Data Sheet
10/11-8.11 EN

Temperature Transmitter, head mounted
TR11, TR01-EX

analog, high accuracy,
Pt 100 (2-, 3-, 4-wire circuit)

- **Supply voltage 12...28 V DC**
- **Standard signal 4...20 mA at output , Life Zero Signal**
- **pprovals for explosion protection**
  – Ⓔx II 1 G EEx ia IIC T6 (Intrinsically safe)
- **Immune to changes in supply voltage**
- **Large ambient temperature range, e. g. -50...+110 °C**
- **Tolerated relative humidity of 0...100 %**
- **Error signalling (Sensor short-circuit or break, wire-break monitoring)**
- **Electromagnetic compatibility (EMC), general immunity to interference, meets NAMUR recommendations**
- **High accuracy**
- **Fixed measuring ranges – meaning long-term stability**
- **No potentiometer, thus maintenance-free and failure-protected**
- **Completely encapsulated, thus resistant to environmental influences, vibration proof (to 40 g) and insensitive to high pressures (up to 100 bar)**
- **Low installation costs and simple commissioning**
- **Applications**
  – Chemical and process engineering
  – Plant construction and mechanical engineering
  – Environmental technology
  – Power station construction
  – Heating, air conditioning and ventilation engineering



Type overviewt

Type	Output signal	Explosion protection
Transmitters for resistance thermometers		
TR11	4...20 mA	–
TR01-EX	4...20 mA	PTB 01 ATEX 2134 X Ⓔx II 1 G EEx ia IIC T6

Technical data

Types	TR11, TR01-EX
Input	
Circuit type	Pt 100 in 2-, 3- or 4-wire circuit
Measuring range type	
Standard	See ordering information
Special	Min. span 20 K (e. g. 80...200 °C)
Special	Min. span 5 K (e. g. 8...13 °C)
Measuring current	≤ 1 mA
Output	
Output current	4...20 mA temperature-linear
Current limitation	≤ 40 mA
Input voltage U_S	12...28 V DC
Max. load	$R_{Bmax}\,(\Omega) = \frac{U_S(V) - 12V}{0,02A}$
Rise time τ_{90}	< 1 ms
Switch-on delay	< 2 ms
Error limit, drift values	
(in percent, relative to span)	

Balancing uncertainty	if lower-range limit = 0 °C:
	≤ 0.1 % or 0.1 K, greater value applies
	if lower-range limit ≠ 0 °C:
	≤ 0.15 % or 0.15 K, greater value applies

Linearity deviation	≤ 0.1 %
Effect of ambient temperature	
(relative to 20 °C)	
Lower-range value	≤ 0.1 °C/10 K
Span	≤ 0.1 %/10 K
Change in supply voltage	No influence (in the range 12...28 V DC)
Electromagnetic compatibility (EMC)	
meets NAMUR recommendations	More stringent requirements met
on immunity to interface (as of 02.88)	< 1 % for duration of coupling
IEC 801-3	Satisfies 10 V/m
Vibrations	No influence (tested to 40g)
Error signalling	
Sensor break	> 22 mA
Sensor short-circuit	< 3 mA
Sensor line break	< 3 or > 22 mA Depending on the type of line combination
Incorrect supply voltage polarity	0 mA

Types	**TR11, TR01-EX**
Environment conditions Ambient temperatures a) in non-hazardous areas – Nominal range of use – Overload temperatures (approx. twofold drift values) b) in hazardous areas – Category II 1 G (Zone 0) – Category II 2 G (Zone 1) Transport. and storage temperature range Relative humidity (with isolated sensor connection; condensing permitted)	 -25...+90 °C -50...-25 °C or 90...110 °C T6 T5 T1-T4 -20...+40 °C -20...+55 °C -20...+60 °C -40...+50 °C -40...+70 °C -40...+90 °C -50...+120 °C 0...100 %
Screws terminals	M 3.5
Weight (module)	110 g
Explosion protection Type of protection Mounting of transmitter Supply current circuit (terminals +, –) Measuring current circuit (soldered connections 1...4)	Type TR 01-EX PTB 01 ATEX 2134 X Intrinsic safety II 1 G EEx ia IIC T6 Zone 0 Zone 1 Zone 2 EEx ia IIC T6 or EEx ib IIC only for connection to certifiedintrinsically safe current circuits with a max. U_i = 28 V, I_i = 130 mA, P_i = 800 mW,effective inner inductance and capacitance negligible The type of ignition protection for the signal circuit depends on the type of protection the supply current has. EEx ia or ib IIC/IIB The maximum values are given in Tab. 1. These are dependent on the maximum voltage of the voltage supply circuit U_i.

