



ThermoTrans 205/206

The practical solution for temperature measurement with resistance thermometers.



The Advantages

The ThermoTrans 205/206 temperature transmitters provide you with the perfect amount of flexibility:

- Configuration effort only where it is really necessary instead of complicated configuration tables.
- High level of reliability and compact design due to digital signal processing specially developed for the measuring task, instead of unnecessary reduction in reliability due to overburdening with complicated technology.

The Models

For the majority of standard applications with fixed preset parameters, you simply select one of the numerous fixed setting standard models.

You can solve special measurement tasks with a transmitter that we configure according to your specifications.

The Technology

The ThermoTrans 205/206 temperature transmitters provide protective separation and high insulation between input, output and power supply. They meet the strict EMC requirements according to NAMUR and can easily be used for measurements in hazardous areas. Vacuum encapsulation protects the devices against aggressive environmental influences, shock, and vibrations.

ThermoTrans 205/206 for Resistance Thermometers

Resistance thermometers are highly accurate temperature sensors with long-term stability for measuring temperatures up to max. 850 °C. They are mainly used to measure low and medium temperatures, for example in the air-conditioning, process engineering, and food industries.

The ThermoTrans 205/206 transmitters allow for connection of all common resistance thermometers either in 2-, 3-, or 4-wire configuration. The ability to connect resistance transducers and potentiometers creates a wide range of application possibilities, for example, in the field of displacement or position detection. Converting the input signal into a proportional current/voltage signal enables simple further processing.

ThermoTrans 205/206

Facts and Features

- **Explosion protection [EEx ia] IIC according to ATEX**
Easy use in hazardous areas
- **Wide range of standard models**
No configuration required for standard applications
- **EMC tested**
Reliable operation even with electromagnetic interference in the power grid or in the environment
- **Protective separation**
according to EN 61140, protection of maintenance staff and subsequent devices against excessively high voltages
- **Modular housing, 22.5 mm wide with 73.5 mm standard height**
Compact design means easy installation, also easy to fit in standard enclosures
- **5-year warranty**





Product Line

Models with fixed settings	Order No.	ThermoTrans 205 with current output					ThermoTrans 206 with voltage output						
		205 A7	x	xx	xx	x	Opt. 444	206 A7	x	xx	xx	V	Opt. 444
Sensor													
Pt100 (-200 ... +850 °C)			A						A				
Pt1000 (-200 ... +850 °C)			B						B				
Ni100 (-60 ... +180 °C)			C						C				
1000 Ω			D						D				
5000 Ω			E						E				
Span													
50 K				05						05			
100 K				10						10			
150 K				15						15			
200 K				20						20			
300 K				30						30			
400 K				40						40			
1000 K				70						70			
5000 K				88						88			
Start of scale													
-100 °C					02						02		
-50 °C					01						01		
0 °C					00						00		
50 °C					11						11		
100 °C					12						12		
200 °C					14						14		
0 Ω					30						30		
Output													
0 ... 20 mA						D							
4 ... 20 mA						L							
0 ... 10V											V		

Models with customer-specific settings	Order no.	ThermoTrans 205 with current output	ThermoTrans 206 with voltage output
		205 A7 999 999 opt. 444	206 A7 999 999 opt. 444

Sensor in 4-wire configuration (3-wire configuration with opt. 494), rising output curve, without filter constant
 ThermoTrans 205: Open circuit detection 22 mA; ThermoTrans 206: Open circuit detection 11 V

Power supply	Order no.
230 V AC	
24 V AC/DC	336
115 V AC	363

Options	Order no.
ThermoTrans 205/206, standard model with 3-wire configuration	494

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Configuration Form

Important! Please fill in the configuration form completely and enclose it with your order.
If entries are missing, the value entered in square brackets or the colored setting will be configured.

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Sensor ¹⁾	Temperature detector: <input checked="" type="checkbox"/> Pt100 acc. to IEC 751 <input type="checkbox"/> Ni100 acc. to DIN 43 760 <input type="checkbox"/> Pt500 <input type="checkbox"/> Ni120 <input type="checkbox"/> Pt1000 <input type="checkbox"/> Ni500 <input type="checkbox"/> Ni1000
	Resistance transducer or potentiometer: <input type="checkbox"/> ≤500 Ω <input type="checkbox"/> ≤5000 Ω
Connection	<input type="checkbox"/> 2-wire configuration, line resistance ²⁾ _____ Ω <input type="checkbox"/> 3-wire configuration <input checked="" type="checkbox"/> 4-wire configuration
Measuring range	Start of scale ²⁾ _____ °C [0 °C] or _____ Ω Span ²⁾ _____ K [100 K] or _____ Ω
Output ³⁾	<input checked="" type="checkbox"/> 0 ... 20 mA <input type="checkbox"/> 0 ... 10 V <input type="checkbox"/> 4 ... 20 mA
Characteristic	<input checked="" type="checkbox"/> Rising <input type="checkbox"/> Falling
Error messages	Message: <input checked="" type="checkbox"/> only for open circuit <input type="checkbox"/> for open circuit and overrange Notification signal: <input checked="" type="checkbox"/> 22 mA or 11 V <input type="checkbox"/> -1 mA or -0.5 V
Filter constant T ₉₉	_____ s ²⁾ (1st order filter) [0 s]
Tag number	_____ [none]
Power supply	<input checked="" type="checkbox"/> 230 V AC standard <input type="checkbox"/> 115 V AC <input type="checkbox"/> 24 V AC/DC

