



EN54

EN54 24V 5A FLX M, EN54 24V 10A FLX M, EN54 24V 15A FLX M, EN54 24V 25A FLX M



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1. REVISIONS AND THE EDITION OF THIS DOCUMENT

The current and most recently published edition of this document is available at www.milleteknik.com.

Audit log can be requested, see contact information for address or e-mail address.

The validity of this document can not be guaranteed, as new editions are published without prior notice.

User manual in original language: Swedish.

Instructions for use, technical data and translations thereof may contain errors. It is always the responsibility of the installer to install the product in a safe manner.





READ THIS FIRST!

100 mm free space must be left on the top and bottom. Ventilation must not be covered.

Electronics, regardless of enclosure, are intended for use in a controlled indoor environment. Mains voltage should be disconnected during installation.

It is the installer's responsibility that the system is suitable for its intended use. It is the installer's responsibility that the system is suitable for its intended use. Only authorized persons should install and maintain the system.

All information subject to change.

Instruction manual in Swedish in original¹.



ABOUT GLASS TUBE FUSES ON CERTIFIED DEVICES

There are glass tube fuses on the circuit board's load outputs, these have a tripping time of approx. 150 ms. In the event that a glass tube fuse trips on ONE load output, the voltage on ALL load outputs drops to 0 V for 150 ms.

The installer is responsible for ensuring that there is an energy buffer of at least 150 ms in systems that the battery backup supplies power to or accepts a power failure of 150 ms.

1. About translation of this document

User manual and other documents are in the original language in Swedish. Other languages are machine translated and not reviewed, errors may occur.

¹Translations in languages other than Swedish are only indicative and have not been verified. Translation must always be checked against the Swedish original to ensure correct information.



2. COMPONENT OVERVIEWS

2.1. Component overview

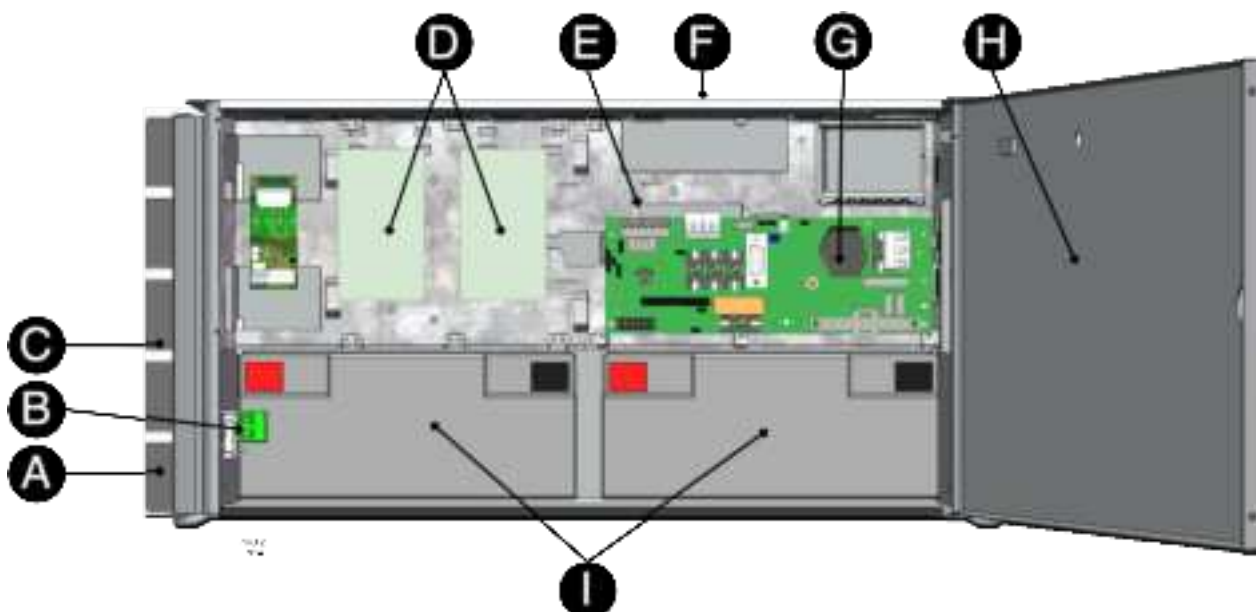


Table 1. Component overview

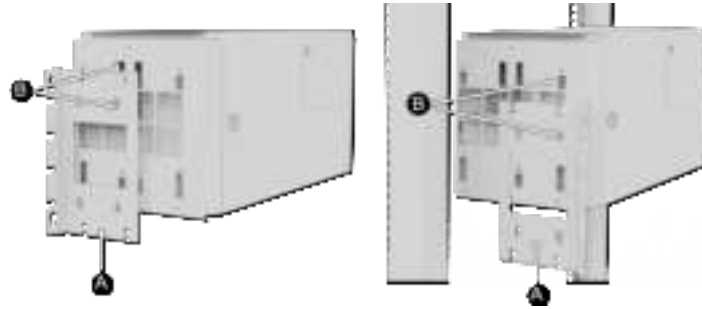
Letter	Explanation
A	Bracket, reversible for wall mounting or 19 "rack.
B	Sabotage contact. If alarm class 3 (SSF) is to be met, the tamper switch must be on the wall.
C	Cabinet in powder-coated sheet metal.
D	Place for mounting of optional cards.
E	Power supply.
F	Cable entries.
G	Motherboard.
H	Lockable door.
I	Space for batteries.

3. ENCLOSURES

3.1. Bracket

The supplied brackets can be attached in two ways: When mounting on a wall, the brackets must sit backwards, against the wall. When mounting in a 19" rack, the bracket must sit at the front of the unit.





No	Explanation
A	Console is pushed in from the bottom up.
B	Clip clicks in when bracket is pushed in correctly.

