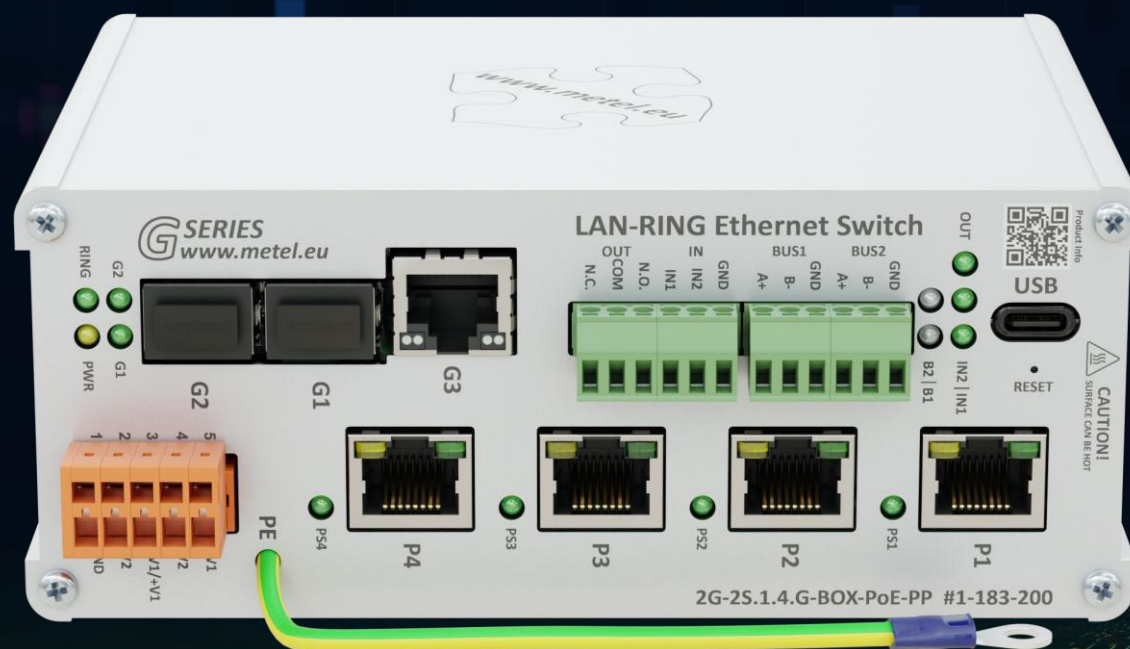




METEL.EU

SECURITY & AUTOMATION

Infrastructure LAN-RING & IPLOG



Update 1/2025



Network Infrastructure Design Step-by-Step

Explaining the Differences Between the F and G Series

- Explanation of the meaning of text colour

Normal text is white

Yellow is important text

Red means or blue text means that this feature is being prepared

Infrastructure LAN-RING & IPLOG

Part: Network Infrastructure Design Step-by-Step

- Explaining the Differences Between the F and G Series
- Selecting Bandwidth for Backbone Segments
- Selecting the Network Management Method (CLI, SIMUland)
- Ensuring Security
 - Secure boot | PKI | Tacacs+ | Encrypted access...
 - Physical security
 - NIS2 - Supply Chain Security | NDAA | ISO27001
 - Redundant topology
 - SNMP Monitoring
 - Syslog
 - EN 50131-1 Certification
 - Backup and Redundant Power Supply



METEL.EU
SECURITY & AUTOMATION

Network Infrastructure Design Step-by-Step

Explaining the Differences Between the F and G Series

- In July 2024, we added the first models of the G series to the F series in production and made significant progress in the development of the H series.

Managed Switches ->	F Series	G Series	H Series
Availability	Full production	Full production	Under development
Secure Boot	✓	✓	✓
Configuration via SIMULand	✓	✓	✓
Configuration via CLI		✓	✓
Running and Boot Config		✓	✓
Timer (Delayed Reboot)		✓	✓
Event Management	✓	✓	✓
Control Tasks			✓
Modbus RTU/TCP support	✓	✓	✓
Support RS485 Galaxy, Asset...	✓		✓

Network Infrastructure Design Step-by-Step

Explaining the Differences Between the F and G Series

- Devices of the F, G and H series are from outside almost identical.

20G-2X.8C.0.F-UNIT/1U



20G-2X.8C.0.G-UNIT/1U

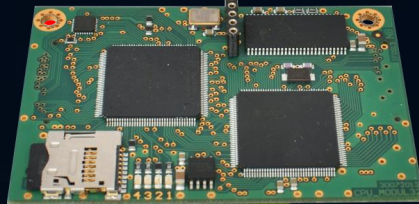


20G-2X.8C.0.H-UNIT/1U



LAN-RING
Switches

CPU module F



CPU module G



CPU module H



IPLOG-G1-05-BOX



IPLOG-H1-05-BOX

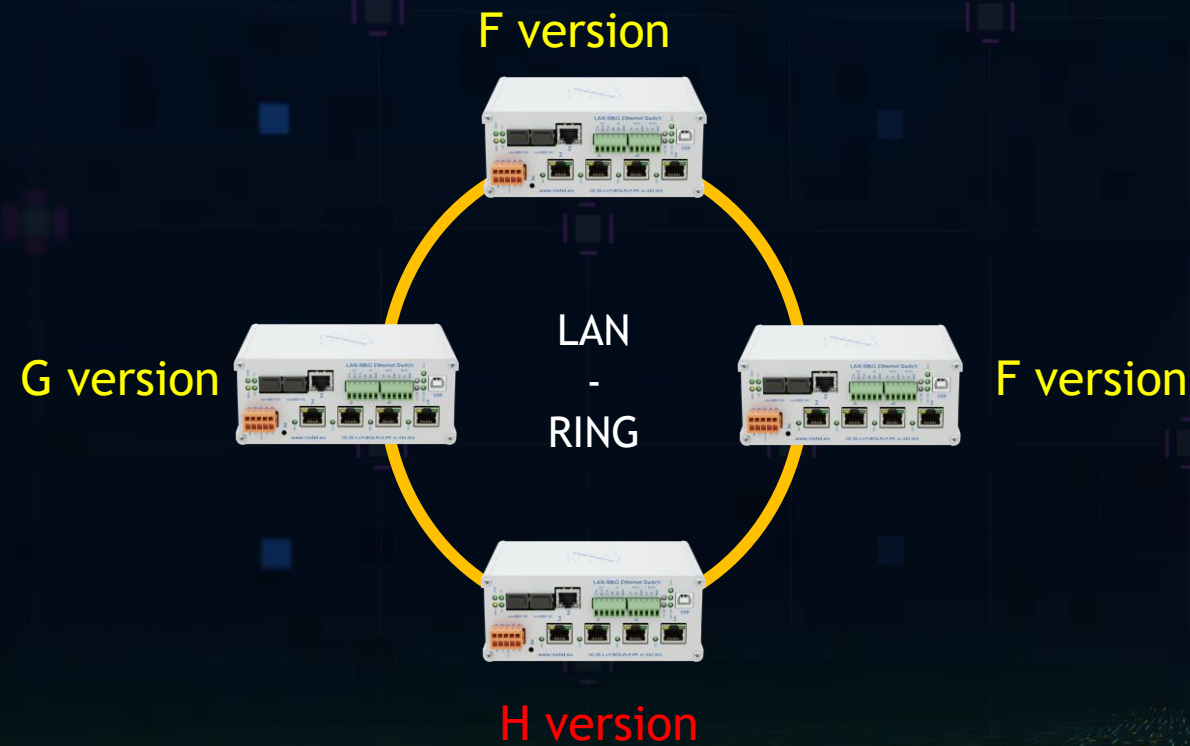


IPLOG
PLCs

Network Infrastructure Design Step-by-Step

Explaining the Differences Between the F and G Series

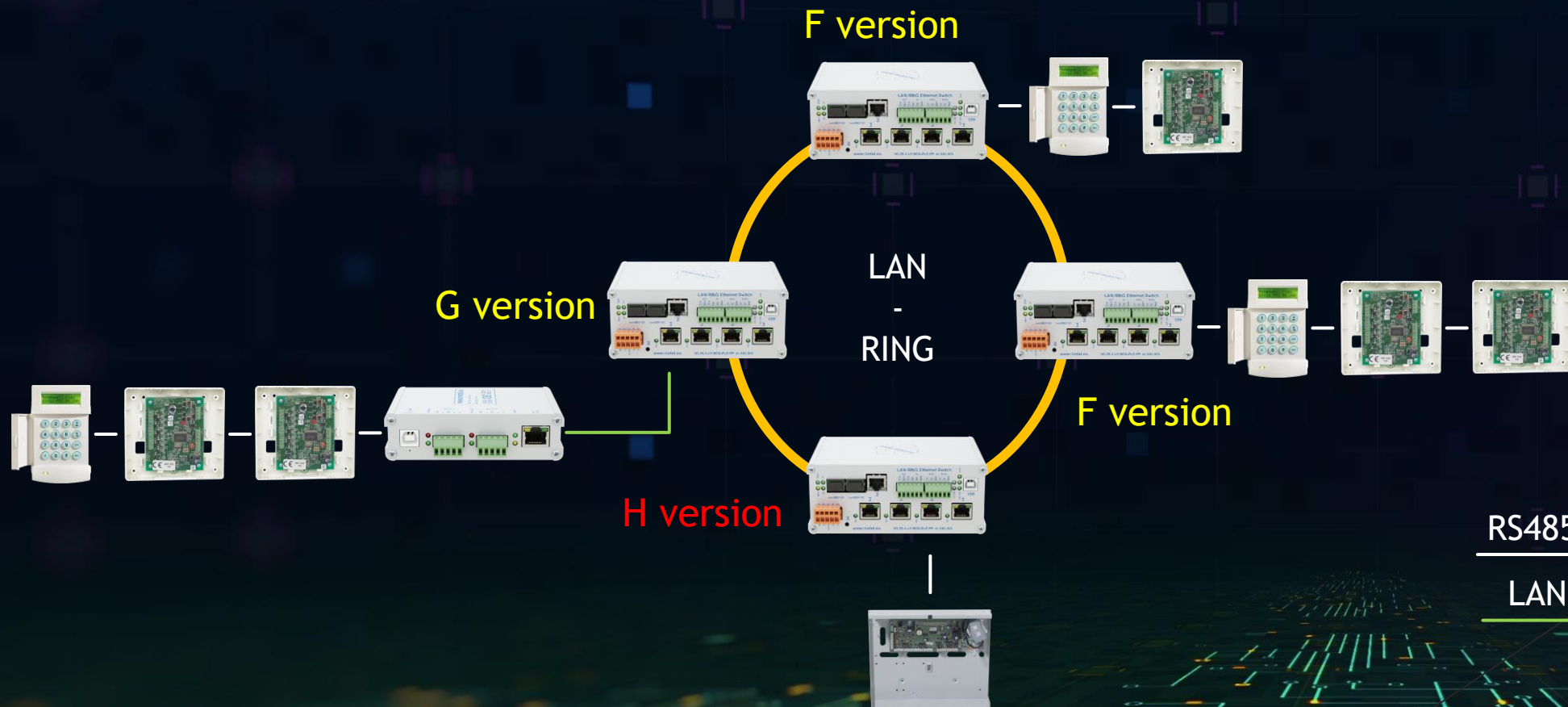
- All series of LAN-RING switches support LAN-RINGv1 and v2.



Network Infrastructure Design Step-by-Step

Explaining the Differences Between the F and G Series

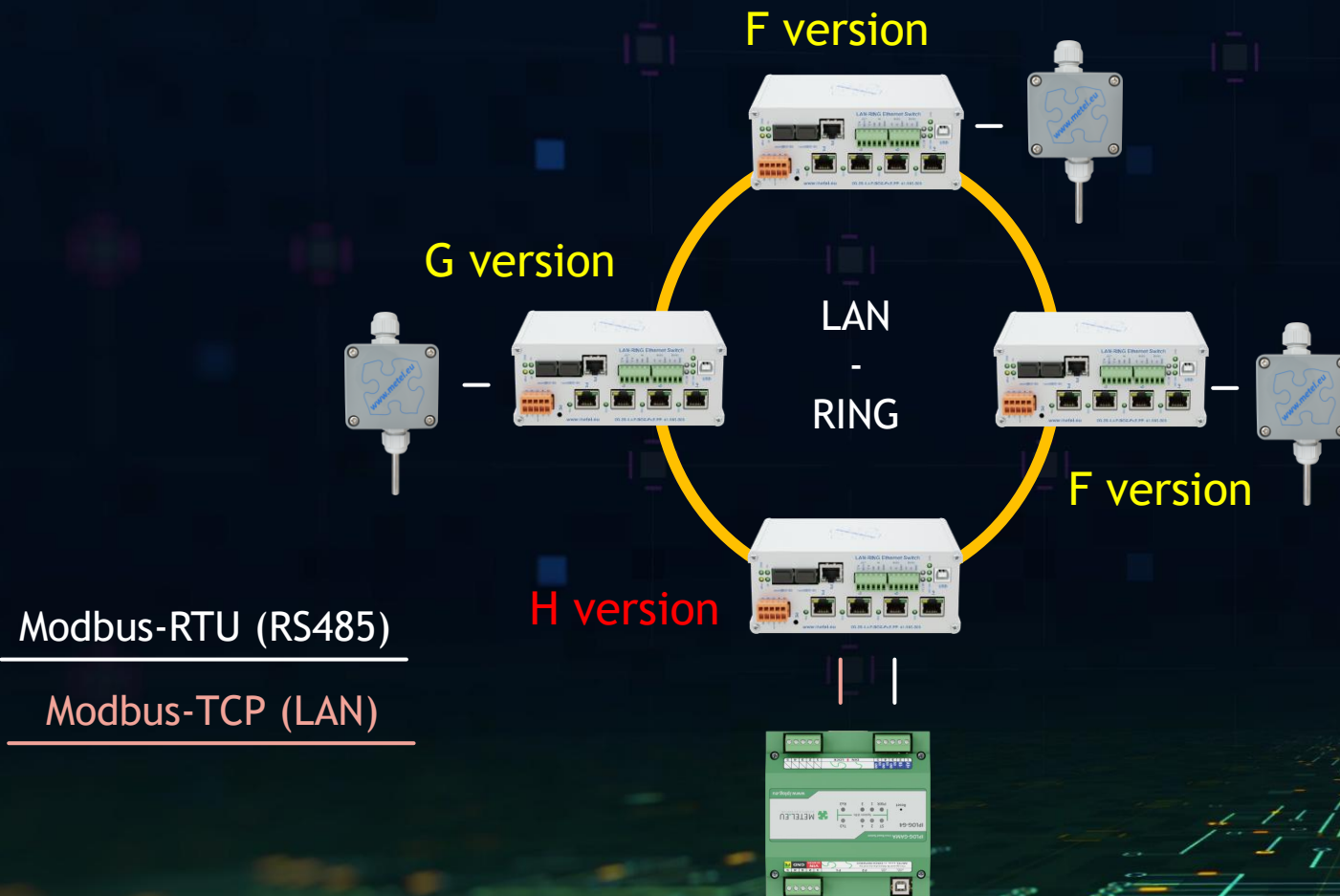
- Only F and future H series can be used for low-latency RS485 bus transmission.



Network Infrastructure Design Step-by-Step

Explaining the Differences Between the F and G Series

- All LAN-RING switches F, G and H series can be used for Modbus RTU/TCP transmission.



Network Infrastructure Design Step-by-Step

Explaining the Differences Between the F and G Series

- Already Available Configuration Options

G Series ->

GUI SIMULand

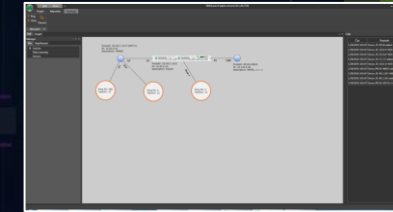


SSH CLI

```
metel@metel: ~  
METEL.EU  
www.metel.eu SECURITY & AUTOMATION  
-----  
SW version 2.1764.15163  
HW version "2G-2C-0.8.G-BOX-PoE-PP (HiPoE)"  
metel@metel:~$ /tmp/metel_cif  
metel600005> enable  
Password: ****  
metel600005# config  
Executing: cmd_config_global  
metel600005(config)# vlan 2  
VID was found at row: 1  
metel600005(config-vlan-2)# member-tagged P3  
metel600005(config-vlan-2)# exit  
metel600005(config)# interface P4  
metel600005(config-if-P4)# duplex auto  
metel600005(config-if-P4)# exit  
metel600005(config)#
```

GUI SIMULand

F Series ->



PuTTY Configuration

Category:

- Session
 - Logging
- Terminal
 - Keyboard
 - Bell
 - Features
- Window
 - Appearance
 - Behaviour
 - Translation
 - Selection
 - Colours
- Connection
 - Data
 - Proxy
 - SSH
 - Serial
 - Telnet
 - Rlogin
 - SUPDUP

Basic options for your PuTTY session

Specify the destination you want to connect to

Host Name (or IP address) Port

Connection type:

☒ SSH ☐ Serial ☐ Other: Telnet

Load, save or delete a stored session

Saved Sessions

Default Settings
Kontejner
Vince

Close window on exit:

☐ Always ☐ Never ☒ Only on clean exit

About Help Open Cancel

Network Infrastructure Design Step-by-Step

Explaining the Differences Between the F and G Series

- Configuration Options

F Series

	SIMULand
Switching Config.	Yes
Extension Config.	Yes
Upgrade	Yes
Status	Yes
Logs	Yes

G Series

	SIMULand	CLI	WWW
Switching Config.	Yes	Yes	Basic
Extension Config.	Yes		
Upgrade	Yes	Yes	
Status	Yes	Yes	Yes
Logs	Yes	Yes	Yes

Network Infrastructure Design Step-by-Step

Explaining the Differences Between the F and G Series

- Configuration Options

F Series

Switching Configuration

IEEE 802.3i, IEEE 802.3u, IEEE 802.3ab,
IEEE 802.3z, IEEE 802.3ac, IEEE 802.3af/at/bt,
POH, UPOE, IEEE 802.3x, IEEE 802.1p,
IEEE 802.1X, IEEE 802.1q, Modbus TCP,
Modbus RTU, Onvif S/T, SNMP, IGMP, SNTP,
SMTP, RSTP, LAN-RING...

G Series

Switching Configuration

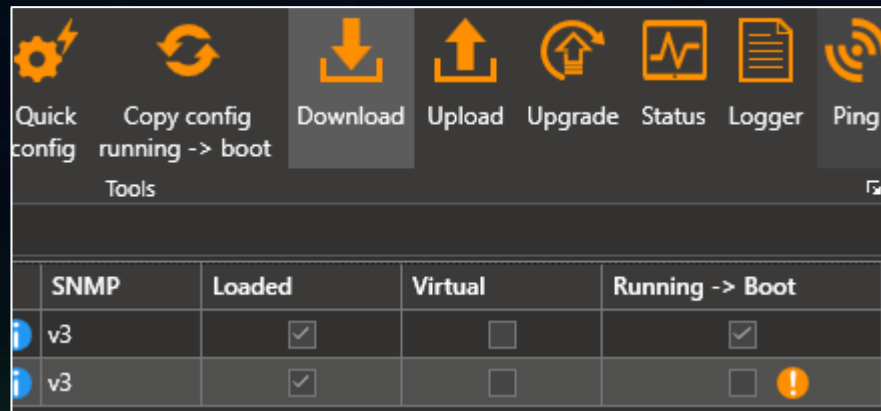
Tacacs+, SSH, Syslog, TFTP, SCP, IEEE 802.3i,
IEEE 802.3u, IEEE 802.3ab, IEEE 802.3z,
IEEE 802.3ac, IEEE 802.3af/at/bt, POH, UPOE,
IEEE 802.3x, IEEE 802.1p, IEEE 802.1X,
IEEE 802.1q, **Modbus TCP, Modbus RTU,**
Onvif S/T, SNMP, IGMP, SNTP, SMTP, RSTP, MSTP,
LACP, LAN-RING.v1, v2...

Network Infrastructure Design Step-by-Step

Explaining the Differences Between the F and G Series

- LAN-RING G Series - Running and Boot Config
 - The switch starts with the boot configuration
 - Every configuration change is saved to the running configuration

Icon for copying
Running Config
to Boot Config



← Sync Status

Copying Running Config
to Boot Config from CLI



```
metel@192.168.6.13# copy running-config boot-config
copying running to boot...
.....
boot-config = running-config
metel@192.168.6.13#
```

Network Infrastructure Design Step-by-Step

Explaining the Differences Between the F and G Series

- LAN-RING G Series - Reboot after losing connection during write
- This fault can cause, for example
 - Disconnected cable
 - Lost/damaged packets
 - Disconnected power

When this option is enabled
the switch is automatically
rebooted with Boot config



Settings

Set time to delayed restart (seconds):

600

Reboot after lost connection during write:

☒

Status:

Start delayed restart

Stop delayed restart

Confirm

Cancel

Network Infrastructure Design Step-by-Step

Explaining the Differences Between the F and G Series

- LAN-RING G Series - Reboot Delay
 - Each G switch has 2 sets of configurations.
 - Boot Config - used at startup
 - Running Config - edited during configuration
 - Copying Running Config -> Boot Config must be confirmed



Lost Connection
Editing Running Config

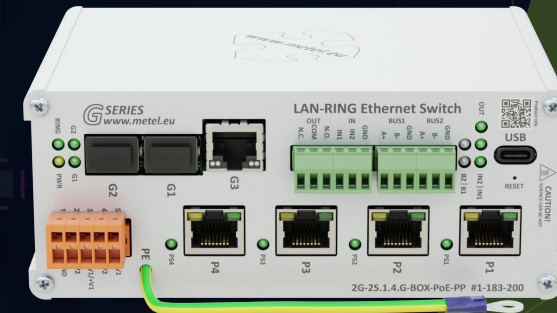


Running
Config

≠



Boot
Config



If you start a timer for, let's say, 10 minutes, you can configure the switch during these 10 minutes, and if some wrong configuration causes a loss of connection after the timer expires, the switch will be automatically rebooted (by timer) and started with boot config.

Network Infrastructure Design Step-by-Step

Explaining the Differences Between the F and G Series

- Modbus RTU/TCP Compatibility

- LAN-RING F Series

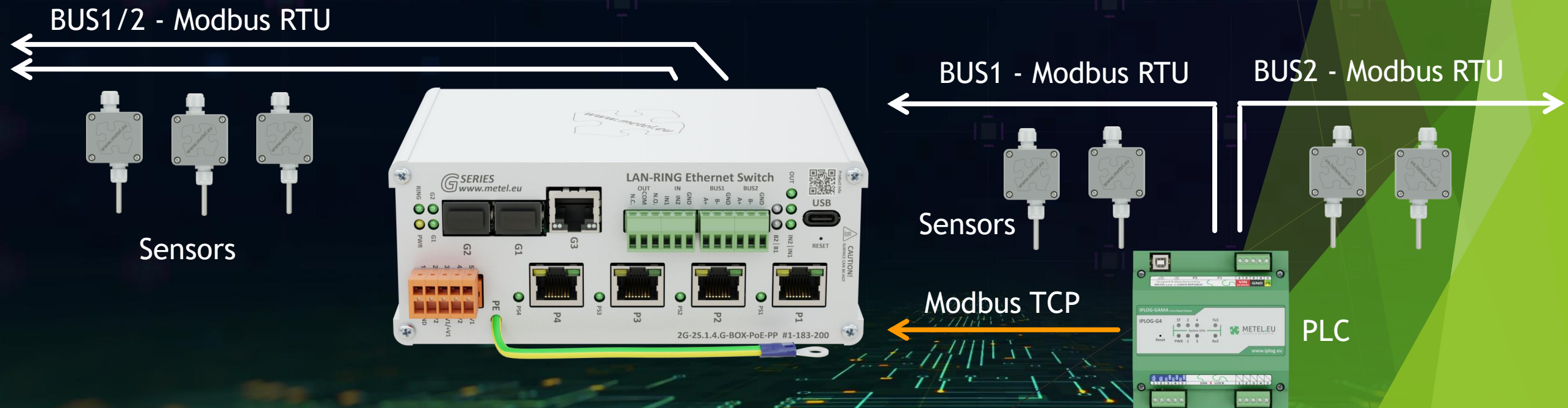
- 2x Modbus RTU (RS485)
- Accessible via Modbus TCP

- LAN-RING G Series

- 2x Modbus RTU (RS485)
- Accessible via Modbus TCP

- IPLOG G Series

- 2x Modbus RTU (RS485)
- Accessible via Modbus TCP



Network Infrastructure Design Step-by-Step

Explaining the Differences Between the F and G Series

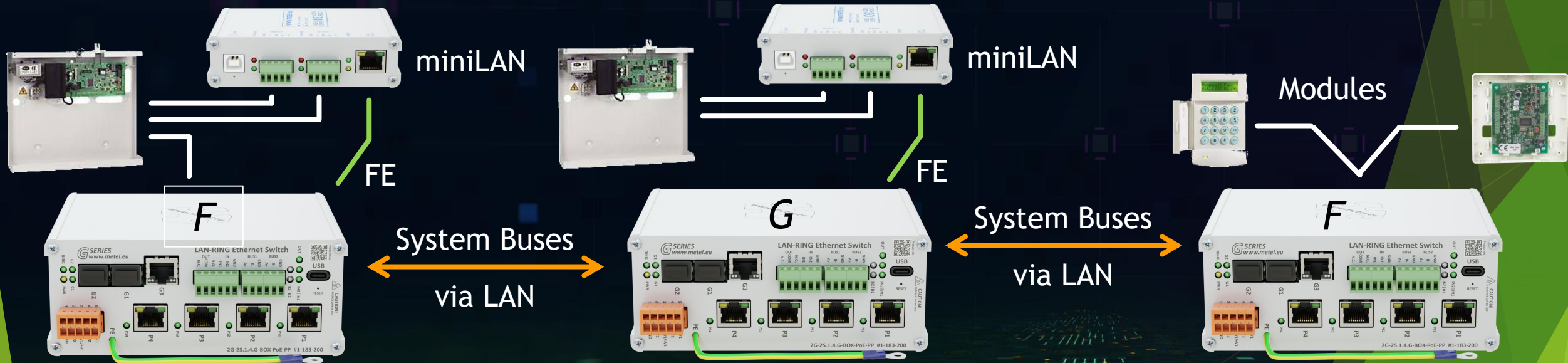
- LAN-RING - Alarm Systems Compatibility

- F Series

- Low latency RS485 (Asset or Galaxy)
- LAN - unlimited quantity of system buses

- G Series

- Low latency RS485 is not supported
- LAN - unlimited quantity of system buses



Network Infrastructure Design Step-by-Step

What does the G and F series have in common?

- LAN-RING switches include Event Management.

- F Series

- Automatic events
- Inputs/outputs from the table below

- G Series

- Automatic events
- Inputs/outputs from the table below

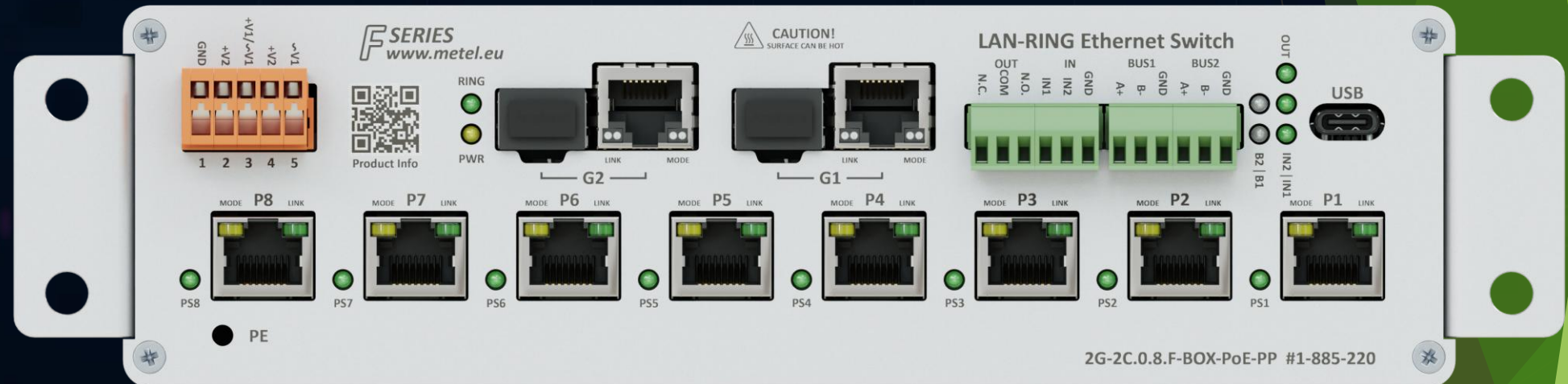
Type	Type	Description
ETH	Input / Output	Rx / Tx events between LAN devices
DIGITAL / ALARM	Input	Local digital / alarm inputs
LAN-RING	Input	Optical ring state
IP Watchdogs	Input	IP device monitoring
TCP Rx	Input	Reception of TCP events
SWITCH	Input	LAN ports monitoring
MODBUS TCP / RTU	Input / Output	Inputs/outputs on Modbus Master / Slave devices
BUS	Input	State of RS485 buses
RELAY	Output	Local relay
CAMERA	Output	Sending Onvif preset cmd to cameras
PORT UP/DOWN	Output	Controlling of the switch ports
LOGGER	Output	Writing to the log
POE	Output	Controlling the PoE

Network Infrastructure Design Step-by-Step

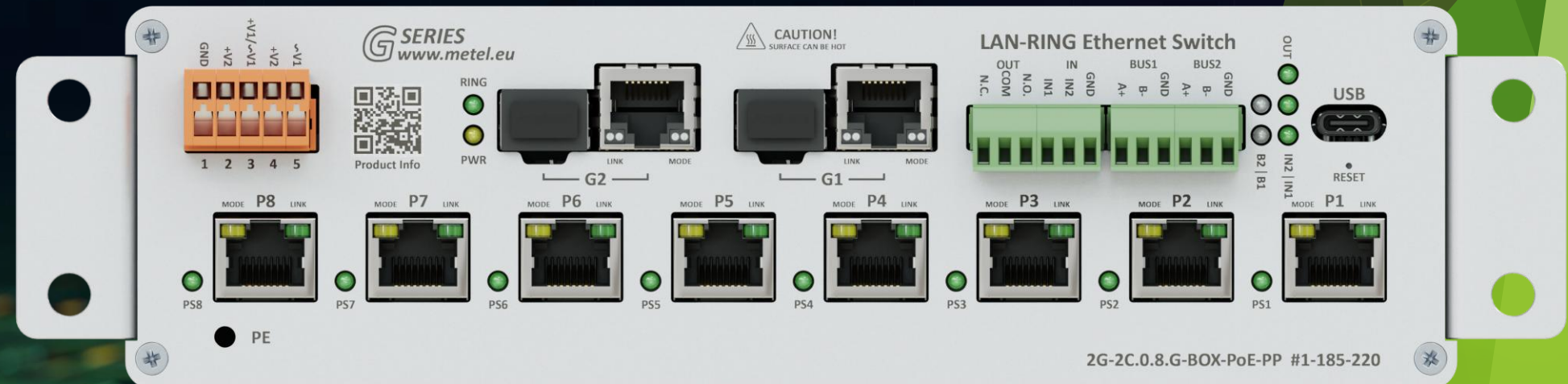
What does the G and F series have in common?

- F and G Switches share hardware excluding CPU module.

F Model ->



G Model ->



Network Infrastructure Design Step-by-Step

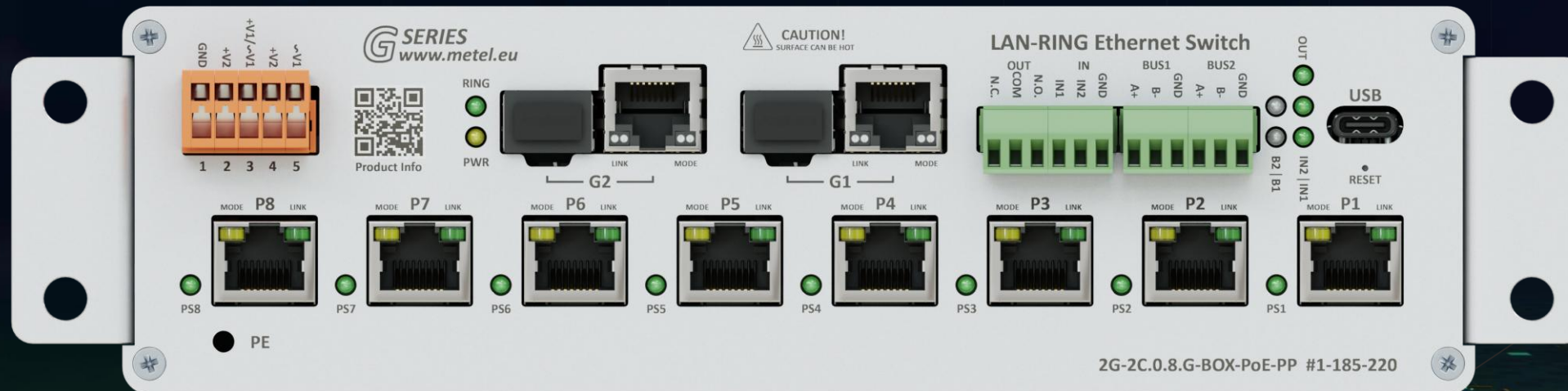
What does the G and F series have in common?

- The F i G series of switches are suitable for industrial outdoor applications.

Temperatures from -40 to + 75 °C



Pulses up to 1000A



What does the G and F series have in common?

The local console connector is gradually changing from USB-B to USB-C



Network Infrastructure Design Step-by-Step

What does the G and F series have in common?

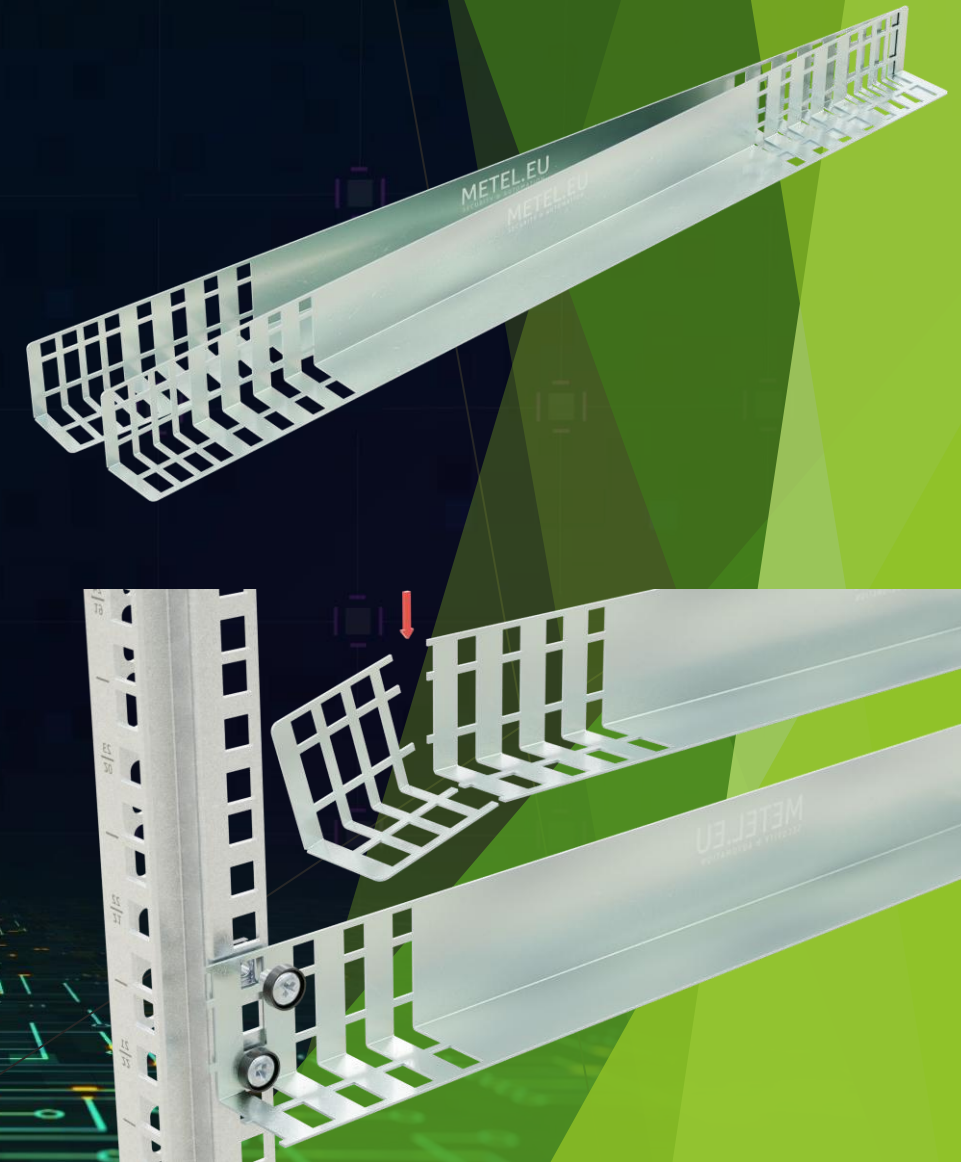
- BOX Series Installation
 - Accessories included holders for DIN 35 and flat surface installation.



Network Infrastructure Design Step-by-Step

What does the G and F series have in common?

- UNIT/1U Series Installation
 - Optimized for installation into 19" racks
 - The delivery of heavier models includes L profiles



Network Infrastructure Design Step-by-Step

Choosing an Installation Method

- Documentation for Designers



METEL.EU
SECURITY & AUTOMATION

English

Search!

