# USER'S MANUAL

INTRINSICALLY SAFE POWER
SUPPLY AND ISOLATOR

# ZS-30/1Ex

Ex version

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Applied symbols

| Symbol | Description |
|---|---|
|  | Warning that the instructions included in the documentation must be strictly observed in order to ensure the safety and full functionality of the device. |
|  | Information particularly useful during installation and operation of the device. |
|  | Information particularly useful during installation and operation of an Ex type device. |
|  | Information on disposal of used equipment. |

## BASIC REQUIREMENTS AND SAFETY OF USE

- The manufacturer will not be liable for damage resulting from incorrect installation, failure to maintain a suitable technical condition of the device or use of the device other than for its intended purpose.
- Installation should be carried out by qualified staff having the required authorizations to install electrical and I&C equipment. The installer is responsible for performing the installation in accordance with manual as well as with the electromagnetic compatibility and safety regulations and standards applicable to the type of installation.
- If a malfunction occurs, the device should be disconnected and handed over to the manufacturer for repair.

In order to minimize the risk of malfunction and associated risks to staff, the device is not to be installed or used in particularly unfavourable conditions, where the following hazards occur:

- possible mechanical impacts, excessive shocks and vibration;
- excessive temperature fluctuation.

- ZS-30/1Ex power supply and isolator should be installed in safe zones only.
- Explosion-proof installations should be made with special care and in accordance with standards and regulations applicable to this type of installations.

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# 1. INTRODUCTION

The operating manual (OM) is a document for users of ZS-30/1Ex power supplies-isolators, containing basic technical data and guidelines necessary to understand the functioning and operation of the device.
The manual provides recommendations on installation and operation methods, as well as procedures in case of a potential power supply failure.
This OM applies to the power supply-isolator in an explosion-proof, intrinsically safe version.

# 2. COMPLETE DELIVERY CHECKLIST

Power supplies are delivered in individual and/or bulk packaging. The user receives the following with the device:

- Product Certificate is provided, which also constitutes a warranty card valid for 12 months
- operating manuals
- Declaration of Conformity and/or the certificate (on request)

(The certificate and declaration of conformity are available on the website www.aplisens.pl.)

# 3. PACKAGING, TRANSPORT, AND STORAGE

**3.1** Packaging
The power supplies-isolators should be packaged in a way that protects them from damage during transport, in either bulk or individual packaging.
**3.2** Transport
The devices should be transported in bulk or individual packages, with protection against displacement during the transport. Land, sea, or air transport can be used, provided that it ensures the elimination of direct exposure to environmental factors.
**3.3** Storage
The power supplies-isolators should be stored in individual or bulk packaging, in rooms free from vapors and aggressive substances, where the air temperature ranges from +5ºC to +40ºC, and the relative humidity does not exceed 85%.

# 4. WARRANTY

The manufacturer provides a warranty under the terms specified in the Product Certificate, which is also a warranty card.

The warranty shall be repealed if the device is used against its intended use, failure to comply with user's manual or interference with the structure of the device.

# 5. APPLICATION AND FEATURES

**5.1** Application
The ZS-30/1Ex power supply-isolator is an accompanying device, i.e., it contains intrinsically safe and non-intrinsically safe circuits. The ZS-30/1Ex is intended to work with two-wire transmitters installed in explosion-hazardous zones, which generate an analog 4…20mA signal.
The supply voltage provided to the intrinsically safe input circuit can range from 7.5VDC to 24VDC (standard version). The input, output, and power circuits are galvanically separated.

Thanks to the galvanic separation of the transmitter installed in the hazardous zone from the cooperating devices (e.g., controllers, indicators, or data collection systems) in the safe zone, the influence of interference on the operation of these devices is reduced, making it easier to configure measurement systems. The power supply uses digital calibration of the output signal parameters, achieved through a 16-bit microcontroller and a 16-bit digital-to-analog converter.

**5.2** Characteristic features:

- The ZS-30/1Ex power supply isolators are rail-mounted, powered by a voltage of 20…253V AC/DC, and intended for installation in enclosures or cabinets with a lock, in dry environments free from dust and aggressive gases
- The main explosion safety requirements are met by complying with the following standards: EN 60079-0:2018, EN 60079-11:2012.
- The intrinsically safe input circuit can cooperate with the intrinsically safe circuit of the device (transmitter) installed in the explosion-hazardous zone, in accordance with the applicable conditions.
- The output and power circuits of the power supply-isolator can cooperate with power and measurement circuits supplied by transformers from a network with nominal voltage of 230VAC.

