W-MOD2 loop test/maintenance module or a panel with the i³ protocol, the EZ Walk loop test feature is available on 2-wire i³ detectors. This feature verifies the initiating loop wiring by providing LED status indication at each detector.

Agency Listings



S911



3011446



7272-1653:152



290-01-E



2093



3180932

Smoke Detector Specifications

Architectural/Engineering Specifications

Smoke detector shall be a System Sensor i³ Series model number _____, listed to Underwriters Laboratories UL 268 for Fire Protection Signaling Systems. The detector shall be a photoelectric type (Model 2W-B, 4W-B) or a combination photoelectric/thermal (Model 2WT-B, 4WT-B) with thermal sensor rated at 135°F (57.2°C). The detector shall include a mounting base for mounting to 3½-inch and 4-inch octagonal, single-gang, and 4-inch square back boxes with a plaster ring, or direct mount to the ceiling using drywall anchors. Wiring connections shall be made by means of SEMS screws. The detector shall allow pre-wiring of the base and the head shall be a plug-in type. The detector shall have a nominal sensitivity of 2.5 percent-per-foot nominal as measured in the UL smoke box. The detector shall be capable of automatically adjusting its sensitivity by means of drift compensation and smoothing algorithms. The detector shall provide dual-color LED indication that blinks to indicate power up, normal standby, out of sensitivity, alarm, and freeze trouble (Model 2WT-B, 4WT-B) conditions. When used in conjunction with the 2W-MOD2 module, 2-wire models shall include a maintenance signal to indicate the need for maintenance at the alarm control panel and shall provide a loop testing capability to verify the circuit without testing each detector individually.

Electrical Specifications

Operating Voltage	Nominal: 12/24 V non-polarized Minimum: 8.5 V Maximum: 35 V
Maximum Ripple Voltage	30% peak to peak of applied voltage
Standby Current	2-wire: 50 µA maximum average; 4-wire: 50 µA maximum average
Maximum Alarm Current	2-wire: 130 mA limited by control panel; 4-wire: 20 mA @12 V, 23 mA @ 24 V
Peak Standby Current	2-wire: 100 µA; 4-wire: n/a
Alarm Contact Ratings	2-wire: n/a; 4-wire: 0.5 A @ 30 V AC/DC
Physical Specifications	
Dimensions (including base)	5.3 inches (127 mm) diameter; 2.0 inches (51 mm) height
Weight	6.3 oz (178 g)
Operating Temperature Range	2W-B and 4W-B: 32°F to 120°F (0°C to 49°C); 2WT-B and 4WT-B: 32°F to 100°F (0°C to 37.8°C)
Operating Humidity Range	0 to 95% RH non-condensing
Thermal Sensor	135°F (57.2°C) fixed
Freeze Trouble	2WT-B and 4WT-B only: 41°F (5°C)
Sensitivity	2.5%/ft nominal
Input Terminals	14 to 22 AWG
Mounting	3½-inch octagonal back box 4-inch octagonal back box Single-gang back box 4-inch square back box with a plaster ring Direct mount to ceiling

LED Modes			Power-Up Sequence for LED Indication	
LED Mode	Green LED	Red LED	Condition	Duration
Power up	Blink every 10 seconds	Blink every 10 seconds	Initial LED status indication	80 seconds
Normal (standby)	Blink every 5 seconds	off		
Out of sensitivity	off	Blink every 5 seconds		
Freeze trouble	off	Blink every 10 seconds		
Alarm	off	Solid		

Ordering Information

Model	Thermal	Wiring	Alarm Current
2W-B	No	2-wire	130 mA max. limited by control panel
2WT-B	Yes	2-wire	130 mA max. limited by control panel
4W-B	No	4-wire	20 mA @ 12 V, 23 mA @ 24 V
4WT-B	Yes	4-wire	20 mA @ 12 V, 23 mA @ 24 V
Accessories			
2W-MOD2	2-wire loop test / maintenance module	RT	Removal / replacement tool
SENS-RDR	Sensitivity reader	A77-AB2	Retrofit adapter bracket, 6.6 inch (16.76 cm) diameter



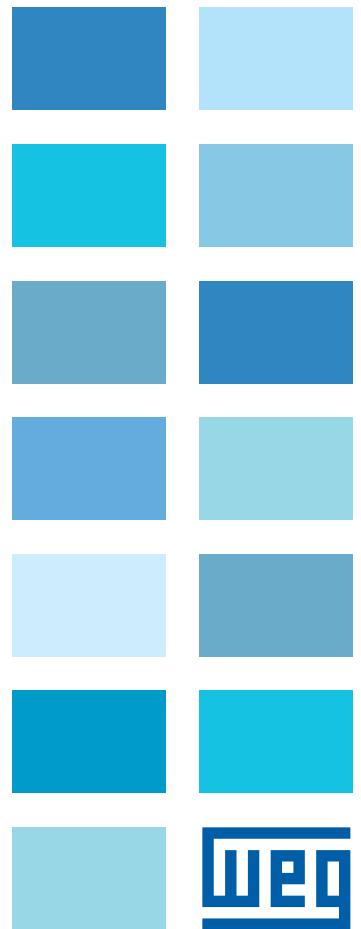
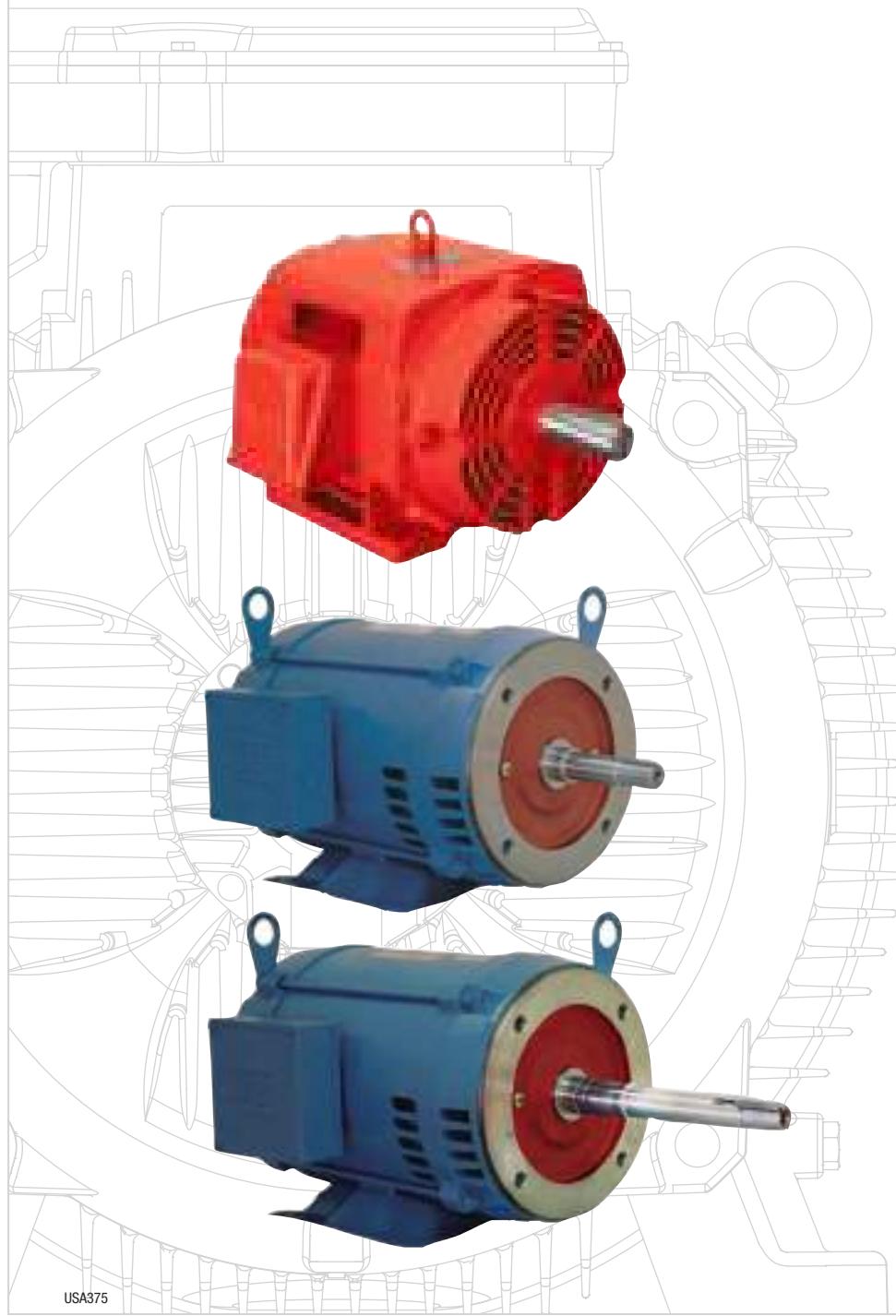
3825 Ohio Avenue • St. Charles, IL 60174
Phone: 800-SENSOR2 • Fax: 630-377-6495

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Product specifications subject to change without notice. Visit systemsensor.com for current product information, including the latest version of this data sheet.
A05-0318-007 • 6/09 • #2169

Fire Pump

- UL Listed
- 50Hz capable

Motor



UL Listed**Fire Pump Motors – ODP****Three Phase – Foot Mount and Flange Mount**

WEG High Efficiency motors are specifically designed to meet or exceed all EISA 2007 requirements for energy efficiency. They are certified by the Department of Energy with our Certificate of Compliance number CC029A.

These Fire Pump Duty (ODP) motors are designed for environments where dirt and moisture are minimal and provide maximum ventilation and heat dissipation. Design B torque and high efficiency design from 143T through 449T frames.

**STANDARD FEATURES**

- Efficiency Certification number CC029A according to US Department of Energy Regulations for EISA2007 Efficiency levels
- 2, 4 and 6 pole, 60Hz
- Voltage: 230/460V, 200/400V, 460V or 575V
- Open Drip Proof (ODP)
- NEMA Dimensions
- NEMA design 'B' ratings
- Service Factor: 1.15
- Class 'F' insulation for all frames, Class B rise
- Continuous Duty (S1)
- 104°F (40°C) ambient temperature
- 1045 heat treated and stress relieved carbon steel shaft (4140 for roller bearing motors)
- Motors are supplied with ball bearings as standard.
- F1 mount (also available flanged motors)
- Paint: Enamel alkyd resin base
- Color: Red – RAL3002
- NPT threaded terminal box
- Stainless steel nameplate – laser etched
- 460V Nameplate includes 380V 50Hz 1.15SF @ unless otherwise noted.

OPTIONAL FEATURES

- 50°C ambient
- Cable glands
- Special voltages
- Cast iron NEMA C-Flange or D-Flange (D-Flange only for frames 254T and up)
- Specially designed shaft
- Second shaft end
- Thermistors, thermostats or RTD's (PT100)
- Roller bearings on drive end
- IEC metric frames (on request) for frame 160T up to 280T

Frame – Specific Features**For Frame 143/5T only**

- Welded steel plate frames (welded feet)
- Cast iron endshields fixed with through bolt construction
- 'ZZ' bearings (double shielded)
- Degree of protection : IP21

182/4T and 213/5T Frames only

- Aluminum endshields and terminal box
- Cooling system with finned rotor

For Frame 254/6T and Up

- Cast iron frames
- Cast iron endshields and terminal box
- Cooling system with finned rotor
- Regreasable bearings positive pressure lubrication system
- Degree of protection : IP23

Note: All motors are tested according to IEEE 112 std. - Method 'B' or C390 CSA. All WEG motors are energy efficiency verified by UL in addition to the DOE.



APPROVED BY
E 104590



APPROVED BY
LR 38324

Fire Pump Motors – ODP (IP21, IP23)



High Efficiency – Foot Mount - Three Phase

HP	RPM	NEMA Frame	Catalog Number	List Price	Mult. Sym.	Approx. Shipp. Weight Lbs	FL Amps High Volts	FL Eff. %	"C" Dimension (in.)	Voltage	Notes
20	3600	254T	020360P3EFP254T	1,469	W1B	205	24.6	90.2	20.669	230/460V	1
	1800	256T	020180P3EFP256T	1,526	W1B	277	25.2	91.0	22.401	230/460V	
25	3600	256T	025360P3EFP256T	1,783	W1B	251	29.3	91.0	22.401	230/460V	
	1800	284TS	025180P3VFP284TS	1,799	W1B	311	34.6	91.7	23.386	200/400V	
	1800	284TS	025180P3EFP284TS	1,799	W1B	311	30.1	91.7	22.000	230/460V	
30	3600	284TS	030360P3VFP284TS	2,033	W1B	373	39.1	92.4	22.000	200/400V	
	3600	284TS	030360P3EFP284TS	2,033	W1B	373	34.0	92.4	22.000	230/460V	
	1800	286TS	030180P3VFP286TS	2,108	W1B	397	40.9	92.4	24.882	200/400V	
	1800	286TS	030180P3EFP286TS	2,108	W1B	397	35.6	92.4	23.504	230/460V	
40	3600	286TS	040360P3VFP286TS	2,757	W1B	457	51.5	92.4	23.504	200/400V	
	3600	286TS	040360P3EFP286TS	2,757	W1B	457	44.8	92.4	23.504	230/460V	
	1800	324TS	040180P3VFP324TS	2,652	W1B	495	55.4	93.0	26.181	200/400V	
	1800	324TS	040180P3EFP324TS	2,652	W1B	495	48.2	93.0	24.685	230/460V	
50	3600	324TS	050360P3VFP324TS	3,184	W1B	523	64.9	93.6	24.685	200/400V	
	3600	324TS	050360P3EFP324TS	3,184	W1B	523	56.4	93.6	24.685	230/460V	
	1800	326TS	050180P3VFP326TS	3,015	W1B	583	69.2	93.0	27.667	200/400V	
	1800	326TS	050180P3EFP326TS	3,015	W1B	583	60.2	93.0	26.181	230/460V	1
60	3600	326TS	060360P3VFP326TS	4,008	W1B	609	81.2	93.0	26.181	200/400V	
	3600	326TS	060360P3HFP326TS	4,008	W1B	609	56.5	93.0	26.181	575V	
	3600	326TS	060360P3EFP326TS	4,008	W1B	609	70.6	93.0	26.181	230/460V	1
	1800	364TS	060180P3VFP364TS	3,703	W1B	743	80.7	93.6	27.638	200/400V	
	1800	364TS	060180P3HFP364TS	3,703	W1B	743	56.2	93.6	27.638	575V	
	1800	364TS	060180P3EFP364TS	3,703	W1B	743	70.2	93.6	27.638	230/460V	
75	3600	364TS	075360P3VFP364TS	5,074	W1B	805	92.7	94.1	27.638	200/400V	
	3600	364TS	075360P3HFP364TS	5,074	W1B	805	64.5	94.1	27.638	575V	
	3600	364TS	075360P3EFP364TS	5,074	W1B	805	80.6	94.1	27.638	230/460V	
	1800	365TS	075180P3VFP365TS	4,715	W1B	935	98.1	94.1	27.638	200/400V	
	1800	365TS	075180P3HFP365TS	4,715	W1B	935	68.2	94.1	27.638	575V	
	1800	365TS	075180P3EFP365TS	4,715	W1B	935	85.3	94.1	27.638	230/460V	
100	3600	365TS	100360P3VFP365TS	6,152	W1B	935	126.5	94.1	27.638	200/400V	
	3600	365TS	100360P3HFP365TS	6,152	W1B	935	88.0	94.1	27.638	575V	
	3600	365TS	100360P3EFP365TS	6,152	W1B	935	110	94.1	27.638	230/460V	1
	1800	404TS	100180P3VFP404TS	6,065	W1B	1037	132.3	94.1	31.141	200/400V	
	1800	404TS	100180P3HFP404TS	6,065	W1B	1037	92.0	94.1	31.141	575V	
	1800	404TS	100180P3EFP404TS	6,065	W1B	1037	115	94.1	31.141	230/460V	1
125	3600	404TS	125360P3HFP404TS	7,762	W1B	1086	105.6	94.1	31.141	575V	
	3600	404TS	125360P3GFP404TS	7,762	W1B	1086	132	94.1	31.141	460V	1
	1800	405TS	125180P3HFP405TS	6,651	W1B	1207	109.6	94.5	31.141	575V	
	1800	405TS	125180P3GFP405TS	6,651	W1B	1207	137	94.5	31.141	460V	1

1 - Rating is 10SF @ 50Hz. Suitable for next lower HP @ 1.15SF

Fire Pump Motors – ODP (IP21, IP23)



ODP (IP21/IP23) – High Efficiency – Foot Mount - Three Phase

HP	RPM	NEMA Frame	Catalog Number	List Price	Mult. Sym.	Approx. Shipp. Weight Lbs	FL Amps High Volts	FL Eff. %	"C" Dimension (in.)	Voltage	Notes
150	3600	405TS	150360P3GFP405TS	10,042	W1B	1401	159	94.5	31.141	460V	1
	3600	405TS	150360P3HFP405TS	10,042	W1B	1401	127.2	94.5	31.141	575V	
	1800	444TS	150180P3HFP444TS	8,891	W1B	1411	132.0	95.0	36.062	575V	
	1800	444TS	150180P3GFP444TS	8,891	W1B	1411	165	95.0	36.062	460V	
200	3600	444TS	200360P3GFP444TS	12,782	W1B	1713	217	94.5	36.062	460V	
	1800	445TS	200180P3GFP445TS	10,837	W1B	1916	220	95.0	36.062	460V	1
	1800	445TS	200180P3HFP445TS	10,837	W1B	1916	176.0	95.0	36.062	575V	
250	3600	445TS	250360P3G445TS	15,654	W1B	1982	266	95.0	36.062	460V	
	1800	445TS	250180P3G445TS	13,358	W1B	2183	270	95.4	36.062	460V	
300	3600	445TS	300360P3G445TS	19,556	W1B	2183	316	95.0	36.062	460V	

"FP" models are EISA 2007 only for Fire Pump Service. Motor comply with NEMA MGI-2009 table 12-11 efficiencies

Fire Pump Motors – ODP (IP21, IP23)

C-Face – Foot Mount - Three Phase

HP	RPM	NEMA Frame	Catalog Number	List Price	Mult. Sym.	Approx. Shipp. Weight Lbs	FL Amps 460V	FL Eff. %	"C" Dimension (in.)	Voltage	Notes
10	3600	213TC	010360P3EFP213TC	901	W1B	108	11.8	88.5	17.165	230/460V	1
	3600	213TC	010360P3HFP213TC	901	W1B	108	9.4	88.5	17.165	575V	
15	3600	215TC	015360P3EFP215TC	1,232	W1B	139	17.1	89.5	17.165	230/460V	1
20	3600	254TC	020360P3EFP254TC	1,469	W1B	205	24.6	90.2	20.669	230/460V	1
25	3600	256TC	025360P3EFP256TC	1,783	W1B	251	29.3	91.0	22.401	230/460V	
30	3600	284TSC	030360P3VFP284TSC	2,033	W1B	373	39.1	92.4	22.000	200/400V	
	3600	284TSC	030360P3EFP284TSC	2,033	W1B	373	34.0	92.4	22.000	230/460V	
40	3600	286TSC	040360P3VFP286TSC	2,757	W1B	457	51.5	92.4	23.504	200/400V	
	3600	286TSC	040360P3FPE286TSC	2,757	W1B	457	44.8	92.4	23.504	230/460V	
50	3600	324TSC	050360P3VFP324TSC	3,184	W1B	523	64.9	93.6	24.685	200/400V	
	3600	324TSC	050360P3EFP324TSC	3,184	W1B	523	56.4	93.6	24.685	230/460V	

Fire Pump Motors – ODP

Three Phase - Close Coupled Pump Motor



WEG offers both JM and JP standardized types of ODP close-coupled pump line of motors. Remember that ODP are suitable where dirt and moisture are at a minimum.

APPLICATIONS

Specially developed line for industrial and commercial pumping applications.

- Water pumping
- Process
- Transfer and circulating pumps

STANDARD FEATURES

- 2, 4, 6 and 8 pole, 60Hz
- Voltage: 200/400V, 230/460V, 460V or 575V
- Cast iron frames
- Squirrel cage rotor / Aluminum die cast
- Open Drip Proof (ODP)
- NEMA Dimensions
- Ball bearings
- Service Factor: 1.25
- Class 'F' insulation
- Temperature rise: Class 'B' (80°C) at Full Load
- Continuous Duty (S1)
- 104°F (40°C) ambient temperature
- Altitude: 3300 ft (1000m)
- 1045 carbon steel shaft
- F1 mount (with cast iron 'C' Flange)
- Paint: Enamel alkyd resin base

OPTIONAL FEATURES

- Cable glands
- Special voltages
- Specially designed shaft
- Second shaft end
- Thermistor, Thermostats or RTD's (PT100)
- IEC metric frames (on request)

Frame – Specific Features

FOR FRAME 143/5JM/JP, only

- Welded steel plate frames (welded feet)
- Cast iron endshields fixed with through bolt construction
- ZZ bearings (double shielded)
- Degree of protection : IP21

FOR FRAME 182JM/JP up to 215JM/JP, only

- Welded steel plate frames (welded feet)
- Aluminum endshields and terminal box
- Cooling system with finned rotor
- ZZ bearings (double shielded)
- Degree of protection: IP21

FOR FRAME 254JM/JP UP TO 445JM/JP

- Cast iron frames
- Cast iron endshields and terminal box
- Cooling system with finned rotor
- Ball bearings
- Regreasable bearings system (frame 254T and up)
- Degree of protection: IP23

All motors are tested according to IEEE 112 std. – method B or C390 CSA



E 104590

Fire Pump Motors – ODP – ODP (IP21, IP23)



Close Coupled Pump – “JM” Type – Three Phase

HP	RPM	NEMA Frame	Catalog Number	List Price	Mult. Sym.	Approx. Shipp. Weight Lbs	FL Amps 460V	FL Eff. %	“C” Dimension (in.)	Voltage	Notes
1	1800	143JM	001180P3E143JM	437	P1C	36	1.41	82.5	14.055	230/460V	
1.5	3600	143JM	001560P3E143JM	453	P1C	32	1.95	82.5	14.055	230/460V	
	1800	145JM	001580P3E145JM	478	P1C	40	1.98	84.0	14.055	230/460V	
2	3600	145JM	002360P3E145JM	498	P1C	43	2.52	84.0	14.055	230/460V	
	1800	145JM	002180P3E145JM	524	P1C	43	2.87	84.0	14.055	230/460V	
3	3600	145JM	003360P3E145JM	565	P1C	49	3.65	84.0	14.055	230/460V	
	1800	182JM	003180P3E182JM	557	P1C	56	3.94	86.5	14.527	230/460V	
5	3600	182JM	005360P3E182JM	669	P1C	57	6.17	86.5	14.527	230/460V	
	1800	184JM	005180P3E184JM	740	P1C	69	6.39	87.5	15.315	230/460V	
7.5	3600	184JM	007360P3E184JM	862	P1C	69	8.97	87.5	15.315	230/460V	
	1800	213JM	007180P3E213JM	945	P1C	85	9.40	88.5	17.323	230/460V	
10	3600	213JM	010360P3E213JM	1,109	P1C	108	11.8	88.5	17.323	230/460V	
	1800	215JM	010180P3E215JM	1,161	P1C	109	12.7	89.5	17.323	230/460V	
15	3600	215JM	015360P3E215JM	1,447	P1C	139	17.1	89.5	17.323	230/460V	
	1800	254JM	015180P3E254JM	1,749	P1C	247	18.7	91.0	22.169	230/460V	
20	3600	254JM	020360P3E254JM	1,816	P1C	205	24.6	90.2	22.169	230/460V	
	1800	256JM	020180P3E256JM	2,107	P1C	277	25.2	91.0	23.902	230/460V	
25	3600	256JM	025360P3E256JM	2,242	P1C	251	29.3	91.0	23.902	230/460V	
	1800	284JM	025180P3E284JM	2,551	P1C	311	30.1	91.7	24.261	230/460V	
30	3600	284JM	030360P3E284JM	2,731	P1C	373	34.0	92.4	24.261	230/460V	
	1800	286JM	030180P3E286JM	2,946	P1C	397	35.6	92.4	25.754	230/460V	
40	3600	286JM	040360P3E286JM	3,260	P1C	457	44.8	92.4	25.754	230/460V	
	1800	324JM	040180P3E324JM	3,354	P1C	495	48.2	93.0	26.431	230/460V	
50	3600	324JM	050360P3E324JM	3,971	P1C	523	56.4	93.6	26.431	230/460V	
	1800	326JM	050180P3E326JM	4,104	P1C	583	60.2	93.0	27.927	230/460V	
60	3600	326JM	060360P3E326JM	4,859	P1C	609	70.6	93.0	27.927	230/460V	
	3600	326JM	060360P3G326JM	4,859	P1C	609	70.6	93.0	27.927	460V	
	1800	364JM	060180P3E364JM	5,254	P1C	743	70.2	93.6	29.139	230/460V	
	1800	364JM	060180P3G364JM	5,254	P1C	743	70.2	93.6	29.139	460V	
75	3600	364JM	075360P3E364JM	6,226	P1C	805	80.6	94.1	29.139	230/460V	
	3600	364JM	075360P3G364JM	6,226	P1C	805	80.6	94.1	29.139	460V	
	1800	365JM	075180P3E365JM	5,989	P1C	935	85.3	94.1	29.139	230/460V	
	1800	365JM	075180P3G365JM	5,989	P1C	935	85.3	94.1	29.139	460V	
100	3600	365JM	100360P3E365JM	7,005	P1C	935	110	94.1	29.139	230/460V	
	3600	365JM	100360P3G365JM	7,005	P1C	935	110	94.1	29.139	460V	

Fire Pump Motors – ODP (IP21, IP23)



Close Coupled Pump – “JP” Type – Three Phase

HP	RPM	NEMA Frame	Catalog Number	List Price	Mult. Sym.	Approx. Shipp. Weight Lbs	FL Amps 460V	FL Eff. %	“C” Dimension (in.)	Voltage	Notes
1	1800	143JP	001180P3E143JP	437	P1C	36	1.41	82.5	17.126	230/460V	
1.5	3600	143JP	001560P3E143JP	453	P1C	32	1.95	82.5	17.126	230/460V	
	1800	145JP	001580P3E145JP	478	P1C	40	1.98	84.0	17.126	230/460V	
2	3600	145JP	002360P3E145JP	498	P1C	43	2.52	84.0	17.126	230/460V	
	1800	145JP	002180P3E145JP	524	P1C	43	2.87	84.0	17.126	230/460V	
3	3600	145JP	003360P3E145JP	565	P1C	49	3.65	84.0	17.126	230/460V	
	1800	182JP	003180P3E182JP	557	P1C	56	3.94	86.5	20.236	230/460V	
5	3600	182JP	005360P3E182JP	669	P1C	57	6.17	86.5	20.236	230/460V	
	1800	184JP	005180P3E184JP	739	P1C	69	6.39	87.5	21.023	230/460V	
7.5	3600	184JP	007360P3E184JP	862	P1C	69	8.97	87.5	21.023	230/460V	
	1800	213JP	007180P3E213JP	946	P1C	85	9.40	88.5	21.240	230/460V	
10	3600	213JP	010360P3E213JP	1,109	P1C	108	11.8	88.5	21.240	230/460V	
	1800	215JP	010180P3E215JP	1,163	P1C	109	12.7	89.5	21.240	230/460V	
15	3600	215JP	015360P3E215JP	1,447	P1C	139	17.1	89.5	21.240	230/460V	
	1800	254JP	015180P3E254JP	1,749	P1C	247	18.7	91.0	25.049	230/460V	
20	3600	254JP	020360P3E254JP	1,815	P1C	205	24.6	90.2	25.049	230/460V	
	1800	256JP	020180P3E256JP	2,107	P1C	277	25.2	91.0	26.782	230/460V	
25	3600	256JP	025360P3E256JP	2,243	P1C	251	29.3	91.0	26.782	230/460V	
	1800	284JP	025180P3E284JP	2,550	P1C	311	30.1	91.7	27.141	230/460V	
30	3600	284JP	030360P3E284JP	2,731	P1C	373	34.0	92.4	27.141	230/460V	
	1800	286JP	030180P3E286JP	2,945	P1C	397	35.6	92.4	28.634	230/460V	
40	3600	286JP	040360P3E286JP	3,260	P1C	457	44.8	92.4	28.634	230/460V	
	1800	324JP	040180P3E324JP	3,354	P1C	495	48.2	93.0	29.311	230/460V	
50	3600	324JP	050360P3E324JP	3,971	P1C	523	56.4	93.6	29.311	230/460V	
	3600	324JP	050360P3G324JP	3,971	P1C	523	56.4	93.6	29.311	460V	
	1800	326JP	050180P3E326JP	4,105	P1C	583	60.2	93.0	30.807	230/460V	
60	3600	326JP	060360P3E326JP	4,859	P1C	609	70.6	93.0	30.807	230/460V	
	3600	326JP	060360P3G326JP	4,859	P1C	609	70.6	93.0	30.807	460V	
	1800	364JP	060180P3E364JP	5,254	P1C	743	70.2	93.6	32.019	230/460V	
	1800	364JP	060180P3G364JP	5,254	P1C	743	70.2	93.6	32.019	460V	
75	3600	364JP	075360P3E364JP	6,226	P1C	805	80.6	94.1	32.019	230/460V	
	3600	364JP	075360P3G364JP	6,226	P1C	805	80.6	94.1	32.019	460V	
	1800	365JP	075180P3E365JP	5,989	P1C	935	85.3	94.1	32.019	230/460V	
	1800	365JP	075180P3G365JP	5,989	P1C	935	85.3	94.1	32.019	460V	
100	3600	365JP	100360P3E365JP	7,005	P1C	935	110.0	94.1	32.019	230/460V	
	3600	365JP	100360P3G365JP	7,005	P1C	935	110	94.1	32.019	460V	
	1800	404JP	100180P3E404JP	7,469	P1C	1037	115	94.1	35.263	230/460V	
	1800	404JP	100180P3G404JP	7,469	P1C	1037	115	94.1	35.263	460V	
125	3600	404JP	125360P3G404JP	9,185	P1C	1086	132	94.1	35.263	460V	
	1800	405JP	125180P3G405JP	8,971	P1C	1207	137	94.5	35.263	460V	
150	3600	405JP	150360P3G405JP	12,106	P1C	1401	159	94.5	35.263	460V	

Fire Pump Motors – ODP (IP21, IP23)



Close Coupled Pump – “JM” Type – High Efficiency – Vertical Motors - Three Phase

HP	RPM	NEMA Frame	Catalog Number	List Price	Mult. Sym.	Approx. Shipp. Weight Lbs	FL Amps 460V	FL Eff. %	“C” Dimension (in.)	Voltage	Notes
1	1800	143JMV	001180P3E143JMV	513	P1C	36	1.41	82.5	14.756	230/460V	
1.5	3600	143JMV	001560P3E143JMV	542	P1C	32	1.95	82.5	14.756	230/460V	
	1800	145JMV	001580P3E145JMV	554	P1C	40	1.98	84.0	14.756	230/460V	
2	3600	145JMV	002360P3E145JMV	573	P1C	43	2.52	84.0	14.756	230/460V	
	1800	145JMV	002180P3E145JMV	603	P1C	43	2.87	84.0	14.756	230/460V	
3	3600	145JMV	003360P3E145JMV	657	P1C	49	3.65	84.0	14.756	230/460V	
	1800	182JMV	003180P3E182JMV	687	P1C	56	3.94	86.5	15.314	230/460V	
5	3600	182JMV	005360P3E182JMV	797	P1C	57	6.17	86.5	15.314	230/460V	
	1800	184JMV	005180P3E184JMV	875	P1C	69	6.39	87.5	15.314	230/460V	
7.5	3600	184JMV	007360P3E184JMV	993	P1C	69	8.97	87.5	15.314	230/460V	
	1800	213JMV	007180P3E213JMV	1,106	P1C	85	9.40	88.5	18.700	230/460V	
10	3600	213JMV	010360P3E213JMV	1,201	P1C	108	11.8	88.5	18.700	230/460V	
	1800	215JMV	010180P3E215JMV	1,323	P1C	109	12.7	89.5	18.700	230/460V	
15	3600	215JMV	015360P3E215JMV	1,617	P1C	139	17.1	89.5	18.700	230/460V	
20	3600	254JMV	020360P3E254JMV	2,092	P1C	205	24.6	90.2	22.169	230/460V	
25	3600	256JMV	025360P3E256JMV	2,518	P1C	251	29.3	91.0	23.902	230/460V	
30	3600	284JMV	030360P3E284JMV	3,082	P1C	373	34.0	92.4	24.261	230/460V	
40	3600	286JMV	040360P3E286JMV	3,611	P1C	457	44.8	92.4	25.754	230/460V	
50	3600	324JMV	050360P3E324JMV	4,394	P1C	523	56.4	93.6	26.431	230/460V	

Note: Prices with Drip Cover Included

Close Coupled Pump – “JP” Type – ODP (IP21/IP23) – Vertical Motors

HP	RPM	NEMA Frame	Catalog Number	List Price	Mult. Sym.	Approx. Shipp. Weight Lbs	FL Amps 460V	FL Eff. %	“C” Dimension (in.)	Voltage	Notes
1.5	3600	143JPV	001560P3E143JPV	513	P1C	32	1.95	82.5	17.827	230/460V	
2	3600	145JPV	002360P3E145JPV	559	P1C	43	2.52	84.0	17.827	230/460V	
3	3600	145JPV	003360P3E145JPV	629	P1C	49	3.65	84.0	17.827	230/460V	
5	3600	182JPV	005360P3E182JPV	729	P1C	57	6.17	86.5	22.400	230/460V	
7.5	3600	184JPV	007360P3E184JPV	993	P1C	69	9.0	87.5	22.400	230/460V	
10	3600	213JPV	010360P3E213JPV	1,273	P1C	108	11.8	88.5	22.617	230/460V	
15	3600	215JPV	015360P3E215JPV	1,617	P1C	139	17.1	89.5	22.617	230/460V	
20	3600	254JPV	020360P3E254JPV	2,092	P1C	205	24.6	90.2	26.387	230/460V	
25	3600	256JPV	025360P3E256JPV	2,518	P1C	251	29.3	91.0	26.782	230/460V	
30	3600	284JPV	030360P3E284JPV	3,082	P1C	373	34	92.4	28.755	230/460V	
40	3600	286JPV	040360P3E286JPV	3,611	P1C	457	44.8	92.4	30.248	230/460V	

Note: Prices with Drip Cover Included

Pump Motors

Close Coupled - High Efficiency

TEFC – THREE PHASE

WEG offers both JM and JP standardized types of close-coupled pump line of motors. Totally enclosed enclosures permit these motors to operate in moist or dusty atmospheres.



APPLICATIONS

Specially developed line for industrial and commercial pumping applications.

- Water pumping
- Process
- Transfer and circulating pumps

STANDARD FEATURES

- 2, 4, 6 and 8 pole, 60Hz
- Voltage: 208-230/460, 460V
- 12:1 Constant torque on VFD
100:1 Variable torque on VFD
- Cast iron frames
- Squirrel cage rotor / Aluminum die cast
- Totally Enclosed Fan Cooled - TEFC
- V-ring slingers on both endshields
- Ball bearings
- Service Factor: 1.25
- Class 'F' insulation
- Temperature rise: Class 'B' (80°C) at Full load
- Continuous Duty (S1)
- 104°F (40°C) ambient temperature
- Altitude: 3300 ft (1000m)
- 1045 carbon steel shaft
- F1 mount
- Stainless steel nameplate
- Paint: Enamel alkyd resin base
- Color: RAL 5009 – Blue
- NPT threaded terminal box
- Automatic drain plugs
- Regreasable bearings system (frames 254JM/JP frames and up)

OPTIONAL FEATURES

- Cable glands
- Special voltages
- 575V
- Specially designed shaft
- Stainless steel shaft
- Space heaters
- Second shaft end
- Thermistor, Thermostats or RTD's (PT100)
- Additional terminal box

* Design B torque rating on nameplate can be re-plated for Design C for 15-200Hp 1800 and 1200 rpm.



APPROVED BY

E 104590





Fire Pump Motors – TEFC (IP55) - W22

Close Coupled Pump – “JM” Type – Three Phase

HP	RPM	NEMA Frame	Catalog Number	List Price	Mult. Sym.	Approx. Shipp. Weight Lbs	FL Amps 460V	FL Eff. %	“C” Dimension (in.)	Voltage	Notes
1	1800	143JM	00118EP3E143JM-W22	497	P1	47	1.49	82.5	14.304	230/460V	
1.5	3600	143JM	00156EP3E143JM-W22	527	P1	45	1.99	82.5	14.304	230/460V	
	1800	145JM	00158EP3E145JM-W22	509	P1	54	2.05	84.0	15.304	230/460V	
2	3600	145JM	00236EP3E145JM-W22	583	P1	47	2.60	84.0	15.304	230/460V	
	1800	145JM	00218EP3E145JM-W22	560	P1	56	2.70	84.0	15.304	230/460V	
3	3600	145JM	00336EP3E145JM-W22	647	P1	54	3.71	85.5	15.304	230/460V	♣
	3600	182JM	00336EP3E182JM-W22	744	P1	106	3.59	85.5	15.996	230/460V	
	1800	182JM	00318EP3E182JM-W22	886	P1	97	3.90	87.5	15.996	230/460V	
5	3600	184JM	00536EP3E184JM-W22	922	P1	114	5.90	87.5	17.020	230/460V	
	1800	184JM	00518EP3E184JM-W22	993	P1	102	6.48	87.5	17.020	230/460V	
7.5	3600	184JM	00736EP3E184JM-W22	1,125	P1	128	8.76	88.5	17.020	230/460V	♣
	3600	213JM	00736EP3E213JM-W22	1,277	P1	150	8.66	88.5	18.678	230/460V	
	1800	213JM	00718EP3E213JM-W22	1,256	P1	150	9.53	89.5	18.678	230/460V	
10	3600	215JM	01036EP3E215JM-W22	1,581	P1	150	11.7	89.5	20.174	230/460V	
	1800	215JM	01018EP3E215JM-W22	1,502	P1	165	12.8	90.2	20.174	230/460V	
15	3600	215JM	01536EP3E215JM-W22	1,803	P1	174	17.3	90.2	20.174	230/460V	♣
	3600	254JM	01536EP3E254JM-W22	2,029	P1	280	17.0	90.2	24.370	230/460V	
	1800	254JM	01518EP3E254JM-W22	2,256	P1	266	17.9	91.0	24.370	230/460V	
20	3600	254JM	02036EP3E254JM-W22	2,368	P1	304	23.3	90.2	24.370	230/460V	♣
	3600	256JM	02036EP3E256JM-W22	2,568	P1	313	23.3	90.2	26.102	230/460V	
	1800	256JM	02018EP3E256JM-W22	2,490	P1	313	24.4	91.0	26.102	230/460V	
25	3600	256JM	02536EP3E256JM-W22	2,803	P1	313	28.4	91.0	26.102	230/460V	♣
	3600	284JM	02536EP3E284JM-W22	2,989	P1	353	29.0	91.0	27.165	230/460V	
	1800	284JM	02518EP3E284JM-W22	3,186	P1	437	29.6	92.4	27.165	230/460V	♦
30	3600	284JM	03036EP3E284JM-W22	3,545	P1	399	33.8	91.0	27.165	230/460V	♣
	3600	286JM	03036EP3E286JM-W22	3,797	P1	404	33.8	91.0	28.700	230/460V	
	1800	286JM	03018EP3E286JM-W22	3,559	P1	481	34.4	92.4	28.700	230/460V	♦
40	3600*	286JM	04036EP3E286JM-W22	4,353	P1	448	46.6	91.7	28.700	230/460V	♣
	3600	324JM	04036EP3E324JM-W22	4,746	P1	561	46.1	91.7	28.149	230/460V	
	1800	324JM	04018EP3E324JM-W22	4,803	P1	587	47.6	93.0	28.149	230/460V	♦
50	3600	324JM	05036EP3E324JM-W22	5,070	P1	565	56.5	92.4	28.149	230/460V	♣
	3600	326JM	05036EP3E326JM-W22	5,502	P1	594	56.5	92.4	29.645	230/460V	
	1800	326JM	05018EP3E326JM-W22	5,500	P1	640	57.8	93.6	29.645	230/460V	♦
60	3600	326JM	06036EP3E326JM-W22	6,598	P1	594	69.0	93.0	29.645	230/460V	♣
	3600	364JM	06036EP3E364JM-W22	7,137	P1	917	69.0	93.0	33.031	230/460V	
	1800	326JM	06018EP3E326JM-W22	7,349	P1	687	72.7	93.6	29.645	230/460V	♦♣
	1800	364JM	06018EP3E364JM-W22	7,805	P1	963	67.0	93.6	33.031	230/460V	♦
75	3600	364JM	07536EP3E364JM-W22	8,995	P1	1025	82.5	93.0	33.031	230/460V	♣
	3600	365JM	07536EP3E365JM-W22	9,848	P1	1025	82.5	93.0	33.031	230/460V	
	1800	365JM	07518EP3E365JM-W22	8,860	P1	1010	82.4	94.1	33.031	230/460V	♦

Note: ♦ Product may not be available from stock

♣ Reduced Frame

Fire Pump Motors – TEFC (IP55) - W22



Close Coupled Pump – “JP” Type - High Efficiency - Three Phase

HP	RPM	NEMA Frame	Catalog Number	List Price	Mult. Sym.	Approx. Shipp. Weight Lbs	FL Amps 460V	FL Eff. %	“C” Dimension (in.)	Voltage	Notes
1	1800	143JP	00118EP3E143JP-W22	508	P1	47	1.49	82.5	17.365	230/460V	
1.5	3600	143JP	00156EP3E143JP-W22	537	P1	45	1.99	82.5	17.365	230/460V	
	1800	145JP	00158EP3E145JP-W22	519	P1	54	2.05	84.0	18.365	230/460V	
2	3600	145JP	00236EP3E145JP-W22	594	P1	47	2.60	84.0	18.365	230/460V	
	1800	145JP	00218EP3E145JP-W22	571	P1	56	2.70	84.0	18.365	230/460V	
3	3600	145JP	00336EP3E145JP-W22	632	P1	54	3.71	85.5	18.365	230/460V	♣
	3600	182JP	00336EP3E182JP-W22	759	P1	106	3.59	85.5	19.057	230/460V	
	1800	182JP	00318EP3E182JP-W22	905	P1	97	3.90	87.5	19.057	230/460V	
5	3600	184JP	00536EP3E184JP-W22	941	P1	114	5.90	87.5	20.395	230/460V	
	1800	184JP	00518EP3E184JP-W22	1,013	P1	102	6.48	87.5	20.395	230/460V	
7.5	3600	184JP	00736EP3E184JP-W22	1,146	P1	128	8.76	88.5	20.395	230/460V	♣
	3600	213JP	00736EP3E213JP-W22	1,303	P1	150	8.66	88.5	22.550	230/460V	
	1800	213JP	00718EP3E213JP-W22	1,280	P1	150	9.53	89.5	22.550	230/460V	
10	3600	215JP	01036EP3E215JP-W22	1,613	P1	150	11.7	89.5	24.046	230/460V	
	1800	215JP	01018EP3E215JP-W22	1,533	P1	165	12.8	90.2	24.046	230/460V	
15	3600	215JP	01536EP3E215JP-W22	1,791	P1	174	17.3	90.2	24.046	230/460V	♣
	3600	254JP	01536EP3E254JP-W22	2,069	P1	280	17.0	90.2	26.964	230/460V	
	1800	254JP	01518EP3E254JP-W22	2,300	P1	266	17.9	91.0	26.964	230/460V	♦
20	3600	254JP	02036EP3E254JP-W22	2,451	P1	304	23.3	90.2	26.964	230/460V	♣
	3600	256JP	02036EP3E256JP-W22	2,621	P1	313	23.3	90.2	28.736	230/460V	
	1800	256JP	02018EP3E256JP-W22	2,541	P1	313	24.4	91.0	28.736	230/460V	♦
25	3600	256JP	02536EP3E256JP-W22	2,790	P1	313	28.4	91.0	28.736	230/460V	♣
	3600	284JP	02536EP3E284JP-W22	3,049	P1	353	29.0	91.0	30.079	230/460V	
	1800	284JP	02518EP3E284JP-W22	3,249	P1	437	29.6	92.4	30.079	230/460V	♦
30	3600	284JP	03036EP3E284JP-W22	3,519	P1	399	33.8	91.0	30.079	230/460V	♣
	3600	286JP	03036EP3E286JP-W22	3,872	P1	404	33.8	91.0	31.575	230/460V	
	1800	286JP	03018EP3E286JP-W22	3,630	P1	481	34.4	92.4	31.575	230/460V	♦
40	3600	286JP	04036EP3E286JP-W22	4,545	P1	448	46.6	91.7	31.575	230/460V	♣
	3600	324JP	04036EP3E324JP-W22	4,840	P1	561	46.1	91.7	32.525	230/460V	
	1800	324JP	04018EP3E324JP-W22	4,900	P1	587	47.6	93.0	32.525	230/460V	♦
50	3600	324JP	05036EP3E324JP-W22	4,954	P1	565	56.5	92.4	32.525	230/460V	♣
	3600	326JP	05036EP3E326JP-W22	5,613	P1	594	56.5	92.4	34.021	230/460V	
	1800	326JP	05018EP3E326JP-W22	5,611	P1	640	57.8	93.6	34.021	230/460V	♦
60	3600	326JP	06036EP3E326JP-W22	7,954	P1	594	69.0	93.0	34.021	230/460V	♣
	3600	364JP	06036EP3E364JP-W22	8,412	P1	917	69.0	93.0	35.916	230/460V	
	1800	326JP	06018EP3E326JP-W22	7,176	P1	687	72.7	93.6	34.021	230/460V	♣♦
	1800	364JP	06018EP3E364JP-W22	7,960	P1	963	67.0	93.6	35.916	230/460V	♦
75	3600	364JP	07536EP3E364JP-W22	9,623	P1	1025	82.5	93.0	35.916	230/460V	♣
	3600	365JP	07536EP3E365JP-W22	10,045	P1	1025	82.5	93.0	35.916	230/460V	
	1800	365JP	07518EP3E365JP-W22	9,038	P1	1010	82.4	94.1	35.916	230/460V	♦
100	3600	405JP	10036EP3E405JP-W22	11,449	P1	1361	113	93.6	38.911	230/460V	
	3600	405JP	10036EP3G405JP-W22	11,449	P1	1361	113	93.6	38.911	460V	
	1800	405JP	10018EP3E405JP-W22	10,269	P1	1273	115	94.5	38.911	230/460V	♦
	1800	405JP	10018EP3G405JP-W22	10,269	P1	1273	115	94.5	38.911	460V	♦

Note: ♦ Product may not be available from stock

♣ Reduced Frame



www.weg.net

Fire Pump Motors

UL File number

EX5990

located on Fire Pump Label

WEG's Fire Pump motors are UL listed (UL 1004A) for Fire Pump applications in accordance with NFPA 20. In addition, they feature a Class F insulation system and 1.15 service factor.

**SUITABLE FOR FIRE PUMP APPLICATIONS DRIVEN
BY VFD'S 10:1 SPEED RANGE (6 TO 60HZ) AND SF 1.15
FIRE PUMP MOTOR**

USA375

Please contact your authorized distributor:



WEG Electric Corp.
6655 Sugarloaf Parkway
Duluth, GA 30096
Phone: 1-800-ASK-4WEG (275-4934)
web: www.weg.net



Features

- Assembled in USA
- 0-90 second field replaceable time delay retard
- Easy to read retard time delay adjustment knob
- UL Listed models for 2"-6" steel pipe schedules 5 through 40
- UL Listed and FM approved models for 2"-8" steel pipe schedules 10 through 40
- Two SPDT (form C) contacts
- Weatherproof
- Easy to read wire terminal designations

WARNING

- Installation must be performed by qualified personnel and in accordance with all national and local codes and ordinances.
- Shock hazard. Disconnect power source before servicing. Serious injury or death could result.
- Risk of explosion. Not for use in hazardous locations. Serious injury or death could result.

CAUTION

Waterflow switches that are monitoring wet pipe sprinkler systems shall not be used as the sole initiating device to discharge AFFF, deluge, or chemical suppression systems. Waterflow switches used for this application may result in unintended discharges caused by surges, trapped air, or short retard times.

Description

The Model VSR is a vane type waterflow switch for use on wet sprinkler systems. It is UL Listed for use on a steel pipe; schedules 5 through 40, sizes 2" - 6" and is UL Listed and FM Approved for use on steel pipe; schedules 10 through 40, sizes 2" thru 8" (50 mm thru 200 mm). LPC approved sizes are 2" thru 8" (50 mm thru 200 mm). See Ordering Information chart.

The VSR may also be used as a sectional waterflow detector on large systems. The VSR contains two single pole, double throw, snap action switches and an adjustable, instantly recycling pneumatic retard. The switches are actuated when a flow of 10 GPM (38 LPM) or more occurs downstream of the device. The flow condition must exist for a period of time necessary to overcome the selected retard period.

Enclosure

The VSR switches and retard device are enclosed in a weather/UV/flame resistant high impact composite plastic. The cover is held in place with two tamper resistant screws which require a special key for removal. A field installable cover tamper switch is available as an option which may be used to indicate unauthorized removal of the cover. See bulletin number 5401103 for installation instructions of this switch.

NOTICE

This document contains important information on the installation and operation of the VSR. Please read all instructions carefully and notify the building owner or their authorized representative before any work is done on the fire sprinkler or fire alarm system. A copy of this document is required by NFPA 72 to be maintained on site.



Technical Specifications

Conduit Entrances	Two knockouts provided for 1/2" conduit. Individual switch compartments suitable for dissimilar voltages	
Contact Ratings	Two sets of SPDT (Form C) 10.0 Amps at 125/250VAC 2.0 Amps at 30VDC Resistive 10 mAmps min. at 24VDC	
Enclosure	Cover - Weather/UV/Flame Resistant High Impact Composite Base - Die-cast aluminum	
Environmental Specifications	NEMA 4/IP54 Rated Enclosure suitable for indoor or outdoor use with factory installed gasket when used with appropriate conduit fitting. Temperature Range: 40°F - 120°F, (4.5°C - 49°C) - UL Non-corrosive sleeve factory installed in saddle.	
Flow Sensitivity Range for Signal	4-10 GPM (15-38 LPM) - UL	
Maximum Surge	18 FPS (5.5 m/s)	
Service Pressure	450 PSI (31 BAR) - UL	
Service Use	Automatic Sprinkler One or two family dwelling Residential occupancy up to four stories National Fire Alarm Code	NFPA-13 NFPA-13D NFPA-13R NFPA-72

Specifications subject to change without notice.

Installation (see Fig. 1)

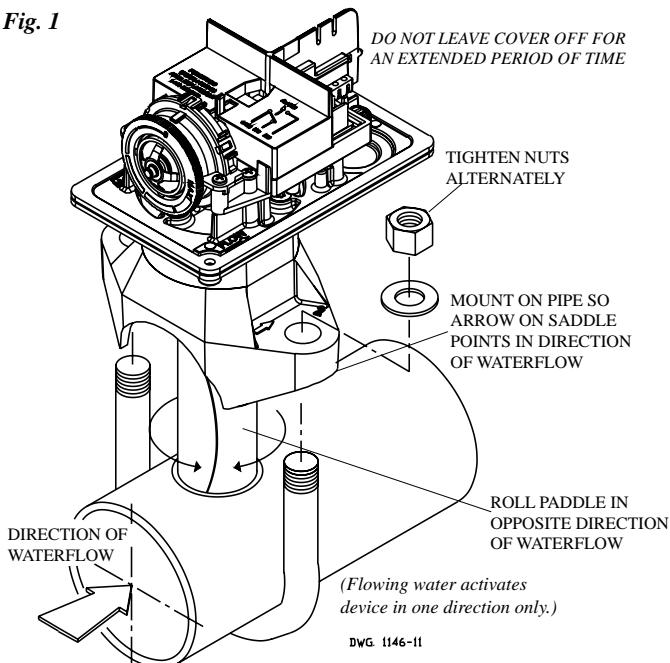
These devices may be mounted on horizontal or vertical pipe. On horizontal pipe they shall be installed on the top side of the pipe where they will be accessible. The device should not be installed within 6" (15 cm) of a fitting which changes the direction of the waterflow or within 24" (60 cm) of a valve or drain.

NOTE: Do not leave cover off for an extended period of time.

Drain the system and drill a hole in the pipe using a hole saw in a slow speed drill (see Fig. 1). Clean the inside pipe of all growth or other material for a distance equal to the pipe diameter on either side of the hole. Roll the vane so that it may be inserted into the hole; do not bend or crease it. Insert the vane so that the arrow on the saddle points in the direction of the waterflow. Take care not to damage the non-corrosive bushing in the saddle. The bushing should fit inside the hole in the pipe. Install the saddle strap and tighten nuts alternately to required torque (see the chart in Fig. 1). The vane must not rub the inside of the pipe or bind in any way.

CAUTION

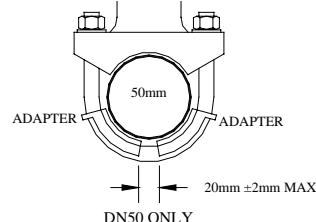
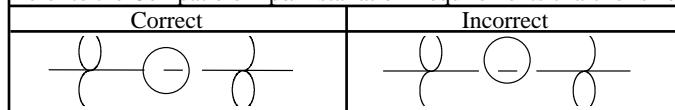
Do not trim the paddle. Failure to follow these instructions may prevent the device from operating and will void the warranty. Do not obstruct or otherwise prevent the trip stem of the flow switch from moving when water flows as this could damage the flow switch and prevent an alarm. If an alarm is not desired, a qualified technician should disable the alarm system.

Fig. 1

Retard Adjustment

The delay can be adjusted by rotating the retard adjustment knob from 0 to the max setting (60-90 seconds). The time delay should be set at the minimum required to prevent false alarms

CAUTION

Hole must be drilled perpendicular to the pipe and vertically centered. Refer to the Compatible Pipe/Installation Requirements chart for size.



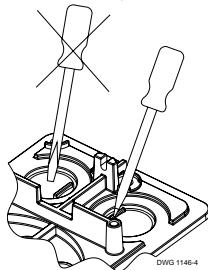
USE (2) 5180162 ADAPTERS AS SHOWN ABOVE

Compatible Pipe/ Installation Requirements

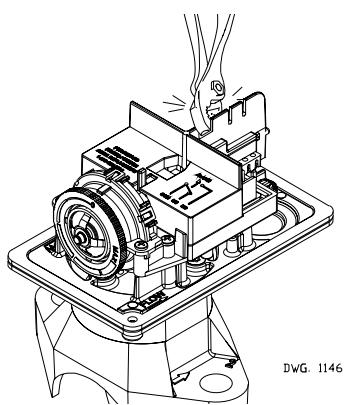
Model	Nominal Pipe Size		Nominal Pipe O.D.		Pipe Wall Thickness								Hole Size		U-Bolt Nuts Torque			
	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm				
VSR-2	2	DN50	2.375	60.3	.065	1.651	0.109	2.77	0.154	3.91	0.142	3.6	0.091	2.3	1.25 + .125/-0.062	33.0 ± 2.0	20	27
VSR-2 1/2	2.5	-	2.875	73.0	.084	2.134	0.120	3.05	0.203	5.16	-	-	-	-				
VSR-2 1/2	-	DN65	3.000	76.1	-	-	-	-	-	-	0.142	3.6	0.102	2.6				
VSR-3	3	DN80	3.500	88.9	.083	2.108	0.120	3.05	0.216	5.49	0.157	4.0	0.114	2.9				
VSR-3 1/2	3.5	-	4.000	101.6	-	-	0.120	3.05	0.226	5.74	-	-	-	-				
VSR-4	4	DN100	4.500	114.3	.084	2.134	0.120	3.05	0.237	6.02	0.177	4.5	0.126	3.2				
VSR-5	5	-	5.563	141.3	-	-	0.134	3.40	0.258	6.55	-	-	-	-				
VSR-6	6	DN150	6.625	168.3	.115	2.921	0.134	3.40	0.280	7.11	0.197	5.0	0.157	4.0				
VSR-8	8	DN200	8.625	219.1	-	-	0.148	3.76	0.322	8.18	0.248	6.3	0.177	4.5				

Fig. 2

To remove knockouts: Place screwdriver at inside edge of knockouts, not in the center.


Fig. 3

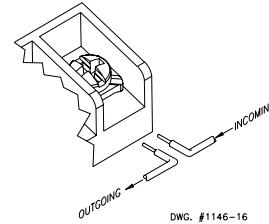
Break out thin section of cover when wiring both switches from one conduit entrance.


NOTICE

Do not drill into the base as this creates metal shavings which can create electrical hazards and damage the device. Drilling voids the warranty.

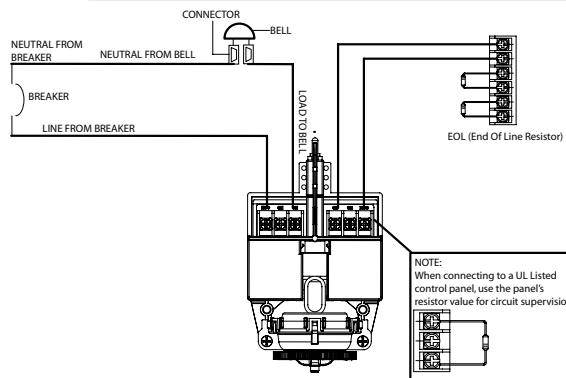
Typical Electrical Connections
Fig. 5
Notes:

1. The Model VSR has two switches, one can be used to operate a central station, proprietary or remote signaling unit, while the other contact is used to operate a local audible or visual annunciation.
2. For supervised circuits, see "Switch Terminal Connections" drawing and warning note (Fig. 4).

**Switch Terminal Connections
Clamping Plate Terminal**
Fig. 4

WARNING

An uninsulated section of a single conductor should not be looped around the terminal and serve as two separate connections. The wire must be severed, thereby providing supervision of the connection in the event that the wire become dislodged from under the terminal. Failure to sever the wire may render the device inoperable risking severe property damage and loss of life.

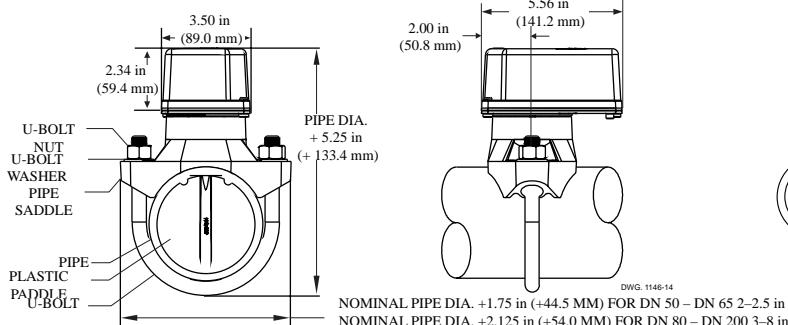
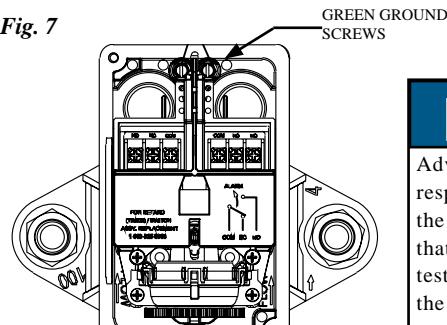
Do not strip wire beyond 3/8" of length or expose an uninsulated conductor beyond the edge of the terminal block. When using stranded wire, capture all strands under the clamping plate.


Testing

The frequency of inspection and testing for the Model VSR and its associated protective monitoring system shall be in accordance with applicable NFPA Codes and Standards and/or the authority having jurisdiction (manufacturer recommends quarterly or more frequently).

If provided, the inspector's test valve shall always be used for test purposes. If there are no provisions for testing the operation of the flow detection device on the system, application of the VSR is not recommended or advisable.

A minimum flow of 10 GPM (38 LPM) is required to activate this device.

Fig. 6 Mounting Dimensions

Fig. 7

NOTICE

Advise the person responsible for testing of the fire protection system that this system must be tested in accordance with the testing instructions.

Maintenance

Inspect detectors monthly. If leaks are found, replace the detector. The VSR waterflow switch should provide years of trouble-free service. The retard and switch assembly are easily field replaceable. In the unlikely event that either component does not perform properly, please order replacement retard switch assembly stock #1029030 (see Fig. 8). There is no maintenance required, only periodic testing and inspection.

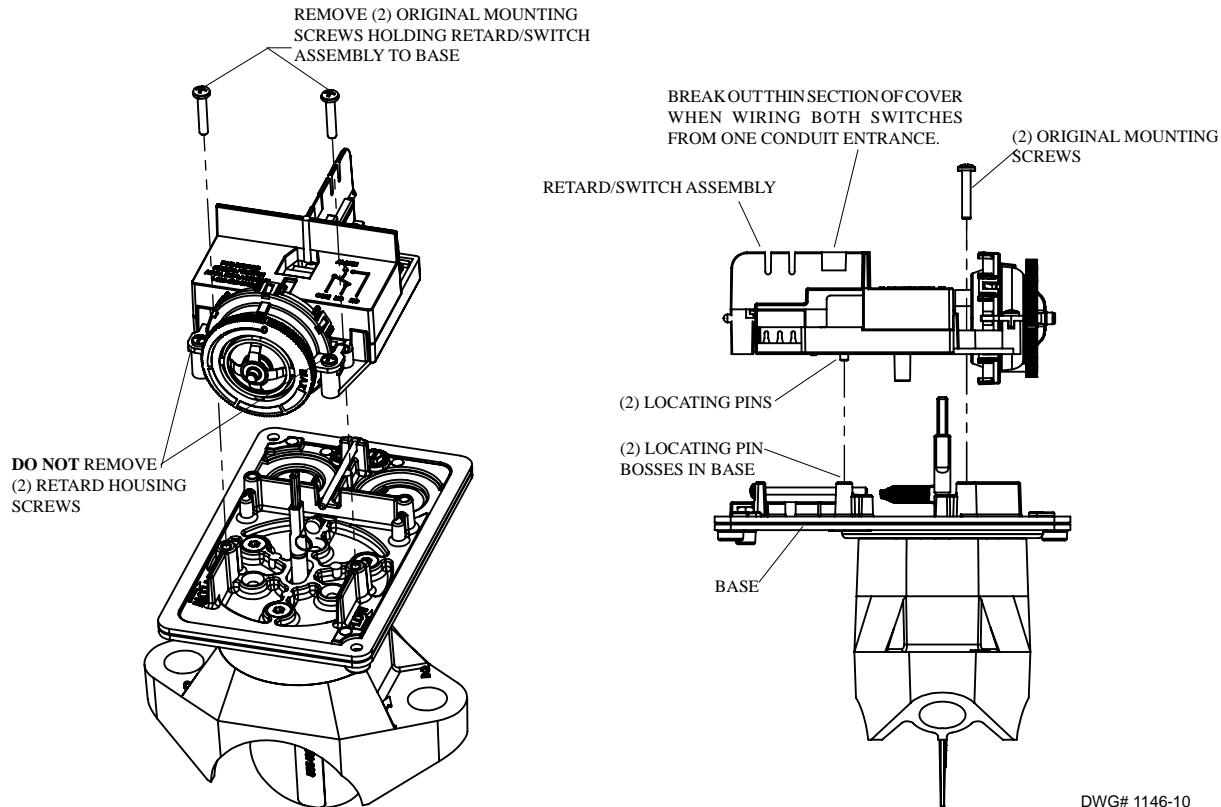
Retard/Switch Assembly Replacement (See Fig. 8)

1. Make sure the fire alarm zone or circuit connected to the waterflow switch is bypassed or otherwise taken out of service.
2. Disconnect the power source for local bell (if applicable).
3. Identify and remove all wires from the waterflow switch.
4. Remove the (2) mounting screws holding retard/switch assembly to the base. **Do not** remove the (2) retard housing screws.
5. Remove the retard assembly by lifting it straight up over the tripstem.
6. Install the new retard assembly. Make sure the locating pins on the retard/switch assembly fit into the locating pin bosses on the base.
7. Re-install the (2) original mounting screws.
8. Reconnect all wires. Perform a flow test and place the system back in service.

NOTICE

The Retard/Switch Assembly is field-replaceable without draining the system or removing the waterflow switch from the pipe

Fig. 8



Removal of Waterflow Switch

- To prevent accidental water damage, all control valves should be shut tight and the system completely drained before waterflow detectors are removed or replaced.
- Turn off electrical power to the detector, then disconnect wiring.
- Loosen nuts and remove U-bolts.
- Gently lift the saddle far enough to get your fingers under it. With your fingers, roll the vane so it will fit through the hole while continuing to lift the waterflow detector saddle.
- Lift detector clear of pipe.

NOTICE

Flow switches have a normal service life of 10-15 years.
 However, the service life may be significantly reduced by local environmental conditions.

Ordering Information

Model	Nominal Pipe Size	Part Number
VSR-2	2"	DN50
VSR-2 1/2	2 1/2"	DN65
VSR-3	3"	DN80
VSR-3 1/2	3 1/2"	-
VSR-4	4"	DN100
VSR-5	5"	-
VSR-6	6"	DN150
VSR-8	8"	DN200

Optional: Cover Tamper Switch Kit, stock no. 0090148

FSBS-FLOWSWITCH BYPASS SWITCH, stock no. 3001006

Replaceable Components: Retard/Switch Assembly, stock no. 1029030



APX™ 6000XE

P25 single-band portable radio

From day one, the APX 6000XE two-way portable radio has met agencies' most demanding performance expectations. It delivers trusted performance in a single-band solution without compromising on the extreme form factor or features that are required for routine activities and emergencies. The APX 6000XE offers essential features such as Wi-Fi, Adaptive Audio Engine, and Bluetooth 4.0 wireless technology to keep operational efficiency and response time at the forefront for public safety.



Voice and data, all at once

Update your radio fleet without interrupting voice communications with secure Wi-Fi. This dramatically improves the speed of configuring new codeplugs, firmware and software features over-the-air via Radio Management*. Agencies can pre-provision up to 20 secure Wi-Fi hotspots so personnel can easily access updates at the facility or in the field. When P25 is unavailable, SmartConnect automatically switches your voice channel to an available Wi-Fi hotspot and back again as soon as you return to P25 coverage.

Hear and be heard

The APX 6000XE is equipped with a 3-watt speaker, 3 integrated microphones and Adaptive Audio Engine. This changes the level of noise suppression, microphone gain, windporting and speaker equalization to produce clear and loud audio in any environment.

Emergency find me

Bluetooth 4.0 places a wide range of wireless accessories at your disposal and provides personnel with an added level of security by improving response time in emergencies. With Emergency Find Me, a Bluetooth-enabled beacon signal guides other Bluetooth-enabled APX radios within range to assist the user in distress.

Clear in-mask communications

With Bluetooth 4.0 standard on all APX XE radios, we are able to partner with SCBA industry leaders to provide in-mask communications so you can clearly hear and be heard. Collaborations with both MSA and Scott Safety allow us to deliver intelligible voice and data communications.

Seamless on-scene communication

Ensure fast and seamless communication and collaboration across all responders arriving on a scene. Mission Critical Geofence automatically changes a radio's active talkgroup based on its GPS location and an agency-defined virtual barrier. For example, an incident commander can create a geofence around the 3-block radius of a burning building so that all arriving military personnel are automatically placed in the same talkgroup.

Improve safety with real-time data

APX Personnel Accountability Application allows incident command personnel to quickly and accurately account for first responders with APX radios roll call and an interactive GUI. This real-time information allows you to maintain control of a chaotic fireground.



Features

RF bands

700/800 MHz, VHF, UHF Range 1 & UHF Range 2

9600 Baud Digital APCO P25 Phase 1 FDMA and Phase 2 TDMA Trunking

3600 Baud SmartNet®, SmartZone®, SmartZone, Omnilink Trunking

Digital APCO 25, Conventional, Analog MDC 1200, Quick Call II System Configurations Narrow and Wide Bandwidth Digital Receiver (6.25 kHz Equivalent/25/20/12.5 KHz)

Standard features

Mission Critical Wireless Bluetooth 4.0 (LE)¹

Emergency Find Me¹

IP68 (2m/4hr), Mil Std 512.X Delta - T

Listed by UL to the standards ANSI/TIA 4950-A and CAN/CSA C22.2 NO. 157-92 Classification Rating: Class I, Division 1, Groups C, D; Class II, Division 1, Group E, F, G; Class III, Hazardous (Classified) Locations. ANSI/ISA 12.12.01-2015 and CAN/CSA C22.2 No. 213-15; Class I, Division 2, Groups A, B, C, D; T3C. Tamb = -25 °C to +60 °C. When used with Motorola Battery: NNTN8921A NNTN8930A (Standard on XE) 7.4V

ASTRO 25 Integrated Voice & Data

Integrated GPS/GLONASS for Outdoor Location Tracking

Voice Announcements

ISSI 8000 Roaming

Radio Profiles

Dynamic Zone

Intelligent Lighting

Single-Key ADP Encryption

IMPRES 2 Battery (NNTN8930)

Text Message

Software Key

Optional features

Wi-Fi 802.11 b/g/n

SmartConnect via WiFi³

Data Modem Tethering

RFID Volume Knob

Multi-key for 128 keys and Multi-Algorithm

Programming Over Project 25 (OTAP)

Over the Air Rekey (OTAR)

Digital Tone Signaling

LEX L11 Collaboration

P25 Authentication

Man Down / Fall Alert

High Impact Green and Public Safety Yellow Colored Housing Options

Adaptive audio engine (optional)

3 Watt Speaker with Adaptive Equalization

Adaptive Dual-Sided Operation

Adaptive Noise Suppression Intensity

Adaptive Gain Control

Adaptive Windporting

Programming

Utilizes Customer Programming Software (CPS) with Radio Management

¹ Per the FCC Narrowbanding rules, new products (APX6000 UHFR1, UHFR2) submitted for FCC certification after January 1, 2011 are restricted from being granted certification at 25 kHz for United States - State & Local Markets only.

² CPS version R12.00.00 and greater ordered after June 2014 will only support Windows 7 and 8

³ Check with your Motorola Solutions representative for availability in your area.





Radio models

	MODEL 1.5	MODEL 2.5	MODEL 3.5		
Display	Full bitmap monochromatic LCD top display 1 line text x 8 characters 1 line of icons No menu support Multi-color backlight	Top display plus: Full bitmap color LCD display 4 lines of text x 14 characters 2 lines of icons 1 menu line x 3 menus White backlight	Top display plus: Full bitmap color LCD display 4 lines of text x 14 characters 2 lines of icons 1 menu line x 3 menus White backlight		
Keypad	none	Backlit keypad 3 soft keys 4 direction Navigation key Home and Data buttons	Backlit keypad 3 soft keys 4 direction Navigation key 4x3 keypad Home and Data buttons		
Channel Capacity	96	1000	1000		
FLASHport Memory	64 MB	64 MB	64 MB		
700/800 MHz (763-870 MHz)	H98UCD9PW5BN	H98UCF9PW6BN	H98UCH9PW7BN		
VHF (136-174 MHz)	H98KGD9PW5BN	H98KGF9PW6BN	H98KGH9PW7BN		
UHF Range 1 (380-470 MHz)	H98QDD9PW5BN	H98QDF9PW6BN	H98QDH9PW7BN		
UHF Range 2 (450-520 MHz)	H98SDD9PW5BN	H98SDF9PW6BN	H98SDH9PW7BN		
Buttons & Switches	Large PTT button ■ Angled On/Off volume control ■ Orange emergency button ■ 16 position top-mounted rotary switch ■ 2-position concentric switch ■ Multi-color backlight ■ 3-position toggle switch ■ 3 programmable side buttons				
REGULATORY INFORMATION					
	FCC ID	INDUSTRY CANADA			
700/800 (764-869 MHz)	AZ489FT7086	109U-89FT7086			
VHF (136-174 MHz)	AZ489FT7087	109U-89FT7087			
UHF Range 1 (380-470 MHz)	AZ489FT7077	109U-89FT7077			
UHF Range 2 (420-520 MHz)	AZ489FT7085	109U-89FT7085			
FCC EMISSIONS DESIGNATORS					
FCC Emissions Designators	11K0F3E, 16K0F3E, 8K10F1D, 8K10F1E, 8K10F1W, 20K0F1E2				
POWER SUPPLY					
Power Supply	One rechargeable Li-Ion IMPRES 2 2650 mAh Battery Standard (NNTN8930), with alternate battery options available.				

1 Enhancement package available

2 Per the FCC Narrowbanding rules, new products (APX6000 UHFR1, UHFR2) submitted for FCC certification after January 1, 2011 are restricted from being granted certification at 25KHz for United States - State & Local Markets only.

Transmitter—typical performance specifications

	700/800	VHF	UHF RANGE 1	UHF RANGE 2
Frequency Range/Bandsplits	700 MHz 800 MHz	763-776, 793-806 MHz 806-824, 851-870 MHz	136-174 MHz	380-470 MHz 450-520 MHz
Channel Spacing		25/20/12.5 kHz	25/20/12.5 kHz	25/20/12.5 kHz
Maximum Frequency Separation		Full Bandsplit	Full Bandsplit	Full Bandsplit
Rated RF Output Power Adj ¹		1-3 W	1-6 Wx	1-5 W
Frequency Stability ¹ (-30 °C to +60 °C; +25 °C Ref.)		±0.00010 %	±0.00010 %	±0.00010 %
Modulation Limiting ¹		±5 kHz / ±4 kHz / ±2.5 kHz	±5 kHz / ±4 kHz / ±2.5 kHz	±5 kHz / ±4 kHz / ±2.5 kHz
Emissions (Conducted and Radiated) ¹		-75 dB	-75 dB	-75 dB
Audio Response ¹		+1, -3 dB	+1, -3 dB	+1, -3 dB
FM Hum & Noise	25K 12.5k	-52 dB -49 dB	-55 dB -50 dB	-52 dB -47 dB
Audio Distortion ¹	700 MHz 800 MHz	1.00 %	1.00 %	1.00 %

Receiver—typical performance specifications

	700/800	VHF	UHF RANGE 1	UHF RANGE 2
Frequency Range/Bandsplits	700 MHz 800 MHz	763-776 MHz 851-870 MHz	136-174 MHz	380-470 MHz 450-520 MHz
Channel Spacing		25/20/12.5 kHz	25/20/12.5 kHz	25/20/12.5 kHz
Maximum Frequency Separation		Full Bandsplit	Full Bandsplit	Full Bandsplit
Audio Output Power at Rated ¹		500 mW	500 mW	500 mW
Analog Sensitivity ² Digital Sensitivity ³	12 dB SINAD 1% BER (800 MHz) 5% BER	0.25 µV 0.375 µV 0.24 µV	0.17 µV 0.243 µV 0.15 µV	0.224 µV 0.298 µV 0.200 µV
Selectivity ¹	25 kHz channel 12.5 kHz channel	-76 dB -70 dB	-78 dB -73 dB	-77 dB -67 dB
Intermodulation		-80.1 dB	-80.2 dB	-80.3 dB
Spurious Rejection		-75 dB	-78 dB	-80.5 dB
FM Hum and Noise	25 kHz 12.5 kHz	-54 dB -79 dB	-54.3 dB -50.1 dB	-53.5 dB -47.5 dB
Audio Distortion at Rated ¹		0.90%	0.90%	0.70%

Batteries for apx 6000xe

BATTERY CAPACITY / TYPE	DIMENSIONS (HXWXD)	WEIGHT	BATTERY PART NUMBER	BATTERY CAPACITY
Li-Ion IMPRES 2 3400mAh	3.4" x 2.3" x 1.7"	6.5 oz	PMNN4486	3400 mAh
Li-Ion IMPRES 2 4850mAh	5" x 2.3" x 1.7"	11.0 oz	PMNN4487	4850 mAh
Li-Ion IMPRES 2 5100mAh	5" x 2.3" x 1.7"	11.0 oz	PMNN4494	5100 mAh
Li-Ion IMPRES 2, 4600 mAh, TIA 4950-A, IP 68	5" x 2.3" x 1.6"	11.2 oz	PMNN4573	4600 mAh

¹ Measured in the analog mode per TIA / EIA 603 under nominal conditions

² Measured conductively in digital mode per TIA / EIA IS 102.CAAA under nominal conditions.

³ Accuracy specs are for long-term tracking (95th percentile values >5 satellites visible at a nominal -130 dBm signal strength).

⁴ The standard shipping battery for the APX 6000XE



Dimensions of the radios without battery

Length	6.2 in	156 mm
Width Push-To-Talk button	2.4 in	61 mm
Depth Push-To-Talk button	1.4 in	36 mm
Width Top	3.3 in	84 mm
Depth Top	2.1 in	54 mm
Depth Bottom of Battery	1.2 in	32 mm
Weight of the radios without battery	13.7 oz	389 g

Encryption

Supported Encryption Algorithms	ADP, 256-bit AES, DES, DES-XL, DES-OFB, DVP-XL
Encryption Algorithm Capacity	8
Encryption Keys per Radio	Module capable of storing 1024 keys. Programmable for 64 Common Key Reference (CKR) or 16 Physical Identifier (PID)
Encryption Frame Re-sync Interval	P25 CAI 300 mSec
Encryption Keying	Key Loader
Synchronization	XL – Counter Addressing OFB – Output Feedback
Vector Generator	National Institute of Standards and Technology (NIST) approved random number generator
Encryption Type	Digital
Key Storage	Tamper protected volatile or non-volatile memory
Key Erasure	Keyboard command and tamper detection
Standards	FIPS 140-3 Level 3 FIPS 197

GPS/GPS/GNSS specifications

Constellations	GPS & GLONASS
Tracking Sensitivity	-164 dBm
Accuracy ¹	<5 meters (95%)
Cold Start	<60 seconds (95%)
Hot Start	<5 seconds (95%)
Mode of Operation	Autonomous (Non-Assisted)

Rugged specifications

Leakage (submersion)	MIL-STD-810 C, D, E, F and G Method 512.X Procedure I, IP68 (2 meters, 4 hours)
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Environmental specifications

Operating Temperature ²	-30 °C to +60 °C
Storage Temperature ²	-50 °C to +85 °C
Humidity Per MIL-STD	ESD IEC 61000-4-2
Water and Dust Intrusion	IP68 (2 meters, 4 hours)

Housing color

Black (Standard), Public Safety Yellow, and High Impact Green

¹ Measured conductively in analog mode per TIA / EIA 603 under nominal conditions

² Temperatures listed are for radio specifications. Battery storage is recommended at 25 °C, ±5 °C to ensure best performance.

Portable military standards 810 C, D, E, G & G

	MIL-STD 810C		MIL-STD 810D		MIL-STD 810E		MIL-STD 810F		MIL-STD 810G	
	Method	Proc./Cat.	Method	Proc./Cat.	Method	Proc./Cat.	Method	Proc./Cat.	Method	Proc./Cat.
Low Pressure	500.1	I	500.2	II	500.3	II	500.4	II	500.5	II
High Temperature	501.1	I, II	501.2	I/A1, II/A1	501.3	I/A1, II/A1	501.4	I/Hot, II/Basic Hot	501.5	I/A1, II/A2
Low Temperature	502.1	I	502.2	I/C3, II/C1	502.3	I/C3, II/C1	502.4	I/C3, II/C1	502.5	I/C3, II/C1
Temperature Shock	503.1	I	503.2	I/A1C3	503.3	I/A1C3	503.4	I	503.5	I/C
Solar Radiation	505.1	II	505.2	I	505.3	I	505.4	I	505.5	I/A1
Rain	506.1	I, II	506.2	I, II	506.3	I, II	506.4	I, III	506.5	I, III
Humidity	507.1	II	507.2	II	507.3	II	507.4	1 Proc	507.5	II/Aggravated
Salt Fog	509.1	I	509.2	I	509.3	I	509.4	1 Proc	509.5	1 Proc
Blowing Dust	510.1	I	510.2	I	510.3	I	510.4	I	510.5	I
Blowing Sand	1 Proc	1 Proc	510.2	II	510.3	II	510.4	II	510.5	II
Immersion	512.1	I	512.2	I	512.3	I	512.4	I	512.5	I
Vibration	514.2	VIII/F, Curve-W	514.3	I/10, II/3	514.4	I/10, II/3	514.5	I/24	514.6	I/24
Shock	516.2	I, III, V	516.3	I, V, VI	516.4	I, V, VI	516.5	I, V, VI	516.6	I, V, VI
Shock (Drop)	516.2	II	516.2	IV	516.4	IV	516.5	IV	516.6	IV

Emission designators

LMR:	8K10F1D, 8K10F1E, 8K10F1W, 11K0F3E, 16K0F3E, 20K0F1E
Bluetooth:	852KF1D, 1M17F1D, 1M19F1D, 1M04F1D
WLAN (Wi-Fi):	13M7G1D, 17M0D1D, 18M1D1D

¹ 2400 - 2483.5 MHz for EMEA region and includes guardband.
Channels 1 – 11 used for FCC/IC region.

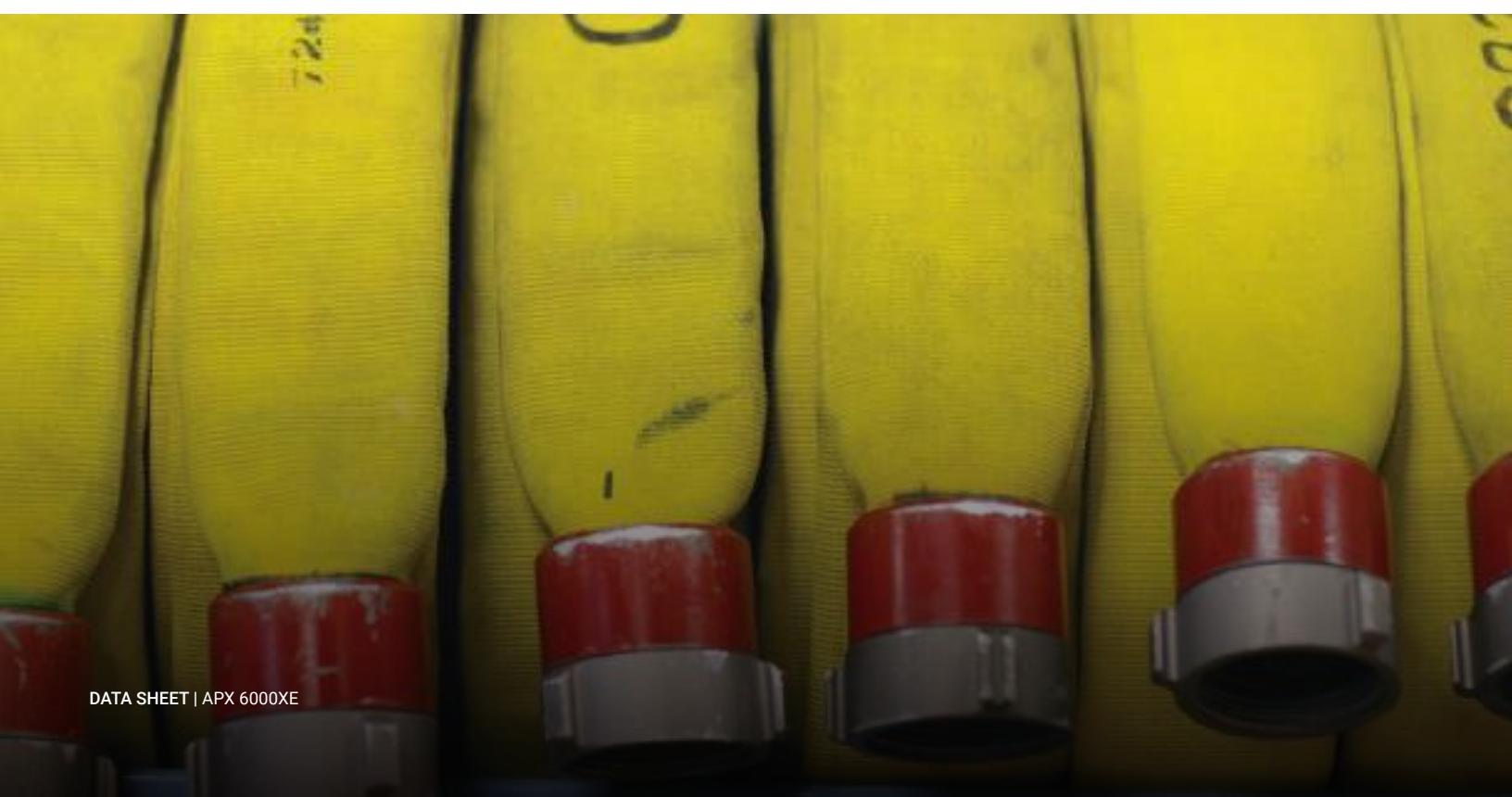
Wireless connectivity and security

Frequency Range/Bandsplits:
Bluetooth: 2402 - 2480 MHz, WLAN (Wi-Fi): 2400 - 2483.5 MHz

WLAN (Wi-Fi) 802.11 b/g/n supports WPA-2, WPA, WEP security protocols; radio can be pre-provisioned with up to 20 SSIDs¹

Mission Critical Wireless Bluetooth 2.1 uses 96 bit encryption for pairing & 128 bit encryption for voice, signaling and data. The radio BT supports up to 6 data connections and 1 audio connection

Bluetooth 4.0 Low Energy uses 128-bit AES-CCM encryption





For more information, please visit: www.motorolasolutions.com/apx



Motorola Solutions, Inc. 500 West Monroe Street, Chicago, IL 60661 U.S.A. motorolasolutions.com

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2900HA Series Electric Baseboard - High Altitude Convection Heater

52



Features

- Available in white or ivory with Aluminum heating element and Aluminum fins.
- Painted 22 gauge steel front with 20 gauge junction boxes located on each end of the heater - junction boxes contain quick connect cable clamps and 6" ground lead wires.
- Over-temperature thermal limit extends entire length of heated area.
- A full length wireway provided along the back of the heater.
- Optional enclosed conduit wireway available.
- Heater can be mounted to the wall by using the key hole knockouts every 4" at the back of the heater.
- Optional In-Built thermostats field installed in the junction box.
- Ivory available with extended lead times, consult factory.
- Made in U.S.A. • Height: 6" Depth: 2-1/2"

Standard Models

UPC# 686334	WHITE MODEL	WATTS	BTU's	VOLTS	AMPS	HEATER LENGTH (IN)	WT. (LBS)
101226	E2903-024HAW	375	1275	120	3.1	24	5
101233	F2903-024HAW	375	1275	208	1.8		
101240	H2903-024HAW	375 / 281	1275 / 955	240 / 208	1.6/1.4		
101257	G2903-024HAW	375 / 281	1275 / 955	277 / 240	1.6/1.2		
101264	E2905-028HAW	500	1706	120	4.2		
101271	F2905-028HAW	500	1706	208	2.4	28	6
101288	H2905-028HAW	500 / 375	1706 / 1275	240 / 208	2.1/1.8		
101295	G2905-028HAW	500 / 375	1706 / 1275	277 / 240	1.8/1.6		
101301	E2906-036HAW	600	2040	120	5		
101318	F2906-036HAW	600	2040	208	2.9	36	7
101325	H2906-036HAW	600 / 450	2040 / 1530	240 / 208	2.5/2.2		
101332	G2906-036HAW	600 / 450	2040 / 1530	277 / 240	2.2/1.9		
101349	E2907-040HAW	750	2550	120	6.3		
101356	F2907-040HAW	750	2550	208	3.6	40	8
101363	H2907-040HAW	750 / 563	2550 / 1914	240 / 208	3.1/2.7		
101370	G2907-040HAW	750 / 563	2550 / 1914	277 / 240	2.7,2.6		
101387	E2910-048HAW	1000	3413	120	8.3		
101394	F2910-048HAW	1000	3413	208	4.8	48	10
101400	H2910-048HAW	1000 / 750	3413 / 2550	240 / 208	4.2/3.6		
101417	G2910-048HAW	1000 / 750	3413 / 2550	277 / 240	3.6/3.1		
101424	E2912-060HAW	750	2550	277	3.4		
101431	F2912-060HAW	1250	4250	120	10.4	60	12
101448	H2912-060HAW	1250	4250	208	6		
101455	G2912-060HAW	1250 / 938	4250 / 3189	240 / 208	5.2/4.5		
101462	E2915-072HAW	1250 / 938	4250 / 3189	277 / 240	4.5/3.9		
101479	F2915-072HAW	938	3189	277	3.4	72	14
101486	H2915-072HAW	1500	5100	120	12.5		
101493	G2915-072HAW	1500	5100	208	7.2		
101509	E2920-096HAW	1500 / 1125	5100 / 3825	240 / 208	6.3/4.7		
101516	F2920-096HAW	1500 / 1125	5100 / 3825	277 / 240	5.4/4.7		
101523	H2920-096HAW	1125	3825	277	4.1	96	18
101578	G2920-096HAW	2000	6826	208	9.6		
101585	E2925-120HAW	2000 / 1500	6826 / 5100	240 / 208	8.3/7.2		
101592	F2925-120HAW	2000 / 1500	6826 / 5100	277 / 240	7.2/6.3		
101608	H2925-120HAW	1500	5100	277	5.4	120	22
101653	G2925-120HAW	2500	8532	208	12		
101660	E2925-120HAW	2500 / 1875	8532 / 6375	240 / 208	10.4/9.0		
101677	F2925-120HAW	2500 / 1875	8532 / 6375	277 / 240	9.0/7.8		
101684	H2925-120HAW	1875	6375	277	6.8		

2900A Series - International Models

UPC# 686334	WHITE MODEL	WATTS	BTU's	VOLTS	HEATER LENGTH (IN)	WT. (LBS)
115766	M2903-24AWi	375	1275	220	24"	10
115773	H2903-24AWi			240		
115780	M2905-28AWi	500	1706	220	28"	11
115977	H2905-28AWi			240		
115803	M2906-36AWi	600	2040	220	36"	11.5
115810	H2906-36AWi			240		
115827	M2907-40AWi	750	2550	220	40"	13
115834	H2907-40AWi			240		
115841	M2910-48AWi	1000	3413	220	48"	14
115858	H2910-48AWi			240		
115865	M2912-60AWi	1250	4250	220	60"	16
115872	H2912-60AWi			240		
115889	M2915-72AWi	1500	5100	220	72"	19
115896	H2915-72AWi			240		
115902	M2917-84AWi	1750	5950	220	80"	22
118002	H2917-84AWi			240		
118033	M2925-120AWi	2500	8532	220	120"	31
118040	H2920-120AWi			240		

Note: Wireway length is the same as baseboard length.

ELECTRIC BASEBOARD

Sensible, quiet heat starts here



- Practical design is ideal for new construction and built to last
- Easy installation with pre-punched knockouts at 1-inch intervals
- Universal wiring available at either end
- Proven construction helps maximize surface area and funnel heated air
- Place under a window for best results
- Includes high-temperature safety shutoff feature
- Powder coated for a smooth, durable finish
- Lifetime warranty

Take the chill out of any room with our most popular baseboard heater. Enjoy the simple warmth of reliable, quiet convection heat. All our Cadet baseboards are designed for easy installation and will keep you warm for years to come.

ARCHITECTURAL - ENGINEERING INFORMATION

Electric baseboard heaters are ETL listed, factory rated at 120V, 208V, and dual rated from 208V to 240V. Element is steel sheathed calrod element with channel shaped aluminum fins. A full length capillary sensor tube is an integral part of each unit. Case, cover, and deflector are made of 24 gauge steel with 20 gauge junction boxes containing a grounding screw. All metal pieces are finished with a powder coat paint system.

TECHNICAL INFORMATION

Baseboard heaters work best when placed under a window and at least 12 inches away from furniture or other objects. Keep at least 12 inches minimum from objects hanging above (i.e., drapes). Do not install below electrical outlets. The electric baseboard heater may be placed directly on the floor and mounted to the wall. An optional Cadet MTX mounting tool is helpful for installing the heater. Originally designed for mounting baseboard heaters, its applications are unlimited.

All models require hard-wire installation (no cord or plug).

CADET
INVITING WARMTH

cadetheat.com
855.CADET.US
Vancouver, Washington



ELECTRIC BASEBOARD



Dimensions: 6-3/4" H x 2-1/2"D x Various lengths

All models require a thermostat. Accessories below.

WHITE PART	ALMOND PART	MODEL*	DESCRIPTION	WATTS	VOLTS	AMPS	BTUS	WT/LBS
05530	05520	2F500-1	30" baseboard	500	120	4.2	1710	6
05532	05522	3F750-1	36" baseboard	750	120	6.3	2560	7
05534	05524	4F1000-1	48" baseboard	1000	120	8.3	3415	9
05536	05526	6F1500-1	72" baseboard	1500	120	12.5	5120	12
11924	11918	2F500-8	30" baseboard	500	208	2.4	1710	6
11934	11938	3F750-8	36" baseboard	750	208	3.6	2560	7
11944	11948	4F1000-8	48" baseboard	1000	208	4.8	3415	9
11954	11958	5F1250-8	60" baseboard	1250	208	6.0	4265	10
11964	11968	6F1500-8	72" baseboard	1500	208	7.2	5120	12
11984	11988	8F2000-8	96" baseboard	2000	208	9.6	6825	16
10924	11990	8F2500-8	96" baseboard	2500	208	12.0	8530	18
09949	06501	2F350	24" baseboard	350/262	240/208	1.5/1.3	1195/895	5
09950	06502	2F500	30" baseboard	500/375	240/208	2.1/1.8	1710/1280	6
09952	06508	3F750	36" baseboard	750/563	240/208	3.1/2.7	2560/1925	7
09954	06509	4F1000	48" baseboard	1000/750	240/208	4.2/3.6	3415/2560	9
09955	06510	5F1250	60" baseboard	1250/937	240/208	5.2/4.5	4265/3200	10
09956	06511	6F1500	72" baseboard	1500/1125	240/208	6.3/5.4	5120/3840	12
09958	06513	8F2000	96" baseboard	2000/1500	240/208	8.3/7.2	6825/5120	16
09960	06515	8F2025	96" baseboard	2500/2000 1875/1500	240 208	10.4/8.3 9.0/7.2	8530/6825 6400/5120	18
03360	03358	8F2500	96" baseboard	2500/1875	240/208	10.4/9.0	8530/6400	18

*Add suffix W or A to model to designate color

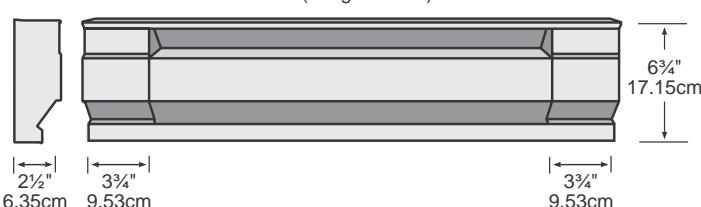
BASEBOARD ACCESSORIES

WHITE PART	ALMOND PART	MODEL*	DESCRIPTION	VOLTS	AMPS	Model No. Code
03400	n/a	SBFT2	Smartbase built-in thermostat kit, electronic programmable, double pole, 40°F to 85°F, retail pack	240/208	12.6	2 F 500 1 W
08734	03365	BTF2	Built-in thermostat kit, double pole, retail pack, 40°F to 85°F	120/208/240	22	Length: 2 = 24" or 30" 3 = 36" 4 = 48" 5 = 60" 6 = 72" 8 = 96"
14925	14920	BTF2	Built-in thermostat kit, double pole, 40°F to 85°F	120/208/240	22	F-Series Electric Baseboard
08732	03366	BTF1	Built-in thermostat kit, single pole, retail pack, 40°F to 85°F	120/208/240	22	Wattage: 350/500/750 1000/1250 1500/2000 2025 = 2000/2500 2500
14915	14910	BTF1	Built-in thermostat kit, single pole, 40°F to 85°F	120/208/240	22	Voltage: 240/208 1 = 120 8 = 208
14963	14960	LTF240	Built-in load transfer switch kit	240		Color: W = White A = Almond
14902	14900	BRF12	Built-in receptacle plate, requires separate supply wire	120		
14932	14930	BTF1TP	Built-in thermostat kit single pole tamper proof, 40°F to 85°F	120/208/240	22	
14942	14940	BTF2TP	Built-in thermostat kit double pole tamper proof, 40°F to 85°F	120/208/240	22	
14971	14970	BLF1	Corner Connector, inside 90°			
11030	MTX		Mounting tool for baseboard installation			

*Add suffix W or A to model to designate color

Side

Front (Length varies)



SBFT2W



BTF2W



LTF240A



BRF12W



BLF



MTX

FireSwitch108 Managed NAC Power Extender



FireSwitch108

STANDARD FEATURES

- Power outputs are programmable as:
 - 8 Class B NAC outputs;
 - 4 Class A NAC outputs;
 - Aux. power outputs (with or without battery backup);
 - Any combination of the above
- Local and remote status monitoring (LCD display/Ethernet port).
- EOL resistor value is programmable by output
- Temporal Code 3, Steady Mode and Input to Output Follower Mode.
- CO Temporal Code 4 (NFPA720) include Gentex®, Potter and System Sensor® devices.
- Thermal and short circuit protection with auto reset.
- Signal circuit trouble memory - quickly locates intermittent system trouble and eliminates unnecessary service calls.
- Synchronize up to twelve (12) FireSwitch108 units.
- UL Listed in the U.S. and Canada for Fire Alarm Systems.
- California State Fire Marshall Approved.

DESCRIPTION

Altronix FireSwitch108 Networked NAC Power Extender adds greater flexibility and capacity to your system. Eight (8) Class B NACs are individually programmable for Aux. power or up to Four (4) Class A outputs. FireSwitch generates CO Temporal Code 4, compatible with Gentex®, Potter and System Sensor® signals. Selectable EOL resistor values simplify retrofits. Programmable LCD display interface and an ethernet port interface for remote programmability and monitoring add to flexibility and convenience.

SPECIFICATIONS

INDEX

Voltage	120VAC 60Hz, 4.8A.
FACP	Two (2) Class A or two (2) Class B
Two (2) configurable inputs trigger via Class A or Class B FACP signal circuits (polarity reversal) or dry contacts.	

OUTPUTS

Voltage	24VDC regulated power-limited NACs.
Current	10A max total alarm current. 7A max stand-by without battery back-up. 1A with battery back-up including Aux. output (0.45A for Canadian applications).
Auxiliary	One (1) rated at 1A (regulated, battery backed-up) (0.45A for Canadian applications).
Other	Any NAC can be configured as an Aux. output, with or without battery backup. Programmable supervised indicating circuit options: Eight (8) Class B, four (4) Class A or any combination of Class A, Class B or Aux power

BACK-UP BATTERY

Type	Sealed lead acid or gel type
Switchover	Upon AC loss, instantaneous. Zero voltage drop.

PRODUCT LISTINGS



Specifications subject to change without notice.

Continued on back.





FireSwitch108 Managed NAC Power Extender

SUPERVISION

AC Failure	Form "C" contacts
Battery Fail	Form "C" contacts
Battery Presence	Form "C" contacts

LOW DC POWER SHUTDOWN

Prevents deep discharge (24VDC / 70-75%).

INDICATORS (LED)

LCD Display	Indicates trouble and conditions of operation Facilitates quick identification of a fault. Displays which output fault has occurred on.
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AGENCY LISTINGS

UL/Cul - UL 864	Control Units and Accessories for Fire Systems.
UL/Cul - UL 2017	General Purpose Signaling Devices and Systems.
CAN/ULC-S527-99	Control Units for Fire Alarm Systems
FM	Factory Mutual Approved

California State Fire Marshall Approved
NFPA 72 and NFPA 720 Compliant

PHYSICAL AND ENVIRONMENT

Dimensions (L x W x H)	15.5" x 12" x 4.5" (393.7mm x 304.8mm x 114.3mm) Enclosure accommodates up to two (2) 12VDC/12AH batteries
Product Weight	12.4 lbs. (5.62 kg).
Shipping Weight	13.7 lbs. (6.21 kg).
Temperature: Operating	0°C to 49°C (32°F to 120°F).
Temperature: Storage	-20°C to 70°C (-4°F to 158°F).
Relative Humidity	85% +/-5%.
BTU/Hr. (approx.):	123 BTU/Hr.

DS-2CD2387G2-L(U)
8 MP ColorVu Fixed Turret Network Camera

ColorVu



Hikvision ColorVu technology provides 24/7 vivid colorful images with F1.0 advanced lenses and high performance sensors. F1.0 super-aperture collects more light to produce brighter images. Advanced sensor technology can vastly improve the utilization of available light.

- High quality imaging with 8 MP resolution
- Efficient H.265+ compression technology
- Clear imaging against strong backlight due to 130 dB WDR technology
- Built-in microphone for real-time audio security(-U)
- Focus on human and vehicle targets classification based on deep learning
- 24/7 colorful imaging
- Water and dust resistant (IP67)



www.hikvision.com

▪ Specification

Camera	
Image Sensor	1/1.2" Progressive Scan CMOS
Max. Resolution	3840 × 2160
Min. Illumination	Color : 0.0005 Lux @ (F1.0, AGC ON)
Shutter Speed	1/3 s to 1/100,000 s
Day & Night	24/7 Color imaging
Angle Adjustment	Pan: 0° to 360°, tilt: 0° to 75°, rotate: 0° to 360°
Lens	
Lens Type	Fixed focal lens, 2.8 and 4 mm optional
Focal Length & FOV	2.8 mm, horizontal FOV 102°, vertical FOV 52°, diagonal FOV 124° 4 mm, horizontal FOV 88°, vertical FOV 47°, diagonal FOV 104°
Lens Mount	M16
Iris Type	Fixed
Aperture	F1.0
Depth of Field	2.8 mm: 4 m to ∞ 4 mm: 6.2 m to ∞
DORI	
DORI	2.8 mm: D: 96 m, O: 38 m, R: 19 m, I: 9 m 4 mm: D: 102 m, O: 40 m, R: 20 m, I: 10 m
Illuminator	
Supplement Light Type	White Light
Supplement Light Range	Up to 30 m
Smart Supplement Light	Yes
Video	
Main Stream	50 Hz: 25 fps (3840 × 2160, 3200 × 1800 , 2688 × 1520, 1920 × 1080, 1280 × 720) 60 Hz: 24 fps (3840 × 2160) 30 fps (3200 × 1800 , 2688 × 1520, 1920 × 1080, 1280 × 720)
Sub-Stream	50 Hz: 25 fps (1280 × 720, 640 × 480, 640 × 360) 60 Hz: 30 fps (1280 × 720, 640 × 480, 640 × 360)
Third Stream	50 Hz: 10 fps (1920 × 1080, 1280 × 720, 640 × 480, 640 × 360) 60 Hz: 10 fps (1920 × 1080, 1280 × 720, 640 × 480, 640 × 360)
Video Compression	Main stream: H.265/H.264/H.264+/H.265+ Sub-stream: H.265/H.264/MJPEG Third stream: H.265/H.264
Video Bit Rate	32 Kbps to 16 Mbps
H.264 Type	Baseline Profile/Main Profile/High Profile
H.265 Type	Main Profile
Bit Rate Control	CBR/VBR
Scalable Video Coding (SVC)	H.264 and H.265 encoding
Region of Interest (ROI)	1 fixed region for main stream and sub-stream
Audio	
Environment Noise Filtering	-U: Yes

Audio Sampling Rate	-U: 8 kHz/16 kHz/32 kHz/44.1 kHz/48 kHz
Audio Compression	-U: G.711ulaw/G.711alaw/G.722.1/G.726/MP2L2/PCM/MP3/AAC-LC
Audio Bit Rate	-U: 64 Kbps (G.711ulaw/G.711alaw)/16 Kbps (G.722.1)/16 Kbps (G.726)/32 to 192 Kbps (MP2L2)/8 to 320 Kbps (MP3)/16 to 64 Kbps (AAC-LC)
Network	
Simultaneous Live View	Up to 6 channels
API	Open Network Video Interface (Profile S, Profile G, Profile T), ISAPI, SDK , ISUP
Protocols	TCP/IP, ICMP, HTTP, HTTPS, FTP, DHCP, DNS, DDNS, RTP, RTSP, NTP, UPnP, SMTP, IGMP, 802.1X, QoS, IPv4, IPv6, UDP, Bonjour, SSL/TLS, PPPoE, SNMP, WebSocket, Websockets
User/Host	Up to 32 users. 3 user levels: administrator, operator and user
Security	Password protection, complicated password, HTTPS encryption, IP address filter, Security Audit Log, basic and digest authentication for HTTP/HTTPS, TLS 1.1/1.2, WSSE and digest authentication for Open Network Video Interface
Network Storage	NAS (NFS, SMB/CIFS), auto network replenishment (ANR)
Client	iVMS-4200, Hik-Connect, Hik-Central
Web Browser	Plug-in required live view: IE 10, IE 11 Plug-in free live view: Chrome 57.0+, Firefox 52.0+, Edge 89+ Local service: Chrome 57.0+, Firefox 52.0+, Edge 89+
Image	
Wide Dynamic Range (WDR)	130 dB
Privacy Mask	8 programmable polygon privacy masks, mask color or mosaic configurable
Day/Night Switch	Day, Night, Auto, Schedule
Image Enhancement	BLC, HLC, 3D DNR
Image Parameters Switch	Yes
Image Settings	Rotate mode, saturation, brightness, contrast, sharpness, gain, white balance adjustable by client software or web browser
Interface	
Ethernet Interface	1 RJ45 10 M/100 M self-adaptive Ethernet port
On-Board Storage	Built-in memory card slot, support microSD/SDHC/SDXC/TF card, up to 512 GB
Built-in Microphone	-LU: Yes
Event	
Basic Event	Motion detection (support alarm triggering by specified target types (human and vehicle)), video tampering alarm, exception (network disconnected, IP address conflict, illegal login, HDD full, HDD error)
Smart Event	Line crossing detection, intrusion detection, region entrance detection, region exiting detection (support alarm triggering by specified target types (human and vehicle)) Scene change detection
Linkage	Upload toNAS/memory card/FTP, notify surveillance center, trigger record, trigger capture, send email
Deep Learning Function	
Face Capture	Yes

General	
Power	-L: 12 VDC, 0.42 A, max. 5 W PoE: 802.3af, 36 V to 57 V, 0.17 A to 0.11 A, max. 6.0 W -LU: 12 VDC, 0.46 A, max. 5.5 W PoE: 802.3af, 36 V to 57 V, 0.18 A to 0.11 A, max. 6.5 W
Material	Cover: metal, main body: metal
Dimension	Ø138.3 mm × 120.1 mm (Ø5.4" × 4.7")
Package Dimension	170 mm × 170 mm × 150 mm (6.7" × 6.7" × 5.9")
Weight	Approx. 870 g (1.9 lb.)
With Package Weight	Approx. 1160 g (2.6 lb.)
Storage Conditions	-30 °C to 60 °C (-22 °F to 140 °F). Humidity 95% or less (non-condensing)
Startup and Operating Conditions	-30 °C to 60 °C (-22 °F to 140 °F). Humidity 95% or less (non-condensing)
Language	33 languages English, Russian, Estonian, Bulgarian, Hungarian, Greek, German, Italian, Czech, Slovak, French, Polish, Dutch, Portuguese, Spanish, Romanian, Danish, Swedish, Norwegian, Finnish, Croatian, Slovenian, Serbian, Turkish, Korean, Traditional Chinese, Thai, Vietnamese, Japanese, Latvian, Lithuanian, Portuguese (Brazil), Ukrainian
General Function	Anti-flicker, heartbeat, mirror, password reset via e-mail, pixel counter
Software Reset	Yes
Approval	
EMC	FCC (47 CFR Part 15, Subpart B) CE-EMC (EN 55032: 2015, EN 61000-3-2: 2019, EN 61000-3-3: 2013+A1: 2019, EN 50130-4: 2011+A1: 2014) RCM (AS/NZS CISPR 32: 2015) IC (ICES-003: Issue 7) KC (KN32: 2015, KN35: 2015)
Safety	UL (UL 62368-1) CB (IEC 62368-1: 2014+A11) CE-LVD (EN 62368-1: 2014/A11: 2017)
Environment	CE-RoHS (2011/65/EU) WEEE (2012/19/EU) Reach (Regulation (EC) No 1907/2006)
Protection	IP67 (IEC 60529-2013)

▪ Available Model

DS-2CD2387G2-L (2.8/4 mm)

DS-2CD2387G2-LU (2.8/4 mm)

▪ Typical Application

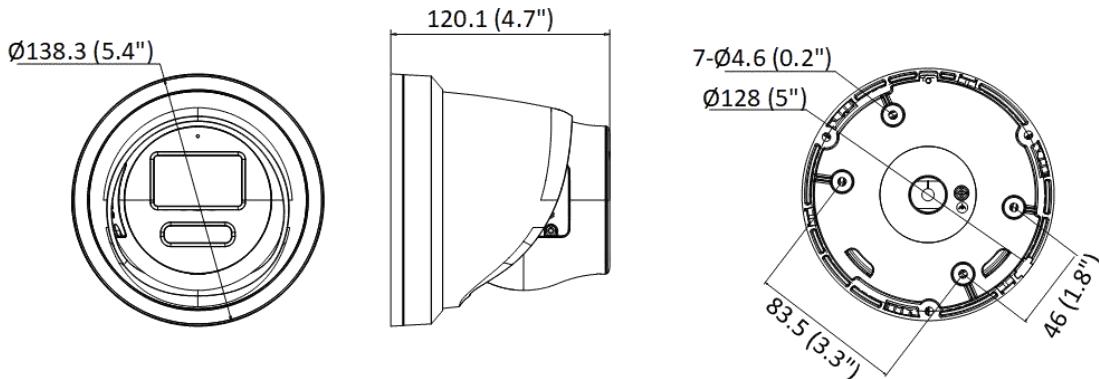
Hikvision products are classified into three levels according to their anti-corrosion performance. Refer to the following description to choose for your using environment.

This model has NO SPECIFIC PROTECTION.

Level	Description
Top-level protection	Hikvision products at this level are equipped for use in areas where professional anti-corrosion protection is a must. Typical application scenarios include coastlines, docks, chemical plants, and more.
Moderate protection	Hikvision products at this level are equipped for use in areas with moderate anti-corrosion demands. Typical application scenarios include coastal areas about 2 kilometers (1.24 miles) away from coastlines, as well as areas affected by acid rain.
No specific protection	Hikvision products at this level are equipped for use in areas where no specific anti-corrosion protection is needed.

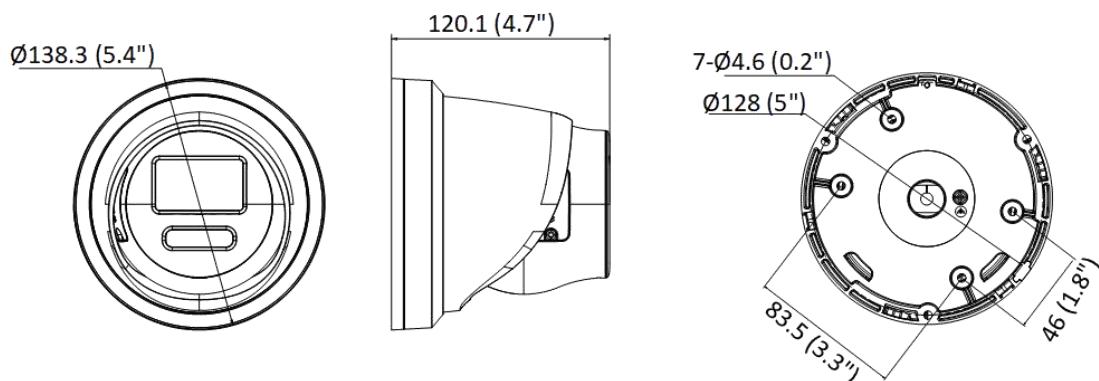
▪ Dimension

Model With Mic



Unit: mm (inch)

Model Without Mic



Unit: mm (inch)

▪ Accessory

▪ Optional

WML+PC140	CPM+PC140	PM	CB140PT	CM
Wall Mount	Pendant Mount	Vertical Pole Mount	Junction Box	Corner Mount
				
WMLB+PC140B	CPMB+PC140B	DS-1275ZJ-SUS (Black) Pole Mount	CB135B Corner Mount	DS-1276ZJ-SUS (Black) Pole Mount
				

Distributed by



HIKVISION®

Headquarters

No.555 Qianmao Road, Binjiang District,
Hangzhou 310051, China
T +86-571-8807-5998
salesbuschina@hikvision.com

Hikvision USA
T +1-909-605-0400
sales.usa@hikvision.com

Hikvision Australia
T +61-2-8595-4233
sales.au@hikvision.com

Hikvision India
T +91-22-28409960
sales.in@hikvision.com

Hikvision Canada
T +1-866-200-0600
sales.canada@hikvision.com

Hikvision Thailand
T +662-275-8913
sales.thailand@hikvision.com

Hikvision Europe
T +31-23-5542770
sales.eu@hikvision.com

Hikvision Italy
T +39-0438-6902
info.it@hikvision.itm

Hikvision Brazil
T +55-11-3318-4050
latam.support@hikvision.com

Hikvision Turkey
T +90 (218) 521.7029-7074
sales.tr@hikvision.com

Hikvision Malaysia
T +601-7652-2413
sales.my@hikvision.com

Hikvision UK & Ireland
T +01626-902146
sales.uk@hikvision.com

Hikvision South Africa
T +27 11 01 955172
info.sa@hikvision.com

Hikvision France
T +33(0)1-85-330-450
info.fr@hikvision.com

Hikvision Kazakhstan
T +7-727-9730867
kaz.kz@hikvision.ru

Hikvision Vietnam
T +84-974273698
sales.vt@hikvision.com

Hikvision UAE
T +971-4-4452000
sales.ae@hikvision.com

Hikvision Singapore
T +65-6891-4718
sg@hikvision.com

Hikvision Spain
T +34-91-737-35-95
info.es@hikvision.com

Hikvision Tashkent
T +99-72-1230-9430
info.tz@hikvision.ru

Hikvision Hong Kong
T +852-2151-1781
info.hk@hikvision.com

Hikvision Russia
T +7-495-800-07-99
sales.ru@hikvision.com

Hikvision Korea
T +82-10-31-731-8817
sales.korea@hikvision.com

Hikvision Poland
T +48-22-460-01-50
info.pl@hikvision.com

Hikvision Indonesia
T +62-21-2933759
sales.in@hikvision.com

Hikvision Colombia
sales.colombia@hikvision.com



DP14HM COMMERCIAL

Cooling Capacity: 34,400 - 58,000 BTU/h
Heating Capacity: 33,200 - 57,000 BTU/h

3 - 5 TON THREE-PHASE
PACKAGED HEAT PUMPS
14 SEER



Contents

Nomenclature	2
Product Specifications	3
Expanded Cooling Data.....	4
Expanded Heating Data	10
Airflow Data	11
Dimensions.....	12
Wiring Diagram	13
Accessories.....	15

Standard Features

- Energy-efficient compressor with internal relief valve
- Fully charged with R-410A chlorine-free refrigerant
- Multispeed EEM blower motor
- Convertible airflow: horizontal or downflow
- Copper tube / aluminum fin condenser coil
- All-aluminum evaporator coils
- Totally enclosed, permanently lubricated condenser fan motor
- AHRI Certified; ETL Listed
- Two-stage cooling on 5-ton units

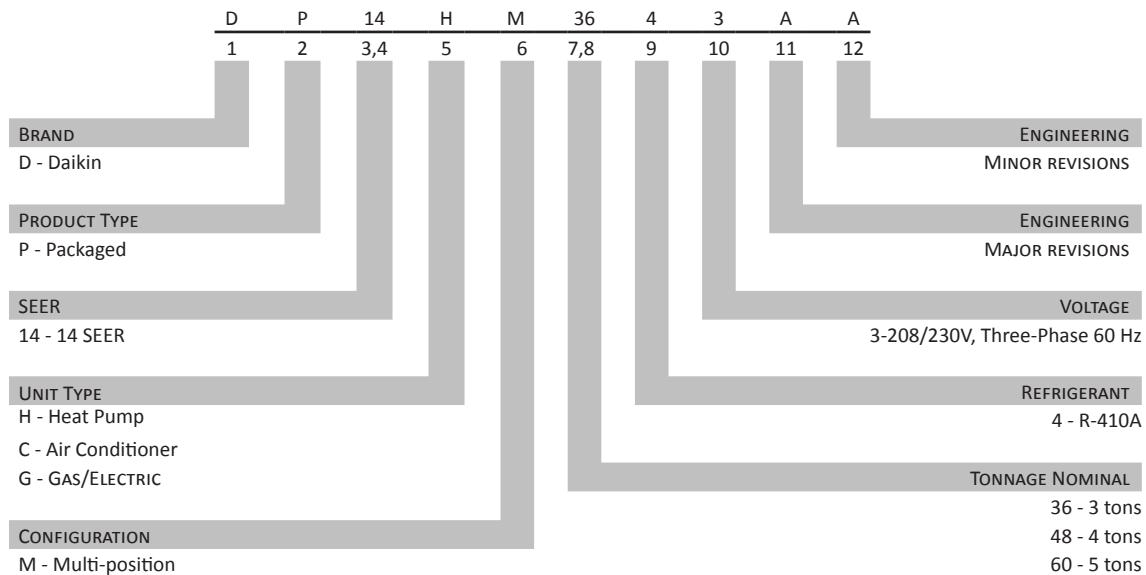
Cabinet Features

- Heavy-gauge galvanized-steel cabinet
- Attractive Nickel Gray powder-paint finish
- Fully insulated blower compartment with convenient access panels
- Louvered condenser coil protection
- One footprint; two heights



* Complete warranty details available from your local distributor or manufacturer's representative or at www.daikincomfort.com.

