

HYDROGEN PRESSURE TRANSMITTER

Swiss based Trafag is a leading international supplier of high quality sensors and monitoring instruments for measurement of pressure and temperature. The NHT 8250 Hydrogen pressure transmitter features a thin-film-on-steel sensor based on a special hydrogen-compatible high-performance alloy for best-in-class signal stability. The robust mechanical design with fully welded housing is built to last in harsh environments.



Applications

- H₂ fuelling stations
- Hydrogen compressors
- Fuel cells
- Vehicles with H₂ drive
- Hydrogen tanks

Features

- EC79/2009 certified by the KBA Kraftfahrt-Bundesamt
- Wetted materials made of hydrogen-compatible steel
- Completely welded sensor system without additional seals
- Excellent long-term stability
- Optional: Switching output 1 or 2 PNP

Technical Data

Measuring principle	Thin-film-on-steel	Accuracy @ 25°C typ.	± 0.5 % FS typ. ± 0.3 % FS typ.
Measuring range	0 ... 1 to 0 ... 600 bar 0 ... 15 to 0 ... 7500 psi	Media temperature	-40°C ... +85°C
Output signal	4 ... 20 mA, 0.5 ... 4.5 VDC, 0 ... 5 VDC, 1 ... 5 VDC, 1 ... 6 VDC, 0 ... 10 VDC, 0.1 ... 10.1 VDC, 0.5 ... 4.5 VDC ratiometric, Switching output: 1 or 2 PNP	Ambient temperature	-40°C ... +85°C (Cable PVC 22: -5°C ... +60°C) (Cable PUR 24: -40°C ... +70°C)
NLH @ 25°C (BSL) typ.	± 0.2 % FS typ.	Approval / conformity	EC79/2009: e1*79/2009*406/2010*00047*00

