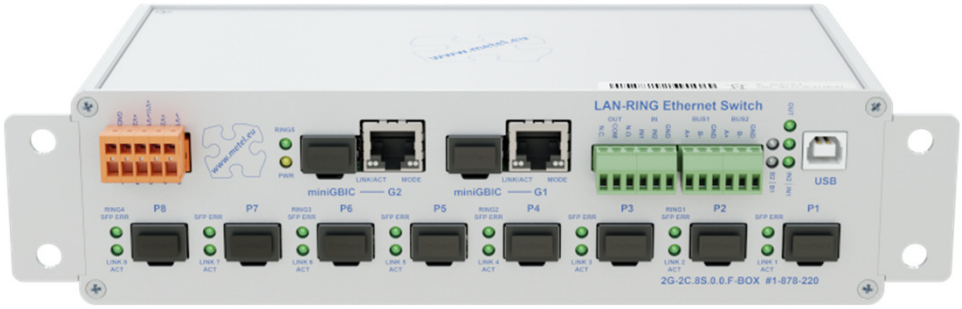


- 2x COMBO Ports (SFP/RJ45) (1)
- 8x SFP Ports Supporting 100BASE-X (2)
- Serial Buses 2x RS485 / 1x RS422 / Modbus
- 2x Digital/Alarm Inputs
- 1x Programmable Relay Output
- 2x Independent Supply Inputs
- Redundant Topology LAN-RING, RSTP-M
- Event Management, Supporting: HTTP/ONVIF Client, E-mail, IP Watchdogs, ETH Events, TCP, Modbus, DIO, Balanced Loops...
- Support of Visualization Software
- Encrypted Management over LAN/Local USB
- VLAN, QoS, SNMP, SMTP, SNTP, IGMP, RSTP(-M), LLDP, 802.1X
- Fine Overvoltage Protections on All Ports
- Maximum Start Time 15s
- Operating Range –40°C to +70°C
- Operating Range of Components –40°C to +85°C

PRODUCT NAME	CODE	NOTE
2G-2C.8S.0.0.F-BOX	1-878-220	10-60VDC/10-30VAC
Holders for DIN35, Flat Surface and to 10" Cabinets are Included.		

AVAILABLE PORTS:	COMBO(1)	SFP(2)	DI	RELAY	RS485/422
2G-2C.8S.0.0.F-BOX	2	8	2	1	2/1

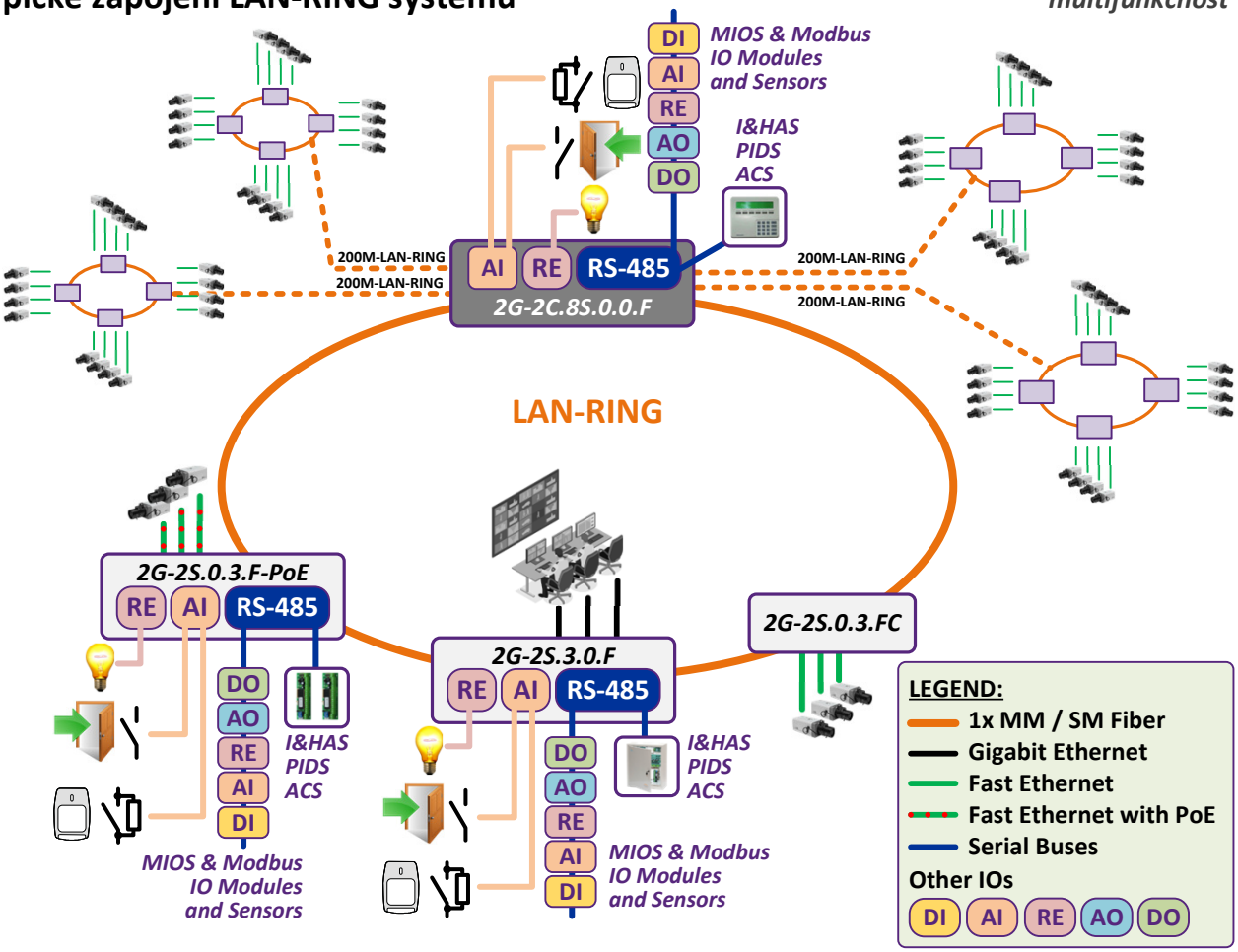
For Available SFP Modules Visit www.metel.eu

(1) Compatible with 100/1000BASE-X and 10/100/1000BASE-T

(2) Compatible with 100BASE-X

Typické zapojení LAN-RING systému

multifunkčnost



2x SFP Slots with 100/1000BASE-X Support

Switches 2G-2C.8S.0.0.F have 2 COMBO ports universally usable both for SFP modules METEL (tab on the right) and for SFP modules of other manufacturers. If the SFP module is not inserted into the slot, the adjacent gigabit port is automatically activated, which supports the 10BASE-T, 100BASE-Tx, 1000BASE-T, Auto negotiation and MDI / MDI-X standards.

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 (all versions -20-)
- minimum warranty period 5 years

PRODUCT NAME	CODE	CONNECTOR	RANGE[1]
BX-100-20-W4-L	4-101-020	SC / PC	20 / 5 km
BX-100-20-W5-L	4-101-010	SC / PC	20 / 5 km
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 / - km
BX-1000-60-W5-L	4-101-112	SC / PC	60 / - km

[1] singlemode (9/125µm) / multimode (50/125µm)

8x Port SFP with supporting 100BASE-X

Switch is equipped with eight universal SFP ports. Into SFP slot, it is possible to insert SFP modules METEL or other manufacturers' supporting 100BASE-X standard.

2x RS485/Modbus-RTU Busses

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.

🕮 **The transmission of system buses of I&HAS systems is certified according to EN50131-1.**

Further info pages 12 - 13 17 - 18

2x Digital/Alarm Inputs

Digital/alarm inputs are mainly used for connecting button tampers, PIR sensors and others. 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.

Further info page 9

1x Programmable Relay Output

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

Further info page 14

2 Independent Power Inputs

The switches have 2 independent power inputs 10 to 60VDC and one 10-30VAC input. Typical applications with backup power supply are systems where the switch is part of the IP CCTV system and at the same time transmits the system bus of the I&HAS system. The inputs are protected against overvoltage.

Further info page 18

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.

