

OPG-1/2/1Z

Communication converters



**POWER SYSTEM PROTECTION
EQUIPMENT**

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1. MANUFACTURER COMMENTS

1.1. General safety rules

**WARNING!**

During normal operation of the device, some of its parts are under hazardous voltage. Inappropriate or improper use of the device can pose a danger to persons serving, also leads to damage of the device.

1.2. List of applied standards

The device described in this manual has been designed and manufactured for industrial purposes. In the process of development and production, compliance with the standards has been assumed, the fulfilment of which ensures the implementation of the assumed principles and safety measures, provided that the user complies with the installation, commissioning and operating instructions.

This device complies with the essential requirements of the Low Voltage Directive (2014/35/UE) and the Electromagnetic Compatibility Directive (2014/30 / EU), in compliance with the following standards:

- **PN-EN 60664-1:2011** Insulation coordination for equipment within low-voltage systems - Part 1: Principles, requirements and tests
- **PN-EN 61010-1:2011** Safety requirements for electrical equipment for measurement, control, and laboratory use -- Part 1: General requirements
- **PN-EN 60255-26:2014-01** Measuring relays and protection equipment -- Part 26: Electromagnetic compatibility requirements
- **PN-EN 61000-6-2:2008** Electromagnetic compatibility (EMC) - Part 6-2: Generic standards - Immunity for industrial environments
- **PN-EN 61000-6-4:2008/A12:2012** Electromagnetic compatibility (EMC) - Part 6-4: Generic standards - Emission standard for industrial environments



Related standards:

- **PN-EN 61000-4-2:2011** Electromagnetic compatibility (EMC) - Part 4-2: Testing and measurement techniques - Electrostatic discharge immunity test
- **PN-EN 61000-4-4:2013-05** Electromagnetic compatibility (EMC) - Part 4-4: Testing and measurement techniques - Electrical fast transient/burst immunity test
- **PN-EN 61000-4-5:2014-10** Electromagnetic compatibility (EMC) -- Part 4-5: Testing and measurement techniques -- Surge immunity test
- **PN-EN 61000-4-11:2007** Electromagnetic compatibility (EMC) - Part 4-11: Testing and measurement techniques - Voltage dips, short interruptions and voltage variations immunity tests
- **PN-IEC 255-11:1994** Electrical relays - Part 11: Interruptions to and alternating component (ripple) in d.c. auxiliary energizing quantity of measuring relays

1.3. Storage and transport

The devices are packed in individual packages to protect them from damage during transport and storage. Equipment should be stored in transport packs, indoors, free of vibration and direct atmospheric, dry, airy, free from harmful vapors and gases. Ambient air temperature should not be below -20 ° C and above + 70 ° C and relative humidity should not exceed 80%.

1.4. Place of installation

The equipment should work in areas free of water, dust and gases and explosive, flammable and chemically active gases where the mechanical exposure is moderate. Installation height should not exceed 2000 m above sea level at an ambient temperature of -5 ° C to + 40 ° C and relative humidity not exceeding 80%.

The device terminal marked with the PE symbol should be connected to ground potential. It is recommended to use stranded wire of cross section min. 2,5 mm² and insulation strength min. 500 V with a length of no more than 3 m.

1.5. Device documentation

The device comes with:

- Operating manual
- Test protocol
- Warranty Card

1.6. Disposal

The device has been manufactured mostly from materials that can be recycled or disposed of without endangering the environment. A recalled device may be recaptured for re-processing, provided that its condition corresponds to normal wear and tear. All components that are not regenerated will be removed in an environmentally friendly manner. The device should be disposed of in accordance with local law or passed on to an electronic waste disposal company.

1.7. Warranty and service

The warranty period is 24 months from the date of sale, unless a longer period agreed in the contract or the sales contract.

The warranty covers free of charge removal of defects revealed during use, under the conditions specified in the warranty card.

