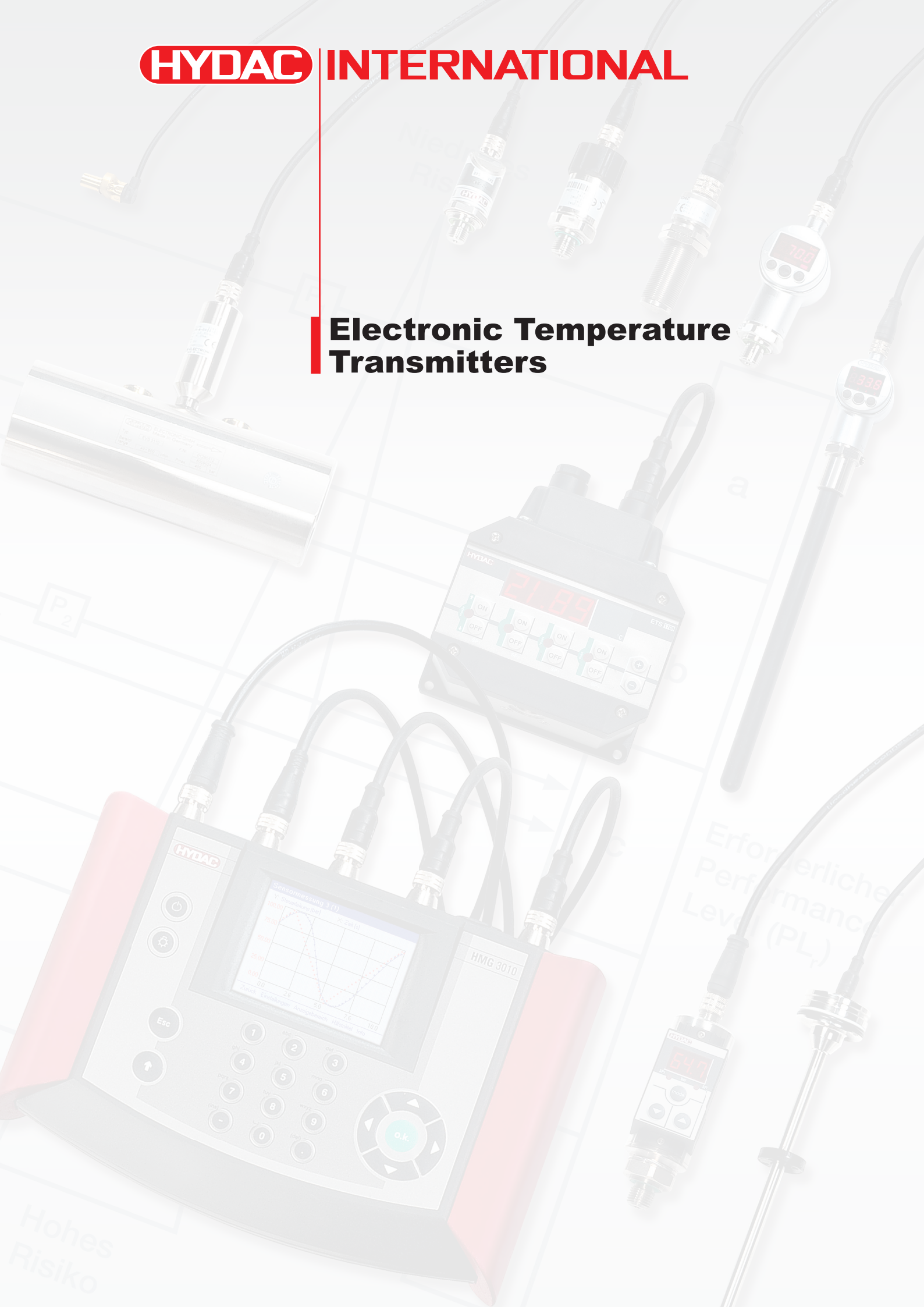


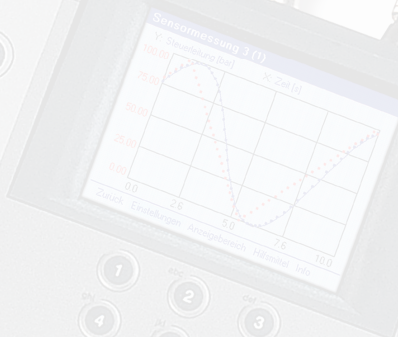
Electronic Temperature Transmitters



P₂

Erforderliche Performance Level (PL)

