

# IO-LINK PRESSURE TRANSMITTER AND SWITCH

Swiss based Trafag is a leading international supplier of high quality sensors and monitoring instruments for measurement of pressure and temperature. The NAI 8273 IO-Link pressure transmitter is designed as a smart sensor and provides application-relevant information in addition to the process data. The process data contains the pressure value and the media temperature, which is measured directly at the exceptionally long-term stable thin-film-on-steel pressure sensor cell. The small sensor dimension combined with the pressure and temperature value of the media make the NAI 8273 the ideal choice in various applications. For the use of the conventional switching outputs, the polarity NPN and PNP is configurable.



 **IO-Link**

## Applications

- Machine tools
- Hydraulics
- Pneumatics
- Process technology

## Features

- Pressure measuring accuracy 0.3 %, 0.5 %
- Media and device temperature measurement
- COM3, min. process cycle time 1 ms
- 2 Switching outputs PNP/NPN configurable
- Optional: 5-fold overpressure resistance

Technical Data			
Measuring principle	Thin-film-on-steel	Accuracy @ 25°C typ.	± 0.5 % FS typ. ± 0.3 % FS typ.
Measuring range	-0.2 ... 0.2 to 0 ... 700 bar	Media temperature	-40°C ... +125°C
Output signal	IO-Link 1.1, COM3, min. process cycle time 1 ms, Smart Sensor Profile ED2 2 Switching outputs PNP/NPN	Ambient temperature	-40°C ... +105°C
NLH @ 25°C (BSL) typ.	± 0.2 % FS typ.		

