ZPA NOVÁ PAKA

PRUDUCT MANUAL

Two-wire smart to DIN rail converter isolated, programmable

INOR

IPAQ R330/ R330X

APPLICATION

- To convert a resistance or thermoelectric sensor signal to a unified output signal 4 to 20 mA or 20 to 4 mA
- For installation on 35 mm DIN rail according to EN 60715 / DIN 50022
- For explosive conditions in areas Zone 2, Zone 1 and Zone 0 pursuant to EN 60079-10 in case of using the converter R330X

DESCRIPTION

On the front side of the converter there are terminals for sensor connection and power supply / evaluation and a connector for PC connection (configuration units).
The converter is powered from an external source and is equipped with polarity protection and EMC circuits. Converters is equipped with galvanic isolation, sensor error correction and the whole system, adjustable output function at sensor interruption and short-circuit, a run counter to monitor elapsed running time between calibrations.
In case of instability or interference at the input, an adjustable output filter level can be used.
The converter is set up using a PC connection via USB, using the ConSoft software or on a portable device with NFC and Bluetooth. All HW and SW required to set up the converter is included in the supplied ICON configuration set (separately supplied), no power required for programming.

TECHNICAL DATA

Intrinsically safe version pursuant to EN 60079-0 and EN 60079-11 (version R330X):
Ex II 1G Ex ia IIC T6…T4 Ga
Intrinsically safe circuit parameters:

Output (terminals 6 and 7):	Input (terminals 1 to 5):
U_i: ≤ 30 V DC	U_o: ≤ 6,5 V DC
I_i: ≤ 100 mA	I_o: ≤ 11,7 mA
P_i: ≤ 900 mW	P_o: ≤ 19,1 mW
L_i: 20 µH	L_o: 400 mH
C_i: 23,1 nF	C_o: 24 µF

Galvanic isolation: 1500 V AC/ 1 min
Ingress protection EN 60529: IP 20 / IP 20
Weight: approx. 0,070 kg
Terminals type: screw, wire cross section 1,5 mm^2
Communication interface: mini USB connector, NFC and Bluetooth

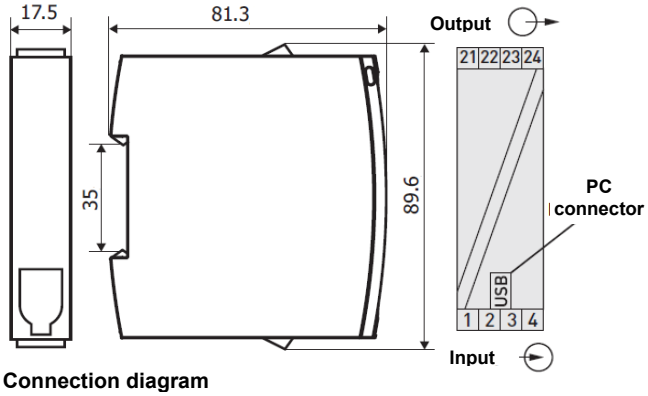
OPERATION CONDITIONS

Ambient temperature:
R330 -40 to +85 °C
R330X -40 to +60 °C (T6)
-40 to +75 °C (T5)
-40 to +85 °C (T4)
Relative ambient humidity:
0 to 95 % without condensation
Vibrations pursuant to IEC 60068-2-6:
test Fc, 10…2000 Hz, 10g
Converter power supply:
R330 from source SELV, (i.e. INAP 16 or INAP 901)
R330X from intrinsically safe source Ex ia,
Type of power supply:
R330 DC 8 V to 36 V
R330X DC 8 V to 30 V
see parameters of intrinsically safe source
Electromagnetic compatibility EMC:
pursuant to EN 61326-1 and EN 61326-2-3, criterion A
Load resistance of current output signal:

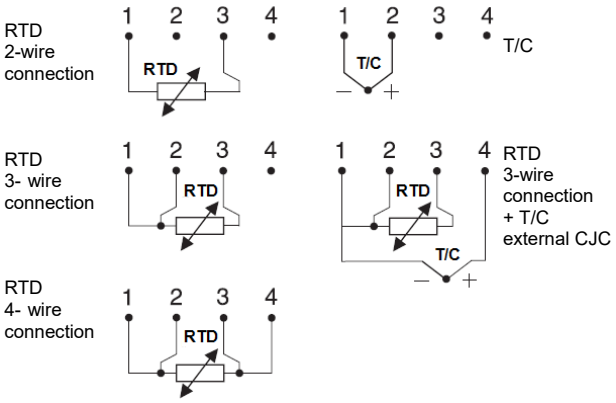
$$Rzc\ \max = \frac{Un-8}{0{,}022}[\Omega,V] \quad Rzc = Rz + Rv[\Omega]$$

where *Rzc* max … the maximum total load resistance *Rzc*
Un … the supply voltage of the power supply
Rv … the wire resistance in the power loop
Rz … the load resistance

