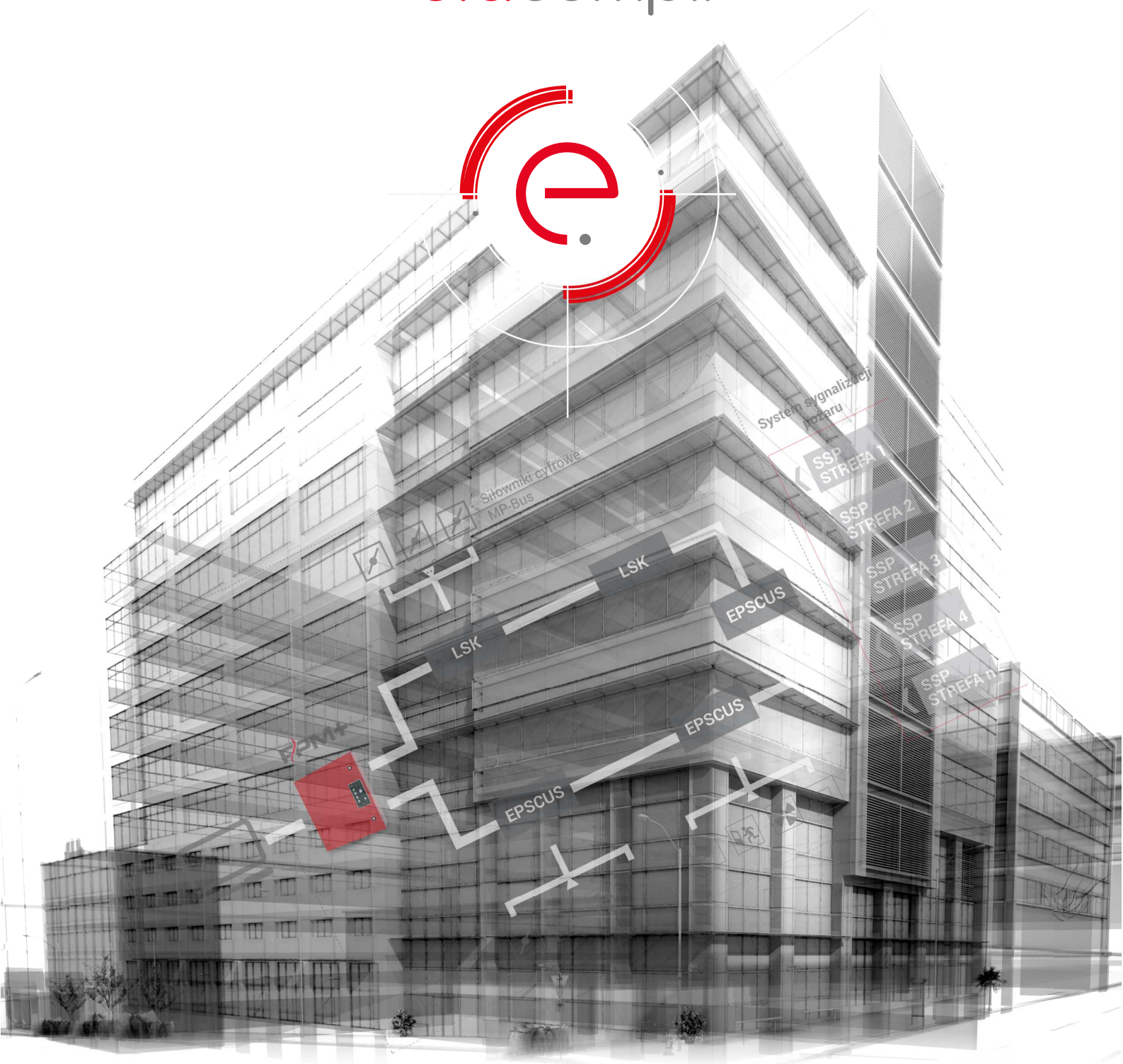


elacompil



FPM+

technical and operational documentation

Doc. version: 3.0.100

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1. APPLICATION OF THE FPM+ UNIT

The FPM Plus fire alarm control panel is a modular device for monitoring the operating status and control of all the pieces of equipment triggered as a result or during a fire. These can be dedicated firefighting systems, such as:

Fire emergency ventilation system,

Fire shutdown systems,

Evacuation support system,

Other building systems triggered to do any action as a result of fire.

Other systems include:

Access control system,

Burglary and robbery alarm system,

Escalator,

Lifts,

Utilities control (shut-off) systems,

Heat pumps and HVAC systems.

The unit features integration of various types of systems (with different functions) and building a single control algorithm (control matrix).

9) (...) equipment (fixed or semi-fixed, actuated manually or automatically) having the function of prevention, detection and putting out or containment of fires, particularly fixed or semi-fixed fire extinguishing and fire protection systems,

inerting systems, voice alarm system and fire alarm system equipment, including alerting/alarm devices, fire alarm receiving equipment, damage alert receiving system, evacuation lighting systems, internal standpipes and standpipe valves, external standpipes, pumps in fire water pumping stations, fire dampers, smoke extraction equipment, explosion prevention and containment equipment, smoke curtains and doors, fire doors and other fire rated closures if fitted with control systems, fire emergency power shutdown devices, and hoists for rescue teams;

The control unit is responsible for technical handling of fire controls in the building. In response to an alarm from the Fire Alarm System, the unit will control all the firefighting equipment according to the assumed fire scenario.

As a minimum, the link between the Fire Alarm System and the Control Unit can consist of:

Zone alarms ('Fire in a zone') - number of signals equals the number of zones - signal from FAS to the FPM+ control unit, Feedback alarms - these should be matched to the needs of the building. Feedback alarms may include notifications of the control unit operation in fire mode (trigger confirmation), notifications of damage to the FAS, indications of alarms and hazards discovered by the control unit (if needed)

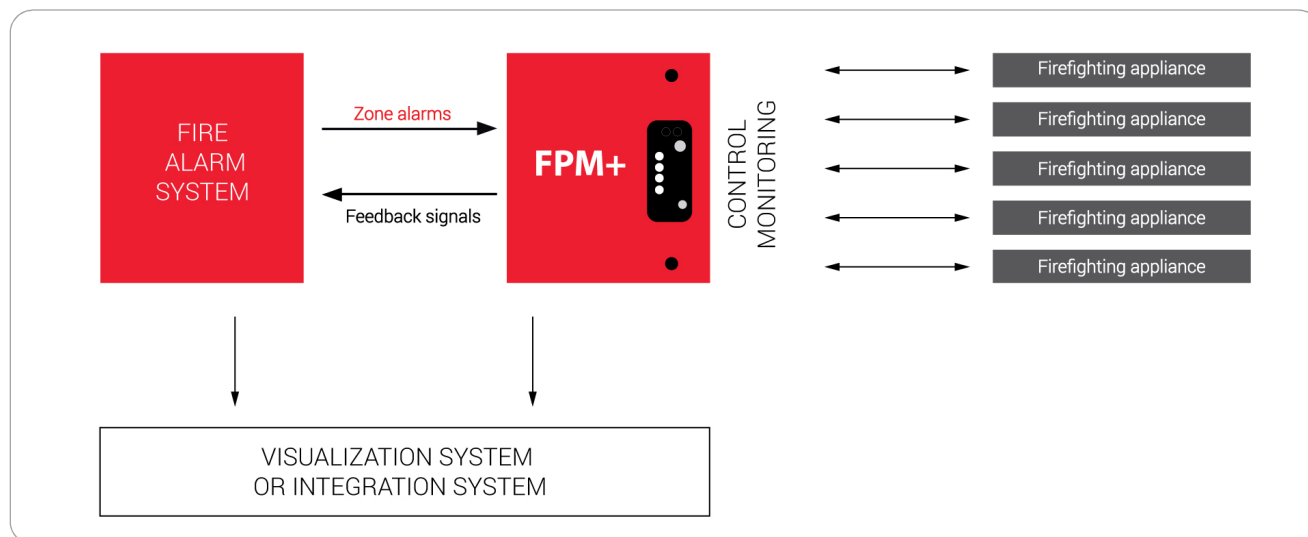


Fig. 1 Location of the control unit within the overall fire safety system in the building



2. FPM+ ARCHITECTURE AND TOPOLOGY

The FPM+ unit has a modular design and is composed of modules of various types with various functions. Specific modules may be enclosed in separate single-module housings or in group housings where more than one module can be placed in each.

All the modules are connected with a bus loop. Every module on the bus is addressable. Information is exchanged digitally between the modules.

The MASTER module is unique among all the unit modules. This is the main module of the unit, with the function of overseeing the exchange of information between the other

modules and the exchange of information between the control unit and the higher level system (BMS, firefighting equipment integration system). The MASTER module with additional control unit handling items (buttons and indicator lights) is always housed in a separate housing (main housing of the control unit). Together with the MASTER, this housing can accommodate the power supply and a maximum of two EPSCUS controllers.

Other modules can be housed in ABS housings or steel housings.

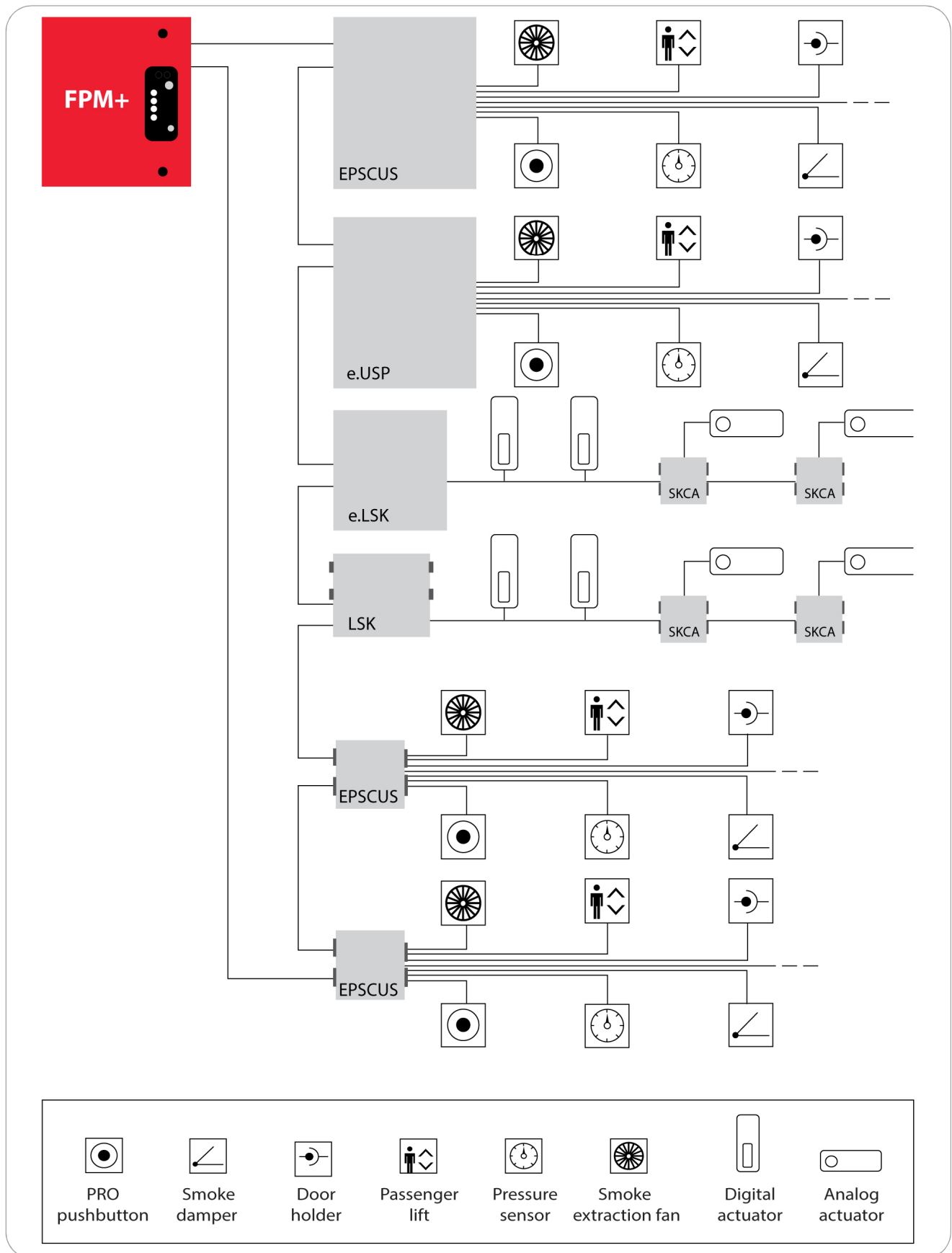


Fig. 2 Control unit topology diagram



3. REQUIREMENTS FOR EXTERNAL COMPONENTS

3.1. FPM+ POWER SUPPLY

The FPM+ modules, according to type, can be powered from:

The control unit internal power supply,

External power supply,

Mains power ~230V.

Mains power can only be used when the unit performs control and monitoring functions over systems which are not required to work during a fire. An example system of this type can be a fire damper control system. In this case, mains

voltage or secure voltage from external power supply units can be used.

If the FPM+ is expected to monitor and control equipment and systems which are required to operate during a fire, all the FPM+ modules should be powered with a buffered power supply, certified for conformity with EN-PN 54-4 or EN-PN12101-10, with the supply voltage and output current appropriate for the specific application.

3.2. ELECTRICAL INSTALLATION

Electrical installation should be built with flame retardant or non-flammable cables. The choice of cable depends on the use of the FPM+ unit in the building. If the FPM+ controls any equipment or systems which are required to operate during a fire, a non-flammable cable must be used. If the FPM+ controls any equipment or systems which are not required to operate during a fire, a flame retardant cable can be used.

The general rule is that if at least one system or one appliance connected to the FPM+ must be operating during a fire, FPM+ action at the time of fire must be assured. Therefore, the bus and controller power supply installations must be wired in non-flammable cables. Connections to appliances and systems should be wired with a cable adequate for the requirements prevailing in the building.

For fire safety applications, Certificates of Approval should be issued for the cables by CNBOP-PIB Scientific and Research Center for Fire Protection National Research Institute.

Cable ways for fire safety applications should be produced to appropriate rating, i.e. E30/E60/E90, etc. For a specific application. Conformity with the classification requirements should be verified by an appropriate certificate.

Example cables:

YnTKSYekw 1x2x0.8 – fire retardant cable for wiring installations not required to operate during a fire. Can be used for example to wire a bus linking the modules, or to wire an MP-Bus.

HTKSHeqw PH90 1x2x1 – fire resistant cable for wiring installations required to operate during a fire. Can be used for example to connect bus lines.

HDGs 2x1 – fire resistant cable for power supply and control of systems which need to be powered with electricity during a fire.

The designer should always make sure that the cable they intend to use has the requisite approvals and certificates required by law.



4. FPM+ LIMITATIONS

4.1. NO. OF ITEMS PER BUS

In terms of technical feasibility, a maximum of 254 controllers can be covered within a single bus. These modules are divided into two groups:

126 x LSK / e.LSK controllers

126 x EPSCUS/e.USP controllers

LSK/e.LSK modules have an address pool attributed on bus 1..126, while the pool attributed to EPSCUS/e.UPS modules is 129...254.

LSK controllers can be addressed on the basis of settings of controls on the front panel of the respective module, or on the basis of controller serial numbers.

EPSCUS, e.USP and e.LSK controllers are addressed on the basis of controller serial numbers.

4.2. LENGTH OF BUS BETWEEN MODULES

The bus is divided into sections. Each module on the bus is the end and the start of the respective sections to which it is connected. The length of sections between specific modules should not exceed 1200 meters.

4.3. LENGTH OF MP-BUS

The overall length of a single MP-Bus (connecting 8 actuators with a single LSK module) should not exceed 600 meters.

4.4. NUMBER OF ZONES

Notwithstanding the number of all zones (fire, control, smoke extraction zones) that can be covered by the FPM+ unit, there is a limitation of the number of zones to which a specific output can be assigned. This number is limited to 70 in the software. Should outputs (EPSCUS and e.USP relay outputs and LSK and e.LSK actuators) need to be assigned to a higher number of zones, contact the FPM+ unit manufacturer.

5. FPM+ UNIT AND MODULE SPECIFICATIONS

Table 1 FPM+ unit and module specifications

GENERAL	DESCRIPTION
FPM+ architecture	Modular, loop, addressable unit
Climate class	2
Loops	1x
Minimum no. of modules	1x, as per 3.1.1 of this approval
Maximum no. of modules	1 MASTER 126 EPSCUS/e.USP 126 LSK or LSK/24 or e.LSK 2016 SKC, SKC-A (using 126 e.LSK), or 1008 SKC, SKC-A (using 126 LSK) A MASTER module is required for more than 1 module
Max. bus voltage	5VDC
Max. bus current	Short-circuit current 50mA (limited with a polyfuse)
IP	IP42 for external housing of the control unit and individual housings IP55 for SKC modules IP65 for LSK and LSK/24 modules
Operating temperature range	-50C to +550C (relative humidity 80% at 550C)
Dimensions (L x W x H)	Min. 500x600x250 Other dimensions as per the control unit documentation
Firmware version	FPMplus
Manual/auto options	Automatic, through a signal from the fire alarm system control panel, smoke extraction system control panel, or automatic smoke detectors of the fire alarm system. Manual trigger with the smoke extraction button Manual control from the integrating system
Systems and appliances integrated with the control unit	Fire alarm control panels Smoke and heat propagation control system components (shut-off dampers, smoke vents, fire vents, smoke curtains, etc.) Conventional fire detectors (readings on parametric lines) Smoke extraction buttons and manual call points Pressure sensors Temperature sensors Wind direction and wind force detectors Voltage presence detectors Fire dampers Electromagnetic holders (releases) Voice alarm systems Fixed fire extinguishing equipment Emergency exit controls Other building control systems Intermediary devices, such as: contacts, inverters, switches

Other external appliances and systems that may or must be controlled during a fire, where the design and operating mode makes them integrable with the control unit

Other systems and appliances without firefighting functions where the design and operating mode makes them integrable with the control unit

POWER SUPPLY	DESCRIPTION
Power supply	External power supply conforming to PN-EN12101-10 and PN-EN 54-4 Dedicated control unit power supply, type CAMELEON, series ZM24VxxA-yyyPZ(C), specifically ZM24V6A-151PZ(C), ZM24V8A-200PZ(C) ZM24V12A-300PZ(C), ZM24V16A-400PZ(C) and ZM24V24A-600PZ(C) ~230V mains for LSK module
Supply voltage	24-48VDC from external power supply For LSK module powered from ~230VAC mains
Max. power consumption	2A @ 24VDC (excluding power supply to appliances, such as actuator, holders, etc.)
Internal operating voltage	24-48VDC
Power supply type or other identification	CAMELEON ZM24V24A-600PZ(C)
Operating temperature range	-25..70°C
Housing protection grade	n.a. (installed in multiple-module IP42 housing)
Dimensions (L x W x H)	262x111x66mm With connections 279x111x66mm
Main power supply: supply voltage	184..230..253VAC 230 V AC (-20% / +10%)
Max. power consumption from mains	2.1A
Max. continuous load on power supply	$I_{\max A}=18A$
Max. short-term load on power supply	$I_{\max B}=24A$
Ripples	150mV
Uninterrupted power supply: battery type	AGM type (VRLA) lead acid batteries
Max. battery capacity	120Ah
Battery charging voltage in buffer mode	26.4.....28.8V
Max. battery charging current	6A
Battery cut-off voltage	<21.0V
Max. resistance of battery bank circuit	100mΩ
Output circuits: power supply output voltage range	21.0...28.8V
Functional class	A

Environmental class | 2 (when installed in the control unit in IP42 housing)

OUTPUTS	DESCRIPTION
Potential-free relay outputs	<p>Potential-free relay contacts</p> <p>Contact type: changeover</p> <p>Current capacity: 2A for 30VDC</p> <p>Resistance of contacts: < 50mΩ</p> <p>For loads with higher current or voltage, use additional high current relays</p> <p>Number of zones assignable to a single output: 70</p>
OC outputs	<p>OC type outputs</p> <p>Max. external voltage 48VDC</p> <p>Current capacity: 100mA per output at 25°C</p> <p>Induction load operation only with idling diode!</p>
MP-Bus outputs	<p>MP-Bus output</p> <p>No. of items on bus: 8</p> <p>Operating voltage >20VDC</p> <p>Maximum current >10mA</p>
Maximum outputs	<p>MP-Bus: 126*8 = 1008 x MP-Bus devices for LSK, 2016 for e.LSK</p> <p>Relay outputs: 1008</p> <p>O/C: 756</p>
INPUTS	DESCRIPTION
Digital inputs	<p>Digital inputs, supervised, with the option of switching off supervision (NO, NC mode)</p> <p>Typical line resistance values</p> <p>Supervision state 1kΩ</p> <p>Alarm state 3,3kΩ</p>
Analog inputs	<p>Analog inputs for signal acquisition:</p> <p>4..20mA (with external resistor)</p> <p>0..5V direct</p> <p>0..10V with external resistor</p>
Max. inputs	<p>Digital, monitored: 504</p> <p>Digital/analog (configurable): 1008 for EPSCUS, 2016 for e.LSK</p>
Recommended cable types	<p>For control unit bus: non-flammable cables (for fire ventilation systems and smoke extraction systems) or flame retardant cables (for fire damper control), single pair, shielded. Min. core section 0.5mm</p> <p>Sample cables:</p> <p>Flame retardant YnTKSYekw 1x2x0.8</p> <p>Fire resistant HTKSHekw 1x2x1.0 PH90</p> <p>If the control unit covers at least one appliance requiring uninterrupted power supply during a fire alarm, fire resistant cables should be used to produce the bus, in accordance with the applicable legal requirements, including § 187 of Regulation of the Minister of Infrastructure of 12 April 2002 concerning</p>

technical requirements applicable to buildings and their locations (Journal of Laws No. 75, item 690, as amended).

For powering actuators - cables should be selected in accordance with the legal requirements, including § 187 of Regulation of the Minister of Infrastructure of 12 April 2002 concerning technical requirements applicable to buildings and their locations (Journal of Laws No. 75, item 690, as amended).

E.g. fire resistant cable HDGs 2x1

Use of a flame retardant cable, e.g. YnTKSYekw 3x2x0.8, is permitted for powering and controlling appliances for which uninterrupted power supply is not required during a fire (e.g. fire cut-off dampers with springreturn actuator).

If the appliances connected to the control unit require the use of cabling with varying flammability classifications, use highest rated cables out of the applicable requirements to build the bus.

Cables must be provided with relevant approval documents for use in fire protection installations (Certificate of conformity, Certificate of Approval by CNBOP-PIB Scientific and Research Center for Fire Protection National Research Institute).

Supply voltage	24-48VDC
IP	n.a. (installed in multiple-module IP42 housing)
No. of inputs	Digital/analog inputs: 8
No. of outputs	Relay outputs: 8
FPM+ bus	2xRS485
Configuration/visualization bus	Ethernet

EPSCUS module	DESCRIPTION
Supply voltage	24-48VDC
IP	n.a. (installed in multiple-module IP42 housing) IP42 – for individual housing with ABS
No. of inputs	Digital/analog inputs: 8
No. of outputs	Relay outputs: 8 O/C outputs: 6
FPM+ bus	2xRS485

LSK and LSK/ MODULE	DESCRIPTION
Supply voltage	24 - 48VDC for LSK/24 230VAC for LSK
IP	IP65
No. of inputs	Digital inputs: 4
No. of outputs	MP-Bus: 1
FPM+ bus	2xRS485



FPM+ BUS REPEATER MODULE	DESCRIPTION
Supply voltage	24VDC
IP	n.a. (installed in multiple-module IP42 housing)
No. of inputs	2x RS485

SKC module	DESCRIPTION
Supply voltage	230VAC
IP	IP55
No. of inputs	n/a (power supply module)
No. of outputs	24VAC power supply output

SKC-A MODULE	DESCRIPTION
Supply voltage	230VAC or 24VAC or 24VDC
IP	IP42
No. of inputs	MP-Bus: 1 Analog actuator limit switches: 1
No. of outputs	230VAC or 24VDC control output MP-Bus: 1

e.LSK MODULE	DESCRIPTION
Supply voltage	24-48VDC/VAC
IP	IP 20 for the module itself IP 42 for steel housings (module installed in FPM+ multiple-module housing) IP 42 for ABS housings (module installed in same housing as SKC-A)
Maximum power consumption	2.4W @ 24VDC
In/out lines	System bus – 2x – EIA-485 (RS-485) standard, galvanically isolated MP-BUS – 2 x – MP-BUS standard
System bus voltage	+/-5VDC
Max. bus current in supervised state	50mA (typical 0.05mA)
Dimensions	88 x 108 x 62 mm In ABS housing: 172 x 132 x 78 mm
Weight	ca. 180 g In ABS housing: 450 g

e.USP MODULE	DESCRIPTION
Supply voltage	24-48VDC/VAC



IP	IP 20 for the module itself IP 42 for steel housings (module installed in FPM+ multiple-module housing) IP 42 for ABS housings (module installed in same housing as EPSCUS)
Maximum power consumption	2.4W @ 24VDC
In/out lines	System bus – 2x – EIA-485 (RS-485) standard, galvanically isolated Inputs – 16 x Outputs – 8 x - relays
System bus voltage	+/-5VDC
Max. bus current in supervised state	50mA (typical 0.05mA)
Dimensions	214 x 108 x 62 mm In ABS housing: 252 x 202 x 90 mm
Weight	ca. 400 g In ABS housing: 1100 g



6. FPM+ MODULES

The FPM Plus system is composed of multiple units (the central module and local modules) with different functions. The central module monitors the service of local controllers and facilitates communication between them.

