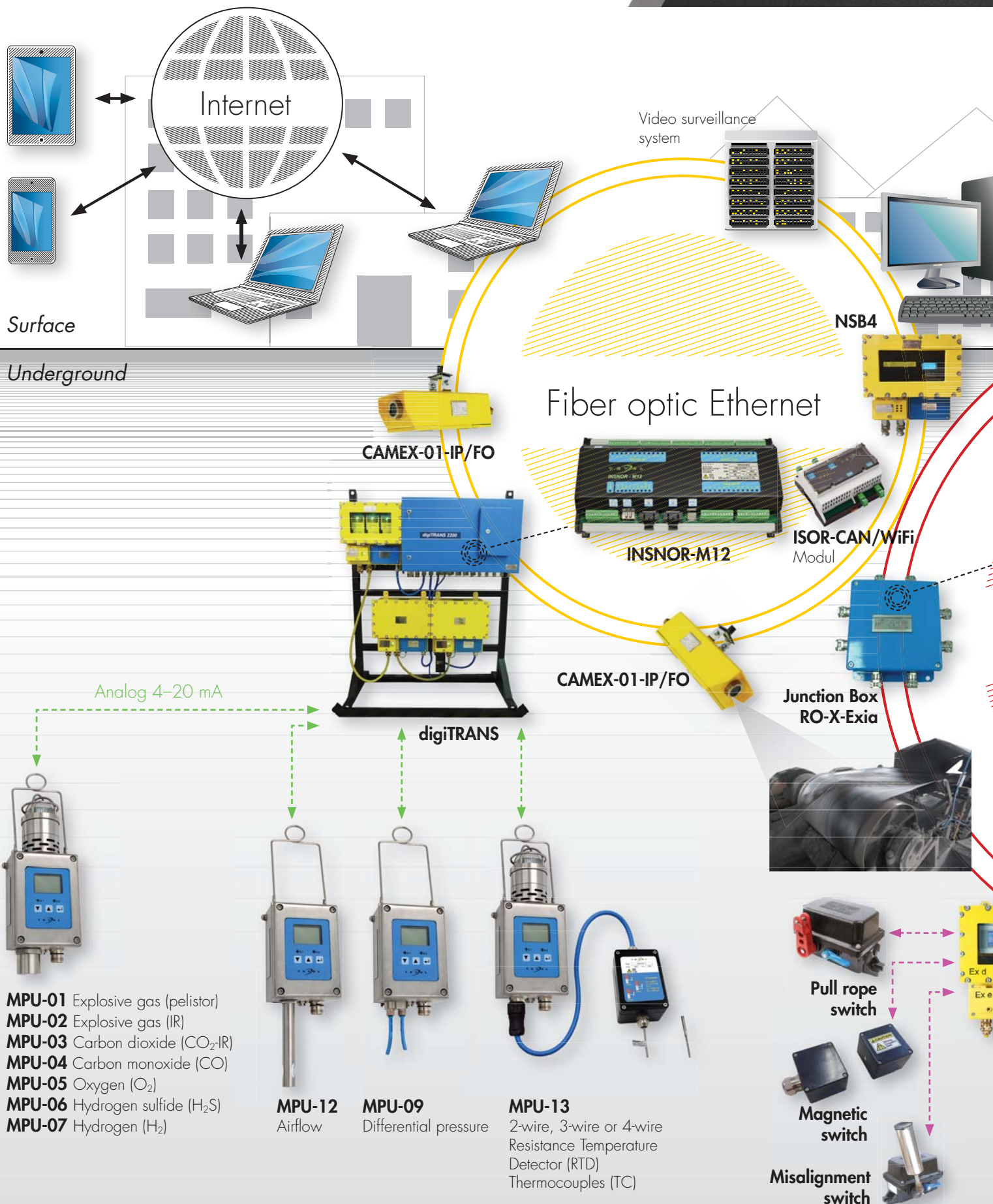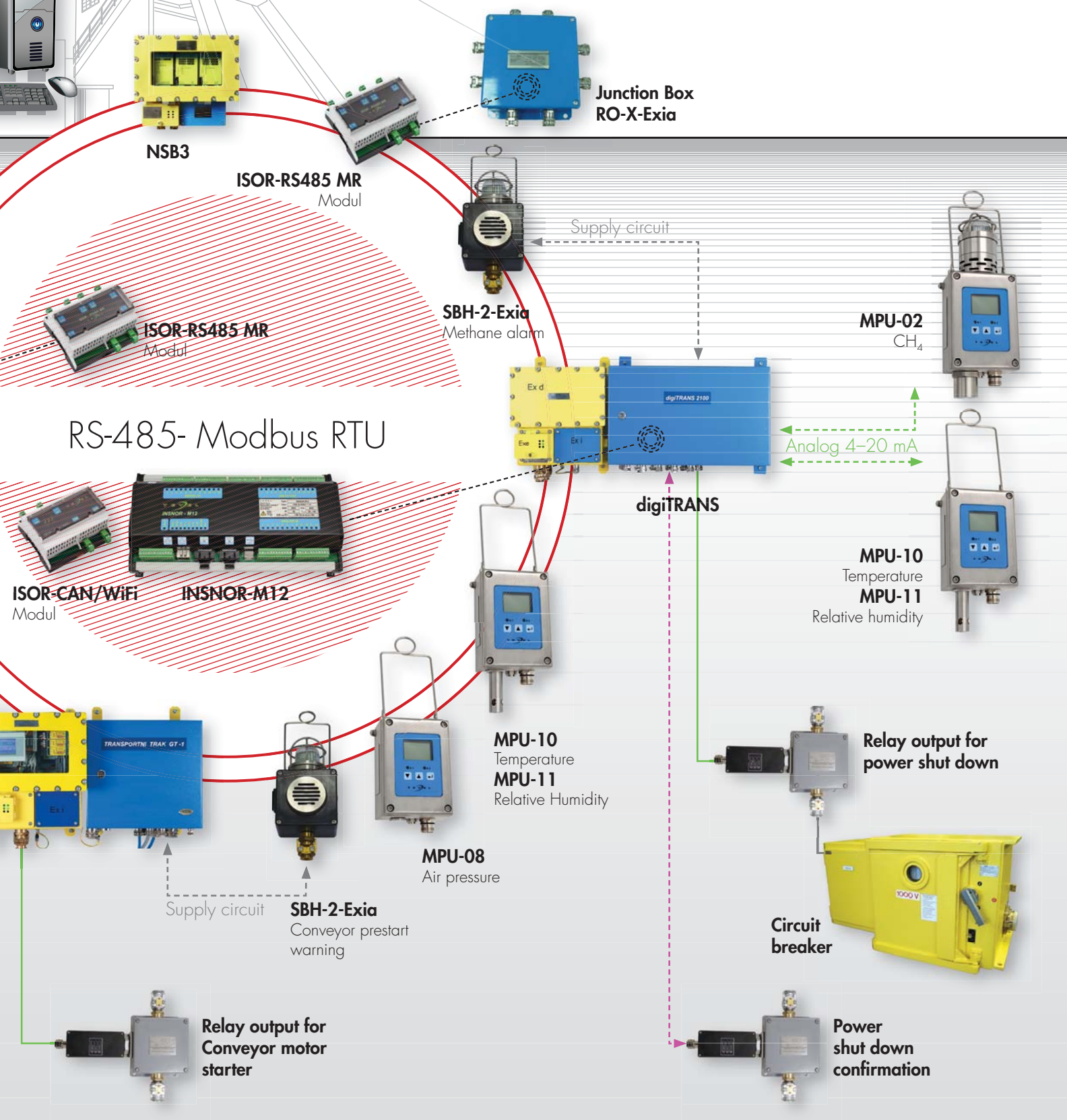# MINING SAFETY TECHNOLOGY INFORMATION SYSTEM