Dimension drawing and location of terminals

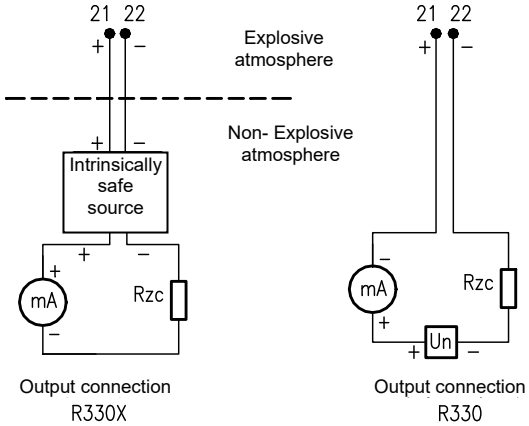


Connection diagram



RTD - *Measuring resistance*
T/C – *Thermocouple (compensation wire connection)*
CJC – *Cold junction compensation*

Schéma zapojení výstupu



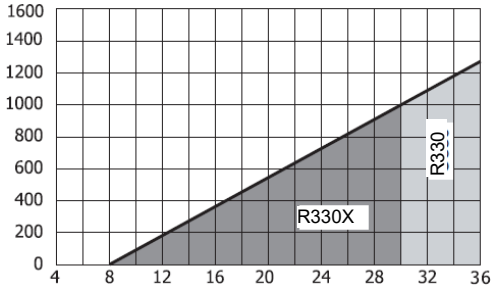
Accuracy table:

Setting probe		Measuring range [°C]	Min. span [°C]	Accuracy [°C]	Accuracy [%] of span	Temperature influence [Dev. from ref temp. 20°C]
RTD *)	Pt 100	-200…+850	10	±0,08	±0,08	±0,01% of span per °C
	Pt X ***)	only to 4 kΩ		±0,1	±0,1	±0,01% of span per °C**)
	Ni 100	-60…+250				±0,01% of span per °C
	Ni 120	-60…+250				
	Ni 1000	-50…+180				±0,01% of span per °C**)
	Cu 10	-50…+200	83	±1,5	±0,2	±0,02% of span per °C
T/C ****)	B	+400…+1800	700	±1	±0,1	±0,01% of span per °C
	C	0…+2315	200			
	D	0…+2315	200			
	E	-270…+1000	50	±0,5	±0,1	
	J	-210…+1000	50			
	K	-270…+1300	50			
	N	-100…+1300	100			
	N	-270…-100	100	±1	-	±0,1% of span per °C
	R	-50…-1750	300	±1	±0,1	±0,01% of span per °C
	S	-50…+1750	300			
	T	-270…+400	50	±0,5	±0,1	

*) Valid for 3- and 4-wire connection. For factory settings Pt100, 3-wire connection, 0…100°C applies ±0,05°C
**) For 2-wire connection an span >2000 Ω applies ±0,02% of span per °C
***) 10 ≤ X ≤ 1000
****) Cold Junction Compensation error is not included. ≤ 0,5°C within ambient temperature range.

Load characteristics

R330 R330X



CERTIFICATION

Version R330X

- Non-explosiveness Ⓔx II 1G Ex ia IIC T4…T6 Ga
  EU-Type Examination Certificate pursuant to the 2014/34/EU KIWA 16 ATEX 0040 X

Configuration kit ICON-X

- Non-explosiveness II (1)G [Ex ia Ga] IIC
  EU-Type Examination Certificate pursuant to the 2014/34/EU KIWA 16 ATEX 0011 X

P A C K I N G

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

METROLOGICAL DATA

INPUT SIGNAL:

- from a resistance sensor
  Pt100 (α=0.00385 [K^{-1}])
  PtX 10 ≤ X ≤ 1000 (α=0.00385 [K^{-1}]) The upper range depends on the X value, max. input temperature corresponding to 4000 Ω
  Ni100 (DIN 43760)
  Ni1000 (Edison Curve No. 7)
  Ni1000 (DIN 43760)
  Cu10 (Edison Copper Windings No. 15)
- from resistance 0…10000Ω
- from potentiometer 100…10000Ω
- from thermocouple
  B, E, J, K, N, R, S, T (IEC 60584)
  C,D (ASTM E 988)

Minimum span:

RTD 10°C
resistance / potentiometer 10 Ω
voltage 2 mV

Sensor current: ≤300 µA

RTD

Maximum sensor wire resistance:
2- wire loop resistance compensation 0 to 100 Ω
3 and 4- wire 50 Ω / wire

Zero adjustment: anywhere in the limited range

T/C

Input impedance: >10 MΩ

Maximum wire loop resistance:
10 kΩ (loop including thermocouple)

Cold Junction Compensation (CJC):
Internal, external (Pt100) or fixed

OUTPUT SIGNAL:
4 to 20 mA, 20 to 4mA, temperature, resistance or voltage linear, customized linearization possible

Stabilization time: max. 15 minutes

Sensors break and short-circuit sensor:
≤ 3,6 mA or >21 mA

Supply voltage influence:
<±0.005 % of span per 1 V

Long-term drift:
max. ± 0,02°C or ± 0,02% of span per year

Adjustable filtering level:
0,17…90 s (default 1,4s) (3-wire RTD)

CONVERTER INSTALLATION IN CONDITIONS WITH EXPLOSIVE GAS ATMOSPHERE

Only R330X converters can be installed in an explosive gas atmosphere. An intrinsically safe power supply approved for powering intrinsically safe equipment must always be used.

R330X

If an ICON-X certified interface is used, the converter can be connected to a sensor that is located in a **explosive atmosphere.**

R330

The converter must not be installed in explosive atmosphere or connecter to sensor in explosive atmosphere or using an ICON-X certified interface

CONVERTER SETTING

The converter is set up using a PC connection via USB, using the ConSoft software or NFC interface in portable device such as a smartphone. NFC applies only to later versions of IPAQ 330. The smartphone app – INOR Connect, makes it possible to read, write, save and share settings directly in the field.

PC programmable:

- Measuring range are set from PC
- Full accuracy is provided without any need for calibration
- Configuration without external power

High security

The configuration is protected by a password and the date the changes were written.

Runtime counter
The runtime counter function can be used to monitor the elapsed operating time.

Configuration software ConSoft
ConSoft configuration software is a tool for configuring the converter, such as measuring range, sensor fault operation, error correction, TAG, etc.
ConSoft is part of the complete ICON configuration kit, which also includes a USB interface and the necessary cables.

Before configuring the converter R330 or R330X using a PC, follow these steps:
1. Install the ConSoft configuration software and INOR USB communication drivers on your computer.
2. Connect the USB interface to an available USB port on your computer and wait for the USB to install automatically. For detailed installation instructions, see the ConSoft installation guide.

Configuration procedure:
1. Connect the converter to a computer via USB, the "DEV" LED on the USB interface will turn green. Configuration can be done with or without power supply.
2. In ConSoft, click the "Read" button. The software recognizes the connected converter and opens the configuration window.
3. In the "R330 / R330" configuration window, edit the parameters that need to be changed.
4. The selected configuration is downloaded to the converter by clicking on the "Write" button. When the data transfer is complete, the converter starts using the new parameters directly.

CONVERTER ORDEING NUMBER

R330	70R3300012
R330X	70R330X012
Ex Configuration kit (software ConSoft, Ex modem, USB cables)	70USBX001
ICON-BT Bluetooth kit	70CFGBT001

OPTIONAL ACCESSORIES

Ex CONFIGURATION KIT ICON

The kit includes a USB storage medium with ConSoft configuration software and drivers, an ICON-X USB interface and the necessary cables (USB cable for connecting PC to USB and cable for connecting USB to converter). The set is placed in a plastic case.
All software, USB drivers and installation guides can also be downloaded from the website www.inor.com.

USB ICON-X is a portable device to be connected between the converter and the computer used to configure the converter. It is enclosed in a non-metallic housing with three built-in status LEDs. The device has a computer connector and a converter connector.
When connecting the ICON-X configuration interface to the converter, the converter and interface must not be placed in an explosive atmosphere.