Modules are set up in FPM+ Configurator.

6.1. FPM+ CONTROL UNIT - CENTRAL (MASTER) MODULE

The master module of FPM+ control unit has the following functions:

exchange of information between other modules

monitoring loop continuity

connection of FPM+ unit with a visualization system (BMS, SMS).

Fitted with Ethernet port, two RS485 ports, an RS232 port, eight relay outputs, and eight inputs.

The communication ports as well as two 5A@VDC relays are installed on the main board of the module, while the inputs

and the six additional 1A@30VDC outputs are located on the extension board.

Module inputs are used to monitor and control the unit (managing lights, buttons, access key).

The main unit housing consists of: the housing itself, a control & alert panel, a power supply with batteries (the power supply and batteries can be waived upon request and the unit can be powered from an external certified power supply), installation pieces (cable grommets, DIN bus bars, cable trays).



Fig. 3 FPM+ unit housing (MASTER housing)



A control & alert panel is located on the main housing of the FPM+ unit, fitted with the following controls:



Confirm button

for shutting down voice alarms

Reset button

for a fire reset triggered from access level 2

Power light

indicates that the unit is powered and working

Malfunction light

indicates that the unit has discovered a malfunction

Fire light

indicates that the unit is in the fire state

Locked light

indicates that the unit has certain components in locked state

Fig. 4 Control panel



6.2. LSK

The LSK module is designed for controlling and monitoring actuators and other devices fitted with MP-Bus interface. Such actuators may include:

fire shut-off damper actuators (e.g. BF24-TL-T-ST),
line actuators of air dampers in HVAC systems, and slide valves (e.g. LH24A-MP, NM24A-MP, SM24A-MP, GM24A-MP)
SA actuators for dampers and louvres (e.g. LU24A-MP)
actuator valves for water installations (e.g. LV24A-MP-TPC, NVC24A-MP-TPC)
actuators for water installation valves (e.g. LR24A-MP)
VAV regulators (e.g. LMV-D3-MP)
air pressure regulators (e.g. VRP-M)

Apart from devices supporting the MP-BUS standard, the LSK module can also control and monitor analog equipment

items, e.g. fire damper actuators. In order to support such devices, the LSK must be connected to SKC-A module.

The LSK module is also fitted with four potential-free signal inputs. These inputs can operate in supervised, NO or NC modes. For the purpose of receiving alarm signals from the FAS, an input should be configured in line supervision mode.

The primary method of installation of an LSK module is to place it in a separate housing in the building, near the equipment it supervises.

Two versions of LSK modules are available: fitted for 230VAC or 24VAC/VDC power supply. The difference between these modules is the non-existence of a transformer in the power system. Besides, the modules are identical and have the same properties.



Fig. 5 LSK module

6.3. E.LSK

The e.LSK is a more recent version of LSK, a module designed for controlling and monitoring actuators and other devices fitted with MP-Bus interface.



Fig. 6 e.LSK module

Below are the primary differences between e.LSK and LSK:

e.LSK is fitted with two MP-Bus items (1 bus in LSK), capable of accommodating up to 16 actuators (8 actuators can be connected to an LSK module);

no trip inputs in e.LSK (there are 4 trip inputs in an LSK module);

different installation method: by default, e.LSK should be installed in a multiple-module housing of the FPM+ unit on a DIN bus bar, while LSK is installed in a separate housing.

The primary method of installation of an LSK module is to place it in a multiple-module housing of the FPM+ unit, while an e.LSK can be installed in a separate housing in the building, near the equipment it supervises. Such additional housing for e.LSK is the same as that for SKC-A.

e.LSK modules are powered with 24- 40VDC/VAC voltage.



6.4. EPSCUS

EPSCUS is the primary control and monitoring module of an FPM+ unit. It can receive potential-free signals from external equipment and systems, and is fitted with 8 relay outputs for controlling external hardware.

In addition, an EPSCUS module has 6 OC outputs which can be used for connecting indicator elements, such as lights.

A module adapted to measurement of analog values from different types of detectors is referenced as EPSCUS(A).

An EPSCUS module can be placed:

in the main housing, together with the MASTER module - max. 2 items;

in one of the steel housing versions (OZ-FPMPLUS-xx or OBZ-FPMPLUS-xx);

in an ABS housing for a single module.

EPSCUS modules are installed in multiple-module housings on a DIN bus bar.

The choice of the specific housing and number of modules in a housing depends on the building design and the need to build a control system for fire safety equipment.

The EPSCUS model is designed for 12-48VDC.

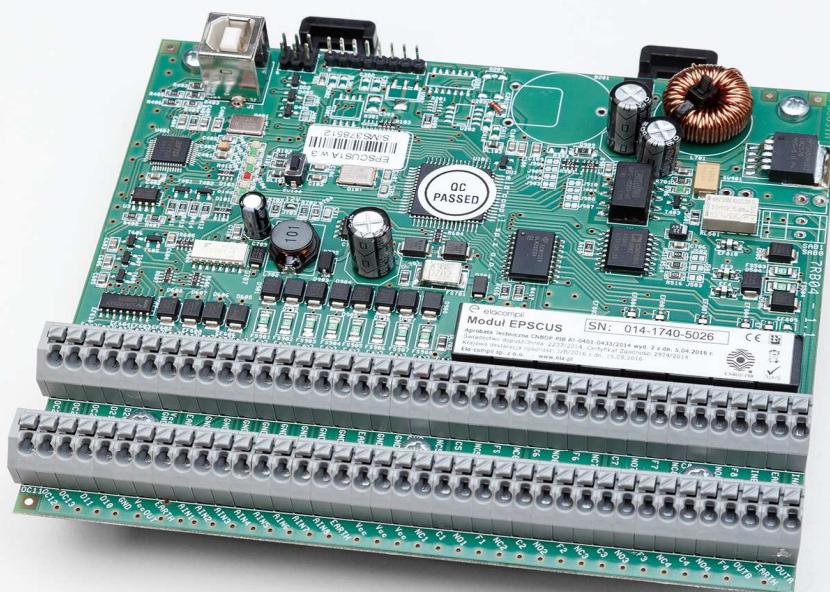


Fig. 7 EPSCUS module



6.5. E.USB

e.USB is the more recent version of the EPSCUS module. It can receive potential-free signals from external equipment and systems, analog signals (0-30V or 0-24mA, shared

ground wire) and is fitted with 8 relay (toggle) outputs designed for external device control.



Fig. 8 e.USB module

Differences between USB and EPSCUS modules:

- no OC outputs in e.USB (there are 6 OC outputs in an EPSCUS module);
- e.USB has 16 inputs (EPSCUS - 8 inputs);
- higher current capacity of e.USB outputs (up to 5A);
- additional indicator items (LEDs) for easier startup and servicing;
- terminals supporting cables with core diameters up to 2.5mm² (28-12AWG);
- closed DIN bus bar enclosure.

EPSCUS modules are installed in FPM+ unit housings on a DIN bus bar. Installation in an additional ABS housing is also possible, such as the housing for EPSCUS module. The choice of the specific housing and number of modules in a housing depends on the building design and the need to build a control system for fire safety equipment.

The EPSCUS model is designed for 12-48VDC.

6.6. SKC

SKC modules are designed for powering and monitoring the service of type BF24TL-T-ST actuators. These actuators are used to energize fire shut-off dampers.

A single module supports the connection of a single damper with a single actuator. It converts ~230V mains voltage to the supply voltage for ~24V actuator.



Fig. 9 SKC module

6.7. SKC-A

The function of SKC-A modules is to supervise the service of analog equipment controlled by 24VDC or 230VAC voltage input. Such equipment can include fire damper actuators. The modules are adapted for integration with LSK modules.

The modules are available in 2 versions, depending on equipment operating voltage:

230V version - for equipment powered from ~230VAC mains

24V version - for equipment powered with 24VDC

The module can be configured for transmission at 230VAC, 24VDC voltage relay output, or as a potential-free output only.

The module is configured in terms of output signal (230VAC voltage, 24VDC voltage, potential-free signal) by the manufacturer. Such setup can also be done by a trained service operative. In such case, the manufacturer is not responsible for service personnel errors.

Identification of SKC-A module. According to module configuration, additional power supply and output data is provided in the identification.

Identification of **SKC-A-XXX-YYY**. Where:

SKC-A – module type

-XXX – supply voltage

- **-230** – 230VAC power supply
- **-24** – 24VDC power supply

YYY- output type

- **-230** – 230VAC output
- **-24** – 24VDC output
- **-R** – relay output



Example:

SKC-A-230-230 – SKC-A module configured for 230VAC voltage supply and generating 230VAC voltage signal at output

Example:

SKC-A-230-24 – SKC-A module configured for 230VAC voltage supply and generating 24VDC voltage signal at output

Example:

SKC-A-230-R – SKC-A module configured for 230VAC voltage supply and generating potential-free signal at output

NOTE: For technical reasons, the module cannot be configured according to the pattern SKC- A- 24- 230



Fig. 10 SKC-A module

6.8. FPM+ BUS REPEATER MODULE

The function of FPM+ bus repeater module is to provide bus signal gain. It is used in layouts with very large distances between modules, and in high-interference environments (primarily at industrial sites).

The FPM+ bus repeater module is manufactured by MOXA as TCC-120I module, but will be tuned by the control unit manufacturer to the operating parameters of the FPM+ control unit bus. The control unit manufacturer cannot warrant proper operation of the bus if a TCC-120I module is used without appropriate tuning.

The FPM+ bus repeater module is installed inside the housing of an FPM+ unit module and powered with the supply voltage dedicated to that module. The FPM+ bus repeater module will always be installed so that one of the FPM+ bus repeater module buses extends outside the housing in which the module is installed and the other bus connects to an EPSCUS or MASTER module installed locally.

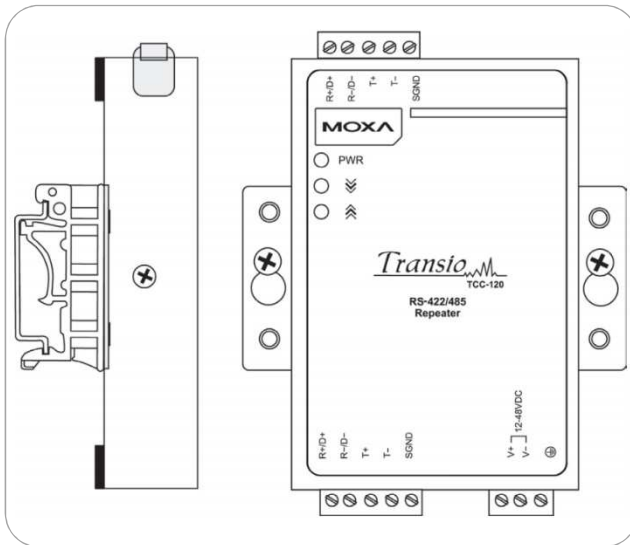


Fig. 11 FPM+ bus repeater module

The FPM+ bus repeater module is not addressable and invisible for the FPM+ control unit. Any damage to that module can be diagnosed on the basis of broken bus continuity. If the control unit generates an alert of loss of bus continuity:

- Check the power supply to FPM+ bus repeater module(s);
- Check the connection between the FPM+ bus repeater module and other FPM+ unit modules;
- Check the connections between other FPM+ unit modules.

Damage to the bus is indicated by a joint damage alert (DAMAGE indicator light on the unit's control panel), in the visualization system and in FPM Configurator.



7. CONNECTING MODULES

The modules must be connected with the use of appropriate precautions, in accordance with the applicable guidelines. Failure to comply with the applicable requirements can have an adverse effect on the functioning of the control unit and result in a security impairment.

7.1. FPM-X-YY-ZZ HOUSINGS

Below is a presentation of power supply connector and bus layout for an FPM+ unit.

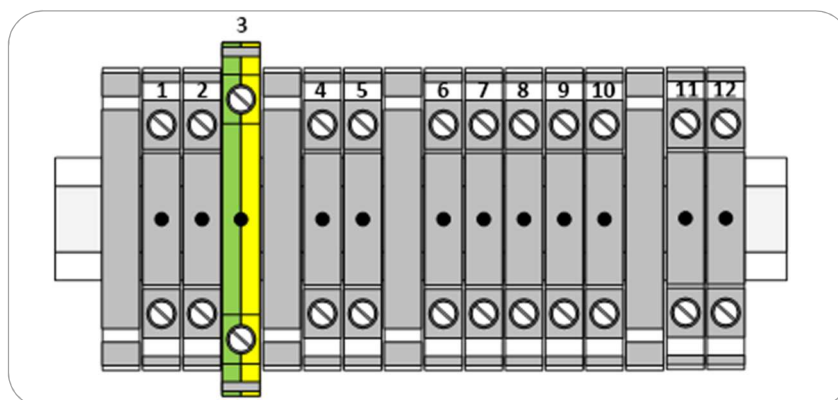


Fig. 12 FPM+ unit power supply connector and bus layout

Table 2 Identification and functions of FPM-X-YY-ZZ housing

ITEM	IDENTIFICATION	FUNCTION
1	230VAC L	Power supply ~230V – L wire
2	230VAC N	Power supply ~230V – N wire
3	PE	Power supply ~230V – protective wire
4	+24 VDC	Internal FPM+ power supply +24 VDC
5	0 VDC	Internal FPM+ power supply 0 VDC
6	ELA-BUS1 A	ELA-BUS1 A
7	ELA-BUS1 B	ELA-BUS1 B
8	SCREEN	ELA-BUS1 and ELA-BUS2 screens
9	ELA-BUS2 A	ELA-BUS2 A
10	ELA-BUS2 B	ELA-BUS2 B
11	USZK. ZAS. +	Power supply failure signal input
12	USZK. ZAS. -	Power supply failure signal input



7.2. EPSCUS

The diagram below shows the layout of EPSCUS module interfaces. Input and output connections are identified, which we will be using while connecting the EPSCUS module supplied in an ABS housing. When the EPSCUS module is ordered together with other modules in a steel housing, the interfaces are already connected.

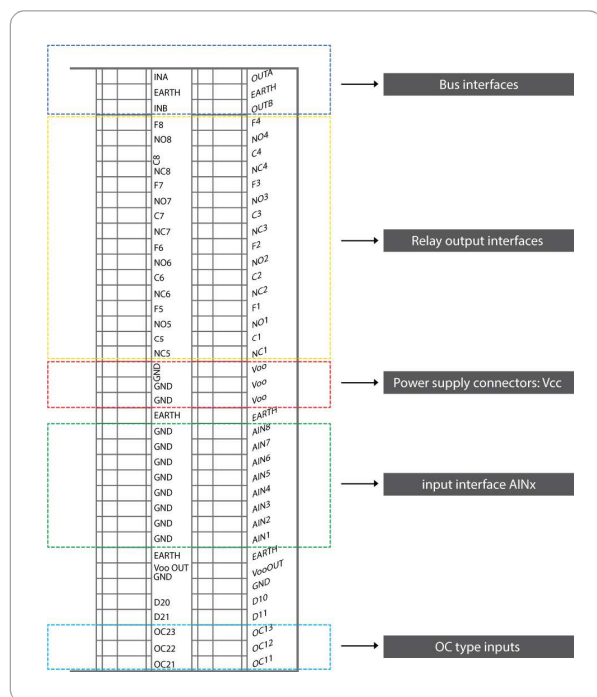


Fig. 13 EPSCUS module connectors

Bus interfaces, i.e. unit bus input and unit bus output, are identified as INA, INB for inputs and OUTA, OUTB for outputs.

Relay output interfaces are identified as Cx, NOx, NCx. These outputs are designed to control external equipment.

Auxiliary terminal is identified as Fx and can be used for example to connect an external resistor.

Power supply connectors: Vcc – 24VDC power supply, polarity +; GND – power supply 24VDC polarity

AINx is the identification of an input interface no. x and GND is the input neutral (shared with power)

OC type inputs are identified as follows: OC11, OC12, OC13, OC21, OC22, OC23.

EARTH terminals are used for connecting cable shields

7.3. E.UPS

e.UPS modules are installed in multiple-module housings (FPM-X-YY-ZZ) on a DIN bus bar, or in a plastic housing and on a DIN bus bar as well.

An e.UPS module has 16 analog/digital inputs. Neutral wiring is shared for all the inputs. In addition, the module has 8 potential-free (relay) outputs.

Module power supply is connected to the two terminals in the left upper section of the housing. The unit bus is connected in the left bottoms section of the housing. The bus should be set up with shielded cable - terminal S is used to connect the bus line shielding.

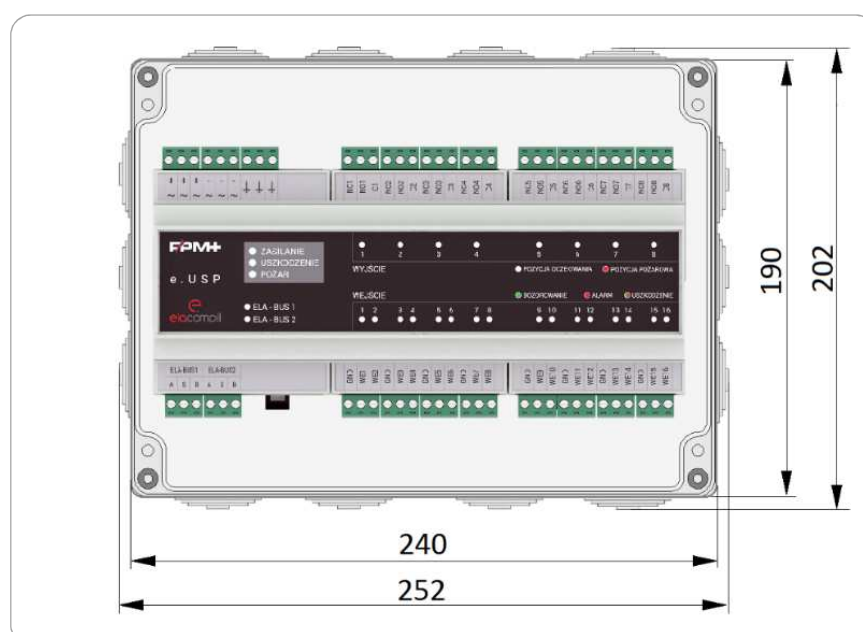


Fig. 14 e.USP module in a plastic housing

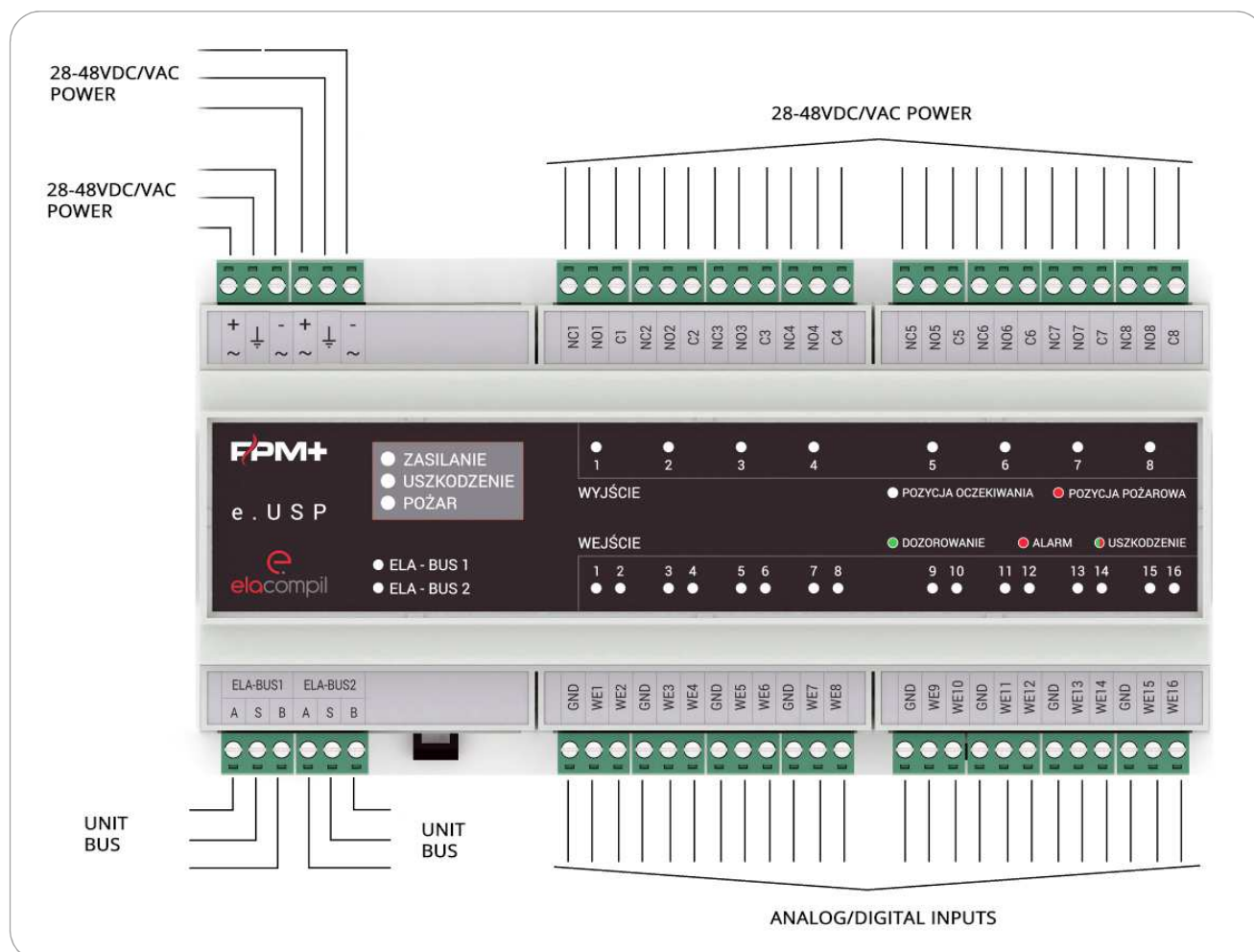


Fig. 15 Connection of e.USP module

7.4. LSK

The gland chokes identified on the drawing as 1, 2, 3, and 6 should be removed from every LSK controller. If the design sets out fire zone triggering via FACP unit modules and if signals for trigger inputs should be connected to a specific module, the following gland chokes should be removed:

For gland identified as 4 on the drawing - when WE3 and/or WE4 input is used;

For gland identified as 5 on the drawing - when WE2 and/or WE1 input is used.

Glands should be tightened with significant force so that they have no slack in the housing; however, the installer should be careful not to damage the glands.

Gland 1 is manufactured to size PG9, the remaining glands are sized PG11.

