TURCK works

INTERFACE & INTRINSIC SAFETY:

Quick Reference Guide

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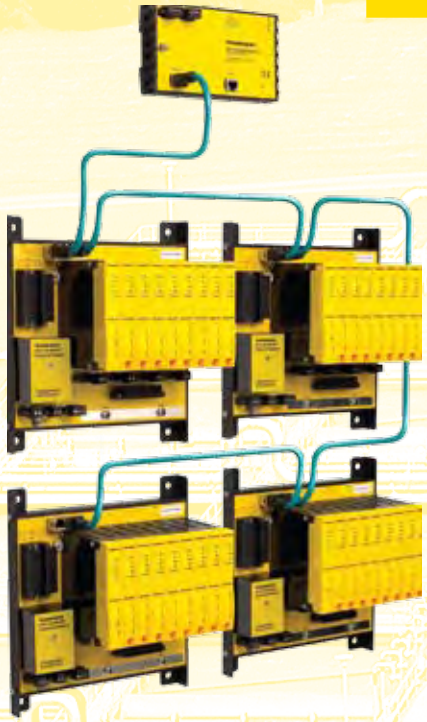
DPC SYSTEM OVERVIEW

The DPC-System (Diagnostic Power Conditioner System) is a power supply system for the installation of **FOUNDATION™ fieldbus** H1 segments. It provides comprehensive diagnostic functions for monitoring FOUNDATION™ fieldbus segments, and supports asset management for the entire system. This includes asset management of the physical layer which is extremely valuable.

A DPC system consists of one or more module racks (**DPC-49-4RMB**) each with up to eight power supply modules (**DPC-49-IPS1**) and one diagnostic module (**DPC-49-ADU**). Up to four H1 segments for each module rack can be operated and monitored redundantly. The diagnostic data from the H1 segments is transmitted via the HSE interface module (**DPC-49-HSEFD/24VDC**) to the higher level asset management system.



The diagnostic module (**DPC-49-ADU**) is used as a communication and diagnostic interface between the H1 segments and the power supply module. The diagnostics module monitors the electrical parameters and the communication parameters of the H1 segments. Operation without diagnostic module is possible. In this configuration, simple diagnostics are provided locally.

The diagnostic information is collected in the device and transmitted via the HSE interface module to the higher fieldbus level (e.g. to the host) as diagnostic and alarm data. The diagnostic module can be plugged and unplugged during operation (hot swappable).

The DPC system provides complete galvanic isolation; H1 to H1, H1 to 24 VDC power, ADU/DU to H1, and HSE to H1. The DPC system can also be used to supply devices in hazardous classified areas when Fisco power supplies/repeaters or multibarriers from TURCK are used.

TURCK extends its diagnostic power conditioner system (DPC) with a new interface backplane for single **FOUNDATION fieldbus** segments. The new **DPC-49-1RMB** is specially suited for smaller fieldbus installations, and provides a handy alternative to the **DPC-49-4RMB** multi-segment backplanes.

Like the multi-segment backplanes, the new **DPC-49-1RMB** features a redundant power supply, as well as a built-in diagnostics via a system alarm relay contact. Based on the established 800 mA supply **DPC-49-IPS1**, the new backplane supplies power to a single **FOUNDATION fieldbus** segment. Connections to the host system and to the field are provided via removable 3-pin screw terminals.

