

Thermocouples

Description	Type	Standard	ITS	Measuring range	Accuracy ^a
Fe-CuNi	"L"	DIN 43710	ITPS-68	-200 to +900 °C	≤ 0.25 %
Fe-CuNi	"J"	IEC 60584-1	ITS-90	-210 to +1200 °C	≤ 0.25 % from -100 °C
Cu-CuNi	"U"	DIN 43710	ITPS-68	-200 to +600 °C	≤ 0.25 % from -100 °C
Cu-CuNi DIN	"T"	IEC 60584-1	ITS-90	-270 to +400 °C	≤ 0.25 % from -150 °C
NiCr-Ni DIN	"K"	IEC 60584-1	ITS-90	-270 to +1372 °C	≤ 0.25 % from -80 °C
NiCr-CuNi	"E"	IEC 60584-1	ITS-90	-270 to +1000 °C	≤ 0.25 % from -80 °C
NiCrSi-NiSi	"N"	IEC 60584-1	ITS-90	-270 to +1300 °C	≤ 0.25 % from -80 °C
Pt10Rh-Pt	"S"	IEC 60584-1	ITS-90	-50 to 1768 °C	≤ 0.25 % from 20 °C
Pt13Rh-Pt	"R"	IEC 60584-1	ITS-90	-50 to 1768 °C	≤ 0.25 % from 50 °C
Pt30Rh-Pt6Rh	"B"	IEC 60584-1	ITS-90	0 to 1820 °C	≤ 0.25 % from 400 °C
W5Re/W26Re	"C"	ASTM E230M-11	ITS-90	0 to 2315 °C	≤ 0.25 % from 500 °C
W3Re/W25Re	"D"	ASTM E1751M-09	ITS-90	0 to 2315 °C	≤ 0.25 % from 500 °C
W5Re/W20Re	"A1"	GOST R 8.585-2001	ITS-90	0 to 2500 °C	≤ 0.25 % from 500 °C
Chromel-Copel	"L"	GOST R 8.585-2001	ITS-90	-200 to +800 °C	≤ 0.25 % from -80 °C
Chromel-Alumel		GOST R 8.585-2001	ITS-90	-270 to 1372 °C	≤ 0.25 % from -80 °C
Ambient temperature influence	≤ 100 ppm/K				
Smallest measuring span	Type L (Fe-CuNi), J, U, T, K, E, N, Chromel-Alumel: 100 K Type S, R, B, C, D, A1, Chromel-Copel: 500 K				
Measuring range start/end	Freely programmable within the limits in steps of 0.1 K				
Cold junction	Internal (Pt100) or external (constant)				
Reference point accuracy (internal)	± 1 K				
Reference point temperature (external)	-30 to +85 °C (adjustable)				
Sampling rate	3 or 6 channels: 125 ms				
Input filter	Digital filter, 2nd order; filter constant can be set from 0 to 100.0 s				
Galvanic isolation	See "Galvanic isolation"				
Base measuring range	20 to 70 mV				

^a The accuracy value refers to the maximum measuring range. Small measuring ranges lead to reduced linearization accuracy.

RTD temperature probe

Description	Standard	ITS	Connection type	Measuring range	Accuracy ^a	Measuring current
Pt50	IEC 751: 2008	ITS-90	2-/3-/4-wire	-200 to +850 °C	≤ 0.1 %	500 µA
Pt100	IEC 751: 2008	ITS-90	2-/3-/4-wire	-200 to +850 °C	≤ 0.1 %	500 µA
Pt500	IEC 751: 2008	ITS-90	2-/3-/4-wire	-200 to +850 °C	≤ 0.1 %	100 µA
Pt1000	IEC 751: 2008	ITS-90	2-/3-/4-wire	-200 to +850 °C	≤ 0.1 %	100 µA
Pt100	JIS 1604		2-/3-/4-wire	-200 to +650 °C	≤ 0.1 %	500 µA
Pt50	GOST 6651-2009 A.2	ITS-90	2-/3-/4-wire	-200 to +850 °C	≤ 0.1 %	500 µA
Pt100	GOST 6651-2009 A.2	ITS-90	2-/3-/4-wire	-200 to +850 °C	≤ 0.1 %	500 µA
Cu50	GOST 6651-2009 A.3	ITS-90	2-/3-/4-wire	-180 to +200 °C	≤ 0.4 %	500 µA
Cu100	GOST 6651-2009 A.3	ITS-90	2-/3-/4-wire	-180 to +200 °C	≤ 0.4 %	500 µA
Ni100	DIN 43760	ITPS-68	2-/3-/4-wire	-60 to +250 °C	≤ 0.2 %	500 µA
Ni100	GOST 6651-2009 A.5	ITPS-68	2-/3-/4-wire	-60 to +180 °C	≤ 0.2 %	500 µA
Ambient temperature influence	≤ 50 ppm/K					
Smallest measuring span	15 K					
Sensor lead wire resistance	Max. 10 Ω per lead for two-wire circuit Max. 30 Ω per lead for three/four-wire circuit					
Measuring range start/end	Freely programmable within the limits in steps of 0.1 K					
Sampling rate	3 or 6 channels: 125 ms					
Input filter	Digital filter, 2nd order; filter constant can be set from 0 to 100.0 s					
Galvanic isolation	See "Galvanic isolation"					