## 6. IDENTIFICATION MARKS. ORDERING PROCEDURE

ZS–30/1Ex power supply-isolator is equipped with a nameplate and additional plates, which must include at least the following information:

- manufacturer's name
- CE mark
- type designation ZS-30/1Ex
- product name
- serial number
- input and output signal values, explosion-proof construction feature, and certificate designation:

I (M1) [Ex ia Ma] I
II (1) G [Ex ia Ga] IIC
II (1) D [Ex ia Da] IIIC
KDB 19ATEX0026
IECEx KDB 23.0003

- permissible values of: voltage, current, and power for intrinsically safe input circuit
- permissible capacitance and inductance of the input circuit

The intrinsically safe circuit is marked with the color blue.

Ordering procedure:

Intrinsically safe power supply-isolator type:

**ZS-30/1Ex/___ / ___ /**

Nominal supply voltage of the input circuit according to section 7.1

Output signal according to section 7.2

Examples of orders:

1. Intrinsically safe power supply-isolator in the standard version, i.e., with a nominal input voltage $U_{IN}$ =24V and output signal 4…20mA:

**ZS-30/1Ex**

Note:
When powering APC-2000ALW, APR-2000ALW, and APR-2200ALW transmitters with the display backlight on and the factory-installed 240Ω resistor connected, the standard version, i.e., ZS-30/1Ex, should be selected..

2. Intrinsically safe power supply-isolator in non-standard version, i.e., with a nominal input voltage $U_{IN}$ =15V and output signal 4…20mA :

**ZS-30/1Ex/15V/4…20mA**

## 7. TECHNICAL DATA

### **7.1** Input circuit

The input circuit is a current loop along with the cooperating intrinsically safe transmitter, routed from the explosion-hazardous zone.
The input signal from the transmitter: 4…20mA.

| Nominal input circuit supply voltage $U_{IN}$ | 7.5V | 15V | 18V | 20V | 22V | 24V |
|---|---|---|---|---|---|---|
| Maximum voltage on input circuit terminals (<P+>,<P–>) | 7.88V | 15.75V | 18.38V | 21.0V | 23.1V | 25.2V |
| Operating supply voltage on input circuit terminals <(P+>,<P–>) | 6.8V | 14.1V | 16.5V | 18.8V | 20.6V | 22.5V |
| Min. input voltage (for $I_{IN}$=20mA) when loaded with a transmitter generating a 4…20mA signal | $U_{IN20} = U_{IN} \cdot 0.65$ | | | | | |
| Short-circuit current / Max. input circuit current (<P+>,<P–>) | 30 mA / 92 mA | | | | | |

### **7.2** Output circuit

| Output signal ($I_{OUT}$ or $U_{OUT}$) | Load resistance Ro |
|---|---|
| 4…20mA, 0…20mA | 0…500Ω |
| 0…5mA | 0…2kΩ |
| 0…5V, 1…5V, 0…10V, 2…10V | ≥ 10kΩ |

### **7.3** Metrological parameters

| Parameter name | Parameter value |
|---|---|
| Accuracy | ≤ 0.1% |
| Effect of load resistance fluctuations | ≤ ±0.05% |
| Effect of temperature fluctuations | ≤ ±0.01%/°C |
| Time constant | approx. 0.05 s (upon arrangement: 0.1 ÷ 1s) |

### **7.4** Separation of circuits. Power supply

| | |
|---|---|
| Separation of circuits | all the circuits are galvanically separated |
| Test voltage between circuits | 1.5kV 50Hz EN 60079-11, EN 61010-1 |
| Supply voltage | 20…253 V AC/DC |
| Power consumption | ≤ 2W |