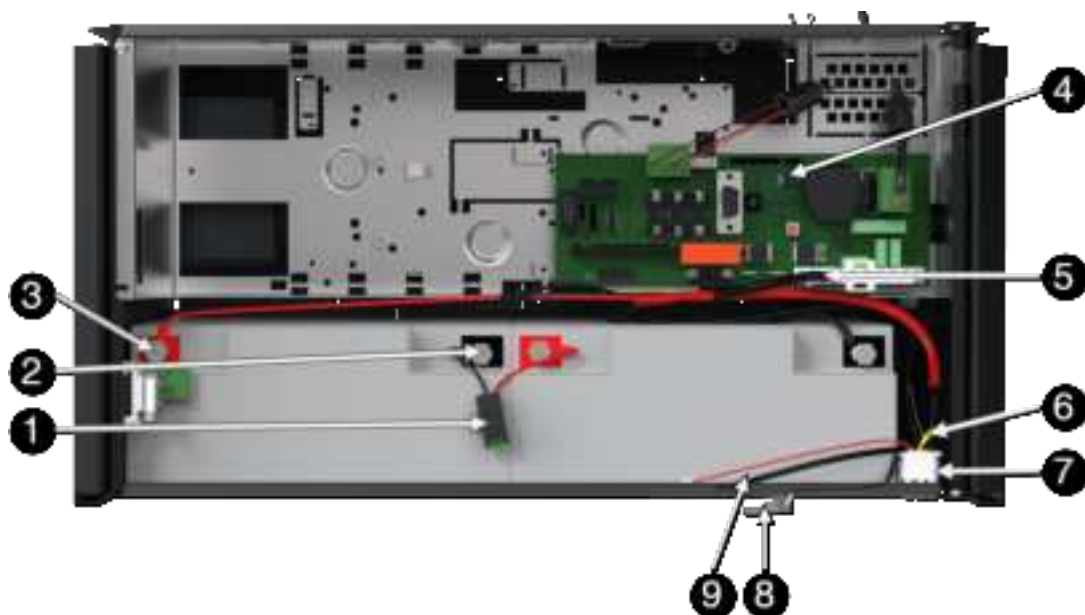
3.2. Mounting

Use the appropriate screw for mounting on a wall or in a 19" rack. Screws for mounting on a wall or in a rack are not included.

4. BATTERIES - PLACEMENT AND CONNECTION

4.1. Connecting batteries in FLX M

Figure 1. Connection of batteries in FLX M. Motherboards may differ depending on the configuration, but connection of batteries takes place in the same way.



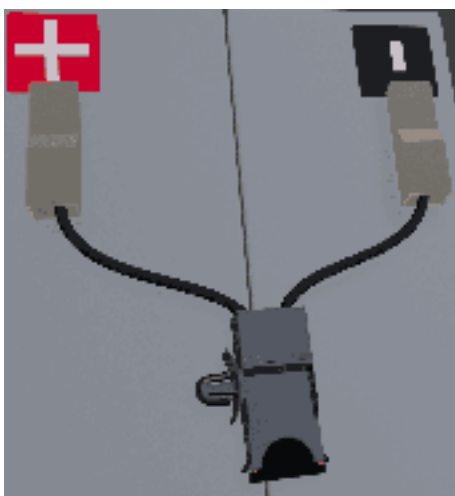
No	Explanation
1	Fuse.



No	Explanation
2	Minus coil for battery cable from 4.
3	Plus terminal for battery cable from 4.
4	Motherboard, varies with configuration.
5	Battery cables are located on the system board.
6	Connection for connection of battery box.
7	Yellow cable, which must be cut when connecting the battery box.
8.9	Alarm cable for battery box.

4.2. Connect battery fuse / blade fuse

Figure 2. Fuse holders with blade fuses are connected to + and minus on batteries



4.3. Connection of batteries in FLX S, FLX M and FLX L

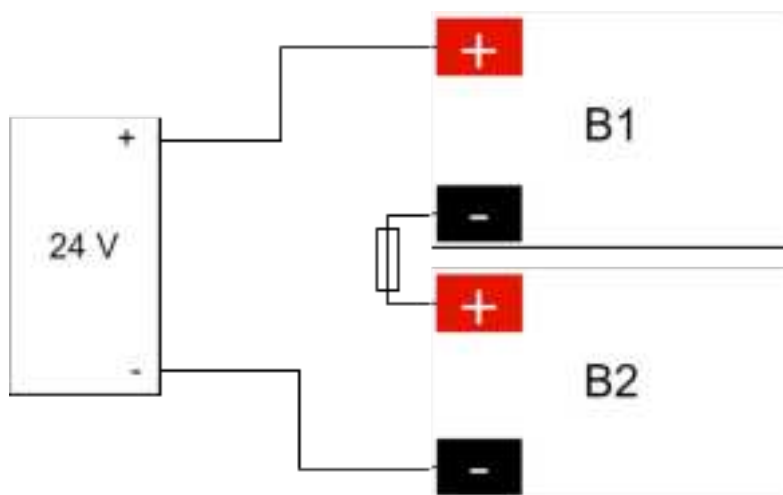
Battery wiring is mounted on the circuit board upon delivery. Pictures below only show how to connect wiring.

1. Place the batteries in the cabinet with the battery terminals facing outwards.
 2. Connect the battery cable. Red cable on + and black cable on -.
- If possible, disconnect mains voltage when replacing the battery.





Figure 3. Wiring diagram for batteries in battery backup



Connect the terminals correctly so that you do not damage the equipment.

5. OVERVIEW OF CONNECTION

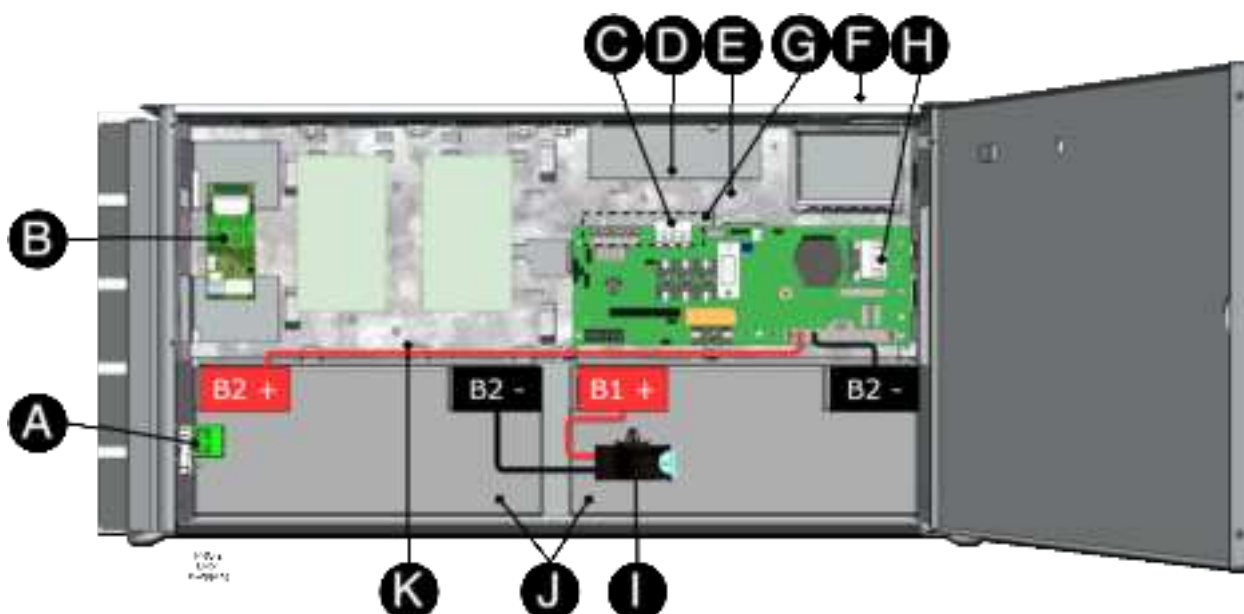


Table 2. Overview of connections

Letter	Explanation
A	Tamper contact. Option for EN54 units.
B	Load is connected here for units 15 A - 25 A.
C	Load is connected on motherboard, terminal P2:1-4 for units 5 A - 10 A
D	Hidden - Ferrite block for AGG 24 V. Würth 742700790 or equivalent, 2 turns.
E	Ferrite blocks for power supplies are mounted as close to the connection to the power supply as possible. Würth 742700790 or equivalent, 2 turns.
F	Ferrite on load and communication must be fitted by installer.