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

TEVEL

SINCE 1990

TEVEL
SINCE1990

Internet

Video surveillance system

Surface

NSB4

Underground

Fiber optic Ethernet

CAMEX-01-IP/FO

INSNOR-M12

ISOR-CAN/WiFi
Modul

digiTRANS 2200

Analog 4–20 mA

CAMEX-01-IP/FO

digiTRANS

**Junction Box
RO-X-Exia**

MPU-01 Explosive gas (pelistor)
MPU-02 Explosive gas (IR)
MPU-03 Carbon dioxide (CO_2-IR)
MPU-04 Carbon monoxide (CO)
MPU-05 Oxygen (O_2)
MPU-06 Hydrogen sulfide (H_2S)
MPU-07 Hydrogen (H_2)

MPU-12
Airflow

MPU-09
Differential pressure

MPU-13
2-wire, 3-wire or 4-wire
Resistance Temperature
Detector (RTD)
Thermocouples (TC)

**Pull rope
switch**

Ex d

Ex e

**Magnetic
switch**

**Misalignment
switch**

⟷ Internet	⇠- - -⇢ Analog 4–20mA	⇠- - -⇢ Supply circuit	—— Relay output
—— Ethernet	—— RS-485- Modbus RTU	⇠- - -⇢ Digital input	

ATEX

MINING SAFETY TECHNOLOGY INFORMATION SYSTEM

Junction Box
RO-X-Exia

NSB3

ISOR-RS485 MR
Modul

Supply circuit

MPU-02
CH$_4$

ISOR-RS485 MR
Modul

SBH-2-Exia
Methane alarm

Ex d

digiTRANS 2100

Ex e
Ex i

Analog 4–20 mA

RS-485- Modbus RTU

digiTRANS

MPU-10
Temperature
MPU-11
Relative humidity

ISOR-CAN/WiFi   INSNOR-M12
Modul

MPU-10
Temperature
MPU-11
Relative Humidity

Relay output for
power shut down

MPU-08
Air pressure

TRANSPORTNI TRAK GT-1

Circuit
breaker

1000 V

Supply circuit

SBH-2-Exia
Conveyor prestart
warning

Relay output for
Conveyor motor
starter

Power
shut down
confirmation

DigiTRANS Control Unit

DigiTRANS is an underground control and alarm system, microprocesor 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

ATEX

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

MINING SAFETY
TECHNOLOGY
INFORMATION
SYSTEM
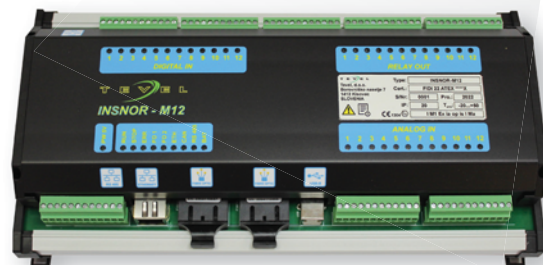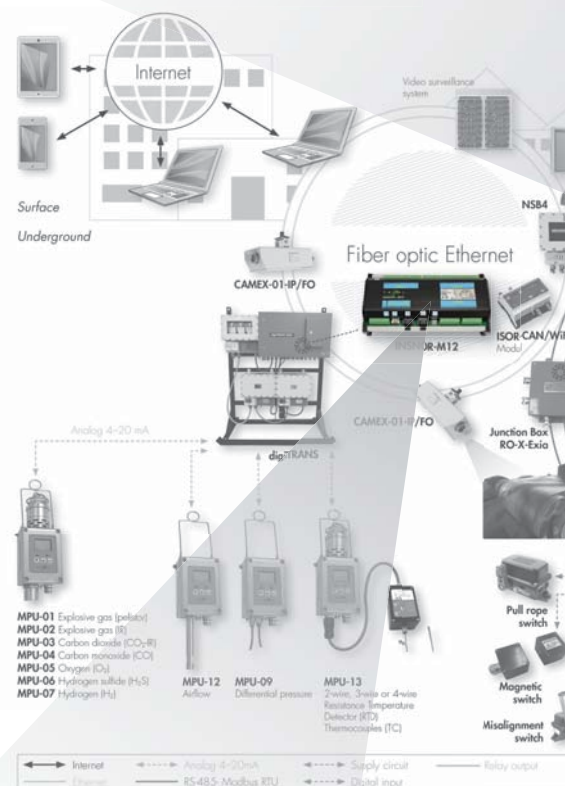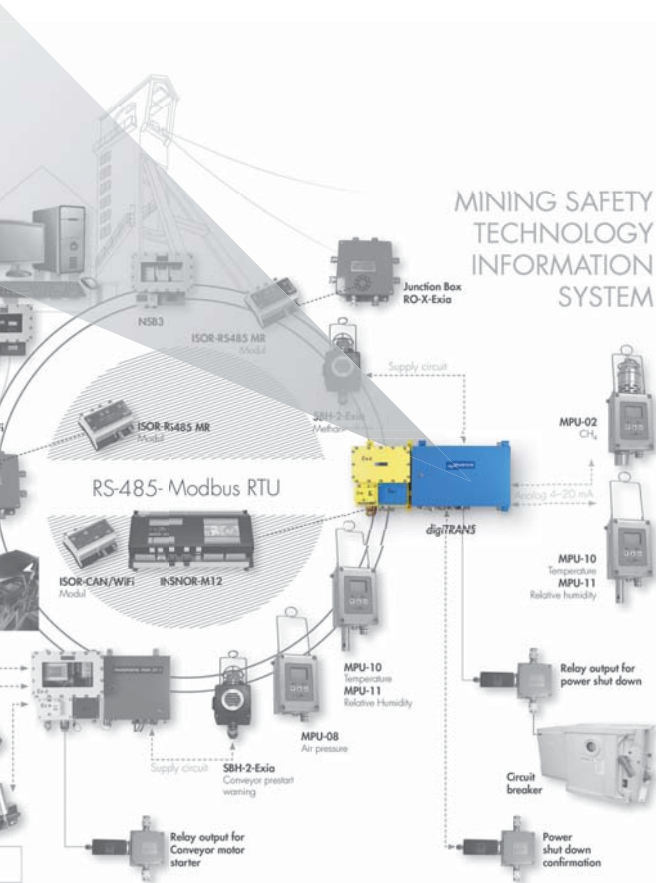
The compact programmable controller INSNOR-M12 connection types

