QSG0009 PS-Selection Guide AC Backup

Guide for AC backup for power supplies

Instructions to select proper devices for AC backup

Abstract:
This guide gives you an overview of the Weidmüller products that ensure the 24V supply of the devices when there is a voltage interruption on the AC side.

Hardware reference

No.	Component name	Article No.	Hardware / Firmware version
1	CP DC UPS 24V 20A/10A	1370050010	-
2	CP DC UPS 24V 40A	1370040010	-
3	DURA ECO LA-BAT 24V 1.2AH	2789890000	-
4	DURA ECO LA-BAT 24V 3.4AH	2789900000	-
5	DURA ECO LA-BAT 24V 7AH	2789910000	-
6	DURA ECO LA-BAT 24V 12AH	2789920000	-
7	DURA ECO LA-BAT 24V 17AH	2789930000	-
8	PRO DC BUFFER 24V 20A	2786240000	-
9	PRO DC BUFFER 24V 40A	2786250000	-

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Content

1 Warning and Disclaimer

Warning
Controls may fail in unsafe operating conditions, causing uncontrolled operation of the controlled devices. Such hazardous events can result in death and / or serious injury and / or property damage. Therefore, there must be safety equipment provided / electrical safety design or other redundant safety features that are independent from the automation system.

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Note
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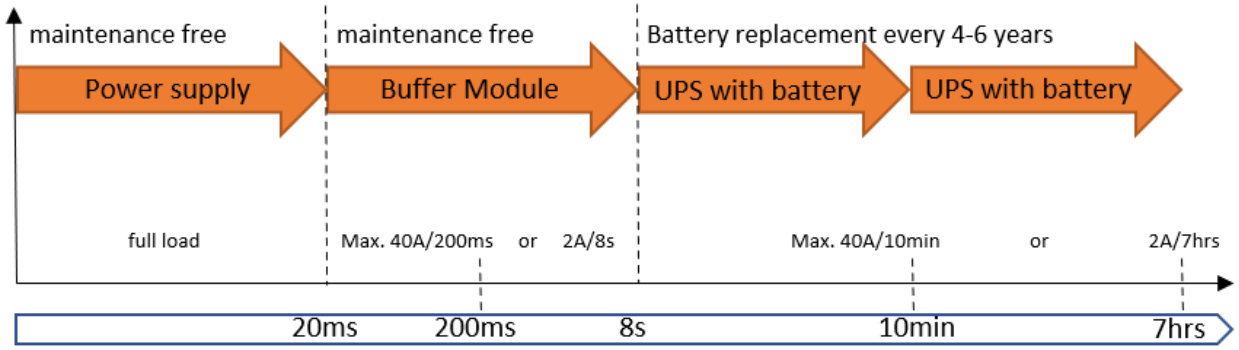
Security notes
In order to protect equipment, systems, machines and networks against cyber threats, it is necessary to implement (and maintain) a complete state-of-the-art industrial security concept. The customer is responsible for preventing unauthorized access to his equipment, systems, machines and networks. Systems, machines and components should only be connected to the corporate network or the Internet if necessary and appropriate safeguards (such as firewalls and network segmentation) have been taken.

2 Solutions depending on back-up time required

2.1 Overview

There are several different mechanisms to solve AC block-out depending on the time that sustainable DC power must be active when AC supply is out. In the following figure we can see a fast overview about different solutions depending on that:



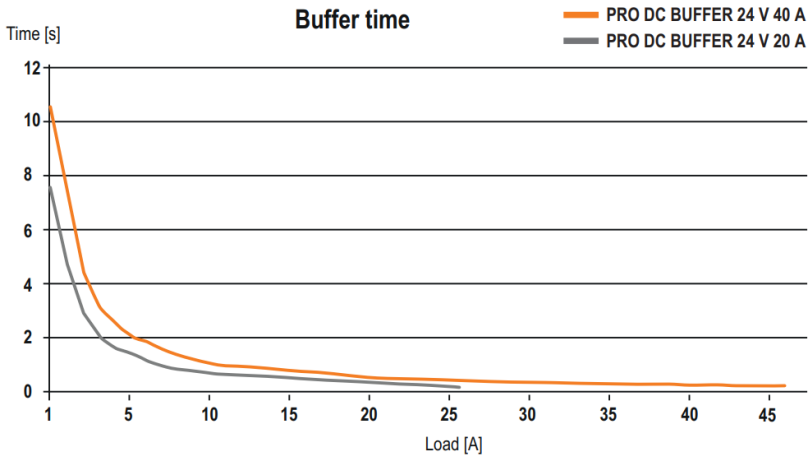
2.2 Power supply

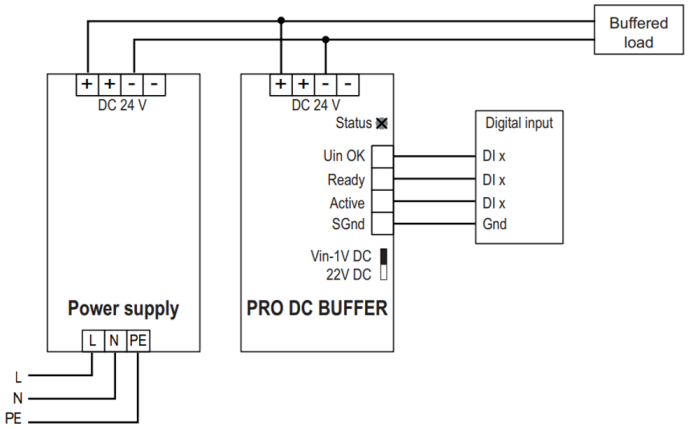
Our actual range of power supplies (PROECO, PROMAX and PROTOP) can grant stable DC output for a minimum of 20ms when AC side is off.