Further info page 5

Technical Parameters

compatibility

	Parameter	Value		Unit	Note
SFP	Count	8			FE
	Supported Formats	100 BaseX			Compatible with MSA
	Overvoltage Protection	150		A	8/20µs
	Connector	RJ45			
COMBO Ports	Count	2			
	SFP slot(1) - Supported Formats	100/1000 BASE-LX, BASE-BX			Compatible with MSA
	RJ45(1)	10/100/1000 BASE-T			
Management	Application	SIMULand			Windows Application
RS485/RS422(2)	Count	2/1			
	Speed	Max. 57.6		kbps	
	Overvoltage Protection	30		A	8/20µs
Digital Inputs	Count	2			
	Mode	Digital - NC / NO			
		Analog 0 - 30kΩ for Balanced Loops			
Relay Output	Type of contact	1x Change-over			
	Max. Load	62.5VA (30W) / 1A / 60V			Resistive Load
Power Supply		Main input	Back-up input		
		10 - 60 / 10 - 30	10 - 60	VDC/AC	
	Power Consumption	Max. 13		W	
	Overvoltage Protection	1500		W	10/1000µs
Environment	Operational Range	–40...+70		°C	Temperature of Environment
	Storage Range	–40...+70		°C	
	Humidity	Max. 95		%	Non-condensing
	Weight	1.1		kg	
Certification		CE, TUV			

The producer retains the right to change any technical parameters without previous written or published notification.

(1, 2) It is not possible to use both interfaces at the same time.

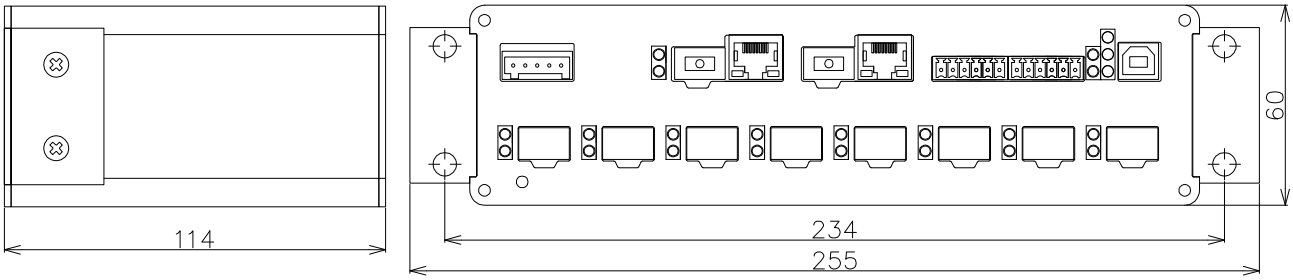
Electromagnetic Compatibility

compatibility

Standard	Tested Level – Criteria	Note
EN 55024 - Information technology equipment - Immunity characteristics - Limits and methods of measurement		
EN 61000-4-2 – Contact Discharge	Level 4 – Criteria B	8kV
EN 61000-4-2 – Air Discharge	Level 4 – Criteria B	15kV
EN 61000-4-4 – Bursts	Level 4 – Criteria B	4kV / 5kHz
EN 61000-4-5 – Surge Immunity	Level 3 – Criteria B	2kV
EN 61000-4-8 – Magnetic Field 50 Hz	Level 5 – Criteria A	100A
EN 61000-4-9 – Pulse Magnetic Field	Level 5 – Criteria A	1000A
EN 55022 – Radiated Emission	Class A	

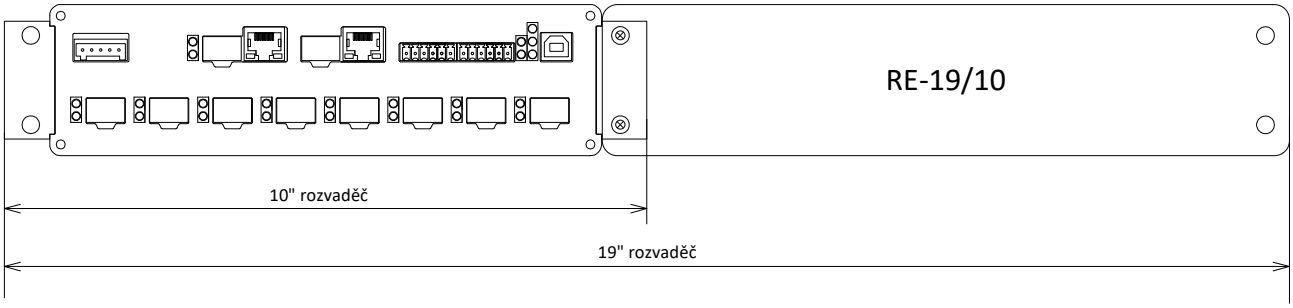
Dimensions of 2G-2C.8S.0.0.F

universality



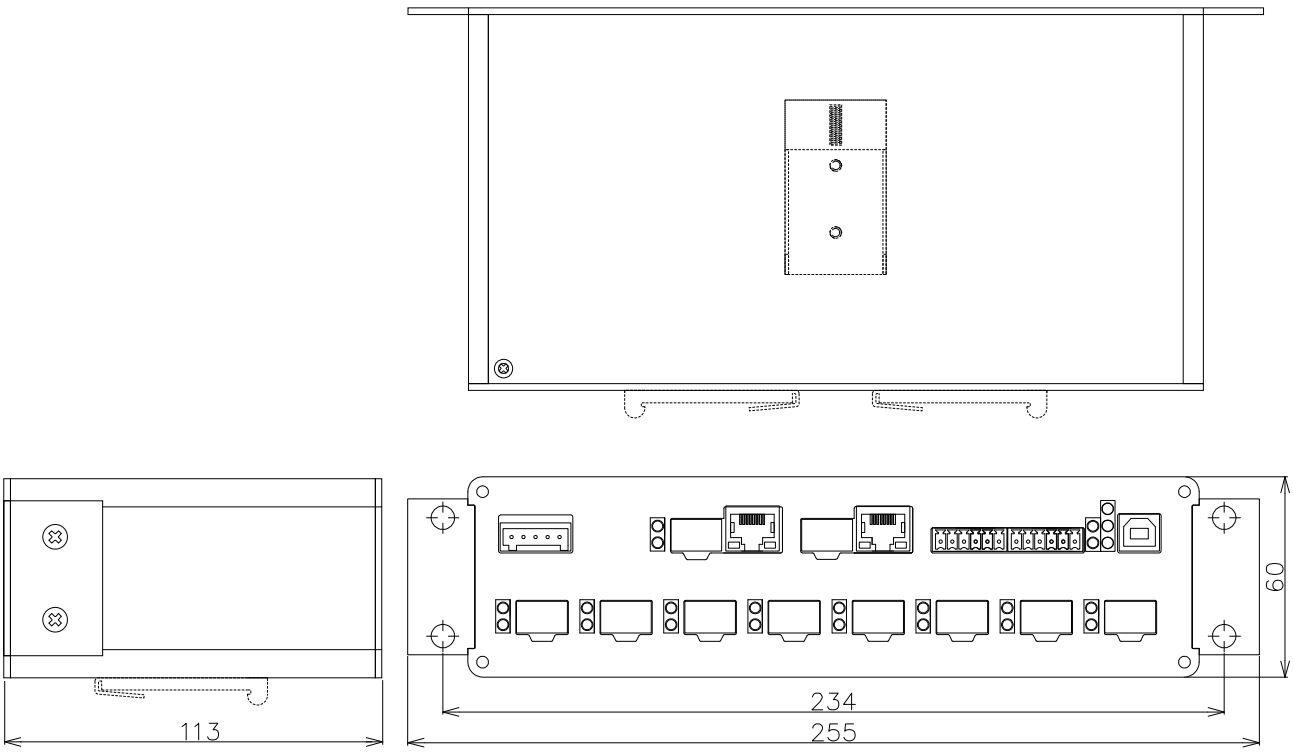
Mounting in the 10" and 19" rack

universality



Mounting to DIN35

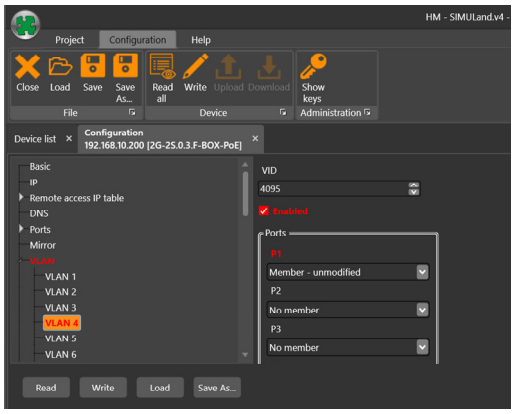
universality

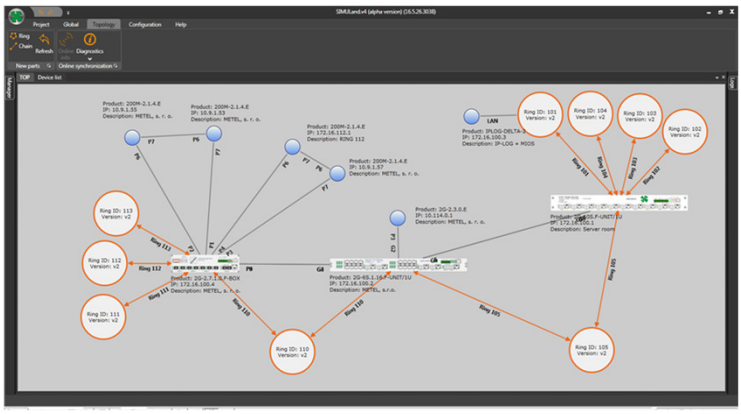


REV: 201608 – Default
201906 – Design change, added 802.1X protocol, galvanically separated cover from the electronics
202303 – Text correction