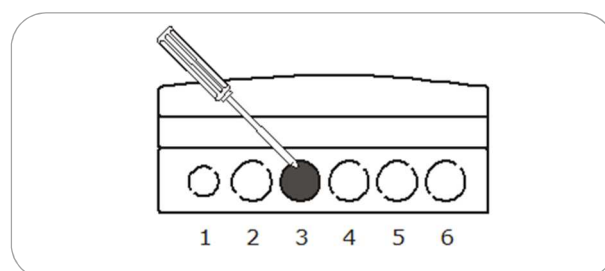


Fig. 16 Gland chokes



7.4.1. CONNECTING TO POWER SUPPLY

The power terminal is located to the right of the module terminal strip.

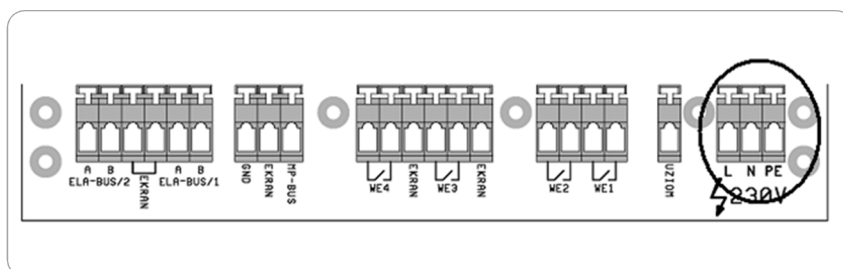


Fig. 17 Connecting LSK to power supply

To connect to power supply, draw the supply cable through gland no. 6, then press the terminal levers with a flat-blade screwdriver (width 3-4mm) and insert the separate cable cores into the right slot (see the table below).

IDENTIFICATION	DESCRIPTION	WIRE COLOR	TERMINAL COLOR
L	Phase	Other than blue and yellow-green	Red
N	Neutral	Blue	White
PE	Protective	Yellow-green	Green

NOTE: For your own safety, this operation should be performed after shutting down ~230V, 50Hz power supply.

7.4.2. CONNECTING FIRE DAMPERS

The LSK module is designed to operate with dampers fitted with MP-BUS actuators. Connect the MP-Bus control cable on LSK side to the interface identified as MP-BUS.

To do this, draw the fire damper connection cable through gland no. 3, then press the MP-BUS, GND and SHIELD

terminal levers with a flat-blade screwdriver (width 3-4mm) and insert the separate cable cores into the corresponding terminals. Terminal colors correspond to YnTKSY cable core colors to facilitate the connection (blue to blue, white to white).

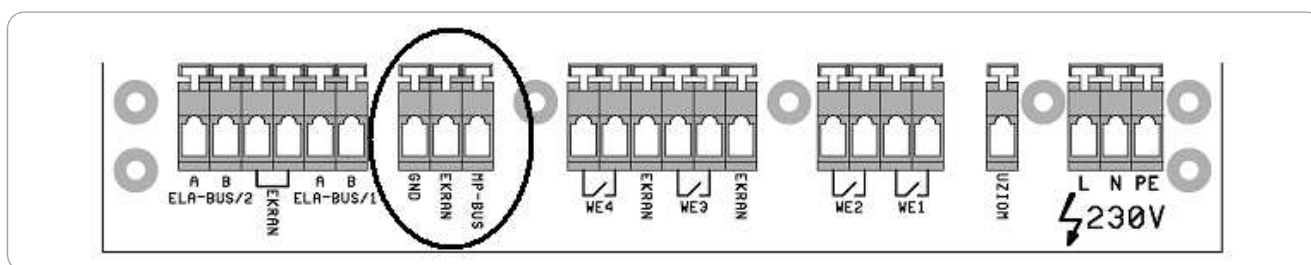


Fig. 18 Connecting fire dampers to LSK



7.4.3. CONNECTING ELA-BUS COMMUNICATION BUS LINES

To connect several LSK modules, use ELA-BUS. An LSK controller features two ELA-BUS ports identified as ELA-BUS/1 and ELA-BUS/2.

To connect ELA-BUS lines to a module, draw the bus cables (two cables must reach every module) through glands 1 and

2 (with the cables entering the housing separately), then press the A, B and SHIELD terminal levers with a flat-blade screwdriver (width 3-4mm) and insert the separate cable cores into the corresponding terminals. Terminal colors correspond to YnTKSY cable core colors to facilitate the connection (blue to blue, white to white, shielding to green).

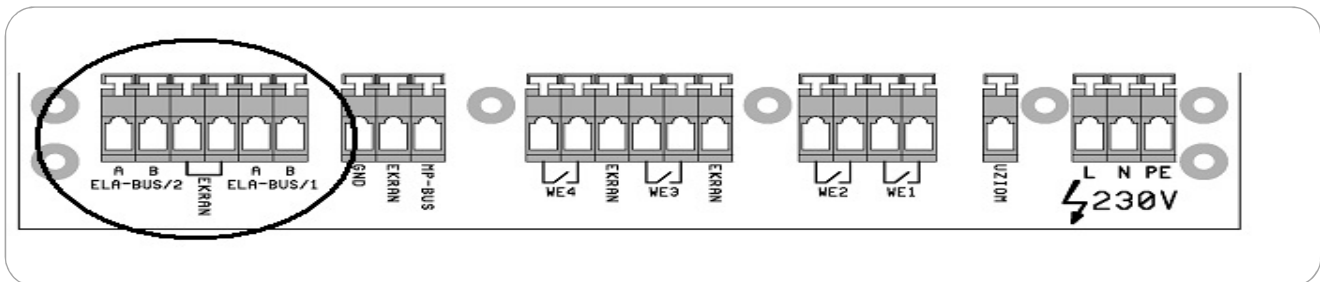


Fig. 19 Connecting ELA-BUS lines in LSK

7.4.4. CONNECTING WE1-WE4 TRIGGER INPUTS

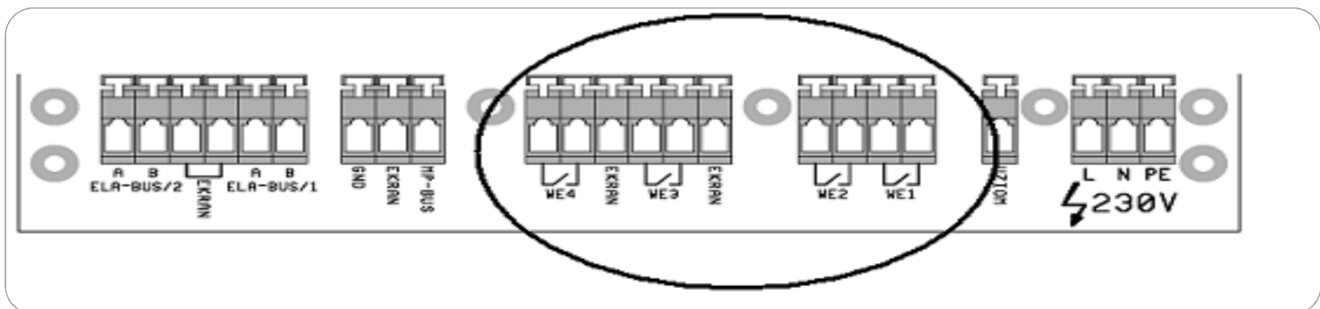


Fig. 20 Connecting WE1-WE4 trigger inputs in LSK

Trigger inputs are connected according to the instructions given in section 4.

7.5. E.LSK

e.LSK modules are installed in multiple-module housings (FPM-X-YY-ZZ) on a DIN bus bar, or in a plastic housing and on a DIN bus bar as well.

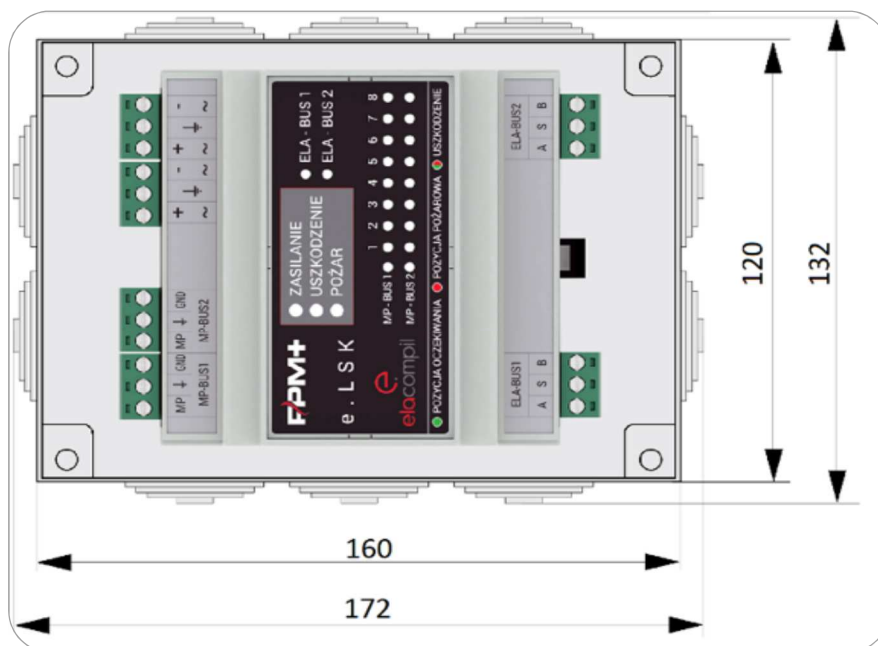


Fig. 21 e.LSK module in a plastic housing

An e.LSK module is fitted with two control unit bus inputs (at the bottom of the housing, on both sides) and two MP-BUS bar inputs (left upper section of the housing).

Module power supply is connected to the two terminals in the right upper section of the housing.

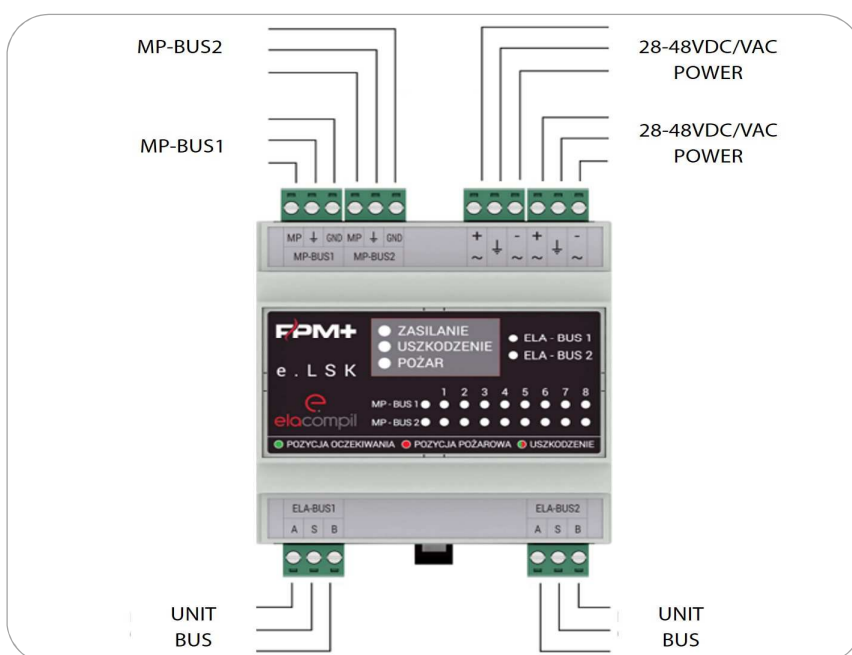
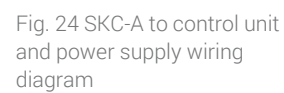
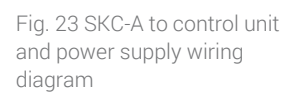


Fig. 22 Connection of e.LSK module

7.6. SKC-A

The diagrams below present the main methods of connecting SKC-A modules to power supply and to the control unit.



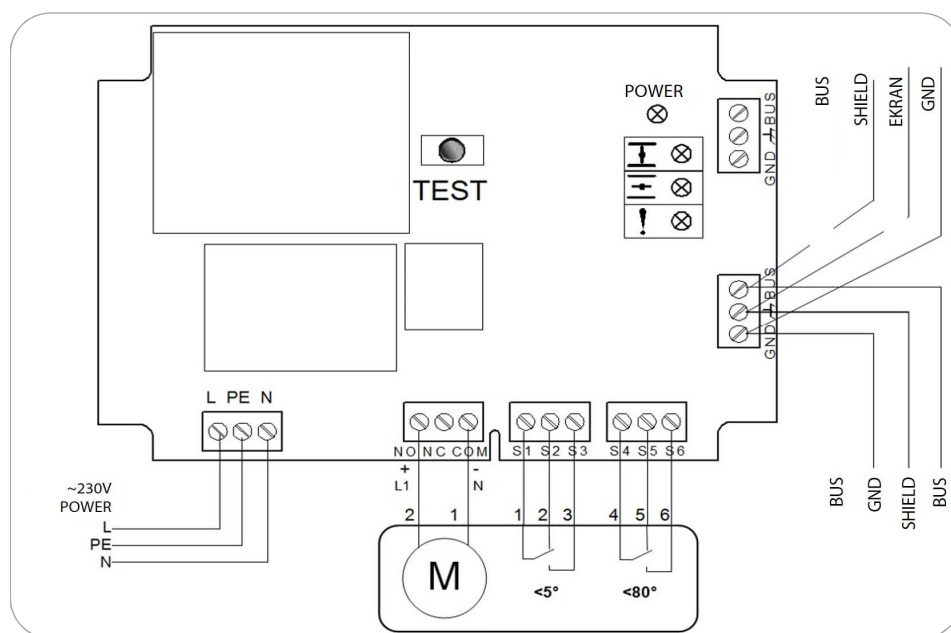


Fig. 25 SKC-A to control unit and power supply wiring diagram



7.7. FPM+ BUS REPEATER

An FPM+ bus repeater module is powered with 24VDC voltage. It is fitted with two ports for connecting ELA-BUS.

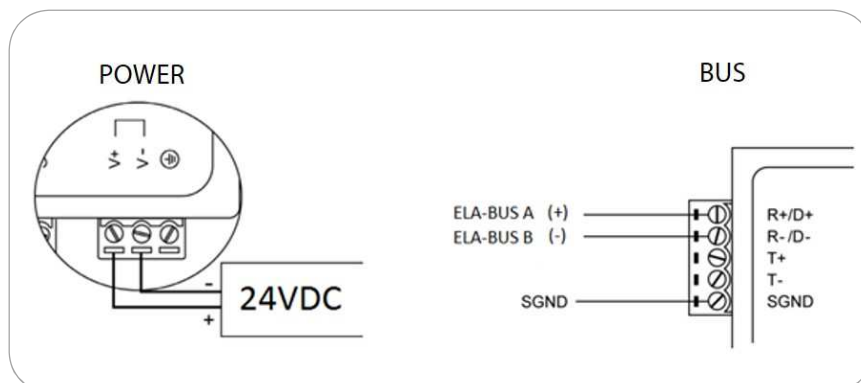


Fig. 26 FPM+ bus repeater module connection diagram



8. MAIN HOUSINGS FOR CONTROL UNIT MODULES

According to actual needs on site, the designer is able to choose housing types and sizes, and therefore the number of modules in a single location.

8.1. EPSCUS

An EPSCUS module can be housed in an ABS housing for a single module.

EPSCUS modules are also installed in multiple-module housings on a DIN bus bar.

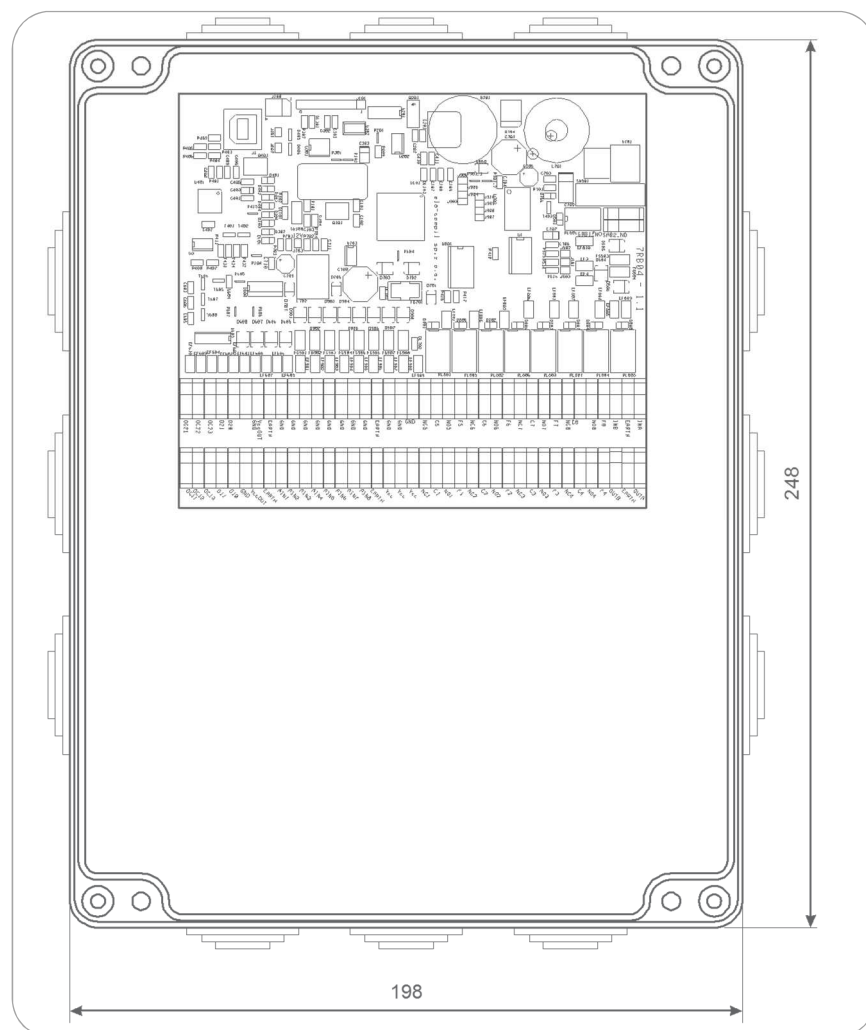


Fig. 27 EPSCUS module in housing.

The choice of the specific housing and number of modules in a housing depends on the building design and the need to build a control system for fire safety equipment.

The EPSCUS model is designed for 12-48VDC. Power can be supplied from a certified fire rated power supply.

In the selection of cable thickness for connections, power consumption and voltage drops should be considered.

Power can be supplied from a certified fire rated power supply.

Follow the guidelines for installation to maintain a proper level of security and to avoid interference with the protection level.

Each module must be permanently attached to building structure components or to other items permanently affixed to the building structure.

8.2. LSK

LSK module is enclosed in a plastic ABS housing and is fit for user installation on site.

Follow the guidelines for installation to maintain a proper level of security and to avoid interference with the protection level.

The module needs to be affixed permanently.

8.3. SKC



SKC module is enclosed in a plastic ABS housing and is fit for user installation on site.

Considering its low output powers, it is recommended to use supply cables with as small core diameter as possible.

Follow the guidelines for installation to maintain a proper level of security and to avoid interference with the protection level.

The module needs to be affixed permanently.

8.4. SKC-A

SKC-A module is enclosed in a plastic ABS housing and is fit for user installation on site.

The thinnest possible wire (3x0.75) should be used when the module is powered with 230V voltage.

Follow the guidelines for installation to maintain a proper level of security and to avoid interference with the protection level.

The module needs to be affixed permanently.

8.5. MAIN HOUSING OF THE CONTROL UNIT, TYPE FPM-M-YY-ZZ

The main housing of the control unit and the basic multiple-module housings are designed on the basis of single range steel cabinets. This ensures identical housing attachment technique, connection tightness and effective installation of fixtures.

The differences between the specific types of housings are concerned with dimensions (5 basic dimensions) and housing fixtures. The fixtures include: cable penetrations, equipment mounting bars, cable trays.

The main enclosure of a control unit type FPM-M-YY-ZZ is fitted by default with a MASTER module and an indicator panel with LEDs and pushbuttons.

Depending on actual needs, it can be fitted with a power supply unit complete with batteries. This housing can accommodate a maximum of two EPSCUS modules together with the MASTER.

The dimensions of the housing are: (HxWxD) 600x500x250; available colors: RAL3000

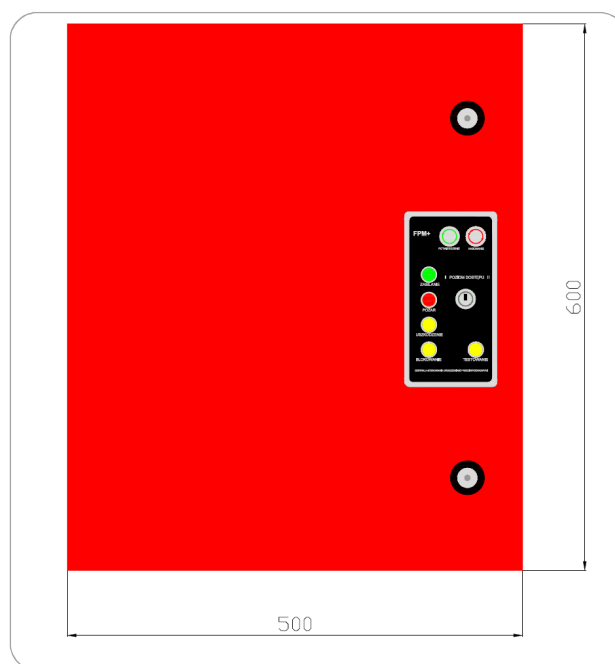


Fig. 28 FPM+ unit housing



8.6. FPM-X-YY-ZZ

The main housing of the control unit and the basic multiple-module housings are designed on the basis of single range steel cabinets. This ensures identical housing attachment technique, connection tightness and effective installation of fixtures.

The differences between the specific types of housings are concerned with dimensions (6 basic dimensions) and housing fixtures. The fixtures include: cable penetrations, equipment mounting bars, cable trays.

FPM-X-YY-ZZ line housings, designed to accommodate multiple modules, are available in five basic sizes. They can be fitted with power supplies with different power ratings and batteries with different capacities. Depending on the size of a specific housing, it can accommodate different numbers of modules, and therefore it offers different numbers of unit inputs and outputs.

Item	ENCLOSURE SYMBOLS	MAX. EPSCUS CONTROLLERS	MAX. INPUTS/OUTPUTS
1	FPM-2-YY-ZZ	2	12 x O/C outputs 16 x relay outputs 16 x analog or digital inputs
2	FPM-4-YY-ZZ	4	24 x O/C outputs 32 x relay outputs 32 x analog or digital inputs
3	FPM-6-YY-ZZ	6	36 x O/C outputs 48 x relay outputs 48 x analog or digital inputs
4	FPM-8-YY-ZZ	8	48 x O/C outputs 64 x relay outputs 64 x analog or digital inputs
5	FPM-10-YY-ZZ	10	60 x O/C outputs 80 x relay outputs 80 x analog or digital inputs

A detailed description of the housing versions is presented in Appendix 2.

On special order, control unit housings with different capacity or dimensions can be produced. The housings must meet the isolation criteria (min. IP42). The range of housings and ranges are presented in Appendix E.



8.7. FPM-U-X-X-X-X AND FPM-L-X-X-X-X

The main housing of the control unit and the basic multiple-module housings are designed on the basis of single range steel cabinets. This ensures identical housing attachment technique, connection tightness and effective installation of fixtures.

FPM-U-x-x-x-x and FPM-L-x-x-x-x line housings are the extension of line FPM-X-YY-ZZ housings. The primary

difference between the particular lines of housings is the layout of cable trays inside the housing, and the cable exit pattern. FPM-U-x-x-x-x and FPM-L-x-x-x-x line housings are primarily fit for installation of e.LSK and e.USP modules.

Detailed specifications of the housings are presented in Appendix 3 and assembly drawings of the housings are given in Appendix D.

8.8. PLASTIC MULTIPLE-MODULE HOUSINGS

Multiple-module plastic housings are designed to accommodate multiple modules and are available in three basic sizes. They can be fitted with power supplies with different power ratings and batteries with different

capacities. Depending on the size of a specific housing, it can accommodate different numbers of modules, and therefore it offers different numbers of unit inputs and outputs.