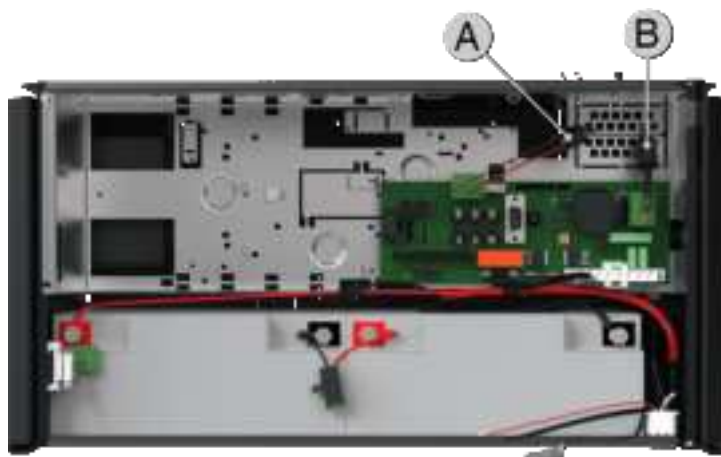
Letter	Explanation
G	One (1) ferrite core is included with the unit in addition to those factory installed. When replacing the ferrite core see specified ferrites, below. Ferrite block for load and communication, Wurth 742700790 or similar, 1 turn. Load through ferrite only when connecting load on main board.
H	Incoming mains 230 V
I	Flat pin fuse, battery fuse.
J	2 pcs 12 V, 14 Ah batteries connected in series.
K	Battery wiring

5.1. How ferrites are mounted on cables



A "pass" is how many times the cable passes through the ferrite.

A ferrite can either be threaded through the cable, this counts as one pass (1). A cable looped through the ferrite counts as two passes (2).



A ferrite on EN54 shall be threaded one pass on load cables (A).

A ferrite must be shall be threded one pass on the mains power cable (B).

6. PCB DESCRIPTION OF PRO2V3

The motherboard controls the device, distributes power and communicates with other systems. See technical data for more information.





Figure 4. PRO2 v3

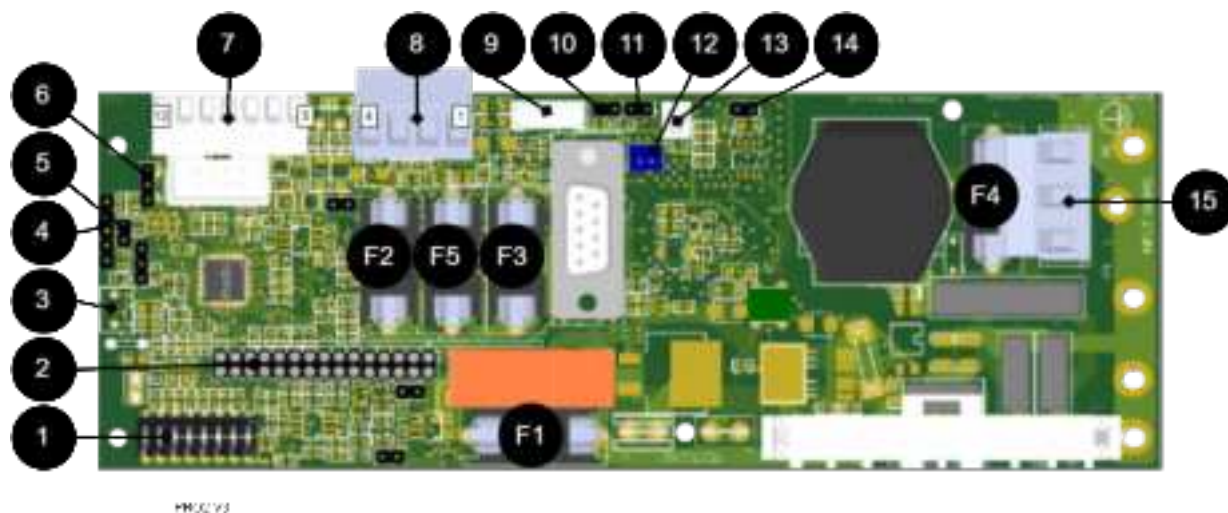


Table 3. Circuit board overview, explanation

No .	On circuit board	Explanation
1	Dip SW	Dip switch 1-8
2	J20	Connection relay board.
3	JU17	Connection external indicator diode.
4	-	Programming contact.
5	J13	Reset of data after battery replacement.
6	J6	Temperature sensor.
8	P2:1-4 1 2 3 4	Load outputs. + - + -
9	J29	Connection to fan.
10	J14	Tamper switch connection.
11	J3	Connection tamper switch from battery box.
12	J1	Connection option card.
13	J4	Connection external fuse (NO).
14	J7/21	Connection to external fuse (NC).
15	P1:1-3	Incoming mains, (230 V). L, N, PE.

6.1. Fuses

Table 4. Fuses on PRO2 / PRO2 V3

Fuse	Type	Explanation
F1	T16A	Mains fuse
F2	T2A	Load fuse 2 + (for P2: 4)
F3	T2A	Reading protection 1 + (for P2: 1)
F4	T2.5A / T4A	Mains fuse, the lower valute for units 5 A - 15 A and the higher value for 25 A units.
F5	T16A	Load fuse 1+ (for P2: 2)



FUSE REPLACEMENT WARNING (A)

There is a risk of damage if the fuse is changed to a larger one than what the unit is delivered with. The function of the fuse is to protect the connected load and cables against damage and fire. It is not possible to change the fuse to a larger one to increase the power output.

6.2. Connect the mains to the motherboard (PCB)

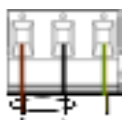
6.2.1. Connect mains

Pull wiring through the cable entry on the cabinet.

If possible, secure the mains cable with cable ties where possible.

Electrical network cabling shall be kept separate from other cabling to avoid EMC interference.

Figure 5. Connect the mains to the motherboard



Connect the mains cable to the terminal before it is put back on the motherboard. Secure F and N with cable ties for electrical safety.

Table 5. Electrical network connections

Letter	Explanation
F	Phase
N	Neutral
PE	Protective earth



ELECTRICAL MAINS CONNECTION 230 V AC ON CIRCUIT BOARD

Check that the marking on the circuit board matches the cable arrangement on the terminal block.