Ordering information/type code

				8250 . XX				XX	XX	XX	XX	XX
Measuring range ¹⁾	Pressure measurement range [bar]	Over pressure [bar]	Burst pressure [bar]		Pressure measurement range [psi]	Over pressure [psi]	Burst pressure [psi]					
	0 ... 1	2	25	71	0 ... 15	30	350	G1				
	0 ... 1.6	3.2	32	73	0 ... 30	60	700	G5				
	0 ... 2.5	5	50	75	0 ... 50	100	850	G6				
	0 ... 4	8	60	76	0 ... 100	200	1450	G7				
	0 ... 6	12	100	77	0 ... 150	300	2500	G8				
	0 ... 10	20	200	78	0 ... 200	400	2500	GA				
	0 ... 16	32	200	79	0 ... 250	500	2500	G9				
	0 ... 25	38	300	80	0 ... 300	600	4000	HA				
	0 ... 40	60	300	81	0 ... 400	600	4000	H0				
	0 ... 60	90	400	82	0 ... 500	750	4000	H1				
	0 ... 100	150	500	83	0 ... 1000	1500	5000	H2				
	0 ... 160	240	750	85	0 ... 1500	2250	7000	H3				
	0 ... 250	375	1000	74	0 ... 2000	3000	10000	H5				
	0 ... 400	600	1500	84	0 ... 3000	4500	14500	G4				
	0 ... 600	900	2000	86	0 ... 7500	11250	29000	H6				
	Sensor	Relative pressure, accuracy: 0.3 %			33	Relative pressure, accuracy: 0.5 %			35			
Pressure connection	G1/4" male, seal: DIN 3869 (accessories 61/63/83)								17			
	1/4" NPT male								30			
	1/8" NPT male								43			
	7/16"-20UNF SAE4 male, seal: accessory 61/63								42			
Electrical connection	Male electrical plug, industrial standard, contact distance 9.4 mm, Mat. PA								01			
	Male electrical plug M12x1, 4-pole, Mat. PA, IEC 61076-2-101								32			
	Male electrical plug M12x1, 5-pole, Mat. PA, IEC 61076-2-101								35			
	Male electrical connector MIL-C 26482, 6-pole, metal								02			
	Male electrical connector Deutsch DT04-3P, 3-pole								D3			
	Male electrical connector Deutsch DT04-4P, 4-pole								D4			
	Cable IP67, Mat. PVC ³⁾								22			
	Cable IP67, Mat. PUR ³⁾								24			
	Cable IP67, Mat. EPD Raychem FDR25 ³⁾								08			
Output signal	Signal output	Load resistance		I (supply)	U (supply)							
	4 ... 20 mA	See graphic			24 (9 ... 32) VDC							19
	0.5 ... 4.5 VDC ⁴⁾	≥ 5.0 kΩ to Us-		≤ 20 mA	24 (9 ... 32) VDC							20
	0 ... 5 VDC ⁶⁾	≥ 5.0 kΩ to Us-		≤ 20 mA	24 (9 ... 32) VDC							14
	0.1 ... 4.1 VDC ⁴⁾	≥ 5.0 kΩ to Us-		≤ 20 mA	24 (9 ... 32) VDC							28
	0.1 ... 5.1 VDC ⁴⁾	≥ 5.0 kΩ to Us-		≤ 20 mA	24 (9 ... 32) VDC							29
	0.5 ... 5 VDC ⁶⁾	≥ 5.0 kΩ to Us-		≤ 20 mA	24 (9 ... 32) VDC							22
	1 ... 5 VDC ⁶⁾	≥ 5.0 kΩ to Us-		≤ 20 mA	24 (9 ... 32) VDC							25
	0.5 ... 5.5 VDC ⁴⁾	≥ 5.0 kΩ to Us-		≤ 20 mA	24 (9 ... 32) VDC							24
	1 ... 6 VDC ⁶⁾	≥ 5.0 kΩ to Us-		≤ 20 mA	24 (9 ... 32) VDC							16
	0 ... 10 VDC	≥ 5.0 kΩ to Us-		≤ 15 mA	24 (15 ... 32) VDC							17
	1 ... 10 VDC	≥ 5.0 kΩ to Us-		≤ 15 mA	24 (15 ... 32) VDC							26
	0.1 ... 10.1 VDC	≥ 5.0 kΩ to Us-		≤ 15 mA	24 (15 ... 32) VDC							13
	0.5 ... 4.5 VDC ratiometric ⁶⁾	≥ 5.0 kΩ to Us-		≤ 10 mA	5 (4.75 ... 5.25) VDC							23
	2 PNP transistors ⁴⁾			≤ 10 mA	24 (9 ... 32) VDC							PS
	1 PNP transistor ⁴⁾			≤ 10 mA	24 (9 ... 32) VDC							T1