HOUSING	OUTER DIMENSIONS	INNER DIMENSIONS	WEIGHT
CP5004	400 x 500 x 175 mm	350 x 455 x 150 mm	3 kg
CP5005	400 x 600 x 200 mm	355 x 550 x 175 mm	4 kg
CP5008	500 x 600 x 220 mm	455 x 550 x 195 mm	5 kg

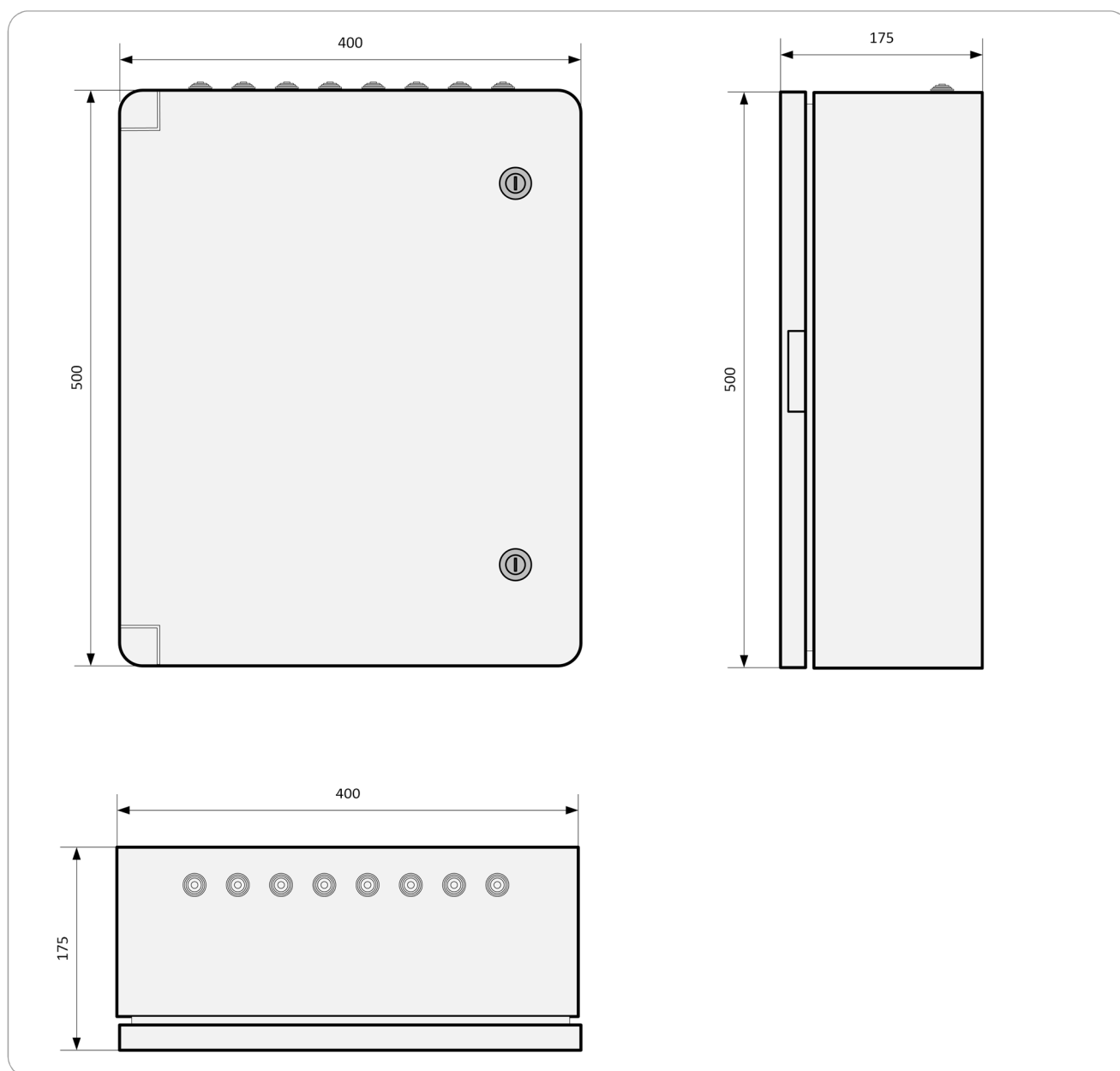


Fig. 29 CP5004 type housing

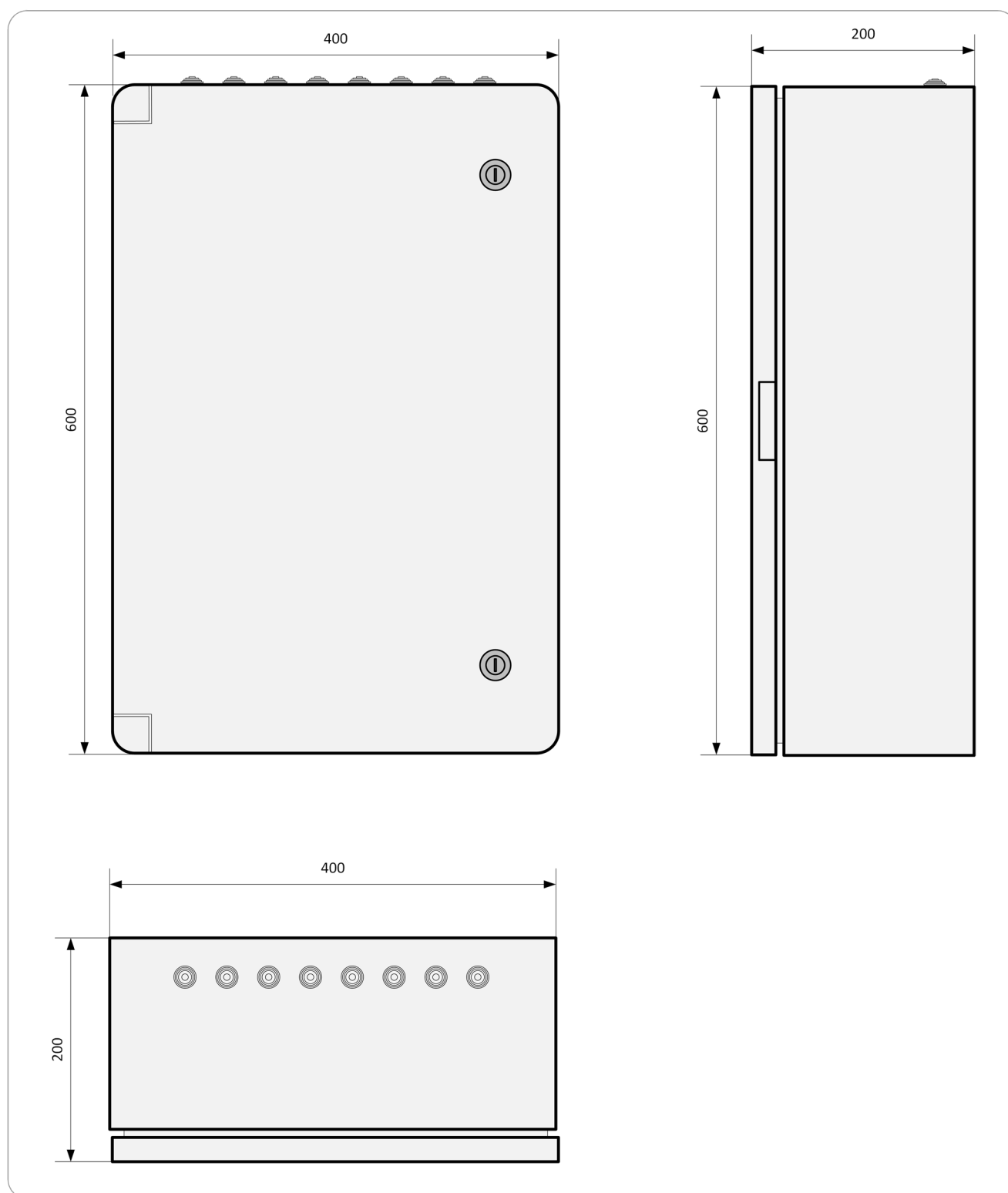


Fig. 30 CP5005 type housing

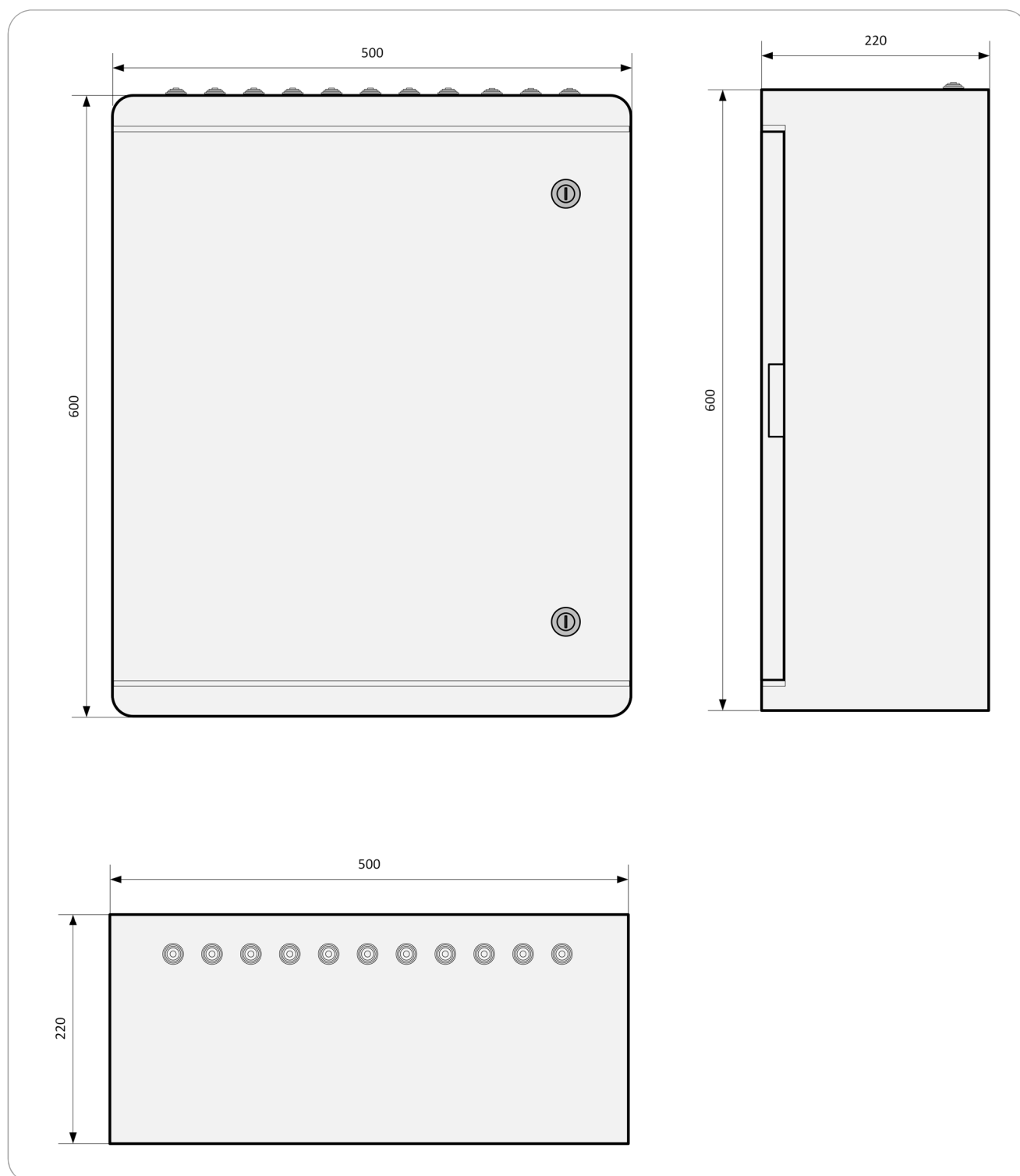


Fig. 31 CP5008 type housing



9. ASSEMBLY INSTRUCTIONS

9.1. BUS

A single section of bus line between modules can reach 1200m length. The acceptable MP-Bus length is 600m (determined as the sum of the lengths of cable sections within the bus and not the largest distance between appliances).

Bus cables should not be laid near power cables.

If the system is used for smoke extraction, the bus line, motor line and the terminal rooms must be designed to E90.

Moreover, make sure that the bus incoming and outgoing cables are laid as separate routes. In this case, construction laws must be specifically complied with.

LSK, EPSCUS and MASTER modules must be connected into a single loop. No other connections can be established (additional branch lines from the main loop).

MP-Bus modules cannot be designed in a loop layout. Linear or star topology is acceptable.

9.2. SHIELDING

In order to comply with the interference immunity requirements as per PN-EN 61000-6-2:2008 Electromagnetic compatibility (EMC), Part 6-2: General - Immunity requirements for the industrial environment", all bus connections (control unit bus, MP-BUS) must be made of shielded cables (e.g. YnTKSYekw, HTKSHekw).

It is further recommended to connect input signals (to EPSCUS module inputs) using shielded cables.

Shielding should be continuous, connected to shared PE potential. It is recommended to join ELA-BUS shields together (e.g. by twisting or connecting to appropriate terminals in the modules).

All steel housings (FPMPLUS-M-xx-xx, OBZ-FPMPLUS-xx and OZ-FPMPLUS-xx) should be connected to PE potential. It is recommended to establish a direct connection with the building structure earthing (hoop iron).

9.3. EXTERNAL POWER SUPPLIES

If external power supplies are used, each power supply should be located as close as possible to the control unit

housing with modules. In addition to power, power supply failure signal should be connected to the unit as well.

10. TYPES OF INPUTS IN THE UNIT

Unit inputs can vary in terms of type and function (a description of their functions is given in section 6). Both these properties are assigned in FPM+ Configurator.

Type of input indicates the electrical characteristics of the input.

Inputs differ in terms of response and auxiliary external pieces (if any).

Input types are defined for LSK, EPSCUS and EPSCUS(A) controllers.

Not all the types enumerated below are available for every controller.



10.1. INPUT TYPE: UNUSED

Unused inputs are present in LSK, EPSCUS and EPSCUS(A) modules.

An unused input is not utilized in the system and does not report any state, irrespective of the connected alarm.

10.2. INPUT TYPE: DIGITAL NO

Digital NO inputs are present in LSK and EPSCUS modules.

Open state is alerted as idle, shorting means an alarm.

A digital NO input is a digital input without line state supervision, for direct connection of relay contact.

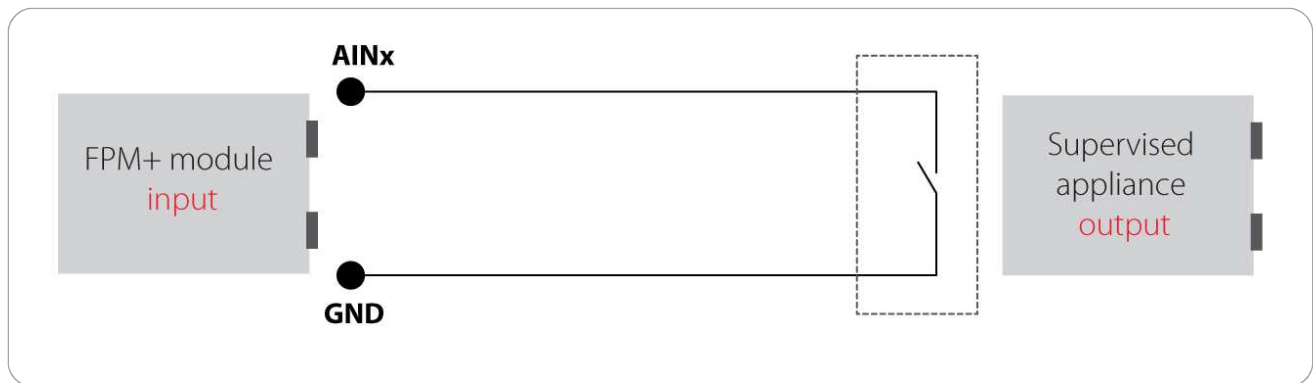


Fig. 32 Digital NO input diagram

10.3. INPUT TYPE: DIGITAL NC

Digital NC inputs are present in LSK and EPSCUS modules.

Open state is indicated as alarm, shorting - idle.

A digital NC input is a digital input without line state supervision, for direct connection of relay contact.

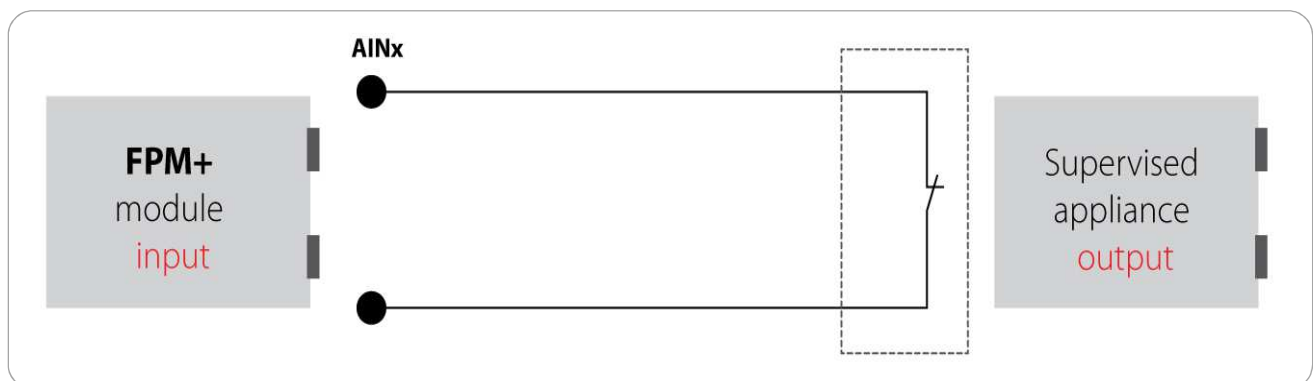


Fig. 33 Digital NC input diagram



10.4. INPUT TYPE: DIGITAL THREE-STATE

Digital three-state inputs are present in LSK and EPSCUS modules.

Inputs of this type will indicate either of the three states: open, closed, or intermediate.

It is used for such functions as damper operation, where the damper status can be verified with the right selection of resistors.

10.5. INPUT TYPE: ANALOG RESISTIVE

Analog resistive inputs are present in EPSCUS modules.

They are used to measure the value of connected resistance.

Analog resistive inputs do not trigger alarms.

10.6. INPUT TYPE: DIGITAL SUPERVISED NO

Digital supervised NO inputs are present in EPSCUS modules.

A digital supervised NO input is a digital input with line state monitoring. Monitoring is done via a connected NO contact that triggers resistor signal.

The resistance values are the following: 3.3kOhm for idle, 1kOhm for alarm.

This input indicates line failure if the line resistance value is outside these two values.

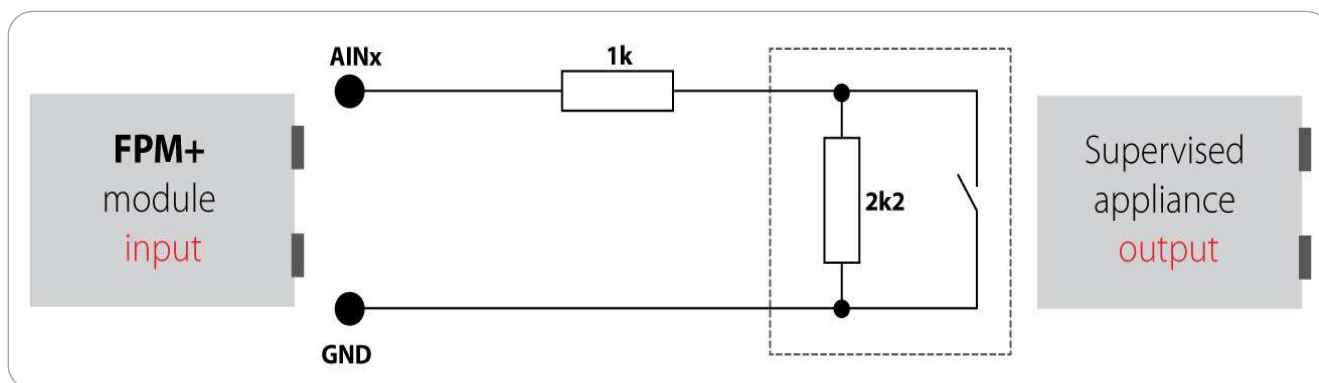


Fig. 34 Digital supervised NO (2EOL/NO) input diagram

10.7. INPUT TYPE: DIGITAL SUPERVISED NC

Digital supervised NC inputs are present in EPSCUS modules.

A digital supervised NC input is a digital input with line state monitoring. Monitoring is done via a connected NC contact that triggers resistor signal.

The resistance values are the following: 1kOhm for idle, 3.3kOhm for alarm.

This input indicates line failure if the line resistance value is outside these two values.

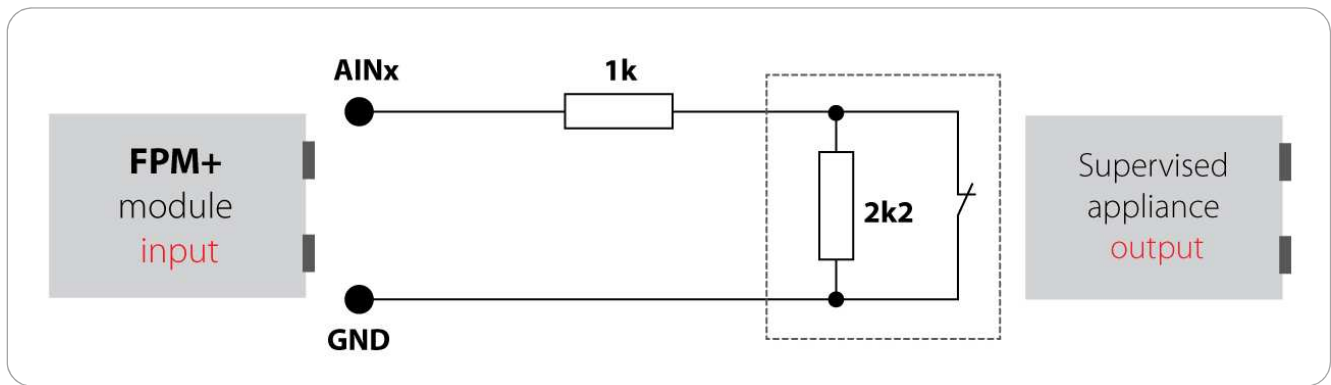


Fig. 35 Digital supervised NC (2EOL/NC) input diagram

10.8. INPUT TYPE: ANALOG 0-5V

Analog 0-5V inputs are present in EPSUS(A) modules.

Analog 0-5V inputs accept signals from the range of 0-5V.

If monitoring is to cover other voltages than those in 0-5V range, use a resistor divider so as to avoid exceeding the 5V threshold.

An additional safeguard is used to protect the system against the consequences of exceeding the permitted voltage value.

Example function of an analog 0-5V input is for voltage supervision.

10.9. INPUT TYPE: ANALOG 4-20mA

Analog 4-20mA inputs are present in EPSUS(A) modules.

Analog 4-20mA inputs accept 4-20mA signal (where an additional 249Ohm resistor is required).

