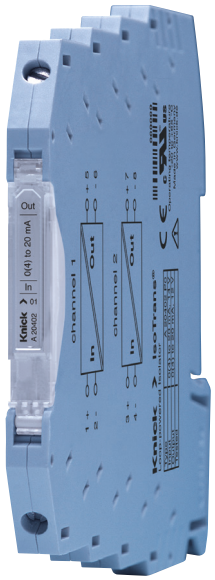


IsoTrans A 20400

The first decoupled passive isolator with load stop function to provide protective separation of 0(4) ... 20 mA standard signals.

The Task
Measurement signals between sensor and controller should be galvanically isolated to ensure reliable and safe operation of the installation. Here, loop-powered signal isolators are a low-cost solution. There is no expenditure for power supply units and the associated wiring.

The Problems
are often, particularly in large plants, the lack of space for mounting the isolators and the higher operating temperatures in distributors and enclosures.

The Solution
from Knick are the advanced series loop-powered isolators IsoTrans A 20400. Thanks to an extremely high packing density of up to 320 channels per meter of mounting rail and outstanding technical properties such as protective separation, these isolators leave the competition in the dust —even when it comes to the price-performance ratio!

The Housing
The ultra-slim 6 mm wide modular housing for one or two channels allows for simple and fast installation.

The Functional Principle
The IsoTrans A 20400 draws its power as a voltage drop directly from the measurement signal without falsifying it. There are no costs for a power supply and wiring. The IsoTrans A 20400 has virtually no self-heating that would cause the electronic components to age faster. Together with a patented circuit design, this means maximum reliability.
The consequence of this extraordinary long service life: 5-year warranty!

The Technology
Transmission error of just 0.1 %, excellent squareness behavior and very low residual ripple guarantee perfect signal transmission. The low internal voltage drop of approx. 1.7 V only loads the signal slightly.

The high test voltage up to 2.5 kV and protective separation up to 300 V according to EN 61140 protect the operating personnel against the mains voltage, for example.

Functionality Without Undesired Feedback
Now, Knick has considerably expanded the application possibilities of passive isolators by implementing a load stop function. The current supplied at the primary side is maintained independent of the output load, without generating feedback. Thus, for the first time, any excessive load increase at the output, such as that caused by line breakage or inconstant loads including complex impedances, can be compensated for.

IsoTrans A 20400

Facts and Features

- **Extremely compact design**
  up to 320 channels per meter
- **1- and 2-channel versions**
  Cheap and flexible for a wide range of applications
- **Galvanic isolation**
  between input and output protects against incorrect measurements or damage to the equipment due to parasitic voltages
- **Protective separation up to 300 V AC/DC according to EN 61140**
  to protect personnel and equipment
- **Load stop prevents undesired feedback**
  e.g., in the case of an open output circuit
- **No power supply required**
  Cost savings due to lower wiring requirements, no mains interference, no unnecessary heating and therefore maximum service life of components
- **High accuracy**
  No falsification of measurement signal
- **Maximum reliability**
  No repair and failure costs
- **International use**
  UL / CSA approvals
- **5-year warranty**