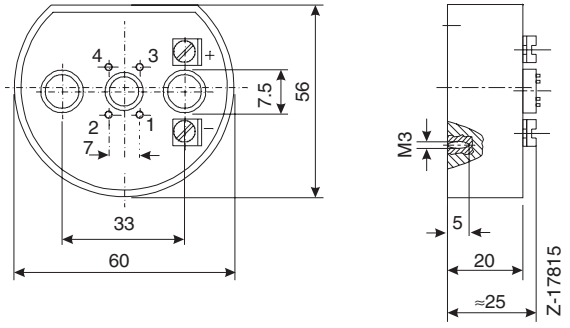
					Type of protection			
					EEx ia/ib IIC		EEx ia/ib IIB	
U_i	U_o	I_0	P_0	I_{dyn}	C_0	L_0	C_0	L_0
28 V	28 V	52 mA	555 mW	93.2 mA	38 nF	0.5 mH	260 nF	2 mH
24 V	24 V	52 mA	467 mW	80 mA	61 nF	0.5 mH	420 nF	10 mH
18 V	18 V	52 mA	207 mW	60 mA	190 nF	2 mH	10.7 µF	10 mH

Tab. 1: (L_0 and C_0 in the table are based on the respective I_{dyn})

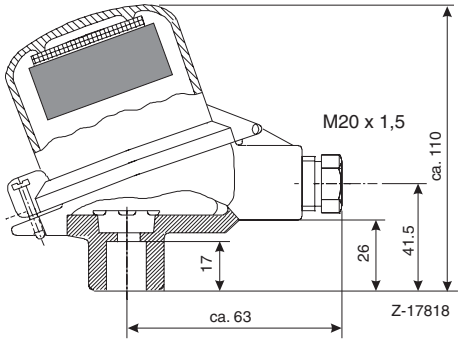
Characteristic curve: linear
I_0 Load current for connected intrinsically safe transducers (static)
I_{dyn} Dynamic short-circuit current of the signal circuit
The signal circuit and the power circuit are electrically connected to each other.

Dimensional drawings (all dimensions in mm)

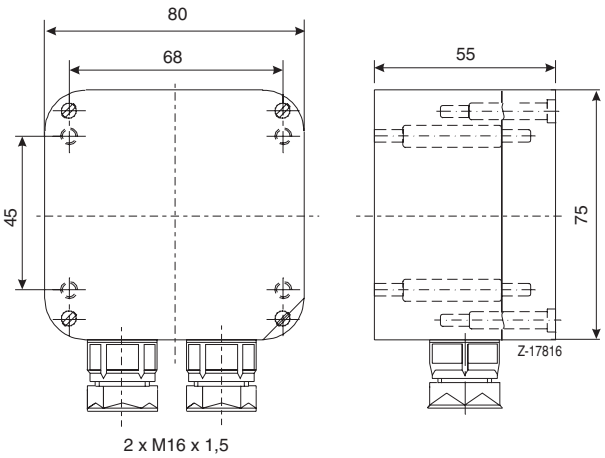
Module (with soldered connection)



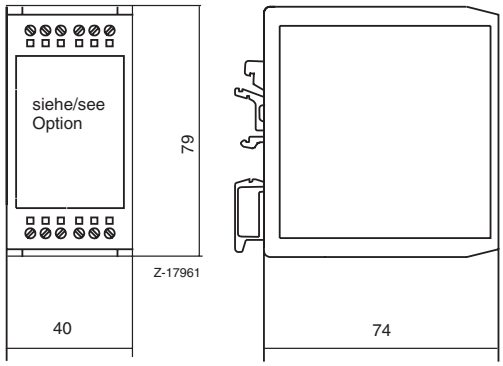
Connection head (type BUZH)