ZEG-ENERGETYKA SP. Z O.O. gives a guarantee subject to the following conditions:

- the installation and operation of the device should be in accordance with that manual
- the seal on the device's housing must not be affected
- no corrections or changes can be made to the warranty card

The warranty does not cover:

- defects caused in result of inappropriate transport or storage conditions
- defects caused in result of inappropriate installation or operation of the device
- defects caused in result of tampering within the unit, structural modifications, alterations and repairs carried out without the consent of the manufacturer

BUYER TIPS:

- Proper and trouble-free operation of the device requires proper transport, storage, mounting and commissioning, as well as proper operation, maintenance and service.
- The equipment must be handled by properly trained and qualified personnel
- When complaining, please state the reason for the complaint (symptoms related to malfunction) and factory serial number
- After receiving of the complaint confirmation, send the complaint device with the warranty card to the manufacturer's address
- The warranty period is extended by the time of successful complaint filling

1.8. How to order

The order should specify the full name of the device and all the necessary parameters:

- type and version of the device
- OPG-1 – RS485 (RS232) -> fiber optic ST converter
- Supply voltage 220V AC/DC or 24 V DC

Example of order:

- OPG-1-220 V AC/DC – RS485 (RS232) -> fiber optic ST converter
- OPG-1-24V DC – RS485 (RS232) -> fiber optic ST converter

1.9. Manufacturer's data

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2. TECHNICAL DESCRIPTION

2.1. Application

Communication converters are used in order to unify communication channels used on substation. There are two types of communication channels on substation:

- telecontrol channel – control and signalling purposes
- diagnostic channel – disturbances and event recorders reading, measurements, setting etc.

In most cases substation is unmanned. The substation devices are connected to the star point, and the star point is joined to computer network, which enables continuous monitoring of substation. The connection of a few OPG-1/2/IZ devices serves as communication equipment which allows to configure both telecontrol and diagnostic purpose communication channels. Such connection enables connecting many different devices of different types and transfer data through one communication channel.

2.2. Main features

OPG-1 converter is equipped with:

- one fiber-optic ST port (820 nm – multimode)
- one RS-485 port (parallelly one RS-232 port)
- 220-250V AC/DC or 24V AC/DC supply module

OPG-2 converter is equipped with:

- two fiber-optic ST port (820 nm – multimode)
- one RS-485 port (parallelly one RS-232 port)
- 220-250V AC/DC or 24V AC/DC supply module

OPG-IZ converter is equipped with:

- one RS-232 port
- one RS-485 port
- 220-250V AC/DC or 24V AC/DC supply module

OPG-IZ-1 converter is equipped with:

- one RS-232 port (with additional fiber-optic ST port – 820 nm multimode)
- one RS-485 port
- 220-250V AC/DC or 24V AC/DC supply module

OPG-IZ-2 converter is equipped with:

- one RS-232 port (with additional two fiber-optic ST ports – 820 nm multimode)
- one RS-485 port
- 220-250V AC/DC or 24V AC/DC supply module

2.3. Construction

OPG-1/2/IZ converters are enclosed in casing of type CN-55AK (Fig. 1a, 1b) which enables 35 mm rail mounting. Z2 terminal located on the front of the devices (Fig. 1c, 1d) is used to connect RS-485 and RS-232 ports.

