

POTENTIALLY HAZARDOUS AREAS



Ex-approved temperature and pressure monitoring solutions

- Pressure switches
- Pressure transmitters
- Thermostats



Trafag – Swiss quality solutions to rely on

Trafag draws from decades of experience in the design and manufacturing of pressure and temperature measuring instruments for intrinsically safe applications with worldwide support. We continuously meet the rising expectations in respect of safety and reliability of our products. These products provide reliable functionality in various hazardous zones, with a guaranteed safety operation. In addition to both CE and EX-conformance, Trafag products are also extremely fail-safe.

CE – designation and labelling

CE 1258  II 2 GD

Control No. of notified body for the supervision of the quality assurance system

I: Mining
II: All other areas

Category (see below)

G = Gas
D = Dust

- Category 1: Can be used in zone 0 (gas) and 20 (dust)
 - Potentially explosive atmosphere: Permanent
 - Two independent failures - safety
- Category 2: Can be used in zone 1 (gas) and 21 (dust)
 - Potentially explosive atmosphere: Regularly
 - One failure - safety
- Category 3: Can be used in zone 2 (gas) and 22 (dust)
 - Potentially explosive atmosphere: Unlikely or for very short time

IEC/EN 60079-8 – GASES

Ex ia IIC T6 Ga

Type of protection

Equipment groups (for gases)

Temperature level

Equipment protection level

- Type of protection: Intrinsically safe
- Equipment group (gases): IIC = Hydrogen, Acetylene
- Temperature level: Defines ignition temperature and permissible temperature of equipment surface
- Protection level: Referring to installation zone (Ga = Zone 0 = Category 1 in ATEX)

IEC/EN 60079-0 – DUST

Ex ia IIC IP6X T130 °C Da

Type of protection

Equipment groups (for dust)

Ingress protection

Temperature level

Equipment protection level

- Type of protection: Intrinsically safe, powder filling, encapsulation, ...
- Equipment group (dust): IIC = Conductive dust
- Temperature level: Defines maximum surface temperature
- Protection level: Referring to installation zone (Da = Zone 20 = Category 1 in ATEX)

EN 50303 – MINING

Ex ia I Ma

Type of protection

Equipment for mining

Equipment protection level

- Category and Protection level:
 - Category M1 / Protection level Ma: Fully functional and safe when explosive atmosphere is present. Requires means to cope with two independent failures
 - Category M2 / Protection level Mb: These products are intended to be deenergised in the presence of an explosive atmosphere

Ex-Product lines for pressure and temperature control

Trafag offers a wide range of EX-, ATEX- and IECE approved products for pressure and temperature monitoring:



Pressure transmitters

The electronic pressure transmitters are based on Trafag's own sensor technologies: thin-film-on-steel and thick-film-on-ceramic. In combination with inhouse developed ASIC electronics they offer excellent long-term stability and high accuracy even under harshest conditions. The wide range of executions allows a perfect fit for a wide range of applications.



Pressure switches

Trafag's mechanical pressure switches offer high vibration resistance and switchpoint accuracy in combination with an extraordinary rugged design for years of maintenance-free operation in rough conditions. Different sensors based on bellow, membrane and piston principle cover a wide range of pressure ranges, media and load cycle profiles.



Thermostats

With over 70 years of experience Trafag products have a long track record of proven reliability and accuracy. Different product lines with a variety of features and options offer a wide media temperature range and high switchpoint accuracy in a very robust design.

8292 EXNT

Economic pressure transmitter with excellent long-term stability



Ex-Rating

- II 1G Ex ia IIC T4/T6 Ga
- II 1 D Ex ia IIIC IP6x T130° Da
- I M1 Ex ia I Ma
- II 1/2G Ex ia IIC T4/T6 Ga/Gb (with plastic type connector)
- ATEX and IECEx

Technical data

Sensor technology	Thin-film on steel
Measuring range	0 ... 0.4 to 0 ... 2000 bar
Output signal	4 ... 20 mA
Accuracy @ 25 °C	± 0.5 % FS typ. ± 0.3 % FS typ.
Media temperature range	Depending on connection type min. -40 max. +120°C
Material sensor	1.4542 (AISI630)
Material housing	1.4542 (AISI630) / 1.4301 (AISI304)

Data sheet EXNT
www.trafag.com/H72329

8432 EXL

Economic submersible level transmitter with wide temperature range



Ex-Rating

- II 1G Ex ia IIC T4/T6 Ga
- I M1 Ex ia I Ma
- ATEX and IECEx

Technical data

Sensor technology	Thick-film on ceramic
Measuring range	0 ... 0.2 to 0 ... 25 bar
Output signal	4 ... 20 mA
Accuracy @ 25 °C	> 400 mbar ± 0.3 % FS typ. ≤ 400 mbar ± 0.5 % FS typ.
Media temperature range	T4: -20 ... +70 °C T6: -20 ... +65 °C
Material sensor	Ceramic Al ₂ O ₃ (96%)
Material housing	1.4404 / 1.4435 (AISI316L)

