ELECTRONIC UNITS FOR ELECTRICAL NETWORK CONTROL

- **NIMR-220**
- **IZS-42/P**
- **ZZS-500/P, ZZS-1000/P**
- **NZKT-1/P**
- **Z-500/P**

TEVEL

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ELECTRONIC UNITS FOR ELECTRICAL NETWORK CONTROL

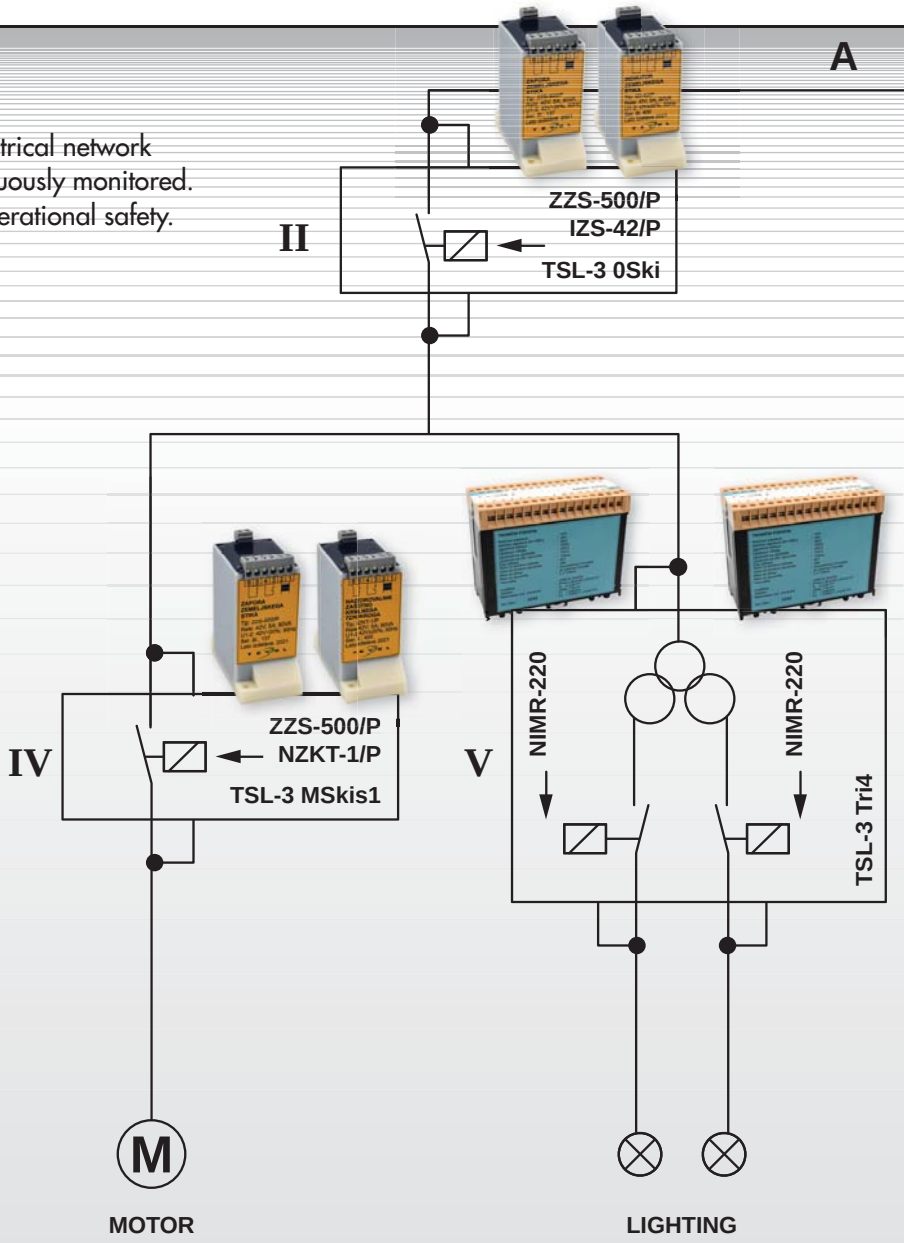
Regulations require that the insulating status of an electrical network established under particular conditions must be continuously monitored. The electrical network is also monitored for greater operational safety.