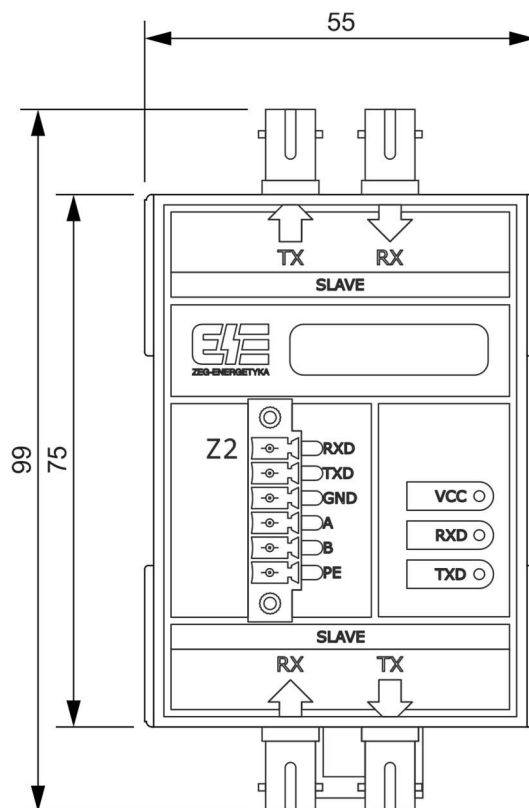


Fig. 1a. Dimensional drawing – front view

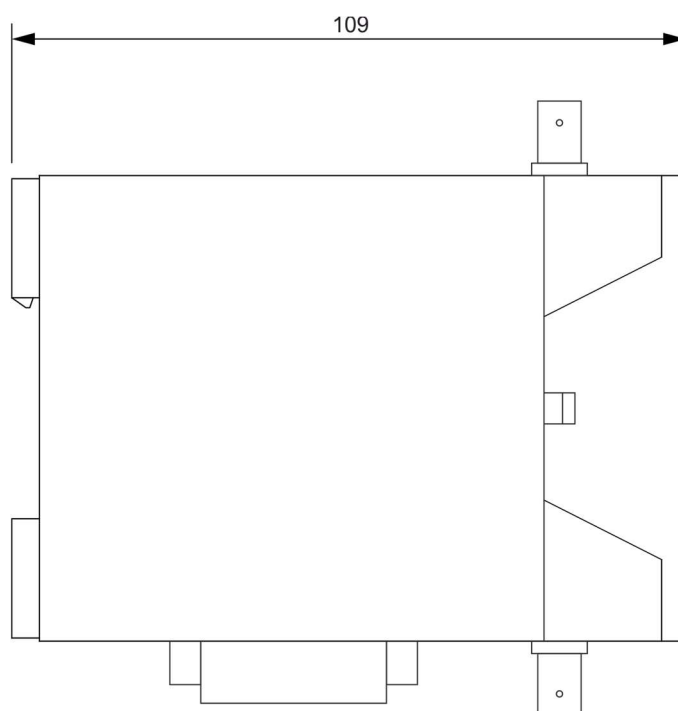


Fig. 1b. Dimensional drawing – side view

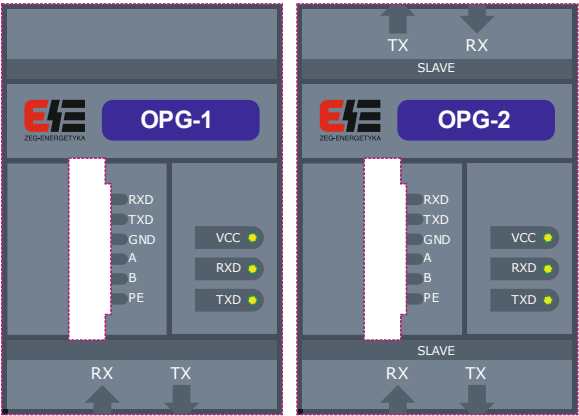


Fig. 1c. Fronts of OPG-1 and OPG-2 converters

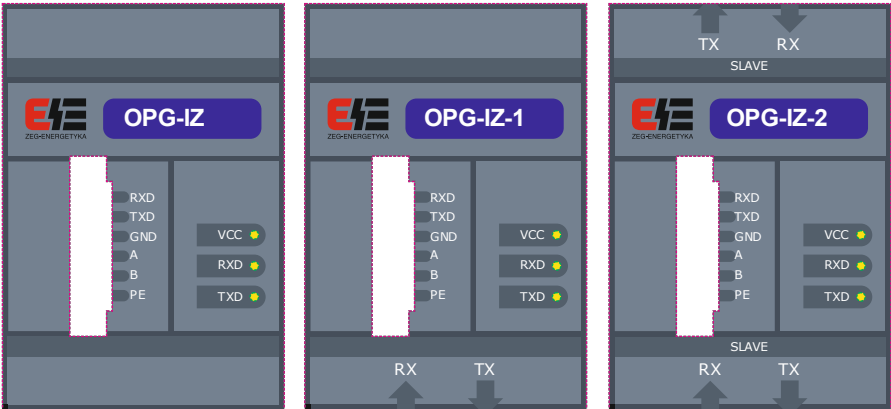


Fig. 2d. Fronts of OPG-IZ, OPG-IZ-1 and OPG-IZ-2 converters

Z1 terminal is located on the bottom of the device (Fig. 2.). Relay contact signalling lack of auxiliary voltage is also fed to the terminal. Terminal pins are described in table 1.

