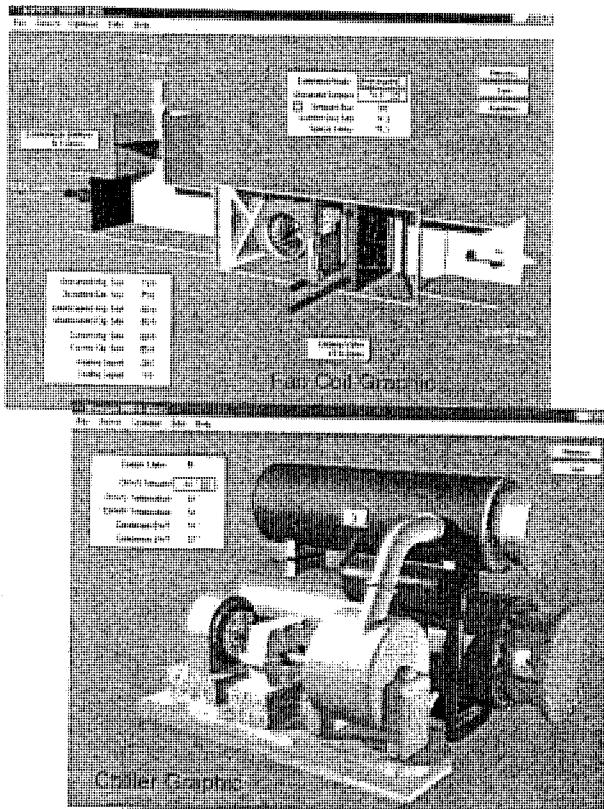




BACtalk® for Windows

Operator Terminal Software



Alerton® BACtalk® for Windows operator terminal software for BACnet is a true Microsoft Windows® software package that manages and controls building equipment from a personal computer. BACtalk for Windows communicates with BACtalk field devices and other manufacturers' BACnet-compliant devices over an Ethernet LAN, or through point-to-point (PTP) serial or modem connections.

BACtalk for Windows' easy-to-use graphical user interface was designed for the world's most popular operating systems—Microsoft Windows. BACtalk for Windows runs simultaneously with other applications, and alarm conditions appear on screen regardless of the active Windows program.

BACtalk for Windows features an extensive graphics library for generating intuitive, detailed site displays. Live, three-dimensional animation and full-color graphics enable the facility operator to access real-time data with simple point-and-click control. As-built drawings, floor plans and specific graphics of HVAC equipment can be customized for each site from bitmap-based graphics. Import bitmaps from CAD programs or virtually any graphics program.

Features and Highlights

- **Vivid Custom Graphics** 3-D animation and colorful graphics respond to real-time data and provide easy point-and-click control. Customize displays for each site with graphics from CAD programs or scanned-in photographs. Extensive library of 3-D graphics.
- **Energy Saving Tools** Graphical setup of schedules, trendlogs, energy logs, energy limiting, and tenant and operator activity logs.
- **Versatile Connection Options** BACnet-compliant Ethernet LAN, and point-to-point (PTP) serial and modem connections. Monitor and control multiple buildings or sites from a single location.

BACtalk for Windows supports a full range of functions, including BACnet-defined schedules, trend logs in text or graphic format, energy logs, energy limiting, ActiveX and tenant and operator activity logs. User-by-user security setup protects the system from unauthorized access.

In a multi-building campus, a BACnet Ethernet or ARCNET LAN can interconnect buildings. Each can have its own operator terminal, and technicians can control the entire campus from a single, central operator terminal. BACtalk for Windows can also monitor and control multiple remote sites via modem over ordinary telephone lines. These flexible, integrated control options save energy and maintenance costs.

BACtalk for Windows—together with Alerton's complete BACtalk line of powerful LSi Controllers, routers and programmable VisualLogic® controllers—offers a total BACnet solution.

Product Number

BTW-CD / BTW-KEYS

BACtalk® for Windows**SPECIFICATIONS**

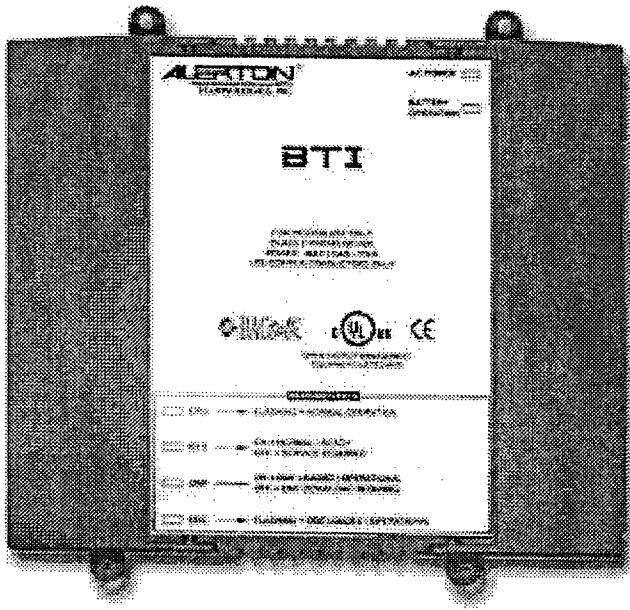
Recommended Minimum Computer Requirements	<ul style="list-style-type: none"> • Pentium® 233 processor or better. • 64 MB RAM and at least 200 MB hard disk space. • 16-bit SVGA card with 2 MB RAM or better. • Windows 95/98/NT. • Keyboard, monitor, mouse, 3.5-inch disk drive, and CD-ROM. • Ethernet network interface card.
Local Area Network (LAN)	BACnet Ethernet to 10 Mbps.
Printer	Printer support for engineering use and alarms. Uses Windows Print Manager.
Display Capability	Complete graphical interface with the number of customized displays dependent only on hard disk space. Maximum resolution depends on hardware capabilities.
Scheduling	Scheduling editor for available schedules.
Alarms	Alarms displayed regardless of currently running application. Alarm history log archived. User-defined alarm categories.
Trendlogs	Graph or text format displayed. Multiple points on each graph. Archived in database format.
Security	Up to 100 users. Each can have unique access privileges assigned by the system administrator.
Energy Logs	Hourly or daily energy use displayed in graph or text format. Archived in database format.
Energy Limiting	Energy program editor.
Tenant Activity Logs	Archives after-hours usage by tenants. Includes editor for report generation.
Operator Activity Logs	Logs all changes made to the system and which operator made the change. Stored in database format.
Remote Site Monitoring	Graphical interface to all sites, regional scheduling, automatic data gathering and alarm monitoring.
ActiveX	Provides interface to other programs that support ActiveX.
BACnet Conformance	Conformance Class 3. See Protocol Implementation Conformance Statement (PICS) for details.

Specifications subject to change without notice



BACtalk® Integrator (BTI)

BACnet-compliant Global Controller



The BACtalk® Integrator (BTI) is the next-generation BACnet-compliant global controller from Alerton®. BTIs can connect to a 10Base-T or 100Base-TX BACnet Ethernet network or operate in a stand-alone capacity. Each BTI supports field controllers on four BACnet MS/TP LANs. MS/TP is a simple twisted-pair bus with a configurable speed to 76.8 Kbps. The BTI is IP capable for interoperability across campuses or continents.

The BTI independently executes global direct digital control (DDC) algorithms to orchestrate the operation of field controllers on its MS/TP LANs. DDC is programmed at a BACtalk operator terminal with Alerton's easy-to-use, Windows-based graphical programming environment, VisualLogic®. Revolutionary features like an extensive application library, drag-and-drop DDC edits, dynamic real-time data updates, and self-documentation save time and ease the setup process.

In addition to executing DDC, the BTI hosts automated control features—schedules, trendlogs, and alarms—set up at a BACtalk operator terminal.

The BTI can access available data as BACnet objects and properties from throughout the BACnet internetwork,

Features & Application Highlights

- **Interoperable** BACnet-compliant controller with 10Base-T and 100Base-TX Ethernet and four MS/TP connections to BACnet internetwork.
- **Powerful** Global control algorithms and automated control functions execute quickly and reliably on a 32-bit Motorola Power PC platform with more than 32 MB SDRAM.
- **Versatile** Independent or system-integrated operation. Options for BACtalk operator terminal connection include BACnet or BACnet/IP over Ethernet, as well as BACnet PTP over direct serial cable or optional 33.6 Kbps modem.
- **Reliable** Onboard battery-supplied power source, extensive noise filtering, 16 MB CompactFlash, 128 K SRAM, and 64 K FLASH ROM ensure data reliability.

making its operational status and control data available to other BACnet devices in the same way. This enables an unmatched level of interoperability with other site systems.

For sites that require fully independent operation with remote access, a BTI with an optional 33.6 Kbps modem is available for alarm dialout and remote access. A 9-pin RS-232 port on all BTIs supports BACnet PTP connections, including roaming BACtalk operator terminal connections.

A battery-backed, real-time clock, CPU watchdog, 6-layer circuit design with separate ground plane, battery supervised shutdown, 128 K SRAM, CompactFlash, and a shock-resistant, flame-retardant case ensure the highest level of reliability available in any control device.

Product Numbers

BTI

BTI-MDM (with onboard 33.6 Kbps modem)

Accessories

AC-2650 (configuration cable)

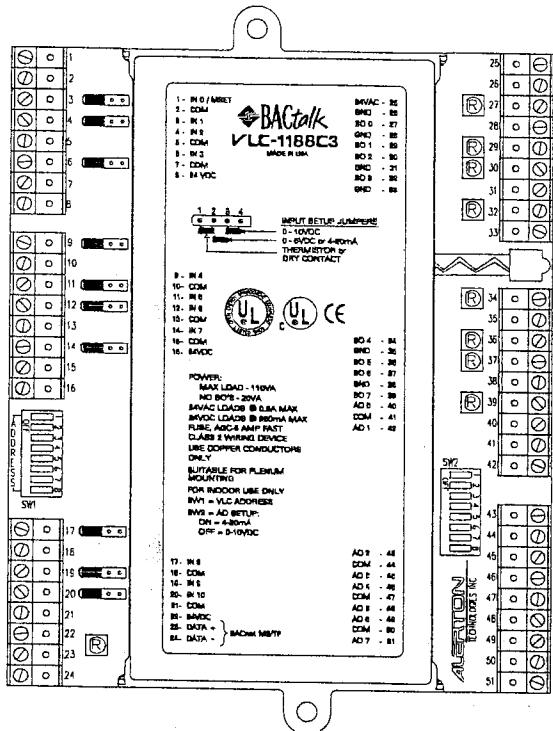
BTI	Technical Data										
Power	24 VAC, 50-60 Hz @ 10 VA. Utilizes a full-wave rectifier, which requires a dedicated 24 VAC transformer.										
Onboard Power Source	Onboard power source with memory-free gel cell battery provides ongoing power conditioning and noise filtering for operational data integrity. Also provides up to 5 minutes of powerless operation for orderly shutdown and data backup.										
Battery	Replaceable 3.0V lithium battery provides up to 1.5 years (cumulative) real-time clock (without external power supply). Standby battery life is 10 years. Coin-cell type BR1225 or equivalent.										
Memory & CPU	128 K static RAM and 32 MB dynamic RAM for program execution, in addition to 16 MB CompactFlash and 64 K FLASH ROM, provides high performance and data reliability. 32-bit high-integration Motorola Power PC running at 50 MHz.										
Real-time Clock	Onboard, battery-backed, real-time clock supports schedule operations, trendlogs, and timed DDC functions.										
BACnet Ethernet	Integrated Ethernet adapter circuitry with RJ-45 jack for connection to 10Base-T (10 Mbps) or 100Base-TX (100 Mbps) networks.										
BACnet Internet Protocol (IP)	IP support for interoperability on wide area networks (WANs) and campus area networks (CANs). Functions as a BACnet Broadcast Management Device (BBMD) in accordance with "Annex J" BACnet/IP.										
BACnet MS/TP	Removable, header-style screw terminals for 4 BACnet MS/TP (shielded twisted-pair bus) LANs, each individually configurable from 9.6 to 76.8 Kbps.										
Optional Modem	Available with optional 33.6 Kbps analog modem. Supports alarm dialout and temporary point-to-point (PTP) connection of remote BACtalk operator terminal over analog phone lines and public switched telephone network.										
Direct Access Port	Female DB-9 connector supports BACnet temporary PTP connection of portable BACtalk operator terminal at 9.6 to 115.2 Kbps over RS-232 null modem cable and connection of an external modem.										
Dimensions	7.10" (181mm) H X 7.00" (178mm) W X 1.62" (42mm) D.										
Environmental	32-131°F (0-55°C). 0-95% RH, non-condensing.										
BACnet Conformance	Conformance Class 3. See Protocol Implementation Conformance Statement (PICS).										
Ratings	<ul style="list-style-type: none"> • Listed Underwriters Laboratory for Open Energy Management Equipment (PAZX) under the UL Standard for Safety 916. Listing includes both U.S. and Canadian certification. • EMC Directive 89/336/EEC (European CE Mark). • FCC Part 15, Subpart J, Class A. Pending. 										
Software	<table> <tr> <td>Programming Interface</td><td>BACtalk for Windows over BACnet network (Ethernet) or temporary PTP connection (direct-connect or optional modem).</td></tr> <tr> <td>DDC</td><td>VisualLogic® control algorithms execute locally every second. Supports a maximum of 1000 BACnet AVs and 1000 BACnet BVs.</td></tr> <tr> <td>Schedules</td><td>Supports a maximum of 250 schedules.</td></tr> <tr> <td>Alarms</td><td>Supports a maximum of 1500 alarm setups stored as BACnet event enrollment objects—system destination and actions individually configurable.</td></tr> <tr> <td>Trendlogs</td><td>Supports a maximum of 1000 trendlogs to store data point histories for analysis.</td></tr> </table>	Programming Interface	BACtalk for Windows over BACnet network (Ethernet) or temporary PTP connection (direct-connect or optional modem).	DDC	VisualLogic® control algorithms execute locally every second. Supports a maximum of 1000 BACnet AVs and 1000 BACnet BVs.	Schedules	Supports a maximum of 250 schedules.	Alarms	Supports a maximum of 1500 alarm setups stored as BACnet event enrollment objects—system destination and actions individually configurable.	Trendlogs	Supports a maximum of 1000 trendlogs to store data point histories for analysis.
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VLC-1188C3

Programmable VisualLogic® Controller



The Alerton® BACtalk® VLC-1188C3 is a high-performance, fully programmable logic controller designed for control of central plant systems, air handling units, clean rooms, fume hoods, large terminal units and similar control and process equipment. The VLC-1188C3 is part of Alerton's complete BACtalk product line in total compliance with ANSI/ASHRAE Standard 135-1995, BACnet. As a native BACnet controller, it requires no proprietary chip sets to integrate seamlessly with your BACnet system.

The VLC-1188C3 communicates using the standard BACnet protocol on a BACnet MS/TP LAN, which operates at up to 76.8 Kbps. An LED indicates communication activity on the MS/TP LAN. The VLC-1188C3 can also operate as a stand-alone controller. Its design includes support for Alerton's BACtalk Microset™, an intelligent wall sensor unit offering convenient data display and setpoint adjustment.

All VLC-1188C3 control logic is programmed with Alerton's easy-to-learn graphical programming language, VisualLogic®. This self-documenting software's

Features & Application Highlights

- Capable** Eleven 10-bit universal inputs, eight binary outputs and eight 8-bit analog outputs.
- Interoperable** Fully BACnet-compliant on MS/TP LAN at up to 76.8 Kbps.
- Versatile** Fully programmable for central plant systems, air handling units, clean rooms, fume hoods and other control and process equipment.
- Reliable** Extensive onboard filtering, with all program data backed up in non-volatile EEPROM.
- Fast** Internal logic loop of 100 msec.

complete function library enables you to implement entirely flexible control strategies. A single VLC-1188C3 can contain numerous algorithm loops that control various parts or multiple pieces of equipment. Non-volatile EEPROM stores all program data.

The VLC-1188C3 is built for high-speed processing, with an internal logical loop time of 100 msec. Programmable timers also maintain a resolution of 100 msec. High-resolution, 10-bit analog inputs are field adjustable for thermistor/dry contact, 0-5 VDC/4-20 mA or 0-10 VDC. Analog outputs are switch-selectable for 4-20 mA or 0-10 VDC.

CMOS circuitry, a four layer circuit board with separate ground plane, and extensive hardware, software and power-supply filtering ensure reliable and stable operation. The CMOS processor uses an internal watchdog, and power supply voltage is monitored to provide automatic shutdown and data backup.

Product Number

VLC-1188C3

VLC-1188C3**SPECIFICATIONS**

Power	24 VAC @ 20 VA min., plus binary output loads (110 VA max.). Utilizes a half-wave rectifier, which allows multiple VLCs to be powered from a single transformer. One leg of 24 VAC connects to earth (panel) ground.
Inputs	11 inputs with 10-bit resolution. Input 0 can be used for a BACtalk® Microset™. Inputs 1–10 are jumper-selectable for thermistor/dry contact, 0–5 VDC/4–20 mA or 0–10 VDC signals.
Binary Outputs	8 outputs each rated at 24 VAC, 0.5 A. The outputs utilize optically coupled triacs, which have a common connection to the fused 24 VAC supply.
Analog Outputs	8 outputs with 8-bit resolution. Each is switch-selectable for 0–10 VDC or 4–20 mA. 4–20 mA outputs are sourced by the VLC. Connected loads must return to the VLC ground. 4–20 mA max. load resistance is 1,000Ω. 0–10 VDC min. load resistance is 500Ω.
24VDC Output	Up to 250 mA of 24 VDC power is provided to power transducers or other devices.
Processor	Motorola CMOS processor with ROM and RAM.
EEPROM	Provides non-volatile program and data storage.
Max. Dimensions	6.98" (117mm) H X 5.00" (127mm) W X 1.50" (38mm) D.
Terminations	Removable header-type screw terminals accept 14–24 AWG wire.
Environmental	32–158°F (0–70°C). 0–95% RH, non-condensing.
Communications	BACnet MS/TP LAN up to 76.8 Kbps.
BACnet Conformance	Conformance Class 3. See Protocol Implementation Conformance Statement (PICS).
Ratings	<ul style="list-style-type: none"> • Listed Underwriters Laboratory for Open Energy Management Equipment (PAZX) under the UL Standard for Safety 916. Listing includes both U.S. and Canadian certification. • EMC Directive 89/336/EEC (European CE Mark). • FCC Part 15, Subpart J, Class A.

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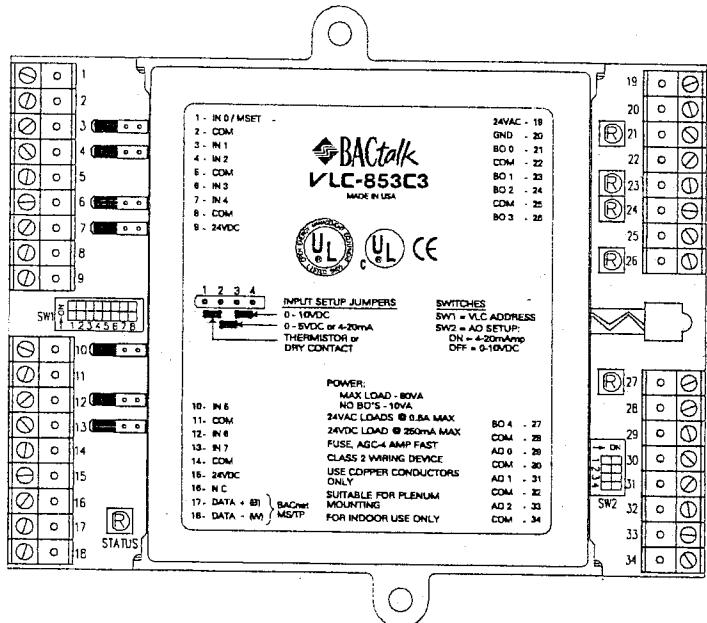
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VLC-853C3

Programmable VisualLogic® Controller



The Alerton® BACtalk® VLC-853C3™ is a high-performance, fully programmable logic controller designed for control of central plant systems, air handling units, large terminal units and similar control and process equipment. The VLC-853C3 is part of Alerton's complete BACtalk product line in total compliance with ANSI/ASHRAE Standard 135-1995, BACnet. As a native BACnet controller, it requires no proprietary chip sets to integrate seamlessly with your BACnet system.

The VLC-853C3 communicates using the standard BACnet protocol on a BACnet MS/TP LAN, which operates at up to 76.8 Kbps. An onboard LED indicates the status of BACnet communications. The VLC-853C3 can also operate as a stand-alone controller. Its design includes support for Alerton's BACtalk Microset™, an intelligent wall sensor unit offering convenient data display and setpoint adjustment.

All VLC-853C3 control logic is programmed with Alerton's easy-to-learn graphical programming language, VisualLogic. This self-documenting software's complete function library enables you to implement entirely flexible

Features & Application Highlights

- Capable** Eight 10-bit inputs, five binary outputs, and three 8-bit analog outputs.
- Interoperable** Fully BACnet-compliant on MS/TP LAN at up to 76.8 Kbps.
- Versatile** Fully programmable for central plant systems, air handling units, other control and process equipment.
- Reliable** Extensive onboard filtering, with all program data backed up in nonvolatile EEPROM.
- Fast** Internal logic loop of 100 msec.

control strategies. A single VLC-853C3 can contain numerous algorithm loops that control various parts or multiple pieces of equipment. Non-volatile EEPROM stores all program data.

The VLC-853C3 is built for high-speed processing, with an internal logical loop time of 100 msec. Programmable timers also maintain a resolution of 100 msec.

High-resolution, 10-bit analog inputs are field-adjustable for thermistor/dry contact, 0-5 VDC/4-20 mA or 0-10 VDC. Analog outputs are switch-selectable for 4-20 mA or 0-10 VDC. An onboard LED for each binary output indicates ON/OFF status.

CMOS circuitry, a four layer circuit board with separate ground plane, and extensive hardware, software, and power-supply filtering ensure reliable and stable operation. The CMOS processor uses an internal watchdog, and power supply voltage is monitored to provide automatic shutdown and data backup.

Product Number

VLC-853C3

VLC-853C3**SPECIFICATIONS**

Power	24 VAC @ 10 VA min., plus binary output loads (80 VA max). Utilizes a half-wave rectifier, which allows multiple VLCs to be powered from a single transformer. One leg of 24 VAC connects to earth (panel) ground.
Inputs	8 inputs with 10-bit resolution. Input 0 can be used for a BACtalk® Microset™. Inputs 1–7 are jumper-selectable for thermistor/dry contact, 0–5 VDC/4–20 mA or 0–10 VDC signals.
Binary Outputs	5 outputs, each rated at 24 VAC, 0.5 A. The outputs utilize hot-switched triacs, which have a common connection to the fused 24 VAC supply.
Analog Outputs	3 outputs with 8-bit resolution. Each is switch-selectable for 0–10 VDC or 4–20 mA. 4–20 mA outputs are sourced by the VLC. Connected loads must return to the VLC ground. 4–20 mA max. load resistance is 1,000Ω. 0–10 VDC min. load resistance is 500Ω.
24VDC Outputs	Two terminals provide up to 250 mA (total) of 24 VDC to power transducers or other devices.
Processor	Motorola CMOS processor with ROM and RAM.
EEPROM	Provides non-volatile program and data storage.
Max. Dimensions	4.9" (125mm) H X 5.4" (136mm) W X 1.4" (36mm) D.
Terminations	Removable header-type screw terminals accept 14–24 AWG wire.
Environmental	32–158°F (0–70°C), 0–95% RH, non-condensing.
Communications	BACnet MS/TP LAN up to 76.8 Kbps.
BACnet Conformance	Conformance Class 3. See Protocol Implementation Conformance Statement (PICS).
Ratings	<ul style="list-style-type: none"> • Listed Underwriters Laboratory for Open Energy Management Equipment (PAZX) under the UL Standard for Safety 916. Listing includes U.S. and Canadian certification. • EMC Directive 89/336/EEC (European CE Mark). • FCC Part 15, Subpart J, Class A.

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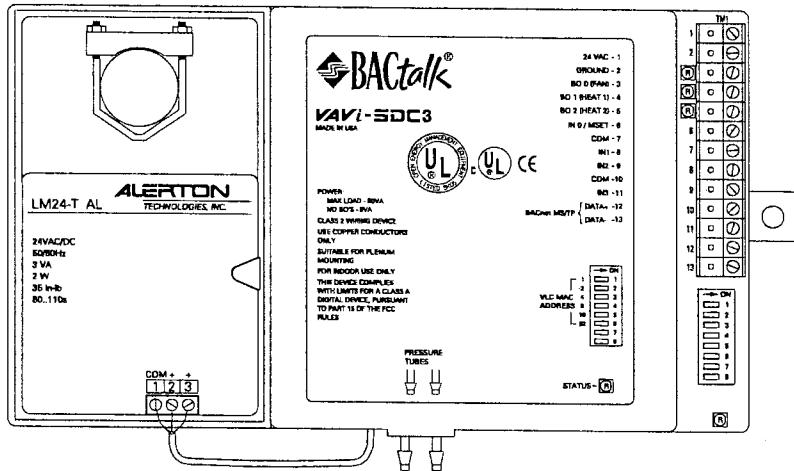
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VAVi-SDC3™

VisualLogic® Controller with Actuator ■



Features & Application Highlights

- Capable** 410-bit inputs plus an integrated airflow sensor, integrated actuator and three additional binary outputs.
- Convenient** Integrated actuator eases installation.
- Interoperable** Fully BACnet-compliant on MS/TP LAN at up to 76.8 Kbps.

The Alerton® BACtalk® VAVi-SDC3™ controller with integrated actuator is a versatile BACnet-compliant controller, providing pressure-independent control of any single-duct variable air volume (VAV) box.

The VAVi-SDC3 is part of Alerton's complete BACtalk product line, in total compliance with ANSI/ASHRAE Standard 135-1995, BACnet. As a native BACnet controller, it requires no proprietary chipsets to integrate seamlessly with your BACnet system, communicating at up to 76.8 Kbps on a BACnet MS/TP LAN.

An integrated airflow sensor provides pressure-independent operation of the VAV box. Each airflow sensor is factory-calibrated at multiple velocity points. Technicians can set minimum, maximum and reheat airflow via either a Microset wall unit or a BACtalk for Windows operator terminal. With the Microset, a

- Versatile** Factory-loaded, completely programmable control logic can be modified on-site.
- Reliable** Extensive onboard filtering, with all program data backed up in non-volatile EEPROM.
- Accurate** Factory calibrated at multiple velocity points and field-adjustable during balancing.

technician can adjust the calibration while in the zone during balancing to compensate for slight variations in box installation and type.

The direct-coupled actuator is a high-reliability, maintenance-free ON-OFF/floating point control model manufactured by Belimo Air Controls, Inc. Its universal V-bolt clamp assembly mounts directly to the damper operating shaft.

All control algorithms are factory-loaded into EEPROM and can be field-modified. The VAV-SDC3 can execute control algorithms independently of other equipment. All calibration, programming and operator-entered setup data is stored in non-volatile EEPROM for further assurance of stable, reliable and independent operation.