Communication Signal

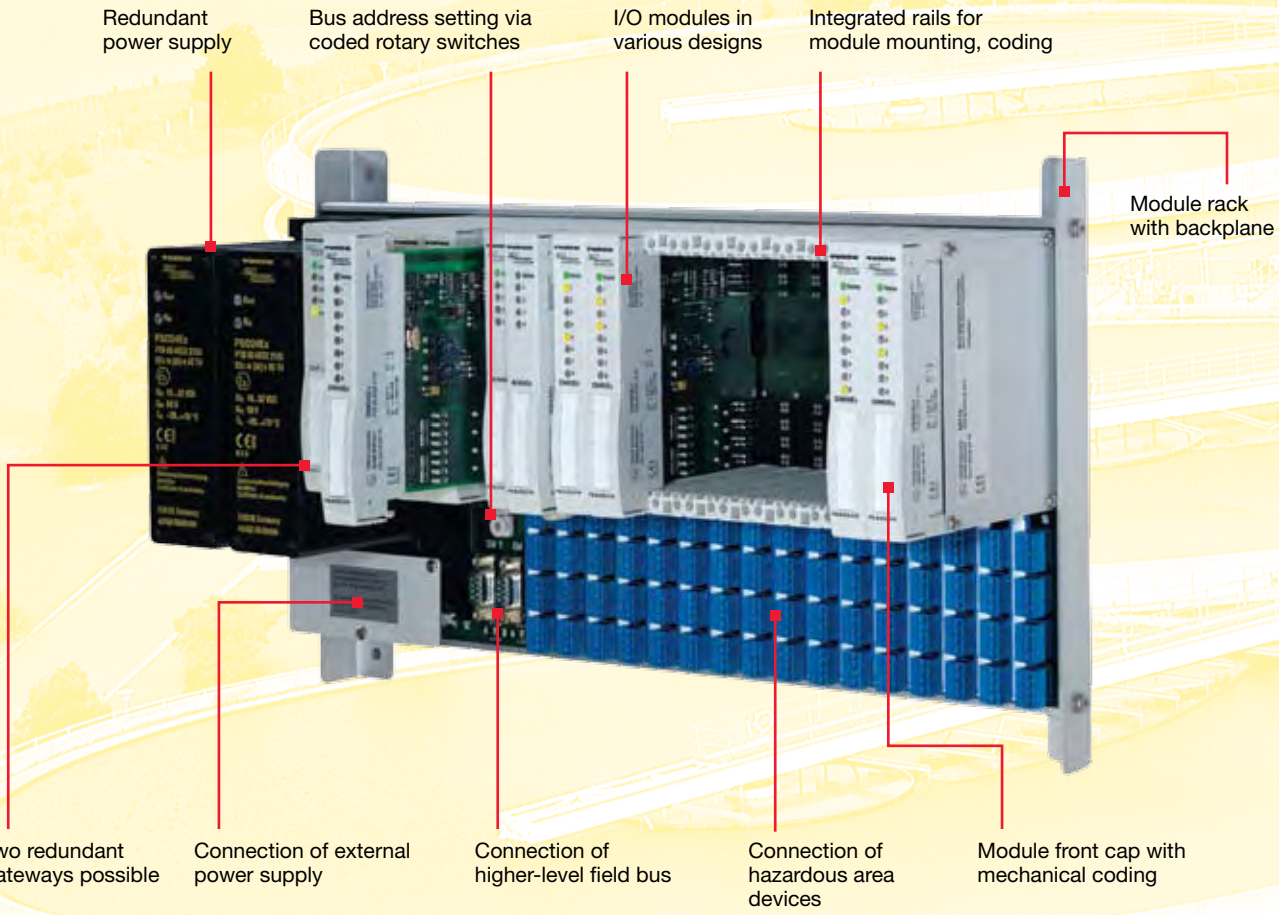
The **FOUNDATION fieldbus** H1 communication signal is a square waveform superimposed on a DC carrier. The frequency of the signal is 31.25 Khz. Although it is not a requirement, most devices derive their supply power from the fieldbus communications cable. The fieldbus specification states that devices must not be polarity sensitive. However, it is good electrical practice to have all devices wired with the same polarities. The voltage range allowed for proper operation is 9 to 32 VDC. A typical fieldbus device will consume 20 mA of current.

Fieldbus Cable Specifications

The specifications for fieldbus H1 physical media are defined by IEC 61158-2 and the ISA-S50.02 Part 2 Physical Layer Standards. The same standard is also listed in the **FOUNDATION fieldbus** specifications under 31.25 Kbps Physical Layer Profile FF-816-1.4. There are essentially four types of cable designations for fieldbus (see table). Type A cable is preferred for new installations, because it allows for the most versatile lengths. The other cable types are for installations where cable already exists from 4-20 mA systems.