NOMENCLATURE



	DP14HM 3643A*	DP14HM 4843A*	DP14HM 6043A*
COOLING CAPACITY			
Total BTU/h	34,400	48,000	58,000
Sensible BTU/h	26,200	36,400	42,500
SEER / EER	14/11	14/11	14/11
Decibels	81	79	80
AHRI #s	9956304	9956305	9956306
HEATING CAPACITY			
BUT/h (47°F)	33,200	45,500	57,000
C.O.P (47°F)	3.6	3.6	3.5
BUT/h (17°F)	19,000	26,600	31,400
C.O.P (17°F)	2.2	2.2	2.2
HSPF	8.0	8.0	8.0
EVAPORATOR MOTOR			
Type	EEM	EEM	EEM
Wheel (DxW)	10 x 9	10 x 9	10 x 9
Nominal Cooling CFM	1,200	1,600	1,850
FLA/LRA	3.8 / --	5.4 / --	7.0 / --
No. of Speeds	5	5	5
Horsepower - RPM	½ - 1,050	¾ - 1,050	1 - 1,050
EVAPORATOR COIL			
Face Area (ft ²)	4.55	6.20	6.20
Rows Deep/ Fin per Inch	4 / 14	4 / 14	4 / 14
Drain Size (NPT)	¾"	¾"	¾"
Refrigerant Charge (oz.)	115	153	180
CONDENSER FAN / COIL			
Horsepower - RPM	¼ - 830	¼ - 1,075	½ - 1,075
FLA/ LRA	1.4 / 3.0	1.4 / 2.9	2.0 / 3.0
Fan Diameter / # Fan Blades	22 / 4	22 / 3	22 / 3
Face Area (ft ²)	12.21	15.30	21.32
Rows Deep/ Fin per Inch	2 / 16	2 / 16	2 / 16
COMPRESSOR			
Quantity / Type	1 / Scroll	1 / Scroll	1 / Scroll
Stage	Single	Single	2 Stage
Compressor RLA/ LRA	10.4 / 73	13.7 / 83.1	16.5 / 110
ELECTRICAL DATA			
Voltage/ Phase/ Frequency	208-230/3/60	208-230/3/60	208-230/3/60
Total Unit Amps	15.6	20.5	25.5
Min. Circuit Ampacity ¹	18.2	23.9	29.6
Max. Overcurrent Protection ²	25 amps	35 amps	45 amps
SHIPPING WEIGHT (LBS)	400	475	495

¹ Wire size should be determined in accordance with National Electrical Codes. Extensive wire runs will require larger wire sizes.

² May use fuses or HACR-type circuit breakers of the same size as noted.

Note: Always check the S&R plate for electrical data on the unit being installed.

*EXPANDED COOLING DATA — DP14HM3643A***

IDB	AIRFLOW	Outdoor Ambient Temperature															
		65°F				75°F				85°F				95°F			
		59	63	67	71	59	63	67	71	59	63	67	71	59	63	67	71
1350	MBh	33.7	34.9	38.3	-	32.9	34.1	37.4	-	32.1	33.3	36.5	-	31.4	32.5	35.6	-
	S/T	0.76	0.64	0.44	-	0.79	0.66	0.46	-	0.81	0.68	0.47	-	0.84	0.70	0.48	-
	ΔT	17	15	11	-	18	15	12	-	18	15	12	-	18	15	12	-
	kW	2.35	2.40	2.47	-	2.53	2.58	2.67	-	2.69	2.75	2.84	-	2.83	2.89	2.99	-
	Amps	10.4	10.6	10.9	-	11.1	11.3	11.6	-	11.9	12.2	12.5	-	12.6	12.9	13.2	-
	HI PR	242	260	275	-	271	292	308	-	309	332	351	-	351	378	399	-
	LO PR	111	118	129	-	118	125	137	-	122	130	142	-	128	137	149	-
	MBh	32.7	33.9	37.2	-	32.0	33.1	36.3	-	31.2	32.3	35.4	-	30.4	31.6	34.6	-
	S/T	0.73	0.61	0.42	-	0.75	0.63	0.44	-	0.77	0.64	0.45	-	0.80	0.67	0.46	-
	ΔT	18	16	12	-	18	16	12	-	18	16	12	-	19	16	12	-
1200	kW	2.33	2.38	2.46	-	2.51	2.56	2.65	-	2.67	2.73	2.82	-	2.81	2.87	2.96	-
	Amps	10.3	10.5	10.8	-	11.0	11.2	11.5	-	11.8	12.1	12.4	-	12.5	12.8	13.1	-
	HI PR	239	258	272	-	269	289	305	-	306	329	347	-	348	375	395	-
	LO PR	110	117	128	-	116	124	135	-	121	129	141	-	127	135	148	-
	MBh	30.2	31.3	34.3	-	29.5	30.6	33.5	-	28.8	29.9	32.7	-	28.1	29.1	31.9	-
	S/T	0.70	0.58	0.41	-	0.73	0.61	0.42	-	0.74	0.62	0.43	-	0.77	0.64	0.44	-
	ΔT	19	16	12	-	19	16	12	-	19	16	12	-	19	16	12	-
	kW	2.28	2.32	2.40	-	2.45	2.50	2.58	-	2.60	2.66	2.75	-	2.74	2.80	2.89	-
	Amps	10.1	10.3	10.6	-	10.8	11.0	11.3	-	11.5	11.8	12.1	-	12.2	12.5	12.8	-
	HI PR	232	250	264	-	261	280	296	-	296	319	337	-	338	363	384	-
	LO PR	107	114	124	-	113	120	131	-	117	125	136	-	123	131	143	-
1050	MBh	30.2	31.3	34.3	-	29.5	30.6	33.5	-	28.8	29.9	32.7	-	28.1	29.1	31.9	-
	S/T	0.70	0.58	0.41	-	0.73	0.61	0.42	-	0.74	0.62	0.43	-	0.77	0.64	0.44	-
	ΔT	19	16	12	-	19	16	12	-	19	16	12	-	19	16	12	-
	kW	2.28	2.32	2.40	-	2.45	2.50	2.58	-	2.60	2.66	2.75	-	2.74	2.80	2.89	-
	Amps	10.1	10.3	10.6	-	10.8	11.0	11.3	-	11.5	11.8	12.1	-	12.2	12.5	12.8	-
	HI PR	232	250	264	-	261	280	296	-	296	319	337	-	338	363	384	-
	LO PR	107	114	124	-	113	120	131	-	117	125	136	-	123	131	143	-
	MBh	34.3	35.3	38.2	41.0	33.5	34.5	37.3	40.0	32.7	33.7	36.4	39.1	31.9	32.8	35.5	38.1
	S/T	0.77	0.59	0.4	0.90	0.80	0.61	0.4	0.92	0.82	0.62	0.4	0.95	0.85	0.64	0.4	0.99
	ΔT	20	19	15	11	20	19	15	11	20	19	15	11	21	19	15	11
75	MBh	34.3	35.3	38.2	41.0	33.5	34.5	37.3	40.0	32.7	33.7	36.4	39.1	31.9	32.8	35.5	38.1
	S/T	0.87	0.77	0.59	0.4	0.90	0.80	0.61	0.4	0.92	0.82	0.62	0.4	0.95	0.85	0.64	0.4
	ΔT	21	19	16	11	21	20	16	11	21	20	16	11	21	20	16	11
	kW	2.37	2.42	2.50	2.6	2.55	2.61	2.69	2.8	2.71	2.77	2.86	3.0	3.01	3.1	2.98	3.04
	Amps	10.5	10.7	11.0	11.3	11.2	11.4	11.7	12.1	12.0	12.2	12.6	13.0	12.7	13.4	13.8	13.4
	HI PR	244	263	278	289.5	274	311	324.9	312	335	354	369.5	355	382	403	420.8	399
	LO PR	112	120	131	139.0	119	126	138	146.9	123	131	143	152.7	130	138	151	160.4
	MBh	33.3	34.3	37.1	39.8	32.5	33.5	36.2	38.9	31.7	32.7	35.4	38.0	31.0	31.9	34.5	37.0
	S/T	0.83	0.74	0.56	0.4	0.86	0.77	0.58	0.4	0.88	0.78	0.59	0.4	0.91	0.81	0.61	0.4
	ΔT	21	19	16	11	21	20	16	11	21	20	16	11	21	20	16	11
1200	MBh	30.7	31.6	34.2	36.7	30.0	30.9	33.4	35.9	29.3	30.2	32.6	35.0	28.6	29.4	31.8	34.2
	S/T	0.80	0.71	0.54	0.3	0.83	0.74	0.56	0.4	0.85	0.76	0.57	0.4	0.87	0.78	0.59	0.4
	ΔT	21	20	16	11	22	20	16	11	22	20	16	11	22	20	16	11
	kW	2.35	2.40	2.48	2.6	2.53	2.59	2.67	2.8	2.69	2.75	2.84	2.9	2.83	2.89	2.99	3.1
	Amps	10.4	10.6	10.9	11.2	11.1	11.3	11.6	12.0	11.9	12.2	12.5	12.9	12.6	13.2	13.7	13.3
	HI PR	242	260	275	286.7	271	292	308	321.7	309	332	351	365.8	352	378	399	416.7
	LO PR	111	118	129	137.7	118	125	137	145.4	122	130	142	151.2	128	137	149	158.8
	MBh	30.7	31.6	34.2	36.7	30.0	30.9	33.4	35.9	29.3	30.2	32.6	35.0	28.6	29.4	31.8	34.2
	S/T	0.80	0.71	0.54	0.3	0.83	0.74	0.56	0.4	0.85	0.76	0.57	0.4	0.87	0.78	0.59	0.4
	ΔT	21	20	16	11	22	20	16	11	22	20	16	11	22	20	16	11
1050	MBh	30.7	31.6	34.2	36.7	30.0	30.9	33.4	35.9	29.3	30.2	32.6	35.0	28.6	29.4	31.8	34.2
	S/T	0.80	0.71	0.54	0.3	0.83	0.74	0.56	0.4	0.85	0.76	0.57	0.4	0.87	0.78	0.59	0.4
	ΔT	21	20	16	11	22	20	16	11	22	20	16	11	22	20	16	11
	kW	2.29	2.34	2.42	2.5	2.47	2.52	2.60	2.7	2.62	2.68	2.77	2.9	2.76	2.82	2.91	3.0
	Amps	10.2	10.4	10.6	11.0	10.8	11.1	11.4	11.7	11.6	11.9	12.2	12.6	12.3	12.6	12.9	13.3
	HI PR	235	252	267	278.1	263	283	299	312.0	299	322	340	354.9	341	367	388	404.2
	LO PR	108	115	125	133.5	114	121	132	141.1	119	126	138	146.6	125	132	145	154.0
	MBh	30.7	31.6	34.2	36.7	30.0	30.9	33.4	35.9	29.3	30.2	32.6	35.0	28.6	29.4	31.8	34.2
	S/T	0.80	0.71	0.54	0.3	0.83	0.74	0.56	0.4	0.85	0.76	0.57	0.4	0.87	0.78	0.59	0.4
	ΔT	21	20	16	11	22	20	16	11	22	20	16	11	22	20	16	11

IDB: Entering Indoor Dry Bulb Temperature
High and low pressures are measured at the liquid and suction access fittings
Shaded area reflects ACCA (TVA) conditions

Amps = Unit amps (Comp.+Evaporator + Condenser fan motors)

kW = Total system power

EXPANDED COOLING DATA — DP14HM3643A** (CONT.)

IDB	AIRFLOW	Outdoor Ambient Temperature																							
		65°F							75°F							85°F							115°F		
		59	63	67	71	59	63	67	71	59	63	67	71	59	63	67	71	59	63	67	71	59	63	67	71
80	MBh	34.9	35.7	38.1	40.7	34.1	34.8	37.2	39.8	33.3	34.0	36.3	38.8	32.5	33.2	35.4	37.9	30.8	31.5	33.7	36.0	28.6	29.2	31.2	33.3
	S/T	0.95	0.89	0.72	0.5	1.00	0.92	0.75	0.6	1.00	0.95	0.77	0.6	1.00	1.00	0.80	0.6	1.00	1.00	0.83	0.6	1.00	1.00	0.83	0.6
	ΔT	23	22	19	15	23	22	19	15	23	22	19	15	22	23	19	15	21	21	19	15	19	20	18	14.1
	kW	2.39	2.44	2.52	2.6	2.57	2.63	2.71	2.8	2.74	2.80	2.89	3.0	2.88	2.94	3.04	3.1	3.00	3.07	3.17	3.3	3.11	3.18	3.28	3.4
	Amps	10.5	10.8	11.1	11.4	11.3	11.5	11.8	12.2	12.1	12.3	12.7	13.1	12.8	13.1	13.5	13.9	13.5	13.8	14.2	14.7	14.2	14.5	15.0	15.5
	HI PR	247	266	280	292.5	277	298	315	328.2	315	339	358	373.2	359	386	408	425.1	403	434	459	478.2	446	480	507	528.4
	LO PR	114	121	132	140.4	120	128	139	148.4	125	133	145	154.2	131	139	152	162.0	137	146	159	169.8	142	151	165	175.6
	MBh	33.9	34.6	37.0	39.5	33.1	33.8	36.1	38.6	32.3	33.0	35.3	37.7	31.5	32.2	34.4	36.8	29.9	30.6	32.7	34.9	27.7	28.3	30.3	32.4
1050	S/T	0.91	0.85	0.69	0.5	0.94	0.88	0.72	0.5	0.96	0.90	0.73	0.5	0.99	0.93	0.76	0.6	1.00	0.97	0.79	0.6	1.00	0.98	0.79	0.6
	ΔT	24	23	20	16	24	23	20	16	24	23	20	16	24	23	20	16	23	20	16	21	21	18	14.7	
	kW	2.37	2.42	2.50	2.6	2.55	2.61	2.69	2.8	2.71	2.77	2.86	3.0	2.86	2.92	3.02	3.1	2.98	3.04	3.14	3.3	3.08	3.15	3.26	3.4
	Amps	10.5	10.7	11.0	11.3	11.2	11.4	11.7	12.1	12.0	12.2	12.6	13.0	12.7	13.0	13.4	13.8	13.4	13.7	14.1	14.6	14.1	14.4	14.9	15.4
	HI PR	244	263	278	289.6	274	295	312	324.9	312	336	354	369.5	355	382	404	420.9	399	430	454	473.5	441	475	502	523.2
	LO PR	112	120	131	139.1	119	126	138	146.9	123	131	143	152.7	130	138	151	160.4	136	145	158	168.1	141	150	163	173.9
	MBh	31.3	31.9	34.1	36.5	30.5	31.2	33.3	35.6	29.8	30.5	32.5	34.8	29.1	29.7	31.8	33.9	27.6	28.2	30.2	32.2	25.6	26.2	27.9	29.9
	S/T	0.87	0.82	0.67	0.5	0.90	0.85	0.69	0.5	0.93	0.87	0.71	0.5	0.96	0.90	0.73	0.5	0.99	0.93	0.76	0.6	1.00	0.94	0.77	0.6
85	ΔT	24	23	20	16	24	23	20	16	24	23	20	16	24	23	20	16	24	23	19	20	21	21	18.2	
	kW	2.31	2.36	2.43	2.5	2.49	2.54	2.62	2.7	2.65	2.70	2.79	2.9	2.78	2.85	2.94	3.0	2.90	2.97	3.06	3.2	3.00	3.07	3.17	3.3
	Amps	10.2	10.4	10.7	11.1	10.9	11.1	11.5	11.8	11.7	12.0	12.3	12.7	12.4	12.7	13.0	13.5	13.1	13.4	13.8	14.2	13.8	14.1	15.0	
	HI PR	237	255	269	280.9	266	286	302	315.2	302	325	344	358.5	344	371	391	408.3	388	417	440	459.3	428	461	487	507.5
	LO PR	109	116	127	134.9	115	123	134	142.5	120	127	139	148.1	126	139	146	155.6	132	140	153	163.0	136	145	158	168.6
	MBh	35.5	36.2	37.9	40.4	34.7	35.3	37.0	39.5	33.8	34.5	36.1	38.6	33.0	33.7	35.3	37.6	31.4	32.0	33.5	35.7	29.1	29.6	31.0	33.1
	S/T	1.00	0.96	0.87	0.7	1.00	0.90	0.7	0.5	1.00	0.92	0.7	0.5	1.00	1.00	0.95	0.8	1.00	1.00	0.99	0.8	1.00	1.00	0.95	0.8
	ΔT	24	22	19	15	24	23	20	16	23	22	20	16	24	23	20	16	21	22	19	20	21	21	18.2	
1350	MBh	35.5	36.2	37.9	40.4	34.7	35.3	37.0	39.5	33.8	34.5	36.1	38.6	33.0	33.7	35.3	37.6	31.4	32.0	33.5	35.7	29.1	29.6	31.0	33.1
	S/T	1.00	0.96	0.87	0.7	1.00	0.90	0.7	0.5	1.00	0.92	0.7	0.5	1.00	1.00	0.95	0.8	1.00	1.00	0.99	0.8	1.00	1.00	0.95	0.8
	ΔT	24	22	19	15	24	23	20	16	23	22	20	16	24	23	20	16	21	22	19	20	21	21	18.2	
	kW	2.41	2.46	2.54	2.6	2.59	2.65	2.73	2.8	2.76	2.82	2.91	3.0	2.90	2.97	3.07	3.2	3.03	3.09	3.20	3.3	3.13	3.20	3.31	3.4
	Amps	10.6	10.8	11.1	11.5	11.4	11.6	11.9	12.3	12.2	12.4	12.8	13.2	12.9	13.2	13.6	14.0	13.6	13.9	14.3	14.8	14.3	14.7	15.1	15.6
	HI PR	249	268	283	295.4	280	301	318	331.5	318	342	361	377.0	362	390	412	429.3	408	439	463	483.0	450	485	512	533.7
	LO PR	115	122	133	141.9	121	129	141	149.9	126	134	146	155.8	132	141	154	163.6	139	147	161	171.5	143	153	167	177.4
	MBh	34.5	35.1	36.8	39.3	33.7	34.3	35.9	38.3	32.9	33.5	35.1	37.4	32.1	32.7	34.2	36.5	30.5	31.0	32.5	34.7	28.2	28.8	30.1	32.1
100	S/T	0.95	0.92	0.83	0.7	0.98	0.95	0.86	0.7	1.00	0.97	0.88	0.7	1.00	0.91	0.7	1.00	1.00	0.94	0.8	1.00	1.00	0.95	0.8	
	ΔT	25	25	23	20	25	24	20	16	25	24	20	16	25	24	21	21	23	24	20	22	22	22	22	19.0
	kW	2.39	2.44	2.52	2.6	2.57	2.63	2.71	2.8	2.74	2.80	2.89	3.0	2.88	2.94	3.04	3.1	3.00	3.07	3.17	3.3	3.11	3.18	3.28	3.4
	Amps	10.5	10.8	11.1	11.4	11.3	11.5	11.8	12.2	12.1	12.3	12.7	13.1	12.8	13.1	13.5	13.9	13.5	13.8	14.2	14.7	14.2	14.5	15.0	15.5
	HI PR	247	266	280	292.5	277	298	315	328.2	315	339	358	373.2	359	386	408	425.1	403	434	459	478.2	446	480	507	528.4
	LO PR	114	121	132	140.4	120	128	139	148.4	125	133	145	154.2	131	139	152	162.0	137	146	159	169.8	142	151	165	175.6
	MBh	31.8	32.4	34.0	36.2	31.1	31.7	33.2	35.4	30.3	30.9	32.4	34.5	29.6	30.2	31.6	33.7	28.1	28.7	30.0	32.0	26.0	26.5	27.8	29.7
	S/T	0.92	0.88	0.80	0.6	0.95	0.92	0.83	0.7	0.97	0.94	0.85	0.7	1.00	0.97	0.87	0.7	1.00	1.00	0.91	0.7	1.00	1.00	0.92	0.7
1050	ΔT	25	25	24	21	26	25	24	21	26	25	24	21	26	24	21	25	25	24	21	23	23	22	22	19.3
	kW	2.33	2.38	2.45	2.5	2.51	2.56	2.65	2.7	2.67	2.73	2.81	2.9	2.81	2.87	2.96	3.1	2.93	2.99	3.09	3.2	3.03	3.10	3.20	3.3
	Amps	10.3	10.5	10.8	11.1	11.0	11.2	11.5	11.9	11.8	12.1	12.4	12.8	12.5	12.8	13.1	13.6	13.2	13.5	13.9	14.3	13.9	14.2	14.6	15.1
	HI PR	239	258	272	283.7	269	289	305	318.3	305	329	347	362.0	348	374	395	412.3	391	421	445	463.9	432	465	491	512.5
	LO PR	110	117	128	136.2	116	124	135	143.9	121	129	140	149.6	127	135	148	157.1	133	1						

*EXPANDED COOLING DATA — DP14HM4843A**

IDB	AIRFLOW	Outdoor Ambient Temperature															
		65°F				75°F				85°F				95°F			
		59	63	67	71	59	63	67	71	59	63	67	71	59	63	67	71
1800	MBh	47.0	48.8	53.4	-	45.9	47.6	52.2	-	44.8	46.5	50.9	-	43.8	45.4	49.7	-
	S/T	0.76	0.63	0.44	-	0.79	0.66	0.45	-	0.81	0.67	0.47	-	0.83	0.70	0.48	-
	ΔT	18	16	12	-	18	16	12	-	18	16	12	-	19	16	12	-
	kW	3.22	3.29	3.40	-	3.47	3.55	3.66	-	3.69	3.77	3.90	-	3.89	3.97	4.10	-
	Amps	13.6	13.9	14.3	-	14.6	14.9	15.3	-	15.7	16.1	16.5	-	16.7	17.1	17.6	-
	HI PR	250	269	284	-	280	301	318	-	318	343	362	-	363	390	412	-
	LO PR	111	118	129	-	117	124	136	-	122	129	141	-	128	136	148	-
	MBh	45.7	47.3	51.9	-	44.6	46.2	50.7	-	43.5	45.1	49.4	-	42.5	44.0	48.2	-
1600	S/T	0.72	0.60	0.42	-	0.75	0.63	0.43	-	0.77	0.64	0.44	-	0.79	0.66	0.46	-
	ΔT	19	16	12	-	19	17	13	-	19	17	13	-	19	17	13	-
	kW	3.20	3.26	3.37	-	3.44	3.52	3.63	-	3.66	3.74	3.86	-	3.85	3.94	4.07	-
	Amps	13.5	13.8	14.2	-	14.5	14.8	15.2	-	15.6	15.9	16.4	-	16.6	16.9	17.4	-
	HI PR	247	266	281	-	277	298	315	-	315	339	358	-	359	386	408	-
	LO PR	110	117	127	-	116	123	135	-	120	128	140	-	126	135	147	-
	MBh	42.1	43.7	47.9	-	41.2	42.7	46.8	-	40.2	41.7	45.6	-	39.2	40.6	44.5	-
1400	S/T	0.70	0.58	0.40	-	0.72	0.60	0.42	-	0.74	0.62	0.43	-	0.77	0.64	0.44	-
	ΔT	19	17	13	-	20	17	13	-	20	17	13	-	20	17	13	-
	kW	3.12	3.19	3.29	-	3.36	3.43	3.54	-	3.57	3.65	3.77	-	3.76	3.84	3.97	-
	Amps	13.2	13.5	13.8	-	14.1	14.4	14.8	-	15.2	15.5	16.0	-	16.1	16.5	17.0	-
	HI PR	240	258	272	-	269	289	306	-	306	329	348	-	348	375	396	-
	LO PR	106	113	123	-	112	120	130	-	117	124	136	-	123	130	142	-
	MBh	47.8	49.2	53.3	57.2	46.7	48.1	52.1	55.9	45.6	47.0	50.8	54.6	44.5	45.8	49.6	53.2
70	S/T	0.86	0.77	0.58	0.4	0.89	0.80	0.61	0.4	0.92	0.82	0.62	0.4	0.95	0.85	0.64	0.4
	ΔT	21	19	16	11	21	20	16	11	21	20	16	11	21	20	16	11
	kW	3.25	3.32	3.42	3.5	3.50	3.58	3.69	3.8	3.72	3.81	3.93	4.1	3.92	4.01	4.14	4.3
	Amps	13.7	14.0	14.4	14.9	14.7	15.0	15.5	16.0	16.2	16.7	17.3	16.8	17.2	17.7	18.4	19.0
	HI PR	252	271	286	298.8	283	304	321	335.3	322	346	366	381.3	366	394	416	434.3
	LO PR	112	119	130	138.3	118	126	137	146.2	123	131	143	151.9	129	137	150	159.6
	MBh	46.4	47.8	51.8	55.5	45.4	46.7	50.6	54.3	44.3	45.6	49.3	53.0	43.2	44.5	48.1	51.7
55	S/T	0.82	0.74	0.56	0.4	0.85	0.76	0.58	0.4	0.87	0.78	0.59	0.4	0.90	0.81	0.61	0.4
	ΔT	22	20	17	11	22	20	17	12	22	21	17	12	22	20	17	12
	kW	3.22	3.29	3.40	3.5	3.47	3.55	3.66	3.8	3.69	3.77	3.90	4.0	3.89	3.97	4.11	4.2
	Amps	13.6	13.9	14.3	14.8	14.6	14.9	15.3	15.7	16.1	16.6	17.1	16.7	17.1	17.6	18.2	18.7
	HI PR	250	269	284	295.8	280	301	318	331.9	319	343	362	377.5	363	390	412	430.0
	LO PR	111	118	129	137.0	117	124	136	144.7	122	129	141	150.4	128	136	148	158.0
	MBh	42.9	44.1	47.8	51.3	41.9	43.1	46.7	50.1	40.9	42.1	45.5	48.9	39.9	41.1	44.4	47.7
40	S/T	0.79	0.71	0.54	0.3	0.82	0.74	0.56	0.4	0.84	0.75	0.57	0.4	0.87	0.78	0.59	0.4
	ΔT	22	21	17	12	23	21	17	12	23	21	17	12	23	21	17	12
	kW	3.15	3.21	3.31	3.4	3.39	3.46	3.57	3.7	3.60	3.68	3.80	3.9	3.79	3.87	4.00	4.1
	Amps	13.3	13.6	14.0	14.4	14.2	14.5	15.0	15.5	15.3	15.7	16.1	16.7	16.3	17.1	17.7	18.2
	HI PR	242	261	275	286.9	272	292	309	322.0	309	332	351	366.2	352	379	400	417.1
	LO PR	107	114	125	132.9	113	121	132	140.4	118	125	137	145.9	124	132	144	153.2
	MBh	42.9	44.1	47.8	51.3	41.9	43.1	46.7	50.1	40.9	42.1	45.5	48.9	39.9	41.1	44.4	47.7

IDB: Entering Indoor Dry Bulb Temperature
High and low pressures are measured at the liquid and suction access fittings
Shaded area reflects ACCA (TVA) conditions

Amps = Unit amps (Comp.+Evaporator + Condenser fan motors)

kW = Total system power

IDB	AIRFLOW	Outdoor Ambient Temperature																							
		65°F							75°F							85°F							115°F		
		59	63	67	71	59	63	67	71	59	63	67	71	59	63	67	71	59	63	67	71	59	63	67	71
80	MBh	48.7	49.7	53.1	56.8	47.6	48.6	51.9	55.5	46.4	47.4	50.7	54.2	45.3	46.3	49.4	52.9	43.0	44.0	47.0	50.2	39.9	40.7	43.5	46.5
	S/T	0.95	0.89	0.72	0.5	1.00	0.92	0.75	0.6	1.00	0.94	0.77	0.6	1.00	1.00	0.79	0.6	1.00	1.00	0.82	0.6	1.00	1.00	0.83	0.6
	ΔT	24	23	20	16	24	23	20	16	24	23	20	16	23	24	20	16	22	22	20	16	20	21	18	14.7
	kW	3.27	3.34	3.45	3.6	3.53	3.61	3.72	3.8	3.75	3.84	3.96	4.1	3.95	4.04	4.17	4.3	4.12	4.21	4.35	4.5	4.27	4.36	4.51	4.7
	Amps	13.8	14.1	14.5	15.0	14.8	15.2	15.6	16.1	16.0	16.3	16.8	17.4	17.0	17.4	17.9	18.5	18.0	18.4	19.0	19.6	19.0	19.4	20.0	20.7
	HI PR	255	274	289	301.8	286	307	325	338.6	325	350	369	385.1	370	398	421	438.6	416	448	473	493.5	460	495	523	545.2
	LO PR	113	120	131	139.7	119	127	139	147.6	124	132	144	153.4	130	139	151	161.2	137	145	159	168.9	141	150	164	174.7
	MBh	47.3	48.3	51.6	55.2	46.2	47.2	50.4	53.9	45.1	46.1	49.2	52.6	44.0	44.9	48.0	51.3	41.8	42.7	45.6	48.7	38.7	39.5	42.2	45.2
100	S/T	0.90	0.85	0.69	0.5	0.93	0.88	0.71	0.5	0.96	0.90	0.73	0.5	0.99	0.93	0.76	0.6	1.00	0.96	0.78	0.6	1.00	0.97	0.79	0.6
	ΔT	25	23	20	16	25	24	21	17	25	24	21	17	25	24	21	17	24	24	21	16	22	22	19	15.3
	kW	3.25	3.32	3.42	3.5	3.50	3.58	3.69	3.8	3.72	3.81	3.93	4.1	3.92	4.01	4.14	4.3	4.09	4.18	4.32	4.5	4.23	4.33	4.47	4.6
	Amps	13.7	14.0	14.4	14.9	14.7	15.0	15.5	16.0	15.9	16.2	16.7	17.3	16.8	17.2	17.7	18.4	17.8	18.2	18.8	19.5	18.8	19.2	19.8	20.5
	HI PR	252	271	286	298.8	283	304	321	335.3	322	346	366	381.3	366	394	416	434.3	412	444	468	488.6	455	490	518	539.8
	LO PR	112	119	130	138.3	118	126	137	146.2	123	131	143	151.9	129	137	150	159.6	135	144	157	167.2	140	149	162	173.0
	MBh	43.6	44.6	47.6	50.9	42.6	43.5	46.5	49.7	41.6	42.5	45.4	48.5	40.6	41.5	44.3	47.4	38.6	39.4	42.1	45.0	35.7	36.5	39.0	41.7
	S/T	0.87	0.82	0.66	0.5	0.90	0.85	0.69	0.5	0.92	0.87	0.71	0.5	0.95	0.89	0.73	0.5	0.99	0.93	0.76	0.6	1.00	0.94	0.76	0.6
120	ΔT	25	24	21	17	25	24	21	17	25	24	21	17	25	24	21	17	25	24	21	17	23	22	20	15.6
	kW	3.17	3.24	3.34	3.4	3.42	3.49	3.60	3.7	3.63	3.71	3.83	4.0	3.82	3.91	4.04	4.2	3.98	4.07	4.21	4.4	4.12	4.22	4.36	4.5
	Amps	13.4	13.7	14.1	14.5	14.3	14.7	15.1	15.6	15.5	15.8	16.3	16.8	16.4	16.8	17.3	17.9	17.4	17.8	18.3	19.0	18.3	18.7	20.0	
	HI PR	245	263	278	289.8	274	295	312	325.2	312	336	355	369.9	355	383	404	421.3	400	430	454	473.9	442	475	502	523.6
	LO PR	108	115	126	134.2	115	122	133	141.8	119	127	138	147.4	125	133	145	154.8	131	140	152	162.2	136	144	158	167.8
	MBh	49.5	50.5	52.9	56.4	48.4	49.3	51.7	55.1	47.2	48.1	50.4	53.8	46.1	47.0	49.2	52.5	43.8	44.6	46.7	49.9	40.5	41.3	43.3	46.2
	S/T	0.99	0.96	0.86	0.7	1.00	0.99	0.89	0.7	1.00	0.92	0.7	1.00	1.00	0.95	0.8	1.00	1.00	0.98	0.8	1.00	1.00	0.99	0.8	
	ΔT	25	25	23	20	25	25	24	20	24	25	24	20	24	24	21	21	22	23	20	21	21	22	19.0	
140	kW	3.30	3.37	3.48	3.6	3.56	3.64	3.75	3.9	3.79	3.87	4.00	4.1	3.99	4.07	4.21	4.4	4.16	4.25	4.39	4.5	4.30	4.40	4.55	4.7
	Amps	13.9	14.2	14.7	15.1	14.9	15.3	15.7	16.3	16.1	16.5	17.0	17.6	17.1	17.5	18.0	18.7	18.1	18.5	19.1	19.8	19.1	19.6	20.2	20.9
	HI PR	257	277	292	304.8	289	311	328	342.0	328	353	373	389.0	374	402	425	443.0	421	453	478	498.4	465	500	528	550.7
	LO PR	114	121	133	141.1	121	128	140	149.1	125	133	146	155.0	132	140	153	162.8	138	147	160	170.6	143	152	166	176.5
	MBh	48.1	49.0	51.3	54.8	47.0	47.9	50.1	53.5	45.9	46.7	49.0	52.2	44.7	45.6	47.8	51.0	42.5	43.3	45.4	48.4	39.4	40.1	42.0	44.8
	S/T	0.95	0.91	0.82	0.7	0.98	0.95	0.85	0.7	1.00	0.97	0.88	0.7	1.00	0.90	0.7	1.00	1.00	0.94	0.8	1.00	1.00	0.95	0.8	
	ΔT	26	26	24	21	26	25	21	17	26	25	21	17	27	26	25	21	24	25	24	21	23	23	23	19.8
	kW	3.27	3.34	3.45	3.6	3.53	3.61	3.72	3.8	3.75	3.84	3.96	4.1	3.95	4.04	4.17	4.3	4.12	4.21	4.35	4.5	4.27	4.36	4.51	4.7
160	Amps	13.5	13.8	14.2	14.7	14.5	14.8	15.2	15.7	15.6	15.9	16.4	17.0	16.6	16.9	17.4	18.0	18.0	18.4	19.0	19.6	19.0	19.4	20.0	
	HI PR	247	266	281	292.7	277	298	315	328.5	315	339	358	373.6	359	386	408	425.5	404	435	459	478.7	446	480	507	528.9
	LO PR	110	117	127	135.5	116	123	134	143.2	120	128	140	148.8	126	134	147	156.3	132	141	154	163.8	137	146	159	169.5
	MBh	44.4	45.2	47.4	50.6	43.4	44.2	46.3	49.4	42.3	43.1	45.2	48.2	41.3	42.1	44.1	47.0	39.2	40.0	41.9	44.7	36.3	37.0	38.8	41.4
	S/T	0.91	0.88	0.79	0.6	0.95	0.91	0.82	0.7	0.97	0.94	0.84	0.7	1.00	0.97	0.87	0.7	1.00	1.00	0.90	0.7	1.00	1.00	0.91	0.7
	ΔT	27	26	25	21	27	26	22	17	26	25	22	17	27	25	22	17	26	25	22	24	24	23	20.1	
	kW	3.20	3.26	3.37	3.5	3.44	3.52	3.63	3.8	3.66	3.74	3.86	4.0	3.85	3.94	4.07	4.2	4.02	4.11	4.24	4.4	4.16	4.25	4.39	4.5
	Amps	13.5	13.8	14.2	14.7	14.5	14.8	15.2	15.7	15.6	15.9	16.4	17.0	16.6	16.9	17.4	18.0	17.5	17.9	18.5	19.1	18.5	18.9	19.5	20.2

IDB: Entering Indoor Dry Bulb Temperature
High and low pressures are measured at the liquid and suction access fittings
Shaded area reflects AHRI conditions

Amps = Unit amps (Comp.+Evaporator + Condenser fan motors)

kW = Total system power

*EXPANDED COOLING DATA — DP14H60M43A**

IDB	AIRFLOW	Outdoor Ambient Temperature																				
		65°F				75°F				85°F				95°F				105°F				
		59	63	67	71	59	63	67	71	59	63	67	71	59	63	67	71					
70	MBh	56.8	58.9	64.5	-	55.5	57.5	63.0	-	54.2	56.2	61.5	-	52.9	54.8	60.0	-	50.2	52.1	57.0	-	
	S/T	0.73	0.61	0.42	-	0.76	0.63	0.44	-	0.78	0.65	0.45	-	0.80	0.67	0.46	-	0.83	0.69	0.48	-	
	ΔT	18	16	12	-	19	16	12	-	19	16	12	-	19	16	12	-	18	16	12	-	
	kW	4.07	4.16	4.29	-	4.39	4.49	4.64	-	4.68	4.78	4.94	-	4.93	5.04	5.21	-	5.15	5.26	5.44	-	
	Amps	6.2	6.6	7.2	-	7.6	8.0	8.6	-	9.1	9.6	10.2	-	10.4	10.9	11.6	-	11.7	12.3	13.0	-	
	HI PR	258	277	293	-	289	311	329	-	329	354	374	-	375	403	426	-	421	453	479	-	
	LO PR	107	114	124	-	113	120	131	-	118	125	137	-	124	131	144	-	130	138	150	-	
	MBh	55.2	57.2	62.7	-	53.9	55.9	61.2	-	52.6	54.5	59.7	-	51.3	53.2	58.3	-	48.8	50.5	55.4	-	
	S/T	0.70	0.58	0.40	-	0.72	0.60	0.42	-	0.74	0.62	0.43	-	0.76	0.64	0.44	-	0.79	0.66	0.46	-	
75	MBh	50.9	52.8	57.8	-	49.7	51.6	56.5	-	48.6	50.3	55.1	-	47.4	49.1	53.8	-	45.0	46.7	51.1	-	
	S/T	0.67	0.56	0.39	-	0.70	0.58	0.40	-	0.71	0.60	0.41	-	0.74	0.62	0.43	-	0.76	0.64	0.44	-	
	ΔT	19	17	13	-	19	17	13	-	19	17	13	-	20	17	13	-	20	17	13	-	
	kW	3.94	4.02	4.15	-	4.25	4.34	4.48	-	4.52	4.62	4.78	-	4.76	4.87	5.04	-	4.97	5.08	5.26	-	
	Amps	5.7	6.0	6.6	-	6.9	7.3	7.9	-	8.4	8.9	9.5	-	9.7	10.2	10.8	-	10.9	11.5	12.2	-	
	HI PR	247	266	281	-	278	299	316	-	316	340	359	-	360	387	409	-	405	435	460	-	
	LO PR	103	109	120	-	109	116	126	-	113	120	131	-	119	126	138	-	124	132	144	-	
	MBh	57.8	59.5	64.4	69.1	56.5	58.1	62.9	67.5	55.1	56.7	61.4	65.9	53.8	55.4	59.9	64.3	51.1	52.6	56.9	61.1	
	S/T	0.83	0.74	0.56	0.4	0.86	0.77	0.58	0.4	0.88	0.79	0.60	0.4	0.91	0.81	0.62	0.4	0.94	0.85	0.64	0.4	
75	MBh	51.8	53.3	57.7	67.1	54.8	56.4	61.1	65.6	53.5	55.1	59.6	64.0	52.2	53.7	58.2	62.4	49.6	51.1	55.3	59.3	
	S/T	0.79	0.71	0.54	0.3	0.82	0.73	0.56	0.4	0.84	0.75	0.57	0.4	0.87	0.78	0.59	0.4	0.90	0.81	0.61	0.4	
	ΔT	22	20	17	11	22	21	17	12	22	21	17	12	23	21	17	12	22	20	17	12	
	kW	4.07	4.16	4.29	4.4	4.39	4.49	4.64	4.8	4.68	4.79	4.95	5.1	4.93	5.04	5.21	5.4	5.15	5.26	5.44	5.6	
	Amps	6.3	6.6	7.2	7.8	7.6	8.0	8.6	9.3	9.1	9.6	10.2	11.0	10.4	10.9	11.6	12.5	11.8	12.3	13.0	13.9	
	HI PR	258	277	293	305.5	289	311	329	342.8	329	354	374	389.8	375	403	426	444.0	421	454	479	499.5	466
	LO PR	107	114	124	132.5	113	120	131	140.0	118	125	137	145.5	124	131	144	152.9	130	138	150	160.2	134
	MBh	50.6	51.8	53.3	57.7	62.0	50.6	52.1	56.4	60.5	49.4	50.8	55.0	59.1	48.2	49.6	53.7	57.6	45.8	47.1	51.0	54.7
	S/T	0.76	0.68	0.52	0.3	0.79	0.71	0.54	0.3	0.81	0.73	0.55	0.4	0.84	0.75	0.57	0.4	0.87	0.78	0.59	0.4	0.91
75	MBh	51.8	53.3	57.7	62.0	50.6	52.1	56.4	60.5	49.4	50.8	55.0	59.1	48.2	49.6	53.7	57.6	45.8	47.1	51.0	54.7	
	S/T	0.72	0.61	0.46	0.2	0.73	0.64	0.49	0.3	0.75	0.66	0.51	0.3	0.77	0.68	0.53	0.3	0.79	0.70	0.55	0.3	0.82
	ΔT	22	21	17	12	23	21	17	12	23	21	17	12	23	21	17	12	23	21	17	12	21
	kW	3.97	4.06	4.19	4.3	4.28	4.38	4.52	4.7	4.56	4.66	4.82	5.0	4.81	4.91	5.08	5.3	5.01	5.13	5.30	5.5	5.19
	Amps	5.8	6.2	6.7	7.3	7.1	7.5	8.1	8.8	8.6	9.0	9.7	10.4	9.9	10.4	11.0	11.8	11.1	11.7	12.4	13.3	12.4
	HI PR	250	269	284	296.3	281	302	319	332.5	319	343	363	378.1	363	413	430.7	409	440	465	484.5	452	486
	LO PR	104	111	121	128.6	110	117	128	135.8	114	121	133	141.2	120	128	139	148.3	126	134	146	155.4	130
	MBh	51.8	53.3	57.7	62.0	50.6	52.1	56.4	60.5	49.4	50.8	55.0	59.1	48.2	49.6	53.7	57.6	45.8	47.1	51.0	54.7	42.4
	S/T	0.76	0.68	0.52	0.3	0.79	0.71	0.54	0.3	0.81	0.73	0.55	0.4	0.84	0.75	0.57	0.4	0.87	0.78	0.59	0.4	0.91

IDB: Entering Indoor Dry Bulb Temperature
High and low pressures are measured at the liquid and suction access fittings

Shaded area reflects ACCA (TVA) conditions

IDB: Entering Indoor Dry Bulb Temperature
High and low pressures are measured at the liquid and suction access fittings

Amps = Unit amps (Comp.+Evaporator + Condenser fan motors)

kW = Total system power

EXPANDED COOLING DATA — DP14H60M43A* (CONT.)

IDB	AIRFLOW	Outdoor Ambient Temperature														115°F								
		65°F							75°F							85°F				95°F				
		59	63	67	71	59	63	67	71	59	63	67	71	59	63	67	71	59	63	67	71			
80	MBh	58.8	60.1	64.2	68.7	57.5	58.7	62.7	67.1	56.1	57.3	61.2	65.5	54.7	55.9	59.7	63.9	52.0	53.1	56.8	60.7			
	S/T	0.91	0.85	0.69	0.5	0.94	0.88	0.72	0.5	0.97	0.91	0.74	0.6	1.00	0.94	0.76	0.6	1.00	1.00	0.79	0.6	0.80		
	ΔT	24	23	20	16	24	23	20	16	24	23	20	16	24	23	20	16	23	20	16	21	22		
	kW	4.14	4.23	4.37	4.5	4.47	4.57	4.72	4.9	4.76	4.87	5.03	5.2	5.02	5.13	5.31	5.5	5.24	5.36	5.54	5.7	5.42		
	Amps	6.5	6.9	7.5	8.2	7.9	8.3	8.9	9.7	9.5	9.9	10.6	11.4	10.8	11.3	12.0	12.9	12.2	12.7	13.5	14.4	13.5		
	HIPR	263	283	299	311.6	295	318	335	349.7	336	361	381	397.7	382	411	434	453.0	430	463	489	509.6	475	511	
	LOPR	109	116	127	135.2	116	123	134	142.9	120	128	139	148.5	126	134	146	156.0	132	141	153	163.5	137	145	
	MBh	57.1	58.4	62.4	66.7	55.8	57.0	60.9	65.1	54.5	55.6	59.5	63.6	53.1	54.3	58.0	62.0	50.5	51.6	55.1	58.9	46.8	47.8	
160	S/T	0.87	0.81	0.66	0.5	0.90	0.84	0.69	0.5	0.92	0.87	0.70	0.5	0.95	0.89	0.73	0.5	0.99	0.93	0.75	0.6	0.76		
	ΔT	25	24	21	16	25	24	21	17	25	24	21	17	25	24	21	17	25	24	21	17	23	22	
	kW	4.10	4.19	4.33	4.5	4.43	4.53	4.68	4.8	4.72	4.83	4.99	5.2	4.97	5.09	5.26	5.4	5.19	5.31	5.49	5.7	5.38	5.50	
	Amps	6.4	6.8	7.3	8.0	7.7	8.2	8.8	9.5	9.3	9.8	10.4	11.2	10.6	11.1	11.8	12.7	12.0	12.5	13.3	14.2	13.3	13.9	
	HIPR	260	280	296	308.6	292	314	332	346.2	332	358	378	393.8	378	407	430	448.5	426	458	484	504.6	470	506	534
	LOPR	108	115	126	133.9	114	122	133	141.5	119	126	138	147.0	125	133	145	154.4	131	139	152	161.8	135	144	157
	MBh	52.7	53.9	57.5	61.5	51.5	52.6	56.2	60.1	50.3	51.4	54.9	58.7	49.0	50.1	53.5	57.2	46.6	47.6	50.9	54.4	43.2	44.1	50.4
	S/T	0.84	0.79	0.64	0.5	0.87	0.81	0.66	0.5	0.89	0.83	0.68	0.5	0.92	0.86	0.70	0.5	0.95	0.89	0.73	0.5	0.90	0.73	
240	ΔT	25	24	21	17	25	24	21	17	25	24	21	17	26	24	21	17	25	24	21	17	24	23	
	kW	4.00	4.09	4.22	4.4	4.32	4.42	4.56	4.7	4.60	4.70	4.86	5.0	4.85	4.96	5.12	5.3	5.06	5.17	5.35	5.5	5.24	5.36	
	Amps	6.0	6.3	6.9	7.5	7.3	7.7	8.3	8.9	8.8	9.2	9.9	10.6	10.0	10.5	11.2	12.0	11.3	11.9	12.6	13.2	14.0	14.9	
	HIPR	253	272	287	299.3	283	305	322	335.8	322	347	366	382.0	367	395	417	435.0	413	444	469	489.4	456	491	518
	LOPR	105	112	122	129.9	111	118	129	137.2	115	123	134	142.6	121	129	141	149.8	127	135	147	157.0	131	140	152
	MBh	59.9	61.0	63.9	68.2	58.5	59.6	62.4	66.6	57.1	58.2	60.9	65.0	55.7	56.8	59.4	63.4	52.9	53.9	56.5	60.2	49.0	49.9	55.8
	S/T	0.95	0.92	0.83	0.7	0.99	0.95	0.86	0.7	1.00	0.98	0.88	0.7	1.00	0.91	0.7	1.00	0.95	0.8	1.00	1.00	0.95	0.8	
	ΔT	25	25	23	20	26	25	24	21	25	25	24	21	25	24	21	25	23	24	24	20	22	22	
320	kW	4.17	4.26	4.40	4.6	4.51	4.61	4.76	4.9	4.80	4.91	5.07	5.2	5.06	5.18	5.35	5.5	5.28	5.40	5.59	5.8	5.47	5.60	
	Amps	6.7	7.1	7.7	8.3	8.1	8.5	9.1	9.8	9.6	10.1	10.8	11.6	11.0	11.5	12.2	13.1	12.4	12.9	13.7	14.6	13.7	14.3	
	HIPR	266	286	302	314.8	298	321	339	353.2	339	365	385	401.7	386	415	439	457.5	434	467	493	514.7	480	516	545
	LOPR	110	117	128	136.6	117	124	135	144.3	121	129	141	150.0	127	135	148	157.5	133	142	155	165.1	138	147	160
	MBh	58.1	59.2	62.0	66.2	56.8	57.9	60.6	64.6	55.4	56.5	59.2	63.1	54.1	55.1	57.7	61.6	51.4	52.3	54.8	58.5	47.6	48.5	54.2
	S/T	0.91	0.88	0.79	0.6	0.94	0.91	0.82	0.7	0.97	0.93	0.84	0.7	1.00	0.96	0.87	0.7	1.00	0.90	0.7	1.00	1.00	0.91	
	ΔT	26	26	24	21	27	26	25	21	27	26	25	21	27	26	25	22	26	25	21	24	24	23	
	kW	4.14	4.23	4.37	4.5	4.47	4.57	4.72	4.9	4.76	4.87	5.03	5.2	5.02	5.13	5.31	5.5	5.24	5.36	5.54	5.7	5.42	5.55	
400	Amps	6.5	6.9	7.5	8.2	7.9	8.3	8.9	9.7	9.5	9.9	10.6	11.4	10.8	11.3	12.0	12.9	12.2	12.7	13.5	14.4	13.5	14.9	
	HIPR	263	283	299	311.6	295	318	335	349.7	336	361	381	397.7	382	411	434	453.0	430	463	489	509.6	475	511	540
	LOPR	109	116	127	135.2	116	123	134	142.9	120	128	139	148.5	126	134	146	156.0	132	141	153	163.5	137	145	169.1
	MBh	53.6	54.7	57.3	61.1	52.4	53.4	55.9	59.7	51.1	52.1	54.6	58.2	49.9	50.9	53.3	56.8	47.4	48.3	50.6	54.0	43.9	44.8	50.0
	S/T	0.88	0.85	0.76	0.6	0.91	0.88	0.79	0.6	0.93	0.90	0.81	0.7	0.96	0.93	0.84	0.7	1.00	0.96	0.87	0.7	1.00	0.97	
	ΔT	27	26	25	21	27	25	22	27	25	22	27	25	22	27	25	22	27	26	25	22	25	23	
	kW	4.04	4.12	4.26	4.4	4.36	4.45	4.60	4.8	4.64	4.74	4.90	5.1	4.89	5.0	5.17	5.3	5.10	5.22	5.39	5.6	5.28	5.41	
	Amps	6.1	6.5	7.0	7.7	7.4	7.8	8.4	9.1	8.9	9.4	10.0	10.8	10.2	11.4	12.2	11.5	12.1	12.8	13.7	12.8	13.4	14.2	
480	HIPR	255	274	290	302.3	286	308	325	339.2	325	350	370	385.8	371	399	421	439.4	417	449	474	494.3	461	496	524
	LOPR	106	113	123	131.2	112	119	130	138.6	116	124	135	144.0	122	130	142	151.3	128	136	149	158.6	133	141	154
	MBh	53.6	54.7	57.3	61.1	52.4	53.4	55.9	59.7	51.1	52.1	54.6	58.2	49.9	50.9	53.3	56.8	47.4	48.3	50.6	54.0	43.9	44.8	50.0
	S/T	0.88	0.85	0.76	0.6	0.91	0.88	0.79	0.6	0.93	0.90	0.81	0.7	0.96	0.93	0.84	0.7	1.00	0.96	0.87	0.7	1.00	0.97	
	ΔT	27	26	25	21	27	25	22	27	25	22	27	25	22	27	25	22	27	26	25	22	25	23	
	kW	4.04	4.12	4.26	4.4	4.36	4.45	4.60	4.8	4.64	4.74	4.90	5.1	4.89	5.0	5.17	5.3	5.10	5.22	5.39	5.6	5.28	5.41	
	Amps	6.1	6.5	7.0	7.7	7.4	7.8	8.4	9.1	8.9	9.4	10.0	10.8	10.2	11.4	12.2	11.5	12.1	12.8	13.7	12.8	13.4	14.2	
	LOPR	106	113	123	131.2	112	119	130	138.6	116	124	135	144.0	122	130	142	151.3	128	136	149	158.6	133	141	

EXPANDED HEATING DATA

DP14HM3643A**

	OUTDOOR AMBIENT TEMPERATURE																	
	65	60	55	50	47	45	40	35	30	25	20	17	15	10	5	0	-5	-10
MBh	41.7	39.5	37.2	34.8	33.2	32.2	29.9	27.6	23.7	21.9	20.1	19.0	18.3	16.4	14.6	12.7	10.8	8.9
T/R	32.2	30.5	28.7	26.8	25.6	24.8	23.1	21.3	18.3	16.9	15.5	14.7	14.1	12.7	11.2	9.8	8.4	6.8
kW	2.76	2.71	2.66	2.60	2.57	2.55	2.49	2.44	2.53	2.47	2.41	2.38	2.36	2.30	2.24	2.18	2.13	2.07
Amps	7.0	6.6	6.4	6.1	6.0	5.9	5.7	5.5	5.4	5.2	5.1	5.0	5.0	4.9	4.7	4.5	4.4	4.2
COP	4.42	4.27	4.10	3.91	3.78	3.70	3.51	3.30	2.74	2.59	2.44	2.34	2.27	2.09	1.90	1.70	1.49	1.26
HI PR	391	375	361	345	337	330	318	305	292	279	268	261	257	247	237	228	220	212
LO PR	134	125	117	107	101	97	90	80	72	64	57	53	51	43	37	31	27	21

Above information is for nominal CFM and 70 degree indoor dry bulb. Instantaneous capacity listed.

High pressure is measured at the liquid line access fitting.

Amps Unit amps (comp.+ evaporator motor + condenser fan motor)

Low pressure is measured at the compressor suction access fitting.

DP14HM4843A*

	OUTDOOR AMBIENT TEMPERATURE																	
	65	60	55	50	47	45	40	35	30	25	20	17	15	10	5	0	-5	-10
MBh	57.3	54.3	51.1	47.7	45.6	44.2	41.0	37.8	33.0	30.5	28.1	26.5	25.5	22.9	20.3	17.7	15.1	12.4
T/R	33.2	31.4	29.6	27.6	26.4	25.6	23.8	21.9	19.1	17.6	16.2	15.3	14.8	13.3	11.7	10.2	8.7	7.2
kW	3.87	3.79	3.71	3.64	3.59	3.56	3.49	3.41	3.41	3.33	3.25	3.21	3.18	3.10	3.02	2.94	2.86	2.79
Amps	19.0	17.7	16.7	15.8	15.3	15.0	14.2	13.6	13.1	12.5	12.0	11.8	11.6	11.1	10.5	10.0	9.3	8.5
COP	4.34	4.19	4.02	3.84	3.71	3.63	3.44	3.25	2.84	2.68	2.53	2.42	2.35	2.16	1.97	1.76	1.54	1.30
HI PR	387	371	356	341	333	326	314	301	289	276	265	258	254	244	235	225	217	209
LO PR	129	120	112	103	97	93	86	77	69	62	54	50	49	41	35	30	26	21

DP14HM6043A*

	OUTDOOR AMBIENT TEMPERATURE																	
	65	60	55	50	47	45	40	35	30	25	20	17	15	10	5	0	-5	-10
MBh	71.6	67.8	63.8	59.7	57.0	55.2	51.3	47.3	39.1	36.1	33.3	31.4	30.2	27.1	24.1	21.0	17.9	14.7
T/R	35.9	33.9	32.0	29.9	28.5	27.6	25.7	23.7	19.6	18.1	16.6	15.7	15.1	13.6	12.0	10.5	9.0	7.3
kW	5.06	4.96	4.85	4.75	4.69	4.65	4.55	4.44	4.10	4.00	3.91	3.85	3.81	3.72	3.62	3.53	3.43	3.34
Amps	30.1	27.1	24.6	22.5	21.2	20.6	18.8	17.3	16.0	14.8	13.6	13.0	12.7	11.4	9.9	8.7	7.2	5.3
COP	4.15	4.01	3.85	3.68	3.56	3.48	3.30	3.12	2.79	2.64	2.49	2.39	2.32	2.14	1.94	1.74	1.53	1.29
HI PR	426	409	393	376	367	360	346	332	318	304	292	285	280	269	259	248	239	231
LO PR	126	117	110	101	95	92	84	75	68	61	53	49	48	40	35	29	26	20

Above information is for nominal CFM and 70 degree indoor dry bulb. Instantaneous capacity listed.

High pressure is measured at the liquid line access fitting.

Amps Unit amps (comp.+ evaporator motor + condenser fan motor)

Low pressure is measured at the compressor suction access fitting.

DP14HM3643*

	MOTOR SPEED	VOLTS		STATIC								
				0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9
Horizontal Position	T1	230	CFM Watts	846 74	762 83	716 94	585 98	519 108	---	---	---	---
	T2 / T3	230	CFM Watts	1278 221	1214 218	1182 232	1129 245	1072 253	1013 264	950 265	853 275	788 272
	T4 / T5	230	CFM Watts	1604 396	1560 402	1507 408	1468 424	1415 426	1364 423	1321 444	1276 454	1218 454
Downshot Position	T1	230	CFM Watts	809 73	730 85	623 92	542 98	485 107	441 112	---	---	---
	T2 / T3	230	CFM Watts	1284 220	1223 227	1175 241	1097 247	1031 255	974 262	871 272	804 277	761 285
	T4 / T5	230	CFM Watts	1578 401	1539 409	1498 421	1452 425	1396 438	1332 439	1279 452	1224 453	1161 455

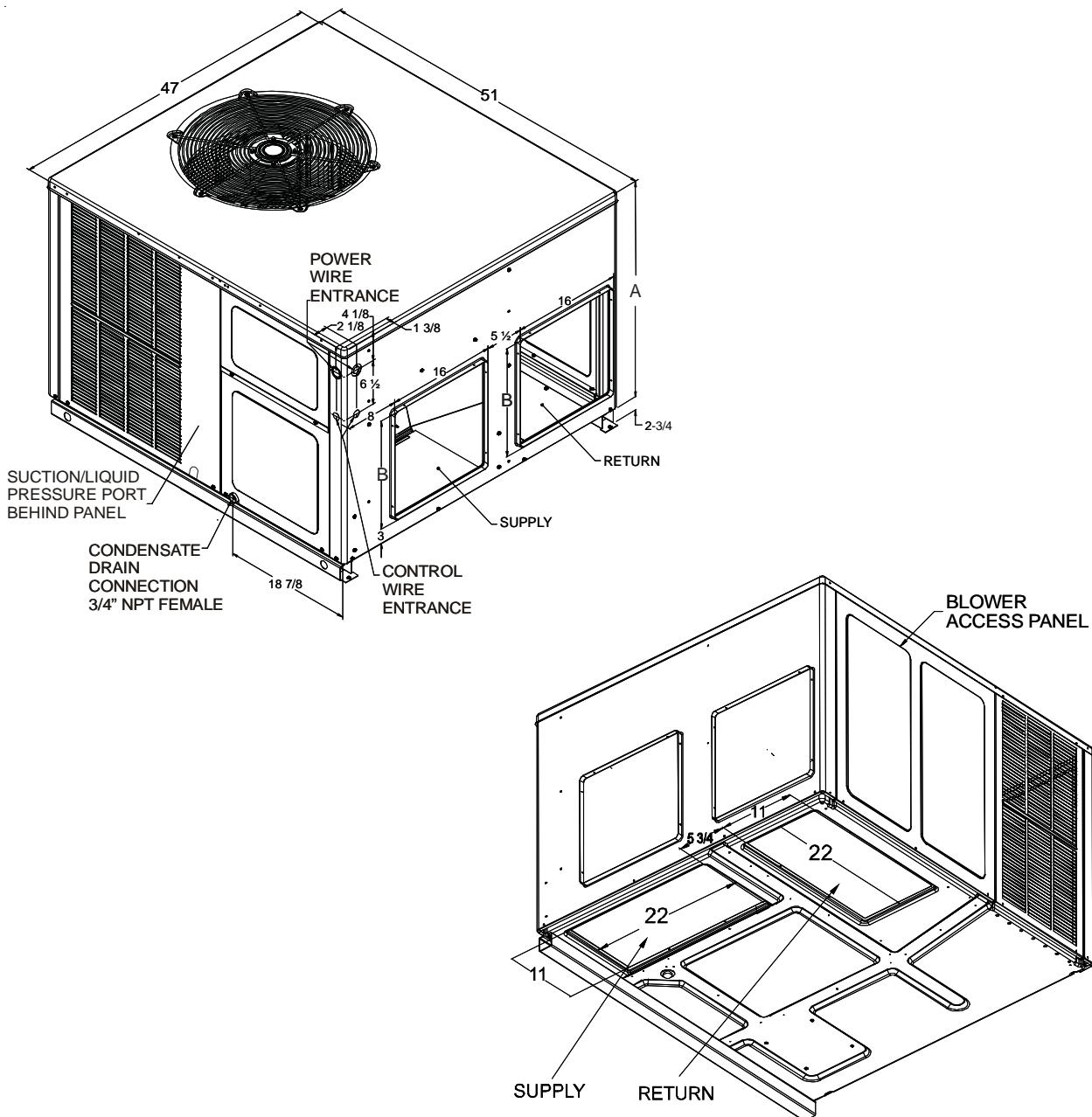
DP14HM4843*

	MOTOR SPEED	VOLTS		STATIC								
				0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9
Horizontal Position	T1	230	CFM Watts	1167 139	1101 144	1045 156	992 165	939 177	870 193	802 203	732 217	681 223
	T2 / T3	230	CFM Watts	1723 372	1637 370	1598 381	1554 390	1509 404	1467 411	1420 420	1361 427	1295 441
	T4 / T5	230	CFM Watts	2012 578	1965 593	1912 599	1871 606	1809 610	1770 627	1741 626	1691 634	1635 638
Downshot Position	T1	230	CFM Watts	1155 153	1074 156	1023 169	969 180	896 195	805 205	755 216	667 226	626 230
	T2 / T3	230	CFM Watts	1670 383	1596 392	1558 399	1484 408	1467 419	1383 434	1339 436	1259 447	1168 449
	T4 / T5	230	CFM Watts	1949 603	1881 607	1853 608	1792 616	1753 622	1699 626	1621 648	1561 650	1522 645

DP14HM6043*

	SPEED	VOLTS		STATIC								
				0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9
Horizontal Position	T1	230	CFM Watts	1427 222	1370 229	1317 237	1273 256	1204 256	1165 276	1111 291	1058 299	1003 320
	T2 / T3	230	CFM Watts	1935 498	1885 512	1848 515	1809 520	1755 541	1705 549	1659 559	1616 567	1567 569
	T4 / T5	230	CFM Watts	2232 805	2188 795	2144 790	2087 827	2035 830	2017 842	1963 864	1926 864	1869 848
Downshot Position	T1	230	CFM Watts	1347 242	1293 251	1236 268	1184 276	1117 290	1054 305	996 321	934 330	871 348
	T2 / T3	230	CFM Watts	1827 529	1780 538	1739 548	1683 557	1633 557	1588 576	1518 578	1462 604	1404 601
	T4 / T5	230	CFM Watts	2111 835	2057 843	2030 846	1979 852	1947 870	1957 959	1922 956	1868 960	1818 966

DIMENSIONS

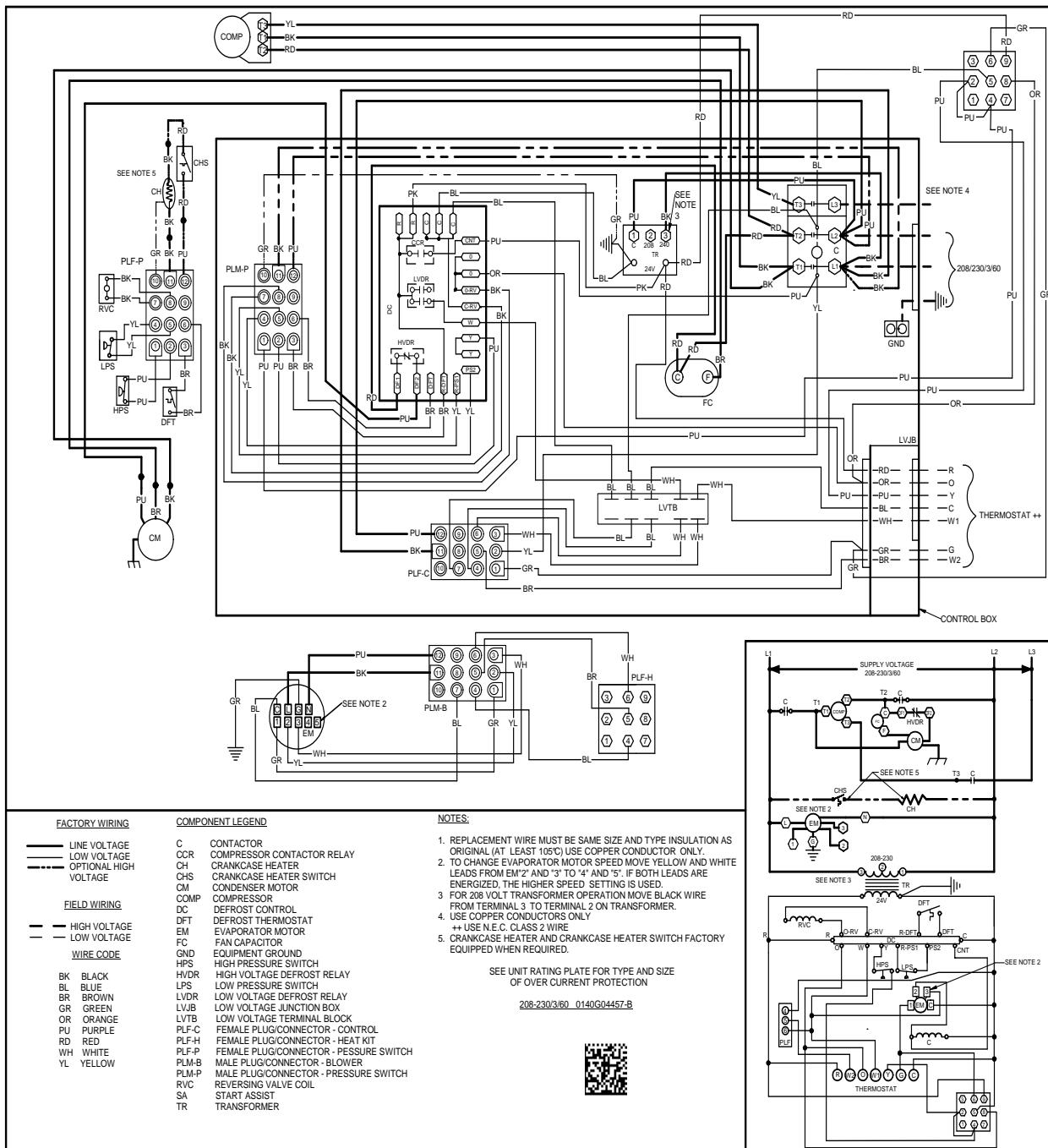


DIMENSIONS

MODEL	W"	D"	H"	B	A
DP14HM3643	47	51	34 1/4	16"	32"
DP14HM4843	47	51	42 3/4	18"	40"
DP14HM6043	47	51	42 3/4	18"	40"

FILTERS

MODEL	DIMENSIONS	QTY.
DP14HMMFR102 (for medium models)	16" x 25" x 2"	1
DP14HMMFR103 (for large models)	20" x 25" x 2"	2



Wiring is subject to change. Always refer to the wiring diagram on the unit for the most up-to-date wiring.

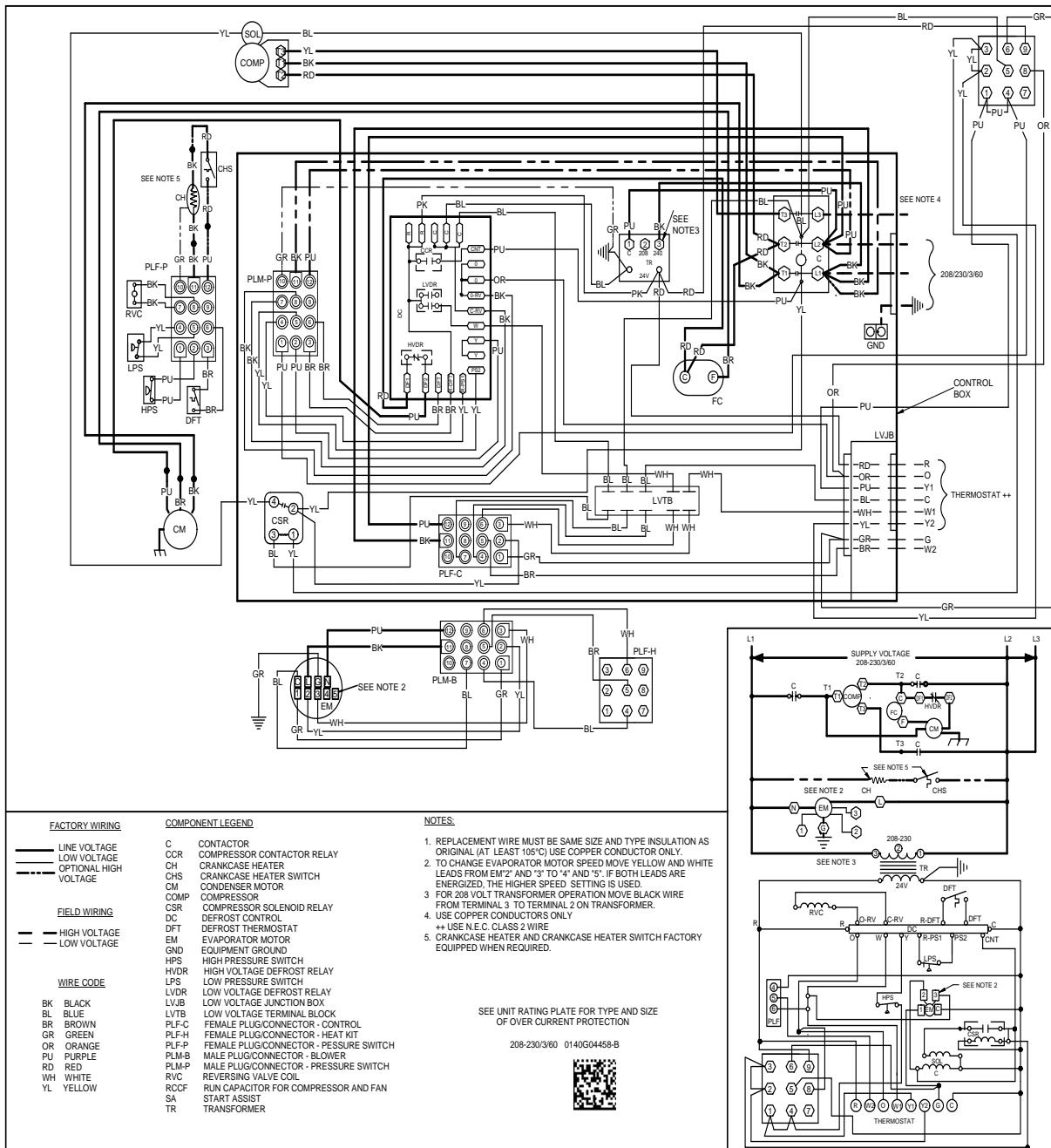


WARNING

High Voltage: Disconnect all power before servicing or installing this unit. Multiple power sources may be present. Failure to do so may cause property damage, personal injury, or death.



WIRED DIAGRAM – DP14HM6043



Wiring is subject to change. Always refer to the wiring diagram on the unit for the most up-to-date wiring.



High Voltage: Disconnect all power before servicing or installing this unit. Multiple power sources may be present. Failure to do so may cause property damage, personal injury, or death.

ITEM	DESCRIPTION	FITS CHASSIS SIZE
20464501NGK	Horizontal Duct Cover	Medium
20464502NGK	Horizontal Duct Cover	Large
CDK36	Concentric Kit	Medium
CDK4872	Concentric Kit	Large
DDNECNJPCHMM	Downflow Economizer	Medium
DDNECNJPCHML	Downflow Economizer	Large
DDNIFRPCHMM	Downflow Internal Filter Rack	Medium
DDNIFRPCHML	Downflow Internal Filter Rack	Large
DHZECNJPCHM	Horizontal Economizer	Medium
DHZECNJPCHCL	Horizontal Economizer	Large
DPHFRA	External Horizontal Filter Rack	All Sizes
DDN25FDPGCHMM	25% Manual Downflow Fresh Air Damper	Medium
DDN25FDPGCHML	25% Manual Downflow Fresh Air Damper	Large
DHZ25FDPGCHMM	25% Manual Horizontal Fresh Air Damper	Medium
DHZ25FDPGCHML	25% Manual Horizontal Fresh Air Damper	Large
DDN25MFDPGCHMM	25% Motorized Downflow Fresh Air Damper	Medium
DDN25MFDPGCHML	25% Motorized Downflow Fresh Air Damper	Large
DHZ25MFDPGCHMM	25% Motorized Horizontal Fresh Air Damper	Medium
DHZ25MFDPGCHML	25% Motorized Horizontal Fresh Air Damper	Large
OT/EHR18-60	Outdoor Thermostat & Emergency Heat Relay Kit	All Sizes
OT18-60A	Outdoor Thermostat Kit w/ Lockout Stat	All Sizes
D14CRBPGCHMA	Roof Curb	All Sizes
SQRPG101/102	Square-to-Round Adapter w/16" Round for Downflow Application	Medium
SQRPG103	Square-to-Round Adapter w/18" Round for Downflow Application	Large
SQRPGH101/102	Square-to-Round Adapter w/16" Round for Horizontal Application	Medium
SQRPGH103	Square-to-Round Adapter w/18" Round for Horizontal Application	Large

NOTES

Our continuing commitment to quality products may mean a change in specifications without notice.
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N4A4S
Single-Stage Air Conditioner
with R-410A Refrigerant
1-1/2 To 5 Tons

KeepRite®

Product Specifications



This unit has designed utilizing R-410A refrigerant. The environmentally sound refrigerant allows you to make a responsible decision in the protection of the earth's ozone layer.

NOTE: Ratings contained in this document are subject to change at any time. Always refer to the AHRI directory (www.ahridirectory.org) for the most up-to-date ratings information.

Features / Benefits

Efficiency

- 13.4 - 16.0 SEER2 (13.5 - 16.5 SEER) / 11.0 – 13.5 EER2 (11.0 - 14.5 EER)
- Indoor air quality accessories available

Reliability

- R-410A refrigerant - environmentally sound, won't deplete the ozone layer and low lifetime service cost.
- Scroll compressor
- Internal pressure relief valve
- Internal thermal overload
- Filter drier

Durability

Protection Package:

- Solid, durable sheet metal construction
- Dense wire coil guard

Applications

- Long-line – up to 250 feet (76.20 m) total equivalent length, up to 200 feet (60.96 m) condenser above evaporator, or up to 80 ft. (24.4 m) evaporator above condenser (See Long Line Guide for more information.)
- Low ambient cooling (down to 0°F / -18°C) with approved low ambient accessory kits.

STANDARD FEATURES

Features	18	24	30	36	42	48	60
R-410A Refrigerant	X	X	X	X	X	X	X
SEER2 (Range depending on indoor combination)	13.4 - 16.0	13.4 - 16.0	13.4 - 16.0	13.4 - 15.0	13.4 - 15.5	13.4 - 15.2	13.4 - 14.0
Scroll Compressor	X	X	X	X	X	X	X
Field Installed Filter Drier	X	X	X	X	X	X	X
Front Seating Service Valves	X	X	X	X	X	X	X
Internal Pressure Relief Valve	X	X	X	X	X	X	X
Internal Thermal Overload	X	X	X	X	X	X	X
Long Line Capability	X	X	X	X	X	X	X
Low Ambient Capability with Kit	X	X	X	X	X	X	X

MODEL NUMBER NOMENCLATURE

N	4	A	4	S	18	A	K	A	N	A
Brand N = Builder	Refrigerant 4 = R-410A	Type A = AC	SEER2 4 = 13.4 SEER2	OD Design Type S= Single Stage	Nominal Capacity 18 = 1-1/2 Tons 24 = 2 Tons 30 = 2-1/2 Tons 36 = 3 Tons 42 = 3-1/2 Tons 48 = 4 Tons 60 = 5 Tons	Feature A = Standard	Voltage K = 208/230-60-1	Special Feature A = Standard	Region N= Standard North AC	Major Series A = Initial

CATALOG ORDERING NUMBERS

Size	Model Number
18	N4A4S18AKANA
24	N4A4S24AKANA
30	N4A4S30AKANA
36	N4A4S36AKANA
42	N4A4S42AKANA
48	N4A4S48AKANA
60	N4A4S60AKANA



Use of the AHRI Certified TM Mark indicates a manufacturer's participation in the program. For verification of certification for individual products, go to www.ahridirectory.org.



Quality
ISO 9001
SAI GLOBAL



Physical Data

UNIT SIZE	18	24	30	36	42	48	60
Compressor Type				Scroll			
REFRIGERANT				R-410A			
Control				TXV (Puron Hard Shutoff)			
Factory Charge lb (kg)*	3.50 (1.59)†	4.00 (1.81)†	6.00 (2.72)	5.20 (2.36)	7.90 (3.58)	8.90 (4.04)	9.10 (4.13)
COND FAN				Propeller Type, Direct Drive			
Air Discharge				Vertical			
Air Qty (CFM)	1600	1800	2500	2750	4100	3850	4000
Motor HP	1/12	1/12	1/10	1/5	1/4	1/4	1/4
Motor RPM	1100	1100	1100	1100	1100	1100	1100
COND COIL							
Face Area (Sq ft)	8.4	9.8	17.1	12.9	23.6	15.0	19.3
Fins per In.	25	25	25	20	25	20	20
Rows	1	1	1	1	1	2	2
Circuits	3	5	4	5	7	6	9
VALVE CONNECT. (In. ID)							
Vapor	3/4	3/4	3/4	7/8	7/8	7/8	7/8
Liquid				3/8"			
REFRIGERANT TUBES* (In. OD)							
Rated Vapor‡	3/4	3/4	3/4	7/8	7/8	7/8	1-1/8
Rated Liquid Line**				3/8"			

*For 15 ft. lineset

†To reach 15 ft. of line set, add 18 oz for the 18 size and 6 oz for the 24 size. Adjust per installation instructions. Refrigerant charge also varies with indoor unit; refer to refrigerant charge label.

‡Units are rated with 25 ft (7.6 m) of lineset length. See Vapor Line Sizing and Cooling Capacity Loss table when using other sizes and lengths of lineset.

**See Liquid Line Sizing For Cooling Only Systems with R-410A Refrigerant tables.

Note: See unit Installation Instruction for proper installation.

REFRIGERANT PIPING LENGTH LIMITATIONS

Liquid Line Sizing and Maximum Total Equivalent Lengths for Cooling Only Systems with R-410A Refrigerant:

The maximum allowable length of a residential split system depends on the liquid line diameter and vertical separation between indoor and outdoor units.

See Table below for liquid line sizing and maximum lengths :

Table 1 – Maximum Total Equivalent Length^{*}
Outdoor Unit BELOW Indoor Unit

Size	Liquid Line Connection	Liquid Line Diam. w/ TXV	AC with R-410A Refrigerant Maximum Total Equivalent Length [†] : Outdoor unit BELOW Indoor Vertical Separation ft (m)								
			0-5 (0-1.5)	6-10 (1.8-3.0)	11-20 (3.4-6.1)	21-30 (6.4-9.1)	31-40 (9.4-12.2)	41-50 (12.5-15.2)	51-60 (15.5-18.3)	61-70 (18.6-21.3)	71-80 (21.6-24.4)
18000	3/8	1/4	150	150	125	100	100	75	--	--	--
		5/16	250*	250*	250*	250*	250*	250*	250*	225*	150
		3/8	250*	250*	250*	250*	250*	250*	250*	250*	250*
24000	3/8	1/4	75	75	75	50	50	--	--	--	--
		5/16	250*	250*	250*	250*	250*	225*	175	125	100
		3/8	250*	250*	250*	250*	250*	250*	250*	250*	250*
30000	3/8	1/4	30	--	--	--	--	--	--	--	--
		5/16	175	225*	200	175	125	100	75	--	--
		3/8	250*	250*	250*	250*	250*	250*	250*	250*	250*
36000	3/8	5/16	175	150	150	100	100	100	75	--	--
		3/8	250*	250*	250*	250*	250*	250*	250*	250*	250*
42000	3/8	5/16	125	100	100	75	75	50	--	--	--
		3/8	250*	250*	250*	250*	250*	250*	250*	250*	150
48000	3/8	3/8	250*	250*	250*	250*	250*	250*	250*	230	160
60000	3/8	3/8	250*	250*	250*	225*	190	150	110	--	--

*.Maximum actual length not to exceed 200 ft (61 m)

†.Total equivalent length accounts for losses due to elbows or fitting. See the Long Line Guideline for details.

-- = outside acceptable range

Table 2 – Maximum^{*} Total Equivalent Length
Outdoor Unit ABOVE Indoor Unit

Size	Liquid Line Connection	Liquid Line Diam. w/ TXV	AC with R-410A Refrigerant Maximum Total Equivalent Length [†] : Outdoor unit ABOVE Indoor Vertical Separation ft (m)							
			25 (7.6)	26-50 (7.9-15.2)	51-75 (15.5-22.9)	76-100 (23.2-30.5)	101-125 (30.8-38.1)	126-150 (38.4-45.7)	151-175 (46.0-53.3)	176-200 (53.6-61.0)
18000	3/8	1/4	175	250*	250*	250*	250*	250*	250*	250*
		5/16	250*	250*	250*	250*	250*	250*	250*	250*
		3/8	250*	250*	250*	250*	250*	250*	250*	250*
24000	3/8	1/4	100	125	175	200	225*	250*	250*	250*
		5/16	250*	250*	250*	250*	250*	250*	250*	250*
		3/8	250*	250*	250*	250*	250*	250*	250*	250*
30000	3/8	1/4	30	--	--	--	--	--	--	--
		5/16	250*	250*	250*	250*	250*	250*	250*	250*
		3/8	250*	250*	250*	250*	250*	250*	250*	250*
36000	3/8	5/16	225*	250*	250*	250*	250*	250*	250*	250*
		3/8	250*	250*	250*	250*	250*	250*	250*	250*
42000	3/8	5/16	175	200	250*	250*	250*	250*	250*	250*
		3/8	250*	250*	250*	250*	250*	250*	250*	250*
48000	3/8	3/8	250*	250*	250*	250*	250*	250*	250*	250*
60000	3/8	3/8	250*	250*	250*	250*	250*	250*	250*	250*

*.Maximum actual length not to exceed 200 ft (61 m)

†.Total equivalent length accounts for losses due to elbows or fitting. See the Long Line Guideline for details.

-- = Outside acceptable range

Table 3 – Refrigerant Charge Adjustments

Liquid Line Size	R-410A Charge oz/ft (g/m)
3/8	0.60 (17.74) (Factory charge for lineset = 9 oz / 266.16 g)
5/16	0.40 (11.83)
1/4	0.27 (7.98)

Units are factory charged for 15 ft (4.6 m) of 3/8" liquid line. The factory charge for 3/8" lineset 9 oz.(266.16 g). When using other length or diameter liquid lines, charge adjustments are required per the chart above.

Charging Formula:

$[(\text{Lineset oz/ft} \times \text{total length}) - (\text{factory charge for lineset})] = \text{charge adjustment}$

Example 1: System has 15 ft of lineset* using existing 1/4" liquid line. What charge adjustment is required?

Formula: (.27 oz/ft X 15ft) – (9 oz) = (-4.95) oz.

Net result is to remove 4.95 oz of refrigerant from the system

Example 2: System has 45 ft of existing 5/16" liquid line. What is the charge adjustment?

Formula: (.40 oz/ft. X 45ft) – (9 oz.) = 9 oz.

Net result is to add 9 oz of refrigerant to the system

NOTE: Conditions must be favorable for charging by subcooling method. Indoor temperature must be 70°F to 80°F (21°C to 27°C), and outdoor temperature must be 70°F to 100°F (21°C to 38°C). If outside these conditions, adjust charge for long linesets by weigh-in method.

* When applicable. Refer to Physical Data Table in this PD and to the Installation Instructions for more information.

Long Line Applications

An application is considered Long Line, when the refrigerant level in the system requires the use of accessories to maintain acceptable refrigerant management for systems reliability. See Accessory Usage Guideline table for required accessories. Defining a system as long line depends on the liquid line diameter, actual length of the tubing, and vertical separation between the indoor and outdoor units.

For Air Conditioner systems, the chart below shows when an application is considered Long Line.

Table 4 – AC with R-410A Refrigerant Long Line Description ft (m) Beyond these lengths, a TXV is required

Total Length	Outdoor Unit Above or Below Indoor Unit
TXV required beyond 50 ft. (15.2 m)	TXV required beyond 20 ft. (6.1 m)

Table 5 – AC with R-410A Refrigerant Long Line Description ft (m) (Beyond these lengths, long line accessories are required)

Liquid Line Size	Units On Same Level	Outdoor Below Indoor	Outdoor Above Indoor
1/4 + TXV	No accessories needed within allowed lengths	No accessories needed within allowed lengths	175 (53.3)
5/16 + TXV	120 (36.6)	50 (15.2) vertical or 120 (36.6) total	120 (36.6)
3/8 + TXV	80 (24.4)	35 (10.7) vertical or 80 (24.4) total	80 (24.4)

Note: See Residential Piping and Long Line Guideline for details

VAPOR LINE SIZING AND COOLING CAPACITY LOSS

Acceptable vapor line diameters provide adequate oil return to the compressor while avoiding excessive capacity loss. The suction line diameters shown in the chart below are acceptable for AC systems with **R-410A** refrigerant:

Table 6 – Vapor Line Sizing and Cooling Capacity Losses — R-410A Refrigerant 1-Stage Air Conditioner Applications

Unit Nominal Size (Btuh)	Maximum Liquid Line Diameters (In. OD)	Vapor Line Diameters (In. OD)	Cooling Capacity Loss (%) Total Equivalent Line Length ft. (m) 1-Stage AC with R-410A								
			26-50 (7.9-15.2)	51-80 (15.5-24.4)	81-100 (24.7-30.5)	101-125 (30.8-38.1)	126-150 (38.4-45.7)	151-175 (46.0-53.3)	176-200 (53.6-61.0)	201-225 (61.3-68.6)	226-250 (68.9-76.2)
18	3/8	1/2	1	2	3	5	6	7	8	9	11
		5/8	0	1	1	1	2	2	2	3	3
		3/4	0	0	0	0	1	1	1	1	1
24	3/8	5/8	0	1	2	2	3	3	4	5	5
		3/4	0	0	1	1	1	1	1	2	2
		7/8	0	0	0	0	0	1	1	1	1
30	3/8	5/8	1	2	3	3	4	5	6	7	8
		3/4	0	0	1	1	1	2	2	2	3
		7/8	0	0	0	0	1	1	1	1	1
36	3/8	5/8	1	2	4	5	6	8	9	10	12
		3/4	0	1	1	2	2	3	3	4	4
		7/8	0	0	0	1	1	1	1	2	2
42	3/8	3/4	0	1	2	2	3	4	4	5	6
		7/8	0	0	1	1	1	2	2	2	3
		1 1/8	0	0	0	0	0	0	0	0	0
48	3/8	3/4	0	1	2	3	4	5	5	6	7
		7/8	0	0	1	1	2	2	2	3	3
		1 1/8	0	0	0	0	0	0	0	1	1
60	3/8	3/4	1	2	4	5	6	7	9	10	11
		7/8	0	1	2	2	3	4	4	5	5
		1 1/8	0	0	0	1	1	1	1	1	1

Applications in this area may be long line and may have height restrictions. See the Residential Piping and Long Line Guideline.

ACCESSORIES

KIT NUMBER	KIT NAME	18	24	30	36	42	48	60
NASA00201FS	FRZ THERM KIT	X	X	X	X	X	X	X
NASA001TD	TIME DELAY KIT (90 second TDR)	X	X	X	X	X	X	X
NASA00201TD	TIME DELAY KIT (30 second TDR)	X	X	X	X	X	X	X
NASA401LA	LOW AMBIENT COOLING KIT	X	X	X	X	X	X	X
NASA012SC	HARD START KIT	X	X	X	X	X	X	X
NASA001AC	CYCLE PROTR KIT	X	X	X	X	X	X	X
NASA00201SF	SPRT FEET KIT	X	X	X	X	X	X	X
NASA401LS	SOL VALVE KIT	X	X	X	X	X	X	X
NASA00201WS	WINTER ST KIT	X	X	X	X	X	X	X
NASA403PS	LOW PRESSURE SW KIT	X	X	X	X	X	X	X
NASA404PS	HIGH PRESSURE SW KIT	X	X	X	X	X	X	X
NASA00601CH	CRKC HTR KIT	X	X	X	X			
NASA00501CH	CRKC HTR KIT					X	X	X
NAEA40501TX	TXV KIT (For use with copper coils)	X	X	X				
NAEA40601TX	TXV KIT (For use with copper coils)				X	X		
NAEA40701TX	TXV KIT (For use with copper coils)						X	X
NAEB40501TX	TXV KIT (For use with aluminum coils)	X	X	X				
NAEB40601TX	TXV KIT (For use with aluminum coils)				X	X		
NAEB40701TX	TXV KIT (For use with aluminum coils)						X	X
NASA00201SJ	SOUND BLKT KIT	X	X	X	X			
NASA00101SJ	SOUND BLKT KIT					X	X	X

X = Accessory

ACCESSORY USAGE GUIDELINE

ACCESSORY	REQUIRED FOR LOW-AMBIENT COOLING APPLICATIONS (Below 55°F/12.8°C)	REQUIRED FOR LONG LINE APPLICATIONS*	REQUIRED FOR SEA COAST APPLICATIONS (Within 2 miles/3.22 km)
Ball Bearing Fan Motor	Standard	Standard	Standard
Compressor Start Assist Capacitor and Relay	Yes	Yes	No
Crankcase Heater	Yes	Yes	No
Evaporator Freeze Thermostat	Yes	No	No
Hard Shut-Off TXV	Yes	Yes	No
Liquid Line Solenoid Valve	No	See Long Line Guideline	No
Low-ambient Pressure Switch	Yes	No	No
Support Feet	Recommended	No	Recommended
Winter Start Control	Yes [†]	No	No

*.For tubing set lengths between 80 and 200 ft. (24 and 61 m) horizontal or 35 ft. (10.7 m) vertical differential (total equivalent length), refer to the Residential Split-System Long Line Application Guideline.

†.Required if Low Pressure Switch is factory or field installed.

Accessory Description and Usage (Listed Alphabetically)

1. Ball-Bearing Fan Motor

A fan motor with ball bearings which permits speed reduction while maintaining bearing lubrication.

2. Compressor Start Assist - Capacitor and Relay

Start capacitor and relay gives a "hard" boost to compressor motor at each start up.

Usage Guideline:

Required for single-phase scroll compressors in the following applications:

Long line

Low ambient cooling

Suggested for all compressors in areas with a history of low voltage problems.

3. Crankcase Heater

An electric resistance heater which mounts to the base of the compressor to keep the lubricant warm during off cycles. Improves compressor lubrication on restart and minimizes the chance of liquid slugging.

Usage Guideline:

Required in low ambient cooling applications.

Required in long line applications.

Suggested in all commercial applications.

4. Cycle Protector

The cycle protector is designed to prevent compressor short cycling. This control provides an approximate 5-minute delay after power to the compressor has been interrupted for any reason, including power outage, protector control trip, thermostat jiggling, or normal cycling.

5. Evaporator Freeze Thermostat

An SPST temperature-actuated switch that stops unit operation when evaporator reaches freeze-up conditions.

Usage Guideline:

Required when low ambient kit has been added.

6. Low-Ambient Pressure Switch Kit

A long life pressure switch which is mounted to outdoor unit service valve. It is designed to cycle the outdoor fan motor in order to maintain head pressure within normal operating limits (approximately 100 psig to 225 psig). The control will maintain working head pressure at low-ambient temperatures down to 0°F (-18°C) when properly installed and also using wind baffles. Instructions provided in accessory kit.

Usage Guideline:

A Low-Ambient Pressure Switch must be used when cooling operation is used at outdoor temperatures below 55°F (12.8°C).

7. Outdoor Air Temperature Sensor

This device enables the thermostat to display the outdoor temperature. This device is also required to enable special thermostat features such as auxiliary heat lock out.

Usage Guideline:

Suggested for use with compatible thermostats.

8. Sound Hood

Wraparound sound reducing cover for the compressor. Reduces the sound level of the compressor.

Usage Guideline:

Suggested when unit is installed closer than 15 ft (4.57 m) to quiet areas, bedrooms, etc.

Suggested when unit is installed between two houses less than 10 ft (3 m) apart.

Accessory Description and Usage (Listed Alphabetically) Continued

9. Support Feet

Four or five stick-on plastic feet that raise the unit 4 in. (101.6 mm) above the mounting pad. This allows sand, dirt, and other debris to be flushed from the unit base, minimizing corrosion.

Usage Guideline:

Suggested in the following applications:

Coastal installations.

Windy areas or where debris is normally circulating.

Rooftop installations.

For improved sound ratings.

10. Thermostatic Expansion Valve (TXV)

A modulating flow-control valve which meters refrigerant liquid flow rate into the evaporator in response to the superheat of the refrigerant gas leaving the evaporator.

Kit includes valve, adapter tubes, and external equalizer tube. Hard shut off types are available.

Usage Guideline:

Required to achieve AHRI ratings in certain equipment combinations. Refer to combination ratings.

Hard shut off TXV or LLS required in air conditioner long line applications.

Required for use on all zoning systems.

11. Time-Delay Relay

An SPST delay relay which briefly continues operation of indoor blower motor to provide additional cooling after the compressor cycles off.

NOTE: Most indoor unit controls include this feature. For those that do not, use the guideline below.

Usage Guideline:

For improved efficiency ratings for certain combinations of indoor and outdoor units. Refer to AHRI Directory of Certified Product Performance (AHRI Directory).

When a Time-Delay Relay (TDR) is called for in the AHRI Directory, use a 30 second TDR for MicroChannel Indoor units and use a 90 second TDR for Round Tube Plate Fin Indoor units.

12. Winter Start Control

This control is designed to alleviate nuisance opening of the low-pressure switch by bypassing it for the first 3 minutes of operation.

AHRI RATINGS

For AHRI ratings certificates, please refer to the AHRI directory www.ahridirectory.org

Additional ratings and system combinations can be accessed via the Ratings Database here: [Keeprite Ratings](#)

Electrical Data

UNIT SIZE	V/PH	OPER VOLTS*		COMPRESSOR		FAN	MCA	MAX FUSE† or CKT BRK AMPS
		MAX	MIN	LRA	RLA	FLA		
18	208-230/1	253	197	48.0	8.00	0.40	10.4	15
24				59.5	11.70	0.50	15.1	25
30				64.3	11.80	0.75	15.6	25
36				80.1	12.20	1.05	16.4	25
42				110.2	17.70	1.40	23.5	40
48				124.0	18.50	1.40	24.5	40
60				150.0	25.60	1.52	33.5	50

*.Permissible limits of the voltage range at which the unit will operate satisfactorily

†.Time-Delay fuse.

FLA- Full Load Amps

LRA - Locked Rotor Amps

MCA- Minimum Circuit Amps

RLA- Rated Load Amps

NOTE: Control circuit is 24V on all units and requires external power source. Copper wire must be used from service disconnect to unit.

All motors/compressors contain internal overload protection.

Complies with requirements of ASHRAE Standards 90.1

Sound Power Level without sound shield

UNIT SIZE	STANDARD RATING (dBA)	TYPICAL OCTAVE BAND SPECTRUM (without tone adjustment) (dB)						
		125	250	500	1000	2000	4000	8000
18	75	68.9	65.3	65.6	71.4	68.4	63.8	61.2
24	74	66.9	72.6	70.0	70.7	66.6	62.7	59.2
30	73	69.5	68.9	68.9	68.5	62.8	60.0	57.4
36	75	70.8	73.6	71.5	69.5	66.1	63.6	58.1
42	73	73.9	72.6	70.3	68.2	64.3	61.2	57.3
48	76	72.3	74.1	71.2	70.6	63.8	61.6	55.9
60	76	70.0	75.0	71.9	73.7	66.0	61.7	56.3

NOTE: Tested in compliance with AHRI 270 but not listed with AHRI.

Sound Power Level with Accessory sound shield

UNIT SIZE	STANDARD RATING (dBA)	TYPICAL OCTAVE BAND SPECTRUM (without tone adjustment) (dB)						
		125	250	500	1000	2000	4000	8000
18	75	66.4	67.0	66.1	71.5	66.6	62.5	61.1
24	74	68.4	72.2	70.4	70.2	66.0	62.3	58.5
30	72	69.3	69.7	68.8	68.0	62.4	59.5	55.7
36	75	71.0	73.7	71.2	69.0	65.4	63.0	57.7
42	73	75.3	71.7	70.0	68.1	63.9	60.2	55.3
48	74	73.3	74.2	71.6	69.9	63.8	60.4	54.7
60	75	70.2	73.9	71.8	72.4	64.2	60.4	54.6

NOTE: Tested in compliance with AHRI 270 but not listed with AHRI.

Charging Subcooling (TXV-Type Expansion Device)

UNIT SIZE	REQUIRED SUBLICOOLING (F)	Indoor
18	14	TXV
24	10	
30	10	
36	10	
42	11	
48	12	
60	12	

DIMENSIONS

Manufacturer reserves the right to change, at any time, specifications and designs without notice and without obligations.

UNIT	SERIES	ELECTRICAL CHARACTERISTICS				A		B		C		D		E		F		G		H		I		J		K		OPERATING WEIGHT		SHIPPING WEIGHT		SHIPPING LENGTH / WIDTH (S ₁)		SHIPPING HEIGHT	
		INCH	MM	INCH	MM	INCH	MM	INCH	MM	INCH	MM	INCH	MM	INCH	MM	INCH	MM	INCH	MM	INCH	MM	INCH	MM	Lbs	Kgs	Lbs	Kgs	INCH	MM	INCH	MM				
N4A4S18**ANA	A	Y	N	N	N	23 1/8	587.3	25 5/16	642.9	3/4	19.1	4 7/16	113.0	18 1/16	459.0	7 13/16	197.9	5/16	7.9	3	76.2	11	279.4	10 1/2	266.7	100	45.4	109	49.4	26	660.0	30 9/16	775.7		
N4A4S24**ANA	A	Y	N	N	N	25 3/4	654.0	25 5/16	642.4	3/4	19.1	4 7/16	113.0	21 1/4	539.9	9 1/8	231.3	5/16	7.9	3	76.2	13 1/2	342.9	13	330.2	12 1/2	317.5	111	50.3	121	54.9	28 3/4	730.0	30 9/16	775.7
N4A4S30**ANA	A	Y	N	N	N	31 3/16	792.5	32 1/16	815.1	3/4	19.1	6 9/16	166.1	24 11/16	626.3	9 1/8	231.3	5/16	7.9	3	76.2	15	381.0	15 3/4	400.1	16	406.4	139	63.0	161	73.0	34 1/4	870.0	37 5/16	947.9
N4A4S36**ANA	A	Y	N	N	N	31 3/16	792.5	25 5/16	642.4	7/8	22.2	6 9/16	166.1	24 11/16	626.3	9 1/8	231.3	5/16	7.9	3	76.2	14 1/2	368.3	15	381.0	11 1/2	292.1	132	59.9	146	66.2	34 1/4	870.0	30 1/2	775.2
N4A4S42**ANA	A	Y	N	N	N	31 3/16	792.5	42 5/16	1074.2	7/8	22.2	6 9/16	166.1	24 11/16	626.3	9 1/8	231.3	5/16	7.9	3	76.2	17	431.8	15 1/2	393.7	22 1/2	571.5	181	82.1	203	92.1	34 1/4	870.0	47 1/2	1207.1
N4A4S48**ANA	A	Y	N	N	N	31 3/16	792.5	28 11/16	728.7	7/8	22.2	6 9/16	166.1	24 11/16	626.3	9 1/8	231.3	5/16	7.9	3	76.2	14 1/2	368.3	14 1/2	368.3	12 1/2	317.5	171	77.6	190	86.2	34 1/4	870.0	33 15/16	861.6
N4A4S60**ANA	A	Y	N	N	N	31 3/16	792.5	35 1/2	901.4	7/8	22.2	6 9/16	166.1	24 11/16	626.3	9 1/8	231.3	5/16	7.9	3	76.2	15 1/2	393.7	16	406.4	18 1/2	469.9	190	86.2	206	93.4	34 1/4	870.0	40 3/4	1034.3

Y=YES
N=NO
09-57515
09-57519
208-282-1-090

UNIT SIZE	"X"	MINIMUM GROUND MOUNTING PAD APPLICATION DIMENSIONS	"Y"	MINIMUM ROOF-TOP MOUNTING PAD APPLICATION DIMENSIONS
18	23 1/8	587.3	17 7/8	454.6
24	25 3/4	654.0	20 7/16	518.5
30,36,42,48,60	31 3/16	792.5	22 15/16	583.2
-	35	889.0	26 3/4	679.7

NOTE: ALL DIMENSIONS IN INCH (MM)

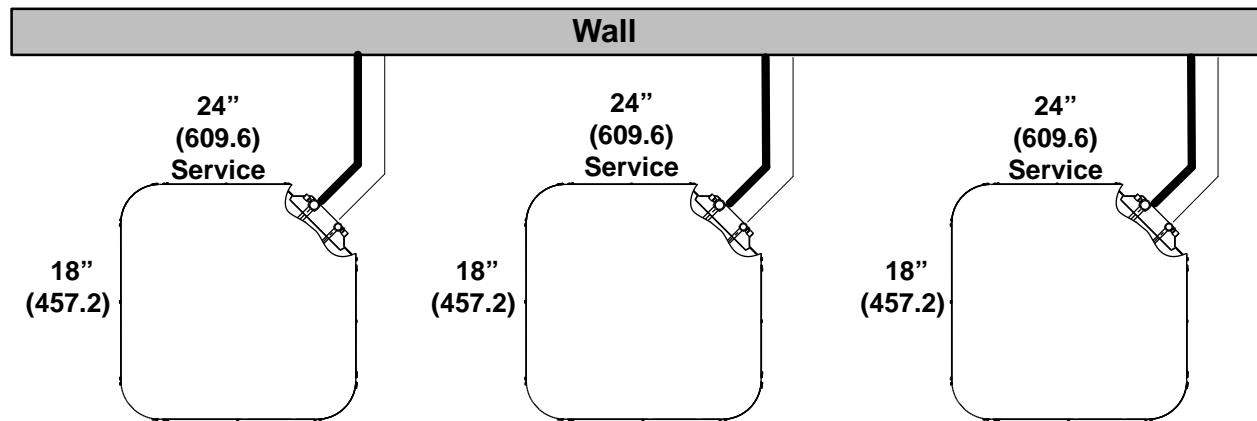
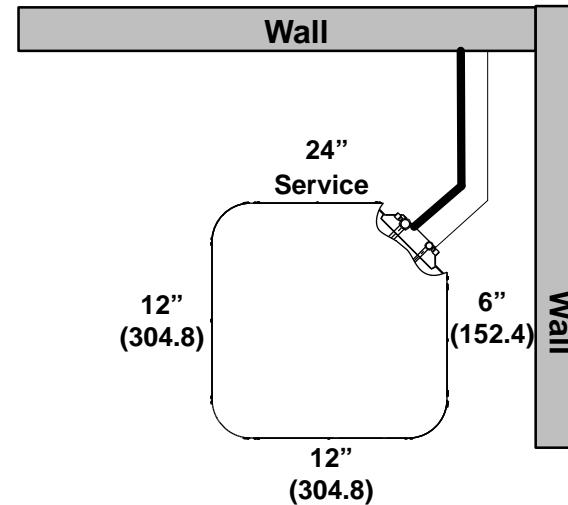
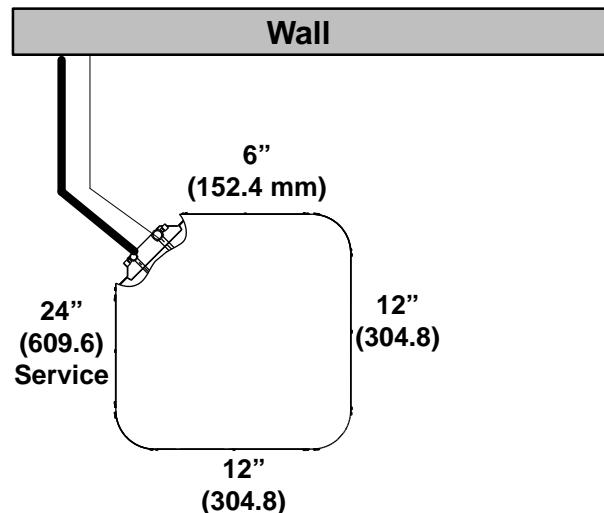
U.S. ECCN: Not Subject to Regulation (N.S.R.)

SD5752-4 REV.A

Clearances

Manufacturer reserves the right to change, at any time, specifications and designs without notice and without obligations.

Clearances (various examples)



**Note: Numbers in () = mm
Allow 48" above unit**

IMPORTANT: When installing multiple units in an alcove, roof well, or partially enclosed area, ensure there is adequate ventilation to prevent re-circulation of discharge air.

DETAILED COOLING CAPACITIES

Manufacturer reserves the right to change, at any time, specifications and designs without notice and without obligations.

