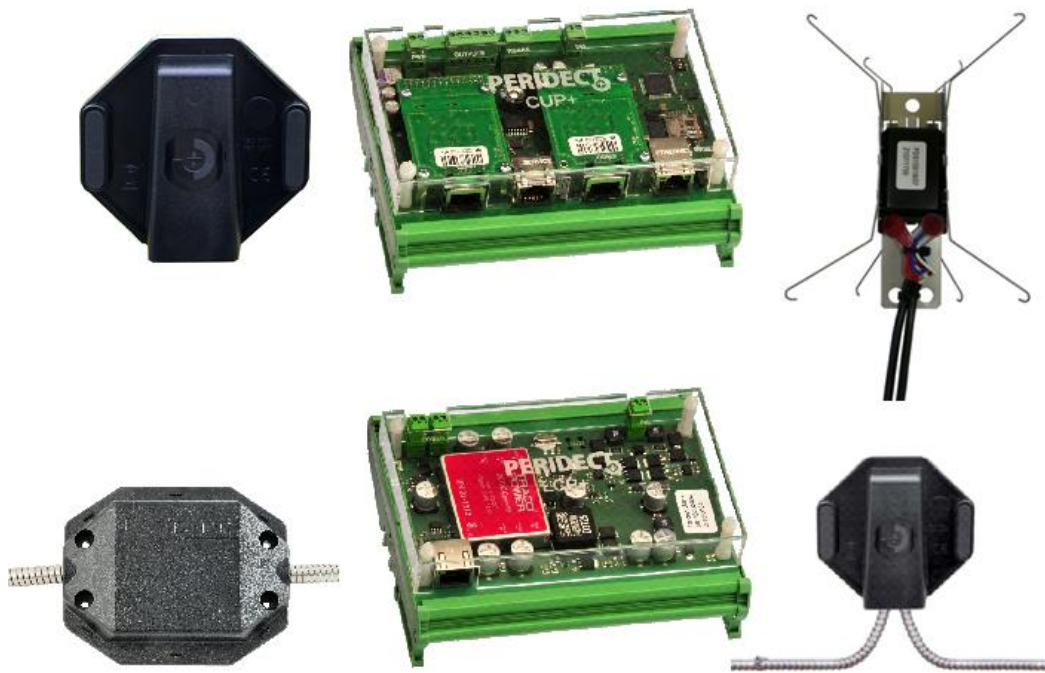


PERIDECT

Perimeter Detection System - Installation manual



The manual describes installation and configuration of the PERIDECT+ detection system and is intended exclusively for authorized partners of the manufacturer SIEZA, a.s.

Updated: 02/11/2016

Contents

1. Introduction – basic description of PERIDECT+	2 -
1.1. Purpose of the System.....	2 -
1.2. System Topology	2 -
2. HW of the PERIDECT+ System	3 -
2.1. PERIDECT+ Detection Line	3 -
2.1.1. Standard Version	4 -
2.1.2. Antivandal Version	5 -
2.1.3. Hidden Version	6 -
2.1.4. Installing the Perimeter onto the Fence.....	7 -
2.2. CUP+ – Control Unit PERIDECT+.....	9 -
2.2.1. Connecting the CUP+ Terminal Board	10 -
2.3. LCP+ – Line Controller PERIDECT+.....	12 -
2.3.1. Connecting the LCP+ Terminal Board.....	12 -
2.3.2. LED Signalling of CUP+ and LCP+	13 -
2.4. LIP+ – Line Input PERIDECT+.....	13 -
2.5. LPP+ – Line Protection PERIDECT+	13 -
2.6. IOP+/LAN/RS485 I/O Module PERIDECT+.....	14 -
2.6.1. Connecting the IOP+ Terminal Board	14 -
2.7. LSP+ – Line Separator PERIDECT+.....	15 -
2.8. Block Diagram of the System	15 -
3. Technical Specification of PERIDECT+	16 -
3.1. PERIDECT+ CUP+ Control Unit.....	16 -
3.2. PERIDECT+ LCP+ Line Controller.....	16 -
3.3. PERIDECT+ LIP+ Line Input.....	16 -
3.4. PERIDECT+ DSP+ Detection Sensor	16 -
3.5. PERIDECT+ LSP+ Line Separator.....	16 -
3.6. PERIDECT+ IOP+/LAN I/O Module	17 -
3.7. PERIDECT+ IOP+/RS485 I/O RS485 Module.....	17 -
3.8. PERIDECT+ IOP+/EXP I/O Expansion Module.....	17 -

1. Introduction – basic description of PERIDECT+

1.1. Purpose of the System

The PERIDECT+ perimeter detection system is intended especially for protection against trespassing into the secured area or property. The system can be fitted onto common fence types (such as traditional mesh fences, welded mesh in rolls, welded fence segments, fence superstructure), as well as non-standard fence types (metal board fences, decorative welded fences). Apart from the standard version, they are also made in more resilient design (the Antivandal version). They can also be installed inside poles of fence frames (the Hidden version). There are even more options available, such as a detector of the manipulation with photo-voltaic panels or combinations with various types of mechanical inhibition.

PERIDECT+ detects vibrations generated by mechanical stimulus that accompanies the trespassing attempts (climbing, cutting or crawling under the fence).

PERIDECT utilizes the so-called "differential logic" which significantly reduces false alarms caused by weather conditions (rain, wind, hail, lightning bolts) and enables operation under these conditions without need to manually or automatically adjust the system sensitivity settings.

1.2. System Topology

The system consists of basic components:

- CUP+ control unit
- LCP+ line controller
- DSP+ detection sensor

The system can be supplemented by additional elements according to the specific application:

- LIP+ line input (double input module)
- LPP+ line protection (overvoltage protection module)
- IOP+/LAN I/O LAN module (relay module with ETH interface)
- IOP+/RS485 I/O RS485 module (relay module with RS485 interface)
- LSP+ line separator
- IOP+/EXP 16 relay expansion module connectable to both IOP+/LAN and IOP+/RS485 modules

The detection is carried out by DSP+ detectors mechanically attached to the fence at the rate of one detector per one fence segment. The detectors contain a piezoelectric sensor with microprocessor signal processing. Each detector has its own address assigned within a detection line connected to one line module, which allows setting parameters of each detector individually. The accuracy of intrusion point detection when using PERIDECT+ is therefore per one DSP+ sensor.

