Isolating repeater IRU–420

- **Universal intrinsically safe isolating repeater of current signals 0/4 ÷ 20 mA with option voltage output 0 ÷ 10 V**
- **For supply sensors with output 0/4 ÷ 20 mA in explosive area**
- **Galvanic separation input and output signals**
- **Option bidirectional transmission of communication signal HART®**
- **Installation on DIN rail 35 mm**
- **Variants for 24 V DC or 230 V AC**

Isolating repeaters IRU-420 are designed for supply intrinsically safe level meters in explosive areas and for conversion of input signal 0/4 ÷ 20 mA to output signal. Galvanic separation of current signal from explosive area to non-explosive area. Housing of units are made by polycarbonate and ready for mounting on DIN rail 35 mm. Is manufactured in variants for 24 V DC or 230 V AC.

Range of application

II (1)G [Ex ia Ga] IIB/IIC - can be used in an non-exlosive area or in a solid enclosure "d". Their external intrinsically safe circuits with a intrinsic safety of ia can be used in dangerous areas zone 0, zone 1, zone 2 in the sense of EN 60079-10-1 (explosive gas atmospheres).

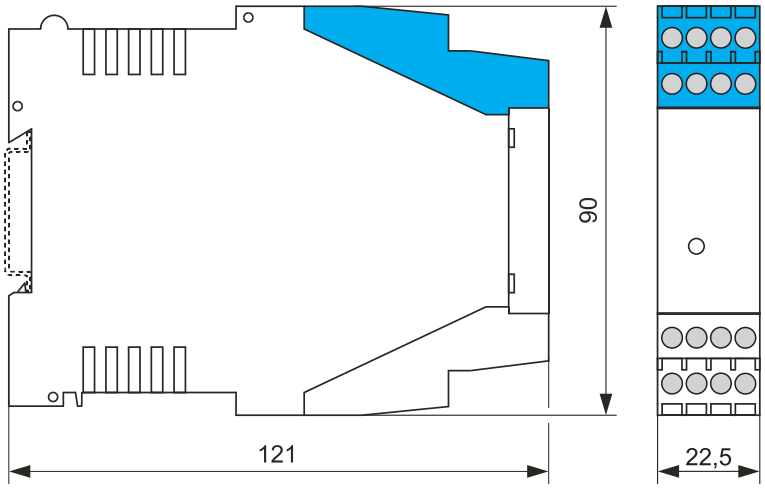
II (1)D [Ex ia Da] IIIC - can be used in an non-exlosive area or in a solid enclosure "d". Their external intrinsically safe circuits with a intrinsic safety of ia can be used in dangerous areas zone 20, zone 21, zone 22 in the sense of EN 60079-10-2 (explosive atmospheres with flammable gas).

I (M1) [Ex ia Ma] I - can be used in an non-exlosive area or in a solid enclosure "d". Their external intrinsically safe circuits with a intrinsic safety of ia can be used in underground parts of mines and surface installations of these mines, where there is a probability of a methane or flammable gas hazard occurring.

Basic variants

- **IRU–420–I** **converts signal 0/4 ... 20 mA to 0/4 ... 20 mA** from explosive area to non-explosive area.
- **IRU–420–H** **converts signal 0/4 ... 20 mA to 0/4 ... 20 mA** from explosive area to non-explosive area, bidirectional transmission of communication signal HART®.
- **IRU–420–U** **converts signal 0/4 ... 20 mA to 0 ... 10 V** from explosive area to non-explosive area. Possibility of switching the two-state relay.

