



NEO 24V 15A-25A FLX L PRO1

NEO 24V 15A-25A FLX M

350-141

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1. ABOUT NEO

NEO is normally used in security systems where the requirements are higher for more functions, alarm functions, longer backup operating times or when the battery backup is to handle higher loads.



1.1. About translation of this document

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

2. STEPS FOR INSTALLATION AND DEPLOYMENT

The unit must be installed and deployed in the following order:

1. Installation of the device.
2. Connecting batteries.
3. Connection of load.
4. Connection of communication or to external alarm. If communication / external alarm is not required or if the device cannot communicate - skip this step.
5. Mains connection.
6. Commissioning



CAUTION

When the mains is connected, the unit is put into operation. Therefore connect the electrical network (mains) last to avoid faults on other equipment that is connected on load or over communication. The unit also does not register batteries if they are connected after the mains has been connected.





3. COMPONENT OVERVIEWS

3.1. Component overview NOVA FLX M

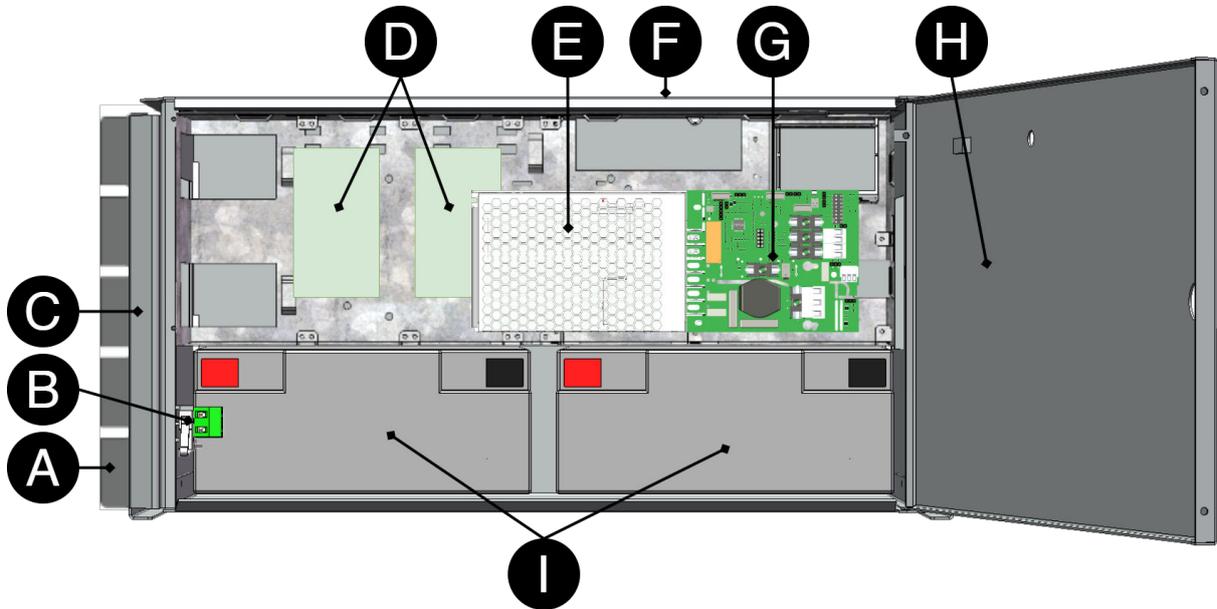
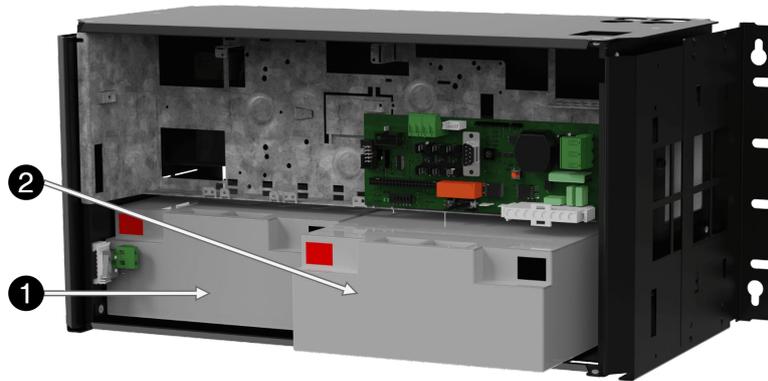