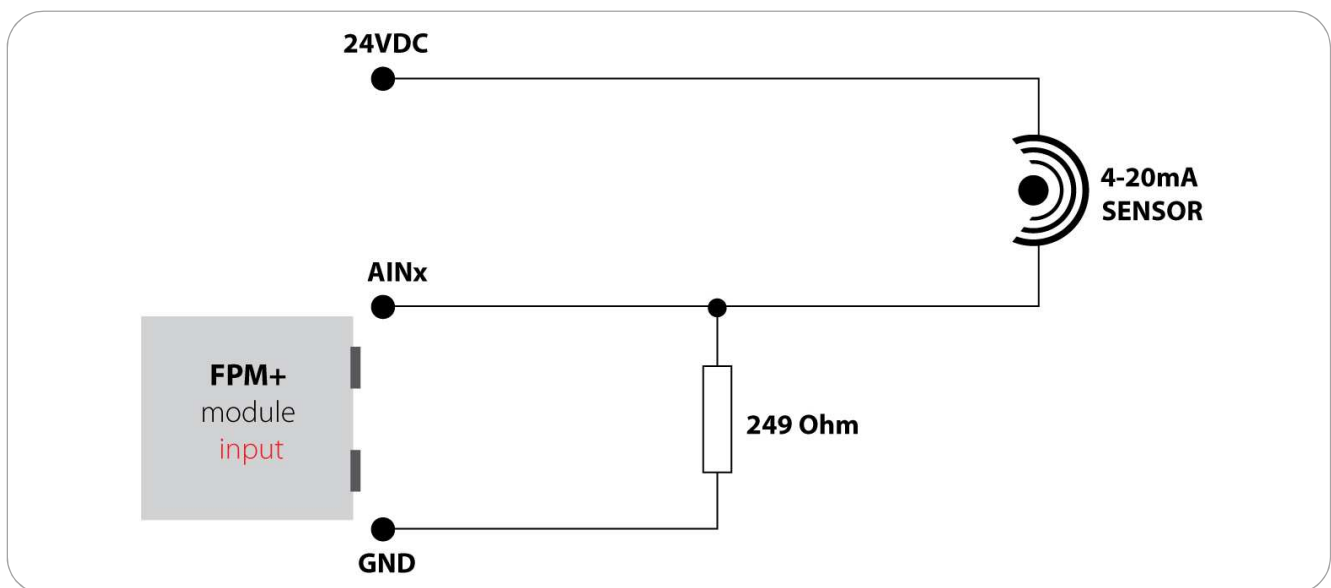


Fig. 36 Analog 4-20mA input diagram



11. TYPES OF OUTPUTS IN THE UNIT

Unit outputs can vary in terms of type and function (description in section 7). Depending on their type, outputs can control various appliances, such as lifts, escalators, analog actuators, other actuators, or indicator lights.

11.1. OUTPUT TYPE: RELAY

Relay outputs are designed to control external equipment.

An EPSCUS module is fitted with eight relay outputs.

An auxiliary terminal F is located at each relay output, which can be used for example to connect an external resistor.

11.3. OUTPUT TYPE: ACTUATORS AND APPLIANCES COMPATIBLE WITH MP-BUS STANDARD

Actuators and appliances compatible with the MP-Bus standard are designed for monitoring and controlling appliances conforming to MP-Bus standard that have firefighting and utility functions.

11.2. OUTPUT TYPE: OPEN COLLECTOR

Open Collector outputs can be used for connecting indicator elements, such as lights.

An external relay with 12V coil can be connected to an Open Collector output and in such case, a flyback diode should be additionally used.

An EPSCUS module is fitted with six Open Collector outputs.



12.INPUT FUNCTIONS

An input function indicates the logical function of a specific input in the system.

The function of each specific input is defined in FPM+ Configurator.

Not all functions are available for each input.

12.1. INPUT FUNCTION: DISABLED

This input is not used in the system.

12.2. INPUT FUNCTION: FIRE ALARM

An input for connecting a fire alarm signal from a fire alarm control panel or any other signal that will trigger a fire scenario.

12.3. INPUT FUNCTION: SMOKE ALARM IN A DUCT

An input for connecting a smoke detectors put in the duct. If an alarm occurs on this input, the fan associated with that input will be switched off.

12.4. INPUT FUNCTION: SMOKE ALARM IN AIR INTAKE

An input for connecting a smoke detectors put in the duct. If an alarm occurs on this input, the fan associated with that input will be switched off.

12.5. INPUT FUNCTION: SMOKE WARNING IN AIR INTAKE

An input for connecting a smoke detectors put in the duct. If an alarm occurs on this input, it will only be displayed in the visualization system.

12.6. INPUT FUNCTION: SMOKE WARNING IN A DUCT

An input for connecting a smoke detectors put in the duct. If an alarm occurs on this input, it will only be displayed in the visualization system.

12.7. INPUT FUNCTION: FIRE RESET

A system reset input - all the appliances will be reset to idle positions and the inputs (actuators) will return to ready state.

12.8. INPUT FUNCTION: FIREFIGHTING ACTION

Firefighting action signal input. Active state at this input indicates that additional relay outputs are operated in EPSCUS modules.

12.9. INPUT FUNCTION: TECHNICAL ALARM

A general purpose input for connecting any external signals to be displayed by the visualization system.

12.10. INPUT FUNCTION: VENTILATION

Ventilation signal connection input. Active state at this input indicates that the system will trigger fan function in staircases in ventilation mode.

12.11. INPUT FUNCTION: FORCED AIR SUPPLY FROM DOWNSTAIRS

Input enforcing continuous air supply to staircases from the bottom, irrespective of temperature measurement results.

12.12. INPUT FUNCTION: FORCED AIR SUPPLY FROM UPSTAIRS

Input enforcing continuous air supply to staircases from the top, irrespective of temperature measurement results.

12.13. INPUT FUNCTION: INDICATOR LIGHT TEST

Switching all inputs identified as indicator lights on for several seconds.

12.14. INPUT FUNCTION: MEASUREMENT

This input is responsible for direct presentation of measured values (e.g. voltage, current). It can be used to monitor continuous type variables.

An input with the measurement function is not involved in system control.

12.15. INPUT FUNCTION: VENTING OPEN

Control of actuators responsible for opening smoke dampers, windows for venting.

12.16. INPUT FUNCTION: VENTING CLOSE

Control of actuators responsible for opening smoke dampers, windows for venting.

12.17. INPUT FUNCTION: DRIVE START TEST

Checking the operating capacity of smoke damper actuators.

12.18. INPUT FUNCTION: POWER FAILURE

This input is presented as a power failure, e.g. from an external power supply.

12.19. INPUT FUNCTION: LIMIT SWITCH

Damper terminals, e.g. damper open/close sensors, are connected to this input.

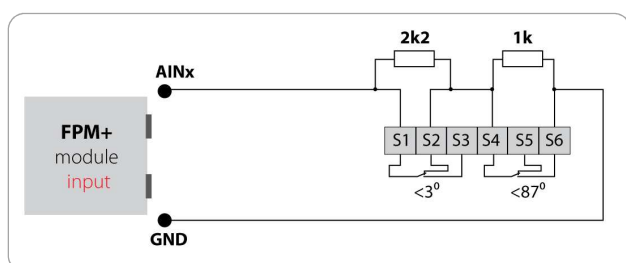


Fig. 37 Limit switch input diagram

Resistance values:

1k – closed

2k2 – open

3k2 – intermediate position

12.20. INPUT FUNCTION: LIMIT SWITCH GROUP

Damper terminals, e.g. damper open/close sensors, are connected to this input.

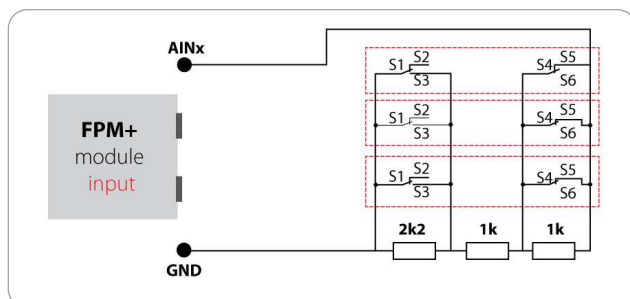


Fig. 38 Limit switch group input diagram

Resistance values:

3k2 – closed,

2k2 – open,

1k – intermediate position

12.21. INPUT FUNCTION: MANUAL CONTROL

In manual control, the unit stops responding to automatic alarms from the fire alarm control panel (a fire reset occurs, switching the appliances to idle mode).

12.22. INPUT FUNCTION: MANUAL FIRE ALARM

Manual input of a fire alarm from FACP, for example using the control panel.

12.23. INPUT FUNCTION: SMOKE DETECTOR ALARM

If an alarm is notified from a smoke detector during a fire, a fan will be shut down.

If a smoke position is set for a damper, it will switch to that position at this alarm.

12.24. INPUT FUNCTION: SMOKE DETECTOR WARNING

If a warning is notified from a smoke detector, it will be indicated but will not cause any change of system operation control.

12.25. INPUT FUNCTION: EVACUATION WITH FIREFIGHTING ACTION

Firefighting action signal input. Active state at this input indicates that additional relay outputs are operated in EPSCUS modules.

12.26. INPUT FUNCTION: GENERAL ALARM

A general purpose input for connecting any external signals to be displayed by the visualization system.

12.27. INPUT FUNCTION: PRESSURE CONTROL

An input forcing control based on pressure and not temperature measurement results.

12.28. INPUT FUNCTION: EXTERNAL TEMPERATURE SENSOR

Temperature measurement, result in degrees Celsius *10. The result of measurement is responsible for fan action in the assigned zone.



12.29. INPUT FUNCTION: INTERNAL TEMPERATURE SENSOR

Temperature measurement, result in degrees Celsius *10. The result of measurement is responsible for fan action in the assigned zone.

12.30. INPUT FUNCTION: UPPER PRESSURE SENSOR

Pressure measurement, result in Pascals. The result of measurement is responsible for fan action in the assigned zone.

12.31. INPUT FUNCTION: BOTTOM TEMPERATURE SENSOR

Pressure measurement, result in Pascals. The result of measurement is responsible for fan action in the assigned zone.

13. OUTPUT FUNCTIONS

Unit outputs can vary in terms of function. The function of each specific output is defined in FPM+ Configurator.

Not all functions are available for each output.

13.1. OUTPUT FUNCTION: NORMAL FAN SWITCH ON

An output for switching on a fan (via an inverter or motor module) assigned to normal zone.

13.2. OUTPUT FUNCTION: REVERSE FAN SWITCH ON

An output for switching on a fan (via an inverter or motor module) assigned to reverse zone.

13.3. OUTPUT FUNCTION: UPPER FAN ROTATION DIRECTION

An output for changing inverter setup for the purpose of altering the air flow direction from a fan assigned to the reverse zone.

13.4. OUTPUT FUNCTION: LOWER FAN ROTATION DIRECTION

An output for changing inverter setup for the purpose of altering the air flow direction from a fan assigned to the reverse zone.

13.5. OUTPUT FUNCTION: FAN SWITCH ON WITH FIREFIGHTING ACTION

An output for switching on a fan (via an inverter or motor module) assigned to normal zone, with enhanced air supply option.

13.6. OUTPUT FUNCTION: EVACUATION WITH FIREFIGHTING ACTION

An output for enabling enhanced air supply mode.

13.7. OUTPUT FUNCTION: SENSOR POWER SUPPLY RESET

This output will switch within 10-20 seconds after a fire reset, designed for shutting off and restarting power supply for appliances where such procedure is required (duct sensors).

13.8. OUTPUT FUNCTION: INDICATOR LIGHTS

An output for connecting an indicator light, indicating a fire in the zone. It will also respond to "Light test" input signal.

13.9. OUTPUT FUNCTION: FIRE ALARM

An output to an external system, communicating a fire occurring in the assigned zone.

13.10. OUTPUT FUNCTION: TECHNICAL ALARM

An output to be used to transmit signals to other systems, responding to "Technical alarm" input signal.

13.11. OUTPUT FUNCTION: LINE ACTUATOR PLUS

Line actuator plus, e.g. smoke dampers, will be controlled through polarity switching.

Positive wire of the actuator (i.e. the one to which voltage is applied during a fire) is connected to plus terminal.

13.12. OUTPUT FUNCTION: LINE ACTUATOR MINUS

Line actuator minus, e.g. smoke dampers, will be controlled through polarity switching.

13.13. OUTPUT FUNCTION: FAILURE

Communicates system failure information to the outside, possible connection of e.g. a fault indicator light or another system to which the unit is connected.

13.14. OUTPUT FUNCTION: ACTUATOR

When idle, this has a specific state assigned; when an alarm occurs, it will behave in the manner defined in the program.

13.15. OUTPUT FUNCTION: ACTUATOR DISABLED

Actuator function has not been defined; default value after adding an actuator to the design. It should be changed to either of the following values.



13.16. OUTPUT FUNCTION: CUT-OFF GATE

Cut-off gate installed in air intake or duct has the function of closing or opening the duct. It should be assigned to a normal and not reverse zone.

13.17. INPUT FUNCTION: PRESSURE REGULATOR

A pressure regulator located anywhere outside staircases, not subject to temperature-controlled action.

13.18. OUTPUT FUNCTION: EXHAUST BOTTOM

This is an actuator function used in configuring a staircase and the reverse system.

These actuators are characterized by an alarm position changing during system operation, depending on temperature.

These actuators can only be associated with the reverse zone.

13.19. OUTPUT FUNCTION: EXHAUST TOP

This is an actuator function used in configuring a staircase and the reverse system.

These actuators are characterized by an alarm position changing during system operation, depending on temperature.

These actuators can only be associated with the reverse zone.

13.20. OUTPUT FUNCTION: SUPPLY BOTTOM

This is an actuator function used in configuring a staircase and the reverse system.

These actuators are characterized by an alarm position changing during system operation, depending on temperature.

These actuators can only be associated with the reverse zone.

13.21. OUTPUT FUNCTION: SUPPLY TOP

This is an actuator function used in configuring a staircase and the reverse system.

These actuators are characterized by an alarm position changing during system operation, depending on temperature.

These actuators can only be associated with the reverse zone.



14.COMMISSIONING INSTRUCTIONS

The **FPM+ fire alarm control panel unit** can only be commissioned and started for the first time by properly trained personnel. Untrained and unauthorized persons are not allowed to start the unit.

To start the unit, you need to launch the MASTER module and verify the bus connecting the modules. All the unit modules should be installed at the target locations and connected with the bus.

Startup consists of the following steps:

Start the FPM+ unit power supply by switching on the appropriate fuse at the switching station.

Check the indicator light status - if no light is on, make sure the unit supply voltage is received by the power supply. If yes, then check the power supply to MASTER module connection.

Connect the MASTER module of the FPM+ unit to a PC with an Ethernet cable. *FPM Configurator* servicing and diagnostic

software, as well as *Tibbo DS Manager* must be installed on the PC.

Start *Tibbo DS Manager* and see whether the PC can correctly detect the MASTER module of the FPM+ unit. Otherwise check the Ethernet cable.

Check the IP address of the MASTER module with *Tibbo DS Manager*.

Start FPM Configurator.

Create a new unit setup file, add the MASTER module, specify its IP address and IP port (502).

Launch unit status monitoring.

After completing these steps, the installer can receive feedback on possible damage, missing hardware parts, or unit setup errors. All errors and defects are presented in *FPM Configurator*.

The FAULT indicator light on the unit control panel should go off after the unit has been configured and all errors eliminated.



15. PRODUCT SAFETY PRECAUTIONS

15.1. PROPER USAGE REGULATIONS

Reliable operation of the unit depends on maintaining appropriate operating conditions, supply voltage, battery status, and periodical inspections. Periodical inspections should be conducted by an authorized maintenance operative hired by the user to carry out system maintenance.

Any defects should be promptly reported to the maintenance operative. When replacing fuses, note the rated values. Never install a replacement fuse with a higher rating than the blown original fuse; otherwise, the unit can be damaged.

15.2. PERIODICAL INSPECTION AND MAINTENANCE REGULATIONS

The **FPM+ fire alarm control panel unit** should be inspected regularly, at least once a year. Every six months, verify the condition of the protective, earthing or neutral wire connection with the unit housing, and clean the battery bank terminals. Check the battery bank charging status at least once a year. To do this, shut down mains power using the mains on/off switch for approx. 2 hours, then restart the unit

and see whether the battery bank is charged within not more than 5 hours and whether the system switches to buffering mode automatically. The system in good service condition, which is regularly inspected, does not require special maintenance. It is recommended to clean up the dust off the external surfaces of the unit.

15.3. SAFETY PRECAUTIONS

15.3.1. INSTRUCTIONS FOR USE

Failure to comply with the instructions in the user manual poses a risk of irreversible damage to the unit and can cause property losses, injury and/or death.

15.3.2. PROTECTION AGAINST ELECTRIC SHOCK

The **FPM+ fire control unit** is classified as Class I protection rated equipment and as such can only be used with additional electric shock protection, specifically the protective earthing. 230V / 50Hz power supply circuit

insulation is reinforced and resistant to test voltage of 2800V, while the insulation of low voltage circuits (below 42V) can withstand a test voltage of 700VDC.

15.3.3. INSTALLATION AND EQUIPMENT SAFETY

The installation should be wired with cables with required fire rating and properly secured at fire zone limit passages. Maintain the required distances from low voltage installation to power system and lightning protection system, to avoid undesired impact. In terms of system resistance to interference, protective earthing is recommended. Backup battery should be placed in the unit at the final stage of

installation. Parts of the unit are heat sensitive. Maximum ambient temperature should not exceed 40°C. Do not block the vents at the side of the unit. Leave sufficient space around the unit for unrestricted air circulation. Relative humidity of the atmosphere in the rooms where the unit is operated should not exceed 95%.



15.3.4. REPAIRS AND MAINTENANCE

Maintenance work and periodical inspections must be carried out by certified personnel of operators duly authorized or trained by Ela-compil. Any repairs can only be done by the manufacturer. Ela-compil shall not be

responsible for the functioning of equipment maintained or repaired by unauthorized personnel.

The specific maintenance requirements are defined for each building separately, on the basis of the specific contract.

15.3.5. FUSE REPLACEMENT

When replacing fuses, use substitutes of the appropriate type and rated value.



16. PACKAGING, TRANSPORT AND STORAGE

16.1. PACKAGING

All modules which can be incorporated in an **FPM+ (FPM plus)** unit are packed in multi-layer board boxes for transport. An instruction manual is packed together with the unit to the transport box.



16.2. TRANSPORT REGULATIONS

The modules in their original packaging should be transported in locked space of regular land transport vehicles, taking into account the transport instructions indicated on the packaging, protected from violent shock or ambient temperature below -25°C or above +55°C.

16.3. STORAGE REGULATIONS

Store the control unit (all modules) indoors, at 0°C to +70°C, 40% to 70% relative humidity, free from aggressive vapours or gases.

17. ENVIRONMENT IMPACT

<p>THE MATERIALS AND PRODUCTS USED IN THE MANUFACTURING PROCESSES DO NOT CONTAIN HAZARDOUS SUBSTANCES: PB, CD, CR6+, HG, PBB, PBDE IN LEVELS SPECIFIED IN DIRECTIVE 2002/95/EC (ROHS) OF 27 JANUARY 2003, IMPLEMENTED ON 1 JULY 2006, AND ARE IN CONFORMITY WITH REGULATION OF THE MINISTER OF THE ECONOMY OF THE REPUBLIC OF POLAND OF 27 MARCH 2007 (JOURNAL OF LAWS NO. 69, ITEM 457) CONCERNING SPECIFIC RESTRICTIONS ON THE USE OF CERTAIN SUBSTANCES CAPABLE OF NEGATIVELY IMPACTING THE ENVIRONMENT IN ELECTRICAL AND ELECTRONIC EQUIPMENT.</p>	
<p>Worn-out products which are unfit for continued use should be handed over to a waste electrical and electronic equipment collection point.</p>	

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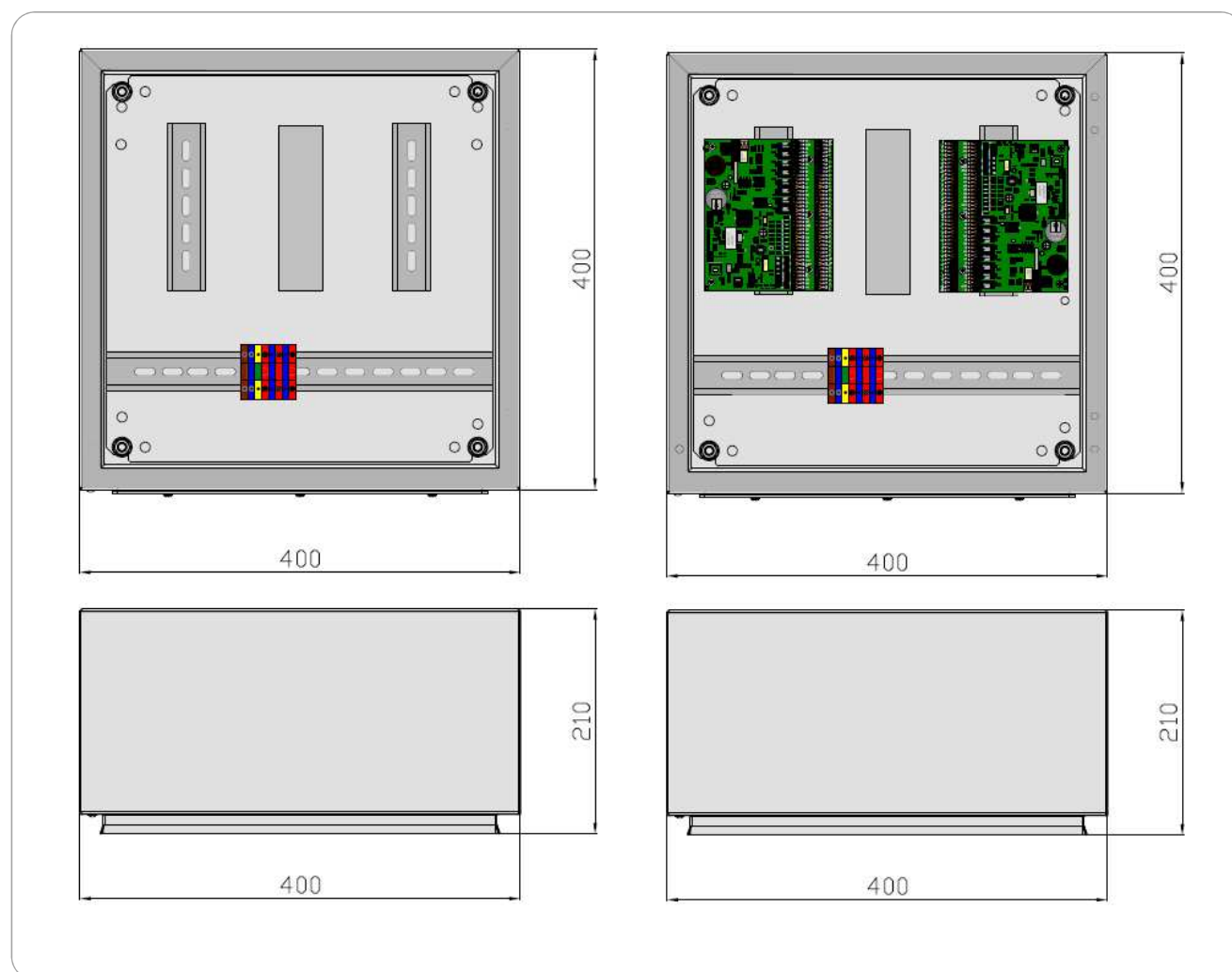
18. APPENDIX A: FPM-X-YY-ZZ HOUSING SPECIFICATIONS