**7.5** Ambient temperature: standard version : 5…+55°C
special version : -25…+55°C

**7.6** Ingress protection rating: IP20 PN-EN 60529
**7.7** Weight < 0,150 kg
**7.8** Dimensions (114 x 99 x 22,5)mm
**7.9** Relative humidity 30…85%
**7.10** Electromagnetic compatibility according to EN-61326-1
Immunity :
EN 61000-4-2: Contact ±6kV, Air ±8kV
EN 61000-4-6: 0,15…80 MHz, 3V, max. error ≤ 0,1%
EN 61000-4-4: ±1kV, 5kHz, (L/+, N/-), (P+, P-),( O+, O-)
EN 61000-4-5: ±1kV, (L/+)/PE, (N/-)/PE, P+/PE, P-/PE, sec. 10.6

**7.11** Intrinsically safe circuit parameters:
Intrinsically safe input circuits (depending on the configuration):
-terminals : <P+>,<P->

A) Certificate No. KDB19ATEX0026

1) Uo=25.2V; Io=88mA; Po=0.555W; Li ~ 0; Ci = 49.2nF

**Group I**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Lo [mH] | 41.0 | 20.0 | 10.0 | 5.0 | 2.0 | 1.0 | 0.5 | 0.2 |
| Co [µF] | 0.53 | 0.83 | 0.84 | 0.84 | 0.84 | 0.84 | 0.93 | 1.1 |
| Lo [mH] | 0.1 | 0.05 | 0.02 | 0.01 | 0.005 | 0.002 | 0.001 | |
| Co [µF] | 1.4 | 1.7 | 2.2 | 2.8 | 3.6 | 4.15 | 4.15 | |

**Group IIC**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Lo [mH] | 2.6 | 2.0 | 1.0 | 0.5 | 0.2 | 0.1 | 0.05 | 0.02 |
| Co [µF] | 0.047 | 0.051 | 0.064 | 0.081 | 0.107 | 0.107 | 0.107 | 0.107 |
| Lo [mH] | 0.01 | 0.005 | 0.002 | 0.001 | | | | |
| Co [µF] | 0.107 | 0.107 | 0.107 | 0.107 | | | | |

2) Uo=23.1V; Io=88mA; Po=0.507W; Li ~ 0; Ci = 49.2nF

**Group I**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Lo [mH] | 43.0 | 20.0 | 10.0 | 5.0 | 2.0 | 1.0 | 0.5 | 0.2 |
| Co [µF] | 0.6 | 0.96 | 1.1 | 1.1 | 1.1 | 1.1 | 1.1 | 1.4 |
| Lo [mH] | 0.1 | 0.05 | 0.02 | 0.01 | 0.005 | 0.002 | 0.001 | |
| Co [µF] | 1.6 | 1.9 | 2.6 | 3.2 | 4.1 | 5.1 | 5.1 | |

**Group IIC**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Lo [mH] | 3.3 | 2.0 | 1.0 | 0.5 | 0.2 | 0.1 | 0.05 | 0.02 |
| Co [µF] | 0.066 | 0.067 | 0.078 | 0.095 | 0.130 | 0.140 | 0.140 | 0.140 |
| Lo [mH] | 0.01 | 0.005 | 0.002 | 0.001 | | | | |
| Co [µF] | 0.140 | 0.140 | 0.140 | 0.140 | | | | |

3) Uo=21.0V; Io=92mA; Po=0.482W; Li ~ 0; Ci = 49.2nF

**Group I**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Lo [mH] | 40.0 | 20.0 | 10.0 | 5.0 | 2.0 | 1.0 | 0.5 | 0.2 |
| Co [µF] | 0.72 | 1.1 | 1.4 | 1.6 | 1.6 | 1.6 | 1.6 | 1.7 |
| Lo [mH] | 0.1 | 0.05 | 0.02 | 0.01 | 0.005 | 0.002 | 0.001 | |
| Co [µF] | 1.9 | 2.3 | 3.0 | 3.7 | 4.8 | 6.3 | 6.3 | |

**Group IIC**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Lo [mH] | 3.4 | 2.0 | 1.0 | 0.5 | 0.2 | 0.1 | 0.05 | 0.02 |
| Co [µF] | 0.1 | 0.1 | 0.1 | 0.12 | 0.15 | 0.18 | 0.188 | 0.188 |
| Lo [mH] | 0.01 | 0.005 | 0.002 | 0.001 | | | | |
| Co [µF] | 0.188 | 0.188 | 0.188 | 0.188 | | | | |