SOLUTION PRODUCTS SUPPORT TRAINING ABOUT US

2G-2C.0.8.F

- 2x COMBO port (SFP/RJ45)
- 8x Fast ethernet port with PoE+ (2x PoE++)
- Serial bus 2x RS485 / 1x RS422 / Modbus
- 2x digital/alarm input
- 1x programmable relay output
- 2 independent power inputs

SHOW MORE ▼

Industrial managed PoE++ LAN-RING switches equipped with Ethernet ports, COMBO ports and also RS485 buses, digital / alarm inputs and relay outputs. Event management, which is part of advanced management, makes these switches an ideal solution for applications with high demands on the security and flexibility of the devices used. The switches support redundant MESH/RING topologies with connection recovery up to 30ms. Thanks to highly durable hardware, switches can be deployed in a wide operating temperature range of -40 to 70 °C at a maximum PoE power of 270 W. All inputs and outputs are equipped with surge protectors, making the switches suitable for use even in very harsh conditions.

Switch is certificated by EN50131-1 standard as a system bus transmission route for Asset(RS485), Galaxy(RS485) a MB-Secure (BUS-2). Devices are developed and manufactured in the EU and meet the requirements of the NDAA.

Models Specifications Sources FAQ Accessories Solution

Sources

AutoCad

↓ PDF

↓ DWG

Model 3D

↓ STEP model

Network Infrastructure Design Step-by-Step

Selecting Bandwidth for Backbone Segments

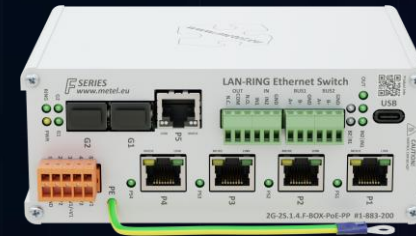
- 20G Series
- Backbone SFP+ slots support
 - 10Gbps SFP+ modules
 - 1Gbps SFP modules



↑
10Gbps/1Gbps

- 2G Series
- Backbone SFP slots support
 - 1Gbps SFP modules
 - 100Mbps* SFP modules

1Gbps/100Mbps*



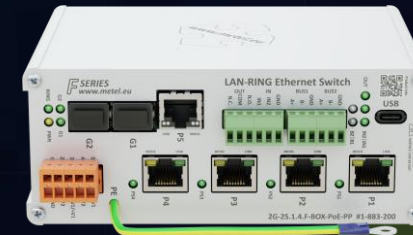
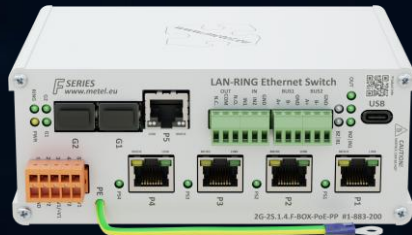
* 100Mbps supported only on selected models

EN 62676-1-2 - In paragraph, 5.3.2.2 it is required to keep the max load of the network under 75% of the available bandwidth.

Network Infrastructure Design Step-by-Step

Selecting Bandwidth for Backbone Segments

- For use in uplink backbone ports, we offer SFP(+) modules with
 - CWDM (two-way communication over one optical fibre)
 - Component operating temperature from -40 to +85 °C
 - SM compatible for 10Gbps (max. 20km) and SM/MM* universal for 1Gbps (max. 20/2 km)
- Our SFP slots and modules are 100% MSA compliant and can be used with any MSA-compatible SFP module module!

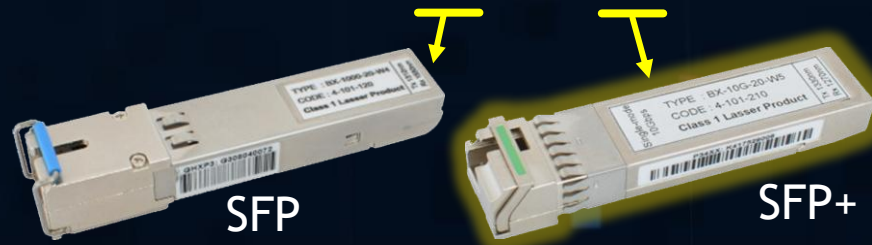


*OM3 or better OM4

Network Infrastructure Design Step-by-Step

Selecting Bandwidth for Backbone Segments

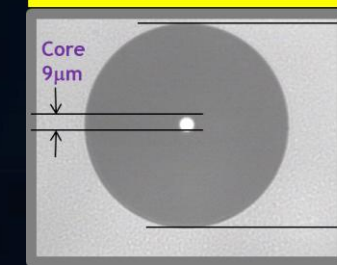
- Our SFP Modules are SC and LC Type (Use PC Grinding Ferrules)



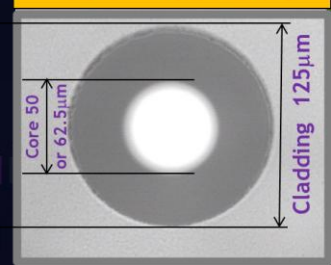
- 100 and 1000BASE-BX SFP modules compatibility

- Singlemode fibers 9/125 μm
- Multimode OM3-4 fibers 50/125 or 62.5/125 μm

Singlemode Fibers



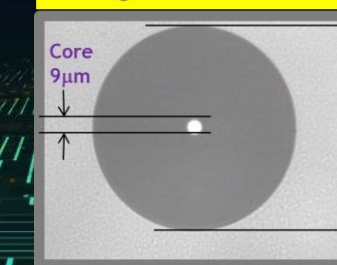
Multimode Fibers



- 10G-BX20 SFP+ modules compatibility

- **ONLY** Singlemode fibers 9/125 μm

Singlemode Fibers



Multimode Fibers



LAN-RING - minimum quality requirements for optical routes

Network Infrastructure Design Step-by-Step

Selecting the Network Management Method

- Management via LAN



- Management over routed connection



SIMULand

⊕ User-friendly graphical interface including upgrade and config backup

⊕ Automatic discovery of elements only on the LAN

⊖ Slower for IT experts

⊕ Topology view

CLI

⊖ Requires command knowledge

⊖ Does not include automatic device detection

⊕ Faster for IT experts

⊖ Does not contain

Network Infrastructure Design Step-by-Step

Choosing the Right PoE Solution

- The availability of PoE is evident from the order name
 - 2G-2S.0.2.F-BOX-PoE-PP
- PoE is available on FE and now also GE ports in 2 levels
 - 2G-2S.0.3.F-BOX-PoE - max. 30W per port
 - 2G-2S.0.2.F-BOX-PoE-PP - max. 95W per port
- Supported standards

	PoE	PoE+	PoE++	UPoE	PoH
Standard	IEEE 802.3af	IEEE 802.3at	IEEE 802.3bt	Cisco UPOE	Power over HDBaseT
Max. Power from PSE	15.40W	30W	60W (Type 3) 100W (Type 4)	60W	100W
Max. Power to PD	12.95W	25.5W	51W (Type 3) 71W (Type 4)	51W	71W
Twisted Pair Used	2-pair	2-pair	4-pair	4-pair	4-pair
Min. Cable Type	Category 3	Category 5	Category 5	Category 5	Category 5e
Max. Distance	100m	100m	100m	100m	100m

Network Infrastructure Design Step-by-Step

Choosing the Network Management Method

- Commands implemented in the CLI (G series)

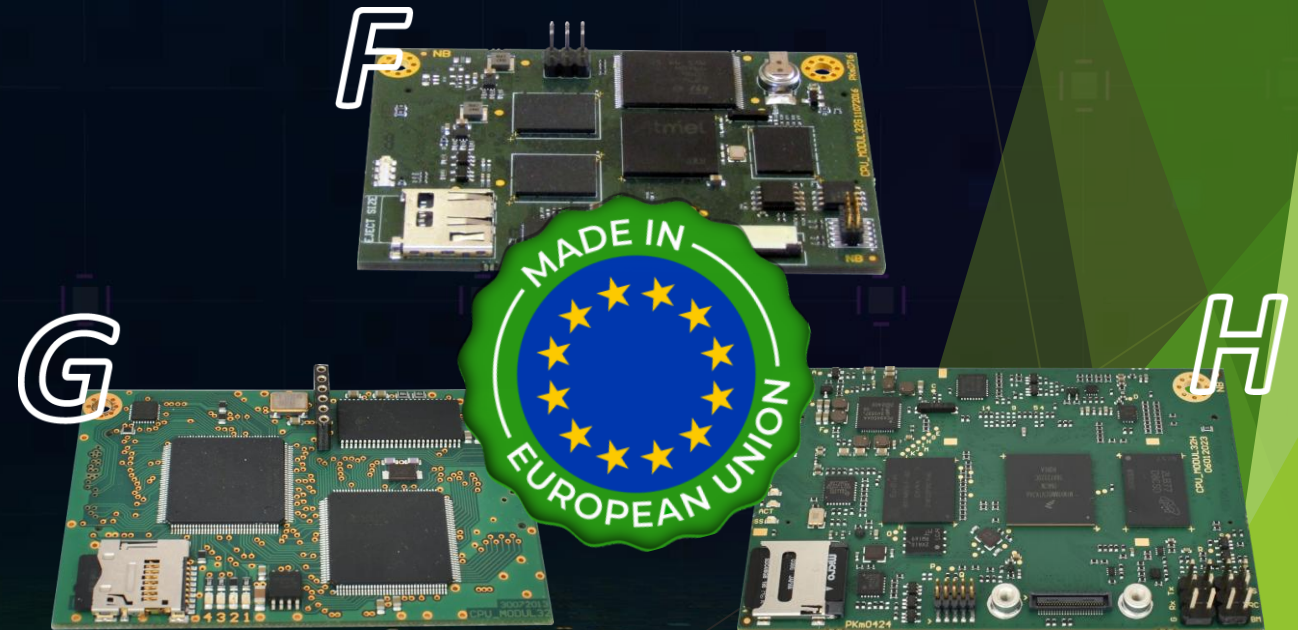
boot, boot factory-reset, boot system, boot upgrade, clock, clock date, clock time, configure, copy, copy nvram, copy ram, copy running-config, copy running-config boot-config, copy running-config nvram, copy running-config ram, copy running-config sftp, copy running-config tftp, copy sftp, copy tftp, dir, dir nvram, dir ram, disable, exit, export-help, help, reboot, rmfile, rmfile nvram, rmfile ram, view, view bootvar, view boot-config, view clock, view diff, view ports, view ports alias, view ports errorCounters, view ports summary, view ports stats, view ports status, view ip, view log, view log count, view log count emergency, view log count alert, view log count critical, view log count error, view log count warning, view log count notice, view log count info, view log count debug, view log list, view log list emergency, view log list alert, view log list critical, view log list error, view log list warning, view log list notice, view log list info, view log list debug, view mac, view mac address-table, view poe, view poe consumption, view poe status, view poe version, view power, view power supply, view ring, view ring status, view running-config, view snmp, view snmp configuration, view snmp status, view syslog, view system, view tacacs, view topology, view version, view vlan, accounting, accounting all, accounting all method1, accounting all method1 deny, accounting all method1 permit, accounting all method1 tacacs, accounting all method2, accounting all method2 deny, accounting all method2 permit, accounting all method2 tacacs, accounting all method3, accounting all method3 deny, accounting all method3 permit, accounting all method3 tacacs, authorization, authorization all, authorization all method1, authorization all method1 deny, authorization all method1 permit, authorization all method1 tacacs, authorization all method2, authorization all method2 deny, authorization all method2 permit, authorization all method2 tacacs, authorization all method3, authorization all method3 deny, authorization all method3 permit, authorization all method3 tacacs, description, do, enable-password, enable-password hash, enable-password sha-512, enable-password none, end, exit, port, port P1x, port Gx, ring, ring R1, line, line usb, line ssh, snmp, snmp version, snmp version v2c, snmp version v3, snmp, snmp disable, snmp enable, snmp server1, snmp server2, snmp server3, snmp request-interval, snmp timezone, snmp auto-DST-disable, snmp auto-DST-enable, snmp synchronize, snmp set-time, ip, ip addr-mask, ip addr, ip gate, ip mask, ip icmp-echo-disable, ip icmp-echo-enable, ip vlan-disable, ip vlan-enable, ip vlan-id, ip vlan-pri, mirror, mirror ingress-dst, mirror ingress-dst Px, mirror ingress-dst Gx, mirror egress-dst, mirror egress-dst Px, mirror egress-dst Gx, mirror no-egress-dst, mirror cpu-ingress-src, mirror no-cpu-ingress-src, mirror cpu-egress-src, mirror no-cpu-egress-src, syslog, syslog server1, syslog server1 disable, syslog server1 enable, syslog server1 host, syslog server2, syslog server2 disable, syslog server2 enable, syslog server2 host, tacacs, tacacs server1, tacacs server1 disable, tacacs server1 enable, tacacs server1 host, tacacs server1 key, tacacs server1 key code, tacacs server1 key base32, tacacs server1 key none, tacacs server1 timeout, tacacs server2, tacacs server2 disable, tacacs server2 enable, tacacs server2 host, tacacs server2 key, tacacs server2 key code, tacacs server2 key base32, tacacs server2 key none, tacacs server2 timeout, topology, topology mode, topology mode none, topology mode lan-ring, topology mode rstp-m, topology rstp-m, topology rstp-m priority, topology rstp-m hello-time, topology rstp-m max-age, topology rstp-m forward-delay, user-add, user-del, user-erase-all, vlan, vlan configuration, vlan-init-tab, import, authentication, authentication method1, authentication method1 deny, authentication method1 permit, authentication method1 local, authentication method1 tacacs, authentication method2, authentication method2 deny, authentication method2 permit, authentication method2 local, authentication method2 tacacs, authentication method3, authentication method3 deny, authentication method3 permit, authentication method3 local, authentication method3 tacacs, banner, disable, do, enable, end, exit, adv-10-full-enable, adv-10-full-disable, adv-10-half-enable, adv-10-half-disable, adv-100-full-enable, adv-100-full-disable, adv-100-half-enable, adv-100-half-disable, alias, an-enable, an-disable, atu-disable-learning, atu-disable-using-da, atu-egress-mode, atu-egress-mode all, atu-egress-mode no-unknown-unicast, atu-egress-mode no-unknown-multicast, atu-egress-mode no-unknown-DA, atu-enable-learning, atu-enable-using-da, do, end, exit, force-10-full, force-10-half, force-100-full, force-100-half, mdix, mdix force-mdi, mdix force-mdix, mdix auto, mirror, mirror ingress-src, mirror egress-src, mirror no-ingress-src, mirror no-egress-src, poe-disable, poe-donot-ignore-discovery, poe-enable, poe-ignore-discovery, poe-no-swap-pairs, poe-no-power-limit, poe-swap-pairs, poe-power-limit, port-vlan-member, port-vlan-member default, port-vlan-member Px, port-vlan-member Gx, port-vlan-no-member, port-vlan-no-member Px, port-vlan-no-member Gx, power-down, power-up, rate-in-speed, rate-in-limit, rate-in-nolimit, rate-out-speed, rate-out-limit, rate-out-nolimit, rstp-disable, rstp-enable, rstp-prio, rstp-edge, rstp-edge-none, rstp-cost, vlan-none, vlan-keep-tag, vlan-keep-untag, vlan-keep-vid, vlan-default-pri, vlan-default-pri end, vlan-default-pri default, vlan-default-pri tag-only, vlan-default-pri ip-only, vlan-default-pri iptag-comb, vlan-default-pri iptag-tag, vlan-pri-value, vlan-force-vid, vlan-default-id, vlan-mode, vlan-mode fallback, vlan-mode check, vlan-mode secure, vlan-discard-tag, vlan-discard-untag, do, end, exit, member-none, member-none CPU, member-none Px, member-none Gx, member-tagged, member-tagged CPU, member-tagged Px, member-tagged Gx, member-unmodified, member-unmodified CPU, member-unmodified Px, member-unmodified Gx, member-untagged, member-untagged CPU, member-untagged Px, member-untagged Gx, priority-override x, priority-override disable, remove, disable, enable, end, exit, do, ring-enable, ring-disable, ring-id, ring-master, ring-slave, ring-version, ring-version v1, ring-version v2

Network Infrastructure Design Step-by-Step

Ensuring Security => Supply Chain Control

- Cybersecurity starts with component selection.
 - The NDAA banned several companies , primarily based in China, from selling or installing the products. Furthermore, parts made by such companies that are included in other products or are OEM will be subject to enhanced scrutiny or restriction due to section 889 compliance.

All OUR devices contain exclusively CPUs from manufacturers based in the democratic countries of the EU, Japan, South Korea, Canada, USA...



Network Infrastructure Design Step-by-Step

Ensuring Security => Information Security Management System

- Company processes are certified according to ISO 27001 to guarantee the maximum level of cyber security.

- ISO 27001 Measures

- Risk assessment and management
- Incident response and management
- Business continuity management
- Physical security
- Supplier and third-party management
- Information security policies
- Asset management
- Employee awareness and training
- Access control
- Continuous monitoring and improvement



Network Infrastructure Design Step-by-Step

Ensuring Security => Encryption

- Communication security

- SIMULand

Encryption	Hash
AES256*	SHA-512*
* quantum resistant (source NÚKIB)	

- SSH CLI

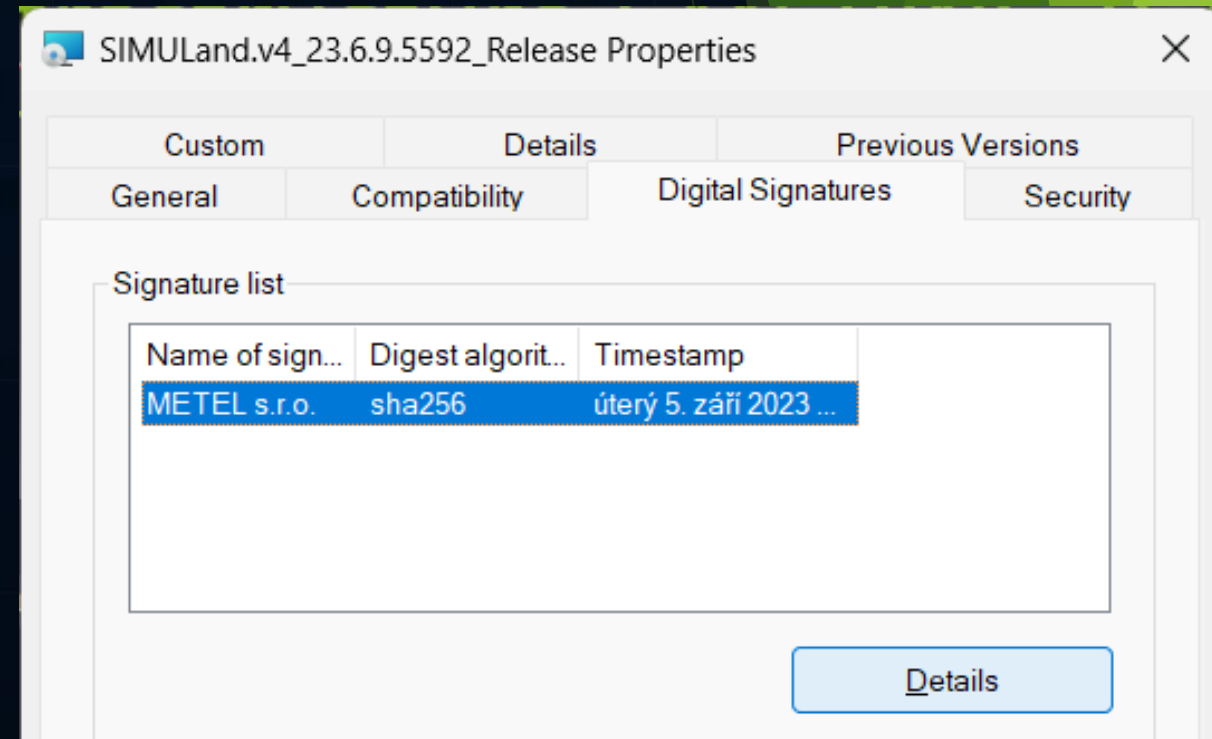
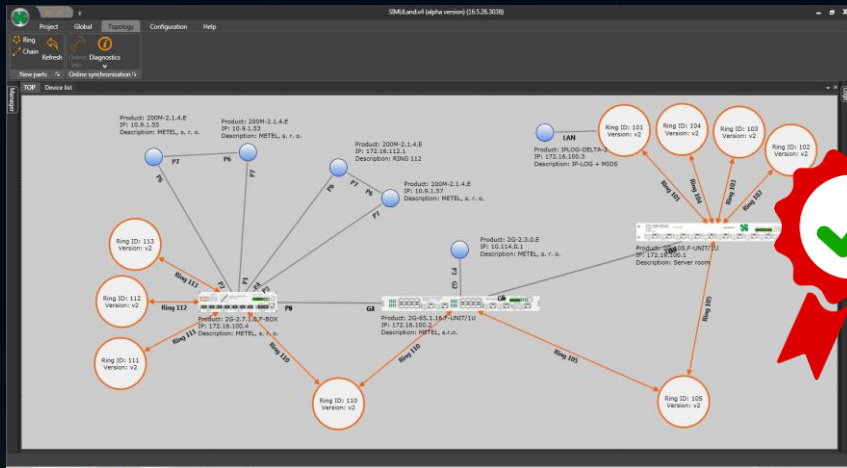
- Using library OpenSSL 3.0.12

Symmetric Encryption	Asymmetric Encryption	Hash
AES256 ChaCha20	RSA2048 (and higher) ECDSA ECDH Ed25519 Ed448	SHA-2 family (SHA-224, SHA-256, SHA-384, SHA-512) BLAKE2 SM3

Network Infrastructure Design Step-by-Step

Ensuring Security => PKI

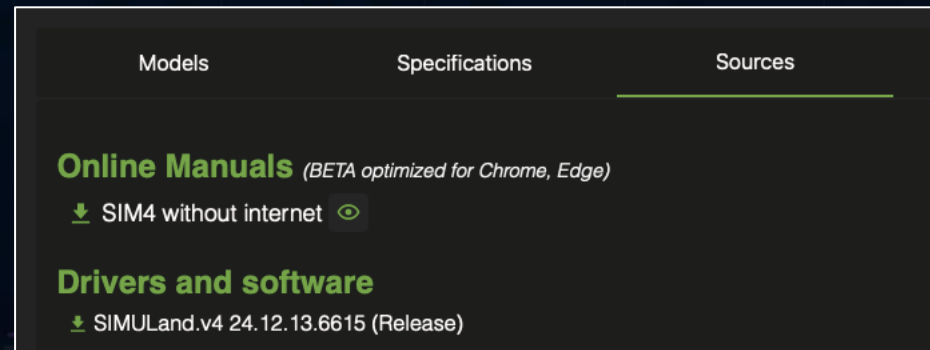
- Checking the authenticity of the SIMULand application
 - The installation file and application binary are signed with a certificate that is bound to the root CA DigiCert
 - During boot and run, check the use of DLLs
 - Automatic check of the latest version



Network Infrastructure Design Step-by-Step

Ensuring Security => PKI

- Checking the authenticity of the SIMULand application
 - Computers without internet access can not verify the signature of the firmware files. This is because the application uses the Windows certificate store (certmgr.msc).
- The solution is the certificates import from the other PC connected to the internet.



SIM4 without internet

Certificate export for PC without internet

Computers that are disconnected from the Internet for a long time may have a problem with starting the SIMULand application and verifying the signature of the firmware files. This is because the application uses the Windows certificate store (certmgr.msc).

Solution 1 - export certificates from another PC

List of required certificates:

DigiCert Trusted G1 Code Signing RSA4096 SHA384 2021 CA1

Network Infrastructure Design Step-by-Step

Ensuring Security => Secure boot

- LAN-RING F/G series switches has signed Bootloader.



Bootloader is a small program that runs first when the device is powered on and loads the operating system (OS).



Secure Boot is a mechanism that ensures that only trusted, signed software can run during the boot sequence.

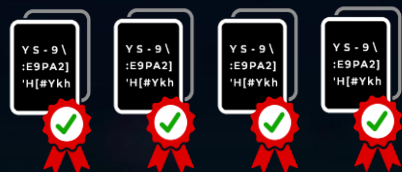
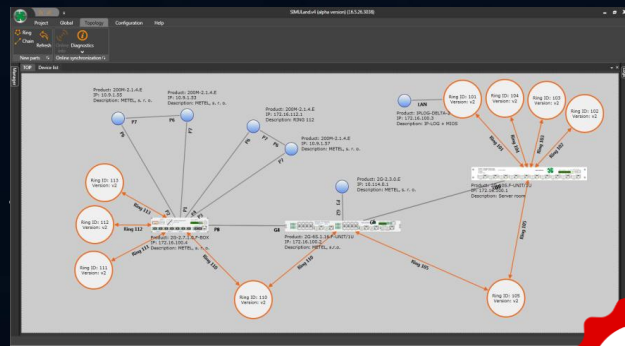
The bootloader is not rewritable and even with a brute force attack it can only be irreversibly damaged !



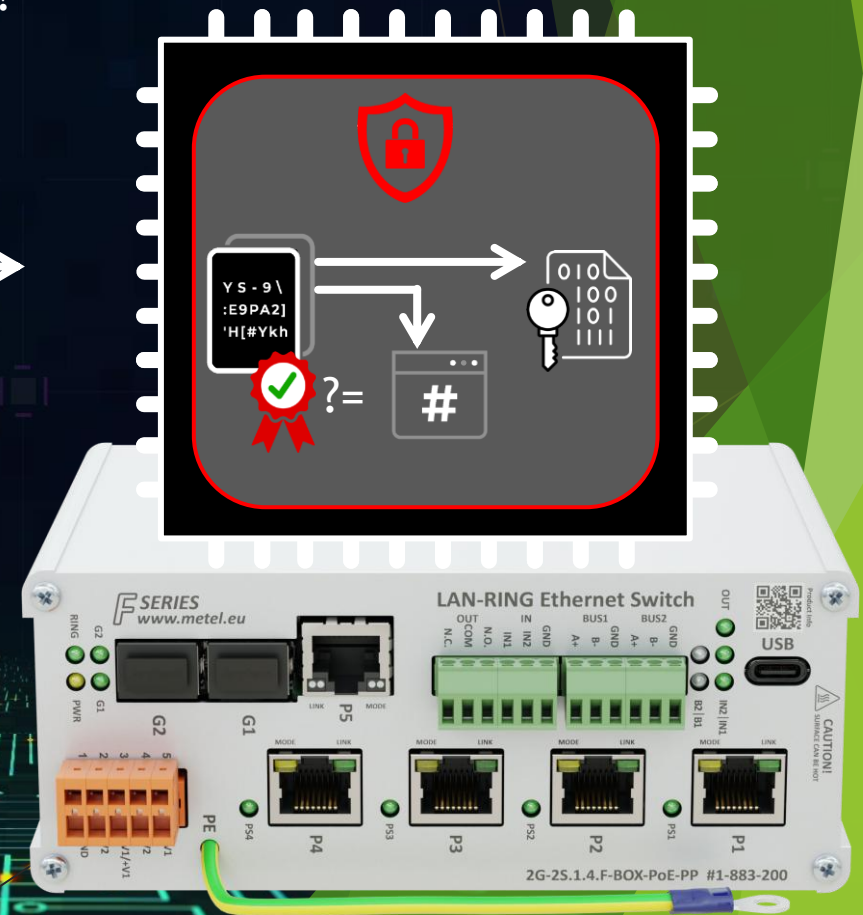
Network Infrastructure Design Step-by-Step

Ensuring Security => Signed Firmware

- LAN-RING F/G Series checking the authenticity of the firmware.
 - Validating the signature and decrypting the transferred firmware directly by the device
 - The digital signature is checked at every boot and firmware upgrade!



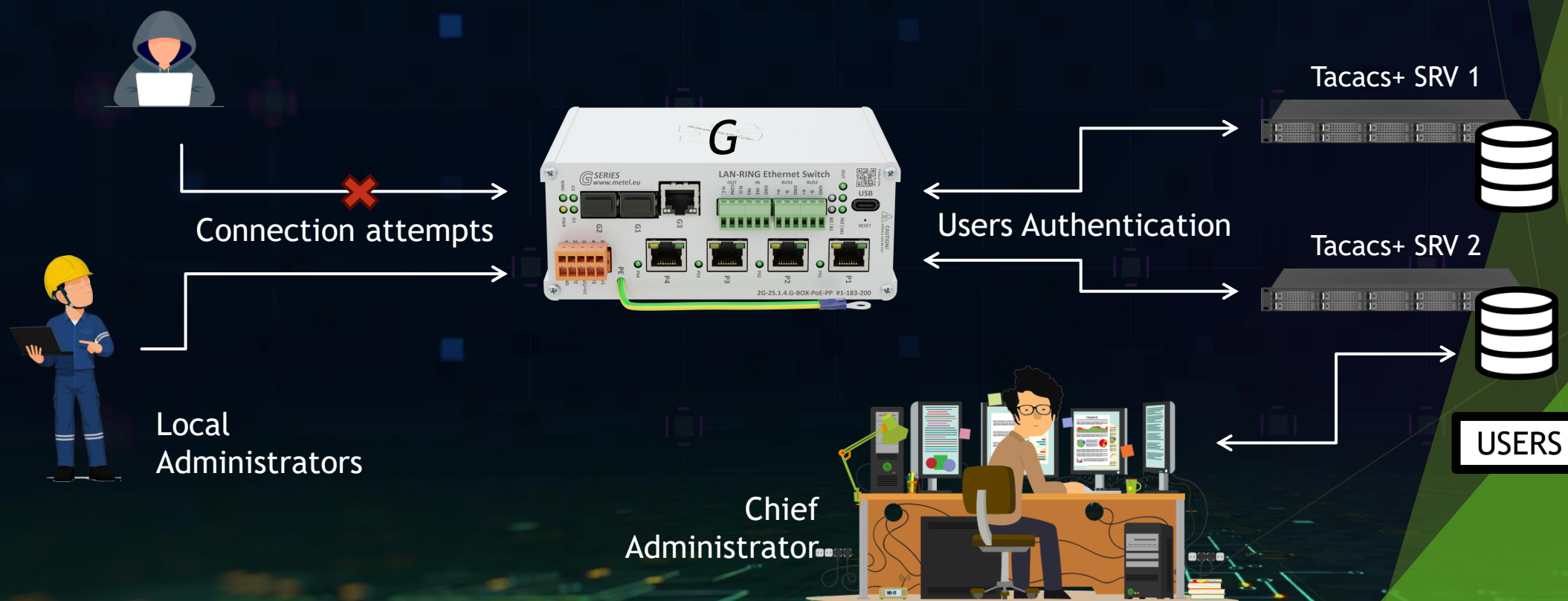
Encrypted and digitally RSA
signed firmware image
(AES-256, RSA-4096)



Network Infrastructure Design Step-by-Step

Ensuring Security => User Authentication

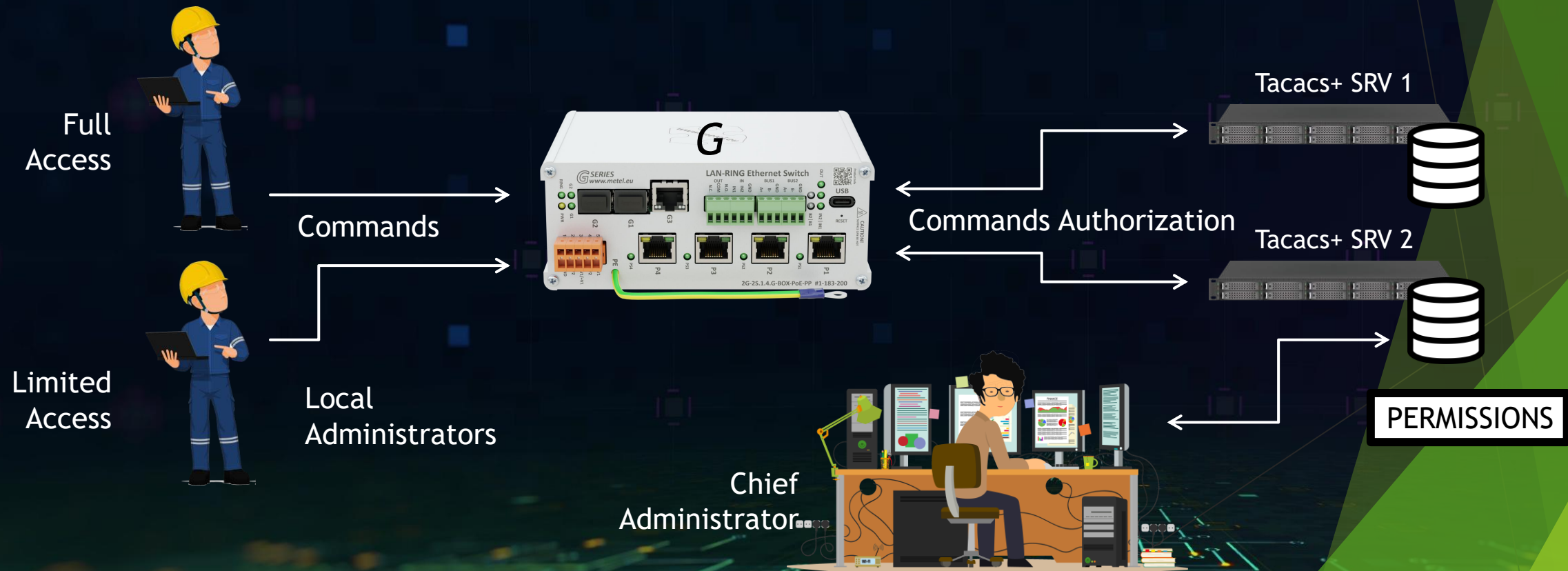
- The LAN-RING G Series Supports Users Authentication using TACACS+.
 - Tacacs+ verifies the identity of the user attempting to log in.



Network Infrastructure Design Step-by-Step

Ensuring Security => Users Authorization

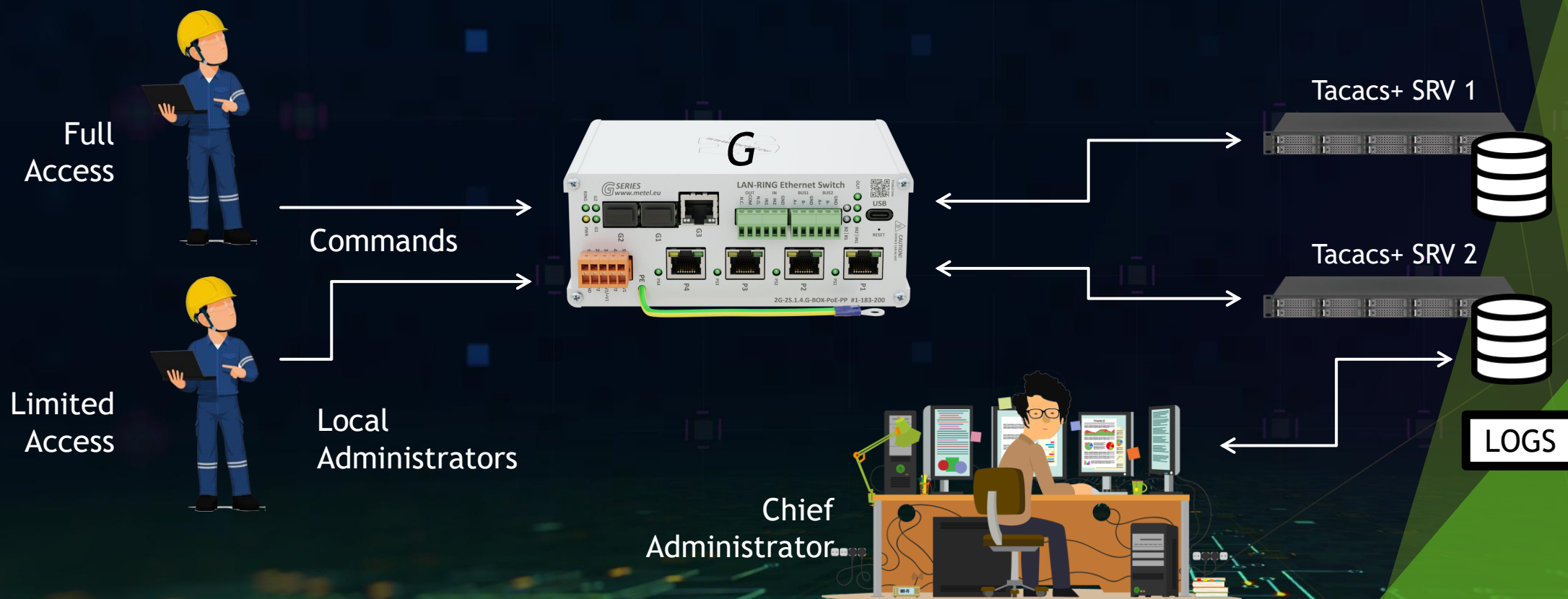
- The LAN-RING G Series Supports Commands Authorization using TACACS+.
 - Tacacs+ controls which commands a user is allowed to execute after logging in.



Network Infrastructure Design Step-by-Step

Ensuring Security => Users Accounting

- The LAN-RING G Series Supports TACACS+ Accounting.
 - Accounting - tracking and recording user activities for auditing and resource usage analysis.



