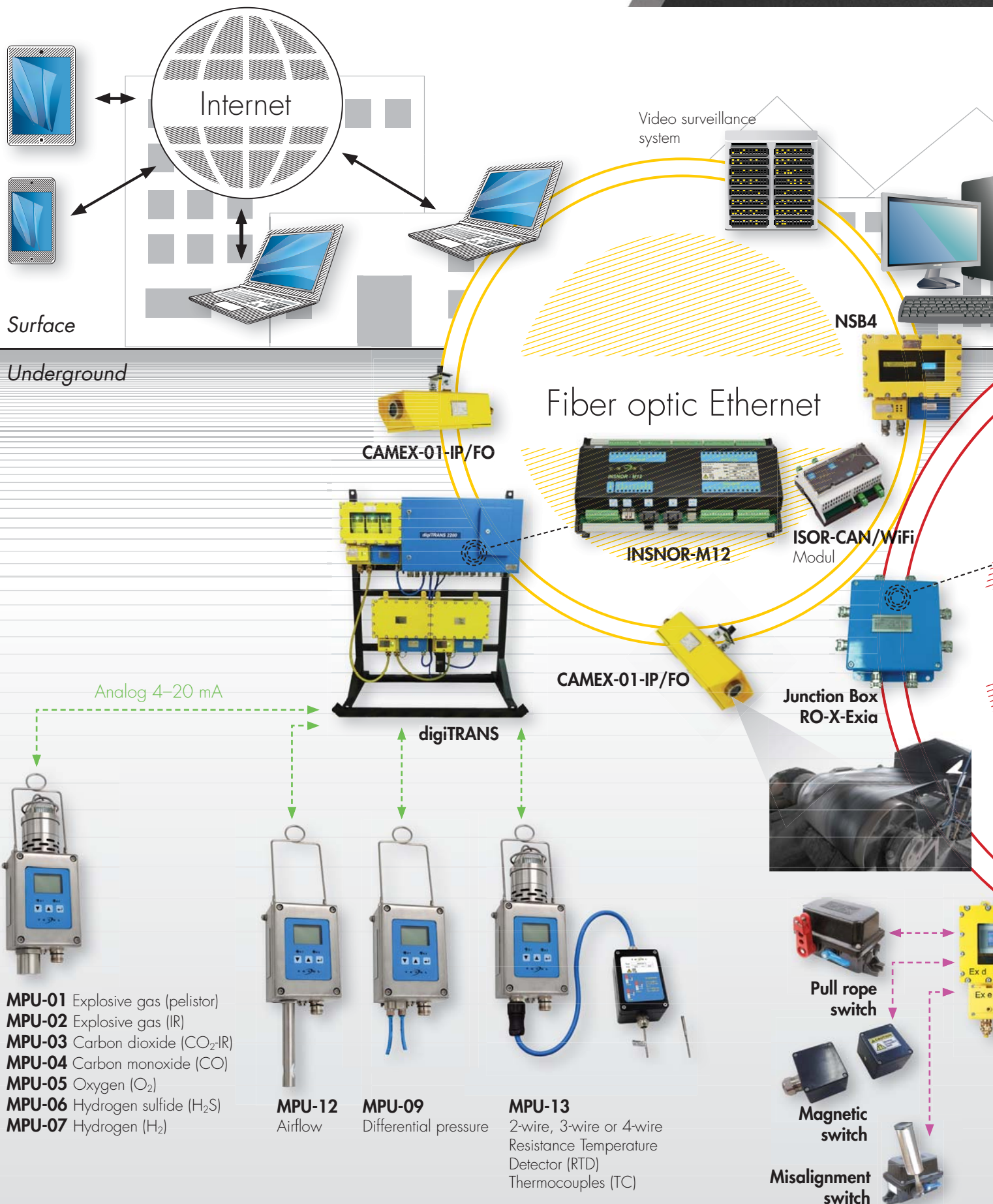


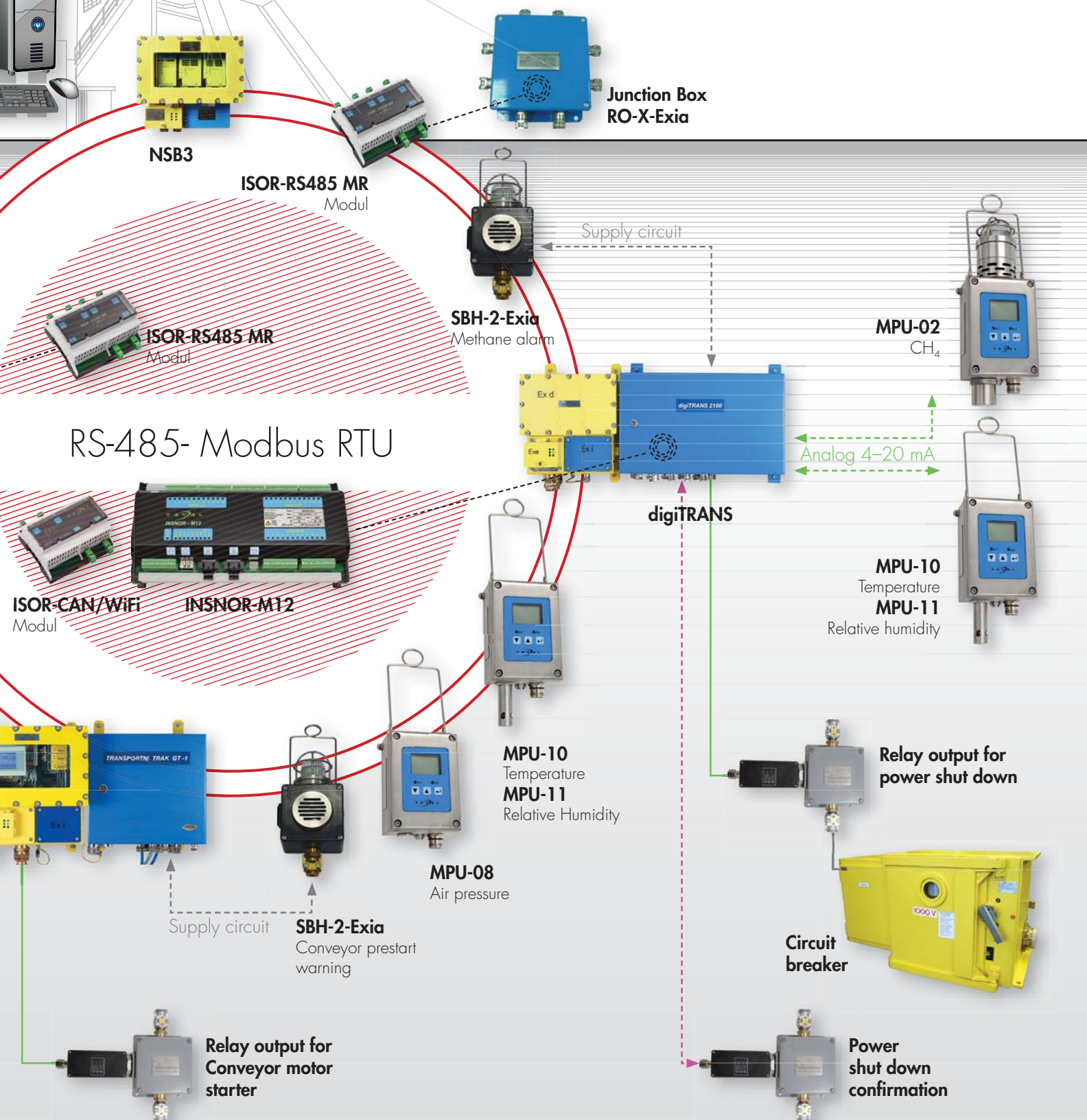


MINING SAFETY TECHNOLOGY INFORMATION SYSTEM

- **SYSTEM & CUSTOM SOLUTIONS**
- **CONTROL UNITS**
- **GAS DETECTORS**
- **AUDIO/VISUAL DEVICES**
- **JUNCTION BOXES**

T E V E L
SINCE 1990

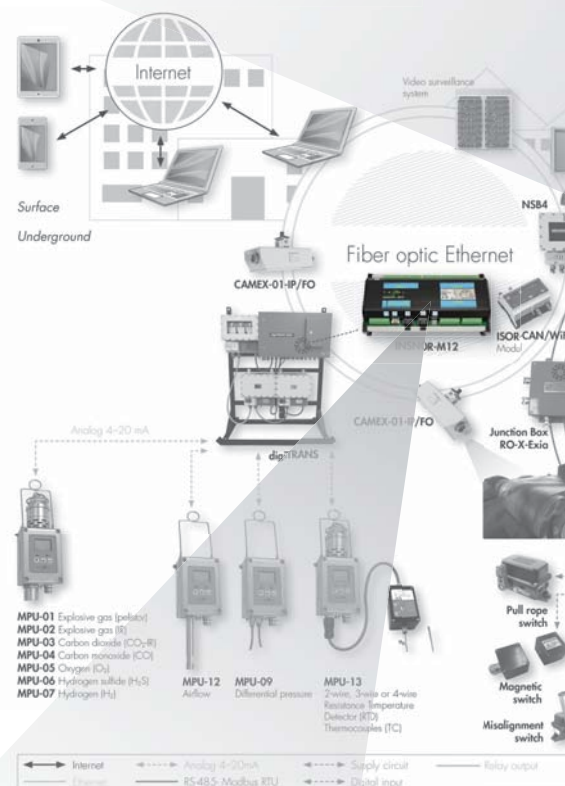




DigiTRANS Control Unit

DigiTRANS is an underground control and alarm system, microprocessor controlled, mainly used for gas detection and automation. Different communication interfaces offer reliable communication with supervisory control and data acquisition system on the surface.

Supply: 230 VAC +/- 10% with 8h battery back up

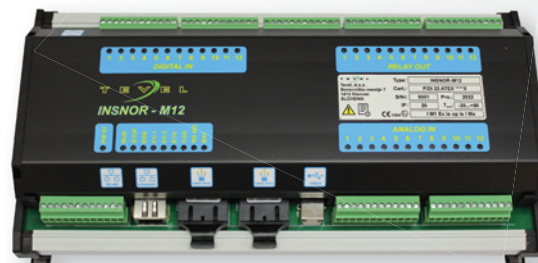


Programmable Controller type INSNOR-M12

The compact programmable controller type INSNOR-M12 is designed for data acquisition, processing, control, and transmission. Data can be transmitted in real-time over long distances via various buses, e.g. to a control center where it can be pre-processed, visualized, stored, and transmitted. The controller is designed according to the standards for use in coal mines endangered by methane and coal dust.

Easy installation on standard DIN rail 35. The device must be installed in a housing with minimum Ingress Protection IP54.

Ex marking: I M1 Ex ia op is I Ma





The compact programmable controller INSNOR-M12 connection types

- 12 Analog inputs (0.2–1 mA or 4–20 mA or 5–15 Hz)
- 12 Digital inputs ($U_{in}=0V \rightarrow \text{Low (0)}$; $U_{in}=3-15V \rightarrow \text{High (1)}$; $F_{max}=10\text{kHz}$)
