

## APPLICATION

- For power supply of two-wire converters
- For galvanic separation of signals
- For conversion of unified current signals from devices installed also in conditions with a threat of explosion (design EExi – 901 000 10x)

The sources are rated products pursuant to the Act No. 22/1997 Coll. and the Declaration of Conformity **EC-901000** is issued for them.

## DESCRIPTION

The components are located on two spatially separated boards with printed circuits. On the board of the output amplifier, there are potentiometers, in addition to the terminal board and fuses, which are used to adjust zero and maximum of the output signal. On the board of the input amplifier, there is a diode, in addition to the terminal board, which indicates serviceable conditions of the device. Both boards are connected in a way, which enables their dismantling, and are located in a shared cover. On the rear side of this cover, there is a lock for the installation on a standardized load-bearing bar (pursuant to ČSN EN 60715); in addition to this type of installation, the source can also be attached on the wall with the use of 2 screws.

## TECHNICAL DATA

The source is designed as an electrical equipment of protection class II for the application in networks with the category of overvoltage in the installation III and pollution grade 1 pursuant to ČSN EN 61010-1; the inner source of output voltage for power supply of circuits of two-wire converter corresponds to Article 6.3 of the said standard.

**Follow-up equipment** pursuant to ČSN EN 50014 and ČSN EN 50020 ed.3:

⊕ II(1)G [EExia] IIC  
(design EExi - 901 000 10x )

**The source** is short-circuit-proof; it has a fuse of mains power supply T 32L250V pursuant to ČSN EN 60127-2. The mains transformer has built-in reversible temperature protection. Design EExi - 901 000 10x has fuse T 50mA / 35A 250V in the circuit of output signal.

**Electric strength** pursuant to ČSN EN 61010-1 Article 6.8.4:  
mains circuit against input and output circuits  
5660 V DC  
input circuit against output:  
2120 V DC

**Electric insulation resistance** pursuant to ČSN 34 5611:  
min. 100 MΩ

**Power input:** max. 7 VA  
**Ingress protection** pursuant to ČSN EN 60529: IP 20  
**Operation position:** to be determined by the type of installation

**Weight:** approx. 0.35 kg  
**Type of operation:** continuous

**Used materials:**  
Box (cover): PC (30%GV), RAL7032, UL 94 V-1  
Body of the terminal board, blind flange, face: PC UL 94 V-2  
**Type of connecting terminals:** screw type; for wires up to 4 mm<sup>2</sup>

## CERTIFICATION

Design EExi – 901 000 10x

- Non-explosiveness ⊕ II(1)G [EExia] IIC,  
EC-Type Examination Certificate pursuant to the Decree of the Government 23/2003 Coll. FTZÚ 03 ATEX 0127X

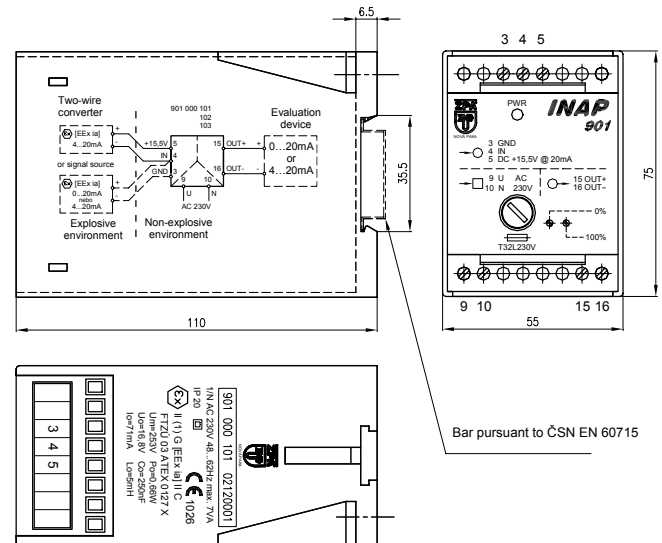
## OPERATION CONDITIONS

**The environment** is defined by the group of parameters and their severity grades IE 36 pursuant to ČSN EN 60721-3-3 and the following operation conditions:

**Ambient temperature:** -20 °C to +70 °C  
In case of a close installation of a neighbouring device, max. ambient temperature is decreased:  
in case of one-sided installation to + 60 °C  
in case of two-sided installation to + 55 °C

## Relative ambient humidity:

10 to 95 % with condensation, with upper limit of water content 29 g H<sub>2</sub>O/kg of dry air



**Atmospheric pressure:** 70 to 106 kPa  
**Type of power supply mains:** 1/N AC 230 V 50 Hz  
**Tolerance of supply voltage:** +10 %, -15 %  
**Tolerance of mains frequency:** 48 ÷ 62 Hz  
**Coefficient of upper harmonics:** max. 10 %  
**Settlement period:** 30 minutes  
**Electromagnetic compatibility:**  
Emissions: they comply with the standard ČSN EN 61000-6-3  
Limit values of interfering voltage on mains terminals pursuant to ČSN EN 55022: class B, group 1  
Resistance: it complies with the standard ČSN EN 61326  
Electrostatic discharges pursuant to ČSN EN 61000-4-2 intensity ± 4 kV air: functional criterion B  
External electromagnetic field 27 to 1000 MHz, mod. 80 % AM / 1 kHz, pursuant to ČSN EN 61000-4-3 ed.2 intensity 3 V/m: functional criterion A  
Fast transient phenomena pursuant to ČSN EN 61000-4-4 ed.2 intensity 1/0.5kV: functional criterion B  
Surge impulse pursuant to ČSN EN 61000-4-5 intensity 1/0.5kV: functional criterion B  
External electromagnetic field 0.15 to 80 MHz transmitted via wiring pursuant to ČSN EN 61000-4-6, intensity 3 Vef: functional criterion A  
External magnetic fields 50 Hz pursuant to ČSN EN 61000-4-8, intensity 400 A/m: functional criterion A  
Power supply drops and failures pursuant to ČSN EN 61000-4-11 ed.2 level 0 % UT, voltage drop by 100%, time of existence 5 periods: functional criterion B

**METROLOGICAL DATA****Input signal for design EExi - 901 000 10x:**

Input signal from circuit of two-wire converter:	4 to 20 mA
Input resistance:	25 Ω
Permitted exceeding of limits of input signal:	max. 200 %
Parameters of power supply circuit of two-wire converter	
- Supply voltage $U_0$	
o Maximum output voltage (idle):	16.8 V
o At nominal load 20 mA:	15.5 V ± 0.8 V
o Ripple of supply voltage max.:	30 mV šš.
- Maximum output current $I_0$ :	71 mA
- Maximum output $P_0$ :	0.66 W
- Maximum capacity $C_0$ :	250 nF
- Maximum inductance $L_0$ :	5 mH
- Maximum circuit resistance of current loop:	

$$R_{\max} = \frac{14,7 - U_{p\min}}{0,02}$$

Input signal from other signal sources:  
0 to 20 mA or 4 to 20 mA

Input resistance:	25 Ω
Permitted exceeding of limits of input signal:	max. 200 %
Parameters of input signal circuit	
- Maximum input voltage $U_i$ :	28 V
- Maximum input current $I_i$ :	93 mA
- Maximum power input $P_i$ :	0.66 W
- Maximum inner capacity $C_i$ :	0 nF
- Maximum inner inductance $L_i$ :	0 mH

**Input signal for design 901 000 20x :**

Input signal from circuit of two-wire converter: 4 to 20 mA  
Input signal from other signal sources:  
0 to 20 mA or 4 to 20 mA

Input resistance:	25 Ω
Permitted exceeding of limits of input signal:	max. 200 %
Parameters of supply circuit of two-wire converter	
- Supply voltage $U_0$	
o Maximum output voltage (idle):	20.0 V
o At nominal load 20 mA:	18.0 V ± 1.0 V
o Ripple of supply voltage max.:	45 mV šš
- Maximum resistance of circuit of current loop:	

$$R_{\max} = \frac{17,0 - U_{p\min}}{0,02}$$

**Output signal:** 0 to 20 mA or 4 to 20 mA  
Type of output signal (4 to 20 mA or 0 to 20 mA) can be selected by the user in dependency on the type of input signal (4 to 20 mA or 0 to 20 mA) with the procedure pursuant to Article *INSTALLATION AND CONNECTION, Change of configuration*.

