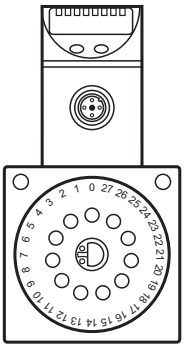
Operating instructions

Control unit

Part seat monitoring

PS7570

UK



11433189 / 00 04 / 2005

Contents

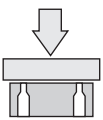
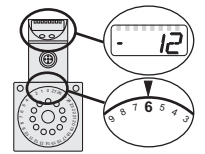
1 Safety instructions

Please read the product description prior to installing the unit.
Please check that the product is suitable for your application without any restrictions.
If the operating instructions or the technical data are not adhered to, personal injury and/or damage to property may occur.
Please check in all applications that the product materials (see Technical data) are compatible with the media to be measured.

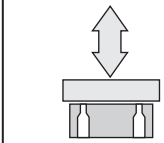
System pressure:
0.7 up to max. 1.5 bar (for optimum operation 1bar).
Set the pressure regulator to a pressure < 1.5 bar (150 kPa / 22 PSI) before you install the control unit.
Recommended quality class of the air supply (to DIN ISO 8573-1): class 2

UK

2 Brief instructions for setting the control unit

	Set the pressure regulator to a pressure < 1.5 bar (150 kPa / 22 psi) before you install the control unit. Activate the system pressure (0.7 bar up to max. 1.5 bar / for optimum operation 1 bar).
	Move the object towards the backpressure nozzle (up to the desired distance).
	Turn the setting dial until the smallest positive or negative pressure value is displayed. The displayed value can be taught as a switch point: Activate TSP1 / TSP2 and press the button on the right until the value is stored as switch point.

Optional (setting options for special conditions)



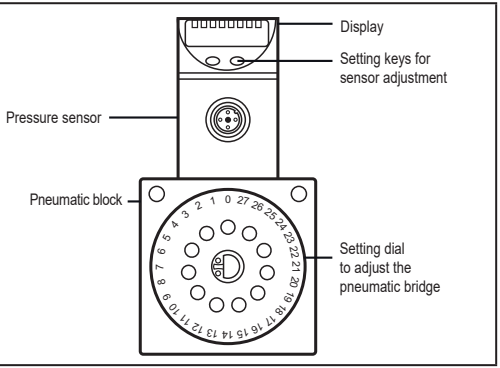
If different surface structures or varying clamping pressures can be expected in the process, there may be different values with the same gap.
Repeat the approach of the object with the requested "limit gap" several times, write down the displayed value for each end point, e.g. [- 8], [- 26], [- 18], [- 10].

Set the switch point (SPx) to the highest value so that reliable switching is ensured in any case (for the example above: to -8).
- Press the Mode/Enter button twice (SPx is displayed).
- Press and hold the Set button for more than 5 seconds until the requested value is displayed.
- Press the Mode/Enter button once (for confirmation).

If the output is to be safely reset (changing from "OK signal" to "BAD signal") in the event of a failure of the supply pressure (P-SUP = 0):
- Turn the setting dial until just below the value "-20" in the display, or
- set the switch point (SPx) to the value "-20" or smaller.

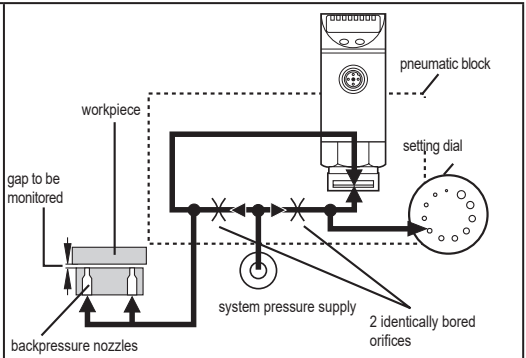
3 Function and features

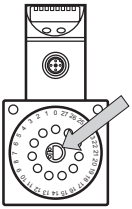
Distance monitoring by backpressure measurement



	The system monitors whether distances from 10 µm to approx. 400µm (max. approx. 700µm depending on the number and diameter of the backpressure nozzles and the measurement situation) are adhered to / exceeded. This enables reliable distance and part seat monitoring (e.g. monitoring of the position of a workpiece at its machining point).
Operating principle	• The pressure sensor in the pneumatic block measures the differential pressure of a pneumatic bridge, that is the difference between - backpressure on the nozzles (measuring distance) and - backpressure on the setting dial of the block (27 orifices to generate a reference pressure). • The sensor indicates the differential pressure and provides 2 GOOD /BAD output signals according to the set switch points (e.g. above /below the set distance).