Network Infrastructure Design Step-by-Step

Ensuring Security => Protection Against Unauthorised Physical Access

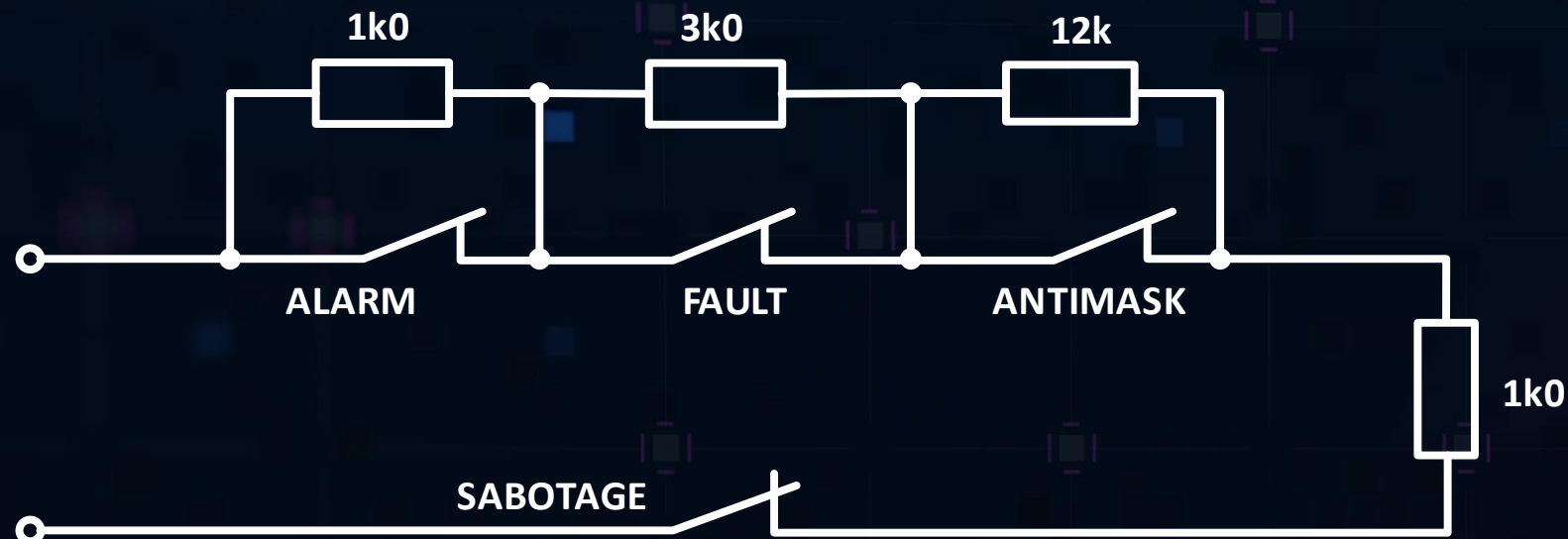
- Switches are equipped with alarm inputs for connecting tampers (can be balanced).
- Outdoor cabinets of the OH series are equipped with tampers and shock detectors.
- Opening or tampering with the switchboard is reported by SNMPv3 TRAPs.



Network Infrastructure Design Step-by-Step

Ensuring Security => Protection Against Unauthorised Physical Access

- Switches are equipped with alarm inputs for connecting tampers (can be balanced).



Network Infrastructure Design Step-by-Step

Ensuring Security => Redundant Topology

- LAN-RING switches support RING topology with reconfiguration within 30ms



1x SM or MM Fiber

- LAN-RING switches support MESH topology controlled by the RSTP protocol



This year, we publish a new FW every 1-2 months. We will gradually make the functionalities from the F series available on the G series and add new functions such as MSTP and LACP.

- All connections, disconnections or line overloads are reported via SNMPv3 traps



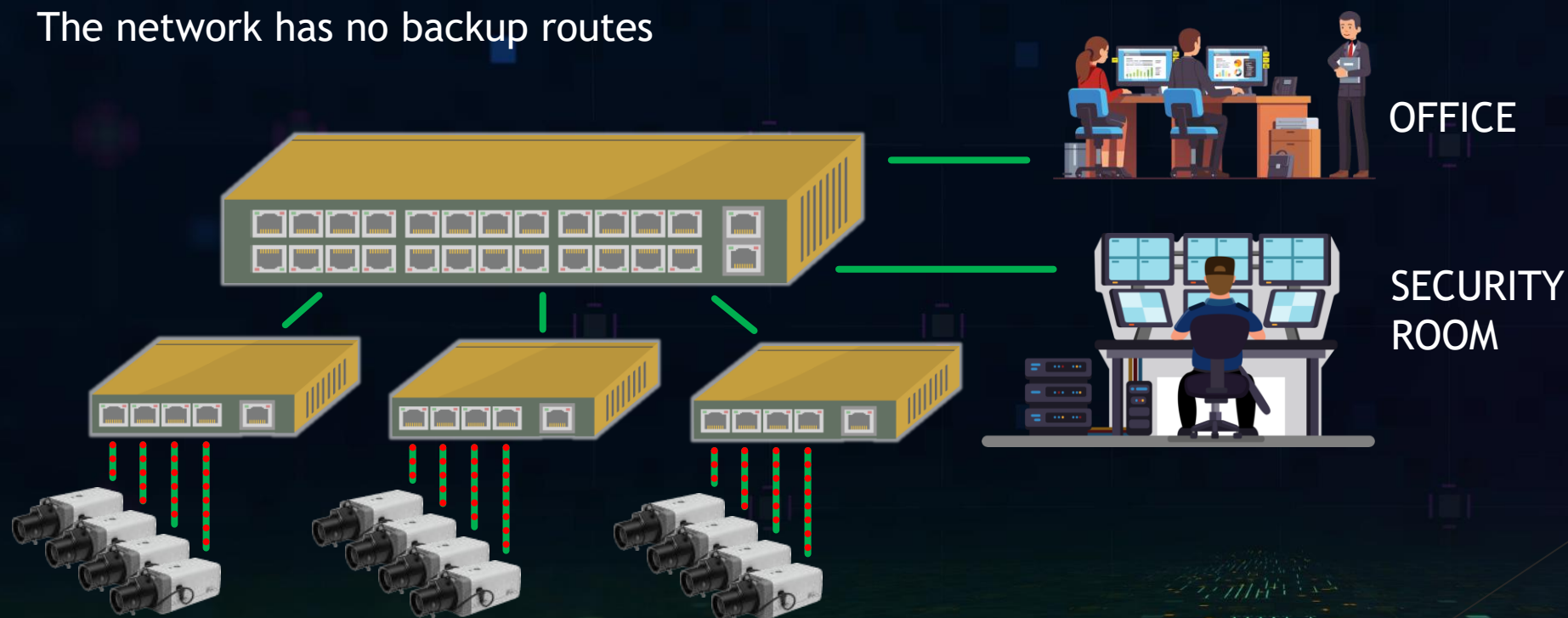
SNMP TRAPs

Network Infrastructure Design Step-by-Step

Ensuring Security => SNMP Monitoring

- Unmanaged Devices

- Users have unlimited access across the network
- Switches do not allow monitoring of the network infrastructure
- The network has no backup routes

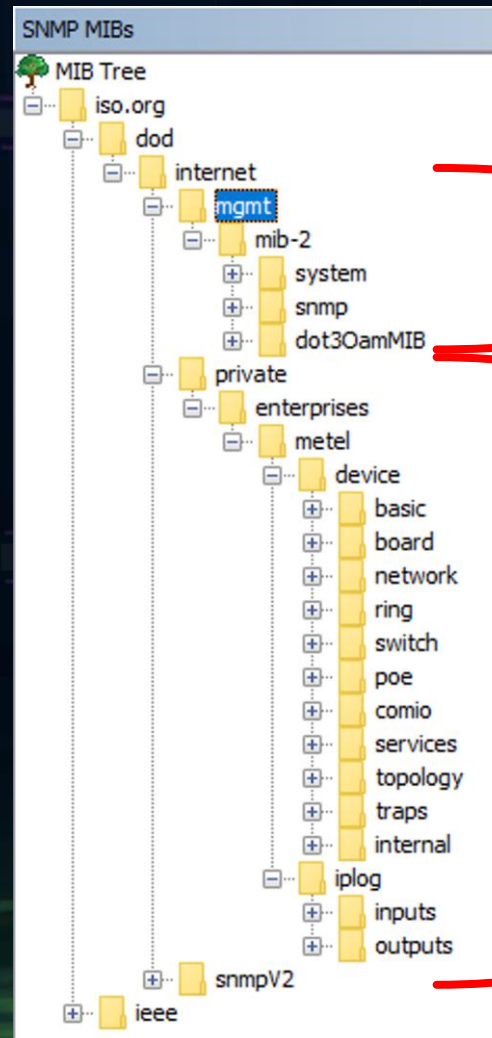


In Conflict with EN 62676-1-2:2014, Video surveillance systems for use in the security application.

Network Infrastructure Design Step-by-Step

Ensuring Security => SNMP Monitoring

- All LAN-RING switches support very detailed monitoring via the secure SNMPv3 protocol.
- LAN-RING switches support, the commonly used PUBLIC MIB.
- In addition, our switches have so-called PRIVATE MIBs, which enable detailed monitoring of the LAN-RING infrastructure and its integration into supervision systems.
- New MIBs
 - Ports descriptions
 - SFP diagnostic OIDs



PUBLIC SNMP MIB FILES
Standardized variables used
across manufacturers

PRIVATE SNMP MIB FILES
Bonus variables for detailed
device monitoring

Network Infrastructure Design Step-by-Step

Ensuring Security => SNMP Monitoring

- All LAN-RING switches support **SNMP-GET**, **SNMP-TRAP** and **SNMP-SET**.

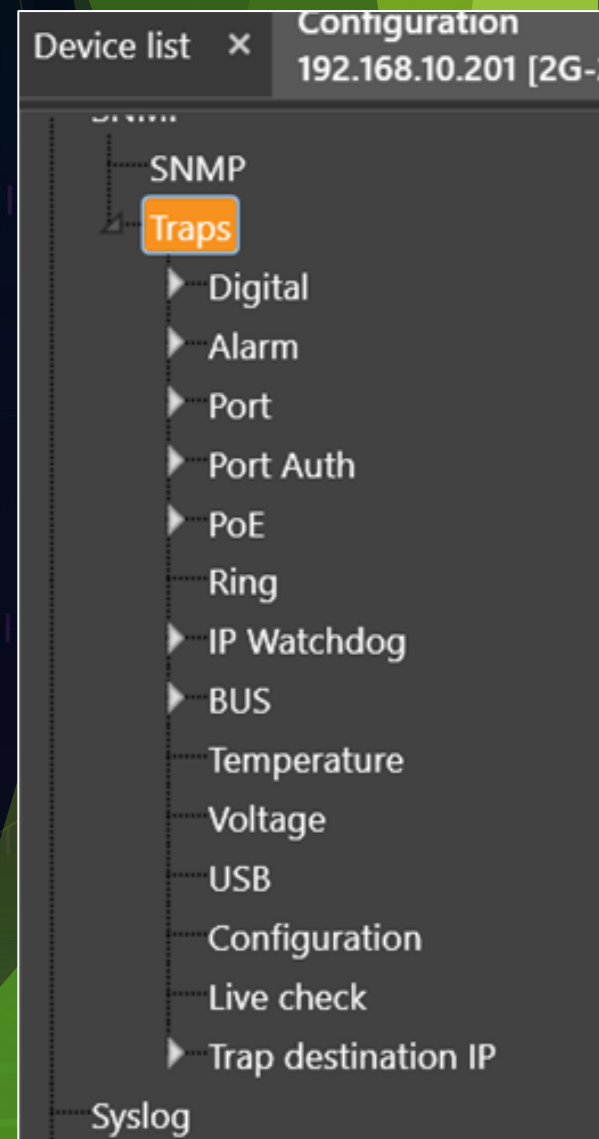
Mode	Trigger	Data Flow	User Case
SNMP-GET	Manager requests data	Manager <-> Agent	Fetch information from devices.
SNMP-TRAP	Agent sends alert	Agent -> Manager	Notify the manager of critical events.
SNMP-SET	Manager sends command	Manager <-> Agent	Change or configure device settings.

Network Infrastructure Design Step-by-Step

Ensuring Security => SNMP Monitoring

*Best Practices
for Security
Assurance*

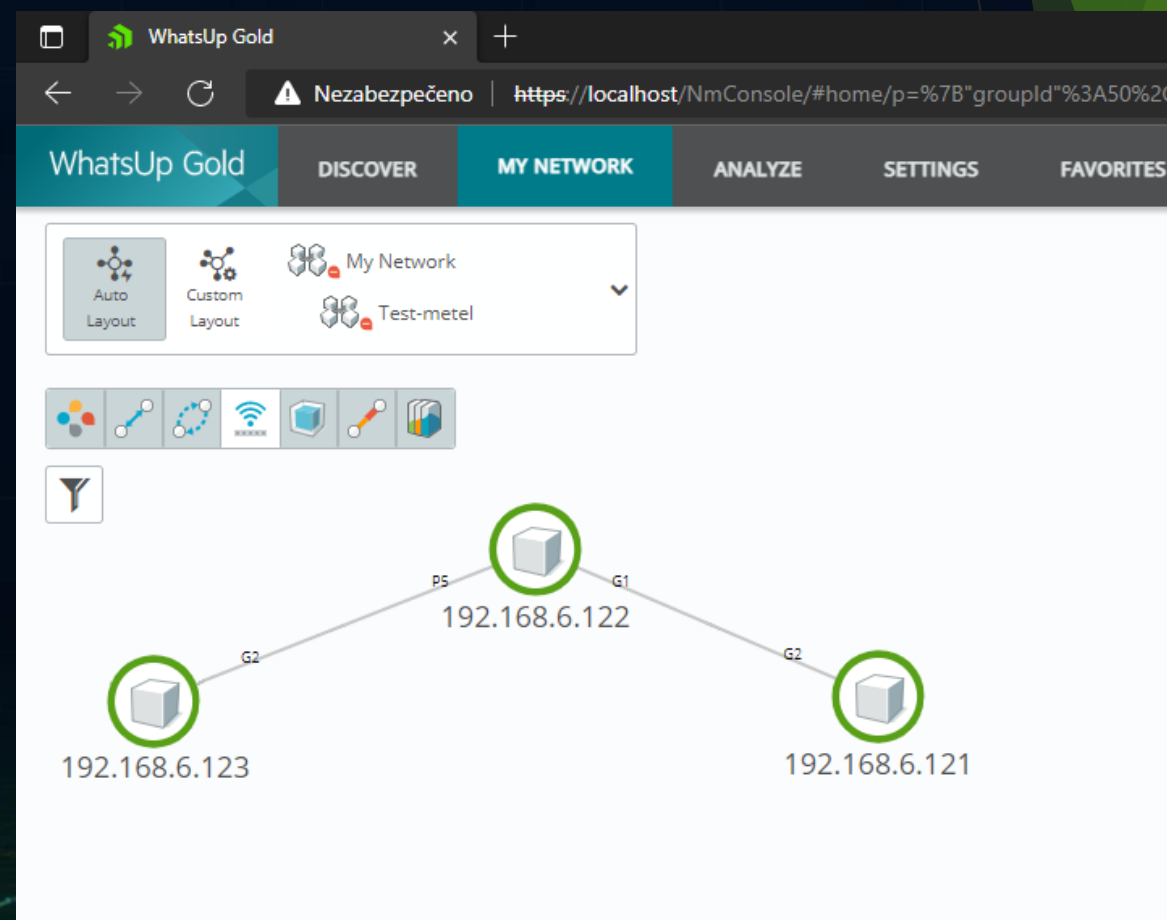
- You Can Monitor
 - Input voltage
 - 230V loss detection
 - Battery discharging
 - Ring status
 - Any FE, GE port
 - SFP diagnostic
 - Housing temperature
 - Device temperature
 - USB
 - 3rd party perimeter systems
 - Tamper
 - Battery voltage
- etc



Network Infrastructure Design Step-by-Step

Ensuring Security => SNMP Monitoring

- We recommend to report malfunctions and alarm conditions to the local/remote BMS or VMS.
 - C4, EQU, LATIS, SBI
 - Nagios, WUG, Zabbix, OpManager...
 - Gevisoft, Luxriot, VideoXpert...



Network Infrastructure Design Step-by-Step

Ensuring Security => Syslog

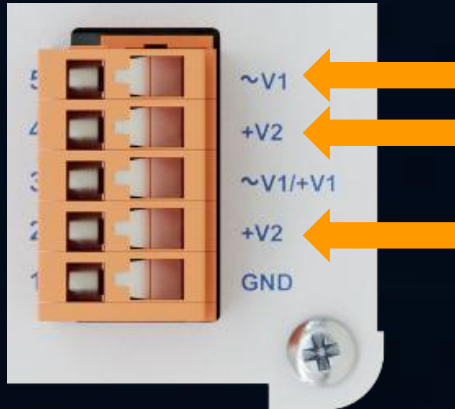
- LAN-RING G series supports **Syslog** standard for logging system events.
- Message Format**
 - TIMESTAMP** - the date and time when the message was generated.
 - HOSTNAME** - the name of the device or system that generated the log message.
 - SEVERITY LEVEL** - the severity or importance of the event.
 - FACILITY** - the type of device or system generating the message (e.g., kernel, user-level application...).
 - MESSAGE CONTENT** - a textual description of the event or error.

text	from	date
<166>Jan 7 21:03:45 192.168.6.13 logapi: 6-LINE User 'metel' succesfully verified	192.168.6.13	10/01 05:32:46.106
<166>Jan 7 21:03:45 192.168.6.13 logapi: 6-LINE User 'metel' connected (ssh / 192.168.6.29)	192.168.6.13	10/01 05:32:46.318
<166>Jan 7 21:03:46 192.168.6.13 logapi: 6-LINE Terminal started	192.168.6.13	10/01 05:32:46.998
<166>Jan 7 21:04:07 192.168.6.13 logapi: 6-LINE Executing 'configure'	192.168.6.13	10/01 05:33:08.171
<166>Jan 7 21:04:15 192.168.6.13 logapi: 6-LINE Executing 'port P1'	192.168.6.13	10/01 05:33:16.090
<166>Jan 7 21:04:43 192.168.6.13 logapi: 6-LINE Executing 'poe-enable'	192.168.6.13	10/01 05:33:43.711
<166>Jan 7 21:04:48 192.168.6.13 logapi: 6-PORT Port P1 link up	192.168.6.13	10/01 05:33:49.529
<166>Jan 7 21:04:53 192.168.6.13 logapi: 6-PORT PoE on port P1 active	192.168.6.13	10/01 05:33:53.836
<166>Jan 7 21:05:05 192.168.6.13 logapi: 6-PORT Port P1 link down	192.168.6.13	10/01 05:34:05.963
<166>Jan 7 21:05:07 192.168.6.13 logapi: 6-PORT Port P1 link up	192.168.6.13	10/01 05:34:07.618

Network Infrastructure Design Step-by-Step

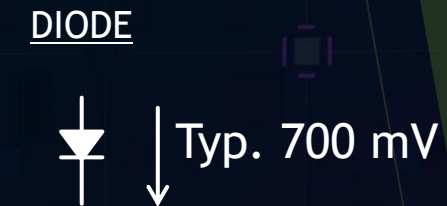
Ensuring Security => Backup and Redundant Power Supply

- All BOX version switches have*
 - 2x power inputs 10 - 60 VDC
 - or
 - 1x power input 10 - 30 VAC
 - 1x power inputs 10 - 60 VDC

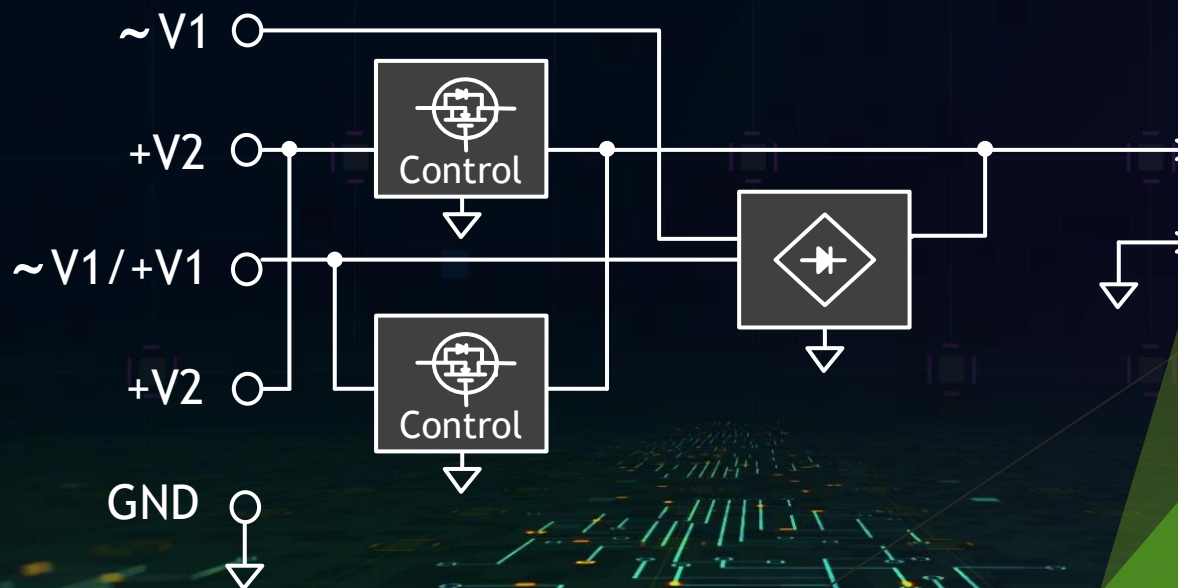


*48VDC must be used
for PoE applications

- Smart diodes manage redundant DC inputs, reducing heat loss and enabling reliable, fail-safe switching.



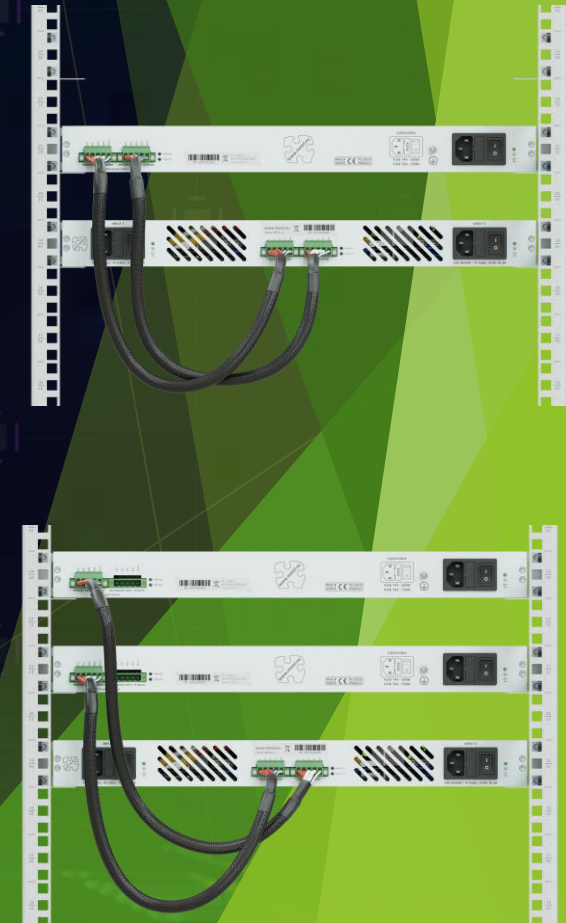
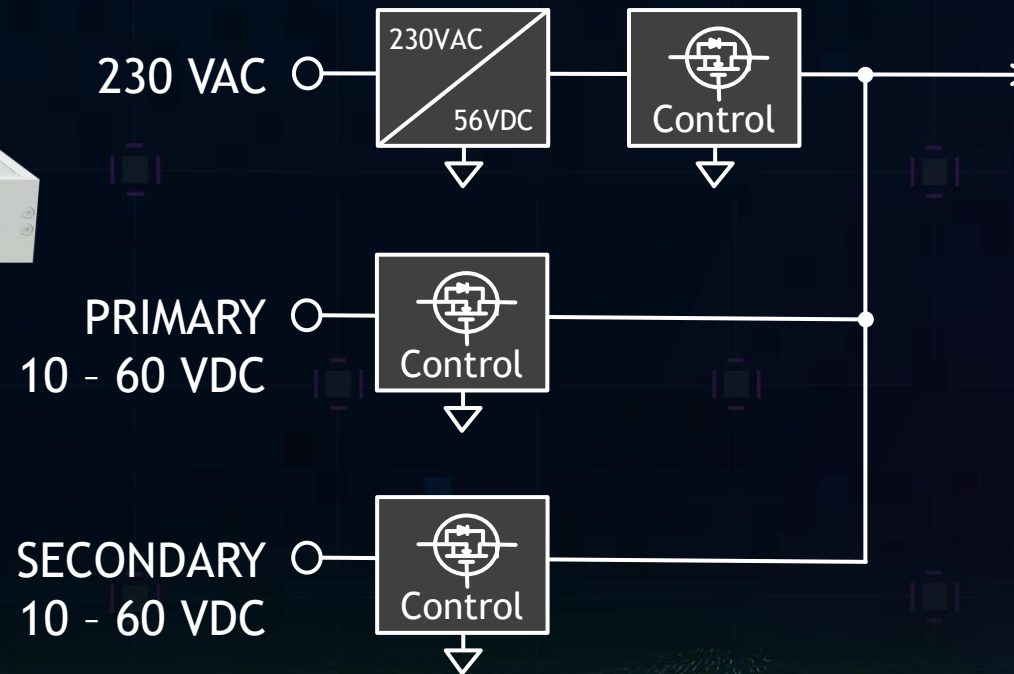
- The device always draws current from the input with the higher voltage.



Network Infrastructure Design Step-by-Step

Ensuring Security => Backup and Redundant Power Supply

- 20G-2X.1.24(16).F-POE-750-UNIT/1U**
 - 1x power input 230 VAC
 - 2x power inputs 10 - 60 VDC



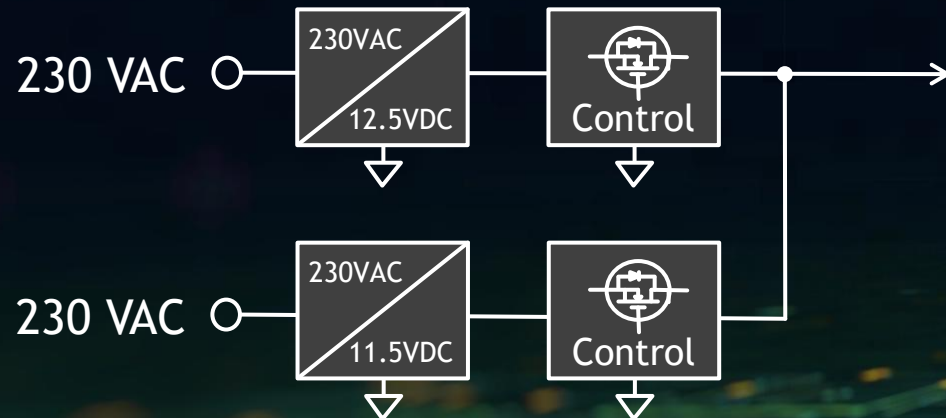
**48VDC or 230 VAC must be used for PoE applications

Network Infrastructure Design Step-by-Step

Ensuring Security => Backup and Redundant Power Supply

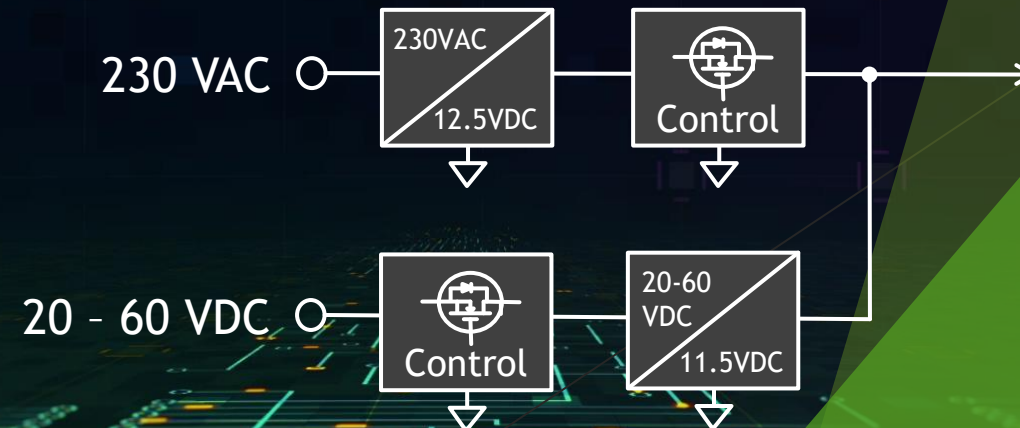
20G-2X.8C.F(G)-UNIT/1U**

- 2x power input 230 VAC



20G-2X.8C.F(G)-UNIT/1U-DC**

- 1x power input 230 VAC
- 1x power inputs 20 - 60 VDC



Network Infrastructure Design Step-by-Step

Ensuring Security => Backup and Redundant Power Supply

- OH6425 Switchboards with Backup
 - Steel switchboards with IP66 protection
 - Suitable for outdoor switch installations
 - Tested according to EN 61439-1
 - Shelf for backup batteries 4x 18-22 Ah
 - Dimensions: 600x400x250 mm
 - Basic equipment: 230 VAC socket, circuit breaker, overvoltage protection, tamper
 - Optional accessories: installation brackets, ventilation, shock detector, optical cartridges, locks



Network Infrastructure Design Step-by-Step

Ensuring Security => Backup and Redundant Power Supply⁷⁵

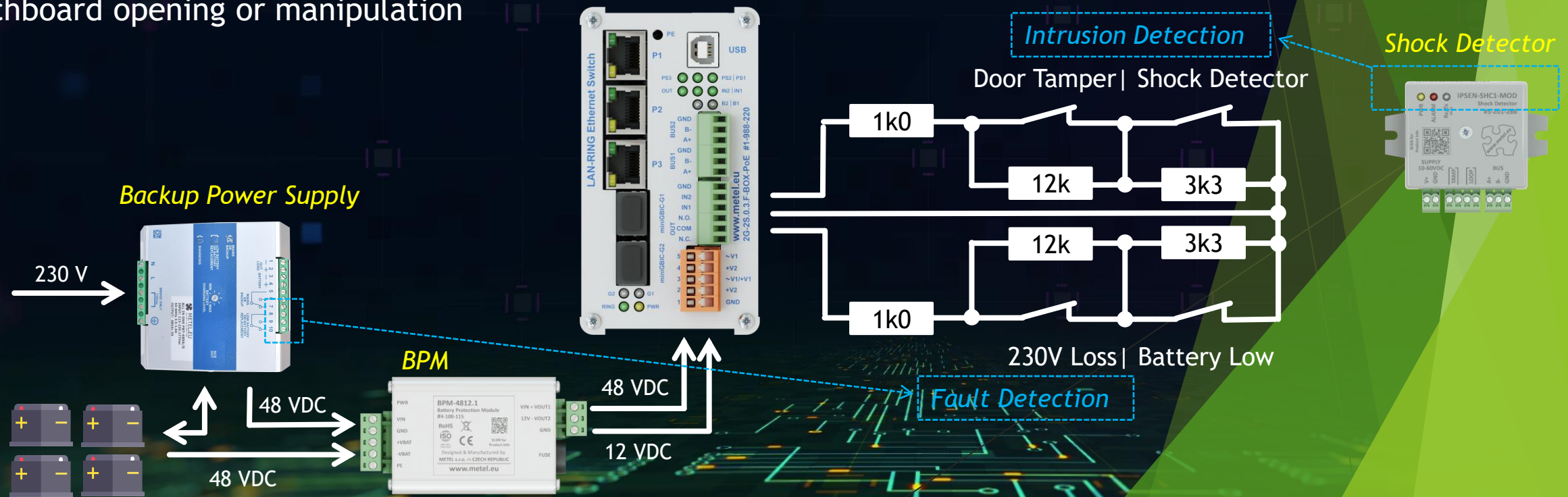
- OH7525 Switchboards with Backup
 - Steel switchboards with IP66 protection
 - Suitable for outdoor switch installations
 - Tested according to EN 61439-1
 - Shelf for backup batteries 4x 36Ah
 - Dimensions: 600x400x250 mm
 - Basic equipment: 230 VAC socket, circuit breaker, overvoltage protection, tamper
 - Optional accessories: installation brackets, ventilation, heating, shock detector, optical cartridges, locks



Network Infrastructure Design Step-by-Step

Ensuring Security => Backup and Redundant Power Supply

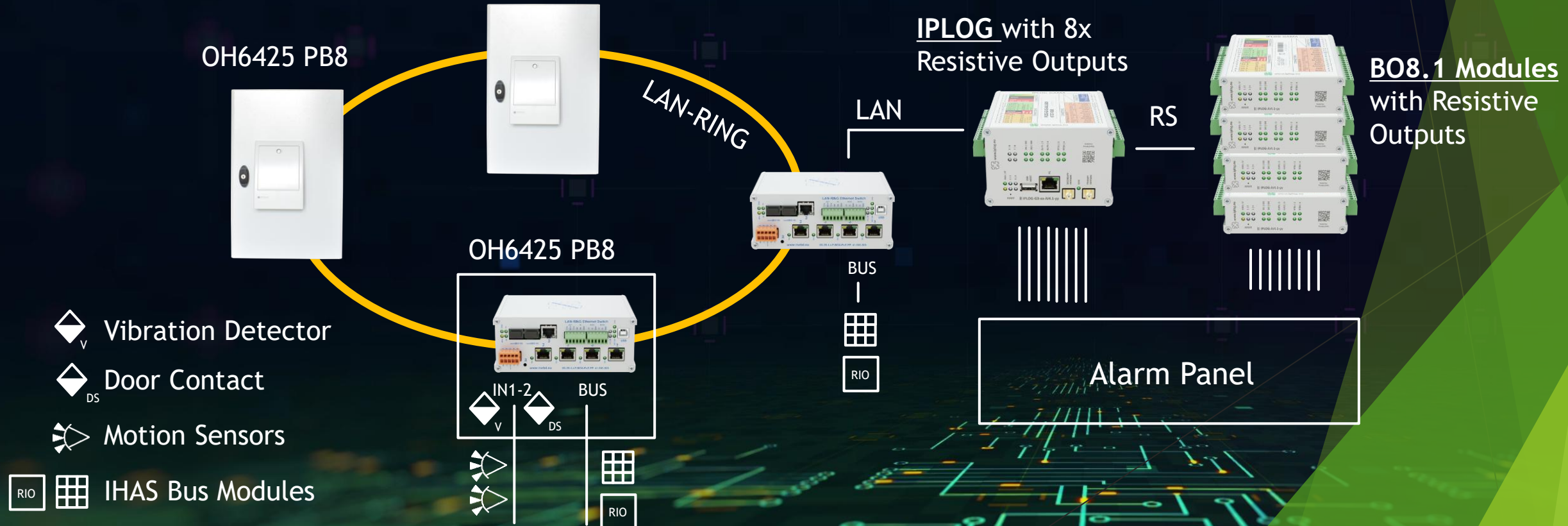
- OH6425 and OH7525 Switchboards with Backup
 - MAINS OR BACKUP RELAY - remotely can be detected loss of power from the mains
 - LOW BATTERY RELAY - remotely can be detected battery discharging/fault
 - BPM Module - in case of voltage loss at output PB7, supplies 12 VDC to maintain RS485 buses
 - In addition, alarm inputs can report switchboard opening or manipulation



Network Infrastructure Design Step-by-Step

Ensuring Security => Certification

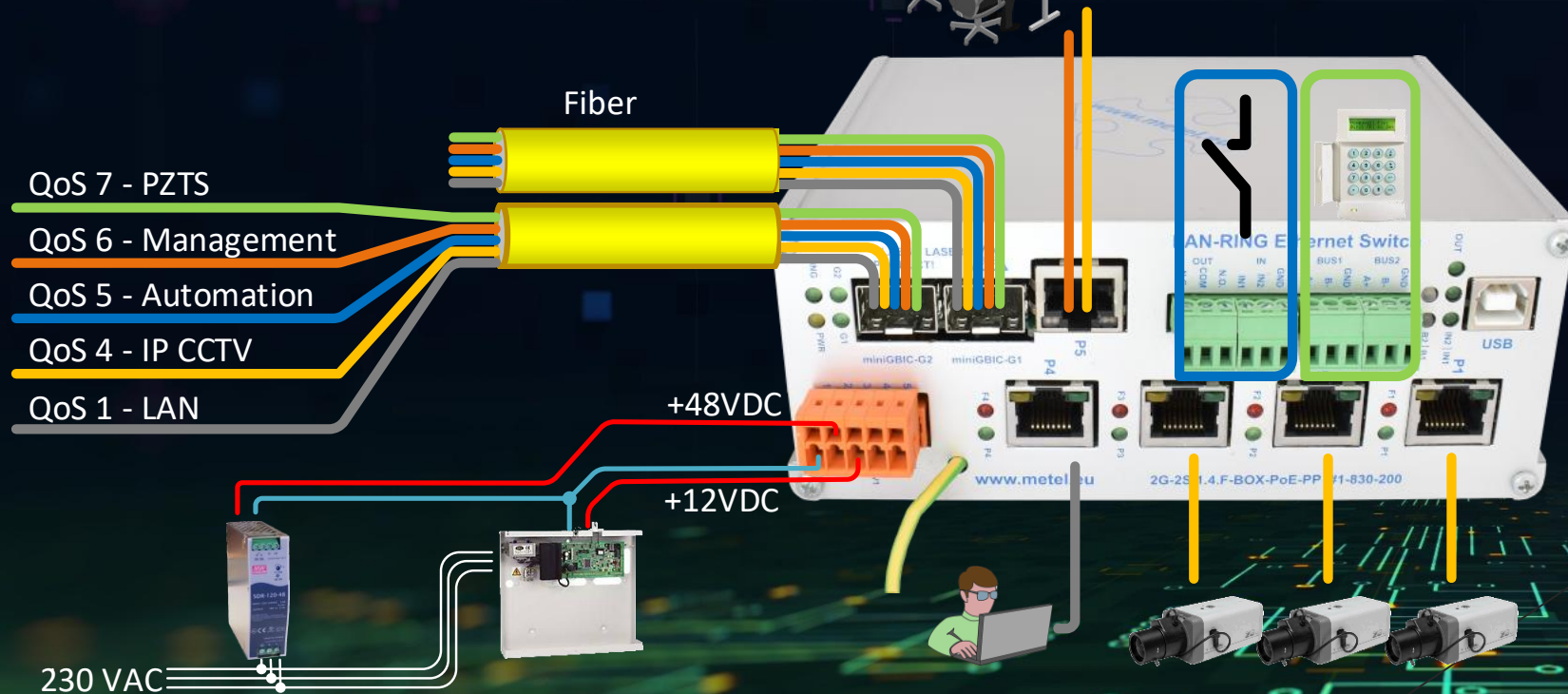
- Certified Since 2018
 - Selected models of 2G switches - certification of RS485 buses according to EN 50131-1 level 4
- Certified in 2024
 - Selected models of 2G and 20G switches - certification of balanced inputs according to EN 50131-6 level 4
 - IPLOG's alarm outputs - certification according to EN 50131-6 level 4
 - OH6425 PB8 - certification of outdoor backup switchboards according to EN 50131-6 level 4



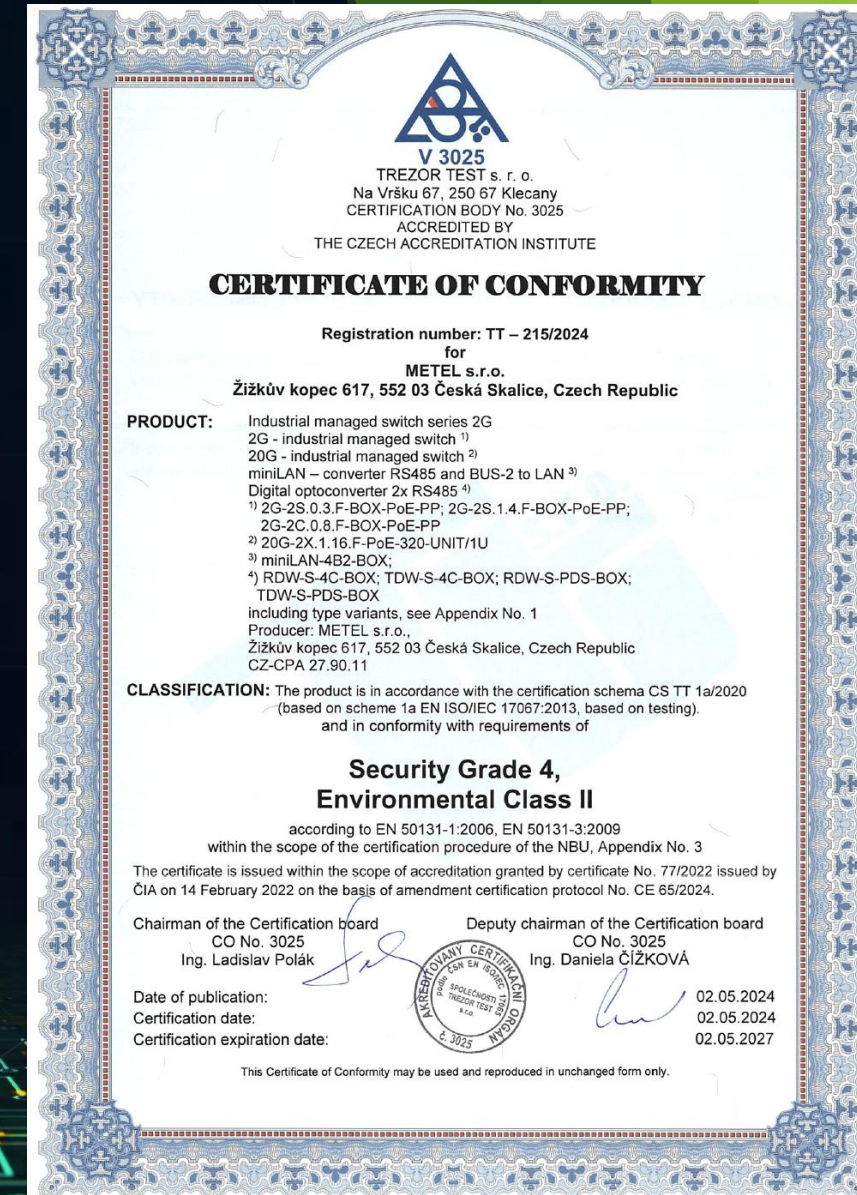
Network Infrastructure Design Step-by-Step

Ensuring Security => VLANs

- You can define both VLAN and QoS separately even for RS485 ports, thanks to which the switches are certified as a transmission system for IHAS up to level 4.



