Modular Housings for Hazardous Areas

Knick

IsoTrans® 36/37

For hazardous area/safe area isolation of 0 ... 20 mA standard signals without power supply.

The Task

Hazardous area normally means systems in continuous operation that require highly reliable components. The measurement signals need to be transmitted to the controller outside the hazardous area very accurately to control the processes optimally.

The Problems

Often complex systems with power supplies are used for reliable hazardous/safe area isolation combined with electrical isolation to prevent measurement errors.

The Solution

Knick loop-powered isolators for 0(4) ... 20 mA signal transmission. These devices are available as hazardous-area input and hazardous-area output isolators. Due to their patented design (German patent 3526997), they are considered to be the most reliable solution for isolating standard signals without external power supply.

The Advantages

The IsoTrans® 36 and 37 isolators are not only suitable as highly reliable isolators for normal applications, they also meet the most extreme requirements that can be set for potential isolation. There is no need to wire the power supply.

The Technology

The pioneering TransShield® technology allows specifications that previously could not be implemented:

– Extremely high reliability
– Safe Isolation, transient protection
– 10 kV test voltage (optional)
– High electromagnetic compatibility
– Extremely low residual ripple and common-mode interference
– Excellent pulse formation
– High transmission accuracy
– SMART transmission
– Hazardous/safe area isolation

In addition to the analog signals, they also transmit data protocols for SMART transmitters (HART®). They allow bidirectional communication from every point of the cabling.

Special model available! Measure voltage without a power supply.

Voltages in the range from 250 to 1200 V DC can be converted into current signals up to 5 mA using a special loop-powered version of the isolator. This allows, for example, the contact wire voltage to be checked easily. Please contact us if you need detailed information on this special model.

Warranty
5 years!

Defects occurring within 5 years from delivery are remedied free of charge at our works (carriage and insurance paid by sender).

Loop-Powered Isolators for Standard Signals



Knick

The Facts

Galvanic isolation between input and output signal
Protection against measuring errors caused by grounding problems and parasitic interference voltage

No power supply required
Cost saving due to lower wiring effort, no mains influences

Very low residual ripple
No interference of the connected measuring or control system

Explosion protection according to ATEX

High transmission accuracy
Excellent pulse formation due to exact transmission of measured values

Very low common-mode interference
Avoiding incorrect measurements or failure due to interference signals

Maximum reliability
No repair and failure costs

10 kV test voltage (optional)

Safe Isolation according to EN 61140
Protection of maintenance staff and subsequent devices against non-permitted high voltages

SMART transmission
Bidirectional point-to-point transmission of digital data according to HART® specification

5-year warranty

HART® is a registered trademark of the HART Communication Foundation

Modular Housings for Hazardous Areas

IsoTrans® 36/37

Product Line

Devices		Order No.
IsoTrans® 36	Input intrinsically safe	36 A7
IsoTrans® 37	Output intrinsically safe	37 A7
IsoTrans® 36 A9 special model	Passive voltage measurement, details on request	36 A9-xxx

Power supply
None, supply from input signal

Options	
Increased test voltage 10 kV AC	471

Specifications

Input data	**36 A7**	**37 A7**
Input[1]	0 ... 20 mA, intrinsically safe	0 ... 20 mA
Operating current	≤ 20 µA	
Overload	50 mA	
Voltage drop	Approx. 4.5 V at 20 mA[2]	Approx. 4 V at 20 mA

Output data	**36 A7**	**37 A7**
Output	0 ... 20 mA, max. 10 V (corresponds to 500 ohms load)	0 ... 20 mA, max. 20 V, intrinsically safe (corresponds to 1000 ohms load)
Load error	< 0.15 % meas. val. per 100 ohms load	
Offset	< 20 µA	
Residual ripple V_{rms}	< 10 mV at 20 mA and 500 ohms load	

Transmission behavior	
Transmission error	0.2 % meas. val.
Rise or fall time	≤ 400 µs at 500 ohms load (10 ... 90 %, jump from 0 ... 20 mA or 20 ... 0 mA)
HART® attenuation	<10 dB

1) Linear transmission IsoTrans® 36: up to 50 mA, IsoTrans® 37: up to 22 mA
2) Approx. 8.5 V at 50 mA

Specifications *(continued)*

Isolation

Test voltage	4.4 kV AC 10 kV AC with option 471
Working voltages (basic insulation)	3600 V AC/DC, 2500 V AC[3] with overvoltage category II and pollution degree 2 according to EN 61010-1 For applications with high working voltages, you should ensure there is sufficient spacing or isolation from neighboring devices and protection against electric shocks. Permissible working voltages for other overvoltage categories and pollution degrees on request. For hazardous area applications the maximum working voltage is 250 V.
Protection against electric shock	Safe Isolation according to EN 61140 by reinforced insulation in accordance with EN 61010-1. Working voltages with overvoltage category II and pollution degree 2: 600 V AC/DC. For applications with high working voltages, you should ensure there is sufficient spacing or isolation from neighboring devices and protection against electric shocks. For hazardous area applications the maximum working voltage is 250 V.