¹⁾ Other models upon request

²⁾ See the specifications for the possible parameter range

³⁾ Other values upon request



Specifications

Input data	Sensor type	Range	Span (adjustable)
Intrinsically safe	Pt100 acc. to IEC 751 Pt500 Pt1000	-200 ... +850 °C	25 ... 1050 K
	Ni100 acc. to DIN 43760 Ni120 Ni500 Ni1000	-60 ... +180 °C	25 ... 240 K
	Remote resistance transducer and potentiometer	0 ... 500 Ω or 0 ... 5000 Ω	9 ... 500 Ω or 90 ... 5000 Ω
Connection	<p>2-wire configuration: adjusted line resistance is accounted for in the calculation of the measured value</p> <p>3-wire configuration: $R_{L1} = R_{L4}$</p> <p>4-wire configuration</p>		
Max. line resistance	$R_{L1} + R_{L4} = 100 \Omega$		
Sensor current	Approx. 1 mA or 0.1 mA, depending on the measuring range		
Open-circuit voltage	< 5 V		
Sensor break monitoring	All inputs for open circuits		
Input error limits	Resistance: Measuring range 0 ... 500 Ω ± 0.05 Ω Measuring range 0 ... 5 kΩ ± 0.5 Ω With Pt: Measuring range -200 ... +850 °C ± 0.2 K With Ni: Measuring range -60 ... +180 °C ± 0.2 K		
Temperature coefficient at the input	0.0025 ppm/K full scale (average TC in allowable operating temperature range, reference temperature 23 °C)		
Output data			
Output signal (0 ... 100 %)	Model 205: 0 / 4 ... 20 mA, impressed current, load voltage ≤ 10 V Model 206: 0 ... 10 V, impressed voltage, load current ≤ 10 mA		
Resolution	Approx. 8000 increments (for 0 ... 100 %)		
Control range	-2.5 % ... +102.5 % span		
Overload range with error message	Model 205: -1.0 mA or +22 mA Model 206: -0.5 V or +11 V		
Output error limits	0.1 % full scale		
Temperature coefficient at the output	0.01 ppm/K full scale (average TC in allowable operating temperature range, reference temperature 23 °C)		
Residual ripple at output	< 10 mV _{pp} + input digitization error		

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Specifications (continued)

Transmission behavior

Characteristic	Resistance or temperature linear rising or falling
Measuring rate	Approx. 1/s
Response time t_{99}	≤ 900 ms
Digital output filter	$T_{99} = 0 \dots 100$ s (1st order filter)

Power supply

Power supply	230 V AC $-15\% +10\%$, 48 ... 62 Hz, approx. 2 VA
Option 336:	24 V AC/DC AC: $-15\% +10\%$, 48 ... 500 Hz, approx. 1.5 VA DC: $-15\% +20\%$, approx. 1.2 W
Option 363:	115 V AC $-15\% +10\%$, 48 ... 62 Hz, approx. 2 VA

Isolation

Galvanic isolation	3-port isolation between input, output, and power supply
Test voltage	4 kV AC (across input and output / power supply) 3 kV AC (across output and power supply)
Working voltage (basic insulation)	1000 V AC/DC across input and output / power supply with overvoltage category II and pollution degree 2, 330 V AC/DC across output and power supply with overvoltage category II and pollution degree 2 according to EN 61010-1 For applications with high working voltages, take measures to prevent accidental contact and make sure that there is sufficient distance or insulation between adjacent devices.
Protection against electric shock	Protective separation to EN 61140 by reinforced insulation according to EN 61010-1. Working voltages with overvoltage category II and pollution degree 2: 600 V AC/DC for input against output and power supply with overvoltage category II and pollution degree 2: 300 V AC/DC for output against power supply. For applications with high working voltages, take measures to prevent accidental contact and make sure that there is sufficient distance or insulation between adjacent devices.