The DSP+ detectors are connected to each other in parallel configuration, as well as to the line module.

It is possible to connect up to 500 addresses to one LCP+ line module. These addresses can be used by a combination of DSP+ or LIP+ modules.

LIP+ module provides two double-balanced inputs, whose states are distinguished by different values of balancing resistance for each input. These inputs allow connecting a different security device to the PERIDECT+ system (magnetic contact, IR or MW barrier etc.). LPP+ overvoltage protection module is installed on the line in order to increase the overvoltage resistance of the system. It is also possible to fit the line with insulator modules which allow for automatic disconnection of a specific part of the line that is experiencing technical problems in form of a lead in, a short circuit etc. Their fitting is especially appropriate for installations of circular or continuous connection design.

Being the core of the system, CUP+ unit is fitted with several auxiliary module ports. Directly on the CUP+ board, there are four OC outputs which can be configured freely. The number of outputs can also be expanded by IOP+/LAN or IOP+/RS485 modules via ETH and RS485 ports. These modules are equipped with relay outputs and can be used to connect the PERIDECT+ system outputs to inputs of equipment made by other manufacturers (security central, DVR etc.) while maintaining the galvanic separation of these systems.

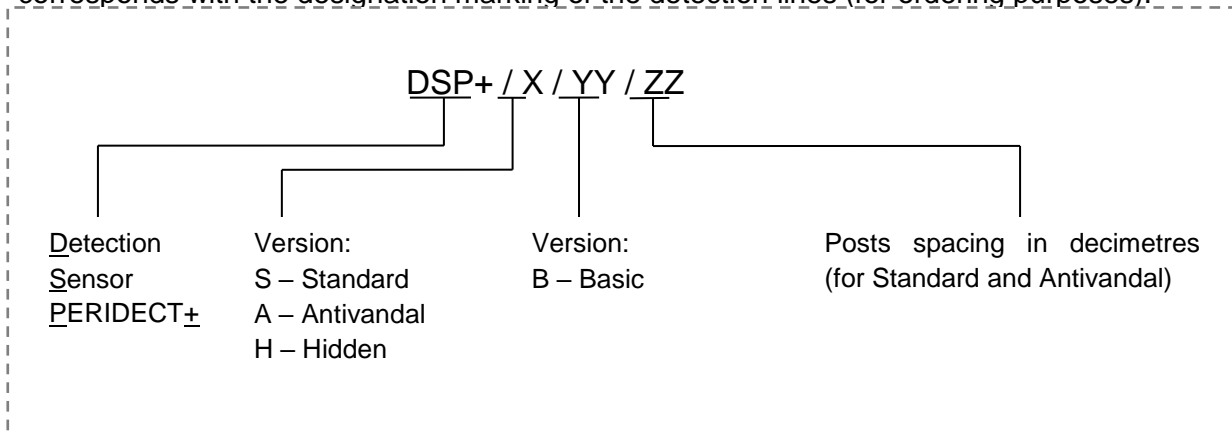
PERIDECT+ acts as a fully autonomous alarm system and its programmable outputs can be connected to common security centrals just like standard sensors. In this case, the detector groups are usually combined within the appropriate outputs and the system detects alarm situations based on individual, freely defined zones.

2. HW of the PERIDECT+ System

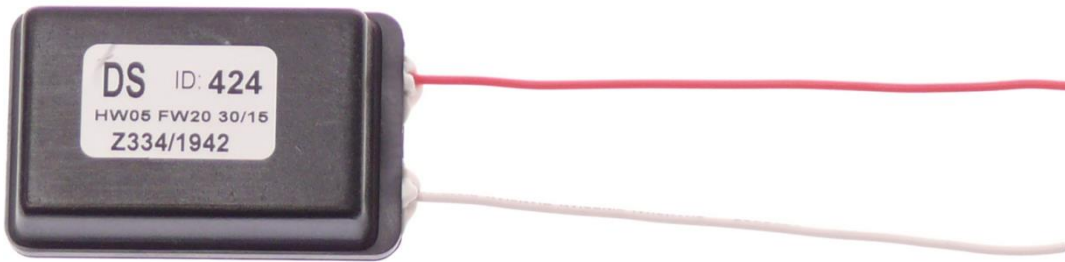
2.1. PERIDECT+ Detection Line

The detection line of the PERIDECT+ perimeter detection system consists of DSP+ detectors interconnected by a twin core cable. This cable is used as a power supply, as well as a digital data transfer line between the detectors and the evaluation unit.

The detection lines are made in three versions: Standard, Antivandal and Hidden. This corresponds with the designation marking of the detection lines (for ordering purposes):



DSP+ contains a sensor fitted in a protective casing. This sensor detects mechanical shocks of the fence via piezoelectric converters. The shocks are digitised, pre-processed by the sensor's microprocessor and delivered using digital sub transfer to the LCP+ module for further processing and finally to the CUP+ evaluation unit.



PERIDECT+ detection sensor

Marking of the PERIDECT+ detection sensor on the picture:

DS – type of detection sensor

ID : 424 – Sensor address (1 – 500)

30/15 – production date (week number and year)

Z334 – internal marking

1942 – internal marking

FW20 – firmware version

HW05 – hardware version

2.1.1. Standard Version

A basic detection perimeter version. The Standard version currently uses the same casing design as the Antivandal version. The detection sensor is placed in the detector casing that acts as a "roof" and therefore has to be installed using a cover with two screws that always point towards the ground.

The detectors are connected using a special twin-core cable of exterior design, i.e. a cable with coating resistant to UV radiation and outside environment.



The Standard version of detection perimeter always comes with pre-connected detectors. When ordering a detection line, it is necessary to define the posts spacing (a direct distance between the centre of one post to the centre of another). In case the pole spacing varies, the longest distance is used. This is used as a measure for cables in production, with an installation addition of approximately 40 cm added for turns at the detector and around the post.