Hohes Risiko



ELECTRONIC TEMPERATURE TRANSMITTERS

As with the pressure transmitters, HYDAC ELECTRONIC also has temperature transmitters appropriate for every application. The transmitters are available with a variety of output signals, connectors and fluid port connection options.

Electronic temperature transmitters for general applications:

ETS 7200

ETS 4100

ETS 4500

Other temperature transmitters for special applications can be found in the sections "*Service Instruments*" and "*OEM Products for Large Volume Production*".



Electronic Temperature Transmitter ETS 7200

Description:

The ETS 7200 is an electronic temperature transmitter which, because of its compact design, is particularly suited to measuring temperature in hydraulic applications in the industrial and mobile sectors. Based on a silicon semiconductor device and corresponding evaluation electronics, the temperature sensor is designed to measure temperatures in the range -13 °F..+212 °F.

The sensor has various analog output signals as standard, e.g. 4 .. 20 mA or 0 ... 10V to enable integration into modern control systems through an M12x1 connector.

The pressure resistance up to 8700 psi and excellent EMC characteristics make the ETS 7200 ideal for use in harsh conditions.

Special features:

- Accuracy $\leq \pm 2$ % FS
- Ideal for OEM applications
- Very compact design
- Excellent EMC characteristics
- Long-term stability
- Standard protection class IP 67

Technical data:

Input data	
Measuring principle	Silicon semiconductor device
Measuring range	-13..+212 °F (-25..+100 °C)
Probe length	10 mm
Probe diameter	6.7 mm
Pressure resistance	8700 psi
Overload pressure	13050 psi
Mechanical connection	G1/4 A DIN 3852
Torque value	15lb-ft (20 Nm)
Parts in contact with medium	Mech. conn.: Stainless steel Seal: FPM
Output data	
Output signal, permitted load resistance	4 .. 20 mA, 2 conductor $R_{Lmax} = (U_B - 8 V) / 20 \text{ mA}$ [kΩ] 0 .. 10 V, 3 conductor $R_{Lmin} = 2 \text{ kΩ}$
Accuracy (at room temperature)	$\leq \pm 1.0$ % FS typ. $\leq \pm 2.0$ % FS max.
Temperature drift (environment)	$\leq \pm 0.012$ % FS / °F
Rise time to DIN EN 60751	t_{50} : 4 s t_{90} : 8 s
Environmental conditions	
Ambient temperature range	-13..176 °F
Storage temperature range	-40..212 °F
Fluid temperature range ¹⁾	-40..+212 °F / -13..+212 °F
CE mark	EN 61000-6-1 / 2 / 3 / 4
us mark ²⁾	Certificate No. E318391
Vibration resistance to DIN EN 60068-2-6 at 10 .. 500 Hz	≤ 20 g
Protection class to IEC 60529	IP 67
Other data	
Supply voltage	8 .. 30 V DC 2 conductor 12 .. 30 V DC 3 conductor
for use acc. to UL spec.	- limited energy - according to 9.3 UL 61010; Class 2; UL 1310/1585; LPS UL 60950
Residual ripple of supply voltage	≤ 5 %
Current consumption	≤ 25 mA
Weight	~ 50 g

Note: Reverse polarity protection of the supply voltage, excess voltage, override and short circuit protection are provided.