EVAPORATOR AIR		CONDENSER ENTERING AIR TEMPERATURES °F (°C)																	
		75 (23.9)			85 (29.4)			95 (35)			105 (40.6)			115 (46.1)			125 (51.7)		
CFM	EWB	Capacity MBtuh	Total Sys. kW**	Capacity MBtuh	Total Sys. kW**	Capacity MBtuh	Total Sys. kW**	Capacity MBtuh	Total Sys. kW**	Capacity MBtuh	Total Sys. kW**	Capacity MBtuh	Total Sys. kW**	Capacity MBtuh	Total Sys. kW**	Capacity MBtuh	Total Sys. kW**	Capacity MBtuh	Total Sys. kW**
		Total	Sens‡	Total	Sens‡	Total	Sens‡	Total	Sens‡	Total	Sens‡	Total	Sens‡	Total	Sens‡	Total	Sens‡	Total	Sens‡
N4A4S18AKANA Outdoor Section With EA*4X19L17A* Indoor Section																			
525	72.0 (22.2)	21.36	10.47	1.23	20.54	10.18	1.37	19.58	9.85	1.53	18.48	9.48	1.71	17.26	9.08	1.92	15.94	8.64	2.17
	67.0 (19.4)	19.43	12.90	1.23	18.64	12.60	1.37	17.71	12.25	1.53	16.65	11.85	1.71	15.50	11.43	1.92	14.28	10.99	2.18
	63.0 (17.2)††	18.04	12.41	1.23	17.26	12.09	1.38	16.34	11.72	1.54	15.33	11.32	1.72	14.22	10.88	1.94	13.09	10.44	2.20
	62.0 (16.7)	17.67	15.27	1.23	16.91	14.94	1.38	16.03	14.55	1.53	15.15	15.15	1.72	14.30	14.30	1.93	13.39	13.39	2.19
	57.0 (13.9)	17.21	17.21	1.23	16.61	16.61	1.38	15.91	15.91	1.53	15.12	15.12	1.72	14.28	14.28	1.93	13.37	13.37	2.19
600	72.0 (22.2)	21.71	11.04	1.26	20.87	10.75	1.41	19.88	10.42	1.57	18.74	10.05	1.74	17.49	9.64	1.95	16.13	9.21	2.20
	67.0 (19.4)	19.77	13.82	1.26	18.96	13.52	1.41	18.00	13.17	1.57	16.91	12.77	1.75	15.73	12.34	1.96	14.47	11.89	2.21
	63.0 (17.2)††	18.38	13.28	1.27	17.58	12.96	1.41	16.64	12.58	1.57	15.59	12.17	1.75	14.46	11.73	1.97	13.28	11.27	2.23
	62.0 (16.7)	18.08	18.08	1.27	17.38	17.38	1.41	16.64	16.64	1.57	15.80	15.80	1.75	14.90	14.90	1.96	13.92	13.92	2.22
	57.0 (13.9)	17.98	17.98	1.27	17.35	17.35	1.41	16.61	16.61	1.57	15.78	15.78	1.75	14.87	14.87	1.96	13.90	13.90	2.22
675	72.0 (22.2)	21.95	11.59	1.30	21.09	11.31	1.44	20.07	10.98	1.60	18.92	10.60	1.78	17.64	10.20	1.99	16.24	9.76	2.23
	67.0 (19.4)	20.01	14.72	1.30	19.19	14.42	1.44	18.21	14.07	1.60	17.11	13.66	1.78	15.90	13.23	1.99	14.62	12.76	2.24
	63.0 (17.2)††	18.63	14.11	1.30	17.82	13.79	1.44	16.85	13.41	1.60	15.78	12.99	1.79	14.63	12.54	2.00	13.43	12.05	2.26
	62.0 (16.7)	18.64	18.64	1.30	17.99	17.99	1.44	17.22	17.22	1.60	16.34	16.34	1.78	15.39	15.39	1.99	14.36	14.36	2.25
	57.0 (13.9)	18.61	18.61	1.30	17.96	17.96	1.44	17.19	17.19	1.60	16.32	16.32	1.78	15.37	15.37	1.99	14.34	14.34	2.25
N4A4S24AKANA Outdoor Section With ESD4X24M14A1E Indoor Section																			
700	72 (22.2)	27.12	13.79	1.58	26.00	13.38	1.76	24.79	12.92	1.96	23.58	12.43	2.19	22.15	11.88	2.46	20.56	11.27	2.76
	67 (19.4)	24.86	16.90	1.59	23.89	16.45	1.77	22.79	15.97	1.97	21.51	15.43	2.20	20.19	14.83	2.48	18.69	14.18	2.79
	63 (17.2)††	23.09	16.32	1.59	22.19	15.88	1.77	21.10	15.38	1.98	19.93	14.79	2.22	18.64	14.19	2.49	17.22	13.52	2.80
	62 (16.7)	22.57	19.79	1.59	21.76	19.40	1.77	20.76	18.96	1.98	19.56	18.32	2.22	18.39	17.79	2.49	17.32	17.32	2.80
	57 (13.9)	22.09	22.09	1.60	21.50	21.50	1.78	20.38	20.38	1.98	19.57	19.57	2.22	18.45	18.45	2.49	17.26	17.26	2.80
805	72 (22.2)	27.54	14.33	1.62	26.39	13.90	1.80	25.30	13.43	2.00	23.98	12.89	2.24	22.47	12.35	2.50	20.75	11.69	2.80
	67 (19.4)	25.37	17.77	1.63	24.34	17.32	1.81	23.20	16.82	2.02	21.80	16.17	2.24	20.50	15.65	2.52	18.97	14.99	2.83
	63 (17.2)††	23.58	17.13	1.64	22.58	16.65	1.82	21.52	16.23	2.02	20.09	15.48	2.25	18.94	14.94	2.54	17.47	14.28	2.85
	62 (16.7)	23.07	21.03	1.64	22.18	20.62	1.82	21.12	20.11	2.03	19.93	17.98	2.26	19.13	19.13	2.53	17.90	17.90	2.85
	57 (13.9)	23.01	23.01	1.64	22.07	22.07	1.82	21.13	21.13	2.03	20.28	20.28	2.26	19.09	19.09	2.54	17.83	17.83	2.84
900	72 (22.2)	27.81	14.76	1.66	26.65	14.31	1.84	25.58	13.83	2.04	24.30	13.30	2.28	22.68	12.74	2.54	21.00	12.11	2.85
	67 (19.4)	25.70	18.49	1.68	24.63	18.03	1.85	23.44	17.51	2.06	22.14	16.94	2.29	20.70	16.35	2.56	19.12	15.69	2.87
	63 (17.2)††	23.95	17.84	1.68	22.89	17.33	1.86	21.75	16.80	2.07	20.49	16.21	2.30	19.13	15.58	2.58	17.61	14.90	2.89
	62 (16.7)	23.47	22.13	1.68	22.96	21.92	1.86	21.56	21.56	2.07	20.53	20.53	2.29	19.56	19.56	2.57	18.17	18.17	2.87
	57 (13.9)	23.63	23.63	1.68	22.77	22.77	1.86	21.69	21.69	2.07	20.71	20.71	2.30	19.56	19.56	2.58	18.18	18.18	2.88
N4A4S30AKANA Outdoor Section With EA*4X37L21A* Indoor Section																			
875	72 (22.2)	34.39	17.38	1.99	32.89	16.86	2.20	31.29	16.31	2.44	29.57	15.72	2.72	27.69	15.09	3.05	25.62	14.41	3.43
	67 (19.4)	31.24	21.52	2.00	29.86	20.98	2.21	28.39	20.42	2.45	26.82	19.83	2.73	25.09	19.18	3.06	23.18	18.47	3.44
	63 (17.2)††	29.00	20.68	2.01	27.71	20.14	2.22	26.34	19.58	2.46	24.85	18.97	2.74	23.23	18.32	3.07	21.41	17.59	3.46
	62 (16.7)	28.48	25.54	2.01	27.24	24.97	2.22	25.99	25.99	2.46	24.73	24.73	2.76	23.45	23.45	3.07	21.92	21.92	3.54
	57 (13.9)	27.96	27.96	2.01	26.96	26.96	2.22	25.89	25.89	2.46	24.71	24.71	2.75	23.41	23.41	3.07	21.95	21.95	3.45
1000	72 (22.2)	34.92	18.35	2.05	33.36	17.82	2.25	31.70	17.27	2.49	29.96	16.72	2.79	27.97	16.03	3.11	25.83	15.34	3.49
	67 (19.4)	31.76	23.06	2.06	30.32	22.52	2.26	28.80	21.95	2.50	27.22	21.35	2.80	25.39	20.68	3.12	23.43	19.96	3.50
	63 (17.2)††	29.51	22.12	2.07	28.16	21.56	2.27	26.74	20.99	2.51	25.19	20.35	2.82	23.52	19.70	3.13	21.69	18.97	3.51
	62 (16.7)	29.20	29.20	2.07	28.12	28.12	2.27	26.96	26.96	2.51	25.70	25.70	2.79	24.31	24.31	3.12	22.75	22.75	3.50
	57 (13.9)	29.16	29.16	2.07	28.07	28.07	2.27	26.92	26.92	2.51	25.67	25.67	2.80	24.27	24.27	3.12	22.72	22.72	3.50
1125	72 (22.2)	35.29	19.30	2.10	33.68	18.77	2.31	31.97	18.21	2.55	30.14	17.61	2.83	28.14	16.96	3.16	25.95	16.25	3.54
	67 (19.4)	32.14	24.57	2.12	30.66	24.01	2.32	29.10	23.43	2.56	27.45	22.81	2.85	25.61	22.13	3.17	23.66	21.36	3.57
	63 (17.2)††	29.88	23.51	2.13	28.49	22.95	2.33	27.03	22.36	2.57	25.46	21.73	2.85	23.75	21.03	3.18	21.90	20.22	3.56
	62 (16.7)	30.19	30.19	2.12	29.04	29.04	2.33	27.81	27.81	2.57	26.50	26.50	2.86	25.01	25.01	3.18	23.37	23.37	3.55
	57 (13.9)	30.14	30.14	2.12	29.00	29.00	2.33	27.77	27.77	2.57	26.46	26.46	2.85	24.98	24.98	3.18	23.34	23.34	3.55

DETAILED COOLING CAPACITIES

EVAPORATOR AIR		CONDENSER ENTERING AIR TEMPERATURES °F (°C)																	
		75 (23.9)			85 (29.4)			95 (35)			105 (40.6)			115 (46.1)			125 (51.7)		
CFM	EWB	Capacity MBtuh		Total Sys. kW**	Capacity MBtuh		Total Sys. kW**	Capacity MBtuh		Total Sys. kW**	Capacity MBtuh		Total Sys. kW**	Capacity MBtuh		Total Sys. kW**	Capacity MBtuh		Total Sys. kW**
		Total	Sens‡		Total	Sens‡		Total	Sens‡		Total	Sens‡		Total	Sens‡		Total	Sens‡	
N4A4S36AKANA Outdoor Section With EVD4X37M21A1E Indoor Section																			
1090	72 (22.2)	40.69	19.90	2.41	38.81	19.27	2.66	36.90	18.55	2.93	34.80	17.74	3.24	32.32	16.95	3.61	29.76	16.06	4.05
	67 (19.4)	37.24	24.64	2.42	35.72	23.66	2.67	33.80	23.24	2.94	31.87	22.38	3.25	29.66	21.55	3.61	27.24	20.62	4.06
	63 (17.2)††	34.67	23.82	2.41	33.26	23.01	2.67	31.46	22.47	2.94	29.62	21.58	3.25	27.60	20.72	3.61	25.33	19.76	4.04
	62 (16.7)	34.01	29.13	2.41	32.44	28.47	2.67	30.82	27.76	2.94	29.10	27.01	3.25	27.71	27.71	3.61	25.82	25.82	4.05
	57 (13.9)	33.39	33.39	2.41	32.23	32.23	2.67	30.78	30.78	2.94	29.37	29.37	3.25	27.60	27.60	3.60	25.78	25.78	4.05
1200	72 (22.2)	41.15	20.46	2.46	39.22	19.82	2.71	37.24	19.05	2.98	35.04	18.27	3.29	32.56	17.45	3.66	29.93	16.53	4.10
	67 (19.4)	37.72	25.54	2.46	36.08	24.90	2.72	34.15	24.09	2.99	32.09	23.27	3.30	29.90	22.38	3.66	27.42	21.47	4.10
	63 (17.2)††	35.02	23.92	2.47	33.56	23.97	2.72	31.80	23.19	2.99	29.92	22.39	3.30	27.84	21.51	3.66	25.50	20.53	4.10
	62 (16.7)	34.48	30.45	2.47	32.90	29.75	2.72	31.91	29.92	2.99	30.06	30.06	3.30	28.26	28.26	3.66	26.48	26.48	4.10
	57 (13.9)	34.26	34.26	2.47	33.05	33.05	2.72	31.54	31.54	2.99	30.03	30.03	3.30	28.25	28.25	3.67	26.28	26.28	4.10
1350	72 (22.2)	41.63	21.14	2.52	39.74	20.44	2.78	37.66	19.72	3.05	35.34	18.92	3.36	32.83	18.06	3.73	30.09	17.10	4.17
	67 (19.4)	38.24	26.68	2.53	36.46	25.96	2.78	34.51	25.20	3.06	32.34	24.42	3.37	30.09	23.49	3.73	27.57	22.55	4.17
	63 (17.2)††	35.61	25.70	2.53	33.97	25.00	2.79	32.14	24.21	3.06	30.10	23.35	3.36	28.07	22.60	3.73	25.65	21.51	4.16
	62 (16.7)	36.30	29.92	2.54	34.32	32.06	2.79	32.34	32.34	3.06	30.75	30.75	3.37	28.95	28.95	3.73	26.86	26.86	4.17
	57 (13.9)	35.27	35.27	2.53	33.95	33.95	2.79	32.44	32.44	3.06	30.72	30.72	3.37	28.85	28.85	3.73	26.83	26.83	4.17
N4A4S42AKANA Outdoor Section With EVD4X42M21A1E Indoor Section																			
1225	72 (22.2)	46.39	23.82	2.89	44.31	23.00	3.17	42.29	22.15	3.47	40.04	21.26	3.82	37.65	20.36	4.21	35.07	19.31	4.64
	67 (19.4)	42.01	28.83	2.89	40.38	28.12	3.16	38.40	27.16	3.47	36.33	26.24	3.81	34.14	25.28	4.20	31.79	24.24	4.64
	63 (17.2)††	38.81	27.78	2.89	37.18	26.96	3.16	35.44	26.12	3.46	33.55	25.22	3.81	31.50	24.24	4.19	29.30	23.18	4.62
	62 (16.7)	38.00	33.69	2.89	36.43	32.85	3.16	34.78	32.08	3.46	32.89	31.10	3.80	30.92	30.17	4.19	29.16	29.16	4.62
	57 (13.9)	36.62	36.62	2.89	35.50	35.50	3.16	34.20	34.20	3.46	32.74	32.74	3.80	31.07	31.07	4.19	29.26	29.26	4.62
1380	72 (22.2)	47.19	24.61	2.97	45.21	23.77	3.24	43.00	22.90	3.55	40.67	21.99	3.90	38.13	21.02	4.29	35.43	19.99	4.72
	67 (19.4)	42.84	30.07	2.97	40.94	29.23	3.24	39.00	28.34	3.55	36.87	27.42	3.89	34.60	26.43	4.28	32.13	25.38	4.71
	63 (17.2)††	39.55	28.93	2.97	37.86	28.10	3.24	36.04	27.39	3.54	34.06	26.28	3.88	31.94	25.30	4.27	29.63	24.25	4.70
	62 (16.7)	38.77	35.39	2.96	37.09	34.54	3.23	35.35	33.69	3.54	33.87	30.17	3.89	31.31	32.28	4.26	30.14	30.14	4.72
	57 (13.9)	37.87	37.87	2.96	36.72	36.72	3.23	35.32	35.32	3.54	33.71	33.71	3.88	32.00	32.00	4.28	29.94	29.94	4.66
1575	72 (22.2)	48.16	25.44	3.06	45.96	24.63	3.34	43.73	23.76	3.65	41.29	22.81	3.99	38.61	21.81	4.38	35.78	20.70	4.82
	67 (19.4)	43.67	31.54	3.06	41.70	30.65	3.33	39.63	29.77	3.64	37.39	28.81	3.98	35.02	27.80	4.38	32.47	26.73	4.81
	63 (17.2)††	40.32	30.30	3.06	38.53	29.42	3.33	36.60	28.54	3.63	34.54	27.57	3.98	32.33	26.53	4.35	29.94	25.45	4.80
	62 (16.7)	39.54	37.49	3.06	37.80	36.67	3.33	36.70	35.79	3.63	34.71	34.71	3.98	32.91	32.91	4.36	30.96	30.96	4.80
	57 (13.9)	39.24	39.24	3.06	38.00	38.00	3.33	36.36	36.36	3.63	34.72	34.72	3.98	32.80	32.80	4.36	30.90	30.90	4.80
N4A4S48AKANA Outdoor Section With EA*4X61L24A* Indoor Section																			
1400	72 (22.2)	54.25	27.28	3.40	51.97	26.48	3.71	49.55	25.64	4.08	46.97	24.75	4.50	44.19	23.81	4.97	41.16	22.81	5.50
	67 (19.4)	49.34	33.66	3.39	47.24	32.84	3.70	45.01	31.98	4.06	42.64	31.08	4.48	40.14	30.09	4.95	37.32	29.08	5.47
	63 (17.2)††	45.82	32.37	3.39	43.85	31.54	3.69	41.76	30.68	4.05	39.55	29.76	4.46	37.16	28.79	4.93	34.57	27.75	5.45
	62 (16.7)	45.10	39.88	3.38	43.21	39.02	3.69	41.23	38.08	4.05	39.25	39.25	4.46	37.33	37.33	4.93	35.21	35.21	5.46
	57 (13.9)	44.11	44.11	3.38	42.58	42.58	3.69	40.95	40.95	4.05	39.19	39.19	4.46	37.23	37.23	4.93	35.15	35.15	5.46
1545	72 (22.2)	54.89	28.36	3.47	52.54	27.56	3.78	50.05	26.71	4.15	47.40	25.81	4.57	44.55	24.86	5.05	41.45	23.84	5.57
	67 (19.4)	49.97	35.37	3.46	47.80	34.54	3.77	45.50	33.67	4.14	43.10	32.76	4.55	40.48	31.78	5.02	37.65	30.72	5.55
	63 (17.2)††	46.43	33.96	3.46	44.39	33.12	3.76	42.25	32.25	4.12	39.98	31.32	4.54	37.53	30.33	5.00	34.88	29.26	5.53
	62 (16.7)	45.90	42.13	3.46	44.13	40.89	3.76	42.23	42.23	4.12	40.37	40.37	4.54	38.35	38.35	5.01	36.12	36.12	5.54
	57 (13.9)	45.51	45.51	3.45	43.89	43.89	3.76	42.17	42.17	4.12	40.32	40.32	4.54	38.30	38.30	5.01	36.08	36.08	5.53
1800	72 (22.2)	55.69	30.18	3.59	53.24	29.36	3.91	50.66	28.50	4.28	47.90	27.59	4.70	44.95	26.62	5.17	41.75	25.59	5.70
	67 (19.4)	50.78	38.29	3.58	48.53	37.44	3.90	46.16	36.55	4.26	43.68	35.62	4.68	40.98	34.60	5.15	38.09	33.48	5.67
	63 (17.2)††	47.22	36.66	3.58	45.11	35.80	3.89	42.89	34.90	4.25	40.54	33.94	4.66	38.03	32.91	5.13	35.33	31.77	5.65
	62 (16.7)	47.61	47.61	3.58	45.85	45.85	3.89	43.99	43.99	4.25	41.98	41.98	4.67	39.82	39.82	5.14	37.43	37.43	5.67
	57 (13.9)	47.54	47.54	3.58	45.79	45.79	3.89	43.93	43.93	4.25	41.93	41.93	4.67	39.76	39.76	5.14	37.38	37.38	5.67

DETAILED COOLING CAPACITIES

EVAPORATOR AIR		CONDENSER ENTERING AIR TEMPERATURES °F (°C)																	
		75 (23.9)			85 (29.4)			95 (35)			105 (40.6)			115 (46.1)			125 (51.7)		
CFM	EWB	Capacity MBtuh		Total Sys. kW**	Capacity MBtuh		Total Sys. kW**	Capacity MBtuh		Total Sys. kW**	Capacity MBtuh		Total Sys. kW**	Capacity MBtuh		Total Sys. kW**	Capacity MBtuh		Total Sys. kW**
		Total	Sens‡		Total	Sens‡		Total	Sens‡		Total	Sens‡		Total	Sens‡		Total	Sens‡	
N4A4S60AKANA Outdoor Section With EVD4X61M24A* Indoor Section																			
1800	72 (22.2)	67.31	34.72	4.23	64.05	33.52	4.62	60.65	32.23	5.08	57.21	30.87	5.60	53.30	29.42	6.18	49.09	27.91	6.83
	67 (19.4)	61.11	42.71	4.20	58.80	41.29	4.60	55.50	40.17	5.05	52.26	38.78	5.56	48.75	37.20	6.15	44.88	35.62	6.80
	63 (17.2)††	56.68	41.19	4.18	54.40	39.82	4.57	51.47	38.70	5.02	48.47	37.27	5.53	45.19	35.74	6.11	41.62	34.01	6.76
	62 (16.7)	55.62	50.35	4.18	53.08	49.09	4.56	50.52	47.91	5.01	48.10	44.25	5.53	45.71	45.84	6.12	42.28	42.28	6.77
	57 (13.9)	54.39	54.39	4.17	52.57	52.57	4.56	50.12	50.12	5.01	47.19	47.19	5.51	45.17	45.17	6.11	42.19	42.19	6.77
2000	72 (22.2)	68.24	35.82	4.32	64.89	34.59	4.72	61.59	33.27	5.18	58.04	31.85	5.70	53.80	30.40	6.28	49.46	28.73	6.93
	67 (19.4)	62.05	44.42	4.30	59.30	43.20	4.70	56.18	41.84	5.15	52.79	40.37	5.66	49.21	38.84	6.25	45.24	37.14	6.90
	63 (17.2)††	57.57	42.78	4.28	55.01	41.58	4.67	52.14	40.25	5.12	49.05	38.77	5.63	45.57	37.20	6.21	41.97	35.50	6.87
	62 (16.7)	56.53	52.71	4.28	53.95	51.52	4.67	51.65	51.12	5.12	49.59	49.78	5.64	46.26	46.26	6.23	43.14	43.14	6.88
	57 (13.9)	56.01	56.01	4.28	54.04	54.04	4.67	51.66	51.66	5.12	49.06	49.06	5.64	46.24	46.24	6.22	43.14	43.14	6.88
2250	72 (22.2)	69.18	37.06	4.45	65.68	35.81	4.84	62.30	34.45	5.30	58.62	32.97	5.82	54.40	31.51	6.41	49.78	29.76	7.06
	67 (19.4)	63.10	46.47	4.43	60.12	45.28	4.82	56.89	43.78	5.27	53.36	42.31	5.79	49.61	40.75	6.37	45.50	38.87	7.02
	63 (17.2)††	58.44	44.65	4.41	55.77	43.41	4.80	52.78	42.04	5.24	49.56	40.56	5.76	46.04	38.93	6.34	42.20	37.06	6.99
	62 (16.7)	57.39	55.65	4.40	55.86	54.50	4.80	52.98	52.98	5.25	50.47	50.47	5.77	47.44	47.44	6.36	44.15	44.15	7.01
	57 (13.9)	57.74	57.74	4.41	55.59	55.59	4.80	53.12	53.12	5.25	50.41	50.41	5.77	47.36	47.36	6.35	44.11	44.11	7.01

† Total and sensible capacities are net capacities based on 25 feet line set at DOE Appendix M1 test levels.

‡ Sensible capacities shown are based on 80°F (27°C) entering air at the indoor coil. For sensible capacities at other than 80°F (27°C), deduct 835 Btuh (245 kW) per 1000 CFM (480 L/S) of indoor coil air for each degree below 80°F (27°C), or add 835 Btuh (245 kW) per 1000 CFM (480 L/S) of indoor coil air per degree above 80°F (27°C).

Detailed cooling capacities are based on indoor and outdoor unit at the same elevation per AHRI standard 210/240-2023. If additional tubing length and/or indoor unit is located above outdoor unit, a slight variation in capacity may occur.

** System kw is total of indoor and outdoor unit kilowatts.

†† At TVA rating indoor condition (75°F edb/63°F ewb). All other indoor air temperatures are at 80°F edb.

NOTE: When the required data falls between the published data, interpolation may be performed. Extrapolation is not an acceptable practice.

EWB — Entering Wet Bulb

CONDENSER ONLY RATINGS

SST °F (°C)		CONDENSER ENTERING AIR TEMPERATURES °F (°C)						
		55.0 (12.8)	65.0 (18.3)	75.0 (23.9)	85.0 (29.4)	95.0 (35.0)	105.0 (40.6)	115.0 (46.1)
N4A4S18AKANA								
30.0 (-1.1)	TCG	15.10	14.10	13.10	12.20	11.30	10.40	9.50
	SDT	70.40	79.80	89.20	98.70	108.30	117.80	127.30
	KW	0.80	0.91	1.02	1.15	1.30	1.46	1.65
35.0 (1.7)	TCG	16.60	15.60	14.60	13.60	12.70	11.70	10.60
	SDT	71.50	80.80	90.30	99.70	109.20	118.70	128.20
	KW	0.80	0.91	1.02	1.15	1.30	1.47	1.66
40.0 (4.4)	TCG	18.30	17.20	16.10	15.10	14.10	13.00	11.90
	SDT	72.50	81.90	91.30	100.80	110.20	119.60	129.10
	KW	0.79	0.90	1.02	1.15	1.30	1.47	1.66
45.0 (7.2)	TCG	20.00	18.80	17.80	16.70	15.60	14.50	13.30
	SDT	73.70	83.00	92.40	101.90	111.20	120.70	130.10
	KW	0.78	0.89	1.02	1.15	1.30	1.47	1.67
50.0 (10.0)	TCG	21.80	20.70	19.50	18.40	17.30	16.10	14.80
	SDT	74.90	84.20	93.50	103.00	112.40	121.70	131.10
	KW	0.77	0.89	1.01	1.15	1.30	1.48	1.67
55.0 (12.8)	TCG	23.80	22.60	21.40	20.20	19.00	17.70	16.40
	SDT	76.10	85.40	94.80	104.20	113.60	122.90	132.10
	KW	0.76	0.88	1.00	1.15	1.30	1.48	1.68
N4A4S24AKANA								
30.0 (-1.1)	TCG	19.34	18.30	17.26	16.17	15.01	13.77	12.40
	SDT	73.94	83.52	93.16	102.71	112.14	121.57	130.96
	KW	0.98	1.12	1.29	1.47	1.68	1.92	2.20
35.0 (1.7)	TCG	21.38	20.26	19.13	17.96	16.72	15.37	13.93
	SDT	75.24	84.81	94.38	103.89	113.31	122.73	132.06
	KW	0.98	1.13	1.29	1.47	1.68	1.92	2.20
40.0 (4.4)	TCG	23.58	22.37	21.16	19.90	18.57	17.13	15.58
	SDT	76.62	86.14	95.61	105.11	114.51	123.92	133.17
	KW	0.98	1.13	1.29	1.47	1.68	1.92	2.20
45.0 (7.2)	TCG	25.95	24.65	23.35	22.00	20.56	19.03	17.39
	SDT	78.08	87.51	96.97	106.34	115.79	125.11	134.39
	KW	0.98	1.13	1.29	1.47	1.68	1.92	2.19
50.0 (10.0)	TCG	28.48	27.09	25.69	24.26	22.72	21.08	19.32
	SDT	79.73	89.10	98.46	107.57	116.94	126.28	135.58
	KW	0.98	1.13	1.28	1.46	1.67	1.91	2.19
55.0 (12.8)	TCG	31.22	29.72	28.21	26.66	25.02	23.26	21.38
	SDT	81.37	90.71	100.00	109.14	118.21	127.54	136.81
	KW	0.98	1.12	1.28	1.45	1.65	1.89	2.17
N4A4S30AKANA								
30.0 (-1.1)	TCG	23.36	22.09	20.86	19.60	18.26	16.80	15.18
	SDT	77.76	87.66	97.65	107.75	117.95	128.31	138.89
	KW	1.20	1.35	1.53	1.74	1.99	2.28	2.64
35.0 (1.7)	TCG	25.77	24.41	23.07	21.70	20.25	18.65	16.96
	SDT	79.48	89.29	99.26	109.32	119.51	129.88	140.34
	KW	1.21	1.36	1.54	1.75	2.01	2.31	2.67
40.0 (4.4)	TCG	28.37	26.91	25.46	23.98	22.39	20.67	18.83
	SDT	81.25	91.02	100.97	110.97	121.09	131.37	141.69
	KW	1.22	1.37	1.55	1.77	2.02	2.33	2.69
45.0 (7.2)	TCG	31.18	29.61	28.04	26.43	24.70	22.83	20.81
	SDT	83.07	92.90	102.76	112.64	122.70	132.94	143.15
	KW	1.23	1.38	1.56	1.78	2.04	2.35	2.72
50.0 (10.0)	TCG	34.21	32.51	30.81	29.05	27.19	25.16	22.98
	SDT	85.18	94.87	104.65	114.51	124.32	134.42	144.49
	KW	1.24	1.39	1.57	1.80	2.06	2.37	2.74
55.0 (12.8)	TCG	37.46	35.63	33.78	31.87	29.86	27.66	25.32
	SDT	87.34	96.88	106.60	116.34	125.94	135.92	145.81
	KW	1.24	1.40	1.58	1.81	2.07	2.39	2.75

Manufacturer reserves the right to change, at any time, specifications and designs without notice and without obligations.

CONDENSER ONLY RATINGS (Continued)

SST °F (°C)		CONDENSER ENTERING AIR TEMPERATURES °F (°C)						
		55.0 (12.8)	65.0 (18.3)	75.0 (23.9)	85.0 (29.4)	95.0 (35.0)	105.0 (40.6)	115.0 (46.1)
N4A4S36AKANA								
30.0 (-1.1)	TCG	30.00	28.36	26.78	25.19	23.53	21.80	19.97
	SDT	75.41	84.88	94.32	103.73	113.17	122.50	131.71
	KW	1.39	1.66	1.90	2.14	2.39	2.66	2.98
35.0 (1.7)	TCG	33.10	31.32	29.60	27.86	26.04	24.12	22.12
	SDT	76.81	86.28	95.69	105.00	114.37	123.69	132.82
	KW	1.41	1.68	1.92	2.16	2.41	2.70	3.03
40.0 (4.4)	TCG	36.40	34.50	32.61	30.66	28.71	26.61	24.41
	SDT	78.36	87.68	97.07	106.39	115.63	124.86	133.91
	KW	1.43	1.69	1.93	2.17	2.43	2.73	3.07
45.0 (7.2)	TCG	39.90	37.87	35.82	33.74	31.53	29.24	26.79
	SDT	80.19	89.25	98.51	107.73	116.97	126.07	135.21
	KW	1.46	1.70	1.94	2.18	2.45	2.75	3.12
50.0 (10.0)	TCG	43.65	41.42	39.21	36.90	34.51	32.00	29.36
	SDT	81.93	91.11	99.94	109.21	118.32	127.31	136.24
	KW	1.47	1.72	1.94	2.19	2.46	2.77	3.14
55.0 (12.8)	TCG	47.55	45.19	42.78	40.26	37.63	34.90	32.03
	SDT	84.02	92.82	101.95	110.58	119.68	128.54	137.29
	KW	1.48	1.72	1.95	2.19	2.47	2.78	3.15
N4A4S42AKANA								
30.0 (-1.1)	TCG	33.37	31.78	30.15	28.45	26.69	24.84	22.89
	SDT	69.65	79.17	88.69	98.22	107.73	117.17	126.59
	KW	1.86	2.07	2.31	2.58	2.87	3.21	3.58
35.0 (1.7)	TCG	36.81	35.06	33.26	31.40	29.46	27.44	25.34
	SDT	70.90	80.29	89.76	99.21	108.68	118.11	127.43
	KW	1.87	2.08	2.32	2.59	2.89	3.22	3.60
40.0 (4.4)	TCG	40.55	38.61	36.62	34.56	32.45	30.26	27.97
	SDT	72.12	81.47	90.89	100.36	109.73	119.04	128.37
	KW	1.88	2.09	2.33	2.60	2.90	3.24	3.62
45.0 (7.2)	TCG	44.61	42.45	40.25	37.99	35.72	33.31	30.81
	SDT	73.45	82.79	92.17	101.54	110.71	120.07	129.36
	KW	1.88	2.10	2.34	2.61	2.91	3.26	3.64
50.0 (10.0)	TCG	49.00	46.61	44.20	41.72	39.18	36.60	33.89
	SDT	74.85	84.11	93.40	102.71	112.06	121.16	130.34
	KW	1.89	2.10	2.35	2.62	2.93	3.27	3.66
55.0 (12.8)	TCG	53.74	51.14	48.46	45.75	42.97	40.14	37.20
	SDT	76.40	85.41	94.76	104.00	113.27	122.31	131.40
	KW	1.89	2.11	2.35	2.63	2.94	3.29	3.68
N4A4S48AKANA								
30.0 (-1.1)	TCG	38.05	36.11	34.19	32.26	30.26	28.17	25.97
	SDT	70.62	79.92	89.27	98.66	108.06	117.49	126.92
	KW	2.25	2.45	2.70	3.00	3.34	3.75	4.21
35.0 (1.7)	TCG	41.87	39.78	37.70	35.60	33.43	31.17	28.79
	SDT	72.00	81.22	90.51	99.85	109.22	118.60	127.96
	KW	2.26	2.46	2.72	3.02	3.37	3.77	4.24
40.0 (4.4)	TCG	46.02	43.75	41.49	39.20	36.85	34.40	31.71
	SDT	73.48	82.63	91.89	101.17	110.47	119.77	129.03
	KW	2.26	2.47	2.73	3.04	3.39	3.80	4.27
45.0 (7.2)	TCG	50.50	48.04	45.58	43.10	40.54	37.88	35.10
	SDT	75.10	84.21	93.39	102.59	111.81	121.04	130.22
	KW	2.27	2.48	2.75	3.06	3.42	3.83	4.30
50.0 (10.0)	TCG	55.39	52.67	50.00	47.30	44.52	41.64	38.62
	SDT	76.95	85.90	94.99	104.12	113.25	122.35	131.43
	KW	2.27	2.49	2.76	3.08	3.45	3.86	4.34
55.0 (12.8)	TCG	60.58	57.73	54.77	51.83	48.81	45.68	42.41
	SDT	78.82	87.79	96.72	105.73	114.73	123.74	132.72
	KW	2.27	2.51	2.78	3.10	3.47	3.89	4.37

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CONDENSER ONLY RATINGS (Continued)

SST °F (°C)		CONDENSER ENTERING AIR TEMPERATURES °F (°C)						
		55.0 (12.8)	65.0 (18.3)	75.0 (23.9)	85.0 (29.4)	95.0 (35.0)	105.0 (40.6)	115.0 (46.1)
N4A4S60AKANA								
30.0 (-1.1)	TCG	48.86	46.38	43.92	41.41	38.79	36.02	33.09
	SDT	71.15	80.38	89.65	98.97	108.25	117.49	126.66
	KW	2.73	2.99	3.30	3.67	4.10	4.59	5.16
35.0 (1.7)	TCG	53.79	51.10	48.43	45.70	42.85	39.87	36.67
	SDT	72.64	81.80	91.01	100.26	109.46	118.64	127.76
	KW	2.75	3.01	3.33	3.70	4.14	4.64	5.21
40.0 (4.4)	TCG	59.10	56.19	53.28	50.30	47.20	43.95	40.47
	SDT	74.25	83.34	92.49	101.64	110.78	119.88	128.91
	KW	2.77	3.04	3.36	3.74	4.18	4.69	5.27
45.0 (7.2)	TCG	64.80	61.64	58.47	55.23	51.85	48.30	44.54
	SDT	75.99	84.99	94.06	103.14	112.20	121.20	130.14
	KW	2.78	3.06	3.39	3.78	4.23	4.74	5.32
50.0 (10.0)	TCG	70.91	67.48	64.02	60.48	56.80	52.92	48.82
	SDT	77.86	86.77	95.77	104.76	113.70	122.61	131.43
	KW	2.79	3.08	3.42	3.81	4.27	4.79	5.37
55.0 (12.8)	TCG	77.45	73.70	69.92	66.05	62.03	57.81	53.36
	SDT	79.90	88.70	97.59	106.47	115.30	124.08	132.77
	KW	2.81	3.10	3.44	3.85	4.31	4.83	5.42

KW - Outdoor Unit Kilowatts Only.

SDT - Saturated Temperature Leaving Compressor (°F)

SST - Saturated Temperature Entering Compressor (°F/°C)

TCG - Gross Cooling Capacity (1000 Btu/h)

GUIDE SPECIFICATIONS

GENERAL

System Description

Outdoor-mounted, air-cooled, split-system air conditioner unit suitable for ground or rooftop installation. Unit consists of a hermetic compressor, an air-cooled coil, propeller-type condenser fan, and a control box. Unit will discharge supply air upward as shown on contract drawings. Unit will be used in a refrigeration circuit to match up to a packaged fan coil or coil unit.

Quality Assurance

- Unit will be rated in accordance with the latest edition of AHRI Standard 210/240.
- Unit will be certified for capacity and efficiency, and listed in AHRI directory.
- Unit construction will comply with latest edition of ANSI/ASHRAE and with NEC.
- Unit will be constructed in accordance with UL standards and will carry the UL label of approval. Unit will have c-UL-us approval.
- Unit cabinet will be capable of withstanding Federal Test Method Standard No. 141 (Method 6061) 500-hr salt spray test.
- Air-cooled condenser coils will be leak tested at 150 psig and pressure tested at 470 psig.
- Unit constructed in ISO9001 approved facility.

Delivery, Storage, and Handling

- Unit will be shipped as single package only and is stored and handled per unit manufacturer's recommendations.

Warranty (for inclusion by specifying engineer)

- U.S. and Canada only.

PRODUCTS

Equipment

Factory assembled, single piece, air-cooled air conditioner unit. Contained within the unit enclosure is all factory wiring, piping, controls, compressor, refrigerant charge R-410A, and special features required prior to field start-up.

Unit Cabinet

- Unit cabinet will be constructed of galvanized steel, bonderized, and coated with a pre-paint.

Fans

- Condenser fan will be direct-drive propeller type, discharging air upward.
- Condenser fan motors will be totally enclosed, 1-phase type with class B insulation and permanently lubricated bearings. Shafts will be corrosion resistant.
- Fan blades will be statically and dynamically balanced.
- Condenser fan openings will be equipped with coated steel wire safety guards.

Air-cooled, split-system air conditioner

N4A4S

1-1/2 to 5 nominal tons

Compressor

- Compressor will be hermetically sealed.
- Compressor will be mounted on rubber vibration isolators.

Condenser Coil

- Condenser coil will be air cooled.
- Coil will be constructed of aluminum fins mechanically bonded to copper or aluminum tubes which are then cleaned, dehydrated, and sealed.

Refrigeration Components

- Refrigeration circuit components will include liquid-line shutoff valve with sweat connections, vapor-line shutoff valve with sweat connections, system charge of R-410A refrigerant, and compressor oil.
- Unit will be shipped with filter drier for R-410A refrigerant.

Operating Characteristics

- The capacity of the unit will meet or exceed _____ Btuh at a suction temperature of _____ °F/°C. The power consumption at full load will not exceed _____ kW.
- Combination of the unit and the evaporator or fan coil unit will have a total net cooling capacity of _____ Btuh or greater at conditions of _____ CFM entering air temperature at the evaporator at _____ °F/°C wet bulb and _____ °F/°C dry bulb, and air entering the unit at _____ °F/°C.
- The system will have a SEER2 of _____ Btuh/watt or greater at DOE conditions.

Electrical Requirements

- Nominal unit electrical characteristics will be _____ v, single phase, 60 Hz. The unit will be capable of satisfactory operation within voltage limits of _____ v to _____ v.
- Nominal unit electrical characteristics will be _____ v, three phase, 60 Hz. The unit will be capable of satisfactory operation within voltage limits of _____ v to _____ v.
- Unit electrical power will be single point connection.
- Control circuit will be 24v.

Special Features

- Refer to section of this literature identifying accessories and descriptions for specific features and available enhancements.

Keypad Reader

The Openpath Keypad Reader revolutionizes PIN code access. Designed for ease of use for both credentialed users and visitors, the reader also supports multi-factor authentication with any combination of credentials and access methods. Built to last, the durable, capacitive touch keypad prevents spoofing, and the multi-technology, cloud-based device allows remote unlock and PIN-activated Lockdown, plus is backward compatible with third-party access systems through mobile gateway.



Features

Increased Security

Multi-factor authentication combines PIN code access with any combination of credentials and access methods for secure ease of use

Fast & Reliable

Patented Triple Unlock with Bluetooth, WiFi and cellular data

Touchless Access

Supports hands-free Wave to Unlock, mobile or watch app, tablet, HF and LF keycards, fobs, and Cloud Key

Durability

Capacitive touch screen eliminates physical buttons and guarantees minimal wear-and-tear.

Cloud Security

Encrypted end-to-end communication, strong public key cryptography

Interoperability

Easily integrates with physical on-premise systems and logical software systems

Simple Management

Software runs in the cloud, no need to set up or maintain local servers and software

Capacity Tracking

Track occupancy and enforce capacity limits with innovative BLE functionality

Monitoring

Built-in diagnostic and real-time troubleshooting insights

Reliability

Instant software upgrades ensure consistent, high-quality performance



Works with any single or combined credential type



Keypad Reader

Specifications

Cloud Based	Yes
Form	Mullion & Standard
Color	Black
Frequency	Bluetooth LE (2402-2480MHz): 2 dBm
Openpath Bluetooth	Yes
NFC	Yes
Wave to Unlock/Touch	Yes
Auto Proximity Unlock	Yes
Openpath Prox Cards/Fobs	Yes
HID Prox®	Yes
LenelProx®	Yes
Openpath DESFire EV3	Yes
MIFARE/DESFire (CSN)	Yes
Standards	ISO 14443A, Prox
Certification	FCC, CE, ISED/IC, UL294, IP65
Environmental	IP65

Installation Options

Mullion (OP-RKP-MULL)

- Surface mounted on wall or door frame

Standard (OP-RKP-STND)

- Flush mounted with US gang box
- Surface mounted on a wall
- Surface mounted on EU gang box

Features

- Modern design, can seamlessly blend into or upgrade the aesthetics of any entry
- Indoor/outdoor design
- Supports auxiliary Wiegand readers connected through the Openpath reader
- Functions seamlessly with the Openpath mobile app on both Android and iOS
- Works with Smart Watches in addition to the mobile app
- Supports remote unlocking with user-level privileges
- Supports PIN functionality
- Supports two-factor authentication (2FA) & multi-factor authentication (MFA)

Installation

The Keypad Reader and our ACUs communicate via RS-485. We recommend using a shielded CAT6A cable with recommended maximum cable length of 300ft (91m) with CAT6 or 500ft (152 m) if two wire pairs are used for GND and VIN (power).

Please review the wiring information chart for additional wiring instructions. Temperature should not exceed -22°F to 140°F (-30°C to 60°C).

Security

- Fully encrypted communication between mobile app and controller
- Fully encrypted communication between Openpath key cards and reader
- Eliminates the threat of copying or cloning Openpath key cards
- Includes tamper resistant secure storage
- Fully encrypted PIN transmission between reader and controller

System Compatibility

- The Keypad Reader works with Openpath Access System including Openpath controllers, cloud management software, and the Openpath mobile app and mobile SDK
- The Keypad Reader works with legacy access control systems via Mobile Gateway option
- The Keypad Reader works with 3rd party wiegand accessories
- Support for Apple Enhanced Contactless Protocol (ECP)

Dimensions

- Mullion: 4.4 x 18.4 x 2.4 cm (1.7 x 7.2 x 0.9 in)
- With Standard bracket: No back plate, on gang box: 11 x 12 x 1.2 cm (4.3 x 4.7 x 0.5 in)

Power Rating

- 0.25A @ 12VDC
- 0.12A @ 24VDC



MS-9200UDLS(E) Rev 3

Intelligent Addressable FACP with Built-In Communicator



Addressable Fire Alarm Control Panel

General

The Fire•Lite MS-9200UDLS Rev 3 with Version 5.0 firmware is a combination FACP (Fire Alarm Control Panel) and DACT (Digital Alarm Communicator/Transmitter) all on one circuit board. This compact intelligent addressable control panel has an extensive list of powerful features.

While the MS-9200UDLS Rev 3 may be used with an SLC configured in the CLIP (Classic Loop Interface Protocol) mode, it can also operate in LiteSpeed™ mode—Fire•Lite's latest polling technology—for a quicker device response time. LiteSpeed's patented technology polls 10 devices at a time. This improvement allows a fully-loaded panel with up to 198 devices to report an incident and activate the notification circuits in under 10 seconds. With Litespeed polling, devices can be wired on standard twisted, unshielded wire up to a distance of 10,000 feet.

The MS-9200UDLS Rev 3's quick-remove chassis protects the electronics during construction. The backbox can be installed allowing field wiring to be pulled. When construction is completed, the electronics can be quickly installed with just two bolts.

New features for Rev 3 with Version 5.0 firmware include removable terminal blocks, improved transient protection, additional secondary ANN-BUS, and increased power for the resettable and remote sync outputs.

Available accessories include ANN-BUS devices as well as ACS LED, graphic and LCD annunciators, and reverse polarity/city box transmitter.

The integral DACT transmits system status (alarms, supervisions, troubles, AC loss, etc.) to a Central Station via the public switched telephone network. It also allows remote and local programming of the control panel using the PS-Tools Upload/Download utility. In addition, the control panel may be programmed or interrogated off-site via the public switched telephone network. Any personal computer with Windows® XP or greater, a compatible modem, and PS-Tools—the Fire•Lite Upload/Download software kit—may serve as a Service Terminal. This allows download of the entire program or upload of the entire program, history file, walktest data, current status and system voltages. The panel can also be programmed through the FACP's keypad or via a standard PS-2 computer keyboard, which can be plugged directly into the printed circuit board. This permits easy typing of address labels and other programming information.

Version 5.0 firmware supports the following: Primary and Secondary ANN-bus devices, AD355 (LiteSpeed), USB port, NAC circuit diagnostics, a new report has been added to the walk-test that lists untested devices, new device types added: audio telephone type code for ACC 25/50ZST, Photo Supervisory and auto-resettable Drill (non-latching).

The FireWatch Series internet monitoring modules IPDACT-2 and IPDACT-2UD permit monitoring of alarm signals over the Internet saving the monthly cost of two dedicated business telephone lines. Although not required, the secondary telephone line may be retained providing backup communication over the public switched telephone line.

NOTE: Unless otherwise specified, the term MS-9200UDLS is used in this document to refer to both the MS-9200UDLS and the MS-9200UDLS(E) FACPs (Fire Alarm Control Panels).



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Features

- Listed to UL standard 864, 9th edition.
- On-board DACT.
- Remote site or local USB port upload/download, using PS-Tools.
- Four (4) Style Y (Class B) NAC circuits, which can be converted to four (4) Style Z (Class A) circuits with optional ZNAC-92 converter module. (Up to 6.0 amps total NAC power when using optional XRM-24B.)
- Selectable strobe synchronization for System Sensor, Wheelock, and Gentex devices.
- Remote Acknowledge, Silence, Reset and Drill via addressable monitor modules or LCD-80F, ANN-80 or Legacy ACS Announciators.
- ANN-BUS for connection to following optional modules (cannot be used if ACS annunciators are used):
 - ANN-80(-W) Remote LCD Annunciator
 - ANN-I/O LED Driver
 - ANN-S/PG Printer Module
 - ANN-RLY Relay Module
 - ANN-LED Annunciator Module
 - ANN-RLED Annunciator Module alarms only
 - ROME Relay Option Module Enclosure
- ACS/TERM:
 - ACS Announciators: Up to 32 Legacy ACM Series annunciators (ACM-16AT or ACM-32 series). Cannot be used if ANN-BUS devices are used.
 - Terminal-mode Announciators: Up to 32 Legacy LCD-80F remote annunciators.

- EIA-232 printer/PC interface (variable baud rate) on main circuit board, for use with optional UL-listed printer PRN-6F.
- Integral 80-character LCD display with backlighting.
- Real-time clock/calendar with automatic daylight savings control.
- Detector sensitivity test capability (NFPA 72 compliant).
- History file with 1,000-event capacity.
- Maintenance alert warns when smoke detector dust accumulation is excessive.
- Automatic device type-code verification.
- One person audible or silent walk test with walk-test log and printout.
- Point trouble identification.
- Waterflow (nonsilenceable) selection per monitor point.
- System alarm verification selection per detector point.
- PAS (Positive Alarm Sequence) and presignal delay per point (NFPA 72 compliant).

NOTE: Only detectors may participate in PAS.

SLC LOOP:

- SLC can be configured for NFPA Style 4, 6, or 7 operation.
- SLC supports up to 198 addressable devices per loop (99 detectors and 99 monitor, control, or relay modules).
- SLC loop maximum length 10,000 ft. (3,000 m.).
See installation manual for wire tables.

NOTIFICATION APPLIANCE CIRCUITS (NACS):

- Four onboard NACs with additional NAC capability using output control modules (CMF-300 or CMF-300-6). The four Class B NACs can be converted to four Class A NACs with optional ZNAC-92 converter module.
- Silence Inhibit and Auto Silence timer options.
- Continuous, March Time, Temporal or California code for main circuit board NACs with two-stage capability.
- Selectable strobe synchronization per NAC.
- 2.5 amps maximum per each NAC circuit.

NOTE: Maximum 24VDC system power output is shared among all NAC circuits and 24VDC special-application auxiliary power outputs. Total available output is 3.0 amps. Using the optional XRM-24B transformer increases 24VDC output to 6.0 amps.

PROGRAMMING AND SOFTWARE:

- Autoprogram (learn mode) reduces installation time.
- Custom English labels (per point) may be manually entered or selected from an internal library file.
- Three Form-C relay outputs (two programmable).
- 99 software zones.
- Continuous fire protection during online programming at the front panel.
- Program Check automatically catches common errors not linked to any zone or input point.
- **OFFLINE PROGRAMMING:** Create the entire program in your office using a Windows®-based software package (order programming kit PS-Tools, separately). Upload/download system programming locally to the MS-9200UDLS Rev 3 in less than one minute.
- USB upload/download programming with standard Male-A to Male-B cable.

User Interface

LED INDICATORS

- AC Power (green)
- Fire Alarm (red)

- Supervisory (yellow)
- Alarm Silenced (yellow)
- System Trouble (yellow)
- Maintenance/Presignal (yellow)
- Disabled (yellow)
- Battery Fault (yellow)
- Ground Fault (yellow)

KEYPAD CONTROLS

- Acknowledge/Step
- Alarm Silence
- Drill
- System Reset (lamp test)
- 16-key alpha-numeric pad (similar to telephone keypad)
- 4 cursor keys
- Enter

Product Line Information

MS-9200UDLS: 198-point addressable Fire Alarm Control Panel, one SLC loop. Includes 80-character LCD display, single printed circuit board mounted on chassis, and cabinet. 120 VAC operation.

MS-9200UDLSE: Same as **MS-9200UDLS**, except with 240 VAC operation.

4XTMF Reverse Polarity Transmitter Module: Provides supervised output for local energy municipal box transmitter, alarm, and trouble.

ZNAC-92: Optional converter module which converts four (4) Style Y (Class B) NAC circuits to four (4) Style Z (Class A) circuits.

PK-CD Programming software for Windows®-based PC computer (cable not included), available on www.firelite.com.

DP-9692: Optional dress panel for MS-9200UDLS Rev 3.

TR-CE: Optional trim Ring for semi-flush mounting.

BB-26: Battery backbox, holds up to two 25 AH batteries and CHG-75.

BB-55F: Battery box, houses two 55 AH batteries.

CHG-75: Battery charger for lead-acid batteries with a rating of 25 to 75 AH.

CHG-120F: Remote battery charging system for lead-acid batteries with a rating of 55 to 120 AH. Requires additional BB-55F for mounting.

BAT Series: Batteries, see data sheet DF-52397.

XRM-24B(E): Optional transformer. Increases system power output to 6.0 amps. Use XRM-24BE with MS-9200UDLS Rev 3(E).

PRT/PK-CABLE: Cable printer/personal computer interface cable; required for printer or for local upload/download programming and updating panel firmware.

PRN-6F: UL listed compatible event printer. Uses tractor-fed paper.

IPDACT-2/2UD, IPDACT Internet Monitoring Module: Mounts in bottom of enclosure with optional mounting kit (PN IPBRKT). Connects to primary and secondary DACT telephone output ports for internet communications over customer provided ethernet internet connection. Requires compatible Teldat VisorALARM Central Station Receiver. Can use DHCP or static IP. (See data sheet DF-60407 or DF-52424 for more information.)

IPBRKT: Mounting kit for IPDACT-2/2UD in common enclosure.

IPSPLT: Y-adaptor option allows connection of both panel dialer outputs to one IPDACT-2/2UD cable input.

COMPATIBLE ANNUNCIATORS

ANN-80(-W): LCD Annunciator is a remote LCD annunciator that mimics the information displayed on the FACP LCD display. Recommended wire type is un-shielded. (Basic model is red; order -W version for white; see *DF-52417*.)

ANN-LED: Annunciator Module provides three LEDs for each zone: Alarm, Trouble and Supervisory. Ships with red enclosure (see *DF-60241*).

ANN-RLED: Provides alarm (red) indicators for up to 30 input zones or addressable points. (See *DF-60241*.)

ANN-RLY: Relay Module, which can be mounted inside the cabinet, provides 10 programmable Form-C relays. (See *DF-52431*.)

ROME: Relay Option Module Enclosure. Provides one **ANN-RLY** Relay Module already installed. The ROME Series provides mounting space for one additional Relay Module or one addressable Multi-module. (See *Installation Sheet PN 53530*.)

ANN-S/PG: Serial/Parallel Printer Gateway module provides a connection for a serial or parallel printer. (See *DF-52429*.)

ANN-I/O: LED Driver Module provides connections to a user supplied graphic annunciator. (See *DF-52430*.)

ACM-8RF: Relay module provides 8 Form-C 5.0 amp relays.

ACS-LED Zone Series: LED-type fire annunciators capable of providing up to 99 software zones of annunciation. Available in increments of 16 or 32 points to meet a variety of applications.

LDM Graphic Series: Lamp Driver Module series for use with custom graphic annunciators.

LCD-80F (Liquid Crystal Display) point annunciator: 80-character, backlit LCD-type fire annunciators capable of displaying English-language text.

NOTE: For more information on Compatible Annunciators for use with the MS-9200UDLS Rev 3, see the following data sheets (document numbers) ACM-8RF (*DF-51555*), ACS/ACMSeries (*DF-52378*), LDM Series (*DF-51384*), LCD-80F (*DF-52185*).

LITESPEED COMPATIBLE ADDRESSABLE DEVICES

All feature a polling LED and rotary switches for addressing.

CP355: Addressable low-profile ionization smoke detector.

SD355: Addressable low-profile photoelectric smoke detector.

SD355T: Addressable low-profile photoelectric smoke detector with thermal sensor.

SD355R: Addressable remote test capable detector for use with D355PL or DNR(W) duct smoke detector housings.

H355: Fast-response, low-profile heat detector.

H355R: Fast-response, low-profile heat detector with rate-of-rise option.

H355HT: Fixed high-temperature detector that activates at 190F/88C.

AD355(A): Low-profile, intelligent, "Adapt" multi-sensor detector (B350LP base included).

BEAM355: Intelligent beam smoke detector.

BEAM355S: Intelligent beam smoke detector with integral sensitivity test.

D355PL: Innovair Flex low-flow non-relay duct-detector housing. SD355R included.

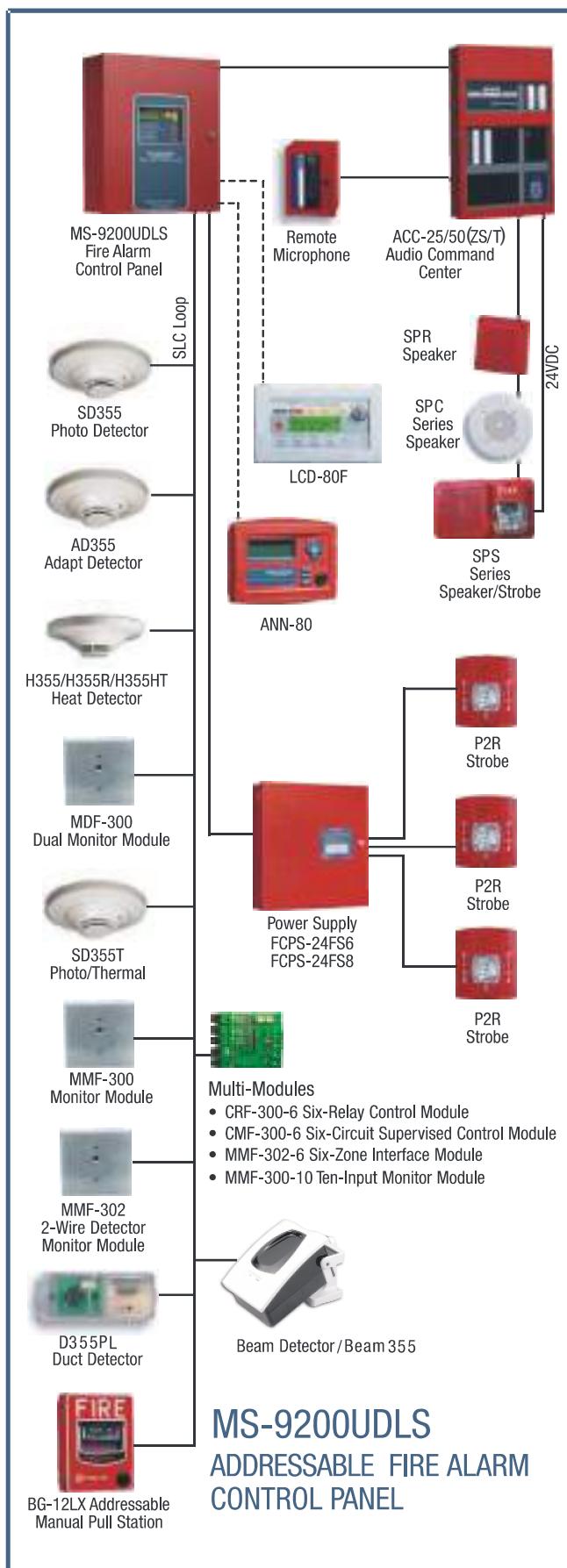
DNRW: Innovair Flex low-flow non-relay duct-detector housing, with NEMA-4 rating. Watertight. (Order SD355R separately.)

MMF-300: Addressable Monitor Module for one zone of normally-open dry-contact initiating devices. Mounts in standard 4.0" (10.16 cm.) box. Includes plastic cover plate and end-of-line resistor. Module may be configured for either a Style B (Class B) or Style D (Class A) IDC.

MDF-300: Dual Monitor Module. Same as MMF-300 except it provides two Style B (Class B) only IDCs.

MMF-301: Miniature version of MMF-300. Excludes LED and Style D option. Connects with wire pigtails. May mount in device backbox.

MMF-302: Similar to MMF-300, but may monitor up to 20 conventional two-wire detectors. Requires resettable 24 VDC power. Consult factory for compatible smoke detectors.



CMF-300: Addressable Control Module for one Style Y/Z (Class B/A) zone of supervised polarized Notification Appliances. Mounts directly to a 4.0" (10.16 cm.) electrical box. Notification Appliance Circuit option requires external 24 VDC to power notification appliances.

CRF-300: Addressable relay module containing two isolated sets of Form-C contacts, which operate as a DPDT switch. Mounts directly to a 4.0" (10.16 cm.) box, surface mount using the SMB500.

BG-12LX: Addressable manual pull station with interface module mounted inside.

I300: Fault Isolator Module. This module isolates the SLC loop from short circuit conditions (required for Style 6 or 7 operation).

SMB500: Used to mount all modules except the MMF-301 and M301.

MMF-300-10: Ten-input monitor module. Mount one or two modules in a BB-2F cabinet (optional). Mount up to six modules on a CHS-6 chassis in a BB-6F.

MMF-302-6: Six-zone interface module for compatible conventional two-wire detectors. Mount one or two modules in a BB-2F cabinet (optional). Mount up to six modules on a CHS-6 chassis in a BB-6F.

CMF-300-6: Six-circuit supervised control module. Mount one or two modules in a BB-2F cabinet (optional). Mount up to six modules on a CHS-6 chassis in a BB-6F.

CRF-300-6: Six Form-C relay control module. Mount one or two modules in a BB-2F cabinet (optional). Mount up to six modules on a CHS-6 chassis in a BB-6F.

NOTE: 1) For more information on Compatible Addressable Devices for use with the MS-9200UDLS Rev 3, see the following data sheets (document numbers): AD355 (DF-52324), BG-12LX (DF-52013), CMF-300-6 (DF-52365), CRF-300-6 (DF-60379), CMF/CRF Series (DF-52130), CP355 (DF-52383), D355PL (DF-52398), H355 Series (DF-52385), I300 (DF-52389), MMF-300 Series/MDF-300 (DF-52121), MMF-300-10 (DF-52347), MMF-302-6 (DF-52356), SD355/SD355T (DF-52384). 2) Legacy 300 Series detection devices such as the CP300/CP350, SD300(T)/SD350(T) and older modules such as the M300, M301, M302, C304, and BG-10LX are **not compatible** with LiteSpeed polling. If the SLC contains one of these devices, polling must be set for standard LiteSpeed protocol. Please consult factory for further information on previous 300 Series devices.

Wiring Requirements

While shielded wire is not required, it is recommended that all SLC wiring be twisted-pair to minimize the effects of electrical interference. Wire size should be no smaller than 18 AWG (0.78 mm²) and no larger than 12 AWG (3.1 mm²). The wire size depends on the length of the SLC circuit. Refer to the panel manual for wiring details.

SYSTEM SPECIFICATIONS

System Capacity

• Intelligent Signalling Line Circuits.....	1
• Addressable device capacity	198
• Programmable software zones.....	99
• ACS Annunciators	32
• ANN-bus devices.....	16

16.65" (42.29 cm.) wide x 5.20" (13.34 cm.) deep. **Trim Ring (TR-CE):** 22.00" (55.88 cm.) high x 19.65" (49.91 cm.) wide.

Shipping Specifications

Weight: 26.9 lbs. (12.20 kg.) **Dimensions:** 20.00" (50.80 cm.) high x 22.5" (57.15 cm.) wide x 8.5" (21.59 cm.) deep.

Temperature and Humidity Ranges

This system meets NFPA requirements for operation at 0 – 49°C/32 – 120°F and at a relative humidity 93% ± 2% RH (noncondensing) at 32°C ± 2°C (90°F ± 3°F). However, the useful life of the system's standby batteries and the electronic components may be adversely affected by extreme temperature ranges and humidity. Therefore, it is recommended that this system and its peripherals be installed in an environment with a normal room temperature of 15 – 27°C/60 – 80°F.

NFPA Standards

The MS-9200UDLS Rev 3 complies with the following NFPA 72 Fire Alarm Systems requirements:

- **LOCAL** (Automatic, Manual, Waterflow and Sprinkler Supervisory).
- **AUXILIARY** (Automatic, Manual and Waterflow) (requires 4XTMF).
- **REMOTE STATION** (Automatic, Manual, Waterflow and Sprinkler Supervisory) (Where a DACT is not accepted, the alarm, trouble and supervisory relays may be connected to UL 864 listed transmitters. For reverse polarity signaling of alarm and trouble, 4XTMF is required.)
- **PROPRIETARY** (Automatic, Manual, Waterflow and Sprinkler Supervisory).
- **CENTRAL STATION** (Automatic, Manual, Waterflow and Sprinkler Supervisory).
- **OT, PSDN** (Other Technologies, Packet-switched Data Network)

Agency Listings and Approvals

The listings and approvals below apply to the basic MS-9200UDLS Rev 3 control panel. In some cases, certain modules may not be listed by certain approval agencies, or listing may be in process. Consult factory for latest listing status.

- **UL Listed:** S624
- **FM approved**
- **CSFM:** 7165-0075:0208
- **MEA:** 120-06-E

For ULC-listed version, see DF-60599.



This document is not intended to be used for installation purposes.
We try to keep our product information up-to-date and accurate.
We cannot cover all specific applications or anticipate all requirements.

All specifications are subject to change without notice.

For more information, contact Fire•Lite Alarms. Phone: (800) 627-3473, FAX: (877) 699-4105.
www.firelite.com



Made in the U.S. A.

BLODGETT

DFG-100

**Full-Size, Standard Depth
Dual Flow Gas Convection Oven**



OPTIONS AND ACCESSORIES

(AT ADDITIONAL CHARGE)

■ Legs, casters & stands

- 6" (152mm) seismic legs
- 6" (152mm) casters
- 4" (102mm) low profile casters (double only)
- 25" (635mm) stainless steel stand w/rack guides
- 29" (737mm) stainless steel, fully welded open stand with pan supports

■ Gas hose w/quick disconnect restraining device

- 48" (1219mm) hose
- 36" (914mm) hose
- SSI-M - Solid state infinite control w/manual timer
- Stainless steel oven liner
- Extra oven racks
- Stainless steel solid back panel
- Gas manifold (for double sections)
- Prison package (includes security control panel and stainless steel back)
- Flue connector

OPTIONS AND ACCESSORIES

(AT NO ADDITIONAL CHARGE)

- Solid stainless steel doors

Project _____

Item No. _____

Quantity _____

Standard depth baking compartment - accepts five 18" x 26" standard full-size baking pans in left-to-right positions.

All data is shown per oven section, unless otherwise indicated.

Refer to operator manual specification chart for listed model names.

EXTERIOR CONSTRUCTION

- Stainless steel front, top, and sides
- Dual pane thermal glass windows encased in stainless steel door frames
- Powder coated door handle with simultaneous door operation
- Triple-mounted pressure lock door design with turnbuckle assembly
- Modular slide out front control panel for easy cleaning
- Solid mineral fiber insulation at top, back, sides and bottom

INTERIOR CONSTRUCTION

- Full angle-iron frame
- Double-sided porcelainized baking compartment liner (14 gauge)
- Aluminized steel combustion chamber
- Dual inlet blower wheel
- Five chrome-plated racks, eleven rack positions with a minimum of 1-5/8" (41mm) spacing

OPERATION

- Dual Flow Gas system combines direct and indirect heat
- Electronic spark ignition control system
- Removable dual tube burners
- Pressure regulator
- Manual gas service cut-off switch located on the front of the control panel
- Air mixers with adjustable air shutters
- Solid state thermostat with temperature control range of 200°F (93°C) to 500°F (260°C)
- Two speed fan motor
- 1/2 horsepower blower motor with automatic thermal overload protection
- Control area cooling fan
- Interior oven lights

STANDARD FEATURES

- SSD - Solid state digital control with LED display, Cook & Hold and Pulse Plus®
- 25" (635mm) adjustable stainless steel legs (for single units)
- 6" (152mm) adjustable stainless steel legs (for double sections)
- Draft diverter or draft hood for venting (select one)
- Three year parts and two year labor warranty
- Five year limited oven door warranty*
- * For all international markets, contact your

** For all international markets, contact your local distributor.*

NOTE: The company reserves the right to make substitutions of components without prior notice


www.blodgett.com

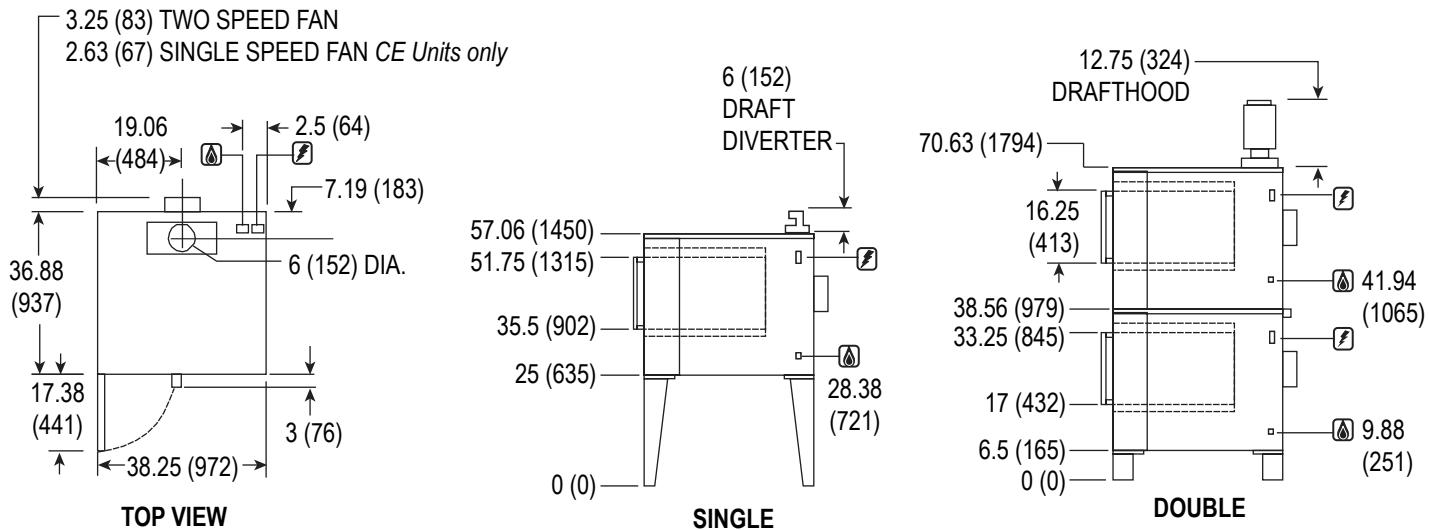
42 Allen Martin Drive, Essex Junction, VT 05452

Phone: (802) 658-6600 | Fax: (802) 864-0183

DFG-100

BLODGETT**DFG-100**

APPROVAL/STAMP



SHORT FORM SPECIFICATIONS Provide Blodgett full-size convection oven model DFG-100, (single/double) compartment. Each compartment shall have (porcelainized/stainless) steel liner and shall accept five 18" x 26" standard full-size bake pans. Stainless steel front, top and sides. Doors shall be (solid stainless steel/have dual pane thermal glass windows) with single powder coated handle and simultaneous operation. Unit shall be gas heated with electronic spark ignition and shall cook by means of a dual-flow system combining direct and indirect heat with a gas shutoff switch on the front of the control panel. Air in baking chamber distributed by dual inlet blower wheel powered by a two-speed, 1/2 HP motor with thermal overload protection. Each chamber shall be fitted with two commercial oven lamps, and five chrome-plated removable racks. Control panel shall be recessed with solid state digital control with LED display, Cook & Hold and Pulse Plus. Provide three years parts, two year labor and five year door warranty. Provide options and accessories as indicated.

DIMENSIONS

Floor space	38-1/4" (972mm) W x 36-7/8" (937mm) D
Interior	29" (737mm) W x 20" (508mm) H x 24-1/4" (616mm) D
If oven is on casters	
Single	Add 4-1/2" (114mm) to height
Double	Height dimensions remain the same
Double Low Profile	Subtract 2.5" (64mm) from all height dimensions

PRODUCT CLEARANCE**From combustible and non-combustible construction**

Oven sides	2" (51mm)
Oven back	0" (0mm)

MINIMUM ENTRY CLEARANCE

Uncrated	32-1/16" (814mm)
Crated	37-1/2" (953mm)

SHIPPING INFORMATION**Approx. Weight**

Single	600 lbs. (273 kg)
Double	1295 lbs. (589 kg)

Crate Size

37-1/2" (952mm) x 43-1/2" (1105mm) x 51-3/4" (1315mm)
(2 crates required for double)

GAS SUPPLY (per section)

3/4" NPT

Inlet Pressure

Natural Gas	7.0" W.C. min. - 10.5" W.C. max.
Propane	11.0" W.C. min. - 13.0" W.C. max.

Manifold Pressure

Natural Gas	3.5" W.C.
Propane	10" W.C.

MAXIMUM INPUT

55,000 BTU/hr (16.2 Kw) per oven section

POWER SUPPLY

115 VAC, 1 phase, 6 Amp, 60 Hz., 2-wire with ground, 1/2 H.P., 2 speed motor, 1120 and 1710 RPM
6' (1.8m) electric cord set furnished on 115 VAC ovens only.



CHEMICAL SANITIZING SINGLE RACK STRAIGHT DISHWASHER

AH

Low Temperature
Straight Dishwasher



CMA MODEL: AH



Solid/Powder Dual Bowl
Option Dispenser. Bowl
option available for capsule
dispensed products.



Unique pull-pin design
allows wash arms to be
easily removed for cleaning.



Pump purging system
improves results by
eliminating soil and
chemical carryover during
rinse cycle.

FEATURES

- 40 racks / 160 covers per hour.
- All stainless steel construction assures long life and years of trouble free operation.
- Unique spray arm system features upper and lower stainless steel wash arms with reinforced end caps.
- Top mounted controls include built-in chemical pumps and deliming system that assures proper chemical usage.
- Auto start/stop makes operation safe and easy.
- Integrated scrap tray prevents food soil from entering drain system.
- Water inlet comes with built-in strainer, prevents debris from clogging the water valve.
- Dishmachine comes with 2 dishracks.
- Stainless steel impeller offers extended life and service.
- Stainless Steel scrap tray, long lasting.

AVAILABLE OPTIONS

- Temp-Sure heater assures a continuous supply of 140°F hot water that guarantees excellent results. Requires a separate 208-240V 3 phase 40 amp power supply.
- Low Chemical Alarm
- Stainless Steel Dishtables
- Alternative Cycle Times
- Alternative Electrical Available
- Slant shelf 21"X42"
- Stainless Steel Scrap Trap in lieu of Poly Pro



CMA
MIZER
Registered Trademark

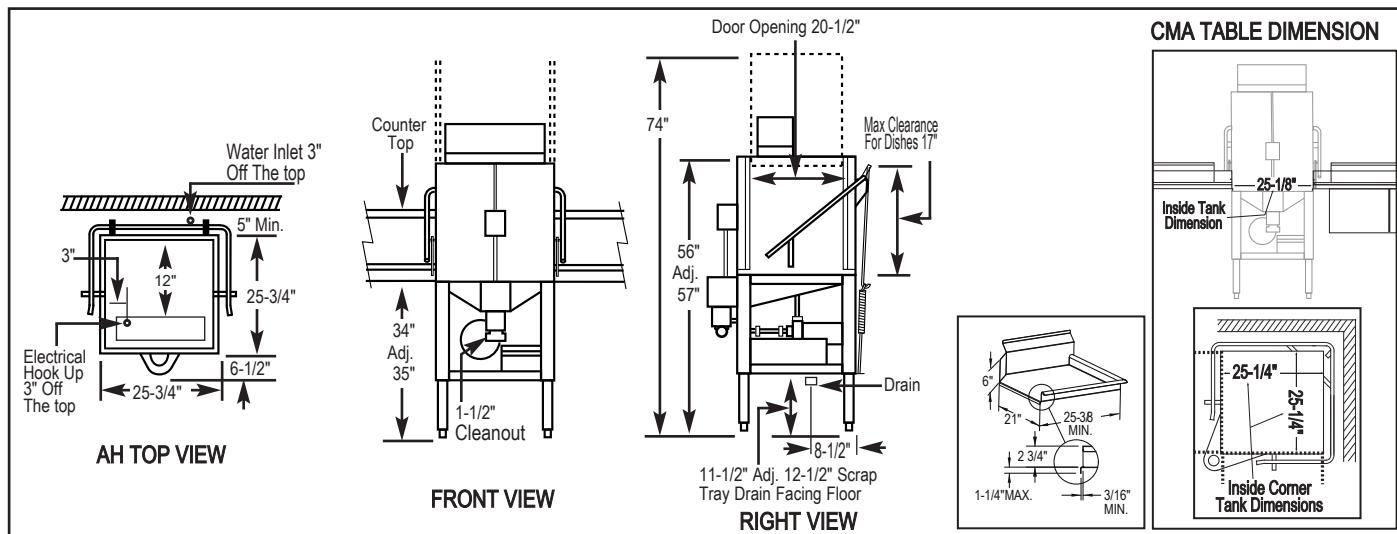


AH

Chemical Sanitizing
Single Rack
Straight Dishwasher

WARNINGS:

- Plumbing connections must be made by a qualified service company who will comply with all available Federal, State, and Local Health, Plumbing and Safety codes.
- CMA recommends utilizing a water softening system to maintain water hardness measurements of 3.5 gpg (grains per gallon) or less. This will assure maximum results and optimum operation of the dishmachine.



Specifications:

MODEL AH	USA	METRIC	USA	METRIC	
OPERATING CAPACITY RACKS PER HOUR (NSF RATED)	40	40	WASH PUMP MOTORS HP	1 1	
OPERATING CYCLE WASH TIME-SEC RINSE TIME-SEC DWELL TIME-SEC TOTAL CYCLE TIME	45 30 15 90	45 30 15 90	DEPTH	25-3/4" (65.4cm)	
WASH TANK CAPACITY	1.7 GAL. (6.45 L)	PUMP CAPACITY	52 GPM (197 LPM)	WIDTH (OUTSIDE DIMENSION)	25-3/4" (65.4cm)
OPERATING TEMPERATURE REQUIRED RECOMMENDED	120°F (49°C) 140°F (60°C)	STANDARD DISHRACK DIMENSIONS	20" x 20" (50.8 x 50.8cm)	HEIGHT	56"-57" (142.2cm-144.8cm)
WATER CONSUMPTION PER RACK PER HOUR	1.7 GAL. 68 GPH (6.45 L) (257 LPH)	ELECTRICAL RATING VOLTS AMPS	115 16	STANDARD TABLE HEIGHT	34" (86cm)
WATER REQUIREMENTS WATER INLET DRAIN-I.P.S.	3/4" 2"	APPROXIMATE SHIPPING WEIGHT	259# (117kg)	MAXIMUM CLEARANCE FOR DISHES	17" (43cm)
SHIPPING DIMENSIONS	PALLET & BOX @ 41" X 41" X 66"				

Summary Specifications: Model AH

CMA Energy Mizer model AH low temperature, chemical sanitizing commercial dishwashers meet NSF, UL and construction standards WITHOUT the use of BOOSTER or TANK HEATERS. The model AH is constructed entirely of stainless steel. Each unit automatically washes, rinses and sanitizes food service utensils in standard 19-3/4" x 19-3/4" racks. Unit comes standard with upper and lower stainless steel wash arms. The model AH incorporates a pump purging system that improves results by eliminating soil and chemical carryover during rinse cycle. **Note: These machines do not have built-in heaters, therefore produce no steam.**

Advisory: CMA does NOT endorse "Tankless On-Demand" water heaters for use on CMA Dishmachine products. CMA DOES endorse, and highly recommends, the standard "tank" style water heaters, sized properly to handle each particular facility with their water heating requirements.

Advisory: CMA does NOT endorse GFI outlets. CMA DOES endorse hard wiring this machine (UL921 standard requirement) to a dedicated, properly sized GFCI breaker.



LOW VOLTAGE AND HIGH VOLTAGE TECHNICAL SPECIFICATION

Electrical

Input voltage: Low voltage = 110-127 V, High voltage = 200-240 V

Frequency: 50 or 60 Hz, subject to voltage (85-115 V at 50 Hz); (85-130 V at 60 Hz); (200-240 V at 50 & 60 Hz)

Standby power consumption: Less than 0.5 W

Motor specification: 1,000 W digital brushless motor

Motor switching rate: 5,000 per second

Amp: Recommended dedicated 15 amp circuit. (110V ~10A; 120V ~8.33A; 220V ~4.55A; 240V ~4.17A)

Heater type: None

Construction

Fascia: Polycarbonate

Antibacterial coating type:

HU02 (Sprayed Nickel) contains antibacterial additive in paint.

HU02 (White) contains antibacterial moulded additive.

Can help prevent the growth of bacteria.

Back plate mounting bracket: ABS/PBT Plastic

Exterior screw type: Anti-tamper 4 mm Pin-Hex

Water ingress protection to IP24

Filter

HEPA filter (Glass fiber and fleece prelayer)

Removes 99.97% of bacteria as small as 0.3 microns

Operation

Touch free capacitive sensor activation

Hand dry time measurement: 12 seconds
(Measurement based on NSF Protocol P.335)

Sound power level: 79 dB(A)

Sound pressure level @ 2 m: 63 dB(A)¹

Operation lock-out period: 30 seconds

Airspeed at aperture: 675 km/h / 420 mph

Maximum altitude: 2,000 metres / 6,561 ft.

Operating airflow: up to 5.28 gal/sec & up to 42.38 CFM

Operating temperature range: 0°C-40°C / 32°F-104°F

Logistics

Single unit order code:

Sprayed Nickel - Low voltage: 307174-01, High voltage: 307172-01

White - Low voltage: 307173-01, High voltage: 307171-01

Unit barcodes:

Sprayed Nickel - Low voltage: 885609009933, High voltage: 885609009797

White - Low voltage: 885609009896, High voltage: 885609009179

Net weight: 2.9 kg / 6.17 lbs

Packaged weight: 4.0 kg / 8.81 lbs

Packaged dimensions:

(H) 146 mm × (W) 454 mm × (D) 273 mm / (H) 5 3/4" × (W) 17 7/8" × (D) 10 3/4"

Standard warranty

5 year parts and 5 year limited labor warranty

Accreditations:

Carbon Trust

NSF International

Quiet Mark

Contributes to LEED certification

ADA compliant

UL Listed



Product range (Select one)

HU02 Sprayed Nickel

Part number/SKU

Low Voltage: 307174-01
High Voltage: 307172-01

HU02 White

Part number/SKU

Low Voltage: 307173-01
High Voltage: 307171-01



The Carbon label is a trademark of the Carbon Trust. The NSF logo is the registered trademark of NSF International. Quiet Mark is a registered trademark of the Noise Abatement Society.

For further information, please contact Dyson: 1-855-720-6169,
www.dyson.com/airblade

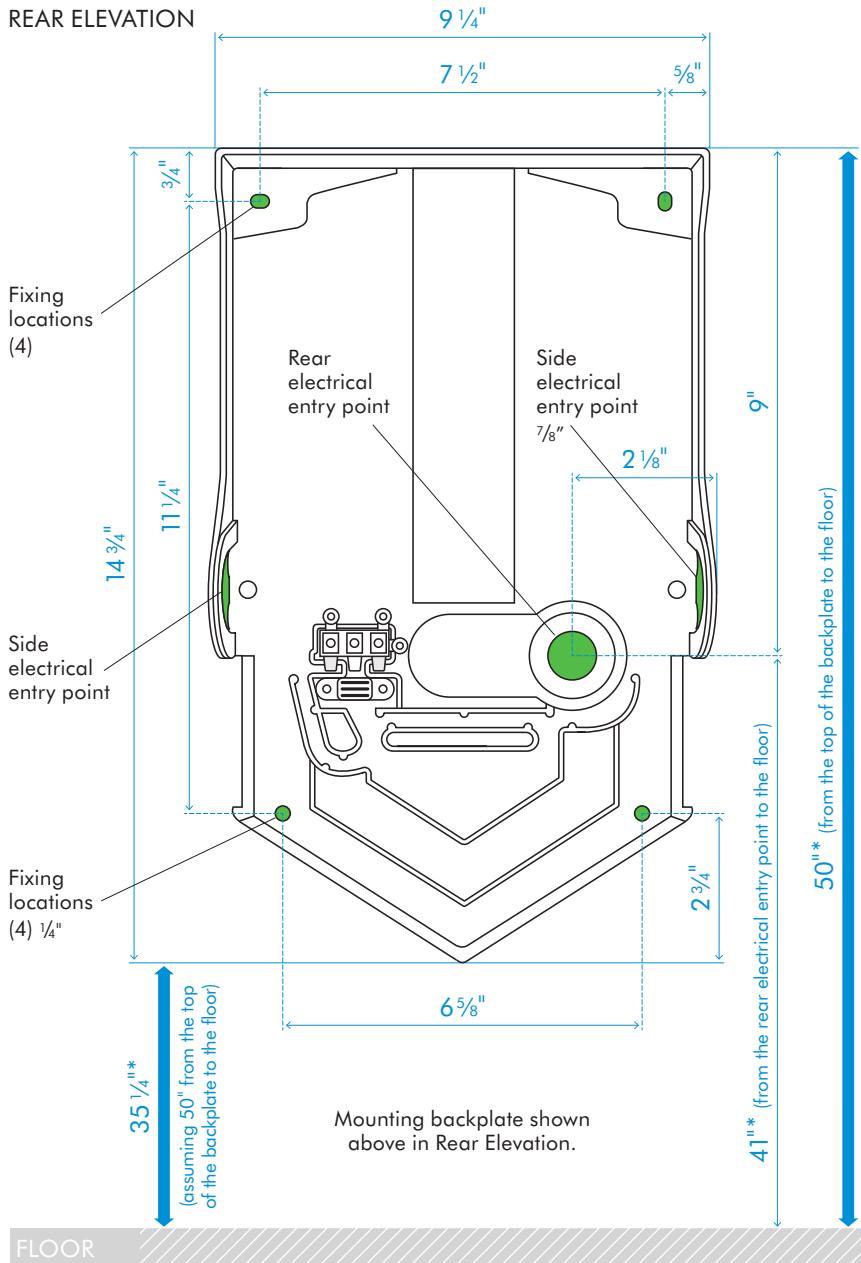
¹Sound pressure measured at 2 m distance, in a semi-anechoic chamber.

TECHNICAL SPECIFICATION

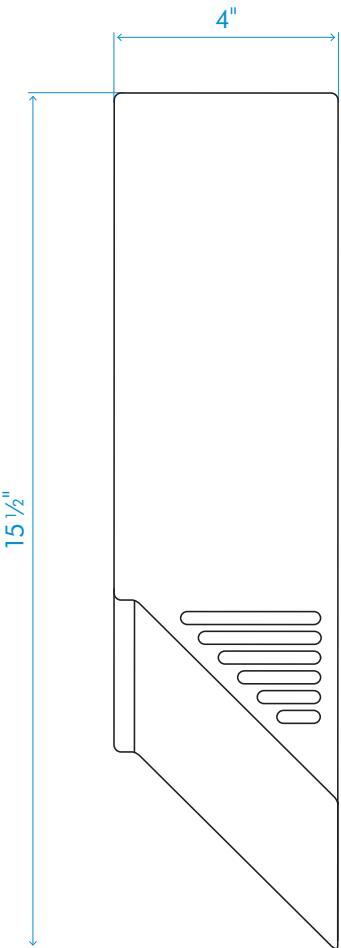
HU
O2



REAR ELEVATION



SIDE ELEVATION



Machine fascia shown above in Side Elevation.

All dimensions shown in inches (+/- 3/16 inch).

Holes indicated in green are measured to the center of the hole.

FLOOR

Machine dimensions

Height 15 1/2" Width 9 7/32" Depth 4"

Minimum clearance

8 1/16" clearance either side and 1 3/16" above machine.

*Please look into local guidelines for ADA compliance.

TECHNICAL DATA



Fire Door Frames



SPECIFICATIONS

SECTION 08100 - FIRE DOOR FRAMES

1.0 GENERAL

- 1.1 **Scope:** This specification applies to fire door frames as manufactured by Premier Products, Inc., Monroe, Louisiana
- 1.2 **Quality Assurance:** Fire door frames shall bear labels or stamped listing markings of Underwriters Laboratories, Inc. or Warnock Hersey International.

2.0 PRODUCTS

- 2.1 **Steel:** Provide door frames fabricated from commercial quality steel complying with ASTM A1008 (uncoated), ASTM A568 or ASTM A653 (hot dipped galvanized).
- 2.1.1 **Door Frame Construction:** Provide door frames fabricated from a minimum of 16 gage and a maximum of 14 gage commercial quality steel. All bends shall be brake formed to assure a true, sharp radii and to minimize camber.
- 2.2 **Drywall Frames:** Provide drywall door frames knock-down.
- 2.2.1 **Conventional Frames:** Provide conventional frames either knock-down or set-up and welded.
- 2.2.2 **Transom Frames:** Provide transom frames set-up and welded only.
- 2.3 **Hardware Provision:** Provide frames with 9 gage steel hinge reinforcements projection welded to the frame in six

places. Standard hardware provisions for door frames for 1 1/4" (44) thick doors shall be for template 4 1/2" x 4 1/2" (114 x 114) regular weight .134" (3) hinges and an ANSI A115.1 or A115.2 4 1/8" (124) universal strike. Frames up to 7' 2" (2184) high shall have a minimum of three hinge provisions, frames over 7' 2" (2184) high through 10' 0" (3048) high shall have four hinge provisions.

- 2.4 **Other Reinforcements:** Provide hardware provisions in accordance with requirements of the finish hardware schedule and templates. Reinforcing shall be in accordance with ANSI A250.8.
- 2.5 **Painting:** All door frames shall be phosphatized, prime painted by dip process to insure heavy, complete coverage and oven baked.
- 2.6 **Fire Protection:** Provide frames with fire ratings from Underwriters Laboratory or Warnock Hersey International in accordance with the frame schedule.

3.0 EXECUTION

- 3.1 **Installation:** Contractor to provide installation of the frames plumb, square and in true alignment. Use wood installation spreader at base, strike and mid-top locations to insure constant and proper jamb opening for door.

FIRE DOOR FRAMES

PREMIER offers a complete line of fire door frames for 1 $\frac{3}{4}$ " (44) thick labeled fire doors to meet most fire protection requirements. Since fire rating requirements vary throughout the country, local authorities having jurisdiction regarding the use of label openings should be consulted during the design and planning stage.

UNDERWRITERS LABORATORIES (UL)

Frames approved by Underwriters Laboratories, Inc. have been investigated, fire tested and have met the conditions of acceptance for tests UL10B (neutral pressure) and **UL10C, UBC7-2 (1997) part 1 (positive pressure)**. Frames are produced under the Underwriters Laboratories' factory inspection and labeling program.

WARNOCK HERSEY INTERNATIONAL (WHI)

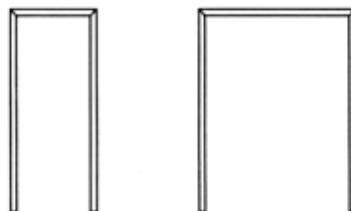
Frames having the Warnock Hersey International, Inc. label have been tested for the fire endurance and hose stream test in accordance with ASTM E-152. The test results complied with the conditions of acceptance for this standard and are produced under Warnock Hersey's factory inspection and labeling service program.

DOOR FRAME RATINGS

Frames for fire doors are not affected by the exposure ratings and opening classifications that apply to doors. There are *no hourly ratings* for a basic fire door frame, unless the labeling on the frame specifically states that the frame is rated for something less than 3 hours. If a frame bears a recognized label qualifying it as a fire door frame, it may support a 3-hour, a 1 $\frac{1}{2}$ -hour, a $\frac{3}{4}$ -hour or $\frac{1}{2}$ -hour door. Frames used in masonry walls may be used with a maximum 3-hour fire door, while frames used in drywall walls may be used with a maximum 1 $\frac{1}{2}$ -hour fire door.

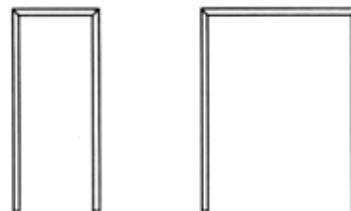
UL and WHI frames are available with loose anchors. Frames for masonry, wood stud or steel stud walls can be furnished. Anchors and installation instruction sheets are packaged with each frame or packaged with frame anchors.

CONVENTIONAL FRAMES



- Maximum door opening size:
Single swing: 4' - 0" (1219) x 10' - 0" (3048)
Pairs: 8' - 0" (2438) x 10' - 0" (3048)
- Jamb depth: 3" (76) to 12 $\frac{3}{4}$ " (324)
- Frame steel thickness: 16 gage or 14 gage
- Frame construction: knocked-down or set-up and welded
- Frames with 4" (102) face heads are available
- Frames with hospital stops are available
- Communicating frames are available
- Maximum rating: 3 hours

DRYWALL FRAMES



UL

- Maximum door opening size:
Single swing: 4' - 0" (1219) x 8' - 0" (2438)
Pairs: 8' - 0" (2438) x 8' - 0" (2438)

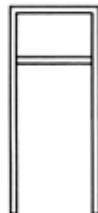
WHI

- Maximum door opening size:
Single swing: 4' - 0" (1219) x 9' - 0" (2743)
Pairs: 6' - 0" (1829) x 9' - 0" (2743)

UL and WHI

- Jamb depth: 4 $\frac{3}{4}$ " (121) to 10" (254)
- Frame steel thickness: 16 gage
- Frames with hospital stops are available
- Communicating frames are available
- Maximum rating: 1 $\frac{1}{2}$ hours

TRANSOM FRAMES WITH WOOD PANELS



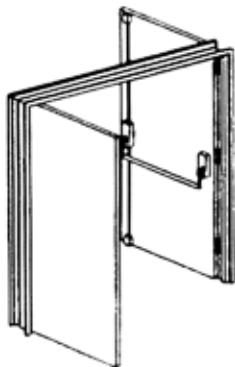
**TRANSOM FRAME
WITH TRANSOM BAR**



**TRANSOM FRAME
WITHOUT TRANSOM BAR**

- Maximum door opening size: 4' - 0" (1219) x 8' - 0" (2438)
- Maximum panel height: 4' - 0" (1219)
- Jamb depth: 4 $\frac{3}{4}$ " (121) to 12 $\frac{3}{4}$ " (324)
- Frame steel thickness: 16 gage or 14 gage
- Wood panel requirement: **Weyerhaeuser Co.** listed transom panel only
- Maximum rating: 1 $\frac{1}{2}$ hours

- Maximum door opening size: 4' - 0" (1219) x 8' - 0" (2438)
- Maximum panel height: 4' - $\frac{1}{2}$ " (1232)
- Jamb depth: 4 $\frac{3}{4}$ " (121) to 12 $\frac{3}{4}$ " (324)
- Frame steel thickness: 16 gage or 14 gage
- Wood panel requirement: **Algoma Hardwoods, Inc.** model 11DT transom panel
- Door requirement: **Algoma Hardwoods, Inc.** model 11DT fire door
- Maximum rating: 1 $\frac{1}{2}$ hours

DOUBLE EGRESS FRAMES

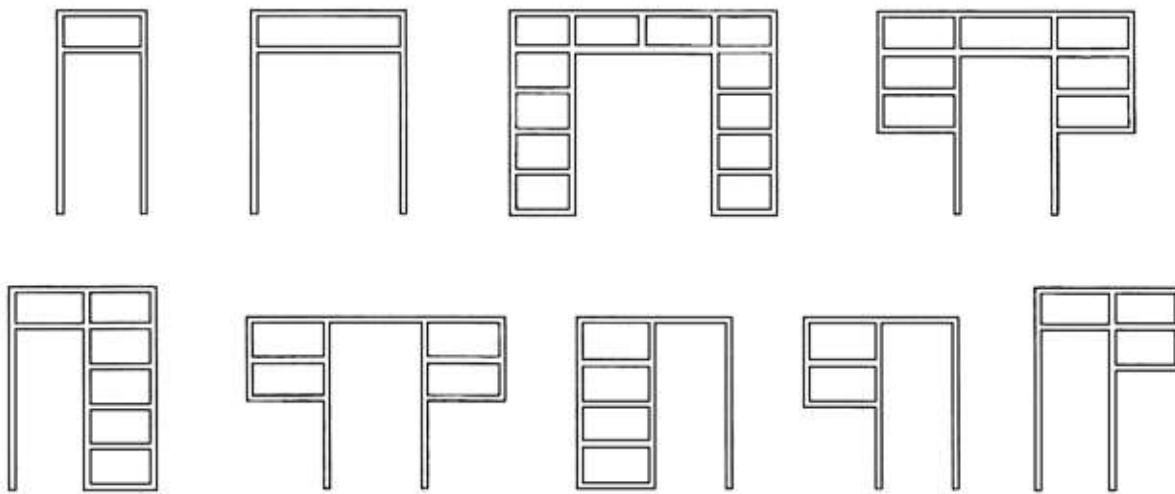
- Maximum door opening size: 8' - 0" (2438) x 8' - 0" (2438)
- Jamb depth: 4 $\frac{3}{4}$ " (121) to 12 $\frac{3}{4}$ " (324)
- Frame steel thickness: 16 gage or 14 gage
- Frames are provided for listed vertical rod fire exit hardware strikes
- For use with **Premier** classified double egress fire doors
- Maximum rating: 1 $\frac{1}{2}$ hours

FIRE WINDOW FRAMES

- Maximum overall frame size: 13' - 6" (4115) wide x 12' - 0" (3658) high (see rating)
- Jamb depth: 4 $\frac{3}{4}$ " (121) to 12 $\frac{3}{4}$ " (324)
- Frame steel thickness: 16 gage or 14 gage
- Rating:
 - $\frac{1}{2}$ hour frame installed in a masonry opening with a masonry sill shall not exceed 13'-6" (4115) wide x 12'-0" (3658) high
 - $\frac{1}{2}$ hour frame installed in a drywall opening with a masonry sill shall not exceed 10'-0" (3048) wide x 5'-1" (1549) high
 - 1 hour frame installed in a masonry opening with a masonry sill shall not exceed 10'-2" (3099) wide x 10'-1" (3073) high
 - 1 hour frame installed in a drywall opening with a masonry sill shall not exceed 10'-2" (3099) wide x 10'-1" (3073) high
 - 1 hour frame installed in a drywall opening on all sides shall not exceed 9'-2 $\frac{1}{2}$ " (2807) wide x 4'-11 $\frac{1}{4}$ " (1511) high

FIRE WINDOW GLAZING

Maximum Rating	Maximum Area (sq. in.)	Maximum Width	Maximum Height	Glazing	Stop Height
$\frac{1}{2}$ Hour	1296 (836,127)	54" (1372)	54" (1372)	$\frac{1}{4}$ " (6) thick listed wire glass	$\frac{1}{8}$ " (16)
	4704 (3,034,833)	98" (2489)	98" (2489)	$\frac{1}{4}$ " (6) thick Pilkington wired glass with Pemko FG3000 glazing compound	
1 Hour	2721 (1,755,480)	54" (1372)	77 $\frac{1}{4}$ " (1975)	$\frac{1}{8}$ " (5) thick "Firelite" ceramic glass with DAP-33, pure silicone or metacaulk 990 glazing compound	

TRANSOM / SIDELIGHT FRAMES

- Maximum overall frame size:
13' 6" (4115) wide x 12'- 0" (3658) high installed in masonry
12' 10" (3912) wide x 11'- 7 1/2" (3543) high installed in drywall
- Jamb depth: 4 1/4" (121) to 12 1/4" (324)
- Frame steel thickness: 16 gage or 14 gage
- Maximum rating: 1 1/2 hours with panels and 1 hour with glass
- Maximum panel size:
Transom: 1 3/4" (44) thick panel (door construction) 90" (2286) wide x 46" (1168) high
1/2" (13) or 5/8" (16) thick solid panel 30" (762) wide x 40" (1016) high
- Side: 1 1/4" (44) thick panel (door construction) 46" (1168) wide x 90" (2286) high
1/2" (13) or 5/8" (16) thick solid panel 36" (914) wide in masonry and 32" (813) wide in drywall x 54" (1372) high
- Minimum stop height for panels is 5/8" (16)

TRANSOM / SIDELIGHT GLAZING					
Maximum Rating	Maximum Area (sq. in.)	Maximum Width	Maximum Height	Glazing	Stop Height
1/4 Hour	1296 (836,127)	54" (1372)	54" (1372)	1/4" (6) thick listed wire glass	5/8" (16)
	4704 (3,034,833)	106" (2692)	NOTE ①	1/4" (6) thick Pilkington wired glass with Pemko FG3000 glazing compound	
1 Hour	2721 (1,755,480)	54" (1372)	77 1/4" (1975)	3/16" (5) thick "Firelite" ceramic glass with DAP-33, pure silicone or metacaulk 990 glazing compound	

NOTE ①: 36" (914) for transom lights and 106" (2692) for side lights.



TECHNICAL DATA FIRE DOORS



FIRE DOOR OPENINGS

Door Rating	Wall Rating	Opening Description
3 Hour	4 Hour	Openings in walls that separate buildings or divide a single building into fire areas.
1 1/2 Hour	2 Hour	Openings in enclosures of vertical communication or egress through buildings, such as, openings in stairwells and elevator shafts.
1 Hour	1 Hour	Openings that divide occupancies in a building.
1/4 Hour	1 Hour	Openings in corridors or room partitions.
1 1/2 Hour	2 Hour	Openings in exterior walls subject to severe fire exposure from outside of the building.
1/4 Hour	1 Hour	Openings in exterior walls subject to moderate or light fire exposure from outside of the building.
1/2 Hour	1 Hour	Openings in corridors where smoke and draft control are required.

DOOR GLAZING LIMITATIONS

Door Rating	Maximum Exposed Area (sq. in.)	Maximum Width	Maximum Height	Number of Lights	Notes
3 Hour	100 (64,516)	12" (305)	33" (838)	1	① ②
1 1/2 Hour	100 (64,516)	12" (305)	33" (838)	1	
1 1/2 Hour	552 (356,409)	12" (305)	46" (1168)	4	②
1/4 and 1/2 Hour	1296 (836,127)	36" (914)	54" (1372)	No Limit	
1/4 and 1/2 Hour	2856 (1,842,556)	34" (864)	84" (2134)	4	②
20 min. w/o Hose Stream	1296 (836,127)	36" (914)	54" (1372)	No Limit	
20 min. w/o Hose Stream	2971 (1,916,805)	35 3/4" (908)	83 1/8" (2111)	No Limit	

① When acceptable to the local authority having jurisdiction.

② Requires the use of specific glass and glazing compound.

FIRE DOORS

PREMIER offers a complete line of $1\frac{1}{4}$ " thick labeled fire doors to meet most fire protection requirements. The construction conforms to fire door procedure whether the doors are furnished with labels or not. Since fire rating requirements vary throughout the country, local authorities having jurisdiction regarding the use of label openings should be consulted during the design and planning stage.

UNDERWRITERS LABORATORIES (UL)

Doors approved by Underwriters Laboratories, Inc. have been investigated, fire tested and have met the conditions of acceptance for tests UL10B (neutral pressure) and **UL10C, UBC7-2 (1997) part 1 (positive pressure)**. Doors are produced under the Underwriters Laboratories' factory inspection and labeling program.

WARNOCK HERSEY INTERNATIONAL (WHI)

Doors having the Warnock Hersey International, Inc. label have been tested for the fire endurance and hose stream test in accordance with ASTM E-152. The test results complied with the conditions of acceptance for this standard and are produced under Warnock Hersey's factory inspection and labeling program.

NOTES:

- Door sizes shown in the schedule are the maximum sizes available from PREMIER.
- The maximum hourly rating for doors have been shown in the schedule while doors with lower hourly ratings are also available.
- The maximum rating for labeled fire doors is 3 hours. The other ratings available include $1\frac{1}{4}$, $\frac{1}{2}$ hour or 20 minutes.
- Labeled openings include door, frame and hardware. The effectiveness of the entire opening as a fire barrier may be destroyed if any component is omitted.
- Doors manufactured under the various label procedures are similar, except as noted. When in doubt, consult PREMIER for availability.

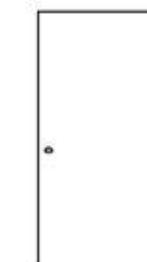
S - Polystyrene. A pre-foamed polystyrene slab of 1.0# test density filling the inside of the door.

H - Honeycomb. The honeycomb core shall be 99# test, impregnated with water resistant resin.

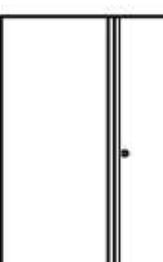
P - Polyurethane foamed-in-place. The core shall be closed cell and waterproof.

PS - Polyurethane foamed-in-place with vertical Z stiffeners.

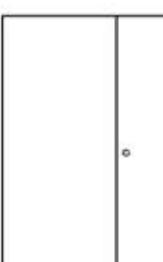
M - Mineral. The composite core is for temperature rise rated doors.



SINGLE DOORS

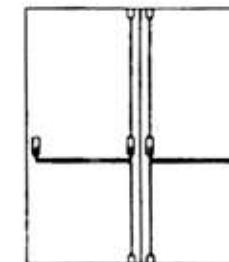


PAIRS OF DOORS WITH ATTACHED ASTRAGAL



PAIRS OF DOORS WITHOUT ATTACHED ASTRAGAL

DOOR SERIES				
	Maximum Door Size	Maximum Rating	Maximum Door Size	Maximum Rating
H20-4	4072	1 $\frac{1}{2}$ Hour	4090	1 $\frac{1}{2}$ Hour
P20-4			3070	1 $\frac{1}{2}$ Hour
S20-4	4072	1 $\frac{1}{2}$ Hour	4072	1 $\frac{1}{2}$ Hour
H18-4	4090	3 Hour	4090	1 $\frac{1}{2}$ Hour
			4080	3 Hour
P18-4			3070	1 $\frac{1}{2}$ Hour
PS18-4			3070	1 $\frac{1}{2}$ Hour
S18-4	4090	3 Hour	4090	3 Hour
H16-4	4090	3 Hour	4090	1 $\frac{1}{2}$ Hour
			4080	3 Hour
P16-4				
PS16-4				
S16-4	4090	3 Hour	4090	3 Hour
	4072	3 Hour		
	4080	1 $\frac{1}{2}$ Hour		
M16-4	4072	3 Hour		
	4080	1 $\frac{1}{2}$ Hour		



PAIRS OF DOORS WITHOUT ASTRAGAL

DOOR SERIES				
	Maximum Door Size	Maximum Rating	Maximum Door Size	Maximum Rating
H20-4	8072	1 $\frac{1}{2}$ Hour	6090	1 $\frac{1}{2}$ Hour
			8080	1 $\frac{1}{2}$ Hour
P20-4			6070	1 $\frac{1}{2}$ Hour
S20-4	8072	1 $\frac{1}{2}$ Hour	8072	1 $\frac{1}{2}$ Hour
H18-4	8080	3 Hour	6090	1 $\frac{1}{2}$ Hour
			8080	1 $\frac{1}{2}$ Hour
P18-4			6070	1 $\frac{1}{2}$ Hour
PS18-4			6070	1 $\frac{1}{2}$ Hour
S18-4	8080	1 $\frac{1}{2}$ Hour	8080	1 $\frac{1}{2}$ Hour
H16-4	8080	3 Hour	6090	1 $\frac{1}{2}$ Hour
			8080	1 $\frac{1}{2}$ Hour
P16-4				
PS16-4				
S16-4	8080	1 $\frac{1}{2}$ Hour	8080	1 $\frac{1}{2}$ Hour
M18-4	8072	3 Hour		
M16-4	8072	3 Hour		



DOORS WITH FUSIBLE LINK LOUVERS

DOOR SERIES				
	Maximum Door Size	Maximum Rating	Maximum Door Size	Maximum Rating
H20-4	8080	1 $\frac{1}{2}$ Hour	6090	1 $\frac{1}{2}$ Hour
P20-4			6070	1 $\frac{1}{2}$ Hour
S20-4	8080	1 $\frac{1}{2}$ Hour	8072	1 $\frac{1}{2}$ Hour
H18-4	8080	1 $\frac{1}{2}$ Hour	6090	1 $\frac{1}{2}$ Hour
P18-4			6070	1 $\frac{1}{2}$ Hour
PS18-4			6070	1 $\frac{1}{2}$ Hour
S18-4	8080	1 $\frac{1}{2}$ Hour	8080	1 $\frac{1}{2}$ Hour
H16-4	8080	1 $\frac{1}{2}$ Hour	6090	1 $\frac{1}{2}$ Hour
P16-4				
PS16-4				
S16-4	8080	1 $\frac{1}{2}$ Hour	8080	1 $\frac{1}{2}$ Hour
M18-4				
M16-4				



DOUBLE EGRESS DOORS

DOOR SERIES				
	Maximum Door Size	Maximum Rating	Maximum Door Size	Maximum Rating
H20-4	8080	1 $\frac{1}{2}$ Hour	6090	1 $\frac{1}{2}$ Hour
P20-4			6070	1 $\frac{1}{2}$ Hour
S20-4	8080	1 $\frac{1}{2}$ Hour	8072	1 $\frac{1}{2}$ Hour
H18-4	8080	1 $\frac{1}{2}$ Hour	6090	1 $\frac{1}{2}$ Hour
P18-4			6070	1 $\frac{1}{2}$ Hour
PS18-4			6070	1 $\frac{1}{2}$ Hour
S18-4	8080	1 $\frac{1}{2}$ Hour	8080	1 $\frac{1}{2}$ Hour
H16-4	8080	1 $\frac{1}{2}$ Hour	6090	1 $\frac{1}{2}$ Hour
P16-4				
PS16-4				
S16-4	8080	1 $\frac{1}{2}$ Hour	8080	1 $\frac{1}{2}$ Hour
M18-4				
M16-4				

For use with classified double egress PREMIER frames. Doors must be provided with UL approved vertical rod and fire exit hardware on each leaf. (Less bottom rod also permitted). May be provided with or without an astragal.

SUGGESTED PROCEDURE FOR THE SELECTION OF SWINGING FIRE DOORS AND FRAMES

- A. Determine the appropriate building code.
- B. Check and fulfill the fire insurance company's requirements for the specific building.
- C. Basic Fire Door Requirements — Use this check list:
 - 1. A fire door must have a label attached.
 - 2. A fire door frame must have either an attached or an embossed label.
 - 3. A fire door must be self-latching.
 - 4. A fire door must be self-closing.
 - 5. If a fire door is held open, it must be equipped with a listed heat responsive device, fusible link or a smoke detection device.
 - 6. A fire door must be free of any obstructions which could prevent the door from operating properly, i.e., wedge door stops, chains, hookbacks, etc.
 - 7. Only listed fire door hardware shall be used.
 - 8. A fire door must have steel bearing-type hinges. (Exception: Non-bearing plain steel hinges may be used if they are part of a listed assembly).
 - 9. Doors swinging in pairs that require astragals shall have at least one overlapping astragal. Pairs of doors within a means of egress shall not be equipped with an astragal that inhibits the free use of either leaf. A coordinator or open-back strike should be used to ensure proper closing.
 - 10. Fire doors with glass lights:
 - a. The glass frame and glazing bead must be metal.
 - b. The glass must be labeled as permitted by the labeling agency.
 - 11. Fire doors with fusible link louvers:
 - a. Only listed louvers can be used.
 - b. Louvers can be furnished in 1 1/4" (44) thick doors with a 1 1/2-hour or a 1/2-hour (no louver and glass light combinations are permitted).
 - c. Maximum louver size is 24" x 24" (610 x 610).
 - d. Louvers are not permitted to be installed in doors with fire exit hardware or in stairwells.
- D. For maximum fire protection, Standard Number 80 of the National Fire Protection Association should be used for an installation guide.
- E. Purchase doors from a recognized, responsible manufacturer whose fire doors and frames are produced to conform to Fire Door Procedures and are subject to periodic inspections.



FEATURES & SPECIFICATIONS

INTENDED USE — Provides a minimum of 90 minutes of illumination for the rated wattage upon loss of AC power. Ideal for applications requiring attractive unit equipment with quick installation. **Certain airborne contaminants can diminish integrity of acrylic.** [Click here for Acrylic Environmental Compatibility table, for suitable uses.](#)

CONSTRUCTION — White, compact, low-profile contemporary design. Engineering-grade thermoplastic housing is impact-resistant, scratch-resistant and corrosion-proof. UL94V-0 flame rating. UV-stable resin resists discoloration from natural and man-made light sources.

Two LED lamp heads with 12 series-parallel white LEDs each, provide redundant light sources to ensure emergency lighting performance. Typical LED lamp life is 10 years.

Dual-voltage input capability (120/277V). Edge connector on printed circuit board ensures long-term durability. Low-profile, integrated test switch/pilot light. Easily visible bright red status indicator.

Unique track-and-swivel arrangement permits full range of direction of lamp head adjustment. Universal J-box mounting pattern. Tool-less access for maintenance. Flexible conduit entry provision on top of the unit.

Ceiling- or wall-mount standard.

ELECTRICAL — Current-limiting charger maximizes battery life and minimizes energy consumption. Provides low operating costs.

Short-circuit protection — current-limiting charger circuitry protects printed circuit board from shorts.

Thermal compensation adjusts charger output to provide optimum charge voltage relative to ambient temperature.

Regulated charge voltage maintains constant-charge voltage over a wide range of line voltages. Prevents over/undercharging that shortens battery life and reduces capacity.

Filtered charger input minimizes charge voltage ripple and extends battery life.

AC/LVD reset allows battery connection before AC power is applied and prevents battery damage from deep discharge.

BATTERY: Sealed, maintenance-free nickel-cadmium battery delivers 90 minute capacity to emergency lamps. Two-state constant-current charge maximizes battery life and automatically recharges after battery discharge. Low-voltage disconnect prevents excessively deep discharge that can permanently damage the battery. Optional high-output battery available to power both local and optional LED remote lamp heads simultaneously.

Wireless Reporting System (WRS option): Data from self-diagnostics will be communicated via wireless transceivers within their vicinity, creating a self-configuring, self-healing and self-optimizing wireless network that exchanges the data between FIDO-compatible emergency lighting fixtures on an event-driven basis. Wireless communications electronics to operate 2.4GHz mesh network are enclosed entirely within the fixture.

Self-Diagnostics (SD-Option) Single multi-color LED indicator to display two-state charging, test activation and three-state diagnostic test. Test switch provides manual activation of 30-second diagnostic testing for on-demand visual inspection. Self-diagnostic testing for 30 seconds every 30 days, 30 minutes at 180-day interval, and 90 minutes annually. Diagnostic evaluation of LED light source, AC to DC transfer, charging and battery condition.

Wireless Reporting System (WRS option) must be ordered with FIDO edge router.

Catalog Number
Notes
Type



Thermoplastic Emergency Light

ELM2 LED



LED Lamp Head
Ni-Cad Battery



FIDO



INSTALLATION — Radio range is 500' between fixtures in most buildings. Actual performance may vary depending on application environment and electromagnetic interference. Substantially longer distances have been recorded in uninterrupted open air. Consult factory for more details.

LISTING — UL damp location listed standard 50-104°F (10-40°C). Meets UL 924, NFPA 101 (current Life Safety Code), NEC and OSHA illumination standards.

WARRANTY — Five-year limited warranty. Full warranty terms located at www.AcuityBrands.com/CustomerResources/Terms_and_Conditions.aspx.

Specifications subject to change without notice.

Actual performance may differ as a result of end-user environment and application.

Example: ELM2 LED

ORDERING INFORMATION Lead times will vary depending on options selected. Consult with your sales representative.

ELM2	LED	Housing	Options
Series	Lamp type		
ELM2	LED Two 1.5W/3.6V white LED	(blank) White B Black	HO High-output ni-cad battery for 6W remote capacity ¹ SD Self-diagnostics ¹ NOM Meets Mexican standards WRS Dual-voltage 120/277, nickel-cadmium battery back-up and self-diagnostics with FIDO wireless reporting system capability ¹

Accessories: Order as separate catalog number.

ELA Q L0304 SD	Single LED indoor remote head, white, self-diagnostics ^{2,3,4}	ELA Q L0304	Single LED indoor remote head, white ^{2,3,4}
ELA T Q L0304 SD	Twin LED indoor remote head, white, self-diagnostics ^{2,3,4}	ELA T Q L0304	Twin LED indoor remote head, white ^{2,3,4}
ELA QWP L0304 SD	Single LED weather-proof remote head, gray, self-diagnostics ^{2,3,4}	ELA QWP L0304	Single LED weather-proof remote head, gray ^{2,4}
ELA T QWP L0304 SD	Twin LED weather-proof remote head, gray, self-diagnostics	ELA T QWP L0304	Twin LED weather-proof remote head, gray ^{2,4}
ELA WG1	Wireguard, 15" W x 13-1/2" H x 6" D (See spec sheet ELA-WG)		
FIDO	Emergency wireless reporting system edge router (See spec sheet FIDO)		

Notes

- 1 Not available with NOM.
- 2 Only available with HO option. See spec sheet [ELA Q LED](#).
- 3 Also available in black. Add "B" after ELA to order black finish. Example: ELA B Q L0304 SD. See spec sheet [ELA Q LED](#).
- 4 Only compatible with Quantum LED series.

ELM2 LED QUANTUM® Thermoplastic Emergency Light

SPECIFICATIONS

Electrical				
Primary Circuit				
Typical LED life ¹	Supply voltage	Max amps	Max watts	H0/max watts
	120	.04	1.44	2.88
10 years	277	.03	1.44	2.88

BATTERY

Ni-Cad				
Voltage	Shelf life ²	Typical life ³	Maintenance ³	Optimum temperature ⁴
3.6	3 years	7-9 years	none	50-104°F (10-40°C)

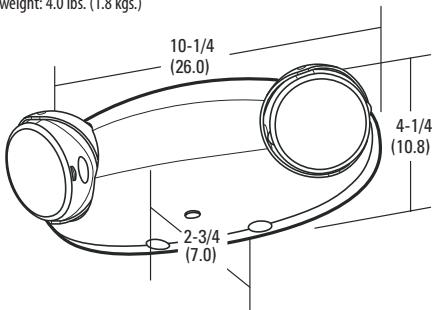
- 1 Based on continuous operation.
- 2 At 77°F (25°C).
- 3 All life safety equipment, including emergency lighting path of egress, must be maintained, serviced and tested in accordance with all National Fire Protection Association and local codes. Failure to perform the required maintenance, service or testing could jeopardize the safety of occupants and will void all warranties.
- 4 Optimum ambient temperature range where unit will provide capacity for 90 minutes. Higher and lower temperatures affect life and capacity. Consult factory for detailed information.

Remote Output Capacity	
Standard unit	Unit/H0 battery

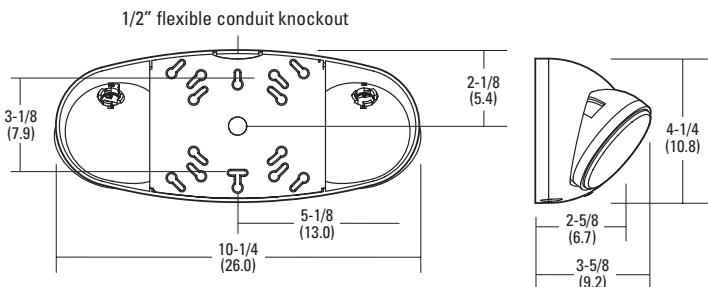
MOUNTING

All dimensions are inches (centimeters).

Shipping weight: 4.0 lbs. (1.8 kgs.)



Mounting Plate

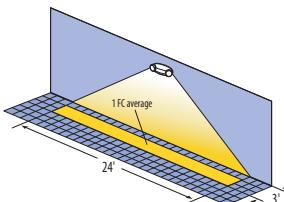


LAMP PHOTOMETRICS

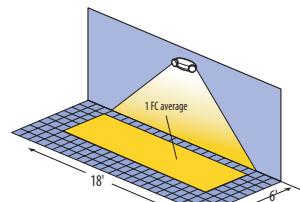
QUANTUM LED SERIES – SINGLE COVERAGE

3W Total White LEDs

Using a single unit at a typical 7.5' mounting height delivers an average illuminance of 1.0 FC over a distance of 24' on a 3' path of egress and 18' on a 6' path of egress.



Example of single ELM2 LED WRS unit illuminating a 3' path of egress

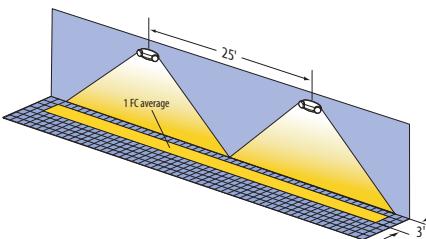


Example of single ELM2 LED WRS unit illuminating a 6' path of egress

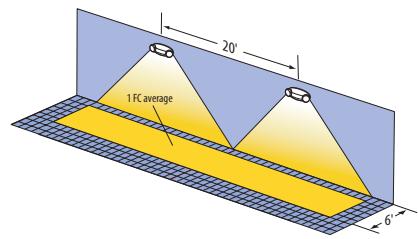
QUANTUM LED SERIES – MULTIPLE COVERAGE

3W Total White LEDs

Using multiple units at a typical 7.5' mounting height delivers 25' center-to-center spacing on a 3' path of egress and 20' center-to-center spacing on a 6' path of egress.



Example of multiple ELM2 LED WRS units illuminating a 3' path of egress



Example of multiple ELM2 LED WRS units illuminating a 6' path of egress

EXTENDED RUN-TIME FOR HIGH-OUTPUT UNITS

Product	Run time
ELM2 LED HO WRS (no remotes)	3.9 hours

* Meets Life Safety Code standard minimum illuminance of 0.1 FC and average illuminance of 1.0 FC. Assumes open space with no obstructions, mounting height: 7.5'; ceiling height: 9'; and reflectances: 80/50/20. Analysis based on independently tested photometrics.



An Acuity Brands Company

Sidewall Propeller Fans Models AER and BAER

Efficient and Reliable Supply and Exhaust Fans





For efficient air movement, look no further than Greenheck's AER direct drive and BAER belt drive sidewall fan offering! With up to 30% higher maximum airflow compared to existing options, the two models serve all of your clean air application needs. Constructed from corrosion-resistant galvanized steel and incorporating high efficiency fabricated steel and cast aluminum airfoil propellers, the AER and BAER outclass the competition. Package with any of our standard sidewall options or accessories for all of your wall-mounted fan needs!

SIZES

- Direct drive sizes from 20 - 60
- Belt drive sizes from 24 - 48

PERFORMANCE

- Direct drive up to 78,600 cfm
- Direct drive up to 3.4 in. wg of static pressure
- Belt drive up to 54,000 cfm
- Belt drive up to 3.7 in. wg of static pressure

MOUNTING OPTIONS

- Horizontal or vertical
- Wall housing
- Wall collar

APPLICATIONS

- Clean air applications
- Industrial environments
- Factories
- Warehouses
- Data centers/data management
- Mission critical

AER DIRECT DRIVE



BAER BELT DRIVE



Drive Frame

- Galvanized steel with bolted construction
- Pre-punched mounting holes
- Formed flanges

Propeller

- Heavy-duty cast aluminum propeller (AER direct drive 20 to 60 inch diameters, BAER belt drive 24 to 48 inch diameters)
- Fabricated steel propeller (AER direct drive 20 to 48 inch diameters, BAER belt drive 24 to 48 inch diameters)
- All propellers are statically and dynamically balanced

Motor

- Heavy-duty, permanently lubricated, ball bearing type
- Greenheck's Vari-Green® electronically commutated (EC) motor up to 10 horsepower (AER only)
- AC up to 20 horsepower

Belt Tensioner (BAER only)

- Standard automatic belt-tensioning drive setup for simplified maintenance and drive loss reduction to increase fan efficiencies

PRODUCT CERTIFICATIONS

Greenheck takes pride in offering a high-quality, reliable product. We invest our resources into designing, testing and manufacturing products to ensure customer satisfaction.



Model AER and BAER are listed for electrical (UL/cUL 705)
File no. E40001

Greenheck's AER Seismic Certification

Greenheck's tests incorporate the most severe seismic conditions anywhere in the United States including the most severe spectral response accelerations (SDS = 2.28), an Importance Factor of 1.5, all Site Classes (F being the most severe), all Occupancy Categories (IV- essential facilities), and all Seismic Design Categories (F being the most severe).

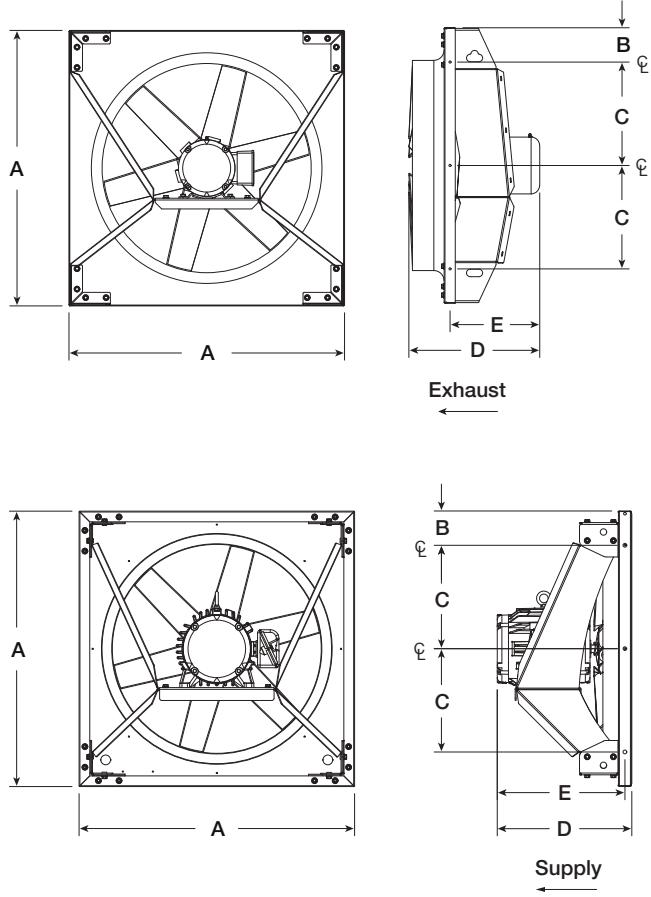
Testing equipment for the worst case scenarios allows Greenheck to supply a seismic certified fan to a job anywhere in the United States regardless of location. For projects presided over by HCAI, reference #OSP-0356 for a listing of Greenheck AER equipment that meets Special Seismic Certification Preapproval.



