

# TEMPERATURE SWITCH

Swiss based Trafag is a leading international supplier of high quality sensors and monitoring instruments for measurement of pressure and temperature.



## Applications

- Machine tools
- Hydraulic power units
- Cooling and lubrication systems
- HVAC
- Process technology

## Features

- Parameterization also via NFC-smartphone App (Android)
- Display and electrical connection are independently rotatable 335°/343°
- Analogue output switchable mA or V
- Integrated datalogger
- Temperature measuring range adjustable, 50 ... 100 % of the nominal range

## Technical Data

Measuring principle	PT 1000, DIN EN 60751 class A, 2 conductors	Accuracy @ 25°C typ.	± 0.5 % FS typ. + temperature sensor error
Measuring range	-50°C ... +150°C / -58°F ... 302°F adjustable 50 ... 100 % FS	Ambient temperature	-25°C ... +85°C
Output signal	4 ... 20 mA, 0 ... 5 VDC, 1 ... 6 VDC, 0 ... 10 VDC, switchable mA or V	Temperature unit for display	°C, °F, K, user scale
Switching output	2 transistors PNP	Logger	Ring buffer: 3518 data points Sampling time: 0.1 ... 999.9 s, Off (0)

01/2020

Data sheet H72352d

Subject to change

## Ordering information/type code

		8180 .	XX	XX	XX	XX	XX
<b>Operating temperature media</b>	<b>Measuring range</b>	-50°C ... +150°C (-58°F ... 302°F)	50				
<b>Sensor</b>	Sensor DIN EN 60751, class 1, wetted parts 1.4404 (AISI316L)		21				
	Sensor DIN EN 60751, class 1, wetted parts 1.4404 (AISI316L), shorter response time <sup>1)</sup>		22				
<b>Process connections</b>	See table below "Ordering no. for process connections"						
<b>Electrical connection</b>	Male electrical plug M12x1, 4-pole, Mat. PA (Accessories P3, P4)					32	
	Male electrical plug M12x1, 5-pole, Mat. PA (Accessories P1, P2)					35	
<b>Output signal</b>	Switching output PNP, current output 4 ... 20 mA, switchable to 0 ... 10 VDC; output detail see accessories P1, P2, P3						PA
	Switching output PNP, voltage output 1 ... 6 VDC; output detail see accessories P1, P2, P3						PU
	Switching output PNP, voltage output 0 ... 10 VDC; output detail see accessories P1, P2, P3						PV
	Switching output PNP, voltage output 0 ... 5 VDC; output detail see accessories P1, P2, P3						PW
	Switching output PNP; output detail see accessory P4						PS
<b>Accessories</b>	Pin configuration 5-pole.; 1: U+, 2: analogue, 3: U-, 4: SP1, 5: SP2						P1
	Pin configuration 5-pole.; 1: U+, 2: SP2, 3: U-, 4: SP1, 5: analogue						P2
	Pin configuration 4-pole.; 1: U+, 2: analogue, 3: U-, 4: SP1						P3
	Pin configuration 4-pole.; 1: U+, 2: SP2, 3: U-, 4: SP1						P4
	Female electrical plug M12x1, 5-pole						33
	Parametrisation standard (see table Parameter)						ZS
	Parametrisation according to customer specifications (see table Parameter)						ZC
	Function package 1: Temperature offset correction / Measuring range zero point adjustment (included as basic function)						Z1
	Function package 2: User scale unit / analogue output adjustment						Z2
Protective cap, 1 pc. F89051, package of 5 pcs. F89052, package of 25 pcs. F89075							

<sup>1)</sup> Upon request

## Ordering no. for process connections

Sensor length	50 mm	100 mm	150 mm	200 mm *	250 mm *
G1/8" male	11	21	31	41	51
G1/4" male	12	22	32	42	52
G1/2" male	13	23	33	43	53
G1/8" male, compression fitting	14	24	34	44	54
G1/4" male, compression fitting	15	25	35	45	55
G1/2" male, compression fitting	16	26	36	46	56
1/4" NPT male	1B	2B	3B	4B	5B
1/2" NPT male	1C	2C	3C	4C	5C
1/4" NPT male, compression fitting	1D	2D	3D	4D	5D
1/2" NPT male, compression fitting	1E	2E	3E	4E	5E
Tri-Clamp DIN 32676, DN25/DN40 *	1G	2G	3G	4G	5G
Tri-Clamp DIN 32676, DN50 *	1J	2J	3J	4J	5J
Sanitary fitting DIN 11851, DN25 *	1L	2L	3L	4L	5L
Sanitary fitting DIN 11851, DN40 *	1M	2M	3M	4M	5M
Sanitary fitting DIN 11851, DN50 *	1N	2N	3N	4N	5N