FS (Full Scale) = relative to complete measuring range

¹⁾-13 °F with FPM seal, -40 °F on request

²⁾ Environmental conditions according to 1.4.2 UL 61010-1; C22.2 No 61010-1

Model code:

ETS 7 2 4 6 - X - 010 - 000

Mechanical connection

4 = G1/4 A DIN 3852 (male)

Electrical connection

6 = Male M12x1, 4 pole
(connector not supplied)

Signal

A = 4 .. 20 mA, 2 conductor

B = 0 .. 10 V, 3 conductor

Probe length

010 = 10 mm

Modification number

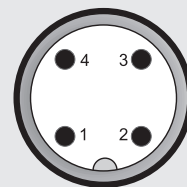
000 = Standard

Accessories:

Appropriate accessories, such as electrical connectors can be found in the Accessories brochure.

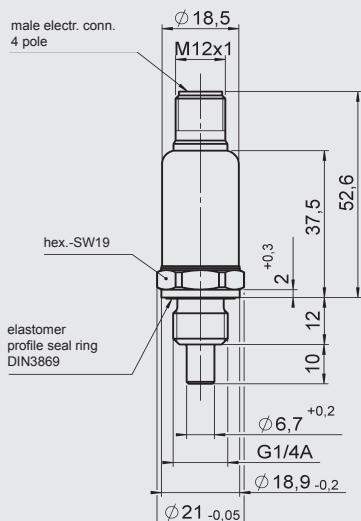
Pin connections:

M12x1



Pin	ETS 7246-A	ETS 7246-B
1	Signal+	+U _B
2	n.c.	n.c.
3	Signal-	0 V
4	n.c.	Signal

Dimensions:



Note:

The information in this brochure relates to the operating conditions and applications described.

For applications or operating conditions not described, please contact the relevant technical department.

Subject to technical modifications.

HYDAC ELECTRONICS

90 Southland Dr. Bethlehem, PA 18017

Telephone: +1 (610) 266-0100

E-mail: electronics@hydacusa.com

Website: www.hydac-na.com



Electronic Temperature Transmitter ETS 4100

Description:

The ETS 4100 is a robust electronic temperature transmitter which is particularly suited to measuring temperature in hydraulic applications in industry.

The temperature sensor, based on a PT 1000 and corresponding evaluation electronics, is capable of measuring temperatures in the range -13 °F to +212 °F.

The sensor has analog output signals of 4 .. 20 mA and 0 .. 10 V available as standard for integration into modern control systems. The pressure resistance up to 8700 psi and excellent EMC characteristics make the ETS 4100 ideal for use in harsh conditions.

Special features:

- Accuracy $\leq \pm 0.8$ % FS
- Ideal for industrial applications
- Robust design
- Excellent EMC characteristics
- Excellent long term stability
- Standard protection class IP 65 / IP 67

Technical data:

Input data	
Measuring principle	PT 1000
Measuring range	-13..+212 °F (-25..+100 °C)
Probe length	6; 50; 100; 250; 350 mm
Probe diameter	4.5; 8; 8; 8; 8 mm
Pressure resistance	8700 psi (probe length 6 mm) 1812.5 psi (probe length 50 mm) 1812.5 psi (probe length 100 mm) 1812.5 psi (probe length 250 mm) 1812.5 psi (probe length 350 mm)
Mechanical connection	G1/4 A DIN 3852
Torque value	15lb-ft(20Nm)
Parts in contact with medium ¹⁾	Mech. conn.: Stainless steel Seal: FPM
Output data	
Output signal, permitted load resistance	4 .. 20 mA, 2 conductor $R_{Lmax} = (U_B - 8 V) / 20 \text{ mA}$ [kΩ] 0 .. 10 V, 3 conductor $R_{Lmin} = 2 \text{ k}\Omega$
Accuracy (at room temperature)	$\leq \pm 0.4$ % FS typ. $\leq \pm 0.8$ % FS max.
Temperature drift (environment)	$\leq \pm 0.006$ FS / °F
Rise time to DIN EN 60751	t_{50} : ~ 4 s t_{80} : ~ 8 s
Environmental conditions	
Operating temperature range ²⁾	-40..185 °F / -13..+185 °F
Storage temperature range	-40..212 °F
Fluid temperature range ²⁾	-40..+257 °F / -13..+257 °F
CE mark	EN 61000-6-1 / 2 / 3 / 4
Vibration resistance to DIN EN 60068-2-6 at 10 .. 500 Hz	≤ 25 g
Protection class to IEC 60529	IP 65 (for male EN175301-803 (DIN 43650) and Binder 714 M18) IP 67 (for male M12x1, when an IP 67 connector is used)
Other data	
Electrical connection	M12x1, 4 pole, Binder Series 714 M18, 4 pole, EN 175301-803 (DIN 43650)
Supply voltage	8 .. 32 V DC 2 conductor 12 .. 32 V DC 3 conductor
Residual ripple of supply voltage	≤ 5 %
Current consumption 3 conductor	~ 25 mA
Weight	~ 200 g (probe length 6 mm) ~ 215 g (probe length 50 mm) ~ 235 g (probe length 100 mm) ~ 280 g (probe length 250 mm) ~ 315 g (probe length 350 mm)