4 Setting of the system

Operating principle: Pneumatic bridge circuit	

Setting of the pneumatic bridge:	1. Select gap distance: • Create real operating conditions (e.g. put the workpiece into the machining position); • or simulate backpressure by external micrometers with integrated nozzle. The external micrometers with integrated nozzle (nozzle diameter = 1.5 mm) are available under the order no. E30074. Other nozzle diameters on request. 2. Pull and turn the setting dial until the smallest positive or negative value is displayed. The differential pressure is then near 0 mbar. Because of the pneumatic bridge circuit the system functions to a large extent independently of fluctuations in the supply pressure after setting.
Electronic fine tuning (if required):	Adjust the setpoint when the gap distance is specified. There are 2 options: • Teach the switch point 1 and / or the switch point 2 (TSP1/ TSP2). Or: • Enter the displayed value (differential pressure) manually as switch point 1 and / or switch point 2.
Locking 	Mechanical securing of the setting dial: • Remove the snap ring. • Pierce the plastic cover (orange) in the middle of the setting dial and remove it. • Tighten the self-locking screw (to unlock: loosen the screw). • Insert a new plastic cover (supplied as accessory) and reinsert the snap ring. Electronic locking of the setting of the pressure sensor: → page 11.

5 Compressed air supply

Pneumatics	• Compressed air supply: 0.7 bar to max. 1.5 bar (70 kPa to max. 150 kPa / 10 psi to max. 22 psi); for optimum operation 1bar (100 kPa / 15 psi). Set the pressure regulator to a pressure < 1.5 bar (150 kPa / 22 PSI) before you install the control unit. • Air consumption: up to approx. 50l/min (depending on the number and size of the backpressure nozzles and on the gap distance). • Recommended quality class of the air supply (to DIN ISO 8573-1): class 2, for a short time class 4 - 5. • Particle size: approx. 1 µm • Oil content: approx. 1 mg / m³ • Water dew point: approx. -20 bis +3 °C The orifice system of the pneumatic bridge should be protected against deposits of any kind and against penetration of oil. The airduct system in the unit is designed in a way that when mounted properly particles and condensation are removed from the unit via the airflow. For the suitable mounting positions see → page 7. The standard mounting position (pneumatic block and sensor vertically) is preferred. The smaller the orifice / nozzle diameter used, the lower the flow velocity in the airduct system, the more care should thus be taken with the cleanness of the air to avoid deposits of any kind.

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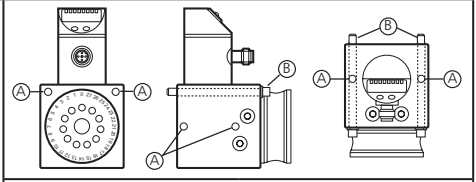
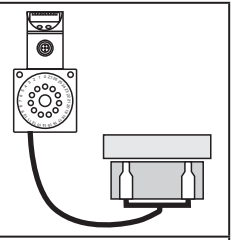
6 Installation of the control unit

Mounting holes for different mounting positions	 A = mounting holes for the included fastening screws (B). Scale drawing → page 19).

Mounting position

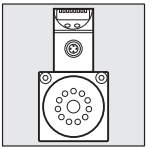
If possible, the mounting position of the unit should be above the backpressure nozzles to constantly eliminate condensation and particles in the compressed air system.



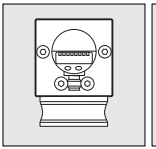
Installation environment

The unit must not be installed in a sealed housing / sealed control cabinet (the exhaust airflow at the setting dial must be allowed to vent).