Accessories	Female electrical plug M12x1, 5-pole ²⁾	33
	Female electrical plug industrial standard (for electrical connection 01)	34
	Seal FPM, -18°C ... +125°C	61
	Seal EPDM, -40°C ... +125°C	63
	Seal NBR, -25°C ... +100°C	83
	Special electrical connection: Pin 2 +, Pin 3 Ground, Pin 4 - (only for output signal 19 and male electrical connector 01, industrial standard)	90
	Special electrical connection: Pin 1 Out, Pin 2 +, Pin 3 Ground, Pin 4 - (only for output signals 13, 14, 16, 17, 20, 22, 23, 24, 25, 26 and male electrical connector 01, industrial standard)	91
	Special electrical connection: Pin 1 +, Pin 2 Ground, Pin 3 Out, Pin 4 - (only for output signals 13, 14, 16, 17, 20, 22, 23, 24, 25, 26, 28, 29 and male electrical connector 32, M12x1, 4-pole)	95
	Special electrical connection: Pin 1 +, Pin 2 Ground, Pin 3 -, Pin 4 Out (only for output signals 13, 14, 16, 17, 20, 22, 23, 24, 25, 26 and male electrical connector 32, M12x1, 4-pole)	96
	Special electrical connection: Pin 1 +, Pin 3 -, Pin 4 Out (only for output signals 13, 14, 16, 17, 20, 22, 23, 24, 25, 26, 28, 29 and male electrical connector 32, M12x1, 4-pole)	G1
	Special electrical connection: Pin 1 +, Pin 2 -, Pin 4 Ground (only for output signal 19 and male electrical connector 01, industrial standard)	92
	Special electrical connection: Pin 1 +, Pin 2 -, Pin 4 Ground (only for output signal 19 and male electrical connector 32, M12x1, 4-pole)	E1
	Special electrical connection: Pin 1 +, Pin 2 -, Pin 3 Out, Pin 4 Ground (only for output signals 13, 14, 16, 17, 20, 22, 23, 24, 25, 26 and male electrical connector 32, M12x1, 4-pole)	E2
	Special electrical connection: Pin 1 Out, Pin 2 -, Pin 3 +, Pin 4 Ground (only for output signals 13, 14, 16, 17, 20, 22, 23, 24, 25, 26, 28, 29 and male electrical connector 01, industrial standard)	E3
	Special electrical connection: Pin 1 +, Pin 2 -, Pin 3 Out, Pin 4 Ground (only for output signals 13, 14, 16, 17, 20, 22, 23, 24, 25, 26, 28, 29 and male electrical connector 01, industrial standard)	E9
	Special electrical connection: Pin 1 +, Pin 2 Ground, Pin 4 - (only for output signal 19 and male electrical connector 32, M12x1, 4-pole)	E6
	Special electrical connection: Pin A +, Pin C - (only for output signals 19 and male electrical connector Deutsch DT04-3P, 3-pole)	F0
	Special electrical connection: Pin A +, Pin B Out, Pin C - (only for output signals 13, 14, 16, 17, 20, 22, 23, 24, 25, 26, 28, 29 and male electrical connector Deutsch DT04-3P, 3-pole)	F1
	Special electrical connection: Pin 2 +, Pin 3 - (only for output signals 19 and male electrical connector Deutsch DT04-4P, 4-pole)	G3
	Special electrical connection: Pin 1 Out, Pin 2 +, Pin 3 - (only for output signals 13, 14, 16, 17, 20, 22, 23, 24, 25, 26, 28, 29 and male electrical connector Deutsch DT04-4P, 4-pole)	G4
	Special electrical connection: Pin A +, Pin C Out, Pin B/D -, Pin E Ground (Pin B and D are connected) (only for output signals 13, 14, 16, 17, 20, 22, 23, 24, 25, 26, 28, 29 and male electrical connector 02, MIL-C 26482)	F3
	Special electrical connection: Pin 1 +, Pin 2 - (only for output signal 19 and male electrical connector 32, M12x1, 4-pole)	F4
	Special electrical connection: Pin 1 +, Pin 3 - (only for output signal 19 and male electrical connector 32, M12x1, 4-pole)	F5
	Special electrical connection: Pin 1 +, Pin 2 -, Pin 3 -, Pin 4 Ground (only for output signals 19 and male electrical connector 32, M12x1, 4-pole)	G2
	Special electrical connection: Pin 1 +, Pin 4 - (only for output signals 19 and male electrical connector 32, M12x1, 4-pole)	G5
	Special electrical connection: Pin 1 +, Pin 2 Out, Pin 3 Ground, Pin 4 - (only for output signals 13, 14, 16, 17, 20, 22, 23, 24, 25, 26, 28, 29 and male electrical connector 32, M12x1, 4-pole)	F6
	Special electrical connection: Pin 1 +, Pin 2 Out, Pin 3 - (only for output signals 13, 14, 16, 17, 20, 22, 23, 24, 25, 26, 28, 29 and male electrical connector 32, M12x1, 4-pole)	F7
	Cable length 0.5 m	EM
	Cable length 1.0 m	1M
	Cable length 2.0 m	2M
	Parametrisation according to customer specification for output signal PS, T1 (see table "Parameters")	ZC
	Parametrisation standard for output signal PS, T1 (see table "Parameters")	ZS
	Multiple packaging ⁵⁾	VM
	Type label e1 (EC79) ⁷⁾	HC