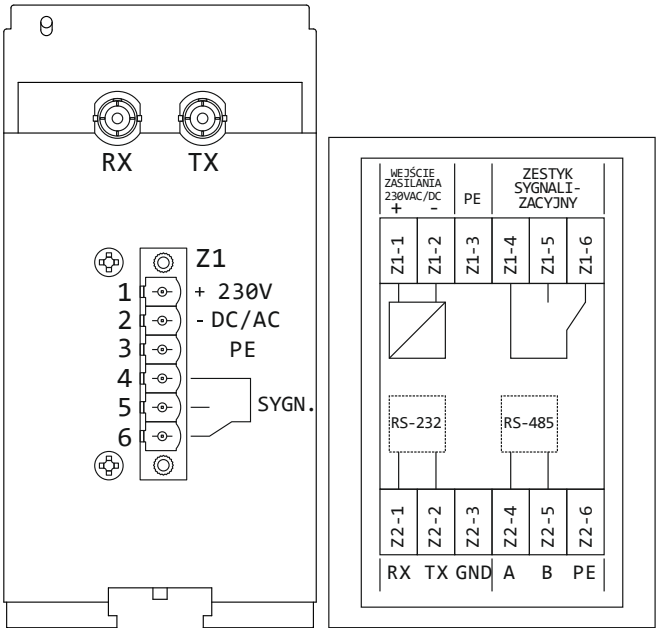


Fig. 2. Bottom of the device

Table1. Pins description – supply voltage and signals

Pin	Z1 terminal
1	+/- 220V DC/AC
2	or other value on request ex. 24V DC
3	PE
4	COM
5	NO contact – healthy
6	NC contact – failure

NO – normal open contact

NC – normal close contact

3. TECHNICAL DATA

Rated supply voltage	U = 110V - 220 V DC or 230V AC or other on request
Rated burden in supply voltage	PZ ≤ 2 W
Communication ports	Depending on converter type
Ambient temperature	-5°C to +40°C
Dimensions	75 × 55 × 110 mm
Weight	0,3 kg
Ingress protection	IP40
Mounting	TS-35 rail

4. FUNCTIONALITY

4.1. Principle of operation

All types of communication converters are equipped with isolated supply voltage modules. OPG-IZ are characterised by isolated communication ports too.

OPG-1 converter is standard RS-485/232 to fiber-optic ST port converter. Functional diagram is shown on figure 3.

OPG-2 converter is additionally equipped with another fiber-optic ST port. If RS-485 or RS-232 port is set to MASTER, the converter operates as a star coupler. Functional diagram is shown on figure 4.

Isolated converter of type OPG-IZ serves as RS-232 to RS-485 converter. Functional diagram is shown on figure 5.

Isolated OPG-IZ-1 converter is additionally equipped with fiber-optic port which works parallelly to RS-232 port. The converter serves as a starcoupler. Functional diagram is shown on figure 6.

Isolated OPG-IZ-2 converter is additionally equipped with two fiber-optic port which works parallelly to RS-232 port. The converter serves as a starcoupler. Functional diagram is shown on figure 7.