- 12 Changeover Relays outputs ($U_{max}=30V$; $I_{max}=2A$; $P_{max}=30W$)
- Serial RS485 – Modbus RTU
- Serial CAN – open
- USB B-type
- Ethernet 10/100Mbps
- 2 Fiber Optic Transceivers (redundant mode), Duplex SC Port (up to 15km)

Benefits

- Compact design
- Simple configuration through the Ethernet or USB interface using a PC, tablet, or smartphone
- Easy programming with advanced PoKeys software

Technical specifications

Type: **INSNOR-M12**

Ex mark: **I M1 Ex ia op is I Ma**

Power supply voltage: $3 \times U_n = 12VDC$, $I_n = 300mA$

(Suitable with Tevels power supply unit **NSB4/x-ia**)

Digital inputs: $U_{min}=3V$

Analog inputs (3 options):

- Current input: 0.2–1 mA ($R_{in}=2k\Omega$)
- Current input: 4–20 mA : ($R_{in}=180\Omega$)
- Frequency input: 5–15 Hz: $U_{min}=3V$

Relay outputs: SPDT switching contacts
($U_{max}=30V$, $I_{max}=2A$, $P_{max}=30W$)

RS485: Modbus RTU

CAN: Can open

Ethernet (RJ45)

USB B-type

2 Fiber Optic Transceivers, Duplex SC Port:

125 MBd MMF Transceiver for Fast Ethernet
(100Base-FX)/ATM/FDDI
(up to 15km)

Operating temperature range: $-20^{\circ}C$ to $+50^{\circ}C$

Relative humidity: 15–90% Rh (without condensation)

Dimension: 275 x 143 x 71 (L x H x W in mm)

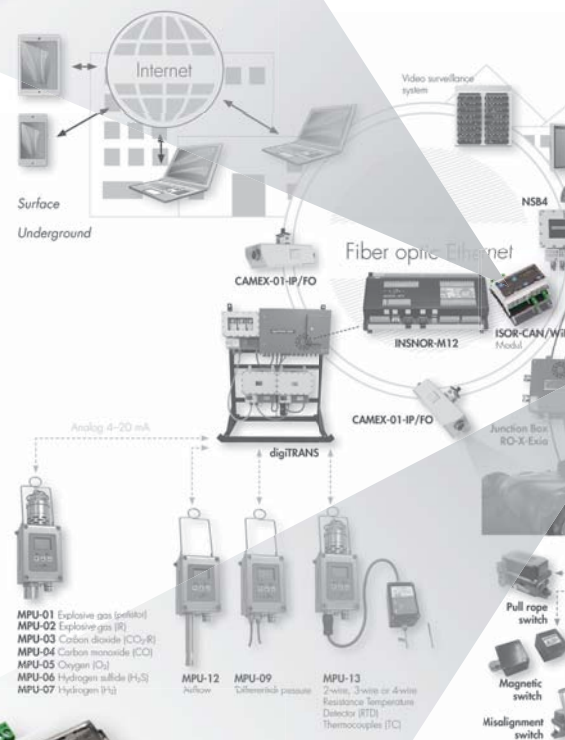
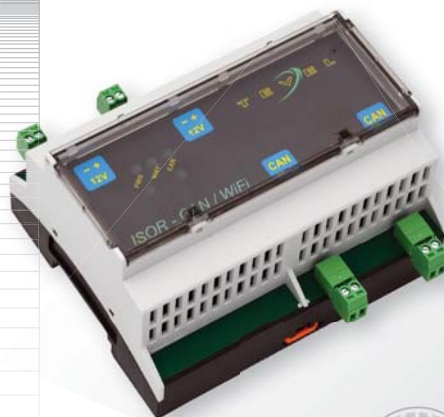
Weight: < 1kg

Modul ISOR-CAN/WiFi

ISOR-CAN/WiFi (interface)

The module serves for wireless (WiFi) communication between (master) INSINOR-M12 and a smart WiFi device such as: PC, tablet or smartphone.