Note: Reverse polarity protection of the supply voltage, excess voltage, override and short circuit protection are provided.

FS (Full Scale) = relative to complete measuring range

¹⁾ Other seal materials on request

²⁾ -13 °F with FPM seal, -40 °F on request

Model code:

ETS 4 1 4 X - X - XXX - 000

Mechanical connection

4 = G1/4 A DIN 3852 (male)

Electrical connection

4 = Male, 4 pole Binder series 714 M18
(connector not supplied)

5 = Male, 3 pole + PE,
EN 175301-803 (DIN 43650)
(connector supplied)

6 = Male M12x1, 4 pole
(connector not supplied)

Signal

A = 4 .. 20 mA, 2 conductor

B = 0 .. 10 V, 3 conductor

Probe length

006 = 6 mm

050 = 50 mm

100 = 100 mm

250 = 250 mm

350 = 350 mm

Modification number

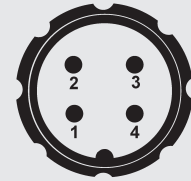
000 = Standard

Accessories:

Appropriate accessories, such as electrical connectors can be found in the Accessories brochure.

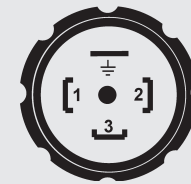
Pin connections:

Binder series 714 M18



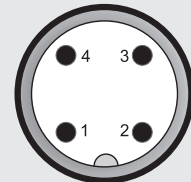
Pin	ETS 4144-A	ETS 4144-B
1	n.c.	+U _B
2	Signal+	Signal
3	Signal -	0 V
4	n.c.	n.c.

EN175301-803 (DIN 43650)



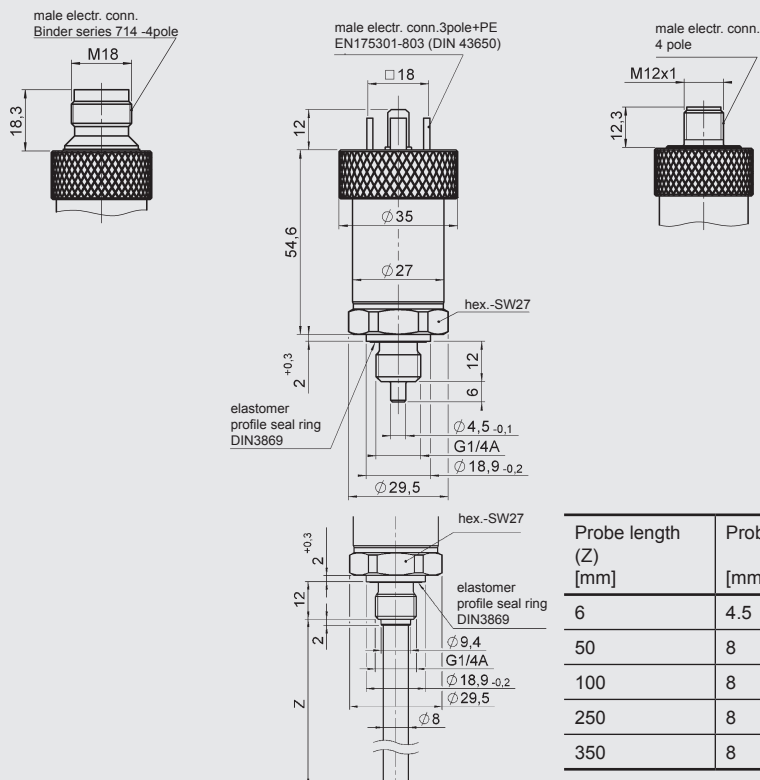
Pin	ETS 4145-A	ETS 4145-B
1	Signal+	+U _B
2	Signal-	0V
3	n.c.	Signal
⊥	Housing	Housing