^a The accuracy value refers to the maximum measuring range. Small measuring ranges lead to reduced linearization accuracy.

Resistance transmitter and resistor/potentiometer

Description	Measuring range	Accuracy ^a	Measuring current
Resistance transmitter	0 to 4000 Ω	≤ 0.1 %	100 μA
Resistance/potentiometer	0 to 400 Ω	≤ 0.1 %	500 μA
	0 to 4000 Ω	≤ 0.1 %	100 μA
Ambient temperature influence	≤ 100 ppm/K		
Connection type	Resistance transmitter: Three-wire circuit Resistance/potentiometer: Two/three/four-wire circuit		
Smallest measuring span	60 Ω		
Sensor lead wire resistance	Max. 10 Ω per cable for two-wire and three-wire circuits		
Resistance values	Freely programmable within the limits in steps of 0.1 Ω		
Sampling rate	3 or 6 channels: 125 ms		
Input filter	Digital filter, 2nd order; filter constant can be set from 0 to 100.0 s		
Galvanic isolation	See "Galvanic isolation"		

^a The linearization accuracy value refers to the maximum measuring range. Small measuring ranges lead to reduced linearization accuracy.

Voltage, current (standard signals)

Description	Measuring range	Accuracy ^a	Input resistance or burden voltage
Voltage	0 to 70 mV	≤ 0.1 %	> 500 kΩ
	0 to 10 V	≤ 0.05 %	> 500 kΩ
	-10 to +10 V	≤ 0.05 %	> 500 kΩ
	-1 to +1 V	≤ 0.08 %	> 500 kΩ
	0 to 1 V	≤ 0.08 %	> 500 kΩ
Current	4 to 20 mA	≤ 0.1 %	< 2 V
	0 to 20 mA	≤ 0.1 %	< 2 V
Ambient temperature influence	≤ 100 ppm/K		
Smallest measuring span	Voltage: 5 mV Current: 0.5 mA		
Measuring range start/end	Voltage: Freely programmable within the limits in steps of 0.01 mV Current: Freely programmable within the limits in steps of 0.01 mA		
Deviation below/above the measuring range	According to NAMUR recommendation NE 43 (only current input 4 to 20 mA)		
Sampling rate	3 or 6 channels: 125 ms		
Input filter	Digital filter, 2nd order; filter constant can be set from 0 to 100.0 s		
Galvanic isolation	See "Galvanic isolation"		

^a The accuracy value refers to the maximum measuring range. Small measuring ranges lead to reduced linearization accuracy.

Measuring circuit monitoring

The device response in the event of a fault is configurable.

Measuring probe	Probe break	Short-circuit	Polarity
Thermocouple	is detected	is not detected	is detected in certain conditions ^a
RTD temperature probe	is detected	is detected	is not detected
Resistance transmitter	is detected	is not detected	is not detected
Resistance/potentiometer	is detected	is not detected	is not detected
Voltage 0 to 70 mV	is detected	is not detected	is detected
Voltage 0 to 10 V	is not detected	is not detected	is detected
Voltage -10 to +10 V	is not detected	is not detected	is not detected
Voltage 0 to 1 V	is detected	is not detected	is detected
Voltage -1 to +1 V	is detected	is not detected	is not detected
Current 0 to 20 mA	is not detected	is not detected	is not detected
Current 4 to 20 mA	is detected	is detected	is detected

^a dependent on the set characteristic line

Digital inputs (options 1 and 2)

Quantity	0, 6, or 12
Connector number (back of device)	6 and 10
Input	
Level	Logic level "0": < 3.5 V; logic level "1": > 10 V
Sampling rate	125 ms (max. counting frequency: 8 Hz)
Potential-free contact	R_{ON} : < 1 k Ω ; R_{OFF} : > 50 k Ω (use of the auxiliary voltage 24 V)
Auxiliary voltage	DC 24 V +10/-15 %, max. 50 mA per option