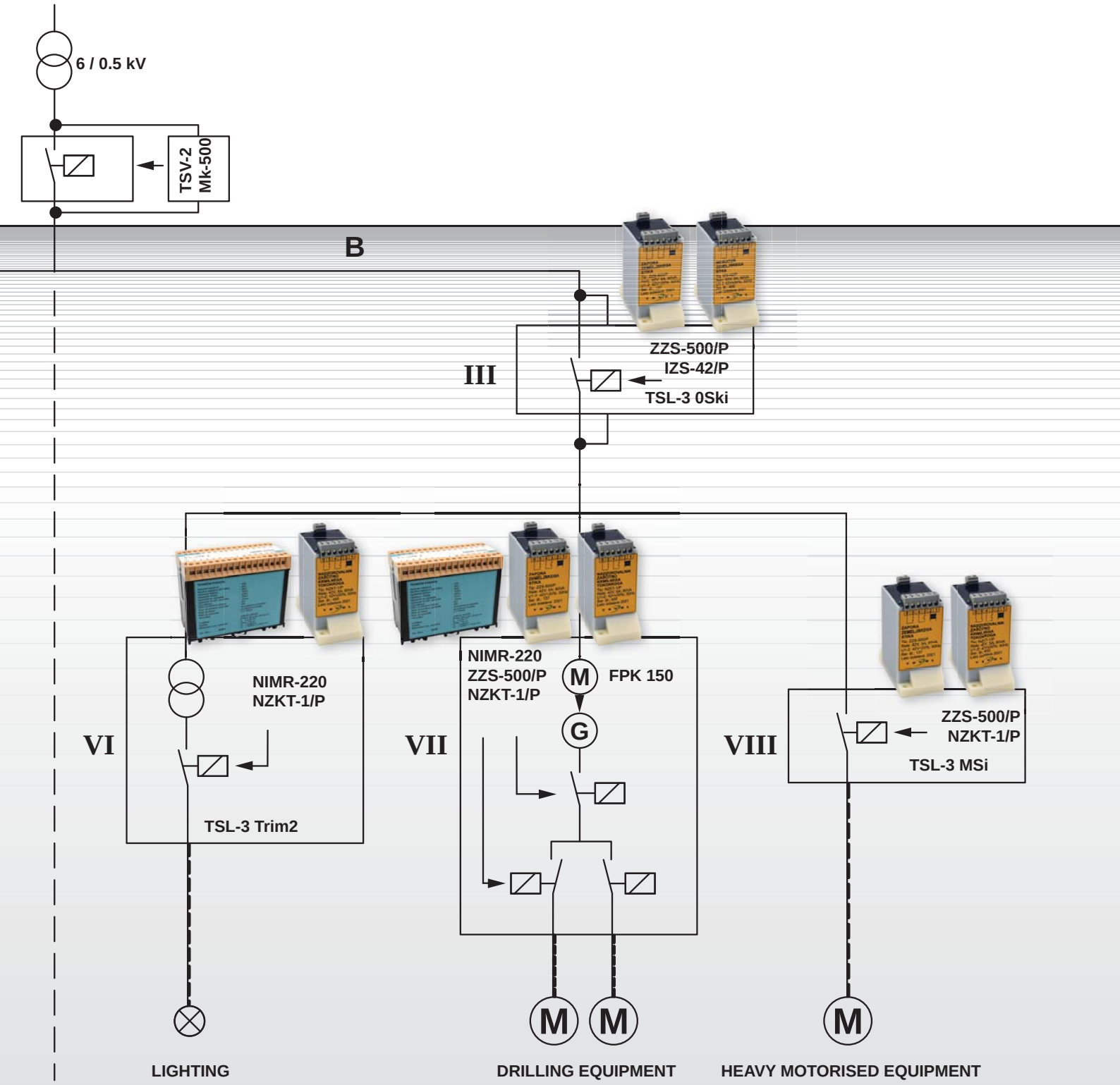
Electronic units type NIMR-220, ZZS-500/P, NZKT-1/P and IZS-42/P are intended for use in power networks with an isolated hub (IT network system). They are designed according to the principles of modern technology using integrated circuits with reliable operation.

The design, measuring current and measuring voltage of all electronic units are within the limits of the values required for "intrinsically safe" circuits for Exib implementation according to BAS standard. All units are designed for installation in the electrical equipment of motor protection switches. The units themselves are not explosion-proof, so they may only be installed outside hazardous areas or in housings with explosion-proof protection.

By appropriately combining individual units, we can obtain devices that meet the requirements for controllers according to the Regulations for Electrical Installations in Underground Mines.

For example, the combination of the NIMR-220 type unit and the NZKT-1/P type meets the requirements for a lighting network controller, while the combination of the ZZS-500/P type unit and the NZKT-1/P type meets the requirements for a cable controller.




6 / 0.5 kV
TSV-2
Mk-500
B
III
ZZS-500/P
IZS-42/P
TSL-3 0Ski
VI
NIMR-220
NZKT-1/P
TSL-3 Trim2
VII
NIMR-220
ZZS-500/P
NZKT-1/P
M
FPK 150
G
VIII
ZZS-500/P
NZKT-1/P
TSL-3 MSi
M
M
M
LIGHTING
DRILLING EQUIPMENT
HEAVY MOTORISED EQUIPMENT

Blocking unit in the case of earth fault, type ZZS-500/P or ZZS-1000/P

Blocking unit in the case of earth fault, type ZZS-500/P or ZZZ-1000/P is used to check the insulation resistance in the disconnected part of the cable line. It is designed for use in ungrounded networks with a nominal voltage of 500V or 1000V.
It consists of a transformer, a rectifier, a voltage and current limiter, and an electronic circuit with a relay. All these elements are on a printed circuit board and then built into a housing with a connector terminal.

