

M12 Field Housings

Knick >

Compact standard signal isolators / converters with M12 connection technology for automation without enclosures.

The Task

Isolation and conversion of 0 (4) ... 20 mA und 0 ... 10 V standard signals directly on the site in harsh industrial environment.

The Problems

Wet, dirty, or dusty environments require a robust housing. Therefore, components with IP20 protection are not suitable for modern automation concepts without enclosures since they would require additional and expensive protective cases. An easy and above all feasible solution must be found for analog signal processing in an IP67 environment.

The Solution

With the DuraTrans® M12-A 20000 standard-signal isolation converters, Knick has now presented a new series that considerably simplifies decentralization in the field of analog signal transmission. The devices are protected according to IP68 and are installed without an enclosure or additional protective case directly in the machine – even under harsh ambient conditions. They enable signal adaptation and galvanic isolation in one component and carry out the two core functions of analog signal processing directly on the site.

DuraTrans® M12-A 20000



The Housing

DuraTrans® M12-A 20000 consistently uses the tried and tested M12 circular connectors, thus it optimally supports existing wiring concepts for IP67. Measuring 83 x 36 x 14 mm, the DuraTrans® M12 housings have extremely compact dimensions. The housing material is PBT (polybutylene terephthalate). It is extremely resistant to mineral lubricants and alcohols and complies with flame class V-0 according to UL 94. A retaining bracket for easy on-site installation as well as cables in different lengths with M12 connection technology are available as product accessories.

The Advantages

- Substantial cost and space savings due to omission of enclosures or terminal boxes.
- Plug & Play:
 - Easy connection thanks to screwable M12 circular connectors
 - Quick and easy installation without tools
 - Preassembled connections to prevent wiring errors

- Sturdy housing with IP 68 protection, fully encapsulated and therefore optimally suited for wet, dirty, or dusty environments.
- Eight device variants with fixed input and output settings: 0 to 20 mA, 4 to 20 mA, or 0 to 10 V.

The Technology

Despite the extremely compact housings, the DuraTrans® M12 series provides true 3-port isolation between input, output, and power supply. Safe Isolation according to EN 61140 ensures optimum protection of personnel and equipment. The test voltage across input, output, and power supply is 1500 V AC. Minimum self-heating enables use in a wide temperature range and increases the service life of the devices. For example, the MTBF (mean time between failures) is 440 years. Vacuum encapsulation protects the electronics reliably against extreme ambient conditions. Analog transmission of measured values ensures excellent signal quality with maximum long-term stability and reliability.

Isolation Amplifiers for Standard Signals

Isolation Amplifiers
Transmitters

Indicators

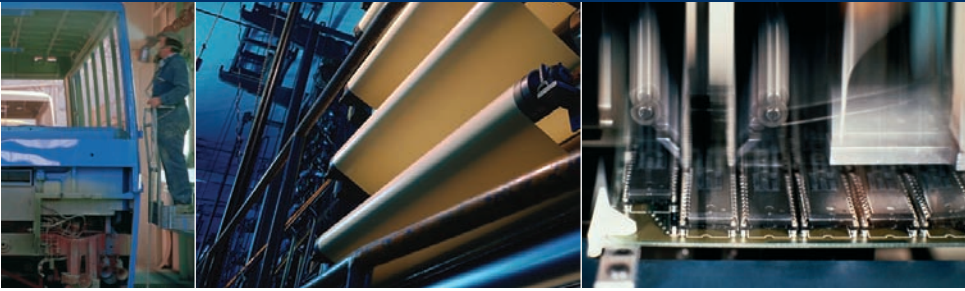
Process Analytics

Portable Meters

Laboratory Meters

Sensors

Fittings



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■ The Facts

Appropriate signal adaptation
with preconfigured fixed range models

Low gain error of only
0.1 ... 0.3 %

Excellent pulse imaging
Undistorted transmission,
even of critical input signals

**Prevention of
signal interferences**
through 3-port isolation

Safe electrical isolation

Test voltage 1500 V AC

**Safe Isolation according to
EN 61140**
provides best possible protection
of personnel and equipment

Plug & Play:

- Easy connection using screw-on M12 circular connectors
- Quick and easy installation without tools
- Preassembled connections to prevent wiring errors

Fully cast housing
with IP 68 protection

5-year warranty

Warranty
5 years!