Digital inputs/outputs (option 3)

Quantity	0 or 12
Connector number (back of device)	14 and 15
Input or output	Individually configurable as input or output
Input	
Level	Logic level "0": < 3.5 V; logic level "1": > 10 V
Sampling rate	125 ms (max. counting frequency: 8 Hz)
Potential-free contact	R_{ON} : < 1 k Ω ; R_{OFF} : > 50 k Ω (use of the auxiliary voltage 24 V)
High-speed input	Input 1
Function	Counts each positive edge of the input signal
Max. counting frequency	12.5 kHz
Mark-to-space ratio	30 to 70 % (high-pulse \geq 30 μ s, low-pulse \geq 30 μ s)
Accuracy in flow measurement	0.5 % of measured value; ambient temperature influence: 50 ppm/K
Output	
Output signal	DC 0/24 V +10/-15 %; galvanically isolated
Current	Max. 40 mA per output, max. 100 mA on the whole
Auxiliary voltage	DC 24 V +10/-15 %, max. 100 mA (incl. current of digital outputs)

Analog outputs (options 1 and 2)

Quantity	0, 1, or 2
Connector number (back of device)	6 and 10
Voltage	
Output signal	DC 0 to 10 V
Load resistance	> 500 Ω
Current	
Output signal	DC 0(4) to 20 mA
Load resistance	< 450 Ω
Accuracy	0.5 %
Ambient temperature influence	150 ppm/K

Relay

Quantity	1
Connector number (back of device)	4
Relay (changeover contact)	
Switching capacity	3 A at AC 230 V, resistive load
Contact life	30,000 switching operations at rated load

Interfaces

RS232/RS485	
Quantity	1 (can be switched between RS232 and RS485)
Connector type	SUB-D 9-pin (socket)
Baud rate	9600, 19200, 38400, 115200
Data format	8/1n, 8/1e, 8/1o
Protocol	Modbus RTU as master or slave; barcode scanner
Application	Communication with Modbus master/slave, connection of a barcode scanner
External inputs	Via Modbus master/slave functionality: 24 analog and 24 digital inputs, 10 batch texts, 4 event texts
Ethernet	
Quantity	1
Connector type	RJ45 (socket)
Transfer rate	10 Mbit/s, 100 Mbit/s
Protocol	IPv4; TCP, UDP; DHCP, DNS, HTTP, SMTP, SNMP, Modbus/TCP
Application	Communication with PC (setup program, data archiving, web server), email server, SNMP server, and Modbus master/slave
External inputs	Via Modbus master/slave functionality: 24 analog and 24 digital inputs, 10 batch texts, 4 event texts
Max. cable length	100 m
USB host	
Quantity	1 (on front with cover)
Connector type	A (socket)
Standard	USB 2.0 (high speed)
Application	Exclusively for connecting a USB flash drive (FAT16/FAT32; see accessories)
Max. load current	100 mA
USB device	
Quantity	1 (on the back)
Connector type	Micro-B (socket)
Standard	USB 2.0 (high speed)
Application	To connect to a PC (setup program, PCC/PCA3000)
Max. cable length	5 m

Screen

Type	TFT color screen/touchscreen (resistive) ^a
Size	14.5 cm (5.7")
Resolution	640 × 480 pixels (VGA)
Number of colors	65536
Frame rate	60 Hz (type)
Brightness setting	Adjustable on the device
Screen saver (switch-off)	After waiting period or control signal

^a TFT color screens can have pixel errors due to technological and/or production-related reasons. Four pixel errors are deemed acceptable for this paperless recorder. They do not constitute an assertion for warranty claims.

Electrical data

Voltage supply	AC 110 to 240 V +10/-15 %, 48 to 63 Hz or AC/DC 20 to 30 V, 48 to 63 Hz (not in conjunction with extra code 970)
Electrical safety	According to DIN EN 61010-1 Overvoltage category II up to 300 V mains voltage, pollution degree 2
Protection rating	I with internal isolation from SELV
Power consumption AC 110 to 240 V AC/DC 20 to 30 V	< 45 VA < 30 VA
Data backup	Internal flash memory
Data buffering	Battery (operating life > 7 years); additionally, storage capacitor for buffering during battery change (buffer time approx. 6 minutes)
Clock	Battery-buffered real-time clock
Electrical connection	On the back via push-in spring-cage terminals
Conductor cross section Wire or strand without ferrule Strand with ferrule 2 × strand with twin ferrule with plastic collar Stripping length	At plug connector 4 and 5 (voltage supply and relay) Min. 0.2 mm ² , max. 2.5 mm ² Min. 0.25 mm ² , max. 2.5 mm ² Min. 0.5 mm ² , max. 1.5 mm ² (both strands with identical cross section) 10 mm
Conductor cross section Wire or strand without ferrule Strand with ferrule Stripping length	At plug connector 6 to 15 (inputs and outputs) Min. 0.14 mm ² , max. 1.5 mm ² Without plastic collar: min. 0.25 mm ² , max. 1.5 mm ² With plastic collar: min. 0.25 mm ² , max. 0.5 mm ² 9 mm
Voltage supply influence	< 0.1 % of the measuring range