	Type A	Type B	Type C	Type D
Cable Description	Shielded, Twisted Pair	Shielded, Multi-Twisted Pair	Unshielded, Multi-Twisted Pair	Shielded, Untwisted Pair
Conductor Size	18 AWG	22 AWG	26 AWG	16 AWG
Maximum Length	1,900 meters (6,232 feet)	1,200 meters (3,936 feet)	400 meters (1,312 feet)	200 meters (656 feet)

excom® SYSTEM OVERVIEW



The *excom*® System

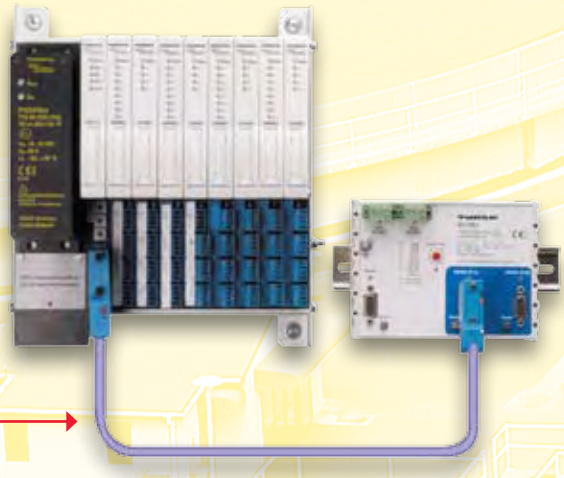
excom is a remote I/O system for use in hazardous locations consisting of power modules, PROFIBUS®-DP communication gateways, I/O modules and a backplane rack. The backplane is available in two sizes, with support for 8 or 16 I/O modules. The larger rack (**MT18-**) also allows for redundant power supplies and/or PROFIBUS-DP gateway cards.

The I/O modules provide the interface to field devices. The backplane distributes power to the I/O from the power supply, with no need for a separate field supply. The gateways, power supplies and I/O cards are simply plugged into the backplane rack, with all power, PROFIBUS-DP and I/O wiring separate from the removable modules. I/O modules may also be changed during operation ("hot-swappable"). The system automatically checks whether a newly inserted module matches the configuration.

When the excom system is used, the PROFIBUS-DP segment coupler **SC12Ex** must also be used for the interfacing. The coupler is equipped with one standard RS485 interface and two **RS485-IS** interfaces that allow redundancy. Optional fiber-optic couplers are also available.

The **D9T-RS485IS D9T-EX 455-*M** cable is used for the connection of the segment coupler to the excom gateway.

The excom system, (including the **SC12-Ex** segment coupler) can be mounted in Divison 2, Zone 1 or 2 and is FDT/DTM and HART compatible. The field circuits are approved for Division 1 and Zone 0.



Note: Not all products are shown. For further assistance please call Application Support: 1-800-544-7769

Hazardous Area Descriptions

Class and Groups

Class	Substance	Group	
		NEC500	NEC505/CENELEC/IEC
Class I (gas)	Acetylene	A	IIC
	Hydrogen	B	
	Ethylene	C	IIB
	Propane	D	IIA
Mining	Methane		I
Class II (dust)	Metal dust	E	Note: See Zones Below
	Coal dust	F	
	Grain dust	G	
Class III (fibers)	Fibers		

Division / Zone

Flammable Material	NEC500	NEC505	CENELEC/IEC
Continuously Present	Division 1	Zone 0	Zone 0 (Zone 20-dust)
Likely to / Can be Present		Zone 1	Zone 1 (Zone 21-dust)
Not Normally Present	Division 2	Zone 2	Zone 2 (Zone 22-dust)

Temperature

Maximum Surface Temperature °C	Temperature Class	
	NEC500	NEC505/CENELEC/IEC
450	T1	T1
300	T2	
280	T2A	T2
260	T2B	
230	T2C	
215	T2D	
200	T3	
180	T3A	T3
165	T3B	
160	T3C	
135	T4	T4
120	T4A	
100	T5	T5
85	T6	T6

NEC500 (Division Method)

Class I | Div 1 | Groups A, B, C, D | T4

- Class I: Flammable Gas or Vapor
- Div 1: Area Classification
- Groups A, B, C, D: Gas Group
- T4: Temperature Class

NEC505 (Zone Method)

Class I | Zone 0 | A | Ex | ia | IIC | T4

- Class I: Flammable Gas or Vapor
- Zone 0: Area Classification
- A: Conformity to US Requirements
- Ex: Protection Method
- ia: Explosion Protected
- IIC: Gas Group
- T4: Temperature Class

ATEX

CE | 0575 | Ex | II | 2 | GD | EEx | ia | IIC | T4

- CE: European Community Mark
- 0575: Notified Body Number
- Ex: Explosive Atmosphere Mark
- II: Equipment Group
- 2: Equipment Category
- GD: Type of Hazardous Atmosphere
- EEx: Type of Protection Mark
- ia: Explosion Protected
- IIC: Gas Group
- T4: Temperature Class

Definitions according to the NEC (national electrical code):

Intrinsically Safe Circuit: A circuit in which any spark or thermal effect is incapable of causing ignition of a mixture of flammable or combustible material in air under prescribed conditions. (NEC 504-2).

