

20G
2X.1.24.F
2X.1.16.F

Industrial Managed Switches

802.1X

VLAN

RSTP

SNMP

IGMP

REV-202303

20G
2X.1.24.F
2X.1.16.F



20G-2X.1.24.F-POE-UNIT/1U

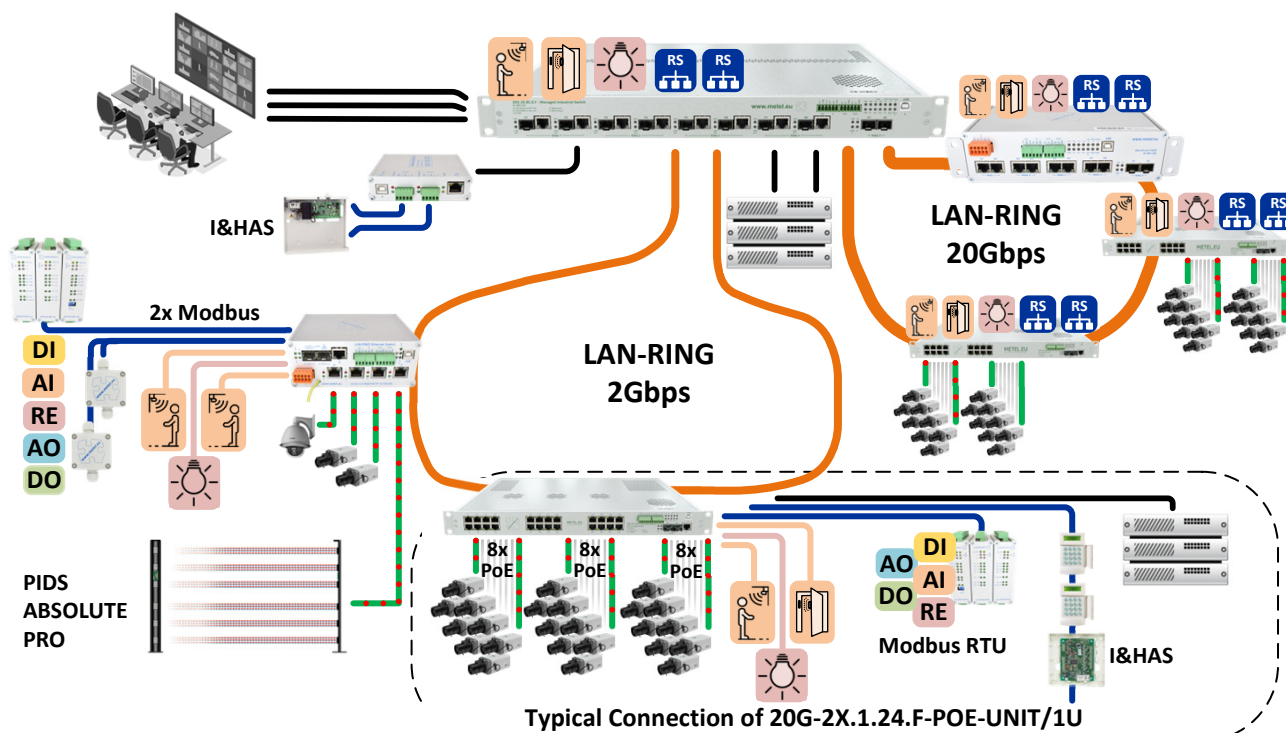


20G-2X.1.16.F(C)-POE-UNIT/1U

- ❖ 2x SFP+ Slot 10 GBASE-R / 1000 BASE-X
- ❖ 1x RJ45 Port 10/100/1000 BASE-T
- ❖ 24(16)x RJ45 Port 10/100 BASE-T
- ❖ 30W PoE on 24/16/8 ports^(see tab.)
- ❖ 2x Bus RS485 / Modbus-RTU
- ❖ 2x Digital/Alarm Input
- ❖ 1x Programmable Relay Output
- ❖ 3x Independent Supply Inputs
- ❖ Redundant Topology LAN-RING, RSTP
- ❖ Overvoltage Protections 30A (8/20μs)
- ❖ Event Management: IP Watchdogs, HTTP/ONVIF client, ETH/TCP Events Modbus, DI/relay/alarm loops...
- ❖ VLAN, QoS, SNMP, SMTP, STNP, IGMPv1/2, RSTP, LLDP, 802.1X
- ❖ Operating Range -30°C to +50°C

| PRODUCT NAME | CODE | | INPUT 230VAC (Internal Supply PoE) 10 - 60VDC | | INPUT | |
|---|-----------|---------|--|-------|--------|---|
| 20G-2X.1.24.F-POE-320-UNIT/1U | 1-990-411 | | 1x 320W | | 2x | |
| 20G-2X.1.24.F-POE-750-UNIT/1U | 1-990-413 | | 1x 750W | | 2x | |
| 20G-2X.1.16.F-POE-320-UNIT/1U | 1-991-411 | | 1x 320W | | 2x | |
| 20G-2X.1.16.F-POE-750-UNIT/1U | 1-991-413 | | 1x 750W | | 2x | |
| 20G-2X.1.16.FC-POE-320-UNIT/1U | 1-992-411 | | 1x 320W | | 2x | |
| Holders for mounting in a 19" cabinet are included. | | | | | | |
| AVAILABLE PORTS: | SFP+ | GE | FE (PoE) DI/BI | RELAY | RS485 | |
| 20G-2X.1.24.F-POE-x-UNIT/1U | 2 | 1 | 24(24) | 2 | 1 | 2 |
| 20G-2X.1.16.F-POE-x-UNIT/1U | 2 | 1 | 16(16) | 2 | 1 | 2 |
| 20G-2X.1.16.FC-POE-x-UNIT/1U | 2 | 1 | 16(8) | 2 | 1 | 2 |
| ACCESSORIES | CODE | POWER | INPUT | | OUTPUT | |
| M-PPS-230/55-750 | 4-100-201 | 750W | 90 ~ 264VAC | | 55V | |
| M-PPS-230/55-750R | 4-100-202 | 2x 750W | 2x 90 ~ 264VAC | | 2x 55V | |

Two optical SFP+ 1/10 Gbps ports, a gigabit uplink and up to 24 ports with PoE predetermine these L2 switches for use in large security systems. RS485 buses, digital inputs and relays increase the added value of the switches. In addition to data transmission, I&HAS systems can also transmit data to Modbus RTU devices. Furthermore, they allow the connection of tampers, PIR sensors, they can control el. locks and have a number of other possible applications in building automation systems.



LEGEND:

10 GBASE-R
1000 BASE-X
1000 BASE-T

10/100BASE-T + PoE
Modbus RTU, I&HAS

DI Digital Input
AI Analog Output
RE Relay Output

AO Analog Output
DO Digital Output

2x SFP+ Slot 10 GBASE-R / 1000 BASE-X

Switches have 2x SFP+ slot universally usable both for SFP modules METEL (tab on the right) and for SFP modules of other manufacturers. The main advantages of METEL SFP modules are:

- bidirectional CWDM data transmission over one fiber
- used components with a range from -40 to +85°C
- SM / MM universal for gigabit module
- minimum warranty period 5 years


| ORDER NAME | CODE | CONNECTOR | RANGE ⁽¹⁾ |
|--|-----------|-----------|----------------------|
| BX-1000-20-W4-L | 4-101-120 | SC / PC | 20 / 2 km |
| BX-1000-20-W5-L | 4-101-110 | SC / PC | 20 / 2 km |
| BX-1000-60-W4-L | 4-101-122 | SC / PC | 60 / 0 km |
| BX-1000-60-W5-L | 4-101-112 | SC / PC | 60 / 0 km |
| BX-10G-20-W4 | 4-101-220 | LC / PC | 20 / 0 km |
| BX-10G-20-W5 | 4-101-210 | LC / PC | 20 / 0 km |
| ⁽¹⁾ singlemode (9/125µm) / multimode (50/125µm) | | | |

1x Gigabit Ethernet Port

The Gigabit Ethernet port supports 10BASE-T, 100BASE-Tx, 1000BASE-T standards, including Auto negotiation and MDI/MDI-X. To increase reliability, the port is equipped with surge protection.

24(16)x Fast Ethernet Port with PoE up to 30W per Port


Fast Ethernet ports support 10BASE-T, 100BASE-T standards including Auto negotiation, MDI/MDI-X and PoE 802.3af/at standards up to 30W per port. The distribution of PoE power to individual ports is set in the Simuland.v4 application. The ports are protected by surge protection with an efficiency of up to 30A to increase reliability.

 **The total PoE power consumption is limited to 300 or 700W, depending on the type of switch.**

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2x RS485/Modbus-RTU Bus

The switches are equipped with two RS485 buses enabling the connection of Modbus RTU IO modules and sensors, selected types of I&HAS systems and other devices.

 **I&HAS system bus transmission meets the requirements of EN50131-1. There are 2x 10-60 VDC inputs available for power backup from the I&HAS system power source.**

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2x Digital/Alarm Inputs

Digital/alarm inputs are mainly used for connecting button tampers, PIR sensors and so on. SIMULand management software allows them to be used to set up a range of automatic actions. In addition, the inputs are monitorable via the SNMP protocol.

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1x Programmable Relay Output

Programmable relay output is used to signal faults (eg open circuit), control el. locks, contactors and signaling elements. In addition, the relay can be controlled from software superstructures, IPLOG PLC SNMP or MODBUS protocol, or EVENT MANAGENT switches.

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3x Independent Power Input

The switches include 3 independent power inputs. All variants have 2 inputs 10 to 60VDC for connecting an external source and one 230VAC input with internal 55VDC sources with a power of 320 or 750W for powering the switch, including PoE support.

Typical use of external power inputs

- Connection of the I&HAS system power source during the transmission of I&HAS buses.
- Connection of 1-2 backup power supplies 55VDC series M-PPS-230/55-750.

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LAN / USB Management

In addition to secure LAN management, each LAN-RING switch has a USB-A connector for local management via the SIMULand application. The USB connector also allows you to reset the switch to factory settings. The inputs are protected against overvoltage.

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Technical Parameters

Compatibility

| | Parameter | Value | Unit | Note |
|---|------------------------------|---|------|--------------------------------|
| Switching Capacity | Throughput | 44,8 / 43,2 | Gbps | 24p / 16p |
| | Processor | Marvell (USA) | | |
| 10GE/GE Ports | Count | 2 | | |
| | Supported Formats | 10 GBASE-R / 1000BASE-X | | |
| | Connector | SFP+ Slots | | |
| GE Port | Count | 1 | | |
| | Supported Formats | 10BaseT, 100BaseTx, 1000BaseTx | | |
| | Overvoltage Protection | 30 | A | 8/20μs |
| | Connector | RJ45 | | |
| FE Ports | Count | 24(16) | | 20G 2X.1.24(16).F |
| | Supported Formats | 10BaseT, 100BaseTx | | |
| | Overvoltage Protection | 30 | A | 8/20μs |
| | Connectors | RJ45 | | |
| | PoE Standards | IEEE802.3af, IEEE802.3at | | |
| | Max. PoE power 1port | 30 | W | |
| Management | SNMPv3 | SIMULand application with GUI for mass management of devices and projects | | |
| RS485 | Count | 2 | | Modbus RTU |
| | Speed | Max. 115,2 | kbps | |
| | Overvoltage Protection | 600W | W | 10/1000μs |
| Digital Inputs | Count | 2 | | |
| | Mode | Digital- NC / NO | | |
| | | Analog 0 - 30kΩ (for connecting balanced PIR sensor loops) | | |
| | Overvoltage Protection | 600W | W | 10/1000μs |
| Relay Output | Type of Contact | 1x Change-over | | |
| | Max. Load | 62.5VA (30W) / 1A / 60V | | Resistive Load |
| 230V Power Input 1 | | | | |
| | Rated input voltage | 230 | VAC | |
| | Input Voltage Range | 90 - 264 | VAC | |
| | Connector | IEC 60320 C15 | | |
| | Variants xxx-320-xxx | The input is connected to an internal 320W / 50VDC power supply | | |
| | Variants xxx-750-xxx | The input is connected to an internal power supply 750W / 50VDC | | |
| Power Input 2 and 3 | | | | |
| | Input Voltage | 10 - 60 | VDC | With PoE 48 - 57 VDC / max.16A |
| | Connector | WAGO 734-205 | | |
| | Power Consumption | Max. 20 | W | Max. 320/750 W include PoE |
| | Consumption for backup I&HAS | Max. 15 | W | |
| | Overvoltage Protection | 1500 | W | 10/1000μs |
| Environment | Operational Range | -30...+50 | °C | Temperature of Environment |
| | Storage Range | -30...+70 | °C | |
| | Humidity | Max. 95 | % | Non-condensing |
| | Weight | 4.62 / 5.36 | kg | 320 / 750 |
| Planned Certification | | CE, TUV | | |
| The producer retains the right to change any technical parameters without previous written or published notification. | | | | |