Mains failure bridge-over time	> 20 ms @ 115V AC/ 230 VAC

2.3 Buffer module

The big advantage of the buffer module is the uninterrupted bridging. The disadvantage of the buffer module is the short bridging time. Buffer modules can therefore only be used for short bridging times. In the following graph you can see the buffering time for the PRO DC BUFFER 24 V 40A and PRO DC BUFFER 24 V 20A.



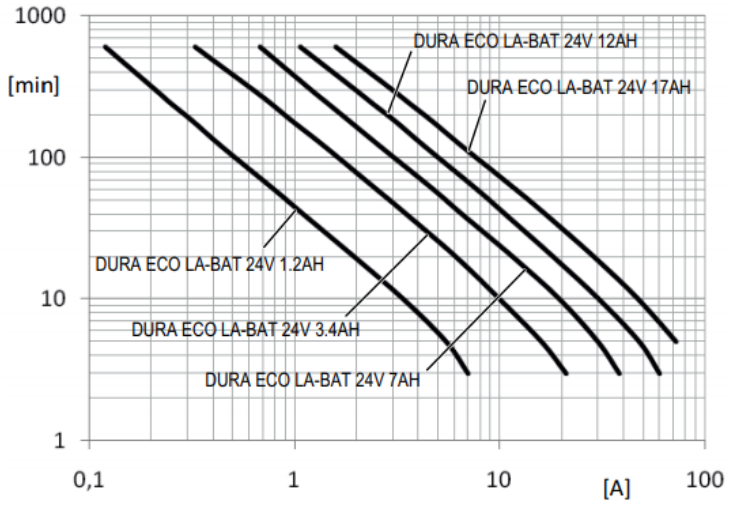


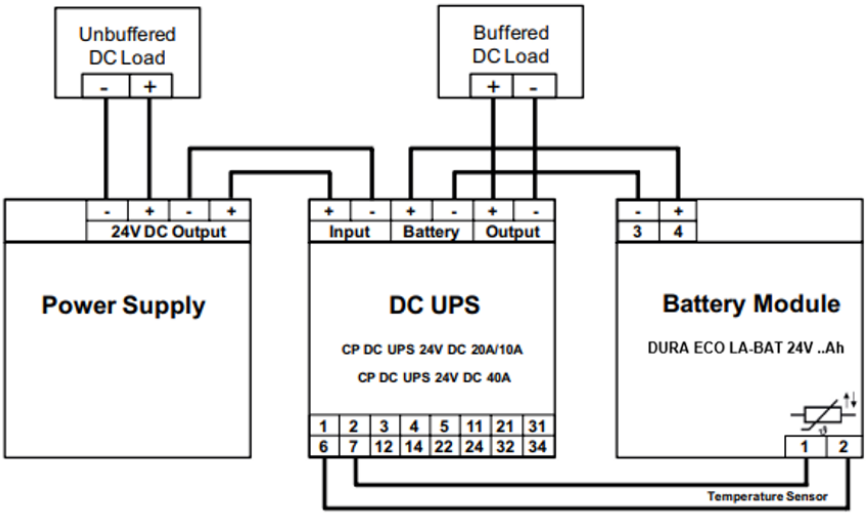
2.4 Battery module

For longer periods of time the usage of a batteries is required.
First, we should place a control unit module to properly charge the battery, detect AC fault and make the switching between standard mode and battery mode. The control unit module will be selected depending on the DC output power required for the application:

Current (output DC power)	Unit control module part number
Up to 20 Amps	1370050010
Up to 40 Amps	1370040010

The battery will be selected depending on how much current and how much time we want to keep the DC power ON when there is an AC failure. To make the selection the following graph should be used:





Currently we have these following batteries:

Battery Capacity (Ah)	Battery part number
1,2 Ah	2789890000 (use only with unit control module of 10/20 Amps)
3,4 Ah	2789900000
7 Ah	2789910000
12 Ah	2789920000
17 Ah	2789930000

To configure properly the unit control module following topics must be taken into consideration:

1. If the unit control module is the 10A/20A first, you must select the maximum output current:

2. Then, the battery type (capacity) must be selected:

H Battery selector switch / replacing the battery

The battery selector switch must be set to the right Ah position for optimal battery charging and setting of the internal monitoring function. In the event that a battery or replacement battery is not available, the "No Batt." switch setting can be used. All battery relevant signals, failures and displays will be suppressed.

For replacement or any work on the battery module, the selector switch must be set into "Service" position. This will switch off the charger. The following sequence must be adhered to:

1. Set selector switch into „Service" position
2. Remove the battery fuses intergated in the battery module
3. Disconnect the wiring or the battery plug.
4. For commissioning, the reverse sequence must be used.

3. Finally, we must select how much time we want the battery to supply the 24 VDC output when there is an AC failure. If there is a block-out on AC side, when the selected time has elapsed the system will get disconnected:

Settings for battery operation

There are 3 different operating modes:

- Battery shut-down after preset time (0.5…45 min)
- Battery shut-down on reaching deep discharge threshold of 19.2 V DC (∞)
- Battery deep discharge up to 15 V DC (w/o ∞)

When shutting down at the preset time, the battery voltage is also monitored for deep discharge threshold. If the deep discharge threshold is reached before the time expires it will also be shut down. In operating mode "w/o ∞", the battery will be discharged up to 15 V DC. This action is likely to cause damage to the battery. Therefore this type of battery deep discharge should only be chosen if required for safety-related reasons.

Please notice that if we select discharge (19.2 VDC) battery can be charged again when AC power comes back, but if we select deep discharge (15 VDC) this will not happen, and on-site maintenance must be realized because battery will go to under a voltage value that standard charge provided by the control unit module will not be able to rise-up.