\* Upon request

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	SP1 > RP1 FH1 > FL1 Hysteresis $\geq$ 1 % FS	SP1	
Reset point RP1 (hysteresis mode) Lower switch point FL1 (window mode)	25 % Measuring range	RP1 < SP1 FL1 < FH1 Hysteresis $\geq$ 1 % FS	RP1	
Switch point SP2 (hysteresis mode) Upper switch point FH2 (window mode)	75 % Measuring range	SP2 > RP2 FH2 > FL2 Hysteresis $\geq$ 1 % FS	SP2	
Reset point RP2 (hysteresis mode) Lower switch point FL2 (window mode)	25 % Measuring range	RP2 < SP2 FL2 < FH2 Hysteresis $\geq$ 1 % FS	RP2	
Switch point delay time SP1 (hysteresis mode) Switch point delay time FH1 (window mode)	0	0 ... 99.99 s	dS1	
Switch point delay time RP1 (hysteresis mode) Switch point delay time FL1 (window mode)	0	0 ... 99.99 s	dR1	
Switch point delay time SP2 (hysteresis mode) Switch point delay time FH2 (window mode)	0	0 ... 99.99 s	dS2	
Switch point delay time RP2 (hysteresis mode) Switch point delay time FL2 (window mode)	0	0 ... 99.99 s	dR2	
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)	ou2	
Temperature units	°C	°C, °F, K	uni	
Measuring range adjustment	100 % Nominal temperature	50 ... 100 % Nominal	T_EP	
Damping (analogue output)	0.01 s	0.01 ... 3.00 s (time constant)	dAA	
Display rotation	No	no, yes (180°)	disr	
Display mode	Current measuring value	Measuring value: current, highest, lowest, display off Current value: decimal places selectable (max. 3)	dis	
Display actualisation	2	1, 2, 5, 20 Hz	duTd	

Specifications		
<b>Electrical Data</b>	Output / supply voltage	4 ... 20 mA: 24 (15 ... 30) VDC 0 ... 5 VDC: 24 (15 ... 30) VDC 1 ... 6 VDC: 24 (15 ... 30) VDC 0 ... 10 VDC: 24 (15 ... 30) VDC
	Switch-on-delay	Typ. 200 ms
	Inverse-polarity protection, short-circuit strength @ 25°C during 5 min.	integrated
	Current consumption	≤ 30 mA
<b>Environmental conditions</b>	Ambient temperature	-25°C ... +85°C
	Protection <sup>1)</sup>	IP67
	Humidity	Max. 95 % relative
	Vibration	10 g (10 ... 2000 Hz) for sensor length ≤ 150 mm
	Shock	50 g / 3 ms
<b>EMC Protection</b>	Emission	EN/IEC 61000-6-3
	Immunity	EN/IEC 61000-6-2
<b>Mechanical Data</b>	Sensor (wetted parts)	1.4404/1.4435 (AISI316L)
	Housing	Steel, die cast metal galvanised display housing plastic
	Sealing	FPM, EPDM
	Male electrical plug	See ordering information
	Weight	~ 189 g, depending on process connector
	Mounting torque	20 Nm
	Housing alignment	Display 335° rotatable, max. 2.5 Nm Electrical connection 343° rotatable, max. 5 Nm

<sup>1)</sup> See electrical connection

Accuracy	
Analogue output	± 0.5 % FS typ. + Temperature sensor error
Switch point	± 0.3 % FS typ. + Temperature sensor error
Display	± 0.3 % FS typ. + Temperature sensor error + 1 digit
Temperature sensor error	For °C: ± (0.15 K + 0.002   t  ) according to EN 60751 For °F: ± [1.8*(0.15 + 0.002 (t - 32) / 1.8)]
Time constant	T <sub>60</sub> = 12.5 s, in air T <sub>90</sub> = 33 s, in air