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VLAN

RSTP

SNMP

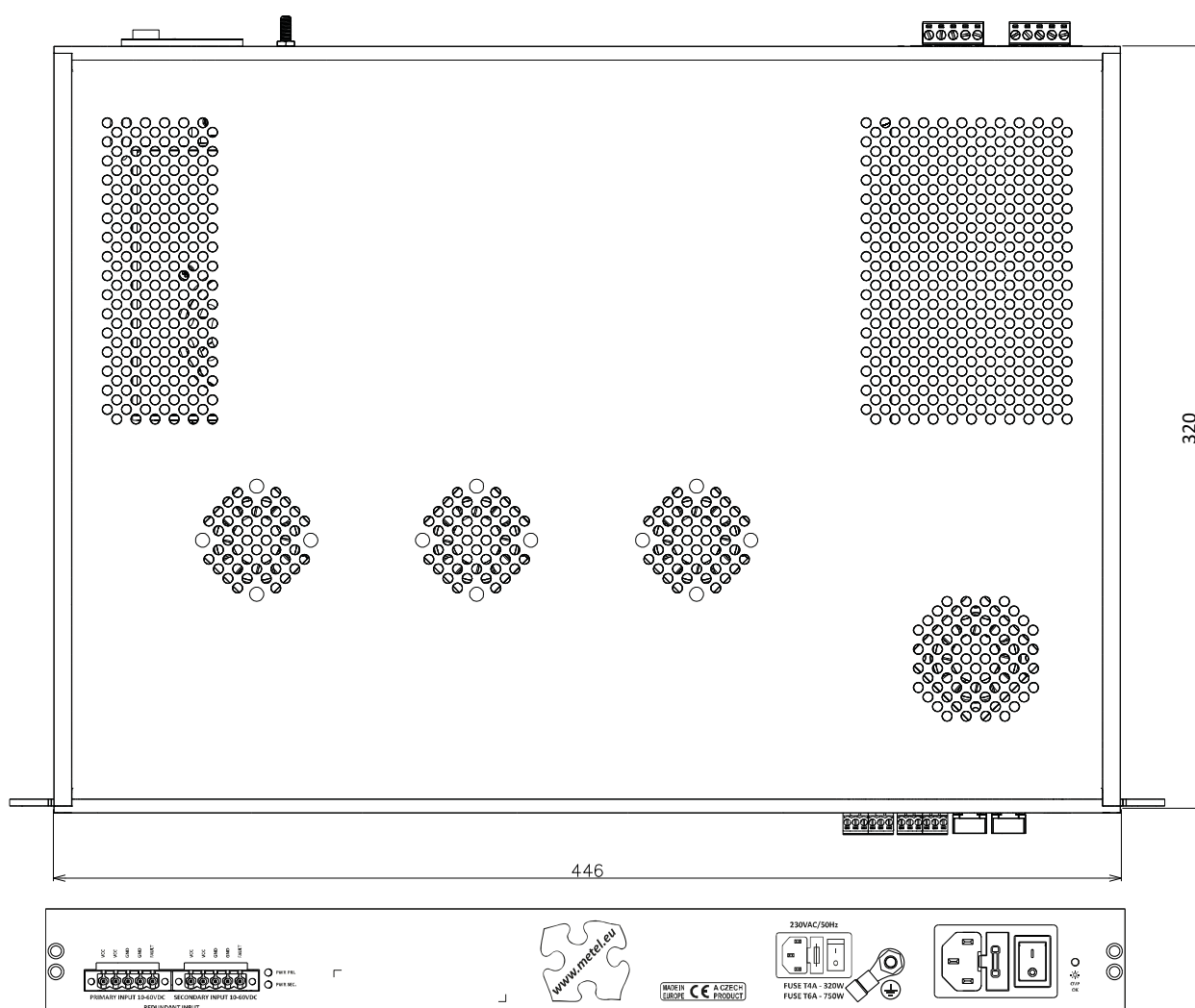
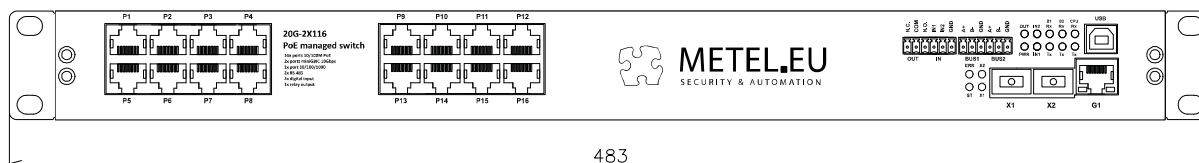
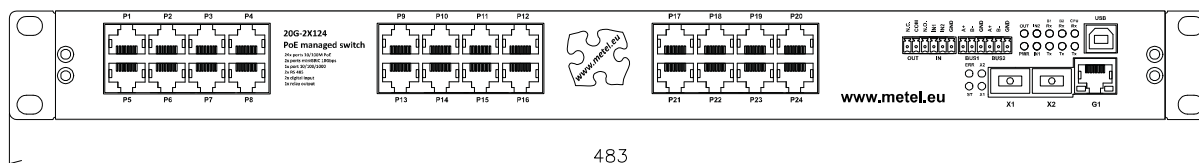
IGMP

REV-202303

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Dimensions 20G-2X.1.24(16).F-UNIT/1U

Universality



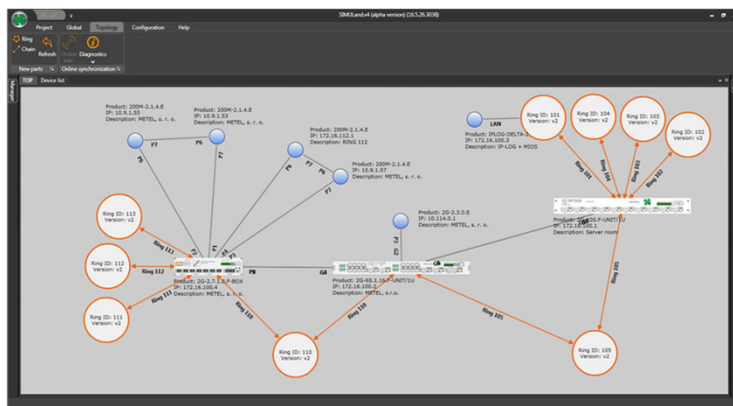
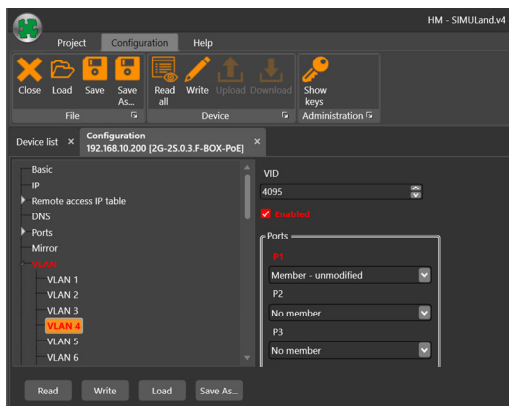
Accessories Supplied with the Switch

- 1x Quick Installation Manual
- 1x Power cable 2m, plug type E / F / straight female connector IEC C13 to 10A
- 2x Supporting side bar

REV: 202212 – Series production
202303 – Correction of the table of RS485 modes, deleted external power supply M-PPS-230/55-320

SIMULand.v4 - Configuration Software with GUI

SIMULand.v4 is a freeware software for configuring all LAN-RING devices. It excels in intuitive GUI and advanced tools for efficient management of even very large systems.



- ❖ Online / Offline configuration of all LAN-RING devices in the GUI
- ❖ Automatic search for available devices on the LAN
- ❖ Automatic detection and rendering of system topology
- ❖ USB console for local device management
- ❖ Download menu for bulk downloads of configurations from device to SIMULand
- ❖ Upload menu for bulk uploads of the prepared configurations to the devices
- ❖ Encrypted communication protected by a hash algorithm
- ❖ SIMULand includes firmware for upgrading all supported devices
- ❖ In the Status menu, you can monitor the operating status of the device online
- ❖ Quick config for accelerated PoE configuration, IP address assignment ...
- ❖ Access to the device log

SIMULand.v4 is a Windows desktop software with a GUI for bulk configuration of LAN-RING devices in Online, Offline or USB mode. It also includes a number of tools for network communication analysis, including fully automatic detection of network topology with display of optical and metallic connections, amount of transmitted data in Mbps in connections, number of dropped packets on ports, PoE status, power status, input/outputs/ports status.

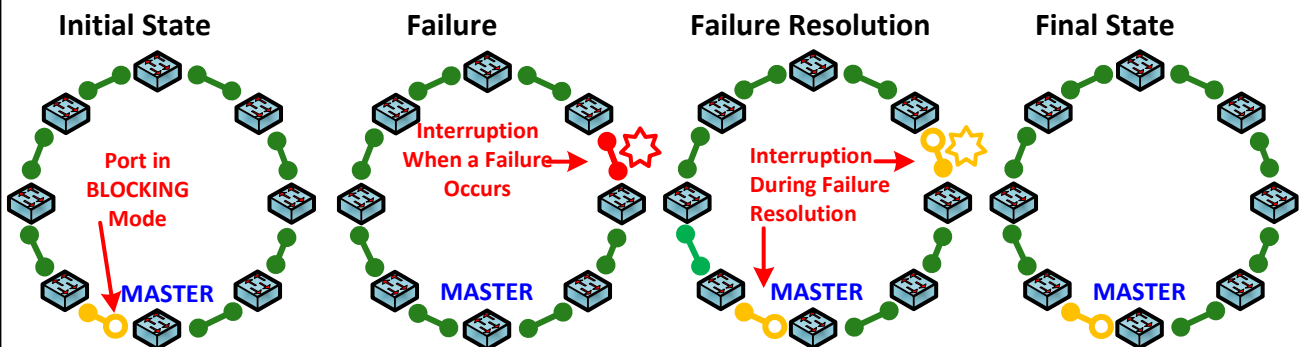
| SYSTEM REQUIREMENTS | |
|--|---|
| Operating system | Windows 8, 10 – 32/64bit |
| Monitor | Full HD |
| Processor | Intel Core 2 DUO 2GHz / AMD X2 2GHz or faster |
| RAM | 2GB or more, depending on the size of the project |
| Language versions | CZ, EN PL, UA |
| The manufacturer reserves the right to change technical parameters without prior notice. | |

