dTRANS T01
707011/...

dTRANS T01 T
707013/...

JUMO dTRANS T01 HART®

Programmable
2-wire transmitter

B 70.7011.0
Operating Instructions

Contents

1 Type designation

JUMO dTRANS T01 HART

		(1)	**Basic version**
	707011		programmable 2-wire transmitter with HART® interface
	707013		programmable 2-wire transmitter with HART® interface installed in rail-mounting housing[1]
		(2)	**Input (programmable)**
x x		888	factory-set (Pt100 DIN vl)
x x		999	configuration to customer specification[2]
		(3)	**Output (proportional DC current)**
x x		888	factory-set (4 — 20mA)
x x		999	configuration to customer specification (20 — 4mA)
		(4)	**Probe break/short-circuit**
x x		888	factory-set (positive protection)
x x		999	configuration to customer specification (negative protection)

	(1)		(2)		(3)		(4)
Order code		/		-		-	
Order example	**707011**	**/**	**888**	**-**	**888**	**-**	**888**

[1] Because of the internal compensating cable, a retrospective sensor change is not possible in the case of a thermocouple input. Any type of resistance thermometer can be attached to the resistance thermometer input, but not thermocouples.

[2] For configuration to customer specification, the probe type and the range have to be specified in plain text.

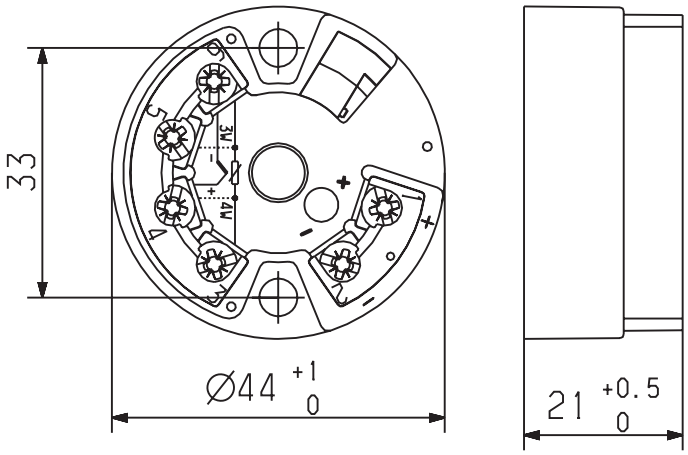
Standard accessories

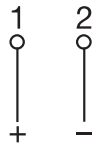
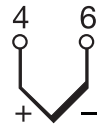
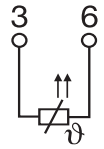
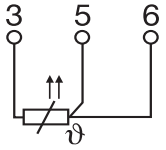
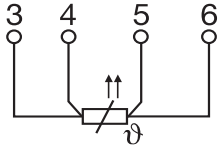
- 1 Operating Instructions B 70.7011.0
- fixing items: 2 screws + 2 compression springs (type 707011 only)

Accessories

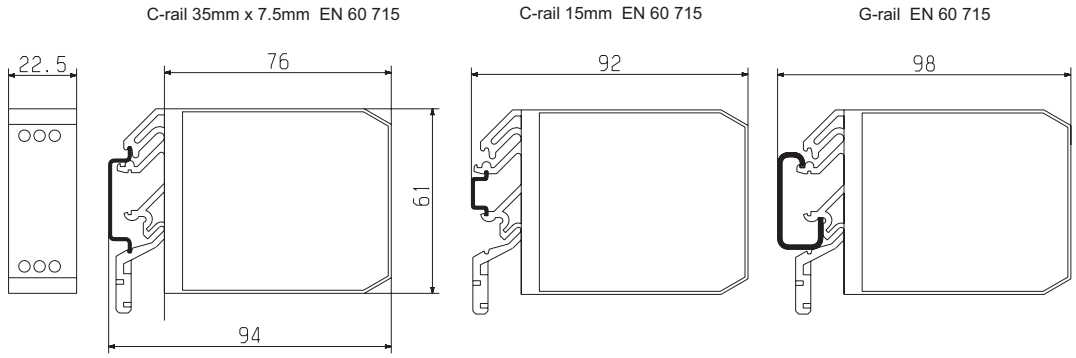
- PC setup program, multilingual
- HART® modem (Sales No. 40/00345666)
- Supply units 1- and 4-way (Data Sheet 70.7500)
- Ex supply unit with isolating transformer - with HART®capability (Data Sheet 40.4757)

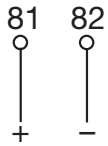
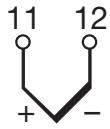
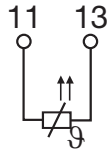
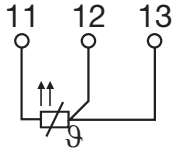
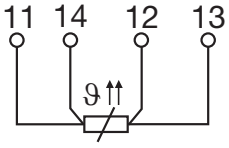
Connections and dimensions, type 707011/...