For reasons of weight and dimensions of the detectors, the Standard version detection lines come in packages of maximum of 100 interconnected detectors. The delivered segments are connected at the installation site to make a complete perimeter. A detailed installation is described in chapter [2.1.4.](#)

2.1.2. Antivandal Version

This version features increased resistance to cable damage, e.g. being cut by the intruder or bitten apart by animals. The twin core cable is positioned in a stainless steel protection tube that secures the mechanical protection of the cable. The protection tube can also act as shielding in places with high-intensity electromagnetic interference (such as direct exposure to radar radiation).

Like the Standard version, the Antivandal version of detection line always comes with connected detectors. When ordering a detection line, it is necessary to define the posts spacing (a direct distance between the centre of one pole to the centre of another). In case the posts spacing varies, the longest distance is used. This is used as a measure for cables in production, with an installation addition of approximately 40 cm added for turns at the detector and around the post.



For reasons of weight and dimensions of the detectors, the Antivandal version detection lines come in packages of maximum of 50 interconnected detectors. The delivered segments are connected at the installation site to make a complete perimeter. A detailed installation is described in chapter [2.1.4](#).

Positioning of the sensors on the fence and connecting the perimeter segments is similar to the Standard version.

KE1128-C stainless steel tapes are used when installing the cables in the protection tube onto the fence. The tapes are attached using the M100 mounting pliers which are also equipped with a cutting device.



Prior to fixing using the stainless steel straps, it is recommended to fix the detection line cable with standard plastic fixing ties, followed by the steel ties.

2.1.3. Hidden Version

The Hidden version is designed for situations where it is necessary that the fence cannot be identified as security-protected. The detectors are installed inside the posts. Interconnecting cables in the protector are also led through the posts and underground in between the posts (alternatively on the foundation wall or the fence frame).

Installation of this solution is more demanding and the Hidden version does not come with interconnected detectors. The protectors with cables leading from one post to another have to be prepared prior to the installation. This can be done for new fences during their installation, but can turn out to be problematic for existing fences.

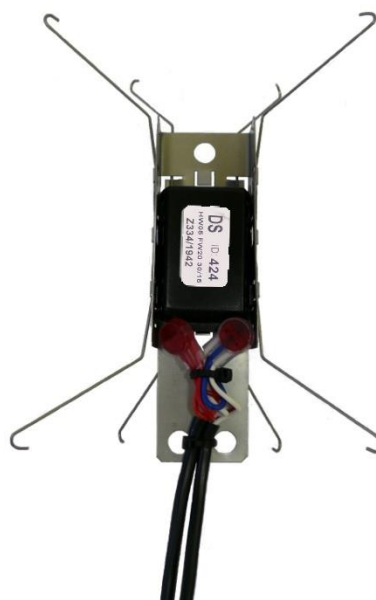
In some cases, a solution can be used for existing fences where the detectors are placed inside the poles and the cable is fitted on top of the fence. While the cables are not protected from potential damage anymore, they are not as noticeable and therefore less conspicuous (depends on the fence type and installation method).

In order to be able to be placed inside posts of different shapes and diameters, the detection sensor itself is attached to a sheet metal holder with springs (the so-called "bridge") that ensures its fixation inside the post. Sometimes it is appropriate to fasten the sensor holder (e.g. using an S-shaped wire – there is a hole in the holder for this purpose), so that it does not sink deeper inside the post over time. Additionally, a blind flange has to be used to enclose the hole in the pole so that the detector is protected from rain.

During installation, the cables are connected using UR2 gel couplings (see [2.1.4](#) connecting the line). The cable is secured against pulling out by fixing to the detection sensor holder using a binding strap at the bottom of the holder (there are two more holes for this purpose). There is a shaped shim on the other side of the holder which is bent to secure the detector from shifting. The third hole at the top is used to manipulate the holder inside the pole. We can provide an appropriate tool with a hook at the end that can be used to manipulate the detector inside the poles.



Detector holder for the Hidden version



Connection and securing of hidden detector cable

2.1.4. Installing the Line on the Fence

For the installation it is necessary to plan preliminary the detectors addressing as per the disposition of the object to be secured. The detectors are delivered with the addresses already in the lines with the maximum number of the detectors in one line according to the version of the product. The first and the last detector of the line have the ID number (address) stuck on the lid of the detector's casing. ID number of each detector from the production can be found out also inside the casing from the detector's description.

After placement the detectors are installed on the fence and the line is fastened. Afterwards it is necessary to connect the delivered sections into the detection line.

Single sections are connected by means of the gel connectors UR2 inside the protection cover of the end detectors. For the reliable execution of the connection we totally recommended to use only the special jaw crimping tool E-9Y or E9BM type.



E-9Y pliers, Scotchlok UR2 gel coupling and E-9BM pliers

The detector itself is fixed on the fence by four screws by means of the fastening clamp (totally 8 holes are prepared for the screws to be able to choose the most suitable openings in accordance with the type and execution of the fence). The detector is always placed in the middle of the single fence panel outside the tensioning wires of the fence. The cable is fixed to the fencing by the fastening ties after approximately each 25 cm (10 pcs. fastening ties between each two detectors) to avoid the impacts of the wiring to the fencing caused by the wind in order to reduce the probability of causing the false alarms.

Before connecting the line the outside black insulation is removed and inside wires including the coloured working insulation are inserted into the openings of the UR2 gel connector. One connector is used for the connection of red conductors, the second connector for the connection of the white conductors (or as the case may be with the blue one). The wires of the detector are inserted into the middle opening of the UR2 connector, the conductors of the cable into the side ones. We recommend swapping of detector's polarity periodically (e.g. swapping connection from red-red -> red-white and white-white -> white-red). Pressing by the jaw crimping tool E-9Y/E-9BM makes the connection of the conductors. Superfluous gel pushed out of the connector is removed and the visual check of the connection is executed. Correctly made connection has the red surface completely pressed parallel with the connector edge and all three conductors inserted inside the connector as to the stop.