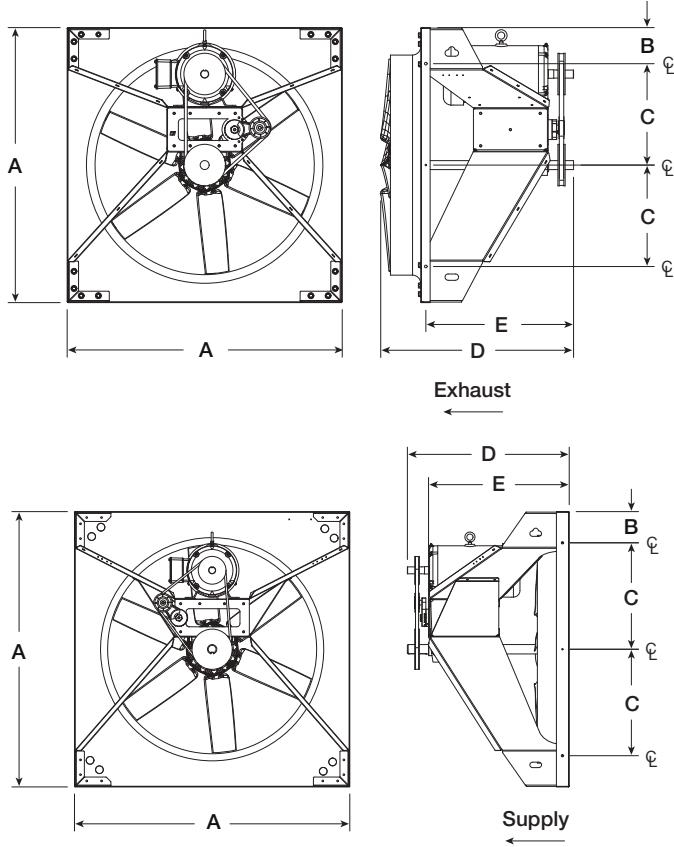
Greenheck Fan Corporation certifies that the model AER and BAER shown herein are licensed to bear the AMCA Seal. The ratings shown are based on tests and procedures performed in accordance with AMCA Publication 211 and AMCA Publication 311 and comply with the requirements of the AMCA Certified Ratings Program.



AER DIRECT DRIVE



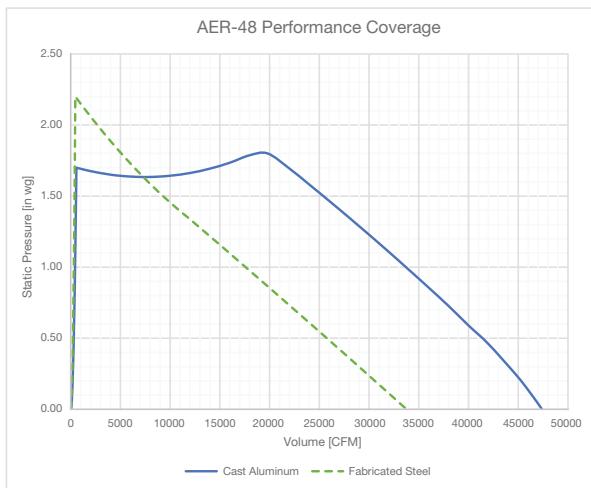
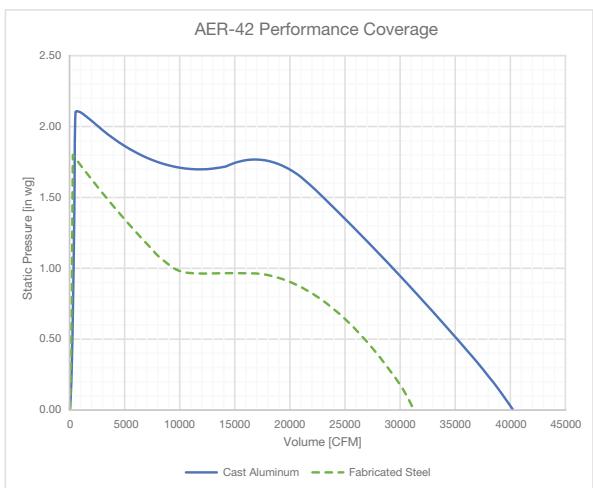
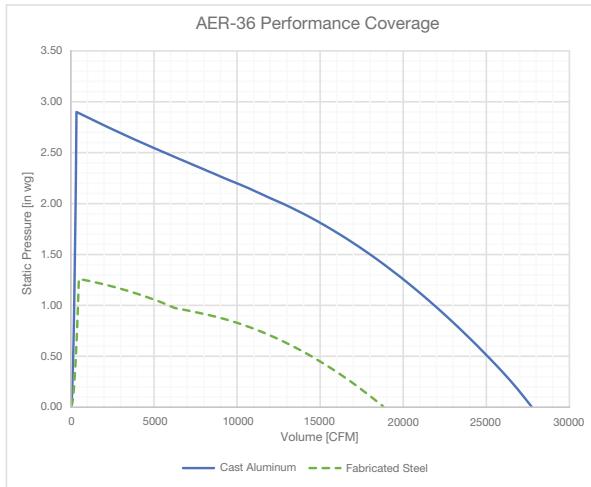
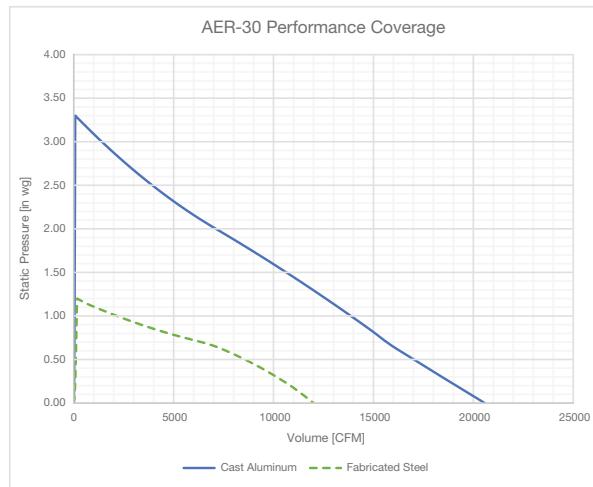
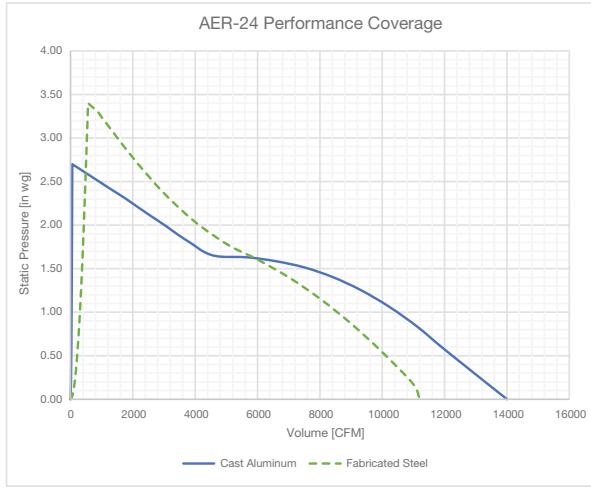
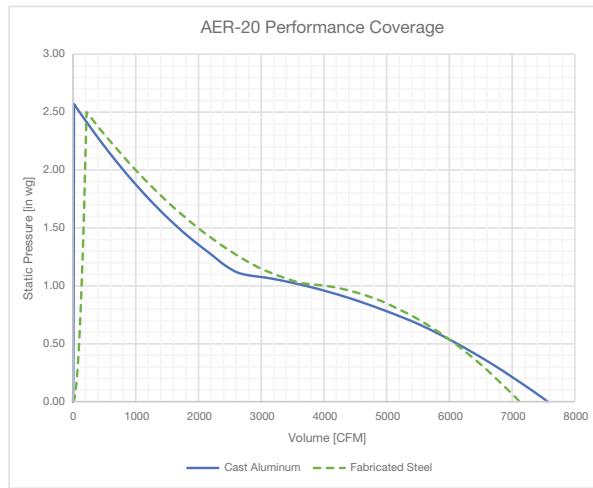
BAER BELT DRIVE



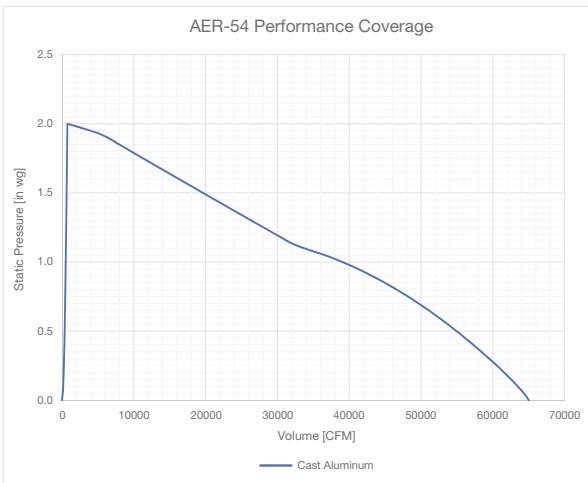
Fan Size	A	B	C	D* Max.	E* Max.	Direct To Wall Recommended Wall Opening Sq.	Damper Size	Approx. Fan Weight*
AER Direct Drive								
20	26.125	4.000	9.020	20.500	16.500	23.250	22 x 22	190
24	32.125	4.000	12.050	23.000	18.500	26.125	26 x 26	295
30	38.125	5.000	14.050	23.250	18.250	32.125	32 x 32	305
36	44.125	5.000	17.050	27.125	18.125	38.125	38 x 38	410
42	50.125	5.000	13.380	29.000	22.875	44.125	44 x 44	640
48	56.125	5.000	14.380	29.375	22.250	50.125	50 x 50	650
54	62.000	5.380	12.810	33.750	28.250	56.000	56 x 56	840
60	68.000	5.380	11.450	38.500	32.000	62.000	62 x 62	880
BAER Belt Drive								
24	32.125	4.000	12.050	19.500	15.375	26.125	26 x 26	307
30	38.125	5.000	14.050	23.750	18.750	32.125	32 x 32	323
36	44.125	5.000	17.050	27.500	21.750	38.125	38 x 38	436
42	50.125	5.000	13.380	28.000	22.250	44.125	44 x 44	450
48	56.125	5.000	14.380	32.500	25.750	50.125	50 x 50	550

All dimensions in inches and weight is shown in pounds, does not include accessories. *Varies with motor selection.

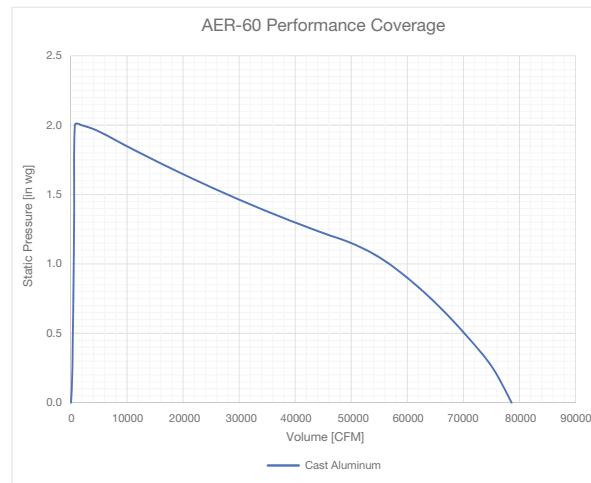
Performance AER Direct Drive



Performance AER Direct Drive



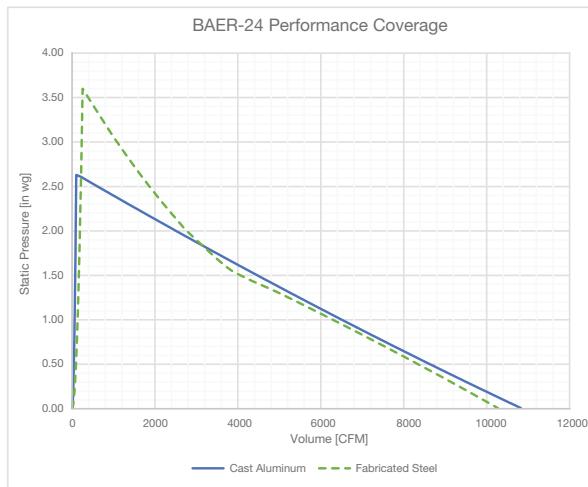
Curves represent a maximum coverage area of multiple prop configurations
Configurations include 3 and 6 blades with all available pitch configurations
Represents data at standard air (70°F, 0 ft)



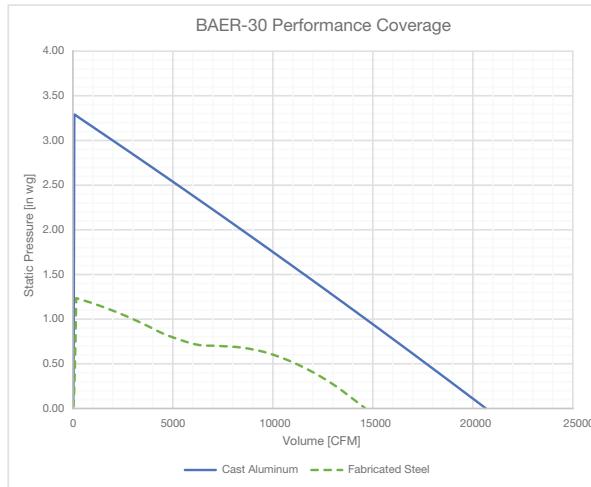
Curves represent a maximum coverage area of multiple prop configurations
Configurations include 3 and 6 blades with all available pitch configurations
Represents data at standard air (70°F, 0 ft)

Fan Size	Motor HP Max.	Fan RPM Max.	CFM Max.	Max. Static Pressure in. wg
Fabricated Steel Propeller				
20	2	1750	7,100	2.5
24	5	1750	11,200	3.4
30	5	1160	14,500	1.2
36	7.5	1160	18,800	1.2
42	10	860	31,200	1.9
48	10	860	33,700	2.2
Cast Aluminum Airfoil Propeller				
20	2	1750	7,600	2.6
24	5	1750	14,000	2.7
30	5	1750	20,500	3.3
36	7.5	1750	27,700	2.9
42	10	1160	40,200	2.1
48	10	1160	47,300	1.8
54	20	860	64,900	2.0
60	20	860	78,600	2.0

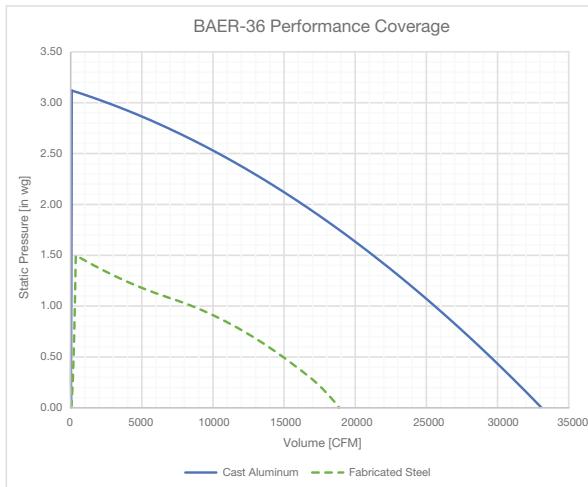
Performance BAER Belt Drive



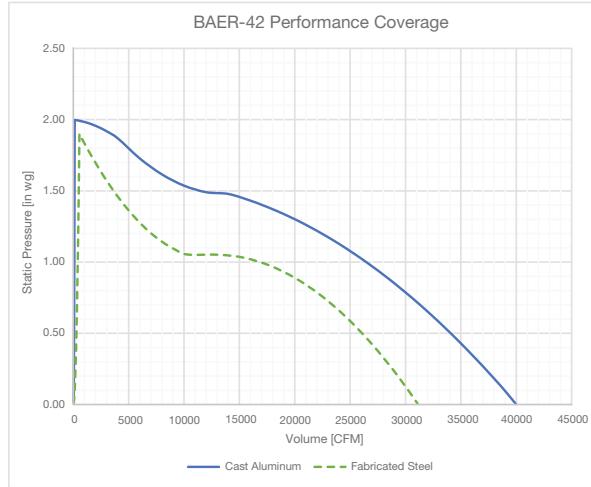
Curves represent a maximum coverage area of multiple prop configurations
Configurations include two prop types with all available blade and pitch configurations
Represents data at standard air (70°F, 0 ft)



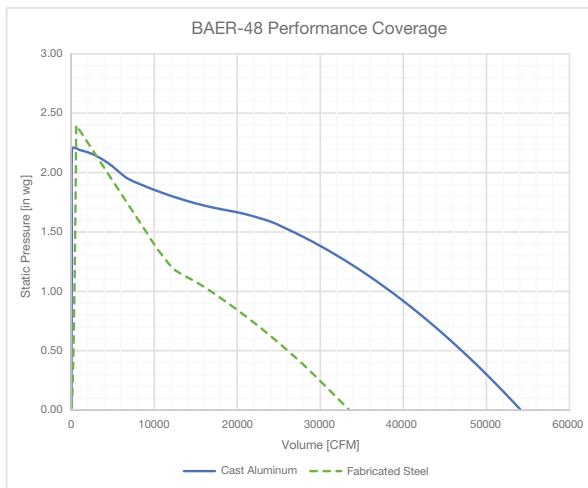
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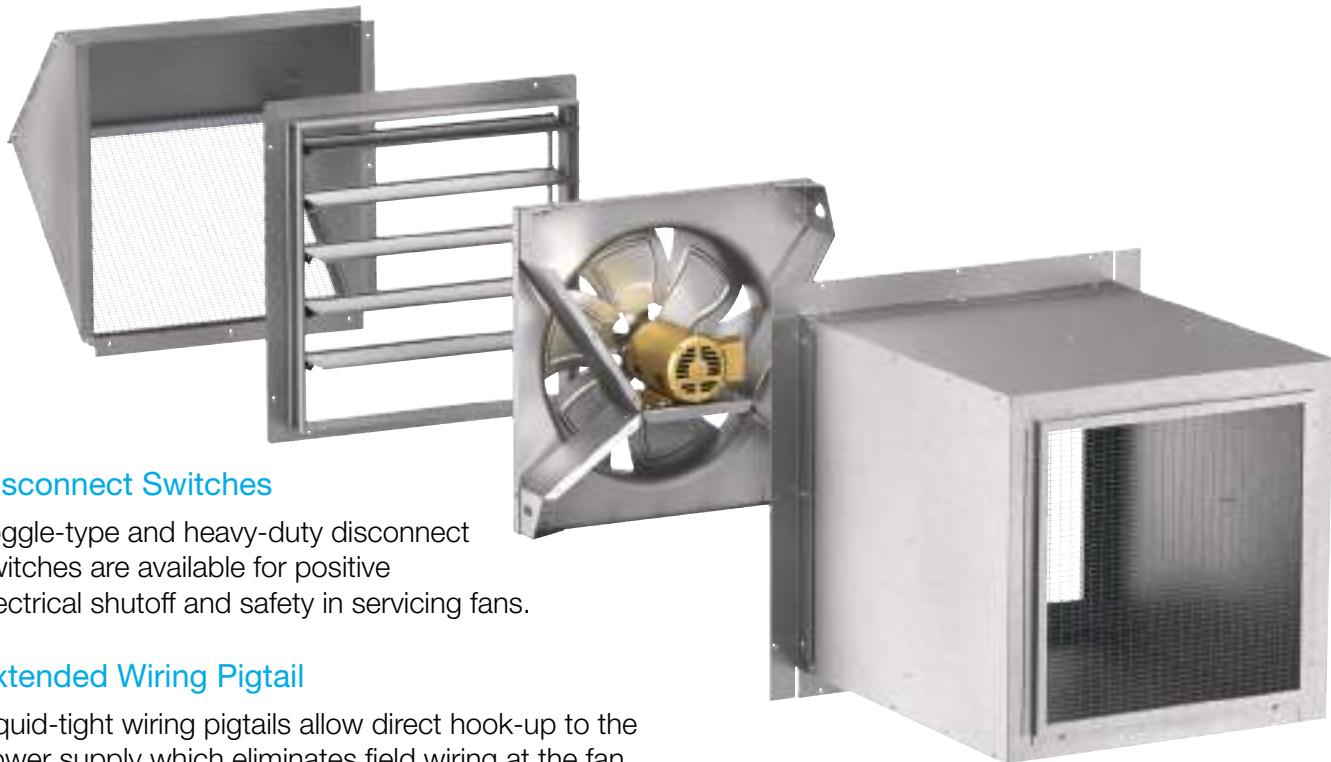


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Represents data at standard air (70°F, 0 ft)

Fan Size	Motor HP Max.	Fan RPM Max.	CFM Max.	Max. Static Pressure in. wg
Fabricated Steel Propeller				
24	2	1750	10,200	3.7
30	5	1160	14,600	1.2
36	10	1160	18,800	1.5
42	15	860	31,100	1.9
48	15	860	33,400	2.4
Cast Aluminum Airfoil Propeller				
24	2	1750	10,860	2.6
30	5	1750	20,700	3.3
36	10	1750	33,100	3.2
42	15	1160	39,900	1.9
48	15	1160	54,100	2.2



Disconnect Switches

Toggle-type and heavy-duty disconnect switches are available for positive electrical shutoff and safety in servicing fans.

Extended Wiring Pigtail

Liquid-tight wiring pigtails allow direct hook-up to the power supply which eliminates field wiring at the fan. Available only in conjunction with factory-mounted disconnect switches. Internal or external power supply can be specified.

End Switches

Factory-mounted end switches allow the damper to open completely before the fan is energized and help reduce the back pressure and brake horsepower load on the fan motor at start-up. (Field-supplied motor starter with a relay is required to complete the wiring on a system using an end switch.)

One-Point Wiring

Available when common voltages are on the motor and the actuator, the disconnect is factory mounted and wired, and a wall housing accessory is selected. The wires are pulled from the motor and the actuator on the damper to the disconnect box. (Hardwiring of the components to the disconnect switch is by others.)

Motors

Greenheck offers a wide variety of alternating current (AC) as well as electronically commutated (EC) Vari-Green® motors (AER only) to best suit your application and installation needs. The Greenheck motor offering allows you to configure motor electrical characteristics and motor protections to pair up with your project needs.

Vari-Green® Drive (AER only)

The Vari-Green Drive (VGD) is a factory mounted and wired variable frequency drive. It is programmed at the factory to match the characteristics of the fan and motor on which it is installed.

Vari-Green® Controls (AER only)

Vari-Green controls allow for maximized ventilation system efficiency with manual and automated on demand-controlled operation.

Motor Starters

Can be used to coordinate dampers, end switches and motor starting. They protect the motor, offer control options, and provide Lockout/Tagout features as well.

Coatings

A variety of special coatings ranging from enamels to phenolics are available for decorative or protective purposes. When a special coating is selected for the fan, all accompanying accessory items are also coated unless specified. Consult your local representative for more details.

Options and Accessories

Propeller Guard

The zinc-coated wire propeller guard is an easy way to provide OSHA-rated protection to the propeller-side of your sidewall fan. Guard can be used in conjunction with wall housing or OSHA motor side guards.



Weatherhood Kit

Weatherhoods shield wall openings and dampers from rain and snow. Constructed of galvanized steel with wire mesh birdscreen. Mounting flanges have prepunched mounting holes. 45° turndown is for exhaust and 90° turndown is for exhaust and supply. Options include aluminum construction, insect screen and painted finish. Shipped unassembled in kit form for field assembly. Cannot be used with the damper guard option. (More details on page 10.)

Wall Collar with Guard Combo

Wall collar with guard combo offers a method for mounting sidewall propeller fans while leaving the motor and fan protected. Standard construction is of galvanized steel (painted steel is optional) with heavy-gauge mounting flanges and prepunched mounting holes. (More details on page 11.)

OSHA Motor Side Guard

Protective guards are of wire mesh in a steel frame (fan sizes 20 - 48) or expanded metal screen in structural steel frames (fan sizes 54 and 60). Guards are available to completely enclose the motor and drive side of the fan. (More details on page 12).

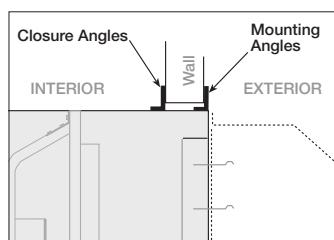
Wall Collar

Wall collars offer a method for mounting sidewall propeller fans while leaving the motor and fan frame exposed for easier access to the motor and fan propeller. Standard construction is of galvanized steel (painted steel is optional) with heavy-gauge mounting flanges and prepunched mounting holes. (More details on page 13.)

Wall Housing

Wall housings are the safest, most efficient, and sturdiest platform for mounting sidewall propeller fans and their optional accessories. Constructed of galvanized steel with heavy-gauge mounting flanges and prepunched mounting holes. The wall housing is designed to reduce installation time and provide maximum installation flexibility. Attached accessories such as dampers, guards and weatherhoods may mount to either end. As a result, a wide variety of configurations are available to accommodate the needs of the system designer. (More details on page 13.)

Closure Angles



An extra set of mounting flanges are available for field installation to close off the interior wall opening for a finished appearance. Shipped in crate unattached.

Filtered Housing

Filtered wall housings allow for a wide range of mounting arrangements to meet specific applications. Constructed of galvanized steel with heavy-gauge mounting flanges and prepunched mounting holes. Fan filters are permanent 2-inch washable aluminum filters which can be accessed through a bolted panel for easy removal and cleaning. (More details on page 14.)

Damper Guard

Meets the OSHA requirements to completely enclose the damper or wall openings on the discharge side of the fan. Constructed of expanded galvanized steel screen in galvanized steel frames. Mounting flanges have prepunched mounting holes. Options include aluminum construction and painted finish. The damper guard cannot be used with the weatherhood option. (More details on page 15.)

Dampers

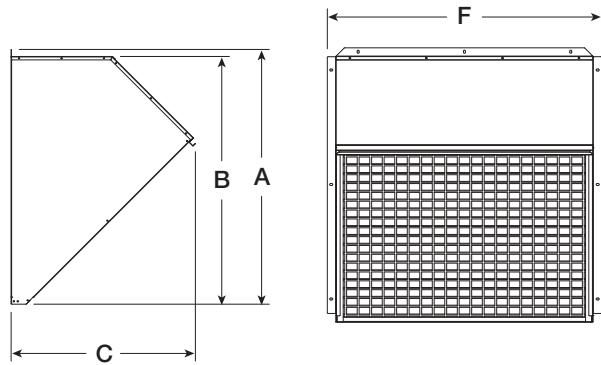
Used in a stand-alone manner or in conjunction with the wall housing or wall collar, a complete line of dampers are available for exhaust or supply configurations. (More details on page 16.)

Weatherhood Kit

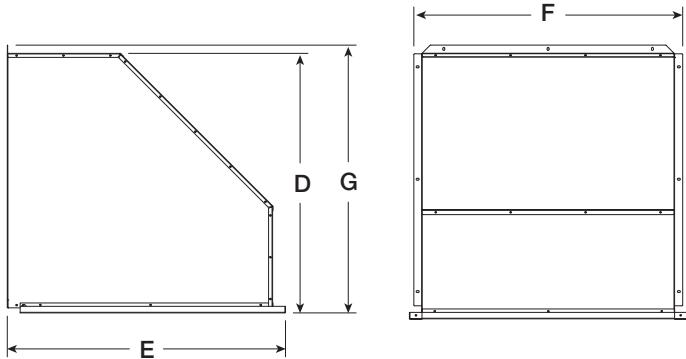


Weatherhoods shield wall openings and dampers from rain and snow. Construction is of galvanized steel or optional aluminum. Standard with wire mesh birdscreen and optional insect screen. Available in 45 or 90 degree turndown. Shipped knocked-down and loose from the factory. Available with decorative or protective coatings.

45° KIT



90° KIT



Fan Size	A Sq.	B	C	D	E	F	G	Gauge
20	25.000	23.625	25.000	24.375	30.875	25.125	25.625	18
24	32.000	30.500	27.250	31.125	36.750	31.875	32.500	18
30	37.875	36.500	29.375	37.375	41.000	37.875	38.750	18
36	43.875	42.500	33.375	43.375	46.375	43.875	44.625	18
42	49.875	48.500	36.000	49.250	50.250	49.875	50.625	18
48	56.125	54.750	40.750	55.500	56.750	56.000	57.000	18
54	62.250	61.000	44.875	62.000	62.625	62.250	63.375	16
60	68.375	67.000	48.000	68.500	68.000	68.375	69.875	16

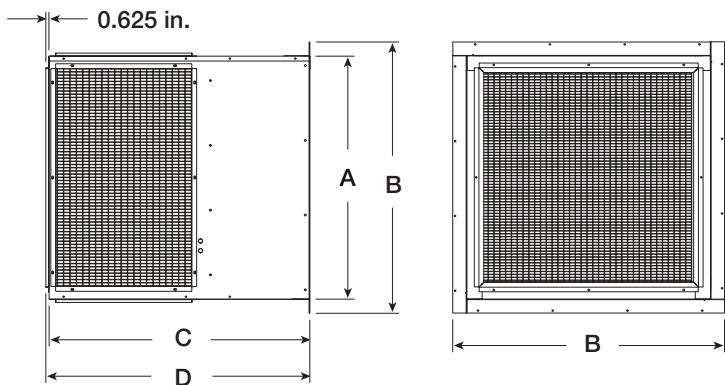
All dimensions in inches.

Wall Collar With Guard Combo

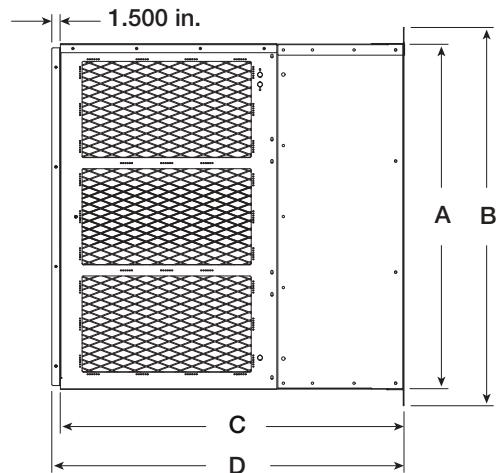


Wall collar with guard combo offers a method for mounting sidewall propeller fans while leaving the motor and fan protected. Removable screens allow easier maintenance access to the fan without having to remove the entire guard. Standard construction is of galvanized steel (painted steel is optional) with heavy-gauge mounting flanges and prepunched mounting holes. Factory installed to fan.

SIZES 20-48



SIZES 54



Fan Size	A Sq.	B Sq.	C		D		Recommended Wall Opening Sq.	Gauge
			Supply	Exhaust	Supply	Exhaust		
20	26.375	30.250	42.875	42.875	43.500	43.500	27.375	18
24	32.500	38.250	43.750	43.750	44.375	44.375	33.500	18
30	38.500	44.250	46.750	46.750	47.375	47.375	39.500	18
36	44.500	50.250	52.000	52.000	52.625	52.625	45.500	18
42	50.500	56.250	54.000	54.000	54.625	54.625	51.500	18
48	56.500	62.250	55.500	55.500	56.125	56.125	57.500	18
54	62.375	68.375	57.125	57.125	63.750	58.625	63.375	16

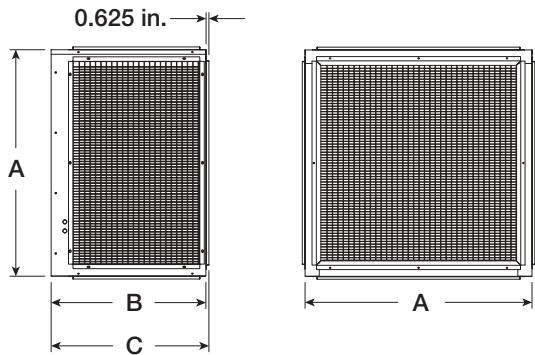
All dimensions in inches.

OSHA Motor Side Guard

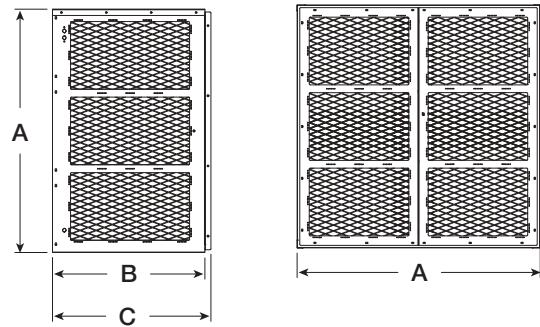


Protective guards are for use in commercial and industrial applications with belt drive and direct drive propeller fans. Protective guards provide safety for workers when propeller fans are installed at working level. OSHA-compliant screen completely encloses the motor and drive side of the fan. Features galvanized steel construction to resist corrosion in demanding environments. Factory installed to fan. Available with decorative or protective coatings.

SIZES 20-48



SIZE 54



Fan Size	A Sq.	B		C		Gauge
		Supply	Exhaust	Supply	Exhaust	
20	26.375	22.750	22.750	23.375	23.375	18
24	32.500	23.750	23.750	24.375	24.375	18
30	38.500	26.750	26.750	27.375	27.375	18
36	44.500	32.500	32.500	33.125	33.125	18
42	50.500	34.500	34.500	35.125	35.125	18
48	56.500	36.000	36.000	36.625	36.625	18
54	62.375	39.000	34.000	40.500	35.500	16

All dimensions in inches.

Wall Collar and Wall Housing



Building Value in Air.

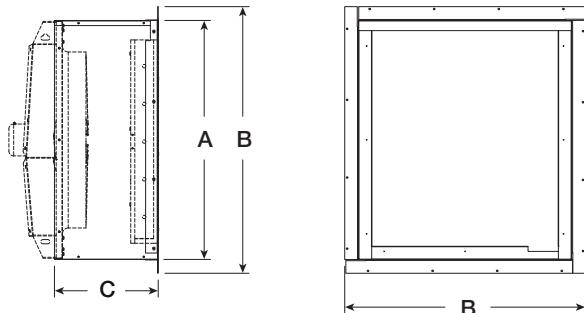
WALL COLLAR

The wall collar provides an easy way to mount the sidewall propeller fan and its accessories. Standard construction is of galvanized steel (painted steel is optional) with heavy-gauge mounting flanges and prepunched mounting holes. Factory installed to fan. Available with decorative or protective coatings.



Fan Size	A Sq.	B	C	Recommended Wall Opening Sq.	Gauge
20	26.375	30.250	21.250	27.375	18
24	32.500	38.250	21.375	33.500	18
30	38.500	44.250	21.375	39.500	18
36	44.500	50.250	21.750	45.500	18
42	50.500	56.250	21.750	51.500	18
48	56.500	62.250	22.000	57.500	18
54	62.375	68.375	22.875	63.375	16

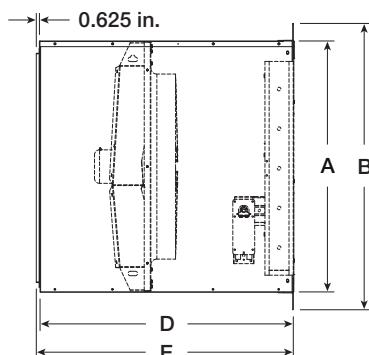
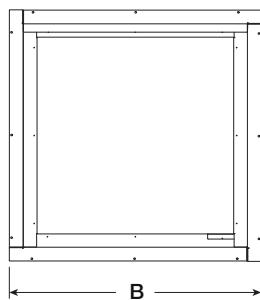
All dimensions in inches.



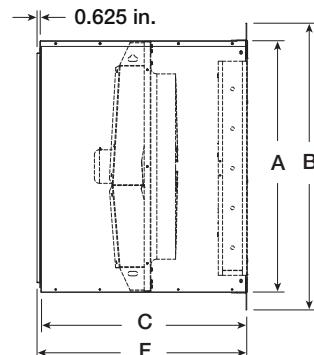
WALL HOUSING

A wall housing allows for a wide range of mounting arrangements to meet specific applications. It is constructed of galvanized steel (painted steel optional) with heavy-gauge mounting flanges and prepunched mounting holes. Protective guards completely protect the drive side of the wall housing. Factory installed to fan, reference pages 18 and 19 for installation options offered. Available with decorative or protective coatings. Wall housing guards that meet OSHA requirements are also available.

LONG HOUSING



SHORT HOUSING



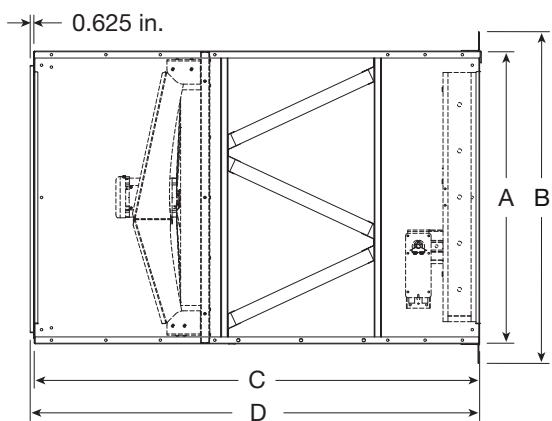
Fan Size	A Sq.	B	C	D	E	F	Recommended Wall Opening Sq.	Gauge
20	26.375	30.250	32.125	38.125	38.750	32.750	27.375	18
24	32.500	38.250	37.000	43.000	43.625	37.625	33.500	18
30	38.500	44.250	38.000	44.000	44.625	38.625	39.500	18
36	44.500	50.250	39.000	44.750	45.375	39.625	45.500	18
42	50.500	56.250	44.000	48.000	48.625	44.625	51.500	18
48	56.500	62.250	44.000	50.000	50.625	44.625	57.500	18
54	62.375	68.375	52.125	58.000	58.625	52.750	63.375	18
60	68.375	74.375	54.125	60.125	60.750	54.750	69.375	18

All dimensions in inches.



Filtered Housing

The filtered supply wall housing is a flexible and easy way to mount the fan for installations where filtering is required. It is designed with the draw-through concept to achieve the highest filter and fan efficiencies. Standard construction is galvanized steel (painted steel optional). Mounting flanges are factory installed for either flush exterior or flush interior mounting. Permanent 2-inch washable filters are accessed through a bolted panel and can be easily removed for cleaning. All accessory items available with the standard wall housing can be used with the filtered supply wall housing. Factory installed to fan.



Weatherhood
is an optional
accessory



Fan Size	A Sq.	B	C	D	Recommended Wall Opening Sq.	Gauge
24	32.625	38.500	61.875	62.500	33.500	18
30	38.625	44.500	63.250	63.875	39.500	18
36	44.625	50.500	65.250	65.875	45.500	18
42	50.625	56.500	68.250	68.875	51.500	18
48	56.625	62.500	74.500	75.125	57.500	18

All dimensions in inches.



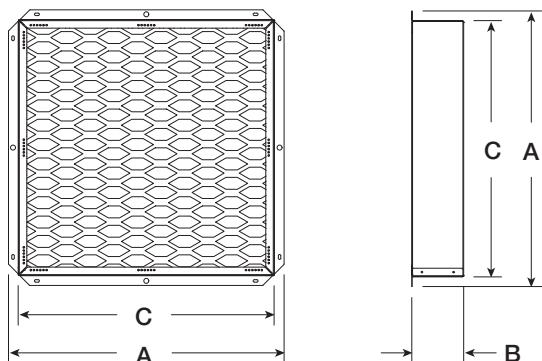
Replacement 2-inch
washable filter

Damper Guard

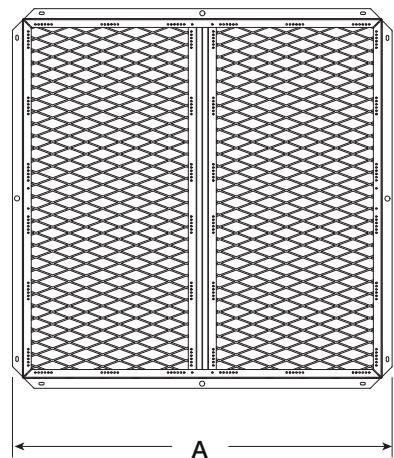


Meets the OSHA requirements to completely enclose the damper or wall openings on the discharge side of the fan. Constructed of expanded galvanized steel screen in galvanized steel frames. Mounting flanges have prepunched mounting holes. Options include aluminum construction and painted finish. Factory installed to fan with wall housing and wall collar. Shipped in crate unattached with stand-alone fan. The damper guard cannot be used with the weatherhood option.

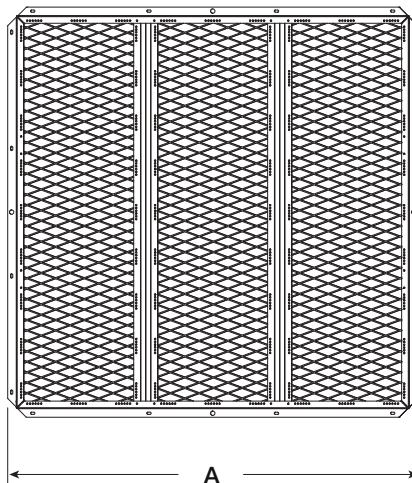
SIZES 20-36



SIZES 42 AND 48



SIZES 54 AND 60



Fan Size	A Sq.	B	C	Gauge
20	25.000	6.625	22.375	18
24	29.000	6.375	26.375	18
30	34.875	6.625	32.375	18
36	40.875	6.875	38.375	18
42	46.875	10.000	44.375	18
48	52.875	9.125	50.375	18
54	58.875	7.625	56.375	18
60	64.875	7.375	62.375	18

All dimensions in inches.

BACKDRAFT DAMPERS

Used as a stand-alone accessory or in conjunction with a wall housing or wall collar accessory, backdraft dampers are available for exhaust or supply configurations. Backdraft dampers are constructed with aluminum or galvanized frames and blades and vinyl blade seals. Actuators are available in 24, 115, 208, 230, or 460 volts. Actuators for 50-cycle voltages are also available.

Backdraft damper model availability will be limited if fan velocity exceeds maximum damper catalog velocity.



WD-320/430 Series

EM-31 Series

COMMERCIAL CONTROL DAMPERS

Used as a stand-alone accessory or in conjunction with a wall housing or wall collar accessory, commercial control dampers are available for exhaust or supply configurations. Commercial control dampers are constructed with galvanized or aluminum frames and galvanized or stainless steel blades and stainless steel blade seals. Actuators are available in 24, 115, 208, 230, or 460 volts. Actuators for 50-cycle voltages are also available.



VCD-20/30/40 Series

Damper Availability	EM-31	VCD-20	VCD-23	VCD-33	VCD-34	VCD-42	VCD-43	WD-320	WD-430
Exhaust	○	●	●	○	○	○	○	●	
Supply		●	●	○	○	○	○		●

○ Ship Loose Only ● Factory Attached or Ship Loose

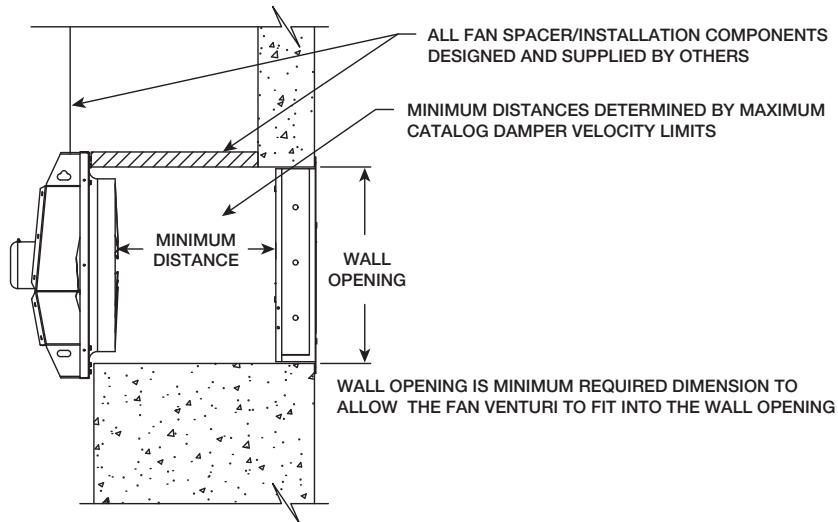
TYPICAL INSTALLATION

Fan Size	Damper Size	Minimum Distance	Recommended Wall Opening Sq.
20	22 x 22	12	23.250
24	26 x 26	13	26.125
30	32 x 32	13	32.125
36	38 x 38	14	38.125
42	44 x 44	15	44.125
48	50 x 50	16	50.125
54	56 x 56	17	56.000
60	62 x 62	19	62.000

Damper size is nominal. All dimensions in inches.

Wall housing length increases by 6 inches when an actuated damper or heavy-duty backdraft damper is selected.

Backdraft damper availability will be limited by maximum catalog velocity and maximum fan motor power rating of 5 hp.



WALL OPENING IS MINIMUM REQUIRED DIMENSION TO ALLOW THE FAN VENTURI TO FIT INTO THE WALL OPENING

Model AER (direct drive) is available with Greenheck's Vari-Green® technology. Greenheck's Vari-Green products are designed for efficiency, controllability and low maintenance.

MOTORS

The Greenheck Vari-Green motor is an electronically commutated (EC) motor that operates on single or three phase AC power input and internally converts it to DC power providing better speed control capabilities (up to an 80% turndown) and higher efficiencies than standard motors. The Vari-Green motor blends technology, controllability and energy efficiency in a low maintenance package that has changed the way the industry designs, specifies and operates air movement equipment. Depending on power rating, Vari-Green motors are available in both single and three phase with either a dial-mounted potentiometer (speed control) or wired to accept a 0-10 VDC control signal from an external source.



CONTROLS

For expanded controllability, Greenheck offers many different solutions to fit any need. Controls are designed specifically for Vari-Green motors. These controls are available for applications requiring manual operation or demand-controlled ventilation (DCV). Applications utilizing DCV controls provide only the desired amount of ventilation, delivering building owners savings on their energy bills.



Manual Controls

- Dial-on Motor
- Remote Dial
- Touch Remote

Demand Controlled Ventilation

- Hand/Off/Auto (HOA)
- Constant Airflow
- Constant Pressure
- Air Quality - Volatile Organic Compound (VOC)
- Air Quality - Temperature/Humidity
- 0-10 VDC Signal from Building Management System (BMS)



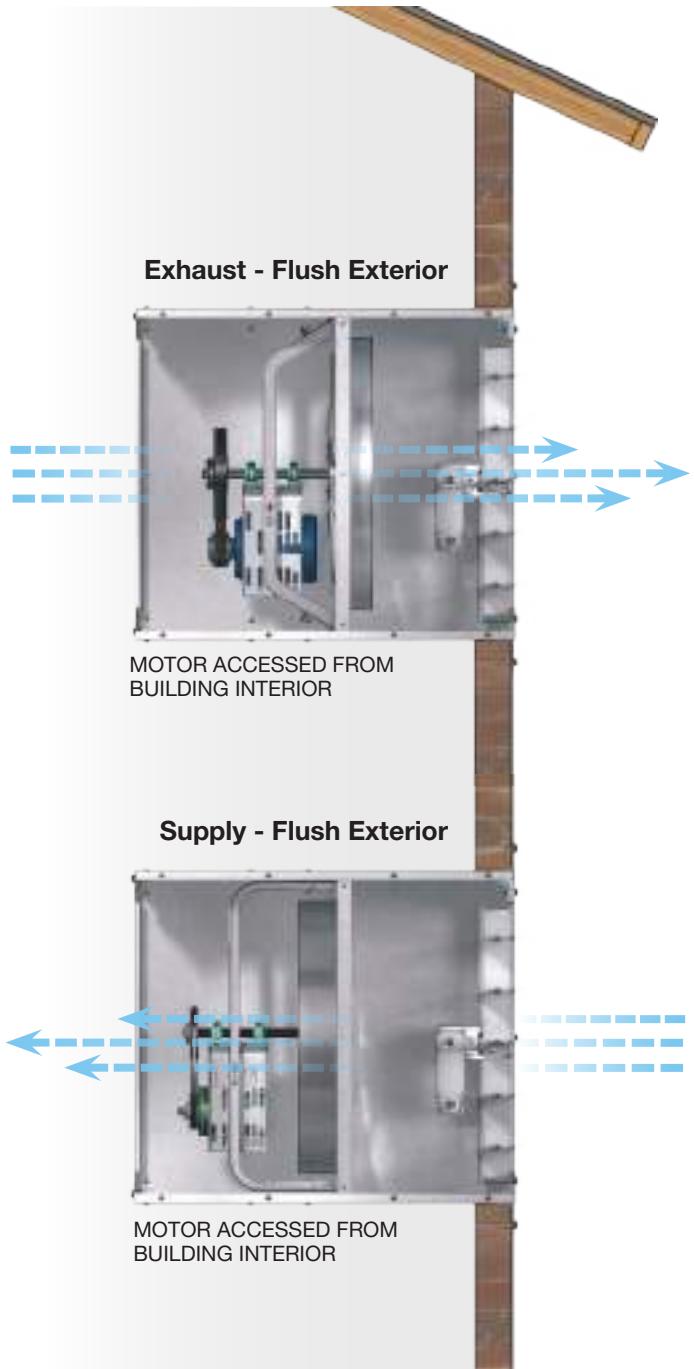
Mounting Options

Sidewall propeller housings can be oriented in eight horizontal and eight vertical configurations. The two main considerations for determining which orientation the project requires are:

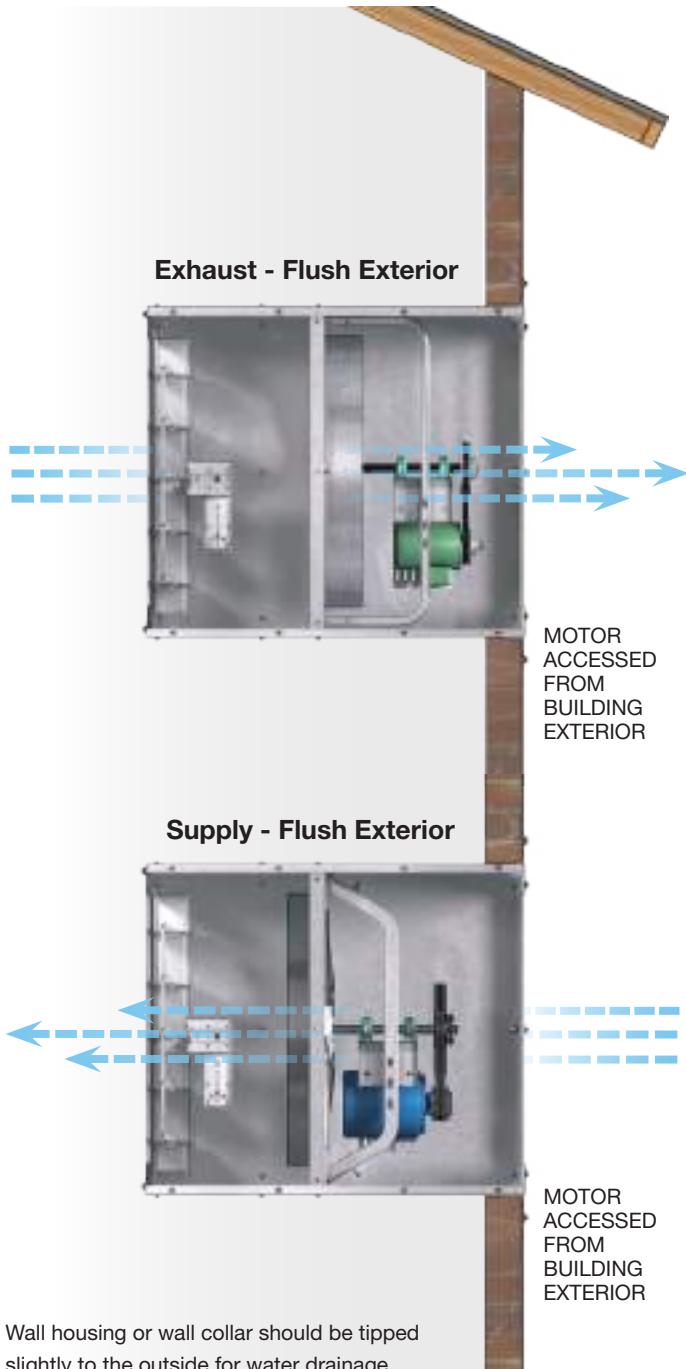
1. Will the fan and housing be placed inside the building or outside of the building?
2. How will the motor and drives be most easily accessed, from inside of the building or from outside of the building?

FLUSH EXTERIOR - MOTOR AND DRIVE ACCESSED FROM

INSIDE OF BUILDING - DAMPER OUTSIDE



OUTSIDE OF BUILDING - DAMPER INSIDE



Mounting Options

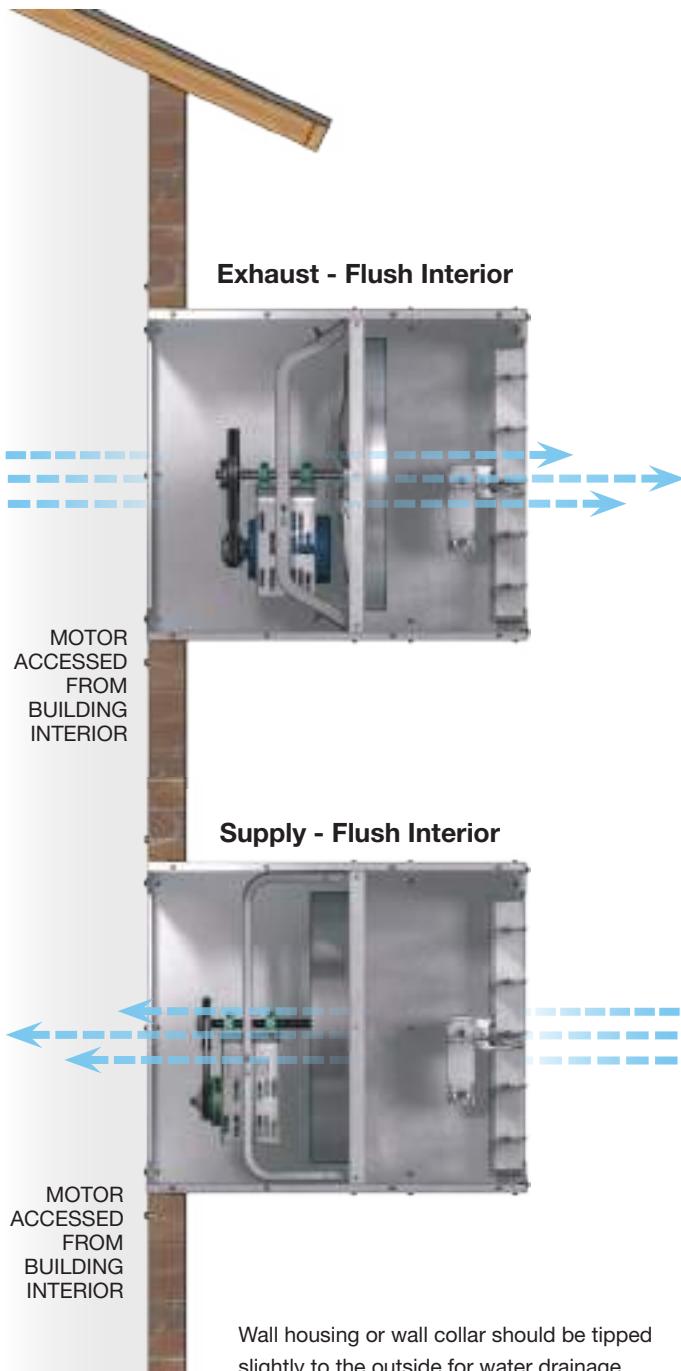
Flush Interior: The fan and housing will be outside the building and the end of the housing will be flush with the interior wall.

Flush Exterior: The fan and housing will be inside the building and the end of the housing will be flush with the exterior wall.

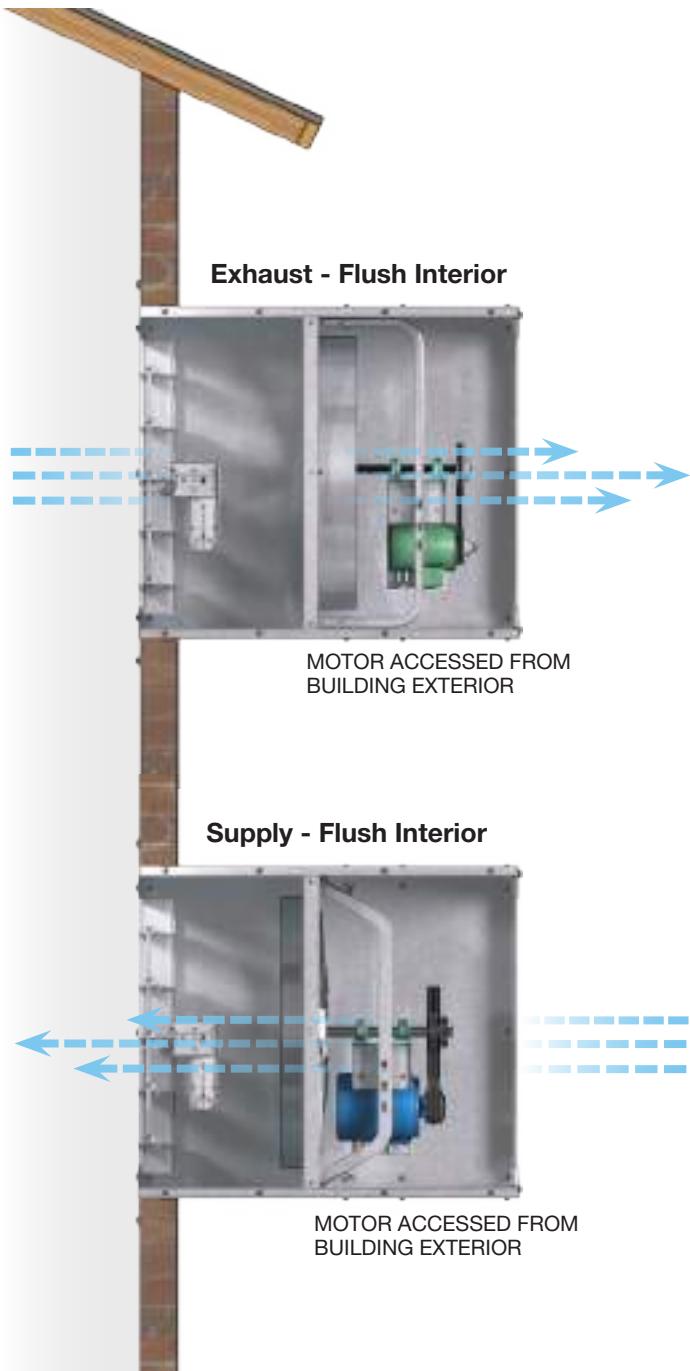
Motor Access: The motor and drives can be placed on either side of the propeller for access to grease bearings, check or change belts and inspect the motor/wiring connections. Failure to assess the best access point can place maintenance personnel in extreme danger if they must reach through the propeller.

FLUSH INTERIOR - MOTOR AND DRIVE ACCESSED FROM

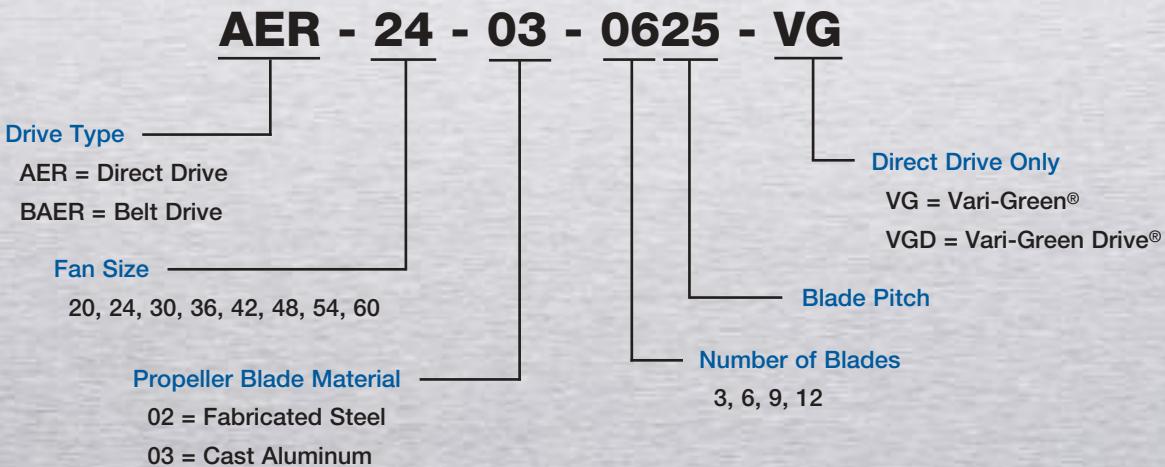
INSIDE OF BUILDING - DAMPER OUTSIDE



OUTSIDE OF BUILDING - DAMPER INSIDE



Model Nomenclature



Quick Delivery and Quick Build



Greenheck's Quick Delivery (QD) and Quick Build (QB) programs have the industry's most comprehensive offering of commonly requested ventilation equipment.

The QD program has more than 1000 of the most in-demand products in stock, ready to ship. Some products require specific customization to meet the demands of a project. The QB program offers an even larger assortment of configure-to-order products built just for you, in the time frame you need!

Greenheck's Quick Build (QB) program ensures these products can be manufactured as needed in 1, 3, 5, 10, 15, and 25-day manufacturing cycles.

Our Commitment

As a result of our commitment to continuous improvement, Greenheck reserves the right to change specifications without notice.

Product warranties can be found online at Greenheck.com, either on the specific product page or in the literature section of the website at Greenheck.com/Resources/Library/Literature.



Orientalmotor

ORIENTAL MOTOR U.S.A. Corp.
570 Alaska Avenue
Torrance, CA 90503
1-800-GO-VEXTA (468-3982)

Item # MU1238A-21B, 4.69 in. (119 mm) MU Series Axial Fan (Single-Phase 115 VAC)



Axial fans use a propeller to create a flow of air in the direction of the axis of rotation. Because they create a large airflow, axial fans are optimal for a wide variety of cooling and other airflow needs.

- Slim-Line, General Purpose Axial fan
- Plug cord accessory required.



Web Price

\$33.00

[Specifications](#) | [Dimensions](#) | [Airflow](#) | [Connection](#) | [System](#)

Specifications

Lead Time¹ Up to 30 pcs as of 6:30am EST Estimated Ship: 04/09/2025

Product Line ORIX®

Fan Type Axial Fan

Frame Size 4.69 in

Thickness 1.5 in.

Power Supply Single-Phase 115 VAC

Frequency 50 Hz
60 Hz

Current 0.18 A [115 VAC, 60 Hz]
0.20 A [115 VAC, 50 Hz]

Connection Type Plug

Type Standard Speed

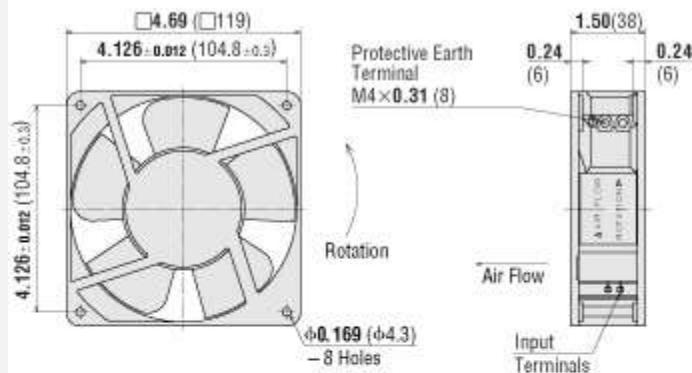
Speed (r/min)	2800 [50 Hz] 3250 [60 Hz]
Max. Air Flow	95.3 CFM [50 Hz] 106 CFM [60 Hz]
Max. Static Pressure	0.325 inH ₂ O
Noise Level	43 dB (A) [50 Hz] 46 dB (A) [60 Hz]
Fan Kit	Fan Only
RoHS Compliant	Yes
Safety Standards	UL CSA JET EN CE
CE Marking	Low Voltage Directives
Insulation Resistance	100 MΩ or more when 500 VDC is applied between the windings and the frame under normal ambient temperature and humidity.
Dielectric Strength	Sufficient to withstand 1.5 kV at 50Hz applied between the windings and the frame for 1 minute under normal ambient temperature and humidity.
Temperature Rise	54°F (30°C) or less measured by the thermometer method after the temperature of the case has stabilized after continuous operation under normal ambient temperature and humidity.
Insulation Class	Class E (248°F [120°C]), Recognized as Class A (221°F [105°C]) by UL and CSA standards.
Overheat Protection	Impedance protection
Ambient Temperature Range	14°F ~ 140°F (-10°C ~ 60°C)
Ambient Humidity	85% or less (noncondensing)

Dimensions

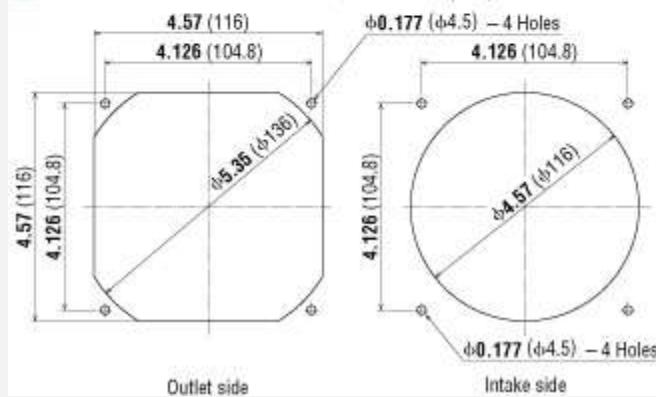
-

Dimensions Scale 1/4, Unit = inch (mm)

Weight: 1.2 lb. (0.53 kg)



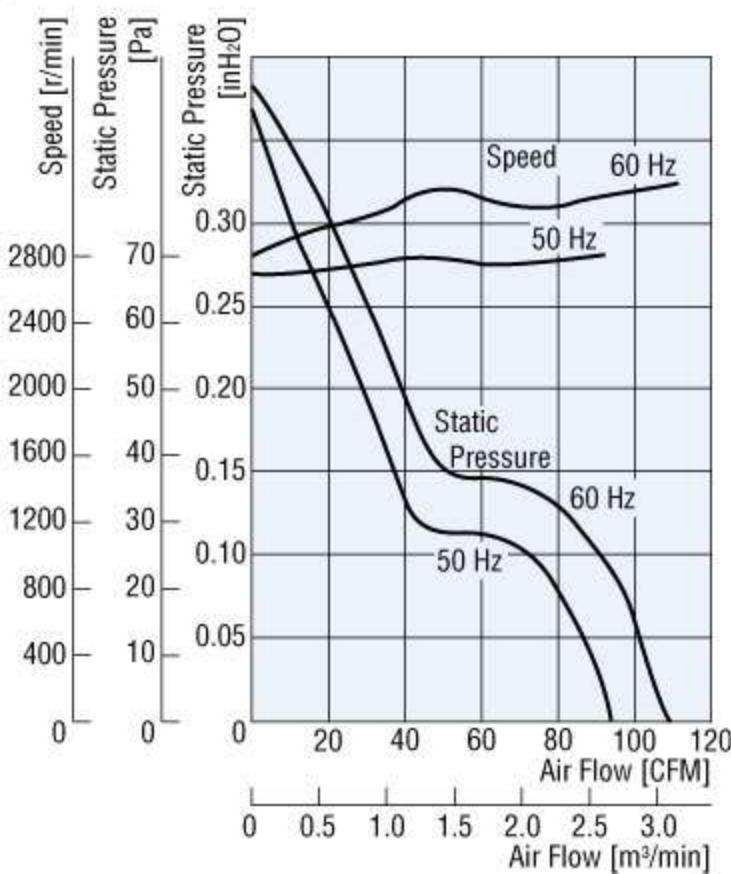
Panel Cut-Out Scale 1/4, Unit = inch (mm)



Airflow

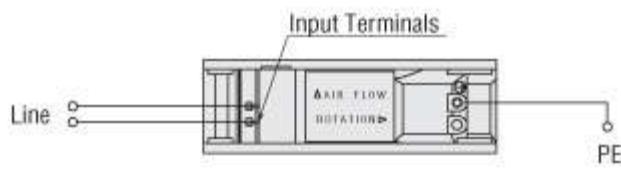
Air Flow — Static Pressure Characteristics

MU1238A



Connection

Connection Diagram



System

Finger Guards (Accessories)
Protect against the hazards posed by rotating fan blades.



Screens (Accessories)
Allow the passage of air but block electromagnetic waves.

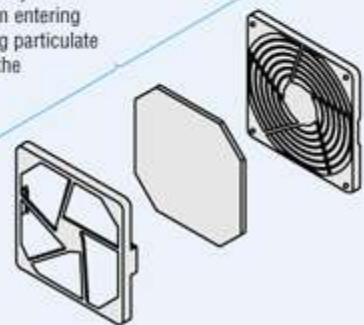


Thermostats

Thermostats make it possible for fans to operate only when cooling is necessary, thereby conserving energy.



Filters (Accessories)
Prevents dust from entering the fan, eliminating particulate contamination of the equipment.



Plug Cords (Accessories)
Provide terminals for connection to the power supply.
For **MU** Series fans.



Axial Flow Fans

The system configuration shown is an example. Other combinations are available.

¹ Quoted Ship Date for orders placed before 12:00 pm PST. Quantities may affect Shipping Date.

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Site Search...



Flow switch

For wet sprinkler systems

Model FSFD, with adjustable time delay

WIKA data sheet FL 50.01



Applications

- Detection of the flow in wet sprinkler systems once the sprinkler has been triggered

Special features

- Adjustable time delay mechanism to avoid false alarms during water surges
- Tamper-proof cover prevents unauthorised access to the switch point setting
- IP56/NEMA 4 ingress protection enables the instrument to be used indoors and outdoors
- Two sets of microswitches activate the control panel and the local audible warnings
- Two cable duct openings enable easy connections to terminal blocks



Flow switch, model FSFD

Description

The model FSFD was developed to detect the water flow in wet sprinkler systems once the sprinkler has been triggered. The flow switch is fitted with a pneumatic time delay mechanism that can be set from 0 ... 70 seconds via an adjustment dial to avoid false alarms during water surges.

The tamper-proof screws on the cover prevent unauthorised access to the switch point setting. The robust design, with IP56/NEMA4 ingress protection, is suitable for indoor and outdoor applications. For error-free installation, the direction of flow is indicated on the case and on the saddle.

The model FSFD has two cable duct openings for two sets of SPDT switches (form C) in a fused terminal block, which provides a direct electrical connection to control panels and local audible warnings.

Since the flow switch is designed for pipe sizes from 2 ... 8" in various pipe schedules, it provides a complete solution for construction projects.

The model FSFD has been designed for improved sensitivity and repeatability of the switch point and has UL and FM certifications.

Specifications

Specifications	
Approvals	■ UL 346 ■ FM 1042
Case	Aluminium die-casting (per EN AC-46000)
Sealing	EPDM
Ingress protection	IP56/NEMA 4, suitable for indoor and outdoor applications
Flow rate/sensitivity	4 ... 10 GPM [15 ... 38 LPM]
Operating pressure	268 psi [18.5 bar] ¹⁾
Max. water surge	18 FPS [5.5 m/s])
Operating temperature	0 ... 68 °C [32 ... 154 °F]
Switching function	2 x SPDT (single pole double throw), form C
Electrical rating	■ 10 A, AC 125/250 V ■ 2 A, DC 30 V res.
Electrical connection	Two inputs for ½" conduit
Mounting	■ Horizontal mounting ■ Vertical mounting The arrows on the case and the saddle determine the flow direction.
Regulations	
Installation of sprinkler systems	NFPA-13
Installation of sprinkler systems in one- and two-family dwellings and manufactured homes	NFPA-13D
Installation of sprinkler systems in low-rise residential occupancies	NFPA-13R
National fire alarm and signaling code	NFPA-72
Weight	Approx. 2 ... 3.5 kg [4.4 ... 7.7 lb], depending on pipe size

1) With UL346 the operating pressure is limited to 175 psi [12 bar] for pipe size 8 inch (DN 200).

Compatible pipes

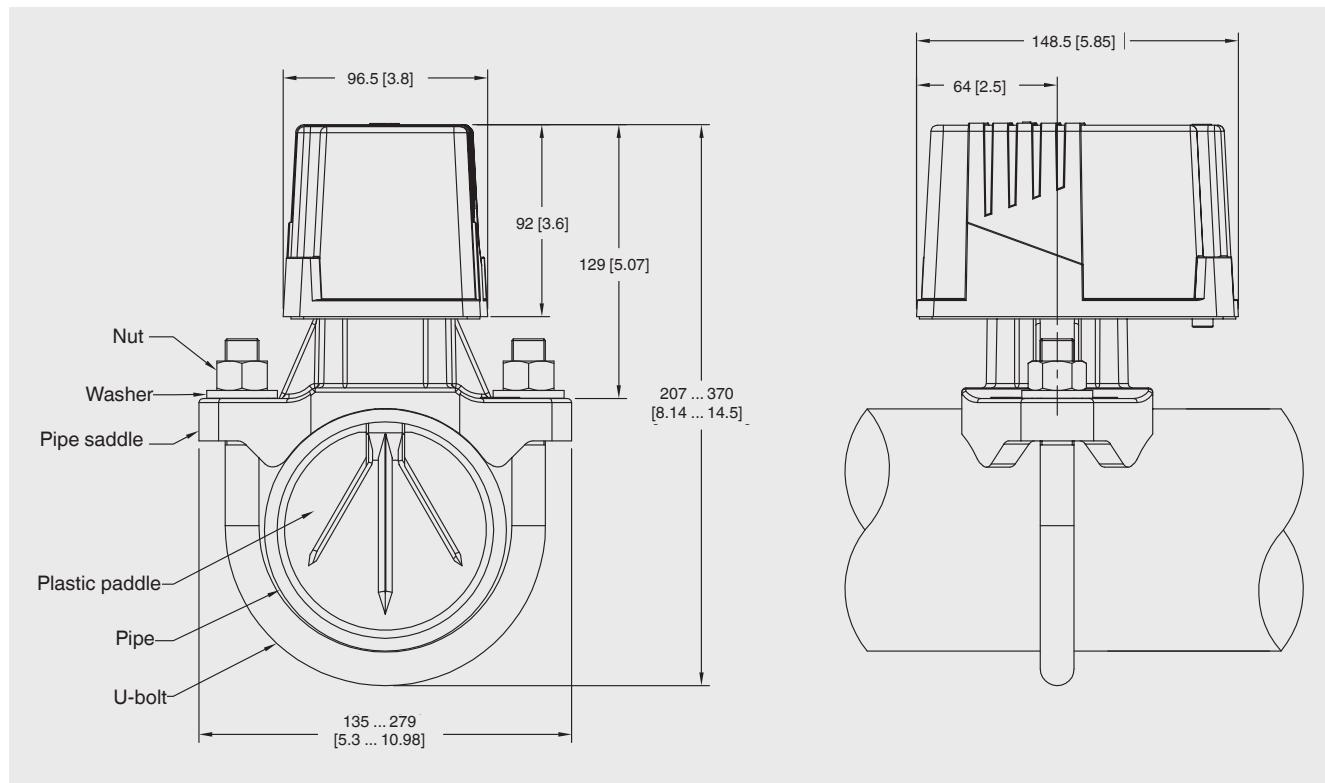
Model	Nominal pipe size		Outer diameter		Wall thickness					
					Light-weight wall		Schedule 10		Schedule 40	
	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm
FSFD 2	2	DN 50	2.37	60.3	0.07	1.65	0.11	2.77	0.15	3.91
FSFD 2.5	2.5	DN 65	2.87	73	0.08	2.13	0.12	3.05	-	-
FSFD 3	3	DN 80	3.5	88.9	0.08	2.11	0.12	3.05	0.22	5.49
FSFD 3.5	3.5	-	4	101.6	-	-	0.12	3.05	0.23	5.74
FSFD 4	4	DN 100	4.5	114.3	0.08	2.13	0.12	3.05	0.24	6.02
FSFD 5	5	-	5.56	141.3	-	-	0.13	3.4	0.26	6.55
FSFD 6	6	DN 150	6.63	168.3	0.12	2.92	0.13	3.4	0.28	7.11
FSFD 8	8	DN 200	8.63	219.1	-	-	0.15	3.76	0.32	8.18

Approvals

Logo	Description	Region
	UL Safety (e.g. electr. safety, overpressure, ...)	USA
	FM Hazardous areas	USA

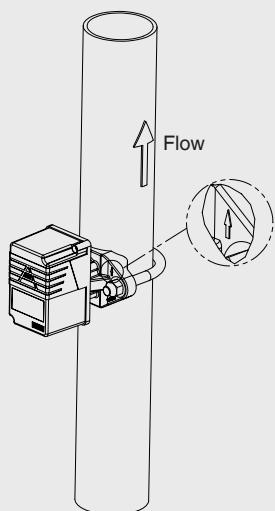
→ For approvals and certificates, see website

Dimensions in mm [in]

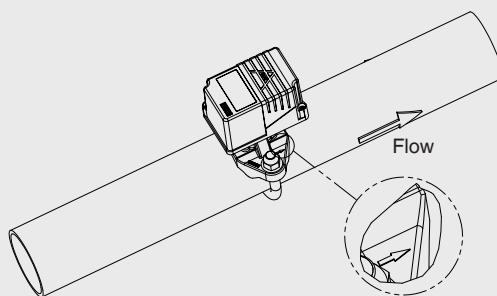


Mounting

Vertical mounting



Horizontal mounting



Ordering information

Nominal pipe size		Model	Order number
inch	mm		
2	DN 50	FSFD 2	83792488
2.5	DN 65	FSFD 2.5	83792489
3	DN 80	FSFD 3	83792490
3.5	-	FSFD 3.5	83792491
4	DN 100	FSFD 4	83792492
5	-	FSFD 5	83792493
6	DN 150	FSFD 6	83792494
8	DN 200	FSFD 8	83792495

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The specifications given in this document represent the state of engineering at the time of publishing.
We reserve the right to make modifications to the specifications and materials.

20.2 cu. ft. Top Freezer Refrigerator

- 20.2 cu. ft. Capacity
- Reversible Door
- Premium LED Refrigerator Lights
- Humidity-Controlled Crispers
- Optional Ice Maker LK65C



COLOR AVAILABILITY

<input checked="" type="radio"/>	LTCS20020S – Stainless Steel
<input type="radio"/>	LTCS20020W – Smooth White
<input checked="" type="radio"/>	LTCS20020B – Smooth Black

CAPACITY

Refrigerator (cu. ft.)	14.7
Freezer (cu. ft.)	5.5
Total Capacity (cu. ft.)	20.2

ENERGY

Energy Consumption (kWh / Year)	430
ENERGY STAR® Qualified	Yes

WATER & ICE SYSTEM

Ice & Water Dispenser	No
Ice System	Manual Ice Tray or Optional Ice Maker

COOLING

Compressor Type	Linear Compressor
Dual Evaporators	No
Cooling System	Standard
Multi-Air Flow™ System	Yes
Door Cooling+	No
Temperature Sensors	3
Fresh Air Filter	No

CONVENIENCE

Display Type	Membrane / Green LED
Temperature Controls	Electronic / Digital
Door Alarm	No
Child Lock	No
Auto Closing Door Hinge	No
ADA Compliant	No
Sabbath Mode	No
LoDecibel™ Quiet Operation	Yes

REFRIGERATOR

No. of Shelves	3 Full Width (2 Adjustable)
Shelf Construction	Tempered Glass
Crisper Bins	2 Humidity Crispers
Glide N' Serve™ Pantry Drawer	No
CoolGuard™	No
Refrigerator Light	Ceiling LED

REFRIGERATOR DOOR

No. of Door Bins	3 (2 Full Width, 1 Covered Dairy)
Door Bin Construction	1 Piece (Clear, Diamond Pattern)

FREEZER

Freezer Type	Swing Door
No. of Shelves	1 Adjustable Glass Shelf
No. of Door Bins	2 Full Width (Clear, Diamond Pattern)
Ice Storage	Ice Maker Optional - LK65C
Freezer Light	No
Freezer Handle	Pocket Handle

SMART FEATURES

Wi-Fi Enabled	No
ThinQ®	No
SmartDiagnosis™	No

MATERIALS AND FINISHES

Hidden Hinges	No
Surface	Smooth
Fingerprint & Smudge Resistant Exterior	No
Handles	Pocket Handle

ACCESSORIES

Optional Ice Maker	LK65C
--------------------	-------

TECHNICAL SPECS

Required Power Supply	115 V, 60 Hz, 15 Amp
Plug Type	3-Prong
Power Cord Location	Back
Min. / Max. Water Pressure	20–120 psi

DIMENSIONS / CLEARANCES / WEIGHTS

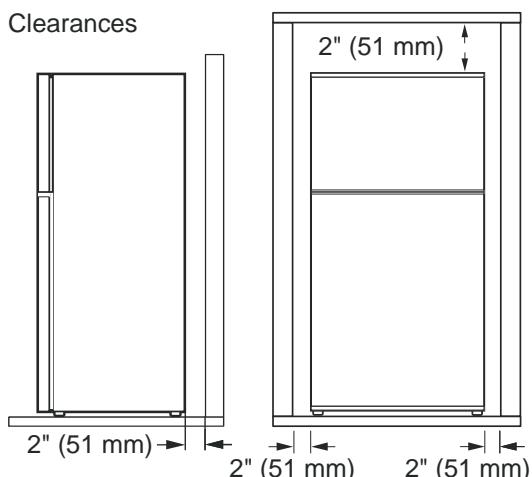
Depth with Handles	33 3/8"
Depth without Handles	33 3/8"
Depth without Door	29"
Depth (Total with Door Open)	60"
Height to Top of Case	65 1/2"
Height to Top of Door Hinge	66 1/8"
Width	29 3/4"
Width (Door Open 90° with Handle)	31 3/4"
Width (Door Open 90° without Handle)	31 3/4"
Door Edge Clearance with Handle	2"
Door Edge Clearance without Handle	2"
Installation Clearance	Sides 2", Top 2", Back 2"
Approx. Weight (Product / Carton)	202 lbs. / 226 lbs.
Carton Dimensions (W x H x D)	31 7/8" x 69 3/8" x 38 1/4"

LIMITED WARRANTY

Parts & Labor	1 Year
Sealed System (Parts & Labor)	5 Years
Compressor (Parts & Labor)	5 Years
Linear / Inverter Compressor (Parts Only)	10 Years

DIMENSIONS / CLEARANCES

Product Drawings Coming Soon

Clearances**DIMENSIONS / CLEARANCES**

Back, Top and Side Clearance 2" (51 mm)

INSTALLATION NOTES

- Allow at least 2 inches (51 mm) between the back of the refrigerator and the wall as well as on the sides and top of the refrigerator and adjacent walls or objects.

MODULAR ELECTRIC FURNACE

2, 3, 4, and 5 TONS

FEATURES

- Modular Blower Cabinet, Air Conditioning or Heat Pump ready
- Upflow, horizontal right or left applications
- Downflow requires sub-base accessory
- Electronic fan control board
- Three speed PSC motor on all models
- Matches with AC and HP cased coils (Hot water coil may be used, but doesn't match case size)
- Accepts accessory two stage outdoor thermostats
- 208/230-1-60 supply voltage
- Requires a "NO HEAT KIT" if installed without electric heat.
- Field installed electric heater packages from 5kW- 25kW, single or three phase available separately

SERVICE

- Direct drive slide-out blower assembly

QUALITY

- Internally lined with ½ inch Tuf-Skin insulation
- Thermosetting powder coated steel cabinet

WARRANTY

- 5 year parts limited warranty



Model	Nominal Tons	Nominal CFM	Motor HP	Dimensions H x W x D in (mm)	Unit Weight lbs/kg	Ship Weight lbs/kg
MF080014C	2	800	1/3	24 x 14-3/16 x 20-1/2 (610 x 360 x 521)	54/25	58/26
MF120017C	3	1200	1/2	24 x 17-1/2 x 20-1/2 (610 x 445 x 521)	58/26	62/28
MF160021C	4	1600	1/2	25 x 21 x 20-1/2 (635 x 533 x 521)	70/32	75/34
MF200024C	5	2000	3/4	25 x 24-1/2 x 20-1/2 (635 x 622 x 521)	73/33	79/36

UNIT SPECIFICATIONS - ELECTRIC FURNACE

	Model Number	MF080014C	MF120017C	MF160021C	MF200024C
Application		Upflow / Horizontal / Downflow *			
Electrical Data**	Volt - Phase - Hz.	208 / 230 - 1 - 60			
	Minimum Circuit Ampacity	3.1	3.6	3.6	7.5
	Time Delay Fuse (Amps)		15		
	Maximum Fuse or Breaker Size (Amps)		15		
Blower Data	Size	DD10 - 7	DD10 - 8	DD10 - 8	DD10 - 9
	Horsepower - Speed	1/3 - 3	1/2 - 3	1/2 - 3	3/4 - 3
	Full Load Amps	2.5	2.9	2.9	6.0
Transformer		(208-230 / 24 - VAC) 40 VA			

* Accessory subbase kit required for downflow application.

** Disregard if electric heat is added. Refer to Electric Heat table

Dimensions and Clearances – in (mm)

	CLEARANCES
	NO HEATERS ALL Sides..... 0" From Supply Duct..... 0" Recommended Service From Front.... 20" (508mm) (Service for blower, filter if installed)

WITH HEATERS ALL Sides..... 0" From First Three Feet of Supply Duct to Combustibles.... 1" (26mm) From Duct after Three Feet 0" Recommended Service From Front.... 20" (508mm) (Service for blower, heaters if installed)	
ALL DIMENSIONS IN (MM)	

MODEL NUMBER IDENTIFICATION GUIDE

1	2	3,4	5,6	7,8	9	10
M	F	08	00	14	C	1
M = Cased Modular Blower						
V = Variable Speed ECM Motor - 208/230-1-60						
F = PSC Motor - 208/230-1-60						
B = PSC Motor - 115-1-60		TYPE				
08 = 800						
12 = 1200						
16 = 1600						
20 = 2000						
		NOMINAL MAX CFM				
00 = No Electric Heat		FACTORY INSTALLED ELECTRIC HEAT				
14 = 14.5"						
17 = 17.5"						
21 = 21"						
24 = 24.5"						
Sales Digit (Major Revision)						
Engineering Digit (Minor Revision)						
				CABINET WIDTH		

Airflow based on no coil, no filter, no electric heat (pre-accessory external static pressure). When heaters, filters, horizontal drain pan and/or downflow subbase are installed in an application, airflow must be re-calculated by adding the heater static, filter static, and coil static pressures (provided in the following tables) to the pre-accessory external static amount. See Coil Specification Sheet. Add .10 for Horizontal Drain Pan Kit. Add .20 for Downflow Subbase Kit.

Airflow is blower only, no coil attached

MF08		ESP in wc						
SPEED	VOLTS	0.2	0.3	0.4	0.5	0.6	0.7	0.8
Low	208v	1029	1020	1007	985	960	915	862
	230v	872	860	845	825	797	765	721
Med	208v	1286	1270	1254	1220	1180	1125	1058
	230v	1113	1105	1091	1070	1042	1000	947
High	208v	1500	1470	1432	1380	1315	1250	1168
	230v	1317	1305	1286	1255	1220	1170	1008

MF12		ESP in wc						
SPEED	VOLTS	0.2	0.3	0.4	0.5	0.6	0.7	0.8
Low	208v	973	975	979	979	973	955	931
	230v	811	815	816	810	797	780	749
Med	208v	1284	1295	1301	1305	1302	1280	1246
	230v	1084	1084	1084	1090	1089	1065	1030
High	208v	1663	1670	1671	1655	1631	1585	1519
	230v	1383	1385	1390	1390	1383	1365	1328

MF16		ESP in wc						
SPEED	VOLTS	0.2	0.3	0.4	0.5	0.6	0.7	0.8
Low	208v	1020	1015	1009	1002	991	975	950
	230v	858	845	830	815	801	780	749
Med	208v	1379	1385	1386	1379	1364	1343	1309
	230v	1156	1154	1149	1144	1134	1120	1098
High	208v	1776	1782	1783	1765	1738	1698	1643
	230v	1496	1496	1496	1495	1495	1470	1433

MF20		ESP in wc						
SPEED	VOLTS	0.2	0.3	0.4	0.5	0.6	0.7	0.8
Low	208v	1492	1495	1492	1475	1451	1395	1308
	230v	1246	1245	1238	1225	1203	1175	1125
Med	208v	1969	1955	1935	1890	1818	1700	1570
	230v	1641	1640	1633	1615	1584	1510	1406
High	208v	2696	2600	2492	2350	2192	2020	1844
	230v	2417	2355	2287	2200	2092	1940	1774

FILTER STATIC PRESSURE DROP

MODEL	WASHABLE FILTER SIZE	NOMINAL DISPOSABLE	CFM							
			600	800	1000	1200	1400	1600	1800	2000
MF08	14 1/4 x 20 1/4	14 x 20	0.05	0.09	0.13	0.19	---	---	---	---
MF12	17 3/4 x 20 1/4	18 x 20	---	---	0.09	0.12	0.17	0.22	---	---
MF16	21 1/4 x 20 1/4	20 x 20	---	---	---	---	0.12	0.15	0.19	---
MF20	24 3/4 x 20 1/4	24 x 20	---	---	---	---	0.09	0.11	0.14	0.18

ELECTRIC HEATER STATIC DROP IN. W.C.

Single-Phase						
CFM	EHIA05	EHIA07	EHIA10	EHIA15	EHIA20	EHIA25
600	0.01	0.01	0.01	---	---	---
700	0.01	0.01	0.01	---	---	---
800	0.01	0.01	0.01	0.01	---	---
900	0.01	0.01	0.01	0.01	---	---
1000	0.01	0.01	0.01	0.01	0.02	---
1100	0.01	0.01	0.01	0.02	0.02	---
1200	0.01	0.01	0.01	0.02	0.02	---
1300	0.01	0.02	0.02	0.02	0.02	---
1400	0.01	0.02	0.02	0.02	0.03	0.03
1500	0.01	0.02	0.02	0.02	0.03	0.04
1600	0.01	0.02	0.02	0.03	0.03	0.04
1700	0.01	0.02	0.02	0.03	0.03	0.04
1800	0.01	0.02	0.02	0.03	0.04	0.04
1900	0.01	0.02	0.02	0.03	0.04	0.05
2000	0.01	0.02	0.02	0.03	0.04	0.05

Three-Phase						
CFM	---	---	EHIA10	EHIA15	EHIA20	EHIA25
600	---	---	0.01	---	---	---
700	---	---	0.01	---	---	---
800	---	---	0.01	0.01	---	---
900	---	---	0.01	0.01	---	---
1000	---	---	0.01	0.01	0.02	---
1100	---	---	0.01	0.02	0.02	---
1200	---	---	0.01	0.02	0.02	---
1300	---	---	0.02	0.02	0.02	---
1400	---	---	0.02	0.02	0.03	0.03
1500	---	---	0.02	0.02	0.03	0.04
1600	---	---	0.02	0.03	0.03	0.04
1700	---	---	0.02	0.03	0.03	0.04
1800	---	---	0.02	0.03	0.04	0.04
1900	---	---	0.02	0.03	0.04	0.05
2000	---	---	0.02	0.03	0.04	0.05

--- DO NOT OPERATE IN THIS AREA CFM / KW LIMIT EXCEEDED

UNIT SPECIFICATIONS – No Heat Kit

No Heat Kit Model	Cabinet	Volts	Phase	Hertz	Supply circuit No.	H.P.	Maximum Motor Amps	MCA Branch Circuit Ampacity	Maximum Overcurrent Protection (Amps)	Recommended				
										Supply Wire 75°C copper		Ground Wire		
										No. of Wires	Wire Size	Max. Ft. Length	No. of Wires	Wire Size
EHIA00KN10*	MF08**	208	1	60	Single	1/3	2.5	3.1	15	2	14	105 (32 m)	1	14
		230												
	MF12**	208	1	60	Single	1/2	2.9	3.6	15	2	14	105 (32 m)	1	14
		230												
	MF16**	208	1	60	Single	1/2	2.9	3.6	15	2	14	105 (32 m)	1	14
		230												
	MF20**	208	1	60	Single	3/4	6.0	7.5	15	2	14	90 (27.5 m)	1	14
		230												

* No Heat Kit ** Unit without electric heat installed

Conversion: 1 foot = .305 meters

TECHNICAL DATA (MF only) Single Phase with Circuit Breaker

Heater Model	Supply Volt-	Nom. Heat- BTUH	Heat KW	KW Per Element	Supply Circuit No.	Heater kW Per Circuit	Heater AMPS.	Max Motor AMPS.	FLA Total AMPS.	MCA Min Circuit Capacity	Maximum Overcurrent Protective Device (AMPS.)	Recommended **				
												Supply Wire			Ground Wire	
												75 °C. Copper		Wire		
EHIA05KB10	240	16378	4.8	4.8	Single	4.8	20.0	8	28.0	32.5	35	2	8	113	1	10
	208	12263	3.6	3.6	Single	3.6	17.3	6	23.3	28.1	30	2	10	118	1	10
EHIA07KB10	240	24567	7.2	3.6	Single	7.2	30.0	6	36.0	45.0	45	2	8	81	1	10
	208	18425	5.4	2.7	Single	5.4	26.0	6	32.0	40.0	40	2	8	92	1	10
EHIA10KB10	240	32756	9.6	4.8	Single	9.6	40.0	8	48.0	57.5	60	2	8	101	1	10
	208	24567	7.2	3.6	Single	7.2	34.8	8	40.8	50.8	60	2	8	115	1	10
EHIA15KB10	240	49134	14.4	4.8	Single	14.4	50.0	8	66.0	82.5	90	2	4	113	1	8
	208	38851	10.8	3.6	Mult. 1	8.6	40.0	8	48.0	57.5	60	2	8	101	1	10
					Mult. 2	4.8	20.0	0	20.0	25.0	25	2	10	95	1	10
	240	65513	19.2	4.8	Single	19.2	80.0	8	86.0	107.5	113	2	2	137	1	8
					Mult. 1	9.6	40.0	8	46.0	57.5	60	2	8	101	1	10
	208	49134	14.4	3.6	Mult. 2	7.2	34.8	8	40.8	50.8	60	2	8	73	1	10
					Single	14.4	59.2	8	52.2	64.0	108	2	3	124	1	10
EHIA20KB10	240	81881	24	4.8	Single	24	100.0	8	108.0	132.5	158	2	10	177	1	8
	208	61418	18	3.6	Mult. 1	9.6	40.0	8	48.0	57.5	60	2	8	102	1	10
					Mult. 2	7.2	34.8	8	40.8	50.8	60	2	8	74	1	10
	240	81881	24	4.8	Mult. 3	4.8	20.0	0	20.0	25.0	25	2	12	60	1	10
					Single	18	86.8	8	82.5	115.7	123	2	1	161	1	8
	208	61418	18	3.6	Mult. 1	7.2	34.7	8	40.7	50.8	60	2	8	104	1	10
					Mult. 2	7.2	34.7	0	14.7	43.3	45	2	8	77	1	10

TECHNICAL DATA (MF only) Single-Phase with Terminal Block

Heater Model	Supply Volt-	Nom. Heat- BTUH	Heat KW	KW Per Element	Supply Circuit No.	Heater kW Per Circuit	Heater AMPS.	Max Motor AMPS.	FLA Total AMPS.	MCA Min Circuit Capacity	Maximum Overcurrent Protective Device (AMPS.)	Recommended **				
												Supply Wire			Ground Wire	
												75 °C. Copper		Wire		
EHIA05KN10	240	16378	4.8	4.8	Single	4.8	20.0	8	28.0	32.5	35	2	8	113	1	10
	208	12263	3.6	3.6	Single	3.6	17.3	6	23.3	28.1	30	2	10	118	1	10
EHIA07KN10	240	24567	7.2	3.6	Single	7.2	30.0	8	36.0	45.0	45	2	8	81	1	10
	208	18425	5.4	2.7	Single	5.4	26.0	8	32.0	40.0	40	2	8	92	1	10
EHIA10KN10	240	32756	9.6	4.8	Single	9.6	40.0	8	48.0	57.5	60	2	8	101	1	10
	208	24567	7.2	3.6	Single	7.2	34.8	8	40.8	50.8	60	2	8	115	1	10

TECHNICAL DATA (MF only) Three Phase with Circuit Breaker

Heater Model	Supply Volt-	Nom. Heat- BTUH	Heat KW	KW Per Element	Supply Circuit No.	Heater kW Per Circuit	Heater AMPS.	Max Motor AMPS.	FLA Total AMPS.	MCA Min Circuit Capacity	Maximum Overcurrent Protective Device (AMPS.)	Recommended **				
												Supply Wire			Ground Wire	
												75 °C. Copper		Wire		
EHIA10HB10	240	32756	9.6	3.2	Single	9.6	23.1	8	29.1	36.4	40	3	8	117	1	10
	208	24567	7.2	2.4	Single	7.2	20.0	8	28.0	32.5	35	3	8	131	1	10
EHIA15HB10	240	49134	14.4	4.8	Single	14.4	34.7	8	40.7	50.8	60	3	8	132	1	8
	208	38851	10.8	3.6	Single	10.8	30.0	8	38.0	45.0	45	3	8	94	1	10
EHIA20HB10	240	65513	19.2	3.2	Single	19.2	46.2	8	52.2	60.3	70	3	4	165	1	8
	208	49134	14.4	2.4	Mult. 1	8.4	15.4	8	21.4	26.8	30	3	10	102	1	10
					Mult. 2	12.8	30.8	0	30.8	38.5	40	3	8	110	1	10
	240	81881	24	4	Single	14.4	40.0	8	45.0	57.5	60	3	8	137	1	8
					Mult. 1	4.8	13.3	8	19.3	24.2	30	3	10	113	1	10
	208	61418	18	3	Mult. 2	9.6	26.7	0	26.7	33.3	35	3	8	127	1	10
					Single	18	50.0	8	58.0	70.0	70	3	4	153	1	8
	240	81881	24	4	Mult. 1	6	16.7	8	22.7	28.3	30	3	10	96	1	10
					Mult. 2	12	33.3	0	33.3	41.7	45	3	8	102	1	10

Conversion: 1 foot = .3048 meters

** Must conform to local building codes and national standards

USA: National Electrical Code (NEC) ANSI/NFPA 70-2011

CANADA: Canadian Electrical Code OSA C22.1

HEATER STAGING**Single-Phase**

ELECTRIC HEATER	VOLTAGE	TOTAL HEAT KW		1st STAGE KW (W1)		2nd STAGE KW (W2)	
		208V	240V	208V	240V	208V	240V
EHIA05KB10	208-240/1/60	3.6	4.8	3.6	4.8	-	-
EHIA07KB10	208-240/1/60	5.4	7.2	5.4	7.2	-	-
EHIA10KB10	208-240/1/60	7.2	9.6	7.2	9.6	-	-
EHIA15KB10	208-240/1/60	10.8	14.4	7.2	9.6	3.6	4.8
EHIA20KB10	208-240/1/60	14.4	19.2	7.2	9.6	7.2	9.6
EHIA25KB10	208-240/1/60	18	24	7.2	9.6	10.8	14.4
EHIA05KN10	208-240/1/60	3.6	4.8	3.6	4.8	-	-
EHIA07KN10	208-240/1/60	5.4	7.2	5.4	7.2	-	-
EHIA10KN10	208-240/1/60	7.2	9.6	7.2	9.6	-	-

Three-Phase

ELECTRIC HEATER	VOLTAGE	TOTAL HEAT KW		1st STAGE KW (W1)		2nd STAGE KW (W2)	
		208v	240v	208v	240v	208v	240v
EHIA10HB10	208-240/3/60	7.2	9.6	7.2	9.6	-	-
EHIA15HB10	208-240/3/60	10.8	14.4	10.8	14.4	-	-
EHIA20HB10	208-240/3/60	14.4	19.2	4.8	6.4	9.6	12.8
EHIA25HB10	208-240/3/60	18	24	6	8	12	16

Conversion: 1 foot = .305 meters

HEAT STRIP STAGING

	Single-Stage Operation (no staging - all electric heat together)	Two-Stage Capable	Three-Stage Capable (with ODTs only)
Single-Phase	EHIA05KB / KN EHIA07KB / KN EHIA10KB / KN EHIA15KB EHIA20KB EHIA25KB	EHIA15KB EHIA20KB EHIA25KB	EHIA25KB
Three-Phase	EHIA10HB EHIA15HB EHIA20HB EHIA25HB	EHIA10HB EHIA15HB EHIA20HB EHIA25HB	EHIA20HB EHIA25HB

ACCESSORIES

Model	Description	Used with MF Model
EHIA00KN10	No Heat Kit	08, 12, 16, 20
EHIA05KB10	5 kW 1-Phase w/C.B.	08, 12, 16, 20
EHIA05KN10	5 kW 1-Phase w/T.B.	08, 12, 16, 20
EHIA07KB10	7.5 kW 1-Phase w/C.B.	08, 12, 16, 20
EHIA07KN10	7.5 kW 1-Phase w/T.B.	08, 12, 16, 20
EHIA10KB10	10 kW 1-Phase w/C.B.	08, 12, 16, 20
EHIA10KN10	10 kW 1-Phase w/T.B.	08, 12, 16, 20
EHIA15KB10	15 kW 1-Phase w/C.B.	08, 12, 16, 20
EHIA20KB10	20 kW 1-Phase w/C.B.	12, 16, 20
EHIA25KB10	25 kW 1-Phase w/C.B.	16, 20
EHIA10HB10	10 kW 3-Phase w/C.B.	12, 16, 20
EHIA15HB10	15 kW 3-Phase w/C.B.	12, 16, 20
EHIA20HB10	20 kW 3-Phase w/C.B.	16, 20
EHIA25HB10	25 kW 3-Phase w/C.B.	16, 20

KN = 1-phase T.B. = terminal block
 KB = 1-phase C.B. = circuit breaker
 HB = 3-phase

OUTDOOR THERMOSTAT

Model	Description	Used with Heater size
AMF002OTA	2-Stage ODTs	15 kW and above

DOWNTOWNS KIT

Model	Description	Used with MF Model
AMF008DFB1	Downflow kit	08
AMF012DFB1	Downflow kit	12
AMF016DFB1	Downflow kit	16
AMF020DFB1	Downflow kit	20

International Comfort Products, LLC
 Lewisburg, Tennessee 37091 U.S.A.

LEF-3L

3-Call Master Station with Selective Door Release

DESCRIPTION:

The LEF-3L is a compact, 3-call master station with the ability to selectively release doors and control external devices. The unit can activate door strikes or maglocks, call up CCTV cameras, turn on lights, or control other devices that are triggered by a relay. The control corresponds to the station where communication is established.

A relay (RY-PA) is required for each external device, and can be connected to provide a momentary or maintained closure. The RY-PA has a "normally open" output, but can be modified to "normally closed".

FEATURES:

- Intermixable, any number of masters and remotes up to 4 total stations
- Press-to-talk communication at initiating master, hands free at responding station
- Selectively control external device from the master station in one of two ways with relay:
 - Momentary closure while "key" button is pressed
 - Maintained closure while station is selected
- Desk or wall mount
- Any "LE-" series sub station or others compatible with the LEF series can be used
- LS-NVP/A vandal proof, weatherized sub can be used

LEF-3L**SOME APPLICATIONS:**

- Offices
- Courthouses
- Hotels/Motels
- Retail/Convenience Stores
- Small Secured Facilities

SPECIFICATIONS:

- Power: 12V DC. Use PS-12C.
Output: 500mW at 20Ω (transmit); 800mW at 20Ω (receive).
Calling: Mono-electronic tone while call button is pressed, plus LED for 20 seconds.
Relay Contact: RY-PA, normally open output, 1A, up to 110V AC or 24V DC.
Wiring: 2 conductors per remote (1-master system), or 3 conductors per remote (multi-master).
Max. 12 conductors between masters (full system).
Wiring Distance: 650' with 22AWG; 1600' with 18AWG.
Mounting: Desk or wall mount
Dimensions: 7-1/16"H x 5-5/8"W x 2-3/16"D

LEF-3L 3-call Master Station with Door Release

SPECIAL ORDER PRODUCTS:

Master Station

LEF-3L 3-call Master w/sel. door release

Sub Stations

LS-NVP/A Vandal proof, weather resistant sub station

Accessories

BA-1 Paging adaptor

STANDARD PRODUCTS:

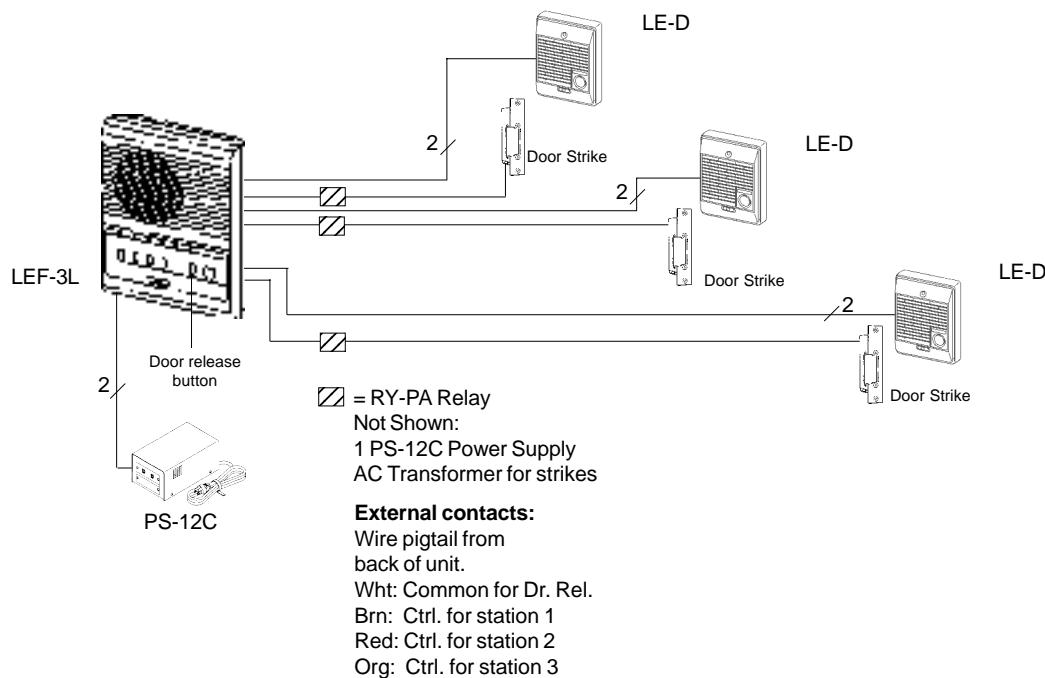
Sub Stations

LE-D	Door station, surface mt.
LE-DA	Door station, flush stainless steel
LE-DL	Door station, surface mt. metal
AH-108	10W 8 ohm horn w/ built-in capacitor

Accessories

NP-B	Call button
NP-W	Surface mount box for NP-B
NP-25V	33mfd, 25V, non-polarized capacitor
RY-AC	External signaling relay
SBX-NVP	Surface mount box for LS-NVP/A
PS-12C	12V DC power supply, 1A

SYSTEM LAYOUT EXAMPLE:



ARCHITECTS/ENGINEERS' SPECIFICATIONS:

The intercom system shall be of an open voice, selective calling type with three channels for communication and selective control.

Master station shall have selector buttons with associated LEDs for call-in indication, and a directory for station labeling. A call-in shall light the LED for approximately 20 seconds and activate a momentary call tone. The call shall be answered by pressing the station's selector button, then pressing the TALK button to transmit, releasing to listen. The person at the remote speaks hands free. The system shall provide master-to-master communication with hands free reply from the responding station.

Master station shall be equipped with a door release button, activating the door strike where communication has been established. A relay shall be used to provide Normally Open or Normally Closed contacts. Other controls shall include TALK and OFF buttons, voice and call tone volume controls. An "Occupied" LED shall indicate if the system is in use.

Compatible remote stations shall include surface or flush mount styles, with or without privacy, outdoor stations, and vandal proof stations.

System shall be manufactured by Aiphone.

Keurig K1500 Coffee Maker

Specifications

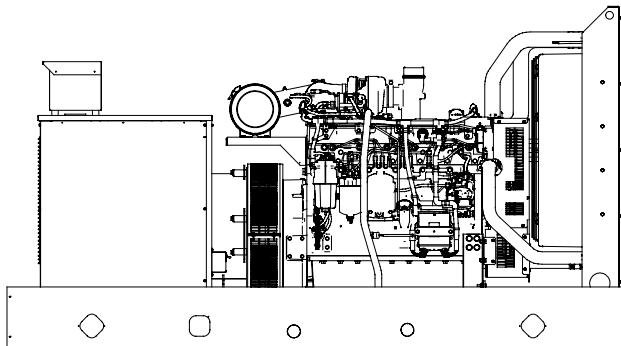
Brand	Green Mountain Coffee Roasters
Material	Plastic
Color	Black
Number of Preset Cup Sizes	4
Water Reservoir Capacity	96 oz
Compatible Form	Pods
Features	Programmable
Assembled Product Weight	10.2 lb
Manufacturer	keurig
manufacturer_part_number	k1500
Model	7794
Assembled Product Dimensions (L x W x H)	15.99 x 10.25 x 12.35 Inches



Ratings Range

60 Hz

Standby:	kW	250-255
	kVA	313-319
Prime:	kW	225-230
	kVA	281-288



Generator Set Ratings

Alternator	Voltage	Ph	Hz	130°C Rise Standby Rating		105°C Rise Prime Rating	
				kW/kVA	Amps	kW/kVA	Amps
4UA10	120/208	3	60	250/313	867	225/281	781
	127/220	3	60	250/313	820	225/281	738
	120/240	3	60	250/313	752	225/281	677
	139/240	3	60	250/313	752	225/281	677
	220/380	3	60	250/313	475	225/281	427
	240/416	3	60	250/313	434	225/281	390
	277/480	3	60	250/313	376	225/281	338
	347/600	3	60	250/313	301	225/281	271
4UA13	120/208	3	60	255/319	885	230/288	798
	127/220	3	60	255/319	837	230/288	754
	120/240	3	60	255/319	767	230/288	692
	139/240	3	60	255/319	767	230/288	692
	220/380	3	60	255/319	484	230/288	437
	240/416	3	60	255/319	442	230/288	399
	277/480	3	60	255/319	383	230/288	346
	347/600	3	60	255/319	307	230/288	277

RATINGS: All three-phase units are rated at 0.8 power factor. All single-phase units are rated at 1.0 power factor. **Standby Ratings:** Standby ratings apply to installations served by a reliable utility source. The standby rating is applicable to varying loads for the duration of a power outage. There is no overload capability for this rating. Ratings are in accordance with ISO-3046/1, BS 5514, AS 2789, and DIN 6271. **Prime Power Ratings:** Prime power ratings apply to installations where utility power is unavailable or unreliable. At varying load, the number of generator set operating hours is unlimited. A 10% overload capacity is available for one hour in twelve. Ratings are in accordance with ISO-8528/1, overload power in accordance with ISO-3046/1, BS 5514, AS 2789, and DIN 6271. For limited running time and base load ratings, consult the factory. Obtain the technical information bulletin (TIB-101) on ratings guidelines for the complete ratings definitions. The generator set manufacturer reserves the right to change the design or specifications without notice and without any obligation or liability whatsoever. **GENERAL GUIDELINES FOR DERATING:** *Altitude:* Derate 0.5% per 100 m (328 ft.) elevation above 1000 m (3300 ft.). *Temperature:* Derate 1.0% per 10°C (18°F) temperature above 25°C (77°F).

Standard Features

- Kohler Co. provides one-source responsibility for the generating system and accessories.
- The generator set and its components are prototype-tested, factory-built, and production-tested.
- The 60 Hz generator set offers a UL 2200 listing.
- The generator set accepts rated load in one step.
- The 60 Hz generator set meets NFPA 110, Level 1, when equipped with the necessary accessories and installed per NFPA standards.
- The generator set complies with ISO 8528-5, Class G2, requirements for transient performance in all generator set configurations. Select the Decision-Maker® 550 controller for improved voltage regulation and ISO 8528-5, Class G3, compliance.
- The 60 Hz generator set engine is certified by the Environmental Protection Agency (EPA) to conform to Tier 3 nonroad emissions regulations.
- A one-year limited warranty covers all systems and components. Two-, five-, and ten-year extended warranties are also available.
- Alternator features:
 - The unique Fast-Response™ II excitation system delivers excellent voltage response and short-circuit capability using a permanent magnet (PM)-excited alternator.
 - The brushless, rotating-field alternator has broadrange reconnectability.
- Other features:
 - Controllers are available for all applications. See controller features inside.
 - The low coolant level shutdown prevents overheating (standard on radiator models only).
 - Integral vibration isolation eliminates the need for under-unit vibration spring isolators.

Alternator Specifications

Specifications	Alternator	
Manufacturer	Kohler	
Type	4-Pole, Rotating-Field	
Exciter type	Brushless, Permanent-Magnet	
Leads: quantity, type	12, Reconnectable	
Voltage regulator	Solid State, Volts/Hz	
Insulation:	NEMA MG1	
Material	Class H	
Temperature rise	130°C, Standby	
Bearing: quantity, type	1, Sealed	
Coupling	Flexible Disc	
Amortisseur windings	Full	
Voltage regulation, no-load to full-load		
Permanent magnet (PM) alternator	±2% Average	
550 controller (with 0.5% drift due to temperature variation)	3-Phase Sensing, ±0.25%	
Unbalanced load capability	100% of Rated Standby Current	
One-step load acceptance	100% of Rating	
Peak motor starting kVA:	(35% dip for voltages below)	
480 V 4UA13 (12 lead)	960	
480 V 4UA10 (12 lead)	785	

Application Data

Engine

Engine Specifications	
Manufacturer	John Deere
Engine model	6090HF484
Engine type	4-Cycle, Turbocharged, Charge Air-Cooled
Cylinder arrangement	6 Inline
Displacement, L (cu. in.)	9.0 (548)
Bore and stroke, mm (in.)	118.4 x 136 (4.66 x 5.35)
Compression ratio	16.0:1
Piston speed, m/min. (ft./min.)	457 (1500)
Main bearings: quantity, type	7, Replaceable Insert
Rated rpm	1800
Max. power at rated rpm, kWm (BHP)	287 (385)
Cylinder head material	Cast Iron
Crankshaft material	Forged Steel
Valve material:	
Intake	Chromium-Silicon Steel
Exhaust	Stainless Steel
Governor: type, make/model	JDEC Electronic L14 Denso HP4
Frequency regulation, no-load to full-load	Isochronous
Frequency regulation, steady state	±0.25%
Frequency	Fixed
Air cleaner type, all models	Dry

Exhaust

Exhaust System	
Exhaust manifold type	Dry
Exhaust flow at rated kW, m ³ /min. (cfm)	49.0 (1730)
Exhaust temperature at rated kW, dry exhaust, °C (°F)	625 (1157)
Maximum allowable back pressure, kPa (in. Hg)	Min. 0 (0) Max. 7.5 (2.2)
Exhaust outlet size at engine hookup, mm (in.)	98 (3.86)

Engine Electrical

Engine Electrical System	
Battery charging alternator:	24 Volt
Ground (negative/positive)	Negative
Volts (DC)	24
Ampere rating	45
Starter motor rated voltage (DC)	24
Battery, recommended cold cranking amps (CCA):	
Quantity, CCA rating each	Two, 950
Battery voltage (DC)	12

Application Data

Fuel

Fuel System	
Fuel supply line, min. ID, mm (in.)	11.0 (0.44)
Fuel return line, min. ID, mm (in.)	6.0 (0.25)
Max. lift, fuel pump: type, m (ft.)	Electronic, 3 (10)
Max. fuel flow, Lph (gph)	240.0 (63.4)
Fuel prime pump	Electronic
Fuel filter	
Secondary	2 Microns @ 98% Efficiency
Primary	10 Microns
Water Separator	Yes
Recommended fuel	#2 Diesel

Lubrication

Lubricating System	
Type	Full Pressure
Oil pan capacity, L (qt.)	32.5 (34.4)
Oil pan capacity with filter, L (qt.)	33.4 (35.3)
Oil filter: quantity, type	1, Cartridge
Oil cooler	Water-Cooled

Cooling

Radiator System	
Ambient temperature, °C (°F)	50 (122)
Engine jacket water capacity, L (gal.)	16 (4.25)
Radiator system capacity, including engine, L (gal.)	36 (9.5)
Engine jacket water flow, Lpm (gpm)	265 (70)
Heat rejected to cooling water at rated kW, dry exhaust, kW (Btu/min.)	115.9 (6590)
Heat rejected to air charge cooler at rated kW, dry exhaust, kW (Btu/min.)	70.8 (4030)
Water pump type	Centrifugal
Fan diameter, including blades, mm (in.)	863.6 (34.0)
Fan, kWm (HP)	9.0 (12.1)
Max. restriction of cooling air, intake and discharge side of radiator, kPa (in. H ₂ O)	0.125 (0.5)

Operation Requirements

Air Requirements	
Radiator-cooled cooling air, m ³ /min. (scfm)‡	368.1 (13000)
Combustion air, m ³ /min. (cfm)	21.8 (770)
Heat rejected to ambient air:	
Engine, kW (Btu/min.)	53.8 (3060)
Alternator, kW (Btu/min.)	20.6 (1170)

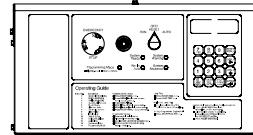
‡ Air density = 1.20 kg/m³ (0.075 lbm/ft³)

Fuel Consumption

Diesel, Lph (gph) at % load	Standby Rating
100%	66.5 (17.6)
75%	50.4 (13.3)
50%	35.0 (9.2)
25%	20.5 (5.4)

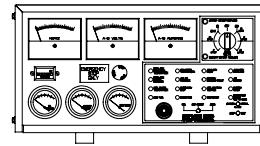
Diesel, Lph (gph) at % load	Prime Rating
100%	59.1 (15.6)
75%	45.3 (12.0)
50%	31.6 (8.3)
25%	18.4 (4.9)

Controllers



Decision-Maker® 550 Controller

Audiovisual annunciation with NFPA 110 Level 1 capability. Programmable microprocessor logic and digital display features. Alternator safeguard circuit protection. 12- or 24-volt engine electrical system capability. Remote start, remote annunciation, and remote communication options. Refer to G6-46 for additional controller features and accessories.