6.3. Connect load



MAX CURRENT

The maximum current must not be exceeded. Max current is indicated on [nameplate](#) on the device.





If there are one or more connection cards (to increase the number of load outputs), load must be connected there and not on the main board.

Table 6. Load connections

Circuit board number	Explanation
P2: 1	Connection for load 1 +
P2: 2	Connection for load 1 -
P2: 3	Connection for load 2 +
P2: 4	Connection for load 2 -



CAUTION

Load may only be connected to the motherboard in 5 A and 10 A units. For other units, load must be connected via power board or option board.

6.4. Connection of load 15 A - 25 A units

For units with a effect card, which is available to handle the higher currents (15 ampere and above), the load must be connected on an optional board.

See documentation for option board for how to connect load.



WARNING

Load must not be connected to the motherboard if the device is a 15 A or 25 A, as it will be destroyed during commissioning. Motherboards that are faulty due to incorrect connections are not covered by warranty.

Figure 6. Effect card



The effect card increases the current for 15 A and 25 A units.



6.5. Load cards with blade fuses

The card replaces the load output on the motherboard.

The load card has a different type of fuse that is easier to change and at the same time the card provides a easier connection of the load.

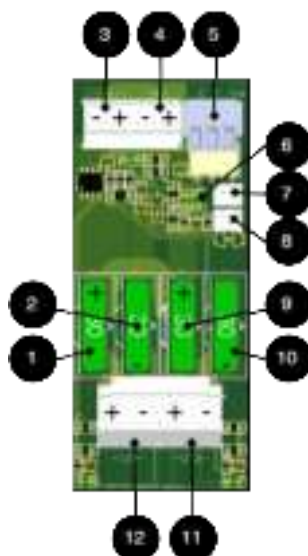


Table 7. Circuit board overview, explanation

No .	On circuit board	Explanation
1, 9	FUS2, FUS4	+ fuse, 10 A- 25 A depending on the product.
2, 10	FUS1, FUS3	- fuse, 30A.
3, 4	IN1, IN2	Incoming connection 24 V, (from motherboard).
5	P1:1-3	Alarm relay: NC, Com, NO
6	D29, D30	LED.
7	J1	Fuse alarm.
8	J2	Fuse alarm for forwarding to several cards.
11, 12	+UT1-, +UT2-	Load connection, outgoing, 24 V

Load is connected to 11 or 12 on fuse card, see component overview.

6.6. Dip switch 1-8

Dip-Switch has several different configuration modes:

Table 8. Dip switch 1-8

Dip switch	In mains operation or in battery operation	Comment
1	Address for external communication.	-
2	Address for external communication	-
3	Address for external communication	-
4	Address for external communication	-
5	Sets alarm for mains failure delay	Available from software v1.5
6	Sets alarm for mains failure delay	Available from software v 1.5
7	Sets alarm limit for low battery voltage in battery operation.	Available from software v 1.5





Dip switch	In mains operation or in battery operation	Comment
8	Turns LED off or on.	Upcoming feature through software update
8 in sequence	Performs battery test	Not available in NEO.

6.6.1. Mains failure delay (dip 5-6)

It is possible to change the time for when the alarm for a power outage should be given. Use the matrix to set the alarm.

Table 9. Mains failure delay

Alarms for mains failure are given after:	Dip 5	Dip 6
3 seconds	OFF	OFF
30 minutes	ON	OFF
60 minutes	OFF	ON
240 minutes (4 hours)	ON	ON

6.6.2. Low battery voltage (dip 7)

Dip: 7 has the same function regardless of whether the unit is in mains or battery operation or whether the tamper switch is held down.

Table 10. Low battery voltage

Alarm for low battery voltage is given when	Dip 7
22,8 V*	ON
24 V	OFF
*25% of battery capacity remains.	

6.6.3. LED (dip 8)

LED/battery-test always lights up when the door is open.

Dip-switch 8=ON turns off the LED.

Dip-switch 8=OFF turns on the LED.

6.6.4. Battery test (dip 8)

To do a battery test, dip 8 needs to change position and five seconds need to pass before the test is initiated.

- If dip 8 in original position is on OFF then switch dip 8 to: ON (wait 5 seconds) and then switch back to OFF.
- If dip 8 in original position is on ON then switch dip 8 to: OFF (wait 5 seconds) and then switch back to ON.

This activates the battery test after 3-8 seconds. The battery test lasts for about 6 seconds and then the LED flashes yellow quickly. Aged battery alarms may be indicated while the battery test is being performed.

Only reset dip 8 when the test is complete.



6.7. Reboot to confirm changes in address, battery and alarm settings to parent system

After the dip-switch has been set for various parameters, the device's software needs to be restarted. This is for the new settings to be stored and take effect.



IMPORTANT

Rebooting according to this procedure does not interrupt the output voltage.

Restarting the device software is done by jumpering J13 (PRO2)



IMPORTANT

Reboot must be done every time a change is made to the device.

NEO cannot be connected to communication/UC.

6.8. Alarm card for PRO2

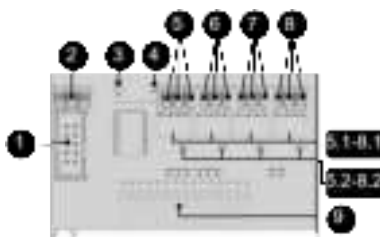
Relay card - description, connections and alarm outputs.

- All fault arm relays must be in the drawn state. Check that there is a gap between CO and NC. Put the measuring instrument on continuity measurement and test closure. This should then indicate a short circuit.
- All relay outputs are normally live and give an alarm in the event of no voltage.



IMPORTANT

There is normally a 10 second delay in alarm reset. The software on the main board must be configured for a different time period.





No .	Relay (Terminal no.)	The relay is normally energized.	Alarm type / explanation
1	J7	-	Connection for RS-232 cable.
2	P4:1	-	RS-232: TxD, data OUT from motherboard.
	P4:2	-	RS-232: RxD, data IN to motherboard.
	P4:3	-	RS-232: Ground, do not connect ground to another terminal.
3	J6	-	Reset jumper.
4	D7	-	Indicator diode, flashes green during normal operation.
5, 5.1, 5.2	P5:1-3	NO, COM, NC	Tamper alarm, (optional for EN54). 5.1 Relay. 5.2 LED, lights up green when relay is energized.
6, 6.1, 6.2	P5:4-6	NO, COM, NC	Alarm for: Low system voltage. 6.1 Relay. 6.2 LED, lights up green when relay is energized.
7, 7.1, 7.2	P5:7-9	NO, COM, NC	Alarm for: Fuse failure, charger failure overvoltage, charger failure undervoltage, cell failure/not connected battery, low battery voltage in case of mains failure and aged battery. 7.1 Relay. 7.2 LED, lights up green when relay is energized.
8, 8.1, 8.2	P5:10-12	NO, COM, NC	Power failure alarm. 8.1 Relay. 8.2 LED, lights up green when relay is energized.
9	J11	-	Connection to motherboard.
Via communication on PRO1 card: All alarms and alarms for: Fan fault, overtemperature, subtemperature, short battery life left, overcurrent 100% of minute average, overcurrent 80% daily average and overcurrent 175% second average.			