¹⁾ Customized pressure ranges upon request

²⁾ For electrical connections 32 and 35

³⁾ Cable length see accessories

⁴⁾ Only with electrical connections 32, 22, 24, 08

⁵⁾ The order quantity must be a multiple of 50

⁶⁾ Only measuring ranges > 16 bar

⁷⁾ Pressure connection 17 only measuring ranges ≤ 350 bar

Parameters				
Name	Standard setting (accessory ZS)	Value range	Short name	Customer adjustment (accessory ZC)
Switch point SP1 (hysteresis mode) Upper switch point FH1 (window mode)	75 % Measuring range	> RP1, FL1 Hysteresis ≥ 1 % FS	SP1	
Reset point RP1 (hysteresis mode) Lower switch point FL1 (window mode)	25 % Measuring range	< SP1, FH1 Hysteresis ≥ 1 % FS	RP1	
Switch point SP2 (hysteresis mode) Upper switch point FH2 (window mode)	75 % Measuring range	> RP2, FL2 Hysteresis ≥ 1 % FS	SP2	
Reset point RP2 (hysteresis mode) Lower switch point FL2 (window mode)	25 % Measuring range	< SP2, FH2 Hysteresis ≥ 1 % FS	RP2	
Switch point delay time SP1 / RP1 (hysteresis mode) Switch point delay time FH1 / FL1 (window mode)	0	0; 2^x [ms], x = 3, 4 ... 16	dS1	
Switch point delay time SP2 / RP2 (hysteresis mode) Switch point delay time FH2 / FL2 (window mode)	0	0; 2^x [ms], x = 3, 4 ... 16	dS2	
Functions switching output 1	Hysteresis, closer (Hno)	Hysteresis NO (Hno), Hysteresis NC (Hnc) Window NO (Fno), Window NC (Fnc)	ou1	
Functions switching output 2	Hysteresis, closer (Hno)	Hysteresis NO (Hno), Hysteresis NC (Hnc) Window NO (Fno), Window NC (Fnc) Device ready	ou2	

Parameterization of switching points

The switching points, delay times and output functions can be parameterised quickly and easily with the Sensor Master Communicator (SMC) application, which is available for Windows (PC) and Android smartphone.

The Android app is available in the Google Play Store and the Windows app is available in the Microsoft Store. The apps are free of charge.



- Data sheet SMI Sensor Master Interface: www.trafag.com/H72618
- Instruction for the Sensor Master Communicator App (SMC) and the Sensor Master Interface (SMI): www.trafag.com/H73618



Specifications		
Electrical data	Output / supply voltage	4 ... 20 mA: 24 (9...32) VDC 0.5 ... 4.5 VDC: 24 (9...32) VDC 0 ... 5 VDC: 24 (9...32) VDC 1 ... 5 VDC: 24 (9...32) VDC 1 ... 6 VDC: 24 (9...32) VDC 0 ... 10 VDC: 24 (15...32) VDC 0.1 ... 10.1 VDC: 24 (15...32) VDC 0.5 ... 4.5 VDC ratiom., 10 ... 90% U_{supply} : 5 ± 0.25 VDC 1 or 2 PNP transistors: 24 (9...32) VDC
	Rise time	Typ. 1 ms / 10 ... 90 % nominal pressure
	Power-on delay time pressure transmitters	100 ms
	Power-on delay time pressure switches	50 ms + switching delay time
	Inverse-polarity protection, short-circuit strength @ 25°C during 5 min.	4...20 mA: to $U_s = 32$ VDC 0.5...4.5 VDC, 0...5 VDC, 1...5 VDC, 1...6 VDC, 0...10 VDC, 0.1...10.1 VDC: to $U_s = 28$ VDC 0.5...4.5 VDC ratiometric: to $U_s = 14$ VDC 1 or 2 PNP transistors: to $U_s = 32$ VDC
Environmental conditions	Media temperature	-40°C ... +85°C
	Ambient temperature	-40°C ... +85°C (Cable PVC 22: -5°C ... +60°C) (Cable PUR 24: -40°C ... +70°C)
	Protection ¹⁾	IP65, IP67, IP68
	Humidity	Max. 95 % relative
	Vibration	15 g RMS (20...2000 Hz) (EN60068-2-64) 25 g sin (80...2000 Hz), 1 oct./min, (1x @ 25°C) (EN60068-2-6)
	Shock	50 g / 11 ms 100 g / 6 ms Male electrical plug M12x1 (EN60068-2-27) ²⁾
EMC protection	Emission	EN/IEC 61000-6-3
	Immunity	EN/IEC 61000-6-2
Mechanical data	Sensor (wetted parts)	Nitrogen-strengthened austenitic steel, hydrogen compatible
	Pressure connection (wetted parts)	1.4404 (AISI316L)
	Housing	1.4301 (AISI304)
	Sealing	FPM/EPDM/NBR
	Male electrical connector	See ordering information
	Weight	appr. 50 g
	Mounting torque	25 Nm