4) Uo=18.38V; Io=86mA; Po=0.395W; Li ~ 0; Ci = 49.2nF

**Group I**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Lo [mH] | 48.0 | 20.0 | 10.0 | 5.0 | 2.0 | 1.0 | 0.5 | 0.2 |
| Co [µF] | 0.88 | 1.4 | 1.8 | 2.2 | 2.7 | 2.7 | 2.7 | 2.7 |
| Lo [mH] | 0.1 | 0.05 | 0.02 | 0.01 | 0.005 | 0.002 | 0.001 | |
| Co [µF] | 2.8 | 3.1 | 3.9 | 4.8 | 6.1 | 8.5 | 8.5 | |

**Group IIC**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Lo [mH] | 4.7 | 2.0 | 1.0 | 0.5 | 0.2 | 0.1 | 0.05 | 0.02 |
| Co [µF] | 0.160 | 0.190 | 0.190 | 0.190 | 0.210 | 0.250 | 0.285 | 0.285 |
| Lo [mH] | 0.01 | 0.005 | 0.002 | 0.001 | | | | |
| Co [µF] | 0.285 | 0.285 | 0.285 | 0.285 | | | | |

5) Uo=15.75V; Io=90mA; Po=0.353W; Li ~ 0; Ci = 49.2nF

**Group I**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Lo [mH] | 45.0 | 20.0 | 10.0 | 5.0 | 2.0 | 1.0 | 0.5 | 0.2 |
| Co [µF] | 1.2 | 1.8 | 2.3 | 2.9 | 3.7 | 4.5 | 5.4 | 5.8 |
| Lo [mH] | 0.1 | 0.05 | 0.02 | 0.01 | 0.005 | 0.002 | 0.001 | |
| Co [µF] | 5.8 | 5.8 | 6.3 | 7.4 | 9.2 | 13.0 | 13.6 | |

**Group IIC**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Lo [mH] | 4.7 | 2.0 | 1.0 | 0.5 | 0.2 | 0.1 | 0.05 | 0.02 |
| Co [µF] | 0.190 | 0.320 | 0.420 | 0.420 | 0.420 | 0.420 | 0.460 | 0.478 |
| Lo [mH] | 0.01 | 0.005 | 0.002 | 0.001 | | | | |
| Co [µF] | 0.478 | 0.478 | 0.478 | 0.478 | | | | |

6) Uo=7.88V; Io=89mA; Po=0.176W; Li ~ 0; Ci = 49.2nF

**Group I**

| Lo [mH] | 51.0 | 50.0 | 20.0 | 10.0 | 5.0 | 2.0 | 1.0 | 0.5 |
|---|---|---|---|---|---|---|---|---|
| Co [µF] | 4.2 | 4.2 | 6.9 | 8.5 | 10.0 | 13.0 | 15.0 | 18.0 |
| Lo [mH] | 0.2 | 0.1 | 0.05 | 0.02 | 0.01 | 0.005 | 0.002 | 0.001 |
| Co [µF] | 23.0 | 29.0 | 38.0 | 58.0 | 90.0 | 180.0 | 1000 | 1000 |

**Group IIC**

| Lo [mH] | 6.1 | 5.0 | 2.0 | 1.0 | 0.5 | 0.2 | 0.1 | 0.05 |
|---|---|---|---|---|---|---|---|---|
| Co [µF] | 0.610 | 0.720 | 1.100 | 1.400 | 1.800 | 2.300 | 2.800 | 3.500 |
| Lo [mH] | 0.02 | 0.01 | 0.005 | 0.002 | 0.001 | | | |
| Co [µF] | 4.800 | 6.300 | 8.600 | 8.800 | 8.800 | | | |

