



4466

EXTERNAL POWER SUPPLY

Fire alarm solutions
technical description

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1. INTRODUCTION

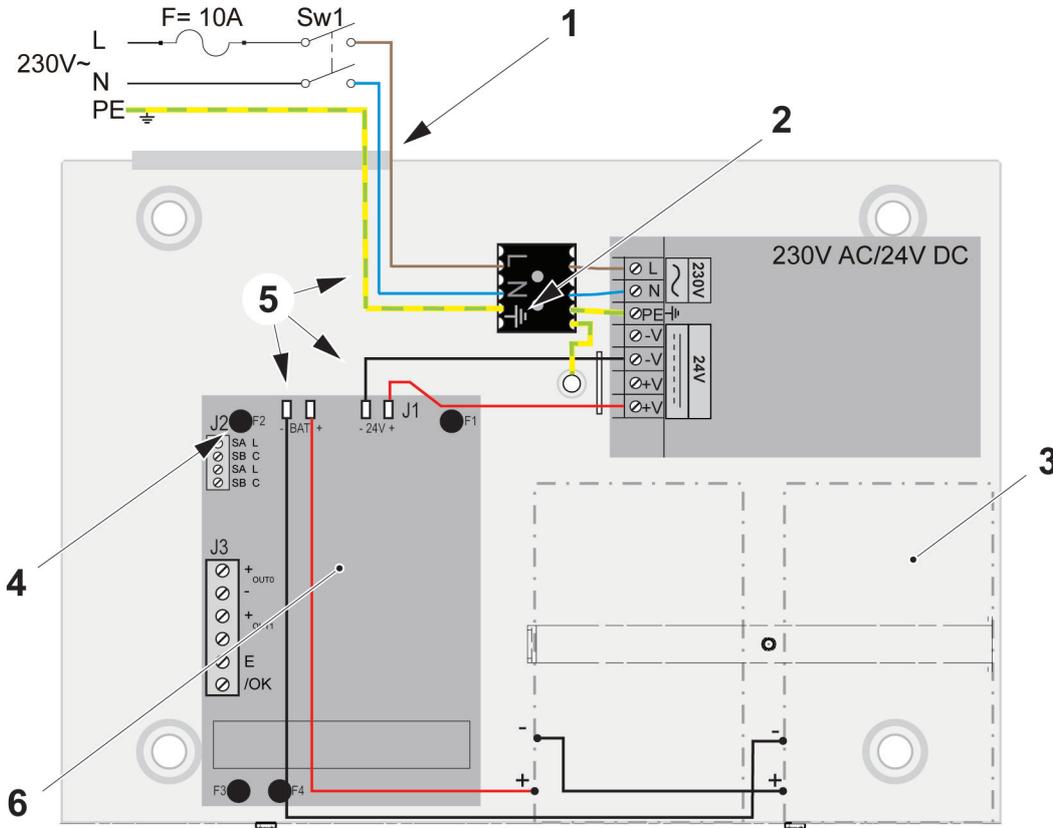
This document describes the external power supply, type number 4466.

The document contains information about the product and instructions on how to mount and connect it.

2. ABBREVIATIONS

CIE	Control and indicating equipment	= control unit
EOL	End-of-line	
PC	Personal Computer	
SMPS	Switch Mode Power Supply	
S/W	Software	

3. SAFETY INSTRUCTIONS



Element	Description	Markings / Instructions
1	Caution! Risk of electric shock. Dangerous voltage. Make sure to disconnect the equipment from the mains power supply before opening the housing of 4466.	
2	Note! Protective earth (ground). Make sure to connect the protective earth conductor when installing the 4466.	
3	Caution! Risk of explosion if batteries are replaced by incorrect type. See 4.5. BACKUP BATTERY on page 8	
4	Caution! Risk of electric shock. Make sure to disconnect the fuse F2 for the backup batteries before touching anything in the 4466.	 CAUTION!
5	Caution! Risk of electric shock. Long cable cores should be safely secured, not to touch high/low voltage parts if becoming loose from its terminal. For example; secure with a cable tie.	 CAUTION!
6	Caution! Hot parts! Risk of burned fingers when touching hot electrical components. Do not touch any electrical components when the unit is powered	 CAUTION!

4. GENERAL DESCRIPTION

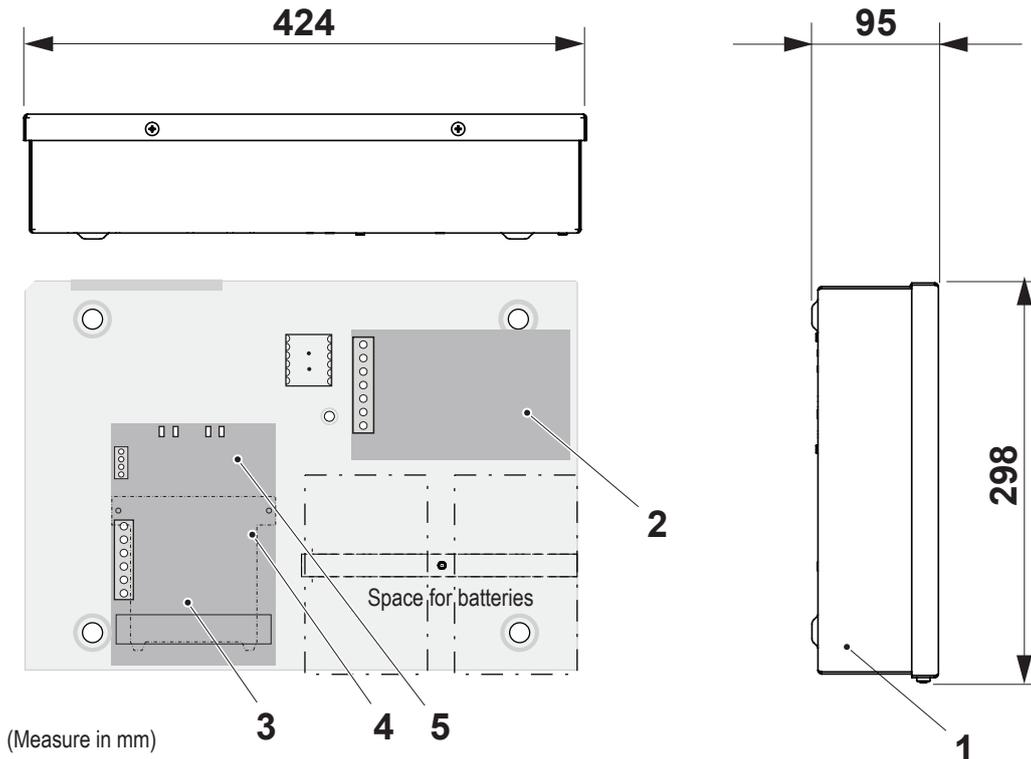
The external power supply 4466 consists of a SMPS (the main power source) and a charger board. It is intended to be used as power supply for external equipment requiring 24V DC with battery backup.