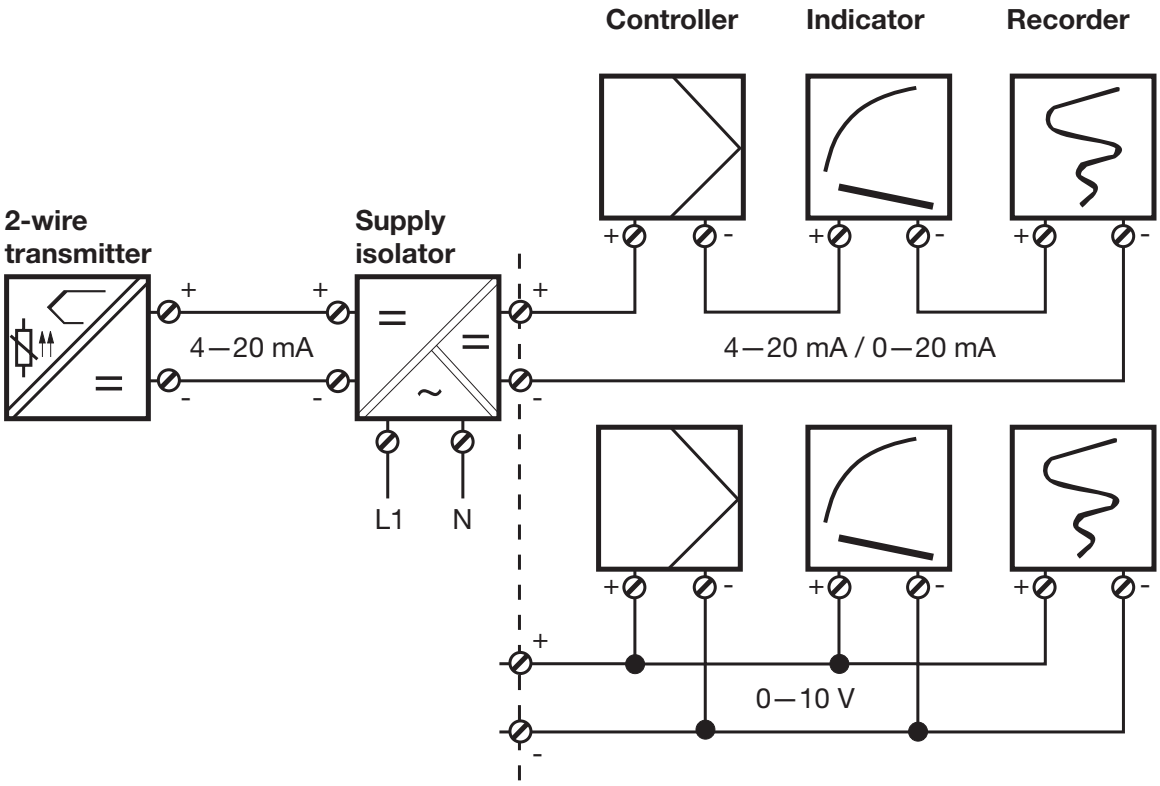
Connection for	Terminals	
Supply 10 — 35V DC or current output 4 — 20mA	+1 -2 $R_B = \frac{U_b - 10V}{22mA}$ R_B = burden resistance U_b = supply voltage	
Analog inputs		
Thermocouple	+4 -6	
Resistance thermometer in 2-wire circuit	3 6 $R_L \leq 11\Omega$ R_L = lead resistance per conductor	
Resistance thermometer in 3-wire circuit	3 5 6 $R_L \leq 11\Omega$ R_L = lead resistance per conductor	
Resistance thermometer in 4-wire circuit	3 4 5 6 $R_L \leq 11\Omega$ R_L = lead resistance per conductor	

Connections and dimensions, type 707013/...