Product Number

VAVi-SDC3

VAVi-SDC3**SPECIFICATIONS**

Power	24 VAC@10 VAmín.plus binary output loads(50 VAmáx.). Utilizes a half-wave rectifier, which enables multiple VLCs to be powered from a single transformer. One leg of 24 VAC connects to earth (panel) ground.
Inputs	4 universal inputs with 10-bit resolution. Input 0 supports the BACtalk [®] Microset™ . Inputs 1–3 support thermistor/dry-contact.
Binary Outputs	3 outputs for staged heater/fan control, each rated 24 VAC, 0.5 A. Outputs utilize hot-switched triacs which have a common connection to the fused 24 VAC supply.
Airflow Sensor	0–1.25 inches water column differential pressure sensor.
Processor & Memory	Motorola CMOS processor with ROM and RAM. EEPROM provides non-volatile program and data storage.
Max. Dimensions	3.58" (91mm) H X 6.07" (155mm) W X 2.56" (66mm) D.
Terminations	Removable header-type screw terminals accept 14–24 AWG wire.
Environmental	32–158°F (0–70°C). 0–95% RH, non-condensing.
Communications	BACnet MS/TPLAN up to 76.8 Kbps.
BACnet Conformance	Conformance Class 3. See Protocol Implementation Conformance Statement (PICS).
Ratings	<ul style="list-style-type: none"> • Listed Underwriters Laboratory for Open Energy Management Equipment (PAZX) under the UL Standard for Safety 916. Listing includes U.S. and Canadian certification. • EMC Directive 89/336/EEC (European CE Mark). • FCC Part 15, Subpart J, Class A.

Actuator

Manufacturer	Belimo Air Controls, Inc.
Model	LM24-T-AL.
Overload Protection	Electronic throughout 0–95° rotation.
Angle of Rotation	Maximum 95°, adjustable with mechanical stops.
Torque	Minimum 35 in-lb (4Nm).
Running Time	80–110 seconds for 0–35 in-lb.
Manual Override	External pushbutton.
Servicing	Maintenance free.
Ratings	<ul style="list-style-type: none"> • UL 873 listed. • CSA 481 302 certified.

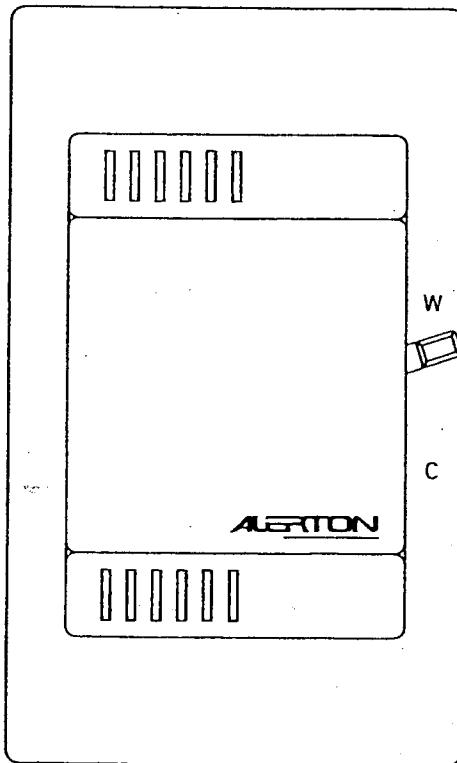
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BACtalk Microtouch

Wall Sensor ■



The BACtalk Microtouch is a fully BACnet-compliant wall sensor that complements any building's interior decor. Beneath the stylish housing is an accurate thermistor temperature sensing element, an override push-button switch, adjustable setpoint bias, and service jack for servicing flexibility.

Accuracy is assured with the BACtalk Microtouch's interchangeable, industrial-grade thermistor that connects directly to Alerton field equipment.

After-hours, the occupant pushes the cover to activate the override timer in the VisualLogic controller (VLC) controlling the zone HVAC equipment. Energy costs are reduced when the facility operator establishes minimum occupied time periods and uses the after-hours override time outside these occupied time periods.

The BACtalk Microtouch's setpoint adjustment lever allows the occupant to bias the zone setpoint. The bias amount — typically +/-2°F — and center setpoint are set at the operator's terminal or with the Microset Service Tool.

Features & Application Highlights

- **Reliable** An interchangeable, industrial-grade thermistor provides consistent accuracy and interfaces with Alerton field equipment.
- **Flexible** Use the Microset Service Tool at the BACtalk Microtouch to adjust setpoint ranges, after-hours override time, VAV box CFM setpoints, heat pump economizer setpoints, and more.
- **Energy-efficient** Maintenance and energy costs are reduced with operator-established after-hours override time and temperature bias setpoints.
- **Attractive** Discreet and stylish, the BACtalk Microtouch is the ideal companion to any building's interior decor.

The BACtalk Microtouch's lever can be disabled by setting a 0 bias or removing the lever entirely.

The Microset Service Tool easily connects to the Microtouch's service jack with a 5' cable. The Microset Service Tool allows service personnel to configure the VLCs that are directly connected to the BACtalk Microtouch. Setpoint adjustment range, after-hours override time, VAV box CFM setpoints, heat pump economizer setpoints, and more, are readily configured.

Together with Alerton's complete BACtalk line of powerful Windows-based operator's terminal software and programmable VisualLogic controllers, the BACtalk Microtouch wall sensor offers a total BACnet solution.

Product Number

TS-1050BT

Thermistor

Type	Uni-curve Type II.
Resistance	10,000 Ohms at 77°F (22°C). See table below.
Time Constant	10 seconds (to 66% of new temperature).
Interchangeability	0.36°F (0.2°C).

Operating and Storage Range -20°–180°F (-29°–82°C).

Wiring 18–22 AWG, shielded. Low capacitance wire recommended.

Dimensions

Unit 3.00" (H) x 2.00" (W) x 0.75" (D).
77 mm (H) x 51 mm (L) x 20 mm (W).

Wallplate 4.5" (H) x 2.75" (L) x 0.2" (W).
115 mm (H) x 70 mm (L) x 6 mm (W).

Color White. Other colors available by special order.

Thermistor Resistance at Selected Temperatures

Temperature	Resistance	Temperature	Resistance
35°F (1.7°C)	29,997 Ohms	90°F (32.2°C)	6,667 Ohms
40 (4.4)	26,100	95 (35.0)	6,530
45 (7.2)	22,799	100 (37.8)	5,827
50 (10.0)	19,900	105 (40.6)	5,207
55 (12.8)	17,437	120 (48.9)	3,757
60 (15.6)	15,313	125 (51.7)	3,380
65 (18.3)	13,477	130 (54.4)	3,047
70 (21.1)	11,883	135 (57.2)	2,720
75 (23.9)	10,500	140 (60.0)	2,488
80 (26.7)	9,297	145 (62.8)	2,250
85 (29.4)	8,250	150 (65.6)	2,040

Specifications subject to change without notice.

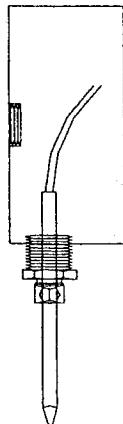
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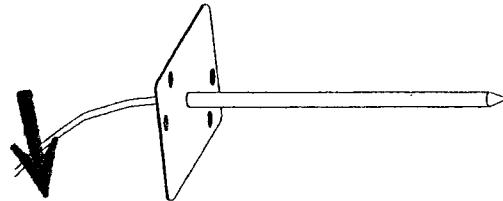


Equipment Sensors

Temperature Sensors



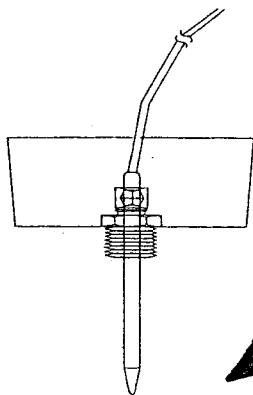
Outside Air Sensor
TS-3200BT



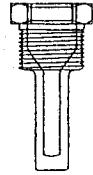
Duct Sensors
TS-2000BT TS-2008BT TS-2010BT TS-2020BT



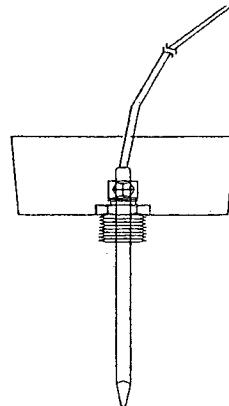
Pencil Sensor
TS-3000BT



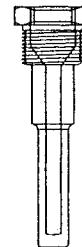
2.5" Immersion Sensor
TS-2100BT



2.5" Pipe Well
TS-3100



6" Immersion Sensor
TS-2115BT



6" Pipe Well
TS-3115

Each Alerton® BACtalk® temperature sensor utilizes the same industrial-grade sensing element. The element is a precalibrated, interchangeable thermistor that changes resistance relative to temperature and is held at the tip of the sensor tube with thermally conductive epoxy.

The TS-2000BT, TS-2008BT and TS-2010BT are duct sensors with 5 in., 8 in. and 10 in. probes, respectively. These have 5 ft. wire leads. The TS-2020BT is a discharge duct sensor with a 5 in. probe and 6 ft. plenum-rated wire leads.

The TS-2100BT and TS-2115BT are 2.5 in. and 6 in. stainless steel immersion sensors with 5 ft. wire

leads. The TS-3100BT is 2.5 in. brass, and the TS-3115BT is a 6 in. stainless steel pipe used with their corresponding immersion sensors.

The TS-3200BT is an outside air sensor with 5 ft. wire leads mounted in a bell box.

The TS-3000BT pencil sensor is a 4.25 in. long stainless steel tube with a diameter of 0.25 in. and 6 in. wire leads. The pencil sensor is mounted in various standard hardware for duct, well, and outside air applications.

Product Number

Please see above diagrams for corresponding product numbers.

Sensors**SPECIFICATIONS****Thermistor**

Type	Uni-curve Type II.
Resistance	10KΩ at 77°F (22°C). See table below.
Interchangeability	0.36°F (0.2°C).
Time Constant*	10 seconds (to 66% of new temperature).
Stability*	0.036°F (0.02°C) drift per year.
Accuracy*	± 0.36°F (0.2°C) over range of 32°F (0°C) to 158°F (77°C).

*Based on normal operating conditions.

Wiring	18–22 AWG. Shielded.
---------------	----------------------

Operating and Storage Range	-20°–180°F (29°–82°C).
------------------------------------	------------------------

Thermistor Resistance at Selected Temperatures

Temperature	Resistance	Temperature	Resistance
35 F (1.7 C)	29,997 Ohms	90 F (32.2 C)	6,667 Ohms
40 (4.4)	26,100	95 (35.0)	6,530
45 (7.2)	22,799	100 (37.8)	5,827
50 (10.0)	19,900	105 (40.6)	5,207
55 (12.8)	17,437	120 (48.9)	3,757
60 (15.6)	15,313	125 (51.7)	3,380
65 (18.3)	13,477	130 (54.4)	3,047
70 (21.1)	11,883	135 (57.2)	2,720
75 (23.9)	10,500	140 (60.0)	2,488
80 (26.7)	9,297	145 (62.8)	2,250
85 (29.4)	8,250	150 (65.6)	2,040

Specifications subject to change without notice.

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Medical / Dental Clinic

SECTION 6B

Outside Purchases

<u>MODEL</u>	<u>DESCRIPTION</u>	<u>MFR.</u>
NF Series	Damper Actuator	Belimo
AGC Series	Glass Fuse	Bussmann
MR601/T	Multi-Voltage Control Relay	Hawkeye
H708-908	Current Status Switch	Hawkeye
H735-759	Current Sensor	Hawkeye/Veris
C-SDx Series	Nema 4 Enclosure	Hoffman
A-xNxALP Series	Nema 1 Enclosure	Hoffman
T651A2028	Line Voltage Thermostat	Honeywell
I/DP-8-4	Duct Trans. 4-20mA, 0-3"	Intec
ST-FZ3-25	10K Ohm Averaging Thermistor Sensor	Kele
1910 Series	Differential Pressure Switch	Kele
A-602	Air Filter Kit	Kele
24-013	Differential Pressure Switch	Kele
F61KB-11	Flow Switch	Kele
AT150A	50 VA Transformer	Kele
691 Series	Transformer 120/24V	Kele
M10/16SFL	Fuse Holder	Kele
M4/6	Terminal Block	Kele
WD-1B	Water Detector	Kele
PTX1	Pressure Transmitter	Kele
AFS-460	Manual Reset Air Sensing Switch	Kele
M264	Differential Pressure Transmitter	Setra
2641-005WD-11T1-C	Static Pressure Transducer	Setra
M230	Water Diff. Press. Transmitter	Setra

Submittal

Torque min. 60 in-lb, for damper areas up to 15 ft²***On-Off Control, 24 VAC/DC Power**

- NF24 us
 NF24-S us (NF24 us with built-in auxiliary switch)

On-Off Control, 120 VAC Power

- NF120 us
 NF120-S us (NF120 us with built-in auxiliary switch)

Proportional Control, 24 VAC/DC Power

- NF24-SR us
 Control signal:
 2 to 10 VDC
 4 to 20 mA (with 500Ω resistor)
 Input impedance:
 100 kΩ (500Ω)
 Feedback output:
 2 to 10 VDC

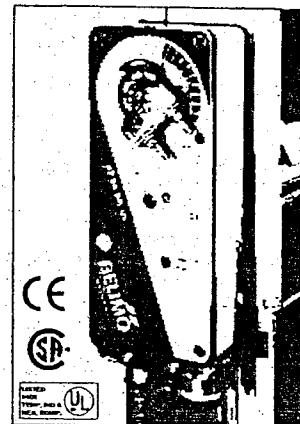
Common Data

- Power consumption:
 3 to 6 W running,
 1 to 3.5 W holding (models vary)
 Transformer sizing:
 6 VA (NF24-SR us), 7 VA (NF120 us)
 8 VA (NF24 us), class 2 power
 Electrical connection:
 3 ft, 18 GA appliance cable,
 1/2" conduit fitting
 Electrical protection:
 120V actuators/aux. switches
 double insulated
 Overload protection:
 electronic throughout rotation
 Angle of rotation:
 95° (adjustable with ZDB-AF2)
 Direction of rotation:
 selected by switch:
 CW=CW with decrease signal
 CCW=CCW with decrease signal
 Spring return direction:
 CW/CCW mounting
 Position indication:
 visual indicator
 Auxiliary switch:
 1 x SPDT, 5° to 85° (-S)
 Running time:
 <75 sec. (on-off)
 150 sec. independent of load (proportional)
 < 60 sec. (spring)
 Ambient temperature:
 -22° F to 122° F [-30° C to 50° C]
 Housing:
 NEMA 2 / IP54
 Agency listings:
 UL 873, CSA 4813 02, CE
 Noise level:
 max. 45 dB(A)
 Weight:
 6.0 lbs to 7.3 lbs (models vary)

Application/Operation

For fail-safe control of dampers in HVAC systems. Actuator sizing should be done in accordance with the damper manufacturer's specifications.

NF series actuator is mounted directly to a damper shaft up to 3/4" in diameter by means of its universal clamp, or up to a 1.05" jackshaft with the optional K4-1 clamp. A crankarm and several mounting brackets are available for applications where the actuator cannot be direct coupled to the damper shaft.

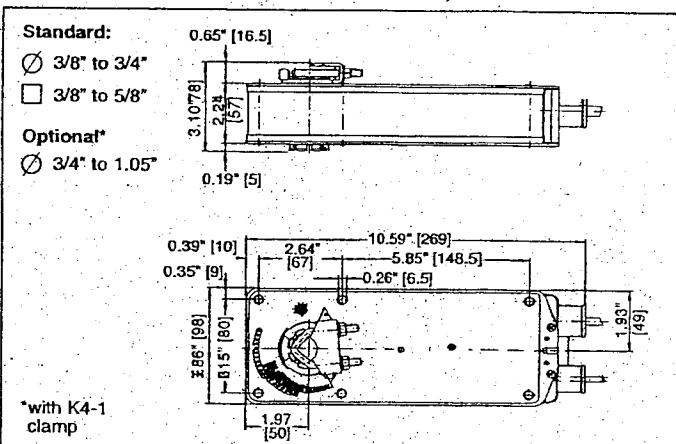


NF24(-S) us and NF120(-S) us control is on-off from an auxiliary contact of a fan motor contactor or a manual switch. The NF24-SR us operates in response to a 2 to 10 VDC, or with the addition of a 500Ω resistor, a 4 to 20 mA control input from an electronic controller or positioner. A 2 to 10 VDC feedback signal is provided for position indication or master slave applications. A microprocessor provides intelligence to the ASIC to provide a constant rotation rate and to know the actuator's exact zero position. The NF24-SR us uses a brushless DC motor which is controlled by an Application Specific Integrated Circuit (ASIC) and a microprocessor which monitors and controls the motor's rotation, and provides a digital rotation sensing function to prevent damage to the actuator in a stall condition. The 120 VAC models and all actuators with auxiliary switches are constructed to meet the requirements for Double Insulated devices. These units do not require a good connection to meet electrical code requirements.

True spring return operation is provided for reliable fail-safe application and positive close-off on air-tight dampers. Consistent torque is provided to the damper with, and without, power applied to the actuator.

The NF series provides 95° of rotation with a graduated position indicator showing 0° to 95°. The actuator may be stalled anywhere in its normal rotation without the need of mechanical end switches.

* Based on 4 in-lb/ft² damper torque loading. Parallel blade. No edge seals.

Dimensions (All numbers in brackets are metric.)

*with K4-1
clamp

Project _____

Engineer _____

Submittal Date _____

Description

- Fast-acting, glass tube
- Optional leaded version available
- 1/4 x 1-1/4 (6.3mm x 32mm) physical size
- Glass tube, nickel-plated brass endcap construction
- UL Listed product meets standard 248-14

ELECTRICAL CHARACTERISTICS	
% of Amp Rating	Opening Time
100%	None
135%	60 Minutes Maximum
200%	120 Seconds Maximum

Agency Information

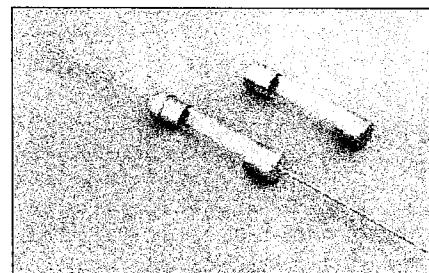
- UL Listed Card: AGC 1/500-10
- UL Recognition Card: AGC 11-30
- CSA Component Acceptance Card (Class No. 1422 30)
- CSA Certification Card (Class No. 1422 01)

Environmental Data

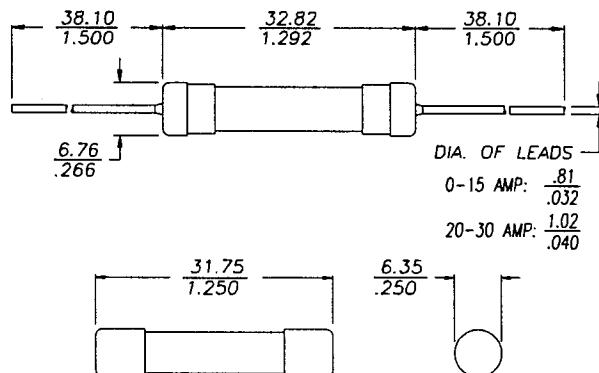
- Shock: 1/100A thru 3/4A – MIL-STD-202, Method 213, Test Condition I; 1A thru 30A – MIL-STD-202, Method 207, (HI Shock)
- Vibration: 1/100A thru 30A – MIL-STD-202, Method 204, Test Condition A (Except 5g, 500HZ)

Ordering

- Specify product code and packaging code


Dimensions (mm/in)

Drawing Not to Scale

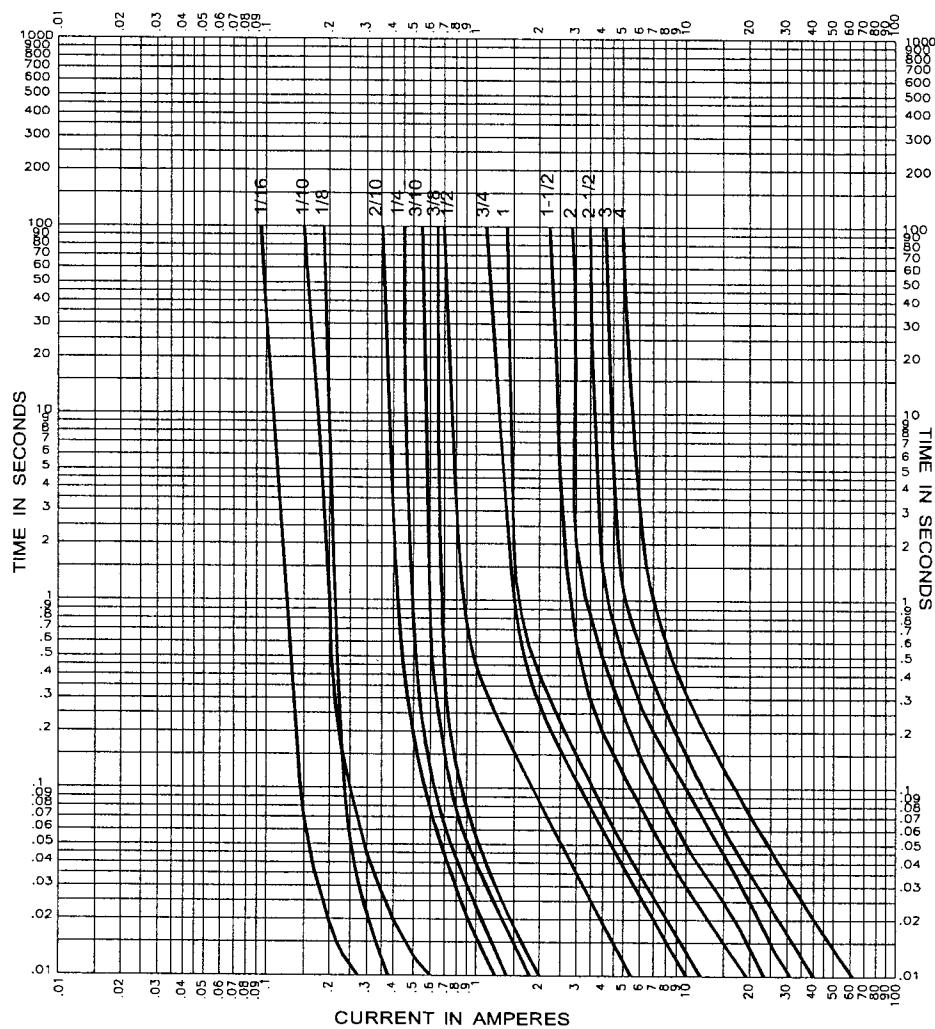


Product Code	Voltage Rating AC	AC Interrupting Rating			Typical DC Cold Resistance** (ohms)	Typical Melting I ^t t† AC	Typical Voltage Drop‡
		250V	125V	32V			
		35A	10000A	1000A			
AGC-1/20	250V	35A	10000A	1000A	4.500	0.00773	0.67
AGC-1/16	250V	35A	10000A	1000A	29.000	0.000181	10.41
AGC-1/10	250V	35A	10000A	1000A	12.565	0.000787	6.00
AGC-1/8	250V	35A	10000A	1000A	6.800	0.00131	4.67
AGC-3/16	250V	35A	10000A	1000A	4.900	0.00637	4.12
AGC-2/10	250V	35A	10000A	1000A	3.360	0.00435	4.51
AGC-1/4	250V	35A	10000A	1000A	1.860	0.0148	0.89
AGC-3/10	250V	35A	10000A	1000A	1.670	0.0208	2.88
AGC-3/8	250V	35A	10000A	1000A	1.203	0.0321	4.59
AGC-1/2	250V	35A	10000A	1000A	0.615	0.269	0.59
AGC-3/4	250V	35A	10000A	1000A	0.312	0.815	0.37
AGC-1	250V	35A	10000A	1000A	0.190	1.615	0.31
AGC-1-1/4	250V	100A	10000A	1000A	0.145	0.018	0.35
AGC-1-1/2	250V	100A	10000A	1000A	0.115	0.0149	0.27
AGC-2	250V	100A	10000A	1000A	0.078	0.00509	0.28
AGC-2-1/4	250V	100A	10000A	1000A	0.067	0.00588	0.26
AGC-2-1/2	250V	100A	10000A	1000A	0.057	0.00879	0.31
AGC-3	250V	100A	10000A	1000A	0.045	0.0167	0.25
AGC-4	250V	200A	10000A	1000A	0.030	0.0305	0.22
AGC-5	250V	200A	10000A	1000A	0.024	0.045	0.23
AGC-6	250V	200A	10000A	1000A	0.020	0.071	0.23
AGC-7	250V	200A	10000A	1000A	0.017	0.105	0.23
AGC-8	250V	200A	10000A	1000A	0.014	0.152	0.19
AGC-9	250V	200A	10000A	1000A	0.012	0.21	0.18
AGC-10	250V	200A	10000A	1000A	0.008	0.492	0.20
AGC-15	32V	-	-	1000A	0.006	0.566	0.14
AGC-20	32V	-	-	1000A	0.004	1.438	0.12
AGC-25	32V	-	-	1000A	0.003	2.109	0.11
AGC-30	32V	-	-	1000A	0.002	3.807	0.12

** DC Cold Resistance (Measured at <10% of rated current)

† Typical Melting I^tt (A²Sec) (I^tt was measured at listed interrupting rating and rated voltage.)

‡ Typical Voltage Drop (Voltage drop was measured at 25°C ambient temperature at rated current)

TIME CURRENT CURVE
 CURRENT IN AMPERES

OPTION CODE

Option Code	Description
B	Board Washable - Hermetically sealed to withstand aqueous cleaning
V	Axial leads - brass overcaps with copper and nickel flash, plated in tin lead

PACKAGING CODE

Packaging Code	Description
BK	100 pieces of fuses packed into a cardboard carton with flaps folded
BK1	1,000 pieces of fuses packed into a cardboard carton with flaps folded
BK8	8,000 pieces of fuses packed into a cardboard carton with flaps folded

RELAYS & CONTACTORS

MULTI-VOLTAGE CONTROL RELAYS MR SERIES

DESCRIPTION

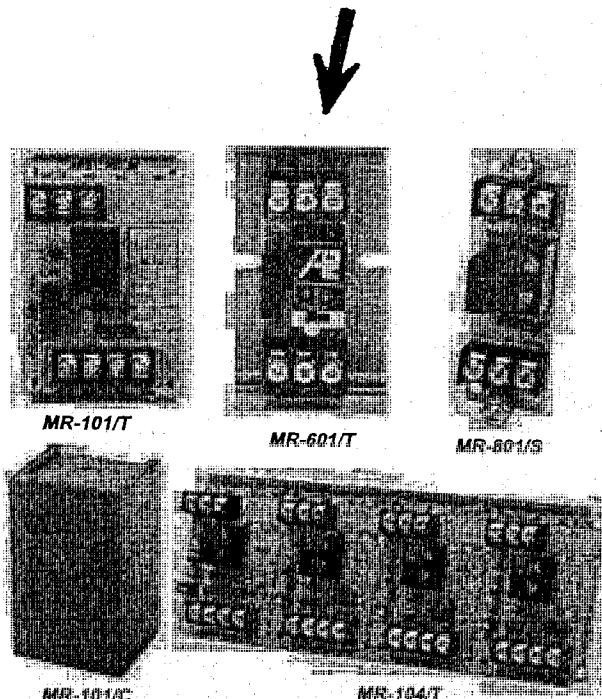
The MR Series Multi-Voltage Control Relays offer SPDT or DPDT contacts which may be operated by multiple input control voltages.