The 4466 shall be connected to the COM loop in order to be monitored by the CIE.

4466 has a build in short circuit isolator.

It is possible to mount and connect two the “2 voltage outputs board” and/or the “com loop repeater 4585” inside the 4466, i.e. in total two expansion boards.

The external power supply is intended for indoor use and in dry premises.



1. Housing
2. SMPS
3. Charger board 4467
4. Yellow LED
5. Red LED

4.1. LED

The external power supply has two LEDs.

The red LED will only be lit by the function 'Toggle LED' via EBLWin`. For more information, see Planning instructions for the system, version 2.4.x or later.

The yellow LED is lit when the battery is charging.

4.2. HOUSING

Wall mounted.

The SMPS and the charger board are mounted in a metal housing. The housing also has space for two maintenance-free sealed Lead-Acid backup batteries. The housing has a cable gland plate for cable inlets on the top.

4.3. SWITCH MODE POWER SUPPLY (SMPS)

The SMPS, which is the main power source, is connected to the mains. The total current consumption, including maximum battery charging current, must not at any time exceed 4.5 A. Allowed input voltage is 195 - 253 V AC.

The output voltage is factory set to 24 V with a tolerance of $\pm 1\%$. On the SMPS is a potentiometer for output voltage adjustment ($\pm 10\%$) available. Do not use this potentiometer unless the output voltage is not 24 V.

Input	Voltage	195-253V AC
	Current	≤ 2.0 A
Output	Voltage	24V DC (nominal)
	Current	0 – 4.5 A

4.4. CHARGER BOARD

The charger board has in the standard configuration two 2 A outputs (24V DC).

The total continuous current takeout can be maximum 3.0 A or 1.5 A depending on the battery charging current mode.

4.4.1. FUSES

There are four fuses on the charger board:

F1 = T5AH 250 V, 5x20mm +24V DC rectifier input.

F2 = T5AH 250 V, 5x20mm + battery input.

F3 = T2AH 250 V, 5x20mm +24V DC output 0 or connector J5.

F4 = T2AH 250 V, 5x20mm +24V DC output 1 or connector J6.

4.5. BACKUP BATTERY

Make sure to install the batteries according to national regulations. Consider ventilation and codes of practice.

BATTERIES INSIDE THE 4466

By loss of the main power source (230 V AC), the second power source consists of two sealed Lead-Acid batteries 12 V / 7.2 Ah (Size 153x65x95 mm with 4.8 FASTON spade terminal).

The internal batteries must be approved according to IEC 61056-1, and must have flammability rating UL94-V1 or better.

BATTERIES OUTSIDE THE 4466

Batteries with higher capacity than 7 Ah up to 42 Ah have to be placed outside the housing, in a separate cabinet (type 5014).

For external batteries, a maximum cable length of 3 meter (minimum 4 mm²) is allowed.



CAUTION!

Risk of explosion if batteries are replaced by incorrect type.

4.5.1. BATTERY BACKUP TIME

Find out the required battery backup time, according to national regulations / customer demands, in normal state and in alarm state. Calculate the battery capacity required in normal state (QN) and the battery capacity required in alarm state (QA) respectively QN.

$Q_N \text{ (Ah)} = I_{TN} \text{ (A)} \times \text{battery backup time in normal state (h)}$

$Q_A \text{ (Ah)} = I_{TA} \text{ (A)} \times \text{battery backup time in alarm state (h)}$

The total battery capacity $Q = Q_N + Q_A \text{ (Ah)}$

The battery voltage at the end of a discharging period is not the same as at the start. Round up the calculated capacity and add at least 20% margin at room temperature (~20°C) and up to 40% in cold premises, as a safety margin. The following tables show the relation between current consumption (I) and backup time.

I (A)	Backup time (hours:min) @ 20°C without any margin	
	Built-in 7.2 Ah batteries.	External 42 Ah batteries
4	1:0	10:30
3	1:30	14:00
2	2:30	21:00
1.5	3:30	28:00
1.0	6:30	42:00
0.8	9:0	52:30
0.6	12:0	70:00
0.4	18:0	105:00
0.2	36:0	210:00

The values in the table above are calculated and give only a rough idea of the back-up time.

