

IO-Link Flush Membrane Transmitter and Switch

 **IO-Link**


Product description

The FPI 8237 IO-Link Flush Membrane pressure transmitter impresses with an absolutely smooth and robust flush-mounted measuring diaphragm made of corrosion-resistant duplex steel. The transmitter is designed as a smart sensor and provides application-relevant information in addition to the process data. Trafag's proprietary thin-film-on-steel sensor technology ensures a wide temperature range and excellent long-term stability.

Applications

- Machine tools
- Food Industry
- Process technology
- Water treatment
- Hydraulics

Features

- Flush membrane with smooth and plain surface, duplex steel 1.4462
- Media temperature measurement
- Completely welded sensor system
- Excellent long-term stability
- 2 Switching outputs PNP/NPN/Push-Pull configurable

 EMC: 2014/30/EU

 S.I. 2016 No. 1091: IEC 61131-9 (IO-Link)

 RoHS/Reach compliant

 IEC 61131-9 (IO-Link)

Technical Data

Measuring principle	Thin-film-on-steel
Measuring range	-0.5 ... 0.5 to 0 ... 100 bar, correlation with -7.2 ... 7.2 to 1500 psi
Output signal	IO-Link 1.1, COM3, min. process cycle time 1 ms, Smart Sensor Profile ED2, 2 Switching outputs PNP/NPN, Push-Pull configurable
Media temperature	-10°C ... +125°C
Ambient temperature	-10°C ... +105°C

Additional information

Data sheet	www.trafag.com/H72622
Flyer	www.trafag.com/H70622
Instructions	www.trafag.com/H73621
Interface description	www.trafag.com/H73664
Accessories	www.trafag.com/H72258
Video	https://youtu.be/E2g7un5Ez2o

Ordering information/Type code

	8237	XX	XX	XX	XX	XX	XX
Measuring range	Pressure measurement range [bar]	Over pressure [bar]	Burst pressure [bar]	Pressure measurement range [psi] ¹⁾	Over pressure [psi]	Burst pressure [psi]	
	-0.5 ... 0.5	5	7.5	-7.2 ... 7.2	60	91	A7
	-1 ... 0	5	7.5	-14.5 ... 0	60	90	D4
	-1 ... 1	5	7.5	-14.5 ... 14.5	60	90	B1
	-1 ... 1.6	5	7.5	-14.5 ... 23.2	60	90	B3
	-1 ... 2.5	5	7.5	-14.5 ... 36.2	60	90	B4
	-1 ... 4	8	12	-14.5 ... 58	100	150	B6
	-1 ... 6	12	15	-14.5 ... 87	200	250	B7
	-1 ... 10	20	25	-14.5 ... 145	300	375	B8
	-1 ... 16	32	40	-14.5 ... 232	500	625	B9
	-1 ... 25	50	40	-14.5 ... 362	500	625	C0
	0 ... 1	5	7.5	0 ... 14.5	60	90	71
	0 ... 1.6	5	7.5	0 ... 23.2	60	90	73
	0 ... 2.5	5	7.5	0 ... 36.2	60	90	75
	0 ... 4	8	12	0 ... 58	100	150	76
	0 ... 6	12	15	0 ... 87	200	250	77
	0 ... 10	20	25	0 ... 145	300	375	78
	0 ... 16	32	40	0 ... 232	500	625	79
	0 ... 25	50	75	0 ... 362	800	1200	80
	0 ... 40	80	100	0 ... 580	1000	1250	81
	0 ... 100	200	300	0 ... 1500	3000	4500	83
Sensor	Relative pressure 0.5 %, process data includes the media temperature						23
Pressure connection	G1/2" male, flush membrane						93
	G1/2" male, flush membrane, 30 mm length ²⁾						94
Electrical connection	Male electrical connector M12x1, 5-pole, Mat. PA						35
Output signal	IO-Link						50
Accessories	Seal FKM						61
	Female electrical plug M12x1, 5-pole						33
	Standard electrical connection: Pin 1 L+, Pin 2 Out 2 I/Q, Pin 3 L-, Pin 4 Out 1 C/Q, Pin 5 n/c						OK
	Accessories and options						
	Parameterization according to customer specification (refer to the interface description)						ZC
	Parametrization standard (refer to the interface description)						ZS

¹⁾ Pressure values in [psi] are given for information and correspond to the pressure values in [bar]