| LIST OF SUPPORTED DEVICES | | | | |
|--|---|---|---|--|
| BB-x.x.x-22 200M-1.0.4.E-W4 200M-1.0.4.E-W4-PoE+ 200M-1.0.4.E-W5 200M-1.0.4.E-W5-PoE++ 200M-2.0.1.E 200M-2.0.4.ECA 200M-2.0.4.ECB 200M-2.1.0 200M-2.1.0.E 200M-2.1.4 200M-RS.E4 200M-RS.E5 200M-EVA 200M-EVA8 200M-ADAM 200M-ADAM8 | 2G-0.1.4 2G-0.1.4.E 2G-0.1.8.E 2G-0.1.8.EC 2G-1.0.4.E-W4 2G-1.0.4.E-W4-PoE++ 2G-1.0.4.E-W5 2G-1.0.4.E-W5-PoE++ 2G-2.0.1.E 2G-2.0.4.ECA 2G-2.0.4.ECB 2G-2.1.0 2G-2.1.0.E 2G-2.1.0.EBT 2G-2.1.4 2G-RS.E4 2G-RS.E5 | 2G-RS.E6 RING-IO LAN-485 200M-2.1.4.E 200M-2.1.4.E ++ 2G-2.1.4.E 2G-2.1.4.E ++ 2G-2.1.7.E 2G-2.3.0.E 2G-6S.1.16.E 2G-6S.1.16.F-UNIT/1U, 2G-10S.F-UNIT/1U 2G-2S.0.3.F-BOX-PoE 2G-2S.0.3.F-BOX PoE(M-PoE) 2G-2S.0.3.FC-BOX 2G-2S.3.0.F-BOX 2G-2S.0.2.F-BOX-PoE | 2G-2S.0.2.F-BOX-PoE 2G-2S.0.2.F-BOX-PoE-PP 2G-2S.1.4.F-BOX 2G-2S.1.4.F-BOX-PoE-PP 2G-2.7.1.0.F-BOX 2G-2C.0.8.F-BOX-PoE-PP 2G-1C.0.8.FC-BOX-PoE-PP 2G-2C.8S.0.0.F-BOX 20G-2X.8.0.F-BOX miniLAN-232 miniLAN-485 IPLOG-DELTA-1 IPLOG-DELTA-2 IPLOG-DELTA-3 IPLOG-DELTA-1-Geuteb. IPLOG-DELTA-1-Eza IPLOG-DELTA-1-Redwall | IPLOG-DELTA-1-Elfar IPLOG-DELTA-1-R62 IPLOG-DELTA-1-Peridect IPLOG-DELTA-3-Peridect IPLOG-DELTA-3-Valert IPLOG-DELTA-VoIP IPLOG-DELTA-2-GSM IPSEN-D6 IPSEN-D16 IPSEN-H2O IPSEN-T1 IPSEN-TH1 IPSEN-BL8I IPSEN-BL8O |

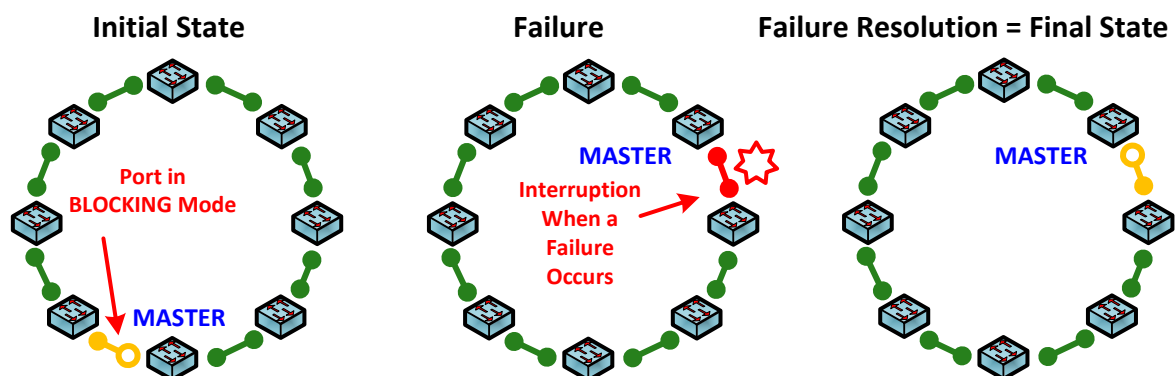
Redundant Topology

LAN-RING for Ring Topology

One of the fundamental elements of the security system LAN-RING is fast data forwarding to a back-up line. Since 2008, this function has been performed by LAN-RING.v1 protocol with a switchover time of 30ms from the failure. Each ring in the system has a unique ID and one switch with the MASTER function (controls the ring). The higher port of the MASTER switch is normally set to a BLOCKING mode, hence preventing a loop. A port in BLOCKING mode receives only LAN-RING frames and blocks the other data (back-up line). If a failure occurs, the state of the blocked port changes to FORWARDING and starts to transmit all data.



During the failure creation and resolution, there are 2 short interruptions in the route. The second interruption provides the switchover from the back-up line back to the MASTER switch. Since the end of 2014, a new innovative version of LAN-RING.v2 is available. The switch which has the MASTER function which controls the ring. In the case of a failure, the MASTER function moves to the switch next to the failure. From the origin of the problem to the time of its removal, only one interruption occurs of up to maximum of 30ms.

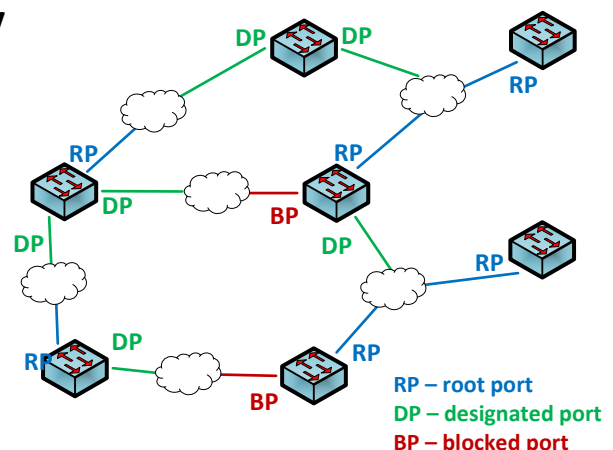


The switchover time to the back-up line is for LAN-RING protocols slightly dependent on the number of switches connected in the ring. With each switch connected to the ring, the reconfiguration time increases by only about 6µs!

RSTP and RSTP-M for MESH Topology

The RSTP-M protocol is a time-optimized version of the general RSTP protocol with which it is backward compatible. In addition, it meets the requirements of safety and automation systems to quickly secure a backup route in the event of a fault and:

- ❖ is fully compatible with RSTP according to IEEE 802.1D-2004
- ❖ supports MESH topology
- ❖ reduces reconfiguration times to a minimum



Event Management - Overview

The LAN-RING industrial switch software includes the Event Management tool set in the Extension menu. The user can set up to 64 automatic actions. The event management switch is also able to communicate directly with the PLC IPLOG where the control program written in the FBD, LD, ST or IL language described in IEC 61131-3 is running. Event management has the potential to significantly increase the value of your system and customize the system to the customer's requirements.

Examples of Automatic Actions

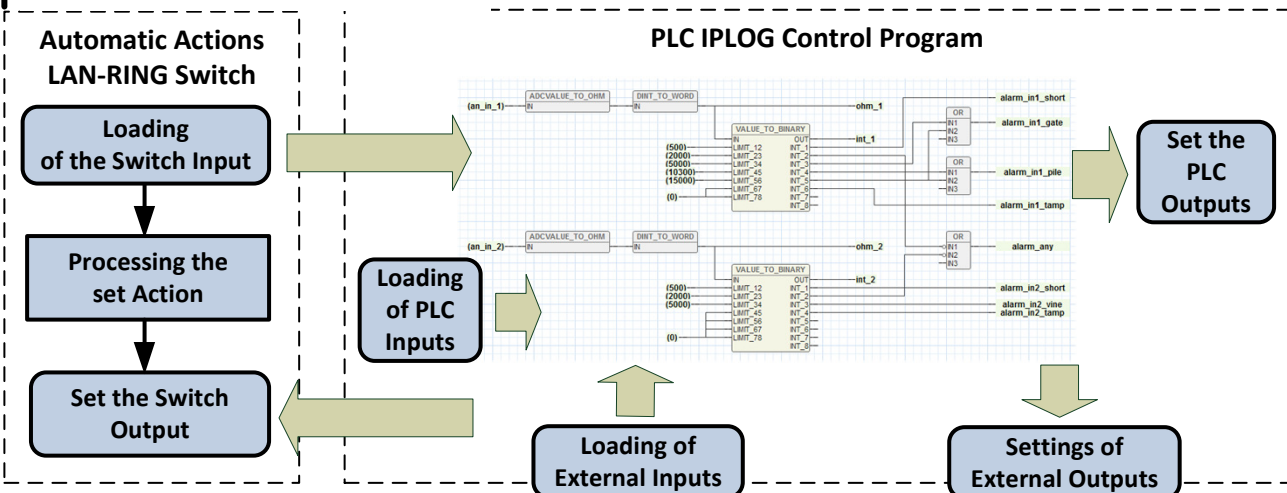


Available Inputs and Outputs

A unique set of tools in the EXTENSION menu of LAN-RING switches and monitoring units IPLOG allow you to set a whole range of automated actions independent of external software. The table below provides an overview of supported inputs and outputs that can be used to set automatic actions.

| NAME | TYPE | NOTE |
|--------------------|---|--|
| MODBUS RTU/TCP | INPUTS and OUTPUTS (DI, AI, BI, RE, AO, DO, BO) | Up to 16 IO Modules and Sensors on RS485 Bus |
| LOCAL IO | INPUTS and OUTPUTS (BI, DI, RE) | Local Inputs and Outputs LAN-RING Switches |
| ETHERNET EVENTS | INPUTS and OUTPUTS | Protocol for Transmission of Statuses Over LAN |
| SNMPv2/v3 | INPUTS and OUTPUTS | Protocol for Transmission of Statuses Over LAN |
| TCP EVENTS | INPUTS | Receives TCP Messages From Cameras etc. |
| RESTART POE | OUTPUTS | Restarts PoE with IP Watchdog |
| EMAIL | OUTPUTS | Sends E-mails |
| ONVIF | OUTPUTS | Controls Cameras |
| HTTP | OUTPUTS | Sends HTTP Commands to CAM, NVR, PLC... |
| IP WATCHDOGS | INPUTS | Monitors IP devices |
| OPTICAL RINGS | INPUTS | Monitors Optical RINGs States |
| FE / GE / FO PORTS | INPUTS and OUTPUTS | Monitors Port States, Port Control |

Connection to a PLC IPLOG



Event Management - ETH, DIGITAL

ETH

ETH events are used for status transmission over the LAN-RING network. Events differ from each other by a so-called ID identifier in the range of 1 to 999. An ETH event with the same identifier must be set on the side that sends and receives the event.

Example: The switch sends the status of input IN1 as an ETH event with ID#87.

| | | | |
|--------------|-----------|---------------|--------|
| Input | | Output | |
| Input MODULE | DIGITAL | Output MODULE | ETH |
| CHANNEL | IN1 [IN1] | ETH ID | ID #87 |
| DIGITAL MODE | Direct | | |
| ACTIVE | Closed | | |

Example: The switch receives ETH events with ID#87, which control the relay.

| | | | |
|--------------|--------|---------------|-------------|
| Input | | Output | |
| Input MODULE | ETH | Output MODULE | RELAY |
| ETH ID | ID #87 | CHANNEL | OUT1 [OUT1] |
| | | MODE | Set/Reset |

Menu „Extension/ETH-IO“

The setting of the communication parameters for status transfer between inputs and outputs is configured in the "Extension / ETH-IO" menu. So-called multicast packets are used for transmission, which enable the transmission of information to multiple recipients.

Receive address - multicast address for receiving packets

Priority - QoS priority assigned to outgoing packets

VLAN ID - VLAN tag for sending and receiving packets

Transmit address 1 to 5 - multicast address for sending packets

Application note: I/O transfer between switches

| |
|--------------------|
| Receive address |
| 239.191.168.20 |
| Priority |
| 5 |
| VLAN ID |
| 49 |
| Transmit address 1 |
| 239.191.168.10 |

DIGITAL

DIGITAL inputs allow you to set automatic actions with digital inputs of switches IN1 and IN2.

DIGITAL MODE - supported modes

Close - event is triggered by closing the input (connection of IN to GND)

Open - the event is triggered by opening the input

Direct - the input status is sent every 3 seconds. When there is a change, this change is sent immediately

Change - the event is triggered by closing or opening the input

Example: Switch on input No. 2 calls up the setting of Preset No. 12 on camera No. 3 (Onvif command).

| | | | |
|--------------|-----------|---------------|---------------|
| Input | | Output | |
| Input MODULE | DIGITAL | Output MODULE | CAMERA |
| CHANNEL | IN2 [IN2] | CHANNEL | CAM 3 [CAM 3] |
| DIGITAL MODE | Close | MODE | Move |
| | | PRESET | Preset 12 |

Menu „Extension/Input/Digital“

Label - input naming (stored in the SIMULandv4 project)

Negation - input negation

Minimal pulse duration (s) - minimum input on/off length

 The METEL-COMIO-DIO-MIB file, which also contains SNMP TRAP permissions, is available for monitoring SNMP inputs.

| |
|--|
| Label |
| Input 2 |
| <input checked="" type="checkbox"/> Negation |
| Minimal pulse duration [s] |
| 1.00 |

Event Management - ALARM

ALARM

ALARM inputs are digital inputs IN1 and IN2 switched to alarm mode in the "**Extension / Input / Alarm**" menu. Once activated, they function as standard alarm inputs and support PIR connections with EOL resistors (up to 8 states per input).