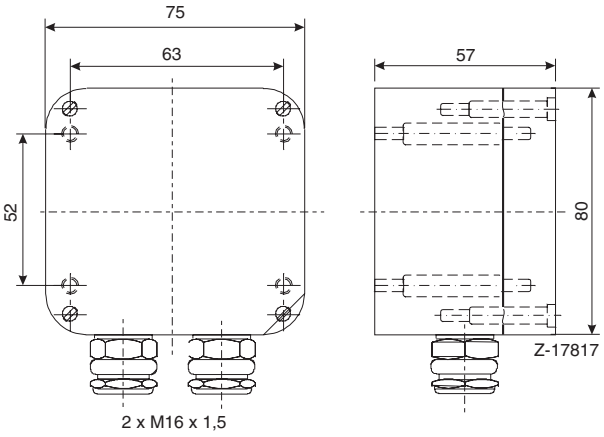
Polyester field housing



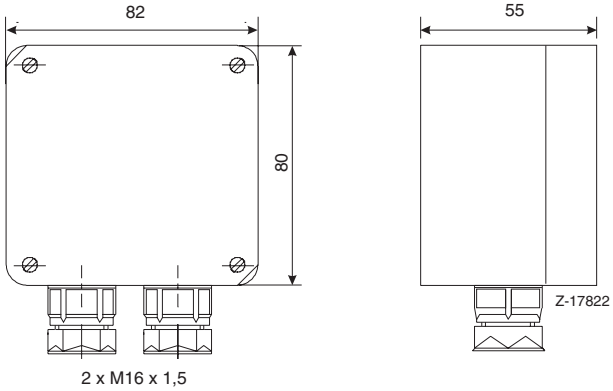
Serial rail housing



Aluminium field housing



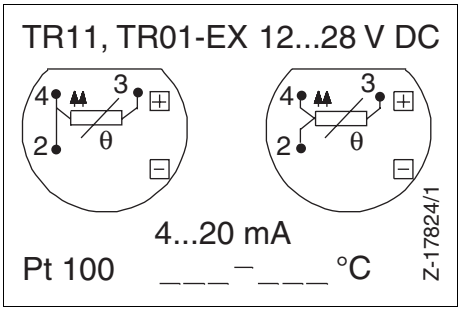
Polycarbonat field housing



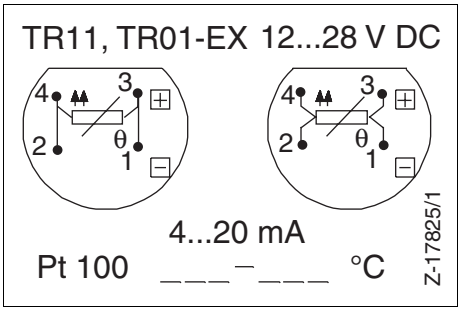
Connection diagrams

Construction: modul

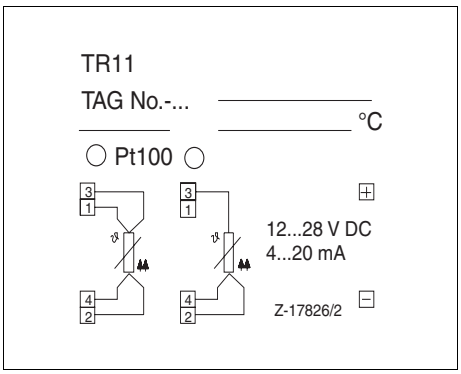
2- or 3-wire circuit

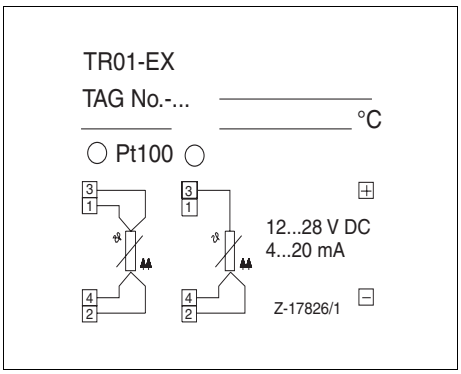


2- or 4-wire circuit

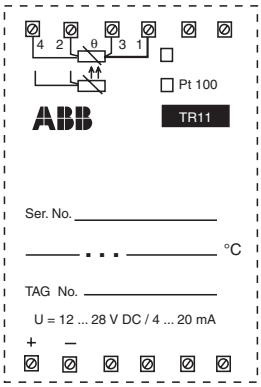


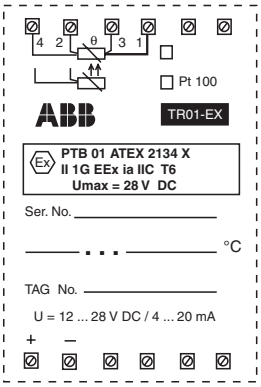
Construction: field housing





Construction: serial field housing





Ordering information

		Catalog No.						
TR11, TR01-EX		**V11541-**						
Explosion protection / output signal								
TR11	without explosion protection, 4...20 mA	1						
TR01-EX	with explosion protection EEx ia IIC or ib IIC T6, 4...20 mA	5						
Construction								
Modules, provided on the sensor side with								
Soldered connection			0					
Soldered-on connection line for mounting in raised cover			1					
Screw connection, **without** snap-on fixing			3					
Screw connection, **with** snap-on fixing			4					
Module built into connection head with sensor connecting line:								
BUZH head			R					
BUSH head			P					
BUKH-Ex head			N					
Module built into other connection head on request								
Module built into field housing:								
Aluminum field housing 80 x 75 x 57 mm, IP 65; 2 x M16 x 1.5			A					
Polyester field housing 75 x 80 x 55, IP 65; 2 x M16 x 1.5			9					
for pipe mounting in polyester field housing 75 x 80 x 55, IP 65; 2 x M16 x 1.5			C					
for pipe mounting in aluminum field housing 80 x 75 x 57, IP 65; 2 x M16 x 1.5			D					