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, etc.**
- ❖ **Access to the device log**

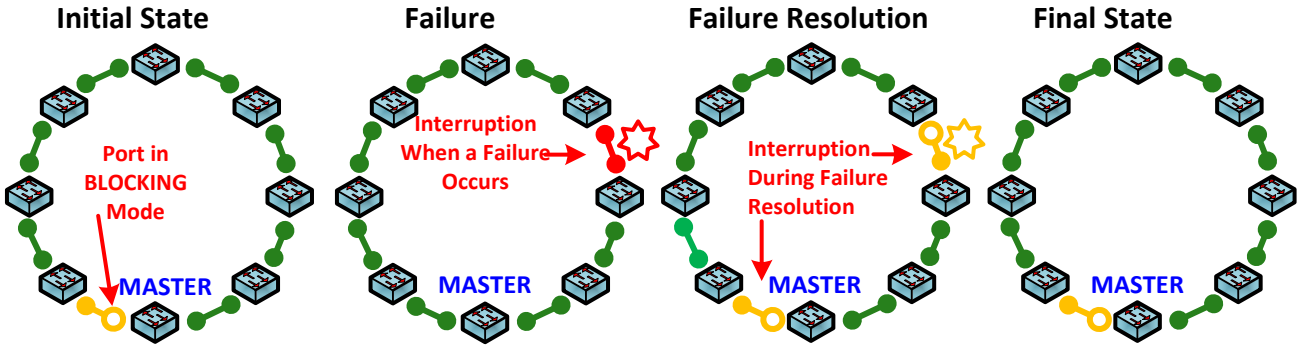
SIMULand.v4 is a Windows desktop software with a GUI for bulk configuration of LAN-RING devices in Online, Offline or USB mode. It also includes a number of tools for network communication analysis, including fully automatic detection of network topology with display of optical and metallic connections, 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.	

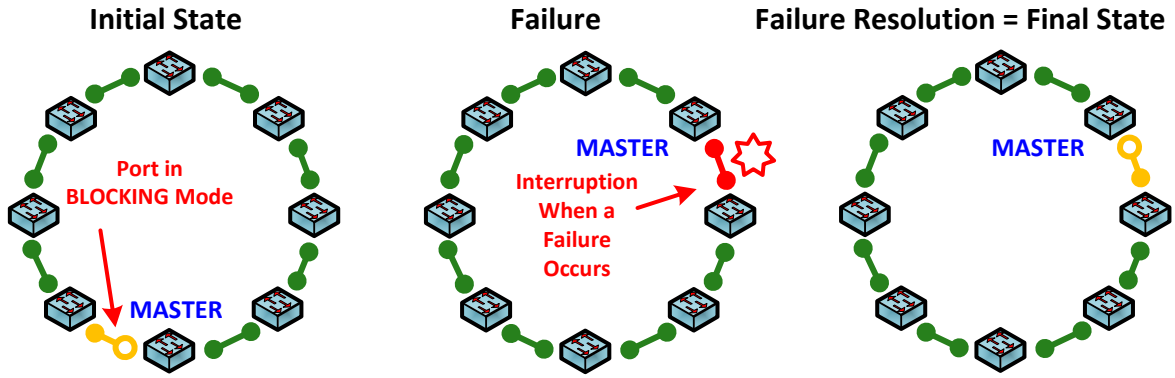
LIST OF SUPPORTED DEVICES				
BB-x.x.x-22	2G-0.1.4	2G-RS.E6	2G-2S.0.2.F-BOX-PoE	IPLOG-DELTA-1-Elfar
200M-1.0.4.E-W4	2G-0.1.4.E	RING-IO	2G-2S.0.2.F-BOX-PoE-PP	IPLOG-DELTA-1-R62
200M-1.0.4.E-W4-PoE+	2G-0.1.8.E	LAN-485	2G-2S.1.4.F-BOX	IPLOG-DELTA-1-Peridect
200M-1.0.4.E-W5	2G-0.1.8.EC	200M-2.1.4.E	2G-2S.1.4.F-BOX-PoE-PP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

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.

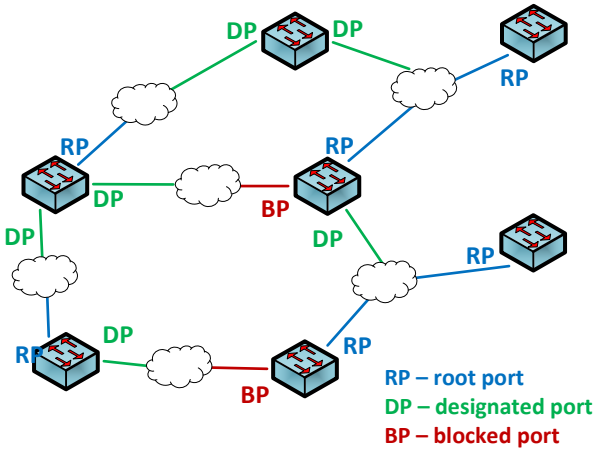


🕮 **The switchover time to the back-up line is for LAN-RING protocols slightly dependent on the number of switches connected in the ring. With each switch connected to the ring, the reconfiguration time increases by only about 6µs!**

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:

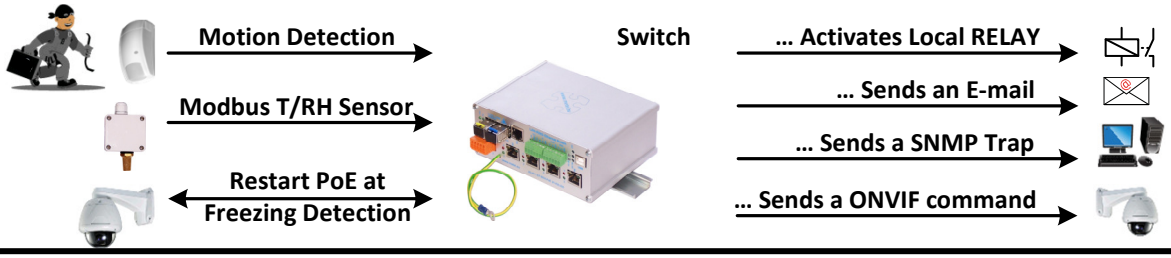
- ❖ is fully compatible with RSTP according to IEEE 802.1D-2004
- ❖ supports MESH topology
- ❖ reduces reconfiguration times to a minimum