06/2023

Data sheet H72621b

Subject to change

## Ordering information/type code

Measuring range <sup>1)</sup>	Pressure measurement range [bar]	Over pressure [bar]	Burst pressure [bar]	Pressure measurement range [psi] <sup>13)</sup>	Over pressure [psi]	Burst pressure [psi]	8273 .	XX	XX	XX	XX	XX
							XX	XX	XX	XX	XX	
	-0.2 ... 0.2 <sup>10)</sup>	1.2	25	-2.9 ... 2.9	17.4	362	<b>A8</b>					
	-0.4 ... 0 <sup>10)</sup>	1.2	25	-5.8 ... 0	17.4	17.4	<b>D3</b>					
	-0.4 ... 0.4 <sup>10)</sup>	1.6	25	-5.8 ... 5.8	23.2	362	<b>A9</b>					
	-1 ... 0 <sup>10)</sup>	2	25	-14.5 ... 0	29	362	<b>D4</b>					
	-1 ... 1 <sup>10)</sup>	6	50	-14.5 ... 14.5	87	362	<b>B1</b>					
	-1 ... 1.6 <sup>10)</sup>	7.8	50	-14.5 ... 23.2	113	725	<b>B3</b>					
	-1 ... 4	12	50	14.5 ... 58	174	870	<b>B6</b>					
	-1 ... 6	18	100	-14.5 ... 87	261	1450	<b>B7</b>					
	-1 ... 10	30	200	-14.5 ... 145	435	2900	<b>B8</b>					
	-1 ... 16	48	200	-14.5 ... 232	696	2900	<b>B9</b>					
	-1 ... 25	75	300	-14.5 ... 362	1087	4351	<b>C0</b>					
	0 ... 0.2 <sup>10)</sup>	1.2	25	0 ... 2.9	17.4	362	<b>68</b>					
	0 ... 0.4 <sup>10)</sup>	1.2	25	0 ... 5.8	17.4	362	<b>69</b>					
	0 ... 1 <sup>10)</sup>	2	25	0 ... 14.5	29	362	<b>71</b>					
	0 ... 2.5	7.5	50	0 ... 36.2	109	870	<b>75</b>					
	0 ... 10	30	200	0 ... 145	435	2900	<b>78</b>					
	0 ... 40	120	300	0 ... 580	1740	4351	<b>81</b>					
	0 ... 60	180	400	0 ... 870	2610	5801	<b>82</b>					
	0 ... 100	300	500	0 ... 1450	4351	7252	<b>83</b>					
	0 ... 160	480	750	0 ... 2320	6962	10878	<b>85</b>					
	0 ... 250	750	1000	0 ... 3626	10878	14504	<b>74</b>					
	0 ... 400	1000	2000	0 ... 5801	14504	29007	<b>84</b>					
	0 ... 600	1500	2500	0 ... 8702	21755	36259	<b>86</b>					
	0 ... 700	1500	2500	0 ... 10152	21755	36259	<b>87</b>					
	<b>Option 5P:</b>		<b>Fifefold overpressure</b>									
	0 ... 2.5	12.5	60	0 ... 36.2	181	870	<b>55</b>					
	0 ... 4	20	100	0 ... 58	290	1450	<b>56</b>					
	0 ... 6	30	200	0 ... 87	435	2900	<b>57</b>					
	0 ... 10	50	200	0 ... 145	725	2900	<b>58</b>					
	0 ... 16	80	300	0 ... 232	1160	4351	<b>59</b>					
	0 ... 25	125	300	0 ... 362	1813	4351	<b>60</b>					
	0 ... 40	200	400	0 ... 580	2900	5801	<b>61</b>					
	0 ... 60	300	500	0 ... 870	4351	7252	<b>62</b>					
	0 ... 100	500	750	0 ... 1450	7252	10878	<b>63</b>					
	0 ... 160	800	1000	0 ... 2320	11603	14504	<b>65</b>					
<b>Sensor</b>	Relative pressure, accuracy: 0.5 % <sup>6)</sup>							<b>25</b>				
	Relative pressure, accuracy: 0.3 % <sup>7)</sup>							<b>23</b>				
<b>Pressure connection</b>	G1/4" male, Seal: DIN 3869 (accessories 61/63/83)	<b>17</b>		9/16"-18UNF-2A male, SAE J1926-2 (Heavy Duty), seal: accessory 61 <sup>14)</sup>				<b>67</b>				
	G1/4" male, with integrated damping Ø 0.5 mm, Seal: DIN 3869 (accessories 61/63/83) <sup>15)</sup>	<b>15</b>		R1/4" male, DIN3858				<b>19</b>				
	G1/4" male (Manometer) EN 837	<b>53</b>		R1/4" male, DIN2999 <sup>9)</sup>				<b>20</b>				
	G1/8" male DIN3852-E, seal: accessory 61 <sup>4)</sup>	<b>54</b>		R1/8" male, DIN3858 <sup>4)</sup>				<b>16</b>				
	1/4" NPT male	<b>30</b>		M10x1 male, DIN EN ISO 6149-2, seal: accessory 61				<b>32</b>				
	1/8" NPT male <sup>11)</sup>	<b>43</b>		M12x1 male, seal: accessory 61 <sup>12)</sup>				<b>64</b>				
	7/16"-20UNF female, SAE J512 with valve opener <sup>3)</sup>	<b>24</b>		M12x1.25 male, seal: accessory 61 <sup>12)</sup>				<b>65</b>				
	7/16"-20UNF female, SAE J512 without valve opener <sup>3)</sup>	<b>44</b>		M12x1.5 male, DIN EN ISO 9974-2, seal: accessory 61				<b>49</b>				
	7/16"-20UNF male, DIN3866 <sup>3)</sup>	<b>18</b>		M14x1.5 male DIN EN ISO 6149-2, seal: accessory 61 <sup>9)</sup>				<b>31</b>				
	7/16"-20UNF-2A male, SAE J1926-2 (Heavy Duty), seal: accessory 61/63 <sup>14)</sup>	<b>69</b>										