Simple Apparatus: An electrical component or combination of components of simple construction with well-defined electrical parameters that does not generate more than 1.5 volts, 100 milliamps, and 25 milliwatts, or a passive component that does not dissipate more than 1.3 watts and is compatible with the intrinsic safety of the circuit in which it is used.

SWITCHING AMPLIFIERS

	IM1-12Ex-R	IM1-12Ex-T	IM1-22Ex-R	IM1-23Ex-R	IM1-22Ex-T	IM1-22Ex-MT	IM1-12Ex-R	IM1-12Ex-T	IM1-45Ex-R	IM1-45Ex-T	IM12-22Ex-R	MK1-22P-Ex0/24VDC MK1-22N-Ex0/24VDC	MK13-22N-Ex0/24VDC MK13-22P-Ex0/24VDC	MK13-P-Ex0/24VDC MK13-N-Ex0/24VDC	MK13-PF-Ex0/24VDC MK13-NF-Ex0/24VDC	MK13-PN-Ex0/24VDC	MK15-12Ex0-PN/24VDC	MK13-R-Ex0/24VDC	MK13-11AEx0-R/24VDC	MK13-12IAEx0-R/24VDC	MK13-22AEx0-R/24VDC
Voltage Supply	20-250 VAC 20-125 VDC	20-250 VAC 20-125 VDC	20-250 VAC 20-125 VDC	20-250 VAC 20-125 VDC	20-250 VAC 20-125 VDC	20-250 VAC 20-125 VDC	20-250 VAC 20-125 VDC	20-250 VAC 20-125 VDC	20-250 VAC 20-125 VDC	20-250 VAC 20-125 VDC	20-250 VAC 20-125 VDC	19-29 VDC	19-29 VDC	10-30 VDC	10-30 VDC	10-30 VDC	10-30 VDC	20-250 VAC 20-125 VDC	10-30 VDC	10-30 VDC	10-30 VDC
Inputs	1 NAMUR sensor or contact	1 NAMUR sensor or contact	2 NAMUR sensors or contacts	2 NAMUR sensors or contacts	2 NAMUR sensors or contacts	2 NAMUR sensors or contacts	1 NAMUR sensor or contact	1 NAMUR sensor or contact	4 NAMUR sensors or contacts	4 NAMUR sensors or contacts	2 NAMUR sensors or contacts	2 NAMUR sensors or contacts	2 NAMUR sensors or contacts	1 NAMUR sensor or contact	1 NAMUR sensor or contact	1 NAMUR sensor or contact	1 NAMUR sensor or contact	1 NAMUR sensor or contact	1 NAMUR sensor or contact	1 NAMUR sensor or contact	2 NAMUR sensors or contact
Outputs	2 SPST Relays	2 transistors	2 SPST Relays	2 SPDT Relays and 1 SPST alarm output	2 transistors	2 MOSFET	2 SPST Relays, incl. 1 alarm output	2 transistors incl. 1 alarm output	5 SPST Relays, incl. 1 alarm output	4 transistors incl. 1 alarm output	2 SPST Relays	2 transistors	2 transistors	2 transistors	2 transistors	2 transistors	2 transistors	1 SPST Relay	1 SPDT Relay	2 SPDT Relays, incl. 1 alarm output	2 SPDT Relays
Approvals	IECEX ATEX, FM C/US, UL	IECEX ATEX, FM C/US, UL	IECEX ATEX, FM C/US, UL	IECEX ATEX	IECEX ATEX, FM C/US, UL	IECEX ATEX, FM C/US, UL	IECEX ATEX, FM C/US, UL	IECEX ATEX, FM C/US, UL	IECEX ATEX, FM C/US, UL	IECEX ATEX, FM C/US, UL	IECEX ATEX, FM C/US, UL	ATEX FM C/US	ATEX FM C/US	ATEX FM C/US	ATEX FM C/US	ATEX FM C/US	ATEX	ATEX FM C/US	ATEX	ATEX	ATEX