- 12 Analog inputs (0.2–1mA or 4–20mA or 5–15Hz)
- 12 Digital inputs (U_{in}=0V→Low (0) ; U_{in}=3–15V→**High** (1) ; F_{max}=10kHz)
- 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: 0.2–1mA (R_{in}=2kΩ)
- Current input: 4–20mA : (R_{in}= 180Ω)
- Frequency input: 5–15Hz: 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°C to +50°C
Relative humidity: 15–90% Rh (without condensation)
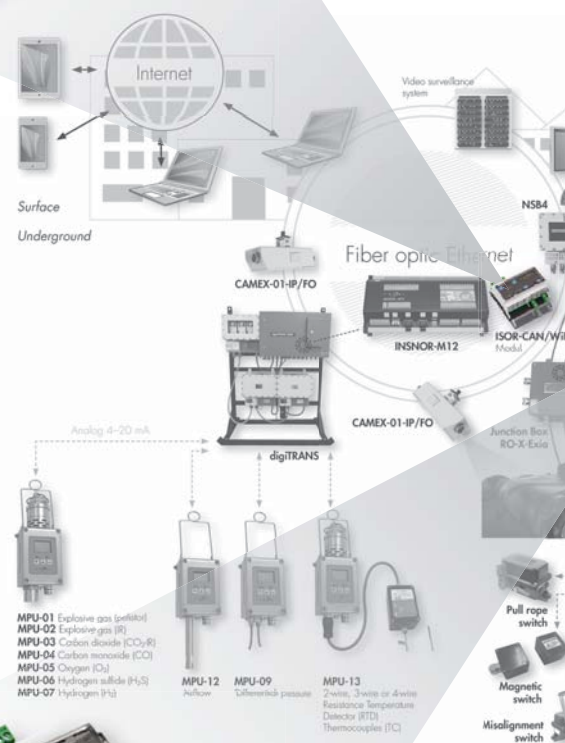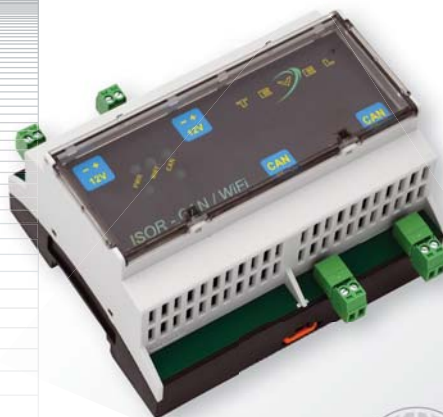Dimension: 275 x 143 x 71 (L x H x W in mm)
Weight: < 1kg

Modul ISOR-CAN/WiFi
ISOR-CAN/WiFi (interface)

The module serves for wireless (WiFi) communication between (master) INSNOR-M12 and a smart WiFi device such as: PC, tablet or smartphone.
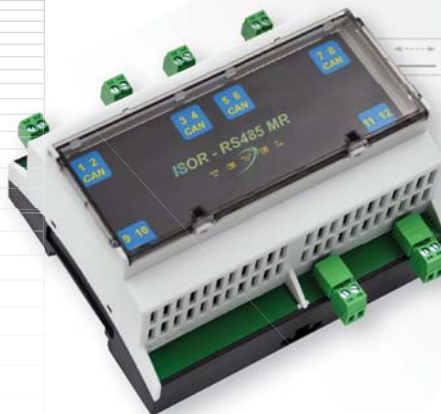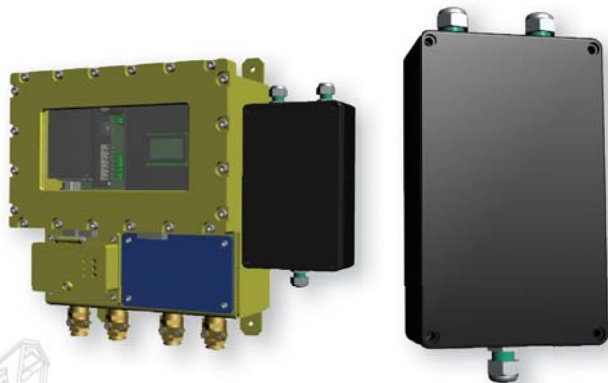
Ex marking: I M1 Ex ia I Ma

Multichannel Repeater RS485 type ISOR-RS485 MR

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

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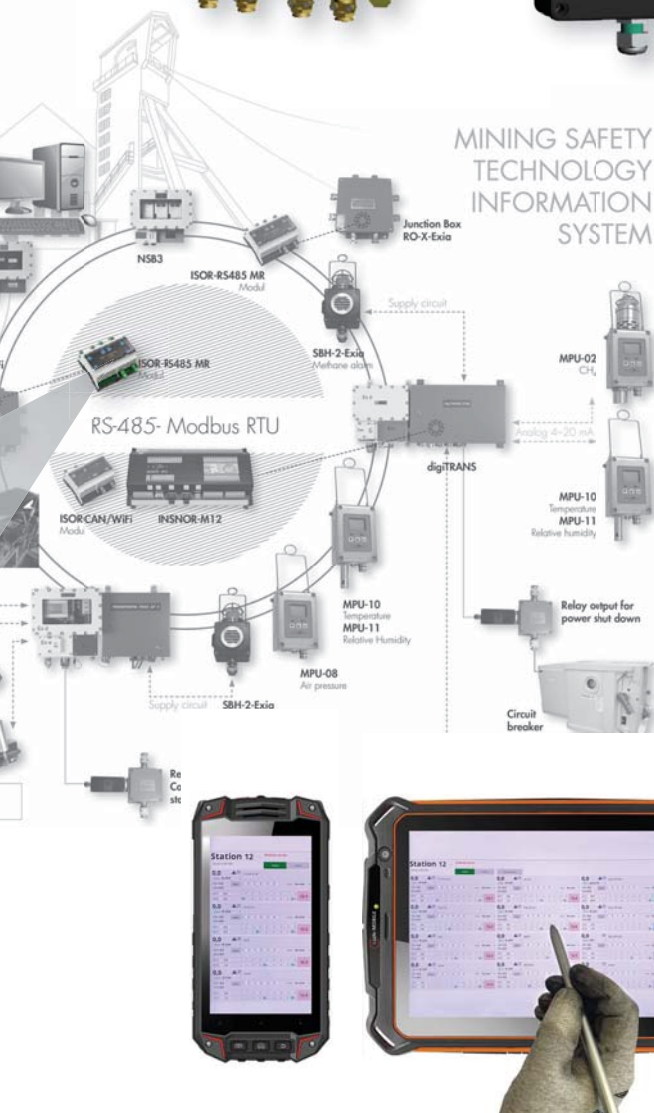- Extend the distance of one single RS485 communications line

