

Temperature Transmitter, head mounted TF12/TF12-Ex

PROFIBUS PA,
Pt 100 (RTD), Thermocouples,
1 or 2 independent channels

IndustrialIT
enabled™

■ Input

- Resistance thermometer (2, 3, 4-wire circuit)
- Thermocouples
- Resistance remote signalling units
(0...400 Ω, 0...4000 Ω)
- Voltages, mV (-15...+115 mV)

■ Output

- PROFIBUS PA profile V3.0, type A and B
- Bus design acc. to IEC 1158-2, 31.25 kbit/s

■ Electrical isolation (I/O)

■ Digital, long-term solid processing of measuring values

■ Customer-specific linearization

■ Continuous sensor and self-monitoring

■ Approvals for explosion protection

- intrinsically safe  II 2 G EEx ia IIC T6

■ Input functionality

- 1 or 2 channels
- Redundancy
- Average value
- Differential value

■ EMC acc. to EN 50082-2 and NE 21

■ Reserve voltage protection and solid bus current limitation

■ Parameterization

- DTM for FDT 0.98-1 and 1.2 interface
and DSV401 (SMART VISION)
- Siemens Simatic PDM driver for TF12/TF212



Excellent long term stability
Temperature linear output signal
Enhanced self diagnostics

ABB

Technical data

Output

Digital output signal

PROFIBUS PA profile V3.0, type A and B

Transmission rate (baud rate)

31.25 kbit/s

Nominal current consumption

11.8 mA

Max. current in case of device error

15 mA

Damping (programmable)

$t_{63} = 0...60$ s

Input

Resistance (temperature linear)

Resistance thermometer

Pt 50...Pt 100...Pt 1000

Resistance

0...400 Ω /0...4000 Ω

Maximum line resistance (R_w) per core

< 5 Ω

Measuring current

200 μ A

Sensor short-circuit

< 5 Ω (for RTD)

Sensor break

> 5 M Ω

Thermocouples

Types

B, C, D, E, J, K, L, N, R, S, T, U

Voltages

-15 mV...+ 115 mV

Sensor monitoring current

200 μ A

Input resistance

5 M Ω

Input filter

50/60 Hz

Internal reference junction

Pt 100, programmable

Standard	Input element	Measuring range	Basis Measuring error
	Sensor		
IEC 584-1	Thermocouple type B	400...+1820 °C (+752...+3308 °F)	0.8 K
	Thermocouple type E	-100...+1000 °C (-148...+1832 °F)	0.2 K
	Thermocouple type J	-100...+1200 °C (-148...+2192 °F)	0.2 K
	Thermocouple type K	-180...+1370 °C (-292...+2498 °F)	0.2 K
	Thermocouple type R	- 50...+1760 °C (- 58...+3200 °F)	0.8 K
	Thermocouple type S	- 50...+1760 °C (- 58...+3200 °F)	0.8 K
	Thermocouple type T	-200...+ 400 °C (-328...+ 752 °F)	0.2 K
	Thermocouple type N	-180...+1300 °C (-292...+2372 °F)	0.2 K
W3, ASTM E 998	Thermocouple type C	0...+2300 °C (+ 32...+4172 °F)	0.8 K
	Thermocouple type D	0...+2300 °C (+ 32...+4172 °F)	0.8 K
DIN 43710	Thermocouple type L	-100...+ 900 °C (-148...+1652 °F)	0.2 K
	Thermocouple type U	-200...+ 600 °C (-328...+1112 °F)	0.2 K
IEC 751 ¹⁾	Resistance thermometer Pt 100	-200...+ 850 °C (-328...+1562 °F)	0.4 K
	Resistance thermometer Pt 1000	-200...+ 850 °C (-328...+1562 °F)	0.4 K
	Resistance thermometer Pt 100/PT1000	-100...+ 250 °C (-148...+ 482 °F)	0.2 K
DIN 43760 ²⁾	Resistance thermometer Ni 100	- 60...+ 250 °C (- 76...+ 482 °F)	0.2 K
Resistance	2-, 3-, 4-wire	0...400 Ω /0...4000 Ω	0.05 Ω /0.4 Ω
Voltage		-15 mV...+115 mV	20 μ V

