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CSU-40

Central Service Unit - 40
Seawater Desalinator

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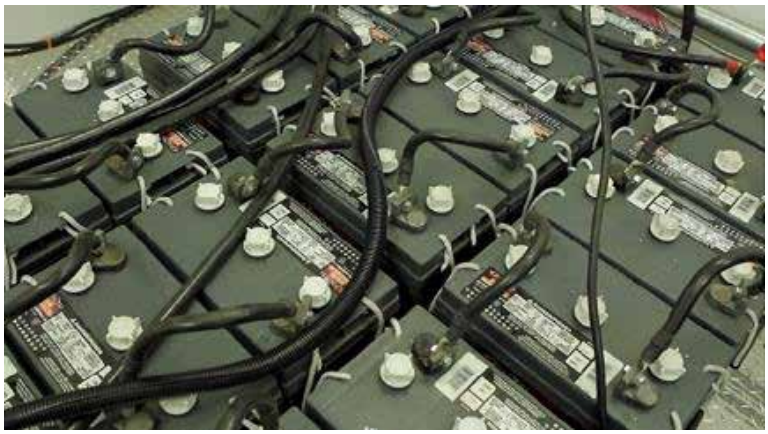

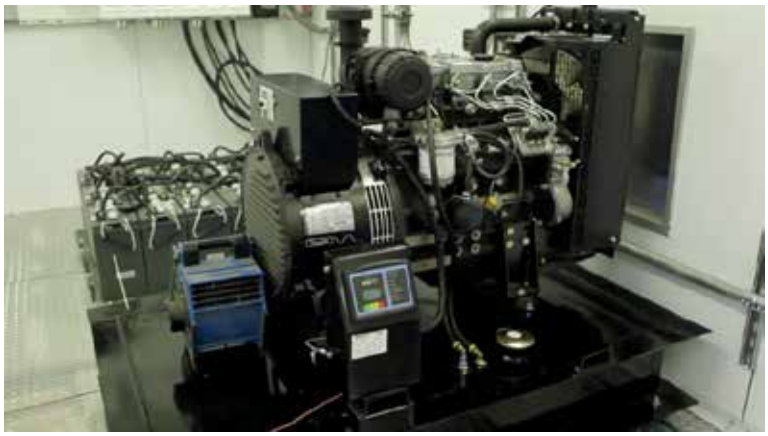

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The CSU was designed for Rapid Response Deployment to provide power generation, water filtration, communications and monitoring/security capabilities for first responders and those displaced by disasters. The CSU can also be deployed to support military and/or law enforcement in remote locations.

Central Service Unit

POWER GENERATION:

Diesel Generator:

- 44kW Perkins 400d series GenSet

Solar System:

- 1 2817600 WSS Magnum MS4448PAE Quad Inverter Power Center, 17,600 watts
- 1 2970180 Outback FM80 & Breakers installed on Mini Magnum Center
- 18 19112455 Solarworld, 245W, Module, SW245 Mono, Silver

Batteries:

- 24 8L16 Flooded Batteries, 6 Volts, 370 AMP Hours

Wind Turbines:

- 2 1200W PM Heater Wind Turbines

Brackish Water System:

- BW-600 - 600 gallons per day Parker#94-0307
- 19,000 gallon holding tank
- 400' of 2" discharge hose with quick connects

Plumbing:

- Fully integrated plumbing system
- ABS draining piping system
- 10 Black Water connections with 5 gallon per minute pump
- 10 Brackish Water connections with 10 gallon per minute pump
- Outlet feed UF Reject Water
- Outlet feed RO Reject Water
- Water inlet feed
- Potable Water Discharge Feed
- 10 Fresh water quick connects
- 400' of quick connect 1" fresh water hose

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Electrical:

- Fully integrated electrical system (120/240V-60Hz)
- UL approved material and devices
- 2 200 AMP electrical distribution panels
- 10 220 30 AMP quick disconnects
- 10 duplex electrical outlets
- 10 T4 lights

Electronics:

- HP P7-1007C Tower
- 2 year MFG warranty
- AMD Phenom II Dual Core
- 6GB DDR Memory
- ITB 7200rpm HD
- SuperMulti DCD +=/-R/RW/CDRW
- ATI Radeon HD 4200
- Built-In WiFi
- Memory Card Reader
- 17" monitor
- Cisco router
- GCX mounting hardware

HVAC:

- 1 ton Bard Commercial HVAC System

Equalizer Leveling and Deployment System:

- CM 4/30 TRL w/ Auto-Level M/O HP
- Gear Box El II Bison/Motor

Images of frame

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Brackish Water Series

Brackish Water Series

300-19,000 GPD
(1-72 m^3/day)

Racor Brackish Water RO Systems

Racor BW systems are designed to produce soft water with reduced dissolved solids from tap or well water sources using high efficiency reverse osmosis membranes. The product water is used in applications such as spot free rinse, water stores, whole house, labs, ice makers, humidification, misting and a wide variety of other applications.

Racor Brackish Water RO systems use proven, reliable components and are mounted on a sturdy powder-coated metal frame. Systems are designed to work at pressures of 150-200PSI. The process design ensures an optimum membrane life by minimizing membrane fouling potential.

Brackish Water Series

Standard Features:

- Stainless steel high pressure RO pump (on all models above 3000 GPD)
- Delayed start-up of high pressure pump
- Automatic membrane flush
- TFC membranes with 316SS or FRP membrane pressure vessels
- Panel mounted permeate & concentrate flowmeters
- Recycle flowmeter
- System and recycle control valves
- Storage tank float tree for auto start/stop
- Powder coated carbon steel frame
- Permeate quality display with high TDS alarm
- Low pressure shut-down with auto-restart
- Pre-treatment backwash/ lockout

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Power Control System Specifications