Data sheet EXL
www.trafag.com/H72330

8298 EPN

Category 3 pressure transmitter also suitable for high pressure measurement



Ex-Rating

- II 3G Ex nA/nC IIC T4
- Ship approval
ABS, BV, CCS, DNV, GL, KRS, LRS,
NKK, RINA, RMRS

Technical data

Sensor technology	Thin-film on steel
Measuring range	0 ... 2.5 to 0 ... 2500 bar
Output signal	4 ... 20 mA 0.5 ... 4.5VDC ratiometric
Accuracy @ 25 °C	± 0.5 % FS typ. ± 0.3 % FS typ.
Media temperature range	-40 ... +125 °C
Material sensor	1.4542 (AISI630)
Material housing	1.4542 (AISI630) / 1.4301 (AISI304)



Data sheet EPN/EPNCR
www.trafag.com/H72312

8854 EXNA

Low pressure range and high accuracy, flush membrane optional



Ex-Rating

- II 1G Ex ia IIC T3...T6 Ga
- II 1D Ex ia IIIC IP6x T145...T70°C
- I M1 Ex ia I
- ATEX and IECEx

Technical data

Sensor technology	Piezoresistive
Measuring range	0 ... 0.1 to 0 ... 1000 bar
Output signal	4 ... 20 mA
Accuracy @ 25 °C	± 0.25 % FS typ. ± 0.1 % FS typ.
Media temperature range	T3: -40 ... +150 T4: -40 ... +100 T6: -40 ... + 50
Material Sensor	1.4435 (AISI316L) (opt. Titanium)
Material Housing	1.4435 (AISI316L) (opt. Titanium)



Data sheet EXNA
www.trafag.com/H72334

8852/8853 EXNA


Pressure transmitter with ship approvals



Ex-Rating

- II 1G Ex ia IIC T3...T6 Ga
- Ship approval
GL, KRS
- ATEX

Technical data	
Sensor technology	Piezoresistive
Measuring range	0 ... 0.1 to 0 ... 1000 bar
Output signal	4 ... 20 mA
Accuracy @ 25 °C	± 0.5 % FS typ. ± 0.25 % FS typ. ± 0.1 % FS typ.
Media temperature range	T3: -25 ... +150 T4: -25 ... +100 T6: -25 ... + 55
Material sensor	1.4435 (AISI316L)
Material housing	1.4435 (AISI316L)

 Data sheet EXNA
www.trafag.com/H72227

8858 EXNAL


Submersible level transmitter



Ex-Rating

- II 1G Ex ia IIC T3...T6 Ga
- II 1D Ex ia IIIC IP6x T145...T70 °C
- I M1 Ex ia I
- ATEX

Technical data	
Sensor technology	Piezoresistive
Measuring range	0 ... 0.1 to 0 ... 25 bar
Output signal	4 ... 20 mA
Accuracy @ 25 °C	± 0.5 % FS typ. ± 0.25 % FS typ. ± 0.1 % FS typ.
Media temperature range	T4: -5 ... +50 °C T6: -5 ... +50 °C
Material sensor	1.4435 (AISI316L) (opt. Titanium)
Material housing	1.4435 (AISI316L) (opt. Titanium)

 Data sheet EXNAL
www.trafag.com/H72231

404 / 414 EXS Industat

Industrial thermostat with remote sensor



Ex-Rating

- II 2 G Ex de IIC T6
- II 2 D Ex tD A21 IP65 T80°C
- ATEX

Technical data

Sensor technology	Capillary tube, remote sensor
Measuring range	-30 ... +40 to + 70 ... +350°C
Output signal	Floating change-over contact
Repeatability	± 0.5 % FS typ.
Shock resistance	50g/ 11ms
Material sensor	Stainless steel / copper / copper nickel plated
Material housing	AlSi9Cu3, coated

Data sheet EXS
www.trafag.com/H72108

409 / 419 EXAS Ambistat

Thermostat with local sensor for room controlling



Ex-Rating

- II 2 G Ex de IIC T6
- II 2 D Ex tD A21 IP65 T80°C
- ATEX

Technical data

Sensor technology	Sensor coil
Measuring range	-30 ... +30 to 0 ... 60°C
Output signal	Floating change-over contact
Repeatability	± 0.5 % FS typ.
Shock resistance	50g/ 11ms
Material Sensor	Copper / copper nickel plated
Material Housing	AlSi9Cu3, coated