<b>Electrical connection</b>	Male electrical connector M12x1, 4-pole, Mat. PA, IEC 61076-2-101	32	
<b>Output signal</b>	IO-Link		50
<b>Accessories</b>	Female electrical plug M12x1, 5-pole <sup>2)</sup>		33
	Pressure peak damping element ø 1.0 mm <sup>5)</sup>		40
	Pressure peak damping element ø 0.4 mm <sup>5)</sup>		44
	Seal FPM, -18°C ... +125°C		61
	Seal EPDM, -40°C ... +125°C		63
	Seal NBR, -25°C ... +100°C		83
	Standard electrical connection: Pin 1 L+, Pin 2 Out 2 I/Q, Pin 3 L-, Pin 4 Out 1 C/Q (for male electrical connector 32, M12x1, 4-pole)		0L
	Parameterization according to customer specification (refer to the interface description)		ZC
	Parameterization standard (refer to the interface description)		ZS
	Multiple packaging <sup>8)</sup>		VM

<sup>1)</sup> Customized pressure ranges upon request

<sup>2)</sup> For electrical connection 32

<sup>3)</sup> Max. allowable pressure range 60 bar (870 psi) at 180 bar (2610 psi) overpressure

<sup>4)</sup> Max. allowable pressure range 160 bar (2320 psi) at 480 bar (6961 psi) overpressure

<sup>5)</sup> Not for pressure connections 53, 24, 44, 18

<sup>6)</sup> IO-Link process data includes the device temperature

<sup>7)</sup> IO-Link process data includes the media temperature, device temperature via ISDU

<sup>8)</sup> The order quantity must be a multiple of 50, only for electrical connection 32

<sup>9)</sup> Upon request

<sup>10)</sup> Only for relative pressure, accuracy: 0.3 % <sup>23)</sup>

<sup>11)</sup> Max. allowable pressure range 400 bar (5800 psi) at 600 bar (8700 psi) overpressure

<sup>12)</sup> Without seal, use seal geometry according DIN EN ISO 6149-2

<sup>13)</sup> Pressure values in [psi] are given for information and correspond to the pressure values in [bar]

<sup>14)</sup> Measuring range max. 630 bar according to SAE J1926-2 (Heavy Duty)

<sup>15)</sup> For measuring ranges  $\geq 2.5$  bar

Parameters			
Name	Standard setting (accessory ZS)	Value range	Customer adjustment (accessory ZC)
<b>Switching output OUT1</b>			
Source of measured value	Pressure		Pressure
Switching output polarity	PNP	PNP, NPN	
Switch point SP1 <sup>2)</sup>	75 %	[bar], > SP2, 1 ... 100 % nominal pressure	
Switch point SP2 <sup>3)</sup>	25 %	[bar], < SP1, 0 ... 99 % nominal pressure Hysteresis SP1 - SP2 ≥ 1 % nominal pressure	
Switching output logic	0 = high active	0 = high active (normally open) 1 = low active (normally closed)	
Function mode	3 = Two Point Mode	0 = Deactivated 1 = Single Point Mode 2 = Window Mode 3 = Two Point Mode	
Hysteresis <sup>1)</sup>	0	[bar] Hysteresis ≥ 1 % nominal pressure	
Activation Delay	0	0 ... 65535 [ms]	
Deactivation Delay	0	0 ... 65535 [ms]	
Error behaviour	0	0 = Tri-State 1 = NPN/PNP: Open / Push-Pull: High 2 = NPN/PNP: Closed / Push-Pull: Low 3 = Last valid state	
<b>Switching output OUT2</b>			
Source of measured value	P = Pressure	P = Pressure, T = Temperature	
Switching output polarity	PNP	PNP, NPN	
Switch point SP1 <sup>2)</sup>	75 %	> SP2 [bar] 0 ... 100 % nominal pressure [°C] -40 ... 125°C	
Switch point SP2 <sup>3)</sup>	25 %	< SP1 [bar] 0 ... 99 % nominal pressure Hysteresis SP1 - SP2 ≥ 1 % nominal pressure [°C] -40 ... 125°C, Hysteresis SP1 - SP2 ≥ 1°C	
Switching output logic	0 = high active	0 = high active (normally open) 1 = low active (normally closed)	
Function mode	3 = Two Point Mode	0 = Deactivated 1 = Single Point Mode 2 = Window Mode 3 = Two Point Mode	
Hysteresis <sup>1)</sup>	0	[bar] Hysteresis ≥ 1 % nominal pressure [°C] ≥ 1°C	
Activation Delay	0	0 ... 65535 [ms]	
Deactivation Delay	0	0 ... 65535 [ms]	
Error behaviour	0	0 = Tri-State 1 = NPN/PNP: Open / Push-Pull: High 2 = NPN/PNP: Closed / Push-Pull: Low 3 = Last valid state	
<b>Signal processing</b>			
Pressure measurement signal damping for switching outputs	0	0 = Deactivated 0; 1 ... 65536 [ms], time constant "tau"	