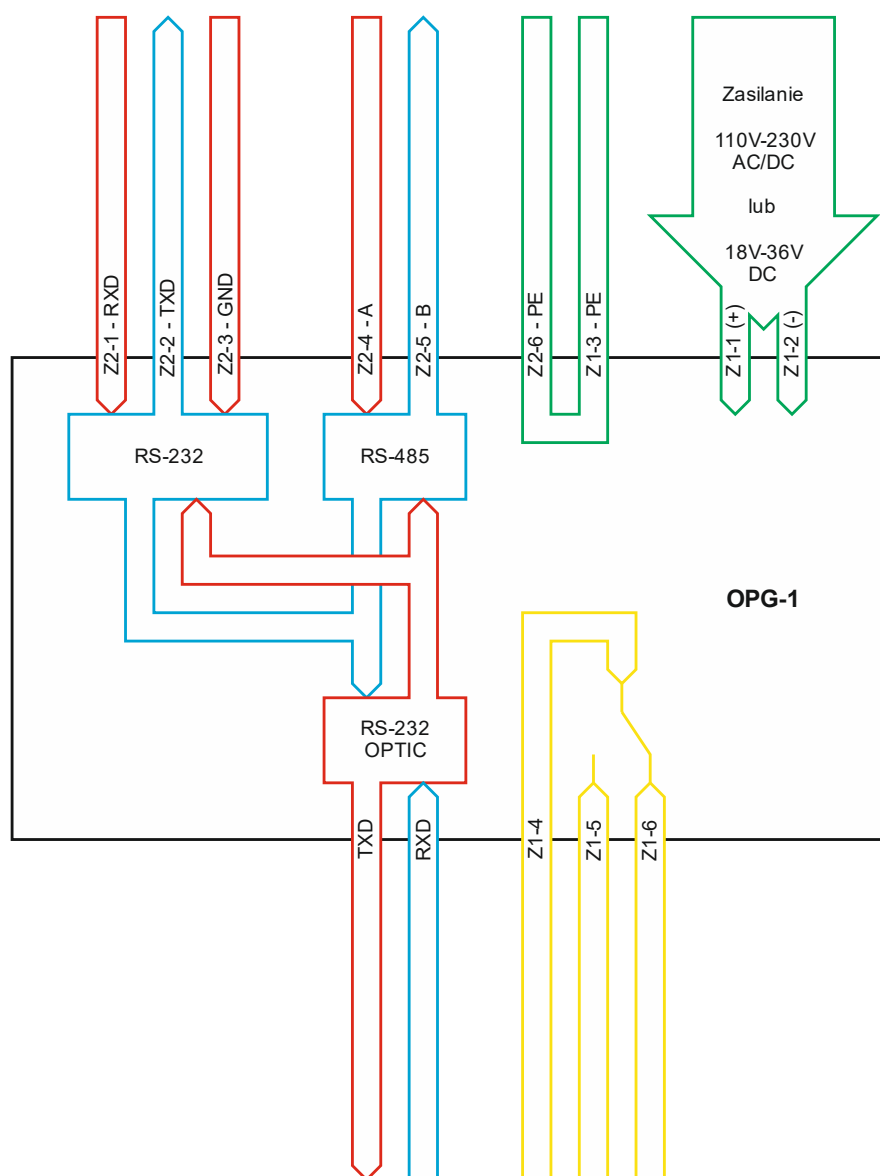


Fig. 3. OPG-1 converter – functional diagram

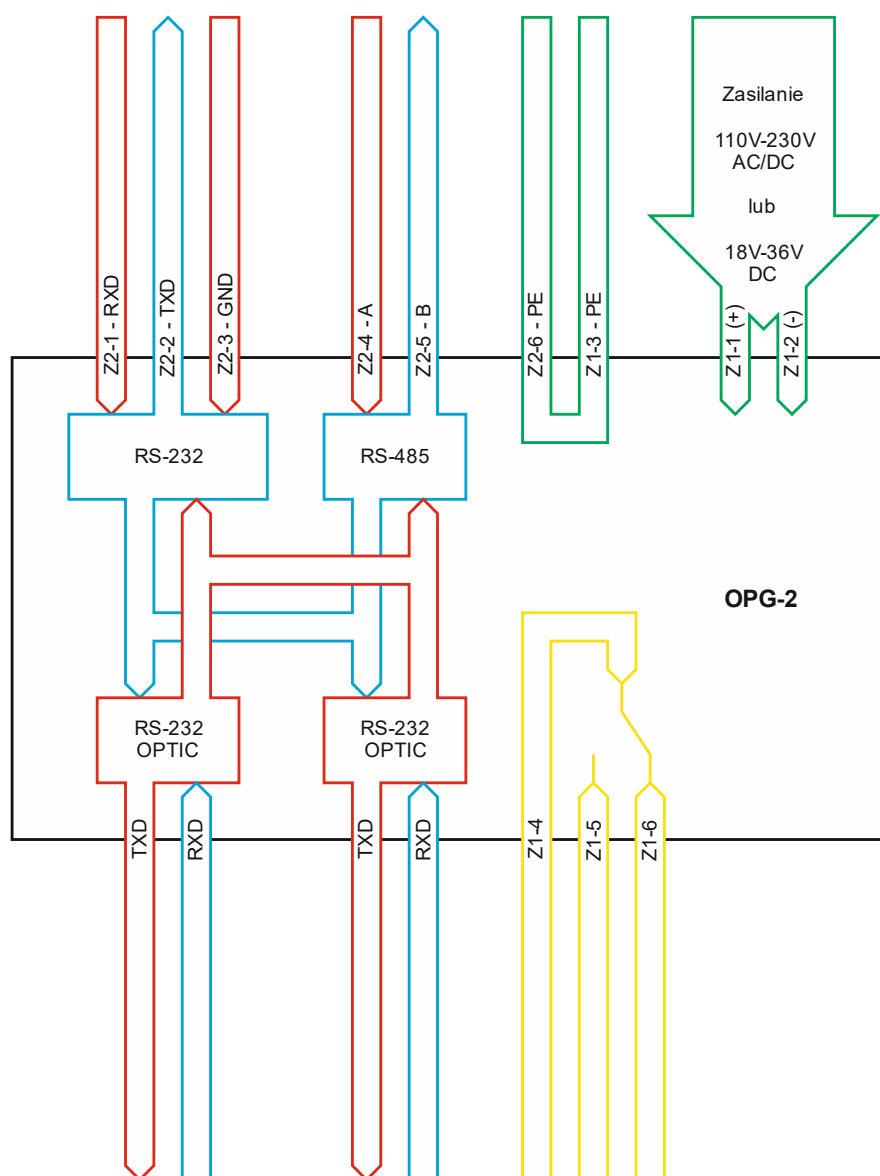


Fig. 4. OPG-2 converter – functional diagram – operating as a starcoupler

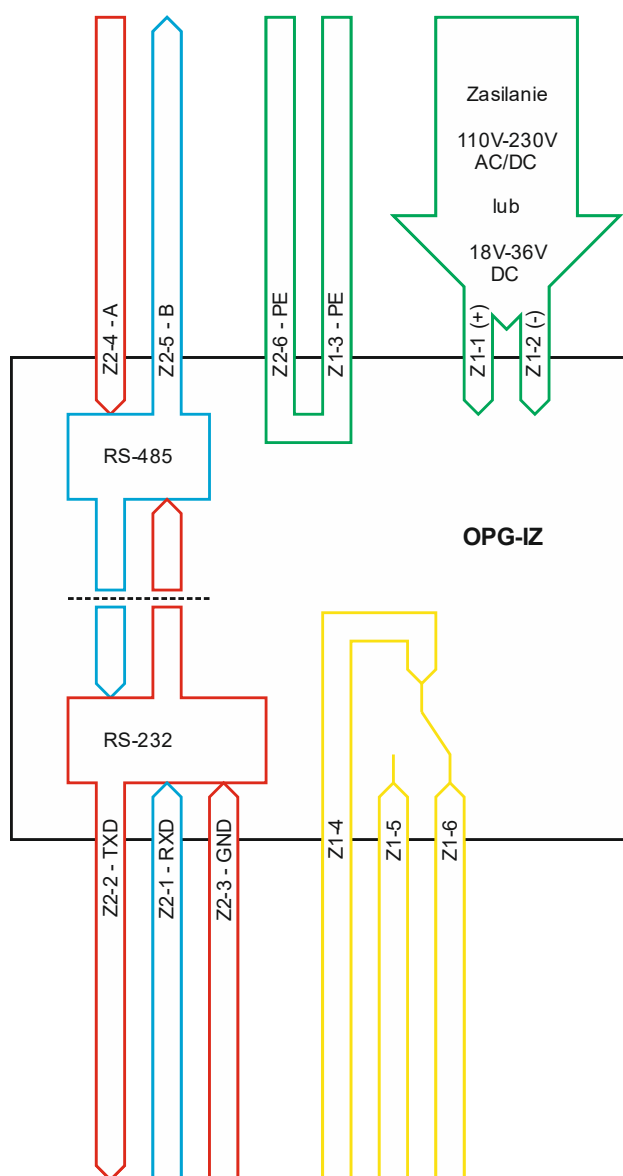


Fig. 5. OPG-IZ converter – functional diagram

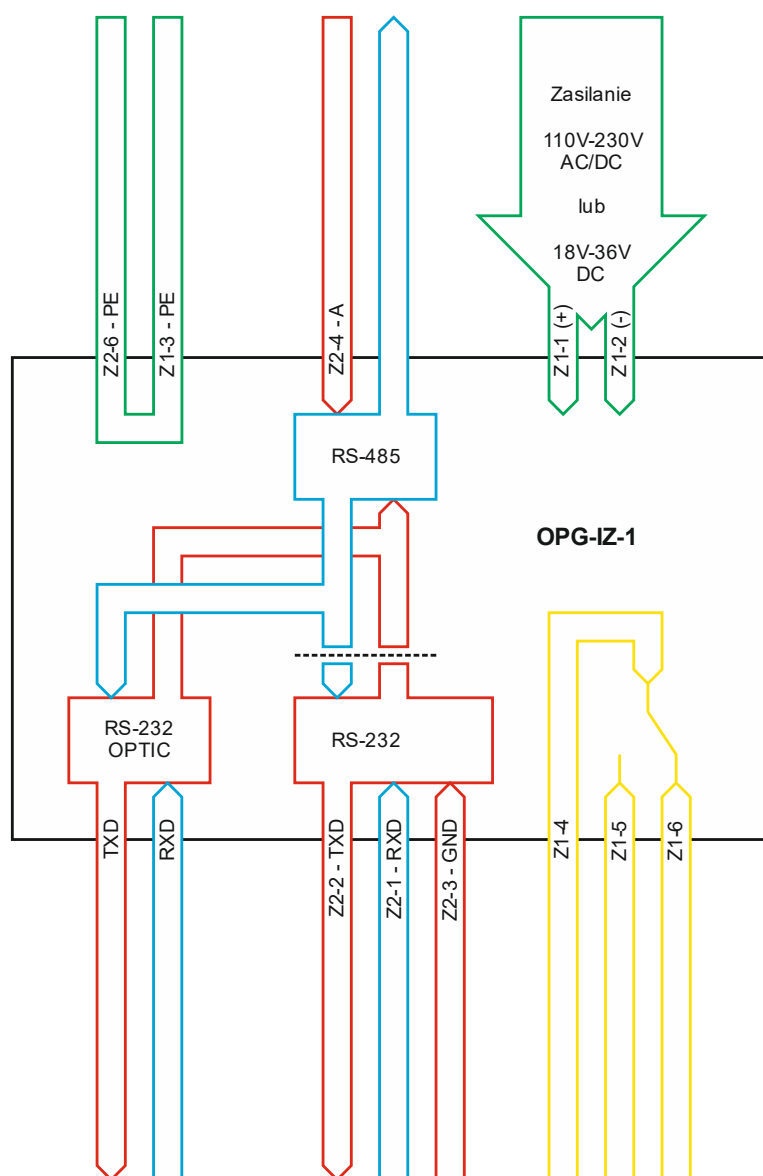