B) Certificate IECEx KDB 23.0003

1) Uo=25.2V; Io=88mA; Po=0.555W; Li ~ 0; Ci = 49.2nF

**Group I:** Lo=0.2mH; Co=1.1uF
**Group IIC:** Lo=0.2mH; Co=0.107uF

2) Uo=23.1V; Io=88mA; Po=0.507W; Li ~ 0; Ci = 49.2nF

**Group I:** Lo=0.2mH; Co=1.4uF
**Group IIC:** Lo=0.2mH; Co=0.130uF

3) Uo=21.0V; Io=92mA; Po=0.482W; Li ~ 0; Ci = 49.2nF

**Group I:** Lo=0.2mH; Co=1.7uF
**Group IIC:** Lo=0.2mH; Co=0.15uF

4) Uo=18.38V; Io=86mA; Po=0.395W; Li ~ 0; Ci = 49.2nF

**Group I:** Lo=0.2mH; Co=2.7uF
**Group IIC:** Lo=0.2mH; Co=0.210uF

5) Uo=15.75V; Io=90mA; Po=0.353W; Li ~ 0; Ci = 49.2nF

**Group I:** Lo=0.2mH; Co=5.8uF
**Group IIC:** Lo=0.2mH; Co=0.420uF

6) Uo=7.88V; Io=89mA; Po=0.176W; Li ~ 0; Ci = 49.2nF

**Group I:** Lo=0.2mH; Co=23uF
**Group IIC:** Lo=0.2mH; Co=2.300uF

# 8. CONSTRUCTION

## 8.1 Electronic construction

The electronic construction of the ZS-30/1Ex power supply-isolator consists of three isolated circuits:

a) power supply circuit

The power supply circuit is based on a pulse converter, operating on a specialized integrated controller with a built-in switching transistor, a ferrite transformer, and several auxiliary components. The output winding of this converter is used to power the output signal circuit and to power the second pulse converter, responsible for powering the intrinsically safe circuit. The protection from the power supply side includes a fuse and a varistor.

b) input circuit

The input circuit provides a voltage of one of six values from 7.5 V to 24 V, which supplies the transmitter installed in the explosion hazard zone via a two-wire line. The 4…20mA signal generated in the line by the transmitter, powered by the aforementioned voltage, is introduced into the 16-bit microcontroller's analog-to-digital converter and then transmitted to the output 16-bit digital-to-analog converter using 3 digital opto-isolators. The input circuit is protected by a safety system that limits short-circuit current and input voltage for the hazardous zone. This system is part of the input circuit and consists of a series current limiter made of infallible resistors and 3 parallel Zener diodes, which are intended to limit the voltage. The nominal voltages can be 7.5V, 15V, 18V, 20V, 22V, and 24V. The limiting diodes are protected by a 32mA, 250V fuse according to IEC 60127. The nominal voltages can be 7.5V, 15V, 18V, 20V, 22V, and 24V. The limiting diodes are protected by a 32mA, 250V fuse according to IEC 60127.

c) output circuit

The output circuit converts the analog signal from the input circuit to one of the standard analog output signals. The main element of the output circuit is a 16-bit digital-to-analog converter, equipped with both voltage output and current outputs, as well as digital opto-isolators. The output circuits of the digital opto-isolators are protected by resistors, a Zener diode, and a 32mA, 250V series fuse in accordance with IEC 60127. The power supply separator can cooperate with devices powered via network transformers from a 230V 50Hz supply on the output circuit side. The output circuit is protected by a Transil diode.

## 8.2 Mechanical construction

The ZS-30/1Ex electronic system is assembled on a single PCBenclosed in a rail-mounted housing.

The enclosure features a nameplate and information labels. A green LED indicator On the front panel signals that the supply voltage is applied. The housing is designed for mounting on a TS-35 or TS-32 rail (EN 60715).

**The terminals for connecting the intrinsically safe input circuit are marked with a blue label.**

**The power supply connectors, i.e. sockets and plugs, are paired using coding profiles, eliminating the risk of incorrect connections.**

# 9. INSTALLATION

**9.1.** The rail-mounted ZS–30/1Ex power supply-isolator shall be installed in non-hazardous environment — dry, free from dust and aggressive gases, and protected from mechanical exposure. It is designed for TS–35 or TS–32 rail mounting and requires a cabinet or enclosure with a lock preventing unauthorized access.

**9.2.** If the environmental conditions at the installation site do not meet the requirements outlined in section 9.1, the enclosure or installation cabinet shall provide a protection rating of at least IP54, depending on the specific environmental conditions. Additionally, it is recommended to use higher-rated enclosures or cabinets if operation in subzero ambient temperatures is expected.

**9.3.** In the case of wall-mounted enclosures, an enclosure with one or more power supply separators installed on a TS-35 or TS-32 rail is considered equivalent to an installation cabinet. In this case, the enclosure serves as the installation site for intrinsically safe devices, including power supply separators.