Decision-Maker® 3+, 16-Light Controller

Audiovisual annunciation with NFPA 110 Level 1 capability. Microprocessor logic, AC meters, and engine gauge features. 12- or 24-volt engine electrical system capability. Remote start, prime power, and remote annunciation options. Refer to G6-30 for additional controller features and accessories.

Additional Standard Features

- Alternator Protection (standard with 550 controller)
- Battery Rack and Cables
- Emission Compliant Engine
- Integral Vibration Isolation
- Oil Drain Extension
- Operation and Installation Literature

Available Options

Approvals and Listings

- CSA Approval
- IBC Seismic Certification
- UL 2200 Listing

Enclosed Unit

- Sound Enclosure and Subbase Fuel Tank Packages
- Weather Enclosure and Subbase Fuel Tank Packages
- Weather Housing (with roof-mounted critical silencer)

Open Unit

- Exhaust Silencer, Critical (kit: PA-354809)
- Exhaust Silencer, Hospital (kit: PA-365349)
- Flexible Exhaust Connector, Stainless Steel

Fuel System

- Auxiliary Fuel Pump
- Flexible Fuel Lines
- Fuel Pressure Gauge
- Subbase Fuel Tanks
- Subbase Fuel Tank with Day Tank

Controller

- Common Failure Relay
- Communication Products and PC Software (550 controller only)
- Customer Connection
- Dry Contact (isolated alarm)
- Prime Power Switch (550 controller only)
- Remote Annunciator Panel
- Remote Audiovisual Alarm Panel
- Remote Emergency Stop
- Remote Mounting Cable
- Run Relay

Cooling System

- Block Heater
 (recommended for ambient temperatures below 0°C [32°F])
- Radiator Duct Flange

Electrical System

- Alternator Strip Heater
- Battery
- Battery Charger, Equalize/Float Type
- Battery Heater
- Line Circuit Breaker (NEMA type 1 enclosure)
- Line Circuit Breaker with Shunt Trip (NEMA type 1 enclosure)
- Safeguard Breaker (16-light controller)

Paralleling System

- Reactive Droop Compensator
- Voltage Adjust Control
- Voltage Regulator Relocation

Miscellaneous

- Air Cleaner, Heavy Duty
- Air Cleaner Restriction Indicator
- Crankcase Emissions Canister
- Engine Fluids (oil and coolant) Added
- Rated Power Factor Testing
- Rodent Guards
- Skid End Caps

Literature

- General Maintenance
- NFPA 110
- Overhaul
- Production

Warranty

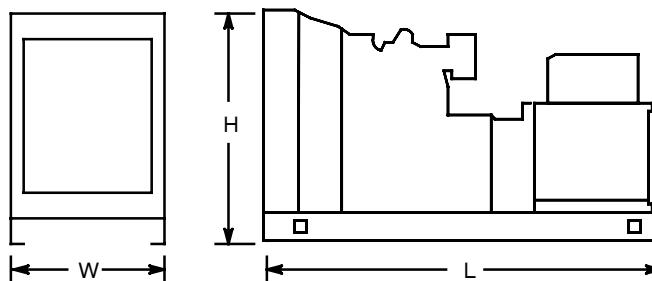
- 2-Year Basic
- 2-Year Prime
- 5-Year Basic
- 5-Year Comprehensive
- 10-Year Major Components

Other Options

- _____
- _____
- _____
- _____

Dimensions and Weights

Overall Size, L x W x H, mm (in.): 3100 x 1250 x 1703
 (122.05 x 49.21 x 67.06)
 Weight (radiator model), wet, kg (lb.): 2132-2268 (4700-5000)



NOTE: This drawing is provided for reference only and should not be used for planning installation. Contact your local distributor for more detailed information.

DISTRIBUTED BY:

La Marzocco Linea Mini Home Espresso Machine

Specifications

Manufacturer:	La Marzocco
Model:	Linea Mini
Machine style:	Dual-boiler, semi-automatic paddle group
Basket size:	58 mm
Reservoir size:	3.5 L
Plumable:	Yes. Plumbing kit sold separately
Brew boiler capacity:	6 fl oz
Steam boiler capacity:	3.5 L
Pre-Infusion:	Yes
PID:	Yes
Voltage:	10–120 VAC
Watts:	1600W
Amps:	15
Dimensions (W x D x H):	14 x 21 x 15 in.
Weight:	71 lbs.

LEF-3L

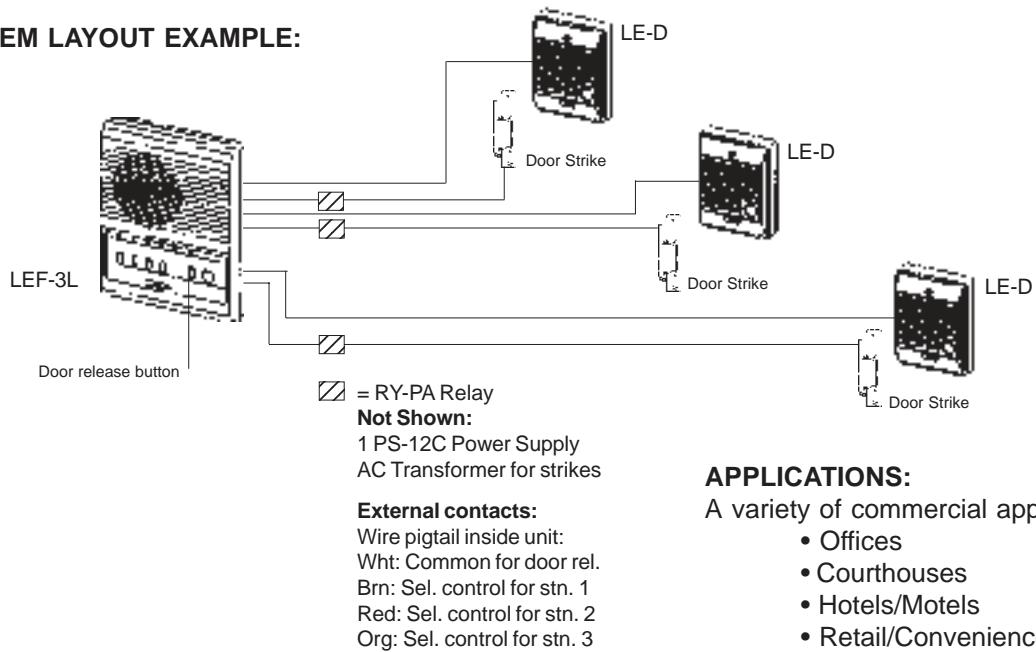
3-Call Master Station with Selective Door Release

DESCRIPTION:

The LEF-3L is a compact 3-call master station able to communicate with three other stations, plus selectively release doors and control external devices. CCTV cameras, lights, or other devices can be activated through a relay, which is triggered when a communication channel is selected. The master station is equipped with a door release button to activate electric strikes or magnetic locks.

A relay (RY-PA*) is required for each external device, and can be connected to provide a momentary or maintained closure. *RY-PA has a "normally open" output, but can be modified to "normally closed".

SYSTEM LAYOUT EXAMPLE:



SPECIFICATIONS:

Power:	12V DC. Use PS-1225UL.
Output:	500mW at 20 ohms (transmit); 800mW at 20 ohms (receive).
Calling:	Mono-electronic tone while call button is pressed, plus LED for 20 seconds.
Relay Contact:	RY-PA, normally closed output, 1A, up to 110V AC or 24V DC.
Wiring:	2 conductors per remote (1-master system), or 3 conductors per remote (multi-master). Max. 12 conductors between masters (full system).
Wire:	Between masters: 822212 (12 cond.) To subs: 822202 (2 cond.); 822203 (3 cond.); 821802 (2 cond. 18AWG); 821803 (3 cond. 18AWG) 650' with 22AWG; 1,600' with 18AWG.
Mounting:	Desk or wall mount (wall mounts on 1-gang box)
Dimensions:	7-1/16" H x 5-5/8" W x 2-3/16" D

FEATURES:

- Intermixable -- any number of masters and remotes up to 4 total stations
- Press-to-talk communication at initiating master, hands free at responding station
- Selective control of external device from master in one of two ways with relay:
 - Momentary closure while "key" button is pressed
 - Maintained closure while station is selected
- Desk or Wall mount
- Any "LE-" series component or others compatible with the LEF series can be used
- LS-NVP/B Vandal proof, weather resistant remote station can be used

APPLICATIONS:

A variety of commercial applications:

- Offices
- Courthouses
- Hotels/Motels
- Retail/Convenience Stores
- Small Secured Facilities

Product Specifications

SM58® Cardioid Dynamic Microphone

Overview

The legendary SM58® is an industry-standard, highly versatile cardioid dynamic vocal microphone that is consistently the first choice of vocal performers around the globe. Even in extreme conditions, the SM58 is tailored to target the main sound source while minimizing background noise, delivering warm and clear vocal reproduction.

Features

- Frequency response tailored for vocals, with brightened midrange and bass rolloff
- Uniform cardioid pickup pattern isolates the main sound source and minimizes background noise
- Pneumatic shock-mount system cuts down handling noise
- Effective, built-in spherical wind and pop filter
- Supplied with break-resistant stand adapter which rotates 180 degrees
- Legendary Shure quality, ruggedness and reliability
- Cardioid (unidirectional) dynamic
- Frequency response: 50 to 15,000 Hz

Available Models

SM58-LC	Includes Stand Adapter and Zippered Pouch
SM58-CN	Includes 7.6 m (25 ft) XLR-Male to XLR-Female Cable, Swivel Adapter and a Zippered Pouch
SM58S	Includes Integrated On/Off Switch, Swivel Adapter and a Zippered Pouch

Specifications

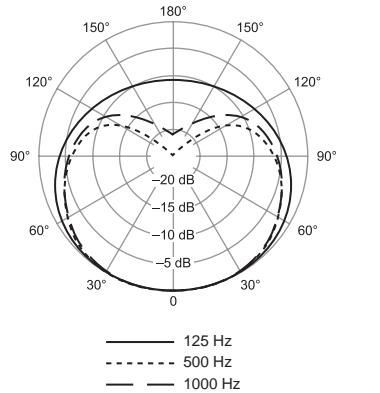
Type	Dynamic
Frequency Response	50 to 15,000 Hz
Polar Pattern	Cardioid
Sensitivity (at 1,000 Hz Open Circuit Voltage)	-54.5 dBV/Pa (1.85 mV) 1 Pa = 94 dB SPL
Impedance	Rated impedance is 150Ω (300Ω actual) for connection to microphone inputs rated low impedance
Polarity	Positive pressure on diaphragm produces positive voltage on pin 2 with respect to pin 3.
Case	Dark gray, enamel-painted, die cast metal; matte-finished, silver colored, spherical steel mesh grille
Connector	Three-pin professional audio connector (male XLR type)
Net Weight	298 grams (10.5 oz)
Dimensions	162 mm (6-3/8 in.) L x 51 mm (2 in.) W



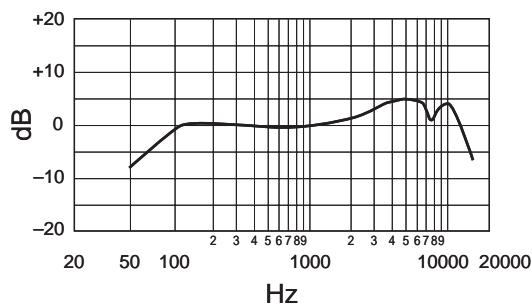
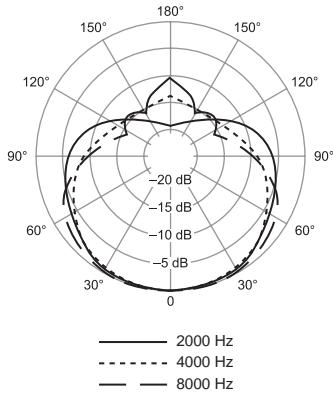
SM58

Optional Accessories and Replacement Parts

A58WS	Windscreens	A55M	Isolation Mount	C25F	7.6 m Cable (25 ft)
A25D	Microphone Clip	A26M	Dual Mount	RK143G	Screen and Grille
R59	Cartridge	S37A, S39A	Desk Stand		



Polar Pattern



Frequency Response

SHURE[®]
LEGENDARY
PERFORMANCE™



Commercial Microwave Oven

NE-1054

This Commercial Microwave Oven by Panasonic is ideal for full and quick service restaurants, banquets, supermarkets, catering, and institutional applications.

- 1000* Watts of Power
- Capacity: 0.8 Cubic Feet
- “Grab & Go” Door Handle
- Bottom Energy Feed
- Fits One 6" Tall, Half-Size Steam Table Pan with Cover**



Pro

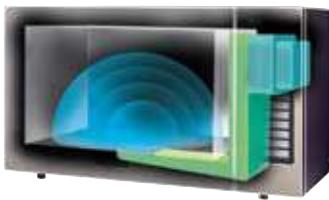
Panasonic ideas for life



NE-1054 Commercial Microwave Oven

Additional Features:

- Compact Size
- Stainless Steel Front
- Touch Control Keypad with Braille
- Beep Control (On/Off)
- 10 Programmable Memory Pads; 20 Memory Capability
- 6 Power Levels
- 2- and 3-Stage Cooking
- Programmable and Manual Operations
- Program List/Cycle Counter
- Self Diagnostics
- 99:99 Minute Capacity
- See-Through Oven Door
- Interior Oven Light
- Chef Technical Support
- Anti-Theft Equipped
- Will Ship via UPS
- NSF & UL Commercial Approved



"Grab & Go" Door Handle

Without the hassle of moving parts like those found in push button doors or trigger-activated handles, the "Grab & Go" Door Handle is fast and durable.



Touch-Control Keypad

Featuring an electronic keypad with 10 programmable memory pads and a 20-memory capability, the NE-1054 cooks with speed and precision with its 6 power levels and 2- and 3-stage cooking.

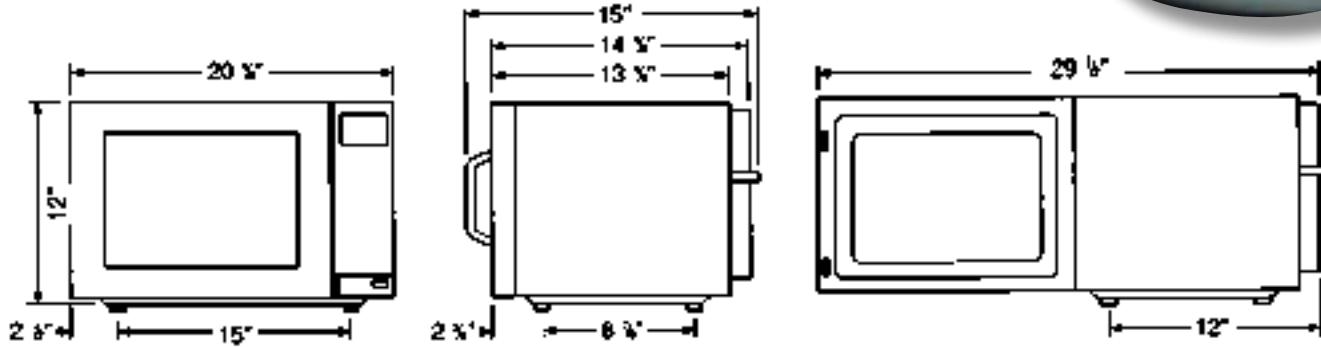
Specifications

NE-1054

Power Source	120V, 60Hz, Single Phase
Receptacle Required	NEMA 5-15 R or NEMA 5-20 R
Frequency	2,450MHz
Required Power Output	13.4A 1000 Watts*
Outer Dimensions (wxddxh)	20 1/8" x 16 5/16" x 12"
Cavity Dimensions (wxddxh)	13" x 13" x 8 1/16"
Net Weight	34 lbs.
Shipping Weight	39 lbs.
Shipping Box Size (wxddxh)	24 x 18 3/4 x 14 3/4, 3.8 cu. ft.
Timer	99 Min., 99 Sec.
Memory Capability	20 Programs

To Specify a Panasonic Commercial Microwave Oven

The NE-1054 Commercial Microwave Oven meets or exceeds all safety performance and sanitation standards set for commercial food service microwave ovens by UL, DHHS, FCC and NSF. Plus, oven shall have output power 1000 Watts*, stainless steel front, bottom energy feed, 10 programmable memory pads, Braille keypad, 20-memory capability, Double Quantity Key, 6 power levels, 2- and 3-stage cooking, programmable lock, unique "quick pick" preset times and self-diagnostics, and Chef/Test Kitchen technical support. 3 years limited warranty. 1 year parts & labor. 3 years magnetron.



* I.E.C. 60705 Test Procedure. Specifications subject to change without notice.

Panasonic ideas for life

Panasonic Home & Commercial Appliance Group
Panasonic Corporation of North America
Executives Offices: One Panasonic Way, Panazip 1H-2
Secaucus, NJ 07094

Toll-free: 877-CMO-OVEN (266-6836)
Sales Support, Recipes and Training at: www.panasonic.com/cmo
For a Panasonic Distributor/Services nearest you, 1-800-350-9590

NN-SN686S 1.2 Cu. Ft. Stainless Microwave 2016 MICROWAVE OVENS

[HOME](#)

INVERTER
precision cook technology

Model:
NN-SN686S (Stainless)

1200 WATT HIGH POWER

Enjoy faster cooking times.

PATENTED INVERTER TECHNOLOGY

Delivers a seamless stream of cooking power even at low settings for precise cooking that preserves that flavor and texture of your favorite foods.

INVERTER TURBO DEFROST

Defrosts quickly and evenly using advanced microwave sequencing.

ONE-TOUCH SENSOR COOK AND REHEAT

Automatically adjusts power levels, and cooking and reheating times for various food types.

EVEN COOKING
DELICIOUS RESULTS



BRAISE



POACH



RE-HEAT



KEEP WARM

FEATURES

- Family-Size 1.2 Cu. Ft.
- 14 Preset Auto Cook Menu Items
- Keep Warm Feature
- Membrane Keypad
- Quick :30 Feature
- Child Lock
- Complies with 2016 DOE Energy Conservation Standards



Fits a 13" casserole dish.

2016 MICROWAVE OVENS

NN-SN686S

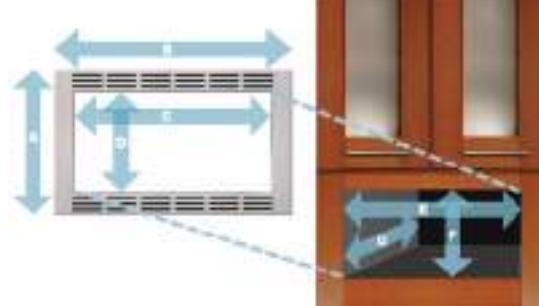
HOME

CAPACITY (cu. ft)	1.2
POWER	
Power Supply	Inverter
Cooking Power	1200W
Power Consumption	1480W
COLOR (MATERIAL)	
Face of Door/Base	Stainless Steel (Normal)
Cabinet Body	Silver
Dial / Button	N/A
OVEN INTERIOR	
Color (Material)	Paint White
Oven Lamp	
DOOR	
Door Design	New Regular Type / Side Open
Door Open	Push Open
Screen	Half Mirror
CONTROL PANEL	
Panel Design	Membrane (Emboss Look)
Number Key	0-9 Key
Language	English
DISPLAY	
Type	4 Digit
Color	Green
Back Light	Yes
POWER LEVEL	
Power Levels	10 (P1-P10)
Cooking Time	99min 99sec
Kitchen Timer	Yes (99min 99sec)
Standing Time	Yes (99min 99sec)
Delay Start	Yes (99min 99sec)
Clock	12H
Child Lock	Yes
Stage Cooking	3 stage
MENU	
Sensor	Yes
Turbo Defrost	Yes (0.1-3.0kg)
Popcorn	Yes (3.5/3.0/1.75oz)
Keep Warm	Yes (up to 30 min)
Quick 30 Sec.	Yes (up to 5 min)
More/Less	Yes
Auto Reheat	Yes (in Sensor Mode)

Sensor Cook or Auto Cook	Number of Auto Cook Items	14
	1. Oatmeal	
	2. Breakfast Sausage	
	3. Omelet	
	4. Quinoa	
	5. Soup	
	6. Frozen Entrees	
	7. Frozen Pizza (single)	
	8. Potatoes	
	9. Fresh Vegetables	
	10. Frozen Vegetables	
	11. Rice	
	12. Frozen Dinners	
	13. Pasta	
	14. Fish Fillets	
OTHER		
Turntable Size (In)		13.4
Operating Instructions		English / Spanish
Accessory		Glass Tray
Trim Kit		No
Power Source		120V / 60HZ
DIMENSIONS		
Outside H x W x D (in)		12 1/4 x 20 11/16 x 15 13/16
Oven H x W x D (in)		9 15/16 x 13 15/16 x 14 3/8
Weight (lb)		25.5
Safety Standard		UL
UPC Code		8-85170-28291-9

BUILT-IN INSTALLATION TRIM KITS

Achieve a built-in look with Panasonic's optional trim kits.



Microwave Oven	1.2 Cu. Ft.
	NN-SN686S
Trim Kit	27"
	NN-TK621SS
Outer Size	A
	16-1/2"
Inner Size	B
	27"
Cabinet Opening	C
	20-7/8"
Cabinet Opening	D
	12-1/4"
	E
	25-1/2"
	F
	15-5/16"
	G
	21" minimum

Dell OptiPlex 7070 Small Form Factor

Setup and Specifications



Notes, cautions, and warnings

 **NOTE:** A NOTE indicates important information that helps you make better use of your product.

 **CAUTION:** A CAUTION indicates either potential damage to hardware or loss of data and tells you how to avoid the problem.

 **WARNING:** A WARNING indicates a potential for property damage, personal injury, or death.

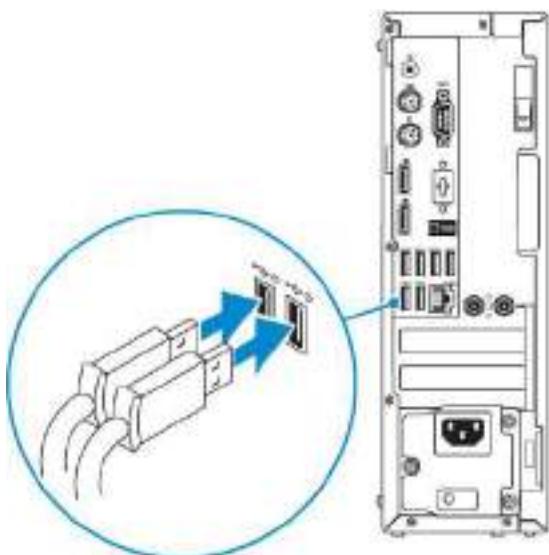
Contents

Chapter 1: Set up your computer.....	5
Chapter 2: Chassis.....	8
Front view.....	8
Back view.....	9
Chapter 3: System specifications.....	10
Processor.....	10
Chipset.....	11
Memory.....	11
Storage.....	11
Storage combinations.....	12
Audio.....	12
Video.....	13
Communications.....	13
Ports and connectors.....	13
System board drive connectors.....	14
Operating system.....	14
Power supply.....	14
Physical specifications.....	15
Regulatory and environmental compliance.....	15
Chapter 4: BIOS setup.....	17
BIOS overview.....	17
Entering BIOS setup program.....	17
Navigation keys.....	17
Boot menu.....	18
One time boot menu.....	18
System setup options.....	18
General options.....	19
System information.....	19
Video screen options.....	21
Security.....	21
Secure boot options.....	22
Intel Software Guard Extensions options.....	23
Performance.....	23
Power management.....	24
Post behavior.....	24
Manageability.....	25
Virtualization support.....	25
Wireless options.....	25
Maintenance.....	26
System logs.....	26
Advanced configuration.....	26

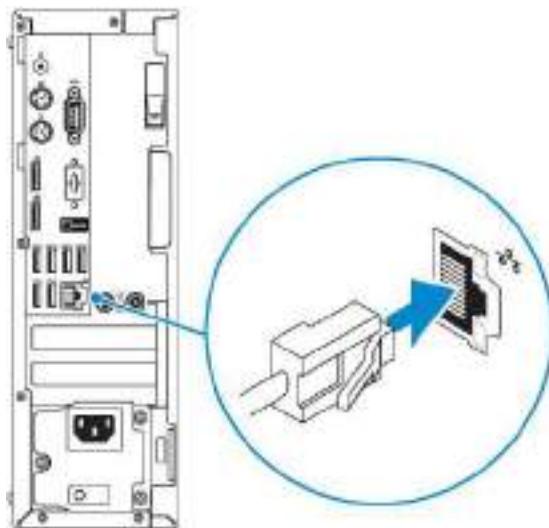
Updating the BIOS.....	27
Updating the BIOS in Windows.....	27
Updating the BIOS in Linux and Ubuntu.....	27
Updating the BIOS using the USB drive in Windows.....	27
Updating the BIOS from the F12 One-Time boot menu.....	28
System and setup password.....	28
Assigning a system setup password.....	29
Deleting or changing an existing system setup password.....	29
Clearing BIOS (System Setup) and System passwords.....	29
Chapter 5: Software.....	30
Downloading Windows drivers.....	30
System device drivers.....	30
Serial IO driver.....	31
Security drivers.....	32
USB drivers.....	32
Network adapter drivers.....	32
Realtek Audio.....	32
Storage controller.....	32
Chapter 6: Getting help.....	33
Contacting Dell.....	33

Set up your computer

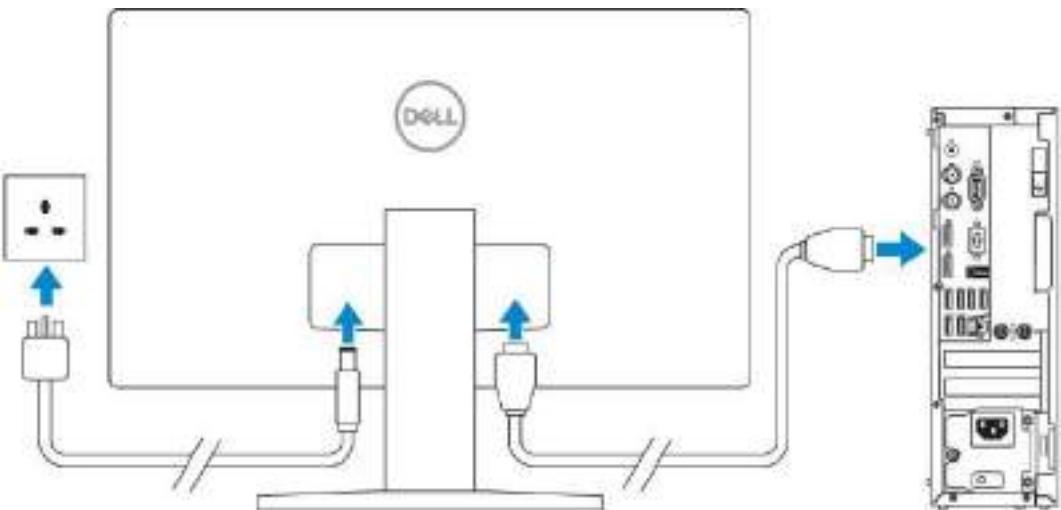
1. Connect the keyboard and mouse.



2. Connect to your network using a cable, or connect to a wireless network.

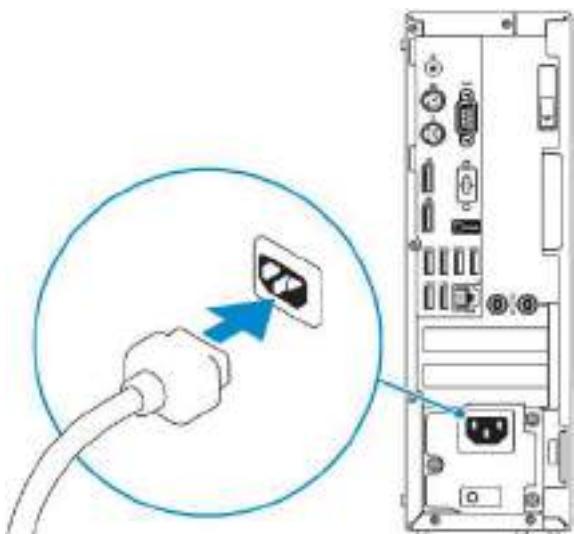


3. Connect the display.

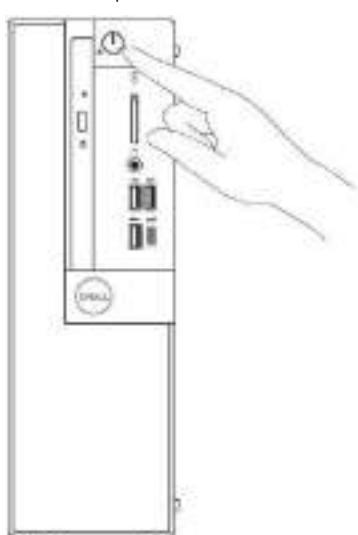


(i) NOTE: If you ordered your computer with a discrete graphics card, the HDMI and the display ports on the back panel of your computer are covered. Connect the display to the discrete graphics card.

4. Connect the power cable.



5. Press the power button.



6. Follow the instructions on the screen to finish Windows setup:

- a. Connect to a network.



- b. Sign-in to your Microsoft account or create a new account.



7. Locate Dell apps.

Table 1. Locate Dell apps

	Register your computer
	Dell Help & Support
	SupportAssist — Check and update your computer

Chassis

This chapter illustrates the multiple chassis views along with the ports and connectors and also explains the FN hot key combinations.

Topics:

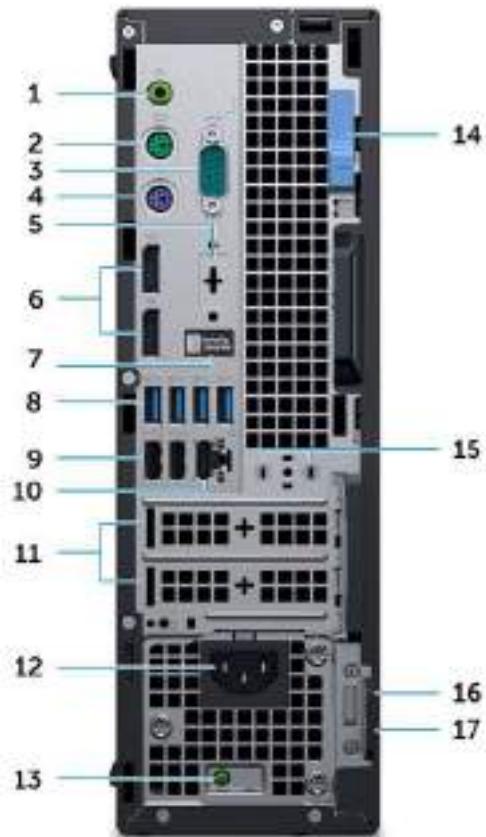
- [Front view](#)
- [Back view](#)

Front view



1. Optical drive (optional)
2. Power button and power light
3. Hard-drive activity light
4. Memory card reader (optional)
5. Headset/Universal audio jack port
6. USB 2.0 port with PowerShare (supports battery charge capability)
7. USB 2.0 port
8. USB 3.1 Gen 2 Type-C port with PowerShare
9. USB 3.1 Gen 1 port

Back view



1. Line-out audio port
2. PS2 Port (Keyboard)
3. Serial port
4. PS2 Port (Mouse)
5. DisplayPort/HDMI 2.0b/VGA/USB Type-C Alt-Mode (optional)
6. DisplayPorts (2)
7. Service tag label
8. USB 3.1 Gen 1 ports (4)
9. USB 2.0 ports (2) (one supports SmartPower On)
10. Network port
11. Expansion card slots
12. Power connector port
13. Power supply diagnostic light
14. Release latch
15. External SMA antenna connectors (optional)
16. Kensington security cable slot
17. Padlock ring

System specifications

i **NOTE:** Offerings may vary by region. The following specifications are only those required by law to ship with your computer. For more information about the configuration of your computer, go to **Help and Support** in your Windows operating system and select the option to view information about your computer.

Topics:

- Processor
- Chipset
- Memory
- Storage
- Storage combinations
- Audio
- Video
- Communications
- Ports and connectors
- System board drive connectors
- Operating system
- Power supply
- Physical specifications
- Regulatory and environmental compliance

Processor

i **NOTE:** Processor numbers are not a measure of performance. Processor availability subject to change and may vary by region/country.

i **NOTE:** These are available offline only.

Table 2. Processor

Intel Core Processors 9th Gen Core CPUs
Intel Core i3-9300 (4 Core/ 8 MB Smart Cache/ 4 Threads/ Turbo Frequency up to 4.3 GHz/ TDP : 65 W)
Intel Core i3-9100 (4 Core/ 6 MB/ 4T/ up to 4.2 GHz/ 65 W)
Intel Core i5-9400 (6 Core/ 9 MB/ 6T/ up to 4.1GHz/ 65 W)
Intel Core i5-9500 (6 Core/ 9 MB/ 6T/ up to 4.4 GHz/ 65 W)
Intel Core i5-9600 (6 Core/ 9 MB/ 6T/ up to 4.6 GHz/ 65 W)
Intel Core i7-9700 (8 Core/ 12 MB/ 8T/ up to 4.7 GHz/ 65 W)
Intel Core i9-9900 (8 Core/ 16 MB/ 16T/ up to 4.9 GHz/ 65 W)
Intel Core Processors 8th Gen Core CPUs
Intel Core i3-8100 (4 Core/ 6 MB/ 4T/ up to 3.6 GHz/ 65 W)
Intel Core i3-8300 (4 Core/ 8 MB/ 4T/ up to 3.7 GHz/ 65W)
Intel Core i5-8400 (6 Core/ 9 MB/ 6T/ up to 4.0GHz/ 65 W)
Intel Core i5-8500 (6 Core/ 9 MB/ 6T/ up to 4.1GHz/ 65 W)

Table 2. Processor (continued)

Intel Core i5-8600 (6 Core/ 9 MB/ 6T/ up to 4.3 GHz/ 65 W)
Intel Core i7-8700 (6 Core/12 MB/ 12T/ up to 4.6 GHz/ 65 W)

Chipset

Table 3. Chipset specifications

Type	Intel Q370
Non-volatile memory on chipset	Yes
BIOS configuration SPI (Serial Peripheral Interface)	256Mbit (32MB) located at SPI_FLASH on chipset
Trusted Platform Module (Discrete TPM Enabled)	24KB located at TPM 2.0 on chipset
Firmware TPM (Discrete TPM Disabled)	Available in select countries
NIC EEPROM	LOM configuration contained within SPI flash ROM instead of LOM e-fuse

Memory

Table 4. Memory specifications

Minimum memory configuration	4 GB
Maximum memory configuration	64 GB
Number of slots	4 UDIMM
Maximum memory supported per slot	16 GB
Memory options	<ul style="list-style-type: none"> ● 4 GB - 1 x 4 GB ● 8 GB - 1 x 8 GB ● 8 GB - 2 x 4 GB ● 16 GB - 1 x 16 GB ● 16 GB - 2 x 8 GB ● 32 GB - 2 x 16 GB ● 32 GB - 4 x 8 GB ● 64 GB - 4 x 16 GB
Type	DDR4 DRAM Non-ECC memory
Speed	2666 MHz memory will perform at 2400 MHz on i3 processors

Storage

Table 5. Storage specifications

Type	Form factor	Interface	Capacity
Solid-State Drive (SSD)	M.2 2280/ 2.5 inch	<ul style="list-style-type: none"> ● SATA AHCI, Up to 6 Gbps 	Up to 2 TB

Table 5. Storage specifications (continued)

Type	Form factor	Interface	Capacity
		• PCIe 3 x4 NVME, Up to 32 Gbps	
Hard drive (HDD)	2.5 and 3.5 inch	SATA AHCI, Up to 6 Gbps	Up to 2 TB at 5400/7200 RPM
Self-encrypting Opal drive Hard-Disk Drive (SED HDD)	One 2.5 inch	SATA AHCI, Up to 6 Gbps	2.5 inch 500 GB at 7200 RPM
Optical drive	1 Slimline	SATA AHCI, Up to 6 Gbps	
Intel Optane Memory (Optional)	M.2	PCIe NVMe	16 GB

Storage combinations

Table 6. Storage combinations

Primary/Boot drive	Secondary drive
M.2 Drive	None
M.2 Drive	2.5 inch HDD/ SSD
M.2 Drive	3.5 inch HDD
2.5 inch HDD/ SSD	None
2.5 inch HDD/ SSD	2.5 inch HDD/ SSD
3.5 inch HDD	None
2.5 inch HDD with Intel Optane	None
2.5 inch HDD with Intel Optane	2.5 inch HDD/ SSD

Audio

Table 7. Audio specifications

Controller	Realtek ALC3234
Type	Integrated
Speakers	Internal speaker (mono)
Interface	<ul style="list-style-type: none"> • AC511 Sound Bar (optional) • Dell AX210CR USB Stereo speakers (optional) • Dell 2.0 Speaker System - AE215 (optional) • Dell 2.1 Speaker System - AE415 (optional) • Dell Wireless 360 Speaker System - AE715 (optional) • Dell Sterio Soundbar - AX510 • Dell Professional Soundbar - AE515 • Stereo headset/mic combo
Internal speaker amplifier	2W (RMS) per channel

Video

Table 8. Video

Controller	Type	CPU Dependency	Graphics memory type	Capacity	External display support	Maximum resolution
Intel UHD Graphics 630	UMA	8th Generation Intel Core Processor i3, i5,i7	Integrated	Shared system memory	DisplayPort HDMI 1.4	VGA: 1920x1200 @60Hz HDMI : 2560x1600; 4096x2160 @60Hz DP:4096x2304 @60hz
AMD Radeon R5 430	Discrete	NA	GDDR5	2GB	Two DP 1.2	1 display of 4K @ 60hz
NVIDIA GeForce GT 730	Discrete	NA	GDDR5	2GB	3 displays with 1 or 2 DP of 1.2 ports	1 display of 2560x1600; 4096x2160 @60Hz
AMD Radeon RX 550	Discrete	NA	GDDR5	4GB	DP 1.4 Two mDP 1.4	1 display of 5K @ 60hz . 3 displays 4K @ 60hz
Dual AMD Radeon R5 430	Discrete	NA	GDDR5	2GB	Two DP 1.2	1 display of 4K @ 60hz

Communications

Table 9. Communications

Network adapter	Intel i219-LM Gigabit Ethernet LAN 10/100/1000 (Remote Wake Up, PXE support and Intel Active Management Technology support)
Wireless	<ul style="list-style-type: none"> Qualcomm QCA61x4A Dual-band 2x2 802.11ac Wireless with MU-MIMO + Bluetooth 4.2 Intel Wireless-AC 9560, Dual-band 2x2 802.11ac Wi-Fi with MU-MIMO + Bluetooth 5

Ports and connectors

Table 10. Ports and connectors

Memory card reader	SD 4.0 memory card reader—optional
USB	<ul style="list-style-type: none"> One USB 3.1 Gen 2 Type-C port with PowerShare (front) One USB 3.1 Gen 1 port (front) Two USB 2.0 ports (one with PowerShare, supports battery charge capability) (front) Four USB 3.1 Gen 1 ports (rear)

Table 10. Ports and connectors (continued)

	<ul style="list-style-type: none"> Two USB 2.0 ports (one supports SmartPower On) (rear)
Security	Kensington security cable slot
Audio	<ul style="list-style-type: none"> One headset port/Universal audio jack (front) One line-out port (rear)
Video	<ul style="list-style-type: none"> Two DisplayPorts (rear) DisplayPort/HDMI 2.0b/VGA/USB Type-C Alt-Mode (optional) (rear)
Network adapter	One RJ-45 (10/100/1000) connector
Serial port	Serial + PS/2 (rear)

System board drive connectors

Table 11. System board drive connectors

M.2 Connectors	<ul style="list-style-type: none"> 1 - 2230/2280 1 - 2230 (keyed to support Integrated or Discrete WiFi, Support Intel CNVi or USB2.0/PCIe)
Serial ATA (SATA) connector	3 (one Gen2 port for ODD and the rest of the ports support Gen3)
PCIe X16 slot	1 (Support Standard Rev 3.0)
PCIe X1 slot	0
PCIe X16 slot (wired x4) slot	0
PCIe X4	1 (open ended X4)

Operating system

Table 12. Operating system

Operating systems supported	<ul style="list-style-type: none"> Windows 10 Home (64-bit) Windows 10 Pro (64-bit) Windows 10 National Academic (64-bit) Ubuntu 18.04 LTS (64-bit) Neokylin v6.0 SP4 (China only)
-----------------------------	---

Power supply

Table 13. Power supply

Input Voltage	100-240 Vac
Input current (maximum)	3.2A

Table 13. Power supply (continued)

Wattage	<ul style="list-style-type: none"> • 200W Bronze • 200W Platinum
---------	--

Physical specifications

Table 14. Physical system dimensions

Chassis volume (liters)	7.8
Chassis weight (pounds / kilograms)	11.57/5.26

Table 15. Chassis dimensions

Height (inches / centimeters)	11.42/29
Width (inches / centimeters)	3.65/9.26
Depth (inches / centimeters)	11.50/29.2
Shipping weight (pounds / kilograms – includes packaging materials)	15.09 / 6.86

Table 16. Packaging parameters

Height (inches / centimeters)	10.38/26.4
Width (inches / centimeters)	19.2/48.7
Depth (inches / centimeters)	15.5/39.4

Regulatory and environmental compliance

Product related conformity assessment and regulatory authorizations including Product Safety, Electromagnetic Compatibility (EMC), Ergonomics, and Communication Devices relevant to this product may be viewed at www.dell.com/regulatory_compliance. The Regulatory Datasheet for this product is located at http://www.dell.com/regulatory_compliance.

Details of Dell's environmental stewardship program to conserve product energy consumption, reduce or eliminate materials for disposal, prolong product life span and provide effective and convenient equipment recovery solutions may be viewed at www.dell.com/environment. Product related conformity assessment, regulatory authorizations, and information encompassing Environmental, Energy Consumption, Noise Emissions, Product Materials Information, Packaging, Batteries, and Recycling relevant to this product may be viewed by clicking the Design for Environment link on the webpage.

Table 17. Regulatory/Environmental Certifications

	Tower	SFF	Micro
Energy Star 7.0/7.1 Compliant (Windows & Ubuntu)	Yes	Yes	Yes
EPEAT 2018 Bronze Rated Configurations	Yes	Yes	Yes
NFPA 99 Leakage Current Spec (Dell ENG0011750)	Yes	Yes	Yes
TCO 8.0	Yes	Yes	Yes
BFR / PVC Free: (aka Halogen Free) : The system shall comply with the limits defined in Dell specification ENV0199 - BFR/CFR/PVC-Free Specification	No	No	Yes

Table 17. Regulatory/Environmental Certifications (continued)

	Tower	SFF	Micro
California Energy Commission (CEC) MEPs - Internal PSU Requirements	Yes	Yes	No
Br/CL Reduction: Plastic parts above 25 grams shall not contain greater than 1000 ppm chlorine or greater than 1000 ppm bromine at the homogenous level. Following can be excluded: - Printed circuit boards, cable and wiring, fans, and electronic components Anticipated Required Criteria for EPEAT Revision Effective 1H 2018	Yes	Yes	Yes
Minimum 2% Post-Consumer Recycled (PCR) plastics as standard in product. Anticipated Required Criteria for EPEAT Revision Effective 1H 2018	Yes	No	No
Higher level % Post-Consumer Recycled (PCR) plastics in product: * DT, Workstations, Thin Clients - 10% * Integrated Desktop Computers (AIO) 15% (Anticipated 1 Optional point in the EPEAT Revision for higher level PCR)	Yes	No	No

BIOS setup

 **CAUTION:** Unless you are an expert computer user, do not change the settings in the BIOS Setup program. Certain changes can make your computer work incorrectly.

 **NOTE:** Depending on the computer and its installed devices, the items listed in this section may or may not be displayed.

 **NOTE:** Before you change BIOS Setup program, it is recommended that you write down the BIOS Setup program screen information for future reference.

Use the BIOS Setup program for the following purposes:

- Get information about the hardware installed in your computer, such as the amount of RAM and the size of the hard drive.
- Change the system configuration information.
- Set or change a user-selectable option, such as the user password, type of hard drive installed, and enabling or disabling base devices.

Topics:

- BIOS overview
- Entering BIOS setup program
- Navigation keys
- Boot menu
- One time boot menu
- System setup options
- Updating the BIOS
- System and setup password
- Clearing BIOS (System Setup) and System passwords

BIOS overview

The BIOS manages data flow between the computer's operating system and attached devices such as hard disk, video adapter, keyboard, mouse, and printer.

Entering BIOS setup program

1. Turn on your computer.
2. Press F2 immediately to enter the BIOS setup program.

 **NOTE:** If you wait too long and the operating system logo appears, continue to wait until you see the desktop. Then, turn off your computer and try again.

Navigation keys

 **NOTE:** For most of the System Setup options, changes that you make are recorded but do not take effect until you restart the system.

Table 18. Navigation keys

Keys	Navigation
Up arrow	Moves to the previous field.

Table 18. Navigation keys (continued)

Keys	Navigation
Down arrow	Moves to the next field.
Enter	Selects a value in the selected field (if applicable) or follow the link in the field.
Spacebar	Expands or collapses a drop-down list, if applicable.
Tab	Moves to the next focus area. (i) NOTE: For the standard graphics browser only.
Esc	Moves to the previous page until you view the main screen. Pressing Esc in the main screen displays a message that prompts you to save any unsaved changes and restarts the system.

Boot menu

Press <F12> when the Dell logo appears to initiate a one-time boot menu with a list of the valid boot devices for the system. Diagnostics and BIOS Setup options are also included in this menu. The devices listed on the boot menu depend on the bootable devices in the system. This menu is useful when you are attempting to boot to a particular device or to bring up the diagnostics for the system. Using the boot menu does not make any changes to the boot order stored in the BIOS.

The options are:

- UEFI Boot:
 - Windows Boot Manager
- Other Options:
 - BIOS Setup
 - BIOS Flash Update
 - Diagnostics
 - Change Boot Mode Settings

One time boot menu

To enter **one time boot menu**, turn on your computer, and then press F12 immediately.

(i) NOTE: It is recommended to shutdown the computer if it is on.

The one-time boot menu displays the devices that you can boot from including the diagnostic option. The boot menu options are:

- Removable Drive (if available)
- STXXXX Drive (if available)
(i) NOTE: XXX denotes the SATA drive number.
- Optical Drive (if available)
- SATA Hard Drive (if available)
- Diagnostics

The boot sequence screen also displays the option to access the System Setup screen.

System setup options

(i) NOTE: Depending on the computer and its installed devices, the items listed in this section may or may not appear.

General options

Table 19. General

Option	Description
System Information	<p>Displays the following information:</p> <ul style="list-style-type: none"> System Information: Displays BIOS Version, Service Tag, Asset Tag, Ownership Tag, Ownership Date, Manufacture Date, and the Express Service Code. Memory Information: Displays Memory Installed, Memory Available, Memory Speed, Memory Channel Mode, Memory Technology, DIMM 1 Size, DIMM 2 Size. PCI Information: Displays SLOT1, SLOT 2, SLOT1_M.2, SLOT2_M.2 Processor Information: Displays Processor Type, Core Count, Processor ID, Current Clock Speed, Minimum Clock Speed, Maximum Clock Speed, Processor L2 Cache, Processor L3 Cache, HT Capable, and 64-Bit Technology. Device Information: Displays SATA-0, SATA 4, M.2 PCIe SSD-0, LOM MAC Address, Video Controller, Audio Controller, Wi-Fi Device, and Bluetooth Device.
Boot Sequence	<p>Allows you to specify the order in which the computer attempts to find an operating system from the devices specified in this list.</p> <ul style="list-style-type: none"> Windows Boot Manager ONboard NIC (IPV4) Onboard NIC (IPV6)
Advanced Boot Options	<p>Allows you to select the Enable Legacy Option ROMs option, when in UEFI boot mode. By default, this option is selected.</p> <ul style="list-style-type: none"> Enable Legacy Option ROMs—Default Enable Attempt Legacy Boot
UEFI Boot Path Security	<p>This option controls whether or not the system will prompt the user to enter the Admin password when booting a UEFI boot path from the F12 Boot Menu.</p> <ul style="list-style-type: none"> Always, Except Internal HDD—Default Always, Except Internal HDD and PXE Always Never
Date/Time	<p>Allows you to set the date and time settings. Changes to the system date and time take effect immediately.</p>

System information

Table 20. System Configuration

Option	Description
Integrated NIC	<p>Allows you to control the on-board LAN controller. The option 'Enable UEFI Network Stack' is not selected by default. The options are:</p> <ul style="list-style-type: none"> Disabled Enabled Enabled w/PXE (default) <p>NOTE: Depending on the computer and its installed devices, the items listed in this section may or may not appear.</p>
Serial Port	<p>Determines how the built-in serial port operates.</p> <p>Choose any one option:</p> <ul style="list-style-type: none"> Disabled COM1 (default) COM2

Table 20. System Configuration (continued)

Option	Description
	<ul style="list-style-type: none">• COM3• COM4
SATA Operation	Allows you to configure the operating mode of the integrated hard drive controller. <ul style="list-style-type: none">• Disabled = The SATA controllers are hidden• AHCI = SATA is configured for AHCI mode• RAID ON = SATA is configured to support RAID mode (selected by default)
Drives	Allows you to enable or disable the various drives on-board: <ul style="list-style-type: none">• SATA-0• SATA-2• SATA-3• SATA-4• M.2 PCIe SSD-0
Smart Reporting	This field controls whether hard drive errors for integrated drives are reported during system startup. The Enable Smart Reporting option is disabled by default.
USB Configuration	Allows you to enable or disable the integrated USB controller for: <ul style="list-style-type: none">• Enable USB Boot Support• Enable Front USB Ports• Enable Rear USB Ports All the options are enabled by default.
Front USB Configuration	Allows you to enable or disable the front USB ports. All the ports are enabled by default.
Rear USB Configuration	Allows you to enable or disable the rear USB ports. All the ports are enabled by default.
USB PowerShare	This option allows you to charge the external devices, such as mobile phones, music player. This option is enabled by default.
Audio	Allows you to enable or disable the integrated audio controller. The option Enable Audio is selected by default. <ul style="list-style-type: none">• Enable Microphone• Enable Internal Speaker Both the options are selected by default.
Dust Filter Maintenance	Allows you to enable or disable BIOS messages for maintaining the optional dust filter installed in your computer. BIOS will generate a pre-boot reminder to clean or replace the dust filter based on the interval set. <ul style="list-style-type: none">• Disabled (default)• 15 days• 30 days• 60 days• 90 days• 120 days• 150 days• 180 days
Miscellaneous Devices	<ul style="list-style-type: none">• Enable Secure Digital SD Card (default)• Secure Digital SD Card• Secure Digital SD Card Read-Only Mode

Video screen options

Table 21. Video

Option	Description
Primary Display	<p>Allows you to select the primary display when multiple controllers are available in the system.</p> <ul style="list-style-type: none"> • Auto (default) • Intel HD Graphics <p>(i) NOTE: If you do not select Auto, the on-board graphics device will be present and enabled.</p>

Security

Table 22. Security

Option	Description
Strong Password	This option lets you enable or disable strong passwords for the system. The option is disabled by default.
Password Configuration	Allows you to control the minimum and maximum number of characters allowed for a administrative password and the system password. The range of characters is between 4 and 32.
Password Bypass	<p>This option lets you bypass the System (Boot) Password and the internal HDD password prompts during a system restart.</p> <ul style="list-style-type: none"> • Disabled — Always prompt for the system and internal HDD password when they are set. This option is enabled by default. • Reboot Bypass — Bypass the password prompts on Restarts (warm boots). <p>(i) NOTE: The system will always prompt for the system and internal HDD passwords when powered on from the off state (a cold boot). Also, the system will always prompt for passwords on any module bay HDDs that may be present.</p>
Password Change	<p>This option lets you determine whether changes to the System and Hard Disk passwords are permitted when an administrator password is set.</p> <p>Allow Non-Admin Password Changes - This option is enabled by default.</p>
UEFI Capsule Firmware Updates	This option controls whether this system allows BIOS updates via UEFI capsule update packages. This option is selected by default. Disabling this option will block BIOS updates from services such as Microsoft Windows Update and Linux Vendor Firmware Service (LVFS)
TPM 2.0 Security	<p>Allows you to control whether the Trusted Platform Module (TPM) is visible to the operating system.</p> <ul style="list-style-type: none"> • TPM On (default) • Clear • PPI Bypass for Enable Commands • PPI Bypass for Disable Commands • PPI Bypass for Clear Commands • Attestation Enable (default) • Key Storage Enable (default) • SHA-256 (default) <p>Choose any one option:</p> <ul style="list-style-type: none"> • Disabled • Enabled (default)
Absolute	<p>This field lets you Enable, Disable or Permanently Disable the BIOS module interface of the optional Absolute Persistence Module service from Absolute Software.</p> <ul style="list-style-type: none"> • Enabled (default)

Table 22. Security (continued)

Option	Description
	<ul style="list-style-type: none"> Disabled Permanently Disabled
Chassis Intrusion	<p>This field controls the chassis intrusion feature.</p> <p>Choose any one of the option:</p> <ul style="list-style-type: none"> Disabled (default) Enabled On-Silent
OROM Keyboard Access	<ul style="list-style-type: none"> Disabled Enabled (default) One Time Enable
Admin Setup Lockout	Allows you to prevent users from entering Setup when Admin password is set. This option is not set by default.
SMM Security Mitigation	Allows you to enable or disable additional UEFI SMM Security Mitigation protections. This option is not set by default.

Secure boot options

Table 23. Secure Boot

Option	Description
Secure Boot Enable	<p>Allows you to enable or disable Secure Boot feature</p> <ul style="list-style-type: none"> Secure Boot Enable <p>This option is not selected by default.</p>
Secure Boot Mode	<p>Allows you to modify the behavior of Secure Boot to allow evaluation or enforcement of UEFI driver signatures.</p> <ul style="list-style-type: none"> Deployed Mode (default) Audit Mode
Expert key Management	<p>Allows you to manipulate the security key databases only if the system is in Custom Mode. The Enable Custom Mode option is disabled by default. The options are:</p> <ul style="list-style-type: none"> PK (default) KEK db dbx <p>If you enable the Custom Mode, the relevant options for PK, KEK, db, and dbx appear. The options are:</p> <ul style="list-style-type: none"> Save to File- Saves the key to a user-selected file Replace from File- Replaces the current key with a key from a user-selected file Append from File- Adds a key to the current database from a user-selected file Delete- Deletes the selected key Reset All Keys- Resets to default setting Delete All Keys- Deletes all the keys <p>i NOTE: If you disable the Custom Mode, all the changes made will be erased and the keys will restore to default settings.</p>

Intel Software Guard Extensions options

Table 24. Intel Software Guard Extensions

Option	Description
Intel SGX Enable	This field specifies you to provide a secured environment for running code/storing sensitive information in the context of the main OS. Click one of the following options: <ul style="list-style-type: none">• Disabled• Enabled• Software controlled—Default
Enclave Memory Size	This option sets SGX Enclave Reserve Memory Size Click one of the following options: <ul style="list-style-type: none">• 32 MB• 64 MB• 128 MB—Default

Performance

Table 25. Performance

Option	Description
Multi Core Support	This field specifies whether the process has one or all cores enabled. The performance of some applications improves with the additional cores. <ul style="list-style-type: none">• All—Default• 1• 2• 3
Intel SpeedStep	Allows you to enable or disable the Intel SpeedStep mode of processor. <ul style="list-style-type: none">• Enable Intel SpeedStep This option is set by default.
C-States Control	Allows you to enable or disable the additional processor sleep states. <ul style="list-style-type: none">• C states This option is set by default.
Intel TurboBoost	Allows you to enable or disable the Intel TurboBoost mode of the processor. <ul style="list-style-type: none">• Enable Intel TurboBoost This option is set by default.
Hyper-Thread Control	Allows you to enable or disable the HyperThreading in the processor. <ul style="list-style-type: none">• Disabled• Enabled—Default

Power management

Table 26. Power Management

Option	Description
AC Recovery	Determines how the system responds when AC power is re-applied after a power loss. You can set the AC Recovery to: <ul style="list-style-type: none"> ● Power Off ● Power On ● Last Power State This option is set to Power Off by default.
Enable Intel Speed Shift Technology	Allows you to enable or disable Intel Speed Shift Technology support. The option Enable Intel Speed Shift Technology is set by default.
Auto On Time	Sets time to automatically turn on the computer. Time is kept in standard 12-hour format (hour:minutes:seconds). Change the startup time by typing the values in the time and AM/PM fields. (i) NOTE: This feature does not work if you turn off your computer using the switch on a power strip or surge protector or if Auto Power is set to disabled .
Deep Sleep Control	Allows you to define the controls when Deep Sleep is enabled. <ul style="list-style-type: none"> ● Disabled (default) ● Enabled in S5 only ● Enabled in S4 and S5
Fan Control Override	The option is not set by default
USB Wake Support	Allows you to enable the USB devices to wake the computer from standby mode. The option " Enable USB Wake Support " is selected by default
Wake on LAN/WWAN	This option allows the computer to power up from the off state when triggered by a special LAN signal. This feature only works when the computer is connected to AC power supply. <ul style="list-style-type: none"> ● Disabled - Does not allow the system to power on by special LAN signals when it receives a wake-up signal from the LAN or wireless LAN. ● LAN or WLAN - Allows the system to be powered on by special LAN or wireless LAN signals. ● LAN Only - Allows the system to be powered on by special LAN signals. ● LAN with PXE Boot - A wakeup packet sent to the system in either the S4 or S5 state, that will cause the system to wake-up and immediately boot to PXE. ● WLAN Only - Allows the system to be powered on by special WLAN signals. This option is set to Disabled by default.
Block Sleep	Allows you to block entering to sleep (S3 state) in OS environment. This option is disabled by default.

Post behavior

Table 27. POST Behavior

Option	Description
Numlock LED	Allows you to enable or disable the Numlock feature when your computer starts. This option is enabled by default.
Keyboard Errors	Allows you to enable or disable the keyboard error reporting when the computer starts. The option Enable Keyboard Error Detection is enabled by default.
Fast Boot	This option can speed up the boot process by bypassing some compatibility steps: <ul style="list-style-type: none"> ● Minimal — The system boots quickly, unless the BIOS has been updated, memory changed, or the previous POST did not complete. ● Thorough — The system does not skip any steps in the boot process.

Table 27. POST Behavior (continued)

Option	Description
	<ul style="list-style-type: none"> Auto — This allows the operating system to control this setting (this works only when the operating system supports Simple Boot Flag). <p>This option is set to Thorough by default.</p>
Extend BIOS POST Time	<p>This option creates an additional pre-boot delay.</p> <ul style="list-style-type: none"> 0 seconds (default) 5 seconds 10 seconds
Full Screen Logo	<p>This option will display full screen logo if your image match screen resolution. The option Enable Full Screen Logo is not set by default.</p>
Warnings and Errors	<p>This option causes the boot process to only pause when warning or errors are detected. Choose any one of the option:</p> <ul style="list-style-type: none"> Prompt on Warnings and Errors (default) Continue on Warnings Continue on Warnings and Errors

Manageability

Table 28. Manageability

Option	Description
USB provision	This option is not selected by default.
MEBx Hotkey	This option is selected by default.

Virtualization support

Table 29. Virtualization Support

Option	Description
Virtualization	<p>This option specifies whether a Virtual Machine Monitor (VMM) can utilize the additional hardware capabilities provided by the Intel Virtualization technology.</p> <ul style="list-style-type: none"> Enable Intel Virtualization Technology <p>This option is set by default.</p>
VT for Direct I/O	<p>Enables or disables the Virtual Machine Monitor (VMM) from utilizing the additional hardware capabilities provided by the Intel Virtualization technology for direct I/O.</p> <ul style="list-style-type: none"> Enable VT for Direct I/O <p>This option is set by default.</p>

Wireless options

Table 30. Wireless

Option	Description
Wireless Device Enable	<p>Allows you to enable or disable the internal wireless devices. The options are:</p> <ul style="list-style-type: none"> WLAN/WiGig Bluetooth

Table 30. Wireless

Option	Description
	All the options are enabled by default.

Maintenance

Table 31. Maintenance

Option	Description
Service Tag	Displays the service tag of your computer.
Asset Tag	Allows you to create a system asset tag if an asset tag is not already set. This option is not set by default.
SERR Messages	Controls the SERR message mechanism. This option is set by default. Some graphics cards require that the SERR message mechanism be disabled.
BIOS Downgrade	Allows you to flash previous revisions of the system firmware. <ul style="list-style-type: none"> ● Allow BIOS Downgrade This option is set by default.
Bios Recovery	BIOS Recovery from Hard Drive —This option is set by default. Allows you to recover the corrupted BIOS from a recovery file on the HDD or an external USB key. BIOS Auto-Recovery — Allows you to recover the BIOS automatically.
First Power On Date	Allows you to set Ownership date. The option Set Ownership Date is not set by default.

System logs

Table 32. System Logs

Option	Description
BIOS events	Allows you to view and clear the System Setup (BIOS) POST events.

Advanced configuration

Table 33. Advanced configuration

Option	Description
ASPM	Allows you to set the ASPM level. <ul style="list-style-type: none"> ● Auto (default) - There is handshaking between the device and PCI Express hub to determine the best ASPM mode supported by the device ● Disabled - ASPM power management is turned off at all time ● L1 Only - ASPM power management is set to use L1

Updating the BIOS

Updating the BIOS in Windows

 **CAUTION:** If BitLocker is not suspended before updating the BIOS, the next time you reboot the system it will not recognize the BitLocker key. You will then be prompted to enter the recovery key to progress and the system will ask for this on each reboot. If the recovery key is not known this can result in data loss or an unnecessary operating system re-install. For more information on this subject, see Knowledge Article: <https://www.dell.com/support/article/sln153694>

1. Go to www.dell.com/support.
2. Click **Product support**. In the **Search support** box, enter the Service Tag of your computer, and then click **Search**.
 **NOTE:** If you do not have the Service Tag, use the SupportAssist feature to automatically identify your computer. You can also use the product ID or manually browse for your computer model.
3. Click **Drivers & Downloads**. Expand **Find drivers**.
4. Select the operating system installed on your computer.
5. In the **Category** drop-down list, select **BIOS**.
6. Select the latest version of BIOS, and click **Download** to download the BIOS file for your computer.
7. After the download is complete, browse the folder where you saved the BIOS update file.
8. Double-click the BIOS update file icon and follow the on-screen instructions.
For more information, see knowledge base article [000124211](https://www.dell.com/support/article/000124211) at www.dell.com/support.

Updating the BIOS in Linux and Ubuntu

To update the system BIOS on a computer that is installed with Linux or Ubuntu, see the knowledge base article [000131486](https://www.dell.com/support/article/000131486) at www.dell.com/support.

Updating the BIOS using the USB drive in Windows

 **CAUTION:** If BitLocker is not suspended before updating the BIOS, the next time you reboot the system it will not recognize the BitLocker key. You will then be prompted to enter the recovery key to progress and the system will ask for this on each reboot. If the recovery key is not known this can result in data loss or an unnecessary operating system re-install. For more information on this subject, see Knowledge Article: <https://www.dell.com/support/article/sln153694>

1. Follow the procedure from step 1 to step 6 in [Updating the BIOS in Windows](#) to download the latest BIOS setup program file.
2. Create a bootable USB drive. For more information, see the knowledge base article [000145519](https://www.dell.com/support/article/000145519) at www.dell.com/support.
3. Copy the BIOS setup program file to the bootable USB drive.
4. Connect the bootable USB drive to the computer that needs the BIOS update.
5. Restart the computer and press **F12**.
6. Select the USB drive from the **One Time Boot Menu**.
7. Type the BIOS setup program filename and press **Enter**.
The **BIOS Update Utility** appears.
8. Follow the on-screen instructions to complete the BIOS update.

Updating the BIOS from the F12 One-Time boot menu

Update your computer BIOS using the BIOS update.exe file that is copied to a FAT32 USB drive and booting from the F12 One-Time boot menu.

 **CAUTION:** If BitLocker is not suspended before updating the BIOS, the next time you reboot the system it will not recognize the BitLocker key. You will then be prompted to enter the recovery key to progress and the system will ask for this on each reboot. If the recovery key is not known this can result in data loss or an unnecessary operating system re-install. For more information on this subject, see Knowledge Article: <https://www.dell.com/support/article/sln153694>

BIOS Update

You can run the BIOS update file from Windows using a bootable USB drive or you can also update the BIOS from the F12 One-Time boot menu on the computer.

Most of the Dell computers built after 2012 have this capability, and you can confirm by booting your computer to the F12 One-Time Boot Menu to see if BIOS FLASH UPDATE is listed as a boot option for your computer. If the option is listed, then the BIOS supports this BIOS update option.

 **NOTE:** Only computers with BIOS Flash Update option in the F12 One-Time boot menu can use this function.

Updating from the One-Time boot menu

To update your BIOS from the F12 One-Time boot menu, you need the following:

- USB drive formatted to the FAT32 file system (key does not have to be bootable)
- BIOS executable file that you downloaded from the Dell Support website and copied to the root of the USB drive
- AC power adapter that is connected to the computer
- Functional computer battery to flash the BIOS

Perform the following steps to perform the BIOS update flash process from the F12 menu:

 **CAUTION:** Do not turn off the computer during the BIOS update process. The computer may not boot if you turn off your computer.

1. From a turn off state, insert the USB drive where you copied the flash into a USB port of the computer.
2. Turn on the computer and press F12 to access the One-Time Boot Menu, select BIOS Update using the mouse or arrow keys then press Enter.
The flash BIOS menu is displayed.
3. Click **Flash from file**.
4. Select external USB device.
5. Select the file and double-click the flash target file, and then click **Submit**.
6. Click **Update BIOS**. The computer restarts to flash the BIOS.
7. The computer will restart after the BIOS update is completed.

System and setup password

Table 34. System and setup password

Password type	Description
System password	Password that you must enter to log in to your system.
Setup password	Password that you must enter to access and make changes to the BIOS settings of your computer.

You can create a system password and a setup password to secure your computer.

 **CAUTION:** The password features provide a basic level of security for the data on your computer.

 **CAUTION:** Anyone can access the data that is stored on your computer if it is not locked and left unattended.

 **NOTE:** System and setup password feature is disabled.

Assigning a system setup password

You can assign a new **System or Admin Password** only when the status is in **Not Set**.

To enter the system setup, press F12 immediately after a power-on or reboot.

1. In the **System BIOS** or **System Setup** screen, select **Security** and press Enter.

The **Security** screen is displayed.

2. Select **System/Admin Password** and create a password in the **Enter the new password** field.

Use the following guidelines to assign the system password:

- A password can have up to 32 characters.
- At least one special character: ! " # \$ % & ' () * + , - . / : ; < = > ? @ [\] ^ _ ` { | }
- Numbers 0 through 9.
- Upper case letters from A to Z.
- Lower case letters from a to z.

3. Type the system password that you entered earlier in the **Confirm new password** field and click **OK**.

4. Press Esc and save the changes as prompted by the pop-up message.

5. Press Y to save the changes.

The computer restarts.

Deleting or changing an existing system setup password

Ensure that the **Password Status** is **Unlocked** (in the System Setup) before attempting to delete or change the existing System and/or Setup password. You cannot delete or change an existing System or Setup password, if the **Password Status** is **Locked**.

To enter the System Setup, press F12 immediately after a power-on or reboot.

1. In the **System BIOS** or **System Setup** screen, select **System Security** and press Enter.

The **System Security** screen is displayed.

2. In the **System Security** screen, verify that **Password Status** is **Unlocked**.

3. Select **System Password**, update, or delete the existing system password, and press Enter or Tab.

4. Select **Setup Password**, update, or delete the existing setup password, and press Enter or Tab.

 **NOTE:** If you change the System and/or Setup password, reenter the new password when prompted. If you delete the System and/or Setup password, confirm the deletion when prompted.

5. Press Esc and a message prompts you to save the changes.

6. Press Y to save the changes and exit from System Setup.

The computer restarts.

Clearing BIOS (System Setup) and System passwords

To clear the system or BIOS passwords, contact Dell technical support as described at www.dell.com/contactdell.

 **NOTE:** For information on how to reset Windows or application passwords, refer to the documentation accompanying Windows or your application.

Software

This chapter details the supported operating systems along with instructions on how to install the drivers.

Topics:

- Downloading Windows drivers

Downloading Windows drivers

1. Turn on the .
 2. Go to **Dell.com/support**.
 3. Click **Product Support**, enter the Service Tag of your , and then click **Submit**.
- (i) NOTE:** If you do not have the Service Tag, use the auto detect feature or manually browse for your model.
4. Click **Drivers and Downloads**.
 5. Select the operating system installed on your .
 6. Scroll down the page and select the driver to install.
 7. Click **Download File** to download the driver for your .
 8. After the download is complete, navigate to the folder where you saved the driver file.
 9. Double-click the driver file icon and follow the instructions on the screen.

System device drivers

Verify if the system device drivers are already installed in the system.

- ▼  System devices
 -  ACPI Fan
 -  ACPI Fan
 -  ACPI Fan
 -  ACPI Fan
 -  ACPI Fan
 -  ACPI Fixed Feature Button
 -  ACPI Power Button
 -  ACPI Processor Aggregator
 -  ACPI Thermal Zone
 -  CannonLake LPC Controller (Q370) - A306
 -  CannonLake SMBus - A323
 -  CannonLake SPI (flash) Controller - A324
 -  CannonLake Thermal Subsystem - A379
 -  Composite Bus Enumerator
 -  High Definition Audio Controller
 -  High precision event timer
 -  Intel(R) Management Engine Interface
 -  Intel(R) Power Engine Plug-in
 -  Intel(R) Serial IO GPIO Host Controller - INT3450
 -  Intel(R) Serial IO I2C Host Controller - A368
 -  Intel(R) Xeon(R) E3 - 1200/1500 v5/6th Gen Intel(R) Core(TM) Gaussian Mixture Model - 1911
 -  Microsoft ACPI-Compliant System
 -  Microsoft System Management BIOS Driver
 -  Microsoft UEFI-Compliant System
 -  Microsoft Virtual Drive Enumerator
 -  Microsoft Windows Management Interface for ACPI
 -  Microsoft Windows Management Interface for ACPI
 -  Microsoft Windows Management Interface for ACPI
 -  Microsoft Windows Management Interface for ACPI
 -  Microsoft Windows Management Interface for ACPI
 -  NDIS Virtual Network Adapter Enumerator
 -  Numeric data processor
 -  PCI Express Root Complex
 -  PCI standard host CPU bridge
 -  PCI standard RAM Controller
 -  Plug and Play Software Device Enumerator
 -  Programmable interrupt controller
 -  Remote Desktop Device Redirector Bus
 -  System CMOS/real time clock

Serial IO driver

Verify if the drivers for Touchpad, IR camera, and keyboard and are installed.



Figure 1. Serial IO driver

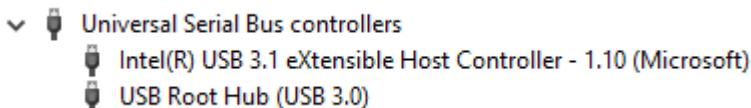
Security drivers

Verify if the security drivers are already installed in the system.



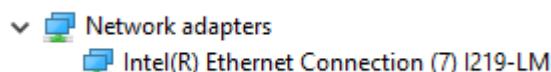
USB drivers

Verify if the USB drivers are already installed in the computer.



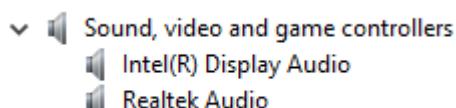
Network adapter drivers

Verify if the Network adapter drivers are already installed in the system.



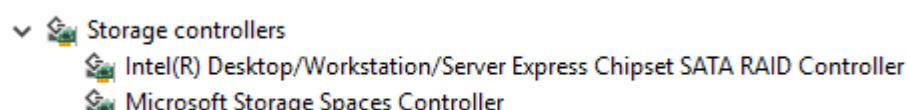
Realtek Audio

Verify if audio drivers are already installed in the computer.



Storage controller

Verify if the storage control drivers are already installed in the system.



Getting help

Topics:

- Contacting Dell

Contacting Dell

 **NOTE:** If you do not have an active Internet connection, you can find contact information on your purchase invoice, packing slip, bill, or Dell product catalog.

Dell provides several online and telephone-based support and service options. Availability varies by country and product, and some services may not be available in your area. To contact Dell for sales, technical support, or customer service issues:

1. Go to **Dell.com/support**.
2. Select your support category.
3. Verify your country or region in the **Choose a Country/Region** drop-down list at the bottom of the page.
4. Select the appropriate service or support link based on your need.

GRIDDLES & BROILERS


**VCRG-M RESTAURANT SERIES
GAS GRIDDLES**


Model VCRG48-M



- VCRG24-M** 24" w x 20½" d griddle plate
- VCRG36-M** 36" w x 20½" d griddle plate
- VCRG48-M** 48" w x 20½" d griddle plate

STANDARD FEATURES

- 1" thick polished steel griddle plate welded to 3¼" stainless steel back, tapered side splashes and stainless steel grease trough.
- Fully welded stainless and aluminized steel chassis frame.
- 12½" cooking height on 4" adjustable legs.
- One 25,000 BTU/hr. "U" shaped aluminized steel burner for every 12" of griddle width.
- One infinite heat control valve per burner.
- Standing pilot ignition system.
- High capacity 4½ quart capacity grease can.
- ¾" rear gas connection and convertible gas pressure regulator for LP service.
- Constructed standard for natural gas service. LP conversion kit supplied with unit.
- One year limited parts and labor warranty.

SPECIFICATIONS

Low profile gas griddle Vulcan Model No. _____. Stainless steel front, sides and front top ledge. Fully welded stainless and aluminized steel body frame. 12½" cooking height on 4" legs. 1" thick polished steel griddle plate welded to stainless steel back and tapered side splashes. One 25,000 BTU/hr. "U" shaped aluminized steel burner and infinite heat control for each 12" of griddle width. 4½ quart capacity grease can. ¾" rear gas connection and convertible gas pressure regulator for LP service.

Exterior Dimensions:

____" w x 27" d x 16" h on 4" legs.

CSA design certified. NSF listed.

NOTE: Models are constructed standard for natural gas service. Propane conversion kit is supplied with the unit. Conversion is the customer's responsibility. Please indicate propane or natural gas when processing your order.

NOTE: Elevation orifice kit is available free of charge for high-elevation applications. Installation is the customer's responsibility. Please indicate elevation when processing your order.



a division of ITW Food Equipment Group LLC

P.O. Box 696 ■ Louisville, KY 40201 ■ Toll-free: 1-800-814-2028 ■ Local: 502-778-2791 ■ Quote & Order Fax: 1-800-444-0602

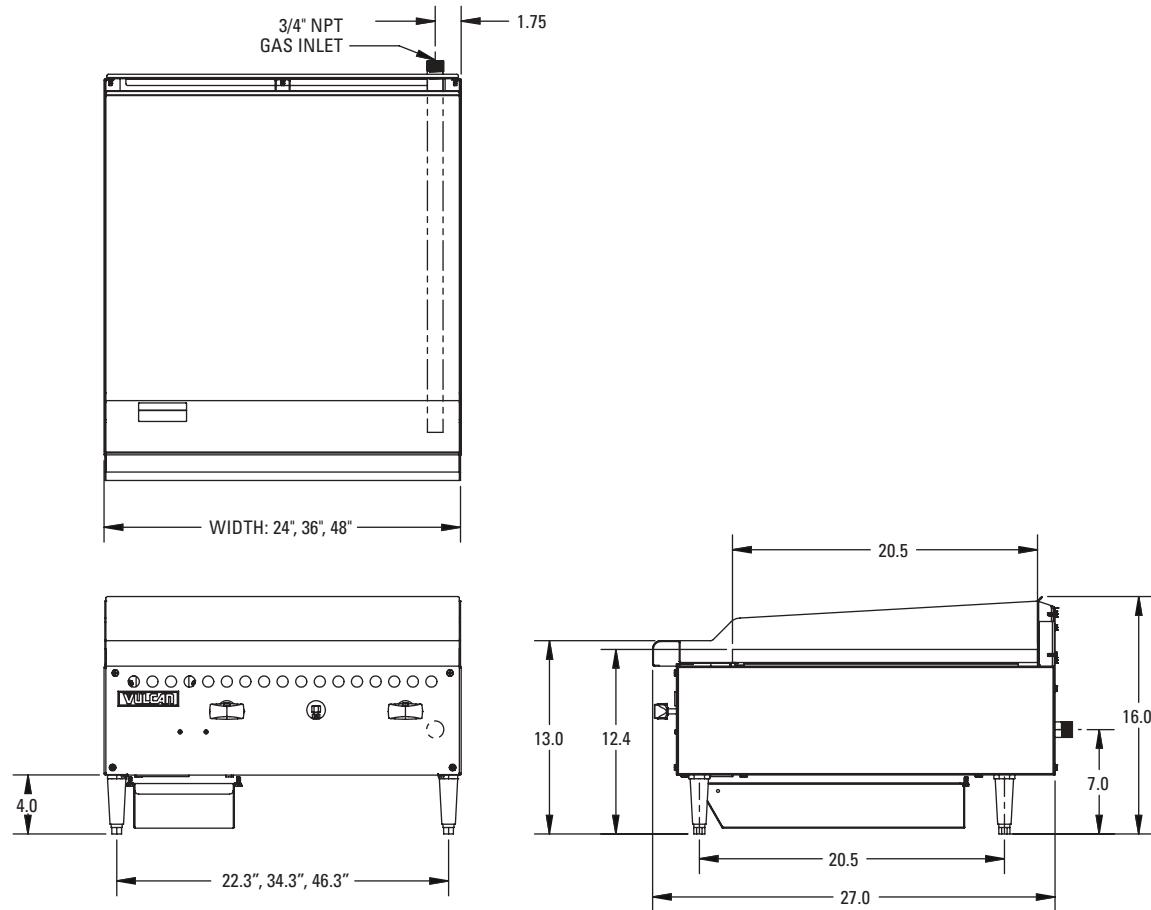


VCRG-M RESTAURANT SERIES GAS GRIDDLES

INSTALLATION INSTRUCTIONS

- A gas pressure regulator supplied with the unit must be installed;
Natural Gas 4.0" (102 mm) W.C.
Propane Gas 10.0" (254 mm) W.C.
- All models require a 6" (152 mm) clearance at both sides and rear adjacent to combustible and 0" from non-combustible constructions. All models require a 4" (102mm) bottom clearance and must be installed with minimum 4" legs.

An adequate ventilation system is required for Commercial Cooking Equipment (NFPA No. 96). Information may be obtained by writing to the National Fire Protection Association, Batterymarch Park, Quincy, MA 02169.
- These units are manufactured for installation in accordance with National Fuel Gas Code, ANSI-Z223.1/NFPA #54 (latest edition). Copies may be obtained from The American Gas Association, Accredited Standards Committee Z223 @ 400 N. Capital St. NW, Washington, DC 20001, or the Secretary Standards Council, NFPA, 1 Batterymarch Park, Quincy, MA 02169-7471.
NOTE: In The Commonwealth of Massachusetts
All gas appliances vented through ventilation hood or exhaust system equipped with a damper or with a power means of exhaust shall comply with 248 CMR.
- This appliance is manufactured for commercial installation only and is not intended for home use.



MODEL	WIDTH	DEPTH	OVERALL HEIGHT*	WORKING HEIGHT*	NO. OF BURNERS	TOTAL BTU/HR	NO. OF DRAWERS	APPROX. SHIP. WT.
VCRG24-M	24"	27"	16"	12 1/2"	2	50,000	1	243 lbs/111 kg
VCRG36-M	36"	27"	16"	12 1/2"	3	75,000	1	340 lbs/155 kg
VCRG48-M	48"	27"	16"	12 1/2"	4	100,000	1	408 lbs/185 kg

*These are nominal dimensions and can vary by +1.75" with adjustable legs.



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P.O. Box 696 ■ Louisville, KY 40201 ■ Toll-free: 1-800-814-2028 ■ Local: 502-778-2791 ■ Quote & Order Fax: 1-800-444-0602

DS-2CD2142FWD-I(W)(S)**Key Features**

- Up to 4 megapixel 2688×1520 @ 20fps resolution
- Standard video compression with high compression ratio, ROI (region of interest) encoding
- Progressive scan CMOS, capture motion video without incised margin
- Support dual stream, and the sub-stream for mobile surveillance
- High-performance and long service life Infrared LED, Approx. 10 to 30 meters IR range
- Two-way audio (-S)
- Audio I/O (-S)
- Support Wi-Fi (W)
- Support 120dB wide dynamic range
- IR cut filter with auto switch
- PoE (Power over Ethernet)
- Built-in Micro SD/SDHC/SDXC card slot, up to 128 GB
- Ingress Protection level: IP66
- Impact Protection: IK08
- Other functions: rotate mode, alarm, mirror, reset button, etc
- 3-axis adjustment
- Support VCA, which is compatible with NVR for the second time of video searching and analysing

Specification

Model	DS-2CD2142FWD-I(W)(S)
Parameter	4 Megapixel CMOS Vandal-proof Network Dome Camera
Camera	

Image Sensor	1/2.8" Progressive Scan CMOS
Min. Illumination	0.01Lux @ (F1.2, AGC ON) ,0 Lux with IR 0.028 Lux @ (F2.0, AGC ON) ,0 Lux with IR
Shutter Speed	1/3 s to 1/10,000 s
Lens	2.8mm@ F2.0, (4mm, 6mm optional)
Lens Mount	M12
Day &Night	IR cut filter with auto switch
Digital Noise Reduction	3D DNR
Wide Dynamic Range	120dB WDR
Angle Adjustment	Pan:0° - 355°, Tilt: 0° - 75°, Rotation: 0-355°
Compression Standard	
Video Compression	H.264/ MJPEG
H.264 Type	Main Profile
Video Bit Rate	256 Kbps – 16 Mbps
Dual Stream	Yes
Audio Compression(-S)	G.711/G.722.1/G.726/MP2L2
Audio Bit Rate(-S)	64Kbps(G.711) /16Kbps(G.722.1)/16Kbps(G.726) /32-128Kbps(MP2L2)
Image	
Max. Resolution	2688×1520
Frame Rate	50Hz: 20fps (2688×1520), 25fps(1920×1080), 25fps(1280×720) 60Hz: 20fps (2688×1520), 30fps (1920×1080), 30fps(1280×720)
Image Settings	Rotate mode, Saturation, Brightness, Contrast adjustable by client software or web browser
Backlight compensation	Yes, zone optional
ROI	Support
Network	
Network Storage	Local storage: Built-in Micro SD/SDHC/SDXC card slot, up to 128 GB. NAS (Support NFS,SMB/CIFS)
Alarm Trigger	Intrusion Detection, Line Crossing detection, Motion detection, Dynamic analysis, Tampering alarm, Network disconnect , IP address conflict, Storage exception
Protocols	TCP/IP,ICMP,HTTP,HTTPS,FTP,DHCP,DNS,DDNS,RTP,RTSP,RTCP, PPPoE,NTP,UPnP,SMTP,SNMP,IGMP,802.1X,QoS,IPv6,Bonjour
Security	One-key reset, Flash-prevention, dual stream, heartbeat, mirror, password protection, privacy mask, watermark, IP address filtering, Anonymous access
Standard	ONVIF, PSIA, CGI, ISAPI

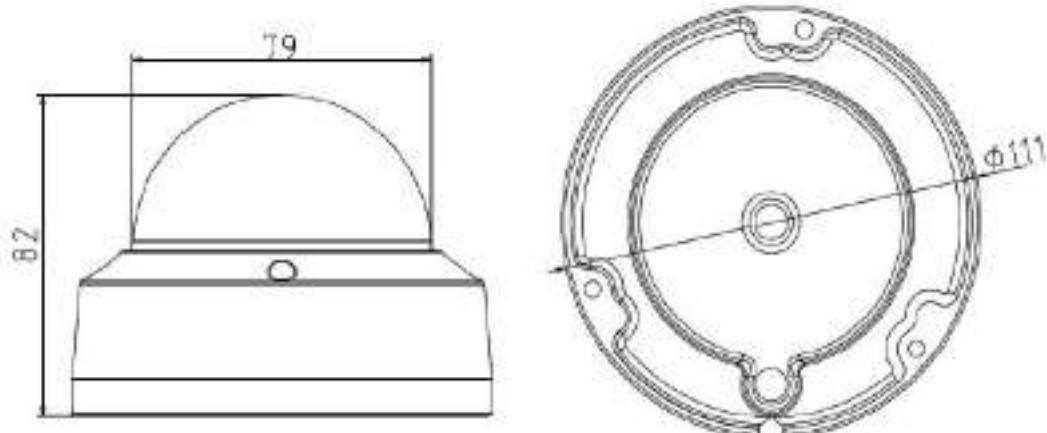
Interface	
Communication Interface	1 RJ45 10M/100M Ethernet interface
Alarm interface	1 alarm I/O (-S)
Audio interface	1 audio I/O (-S)
Wi-Fi Specification (-W)	
Wireless Standards	IEEE802.11b, 802.11g, 802.11n
Frequency Range	2.4 GHz ~ 2.4835 GHz
Channel Bandwidth	20/40MHz Support
Protocols	802.11b: CCK, QPSK, BPSK 802.11g/n: OFDM
Security	64/128-bit WEP, WPA/WPA2, WPA-PSK/WPA2-PSK, WPS
Transmit Output Power	11b: 17±1.5dBm @ 11Mbps 11g: 14±1.5dBm @ 54Mbps 11n: 12.5±1.5dBm
Receive Sensitivity	11b: -90dBm @ 11Mbps (Typical) 11g: -75dBm @ 54Mbps (Typical) 11n: -74dBm (Typical)
Transfer Rates	11b: 11Mbps 11g: 54Mbps 11n: up to 150Mbps
Wireless Range	50m (depend on environment)
Wireless Standards	IEEE802.11b, 802.11g, 802.11n
General	
Operating Conditions	-30 °C – 60 °C (-22 °F – 140 °F) Humidity 95% or less (non-condensing)
Power Supply	12 V DC ± 10% PoE (802.3af)
Power Consumption	Max. 5W
Ingress Protection level	IP66
IR Range	10~30 meters
Impact Protection	IK08
Dimensions	Φ111 × 82 (4.4" × 3.2")
Weight	500g (1.1 lb)

* “-W” series support Wi-Fi (802.11b/g/n) and the modules with Wi-Fi function don’t support the 802.1X protocol.

Order Models

DS-2CD2142FWD-I, DS-2CD2142FWD-IW, DS-2CD2142FWD-IS, DS-2CD2142FWD-IWS

Dimensions



Accessories



Inclined ceiling mount
DS-1259ZJ



Wall mount
DS-1272ZJ-110



Out of Stock

PowerLite 2250U Full HD WUXGA 3LCD Projector

[Contact Us 800.463.7766](#)

Mon-Fri 7am-4pm PT



Image Hot Spots



Media



Features



Product Comparison



The bright WUXGA, Full HD projector with optional wireless networking.

A bright, feature-packed projector, the PowerLite 2250U brings brilliant high-definition performance to nearly any boardroom or conference room, with native WUXGA resolution for displays up to 300", Full HD 1080p support for true-to-life images, and optional wireless networking. Offering high Color Brightness[†], Epson® 3LCD projectors ensure vivid images. With 5,000 lumens of color brightness and 5,000 lumens of white brightness[†], the 2250U shines bright in a variety of lighting conditions. And, it features great contrast for impactful presentations. This powerhouse projector also includes enterprise-level wireless security (module sold separately) for added peace of mind when using the optional wireless networking.

Projection System: High-aperture Epson 3LCD, 3-chip technology

Native Resolution: WUXGA resolution (1920 x 1200)

Color Brightness: 5000 lumens[†]

White Brightness: 5000 lumens[†]

Throw Distance Calculator

Model: V11H871020

OUR PRICE :

\$1,228.00

3.7 (6) [Write a review](#)

Overview

**Bright and Colorful**

Features 5000 lumens of color brightness (color light output)¹ and 5000 lumens of white brightness (white light output).¹

Speaker Included

Includes a built-in speaker to amplify the audio of the presentation

HDMI / MHL Connectivity

Stream 1080p content and mirror your mobile device with MHL & the latest in connectivity. Get instant access to movies, games and more from MHL-enabled devices.

**Auto Screen Fit**

Easily and quickly adjust the image to fit the screen.

WUXGA Resolution

1920 x 1200 Full HD widescreen resolution

- **Far more accurate color with Epson** — 3LCD, 3-chip technology for high Color Brightness¹ and wide Color Gamut²
- **Look for two numbers** —
 - 5,000 lumens¹ Color Brightness for more accurate, vivid color
 - 5,000 lumens² White Brightness for well-lit rooms
- **Bright, widescreen images up to 300"** — WUXGA resolution (1920 x 1200); Full HD 1080p support
- **Remarkable sharpness and detail** — 15,000:1 contrast ratio; added clarity when displaying text and graphics
- **Optional wireless networking** — optional module required; enterprise-level security for peace of mind; compatible with WEP, WPA, WPA2-PSK and WPA2-EAP security protocols
- **Split Screen**³ — simultaneously project two images (video or still) side-by-side from two different sources
- **Long-lasting lamp** — up to 10,000 hours in ECO Mode⁴
- **Remote management and control tools** — included software allows for remote monitoring and control of Epson networked projectors; also compatible with Crestron® RoomView®
- **Versatile in every way** — small enough for travel; features a full array of connectivity options, including 2x HDMI®, MHL®, VGA, RJ-45 and more

IMPORTANT SAFETY INFORMATION ABOUT USAGE ENVIRONMENTS FOR MOUNTED PROJECTORS ►



Optional wireless networking

Optional module required; enterprise-level security;
compatible with WEP, WPA, WPA2-PSK and WPA2-EAP.



Product Comparison



**POWERLITE
2250U**



**POWERLITE
2247U**



3-Chip, 3LCD Technology	✓	✓
Color Brightness	5,000 Lumens	4,200 Lumens
White Brightness	5,000 Lumens	4,200 Lumens
Native Resolution	WUXGA (1920 x 1200) Full HD 1080p Support	WUXGA (1920 x 1200) Full HD 1080p Support
Contrast Ratio	15,000:1	15,000:1
Wireless	Optional Module Sold Separately	✓
HDMI	✓	✓
Keystone Correction	Automatic Vertical and Horizontal	Automatic Vertical and Horizontal
Remote Management and Control	✓	✓
Lamp Life	Up to 10,000 hours in ECO Mode	Up to 12,000 hours in ECO Mode

¹ ECO Mode is up to 10,000 hours. Normal Mode is up to 5,000 hours. Lamp life will vary depending upon mode selected, environmental conditions and usage. Lamp brightness decreases over time.

Specifications

Specifications Projector:

Projection System:
3LCD, 3-chip technology

Projection Method:
Front/rear/ceiling mount

Driving Method:
Poly-silicon TFT Active Matrix

Pixel Number:
2,304,000 dots (1920 x 1200) x 3

Color Brightness - Color Light Output:
5,000 lumens

White Brightness - White Light Output:
5,000 lumens

Aspect Ratio:
16:10

Resolution:
1920 x 1200 (WUXGA)

Supported Resolution:
1920 x 1080 (1080p)

Resize:
640 x 480, 800 x 600, 1280 x 1024, 1400 x 1050

Lamp Type:
300 W UHE

Lamp Life:
Up to 10,000 hours (ECO Mode), Up to 5,000 hours (Normal Mode)

Throw Ratio Range:
1.38 (Zoom: Wide), 2.28 (Zoom: Tele)

Size - projected distance:
50" – 300" (1.46 m – 8.95 m) (Zoom: Wide)

Keystone Correction:

Vertical: ± 30 degrees, Horizontal: ± 20 degrees

USB Plug 'n Play:

Projector is compatible with PC and Mac® computers

Contrast Ratio:

Up to 15,000:1

Color Reproduction:

Up to 1.07 billion colors

General:**Operating Temperature:**

41 ° to 95 °F (5 ° to 35 °C)

**Weight:**

10.2 lb(4.6 kg)

Security:

Kensington-style lock provision

Projection Lens:**Type:**

Optical Zoom (Manual)/Focus (Manual)

F-number:

1.5 – 2.0

Focal Length:

23.0 – 38.4 mm

Zoom Ratio:

1.0 – 1.6

Projector Details:**Input Signal:**

Auto, RGB, and Component

Interfaces:

- 2x HDMI® (1 in common with MHL®)
- Computer: 1x D-sub 15 pin
- Video: 1x RCA
- Audio-in: 3x Mini stereo
- Audio-in: 1x RCA (L & R)
- Network: 1x RJ-45, 100
- Mbps Serial: 1x RS-232c
- Monitor Out: 1x D-sub 15 pin

Speaker:

16 W (mono)

Fan Noise:

39 dB (Normal Mode), 29 dB (ECO Mode)

Projector Dimensions:**Including feet:**

14.85" x 11.48" x 4.93" (W x D x H)

Excluding feet:

14.85" x 11.46" x 4.33" (W x D x H)

Remote Control:**Features:**

Brightness, Contrast, Tint, Saturation, Sharpness, Input signal, Sync, Tracking, Position, Color temperature, Volume

Operating Distance:

26.2 ft (8 m)

Operating Angle:

Right/left: ± 45 degrees, Upper/lower: +45 to -15 degrees

Power:**Power Supply Voltage:**

100 – 240 V AC ±10%, 50/60 Hz

Power Consumption:

- 429 W (Normal Mode)
- 340 W (ECO Mode)
- 2.0 W Standby (Communication On)
- 0.21 W Standby (Communication Off)

Service Plans**Service Plans:**

We know protecting your investment is important. Epson Preferred Plus Extended Service Plans offer peace of mind beyond the device's limited warranty and help keep you up and running — because we understand there's simply no time for downtime.

	SKU	Price
3-Year Next Business Day Whole Exchange - Extended Service Plan	EPPEXPB3	\$389.00
2-Year Exchange - Extended Service Plan	EPPEXPB2	\$279.00
1-Year Exchange - Extended Service Plan	EPPEXPB1	\$199.00

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HP LaserJet Pro MFP M428 series

The HP LaserJet Pro MFP M428—focus your time growing your business and staying ahead.

Winning in business means working smarter. The HP LaserJet Pro MFP M428 is designed to let you focus your time where it's most effective—growing your business and staying ahead of the competition.



HP LaserJet Pro MFP M428fdn



HP LaserJet Pro MFP M428fdw

Built to keep you—and your business—moving forward

- Scan files directly to Microsoft® SharePoint, email, USB, and network folders.¹
- Help save time by automating all the steps in a complicated workflow and use at a touch of a button.²
- Print wirelessly even without the network, stay connected with dual band Wi-Fi and Wi-Fi direct.³⁴⁵
- Print effortlessly from any device, virtually anywhere, to any HP printer—securely through the cloud.⁶

Best-in-class security- detect and stop attacks⁷

- A suite of embedded security features help protect your MFP from being an entry point for attacks.⁷
- Help ensure the security of confidential information with optional PIN/Pull printing to retrieve print jobs⁸
- Optional HP JetAdvantage Security Manager lets you set configuration
- Thwart potential attacks and take immediate action with instant notification of possible security issues.¹²

Simply designed to uncomplicate your day

- Set up this MFP fast, and easily manage device settings to help increase overall printing efficiency.
- Tackle tasks quickly and easily—with the simple 2.7" (6.8cm) color touchscreen.
- Print Microsoft office formatted files in addition to pdfs right off your USB drive.⁹
- Avoid interruptions with an HP LaserJet MFP designed to be streamlined for maximum productivity.

Sustainability is smart business

- Avoid frustrating reprints, wasted supplies, and service calls using Original HP toner cartridges
- Help save paper right out of the box. The duplex print setting is set at default paper savings mode.¹⁰
- Saves up to 22% over prior products.¹¹
- Help save energy with HP Auto-on/Auto-off technology.¹³

Product walkaround



Series at a glance

HP LaserJet Pro M428fdw



Model (product number)	M428fdn (W1A29A)	M428fdw (W1A30A)
Functions	Print, copy, scan, fax (<i>both models</i>)	
Print speed (A4) ⁵	Up to 38 pages per minute (ppm); 2-sided: Up to 31 ppm (<i>both models</i>)	
Scan speed (A4) ⁶	Simplex: Up to 29 ppm (black); up to 20 ppm (colour) Duplex: Up to 49 images per minute (ipm) (black); up to 36 ipm (colour)	
Scanning	50-sheet ADF with single-pass, two-sided scanning (<i>both models</i>)	
Automatic two-sided printing	✓	✓
Control panel display	6.9 cm (2.7-inch) colour touchscreen (<i>both models</i>)	
100-sheet multipurpose tray 1, 250-sheet tray 2	✓	✓
Optional 550-sheet tray 3	Add up to one (<i>both models</i>)	
Input capacity (standard/maximum) ⁷	Up to 350/900 sheets (<i>both models</i>)	
Recommended monthly page volume ⁸	Up to 4,000 pages (<i>both models</i>)	
Cartridge yields ⁹ (A/X)	Black: 3,000/10,000 pages (<i>both models</i>)	
Dual-band Wi-Fi with Bluetooth Low Energy ^{1,2}	Not available	✓

¹ Wireless operations are compatible with 2.4 GHz and 5.0 GHz operations only. Learn more at hp.com/go/mobileprinting. Wi-Fi is a registered trademark of Wi-Fi Alliance®.² Bluetooth® is a trademark owned by its proprietor and used by HP Inc. under license. Learn more at hp.com/go/mobileprinting.³ An administrator must enable the easy-access USB port before use.⁴ Requires purchase of separate USB flash drive with at least 16 GB capacity.⁵ Measured using ISO/IEC 24734, excludes first set of test documents. For more information, see hp.com/go/printercclaims. Exact speed varies depending on the system configuration, software application, driver, and document complexity.⁶ Scan speeds measured from ADF. Actual processing speeds may vary depending on scan resolution, network conditions, computer performance, and application software.⁷ Selection of optional 550-sheet tray 3 required to reach maximum input capacity.⁸ Recommended Monthly Page Volume (RMPV): HP recommends that the number of printed pages per month be within the stated range for optimum device performance, based on factors including supplies replacement intervals and device life over an extended warranty period.⁹ Actual yields vary considerably based on images printed and other factors. For details visit hp.com/go/learnaboutsupplies. Pages may vary based on customer printing conditions and usage.

HP Services

Downtime can have serious consequences, so HP provides support beyond the standard warranty. You benefit from reduced risk, maximized uptime, predictable service delivery and no unbudgeted repair costs.

Choose from:

Optimized Care (optimum performance and stability):

4 hour Onsite Support, Maintenance Kit Replacement Service, Installation with Network Configuration Service

Standard Care (high level of uptime):

Next Business Day Onsite Support, Maintenance Kit Replacement Service, Installation with Network Configuration Service

Basic Care (minimum recommended support):

Next Business Day Onsite Support

4 hour Onsite Support:

Onsite support within four hours after a service call received within the coverage window

Next Business Day Onsite Support:

Onsite service the next business day after the service call is received

Maintenance Kit Replacement Service:

Onsite replacement of your printer's maintenance kit including parts, materials, and labor

Installation with Network Configuration Service:

Assembly, network configuration, and basic administrator familiarization. For more information about HP Care Pack, HP Contractual, or HP Managed Print Services, visit hp.com/go/printservices



HP Care Pack

Top features

Today's businesses are always on, and always connected. Choose an MFP that can keep up with how you actually work, collaborate, and get things done.

HP Print Security isn't just about securing printers. It's about helping to secure your network with real-time threat detection, automated monitoring, and software validation—designed to detect and stop an attack as it happens.⁷

You have enough to worry about each day. It's easy to accomplish what you need—and exceed your own expectations—with a streamlined MFP that's made for simple use.

Business is all about resource management, and finding efficiencies is everyone's responsibility. HP LaserJet MFPs are designed with the environment in mind, so you can handle what you need while conserving energy wherever possible

Product

W1A29A	HP LaserJet Pro MFP M428fdn
W1A30A	HP LaserJet Pro MFP M428fdw

Accessories

D9P29A	HP LaserJet Pro 550-sheet Feeder Tray
POR81AA	HP v222w 16GB Mini USB Drive

Supplies

CF276A	HP 76A Black Original LaserJet Toner Cartridge (3,000 pages)
CF276X	HP 76X High Yield Black Original LaserJet Toner Cartridge (10,000 pages)

HP Care Packs

UB9R7E	HP 3 year Next Business Day Service for LaserJet Pro MFP M428
UB9R8E	HP 4 year Next Business Day Service for LaserJet Pro MFP M428
UB9R9E	HP 5 year Next Business Day Service for LaserJet Pro MFP M428
UCOR2E	HP 3 year 4 hour 9x5 Service for LaserJet Pro MFP M428
UCOR3E	HP 4 year 4 hour 9x5 Service for LaserJet Pro MFP M428
UCOR4E	HP 5 year 4 hour 9x5 Service for LaserJet Pro MFP M428
UB9S0E	HP 3 year Next Business Day Exchange Service for LaserJet Pro MFP M428
UB9S1E	HP 3 year Return to Depot Service for LaserJet Pro MFP M428
UB9S2PE	HP 1 year Post Warranty Next Business Day Service for LaserJet Pro MFP M428
UCOR5PE	HP 1 year Post Warranty 4 hour 9x5 Service for LaserJet Pro MFP M428
UB9S4PE	HP 1 year Post Warranty Next Business Day Exchange Service for LaserJet Pro MFP M428
UB9S5PE	HP 1 year Post Warranty Return to Depot Service for LaserJet Pro MFP M428

Protect your investment with HP Care Pack. Let HP certified engineers resolve your technical issues. For more details on HP Care Pack, go to hp.com/go/cpc

Paper

Contact HP via phone: Asia: 65 6253 8500

Solutions

HP Web Jetadmin: hp.com/go/wja

HP Universal Print Driver: hp.com/go/upd

HP Imaging and Printing Security Center: hp.com/go/ipsc

HP LaserJet Pro MFP M428 series

Model	HP LaserJet Pro MFP M428fdn	HP LaserJet Pro MFP M428fdw
Product number	W1A29A	W1A30A
Functions	Print, Copy, Scan, Fax, Email	
Print		
Duplex print options	Automatic (default)	
Print speed ⁸	Black (A4, normal): Up to 38 ppm; Black (letter, normal): Up to 40 ppm; Black (A4, duplex): Up to 31 ipm; Black (letter, duplex): Up to 33 ipm	
First page out ¹⁰	Black (A4, ready): As fast as 6.3 sec; Black (A4, sleep): As fast as 8.8 sec	
Print technology	Laser	
Print resolution	Black (best) Fine Lines (1200 x 1200 dpi); Black (normal) Normal (native 600 x 600 dpi; enhanced up to 4800 x 600 dpi); Black (fine lines) Fine Lines (1200 x 1200 dpi)	
Print resolution technology	HP FastRes 1200, HP ProRes1200, Economode	
Print cartridges number	1 (black)	
Standard print languages	HP PCL 6, HP PCL 5c, HP postscript level 3 emulation, PDF, URF, Native Office, PWG Raster	
Printer management	HP Printer Assistant, HP Utility (Mac), HP Device Toolbox, HP Web JetAdmin Software, HP JetAdvantage Security Manager, HP SNMP Proxy Agent, HP WS Pro Proxy Agent, Printer Administrator Resource Kit for HP Universal Print Driver (Driver Configuration Utility - Driver Deployment Utility - Managed Printing Administrator)	
Scan		
Scan technology	Type: Flatbed, ADF; Technology: Contact Image Sensor (CIS)	
Scan speed ¹⁴	Normal (A4): Up to 29 ppm/46 ipm (b&w), up to 20 ppm/34 ipm (color)	
Scan resolution	Enhanced: Up to 1200 x 1200 dpi; Hardware: Flatbed (Up to 1200 x 1200 dpi); ADF (Up to 300 x 300 dpi); Optical: Up to 1200 x 1200 dpi	
Digital sending standard features	Scan to email with LDAP email address lookup, Scan to network folder, Scan to USB, Scan to Microsoft SharePoint®, Scan to computer with software, Fax archive to network folder, Fax archive to email, Fax to computer, Enable/disable fax, Quick Sets	
Color scanning	Yes	
Scan Size	Flatbed: 216 x 297 mm; ADF: 216 x 356 mm	
Scan input modes	Front-panel scan, copy, email, or file buttons; HP Scan software; and user application via TWAIN or WIA	
Scan file format	PDF, JPG, TIFF	
Copy		
Copier smart software features	Instant-on copy; Duplex copy (2-sided to 2-sided option of "book-style" or "flip style"); up to 999 multiple copies; Scan once print many; Collation; Reduce/enlarge from 25 to 400% (custom page size presets, binding margin, and two pages to one page); Fit to page; Brightness (lighter/darker); Quality (draft/normal/best); ID copy; Enhancements (optimize for content with presets: none, text, photo, mixed); Copy preview (scan glass only)	
First copy out	Black (A4): As fast as 7.2 sec; Black (A4, sleep): As fast as 9.5 sec; Black (letter): As fast as 6.8 sec; Black (letter, sleep): As fast as 9.1 sec	
Copy resolution	Color (text and graphics): Up to 600 x 600 dpi	
Max no of copies	Up to 999 copies	
Copier resize	25 to 400%	
Copier settings	ID Copy; Number of copies; Resize (including 2-Up); Lighter/Darker; Enhancements; Original Size; Binding Margin; Collation; Tray Selection; Two-Sided; Quality (Draft/Normal/Best); Save Current Settings; Restore Factory Defaults	
Fax		
Fax speed	33.6 kbps / 3 sec per page	
Fax memory	Fax memory (A4): Up to 400 pages; Fax memory (letter): Up to 400 pages	
Fax resolution	Black (best): Up to 300 x 300 dpi (halftone enabled); Black (standard): 203 x 98 dpi; Black and white (fine): Up to 203 x 196 dpi; Black photo grayscale: 300 x 300 dpi (halftone)	
Fax Features	Auto fax reduction supported: Yes; Auto-redialing: Yes; Fax delayed sending: Yes; Distinctive ring detection supported: Yes; Fax forwarding supported: Yes; Junk barrier supported: Yes, CSID matching only (Caller ID not supported); Maximum speed dialing numbers: Up to 120 numbers; PC interface supported: Yes, only for sending; Fax polling supported: Yes (receive only)	
Fax smart software features	Permanent fax memory backup; Auto fax reduction; Auto redialing; Delayed sending; Fax forwarding; TAM interface; Junk barrier; Distinctive ring detection; Cover page; Block fax; Billing codes; Save and load; Fax activity reports; Dial prefix setting; Print fax log; HP Digital Fax	
Connectivity		
Standard connectivity	1 Hi-Speed USB 2.0; 1 rear host USB; 1 Front USB port; Gigabit Ethernet LAN 10/100/1000BASE-T network	1 Hi-Speed USB 2.0; 1 rear host USB; 1 Front USB port; Gigabit Ethernet LAN 10/100/1000BASE-T network; 802.11b/g/n / 2.4 / 5 GHz Wi-Fi radio
Mobile printing capability ⁵	HP Smart App; Apple AirPrint™; Google Cloud Print™; HP ePrint; Mobile Apps; Mopria™ Certified; Roam capable for easy printing	Apple AirPrint™; Google Cloud Print™; HP ePrint; HP Smart App; Mobile Apps; Mopria™ Certified; Roam capable for easy printing; Wi-Fi® Direct Printing
Wireless capability	No	Yes, built-in dual-band Wi-Fi; Authentication via WEP, WPA/WPA2, WPA Enterprise; Encryption via AES or TKIP; WPS; Wi-Fi Direct; Bluetooth Low-Energy
Network capabilities	Yes, via built-in 10/100/1000Base-TX Ethernet, Gigabit; Auto-crossover Ethernet; Authentication via 802.1X	
Memory	Standard: 512 MB; Maximum: 512 MB	
Hard disk	No	
Processor speed	1200 MHz	
Duty cycle (monthly) ¹¹	Up to 80,000 pages; Recommended monthly page volume¹²: 750 to 4000	
Paper handling		
Input	100-sheet tray 1, 250-sheet input tray 2; 50-sheet Automatic Document Feeder (ADF)	
Output	150-sheet output bin	
Media types	Paper (plain, EcoEFFICIENT, light, heavy, bond, colored, letterhead, preprinted, prepunched, recycled, rough); envelopes; labels;	
Media weight	Tray 1: 60 to 175 g/m ² ; tray 2, optional 550-sheet tray 3: 60 to 120 g/m ²	
Media Sizes Custom	Tray 1: 76.2 x 127 to 215.9 x 355.6 mm; Tray 2, 3: 104.9 x 148.59 to 215.9 x 355.6 mm	
Dimensions (w x d x h) ¹	420 x 390 x 323 mm	
Weight	12.6 kg	
What's in the box	HP LaserJet Pro M428fdn; Preinstalled HP Black LaserJet Toner Cartridge (59A for EMEA, 58A for AMS, 76A for AP, yield ~3,000 pages); Getting Started Guide; Support Flyer; Warranty Guide; Regulatory Flyer; Power cord; Phone cord; USB cable (AP Only). HP printer software is available at http://www.hp.com/support	HP LaserJet Pro M428fdw; Preinstalled HP Black LaserJet Toner Cartridge (59A for EMEA, 58A for AMS, 76A for AP, yield ~3,000 pages); Getting Started Guide; Support Flyer; Warranty Guide; Regulatory Flyer; Power cord; Phone cord; USB cable. HP printer software is available at http://www.hp.com/support
Software included	No software solutions are included in the Box, Download software at http://123.hp.com/laserjet or http://hp.com	
Warranty features	One-year Bench/Depot Repair warranty. Warranty and support options vary by product, country and local legal requirements. Contact your Contractual Vendor or go to hp.com/support to learn about HP award winning service and support options in your region. (wty code 4E; wty ID A033)	
Systems		
Compatible operating systems	Windows Client OS (32/64 bit), Win10, Win8.1, Win 8 Basic, Win8 Pro, Win8 Enterprise, Win8 Enterprise N, Win7 Starter Edition SP1, UPD Win7 Ultimate, Mobile OS, iOS, Android, Mac, Apple® macOS Sierra v10.12, Apple® macOS High Sierra v10.13, Apple® macOS Mojave v10.14, Discrete PCL6 Printer Driver, For more information on the supported operating systems go to http://support.hp.com , Enter your product name and search, Click on User Guides and enter your product name and search for User Guide, Search for your (Product Name) - User Guide, Search for the Supported Operating Systems section, UPD PCL6 / PS Printer Drivers, Supported Operating systems, For more information on the supported operating systems see http://www.hp.com/go/upd	
Minimum system requirements	PC: 2 GB available hard disk space, Internet connection, USB port, Internet browser. For additional OS hardware requirements see http://microsoft.com ; Mac: 2 GB available hard drive space, Internet connection or USB port, OS hardware requirements see apple.com ;	Secure Boot, secure firmware integrity, runtime code integrity, password protect EWS, secure browsing via SSL/TLS 1.0, TLS 1.1, TLS 1.2; IPP over TLS; Network: enable/disable network ports and features, unused protocol and service disablement, SNMPv1, SNMPv2, and SNMPv3, community password change; HP ePrint: HTTPS with certificate validation, HTTP Basic Access Authentication, SASL authentication; LDAP authentication and authorization; Firewall and ACL; control panel lock, certificates configuration, UPD PIN printing, Syslog, signed firmware, administrator settings, access control, 802.1x authentication (EAP-TLS, and PEAP); Encrypted data storage; Secure data erase; Automatic firmware updates; Secure Encrypted Print via optional job storage, compatible with optional HP JetAdvantage Security Manager
Security management		
Fonts and typefaces	84 scalable TrueType fonts	
Control panel	2.7" Color Touchscreen	
Display	2.7" (6.86 cm) intuitive color touchscreen (CGD)	
Energy efficiency compliance	CECP; ENERGY STAR® qualified; EPEAT® Silver ¹⁶	
ENERGY STAR Qualified	Yes	

Power	Power supply type: Internal (Built-in) power supply; Power supply required: 110-volt input voltage: 110 to 127 VAC (+/- 10%), 50/60 Hz (+/- 2 Hz); 220-volt input voltage: 220 to 240 VAC (+/- 10%), 50/60 Hz (+/- 2 Hz) (Not dual voltage, product varies by part number with # Option code identifier); Power consumption ² : 510 watts (active printing), 7.5 watts (ready), 0.9 watts (sleep), 0.9 watts (Auto Off/Wake on LAN, enabled at shipment), 0.06 watts (Auto-off/Manual-on), 0.06 (Manual Off); Typical Electricity Consumption number ¹⁸ : BA: 1.144 kWh/week, ES: 1.247 kWh/week
Acoustics	Acoustic power emissions ⁷ : 6.7 Bel(A) (Printing at 38 ppm) ; Acoustic power emissions (ready): Inaudible ; Acoustic pressure emissions bystander (active, printing): 53 dB(A) ; Acoustic pressure emissions bystander (ready) : Inaudible
Environmental ranges	Operating temperature range: 10 to 32.5°C ; Recommended operating temperature: 15 to 27°C ; Operating humidity range: 10 to 80% RH (non-condensing) ; Recommended operating humidity range: 30 to 70% RH
Safety approvals and requirements	IEC 60950-1:2005 +A1:2009+A2:2013/EN 60950-1:2006 +A11:2009+A1:2010+A12:2011+A2:2013; IEC 60825-1:2014/EN 60825-1:2014 (Class 1 Laser/LED Product); IEC 62479:2010/EN 62479:2010;
Supported network protocols	TCP/IP, IPv4, IPv6; Print: TCP-IP port 9100 Direct Mode, LPD (raw queue support only), Web Services Printing, HP ePrint, Apple AirPrint™, Google Cloud Print 2.0, Mopria, IPP Print; Discovery: SLP, Bonjour, Web Services Discovery; IP Config: IPv4 (BootP, DHCP, AutoIP, Manual), IPv6 (Stateless Link-Local and via Router, Stateful via DHCPv6), SSL Security and Certificate management; Management: SNMPv1, SNMPv2, SNMPv3, HTTP/HTTPS, Syslog, FTP FW Download

Footnotes

¹ Requires an Internet connection to the printer. Services may require registration. App availability varies by country, language, and agreements. For details, see <http://hpconnected.com>.

² Connect printer/MFP to the network and complete customization through the Embedded Web Server.

³ Wireless operations are compatible with 2.4 GHz and 5 GHz operations. App or software and HP ePrint account registration may also be required. Some features require purchase of an optional accessory. Learn more at <http://hp.com/go/mobileprinting>.

⁴ Feature only supported on the HP LaserJet Pro MFP M428dw and M428fdw. Wireless performance is dependent on physical environment and distance from access point, and may be limited during active VPN connections.

⁵ Feature is supported on the HP LaserJet Pro Mfp M428dw and M428fdw only. Mobile device needs to be connected directly to the WiFi network of a wireless direct-capable MFP or printer prior to printing. Depending on mobile device, an app or driver may also be required. Learn more at <http://hp.com/go/businessmobileprinting>.