Standards and approvals

Explosion protection (Opt. 444)	II(1) G [EEx] II C PTB 02 ATEX 2107 See the type examination certificate for further specifications
Surge withstand	5 kV 1.2/50 μ s according to IEC 255-4
EMC ¹⁾	EN 61326-1, NAMUR NE 21



Specifications (continued)

Further data

Ambient temperature	Operation: -10 ... +60 °C Transport and storage: -30 ... +80 °C
Ambient conditions	Indoor use ²⁾ Relative humidity 5 ... 95 %, no condensation; max. altitude 2000 m (air pressure: 790 ... 1060 hPa) ³⁾
Type	Modular housing A7, 22.5 mm wide, screw terminals See dimension drawings for further measurements
Tightening torque	0.6 Nm
Ingress protection	Housing: IP 40, terminals: IP 20
Mounting	With snap-on mounting for 35 mm DIN rail according to EN 60715
Connection	Captive terminal screws M 3 x 8 ; box-type terminals with self-raising wire protection, max. conductor cross section: 1 x 4 mm ² solid 1 x 2.5 mm ² stranded with ferrule 2 x 1.5 mm ² stranded with ferrule Only trained and qualified personnel may perform installation, commissioning, and maintenance!
Weight	Approx. 300 g

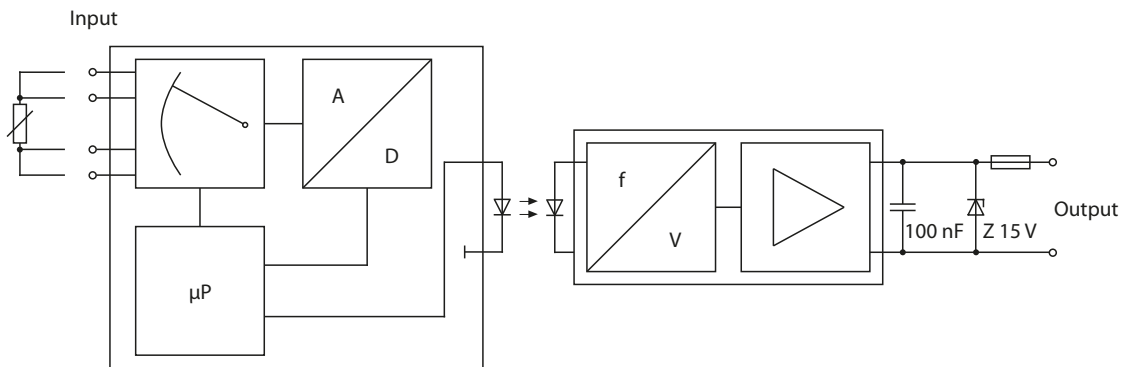
¹⁾ Slight deviations are possible while there is interference from RF radiation

²⁾ Closed, weather-protected operating areas (stationary operation), water or wind-driven precipitation (rain, snow, hail etc.) excluded

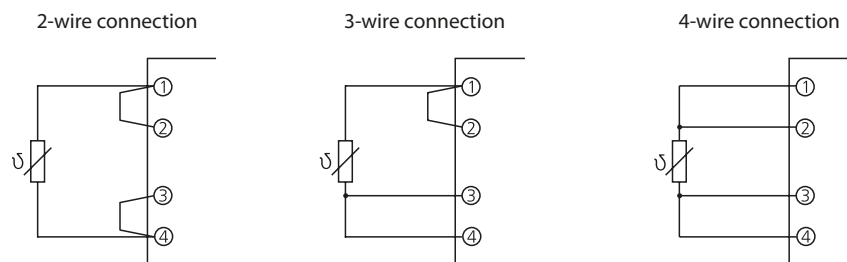
³⁾ Lower air pressure reduces the allowable working voltages.

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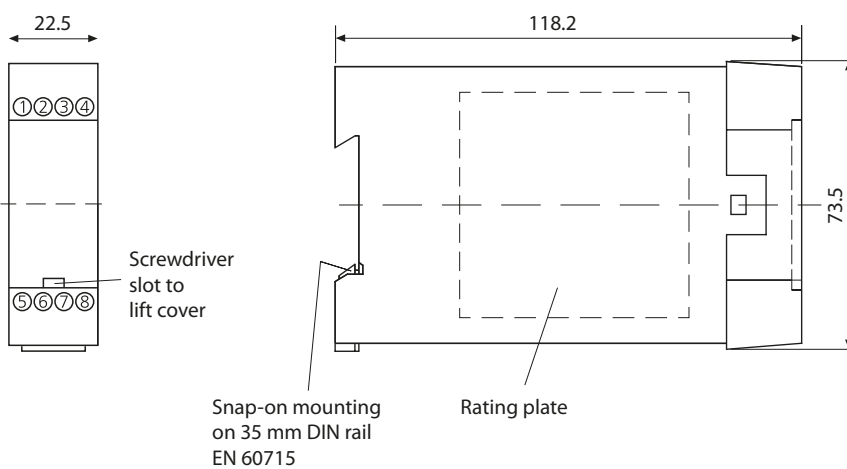
Block Diagram



Typical Applications



Dimension Drawing and Terminal Assignments



ThermoTrans 205/206

- 1 Input
- 2 Sensor line
- 3 Sensor line
- 4 Input

- 5 Output +
- 6 Output -

- 7 Power supply AC/DC
- 8 Power supply AC/DC

Captive terminal screws M 3 x 8
 Box-type terminals with self-raising wire protection, max. conductor cross section:
 1 x 4 mm² solid
 1 x 2.5 mm² stranded with ferrule
 2 x 1.5 mm² stranded with ferrule

All dimensions in mm