¹⁾ See electrical connection

²⁾ For electrical connections 32 and 35

EC79/2009 Certificate

Nominal working pressure (NWP) @15°C	0.08 ... 70 MPa
Maximum allowable working pressure	0.1 ... 100 MPa
Classification	Class 0, Class 1 und Class 2*
Pressure codes	71 ... 88
Process connection	Code 17: Up to NWP 35 MPa Codes 30, 42, 43, 68: Up to NWP 70 MPa
Seal	Codes 61 and 63

* The transmitters of class 0 were tested, Because the most highly loaded case was tested the results can be applied to the whole product family with pressure ranges from 0.8bar to 700bar.

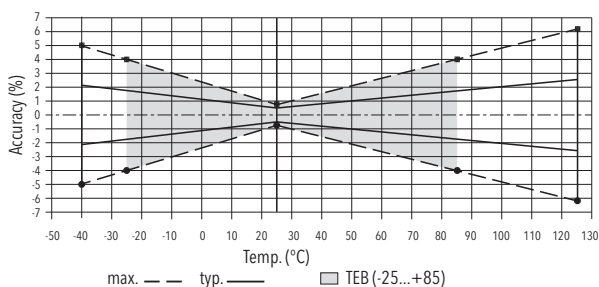
Analogue output

			Sensor 35 accuracy 0.5 %	Sensor 33 accuracy 0.3 %
Accuracy	TEB @ -25 ... +85°C	[% FS typ.]	± 1.75	± 1.0
	Accuracy @ +25°C	[% FS typ.]	± 0.5	± 0.3
	NLH @ +25°C (BSL)	[% FS typ.]	± 0.2	± 0.2
	TC zero point and span	[% FS/K typ.]	± 0.03	± 0.01
	Long term stability 1 year @ +25°C	[% FS typ.]	± 0.75	± 0.75
Rise time	Typ. 1 ms / 10 ... 90 % nominal pressure			