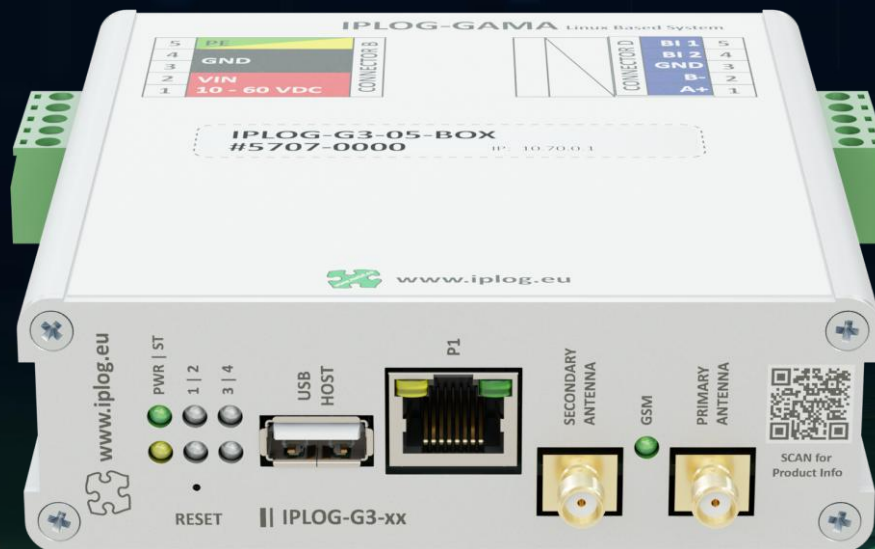
Best Practices
for Security
Assurance



Network Infrastructure Design Step-by-Step

Ensuring Security => Apps

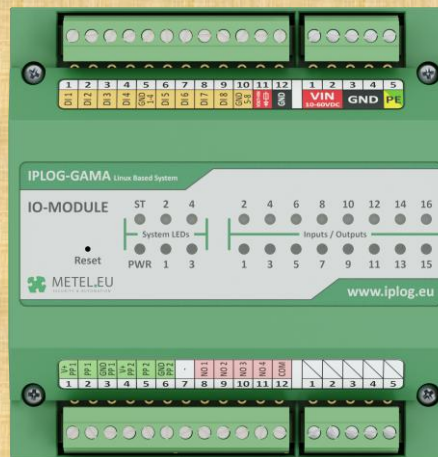
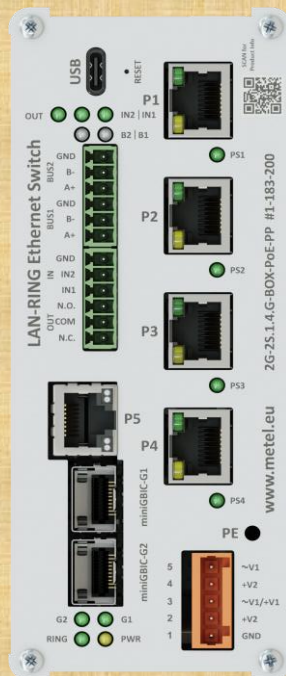
- IPLOG's Apps increases system security, such as:
 - HARDENED RADIUS SERVERS - provide centralized authentication for users who connect and access network resources
 - OPENVPN CLIENTS - provides secure remote access to the remote systems over the internet
 - NFTABLES FIREWALL - is a framework for packet filtering and network address translation (NAT). It is the successor to the older iptables



Infrastructure LAN-RING & IPLOG

Part: Changes in the Portfolio for 2024/25

- Industrial switches LAN-RING
- Control units IPLOG
- OH cabinets
- Accessories



METEL.EU
SECURITY & AUTOMATION

Changes in the Portfolio for 2024/25

LAN-RING Series

- We have included the G series LAN-RING in the series production.

F models



F models 2024/25



- More models with 20G ports
- Newly up to +75° C
- GE ports with 95W PoE
- USB-B -> USB-C Migrating

G models



- CLI, Tacacs+, Syslog, **MSTP, LACP...**
- Tested up to +75° C
- USB-C local console

Changes in the Portfolio for 2024/25

LAN-RING - BOX Series

- Portfolio Changes 2024/25

	2G-2S.0.2.F-BOX-PoE-PP	2G-2S.0.2.F-BOX-PoE-PP	2G-2S.0.2.G-BOX-PoE-PP
Uplinks	2x SFP 100/1000BASE-FX	2x SFP 1G	2x SFP 1G
Total PoE	120 W	150/120 W (70/75 °C)	150/120 W (70/75 °C)
PoE / Port	95 W	95 W	95 W
Working Temp.	-40 to +70 °C	-40 to 75 °C	-40 to +75 °C
Local Console	USB-B	USB-C	USB-C
Configuration	SIMULand GUI	SIMULand GUI	SIMULand GUI, SSH CLI, WWW
Security	Secure Boot, 802.1X	Secure Boot, 802.1X	Secure Boot, 802.1X, Tacacs+
RS485 Ports	Modbus / IHaS	Modbus / IHaS	Modbus
Cooling	Passive	Passive	Passive



Assortment

Changes in the Portfolio for 2024/25

LAN-RING - BOX Series

- Portfolio Changes 2024/25

	20G-2X.0.2.F-BOX-PoE-PP	20G-2X.0.2.G-BOX-PoE
Uplinks	2x SFP+ 1/10G	2x SFP+ 1/10G
Total PoE	150 W	150 W
PoE / Port	95 W	95 W
Working Temp.	-40 to +75 °C	-40 to +75 °C
Local Console	USB-C	USB-C
Configuration	SIMULand GUI	SIMULand GUI, SSH CLI, WWW
Security	Secure Boot, 802.1X	Secure Boot, 802.1X, Tacacs+
RS485 Ports	Modbus / IHaS	Modbus
Cooling	Controlled ventilator	Controlled ventilator



Assortment

Changes in the Portfolio for 2024/25

LAN-RING - BOX Series

- Portfolio Changes 2024/25

	2G-2S.0.3.F-BOX-PoE	2G-2S.0.3.F-BOX-PoE-PP	2G-2S.0.3.G-BOX-PoE
Uplinks	2x SFP 100/1000BASE-FX	2x SFP 1G	2x SFP 100/1000BASE-FX
PoE - Total/Port	90/30 W	150/120 W (70/75 °C)	90/30 W
PoE / Port	30 W	95 W	30 W
Working Temp.	-40 to +70 °C	-40 to +75 °C	-40 to +70 °C
Local Console	USB-B -> USB-C	USB-C	USB-C
Configuration	SIMULand GUI	SIMULand GUI	SIMULand GUI, SSH CLI, WWW
Security	Secure Boot, 802.1X	Secure Boot, 802.1X	Secure Boot, 802.1X, Tacacs+
RS485 Ports	Modbus / IHaS	Modbus / IHaS	Modbus
Cooling	Passive	Passive	Passive
Note	Will be available on request		



Assortment

Changes in the Portfolio for 2024/25

LAN-RING - BOX Series

- Portfolio Changes 2024/25

	20G-2X.0.3.F-BOX-PoE-PP	20G-2X.0.3.G-BOX-PoE
Uplinks	2x SFP+ 1/10G	2x SFP+ 1/10G
Total PoE	150 W	150 W
PoE / Port	95 W	95 W
Working Temp.	-40 to +75 °C	-40 to +75 °C
Local Console	USB-C	USB-C
Configuration	SIMULand GUI	SIMULand GUI, SSH CLI, WWW
Security	Secure Boot, 802.1X	Secure Boot, 802.1X, Tacacs+
RS485 Ports	Modbus / IHaS	Modbus
Cooling	Controlled ventilator	Controlled ventilator



Assortment

Changes in the Portfolio for 2024/25

LAN-RING - BOX Series

- Portfolio Changes 2024/25

	2G-2S.3.0.F-BOX	20G-2X.3.0.F-BOX-PoE-PP	20G-2X.3.0.G-BOX-PoE-PP
Uplinks	2x SFP 100/1000BASE-FX	2x SFP+ 1/10G	2x SFP+ 1/10G
Total PoE	-	150 W	150 W
PoE / Port	-	95 W	95 W
Working Temp.	-40 to +70 °C	-40 to +75 °C	-40 to +75 °C
Local Console	USB-B	USB-C	USB-C
Configuration	SIMULand GUI	SIMULand GUI	SIMULand GUI, SSH CLI, WWW
Security	Secure Boot, 802.1X	Secure Boot, 802.1X	Secure Boot, 802.1X, Tacacs+
RS485 Ports	Modbus / IHaS	Modbus / IHaS	Modbus
Cooling	Passive	Controlled ventilator	Controlled ventilator



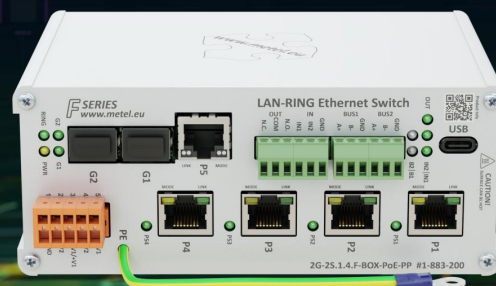
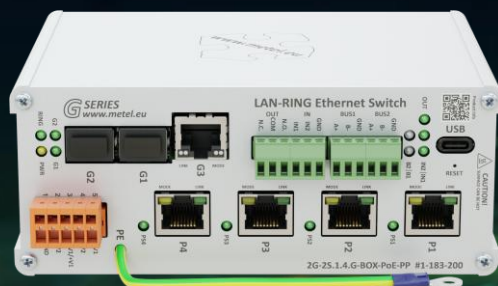
Assortment

Changes in the Portfolio for 2024/25

LAN-RING - BOX Series

Portfolio Changes 2024/25

	2G-2S.1.4.F-BOX-PoE-PP	2G-2S.1.4.G-BOX-PoE-PP	20G-2X.1.4.F-BOX-PoE-PP	20G-2X.1.4.G-BOX-PoE-PP
Uplinks	2x SFP 100/1000BASE-FX	2x SFP 100/1000BASE-FX	2x SFP+ 1/10G	2x SFP+ 1/10G
Total PoE	170 W	170 W	170 W	170 W
PoE / Port	95 W	95 W	95 W	95 W
Working Temperature	-40 to 70 -> 75 °C	-40 to 75 °C	-40 to 75 °C	-40 to 75 °C
Local Console	USB-C	USB-C	USB-C	USB-C
Configuration	SIMULand GUI	SIMULand GUI, SSH CLI, WWW	SIMULand GUI	SIMULand GUI, SSH CLI, WWW
Security	Secure Boot, 802.1X	Secure Boot, 802.1X, Tacacs+	Secure Boot, 802.1X	Secure Boot, 802.1X, Tacacs+
RS485 Ports	Modbus / IHaS	Modbus	Modbus / IHaS	Modbus
Cooling	Passive	Passive	Controlled ventilator	Controlled ventilator



Assortment

Changes in the Portfolio for 2024/25

LAN-RING - BOX Series

- Portfolio Changes 2024/25

	2G-1C.0.8.F-BOX-PoE-PP	2G-1C.0.8.G-BOX-PoE-PP
Uplinks	1x SFP 100/1000BASE-FX	1x SFP 100/1000BASE-FX
PoE - Total/Port	270/95 W	270/95 W
Max. Working Temperature	70 -> 75 °C	75 °C
Local Console	USB-B -> USB-C	USB-C
Configuration	SIMULand GUI	SIMULand GUI, SSH CLI, WWW
Security	Secure Boot, 802.1X	Secure Boot, 802.1X, Tacacs+
RS485 Ports	Modbus / IHaS	Modbus
Cooling	Passive	Passive



Assortment

Changes in the Portfolio for 2024/25

LAN-RING - BOX Series

- Portfolio Changes 2024/25

	2G-2C.0.8.F-BOX-PoE-PP	2G-2C.0.8.G-BOX-PoE-PP
Uplinks	2x SFP 100/1000BASE-FX	2x SFP 100/1000BASE-FX
PoE - Total/Port	270/95 W	270/95 W
Max. Working Temperature	70 -> 75 °C	75 °C
Local Console	USB-B -> USB-C	USB-C
Configuration	SIMULand GUI	SIMULand GUI, SSH CLI, WWW
Security	Secure Boot, 802.1X	Secure Boot, 802.1X, Tacacs+
RS485 Ports	Modbus / IHaS	Modbus
Cooling	Passive	Passive



Assortment

Changes in the Portfolio for 2024/25

LAN-RING - BOX Series

- Portfolio changes 2024/25

	2G-2C.8S.0.0.F-BOX	2G-2C.8S.0.0.G-BOX
Uplinks	2x SFP 100/1000BASE-FX	2x SFP 100/1000BASE-FX
Max. Working Temperature	70 -> 75 °C	75 °C
Local Console	USB-B -> USB-C	USB-C
Configuration	SIMULand GUI	SIMULand GUI, SSH CLI, WWW
Security	Secure Boot, 802.1X	Secure Boot, 802.1X, Tacacs+
RS485 Ports	Modbus / IHaS	Modbus
Cooling	Passive	Passive



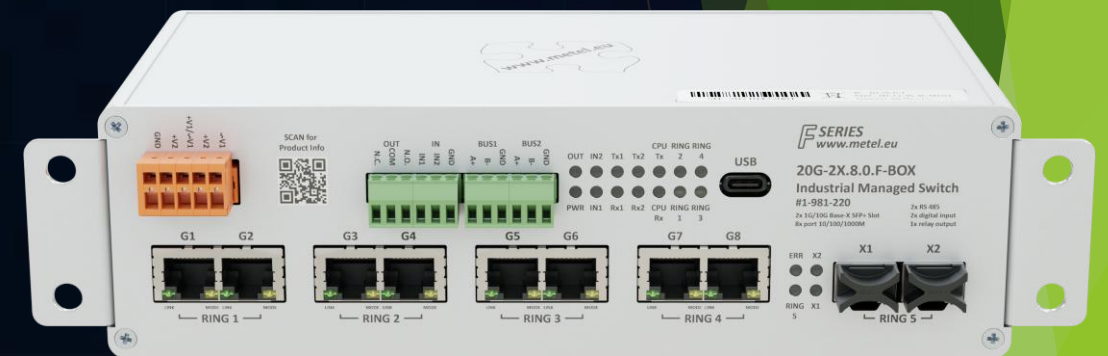
Assortment

Changes in the Portfolio for 2024/25

LAN-RING - BOX Series

- Portfolio Changes 2024/25

	20G-2X.8.0.F-BOX	20G-2X.8.0.G-BOX
Uplinks	2x SFP+ 1/10G	2x SFP+ 1/10G
Max. Working Temperature	70 -> 75 °C	75 °C
Local Console	USB-B -> USB-C	USB-C
Configuration	SIMULand GUI	SIMULand GUI, SSH CLI, WWW
Security	Secure Boot, 802.1X	Secure Boot, 802.1X, Tacacs+
RS485 Ports	Modbus / IHaS	Modbus
Cooling	Controlled ventilator	Controlled ventilator



Changes in the Portfolio for 2024/25

LAN-RING - UNIT/1U Series

- Portfolio Changes 2024/25

	20G-2X.8C.0.F-UNIT/1U	20G-2X.8C.0.G-UNIT/1U	20G-2X.8C.0.F-UNIT/1U-DC	20G-2X.8C.0.G-UNIT/1U-DC
Uplinks	2x SFP+ 1/10G	2x SFP+ 1/10G	2x SFP+ 1/10G	2x SFP+ 1/10G
Local Console	USB-B -> USB-C	USB-C	USB-C	USB-C
Configuration	SIMULand GUI	SIMULand GUI, SSH CLI, WWW	SIMULand GUI	SIMULand GUI, SSH CLI, WWW
Security	Secure Boot, 802.1X	Secure Boot, 802.1X, Tacacs+	Secure Boot, 802.1X	Secure Boot, 802.1X, Tacacs+
RS485 Ports	Modbus / IHaS	Modbus	Modbus / IHaS	Modbus
Power IN	2x 230 VAC	2x 230 VAC	1x 230 VAC + 1x 20-60 VDC	1x 230 VAC + 1x 20-60 VDC



Assortment

Changes in the Portfolio for 2024/25

LAN-RING - UNIT/1U Series

○ 20G-2X.5.16-F(G)-UNIT/1U

- 2x SFP+ slot 10 GBASE-R / 1000 BASE-X
- 4x RJ45 port 10/100/1000 BASE-T with 90 W PoE
- 1x RJ45 port 10/100/1000 BASE-T
- 16x RJ45 port 10/100 BASE-T with PoE
- 2x RS485 / Modbus-RTU bus
- 2x digital/alarm input
- 1x programmable relay output
- Internal 750 W PSU
- 3 independent power inputs
- Redundant topology LAN-RING, RSTP
- Overvoltage protection up to 30A (8/20 μ s)
- Event management with support for: HTTP/ONVIF client, E-mail, IP Watchdogs, ETH events, TCP, Modbus, DIO, balanced loops...



LAN-RING - Overview

- BOX Series

	2025	Backbone SFP Ports Speed	Working Temperature	Cooling	GUI	CLI	PoE Port Total	RS485	
								Modbus RTU	Alarm Systems
New!	2G-2S.0.2.F-BOX-PoE-PP	1/0.1 Gbps	-40 to +70 °C	Passive	Yes	-	95 120 / 150*	Yes	Certified
	2G-2S.0.2.G-BOX-PoE-PP	1/0.1 Gbps	-40 to +75 °C	Passive	Yes	Yes	95 120 / 150*	Yes	-
New!	2G-2S.0.3.F-BOX-PoE	1/0.1 Gbps	-40 to +70 °C	Passive	Yes	-	30 / 90	Yes	Certified
	2G-2S.0.3.F-BOX-PoE-PP	1 Gbps	-40 to +75 °C	Passive	Yes	-	95 120 / 150*	Yes	Certified
New!	2G-2S.0.3.G-BOX-PoE	1 Gbps	-40 to +70 °C	Passive	Yes	Yes	95 120 / 150*	Yes	-
New!	2G-2S.0.3.FC-BOX	1/0.1 Gbps	-40 to +75 °C	Passive	Yes	-	-	-	-
	2G-2S.0.3.GC-BOX	1/0.1 Gbps	-40 to +75 °C	Passive	Yes	Yes	-	-	-
New!	20G-2X.0.3.F-BOX-PoE-PP	10/1 Gbps	-40 to 75 °C	Active	Yes	-	95 150	Yes	Yes
New!	20G-2X.0.3.G-BOX-PoE-PP	10/1 Gbps	-40 to 75 °C	Active	Yes	Yes	95 150	Yes	-
New!	20G-2X.3.0.F-BOX-PoE-PP	10/1 Gbps	-40 to 75 °C	Active	Yes	-	95 150	Yes	Yes
New!	20G-2X.3.0.G-BOX-PoE-PP	10/1 Gbps	-40 to 75 °C	Active	Yes	Yes	95 150	Yes	-
* at maximum temperature + 70 °C									

Changes in the Portfolio for 2024/25

LAN-RING - Overview

○ BOX Series

	2025	Backbone SFP Ports Speed	Working Temperature	Cooling	GUI	CLI	PoE Port Total	RS485	
								Modbus RTU	Alarm Systems
New!	2G-2S.1.4.F-BOX-PoE-PP	1/0.1 Gbps	-40 to +70 75° C	Passive	Yes	-	95 170	Yes	Certified
New!	2G-2S.1.4.G-BOX-PoE-PP	1/0.1 Gbps	-40 to +75° C	Passive	Yes	Yes	95 170	Yes	-
New!	20G-2S.1.4.F-BOX-PoE-PP	10/1 Gbps	-40 to +75° C	Active	Yes	-	95 170	Yes	Yes
New!	20G-2S.1.4.G-BOX-PoE-PP	10/1 Gbps	-40 to +75° C	Active	Yes	Yes	95 170	Yes	-
	2G-1C.0.8.FC-BOX-PoE-PP	1/0.1 Gbps	-40 to +70 75° C	Passive	Yes	-	95 270	-	-
New!	2G-1C.0.8.GC-BOX-PoE-PP	1/0.1 Gbps	-40 to +75° C	Passive	Yes	Yes	95 270	-	-
New!	2G-2C.0.8.F-BOX-PoE-PP	1/0.1 Gbps	-40 to +70 75° C	Passive	Yes	-	95 270	Yes	Certified
New!	2G-2C.0.8.G-BOX-PoE-PP	1/0.1 Gbps	-40 to +75° C	Passive	Yes	Yes	95 270	Yes	-
	2G-2C.8S.0.0.F-BOX	1/0.1 Gbps	-40 to +70° C	Passive	Yes	-	-	Yes	Yes
New!	2G-2C.8S.0.0.G-BOX	1/0.1 Gbps	-40 to +75° C	Passive	Yes	Yes	-	Yes	-
	20G-2X.8.0.F-BOX	10/1 Gbps	-40 to +70° C	Active	Yes	-	-	Yes	Yes
New!	20G-2X.8.0.G-BOX	10/1 Gbps	-40 to +75° C	Active	Yes	Yes	-	Yes	-

Changes in the Portfolio for 2024/25

LAN-RING - Overview

○ UNIT Series

	2025	Backbone SFP Ports Speed	Working Temperature	Cooling	GUI	CLI	PoE Port Total	RS485	
								Modbus RTU	Alarm Systems
	20G-2X.1.24.F-POE-x-UNIT/1U	10/1 Gbps	-30 to +50°C	Active	Yes	-	30 300/700	Yes	Certified
New!	20G-2X.1.24.G-POE-x-UNIT/1U	10/1 Gbps	-30 to +50°C	Active	Yes	Yes	30 300/700	Yes	-
	20G-2X.1.16.F-POE-x-UNIT/1U	10/1 Gbps	-30 to +50°C	Active	Yes	-	30 300/700	Yes	Certified
New!	20G-2X.1.16.G-POE-x-UNIT/1U	10/1 Gbps	-30 to +50°C	Active	Yes	Yes	30 300/700	Yes	-
	20G-2X.1.16.FC-POE-x-UNIT/1U	10/1 Gbps	-30 to +50°C	Active	Yes	-	30 240	Yes	Yes
New!	20G-2X.1.16.GC-POE-x-UNIT/1U	10/1 Gbps	-30 to +50°C	Active	Yes	Yes	30 240	Yes	-
	20G-2X.8C.0.F-UNIT/1U(-DC)	10/1 Gbps	-20 to +50°C	Active	Yes	-	-	Yes	Yes
New!	20G-2X.8C.0.G-UNIT/1U(-DC)	10/1 Gbps	-20 to +50°C	Active	Yes	Yes	-	Yes	-
New!	20G-2X.5.16.F-POE-750-UNIT/1U	10/1 Gbps	-30 to +50°C	Active	Yes	-	95 700	Yes	Yes
New!	20G-2X.5.16.G-POE-750-UNIT/1U	10/1 Gbps	-30 to +50°C	Active	Yes	Yes	95 700	Yes	-

Changes in the Portfolio for 2024/25

LAN-RING - Marking

LAN-RING Marking System

2G-2S.0.2.F-BOX-PoE-PP

| | | | | PP = PoE up to 95 W per port
| | | | | Switch with PoE ports
| | | | BOX = Al profile | UNIT/1U-19" case
| | | | Series F (GUI) | G (GUI + CLI)
| | | Ports and their quantity in order from the fastest
| | Shortcuts: 1S, 2S - SFP slots | 1C, 2C - COMBO ports
| | 1X, 2X - SFP+ 10Gbps slots
| Bussiness name of series
| 2G - 1Gbps backbone | 20G - 10Gbps backbone

Certification

- ☒ Railway
- ☒ CE
- ☐ PZTS

Installation

- ☐ Free base
- ☒ DIN35
- ☐ For 10" rack
- ☐ For 19" rack

Ports and IO

- ☐ SFP/SFP+ *i*
- ☐ COMBO *i*
- ☒ SFP *i*
- ☐ SFP 100Mbps *i*
- ☒ FE *i*
- ☒ GE *i*
- ☐ RS485 *i*
- ☐ DI/BI input *i*
- ☐ Relay output

Power

- ☒ 10 - 60VDC



2G-2S.1.4.F

Industrial managed PoE++ LAN-RING switches equipped with Ethernet ports, SFP slots and also RS485 buses, digital / alarm inputs and relay outputs. Eve...

[SHOW PRODUCT](#)

Changes in the Portfolio for 2024/25

IPLOG - Overview

BOX Series



IPLOG-G1

2x LAN
1x USB-A
1x USB-B
1x IF Slot
1x IO Slot
1x Power

IPLOG-G2E

1x LAN
1x USB-A
1x USB-B
1x IF Slot
1x IO Slot
1x Power

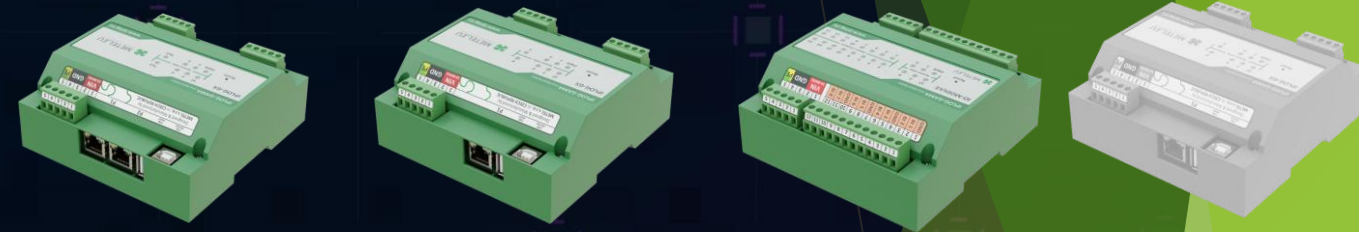
IPLOG-G3

1x 2G/3G/4G
1x LAN
1x USB-A
1x USB-B
1x IF Slot
1x IO Slot
1x Power

IO Modules

Digital Inputs
5/24/230 V
Alarm Inputs
Analog Inputs
U/I
Relay Outputs
Analog Outputs
U/R
SSR and Push
Pull Outputs

DIN Series



IPLOG-G4

2x LAN
1x USB-A
1x USB-B
1x RS485
1x IF Slot
1x Power

IPLOG-G5

1x LAN
1x USB-A
1x USB-B
2x RS485
1x Power
1x 230V DI
1x AI (Bat. Mon.)
3x Alarm Inputs
1x NOC Relay

IO Modules

Digital Inputs
5/24/230 V
Alarm Inputs
Analog Inputs
U/I
Relay Outputs
Analog Outputs
U/R
SSR and Push
Pull Outputs

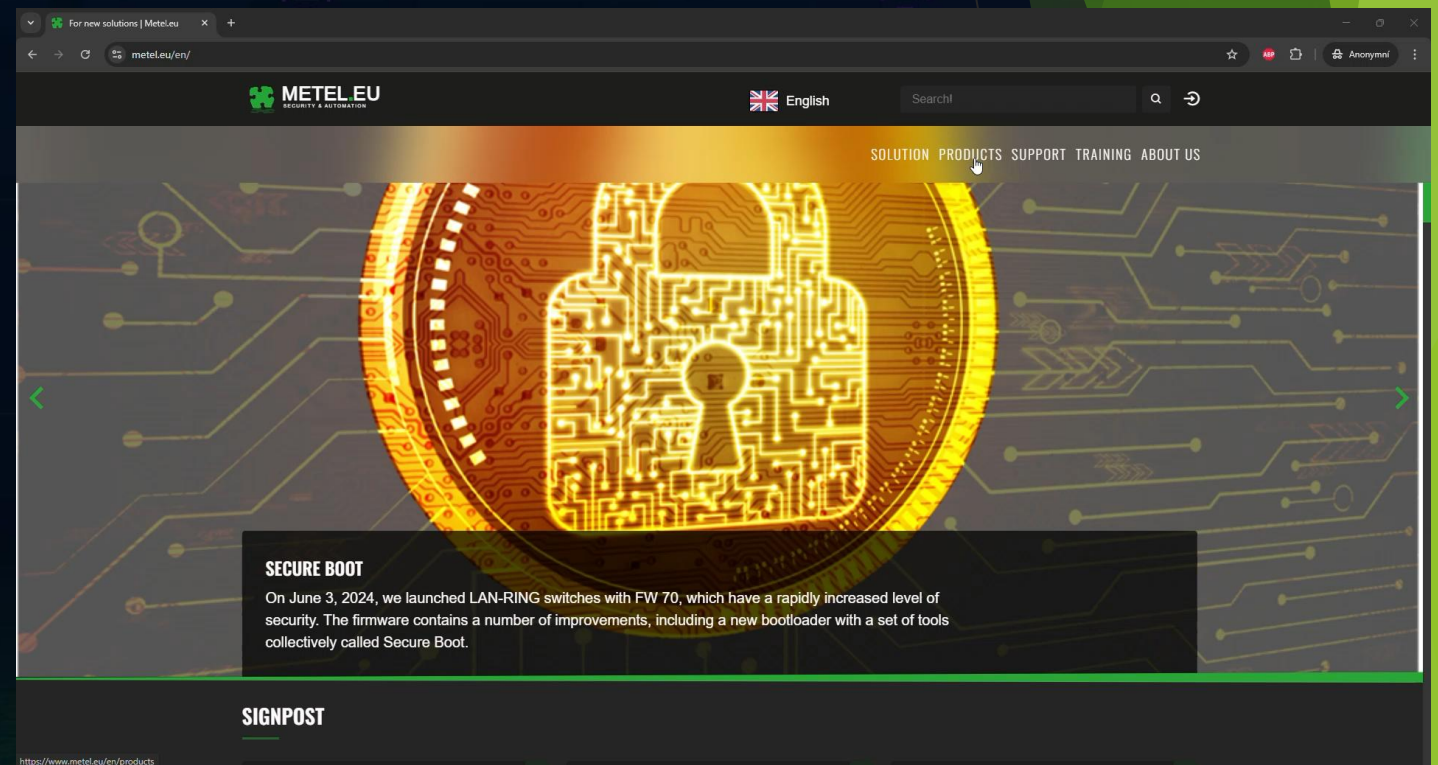
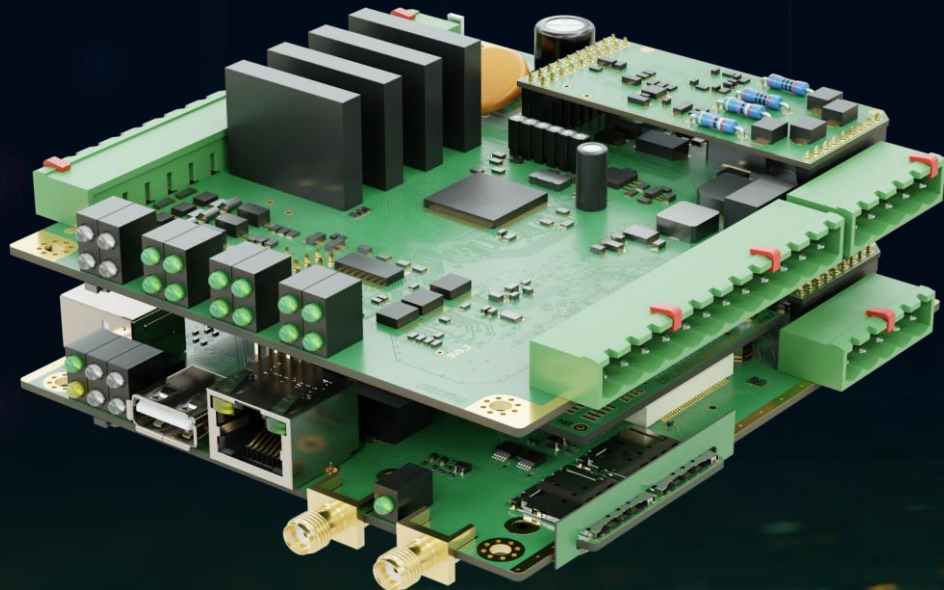
IPLOG-G6

1x LAN
1x USB-A
1x USB-B
2x RS485
1x Power
1x 230V DI
3x Alarm
Inputs
2x NOC Relay

Changes in the Portfolio for 2024/25

IPLOG - Overview

- PLC BOX series can consist of
 - Motherboard with a CPU Module
 - IF Board on Motherboard (optional)
 - IO Board (optional)
 - IF Board on IO Board (optional)



Changes in the Portfolio for 2024/25

Media Converters

- Media Converters

200M-1S.0.1-BOX 200M-1S.0.1-BOX-PoE			
SFP (1G)	SFP (100M)	GE	FE
0	1	0	1

2G-1S.1.0-BOX 2G-1S.1.0-BOX-PoE			
SFP (1G)	SFP (100M)	GE	FE
1	0	1	0



Changes in the Portfolio for 2024/25

Serial Line Converters

○ miniLAN-4B2

- TCP-server/TCP-client
- **EN50131-1 certified with:
ASSET, GALAXY, MB-SECURE**
- **Can simultaneously transfer
2 Asset / Galaxy / MB Secure buses**
- Up to 30 METEL IO Modules on each RS485 bus
- LAN/RS Port Conversion Speed from 3ms
- 600W Surge Protection for All Ports
- Operating Range -40°C to $+70^{\circ}\text{C}$



○ miniLAN-42

- 1x ethernet port
- 1x RS485
- 1x RS232
- Modbus RTU/TCP
- TCP-server/TCP-client
- Encrypted SNMPv3 management
- Mounting on a flat surface or DIN35
- Operating temperature from -40°C to $+70^{\circ}\text{C}$



Changes in the Portfolio for 2024/25

Backup Power Supplies

- PB7-485A/S
 - Input voltage 90-135 and 180-305VAC
 - Output voltage 48 VDC / 5A
 - Battery charging output 48 VDC / 5 A
 - Suited for Open Lead Acid, Sealed Lead Acid, Lead Gel batteries
 - Relay output signalling mains / backup mode
 - Relay output signalling discharged or damaged battery
 - Automatic diagnostic of battery status
 - Mounting on DIN35
 - Passive cooling



Changes in the Portfolio for 2024/25

Backup Power Supplies

○ PB7-485A/S - Available Inputs and Outputs

Mains Power Input

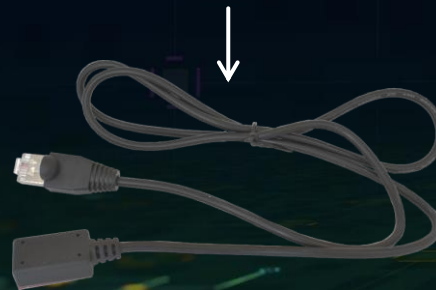
- 90 - 135 VAC | 180 - 305 VAC
- Frequency 47 - 63 Hz
- External fuse 10 A (char. C) or 16 A (char. B)



- Output voltage 48 VDC/5A
- Short-circuit/overload / overheating protection
- Support start-up with capacitive load)
- Max. charging current 5 A $\pm$ 5% (20 - 100 %)
- Supported batteries Lead Acid, GEL, AGM
- Main power loss detection
- Relay 1 (C-NC-NO) | Relay max. 30 VDC / 1 A
- Faulty / low battery detection
- Relay 2 (C-NC-NO) | Relay max. 30 VDC / 1 A

PB-T1-RJ45

- Easy connection
- RJ45 connector
- Temperature Probe Length 1m
- Strong adhesive tape for sticking to the battery



Changes in the Portfolio for 2024/25

Outdoor Switchboards

- We supply outdoor steel cabinets optimized for IP CCTV applications.
- Our switchboards comply with the requirements of EN 61439-1
- All our switchboards are supplied with a wiring diagram and a test report.