7. COMMISSIONING - HOW TO START THE UNIT

1. Connect batteries
2. Connect / switch on fuses
3. connect load, alarm and possibly. other connections.
4. Screw the mains cable into the terminal block and attach the terminal block to the motherboard.
5. Switch on mains voltage.

The unit works normally when the indicator LED on the outside of the cabinet door lights up with a solid green light. See front panel for other status indications.

It may take up to 72 hours before the batteries are fully charged.

7.1. System test

Test the connected device by performing a system test afterwards [commissioning \[17\]](#).

- Switch on incoming mains voltage.
- Indicator LED on the outside of the cabinet door lights up with a solid green light. Disconnect the mains voltage to check that the unit is operating in battery mode and alarms.
- Indicator LED on the cabinet door flashes, see alarm type panel.
- Switch on incoming mains voltage. Indicator LED, on the outside of the cabinet door, lights up with a solid green light. Normal operation.

8. ALARM DISPLAYED ON CABINET DOOR

In normal mode, the indicator LED shows a solid green light.



The indicator diode (LED) shows	Explanation
Solid green light	Normal operation.
Slow green flashes	Sabotage alarm (tillval).
Fast green flashes	Mains failure.
Solid yellow light	Low battery voltage.
Slow yellow flashes	Aged batteries.
Rapid yellow flashes	Disconnected batteries / battery cell shortage.
Solid red light	Overvoltage or undervoltage or charger fault.
Slow red flashes	Low system voltage.
Rapid red flashes	Blown load / battery fuse has blown.
No light / off	Deep discharge protection is activated. (System shutdown).

When operating system: If the indicator LED is off, deep discharge protection has come into force.





9. PRODUCT SHEET - TECHNICAL DATA

9.1. EN54-4 Certified / SBF110:8 Approved battery backup

Figure 7. EN54 FLX M



The battery backup can be mounted on a wall or in a 19" rack.

9.1.1. Technical specifications

These technical specifications are subject to change without notice.

9.1.2. Name, article number, e-number and certificate number

Name	Article number	E-number
EN54 24V 5A FLX M	FM01P20024P050-EN54	52 135 51
EN54 24V 10A FLX M	FM01P20024P100-EN54	52 135 52
EN54 24V 15A FLX M	FM01P20024P150-EN54	52 135 53
EN54 24V 25A FLX M	FM01P20024P250-EN54	52 135 54

9.1.3. Area of use

EN54 powers fire alarms with 24 V DC. The rectifier in the power supply converts 230 V AC down to 24 V DC and supplies power to all important parts of the fire alarm system. Batteries continue to power the fire alarm system when the power goes down. EN54 power supply is certified to be used in security facilities that must meet EN54-4 or be approved for SBF 110:8.



Batteries drive, for example, the access system, when the power grid goes down.

Long life, energy efficient and support is available if something goes wrong, now or in 10 years.

FLEXIBILITY

EN54 can be mounted with 1-4 extra battery boxes. The battery boxes and shelves are connected via a 9-pin connector. The battery box has room for up to 2 pcs. 45 Ah batteries per battery box.

9.1.4. Fixed installation

The product is intended for fixed installation. The battery backup must be installed by a qualified installer.

9.1.5. Area of use

EN54 is used for fire alarm systems in public environments such as schools, offices and commercial properties.



9.2. Regulations and certifications

9.2.1. Standards that product (s) meet and are approved for

Table 11. EN54

EN50131-6:2017.
EN 54-4:1997, EN 54-4:1997/AC:1999, EN 54-4:1997/A1:2002 and EN 54-4:1997/A2:2006.

Table 12. SBF

SBF 110:8

Table 13. SSF

SSF1014 Alarm class 1-4 (burglar alarm).
SSF1014, Issue 5.

Table 14. Certificate and certificate number

Certificate number, SBSC	Designation SBSC
No. 18-243	-

9.2.2. Requirements that the product meets

EMC:	EMC Directive 2014 / 30EU
Electricity:	Low voltage directive: 2014/35 / EU
CE:	CE directive according to: 765/2008





Emission:	EN61000-6-1: 2001 EN55022: 1998: -A1: 2000, A2: 2003 Klass B, EN61000-3-2: 2001
Immunity:	SS-EN 50 130-4:2011 Edition 2, EN50131-6



9.2.3. Translation table certified / marketed units

Certified name:	Marketed as:
NOVA 27 50-FLX	EN54 24V 5A FLX M
NOVA 27 100-FLX	EN54 24V 10A FLX M
NOVA 27 150-FLX	EN54 24V 15A FLX M
NOVA 27 250-FLX	EN54 24V 25A FLX M
Battery box 24V-FLX	Battery box 24V FLX M

9.3. Reserve operating times, power outlet and load output current

9.3.1. Load current EN54

Table 15. EN54 24V 5A FLX M

Battery size	Maximum Power outlet i network operation (I _{max} . A)	Maximum recharge time to 80%
20 Ah	3.5 A	24 h
45 Ah	2 A	24 h
60 Ah	0.7 A	24 h
90 Ah	-	-
110 Ah	-	-
130 Ah	-	-
155 Ah	-	-
180 Ah	-	-
200 Ah	-	-
Maximum charging current with recharging (ie maximum charging current at the same time as batteries are charged): 4.5 Ah.		
Maximum power outlet in battery mode (same as I _{max} . B): 5A		

Table 16. EN54 24V 10A FLX M

Battery size	Maximum Power outlet i network operation (I _{max} . A)	Maximum recharge time to 80%
20 Ah	8.5 A	24 h
45 Ah	7 A	24 h
60 Ah	5.7 A	24 h



Battery size	Maximum Power outlet i network operation (I _{max} . A)	Maximum recharge time to 80%
90 Ah	4.2 A	24 h
110 Ah	2.9 A	24 h
130 Ah	1.4 A	24 h
155 Ah	0.1A	24 h
180 Ah	-	-
200 Ah	-	-
Maximum charging current with recharging (ie maximum charging current at the same time as batteries are charged): 9 Ah.		
Maximum power outlet in battery mode (same as I _{max} . B): 10A		

Table 17. EN54 24V 15A FLX M

Battery size	Maximum Power outlet i network operation (I _{max} . A)	Maximum recharge time to 80%
20 Ah	12.6 A	24 h
45 Ah	11 A	24 h
60 Ah	9.7 A	24 h
90 Ah	8.2 A	24 h
110 Ah	6.9 A	24 h
130 Ah	5.4 A	24 h
155 Ah	4.1 A	24 h
180 Ah	2.5 A	24 h
200 Ah	1.3 A	24 h
Maximum charging current with recharging (ie maximum charging current at the same time as batteries are charged): 14 Ah.		
Maximum power outlet in battery mode (same as I _{max} . B): 15A		