²⁾ Upon request, whereas minimum order quantities may apply

Compatibility matrix pressure connection and accessories

		Seal
Code	Pressure connection	FKM (Code 61)
93	G1/2" male, flush membrane	✓
94	G1/2" male, flush membrane, 30 mm length	✓

Parameters

Name	Standard setting (Accessory ZS)	Value range	Customer adjustment (Accessory ZC)
Switching output OUT1			
Source of measured value	Pressure		Pressure
Switching output polarity	PNP	PNP, NPN	
Switch point SP1 ¹⁾	0.75 %	[bar], > SP2, 1 ... 100 % nominal pressure	
Switch point SP2 ²⁾	0.25 %	[bar], < SP1, 0 ... 99 % nominal pressure Hysteresis SP1 - SP2 ≥ 1 % nominal pressure	
Switching output logic	0 = high active	0 = high active (normally open) 1 = low active (normally closed)	
Function mode	3 = Two Point Mode	0 = Deactivated 1 = Single Point Mode 2 = Window Mode 3 = Two Point Mode	
Hysteresis ³⁾	0	[bar] Hysteresis ≥ 1 % nominal pressure	
Activation Delay	0	0 ... 65535 [ms]	
Deactivation Delay	0	0 ... 65535 [ms]	
Error behaviour	0	0 = Tri-State 1 = NPN/PNP: Open / Push-Pull: High 2 = NPN/PNP: Closed / Push-Pull: Low 3 = Last valid state	
Switching output OUT2			
Source of measured value	P = Pressure	P = Pressure, T = Temperature	
Switching output polarity	PNP	PNP, NPN	
Switch point SP1 ¹⁾	0.75 %	> SP2 [bar] 0 ... 100 % nominal pressure [°C] -40 ... 125°C	
Switch point SP2 ²⁾	0.25 %	< SP1 [bar] 0 ... 99 % nominal pressure Hysteresis SP1 - SP2 ≥ 1 % nominal pressure [°C] -40 ... 125°C, Hysteresis SP1 - SP2 ≥ 1°C	
Switching output logic	0 = high active	0 = high active (normally open) 1 = low active (normally closed)	
Function mode	3 = Two Point Mode	0 = Deactivated 1 = Single Point Mode 2 = Window Mode 3 = Two Point Mode	
Hysteresis ³⁾	0	[bar] Hysteresis ≥ 1 % nominal pressure [°C] ≥ 1°C	
Activation Delay	0	0 ... 65535 [ms]	
Deactivation Delay	0	0 ... 65535 [ms]	
Error behaviour	0	0 = Tri-State 1 = NPN/PNP: Open / Push-Pull: High 2 = NPN/PNP: Closed / Push-Pull: Low 3 = Last valid state	
Signal processing			
Pressure measurement signal damping for switching outputs	0	0 = Deactivated 0; 1 ... 65536 [ms], time constant "tau"	

¹⁾ Applicable for all functions modes

²⁾ Applicable for functions modes "Two Point Mode" and "Window Mode"

³⁾ Applicable for functions modes "Single Point Mode" and "Window Mode"

Specifications

Electrical data	Output / supply voltage	Switching output PNP/NPN: 24 (9 ... 32) VDC IO-Link: 24 (18 ... 32) VDC
	Power-on delay time	IO-Link readiness: 300ms Data readiness: ca. 700ms
	Inverse-polarity protection, short-circuit strength @ 25°C during 5 min.	IO-Link/Out 1 or Out 2: to Us = 32 VDC
	Current consumption / power consumption ¹⁾	< 0.5 W
	Resistance of insulation	> 100 MΩ, 50 VDC
	Dielectric strength	50 VAC, 50 Hz
Environmental conditions	Media temperature	-10°C ... +125°C
	Ambient temperature	-10°C ... +105°C
	Storage temperature	-20°C ... +40°C
	Protection ²⁾	IP65, IP67
	Vibration	15 g RMS (20 ... 2000 Hz) acc.to EN 60068-2-64 25 g sin (80 ... 2000 Hz), 1 oct./min, (1x @ 25°C) acc.to EN 60068-2-6
	Shock	50 g/11 ms
EMC protection	Emission	EN/IEC 61000-6-3
	Immunity	EN/IEC 61000-6-2
Electrical data	Sensor (wetted parts)	1.4462 (AISI 318 LN)
	Pressure connection (wetted parts)	1.4462 (AISI 318 LN), 1.4542
	Housing	1.4542
	Sealing	FKM
	Weight	~ 80 ... 110 g (without cable)
	Mounting torque	20 ... 25 Nm not lubricated 15 ... 20 Nm lubricated