4.5.2. BATTERY PARAMETERS

Ri max	0.7 Ω
UB min (final voltage)	21.0 V
Deep discharge protection	19.0 V

4.5.3. CHARGING MODE

When batteries with capacity > 16 Ah are used, High current charging mode has to be used (if EN54-4 shall be fulfilled).

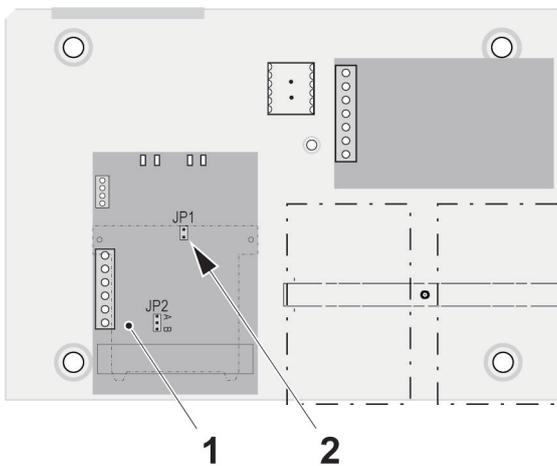
Minimum charging current x 24h x 80% = 18Ah, but 10% security margin is required.

For batteries 12 Ah and below, it is recommended to use the low current charging mode

See the following table:

Charging mode	Jumper JP1	Battery capacity (Ah)	I _{max} a (I _{Out0} + I _{Out1}) 24 V DC output Continuous current takeout (A)
Low current	Open	≤ 12	≤ 3.0
High current	Shunted	≤ 42	≤ 1.5

Jumper JP1 is situated on the charger board. The charger board has to be out of power when shunting JP1. Shut the power of by removing both F1 and F2.



1. Charger board 4467
2. Jumper JP1

Using the high current charging mode results in a "low" continuous current consumption on the 24 V DC output and vice versa.

A fire alarm in the system will automatically allow a total output current up to 4.0 A.

4.5.4. BATTERY CHARGING FUNCTIONS

A battery discharged to its final voltage can be recharged to at least 80% of its rated capacity within 24 hours and to its rated capacity within another 48 hours.

The battery charging cycle is performed in two steps:

1. Constant current: The charging current is constant (fixed) until the battery / charging voltage reaches approximately 14.5 V per battery.
2. Constant voltage: The charging voltage is reduced (and temperature compensated) to approximately 13.6 V per battery at 25°C, and will be constant (fixed) at this level until the batteries are fully charged.

When the battery is fully charged the stand-by "charging current" is 0-0.25 A (typical 0.1 A) and the "charging voltage" will stay constant (fixed) at the "step 2" level, until the batteries have been discharged and have to be charged again. A new charging cycle will then start. The duration of "step 1" and "step 2" respectively is depending on the battery condition when the charging started.

4.5.5. SECURITY FUNCTIONS

The unit has a number of security functions:

- The battery charging will be turned off if the current from the rectifier to the charger board exceeds 4.5 A. The battery charging will remain turned off as long as the continuous output current consumption exceeds 1.5 and 3.0 A respectively.
- In order to prevent damage of the batteries, the voltage output will be turned off at approximately 19 V. This only happens when the backup batteries are used as the power source. The output will be turned on at approximately 21 V.
- If the battery voltage is below 15 V, the battery charging will be turned off. The batteries are probably damaged and have to be changed.

When the battery charging is turned off, a fault will be generated in the c.i.e. The fault message is depending on the system that the unit is connected to.

When the system is in alarm state, the charger fault will be suppressed.

4.6. VOLTAGE OUTPUTS (OUT0 AND OUT1)

The 4466 has two 24 V DC, 2.0A outputs.

The 4464 or 4585 (if mounted) are internally connected to power supply outputs 0 and 1. Therefore, if an internal unit is mounted, the corresponding power supply output must not be used.

Remove F1 and F2 before removing any of F3 or F4.

Put back F3 and F4 before F1 and F2.

(Voltage: 16.0 – 29.5 V DC)

Charging mode	Battery capacity	Number of expansion boards	I _{max a} (I _{Out0} + I _{Out1})	I _{max b} (I _{Out0} + I _{Out1}) (No charging)	I _{min}
Low current	7.2 Ah	0	3.0	4.0	0
Low current	7.2 Ah	1	2.0	2.0	0
Low current	7.2 Ah	2	0	0	0
High current	42 Ah	0	1.5	4.0	0
High current	42 Ah	1	0.5	2.0	0
High current	42 Ah	2	0	0	0

Current	
I _{Out0} I _{Out1}	Max 2.0 A (LPS) Max 2.0 A (LPS)

Each output is fused for 2 A.

4.7. OUTPUT SIGNAL (/OK)

Used for backwards compatibility.

This is an open collector output. The output is intended be used to Addressable 2 voltage outputs unit 3364, "/Mains OK" input when the fire door closing function is to be used. The output signal is for signalling mains fault to an addressable voltage output unit.

The output is low as long as the main power source is available.

Voltage	5.0 - 30V DC
Current	12 mA, limited current

4.8. SHORT CIRCUIT ISOLATOR

The external power supply, 4466, has a built-in short circuit isolator that requires no separate COM loop address. Like any other short circuit isolator, it will be given an individual sequence number when programmed in EBLWin or via automatic addressing function.

For systems \leq EBL512 G3 2.2.x: The isolators must be connected consecutively regarding sequence number 00-127, in the COM loop's A-direction.

For systems \geq EBL512 G3 2.3.X: The sequence numbers can automatically be generated and sorted consecutively in the COM loop's A-direction. Function "Arrange sequence numbers" in EBLWin must be activated. (Tools/Options/EBLWin Settings).