1) Applicable for functions modes "Single Point Mode" and "Window Mode"

2) Applicable for all functions modes

3) Applicable for functions modes "Two Point Mode" and "Window Mode"

Specifications		
<b>Electrical data</b>	Output / supply voltage	Switching output PNP/NPN: 24 (9...32) VDC IO-Link: 24 (18...30) VDC
	Power-on delay time	IO-Link readiness: 300ms Data readiness: ca. 700ms
	Inverse-polarity protection, short-circuit strength @ 25°C during 5 min.	IO-Link/Out 1 or Out 2: to Us = 32 VDC
	Current consumption / power consumption <sup>2)</sup>	< 0.5 W
<b>Environmental conditions</b>	Media temperature	-40°C ... +125°C
	Ambient temperature	-40°C ... +105°C
	Protection <sup>1)</sup>	IP65, IP67
	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 (EN60068-2-27)
<b>EMC protection</b>	Emission	EN/IEC 61000-6-3
	Immunity	EN/IEC 61000-6-2 IEC 61131-9
<b>Mechanical data</b>	Sensor (wetted parts)	1.4542 (AISI630)
	Pressure connection (wetted parts)	1.4542 (AISI630)
	Housing	1.4301 (AISI304)
	Sealing	See ordering information
	Male electrical connector	See ordering information
	Weight	~ 50 g
	Mounting torque	25 Nm

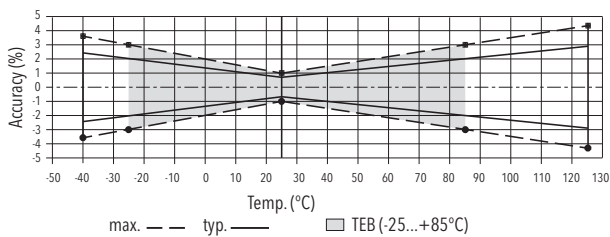
<sup>1)</sup> See electrical connection

<sup>2)</sup> Without load on the switching outputs

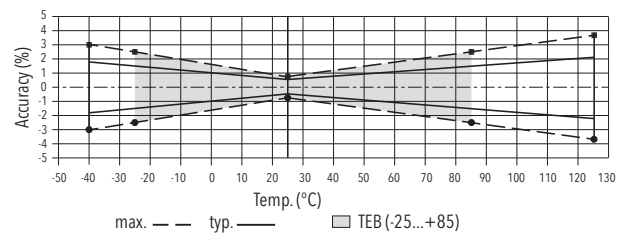
Pressure measuring accuracy		Measuring accuracy 0.3 % Ordering No. 23			Measuring accuracy 0.5 % Ordering No. 25
Measuring range	[bar]	$\geq 0.2$ $\leq 0.6$	$> 0.6$ $< 2.0$	$\geq 2.0$	$\geq 2.5$
	[psi]	$\geq 2.9$ $\leq 8.7$	$> 8.7$ $< 29$	$\geq 29$	$\geq 36.2$
TEB @ -25 ... +85°C	[% FS typ.]	$\pm 2.0$	$\pm 1.5$	$\pm 1.0$	$\pm 1.75$
Accuracy @ +25°C	[% FS typ.]	$\pm 0.8$	$\pm 0.6$	$\pm 0.3$	$\pm 0.5$
NLH @ +25°C (BSL)	[% FS typ.]	$\pm 0.2$	$\pm 0.2$	$\pm 0.2$	$\pm 0.2$
TC zero point and span	[% FS/K typ.]	$\pm 0.02$	$\pm 0.02$	$\pm 0.01$	$\pm 0.03$
Long term stability 1 year @ +25°C	[% FS typ.]	$\pm 0.3$	$\pm 0.2$	$\pm 0.1$	$\pm 0.1$
Mounting dependency with 180° rotation (vibration and shock)	[mbar]	0.5	0.5	0.5	0.5