FLEXmax Specifications

	FLEXmax 80 - FM80-150VDC	FLEXmax 60 - FM60-150VDC
Nominal Battery Voltages	12, 24, 36, 48, or 60 VDC (Single model - selectable via field programming at start-up)	12, 24, 36, 48, or 60 VDC (Single model - selectable via field programming at start-up)
Maximum Output Current	80 amps @ 104º F (40ºC) with adjustable current limit	60 amps @ 104º F (40ºC) with adjustable current limit
Maximum Solar Array STC Nameplate	12 VDC systems 1250 Watts / 24 VDC systems 2500 Watts / 48 VDC systems 5000 Watts / 60 VDC Systems 7500 Watts	12 VDC systems 900 Watts / 24 VDC systems 1800 Watts / 48 VDC systems 3600 Watts / 60 VDC Systems 4500 Watts
NEC Recommended Solar Array STC Nameplate	12 VDC systems 1000 Watts / 24 VDC systems 2000 Watts / 48 VDC systems 4000 Watts / 60 VDC Systems 5000 Watts	12 VDC systems 750 Watts / 24 VDC systems 1500 Watts / 48 VDC systems 3000 Watts / 60 VDC Systems 3750 Watts
PV Open Circuit Voltage (VOC)	150 VDC absolute maximum coldest conditions / 145 VDC start-up and operating maximum	150 VDC absolute maximum coldest conditions / 145 VDC start-up and operating maximum
Standby Power Consumption	Less than 1 Watt typical	Less than 1 Watt typical
Power Conversion Efficiency	97.5% @ 80 Amps in a 48 VDC System - Typical	98.1% @ 60 Amps in at 48 VDC System voltage - Typical
Charging Regulation	Five Stages: Bulk, Absorption, Float, Silent and Equalization	Five Stages: Bulk, Absorption, Float, Silent and Equalization
Voltage Regulation Set points	10 to 60 VDC user adjustable with password protection	10 to 60 VDC user adjustable with password protection
Equalization Charging	Programmable Voltage Setpoint and Duration - Automatic Termination when completed	Programmable Voltage Setpoint and Duration - Automatic Termination when completed
Battery Temperature Compensation	Automatic with optional RTS installed / 5.0 mV per °C per 2V battery cell	Automatic with optional RTS installed / 5.0 mV per °C per 2V battery cell
Voltage Step-Down Capability	Can charge a lower voltage battery from a higher voltage PV array - Max 150 VDC input	Can charge a lower voltage battery from a higher voltage PV array - Max 150 VDC input
Programmable Auxiliary Control Output	12 VDC output signal which can be programmed for different control applications (Maximum of 0.2 amps DC)	12 VDC output signal which can be programmed for different control applications (Maximum of 0.2 amps DC)
Status Display	3.1" (8 cm) backlit LCD screen - 4 lines with 80 alphanumeric characters total	3.1" (8 cm) backlit LCD screen - 4 lines with 80 alphanumeric characters total
Remote Display and Controller	Optional Mate or Mate2 with RS232 Serial Communications Port	Optional Mate or Mate2 with RS232 Serial Communications Port
Network Cabeling	Proprietary network system using RJ 45 Modular Connectors with CAT 5e Cable (8 wires)	Proprietary network system using RJ 45 Modular Connectors with CAT 5e Cable (8 wires)
Data Logging	Last 128 days of Operation - Amp Hours, Watt Hours, Time in Float , Peak Watts, Amps, Solar Array Voltage, Max Battery Voltage Min Battery Voltage and Absorb for each day along with total Accumulated Amp Hours, and kW Hours of production	Last 128 days of Operation - Amp Hours, Watt Hours, Time in Float , Peak Watts, Amps, Solar Array Voltage, Max Battery Voltage Min Battery Voltage and Absorb for each day along with total Accumulated Amp Hours, and kW Hours of production
Hydro Turbine Applications	Consult factory for approved Turbines	Consult factory for approved Turbines
Positive Ground Applications	Requires two Pole Breakers for switching both positive and Negative Conductors on both Solar Array and Battery Connections (HUB 4 and HUB 10 can not be used for use in positive ground applications)	Requires two Pole Breakers for switching both positive and Negative Conductors on both Solar Array and Battery Connections (HUB 4 and HUB 10 can not be used for use in positive ground applications)
Operating Temperature Range	Minimum -40° to maximum 60° C (Power capacity of the controller is automatically derated when operated above 40° C)	Minimum -40° to maximum 60° C (Power capacity of the controller is automatically derated when operated above 40° C)
Environmental Rating	Indoor Type 1	Indoor Type 1
Conduit Knockouts	One 1" (35mm) on the back; One 1" (35mm) on the left side; Two 1" (35mm) on the bottom	One 1" (35mm) on the back; One 1" (35mm) on the left side; Two 1" (35mm) on the bottom
Warranty	Standard 5 year / Available 10 Year	Standard 5 year / Available 10 Year
Weight - Unit	12.20 lbs (5.56 kg)	11.65 lbs (5.3 kg)
Weight - Shipping	15.75 lbs (7.10 kg)	14.55 lbs (6.4 kg)
Dimensions - Unit	16.25" x 5.75" x 4" (41.3 x 14 x 10 cm) - (H x W x D)	13.5 x 5.75 x 4" (40 x 14 x 10 cm)
Dimensions - Shipping	21" x 10.5" x 9.75" (53 x 27 x 25 cm)	18 x 11 x 8" (46 x 30 x 20 cm)
Options	Remote Temperature Sensor (RTS), HUB 4, HUB 10, MATE, MATE 2	Remote Temperature Sensor (RTS), HUB 4, HUB 10, MATE, MATE 2
Menu Languages	English & Spanish	English & Spanish

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Power Control System

- **Increases PV Array Output by up to 30%**
- **Advanced Continuous Maximum Power Point Tracking**
- **Full Power Output in Ambient Temperatures up to 104°F (40°C)**
- **Battery Voltages from 12 VDC to 60 VDC**
- **Fully OutBack Network Integrated and Programmable**
- **Programmable Auxiliary Control Output**
- **Built-in 128 days of Data Logging**
- **Standard 5 Year Warranty**

The FLEXmax family of charge controllers is the latest innovation in Maximum Power Point Tracking (MPPT) charge controllers from OutBack Power Systems. The innovative FLEXmax MPPT software algorithm is both continuous and active, increasing your photovoltaic array power yield up to 30% compared to non-MPPT controllers. Thanks to active cooling and intelligent thermal management cooling, both FLEXmax charge controllers can operate at their full maximum current rating, 60 Amps or 80 Amps respectively, in ambient temperatures as high as 104°F (40°C).