Note: before connecting the lines in Standard version it is necessary to pass both cables through the bottom lid of the cover. Check the right position of the lid (smooth surface upwards, please see the picture 2)



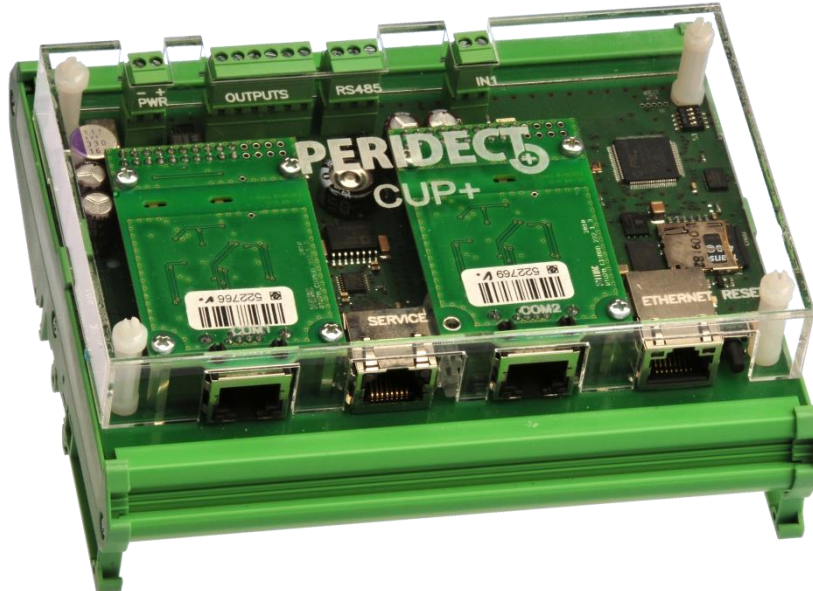
Detector placement and the method of running the cables across the fence



Inner arrangement of the detector

2.2. CUP+ - Control Unit PERIDECT+

The control unit processes the signals acquired from individual LCP+ line modules to which all DSP+ and LIP+ modules are connected. It evaluates the events of the individual detectors based on an internal algorithm and subsequently controls related actions, inputs switching, camera control and sending data into the SW superstructures.



CUP+ Control Unit

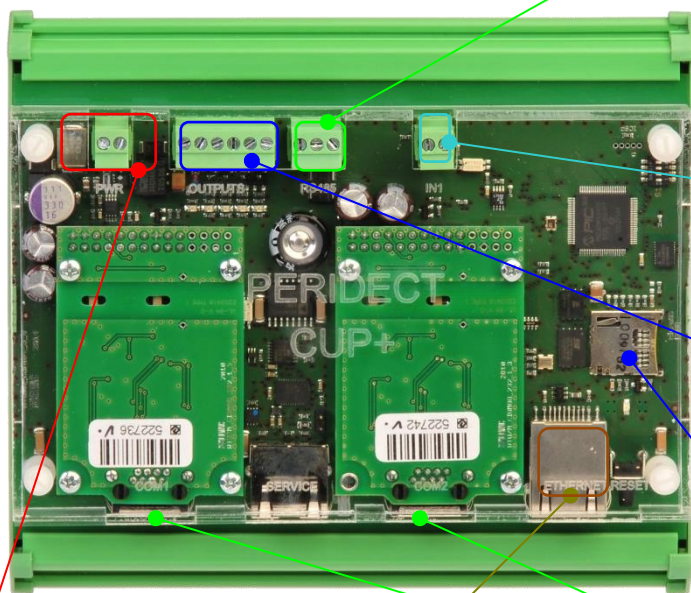
The CUP+ control unit is equipped with several external control and communication modules. There are OC-type outputs which are freely programmable and can be used for purposes such as basic system status indication. The outputs use semi-conductor switches. It is not recommended to use higher switching voltage than that used to power the CUP+ unit or current consumption exceeding 250 mA.

The evaluation unit is placed inside a plastic casing suitable for installation on a DIN rail. For exterior environment, it has to be provided with appropriate IP protection.



CUP+ top view

2.2.1. Connecting the CUP+ Terminal Board



Supply terminal board – supply voltage of 9 – 16 VDC

ETH connector – for connecting CUP+ to the data network, communicating with other elements in the data network, communication with other network elements, IOP/LAN, cameras using the Onvif protocol

RS 485 data line – brought out at two places in parallel: As a system connector for service interventions and onto the terminal board with screwed terminals for permanent installation. Just one line may be connected at a time.

Tamper terminal board – connection of external protective contact (tamper) from the assembly box or another cover, NC contact