Table 18. EN54 24V 25A FLX M

Battery size	Maximum Power outlet i network operation (I _{max} . A)	Maximum recharge time to 80%
20 Ah	-	-
45 Ah	24 A	24 h
60 Ah	22 A	24 h
90 Ah	21.2 A	24 h
110 Ah	19.9 A	24 h
130 Ah	18.3 A	24 h
155 Ah	17.1 A	24 h
180 Ah	15.5 A	24 h
200 Ah	14.3 A	24 h
Maximum charging current with recharging (ie maximum charging current at the same time as batteries are charged): 25 Ah.		
Maximum power outlet in battery mode (same as I _{max} . B): 25A		





9.3.2. Reserve operating times for different alarm classes - overview

Alarm class	Spare operating time in the event of a power failure	Maximum number of hours of battery re-charging (80%)
EN54-4	-	24 h
SBF110: 8	30 h + 10 min	24 h
EN50131-6 grades 1-2	12 h	72 h
EN50131-6 grade 3	24 h	24 h
SSF1014 Alarm class 1/2	12 h	72 h
SSF1014 Alarm class 3/4	30 h	24 h

The table shows the requirements for backup operating time and recharging of batteries for different alarm classes.

9.4. Circuit boards - Technical data

9.4.1. Technical data, motherboard: PRO 2 V3

Info	Explanation
Short name:	PRO 2 V3
Product description	Motherboard in battery backup with advanced functions and communication to parent system.
Own consumption, with relay card	Less than 210 mA. 100 mA without power stage with all relays retracted on external alarm card in normal mode.
Switching time from mains voltage to battery operation	When batteries are idle: <5 microseconds. When batteries are in charge cycle: 0 (none). Batteries rest for 20-day cycles, after which a charging cycle picks up and charges the batteries for 72 hours. If there is a power failure when batteries are in the charge cycle, there is no switching time.
Incoming electricity network	230 V AC -240 V AC, 47-63 Hz.
Fuse on mains	See table: Fuses.
Indication	Indicator diode on circuit board / cabinet door

ALARM

Alarm displayed on indicator LED on the front of the cabinet.

- Cell fault in battery or unconnected battery.
- Charger fault, undervoltage.
- Charger fault, overvoltage.
- Low system voltage, system voltage below 24.0 V in mains operation.
- Low battery voltage, below 24.0 V DC in case of mains failure.
- Power failure alarm.
- Sabotage switch. Optional for EN54.
- Fuse fault.
- Aged battery

Expanding alarm functions are available via communication or with alarm cards.

Table 19. Outputs

Info	Explanation
Alarm on alternating relay? (Yes No)	Yes
Alarm output protocol (communication protocol)	RS-485 and I ² C



Info	Explanation
Load outputs, number	2
Voltage at load output	27.3 V DC
Voltage limit, upper, on load output	27.9 V DC
Voltage limit, lower, on load output. For battery operation and disconnected mains voltage.	20 V DC
Priority (always voltage) load outputs (Yes / No)	-
Maximum load, per output	10 A
Maximum load, total, (must not be exceeded).	10 A
Load output plus (+) secured? (Yes No)	-
Load output minus (-) secured (Yes / No)	-
Fuses on output	Yes, see table: Fuses.
Connection to buzzer? (Yes No)	-

Table 20. Fuses

Fuses	Type
1.5 A	F1.5A
3 A	T3A
5 A	T5A
10 A	T10A
15 A	T15A
25 A	T25A
Power supply fuse of 12V one	T2.5AH250V. Ceramic.
Mains fuse for 24 V units up to 15 A	T2.5AH250V. Ceramic.
Mains fuse for 24 v units over to 15 A	T4AH250V. Ceramic.

Table 21. Protection

Info	Explanation
Deep discharge protection (Yes / No)	Yes. 12 V units protection at 10V, +/- 0.5 V. 24 V units protection at 20, +/- 0.5 V.
Surge protection (Yes / No)	Yes
Overtemperature protection (Yes / No)	Yes
Short circuit protected = (Yes / No)	Yes

9.4.2. Technical data, alarm cards for PRO 2 and PRO2 V3

Info	Explanation
Card name:	PRO2 larmkort
Version:	2.0
Product description	Alarm card for PRO2 and PRO2 V3 with alarm on alternating relay. All relays are normally energized and give an alarm in a voltage-free position.
self-consumption	40 mA

Manufactured in Milleteknik's factory in Partille, Sweden.

This translation is not verified and should be cross referenced with the swedish original before use.



Table 22. Alarm overview

Alarm overview in alphabetical order	Relay 1 * / Alarm output 1	Relay 2 * / Alarm output 2	Relay 3 * / Alarm output 3	Relay 4 * / Alarm output 4	Communication (P1: 1-12)	Indicator LED on motherboard and LED on door.
Network outages	X	-	-	-	X	X
Fuse fault	-	X	-	-	X	X
Sabotage switch	-	-	-	X	X	X
Fan fault	-	-	-	-	X	-
Charger fault, overvoltage	-	X	-	-	X	X
Charger fault, undervoltage	-	X	-	-	X	X
Cell fault or unconnected battery	-	X	-	-	X	X
Low system voltage. **	-	-	X	-	X	X
Low battery voltage (<24.0 V DC) or power failure	-	X	-	-	X	X
Overtemperature	-	-	-	-	X	-
Undertemperature	-	-	-	-	X	-
Undertemperature	-	-	-	-	X	-
Short battery life left	-	-	-	-	X	-
Aged battery	-	X	-	-	X	X
Overcurrent 100%, minute average	-	-	-	-	X	-
Overcurrent 80%, daily average	-	-	-	-	X	-
Overcurrent 175%, second average	-	-	-	-	X	-

* Alarm on potential-free relay contact.

** System voltage in mains operation is below 24.0 V.

350-232

9.5. Power supply

9.5.1. Power supply - Technical Data DR-120-24

Sits in
EN54 24V 5A FLX M

Info	Explanation
Output voltage	27.3 V
Output current:	0 A - 5 A
Output voltage, ripple	80 mVp-p
Overvoltage	29 V - 33 V
Voltage recharge, ripple / current limitation	Less than 2 Vp-p
Efficiency	84%
Current limitation	15% - 150%
Constant voltage	+/- 1.0%



Info	Explanation
Regulatory accuracy	* / - 1.0%
Input current (230 V)	1,6 A
Mains voltage frequency	47 Hz- 63 Hz
Mains voltage	230 V AC - 240 V AC
Brand effect	120 W
Temperature range	-30°C - +70°C
Humidity range	20% - 90% RH non-condensed
The power supply is adapted and calibrated with the battery / hardware of the battery backup. Only power and calibrated power supplies may be used. Contact support when changing power supplies. Use of power supplies coming from another source may cause damage not covered by the warranty. Warranty is canceled if power supplies (from a source other than support / designated by support) that are not correctly calibrated are used.	