Data sheet EXAS
www.trafag.com/H72128

900/904/912 EXP Pressostat

Pressure switch with bellows sensor for gas tight solutions



Ex-Rating

- II 2 G Ex de IIC T6
- II 2 D Ex tD A21 IP66 T80°C
- ATEX

Technical data

Sensor technology	Bellows
Measuring range	-0.9 ... 1.5 to 4 ... 40 bar
Output signal	Floating change-over contact
Repeatability	± 1.0 % FS typ.
Media temperature range	-40 ... +150 °C
Material sensor	1.4435 (AISI316L)
Material housing	AlSi10Mg, epoxy coated

Data sheet 900/904/912
www.trafag.com/H72263

944/947/953 EXPK Pressostat

Pressure switch with piston sensor for high pressure ranges



Ex-Rating

- II 2 G Ex de IIC T6
- II 2 D Ex tD A21 IP66 T80°C
- ATEX

Technical data

Sensor technology	Piston
Measuring range	1 ... 10 to 60 ... 600 bar
Output signal	Floating change-over contact
Repeatability	± 1.0 % FS typ.
Media temperature range	O-Ring NBR: -30 ... +100°C O-Ring FKM: -15 ... +150°C
Material sensor	1.4435 (AISI316L)
Material housing	AlSi10Mg, epoxy coated

Data sheet 944/947/953
www.trafag.com/H72270

920/924/932 EXPD Pressostat

Differential pressure switch



Ex-Rating

- II 2 G, Ex de IIC T6
- II 2 D, Ex tD A21 IP66 T80 °C
- ATEX

Technical data

Sensor technology	Bellows
Measuring range Differential pressure	-1 ... 6 to -1 ... 18 bar -0.6 ... 3.4 to -1 ... 16 bar
Output signal	Floating change-over contact
Repeatability	± 1.0 % FS typ.
Media temperature range	-50 ... +150 °C
Material sensor	1.4435 (AISI316L) / Bronze / bronze nickel plated
Material housing	AISI10Mg, epoxy coated

Data sheet 920/924/932
www.trafag.com/H72256

9XX EXP, EXPK stainless steel

Stainless steel housing for highest resistance



Ex-Rating

- II 2 G, Ex de IIC T6
- II 2 D, Ex tD A21 IP66 T80 °C
- ATEX

Technical data

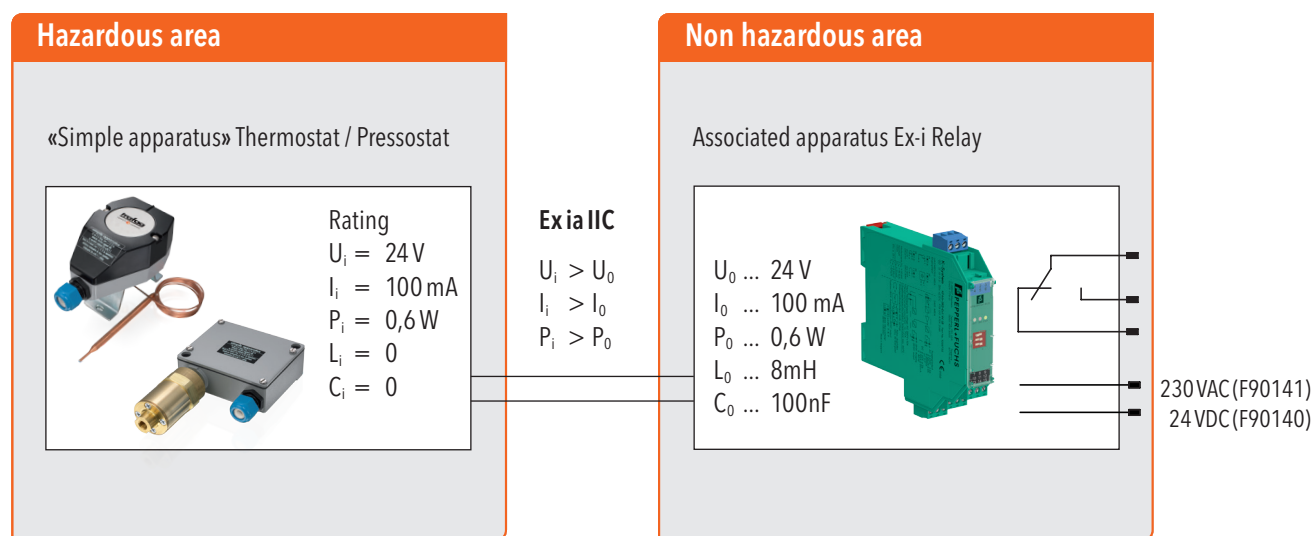
Sensor technology	Bellows / piston
Measuring range	Bellows: -0.9 ... 1.5 to 4 ... 40 bar Piston: 1 ... 10 to 60 ... 600 bar
Output signal	Floating change-over contact
Repeatability	± 1.0 % FS typ.
Media temperature range	Bellows: -40 ... +150 °C Piston: O-Ring NBR -30 ... +100 °C O-Ring FKM -15 ... +150 °C
Material sensor	1.4435 (AISI316L)
Material housing	Stainless steel 1.4301 (AISI304)