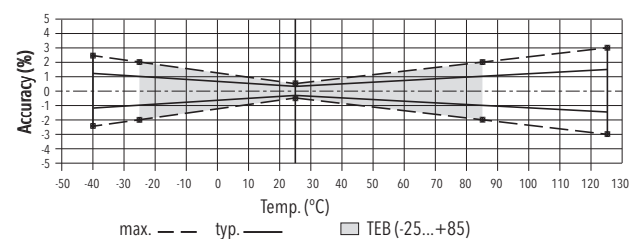
Switching output

			Sensor 35 accuracy 0.5 %	Sensor 33 accuracy 0.3 %
Accuracy	TEB @ -25 ... +85°C	[% FS typ.]	± 1.75	± 1.0
	Accuracy @ +25°C	[% FS typ.]	± 0.5	± 0.3
	Long term stability 1 year @ +25°C	[% FS typ.]	± 0.75	± 0.75
Setting range of switchpoints	1 ... 99 % FS			
Distance switch point Switch point > reset point	≥ 1.0 % FS Switchpoint > reset point			
Switching resistance	≤ 3 Ω			
Output function	Hysteresis, Window; normally closed (NO), normally open (NC)			
Switching current	≤ 400 mA, total of both switching outputs			
Current limiting	integrated			
Lifetime	> 100 x 10 ⁶ cycles			
Delay time	0; 2 ^x [ms], x = 3, 4 ... 16			
Switching frequency	max. 60 Hz (at switching delay time = 0)			

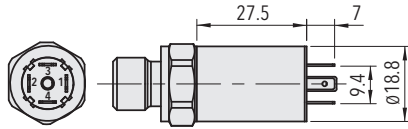
Measuring accuracy 0.5 %



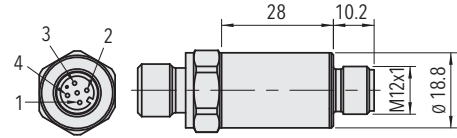
Measuring accuracy 0.3 %



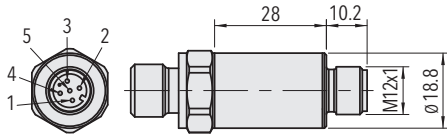
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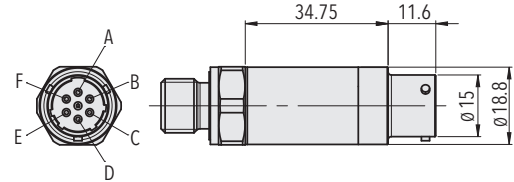
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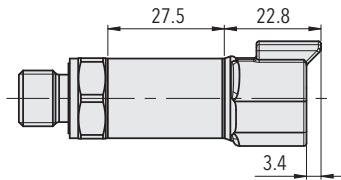
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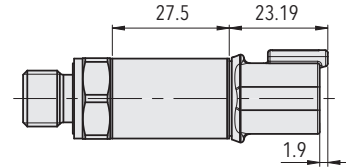
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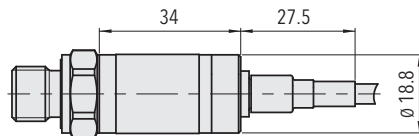
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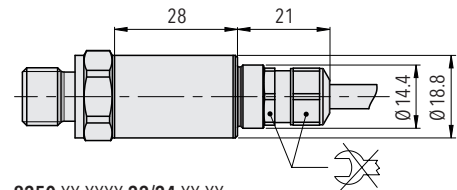
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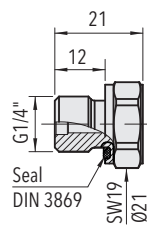
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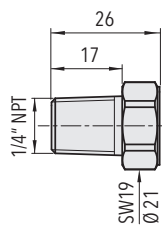
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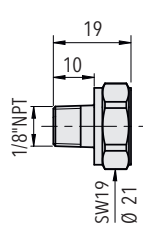
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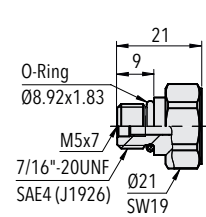
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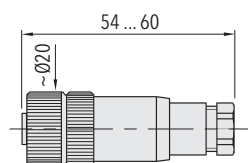
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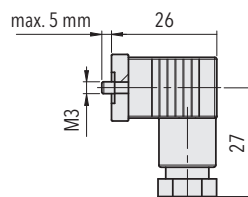
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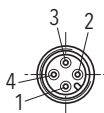
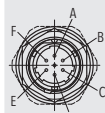
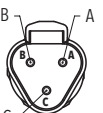
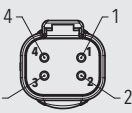
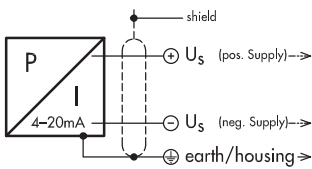
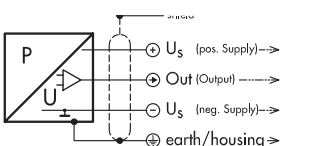