Included in all of the FLEXmax Charge Controllers are the revolutionary features first developed by OutBack Power, including support for a wide range of nominal battery voltages and the ability to step-down a higher voltage solar array to recharge a lower voltage battery bank. A built-in, backlit 80 character display shows the current status and logged system performance data for the last 128 days at the touch of a button. The integrated OutBack network communications allows FLEXmax series Charge Controllers to be remotely programmed and monitored via a MATE system display and provides unrivaled complete system integration.

FLEXmax MPPT Charge Controllers are the only choice when you demand a high performance, efficient and versatile charge controller for your advanced power system.

GREEN HORIZON GLOBAL

Solar Specifications

Models	MS4024PAE	MS4448PAE	MS3748PAEJ
Inverter Specifications			
Input battery voltage range	18.0 to 33.8 VDC	36.0 to 67.6 VDC	36.0 to 67.6 VDC
Absolute maximum DC input	50 VDC	68 VDC	68 VDC
Nominal AC output voltage	120 / 240 VAC split phase		
AC output voltage accuracy	L-N: 120 VAC ±5%, L-L: 240 VAC ±5% (continuous power)		
Output frequency and accuracy	60 Hz ± 0.04%		50 Hz ± 0.4Hz
Total Harmonic Distortion (THD)	< 5%		
Continuous power output (at 25° C with 12.5 VDC nominal)	4000 VA (L-L) (max 81% output imbalance from L-N)	4400 VA (L-L) (max 81% output imbalance from L-N)	3700 VA (L-L) (max 81% output imbalance from L-N)
Continuous AC output current	L-N: 27.0A/120VAC, L-L: 16.7A/240VAC	L-N: 29.7A/120VAC, L-L: 18.3A/240VAC	L-N: 25.0A/120VAC, L-L: 15.5A/240VAC
1 msec surge current (amps AC)	L-N: 120, L-L 70	L-N: 120, L-L 70	L-N: 120, L-L 70
100 msec surge current (amps AC)	L-N: 72, L-L 40	L-N: 75, L-L 40	L-N: 75, L-L 32
5 sec surge power (real watts)	5800	8500	6200
30 sec surge power (real watts)	5200	6000	6000
5 min surge power (real watts)	4800	5400	3600
30 min surge power (real watts)	4500	4800	3500
Maximum continuous input current	267 ADC	147 ADC	123 ADC
Inverter efficiency (peak)	93%	94%	91%
HBCO / HBCI (High Battery Cut Out / In)	>33.8 VDC / 33.2 VDC	>67.6 VDC / 66.4 VDC	>67.6 VDC / 66.4 VDC
LBCO / LBCI (Low Battery Cut Out / In)	18.0 VDC (adjustable) / 25.0 VDC	36.0 VDC (adjustable) / 50.0 VDC	36.0 VDC (adjustable) / 50.0 VDC
AC Relay Transfer time (minimum)	16 msecs		
Power Consumption - searching	< 6 watts		< 10 watts
Power Consumption - inverting (no load)	27 watts	25 watts	22 watts
Output Waveform	Pure Sine Wave		
Charger Specifications			
Continuous charger output at 25° C	105 ADC (@ 28.2VDC)	60 ADC (@56.4VDC)	55 ADC (@56.4VDC)
Input current for continuous rated output	15 AAC (at 120 VAC) per leg	17.5 AAC (at 120VAC) per leg	8 AAC (at 120VAC) per leg
Charger efficiency (peak)	90%		
AC input frequency range	50 to 70 Hz		40 to 60 Hz
AC input voltage range	L-N: 60 to 140 VAC (120 VAC nominal) L-L: 120 to 280 VAC (240 VAC nominal)		
Power factor	>0.95		
General Features and Capabilities			
Transfer relay capability	2 legs at 30 AAC maximum per leg		
Five stage charging capability	Bulk, Absorb, Float, Equalize (requires remote) and Battery Saver™		
Battery temperature compensation	Standard with included temp sensor (battery temp 0 to 50° C)		
Internal cooling	0 to 120 cfm variable speed drive using dual 92mm brushless DC fans		
Over-current protection	with two overlapping circuits		
Over-temperature protection	on transformer, MOSFETs, and ambient temperature		
Corrosion protection	PCB's conformal coated, powder coated chassis/top, and stainless steel fasteners		
Safety Listings	ETL listed to ANSI / UL STD 1741 and CSA STD C22.2 No. 107.1-01		NA
Warranty	2 years parts and labor		
Environmental Specifications			
Operating temperature	-20° C to +60° C (-4° F to 140° F)		
Nonoperating temperature	-40° C to +70° C (-40° F to 158° F)		
Operating humidity	0 to 95% RH non-condensing		
Physical Specifications			
Unit Dimensions (h x w x d)	13.75" x 12.65" x 8.0" (34.9 cm x 32.1 cm x 20.3 cm)		
Shipping Dimensions (h x w x d)	18.5" x 17.5" x12.5" (47 cm x 44.5 cm x 31.8 cm)		
Mounting	Shelf or wall (vents not allowed to face downward unless ME-HOOD and ME-CB are installed)		
Unit Weight	55 lbs (24.9 kg)		
Shipping Weight	60 lbs (27.2 kg)		
Max operating altitude	15,000' (4570 m)		