# 10. ELECTRICAL CONNECTIONS

**10.1.** The ZS–30/1Ex power supply-isolator should be installed in a vertical position, in accordance with the orientation of the front nameplate. The ventilation holes should be positioned at the top and bottom of the unit. The installation method is shown in Fig. 2, section 15.

**10.2.** Power supply-isolator should be connected as shown in Fig. 1. The input terminals <P+> and <P–>, marked with a blue label, should only be connected to intrinsically safe circuits (e.g., transmitters) with a protection level of “ia” or “ib” and without internal power sources. The power and measurement line to the hazardous zone (input circuit) should be installed in accordance with EN 60079-25:2023. The maximum values of inductance and capacitance of the circuit, as specified in the certificate and section 7.11, must not be exceeded. It is recommended to use twisted pair cables for signal lines and, in the case of significant electromagnetic interference, a twisted pair in shielding. Signal cables should not be routed together with interfering cables, such as near large energy-consuming devices or alongside power and control cables for inductive loads.

**10.3.** The <0+> and <0–> terminals of the ZS–30/1Ex output circuit may be connected to cooperating devices located in a safe zone, powered by a maximum of 250V AC via a mains transformer.

**10.4.** When mounting the ZS–30/1Ex on rails, both in cabinets and in wall-mounted enclosures, a minimum distance of 50mm must be maintained between the intrinsically safe and non-intrinsically safe circuit terminals. If this distance cannot be maintained, an insulated or grounded metal partition should be used. It is also recommended to secure the installation wires near the terminals.

**10.5.** Adjacent installations and devices should be mounted in such a way that does not violate the separation conditions between intrinsically safe and non-intrinsically safe circuits (e.g., appropriate distances, barriers, additional cable fixings, insulation status, etc.). Labels indicating the contents and cable outlet locations should be placed on the cabinets and enclosures.

**10.6.** The cable length from the output of the power supply-isolator (terminals O+, O-) to the measurement system should not exceed 30 meters. For longer connections, it is recommended to install surge protection on the signal line.

**10.7.** For a 230V AC power supply, the wiring shall comply with the relevant safety and electromagnetic compatibility standards, as well as local regulations and requirements. In the case of disturbances from the 230V AC power supply, anti-interference filters are recommended. Cables connected to the filter output should not be run in parallel with disturbed cables (e.g., control circuits for relays or contactors).

**10.8.** The fundamental requirements according to PN-EN 60079-25:2023 for type A and B cables used to conduct power and signal circuits in hazardous zones.
**10.8.1.** The insulation thickness should be suited to the material type, with a minimum of 0.2 mm.
Insulation strength:
– 2xUN, but not less than 500V AC per conductor,
– 500V AC between the cable shield and the conductors,
– 1000VAC between two bundles of conductors, each containing half of the connected conductors.
**10.8.2.** No non-intrinsically safe circuits may be run in a multi-conductor cable. Conductors from circuits with a maximum voltage exceeding 60 V should not be run in the same cable.
**10.8.3.** Cables should be protected from damage by being run in cable trays, protective tubes, cable ladders, and through the use of permanent cable supports.
**10.9** The power supply should be installed in an environment with a pollution degree of 2 (or better) and in a surge category with an insulation voltage rating of ≤600V AC/DC (according to Table F.1 PN-EN 60079-11).
**10.10** Connect the PE (grounding) terminal (see Fig. 1, section 15) to the grounding system.

## 11. SETTING AND ADJUSTMENT

The following parameters of ZS–30/1Ex repeater power supply are factory setting (according to customer's requirements):
a) supply voltage of input circuit,
b) time constant,
c) selected output signals.
The power supply is equipped with a digital processing system and an internal RS-232 communication system. The user does not have access to the measurement range limits settings. Any correction of the settings is possible only at the manufacturer.

## 12. INSPECTIONS, REPAIRS, AND SPARE PARTS

**12.1.** Periodic inspections.
**12.1.1.** The ZS–30/1Ex power supply-isolator does not require maintenance during normal operation. Inspections should be performed periodically in accordance with the inspection standards applicable to the user's explosion-proof equipment.
As part of the inspection, the external condition of the device should be checked.

The following should be verified:
- absence of mechanical damage to the enclosure
- no loosening of terminal connections or cable fastenings
- the nameplate and other labels are undamaged and legible.