MODE - supported modes

State is / State is not - Balanced loop is/is not in state ...

Direct is / Direct is not - The loop status is sent every 3 seconds. When the entered input state changes, this change is sent immediately.

Change is / Change is not - If there is/did not change from the state.

State direct - The current state of the loop is sent every 3 seconds. When the loop state changes, this information is sent immediately.

State change - Response to state change only.

Value direct - The current value of the balanced loop is sent every 3 seconds. When the value of the balanced loop changes, the information is sent immediately.

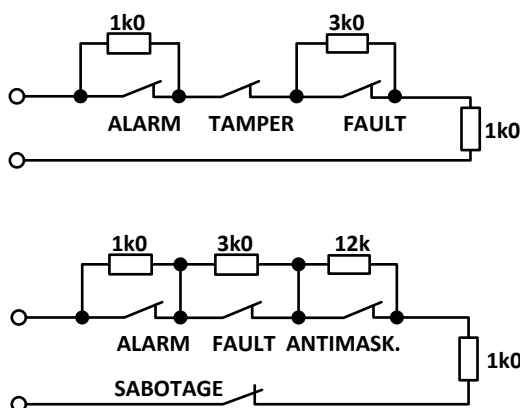
Value change - The information is sent when the value of the balanced loop changes.

ACTIVE - resistance ranges defined in "**Extension / Input / Alarm**". In total, 8 ranges up to a maximum of 30,000 Ohms are available for each input.

Example: If the resistance of the alarm loop at input IN1 corresponds to Sabotage (short), an HTTP user command URL1 ("**Camera / User commands**") with a value of 2 is sent to camera No. 4.

| Input | | Output | |
|--------------|------------------|---------------|---------------|
| Input MODULE | ALARM | Output MODULE | CAMERA |
| CHANNEL | IN1 [IN1] | CHANNEL | CAM 4 [CAM 4] |
| MODE | State is | MODE | URL 1 [URL 1] |
| ACTIVE | Sabotage (short) | PARAM | Value 2 |

Examples of alarm loop balancing:



 The METEL-COMIO-EZS-MIB file is available for monitoring alarm inputs via the SNMP protocol, which also contains SNMP TRAP permissions.

Menu with alarm loop settings:

| |
|---|
| <input checked="" type="checkbox"/> Enabled |
| Label Loop 1 |
| Sabotage (short) [Ω] 0 |
| Low Resistance [Ω] 800 |
| Normal State [Ω] 900 |
| High Resistance [Ω] 1200 |
| Alarm [Ω] 1300 |
| Failure [Ω] 3500 |
| Masking [Ω] 4500 |
| Sabotage (open) [Ω] 19000 |

Event Management – LAN-RING, TCP, MIOS, EXP-C

LAN-RING

Optical ring status monitoring with LAN-RING protocol.

MODE - supported modes

Close - the event is triggered when the ring closes

Open - the event is triggered if the ring opens

Direct - the status of the optical ring is sent every 3 seconds. When the status changes, the change is sent immediately

Change - the event is triggered by closing or disconnecting the optical ring

Example: The state of the ring is transmitted to the relay output, which is connected to the signaling LED light. In case the ring is disconnected, the light is active.

| Input | | Output | |
|--------------|----------|---------------|-------------|
| Input MODULE | LAN-RING | Output MODULE | RELAY |
| CHANNEL | MAIN | CHANNEL | OUT1 [OUT1] |
| MODE | Direct | MODE | Set/Reset |
| ACTIVE | Opened | | |

 A METEL-RING-MIB file is available for monitoring the status of SNMP rings, which also contains SNMP TRAP permissions.

TCP

The switch can listen on the specified TCP port set in the "Extensions / TCP" menu. If a device on the network sends a notification to the switch's IP address and the specified TCP port, the switch can respond to it with the created automatic action.

MODE - supported modes

Matches - the pattern entered must match the text that came

Contains - the received text contains the specified pattern

Starts - the received text starts with the specified pattern

Ends - the received text ends with the specified pattern

Example: In case the switch intercepts a TCP notification from the network with the entered text (pattern), it will control the camera No. 2.

| Input | | Output | |
|-----------------|-----------|---------------|---------------|
| Input MODULE | TCP | Output MODULE | CAMERA |
| PATTERN | Pattern 1 | CHANNEL | CAM 2 [CAM 2] |
| COMPARSION MODE | Matches | MODE | URL 5 [URL 5] |
| | | PARAM | Value 2 |

MIOS, EXP-C

Modes for communication with discontinued IO modules. More information at support@metel.eu

Event Management - SWITCH, BUS

SWITCH

The switch item is available as an input and as an output during setup.

SWITCH as Input

SWITCH inputs allow you to set automatic actions where the ports of the switch are used as inputs.

MODE

Link Up / Link down - the event is triggered if the port becomes active/inactive

Direct - the port status is sent every 3 seconds. When a change is made, the change is sent immediately

Change - the event is triggered by connecting or disconnecting the port

Example: In the case port 3 becomes inactive, this information is stored on the switch's internal SD card.

| Input | | Output | |
|--------------|-----------|---------------|--------|
| Input MODULE | SWITCH | Output MODULE | SYSLOG |
| PORT | P3 [P3] | | |
| MODE | Link down | | |

SWITCH as Output

Allows to control FE/GE/FO ports of the switch by external signals.

MODE

Normal - port active, ready

Down - port off

Normal/Down - port on/off

Down/Normal - port off/on

Example: The P2 port on the switch is controlled by ETH Event ID#15.

| Input | | Output | |
|--------------|--------|---------------|-------------|
| Input MODULE | ETH | Output MODULE | SWITCH |
| ETH ID | ID #15 | PORT | P2 [P2] |
| | | MODE | Normal/Down |

 The METEL-SWITCH-MIB file is available for monitoring FE, GE, FO ports via the SNMP protocol, which also contains SNMP TRAP permissions.

BUS

RS485 bus monitoring.

Active - the event starts with the start of activity on the RS485 bus

Inactive - the event starts with the end of the activity on the RS485 bus

Direct - the event is sent every 3 seconds. When an activity changes, the change is sent immediately

Change - the event is triggered with each change of activity on the bus

Example: In case when data reception on the BUS2 is interrupted, the log is written to the SD card of the switch.

| Input | | Output | |
|---------------|-----------------------------|---------------|--------|
| Input MODULE | BUS | Output MODULE | LOGGER |
| BUS | BUS Port 2 [BUS Port 2] ... | | |
| SUBJECT | Rx | | |
| ACTIVITY MODE | Active | | |

 The METEL-COMIO-BUS-MIB file is available for SNMP bus monitoring, which also contains SNMP TRAP permissions.

Event Management – MODBUS SLAVE/MASTER

MODBUS SLAVE

The correct settings of the connected Modbus devices are described in the application note titled "MODBUS configuration", where the entire settings are described, including automatic actions.

Automatic action with a Modbus Slave on the input side means that there is another modbus master device that writes to the switch registers and thus controls the switch outputs that are available in event management.

COIL = 1 bit register, HOLDING = 16 bit and 32 bit registers

Close - the event starts with writing logical 1 to the COIL register

Open - the event starts with writing logical 0 to the COIL register

Direct – the event is sent every 3 seconds when a registry entry changes, the change is sent immediately

Change - the event starts with each registry entry change

Example: The Modbus Master device writes to COIL register No. 3 on the switch and thus turns on/off port No. 1 on the switch.

| Input | | Output | |
|--------------|--------------|---------------|-------------|
| Input MODULE | MODBUS Slave | Output MODULE | SWITCH |
| REGISTER | COIL 3 (0x) | PORT | P1 [P1] |
| MODE | Change | MODE | Normal/Down |

MODBUS MASTER

The correct settings of the connected Modbus devices are described in the application note titled "MODBUS configuration", where the entire settings are described, including automatic actions. In automatic action with Modbus Master on the side, the switch is in the role of Modbus Master device, which reads registers from other Modbus Slave devices and thus controls events on the output side.

Value Change - changes the value of the read register

Slot Active - active slot, correct reading of the register

True – the event is active if logical 1 is in the read register

False - event is active if logical 0 is in the read register

Change - the event is triggered with each change in the value of the read register

Example: The switch reads the register from slot 8 and, if logical 1 is read from the register, turns the camera 1 to position 11.

| Input | | Output | |
|--------------|-----------------|---------------|---------------|
| Input MODULE | MODBUS Master | Output MODULE | CAMERA |
| SLOT | Slot 8 [Slot 8] | CHANNEL | CAM 1 [CAM 1] |
| MODE | Slot active | MODE | Move |
| Slot state | True | PRESET | Preset 11 |

Application notes: MODBUS configuration (18 pages)

Event Management - MODBUS

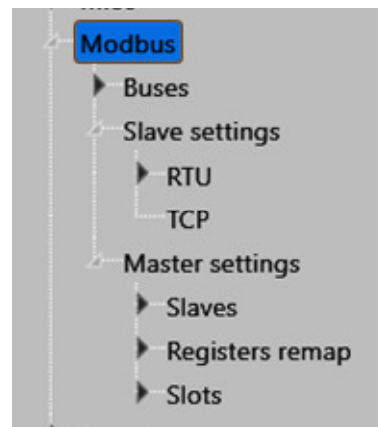
MODBUS

In this part of the switch configuration menu, the properties of the Modbus TCP and RTU protocols are configured.

Buses – Serial line configuration, modes **None**, **Slave RTU** or **Master RTU**.

Slave settings – Device configuration as Slave RTU or TCP.

Master settings – Configuration of the device as a **Master** and its parameters.



Slave Configuration

In the event, the switch behaves as a device in Modbus Slave RTU or TCP.

Master Configuration

This section describes the configuration where the switch behaves as a Modbus Master RTU or TCP device. The configuration of this menu is closely linked to Events (Event management), where automatic actions are combined with Modbus registers.

Slaves (Modbus Slave Device Specifications)

The Modbus Master switch supports connection to eight Modbus Slave devices. The Modbus Slave setting allows the Slave devices to be used together in both RTU and TCP mode. Each line represents one connection to the Modbus Slave device and creates a link for the connection in the **Slots** menu.

Modbus Slave in RTU or TCP Mode

Setting whether it is a Modbus device connected to RS485 or via TCP.

Register Remap (Modbus Register Specification)

Register remap specifies the specific registers to be used and creates a link for the **Slots** menu. Each switch supports the configuration of 64 different registers and their combinations

Register 1....64 - The registry label is stored only in the SIMULand.v4 project

Type - Register type and its specifications

| REGISTRY NAME | TYPE | READ-WRITE FUNCTION | EXAMPLE OF USE |
|---------------|--------|---------------------|----------------|
| Coil | 1-bit | Read-Write | Relay output |
| Discrete | 1-bit | Read-Only | Digital input |
| Holding | 16-bit | Read-Write | Analog output |
| Input | 16-bit | Read-Only | Analog input |

Count - The number of registers to be read starts at the Register address. All other expected responses cannot exceed the allowed length: 256 bytes.

Reverse word order – A proprietary feature where 32-bit messages are read after 16-bit registers in the reverse order of the Modbus protocol.

Slots (Menu mapping Slaves - Registers)

The **Slots** menu combines the configuration from the **Slaves** (Modbus Slave Device Specification) and **Register remap** (Modbus Register Specification) menus. The combination of these two menus provides the switch with all the necessary information for reading and writing Modbus registers in devices connected to the serial interface or via TCP.