Each relay section contains a red light emitting diode (LED) which indicates the relay coil is energized. Relay sections may be "snapped apart" from standard 4 or 8 section assemblies and used independently.

These relays are ideal for applications where local or remote contacts are required for control of electrical loads and general purpose switching. They are suitable for use with HVAC, Temperature Control, Fire Alarm, Security, Building Automation and Lighting Control Systems.

FEATURES

- *Multi-voltage input, SPDT or DPDT control relays*
- *LED indication when relay is energized*
- *Relay sections may be snapped apart from standard 4 or 8 section assemblies*
- *Track, spacer or enclosed mounting options*
- *Enclosed models have dust-proof housing with LED viewing hole*
- *Relays are rated for 10,000,000 mechanical operations*



SPECIFICATIONS

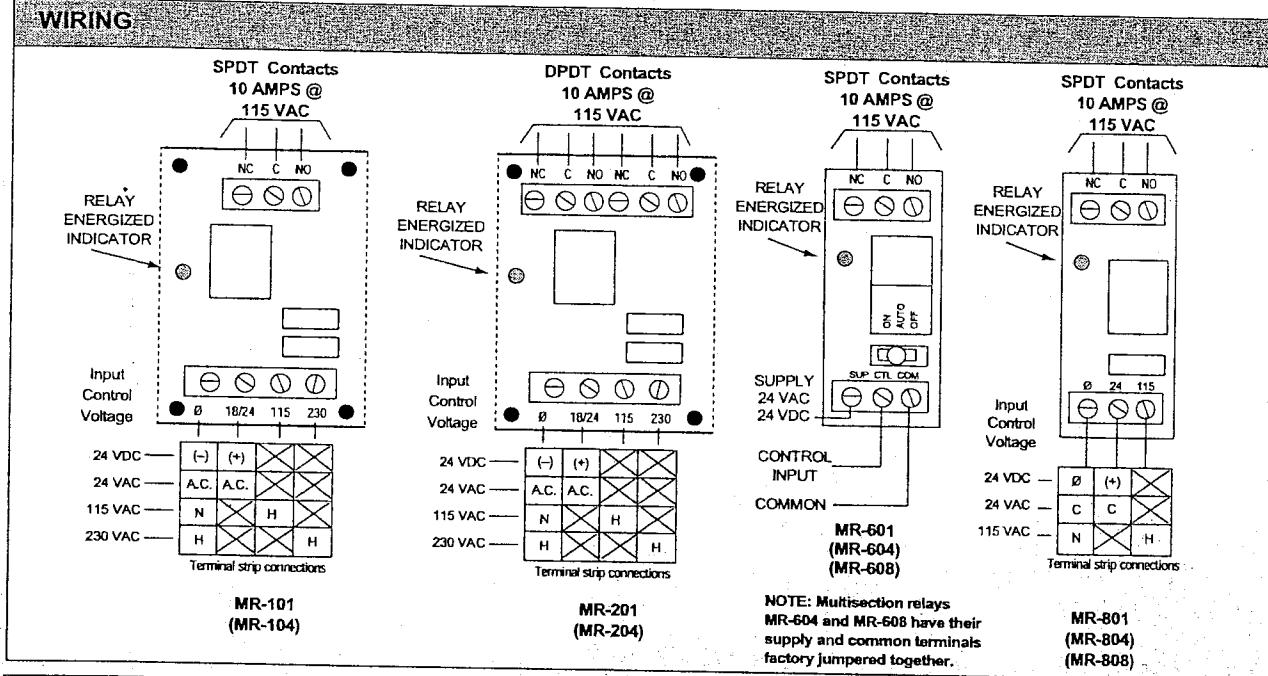
	MR-100 Series	MR-200 Series	MR-600 Series	MR-800 Series
Relay sections (Snap-apart)	1 or 4			1, 4 or 8
Voltage input	24 VDC @ 15 mA, 24 VAC @ 30 mA 115 VAC @ 20 mA, 230 VAC @ 20 mA		24 VAC, 24 VDC @15 mA	24 VAC, 24 VDC, 115 VAC @ 15 mA
Contact type	SPDT	DPDT		SPDT
Contact rating	10A Res. @ 115 VAC, 7A Res. @ 230 VAC/28 VDC N.O.: 1/6 HP @ 115 VAC			10A @ 115 VAC
Temperature			-60° to 185°F (-50° to 85°C)	
Indication		LED		
Mounting	Track or enclosed		Track	Track or spacer
Enclosure option	18 ga. Metal back, ABS-94VO plastic cover 1/2" knockouts			-
Manual override	-		ON-AUTO-OFF Switch	-
Dimensions	3.25"H x 2.125"W x 1.5"D (8.25 cm x 5.39 cm x 3.81 cm)		3.25"H x 1.063"W x 1.38"D (8.25 cm x 2.7 cm x 3.5 cm)	
Enclosure dimensions	5.125"H x 3.125"W x 2.5"D (13 cm x 7.9 cm x 6.35 cm) or 5.125"H x 9.5"W x 2.5"D (13 cm x 24.1 cm x 6.35 cm)			-
Approvals	UL recognized Enclosed model UL listed			UL recognized

*Specifications are for each relay section.

RELAYS & CONTACTORS

MULTI-VOLTAGE CONTROL RELAYS MR SERIES

WIRING



ORDERING INFORMATION

MODEL	COIL VOLTAGE	SECTIONS	TRACK (Included)	SPACERS (Included)	ENCLOSURE (Included)	MANUAL OVERRIDE ON/AUTO-OFF
	24 VDC	SPDT (10A)	DPDT (10A)			
MR-101/T	X	X	X	X	X	
MR-101/C	X	X	X	X		X
MR-104/T	X	X	X	4	X	
MR-104/C	X	X	X	4		X
MR-201/T	X	X	X	X	1	X
MR-201/C	X	X	X	X	1	
MR-204/T	X	X	X	X	4	X
MR-204/C	X	X	X	X	4	
MR-601/T	X	X			1	X
MR-604/T	X	X			4	X
MR-608/T	X	X			8	X
MR-801/T	X	X	X	1	X	
MR-801/S	X	X	X	1		X
MR-804/T	X	X	X	4	X	
MR-804/S	X	X	X	4		X
MR-808/T	X	X	X	8	X	
MR-808/S	X	X	X	8		X

Adjustable Set-Point



**NEW MODELS!
IMPROVED
1 A STATUS
OUTPUT**

Cost effective... reduced installation & service costs

- Adjustable set point, 1 to 135 A (H708), 2.5 to 135 A (H908)
- More reliable & cost effective than differential pressure switches, no fitting or tapping
- 100% solid-state, no moving parts to fail
- Output status LEDs for easy set up
- Non-polarity sensitive output, easy wiring
- Adjustable mounting bracket, easy placement
- Made in USA, 5 year limited warranty

Monitor fans, pumps, motors & electrical loads for proper operation

- Detect belt loss and motor failure...ideal for fan and pump status
- Replace pressure switches and other electro-mechanical devices
- Verify lighting circuit loads
- Monitor critical motors (compressor, fuel, etc.)
- Industrial process equipment status (OEM)

DESCRIPTION

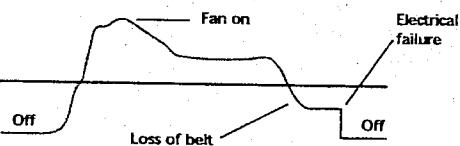
The H708/908 solid and split core adjustable current sensors provide accurate, reliable and maintenance free fan and pump status indication.

APPLICATIONS

Monitor fans, pumps, motors & electrical loads for proper operation

- Detect belt loss and motor failure...ideal for fan and pump status
- Replace pressure switches and other electro-mechanical devices
- Verify lighting circuit loads
- Monitor critical motors (compressor, fuel, etc.)
- Industrial process equipment status (OEM)

Detects belts breaking!



Now you can easily detect drive belts slipping or breaking. In fact, a typical HVAC fan motor that loses its load (belt) has a reduction of current draw of up to 50%. That's why our sensors are the industry standard for status. It's proven and it really works!

SWITCHES

CURRENT S.

Ordering INFORMATION

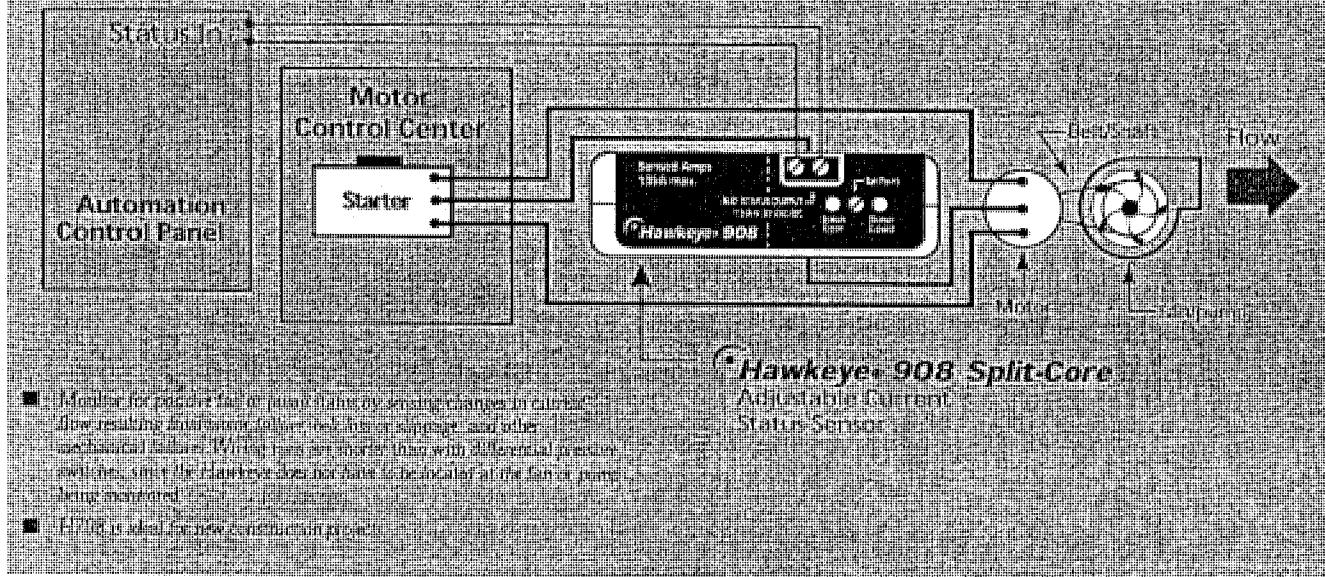
MODEL	AMPERAGE RANGE	OUTPUT TYPE	OUTPUT RATING	TRIP POINT ADJUSTMENT	TRIP LED	POWER LED
Solid Core: H701 H706 H708 H709	1-135 A 1-135 A 1-135 A 1-135 A	N.O. Solid State N.O. Solid State N.O. Solid State N.O. Solid State	0.0 A @ 30 VAC/DC 0.1 A @ 30 VAC/DC 1.0 A @ 30 VAC/DC 0.2 A @ 120 VAC/DC	• • • •	• • • •	• • • •
Split Core: H908 H909	2.5-135 A 2.5-135 A	N.O. Solid State N.O. Solid State	0.0 A @ 30 VAC/DC 0.2 A @ 120 VAC/DC	• •	• •	• •



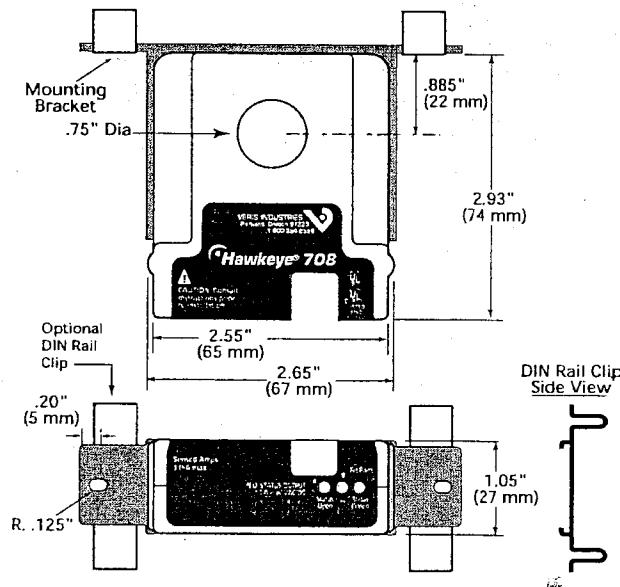
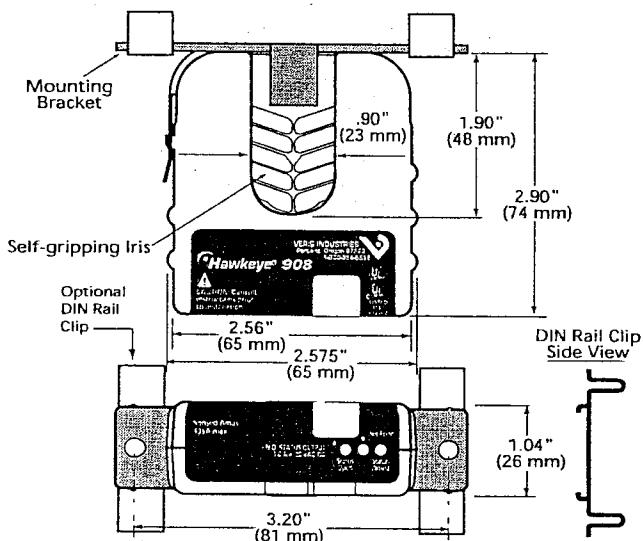
Optional Ordering INFORMATION

MODEL	DESCRIPTION
H700/900-DIN	DIN Rail Mounting Clip Set

APPLICATIONS/WIRING DIAGRAM: Monitoring Fan/Pump Motors for Positive Proof of Flow



DIMENSIONAL DRAWINGS

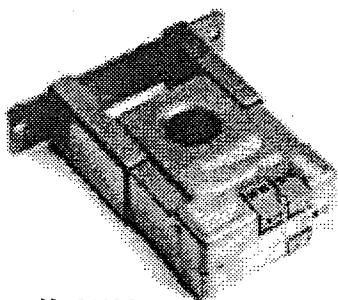


SPECIFICATIONS

Sensor Power Induced from line
Isolation 600 VAC rms
Temperature Range -15° to 60°C
Humidity Range 0 - 95% non-condensing
Dimensions (708) (L x W x H) 2.93" x 2.65" x 1.05"
Sensor Hole Size (708) 0.75" diameter
Dimensions (908) (L x W x H) 2.90" x 2.575" x 1.04"
Sensor Opening Size (908) (L x W) 1.90" x .90"

H735-759

Combo Current Switch/Command Relay



US Patent No. 6,005,760

COMMAND & STATUS IN A SINGLE DEVICE

DESCRIPTION

The H735-759 series are the ideal solution for the automation installer. These units combine status and starting functions into a single package, reducing the space required for total control of fans and pumps. The current switch provides a status level signal to the automation system while the relay provides a contact output capable of switching almost any contactor.

APPLICATIONS

- Starting/stopping and monitoring positive status of fan and pump motors
- Replaces pressure switches and other electro-mechanical devices

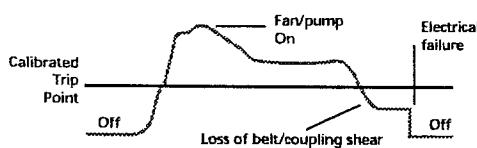
Combines command relay & fan/pump status sensor in a single, easy to install unit!

- Reduces number of components installed--fits better in small starter enclosures
- Command relay & status in a single unit
- Replace pressure switches & other electromechanical devices
- Detect belt loss & motor failure...ideal for fan & pump status
- H748 features SPDT command relay

Now...one device does the job of two!

- Reduced charges from electrician
- Relay and status LEDs for easy setup
- Non-polarity sensitive status output
- 1 to 135 A adjustable set-point for current sensor status
- Made in USA; 5-year limited warranty

Detects belt loss/coupling shear!



Now you can easily detect drive belts slipping, breaking, or pump coupling shear. In fact, a typical HVAC motor that loses its load has a reduction of current draw of up to 50%. That's why our sensors are the industry standard for status. It's proven and it really works!

Ordering INFORMATION

MODEL	COMMAND RELAY COIL	STATUS OUTPUT	AMPERAGE RANGE
H7 \square \square			
H7$\square$$\square$ Solid-core Current Sensor	3 Form A (SPST) 10(5)@250VAC 30VDC, 1/3 HP	24 VAC/DC 10 mA	* 5 0.1 A@30 VAC/DC N.O. Solid State
	4 Form C (SPDT) 8(3.5)@250VAC 30VDC, 1/3 HP	24 VAC/DC 10 mA	8 1.0 A@30 VAC/DC N.O. Solid State
	15 Form A (SPST) 10(5)@250VAC 30VDC, 1/3 HP	9-12 VDC 16mA - 20mA	9 0.2 A@120 VAC/DC N.O. Solid State



LISTED
3T60
UL 508
E150462

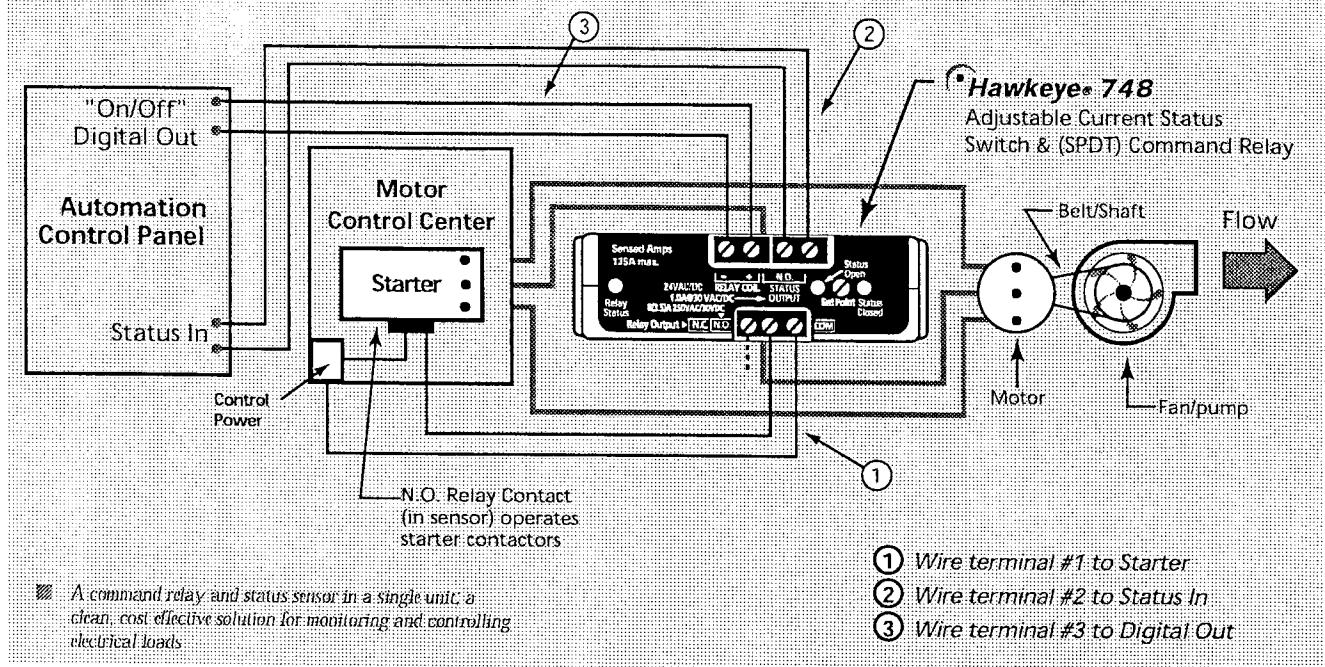
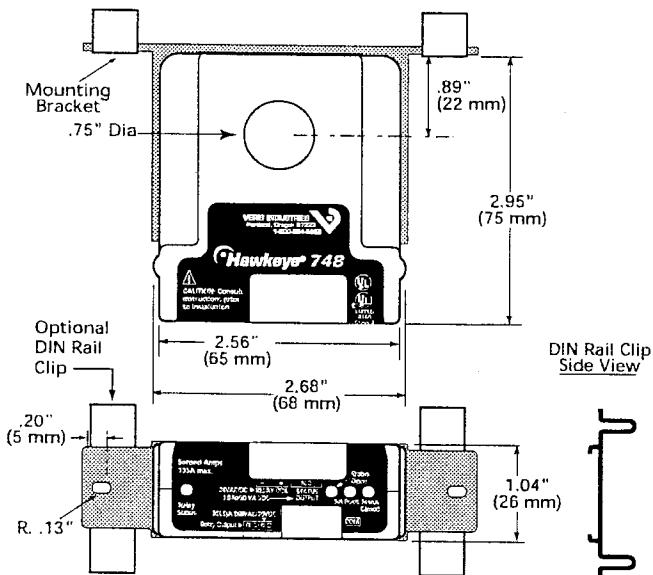
* Available in H735 only

Optional Ordering INFORMATION

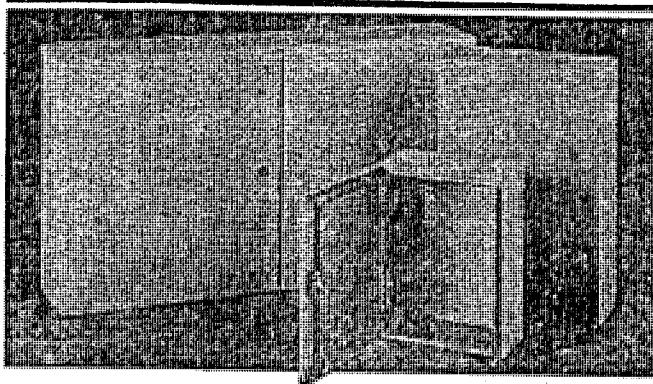
MODEL	DESCRIPTION
H700/900-DIN	Din Rail Mounting Clip Set

ALL MODELS FEATURE: Set point adjustment, status open LED, status Closed LED and relay power LED.

Hawkeye®

APPLICATIONS/WIRING EXAMPLE: Monitoring & Controlling Motor Loads.. New ConstructionDIMENSIONAL DRAWINGSSPECIFICATIONS

Sensor Power	Induced
Isolation	600 VAC rms
Temperature Range	-15° to 60° C
Humidity Range	0 - 95% non-condensing
Dimensions	(L x W x H) 2.95" x 2.68" x 1.04"
Sensor Opening Size75" Dia.



Application

CONCEPT® enclosures house and protect your sensitive electrical or electronic components from harsh, dirty environments. For use in installations where dirt, dust, oil, water, or other contaminants are present. Streamlined styling, flush latching, and an attractive durable finish complement any high-tech electronic equipment.

Construction

- Manufactured from 16 or 14 gauge steel (see tables)
- Seams continuously welded and ground smooth
- Minimum width body flange provides maximum door opening
- Body flange trough excludes liquids and contaminants
- Panel mounting studs fit optional CONCEPT panels and other accessories
- Mounting holes in back of body for direct mounting or for optional external mounting feet
- Hidden hinges for clean aesthetic appearance
- Doors are interchangeable and easily removable by pulling captive hinge pins
- Hinge mounting brackets for wire management or optional accessories
- Seamless foam-in-place one piece gasket provides oil-tight and dust-tight seal against contaminants
- Self-grounding latch system with double seal provides maximum protection against leakage
- Integral body grounding stud
- Furnished hardware kit consists of panel mounting nuts, grounding hardware, and sealing washers for wall mounting holes
- Installation instructions for enclosure and accessories are provided

CONCEPT single-door enclosures

- Door bar on hinge side for wire management and grounding
- Additional door bar and center stiffener on larger doors for extra rigidity
- Provisions on door for thermoplastic data pocket

• Quarterturn latches (U.S. patent 5,509,703 European patent pending), or a 3-point latch system on larger enclosures, furnished with flush slotted insert. Optional handles or inserts are available.

CONCEPT window-door enclosures

- Clear polycarbonate window is mounted flush with door surface
- Quarterturn latch(es) include flush slotted insert. Optional handles are available.

CONCEPT flush-mount enclosures

- Mounting frame extends completely around enclosure
- Quarterturn latch(es) furnished with slotted insert. Optional handles or inserts are available.

CONCEPT two-door enclosures

- Overlapping door design (U.S. patent 5,465,528) provides full width access
- Door bars on each door for wire management and grounding
- Provision on right door for thermoplastic data pocket
- 3-point latch system on right door furnished with flush slotted insert
- Optional handles or inserts are available.

Finish

Two standard finishes are available: ANSI 61 gray polyester powder coating inside and out over phosphatized surfaces; or, textured light gray (RAL 7035) polyester powder coating inside and out. Optional panels are white.

Industry Standards

NOTE: Mounting feet required to maintain UL/CSA ratings. Some models also require internal panel; see order tables.

- CONCEPT single-door and flush-mount models
UL508, File No. E61997, Type 4 and Type 12
NEMA/EEMAC Type 4, Type 12,
and Type 13
CSA, File No. LR42186, Type 4 and Type 12
VDE IP66
IEC 60529, IP66
- CONCEPT window-door models
UL508, File No. E61997, Type 4 and Type 12
NEMA/EEMAC Type 4 and Type 12
CSA, File No. LR42186, Type 4 and Type 12
VDE IP66
IEC 60529, IP66

- CONCEPT two-door models
UL508, File No. E61997, Type 12
NEMA/EEMAC Type 12
CSA, File No. LR42186, Type 12
VDE IP55
IEC 60529, IP55

Accessories

See General Accessories index

- Adjustable Mounting Kit
- Corrosion Inhibitors
- Data Pocket
- Dead Front Kit
- DIN Rail Kit
- Door Stop Kit
- Electric Heater
- Fan Cooling Products
- Grid Straps
- Handles and Latches
- Key Inserts
- Lighting Kits
- Mounting Channels
- Mounting Feet Kit
- Panel Conversion Kit
- Panels (See tables)
- Panels, NEMA
- Pole Mounting Kit
- Rack Mounting Angles
- Swing-Out Panel Kit
- Swing-Out Rack Frames
- Terminal Kit Assembly
- Touch-Up Paint A-TPPY61 (ANSI61)
or A-TPG7035 (RAL7035)
- Wiring Duct

Modification Services™ Program

You can customize this product to your unique requirements by specifying from these options:

- Enclosure height, width, depth (not available on window door enclosures)
- Over 100 standard finish colors and textures
- Holes and cutouts in body, doors, subpanels
- Tapped holes, fasteners in enclosure or subpanel
- Mounting
- Doors
- Subpanels
- Structural changes
- Environmental control (louvers, fans, filters)
- Windows (not available on window door enclosures)
- Standard accessories

For details, see Modification Services at hoffmanonline.com.

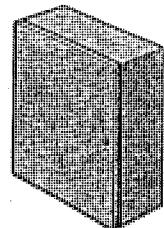
To order, contact your local Hoffman sales representative.