**12.1.2.** The short-circuit current of the input circuit should be checked by connecting an ammeter to terminals <P+>, <P–> and reading the measurement. The short-circuit current value must not exceed the values specified in section 7.1.
The supply voltage of the transmitter in the hazardous zone should be checked by connecting a voltmeter to terminals <P+>, <P–>. The measured values shall comply with the voltage values specified in section 7.1.
**12.2.** Non-periodic inspections.
Non-periodic inspections should be carried out if the isolators have been exposed to harmful mechanical or electrical impacts or if any abnormalities in device operation are detected.

**If a device malfunction is detected, repairs or any other interference with the isolator's electronic circuit are prohibited.**
**Damage assessment and repairs may only be carried out by the manufacturer or an authorized entity.**

## 13. SCRAPPING AND DISPOSAL

Devices that have reached the end of their service life or have been damaged shall be disposed of in compliance with the WEEE Directive (2012/19/EU) on waste electrical and electronic equipment or returned to the manufacturer.

## 14. ADDITIONAL INFORMATION

**14.1** The manufacturer reserves the right to introduce design and technological changes that do not violate the conditions of the intrinsic safety certificate and do not degrade the quality of the power supply-isolators.
**14.2** Related documents
Certificate KDB 19ATEX0026
Certificate IECEx KDB 23.0003
**14.3** Reference standards
EN IEC 60079-0:2018; EN 60079-11:2012; EN IEC 60079-25:2022; EN 61010-1:2010;
EN 60529:1991; EN 60715:2017; EN IEC 61326-1:2021;
IEC 60079-0:2017 Edition:7.0; IEC 60079-11:2011 Edition:6.0