Parameter	Symbol	Value
The maximum line voltage	V_{max}	30V DC
The nominal line voltage	V_{nom}	24V DC
The minimum line voltage	V_{min}	12V DC
The maximum rated continuous current with the switch closed	I_{Cmax}	350 mA
The maximum rated switching current on short circuit conditions	I_{Smax}	2 A
The maximum leakage current with the switch open	I_{Lmax}	1.5 mA
The maximum series impedance with the switch closed	Z_{Cmax}	90 m Ω
The maximum voltage at which the device isolates (i.e. close to open)	V_{SOmax}	11V DC
The minimum voltage at which the device isolates (i.e. close to open)	V_{SOmin}	5V DC
The maximum voltage at which the device will change from open to close.	-	N/A ¹
The minimum voltage at which the device will change from open to close.	-	N/A ¹

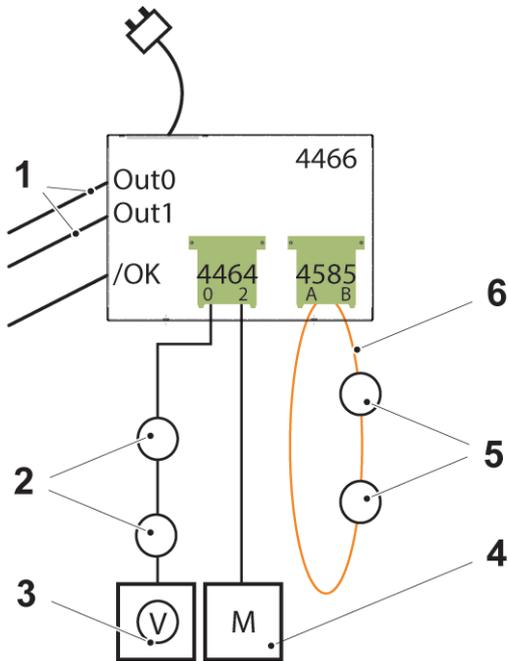
1) The device can change from open to close by commands from the control and indicating equipment only. This can be done at minimum to maximum line voltage, i.e. 12V DC – 30 V DC.

For more information on short circuit isolators, see the Planning instructions for EBL512 G3 and EBL128 version 2.3.x or later, or Planning instructions for EBLOne.

4.9. FUNCTIONAL OVERVIEW

This overview is an example of how the 4466 power supply can be used.

For more information on 4464 and 4585, see each Technical Description respectively.



1. Out0 / Out1 - not to be used if an expansion board is supplied from the output
2. Alarm devices
3. EOL Device
4. Fire door release magnet
5. Addressable units
6. COM sub loop

4.10. FAULTS

The 4466 is generating fault signal in the CIE when the following occurs:

- Loss of main power source.
- Loss of standby power source.
- A high internal resistance of the battery and its associated circuit, $R_{i \max}$.
Value for $R_{i \max}$, see section [4.5.2. BATTERY PARAMETERS on page 10](#)
- Loss of the battery charger.

5. CURRENT CONSUMPTION CALCULATION

Calculate the total continuous current consumption, from both outputs/boards, excluding the battery charging current, in normal state (I^{TN}).

Calculate the total continuous current consumption, from both outputs/boards, excluding the battery charging, in alarm state (I^{TA}).

When the backup battery is the power source, the current consumption for the charger board itself is 10.6 ± 2 mA.

I^{TN} shall be < 1.5 A or < 3.0 A respectively depending on if High or Low current charging mode is selected.

I^{TA} shall be < 4 A (The battery charging will be turned off in conjunction with a fire alarm in the system.)

6. CONFIGURATION

The 4466 needs to be added into the configuration, manually or via auto addressing function. For more information, see the Planning Instructions for the system.

- a) In EBLWin, right click on a loop / Add loop unit 4466 External power supply....

The screenshot shows the '4466 External power supply' configuration window. It is divided into several sections:

- General Information:** Technical address: 1, Name: EPS 4466
- Short circuit isolator:** Sequence number: 0
- Current consumption:** Quiescent: 0 mA, Alarm: 0 mA
- Battery:**
 - Required battery backup time: 24 hr, 30 min
 - Required battery capacity: 0 Ah
 - Total required battery capacity: 0 Ah

At the bottom of the window, there are four buttons: OK, Cancel, Apply, and Add...

- b) In the 4466 External power supply properties window, set the following:
- Technical address (automatically set if auto addressing is used)
 - Sequence number (automatically set if auto addressing is used)
 - Add input for external current consumption values
 - Add input for required battery backup time
- c) Press **Apply** to calculate new value input.

7. SET THE COM LOOP ADDRESS

The 4466 always occupies 3 addresses to support mounting of internal units. The internal units must be programmed at the two addresses following the 4466 unit. Auto addressing of the internal units will take place even if the auto addressing function is not used.

7.1. AUTO ADDRESSING

The 4466 supports automatic addressing via EBLWin.

For more information, see the Planning Instructions for the system S/W version ≥ 2.4 .

The 4464 and 4585 units can only be addressed by the CIE (auto addressing). The unit connected to power supply output J5 must have the 4466 technical address plus one. The unit connected to power supply output J6 must have the 4466 technical address plus two.

For more information on units 4464 and 4585, see the technical description for each unit.