At the factory, the device is set-up according to the specifications in the purchase order.

Range of set-up of start and end of conversion characteristics:  
min ± 0.5 mA

Load resistor:	max. 700 Ω
Ripple of output signal:	max. 0.003

Limitation of output signal (informative value):  
 $I_{OUT} > 23$  mA

Max. voltage, which can be brought to terminals 15, 16 (only for design 901 000 10x):  $U_m = 253$  V AC

**Basic error** (it is related to span of output signal):

Prescribed static characteristics:	linear
Limits of permitted basic error:	max. ± 0.2 %
Linearity error:	max. ± 0.1 %
Long-term drift for 4800 hours:	max. ± 0.15 %
Time response between 10 and 90 % of settled period on transient characteristics (informative value):	max. 1 ms

**Additional errors:**

Output signal:	
- With change of ambient temperature for each 10 °C:	max. ± 0.1 %
- Within the whole operation range of supply voltage:	max. ± 0.1 %
- Within the whole operation range of load resistor:	max. ± 0.1 %
- Within the whole range of permitted vibrations	max. ± 0.1 %

Supply voltage for two-wire converter:

- For each 10 °C of ambient temperature change:	max. ± 0.5 %
- Within the whole operation range of supply voltage:	max. ± 0.5 %

**DESIGNATION****Data on product:**

- Registered trademark of the manufacturer
- Product ordering number
- Ingress protection
- Manufacturing number
- Type of supply mains
- Maximum power input
- Data about class of el. equipment and insulation
- Scheme of connection of co-operating devices
- Mark CE (design 901 000 20x)
- For design EExi 901 000 10x
  - o Mark of non-explosiveness and certificate number
  - o Parameters:  $U_m = 253$  V  
 $U_0 = 16.8$  V  
 $I_0 = 71$  mA  
 $P_0 = 0.66$  W  
 $C_0 = 250$  nF  
 $L_0 = 5$  mH
- o Mark CE 1026

**DELIVERY**

Unless agreed otherwise with the customer, each delivery includes:

- Delivery note
- Source pursuant to the purchase order
- Accessories:
  - 2 pcs of fuses T32L250V pursuant to ČSN EN 60127-2
- Accompanying technical documentation in Czech:
  - o Product quality and completeness certificate, which also serves as the warranty certificate
  - o EC Declaration of Conformity (only for design EExi)
  - o Product manual

If it is established in the purchase contract or agreed otherwise, the following documentation can be also delivered with the product:

- EC Declaration of Conformity
- Copy of EC-Type Examination Certificate pursuant to the Decree of the Government 23/2003 Coll. (only for design EExi)

**PACKING**

Both sources and accessories are delivered in a packing ensuring resistance to the impact of thermal effects and mechanical effects pursuant to controlled packing regulations.

**TRANSPORT**

The sources may be transported on conditions corresponding to the set of combinations of classes IE 21 pursuant to ČSN EN 60721-3-2 (i.e. by airplanes and trucks, in premises that are ventilated and protected against atmospheric conditions).

**STORAGE**

The sources may be stored on conditions corresponding to the set of combinations of classes IE 12 pursuant to ČSN EN 60721-3-1 (i.e. in places without control of temperature and humidity, at temperature from -25 to 70 °C, with a threat of condensation, dropping water and formation of ice but without a special threat of an attack with biological agents, with vibrations of small significance and not situated close to sources of dust and sand).

**ORDERING**

The purchase order shall specify

- Name
- Product ordering number
- Number of pieces

**PURCHASE ORDER EXAMPLE****Standard design**

Intrinsically safe source INAP 901  
901 000 102  
10 pcs

## DESIGN OF SOURCE INAP 901

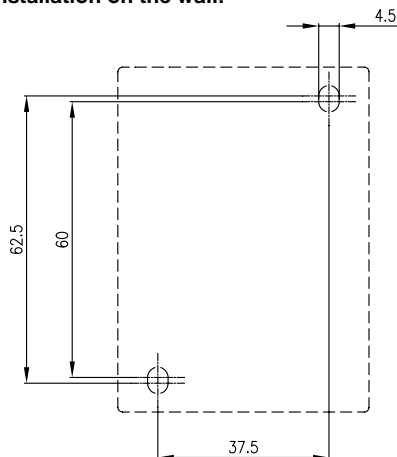
SPECIFICATIONS		ORDERING NUMBER			
		901	000	x	xx
Intrinsically safe source + separating element (EExi)				1	
Source + separating element				2	
Input signal					
from two-wire converter	from other signal sources				
4 - 20 mA	4 - 20 mA				01
					02
	0 - 20 mA				03
					01