Slot 1....64 – Name, description of the connection of tables from the menu **Slaves** and **Register remap**. It is stored only in the SIMULand.v4 project, not in the device.

Enable – Allows the use of a given line, connection.

Slave index – Number, line index from the **Slaves** menu.

Register remap - Number, line index from the **Register remap** menu.

Event Management - RELAY, Camera

RELAY

Programmable relay output switch

MODE

Set only - activates the selected output

Set/Reset - copies the status of the input to the output

Override On - power on with higher priority

Override On/Off - on/off with higher priority

Pulse Set - activates the output for the set time

Reset only - deactivates the selected output

Reset/Set - the same with negation

Override Off - shutdown with higher priority

Override Off/On - the same with negation

Pulse Reset - deact. the output for the set time

Example: The status of the remote input (Direct mode) is copied to the local relay by events with ID#99.

| | | | |
|--------------|--------|---------------|-----------------|
| Input | | Output | |
| Input MODULE | ETH | Output MODULE | RELAY |
| ETH ID | ID #99 | CHANNEL | OUT1 [OUT1] ... |
| | | MODE | Set/Reset |

„Extension / Output“

Menu for setting the programmable relay OUT1.

Digital - digital input evaluation mode

Label - output naming (stored in the project sw. SIMULandv4)

Negation - output negation

Enable manual output - enable relay control from Simuland

Output state (checked = activated) - in combination with enable manual output the relay will be closed

Pulse duration (s) - length of closing / opening in pulse mode

The METEL-COMIO-DIO-MIB file MIB is available for SNMP relay control.

| |
|---|
| Label |
| Output 1 |
| <input type="checkbox"/> Negation |
| <input type="checkbox"/> Enable manual output |
| <input type="checkbox"/> Output state (checked = activated) |
| Pulse duration [s] |
| 3.00 |

Camera

Controls up to 8 Onvif cameras or HTTP commands.

CHANNEL - camera number set in the "Extension / Camera" menu

MODE

Move - sends a PRESETx command via the Onvif protocol, **SET TEXT** - displays text in the AXIS camera image, **URLx** - sends the HTTP command specified in "Camera / User commands" with the **PARAM**

Example: If the ALARM 1 input is in the Alarm state, the switch sends a command to the CAM 3 Onvif to turn to Preset 5.

| | | | |
|--------------|---------------|---------------|-------------------|
| Input | | Output | |
| Input MODULE | ALARM | Output MODULE | CAMERA |
| CHANNEL | IN1 [IN1] ... | CHANNEL | CAM 3 [CAM 3] ... |
| MODE | State is | MODE | Move |
| ACTIVE | Alarm | PRESET | Preset 5 |

„Extension / Camera“

Menu for entering IP parameters and camera logins to be controlled via automatic actions.

ONVIF - camera controlled by Onvif protocol Prof. S

Axis - camera controlled by CGI commands AXIS

Other - camera controlled by user commands URL1 to 8 in the "Camera / User Commands" menu

| | Ip | Model | Username | Password |
|-------|----------------|-------|----------|---------------|
| CAM 1 | 192.168.32.101 | ONVIF | USER | g576FRD47VIZU |
| CAM 2 | 192.168.32.102 | ONVIF | USER | g576FRD47VIZU |
| CAM 3 | 192.168.32.11 | Axis | ADMIN | BZUGHIP76a |
| CAM 4 | 192.168.32.120 | Other | kamil | uu6709R64fZ |
| CAM 5 | 192.168.32.200 | ONVIF | USER | g576FRD47VIZU |
| CAM 6 | 192.168.32.180 | ONVIF | USER | bhgGJGckhj |
| CAM 7 | 192.168.32.181 | ONVIF | USER | g576FRD47VIZU |
| CAM 8 | 192.168.32.182 | ONVIF | USER | g576FRD47VIZU |

Event Management E-mail, LOGGER, IPWatchdog

E-MAIL

Switches support sending e-mails via SMTP server (port 25).

Example: If IP watchdog 8 detects a disconnection, the switch sends an e-mail to address 2.

| | | | |
|--------------|-------------------------------|---------------|-----------------------|
| Input | | Output | |
| Input MODULE | IPWDG | Output MODULE | E-MAIL |
| CHANNEL | IP Watchdog 8 [IP Watchdog 8] | To | Address 2 [Address 2] |
| MODE | Disconnect | | |

 We recommend using IPLOG PLCs or G-Series switches to support secure e-mails.

LOGGER

The input event is stored in the log on the SD card of the switch.

| | | | |
|--------------|-------------------------------|---------------|--------|
| Input | | Output | |
| Input MODULE | IPWDG | Output MODULE | LOGGER |
| CHANNEL | IP Watchdog 4 [IP Watchdog 4] | | |
| MODE | Disconnect | | |

PoE and IP Watchdog

Event management switches allow you to monitor arp queries of 8 IP cameras.

Settings

IP camera specifications in the "Extension/IP watchdog" menu

IP address - IP address of the camera

Retry count - number of arp unsuccessful / successful queries before the set action is run

Restart PoE - restart PoE power supply

Restart PoE timeout (s) - time for which the PoE power supply will be switched of (ensuring the discharge of capacitors in the PoE device). If the IP camera is not powered from PoE, but for example from 24VAC, a restart can be done via a relay.

| | IP address | Retry count | Restart PoE | Restart PoE timeout [s] |
|---------------|--------------|-------------|-------------------------------------|-------------------------|
| IP Watchdog 1 | 192.168.20.6 | 2 | <input checked="" type="checkbox"/> | 3 |
| IP Watchdog 2 | 192.168.20.7 | 2 | <input checked="" type="checkbox"/> | 3 |
| IP Watchdog 3 | 192.168.20.8 | 2 | <input checked="" type="checkbox"/> | 3 |
| IP Watchdog 4 | 192.168.20.9 | 0 | <input type="checkbox"/> | |
| IP Watchdog 5 | 0.0.0.0 | 0 | <input type="checkbox"/> | |
| IP Watchdog 6 | 0.0.0.0 | 0 | <input type="checkbox"/> | |
| IP Watchdog 7 | 0.0.0.0 | 0 | <input type="checkbox"/> | |
| IP Watchdog 8 | 0.0.0.0 | 0 | <input type="checkbox"/> | |

Example: If the IP Watchdog 4 detects a disconnection, the switch relay closes for the set time.

| | | | |
|--------------|-------------------------------|---------------|-------------|
| Input | | Output | |
| Input MODULE | IPWDG | Output MODULE | RELAY |
| CHANNEL | IP Watchdog 4 [IP Watchdog 4] | CHANNEL | OUT1 [OUT1] |
| MODE | Disconnect | MODE | Pulse Set |

Example: Receiving a TCP pattern initiates a restart of the PoE power supply on P2.

| | | | |
|-----------------|-----------|---------------|---------|
| Input | | Output | |
| Input MODULE | TCP | Output MODULE | PoE |
| PATTERN | Pattern 1 | PORT | P2 [P2] |
| COMPARISON MODE | Matches | ACTION | Restart |
| | | TIMEOUT | 3 s |

Event Management - Serial Bus

Industrial LAN-RING and PLC IPLOG switches are equipped with a number of serial interfaces. The switches are mainly RS485 buses, which can operate in various operating modes.

LAN-RING - Overview of Supported RS485 Modes

| | | B U S 2 | | | |
|---------|--------|---------|--------|-------|--------------------------------------|
| | ASSET | GALAXY | MODBUS | RS485 | NOTE |
| B U S 1 | ASSET | X | X | OK | I&HAS Fides |
| | GALAXY | X | X | OK | I&HAS Honeywell |
| | MODBUS | OK | OK | OK | MODBUS ASCII/RTU |
| | RS485 | OK | OK | OK | Typical 4-5ms delay between RS ports |

 The following rules apply when transmitting data of alarm systems according to ČSN EN 50131-1:

- ❖ All frames are marked with VLAN headers according to IEEE 802.1Q
- ❖ All connected systems have a limited bandwidth (protection against DDoS attacks)
- ❖ Alarm system data has the QoS bits set to the highest priority

We recommend monitoring the activity of all ports of the system using the SNMP protocol

BUS

Setting the operating mode of RS485 buses.

Mode - supported protocol

RS485 - general RS485 communication with Modbus RTU support

Asset - for I&HAS systems Asset

Galaxy – for Galaxy Dimension I&HAS systems

Other items only apply in RS485 mode (Modbus RTU)

Speed - communication speed 1.2 to 57.6 kbps

Manual bus speed - manual speed setting up to max 115.2 kbps

Data bits - number of data bits (5-9) in Byte

Parity - parity mode (Even, Odd, Space Mark)

Stop bits - number of stop bits

Check Timeout - interruption of communication in the Tx or Rx direction can be signaled by sending an SNMP trap. Trap sending is enabled in the "SNMP / BUS" menu separately for Rx / Tx direction and bus

Application notes:

RS485 transmission

GALAXY system connection

| | |
|---|-------|
| Mode | RS485 |
| Speed | 9600 |
| Manual bus speed [bps] (0 = above selected) | 0 |
| Data bits | 8 |
| Parity | None |
| Stop bits | 1 |
| Check timeout [ms] (0 = disabled) | 1000 |

Event Management - Serial Bus

Modbus RTU / TCP protocols ensure easy sharing of inputs and outputs between LAN-RING and PLC IPLOG systems.

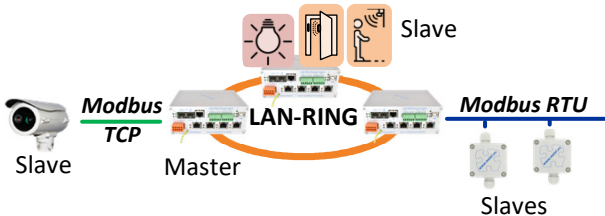
MODBUS RTU / TCP - Support in LAN-RING and IPLOG Devices

Modbus is a serial communication protocol that was created in 1979. Since then, it has found wide application, especially in industrial automation. LAN-RING switches and IPLOG control PLCs support this standard. The use of Modbus in industrial LAN-RING switches can be the following:

| PARAMETRY MODBUS RTU | PLC IPLOG-GAMA | SWITCH LAN-RING F, G |
|-------------------------|--------------------|-------------------------|
| Bitrate | 115.2 / 19.2 kbps | 57.6/19.2 kbps |
| Distance | Max. 100 / 1.200 m | Max. 100 / 1.200 m |
| Slaves on BUS | Max. 30 | Max. 16 |
| R / W cyklus | > 10 ms | > 100 ms |

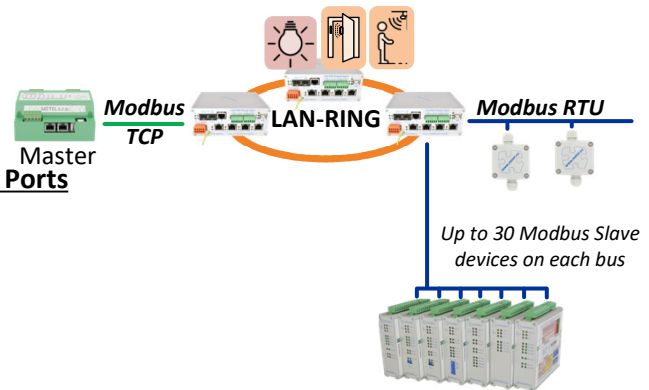
Transparent Modbus Data Transfer between RS485 Ports

LAN-RING switch set as MODBUS Master reads statuses from Modbus device registers on LAN or RS485.