Dimensional drawing



Technical specifications

Basic technical data

	IRU-420-I	IRU-420-H	IRU-420-U
Input value	0/4 ... 20 mA	0/4 ... 20 mA	0/4 ... 20 mA
Output value	0/4 ... 20 mA	0/4 ... 20 mA	0 ... 10 V (loading max. 20 mA)
Bidirectional transmission communication signal HART	NO	YES	NO
Nominal supply voltage variant 230 V	60 ... 230 V AC (+10 %) 50 ÷ 60 Hz, 85 ... 230 V DC (+10 %)		
Nominal supply voltage variant 24 V	18 ... 30 V AC (+10 %) 50 ÷ 60 Hz; 18 ... 40 V DC (+10 %)		
Nominal power demand (AC / DC)	7 VA / 4 W		
Maximum effective value of AC or DC voltage that can be connected to the terminals follow-up devices that are not intrinsically safe, without breaking the type of protection	Um = 253 V		
Voltage on active input (terminals 5 a 6)	typ. 24,1 V DC (0 mA) / min. 18 V DC (20 mA)		
Output auxiliary voltage (terminals 9 a 11)	24 V DC (max. 25 mA)		
Linearity	≤ 0,05 % (4 ... 20 mA) / ≤ 0,07 % (0 ... 20 mA)		≤ 0,05 %
Temperature error	≤ 0,05 % / K		
Allowed short circuit time (input and output)	unlimited (short on output is indicated by off LED)		
Ambient temperature	-20 °C ... +60 °C		
Protection class	IP 20		
Housing material	Polycarbonate		
Material of terminals	CuBe		
Max. conductor size	1 x 2,5 mm^2		
Isolating voltage (main terminals / input + output)	3500 V		
Isolating voltage (input / output)	3500 V		
Weight	cca 0,2 kg		

Working areas and area classification (EN 60079-0, 14 and EN 60079-11)

Classification	Limiting parameters of intrinsically safe circuit	
	Active input - terminals 5 and 6	Passive inputs - terminals 6 and 7
II C	U_0 = 27,3 V; I_0 = 93 mA; P_0 = 0,64 W; C_0 = 86 nF; L_0 = 2 mH	U_0 = 28 V; I_0 = 93 mA; P_0 = 0,8 W; C_0 ≈ 0 nF; L_0 ≈ 0 mH
II B / III C	U_0 = 27,3 V; I_0 = 93 mA; P_0 = 0,64 W; C_0 = 0,68 µF; L_0 = 8 mH	
I	U_0 = 27,3 V; I_0 = 93 mA; P_0 = 0,64 W; C_0 = 1 µF; L_0 = 10 mH	

Installation instructions

Isolating repeaters are intended for installation on switchboards on DIN rail mounting 35mm. The DIN rail is closed shut by pushing down the flap on the front side. Removal is performed using a screwdriver to release the flap. We recommend installing the units in a vertical position.

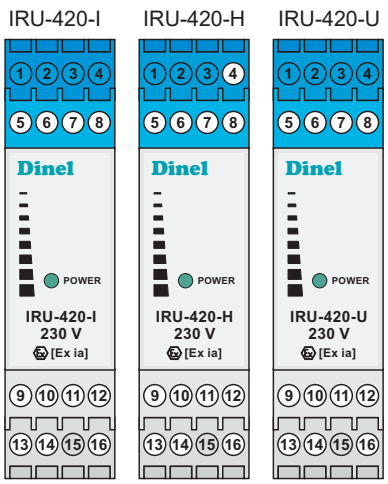
Electrical connection

The electrical connection is performed in a voltage-free state. The supply voltage (terminals 13 and 14) can be connected to mains power only via a fuse or a circuit breaker (max. 16 A)! On to terminals 5, 6 and 7 (blue terminal block, side IN) only an approved sensor with a current output of 0/4 ... 20 mA may be connected, conforming to the conditions of the given hazardous area. If the sensor is connected to terminals 5 and 6, then it is also powered from these terminals. If, however, the sensor is connected to terminals 6 and 7, an external power source must be used to power it. The output from the device is a current signal 0/4 ... 20 mA or a voltage signal 0 ... 10 V with working contacts 9, 10, 11 (grey terminal block, side OUT). Terminals no. 4, 8 and 12, 16 (on version IRU-420-H) are used for the connection of an external communicator HART (HHC - Hand-Held-Communicator).

Commissioning

Consists of turning on the power voltage supply. Verification of correct functionality of mains power circuits - the green (POWER) LED on the front panel is lit. The isolating repeater IRU-420 is not set in any way.