OH6425 with backup

- Steel switchboards with IP66 protection
- Suitable for outdoor switch installations
- Tested according to EN 61439-1
- Shelf for backup batteries
- Dimensions: 600x400x250 mm
- Basic equipment: 230 VAC socket, circuit breaker, overvoltage protection, tamper

[SHOW MORE ▼](#)

The OH6425 series outdoor steel switchboards are designed for outdoor installation of 2G and 20G series industrial switches. Models are available with a backup power supply and a shelf for battery installation. A Wiring Diagram and Unit Test Report are included.

[OH CONFIGURATOR](#) [CONTACT US](#)

Online Configurator contains
standardized versions

Demand for atypical
models

PROTOKOL O KUSOVÉ ZKOUŠCE

Typ rozváděče: OH6425 - C10.A12.R.PB8.5x-SEC

Výrobní číslo: 

Specifikace: 10A | V | IPXX | 2023

In: Thermo Sec Kyn. Sak výrobce
Un: 230VAC / 50Hz AC, TN-S / TN-C
Ui: 2,5kV

Kusová zkouška byla provedena dle ČSN EN 61 439-1

Zkouška:	Výsledek / Testoval
1. Prohlídka	OK / 
2. Test napětím 2,5kV	OK / 
3. Izolační odpor > 20MΩ	OK / 
4. Přechodový odpor _____ Ω	OK / 
5. Kontrola vybavy dle dokumentace	OK / 
6. Kontrola zapojení dle schématu	OK / 
7. Mechanická kontrola spojovacích prvků	OK / 
8. Kontrola povrchové úpravy, značení apod.	OK / 

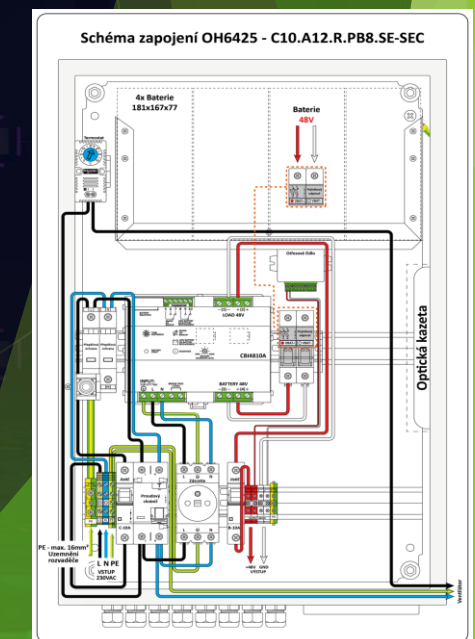
Rozváděč vyhoví provedeným zkouškám

V České Skalici dne: Razítko a podpis: 

Uživatel: METEL s.r.o. Sídlo: Topolná 417 552 01 Česká Skalice CZCEN REPUBLIKA

test@metel.eu www.metel.eu



Changes in the Portfolio for 2024/25

Outdoor Switchboards

- OH Series with Non-Backup Power Sources

	OH3215
Optimized for	Media converters
Dimensions H x W x D [mm]	300 x 250 x 150
PSU Power	40W
PSU Voltage	12/24/48 VDC
Protection	Tamper
Remote PSE monitoring	-



Optional
Accessories



O12-DIN



HOLDER-***



KIT-OH



OH65-LOCK

Changes in the Portfolio for 2024/25

Outdoor Switchboards

- OH Series with Non-Backup Power Sources

	OH4320
Optimized for	5...7 port switches
Dimensions H x W x D [mm]	400 x 300 x 200
PSU Power	120W
PSU Voltage	12/24/48 VDC
Protection	Tamper
Remote PSE monitoring	SNMP (via switch)



Stainless steel
design for applications
with aggressive
environments

Optional
Accessories



O12-DIN



OB12-DIN



HOLDER-***



KIT-OH



OH65-LOCK

Changes in the Portfolio for 2024/25

Outdoor Switchboards

- OH Series with Non-Backup Power Sources

	OH6425
Optimized for	5...10 port switches
Dimensions H x W x D [mm]	600 x 400 x 250
PSU Power	120/240W
PSU Voltage	12/24/48 VDC
Protection	Tamper
Remote PSE monitoring	SNMP (via switch)



Optional
Accessories



O12-DIN



OB12-DIN



HOLDER-***



KIT-OH



OH65-LOCK

Changes in the Portfolio for 2024/25

Outdoor Switchboards

Outdoor Switchboards with Backup Power Supply

	OH6425 PB7
Optimized for	5...10 port switches
PSU Power / Voltage	240W / 48VDC with backup
Dimensions H x W x D [mm]	600 x 400 x 250
Battery Size	4x 18 - 22 Ah (max. 170 x 314 x 212 mm)
Protection	Tamper, shock detector
Remote PSU monitoring	SNMP (via LAN-RING switch)
Ventilation* Heating**	Optional Not supported
* Extends the battery's life.	
** Heating increases battery capacity at low outside temperatures.	



Optional Accessories



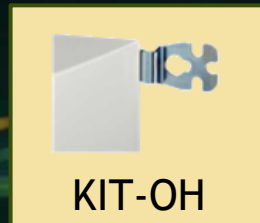
O12-DIN



OB12-DIN



HOLDER-***



KIT-OH



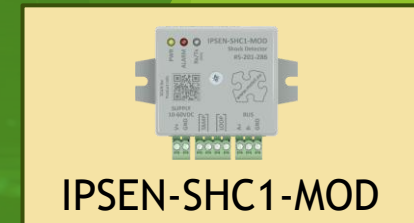
OH65-LOCK



OH-THERMO-SET-V



OH65-LOCK



IPSEN-SHC1-MOD

Changes in the Portfolio for 2024/25

Outdoor Switchboards

○ OH Series

	OH7525 PB7
Optimized for	5...10 port switches
PSU Power / Voltage	240W / 48VDC with backup
Dimensions H x W x D [mm]	600 x 400 x 250
Battery Size	4x 33 - 36 Ah (max. 197 x 131 x 180 mm)
Protection	Tamper, shock detector
Remote PSU monitoring	SNMP (via LAN-RING switch)
Ventilation* Heating**	Optional optional
* Extends the battery's life. ** Heating increases battery capacity at low outside temperatures.	



Optional Accessories



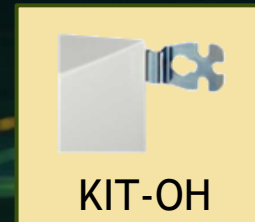
O12-DIN



OB12-DIN



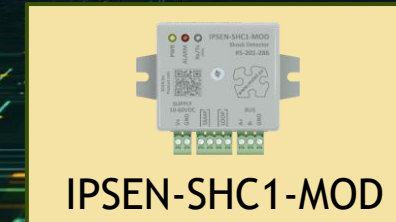
HOLDER-***



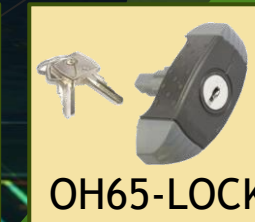
KIT-OH



OH65-LOCK



IPSEN-SHC1-MOD



OH65-LOCK



OH-THERMO-SET-V

Changes in the Portfolio for 2024/25

Outdoor Switchboards

○ OH Series

	OH6425 PB8 SEC
Optimized for	5...10 port switches
PSU Power / Voltage	480W / 48VDC with backup
Dimensions H x W x D [mm]	600 x 400 x 250
Battery Size	4x 18 - 22 Ah (max. 170 x 314 x 212 mm)
Protection	Tamper, shock detector
Remote PSU monitoring	SNMP (via LAN-RING switch)
Ventilation* Heating**	Yes Not supported
* Extends the battery's life.	
** Heating increases battery capacity at low outside temperatures.	



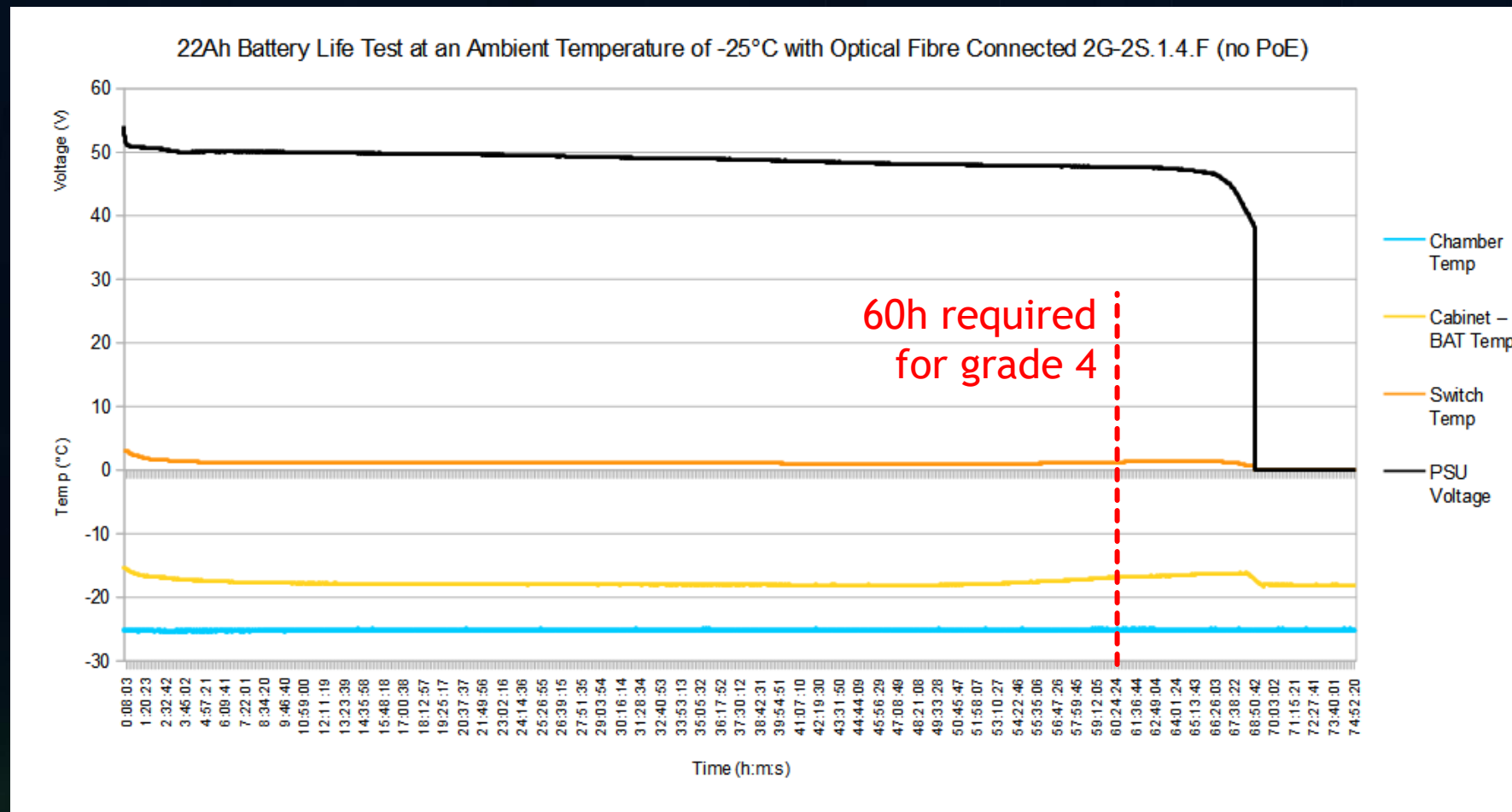
Optional Accessories



Changes in the Portfolio for 2024/25

Outdoor Switchboards with Backup Power Supply

- Discharging 4x22Ah batteries at -25°C and switch 2G-2S.1.4.F-BOX POE-PP



Changes in the Portfolio for 2024/25

Outdoor Switchboards with Backup Power Supply

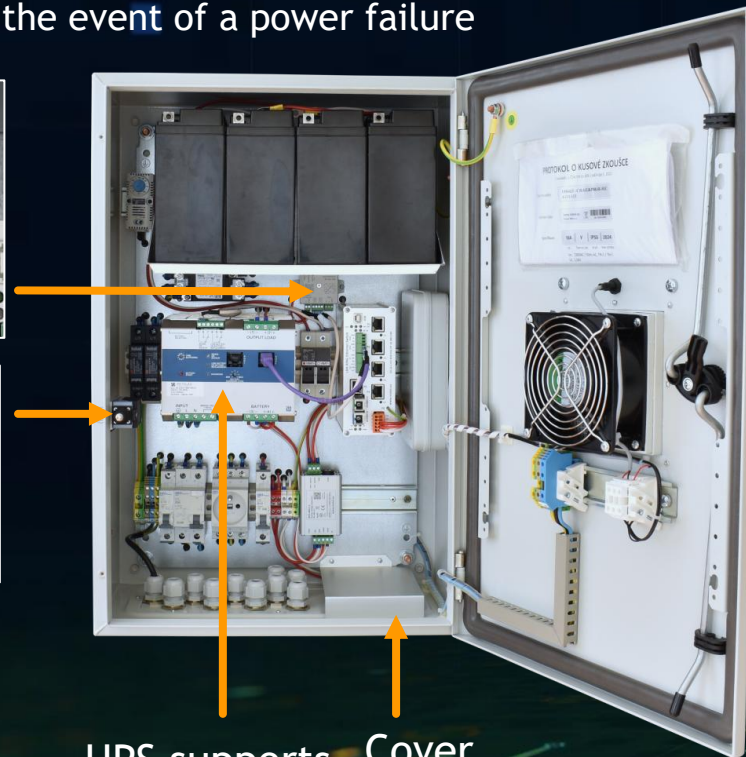
- OH6425 - C10.A12.R.PB8.SE-SEC - Outdoor Steel Switchboards with Backup

- We recommend using these switchboards especially in applications where switches are used as a transmission route for RS485 IHAS system buses
- In order to meet the conditions for backup length, the switch turns off or limits PoE in the event of a power failure

Shock
Detector



Tamper



UPS supports
remote test

Cover
against
intrusion



Tamper



Glands that cannot be disassembled
from the outside

Changes in the Portfolio for 2024/25

Outdoor Switchboards with Backup Power Supply

- Why is it better to use a 48VDC battery system instead of 12VDC in PoE application?

Because there are big energy losses when converting from 230 V to 12 V and then back to 48 V!

230VAC to 48V Conversion



Max. Charging Current 4,4 A

4x 22Ah



Load

230VAC to 12V Conversion

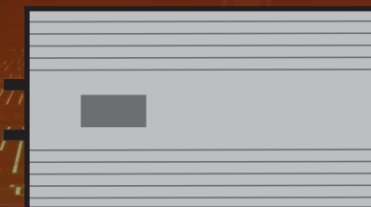


Max. Charging Current 17,6 A

1x 88Ah



12 to 48V Conversion



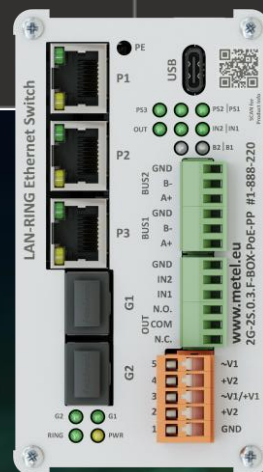
Load

Changes in the Portfolio for 2024/25

Outdoor Switchboards with Backup Power Supply

- How can we ensure functional RS485 even after a 60-hour power outage?
 - Connect Relay Output “MAINS OR BACKUP” into switch alarm input IN1 or IN2.
 - Configure Event, disabling the PoE when a power outage is detected.

Event name	Input	Output
Event 1	DIGITAL:IN1 [IN1]:Direct:Opened	Output MODULE PoE
		PORT P2 [P2]
		MODE Down/Normal
		TIMEOUT 5 s



Alarm
Output

Relay
Output



Infrastructure LAN-RING & IPLOG

Outdoor Switchboards with Backup Power Supply

- Switchboards **Powered from Public Lighting** => 230 VAC only Available at Night
- Risks
 - Decrease in battery capacity at low temperatures
 - Daily battery cycling

	OH6425...PB7	OH7525...PB7
Battery Capacity at +25 °C	864Wh	1728Wh
Battery Capacity at -20 °C	432Wh	864Wh
Backup	18/11 h (summer/winter)	18/11 h (summer/winter)
Max. Consumption During Backup Period	48/39 W	96/78 W
Max. Charged energy per night (0.2C)	100% at charging current 3.6A	48V x 5A x 6/13h = 1440Wh / 100%
Max. Recommended Load	39W	78W
<u>Typical applications</u>	<u>Fixed Cameras</u>	<u>PTZ Camera</u>

Changes in the Portfolio for 2024/25

Outdoor Switchboards - Accessories

○ Optical Boxes O12

- Holders for 12 welds
- Including holder for DIN35
- Suitable for all OH switchboards



○ Optical Boxes OB12

- Holders for 12 optical welds and 12 pigtails
- The inner space is divided into 2 chambers
- Including holder for DIN35
- Suitable for switchboards from the high 40 cm



Changes in the Portfolio for 2024/25

Outdoor Switchboards - Accessories

○ Holder-OH

- Accessories for installing switchboards on a pole
- Supplied with Bandimex straps and clips
- Holder-OH3215 and Holder-OH4320
 - Column diameter 130 - 300mm
- Holder-OH6425
 - Column diameter 150 - 215mm



○ KIT-OH

- Mounting kit for installing all types of OH switchboards on the wall
- Includes 4 pieces of steel brackets (galvanized) and mounting accessories



Changes in the Portfolio for 2024/25

Withdrawable 19" 1U - 4U Shelves

- 1U - 4U Shelves for LAN-RING Switches and IPLOGs
 - Including Power Supply



Changes in the Portfolio for 2024/25

Overvoltage Protections

- Fast Ethernet & Fast Ethernet + PoE



- Maximum Surge Current **1000 A 10/350 μ s**
- Two-Stage Design
- Two-stage Protection
- Transmitted PoE of up to 90W
- PE Terminal Galvanically Isolated
- Operating Temperatures from - 40°C to +70°C

Changes in the Portfolio for 2024/25

Overvoltage Protections

- Overvoltage Protections 1000 BASE-T



- Two-Stage Design
- BOX - Extremely Effective Two-Stage (1kA 8/20 μ s | 500 A 10/350 μ s)
- Protection Suitable also for Outdoor Applications
- PE Terminals Galvanically Isolated
- Transmitted Power max. 30W (IEEE 802.3 at)
- Operating Temperatures from - 40°C to +80°C

Changes in the Portfolio for 2024/25

Accessories

○ PoE+ Injectors

- Input voltage 10 - 30 VDC
- Maximum delivered power of 30W
- Operating temperatures from -40°C to +70°C
- Compatible to IEEE 802.3af/at (MODE B)
- Includes a 52VDC / 0.3A output for powering accessories.
- PoE pairs includes coarse OVP



○ LAN Extenders

- Extends LAN + PoE by 100m
- Overvoltage protection of LAN ports 600 W 10/1000 μ s
- Protection against ESD according to IEC 61000-4-2 $\pm$ 15kV
- Compatible with PoE according to IEEE 802.3af and at
- Operating temperature from - 40°C to +70°C



○ SPT-1220-BOX

- Convert PoE+/++ power to 13.6V/2A
- Galvanically isolated output 13.6VDC / 2A
- Compliant with PoE IEEE 802.3at / bt
- Mounting on a flat surface or DIN35 rail
- Operating range of the device from -40°C to +70°C
- Operating range of used parts from -40°C to +85°C



Infrastructure LAN-RING & IPLOG

Part: Typical applications

- Network infrastructure with PoE up to 95W/port
 - PoE standards | Safety | Dual PD...
- Durable outdoor network infrastructure
 - Designing equipment for outdoor and industrial environments
- Applications requiring compliance with requirements EN 50131-1
 - Extension of RS485 buses over LAN
 - Extension of RS485 buses over fibre optic
 - Certified alarm Inputs and outputs
 - Outdoor cabinets with 60h power backup
- High-security applications
 - Authentication, Authorization, Accounting with Tacacs+
 - Restrict Access to Network Resources with IEEE802.1X and Radius
- LAN-RING Event Management
 - Onvif, I/O, Ports, TCP events, SNMP traps...
- IPLOG - examples of successful customer applications
 - Examples of integrations with IP CCTV, PIDS, ACS, VMS
 - Management of photovoltaic power plants

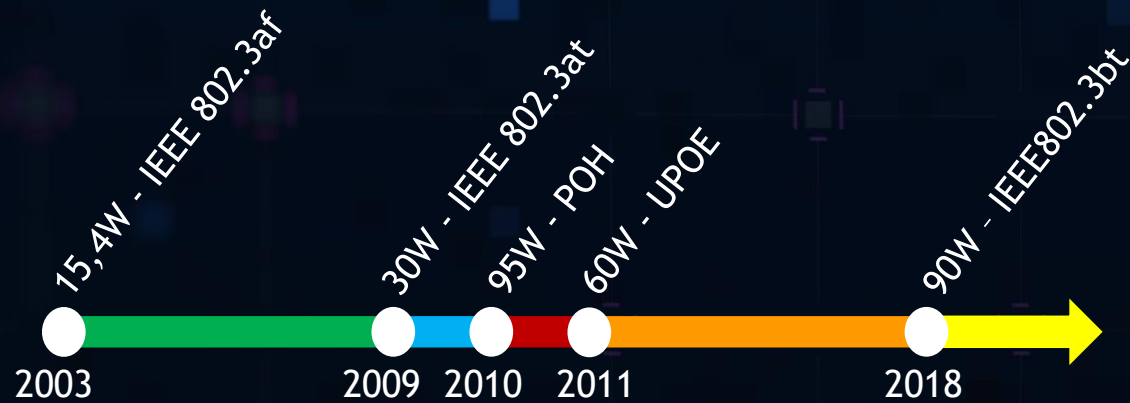


METEL.EU
SECURITY & AUTOMATION

Typical Applications

Network Infrastructure with PoE up to 95W/Port

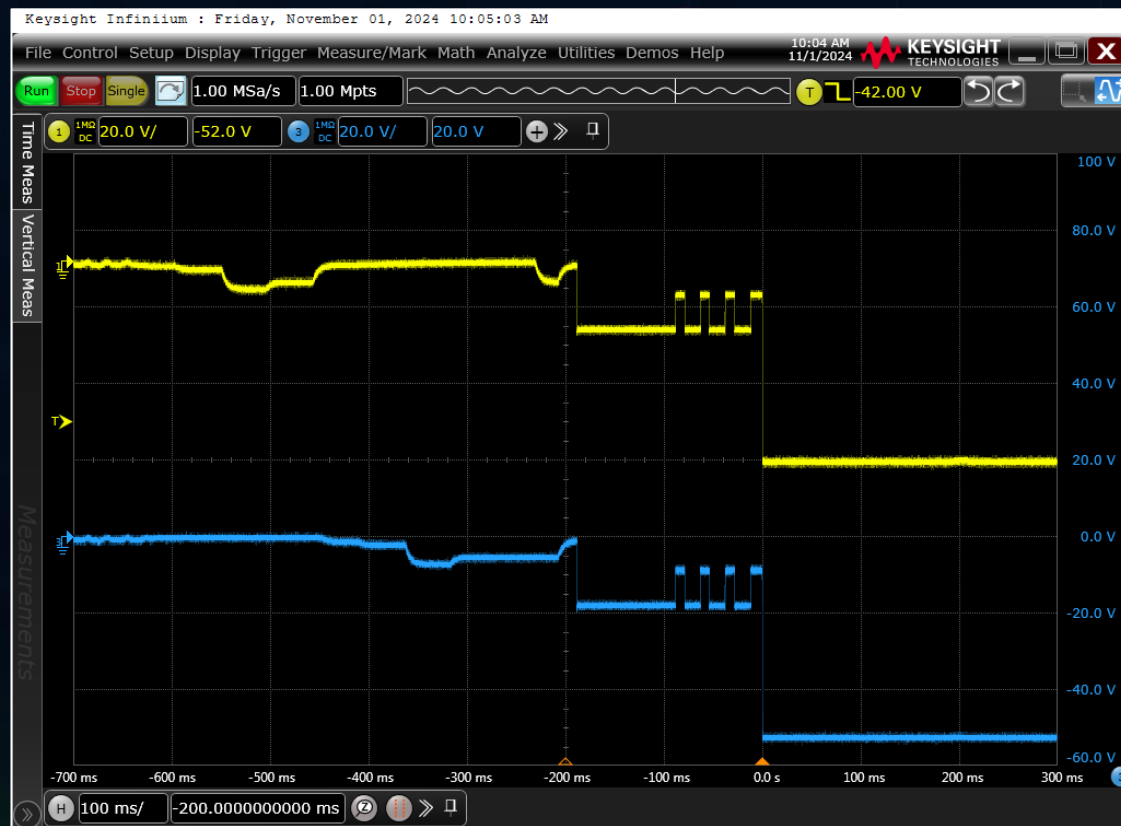
- METEL PoE switches support **all active PoE standards**.



Typical Applications

Network Infrastructure with PoE up to 95W/Port

- METEL PP switches in addition, support **double PD devices**

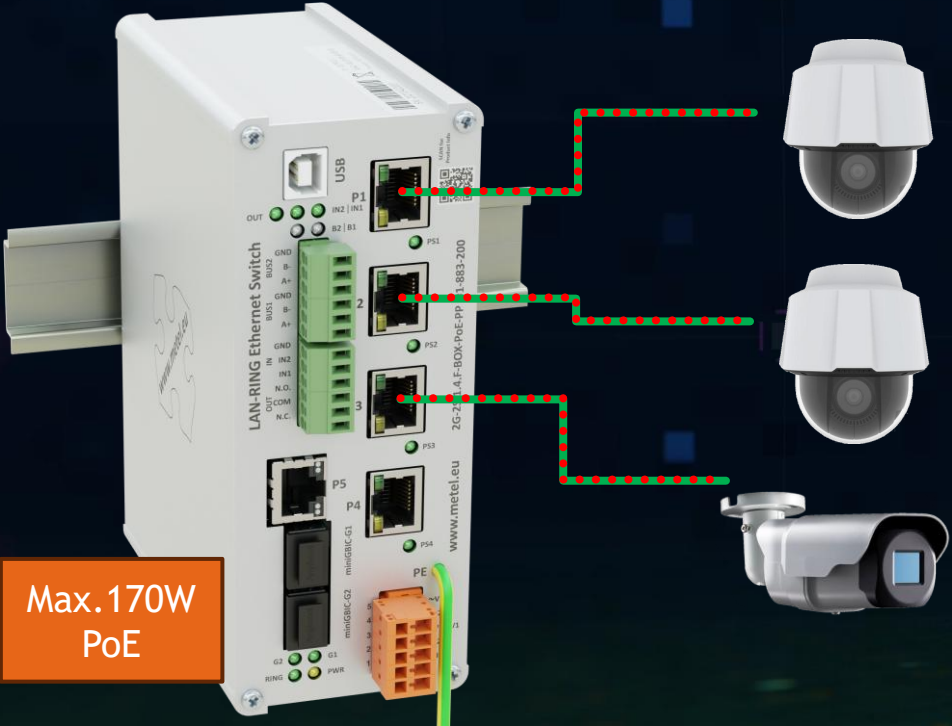


Typical Applications

Network Infrastructure with PoE up to 95W/Port

- METEL PP switches in addition, support **Power Limits**.

IEEE802.3bt Classes	0	1	2	3	4	5	6	7	8
Reserved Power in Watts	15.4	4	7	15.4	30	45	60	75	90



Configuration Example

- Into 1st port is connected PoE camera 802.3bt Class 8 (switch reserves 90W). The measurement shows that 80W is enough for the camera. So we set the limit on the 1st port to 80 W.
- The same camera and PoE settings will be used for the 2nd port as well.
- We still have 10W of PoE power left for the 3rd and 4th ports.

	Enabled (required power supply >= 48V)	Ignore discovery	PSE primary/secondary pairs swap	Power limit [W]
P1	☒	☐	☐	80
P2	☒	☐	☐	80
P3	☒	☐	☐	10
P4	☐	☐	☐	0

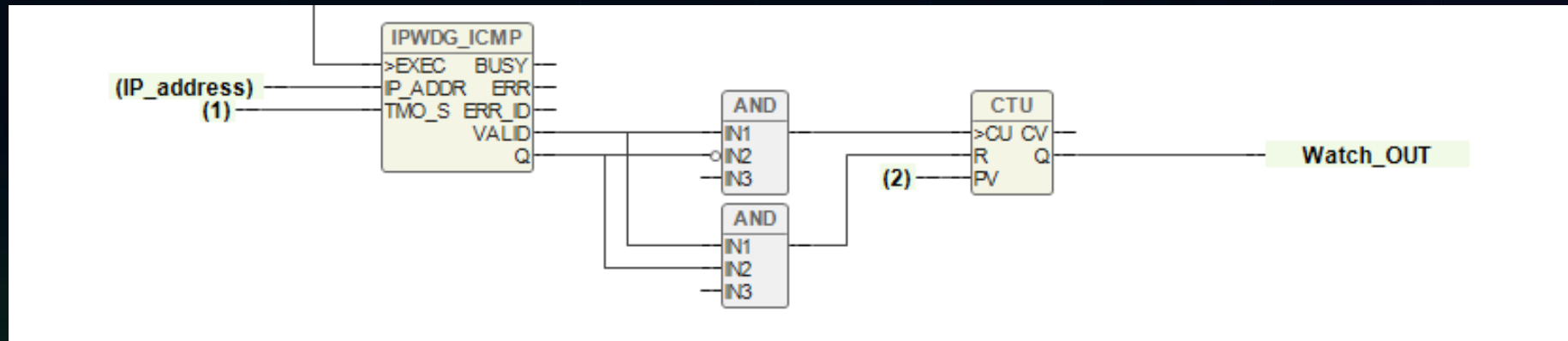
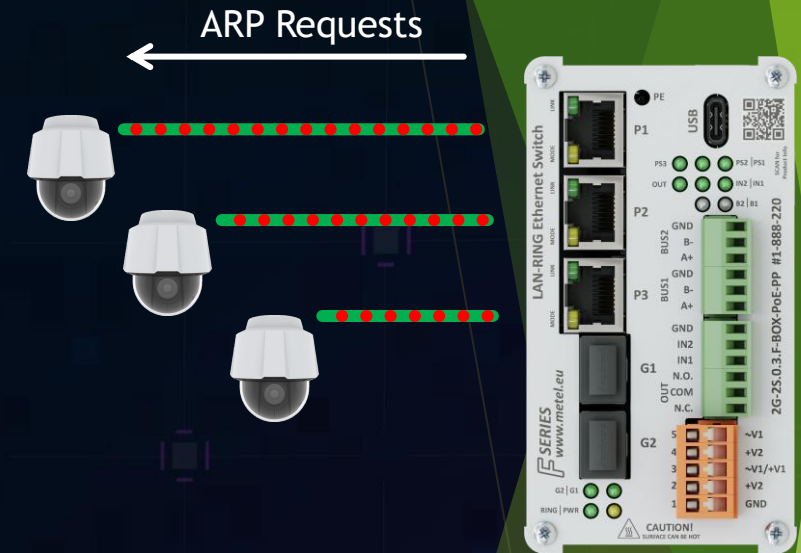
The sum of power limits of all ports shall not exceed 170W.

Typical Applications

Network Infrastructure with PoE up to 95W/Port

- IP (PoE) Watchdogs

- All of our industrial LAN-RING switches are capable of monitoring the availability of IP devices and performing a wide range of automatic actions, such as restarting devices if not functioning.
- IP Watchdogs are also supported on IPLOG PLCs, where additional conditions can be added for their triggering.

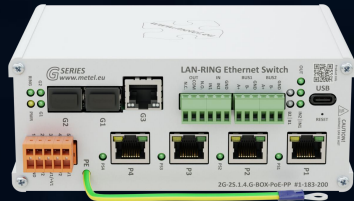


Typical Applications

Network Infrastructure with PoE up to 95W/Port

- High PoE Output

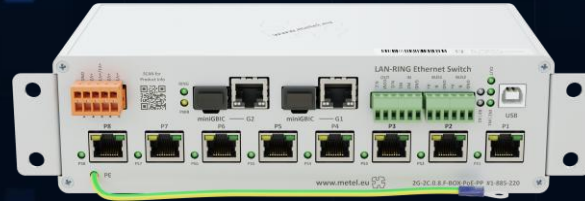
2G-2S.1.4.*-BOX-PoE-PP



Number of PoE ports 4
Max. power/port 95 W
Maximum total PoE 170 W



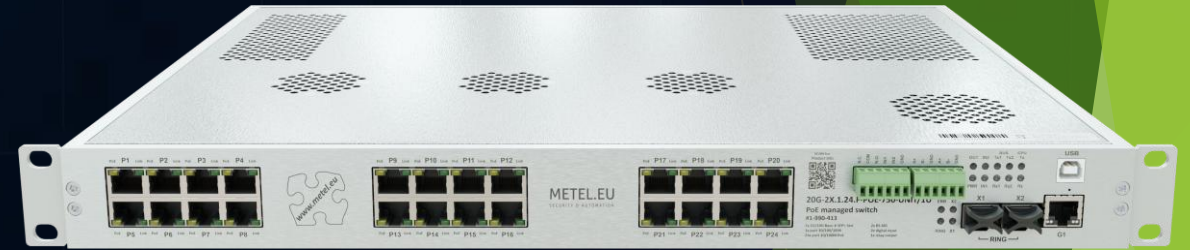
2G-2C.0.8.*-BOX-PoE-PP



Number of PoE ports 8
Max. power/port 95 W
Maximum total PoE 270 W



20G-2X.1.24.*-POE-750-UNIT/1U



Number of PoE ports 24
Max. power/port 30 W
Maximum total PoE 750 W

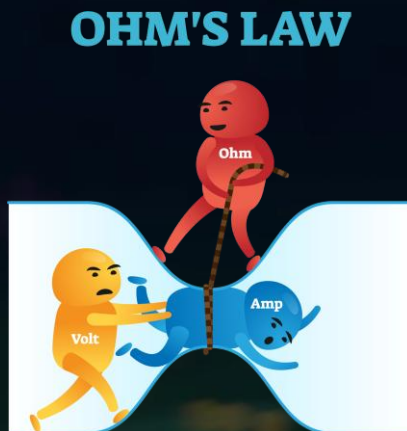


Typical Applications

Network Infrastructure with PoE up to 95W/Port

- High-power PoE, in particular, requires adequate power and cabling.