8250.XX.XXXX.XX.XX.33



8250.XX.XXXX.XX.XX.34

Electrical connection

		Protection / electrical connection																
		IP65 ^{1) 2)}		IP67 ^{1) 2)}					IP67 ^{1) 2)}		IP67, IP68 ^{1) 4)}		IP67, IP68 ^{1) 4)}					
Industrial standard Contact distance 9.4 mm		M12x1										MIL-C 26482		DT04-3P 3-pole		DT04-4P 4-pole		
01		32					35					02		D3		D4		
																		
Output signal	 8250.XX.XXXX.XX.19		90	92	E1	E6	F4	F5	G2	G5				F0		G3		
		2	2	1	1	1	1	1	1	1	1	4	A	A	A	2	2	
		1	4	2	3	2	4	2	3	2/3	4	1	B	B	C	1	3	
		4	3	4	4	4	2			4		5	E				3	
Output signal	 8250.XX.XXXX.XX.13/14/16/17/20/22/ 23/24/25/26/28/29		91	E3	E9	95	96	E2	F6	F7	G1		F3		F1		G4	
		1	2	3	1	1	1	1	1	1	1	1	A	A	A	A	2	2
		2	1	1	3	2	3	4	3	2	2	4	B	C	C	B	4	1
		3	4	2	2	3	4	3	2	4	3	3	C/D	B/D	B	C	1	3
		4	3	4	4	4	2	2	4	3		5	E	E			3	

		Protection / electrical connection					
		IP67, IP68 ^{2) 3)}		IP67 ²⁾		IP67, IP68 ^{2) 3)}	
		M12x1 4-pole		Cable		Cable	
		32		22/24		08	
		PS	T1	PS	T1	PS	T1
Output signal		1	1	white	white	red	red
		4	4	green	green	white	white
		2	-	yellow	-	green	-
		3	3	brown	brown	black	black
8250.XX.XXXX.XX.PS/T1							

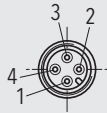
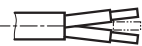
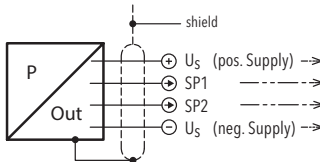
¹⁾ Provided female electrical plug is mounted according to instructions

²⁾ Ventilation via male electric plug/cable end

³⁾ IP68, 20 bar, 30 min.

⁴⁾ IP68, 100 mbar, 4h

Electrical connection

Protection / electrical connection										
IP67 ^{1) 2)}		IP67, IP68 ^{2) 3)}		IP67 ²⁾		IP67, IP68 ^{2) 3)}		IP67, IP68 ^{1) 4)}		
M12x1 4-pole 32 		Cable 22/24 		Cable 08 		Cable 88 		DT04-3P 3-pole D3 		
Output signal		PS	T1	PS	T1	PS	T1	PS	T1	T1
		1 4 2 3	1 4 - 3	white green yellow brown	white green - brown	red white green black	red white - black	brown blue yellow / green black	brown blue - black	A C - B
		8250.XX.XXXX.XX.PS/T1								