7.2. MANUAL ADDRESSING

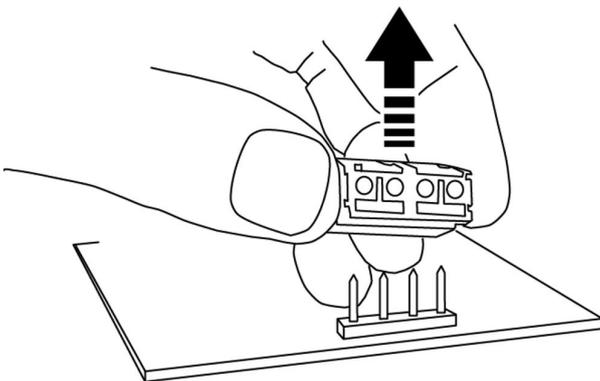
If auto addressing is not used, there is a possibility to manually set the address.

The COM loop address and mode settings have to be done before the unit is connected to the COM loop.

Each COM loop unit has to have a unique COM loop address (001-253). The address is set with the Address Setting Tool (4414E or 4414).

Use the Address setting tool.

- a) Make sure the unit is connected to the 24V DC power supply or the batteries.
- b) Unplug the terminal block on the addressable unit.



- c) Connect the Address Setting Tool's SA and SB terminals with the SA and SB terminals of the addressable unit. Use the connection cable with crocodile clips.
- d) Set the address.

7.3. CHANGE THE COM LOOP ADDRESS

If the COM loop address for 4466 must be changed, the address for 4464 and 4585 also must be changed (if mounted).

- a) Disconnect the 4466 from the COM loop.
- b) Reset the address for PCB 4464/4585 according to the instruction "RESET ADDRESS" in technical description for 4464 or 4585.
- c) Set the new address manually for 4466.
- d) Connect the 4466 to the COM loop.
- e) Download SSD to the CIE. During download SSD, the 4464 and 4585 will get the correct addresses.

8. SET THE MODE

Set the mode with the Address setting tool (4414 or 4414E) according to the table below.

8.1. COMPATIBILITY TABLE

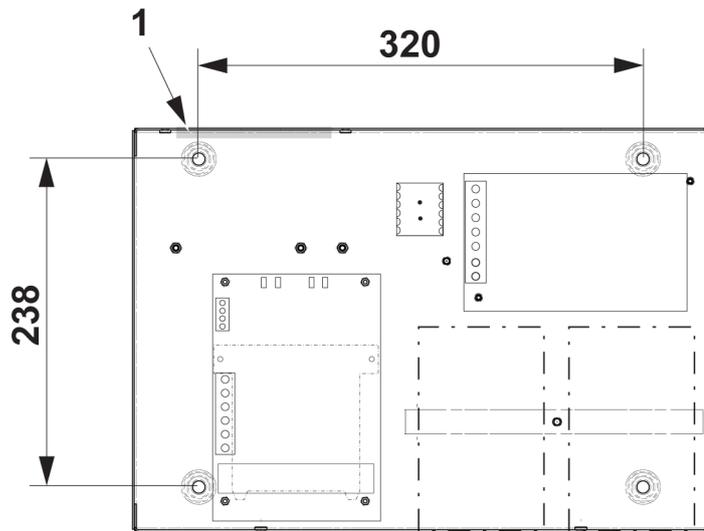
	Advanced mode	NORMAL mode	2330 mode	2312 mode
EBL512 G3	V ≥ 2.5	All versions	Not used	Not used
EBLOne	V ≥ 3.3	Not used	Not used	Not used
EBL128	Not used	All versions	Not used	Not used
Configured as:	4466	3366	-	-

9. MOUNTING

- a) The external power supply must be mounted on the wall. Screws are not supplied.
- b) Make sure the housing is mounted with the cable gland plate upwards.

The 4466 weighs ~ 10 kg including batteries. Use screws of sufficient dimension. Make sure the wall is suitable for this purpose. Preferable an incombustible wall, for example concrete.

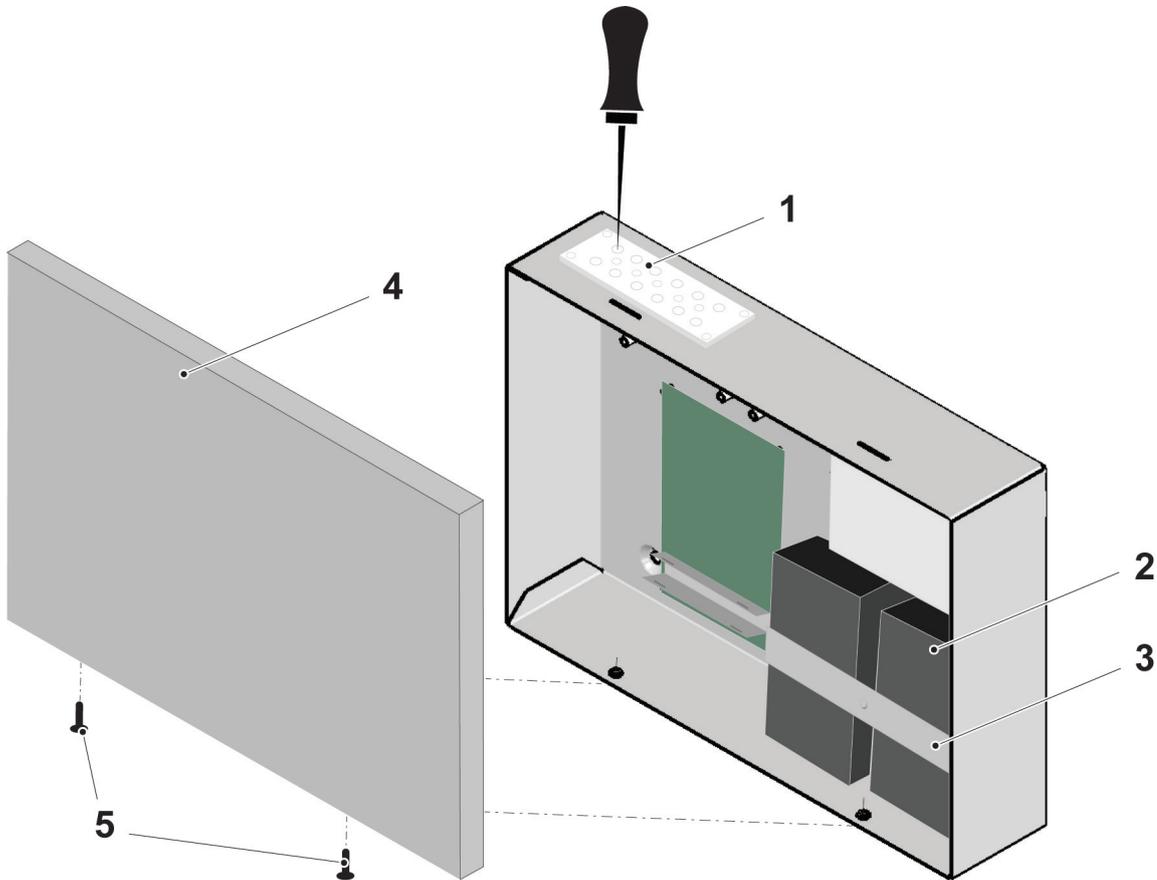
The external power supply is intended for indoor use and in dry premises.