Ex marking: I M1 Ex ia I Ma

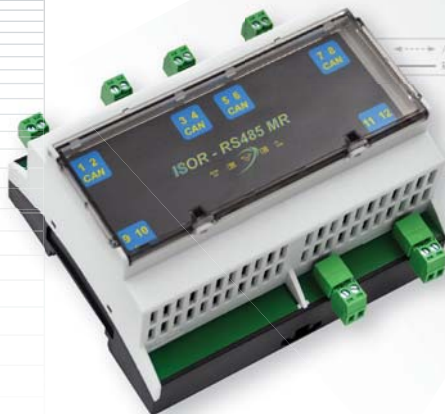


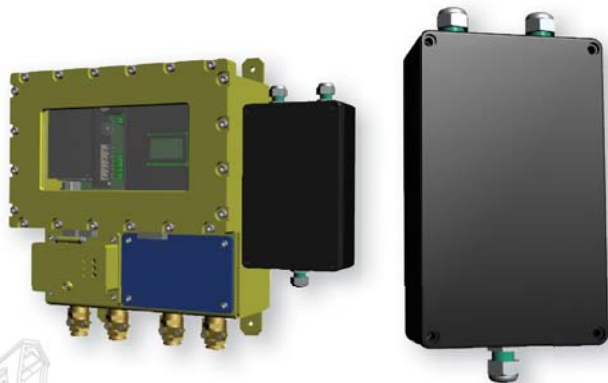
Multichannel Repeater RS485 type ISOR-RS485 MR

Multichannel Repeater RS485 type ISOR-RS485 MR is universal serial line isolator.

- 4 port RS485 hub (multidirection)
- Extend the distance of one single RS485 communications line

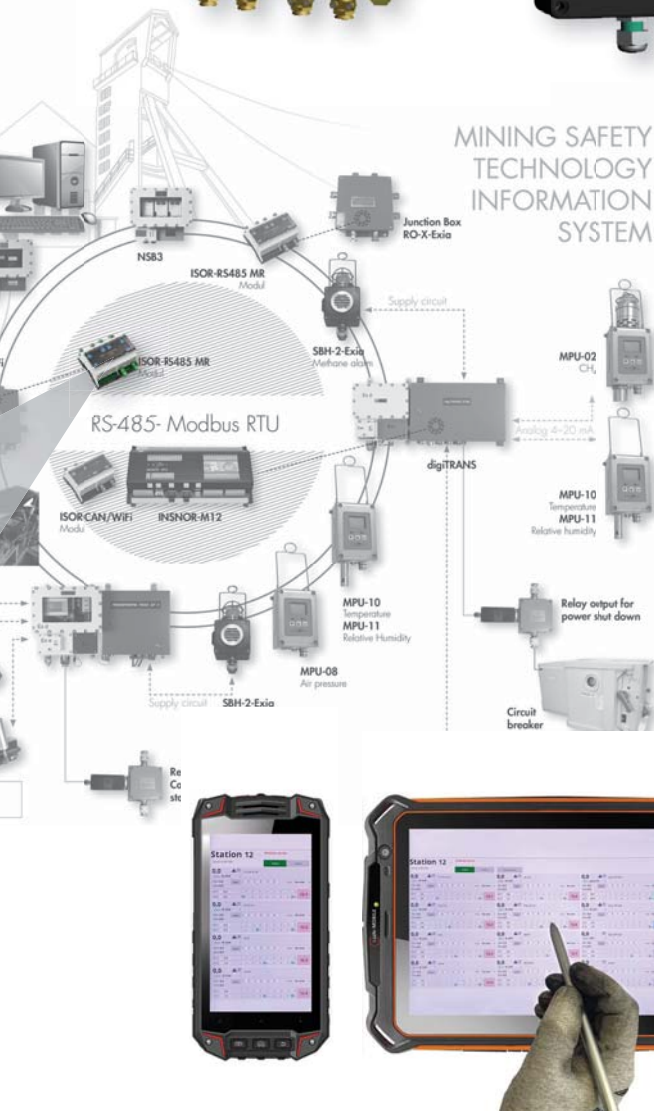
Ex marking: I M1 Ex ia I Ma





ISOR-RS485 communication interface in an IP 65 housing

- RS485 line extension up to 1 km (ISOR-RS485 interface)



Status overview and parameterization

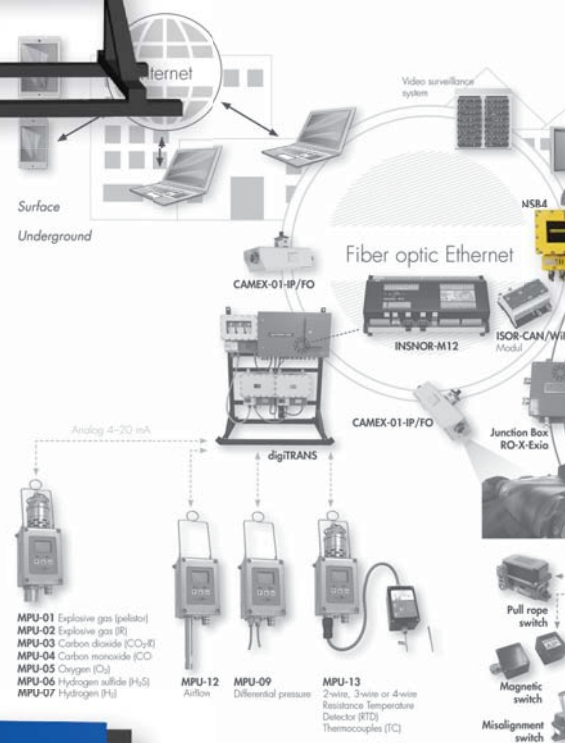
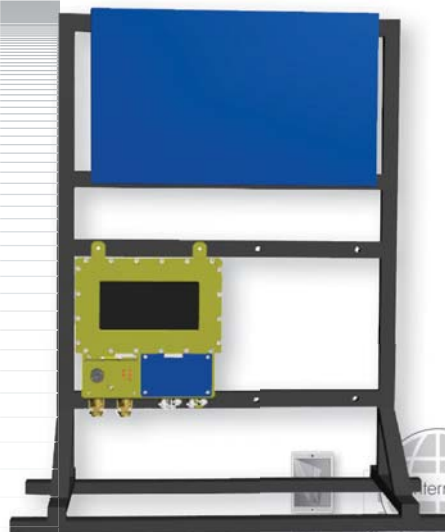
The user can monitor and manage the system with the help of a phone/tablet/pc directly in the endangered area:

- Setting alarm levels
- Selection of relay outputs
- Selection of digital inputs
- Changing the measuring heads...

All changes are automatically transferred to the main SCADA system of the control center.

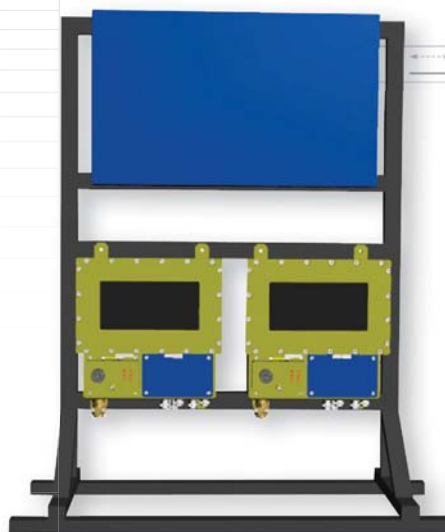
Substation DigiTrans 2400/1

- 4 analog inputs (Measuring heads type MPU-**)
- 12 digital inputs
- 12 relay outputs
- Serial RS485 (Modbus RTU)
- Serial CAN
- USB
- Ethernet
- 2 Fiber Optic Transceivers (single mode up to 20km)
- ISOR-CAN/WiFi interface



Substation DigiTrans 2400/2

- 12 analog inputs (Measuring heads type MPU-**)
- 12 digital inputs
- 12 relay outputs
- Serial RS485 (Modbus RTU)
- Serial CAN
- USB
- Ethernet
- 2 Fiber Optic Transceivers (single mode up to 20km)
- ISOR-CAN/WiFi interface





NSB3-xxx/5Via

Power supply type NSB3-xxx/5Via is intended for use in mining applications. It converts an ac supply voltage into a stabilized and regulated intrinsically safe source for supplying power to approved electronic control devices. NSB3-xxx/5Via provides two 5VDC outputs, capable to source up to 1200 mA. NSB3-xxx/5Via also provide 4–20 mA output signal to monitor battery state of charge and potential-free relay to indicate mains fuse failure for each output channel. In the case of power supply failure, automatic battery backup is provided with capacity of 8000 mAh.