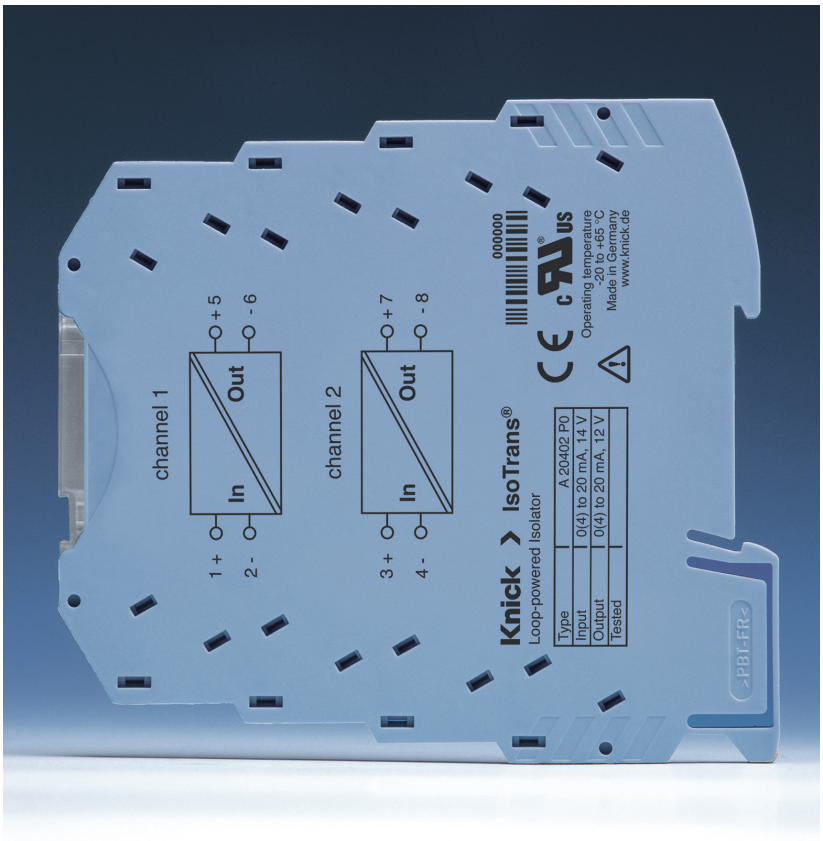
6 mm CLASS

TYPE APPROVED PRODUCT DNV DNV.COM/AF

c UL us

EAC

5 Year Warranty!



Loop-Powered Isolators for Standard Signals

Product Line

Device		Order no.
IsoTrans A 20400	1-channel, P0 modular housing (width: 6 mm)	**A 20401 P0**
	2-channel, P0 modular housing (width: 6 mm)	**A 20402 P0**
	1-channel, P0 modular housing (width: 6 mm), with load stop	**A 20411 P0**
	2-channel, P0 modular housing (width: 6 mm), with load stop	**A 20412 P0**

Power supply

None, supply from input signal

Specifications

Input data	A 20401 and A 20402 (without load stop)	A 20411 and A 20412 (with load stop)
Input	0(4) … 20 mA / max. 18 V	0(4) … 20 mA / max. 3 V
Min. operating current	Approx. 150 µA	Approx. 150 µA
Voltage drop	Approx. 1.7 V at 20 mA	Approx. 1.5 V at 20 mA
Overload capacity	40 mA, 18 V	50 mA, 3 V

Output data		
Output	0(4) … 20 mA / max. 12 V (600 Ω load at 20 mA)	0(4) … 20 mA / max. 1.2 V (60 Ω load at 20 mA)
Residual ripple	< 10 mV_{rms}	

Transmission behavior		
Transmission error	< 0.1 % full scale	
Load error	< 0.05 % meas. val. per 100 Ω	Negligible
Response time (T_{99})	Approx. 5 ms at 500 Ω load	Approx. 5 ms at 60 Ω load
Temperature coefficient[1)]	< 0.002 %/K of meas. val. per 100-ohm load (reference temperature 23 °C)	< 0.002 %/K full scale (reference temp. 23 °C)