Installation, operation

The measuring DC voltage is connected between the phase and protective conductor. If the insulation resistance is high enough, the relay is energized and with its working contact enables the main contactor to be switched on. When it is switched on, the ZZS-500/P or ZZS-1000/P control unit is disconnected from the network via the normal contact on the main contactor and the insulation resistance control is taken over by the network controller.

If the insulation resistance is lower than the permitted value, the relay in the control unit does not pick up and the main contactor cannot be switched on. The relay's safety contact can be used for optical or acoustic signalling of too low insulation resistance.

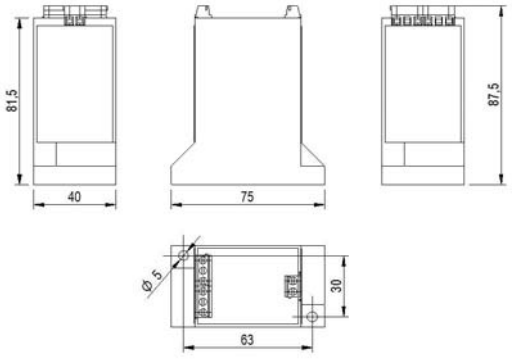
If the insulation resistance has dropped below the permitted limit, re-switching is only possible when the resistance rises to approx. 65 kohm at 500 V network or 120 kohm at 1000 V network. The reaction limit is set with the 500 V or 1000 V switch. In both cases, the unit allows if the insulation resistance value is greater than 100 ohm/V.

The ZZS-500/P or ZZS-1000/P control unit is installed together with the rest of the switching equipment in a suitable EEx d protection housing.

Measures to ensure intrinsic safety

The TR1 transformer withstands short-circuit and voltage tests.
In the event of a fault in D1, the discharge current from the capacitors is limited by metal-plastic resistors.
The product is powered by a protective transformer designed according to SIST EN 50020. The circuit that switches on the relay contacts is also powered from the same transformer.
The product is designed according to SIST EN 50014 and SIST EN 50020.

Dimensions



Technical specifications

Type: **ZZS-500/P, ZZS-1000/P**
Supply voltage: 42V(AC) ±20%, 50Hz
Measuring voltage: 35V at Ri = ∞
Measuring current: 0,8mA at Ri = 0
Turn-off resistance: 50kΩ ±10% at 500V network
100 kΩ ±10% at 1000V network
Turn-on resistance: 65kΩ ±20% at 500V network
120kΩ ±20% at 1000V network
Maximum capacitance of the controlled cable (Cmax): 2,1μF
Maximum inductance of the controlled cable (Lmax): ∞ (no limit)

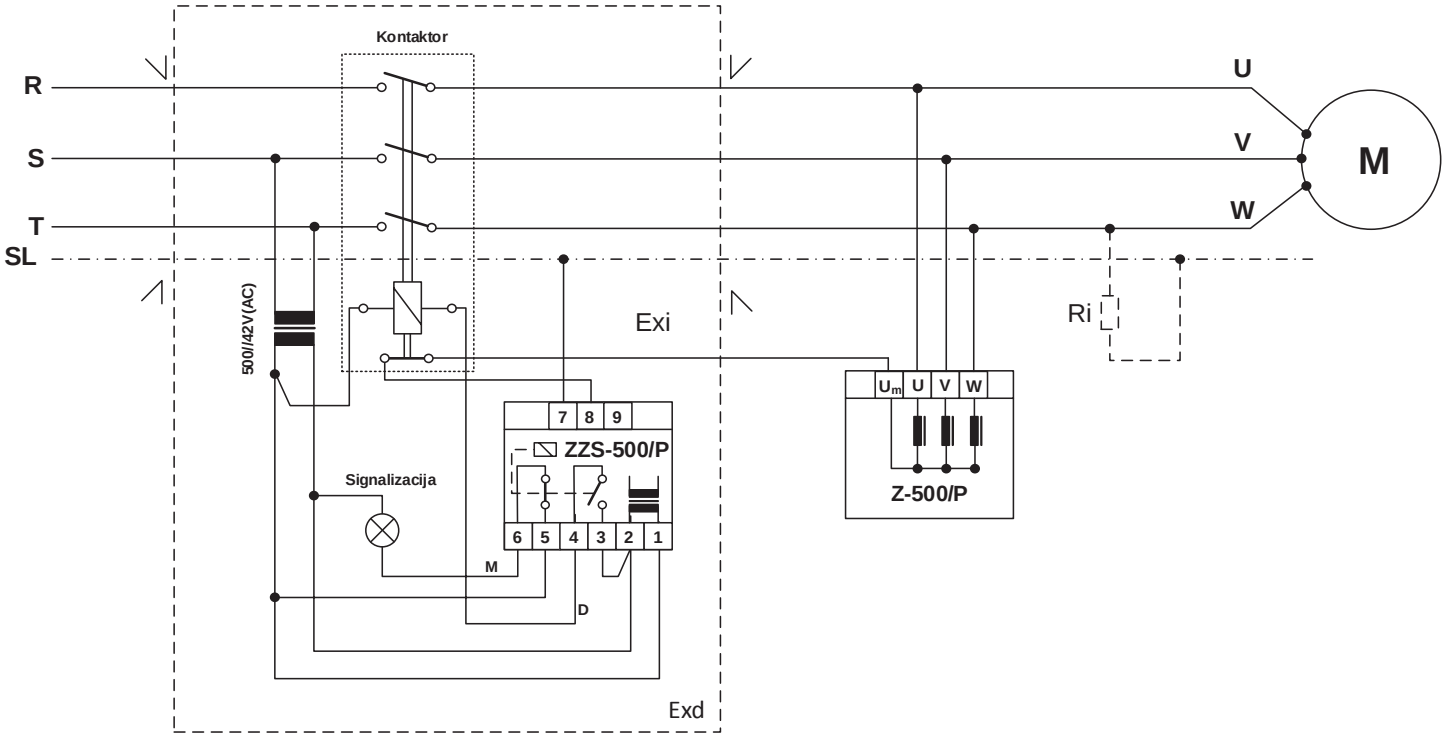
Relay:

- Relay configuration: 1 normally open, 1 normally closed contact
- Contact voltage: 42V(AC)
- Continuous current: 5A
- Switching capacity: 80VA

Maximum ambient temperature: +70°C
Mechanical protection level: IP20

Ex marking: **[Ex ib] I**

Connection



Ground fault indicator IZS-42/P

The ground fault indicator IZS-42/P is used to check the insulation resistance of a 42V control and signaling network.

It consists of a transformer, a rectifier, a comparator with an integrated circuit and a relay. All these elements are integrated into a housing with a connector on a printed circuit board.

Installation, operation

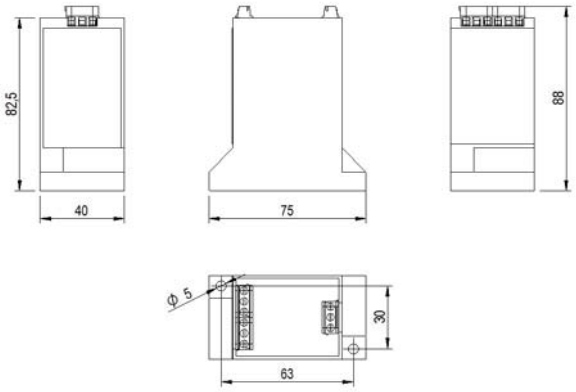
The measuring DC voltage is connected between the phase conductors and the protective conductor. If the insulation resistance is high enough, the relay is energized and with its working contact switches on the contactor for the control circuit. The indicator remains on even after the contactor is activated and thus controls the insulation resistance in the drive as well.

If the insulation resistance drops below 4 kohm, the relay in the indicator opens and the contactor for the 42V circuit is switched off. The relay's normal contact can be used for optical or acoustic signalling of inadequate insulation resistance.

If the insulation resistance has dropped below 4 kohm, the IZS-42/P indicator allows re-activation only when the resistance increases to approximately 6 kohm.

The IZS-42/P electronic unit is installed together with other switching equipment in a suitable EEx ib protection housing.

Dimensions



Technical specifications

Type: **IZS-42/P**
Supply voltage: 42V(AC) ±20%, 50Hz
Measuring voltage: 35V at Ri = ∞
Measuring current: 3mA at Ri = 0
Trip resistance: 4kΩ ±10%
Trip resistance: 6kΩ ±20%
Maximum capacitance of the controlled cable Cmax: 0.5μF
Maximum inductance of the controlled cable Lmax: 100mH