9.5.2. Power supply - Technical Data HRP-300-24

In:
EN54 24V 15A FLX M
EN54 24V 10A FLX M

Info	Explanation
Output voltage	27.3 V
Output current	0 A - 14 A
Output voltage, ripple	150 mVp-p
Overvoltage	30 V - 34.8 V
Voltage recharge, ripple / current limitation	Less than 1.2 Vp-p
Efficiency	87%
Current limitation	105% - 135%
Constant voltage	+/- 0.5%
Regulatory accuracy	+/- 1.0%
Input current (230 V)	1,8 A
Mains voltage frequency	47 Hz- 63 Hz
Mains voltage	230 V AC - 240 V AC
Brand effect	336 W
Temperature range	-40 ° C - + 70 ° C
Humidity range	20% - 90% RH non-condensed
The power supply is adapted and calibrated with the battery / hardware of the battery backup. Only power and calibrated power supplies may be used. Contact support when changing power supplies. Use of power supplies coming from another source may cause damage not covered by the warranty. Warranty is canceled if power supplies (from a source other than support / designated by support) that are not correctly calibrated are used.	

9.5.3. Power supply - Technical Data HRP-600-24

In:
EN54 24V 25A FLX M

Info	Explanation
Output voltage	27.3 V
Output current	0 A - 27 A
Output voltage, ripple	150 mVp-p
Overvoltage	30 V - 34.8 V
Voltage recharge, ripple / current limitation	Less than 1.2 Vp-p
Efficiency	88%





Info	Explanation
Current limitation	105% - 135%
Constant voltage	+/- 0.5%
Regulatory accuracy	+/- 1.0%
Input current (230 V)	3,6 A
Mains voltage frequency	47 Hz- 63 Hz
Mains voltage	230 V AC - 240 V AC
Brand effect	648 W
Temperature range	-30°C - +70°C
Humidity range	20% - 90% RH non-condensed
The power supply is adapted and calibrated with the battery / hardware of the battery backup. Only power and calibrated power supplies may be used. Contact support when changing power supplies. Use of power supplies coming from another source may cause damage not covered by the warranty. Warranty is canceled if power supplies (from a source other than support / designated by support) that are not correctly calibrated are used.	

9.6. Technical data enclosures

9.6.1. Enclosures - Technical Data FLX M

Info	Explanation
Name	FLX M
Enclosure class	IP 32
Measure	Height: 224 mm, width 438 mm, depth 212 mm
Height units	5 HE
Mounting	Wall or 19 "rack
Ambient temperature	+ 5 ° C - + 40 ° C. For best battery life: + 15 ° C to + 25 ° C.
Environment	Environmental class 1, indoors. 20% ~ 90% relative humidity
Material	Powder coated sheet
Color	Black
Cable entries, number	4
Batteries that fit	2 pieces 12 V, 20 Ah.
Fan	Yes

9.7. Link to the latest information

Products and software are subject to updates, you will always find the latest information on our website.

[EN54](#)

9.8. Warranty, support, country of manufacture and country of origin

9.8.1. Warranty 5 years

The product has a five-year warranty, from the date of purchase (unless otherwise agreed). Free support during the warranty period is reached at support@milleteknik.se or telephone, +46 31-34 00 230. Compensation for travel and or working hours in connection with the location of faults, installation of repaired or replaced goods is not included in the warranty. Contact Milleteknik for more information.



Milleteknik provides support during the product's lifetime, however, no later than 10 years after the date of purchase. Switching to an equivalent product may occur if Milleteknik deems that repair is not possible. Support may be added (at Milleteknik's discretion) after the warranty period has expired.

9.8.2. Manufacturer support

Manufacturers provide support for the life of the product, however, for a maximum of 10 years after the date of purchase. Switching to an equivalent product may occur if the manufacturer deems that repair is not possible. Support costs will be added after the warranty period has expired.

9.8.3. Support

Do you need help with installation or connections? Our support phone is available: Monday-Thursday 08: 00-16: 00 and Fridays 08: 00-15: 00. Telephone support is closed between 11: 30-13: 15.

You will find answers to many questions at: www.milleteknik.se/support

Phone: +46 31-340 02 30

Support is open: Monday-Thursday 08:00-16:00, Fridays 08:00-15:00. Closed 11:30-13:15.

SPARE PARTS

Contacted support for questions about spare parts.

SUPPORT AFTER THE WARRANTY PERIOD

Milleteknik provides support during the life of the product, but no longer than 10 years after the date of purchase. Replacement for an equivalent product may occur if the manufacturer deems that repair is not possible. Costs for support and replacement are added after the warranty period has expired.

QUESTIONS ABOUT PRODUCT PERFORMANCE?

Contact sales: 46 31-340 02 30, e-mail: sales@milleteknik.se

9.8.4. Contact us

Milleteknik AB

Ögärdesvägen 8 B

S-433 30 Partille

Sweden

+46 31-34 00 230

www.milleteknik.se

9.8.5. Country of manufacture

Country of manufacture / country of origin is Sweden. For more information, contact your seller.

9.8.6. Designed and produced by: Milleteknik AB

Designed and produced by Milleteknik AB





9.9. Batteries - recommended, not included

9.9.1. Batteries are not included they are sold separately

Batteries are sold separately.

9.9.2. Battery combinations

Battery capacity (Ah)	Battery type	Number of batteries	Batteries in unit
20 Ah	20 Ah	2 pcs	2 in Battery Backup
45 Ah	45 Ah	2 pcs	0 in Battery Backup 2 in Battery Box 1
65 Ah	20 Ah + 45 Ah	4 st	2 in Battery Backup 2 in Battery Box 1
90 Ah	45 Ah	4 st	0 in Battery Backup 2 in Battery Box 1 2 and Batteribox 2
110 Ah	20 Ah + 45 Ah	6 st	2 in Battery Backup 2 in Battery Box 1 2 and Batteribox 2
135 Ah	45 Ah	6 st	0 in Battery Backup 2 in Battery Box 1 2 and Batteribox 2 2 and Batteribox 3
155 Ah	20 Ah + 45 Ah	8 st	2 in Battery Backup 2 in Battery Box 1 2 and Batteribox 2 2 and Batteribox 3
180 Ah	45 Ah	8 st	0 in Battery Backup 2 in Battery Box 1 2 and Batteribox 2 2 and Batteribox 3 2 and Batteribox 4
200 Ah	20 Ah + 45 Ah	10 pieces	2 in Battery Backup 2 in Battery Box 1 2 and Batteribox 2 2 and Batteribox 3 2 and Batteribox 4