## Pressure accuracy class 0.3%

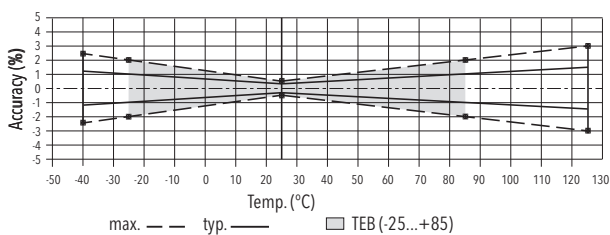
$\geq 0.2$  bar ...  $\leq 0.6$  bar



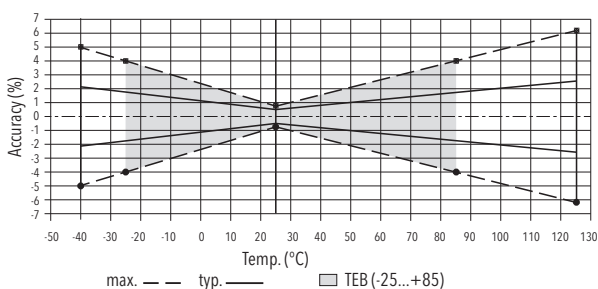
$> 0.6$  bar ...  $< 2.0$  bar



$\geq 2.0$  bar



## Pressure accuracy class 0.5%



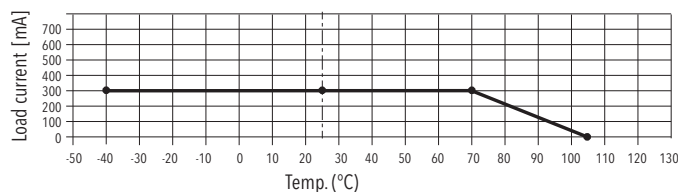
Temperature measurement			
Media temperature <sup>1)</sup>	@ Media temperature	Accuracy	
Accuracy [typ.]	-20°C	± 5K + 0.14 x	(T ambient - T media)
	0°C	± 3K + 0.14 x	(T ambient - T media)
	+25°C	± 2K + 0.14 x	(T ambient - T media)
	+85°C	± 3K + 0.14 x	(T ambient - T media)
	+125°C	± 6K + 0.14 x	(T ambient - T media)
Temperature range	-40°C...+125°C		
Device temperature			
Accuracy	@ 0°C ... +80°C	± 1.5°C	
Temperature range	-40°C ... +125°C		

<sup>1)</sup> Media temperature measurement is only available with pressure accuracy of 0.3% (code 23)

Switching output			
Accuracy	refer to table "Pressure measurement accuracy"		
Number of outputs	2 outputs for switching operation (SIO mode; SIO = Out1, Out2 standard IO)		
Source of measured value	Pressure and temperature (Out1 and Out2)		
Output polarity	PNP, NPN, configurable		
Output function	Function modes: Single Point Mode, Two Point Mode, Window Mode; normally closed (NO), normally open (NC); switch-on/switch-off delay; Damping; configurable via IO-Link interface		
Switching current	-40°C ... +70°C	Ambient temperature	max. 300 mA each switching output
	> +70°C ... +105°C	Ambient temperature	refer to the graphic "Switching current"
Switching resistance	≤ 11Ω		
Current limiting	integrated		
Lifetime	> 100 x 10 <sup>6</sup> cycles		
Switching frequency	< 300 Hz		
Response time	1.6 ms		