Patents:

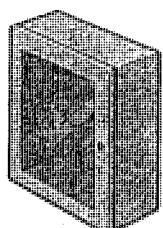
- Cabinet with Overlapping Double Doors 5,465,528 (U.S.)
- Combined Handle and Lock Unit
360,345 (U.S.)
- DEM 9405854.7 (Germany)
- Enclosure Latch 5,509,703 (U.S.)
- Hinge System 5,666,695 (U.S.)

Other patents pending.

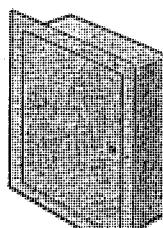
The CONCEPT™ Enclosure Group Accessory Selection Guide See General Accessories Index, CONCEPT™ Enclosure Accessories, page 11.01



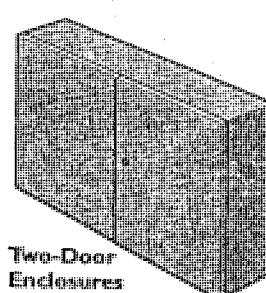
Steel or
Stainless Steel
Enclosures



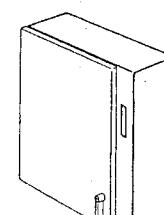
Steel or Stainless
Steel Window-
Door Enclosures



Flush-Mount
Enclosures

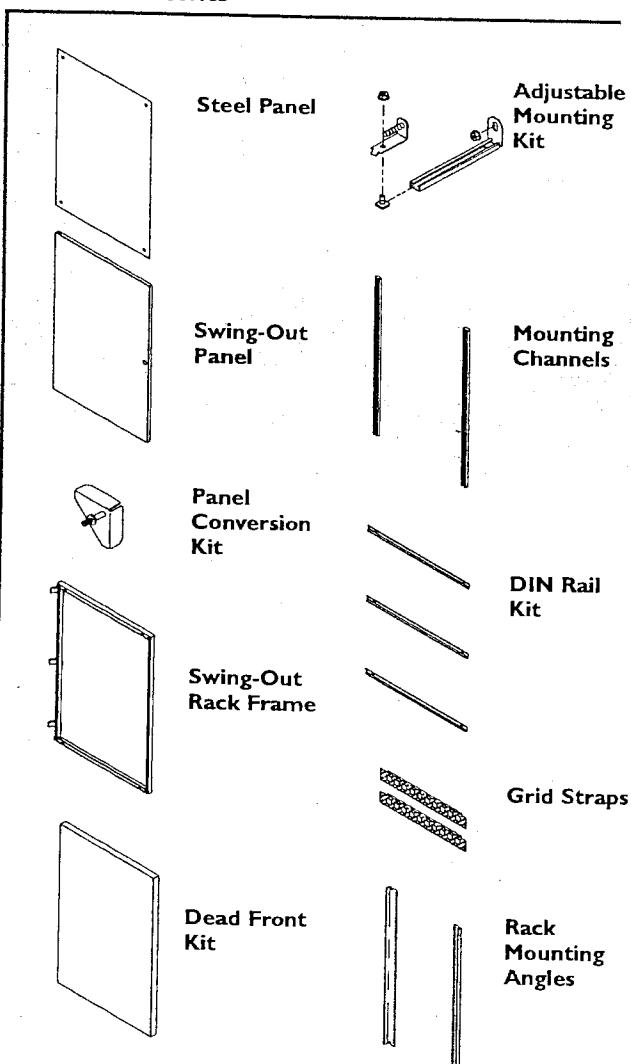


Two-Door
Enclosures

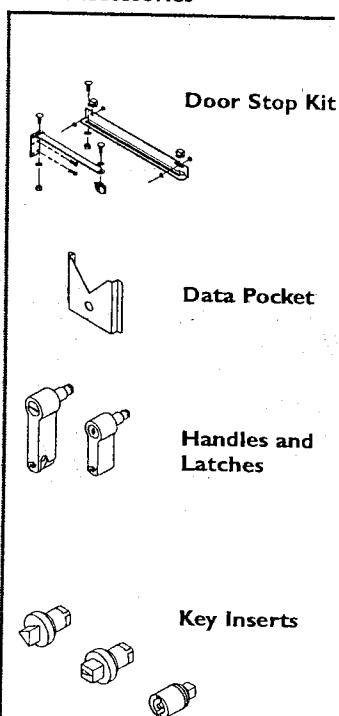


Steel or
Stainless Steel
Disconnect
Enclosures

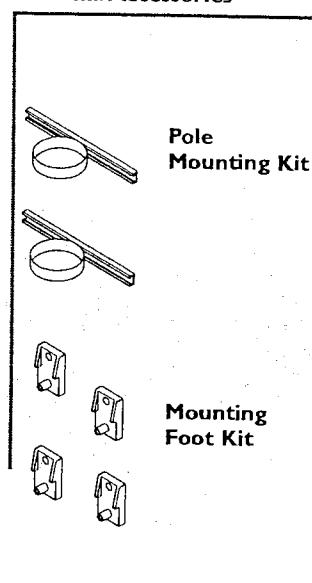
Internal Accessories



Door Accessories



External Accessories



C2588-1



CONCEPT® Wall-Mount Enclosures



Rev B February 2001

Standard Sizes CONCEPT® Single-Door Wall-Mount Enclosures

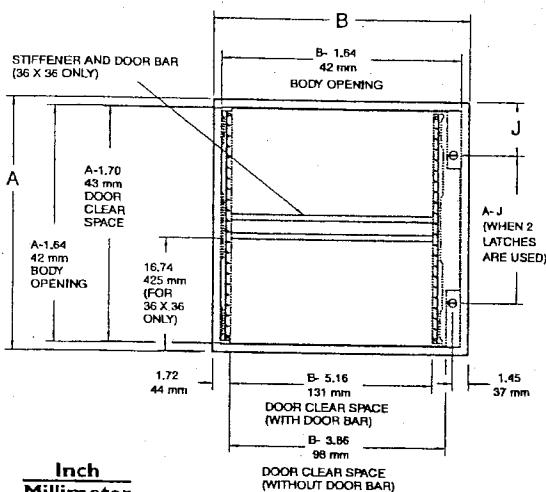
Enclosure Catalog Number	Enclosure Catalog Number	Door	Body Ga.	Enclosure Size A x B x C inch (millimeter)	* CONCEPT Panel Catalog Number	Panel Size D x E inch (mm)	Mounting G x H inch (mm)	Latches qty style	J inch (mm)
ANSI 61 Gray	RAL 7035 Lt. Gray								
C-SD12126	C-SD12126LG	16	16	12.00 x 12.00 x 6.00 (305 x 305 x 152)	C-P1212	10.20 x 10.20 (259 x 259)	10.50 x 10.50 (267 x 267)	1 Qtum.	6.00 (152)
C-SD16126	C-SD16126LG	16	16	16.00 x 12.00 x 6.00 (406 x 305 x 152)	C-P1612	14.20 x 10.20 (361 x 259)	14.50 x 10.50 (368 x 267)	1 Qtum.	8.00 (203)
C-SD16166	C-SD16166LG	16	16	16.00 x 16.00 x 6.00 (406 x 406 x 152)	C-P1616	14.20 x 14.20 (361 x 361)	14.50 x 14.50 (368 x 368)	1 Qtum.	8.00 (203)
C-SD16206	C-SD16206LG	16	16	16.00 x 20.00 x 6.00 (406 x 508 x 152)	C-P2016	18.20 x 14.20 (462 x 361)	14.50 x 18.50 (368 x 470)	1 Qtum.	8.00 (203)
C-SD20166	C-SD20166LG	16	16	20.00 x 16.00 x 6.00 (508 x 406 x 152)	C-P2016	18.20 x 14.20 (462 x 361)	18.50 x 14.50 (470 x 368)	1 Qtum.	10.00 (254)
C-SD20206	C-SD20206LG	16	16	20.00 x 20.00 x 6.00 (508 x 508 x 152)	C-P2020	18.20 x 18.20 (462 x 462)	18.50 x 18.50 (470 x 470)	1 Qtum.	10.00 (254)
C-SD24166	C-SD24166LG	16	16	24.00 x 16.00 x 6.00 (610 x 406 x 152)	C-P2416	22.20 x 14.20 (564 x 361)	22.50 x 14.50 (572 x 368)	1 Qtum.	12.00 (305)
C-SD24206	C-SD24206LG	16	16	24.00 x 20.00 x 6.00 (610 x 508 x 152)	C-P2420	22.20 x 18.20 (564 x 462)	22.50 x 18.50 (572 x 470)	1 Qtum.	12.00 (305)
†C-SD24246	†C-SD24246LG	14	16	24.00 x 24.00 x 6.00 (610 x 610 x 152)	C-P2424	22.20 x 22.20 (564 x 564)	22.50 x 22.50 (572 x 572)	2 Qtum.	5.00 (127)
C-SD16128	C-SD16128LG	16	16	16.00 x 12.00 x 8.00 (406 x 305 x 203)	C-P1612	14.20 x 10.20 (361 x 259)	14.50 x 10.50 (368 x 267)	1 Qtum.	8.00 (203)
C-SD16208	C-SD16208LG	16	16	16.00 x 20.00 x 8.00 (406 x 508 x 203)	C-P2016	18.20 x 14.20 (462 x 361)	14.50 x 18.50 (368 x 470)	1 Qtum.	8.00 (203)
C-SD20208	C-SD20208LG	16	16	20.00 x 20.00 x 8.00 (508 x 508 x 203)	C-P2020	18.20 x 18.20 (462 x 462)	18.50 x 18.50 (470 x 470)	1 Qtum.	10.00 (254)
C-SD24168	C-SD24168LG	16	16	24.00 x 16.00 x 8.00 (610 x 406 x 203)	C-P2416	22.20 x 14.20 (564 x 361)	22.50 x 14.50 (572 x 368)	1 Qtum.	12.00 (305)
†C-SD24248	†C-SD24248LG	14	16	24.00 x 24.00 x 8.00 (610 x 610 x 203)	C-P2424	22.20 x 22.20 (564 x 564)	22.50 x 22.50 (572 x 572)	2 Qtum.	5.00 (127)
†C-SD30208	†C-SD30208LG	14	16	30.00 x 20.00 x 8.00 (762 x 508 x 203)	C-P3020	28.20 x 18.20 (716 x 462)	28.50 x 18.50 (724 x 470)	2 Qtum.	5.00 (127)
†C-SD30308	†C-SD30308LG	14	14	30.00 x 30.00 x 8.00 (762 x 762 x 203)	C-P3030	28.20 x 28.20 (716 x 716)	28.50 x 28.50 (724 x 724)	2 Qtum.	5.00 (127)
†C-SD36308	†C-SD36308LG	14	14	36.00 x 30.00 x 8.00 (914 x 762 x 203)	C-P3630	34.20 x 28.20 (869 x 716)	34.50 x 28.50 (876 x 724)	2 Qtum.	5.00 (127)
C-SD161210	C-SD161210LG	16	16	16.00 x 12.00 x 10.00 (406 x 305 x 254)	C-P1612	14.20 x 10.20 (361 x 259)	14.50 x 10.50 (368 x 267)	1 Qtum.	8.00 (203)
C-SD162010	C-SD162010LG	16	16	16.00 x 20.00 x 10.00 (406 x 508 x 254)	C-P2016	18.20 x 14.20 (462 x 361)	14.50 x 18.50 (368 x 470)	1 Qtum.	8.00 (203)
C-SD202010	C-SD202010LG	16	16	20.00 x 20.00 x 10.00 (508 x 508 x 254)	C-P2020	18.20 x 18.20 (462 x 462)	18.50 x 18.50 (470 x 470)	1 Qtum.	10.00 (254)
C-SD241610	C-SD241610LG	16	16	24.00 x 16.00 x 10.00 (610 x 406 x 254)	C-P2416	22.20 x 14.20 (564 x 361)	22.50 x 14.50 (572 x 368)	1 Qtum.	12.00 (305)
†C-SD242410	†C-SD242410LG	14	16	24.00 x 24.00 x 10.00 (610 x 610 x 254)	C-P2424	22.20 x 22.20 (564 x 564)	22.50 x 22.50 (572 x 572)	2 Qtum.	5.00 (127)
†C-SD302010	†C-SD302010LG	14	16	30.00 x 20.00 x 10.00 (762 x 508 x 254)	C-P3020	28.20 x 18.20 (716 x 462)	28.50 x 18.50 (724 x 470)	2 Qtum.	5.00 (127)
†C-SD303010	†C-SD303010LG	14	14	30.00 x 30.00 x 10.00 (762 x 762 x 254)	C-P3030	28.20 x 28.20 (716 x 716)	28.50 x 28.50 (724 x 724)	2 Qtum.	5.00 (127)
†C-SD363010	†C-SD363010LG	14	14	36.00 x 30.00 x 10.00 (914 x 762 x 254)	C-P3630	34.20 x 28.20 (869 x 716)	34.50 x 28.50 (876 x 724)	2 Qtum.	5.00 (127)
†C-SD423610	†C-SD423610LG	14	14	42.00 x 36.00 x 10.00 (1067 x 762 x 254)	C-P4236	40.20 x 34.20 (1021 x 869)	40.50 x 34.50 (1029 x 876)	2 3 pt.	21.00 (533)
†C-SD483610	†C-SD483610LG	14	14	48.00 x 36.00 x 10.00 (1219 x 762 x 254)	C-P4836	46.20 x 34.20 (1173 x 869)	46.50 x 34.50 (1181 x 876)	2 3 pt.	24.00 (610)

Millimeter dimensions () are for reference only; do not convert metric dimensions to inch.

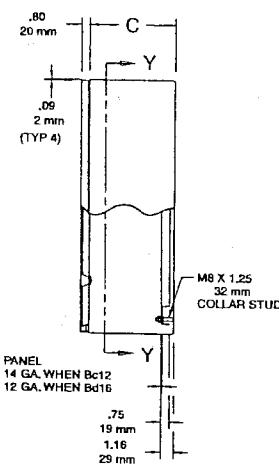
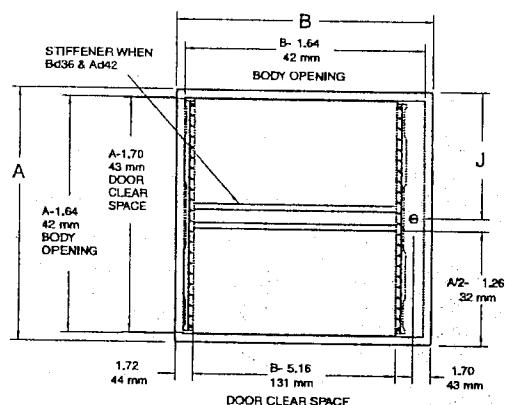
Panels must be ordered separately. Optional zinc-plated CONCEPT panels available for most sizes. Optional NEMA size panels require conversion kit cat. number C-CPM4 (see General Accessories).

†Internal panel required to maintain UL/CSA rating.

CONCEPT® Single-Door Wall-Mount Enclosures



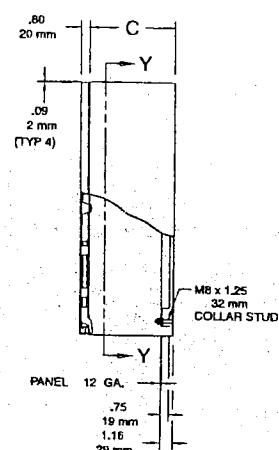
Inch
Millimeter



Single-Door Enclosure
with Quarterturn
Latching

NOTE:

1. Door has provision for data pocket (not applicable to window door). Use large data pocket when A = 30.00 (762) or more and B = 20.00 (508) or more. (Exception: large data pocket when A x B = 24.00 x 30.00.) No data pocket provision when B = 12.00 (305).
2. Panels have flanges along sides which are more than 22.20 inches (564) long, except C-P2420 and C-P2424 which have flanges on two-sides.



Single-Door Enclosure
with 3-Point
Latching

For Section Y-Y see following page

C2502

C-SD202012	C-SD202012LG	16	16	20.00 x 20.00 x 12.00 (508 x 508 x 305)	C-P2020	18.20 x 18.20 (462 x 462)	18.50 x 18.50 (470 x 470)	1	Otum.	10.00 (254)
†C-SD242412	†C-SD242412LG	14	16	24.00 x 24.00 x 12.00 (610 x 610 x 305)	C-P2424	22.20 x 22.20 (564 x 564)	22.50 x 22.50 (572 x 572)	2	Otum.	5.00 (127)
†C-SD303012	†C-SD303012LG	14	14	30.00 x 30.00 x 12.00 (762 x 762 x 305)	C-P3030	28.20 x 28.20 (716 x 716)	28.50 x 28.50 (724 x 724)	2	Otum.	5.00 (127)
†C-SD363012	†C-SD363012LG	14	14	36.00 x 30.00 x 12.00 (914 x 762 x 305)	C-P3630	34.20 x 28.20 (869 x 716)	34.50 x 28.50 (876 x 724)	2	Otum.	5.00 (127)
†C-SD423612	†C-SD423612LG	14	14	42.00 x 36.00 x 12.00 (1067 x 914 x 305)	C-P4236	40.20 x 34.20 (1021 x 869)	40.50 x 34.50 (1029 x 876)	1	3-point	21.00 (533)
†C-SD483612	†C-SD483612LG	14	14	48.00 x 36.00 x 12.00 (1219 x 914 x 305)	C-P4836	46.20 x 34.20 (1173 x 869)	46.50 x 34.50 (1181 x 876)	1	3-point	24.00 (610)
†C-SD242416	†C-SD242416LG	14	14	24.00 x 24.00 x 16.00 (610 x 610 x 406)	C-P2424	22.20 x 22.20 (564 x 564)	22.50 x 22.50 (572 x 572)	2	Otum.	5.00 (127)
†C-SD483616	†C-SD483616LG	14	14	48.00 x 36.00 x 16.00 (1219 x 914 x 406)	C-P4836	46.20 x 34.20 (1173 x 869)	46.50 x 34.50 (1181 x 876)	1	3-point	24.00 (610)
†C-SD302420	†C-SD302420LG	14	14	30.00 x 24.00 x 20.00 (762 x 610 x 508)	C-P3024	28.20 x 22.20 (716 x 564)	28.50 x 22.50 (724 x 572)	2	Otum.	5.00 (127)

† Internal panel required to maintain UL/CSA rating.

Data subject to change without notice

763 422 2211

FAX 763 422 2600

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Standard Sizes CONCEPT® Single-Door Wall-Mount Enclosures with Windows

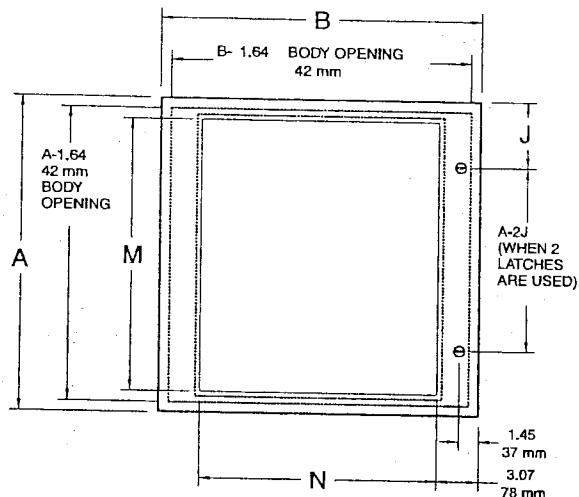
Enclosure Catalog Number	Enclosure Catalog Number	Door Gauge	Body Gauge	Enclosure Size A x B x C	* CONCEPT Panel Catalog Number	Panel Size D x E	Mounting G x H	Window Size M x N	Latches qty style	J
ANSI 61 Gray	RAL 7035 Lt. Gray									
C-SD16125W	C-SD16126WLG	16	16	16.00 x 12.00 x 6.00 (406 x 305 x 152)	C-P1612	14.20 x 10.20 (361 x 259)	14.50 x 10.50 (368 x 267)	12.74 x 7.10 (324 x 180)	1 Quartertum	8.00 (203)
C-SD20206W	C-SD20206WLG	16	16	20.00 x 20.00 x 6.00 (508 x 508 x 152)	C-P2020	18.20 x 18.20 (462 x 462)	18.50 x 18.50 (470 x 470)	16.74 x 15.10 (425 x 384)	1 Quartertum	10.00 (254)
† C-SD24246W	† C-SD24246WLG	14	16	24.00 x 24.00 x 6.00 (610 x 610 x 152)	C-P2424	22.20 x 22.20 (564 x 564)	22.50 x 22.50 (572 x 572)	20.74 x 17.68 (527 x 449)	2 Quartertum	5.00 (127)
C-SD20168W	C-SD20168WLG	16	16	20.00 x 16.00 x 8.00 (508 x 406 x 203)	C-P2016	18.20 x 14.20 (462 x 361)	18.50 x 14.50 (470 x 368)	16.74 x 11.10 (425 x 282)	1 Quartertum	10.00 (254)
C-SD24208W	C-SD24208WLG	16	16	24.00 x 20.00 x 8.00 (610 x 508 x 203)	C-P2420	22.20 x 18.20 (564 x 462)	22.50 x 18.50 (572 x 470)	20.74 x 15.10 (527 x 384)	1 Quartertum	12.00 (305)
† C-SD30248W	† C-SD30248WLG	14	16	30.00 x 24.00 x 8.00 (762 x 610 x 203)	C-P3024	28.20 x 22.20 (716 x 564)	28.50 x 22.50 (724 x 572)	26.74 x 17.68 (679 x 449)	2 Quartertum	5.00 (127)
C-SD201610W	C-SD201610WLG	16	16	20.00 x 16.00 x 10.00 (508 x 406 x 203)	C-P2016	18.20 x 14.20 (462 x 361)	18.50 x 14.50 (470 x 368)	16.74 x 11.10 (425 x 282)	1 Quartertum	10.00 (254)
C-SD242010W	C-SD242010WLG	16	16	24.00 x 20.00 x 10.00 (610 x 508 x 203)	C-P2420	22.20 x 18.20 (564 x 462)	22.50 x 18.50 (572 x 470)	20.74 x 15.10 (527 x 384)	1 Quartertum	12.00 (305)
† C-SD302410W	† C-SD302410WLG	14	16	30.00 x 24.00 x 10.00 (762 x 610 x 203)	C-P3024	28.20 x 22.20 (716 x 564)	28.50 x 22.50 (724 x 572)	26.74 x 17.68 (679 x 449)	2 Quartertum	5.00 (127)
C-SD242012W	C-SD242012WLG	16	16	24.00 x 20.00 x 12.00 (610 x 508 x 305)	C-P2420	22.20 x 18.20 (564 x 462)	22.50 x 18.50 (572 x 470)	20.74 x 15.10 (527 x 384)	1 Quartertum	12.00 (305)
† C-SD302412W	† C-SD302412WLG	14	16	30.00 x 24.00 x 12.00 (762 x 610 x 305)	C-P3024	28.20 x 22.20 (716 x 564)	28.50 x 22.50 (724 x 572)	26.74 x 17.68 (679 x 449)	2 Quartertum	5.00 (127)
† C-SD242420W	† C-SD242420WLG	14	14	24.00 x 24.00 x 20.00 (610 x 610 x 508)	C-P2424	22.20 x 22.20 (564 x 564)	22.50 x 22.50 (572 x 572)	20.74 x 17.68 (527 x 449)	2 Quartertum	5.00 (127)

Millimeter dimensions () are for reference only; do not convert metric to inch.

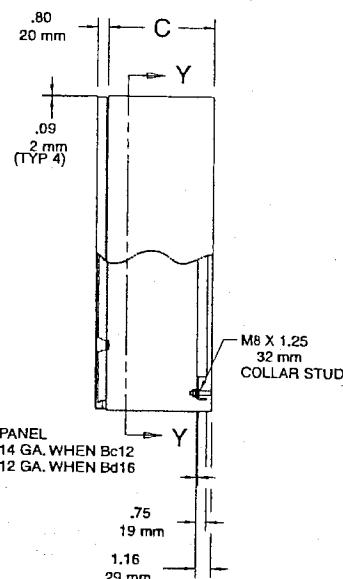
* Panels must be ordered separately. Optional zinc-plated CONCEPT panels available for most sizes. Optional NEMA size panels require conversion kit cat. number C-CPM4 (see General Accessories).

† Internal panel required to maintain UL/CSA rating.

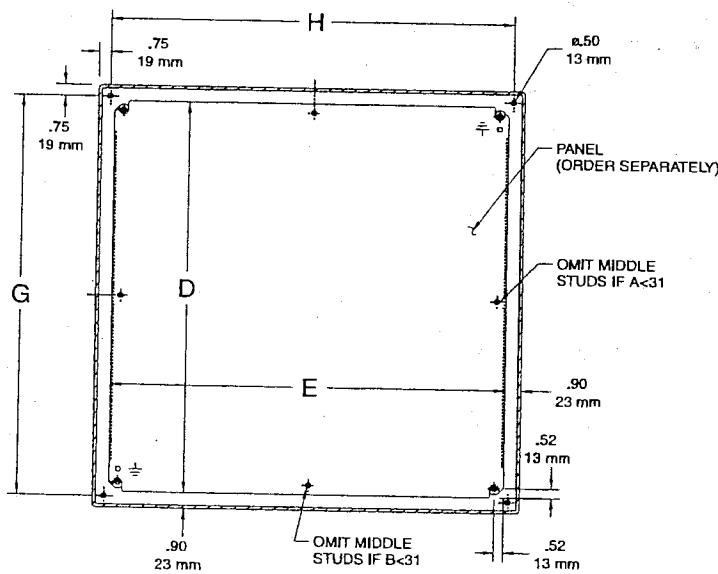
CONCEPT® Single-Door Wall-Mount Enclosures with Windows



Window-Door Enclosure with Quarterturn Latching



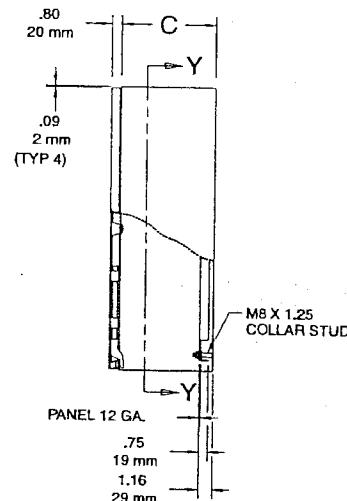
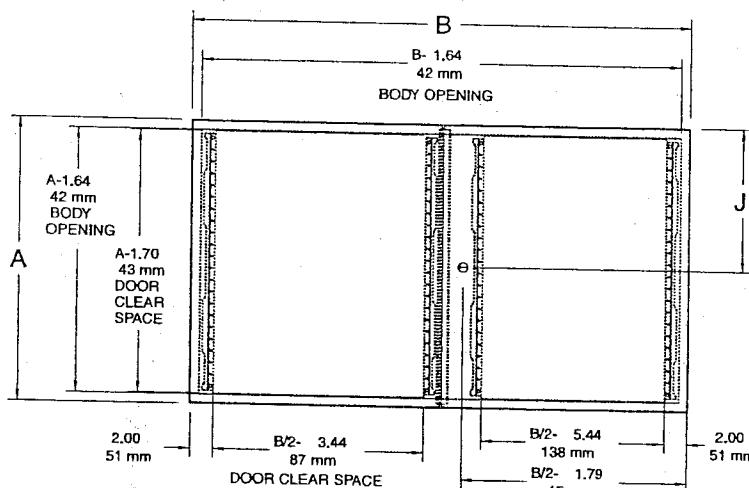
NOTE: Panels have flanges along sides which are more than 22.20 inches (564) long.