Ex marking:

I M2(M1) Ex db eb ia [ia Ma] I Mb
I M1 Ex db eb ia [ia] mb I Ma



NSB4/x-ia

Intrinsically Safe Power Supply NSB4/x-ia is intended for use in mining applications. It converts an AC supply voltage into a stabilized and regulated intrinsically safe source for supplying power to approved electronic control devices. NSB4/x-ia provides eight I.S. outputs with different I.S. parametres. NSB4/x-ia also provides 4–20 mA or 0,2–1 mA output signal to monitor battery capacity and potential-free relay to indicate mains fuse failure for each output channel. In the case of power supply failure, automatic battery backup is provided with capacity of 8000 mAh. On the built-in display, we can monitor the status of I.S. outputs (voltage, current consumption) and battery capacity.

Configuration of NSB4/x-ia:

- NSB4/1-ia: 8x13V
- NSB4/2-ia: 7x13V / 1x12V
- NSB4/4-ia: 6x13V / 2x12V

Ex marking:

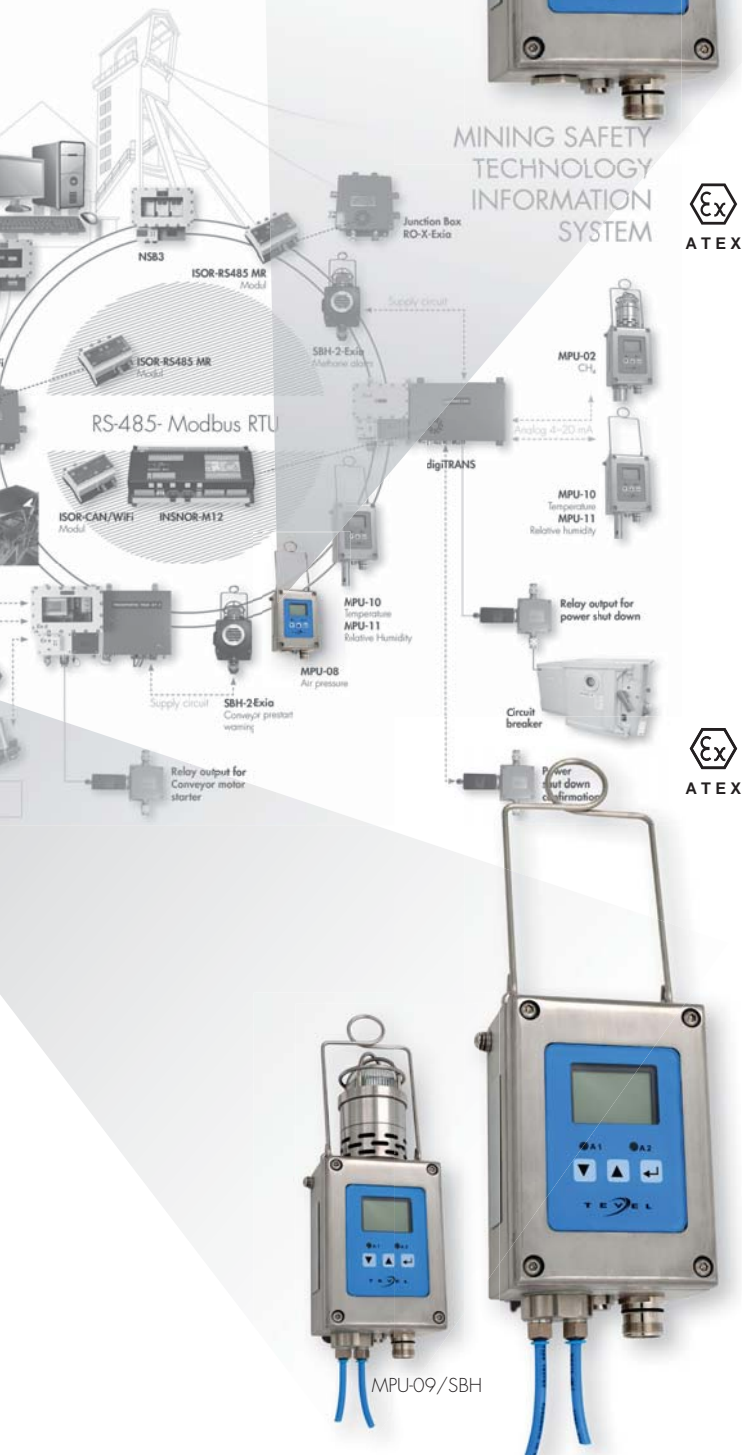
I M2(M1) Ex db eb ia [ia Ma] I Mb
I M1 Ex db eb ia [ia] mb I Ma





MPU-08/SBH

MINING SAFETY
TECHNOLOGY
INFORMATION
SYSTEM



MPU-08 or MPU-08/SBH

Absolute pressure detector

Different signal outputs

Optional RS 485 Modbus RTU or CAN communication

Intrinsically safe device

Optional connection via cable gland

Equipped with local display

Easy operation and maintenance

Corrosion resistant stainless steel housing

Detection: Air pressure (p)

Sensor Technologies: Piezoresistive

Power In/Output: 9–15 VDC I.S./4–20 mA, 0.2–1 mA,
1–5 V, 5–15 Hz

Ex marking: IM1 Ex ia I Ma

MPU-09 or MPU-09/SBH

Differential pressure detector

Different signal outputs

Optional RS 485 Modbus RTU or CAN communication

Intrinsically safe device

Optional connection via cable gland

Equipped with local display

Easy operation and maintenance

Wide range of sensors

Corrosion resistant stainless steel housing

Detection: Differential pressure (Δp)

Sensor Technologies: piezoresistive sensor

Power In/Output: 9–15 VDC I.S./4–20 mA, 0.2–1 mA,
1–5 V, 5–15 Hz

Ex marking: IM1 Ex ia I Ma

MPU-10 or MPU-10/SBH MPU-11 or MPU-11/SBH

Temperature or Relative Humidity Detector

Different signal outputs

Optional RS 485 Modbus RTU or CAN communication

Intrinsically safe device

Optional connection via cable gland

Equipped with local display

Easy operation and maintenance

Corrosion resistant stainless steel housing

Detection:

10/ Temperature (T)

11/ Relative humidity (Rh)

Sensor Technologies: Temperature: band-gap sensor

Relative Humidity: capacitive sensor

Power In/Output: 9–15 VDC I.S./4–20 mA, 0.2–1 mA,

1–5 V, 5–15 Hz

Ex marking: I M1 Ex ia I Ma



MPU-10/SBH
MPU-11/SBH



MPU-12 or MPU-12/SBH

Air Velocity Detector

Different signal outputs

Optional RS 485 Modbus RTU or CAN communication

Intrinsically safe device

Optional connection via cable gland

Equipped with local display

Easy operation and maintenance

Corrosion resistant stainless steel housing

Detection: Air flow rate (v), m/s

Sensor Technologies: thermal conductivity

Power In/Output: 9–15 VDC I.S./4–20 mA, 0.2–1 mA,

1–5 V, 5–15 Hz

Ex marking: I M1 Ex ia I Ma



MPU-12/SBH



MPU-13 - iRTD

Temperature measurement

Interface iRTD is an extension unit for MPU-** device for connecting ATEX-certified RTD sensors to MPU-** device. Interface is dislocated unit (dislocated measuring head) with dedicated cable connector, which is connected to MPU_** device.