Standards and approvals	**36 A7**	**37 A7**
Explosion protection	II (1) G [EEx ia] IIC, input intrinsically safe PTB 02 ATEX 2134	II (2) G [EEx ib] IIC, output intrinsically safe PTB 02 ATEX 2063
	For further specifications, refer to EC-Type-Examination Certificates.	
EMC[4]	European EMC regulations according to 89/536/EEC directive NAMUR NE 21, EN 61326	

Other data

Ambient temperature	Operation: –10 ... +50 °C Transport and storage: –30 ... +80 °C
Design	Modular housing, width 22.5 mm, screw terminals, See dimension drawings for further measurements
Ingress protection	Housing IP 20, terminals IP 20
Mounting	With snap-on mounting for 35 mm top hat rail according to EN 50022, see dimension drawings for conductor cross section
Weight	Approx. 120 g

3) For circuits according to table 6 from EN 61010-1 (transient overvoltage 2600 V)
4) In the 1 ... 20 mA range

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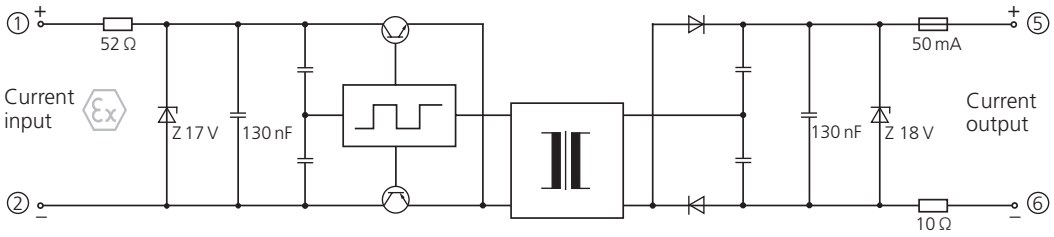
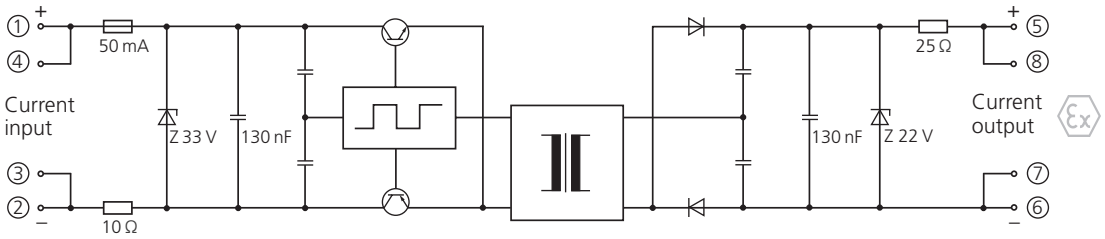
Block Diagrams

IsoTrans® 36 A7

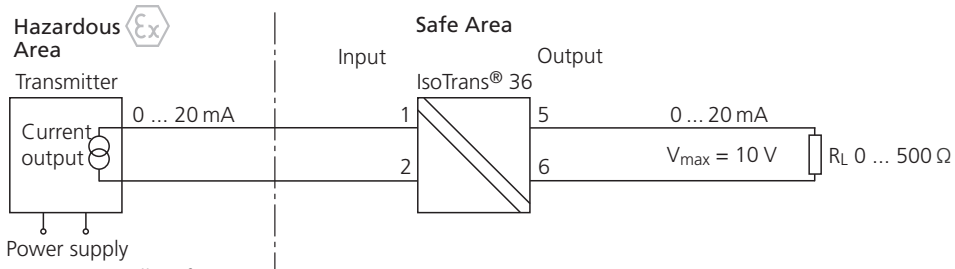


IsoTrans® 37 A7



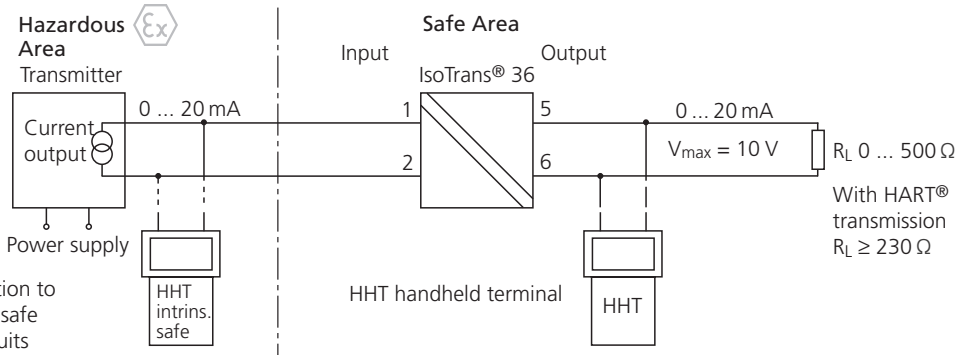
Application Examples IsoTrans® 36 A7

Without HART® communication



For connection to intrinsically safe current circuits with the following maximum values:
$I \leq 100$ mA $P \leq 1.1$ W
C_i ineffective L_i ineffective