Analogue output	
Output signal	Switchable 4 ... 20 mA or voltage
Current limiting output signal	4 ... 20 mA: 25 mA (overload)
	0 ... 10 VDC: < 40 mA (short-circuit)
Damping (rise time)	0.01 ... 3.00 s / 10 ... 90 % Nominal temperature
Offset correction of analogue output and display indication	$\pm 5^\circ\text{C}$
Measuring range zero point adjustment (T_nP)	0 ... 50 % FS <sup>2)</sup>
Measuring range end point adjustment (T_EP)	50 ... 100 % FS <sup>2)</sup>
Zero point adjustment analogue output (o_nP) <sup>1)</sup>	Voltage output: 0 ... 2 VDC Current output: 3.9 ... o_EP - 8 mA
End point adjustment analogue output (o_EP) <sup>1)</sup>	Voltage output: o_nP + 4 ... 10.5 VDC Current output: o_nP + 8 ... 20.1 mA

<sup>1)</sup> Available with optional function package, see "Accessories"

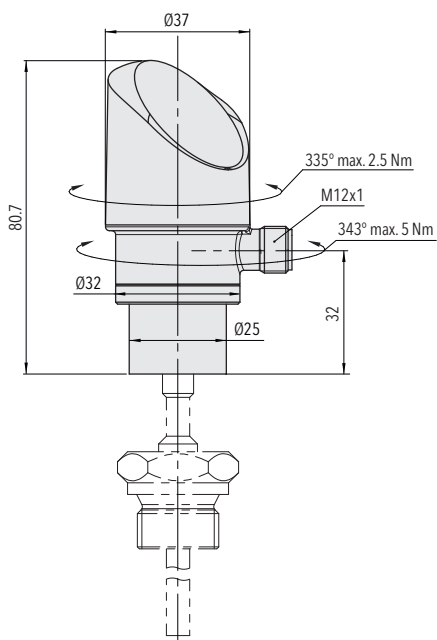
<sup>2)</sup> T\_EP - T\_nP  $\geq$  50 % FS

Switching output	
Adjustment range of switchpoints	0 ... 100 % FS
Switching hysteresis	$\geq 1$ % FS
	Switchpoint > reset point
Switching resistance	$\leq 3 \Omega$
Output function	Hysteresis, Window; normally closed (NO), normally open (NC)
Switching current	$\leq 0.5$ A each switching output
Current limiting	$\leq 2$ A each switching output
Delay time	0 ... 99.99 s

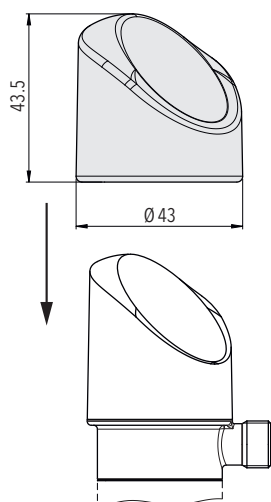
Display	
Display	4-digit 7-segment display 180° flippable with disable function decimal place: 1
Switching status indication	2 LED, red
Operation	With 3 buttons and menu navigation according to VDMA 24574-1
Display resolution	0.1 K
Display range	-3 ... 103 % FS
Setting parameters	See table Parameters
User scale unit; User defined values for display indication zero point and end point <sup>1)</sup>	Display zero point: -999 ... 9998 Display end point: -998 ... 9999

<sup>1)</sup> Available with optional function package, see "Accessories"