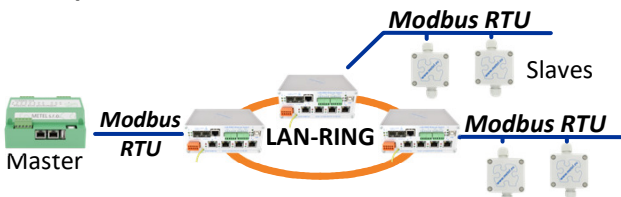


MODBUS SLAVE Mode

The PLC controls the outputs and monitors inputs of the LAN-RING switch and the connected Modbus slave devices

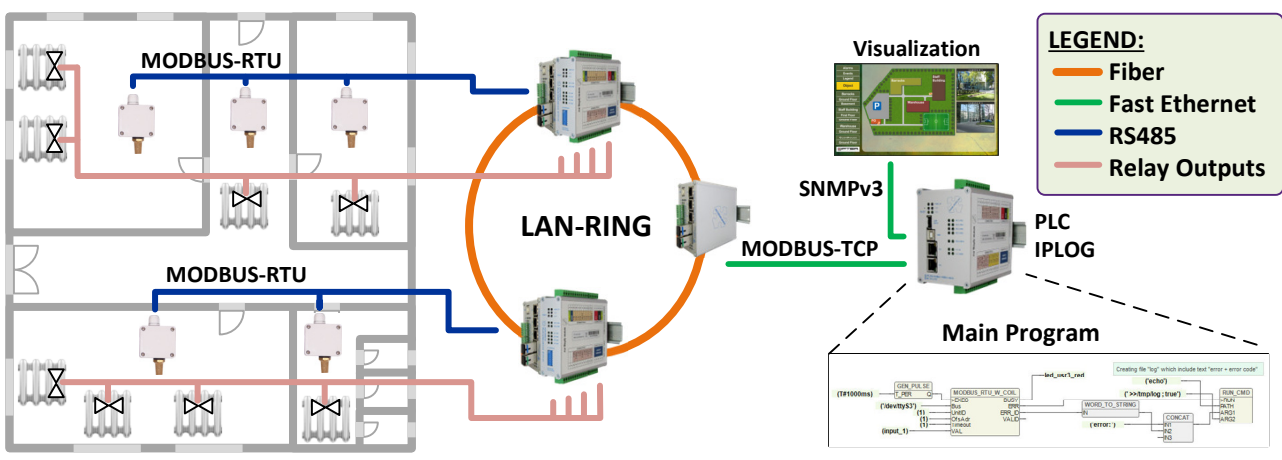


Transparent Modbus Data Transfer between RS485 Ports



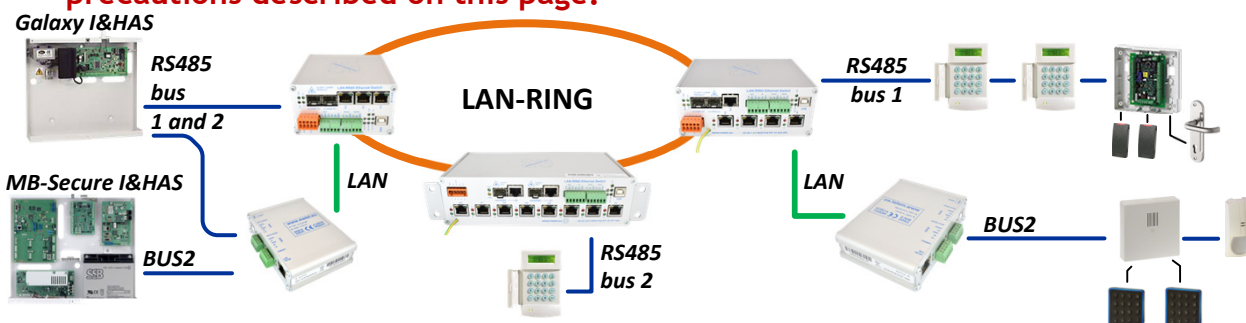
Comprehensive MODBUS Solution for Data Collection, Control and Visualization of Objects

Another option for data processing from Modbus devices is PLC IPLOG. It can also execute a program written in FBD, LD, ST or IL languages according to IEC 61131-3 and visualize the values in the IFTER-EQU software.



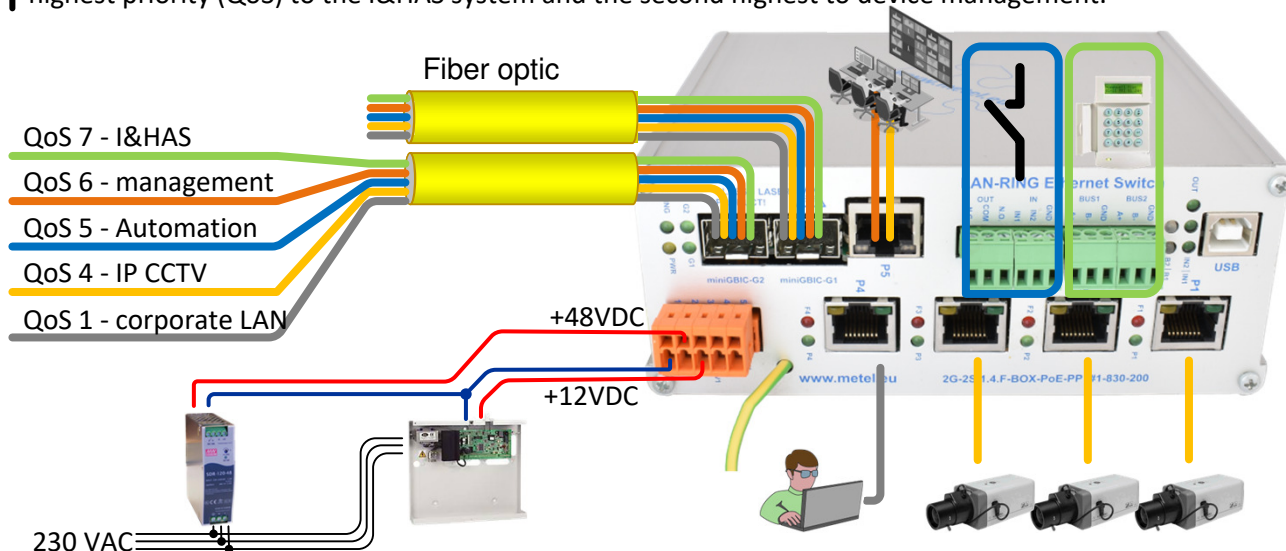
Event Management – Serial Bus

LAN-RING switches with RS485 buses are also certified as a transmission route for I&HAS system buses. Therefore, we verify compliance with the ČSN EN 50131-1 standard every 3 years in the TESTALARM testing laboratory. Currently valid certificates are available at www.metel.eu. Ensuring compatibility with the standard requires compliance with all precautions described on this page.



VLANs and QoS

Communication between the SIMULand software and the device is encrypted by the AES algorithm and protected against unauthorized changes in the transmitted data using the SHA1 hash algorithm. The switches thus meet the requirements for secure communication according to EN 62676-1-2. If switches are used for data transmission of alarm systems, they are also subject to the EN50131-1 standard. In this case, different VLANs and priorities (QoS) must be used for each service. We recommend assigning the highest priority (QoS) to the I&HAS system and the second highest to device management.



Backup Power

In systems where switches are used to transmit I&HAS system buses, the switches must be powered from backed up system resources. See image above. After a failure of the basic power supply, the 48VDC switch continues to operate at 12V and further forwards the I&HAS system data.

FAQ for Using LAN-RING as a I&HAS Transmission Route

Can I transmit multiple I&HAS buses via LAN-RING?

Yes. It is not limited.

Can I connect multiple I&HAS buses to one switch?

It is always possible to connect only one I&HAS bus directly to the RS485 ports of the switch. Additional buses are connected via miniLAN converters to FE or GE ports.

What is the max recommended load of the network if it is also used as a transmission route of the I&HAS. For this, the requirement of the ČSN EN 62676-1-1 applies to a load of max. 75% of the available capacity.

Network Protocols

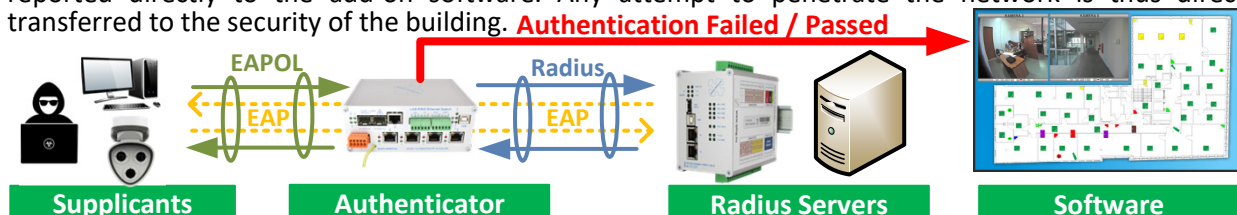
LAN-RING switches belong to the L2 industrial switches, which corresponds to the supported network protocols. We recommend using L2 / 3 G series switches in applications requiring Layer 3 protocol support.

10BaseT, 100BaseT(X) / 100Base FX, 1000Base(X) for IEEE 802.3, IEEE 802.3u , IEEE 802.3ab

LAN-RING switches on metal and optical ports are 100% compatible with LAN devices from other manufacturers. In addition, all metal ports are equipped with surge protectors for better EMC.

IEEE 802.1X - Port Access Control

LAN-RING switches make it possible to protect the network from access by unauthorized persons or devices. In addition, all successful and especially unsuccessful attempts to authorize the switch can be reported directly to the add-on software. Any attempt to penetrate the network is thus directly transferred to the security of the building. **Authentication Failed / Passed**



IGMP - Internet Group Management Protocol

The switches support the creation of multicast groups in IGMPv1 and V2 versions.

LLDP - Link Layer Discovery Protocol

Switches support the LLDP protocol to promote their identity and capabilities among neighboring devices on the LAN. We use this protocol to draw the topology in the SIMULandv4 software.

PoE up to 95W / Port According to IEEE 802.3af, IEEE 802.3at, UPOE and POH Standards

The production firmware of LAN-RING switches supports a wide range of PoE standards.

PoE 90W According to IEEE 802.3bt Standard

In addition to the production firmware, fw with PoE support according to IEEE802.3bt is also available.

SNMP - Simple Network Management Protocol

Switches are supported by a variety of monitoring and visualization softwares. For security reasons, exclusively encrypted SNMP(.v3) and methods are used for communication with these softwares:

SNMP SET - SNMP device settings. A typical example is relay setup and any configuration of fast / gigabit Ethernet ports or RS485 serial buses.

SNMP GET - finding status based on a query from the control system. As a rule, non-critical operational information is transmitted in this form. The SNMP manager periodically queries SNMP agents. The disadvantage is that the transmission of information can occur with a delay of several seconds.

SNMP TRAP - the device autonomously sends status information to the control system. SNMP TRAP is usually used for critical state transmission. Its advantage over SNMP GET is immediate response.

📖 We recommend using ZABBIX software (tested) or any other software that supports SNMP.v3 / v2c when monitoring METEL network devices.

For integration into other programs, MIB files are available at www.metel.eu, which, in addition to the so-called public MIB files written in RFC documents, contain a number of PRIVATE MIB files for even more detailed monitoring and control of the system. The table below shows their selection.

| MIB FILE NAME | | |
|---------------------------|--------|--|
| METEL-COMIO-DIO-MIB | DI | Displays the status of digital inputs. Switching DI / Alarm modes. |
| METEL-COMIO-EZS-MIB | Alarm | Display of alarm input statuses. |
| METEL-COMIO-DIO-MIB | OUT | Status display / output relay control, pulse length setting, etc. |
| METEL-POE-PP-MIB | PoE | Status reading / PoE power control on ports. |
| METEL-SERVICES-MOVBUS-MIB | Modbus | Read / write / create modbus registers. |
| METEL-SERVICES-DOT1X-MIB | 802.1X | Read statuses / control settings related to 802.1X authentication. |
| METEL-BOARD-MIB | HW | Display of basic information about HW, temperature, power supply, USB status, enable traps ... |
| METEL-SWITCH-MIB | Switch | Reading statistics / Port control. |
| METEL-COMIO-BUS-MIB | BUS | RS485 bus settings. |
| METEL-SERV.-CAMDRIVER-MIB | Camera | Control of HTTP, CGI cameras, rotation via Onvif Profile S. |

Network Protocols

IP Access Table

Access to switch management can only be restricted to IP addresses listed in the IP Access Table.