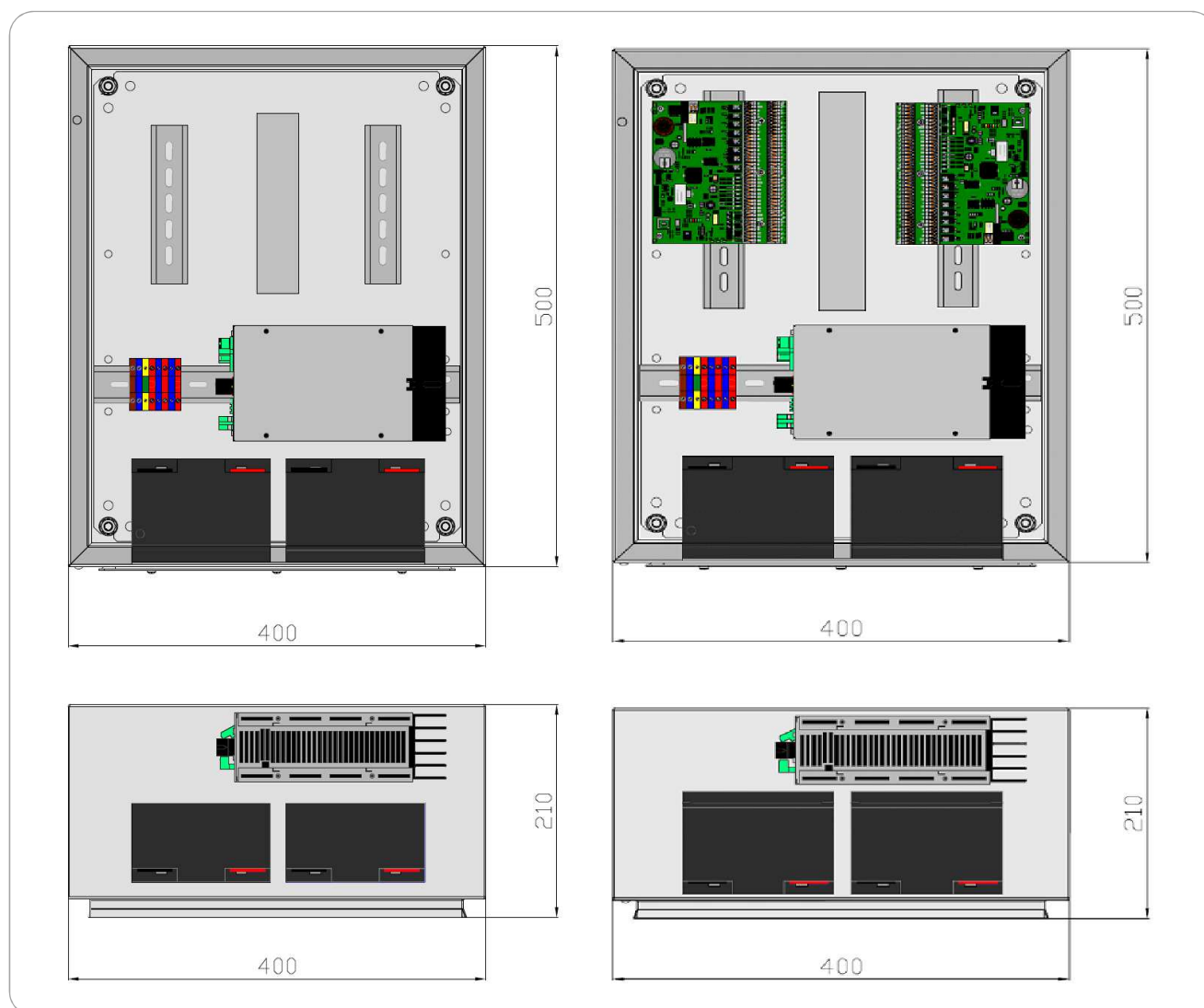
INDEX	MASTER MODULE	NO. OF CELLS FOR EPSCUS MODULES 600x500x250 RAL 3000 red	HOUSINGS						POWER SUPPLIES					BAT.	
			M	2	4	6	8	10	ZM24V6A-151PZ	ZM24V8A-200PZ	ZM24V12A-300PZ	ZM24V16A-400PZ	ZM24V24A-600PZ	17AhAH-2x battery EP12 17Ah	2x 26AH- battery EP12 26Ah
									6A	8A	12A	16A	24A	17Ah	26Ah
FPM M-0-0		2	■												
FPM M-06A-17Ah	■	2	■						■					■	
FPM M-16A-26Ah	■	2	■									■			■
FPM M-24A-26Ah	■	2	■										■		■
FPM 2-0-0		2		■											
FPM 2-6A-17Ah		2		■					■					■	
FPM 2-8A-17Ah		2		■						■				■	
FPM 2-12A-26Ah		2		■							■				■
FPM 2-16A-26Ah		2		■								■			■
FPM 2-24-26Ah		2		■									■		■
FPM 4-0-0		4													
FPM 4-6A-17Ah		4			■				■					■	
FPM 4-8A-17Ah		4			■					■				■	
FPM 4-12A-26Ah		4			■						■				■
FPM 4-16A-26Ah		4			■							■			■
FPM 4-24-26Ah		4			■								■		■
FPM 6-0-0		6				■									
FPM 6-6A-17Ah		6				■			■					■	
FPM 6-8A-17Ah		6				■				■				■	
FPM 6-12A-26Ah		6				■					■				■
FPM 6-16A-26Ah		6				■						■			■
FPM 6-24-26Ah		6				■							■		■
FPM 8-0-0		8					■								
FPM 8-6A-17Ah		8					■		■					■	
FPM 8-8A-17Ah		8					■			■				■	
FPM 8-12A-26Ah		8					■				■				■
FPM 8-16A-26Ah		8					■					■			■
FPM 8-24A-26Ah		8					■						■		■
FPM 10-0-0		10						■							
FPM 10-6A-17Ah		10						■	■					■	
FPM 10-8A-17Ah		10						■		■				■	
FPM 10-12A-26Ah		10						■			■				■
FPM 10-16A-26Ah		10						■				■			■
FPM 10-24A-26Ah		10						■					■		■

19. APPENDIX B : - DRAWINGS OF FPM-X-YY-ZZ HOUSINGS

19.1. FPM-2-YY-ZZ

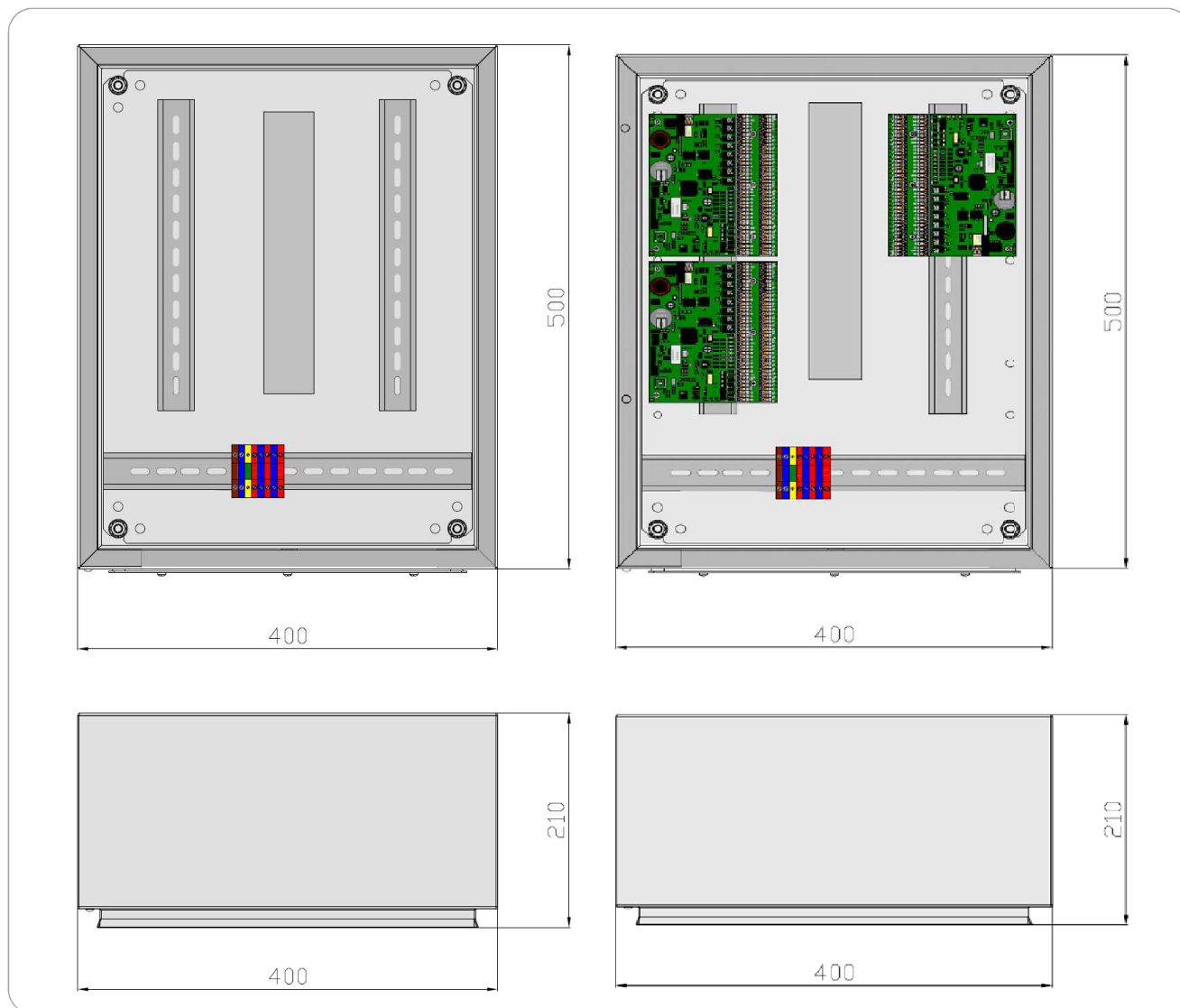
The FPM-2-YY-ZZ is the smallest of all the available multiple-module housings. Its dimensions are: 400x400x210. The housing can accommodate a maximum of two EPSCUS modules. The housing can be fitted with an internal power supply, or adapted to work with an external power supply.

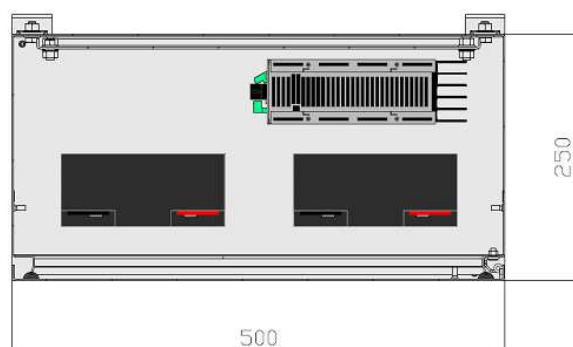
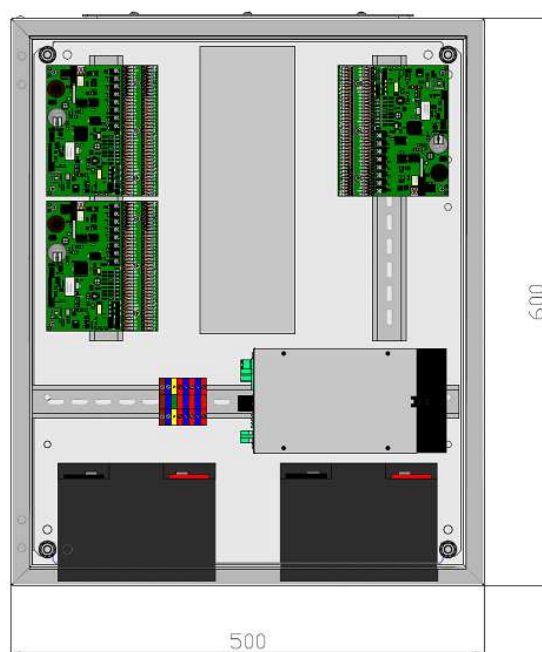
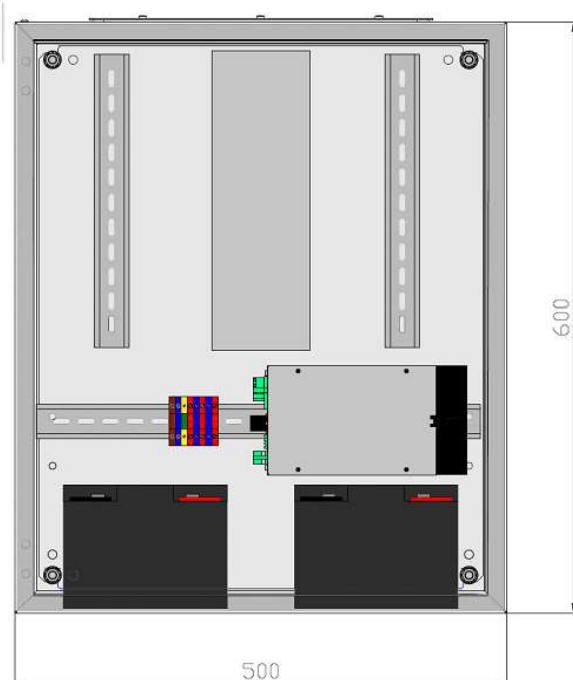




19.2. FPM-4-YY-ZZ

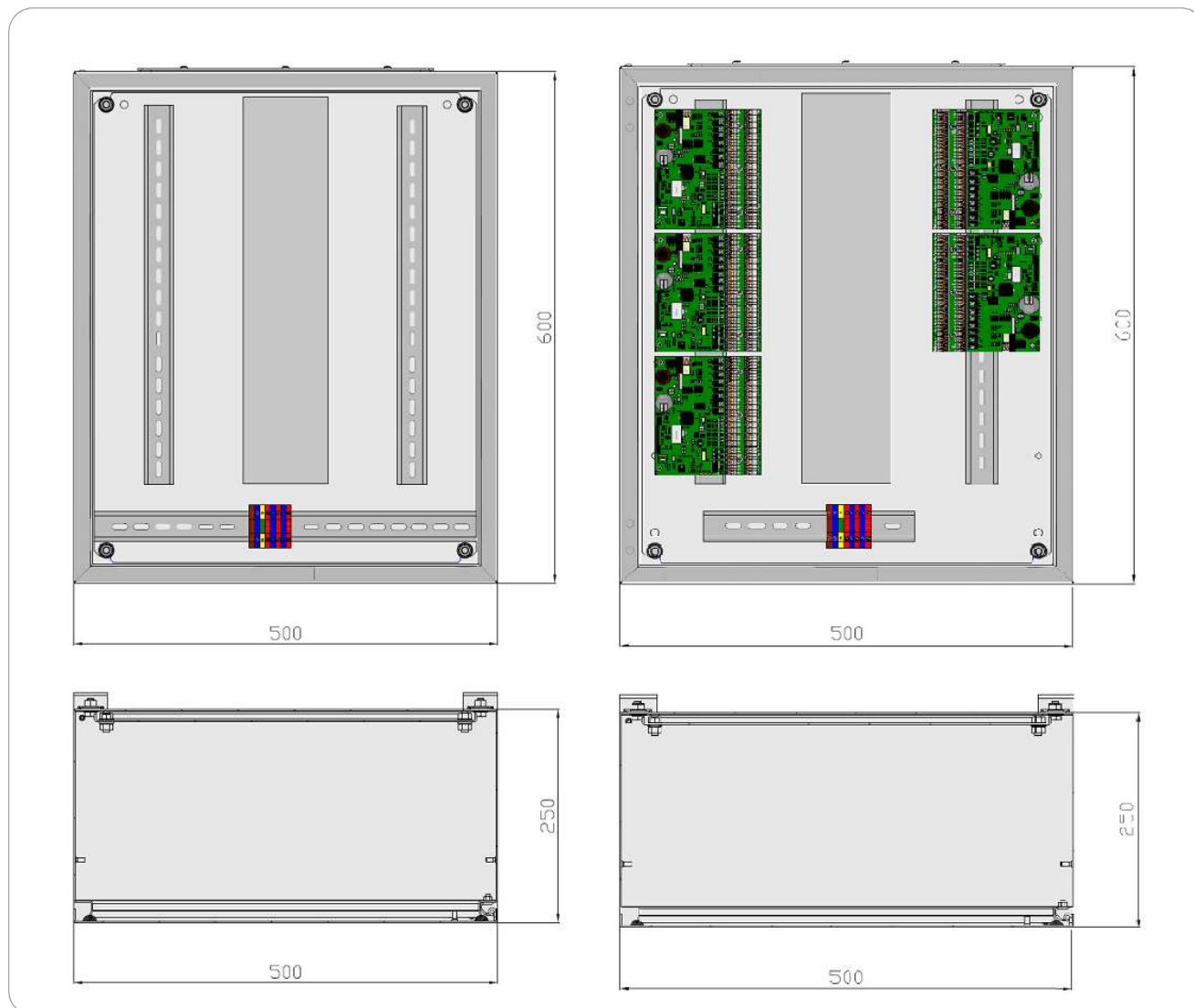
Dimensions of the FPM-4-YY-ZZ housing are: 500x400x210. The housing can accommodate a maximum of four EPSCUS modules. The housing can be fitted with an internal power supply, or adapted to work with an external power supply.

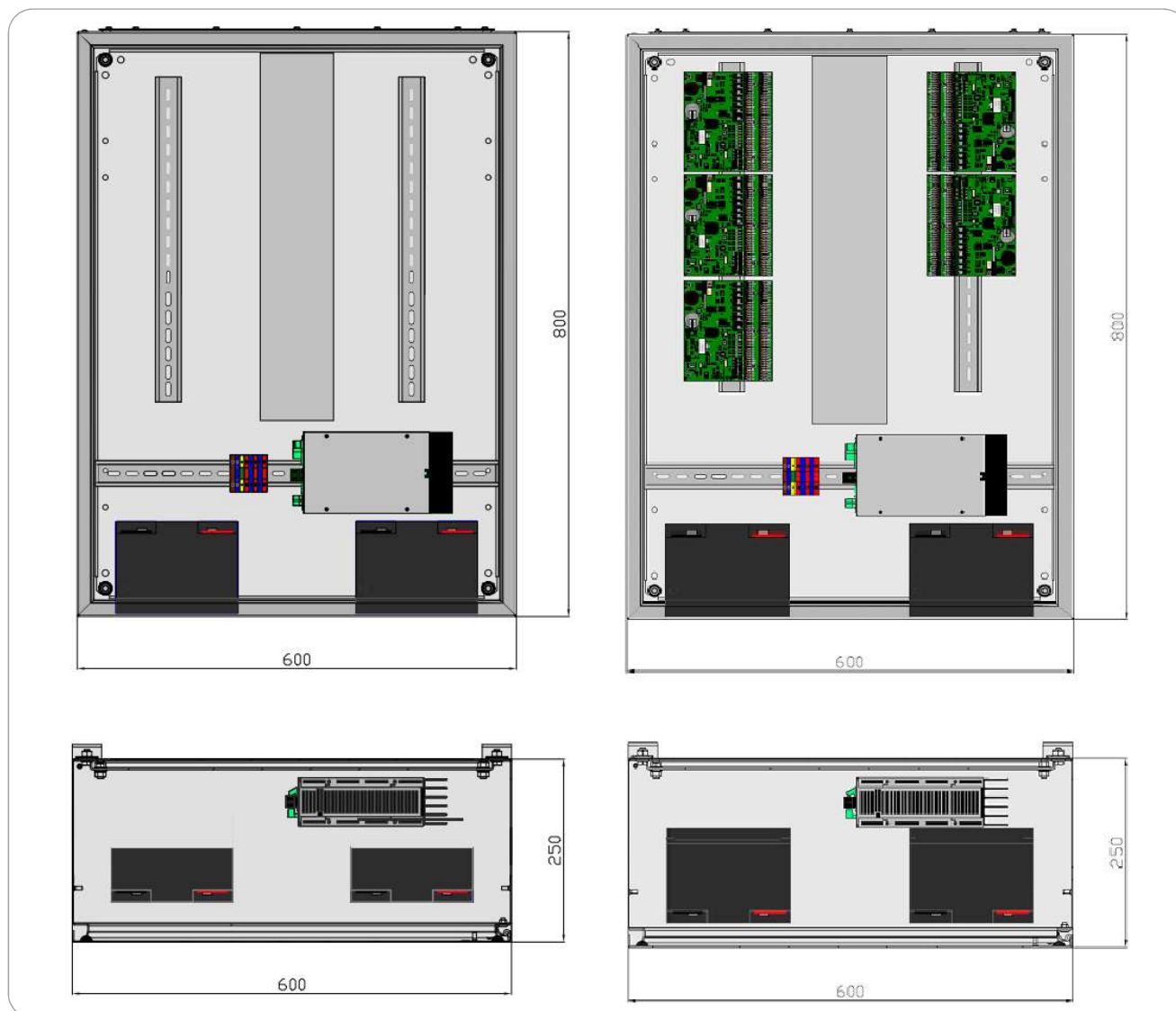




19.3. FPM-6-YY-ZZ

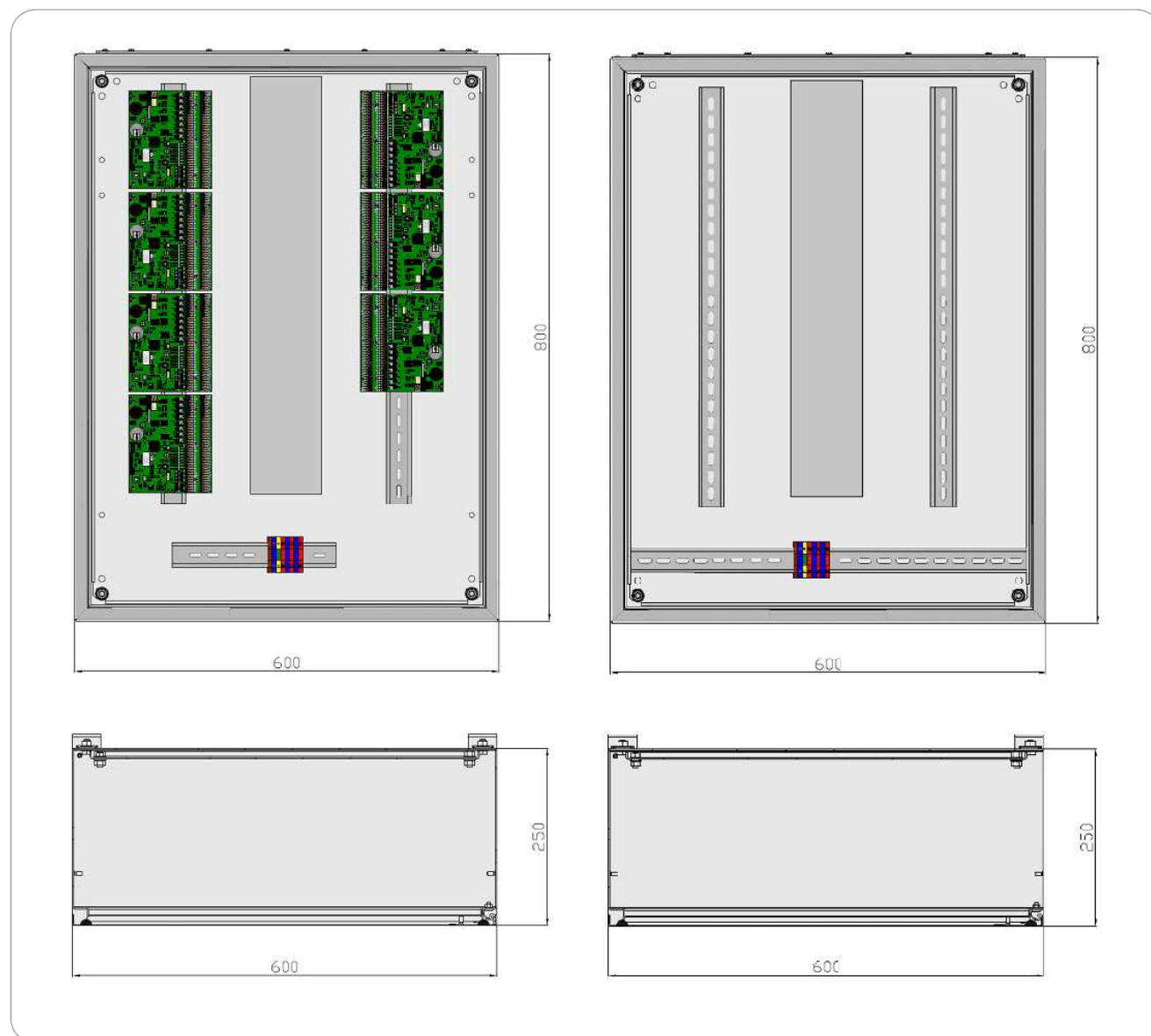
Dimensions of the OBZ-FPMPLUS-6 housing are: 600x500x250. The housing can accommodate a maximum of six EPSCUS modules. The housing can be fitted with an internal power supply, or adapted to work with an external power supply.