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)

MINING SAFETY
TECHNOLOGY
INFORMATION
SYSTEM

## 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.

![TEVEL since 1990]

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
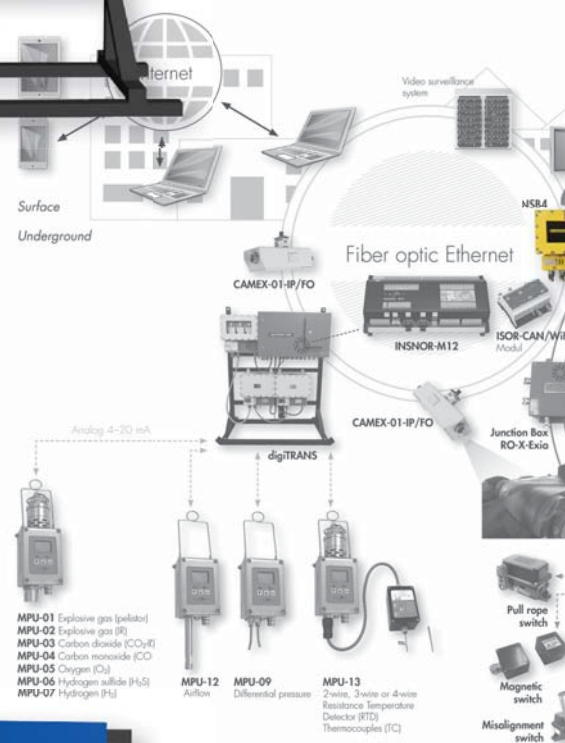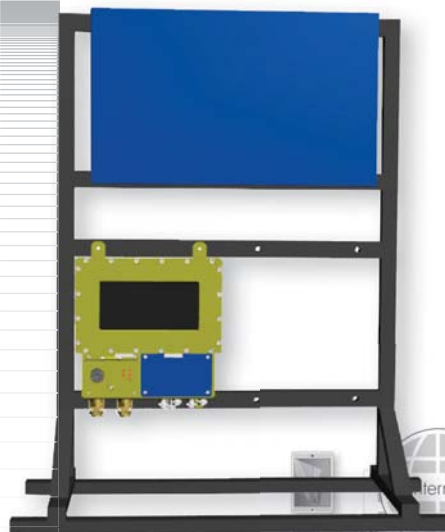
Substation DigiTrans 2400/2

- 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

MINING SAFETY
TECHNOLOGY
INFORMATION
SYSTEM
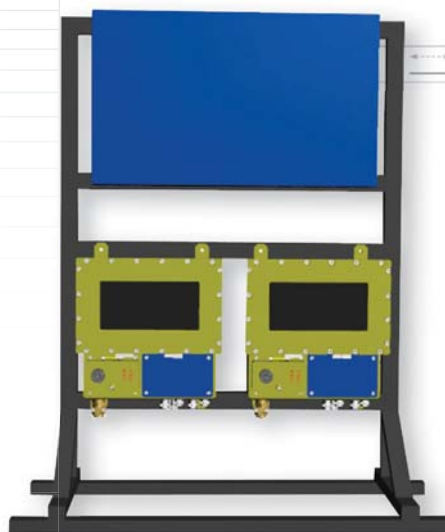
NSB3-xxx/5Via

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 stabilazed 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 0,2–1mA 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

TEVEL
SINCE 1990

MPU-01 or MPU-01/SBH
MPU-02 or MPU-02/SBH
MPU-03 or MPU-03/SBH
MPU-04 or MPU-04/SBH
MPU-05 or MPU-05/SBH
MPU-06 or MPU-06/SBH
MPU-07 or MPU-07/SBH

Gas Detectors

Different signal outputs

Optional RS 485 Modbus RTU or CAN communication

Intrisically safe device

Optional connection via cable gland

Equipped with local display

Easy operation and maintenance

Wide range of sensors

Corrosion resistant stainless steel housing

Gases Detected:

01/ Methane (CH_4-PEL)

02/ Methane (CH_4-IR)

03/ Carbon dioxide (CO_2-IR)

04/ Carbon monoxide (CO)

05/ Oxygen (O_2)

06/ Hydrogen sulfide (H_2S)

07/ Hydrogen (H_2)

Sensor Technologies: infrared (IR), catalytic, electrochemical

Power In/Output: 9–15 VDC I.S./4–20 mA, 0.2–1mA, 1–5 V, 5–15 Hz
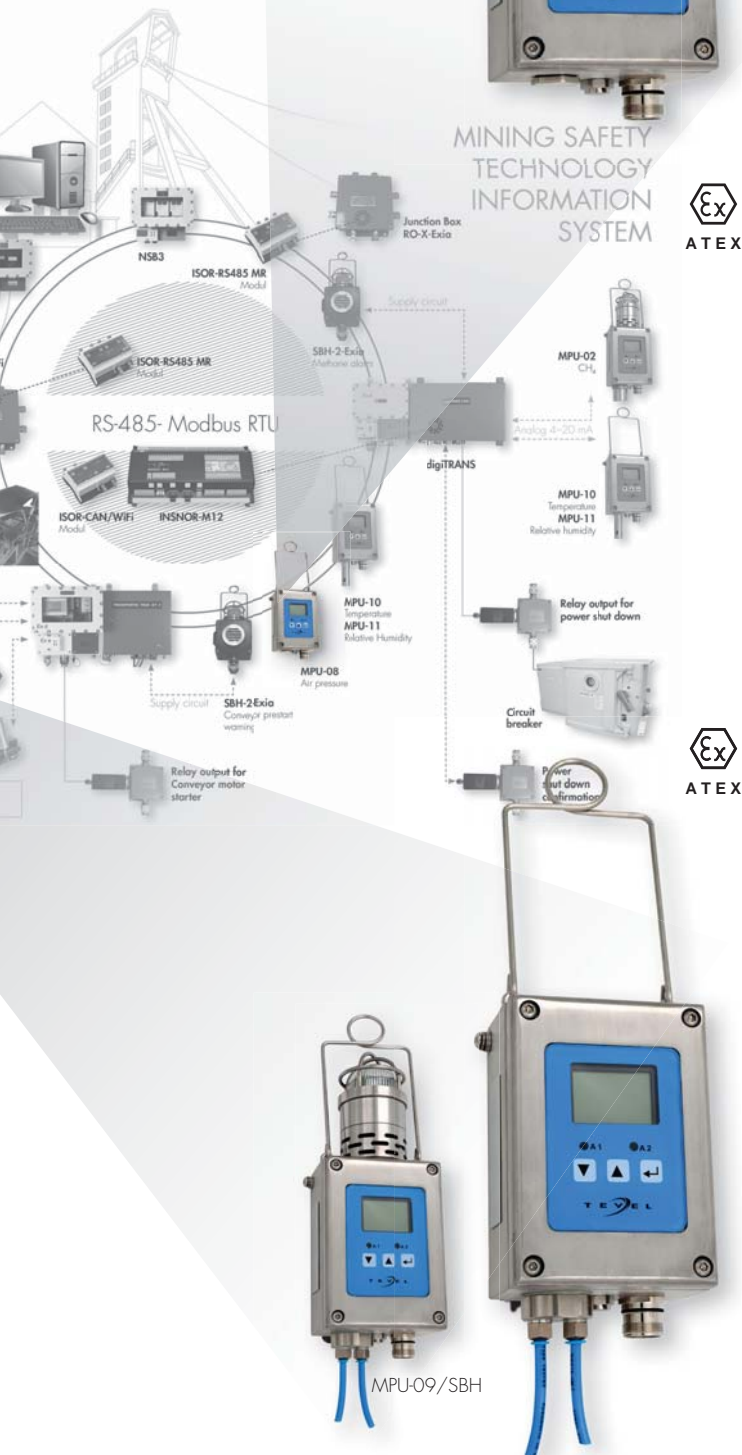
Ex marking: I M1 Ex ia I Ma