¹⁾ a = 0.00385

²⁾ a = 0.00618

Power supply (at transmitter terminals)

Supply voltage (poling protected)

Non-Ex-application $U_s = 9...32$ V DC
For Ex-Application, max. $U_i = 9...17.5$ V DC

General characteristics

Rise time

< 0.1...1.25 s

Vibration resistance

Vibration in operation 2g nach DIN IEC 68T.2-6

Electrical isolation (I/O)

1.5 kV

Environment conditions

Ambient temperature range

-40...+85 °C

Transport and storage temperature

-40...+100 °C

Relative humidity

< 100 % (100 % humidity with isolated terminals only)

Condensation

Permitted

Influences

Influence of ambient temperature (related to 25 °C)

Pt 100 ± 20 ppm/K related to 1050 °C
Thermocouple ± 40 ppm/K related to the defined thermocouple measuring range (IEC 584)

Characteristics at rated conditions

acc. to IEC 770, related to 25 °C)

Measuring error incl. characteristic deviation

Pt 100 (within range -100...+250 °C) ± 0.2 K
resistance measurement 0...400 Ω ± 0.05 Ω
0...4000 Ω ± 0.4 Ω

Thermocouple e. g. type K ± 0.2 K
voltage measurement -15...+115 mV ± 20 μ V

Additional influence of the internal reference junction

Pt 100 DIN IEC 751 cl. B

Mechanical construction

Housing material

polycarbonate

Color

black (Non-Ex-type)
blue (Ex-type)

Weight

250 g (without accessories)

Terminals

Screw terminals 2:5 mm²

Explosion protection

Intrinsically safe

Marking II 2 G EEx ia IIC T6
 EC-Type-Examination certificate ZELM 99 ATEX 0021
 Temperature class T6/T4 < 60 °C/85 °C

Suitable for connecting to fieldbus systems according to
 – FISCO model

Supply circuit	Output [ia]	Input [ia]
Max. voltage	$U_i = 17.5 \text{ V}$	$U_o = 5.9 \text{ V}$
Short-circuit current	$I_i = 360 \text{ mA}$	$I_o = 17 \text{ mA}$
Max. power	$P_i < 2.52 \text{ W}$	$P_o < 26 \text{ mW}$
Internal inductance	$L_i < 10 \mu\text{H}$	neglectable
Internal capacitance	$C_i = 1.2 \text{ nF}$	neglectable

Electromagnetic compatibility (EMC)

Acc. to NAMUR NE 21 recommendation.

With Pt 100 sensor

Type of test	Degree	Standard
Burst to signal/ data lines	1 kV	EN 61000-4-4 EN 50082-2
Static discharge contact discharge to: contact plate terminals for supply	8 kV 6 kV	EN 61000-4-2
Radiated field 80 MHz...1 GHz	10 V/m	EN 61000-4-3
Coupling 150 kHz - 80 MHz	10 V	EN 61000-4-6

Parameterization/structure

Type of inputs (2 independent channels), measuring range, input filter, damping, alarm function, limit values, compensation for ageing, saving of all data proof against mains failure.

Standard parameters (factory setting)

Channel 1

Pt 100, 3-wire circuit
 L-L/L/H/H-H-Lim = -200 °C/-200 °C/850 °C/850 °C
 Damping 0 s, dimension °C

Channel 2

Pt 100, 3-wire circuit
 L-L/L/H/H-H-Lim = -200 °C/-200 °C/850 °C/850 °C
 Damping 0 s, dimension °C

Default address

126

Process Control System (PCS)

A cyclic communication can be established with all PROFIBUS compatible PCSs. Acyclic communication requires a Master CI. 2, the communication may be established on the basis of the generic slave (to be in acc. to Profile 3.0; only standard parameters) or a TF 12 specific driver.