¹⁾ Without load on the switching outputs

²⁾ See electrical connection

Pressure measuring accuracy

Measuring range		$\geq 0 \dots 2.5 \text{ bar}$	$< 0 \dots 2.5 \text{ bar}$
TEB @ -25 ... +85°C	[% FS typ.]	± 1.5	± 3.0
Accuracy @ +25°C	[% FS typ.]	± 0.5 ¹⁾	± 1.0 ²⁾
Additional mounting torque offset	[% FS typ.]	± 0.2	± 0.5
NLH @ +25°C (BSL)	[% FS typ.]	± 0.1	± 0.2
TC zero point and span	[% FS/K typ.]	± 0.01	± 0.025
Additional TC for zero point and span at different media and ambient temperatures ³⁾	[% FS/K typ.]	± 0.08	± 0.25
Long term stability 1 year @ +25°C	[% FS typ.]	± 0.2	± 0.5

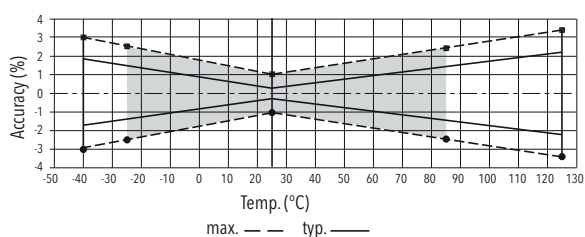
¹⁾ Additional mounting torque offset 0.2 %

²⁾ Additional mounting torque offset 0.5 %

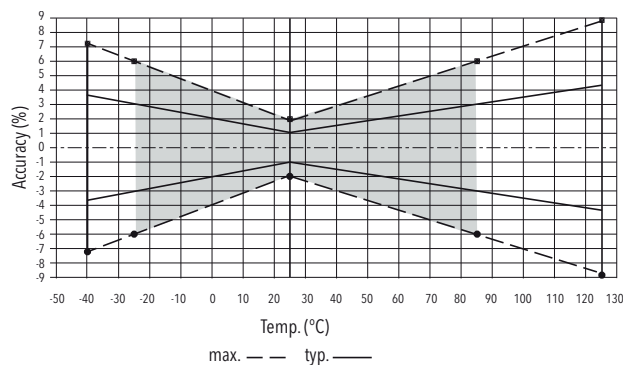
³⁾ Applies to a stationary condition. If there is a sudden change in the temperature of the media, a considerable deviation in the measured value must be expected until thermal balance is re-established

Measuring accuracy

2.5 ... 100 bar



< 2.5 bar



Temperature measurement

Media temperature ¹⁾	@ Media temperature	Accuracy
Accuracy [typ.]	-40° ... -10°C	± (3K + 0.1 x T _{ambient} - T _{media})
	> -10°C ... 0°C	± (3K + 0.1 x T _{ambient} - T _{media})
	> 0°C ... +25°C	± (2K + 0.1 x T _{ambient} - T _{media})
	> +25°C ... +50°C	± (2K + 0.1 x T _{ambient} - T _{media})
	> +50°C ... +85°C	± (4K + 0.1 x T _{ambient} - T _{media})
	> +85°C ... +125°C	± (10K + 0.1 x T _{ambient} - T _{media})
Temperature range	-40°C ... +125°C	
Device temperature		
Accuracy	@ 0°C ... +80°C	± 1.5°C
Temperature range	-40°C ... +125°C	
Example: ambient temperature 15°C, media temperature 20°C: Accuracy +/- (2K + 0.1 x (15-20) °C) = +/- (2K + 0.1 x 5K) = +/- 2.5K		

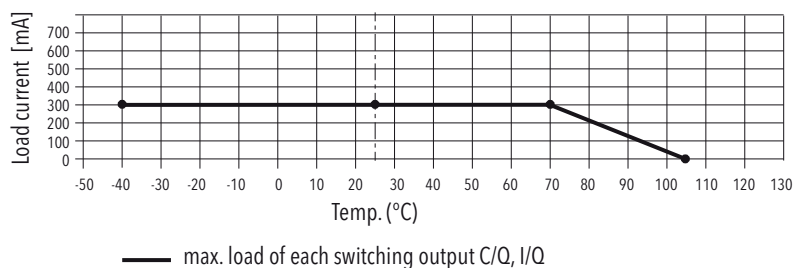
¹⁾ Media temperature measurement is only available with pressure accuracy of 0.3 % (code 23)