## INSTALLATION AND CONNECTION

## MECHANICAL INSTALLATION

The device is connected either to a standardized load-bearing bar ČSN EN 60715 (DIN bar TS 35) or on the wall (or frame) by means of two screws.

## Device installation on the wall:



## WARNING

After the installation, aerial distance of mains terminals (terminals 9 and 10) from surrounding conductive objects shall exceed 8 mm.



## WARNING

For design 901 000 10x:

The device may only be located in the conditions without any threat of explosion.

After the installation, the aerial distance between:

- blank live parts of wires connected to terminals of intrinsically safe source (terminals 3 to 5) and surrounding conductive objects shall be over 3 mm.
- terminals of intrinsically safe source (terminals 3 to 5) and circuits, which are not intrinsically safe, shall be over 50 mm.

In case of a close installation of a neighbouring device, max. ambient temperature is decreased

- in case of one-sided installation to + 60 °C
- in case of two-sided installation to + 55 °C

## ELECTRICAL CONNECTION

The electrical connection may be only realized by qualified workers pursuant to § 5 of the Decree 50/1978 Coll.

Connection for design 901 000 10x refer to

Figure 1- Scheme of connection

Connection for design 901 000 20x refer to

Figure 2 – Scheme of connection

## Connection of power supply circuit:

Recommended type of cable CMSM 2D x 1.0 mm<sup>2</sup>

The device installation shall include a switch or a circuit-breaker that enables disconnecting of the device from the supply mains.

## Connection of circuit of input signal:

Recommended type of cable: JQTQ 2 x 0.8.

Shielding is only connected on the side of the signal source.

If the input circuit of the device is a part of intrinsically safe source, wiring shall comply with values pursuant to Article METROLOGICAL DATA, input and ČSN EN 50020 ed.2. Converters or signal sources are connected pursuant to separate own technical conditions.

## Connection of circuits of output signal:

Recommended type of cable: JQTQ 2 x 0.8

Shielding is only connected on the side of the evaluation device. The evaluation devices of output signal are connected pursuant to separate own technical conditions.

## CHANGE OF CONFIGURATION

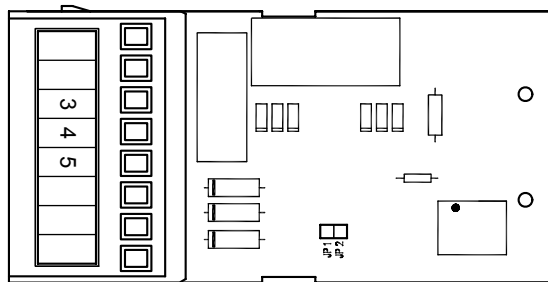
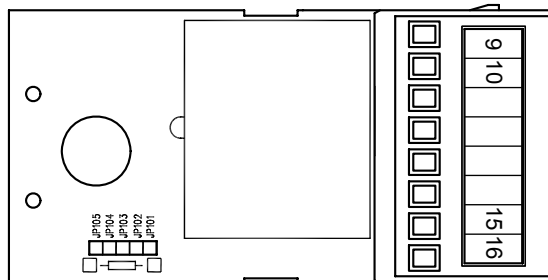
Type of output signal (0 to 20 mA or 4 to 20 mA) in dependence on the type of input signal (0 to 20 mA or 4 to 20 mA) can be selected by the user by the adjustment of interconnecting pieces JP A and JP B pursuant to the following table:

INPUT SIGNAL	OUTPUT SIGNAL	INTERCONNECTED	
		JP A	JP B
4 - 20 mA	4 - 20 mA	-	JP 104 + JP 105
4 - 20 mA	0 - 20 mA	-	JP 101 + JP 102
0 - 20 mA	4 - 20 mA	JP 1 + JP 2	JP 103 + JP 104
0 - 20 mA	0 - 20 mA	-	JP 104 + JP 105

After a change of position of interconnecting pieces, start and end of the conversion characteristic shall be adjusted by means of a potentiometer P 101 (0 %) and P 102 (100 %). Required tools: screw driver 0.6x4.5; screw driver 0.5x3.5; screw driver 0.3x2.0.