Table 1. Component overview

Letter	Explanation
B1 +, B2 +	Bracket, reversible for wall mounting or 19 "rack.
B	Optional: Sabotage contact
C	Cabinet in powder-coated sheet metal.
D	Optional card slot
E	Power supply, sits on the back in some configurations.
F	Cable entries.
G	Motherboard.
H	Lockable door.
I	Space for batteries.

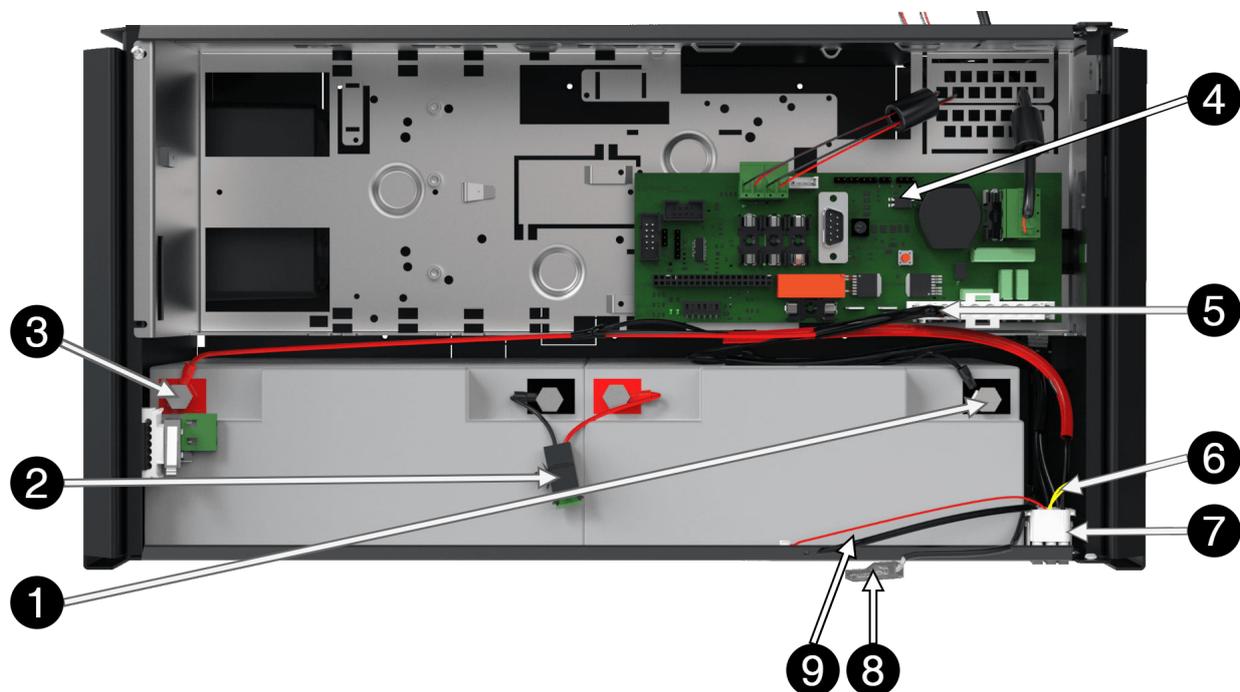
4. BATTERIES - PLACEMENT AND CONNECTION

4.1. Placement of batteries



4.2. 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.



Note that cards (4) differ from different configurations.

No	Explanation
1	Minus coil for battery cable from 4.
2	Fuse.
3	Plus terminal for battery cable from 4.