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

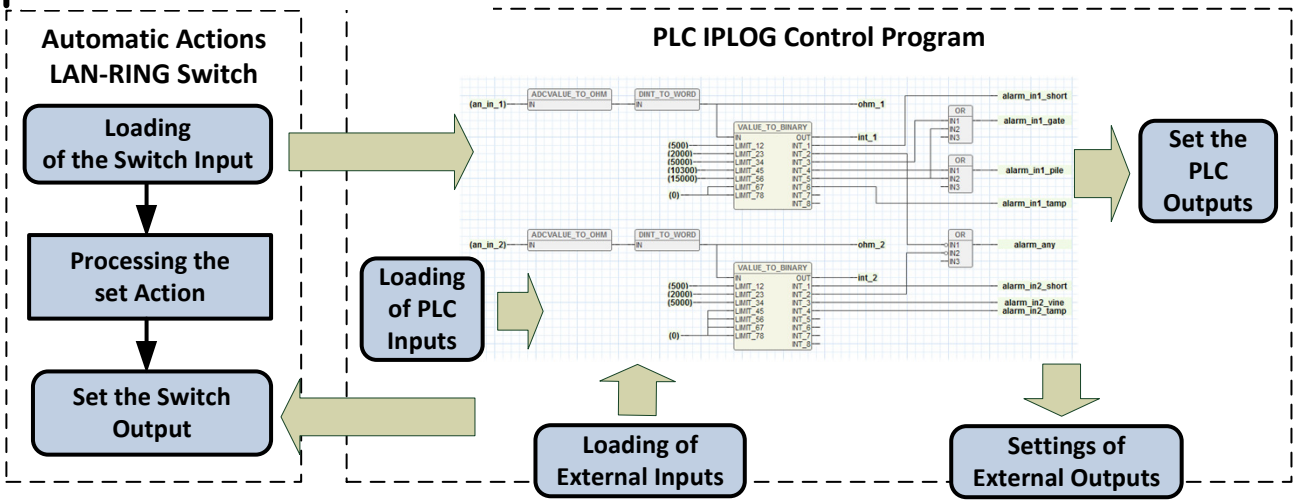


Available Inputs and Outputs

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, etc.
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

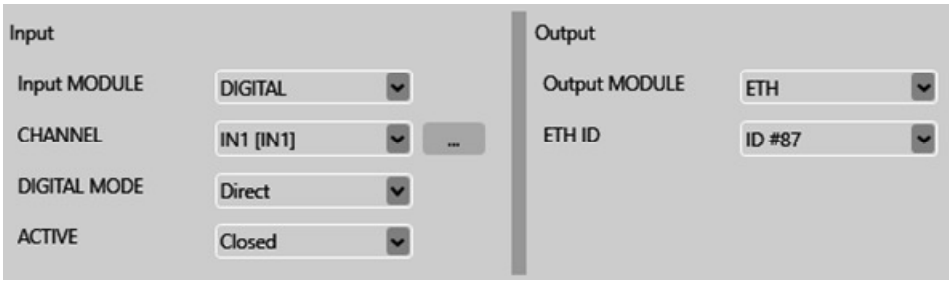


Event Management - ETH, DIGITAL

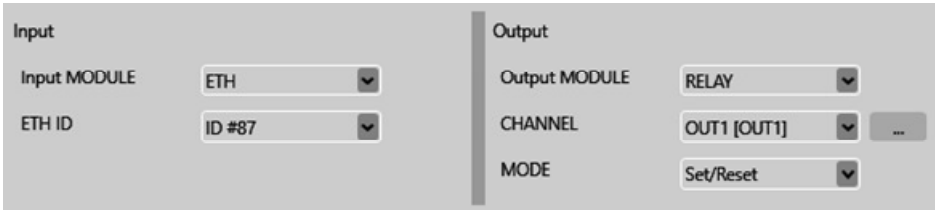
ETH

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.*



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



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

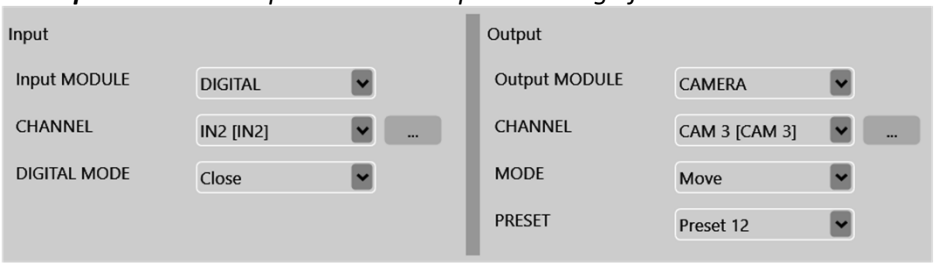
Application note: *I/O transfer between switches*

DIGITAL

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

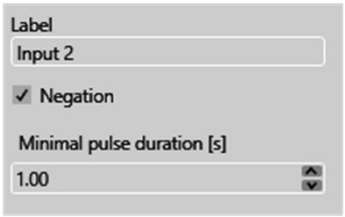
DIGITAL MODE - supported modes
Close - event is triggered by closing the input (connection of IN to GND)
Open - the event is triggered by opening the input
Direct - the input status is sent every 3 seconds. When there is a change, this change is sent immediately
Change - the event is triggered by closing or opening the input

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



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.**

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.

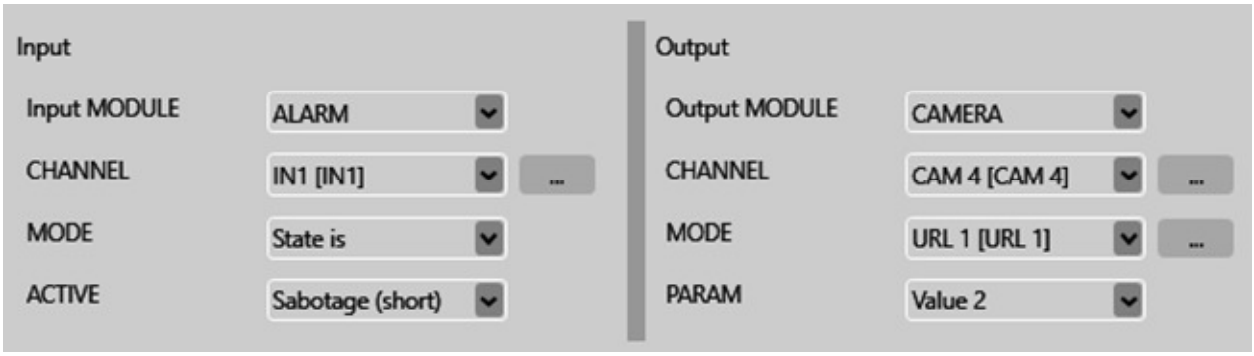
State change –- Response to state change only.

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.

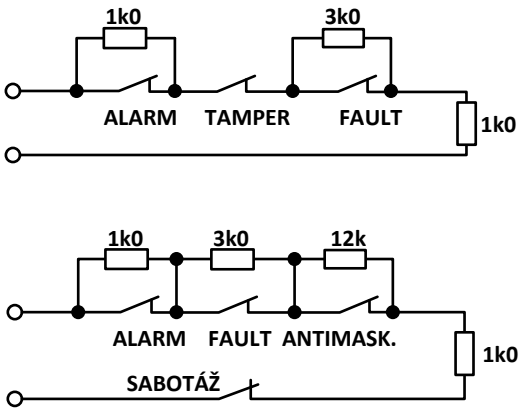
Value change - The information is sent when the value of the balanced loop changes.

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.

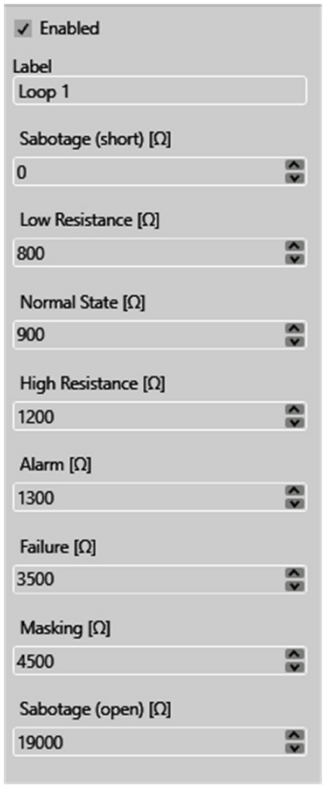
Example: *If the resistance of the alarm loop at input IN1 corresponds to Sabotage (short), an HTTP user command URL1* ***("Camera / User commands")*** *with a value of 2 is sent to camera No. 4.*



Examples of alarm loop balancing:



Menu with alarm loop settings:



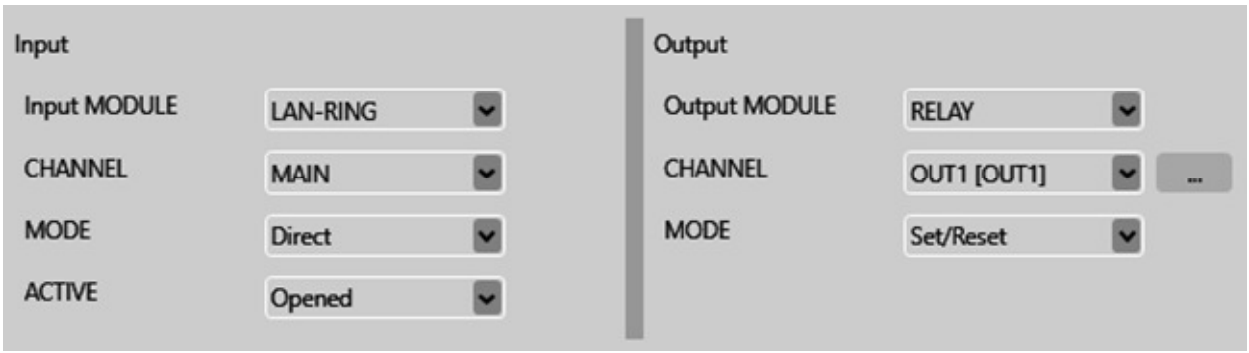
🕮 **The METEL-COMIO-EZS-MIB file is available for monitoring alarm inputs via the SNMP protocol, which also contains SNMP TRAP permissions.**

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

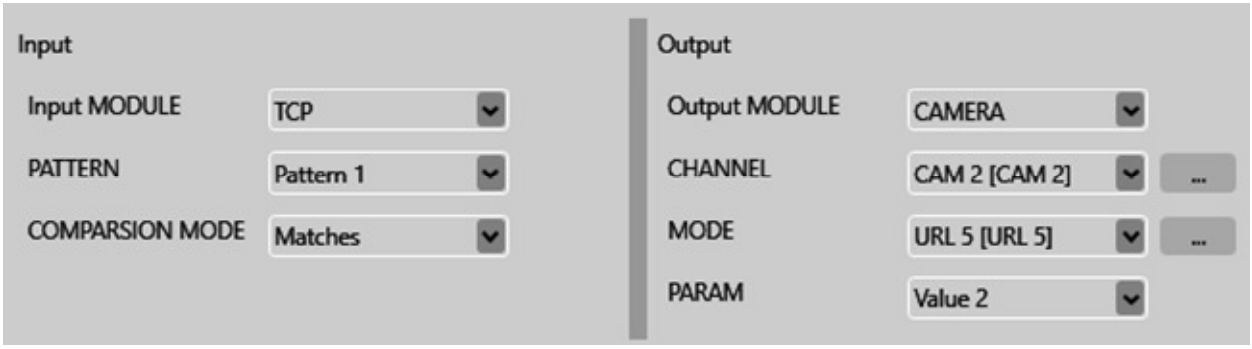
Example: *The state of the ring is transmitted to the relay output, which is connected to the signaling LED light. In case the ring is disconnected, the light is active.*



🕮 **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: *If the switch intercepts a TCP notification from the network with the entered text (pattern), it will control the camera No. 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.

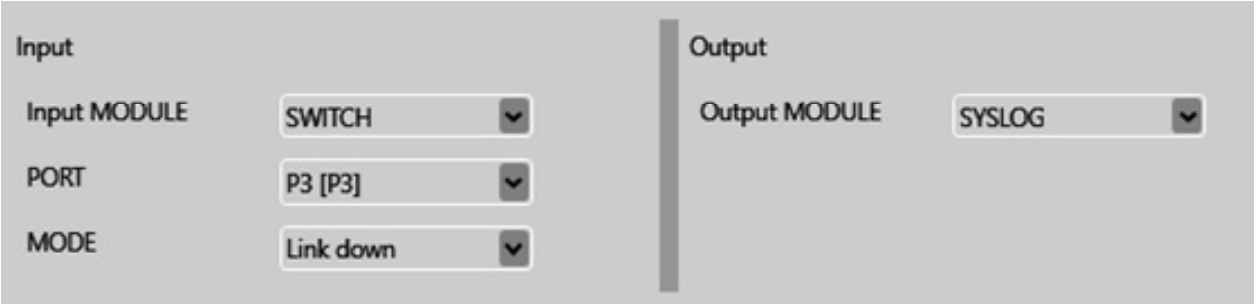
SWITCH as Input

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.*



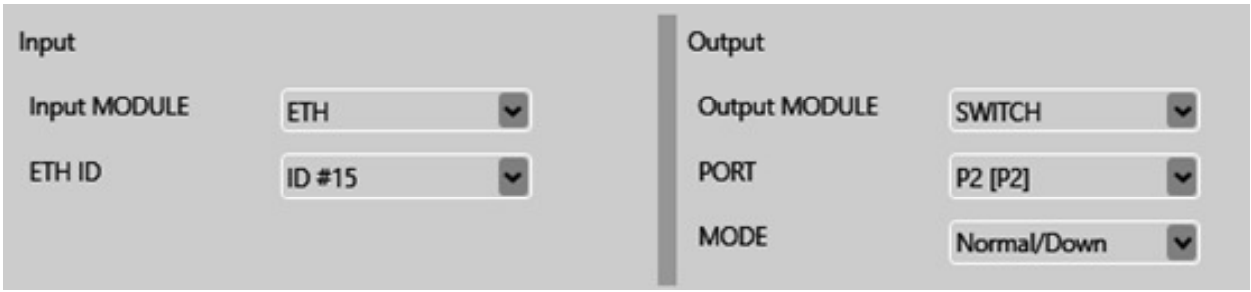
SWITCH as Output

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

MODE

Normal - port active, ready
Normal/Down - port on/off
Down - port off
Down/Normal - port off/on

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



🕮 **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: *When data reception on the BUS2 is interrupted, the log is written to the SD card of the switch.*

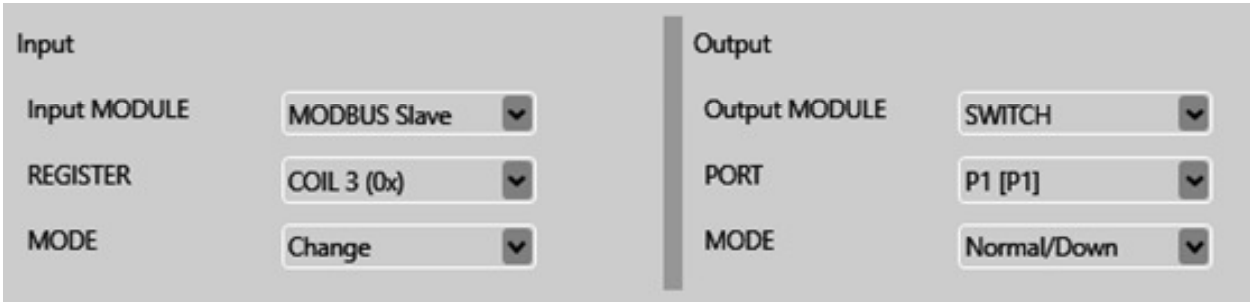
🕮 **The METEL-COMIO-BUS-MIB file is available for SNMP bus monitoring, which also contains SNMP TRAP permissions.**

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

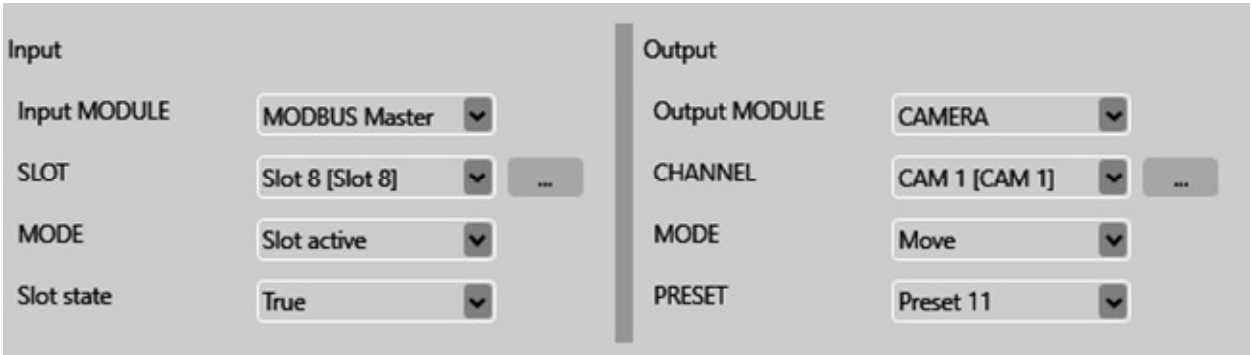
Example: *The Modbus Master device writes to COIL register No. 3 on the switch and thus turns on/off port No. 1 on the switch.*