Procedure (refer to Figure 3 – Device disassembly):

- Disconnect all wires from the terminal boards;
- With the use of a screw driver, carefully lever out the front panel from the position in the body of the terminal board;
- Open the sides of the box with a non-violent pull (approx. to 2-3 mm); by concurrent pressure on both bodies of the terminal board (approx. by 2-3 mm) in the direction inside the device, slide the securing locks of both terminal boards from the holes in the sides of the box;
- By pulling for both terminal boards, remove the set of both boards with printed circuits from the box;
- Install interconnecting pieces JP A and JP B according to the required configuration;
- Insert the set of both boards with printed circuits into the box;
- Insert the front panel into its position in the body of the terminal board and secure it with slight pressure till it clicks;
- Connect power supply and circuits of input and output signals; by means of potentiometers P 101 (0 %) and P 102 (100 %) adjust start and end of conversion characteristic.

**Position of interconnecting pieces JP A:****Position of interconnecting pieces JP B:****DISABLING AND LIQUIDATION**

They shall be realized in compliance with the Waste Act No. 106/2005 Coll.

The product and its package do not include any parts that could impact the environment.

Products that are withdrawn from operation, including their packages (with the exception of products marked as electrical equipment for the purposes of return withdrawal and separate salvage of electrical waste), may be disposed of to sorted or unsorted waste pursuant to the type of waste.

The manufacturer realizes free return withdrawal of marked electrical equipment (from 13.8.2005) from the consumer and points out the danger connected with their illegal disposal.

The package of the source can be recycled completely. Metal parts of the products are recycled, non-recyclable plastic materials and electrical waste shall be disposed of in compliance with the aforesaid Act.

**COMMISSIONING**

After the connection, the device is prepared for operation. The device is functional immediately after the connection of supply voltage; it complies with metrological parameters after 30 minutes of operation.

**WARNING**

A failure to comply with the instructions specified herein can result in an erroneous function or, as the case may be, in a failure of the device without any right to a warranty repair.

**OPERATION AND MAINTENANCE**

The device does not require any operation and maintenance with the exception of adjustment of the output signal.

**SPARE PARTS**

The design of the source does not require any delivery of spare parts.

**WARRANTY**

Pursuant to § 429 of the Commercial Code and the provisions of § 620 (2) of the Civil Code, the manufacturer warrants for technical and operation parameters of the product specified in the manual. The warranty period is 24 months from the receiving of the product by the customer, unless established otherwise in the contract. Rejection of defects shall be enforced in writing at the manufacturer within the warranty period. The rejecting side shall specify the product name, ordering and manufacturing numbers, date of issue and number of the delivery note, clear description of the occurring defect and the subject of the claim. If the rejecting side is invited to send the device for repair, it shall do so in the original package of the manufacturer and/or in another package ensuring safe transport.

The warranty shall not apply to defects caused by unauthorized intervention into the device, its forced mechanical damage or failure to comply with operation conditions of the product and the product manual.

**REPAIRS**

With respect to a possible replacement, the mains fuse is accessible through the hole in the front panel. Other repairs shall be realized by the manufacturer. The device shall be sent for repair in the original or equal package without accessories.