## 15. FIGURES

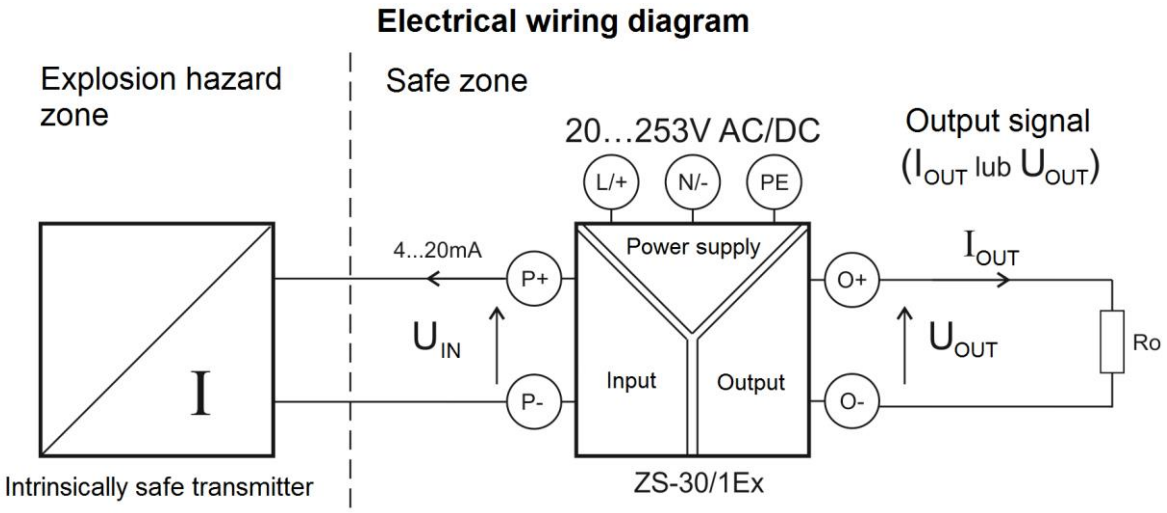


FIG.1 ZS-30/1Ex power supply-isolator connection diagram with converter

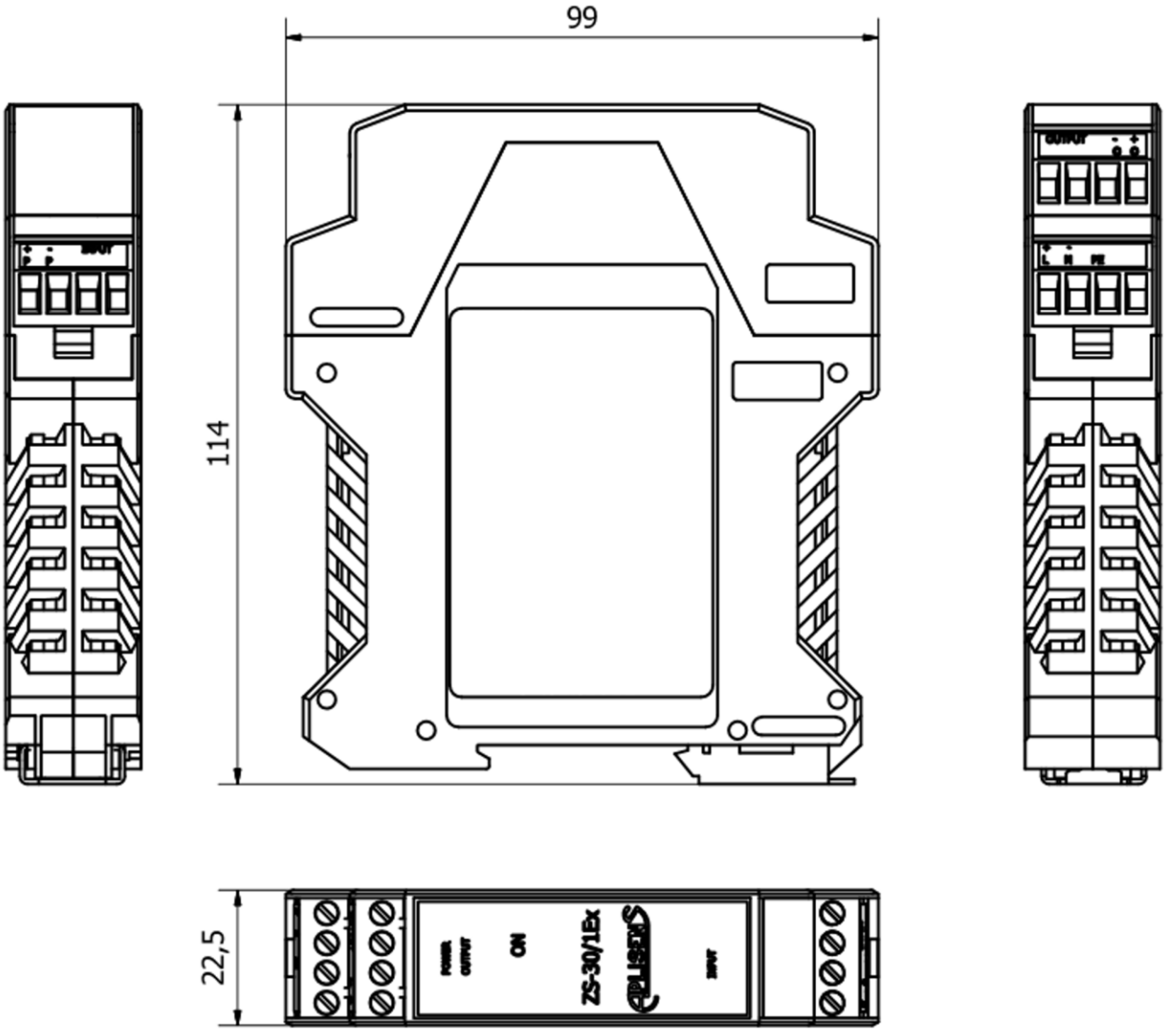


FIG. 2 ZS-30/1Ex power supply-isolator in a rail-mounted enclosure

FIG. 3 ZS-30/1Ex power supply-isolator - view

## 16. HISTORY OF REVISIONS

| Revision no. | Document revision | Description of changes |
|---|---|---|
| - | 01.A.001/2019.06 | Initial document version.<br>Prepared by DKD, BR-OST. |
| 1 | 02.A.002/2020.08 | Update of the power supply voltage range, PE terminal connection method, and EMC immunity parameters.<br>Prepared by DKD, DCF, BR-OST. |
| 2 | 02.A.003/2023.04 | Update of: standards, certificate designation, power supply voltage range, EMC immunity parameters, intrinsically safe circuit parameters, drawings.<br>Prepared by BR-OST. |
| 3 | 03.A.003/2025.04 | Update of standards, certificate designation, and intrinsically safe circuit parameters.<br>Prepared by BR-OST, DCF. |