## Dimensions

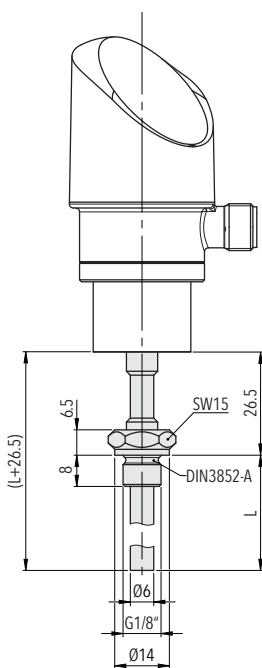


Protective cap

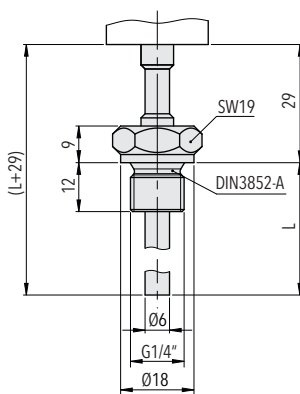


8180.XX.XXXX.35/32.XX.XX

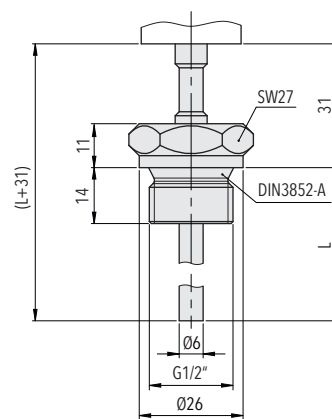
## Standard process connection



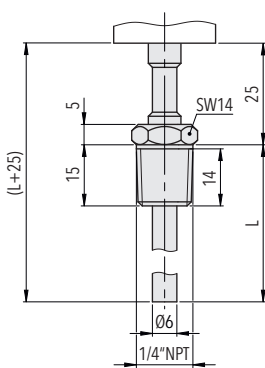
8180.XX.XX11/21/31/41/51.XX.XX.XX



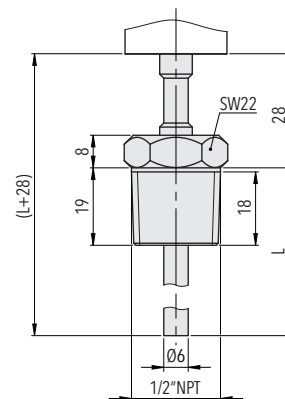
8180.XX.XX12/22/32/42/52.XX...



8180.XX.XX13/23/33/43/53.XX...

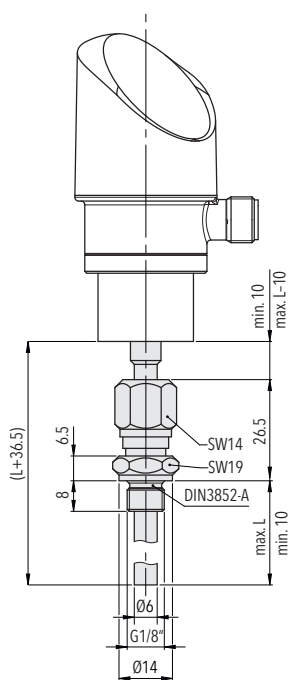


8180.XX.XX1B/2B/3B/4B/5B.XX...

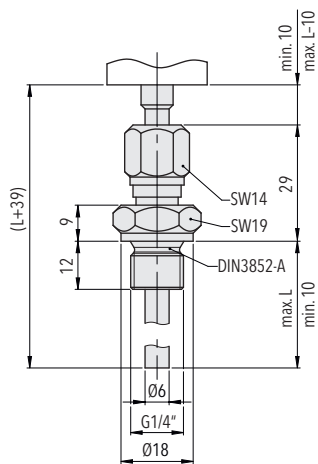


8180.XX.XX1C/2C/3C/4C/5C.XX...

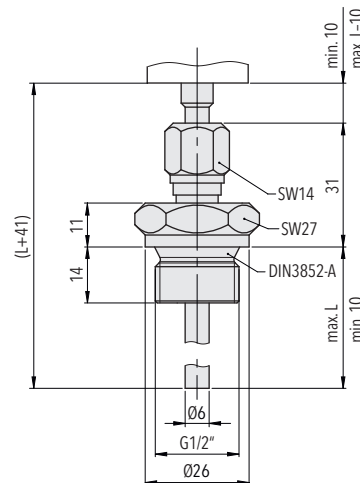
## Adjustable process connections



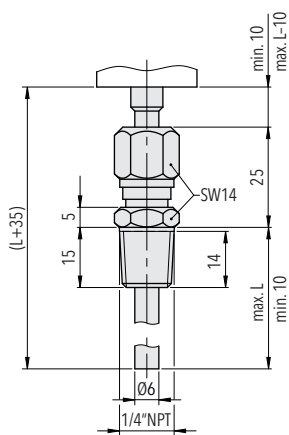
8180.XX.XX14/24/34/44/54.XX.XX.XX



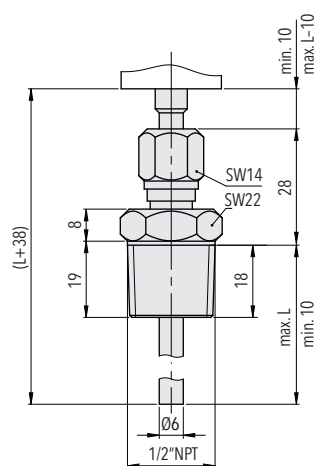
8180.XX.XX15/25/35/45/55.XX...



8180.XX.XX16/26/36/46/56.XX...