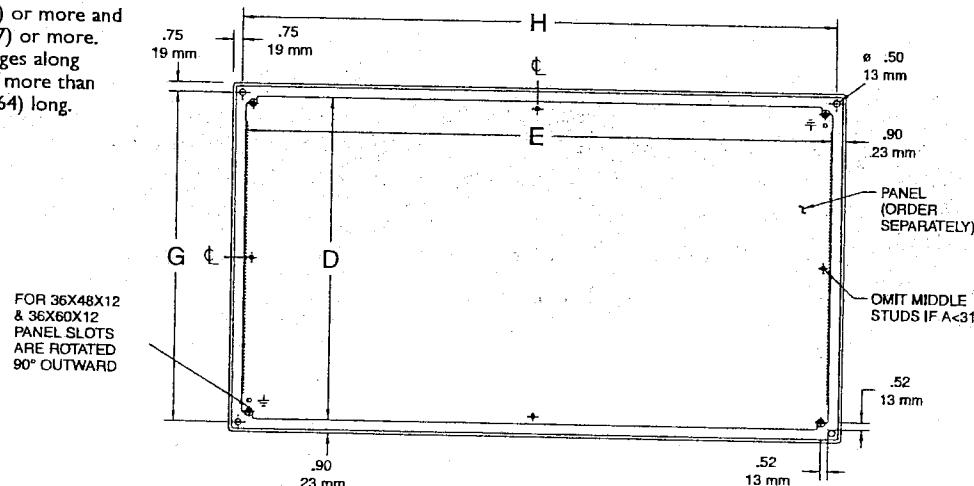
SECTION Y-Y
(WITH CONCEPT PANEL INSTALLED)

C2503

Inch
Millimeter

CONCEPT® Two-Door Enclosures


- NOTE:**
1. Right door has provision for large data pocket when
A = 30.00 (762) or more and
B = 42.00 (1067) or more.
 2. Panels have flanges along sides which are more than 22.20 inches (564) long.



Inch
Millimeter

SECTION Y-Y

C2504

Standard Sizes CONCEPT® Two-Door Enclosures

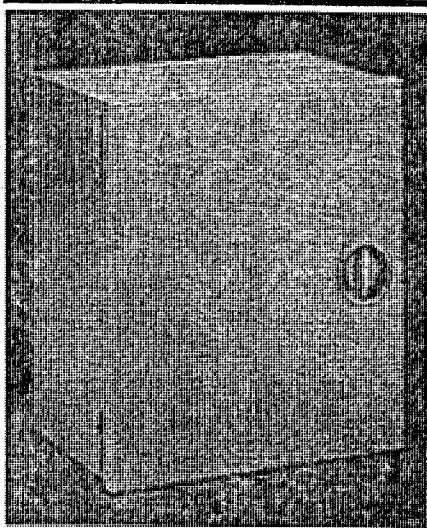
Enclosure Catalog Number	Enclosure Catalog Number	Door Ga.	Body Ga.	Enclosure Size A x B x C (millimeter)	* CONCEPT Panel Catalog Number	Panel Size D x E inch (mm)	Mounting G x H inch (mm)	Latches J qty style	J inch (mm)
ANSI 61 Gray	RAL 7035 Lt. Gray	14	14	30.00 x 48.00 x 8.00 (762 x 1219 x 203)	C-P3048	28.20 x 46.20 (724 x 1181)	28.50 x 46.50 (724 x 1181)	1 3-point	15.00 (381)
† C-TD364812	† C-TD364812LG	14	14	36.00 x 48.00 x 12.00 (914 x 1219 x 305)	C-P4836	34.20 x 46.20 (876 x 1181)	34.50 x 46.50 (876 x 1181)	1 3-point	18.00 (457)

Millimeter dimensions () are for reference only; do not convert metric to inch.

* Panels must be ordered separately.

† Internal panel required to maintain UL/CSA rating.

Wall-Mount Control Enclosures



Application

Aesthetic design for control and instrumentation applications in high visibility areas that do not require oil-tight and dust-tight specifications.

Construction

- 16 or 14 gauge steel
- Removable doors have butt hinges
- Mounting holes on back of enclosure
- Recessed "T" handle latch is flush with door
- Flush cover and offset body provide a stylized appearance
- Optional 12 or 14 gauge steel panel mounted on collar studs

Finish

ANSI 61 gray polyester powder coating inside and out over phosphatized surfaces. Panels are white.

Industry Standards

UL 50, File No. E27567, Type I (See table)
NEMA/EEMAC Type I
CSA, File No. LL42184, Type I
IEC 60529, IP39

Accessories

See General Accessories Index

Electric Heater
Electrical Interlock
Grounding Device
Lock Kit for Control Enclosures
Rack Mounting Angle Kit
Touch-Up Paint (A-TPPY61)
Window Kit

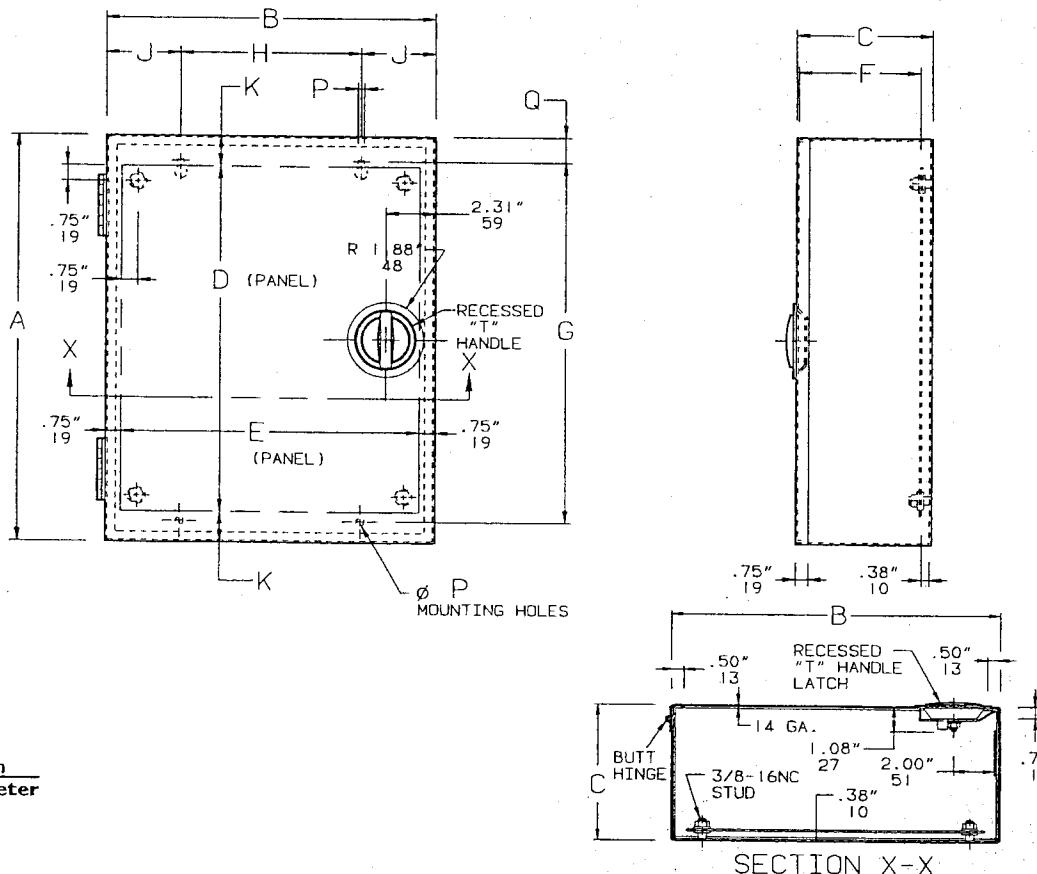
Modification Services™ Program

You can customize this product to your unique requirements by specifying from these options:

- Enclosure height, width, depth
- Over 100 standard finish colors and textures
- Holes and cutouts in body, doors, subpanels
- Tapped holes, fasteners in enclosure or subpanel
- Mounting
- Doors
- Subpanels
- Structural changes
- Environmental control (louvers, fans, filters)
- Windows
- Standard accessories

For details, see Modification Services at hoffmanonline.com.

To order, contact your local Hoffman sales representative.



Inch
Millimeter



Standard Sizes Wall-Mount Control Enclosures

Enclosure Catalog Number	Gauge	Enclosure Size A x B x C	* Panel Catalog Number	Panel Size D x E	Panel Gauge	Number of Studs	Mounting						
							G	H	J	Q	P	F	K
□ A-20N126LP	16	20.00 x 12.00 x 6.62 (508 x 305 x 168)	A-20N12MP	17.00 x 10.50 (432 x 267)	14	4	17.88 (454)	7.00 (178)	2.50 (64)	1.06 (27)	0.31 (8)	6.00 (152)	1.50 (38)
□ A-16N206LP	16	16.00 x 20.00 x 6.62 (406 x 508 x 168)	A-16N20MP	13.00 x 18.50 (330 x 470)	14	4	13.88 (353)	15.00 (381)	2.50 (64)	1.06 (27)	0.31 (8)	6.00 (152)	1.50 (38)
□ A-20N206LP	16	20.00 x 20.00 x 6.62 (508 x 508 x 168)	A-20N20MP	17.00 x 18.50 (432 x 470)	14	4	17.88 (454)	15.00 (381)	2.50 (64)	1.06 (27)	0.31 (8)	6.00 (152)	1.50 (38)
□ A-24N206LP	16	24.00 x 20.00 x 6.62 (610 x 508 x 168)	A-24N20MP	21.00 x 18.50 (533 x 470)	14	4	21.88 (556)	15.00 (381)	2.50 (64)	1.06 (27)	0.31 (8)	6.00 (152)	1.50 (38)
□ A-30N206LP	14	30.00 x 20.00 x 6.62 (762 x 508 x 168)	A-30N20MP	26.00 x 18.50 (660 x 470)	12	6	27.50 (699)	12.75 (324)	3.62 (92)	1.25 (32)	0.44 (11)	6.00 (152)	2.00 (51)
□ A-36N246LP	14	36.00 x 24.00 x 6.62 (914 x 610 x 168)	A-36N24MP	32.00 x 22.50 (813 x 572)	12	6	33.50 (851)	16.75 (425)	3.62 (92)	1.25 (32)	0.44 (11)	6.00 (152)	2.00 (51)
□ A-16N128LP	16	16.00 x 12.00 x 8.62 (406 x 305 x 219)	A-16N12MP	13.00 x 10.50 (330 x 267)	14	4	13.88 (353)	7.00 (178)	2.50 (64)	1.06 (27)	0.31 (8)	8.00 (203)	1.50 (38)
□ A-24N168LP	16	24.00 x 16.00 x 8.62 (610 x 406 x 219)	A-24N16MP	21.00 x 14.50 (533 x 368)	14	4	21.88 (556)	11.00 (279)	2.50 (64)	1.06 (27)	0.31 (8)	8.00 (203)	1.50 (38)
□ A-24N208LP	16	24.00 x 20.00 x 8.62 (610 x 508 x 219)	A-24N20MP	21.00 x 18.50 (533 x 470)	14	4	21.88 (556)	15.00 (381)	2.50 (64)	1.06 (27)	0.31 (8)	8.00 (203)	1.50 (38)
□ A-30N208LP	14	30.00 x 20.00 x 8.62 (762 x 508 x 219)	A-30N20MP	26.00 x 18.50 (660 x 470)	12	6	27.50 (699)	12.75 (324)	3.62 (92)	1.25 (32)	0.44 (11)	8.00 (203)	2.00 (51)
A-30N308LP	14	30.00 x 30.00 x 8.62 (762 x 762 x 219)	A-30N30MP	26.00 x 28.50 (660 x 724)	12	8	27.50 (699)	22.75 (578)	3.62 (92)	1.25 (32)	0.44 (11)	8.00 (203)	2.00 (51)
A-36N308LP	14	36.00 x 30.00 x 8.62 (914 x 762 x 219)	A-36N30MP	32.00 x 28.50 (813 x 724)	12	8	33.50 (851)	22.75 (578)	3.62 (92)	1.25 (32)	0.44 (11)	8.00 (203)	2.00 (51)
□ A-24N2412LP	14	24.00 x 24.00 x 12.62 (610 x 610 x 321)	A-24N24MP	21.00 x 22.50 (533 x 572)	12	4	21.88 (556)	19.00 (483)	2.50 (64)	1.06 (27)	0.31 (8)	12.00 (305)	1.50 (38)
A-36N3012LP	14	36.00 x 30.00 x 12.62 (914 x 762 x 321)	A-36N30MP	32.00 x 28.50 (813 x 724)	12	8	33.50 (851)	22.75 (578)	3.62 (92)	1.25 (32)	0.44 (11)	12.00 (305)	2.00 (51)

Millimeter dimensions () are for reference only; do not convert metric dimensions to inch.

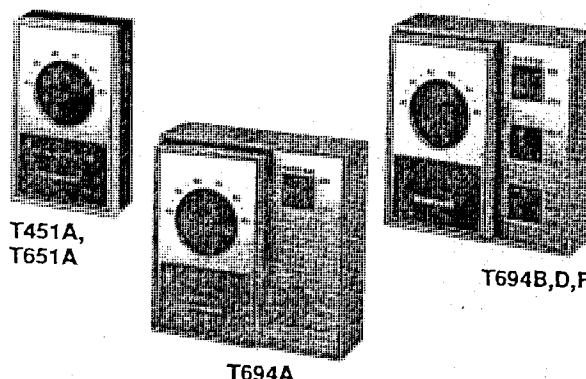
□ UL 50

* Panels must be ordered separately.

Honeywell

T451A, T651A, T694A,B,D,F Light Duty Line Voltage Thermostats

T451, T651, T694 Thermostats provide on-off control of valves, fans, motors, contactors, electric heat elements, duct furnaces and fan coil units in heating/cooling systems. Switching subbases provide manual control of heating, cooling and fan.



- T451A provides heating control only.
- T651A provides heating and cooling control.
- T694A,B,D,F supplied with switching subbase to provide manual control of heating, cooling and fan.
- Q473A,B switching subbase available for T451A/T651A.
- Automatic cooling anticipator for 120, 208, 240 and 277 Vac.
- Thermostats use spst or spdt snap switches activated by bimetal sensor.
- T451A/T651A mount on standard vertical or horizontal junction box.
- Options include adjustable range stops, locking cover, concealed setpoint, locking setpoint, positive off control, cover thermometer.

CONTENTS

Specifications	2
Ordering Information	2
Installation	4
Checkout	7

Specifications

SUPER TRADELINE MODEL

TRADELINE models are selected and packaged to provide ease of stocking, ease of handling and maximum replacement value. TRADELINE model specifications are the same as those of standard models except as noted below.

SUPER TRADELINE MODEL AVAILABLE:
T651A2028 Light Duty Line Voltage Thermostat.

FEATURES:

- Temperature scale range 35° F to 95° F.
- Spdt switch breaks heating contacts and makes cooling contacts on temperature rise.

STANDARD MODELS:

Model Number	Application	System Switch	Changeover Switch	Fan Switch
T451A2007 ^a	Heating only.	—	—	—
T451A2015	Heating only with positive OFF.	—	—	—
T651A2028 ^a	Heating/cooling.	—	—	—
T694A2002	Heating/cooling. OFF position breaks fan circuit.	ON-OFF	—	HI-MEDIUM-LO
T694B2001	Heating/cooling. OFF position breaks cooling and fan circuits.	ON-OFF	HEAT-COOL	HI-MEDIUM-LO
T694D2009	Heating/cooling. Heating circuits isolated from cooling circuits. OFF position breaks all control circuits except heat.	ON-OFF	HEAT-COOL	HI-MEDIUM-LO
T694F2007	Heating/cooling. Heating circuits isolated from cooling circuits. OFF position breaks all power to fan and thermostat.	ON-OFF	HEAT-COOL	HI-MEDIUM-LO

^a With thermometer.

Ordering Information

When purchasing replacement and modernization products from your TRADELINE® wholesaler or your distributor, refer to the TRADELINE Catalog or price sheets for complete ordering number, or specify—

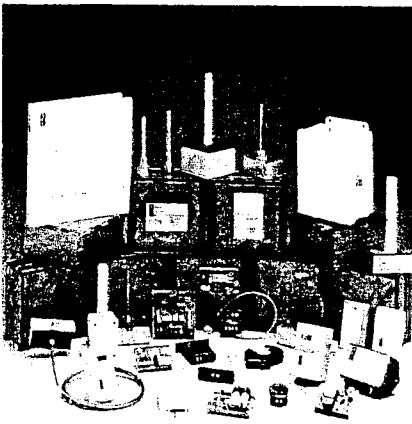
1. Order number.
2. Accessories, if desired.
3. Order additional components and system accessories separately.

If you have additional questions, need further information, or would like to comment on our products or services, please write or phone:

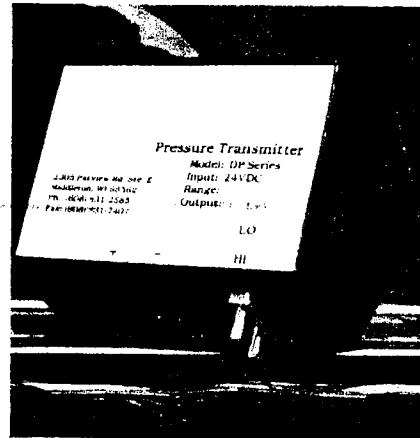
1. Your local Honeywell Home and Building Control Sales Office (check white pages of your phone directory).
2. Home and Building Control Customer Satisfaction
Honeywell Inc., 1885 Douglas Drive North
Golden Valley, MN 55422-4386 (612) 951-1000

In Canada—Honeywell Limited/Honeywell Limitee, 740 Ellesmere Road, Scarborough, Ontario M1P 2V9, International Sales and Service offices in all principal cities of the world. Manufacturing in Australia, Canada, Finland, France, Germany, Japan, Mexico, Netherlands, Spain, Taiwan, United Kingdom, U.S.A.

Pressure Transmitters



I/DP SERIES



Product Description

The I/DP series is a line of differential pressure transmitters. The transmitters are capable of sensing full scale ranges down to 0.1" of water. Each I pressure transmitter is a high quality device designed using a variable capacitance sensor. Variable capacitance sensors have good signal to noise ratio and are not plagued by temperature drift. The transmitter electronics provide a two-wire, linear 4 to 20 mA signal or an optional voltage output. Accuracy is +/- 1% of full scale over the compensated temperature range. The transmitter can be powered by an unregulated 7-35 VDC supply, and is not polarity sensitive. In addition to the requested span each transmitter is capable of being field adjusted to three additional spans

with the included jumpers. This feature provides greater flexibility in the field. Commonly available spans are 0 to 0.25", -0.5 to 0.5", 0 to 1", 0 to 2.5", and 0 to 5".

I pressure transmitters can be used in many different applications. They can be used in static pressure applications such as pressure control in rooms or leak detection. Another application is monitoring filter blockage. In combination with a pitot tube or orifice plate, flow can be measured and controlled in ducts. This pressure transmitter uses a durable and proven technology to provide lengthy and stable performance.

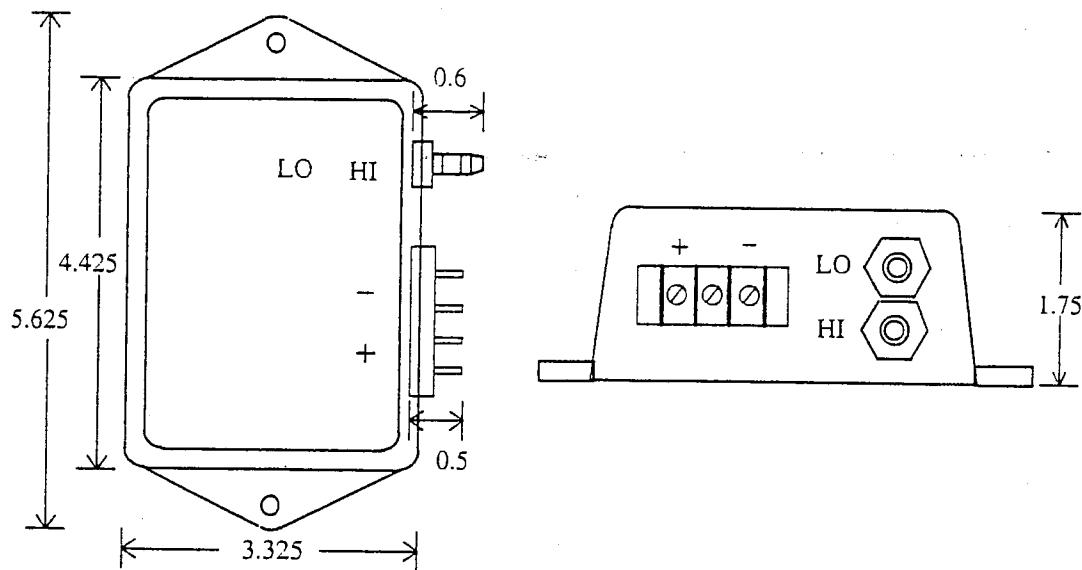
All I/DP low differential pressure transmitters come factory calibrated with a 2 year warranty.

Product Specifications

Input	7 to 35 VDC Non-Polarity Sensitive	Transmitter Accuracy	+/- 1% of span
Output	2 wire, Linear 4 to 20mA DC Current	Operating Range	10 to 40°C
Response Time	1.5msec - 63% full scale step	Linearity	+/- 0.3% of span
Position Effect	2% Null shift from vertical to horizontal	Connections	3/16" barbed brass
Pressure Overload	Span < 2" H ₂ O	Temperature Error	Span < 2" H ₂ O
Positive pressure	1.0 psi	Null	+/- 2.0% FSO
Negative pressure	0.5 psi	Span	+/- 2.0% FSO
	Span > 2" H ₂ O		Span > 2" H ₂ O
Positive pressure	5X	Null	+/- 1.0% FSO
Negative pressure	3X	Span	+/- 1.0% FSO

Dimensions

All Dimensions are in Inches



Ordering Information

I/DP []	Factory Set []	Field Selectable Ranges []			Output - []
		[]	[]	[]	
(1)	+/- 1.0"	+/- 2.0"	+/- 1.5"	+/- 1.25"	(1) 1 to 5 VDC
(2)	+/- 0.5"	+/- 0.4"	+/- 0.3"	+/- 0.25"	(2) 2 to 10 VDC
(3)	+/- 0.25"	+/- 0.5"	+/- 0.4"	+/- 0.3"	(3) 3 to 15 VDC
(4)	0 to 0.1"				(4) 4 to 20 mA
(5)	0 to 0.5"	0 to 0.5"	0 to 0.4"	0 to 0.25"	
(6)	0 to 1.0"	0 to 0.8"	0 to 0.6"	0 to 0.5"	
(7)	0 to 2.0"	0 to 2.5"	0 to 1.5"	0 to 1.0"	
(8)	0 to 3.0"	0 to 5.0"	0 to 4.0"	0 to 2.5"	
(9)	0 to 5.0"	0 to 4.0"	0 to 3.0"	0 to 2.5"	
(10)	0 to 10.0"	0 to 8.0"	0 to 7.0"	0 to 5.0"	
(11)	Please Specify				

Example: I/DP - (9) - (4)

TEMPERATURE

AVERAGING THERMISTOR SENSOR MODEL ST-FZØ

DESCRIPTION

The PreCon Averaging Thermistor Sensor provides precision remote temperature sensing for building automation systems and mechanical equipment room instrumentation. The active sensing elements are highly stable precision thermistor material accurate to within $\pm 0.36^{\circ}\text{F}$.

The sensing elements are sealed in a 3/16" soft-drawn copper coiled tube, attached to a standard handibox with mounting bracket attached.

FEATURES

- Five year warranty
- $\pm 0.36^{\circ}\text{F}$ accuracy
- Wide selection of thermistor curves
- Adaptable to most duct sizes
- Easy to mount to duct wall
- 3/16" soft copper sensor
- Copper facilitates quick average temperature response

OPTIONS

- 12.5' long element for smaller ducts
- • 25' long element for larger ducts
- Weatherproof handibox

SPECIFICATIONS

Sensing element	Thermistor (Thermal resistor)	Stability	0.24°F (0.13°C) over 5 years
Accuracy	$\pm 0.36^{\circ}\text{F}$ (0.2°C)	Heat dissipation constant	2.7mW/°C (power needed to raise the temperature by 1°C)
Sensor Types available (ref. in ohms @ 77°F)	2.252K, 3K, 10K, 20K, 100K	Connection	8' of 24 AWG, pigtailed prestripped
Range	32°F to 160°F (0°C to 71°C)	Mounting	Directly to duct with back box. Clips available for serpentine mounting.
Temperature response	Negative temperature coefficient		
Sensitivity	See "Sensor Resistance Charts" in the Technical Reference Section.		



 PRECON
CORPORATION

APPLICATION

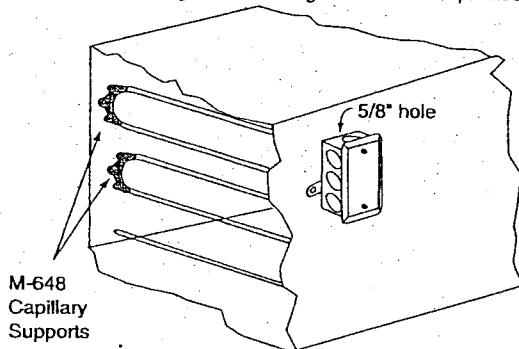
The Duct Averaging Thermistor Sensor is designed for direct mounting to sheet metal for duct temperature sensing. The sensor is multi-point sensitive through the length of the temperature conductive tubing. The 12.5' model contains four sensing elements and the 25' model has nine sensing elements. The thermistors are configured in a parallel/series method which creates an end result of total average resistance, equal to the same span as a standard thermistor, with a temperature range of 32° to 160°F (0° to 71°C).

TEMPERATURE

AVERAGING THERMISTOR SENSOR MODEL ST-FZ◊

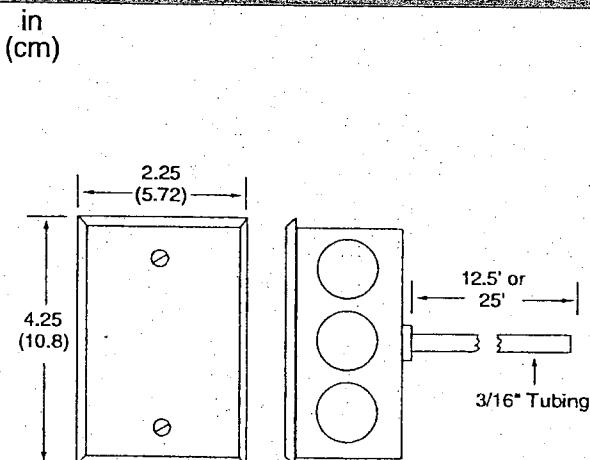
TYPICAL MOUNTING

Mounting: Drill 5/8" hole for probe insertion and serpentine the sensor across the duct, turning at each end using accessory M-648 end clip and mid-duct support M-633. Avoid kinking tube as this could cause a short circuit. Secure the box to the duct with the #6 screws provided either with mounting ears or through the box holes provided.