Terminal board – output connection, utilizes the shared terminal connection

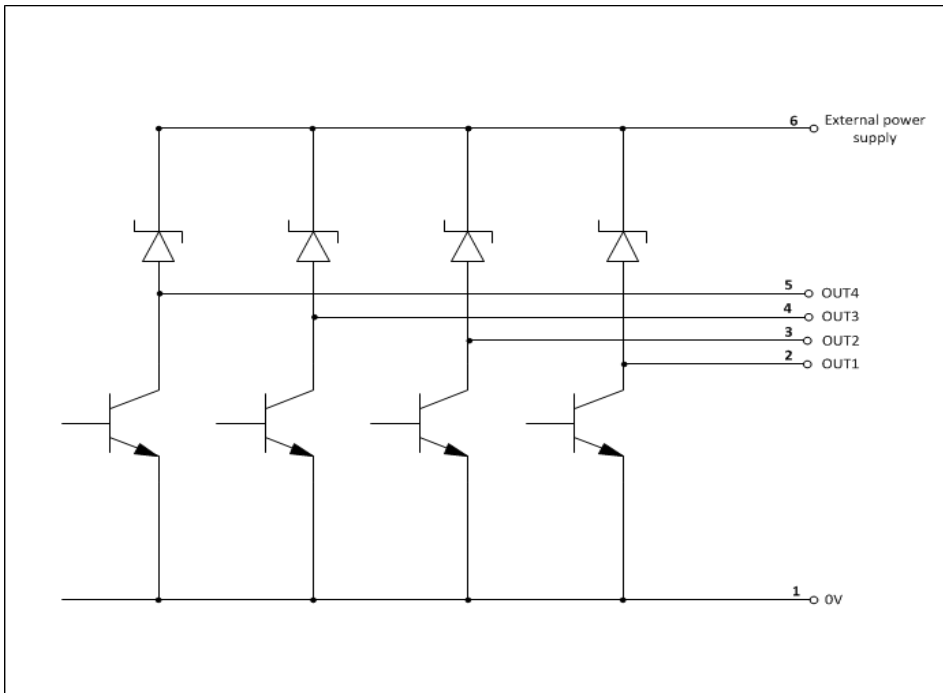
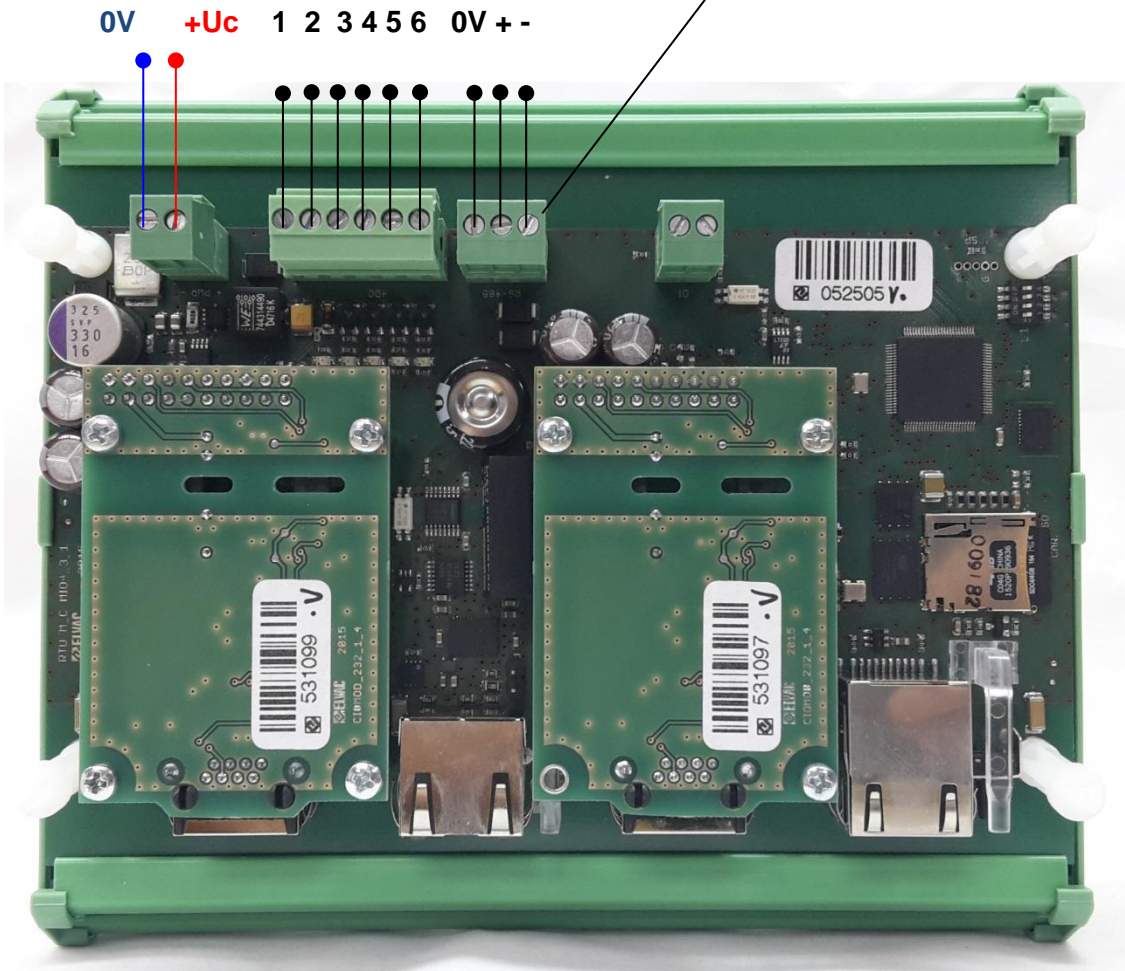
Micro SD slot – memory card slot for purposes of saving logs, configuration etc.

RS 232 data line – used for connection of the LCP modules, it is possible to use standard UTP patchcord

UC – power voltage
9 – 16V DC

Output terminals, for detailed
connection see picture below

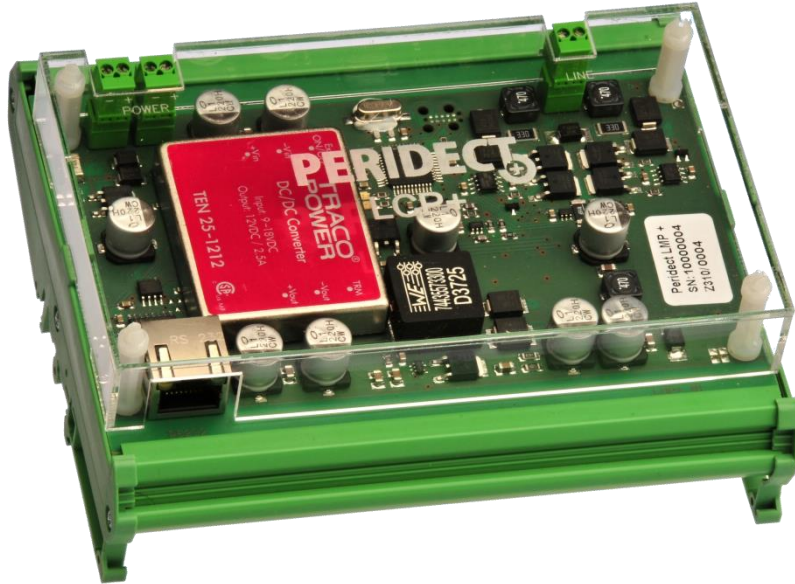
RS485



Schematic internal connection of CUP+'s outputs and their assignment to connectors