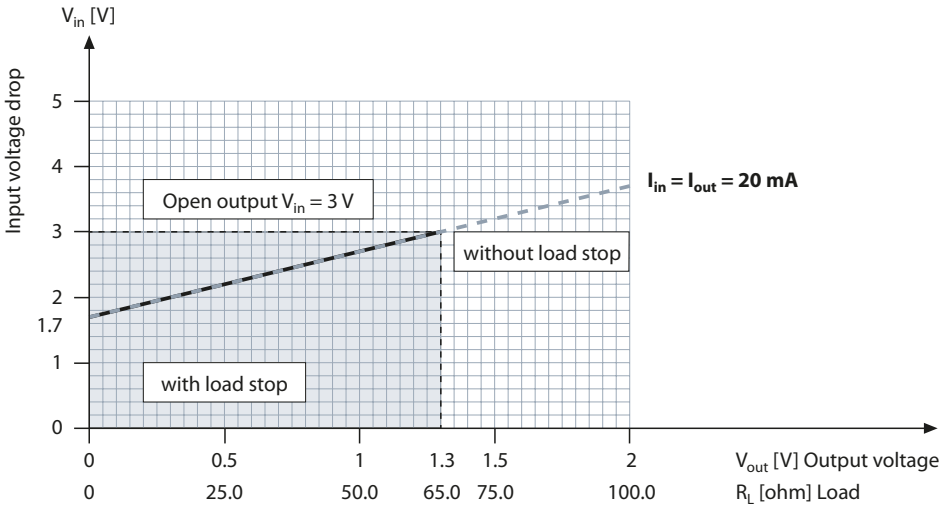
IsoTrans A 20400

Specifications *(continued)*

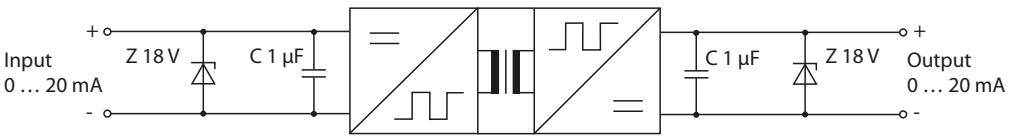
Isolation	
Test voltage	2.5 kV AC
Working voltage (basic insulation)	Up to 600 V AC/DC with overvoltage category II and pollution degree 2, across input and output of the same channel and channels against one another
Protection against electric shock	Protective separation to EN 61140 by reinforced insulation according to EN 61010-1. Working voltage up to 300 V AC/DC across input and output of the same channel and channels against one another with overvoltage category II and pollution degree 2. For applications with high working voltages, take measures to prevent accidental contact and make sure that there is sufficient distance or insulation between adjacent devices.
Standards and approvals	
EMC[2]	Product family standard: EN 61326 Emitted interference: Class B Immunity to interference: Industrial environment
Approvals	cUL: Standards: UL 508 and CAN/CSA 22.2 No. 14-95, File E220033 DNV: No. TAA00002H9
RoHS conformity	According to directive 2011/65/EU
Further data	
MTBF[3]	Approx. 1031 years/channel
Chopper frequency	Approx. 100 kHz
Ambient conditions	Indoor use[4] ; relative humidity 5 … 95 %, no condensation; max. altitude 2000 m (air pressure: 790 …1060 hPa) [5]
Ambient temperature	Operation: –20 … +65 °C Transport and storage: –25 … +85 °C
Design	Modular housing with screw terminals, 6.2 mm wide See dimension drawings for further measurements
Conductor cross sections	Single wire 0.2… 2.5 mm^2 Stranded wire 0.2… 2.5 mm^2 24-14 AWG
Tightening torque	0.6 Nm
Ingress protection	IP 20
Mounting	For 35 mm DIN rail acc. to EN 60715
Weight	Approx. 50 g

[1] Average TC in the specified operating temperature range -20 … +65 °C
[2] applies to 4 … 20 mA, slight deviations are possible while there is interference
[3] Mean time between failures – MTBF – according to EN 61709 (SN 29500). Conditions: stationary operation in well-kept rooms, average ambient temperature 40 °C, no ventilation, continuous operation
[4] Closed, weather-protected operating areas (stationary operation), water or wind-driven precipitation (rain, snow, hail, etc.) excluded
[5] Lower air pressure reduces the allowable working voltages.

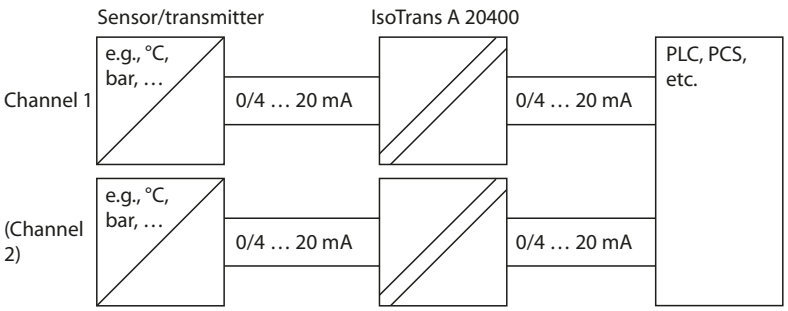
Transfer Function with Load Stop



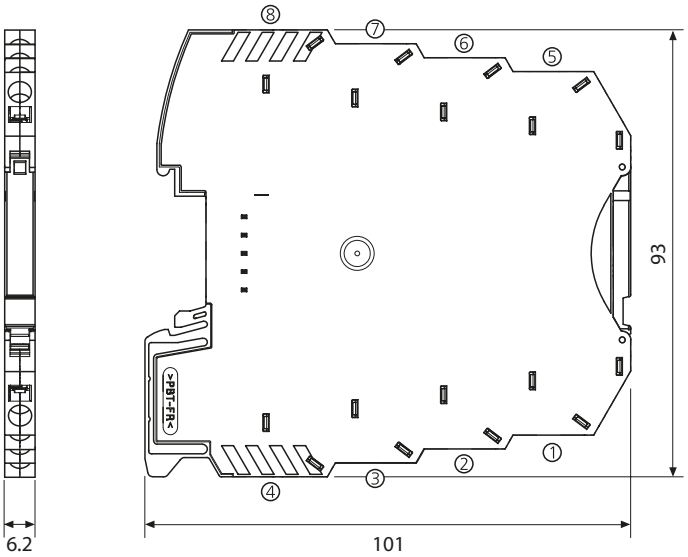
Block Diagram



Typical Application



Dimension Drawing and Terminal Assignments



Terminal assignments

1	Input 1	+
2	Input 1	–
3	Input 2	+
4	Input 2	–
5	Output 1	+
6	Output 1	–
7	Output 2	+
8	Output 2	–

Conductor cross-sections:

single wire	0.2 … 2.5 mm²
stranded wire	0.2 … 2.5 mm²
24-14 AWG	

All dimensions in mm