Aluminum field housing 80 x 175 x 57 mm, IP 65; 1 x M16 x 1.5; 1 x M20 x 1.5; with separate terminal assembly			F					
Polyester field housing 75 x 190 x 55, IP 65; 1 x M16 x 1.5; 1 x M20 x 1.5; with separate terminal assembly			E					
Several transmitters mounted in a single housing on request								
Housing for serial rail mounting			7					
Type of Sensor								
Pt 100 (acc. to IEC/ITS 90), direct action characteristic 4...20 mA				0				
Other type of sensors or reverse action characteristic on request				1				
Measuring ranges								
Standard	-30... 60 °C				0			
	-20... 40 °C				1			
	0... 40 °C				2			
	0... 60 °C				3			
	0...100 °C				4			
	0...120 °C				5			
	0...150 °C				6			
	0...200 °C				7			
	0...250 °C				8			
	0...300 °C				9			
	0...400 °C				A			
	0...600 °C				B			
Special measuring ranges	°C: ..... to ..... (span > 20 K)				C			
	°C: ..... to ..... (span > 5K, < 20 K)				D			
Sensor circuit	2-wire circuit					0		
	3-wire circuit					1		
	4-wire circuit					2		

ABB has Sales & Customer Support
expertise in over 100 countries worldwide.

www.abb.com

The Company's policy is one of continuous product improvement and the right is reserved to modify the information contained herein without notice.

Printed in the Fed. Rep. of Germany (09.2008)

© ABB 2008

10/11-8.11 EN Rev. B

ABB Ltd.
Salterbeck Trading Estate
Workington, Cumbria, CA14 5DS
UK
Tel: +44(0)1946-830-611
Fax: +44(0)1946-832-661

ABB Inc.
125 E. County Line Road
Warminster, PA 18974
USA
Tel: +1 215-674-6000
Fax: +1 215-674-7183

ABB Automation Products GmbH
Borsigstr. 2
63755 Alzenau
Germany
Tel: +49 551 905-534
Fax: +49 551 905-555
CCC-support.deapr@de.abb.com