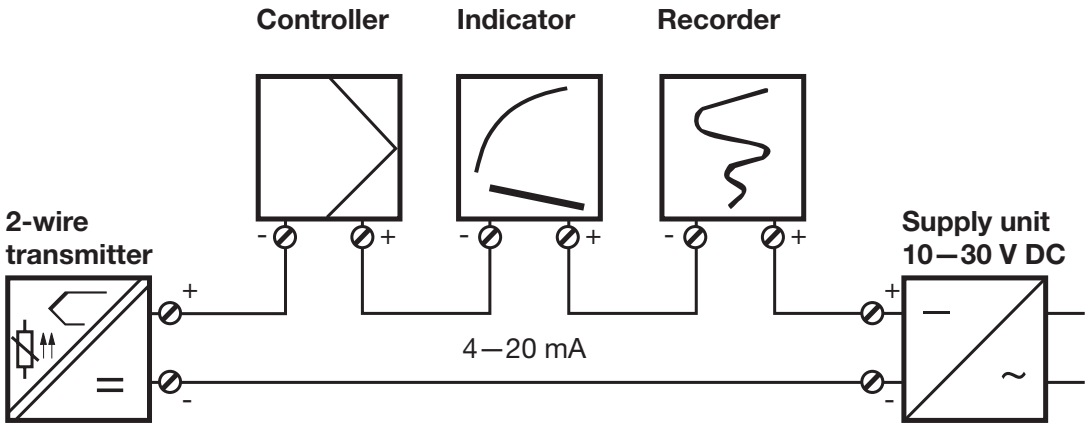


Connection for	Terminals	
Supply 8 — 35V DC or current output 4 — 20mA	+81 –82	$R_B = \frac{U_b - 8V}{22mA}$ R_B = burden resistance U_b = supply voltage	
Analog inputs			
Thermocouple	+11 –12		
Resistance thermometer in 2-wire circuit	11 13	$R_L \leq 11\Omega$ R_L = lead resistance per conductor	
Resistance thermometer in 3-wire circuit	11 12 13	$R_L \leq 11\Omega$ R_L = lead resistance per conductor	
Resistance thermometer in 4-wire circuit	11 12 13 14	$R_L \leq 11\Omega$ R_L = lead resistance per conductor	