ATEX

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
Intrisically 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, 0.2–1mA, 1–5 V, 5–15 Hz

Ex marking: I M1 Ex ia I Ma

MPU-09 or MPU-09/SBH

Differential pressure detector
Different signal outputs
Optional RS 485 Modbus RTU or CAN communication
Intrisically safe device
Optional connection via cable gland

Equipped with local display
Easy operation and maintenance
Wide range of sensors
Corrosion resistant stainless steel housing

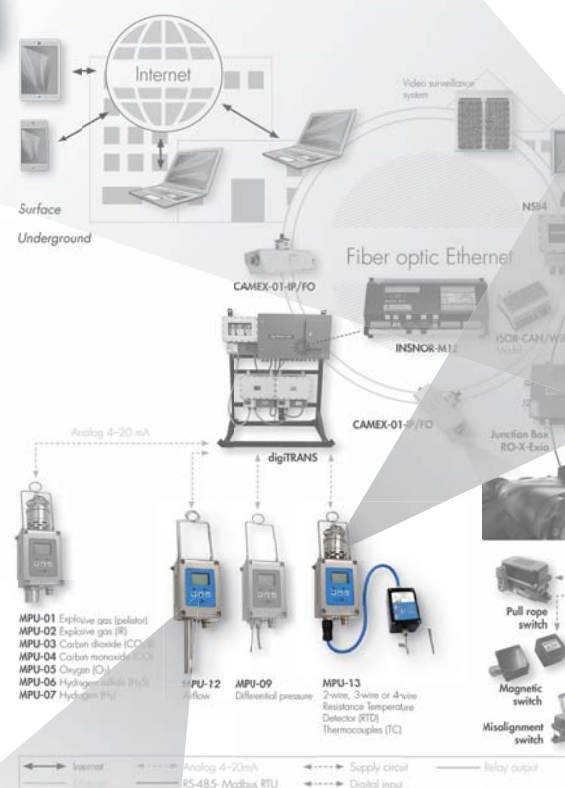**Detection:** Differential pressure (Δp)
Sensor Technologies: piezoresistive sensor
Power In/Output: 9–15 VDC I.S./4–20 mA, 0.2–1mA, 1–5 V, 5–15 Hz

Ex marking: I M1 Ex ia I Ma

MPU-09/SBH

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
Intrisically safe device
Optional connection via cable gland

MPU-10/SBH
MPU-11/SBH

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, 0.2–1mA,
1–5 V, 5–15 Hz

Ex marking: I M1 Ex ia I Ma

ATEX

MPU-12 or MPU-12/SBH

Air Velocity Detector
Different signal outputs
Optional RS 485 Modbus RTU or CAN communication
Intrisically 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, 0.2–1mA,
1–5 V, 5–15 Hz

MPU-12/SBH

Ex marking: I M1 Ex ia I Ma

ATEX

MPU-13 - iRTD

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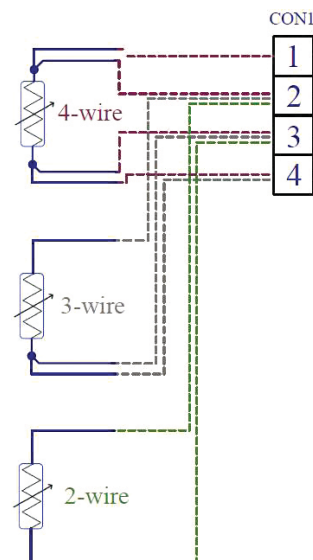
RTD sensor connection to iRTD-13/**.1 interface

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.

Ex marking: I M1 Ex ia I Ma
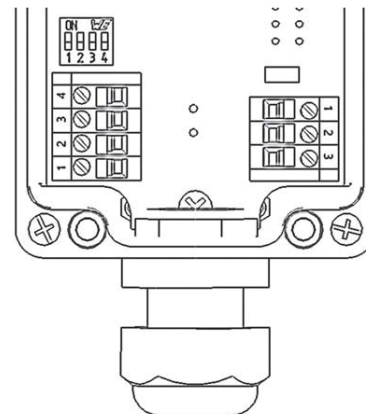
DIP switch settings