Front panel and terminal block

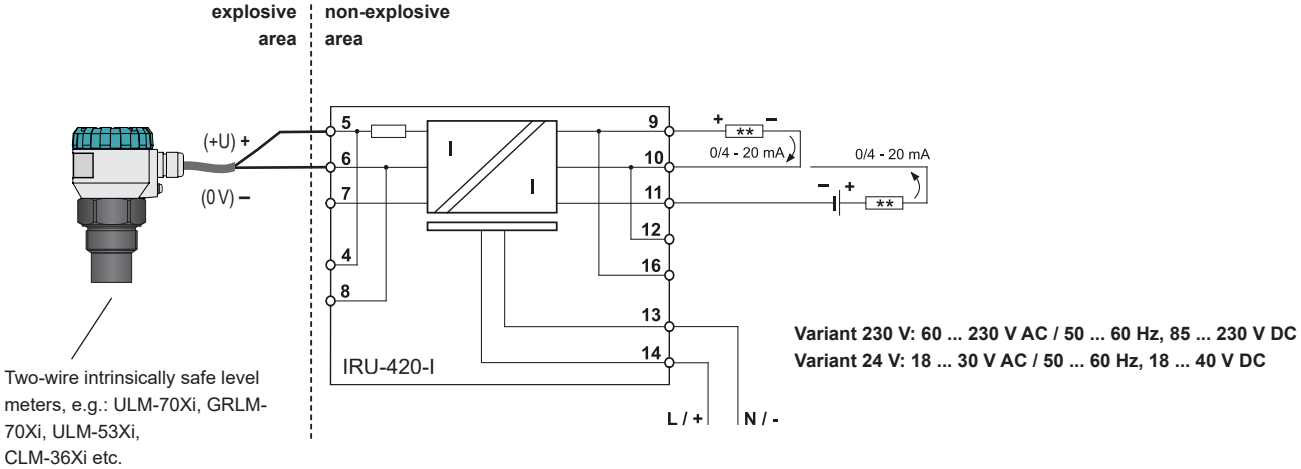


	IRU-420-I	IRU-420-H	IRU-420-U
1			
2			
3			
4		HHC	
5	IN	IN	IN
6	IN	IN	IN
7	IN	IN	IN
8		HHC	
9	OUT	OUT	OUT
10	OUT	OUT	OUT
11	OUT	OUT	OUT
12		HHC	
13	N / -	N / -	N / -
14	L / +	L / +	L / +
15			
16		HHC	

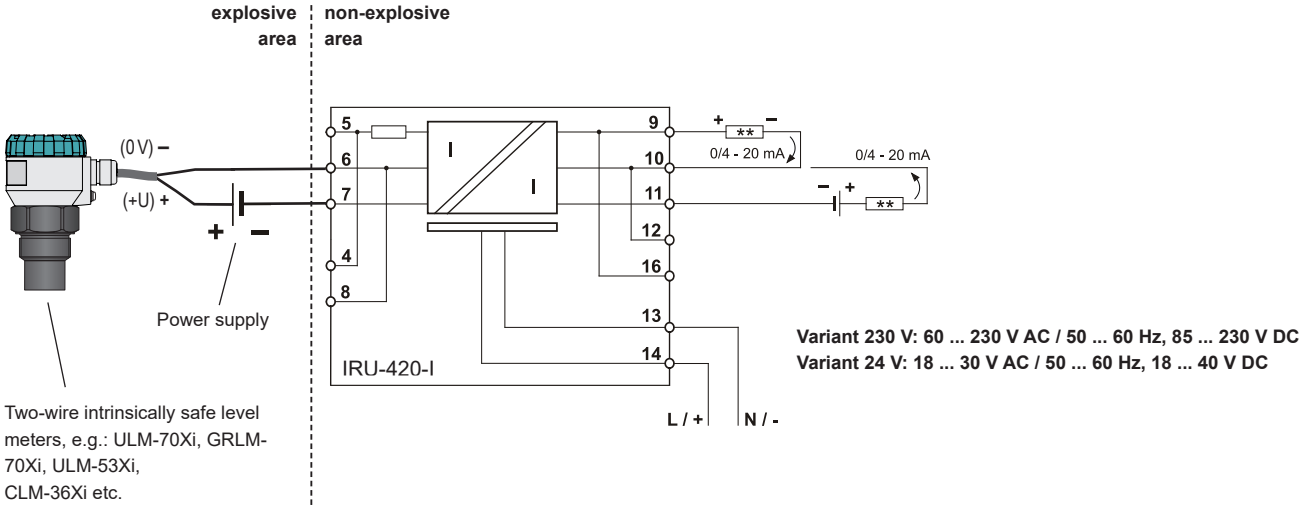
Connection examples

Level meter connection (output 0/4 ... 20 mA) in an explosion hazard area to an IRU-420-I unit with a current output