Connection example with supply isolator

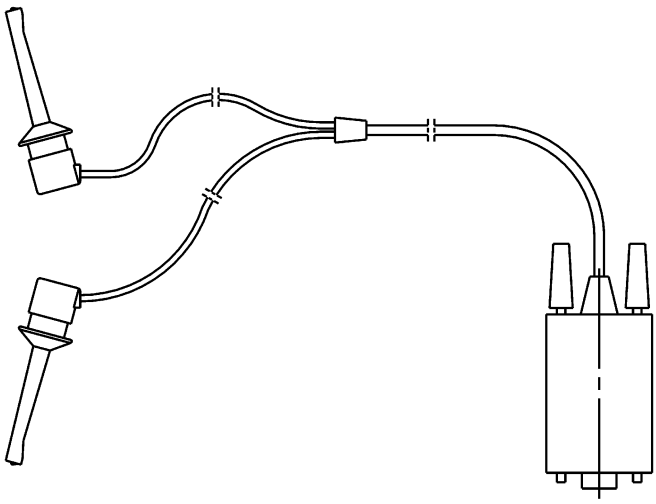


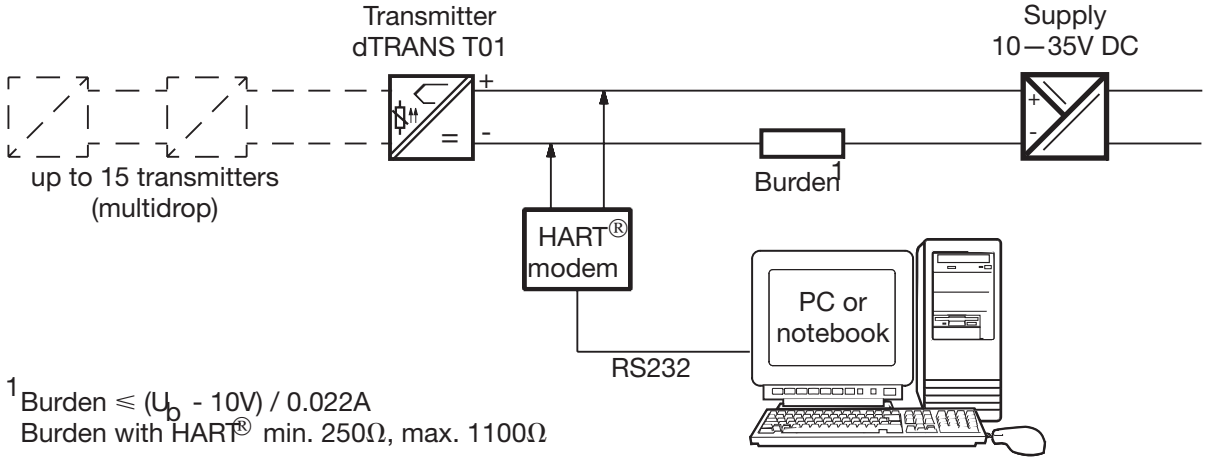
Connection example with supply unit



Connecting a HART® modem

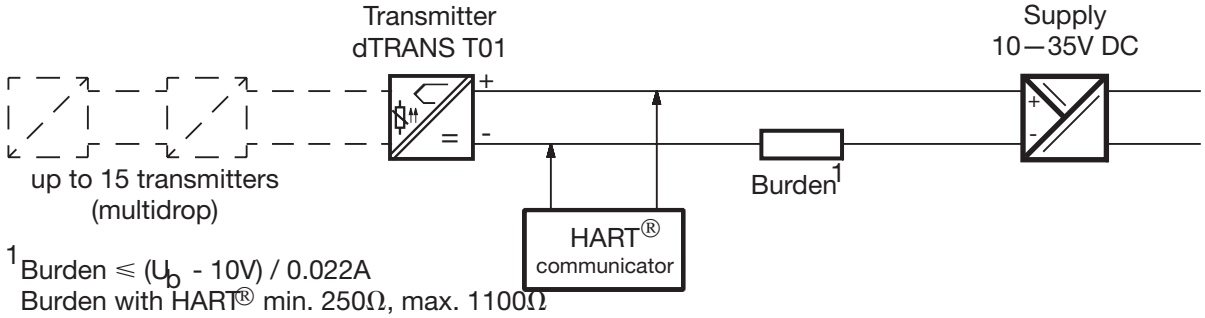
The transmitter can be linked to a PC via the HART® modem.
The modem can be supplied to special order, at extra cost:
Sales No. 40/00345666





[1] Burden ≤ (U_b - 10V) / 0.022A
Burden with HART® min. 250Ω, max. 1100Ω

Connecting a HART® communicator



[1] Burden ≤ (U_b - 10V) / 0.022A
Burden with HART® min. 250Ω, max. 1100Ω

4 Setup program

The setup program is available for configuring the transmitter from a PC. The connection is made via the HART® modem.