4-wire   3-wire   2-wire

CON1

KLV-230-PEx / RO-01
Control separation element
Line monitoring avalible

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

ATEX

PLV-230-PEx / RO-01
Data separation element
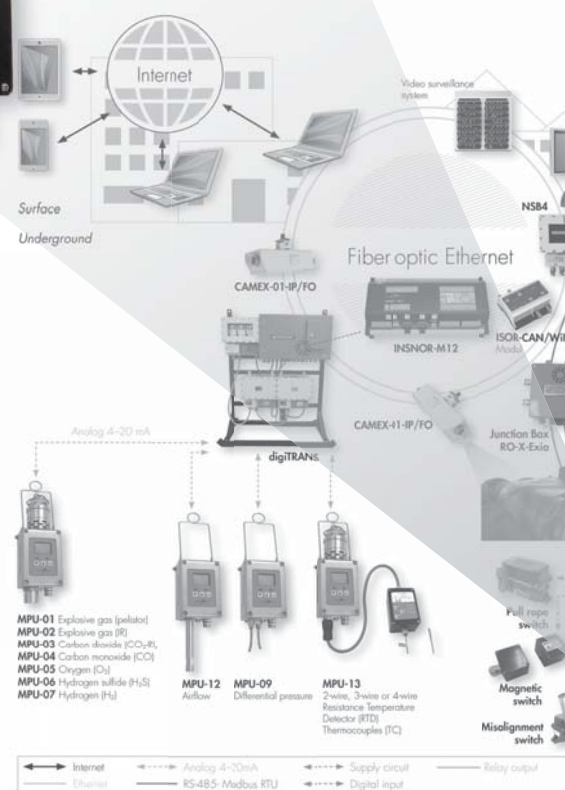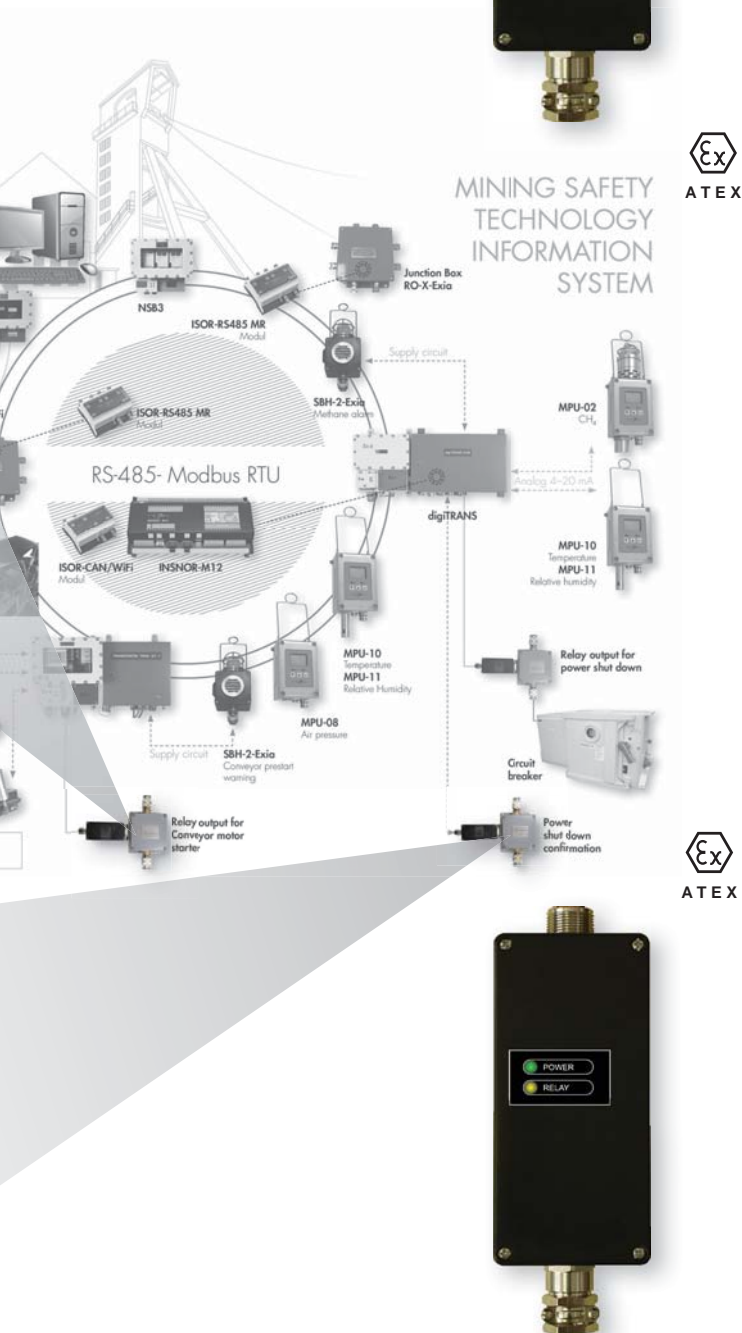Line monitoring avalible

Status LED lights
Easy operation and maintenance
Reinforced polyester housing

Intrisically safe relay output

Power In:
- 24 VAC
- 42 VAC
- 115 VAC
- 230 VAC

ATEX

MINING SAFETY
TECHNOLOGY
INFORMATION
SYSTEM

KLV-230

Control separation element
Direct connection to Ex d or Ex e housings
Line monitoring avalible

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 avalible

Status LED lights
Easy operation and maintenance
Reinforced polyester housing

Intrisically 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
Intrisically safe device
Optional connection via connector
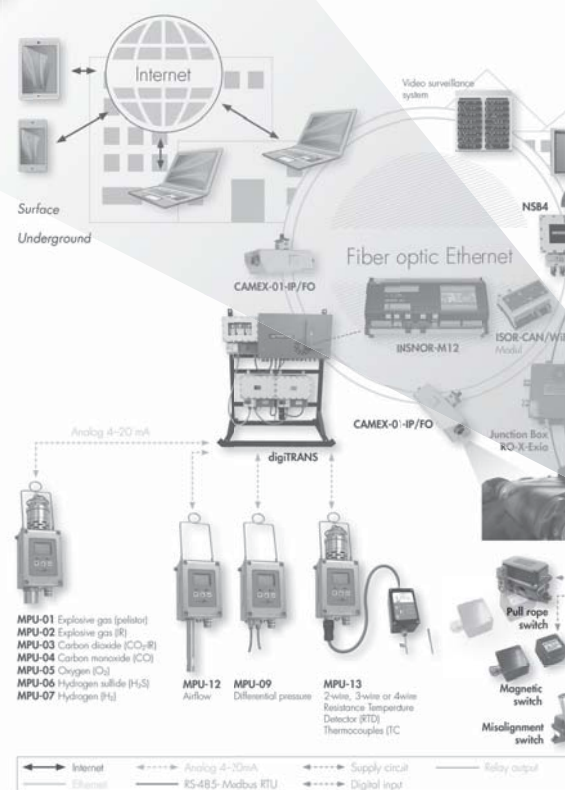Optional test button