9.9.3. Battery combinations

Battery combinations possible with
EN54 5A FLX M
EN54 10A FLX M



Battery combinations possible with
EN54 15A FLX M
EN54 25A FLX M

Table 23. Battery combinations for FLX M and battery box 24V FLX M

Battery capacity	Number of batteries	Unit + battery box
20 Ah	2 pcs 20 Ah	24V 5A-10A FLX M
45 Ah	2 pcs 45 Ah*	24V 5A-10A FLX M Battery box 24V FLX M
65 Ah	2 pcs 20 Ah 2 pcs 45 Ah	24V 5A-10A FLX M Battery box 24V FLX M
90 Ah	2 pcs 45 Ah* 2 pcs 45 Ah*	24V 5A-10A FLX M Battery box 24V FLX M
110 Ah	2 pcs 20 Ah 2 pcs 45 Ah* 2 pcs 45 Ah*	24V 5A-10A FLX M Battery box 24V FLX M Battery box 24V FLX M
135 Ah	2 pcs 45 Ah* 2 pcs 45 Ah* 2 pcs 45 Ah*	24V 5A-10A FLX M Battery box 24V FLX M Battery box 24V FLX M
155 Ah	2 pcs 20 Ah 2 pcs 45 Ah* 2 pcs 45 Ah* 2 pcs 45 Ah*	24V 5A-10A FLX M Battery box 24V FLX M Battery box 24V FLX M Battery box 24V FLX M
180 Ah	2 pcs 45 Ah* 2 pcs 45 Ah* 2 pcs 45 Ah* 2 pcs 45 Ah*	24V 5A-10A FLX M Battery box 24V FLX M Battery box 24V FLX M Battery box 24V FLX M
200 Ah	2 pcs 20 Ah 2 pcs 45 Ah* 2 pcs 45 Ah* 2 pcs 45 Ah* 2 pcs 45 Ah*	24V 5A-10A FLX M Battery box 24V FLX M Battery box 24V FLX M Battery box 24V FLX M Battery box 24V FLX M

It is the installer's responsibility to check that the battery combinations are possible.

* Batteries in battery box.

9.9.4. 20 Ah, 12 V AGM battery

Fits in	Number of batteries
EN54 24V 5A FLX M	2
EN54 24V 10A FLX M	2
EN54 24V 15A FLX M	2
EN54 24V 25A FLX M	2





Battery type	V	Ah
Maintenance-free AGM, lead-acid battery.	12 V	20 Ah

Table 24. 10+ Design life * battery

Article number	E-number	Article name	Terminal	Measure. Height width depth	Weight per piece	Make
MT113-12V20-01	5230538	UPLUS 12V 20Ah 10+ Design Life battery	M5 Bult	182x77x168 mm	6.0 kg	UPLUS

*Design life is the shelf life in years for an unused battery. Environmental factors such as heat and load affect the service life. Batteries that have a durability (+10 Design Life) of 10+ years usually need to be replaced after 5-6 years.

9.9.5. 45 Ah, 12 V AGM battery

Fits in	Number of batteries
---------	---------------------

Battery type	V	Ah
Maintenance-free AGM, lead-acid battery.	12 V	45 Ah

Table 25. 10+ Design life * battery

Article number	E-number	Article name	Terminal	Measure. Height width depth	Weight per piece	Make
MT113-12V45-01	5230546	UPLUS 12V 45Ah 10+ Design Life battery	M5 Bult	197x165x170 mm	14.5 kg	UPLUS

*Design life is the shelf life in years for an unused battery. Environmental factors such as heat and load affect the service life. Batteries that have a durability (+10 Design Life) of 10+ years usually need to be replaced after 5-6 years.

9.9.6. Reserve operating times for different alarm classes - overview

The table shows the requirements for backup operating time and recharging of batteries for different alarm classes.



IMPORTANT

This is a guide and all times are approximate and may differ from actual times. Load, temperature and other factors come into play, which is why exact time can not be provided.

Applies to new batteries.

Amperage and batteries vary with configuration, check if the configuration can handle batteries and amperage.

Table 26. Backup operating times 24 V units - without battery box

Medium current	7.2 Ah	14 Ah	28 Ah	45 Ah
Loading	Backup operating time (approx.), Minutes			



Medium current	7.2 Ah	14 Ah	28 Ah	45 Ah
0.5 A	450	820	1650	2350
1 A	260	485	970	1460
2 A	150	280	560	920
4 A	90	165	335	550
6 A	67	125	245	405
8 A	57	105	210	350
10 A	44	80	160	270
12 A	38	70	140	235
14 A	33	60	120	200
16 A	28	50	100	170
18 A	25	45	89	150
20 A	23	42	84	142

Table 27. Backup operating times 24 V units - with battery box, 28 Ah - 70 Ah

Medium current	28 Ah	42 Ah	65 Ah	70 Ah
-	4 batteries (14 Ah)	6 batteries (14 Ah)	4 batteries (20Ah + 45 Ah)	10 batteries (7 Ah)
Loading	Backup operating time (approx.), Minutes			
0.5 A	1650	2090	5574	3440
1 A	970	865	3252	2118
2 A	560	815	1770	1329
4 A	335	490	930	864
6 A	245	360	600	605
8 A	210	310	426	544
10 A	160	240	342	414
12 A	140	210	270	363
14 A	120	180	234	311
16 A	100	150	204	286
18 A	90	130	150	254
20 A	84	126	138	241

Table 28. Backup operating times 24 V units - with battery box, 90 Ah - 155 Ah

Medium current	90 Ah	110 Ah	135 Ah	155 Ah
-	4 batteries (45 Ah)	6 batteries (20 Ah + 45 Ah)	6 batteries (45 Ah)	8 batteries (20 Ah + 45 Ah)
Loading	Backup operating time (approx.), Minutes			
0.5 A	4705	5796	7056	8215
1 A	2928	3582	4392	5070
2 A	1836	2247	2754	3230
4 A	1183	1438	1762	2018
6 A	788	959	1175	1345
8 A	748	861	1048	1150
10 A	570	689	839	920
12 A	499	603	699	765
14 A	427	516	629	655
16 A	404	499	592	590
18 A	359	444	526	520
20 A	340	420	498	495





Table 29. Backup operating times 24 V units - with battery box, 180 Ah - 225 Ah

Medium current	180 Ah	200 Ah	225 Ah
-	8 batteries (45 Ah)	10 batteries (20 Ah + 45 Ah)	10 batteries (45 Ah)
Loading	Backup operating time (approx.), Minutes		
0.5 A	9408	12972	11760
1 A	5856	7872	7320
2 A	3672	4548	4590
4 A	2365	2670	2945
6 A	1577	1780	1960
8 A	1500	1558	1800
10 A	1140	1246	1410
12 A	950	1038	1200
14 A	855	890	1055
16 A	810	902	995
18 A	715	802	885
20 A	680	722	840

Subject to typos.

10. ADDRESS AND CONTACT DETAILS

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