

Introduction – Battery Back Up Unit for DC Power Management

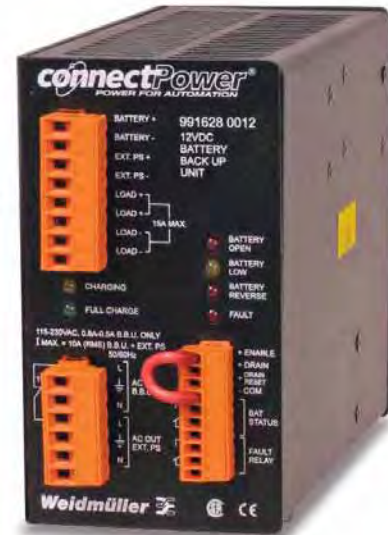
Weidmüller's Battery Back Up Unit (BBU) is designed to be the heart of an uninterruptible DC power management system. The connectPower BBU combines with Weidmüller power supplies and a customer-supplied battery pack to form a scalable DC power system. This enables users to put together a system uniquely tailored to their needs.

These full-featured units have all the diagnostics needed to monitor the status of the power system. These DC power management units interface with the DC power supplies in the control cabinet. In addition, they monitor the status of the DC loads and the DC batteries. If the AC is removed or experiences a voltage sag, the load is switched seamlessly to the batteries. When the AC line is restored, the batteries are recharged and maintained.

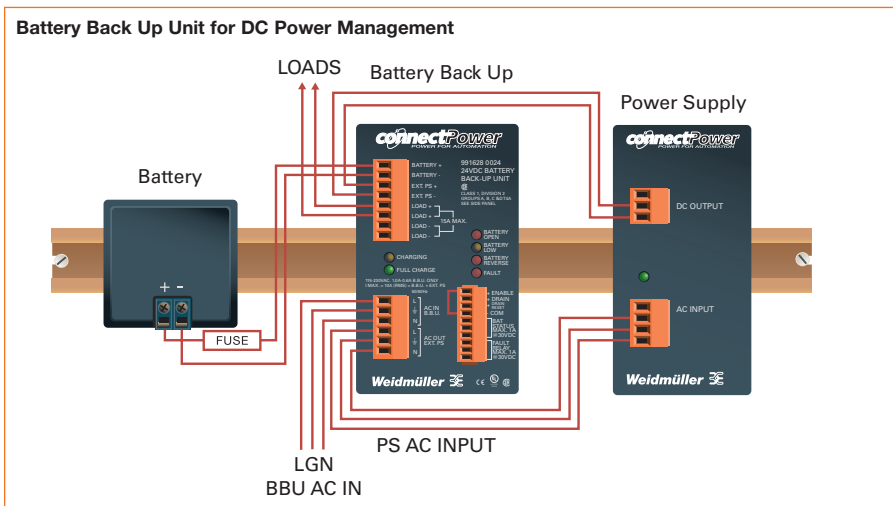
With the BBU Power Supply, 2A of battery charging current is available at 24 VDC, and 3A with the 12 VDC units. Extensive monitoring is provided via LEDs. Relay contacts provide battery status indication and fault indication.

Battery Back Up Units:

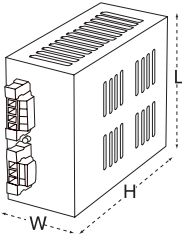
- DC backup system that actively manages DC battery banks
- Increases system uptime by providing DC power to load in the event of an AC power failure
- If the input fails, the load is switched seamlessly to batteries
- Continuously monitors DC output voltage of power supply
- Extensive monitoring is provided via LEDs and outputs



Battery Back Up Unit for DC Power Management



Battery Back Up Unit for DC Power Management



Approvals:



**BBU
12 VDC Input**



**BBU
24 VDC Input**



Ordering Data

Technical Data

Input voltage	Minimum	85 VAC
	Typical	115-230 VAC ± 10%
	Maximum	265 VAC
Input current	at 115 VAC	0.8 A
	at 230 VAC	0.5 A
Input protection	Fuse	2 A slow blow (internal, not user serviceable)
	Input current	Thermistor 40 A maximum
	Overvoltage	Varistor
Output	Voltage Nominal	12 VDC syst.
	Current	15 A maximum
	Surge Current from no load	20 A max for 300 ms 30 A max for 100 ms
Load voltage		12-14 V
AC current		10 A
Switching time		< 0.5 ms
Protection	Battery Polarity Protection	Limited by internal 4.0 A fuse
	Battery Overvoltage	16 V
	Battery Undervoltage	9.3 V
	BBU Over Temperature	120°C (248°F) ±10%
	Charger Short Circuit	Continuous
	Load Short Circuit	Continuous
Hold Time	at 115 VAC	46 ms
	at 230 VAC	226 ms
Temperature	Storage	-20°C...+85°C (-4°F...+185°F)
	Operating	-20°C...+50°C (-4°F...+122°F)
Humidity	Storage temperature	20...90%
	Operating temperature	20...85% non-condensing
Galvanic Isolation	Input to output	3 KV
	Input/output to rail	3 KV
	Input to ground	1.5 KV
	Output to ground	500 V
Wire Size	Power Connections	0.1...4 mm ² (26...12 AWG)
	Control inputs/relay outputs	0.5...1.5 mm ² (28...14 AWG)
Dimensions (L x W x H)		127.5 x 72.5 x 161 mm (5.02 x 2.85 x 6.34 in.)
Weight		950 g (2.09 lbs.)
Control inputs	Enable	dry contact/open collector
Status outputs	Drain	dry contact/open collector
	Drain Reset	dry contact/open collector
	Battery Status	Form C Relay and LED
	Fault	Form C Relay and LED
Battery Charger	Charge Current	3.0 A
	Full Charge	Regulates to 13.65 V
	Battery Reverse	LED
	Battery Open	LED
	Battery Low	Yellow LED on below 11 V
Battery Capacity	Minimum	3 AH
	Maximum	scalable
Mounting		TS 35 DIN rail (optional direct panel mount)
Connections		plug and socket
Approvals/Certifications		
CSA, UL 508 Listed, CE, CSA Class 1 Div. 2 and Zone 2		
Accessories		
Chassis Mounting Kit		

Type	Order No.
BBU 12 VDC	9916280012

Type	Order No.
BBU 24 VDC	9916280024

Input voltage	Minimum	85 VAC
	Typical	115-230 VAC ± 10%
	Maximum	265 VAC
Input current	at 115 VAC	1.0 A
	at 230 VAC	0.6 A
Input protection	Fuse	2 A slow blow (internal, not user serviceable)
	Input current	Thermistor 40 A maximum
	Overvoltage	Varistor
Output	Voltage Nominal	24 VDC syst.
	Current	15 A maximum
	Surge Current from no load	20 A max for 300ms 30 A max for 100ms
Load voltage		24-28 V
AC current		10 A
Switching time		< 0.5 ms
Protection	Battery Polarity Protection	Limited by internal 4.0 A fuse
	Battery Overvoltage	32 V
	Battery Undervoltage	18.3 V
	BBU Over Temperature	120°C (248°F) +10%
	Charger Short Circuit	Continuous
	Load Short Circuit	Continuous
Hold Time	at 115 VAC	24 ms
	at 230 VAC	190 ms
Temperature	Storage	-20...+85°C (-4°F...+185°F)
	Operating	-20...+50°C (-4°F...+122°F)
Humidity	Storage temperature	20...90%
	Operating temperature	20...85% non-condensing
Galvanic Isolation	Input to output	3 KV
	Input/output to rail	3 KV
	Input to ground	1.5 KV
	Output to ground	500 V
Wire Size	Power Connections	0.1...4 mm ² (26...12 AWG)
	Control inputs/relay outputs	0.5...1.5 mm ² (28...14 AWG)
Dimensions (L x W x H)		127.5 x 72.5 x 161 mm (5.02 x 2.85 x 6.34 in.)
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Control inputs	Enable	dry contact/open collector
Status outputs	Drain	dry contact/open collector
	Drain Reset	dry contact/open collector
	Battery Status	Form C Relay and LED
	Fault	Form C Relay and LED
Battery Charger	Charge Current	2.0 A
	Full Charge	Regulates to 27.3V
	Battery Reverse	LED
	Battery Open	LED
	Battery Low	Yellow LED on below 22 V
Battery Capacity	Minimum	2 AH
	Maximum	scalable
Mounting		TS 35 DIN rail (optional direct panel mount)
Connections		plug and socket
Approvals/Certifications		
CSA, UL 508 Listed, CE, CSA Class 1 Div. 2 and Zone 2		
Accessories		