RTD sensor connection to iRTD-13/**.1 interface

The extension iRTD-13/**.1 interface allows connecting ATEX-certified 2-wire, 3-wire, and 4-wire RTD sensors to MPU_** device. Connect the RTD sensor according to the diagram and picture below. The DIP switch shall be also set correctly.

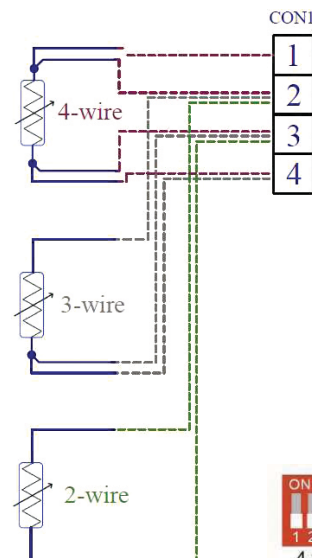
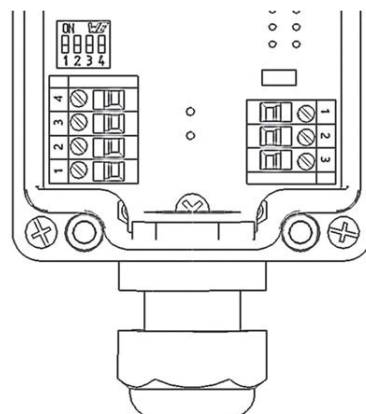
Possible connections:

- RTD (Resistance Temperature Detector) Pt100, Pt1000, PT xxxx
- Thermocouple connection

Possible applications:

- Measurements of temperature in coil layers
- Measurements of temperature in water
- Measurements of temperature on motors or water pumps

Ex marking: I M1 Ex ia I Ma



DIP switch settings



KLV-230-PE_x / RO-01

Control separation element

Line monitoring available

Status LED lights

Easy operation and maintenance

Reinforced polyester housing

Switching capacity: 2 relay outputs (max. 250 VAC/10A)

Power In:

- 24 VAC
- 42 VAC
- 115 VAC
- 230 VAC



PLV-230-PE_x / RO-01

Data separation element

Line monitoring available

Status LED lights

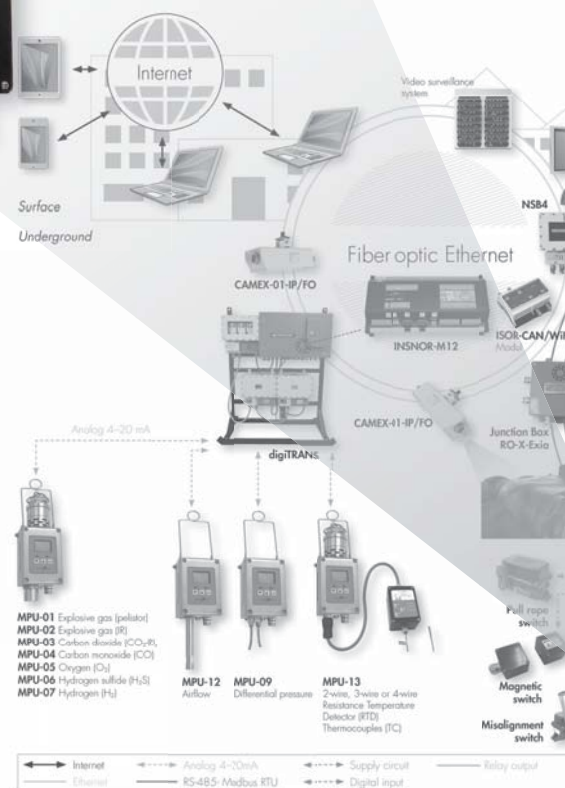
Easy operation and maintenance

Reinforced polyester housing

Intrinsically safe relay output

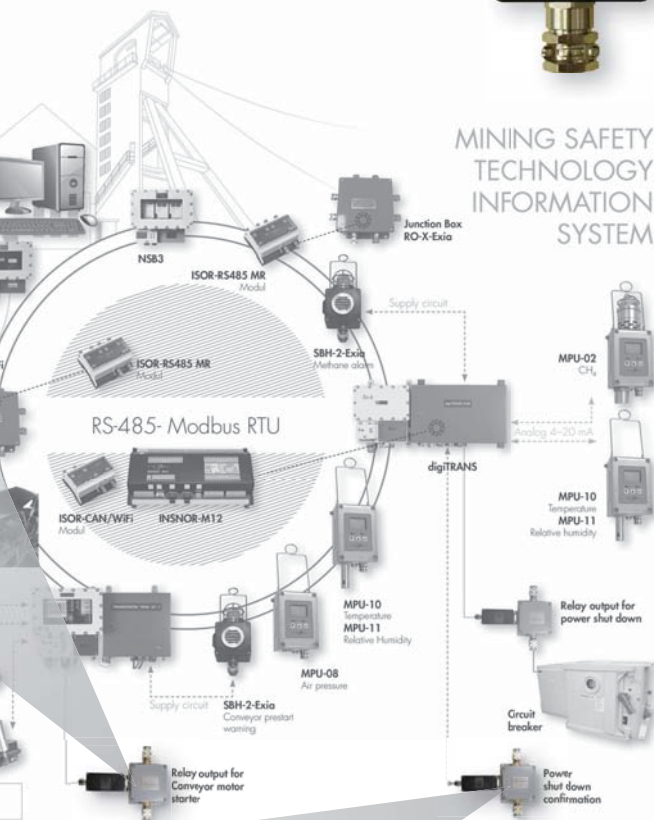
Power In:

- 24 VAC
- 42 VAC
- 115 VAC
- 230 VAC





MINING SAFETY
TECHNOLOGY
INFORMATION
SYSTEM



KLV-230

Control separation element

Direct connection to Ex d or Ex e housings

Line monitoring available

Status LED lights

Easy operation and maintenance

Reinforced polyester housing

Switching capacity: 2 relay outputs (max. 250 VAC/10A)

Power In:

- 24 VAC
- 42 VAC
- 115 VAC
- 230 VAC

Ex marking: I M2(M1) Ex mb [ia Ma] i Mb

PLV-230

Data separation element

Direct connection to Ex d or Ex e housings

Line monitoring available

Status LED lights

Easy operation and maintenance

Reinforced polyester housing

Intrinsically safe relay output

Power In:

- 24 VAC
- 42 VAC
- 115 VAC
- 230 VAC

Ex marking: I M2(M1) Ex mb [ia Ma] i Mb

SBH-2-Exia

Signal flash Light with Alarm Horn

Intrinsically safe device

Optional connection via connector

Optional test button

Easy operation and maintenance

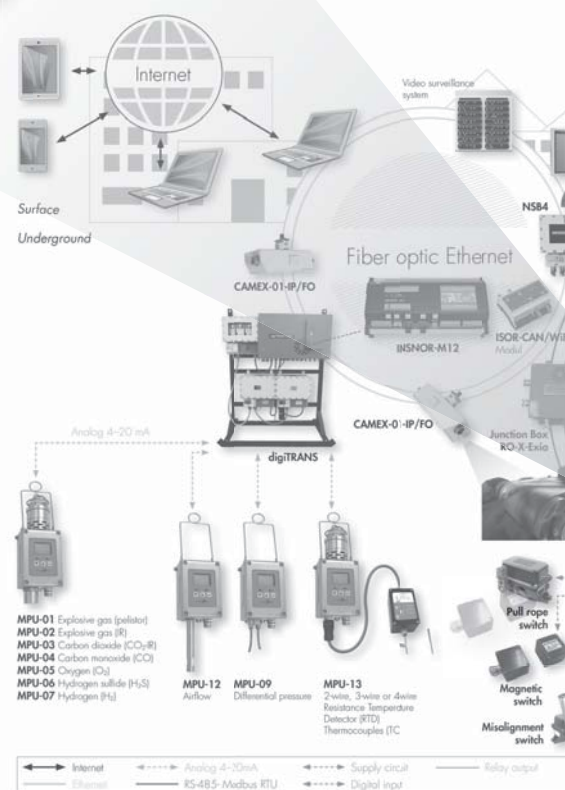
Reinforced polyester housing

Flash light: LED (red, green, white, blue, yellow)

Buzzer: Piezzo 105 dB

Power In: 9-16 VDC I.S.