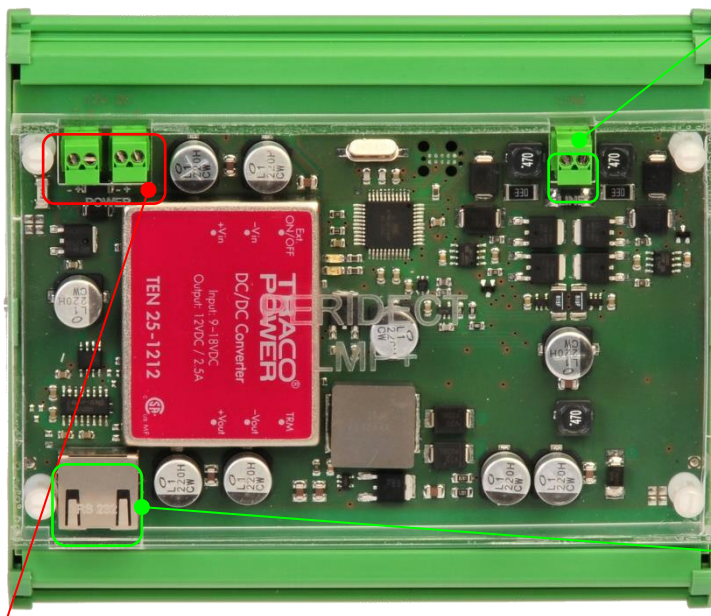
2.3. LCP+ - Line Controller PERIDECT+

LCP+ line controller creates a communication interface for all line modules. This line is used for both powering and communication of the modules. The communication is carried out based on the principle of regular query where LCP+ receives information from individual modules of the line to process them and send the results to the CUP+ control unit using the RS232 serial interface.



LCP+ Line Controller

2.3.1. Connecting the LCP+ Terminal Board



Data line – used for connection and communication with all line types of the modules. The bus has no polarity, meaning the modules can be wired in any way.

RS232 connector – used for connection and communication with the CUP+ control unit. It's possible to use standard UTP patchcord.

Supply terminal board – supply voltage of 9 – 16 VDC

2.3.2. LED Signalling of CUP+ and LCP+

Flashing yellow led on the CUP+ indicates the processor is running and all the internal processes of the unit are operating properly.

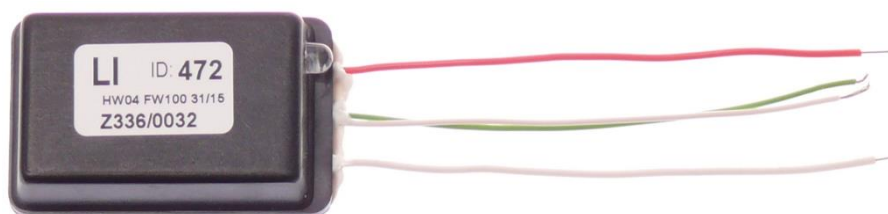
Flashing green led on the LCP+ indicates the processor is running and all the internal processes of the module are operating properly.

Flashing red LED on the LCP+ module indicates communication via the RS232 bus. It also flashes during the query period when communicating with the CUP+ unit. After turning the power supply on, both LEDs of the LCP+ module light up simultaneously for 2 seconds. This brief operation mode is intended for service purposes.

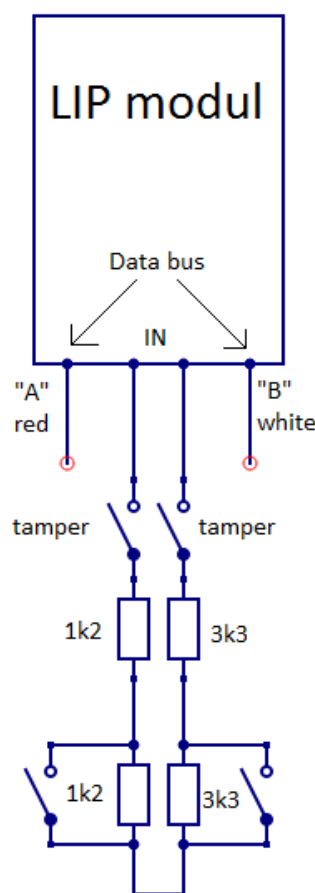
2.4. LIP+ - Line Input PERIDECT+

The input module is used for connecting an external device positioned on the detection perimeter.

The LIP+ module has two double-balanced inputs (the first input is equipped with balancing resistors of 2 x 1.2 kΩ, the second one is fitted with 2 x 3k3 resistors). They are connected parallel to the detection line at any point of its length. The identification of the LIP+ module is defined using its address.



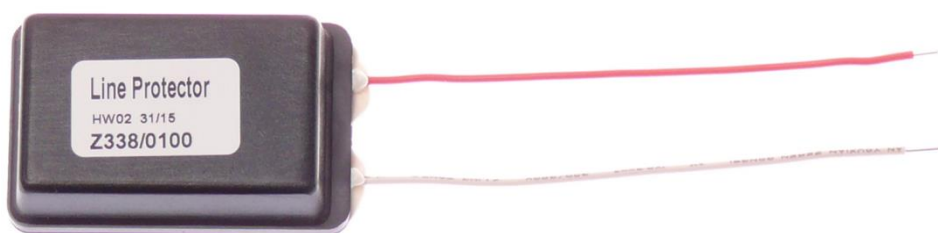
In practice, the input can be used for devices such as a magnetic contact at the gate used to indicate whenever it is opened. Other examples include an IR gate or a microwave barrier above the gate or in the perimeter area that cannot be protected by fence.



LIP+ module Schematic drawing of inputs connection

2.5. LPP+ - Line Protection PERIDECT+

LPP+ overvoltage protection looks like a standard detector and uses the same casing. It is used to increase the resistance to electromagnetic field and surge peaks such as those caused by lightning bolts. It contains a set of elements that limit the potential voltage interference peak between the conductors of the bus.

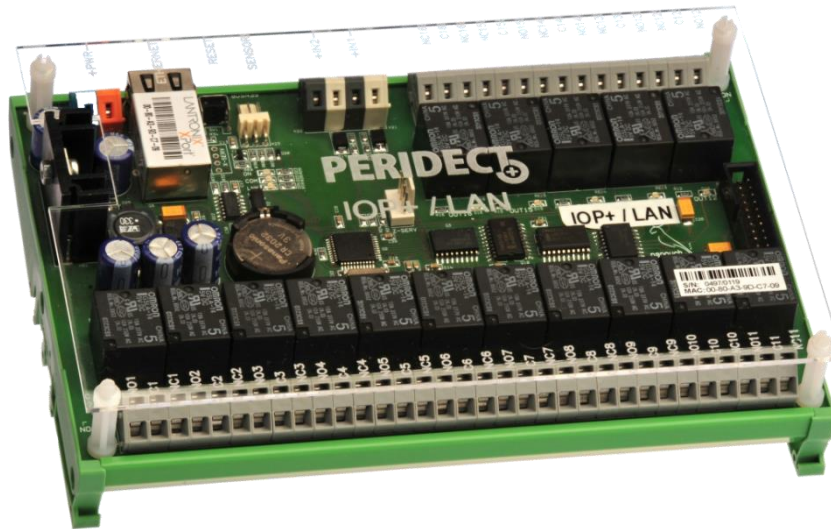


LPP+ Overvoltage Protection Module

The overvoltage module should be installed in regular span along the whole detection line. A detection line of maximum length should be fitted with 15–25 modules.

