



## Temperature Transmitter ETS 4100 Ex applications

Integrated temperature probe

Accuracy 0.4 %

Flameproof enclosure  
ATEX, IECEx, CSA, triple approval  
With junction box  
HART interface  
Optional pressure measurement



### Description:

The ETS 4100 with HART interface is an electronic temperature transmitter in the ignition protection type having flameproof enclosure. The triple approval in accordance with ATEX, CSA and IECEx enables universal, worldwide utilisation of the devices in potentially explosive atmospheres.

Based on a silicon semiconductor device and corresponding evaluation electronics, the temperature sensor is designed to measure temperatures within a range of -25 .. +100 °C.

The sensor has an analogue output signal of 4 .. 20 mA available as standard to enable integration into modern controls. In addition to the analogue output of the measured value, digital communication is possible by means of the HART protocol.

The instrument provides the option of a pressure sensor. The pressure signal is given out as a digital signal via the HART protocol, the temperature signal is still available as an analogue signal (4 .. 20 mA).

The main fields of application are in the oil & gas industry, e.g. in hydraulic power units, drill drives or valve actuation stations. The device is also used in mining applications as well as in locations with high dust contamination.

### Protection types and applications:

**CSA<sub>US</sub>**  
Explosionproof - Seal not required  
Class I Group B, C, D, T6, T5  
Class II Group E, F, G  
Class III  
Type 4

**ATEX**  
Flameproof  
II 2G Ex d IIC T6, T5 Gb  
II 2D Ex tb IIIC T110 .. 120 °C Db

**IECEx**  
Flameproof  
Ex d IIC T6, T5 Gb  
Ex tb IIIC T110 .. 120 °C Db

### Technical data:

#### Input data

Measuring range	-25 .. +100 °C
Probe lengths	10.7; 50; 100; 250; 350 mm
Probe diameter	8 mm
Pressure resistance	600 bar (probe length 10.7 mm) 125 bar (probe length ≥ 50 mm)
Mechanical connection	G¾ A ISO 1179-2
Tightening torque, recommended	20 Nm
Parts in contact with fluid	Stainless steel: 1.4571; 1.4301 Seal: FKM
Conduit / housing material	1.4435; 1.4404

#### Output data

Output signal, permitted load resistance	4 .. 20 mA, 2-conductor, with HART protocol $R_{Lmax} = (U_B - 12 V) / 20 \text{ mA} [\text{k}\Omega]$ for HART communication min. 250 Ω
HART Communication	Acc. to HART 7 specifications
HART Common Practice Commands i.e.	Altering of measuring range limits (see table)
Accuracy (at room temperature)	≤ ± 0.4 % FS typ. ≤ ± 0.8 % FS max.
Temperature drift (environment)	≤ ± 0.01 % FS / °C
Response time acc. to DIN EN 60751	$t_{50}$ : ~ 10 s $t_{90}$ : ~ 15 s

#### Environmental conditions

Operating/ ambient temperature range <sup>1)2)</sup>	T6, T110 °C	Ta = -40 .. +60 °C / -20 .. +60 °C
	T5	Ta = -40 .. +70 °C / -20 .. +70 °C
Storage temperature range	-40 °C .. +100 °C	
Fluid temperature range <sup>1)2)</sup>	T6, T110 °C	Ta = -40 .. +60 °C / -20 .. +60 °C
	T5	Ta = -40 .. +70 °C / -20 .. +70 °C

**CE mark** EN 61000-6-1/ 2/ 3/ 4; EN 60079-0/ 11/ 15/ 26/ 31

Vibration resistance acc. to DIN EN 60068-2-6 at 10 .. 500 Hz	≤ 10 g
Protection class acc. to DIN EN 60529 <sup>3)</sup>	IP 65

#### Other data

Supply voltage	12 .. 30 V DC
Residual ripple of supply voltage	Acc. to FSK Physical Layer Specification (HCF_SPEC_054)
Life expectancy	> 10 million cycles (0 .. 100 % FS)
Weight	280 g (probe length 010), 315 g (probe length 050, 100), 350 g (probe length 250), 385 g (probe length 350)

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

**FS (Full Scale)** = relative to complete measuring range

**B.F.S.L.** = Best Fit Straight Line

<sup>1)</sup> -25 °C with FKM seal, -40 °C on request

<sup>2)</sup> T120 °C with Ta = -40 .. +70 °C / -20 .. +70 °C with electrical connection, single leads possible

<sup>3)</sup> For mounted 1/2 NPT Conduit screwed fitting in corresponding protection class at junction box

## Measuring Range Limits:

By means of HART Common Practice Commands, you have the opportunity to adjust the following measuring range limits.

Measuring range limits of the primary variable, temperature:

Lower measuring range limit		Upper measuring range limit		Measuring span	
min	max	min	max	min	max
-25 °C	75 °C	0 °C	100 °C	25 °C	125 °C

## Fields of application:

	Junction box Aluminium "J"	Junction box Stainless steel "Q"
CSA ATEX IECEX	Explosionproof (seal not required) Flameproof Flameproof	
cCSA <sub>US</sub>	Class I Group B, C, D, T6, T5 Class II Group E, F, G Class III Type 4	Class I Group B, C, D, T6, T5 Class II Group E, F, G Type 4
ATEX	II 2G Ex d IIC T6, T5 Gb II 2D Ex tb IIIC T110 .. 120 °C Db	
IECEX	Ex d IIC T6, T5 Gb Ex tb IIIC T110 .. 120 °C Db	

## Model code:

**ETS 4 1 4 X - F21 - XXX - D - 000**

### Mechanical connection

4 = G1/4 A ISO 1179-2

### Electrical connection

J = aluminium junction box  
Q = stainless steel junction box

### Output signal

F21 = 4 .. 20 mA, 2-conductor, with HART protocol

### Probe length

010 = 10.7 mm  
050 = 50 mm  
100 = 100 mm  
250 = 250 mm  
350 = 350 mm

### Approval

D = CSA Explosionproof (seal not required)  
ATEX Flameproof  
IECEX Flameproof

### Modification number

000 = standard



## Model code with pressure measurement option:

ETS 4 1 2 X - F21 - 007 - P - XXXX - D X - 000

### Mechanical connection

2 = G1/2 A ISO 1179-2

### Electrical connection

J = aluminium junction box  
Q = stainless steel junction box

### Output signal

F21 = 4 .. 20 mA, 2-conductor, with HART protocol

### Probe length

007 = 7 mm

### With pressure measurement

### Measuring ranges in bar

0016; 0040; 0060; 0100; 0250; 0400; 0600

### Approval

D = **CSA** Explosionproof (seal not required)  
**ATEX** Flameproof  
**IECEX** Flameproof

### Type of measurement cell:

S = Sealed Gauge (sealed to atmosphere)  $\geq$  40 bar  
V = Vented Gauge (vented to atmosphere)  $<$  40 bar

### Modification number:

000 = standard

## 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.

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