Wiring: Terminate using butt splices or soldering. (Wire nuts are not recommended.) Use the full 8' lead length provided to avoid moisture migration from the field connection.

DIMENSIONS



ORDERING INFORMATION

MODEL	DESCRIPTION
ST-FZ3	10,000 Ohm Thermistor @ 77°F (25°C) Type III material (gray leads)
ST-FZ21	2252 Ohm Thermistor @ 77°F (25°C) Type II material (green leads)
ST-FZ22	3000 Ohm Thermistor @ 77°F (25°C) Type II material (blue leads)
ST-FZ24	10,000 Ohm Thermistor @ 77°F (25°C) Type II material (yellow leads)
ST-FZ27	100,000 Ohm Thermistor @ 77°F (25°C) Type II material (gray leads)
ST-FZ42	20,000 Ohm Thermistor @ 77°F (25°C) Type IV material (green leads)

SENSING ELEMENT	
12	12.5-foot probe length (four elements total)
25	25-foot probe length (nine elements total)
XW	Weatherproof housing option

ST-FZ3

- 25

Example: ST-FZ3-25 10K Ohm Type III Averaging Thermistor Sensor with 25-ft probe and 9 sensing elements

Related Products

UR
M-648

Moisture resistant three-wire butt splice
Copper-plated capillary mounting end clip

PRESSURE

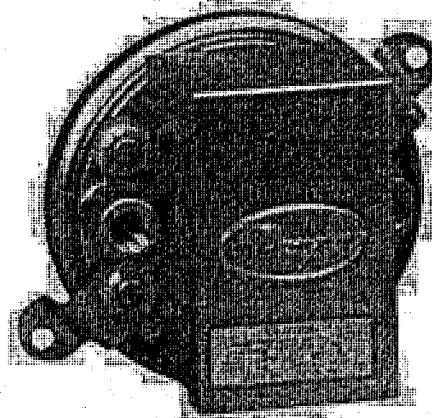
DIFFERENTIAL PRESSURE SWITCHES MODELS 1910 / 1900-5-MR

DESCRIPTION

The **1910 Series Switch** is designed to monitor the differential pressure of air in HVAC applications. These automatic reset switches are available in ranges from 0.07 to 20" W.C. (17.4 to 4982.0 Pa) and have SPDT screw type electrical connections. The optional **A-602 Air Filter Kit** (includes two static pressure tips, aluminum tubing and fittings) allows the **1910 Series Switch** to monitor filter pressure drop.

SELECTION CHART (1910 Series)

MODEL NUMBER	OPERATING RANGE INCHES W.C. (Pa)	APPROXIMATE DEAD BAND	
		AT MIN SETPOINT	AT MAX SETPOINT
1910-00	0.07 to 0.15 (17.4 to 37.4)	0.04 (10.0)	0.05 (12.5)
1910-0	0.15 to 0.5 (37.4 to 124.6)	0.10 (24.9)	0.15 (37.4)
1910-1	0.4 to 1.6 (99.6 to 398.6)	0.15 (37.4)	0.20 (49.8)
1910-5	1.4 to 5.5 (378.7 to 1370.0)	0.3 (74.7)	0.4 (99.6)
1910-10	3.0 to 11.0 (747.3 to 2740.1)	0.4 (99.6)	0.5 (124.6)
1910-20	4.0 to 20.0 (996.4 to 4982.0)	0.4 (99.6)	0.6 (149.5)



DIMENSIONS

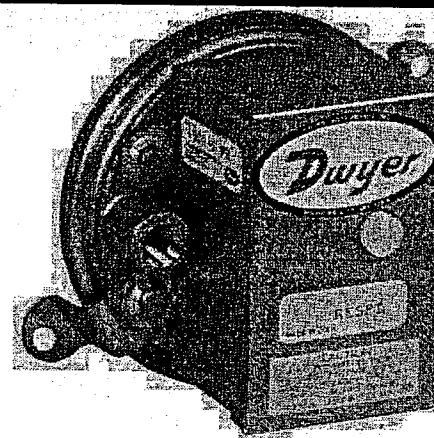
3 1/2" diameter x 2 1/2" depth (8.9 cm x 6.4 cm)

DESCRIPTION

The **1900-5-MR Duct Pressure Kit** is designed to monitor duct static and shut down the blower when excess pressure occurs. The switch must be manually reset before the system can start again. The kit includes a **Model 1900 Manual Reset Pressure Switch** with a range of 1.4 to 5.5" W.C. (378.7 to 1370.0 Pa), duct pressure sensor, tubing, and tubing adapters. Switch contacts are SPDT with solder type connections. The **1900-5-MR measures static pressure only, not differential pressure.**

DIMENSIONS

3 1/2" diameter x 2 1/2" depth (8.9 cm x 6.4 cm)



ORDERING INFORMATION

MODEL

Model 1910
Model 1900-5-MR

DESCRIPTION

To Order, Specify Model Number From Selection Chart
Duct Pressure Kit

Related Products

A-602

Air filter kit

PRESSURE

NEMA 4 DIFFERENTIAL PRESSURE SWITCH MODEL 24-013 / 24-014

DESCRIPTION

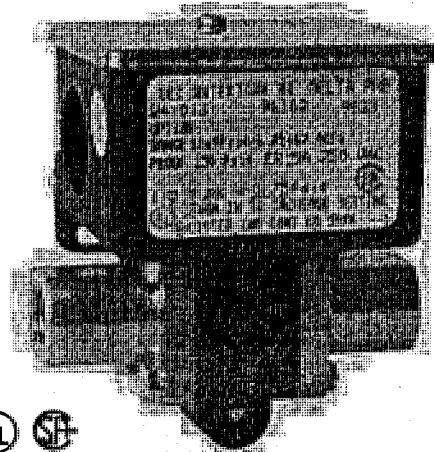
The Delta-Pro Model 24-013 and 24-014 differential pressure switches offer a unique blend of small size, excellent performance, environmental protection and attractive price.

The precision snap-acting switch and sensitive opposing diaphragms combine to provide a narrow deadband and repeatability of approximately $\pm 1\%$ of span. Mechanical contact life is 10 million cycles and actual switch life can be very long with typical pilot duty loads.

The Delta-Pro NEMA 4 enclosure is small yet can still accommodate a 1/2" NPT conduit connection and terminal block wiring. The Delta-Pro is not only lightweight but also strong and durable. The adjustment screw is externally accessible for convenience and multi-turn for good setting resolution. The Delta-Pro's force-balance design provides excellent vibration resistance.

FEATURES

- **SPDT switch with screw terminals**
- **Gasketed, zinc plated steel cover**
- **Strong, corrosion resistant polyester enclosure**
- **External, multi-turn adjusting screw for excellent resolution**
- **7/8" hole for 1/2" NPT conduit connection**
- **Corrosion resistant brass port**
- **Clearance holes for surface mounting**
- **NEMA 4 enclosure**



APPLICATION

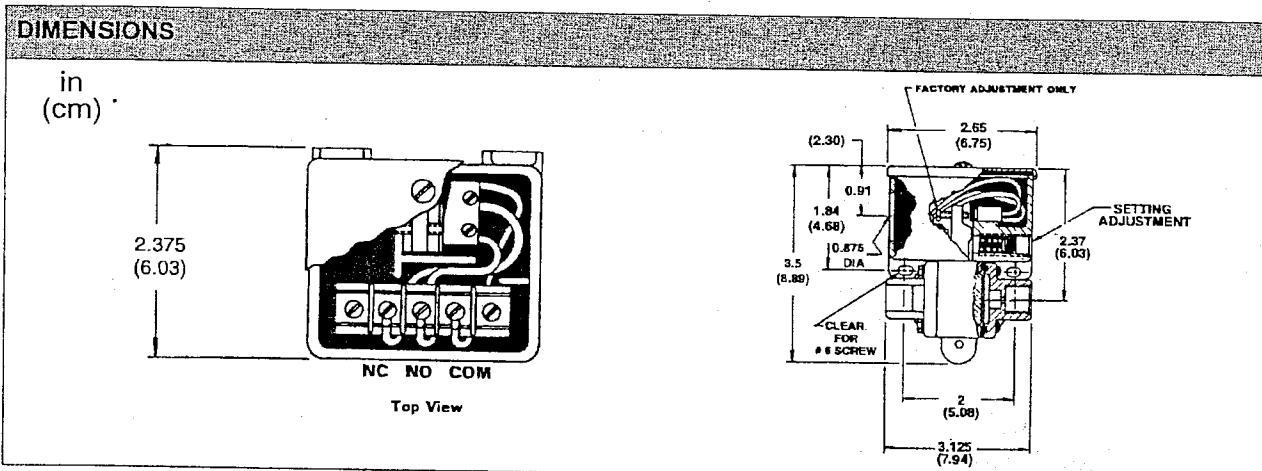
The Delta-Pro Pressure Switch is typically used to sense differential pressure across devices such as oil or water filters, pumps, heat exchangers, chillers, coils, etc. It normally provides an alarm or shutdown function in applications where there is insufficient flow in a system, or when excessive pressure differential indicates a problem. It may also be used to indicate pump status.

SPECIFICATIONS

Switch life	SPDT precision snap-acting design with mechanical contact life 10 million cycles. Actual life depends on load and cycle frequency.	System operating pressure	0-150 psig (1034.3 kPa) at up to 160°F (71°C) air temperature
Rated	5 amp resistive and 5 amp inductive at 125 VAC and 250 VAC, 1/4 hp; 5 amp resistive and 3 amp inductive at 30 VDC; 0.5 amp resistive and 0.25 amp inductive at 125 VDC. Gold clad silver contacts for minimum loads of 5 mA at 6 VDC, 2 mA at 12 VDC and 1 mA at 24 VDC.	Working differential pressure	0-150 psig (1034.3 kPa) at up to 160°F (71°C) air temperature
Approvals Wiring	UL listed file E42272; CSA 22.2 approval 7/8" hole for 1/2" NPT conduit connector (not provided). Three screw terminals. Max wire size 16 AWG.	Differential proof pressure	150 psid (1034.3 kPa) (w/surges) at up to 160°F (71°C) air temperature, without loss of setability
Ambient temperature		Enclosure	Reinforced nylon body, zinc plated steel cover with neoprene gasket, NEMA 4
Storage	-20° to 180°F (-29° to 82°C)	Adjustment	Multi-turn screw, accessible from outside enclosure
Operating	30° to 160°F (-1° to 71°C)	Weight	6.5 oz (184.3 g)
Max media temp	200°F (93°C) at 100 PSI (689.50 kPa) working pressure	Pressure port	1/4 NPTF brass
Vibration	MIL STD 810C, 2.5 G, 5-500 CPS	Mounting	Surface mount with two screws through clearance holes, or mount by ports
Shock	15 G, 10 millisecond duration	Repeatability	Typically $\pm 1\%$ of span
		Wetted materials	Polyurethane diaphragm, ethylene propylene, polysulphone, brass

PRESSURE

NEMA 4 DIFFERENTIAL PRESSURE SWITCH MODEL 24-013 / 24-014



INSTALLATION

MOUNTING

Mount unit in any position. Locate where shock and vibration are minimal and ambient temperature is below 160°F (71°C).

SURFACE MOUNTING

Insert two #6 screws through holes on 2" (5.08 cm) centers (recommended mounting for maximum vibration resistance).

SUSPENDED UNIT MOUNTING

Mount unit from its two ports. Always hold a wrench on pressure port when making pressure connection.

MAKING PRESSURE CONNECTION

Connect high side pressure to port labeled "high". Use a

wrench on the pressure port and hold the unit steady. Then thread a 1/4 NPTM fitting into the port.

CAUTION: Never tighten by turning the control into the fitting.

WIRING

Back out screw terminal just enough to put stripped wire under terminal block clamp. Maximum wire size is 16 AWG.

SETPOINT ADJUSTMENT

Use screwdriver to turn external adjusting screw. Turn "in" (clockwise) to increase differential pressure setting. (1 turn = 1.5 psid or 10.3 kPa) For best setting accuracy, set the switch using the actual working pressures encountered in the application.

PERFORMANCE CHART

MODEL NUMBER	ADJUSTABLE SETTING RANGE (PSID)				PORT	SWITCH	DEADBAND (PSI)
	<u>ON FALL</u>		<u>ON RISE</u>				
	MIN	MAX	MIN	MAX			
24-013	1.0 (6.895 kPa)	9.0 (62.1 kPa)	2.0 (13.8 kPa)	10.0 (69.0 kPa)	1/4 NPTF BRASS	5 amp	0.75 (5.2 kPa)
24-014	4.0 (27.6 kPa)	43.5 (299.9 kPa)	5.5 (37.9 kPa)	45.0 (310.3 kPa)		5 amp	1.0 (6.9 kPa)

ORDERING INFORMATION

TO ORDER: SPECIFY MODEL NUMBER ONLY

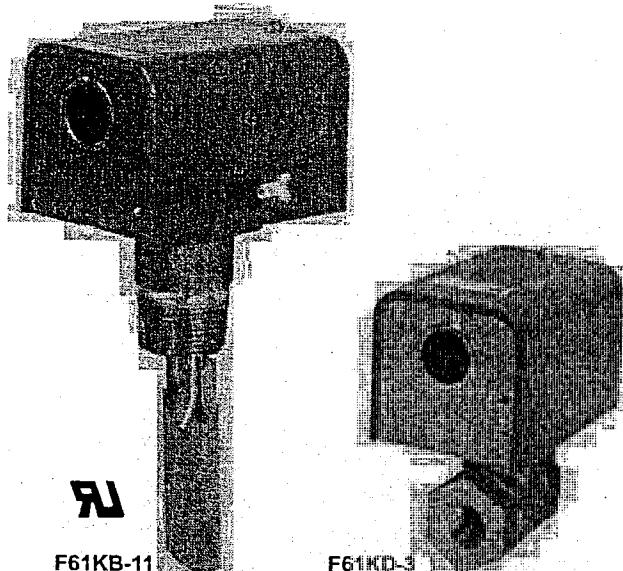
FLOW

GENERAL PURPOSE FLOW SWITCH MODEL F61KB, F61MB, F61KD, F61MD

DESCRIPTION

The **F61 Series Flow Switches** are used to prove flow on liquid lines using water, ethylene glycol solutions, or other liquids compatible with brass and phosphor bronze parts. The SPDT contact switch is activated by liquid flow through the pipe. The setpoint is adjustable.

The **F61KD Series** (NEMA 1 Enclosure) and **F61MD** (NEMA 3R Enclosure) are available for 1/2" NPT and 3/4" NPT pipe. The **F61KB-11** (NEMA 1 Enclosure) and **F61MB-1** (NEMA 3R Enclosure) are for 1" and larger pipe. They are furnished with a bronze paddle in three segments for pipe 1" to 3" dia. Paddle segments may be removed or trimmed as needed. A 6" paddle is also furnished for pipes 4" diameter and larger.



SPECIFICATIONS

Pipe connections

F61KB-11, F61MB-1	1" NPT
F61KD-3, F61MD-1	1/2" x 1/2" NPT
F61KD-4, F61MD-2	3/4" x 3/4" NPT
Max liquid pressure	150 psig (1034 kPa)
Max liquid temperature	250°F (121°C)
Min liquid temperature	
F61KB-11, F61KD-3, F61KD-4	32°F (0°C)
F61MB-1, F61MD-1, F61MD-2	-20°F (-29°C)

Enclosure

F61KB-11, F61KD-3, F61KD-4	NEMA 1
F61MB-1, F61MD-1, F61MD-2	NEMA 3R

Dimensions

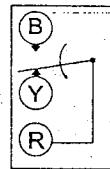
F61KB-11	8.37"H (3" paddle) x 4"W x 2.81"D (21.27 cm x 10.16 cm x 7.14 cm)
F61MB-1	8.69"H (3" paddle) x 4.80"W x 2.81"D (22.06 cm x 12.18 cm x 7.14 cm)
F61KD-3	5.03"H x 4"W x 2.81"D (12.77 cm x 10.16 cm x 7.14 cm)
F61KD-4	5.03" H x 4" W x 2.81" D (12.77 cm x 10.16 cm x 7.14 cm)
F61MD-1	5.03" H x 4" W x 2.81" D (12.77 cm x 10.16 cm x 7.14 cm)
F61MD-2	5.03" H x 4" W x 2.81" D (12.77 cm x 10.16 cm x 7.14 cm)

WIRING

ELECTRICAL RATINGS

MOTOR RATINGS	120V	208V	240V	277V
Horsepower	1	1	1	-
AC Full Load Amps	16	8.8	8	-
AC Locked Rotor Amps	96	52.8	48	-
Noninductive or Resistance Load Amps	16	16	16	16
Pilot Duty - 125 VA 24/277 VAC				

SERIES F61



ACTION ON INCREASE
OF FLOW

FLOW

GENERAL PURPOSE FLOW SWITCH MODEL F61KB, F61MB, F61KD, F61MD

PERFORMANCE: TYPICAL FLOW RATES — gpm (m³/hr) REQUIRED TO ACTUATE SWITCH MODEL F61KB-11/F61MB-1											
Line Pipe Size (in.)		1	1 1/4	1 1/2	2	2 1/2	3	4*	5*	6*	8*
Min adj	Flow Increases R to Y Closes	4.2 (1.0)	5.8 (1.3)	7.5 (1.7)	13.7 (3.1)	18.0 (4.1)	27.5 (6.2)	65.0 (14.8) 37.0† (8.4)	125.0 (28.4) 57.0† (12.9)	190.0 (43.1) 74.0† (16.8)	375.0 (85.2) 205.0† (46.6)
	Flow Decreases R to B Closes	2.50 (0.6)	3.70 (0.8)	5.00 (1.1)	9.50 (2.2)	12.50 (2.8)	19.00 (4.3)	50.0 (11.4) 27.0† (6.1)	101.0 (22.9) 41.0† (9.3)	158.0 (35.9) 54.0† (12.3)	320.0 (72.7) 170.0† (38.6)
Max adj	Flow Increases R to Y Closes	8.80 (2.00)	13.30 (3.00)	19.20 (4.40)	29.00 (6.60)	34.50 (7.80)	53.00 (12.00)	128.0 (29.1) 81.0† (13.4)	245.0 (55.6) 118.0† (26.8)	375.0 (85.2) 144.0† (32.7)	760.0 (172.6) 415.0† (94.2)
	Flow Decreases R to B Closes	8.50 (1.90)	12.50 (2.80)	18.00 (4.10)	27.00 (6.10)	32.00 (7.30)	50.00 (11.40)	122.0 (27.7) 76.0† (17.3)	235.0 (53.4) 111.0† (25.2)	360.0 (81.8) 135.0† (30.7)	730.0 (165.8) 400.0† (90.8)

*Flow rates for these sizes are calculated.

† These gpm figures are for switch with 6" paddle. For 4" and 5" line pipe the paddle is trimmed.

PERFORMANCE: TYPICAL FLOW RATES — F61KD-3, F61KD-4, F61MD-1, F61MD-2

Model Number	Inlet and Outlet Size Female NPTF	Enclosure NEMA Type	Adjustment Range —GPM (m³/hr)	
			R to Y Closes Flow Increase	R to Y Opens Flow Decrease
F61KD-3	1/2" x 1/2"	1		
F61KD-4	3/4" x 3/4"	1		
F61MD-1	1/2" x 1/2"	3R	Minimum 0.6 (0.14) Maximum 1.1 (0.25)	Minimum 0.3 (0.07) Maximum 0.9 (0.2)
F61MD-2	3/4" x 3/4"	3R		

ORDERING INFORMATION

MODEL	DESCRIPTION
F61KD-3	Flow switch 1/2" x 1/2" NPT, NEMA 1
F61MD-1	Flow switch 1/2" x 1/2" NPT, NEMA 3R
F61KD-4	Flow switch 3/4" x 3/4" NPT, NEMA 1
F61MD-2	Flow switch 3/4" x 3/4" NPT, NEMA 3R
F61KB-11	Flow switch for pipe 1" dia and larger, NEMA 1
F61MB-1	Flow switch for pipe 1" dia and larger, NEMA 3R



POWER SUPPLIES

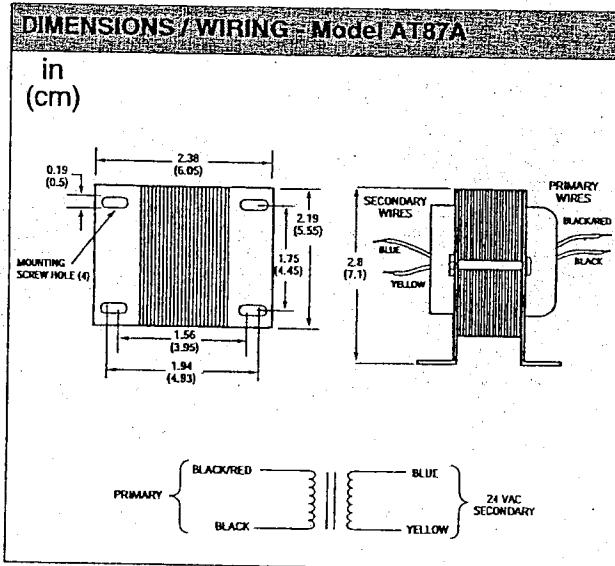
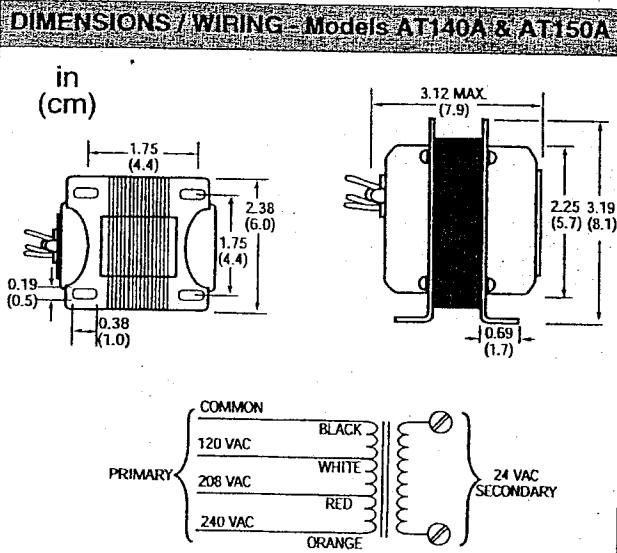
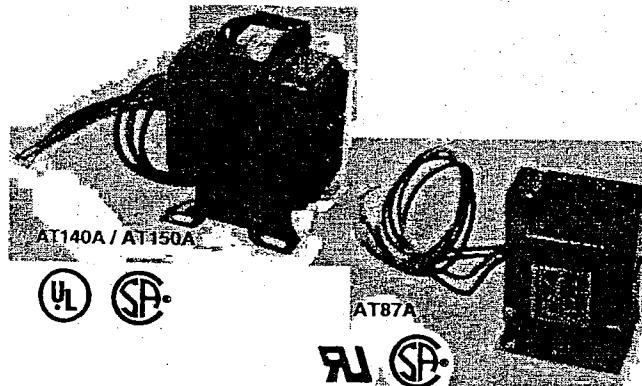
CONTROL TRANSFORMERS MODELS AT140A / AT150A / AT87A

DESCRIPTION

These general purpose transformers provide power to 24 VAC circuits. They are typically used in heating/cooling control systems, but can be used in any application that does not exceed the load ratings. All models are UL listed or recognized and meet NEC Class 2 "not wet", Class 3 "wet" requirements.

FEATURES

- Meets NEC Class 2 "not wet", Class 3 "wet"
- Color coded leads
- Screw terminal secondary (AT140A, AT150A)
- Models with multi-tap primary



SPECIFICATIONS

Primary	AT140A / AT150A
Secondary	120/208/240 VAC
Frequency	24 VAC
VA rating	60 Hz
Mounting	AT140A: 40 VA, AT150A: 50 VA
Wiring connections	foot, knockout, plate (included)
Shipping weight	Primary: 9", colored leads; Secondary: screw terminals
Approvals	2 lbs (0.91 kg)
Class	UL listed, CSA certified

AT140A / AT150A

120/208/240 VAC
24 VAC
60 Hz

AT140A: 40 VA, AT150A: 50 VA

foot, knockout, plate (included)

Primary: 9", colored leads; Secondary: screw terminals

2 lbs (0.91 kg)

UL listed, CSA certified

NEC Class 2 "not wet", Class 3 "wet"

AT87A

480 or 277 VAC

24 VAC

60 Hz

48 VA

foot

10" colored leads

1.75 lbs (0.79 kg)

UL recognized, CSA certified

NEC Class 2 "not wet", Class 3 "wet"

ORDERING INFORMATION

MODEL	DESCRIPTION
AT140A1018	Control Transformer, 120/208/240VAC : 24VAC, 40 VA
AT150A1007	Control Transformer, 120/208/240VAC : 24VAC, 50 VA
AT87A1155	Control Transformer, 480VAC : 24VAC, 48 VA
AT87A1189	Control Transformer, 277VAC : 24VAC, 48 VA

POWER SUPPLIES

CONTROL TRANSFORMERS 691 SERIES

DESCRIPTION

These stepdown voltage transformers are for use in temperature control systems. They are designed to provide nominal 24 VAC control voltage from 120 VAC primary supply. These transformers are designed for NEMA 1 locations. They should be installed in compliance with all national and local electrical codes.

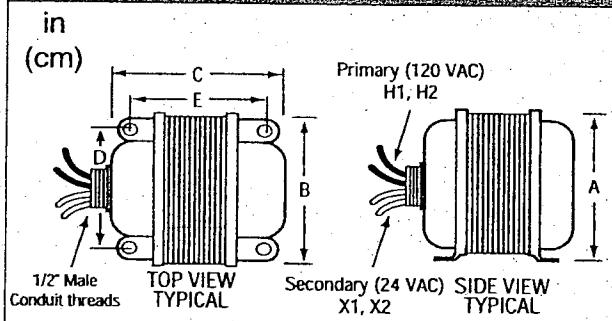
FEATURES

- Low cost
- Hub or foot mounting
- Fully enclosed with metal end bells
- Compact size

SPECIFICATIONS

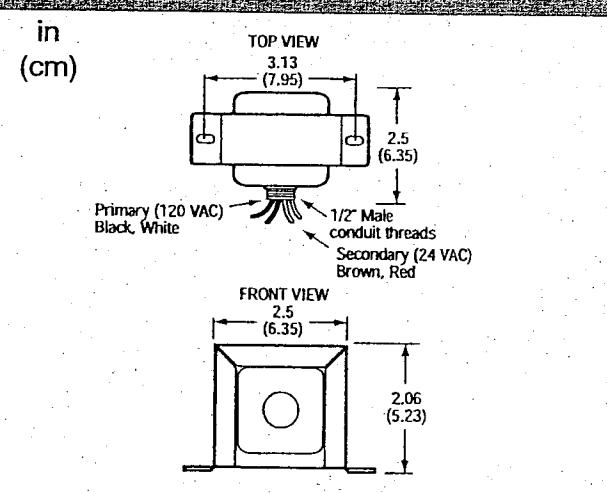
	691-K0A	691-K1	691-K2
Primary	120 VAC	120 VAC	120 VAC
Secondary	24 VAC	24 VAC	24 VAC
Frequency	60 Hz	50/60 Hz	50/60 Hz
VA rating	40 VA	100 VA	170 VA
Mounting	Hub or foot	Hub or foot	Hub or foot
Conduit connection	1/2" male threads	1/2" male threads	1/2" male threads
Wire leads	8", color coded	8", labeled	8", labeled
Shipping weight	2.1 lbs (0.95 kg)	5.35 lbs (2.4 kg)	5.63 lbs (2.6 kg)
Approvals	UL recognized, Class 2 file #E99227	UL listed, file #E3210	UL listed, file #E3210

DIMENSIONS - 691-K1, 691-K2 TRANSFORMERS



Model	A	B	C	D	E
691-K1	2.50 (6.35)	3.0 (7.62)	3.69 (9.37)	2.50 (6.35)	2.19 (5.56)
691-K2	3.13 (7.95)	3.75 (9.525)	4.0 (10.16)	3.25 (8.255)	2.38 (6.05)

DIMENSIONS - 691-K0A TRANSFORMER



ORDERING INFORMATION

MODEL

691-K0A

691-K1

691-K2

DESCRIPTION

Control Transformer, 120/24 V, 40 VA

Control Transformer, 120/24 V, 100 VA

Control Transformer, 120/24 V, 170 VA

POWER SUPPLIES

CONTROL TRANSFORMERS

691 SERIES

DESCRIPTION

The **691 Series** of stepdown voltage transformers are for use in temperature control systems. They provide nominal 24 VAC control voltage from 120 VAC primary supply. These transformers are designed for NEMA 1 locations. They should be installed in compliance with all national and local electrical codes.