Data sheet 9XX EXP/EXPK
www.trafag.com/H72263/H72270

Simple apparatus

Pressostats and Thermostats, when combined with a certified Ex-barrier, can be used as «simple electrical apparatus» in Zone 1 and 2, as well as in Zone 21 and 22, according to IEC/EN 60079-14. These pressostats and thermostats are not suitable for Zone 0 and Zone 20. The use in safety relevant applications (approved electrical apparatus) is not permitted.

Ex-i barriers are suitable for intrinsically safe applications. The device transmits binary signals from the hazardous area into the safe area.



Recommended Ex-i barrier:

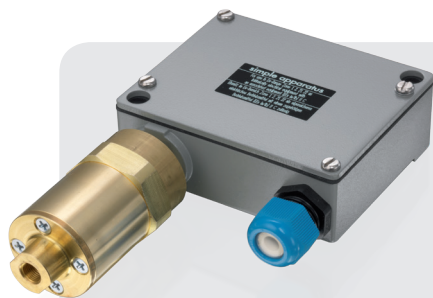
Trafag part no. F90141 (230 VAC)

F90140 (24 VDC)

If another type of Ex-i relay is used, make sure its electrical rating limits are within the specification of the simple apparatus thermostat or pressostat.

904/924/947 Simple apparatus

Pressostats



Ex-Rating

- EN60079-0, EN60079-11:
Zone 1 and 2, Zone 21 and 22

Technical data

Sensor technology	Bellows / piston
Measuring range	904: -0.9 ... 1.5 to 10 ... 100 bar 924: -1 ... 6 to -1 ... 18 bar 947: 1 ... 10 to 60 ... 600 bar
Output signal	Floating change-over contact
Repeatability	± 1.0 % FS typ.
Media temperature range	904 / 924: -40 ... +150°C 947: O-Ring NBR: -30 ... +100°C O-Ring FKM: -15 ... +150°C
Material sensor	1.4435 (AISI316L) / bronze / bronze nickel plated
Material housing	AlSi10Mg, epoxy coated

Data sheet 904
www.trafag.com/H72364

Data sheet 924
www.trafag.com/H72365

Data sheet 947
www.trafag.com/H72366

414/419 Simple apparatus

Thermostats



Ex-Rating

- EN60079-0, EN60079-11:
Zone 1 and 2, Zone 21 and 22

Technical data

Sensor technology	414: Capillary tube, remote sensor 419: Sensor coil
Measuring range	414: -30 ... +40 to +70 ... +350°C 419: -30 ... +30 to 0 ... 60°C
Output signal	Floating change-over contact
Repeatability	± 0.5 % FS typ.
Shock resistance	50g/ 11ms
Material sensor	Stainless steel / copper / copper nickel plated
Material housing	AlSi9Cu3, coated

Data sheet 414
www.trafag.com/H72183

Data sheet 419
www.trafag.com/H72182

Swiss based quality

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■ Subsidiaries

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New Zealand
Norway
Portugal
Romania
Russia
Singapore
South Africa
Spain
Sweden
Taiwan
Thailand
Turkey
United Arab Emirates
USA
Vietnam



References

ABB | AIT | AKG | Alstom | Areva T&D | Atos | AVL | Benninghoven | Bharat Heavy Electrical | Blohm & Voss | Bombardier | Bosch Rexroth | BMW Rolls-Royce
Bühler | Caterpillar | Charmilles | Dalian Marine Diesel Ltd. | Detroit Diesel | Deutsche Bahn AG | Doosan Group | Dräger | Electrolux | Faiveley | Fincantieri
Flender | Gdansk Shipyard | Gdynia Shipyard | Goninan | Greenfield | G&W | Hermetic Pumpen | Roche | Hudong Heavy Machinery | Hyundai Heavy Industries | IAV
Ingersoll Rand | Iveco | KOMA | MAN B&W | Melag | Mitsubishi | MTU | Noske-Kaesar | Oilon | Ormat Turbines | Parker | Philips | Petrochemia | Polarteknik
PMC | Queensland Rail | Reintjes | Renk | Rolls-Royce | Schindler | Schneider Electric | Schottel | Sciteq-Hammel | Siemens | SNCF | STX | Heavy Industries
Szczecin Shipyard | Therman Limited | Toshiba | Trumpf | Verolme Shipyard | Vesta | Viessmann | Voith | Wärtsilä | Westfalia Separator | W&H
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