ANALOG INPUT / OUTPUT

	IM31-11Ex-i	IM31-12Ex-i	IM31-22Ex-U IM31-22Ex-i	IM33-11Ex-HI/24VDC	IM33-12Ex-HI/24VDC	IM33-22Ex-HI/24VDC	IM33-11Ex-HI	IM33-12Ex-HI	IM33-22Ex-HI	IM33-14Ex-CDRI	IM33-FSD-Ex/L	IM34-11Ex-i IM34-11Ex-Ci	IM34-12Ex-RI	IM34-12Ex-CRI	IM34-14Ex-CDRI	IM35-11Ex-HI/24VDC	IM35-22Ex-HI/24VDC	IM36-11Ex-U/24VDC	IM36-11Ex-I/24VDC	MK33-11Ex0-PL1/24 VDC	MK33-11Ex0-LI/24 VDC	MK35-11Ex0-LI/24 VDC
	Analog input repeater/converter	Analog input repeater/converter	Analog input repeater/converter	Current repeater transmitter supply	Current repeater transmitter supply	Current repeater transmitter supply	Current repeater transmitter supply	Current repeater transmitter supply	Current repeater transmitter supply	Current set point transmitter supply	Current repeater loop powered	Temperature measuring amplifier	Temperature measuring amplifier	Temperature measuring amplifier	Temperature set point amplifier	Analog output driver	Analog output driver	Potentiometer amplifier	Potentiometer amplifier	Analog output driver	Analog output driver	Analog output driver
Voltage Supply	20-250 VAC 20-125 VDC	20-250 VAC 20-125 VDC	20-250 VAC 20-125 VDC	24 VDC	24 VDC	24 VDC	20-250 VAC 20-125 VDC	20-250 VAC 20-125 VDC	20-250 VAC 20-125 VDC	20-250 VAC 20-125 VDC	without auxiliary energy	20-250 VAC 20-125 VDC	20-250 VAC 20-125 VDC	20-250 VAC 20-125 VDC	20-250 VAC 20-125 VDC	24 VDC	10-30 VDC	24 VDC	24 VDC	10-30 VDC	24 VDC	10-30 VDC
Inputs	0/2-10 V 0/4-20 mA	0/2-10 V 0/4-20 mA	2 x 0/2-10 V 2 x 0/4-20 mA	0/4-20 mA	1 x 0/4-20 mA	2 x 0/4-20 mA	1 x 0/4-20 mA	1 x 0/4-20 mA	2 x 0/4-20 mA	1 x 0/4-20 mA FDT/DTM	2 x 0-20 mA	Ni/Pt100 or thermo-elements or mV-input	Ni/Pt100 or thermo-elements or mV-input	Ni/Pt100 or thermo-elements or mV-input - FDT/DTM	Ni/Pt100 or thermo-elements or mV-input - FDT/DTM	0/4-20 mA	2 x 0/4-20 mA	≥ 800 to 20 kΩ	≥ 800 to 20 kΩ	1 x 0/4-20 mA	0/4-20 mA	1 x 0/4-20 mA
Outputs	0/4-20 mA	2 x 0/4-20 mA	2 x 0/4-20 mA 2 x 0/2-10 V	0/4-20 mA	2 x 0/4-20 mA	2 x 0/4-20 mA	1 x 0/4-20 mA	2 x 0/4-20 mA	2 x 0/4-20 mA	1 x 0/4-20 mA 3 x relay	2 x 0-20 mA	1 x 0/4-20 mA	1 x 0/4-20 mA 1 relay	1 x 0/4-20 mA 1 relay	3 relays 1 x 0/4-20 mA	0/4-20 mA	2 x 0/4-20 mA	0-10 V	0/4-20 mA	1 x 0/4-20 mA	0/4-20 mA	1 x 0/4-20 mA
Approvals	IECEX, ATEX, FM C/US, UL	IECEX, ATEX, FM C/US, UL	IECEX, ATEX, FM C/US, UL	IECEX ATEX	IECEX, ATEX, FM C/US, UL	IECEX, ATEX, FM C/US, UL	IECEX ATEX	IECEX ATEX	IECEX ATEX	ATEX PACTware	IECEX, ATEX, FM C/US	IECEX, ATEX, FM C/US, UL	IECEX, ATEX, FM C/US, UL	IECEX, ATEX, FM C/US, UL	PACTware, IECEX ATEX, FM C/US, UL	IECEX, ATEX, FM C/US, UL	IECEX, ATEX, FM C/US, UL	ATEX	ATEX	ATEX FM, CSA	ATEX FM, C/US	ATEX FM, CSA