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



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DuraTrans® M12-A 20000

■ Product Line

Devices	Input	Output	Order No.
DuraTrans® M12-A 20000	0 ... 20 mA	0 ... 20 mA	M12-A20016
	0 ... 20 mA	4 ... 20 mA	M12-A20017
	0 ... 20 mA	0 ... 10 V	M12-A20018
	4 ... 20 mA	0 ... 20 mA	M12-A20026
	4 ... 20 mA	4 ... 20 mA	M12-A20016
	4 ... 20 mA	0 ... 10 V	M12-A20028
	0 ... 10 V	0 ... 20 mA	M12-A20036
	0 ... 10 V	4 ... 20 mA	M12-A20037
	0 ... 10 V	0 ... 10 V	M12-A20038

Power supply

24 V DC

Accessories

Retaining bracket for wall mounting		ZU 0610
Signal line, 4-pole, M12 plug, straight – M12 socket, straight	Length 0.3 m	ZU 0611
Signal line, 4-pole, M12 plug, straight – M12 socket, straight	Length 0.6 m	ZU 0612
Signal line, 4-pole, M12 plug, straight – M12 socket, straight	Length 1.5 m	ZU 0613
Signal line, 4-pole, M12 plug – one side open	Length 1.5 m	ZU 0614
Signal line, 4-pole, M12 socket – one side open	Length 1.5 m	ZU 0615

■ Specifications

Input data

Inputs	0 ... 20 mA, 4 ... 20 mA, 0 ... 10 V	
Input resistance	Current input	Voltage drop < 0.1 V at 20 mA (approx. 350 mV with open current output or power failure)
	Voltage input	Approx. 100 kohms
Overload	Current input	< 100 mA
	Voltage input	Voltage limitation with suppressor diode 30 V, max. permitted continuous current 3 mA

Output data

Outputs	0 ... 20 mA, 4 ... 20 mA, 0 ... 10 V	
Load	With output current	≤ 10 V (≤ 500 ohms at 20 mA)
	With output voltage	≤ 1 mA (≥ 10 kohms at 10 V)
Offset	< 20 µA or < 10 mV	
Residual ripple	< 10 mV _{rms}	

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Specifications (continued)

Transmission behavior

Gain error ¹⁾	< 0.2 % meas. val. with direct 1:1 current transmission < 0.3 % meas.val. with voltage input and/or voltage output
Cutoff frequency	> 100 Hz, -3 dB
Temperature coefficient ²⁾	< 0.01 %/K full scale (reference temperature 23 °C)

Power supply

Power supply	24 V DC (±15 %), approx. 0.6 W
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Isolation

Galvanic isolation	3-port isolation between input, output, and power supply
Test voltage	1.5 kV AC, 50 Hz
Working voltage (basic insulation)	300 V AC/DC across input and output with overvoltage category II and pollution degree 3, up to 100 V AC/DC across output and power supply with category II and degree 3 according to EN 61010 Part 1.
Protection against electric shock	Safe Isolation up to 150 V AC/DC according to EN 61140 by reinforced insulation according to EN 61010 Part 1 with overvoltage category II and pollution degree 3 across input and output/power supply.

Standards and approvals

EMC ³⁾	Product standard: EN 61326 Emitted interference: Class B Immunity to interference: Industry
cURus	Standards: UL 508 and CAN/CSA 22.2 no. 14-95, File No. E 220033

Other data

MTBF ⁴⁾	Approx. 440 years
Ambient temperature	Operation: -10 ... +70 °C Transport and storage: -25 ... +85 °C
Design	M12 field housing with 4 pole M12 circular connectors H 36 mm, W 83.3 mm, D 14 mm
Ingress protection	IP68
Mounting	Retaining bracket for wall mounting
Weight	Approx. 50 g

1) Additional error in live-zero operation 20 µA or 10 mV

2) Average TC in specified operating temperature range -10 °C ... +70 °C

3) Slight deviations are possible while there is interference

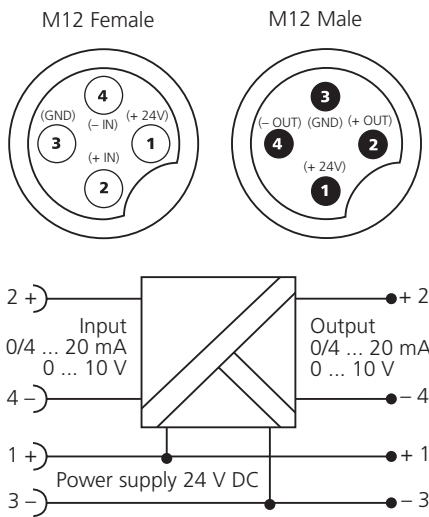
4) Mean Time Between Failures – MTBF – according to EN 61709 (SN 29500).