## Switching current

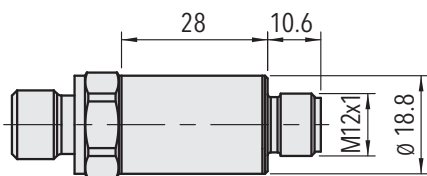
Load depending on ambient temperature



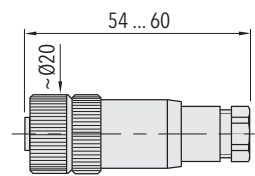
— max. load of each switching output C/Q, I/Q

Interface description		
Communication interface	SDCI Standard IEC 61131-9	IO-Link
Transmission type		COM3 (230,4 kBaud)
IO-Link revision		V1.1
Profiles / function classes		Identification and Diagnosis (0x4000), Measurement Data Channel (0x800A) Measuring and Switching Sensor (DMSS), SSP4.1.2
SIO mode		Yes
Required master port class		Class A
Min. process cycle time	[ms]	1
Resolution pressure measurand	Refer to the interface description	
Resolution temperature measurand	[K]	0.01
IO-Link process data (cyclical)	Pressure [Pa]	16 bit
	Switching signal for pressure	2 bit
	Temperatur [°C]	16 bit
		device temperature with 0.5 % pressure accuracy media temperature with 0.3 % pressure accuracy
	Switching signal for temperature	2 bit
	Device status	4 bit
IO-Link functions (acyclical)	Application specific tag; media temperature, device temperature; operating hours counter; min./max. pressure value; min./max. temperature value; pressure overload counter; temperature overload counter	
IODD download	<a href="https://ioddfinder.io-link.com">https://ioddfinder.io-link.com</a>	

## Dimensions



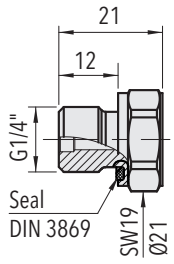
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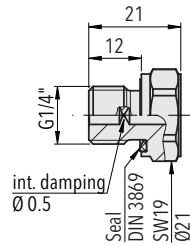
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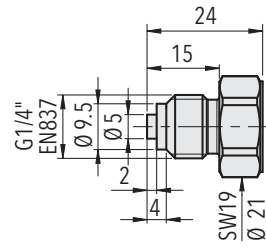
## Dimensions