⁶ To enable HP Roam, some devices may require firmware to be upgraded and an optional accessory to add Bluetooth® Low Energy (BLE) beaconing capabilities. Subscription or accessory may be required. For more information, visit <http://hp.com/go/roam>

⁷ Based on HP review of 2019 published security features of competitive in-class printers. Only HP offers a combination of security features that can monitor to detect and automatically stop an attack then self-validate software integrity in a reboot. For a list of printers, visit <http://hp.com/go/PrintersThatProtect>. For more information: <http://hp.com/go/printersecurityclaims>

⁸ Pin printing enabled via USB installed in rear of device.

⁹ Microsoft and PowerPoint are U.S. registered trademarks of the Microsoft group of companies. Feature works with Microsoft Word and PowerPoint 2003 and later. Only Latin language fonts are supported.

¹⁰ All new product introductions beginning in Fall 2019 will include consistent worldwide default duplex settings (across bundles/drivers); Spring 2019 will include consistent worldwide default duplex settings for most products across the most common drivers.

¹¹ Based on HP Internal testing using normalized TEC Value, 2019.

¹² Instant threat notifications can appear on the device control panel when a potential threat occurs from malicious intent or there is a bug or vulnerability in the firmware code of the device. If this error raises concern, please contact your company IT representative or, if unavailable, HP Support, who can investigate the cause through analysis of device syslog data using a standard SIEM tool from McAfee, Splunk, Arcsight or SIEMonster. The control panel error message may show an error code on a blue screen during code signature checks or memory write intrusions.

¹³ HP Auto-On/Auto-Off Technology capabilities subject to printer and settings; may require a firmware upgrade.

Technical specifications disclaimers

¹ Without trays and covers not extended.

² Power requirements are based on the country/region where the printer is sold. Do not convert operating voltages. This will damage the printer and void the product warranty. Power consumption values typically based on measurement of 115 V device.

³ Toner cartridges designed for distribution and use within a designated region only; will not work outside of designated region.

⁴ Declared yield value in accordance with ISO/IEC 19752. Actual yields vary considerably based on images printed and other factors. For more information, visit <http://www.hp.com/go/learnaboutsupplies>

⁵ Local printing requires mobile device and printer to be on the same network (usually Wi-Fi access points bridge wireless to wired connections) or have a direct wireless connection. Wireless performance is dependent on physical environment and distance from access point. Remote printing requires an Internet connection to an HP web-connected printer. Wireless broadband use requires separately purchased service contract for mobile devices. Check with service provider for coverage and availability in your area. For more information visit <http://hp.com/go/mobileprinting>. To enable HP Roam, some devices may require firmware to be upgraded and an optional accessory to add Bluetooth® Low Energy (BLE) beaconing capabilities. Subscription may be required. For more information, visit <http://hp.com/go/roam>

⁶ First Copy Out from Ready and Simplex Copy Speed measured using ISO/IEC 29183, Duplex Copy Speed measured using ISO/IEC 24735, excludes first set of test documents. For more information see <http://www.hp.com/go/printerclaims>. Exact speed varies depending on the system configuration, software application and document complexity.

⁷ Acoustic values are subject to change. For current information see <http://www.hp.com/support>. Configuration tested: base model, simplex printing, A4 paper at an average of 38 ppm.

⁸ Measured using ISO/IEC 24734, excludes first set of test documents. For more information see <http://www.hp.com/go/printerclaims>. Exact speed varies depending on the system configuration, software application, driver, and document complexity.

⁹ Measured using ISO 24734 Feature Test, A5 Landscape Feed. Speed may vary based on content, PC, media orientation, and media type.

¹⁰ Measured using ISO/IEC 17629. For more information see <http://www.hp.com/go/printerclaims>. Exact speed varies depending on the system configuration, software application, driver, and document complexity.

¹¹ Duty cycle is defined as the maximum number of pages per month of imaged output. This value provides a comparison of product robustness in relation to other HP LaserJet or HP Color LaserJet devices, and enables appropriate deployment of printers and MFPs to satisfy the demands of connected individuals or groups.

¹² HP recommends that the number of pages per month of imaged output be within the stated range for optimum device performance, based on factors including supplies replacement intervals and device life over an extended warranty period.

¹³ HP SureSupply alerts you when your print cartridge is running low and helps you purchase online or locally through HP or a participating retailer. For more information, visit <http://www.hp.com/go/SureSupply>; only available with Original HP supplies; Internet access required.

¹⁴ Scan speeds measured from ADF. Actual processing speeds may vary depending on scan resolution, network conditions, computer performance, and application software.

To learn more, visit <http://www.hp.com>

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Xerox® VersaLink® C7120/C7125/C7130



Color Multifunction Printer



Xerox® VersaLink® C7100 Series Color Multifunction Printers are built on Xerox® ConnectKey® Technology. For more information, go to www.connectkey.com.

System Specifications	VersaLink® C7120	VersaLink® C7125	VersaLink® C7130
One-sided Speed¹			
8.5 x 11 in./A4/210 x 297 mm	Up to 20 ppm (pages per minute) long edge feed (LEF)	Up to 25 ppm LEF	Up to 30 ppm LEF
8.5 x 14 in./216 x 356 mm	Up to 13 ppm	Up to 16 ppm	Up to 20 ppm
11 x 17 in./A3/297 x 420 mm	Up to 11 ppm	Up to 14 ppm	Up to 17 ppm
Two-sided Speed¹			
8.5 x 11 in./A4/210 x 297 mm	Up to 20 ppm LEF	Up to 25 ppm LEF	Up to 30 ppm LEF
8.5 x 14 in./216 x 356 mm	Up to 9 ppm	Up to 10 ppm	Up to 12 ppm
11 x 17 in./A3/297 x 420 mm	Up to 8 ppm	Up to 9 ppm	Up to 11 ppm
Monthly Duty Cycle²	Up to 87,000 pages/month ²	Up to 107,000 pages/month ²	Up to 129,000 pages/month ²
Recommended Average Monthly Print Volume³	Up to 5,500 pages	Up to 6,250 pages	Up to 7,000 pages
Hard Drive	320 GB HDD (Optional on Desktop/Base Unit)		
Processor	1.05 GHz Dual-Core		
Memory	4 GB		
Connectivity	Ethernet 10/100/1000 Base-T, High-speed USB 3.0, Wi-Fi 802.11n/g/b/a, Wi-Fi Direct, and Bluetooth (iBeacon) with optional Wi-Fi Kit (concurrent wired and wireless connections supported), NFC Tap-to-Pair		
Controller Features	Embedded Security and Integrity Control, TLS1.3 Support, NIST800-171r1 Compliance Print on Available Media, Mopria, Remote Install Wizard - Secure Fax Remote Enable/Disable, Air Print		
User Interface Languages	English, French, Italian, German, Spanish, Brazilian Portuguese, Russian, Dutch, Swedish, Danish, Finnish, Norwegian, Greek, Turkish, Polish, Arabic, Czech, Hungarian, Romanian, Catalan, Ukrainian, Croatian		

Xerox® VersaLink® C7120/C7125/C7130 Color Multifunction Printer

Device Specifications				
Electrical Requirements				
North America	Voltage: 110-127 V -10%/+6% Frequency: 50/60 Hz +/-3%, 12A			
Europe and Other Geographies	Voltage: 220-240 V +/-10% Frequency: 50 Hz +/-3%, 8A			
Power Consumption				
Printing⁴	For 110 V and 220 V: 20 ppm = 0.3 kWh or less; 25 ppm = 0.4 kWh or less; 30 ppm = 0.52 kWh or less			
Standby Mode⁴	94 watts or less			
Sleep Mode⁴	0.4 watts or less			
Operating Environment				
Required Temperature Range (Storage)	32 to 95°F (0 to 35°C)			
Required Temperature Range (Operating)	50 to 90°F (10 to 32°C)			
Required Relative Humidity	10% to 85%			
Sound Power Levels	Printing: 6.9 B(A) or less <ul style="list-style-type: none"> • 20 ppm = 6.45 B(A); 25 ppm = 6.50 B(A); 30 ppm = 6.9 B(A) Standby: 4.10 B(A) or less <ul style="list-style-type: none"> • 20 ppm = 4.10 B(A); 25 ppm = 4.10 B(A); 30 ppm = 4.10 B(A) Full System (including Finisher and HCF) Printing: 20 ppm = 7.15 B(A); 25 ppm = 7.18 B(A); 30 ppm = 7.35 B(A) Standby: 20 ppm = 4.10 B(A); 25 ppm = 4.10 B(A); 30 ppm = 4.10 B(A)			
Boot Time (from Off to UI Ready)	As fast as 60 seconds			
Warm-up Time (from Sleep to UI Ready)	As fast as 12 seconds			
Dimensions and Weight (Unpackaged)	Width	Depth	Height	Weight
Base Unit (Desktop Model)	23.23 in./590 mm	26.41 in./670.8 mm	30.18 in./766.5 mm	137.9 lbs./62.5 kg
Base Unit with Single Tray with Stand Module	24.24 in./615.7 mm	26.41 in./670.8 mm	44.04 in./1117.2 mm	196 lbs./88.9 kg
Base Unit with High Capacity Tandem Tray Module	24.24 in./615.7 mm	26.41 in./670.8 mm	44.04 in./1117.2 mm	220.5 lbs./100 kg
Base Unit with Three Tray Module	24.24 in./615.7 mm	26.41 in./670.8 mm	44.04 in./1117.2 mm	200.4 lbs./90.9 kg
Base Unit with Three Tray Module and Office Finisher (with Booklet Maker)	44.69 in./1135.2 mm	26.71 in./678.6 mm	44.04 in./1117.2 mm	277.5 lbs./125.9 kg
Base Unit with Three Tray Module and Integrated Office Finisher	25.98 in./659.9 mm	26.41 in./670.8 mm	44.04 in./1117.2 mm	224.9 lbs./102 kg
Base Unit with Three Tray Module, Office Finisher, Booklet Maker, and High Capacity Feeder	57.1 in./1451.4 mm	26.71 in./678.6 mm	44.04 in./1117.2 mm	346 lbs./156.9 kg
Base Unit with High Capacity Tandem Tray Module and Integrated Office Finisher	26.3 in./668.0 mm	26.41 in./670.8 mm	44.04 in./1117.2 mm	244.9 lbs./111.1 kg
Base Unit with High Capacity Tandem Tray Module, Office Finisher, Booklet Maker, and High Capacity Feeder	57.1 in./1451.4 mm	26.71 in./678.6 mm	44.04 in./1117.2 mm	366 lbs./166 kg
Certifications				
To view the latest list of certifications, go to www.xerox.com/OfficeCertifications .				

Xerox® VersaLink® C7120/C7125/C7130 Color Multifunction Printer Configuration



MAXIMIZE PAPER CAPACITY WITH ONE OF THESE FEEDING OPTIONS⁵		INCREASE VERSATILITY WITH FINISHING OPTIONS⁵		
The Single Tray Module (optional with desktop model) increases total paper capacity to 1,140 sheets (includes Bypass Tray).		The Office Finisher provides advanced finishing functions, 2000-sheet stacker, 3-position stapling, and optional hole punch.		The Work Surface and Convenience Stapler staples up to 50 sheets and provides plenty of elbow room to sort documents.
The Stand Module offers total paper capacity of 1,140 sheets (includes Bypass Tray) and provides storage for toner cartridges and other supplies		The Office Finisher with Booklet Maker simplifies booklet making, including score and saddle-stitch. Use it to create 64-page saddle-stitched booklets (2 to 16 sheets).		
The Three Tray Module (optional with desktop model) increases total paper capacity to 2,180 sheets (includes Bypass Tray).		The Dual Off-set Catch Trays⁷ stack up to 250 sheets each.		The Integrated Office Finisher provides 500-sheet stacking and 50-sheet, dual position stapling.
The Tandem Tray Module allows for total paper capacity of up to 3,140 sheets (includes Bypass Tray).				
The High Capacity Feeder holds 2,000 sheets of Letter/A4 paper, increasing the maximum paper capacity to 5,140 sheets.				
The Envelope Tray can replace Tray 1 to provide feeding of up to 60 envelopes.				

⁵Paper capacities are based on 20 lb/75 gsm stock; capacities will vary with different weight stocks.

⁶USB ports can be disabled.

⁷HDD and Dual Off-set Catch Trays are optional on Desktop model.

Xerox® VersaLink® C7120/C7125/C7130 Color Multifunction Printer

Print	VersaLink® C7120	VersaLink® C7125	VersaLink® C7130
First-Print-Out Time	As fast as 8.8 seconds color	As fast as 8.8 seconds color	As fast as 7.0 seconds color
	As fast as 6.9 seconds black	As fast as 6.7 seconds black	As fast as 5.4 seconds black
Print Resolution	Up to 1200 x 2400 dpi		
Page Description Languages	PCL® 5e, 6 PDF TIFF JPEG HP-GL Adobe® PostScript® 3™ (Optional)		
Maximum Print Area	4 mm from Lead edge of paper, 2 mm from Side and Trail edges of paper		
Print Features	Application Defaults Banner Pages Enable/Disable Bi-directional Real-time Status Booklet Layout Color Adjustments (lightness, contrast, saturation, color balance) Color Correction Draft Mode Finishing Fit to New Paper Size Job Identification (Print ID or Banner, Print ID in margins on first page only or all pages) Job Monitoring (Client or Local User Interface) LAN Fax (requires Fax Kit) N-up Page Layout (up to 16 pages per sheet) Paper Selection by Attribute Personal Print Print Around Enable/Disable Print from USB Sample Set Saved Job Scaling Secure Print Skip Blank Pages Special Pages (exception page programming: covers, inserts, exceptions pages) Store and Recall Driver Settings Stored Jobs Deletion Two-sided Printing (as default) Watermark (predefined and custom) Xerox® Earth Smart Driver Settings		
Print from USB	Allows walk-up printing from Type A USB port Supports direct printing from computer via Type B USB port Supported file formats: PDF, JPEG, TIFF, PDF/A		
Operating Systems	Windows®, 7, 8, 8.1, 10, 11 Windows Server 2008 SP2, Server 2008 R2 SP1, Server 2012, Server 2012 R2, Server 2016 Mac OS® version 10.12, 10.13, 10.14, 10.15, 11, 12 Citrix® Redhat® Enterprise Linux® Fedora Core SUSE® SAP® IBM® AIX® HP-UX® Oracle® Solaris Note: For information about supported versions for the above operating systems, please visit our Drivers & Downloads page and specify your device at www.support.xerox.com .		
Fonts	PostScript fonts: 136 PCL fonts: 83		
Xerox® Global Print Driver®	A truly universal print driver that lets IT administrators install, upgrade, and manage non-Xerox and Xerox® Devices from a single driver. It provides a consistent, easy-to-use interface for end-users, reducing the number of support calls and simplifying print services management		
Xerox® Pull Print Driver	Makes it easy for IT managers to qualify, deploy, and manage all print devices using a single driver in a Pull Print environment. Uses a single queue and driver. The Xerox® Pull Print Driver extends convenience across a broad range of printing assets. IT administrators no longer need to manage and configure multiple drivers. Used in conjunction with Equitrac Office®, Ysoft® SafeQ®, Pharos®, and others		

Xerox® VersaLink® C7120/C7125/C7130 Color Multifunction Printer

Copy	VersaLink® C7120	VersaLink® C7125	VersaLink® C7130
Document Scanner	130-sheet Single-pass Duplex Automatic Document Feeder (DADF)		
Document Scanner Size	Platen: Up to 11.7 x 17 in./297 x 431.8 mm DADF: Up to 11.7 x 17 in./297 x 431.8 mm		
Simplex Copy Speed	Up to 20 cpm (copies per minute) 8.5 x 11 in. Up to 20 cpm A4 (210 x 297 mm)	Up to 25 cpm (copies per minute) 8.5 x 11 in. Up to 25 cpm A4 (210 x 297 mm)	Up to 30 cpm (copies per minute) 8.5 x 11 in. Up to 30 cpm A4 (210 x 297 mm)
Duplex Copy Speed	Up to 20 cpm (copies per minute) 8.5 x 11 in. Up to 20 cpm A4 (210 x 297 mm)	Up to 25 cpm (copies per minute) 8.5 x 11 in. Up to 25 cpm A4 (210 x 297 mm)	Up to 30 cpm (copies per minute) 8.5 x 11 in. Up to 30 cpm A4 (210 x 297 mm)
First-Copy-Out Time	As fast as 8.1 seconds color	As fast as 8.1 seconds color	As fast as 6.7 seconds color
	As fast as 5.7 seconds black	As fast as 5.7 seconds black	As fast as 4.4 seconds black
Sides (input:output)	1:1, 1:2, 2:2, and 2:1		
Quantity	1 to 999		
Resolution (max.)	Up to 600 x 600 dpi		
Reduction/Enlargement	Variable zoom from 25% to 400% in 1% increments		
Concurrency	Concurrent scanning and printing		
Copy Features	Annotation (Page Numbers, Comments, Date Stamp, Bates Stamping)* Auto-color Sensing Automatic Background Suppression Book Copying with Center Erase Booklet Copying* Collation Color Balance Color Effects Darkness Control Edge Erase Front Cover ID Card Copy Image Enhancement Image Shift Lighten/Darken N-up Original Orientation Original Size Original Type Page Layout Reduce/Enlarge 25% to 400% Sample Copy Saturation Sharpness <small>*Requires HDD/Productivity Kit</small>		
Scan			
Capability	Black-and-white and color scanning		
Concurrency	Scan while the system is printing copy or network print jobs, or while it is transferring scan to network or fax jobs		
Simplex Input Speed	Black-and-white: Scan up to 80 ipm – 8.5 x 11 in./A4 (210 x 297 mm) Color: Scan up to 80 ipm – 8.5 x 11 in./80 ipm A4 (210 x 297 mm)		
Duplex Input Speed	Black-and-white: Scan up to 80 ipm – 8.5 x 11 in./A4 (210 x 297 mm) Color: Scan up to 80 ipm – 8.5 x 11 in./80 ipm A4 (210 x 297 mm)		
Resolution	Optical – 600 x 600 dpi		
Bit Depth	24-bit color/8-bit grayscale		
Maximum Scan Area	Platen: 11.7 x 17 in./297 x 431.8 mm Document Feeder: 11.7 x 17 in./297 x 431.8 mm		
Network Filing Protocols	FTP SMTP SMB		

Xerox® VersaLink® C7120/C7125/C7130 Color Multifunction Printer

Scan	
File Formats	JPG TIFF (single and multi-page) PDF (single and multi-page) Searchable PDF via Optical Character Recognition (OCR) Password-protected PDF Linearized PDF (set via embedded web server) and PDF/A
Scan Driver Compatibility (Network Only)	WIA TWAIN
Supported Scan Destinations	Scan to Home Scan to USB Scan to Email Scan to Network (Browse FTP or Browse SMB)
Workflow Scanning (Optional Features)	
Scanning Apps and Xerox App Gallery	Scan to: DocuShare Go, Dropbox, Google Drive, Microsoft OneDrive, Microsoft 365, Box, Xerox® Workplace Mobile App (iOS/Android). See the full list of apps available in the Xerox App Gallery: xerox.com/AppGallery
PSTN One-Line or Three-Line Fax (Optional) Fax ⁸	
Fax Speed	33.6 Kbps
Resolution	Standard 200 x 100 dpi, Fine 200 x 200 dpi, Super Fine 300 x 300, 400 x 400, 600 x 600 dpi
Compression	MH, MR, MMR, JBIG
Fax Features	Walk-up Fax, includes LAN Fax, Direct Fax, Fax Forward to Email, Fax dialing via Unified Address Book (up to 2,000 contacts)
Fax Over IP (Optional)	
Compliance	T.38 compliant IP/SIP
Resolution	Standard 200 x 100 dpi, Fine 200 x 200 dpi, Super Fine 300 x 300, 400 x 400, 600 x 600 dpi
Compression	MH, MR, MMR, JBIG
Fax Features	Walk-up Fax, includes LAN Fax, Direct Fax, Fax Forward to Email, Fax dialing via Unified Address Book (up to 2,000 contacts)
Mobile and Cloud Ready	
Mobile Connectivity	Near Field Communication (NFC); Optional: Wi-Fi Direct, Wi-Fi (802.11 b/g/n/ac), AirPrint™ (iOS) including iBeacon (Bluetooth)
Mobile Printing	Mopria® Print, Apple AirPrint™, Xerox® Print Service (Android), @PrintByXerox App; Optional: Xerox® Workplace Mobile App (iOS/Android), AirPrint™ (iOS) including iBeacon (Bluetooth)
Mobile Scanning	Mopria® Scan, Apple AirPrint™, Optional: Xerox® Workplace Mobile App (iOS/Android)
Mobile Apps and Xerox App Gallery	Automate everyday processes with apps that translate, redact, eSign, personalize, print, convert, route, collaborate, and communicate. Visit xerox.com/WorkplaceApps to find apps by industry or workflow. Software and services: Xerox® DocuShare® Content Management Platform (xerox.com/ecm), XMPie® (xerox.com/XMPie), Xerox® Workplace Solutions (xerox.com/WorkplaceSolutions)
Xerox® Workplace Central Platform	One-platform consistency for seamless productivity across computers, mobile devices, and printers. With the Workflow Central platform's ever-expanding suite of cloud-based workflows, you can change documents into audio files for easy listening, convert PDF or image files to popular Microsoft formats for shareability with a wider audience, turn handwriting into legible, editable, and shareable text, translate to/from over 40 different languages, and automatically redact Personal Identifiable Information using set words or phrases
Xerox® Workplace Suite and Xerox® Workplace Cloud	Optional: Xerox® Workplace Suite is a modular set of workflows designed to save customer's time and money by providing effective control over their print fleet, while enabling worker productivity and mobility through a set of robust workflows. Xerox enables ultimate customer flexibility by offering these capabilities in both an on-premises server version (Workplace Suite) and a cloud based-version (Workplace Cloud) of this solution

Xerox® VersaLink® C7120/C7125/C7130 Color Multifunction Printer

Security	
Security Features	Access Controls AES 256-bit Encryption Audit Log Certificate Path Validation Certificate Revocation List (CRL)/Status Protocol (OCSP) Detection of External Program Falsification (XCP Plug-in) Cisco® Identity Services Engine (ISE) Integration Domain Filtering FIPS 140-2 Firmware Verification Immediate Disk Overwrite* IP Address Filtering IPsec Network Authentication NIST800-171r1 Compliance Port Filtering Pre-installed Self-Signed Certificates Role-based Permissions Secure Email Secure Fax Secure Print Security Certificate Management Smart Card Enablement (CAC/PIV/.NET) SNMPv3 Status Protocol (OCSP) TLS1.3/SSL Support Trellix® – Embedded Control and Integrity Control Whitelisting/Allowlisting *Requires HDD/Productivity Kit #Trellix formerly known as McAfee Enterprise Business. Device firmware will reflect Trellix brand change in future software release.
Accounting	
Xerox® Standard Accounting/Network Accounting (Standard)	
Tracking	Copy, Print, Fax, Scan, and Email usage
Accounting	Xerox® Standard Accounting Feature Up to 1,000 User Accounts without HDD Up to 9,999 User Accounts with HDD Up to 500 General Accounts Network Accounting (Job-based Accounting) Up to 1,000 User IDs; Up to 1,000 Account IDs without HDD Up to 60,000 User IDs; Up to 60,000 Account IDs with HDD Up to 14,000 Accounting Records (transactions)
Features	Administrator can manage the feature via the Embedded Web Server
Accounting Options – Network Accounting (Allows central server to manage all accounting)	
	<ul style="list-style-type: none"> • Enhanced network accounting with up to the minute data on how the system is being used • Comprehensive management and enterprise-scale tracking and reporting of device usage of copy, print, scan, and fax • Numerous solutions are available through Xerox Alliance Partners. For details, visit www.xerox.com • Security enhancements include simultaneous support for HTTP/HTTPS protocols • Device requests account authentication from third party server enabling larger databases of users and accounts • Accept Authentication Login at control panel and pass to third party Networking Account

Xerox® VersaLink® C7120/C7125/C7130 Color Multifunction Printer

Paper Handling	
Document Feeder	
Capacity⁵	Single-pass Duplex Automatic Document Feeder (DADF): 130 sheets
Sizes	Custom sizes: 1.93 x 3.35 in. to 11.69 x 17 in./ 49 x 85 mm to 297 x 431.8 mm
Weights	
One-sided:	11 to 34 lb. bond/38 to 128 gsm
Two-sided:	Single-pass DADF allows simplex weights
Bypass Tray	
Capacity⁵	100 sheets
Sizes	Custom sizes: 3.5 x 3.87 in. to 11.69 x 17 in./88.9 x 98.4 mm to 297 x 431.8 mm
Weights	16 lb. bond to 80 lb. cover/60 to 216 gsm
Types	Bond Cardstock Custom Envelopes Glossy Cardstock Glossy Cardstock Reload Heavyweight Labels Hole Punched Labels Letterhead Lightweight Cardstock Lightweight Glossy Cardstock Lightweight Glossy Cardstock Reload Plain Paper Pre-printed Recycled
Tray 1	
Capacity⁵	520 sheets
Sizes	Custom sizes: 5.5 x 7.17 in. to 11.69 x 17 in./139.7 x 182.0 mm to 297.0 x 431.8 mm
Weights	
One-sided:	16 lb. bond to 95 lb. cover/60 to 256 gsm
Two-sided:	16 lb. bond to 60 lb. cover/60 to 169 gsm
Types	Bond Cardstock Custom Extra Heavyweight Labels Glossy Cardstock Glossy Cardstock Reload Heavyweight Cardstock Heavyweight Cardstock Reload Heavyweight Glossy Cardstock Heavyweight Glossy Cardstock Reload Heavyweight Labels Hole Punched Labels Letterhead Lightweight Cardstock Lightweight Glossy Cardstock Lightweight Glossy Cardstock Reload Plain Paper Pre-printed Recycled

Xerox® VersaLink® C7120/C7125/C7130 Color Multifunction Printer

Single Tray Module (Optional – Base Model Only)	
Capacity⁵	520 sheets
Sizes	Custom sizes: 5.5 x 7.17 in. to 11.69 x 17 in./139.7 x 182.0 mm to 297.0 x 431.8 mm
Weights	
One-sided:	16 lb. bond to 95 lb. cover/60 to 256 gsm
Two-sided:	16 lb. bond to 60 lb. cover/60 to 169 gsm
Types	Bond Cardstock Custom Envelopes Glossy Cardstock Glossy Cardstock Reload Heavyweight Cardstock Reload Heavyweight Glossy Cardstock Heavyweight Glossy Cardstock Reload Heavyweight Labels Hole Punched Labels Letterhead Lightweight Cardstock Lightweight Glossy Cardstock Lightweight Glossy Cardstock Reload Plain Paper Pre-printed Recycled
Single Tray Module with Stand (Optional)	
Capacity⁵	520 sheets
Sizes	Custom sizes: 5.5 x 7.17 in. to 11.69 x 17 in./139.7 x 182.0 mm to 297.0 x 431.8 mm
Weights	
One-sided:	16 lb. bond to 95 lb. cover/60 to 256 gsm
Two-sided:	16 lb. bond to 60 lb. cover/60 to 169 gsm
Types	Bond Cardstock Custom Envelopes Glossy Cardstock Glossy Cardstock Reload Heavyweight Cardstock Reload Heavyweight Glossy Cardstock Heavyweight Glossy Cardstock Reload Heavyweight Labels Hole Punched Labels Letterhead Lightweight Cardstock Lightweight Glossy Cardstock Lightweight Glossy Cardstock Reload Plain Paper Pre-printed Recycled

Xerox® VersaLink® C7120/C7125/C7130 Color Multifunction Printer

Three Tray Module (Optional)	
Capacity⁵	Tray 2: 520 sheets Tray 3: 520 sheets Tray 4: 520 sheets
Sizes	Custom sizes: 5.5 x 7.17 in. to 11.69 x 17 in./139.7 x 182.0 mm to 297.0 x 431.8 mm
Weights One-sided: Two-sided:	16 lb. bond to 95 lb. cover/60 to 256 gsm 16 lb. bond to 60 lb. cover/60 to 169 gsm
Types	Bond Cardstock Custom Glossy Cardstock Glossy Cardstock Reload Heavyweight Cardstock Heavyweight Cardstock Reload Heavyweight Glossy Cardstock Heavyweight Glossy Cardstock Reload Heavyweight Labels Heavyweight Labels Extra Hole Punched Labels Letterhead Lightweight Cardstock Lightweight Glossy Cardstock Lightweight Glossy Cardstock Reload Plain Paper Pre-printed Recycled
High Capacity Tandem Tray Module (Optional)	
Capacity⁵	Tray 2: 520 sheets Tray 3: 870 sheets Tray 4: 1,130 sheets
Sizes	Tray 2: Custom Sizes: 5.5 x 7.17 in. to 11.69 x 17 in./139.7 x 182.0 mm to 297.0 x 431.8 mm Tray 3: Standard Sizes: 8.5 x 11 in. and 7.25 x 10.5 in./A4 or B5 Tray 4: Standard Sizes: 8.5 x 11 in. and 7.25 x 10.5 in./A4 or B5
Weights One-sided: Two-sided:	16 lb. bond to 95 lb. cover/60 to 256 gsm 16 lb. bond to 60 lb. cover/60 to 169 gsm
Types	Bond Cardstock Custom Glossy Cardstock Glossy Cardstock Reload Heavyweight Cardstock Heavyweight Cardstock Reload Heavyweight Glossy Cardstock Heavyweight Glossy Cardstock Reload Heavyweight Labels Heavyweight Labels Extra Hole Punched Labels Letterhead Lightweight Cardstock Lightweight Glossy Cardstock Lightweight Glossy Cardstock Reload Plain Paper Pre-printed Recycled

Xerox® VersaLink® C7120/C7125/C7130 Color Multifunction Printer

Envelope Tray – Replaces Tray 1 (Optional)	
Capacity⁵	Up to 60 envelopes
Sizes	#10 commercial, Monarch, DL, C5 Custom sizes: 3.9 x 5.8 in. to 6.4 x 9.5 in./98 x 148 mm to 162 x 241 mm
Weights	20 to 25 lb. bond/75 to 90 gsm
High Capacity Feeder (Optional)	
Capacity⁵	2,000 sheets
Sizes	Standard Sizes: 8.5 x 11 in. and 7.25 x 10.5 in./A4 or B5
Weights	One-sided: 16 lb. bond to 80 lb. cover/60 to 216 gsm Two-sided: 16 lb. bond to 60 lb. cover/60 to 169 gsm
Total Capacity	
Base Unit Capacity⁵	620 sheets
Single Tray Module Capacity⁵	1,140 sheets
Single Tray Module with Stand Capacity⁵	1,140 sheets
Three Tray Module Capacity⁵	2,180 sheets
High-Capacity Tandem Tray Capacity⁵	3,140 sheets
Finishing	
Finishing Output Trays (Optional on Base Model)	
Dual Off-set Catch Trays⁵	250 sheets each; Lower tray offsets
Integrated Office Finisher (Optional)	
Stacking Tray	500 sheets of 20 lb. bond/80 gsm – 8.5 x 11 in./A4 or 250 sheets of 20 lb. bond/80 gsm – 11 x 17 in./A3
Sizes	3.5 x 3.9 in. to 11.7 x 17 in./89 x 98 mm to 297 x 432 mm
Weights	16 lb. bond to 80 lb. cover/60 to 256 gsm
Stapling	Dual Auto Stapling 50 sheets maximum: Letter/A4/B5-size sheets (less than 90 gsm or (2) 220 gsm covers) 30 sheets maximum: Legal/Tabloid/A3/B4-size sheets (less than 90 gsm or (2) 220 gsm covers)
Office Finisher (Optional)	
Capacity⁵	Stacking Tray: 2,000 sheets unstapled or 1,000 sheets single stapled or 750 sheets dual stapled (8.5 x 11 in./A4)
Sizes	5.8 x 5.8 in. to 11.7 x 17 in./148 x 148 mm to 297 x 432 mm
Weights	16 lb. bond to 80 lb. cover/60 to 220 gsm/Office Finisher GB up to 256 gsm
Multiposition Stapling	50 sheets of 24 lb. bond/90 gsm
Hole Punch (Optional) North America: Europe:	2-3 Hole Punch 2-4 Hole Punch
Booklet Maker for Office Finisher (Score/Crease, Saddle-Stitch Staple) (Optional)	
Capacity⁵	40 booklets (2-15 sheets per booklet – 20 lb./80 gsm or less)
Sizes	Letter – 8.5 x 11 in./A4 SEF Legal – 8.5 x 14 in./B4 SEF Ledger – 11 x 17 in./A3 SEF
Saddle-stitch Stapling	2-15 sheets/8-60 page booklet 16 lb. bond to 80 lb. cover/64 to 220 gsm
Score/Crease	1-15 sheets/unstapled/16 lb. bond to 28 lb. bond/64-105gsm
Convenience Stapler and Work Surface (Optional)	
Capacity⁵	50-sheet stapling 5,000 staples Requires a separate outlet

Xerox® VersaLink® C7120/C7125/C7130 Color Multifunction Printer

Device Management	
Network Protocols	TCP/IP: HTTP/HTTPS, Internet Printing Protocol, LPR/LPD, Raw Socket Printing/Port 9100, IPv4/IPv6, WSD LDAP Bonjour®/AirPrint™ FTP Most protocols not in use can be disabled
Administrative Protocols	DHCP, SNMP, WINS, HTTP, HTTPS, TLS, SNTP, MDNS
Management Support	SNMP Version 1, SNMP Version 2c, and SNMP Version 3 trap over TCP/IP and IP MIB access (IETF-MIBII RFC 1213) Host Resources MIB RFC 2790, Printer MIB RFC 3805, PWG-Imaging-System- Power MIB, Xerox® Easy Assist App
Xerox® CentreWare® Web Software	
	<ul style="list-style-type: none"> • A web-based server application for network administrators that permits web browser-based device management from any workstation, running Windows, UNIX, or any other operating system • Works with any SNMP-managed printer from any manufacturer • Provides help with device discovery and installations, health checks and troubleshooting, and device upgrades, as well as basic accounting and asset management
Embedded Web Server – Integrated Device Web Page	
Device Status	<ul style="list-style-type: none"> • Tray Status/Contents • Consumables Status • Billing/Usage • Quick Links • Online Support
Print Queue Viewing	Job print queue management — view and delete
Job Submission	Print-ready files (PS (with optional PostScript option), PCL, PDF, JPEG)
Device Administration	Allows simple, remote installation setting of configuration options and management of the device
Xerox® Device Manager	Xerox® Device Manager collects and manages the data that drives fact-based decisions for your enterprise device management environment. It is a single tool to install print queues and configure, manage, monitor, and report on both networked and locally connected devices – regardless of vendor – across your enterprise. Xerox® Device Manager provides: <ul style="list-style-type: none"> • Device monitoring and troubleshooting • Remote configuration of SNMP v3 • Extensive reporting and discovery of new devices • Usage collection, chargeback, and billing capabilities • Auto-detect Xerox® Device Manager server and download configurations files for touchless remote install
Xerox® Workplace Cloud	Remote management to set and audit device configuration data with Xerox® Workplace Cloud, eliminating the need for an on-site server
Browsers	Microsoft® Internet Explorer® Microsoft Edge™ Mozilla™ Firefox® Apple® Safari® Google Chrome™
Remote Services	
Automatic Meter Readings (AMR)	Automates the process of collecting and submitting meter reads for the tracking and billing of Xerox® Device usage. Eliminates the need for time-consuming end-user involvement and ensures that meter reads are submitted to Xerox on time
Automatic Supplies Replenishment (ASR)	Automatically orders supplies for output devices from Xerox based on actual usage, eliminating the need to manually manage supplies inventory

Xerox® VersaLink® C7120/C7125/C7130 Color Multifunction Printer

Supplies	Description	Yield
Sold Toner Cartridges	Cyan Magenta Yellow Black	18,500 standard pages ⁹ 18,500 standard pages ⁹ 18,500 standard pages ⁹ 31,300 standard pages ⁹
Metered Toner Cartridges	Cyan Magenta Yellow Black	20,300 standard pages 20,300 standard pages 20,300 standard pages 31,300 standard pages
Drum Cartridge	Black Cyan, Magenta, Yellow	109,000 standard pages ¹⁰ 87,000 standard pages ¹⁰
Waste Toner Bottle	1 Cartridge	30,000 pages
Booklet Maker Cartridge (8 cartridges per carton)	1 Cartridge Carton	16,000 staples (2,000 each cartridge)
Staple Refills for Finishers (3 refills per carton)	1 Refill Carton	15,000 staples (5,000 each refill)
Staple Cartridge for Finishers (1 cartridge per carton)	1 Cartridge	5,000 staples

¹ Declared print speed in accordance with ISO/IEC 24734.

² Maximum volume capacity expected in any one month. Not expected to be sustained on a regular basis.

³ Recommended average throughput is not a minimum, but is intended to cover a range of volumes for different environments.

⁴ Power states defined per ENERGY STAR® Program requirements for Imaging Equipment.

⁵ Paper capacities are based on 20 lb./75 gsm stock; capacities will vary with different weight stocks.

⁶ USB ports can be disabled.

⁷ HDD and Dual Off-set Catch Trays are optional on Desktop model.

⁸ Requires analog phone line.

⁹ Average standard pages. Declared yield in accordance with ISO/IEC 19798. Toner yield can vary due to many factors including, but not limited to, image area coverage, image content, media size, run mode, application types, monthly print volumes, and image quality set-points.

¹⁰ Approximate pages. Declared yield will vary depending on job run length, media size/orientation, and machine speed.

For more information, visit: <https://www.office.xerox.com/latest/SUPGL-01U.pdf>.

Return spent imaging supplies through the Xerox® Green World Alliance® collection/reuse/recycling program.
For more information, visit www.xerox.com/About-Xerox/Recycling.

For more information, visit us at www.xerox.com/Office.

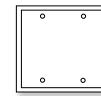
Configurations vary by geography.

Blank - Box Mounted

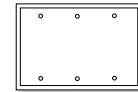
Description	Material	Catalog No.	Colors		
1-Gang	Nylon	<input type="checkbox"/> 5129	A, B, BK, GY, LA, V, W		•
	Thermoset	<input type="checkbox"/> 2129	A, B, LA, V, W		•
	302/304 Stainless Steel	<input type="checkbox"/> 93151	—		•
	REPEL, 302/304 Stainless Steel	<input type="checkbox"/> 93151AM	—	•	•
	Brass	<input type="checkbox"/> 94151	—		•
2-Gang	Nylon	<input type="checkbox"/> 5137	A, B, BK, GY, LA, V, W		•
	Thermoset	<input type="checkbox"/> 2137	A, B, LA, V, W		•
	302/304 Stainless Steel,	<input type="checkbox"/> 93152			•
	REPEL, 302/304 Stainless Steel	<input type="checkbox"/> 93152AM	—	•	•
3-Gang	302/304 Stainless Steel	<input type="checkbox"/> 93153	—		•
	REPEL, 302/304, Stainless Steel	<input type="checkbox"/> 93153AM	—	•	•
4-Gang	302/304 Stainless Steel	<input type="checkbox"/> 93154	—		•
	REPEL, 302/304 Stainless Steel	<input type="checkbox"/> 93154AM	—	•	•



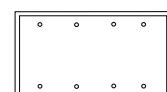
1-Gang



2-Gang



3-Gang



4-Gang

Louver

Description	Material	Catalog No.	
Horizontal	302/304 Stainless Steel	<input type="checkbox"/> 93630	•
Vertical	302/304 Stainless Steel	<input type="checkbox"/> 93631	•



93630



93631

Color Ordering Information

For ordering wallplates, include Cat. No. followed by the color code: A (Almond), B (Brown), BK (Black), BL (Blue), GY (Gray), LA (Light Almond), RD (Red), RN (Orange), V (Ivory), W (White)

Icon Key

- NAFTA Compliant - see page O-30
- REPEL Wallplates - see page J-1

Certifications

2000 series wallplates are cULus certified
 5000 series wallplates are cULus certified
 90000 series wallplates are UL and CSA certified

Specification Information:

Wallplates: J-21

Mounting Holes for Wallplates and Covers

These are the most common nominal spacings for mounting holes on wallplates and covers. Holes are normally countersunk for oval head #6-32 screws.

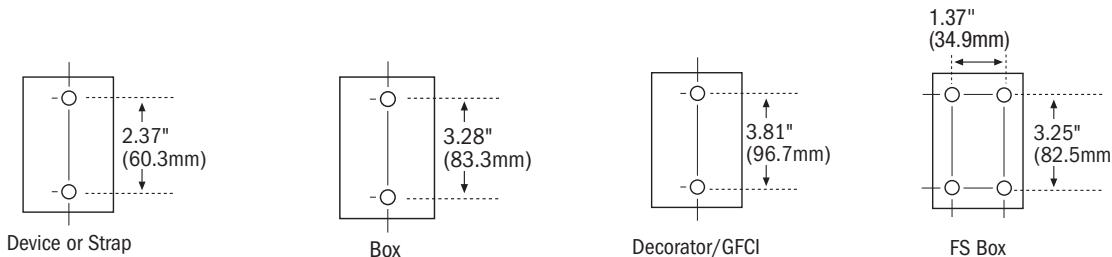
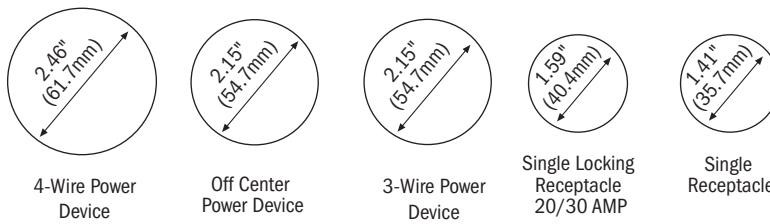


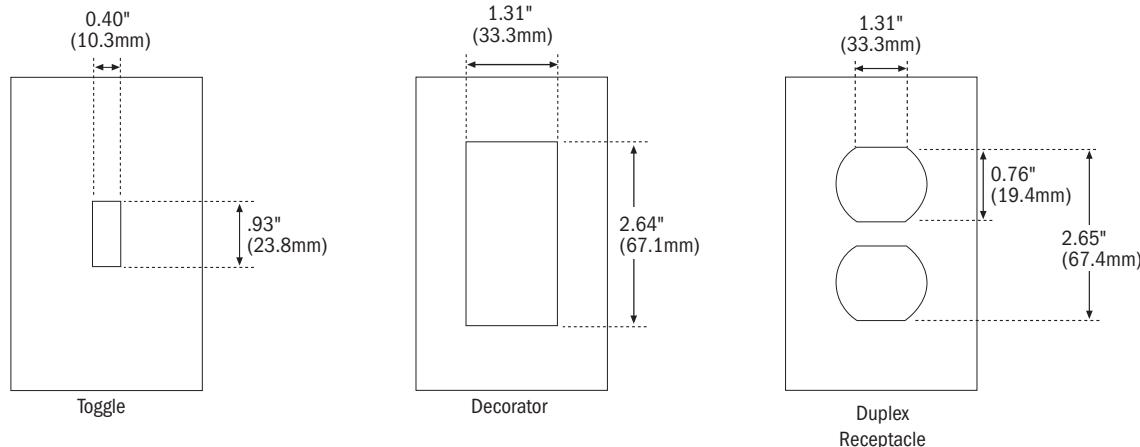
Plate and Cover Opening Dimensions

Cover Openings

Nominal dimensions for plate and cover openings conform to industry standards and practices.

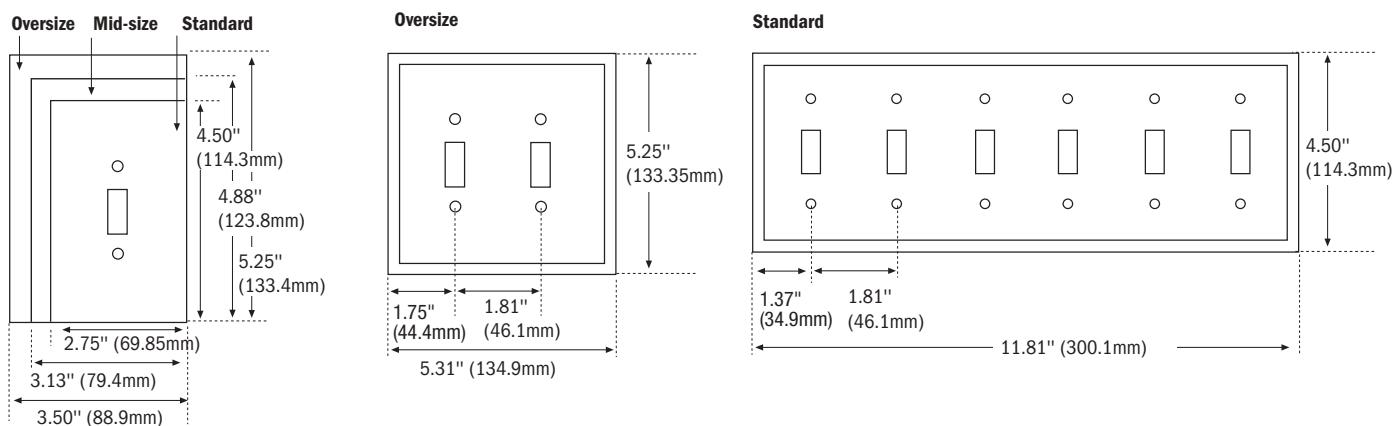


Common Opening Configurations



Wallplate Sizes

Description		Height	Width	First Gang to Edge	Gang to Gang
1-Gang	Standard	4.50" (114.3mm)	2.75" (69.8mm)	1.37" (34.9mm)	—
	Mid-Size	4.87" (123.8mm)	3.12" (79.4mm)	1.56" (39.7mm)	—
	Oversize	5.25" (133.3mm)	3.50" (88.9mm)	1.75" (44.4mm)	—
2-Gang	Standard	4.50" (114.3mm)	4.56" (115.9mm)	1.37" (34.9mm)	1.81" (46.0mm)
	Mid-Size	4.87" (123.8mm)	4.94" (125.4mm)	1.56" (39.7mm)	1.81" (46.0mm)
	Oversize	5.25" (133.3mm)	5.31" (134.9mm)	1.75" (44.4mm)	1.81" (46.0mm)
3-Gang	Standard	4.50" (114.3mm)	6.37" (161.9mm)	1.37" (34.9mm)	1.81" (46.0mm)
	Mid-Size	4.87" (123.8mm)	6.75" (171.4mm)	1.56" (39.7mm)	1.81" (46.0mm)
	Oversize	5.25" (133.4mm)	7.17" (182.2mm)	1.75" (44.4mm)	1.81" (46.1mm)
4-Gang	Standard	4.50" (114.3mm)	8.19" (207.9mm)	1.37" (34.9mm)	1.81" (46.0mm)
	Mid-Size	4.87" (123.8mm)	8.56" (217.5mm)	1.56" (39.7mm)	1.81" (46.0mm)
	Oversize	5.25" (133.3mm)	8.94" (227.0mm)	1.75" (44.4mm)	1.81" (46.0mm)
5-Gang	Standard	4.50" (114.3mm)	10.00" (254.0mm)	1.37" (34.9mm)	1.81" (46.0mm)
	Mid-Size	4.87" (123.8mm)	10.37" (263.5mm)	1.56" (39.7mm)	1.81" (46.0mm)
6-Gang	Standard	4.50" (114.3mm)	11.81" (300.0mm)	1.37" (34.9mm)	1.81" (46.0mm)
	Mid-Size	4.87" (123.8mm)	12.18" (309.5mm)	1.56" (39.7mm)	1.81" (46.0mm)



Wallplates

Standard Size
Mid-Size
Oversize
REPEL

		Standard Size, Mid-Sized & Oversize Wallplates				REPEL		
	Wallplate Type	Thermoset	Nylon	Stainless Steel	Polycarbonate	REPEL Polycarbonate Mid-Sized Wallplates PJ_AM and PJS_AM Series	REPEL Stainless Steel Standard Size Wallplates 93070_AM, 93090_AM, 93100_AM, 93400_AM Series	
Manufacturing Process	Injection Molded	Injection Molded	Stamped	Injection Molded	Injection Molded	Injection Molded	Stamped	
Testing & Code Compliance	UL Listed to UL 514D, file no. E33216	UL Listed to UL 514D, file no. E33216	UL Listed to 514D, file no. E92003	UL Listed to UL 514D, file no. E33216	UL Listed to UL 514D, file no. E33216	UL Listed to UL 514D, file no. E92003		
	cUL certified to C22.2, no. 42.1, UL file E33216	cUL certified to C22.2, no. 42.1, UL file E33216	CSA certified to C22.2, no. 42.1	cUL, UL file E33216 certified to C22.2, no. 42.1	Agion® Antimicrobial Additive: EPA approved for use as product ingredient	Agion® Antimicrobial Additive: EPA approved for use as product ingredient		
					PJ_AM only: cUL Listed to CSA C22.2, no 42.1, file no. E33216	CSA certified to C22.2, no. 42.1		
Specifications: Environmental	Flammability	Meets UL 94 requirements; 5V rated	Meets UL 94 requirements; 5V rated	N/A	Meets UL 94 requirements 5VA rated	Meets UL 94 requirements; 5V rated	N/A	
Temperature Rating	-40°C to 90°C (-40°F to 194°F)	-40°C to 70°C (-40°F to 158°F)	-40°C to 70°C (-40°F to 158°F)	-40° to 70° C (-40°F to 158°F)	-40°C to 70°C (-40°F to 158°F)	-40°C to 70°C (-40°F to 158°F)	-40°C to 70°C (-40°F to 158°F)	
Materials:	Body	0.080" thick thermoset urea or phenolic	0.060" thick thermoplastic	0.032" thick stainless steel alloy, 18% chromium and 8% nickel for corrosion resistance	0.08" thick thermoplastic polycarbonate	0.071" thick polycarbonate with Agion® Antimicrobial Additive incorporated	0.032" thick 302/304 stainless steel alloy, 18% chromium and 8% nickel for corrosion resistance, DuPont® Alesta® powder coating with Agion® Antimicrobial incorporated	
	Inner Wallplate	N/A	N/A	N/A	0.071" thick polycarbonate	PJS_AM only: 0.071" thick polycarbonate	N/A	

NOTE: REPEL products do not protect the user against disease causing organisms and ongoing regular cleaning practices should be maintained. Agion is a registered trademark of Agion Technologies, Inc., Wakefield, MA

Cisco Aironet 2800 Series Access Points

Contents

Product overview	3
Features and benefits	4
802.11ac Wave 2 and beyond	5
Cisco DNA support	5
High-density experience	6
Product specifications	6
Licensing	17
Warranty information	20
Cisco environmental sustainability	20
Cisco Capital	20

The Cisco® Aironet® 2800 Series Wi-Fi access points are highly versatile and deliver the most functionality in the industry.

Product overview



For organizations paving the way for the new 802.11ac Wave 2 standard, the Cisco Aironet 2800 Series is the perfect solution. The access points go beyond getting ready for the new standard, providing the ultimate in flexibility and versatility.

For large enterprise organizations that rely on Wi-Fi to engage with customers, the 2800 Series is a hands-off product that's intelligent enough to make decisions based on end-device activities and usage. This automation allows you to devote time to other pressing matters, secure in the knowledge that your Wi-Fi network is performing to its utmost potential.

The Aironet 2800 Series is packed with the features and capabilities that have made Cisco the industry leader, at a price point that is ideal for managing wireless growth, capacity, and coverage gaps in dense indoor environments.

With the 2800 Series, you can secure remote workers or the micro-office. Any Cisco Aironet or Catalyst access point can function as an OfficeExtend Access Point (OEAP). With an OEAP, an employee at home or in a temporary micro-office will have access to the corporate SSID and the corporate network without the need to set up a VPN or have any advanced technical know-how.

Cisco User Defined Network, a feature available in Cisco DNA Center, allows IT to give end users control of their very own wireless network partition on a shared network. End users can then remotely and securely deploy their devices on this network. Perfect for university dormitories or extended hospital stays, Cisco User Defined Network grants both device security and control, allowing each user to choose who can connect to their network. (Available second half of calendar year 2020.)

The Wi-Fi 6 readiness dashboard is a new dashboard in the Assurance menu of Cisco DNA Center. It will look through the inventory of all devices on the network and verify device, software, and client compatibility with the new Wi-Fi 6 standard. After upgrading, advanced wireless analytics will indicate performance and capacity gains as a result of the Wi-Fi 6 deployment. This is an incredible tool that will help your team define where and how the wireless network should be upgraded. It will also give you insights into the access point distribution by protocol (802.11 ac/n/abg), wireless airtime efficiency by protocol, and granular performance metrics.

Features and benefits

Feature	Benefit
802.11ac Wave 2 support	Provides a theoretical connection rate of up to 2.6 Gbps per radio—roughly double the rates offered by today's high-end 802.11ac access points.
High Density Experience (HDX)	Best-in-class RF architecture, which provides high-performance coverage for a high density of client devices, giving the end user a seamless wireless experience. HDX includes features such as custom hardware in 802.11ac Wave 2 radios, Cisco CleanAir®, ClientLink 4.0, cross-access point noise reduction, and an optimized client roaming experience.
Multiuser Multiple-Input Multiple-Output (MU-MIMO) technology	Supporting three spatial streams, MU-MIMO enables access points to split spatial streams between client devices, to maximize throughput.
Flexible Radio Assignment	Allows the access points to intelligently determine the operating mode of serving radios based on the RF environment. The access points can operate in the following modes: <ul style="list-style-type: none"> 2.4-GHz and 5-GHz mode: One radio will serve clients in 2.4-GHz mode, while the other serves clients in 5-GHz mode. Dual 5-GHz mode: Both radios inside the access point operate on the 5-GHz band, maximizing the benefits of 802.11ac Wave 2 and increasing client device capacity. Security Monitoring and 5-GHz mode, One radio will serve 5-GHz clients, while the other is scanning the full spectrum for wIPS attackers, CleanAir interferers, and rogue devices.
Dual 5-GHz radio support	Enables both radios to operate in 5-GHz client serving mode, allowing an industry-leading 5.2 Gbps (2 x 2.6 Gbps) over-the-air speeds while increasing client capacity.
Smart antenna connector	An intelligent second physical antenna connector is included on 2800 Series models with an external antenna. This connector provides advanced network design flexibility for high-density and large open-area environments such as auditoriums, convention centers, libraries, cafeterias, and arenas/stadiums, allowing two sets of antennas to be connected and active on a single access point.
160-MHz channel support	Supporting channels up to 160 MHz wide, Dynamic Bandwidth Selection allows the access point to dynamically switch between 20-, 40-, 80-, and 160-MHz channels, depending on the RF channel conditions, providing the industry's best-performing wireless network.
Optimized access point roaming	Helps ensure that client devices associate with the access point in their coverage range that offers the fastest data rate available.
Zero-impact Application Visibility and Control*	Uses dedicated hardware acceleration to improve the performance of line-speed applications such as Application Visibility and Control.
Auto Link Aggregation (LAG) support	802.3ad (LACP) compliant, allowing both Gigabit Ethernet interfaces to automatically LAG, increasing overall throughput to the access point.
ClientLink 4.0	Cisco ClientLink 4.0 technology to improve downlink performance to all mobile devices, including one-, two-, and three-spatial-stream devices on 802.11a/b/g/n/ac while improving battery life on mobile devices such as smartphones and tablets.

Feature	Benefit
CleanAir 160 MHz*	Cisco CleanAir technology, enhanced with 160-MHz channel support, provides proactive, high-speed spectrum intelligence across 20-, 40-, 80-, or 160-MHz-wide channels to combat performance problems due to wireless interference.
Cisco Mobility Express	Flexible deployment mode through the Cisco Mobility Express Solution is ideal for medium-sized deployments and can support up to 100 access points. Easy setup allows the 2800 Series Access Points to be deployed on networks without a physical controller.

* Available in a future release.

802.11ac Wave 2 and beyond

The Aironet 2800 Series extends 802.11ac speed and features to a new generation of smartphones, tablets, and high-performance laptops, providing a greater end-user experience. Whether your project involves wholesale changes to your current wireless network or upgrading your legacy Wi-Fi deployments (802.11a/b/g/n/ac wave 1 deployments), the 2800 Series can handle the job.

The 2800 Series supports 802.11ac Wave 2, providing a theoretical connection rate of up to 5.2 Gbps—that's roughly 4x the rates offered by today's high-end 802.11ac access points. The boost helps you stay ahead of the performance and bandwidth expectations of today's mobile worker, who usually uses multiple Wi-Fi devices instead of just one. As such, users are adding proportionally larger traffic loads to the wireless LAN, which has outpaced Ethernet as the default enterprise access network.

Cisco DNA support

Pairing the 2800 Series access points with the Cisco Digital Network Architecture (Cisco DNA) allows for a total network transformation. Cisco DNA allows you to truly understand your network with real-time analytics, quickly detect and contain security threats, and easily provide networkwide consistency through automation and virtualization. By decoupling network functions from the hardware, you can build and manage your entire wired and wireless network from a single user interface.

Working together, the 2800 Series and Cisco DNA offer such features as:

- Flexible Radio Assignment
- Cisco Connected Mobile Experiences
- Cisco High Density Experience
- Fast Lane
- Cisco Identity Services Engine
- And much more

The result? Your network stays relevant, becomes digital-ready, and is the lifeblood of your organization.

High-density experience

Building on the Cisco Aironet heritage of RF excellence, the 2800 Series access points run on a purpose-built, innovative chipset with a best-in-class RF architecture. This chipset provides a high-density experience for enterprise networks designed for mission-critical, high-performance applications.

The 2800 Series is a component of Cisco's portfolio of flagship, 802.11ac-enabled access points, and delivers a robust mobility experience based on the following product features:

- 802.11ac Wave 2 with 4x4 Multiuser Multiple-Input Multiple-Output (MU-MIMO) technology supporting three spatial streams. MU-MIMO enables access points to split spatial streams between client devices to maximize throughput.

With two radios built into each access point, the 2800 Series is more versatile than any access point currently on the market. These radios are outfitted with Flexible Radio Assignment, which means that the access points automatically self-optimize to better serve the environment. For example, one of the radios broadcasts its signal on the 5-GHz channel and the other sends out a 2.4-GHz signal. The access point understands the wireless environment and will automatically switch the 2.4-GHz signal to a 5-GHz signal, increasing the reliability of your Wi-Fi use. This setting automatically works in reverse too, the access point recognizes that the RF environment has changed as reverts changes back to its original configuration.

The access point also dynamically changes the radio settings based on the wireless environment. The 2800 Series Wave 2 access point will allow one of the radios to operate in Wireless Security Monitoring mode. Allowing you to detect wireless security threats, interference, and combat rogue access. This valuable information can be culled in an easy-to-understand matrix to inform you about your customers.

- **Optimized access point roaming** to ensure that client devices associate with the access point in their coverage range that offers the fastest data rate available.
- **Cisco ClientLink 4.0** technology to improve downlink performance to all mobile devices, including one-, two-, and three-spatial-stream devices on 802.11a/b/g/n/ac. At the same time, the technology improves battery life on mobile devices.
- **Cisco CleanAir** technology enhanced with 160-MHz channel support. CleanAir delivers proactive, high-speed spectrum intelligence across 20-, 40-, and 80-, and 160-MHz* wide channels to combat performance problems due to wireless interference.
- **MIMO equalization** capabilities, which optimize uplink performance and reliability by reducing the impact of signal fade.

Product specifications

Item	Specification
Part numbers	<p>Cisco Aironet 2800i Access Point: Indoor environments, with internal antennas</p> <ul style="list-style-type: none">• AIR-AP2802I-x-K9: Dual-band, controller-based 802.11a/g/n/ac• AIR-AP2802I-xK910: Eco-pack (dual-band 802.11a/g/n/ac) 10 quantity access points• AIR-AP2802I-D-K9I: Dual-band, controller-based 802.11a/g/n/ac (India only) <p>Cisco Aironet 2800i Access Point Configurable: Indoor environments, with internal antennas</p> <ul style="list-style-type: none">• AIR-AP2802I-x-K9C: Dual-band, controller-based 802.11a/g/n/ac, configurable• AIR-AP2802I-xK910C: Eco-pack (dual-band 802.11a/g/n/ac) 10 quantity access points, configurable

Item	Specification
	<p>Cisco Aironet 2800e Access Point: Indoor, challenging environments, with external antennas</p> <ul style="list-style-type: none"> • AIR-AP2802E-x-K9: Dual-band controller-based 802.11a/g/n/ac • AIR-AP2802E-xK910: Eco-pack (dual-band 802.11a/g/n/ac), 10 quantity access points <p>Cisco Aironet 2800e Access Point Configurable: Indoor, challenging environments, with external antennas</p> <ul style="list-style-type: none"> • AIR-AP2802E-x-K9C: Dual-band controller-based 802.11a/g/n/ac, configurable • AIR-AP2802E-xK910C: Eco-pack (dual-band 802.11a/g/n/ac), 10 quantity access points, configurable <p>Regulatory domains: (x = regulatory domain)</p> <p>Customers are responsible for verifying approval for use in their individual countries. To verify approval and to identify the regulatory domain that corresponds to a particular country, visit https://www.cisco.com/go/aironet/compliance.</p> <p>Not all regulatory domains have been approved. As they are approved, the part numbers will be available on the Global Price List.</p> <p>Cisco Wireless LAN Services</p> <ul style="list-style-type: none"> • AS-WLAN-CNSLT: Cisco Wireless LAN Network Planning and Design Service • AS-WLAN-CNSLT: Cisco Wireless LAN 802.11n Migration Service • AS-WLAN-CNSLT: Cisco Wireless LAN Performance and Security Assessment Service
Software	<ul style="list-style-type: none"> • Cisco Unified Wireless Network Software Release 8.2.111.0 or later • Cisco IOS® XE Software Release 16.3
Supported wireless LAN controllers	<ul style="list-style-type: none"> • Cisco 2500 Series Wireless Controllers, Cisco 3500 Series Wireless Controllers, Cisco Wireless Controller Module for ISR G2, Cisco Wireless Services Module 2 (WiSM2) for Catalyst® 6500 Series Switches, Cisco 5500 Series Wireless Controllers, Cisco Flex® 7500 Series Wireless Controllers, Cisco 8500 Series Wireless Controllers, Cisco 9800 Series Wireless Controllers, Cisco Virtual Wireless Controller • Cisco Catalyst 3850 Series Switches, Cisco Catalyst 3650 Series Switches • Cisco Mobility Express
802.11n version 2.0 (and related) capabilities	<ul style="list-style-type: none"> • 4x4 MIMO with three spatial streams • Maximal Ratio Combining (MRC) • 802.11n and 802.11a/g beamforming • 20- and 40-MHz channels • PHY data rates up to 450 Mbps (40 MHz with 5 GHz) • Packet aggregation: A-MPDU (Tx/Rx), A-MSDU (Tx/Rx) • 802.11 Dynamic Frequency Selection (DFS) • Cyclic Shift Diversity (CSD) support
802.11ac Wave 1 capabilities	<ul style="list-style-type: none"> • 4x4 MIMO with three spatial streams • MRC • 802.11ac beamforming • 20-, 40-, and 80-MHz channels • PHY data rates up to 1.3 Gbps (80 MHz in 5 GHz) • Packet aggregation: A-MPDU (Tx/Rx), A-MSDU (Tx/Rx) • 802.11 DFS • CSD support

Item	Specification
802.11ac Wave 2 capabilities	<ul style="list-style-type: none"> • 4x4 MU-MIMO with three spatial streams • MRC • 802.11ac beamforming • 20-, 40-, 80, 160-MHz channels • PHY data rates up to 4680 Mbps • Packet aggregation: A-MPDU (Tx/Rx), A-MSDU (Tx/Rx) • 802.11 DFS • CSD support
Integrated antenna	<p>Flexible radio (either 2.4 GHz or 5 GHz)</p> <ul style="list-style-type: none"> • 2.4 GHz, gain 4 dBi, internal antenna, omnidirectional in azimuth • 5 GHz, gain 6 dBi, internal directional antenna, elevation plane beamwidth 90° <p>Dedicated 5-GHz radio</p> <ul style="list-style-type: none"> • 5 GHz, gain 5 dBi, internal antenna, omnidirectional in azimuth
External antenna (sold separately)	<ul style="list-style-type: none"> • 2802e Series access points are certified for use with antenna gains up to 6 dBi (2.4 GHz and 5 GHz) • Cisco offers the industry's broadest selection of antennas, delivering optimal coverage for a variety of deployment scenarios
Smart antenna connector	<ul style="list-style-type: none"> • Available on the 2802e Series access points only • Requires the AIR-CAB002-DART-R= 2 ft smart antenna connector to RP-TNC connectors to connect a second antenna to the access point • Required when running the flexible radio as either a second 5-GHz serving radio or Wireless Security Monitoring radio
Interfaces	<ul style="list-style-type: none"> • 2802I/E <ul style="list-style-type: none"> ◦ 2x 100/1000BASE-T autosensing (RJ-45) • Management console port (RJ-45) • USB 2.0 (enabled via future software)
Indicators	<ul style="list-style-type: none"> • Status LED indicates boot loader status, association status, operating status, boot loader warnings, boot loader errors
Dimensions (W x L x H)	<ul style="list-style-type: none"> • Access point (without mounting brackets): 2802I: 8.66" x 8.68" x 2.17", 2802E: 8.66" x 8.77" x 2.50"
Weight	<p>Cisco Aironet 2802i</p> <ul style="list-style-type: none"> • 3.53 lb (1.6 kg) <p>Cisco Aironet 2802e</p> <ul style="list-style-type: none"> • 4.6 lb (2.09 kg)
Input power requirements	<ul style="list-style-type: none"> • 802.3at PoE+, Cisco Universal PoE (Cisco UPOE®) • 802.3at power injector (AIR-PWRINJ6=)
Power draw	<ul style="list-style-type: none"> • 22.5W at the PSE (20W at the PD) with all features enabled except for the USB 2.0 port • 26.5W at the PSE (23W at the PD) with the USB 2.0 port enabled

Item	Specification				
Environmental	<p>Cisco Aironet 2802i</p> <ul style="list-style-type: none"> • Nonoperating (storage) temperature: -22° to 158°F (-30° to 70°C) • Nonoperating (storage) altitude test: 25°C, 15,000 ft. • Operating temperature: 32° to 104°F (0° to 40°C) • Operating humidity: 10% to 90% (noncondensing) • Operating altitude test: 40°C, 9843 ft. <p>Cisco Aironet 2802e</p> <ul style="list-style-type: none"> • Nonoperating (storage) temperature: -22° to 158°F (-30° to 70°C) • Nonoperating (storage) altitude test: 25°C, 15,000 ft. • Operating temperature: -4° to 122°F (-20° to 50°C) • Operating humidity: 10% to 90% (noncondensing) • Operating altitude test: 40°C, 9843 ft. 				
System memory	<ul style="list-style-type: none"> • 1024 MB DRAM • 256 MB flash 				
Warranty	Limited lifetime hardware warranty				
Available transmit power settings	<table> <tr> <td>2.4 GHz</td> <td>5 GHz</td> </tr> <tr> <td> <ul style="list-style-type: none"> • 23 dBm (200 mW) • 20 dBm (100 mW) • 17 dBm (50 mW) • 14 dBm (25 mW) • 11 dBm (12.5 mW) • 8 dBm (6.25 mW) • 5 dBm (3.13 mW) • 2 dBm (1.56 mW) </td> <td> <ul style="list-style-type: none"> • 23 dBm (200 mW) • 20 dBm (100 mW) • 17 dBm (50 mW) • 14 dBm (25 mW) • 11 dBm (12.5 mW) • 8 dBm (6.25 mW) • 5 dBm (3.13 mW) • 2 dBm (1.56 mW) </td> </tr> </table>	2.4 GHz	5 GHz	<ul style="list-style-type: none"> • 23 dBm (200 mW) • 20 dBm (100 mW) • 17 dBm (50 mW) • 14 dBm (25 mW) • 11 dBm (12.5 mW) • 8 dBm (6.25 mW) • 5 dBm (3.13 mW) • 2 dBm (1.56 mW) 	<ul style="list-style-type: none"> • 23 dBm (200 mW) • 20 dBm (100 mW) • 17 dBm (50 mW) • 14 dBm (25 mW) • 11 dBm (12.5 mW) • 8 dBm (6.25 mW) • 5 dBm (3.13 mW) • 2 dBm (1.56 mW)
2.4 GHz	5 GHz				
<ul style="list-style-type: none"> • 23 dBm (200 mW) • 20 dBm (100 mW) • 17 dBm (50 mW) • 14 dBm (25 mW) • 11 dBm (12.5 mW) • 8 dBm (6.25 mW) • 5 dBm (3.13 mW) • 2 dBm (1.56 mW) 	<ul style="list-style-type: none"> • 23 dBm (200 mW) • 20 dBm (100 mW) • 17 dBm (50 mW) • 14 dBm (25 mW) • 11 dBm (12.5 mW) • 8 dBm (6.25 mW) • 5 dBm (3.13 mW) • 2 dBm (1.56 mW) 				
Frequency band and 20-MHz operating channels	<p>A (A regulatory domain):</p> <ul style="list-style-type: none"> • 2.412 to 2.462 GHz; 11 channels • 5.180 to 5.320 GHz; 8 channels • 5.500 to 5.700 GHz; 8 channels (excludes 5.600 to 5.640 GHz) • 5.745 to 5.825 GHz; 5 channels <p>B (B regulatory domain):</p> <ul style="list-style-type: none"> • 2.412 to 2.462 GHz; 11 channels • 5.180 to 5.320 GHz; 8 channels • 5.500 to 5.720 GHz; 12 channels • 5.745 to 5.825 GHz; 5 channels <p>C (C regulatory domain):</p> <ul style="list-style-type: none"> • 2.412 to 2.472 GHz; 13 channels • 5.745 to 5.825 GHz; 5 channels <p>D (D regulatory domain):</p> <ul style="list-style-type: none"> • 2.412 to 2.462 GHz; 11 channels • 5.180 to 5.320 GHz; 8 channels • 5.745 to 5.825 GHz; 5 channels <p>I (I regulatory domain):</p> <ul style="list-style-type: none"> • 2.412 to 2.472 GHz; 13 channels • 5.180 to 5.320 GHz; 8 channels <p>K (K regulatory domain):</p> <ul style="list-style-type: none"> • 2.412 to 2.472 GHz; 13 channels • 5.180 to 5.320 GHz; 8 channels • 5.500 to 5.620 GHz; 7 channels • 5.745 to 5.805 GHz; 4 channels <p>N (N regulatory domain):</p> <ul style="list-style-type: none"> • 2.412 to 2.462 GHz; 11 channels • 5.180 to 5.320 GHz; 8 channels • 5.745 to 5.825 GHz; 5 channels <p>Q (Q regulatory domain):</p> <ul style="list-style-type: none"> • 2.412 to 2.472 GHz; 13 channels • 5.180 to 5.320 GHz; 8 channels • 5.500 to 5.700 GHz; 11 channels <p>R (R regulatory domain):</p>				

Item	Specification
	<p>E (E regulatory domain):</p> <ul style="list-style-type: none"> • 2.412 to 2.472 GHz; 13 channels • 5.180 to 5.320 GHz; 8 channels • 5.500 to 5.700 GHz; 8 channels (excludes 5.600 to 5.640 GHz) <p>F (F regulatory domain):</p> <ul style="list-style-type: none"> • 2.412 to 2.472 GHz; 13 channels • 5.250 to 5.350 GHz; 4 channels • 5.725 to 5.825 GHz; 4 channels <p>G (G regulatory domain):</p> <ul style="list-style-type: none"> • 2.412 to 2.472 GHz; 13 channels • 5.745 to 5.825 GHz; 5 channels <p>H (H regulatory domain):</p> <ul style="list-style-type: none"> • 2.412 to 2.472 GHz; 13 channels • 5.150 to 5.350 GHz; 8 channels • 5.745 to 5.825 GHz; 5 channels <p>S (S regulatory domain):</p> <ul style="list-style-type: none"> • 2.412 to 2.472 GHz; 13 channels • 5.180 to 5.320 GHz; 8 channels • 5.660 to 5,805 GHz; 7 channels <p>T (T regulatory domain):</p> <ul style="list-style-type: none"> • 2.412 to 2.462 GHz; 11 channels • 5.280 to 5.320 GHz; 3 channels • 5.500 to 5.700 GHz; 8 channels (excludes 5.600 to 5.640 GHz) • 5.745 to 5.825 GHz; 5 channels <p>Z (Z regulatory domain):</p> <ul style="list-style-type: none"> • 2.412 to 2.462 GHz; 11 channels • 5.180 to 5.320 GHz; 8 channels • 5.500 to 5.700 GHz; 8 channels (excludes 5.600 to 5.640 GHz) • 5.745 to 5.825 GHz; 5 channels

Note: Customers are responsible for verifying approval for use in their individual countries. To verify approval and to identify the regulatory domain that corresponds to a particular country, visit <https://www.cisco.com/go/aironet/compliance>.

Maximum number of nonoverlapping channels	<p>2.4 GHz</p> <ul style="list-style-type: none"> • 802.11b/g: <ul style="list-style-type: none"> ◦ 20 MHz: 3 • 802.11n: <ul style="list-style-type: none"> ◦ 20 MHz: 3 	<p>5 GHz</p> <ul style="list-style-type: none"> • 802.11a: <ul style="list-style-type: none"> ◦ 20 MHz: 25 FCC, 16 EU • 802.11n: <ul style="list-style-type: none"> ◦ 20 MHz: 25 FCC, 16 EU ◦ 40 MHz: 12 FCC, 7 EU ◦ 20 MHz: 25 FCC, 16 EU ◦ 40 MHz: 12 FCC, 7 EU ◦ 80 MHz: 6 FCC, 3 EU ◦ 160 MHz: 2 FCC, 1 EU
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Note: This varies by regulatory domain. Refer to the product documentation for specific details for each regulatory domain.

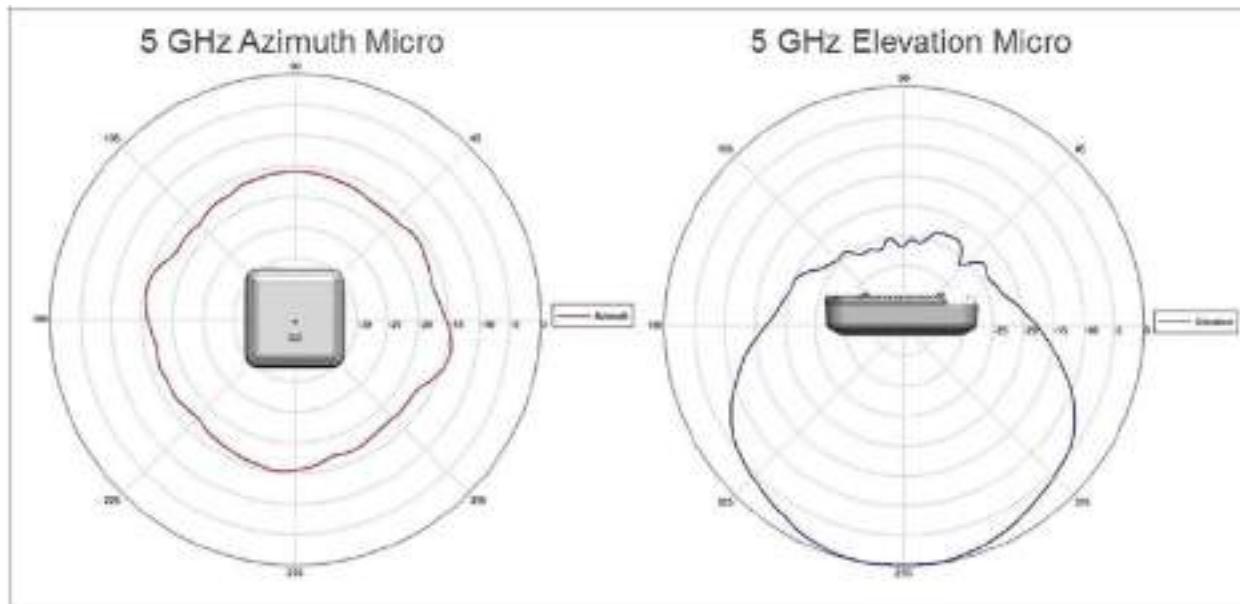
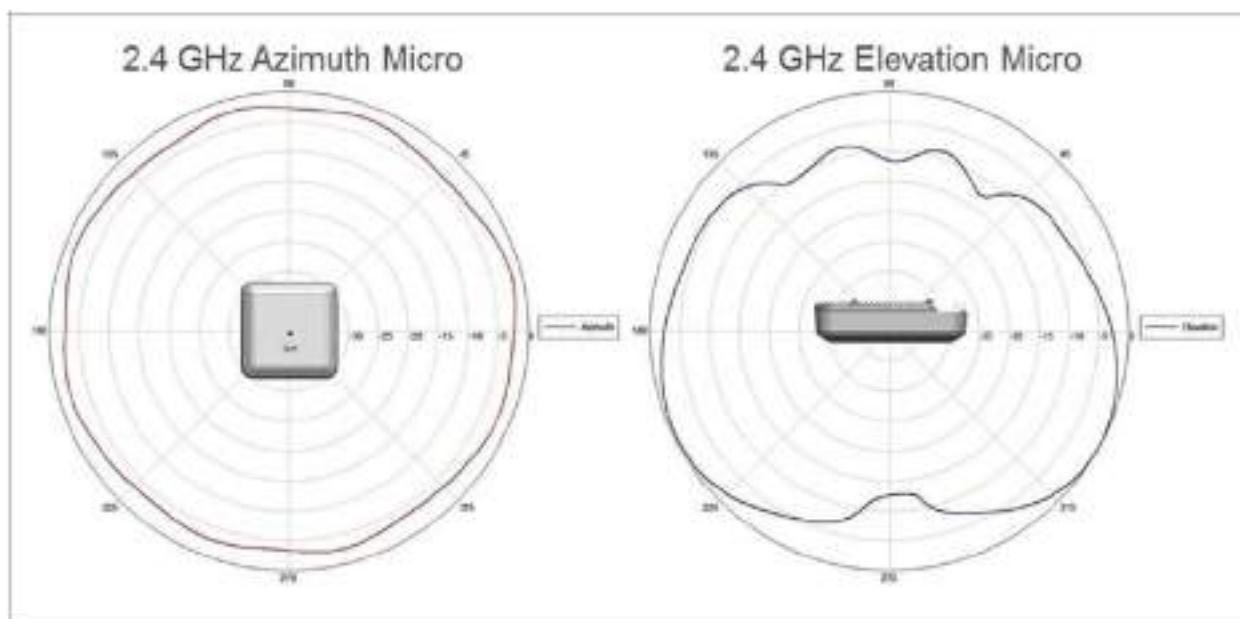
Item	Specification
Compliance standards	<ul style="list-style-type: none"> ◦ UL 60950-1 ◦ CAN/CSA-C22.2 No. 60950-1 ◦ UL 2043 ◦ IEC 60950-1 ◦ EN 60950-1 ◦ EN 50155 for 2800e (Operating temperature -20° to 50° C) ● Radio approvals: <ul style="list-style-type: none"> ◦ FCC Part 15.107, 15.109, 15.247, 15.407, 14-30 ◦ RSS-247 (Canada) ◦ EN 300.328, EN 301.893 (Europe) ◦ ARIB-STD 66 (Japan) ◦ ARIB-STD T71 (Japan) ◦ EMI and susceptibility (Class B) ◦ ICES-003 (Canada) ◦ VCCI (Japan) ◦ EN 301.489-1 and -17 (Europe) ◦ EN 60601-1-2 EMC requirements for the Medical Directive 93/42/EEC ● IEEE standards: <ul style="list-style-type: none"> ◦ IEEE 802.11a/b/g, 802.11n, 802.11h, 802.11d ◦ IEEE 802.11ac ● Security: <ul style="list-style-type: none"> ◦ 802.11i, Wi-Fi Protected Access 3 (WPA3), WPA2, WPA ◦ 802.1X ◦ Advanced Encryption Standards (AES) ● Extensible Authentication Protocol (EAP) types: <ul style="list-style-type: none"> ◦ EAP-Transport Layer Security (TLS) ◦ EAP-Tunneled TLS (TTLS) or Microsoft Challenge Handshake Authentication Protocol Version 2 (MSCHAPv2) ◦ Protected EAP (PEAP) v0 or EAP-MSCHAPv2 ◦ EAP-Flexible Authentication via Secure Tunneling (FAST) ◦ PEAP v1 or EAP-Generic Token Card (GTC) ◦ EAP-Subscriber Identity Module (SIM) ● Multimedia: <ul style="list-style-type: none"> ◦ Wi-Fi Multimedia (WMM) ● Other: <ul style="list-style-type: none"> ◦ FCC Bulletin OET-65C ◦ RSS-102

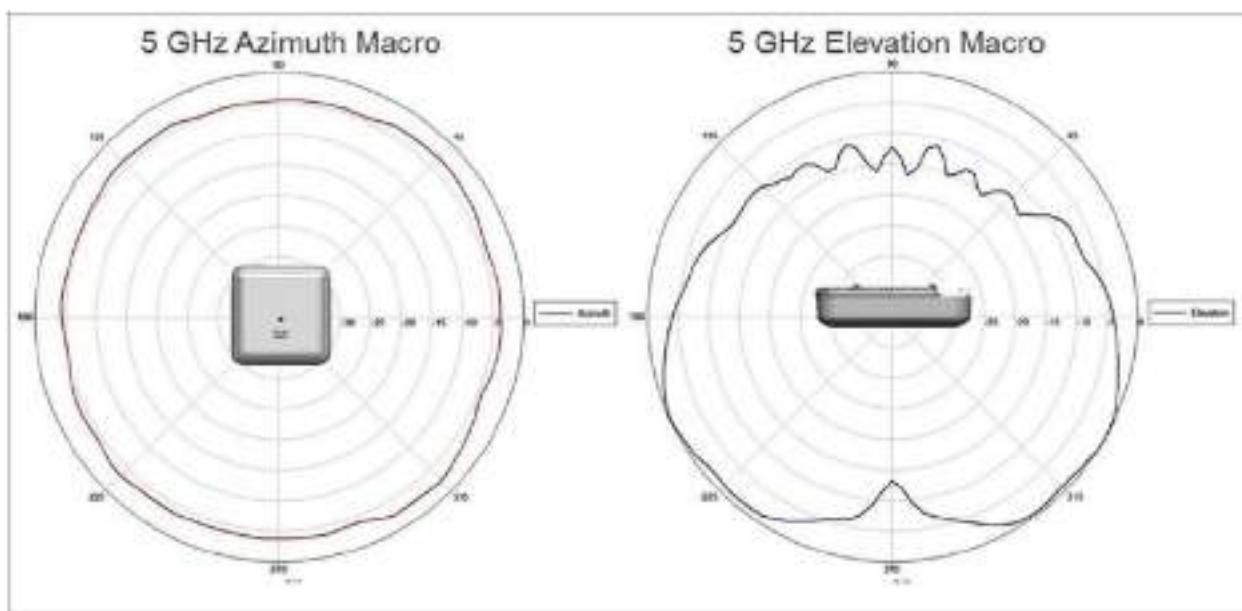
Item	Specification						
Data rates supported	802.11b: 1, 2, 5.5, and 11 Mbps 802.11a/g: 6, 9, 12, 18, 24, 36, 48, and 54 Mbps 802.11n HT20: 6.5 to 216.7 Mbps (MCS0 to MCS23) 802.11n HT40: 13.5 to 450 Mbps (MCS0 to MCS23) 802.11ac VHT20: 6.5 to 288.9 Mbps (MCS0 to 8 - SS 1, MCS0 to 9 - SS 2 and 3) 802.11ac VHT40: 13.5 to 600 Mbps (MCS0 to 9 - SS 1 to 3) 802.11ac VHT80: 29.3 to 1300 Mbps (MCS0 to 9 - SS 1 to 3) 802.11ac VHT160: 58.5 to 2304 Mbps (MCS0 to 9 - SS 1 and 2, MCS0 to 8 - SS 3)						
Transmit power and receive sensitivity							
Spatial streams	5-GHz radio		2.4-GHz flexible radio		5-GHz flexible radio		
	Total Tx power (dBm)	Rx sensitivity (dBm)	Total Tx power (dBm)	Rx sensitivity (dBm)	Total Tx power (dBm)	Rx sensitivity (dBm)	
802.11/11b							
1 Mbps	1	NA	NA	23	-101	NA	NA
11 Mbps	1	NA	NA	23	-88	NA	NA
802.11a/g							
6 Mbps	1	23	-93	23	-91	23	-92
24 Mbps	1	23	-89	23	-87	23	-89
54 Mbps	1	23	-81	23	-77	22	-80
802.11n HT20							
MCS0	1	23	-93	23	-91	23	-93
MCS4	1	23	-88	23	-86	23	-87
MCS7	1	23	-79	23	-77	22	-78
MCS8	2	23	-93	23	-91	21	-93
MCS12	2	23	-86	23	-85	23	-86
MCS15	2	23	-79	23	-77	21	-78
MCS16	3	23	-93	23	-91	23	-92
MCS20	3	23	-85	23	-84	22	-84
MCS23	3	23	-78	23	-76	18	-77

Item		Specification					
802.11n HT40							
MCS0	1	23	-90			23	-89
MCS4	1	23	-85			23	-84
MCS7	1	23	-76			23	-75
MCS8	2	23	-90			23	-89
MCS12	2	23	-83			23	-83
MCS15	2	23	-76			21	-76
MCS16	3	23	-90			23	-89
MCS20	3	23	-82			23	-81
MCS23	3	23	-75			20	-74
802.11ac VHT20							
MCS0	1	23	-93			23	-92
MCS4	1	23	-88			23	-87
MCS7	1	23	-82			22	-80
MCS8	1	23	-77			21	-75
MCS0	2	23	-93			23	-91
MCS4	2	23	-86			23	-84
MCS7	2	23	-79			21	-77
MCS8	2	23	-75			20	-73
MCS9	2	NA	NA			NA	NA
MCS0	3	23	-93			23	-91
MCS4	3	23	-85			22	-83
MCS7	3	23	-78			20	-76
MCS8	3	23	-74			19	-72
MCS9	3	23	-72			18	-70

Item		Specification					
802.11ac VHT40							
MCS0	1	23	-90			23	-89
MCS4	1	23	-85			23	-84
MCS7	1	23	-78			22	-77
MCS8	1	23	-75			21	-73
MCS9	1	23	-73			20	-72
MCS0	2	23	-90			23	-89
MCS4	2	23	-83			23	-82
MCS7	2	23	-76			21	-75
MCS8	2	23	-73			20	-72
MCS9	2	23	-71			19	-69
MCS0	3	23	-90			23	-89
MCS4	3	23	-82			23	-80
MCS7	3	23	-74			20	-73
MCS8	3	23	-70			19	-68
MCS9	3	23	-69			18	-67
802.11ac VHT80							
MCS0	1	23	-87			23	-86
MCS4	1	23	-83			23	-81
MCS7	1	23	-76			22	-74
MCS8	1	23	-72			21	-70
MCS9	1	23	-69			20	-68
MCS0	2	23	-87			23	-86
MCS4	2	23	-80			23	-79
MCS7	2	23	-73			21	-72
MCS8	2	23	-69			20	-68
MCS9	2	23	-67			19	-66

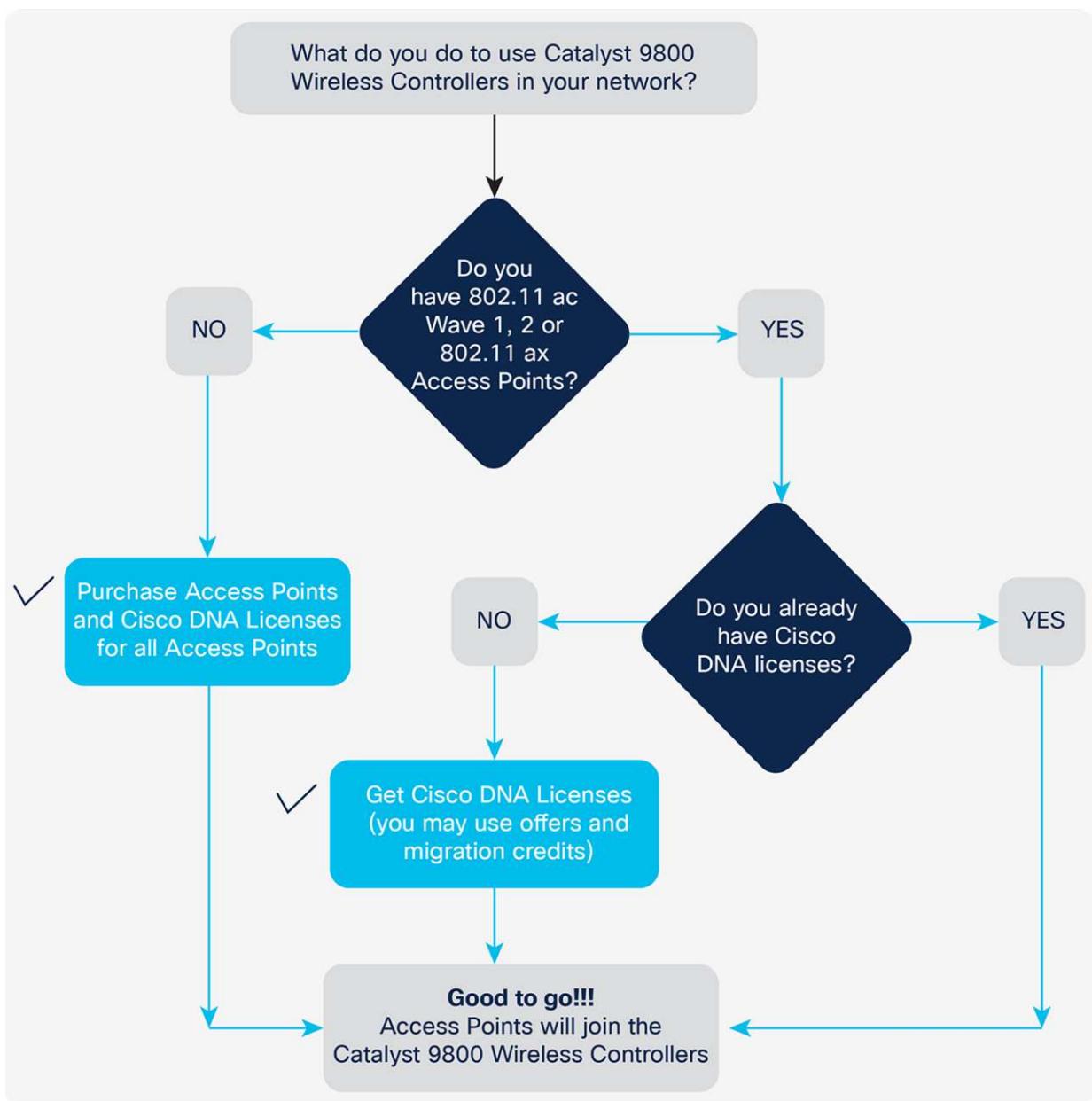
Item		Specification					
MCS0	3	23	-87			23	-86
MCS4	3	23	-77			23	-77
MCS7	3	23	-72			20	-70
MCS8	3	23	-67			19	-66
MCS9	3	22	-65			18	-64
802.11ac VHT160							
MCS0	1	23	-83			23	-83
MCS4	1	23	-78			23	-78
MCS7	1	23	-71			22	-71
MCS8	1	23	-67			21	-68
MCS9	1	23	-66			20	-66
MCS0	2	23	-83			23	-83
MCS4	2	23	-76			23	-76
MCS7	2	23	-69			21	-69
MCS8	2	23	-65			20	-66
MCS9	2	23	-63			19	-63
MCS0	3	23	-82			23	-83
MCS4	3	23	-74			22	-74
MCS7	3	23	-67			20	-68
MCS8	3	23	-62			19	-62





Licensing

In order to connect any access points to the **controller**, Cisco DNA software subscriptions are required. To be entitled to connect to a Cisco Catalyst 9800 Series Wireless Controller, the access point requires a Cisco DNA subscription license.



Access points connecting to a Cisco Catalyst 9800 Series controller have new and simplified software subscription packages.

They can support three tiers of Cisco DNA software: Cisco DNA Essentials and Cisco DNA Advantage.

Cisco DNA software subscriptions provide Cisco innovations on the access point. They also include perpetual Network Essentials and Network Advantage licensing options, which cover wireless fundamentals such as 802.1X authentication, Quality of Service (QoS), and Plug and Play (PnP); telemetry and visibility; and Single Sign-On (SSO), as well as security controls.

Cisco DNA subscription software has to be purchased for a 3-, 5-, or 7-year subscription term. If not renewed by the end of the term, Cisco DNA features will expire, whereas Network Essentials and Network Advantage features will remain.

For the full feature list of Cisco DNA Software, including the perpetual Network Essentials and Network Advantage, please see the feature matrix:

https://www.cisco.com/c/m/en_us/products/software/dna-subscription-wireless/en-sw-sub-matrix-wireless.html?oid=porew018984

Two modes of licensing are available:

- Smart Licensing (SL) simplifies and adds flexibility to licensing. It is:
 - Simple: Procure, deploy, and manage licenses easily. Devices self-register, removing the need for Product Activation Keys (PAKs).
 - Flexible: Pool license entitlements in a single account. Move licenses freely through the network, wherever you need them.
 - Smart: Manage your license deployments with real-time visibility into ownership and consumption.
- Specific License Reservation (SLR) is a feature used in highly secure networks. It provides a method for customers to deploy a software license on a device (product instance) without communicating usage information to Cisco. There is no communication with Cisco or a satellite. The licenses are reserved for every controller. It is node-based licensing.

Four levels of license are supported on the **Cisco Catalyst 9800 Series Wireless Controllers**. The controllers can be configured to function at any one of the four levels:

- Cisco DNA Essentials: At this level the Cisco DNA Essentials feature set will be supported.
- Cisco DNA Advantage: At this level the Cisco DNA Advantage feature set will be supported.
- NE: At this level the Network Essentials feature set will be supported.
- NA: At this level the Network Advantage feature set will be supported.

For customers who purchase Cisco DNA Essentials, Network Essentials will be supported and will continue to function even after term expiration. And for customers who purchase Cisco DNA Advantage, Network Advantage will be supported and will continue to function even after term expiration.

Initial bootup of the controller will be at the Cisco DNA Advantage level.

For questions, contact the Cisco Catalyst 9800 Series Wireless Controllers Licensing mailer group at [ask-catalyst9800licensing](#)

Warranty information

The Cisco Aironet 2800 Series Access Points come with a limited lifetime warranty that provides full warranty coverage of the hardware for as long as the original end user continues to own or use the product. The warranty includes 10-day advance hardware replacement and ensures that software media are defect-free for 90 days. For more details, visit <https://www.cisco.com/go/warranty>.

Cisco environmental sustainability

Information about Cisco's environmental sustainability policies and initiatives for our products, solutions, operations, and extended operations or supply chain is provided in the "Environment Sustainability" section of Cisco's [Corporate Social Responsibility](#) (CSR) Report.

Reference links to information about key environmental sustainability topics (mentioned in the "Environment Sustainability" section of the CSR Report) are provided in the following table:

Sustainability topic	Reference
Information on product material content laws and regulations	Materials
Information on electronic waste laws and regulations, including products, batteries, and packaging	WEEE compliance
Sustainability inquiries	Contact: csr_inquiries@cisco.com

Cisco makes the packaging data available for informational purposes only. It may not reflect the most current legal developments, and Cisco does not represent, warrant, or guarantee that it is complete, accurate, or up to date. This information is subject to change without notice.

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The Netherlands

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Product data sheet

Specifications



Galaxy VS UPS 25kW 208V with N+1 power module for external batteries, Start-up 5x8

GVSUPS25KRS

Overview

Presentation	Highly efficient, easy-to-deploy 25kW, 208V 3-phase UPS that brings best-in-class power protection and low total cost of ownership to edge, small and medium data centers, as well as to critical infrastructure in commercial and industrial applications. Includes 5x8 start-up service and one additional power module for N+1 redundancy.
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Lead time	Usually Ships within 2 Weeks
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Main

Main Input Voltage	208 V 3 phase
Other Input Voltage	200 V 220 V
Main Output Voltage	208 V 3 phase
Kw Rating	25 kW
Rated power in VA	25 kVA
Battery Type	External battery system Li-Ion (Lithium Ion) VRLA
Provided equipment	Dust filter EcoStruxure IT ready (UPS) Installation guide Integrated network management Power modules ship installed Start-Up Service
Range of Product	Galaxy VS
Range Compatibility	Galaxy VS

Batteries & Runtime

Battery Voltage	384-480VDC
End of Discharge Battery Voltage	307 V DC
End of Discharge Maximum Battery Current	85 A

General

Bypass Voltage Tolerance	+/- 10 %
Redundant	Yes
Product or Component Type	Uninterruptible power supply (UPS)

Physical

color	White
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Price is "List Price" and may be subject to a trade discount – check with your local distributor or retailer for actual price.

Height	58.46 in (148.5 cm)
Width	20.51 in (52.1 cm)
Depth	33.35 in (84.7 cm)
Net Weight	551.2 lb(US) (250 kg)

Input

Input Frequency	40 - 70 Hz
Efficiency at full load	177...239 V 208 V
Maximum Input Current per Phase	90 A
Maximum Short Circuit Withstand (lcw)	65 kA
Input Total Harmonic Distortion	Less than 3% for full load
Load power factor	From 0.7 leading to 0.7 lagging without any derating

Output

Max Configurable Power (Watts)	25 kW
Output Frequency (sync to mains)	50 Hz sync to mains 60 Hz sync to mains 50 Hz +/- 0.1 % for 50 Hz nominal not synced 60 Hz +/- 0.1 % for 60 Hz nominal not synced
Crest factor	2.5
Wave type	Sine wave
Output voltage tolerance	+/-1% after 50ms
Overload Operation	10 minutes @ 125% and 60 seconds @ 150%
Bypass type	Built-in Static Bypass
Maximum configurable power in VA	25 kVA

Conformance

Standards	IEC 62040-1-1 IEC 62040-2 UL 1778 5th edition FCC Part 15 class A IEC 60721-4-2 Level 2M2 UL 924 Listed
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Environmental

Ambient air temperature for operation	32...104 °F (0...40 °C)
Relative Humidity	0...95 % non-condensing
Operating altitude	0...3300 ft
Ambient Air Temperature for Storage	-13...131 °F (-25...55 °C)
Storage Relative Humidity	10...80 % non-condensing
Acoustic level	68 dBA
Online Thermal Dissipation	5526 Btu/h
IP degree of protection	IP21

Communications & Management

control panel	Touch Screen LCD User Interface
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Ordering and shipping details

GTIN 731304418573

Packing Units

Unit Type of Package 1	PCE
Number of Units in Package 1	1
Package 1 Height	58.46 in (148.5 cm)
Package 1 Width	20.51 in (52.1 cm)
Package 1 Length	33.35 in (84.7 cm)
Package 1 Weight	551.2 lb(US) (250 kg)

Contractual warranty

Warranty 1 year on-site repair or replace with factory authorized Start-Up



Environmental Data

Schneider Electric aims to achieve Net Zero status by 2050 through supply chain partnerships, lower impact materials, and circularity via our ongoing “Use Better, Use Longer, Use Again” campaign to extend product lifetimes and recyclability.

[Environmental Data explained >](#)

[How we assess product sustainability >](#)

Environmental footprint

Environmental Disclosure

[Product Environmental Profile](#)

Use Better

Materials and Substances

Packaging made with recycled cardboard	Yes
Packaging without single use plastic	No
EU RoHS Directive	Compliant with Exemptions
SCIP Number	7547f066-9302-46d9-96e9-461928dd6901
REACH Regulation	REACH Declaration

Energy efficiency

Optimized Energy Efficiency	Energy efficient product
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Use Again

Repack and remanufacture

Circularity Profile	End of Life Information
Take-back	Yes

24" Bar Handle Dishwasher

SHX878ZD5N

Stainless steel



Features and Benefits

Key Features

- A flexible 3rd rack with fold down sides adds 30% more loading area.
- InfoLight® Beams on Floor to Indicate Dishwasher is Running
- FlexSpace™ Tines fold back to fit your larger pots & pans
- AquaStop® Leak Protection Works 24/7

Design

- Full Size Stainless Steel Tall Tub Installs Perfectly Flush
- 16 Place Setting Capacity
- LED Remaining Time Display
- RackMatic® on Upper Rack - 3 Height Adjustments and Up to 9 Possible Rack Positions
- Flexible Silverware Basket Can be Split into Two Pieces and Placed Anywhere for Added Flexibility

Performance

- 6 Programs and 6 options
- Detergent Tray Optimizes Detergent Dissolving
- Speed60® gets your dishes from dirty to dry in about an hour.
- Extra Dry Option for Better Drying Results
- Load Size Sensor Automates Wash Temperature
- Sanitize Option Eliminates Bacteria and Enhances Drying Results
- ExtraScrub option increases pressure and temperature in the entire lower rack for hard to remove food stains.

Efficiency

- 269 kWh/yr - Energy Star®

Convenience

- 24 h Delay Start Timer
- Self-Latching Door



Notes: All height, width and depth dimensions are shown in inches. *Please refer to installation instructions prior to making cutout. BSH reserves the absolute and unrestricted right to change product materials and specifications, at any time, without notice. Consult the product's installation instructions for final dimensional data and other details. Applicable product warranty can be found in the accompanying product literature or you may contact your account manager for further details.

For more information on our entire line of products, go to boschappliances.com or call 1-800-944-2904.

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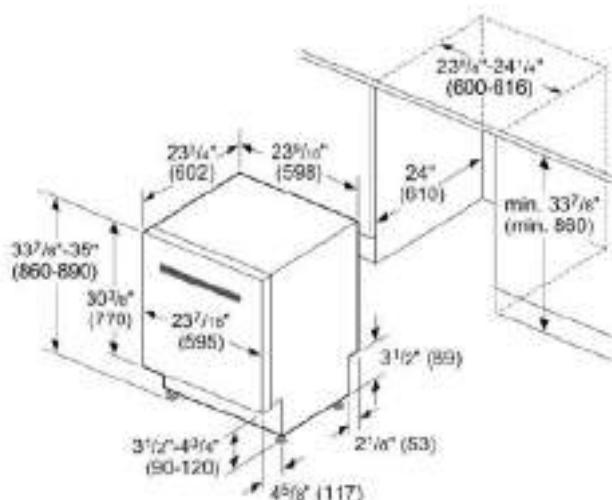
Litho Date: 05/2022



24" Bar Handle Dishwasher

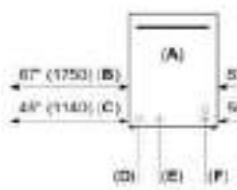
SHX878ZD5N

Stainless steel



measurements in inches (mm)

Measurements in inches (mm)



All connections are at the rear of the appliance. Extension for drain hose available as accessory.
Junction box for hard-wired connection available as accessory.

A: Front view
 B: Drain hose
 C: Electrical Power Cord; length shown according to Installation Instructions
 D: Inlet
 E: Drain
 F: Electrical

Features

Watts	1440
Fuse protection	12
Volts	120
Frequency	60
Power Cord Length	67"
Minimum Water Pressure	14.0
Length inlet hose (in)	
Length outlet hose (in)	78 3/4"
Overall appliance dimensions (HxWxD) (in)	33 7/8" x 23 9/16" x 24"
Required cutout size (HxWxD) (in)	33 7/8" x 23 9/16" x 24"
Adjustable feet	Yes - all from front

Technical Specification

Number of Options	6
Number of programmes	6
Third Rack	3rd Rack 2.0
Tub material	Stainless steel
Concealed heating element	Yes
Leak protection system	
Five-level wash	Yes
Water softener	No
ChildLock	No
Total annual energy consumption	269
Energy Efficiency Class	Tier 1
ENERGY STAR®	Yes
Total annual energy consumption	
Total annual water consumption	624
Number of place settings	16

Notes: All height, width and depth dimensions are shown in inches. *Please refer to installation instructions prior to making cutout. BSH reserves the absolute and unrestricted right to change product materials and specifications, at any time, without notice. Consult the product's installation instructions for final dimensional data and other details. Applicable product warranty can be found in the accompanying product literature or you may contact your account manager for further details.

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Litho Date: 05/2022





Samsung SMART Signage QBR Series

Display any content in ultra-high definition with incredibly rich color on slim, efficient signage.

About Samsung Electronics Co., Ltd.

Samsung Electronics Co., Ltd. inspires the world and shapes the future with transformative ideas and technologies. The company is redefining the worlds of TVs, smartphones, wearable devices, tablets, cameras, digital appliances, medical equipment, network systems, and semiconductor and LED solutions. For the latest news, please visit the Samsung Newsroom at news.samsung.com.

Through intelligent UHD upscaling technology, Samsung's QBR series performs edge restoration and noise reduction to deliver UHD picture quality even with lower resolution content. Backed by Tizen 4.0, the QBR series also provides reinforced capability with multiple web formats and secured protection. Additionally, its new slim design simplifies wall mounting and ensures seamless installation.

SMART Signage

For more information about Samsung SMART Signage QBR Series Displays, visit www.samsung.com/business or www.samsung.com/displayssolutions

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Samsung Electronics Co., Ltd.
416, Maetan 3-dong, Yeongtong-gu, Suwon-si, Gyeonggi-do 443-772, Korea

2019-03

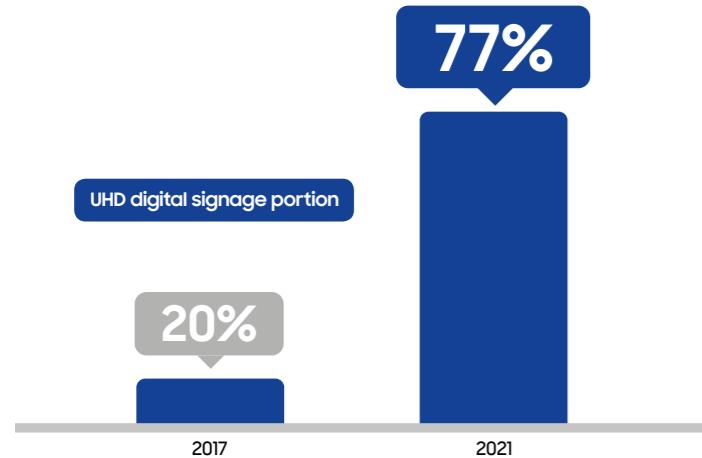
Highlights

- Engage customers with lifelike images through ultra high-definition resolution
- Deliver UHD-level picture quality even with lower resolution content through innovative UHD upscaling technology and unique picture-enhancing features
- Dynamic Crystal Color allows viewers to enjoy a wider spectrum of colors, up to one billion shades
- New symmetrical, slim design simplifies installation and complements any environment.
- Secure, PC-free operation through Knox and rigid three-layer protection

Industry trend

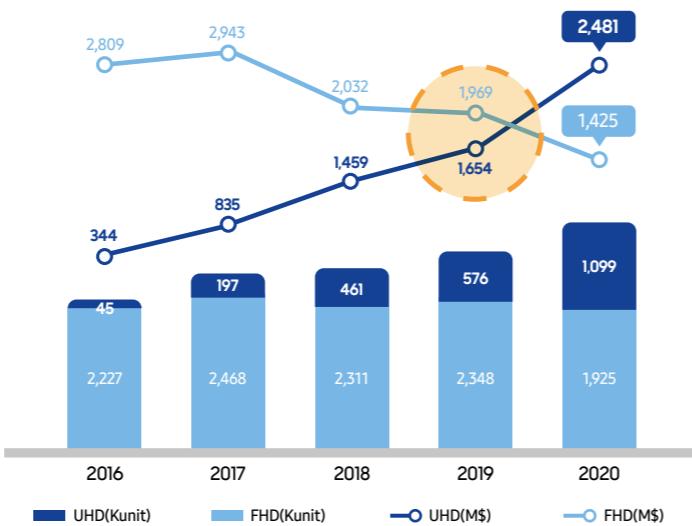
With visual display technology improving across devices, viewers have developed an ever-growing expectation for better picture quality. Additionally, the market has been flooded with a wide variety of color technologies and it's becoming increasingly important for businesses to have rich and vivid display capabilities. As UHD resolution continues to grow in popularity, it is essential for businesses to deliver superb picture quality for their customers. Low quality displays and signage can create negative perceptions of a business. While much content is still being produced at a lower resolution, through Intelligent UHD upscaling technology, Samsung's QBR series is able to upscale even the lowest resolution content to UHD picture quality standards.

UHD resolution is must-have feature in the future



* Source : IHS '18.2Q Final+Forecast(\$)]

UHD sales forecasted to exceed FHD in 2019



* Source : IHS '18.2Q Final+Forecast

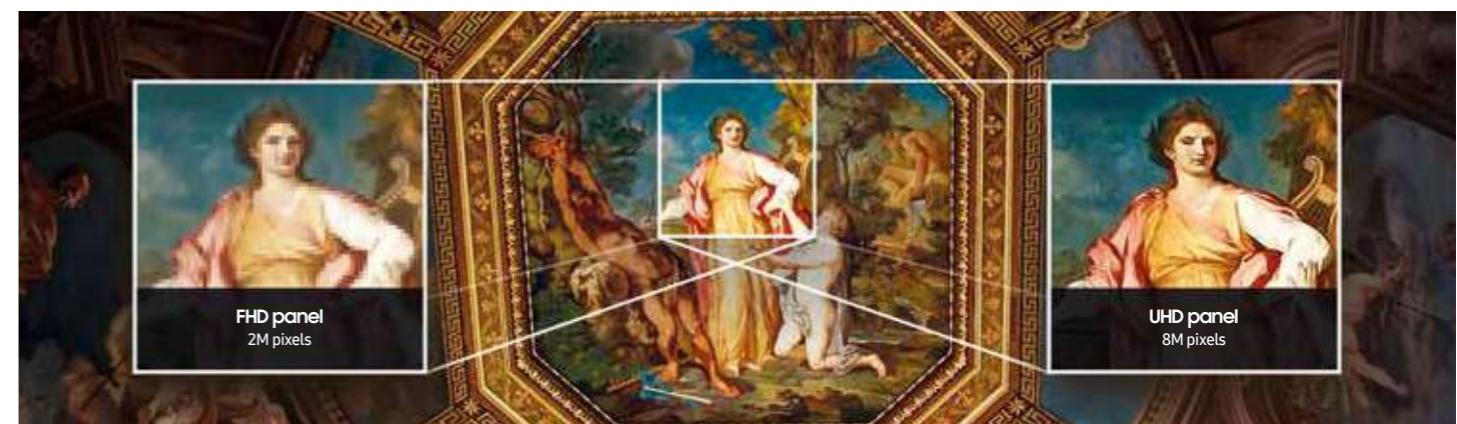
* Note : Standalone digital signage only
Consumer TVs, along with Commercial Lite and Hospitality TVs used for signage are excluded.

Why Samsung's QBR series?

Samsung's superior visual display technology has positioned them as the industry leader in the digital signage market for a decade and in the TV market for 12 years. As an expert in picture quality in the display industry, Samsung is able to deliver best-in-class picture quality through their new QBR series. The signage provides rich and flawless colors, sleek and durable design, powerful performance through Tizen 4.0 and secured protection. Samsung's QBR series is also able to upscale even the lowest resolution content to UHD picture quality. For commercial displays, this technology advancement means highly visible signage with unmatched accuracy to help capture the attention of potential customers. It also means savings both in cost and time for businesses who can produce content more inexpensively at a lower resolution and still display it in stunning UHD quality.



Key features

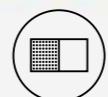


Incredible 4K picture quality

Samsung's new QBR series is able to capture customer attention by providing an incredibly clear picture, showcasing lifelike images and intricate details better than ever before thanks to ultra high-definition 4K resolution.



Intelligent UHD engine



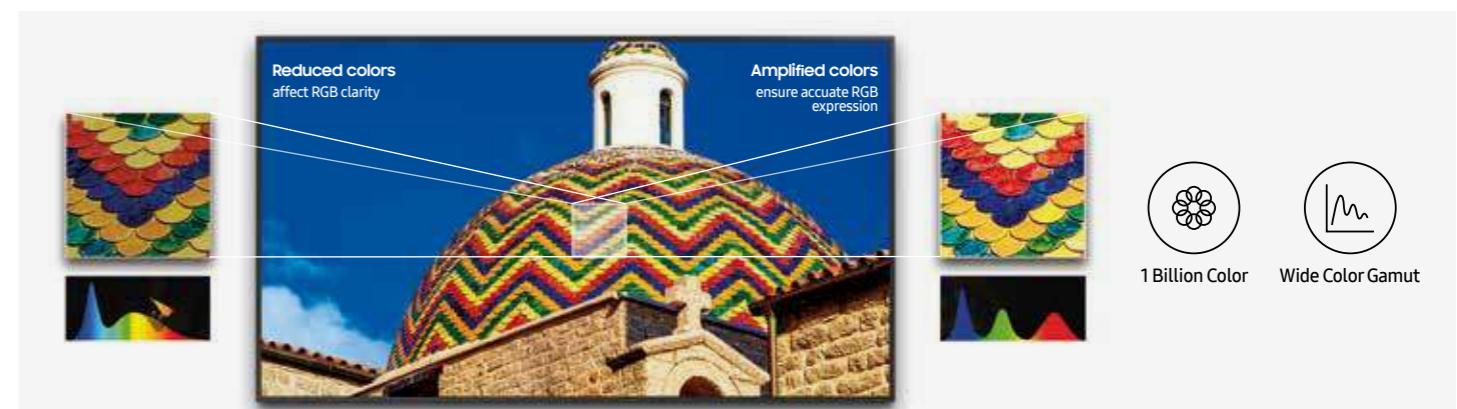
Noise Reduction



Edge Restoration

Intelligent UHD upscaling

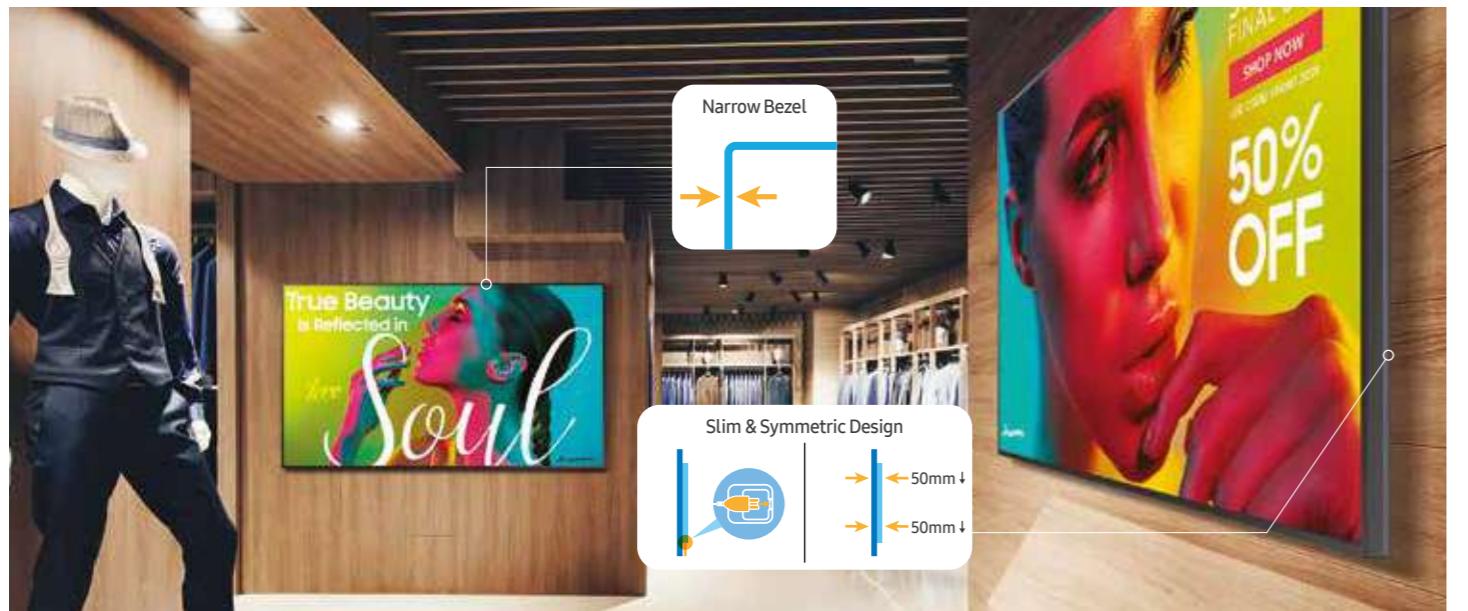
Samsung's global leadership in display technology and picture quality spans more than a decade. Thanks to superior semi-conductor technology, Samsung has developed the most powerful video processor available. Additionally, intelligent UHD upscaling technology is a cutting-edge solution based on Samsung's proprietary intelligent UHD engine that allows content developed at a lower resolution to be elevated to UHD-level quality. It also performs edge restoration and noise reduction to optimize on-screen text and imagery with crisp edges and fine detail.