Ex marking: I M1 Ex ia I Ma



SB-X-Exia

Signal LED flashing light

Intrinsic safe signal horn type SH-1- Exia is intended for acoustic signalization of different alarm states or any other especial events. It is designed for use in applications of underground mines (M1).

Features

- IP 66
- Selectable 4 different modes of operation
- 5 different signaling colors
- Power supply: 9-16 VDC (cat. ia)
- Power consumption: max. 60 mA

Ex marking: I M1 Ex ia I Ma





SH-1-Exia

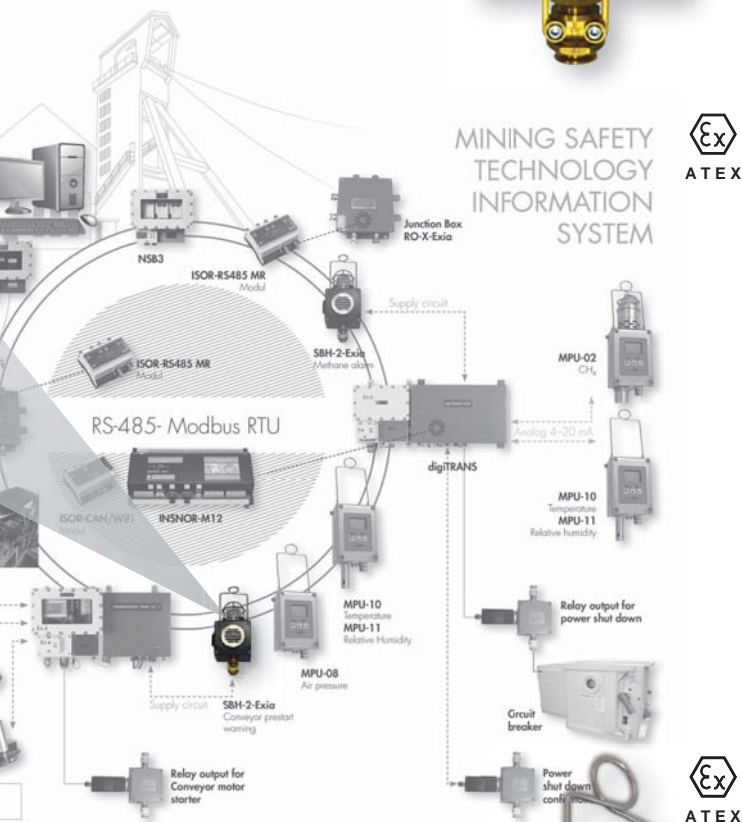
Signal horn

Intrinsic safe signal horn type SH-1-Exia is intended for acoustic signalization of different alarm states or any other especial events. It is designed for use in applications of underground mines (M1).

Features

- IP 66
- Selectable 4 different modes of operation
- TEST/MUTE key (Optional)
- Power supply: 9–16 VDC (cat. ia)
- Power consumption: 15–25 mA
- Acoustic signal: 92–100 dB

Ex marking: I M1 Ex ia I Ma



SBH-ia/PV

Signal flashing light with horn

Signal flash light with horn SBH-ia/PV is intended for use in mining applications. It is used as audio-visual warning device in case of danger. SBH-ia/PV is made of certificated intrinsically safe flashlight with horn SBH-ia/MPS, which is mounted in inox enclosure IP55.

Features

- IP55
- Supply Voltage: 12–16 VDC (I.S.)
- Current Consumption: 30 mA
- Control Current Consumption: 2–4 mA

Ex marking: I M1 Ex ia I Ma

Magnetic switch

Fixed Magnetic switch
Changeover output
Intrinsically safe device
Optional connection via connector

Easy operation and maintenance
Reinforced polyester housing

Detection: status of mechanical devices (air doors)
Sensor Technologies: reed relay
Switching capacity: intrinsically safe: max. 30 VDC/ 660 mA



CAMEX-01-IP/FO

IP camera
Fiber optic connection (single mode, E2000 connection)
Main housing Ex d, Connection chamber Ex e, Signal output Ex op is

Easy operation and maintenance
Remote managing
Robust housing

Picture transmission range > 1.5 km
Resolution: 2 MPixel
Supply voltage: 230 VAC, 50 Hz

Ex marking: I M2 Ex db eb [op is] IMb



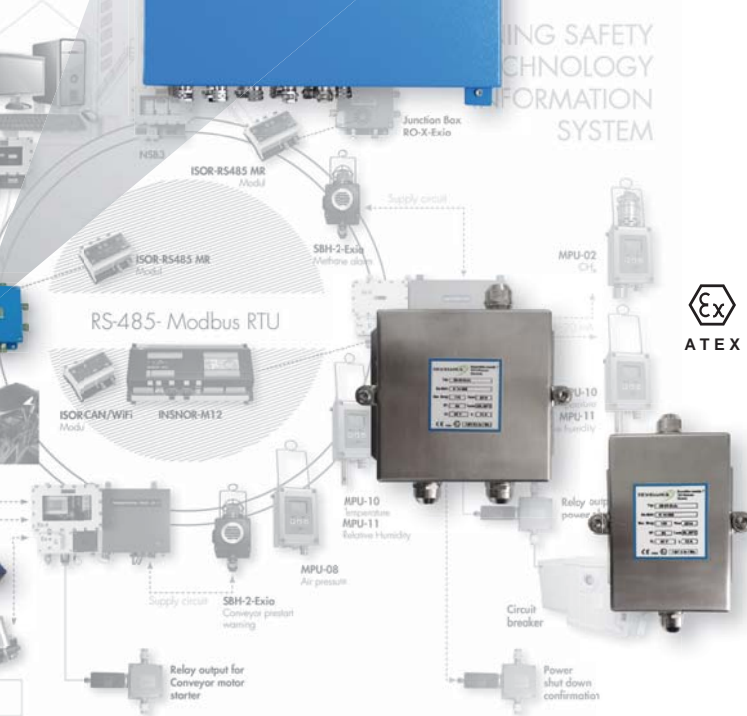
INSTALLATION COMPONENTS



Junction Box RO-x-Exia

Sheet steel enclosure
Ex ia certified
3 enclosure size options
Customizable configuration of terminals, cable entries
and cable gland types

Ex marking: I M1 Ex ia I Ma



Junction Box JB-0x-Exia

Stainless steel enclosure
Ex ia certified
2 enclosure size options
Customizable configuration of terminals, cable entries
and cable gland types

Ex marking: I M1 Ex ia I Ma



Junction Box RO-x-Exe

Sheet steel enclosure
Ex e certified
2 enclosure size options
Customizable configuration of terminals, cable
entries and cable gland types