SOLENOID DRIVERS

	IM72-11Ex/L	IM72-22Ex/L
	Solenoid driver	Solenoid driver
Voltage Supply	19-30 VDC	19-30 VDC
Inputs	15-24 VDC	15-24 VDC
Outputs	45 mA	65 mA
Approvals	IECEX ATEX, FM C/US, UL	IECEX ATEX, FM C/US, UL

RELAY COUPLERS

	IM73-11Ex-R/24VDC	IM73-12Ex-R/24VDC	IM73-22Ex-R/24VDC
	Relay Coupler	Relay Coupler	Relay Coupler
Voltage Supply	10-30 VDC	10-30 VDC	10-30 VDC
Inputs	1 Input	1 Input	2 Inputs
Outputs	1 SPDT Relay	2 SPDT Relays	2 SPDT Relays
Approvals	ATEX	ATEX	ATEX

ROTATIONAL SPEED MONITORS

	IM21-14-CDTRI	IM21-14Ex-CDRI
	Rotational Speed Monitor	Rotational Speed Monitor
Voltage Supply	20-250 VAC / 20-125 VDC	20-250 VAC / 20-125 VDC
Inputs	NAMUR input, 3-wire or external input	1 intrinsically safe NAMUR input
Outputs	relay and analog outputs	relay and analog outputs
Approvals	PACTware	FM CUS, ATEX, PACTware

SET POINT MODULES

	IM43-13-R	IM43-13-SR	IM43-14-SR1	IM43-14-R1	IM43-14-CDRI
	Limit value monitor	Limit value monitor	Limit value monitor	Limit value monitor	Limit value monitor
Voltage Supply	20-250 VUC	20-250 VUC	20-250 VUC	20-250 VUC	20-250 VUC
Inputs	0/4-20 mA or 0/2-10 V or transmitter	0/4-20 mA or 0/2-10 V or transmitter	0/4-20 mA or 0/2-10 V or transmitter	0/4-20 mA or 0/2-10 V or transmitter	0/4-20 mA or 0/2-10 V or transmitter
Outputs	3 relays (N.O.)	3 relays (N.O.)	3 relays (N.O.) 1 x 0/4-20 mA	3 relays (N.O.) 1 x 0/4-20 mA	3 relays 1 x 0/4-20 mA
Approvals	FM, CI, D2	FM, CI, D2	FM, CI, D2	FM, CI, D2	PACTware

POWER SUPPLIES

	IM82-2414/94-265VAC	IM82-2450-PS
	Power supply	Power supply
Voltage Supply	85-265 VAC 210-375 VDC	94-265 VAC
Voltage Output	24 VDC / 1.4 A	24 VDC / 5 A
Approvals	-	-

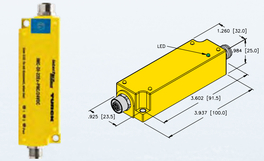
IMC INTERFACE MODULE CARTRIDGES

TURCK'S new interface module cartridge (IMC) series is another innovative breakthrough in process automation: The I.S. barrier is moved from the mounting cabinet directly to the installation, thus making it possible to create further decentralized structures in the installation.

The exceptional compact and rugged device series creates new options and possibilities for the user: In addition to your standard mounting cabinet solution, increase the flexibility of your system by using TURCK interface module cartridges.

- IP 67 protection with screw on connectors
- Mounting in Zone 2 - Application area in accordance with ATEX: II (1) GD, II (3) GD
- Ambient temperature -25° to +70°C
- Standard signals
- Plug & play connection technology, M12 connectors

Part Number	Description
IMC-DI-22Ex-PNO/24 VDC (NO = normally open)	NAMUR sensor, contact with resistor circuitry
IMC-DI-22Ex-PNC/24VDC (NC = normally closed)	NAMUR sensor, contact with resistor circuitry
IMC-AI-11Ex-I/24VDC	Active transmitter; Current source
IMC-AIA-11Ex-I/24VDC	Passive 2-wire transmitter; Current sink
IMC-AO-11Ex-I/24VDC	Analog actuator, positioner, display
IMC-DO-11Ex/L	Pilot light, solenoid valve, 4-wire transmitter
IMC-SG	Cover guard



IMS SIGNAL CONDITIONERS

TURCK introduces the new IMS interface module measuring merely 6.2 mm wide. The module may be configured with a laterally mounted DIP switch for added convenience.