2.6. The IOP+/LAN/RS485 I/O Module of PERIDECT+

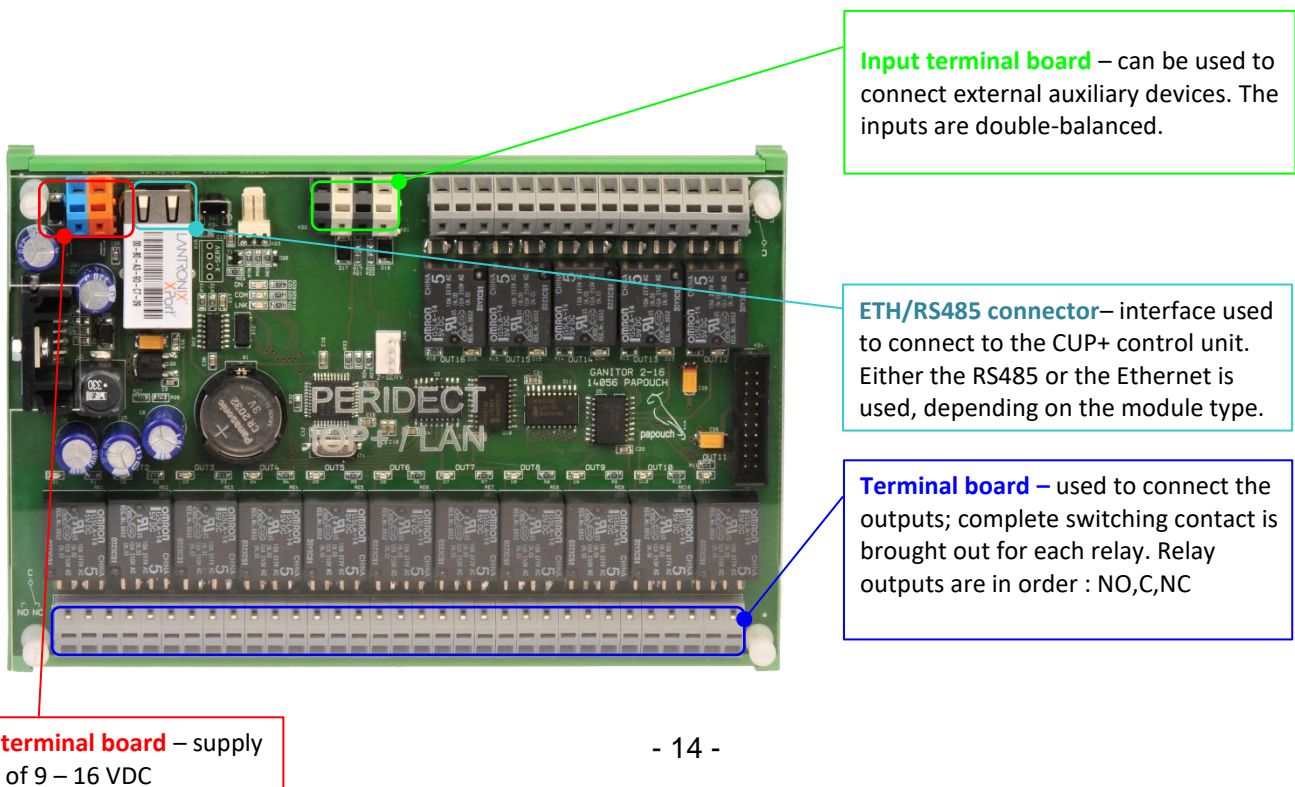
An output module used to control external devices, as well as indicate malfunction or alarm statuses. The evaluation unit sends commands via the RS485 or ETH interface, depending on the design of the output module. Each module is also provided with a couple of balanced inputs. Those can be used to connect external devices such as magnetic contacts, motion detectors etc.



IOP+ Output Module

The output module is placed inside a plastic casing suitable for installation on a DIN rail. For outside environment, it has to be provided with appropriate IP protection.

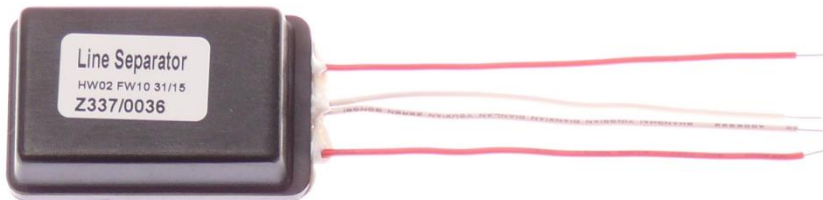
2.6.1. Connecting the IOP+ Terminal Board