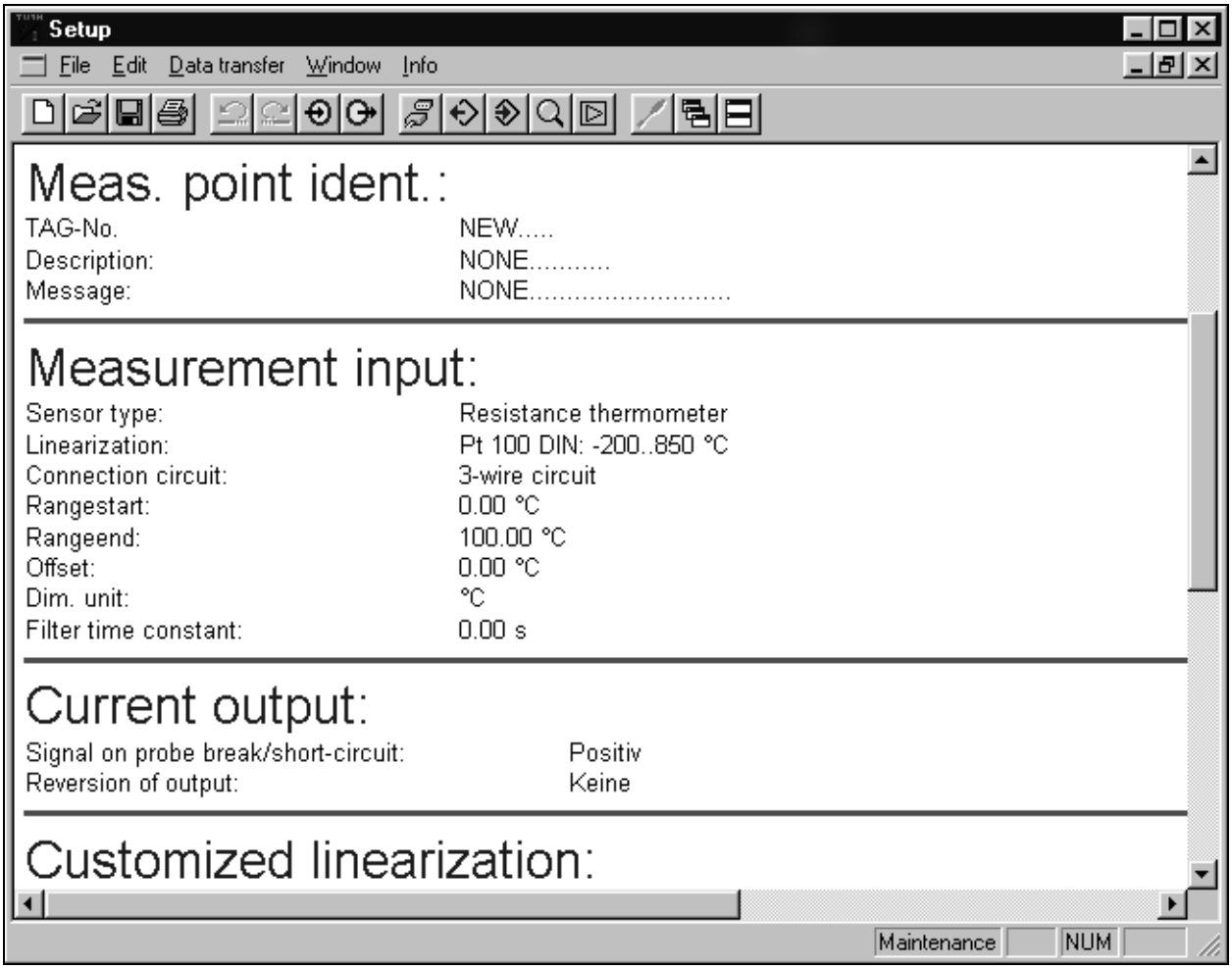
Configurable parameters:

- TAG number (8 characters),
  16 characters for the description and
  32 characters for the message
- sensor type, linearization
- connection circuit (2-/3-/4 wire)
- internal cold junction or
  external cold junction (fixed value)
- custom linearization
- range limits
- output signal rising/falling (reversion)
- digital filter
- response on probe break/short-circuit
- lead resistance for 2-wire circuit
- measurement offset
- unit
- min./max. value
- current simulation

Hardware and software requirements

The following hardware and software requirements have to be met for operating and installing the setup program:

- IBM-PC or compatible PC from 486DX-2-100
- 16 MB main memory
- 15MB available on hard disk
- CD-ROM drive
- 1 free serial interface
- Windows 95 or higher, Windows NT4.0 or Windows 2000



Input for thermocouple

Designation		Range limits	Range	Accuracy[1]
Fe-Con	L	-200 to +900°C	-200 to +900°C	0.5°C typ.
Fe-Con	J	-210 to +1200°C	-150 to +1200°C	0.5°C typ.
Cu-Con	U	-200 to +600°C	-200 to +600°C	0.5°C typ.
Cu-Con	T	-270 to +400°C	-200 to +400°C	0.5°C typ.
NiCr-Ni	K	-270 to +1372°C	-140 to +1372°C	0.5°C typ.
NiCr-Con	E	-270 to +1000°C	-150 to +1000°C	0.5°C typ.
NiCrSi-NiSi	N	-270 to +1300°C	-100 to +1300°C	1°C typ.
Pt10Rh-Pt	S	-50 to +1768°C	20 — 1768°C	2°C typ.
Pt13Rh-Pt	R	-50 to +1768°C	50 — 1768°C	2°C typ.
Pt30Rh-Pt6Rh	B	0 — 1820°C	400 — 1820°C	2°C typ.
W3Re-W25Re	D	0 — 2495°C	500 — 2495°C	1°C typ.
W5Re-W26Re	C	0 — 2320°C	500 — 2320°C	1°C typ.
Shortest span		Type L, J, U, T, K, E, N: 50°C Type S, R, B: 500°C Type D, C: 500°C		
Cold junction		Pt100 internal or external cold junction (adjustable from 0 to 80°C)		
Cold junction accuracy		± 1°C		
Sampling rate		> 1 measurement per second		
Sensor current		350nA		
Input filter		1st order digital filter; filter constant adjustable from 0 to 100sec		
Special features		can also be programmed in °F; range limits are freely programmable; input isolated from output		

[1] The accuracy refers to the maximum range span.