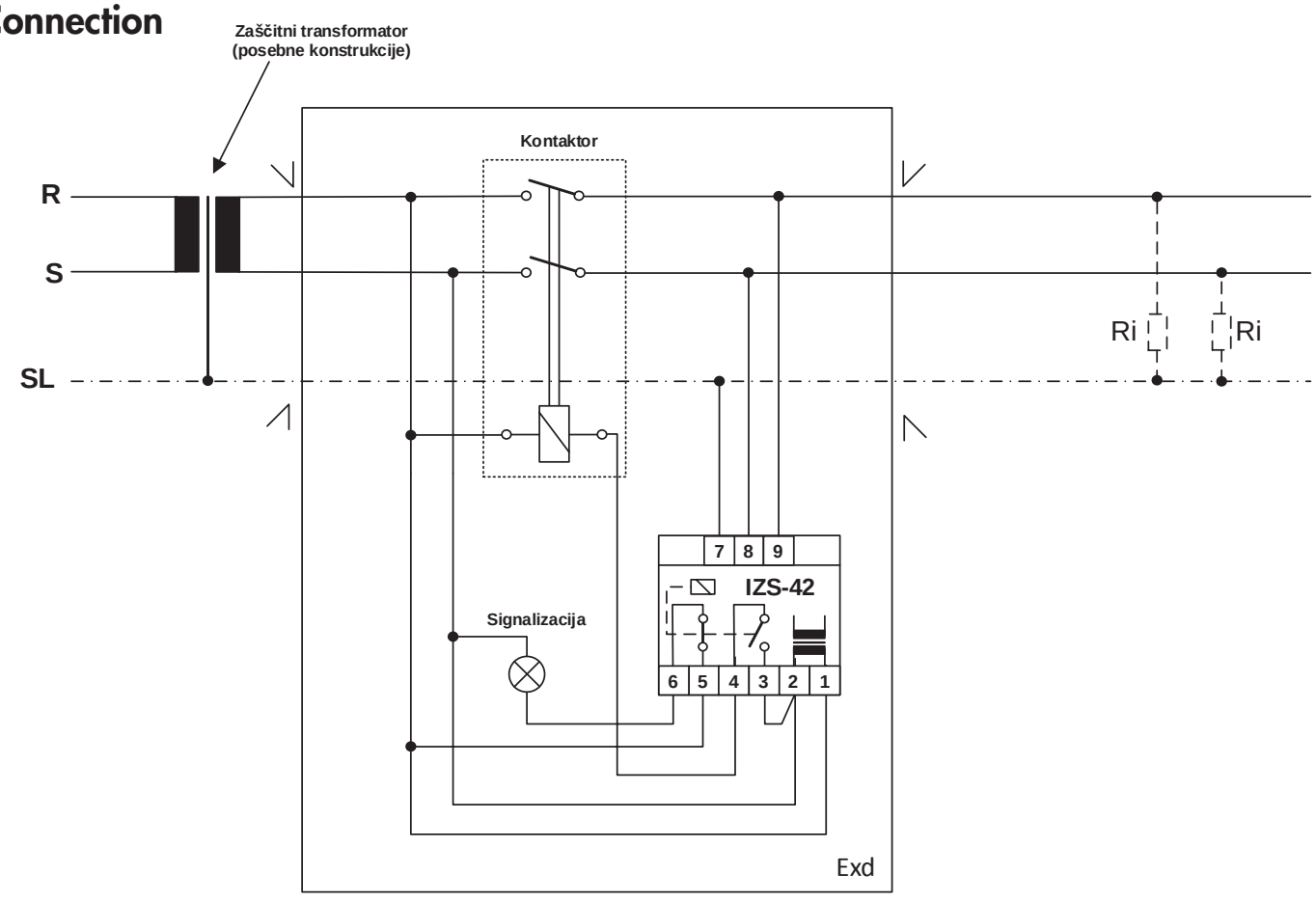
Relay:

- Relay configuration: 1 normally open, 1 normally closed contact
- Contact voltage: 42V(AC)
- Continuous current: 5A
- Switching capacity: 80VA

Maximum ambient temperature: +70C°
Mechanical protection level: IP20

Ex marking: **[Exib] I**

Connection



NZKT-1/P protective control circuit monitor

The NZKT-1/P protective control circuit monitor is used to monitor the mechanical condition of special cables (e.g.: Epn 63), which have a control conductor in addition to the power and protective conductors. These cables are mainly used to power machines and devices that move during operation (combine harvesters, lighting at excavations). The main feature of this electronic unit control is that it reacts if the protective conductor (SL) - final link - control conductor (UL) circuit is interrupted, or if the resistance is increased due to mechanical damage. It also reacts if the insulation between the control and protective conductors is deteriorated.

It consists of a transformer, a rectifier, a comparator with an integrated circuit and a relay. All these elements are on a printed circuit board.

Assembly, operation

The control circuit (protective conductor-final link-control conductor) is supplied with alternating voltage, which is directed at the final link. If the circuit is not interrupted and if the insulation resistance between the control and protective conductors is sufficiently high, a pulsating DC voltage drop is created on the measuring resistor R2 (drawing no. 326006), which is smoothed out on the RC element R3, R4, C1, C2. If everything is fine with the cable, this voltage is sufficiently high, the comparator reacts and the relay is energized.

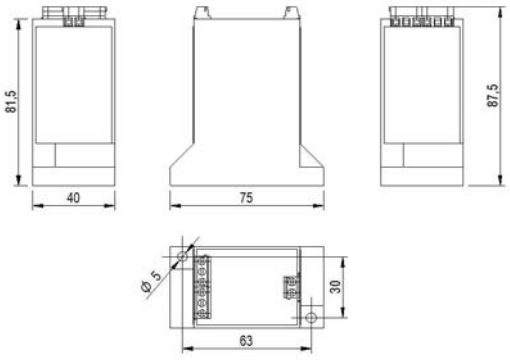
In the event of mechanical damage to the cable, the voltage on the measuring resistor decreases and, if the decrease is sufficiently large, the relay releases.