Ex marking: I M2 Ex eb I Mb

LIGHTING

Explosion proof floodlight LUX-xx-L/x.x

Utilizes latest LED technology lamp type
High quality LED module
In excess of 50.000 hours LED life
Wide supply voltage range
Different colour temperatures available

Ex marking: I M2 Ex db eb I Mb



OUR QUALITY – YOUR SAFETY



A DEALER FOR THE EATON
FHF MINING EQUIPMENT

EATON
Powering Business Worldwide

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TEVEL d.o.o.
Borovniško naselje
7 SLO - 1412 Kisovec

Our Sign: FHF-BT-Ja Agent (Fakultativ) - extension: Jach -363 Date: 14.06.2023

Dealer Certificate

Dear Sir or Madam,

we hereby confirm that

FHF Bergbautechnik GmbH & Co. KG
Gewerkallee 15-19
45478 Mülheim an der Ruhr

authorizes

TEVEL d.o.o.
Borovniško naselje
7 SLO - 1412 Kisovec

to distribute our explosion proof – safe products for underground mines on the territory of Slovenia, Serbia, Croatia, Bosnia Herzegovina, Turkey, Bulgaria

Yours sincerely,

FHF Bergbautechnik GmbH & Co. KG

Graham Ashley
Sales Director EMEA Systems – JAC & MTL
Global Energy Infrastructure Solutions Eaton

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Paritätisch haftende Gesellschaften
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Registernummer: Osnabrück 1918 1501
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Simon James Mühlmann, Sven Thiele

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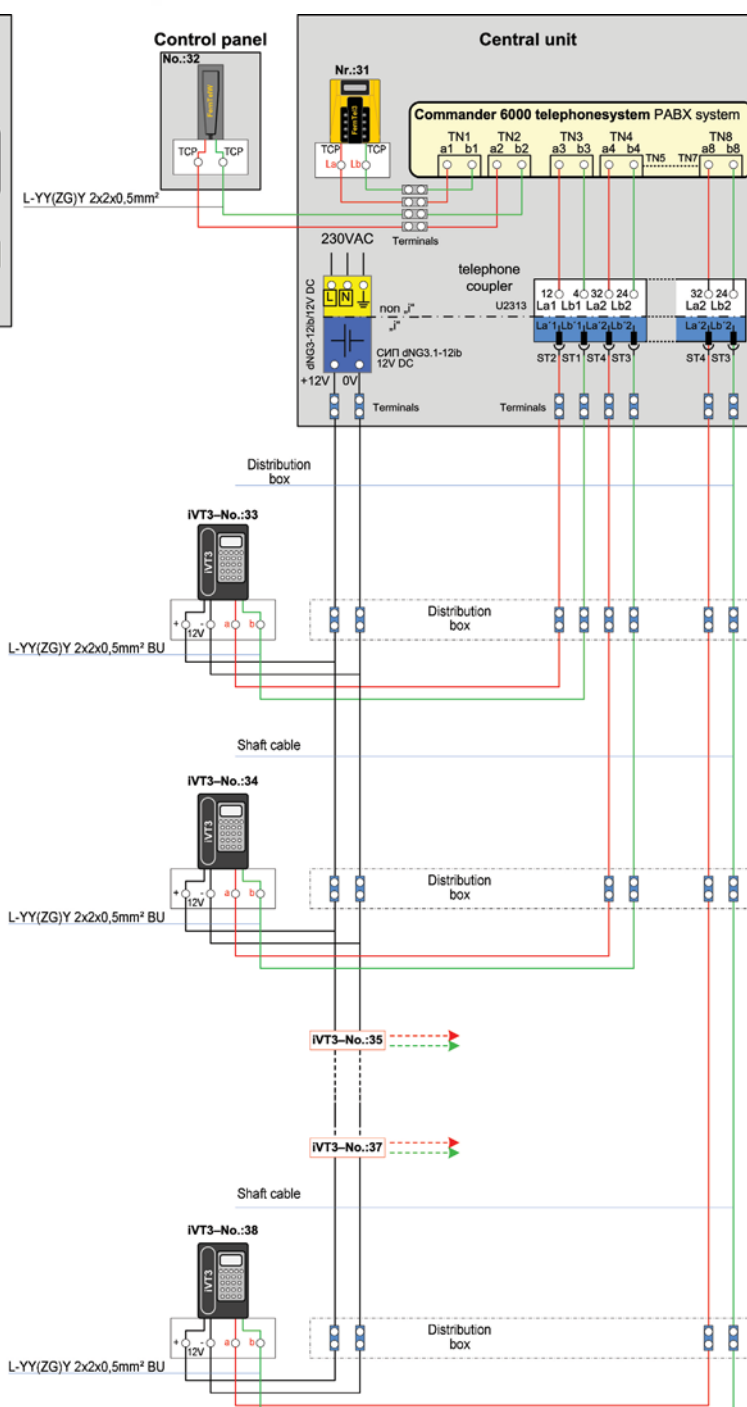
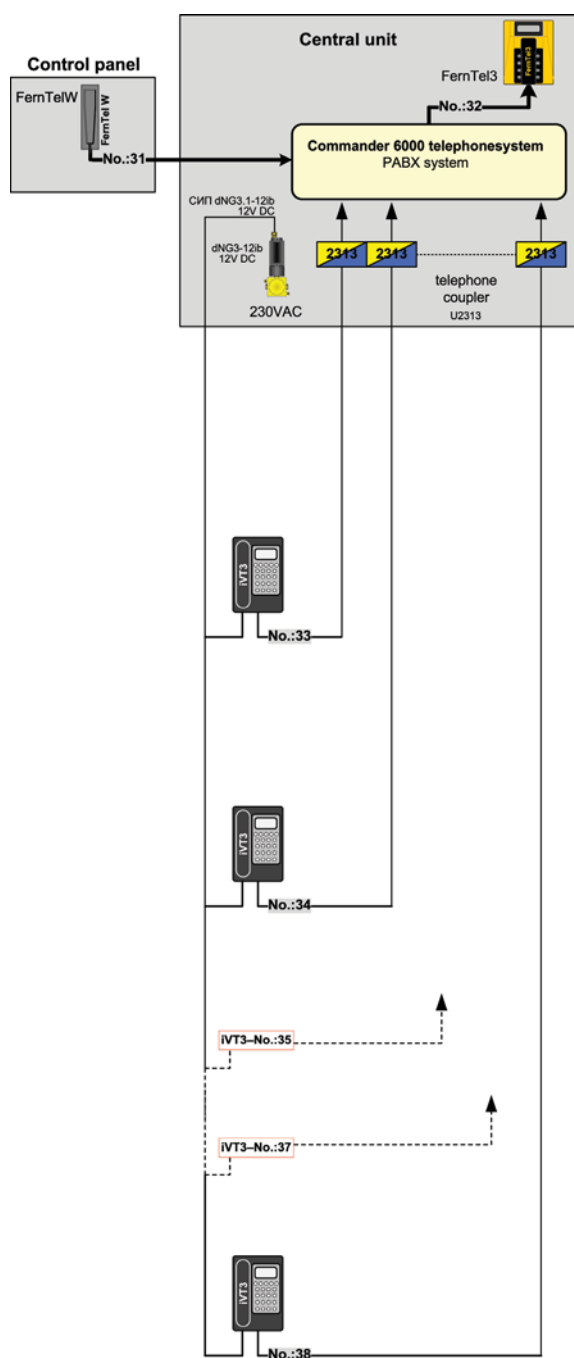