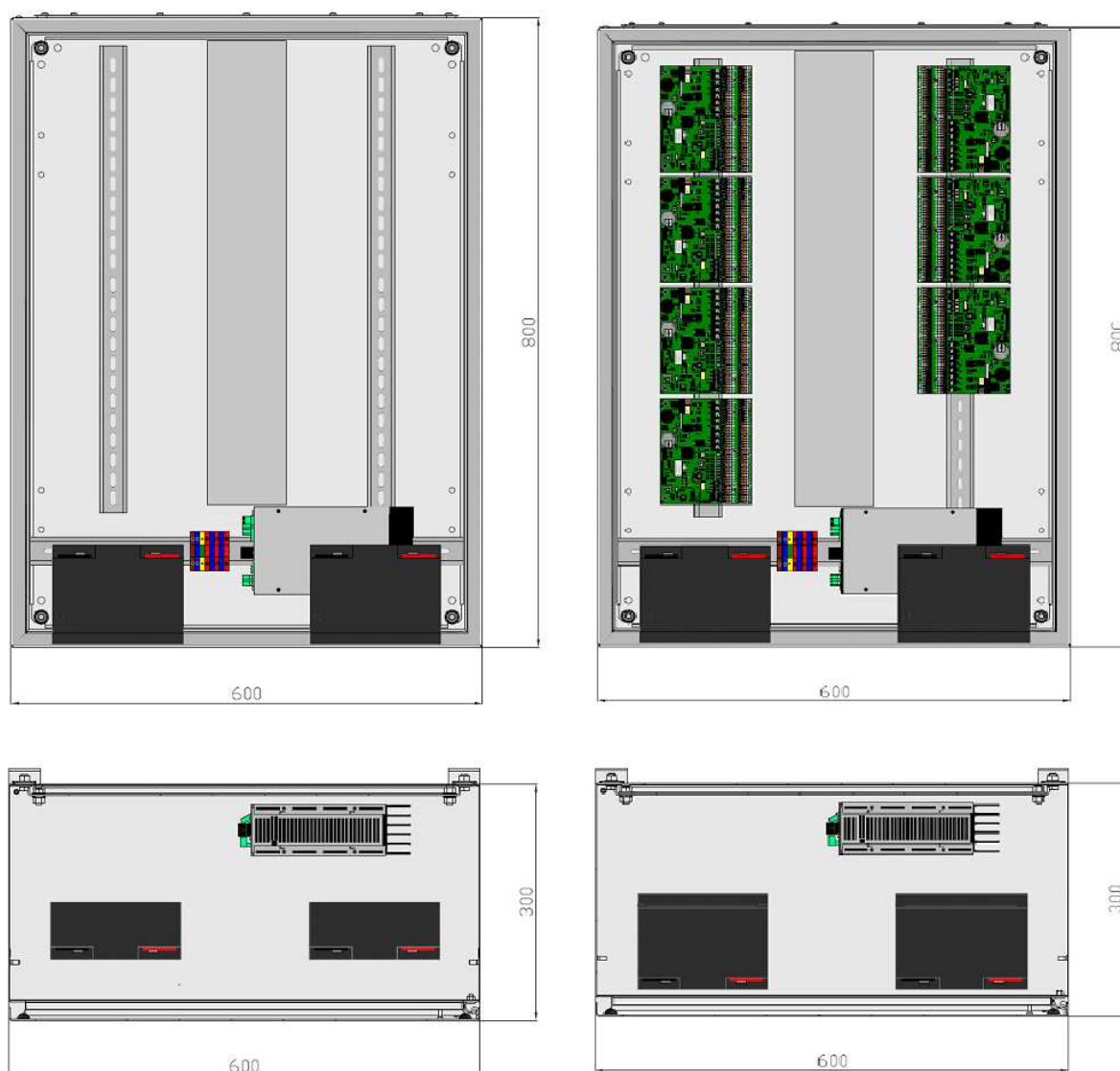




19.4. FPM-8-YY-ZZ

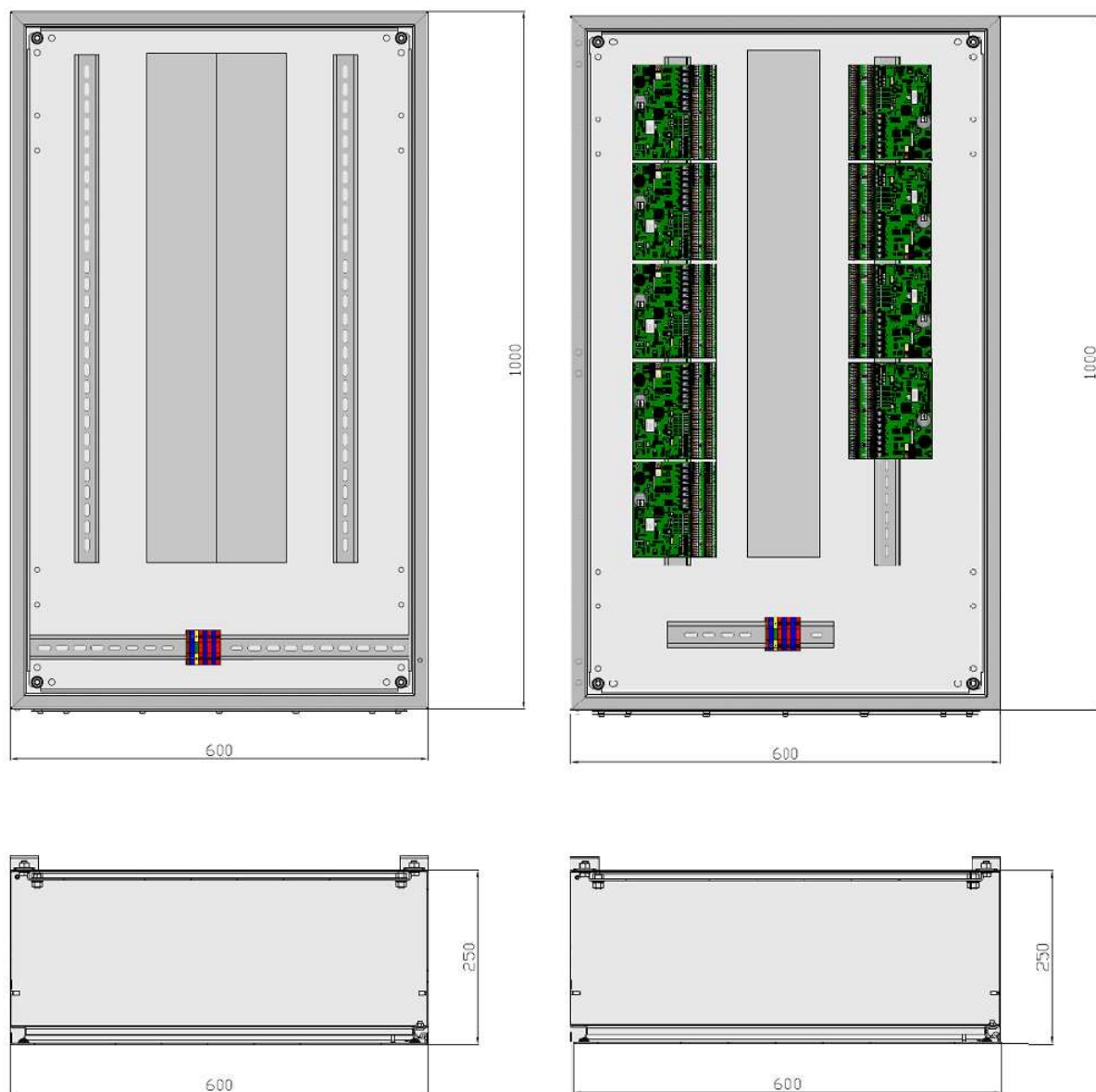
Dimensions of the OBZ-FPMPLUS-8 housing are: 800x600x210. The housing can accommodate a maximum of eight EPSCUS modules. The housing can be fitted with an internal power supply, or adapted to work with an external power supply.

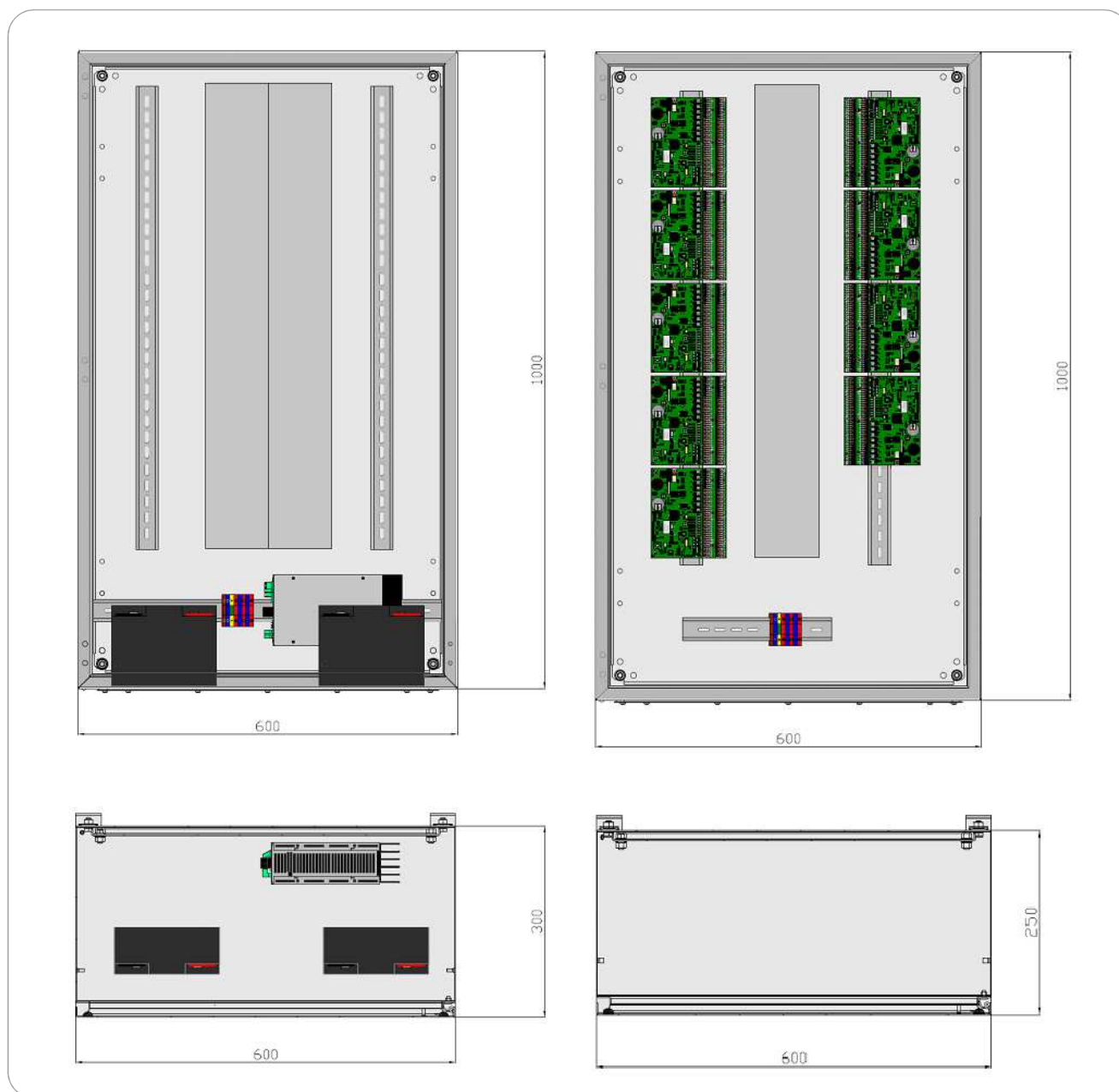




19.5. FPM-10-YY-ZZ

The OBZ-FPMPLUS-10 is the largest of FPM+ multiple-module unit housings, with the dimensions of 1000x600x250. The housing can accommodate a maximum of ten EPSCUS modules. The housing can be fitted with an internal power supply, or adapted to work with an external power supply.





20. APPENDIX C : FPM-U-X-X-X-X AND FPM-L-X-X-X-X HOUSING SPECIFICATIONS

		NO. OF INSTALLATION CELLS		POWER SUPPLY CURRENT [A]		BATTERY CAPACITY [Ah]		CABLE TRAY LAYOUT		CABLE ENTRY (TOP/BOTTOM)	HOUSING DIMENSIONS (H X W X D)
FPM-U	-	4	-	6	-	18	-	A	-	G	600x600x250
FPM-U	-	4	-	12	-	18	-	A	-	G	600x600x250
FPM-U	-	4	-	24	-	18	-	A	-	G	600x600x250
FPM-U	-	4	-	6	-	0	-	A	-	D	600x600x250
FPM-U	-	4	-	12	-	0	-	A	-	D	600x600x250
FPM-U	-	4	-	24	-	0	-	A	-	D	600x600x250
FPM-U	-	4	-	6	-	18	-	B	-	G	600x600x250
FPM-U	-	4	-	12	-	18	-	B	-	G	600x600x250
FPM-U	-	4	-	24	-	18	-	B	-	G	600x600x250
FPM-U	-	4	-	6	-	0	-	B	-	D	600x600x250
FPM-U	-	4	-	12	-	0	-	B	-	D	600x600x250
FPM-U	-	4	-	24	-	0	-	B	-	D	600x600x250
FPM-U	-	6	-	6	-	26	-	A	-	G	800x600x300
FPM-U	-	6	-	12	-	26	-	A	-	G	800x600x300
FPM-U	-	6	-	24	-	26	-	A	-	G	800x600x300
FPM-U	-	6	-	6	-	0	-	A	-	D	800x600x300
FPM-U	-	6	-	12	-	0	-	A	-	D	800x600x300
FPM-U	-	6	-	24	-	0	-	A	-	D	800x600x300
FPM-U	-	6	-	6	-	26	-	B	-	G	800x600x300
FPM-U	-	6	-	12	-	26	-	B	-	G	800x600x300
FPM-U	-	6	-	24	-	26	-	B	-	G	800x600x300
FPM-U	-	6	-	6	-	0	-	B	-	D	800x600x300
FPM-U	-	6	-	12	-	0	-	B	-	D	800x600x300
FPM-U	-	6	-	24	-	0	-	B	-	D	800x600x300
FPM-L	-	8	-	6	-	18	-	A	-	G	600x500x250
FPM-L	-	8	-	6	-	0	-	A	-	D	600x500x250
FPM-L	-	8	-	6	-	18	-	B	-	G	600x500x250
FPM-L	-	8	-	6	-	0	-	B	-	D	600x500x250

21. APPENDIX D : FPM-U-X-X-X-X-X AND FPM-L-X-X-X-X HOUSINGS - DRAWINGS

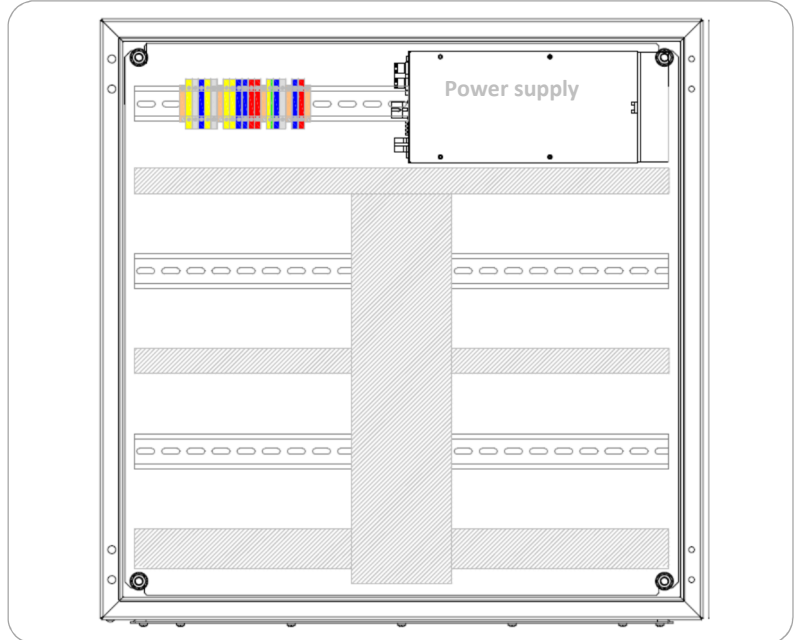
21.1. FPM-U-4-6-0-A-D

The FPM-U-4-6-0-A-D is a universal housing with 4 installation cells (FPM-U-4), a power supply with max. current 6A (FPM-U-4-6), without batteries (FPM-U-4-6-0), with a cable tray layout A (main tray in central location - FPM-U-4-6-0-A) and cable glands in the bottom part of the housing (FPM-U-4-6-0-A-D).

The housing can be fitted with 6A, 12A or 24A power supply; according to the selected option, the respective field in the housing symbol will change.

A single e.USP module or two e.LSK modules can be installed in a single cell.

Dimensions of the housing:
600x600x250mm



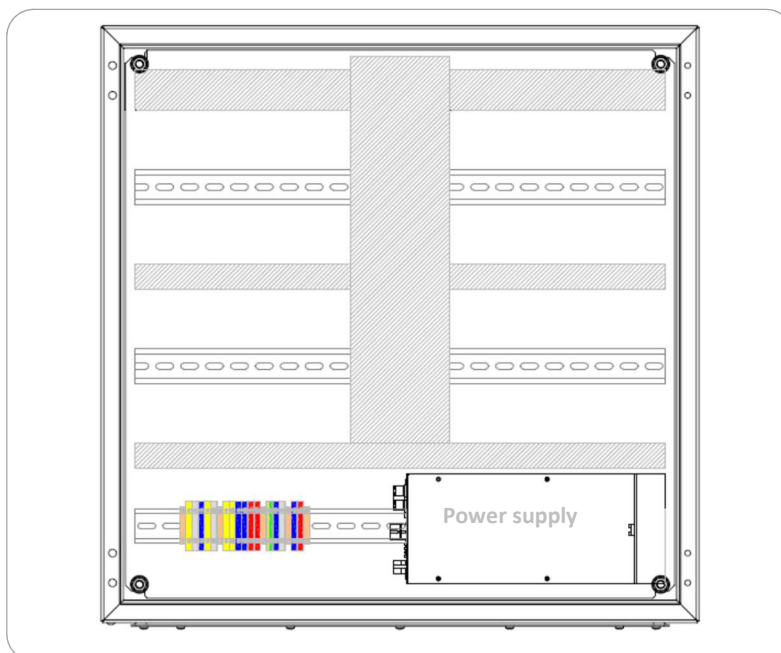
21.2. FPM-U-4-6-18-A-G

The FPM-U-4-6-0-A-G is a universal housing with 4 installation cells (FPM-U-4), a power supply with max. current 6A (FPM-U-4-6), with 18Ah batteries (FPM-U-4-6-18), with a cable tray layout A (main tray in central location - FPM-U-4-6-18-A) and cable glands in the upper part of the housing (FPM-U-4-6-18-A-G).

The housing can be fitted with 6A, 12A or 24A power supply; according to the selected option, the respective field in the housing symbol will change.

A single e.USP module or two e.LSK modules can be installed in a single cell.

Dimensions of the housing:
600x600x250mm



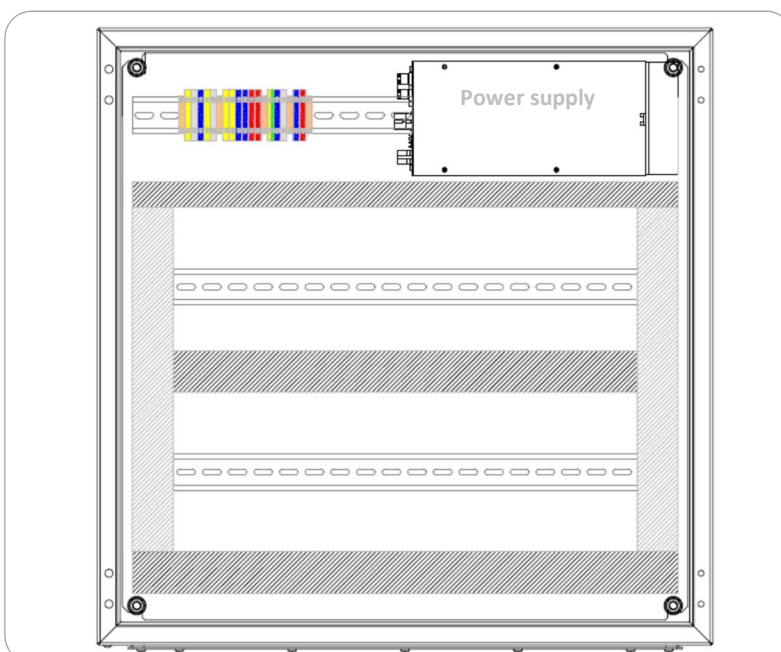
21.3. FPM-U-4-6-0-B-D

The FPM-U-4-6-0-B-D is a universal housing with 4 installation cells (FPM-U-4), a power supply with max. current 6A (FPM-U-4-6), without batteries (FPM-U-4-6-0), with a cable tray layout B (trays around installation cells - FPM-U-4-6-0-B) and cable glands in the bottom part of the housing (FPM-U-4-6-0-B-D).

The housing can be fitted with 6A, 12A or 24A power supply; according to the selected option, the respective field in the housing symbol will change.

A single e.USP module or two e.LSK modules can be installed in a single cell.

Dimensions of the housing:
600x600x250mm



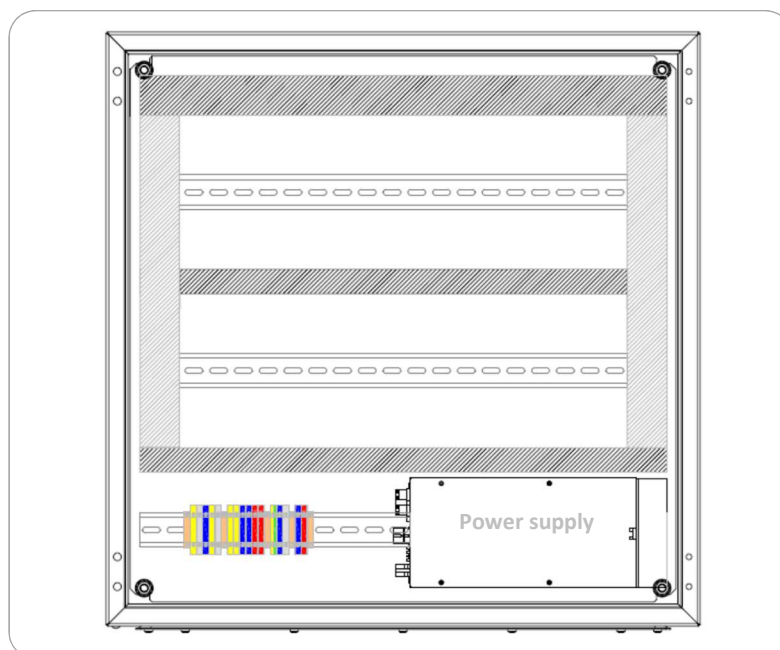
21.4. FPM-U-4-6-18-B-G

The FPM-U-4-6-0-B-D is a universal housing with 4 installation cells (FPM-U-4), a power supply with max. current 6A (FPM-U-4-6), with 18Ah batteries (FPM-U-4-6-18), with a cable tray layout B (trays around installation cells - FPM-U-4-6-18-B) and cable glands in the upper part of the housing (FPM-U-4-6-18-B-G).

The housing can be fitted with 6A, 12A or 24A power supply; according to the selected option, the respective field in the housing symbol will change.

A single e.USP module or two e.LSK modules can be installed in a single cell.

Dimensions of the housing:
600x600x250mm



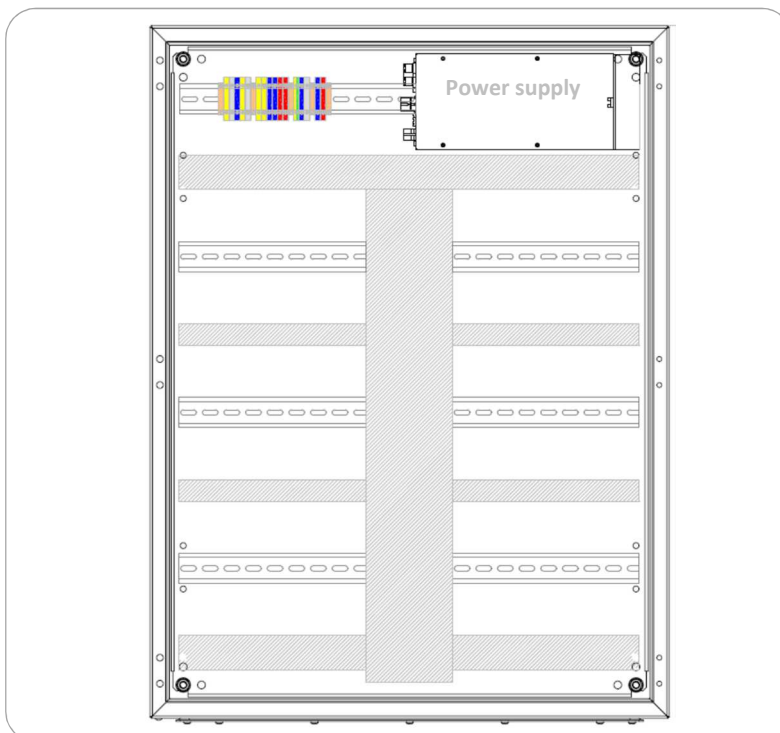
21.5. FPM-U-6-6-0-A-D

The FPM-U-6-6-0-A-D is a universal housing with 6 installation cells (FPM-U-4), a power supply with max. current 6A (FPM-U-6-6), without batteries (FPM-U-6-6-0), with a cable tray layout A (main tray in central location - FPM-U-6-6-0-A) and cable glands in the bottom part of the housing (FPM-U-6-6-0-A-D).