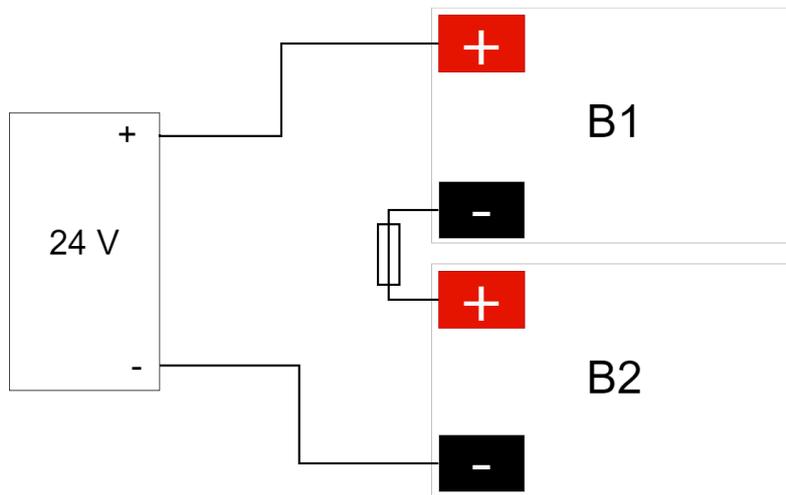
No	Explanation
4	Motherboard, varies with configuration.
5	Battery cables are located on the system board.
6	Yellow cable, which must be cut when connecting the battery box.
7	Connection for connection of battery box.
8	Alarm cable for battery box.
9	Cable for tampering in battery box.

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 2. Wiring diagram for batteries in battery backup