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

MINING SAFETY
TECHNOLOGY
INFORMATION
SYSTEM

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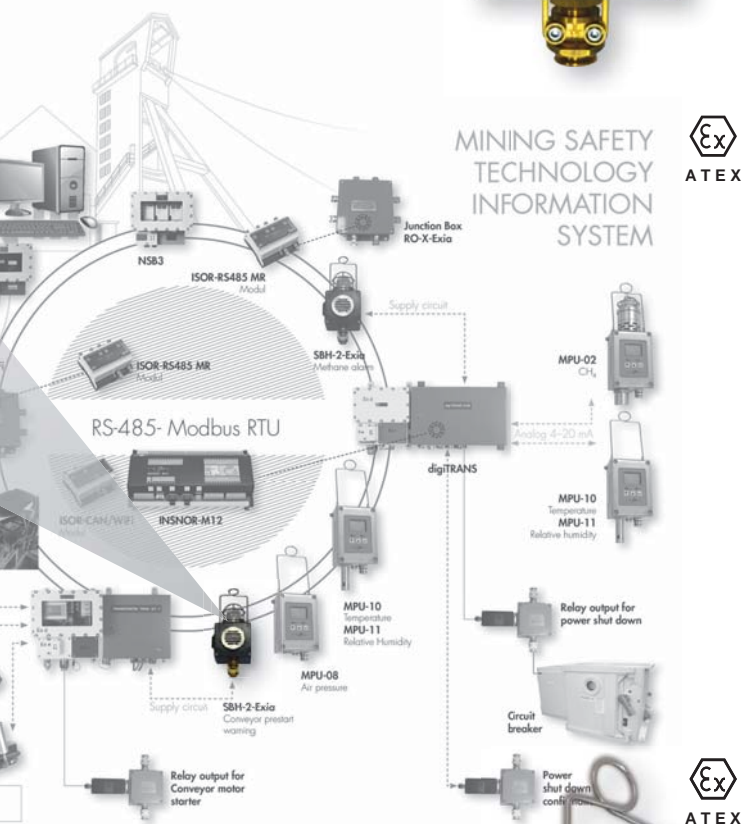
Features
- IP 66
- Selectable 4 different modes of operation
- TEST/MUTE key (Optional)
- Power supply: 9–16 VDC (cat. ia)
- Power consumption: 15–25 mA
- Acoustic signal: 92–100 dB

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

![TEVEL since1990]

Magnetic switch

Fixed Magnetic switch
Changeover output
Intrisically 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:** intrisically safe: max. 30 VDC/ 660 mA

CE

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 transmittion range > 15 km
Resolution: 2 MPixel
Supply voltage: 230 VAC, 50 Hz

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

Ex
ATEX
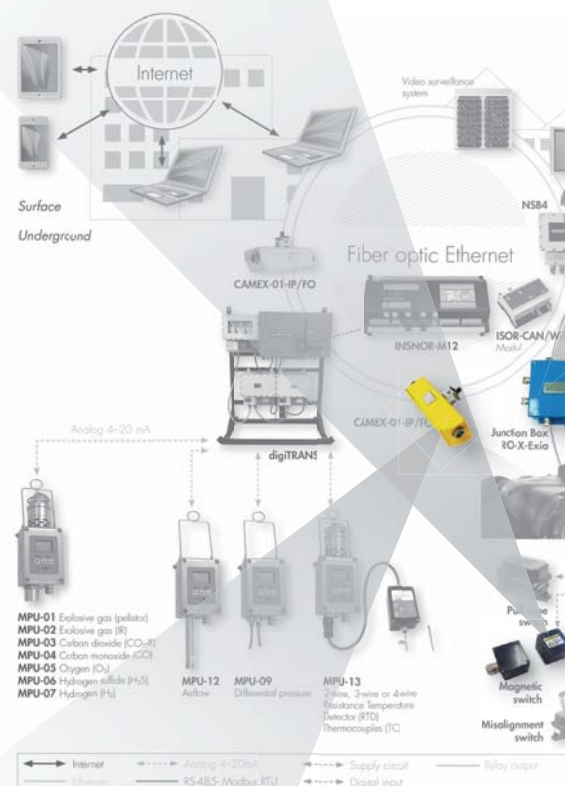
INSTALLATION COMPONENTS

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
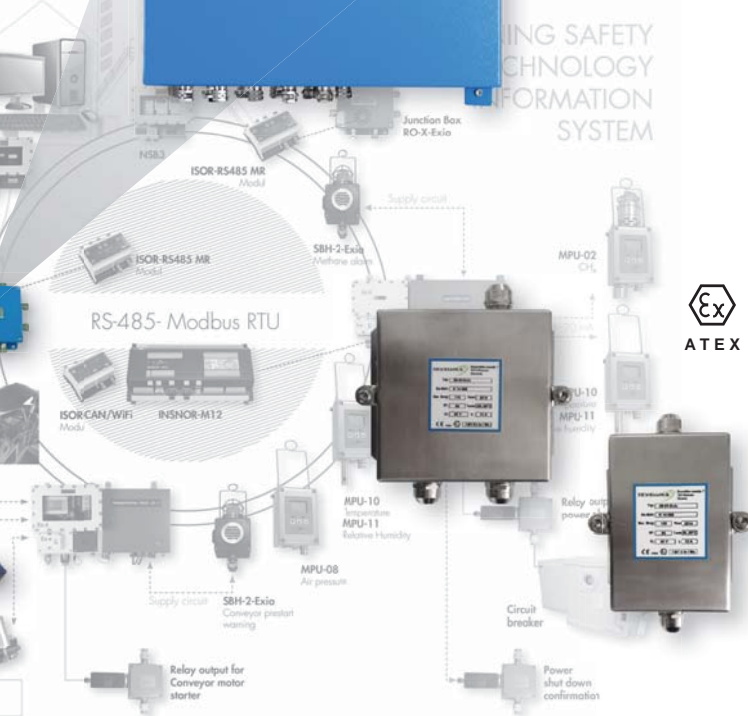
Junction Box JB-0x-Exia