A) variant power supply through the unit IRU



B) VARIANT WITH EXTERNAL POWER SUPPLY

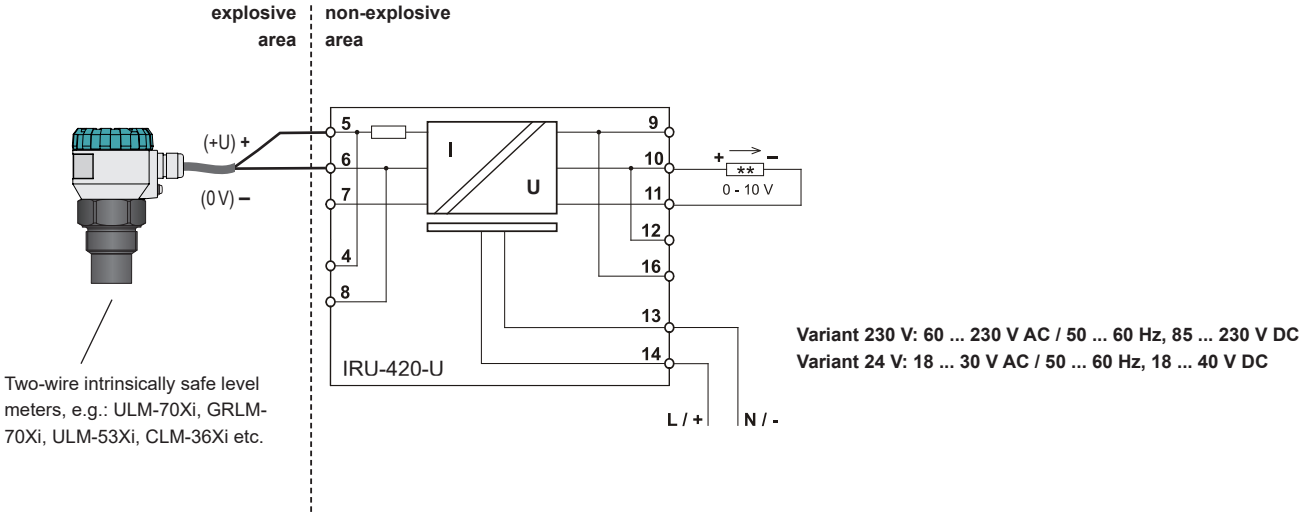


Variant 230 V: 60 ... 230 V AC / 50 ... 60 Hz, 85 ... 230 V DC
Variant 24 V: 18 ... 30 V AC / 50 ... 60 Hz, 18 ... 40 V DC

** - Output devices (e.g. programmable display unit PDU, analog input PLC etc.).

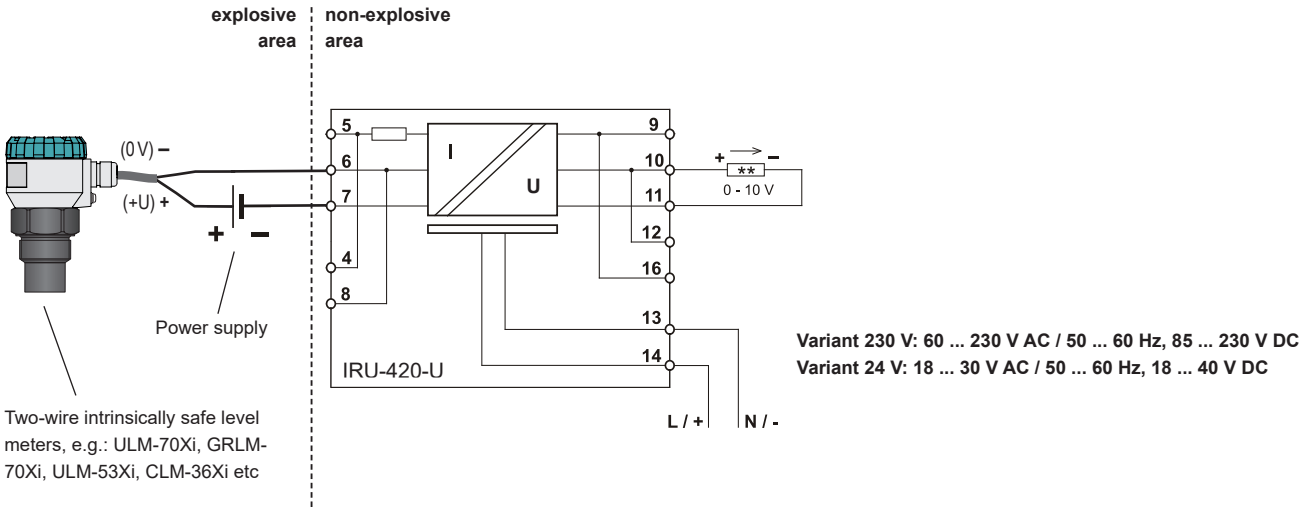
LEVEL METER CONNECTION (OUTPUT 0/4 ... 20 MA) IN AN EXPLOSION HAZARD AREA TO AN IRU-420-U UNIT WITH A VOLTAGE OUTPUT