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

5. MOTHERBOARD - DESCRIPTION

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





Figure 3. PRO1

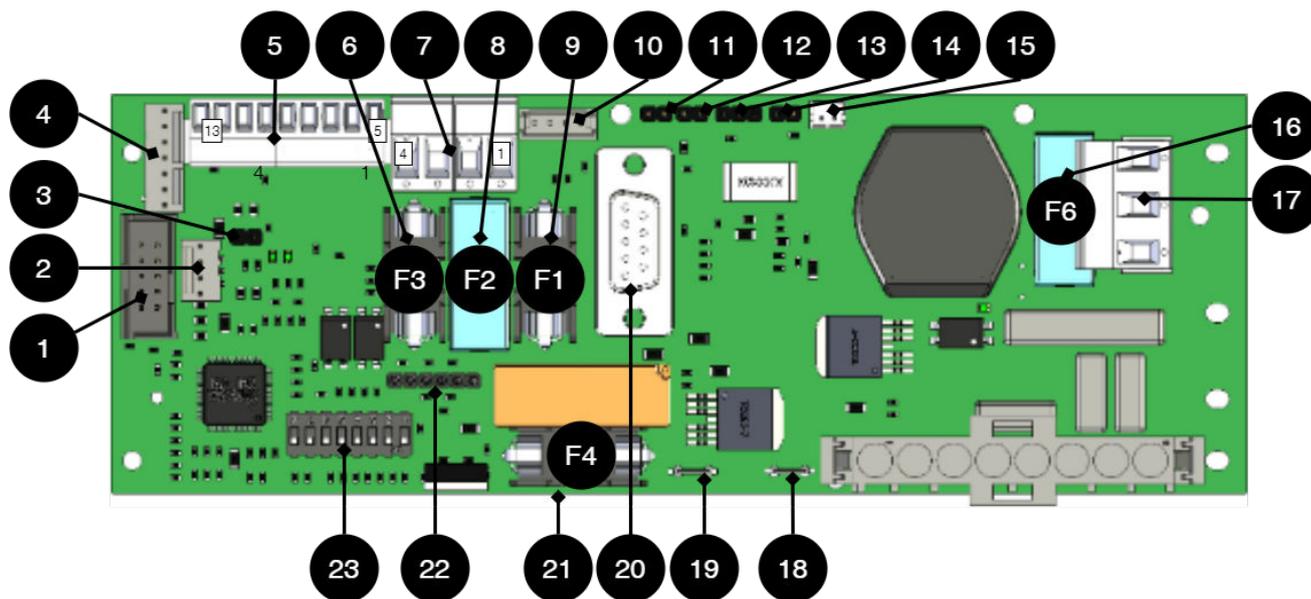


Table 2. Circuit board overview, explanation

No .	On circuit board	Explanation
1	PGM1	Port for firmware update.
2	J12	Connection indicator diode.
3	J5	Termination by jumper, (at over 120 Ω, RS-485).
4	J9	Effect card connection.
5	P2:5-13	Connection for communication.
6	F3	Fuse, load 2 +. (5A and 10A units.)
7	P2:1-4	Load outputs for 5 A and 10 A units only.
8	F2	Fuse, load 1 -. (5A and 10A units.)
9	F1	Fuse, load 1+. (5A and 10A units.)
10	J2	Connection to fan.
11	J11	Tamper switch connection.
12	J7	Connection tamper switch from battery box.
13	JU2	Input from external fuse card, NO.
14	J15	Input from external fuse card, NC.
15	J13	Connection to external alarm. Optional card.
16	F6	See fuses.
17	P1:1-3	Incoming mains, (230 V). Line, Phase, PE.
18	J16	Power resistor connection.
19	J4	Power resistor connection.
20	D-sub	Connection option card via D-sub.
21	F4	Battery fuse.
22	J8	Connection to relay/communication card.
23	S1	Dip switch 1-8

5.1. Fuses

Fuses	Type	Explanation
F1	See table: fuses	Fuse, load 1 plus +.





Fuses	Type	Explanation
F2		Fuse, load 1 minus -.
F3		Fuse, load 2 plus +.
F4		Battery fuse.
F6		Mains fuse.



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.

Table 3. Fuses

Fuse	Type
15 A	T15A
25 A	T25A
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.

5.2. Connect the mains to the motherboard (PCB)

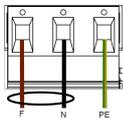
5.2.1. Connect mains

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 4. 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 4. 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.

5.3. 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 5. 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 -

5.4. 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.



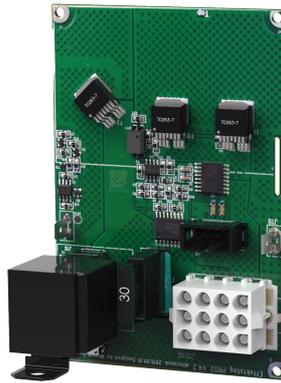
WARNING

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 5. Effect card



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

5.5. Dip-switch - S1

The contact on the dip switch has two positions, ON and OFF.

Dip-switch S1	Explanation
1-4	For address setting to external communication.
1-2	Sets time delay for mains failure alarm. (I ² C)
3-4	Not used.
5	Sets the fan speed.
5-7	Battery capacity setting.
8	For software reset.



NOTE

NEO cannot be connected to communication/UC.

5.6. 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 turning Dip-switch 8: OFF-ON-OFF (PRO1)



IMPORTANT

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

NEO cannot be connected to communication/UC.

5.7. Dip-switch - S1

The alarm can be set in time intervals of 0 seconds, 15 minutes, one hour or four hours.

Time	Dip 1	Dip 2
0 seconds	OFF	OFF
15 minutes	ON	OFF
60 minutes	OFF	ON
240 minutes	ON	ON

5.8. Note on Dip switch 3

In previous versions of the motherboard, it was possible to use Dip-switch 3 to control whether the unit should alarm for fan failure or not.

This feature has been removed. Alarms for fan faults are given over communication.

5.9. Fan speed - setting, Dip-switch 5

Dip-Switch 5 sets the fan speed. (As of software V 4.27.)

Table 6. Fan speed - dip 5

Dip-5	Mode	Temperature limit	Benefit	Drawback
OFF	Normal mode (factory setting).	High speed above 30°C, restores normal mode when the temperature is 25°C.	Best for battery life.	Louder noise from the fan.
ON	Office environment mode.	High speed at 35°C, restores normal mode when the temperature is 30°C.	Lower noise level.	Shortens the lifespan of the batteries.