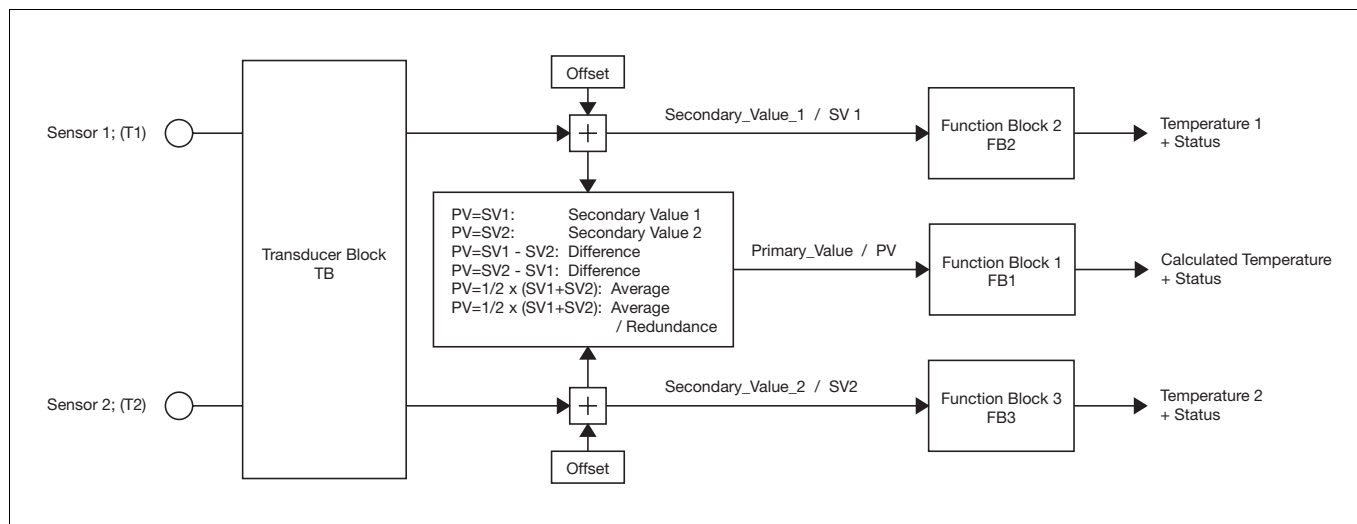
Those drivers are available for following PCSs:

- Freelance 2000/Control Builder F (DTM or template)
- Symphony (Composer via DTM)
- Siemens (via PDM)