The mechanical condition is checked permanently, i.e. before and during operation.

Measures to ensure intrinsic safety

From the transformer TR1, which withstands the short-circuit and voltage test, we obtain energy that is within the limits of intrinsic safety.
In the event of a fault in D1, the discharge current from the capacitors is limited by metal-plastic resistors.
The product is powered by a protective transformer designed according to SIST EN 50020. The circuit that switches on the relay contacts is also powered from the same transformer.
The product is designed according to SIST EN 50014 and SIST EN 50020.

Dimensions



Technical specifications

Type: **NZKT-1/P**
Supply voltage: 42V(AC) ±20%, 50Hz
Measuring voltage: 10V
Measuring current: 1mA (max)
Tripping resistance when increasing series resistance Rs: 800Ω ±10%
Tripping resistance when decreasing parallel resistance Rp: 2700Ω ±10%
Maximum capacitance of controlled cable (Cmax): 2.5 μF
Maximum inductance of controlled cable (Lmax): 50mH

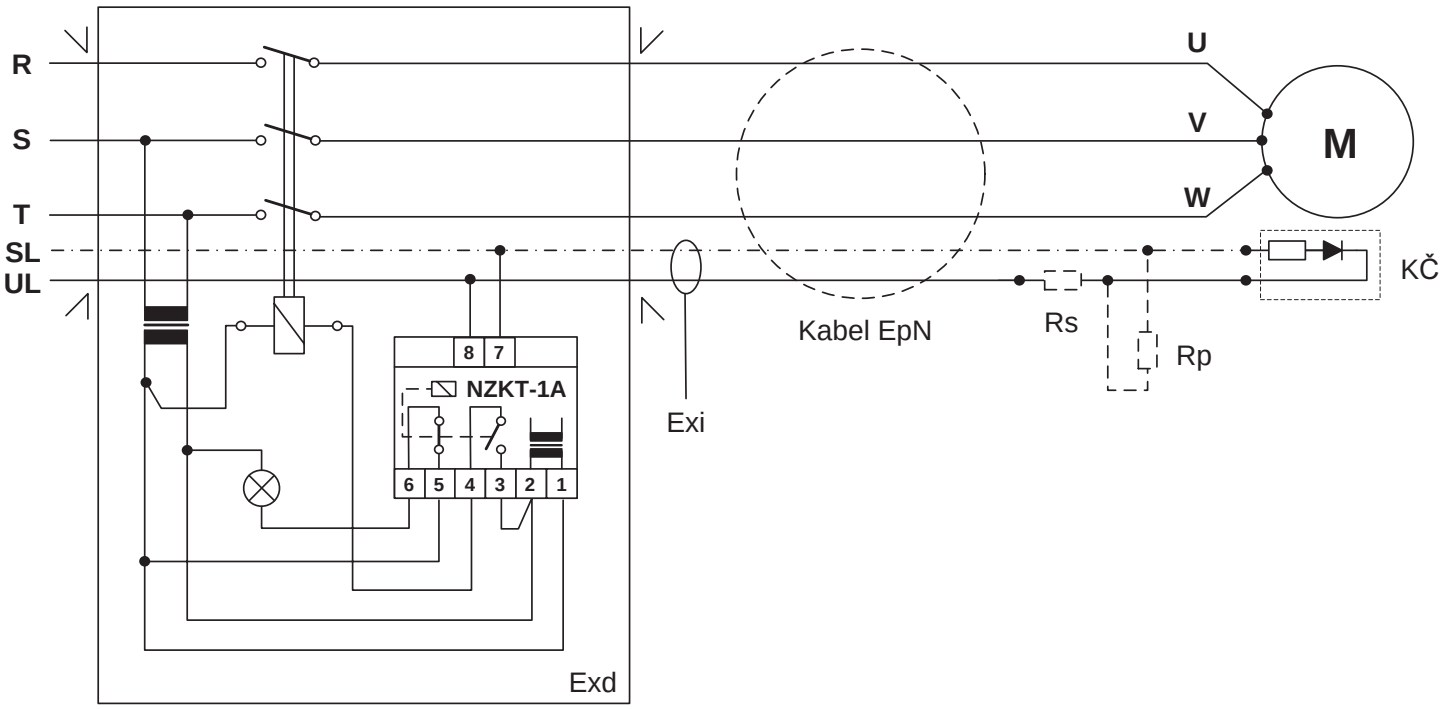
Relay:

- Relay configuration: 1 normally open, 1 normally closed contact
- Contact voltage: 42V(AC)
- Continuous current: 5A
- Switching capacity: 80VA