Dynamic crystal color

Dynamic Crystal Color is what brings the incredible, lifelike color to Samsung displays. Using 10-bit processing, the displays are able to showcase a wider spectrum of colors — up to a billion different shades — capturing subtle differences for flawless color expression, critical to businesses in ensuring brand consistency across communication channels. The QBR series also features HDR10+ functionality that converts standard definition (SDR) content to HDR quality for sharper contrast and more vivid colors.

Key features



Slim and symmetrical design

The all-new slim and symmetrical design of the QBR series significantly simplifies wall mounting the display and ensures installation is a seamless process. The display's power inlet direction has been redesigned to sit flush against the wall. The new design sets guarantees a long life cycle ensuring the QBR series will stand the test of time.



Powerful, all-in-one solution

The Samsung SMART Signage Platform (SSSP) is an open-source, all-in-one solution embedded in Samsung SMART signage that simplifies installation and maintenance. With SSSP, there is no need for any external devices to communicate with the server or play digital media enjoying easy development, reinforced capability with multiple web formats, and secured protection.

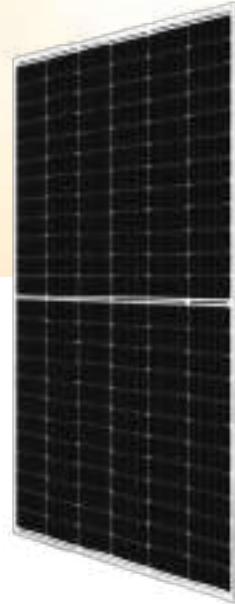
Wi-Fi and Bluetooth built-in

The QBR series features a nearly endless range of business use-cases thanks to built-in Wi-Fi and Bluetooth. Wireless connectivity allows for personalized and interactive services including enabling integration with beacon technology in store, while also simplifying how businesses showcase content.

* Image is for illustrative purposes only, specific application or program may have to be developed for the depicted usage scenario.

Specifications

Model		QB43R	QB49R	QB55R	QB65R	QB75R
Panel	Diagonal Size	Class	43	49	55	65
	Measured		42.5	48.5	54.6	64.5
	Type	Edge LED BLU	Edge LED BLU	Edge LED BLU	Edge LED BLU	Edge LED BLU
	Resolution	UHD (3840 x 2160)	UHD (3840 x 2160)	UHD (3840 x 2160)	UHD (3840 x 2160)	UHD (3840 x 2160)
	Pixel Pitch (mm)	0.2451 x 0.2451	0.093 x 0.279	0.015 x 0.315	0.372 x 0.372	0.42975 x 0.42975
	Active Display Area	941.18(H) x 529.46 (V)	1073.78(H) x 604.00(V)	1209.6(H) x 680.4(V)	1428.48 (H) x 803.52 (V)	1650.24 (H) x 928.26 (V)
	Brightness(Typ.)	350	350	350	350	350
	Contrast Ratio (Typ.)	5000:1	4700:1	4700:1	4000:1	4000:1
	Viewing Angle(H/V)	178/178	178/178	178/178	178/178	178/178
	Response Time (G to G)	8ms(Typ.)	8ms(Typ.)	8ms(Typ.)	8ms(Typ.)	8ms(Typ.)
	Display Colors	16.7M	16.7M	16.7M	16.7M	16.7M
Display	Color Gamut	92%	92%	92%	92%	92%
	Operation Hour	16/7	16/7	16/7	16/7	16/7
	Haze	2%	2%	2%	2%	2%
	DYNAMIC C/R	MEGA	MEGA	MEGA	MEGA	MEGA
	H-Scanning Frequency	30 ~ 81kHz	30 ~ 81kHz	30 ~ 81kHz	30 ~ 81kHz	30 ~ 81kHz
Sound	V-Scanning Frequency	48 ~ 75Hz	48 ~ 75Hz	48 ~ 75Hz	48 ~ 75Hz	48 ~ 75Hz
	Maximum Pixel Frequency	594MHz	594MHz	594MHz	594MHz	594MHz
	Speaker Type	Built in Speaker(10W+10W)	Built in Speaker(10W+10W)	Built in Speaker(10W+10W)	Built in Speaker(10W+10W)	Built in Speaker(10W+10W)
Connectivity	INPUT	RGB	DVI-D	DVI-D	DVI-D	DVI-D
		VIDEO	HDMI 2.0 (2)	HDMI 2.0 (2)	HDMI 2.0 (2)	HDMI 2.0 (2)
		HDCP	HDCP 2.2	HDCP 2.2	HDCP 2.2	HDCP 2.2
		AUDIO	Stereo Mini Jack, DVI/HDMI/ Audio(Common)			
		USB	USB 2.0 x 2			
	OUTPUT	RGB	N/A	N/A	N/A	N/A
		VIDEO	N/A	N/A	N/A	N/A
		AUDIO	Stereo Mini Jack	Stereo Mini Jack	Stereo Mini Jack	Stereo Mini Jack
		Power Out	N/A	N/A	N/A	N/A
		USB	N/A	N/A	N/A	N/A
	EXTERNAL CONTROL	RS232C(in/out) thru stereo jack, RJ45	RS232C(in/out) thru stereo jack, RJ45	RS232C(in/out) thru stereo jack, RJ45	RS232C(in/out) thru stereo jack, RJ45	RS232C(in/out) thru stereo jack, RJ45
	EXTERNAL SENSOR	IR	IR	IR	IR	IR
	Tuner	N/A	N/A	N/A	N/A	N/A
Power	Type	Internal	Internal	Internal	Internal	Internal
	Power Supply	AC100 - 240 V~ (+/- 10%), 50/60 Hz	AC100 - 240 V~ (+/- 10%), 50/60 Hz	AC100 - 240 V~ (+/- 10%), 50/60 Hz	AC100 - 240 V~ (+/- 10%), 50/60 Hz	AC100 - 240 V~ (+/- 10%), 50/60 Hz
	Power Consumption	Max[W/h]	TBU	138	143	TBU
		Typical[W/h]	TBU	103	108	TBU
		Rating[W/h]	TBU	125	130	TBU
		BTU(Max)	TBU	351.2	487.6	TBU
		Sleep mode	0.5	0.5	0.5	0.5
	Off mode	N/A	N/A	N/A	N/A	N/A
Mechanical Spec	Dimension(mm)	Set	967.5 x 557.7 x 48.3	1099.2 x 631.5 x 46.3	1235.1 x 707.9 x 46.3	1453.9 x 831.0 x 46.3
		Package	1095 x 676 x 151	1247 x 772 x 152	1402 x 858 x 163	1611 x 973 x 185
	Weight (kg)	Set	10	13.5	18.1	24.9
		Package	13.3	18	23.6	33.3
	VESA Mount	200 X200	200 X200	200 X200	400 X400	400 X400
Operation	Protection Glass	N/A	N/A	N/A	N/A	N/A
	Stand Type	Foot Stand (Optional)	Foot Stand (Optional)	Foot Stand (Optional)	No	No
	Bezel Width (Top/Side/Bot) (mm)	9.2mm(U/L/R),11.2mm(B)	9.2mm(U/L/R),11.2mm(B)	9.2mm(U/L/R),11.2mm(B)	9.2mm(U/L/R),11.2mm(B)	11.5mm(U/L/R),12.5mm(B)
	Operating Temperature	0°C~40°C	0°C~40°C	0°C~40°C	0°C~40°C	0°C~40°C
Feature	Humidity	10~80%	10~80%	10~80%	10~80%	10~80%
	Key	UHD Signage Display Slim & Light Signage with Built-in MagicInfo S6, SSSP 6.0	UHD Signage Display Slim & Light Signage with Built-in MagicInfo S6, SSSP 6.0	UHD Signage Display Slim & Light Signage with Built-in MagicInfo S6, SSSP 6.0	UHD Signage Display Slim & Light Signage with Built-in MagicInfo S6, SSSP 6.0	UHD Signage Display Slim & Light Signage with Built-in MagicInfo S6, SSSP 6.0
		H/W	Temperature Sensor,Pivot Display, Clock Battery(168hrs Clock Keeping), Built in Speaker(10W 2ch),IPx5 Rating, Wi-Fi/BT	Temperature Sensor,Pivot Display, Clock Battery(168hrs Clock Keeping), Built in Speaker(10W 2ch),IPx5 Rating, Wi-Fi/BT	Temperature Sensor,Pivot Display, Clock Battery(168hrs Clock Keeping), Built in Speaker(10W 2ch),IPx5 Rating, Wi-Fi/BT	Temperature Sensor,Pivot Display, Clock Battery(168hrs Clock Keeping), Built in Speaker(10W 2ch),IPx5 Rating, Wi-Fi/BT
			Auto Source Switching & Recovery, LFD Home UI, Button Lock, Hot key option, Plug&Play(Initial Setting)	Auto Source Switching & Recovery, LFD Home UI, Button Lock, Hot key option, Plug&Play(Initial Setting)	Auto Source Switching & Recovery, LFD Home UI, Button Lock, Hot key option, Plug&Play(Initial Setting)	Auto Source Switching & Recovery, LFD Home UI, Button Lock, Hot key option, Plug&Play(Initial Setting)
	"Internal Player (Embedded H/W)"	Processor	Coretex A71.2GHz Quad-Core CPU			
		On-Chip Cache Memory	L1 Instruction Cache : 48KB L1 Data Cache : 32KB L2 Cache : 2MB	L1 Instruction Cache : 48KB L1 Data Cache : 32KB L2 Cache : 2MB	L1 Instruction Cache : 48KB L1 Data Cache : 32KB L2 Cache : 2MB	L1 Instruction Cache : 48KB L1 Data Cache : 32KB L2 Cache : 2MB
		Clock Speed	1.7GHz	1.7GHz	1.7GHz	1.7GHz
		Main Memory Interface	2.5GB LPDDR41.5GHz 64bit	2.5GB LPDDR41.5GHz 64bit	2.5GB LPDDR41.5GHz 64bit	2.5GB LPDDR41.5GHz 64bit
		Graphics	Graphic resolution : 1920x1080 Output resolution : 3840x2160 (Scale up from graphic processing result.)	Graphic resolution : 1920x1080 Output resolution : 3840x2160 (Scale up from graphic processing result.)	Graphic resolution : 1920x1080 Output resolution : 3840x2160 (Scale up from graphic processing result.)	Graphic resolution : 1920x1080 Output resolution : 3840x2160 (Scale up from graphic processing result.)
		Storage (FDM)	8GB (3.88GB Occupied by O/S, 4.12GB Available)			
		Multimedia	*Video Decoder : MPEG-1/2/4,H.263, H.264/AVC, H.265/H.264/AVC, VC-1, AVS+, HEVC, JPEG, PNG, VP8, VP9 *Au- dio Decoder: AC3 (DD), MPEG	*Video Decoder : MPEG-1/2/4,H.263, H.264/AVC, H.265/H.264/AVC, VC-1, AVS+, HEVC, JPEG, PNG, VP8, VP9 *Au- dio Decoder: AC3 (DD), MPEG	*Video Decoder : MPEG-1/2/4,H.263, H.264/AVC, H.265/H.264/AVC, VC-1, AVS+, HEVC, JPEG, PNG, VP8, VP9 *Au- dio Decoder: AC3 (DD), MPEG	*Video Decoder : MPEG-1/2/4,H.263, H.264/AVC, H.265/H.264/AVC, VC-1, AVS+, HEVC, JPEG, PNG, VP8, VP9 *Au- dio Decoder: AC3 (DD), MPEG
		IO Ports	USB 2.0	USB 2.0	USB 2.0	USB 2.0
		Operating System	Tizen 4.0 (VLDlinux)	Tizen 4.0 (VLDlinux)	Tizen 4.0 (VLDlinux)	Tizen 4.0 (VLDlinux)
Certification	Safety	60950-1	60950-1	60950-1	60950-1	60950-1
	EMC	Class B	Class B	Class B	Class B	Class B
	Environment	ENERGY STAR 7.0 (USA)	ENERGY STAR 7.0 (USA)	ENERGY STAR 7.0 (USA), Epeat	ENERGY STAR 7.0 (USA), Epeat	ENERGY STAR 7.0 (USA), Epeat
Accessories	Included	Quick Setup Guide, Warranty Card, Power Cord, Remote Controller, Batteries	Quick Setup Guide, Warranty Card, Power Cord, Remote Controller, Batteries	Quick Setup Guide, Warranty Card, Power Cord, Remote Controller, Batteries	Quick Setup Guide, Warranty Card, Power Cord, Remote Controller, Batteries	Quick Setup Guide, Warranty Card, Power Cord, Remote Controller, Batteries
	Optional	Stand	STN-L4355F	STN-L4355F	STN-L4355F	No
		Mount	WMN4070SE	WMN4070SE	WMN4070SE	WMN4277SE WMN6575SE
		Specialty	CML400XK	CML400XK	CML400XK	CML450K
		Media Player	N/A	N/A	N/A	N/A



HiKu6 Mono PERC

530 W ~ 550 W

CS6W-530 | 535 | 540 | 545 | 550MS

MORE POWER



Module power up to 550 W
Module efficiency up to 21.5 %



Up to 4.5 % lower LCOE
Up to 5.6 % lower system cost



Comprehensive LID / LeTID mitigation technology, up to 50% lower degradation



Compatible with mainstream trackers,
cost effective product for utility power plant



Better shading tolerance

MORE RELIABLE



Minimizes micro-crack impacts



Heavy snow load up to 5400 Pa,
wind load up to 2400 Pa*



Enhanced Product Warranty on Materials and Workmanship*



Linear Power Performance Warranty*

1st year power degradation no more than 2%
Subsequent annual power degradation no more than 0.55%

*According to the applicable Canadian Solar Limited Warranty Statement.

MANAGEMENT SYSTEM CERTIFICATES*

ISO 9001:2015 / Quality management system
ISO 14001:2015 / Standards for environmental management system
ISO 45001: 2018 / International standards for occupational health & safety

PRODUCT CERTIFICATES*

IEC 61215 / IEC 61730 / CE / INMETRO / MCS / UKCA
CEC listed (US California)
UL 61730 / IEC 61701 / IEC 62716 / IEC 60068-2-68
UNI 9177 Reaction to Fire: Class 1 / Take-e-way



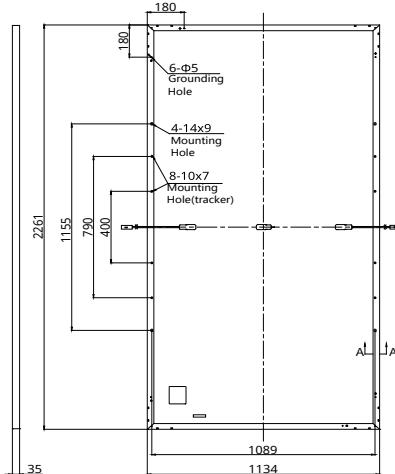
* The specific certificates applicable to different module types and markets will vary, and therefore not all of the certifications listed herein will simultaneously apply to the products you order or use. Please contact your local Canadian Solar sales representative to confirm the specific certificates available for your Product and applicable in the regions in which the products will be used.

CSI SOLAR (USA) CO., LTD. is committed to providing high quality solar photovoltaic modules, solar energy and battery storage solutions to customers. The company was recognized as the No. 1 module supplier for quality and performance/price ratio in the IHS Module Customer Insight Survey. Over the past 20 years, it has successfully delivered over 63 GW of premium-quality solar modules across the world.

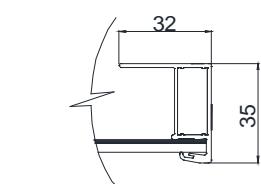
* For detailed information, please refer to Installation Manual.

ENGINEERING DRAWING (mm)

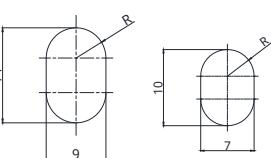
Rear View



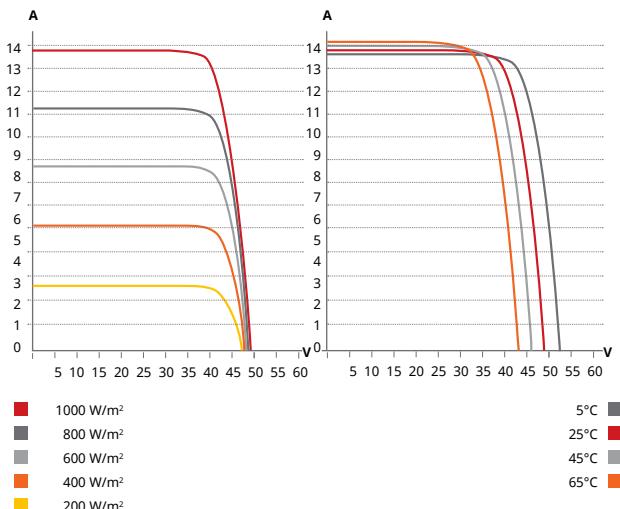
Frame Cross Section A-A



Mounting Hole



CS6W-530MS / I-V CURVES



ELECTRICAL DATA | STC*

CS6W	530MS	535MS	540MS	545MS	550MS
Nominal Max. Power (Pmax)	530 W	535 W	540 W	545 W	550 W
Opt. Operating Voltage (Vmp)	40.9 V	41.1 V	41.3 V	41.5 V	41.7 V
Opt. Operating Current (Imp)	12.96 A	13.02 A	13.08 A	13.14 A	13.20 A
Open Circuit Voltage (Voc)	48.8 V	49.0 V	49.2 V	49.4 V	49.6 V
Short Circuit Current (Isc)	13.80 A	13.85 A	13.90 A	13.95 A	14.00 A
Module Efficiency	20.7%	20.9%	21.1%	21.3%	21.5%
Operating Temperature	-40°C ~ +85°C				
Max. System Voltage	1500V (IEC/UL) or 1000V (IEC/UL)				
Module Fire Performance	TYPE 1 (UL 61730 1500V) or TYPE 2 (UL 61730 1000V) or CLASS C (IEC 61730)				
Max. Series Fuse Rating	25 A				
Application Classification	Class A				
Power Tolerance	0 ~ + 10 W				

* Under Standard Test Conditions (STC) of irradiance of 1000 W/m², spectrum AM 1.5 and cell temperature of 25°C.

ELECTRICAL DATA | NMOT*

CS6W	530MS	535MS	540MS	545MS	550MS
Nominal Max. Power (Pmax)	397 W	401 W	405 W	409 W	412 W
Opt. Operating Voltage (Vmp)	38.3 V	38.5 V	38.7 V	38.9 V	39.1 V
Opt. Operating Current (Imp)	10.38 A	10.42 A	10.47 A	10.52 A	10.55 A
Open Circuit Voltage (Voc)	46.1 V	46.3 V	46.5 V	46.7 V	46.9 V
Short Circuit Current (Isc)	11.13 A	11.17 A	11.21 A	11.25 A	11.29 A

* Under Nominal Module Operating Temperature (NMOT), irradiance of 800 W/m² spectrum AM 1.5, ambient temperature 20°C, wind speed 1 m/s.

* The specifications and key features contained in this datasheet may deviate slightly from our actual products due to the on-going innovation and product enhancement. CSI Solar Co., Ltd. reserves the right to make necessary adjustment to the information described herein at any time without further notice.

Please be kindly advised that PV modules should be handled and installed by qualified people who have professional skills and please carefully read the safety and installation instructions before using our PV modules.

MECHANICAL DATA

Specification	Data
Cell Type	Mono-crystalline
Cell Arrangement	144 [2 x (12 x 6)]
Dimensions	2261 x 1134 x 35 mm (89.0 x 44.6 x 1.38 in)
Weight	27.8 kg (61.3 lbs)
Front Cover	3.2 mm tempered glass with anti-reflective coating
Frame	Anodized aluminium alloy
J-Box	IP68, 3 bypass diodes
Cable	4 mm² (IEC), 12 AWG (UL)
Cable Length (Including Connector)	Portrait: 410 mm (16.1 in) (+) / 290 mm (11.4 in) (-); landscape: 1400 mm (55.1 in) or customized length*
Connector	T4 or MC4 series
Per Pallet	30 pieces
Per Container (40' HQ)	600 pieces

* For detailed information, please contact your local Canadian Solar sales and technical representatives.

TEMPERATURE CHARACTERISTICS

Specification	Data
Temperature Coefficient (Pmax)	-0.34 % / °C
Temperature Coefficient (Voc)	-0.26 % / °C
Temperature Coefficient (Isc)	0.05 % / °C
Nominal Module Operating Temperature	41 ± 3°C

PARTNER SECTION



Control® 25-1

Professional Series – Compact Indoor/Outdoor Background/Foreground Speaker



Key Features:

- Components:
 - 5-1/4" woofer with woven fiberglass cone
 - 3/4" PEI diaphragm tweeter with fluid cooling
- Contemporary, high-design appearance
- Built-in InvisiBall® mounting hardware*, plus available U-bracket
- Weather resistant enclosure and transducers
- Wide 100° x 100° coverage
- 100 Watt power handling (200 Watt program) in direct 8Ω setting, plus built-in 30 Watt 70V/100V multi-tap transformer
- High fidelity sound character with broad frequency response of 60 Hz – 20 kHz



Description:

The Control 25-1 is a two-way 5" speaker with rich sonic character, wide coverage, consistent dispersion, versatile mounting, and a contemporary high-design look that fits into a wide range of decors. This makes Control 25-1 an excellent choice for a wide variety of applications, including retail stores, restaurants, health clubs, theme parks, educational facilities, hospitality, music cafes, leisure venues, and anywhere where a top quality high-output indoor/ outdoor foreground/background music (and/or paging) speaker is required.

The unique InvisiBall mounting hardware is included with each system, making short work of permanent installation. The InvisiBall mounting method provides a high degree of both vertical and horizontal rotation, and because InvisiBall adjustments are made through a hidden access behind the logo badge, the grille never needs to be removed, and there exists a high degree of theft deterrence as well. Integrated M6 mounting points for an optional U-bracket adds to the installation versatility.

The LF driver's woven fiberglass cone provides durability and weather capable performance. The light weight high temperature fiberglass voice coil former and high temperature voice coil wire ensure high sensitivity and high power handling, while also providing stable performance under long-term high-power working conditions. The pure butyl rubber surround delivers clean sound and robust operation. JBL's WeatherEdge™ is a seamless, rubberized extension of the woofer surround that provides added protection to critical transducer elements. Cone geometry is optimized for smooth frequency response and consistent off-axis performance, while an FEA-optimized motor construction and linear suspension spider helps to lower harmonic distortion.

The HF driver's low viscosity ferro-magnetic fluid increases voice coil cooling for higher long-term power handling. The softened PEI diaphragm delivers a smooth and pure high frequency sound quality. The light weight Kapton™ voice coil former increases durability while providing better high frequency response extension. All these factors also contribute toward making the driver especially rugged for outdoors and other stressful applications.

In addition to the driver designs contributing toward a high degree of weather resistance, the cabinet provides excellent endurance against sun, salt and moisture. Grilles are heavily zinc-plated and finished in a tough, high-grade powder coating for rust resistance. The optional MTC-25WMG WeatherMax™ grilles are available for especially difficult environments and to break up driving rain. Connection is made via weather-capable screw-down terminals. The optional MTC-PC2 and MTC-PC3 panel covers are available to protect the terminal compartment, providing a water-tight sealed gland-nut entrance (when used with round-jacketed cable within the specified diameter range).

The frequency response is extremely smooth, resulting in a very natural sound character, and the response extends down to 60 Hz, providing strong bass capability. The system is capable of handling 100 Watts continuous pink noise (200 Watts program) at its 8 ohm setting and is also equipped with a built-in 30 Watt 70V/100V multi-tap transformer for operation on distributed speaker lines. The combination of high sensitivity and power handling provides high Max SPL of 110 dB.

The Control 25-1 readily accepts a variety of paints and finishes to match any décor. Available in black or white (-WH).

Control® 25-1

Professional Series – Compact Indoor/Outdoor Background/Foreground Speaker



Specifications:

System

Frequency Range (-10 dB) ¹	60 Hz – 20 kHz
Frequency Response (+/-3 dB)	85 Hz – 17 kHz
Power Rating ²	200 W Continuous Program (2 hrs) 100 W (400W peak) Continuous Pink Noise (2 hrs) 75 W (300W peak) Continuous Pink Noise (100 hrs)
Maximum Input Voltage	25.3 V RMS (2 hrs), 50.6 V peak
Maximum SPL ³	110 dB average Continuous Pink Noise (116 dB peak)
Sensitivity ⁴	90 dB, 1W/1m (averaged 100 Hz – 10 kHz)
Coverage Angle ⁵	100° x 100°
Directivity Factor (Q)	6.04 (averaged 1 kHz – 16 kHz)
Directivity Index (DI)	7.6 dB (averaged 1 kHz – 16 kHz)
Nominal Impedance	8 ohms (THRU setting)
Crossover Type	2nd order low-pass, 3rd order high-pass

Circuitry

Transformer Taps	70V: 30W, 15W, 7.5W, 3.7W 100V: 30W, 15W, 7.5W Insertion Loss <0.94 dB at any tap setting Thru Setting: 8Ω nominal
Recommended Protective High-Pass ⁶	60 Hz high-pass (24 dB/oct) (for 8Ω operation and for all 70V/100V tap settings)

Transducers

Low Frequency	135 mm (5.25 in), woven-fiberglass cone with pure butyl rubber surround with Weather-Edge frame protection, high-temp fiberglass voice coil former, high-temp voice coil wire, optimized cone geometry, linear suspension spider, and FEA optimized motor structure.
High Frequency	19 mm (0.75 in) PEI diaphragm, low-viscosity ferro-magnetic fluid, and lightweight Kapton™ voice coil former.

Physical

Enclosure Material	High Impact Polystyrene (HIPS), painted with highly-UV resistant paint on white (-WH) version for maximum UV fade resistance.
Grille	Highly zinc-plated, finished in durable TGIC polyester powder coating. MTC-25WMG-1 (&-WH) available with Weather-Max™ multi-layer foam and tight-weave mesh vapor barrier backing.
Installation	InvisiBall wall-mounting system included. Two 6 mm attachment points (on top and bottom) for optional MTC-25UB-1 (&-WH) U-bracket. Secondary safety attachment loop point on back panel.

Environmental

IP-44 per IEC529 (IP-55 when installed with the optional MTC-25WMG-1 WeatherMax™ grille and either MTC-PC2 or MTC-PC3 panel cover.) Exceeds MilSpec 810 for humidity, salt-spray, temperature & UV. Passed MilStd-202F for salt spray and ASTM G85 for acid-air plus salt spray. Optional MTC-25WMG-1 WeatherMax™ grille for breaking up driving rain and for especially difficult environments.

Termination

Screw-down terminal strip, zinc-plated copper based, nickel-plated metal screws and washers. Accepts up to 9 mm outside 4 mm inside open lugs (#6, #8, or #10 lug), plus bare wire (up to 12 AWG / 2.5 mm²). Optional MTC-PC2 and MTC-PC3 protective panel covers available to provide sealed entrance for additional weather protection.

Agency Rating

ROHS-compliant; Transformer UL Recognized per UL1876

Colors

Black (RAL9004) or white (-WH, RAL9016)

Dimensions (H x W x D)⁷

243 x 188 x 145 mm (9.6 x 7.4 x 5.7 in); 203 mm (8.0 in) deep total when mounted on InvisiBall wall-mount bracket.

Net Weight (each)

3.4 kg (7.5 lb)

Shipping Weight (pair)

8.16 kg (18 lb)

Included Accessories

InvisiBall™ wall-mounting system, 6 mm x 100 mm hex key

Optional Accessories

- » MTC-25UB-1 – Yolk-type U-bracket (&-WH)
- » MTC-25WMG-1 – WeatherMax grille with backing (&-WH)
- » MTC-28/25CM – Ceiling-Mount InvisiBall adapter (&-WH)

¹ In half-space (on-wall, 2pi)

² At 8Ω setting. Continuous Pink Noise rating is IEC-shaped pink noise with a 6 dB crest factor. Continuous Program Power is defined as 3 dB above the Continuous Pink Noise Rating and is a conservative expression of the system's ability to handle normal speech and music program material.

³ Calculated from sensitivity and power handling, exclusive of power compression, at THRU setting

⁴ Half-space (on-wall), averaged 100 Hz – 10 kHz, 2.83V

⁵ Coverage angle (-6 dB), average between 1 kHz and 12 kHz

⁶ For protection against driving below resonant frequency and to keep transformer out of saturation

⁷ In vertical orientation

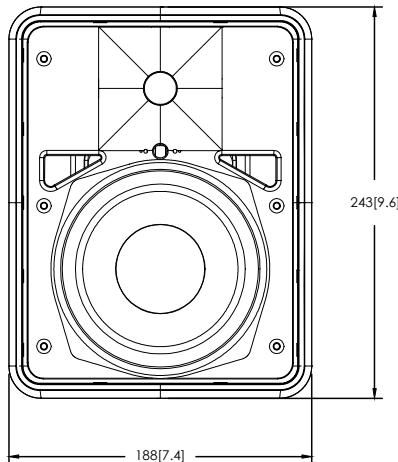
Control® 25-1

Professional Series – Compact Indoor/Outdoor Background/Foreground Speaker

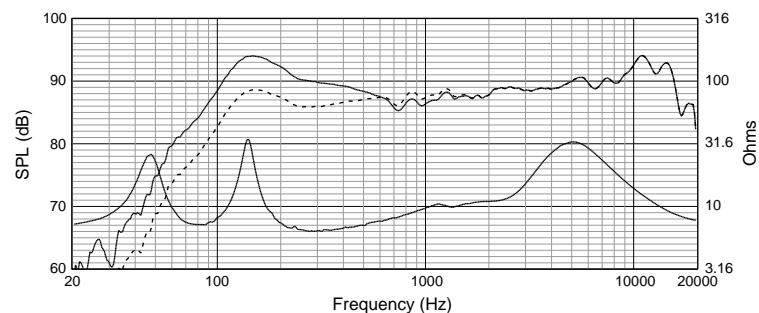


Mounting Dimensions:

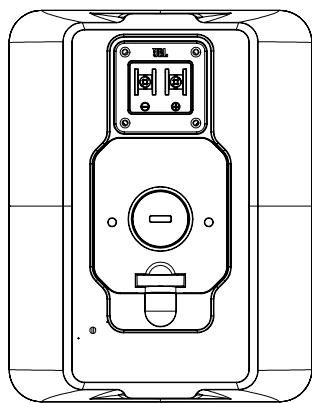
Dimensions in mm (inches)



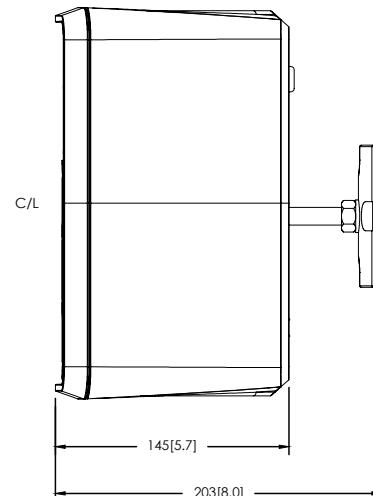
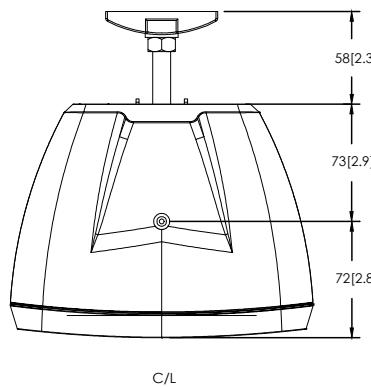
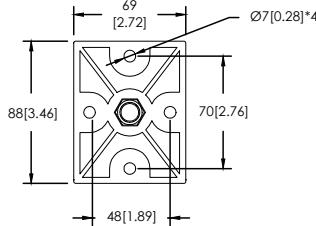
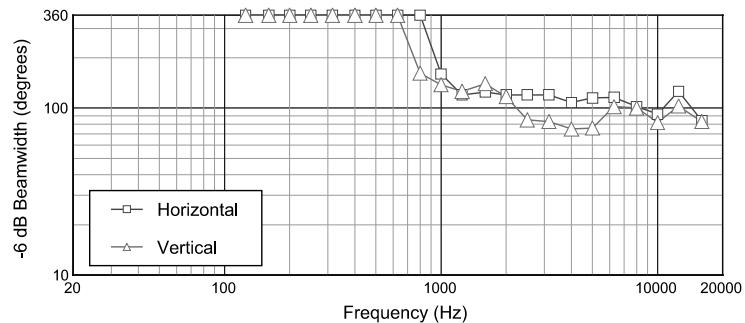
Frequency Response:



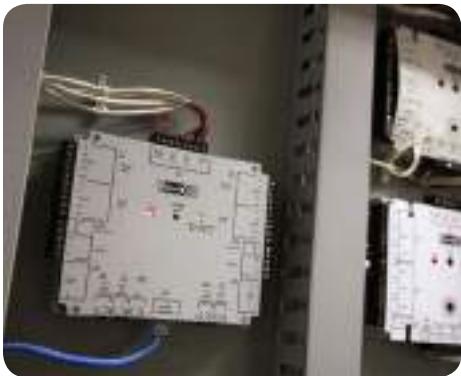
On-axis in half-space (2pi, solid line) and full-space (4pi, dotted line)
at thru (8Ω) setting Input Impedance



Beamwidth vs. Frequency:



VertX EVO™ V1000 Networked Controller



NETWORKED ACCESS CONTROLLER FOR INTERFACE WITH UP TO 32 DOOR CONTROLLERS

- **Open Architecture** – Development platform enables use of hardware with any OPIN compliant access control software from a wide variety of partners.
- **Master Controller** – Minimizes corporate Local Area Network (LAN) overhead by providing access control decisions for up to 64 readers.
- **High Performance** – Powerful platform performance increases door uptime.
- **Versatile Interoperability** – Works with standard VertX® Controllers and is interoperable with VertX V100, 200 and 300 interface modules.

Cable Specifications

Ethernet:

- 300ft (100m), CAT-5
- ALPHA 9504C, ALPHA 9405F
- RS-485 (for Vx00 connection):
- 4000ft (1219m), 2-twisted pair shielded 100Ω cable (two independent RS-485 networks)
- 22AWG Belden 3105

Input Circuits:

- 500ft (150m), 2-conductor shielded
- 22AWG ALPHA 1292C
- 18AWG ALPHA 2421C

Output Circuits:

- 500ft (150m), 2-conductor shielded
- 22AWG ALPHA 1172C
- 18AWG ALPHA 1897C

HID Global's Networked Access Solutions provide an open architecture development platform that enables HID's software partners to deploy a wide variety of versatile access control systems that protect their customers' hardware investments.

As part of HID Global's Networked Access Solutions, VertX EVO™ V1000 is a multi-door access control panel that reduces the burden on corporate LANs by connecting up to 32 door controllers using only one IP address.

VertX EVO V1000 handles all online door decisions, input monitoring and output control for all connected interface modules. The solution has two on-board inputs and outputs for local input point

monitoring and auxiliary output control, and is powered by a local power supply (12 or 24 VDC). VertX EVO V1000 works with standard VertX V100 door interface, V200 input monitor and V300 output control interface modules.

VertX EVO solutions are created for both on-site system administration as well as service oriented off-site solutions, depending on the OEM software provider's total solution.

Providing access to a complete ecosystem of partner solutions, VertX EVO enables customizable products that leverage the unique power of individual software provider offerings.

Features:

- Provides a complete and fully functional hardware/firmware infrastructure for access control software host systems.
- Enables the replacement of head end software without visiting the access control panel, reducing change out costs.
- Stores a complete access control and configuration database for up to 32 Reader Interfaces (up to 64 doors) and 250,000 cardholders.
- Connects to the host and other devices on a TCP/IP network.

- Transactions event buffer max 99,999
- Receives and processes real-time commands from the host software application.
- Reports all activity to the host; reports supervised inputs /alarms with 255 priorities.
- Provides fully functional offline operation when not actively communicating with the host access control software application, performing all access decisions and event logging.
- Access control system interfaces with a maximum of 32 device combinations. Devices are:
 - V100 – Door/reader interface (up to doors/1 reader or 1 door/2 readers)
 - V200 – Input monitor interface (up to 16 monitor points per device)
 - V300 – Output control interface (up to 12 control relays per device)



SPECIFICATIONS

Model (and Part #)	EVO V1000 (71000BEPON01A)
Mounting	Mount to any wall surface, using four screws. For UL compliance, one or more gateways can be mounted inside a locking customer supplied NEMA-4 rated enclosure
Dimensions	"5.8" W x 4.825" H x 1.275" D (147.32 mm x 122.55 mm x 32.38 mm)"
Weight	12.4 oz (.35 kg)
Housing Material	UL94 polycarbonate
Audio / Visual Indicators	Power LED and RS-485 Communications LED
Operating Temperature	32° to 122° F (0° to 50° C)
Operating Humidity	5% to 95% relative, non-condensing
Storage Temperature	-67° to 185° F (-55° to 85° C)
Communication Ports	Ethernet (10/100), RS485 (half duplex)
Certifications	UL294 (US) Listed Component, CSA 205 (Canada), FCC Class A (US), ICES-003 Class A (Canada), CE Mark EN 301 489-3 EN 55022 EN 50130-4 (EU), C-Tick AS/NZS CISPR 22 (Australia, New Zealand) & Korea (KCC)
Warranty	Warrantied against defects in materials and workmanship for 18 months (See complete warranty policy for details).
Input Power	
Operating Current (MAX) @ 12-24VDC	1000mA
Operating Current (AVG) @ 12VDC	210mA
Supervised Inputs Power (MAX)	0.025W (5mA sink, 5V nominal) 0 to +5VDC Ref
Relay Rating	
Relay Contact Rating (Dry Output)	2A @ 30VDC (MAX Amperage that is UL Certified) 5A @ 30VDC



hidglobal.com

North America: +1 512 776 9000

Toll Free: 1 800 237 7769

Europe, Middle East, Africa: +44 1440 714 850

Asia Pacific: +852 3160 9800

Latin America: +52 55 5081 1650

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2016-07-29-vertx-evo-v1000-controller-ds-en PLT-00554

An ASSA ABLOY Group brand

ASSA ABLOY

ONLY FROM



Infrared Strip Heaters

Hold foods for optimum quality and presentation with a strip heater that perfectly fits your operation! Nemco's broad line is sure to have a solution for you.



Buy once. Buy the original.
Always look for this mark of quality





Glowing Performance

High-volume foodservice establishments of all sizes are finding the ideal temperature-holding solutions they need inside the diverse lineup of strip heaters from Nemco—the fastest rising name in food-warming equipment.

Just What Your Bottom Line Needs

Compact, dependable and unapologetically price-competitive, Nemco's full line of strip heaters performs as well as, if not better, than any other name on the market, for maximum ROI.

- Against any other strip heater, Nemco's designs do extremely well holding foods at serving temperatures without drying or overcooking.
- Durable, lightweight, clear-anodized aluminum extrusion housings promise long life and easy cleanup.
- Other commercial-grade features include aluminized steel reflectors and shatter-resistant bulbs.

On the Same Wavelength With You

Whatever you're thinking, Nemco has a model with just the right features to meet your needs, including:

- Hanging, base-mount and pass-through options (pictured, right) to best serve your kitchen, serving-line or counter-space application.
- Single- or double-warmer options for smaller or larger heat zones.
- Standard on/off or infinite-temperature control.
- Showcase lighting available to enhance food presentation.
- Units available with a cord, literally for plug-and-play operation, with no need for hard-wire installations.
- Remote-control devices available to locate the temperature control away from the actual warmer, and place it where it best serves your operation.

Power option: Standard on/off toggle switch (shown) or 'infinite' temperature control dial for varying low, medium and high heat settings

Aluminum-extrusion housings are durable, yet lightweight, with clear anodizing that protects the surface finish from damage

Aluminized-steel reflector ensures all heat radiating off the bulb is directed down upon the food

40W incandescent shatterproof bulbs

Suggested Uses

Hold foods at proper temperatures until you're ready to serve. A favorite for French fries, rice dishes, baked potatoes, fried chicken, pizza and large pans of food. Also works well as a plate or cup warmer.

General Specifications

Optional Accessories

Model	Description
66089	Pan and Screen Set, 12" x 20"
66091	Tray for 6152-24
66099	Wire Leg Kit, 16" Tall



Model 6150-24, with hanging brackets



Model 6152-24, with 66089



Model 6150-24, with 66099



Optional cord-and-plug units simplify installation



Optional showcase lighting adds visual appeal

SINGLE

DUAL

Integrated Control Units

Choose your integrated control strip heater with an on/off toggle switch or infinite temperature control.

SINGLE | On/Off Toggle Switch



Model #	Size (w x h x l)	Volts	Watts	Amps
6150-24*	6 ³ / ₄ " x 2 ³ / ₄ " x 24"	120	500	4.2
6150-24-208	6 ³ / ₄ " x 2 ³ / ₄ " x 24"	208	500	2.4
6150-24-240	6 ³ / ₄ " x 2 ³ / ₄ " x 24"	240	500	2.1
6150-36*	6 ³ / ₄ " x 2 ³ / ₄ " x 36"	120	850	7.1
6150-36-208	6 ³ / ₄ " x 2 ³ / ₄ " x 36"	208	850	4.1
6150-36-240	6 ³ / ₄ " x 2 ³ / ₄ " x 36"	240	850	3.5
6150-48*	6 ³ / ₄ " x 2 ³ / ₄ " x 48"	120	1100	9.2
6150-48-208	6 ³ / ₄ " x 2 ³ / ₄ " x 48"	208	1100	5.3
6150-48-240	6 ³ / ₄ " x 2 ³ / ₄ " x 48"	240	1100	4.6
6150-60*	6 ³ / ₄ " x 2 ³ / ₄ " x 60"	120	1400	11.7
6150-60-208	6 ³ / ₄ " x 2 ³ / ₄ " x 60"	208	1400	6.7
6150-60-240	6 ³ / ₄ " x 2 ³ / ₄ " x 60"	240	1400	5.8
6150-72*	6 ³ / ₄ " x 2 ³ / ₄ " x 72"	120	1725	14.4
6150-72-208	6 ³ / ₄ " x 2 ³ / ₄ " x 72"	208	1725	8.3
6150-72-240	6 ³ / ₄ " x 2 ³ / ₄ " x 72"	240	1725	7.2
6152-24**	6 ³ / ₄ " x 2 ³ / ₄ " x 24"	120	500	4.2

*For factory-installed cord and plug set models (24"-72"), please add "-CP" to the model number when ordering. **Strip Heater is mounted to base.

SINGLE | On/Off Toggle Switch with Lights



Model #	Size (w x h x l)	Volts	Watts	Amps
6150-24-SL	9" x 2 ³ / ₄ " x 24"	120	580	4.8
6150-24-SL-208	9" x 2 ³ / ₄ " x 24"	208	580	2.8
6150-24-SL-240	9" x 2 ³ / ₄ " x 24"	240	580	2.4
6150-36-SL	9" x 2 ³ / ₄ " x 36"	120	970	7.8
6150-36-SL-208	9" x 2 ³ / ₄ " x 36"	208	970	4.5
6150-36-SL-240	9" x 2 ³ / ₄ " x 36"	240	970	3.9
6150-48-SL	9" x 2 ³ / ₄ " x 48"	120	1220	10.2
6150-48-SL-208	9" x 2 ³ / ₄ " x 48"	208	1220	5.9
6150-48-SL-240	9" x 2 ³ / ₄ " x 48"	240	1220	5.1
6150-60-SL	9" x 2 ³ / ₄ " x 60"	120	1560	13.0
6150-60-SL-208	9" x 2 ³ / ₄ " x 60"	208	1560	7.5
6150-60-SL-240	9" x 2 ³ / ₄ " x 60"	240	1560	6.5
6150-72-SL	9" x 2 ³ / ₄ " x 72"	120	1885	15.7
6150-72-SL-208	9" x 2 ³ / ₄ " x 72"	208	1885	9.1
6150-72-SL-240	9" x 2 ³ / ₄ " x 72"	240	1885	7.9

SINGLE | Infinite Temperature Control



Model #	Size (w x h x l)	Volts	Watts	Amps
6151-24*	6 ³ / ₄ " x 2 ³ / ₄ " x 24"	120	500	4.2
6151-24-208	6 ³ / ₄ " x 2 ³ / ₄ " x 24"	208	500	2.4
6151-24-240	6 ³ / ₄ " x 2 ³ / ₄ " x 24"	240	500	2.1
6151-36*	6 ³ / ₄ " x 2 ³ / ₄ " x 36"	120	850	7.1
6151-36-208	6 ³ / ₄ " x 2 ³ / ₄ " x 36"	208	850	4.1
6151-36-240	6 ³ / ₄ " x 2 ³ / ₄ " x 36"	240	850	3.5
6151-48*	6 ³ / ₄ " x 2 ³ / ₄ " x 48"	120	1100	9.2
6151-48-208	6 ³ / ₄ " x 2 ³ / ₄ " x 48"	208	1100	5.3
6151-48-240	6 ³ / ₄ " x 2 ³ / ₄ " x 48"	240	1100	4.6
6151-60*	6 ³ / ₄ " x 2 ³ / ₄ " x 60"	120	1400	11.7
6151-60-208	6 ³ / ₄ " x 2 ³ / ₄ " x 60"	208	1400	6.7
6151-60-240	6 ³ / ₄ " x 2 ³ / ₄ " x 60"	240	1400	5.8
6151-72*	6 ³ / ₄ " x 2 ³ / ₄ " x 72"	120	1440	12.0
6151-72-208	6 ³ / ₄ " x 2 ³ / ₄ " x 72"	208	1440	6.9
6151-72-240	6 ³ / ₄ " x 2 ³ / ₄ " x 72"	240	1440	6.0

*For factory-installed cord and plug set models (24"-72"), please add "-CP" to the model number when ordering.

DUAL | On/Off Toggle Switch



Model #	Size (w x h x l)	Volts	Watts	Amps
6150-24-D	13 ¹ / ₂ " x 2 ³ / ₄ " x 24"	120	1000	8.3
6150-24-D-208	13 ¹ / ₂ " x 2 ³ / ₄ " x 24"	208	1000	4.8
6150-24-D-240	13 ¹ / ₂ " x 2 ³ / ₄ " x 24"	240	1000	4.2
6150-36-D	13 ¹ / ₂ " x 2 ³ / ₄ " x 36"	120	1700	14.2
6150-36-D-208	13 ¹ / ₂ " x 2 ³ / ₄ " x 36"	208	1700	8.2
6150-36-D-240	13 ¹ / ₂ " x 2 ³ / ₄ " x 36"	240	1700	7.1
6150-48-D-208	13 ¹ / ₂ " x 2 ³ / ₄ " x 48"	208	2200	10.6
6150-48-D-240	13 ¹ / ₂ " x 2 ³ / ₄ " x 48"	240	2200	9.2
6150-60-D-208	13 ¹ / ₂ " x 2 ³ / ₄ " x 60"	208	2800	13.5
6150-60-D-240	13 ¹ / ₂ " x 2 ³ / ₄ " x 60"	240	2800	11.7
6150-72-D-208	13 ¹ / ₂ " x 2 ³ / ₄ " x 72"	208	3450	16.6
6150-72-D-240	13 ¹ / ₂ " x 2 ³ / ₄ " x 72"	240	3450	14.4

DUAL | On/Off Toggle Switch with Lights



Model #	Size (w x h x l)	Volts	Watts	Amps
6150-24-DL	15 ³ / ₄ " x 2 ³ / ₄ " x 24"	120	1080	9.0
6150-24-DL-208	15 ³ / ₄ " x 2 ³ / ₄ " x 24"	208	1080	5.2
6150-24-DL-240	15 ³ / ₄ " x 2 ³ / ₄ " x 24"	240	1080	4.5
6150-36-DL	15 ³ / ₄ " x 2 ³ / ₄ " x 36"	120	1780	14.8
6150-36-DL-208	15 ³ / ₄ " x 2 ³ / ₄ " x 36"	208	1780	8.6
6150-36-DL-240	15 ³ / ₄ " x 2 ³ / ₄ " x 36"	240	1780	7.4
6150-48-DL-208	15 ³ / ₄ " x 2 ³ / ₄ " x 48"	208	2320	11.2
6150-48-DL-240	15 ³ / ₄ " x 2 ³ / ₄ " x 48"	240	2320	9.7
6150-60-DL-208	15 ³ / ₄ " x 2 ³ / ₄ " x 60"	208	2960	14.2
6150-60-DL-240	15 ³ / ₄ " x 2 ³ / ₄ " x 60"	240	2960	12.3
6150-72-DL-208	15 ³ / ₄ " x 2 ³ / ₄ " x 72"	208	3610	17.4
6150-72-DL-240	15 ³ / ₄ " x 2 ³ / ₄ " x 72"	240	3610	15.0

DUAL | Infinite Temperature Control



Model #	Size (w x h x l)	Volts	Watts	Amps
6151-24-D	13 ¹ / ₂ " x 2 ³ / ₄ " x 24"	120	1000	8.3
6151-24-D-208	13 ¹ / ₂ " x 2 ³ / ₄ " x 24"	208	1000	4.8
6151-24-D-240	13 ¹ / ₂ " x 2 ³ / ₄ " x 24"	240	1000	4.2
6151-36-D	13 ¹ / ₂ " x 2 ³ / ₄ " x 36"	120	1700	14.2
6151-36-D-208	13 ¹ / ₂ " x 2 ³ / ₄ " x 36"	208	1700	8.2
6151-36-D-240	13 ¹ / ₂ " x 2 ³ / ₄ " x 36"	240	1700	7.1
6151-48-D-208	13 ¹ / ₂ " x 2 ³ / ₄ " x 48"	208	2200	10.6
6151-48-D-240	13 ¹ / ₂ " x 2 ³ / ₄ " x 48"	240	2200	9.2
6151-60-D-208	13 ¹ / ₂ " x 2 ³ / ₄ " x 60"	208	2800	13.5
6151-60-D-240	13 ¹ / ₂ " x 2 ³ / ₄ " x 60"	240	2800	11.7

Cord and Plug Option Available

with Lights

SINGLE

DUAL

Remote Control Units

Choose your remote-controlled strip heater with an on/off toggle switch or infinite temperature control.

SINGLE



These models can be outfitted with the following remote control boxes:
Model #69007, 69008. (see below for remote control details.)

Model #	Size (w x h x l)	Volts	Watts	Amps
6155-24	6 ³ / ₄ " x 2 ³ / ₄ " x 24"	120	500	4.2
6155-24-208	6 ³ / ₄ " x 2 ³ / ₄ " x 24"	208	500	2.4
6155-24-240	6 ³ / ₄ " x 2 ³ / ₄ " x 24"	240	500	2.1
6155-36	6 ³ / ₄ " x 2 ³ / ₄ " x 36"	120	850	7.1
6155-36-208	6 ³ / ₄ " x 2 ³ / ₄ " x 36"	208	850	4.1
6155-36-240	6 ³ / ₄ " x 2 ³ / ₄ " x 36"	240	850	3.5
6155-48	6 ³ / ₄ " x 2 ³ / ₄ " x 48"	120	1100	9.2
6155-48-208	6 ³ / ₄ " x 2 ³ / ₄ " x 48"	208	1100	5.3
6155-48-240	6 ³ / ₄ " x 2 ³ / ₄ " x 48"	240	1100	4.6
6155-60	6 ³ / ₄ " x 2 ³ / ₄ " x 60"	120	1400	11.7
6155-60-208	6 ³ / ₄ " x 2 ³ / ₄ " x 60"	208	1400	6.7
6155-60-240	6 ³ / ₄ " x 2 ³ / ₄ " x 60"	240	1400	5.8
6155-72	6 ³ / ₄ " x 2 ³ / ₄ " x 72"	120	1725	14.4
6155-72-208	6 ³ / ₄ " x 2 ³ / ₄ " x 72"	208	1725	8.3
6155-72-240	6 ³ / ₄ " x 2 ³ / ₄ " x 72"	240	1725	7.2

SINGLE I with Lights



These models can be outfitted with the following remote control boxes:
Model #69007, 69008. (see below for remote control details.)

Model #	Size (w x h x l)	Volts	Watts	Amps
6155-24-SL	9" x 2 ³ / ₄ " x 24"	120	580	4.8
6155-24-SL-208	9" x 2 ³ / ₄ " x 24"	208	580	2.8
6155-24-SL-240	9" x 2 ³ / ₄ " x 24"	240	580	2.4
6155-36-SL	9" x 2 ³ / ₄ " x 36"	120	970	8.1
6155-36-SL-208	9" x 2 ³ / ₄ " x 36"	208	970	4.7
6155-36-SL-240	9" x 2 ³ / ₄ " x 36"	240	970	4.0
6155-48-SL	9" x 2 ³ / ₄ " x 48"	120	1220	10.2
6155-48-SL-208	9" x 2 ³ / ₄ " x 48"	208	1220	5.9
6155-48-SL-240	9" x 2 ³ / ₄ " x 48"	240	1220	5.1
6155-60-SL	9" x 2 ³ / ₄ " x 60"	120	1560	13.0
6155-60-SL-208	9" x 2 ³ / ₄ " x 60"	208	1560	7.5
6155-60-SL-240	9" x 2 ³ / ₄ " x 60"	240	1560	6.5
6155-72-SL	9" x 2 ³ / ₄ " x 72"	120	1885	15.7
6155-72-SL-208	9" x 2 ³ / ₄ " x 72"	208	1885	9.1
6155-72-SL-240	9" x 2 ³ / ₄ " x 72"	240	1885	7.9

Remote Control Box

Remotes available for single and dual units, and your choice of an on/off toggle switch or infinite temperature control.

DUAL



These models can be outfitted with the following remote control boxes:
Model #69007-2, 69008-2. (see below for remote control details.)

Model #	Size (w x h x l)	Volts	Watts	Amps
6155-24-D	13 ¹ / ₂ " x 2 ³ / ₄ " x 24"	120	1000	8.3
6155-24-D-208	13 ¹ / ₂ " x 2 ³ / ₄ " x 24"	208	1000	4.8
6155-24-D-240	13 ¹ / ₂ " x 2 ³ / ₄ " x 24"	240	1000	4.2
6155-36-D	13 ¹ / ₂ " x 2 ³ / ₄ " x 36"	120	1700	14.2
6155-36-D-208	13 ¹ / ₂ " x 2 ³ / ₄ " x 36"	208	1700	8.2
6155-36-D-240	13 ¹ / ₂ " x 2 ³ / ₄ " x 36"	240	1700	7.1
6155-48-D-208	13 ¹ / ₂ " x 2 ³ / ₄ " x 48"	208	2200	10.6
6155-48-D-240	13 ¹ / ₂ " x 2 ³ / ₄ " x 48"	240	2200	9.2
6155-60-D-208	13 ¹ / ₂ " x 2 ³ / ₄ " x 60"	208	2800	13.5
6155-60-D-240	13 ¹ / ₂ " x 2 ³ / ₄ " x 60"	240	2800	11.7
6155-72-D-208	13 ¹ / ₂ " x 2 ³ / ₄ " x 72"	208	3450	16.6
6155-72-D-240	13 ¹ / ₂ " x 2 ³ / ₄ " x 72"	240	3450	14.4

DUAL I with Lights



These models can be outfitted with the following remote control boxes:
Model #69007-2, 69008-2. (see below for remote control details.)

Model #	Size (w x h x l)	Volts	Watts	Amps
6155-24-DL	15 ³ / ₄ " x 2 ³ / ₄ " x 24"	120	1080	9.0
6155-24-DL-208	15 ³ / ₄ " x 2 ³ / ₄ " x 24"	208	1080	5.2
6155-24-DL-240	15 ³ / ₄ " x 2 ³ / ₄ " x 24"	240	1080	4.5
6155-36-DL	15 ³ / ₄ " x 2 ³ / ₄ " x 36"	120	1780	14.8
6155-36-DL-208	15 ³ / ₄ " x 2 ³ / ₄ " x 36"	208	1780	8.6
6155-36-DL-240	15 ³ / ₄ " x 2 ³ / ₄ " x 36"	240	1780	7.4
6155-48-DL-208	15 ³ / ₄ " x 2 ³ / ₄ " x 48"	208	2320	11.2
6155-48-DL-240	15 ³ / ₄ " x 2 ³ / ₄ " x 48"	240	2320	9.7
6155-60-DL-208	15 ³ / ₄ " x 2 ³ / ₄ " x 60"	208	2960	14.2
6155-60-DL-240	15 ³ / ₄ " x 2 ³ / ₄ " x 60"	240	2960	12.3
6155-72-DL-208	15 ³ / ₄ " x 2 ³ / ₄ " x 72"	208	3610	17.4
6155-72-DL-240	15 ³ / ₄ " x 2 ³ / ₄ " x 72"	240	3610	15.0

Replacement parts are available through Nemco's 24-hour Zip Program.

Nemco reserves the right to make design, specification or model changes without notice.



nemco FOOD EQUIPMENT

Physical Address: Corporate HQ
301 Meuse Argonne | Hicksville, OH 43526
800.782.6761 • 419.542.7751 • f: 419.542.6690

Mailing Address:
PO Box 305 | Hicksville, OH 43526

Nemco West Distribution Center/Test Kitchen
4300 E Magnolia Street | Phoenix, AZ 85034

NemcoFoodEquip.com

Printed 10/18. Printed in the USA.



208/240V models are also available. Add -240 to model number when ordering.

Water Purifier Brita Total 360

Technical Details

Brand	BRITA
Special Feature	NSF certified, Chlorine Reduction
Product Dimensions	12"L x 13.5"W x 36"H
Package Information	Tank
Installation Type	Whole House
Power Source	Adapter
Model Name	BRWCWS
UPC	090259922048
Manufacturer	Water Channel Partners
Part Number	BRWCWS
Item Weight	45.3 pounds
Item model number	BRWCWS
Color	White
Item Package Quantity	1
Special Features	NSF certified, Chlorine Reduction
Batteries Required?	No

Tmax molded case circuit-breakers

Tmax T7

Compliance with Standards	
UL489	
CSA C22.2 No. 5.1	
IEC 60947-2	
EC Directive:	
- "Low voltage directives" (LVD) no. 73/23 EEC	
- "Electromagnetic compatibility directive" (EMC) no. 89/336 EEC	

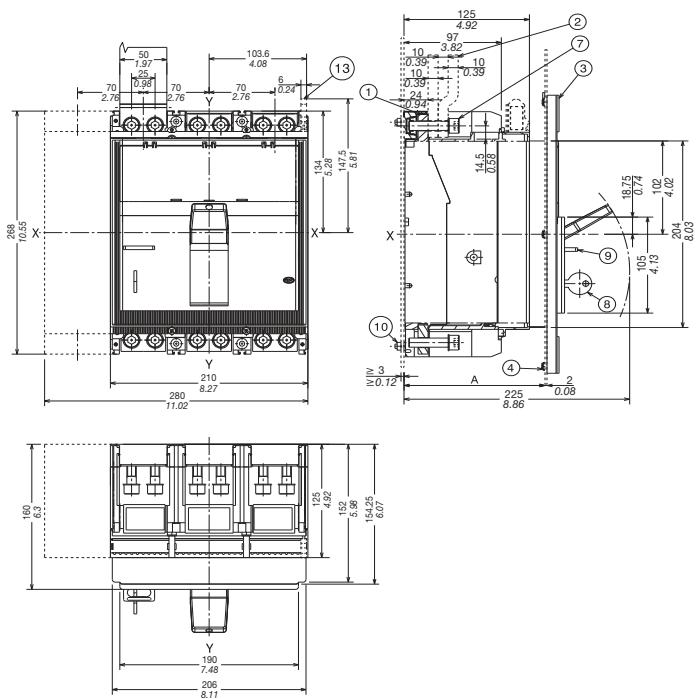


Type of circuit-breaker	Tmax T7			
Frame	1000/1200			
Rated ultimate short-circuit breaking capacity, Icu	S	H	L	
(AC) 50-60 Hz 240 V	[kA]	65	100	150
(AC) 50-60 Hz 277 V	[kA]	—	—	—
(AC) 50-60 Hz 347 V	[kA]	—	—	—
(AC) 50-60 Hz 480 V	[kA]	50	65	100
(AC) 50-60 Hz 600Y/347 V	[kA]	—	—	—
(AC) 50-60 Hz 600 V	[kA]	25	50	65
(DC) 250 V-2 poles in series	[kA]	—	—	—
(DC) 500 V-2 poles in series	[kA]	—	—	—
(DC) 500 V-3 poles in series	[kA]	—	—	—
(DC) 600 V-3 poles in series	[kA]	—	—	—
Trip units:				
T fixed, M fixed (10xIn) TMF		—	—	
T adj., M fixed (10xIn) TMD		—	—	
Thermomagnetic T adj., M adj. (5...10xIn) TMA		—	—	
T adj., M fixed (3xIn) TMG		—	—	
T adj., M adj. (2.5...5xIn) TMG		—	—	
Magnetic only M adjustable (6...12xIn) MA		—	—	
PR231/P		●	—	
PR232/P		●	—	
PR331/P		●	—	
PR332/P		●	—	
Versions	F-W			
Fixed (F)	F-FC CuAI HR/VR			
Terminals	Plug-in (P)	—		
	Withdrawable (W)	HR/VR		
Fixing on DIN rail	—			
Mechanical life	[No. operations /hourly oper.]		10000/60	
Electrical life	[No. operations /hourly oper.]		2000/60	
Basic fixed dimensions	3/4 pole	W [mm]	210/280	
		D [mm]	154/154 Manual 178/178 Motorized	
		H [mm]	268/268	
Weights	fixed	3/4 pole	9.7/12.5 Manual 11/14 Motorized	
	plug-in	3/4 pole	—	
	Withdrawable	3/4 pole	29.7/39.6 Manual 32/42 Motorized	

Tmax molded case circuit-breakers

Dimensions T7/T7M series

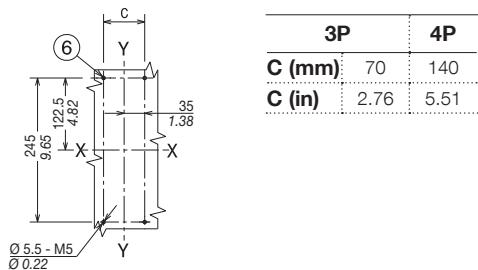
Overall dimensions T7



- 1** Front terminals for flat connection
- 2** Busbars
- 3** Flange for the compartment door
- 4** Flange fixing screws
- 7** Tightening torque: 18 Nm
- 8** Key lock (optional)
- 9** Padlock (optional)
- 10** Tightening torque: 2.5 Nm
- 13** Terminal for auxiliary contacts

	With flange	Without flange
A (mm)	125...141	147
A (in)	4.92...5.55	5.79

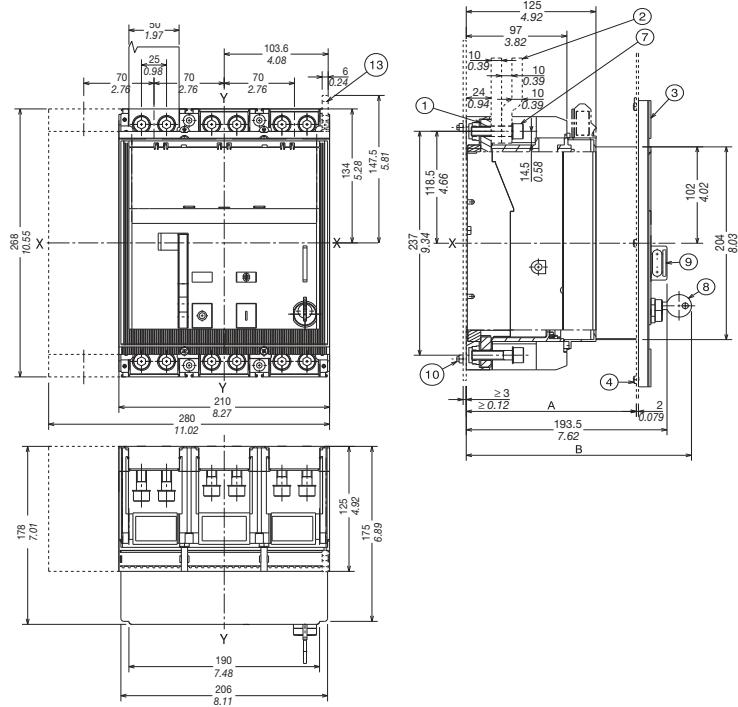
Drilling template for support sheet



Tmax molded case circuit-breakers

Dimensions T7/T7M series

Overall dimensions T7M



1 Front terminals for flat connection

2 Busbars

3 Flange for the compartment door

4 Flange fixing screws

7 Tightening torque: 18 Nm

8 Key lock (optional)

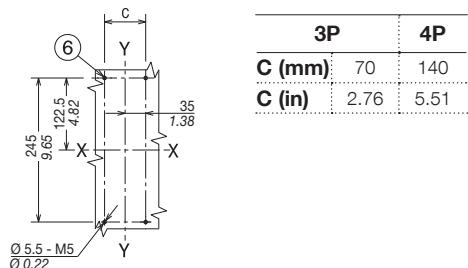
9 Padlock (optional)

10 Tightening torque: 2.5 Nm

13 Terminal for auxiliary contacts

	With flange	Without flange
A (mm)	125..141	147
A (in)	4.92..5.55	5.79
Standard	Ronis	Profalux
B (mm)	208	216
B (in)	8.19	8.5
Kirk	224	—
Castell	—	—

Drilling template for support sheet



Contact us

Canada

ABB Inc.

Low Voltage Products

2117 – 32nd Avenue

Lachine, QC, CANADA H8T 3J1

Tel.: 514-420-3100

Fax: 514-420-3137

Toll Free: 1-800-567-0283

www.abb.ca

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1SXP210009D0201 / August 2011



SIPROTEC 7SJ602

Multifunction Overcurrent and Motor Protection Relay



Fig. 5/33 SIPROTEC 7SJ602
multifunction protection relay

Description

The SIPROTEC 7SJ602 is a numerical overcurrent relay which, in addition to its primary use in radial distribution networks and motor protection, can also be employed as backup for line, transformer and generator differential protection. The SIPROTEC 7SJ602 provides definite-time and inverse-time overcurrent protection along with overload and unbalanced-load (negative-sequence) protection for a very comprehensive relay package.

For applications with earth-current detection two versions are available: One version with four current transformer inputs for non-directional earth (ground) fault detection and a second version with three current inputs (2 phase, 1 earth/ground) and one voltage input for directional earth (ground) fault detection.

The flexible communication interfaces are open for modern communication architectures with control systems.

Function overview

Feeder protection

- Overcurrent-time protection
- Sensitive earth-fault detection
- Directional sensitive earth-fault detection
- Displacement voltage
- Disk emulation
- Overload protection
- Breaker failure protection
- Negative-sequence protection
- Cold load pickup
- Auto-reclosure
- Trip circuit supervision

Motor protection

- Starting time supervision
- Locked rotor
- Restart inhibit
- Undervoltage monitoring
- Temperature monitoring

Control functions

- Commands for control of a circuit-breaker
- Control via keyboard, DIGSI 4 or SCADA system

Measuring functions

- Operational measured values I , V
- Power measurement P , Q , S , W_p , W_q
- Slavepointer
- Mean values

Monitoring functions

- Fault event logging with time stamp (buffered)
- 8 oscillographic fault records
- Continuous self-monitoring

Communication interfaces

- System interface
 - IEC 60870-5-103 protocol
 - PROFIBUS-DP
 - MODBUS RTU/ASCII
- Front interface for DIGSI 4

Hardware

- 4 current transformers or
- 3 current + 1 voltage transformers
- 3 binary inputs
- 4 output relays
- 1 live status contact

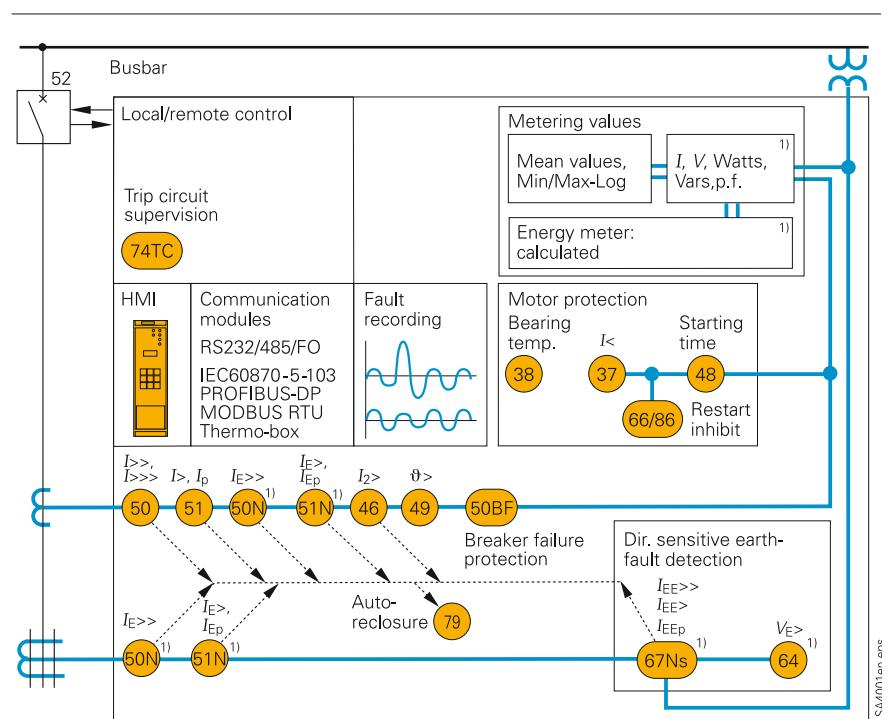
Application

Wide range of applications

The SIPROTEC 7SJ602 is a numerical overcurrent relay which, in addition to its primary use in radial distribution networks and motor protection, can also be employed as backup for feeder, transformer and generator differential protection.

The SIPROTEC 7SJ602 provides definite-time and inverse-time overcurrent protection along with overload and negative sequence protection for a very comprehensive relay package. In this way, equipment such as motors can be protected against asymmetric and excessive loading. Asymmetric short-circuits with currents that can be smaller than the largest possible load currents or phase interruptions are reliably detected.

The integrated control function allows simple control of a circuit-breaker or disconnector (electrically operated/motorized switch) via the integrated HMI, DIGSI or SCADA.



1) alternatively; see "Selection and ordering data" for details

Fig. 5/34 Function diagram

ANSI No.	IEC	Protection functions
(50, 50N)	$I_>$, $I_{>>}$, $I_{>>>}$ $I_E>$, $I_{E>>}$	Definite-time overcurrent protection (phase/neutral)
(51, 51N)	I_p , I_{Ep}	Inverse-time overcurrent protection (phase/neutral)
(67Ns/50Ns)	$I_{EE}>$, $I_{EE}>>$, I_{EEp}	Directional/non-directional sensitive earth-fault detection
(64)	$V_E>$	Displacement voltage
(50BF)		Breaker failure protection
(79)		Auto-reclosure
(46)	$I_2>$	Phase-balance current protection (negative-sequence protection)
(49)	$\vartheta>$	Thermal overload protection
(48)		Starting time supervision
(66/86)		Restart inhibit
(37)	$I_<$	Undercurrent monitoring
(38)		Temperature monitoring via external device, e.g. bearing temperature monitoring
(74TC)		Trip circuit supervision breaker control

Construction

The relay contains all the components needed for

- Acquisition and evaluation of measured values
- Operation and display
- Output of signals and trip commands
- Input and evaluation of binary signals
- SCADA interface (RS485, RS232, fiber-optic)
- Power supply.

The rated CT currents applied to the SIPROTEC 7SJ602 can be 1 A or 5 A. This is selectable via a jumper inside the relay.

Two different housings are available. The flush-mounting version has terminals accessible from the rear. The surface-mounting version has terminals accessible from the front. Retrofitting of a communication module, or replacement of an existing communication module with a new one are both possible.



Fig. 5/35
Rear view of flush-mounting housing



Fig. 5/36
View from below showing system interface (SCADA) with FO connection (for remote communications)

Protection functions

Definite-time characteristics

The definite-time overcurrent function is based on phase-selective evaluation of the three phase currents and earth current.

The definite-time overcurrent protection for the 3 phase currents has a low-set overcurrent element ($I>$), a high-set overcurrent element ($I>>$) and a high-set instantaneous element ($I>>>$). Intentional trip delays can be set from 0 to 60 seconds for all three overcurrent elements.

The definite-time overcurrent protection for the earth (ground) current has a low-set overcurrent element ($I_E>$) and a high-set overcurrent element ($I_E>>$). Intentional trip delays can be parameterized from 0 to 60 seconds.

Inverse-time characteristics

In addition, inverse-time overcurrent protection characteristics (IDM TL) can be activated.

Reset characteristics

For easier time coordination with electromechanical relays, reset characteristics according to ANSI C37.112 and IEC 60255-3 / BS 142 standards are applied. When using the reset characteristic (disk emulation), a reset process is initiated after the fault current has disappeared.

This reset process corresponds to the reverse movement of the Ferraris disk of an electromechanical relay (thus: disk emulation).

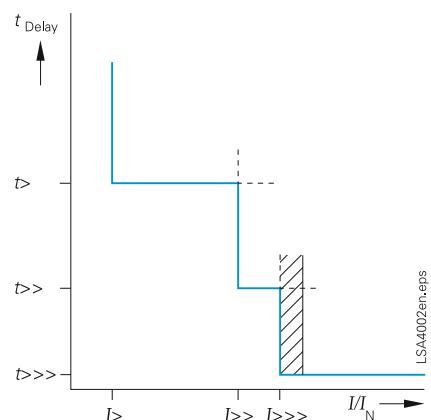


Fig. 5/37
Definite-time overcurrent characteristic

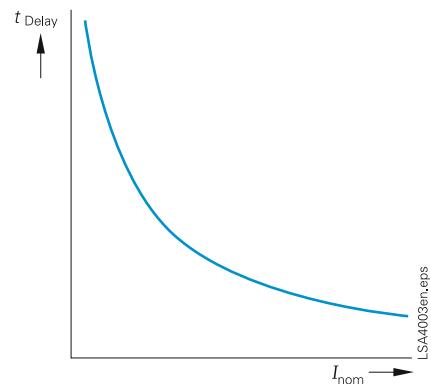


Fig. 5/38
Inverse-time overcurrent characteristic

Available inverse-time characteristics

Characteristics acc. to	ANSI/IEEE	IEC 60255-3
Inverse	•	•
Short inverse	•	
Long inverse	•	•
Moderately inverse	•	
Very inverse	•	•
Extremely inverse	•	•
Definite inverse	•	
$I^2 T$	•	
RI/RD-type		

Protection functions

(Sensitive) directional earth-fault detection (ANSI 64, 67Ns)

The direction of power flow in the zero sequence is calculated from the zero-sequence current I_0 and zero-sequence voltage V_0 . For networks with an isolated neutral, the reactive current component is evaluated; for compensated networks the active current component or residual resistive current is evaluated. For special network conditions, e.g. high-resistance earthed networks with ohmic-capacitive earth-fault current or low-resistance earthed networks with ohmic-inductive current, the tripping characteristics can be rotated approximately ± 45 degrees (cosine/sinus).

Two modes of earth-fault direction detection can be implemented: tripping or in "signaling only mode".

It has the following functions:

- TRIP via the displacement voltage V_E .
- Two instantaneous elements or one instantaneous plus one inverse characteristic.
- Each element can be set in forward, reverse, or non-directional.

(Sensitive) earth-fault detection (ANSI 50Ns, 51Ns / 50N, 51N)

For high-resistance earthed networks, a sensitive input transformer is connected to a phase-balance neutral current transformer (also called core-balance CT).

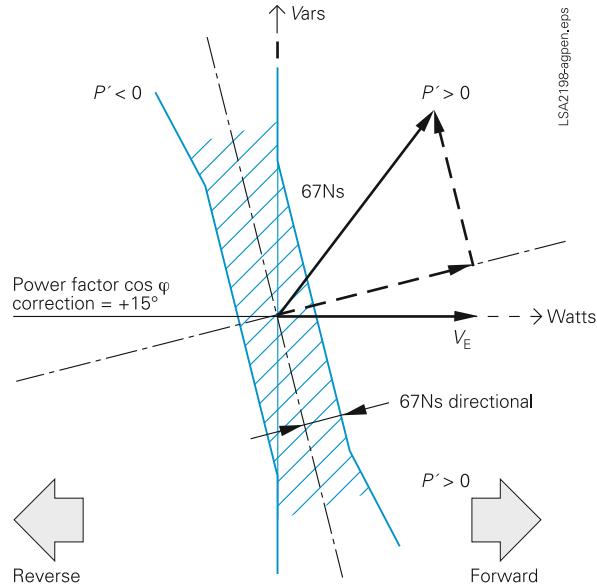


Fig. 5/39 Directional determination using cosine measurements

Thermal overload protection (ANSI 49)

The thermal overload protection function provides tripping or alarming based on a thermal model calculated from phase currents.

The ambient temperature or the temperature of the coolant can be detected serially via an external temperature monitoring box (also called thermo-box). If there is no thermo-box it is assumed that the ambient temperatures are constant.

Thermal overload protection without preload:

For thermal overload protection without consideration of the preload current, the following tripping characteristic applies only when

$$I \geq 1.1 \cdot I_L$$

For different thermal time constants T_L , the tripping time t is calculated in accordance with the following equation:

$$t = \frac{35}{\left(\frac{I}{I_L}\right)^2 - 1} \cdot T_L$$

I = Load current

I_L = Pickup current

T_L = Time multiplier

The reset threshold is above $1.03125 \cdot I/I_N$

Thermal overload protection with preload

The thermal overload protection with consideration of preload current constantly updates the thermal model calculation regardless of the magnitude of the phase currents. The tripping time t is calculated in accordance with the following tripping characteristic (complete memory in accordance with IEC 60255-8).

$$t = \tau \cdot \ln \frac{\left(\frac{I}{k \cdot I_N}\right)^2 - \left(\frac{I_{pre}}{k \cdot I_N}\right)^2}{\left(\frac{I}{k \cdot I_N}\right)^2 - 1}$$

t = Tripping time after beginning of the thermal overload

$$\tau = 35.5 \cdot T_L$$

I_{pre} = Preload current

I = Load current
 k = k factor (in accordance with IEC 60255-8)

\ln = Natural logarithm

T_L = Time multiplier

I_N = Rated (nominal) current

Protection functions

Breaker failure protection (ANSI 50BF)

If a faulted portion of the electrical circuit is not disconnected upon issuance of a trip command, another command can be initiated using the breaker failure protection which operates the circuit-breaker, e.g. of an upstream (higher-level) protection relay. Breaker failure is detected if after a trip command, current is still flowing in the faulted circuit. As an option it is possible to make use of the circuit-breaker position indication.

Negative-sequence protection ($I_{2>>}$, $I_{2>}$ /ANSI 46 Unbalanced-load protection)

The negative-sequence protection (see Fig. 5/40) detects a phase failure or load unbalance due to network asymmetry. Interruptions, short-circuits or crossed connections to the current transformers are detected.

Furthermore, low level single-phase and two-phase short-circuits (such as faults beyond a transformer) as well as phase interruptions can be detected.

This function is especially useful for motors since negative-sequence currents cause impermissible overheating of the rotor.

In order to detect the unbalanced load, the ratio of negative phase-sequence current to rated current is evaluated.

I_2 = negative-sequence current

T_{12} = tripping time

Transformer protection

The high-set element permits current coordination where the overcurrent element functions as a backup for the lower-level protection relays, and the overload function protects the transformer from thermal overload. Low-current single-phase faults on the low voltage side that result in negative phase-sequence current on the high-voltage side can be detected with the negative-sequence protection.

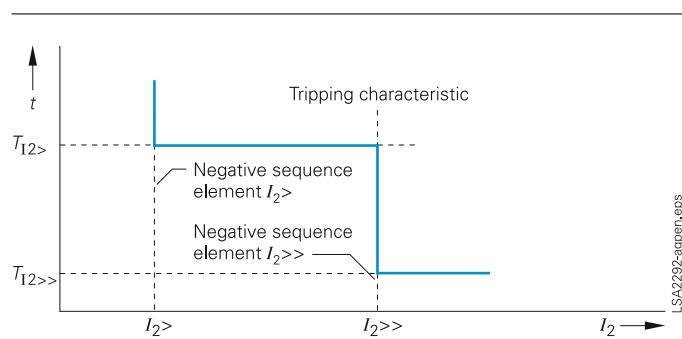


Fig. 5/40 Tripping characteristics of the negative-sequence protection function

Cold load pickup

By means of a binary input which can be wired from a manual close contact, it is possible to switch the overcurrent pickup settings to less sensitive settings for a programmable duration of time. After the set time has expired, the pickup settings automatically return to their original setting. This can compensate for initial inrush when energizing a circuit without compromising the sensitivity of the overcurrent elements during steady state conditions.

3-pole multishot auto-reclosure (AR, ANSI 79)

Auto-reclosure (AR) enables 3-phase auto-reclosing of a feeder which has previously been disconnected by time-overcurrent protection.

Trip circuit supervision (ANSI 74TC)

One or two binary inputs can be used for trip circuit monitoring.

Control

The relay permits circuit-breakers to be opened and closed without command feedback. The circuit-breaker/disconnector may be controlled by DIGSI, or by the integrated HMI, or by the LSA/SCADA equipment connected to the interface.

Protection functions

Switch-onto-fault protection

If switched onto a fault, instantaneous tripping can be effected. If the internal control function is used (local or via serial interface), the manual closing function is available without any additional wiring. If the control switch is connected to a circuit-breaker by-passing the internal control function, manual detection using a binary input is implemented.

Busbar protection (Reverse interlocking)

Binary inputs can be used to block any of the six current stages. Parameters are assigned to decide whether the input circuit is to operate in open-circuit or closed-circuit mode. In this case, reverse interlocking provides high-speed busbar protection in radial or ring power systems that are opened at one point. The reverse interlocking principle is used, for example, in medium-voltage power systems and in switchgear for power plants, where a high-voltage system transformer feeds a busbar section with several medium-voltage outgoing feeders.

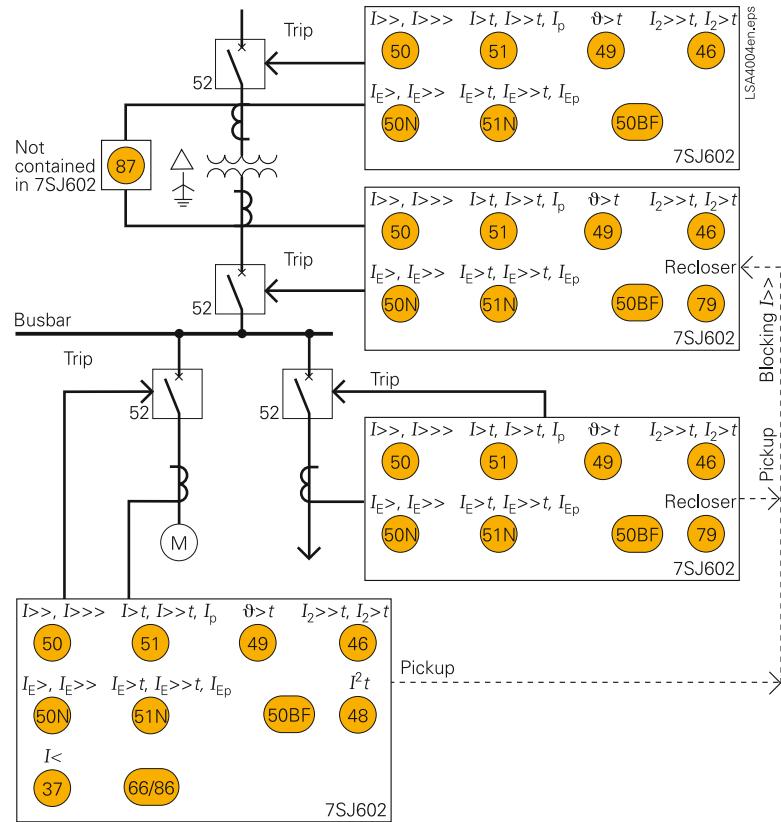


Fig. 5/41 Reserve interlocking

Motor protection

Starting time supervision (ANSI 48)

Starting time supervision protects the motor against long unwanted start-ups that might occur when excessive load torque occurs, excessive voltage drops occur within the motor or if the rotor is locked. Rotor temperature is calculated from measured stator current. The tripping time is calculated according to the following equation:

$$t_{\text{TRIP}} = \left(\frac{I_{\text{start}}}{I_{\text{rms}}} \right)^2 \cdot t_{\text{start max}}$$

for $I_{\text{rms}} > I_{\text{start}}$, reset ratio $\frac{I_N}{I_{\text{start}}}$ approx. 0.94

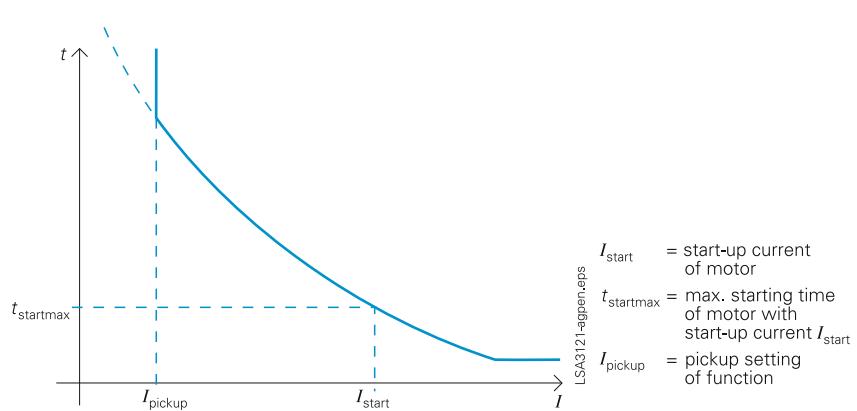


Fig. 5/42 Starting time supervision

t_{TRIP} = tripping time

I_{start} = start-up current of the motor

$t_{\text{start max}}$ = maximum permissible starting time

I_{rms} = actual current flowing

Restart inhibit (ANSI 66/86)

If a motor is started up too many times in succession, the rotor can be subject to thermal overload, especially the upper edges of the bars. The rotor temperature is calculated from the stator current and the temperature characteristic is shown in a schematic diagram. The reclosing lockout only permits startup of the motor if the rotor has sufficient thermal reserves for a complete start-up.

Undercurrent monitoring (ANSI 37)

With this function, a sudden drop in current, which may occur due to a reduced motor load, is detected. This can cause shaft breakage, no-load operation of pumps or fan failure.

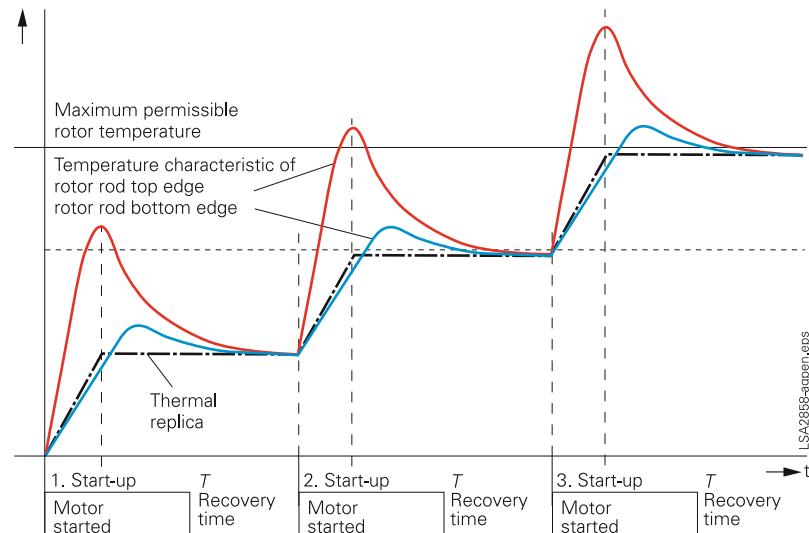


Fig. 5/43 Restart inhibit

Temperature monitoring (ANSI 38)

A temperature monitoring box with a total of 6 measuring sensors can be used for temperature monitoring and detection by the protection relay. The thermal status of motors, generators and transformers can be monitored with this device. Additionally, the temperature of the bearings of rotating machines are monitored for limit value violation. The temperatures are measured with the help of temperature detectors at various locations of the device to be protected. This data is transmitted to the protection relay via a temperature monitoring box (also called thermo-box or RTD-box) (see "Accessories").

Additional functions

Measured values

The r.m.s. values are calculated from the acquired current and voltage along with the power factor, active and reactive power. The following functions are available for measured value processing:

- Currents $I_{L1}, I_{L2}, I_{L3}, I_E, I_{EE}$ (67Ns)
- Voltages V_{L1}, V_E (67N_s) if existing
- Power Watts, Vars, VA/P, Q, S
- Power factor ($\cos \varphi$),
- Energy $\pm \text{kWh}, \pm \text{kVarh}$, forward and reverse power flow
- Mean as well as minimum and maximum current, voltage and power values

Communication

With respect to communication, particular emphasis has been placed on high levels of flexibility, data integrity and utilization of standards common in energy automation. The design of the communication modules permits interchangeability.

Local PC interface

The SIPROTEC 7SJ602 is fitted with an RS232 PC front port. A PC can be connected to ease set-up of the relay using the Windows-based program DIGSI which runs under MS-Windows. It can also be used to evaluate up to 8 oscillographic fault records, 8 fault logs and 1 event log containing up to 30 events.

5

System interface on bottom of the unit

A communication module located on the bottom part of the unit incorporates optional equipment complements and readily permits retrofitting. It guarantees the ability to comply with the requirements of different communication interfaces.

This interface is used to carry out communication with a control or a protection system and supports a variety of communication protocols and interface designs, depending on the module connected.

IEC 60870-5-103 protocol

IEC 60870-5-103 is an internationally standardized protocol for the efficient communication in the protected area.

IEC 60870-5-103 is supported by a number of protection device manufacturers and is used worldwide.

PROFIBUS-DP

PROFIBUS-DP is an industry-recognized standard for communications and is supported by a number of PLC and protection device manufacturers.

MODBUS RTU

MODBUS RTU is an industry-recognized standard for communications and is supported by a number of PLC and protection device manufacturers.



Fig. 5/44
RS232/RS485 electrical communication module



Fig. 5/45
PROFIBUS fiber-optic double ring communication module

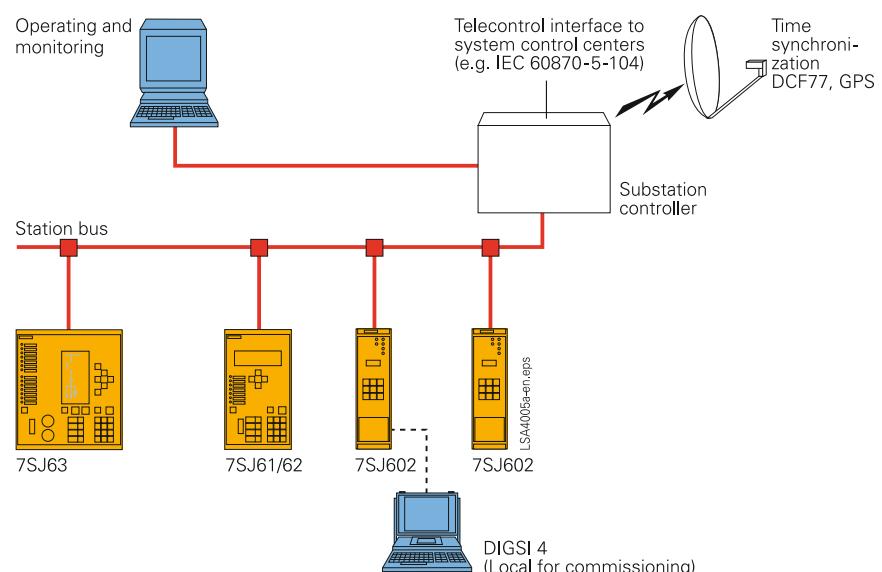


Fig. 5/46 System solution/communication

Typical connections

CT connections

Fig. 5/47 Standard

- Phase current measured
- Earth current measured (e.g. core balance CT)

Fig. 5/48

- Standard connection
• Connection of 3 CTs with residual connection for neutral fault

Fig. 5/49

- Isolated networks only

7SJ6021/7SJ6025

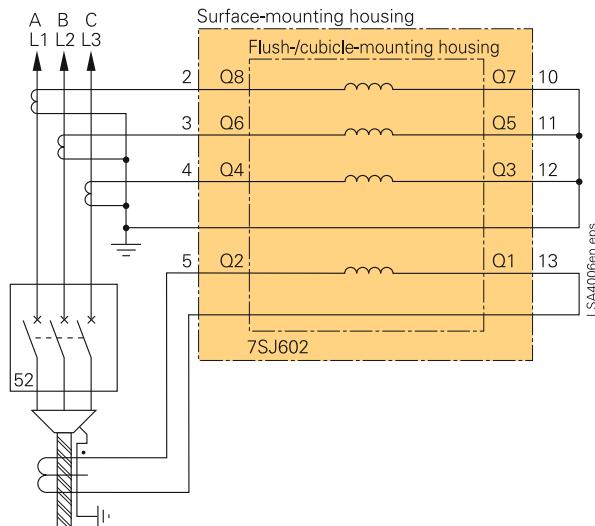


Fig. 5/47
Connection of 4 CTs with measurement of the earth (ground) current

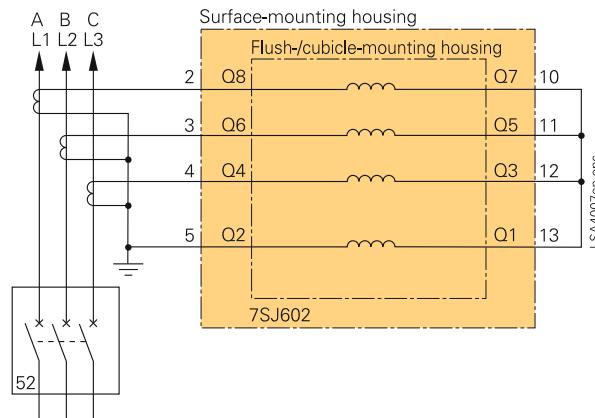


Fig. 5/48
Connection of 3 CTs with residual connection for neutral fault

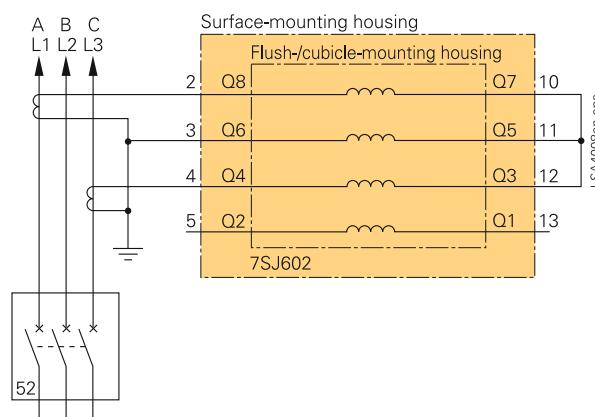


Fig. 5/49
Connection of 2 CTs only for isolated or resonant-earthed (grounded) power systems

Typical connections

7SJ6022/7SJ6026

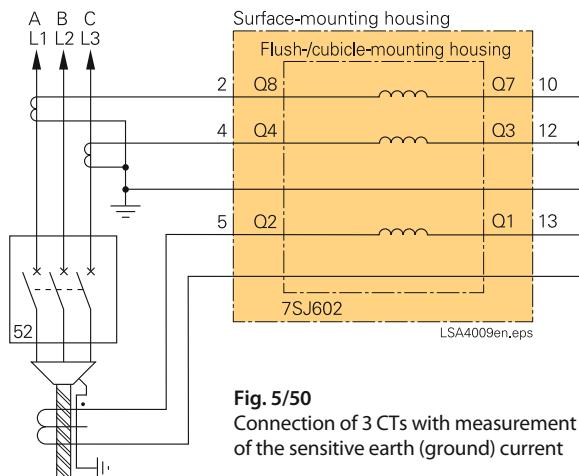


Fig. 5/50
Connection of 3 CTs with measurement
of the sensitive earth (ground) current

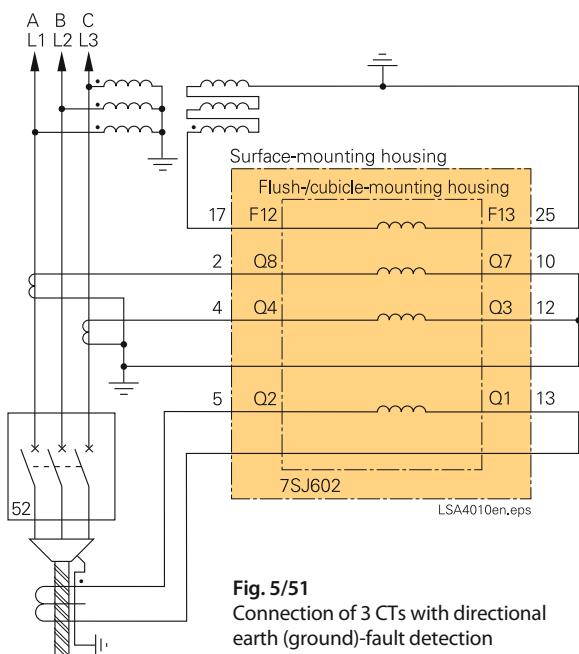


Fig. 5/51
Connection of 3 CTs with directional
earth (ground)-fault detection

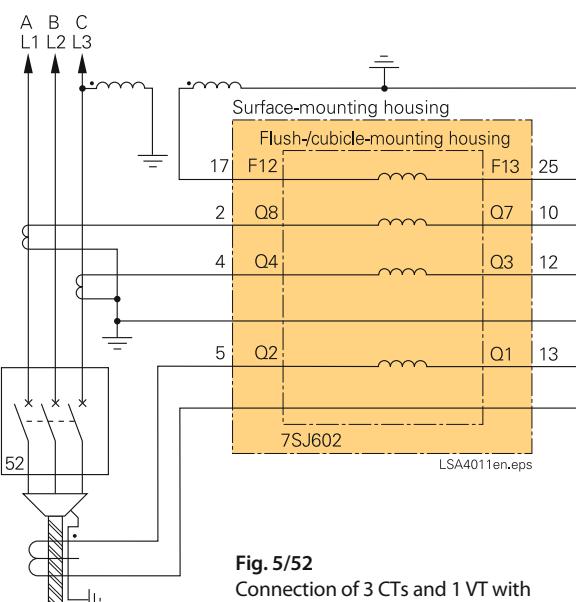


Fig. 5/52
Connection of 3 CTs and 1 VT with
measurement of the earth (ground)
current and one phase voltage

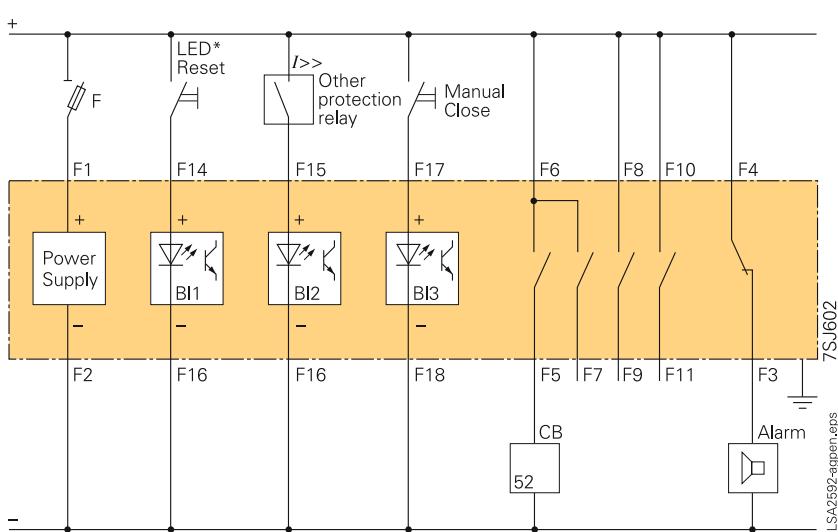


Fig. 5/53 Example of typical wiring

Technical data

General unit data		Alarm relays
CT circuits		1 1 NO/NC (form A/B)
Rated current I_N	1 or 5 A (settable)	
Option: sensitive earth-fault CT	$I_{EE} < 1.6 \text{ A}$ or $< 8 \text{ A}$ (settable)	
Rated frequency f_N	50/60 Hz (selectable)	
Power consumption		
Current input at $I_N = 1 \text{ A}$	< 0.1 VA	
at $I_N = 5 \text{ A}$	< 0.3 VA	
For sensitive earth-fault detection at 1 A	Approx. 0.05 VA	
Overload capability		
Thermal (r.m.s.)	100 x I_N for 1 s 30 x I_N for 10 s 4 x I_N continuous	1000 W/V/A 30 VA, 40 W resistive 25 VA with L/R $\leq 50 \text{ ms}$
Dynamic (pulse current)	250 x I_N one half cycle	250 V
Overload capability if equipped with sensitive earth-fault current transformer		
Thermal (r.m.s.)	300 A for 1 s 100 A for 10 s 15 A continuous	5 A continuous
Dynamic (impulse current)	750 A (half cycle)	
Voltage transformer		Binary inputs
Rated voltage V_N	100 to 125 V	Number 3 (configurable)
Power consumption at $V_N = 100 \text{ V}$	< 0.3 VA per phase	Operating voltage 24 to 250 V DC
Overload capability in voltage path (phase-neutral voltage)		Current consumption, independent of operating voltage Approx. 1.8 mA
Thermal (r.m.s.)	230 V continuous	Pickup threshold, selectable via bridges Rated aux. voltage 24/48/60/110 V DC V_{pickup} $\geq 19 \text{ V DC}$ 110/125/220/250 V DC V_{pickup} $\geq 88 \text{ V DC}$
Power supply		Permissible maximum voltage 300 V DC
Power supply via integrated DC/DC converter		
Rated auxiliary voltage V_{aux} / permissible variations	24/48 V DC/ $\pm 20 \%$ 60/110 V DC/ $\pm 20 \%$ 110/125/220/250 V DC/ $\pm 20 \%$ 115 V AC/- 20 %, + 15 % 230 V AC/- 20 %, + 15 %	
Superimposed AC voltage, peak-to-peak		
At rated voltage	$\leq 12 \%$	Current terminals Connection ring cable lugs Wire size 2.0 - 5.3 mm ² (AWG 14-10)
At limits of admissible voltage	$\leq 6 \%$	Solid conductor, flexible lead, connector sleeve
Power consumption	Approx. 3 to 6 W, depending on operational status and selected auxiliary voltage	Wire size 2.0 - 5.3 mm ² (AWG 14-10)
Bridging time during failure/ short-circuit of auxiliary voltage	$\geq 50 \text{ ms}$ at $V_{\text{aux}} \geq 110 \text{ V AC/DC}$ $\geq 20 \text{ ms}$ at $V_{\text{aux}} \geq 24 \text{ V DC}$	Voltage terminals Connection ring cable lugs Wire size 2.0 - 3.3 mm ² (AWG 20-12)
Binary outputs		Solid conductor, flexible lead, connector sleeve 0.5 - 3.3 mm ² (AWG 20-12)
Trip relays		
Contacts per relay	4 (configurable) 1 NO/form A (Two contacts changeable to NC/form B, via jumpers)	Unit design Housing 7XP20 For dimensions please refer to dimension drawings, part 15
Switching capacity		Degree of protection acc. to EN 60529
Make	1000 W/V/A	For the device in surface-mounting housing
Break	30 VA, 40 W resistive	in flush-mounting housing
Switching voltage	25 VA with L/R $\leq 50 \text{ ms}$	front rear
Permissible current		For personal safety IP 51 IP 20
Continuous	250 V	IP 2x with closed protection cover
For 0.5 s		
Permissible total current		Weight Flush mounting/ cubicle mounting Surface mounting
For common potential:		Approx. 4 kg
Continuous	5 A	Approx. 4.5 kg
For 0.5 s	30 A	
Serial interfaces		
Operating interface		
Connection	At front side, non-isolated, RS232, 9-pin subminiature connector	
Operation	With DIGSI 4.3 or higher	
Transmission speed	As delivered 19200 baud, parity: 8E1 Min. 1200 baud Max. 19200 baud	
Distance	15 m	

Technical data

System interface (bottom of unit)	
IEC 60870-5-103 protocol	
Connection	Isolated interface for data transmission
Transmission rate	Min. 1200 baud, max. 19200 baud As delivered 9600 baud
<u>RS232/RS485 acc. to ordered version</u>	
Connection	9-pin subminiature connector on the bottom part of the housing
Test voltage	500 V AC
RS232 maximum distance	15 m
RS485 maximum distance	1000 m
<u>Fiber-optic</u>	
Connector type	ST connector on the bottom part of the housing
Optical wavelength	$\lambda = 820 \text{ nm}$
Laser class 1 acc. to EN 60825-1/-2	For glass fiber 50/125 μm or 62.5/125 μm
Permissible path attenuation	Max. 8 dB, for glass fiber 62.5/125 μm
Bridgeable distance	Max. 1.5 km
No character position	Selectable, setting as supplied „light off”
PROFIBUS-DP	
Isolated interface for data transfer to a control center	
Transmission rate	Up to 1.5 Mbaud
Transmission reliability	Hamming distance $d = 4$
<u>RS485</u>	
Connection	9-pin subminiature connector
Distance	1000 m/3300 ft \leq 93.75 kbaud; 500 m/1500 ft \leq 187.5 kbaud; 200 m/600 ft \leq 1.5 Mbaud
Test voltage	500 V AC against earth
<u>Fiber optic</u>	
Connection fiber-optic cable	Integrated ST connector for fiber-optic connection
Optical wavelength	$\lambda = 820 \text{ nm}$
Laser class 1 acc. to EN 60825-1-2	For glass fiber 50/125 μm or 62.5/125 μm
Permissible path attenuation	Max. 8 dB, for glass fiber 62.5/125 μm
Distance	500 kB/s 1.6 km/0.99 miles 1500 kB/s 530 m/0.33 miles
Idle state of interface	Settable, setting as supplied “light off”
System interface (bottom of unit), cont'd	
MODBUS RTU / ASCII	
Isolated interface for data transfer to a control center	
Transmission rate	Up to 19200 baud
Transmission reliability	Hamming distance $d = 4$
<u>RS485</u>	
Connection	9-pin subminiature connector
Distance	Max. 1 km/3300 ft max. 32 units recommended
Test voltage	500 V AC against earth
<u>Fiber-optic</u>	
Connection fiber-optic cable	Integrated ST connector for fiber-optic connection
Optical wavelength	820 nm
Laser class 1 acc. to EN 60825-1-2	For glass fiber 50/125 μm or 62.5/125 μm
Permissible path attenuation	Max. 8 dB, for glass fiber 62.5/125 μm
Distance	Max. 1.5 km/0.9 miles
Idle state of interface	“Light off”
Electrical tests	
Specifications	
Standards	IEC 60255-5; ANSI/IEEE C37.90.0
Insulation tests	
High-voltage tests (routine test) all circuits except for auxiliary voltage, binary inputs and communication interfaces	2.5 kV (r.m.s. value), 50 Hz
High-voltage tests (routine test) Auxiliary voltage and binary inputs	3.5 kV DC
High-voltage tests (routine test) only isolated communication interfaces	500 V (r.m.s. value); 50 Hz
Impulse voltage tests (type test) all circuits, except communication interfaces	5 kV (peak value), 1.2/50 μs , 0.5 J, 3 positive and 3 negative impulses at intervals of 5 s
EMC tests for interference immunity; type tests	
Standards	IEC 60255-6; IEC 60255-22, (product standard) EN 50082-2 (generic standard) DIN 57435 Part 303
High-frequency test IEC 60255-22-1, class III and VDE 0435 Part 303, class III	2.5 kV (peak value); 1 MHz, $\tau = 15 \mu\text{s}$; 400 surges per s; test duration 2 s; $R_i = 200 \Omega$
Electrostatic discharge IEC 60255-22-2 class IV EN 61000-4-2, class IV	8 kV contact discharge, 15 kV air gap discharge, both polarities, 150 pF; $R_i = 330 \Omega$
Irradiation with radio-frequency field, non-modulated IEC 60255-22-3 (Report), class III	10 V/m, 27 to 500 MHz
Irradiation with radio-frequency field, amplitude-modulated IEC 61000-4-3, class III	10 V/m, 80 to 1000 MHz, AM 80 %; 1 kHz duration > 10 s
Irradiation with radio-frequency field, pulse-modulated IEC 61000-4-3/ENV 50204, class III	10 V/m, 900 MHz, repetition frequency 200 Hz duty cycle 50 % PM

Technical data

EMC tests for interference immunity; type tests, (cont'd)		Mechanical stress tests
Fast transients interference/bursts IEC 60255-22-4 and IEC 61000-4-4, class IV	4 kV; 5/50 ns; 5 kHz; burst length = 15 ms; repetition rate 300 ms; both polarities; $R_i = 50 \Omega$; test duration 1 min	Vibration, shock and seismic vibration
Surge voltage IEC 61000-4-5, class III Auxiliary voltage	Pulse: 1.2/50 μ s From circuit to circuit (common mode): 2 kV, 12 Ω , 9 μ F; Across contacts (diff. mode): 1 kV, 2 Ω , 18 μ F	<u>During operation</u> Standards Vibration IEC 60255-21-1, class I IEC 60068-2-6
Measuring inputs, binary inputs/outputs	From circuit to circuit (common mode): 2 kV, 42 Ω , 0.5 μ F; Across contacts (diff. mode): 1 kV, 42 Ω , 0.5 μ F	Shock IEC 60255-21-2, class I
Conducted RF amplitude-modulated IEC 61000-4-6, class III	10 V; 150 kHz to 80 MHz; AM 80 %; 1 kHz	Seismic vibration IEC 60255-21-3, class I IEC 60068-3-3
Power frequency magnetic field IEC 61000-4-8, class IV IEC 60255-6	30 A/m continuous 300 A/m for 3 s, 50 Hz 0.5 mT, 50 Hz	<u>During transportation</u> Standards Vibration IEC 60255-21-1, class II IEC 60068-2-6
Oscillatory surge withstand capability ANSI/IEEE C37.90.1	2.5 to 3 kV (peak value), 1 to 1.5 MHz damped wave; 50 surges per s; duration 2 s $R_i = 150$ to 200 Ω ;	Shock IEC 60255-21-2, class I
Fast transient surge withstand capability ANSI/IEEE C37.90.1	4 to 5 kV, 10/150 ns, 50 surges per s, both polarities; duration 2 s, $R_i = 80 \Omega$;	Acc. to IEC 60255-21 and IEC 60068-2
Radiated electromagnetic interference ANSI/IEEE Std C37.90.2	35 V/m; 25 to 1000 MHz; amplitude and pulse-modulated	Sinusoidal 5 to 8 Hz: ± 7.5 mm amplitude; 8 to 150 Hz: 2 g acceleration Sweep rate 1 octave/min 20 cycles in 3 orthogonal axes
Damped wave IEC 60694/ IEC 61000-4-12	2.5 kV (peak value), polarity alternating 100 kHz, 1 MHz, 10 and 50 MHz, $R_i = 200 \Omega$;	Half-sine, acceleration 15 g, duration 11 ms; 3 shocks in each direction of 3 orthogonal axes
EMC tests interference emission; type tests		Climatic stress tests
Standard	EN 50081-* (generic specification)	Temperatures
Conducted interferences, only auxiliary voltage IEC/CISPR 22	150 kHz to 30 MHz limit class B	Recommended temperature During operation -5 °C to +55 °C / 23 °F to 131 °F, (> 55 °C decreased display contrast)
Radio interference field strength IEC/CISPR 22	30 to 1000 MHz limit class B	Limit temperature During operation -20 °C to +70 °C / -4 °F to 158 °F During storage -25 °C to +55 °C / -13 °F to 131 °F During transport (Storage and transport with standard works packaging) -25 °C to +70 °C / -13 °F to 158 °F
Harmonic currents on incoming lines of system at 230 V AC IEC 61000-3-2	Unit belongs to class D (applies only to units with > 50 VA power consumption)	Humidity
Voltage fluctuation and flicker range on incoming lines of system at 230 V AC IEC 61000-3-3	Limit values are adhered to	Permissible humidity stress: It is recommended to arrange the units in such a way that they are not exposed to direct sunlight or pro- nounced temperature changes that could cause condensation.
		Annual average: ≤ 75 % relative humidity, on 56 days per year 95 % relative humidity, condensation not permissible!