Application	BOX Series	UNIT 16/24 Port Series
Without PoE	10 - 30 VDC or 10 - 60 VDC	230 VAC or 10 - 60 VDC
With PoE up to 15,4W	48 - 57 VDC	230 VAC or 48 - 57 VDC
With PoE+ up to 30W	52 - 57 VDC	230 VAC or 52 - 57 VDC
With PoE+ up to 95W	53 - 57 VDC	230 VAC or 53 - 57 VDC



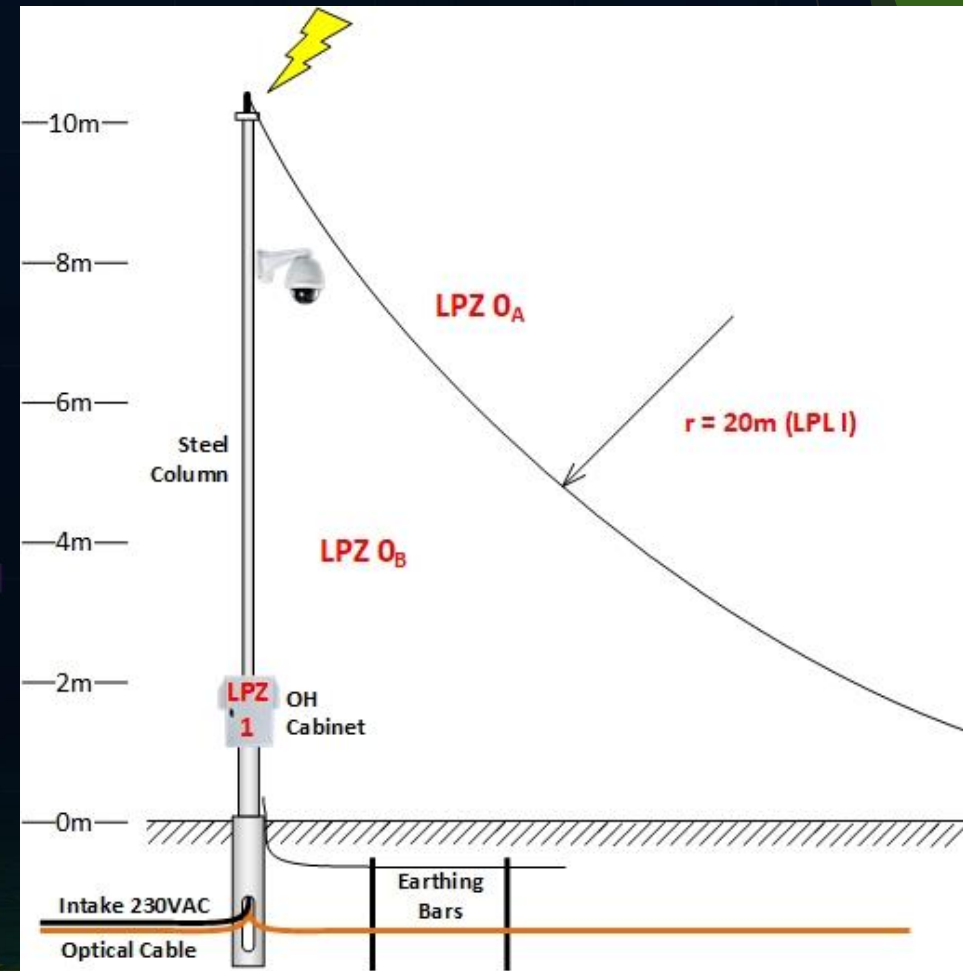
	Cat5e Nexans	Cat6 Nexans
PP Switch -> Max. Power from Port	47.5 W over 2 pairs (total 90 W over 4 pairs)	
PSE Supply Voltage	50 to 57 VDC (to achieve 90 W over 4 pairs)	
Voltage at PD	Min. 42.5 VDC	
Distance	100 m	
1 Pair DC Loop Resistance	9.5 Ω /100m	8.5 Ω /100m
Input PSE Voltage	50 / 56 VDC	
Current through One Pair	0.99 / 0.85 A	
Voltage at PD	41.5 / 49.4 V	42,1 / 50.2 V

Typical Applications

Durable Outdoor Network Infrastructure

- According to the EN 62305 standard, the outdoor environment belongs to zone LPZ0 which is divided into:
 - LPZ 0A is fully exposed to direct lightning strikes.
 - LPZ 0B is not exposed to direct lightning strikes but is still subject to the **full electromagnetic field** generated by nearby lightning activity.

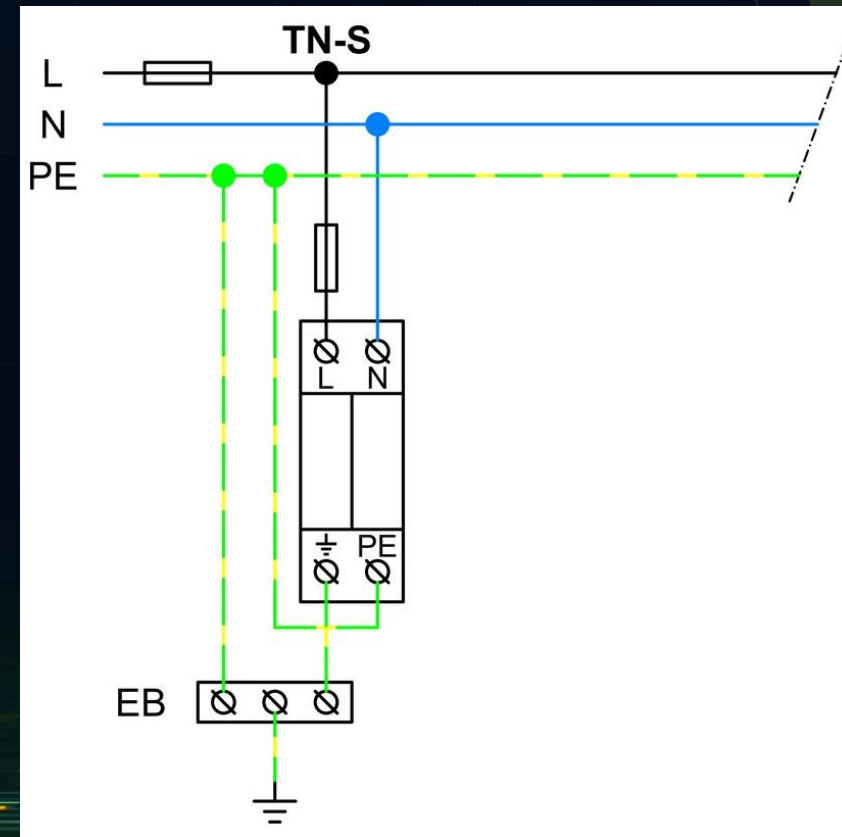
We recommend that our devices are always installed in the LPZ0B zone in switchboards of the OH series with A12 protection inside.



Typical Applications

Durable Outdoor Network Infrastructure

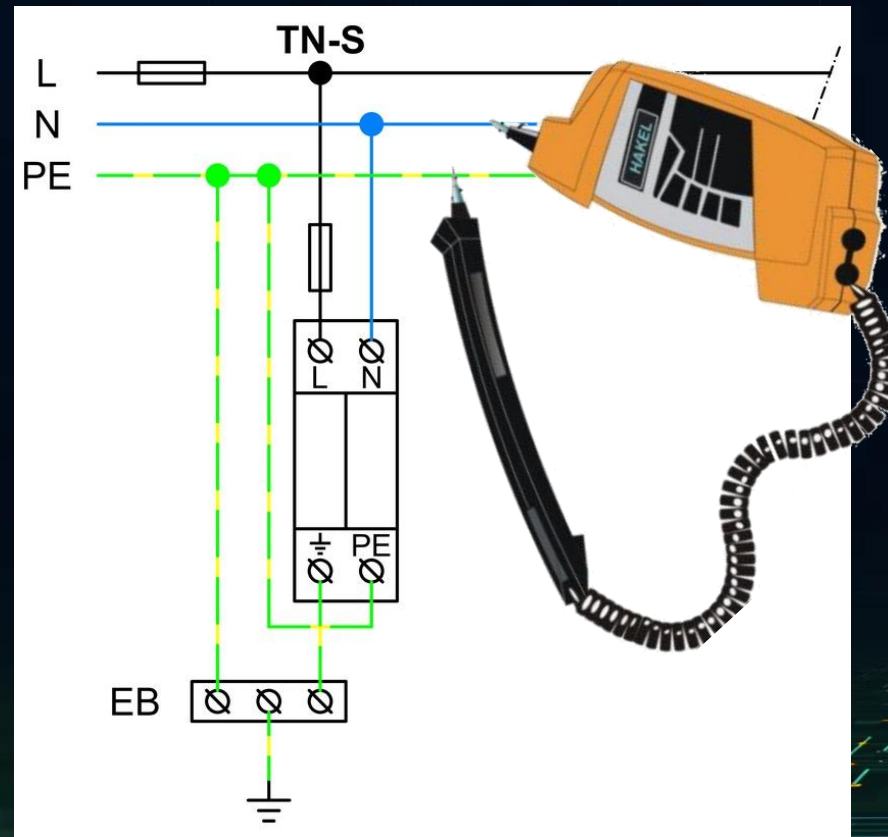
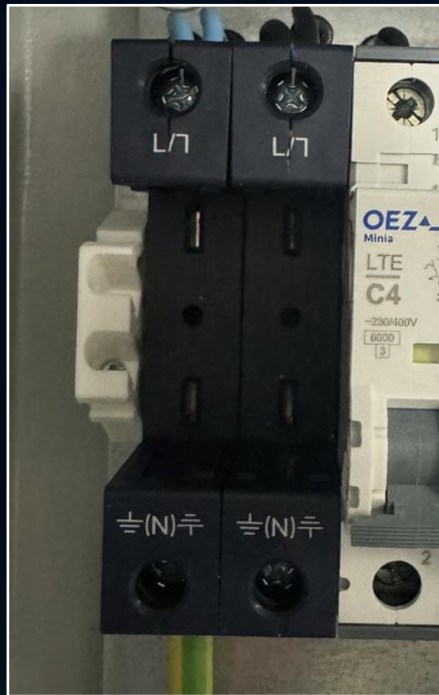
- A12 - 230V Input Surge Protections
 - Impulse discharge current 12.5 kA [10/350 μ s]
 - Maximum discharge current 50 kA [8/20 μ s]



Typical Applications

Durable Outdoor Network Infrastructure

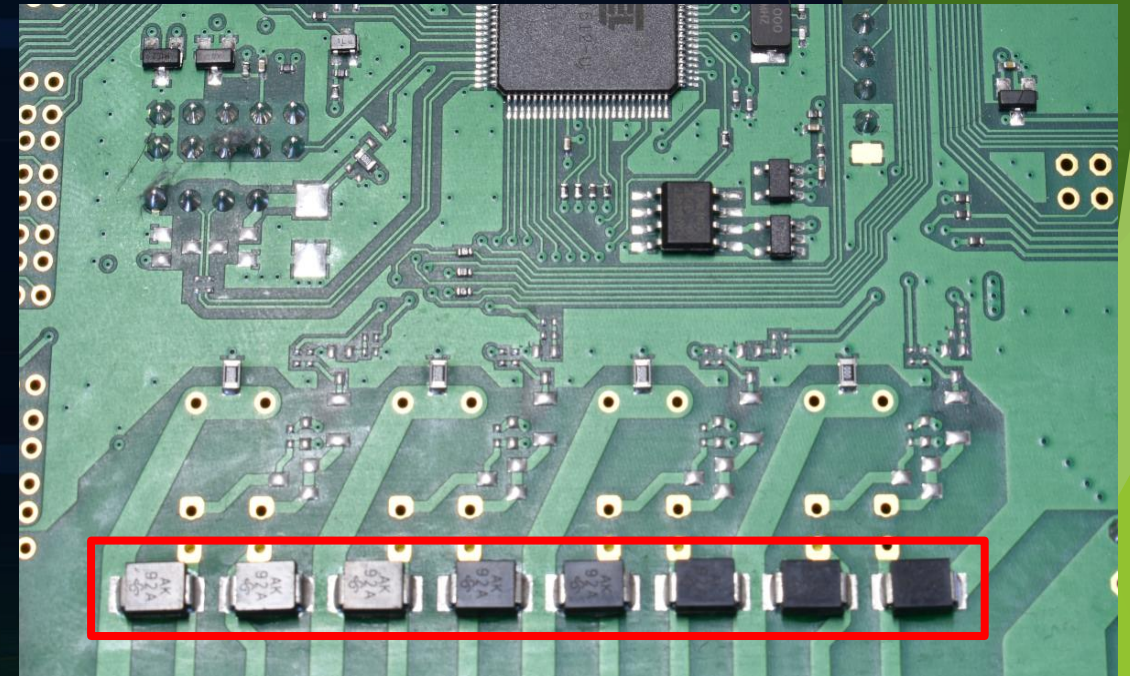
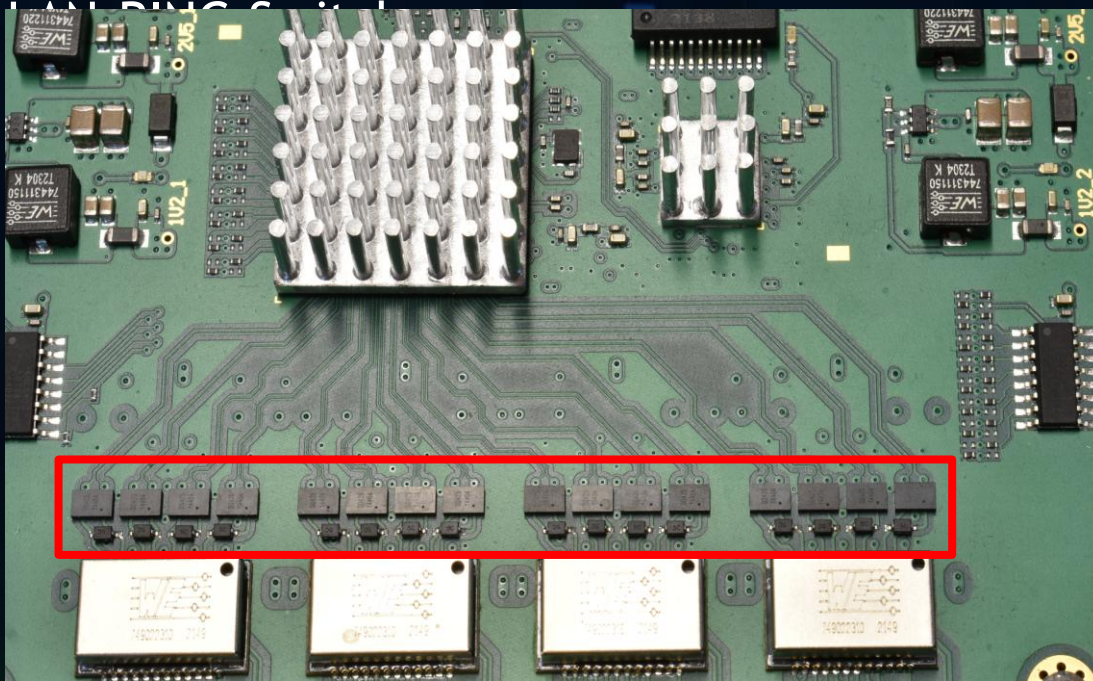
- A12 - 230V Input Surge Protections
 - Interchangeable modules simplify insulation resistance measurements.



Typical Applications

Durable Outdoor Network Infrastructure

- Surge Protection inside LAN-RING & IPLOG Devices
 - Surge protection on all inputs and outputs makes our equipment extremely reliable even in the most demanding conditions.



Typical Applications

Durable Outdoor Network Infrastructure

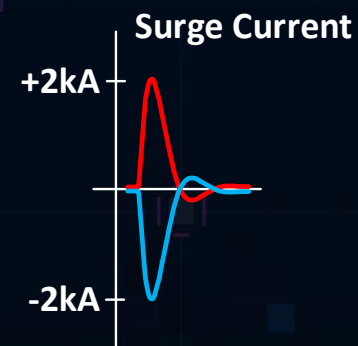
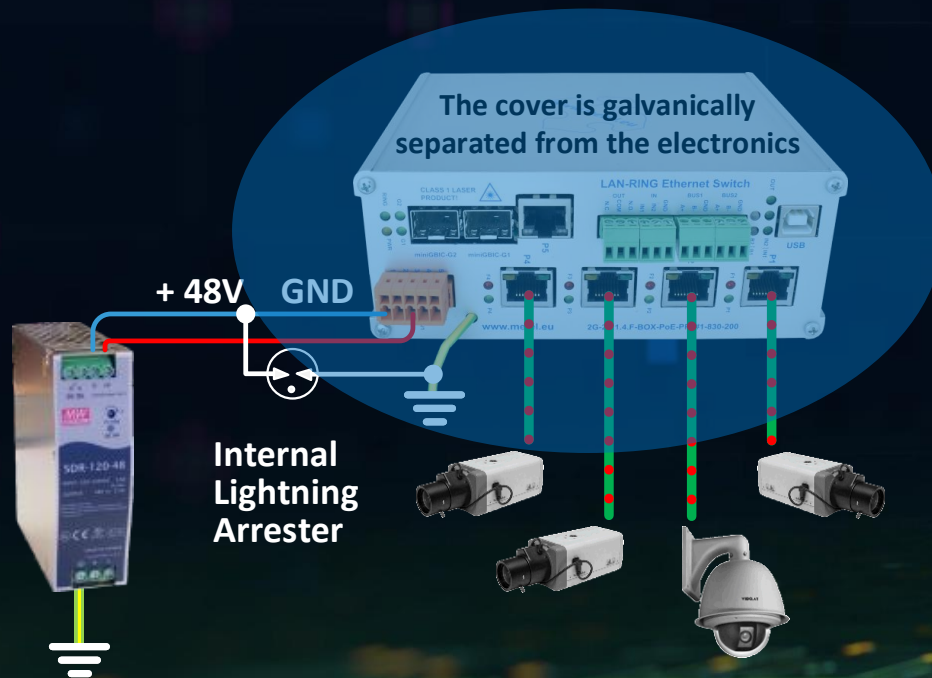
- Surge Protection inside LAN-RING & IPLOG Devices
 - The five-year warranty covers **all indoor and outdoor applications** carried out according to applicable national standards including EN 62 305 (Lightning protection standard).

	Minimum EN requirements	2G-2S.1.4.F-BOX-POE-PP
EN 61000-4-2 - ESD Protection	4 kV	8 kV
EN 61000-4-2 - ESD Protection	8 kV	15 kV
EN 61000-4-3 - VF field	3 V/m	20 V/m
EN 61000-4-4 - Bursts	500 V*	2 kV*
EN 61000-4-5 - Surge Immunity	500 V*	2 kV*
EN 61000-4-8 - Mag. Field 50 Hz	1 A	100 A
EN 61000-4-11 - Mag. Pulse Field	100 A	1000 A
EN 61643-21 - surge protections	-	1000 A*
	* Fast ethernet ports	

Typical Applications

Durable Outdoor Network Infrastructure

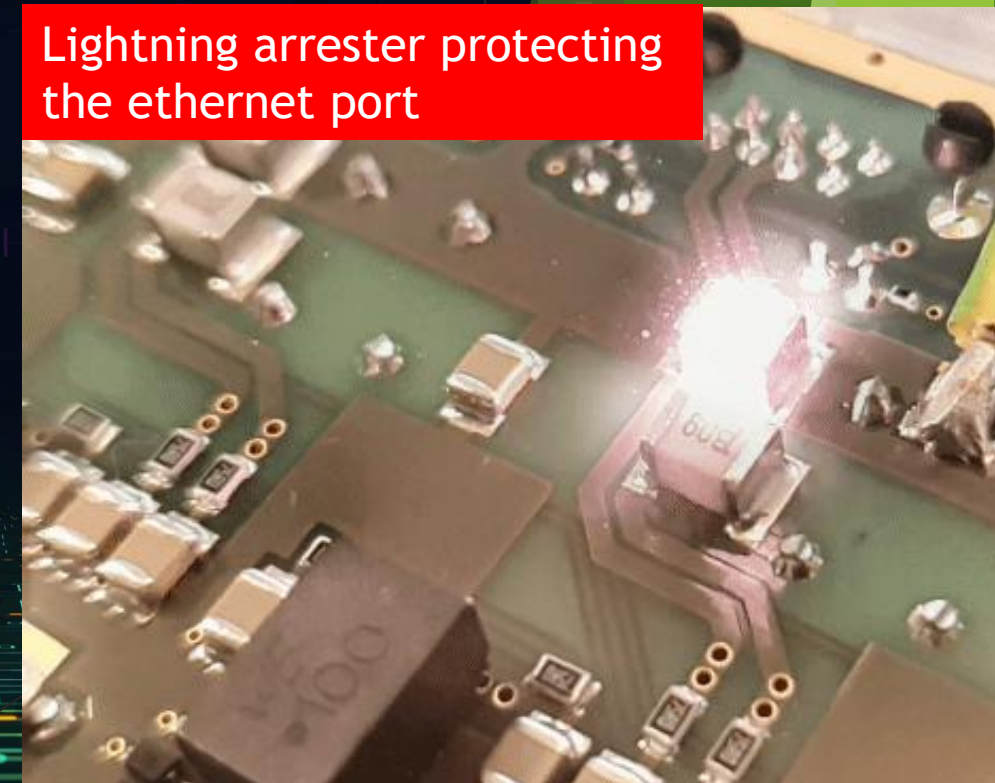
- Surge Protection inside LAN-RING & IPLOG Devices
 - The PoE standards mandate proper isolation between PoE circuits and earth (PE).
 - Devices are designed to avoid creating a conductive path to earth ground via the Ethernet cable.
 - If shielded Ethernet cables are employed, the cable shielding may connect to the PE ground through the equipment chassis. However, the PoE circuitry itself remains isolated.



Voltage Potential
of Electronics
Against Earth

Limited with
an Internal
Lightning Arrester

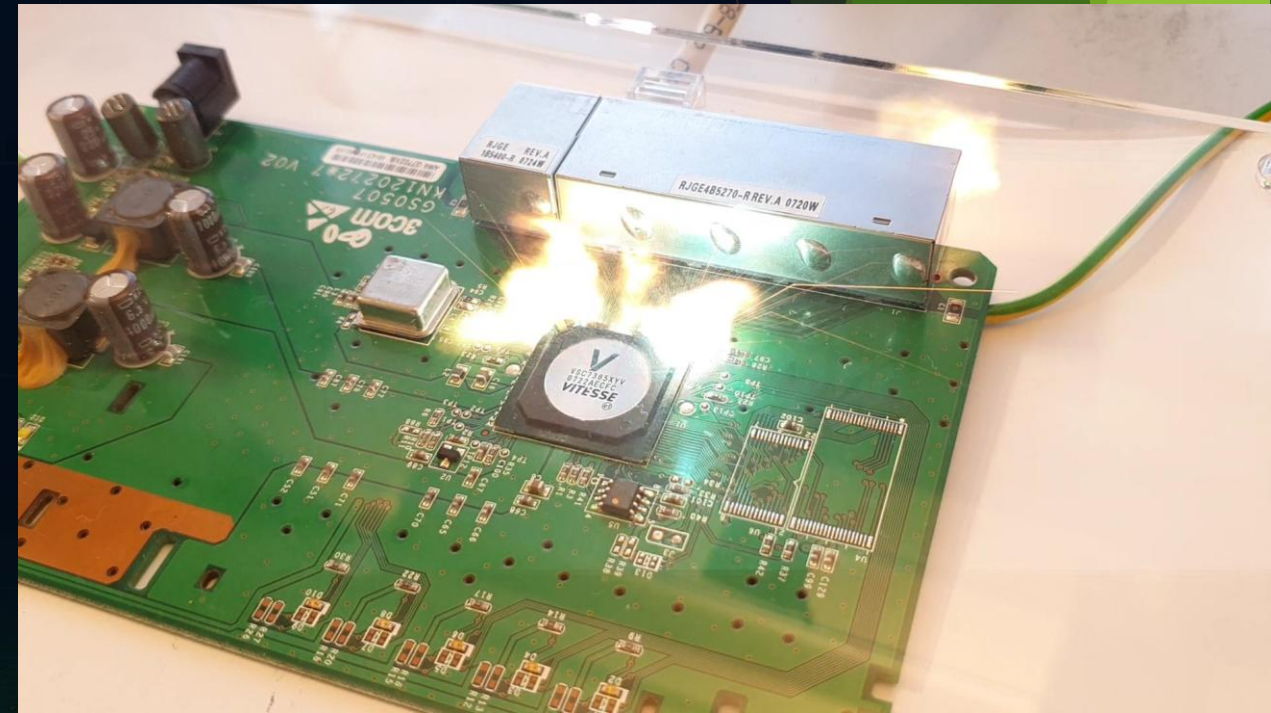
Lightning arrester protecting
the ethernet port



Typical Applications

Durable Outdoor Network Infrastructure

- Surge Protection inside LAN-RING & IPLOG Devices
 - 1000A pulse in 8/20 μ s wave applied to commercial switches without integrated overvoltage protections.



Typical Applications

Applications that Meet the Requirements EN 50131-1

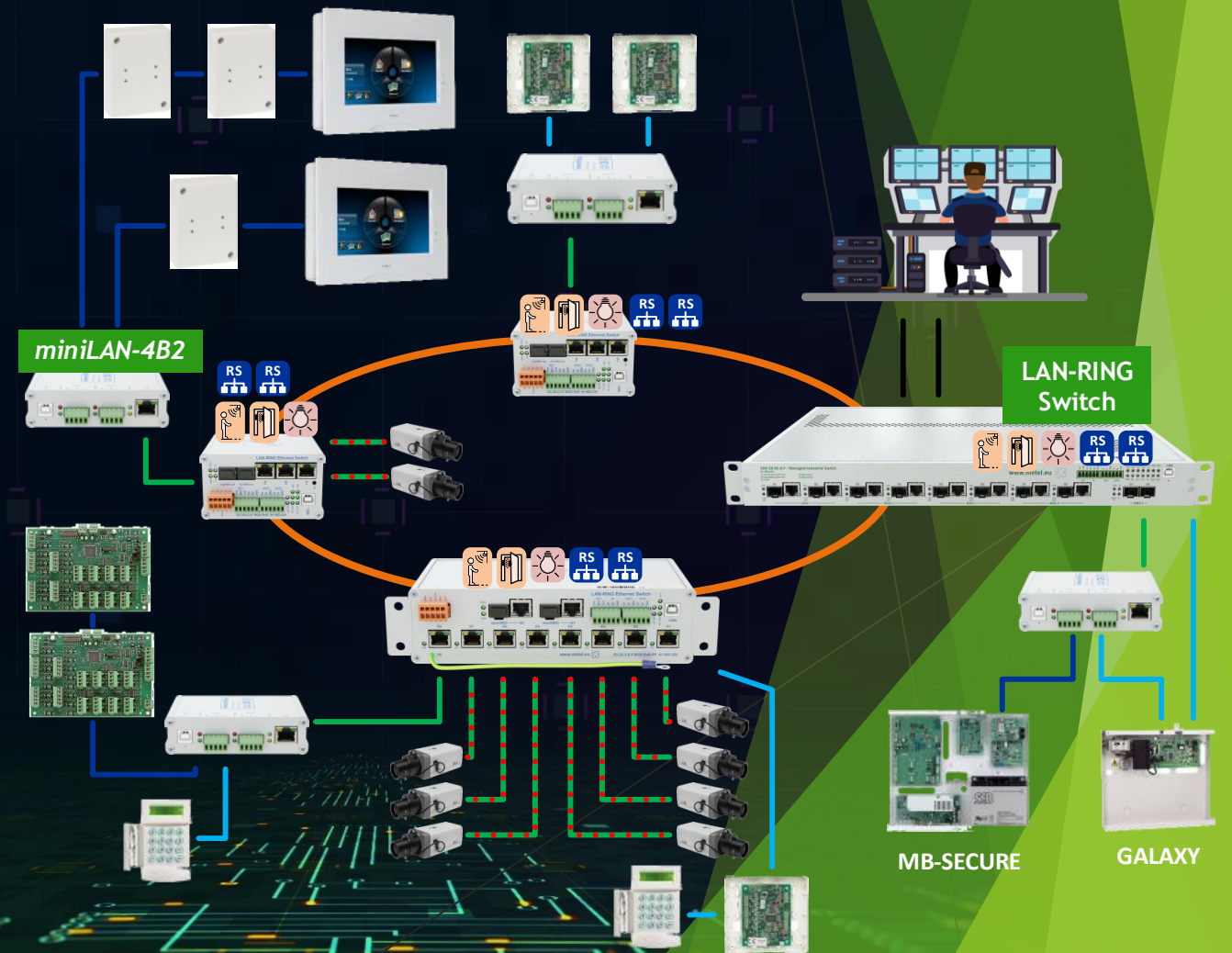
- We have certified selected models of F series switches according to the EN 50131-1 standard.

- EN 50131-1 Certified Hardware

- 2G-2.0.2.F-BOX-POE-PP
- 2G-2S.0.3.F-BOX-POE-PP
- 2G-2S.3.0.F-BOX-POE
- 2G-2S.3.0.F-BOX-POE-PP
- 2G-2S.1.4.F-BOX-POE-PP
- 2G-2C.0.8.F-BOX-PoE-PP
- 20G-2X.8C.0.F-UNIT/1U
- 20G-2X.1.16.F-POE-750-UNIT/1U
- 20G-2X.1.24.F-POE-750-UNIT/1U
- TDW and RDW-S-4C-BOX
- TDW and RDW-S-PDS-BOX
- miniLAN-4B2

- Certified with

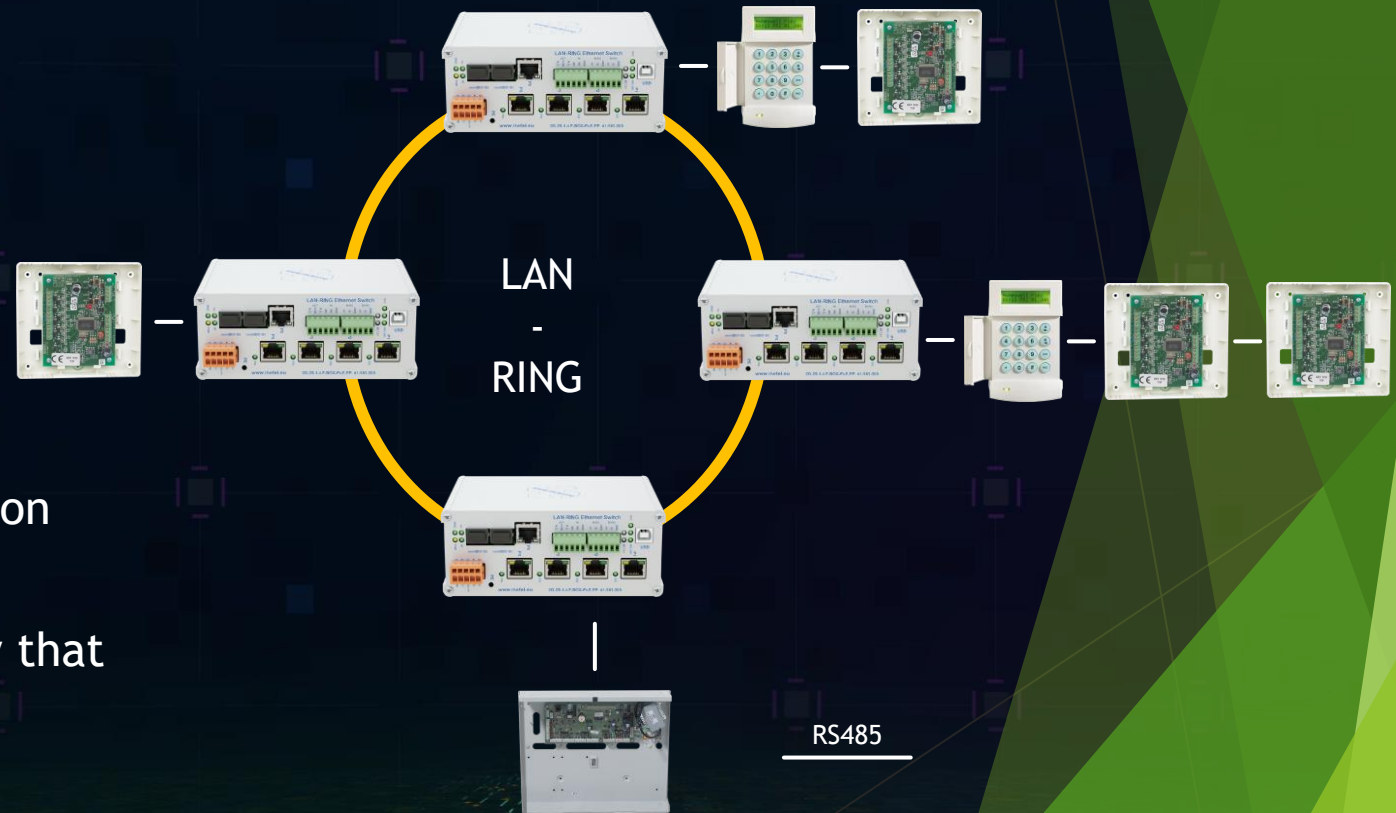
- ASSET and ASSET 2
- GALAXY
- MB-SECURE



Typical Applications

Applications that Meet the Requirements EN 50131-1

- Extension of RS485 Buses over LAN
- What must be observed?
 - Use certified LAN-RING switches
 - Use RING topology including relay for detecting ring disconnection
 - RS485 data has a dedicated high-priority
 - Switches are installed in intrusion detection enclosures
 - The switches have a backup power supply that meets the requirements of EN 50131-1
 - RS485 data has a dedicated VLAN

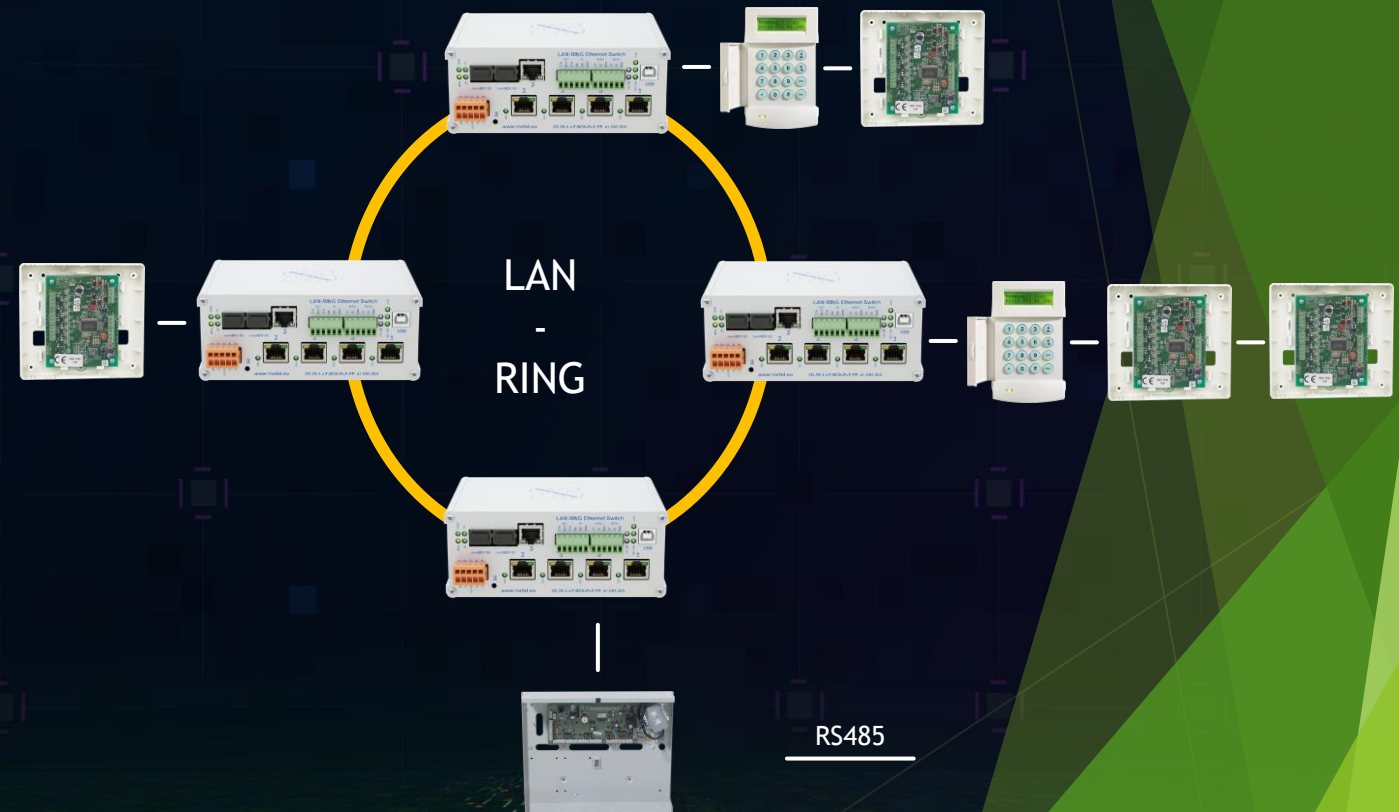


Typical Applications

Applications that Meet the Requirements EN 50131-1

- Extension of RS485 Buses over LAN
- Limitations
 - Each switch can convert only one RS485 or BUS2 bus to LAN
 - Max. 30 switches on RING
 - Max. 20km between switches (SM fiber)

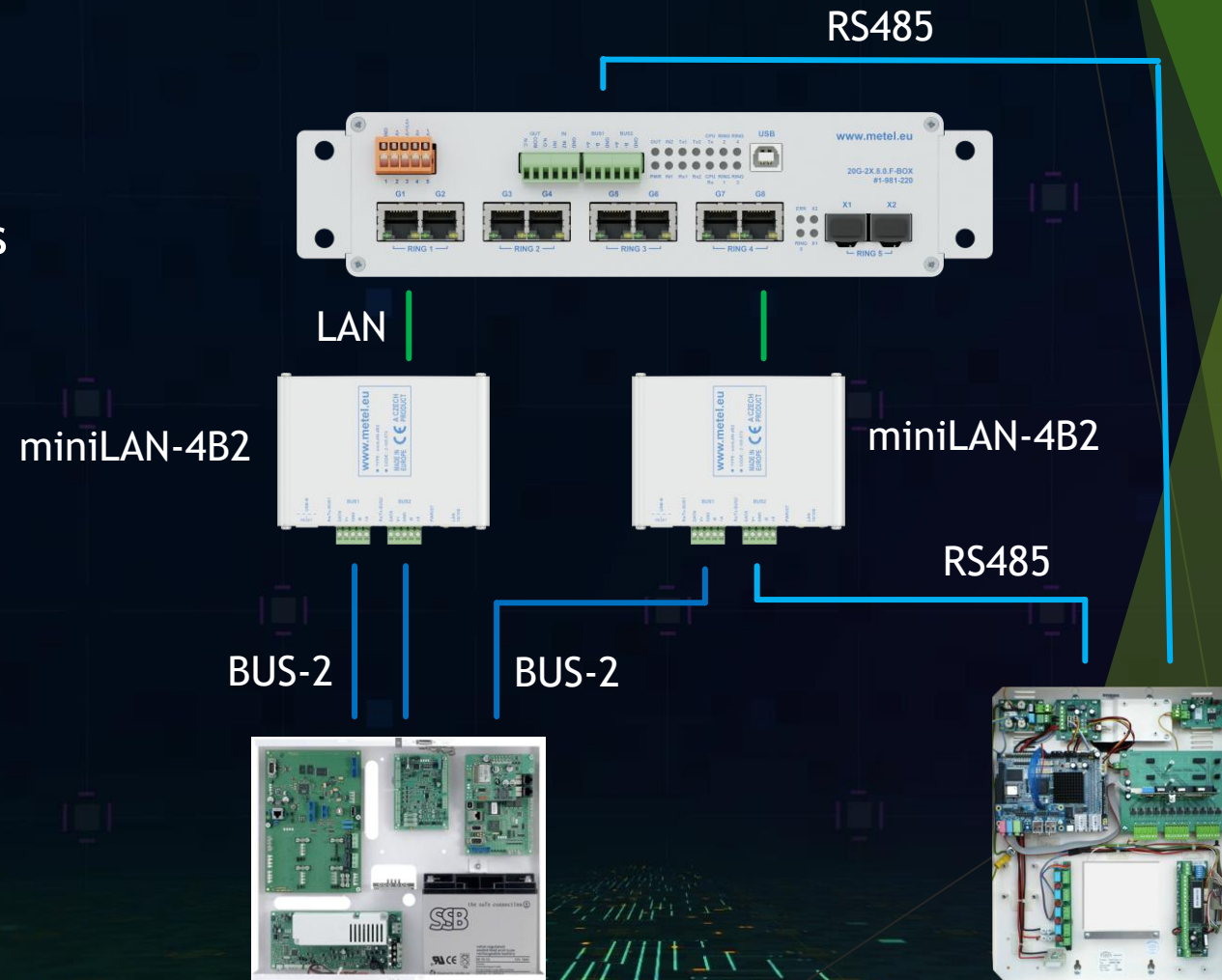
But the number of buses on a LAN is not limited!