Conditions: stationary operation in well-kept rooms, average ambient temperature 40 °C, no ventilation, continuous operation

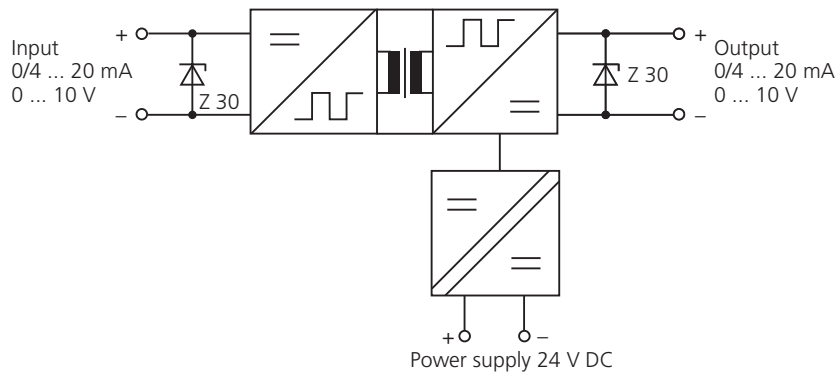
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DuraTrans® M12-A 20000

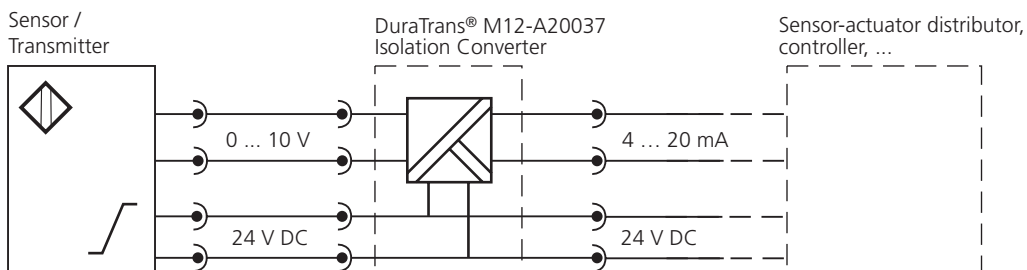
Terminal Assignments



Block Diagram



Application Example



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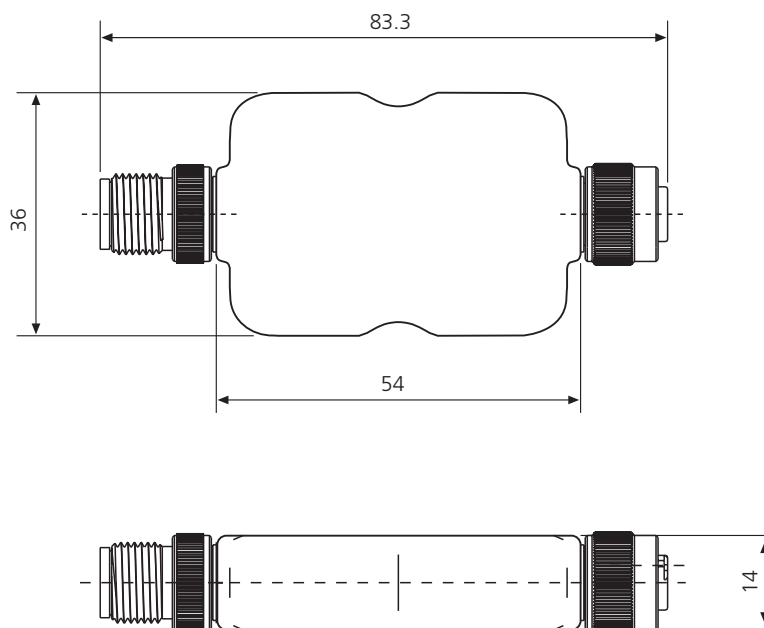
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■ Dimension Drawings and Terminal Assignments



All dimensions in mm!