Battery Back Up Unit for DC Power Management – Operation

Functional Outline

The BBU is at its basic level a scalable UPS for 12 VDC or 24 VDC power. It is the heart or center of the system with everything wired through it. In this way it can monitor the status of the AC mains, the AC to the power supply, the DC out of the power supply and the battery condition. The BBU does NOT have built-in batteries. The batteries are sized based on the current and time demand for the back-up power.

The typical system is comprised of the following: the BBU, the battery pack and the power supply. The power supply is sized as per normal requirements (how much current is needed). The batteries are sized based on the amount of back-

up current and the length of time that the current is required. There is no upper limit to the size of the batteries; we do not recommend that a battery pack smaller than 4Ahr be used due to the bulk charge rates of the BBU (3A for the 12V version and 2A for the 24V version), as they may be damaged with a bulk charge at this level.

Under normal conditions the BBU operates as a battery charger. It trickles the batteries to a minimum voltage (if necessary) then bulk charges at a rate of 3A for the 12V version and 2A for the 24V version until the batteries reach 14.75V / 29.5V. At this point the BBU floats the batteries to 13.65V / 27.3V.

The BBU switches the output current from Power supply to Battery through an internal Mosfet. This allows the unit to switch over in milliseconds.

The BBU has two form C relays, one for Battery status and the other for Fault monitoring. There are three inputs as follows: Enable, Drain and Drain Reset. These I/O are explained in detail below.

Digital Inputs

Enable:

A connection between the "Enable" and "COM" terminals enables the BBU. If terminals are open circuit (Disabled), the BBU functions as a battery charger only. In the event of AC failure the batteries are not connected to the load via the BBU. The BBU is factory preset as Enabled.

Drain:

A temporary short between the "Drain" and "COM" terminals switches the load to the batteries until the battery voltage reaches 11/22V. At this point the AC power is returned to the power supply and the BBU starts recharging the batteries. The Drain cycle can also be reset / terminated by activating the "Drain Reset" input.

Drain Reset:

A temporary short between the "Drain Reset" and "COM" terminals disables the Drain cycle to the batteries.

Diagnostic LEDs

Full Charged LED (green):

On when battery voltage is 14.75/29.5V or greater.

Bat Status relay is energized.

Once fully charged the BBU drops the charge voltage to 13.65/27.3V ("float" voltage).

Battery Low LED (yellow):

On when battery voltage is <11/22 VDC.

Bat Status relay is off.

If the battery voltage drops below 9.7/18.7V the load is switched off.

Charging LED (yellow):

On when BBU is charging the batteries.

Off when the "Full Charged" LED is on.

Fault LED (red):

On when AC fails.

On when the external power supply voltage is <11V/21.5V.

On when the batteries are not connected.

On when the battery voltage is <9.7/18.7V.

Fault relay de-energizes for the above conditions.

Battery Reverse LED (red):

Batteries connected in reverse.

Fault relay de-energizes and fault LED turns on.

There is an internal fuse that will open to prevent damage to BBU or to the batteries.

Battery Open LED (red):

No batteries connected – takes approx. 60 seconds to detect after turning on BBU.

Fault LED is on and Fault relay is de-energized.

Relay Outputs

Bat Status:

Battery status, this changes state based on whether the batteries are charging or fully charged.

See Diagnostic LEDs (Full Charge, Battery Low and Full Charge) for more detailed information.

Fault Relay:

De-energizes under a fault condition.

See Diagnostic LEDs (Fault LED, Battery Reverse, and Battery Open) for more detailed information.