Technical data

Functions		Inverse-time overcurrent protection (ANSI 51/51N)	
Definite-time overcurrent protection (ANSI 50, 50N)			
Setting ranges/steps		Setting ranges/steps	
Low-set overcurrent element		Low-set overcurrent element	
Phase $I >$	$I/I_N = 0.1 \text{ to } 25$ (steps 0.1); or ∞	Phase I_p	$I/I_N = 0.1 \text{ to } 4$ (steps 0.1)
Earth $I_{E>}$	$I/I_N = 0.05 \text{ to } 25$ (steps 0.01); or ∞	Earth I_{Ep}	$I/I_N = 0.05 \text{ to } 4$ (steps 0.01)
High-set overcurrent element		Time multiplier for I_p, I_{Ep} (IEC charac.)	$T_p = 0.05 \text{ to } 3.2 \text{ s}$ (steps 0.01 s)
Phase $I >>$	$I/I_N = 0.1 \text{ to } 25$ (steps 0.1); or ∞	Time multiplier for I_p, I_{Ep} (ANSI charac.)	$D = 0.5 \text{ to } 15 \text{ s}$ (steps 0.1 s)
Earth $I_{E>>}$	$I/I_N = 0.05 \text{ to } 25$ (steps 0.01); or ∞	High-set overcurrent element	
Instantaneous tripping		Phase $I >>>$	$I/I_N = 0.1 \text{ to } 25$ (steps 0.1); or ∞
Phase $I >>>$	$I/I_N = 0.3 \text{ to } 12.5$ (steps 0.1); or ∞	Earth $I_{E>>>}$	$I/I_N = 0.05 \text{ to } 25$ (steps 0.01); or ∞
Delay times T for $I >$, $I_{E>}$, $I >>$, $I_{E>>}$ and $I >>>$	0 to 60 s (steps 0.01 s)	Instantaneous tripping	$I/I_N = 0.3 \text{ to } 12.5$ (steps 0.1); or ∞
The set times are pure delay times		Phase $I >>>$	$I/I_N = 0.3 \text{ to } 12.5$ (steps 0.1); or ∞
Pickup times $I >$, $I >>$, $I_{E>}$, $I_{E>>}$		Delay time $T_{I>>>}$	0 to 60 s (steps 0.01 s)
At 2 x setting value, without meas. repetition	Approx. 25 ms	Tripping time characteristic acc. to IEC	See page 5/33
At 2 x setting value, with meas. repetition	Approx. 35 ms	Pickup threshold	Approx. $1.1 \times I_p$
Pickup times for $I >>>$ at 2 x setting value	Approx. 15 ms	Reset threshold, alternatively disk emulation	Approx. $1.03 \times I_p$
Reset times $I >$, $I >>$, $I_{E>}$, $I_{E>>}$	Approx. 40 ms	Dropout time	
Reset time $I >>>$	Approx. 50 ms	50 Hz	Approx. 50 ms
Reset ratios	Approx. 0.95	60 Hz	Approx. 60 ms
Overshot time	Approx. 55 ms	Tolerances	
Tolerances		Pickup values	5 % of setting value or 5 % of rated value
Pickup values $I >$, $I >>$, $I >>>$, $I_{E>}$, $I_{E>>}$	5 % of setting value or 5 % of rated value	Timing period for $2 \leq I/I_p \leq 20$ and $0.5 \leq I/I_p \leq 24$	5 % of theoretical value ± 2 % current tolerance; at least 30 ms
Delay times T	1 % of setting value or 10 ms	Influencing variables	
Influencing variables		Auxiliary voltage, range: $0.8 \leq V_{aux}/V_{auxN} \leq 1.2$	≤ 1 %
Auxiliary voltage, range: $0.8 \leq V_{aux}/V_{auxN} \leq 1.2$	≤ 1 %	Temperature, range: $-5^\circ\text{C} \leq \Theta_{amb} \leq 40^\circ\text{C}$ / $23^\circ\text{F} \leq \Theta_{amb} \leq 104^\circ\text{F}$	≤ 0.5 %/10 K
Temperature, range: $-5^\circ\text{C} \leq \Theta_{amb} \leq 40^\circ\text{C}$ / $23^\circ\text{F} \leq \Theta_{amb} \leq 104^\circ\text{F}$	≤ 0.5 %/10 K	Frequency, range: $0.95 \leq f/f_N \leq 1.05$	≤ 8 %, referred to theoretical time value
Frequency, range $0.98 \leq f/f_N \leq 1.02$	≤ 1.5 %	Tripping characteristic acc. to ANSI/IEEE	See page 5/33
$0.95 \leq f/f_N \leq 1.05$	≤ 2.5 %	Pickup threshold	Approx. $1.06 \times I_p$
Harmonics		Dropout threshold, alternatively disk emulation	Approx. $1.03 \times I_p$
Up to 10 % of 3 rd harmonic	≤ 1 %	Tolerances	
Up to 10 % of 5 th harmonic	≤ 1 %	Pickup threshold	5 % of setting value or 5 % of rated value
		Timing period for $2 \leq I/I_p \leq 20$ and $0.5 \leq I/I_p \leq 24$	5 % of theoretical value ± 2 % current tolerance; at least 30 ms
Influencing variables		Influencing variables	
Auxiliary voltage, range: $0.8 \leq V_{aux}/V_{auxN} \leq 1.2$	≤ 1 %	Auxiliary voltage, range: $0.8 \leq V_{aux}/V_{auxN} \leq 1.2$	≤ 1 %
Temperature, range: $-5^\circ\text{C} \leq \Theta_{amb} \leq 40^\circ\text{C}$ / $23^\circ\text{F} \leq \Theta_{amb} \leq 104^\circ\text{F}$	≤ 0.5 %/10 K	Temperature, range: $-5^\circ\text{C} \leq \Theta_{amb} \leq 40^\circ\text{C}$ / $23^\circ\text{F} \leq \Theta_{amb} \leq 104^\circ\text{F}$	≤ 0.5 %/10 K
Frequency, range $0.95 \leq f/f_N \leq 1.05$	≤ 8 %, referred to theoretical time value	Frequency, range: $0.95 \leq f/f_N \leq 1.05$	≤ 8 %, referred to theoretical time value

Technical data

(Sensitive) earth-fault protection (directional/non-directional)

Definite-time earth-fault protection (ANSI 50Ns)

Setting ranges/steps	
Low-set element $I_{EE}>$	$I/I_{EEN} = 0.003 \text{ to } 1.5$ (steps 0.001); or ∞ (deactivated)
High-set element $I_{EE}>>$	$I/I_{EEN} = 0.003 \text{ to } 1.5$ (steps 0.001); or ∞ (deactivated)
Delay times T for $I_{EE}>$ and $I_{EE}>>$	0 to 60 s (steps 0.01 s)
Pickup times $I_{EE}>$, $I_{EE}>>$	
At 2 x setting value without meas. repetition	Approx. 35 ms
At 2 x setting value with meas. repetition	Approx. 55 ms
Reset times $I_{EE}>$, $I_{EE}>>$	
At 50 Hz	Approx. 65 ms
At 60 Hz	Approx. 95 ms
Reset ratios	Approx. 0.95
Overshot time	Approx. 55 ms
Tolerances	
Pickup values $I_{EE}>$, $I_{EE}>>$	5 % of setting value or 5 % of rated value
Delay times T	1 % of setting value or 10 ms
Influencing variables	
Auxiliary voltage, range: $0.8 \leq V_{aux}/V_{auxN} \leq 1.2$	$\leq 1\%$
Temperature, range: $-5^{\circ}\text{C} \leq \Theta_{amb} \leq 40^{\circ}\text{C}$ $23^{\circ}\text{F} \leq \Theta_{amb} \leq 104^{\circ}\text{F}$	$\leq 0.5\%/\text{10 K}$
Frequency, ranges: $0.98 \leq f/f_N \leq 1.02$ $0.95 \leq f/f_N \leq 1.05$	$\leq 1.5\%$ $\leq 2.5\%$
Harmonics	
Up to 10 % of 3 rd harmonic	$\leq 1\%$
Up to 10 % of 5 th harmonic	$\leq 1\%$

Inverse-time earth-fault protection (ANSI 51Ns)

Setting ranges/steps	
Low-set element I_{EEp}	$I/I_{EEN} = 0.003 \text{ to } 1.4$ (steps 0.001)
Time multiplier for I_{EEp} (IEC characteristic)	$T_p = 0.05 \text{ to } 3.2 \text{ s}$ (steps 0.01 s)
Time multiplier for I_{EEp} (ANSI characteristic)	$D = 0.5 \text{ to } 15 \text{ s}$ (steps 0.1 s)
High-set element $I_{EE}>>$	$I/I_{EEN} = 0.003 \text{ to } 1.5$ (steps 0.001); or ∞ (deactivated)
Delay time T for $I_{EE}>>$	0 to 60 s (steps 0.01 s)
Tripping time characteristic acc. to IEC	See page 5/33
Pickup threshold	Approx. $1.1 \times I_{EEp}$
Reset threshold alternatively disk emulation	Approx. $1.03 \times I_{EEp}$
Dropout time	
50 Hz	Approx. 50 ms
60 Hz	Approx. 60 ms
Tolerances	
Pickup values	5 % of setting value or 5 % of rated value
Timing period for $2 \leq I/I_{EEp} \leq 20$ and $0.5 \leq I/I_{EEN} \leq 24$	5 % of theoretical value $\pm 2\%$ current tolerance; at least 30 ms
Influencing variables	
Auxiliary voltage, range: $0.8 \leq V_{aux}/V_{auxN} \leq 1.2$	$\leq 1\%$

Inverse-time earth-fault protection (ANSI 51Ns), cont'd

Temperature, range: $-5^{\circ}\text{C} \leq \Theta_{amb} \leq 40^{\circ}\text{C}$ $23^{\circ}\text{F} \leq \Theta_{amb} \leq 104^{\circ}\text{F}$	$\leq 0.5\%/\text{10 K}$
Frequency, range: $0.95 \leq f/f_N \leq 1.05$	$\leq 8\%$, referred to theoretical time value
Tripping characteristic acc. to ANSI/IEEE	
Pickup threshold	See page 5/33
Dropout threshold, alternatively disk emulation	Approx. $1.06 \times I_{EEp}$
Tolerances	
Pickup threshold	Approx. $1.03 \times I_{EEp}$
Timing period for $2 \leq I/I_{EEp} \leq 20$ and $0.5 \leq I/I_{EEN} \leq 24$	5 % of setting value or 5 % of rated value $\pm 2\%$ current tolerance; at least 30 ms
Influencing variables	
Auxiliary voltage, range: $0.8 \leq V_{aux}/V_{auxN} \leq 1.2$	$\leq 1\%$
Temperature, range: $-5^{\circ}\text{C} \leq \Theta_{amb} \leq 40^{\circ}\text{C}$ $23^{\circ}\text{F} \leq \Theta_{amb} \leq 104^{\circ}\text{F}$	$\leq 0.5\%/\text{10 K}$
Frequency, range: $0.95 \leq f/f_N \leq 1.05$	$\leq 8\%$, referred to theoretical time value
Direction detection (ANSI 67Ns)	
Direction measurement	I_E, V_E (measured)
Measuring principle	Active/reactive measurement
Measuring enable	
For sensitive input	$I/I_{EEN} = 0.003 \text{ to } 1.2$ (in steps of 0.001 I/I_{EEN})
Reset ratio	Approx. 0.8
Measuring method	$\cos \varphi$ and $\sin \varphi$
Direction vector	-45° to $+45^{\circ}$ (in steps of 0.1°)
Dropout delay $T_{Reset Delay}$	1 to 60 s (steps 1 s)
Angle correction for cable converter (for resonant-earthed system)	In 2 operating points F1 and F2
Angle correction F1, F2	0° to 5° (in steps of 0.1°)
Current values I_1, I_2	
For sensitive input	$I/I_{EEN} = 0.003 \text{ to } 1.6$ (in steps of 0.001 I/I_{EEN})
Measuring tolerance acc. to DIN 57435	2 % of the setting value or 1 mA
Angle tolerance	3°
Displacement voltage (ANSI 64)	
Displacement voltage, measured	$V_E >/V_N = 0.02 \text{ to } 1.3$ (steps 0.001)
Measuring time	Approx. 60 ms
Pickup delay time	0.04 to 320 s or ∞ (steps 0.01 s)
Time delay	0.1 to 40000 s or ∞ (steps 0.01 s)
Dropout ratio	0.95 or (pickup value -0.6 V)
Measuring tolerance	
V_E (measured)	3 % of setting value, or 0.3 V
Operating time tolerances	1 % of setting value, or 10 ms
The set times are pure delay times	

Technical data

Thermal overload protection with memory (ANSI 49) with preload

Setting ranges	
Factor k according to IEC 60255-8	0.40 to 2 (steps 0.01)
Thermal time constant τ_{th}	1 to 999.9 min (steps 0.1 min)
Thermal warning stage $\Theta_{alarm}/\Theta_{trip}$	50 to 99 % referred to trip temperature rise (steps 1 %)
Prolongation factor at motor stand-still k_T	1 to 10 (steps 0.01)
Reset ratios Θ/Θ_{trip}	Reset below 0.99 Θ_{alarm}
Θ/Θ_{alarm}	Approx. 0.99
Tolerances	
Referring to $k \cdot I_N$	$\pm 5\%$ (class 5 % acc. to IEC 60255-8)
Referring to trip time	$\pm 5\% \pm 2\text{ s}$ (class 5 % acc. to IEC 60255-8)
Influencing variables	
Auxiliary DC voltage, range $0.8 \leq V_{aux}/V_{auxN} \leq 1.2$	$\leq 1\%$
Temperature, range $-5^\circ\text{C} \leq \Theta_{amb} \leq +40^\circ\text{C} / 23^\circ\text{F} \leq \Theta_{amb} \leq 104^\circ\text{F}$	$\leq 0.5\%/10\text{ K}$
Frequency, range $0.95 \leq f/f_N \leq 1.05$	$\leq 1\%$

Thermal overload protection without memory (ANSI 49) without preload

Setting ranges	
Pickup value	$I_L/I_N = 0.4$ to 4 (steps 0.1)
Time multiplier $t_L (= t_6 \text{-time})$	1 to 120 s (steps 0.1 s)
Reset ratio I/I_L	Approx. 0.94
Tolerances	
Referring to pickup threshold $1.1 I_L$	$\pm 5\%$ of setting value or 5 % of rated value
Referring to trip time	$\pm 5\% \pm 2\text{ s}$
Influencing variables	
Auxiliary DC voltage, range $0.8 \leq V_{aux}/V_{auxN} \leq 1.2$	$\leq 1\%$
Temperature, range $-5^\circ\text{C} \leq \Theta_{amb} \leq +40^\circ\text{C} / 23^\circ\text{F} \leq \Theta_{amb} \leq 104^\circ\text{F}$	$\leq 0.5\%/10\text{ K}$
Frequency, range $0.95 \leq f/f_N \leq 1.05$	$\leq 1\%$

Breaker failure protection

Setting ranges/steps	
Pickup of current element	$CB I>/I_N = 0.04$ to 1.0 (steps 0.01)
Delay time	0.06 to 60 s or ∞ (steps 0.01 s)
Pickup times (with internal start) (via control) (with external start)	is contained in the delay time is contained in the delay time is contained in the delay time
Dropout time	Approx. 25 ms
Tolerances	
Pickup value	2 % of setting value
Delay time	1 % or 20 ms

Negative-sequence protection (ANSI 46)

Setting ranges/steps	
Tripping stages $I_2>$ and $I_2>>$	8 to 80 % to I_N (steps 1 %)
Delay times $T(I_2>)$, $T(I_2>>)$	0 to 60 s (steps 0.01 s)
Lower function limit	At least one phase current $\geq 0.1 \times I_N$
Pickup times	$\text{at } f_N = 50 \text{ Hz}$ $\text{at } f_N = 60 \text{ Hz}$
Tripping stages $I_2>$ and $I_2>>$ But with currents $I/I_N > 1.5$ (overcurrent case) or negative-sequence current $<$ (set value $+0.1 \times I_N$)	Approx. 60 ms Approx. 75 ms
Reset times	
Tripping stages $I_2>$ and $I_2>>$	Approx. 200 ms Approx. 310 ms
Reset ratios	
Tripping stages $I_2>$ and $I_2>>$	Approx. 0.9 to 0.01 $\times I_N$
Tolerances	
Pickup values $I_2>$, $I_2>>$	$\pm 1\%$ of $I_N \pm 5\%$ of set value
Current $I/I_N \leq 1.5$	$\pm 5\%$ of $I_N \pm 5\%$ of set value
Current $I/I_N > 1.5$	$\pm 1\%$ but min. 10 ms
Influencing variables	
Auxiliary DC voltage, range $0.8 \leq V_{aux}/V_{auxN} \leq 1.2$	$\leq 1\%$
Temperature, range $-5^\circ\text{C} \leq \Theta_{amb} \leq +40^\circ\text{C} / 23^\circ\text{F} \leq \Theta_{amb} \leq 104^\circ\text{F}$	$\leq 0.5\%/10\text{ K}$
Frequency, range $0.98 \leq f/f_N \leq 1.02$	$\leq 1\% \text{ of } I_N$
$0.95 \leq f/f_N \leq 1.05$	$\leq 5\% \text{ of } I_N$

Auto-reclosure (ANSI 79)

Number of possible shots	1 to 9, configurable
Auto-reclosure modes	3-pole
Dead times for 1 st and any further shot	0.05 s to 1800 s (steps 0.01 s)
Blocking time after successful AR	0.05 s to 320 s (steps 0.01 s)
Lock-out time after unsuccessful AR	0.05 s to 320 s (steps 0.01 s)
Reclaim time after manual close	0.50 s to 320 s (steps 0.01 s)
Duration of reclose command	0.01 s to 60 s (steps 0.01 s)

Trip circuit supervision (ANSI 74TC)

Trip circuit supervision	With one or two binary inputs
Circuit-breaker trip test	Trip/reclosure cycle

Control

Number of devices	1
Evaluation of breaker contact	None

Technical data

Motor protection

Setting ranges/steps Rated motor current/ transformer rated current	$I_{\text{motor}}/I_N = 0.2 \text{ to } 1.2$ (in steps of 0.1)
Start-up current of the motor	$I_{\text{start}}/I_{\text{motor}} = 0.4 \text{ to } 20$ (in steps of 0.1)
Permissible start-up time $t_{\text{start max}}$	1 to 360 s (in steps of 0.1 s)

Starting time supervision (ANSI 48)

Setting ranges/steps Pickup threshold	$I_{\text{pickup}}/I_{\text{motor}} = 0.4 \text{ to } 20$ (in steps of 0.1)
Tripping time characteristic	$t_{\text{TRIP}} = \left(\frac{I_{\text{start}}}{I_{\text{rms}}} \right)^2 \cdot t_{\text{start max}}$ For $I_{\text{rms}} > I_{\text{pickup}}$ $I_{\text{start}} = \text{Start-up current of the motor}$ $I_{\text{rms}} = \text{Current actually flowing}$ $I_{\text{pickup}} = \text{Pickup threshold, from which the motor start-up is detected}$ $t_{\text{start max}} = \text{Maximum permissible starting time}$ $t_{\text{TRIP}} = \text{Tripping time}$ Approx. 0.94
Reset ratio $I_{\text{rms}}/I_{\text{pickup}}$	5 %
Tolerances Pickup values	5 % of setting value or 5 % rated value
Delay time	5 % or 330 ms

Restart inhibit for motors (ANSI 66/86)

Setting ranges/steps Rotor temperature compensation time T_{COMP}	0 to 60 min (in steps of 0.1 min)
Minimum restart inhibit time T_{restart}	0.2 to 120 min (in steps of 0.1 min)
Maximum permissible number of warm starts n_w	1 to 4 (in steps of 1)
Difference between cold and warm start $n_c - n_w$	1 to 2 (in steps of 1)
Extension factor for cooling simulation of the rotor (running and stop)	1 to 10 (in steps of 0.1)
Restarting limit	$\Theta_{\text{restart}} = \Theta_{\text{rot max perm}} \cdot \frac{n_c - 1}{n_c}$ $\Theta_{\text{restart}} = \text{Temperature limit below which restarting is possible}$ $\Theta_{\text{rot max perm}} = \text{Maximum permissible rotor overtemperature} (= 100 \% \text{ in operational measured value } \Theta_{\text{rot}}/\Theta_{\text{rot trip}})$ $n_c = \text{Number of permissible start-ups from cold state}$

Undercurrent monitoring (ANSI 37)

Threshold	$I_L < /I_N = 0.1 \text{ to } 4$ (in steps of 0.01)
Delay time for $I_L <$	0 to 320 s (in steps of 0.1 s)

Thermo-box (instead of system interface) (ANSI 38)

Number of temperature sensors	Max. 6
Type of measuring	Pt 100 Ω or Ni 100 Ω or Ni 120 Ω
Installation drawing	"Oil" or "Environment" or "Stator" or "Bearing" or "Other"
Limit values for indications For each measuring detector	-50 °C to 250 °C (in steps of 1 °C)
Warning temperature (stage 1)	-58 °F to 482 °F (in steps of 1 °F) or ∞ (no indication)
Alarm temperature (stage 2)	-50 °C to 250 °C (in steps of 1 °C) -58 °F to 482 °F (in steps of 1 °F) or ∞ (no indication)

Additional functions

Operational measured values

For currents	$I_{L1}, I_{L2}, I_{L3}, I_E$ in A (Amps) primary or in % I_N 10 to 240 % I_N 3 % of measured value
For voltages	V_{L1-E_1} , in kV primary or in % 10 to 120 % of V_N ≤ 3 % of measured value
For sensitive earth-current detection	$I_{EE}, I_{EEac}, I_{EEreac}$ (r.m.s., active and reactive current) in A (kA) primary, or in % 0 to 160 % I_{EEN} ≤ 3 % of measured value

Power/work

S Apparent power	in kVA, MVA, GVA
S/VA (apparent power)	For $V/V_N, I/I_N = 50 \text{ to } 120 \%$ typically < 6 %
P Active power, P/Watts (active power)	in kW, MW, GW For $ \cos \varphi = 0.707 \text{ to } 1$, typically < 6 %, for $V/V_N, I/I_N = 50 \text{ to } 120 \%$
Q Reactive power, Q/Var (reactive power)	In kvar, Mvar, Gvar For $ \sin \varphi = 0.707 \text{ to } 1$, typically < 6 %, for $V/V_N, I/I_N = 50 \text{ to } 120 \%$
$\cos \varphi$, total and phase-selective Power factor $\cos \varphi$	-1 to +1 For $ \cos \varphi = 0.707 \text{ to } 1$, typically < 5 %

Metering

+ W_p kWh	In kWh, MWh, GWh forward
- W_p kWh	In kWh reverse
+ W_q kvarh	In kvarh inductive
- W_q kvarh	In kvarh, Mvarh, Gvarh capacitive

Long-term mean values

Mean values	15, 30, 60 minutes mean values
$I_{L1 \text{ dmd}}$	in A, kA
$I_{L2 \text{ dmd}}$	in A, kA
$I_{L3 \text{ dmd}}$	in A, kA
P_{dmd}	in kW
Q_{dmd}	in kvar
S_{dmd}	in kVA

Technical data

Min/max. LOG (memory)	
Measured values	With date and time
Reset automatic	Time of day (settable in minutes) Time range (settable in days; 1 to 365, ∞)
Reset manual	Via binary input Via keyboard Via communication
Min./max. values of primary currents	$I_{L1}; I_{L2}; I_{L3}$
Min./max. values of primary voltages	$V_{L1\text{-}E}$
Min./max. values of power	S Apparent Power P Active power Q Reactive power Power factor $\cos \varphi$
Min./max. values of primary currents mean values	$I_{L1\text{dmd}}, I_{L2\text{dmd}}, I_{L3\text{dmd}}$
Min./max. values of power mean value	$P_{\text{dmd}}, Q_{\text{dmd}}, S_{\text{dmd}}$

Fault event log	
Storage	Storage of the last 8 faults
Time assignment	
Resolution for operational indications	1 s
Resolution for fault event indications	1 ms
Max. time deviation	0.01 %

Fault recording	
Storage	Storage of max. 8 fault events
Total storage time (fault detection or trip command = 0 ms)	Max. 5 s, selectable pre-trigger and post-fault time
Max. storage period per fault event T_{max}	0.30 s to 5 s (steps 0.01 s)
Pre-trigger time T_{pre}	0.05 s to 0.50 s (steps 0.01 s)
Post-fault time T_{post}	0.05 s to 0.50 s (steps 0.01 s)
Sampling rate at 50 Hz	1 instantaneous value per ms
Sampling rate at 60 Hz	1 instantaneous value per 0.83 ms
Backup battery	Lithium battery 3 V/1 Ah, type CR $\frac{1}{2}$ AA Self-discharge time > 5 years “Battery fault” battery charge warning

CE conformity

This product is in conformity with the Directives of the European Communities on the harmonization of the laws of the Member States relating to electromagnetic compatibility (EMC Council Directive 89/336/EEC) and electrical equipment designed for use within certain voltage limits (Council Directive 73/23/EEC).

This unit conforms to the international standard IEC 60255, and the German standard DIN 57435/Part 303 (corresponding to VDE 0435/Part 303).

The unit has been developed and manufactured for application in an industrial environment according to the EMC standards.

This conformity is the result of a test that was performed by Siemens AG in accordance with Article 10 of the Council Directive complying with the generic standards EN 50081-2 and EN 50082-2 for the EMC Directive and standard EN 60255-6 for the “low-voltage Directive”.



Selection and ordering data	Description	Order No.	Order code
	<i>7SJ602 multifunction overcurrent and motor protection relay</i>	<i>7SJ602□ - □□□□□ - □□□□ - □□□</i>	
	<i>Measuring inputs (4 x I), default settings</i>		
	<i>$I_N = 1 \text{ A}^1)$, 15th position only with A</i>	1	
	<i>$I_N = 5 \text{ A}^1)$, 15th position only with A</i>	5	
	<i>Measuring inputs (1 x V, 3 x I), default settings</i>		
	<i>$I_{ph} = 1 \text{ A}^1$, $I_e = \text{sensitive}$ ($I_{EE} = 0.003$ to 1.5 A), 15th position only with B and J</i>	2	
	<i>$I_{ph} = 5 \text{ A}^1)$, $I_e = \text{sensitive}$ ($I_{EE} = 0.015$ to 7.5 A), 15th position only with B and J</i>	6	
	<i>Auxiliary voltage</i>		
	<i>24/48 V DC, binary input threshold 19 V</i>	2	
	<i>60/110 V DC²⁾, binary input threshold 19 V³⁾</i>	4	
	<i>110/125/220/250 V DC, 115/230 V AC²⁾ binary input threshold 88 V³⁾</i>	5	
	<i>Unit design</i>		
	<i>Surface-mounting housing, terminals on top and bottom</i>	B	
	<i>Flush-mounting housing, screw-type terminals</i>	E	
	<i>Region-specific default and language settings</i>		
	<i>Region World, 50/60 Hz, ANSI/IEC characteristic, languages: English, German, French, Spanish, Russian</i>	B	
	<i>System port (on bottom of unit)</i>		
	<i>No system port</i>	0	
	<i>IEC 60870-5-103, electrical RS232</i>	1	
	<i>IEC 60870-5-103, electrical RS485</i>	2	
	<i>IEC 60870-5-103, optical 820 nm, ST connector</i>	3	
	<i>Temperature monitoring box, electrical RS485⁴⁾</i>	8	
	<i>PROFIBUS-DP Slave, electrical RS485</i>	9	L 0 A
	<i>PROFIBUS-DP Slave, optical 820 nm, double ring, ST connector</i>	9	L 0 B
	<i>MODBUS, electrical RS485</i>	9	L 0 D
	<i>MODBUS, optical 820 nm, ST connector</i>	9	L 0 E
	<i>Command (without process check back signal)</i>		
	<i>Without command</i>	0	
	<i>With command</i>	1	
	<i>Measuring / fault recording</i>		
	<i>Oscillographic fault recording</i>	1	
	<i>Oscillographic fault recording, slave pointer, mean values, min./max. values</i>	3	

- 1) Rated current can be selected by means of jumpers.
- 2) Transition between the two auxiliary voltage ranges can be selected by means of jumpers.
- 3) The binary input thresholds can be selected in two stages by means of jumpers.
- 4) Temperature monitoring box 7XV5662-□AD10, refer to part 13.

Selection and ordering data

Description		Order No.
<i>7SJ602 multifunction overcurrent and motor protection relay</i>		<i>7SJ602□-□□□□□-□□□□</i>
ANSI No.	Description	
	<i>Basic version</i>	
50/51	Time-overcurrent protection TOC phase $I>, I>>, I>>>, I_p$, reverse interlocking	
50N/51N	Ground/earth-fault protection TOC ground/earth $I_E>, I_E>>, I_{Ep}$	
49	Overload protection	
74TC	Trip circuit supervision	
50BF	Breaker-failure protection	
46	Cold load pickup	
	Negative sequence/unbalanced load protection	<i>F A</i> ¹⁾
	<i>Basic version + directional ground/earth-fault detection</i>	
50/51	Time-overcurrent protection TOC phase $I>, I>>, I>>>, I_p$, reverse interlocking	
67Ns	Directional sensitive ground/earth-fault detection $I_{EE}>, I_{EE}>>, I_{Ep}$	
64	Displacement voltage	
49	Overload protection	
74TC	Trip circuit supervision	
50BF	Breaker-failure protection	
46	Cold load pickup	
	Negative sequence/unbalanced load protection	<i>F B</i> ²⁾
	<i>Basic version + sensitive ground/earth-fault detection + measuring</i>	
50/51	Time-overcurrent protection TOC phase $I>, I>>, I>>>, I_p$, reverse interlocking	
50Ns/51Ns	Sensitive ground/earth-fault detection $I_{EE}>, I_{EE}>>, I_{Ep}$	
49	Overload protection	
74TC	Trip circuit supervision	
50BF	Breaker-failure protection	
46	Cold load pickup	
	Negative sequence/unbalanced load protection	
	Voltage and power measuring	<i>F J</i> ²⁾
	<i>Basic version + motor protection</i>	
50/51	Time-overcurrent protection TOC phase $I>, I>>, I>>>, I_p$, reverse interlocking	
50N/51N	Ground/earth-fault protection TOC ground/earth $I_E>, I_E>>, I_{Ep}$	
49	Overload protection	
74TC	Trip circuit supervision	
50BF	Breaker-failure protection	
46	Cold load pickup	
48	Starting time supervision	
37	Undercurrent/loss of load monitoring	
66/86	Restart inhibit	<i>H A</i> ¹⁾
	<i>Basic version + directional ground/earth fault protection + motor protection</i>	
50/51	Time-overcurrent protection TOC phase $I>, I>>, I>>>, I_p$, reverse interlocking	
67Ns	Directional sensitive ground/earth-fault detection $I_{EE}>, I_{EE}>>, I_{Ep}$	
64	Displacement voltage	
49	Overload protection	
74TC	Trip circuit supervision	
50BF	Breaker-failure protection	
46	Cold load pickup	
48	Negative sequence/unbalanced load protection	
37	Starting time supervision	
66/86	Undercurrent/loss of load monitoring	
	Restart inhibit	<i>H B</i> ²⁾
	<i>Basic version + sensitive ground/earth-fault detection + measuring + motor protection</i>	
50/51	Time-overcurrent protection TOC phase $I>, I>>, I>>>, I_p$, reverse interlocking	
50Ns/51Ns	Sensitive ground/earth-fault detection $I_{EE}>, I_{EE}>>, I_{Ep}$	
49	Overload protection	
74TC	Trip circuit supervision	
50BF	Breaker-failure protection	
46	Cold load pickup	
48	Negative sequence/unbalanced load protection	
37	Starting time supervision	
66/86	Undercurrent/loss of load monitoring	
	Restart inhibit	<i>H J</i> ²⁾
	<i>Auto-reclosure (ARC)</i>	
	Without auto-reclosure ARC	<i>0</i>
79	With auto-reclosure ARC	<i>1</i>

1) Only with position 7 = 1 or 5

2) Only with position 7 = 2 or 6

Accessories

Description	Order No.
DIGSI 4 Software for configuration and operation of Siemens protection units running under MS Windows 2000/XP Professional Edition, device templates, Comtrade Viewer, electronic manual included as well as "Getting started" manual on paper, connecting cables (copper)	
Basis Full version with license for 10 computers, on CD-ROM <u>(authorization by serial number)</u>	7XS5400-0AA00
Professional DIGSI 4 Basis and additionally SIGRA (fault record analysis), CFC Editor (logic editor), Display Editor (editor for default and control displays) and DIGSI 4 Remote (remote operation)	7XS5402-0AA00
SIGRA 4 (generally contained in DIGSI Professional, but can be ordered additionally) Software for graphic visualization, analysis and evaluation of fault records. Can also be used for fault records of devices of other manufacturers (Comtrade format). Running under MS Windows. Incl. templates, electronic manual with license for 10 PCs on CD-ROM. <u>Authorization by serial number.</u>	7XS5410-0AA00
Temperature monitoring box 24 to 60 V AC/DC	7XV5662-2AD10
90 to 240 V AC/DC	7XV5662-5AD10
Connecting cable (contained in DIGSI 4, but can be ordered additionally) Cable between PC/notebook (9-pin con.) and protection unit (9-pin connector)	7XV5100-4
Cable between temperature monitoring box and SIPROTEC 4 unit - length 5 m / 16.4 ft	7XV5103-7AA05
- length 25 m / 82 ft	7XV5103-7AA25
- length 50 m / 164 ft	7XV5103-7AA50
Manual for 7SJ602 English please visit Spanish please visit	www.siemens.com/siprotec www.siemens.com/siprotec



LSP20834fp.eps

Short-circuit links
for current terminals



LSP22984fp.eps

Mounting rail

Description	Order No.	Size of package	Supplier
Terminal safety cover			
Voltage/current terminal 18-pole	C73334-A1-C31-1	1	Siemens
Voltage/current terminal 8-pole	C73334-A1-C32-1	1	Siemens
Short-circuit links			
For current terminals	C73334-A1-C33-1	1	Siemens
For other terminals	C73334-A1-C34-1	1	Siemens
Mounting rail for 19" rack	C73165-A63-D200-1	1	Siemens
Your local Siemens representative can inform you on local suppliers.			

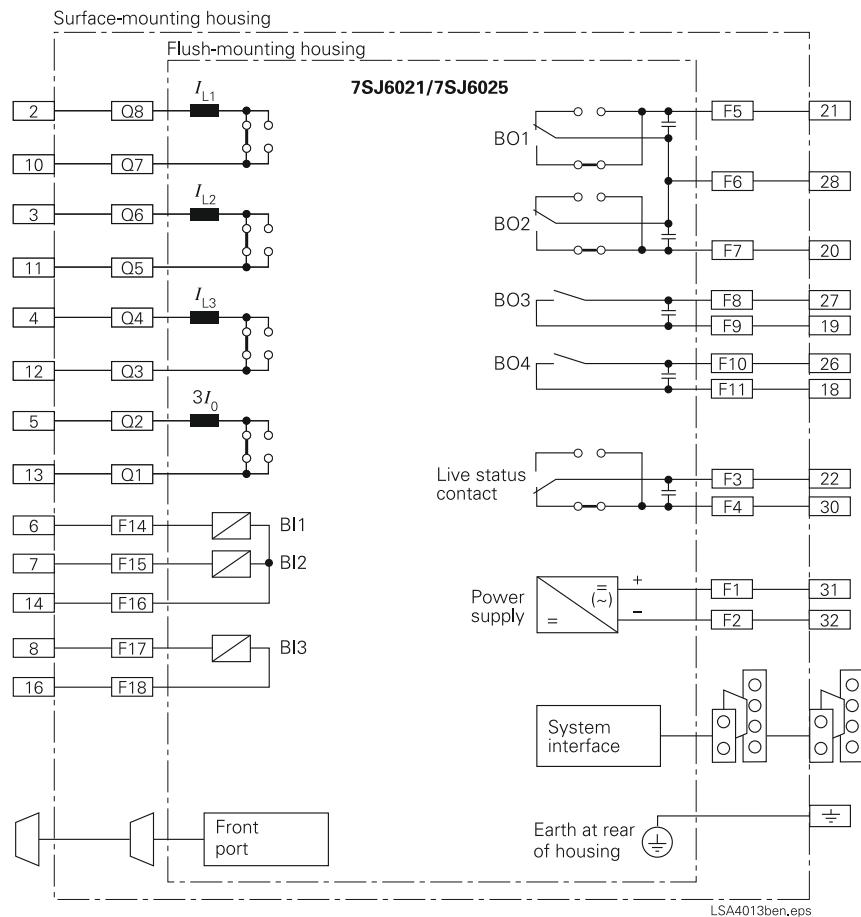
Connection diagram

Fig. 5/54
Connection diagram according to IEC standard

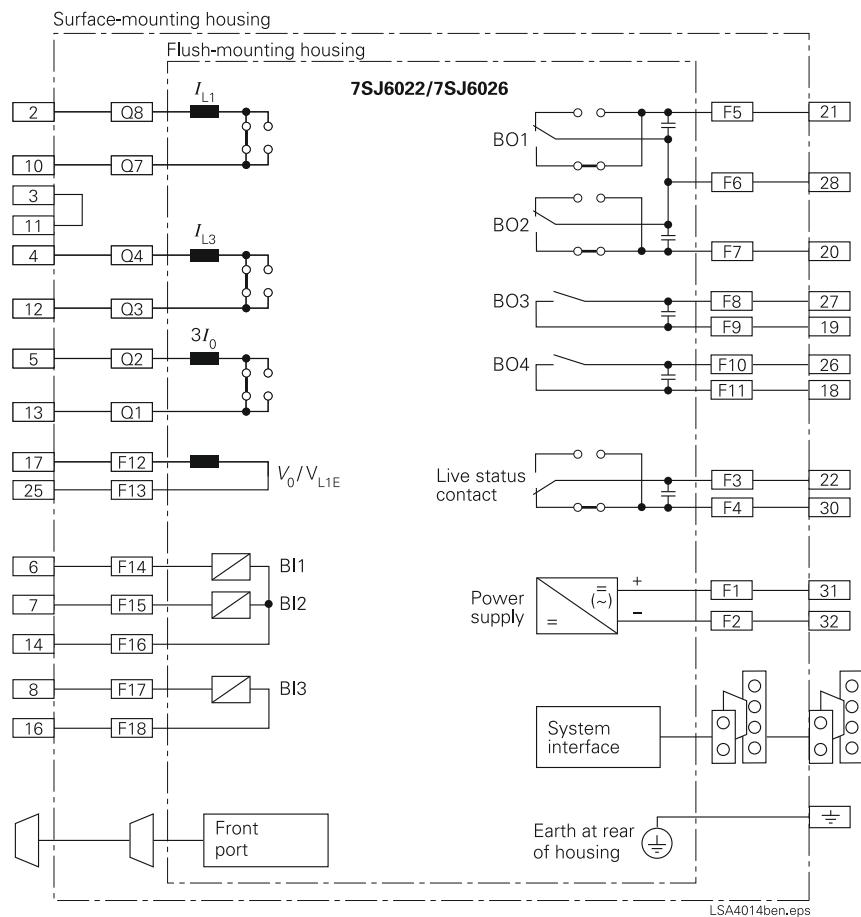
Connection diagram

Fig. 5/55
Connection diagram according to IEC standard

SACE Isomax S.
The largest project
in moulded-case
circuit-breakers

604030/012 en



ABB

A single series of moulded-case circuit-breakers enabling infinite solutions

SACE Isomax S moulded-case low-voltage circuit-breakers offer performance features that meet the full spectrum of application requirements, from small users through to large industrial electricity distribution installations. Innovation, technology and quality have always been the principles guiding the development of ABB SACE L.V. products. Strengths that have reached outstanding levels in the SACE Isomax S series, which now offers even more solutions to meet every need, making it the most complete range of moulded-case circuit-breakers.

The SACE Isomax S series is rationally divided into eight basic models following a modular

logic that converts them into different versions, creating a full spectrum of different ranges to provide an optimal dedicated response to any installation requirement. This results in a wide choice of alternating current and direct current distribution circuit-breakers, current-limiting circuit-breakers, motor protection circuit-breakers, switch-disconnectors and residual-current circuit-breakers. In addition to all these ranges, which meet the IEC 947-2 and EN 60947-2 international standards, there are also motor protection circuit-breakers and switch-disconnectors that comply with the UL489 and CSA C22.2 standards thanks to approval by the Underwriters Laboratories.



The complete system approach of the series can also be seen in the modular nature of its components: the dimensions, installation procedures and accessory options are the same irrespective of the circuit-breaker range, with significant benefits for the user.

What's more, the continuous and constant development of the series that has made the SACE Isomax S offer increasingly complete today, is an ongoing process that continues to bring many new developments.

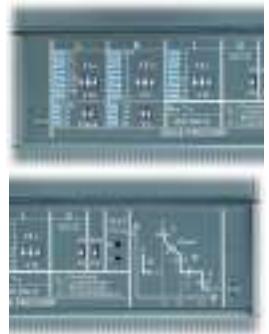
The S2X, which is externally identical to the S2B/N/S, retaining the same dimensions, mounting systems and accessory and

customisation options. Thanks to special technical solutions, such as two fixed contacts for each arcing chamber, it offers excellent performance in terms of breaking, fault current limiting and specific let-through current capacity. The S2X 80 version with 13xI_{th} magnetic-only release is particularly suitable for motor protection, while the S2X 100 version with adjustable thermomagnetic release can be used wherever overload protection is required.

The S4 and S7 circuit-breakers, equipped with the PR212/MP electronic release specially designed for starting and protecting motors, are distinguished by complete leading-edge protection and made it possible to implement optimised coordination while benefiting from significant savings in time, space and money.

The new range for 1000 V alternating current applications raises the use barrier of moulded-case circuit breakers still higher and emblemises the ceaseless development of the SACE Isomax S series together with the outstanding technical qualities that place it in a class of its own.

The new solenoid operating mechanism for S1-S2 completes the option for remote control of the entire SACE Isomax S range. Available in various power supply voltages and two different versions for installation on the front of or alongside the circuit-breaker, it is characterised by a high trip speed and can be used for centralised installation control as well as for switching between the mains and emergency power supply networks.



Circuit-breakers

IEC 947-2



		SACE Isomax S1	SACE Isomax S2			SACE Isomax S3		
Rated uninterrupted current, Iu	[A]	125	160			160 - 250		
Number of poles	N°.	3-4	3-4			3-4		
Rated service voltage, Ue	(a.c.) 50-60 Hz [V~]	500	690			690		
	(d.c.) [V-]	250	500			750		
Rated impulse withstand voltage, Uiimp	[kV]	6	6			8		
Rated insulation voltage, Ui	[V]	500	690			800		
Test voltage at industrial frequency for 1 minute	[V]	3000	3000			3000		
Rated limit short-circuit breaking capacity, Icu		B N	B N S			N H L		
(a.c.) 50-60 Hz	220/230 V~ [kA]	25	40	25	50 65	65	100	170
(a.c.) 50-60 Hz	380/415 V~ [kA]	16	25	16	35 (1) 50	35 (1)	65	85
(a.c.) 50-60 Hz	440 V~ [kA]	10	16	10	20 25	30	50	65
(a.c.) 50-60 Hz	500 V~ [kA]	8	12	8	12 15	25	40	50
(a.c.) 50-60 Hz	690 V~ [kA]	—	—	6	8 10	14	18	20 (5)
(d.c.)	250 V – (2 poles in series) [kA]	16	25	16	35 50	35	65	85
(d.c.)	500 V – (2 poles in series) [kA]	—	—	—	—	35	50	65
(d.c.)	500 V – (3 poles in series) [kA]	—	—	16	35 50	—	—	—
(d.c.)	750 V – (3 poles in series) [kA]	—	—	—	—	20	35	50
Rated duty short-circuit breaking capacity, Ics (2)	[%Icu]	50%	50%	100%	75% 75%	100%	75%	75%
Rated short-circuit making capacity (415 V~), Icm	[kA]	32	52,5	32	74 105	74	143	187
Tripping time (415 V~)	[ms]	8	6	8	7 6	8	7	6
Rated short time withstand current (1 s), Icw	[kA]							
Use category (EN 60947-2)		A		A		A		
Isolation behaviour		■		■		■		
IEC 947-2, EN 60947-2		■		■		■		
Releases	thermomagnetic	T fixed, M fixed 5lth	■	■				
		T fixed, M fixed 10lth	■	■				
		T adjustable, M fixed 3lth				■	■	
		T adjustable, M fixed 5lth		■ ■		■	■	■
		T adjustable, M fixed 10lth		■ ■ ■		■	■	■
		T adjustable, M adjustable						
	magnetic only	M fixed		■ ■ ■ ■		■ ■ ■ ■	■ ■ ■ ■	
	microprocessor-based	PR211/P (I - LI)						
		PR212/P (LSI - LSIG)						
Interchangeability								
Versions								
Terminals (6)	fixed		FC - R		EF - FC - FC CuAl - R		F - EF - ES - FC - FC CuAl - RC - R	
	plug-in		FC - R		FC - R		EF - FC - R	
	withdrawable (3)		—		—		EF - FC - R	
Fixing on DIN rail			DIN EN 50022		DIN EN 50022		DIN EN 50023	
Mechanical life	[No. operations / Operations per hour]		25000 / 240		25000 / 240		25000 / 120	
Electrical life (a 415 V~)	[No. operations / Operations per hour]		8000 / 120		8000 / 120		10000 (160A) - 8000 (250A) / 120	
Basic dimensions	fixed	3 / 4 poles	W [mm]	78 / 103	90 / 120		105 / 140	
			D [mm]	70	70		103,5	
			H [mm]	120	120		170	
Weights	fixed	3 / 4 poles	[kg]	0,9 / 1,2	1,1 / 1,5		2,6 / 3,5	
	plug-in	3 / 4 poles	[kg]	1 / 1,4	1,3 / 1,7		3,1 / 4,1	
	withdrawable	3 / 4 poles	[kg]	—	—		3,5 / 4,5	

Notes

- 1) All versions with Icu = 35 kA are certified to 36 kA.
2) The percentage Ics performance of S3 N/H/L, S4 N/H/L, S5 N/H and S6 N/S/H circuit-breakers is 25% lower at 690 V.

3) Withdrawable circuit-breakers must be fitted with the front flange for the lever operating mechanism or the accessories which are an alternative to it such as the rotary handle or motor

operator.
4) The plug-in version of circuit-breaker S5 is only available for rated current 400 A.
5) The SACE S3 circuit-breaker with breaking capacity L at 690



SACE Isomax S4			SACE Isomax S5			SACE Isomax S6				SACE Isomax S7			SACE Isomax S8	
160 - 250			400 - 630			630 - 800				1250 - 1600			2000-2500-3200	
3-4			3-4			3-4				3-4			3-4	
690			690			690				690			690	
—			750			750				—			—	
8			8			8				8			8	
800			800			800				800			690	
3000			3000			3000				3000			2500	
N	H	L	N	H	L	N	S	H	L	S	H	L	H	V
65	100	200	65	100	200	65	85	100	200	85	100	200	85	120
35 ⁽¹⁾	65	100	35 ⁽¹⁾	65	100	35 ⁽¹⁾	50	65	100	50	65	100	85	120
30	50	80	30	50	80	30	45	50	80	40	55	80	70	100
25	40	65	25	40	65	25	35	40	65	35	45	70	50	70
18	22	30	20	25	30	20	22	25	30	20	25	35	40	50
—	—	—	35	65	100	35	50	65	100	—	—	—	—	—
—	—	—	35	50	65	20	35	50	65	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	20	35	50	16	20	35	50	—	—	—	—	—
100%	100%	75%	100%	100%	75%	100%	100%	100%	75%	100%	75%	50%	50%	50%
74	143	220	74	143	220	74	105	143	220	105	143	220	187	264
8	7	6	8	7	6	10	9	8	7	22	22	22	20	20
5 (400 A)			7,6 (630 A) - 10 (800 A)				15 (1250 A) - 20 (1600 A)				35			
A			B (400 A) - A (630 A)				B				B			
■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
F - EF - ES - FC - FC CuAl - RC - R			F-ES-FC-EF/FC CuAl/RC (400A)			F - EF - FC CuAl - RC - R				F-EF -FC CuAl (1250A) -HR -VR			F (2000-2500A)-VR	
EF - FC - R			EF - FC - R ⁽⁴⁾			—				—			—	
EF - FC - R			EF(400)-ES -FC(400)-R-VR (630A)			EF - HR - VR				EF - HR - VR			—	
DIN EN 50023			DIN EN 50023			—				—			—	
20000 / 120			20000 / 120			20000 / 120				10000 / 120			10000/20	
10000 (160A) - 8000 (250A) / 120			7000 (400A) - 5000 (630A) / 60			7000 (630A) - 5000 (800A) / 60				7000(1250A)-5000(1600A) / 20			2500 (2500A)/20 -1500 (3200)/10	
105 / 140			140 / 184			210 / 280				210 / 280			406/556	
103,5			103,5			103,5				138,5			242	
254			254			268				406			400	
4 / 5,3			5 / 7			9,5 / 12				17 / 22			57/76	
4,5 / 5,9			6,1 / 8,4			—				—			—	
4,9 / 6,3			6,4 / 8,7			12,1 / 15,1				21,8 / 29,2			—	

6) F Front terminals
EF Extended front terminals
ES Spreded front terminals

FC Front terminals for copper cables
FC CuAl Front terminals for copper/aluminium cables
R Rear threaded terminals

RC Rear terminals for copper/aluminium cables
HR Rear horizontal flat bar terminals
VR Rear vertical flat bar terminals



Modular strengths and outstanding performance IEC 947-2. A complete coordinated series.



The SACE Isomax S range of moulded-case circuit-breakers conforms to IEC standard 947-2 and comprises eight basic models with rated uninterrupted currents from 125 to 3200 A and breaking capacities from 16 to 120 kA (380/415 V).

The model chosen determines the basic electrical characteristics, while the overcurrent release chosen determines the type of application.

Alternating current service

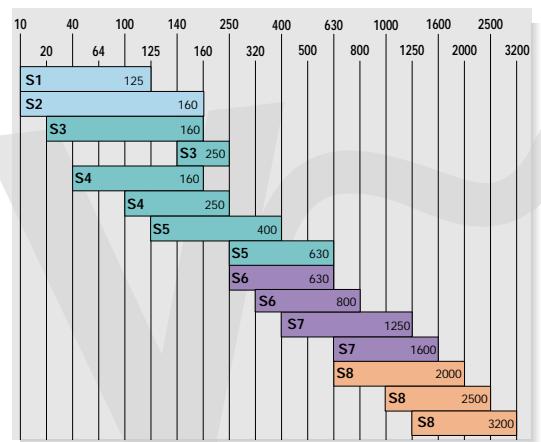
The following circuit-breakers are available for protecting alternating current networks: SACE S1, S2 and S3 fitted with thermomagnetic releases and SACE S4, S4, S6, S7, and S8 circuit-breakers fitted with SACE PR211/P and PR212/P microprocessor-based releases. They are characterised by a wide field of application, extending from 10 to 3200A and a rated voltage of 690V.

Direct current service

SACE S1, S2, S3, S5 and S6 circuit-breakers fitted with thermomagnetic releases can be used for protecting direct current networks with an application range of 10 to 800 A.

1000V in AC range

Rated uninterrupted current, I_u	[A]
No. poles	
Rated service voltage U_e (AC) 50-60 Hz	[V]
Rated impulse withstand voltage, U_{imp}	[kV]
Rated insulation voltage, U_i	[V]
Test voltage at industrial frequency for 1 min.	
Rated limit short-circuit breaking capacity, I_{cu}	
(AC) 50-60 Hz 1000 V	[kA]
Rated short-circuit making capacity (1000 V AC)	[kA]
Opening time (1000 V AC)	[ms]
Rated short-time withstand current for 1 s, I_{cw}	[kA]
Category of use (EN 60947-2)	
Isolation behaviour	
IEC 947-2, EN 60947-2	
Thermomagnetic releases T adjustable, M fixed 10 lth	
PR211/P (I-LI) microprocessor-based releases	
PR212/P (LSI-LSIG) microprocessor-based releases	
Versions	
Terminals	
Mounting on DIN rail	
Mechanical life	[No. operations / operations per hour]
Dimensions	W [mm]
	D [mm]
	H [mm]
Weight	[kg]



Field of application of alternating current circuit-breakers

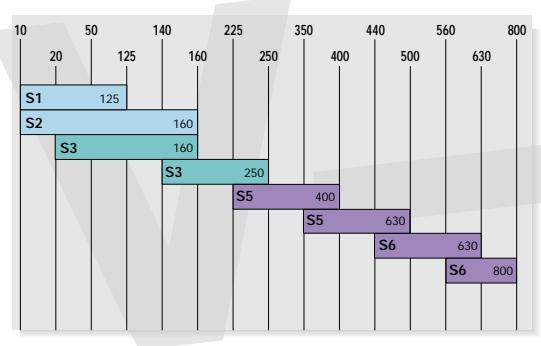
With 2 poles in series, SACE Isomax S circuit-breakers can be used with rated voltages of 250 and 500 V and breaking capacities of up to 100 kA (250 V d.c.) and 65 kA (500 V d.c.), while SACE S3, S5 and S6 circuit-breakers with 3 poles in series can reach 750 V and breaking capacities of up to 50 kA.

Safety and functional efficiency

Double insulation, a compartment door lock, and the ability to rack out the circuit-breaker with the door closed are just some of the features which enable every

operator to work in total safety while improving the functional efficiency of the switchgear installed in the switchboard.

Furthermore, the introduction of digital electronic technology on the SACE Isomax S has made it possible to combine the traditional protection functions typical of thermomagnetic releases with others, such as selective short-circuit protection, earth fault protection, control and communication.



Field of application of direct current circuit-breakers

Generator protection

For protecting generators, which have extremely low fault currents - in the region of 3 times the rated current, you can now not only obtain the protection offered by electronic releases S4 to S7 but also that of model S3 with dedicated thermomagnetic protection, adjustable thermal current $I_{th} = 0.7 \dots 1 \times I_n$ and fixed magnetic threshold $I_m = 3 \times I_n$.

Range up to 1000 V

A new feature of the Isomax series is its range of circuit-breakers for alternating current applications up to 1000 V. Typical sectors of use include mines, road and railway tunnels, traction and industrial applications in general. The circuit-breakers are available in a three-pole version with electronic or adjustable thermomagnetic releases

SACE Isomax S3	SACE Isomax S4	SACE Isomax S6	SACE Isomax S3X	SACE Isomax S4X	SACE Isomax S6X
160	160-250	630-800	125	250	630
3	3	3	3	3	3
1000	1000	1000	1000	1000	1000
8	8	8	8	8	8
1000	1000	1000	1000	1000	1000
3000	3000	3000	3000	3000	3000
L	L	L	X	X	X
6	8	12	30	30	30
9,2	13,6	24	63	63	63
20	30	30	10	20	25
7,6 (630 A) - 10 (800 A)					
A	A	B	A	A	A
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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<input type="checkbox"/> (LI only)		<input type="checkbox"/> (LI only)		<input type="checkbox"/> (LI only)	
F	F	F	F	F	F
F	F	F	F	F	F
DIN EN 50023	DIN EN 50023	DIN EN 50023	DIN EN 50023	DIN EN 50023	DIN EN 50023
25000/120	20000/120	20000/120	25000/120	20000/120	20000/120
105	105	210	105	105	210
103,5	103,5	103,5	103,5	103,5	103,5
170	254	268	255	339	406
2,6	4	9,5	3,6	5	15



IEC 947-2 current-limiting moulded-case circuit-breakers Power and speed.



SACE S2X 100, S3X, S4X and S6X circuit-breakers form the range of SACE Isomax S current-limiting moulded-case circuit-breakers for applications from 1 to 630 A.

The function of a current-limiting circuit-breaker is precisely to "limit" the specific let-through energy as much as possible in the event of a short circuit, protecting the circuits and switchgear downstream. The breaking system makes it possible to interrupt high short-circuit currents very rapidly. Furthermore, the special shape of the parts makes it possible to limit the peak values of the fault currents to values that are significantly lower than those of the prospective short-circuit currents in the point of installation. The high opening speed reduces the electrodynamic stresses to which the circuit-breakers downstream are exposed in the event of a fault. They are available in fixed, plug-in and withdrawable versions that can be fitted with all the accessories available for the corresponding circuit-breakers.

Applications

These circuit-breakers are suitable for installation in all types of installations (civil, industrial and service sector), as well as in the on-board electrical systems of boats, in mines, on oil rigs and, generally speaking, all installations where high transformer and generator powers can result in high short-circuit currents of up to

200 kA at 380/415 V a.c. They can be used as main switches downstream of power supplies as well as in installations where continuity of service is not an essential requirement, and backup protection is provided, enabling circuit-breakers with breaking capacities lower than the prospective short-circuit current in the point of installation to be used downstream.

Duty voltage and breaking capacity

SACE Isomax S current-limiting circuit-breakers conform to IEC standard 947-2. They are characterised by a rated operating voltage U_e of 690V a.c. and a rated limit short-circuit breaking capacity I_{cu} of 200 kA at 380/415 V a.c., 75 kA at 690 V a.c. for S3X, S4X, S6X and 70 kA at 440 V for S2X 100.

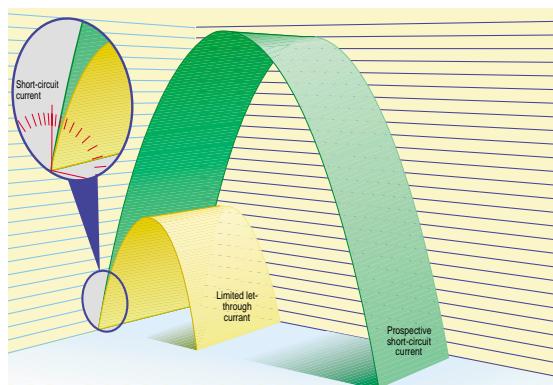
Selective protection can also be provided even though the circuit-breakers have very short breaking times in the event of short-circuits.

Isolation behaviour

In the open position, the circuit-breaker guarantees isolation of the circuit in conformity with IEC standard 947-2. The insulation distances ensure there are no leakage currents and guarantee the dielectric strength against any overvoltages across the input and output.

Compact dimensions

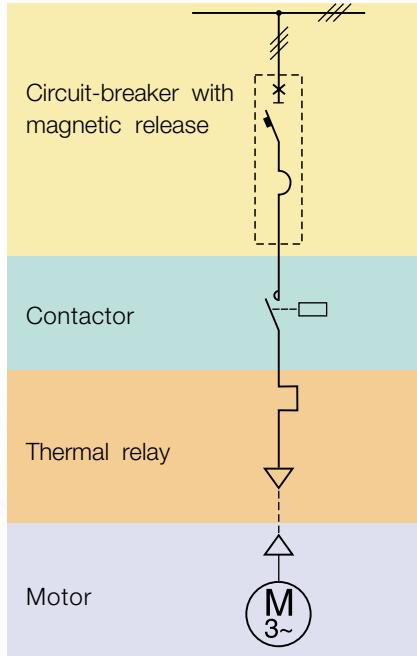
Standardisation of the depth of the circuit-breakers at 70 mm for the S2X 100 and 103.5 mm for the S3X, S4X and S6X, standardisation of their heights and a further reduction in their depths compared to those of the SACE Limitor range makes it possible to reduce the switchboard installation dimensions and standardise the support structures.



	SACE Isomax S2X 100	SACE Isomax S3X	SACE Isomax S4X	SACE Isomax S6X
Rated uninterrupted current, I_u [A]	100	125-200	250	400-630
Number of poles	3-4	3-4	3-4	3-4
Rated service voltage, U_e (a.c.) 50-60Hz [V]	690	690	690	690
Rated impulse withstand voltage, U_{imp} [kV]	6	8	8	8
Rated insulation voltage, U_i [V]	690	800	800	800
Test voltage at industrial frequency for 1 minute	3000	3000	3000	3000
Rated limit short-circuit breaking capacity, I_{cu}	X	X	X	X
(a.c.) 50-60 Hz 220/230 V [kA]	100	300	300	300
(a.c.) 50-60 Hz 380/415 V [kA]	70	200	200	200
(a.c.) 50-60 Hz 440 V [kA]	70	180	180	180
(a.c.) 50-60 Hz 500 V [kA]	50	150	150	150
(a.c.) 50-60 Hz 690 V [kA]	10	75 ⁽¹⁾	75	75
Rated duty short-circuit breaking capacity, I_{cs} ⁽²⁾ [% I_{cu}]	75%	100%	100%	100%
Rated short-circuit making capacity (415 V), I_{cm} [kA]	154	440	440	440
Opening time (415V) [ms]	3,5	3,5	3,5	3,5
Use category (EN 60947-2)	A	A	A	A
Isolation behaviour	■	■	■	■
IEC 947-2, EN 60947-2	■	■	■	■
Releases thermomagnetic T adjustable, M fixed 10 lth	■	■		
Releases microprocessor-based PR211/P (I-LI)			■	■
Releases microprocessor-based PR212/P (LSI-LSIG)			■	■
Interchangeability			■	
Versions	F-P	F-P-W	F-P-W	F-W
Terminals	Fixed EF - FC - FC (CuAl) - R	F - EF - ES - FC - FC (CuAl) - RC - R	F - EF - ES - FC - FC (CuAl) - RC - R	F - EF - FC (CuAl) - RC - R
Plug-in	FC-R	EF - R	EF - R	-
Withdrawable	-	EF - R	EF - R	EF - HR - VR
Fixing on DIN rail	DIN EN 50022	DIN EN 50023	DIN EN 50023	-
Mechanical life [No. operations / Operations per hour]	25000/240	25000/120	20000/120	20000/120
Electrical life (a 415 V) [No. operations / Operations per hour]	8000/120	10000(125A)- 8000(200A)/120	8000 / 120	7000 / 60
Basic dimensions	fixed 3/4 poles			
	W [mm]	90/120	105/140	105/140
	D [mm]	70	103,5	103,5
	H [mm]	120	255	339
Weights	Fixed 3/4 poles [kg]	1,1/1,5	3,6 / 4,8	5 / 7
	Plug-in 3/4 poles [kg]	1,3/1,7	6,3 / 8,7	8,2 / 10,7
	Withdrawable 3/4 poles [kg]	-	7,1 / 9,5	9 / 11,5
				24,5 / 33,8

⁽¹⁾ For S3X with setting R 32, I_{cu} (690 V) = 50 kA and I_{cs} = 100% I_{cu} .

⁽²⁾ The value of I_{cs} for S3X, S4X and S6X is 25% lower at 500/690 V.



IEC 947-4 motor-protection circuit-breakers.

Tailor-made protection for your motor.

Protection and starting of three-phase asynchronous motors

The starting, switching and protection of a three-phase asynchronous motor are essential operations for it to be used correctly. The traditional system used for this purpose requires three different devices: a circuit-breaker for protecting against short circuits, a thermal relay for protecting against overloads and phase failures or imbalances and a contactor for switching the motor. All of these together are of necessity required to take the problems that arise during starting into account.

A number of different factors therefore need to be taken into account when choosing these devices, such as:

- the power of the motor
- the type of starting
- the type of motor: with cage rotor or wound rotor

	S2X 80	S3	S3X	S4	
Rated uninterrupted current, I_u	[A] 80	160 / 250	125 / 200	160 / 250	
Rated service current, I_n	[A] 1...80	3...125 / 160...200	3... 125 / 125...200	100, 160 / 250	
Number of poles	3	3	3	3	
Rated service voltage, U_e (AC) 50-60Hz	[V] 690	690	690	690	
Rated impulse withstand voltage, U_{imp}	[kV] 6	8	8	8	
Rated insulation voltage, U_i	[V] 690	800	800	800	
Test voltage at industrial frequency for 1 minute	3000	3000	3000	3000	
Rated limit short-circuit breaking capacity, I_{cu}	X N H L	X N H L	X N H L	X N H L	
(AC) 50-60 Hz 220/230 V	[kA] 100	65 100 170	300	65 100 200	
(AC) 50-60 Hz 380/415 V	[kA] 70	35 ⁽¹⁾ 65 85	200	35 ⁽¹⁾ 65 100	
(AC) 50-60 Hz 440 V	[kA] 70	30 50 65	180	30 50 80	
(AC) 50-60 Hz 500 V	[kA] 50	25 40 50	150	25 40 65	
(AC) 50-60 Hz 690 V	[kA] 10	14 18 20	75	18 22 30	
Rated duty short-circuit breaking capacity, $I_{cs}^{(2)}$	% I_{cu}	75% 100% 75% 75%	100% 100% 100% 100%	100% 100% 75%	
Rated short-circuit making capacity (415 V), I_{cm}	[kA]	154 74 143 187	440	74 143 220	
Opening time (415V)	[ms]	3,5 8 7 6	3,5	8 7 6	
Category of use (EN 60947-2)		A A A	A A A	A A A	
Isolation behaviour		■ ■ ■	■ ■ ■	■ ■ ■	
IEC 947-2, EN 60947-2		■ ■ ■	■ ■ ■	■ ■ ■	
Releases magnetic only fixed 13xIn		■ - -	■ - -	■ - -	
Releases magnetic only adjustable 4...12xIn		- ■ -	■ - -	- - -	
Releases microprocessor-based PR211/P (I)		- - -	- - -	■ - -	
Interchangeability		- - -	- - -	■ - -	
Versions	F-P	F - P - W	F - P - W	F - P - W	
Terminals	Fixed (F) Plug-in (P) Withdrawable (W)	EF - FC - FC CuAl - R FC-R -	F - EF - ES - FC - FC CuAl - RC - R EF-FC-R EF-FC-R	F - EF - ES - FC - FC CuAl - R - RC EF-R EF-R	F - EF - ES - FC - FC CuAl - R - RC EF-FC-R EF-FC-R
Fixing on DIN rail		DIN EN 50022	DIN EN 50023	DIN EN 50023	DIN EN 50023
Mechanical life [No. operations / Operations per hour]		25000/240	25000/120	25000/120	20000/120
Basic dimensions Fixed, 3 poles W	[mm] D H	90 70 120	105 103,5 170	105 103,5 255	105 103,5 254
Weights	Fixed 3 poles Plug-in 3 poles Withdrawable 3 poles	[kg] 1,1 1,3 -	2,6 3,1 3,5	3,6 6,3 7,1	4 4,5 4,9

⁽¹⁾ All versions with $I_{cu} = 35$ kA are certified to 36 kA.

⁽²⁾ The percentage I_{cs} performance of S3 N/H/L, S4 N/H/L, S5 N/H and S6 N/S/H circuit-breakers is 25% lower at 690 V.



- the fault current at the point in the network where the motor is installed.

ABB SACE L.V. offers a wide range of circuit-breakers that are suitable for use inside traditional protected starters, implementing short-circuit protection only.

The new SACE S2X 80, with magnetic protection that is fixed at 13 times the rated service current, is distinguished by excellent performance in terms of breaking capacity and specific let-through energy limiting capacity.

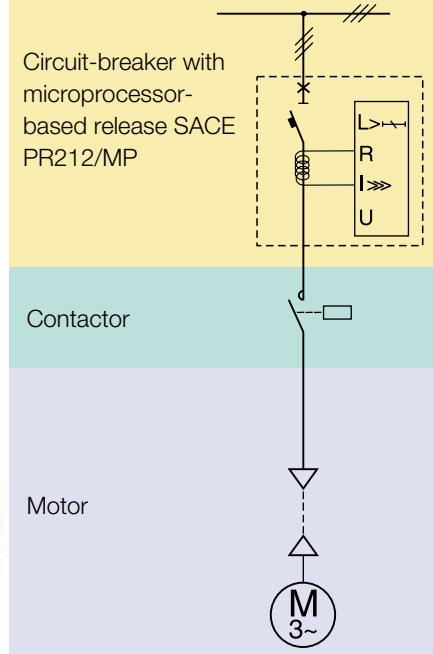
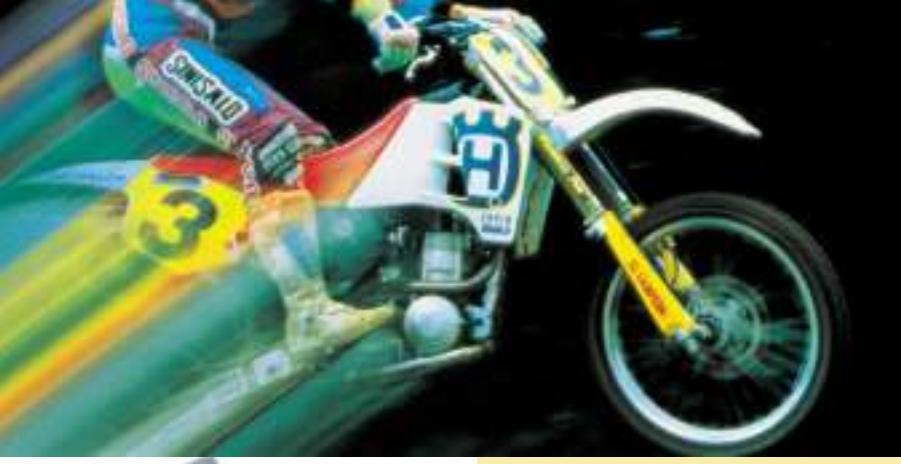
It is extremely easy and fast to install, while offering all the same accessory and customising options as the S2B/N/S circuit-breakers. It can be used in a vast field of starting applications, from 0.37 kW to 37 kW and from 400 V-50 kA up to 690 V-50 kA.

SACE S3N/H/L 160/250 circuit-breakers and the S3X 125/200 current-limiting circuit-breaker are equipped with a magnetic-only release that can

be adjusted to from 4 to 12 times the rated service current. They cover coordinations from 37 to 132 kW and make it possible to provide optimal motor protection thanks to the outstanding flexibility offered by their wide magnetic threshold adjustment range.

Finally, the SACE S4 160/250, S5 400/630, S6 630/800 and S7 1250/1600 with their different N-S-H-L breaking capacity levels, like the S4X and S6X current-limiting circuit-breakers, can be equipped with the PR 211/P (I) microprocessor-based electronic release. They are above all used for protecting high-power motors and make it possible to choose the optimal trip value for any type of motor thanks to the possibility of setting the short-circuit protection to between 1.5 and 12 times.

S4X			S5			S6			S6X			S7		
250	400 / 630		630 / 800		400 / 630	1250 / 1600			1250 / 1600			1250 / 1600		
100, 160, 250	320, 400 / 630		630 / 800		320, 400 / 630	1000, 1250 / 1600			1000, 1250 / 1600			1000, 1250 / 1600		
3	3		3		3	3			3			3		
690	690		690		690	690			690			690		
8	8		8		8	8			8			8		
800	800		800		800	800			800			800		
3000	3000		3000		3000	3000			3000			3000		
X	N	H	L	N	S	H	L	X	S	H	L	X	S	H
300	65	100	200	65	85	100	200	300	85	100	200	300	85	100
200	35 ^(t)	65	100	35 ^(t)	50	65	100	200	50	65	100	200	50	65
180	30	50	80	30	45	50	80	180	40	55	80	180	40	55
150	25	40	65	25	35	40	65	150	35	45	70	150	35	45
75	20	25	30	20	22	25	30	75	20	25	35	75	20	25
100%	100%	100%	75%	100%	100%	100%	75%	100%	100%	75%	50%	100%	100%	75%
440	74	143	220	74	105	143	220	440	105	143	220	440	105	143
3,5	8	7	6	10	9	8	7	3,5	22	22	22	3,5	22	22
A	B(400A) A(630A)		B		A		B		A		B		B	
■	■		■		■		■		■		■		■	
■	■		■		■		■		■		■		■	
■	■		■		■		■		■		■		■	
F - P - W	F - P(400A) - W		F - W		F - W		F - W		F - W		F - W		F - W	
F - EF - ES - FC - FC CuAl - R - RC	F - EF - ES - FC - FC CuAl - R - RC(400A)		F-EF-FC CuAl-R-RC		F-EF-FC CuAl-R-RC		F-EF-FC CuAl(125A)- HR-VR		F-EF-FC CuAl(125A)- HR-VR		F-EF-FC CuAl(125A)- HR-VR		F-EF-FC CuAl(125A)- HR-VR	
EF-R	EF-FC-R		-		-		-		-		-		-	
EF-R	EF-FC-R - VR (630A)		EF-HR-VR		EF-VR-HR		EF-VR-HR		EF-VR-HR		EF-VR-HR		EF-VR-HR	
DIN EN 50023	DIN EN 50023		-		-		-		-		-		-	
20000/120	20000/120		20000/120		20000/120		20000/120		20000/120		20000/120		20000/120	
105	140		210		210		210		210		210		210	
103,5	103,5		103,5		103,5		103,5		103,5		138,5		138,5	
339	254		268		268		406		406		406		406	
5	5		9,5		9,5		15		15		17		17	
8,2	6,1		-		-		-		-		-		-	
9	6,4		12,1		12,1		25,4		25,4		21,8		21,8	



SACE PR212/MP electronic releases IEC 947-4.

The leading edge in motor protection

SACE Isomax S4N-H-L 160/250, S5N-H-L 400, S6N-H-L 800, S7S-H-L, S4X 250 and S6X 400/630 circuit-breakers are equipped with SACE PR212/MP electronic releases featuring microprocessor-based technology. This on the one hand makes it possible to obtain functions that ensure high operating precision, outstanding reliability and freedom from the influence of external agents, while on the other hand making it possible to implement sophisticated new protection functions that, being integrated on board the circuit-breaker, represent the leading-edge of motor starting and protection technology. SACE PR212/MP - a sophisticated design that's simple and intuitive to use. The different function curves with their many threshold and time settings make it possible to draw a global time-current curve that is really close to the motor's starting curve, optimising the protection provided.

	S4	S5	S6	S7	
Rated uninterrupted current, I_u [A]	160 / 250	400	800	1250	
Rated service current, I_n [A]	100, 160 / 200	320	630	1000	
Number of poles	3	3	3	3	
Rated service voltage, U_e (AC) 50-60Hz [V]	690	690	690	690	
Rated impulse withstand voltage, U_{imp} [kV]	8	8	8	8	
Rated insulation voltage, U_i [V]	800	800	800	800	
Test voltage at industrial frequency for 1 minute	3000	3000	3000	3000	
Rated limit short-circuit breaking capacity, I_{cu}	N H L	N H L	N H L	S H L	
(AC) 50-60 Hz 220/230 V [kA]	65 100 200	65 100 200	65 100 200	85 100 200	
(AC) 50-60 Hz 380/415 V [kA]	35 ⁽¹⁾ 65 100	35 65 100	35 ⁽¹⁾ 65 100	50 65 100	
(AC) 50-60 Hz 440 V [kA]	30 50 80	30 50 80	30 50 80	40 55 80	
(AC) 50-60 Hz 500 V [kA]	25 40 65	25 40 65	25 40 65	35 45 70	
(AC) 50-60 Hz 690 V [kA]	18 22 30	20 25 30	20 25 30	20 25 35	
Rated duty short-circuit breaking capacity, I_{cs} ⁽²⁾ [%Icu]	100% 100% 75%	100% 100% 75%	100% 100% 75%	100% 75% 50%	
Rated short-circuit making capacity (415 V), I_{cm} [kA]	74 143 220	74 143 220	74 143 220	105 143 220	
Tripping time (415V) [ms]	8 7 6	8 7 6	9 8 7	22	
Category of use (EN 60947-2)	A	A	B	B	
Isolation behaviour	■	■	■	■	
IEC 947-2, EN 60947-2 IEC 947-4-1, EN 60947-4-1	■	■	■	■	
Releases microprocessor-based PR212/MP (LRIU)	■	■	■	■	
Interchangeability	■	■	■	■	
Versions	F-P-W	F-P-W	F-W	F-W	
Terminals	Fixed (F) Plug-in (P) Withdrawable (W)	F-EF-ES-FC-FC CuAl-R-RC EF-FC-R EF-FC-R	F-EF-ES-FC-FC CuAl-R-RC EF-FC-R EF-FC-R	F-EF-FC CuAl-R-RC - EF-HR-VR	F-EF-FC CuAl-HR-VR - EF-HR-VR
Fixing on rail DIN EN 50023		SI	SI	-	
Mechanical life [No. operations / Operations per hour]	20000/120	20000/120	20000/120	10000/120	
Basic dimensions Fixed, 3 poles					
W	[mm]	105	140	210	
D	[mm]	103,5	103,5	103,5	
H	[mm]	254	254	268	
Weights	Fixed 3 poles [kg] Plug-in 3 poles [kg] Withdrawable 3 poles [kg]	4 4,5 4,9	5 6,1 6,4	9,5 - 12,1	
				210 - 21,8	

⁽¹⁾ All versions with $I_{cu} = 35$ kA are certified to 36 kA.

⁽²⁾ The percentage I_{cs} performance of S4 N/H/L, S5 N/H and S6 N/S/H circuit-breakers is 25% lower at 690 V.

OVERLOAD: FUNCTION L

A thermal model stored in the microprocessor makes it possible to correlate the overcurrents encountered in the power supply line with the temperature levels reached in the copper and in the iron of the motor (ABB SACE L.V.

international patent). This protection conforms to the IEC 947-4-1 international motor protection standards and makes it possible to choose from four different starting classes: 10A, 10, 20 and 30. The protection is also temperature-compensated and sensitive to phase failure or unbalance, in compliance with the standard.

ROTOR LOCK: FUNCTION R

Function R protects the motor against rotor lock during operation.

This protection is automatically de-activated

during the starting phase and subsequently re-activated. This prevents unwanted tripping due to the subtransient current while simultaneously providing protection for the motor and installation during operation.

SHORT-CIRCUIT: FUNCTION I

This protection is designed to trip in just a few milliseconds in the event of short-circuit phenomena. The microprocessor is also able to distinguish starting, preventing untimely opening of the circuit breaker with the inrush current (ABB SACE L.V. international patent).

PHASE FAILURE AND/OR UNBALANCE: FUNCTION U

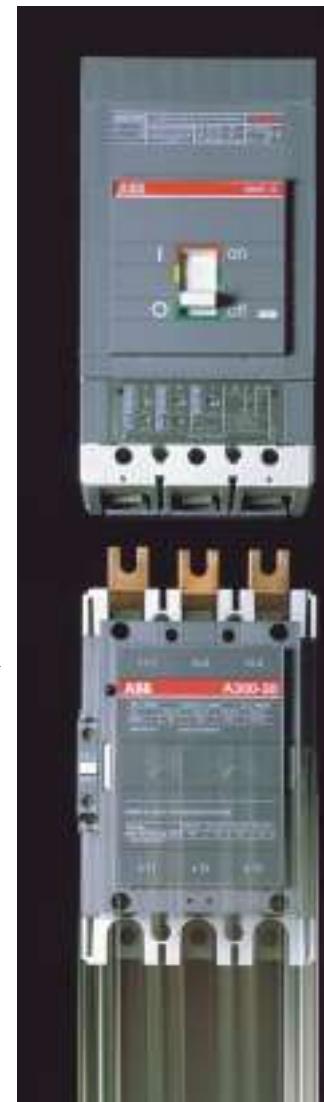
Phase failure or absorption unbalances are detected by the electronic release, which monitors all the phase currents.

Function U provides additional protection to the normal sensitivity to these phenomena, required by the standard and provided by function L. The release trips if the current in one or two phases falls below the preset threshold of 0.4 times the thermal current and stays there for more than 4 seconds.

Solutions coordinated with the ABB system
The innovative strengths of this advanced solution, comprising a starter formed by a SACE Isomax S circuit-breaker with PR212/MP and an ABB contactor, not only ensure complete and optimal motor protection but also offers other important benefits. Firstly, a significant saving in time and space as well as money, due to the fact that it isn't necessary to use an external thermal relay.

What's more, the SACE Isomax S series and new line of ABB A-Line contactors form the core of a new generation of devices that have been specially designed to provide a system of products that can be perfectly integrated to suit different application requirements.

The circuit-breaker and contactor have the same dimensions in width and depth and an exceptionally simple and compact installation system.



In addition to the classic circuit-breaker/contactor/thermal relay combination, model S4 and up of the SACE Isomax S motor protection circuit-breakers can be combined with the contactor alone (with an example being the S5H with PR212/MP and a series "A" model A300-30 contactor)

S4X	S6X
250	400 / 630
100, 160, 200	320 / 400, 630
3	3
690	690
8	8
800	800
3000	3000
X	X
300	300
200	200
180	180
150	150
75	75
100%	100%
440	440
3,5	3,5
A	A
■	■
■	■
■	■
■	■
F-P-W	F - W
F - EF - ES - FC - FC CuAl - R - RC	F-EF-FC CuAl-R-RC
EF-R	-
EF-R	EF-VR-HR
SI	-
20000/120	20000/120
105	210
103,5	103,5
339	406
5	15
8,2	-
9	25,4



Switch-disconnectors IEC 947-3. Switching in total safety.

The switch-disconnectors are based on the corresponding circuit-breakers and retain the same dimensions, versions, mounting systems and accessory options. They conform to IEC standard 947-3. They are characterised by a rated voltage of 690 V in alternating current and 750 V in direct current.

Applications

They can be used as sub-switchboard main switches, switch-disconnectors for lines, busbars and sets of switchgear or as bus-ties. They can also form part of general isolating devices for groups of machines or assemblies for controlling and protecting motors.

Isolating

The main function of these circuit-breakers is to isolate the circuits in which they are installed. When the contacts open they move to a distance that prevents arc ignition, respecting the prescriptions regarding isolation behaviour specified in the standards. The position of the operating lever provides unequivocal indication of the position of the contacts (positive operation).

Protection

Every switch-disconnector must be protected upstream by a coordinated device offering short-circuit protection. The coordination table alongside indicates the SACE Isomax S circuit-breaker able to provide this protection function for each switch-disconnector. All the units are the same or a lower model than the switch-disconnector.

Making capacity

The making capacity is an important performance parameter in that a switch-disconnector must be able to withstand the dynamic, thermal and current stresses which can occur during closing without damage, up to short-circuit closing conditions.



		S2D	S3D	S6D	S7D	S8D
Conventional thermal current at 60°C Ith	A	125-160	100-160-250-320	400-630-800	1000-1250-1600	2000-2500-3200
Poles	N°	3-4	3-4	3-4	3-4	3-4
Rated service voltage Ue	a.c. 50-60 Hz	V~	690	690	690	690
	d.c.	V-	500	750	750	750
Rated current Iu	A	125-160	100-160-250-320	400-630-800	1000-1250-1600	2000-2500-3200
Rated impulse withstand voltage, Uimp	kV	6	8	8	8	8
Rated insulation voltage, Ui	V	690	800	800	800	800
Test voltage at industrial frequency for 1 min.	V	3000	3000	3000	3000	3000
Rated short-circuit making capacity (415 V~, Icm)	kA	3,1	10	30	52,5	85
Rated short-time withstand current for 1s Icw	kA	2,2	6,5	15	25	40
Isolation behaviour		■	■	■	■	■
IEC 947-3		■	■	■	■	■
Mechanical life [No. operat. / Operat. per hour]		25000/240	25000/120	20000/120	10000/120	10000/20
Terminal versions						
	Fixed	EF-FC-FC CuAl-R RC-R	F-EF-FC-FC CuAl RC-R	F-EF-FC CuAl RC-R	F-EF-FC CuAl (1250 A) HR-VR	EF (2500A)-R
	Plug-in	FC-R	F-FC-R	-	-	-
	Withdrawable	-	F-FC-R	F-HR-VR	F-HR-VR	-
Dimensions fixed	3 poles					
	W mm	90	105	210	210	406
	D mm	70	103,5	103,5	138,5	242
	H mm	120	170	268	406	400
Dimensions fixed	4 poles					
	W mm	120	140	280	280	556
	D mm	70	103,5	103,5	138,5	242
	H mm	120	170	268	406	400
Weight	3 poles kg	1,1	2,6	9,5	17	57
	4 poles kg	1,5	3,5	12	22	76

Coordination with circuit-breakers

Breaking capacities (kA) of combinations of circuit-breakers and switch-disconnectors

Maintained in closed position
Identifies the capacity to remain in the closed position for short-time overcurrents. This is an important parameter of this type of switchgear.

Type	S2D 125	S2D 160	S3D 100	S3D 160	S3D 250	S3D 320	S6D 400	S6D 630	S6D 800	S7D 1000	S7D 1250	S7D 1600	S8D 2000	S8D 2500	S8D 3200
S1 B	16		16												
S1 N	25		25												
S2 B	16	16	16	16											
S2 N	35	35	35	35											
S2S	50	50	50	50											
S3 N			35	35	35	35									
S3 H			65	65	65	65									
S5 N							35	35	35						
S5H								65	65	65					
S6 N								35	35	35					
S6 S								50	50	50					
S6 H									65	65	65				
S7 S										50	50	50			
S7 H											65	65	65		
S8 H													85	85	85
S8 V													120	120	120



Residual-current releases. A coordinated combination.

Residual-current circuit-breakers combine overcurrent protection and residual-current protection in a single device. They are tripped both by overloads / short circuits and earth leakage currents. "Pure" residual-current circuit-breakers, obtained using switch-disconnectors, are only tripped by earth fault currents.

They also enable the installation's insulation status to be monitored continuously, ensuring effective protection against fire and explosion hazards and, in the case of devices with

$ID_n \leq 30 \text{ mA}$, ensure protection (personal safety) against direct and indirect contacts, in addition to the compulsory measures specified in the relevant standards and safety prescriptions.

SACE RC210 polarised residual-current release

The SACE RC210/1 polarised residual-current release for horizontal installation on DIN

50022 rails is available for SACE S1 circuit-breakers. It is available in versions for residual simple harmonic alternating currents (a.c.),



with residual-current fault tripping thresholds of 300 mA and 500 mA, rated uninterrupted currents of 63 A and 125 A and operating voltages of up to 500 V.

The polarised residual-current release is available as a unit for fitting on the right-hand side of the circuit-breaker and acts directly on the tripping control. It features a test button for routine testing of the release.

SACE RC211 and RC212 residual-current releases

SACE RC211 and RC212 residual-current releases can be installed in horizontal or vertical layouts with SACE Isamax S1, S2 and S3 circuit-breakers or SACE S3D switch-disconnectors. These releases feature analogue electronic technology. They do not require an auxiliary power supply because they are powered directly from the mains through the circuit-breaker and operation is guaranteed even with only one phase live and unidirectional pulsating currents with continuous current components. A test pushbutton enables operation to be tested. The residual-current releases are manufactured in conformity with the following standards: IEC

947-2 Appendix B, IEC 255-4 and IEC 1000 for protection against slow tripping, as well as IEC 755 for insensitivity to continuous current components.

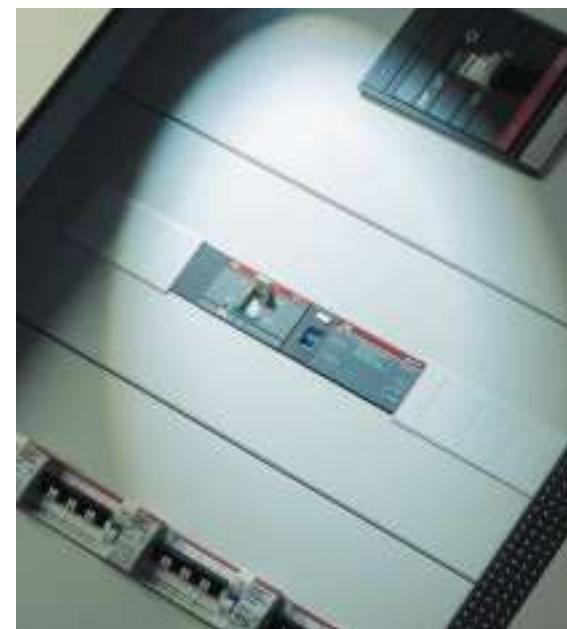
SACE RC211 and SACE RC212 releases act on the circuit-breaker through an opening solenoid supplied with the release to be fitted in the special slot in the zone of the third pole.

SACE RCQ residual-current switchboard release

Suitable for use with solely alternating earth currents and for alternating and/or pulsating currents with continuous components, while also being suitable for implementing residual-current selectivity. It can be used in conjunction with all SACE Isamax S circuit-breakers and is installed in the switchboard with a separate toroid for external installation on the line conductors.

Particularly suitable for applications requiring a residual-current protection system that is coordinated with the various different distribution levels, from the main switchboard to the end user.

	RC210	RC211	RC212	RCQ
Technology	polarised	electronic	electronic	electronic
Installation	horizontal	horizontal-vertical	horizontal-vertical	switchboard compart.
Action	direct	with solenoid	with solenoid	with solenoid
Operating voltage	a.c. [V-] up to 500 d.c. [V-]	220 ÷ 500	50 ÷ 500	up to 500 48 ÷ 125
Operating test range	[V]	230 ÷ 500	220 ÷ 500	80 ÷ 500 a.c. 48 ÷ 125 d.c.
Tripping thresholds $I_{\Delta n}$	[A]	0.3 - 0.5	0.03 - 0.1 - 0.3	0.03-0.1-0.3-0.5-3
Tripping times	[s]	instantaneous	instantaneous	0.01-0.2-0.3-0.5-0.7-1-2-3-5
Rated service current	[A]	up to 125	up to 250	up to 2000
Type: AC for alternating current only	■	■	■	■
Type: A for alternating, pulsating current	—	■	■	■
Type selective	—	—	■	■
Tripping indication	—	■	■	■
Indication of pre-alarm	—	—	■	■
Dimensions W x H x D	103 x 120 x 70	120 x 120 x 70	140 x 170 x 108	96x 96 x 131.5
Input for remote opening	—	—	■	■





Circuit-breakers conforming to UL/CSA Standards.

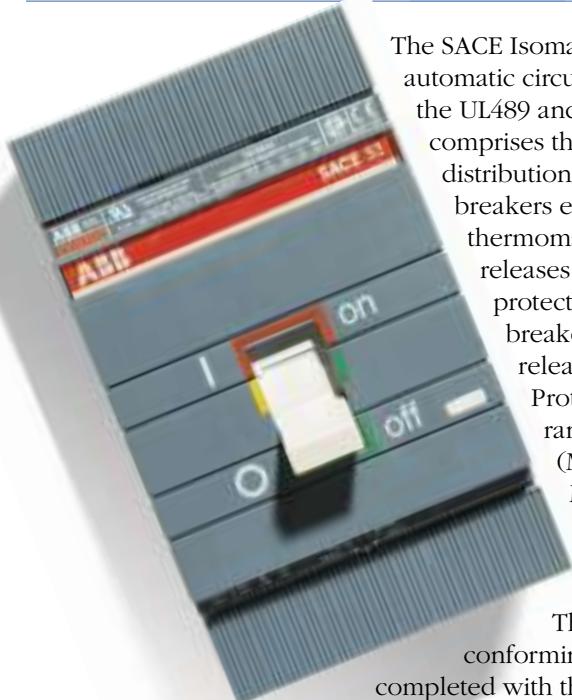
Quality to conquer the New World.

Moulded Case Circuit Breakers

Circuit breaker type		S1	S3 150			S3 225			
Maximum frame continuous rated current 40 °C	[A]	100		150		225			
Poles		3	2 - 3			2 - 3			
Rated operational voltage 50-60 Hz d.c. (3 poles in series)	[V]	277/480	600			240 (B): 480 (N/H/L)			
Test voltage (1min.) 50-60 Hz	[V]	3000	600			500			
UL/CSA short-circuit interrupting capacity	[kA rms]	N	N	H	L	B	N	H	L
240 Vac		50	65	100	150	150	65	100	150
480 Vac		14(for R15) / 20(for R20-R100)	25	50	85	-	25	50	65
600 Vac		-	14	14	25	-	-	-	-
500 Vdc (2 poles in series)		-	35	50	65	50	20	35	50
600 Vdc (3 poles in series)		-	20	35	50	-	-	-	-
Overcurrent trip relays									
Thermal-magnetic		■		■			■		
Microprocessor based		-		-			-		
Interchangeability		-		-			-		
Fixed Version - H	[in/mm]	4,72 / 120		6,70 / 170			6,70 / 170		
Dimensions W	[in/mm]	3,07 / 78		4,13 / 105			4,13 / 105		
D	[in/mm]	2,75 / 70		4,07 / 103,5			4,07 / 103,5		
Mechanical duration	[op./ frequency]	25000 / 240		25000 / 120			25000 / 120		
Weights (fixed - 3P)	[lbs.]	2,42		6,75			6,75		

The SACE Isomax S offer of moulded-case automatic circuit-breakers conforming to the UL489 and CSA22.2 standards comprises the range of power distribution automatic circuit-breakers equipped with thermomagnetic or electronic releases, the range of motor protection automatic circuit-breakers with magnetic only releases (Motor Control Protection – MCP) and the range of control breakers (Moulded Case Switch – MCS) for use as isolators or switching devices for lines, busbars or parts of installations.

The SACE Isomax S offer conforming to UL/CSA standards is completed with the introduction of three new models. As a result there is a constantly increasing array of options for those customers who also operate on markets that adopt the UL/CSA standards, having any entire range of moulded-case circuit-breakers with rated currents that extend from 100 A to 2500 A and breaking capacities, at 480 V AC, that can go up to 100 kA.



The introduction of the S1 model not only extends the range of rated currents downwards but also makes it possible to meet the demands of all those applications typical of power subdistribution in which a circuit-breaker with compact dimensions that nevertheless offers high accessory and installation versatility is particularly attractive.

The choice offered is further increased by the introduction of the new rating for S3 of $I_u = 225$ A with three breaking capacity levels (N/H/L) up to operating voltage values of $U_e=480$ V AC and 500 V DC.

Finally, the new development represented by the S8 circuit-breaker conforming to the UL/CSA standards also makes it possible to complete the offer upwards to higher rated current values. The Isomax S8V 1600, 2000 and 2500 are suitable for installation immediately downstream of the power supply sources for low voltage systems and are suitable for safe operation in the most severe operating conditions required by modern installations. Their high performance, wide range of accessory options, ease of coordination with devices downstream and the possibility they offer of reducing switchboard depths thanks to the circuit-breaker's compact dimensions make the Isomax S8 a particularly advantageous solution.

S4	S5	S6	S7	S8
250	400	800	1200	1600-2000-2500
2 - 3	2 - 3	2 - 3	2 - 3	3
600	600	600	600	600
-	600	600	-	-
3000	3000	3000	3000	3000
N H L	N H L	N H L	H	V
65 150 200	65 150 200	65 150 200	100	120
25 65 100	35 65 100	50 65 100	65	100
18 22 35	22 22 35	25 35 42	50	85
- - -	35 50 65	35 50 65	-	-
- - -	20 35 50	20 35 50	-	-
-	■	■	-	-
■	■	■	■	■
■	■	■	■	■
10,00 / 254	10,00 / 254 (300A); 13,62 / 346 (400A)	14,25 / 268	16 / 406	15,75 / 400
4,13 / 105	5,51 / 140	8,27 / 210	8,27 / 210	15,98 / 406
4,07 / 103,5	4,07 / 103,5	4,07 / 103,5	5,45 / 138,5	9,25 / 235
20000 / 120	20000 / 120	20000 / 120	10000 / 120	10000 / 20
8,8	11	22	37,5	135

Motor Control protection - MCP

	S3 L	S4 N/H/L			S5 N/H/L			S6 N/H/L			S7 H	S8 V
Poles	3	3	3	3	3	3	3	3	3	3	3	3
Trip Unit												
Adjustable magnetic only (4...12xIn)	■											
PR211/P - I		■			■			■		■		■
Rating [A]	3...25	50...150	100-250		400	400	400	600-800	600-800	600-800	1000-1200	1600-2000-2500
	L	L	N	H	L	N	H	L	N	H	L	H
Interrupting capacity												
240 V a.c.	50	150	65	150	200	65	150	200	65	150	200	100
480 V a.c.	25	85	25	65	100	35	65	100	50	65	100	65
600 V a.c.	10	25	18	22	35	22	22	35	25	35	42	50
500 V d.c.	65 ⁽¹⁾	65	-	-	-	-	-	-	-	-	-	-
600 V d.c.	50 ⁽¹⁾	50	-	-	-	-	-	-	-	-	-	-

⁽¹⁾ Performance available only for the 25 A rating version

Moulded Case Switches - MCS

Type	S3H-D 225	S3H-D 150	S4H-D	S5H-D	S6H-D	S7H-D	S8V-D
Rating	[A]	225	150	250	400	800	1200
Poles		3	3	3	3	3	3
Magnetic trip	[A]	2250	1500	3000	5000	10000	20000
Rated voltage							
(a.c.) 50-60 Hz	[V~]	480	600	600	600	600	600
(d.c.) 3 poles in series	[V-]	500	600	600	600	600	600

Intelligent solutions for complete, customised installations

Compact modular designs



Any installation position



Protection degree



New interruption system



Positive operation



Reduce switchboard dimensions

The modular design of our ranges of circuit-breakers, current-limiting circuit-breakers, switch-disconnectors and motor-protection circuit-breakers makes them easy to install in the same compartments. Thanks to the use of new materials and the careful design of the various models, SACE Isomax S circuit-breakers enable switchboard dimensions to be reduced:

- the volume occupied by the switchgear is up to 50% less than traditional units for the same performance
- the entire range is made up of eight models with just four different depths (70 mm for S1 and S2, 103.5 mm for S3 ... S6, 138.5 mm for S7 and 242mm for S8), allowing the support structures and switchboards to be standardised while enabling installation in prefabricated structures

- front flange standardised for groups of circuit-breakers (45 mm for S1 ... S5, 105 mm for S3 ... S7) enabling different models to be installed in the same switchboard compartment
- the compatible dimensions and range of connection options offered by the variety of terminals available facilitates connections using busbar systems or cables.

Maximum flexibility during design and installation

SACE Isomax S circuit-breakers can be installed vertically or horizontally without affecting their performance. They can be powered using either their upper or lower terminals. They can be installed on the base plate of the switchboard or, for all models up to S5, on DIN rails.

Protection against direct and accidental contacts

The protection degree is IP20 for the fixed, plug-in and withdrawable circuit-breakers, and IP30 for circuit-breakers installed in switchboards. Adding a compartment-door-mounted rotary handle operating mechanism with transmission takes the protection degree to IP54. The fixed parts of plug-in and withdrawable circuit-breakers have a protection degree of IP20 towards the front.

Limits the duration and damaging potential of the arc

Three factors combine to extinguish the arc in the shortest time possible. These three elements are:

- the opening speed of the contacts, which is increased thanks to a new operating system that brings them back to their open position immediately;
- the dynamic hiss action that the magnetic field exerts on the arc;
- the structure of the arcing chamber.

Thanks to the considerable reduction in opening time, the circuit-breaker drastically limits the value of the specific let-through energy, protecting the switchgear, users and conductors downstream.

Ensures dependable signalling

The “open” or “closed” status is indicated by the position assumed by the operating lever. The intermediate position indicates opening due to tripping of the releases. Whatever the case, the mechanical indications always correspond to the actual position of the mobile contacts of the circuit-breaker. The circuit-breaker’s operating mechanism is of the trip-free type, which is independent of the force and speed applied to the operating lever.



Double insulation



Total segregation of power circuits and auxiliary circuits

All the circuit-breakers from model S3 up are manufactured using the double insulation technique. The seating of every electrical accessory is completely segregated from the power circuit. This prevents any risk of contact with active parts, increasing the safety of the operators managing and inspecting the installations. The circuit-breakers feature dual redundant insulation between their active parts, both regarding the thickness of the materials and the distances, which exceed those required by the IEC standards and conform to American practice.

Racking out with door closed



Maximum operator safety and the possibility of building internal-arc-proof switchboards

This system, incorporated in a series of moulded-case circuit-breakers for the first time and featured on models S3 and up, enables the circuit-breaker to be racked in and out with the compartment door closed. This system increases operator safety and makes it possible to build internal-arc-proof low voltage switchboards. Racking out is only possible when the circuit-breaker is in its open position, using a special racking-out rotary handle supplied with the withdrawable version of the circuit-breaker.

Simple and safe maintenance



Reduces maintenance times and ensures safety

With the circuit-breaker out of service, the condition of the internal parts and active components of the circuit-breaker can be inspected directly. The arcing chambers and fixed and mobile contacts can be accessed simply by removing the circuit-breaker cover. This operation, which is facilitated by the limited number of components, reduces maintenance times and ensures a higher level of safety.

Conformity with standards



Standards, approvals, certifications and company quality system

SACE Isomax S circuit-breakers and their accessories conform to the international standards IEC 947-2, EN 60947-2 (harmonised in 17 CENELEC countries), CEI EN 60947-2 and IEC 1000, while also conforming to the following EC directives: "Low Voltage Directives" (LVD) No. 73/23 EEC, and "Electromagnetic Compatibility Directive" (EMC) No. 89/336 EEC. Certification of conformity with these product standards is carried out in compliance with European Standard EN 45011 by the Italian certification body ACAE (Associazione per la Certificazione delle Apparecchiature Elettriche - Association for the Certification of Electrical Equipment), a member of the European organisation LOVAG (Low Voltage Agreement Group). The ABB SACE L.V. quality system conforms to the international standard ISO 9001 and the equivalent European standards EN ISO 9001 and Italian standard UNI EN ISO 9001. The third-party certifying body is RINA-QUACER. The ABB SACE L.V. environmental management system is certified by RINA.

Electronics in the service of your installations



Reliability, precision and integration in monitoring systems

The microprocessor-based releases offer precision and reliability thanks to the careful design of their components and the algorithms that implement the protection functions. Digital electronics has made it possible to provide monitoring and communication functions that enable the circuit-breakers to be fully integrated in the control logics of supervisory control systems. ABB SACE L.V. is not only at the leading edge of supervisory control systems for the most complex electrical installations but also offers the most suitable solutions for small installations. The SD-View 810 system has been specially developed for small and medium industrial companies and can be used on personal computers without any special training. Exploiting the performance functions of microprocessor-based releases to the full, SD-View is able to "talk" to all ABB SACE L.V. circuit-breakers, enabling the status of an installation to be monitored by continuously storing data, detecting the status of the circuit-breakers and signalling faults and failures. At the same time, it also allows the operator to set the protection parameters and operating characteristics.





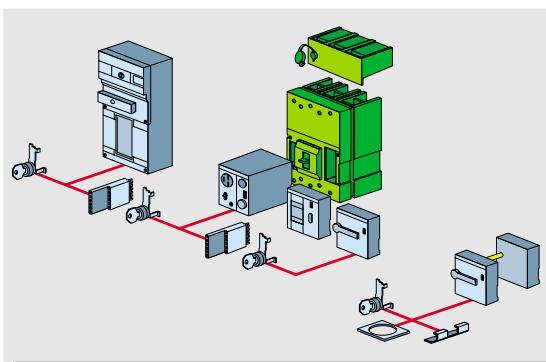
**A complete range of accessories.
Maximum freedom of customisation**



The compatibility of the SACE Isomax S series enables it to offer a complete range of accessories that are standardised for groups of circuit-breakers.

The accessories are the same for all the ranges and can be fitted without removing the circuit-breaker cover. This enables the circuit-breakers to be adapted "in the field" without causing operating problems.

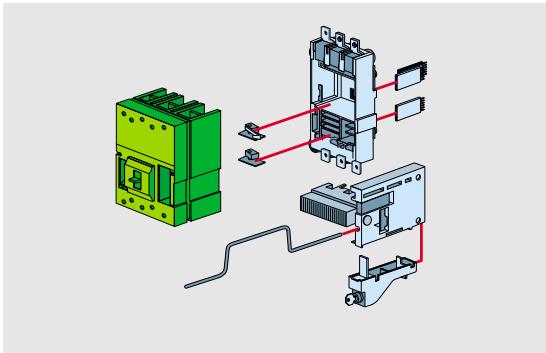
Personal safety is guaranteed in all conditions thanks to the fact that the seatings of the accessories are isolated from the live parts.



Rotary handle operating mechanism

Opening release

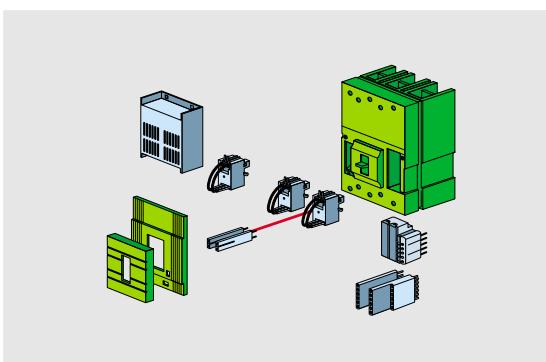
Undervoltage release



Facilitates opening and closing the circuit-breaker. Features a padlock device (standard, with option of fitting a key lock device and compartment door lock (standard for SACE S1 and S2).

Enables remote opening of the circuit-breaker.

Opens the circuit-breaker when there is a significant voltage drop or failure in its power supply.
Also available in a time-lag version.



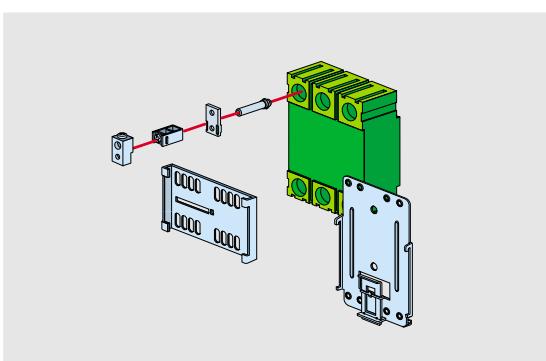
Motor operating mechanism



Dialogue unit and signalling unit



Auxiliary and position contacts



Enables remote opening and closing of the circuit-breaker. A key lock device can also be fitted. Manufactured in a solenoid version for S1 and S2, a direct-action version for SACE S3, S4 and S5 circuit-breakers and in a stored-energy version for SACE S6 and S7 circuit-breakers.

Enables two-way communication with the electrical installation's management and control systems. It is always used in conjunction with:

- an actuator unit for opening and closing the circuit-breaker from the control system.

Can be completed with:

- a signalling unit for displaying the information provided by the microprocessor-based release.

Carry the signals for showing:

- circuit-breaker open/closed;
- circuit-breaker open due to tripping or releases;
- circuit-breaker racked in/racked out.

Available as change-over contacts.

	S1 125 A	S2 160 A	S3 160 A 250 A
Rated voltage Ue 50/60 Hz V-	500	690	690
Performance level	B N	B N S	N H L
Icu kA (380 / 415 V-) 50-60 Hz	16 25	16 35 50	35 65 85

Duty releases



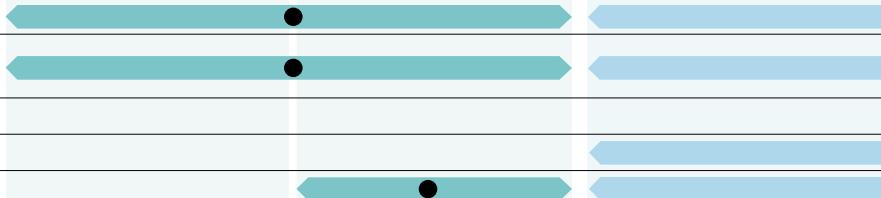
- Shunt opening releases
- Undervoltage releases
- Time-lag versions of undervoltage releases



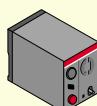
Electrical signalling



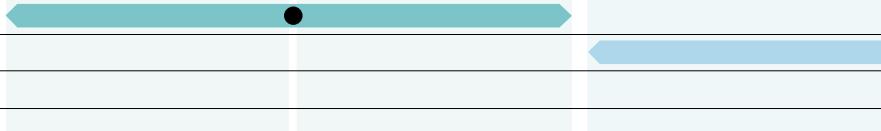
- Contacts: 2 change-over contacts for signalling Open/Closed
- 1 en commutation Ouvert/Fermé + 1 en commutation pour signaler le déclenchement du déclencheur
- 1 open + 1 closed + 1 open for signalling release tripped
- Early auxiliary contact for undervoltage release
- For signalling circuit-breakers Racked in/Racked out



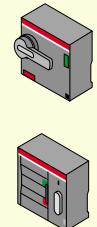
Motor operator



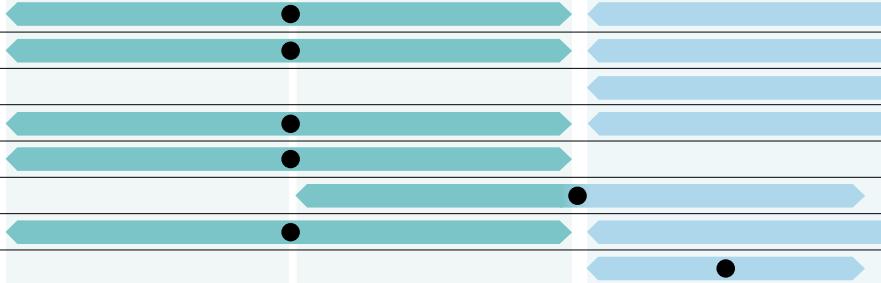
- Solenoid operator
- Direct action motor operator
- Stored-energy motor operator
- Gearmotor for automatic loading of closing springs



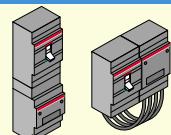
Operating mechanisms and locks



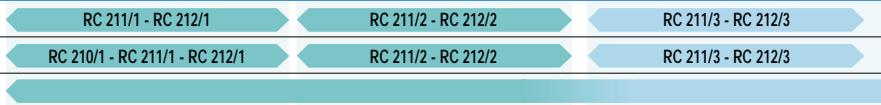
- Rotary handle operating mechanism
- IP54 protection for rotary handle
- Front flange for operating lever mechanism
- Key lock for open position
- Padlock device for operating lever
- Tamper-proof lock for thermomagnetic release
- Lock for compartment door
- Mechanical interlock across two horiz. or vert. installed CB



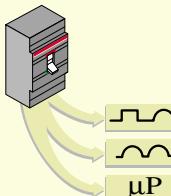
Residual-current releases



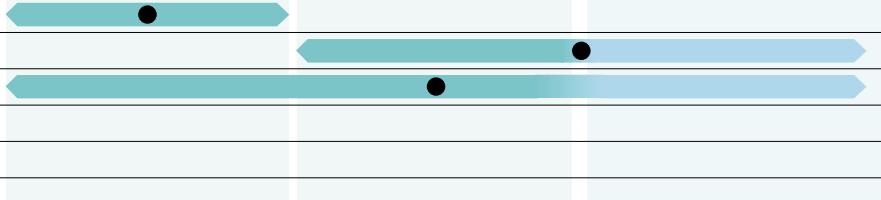
- Vertical installation
- Horizontal installation
- RCQ switchboard compartment



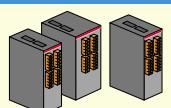
Overcurrent releases



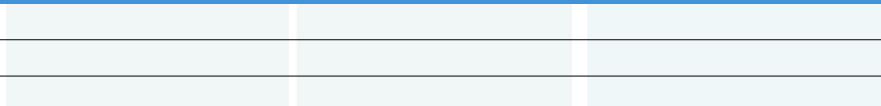
- Thermal fixed / Magnetic fixed
- Thermal adjustable / Magnetic fixed
- Magnetic only
- Thermal adjustable / Magnetic adjustable
- Microprocessor-based PR211/P - PR212/P
- μP Microprocessor-based PR212/P



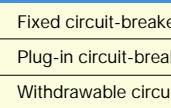
Accessories for microprocessor-based releases



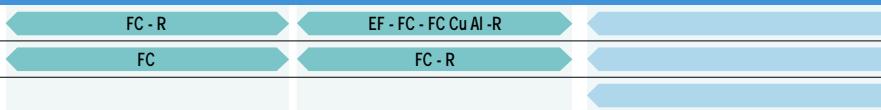
- PR212/K signalling unit
- PR212/D dialogue unit
- PR212/T actuator unit

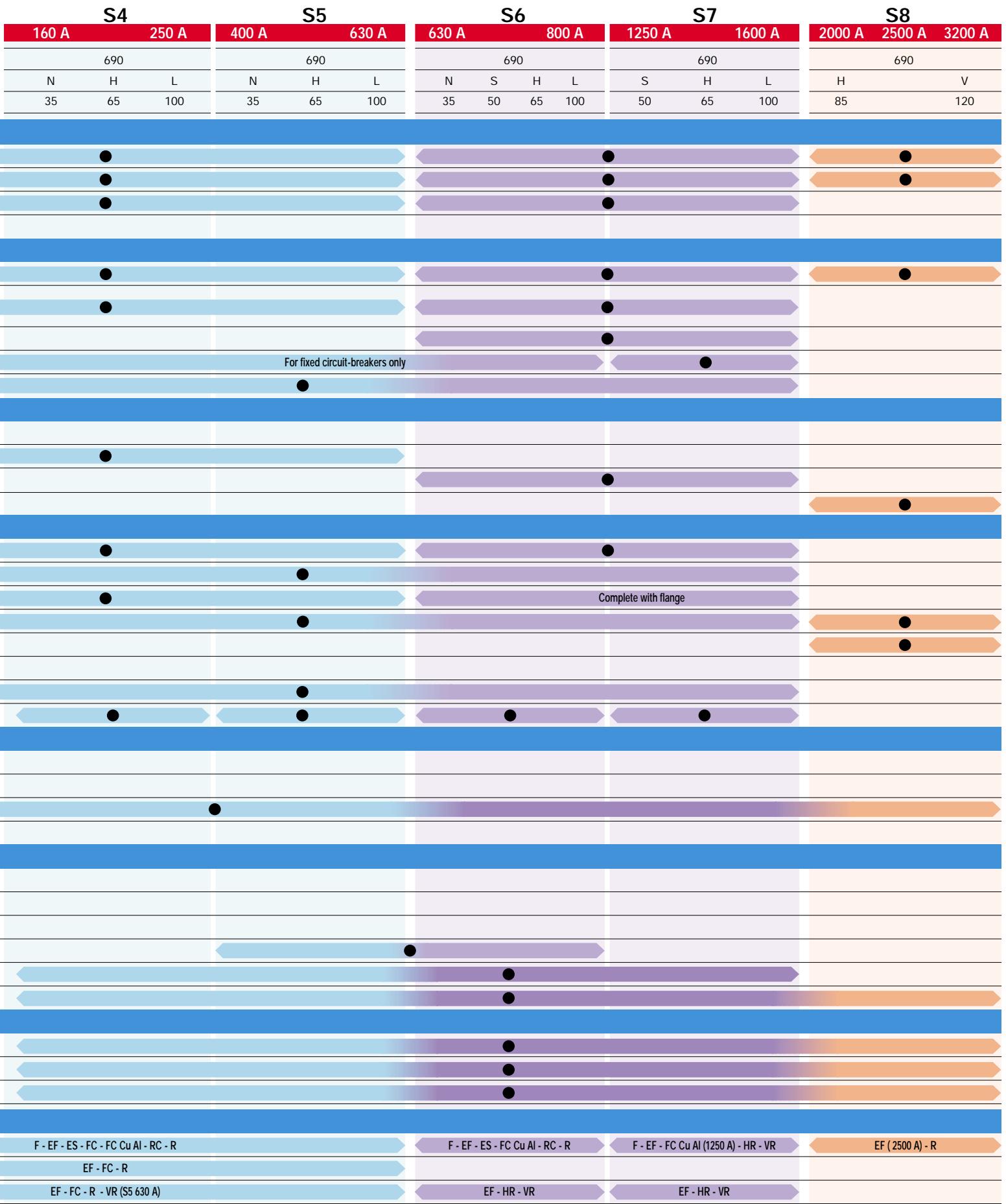


Terminals



- Fixed circuit-breaker
- Plug-in circuit-breaker
- Withdrawable circuit-breaker







Three highly useful work tools are available for designing and sizing electrical installations (DOC software, slide rule kit, guide to L.V. installations) which facilitate calculations, ensure the installation conforms to the relevant standards and decrease the risks of errors. They include information on different low voltage products such as: air circuit-breakers, moulded case circuit-breakers, modular circuit-breakers, contactors, thermal relays, fuse switch-disconnectors.

The three main software products developed by ABB SACE L.V. and ABB Elettrocondutture, called D.O.C., C.A.T.s and DMB/Win have been put together on a single CD-Rom.

D.O.C. (Design Optimization & Computation) is an optimized sizing system for low voltage industrial installations and is able to recommend the best design selections for cables, busbars and protection devices. It allows the design engineer to develop clear and complete design documentation rapidly in compliance with the most recent standards. The C.A.T.s (Computer Aided Technical selection) is both an electronic catalogue and a technical instrument for helping to select and add accessories to each single circuit-breaker. By means of guided paths, the most suitable apparatus for the requirements of individual installations can be selected, configured and ordered.

The DMB software package allows you to automate and speed up the preparation of estimates and the configuration of ABB Turati ArTu and PC series distribution switchboards mainly using ABB switchgear and materials. The package is, moreover, also perfectly compatible and interfaceable with the AutoCad applications (DMBLT3 and DMBCAD 3.0) specially developed by ABB for drawing

Software and slide rules. Selection and design tools.

switchboards and single-line circuit diagrams. The ABB kit comprises four slide rules in different colours that enable rapid electrical installation sizing calculations.

They can be used to calculate:

- The sizing of cables and calculation of short-circuit currents (yellow slide rule)
- Verification of cable protection against direct contact and short-circuits (orange slide rule)
- Selective and back-up co-ordination (green slide rule)
- The sizing of motor lines and transformer outgoing feeders (blue slide rule).

The calculation methods and data on the slide rules have been obtained from the CEI, IEC and NFC Standards in force and from plant engineering practice.

The guide to low voltage installations is a summary of the legal and technical regulations based on current standards regarding the design, sizing and installation of electrical systems. The guide considers the user installation starting from the power supply (MV/LV substation) in category 1 systems.

SACE Isomax S. Technology, innovation and quality

For users. Special user- dedicated, high- performance features

ABB SACE L.V. has a proud history of continuous technological development, innovative choices and simple solutions to the needs of circuit-breaker users. But users constantly and quite rightly demand more. They are always looking for something better, more reliable and safer. Seeing things from the user's standpoint is a strategy that has enabled ABB SACE L.V. to improve continually over the years, adapting new technical solutions to users' needs, recognising they require products that deliver high reliability over time, the ability to replace worn or damaged parts when necessary and, as is always desirable, the close compatibility of protection features with the more or less critical requirements of each application.

For designers. More integrated solutions for every possible need

It is important for designers to be able to specify switchgear that conforms to the relevant international technical standards in every respect and is able to achieve the highest performance levels reliably. A design is the result of careful analysis of a problem and the application of original solution-oriented criteria that carefully balance the factors required for functional performance, safety, reliability over time and simple but effective maintenance. The SACE Isomax S series of circuit-breakers offers professionals solutions - in terms of size, coordination and versatility - that enable them to draw up expert designs, choosing from a range of circuit solutions that have been developed for integration in a complete system and that satisfy all plant engineering and standards requirements.

For maintenance engineers. Easy and safe maintenance

Simple, effective maintenance is an essential requirement in any installation, as dictated by the most recent European standards and directives. SACE Isomax S circuit-breakers enable accessories to be fitted from the front. On plug-in and withdrawable versions, they can be fitted and removed from the fixed part with ease. The fact that the same accessories are used for groups of circuit-breakers makes for simple and economic spare parts warehouse management. The rational construction and modular design of the structure enables circuit-breakers to be changed in many cases without any special adaptation, even when changing from one type to another - such as from an automatic to a current-limiting circuit-breaker.

For installers. Practical convenience for each type of installation

The quality of the accessories supplied for SACE Isomax S circuit-breakers. The in-depth research behind every product. The quality of the technical documentation ABB SACE L.V. provides to support installers. These are just some of the factors that play a decisive role in making a circuit-breaker easy to use, assemble, connect and test. Installers with high professional standards find an equally professional partner in SACE Isomax S circuit-breakers. A professionalism expressed in the highest levels of versatility and integration, designed to enable implementation of the most advanced and simplest solutions alike.





ABB SACE S.p.A.

Head office: Via Baioni, 35
24123 Bergamo - Italy
Tel.: +39 035 395111
Telex: 301627 ABBSAC I
Telefax: +39 035 395306-395433

<http://www.abb.com>