LAN-RINGv1 and LAN-RINGv2

LAN-RING v1 and v2 are proprietary protocols optimized for circular topology reconfiguration speed.

| Protocol version | Occurrence / Elimination of the Fault | Note |
|------------------|---------------------------------------|---|
| LAN-RINGv2 | Switching < 30ms / 0 ms | Support for multi-circuit systems, the total data flow in circles is unlimited. |
| LAN-RINGv1 | Switching < 30ms / < 30ms | Total data flow in rings limited to 1Gbps. |

QoS and VLAN according to IEEE 802.1Q

Switches support the creation of virtual private networks and the prioritization of various types of traffic.

| VLAN mode | Description |
|-----------|---|
| Fallback | Basic 802.1Q mode. Incoming frames are not dropped if their VLAN VID is not defined in the VLAN table. |
| Check | The VLAN VID of the incoming frame must be defined in the VLAN table, otherwise it will be discarded. |
| Secure | The VLAN VID of the incoming frame must be defined in the VLAN table and the input port must be a member of it. |

RSTP - Rapid Spanning Tree Protocol

In addition to the LAN-RING protocol, our switches also support the general RSTP protocol. Compared to the LAN-RING protocol, it is slower, but it supports the MESH topology and the interconnection of network elements from various manufacturers.

SMTP - Simple Mail Transfer Protocol

In the Automatic Actions of event management it is possible to set the sending of e-mails on port 25.

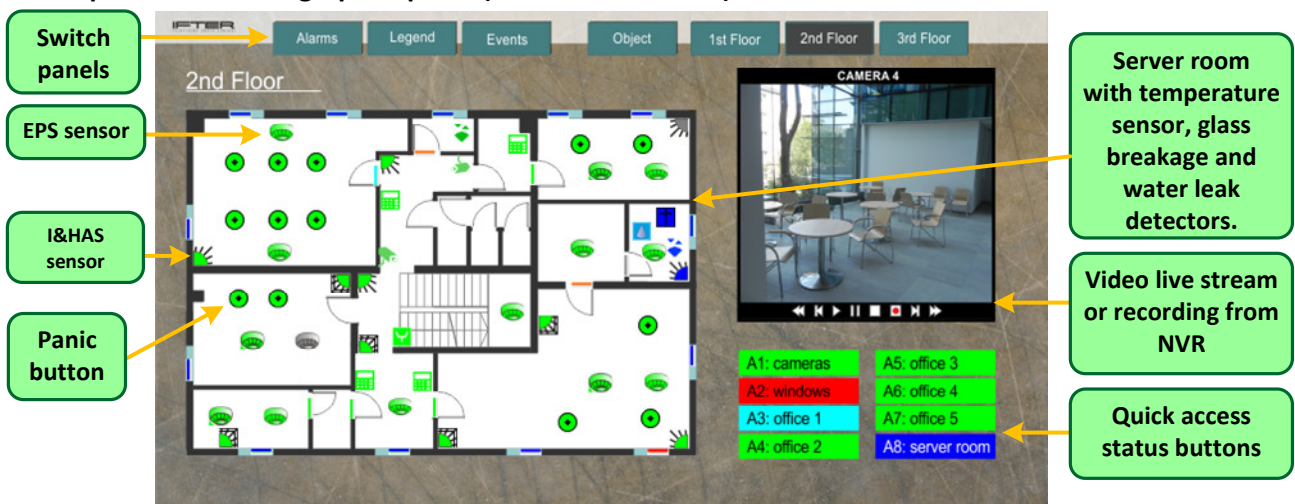
SNTP - Simple Network Time Protocol

The switches support the SNTP time protocol and use it, for example, when logging events to the SD card of the switch.

Visualization of Network Infrastructure

We recommend using the IFTER EQU software to monitor and visualize the network infrastructure consisting of METEL switches or other manufacturers. It is an information system for visualization, integration and management of security systems, building automation systems and their control from control centers. IFTER EQU has built-in support for I&HAS, EKV, IP CCTV, EPS and MaR building automation systems. The software allows you to set the response of one system to events that occurred in another system. One of its basic advantages is the native support of SNMP, MODBUS, BACKNET, OPC standards without the need to create special drivers. IFTER EQU uses a client-server architecture. Client workplaces are connected to a central database for storing process data. The flexible client-server architecture thus enables system management from anywhere on the LAN / WAN.

Example of IFTER EQU graphics panel (100% user editable)



In addition to IFTER-EQU, LAN-RING switches are supported, for example, in C4 and SBI extensions.

Redundant Power

Available Power Inputs

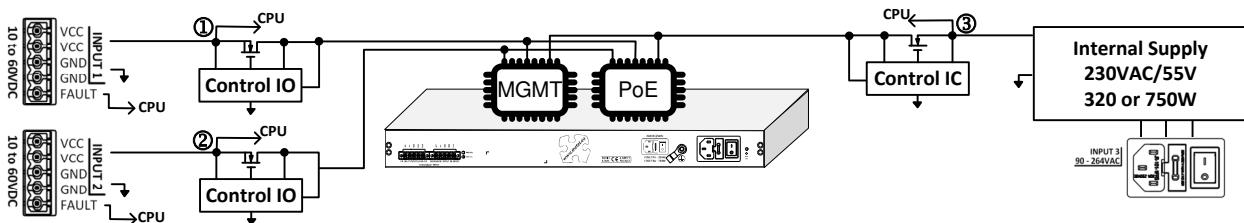
The switches are equipped with three independent power inputs.

INPUT 1 and **INPUT 2** are power inputs with an input voltage range of 10 to 60VDC.

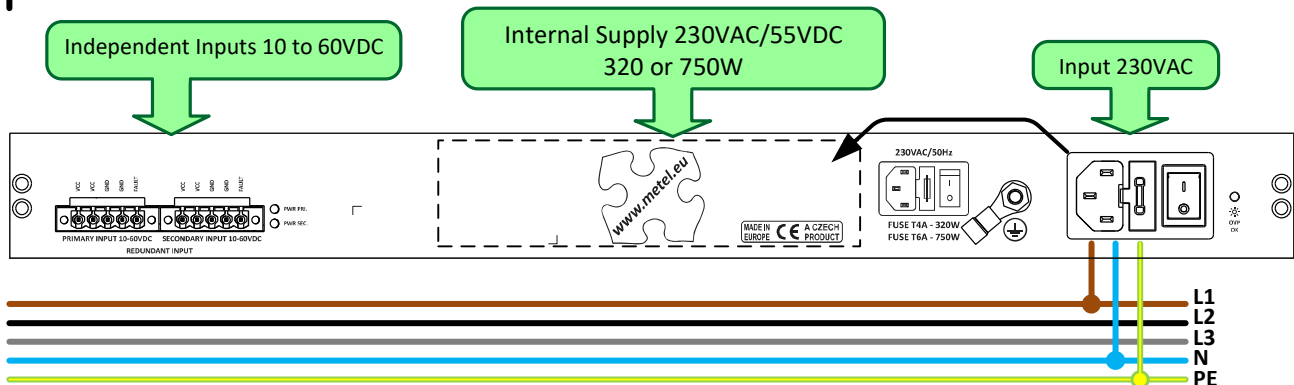
INPUT 3 is a power input with an input voltage range of 90 to 264VAC.

INPUT 1 and 2 are connected directly to the internal circuits of the switch, including PoE-PSE.

The INPUT 3 is connected to the input of an internal 55V supply with a power of 320 or 750W. It supplies the internal circuits of the switch, including PoE-PSE. Switching between inputs takes place automatically. The switch always takes current from the input with the highest input voltage (points ①②③). For the PoE power supply to function properly, the voltage at at least one of the ①②③ points must be in the range of 48 to 56 VDC.

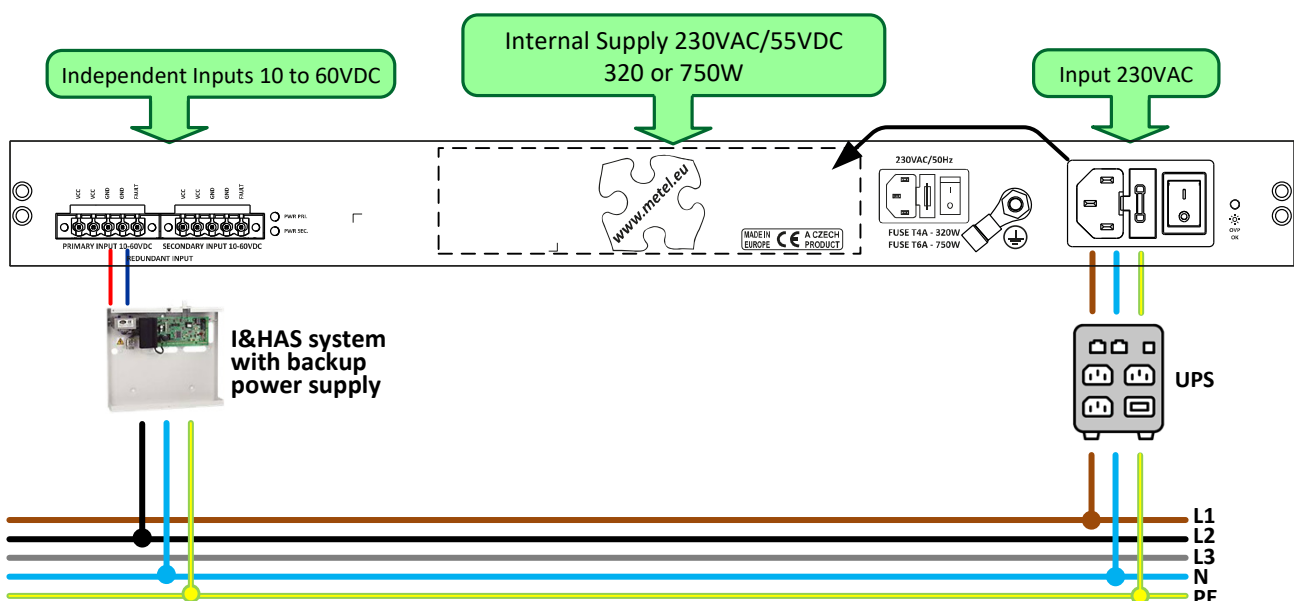


Power Connection without Power Backup / Redundancy



Connection Suitable for IP CCTV Systems Combined with RS485 Transmission of I&HAS Buses - Variant 1

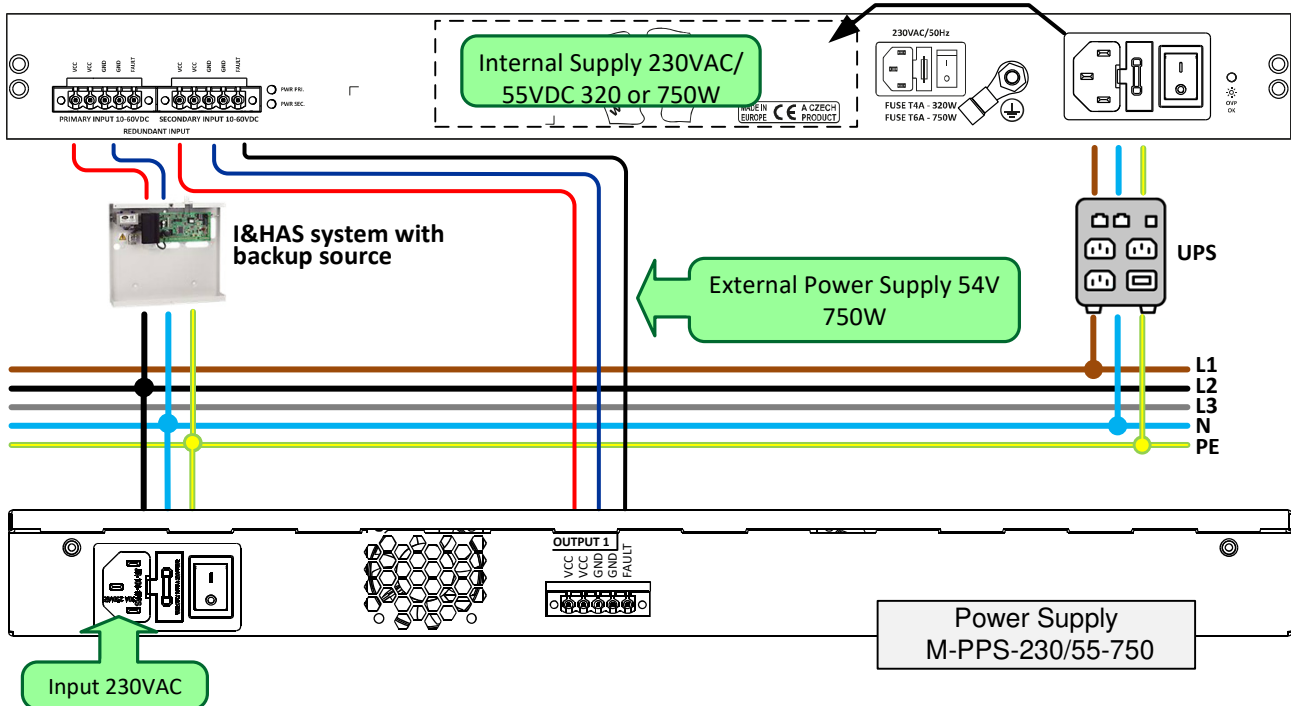
| | PRIMARY POWER SUPPLY | REDUNDANT POWER SUPPLY |
|---------------------|------------------------|------------------------|
| Switching Functions | INPUT3 (backed up UPS) | INPUT1 |
| PoE | INPUT3 (backed up UPS) | - |
| RS485 and IO | INPUT3 (backed up UPS) | INPUT1 |