Fig. 6. OPG-IZ-1 converter – functional diagram – operating as a star coupler

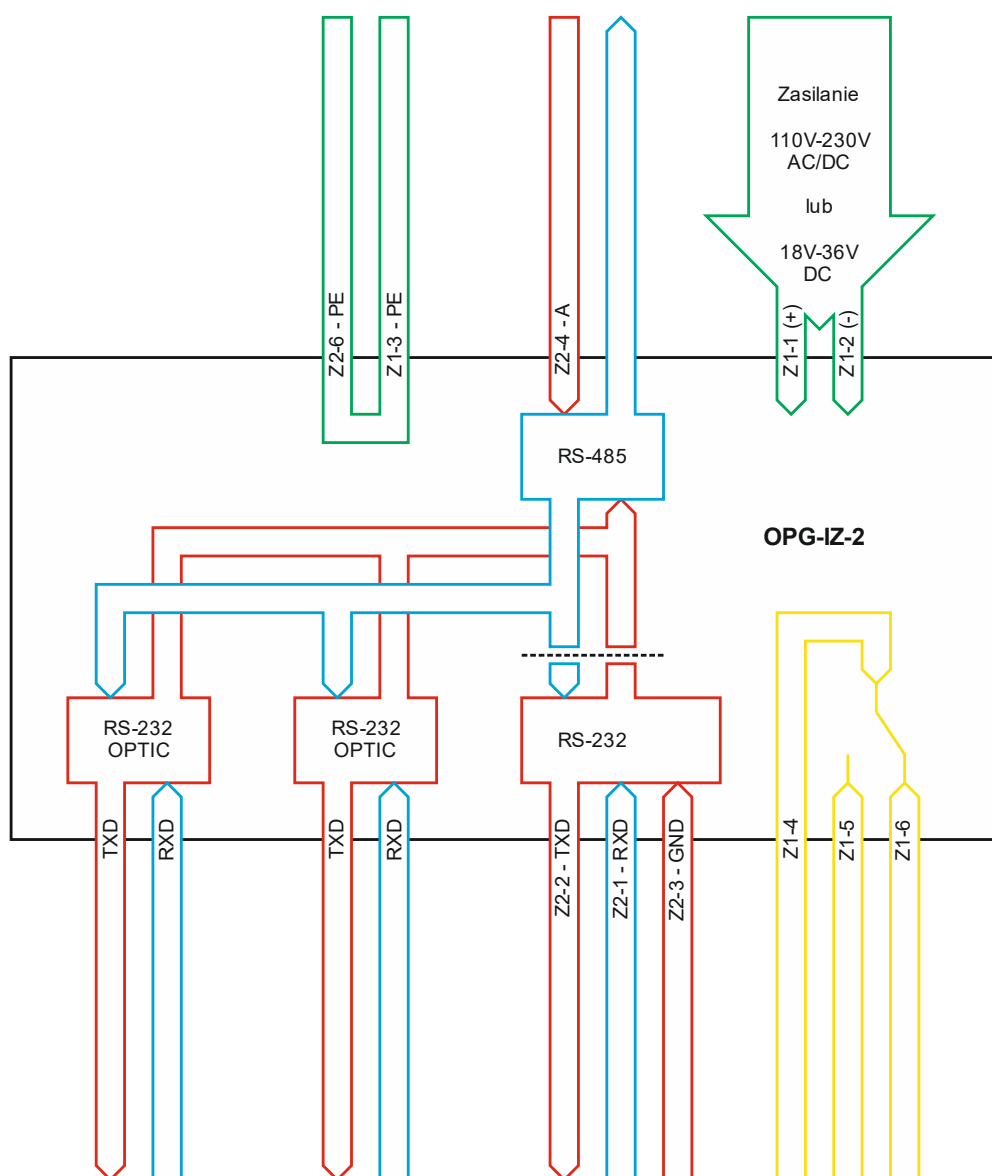


Fig. 7. OPG-IZ-2 converter – functional diagram – operating as a star coupler

5. INSTALLATION AND COMMISSIONING

5.1. Storage and preparation OPG-1/2/IZ converters for operation

OPG-1/2/IZ converters are delivered to the customer in packs to ensure that device is protected against external influences that could cause damage. Therefore, do not unpack them for storage. Transport packages should be transported and reloaded with care, avoiding shocks and maintaining the position specified on their packaging. Storage is possible in indoors, dry (relative humidity <80%), free of corrosive vapors at ambient temperature -20 °C to 70 °C.

5.2. Operation and maintenance

As part of the periodic inspection, the OPG-1/2/IZ converters should be checked at least once a year.

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NOTATKI

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