The housing can be fitted with 6A, 12A or 24A power supply; according to the selected option, the respective field in the housing symbol will change.

A single e.USP module or two e.LSK modules can be installed in a single cell.

Dimensions of the housing:
800x600x250mm



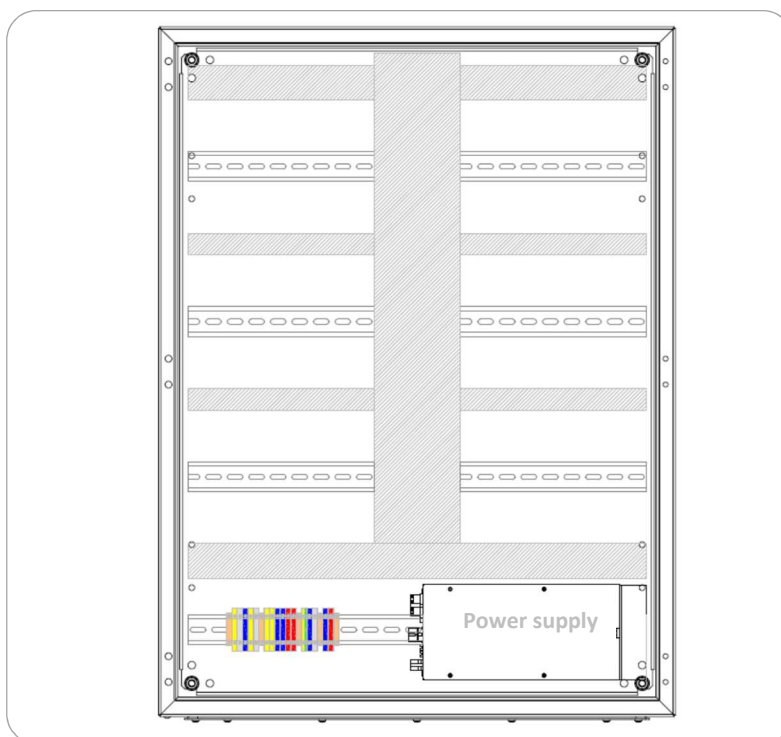
21.6. FPM-U-6-6-26-A-G

The FPM-U-6-6-26-A-G is a universal housing with 6 installation cells (FPM-U-6), a power supply with max. current 6A (FPM-U-6-6), with 26Ah batteries (FPM-U-6-6-26), with a cable tray layout A (main tray in central location - FPM-U-6-6-26-A) and cable glands in the upper part of the housing (FPM-U-6-6-26-A-G).

The housing can be fitted with 6A, 12A or 24A power supply; according to the selected option, the respective field in the housing symbol will change.

A single e.USP module or two e.LSK modules can be installed in a single cell.

Dimensions of the housing:
800x600x250mm



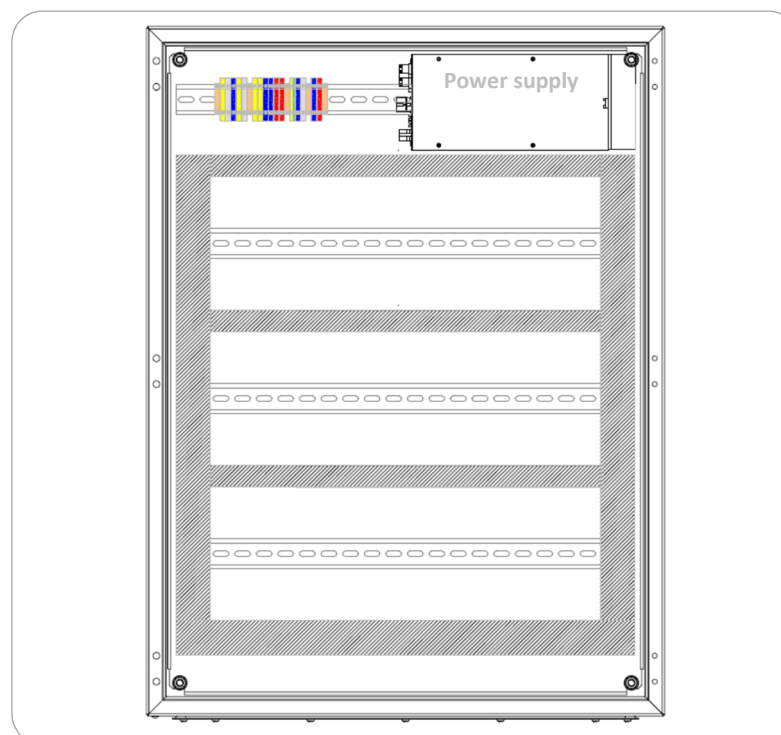
21.7. FPM-U-6-6-0-B-D

The FPM-U-6-6-0-B-D is a universal housing with 6 installation cells (FPM-U-6), a power supply with max. current 6A (FPM-U-6-6), without batteries (FPM-U-6-6-0), with a cable tray layout B (trays around installation cells - FPM-U-6-6-0-B) and cable glands in the bottom part of the housing (FPM-U-6-6-0-B-D).

The housing can be fitted with 6A, 12A or 24A power supply; according to the selected option, the respective field in the housing symbol will change.

A single e.USP module or two e.LSK modules can be installed in a single cell.

Dimensions of the housing:
800x600x250mm



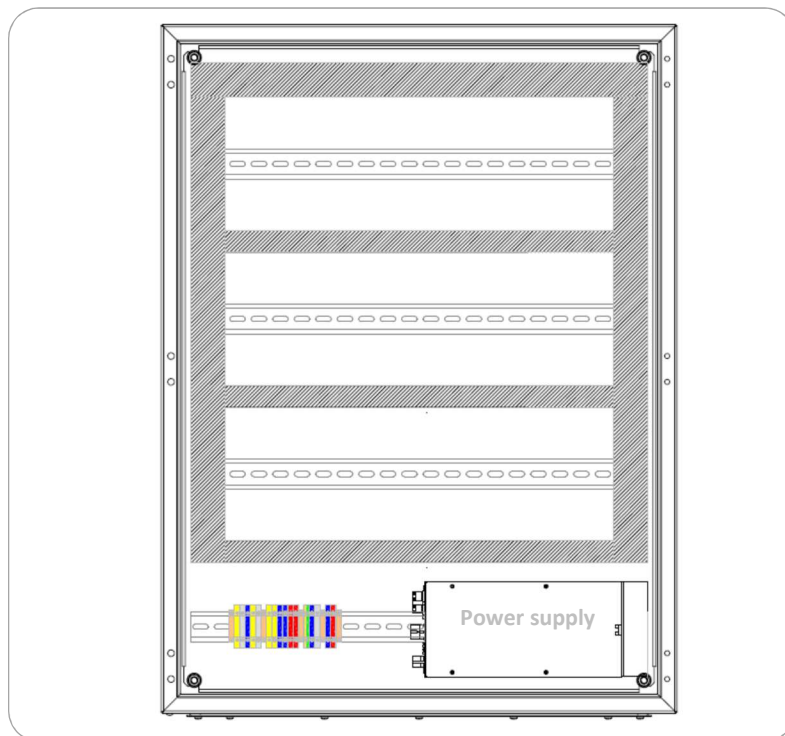
21.8. FPM-U-6-6-26-B-G

The FPM-U-6-6-0-B-D is a universal housing with 6 installation cells (FPM-U-6), a power supply with max. current 6A (FPM-U-6-6), with 26Ah batteries (FPM-U-6-6-26), with a cable tray layout B (trays around installation cells - FPM-U-6-6-26-B) and cable glands in the upper part of the housing (FPM-U-6-6-26-B-G).

The housing can be fitted with 6A, 12A or 24A power supply; according to the selected option, the respective field in the housing symbol will change.

A single e.USP module or two e.LSK modules can be installed in a single cell.

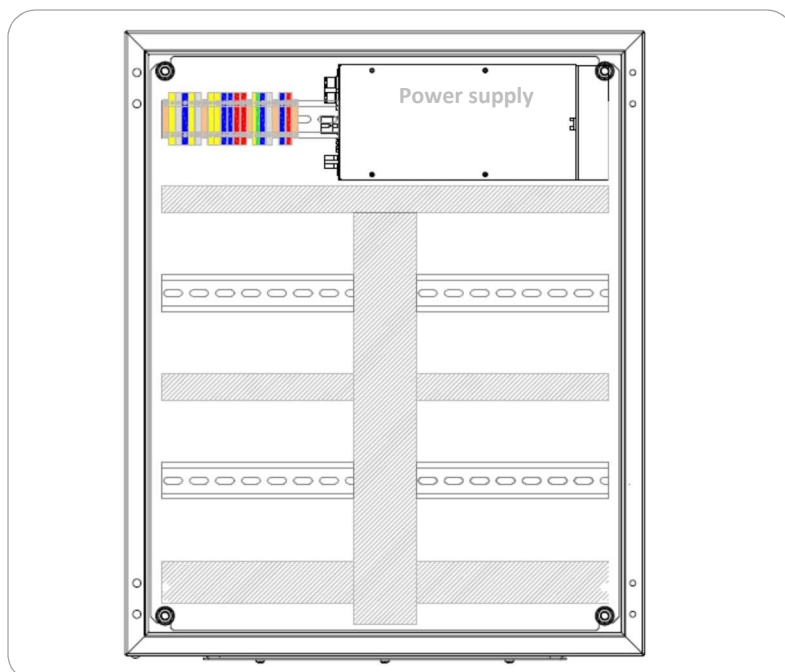
Dimensions of the housing:
800x600x250mm



21.9. FPM-L-8-6-0-A-D

The FPM-U-8-6-0-A-D is a housing dedicated to e.LSK modules, capable of accommodating max. 8 modules (FPM-L-8), a power supply with max. current 6A (FPM-L-8-6), without batteries (FPM-L-8-6-0), with a cable tray layout A (main tray in central location - FPM-L-8-6-0-A) and cable glands in the bottom part of the housing (FPM-L-8-6-0-A-D).

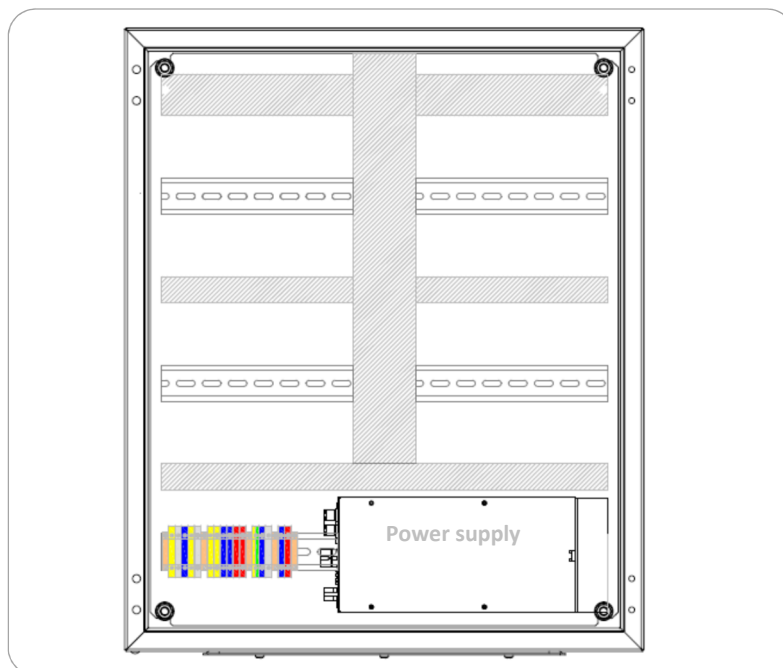
Dimensions of the housing:
600x500x250mm



21.10. FPM-L-8-6-18-A-G

The FPM-U-8-6-18-A-D is a housing dedicated to e.LSK modules, capable of accommodating max. 8 modules (FPM-L-8), a power supply with max. current 6A (FPM-L-8-6), with 18Ah batteries (FPM-L-8-6-18), with a cable tray layout A (main tray in central location - FPM-L-8-6-18-A) and cable glands in the upper part of the housing (FPM-L-8-6-18-A-G).

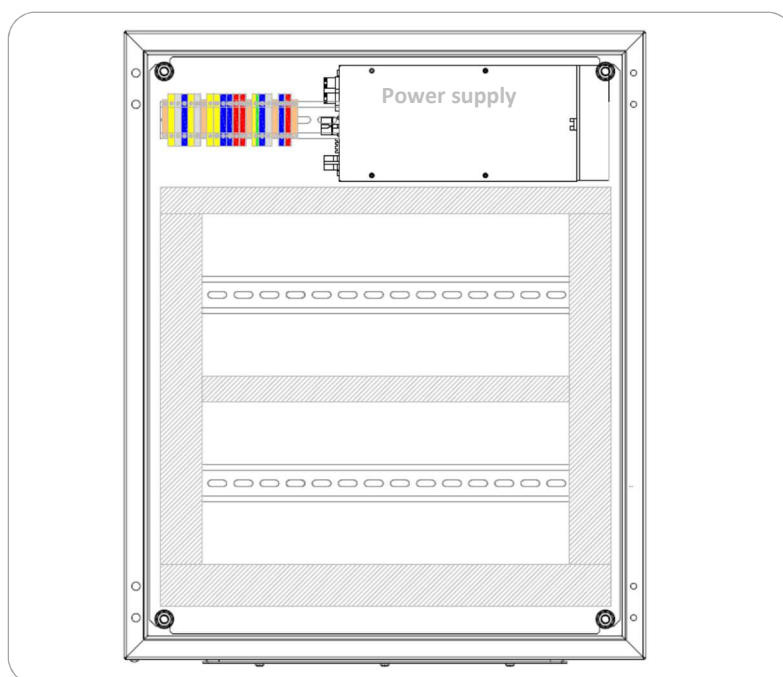
Dimensions of the housing:
600x500x250mm



21.11. FPM-L-8-6-0-B-D

The FPM-U-8-6-0-B-D is a housing dedicated to e.LSK modules, capable of accommodating max. 8 modules (FPM-L-8), a power supply with max. current 6A (FPM-L-8-6), without batteries (FPM-L-8-6-0), with a cable tray layout B (trays around installation cells - FPM-L-8-6-0-B) and cable glands in the bottom part of the housing (FPM-L-8-6-0-B-D).

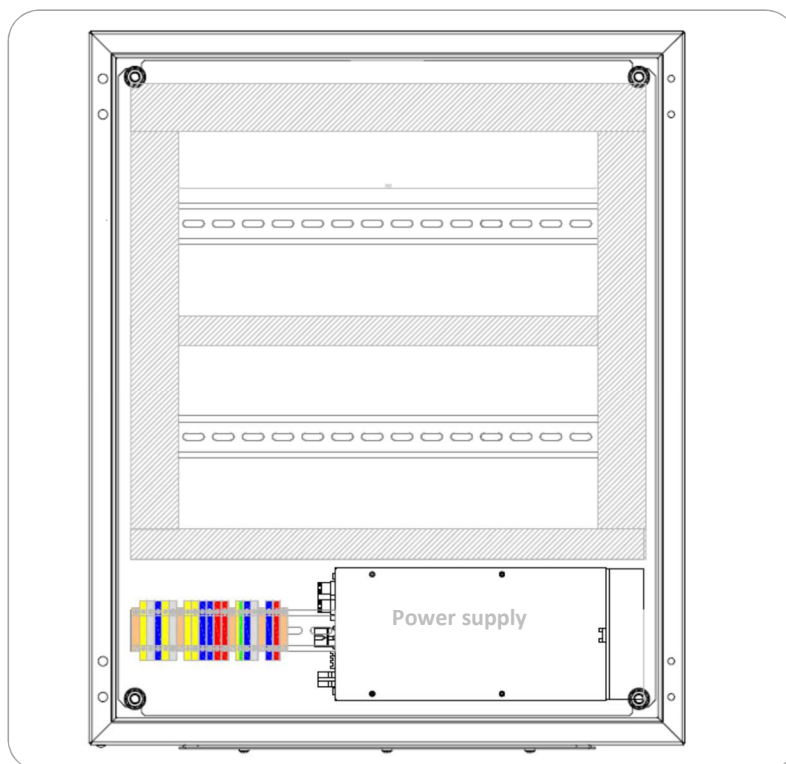
Dimensions of the housing:
600x500x250mm



21.12. FPM-L-8-6-18-B-G

The FPM-U-8-6-18-A-D is a housing dedicated to e.LSK modules, capable of accommodating max. 8 modules (FPM-L-8), a power supply with max. current 6A (FPM-L-8-6), with 18Ah batteries (FPM-L-8-6-18), with a cable tray layout B (trays around installation cells - FPM-L-8-6-18-B) and cable glands in the upper part of the housing (FPM-L-8-6-18-B-G).

Dimensions of the housing:
600x500x250mm



22. APPENDIX E: CUSTOM HOUSINGS

On special order, control unit housings with different capacity or dimensions can be produced. The housings must meet the isolation criteria (min. IP42). Housings can be used from the following ranges:

SWN WALL-MOUNTED CABINETS

MANUFACTURER	SYMBOL	HEIGHT	WIDTH	DEPTH
ZPAS	WZ-2285-01-06-011	500	400	210
ZPAS	WZ-2285-01-09-011	500	400	300
ZPAS	WZ-2285-01-10-011	500	500	210
ZPAS	WZ-2285-01-07-011	600	400	250
ZPAS	WZ-2285-01-12-011	600	500	250
ZPAS	WZ-2285-01-13-011	600	500	300
ZPAS	WZ-2285-01-15-011	600	600	250
ZPAS	WZ-2285-01-16-011	800	600	250
ZPAS	WZ-2285-01-18-011	800	600	300
ZPAS	WZ-2285-01-19-011	800	800	300
ZPAS	WZ-2285-01-17-011	1000	600	250
ZPAS	WZ-2285-01-20-011	1000	800	300

SZE2 CABINETS – WITH SINGLE LEAF DOOR

MANUFACTURER	SYMBOL	WIDTH		HEIGHT	DEPTH
		With integrated shielding	With external shielding		
ZPAS	WZ-1951-01-24-011	600	650	1800	500
ZPAS	WZ-1951-01-23-011	600	650	1800	600
ZPAS	WZ-1951-01-21-011	800	850	1800	500
ZPAS	WZ-1951-01-20-011	800	850	1800	600
ZPAS	WZ-1951-01-50-011	600	650	2000	400
ZPAS	WZ-1951-01-12-011	600	650	2000	500
ZPAS	WZ-1951-01-11-011	600	650	2000	600
ZPAS	WZ-1951-01-10-011	600	650	2000	800
ZPAS	WZ-1951-01-49-011	800	850	2000	400
ZPAS	WZ-1951-01-09-011	800	850	2000	500
ZPAS	WZ-1951-01-08-011	800	850	2000	600
ZPAS	WZ-1951-01-07-011	800	850	2000	800

**SZE2 CABINETS – WITH DOUBLE LEAF DOOR**

MANUFACTURER	SYMBOL	WIDTH		HEIGHT	DEPTH
		With integrated shielding	With external shielding		
ZPAS	WZ-1951-01-15-011	1200	1250	1800	500
ZPAS	WZ-1951-01-14-011	1200	1250	1800	600
ZPAS	WZ-1951-01-06-011	1000	1050	2000	500
ZPAS	WZ-1951-01-05-011	1000	1050	2000	600
ZPAS	WZ-1951-01-04-011	1200	1250	2000	500
ZPAS	WZ-1951-01-03-011	1200	1250	2000	600
ZPAS	WZ-1951-01-02-011	1200	1250	2000	800

KOMPAKT AE CONTROL HOUSINGS

MANUFACTURER	SYMBOL	WIDTH	HEIGHT	DEPTH
RITTAL	1045.500	400	500	210
RITTAL	1037.500	400	800	300
RITTAL	1050.500	500	500	210
RITTAL	1350.500	500	500	300
RITTAL	1057.500	500	700	250
RITTAL	1039.500	600	380	210
RITTAL	1339.500	600	380	350
RITTAL	1060.500	600	600	210
RITTAL	1054.500	600	600	250
RITTAL	1360.500	600	600	350
RITTAL	1076.500	600	760	210
RITTAL	1376.500	600	760	350
RITTAL	1058.500	600	800	250
RITTAL	1090.500	600	1000	250
RITTAL	1260.500	600	1200	300
RITTAL	1077.500	760	760	210
RITTAL	1073.500	760	760	300
RITTAL	1055.500	800	600	300
RITTAL	1180.500	800	1000	300
RITTAL	1280.500	800	1200	300
RITTAL	1100.500	1000	760	210
RITTAL	1130.500	1000	760	300
RITTAL	1110.500	1000	1000	300
RITTAL	1213.500	1000	1200	300
RITTAL	1114.500	1000	1400	300
RITTAL	1101.020	400	400	250
RITTAL	1101.030	400	650	250
RITTAL	1101.040	650	650	250

**KOMPAKT AE CONTROL HOUSINGS, STAINLESS STEEL**

MANUFACTURER	SYMBOL	WIDTH	HEIGHT	DEPTH
RITTAL	1009.600	600	380	210
RITTAL	1015.600	400	500	210
RITTAL	1007.600	500	500	210
RITTAL	1013.600	500	500	300
RITTAL	1008.600	380	600	210
RITTAL	1010.600	600	600	210
RITTAL	1010.500	600	600	210
RITTAL	1012.600	600	760	210
RITTAL	1014.600	760	760	300
RITTAL	1016.600	800	1000	300
RITTAL	1017.600	800	1200	300
RITTAL	1018.600	1000	1000	300
RITTAL	1019.600	1000	1200	300
RITTAL	1019.500	1000	1200	300
RITTAL	1101.120	400	400	250
RITTAL	1101.130	400	650	250
RITTAL	1101.140	650	650	250

KOMPAKT RITTAL CM SYSTEM HOUSINGS

Manufacturer	Symbol	Width	Height	Depth
RITTAL	5110.500	600	800	400
RITTAL	5111.500	600	1000	400
RITTAL	5112.500	600	1200	300
RITTAL	5113.500	600	1200	400
RITTAL	5114.500	800	1000	300
RITTAL	5115.500	800	1000	400
RITTAL	5116.500	800	1200	300
RITTAL	5117.500	800	1200	400
RITTAL	5118.500	1000	1000	300
RITTAL	5119.500	1000	1200	300
RITTAL	5120.500	1000	1200	400
RITTAL	5121.500	1000	1400	300
RITTAL	5122.500	1000	1400	400
RITTAL	5123.500	1200	1200	400

**SYSTEM CABINET, SINGLE, SE 8**

Manufacturer	Symbol	Width	Height	Depth
RITTAL	5830.500	600	1800	400
RITTAL	5831.500	800	1800	400
RITTAL	5832.500	800	2000	400
RITTAL	5833.500	800	2000	500
RITTAL	5834.500	800	2000	600
RITTAL	5840.500	1000	1800	400
RITTAL	5841.500	1200	1800	400
RITTAL	5842.500	1600	1800	400
RITTAL	5843.500	1200	2000	400
RITTAL	5844.500	1200	2000	500
RITTAL	5845.500	1200	2000	600
RITTAL	5846.500	1800	2000	500

SYSTEM CABINET, SINGLE, SE 8 - STAINLESS STEEL

MANUFACTURER	SYMBOL	WIDTH	HEIGHT	DEPTH
RITTAL	5850.500	600	1600	400
RITTAL	5851.500	600	1800	500
RITTAL	5852.500	800	1800	500
RITTAL	5853.500	800	2000	600
RITTAL	5854.500	1000	1800	400
RITTAL	5855.500	1200	2000	500