Switching output

Accuracy	Refer to table "Pressure measurement accuracy"	
Number of outputs	2 outputs for switching operation (SIO mode; SIO = standard IO)	Out1, Out2
Source of measured value	Pressure and temperature (Out1 and Out2)	
Output polarity	PNP, NPN, configurable	
Output function	Function modes: Single Point Mode, Two Point Mode, Window Mode; normally closed (NO), normally open (NC); switch-on/switch-off delay; Damping; configurable via IO-Link interface	
Switching current	-10°C ... +70°C Ambient temperature > +70°C ... +105°C Ambient temperature	max. 300 mA each switching output refer to the graphic "Switching current"
Switching resistance	$\leq 11\Omega$	
Current limiting	Integrated	
Lifetime	> 100 x 10 ⁶ cycles	
Switching frequency	< 300 Hz	
Response time	1.6 ms	

Switching current

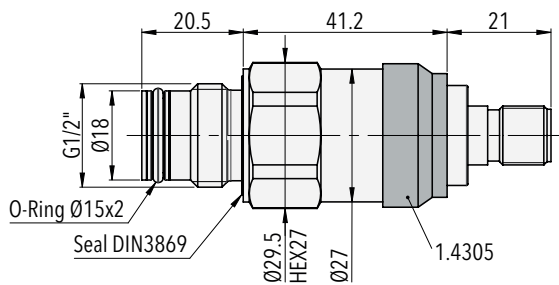
Load depending on ambient temperature



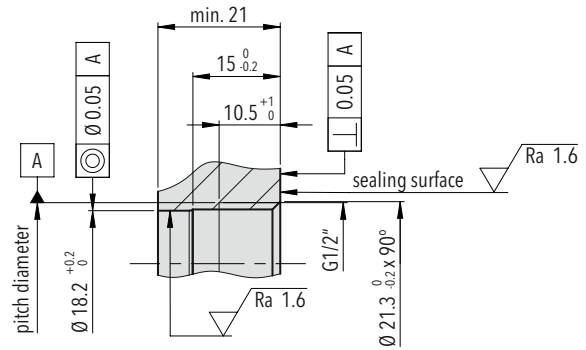
Interface description

Communication interface	SDCI Standard IEC 61131-9 (IO-Link)
Transmission type	COM3 (230,4 kBaud)
IO-Link revision	V1.1
Profiles / function classes	Identification and Diagnosis (0x4000), Measurement Data Channel (0x800A) Measuring and Switching Sensor (DMSS), SSP4.1.2
SIO mode	Yes
Required master port class	Class A
Minimum process cycle time	1 ms
Resolution pressure measurand	Refer to the interface description
Resolution temperature measurand	0.01K
IO-Link process data (cyclical)	
Pressure [Pa]	16 bit
Switching signal for pressure	2 bit
Temperatur [°C]	16 bit Media temperature with sensor 23
Switching signal for temperature	2 bit
Device status	4 bit
IO-Link functions (acyclical)	Application specific tag; media temperature, device temperature; operating hours counter; min./max. pressure value; min./max. temperature value; pressure overload counter; temperature overload counter
IODD download	https://ioddfinder.io-link.com

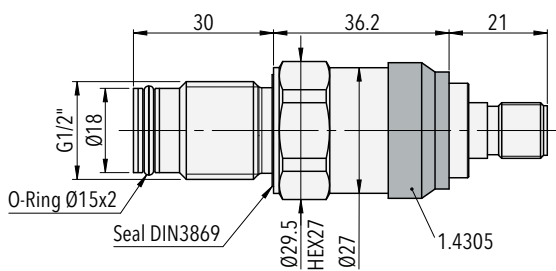
Dimensions



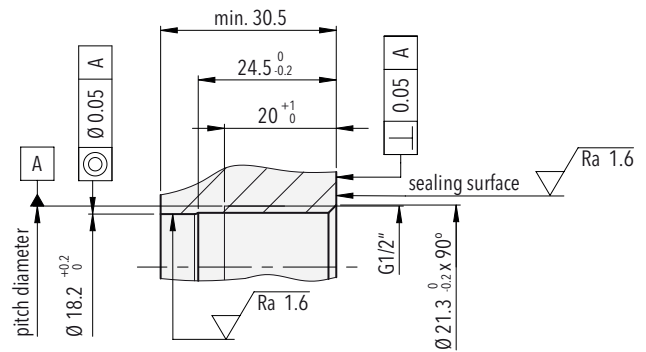
8237.XX.XX.93.35.XX.XX



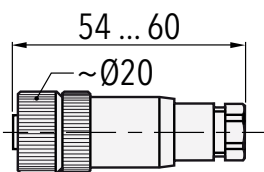
Mounting thread G1/2" standard length (Process connection 93)
DIN EN ISO 1179-1