Maximum ambient temperature: +70°C
Mechanical protection level: IP20

Ex marking: **[Ex ib] I, [Exib] IIB**

Connection



Insulation monitor in lighting network NIMR-220

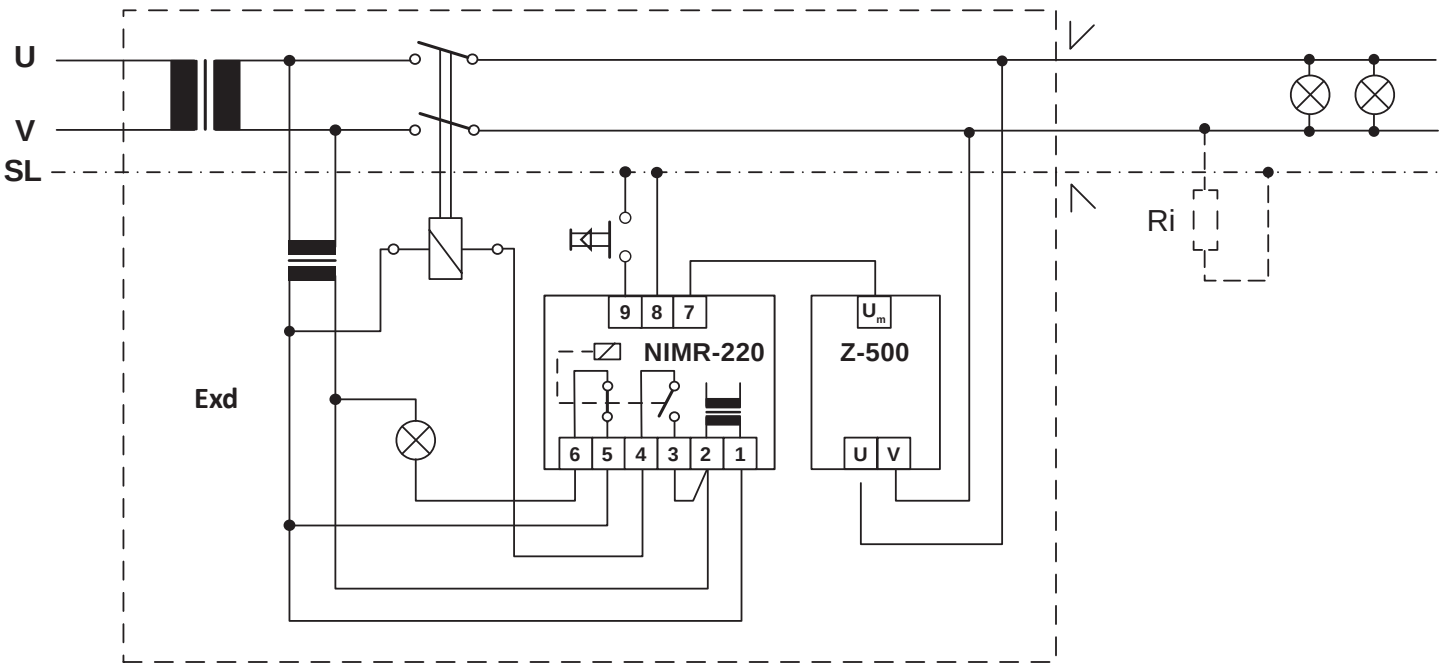
The electronic unit insulation monitor in lighting network type NIMR-220 is used for permanent monitoring (control) of insulation resistance in an isolated electrical network with a nominal voltage of up to 220V, which is used for lighting: signaling and the like.

Insulation monitoring is in a non-voltage and voltage-free state. In the event that the insulation resistance has deteriorated above the permissible limit (40 Ω/V) even before switching on (de-energized), NIMR-220 disables switching on, and in the event that the insulation deterioration occurred during operation, an immediate shutdown is performed (less than 50 msec).

The NIMR-220 unit consists of a transformer, two stabilized rectifiers with functionally appropriate RC filters and an electronic assembly with a relay.

NIMR-220 is designed to disable switching on or performs a trip if the insulation resistance slowly decreases below the permissible limit. At the same time, it reacts to rapid changes in insulation resistance and enables extremely fast tripping if the insulation deteriorates rapidly.

Connection



Adaptive part Z-500/P

The Z-500/P device is designed for use in ungrounded networks with a nominal voltage of 500V, where the power conductors are interconnected via a consumer (e.g. an electric motor winding). The Z-500/P device, together with the ZZS-500/P device, is intended for checking the insulation resistance of individual short cable branches, namely before they are connected to the power source (de-energized).

Technical specifications

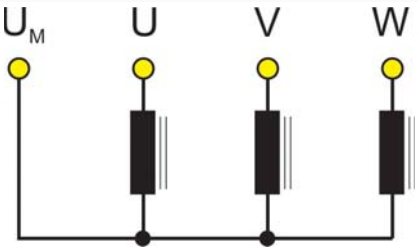
Type: **NIMR-220**
Supply voltage: 42V
Measuring voltage (Ri = 1MΩ): 44V
Trip resistance: 5KΩ
Turn-on resistance: 10KΩ
Warning resistance: 25KΩ
Warning trip resistance: 70KΩ
Trip time: <50ms
Trip test resistance: 5K1
Warning test resistance: 24K
Max capacitance between phase and protective conductor: 0,4µF
Relay for switching off: two changeover contacts
Relay for switching on: one changeover contact
Fuse: 2 x 100mA
Dimensions: 155 x 75 x 120 mm