A) VARIANT POWER SUPPLY THROUGH THE UNIT IRU



Variant 230 V: 60 ... 230 V AC / 50 ... 60 Hz, 85 ... 230 V DC
Variant 24 V: 18 ... 30 V AC / 50 ... 60 Hz, 18 ... 40 V DC

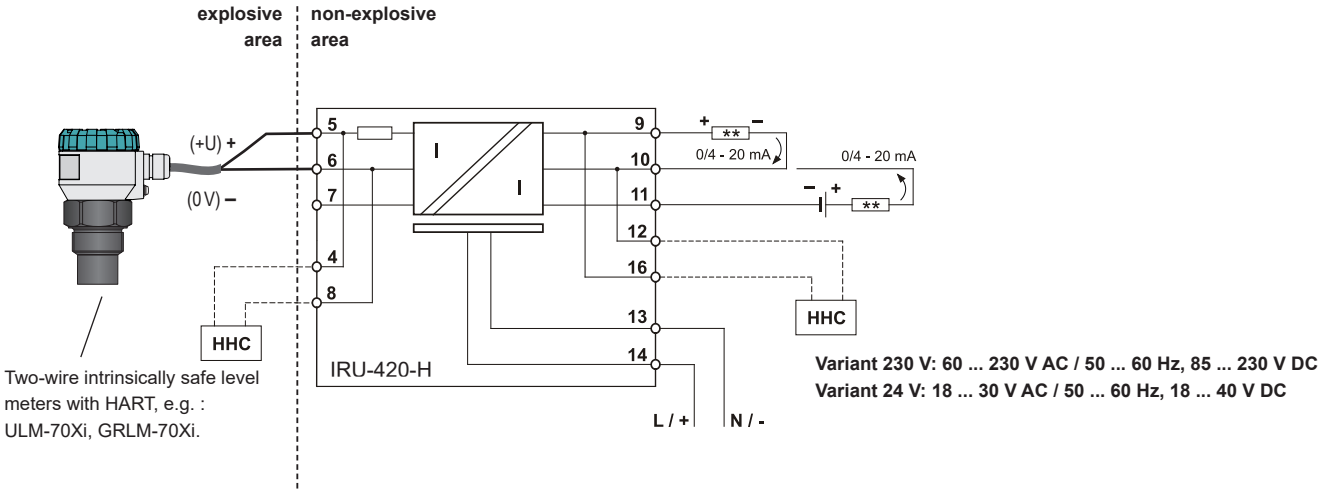
B) VARIANT WITH EXTERNAL POWER SUPPLY



Variant 230 V: 60 ... 230 V AC / 50 ... 60 Hz, 85 ... 230 V DC
Variant 24 V: 18 ... 30 V AC / 50 ... 60 Hz, 18 ... 40 V DC

** - Output devices (e.g. programmable display unit PDU, analog input PLC etc.).

Level meter connection (output 0/4 ... 20 mA + Hart) in an explosion hazard area to an IRU-420-H unit with a current output and Hart communication