Input for resistance thermometer

Designation	Range limits	Range	Accuracy[1]
Pt 100	-200 to +850°C	-100 to +200°C -200 to +850°C	±0.2°C ±0.4°C
Pt 100 JIS	-200 to +649°C	-100 to +200°C -200 to +649°C	±0.2°C ±0.4°C
Pt 500	-200 to +250°C	-100 to +200°C -200 to +250°C	±0.2°C ±0.4°C
Pt 1000	-200 to +250°C	-100 to +200°C -200 to +250°C	±0.2°C ±0.4°C
Ni 100	-60 to +250°C	-60 to +250°C	±0.2°C
Ni 500	-60 to +150°C	-60 to +150°C	±0.2°C
Ni 1000	-60 to +150°C	-60 to +150°C	±0.2°C
Connection circuit	2-, 3-, or 4-wire		
Shortest span	10°C		
Sensor lead resistance - for 3- and 4-wire connection - for 2-wire connection	≤ 11Ω per conductor measuring resistance + ≤22Ω internal lead resistance		
Sensor current	< 0.6mA		
Sampling rate	> 1 measurement per second		
Input filter	1st order digital filter; filter constant adjustable from 0 to 100sec		
Special features	can also be programmed in °F; range limits are freely programmable; input isolated from output		

[1] The accuracy refers to the maximum range span.

Measurement circuit monitoring

Underrange	linear drop to 3.8mA (to NAMUR recommendation 43)
Overrange	linear rise to 20.5mA (to NAMUR recommendation 43)
Probe short-circuit / probe and lead break	resistance thermometer: ≤ 3.5mA or ≥ 21.0mA (configurable) thermocouple: ≤ 3.5mA or ≥ 21.0mA (configurable)[1]
Current limiting on probe short-circuit / break	≤ 23mA

[1] Probe short-circuit recognition is not possible for thermocouple

Output

Output signal	proportional DC current 4 — 20mA, 20 — 4mA
Electrical isolation Test voltage	between input and output U = 2.0kV/50Hz
Transfer characteristic	linear with temperature
	linearized to customer specification
	reversion of output signal
Burden (Rb)	Rb = (Ub - 10V) / 0.022A
Burden error	≤ ± 0.02 % / 100Ω[1]
Calibration conditions Calibration accuracy	24V DC at approx. 22°C ≤ ± 0.05 %[1]
1st order digital filter	0 — 100sec configurable
Step response 0 — 100 %	< 2sec (with filter constant 0sec)
Switch-on delay	correct measurement after applying supply voltage: after 4sec

[1] All data refer to 20mA full-scale value

Custom linearization

Type	via 4th order polynomial

Supply

Supply voltage (Ub) with reverse polarity protection	10 — 35V DC
Supply voltage error	≤ ± 0.01 % per V deviation from 24V[1]

[1] All data refer to the 20mA full-scale value

Environmental influences

Operating / storage temperature range	-40 to +85°C / -40 to +100°C	
Temperature error - resistance thermometer - thermocouple	≤ ± 0.005 % per °C deviation from 22°C[1] ≤ ± 0.005 % per °C deviation from 22°C[1] plus accuracy of cold junction	
Climatic conditions	rel. humidity ≤ 95 %, with condensation	
Vibration strength	according to GL Characteristic 2	
EMC - interference emission - immunity to interference	EN 61 326 Class B to industrial requirements	
IP protection - inside terminal head - open mounting - on C-rail	**Type 707011/...** IP66 IP00	**Type 707013/...** IP20

[1] All data refer to the 20mA full-scale value

Housing

	Type 707011/...	Type 707013/...
Material	polycarbonate (encapsulated)	polycarbonate
Screw connection	≤ 1.75 mm²; max. tightening torque 0.6 Nm	≤ 2.5 mm²; max. tightening torque 0.6 Nm
Mounting	inside terminal head Form B; in surface-mounting case (on request); in switchgear cabinet (mounting bracket is required)	on C-rail 35mm x 7.5mm (EN 50 022); on C-rail 15mm (EN 50 045); on G-rail (EN 50 035)
Operating position	any	
Weight	approx. 40 g	approx. 90 g

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