With HART® communication



For connection to intrinsically safe current circuits with the following maximum values:
$I \leq 100$ mA $P \leq 1.1$ W
C_i ineffective L_i ineffective

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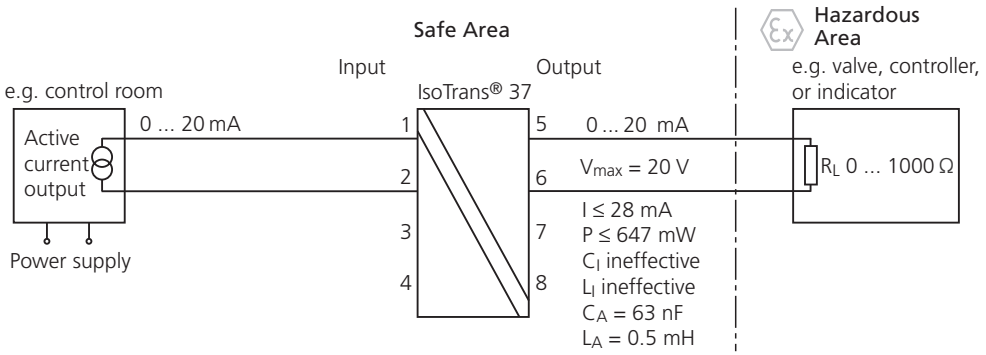
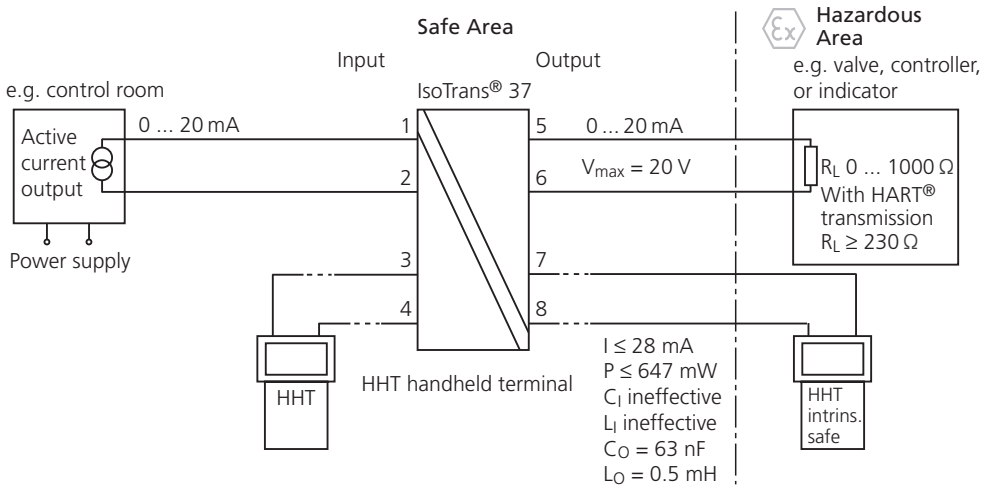
Application Examples IsoTrans® 37 A7 *(continued)*

Without HART® communication



With HART® communication



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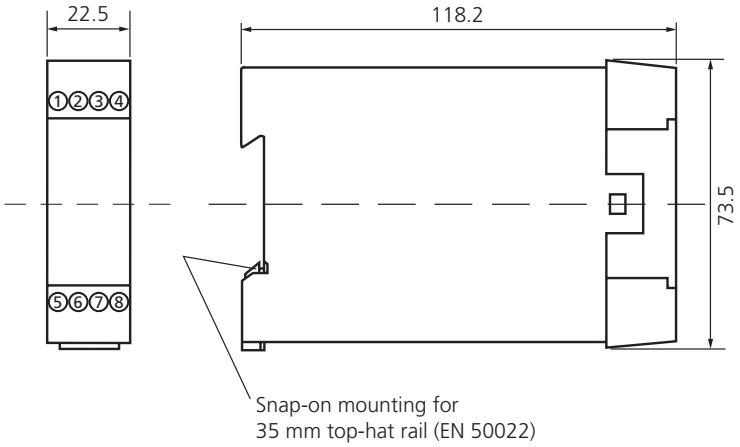
Dimension Drawings and Terminal Assignments



Captive M3x8 clamping screws, box terminals with self-releasing wire protection, max. conductor cross-section
1 x 4 mm² solid; 1 x 2.5 mm² stranded with ferrule;
2 x 1.5 mm² stranded with ferrule

Installation, commissioning, and maintenance may be carried out only by trained personnel!

All dimensions in mm!

IsoTrans® 36 A7

1 Input +
2 Input –
5 Output +
6 Output –

IsoTrans® 37 A7

1 Input +
2 Input –
3 HHT non-intrinsically safe
4 HHT non-intrinsically safe
5 Output +
6 Output –
7 HHT intrinsically safe
8 HHT intrinsically safe

HHT = handheld terminal