Specifications subject to change without notice

GREEN HORIZON GLOBAL

Brackish Water Series

Brackish Water Series

300-19,000 GPD
(1-72 m^3/day)

Larger BW systems available on request.

Model	Part Number	Power Volts/Phase/Hertz/Amps	Capacity GPD	m^3/day	Dimensions Length	(In/cm) Depth	Approx. Height	Ship. Wt. (lb/kg)
BW-300	94-0301 94-0320	110/1/60/7 230/1/50/5	300	1	20/51	24/61	55/140	230/104
BW-600	94-0302 94-0307 94-0321	110/1/60/10 220/1/60/5 230/1/50/7	600	2	20/51	24/61	55/140	240/109
BW-1200	94-0303 94-0308 94-0322	110/1/60/14 220/1/60/7 230/1/50/10	1,200	5	20/51	24/61	55/140	250/113
BW-1800	94-0309 94-0323	220/1/60/8 230/1/50/17	1,800	7	20/51	24/61	55/140	275/125
BW-3000	94-0000 94-0324	220/1/60/16 230/1/50/17	3,000	12	20/51	24/61	55/140	300/136
BW-5500	94-0310 94-0325 94-0335	220/1/60/17 230/1/50/17 440/3/60/5	5,500	21	20/51	32/82	55/140	325/147
BW-7000	94-0311 94-0326 94-0336	220/1/60/17 230/1/50/17 440/3/60/5	7,000	27	20/51	32/82	55/140	350/159
BW-8500	94-0312 94-0327 94-0337	220/1/60/17 230/1/50/17 440/3/60/5	8,500	32	20/51	32/82	55/140	375/170
BW-10000	94-0313 94-0328 94-0338	220/1/60/17 230/1/50/17 440/3/60/5	10,000	38	20/51	32/82	55/140	400/181
BW-11500	94-0314 94-0329 94-0339	220/1/60/17 230/1/50/17 440/3/60/5	11,500	44	20/51	40/102	55/140	441/200
BW-13000	94-0315 94-0330 94-0340	220/1/60/17 230/1/50/17 440/3/60/5	13,000	49	20/51	40/102	55/140	466/211
BW-14400	94-0316 94-0331 94-0341	220/1/60/17 230/1/50/17 440/3/60/5	14,400	55	20/51	40/102	55/140	491/223
BW-16000	94-0317 94-0332 94-0342	220/1/60/17 230/1/50/17 440/3/60/5	16,000	60	20/51	46/117	55/140	516/234
BW-17300	94-0318 94-0333 94-0343	220/1/60/17 230/1/50/17 440/3/60/5	17,300	66	20/51	46/117	55/140	541/245
BW-19000	94-0319 94-0334 94-0344	220/1/60/17 230/1/50/17 440/3/60/5	19,000	72	20/51	46/117	55/140	566/257