Supply terminal board – supply voltage of 9 – 16 VDC

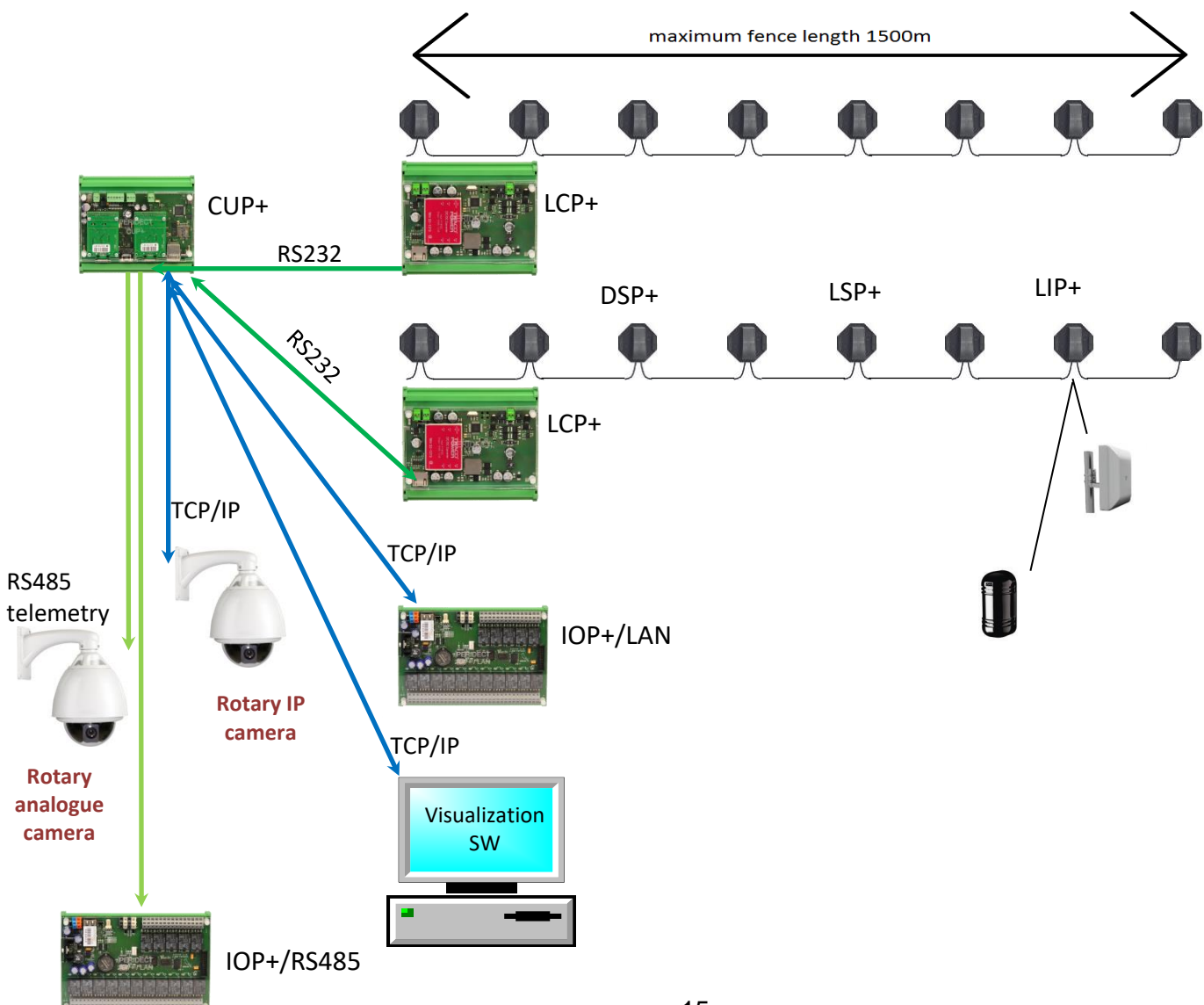
2.7. LSP+ – Line Separator PERIDECT+

The line separator is placed in the same casing as the detector. Its purpose is to separate/disconnect a part of the line that experiences a change in terms of electrical wiring parameters such as short circuit, lead-in etc. The part is disconnected by insulators while the rest of the line remains operational. This is why the insulator is equipped by two pairs of cable outlets. These are both equal, no need to distinguish the inlet from the outlet. The line separators feature a built-in overvoltage protection. That means that as long as there are separators fitted within a line, it is fine to only provide enough overvoltage protection modules to satisfy the rule of 15 – 25 LPP modules per line.



LSP+ Line Separator

2.8. Block Diagram of the System



3. Technical Specification of PERIDECT+

3.1. CUP+ Control Unit PERIDECT+

Supply voltage: 9 – 16 VDC
Consumption: 160 mA
Operational temperature range: -40°C to +80°C
Inputs: 1x tamper contact
Outputs: 4x open collector type
Protection: IP20
Dimensions: 150 x 100 x 40 mm

3.2. LCP+ Line Controller PERIDECT+

Supply voltage: 9 – 16 VDC
Consumption: 60 mA (350 mA at full DSP+ capacity)
Default line voltage: 24V (36V when on or exceeding 1,5km of detection line)
Operational temperature range: -40°C to +85°C
Protection: IP20
Dimensions: 150 x 100 x 40 mm

3.3. LIP+ Line Input PERIDECT+

Power supply: powered by the line controller bus
Consumption: 2 mA max.
Operational temperature range: -40°C to +85°C
Inputs: 2x double-balanced (balancing resistors of 2 x 1k2 and 2 x 3k3)
Electronic elements protection: IP65
Dimensions: 50 x 30 x 20 mm (outer casing 110 x 110 x 40 mm)

3.4. DSP+ Detection Sensor PERIDECT+

Power supply: powered by the line controller bus
Consumption: 2 mA max.
Operational temperature range: -40°C to +85°C
Electronic elements protection: IP65
Dimensions: 50 x 30 x 20 mm (outer casing 110 x 110 x 40 mm)

3.5. LSP+ Line Separator PERIDECT+

Power supply: powered by the line controller bus
Consumption: typically 1 mA
Operational temperature range: -40°C to +85°C
Electronic elements protection: IP65
Dimensions: 50 x 30 x 20 mm (outer casing 110 x 110 x 40 mm)

3.6. PERIDECT+ IOP+/LAN I/O Module

Supply voltage: 9 – 16 VDC

Consumption: 120 mA (620 mA at all relays switched on)

Operational temperature range: -25°C to +60°C

Protection: IP20

Dimensions: 190 x 130 x 50 mm

In case of connecting Expander module, it is necessary to connect it ONLY when the IOP module is powered off.

3.7. PERIDECT+ IOP+/RS485 I/O RS485 Module

Supply voltage: 9 – 16 VDC

Consumption: 120 mA (620 mA at all relays switched on)

Operational temperature range: -25°C to +60°C

Protection: IP20

Dimensions: 190 x 130 x 50 mm

In case of connecting Expander module, it is necessary to connect it ONLY when the IOP module is powered off.

3.8. PERIDECT+ IOP+/EXP I/O Expansion Module

Consumption: The consumption of IOP+/LAN or IOP+/RS485 is increased by 50 mA when the relays are off and by 500 mA when all the relays are on

Operational temperature range: -25°C to +60°C

Protection: IP20

Dimensions: 140 x 130 x 50 mm