Figure 1 - Scheme of connection

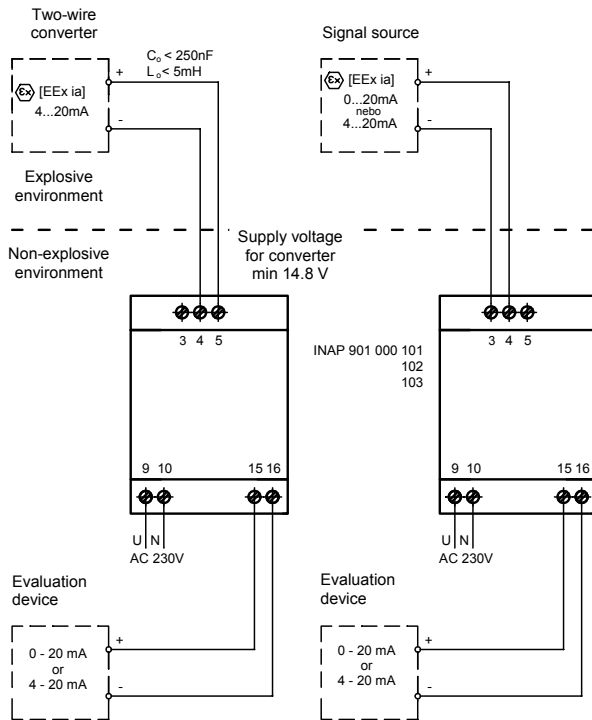


Figure 2 - Scheme of connection

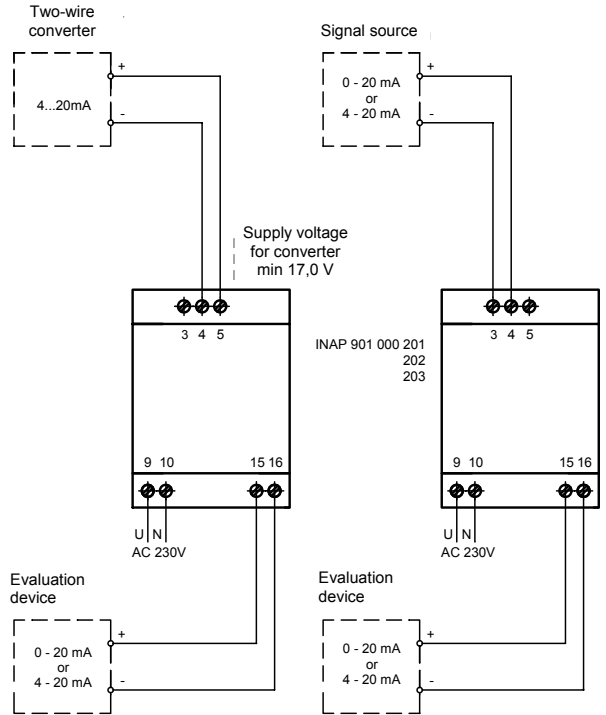
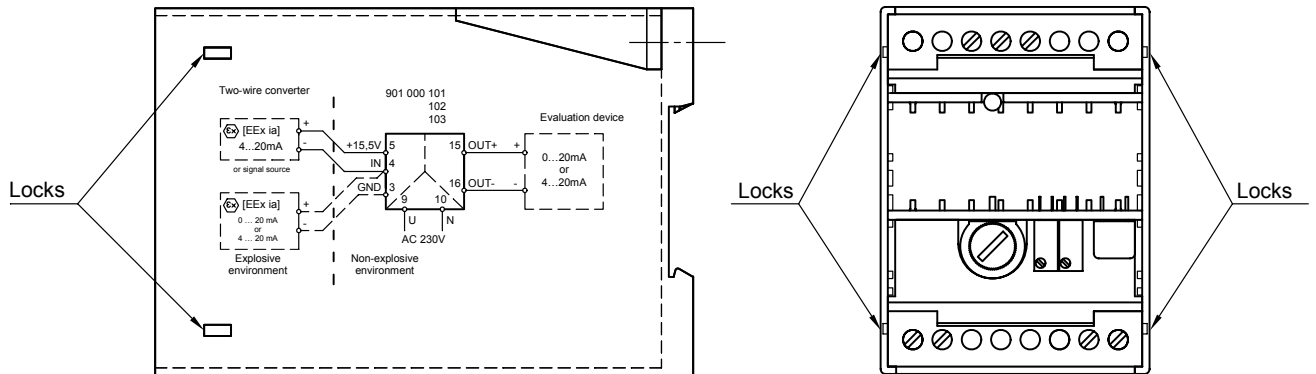


Figure 3 - Device disassembly



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