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

ATEX

A DEALER FOR THE EATON FHF MINING EQUIPMENT
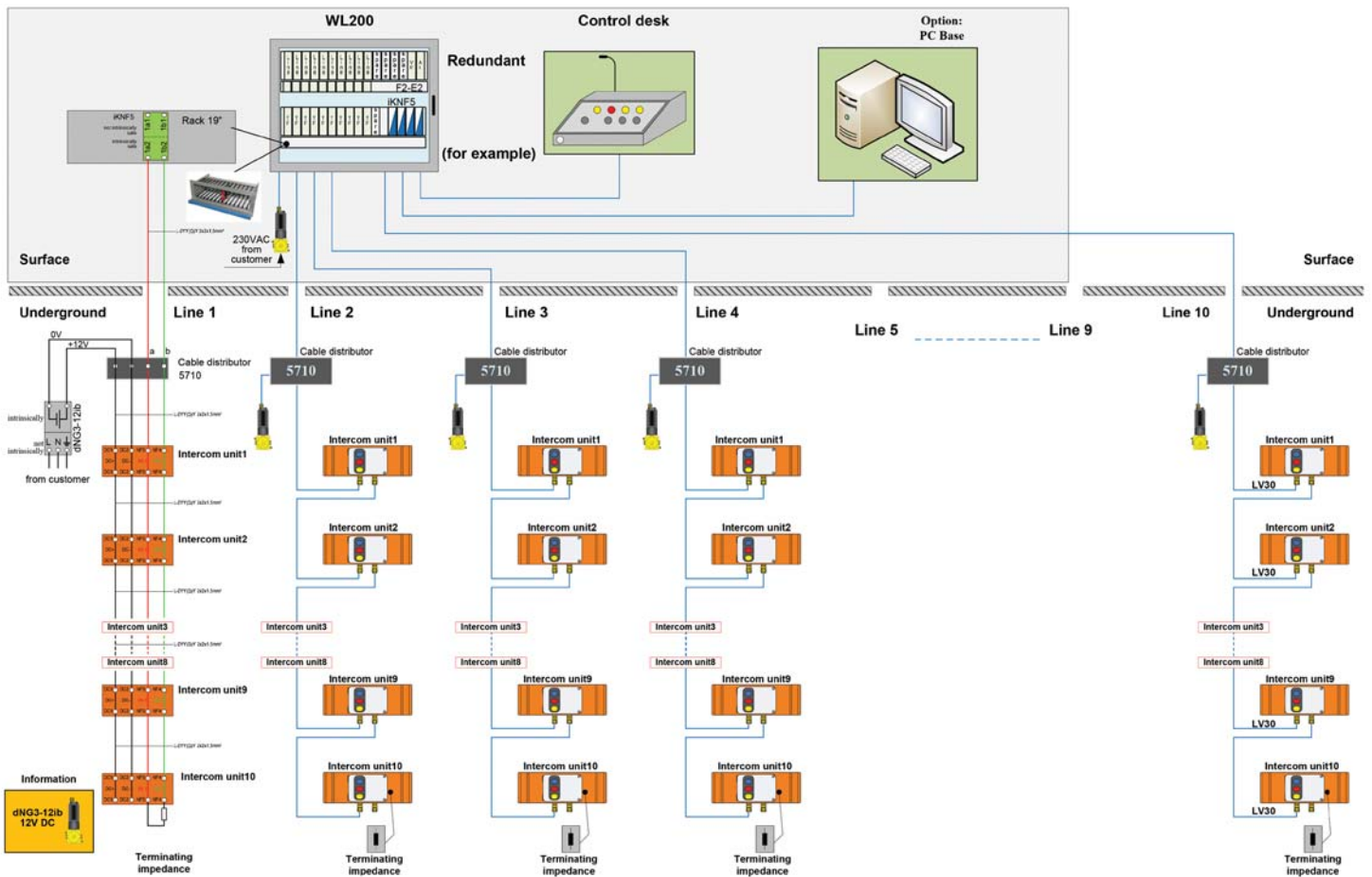
TELEPHONE SYSTEM

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 IIIC T130° 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
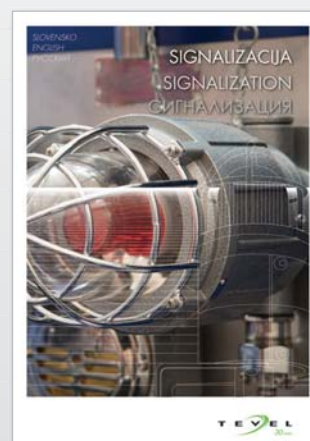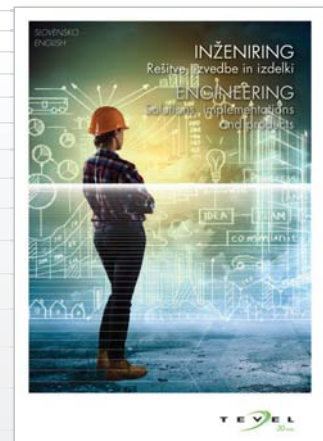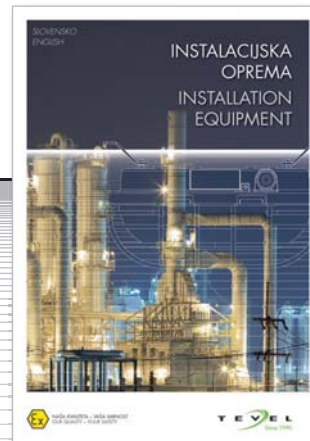Ex tb IIIC T80°C Db
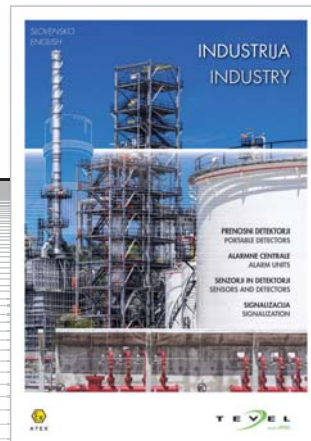Ex db eb [ib] [ia Ma] ia/ib I Mb

PRODUCTION

MINING

DOMESTIC
AND
COMMERCIAL
GAS
DETECTION

INDUSTRY

ATEX

FOLLOW US ON

www.tevel.si

PROGRAMMABLE
CONTROLLER TYPE
INSNOR-M12

INDUSTRIJA
INDUSTRY

PRENOSNI DETEKTORJI
PORTABLE DETECTORS

ALARMNE CENTRALE
ALARM UNITS

SENZORJI IN DETEKTORJI
SENSORS AND DETECTORS

SIGNALIZACIJA
SIGNALIZATION

INSTALACIJSKA
OPREMA
INSTALLATION
EQUIPMENT

PERSONAL TRACKING
SYSTEM
СИСТЕМА
ПОЗИЦИОНИРОВАНИЯ

MINING SAFETY
TECHNOLOGY
INFORMATION SYSTEM

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

OSEBNA VARNOSTNA
OPREMA
PERSONAL SAFETY
EQUIPMENT

INŽENIRING
Rešitve, izvedbe in izdelki
ENGINEERING
Solutions, implementations
and products

MX GALAXY Q-AIR
Inovativen sistem spremljanja
kakovosti notranjega in
zunanjega zraka

GAS DETECTION IN
TECHNOLOGICAL
PROCESSES
OF BREWERIES

SIGNALIZACIJA
SIGNALIZATION
СИГНАЛИЗАЦИЯ

GALAXY
CONTROL SYSTEMS

GAS DETECTION &
TECHNOLOGICAL PRODUCTS

CONTROL UNITS
FIXED GAS DETECTORS
MEASUREMENTS DEVICES
AUDIO/VISUAL DEVICES
WIRELESS TECHNOLOGY
SYSTEMS &
CUSTOM SOLUTIONS

TEVEL

SINCE 1990

TEVEL, d. o. o.
Borovniško naselje 7, 1412 Kisovec
Slovenia – Europe

Phone +386 3 5672050
Email   info@tevel.si
www.tevel.si

OUR QUALITY – YOUR SAFETY