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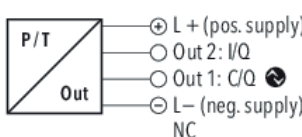


Mounting thread G1/2" 30 mm length (Process connection 94)
DIN EN ISO 1179-1



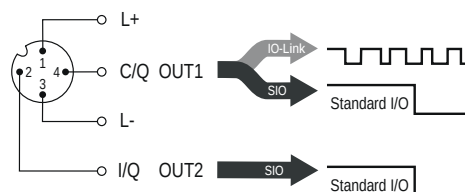
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Electrical connection

	M12x1, 5-pole
	
Electrical connection type code	35
IP protection	IP65, IP67 ^{1) 2)}
Pin assignment type code	OK
Output signal 8237.xx.xxxx.xx.50	
	1 2 4 3 5

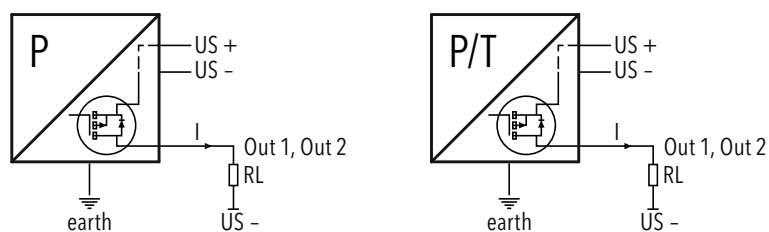
¹⁾ Provided female electrical plug is mounted according to instructions