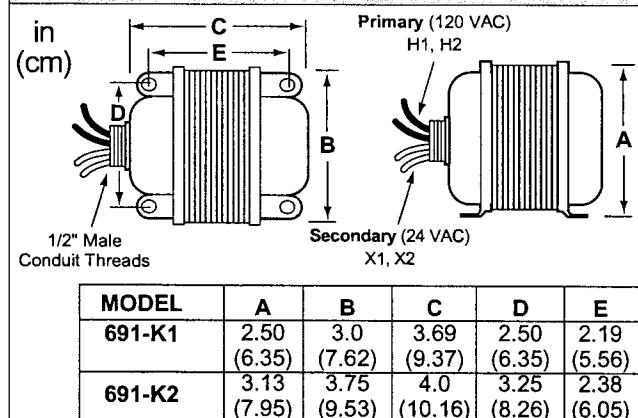
FEATURES

- **Low cost**
- **Hub or foot mounting**
- **Fully enclosed with metal end bells**
- **Compact size**

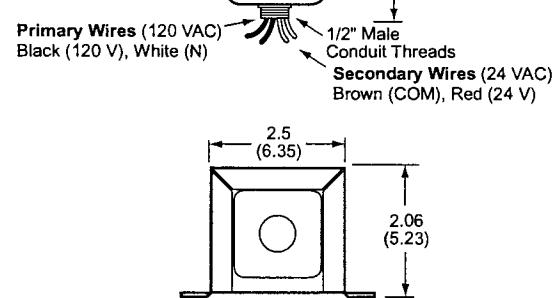
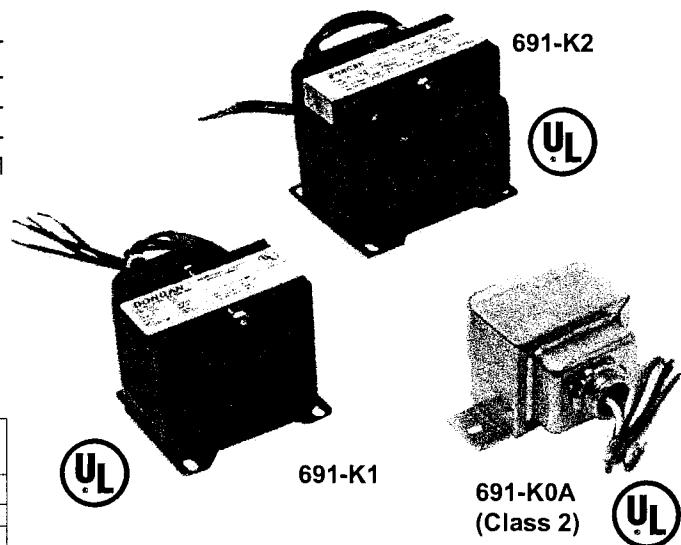
SPECIFICATIONS

	691-K0A	691-K1	691-K2
Primary voltage	120 VAC	120 VAC	120 VAC
Secondary voltage	24 VAC	24 VAC	24 VAC
Frequency	60 Hz	50/60 Hz	50/60 Hz
VA rating	40 VA	100 VA	170 VA
Mounting	Hub or foot	Hub or foot	Hub or foot
Conduit connection	1/2" male threads	1/2" male threads	1/2" male threads
Wire leads	8" (20.3 cm), color coded	8" (20.3 cm), labeled	8" (20.3 cm), labeled
Weight	2.1 lb (0.95 kg)	5.35 lb (2.4 kg)	5.63 lb (2.6 kg)
Approvals	UL listed, Class 2 File #E99227	UL listed, File #E3210 (not Class 2)	UL listed, File #E3210 (not Class 2)

DIMENSIONS



691-K1/691-K2 Transformers



691-K0A Transformer

ORDERING INFORMATION

MODEL	DESCRIPTION
691-K0A	Control Transformer, 120:24 VAC, 40 VA
691-K1	Control Transformer, 120:24 VAC, 100 VA
691-K2	Control Transformer, 120:24 VAC, 170 VA

INSTALLATION MATERIALS

DINRAILFUSEHOLDER MODEL M10/16SFL

DESCRIPTION

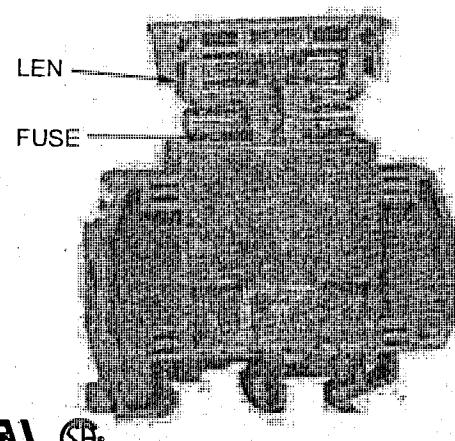
The **M10/16SFL** Fuse Holder provides a safe and reliable method of fuse mounting. The totally enclosed housing prohibits the installer from coming in contact with the live circuit. The fuse is disengaged with push-pull action of the disconnect portion of the fuse holder. The optional fuse indicator lamp (LEN) illuminates when the fuse is blown. The **M10/16SFL** mounts on standard 35mm DIN rail and can be used with the **M4/6** terminal blocks.

FEATURES

- Wire secured by ribbed compression clamp
- Universal DIN rail mounting
- Unique disconnect design
- Optional fuse indicator lamp

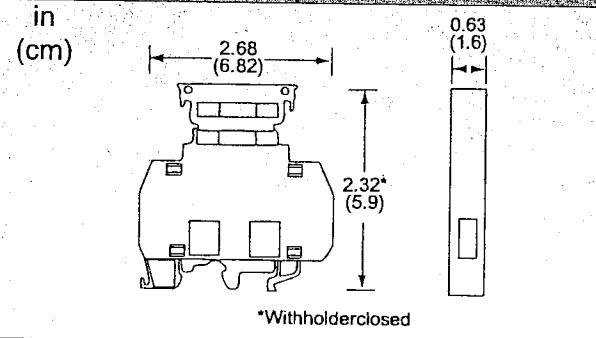
SPECIFICATIONS

Rated voltage	600VAC/DC
Rated current	16amps
Rated wire size	18-8AWG
Fuse size	0.25inx1.25in (GF Series) (0.63cmx3.17cm)
Spacing	0.630in(1.6cm)
LEN voltage	110-220VAC
Approvals	UL recognized file #E60645, E72667 CSA certified



UL CSA

DIMENSIONS



ORDERING INFORMATION

MODEL
M10/16SFL
LEN

DESCRIPTION
DIN Rail Fuse Holder (Fuse not included)
Fuse Indicator Lamp (110-220VAC only)

MODEL
M4/6
DIN-3F
BAM
GLASSFUSES
GF-(amp)
GF-(amp)S
(amp)=Fuserating. Available sizes: 0.5, 1, 1.5, 2, 2.5, 3, 5, 7, 10, 15
Example: GF-2S=2amps slow-blow fuse

Related Products

DESCRIPTION
DIN Rail Terminal Block 0.238" (0.6cm)
35mm steel DIN Mounting Rail, length 39.4in (1meter)
End Stop
0.25inx1.25in (0.63cmx3.17cm)
Fast-Acting Fuse
Slow-Blow Fuse

INSTALLATION MATERIALS

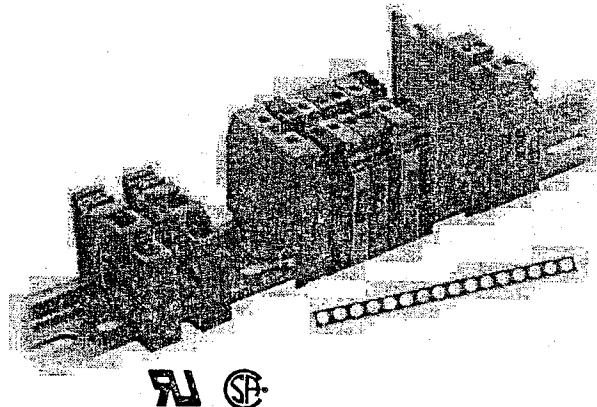
DINRAIL TERMINAL BLOCKS MODEL M4/6

DESCRIPTION

The **M4/6 DIN Rail Terminal Blocks** offer a modular design for flexibility in layout and reduced installation time. Unique marker holders provide optional top or side mount marking capability. These blocks can be used with the **M10/16SFL** fuseholder.

FEATURES

- Wire secured by ribbed compression clamp
- Universal DIN rail mounting
- Reduced installation time
- Block can be removed without displacing adjacent blocks
- Various marking options

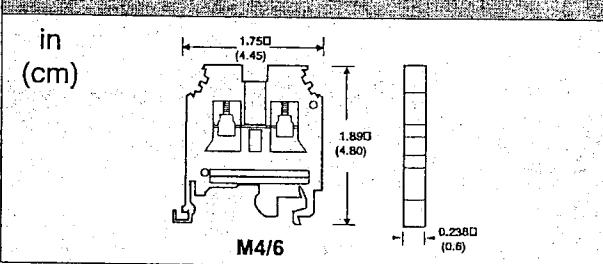


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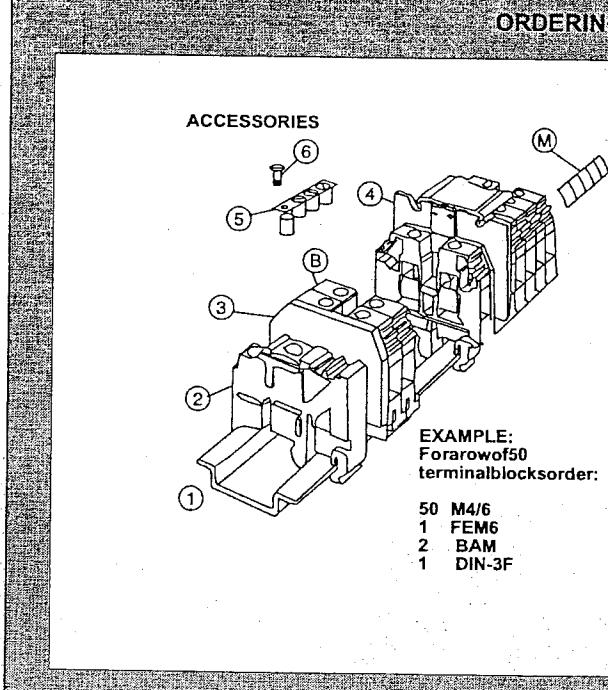
SPECIFICATIONS

Rated voltage	600VAC/DC
Rated current	30ampsUL, 25ampsCSA
Rated wire size	22-10AWG
Spacing	0.238"(0.60cm)
Circuits per ft	50
Approvals	UL recognized file #E60645, E72667 CSA Certified

DIMENSIONS



ORDERING INFORMATION



MODEL	DESCRIPTION
(B) M4/6	DIN Rail Terminal Block - Gray
M4/6-BK	DIN Rail Terminal Block - Black
M4/6-BL	DIN Rail Terminal Block - Blue
M4/6-GR	DIN Rail Terminal Block - Green
M4/6-RD	DIN Rail Terminal Block - Red
M4/6-OR	DIN Rail Terminal Block - Orange
M4/6-YW	DIN Rail Terminal Block - Yellow
M4/6-P	DIN Rail Grounding Block - Green & Yellow
1 DIN-3F	35mm steel DIN Mounting Rail length: 39.4in (1 meter) End Stop (2 required) End Section (1 required)
(2) BAM	Circuit Separator
(3) FEM6	Jumper Bar - 20poles/bar
(4) SCF6	Jumper Bar Hardware (screw & post, pkg. 20)
(5) BJS6	Marker Holders
(6) EV6	(Side Mount, individually scored)
(M) MARKERS (Side Mount, individually scored)	
RC610B	Blank Strips
RC610/1-10	10 strips of 1-10
RC610/1-50	2 strips of 1-50
RC610/1-100	1 strip of 1-100
RC610/101-200	1 strip of 101-200
RC610/201-300	1 strip of 201-300
RC610/301-400	1 strip of 301-400
RC610/401-500	1 strip of 401-500
RTM7	Top Mount - Blank length: 19.7 in (50 cm)

SPECIALTY SENSORS

WATER DETECTOR MODEL WD-1B

DESCRIPTION

The WD-1B Water Detector features gold-plated probes and microchip technology for dependable detection of conductive liquids. The WD-1B can be operated from 11 to 27 volts AC or DC. For application flexibility, SPDT contacts are provided to connect to a monitoring system. A height adjustable, cast aluminum, weatherproof enclosure is standard. A green LED visible outside the box indicates power. A red LED indicates water detected. The WD-1B is also available with an external tape style sensor, the WD-1B-T.

FEATURES

- Weatherproof enclosure
- Easy to install
- SPDT alarm contacts
- 11 to 27 VAC or VDC
- Reliable operation
- LED's for power and alarm indication
- Adjustable detection level

OPERATION

The WD-1B can be used with any "contact-closure" monitoring panel. The SPDT contacts may be wired Normally-Open or Normally-Closed, allowing wiring flexibility to handle most installations.

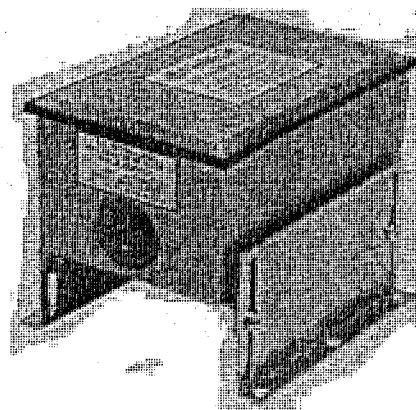
MOUNTING

Secure by applying a silicone adhesive to the mounting feet, and placing the sensor in the area to be protected. For more permanent installations, fasten the sensor using the 0.19" holes provided in the mounting feet with #6 or #8 screws. The legs are adjustable (1.5") for precise water level signaling.

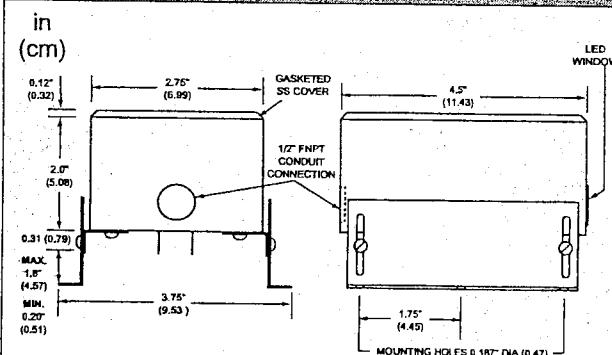
SPECIFICATIONS

Power requirements	11 to 27 VAC or VDC
Power consumption	DC: 10mA typical, 30mA max AC: 30mA typical, 70mA max
Operating temp	32° to 158°F (0° to 70°C)
Enclosure	Cast aluminum, weatherproof with adjustable legs
Alarm output	SPDT contacts rated, 1 A @ 24 VAC/VDC, 1/2 A @ 120 VAC

 Technologies
A Kele Company

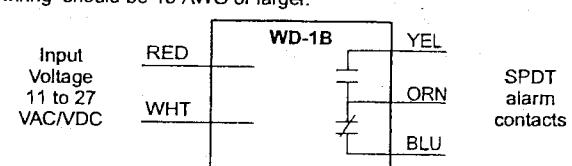


DIMENSIONS



WIRING

The WD-1B Water Detector is provided with a 1/2" FNPT conduit connection in the end of the enclosure. Terminations are made to the color-coded wires with field-supplied connectors. All interconnect wiring should be 18 AWG or larger.



If grounded AC power is used, the grounded power supply lead must be connected to the white lead on the WD-1B, or the unit may fail to operate.

ORDERING INFORMATION

WD-1B

Water Detector

RELATED PRODUCTS

WD-1B-T

Water Detector (Tape Style Sensor)

PRESSURE

STAINLESS STEEL PRESSURE TRANSMITTER MODEL PTX1

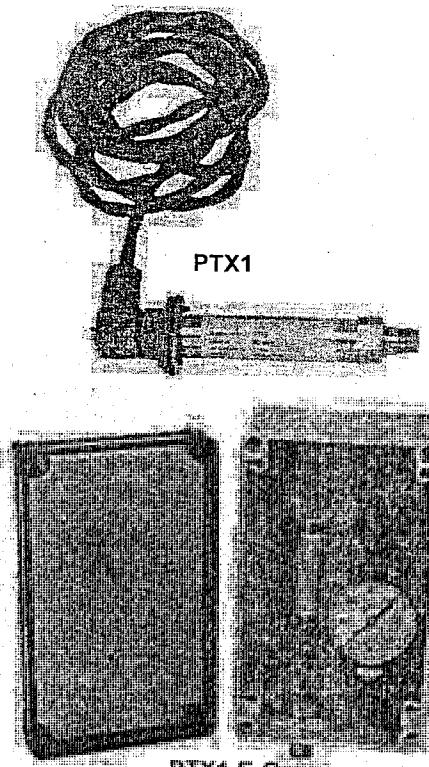
DESCRIPTION

The Model PTX1 Pressure Transmitter utilizes a thin film strain gauge bridge and stainless steel diaphragm to provide a highly accurate, stable means of measuring pressures up to 2000 psi (13.79 MPa). Splash-proof cable connections protect the wiring, allowing Model PTX1 to be mounted near the medium being measured. Optional indication is available as a digital display (options LCD or RED) or as a 2" gauge (option G).

FEATURES

- For steam, water, glycol, ammonia, refrigerants, etc.
- 1% full scale accuracy
- 200% proof pressure
- Wide range of pressures
- 4-20 mA output
- Reverse-polarity protected
- Plug-in splash-proof connector with 6' cable
- Stainless steel wetted parts
- Stainless steel case
- Optional watertight polystyrene enclosure
- Optional LCD/Red digital indication
- Optional gauge available for mediums compatible with brass

 **Technologies.**
A Kele Company



SPECIFICATIONS

Supply voltage	10 to 30 VDC at 25 mA	Thermal effects*	±0.04%FS/°F zero and span
Output current	4-20 mA	Response time	1 msec
Max load impedance	650 Ω at 24 VDC	Case materials	304 stainless steel
Accuracy	±1%FS (full scale)	Connection	1/8" NPT male 316 stainless steel
Overpressure	Proof 200%	Diaphragm	17-4 PH stainless steel
	Burst 800%	Zero and span	Factory adjustable ±10%
Temp compensated	-20° to 160°F (-29° to 71°C)		
Operating temp	-40° to 200°F (-40° to 93°C)		

* Multiply temperature coefficient by 300% on range numbers 01, 03, and 04 and by 150% on range numbers 02 and 05. See Ordering Information for range numbers.

INSTALLATION

Mount the Pressure Transmitter in a manner which protects it from steam or temperatures outside of its operating range. A Model PT steam pigtail/syphon must be installed on all applications where steam is to be monitored. When monitoring the pressure of medium that is above or below the temperature operating range of the transmitter, the sensor should be isolated by a length of tubing. If 6 to 12 inches of brass tubing is used, temperatures up to 400°F (204°C) can be tolerated. See Reference Section for information on Steam Isolation and Temperature Protection.

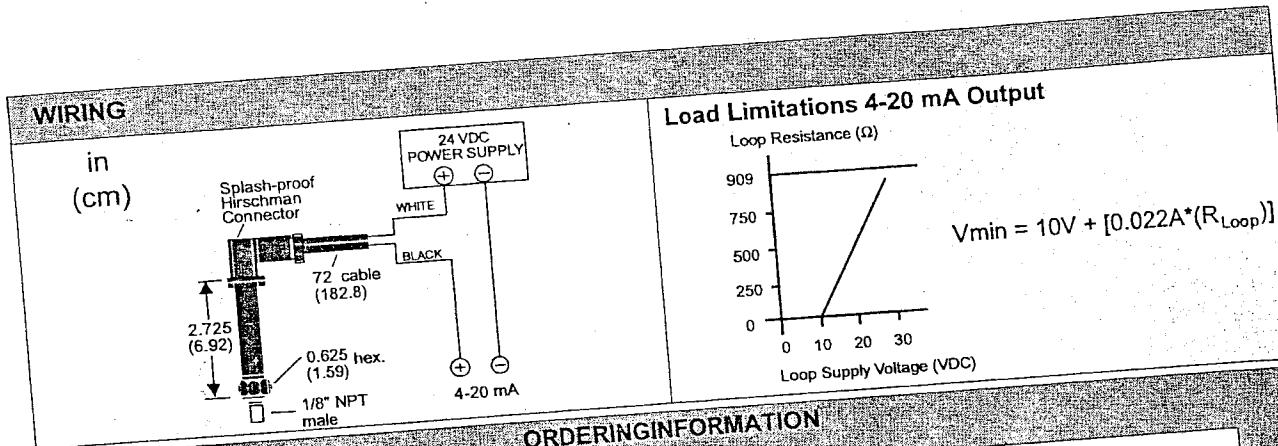
If the PTX1 Pressure Transmitter is to be subjected to fluid hammer, pressure surges or pulsations, a Snubber is recommended.

Technical

Model 47 Pressure

PRESSURE

STAINLESS STEEL PRESSURE TRANSMITTER
MODEL PTX1



ORDERING INFORMATION

RANGE NUMBER	PRESSURE RANGE	
	psig	kPa
01	0-30" VAC	0-101.6
02	30" VAC to 15	-101.6 to 103.4
03	0-15	0-130.4
04	3-15	20.7-103.4
05	0-30	0-206.9
06	0-60	0-413.7
07	0-100	0-689.5
08	0-150	0-1034.3

RANGE NUMBER	PRESSURE RANGE	
	psig	kPa
09	0-200	0-1379.0
10	0-300	0-2068.5
11	0-500	0-3447.5
12	0-750	0-5171.3
13	0-1000	0-6895.0
14	0-2000	0-13790.0
15	30" VAC to 30	-101.6 VAC to 206.9
16	30" VAC to 60	-101.6 VAC to 413.7

PTX1	MODEL	OPTIONS (Leave blank for NO OPTIONS and specify pressure range)		
	E*	Watertight Enclosure (with stainless steel bulkhead fitting)		
	LCD	Model LPI-1C LCD Display (Enclosure Not Watertight)		
	RED	Model LPI-1CR Red Digital Display (Enclosure Not Watertight)		
	G**	Pressure gauge (includes enclosure with transparent cover)		
	XX	PRESSURE RANGE FROM ABOVE TABLE (must specify range)		
PTX1 - E - LCD - 07	Example: PTX1 with 100 psi pressure range, in enclosure with LCD indication.			

* Enclosed models not available in pressure ranges above 1000 psi.
** Pressure gauge option available for all mediums compatible with brass.

RELATED PRODUCTS

47B&47S
PT

Snubbers (Brass or Stainless Steel)
Steam Pigtail Syphon

PRESSURE



MANUAL RESET AIR SENSING SWITCH MODELS AFS-460, AFS-460-DSS

DESCRIPTION

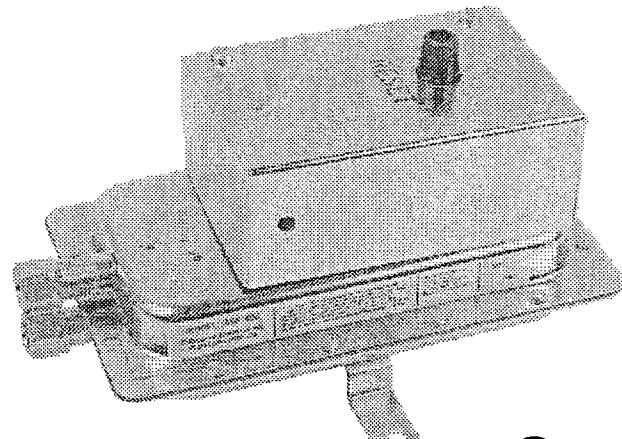
The Model AFS-460 Manual Reset Air Sensing Switch is designed to sense static or differential pressure and to break an electrical circuit when the set point is exceeded. The electrical circuit will remain open until the reset button on the switch is pressed.

The Model AFS-460 is furnished with 1/4" compression fittings for copper or plastic tubing. The set point is adjustable from 0.4" to 12" W.C.

The Model AFS-460-DSS is the same reliable air sensing switch as the Model AFS-460 with the addition of a second SPST normally closed contact. The Model AFS-460-DSS is ideal for the application that requires status as well as an indication of condition.