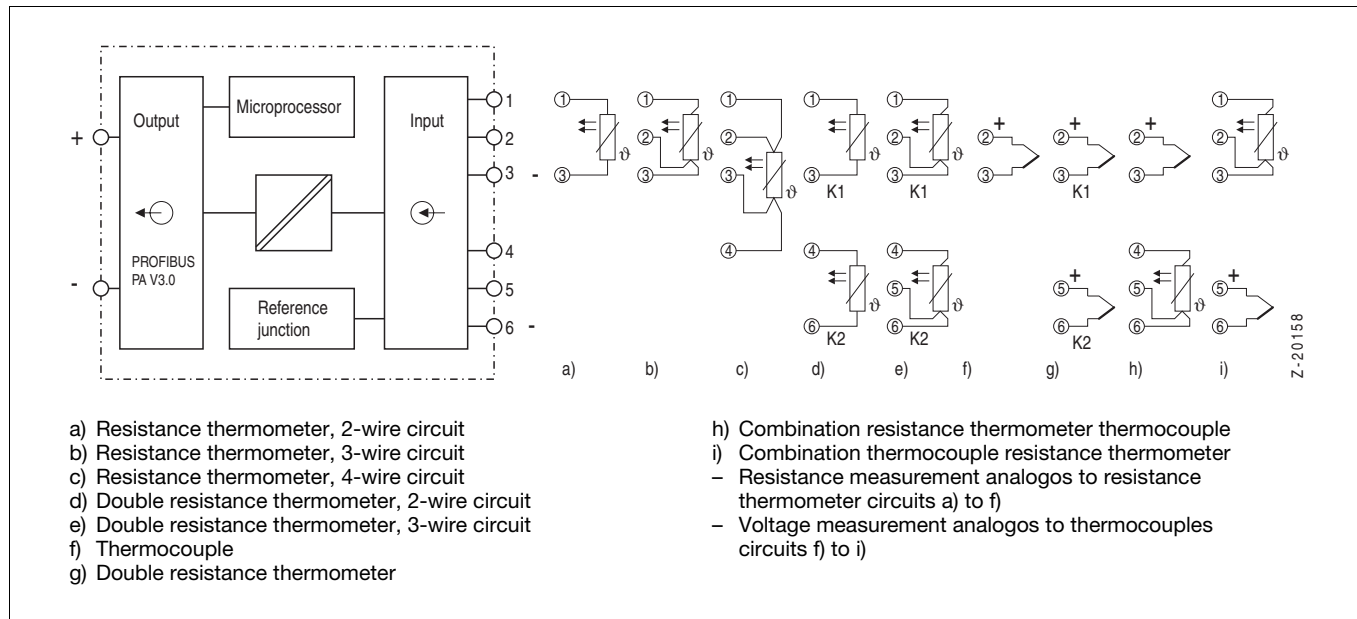
Configuration-tools

- DTM for FDT 0.98-1 and 1.2 interface and DSV401 (SMART VISION)
- Siemens Simatic PDM driver for TF12/TF212