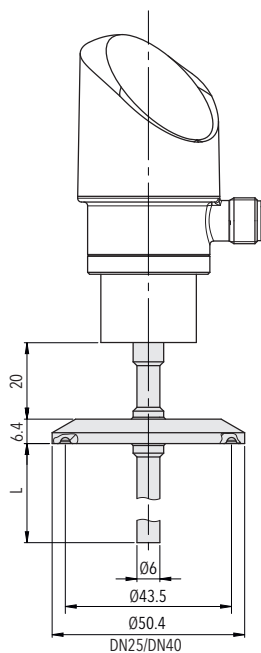


8180.XX.XX1D/2D/3D/4D/5D.XX...

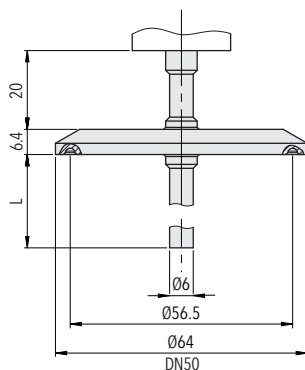


8180.XX.XX1E/2E/3E/4E/5E.XX...

## Tri-Clamp Process connections

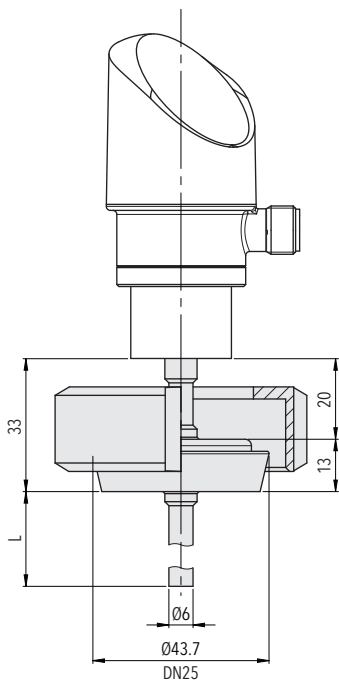


8180.XX.XX1G/2G/3G/4G/5G.XX...

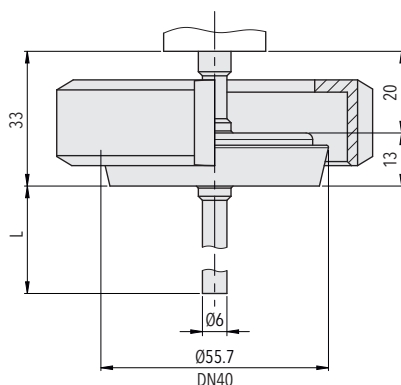


8180.XX.XX1J/2J/3J/4J/5J.XX...

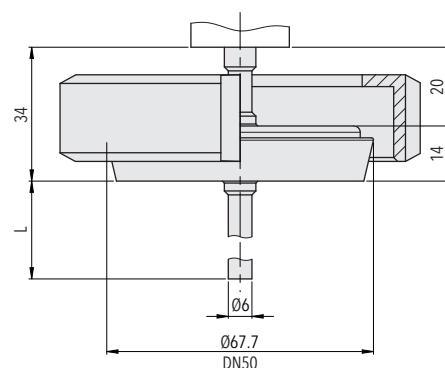
## Sanitary fittings



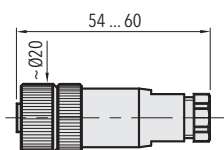
8180.XX.XX1L/2L/3L/4L/5L.XX...



8180.XX.XX1M/2M/3M/4M/5M.XX...