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

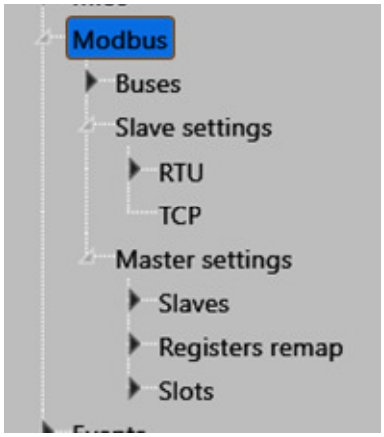
Example: *The switch reads the register from slot 8 and, if logical 1 is read from the register, turns the camera 1 to position 11.*



Application notes: *MODBUS configuration (18 pages)*

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	Analogue output
Input	16-bit	Read-Only	Analogue 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

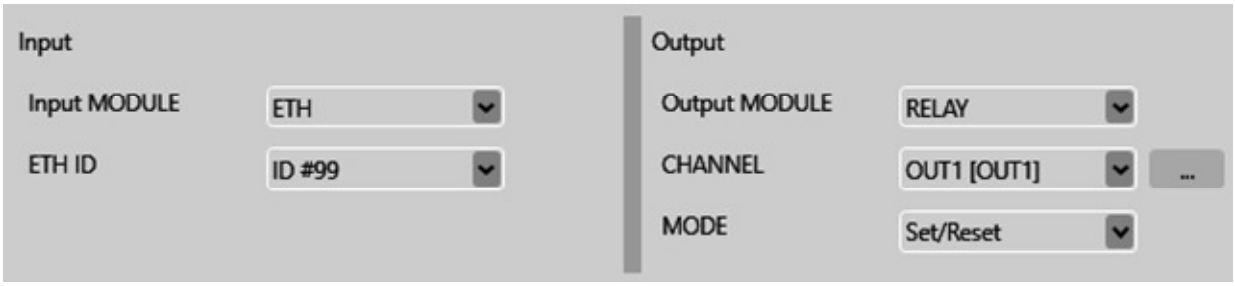
RELAY

Programmable relay output switch

MODE

Set only - activates the selected output
Reset only - deactivates the selected output
Set/Reset - copies the status of the input to the output
Reset/Set - the same with negation
Override On - power on with higher priority
Override Off - shutdown with higher priority
Override On/Off - on/off with higher priority
Override Off/On - the same with negation
Pulse Set - activates the output for the set time
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.*

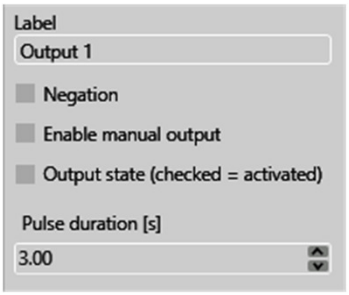


„Extension / Output“

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) - with 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.

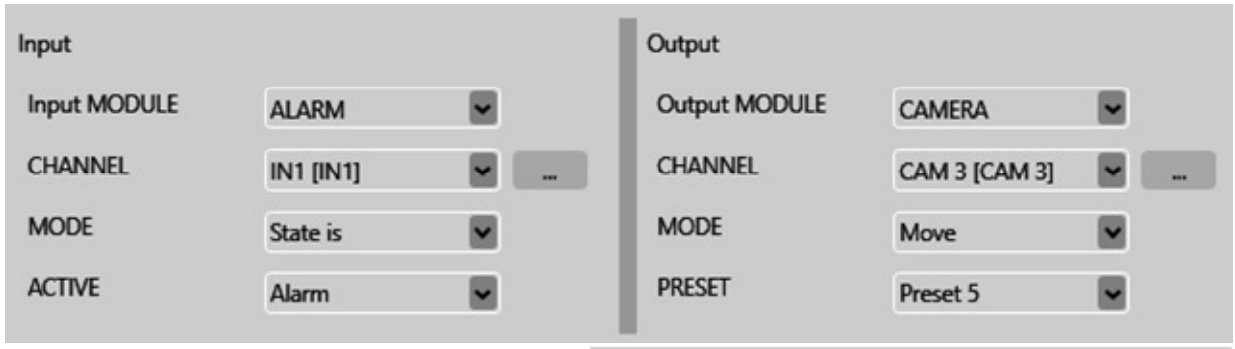
Camera

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.*



„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

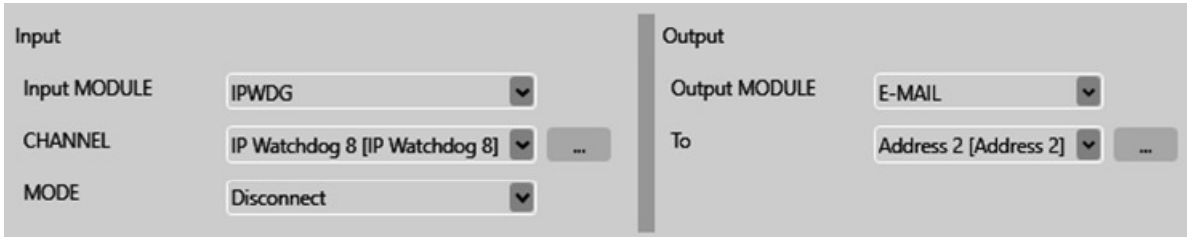
	Ip	Model	Username	Password
CAM 1	192.168.32.101	ONVIF	USER	g576FRD47VIZU
CAM 2	192.168.32.102	ONVIF	USER	g576FRD47VIZU
CAM 3	192.168.32.11	Axis	ADMIN	BZUGHIP76a
CAM 4	192.168.32.120	Other	kamil	uu6709R64řž
CAM 5	192.168.32.200	ONVIF	USER	g576FRD47VIZU
CAM 6	192.168.32.180	ONVIF	USER	bhgGJGCkhj
CAM 7	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.*



🕮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.

PoE and IP Watchdog

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

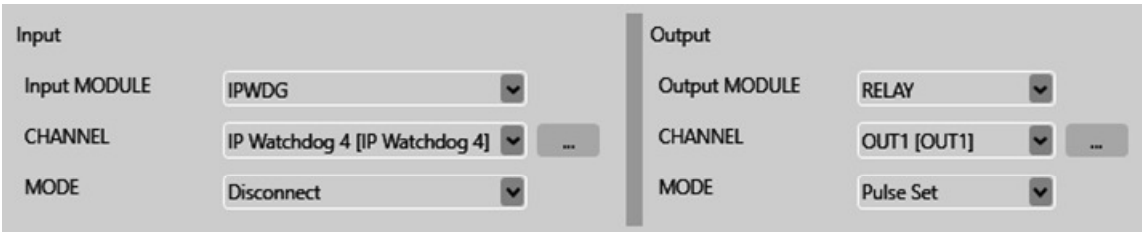
Settings

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 off (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.

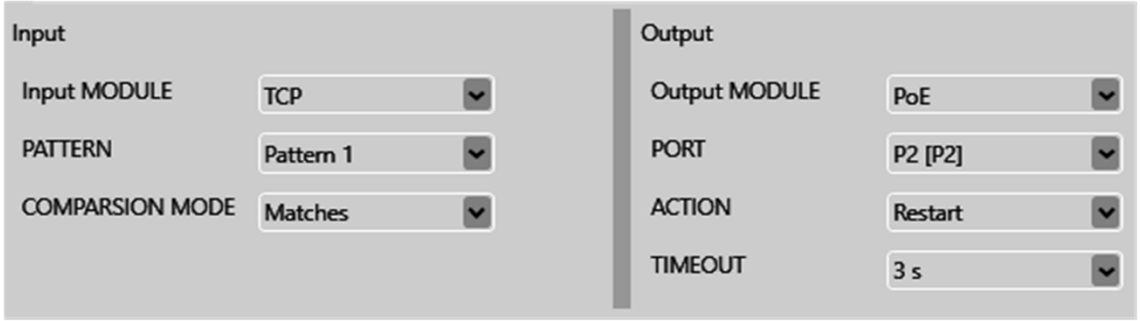
IP camera specifications in the "Extension/IP watchdog" menu