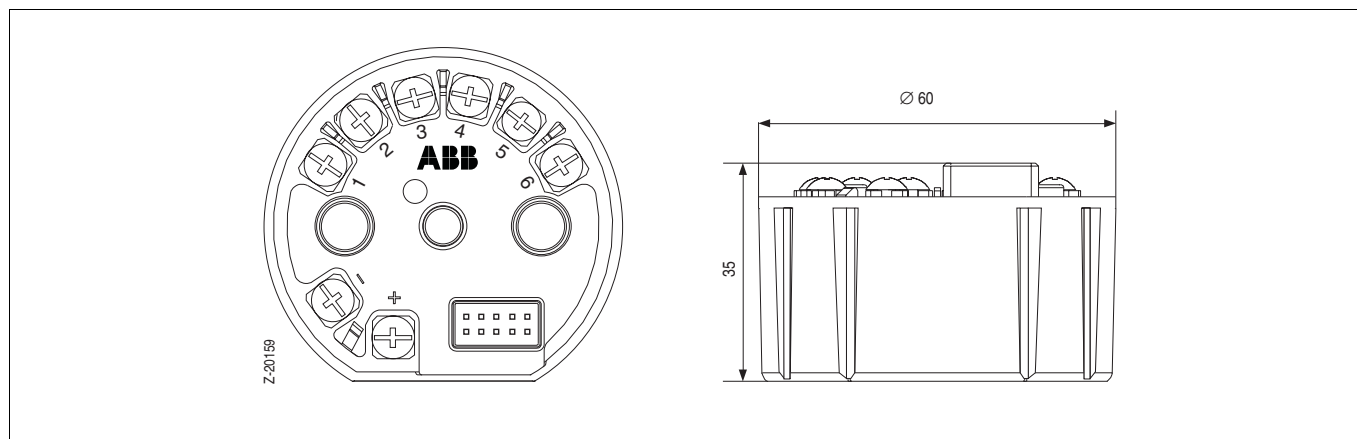
Block diagram



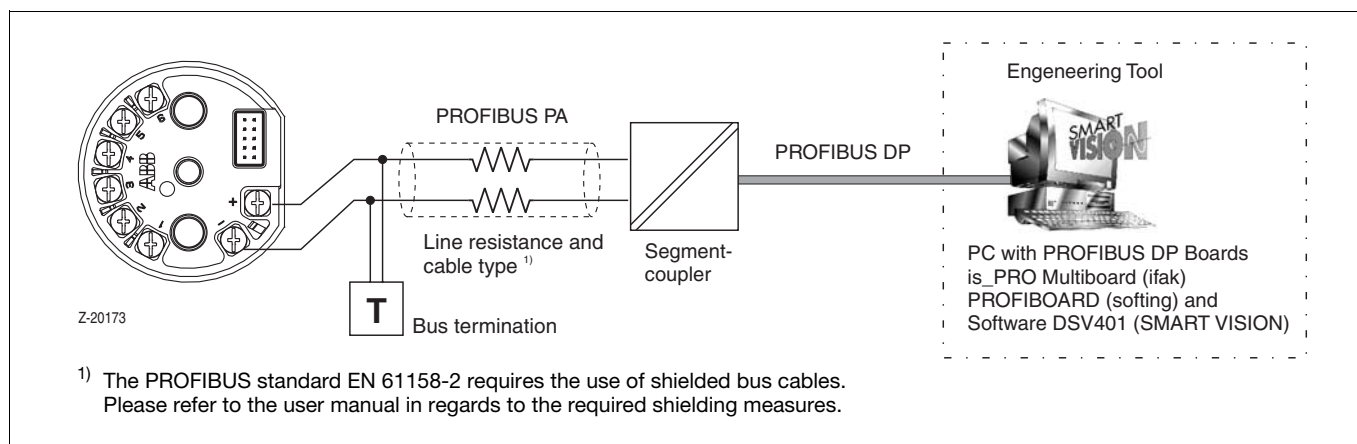
Connection diagram



Dimensional diagram (dimensions in mm)



Communication/Parameterization



Ordering information

	Catalog No.				
TF12/TF12-Ex	V11525-				
TF12 (without Ex-protection)		1			
Type of protection: intrinsically safe TF12-Ex Zone 1: Zelm: II 2 G EEx ia IIC T4/T6		5			
Construction					
Module			3		
Module with sensor connecting line			1		
Module with snap-on fixing			4		
Module built into connection head with sensor connecting line					
BUZH head			R		
BUSH head			P		
BUKH-Ex head			N		
AUZH head			V		
AUSH head			U		
AGL-head ¹⁾ without display			X		
Attention: The sensor connecting lines correspond to the order for the type of sensor or its type of circuitry					
Connections					
<u>with cable-screw-connection / PA-connector</u>					
no head selected				0	
Head-standard-cable-screw-connection ²⁾				N	
M-connector for PROFIBUS PA (Weidmüller)				W	
Programming					
Factory standard parameter (default address 126)					0
Channel 1: Pt 100, 3 wire circuit, damping off, unit °C					
L-L // L / H // H-H = -200 °C // -200 °C / 850 °C // 850 °C					
Channel 2: Pt 100, 3 wire circuit, damping off, unit °C					
L-L // L / H // H-H = -200 °C // -200 °C / 850 °C // 850 °C					
Customer-specified parameter definition (all parameter without user curve)					1
Extended customer-specified parameter definition (all parameter including user curve)					2
Accessories					
	Catalog No.				
DSV401 Software (SMART VISION) and DTM TF12/TF212	see Data Sheet 10/63-1.20 EN				
Device driver TF12/TF212 for Siemens Simatic PDM software (from V5.02+SP1)	7957848				

¹⁾ Standard: Aluminium, protective pipe connection M24 x 1.5 (optional M20 x 1.5; 1/2" NPT; 3/4" NPT, stainless steel)

²⁾ for AGLx-head M20 x 1.5 metal-screw-connection EEx e (cable-diameter 3.5...8.7 mm)

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Printed in the Fed. Rep. of Germany (05.03)

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