FEATURES

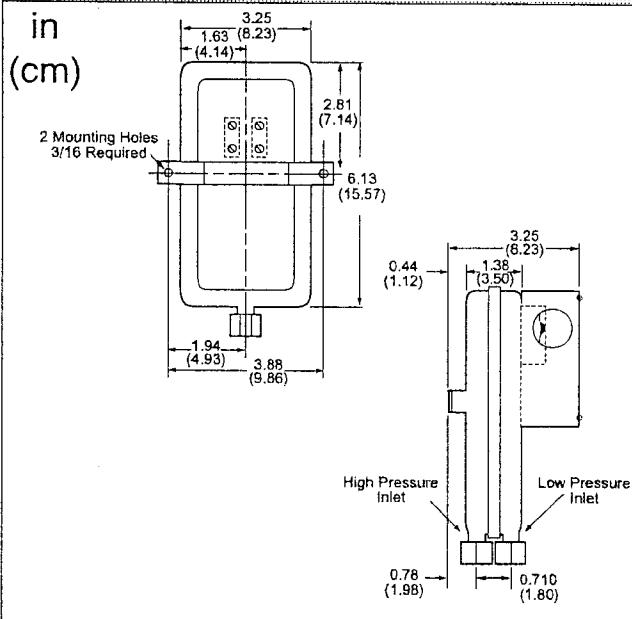
- *Manual reset*
- *SPST contact (normally closed)*



SPECIFICATIONS

Set point range	0.4" to 12.0" W.C. (99.6 to 2989 Pa)
DDS option	2.0" to 12.0" W.C. (498 to 2989 Pa)
Reset	Manual push button
Mounting position	Diaphragm in any vertical plane
Contacts	SPST (normally closed)
DDS option	2 SPST (normally closed)
Electrical rating	15A @ 125-277 VAC 1/4 HP @ 125 VAC 1/2 HP @ 250 VAC 1/2A @ 125 VDC
Pressure connectors	1/4" compression, suitable for use with 1/4" copper or plastic tubing
Overpressure	0.5 psig (2.5 kPa)
Operating temp	-40° to 180°F (-40° to 82°C)
Approval	UL listed, CE
Weight	
Life	6,000 cycles min @ 0.5 psig (3.5 kPa) max pressure and @ max rated load each cycle

DIMENSIONS



ORDERING INFORMATION

MODEL	DESCRIPTION
AFS-460	Manual Reset Air Sensing Switch
AFS-460-C	Kele Calibrated for Your Application (specify set point)
AFS-460-DSS	Manual Reset Air Sensing Switch with 2 SPST Contacts
AFS-460-DSS-C	Kele Calibrated for Your Application (specify set point)

Related Product

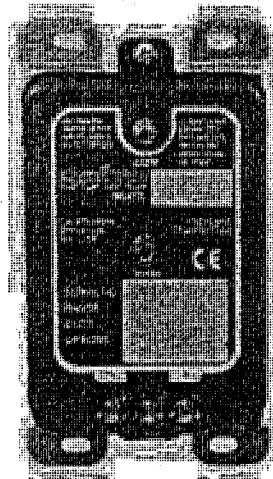
#21121	Duct impact tube
A-301, A-302	Static pressure tip

PRESSURE

DIFFERENTIAL PRESSURE TRANSMITTER MODEL M264

DESCRIPTION

The **Model M264** is a low air pressure transmitter able to sense differential pressure in both negative and positive ranges. The **Model M264** incorporates a tensioned stainless steel diaphragm to form a variable capacitor that will in turn produce variation in the output current. The **Model M264**'s durable design will tolerate an overpressure of 10 psi (68.95 kPa) and is warranted for 3 years unconditionally.



CE

FEATURES

- *4-20 mA output signal*
- *Voltage output signal optional*
- *10 psi (68.95 kPa) overpressure*
- *3 year unconditional warranty*
- *1% accuracy*
- *Reverse wiring protected*
- *Stainless steel diaphragm*
- *Ideal for air and non-conducting gases*

APPLICATIONS

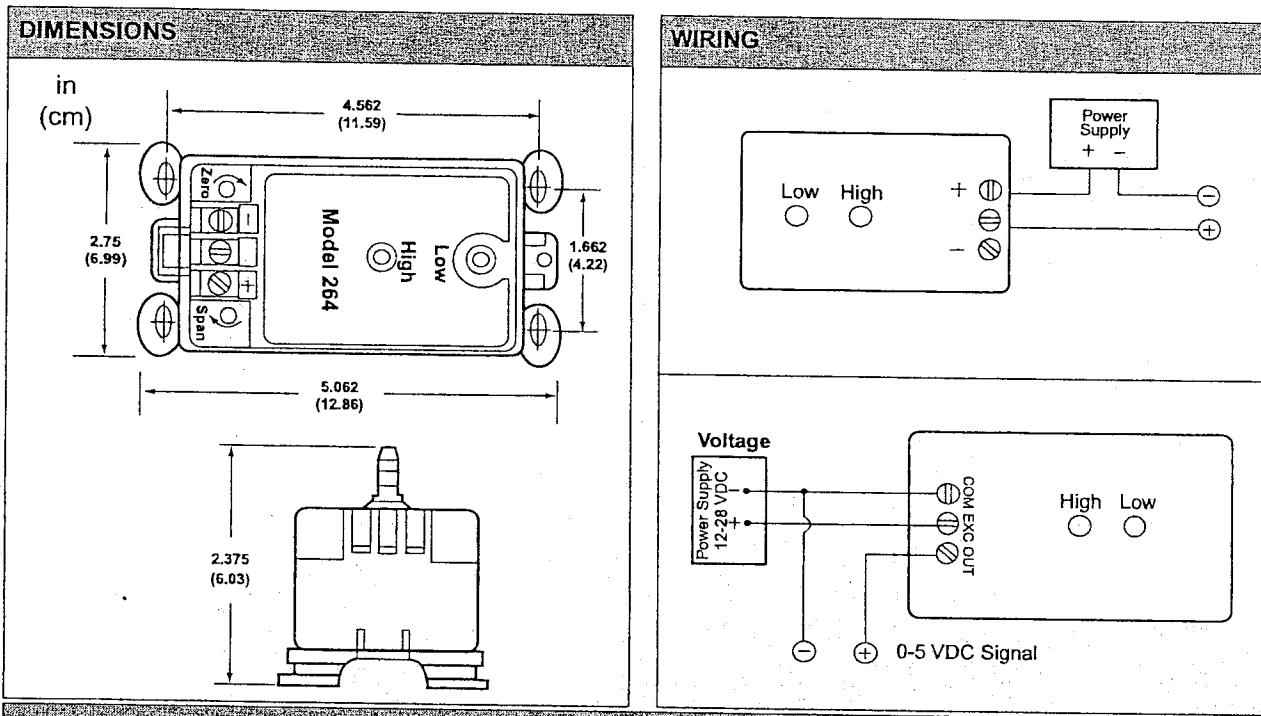
- *HVAC building automation*
- *Variable air volume control*
- *Environmental pollution control*
- *Lab and fume hood control*
- *Filter monitoring*
- *Medical instrumentation*
- *Velocity pressure measurement*

SPECIFICATIONS

SPECIFICATIONS		ELECTRICAL DATA (Current)	ELECTRICAL DATA (Voltage)
Accuracy	±1% FS	Circuit	2 wire
Non-linearity	±0.96% FS	Output	4-20 mA
Hysteresis	0.2% FS	Bi-directional output at zero pressure	12 mA
Non-repeatability	0.1% FS	Max load	800 ohms
Thermal effects		Minimum supply voltage (VDC) =9+(0.02 x circuit resistance)	
Compensated range	0 to 150°F (-18 to 65°C)	Maximum supply voltage (VDC) =32+(0.004 x circuit resistance)	
Zero/span shift	0.033°F (0.018°C)		
Maximum overpressure	±10 psig (68.95 kPa)		
POSITION EFFECT		ELECTRICAL DATA (Voltage)	
(Unit is factory calibrated at 0 g effect with diaphragm vertical)		Circuit	3 wire
Range	Zero offset (%FS/G)	Power	12 to 24 VDC
0-10"	0.12	Output	0 to 5 VDC
→ 0-5"	0.14	Bi-directional output at zero pressure	2.5 VDC
0-1.0"	0.22	Input impedance	≥ 5000Ω
0-0.1"	2.10	Weight	0.55 lbs
Operating temperature	0 to 175°F (-18 to 79°C)		
Storage temperature	-65 to 250°F (-54 to 121°C)		

PRESSURE

DIFFERENTIAL PRESSURE TRANSMITTER MODEL M264



ORDERING INFORMATION

M264	Differential Pressure Transmitter
XXX	Range Code (See Figure 1)
C	4-20 mA output (stocked at Kele)
V	0-5 VDC output (call Kele for availability)

M264 - 2R5WB - C

Model M264 Pressure Transmitter
with a 4-20 mA output proportional to a range of -2.5" W.C. to +2.5" W.C.

Figure 1

RANGE CODE	PRESSURE RANGE	RANGE CODE	PRESSURE RANGE
0R1WD	0-0.10" W.C. 0-24.91 Pa	0R1WB	±0.1" W.C. ±24.91 Pa
R25WD	0-0.25" W.C. 0-62.28 Pa	R25WB	±0.25" W.C. ±62.28 Pa
0R5WD	0-0.50" W.C. 0-124.55 Pa	0R5WB	±0.5" W.C. ±124.55 Pa
00100D	0-1.00" W.C. 0-249.10 Pa	00100B	±1.0" W.C. ±249.10 Pa
2R5WD	0-2.50" W.C. 0-622.75 Pa	2R5WB	±2.5" W.C. ±622.750 Pa
00500D	0-5.00" W.C. 0-1245.50 Pa	00500B	±5.0" W.C. ±1245.50 Pa
010WD	0-10.0" W.C. 0-2491.00 Pa	010WB	±10.0" W.C. ±2491.00 Pa
025WD	0-25.0" W.C. 0-6227.50 Pa	025WB	±25.0" W.C. ±6227.50 Pa
050WD	0-50.0" W.C. 0-12455.00 Pa		
100WD	0-100.0" W.C. 0-24910 Pa		

RELATED PRODUCTS

264-A1

Conduit Housing for M264

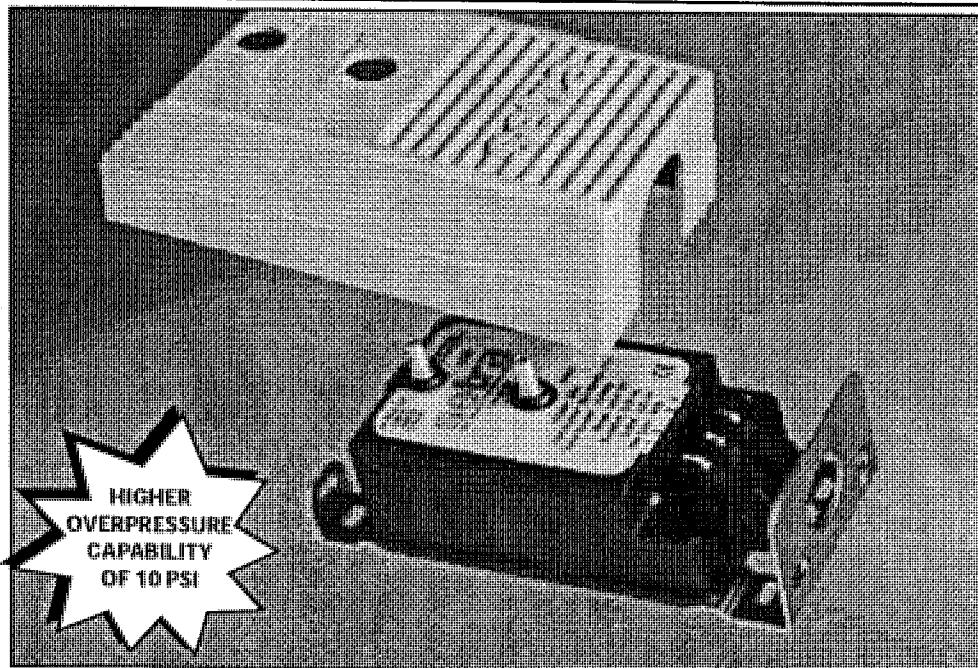
Model 264

Very Low Differential Pressure Transducer

Unidirectional Ranges: 0 - 0.1 to 0 - 100 in. W.C.

Bidirectional Ranges: 0 - ±0.1 to 0 - ±50 in. W.C.

Air or Non-Conducting Gas



Setra Systems 264 pressure transducers sense differential or gauge (static) pressure and convert this pressure difference to a proportional electrical output for either unidirectional or bidirectional pressure ranges. The 264 Series is offered with a high level analog 0 to 5 VDC or 4 to 20 mA output.

Used in Building Energy Management Systems, these transducers are capable of measuring pressures and flows with the accuracy necessary for proper building pressurization and air flow control.

The 264 Series transducers are available for air pressure ranges as low as 0.1 in. W.C. full scale to 100 in. W.C. full scale. Static standard accuracy is ±1.0% full scale in normal ambient temperature environments, but higher accuracies are available. The units are temperature compensated to 0.033% FS/°F thermal error over the temperature range of 0°F to +150°F.



The Model 264 utilizes an improved all stainless steel micro-tig welded sensor. The tensioned stainless steel diaphragm and insulated stainless steel electrode, positioned close to the diaphragm, form a variable capacitor. Positive pressure moves the diaphragm toward the electrode, increasing the capacitance. A decrease in pressure moves the diaphragm away from the electrode, decreasing the capacitance. The change in capacitance is detected and converted to a linear DC electrical signal by Setra's unique electronic circuit.

The tensioned sensor allows up to 10 PSI overpressure (in either direction) with no damage to the unit. In addition, the parts that make up the sensor have thermally matched coefficients, which promote improved temperature performance and excellent long term stability.

When it comes to a product to rely on - choose the Model 264. When it comes to a company to trust - choose Setra, an ESOP (Employee - Owned) company.

Applications

- Heating, Ventilating and Air Conditioning (HVAC)
- Energy Management Systems
- Variable Air Volume and Fan Control (VAV)
- Environmental Pollution Control
- Lab and Fume Hood Control
- Oven Pressurization and Furnace Draft Controls

Benefits

- 10 PSI Overpressure on All Ranges
- Installation Time Minimized with Snap Track Mounting and Easy-To-Access Pressure Ports and Electrical Connections
- 0 to 5 VDC or 2-wire 4 to 20 mA Analog Outputs Are Compatible with Energy Management Systems
- Reverse Wiring Protection
- Internal Regulation Permits Use with Unregulated DC Power Supplies



Visit Setra Online:
<http://www.setra.com>

setra
800-257-3872

NOTE: Setra quality standards are based on ANSI Z540-1.
The calibration of this product is NIST traceable.

U.S. Patent nos. 4093915, 4358814, 4434203; Other Patents Pending

159 Swanson Rd., Boxborough, MA 01719/Telephone: 978-263-1400/Fax: 978-264-0292

Model 264 Specifications

Performance Data

Accuracy RSS(at constant temp)	$\pm 1.0\% \text{ FS}^*$	$\pm 0.25\%$
Non-Linearity, B.F.S.L.	$\pm 0.96\% \text{ FS}$	
Hysteresis	$0.2\% \text{ FS}$	$0.20\% \text{ FS}$
Repeatability	$0.1\% \text{ FS}$	$0.02\% \text{ FS}$

Thermal Effects

Compensated Range $^{\circ}\text{F}$ ($^{\circ}\text{C}$)	0 to +150 (-18 to +65)
Zero/Span Shift %FS/ $^{\circ}\text{F}$ ($^{\circ}\text{C}$)	0.033 (0.06)
Maximum Line Pressure	10 psi
Overpressure	10 psi in Positive or Negative Direction.

Position Effect		
Range	(%FS/G)	Zero Offset
0 to 0.1 in. WC	2.1	
0 to 1.0 in. WC	.22	
0 to 5 in. WC	.14	
0 to 10 in. WC	.12	

* RSS of Non-Linearity, Hysteresis, and Non-Repeatability.

**Note: See ordering information below for optional accuracies.

Specifications subject to change without notice.

Environmental Data

Temperature	
Operating $^{\circ}\text{F}$ ($^{\circ}\text{C}$)	0 to +175 (-18 to +79)
Storage $^{\circ}\text{F}$ ($^{\circ}\text{C}$)	-65 to +250 (-54 to +121)

*Operating temperature limits of the electronics only. Pressure media temperatures may be considerably higher.

Physical Description

Case	Fire-Resistant Glass Filled Polyester
Mounting	Four screw holes on removable zinc plated steel base. Designed for 2.75" snap track.
Electrical Connection	Screw Terminal Strip
Pressure Fittings	3/16" O.D. barbed brass pressure fitting for 1/4" push-on tubing.
Zero and Span Adjustments	Accessible on top of case
Weight (approx.)	10 ounces

Pressure Media

Typically air or similar non-conducting gases.

Electrical Data (Voltage)

Circuit	3-Wire (Com, Exc, Out)
Excitation	9 to 30 VDC
Output	0 to 5 VDC
Bidirectional output at zero pressure:	2.5 VDC
Output Impedance	100 Ohms

*Calibrated into a 50K ohm load, operable into a 5000 ohm load or greater.
**Zero output: factory set to within $\pm 50\text{mV}$.
**Span (full scale) output: factory set to within $\pm 50\text{mV}$.

Electrical Data (Current)

Circuit	2-Wire
Output	4 to 20 mA
Bidirectional output at zero pressure:	12 mA
External Load	0 to 800 ohms
Minimum supply voltage (VDC) = $9 + 0.02 \times$ (Resistance of receiver plus line).	
Maximum supply voltage (VDC) = $30 + 0.004 \times$ (Resistance of receiver plus line).	

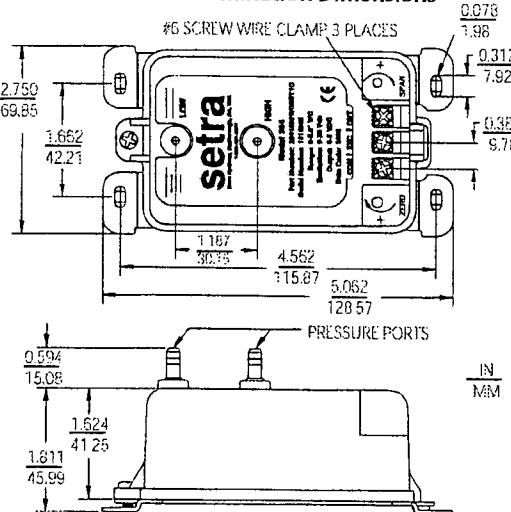
*Calibrated at factory with a 24 VDC loop supply voltage and a 250 ohm load.

**Zero output factory set to within $\pm 16\text{mA}$.

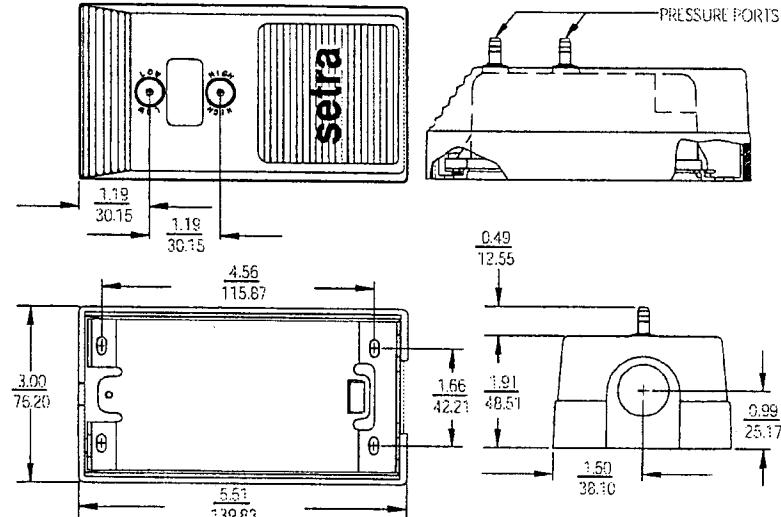
**Span (full scale) output factory set to within $\pm 0.16\text{mA}$.

Outline Drawings

Code T1 Electrical Termination Dimensions



Code A1 Electrical Termination Dimensions



ORDERING INFORMATION

Code all blocks in table.

Example: Part No. 26412R5WD11T1C for a 264 Transducer 0 to 2.5 in.WC Range, 4 to 20 mA Output, Terminal Strip Electrical Connection, and $\pm 1\%$ Accuracy.

2	6	4	1					
Model	Differential	Bidirectional	Output	Elec. Termination	Accuracy			
2641 = 264	OR1WD = 0 to 0.1 in. WC	R05WB = $\pm 0.05 \text{ in. WC}$	11 = 4-20 mA	Standard	Standard			
	R25WD = 0 to 0.25 in. WC	OR1WB = $\pm 0.1 \text{ in. WC}$	2D = 0 to 5 VDC	T1 = Terminal Strip	C = $\pm 1\% \text{ FS}$			
	OR5WD = 0 to 0.5 in. WC	R25WB = $\pm 0.25 \text{ in. WC}$		Optional	Optional (w/Cal. Cert.)			
	001WD = 0 to 1 in. WC	OR5WB = $\pm 0.5 \text{ in. WC}$		A1 = 1/2" Conduit	E = $\pm 0.4\% \text{ FS}$			
	2R5WD = 0 to 2.5 in. WC	001WB = $\pm 1 \text{ in. WC}$			F = $\pm 0.25\% \text{ FS}$			
	003WD = 0 to 3 in. WC	1R5WB = $\pm 1.5 \text{ in. WC}$			G = $\pm 1\% \text{ FS}$			
	005WD = 0 to 5 in. WC	2R5WB = $\pm 2.5 \text{ in. WC}$						
	010WD = 0 to 10 in. WC	005WB = $\pm 5 \text{ in. WC}$						
	015WD = 0 to 15 in. WC	7R5WB = $\pm 7.5 \text{ in. WC}$						
	025WD = 0 to 25 in. WC	010WB = $\pm 10 \text{ in. WC}$						
	050WD = 0 to 50 in. WC	025WB = $\pm 25 \text{ in. WC}$						
	100WD = 0 to 100 in. WC	050WB = $\pm 50 \text{ in. WC}$						

Please contact factory for versions not shown.

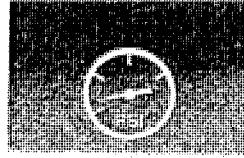
While we provide application assistance on all Setra products, both personally and through our literature, it is up to the customer to determine the suitability of the product in the application.

159 Swanson Road, Boxborough, MA 01719/Tel: 978-263-1400;
Toll Free: 800-257-3872; Fax: 978-264-0292; email: sales@setra.com

setra

PRESSURE

WET / WET DIFFERENTIAL PRESSURE TRANSMITTER MODEL M230



PRESSURE

DESCRIPTION

The Model M230 is a highly accurate differential pressure transmitter that incorporates a capacitive technology to produce a linear electronic signal proportional to the differential pressure. It will measure differential pressure in unidirectional applications as much as 100 psi and bidirectional applications as much as 50 psi. The stainless steel wetted parts and elastomer seals make this unit ideal for both liquids and gases. The NEMA 4 (IP65) case keeps the internal electronics protected from the environment.



CE

FEATURES

- 0.25% accuracy
- NEMA 4/IP65 protection
- Stainless steel wetted parts
- Elastomer seals
- High proof pressure
- Current or voltage outputs
- Mounting bracket included

SPECIFICATIONS

PERFORMANCE DATA

Accuracy	±0.25% FS
Non-linearity	±0.20% FS
Hysteresis	0.10% FS
Non-repeatability	0.05% FS
Thermal effects	
Compensated range	30 to 150°F (-1 to 65°C)
Zero/span shift	2.0 %FS/°F (1.8%FS/°C)
Operating temperature °F (°C)	0 to 175 (-18 to 79)
Storage temperature °F (°C)	-65 to 250 (-54 to 121)
Vibration	5g from 5Hz to 500Hz
Acceleration	10g
Shock	50g
Maximum line pressure	250 psig (1723.8 kPa)
Maximum ΔP overpressure	see chart below

ELECTRICAL DATA (Current)

Circuit	2 wire
Output	4-20 mA
Bidirectional output at zero pressure	12 mA
Electrical load	0 to 1000 ohms
Minimum supply voltage (VDC)	
= 9 VDC + (0.02 X R); R = circuit resistance	
Maximum supply voltage (VDC)	
= 30 VDC + (0.004 X R); R = circuit resistance	

ELECTRICAL DATA (Voltage)

Circuit	3-wire (Exc, Out, Com)
Excitation	9 to 30 VDC for 0 to 5 VDC output
	13 to 30 VDC for 0 to 10 VDC
Output	0 to 5 VDC
	0 to 10 VDC
Load	
Impedance	≥ 5000Ω

PHYSICAL DESCRIPTION

Case	Stainless steel/aluminum
Electrical connection	Terminal block
Pressure fittings	1/4" - 18" NPT internal
Weight	14.4 oz (0.41 kg)
Sensor cavity volume	0.27 in ³ (4.42 cm ³) positive port 0.08 in ³ (1.31 cm ³) negative port (does not include volume of 1/4" NPT fittings)

Proof Pressure range psi	range psi	proof psi	range psi	proof psi
0-1 psi	20 psi	±0.5 psi	20 psi	
0-2 psi	40 psi	±1 psi	40 psi	
0-5 psi	100 psi	±2.5 psi	100 psi	
0-10 psi	100 psi	±5 psi	100 psi	
0-25 psi	250 psi	±10 psi	200 psi	
0-50 psi	250 psi	±25 psi	250 psi	
0-100 psi	250 psi	±50 psi	250 psi	

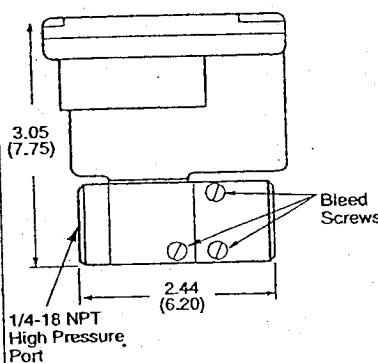
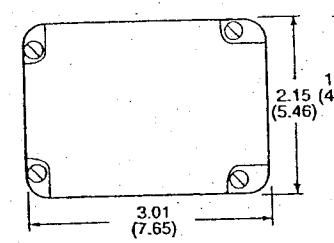
PRESSURE

WET / WET DIFFERENTIAL PRESSURE TRANSMITTER MODEL M230

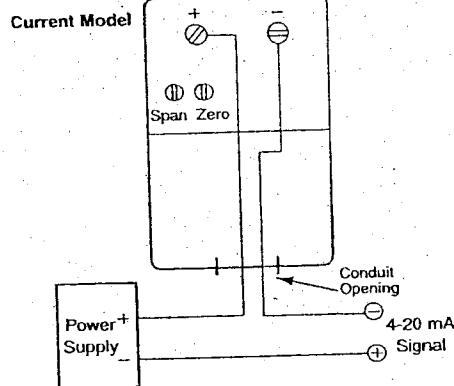


DIMENSIONS

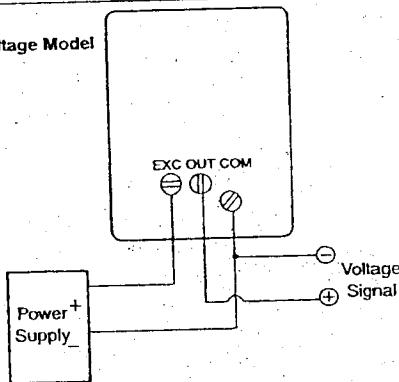
in
(cm)



WIRING



Voltage Model



ORDERING INFORMATION

M230 MODEL		Ranges Code (See Figure 1)	
XXXXX		C	4-20 mA output (stocked at Kele)
		V5	0-5 VDC output
		V10	0 to 10 VDC output
		BVA	Bybass Valve Assembly

M230 - 010PD - C

A wet/wet differential pressure transmitter ranging from 0-10 psi with a 4-20 mA output.

Figure 1

CODE	PRESSURE RANGE psi (kPa)	CODE	PRESSURE RANGE psi (kPa)
001PD	0-1.0 (6.90)	0R5PB	±0.5 (±3.45)
002PD	0-2.0 (13.79)	001PB	±1.0 (±6.90)
005PD	0-5.0 (34.48)	2R5PB	±2.5 (±17.24)
010PD	0-10.0 (68.95)	005PB	±5.0 (±34.48)
025PD	0-25.0 (172.38)	010PB	±10.0 (±68.95)
050PD	0-50.0 (344.75)	025PB	±25.0 (±172.38)
100PD	0-100.0 (689.50)	050PB	±50.0 (±344.75)