M12x1



Pin	ETS 4146-A	ETS 4146-B
1	Signal+	+U _B
2	n.c.	n.c.
3	Signal-	0 V
4	n.c.	Signal

Dimensions:



Probe length (Z) [mm]	Probe diameter [mm]
6	4.5
50	8
100	8
250	8
350	8

Note:

The information in this brochure relates to the operating conditions and applications described.

For applications or operating conditions not described, please contact the relevant technical department.

Subject to technical modifications.

HYDAC ELECTRONICS

90 Southland Dr. Bethlehem, PA 18017

Telephone: +1 (610) 266-0100

E-mail: electronics@hydacusa.com

Website: www.hydac-na.com



Electronic Temperature Transmitter ETS 4500

Description:

The ETS 4500 is a robust electronic temperature transmitter which is particularly suited to measuring temperature in hydraulic applications in industry.

Based on a silicon semiconductor device and corresponding evaluation electronics, the temperature sensor is designed to measure temperatures in the range -13..+212 °F.

The sensor has analog output signals of 4 .. 20 mA and 0 ..10 V available as standard for integration in modern control systems.

The pressure resistance up to 8700 psi and excellent EMC characteristics make the ETS 4500 ideal for use in harsh conditions.

Special features:

- Accuracy $\leq \pm 2\%$ FS
- Ideal for industrial applications
- Robust design
- Excellent EMC characteristics
- Excellent long term stability
- Standard protection class IP 65 / IP 67

Technical data:

Input data	
Measuring principle	Silicon semiconductor device
Measuring range	-13..+212 °F (-25..+100 °C)
Probe length	10.7; 50; 100; 250; 350 mm
Probe diameter	8 mm
Pressure resistance	8700 psi (probe length 10.7 mm) 1812.5 psi (probe length 50 mm) 1812.5 psi (probe length 100 mm) 1812.5 psi (probe length 250 mm) 1812.5 psi (probe length 350 mm)
Mechanical connection	G1/4 A DIN 3852
Torque value	15lb-ft (20 Nm)
Parts in contact with medium ¹⁾	Mech. conn.: Stainless steel Seal: FPM
Output data	
Output signal, permitted load resistance	4 .. 20 mA, 2 conductor $R_{L,max} = (U_B - 8 V) / 20 \text{ mA}$ [kΩ] 0 .. 10 V, 3 conductor $R_{L,min} = 2 \text{ k}\Omega$
Accuracy (at room temperature)	$\leq \pm 1.0\%$ FS typ. $\leq \pm 2.0\%$ FS max.
Temperature drift (environment)	$\leq \pm 0.012\%$ FS / °F
Rise time to DIN EN 60751	$t_{90}: \sim 4 \text{ s}$ $t_{95}: \sim 8 \text{ s}$
Environmental conditions	
Operating temperature range ²⁾	-40..185 °F / -13..+185 °F
Storage temperature range	-40..212 °F
Fluid temperature range ²⁾	-40..+257 °F / -13..+257 °F
CE mark	EN 61000-6-1 / 2 / 3 / 4
Vibration resistance to DIN EN 60068-2-6 at 10 .. 500 Hz	$\leq 25 \text{ g}$
Protection class to IEC 60529	IP 65 (for male EN175301-803 (DIN 43650)) IP 67 (for male M12x1 male, when an IP 67 connector is used)
Other data	
Electrical connection	M12x1, 4 pole EN 175301-803 (DIN 43650)
Supply voltage	8 .. 32 V DC 2 conductor 12 .. 32 V DC 3 conductor
Residual ripple of supply voltage	$\leq 5\%$
Current consumption 3 conductor	$\sim 25 \text{ mA}$
Weight	$\sim 200 \text{ g}$ (probe length 10.7 mm) $\sim 215 \text{ g}$ (probe length 50 mm) $\sim 235 \text{ g}$ (probe length 100 mm) $\sim 280 \text{ g}$ (probe length 250 mm) $\sim 315 \text{ g}$ (probe length 350 mm)