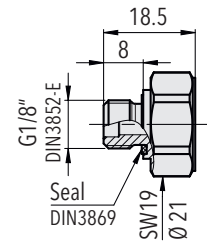
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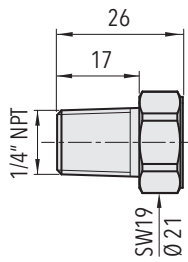
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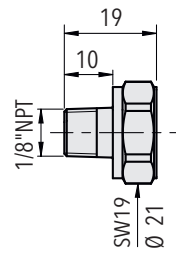
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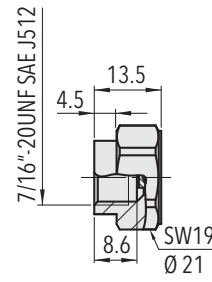
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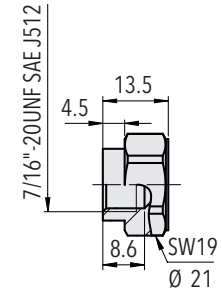
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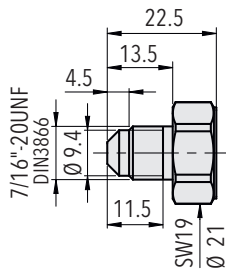
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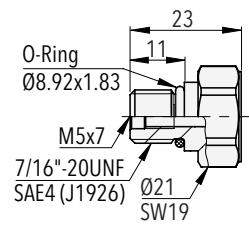
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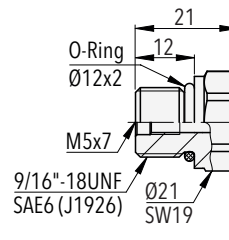
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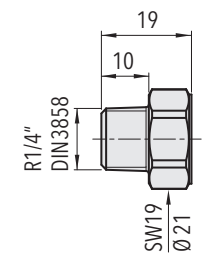
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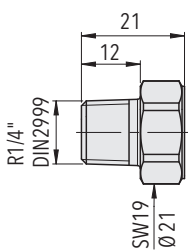
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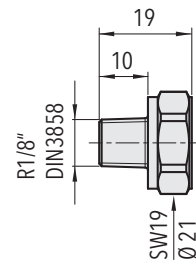
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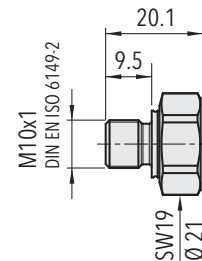
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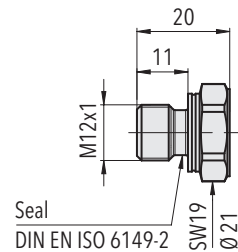
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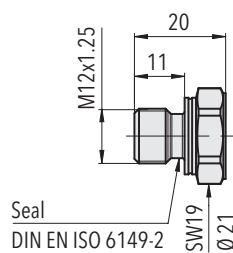
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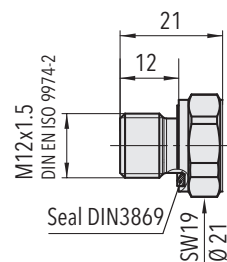
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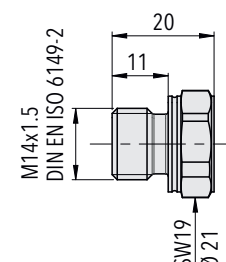
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8273.XX.XX65.XX.XX.XX

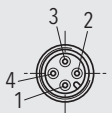
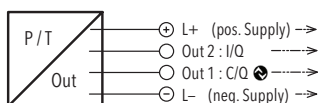