(Measure in mm)

1. Cable gland plate

- c) When the 4466 is mounted on the wall, place the batteries and fasten the battery bracket.
- d) Make holes for the cables in the cable gland plate with a sharp tool.
- e) Connect the 4466 according to [10. INSTALLATION AND WIRING](#) on page 23.
- f) Attach the lid and secure it with the two screws.

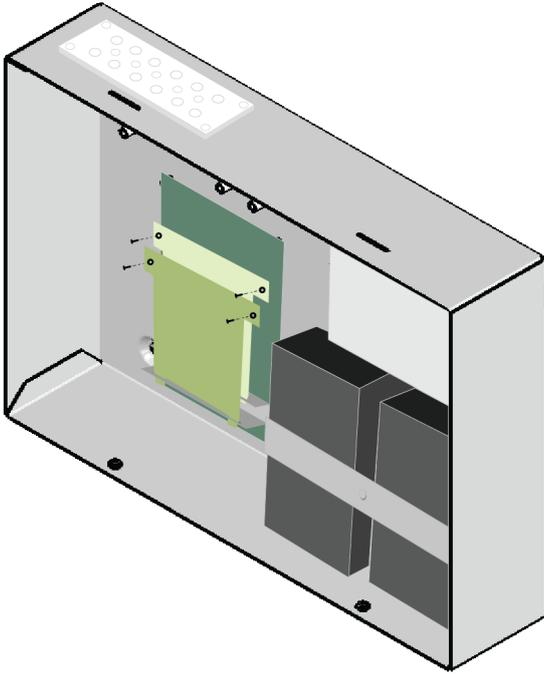


- 1. Cable gland plate
- 2. Battery
- 3. Battery bracket
- 4. Lid
- 5. Screw

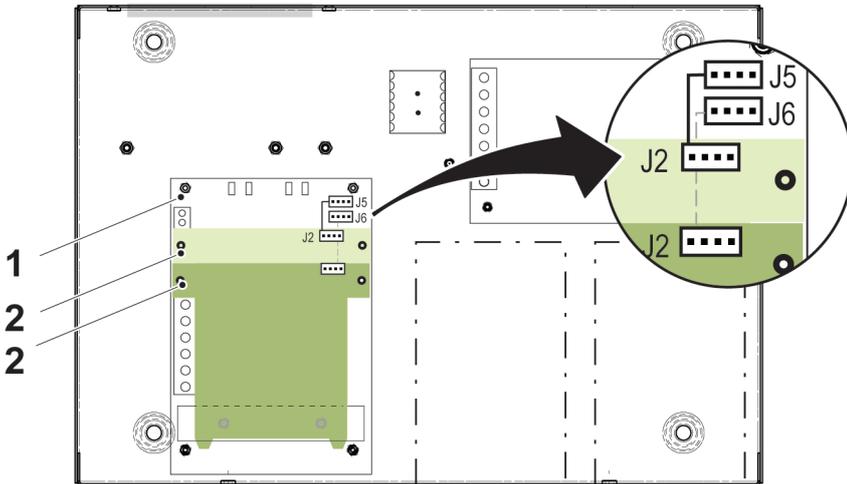
9.1. 9.1. EXPANSION BOARDS

One or two expansion boards 4585 or 4464 can be mounted on the charger board.

- a) Mount the expansion boards according to the picture below. Screws are supplied with the expansion boards separately.



- b) Connect each Molex connector to contact header J2 on the expansion board, and to contact header J5 or J6 on the charger board.
- J5 is powered from OUT0
 - J6 is powered from OUT1



1. Charger board 4467
2. Expansion board

Do not use the corresponding voltage output on terminal J3 when an expansion board is connected.