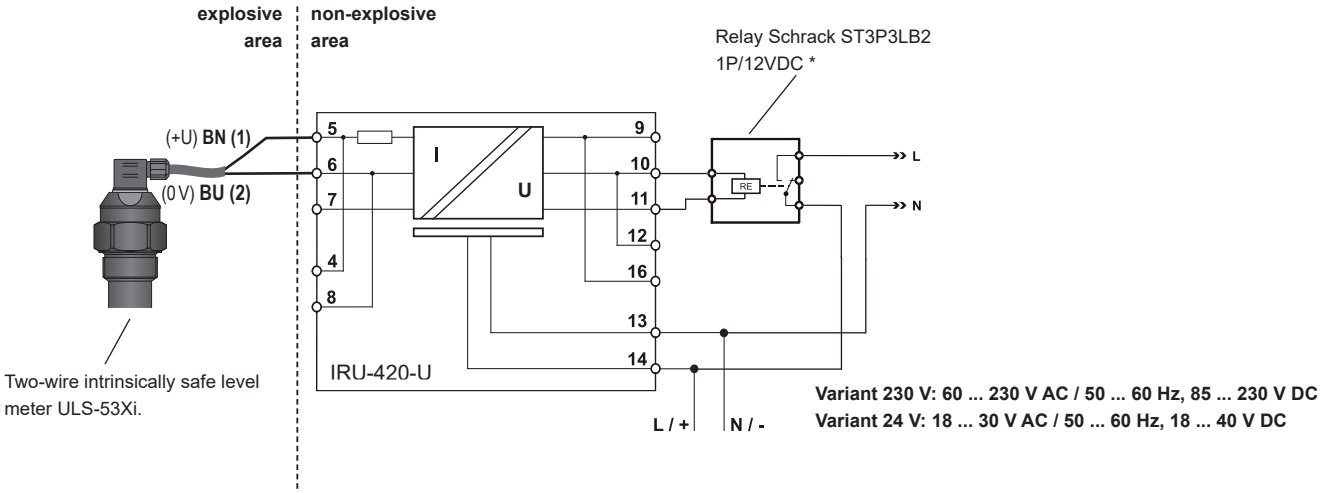


Two-wire intrinsically safe level meters with HART, e.g. : ULM-70Xi, GRLM-70Xi.

Variant 230 V: 60 ... 230 V AC / 50 ... 60 Hz, 85 ... 230 V DC
Variant 24 V: 18 ... 30 V AC / 50 ... 60 Hz, 18 ... 40 V DC

HHC - Hand-held communicator (communicator HART)
** - Output devices (e.g. programmable display unit PDU, analog input PLC etc.).

Limit level sensor (output 4/20 mA) in an explosion hazard area, IRU-420-U unit with a voltage output and a two-state Relay



Two-wire intrinsically safe level meter ULS-53Xi.

Variant 230 V: 60 ... 230 V AC / 50 ... 60 Hz, 85 ... 230 V DC
Variant 24 V: 18 ... 30 V AC / 50 ... 60 Hz, 18 ... 40 V DC

* - Relay is connected to the unit via the IRU socket type ST3P3LB2 with LED indication.

Function and status indication

LED indicator	*colour*	*function*
POWER	green	**shines** - connection to power supply, correct function **dark** - internal malfunction, output terminals 9 and 11 are overloaded

Order code

IRU – 420 – □ – □

- power supply: **230 V** – 60 ... 230 V AC (85 ... 230 V DC)
  24 V – 18 ... 30 V AC (18 ... 40 V DC)
- type of output: **I** – current output
  H – current output with bidirectional communication HART
  U – voltage output

Safety, protection, compatibility and explosion proof

Isolating repeater is equipped with protection against input and output current overload.

Connection to supply can be only through fuse or overcurrent circuit breaker (max. 16 A). Working areas according to EN 60079-10 non-explosive, or installation in flameproof enclosure "d".

Unit is sheltered by fuse T80 mA (variant 230 V) and T500 mA (variant 24 V).

Electrical equipment of protection group II. Electrical safety according to EN 61010 - 1.

Electromagnetic compatibility according to EN 55022, EN 61326, EN 61000-6-2, EN 61000-4-2, -3, -4, -5, -6, -11.

The intrinsic safety of input terminals of the unit according to EN 60079-0 and EN 60079-11. Explosion proof of Intrinsically safe supply units examined by FTZÚ-AO 210 Ostrava-Radvanice, certificate No.: FTZÚ 05 ATEX 0167X.

A declaration of conformity was issued for this device in the wording of Act No. 90/2016 Coll., as amended. Supplied electrical equipment matches the requirements of valid European directives for safety and electromagnetic compatibility.

Special conditions for safe use

When applied in mining conditions must IRU-420 units located either in a safe non-explosive area, or must be placed inside the flameproof enclosure type "d".

Packing, shipping and storage

The IRU-420 device is supplied packaged in a cardboard box that protects it against mechanical damage.

When handling and during transport, it is necessary to prevent impacts and falls.

The IRU-420 electrical device must be stored in dry enclosed areas with humidity up to 85%, free of aggressive vapours at temperatures between -10°C and 50°C, and must be protected against the effects of weather.

Version 07/2018

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