Max. external values:

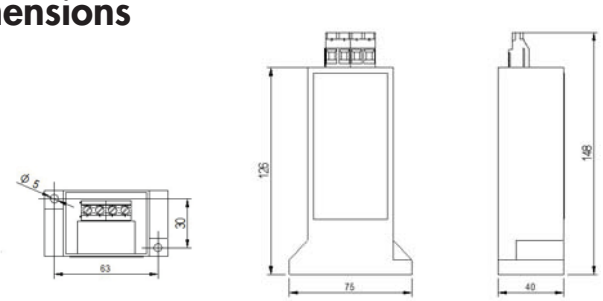
- Ik: 2,24mA
- Umax: 48,4V
- Lv: any
- Cv: 1000nF I; 310nF II A

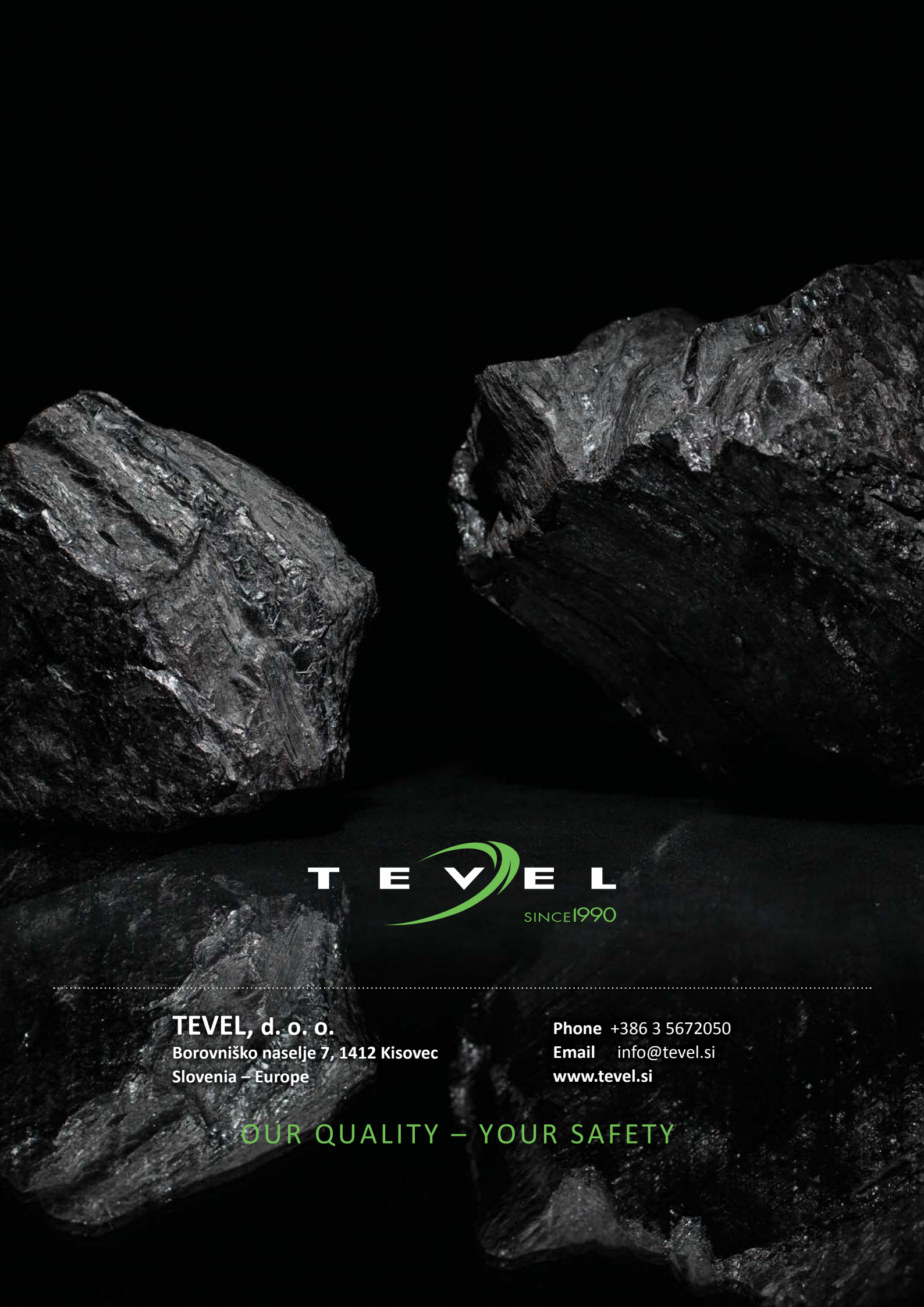
Ex marking: **[Exia] I; [Exia,ia] I; [Exia] II A**

Connection



Dimensions





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