10. INSTALLATION AND WIRING



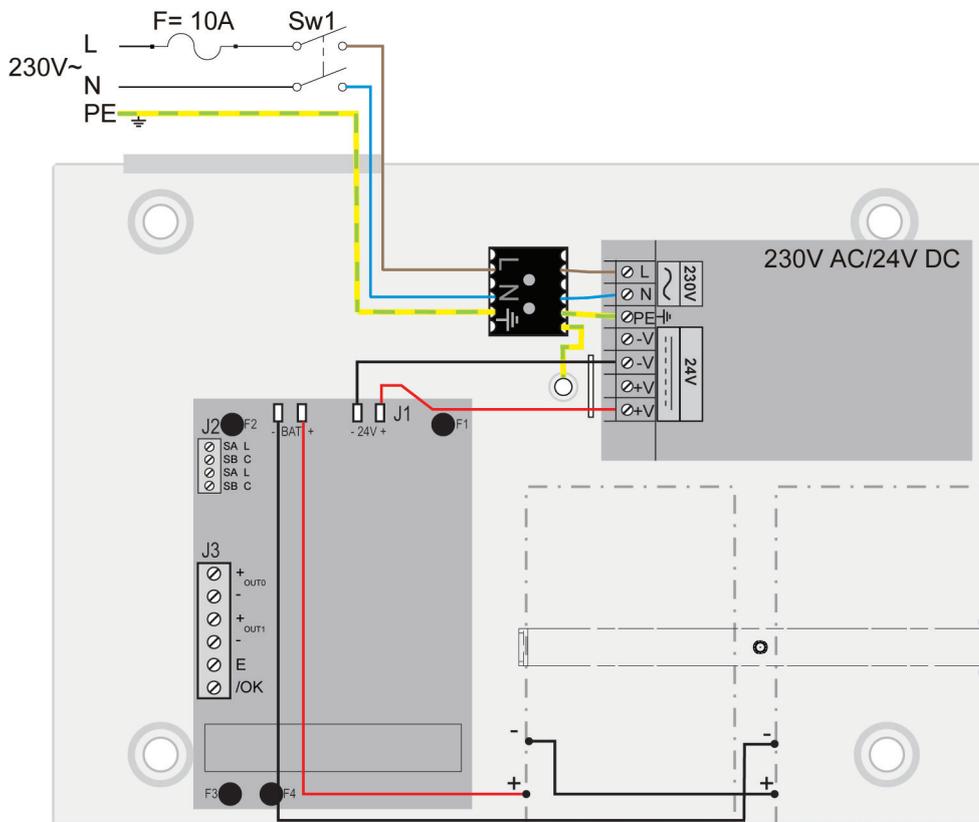
CAUTION! Risk of electric shock!

Make sure to disconnect the equipment from the mains power supply before opening the housing of 4466.

CAUTION! Risk of electric shock!

Make sure to disconnect the fuse F2 for the backup batteries before making any service except address setting in the 4466.

10.1. POWER SUPPLY WIRING



When connecting the mains to the SMPS, connect to a household removable fuse intended for this unit only and marked according to national regulations and codes of practice. Use cable ties to keep mains and 24 V DC wiring well separated.

10.2. DISCONNECT DEVICE

Appropriate disconnect device (all-pole mains switch) shall be provided as a part of the building installation. The disconnect device shall have a contact separation of at least 3 mm.

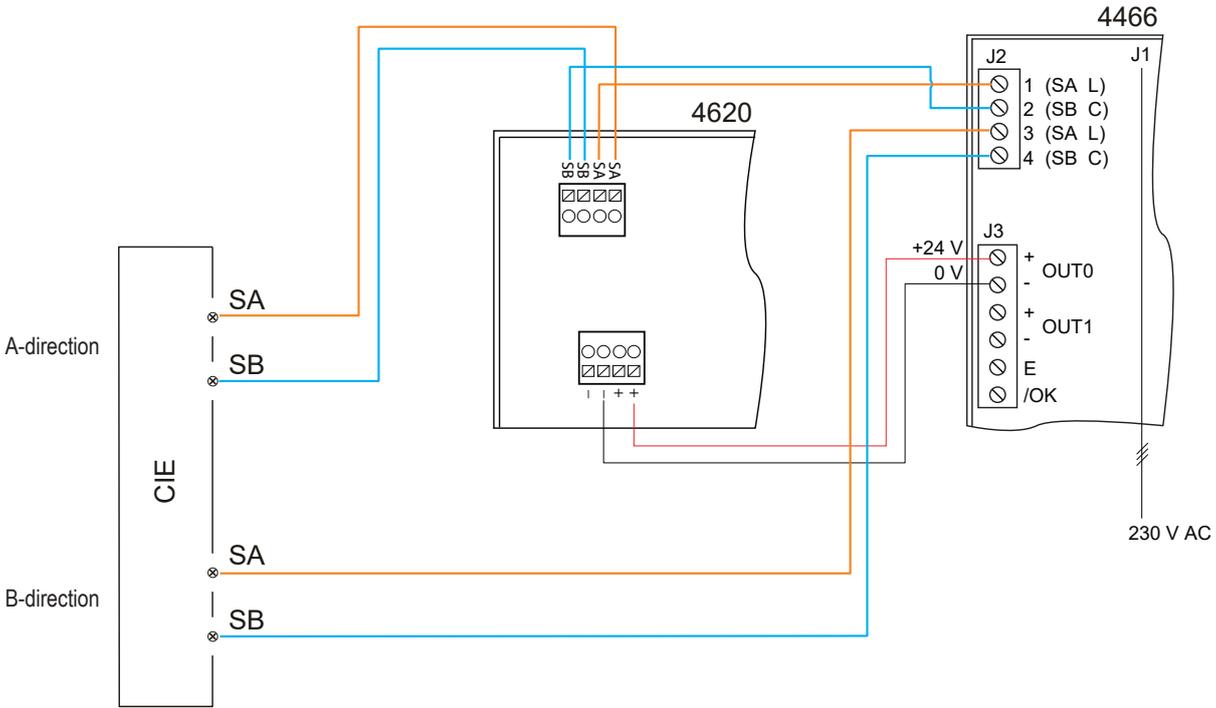
10.2.1. CABLE DATA

COM loop Terminal block J2	
Wire size (Min)	Ø 0.65 mm (0.33 mm ²)
Wire size (Max)	Ø 1.6 mm (2 mm ²)
Terminal block J3	Ø 2.3 mm (4 mm ²)
Terminal blades J1 (batteries) (Depending on the spade terminal type)	
Wire size (Min)	Ø 1.4 mm (1.5 mm ²)
Wire size (Max)	Ø 2.8 mm (6 mm ²)