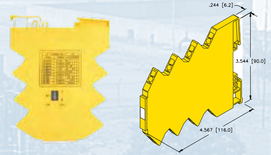
This extremely compact module provides complete galvanic isolation, up to 2.5 KV between the input, output and power supply. Galvanically isolated IMS modules are available with dead-zero to live-zero signal conditioning, or one and two channel modules are available without signal conditioning.

Modules are also available for temperature detection using **Pt-100** technology or other thermo-elements. Those that use **Pt-100** technology achieve 0.3 percent of the full scale, and are available with 2-, 3- or 4-wire connections. An analog signal transmitter that achieves 0.1 percent of the full scale completes the IMS line.

Applications:

- Signal conditioning
- Analog conversion
- Temperature measurement
- UL, Division 2 approved

Part Number	Description
IMS-AI-01-DI/24VDC	0-20 mA to 0-20 mA
IMS-AI-01-DU/24VDC	0-20 mA to 0-10 V
IMS-AI-01-LI/24VDC	0-20 mA to 4-20 mA
IMS-AI-DLI-22-DLI/L	0/4 to 20 mA loop powered dual channel
IMS-AI-DLI-DLI/L	0/4 to 20 mA loop powered
IMS-AI-DU-DI/24VDC	0-10 V to 0-20 mA
IMS-AI-DU-DU/24VDC	0-10 V to 0-10 V
IMS-AI-DU-LI/24VDC	0-10 V to 4-20 mA
IMS-AI-LI-DI/24VDC	4-20 mA to 0-20 mA
IMS-AI-LI-DU/24VDC	4-20 mA to 0-10 V
IMS-AI-LI-LI/24VDC	4-20 mA to 4-20 mA
IMS-AI-UNI/24VDC	Universal mA/V selectable
IMS-TI-J/24VDC	Type J thermocouple
IMS-TI-K/24VDC	Type K thermocouple
IMS-TI-PT100/24VDC	Pt-100 RTD



Interface Modules with FDT/DTM

To simplify device set-up and installation time, TURCK'S interface module (IM) family may now be programmed via a pc or on-board push buttons using FDT/DTM software, along with PACTware. This software allows multiple parameters to be set and saved in a matter of seconds. The ease of use and structure of this system allows asset management ability with trending and data logging of values.

TURCK's IM modules may be used to monitor the speed of motors, shafts and conveyors, the temperature of RTD's and thermocouples, and to control or monitor analog signals for linear movement, temperature, pressure, level control or any other device using 4 to 20 mA signals. Intrinsically safe models to control devices in hazardous areas are also available.

All models are equipped with a two-line transflective LCD display, making it easy to read even in very bright light. The modules also incorporate a universal supply voltage and removable terminals, making them easy to install in new or existing systems.

ZENER Diode Barriers

- Temperature monitoring and control of equipment and their surrounding areas with RTD's and thermocouples
- Load cells
- Control and monitor 4-20 mA transmitters
- Control or monitor all other analog signals for linear movement, temperature, pressure, level control or any other device using 4-20 mA signal feedback

NAMUR Sensors and Junctions

- Class I, Class II, Class III, Division 1 and Division 2 FM approved
- Full line of inductive, capacitive and magnet operated inductive sensors
- Numerous sizes and styles are available
- Eliminates multiple cable runs for wiring IS applications

Intrinsically Safe Pressure Transmitters

- **PT4300** pressure transmitters are UL/cUL 1604 (CSA 213) Class I, Division 2, Groups A, B, C and D approved for hazardous area applications.
- **PT4400** pressure transmitters are UL/cUL 913 Class I, Division 1, Groups C and D approved when installed with an approved barrier, such as the IM33 isolation module.
- **PT4300** and **PT4400** sensors incorporate a 316 stainless steel measuring element that permits ranges from 0-10,000 psi, with high burst pressures up to 20,000 psi.
- **PT4500** submersible level transmitter is Class I, Division 1 approved when installed with an approved barrier, such as the IM33 isolation module.

Intrinsically Safe R16 Level Probes

- Rated for FM Class I, Division 1 areas

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