	IP address	Retry count	Restart PoE	Restart PoE timeout [s]
IP Watchdog 1	192.168.20.6	2	✓	3
IP Watchdog 2	192.168.20.7	2	✓	3
IP Watchdog 3	192.168.20.8	2	✓	3
IP Watchdog 4	192.168.20.9	0		
IP Watchdog 5	0.0.0.0	0		
IP Watchdog 6	0.0.0.0	0		
IP Watchdog 7	0.0.0.0	0		
IP Watchdog 8	0.0.0.0	0		

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



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



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

		BUS 2				
		ASSET	GALAXY	MODBUS	RS485	POZNÁMKA
BUS 1	ASSET	X	X	OK	OK	I&HAS Fides
	GALAXY	X	X	OK	OK	I&HAS Honeywell
	MODBUS	OK	OK	OK	OK	MODBUS ASCII/RTU
	RS485	OK	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**

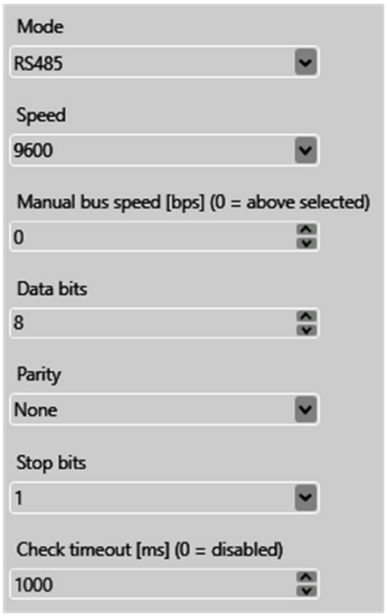
We recommend monitoring the activity of all ports of the system using the SNMP protocol

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



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

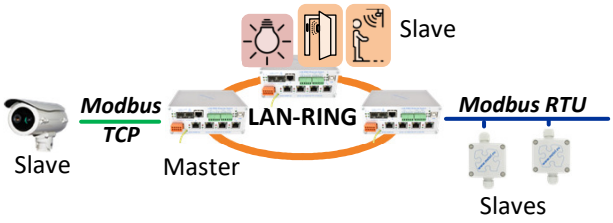
MODBUS RTU / TCP - Support in LAN-RING and IPLOG Devices

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
Slave na sběrnici	Max. 30	Max. 16
R / W cyklus	> 10 ms	> 100 ms

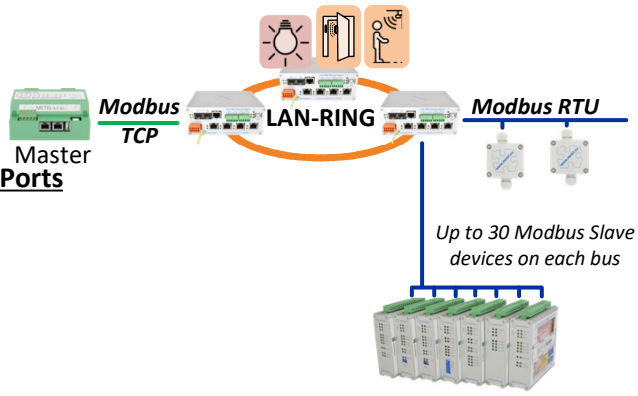
Transparent Modbus Data Transfer between RS485 POrts

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

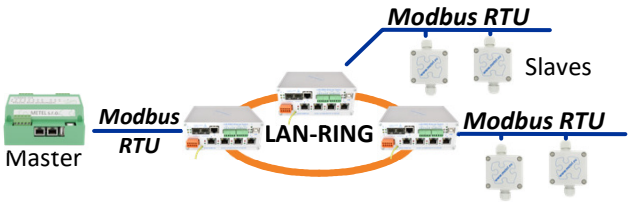


MODBUS SLAVE Mode

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

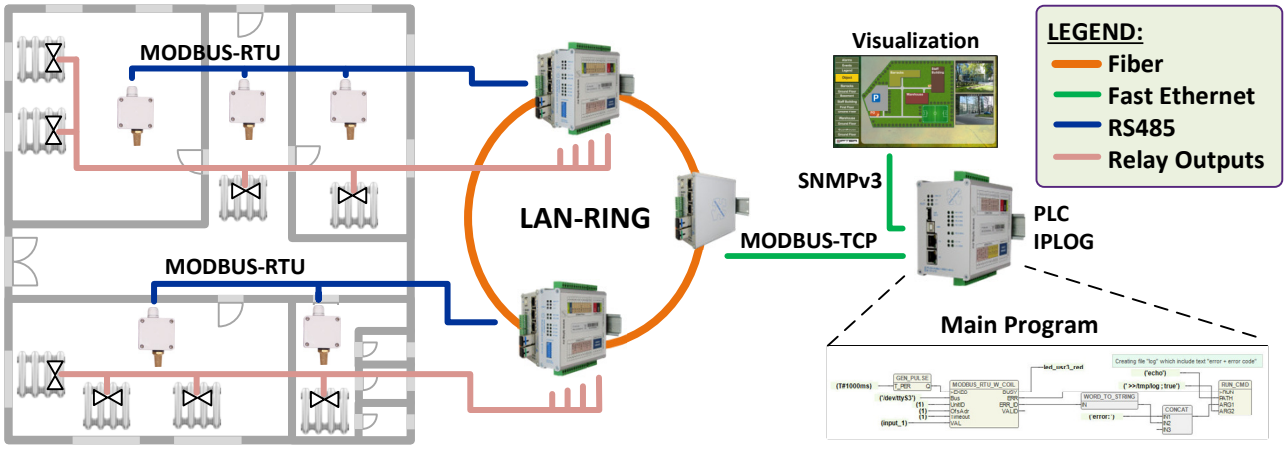


Transparent Modbus Data Transfer between RS485 Ports



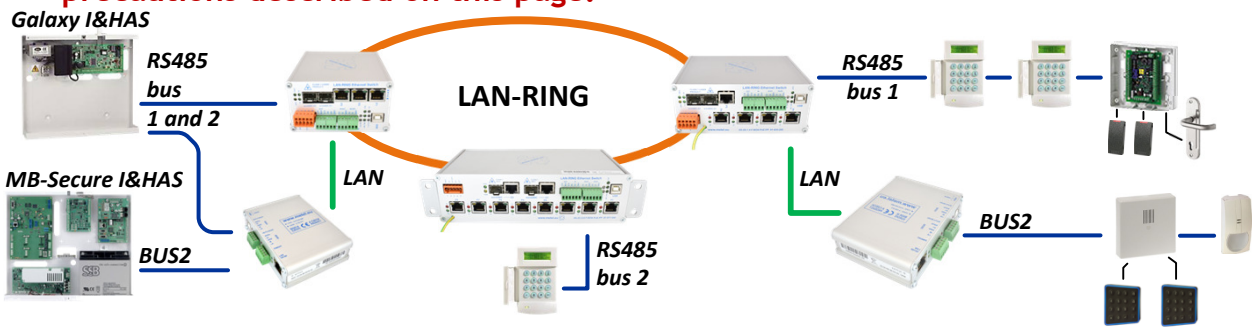
Comprehensive MODBUS Solution for Data Collection, Control and Visualization of Objects

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.