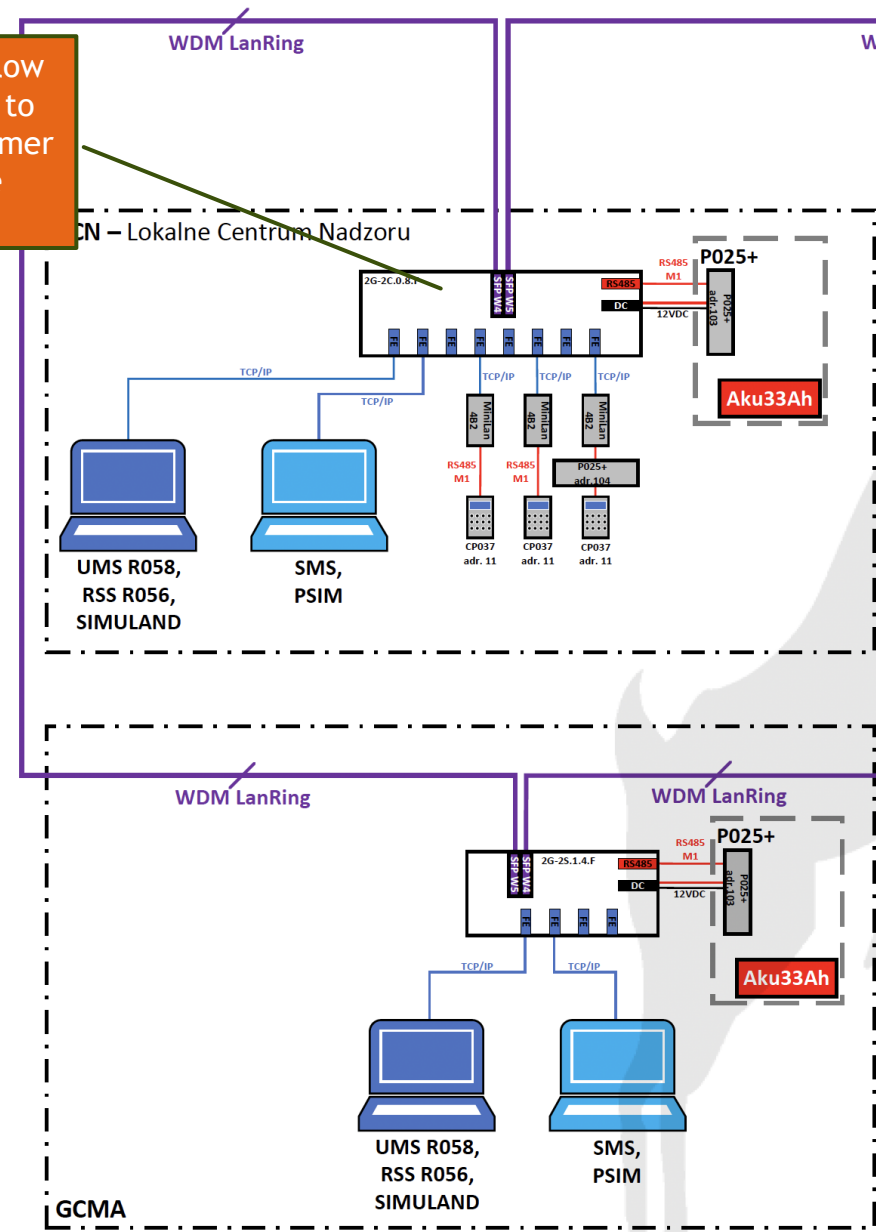
Typical Applications

Applications that Meet the Requirements EN 50131-1

- Extension of RS485 Buses over LAN
- If you need to convert multiple buses to LAN on one switch, use miniLAN-4B2 converters.



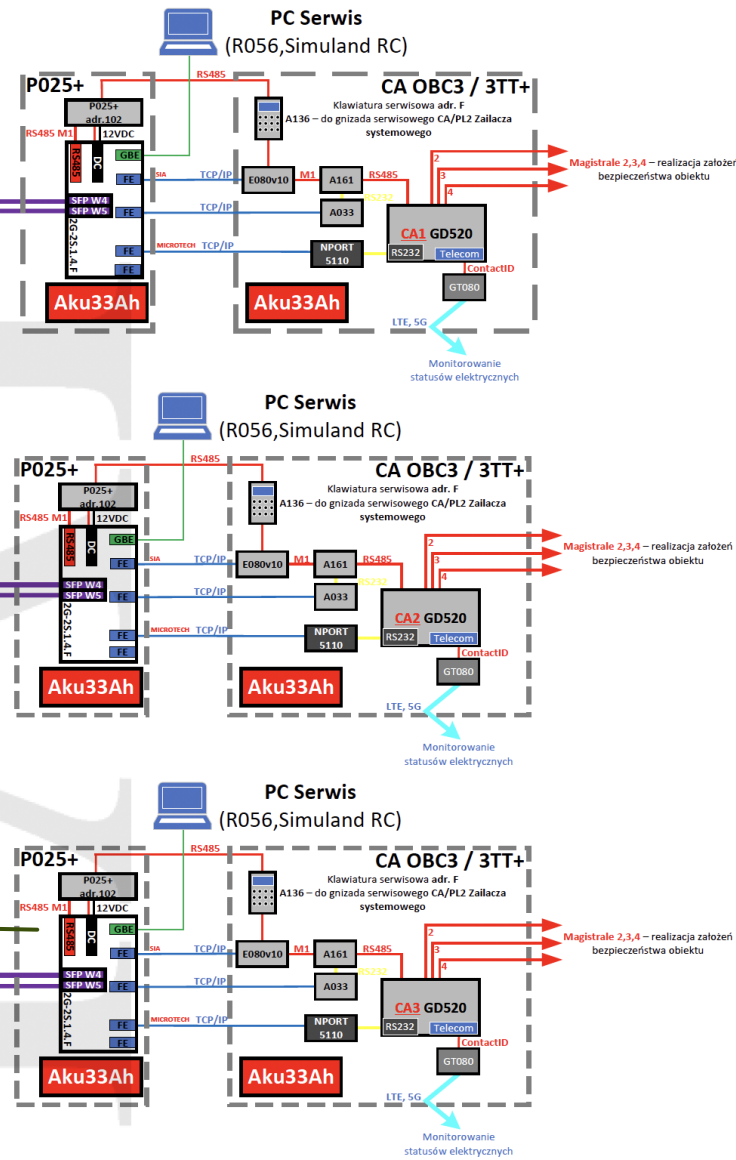
To connect multiple low latency RS485 buses to one switch, the customer correctly used the miniLAN-4B2



Multiple low-latency RS485 buses are flowing via one fibre

LAN-RING 2G

Only one low latency RS485 bus is directly connected



Typical Applications

Applications that Meet the Requirements EN 50131-1

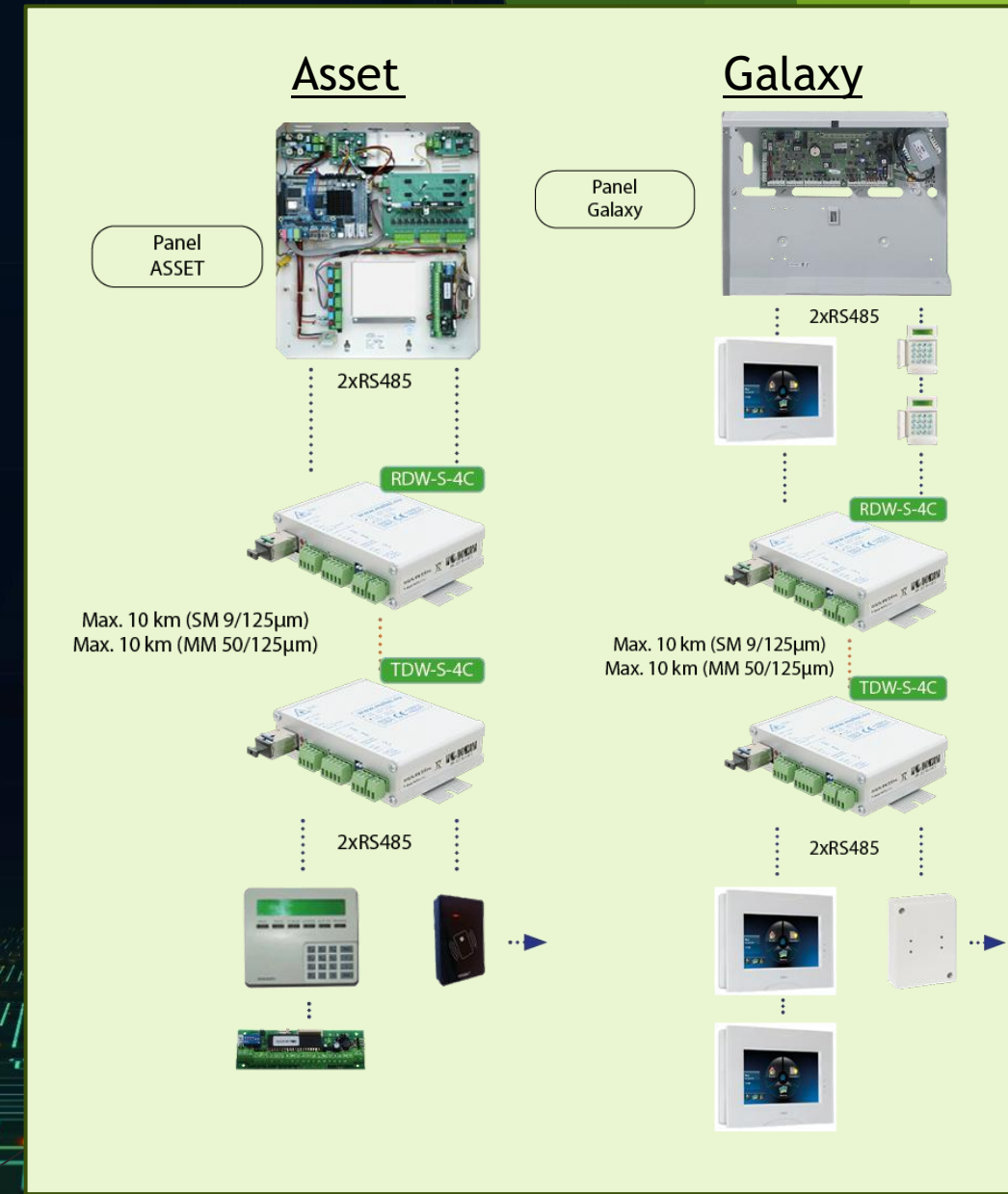
- Extension of RS485 Buses over LAN -> Suitable Outdoor Cabinets



Typical Applications

Applications that Meet the Requirements EN 50131-1

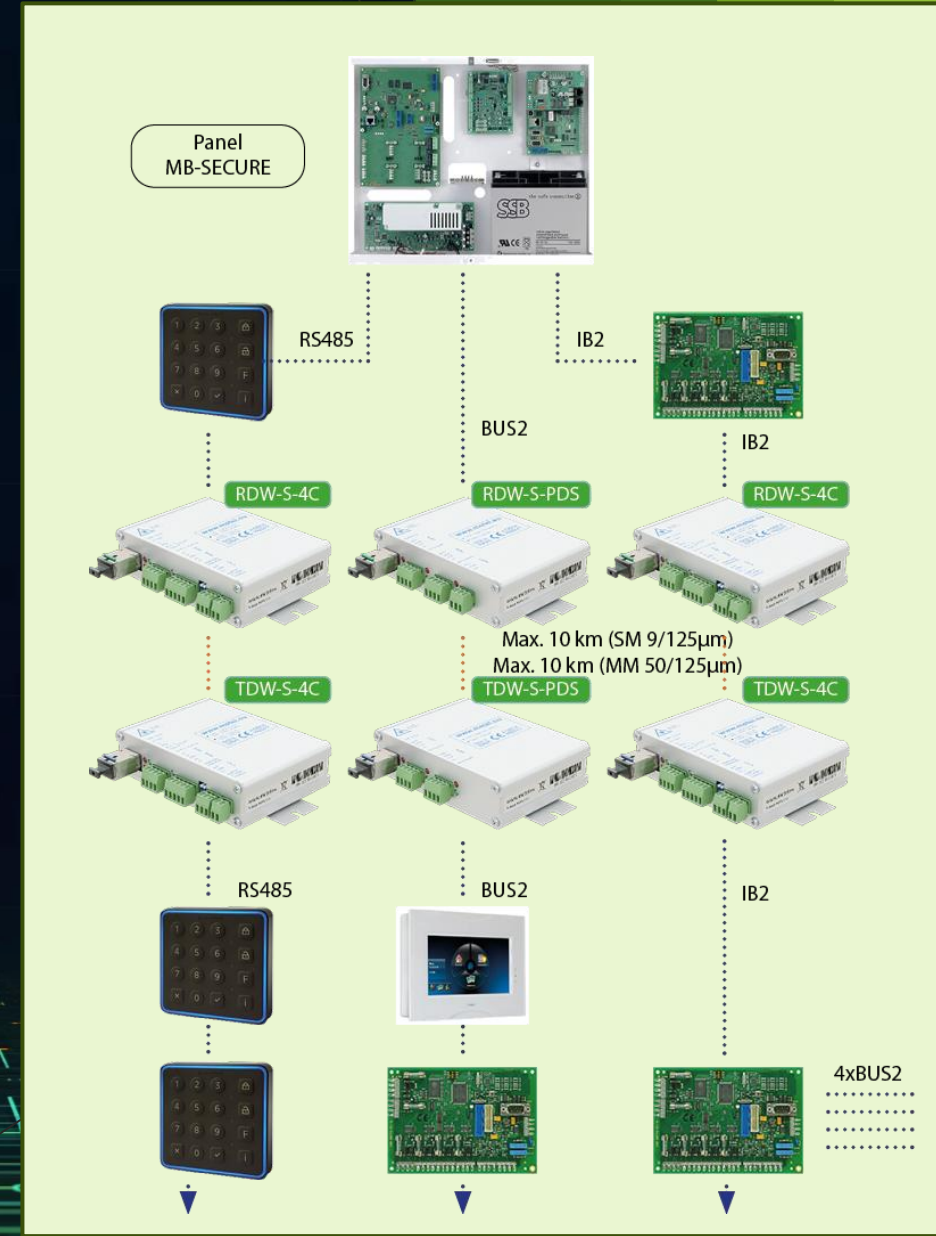
- Extension of RS485 buses over fiber optic (Asset and Galaxy)
- Supported busses -> Certified converters
- RS485 -> TDW and RDW-S-4C
- Limitations
 - Only certified xDW converters with original SFP modules are used
 - Relay LOCK connected to the alarm system
 - Max. 10km over SM/MM fiber



Typical Applications

Applications that Meet the Requirements EN 50131-1

- Extension of RS485 buses over fiber optic (MB-Secure)
- Supported busses -> Certified converters
- IB2 -> TDW and RDW-S-4C
- BUS2 -> TDW and RDW-S-PDS
- RS485 -> TDW and RDW-S-4C
- Limitations
 - Only certified xDW converters with original SFP modules are used
 - Relay LOCK connected to the alarm system
 - Max. 10km over SM/MM fiber



Applications that Meet the Requirements EN 50131-1

- Certified Alarm Inputs and Outputs

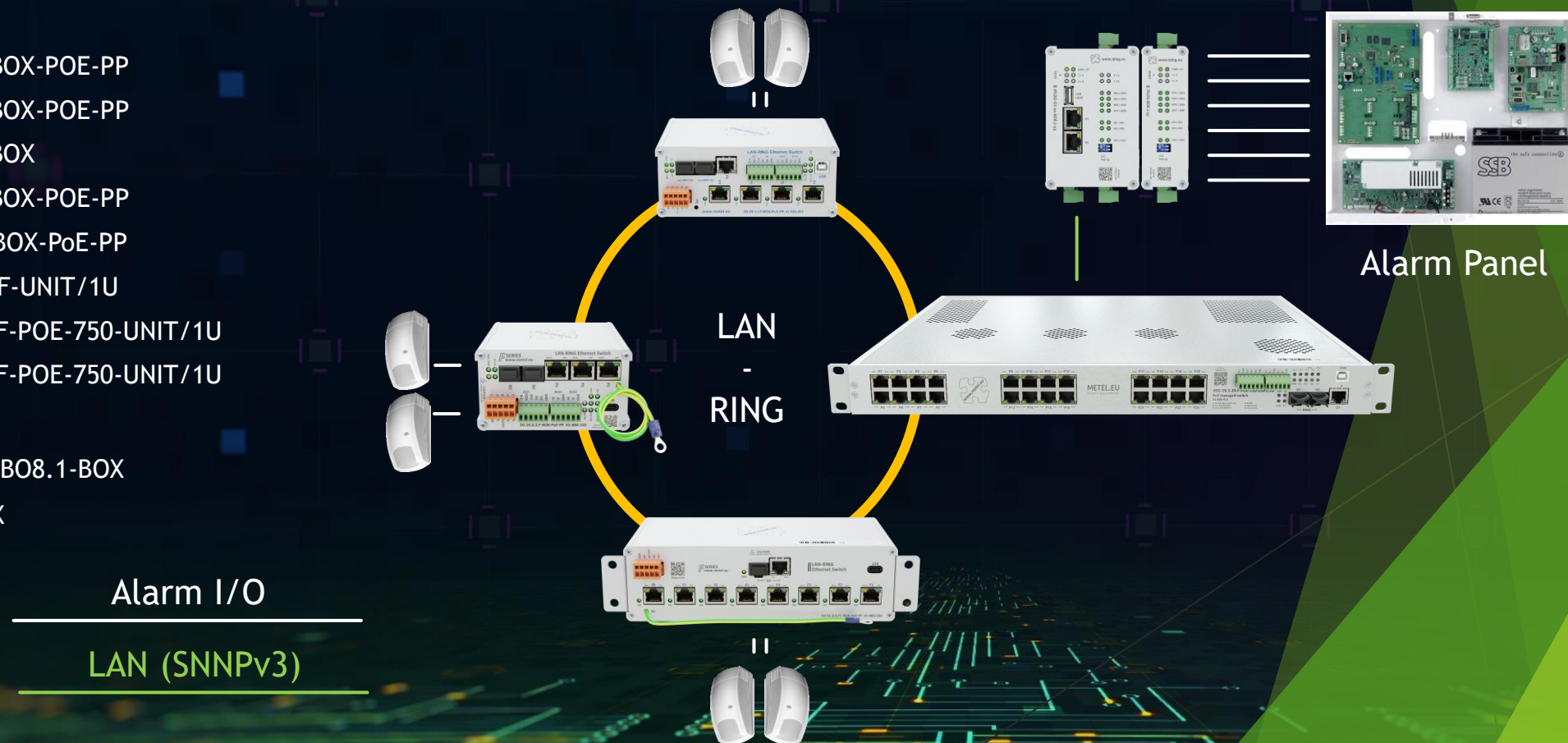
- In 2024, we successfully certified alarm inputs and outputs according to ČSN EN 50131-1

Alarm Inputs

- 2G-2S.0.2.F-BOX-POE-PP
- 2G-2S.0.3.F-BOX-POE-PP
- 2G-2S.3.0.F-BOX
- 2G-2S.1.4.F-BOX-POE-PP
- 2G-2C.0.8.F-BOX-PoE-PP
- 20G-2X.8C.0.F-UNIT/1U
- 20G-2X.1.24.F-POE-750-UNIT/1U
- 20G-2X.1.16.F-POE-750-UNIT/1U

Alarm Outputs

- IPLOG-G1-05-BO8.1-BOX
- BO8.1-05-BOX



LAN-RING Event Management

Supported Inputs and Outputs

- LAN-RING switches have physical and virtual I/Os that enable the setting of 64 automatic actions.

Inputs	Description
ETH	Receiving events from LAN devices
DIGITAL / ALARM	Local digital / alarm inputs
LAN-RING	Optical ring state
IP Watchdogs	IP device monitoring
TCP Rx	Reception of TCP events
SWITCH	LAN ports monitoring
MODBUS TCP / RTU	Inputs on Modbus Master / Slave devices
BUS	State of RS485 buses

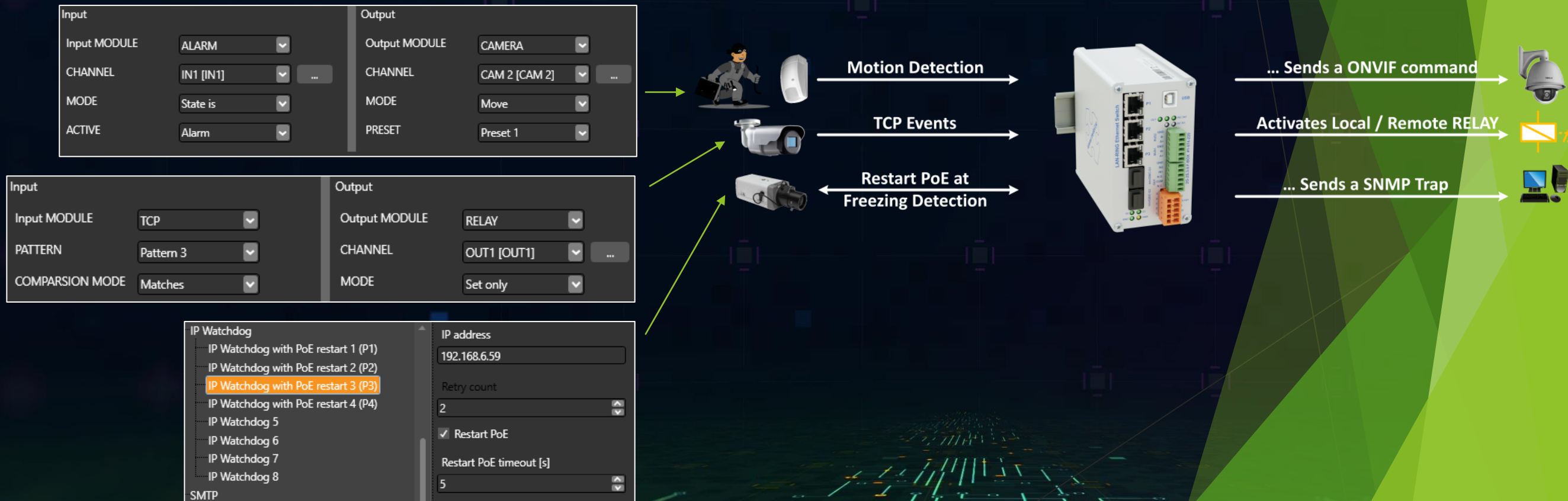
Outputs	Description
ETH	Sending events to LAN devices
RELAY	Local relay
CAMERA	Sending Onvif preset cmd to cameras
SWITCH	Controlling of the switch ports
LOGGER	Writing to the log
MODBUS TCP / RTU	Outputs on Modbus Master / Slave devices
PoE	PoE On / Off

- All I/O on LAN-RING switches and connected IO modules are accessible to IPLOG.

LAN-RING Event Management

Automatic Actions

- LAN-RING switches have physical and virtual I/Os that enable the setting of 64 automatic actions.



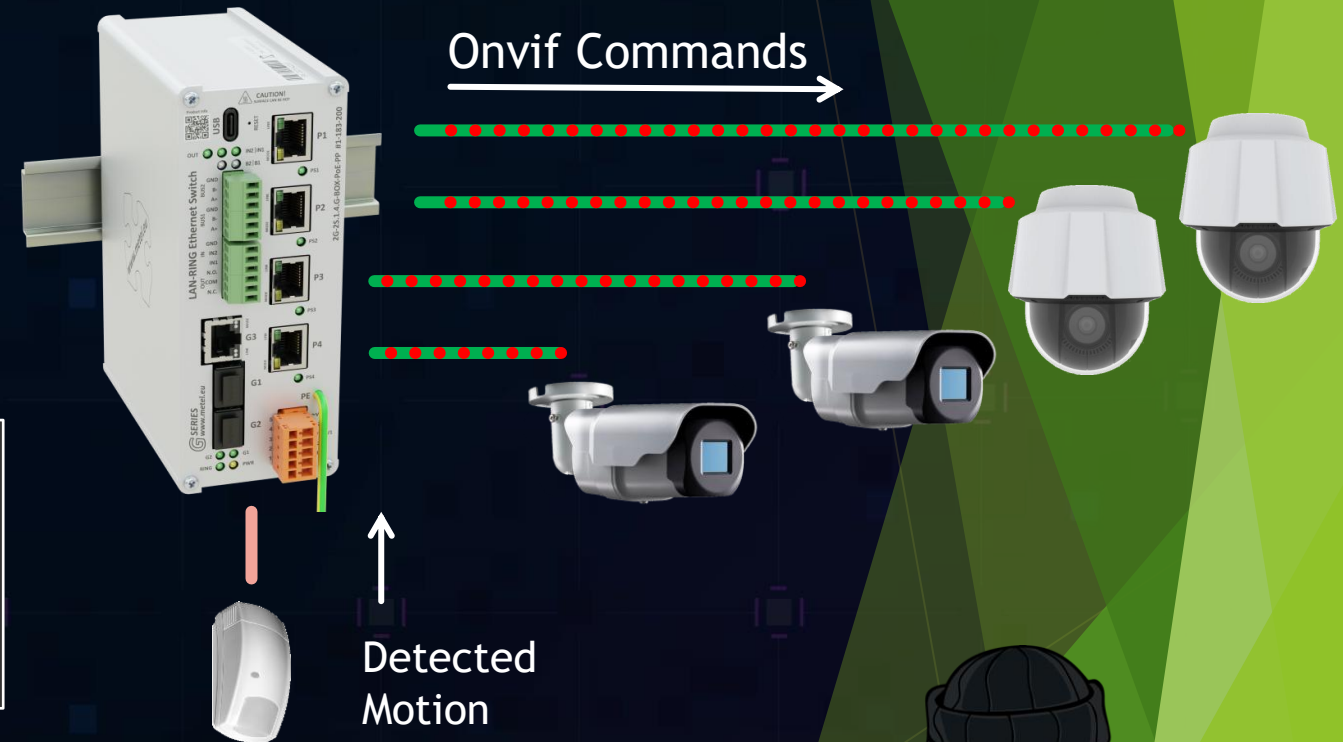
LAN-RING Event Management

Automatic Actions: Alarm Input -> Onvif Commands

- Event Example - Onvif Camera Control

- Part of the software equipment of LAN-RING switches is the so-called EVENT MANAGEMENT, which enables, for example, the automatic sending of an ONVIF COMMANDS in the event of motion detection....

Input	Output
Input MODULE ALARM	Output MODULE CAMERA
CHANNEL IN1 [IN1]	CHANNEL CAM 4 [CAM 4]
MODE State is	MODE Move
ACTIVE Alarm	PRESET Preset 6



LAN-RING Event Management

Automatic Actions: Alarm Input -> SNMP Trap

- SNMP Traps

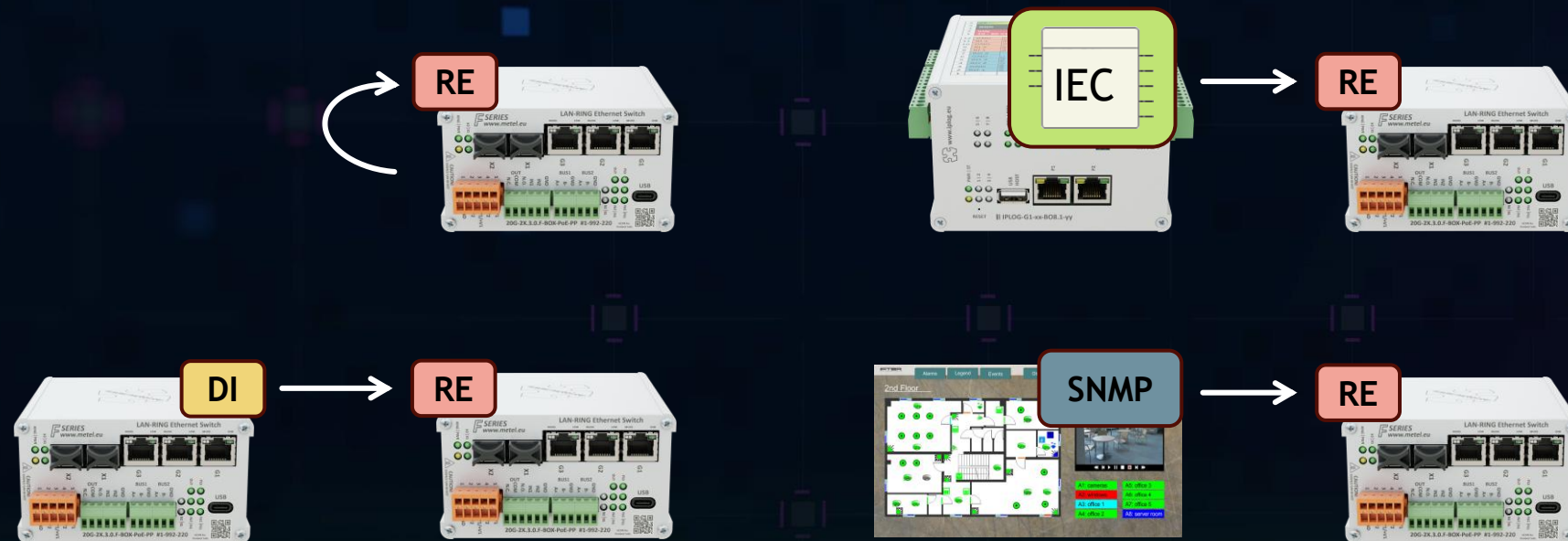


SNMP	
SNMP	State Changes - Closing, Opening, Alarm, Sabotage, Masking...
Traps	Min / Max - Ingress and Egress Traffic Limits Link Up / Down
Digital	
Alarm	Change of Supplicant or Authenticator State
Port	PoE Status Changes
Port Auth	
PoE	Ring(s) Status Changes
Ring	IP Watchdogs Status Changes
IP Watchdog	Bus Inactivity Detection in Tx and Rx Direction
BUS	High/Low Temperature Detection
Temperature	High/Low Voltage Detection
Voltage	Detecting USB Device Connection
USB	
Configuration	Trap Notifying that Device is Alive
Live check	
Trap destination IP	
Logger	

LAN-RING Event Management

Automatic Actions: Programmable Relay Outputs

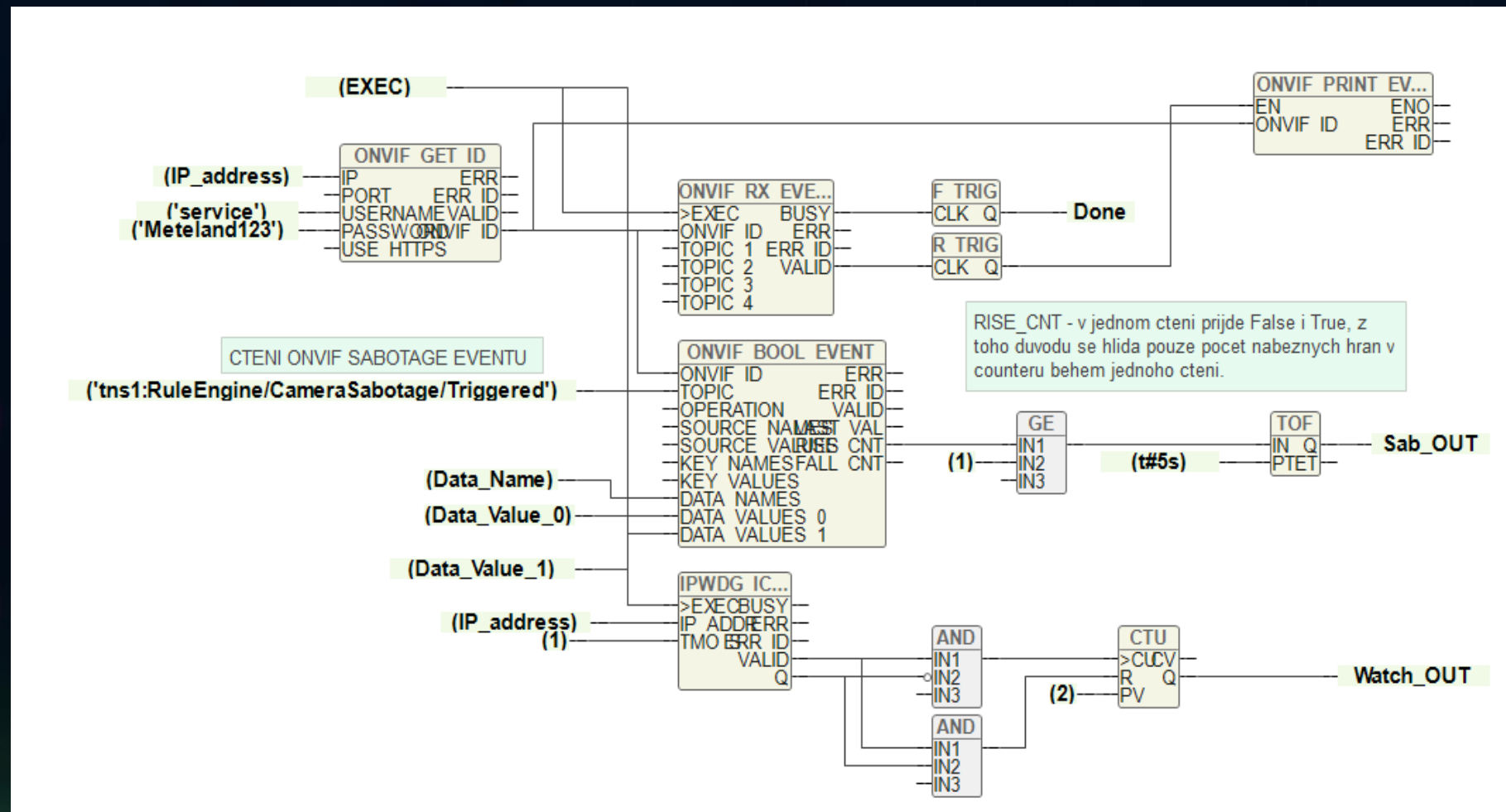
- Most of LAN-RING switches include programmable relays which can be controlled by many ways.



Examples of Successful IPLOG's Applications

IEC Control Programs

- In applications requiring more complex control tasks, we recommend using PLC IPLOG.



Examples of Successful IPLOG's Applications

Processing Onvif Events

- IPLOGs can receive and process Onvif events.