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Parker Hannifin Model PW-12000
Sea Water Reverse Osmosis System

The Village MarineTec. (VMT) Seawater Desalinator is a single-pass purification system that uses reverse osmosis (RO) as its method of seawater desalination. This unit produces potable (drinking) quality water with salt concentrations of <500 ppm by removing approximately 99% of the dissolved salt in seawater. The system includes the following standard equipment:

- Warranty 1 year parts and labor
- Aqua Pro titanium high pressure pump
- (6) membranes installed
- Stainless steel, glycerin filled pressure gauges
- Stainless steel 316 high pressure valve allows bypass for start-up and low pressure flushing without readjustment of regulator valve
- Automatic valve diverts water to discharge if water quality drops below acceptable standards
- Digital water quality monitor. Displays PPM of TDS of product water output
- Temperature & total hours for accurate service
- Freshwater flush system (extended membrane life)
- 25 HP main pump monitor
- 460/3/60 Hz voltage

Physical Characteristics of the PW12000:

- Length: 84”
- Width: 48”
- Height: 35”
- Weight: 1900 lbs

Utility Requirements:

- Monitor: 25 HP

Utility	Connection	Design Pressure Minimum (psi)	Design Pressure Maximum (psi)
Raw water inlet	1 ½” ANSI Flange	0	50
Reject discharge*	1 ½” ANSI Flange	0	15
Product water discharge	1” ANSI Flange	0	15
Flush water inlet	1 ½” NPT	20	50

* Vacuum condition at shutdown is not acceptable, syphon breaker may be reqd.

Unit	Raw Water inlet (gpm)	Reject discharge (gpm)	Product water discharge (gpm)
PW-12000	36	28	8.3

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Environmental Requirements

Parameter	Specification
Ambient temperature:	1-40°C (33-108°F)
List (permanent):	15°
Trim (fore and aft):	+ 30°
Pitch:	± 10° (6 sec cycle)
Roll:	± 30° (12 sec cycle)

Consumables:

The following is the normal quantity of equipment consumed during 6 months of standard unit operation:

Note: Only Village Marine Tec approved filters and chemicals should be used.

Description	Qty.	WMT Part No.
Cleaning Chemical #1, 25 lbs	3	85-0045
Cleaning Chemical #2, 25 lbs	3	85-0048
Preservative Chemical #3, 25 lbs	1	85-0049
Filter, 100 ft², 5 micron	6	33-5100
Filter, 100 ft², 20 micron	6	33-2100
Flushing Filter	2	See Parts Drawing
Oil, HP Pump, Quart	20	85-0050
LP Pump Mech Seal Kit	1	90-0108
HP Pump Service Kits	1	See Pump Manual

P/N	Description	List Price
85-0045	CLEANER, #1, DETERGENT, 2	$206.00
85-0048	CLEANER, #2, SCALE REMOVE	$155.00
33-5100	FILTER,5 MIC,100 SQ FT,8.	$148.00
33-2100	FILTER, 20 MIC, 100 SQ FT	$138.00
85-0050	OIL, PLUNGER PUMP, PER 1	$ 20.00
90-0108	KIT, PUMP, MECH SEAL, 1"	$181.00

The following table lists the basic equipment recommended to perform most types of verification testing and system maintenance. The salinity meter allows the operator to perform routine sampling of the RO membranes:

Description	VMT Part No.
Kit, pH Test, 0-14 (10 strips):	90-0135
Meter, Handheld Analog, 0-5000 ppm:	40-5000
10X Range Extender for Analog Meter:	40-5001
Alternate Digital Handheld meter, 0-1000 ppm:	99-1990
Solution, Calibration, 300 ppm:	90-1300
Solution, Calibration, 30,000 ppm:	90-1301