5.10. Battery capacity setting, Dip switch 5-7

The device is set for the battery capacity that the product can handle the most (largest batteries). If other batteries are to be installed, the battery capacity setting needs to be changed so that alarms and functions works as intended.

- Setting the new battery capacity is done by keeping the tamper switch pressed while Dip-switch 5-7 is changed and the unit is commissioned.
- Open the device and let it operate normally.
 - Press the tamper switch on the door frame. The device is now in write mode for battery capacity setting.
 - Set the connected battery capacity on the Dip switch, according to the table.
 - Release the tamper switch in the door frame. Battery capacity is now stored.





Table 7. Matrix for setting battery capacity

Batteries	Dip 5	Dip 6	Dip 7
7,2 Ah	OFF	OFF	OFF
14 Ah	ON	OFF	OFF
20 Ah	OFF	ON	OFF
28 Ah	ON	ON	OFF
45 Ah	OFF	OFF	ON
60 Ah	ON	OFF	ON
90 Ah	OFF	ON	ON
120 Ah and above	ON	ON	ON

5.11. Resetting data after battery change (Dip-switch 8)

In order for the system to measure the capacity of new batteries, the unit needs to clean up previous battery capacity. Dip-switch 8 makes a software set that, among other things, resets alarms.

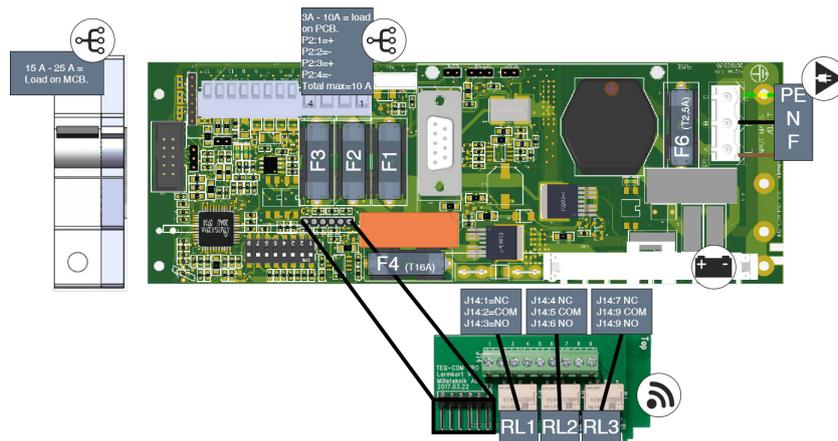


IMPORTANT

The action clears the memory on the card immediately.

- Dip-switch 8 must be switched to: OFF-ON-OFF

6. CONNECTION OF PRO 1 WITH ALARM CARD IN NEO



6.1. ⚡ Connect load (PRO1)

Load is connected to circuit breaker and not to circuit board - see component overview.

To cope with increased power, power is supplied via power cards to circuit breakers. Therefore, loads must be connected to circuit breakers.



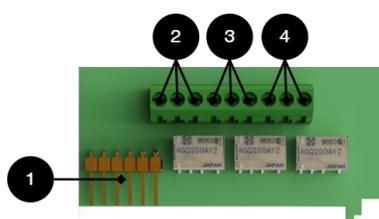
CAUTION

Maximum current must not be exceeded, see plate on the unit.

6.2. Alarm card for PRO1

Relay card - description, connections and alarm outputs.

- All fault alarm relays must be in the drawn state. Make sure the connection between CO and NC is at closure. 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.