Environmental influences

Ambient temperature range Storage Operation	-20 to +60 °C 0 to +50 °C; in conjunction with extra code 970: 0 to +40 °C
Site altitude	Up to 2000 m above sea level
Climatic environmental conditions Resistance to climatic conditions Storage Operation	According to DIN EN 60721-3 with extended temperature range ≤ 85 % rel. humidity without condensation According to class 1K2 According to class 3K3
Mechanical environmental conditions Storage Transport Operation	According to DIN EN 60721-3 According to class 1M2 According to class 2M2 According to class 3M3
Electromagnetic compatibility (EMC) Interference emission Interference immunity	According to DIN EN 61326-1 Class A – only for industrial use – Industrial requirements

Case

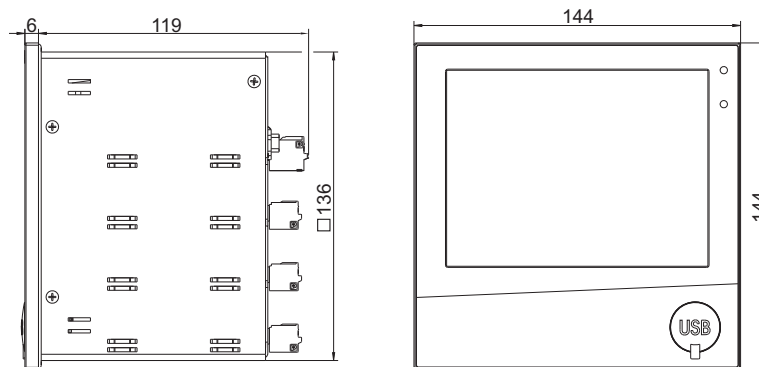
Case type	Flush-mounted case according to DIN IEC 61554 made of zinc-plated steel sheet (indoor use)
Case front	Made of diecast zinc with decor foil
Front frame dimensions	144 mm x 144 mm (front frame depth approx. 8 mm incl. seal)
Mounting depth	119 mm (incl. spring-cage terminals)
Panel cut-out	138 ^{+1.0} mm x 138 ^{+1.0} mm
Panel thickness	2 to 8 mm
Case fastening	In panel, using the four supplied mounting elements
Operating position	Any, with due consideration for the viewing angle of the screen, horizontal $\pm 50^\circ$, vertical $\pm 30^\circ$
Protection type	According to DIN EN 60529, IP65 on the front, IP20 on the back; in conjunction with extra code 970: IP20 with the carrying case open, IP20D with the carrying case closed
Weight	Max. 1.6 kg

Approvals/approval marks

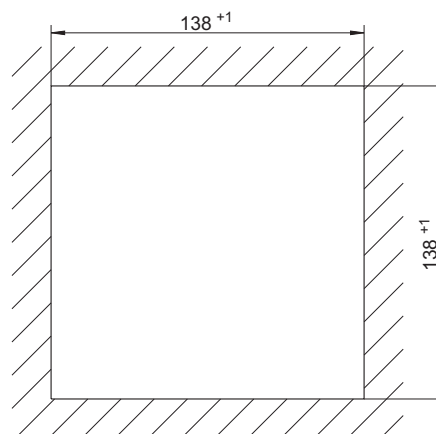
Approval mark	Testing agency	Certificates/certification numbers	Inspection basis	Valid for
c UL us	Underwriters Laboratories	E201387	UL 61010-1 (3rd Ed.), CAN/CSA-22.2 No. 61010-1 (3rd Ed.)	All types of the flush-mounted device; not in conjunction with extra code 970

Dimensions

Device



Panel cut-out



Side-by-side mounting

Spacing of panel cut-outs	Horizontal	Vertical
Minimum spacing	20 mm	20 mm
Recommended spacing (easier insertion of the mounting elements)	50 mm	50 mm

Galvanic isolation