List of Onvif Events sent from a Pelco camera:

- 'tns1:VideoSource/MotionAlarm'
- 'tns1:VideoSource/GlobalSceneChange/ImagingService'
- 'tns1:RuleEngine/CameraSabotage/Triggered'
- 'tns1:Device/Trigger/Relay'
- 'tns1:RecordingConfig/JobState'
- 'tns1:Device/Trigger/DigitalInput'
- 'tns1:RecordingConfig/TrackConfiguration'
- 'tns1:Device/HardwareFailure/StorageFailure/Reason/AccessError'
- 'tns1:RecordingConfig/RecordingConfiguration'
- 'tns1:Device/HardwareFailure/StorageFailure/Reason/Full'
- 'tns1:Device/HardwareFailure/StorageFailure/Reason/Protected'
- 'tns1:Device/HardwareFailure/StorageFailure/Reason/NotInserted'
- 'tns1:Device/HardwareFailure/StorageFailure/Reason/MaintenanceNotification/Warning'
- 'tns1:Monitoring/ProcessorUsage'
- 'tns1:Device/HardwareFailure/StorageFailure/Reason/MaintenanceNotification/Error'



Functional Block

ONVIF RX EVENTS
>EXEC BUSY
ONVIF ID ERR
MODE ERR ID
TMO S VALID
TOPIC 1
TOPIC 2
TOPIC 3
TOPIC 4



Typical Outputs



Examples of Successful IPLOG's Applications

Other Supported Protocols and Tools

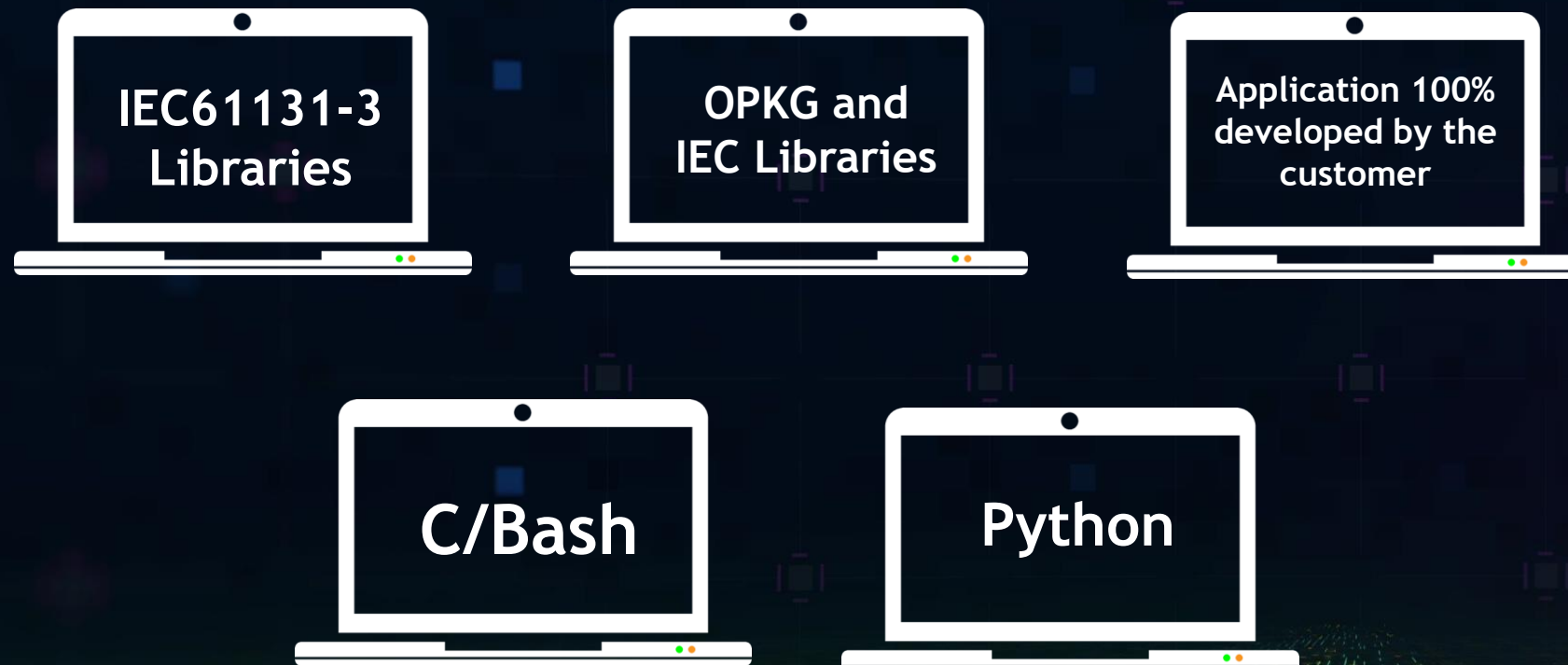
- IPLOGs are often used when a LAN-RING network should cooperate with 3rd party systems using standardized or proprietary protocols.

Open-Source Linux Tools	General Protocols	Proprietary Protocols
Grafana	ARP / ICMP	Absolute PRO
OpenVPN	Bacnet	Audio
Radius Server	Dali	Geutebruck
IPSec	Modbus TCP / RTU	Keyence
NTPD	Onvif	Pelco
	SNMP	SAFR
	SMS	Mobotix
	SMTP	FVE systems
	Wiegand	V-Alert

Examples of Successful IPLOG's Applications

Other Supported Protocols and Tools

- IPLOG has a wide range of tools at its disposal to solve customer requirements.

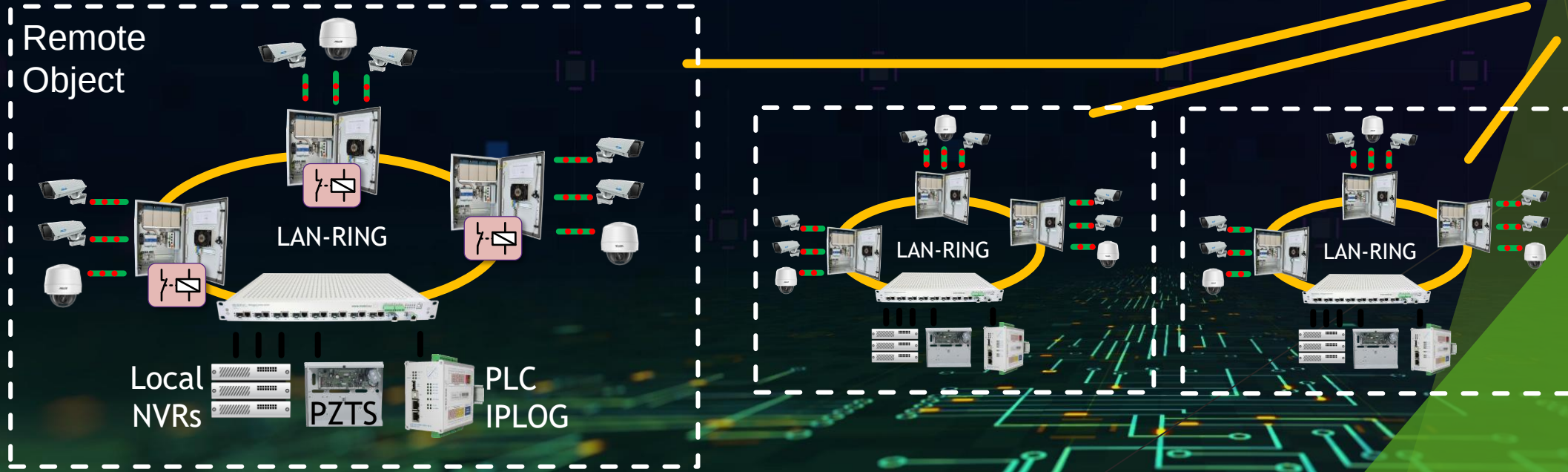


Infrastructure LAN-RING & IPLOG

Event Management & IEC Control Programs in Practice

OPKG and
IEC Libraries

- We use original VideoXpert Plugins and Services.
 - IPLOGs receive events from Pelco Event Monitor as for example Camera Disconnection, Masking, HDD Fault... and forward them to PZTS
 - IPLOGs collect LAN-RING notifications from tampers, power states, authentication errors, etc and via the PELCO ASCII PLUGIN forward them directly to the VMS VideoXpert
 - The Dispatch Plugin allows the control of all relay outputs on the network via the IPLOG. Besides, IPLOG can run the next logic operations.

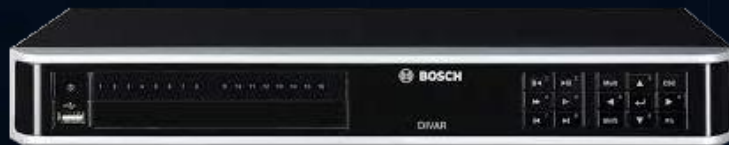


Infrastructure LAN-RING & IPLOG

Event Management & IEC Control Programs in Practice

- This is an example of receiving fault information sent via SNMP TRAPs. In this way, Bosch systems can notify when the camera is covered, when the signal is lost, etc.

Bosch NVR or VMS

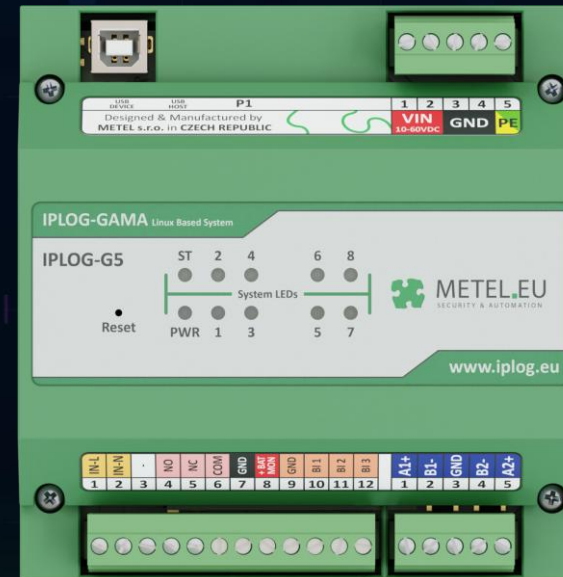


Bosch Cameras

SNMP TRAPs

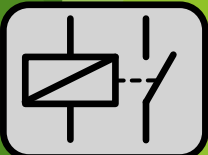


IPLOG with an SNMP TRAP receiver



Typical
Outputs

IEC 61131-3
Libraries



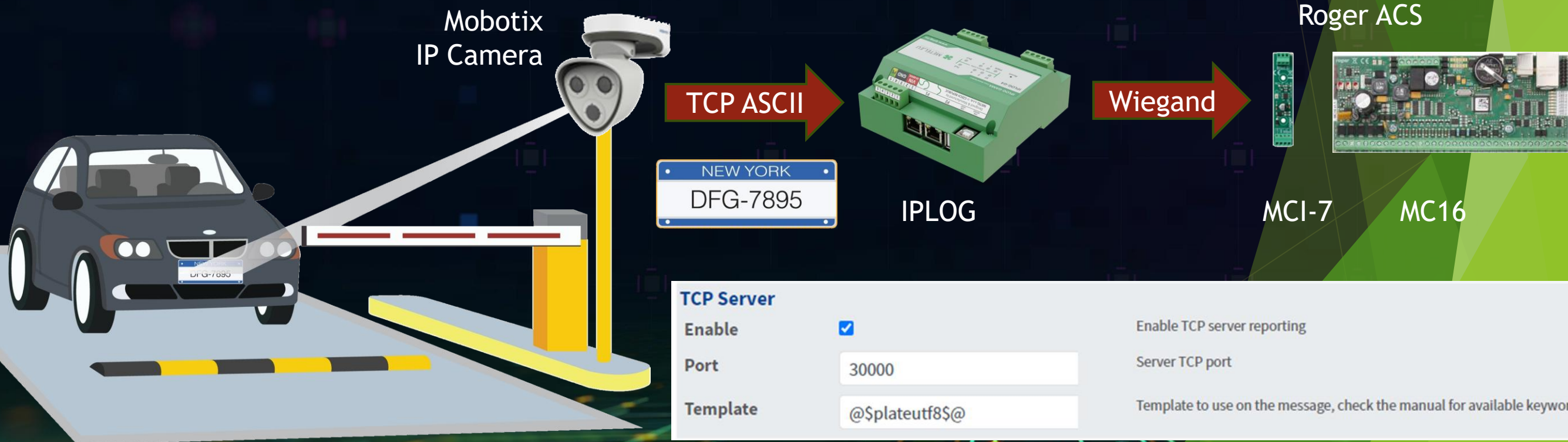
Infrastructure LAN-RING & IPLOG

Event Management & IEC Control Programs in Practice

OPKG and
IEC Libraries

- IPLOG in the License Plate reader application

- IPLOG control units have a wide range of function blocks for creating user programs. Among them are Wiegand blocks, TCP events, format conversion blocks. When connected to a license plate reading application running on IP cameras, IPLOG can transmit this data to various access systems or process it directly in the IEC program.



Infrastructure LAN-RING & IPLOG

Event Management & IEC Control Programs in Practice

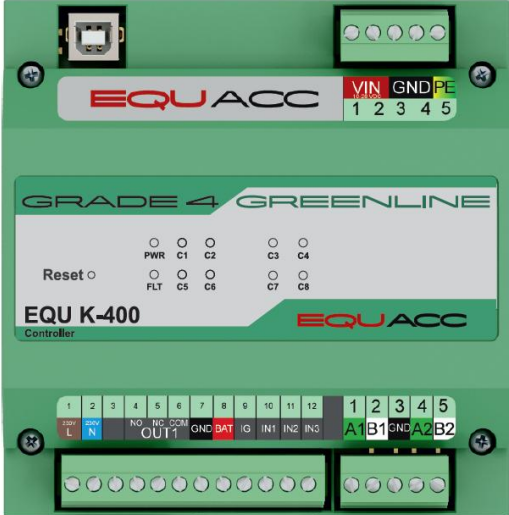
Application 100%
developed by the
customer

- EQU-K400 is a modern unit for access control meeting the requirements of the 4th level of security according to the European standard EN 60839-11-1.
- EQU-M484 is an expansion module for the access control unit EQU-K400.

Urządzenie:
EQU - K400
Kontroler jednego przejścia

Dane techniczne:

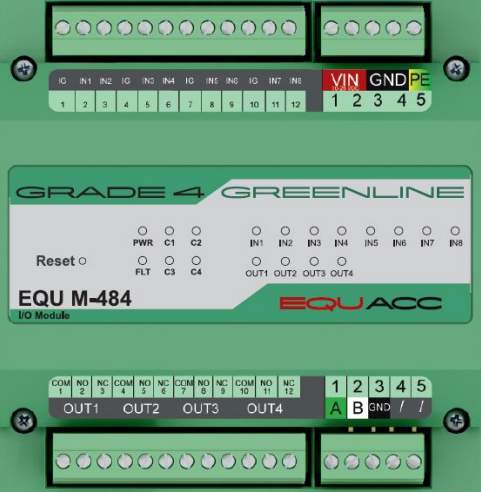
Liczba przejść	1
Pojemność kontrolera:	1 000 000 użytkowników
Bufor zdarzeń:	500 000 rejestracji
Zasilanie:	10 - 28 VDC, 1W
Połączenie z komputerem:	Ethernet (LAN/WAN)
Protokół:	TCP/IP
Prędkość transmisji:	10/100 Mbps
Podłączenie czytników:	EQUbus (RS485)
Długość magistrali:	max. 1000 m
Obudowa:	DIN - 35M
Wymiary:	123 x 120 x 50
Środowisko pracy:	-10°C...+40°C
Wejścia:	230V, akumulator, sabotaż, 2 definiowalne
Wyjście:	1A przekaźnikowe 24V



Urządzenie:
EQU -M484
Moduł rozszerzeń (8 wejść, 4 wyjść)

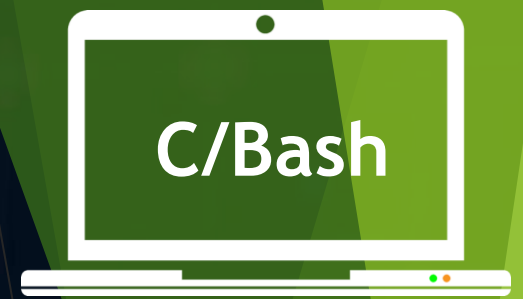
Dane techniczne:

Wyjścia	4 przekaźnikowe
Obciążalność:	1A 24V
Wejścia:	8 (konfigurowalne)
Połączenie z kontrolerem:	RS 485
Zasilanie:	10 - 28VDC
Wymiary:	123 x 120 x 50 mm
Obudowa:	DIN-35, IP20
Temperatura:	-40°C...+70°C
Wilgotność:	95% bez kondensacji
Tworzywo obudowy:	ABS UL94 V0
Zużycie energii:	max. 1,5 W
Zabezpieczenie przeciwprzepięciowe:	600 W



Infrastructure LAN-RING & IPLOG

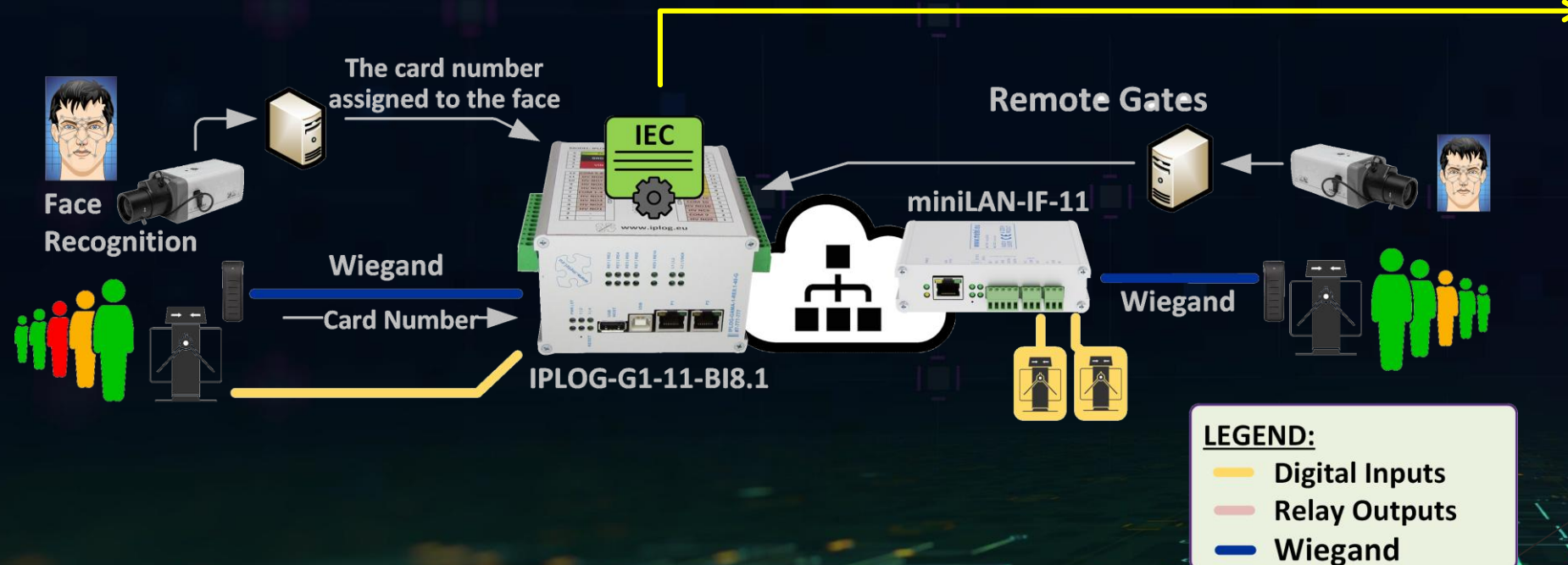
Event Management & IEC Control Programs in Practice



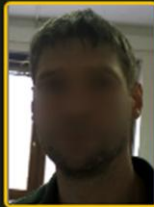
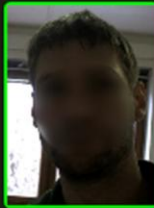
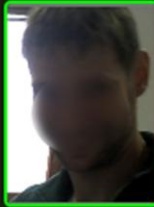
○ ACS with Faces Scanners (SAFR)

- The production plants with more than 30.000 employees upgraded the ACS system (Wiegand readers) with face scanners. IPLOGs compare codes received from Wiegand readers with codes assigned to faces.

Events stored into SAFR Database



Sort by: Chronological ▾ Group by: Event ▾

	Threat: UNKOWN PERSON WITH CARD card_id:44091700 11/26/2021 10:53:54 AM - 11/26/2021 10:54:25 AM 31 seconds Site: DESKTOP-FKPT8S2_metal Source: MOBOTIX M26B-6D
	Concern: tester PERSON WITH WRONG CARD 11/26/2021 10:53:30 AM - 11/26/2021 10:53:30 AM 0 seconds Site: DESKTOP-FKPT8S2_metal Source: MOBOTIX M26B-6D View person activity
	tester PERSON VERIFIED card_id:44091700 11/26/2021 10:53:17 AM - 11/26/2021 10:53:17 AM 0 seconds Site: DESKTOP-FKPT8S2_metal Source: MOBOTIX M26B-6D View person activity
	tester 11/26/2021 10:53:09 AM - 11/26/2021 10:53:09 AM 0 seconds Site: DESKTOP-FKPT8S2_metal Source: MOBOTIX M26B-6D View person activity

Infrastructure LAN-RING & IPLOG

Event Management & IEC Control Programs in Practice

IEC61131-3
Libraries

- IPLOG as a Hospital Exit Controller



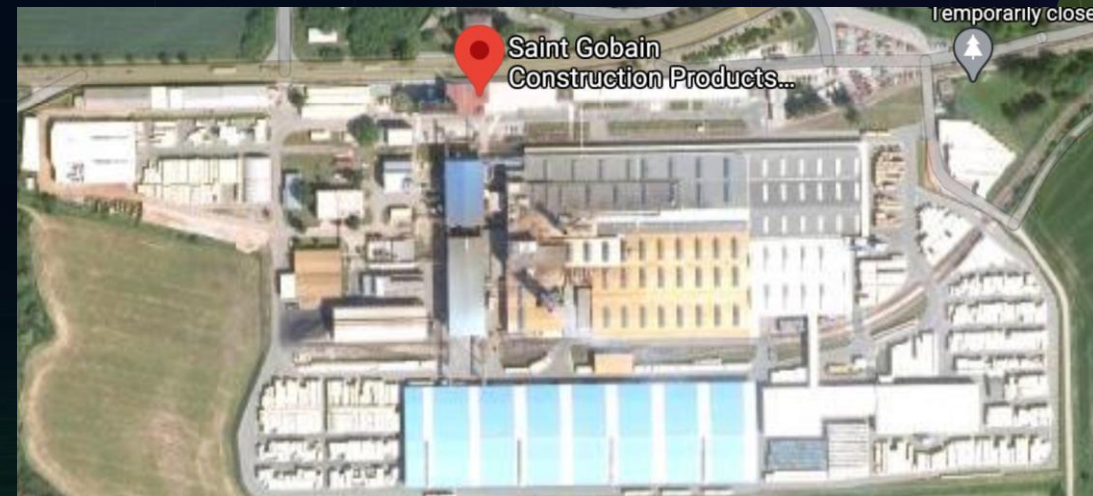
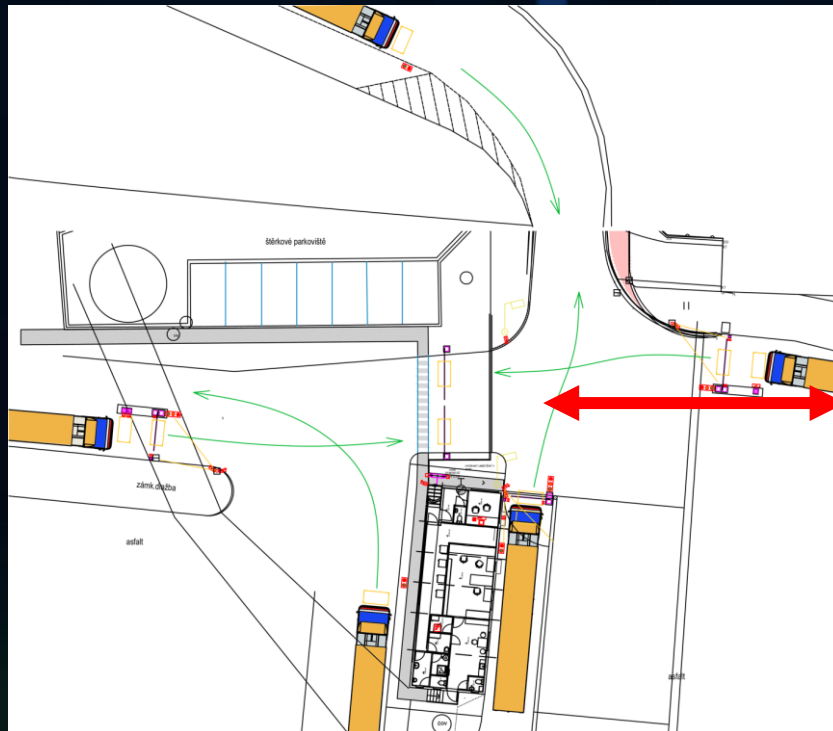
- Opening impulses are: access system (input EKV), door communicator, induction loop detects cars, camera reads car plates, pedestrian button.
- After the passage input is activated:
 - PLC opens the gate. At the same time the red light is turned on at pedestrian crossing and a LED sign WAIT is activated for the cars to wait.
 - After opening the gate, the barrier is opened.
 - After opening the barrier, the WAIT light goes out and the green light for cars goes on.
 - Approaching the departing car to the induction loop behind the barrier will immediately turn on red light for the cars in front of the gate.
 - If there is detected another car in front of the gate, the PLC waits for the departure of the previous car.
 - If no other car is detected, the red light for cars and green for pedestrians light up after 30 seconds.
 - Night / Day Mode: During the night, the gate is automatically closed after passing the car and is permanently opened during the day.

Infrastructure LAN-RING & IPLOG

Event Management & IEC Control Programs in Practice

IEC61131-3
Libraries

- IPLOG Control Passage of the Cargo Gate
 - The PLC controls the passage of the freight gatehouse from 5 different directions. Each direction is controlled by a traffic light and the IPLOG ensures that only one truck passes through the gate at any time.



Infrastructure LAN-RING & IPLOG

Event Management & IEC Control Programs in Practice

OPKG and
IEC Libraries

- IPLOGs are compatible with ABSOLUTE PRO Perimeter System.

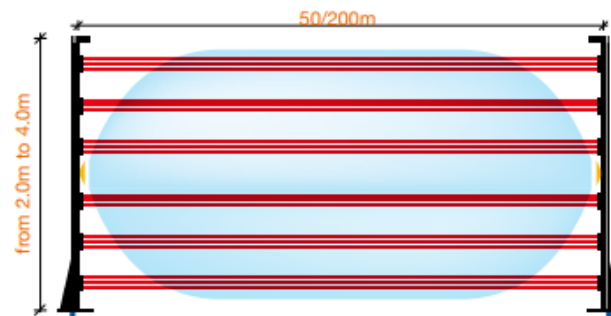
PRODUCT SPECIFICATIONS

ETHERNET ONVIF & I/O MODULE

IMTIPLUG is a Linux based ethernet I/O module that collects data from up to 30 sets of **Absolute PRO™** barriers converting them into physical outputs for third party system integration. It can be also programmed to command networked CCTV cameras via ONVIF protocol or CGI commands. Supports SNMP, SMTP, SNTP, IGMP and UPMP. Working temperatures: from -40° to 70°C.



TYPICAL SYSTEM ARCHITECTURE



- Control Panels
- PTZ Cameras
- Loud Speakers
- Other

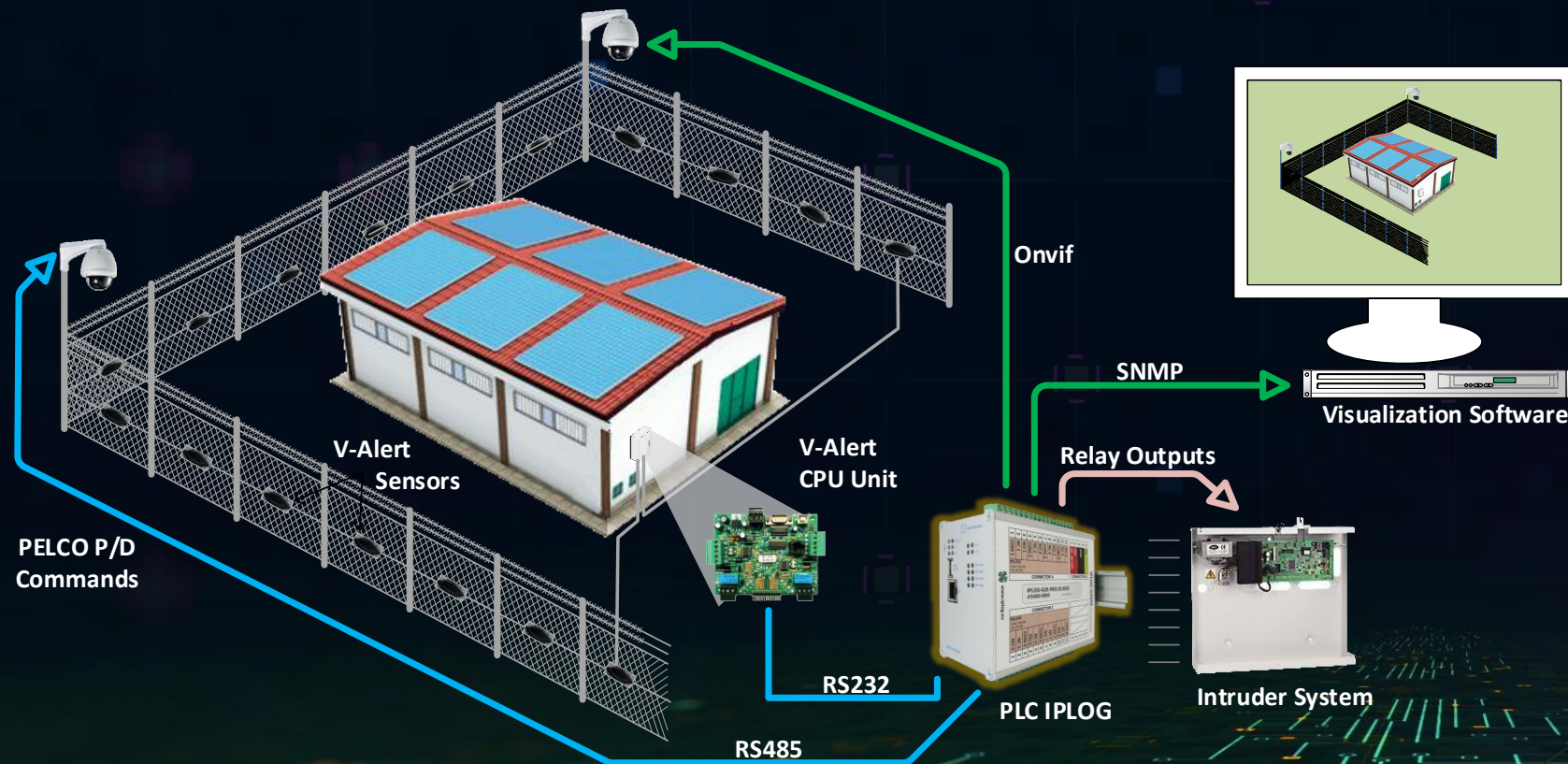
FEATURES	DESCRIPTIONS
Outdoor Range	50m (IMTDT050/X.X) and 200m (IMTDT200/X.X)



Infrastructure LAN-RING & IPLOG

Event Management & IEC Control Programs in Practice

- The customer has already used the IPLOG-DELTA control unit in oil fields for the integration of a perimeter system with IP CCTV. We have recently added this functionality to IPLOG-GAMA.



OPKG and
IEC Libraries

VALERT EVENT

ZONES	ERR
SENSORS	ERR ID
	VALID
	ALARM
	CUT

ONVIF GOTO PRESET

>EXEC	BUSY
ONVIF ID	ERR
PROFILE	ERR ID
PRESET	VALID
TMO S	

PELCO P GOTO PRESET

>EXEC	BUSY
BUS	ERR
BAUDRATE	ERR ID
ADDR	VALID
PRESET	
TMO S	

PELCO D GOTO PRESET

>EXEC	BUSY
BUS	ERR
BAUDRATE	ERR ID
ADDR	VALID
PRESET	
TMO S	

IEC



Infrastructure LAN-RING & IPLOG

Event Management & IEC Control Programs in Practice

Python

○ Charging Stations for E-bikes

- Electric bike users need to charge their bikes in public places for longer trips.
- Of course, setting up a charging station and operating it is not free.
- A smart solution is a service that allows charging for a small fee via a mobile application.

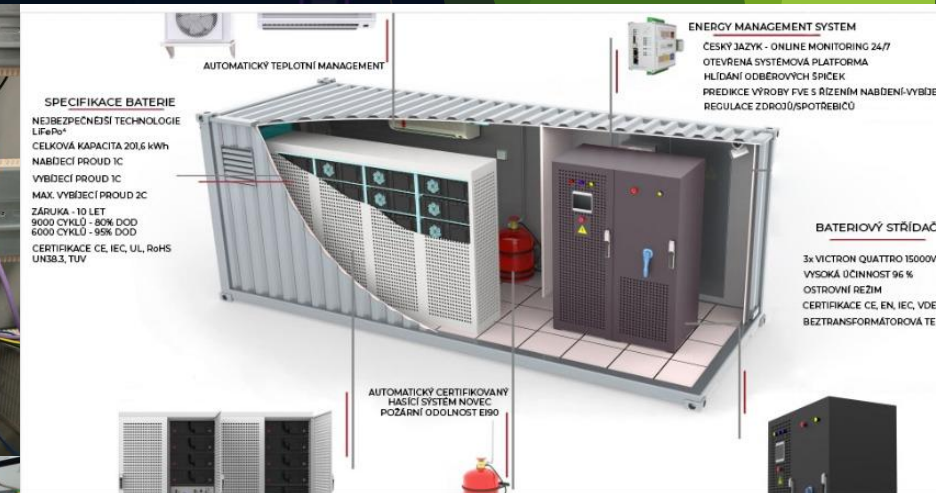
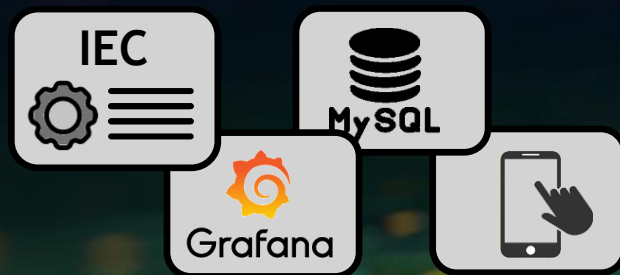


Infrastructure LAN-RING & IPLOG

Event Management & IEC Control Programs in Practice

OPKG and
IEC Libraries

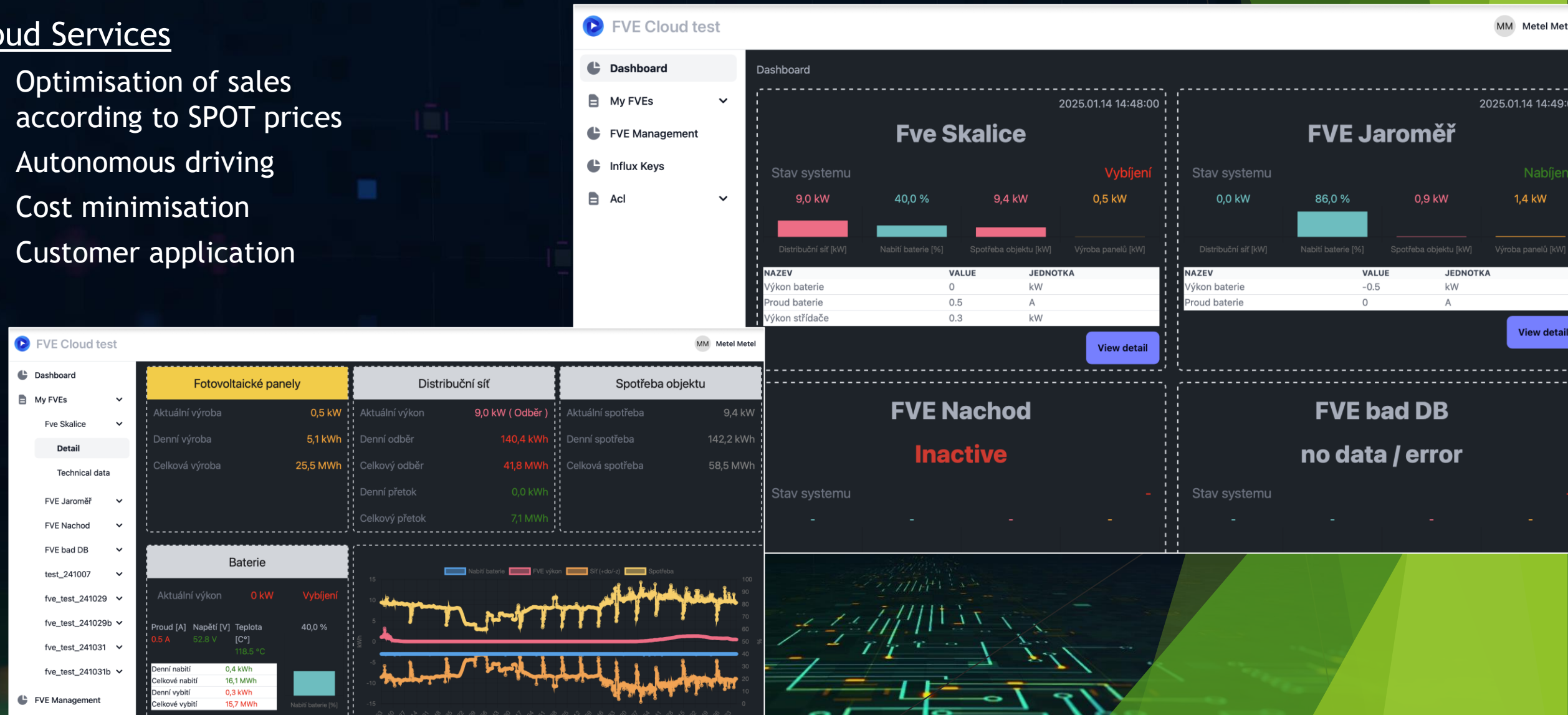
- IPLOGs are used as Energy Management Systems for photovoltaic power plants installed in factories and private homes.
- The primary purposes of using IPLOG are:
 - Maximize the use of energy obtained from the photovoltaic system
 - Elimination of power peaks
 - Data collection in database
 - Remote monitoring



Infrastructure LAN-RING & IPLOG

Event Management & IEC Control Programs in Practice

- Cloud Services
 - Optimisation of sales according to SPOT prices
 - Autonomous driving
 - Cost minimisation
 - Customer application





Thanks for your attention

For More Information, Please Visit

www.metel.eu

wiki.iplog.eu