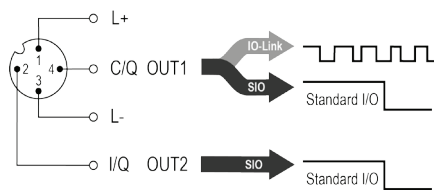
8273.XX.XX49.XX.XX.XX



8273.XX.XX31.XX.XX.XX

## Electrical connection

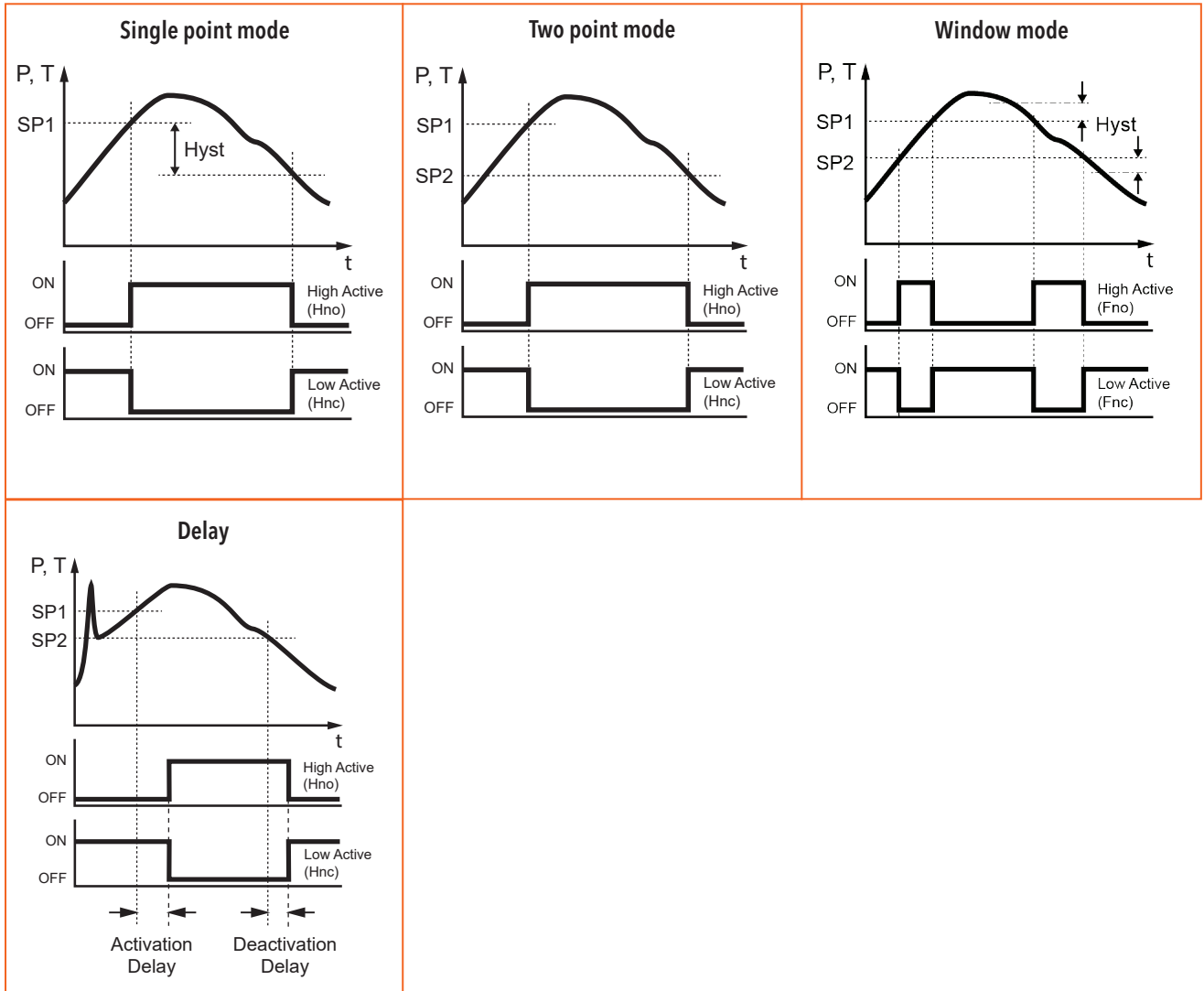
Protection / electrical connection	
	IP65, IP67 *) **)
	M12x1 4-pole <b>32</b> 
Output signal	<b>0L</b>
	1 2 4 3
<b>8273.xx.XXXX.xx.50</b>	



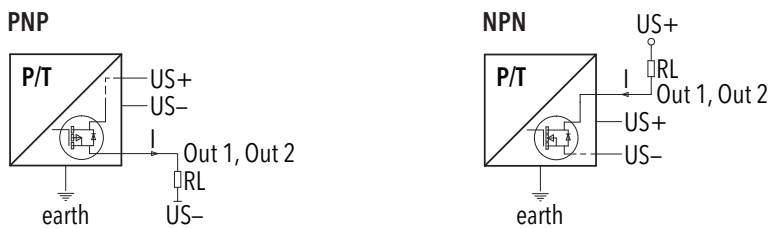
\*) Provided female electrical plug is mounted according to instructions

\*\*) Ventilation via male electric plug/cable end

## Functions switching output



## Switching output polarity



Connection of loads to switching output

### Additional information

#### Documents

Data sheet	<a href="http://www.trafag.com/H72621">www.trafag.com/H72621</a>
Instructions	<a href="http://www.trafag.com/H73621">www.trafag.com/H73621</a>
Flyer	<a href="http://www.trafag.com/H70621">www.trafag.com/H70621</a>
Interface description	<a href="http://www.trafag.com/H73664">www.trafag.com/H73664</a>
Accessories	<a href="http://www.trafag.com/H72258">www.trafag.com/H72258</a>