Note: Reverse polarity protection of the supply voltage, excess voltage, override and short circuit protection are provided.

FS (Full Scale) = relative to complete measuring range

¹⁾ Other seal materials on request

²⁾ -13 °F with FPM seal, -40 °F on request

Model code:

ETS 4 5 4 X - X - XXX - 000

Mechanical connection

4 = G1/4 A DIN 3852 (male)

Electrical connection

5 = Male, 3 pole + PE,
EN 175301-803 (DIN 43650)
(connector supplied)

6 = Male M12x1, 4 pole
(connector not supplied)

Signal

A = 4 .. 20 mA, 2 conductor

B = 0 .. 10 V, 3 conductor

Probe length

010 = 10 mm

050 = 50 mm

100 = 100 mm

250 = 250 mm

350 = 350 mm

Modification number

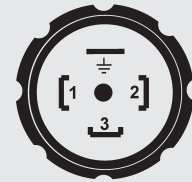
000 = Standard

Accessories:

Appropriate accessories, such as electrical connectors can be found in the Accessories brochure.

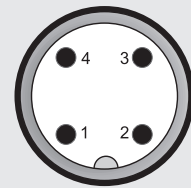
Pin connections:

EN175301-803 (DIN 43650)



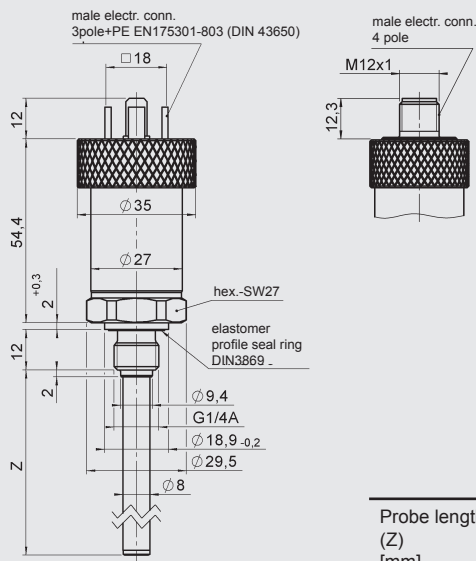
Pin	ETS 4545-A	ETS 4545-B
1	Signal+	+U _B
2	Signal-	0V
3	n.c.	Signal
⊥	Housing	Housing

M12x1



Pin	ETS 4546-A	ETS 4546-B
1	Signal+	+U _B
2	n.c.	n.c.
3	Signal-	0 V
4	n.c.	Signal

Dimensions:



Probe length (Z) [mm]	Probe diameter [mm]
10.7	8
50	8
100	8
250	8
350	8

Note:

The information in this brochure relates to the operating conditions and applications described. For applications or operating conditions not described, please contact the relevant technical department. Subject to technical modifications.

HYDAC ELECTRONICS

90 Southland Dr. Bethlehem, PA 18017
Telephone: +1 (610) 266-0100
E-mail: electronics@hydacusa.com
Website: www.hydac-na.com