Redundant Power

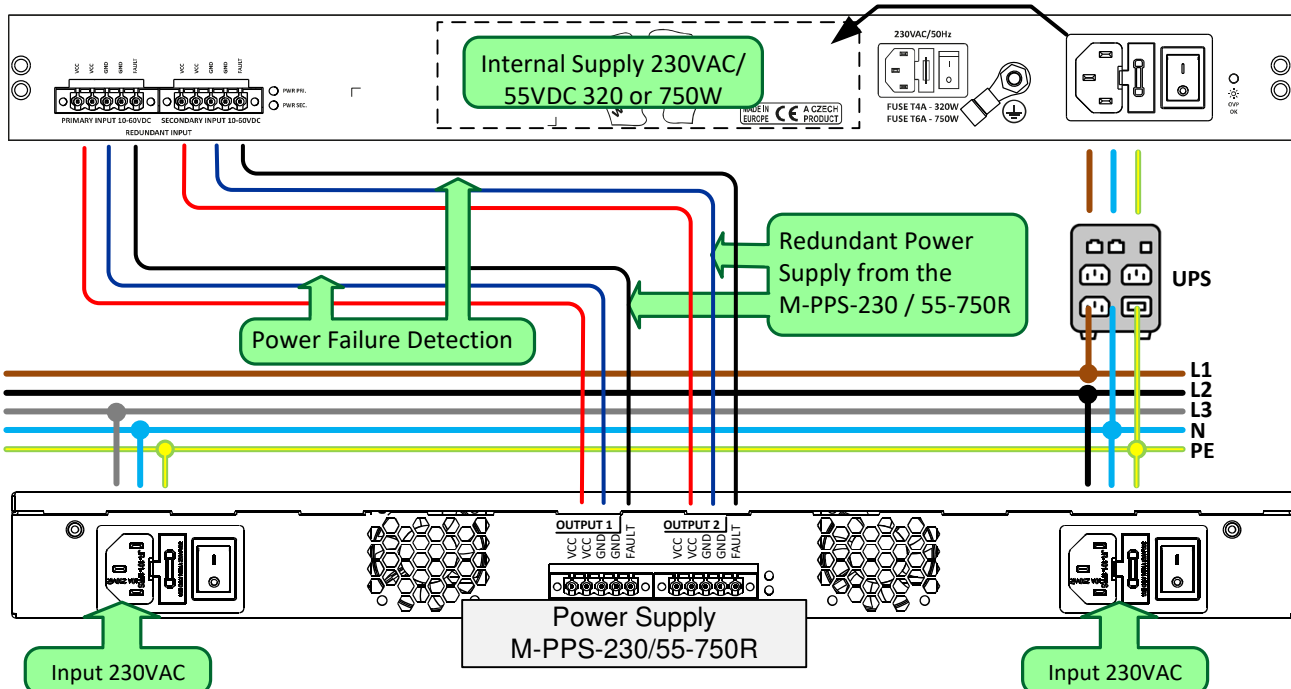
Connection Suitable for IP CCTV Systems Combined with RS485 Transmission of I&HAS Buses - Variant 2

| | PRIMARY POWER SUPPLY | REDUNDANT POWER SUPPLY |
|---------------------|------------------------|------------------------|
| Switching Functions | INPUT3 (backed up UPS) | INPUT2 INPUT1 |
| PoE | INPUT3 (backed up UPS) | INPUT2 |
| RS485 and IO | INPUT3 (backed up UPS) | INPUT2 INPUT1 |

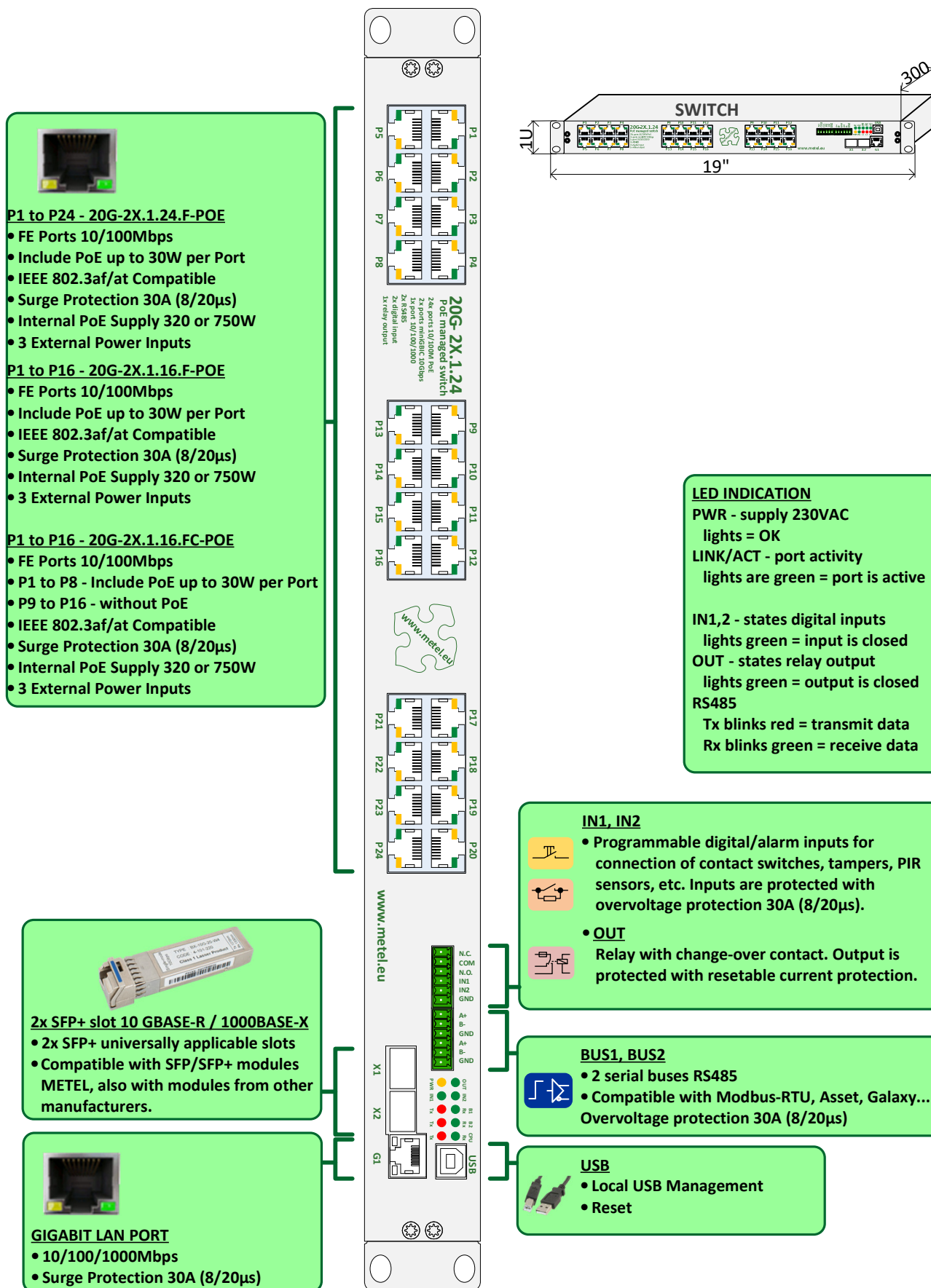


Connection with three redundant power inputs

| | PRIMARY POWER SUPPLY | REDUNDANT POWER SUPPLY |
|---------------------|------------------------|------------------------|
| Switching Functions | INPUT3 (backed up UPS) | INPUT2 INPUT1 |
| PoE | INPUT3 (backed up UPS) | INPUT2 INPUT3 |
| RS485 and IO | INPUT3 (backed up UPS) | INPUT2 INPUT1 |

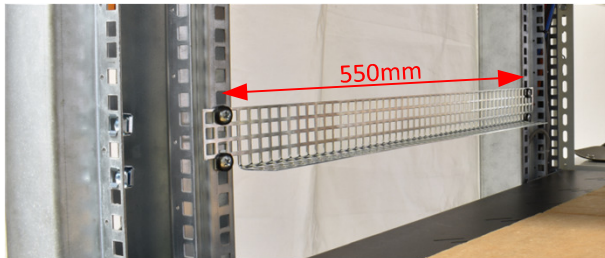


Front View and Dimensions



1. Mounting

Attach the supplied supporting side rails to the 19" rack. Place the switch on the side rails, move it as far back as possible and then screw it in. Leave at least 1/2U of space above the switch for better air flow.



2. Connect Power

Connect the power cables according to the block diagrams on the previous pages. 230VAC. Each power input has a separate switch and a signaling LED or glow plug that signals the power connection. **If the switch is to provide PoE power, at least one of the following must be met:**

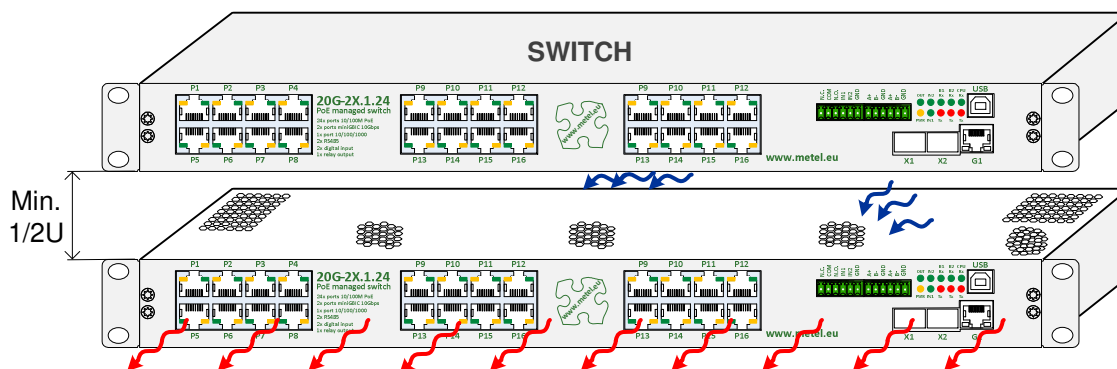
- 230VAC power is connected to INPUT3,
- an external 48 - 57 VDC power supply is connected to INPUT1 and / or INPUT2.

3. Insertion of Optical Modules

Any SFP module that meets the requirements of the MSA (agreement of SFP module manufacturers) can be inserted into the SFP slots. For modules with bidirectional data transmission on one fiber (wave multiplexing), it is necessary to connect the optical modules correctly. This means that, for example, with METEL WDM modules, it is only possible to interconnect the module marked W4 with the module marked W5. You cannot connect W4 to W4 or W5 to W5.

Note:

For the correct functionality of the LAN-RING.v1 and .v2 systems, it is necessary to connect optical connectors so that the optical fiber always connects the lower index port with the higher index port.



In the picture below you can find the maximum draw through each port. In accordance with standard EN 62676-1-2 we recommend the system be designed with a 25% reserve.