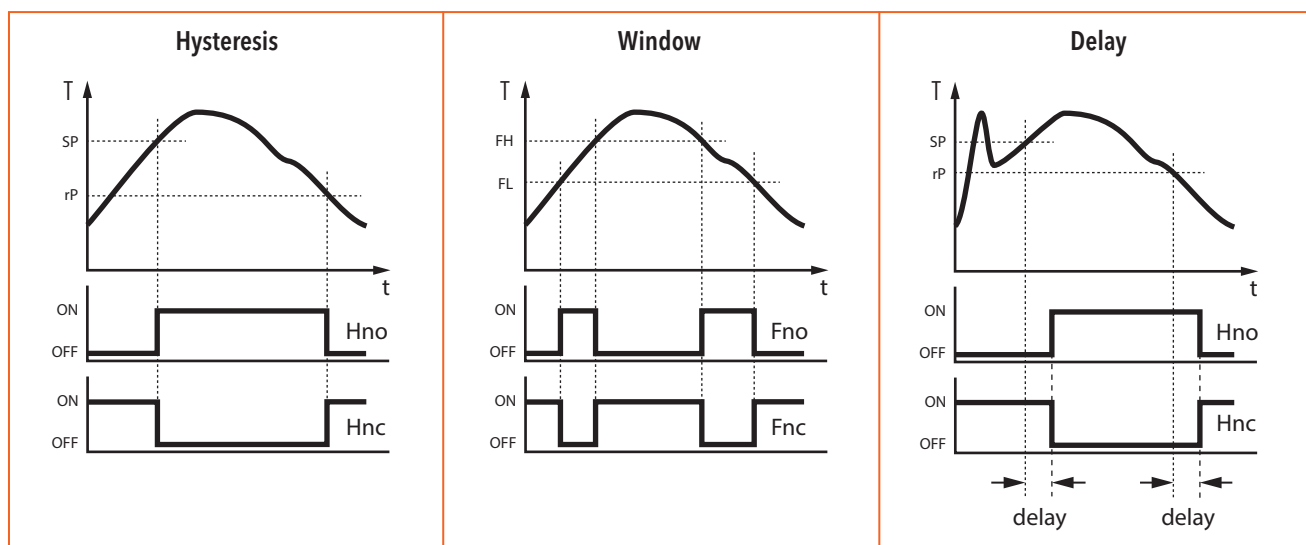


8180.XX.XX1N/2N/3N/4N/5N.XX...



8180.XX.XXXX.XX.XX.33

## Functions switching output



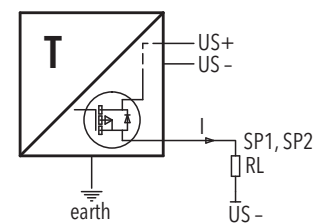
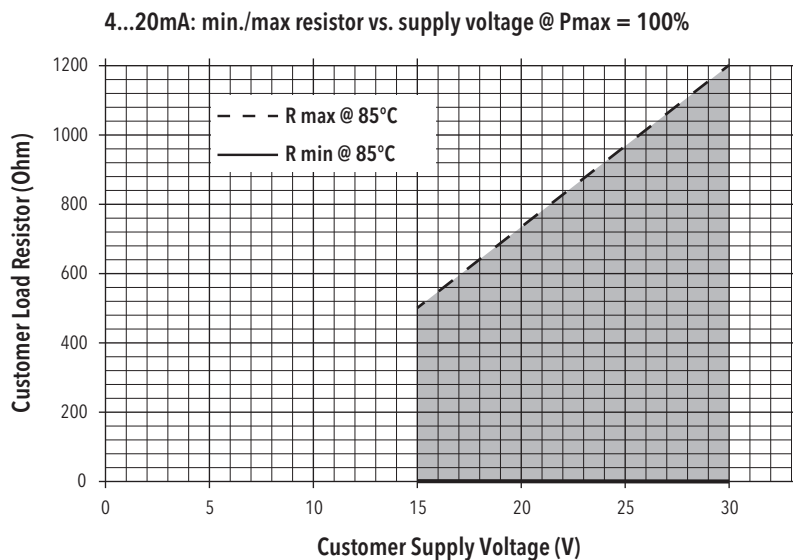


## Electrical connection

		Protection / electrical connection			
		IP65*)			
		M12x1			
		5-pole <b>35</b>		4-pole <b>32</b>	
Output signal		P1	P2	P3	P4
	PA	✓	✓	✓	
	PU	✓	✓	✓	
	PV	✓	✓	✓	
	PW	✓	✓	✓	
	PS				✓
Pin Configuration		P1	P2	P3	P4
	<b>8180.xx.xxxx.xx.PA/PU/PV/PW/PS</b>	1 3 2 4 5  Shield ***)	1 3 5 4 2  Shield ***)	1 3 2 4  Shield ***)	1 3 - 4 2

\*) Provided female connector is mounted according to instructions

\*\*\*) The use of a shielded cable is recommended



Connection of loads to switching output

### Additional information

#### Documents

Data sheet	<a href="http://www.trafag.com/H72352">www.trafag.com/H72352</a>
Instructions	<a href="http://www.trafag.com/H73352">www.trafag.com/H73352</a>
Flyer	<a href="http://www.trafag.com/H70605">www.trafag.com/H70605</a>