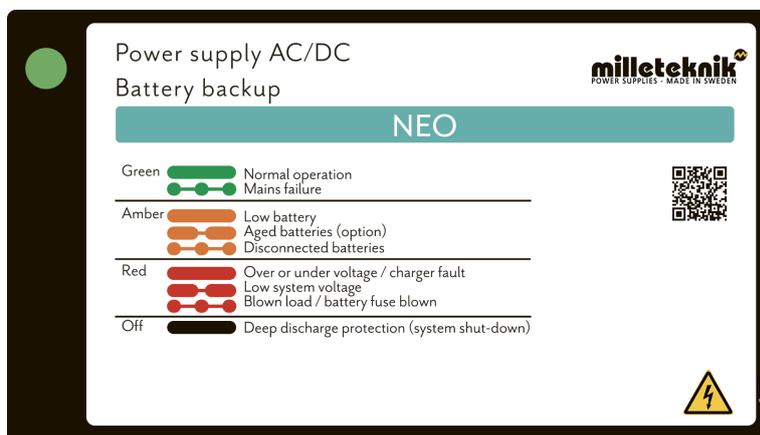
No .	Relay (Terminal no.)	The relay is normally energized.	Alarm type or explanation
1	J12	-	Connection to motherboard.
2	J14:1-3	NC, COM, NC	Power outage alarm.
3	J14:4-6	NC, COM, NO	Alarm for: Fuse failure, tamper switch*, charger failure overvoltage, charger failure undervoltage, cell failure/battery not connected, low battery voltage in case of mains failure and aged battery*.
4	J14:7-9	NO, COM, NC	Alarm for: Low system voltage.

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.

* Optional on units that are not certified.

6.3. 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	Not available for NEO.
Fast green flashes	Mains failure.
Solid yellow light	Low battery voltage.
Slow yellow flashes	Aged batteries, (option).
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.

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.

8. CIRCUIT BOARDS - TECHNICAL DATA

8.1. Technical data, motherboard: PRO 1

Info	Explanation
Short name:	PRO 1
Product description	Main PCB 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

8.1.1. 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.
- Fuse fault.
- Aged battery

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

Table 8. Outputs

Info	Explanation
Alarm on alternating relay? (Yes No)	Yes
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)	Yes
Load output minus (-) secured (Yes / No)	Load output 1 = Yes Load passage 2 = No.
Fuses on output	Yes, see table: Fuses.

Table 9. Fuses

Fuse	Type
15 A	T15A
25 A	T25A
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 10. Protection

Electrical protection	
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. POWER SUPPLY

9.1. Power supply - Technical Data RSP-320-24

In:
NEO 24V 15A FLX M





Info	Explanation
Output voltage	27.3 V
Output current	0 A - 13.4 A
Output voltage, ripple	150 mVp-p
Overvoltage	27.6 V - 32.4 V
Voltage recharge, ripple / current limitation	Less than 1.2 Vp-p
Efficiency	89%
Current limitation	105% - 135%
Constant voltage	+/- 0.5%
Regulatory accuracy	+/- 1.0%
Input current (230 V)	2 A
Mains voltage frequency	47 Hz- 63 Hz
Mains voltage	230 V AC - 240 V AC
Brand effect	321.6 W
Temperature range	-30°C - +70°C
Humidity range	20% - 90% RH non-condensed
<p>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.</p>	

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

In:
NEO 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%
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
<p>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.</p>	



10. TECHNICAL DATA ENCLOSURES

10.1. 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

11. BATTERIES - RECOMMENDED, NOT INCLUDED

11.1. Batteries are not included they are sold separately

Batteries are sold separately.

11.2. 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 11. 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.





11.3. 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 12. 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			
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 13. 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



Medium current	28 Ah	42 Ah	65 Ah	70 Ah
18 A	90	130	150	254
20 A	84	126	138	241

Table 14. 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 15. 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.





12. REGULATIONS AND CERTIFICATIONS

12.1. Requirements that the product meets

EMC:	EMC Directive 2014 / 30EU
Electricity:	Low voltage directive: 2014/35 / EU EN 62368-1
CE:	CE directive according to: 765/2008
Emission:	EN61000-6-: 2001 EN55022: 1998: -A1: 2000, A2: 2003 Klass B, EN61000-3-2: 2001
Immunity:	EN61000-6-2:2005, EN61000-4-2, -3, 4, -5, -6, -11 SS-EN 50 130-4:2011 Edition 2, EN50131-6
Emission	EN55032 (CISPR32) Class B
Environment	REACH Regulation: Directive 1907/2006, WEEE Regulation: Directive 20021961E, RoHS Regulation: Directive 2015/863



13. ADDRESS AND CONTACT DETAILS

Milleteknik AB
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