EATON

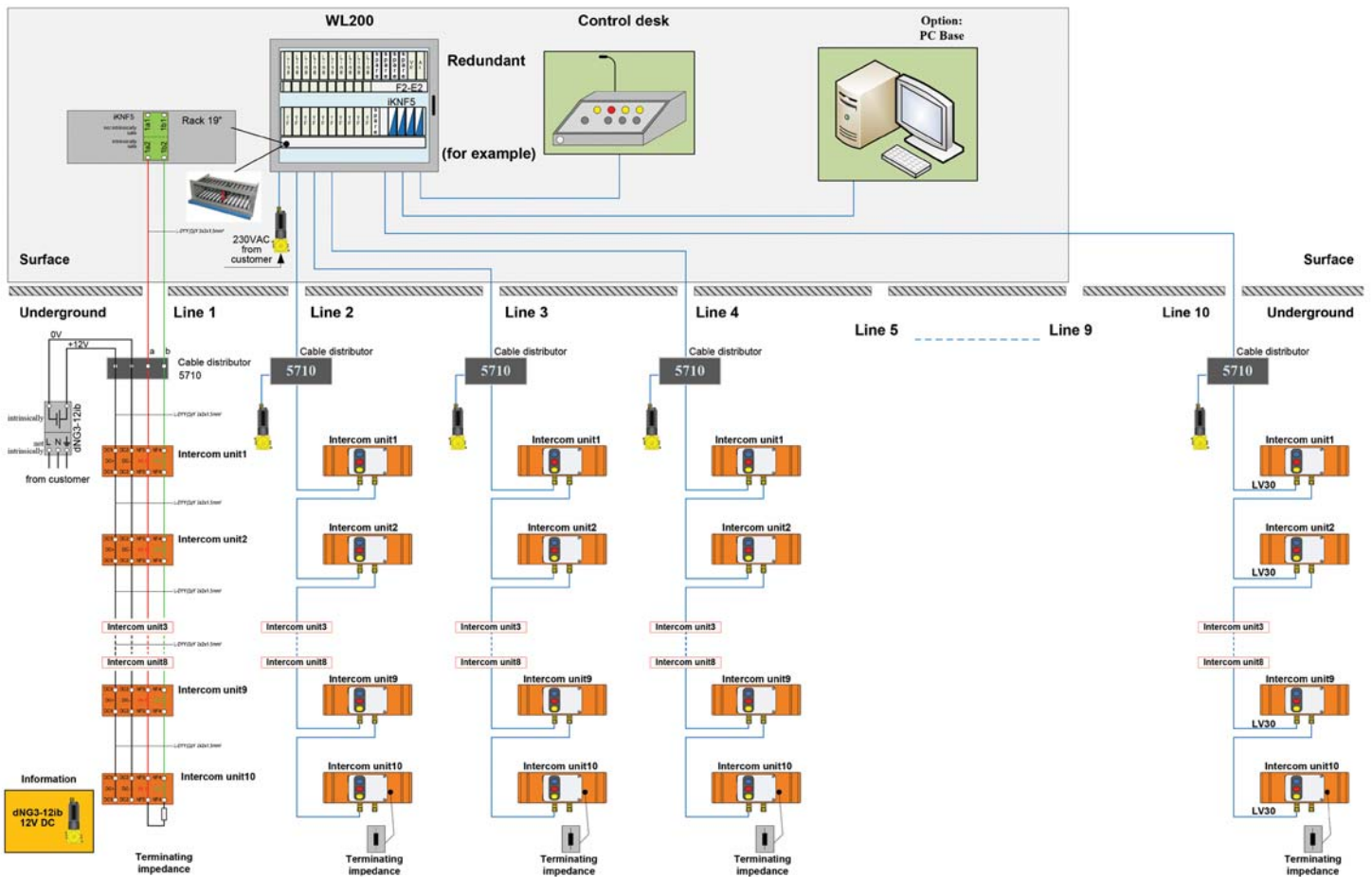
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FHF
FUNKE+HUSTER-FERNSIG

TELEPHONE SYSTEM



WL200 SYSTEM



Bulkhead light fitting 0403.24

Certificate:

FIDI 19 ATEX 0035X

EAC RU C-HR.HB07.B.00273/20

Apparatus category:

II 2GD I M2

Ex marking:

Ex db eb IIC T3-T2 Gb

Ex tb IIC T1 30° Db

Ex d e I Mb



Fluorescent light fitting PSF

Certificate:

FIDI 19 ATEX 0025, EAC RU C-HR.HB07.B.00276/20

FIDI 19 ATEX 0007X (type PSF 218)

Apparatus category:

II 2GD

I M2 (type PSF 218)

Ex marking:

Ex db eb mb IIC T4 Gb

Ex tb IIIA/IIIC T80°C Db

Ex db eb mb I Mb





Control units SKX 12 ... SKX 15

Certificate:

FIDI 19 ATEX 0051X

EAC RU C-HR.HB07.B.00269/20

Apparatus category:

II 2GD

I M2

Ex marking:

Ex db eb ia/ib mb IIC T6 Gb

Ex tb IIIC T80°C Db

Ex db eb ia/ib mb I Mb



Distribution cabinets R3002 ... R3006

Certificate:

FIDI 19 ATEX 0058X ,

RU C-HR.HB07.B.00272/20

Apparatus category:

II 2(1)GD

I M2 (M1)

Ex marking:

Ex db eb [ib] [ia Ga] ia/ib IIC T6 Gb

Ex tb IIIC T80°C Db

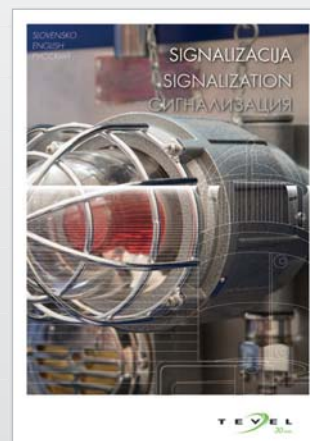
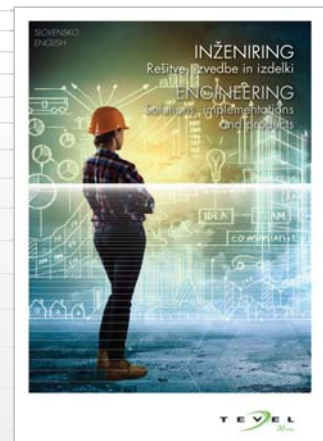
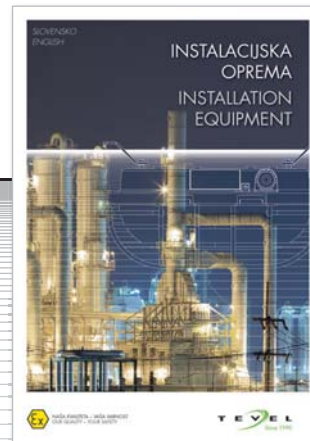
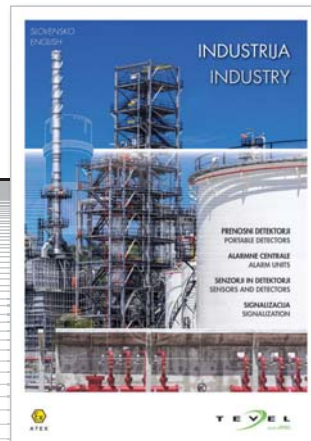
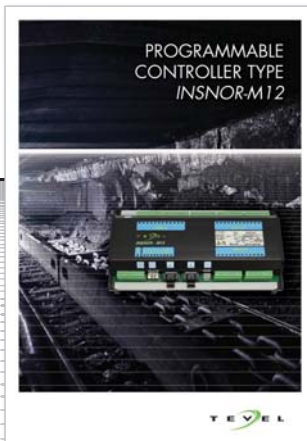
Ex db eb [ib] [ia Ma] ia/ib I Mb

PRODUCTION



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