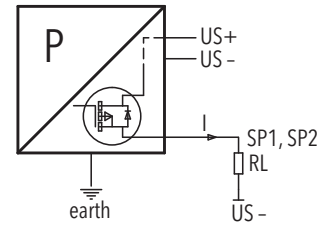
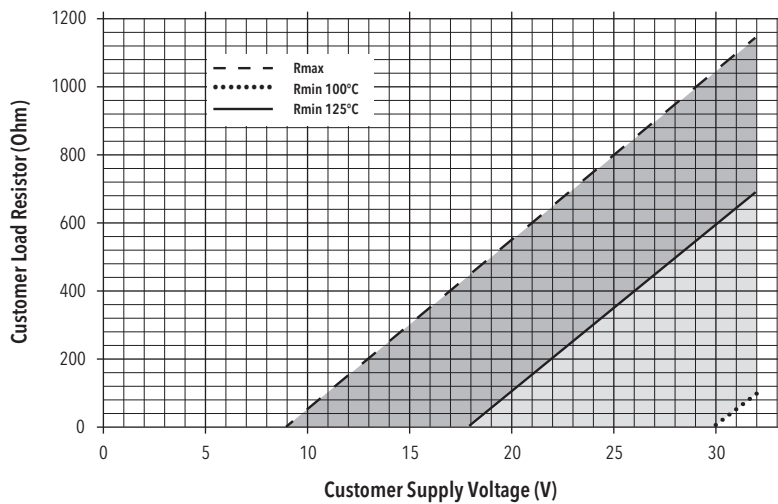
¹⁾ Provided female electrical plug is mounted according to instructions

²⁾ Ventilation via male electric plug/cable end

³⁾ IP68, 20 bar, 30 min.

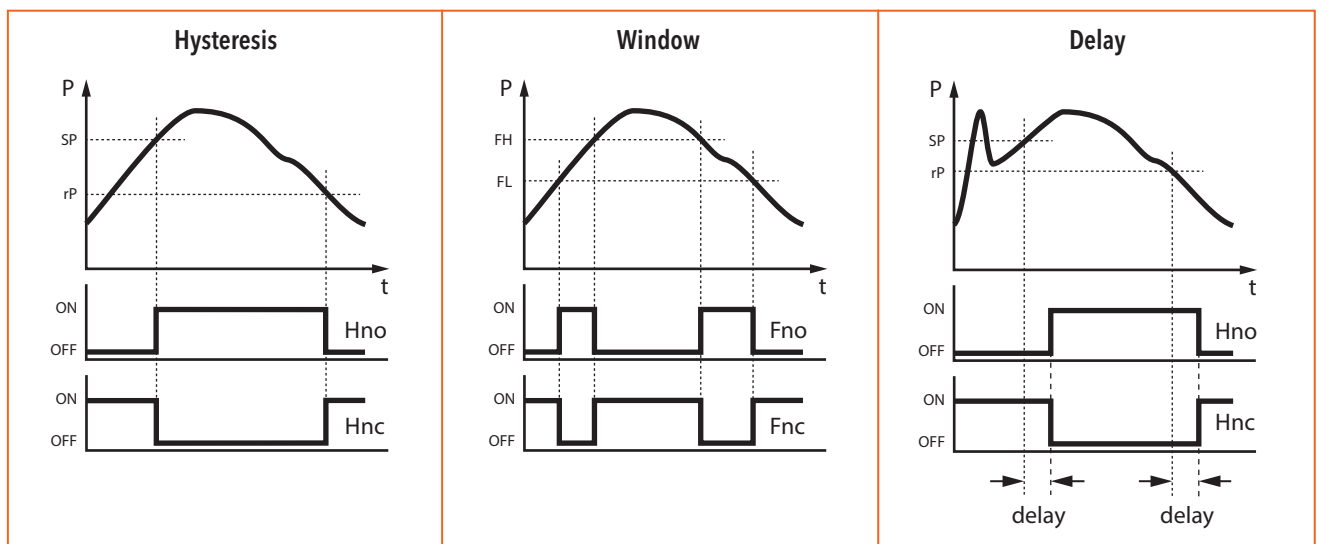
⁴⁾ IP68, 100 mbar, 4h

4...20mA: min./max resistor vs. supply voltage @ Pmax = 100%



Connection of loads to switching contacts

Functions switching output



Additional information

Documents

Data sheet	www.trafag.com/H72338
Instructions	www.trafag.com/H73303
Flyer	www.trafag.com/H70606