²⁾ Ventilation via male electric plug/cable end



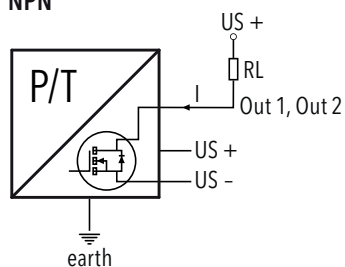
Switching output polarity

PNP

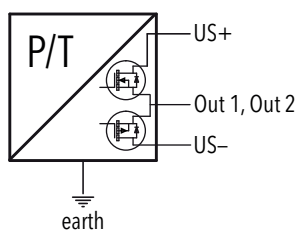


Connection of loads to switching output

NPN

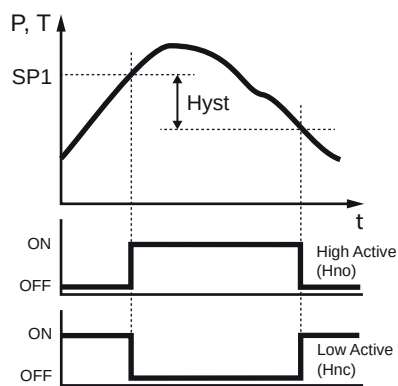


Push-Pull

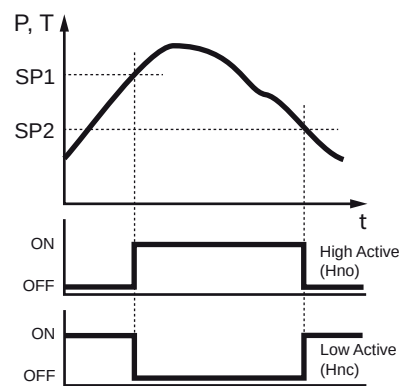


Functions switching output

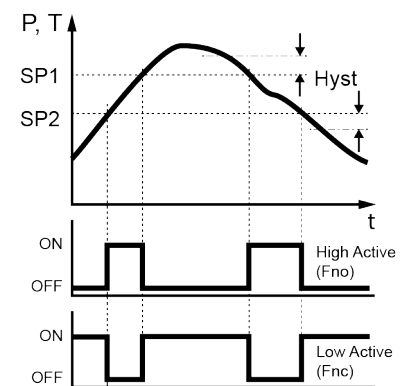
Single point mode



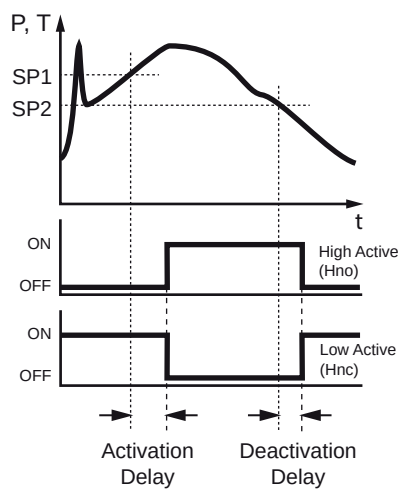
Two point mode



Window mode



Delay



Reliable quality

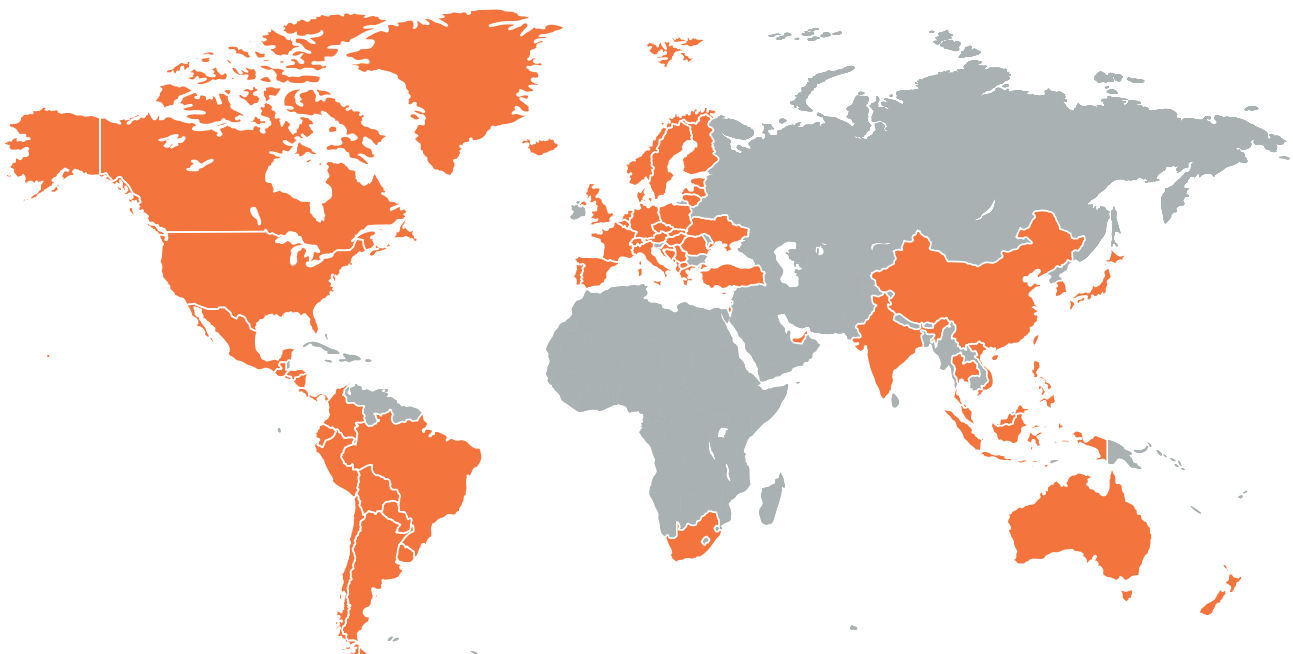
Worldwide represented, globally trusted, Swiss based

Trafag develops, produces and distributes robust, reliable and precise instruments for monitoring pressure, temperature and gas density.

The broad portfolio of pressure and temperature measuring instruments is tailored for use in test benches through to applications in harsh environments. The research and development departments in Switzerland and Germany develop all important components from the sensor to the application-specific microchip, which are

then manufactured in the production facilities in Switzerland, Germany, the Czech Republic, and India. Strict quality management according to ISO 9001 and ISO 14001 ensures that Trafag products meet the required quality and sustainability standards.

Trafag is headquartered in Switzerland, was founded in 1942 and has an extensive sales and service network in more than 40 countries worldwide.



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Pressure transmitters



Electronic pressure switches



Mechanical pressure switches



Pressure gauge



Thermostats



Temperature transmitters



Gas density