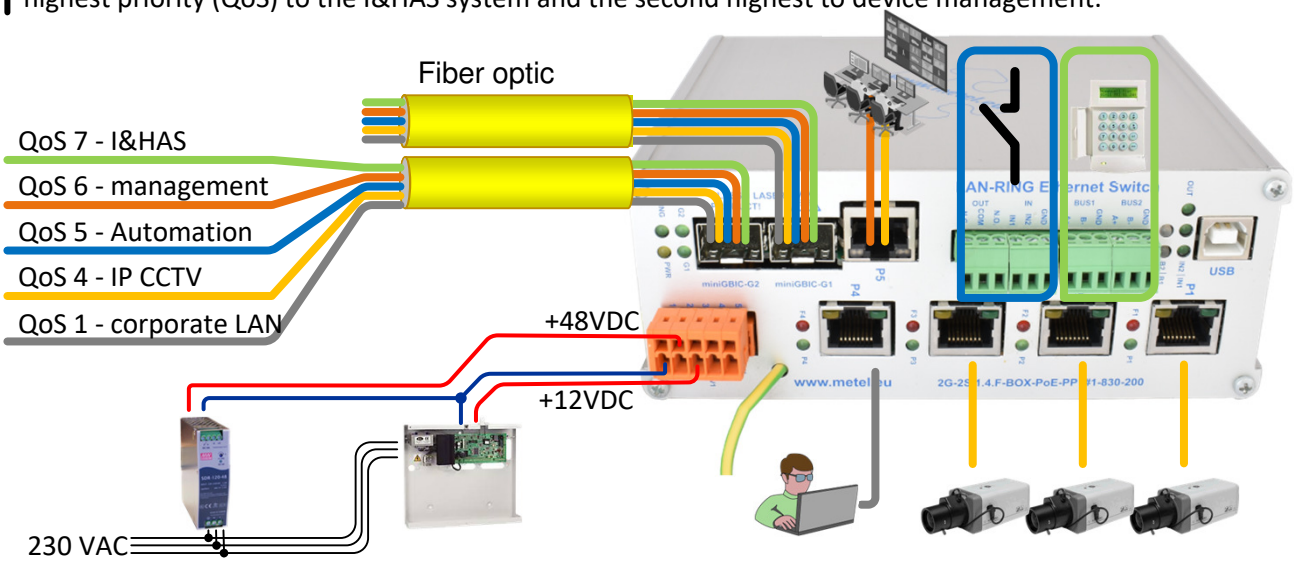
Event Management – Serial Bus

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

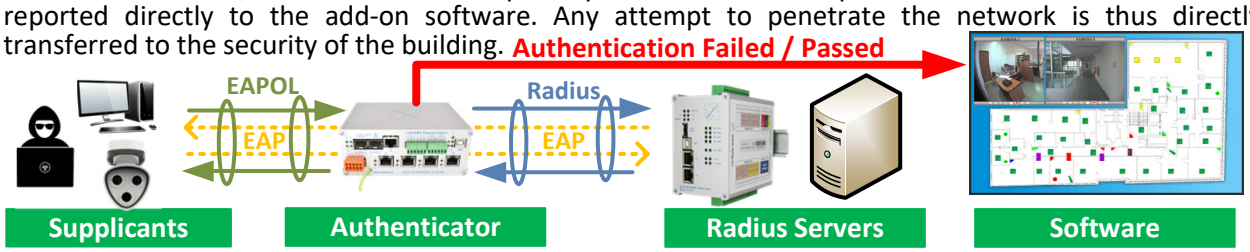
LAN-RING switches belong to the L2 industrial switches, which corresponds to the supported network protocols. We recommend using L2 / 3 G series switches in applications requiring Layer 3 protocol support.

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 practically 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-MODBUS-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.**

Quick Installation Manual REV:202303

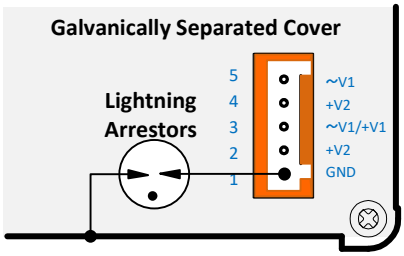
2G-2C.8S.0.0.F

Industrial Managed Switches

1. **Mounting**
   Mount the switch to flat surface, DIN35 rail or to a 10" switchboard. All the necessary holders are included. When mounting to a 19" switchboard use BREAK-RACK-19/10-RE adapter.

2. **Connect Supply**
   According to the pictures below, connect the power supply in the range of 10-60VDC or 10-30VAC. Connection of supply is indicated by LED PWR switching on.

   The metal cover is galvanically separated from the electronic circuitry of the switch. A lightening arrester is connected between the GND terminal and the cover. The switches can therefore be used in systems with an earthed (-) or (+) power supply pole.



3. **Insert Optical Module**
   Any SFP module complying with MSA requirements (agreement of SFP modules manufacturers) can be inserted into the SFP slot. For modules with duplex transmission over one fiber (wavelength multiplex) we must ensure that the optical modules are connected correctly to each other. That means that e.g. for WDM modules METEL can interconnect W4 with W5. We can't interconnect W4 with W4 or W5 with W5.

Note:
For the correct functioning of LAN-RING.v1 and v2 it is necessary to observe the correct connection to the GBIC modules. W4 module must be plugged into the slot MiniGBIC-G1 and module labeled W5 into the slot labeled MiniGBIC-G2.

BUS1, BUS2:
2 serial buses RS485 (or 1x RS422). Overvoltage protection 30A (8/20µs).

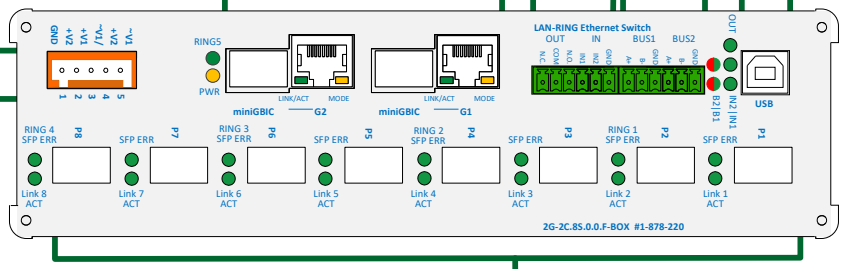
IN1, IN2: Programmable digital/alarm inputs for connection of contact switches, tampers, PIR sensors,...Inputs are protected with overvoltage protection 30A (8/20µs).

OUT: Relay with change-over contact. Output is protected with resetable current protection.

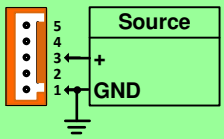
USB:
port for local USB management from the SIMULand application.

miniGBIC – G1, G2:
COMBO PORTS with:
- SFP slot for insertion of miniGBIC SFP modules (100/1000 BASE-X),
- RJ45 port 10/100/1000Mbps.

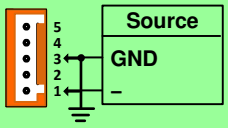
RJ45 port is equipped with overvoltage protection 30A (8/20µs).



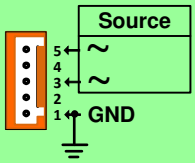
Main Supply Input:
DC Supply +10 up to +60V



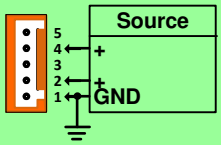
DC Supply −10 up to −60V



AC Supply 10 up to 30V

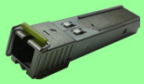


Redundant Supply Input:
DC Supply +10 up to +60V



Notes:
- terminals 2 and 4 are connected
- use both power inputs simultaneously can only be used in systems with a grounded (-) power supply pole

miniGBIC – Gx:
- SFP slots for insertion of miniGBIC SFP modules (100BASE-X)



LED Function Description

Power:	**PWR**	lights = connected to power supply OFF = power off, power failure
RING.v1:	**RING 1-5**	1x ON to OFF = the switch is MASTER and the circle is closed 2x ON to OFF = the switch is MASTER, the circle is not closed, the higher or both ports are disconnected 3x ON to OFF = the switch is MASTER, the circle is not closed, both ports are active or lower disconnected 1x flashing = the switch is SLAVE and the circle is closed 3x flashing = the switch is SLAVE, the circle is not closed, both ports are active or lower disconnected 4x flashing = the switch is SLAVE, the circle is not closed, the higher port or both ports are disconnected OFF = LAN-RING protocol is off
RING.v2:	**RING 1-5**	1x ON to OFF = the switch is MASTER and the circle is closed 4x ON to OFF = the switch is MASTER, the circle is not closed 1x flashing = the switch is SLAVE and the circle is closed 2x flashing = the switch is SLAVE, the circle is not closed OFF = LAN-RING protocol is off
COMPO Ports:	**RJ45**	green LINK/ACT = connected optical fiber or metalic with the other side flashing = the communication orange MODE = connected 1Gbit
SFP:	**SFP ERR** **LINK 1-8** **ACT**	lights = error PoE power supply to the end device (for example, a short-circuit) flashing = connected the fibre
RS485 buses:	**B1, B2**	**red LED** flashing = the RS485 port sends data to the bus OFF = does not send data **green LED** flashing = the RS485 port receives data on the bus OFF = does not send data
Inputs IN1 - IN2:	**IN1, IN2**	DIGITAL MODE: ON = closed OFF = open ALARM MODE: flashing
Relay output:	**OUT1**	ON=relay activated (connected N.O. - COM) OFF=relay deactivated or the module is without power (connected N.C. - COM)