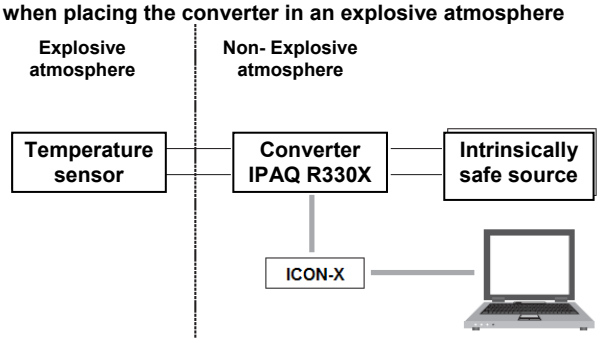
Non-explosiveness version pursuant to EN 60079-0 and EN 60079-11: Ex II (1)G [Ex ia Ga] IIC
Intrinsically safe circuit parameters:
Mini USB connector to converter
U_o: 9,4 V DC
I_o: 96 mA
P_o: 0,68 W
Connector USB to PC
U_m: 250 V AC/DC

PC to USB Interface	USB cable type A to type B
USB Interface to converter	Changeable adapter cables
Power supply	PC´s USB port, 5 V DC, max. 74 mA
Operation temperature	0 to 50 °C
Storage temperature	-20 to 70 °C
Humidity (non-condensing)	0 to 90% RH
Galvanic isolation	1500 V AC
System requirements	32- or 64bit edition of Windows, Windows XP (SP2 +) /Vista /Windows 7/ 8/ 8.1/ 10
Free hard disk space	185 MB
PC Port	1x USB 1.1 or higher port type A

Electromagnetic compatibility EMC:
pursuant to EN 61326-1 and EN 61326-2-3

There are three LED indicators on the USB Interface: "USB", "PC" and "DEV". They are indicator to make the understanding of the communication between PC and converter easier. Their functions are described below:
- LED "USB" indicates data transfer. It lights during data transfer, otherwise it is off.
- "PC" LED indicates a connection between the Configuration program and PC. Green only when reading or writing to the converter.
- "DEV" LED indicates the connection status of the converter. If it is green, the connected converter is detected by the USB Interface. Flashing green indicates that the USB Interface is waiting for a new converter from the same product group, e.g. change to a new device. If it is red, no converter is detected by the USB Interface and any sort converter can be connected to the USB Interface.

Wiring diagram when configuring the IPAQ R330X on-line when placing the converter in an explosive atmosphere



ICON-BT KIT
ICON –BT is an Interface for wireless communication between portable devices (e.g. smartphone) and INOR temperature converter.
The configuration procedure use the NFC function in combination with a smartphone with built-in NFC support to perform all settings of the converter. The converter does not need any power or other external connection, just to be close to the smartphone. The app makes it possible to read, write, save and share settings directly in the field.

The logging function give the possibility to log events directly in the field without any other equipment beside the smartphone. The logged data can be stored or shared by the mobile network. It make it also very simple to read an display the actual measuring value in the converter.

The app does also give direct access to the converter documentation and calibration data through an internet connection.

ICON –BT kit includes USB cable for connecting the interface to the converter, two AAA batteries and user instruction

Ambient temperature: -20 to 50°C

Establish communication via ICON_BT interface:
Before configuring the converter open the sliding list at the back of the ICON-BT, insert batteries into the interface. Make sure that the + and – ends are in the correct position.

1. Download the app INOR Connect from App Store or Google Play Store an install it on your device.
2. Set Bluetooth communication to ON in your portable device (e.g. smartphone)
3. Connect the ICON-BT to converter using the supplied cable

4. Start INOR Connect on your device.
5. You can now manage the converter via the app and choose from four options at the mail screen.

6. When selecting *Read Configuration* or *Monitoring*, the app will scan for available devices and show them in a list.
   Click on the device you want to connect to. The name of your ICON-BT is the same as the serial number, which can be found on the product label.

ZPA Nová Paka, a.s.
Pražská 470
509 39 Nová Paka

tel.: spojovatel: 493 761 111
fax: 493 721 194
e-mail: obchod@zpanp.cz

www.zpanp.cz
bankovní spojení: ČSOB HK
číslo účtu: 271 992 523/300

IČO: 46 50 48 26
DIČ: CZ46504826