10.2.2. ELECTRICAL INTERFACE

Power supply	Via Mains / SMPS. 230V AC with protective earth
24V outputs	2
Terminal board blades for batteries	2
Protective earth	1
Output signal	1

10.3. EXAMPLE OF COM LOOP WIRING



The COM loop in A direction must be connected to number 1 and number 2 in terminal block J2 in 4466.

10.4. CHECK LIST

The following has to be connected:

- Mains is to be connected to the Terminal Block:
 - L (line)
 - N (neutral)
 - \perp (safety earth)
- Batteries (2 x 12V) to the Charger board (J1)
- External equipment to the Charger board (J3)
- COM Loop to the Charger board (J2)

11. COMMISSIONING

This chapter describes the correct sequence to install the external power supply.

Make sure to read the complete technical description before commissioning.

The 4466 will only be powerless when both fuses F1 and F2 are removed or the batteries are disconnected.

11.1. USING AUTOMATIC ADDRESSING

- a) Mount the external power supply housing. See chapter [9. MOUNTING](#) on page 20.
- b) Remove the fuses in this order : F1, F2, F3, F4.
- c) Connect the mains cables to the 230 V terminal block. See section [10.1. POWER SUPPLY WIRING](#) on page 23.
- d) Select high or low current charging mode. See section [4.5.3. CHARGING MODE](#) on page 10.
- e) Connect the COM loop cables to the Terminal block J2. See section [10.3. EXAMPLE OF COM LOOP WIRING](#) on page 25.
- f) Connect the external equipment to the Terminal block J3.
- g) Connect the batteries to the Connector J1.
- h) When 4466 and all other units are properly installed on the loop, connect the system to the mains.
- i) Put back the fuses in this order : F3, F4, F1, F2.
- j) Attach the lid. See section [9. MOUNTING, item f\)](#) on page 21.
- k) Perform the auto addressing function according to [7.1. AUTO ADDRESSING](#) on page 17.

11.2. USING MANUAL ADDRESSING

- a) Mount the external power supply housing. See chapter [9. MOUNTING](#) on page 20.
- b) Remove the fuses in this order : F1, F2, F3, F4.
- c) Connect the mains cables to the 230 V terminal block. See section [10.1. POWER SUPPLY WIRING](#) on page 23.
- d) Select high or low current charging mode. See section [4.5.3. CHARGING MODE](#) on page 10.
- e) Connect the batteries to the Connector J1.

Put the fuse F2 (battery) back during addressing, and then remove it again.

- f) Perform the manual address and mode setting according to section [7.2. MANUAL ADDRESSING](#) on page 17.
- g) Connect the COM loop to the Terminal block J2. See section [10.3. EXAMPLE OF COM LOOP WIRING](#) on page 25.
- h) Connect the external equipment to the Terminal block J3.
- i) Put back the fuses in this order : F3, F4, F1, F2.
- j) Attach the lid. See section [9. MOUNTING, item f\)](#) on page 21.

12. TECHNICAL DATA

All current consumptions are valid by nominal voltage and by 25 °C.

Voltage: Primary	230V AC
COM Loop Voltage Allowed Normal	12 – 30V DC 24V DC
COM Loop Current: Quiescent Active	≤ 6 mA ≤ 6 mA
Board 4467 current consumption	10.6 ± 2 mA @24.0 V
Mains OK output	Normally low
Voltage outputs: Normal By battery backup Maximum current per output Maximum Total current: Continuous When fire alarm is activated in the system	24 V DC 16-29.5 V DC 2.0 A 3.0 A alternative 1.5 A (low or high charging mode) 4 A
Batteries Inside the housing (two batteries) Outside the housing	≤ 7.2 Ah, L x W x H: 151 x 64.5 x 94 mm ≤ 42 Ah
Address range	001-253
Address setting	Auto addressing (or with address setting tool)
Short circuit isolator	Yes
Internal battery	Yes
Material	Metal housing
Ambient temperature: Operating Storage	-5 to +40 °C -20 to +70 °C
Ambient humidity	Maximum 95 % RH (Non condensing)
Ingress protection rating	IP30
Size: H x W x D	298 x 424 x 95 mm
Weight:	4660 g (excluding batteries) 9660 g (including batteries)
Colour	Light grey (NCS S1500-N, PMS Cool Grey 2)

13. APPROVALS

Applicable directive/ Approval	Applicable standards	Notified body
CPR	EN54-4 EN54-17 EN54-18	VdS No. 0786-CPR-21627
VdS	EN54-4 EN54-17 EN54-18 VdS 2344 VdS 2541	VdS No. G219025
EMC	EN 55032 Class A ¹⁾ (Emission) EN 50130-4 (Immunity)	Self declaration VdS
LVD	EN 62368-1	
RoHS	EN IEC 63000	Self declaration

1) Note: Operation of this equipment in a residential environment could cause radio interference.



DOCUMENT NAME: TECHNICAL DESCRIPTION 4466
DOCUMENT NUMBER: MEW01878 EN
DATE OF ISSUE: 2019-04-05
REV: 5
DATE OF REVISION: 2026-03-05

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