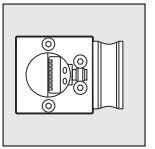
Mounting positions



Pressure sensor in vertical position = standard mounting position

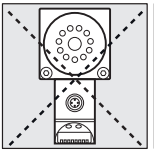


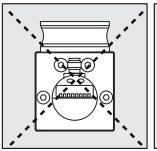
Pressure sensor in horizontal position, setting dial at the bottom

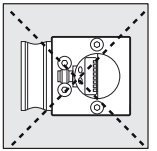


Pressure sensor in horizontal position, setting dial to the right

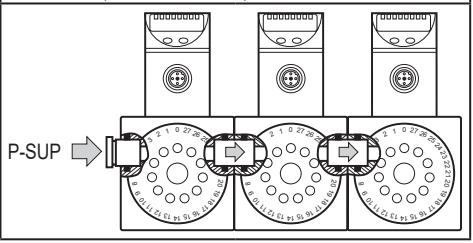
These positions are suitable for elimination of condensation and particles in the compressed air system.







These positions may yield bad results if dirt is in the compressed air supply. They should thus be avoided.

Connect blocks in series: (Observe the notes on page 16!)	• Open the supply pressure connections (P-sup), • supply the compressed air, • pass on the compressed air through the included tube connector (series connection).
	

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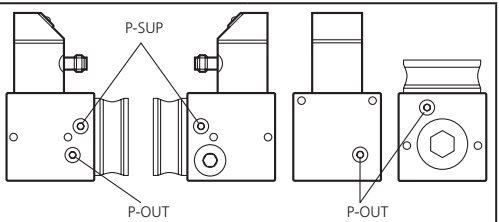
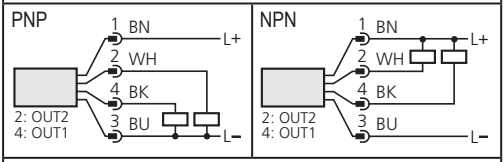
7 Preparations for set-up and installation

Connection of the pressure pipes P-SUP = supply pressure P-OUT = measuring distance (backpressure)	
Accessories for connection to compressed air tubes	Use connection elements with G1/8 standard thread and seal outside the thread by captive gasket (according to DIN ISO 228-1). Suitable connection elements are available as accessories: • G1/8 thread extension with gasket (order no. E30075). • QS-G1/8-6 push-in air fitting for tube with ø 6 mm (order no. E30076). • QS-G1/8-8 push-in air fitting for tube with ø 8 mm (order no. E30077). Please note: For self-locking threads with a teflon layer as sealing according to DIN 2999-1 / ISO 7-1 particles of the teflon seal could come off and soil the airways in the unit.

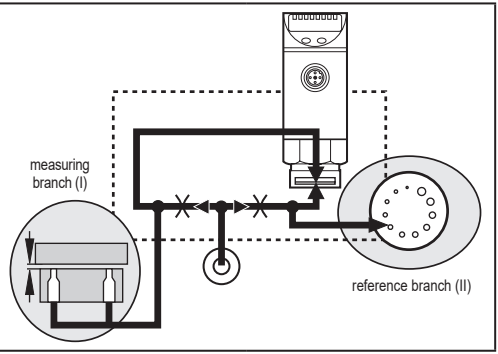
Electrical connection of the sensor

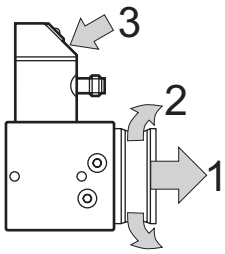
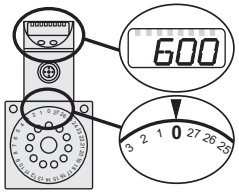
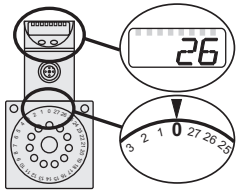
The unit must only be connected by an electrician.
The national and international regulations for the installation of electrical equipment must be observed.
Voltage supply to EN50178, SELV, PELV.
Disconnect power before connecting the unit.
Wiring:

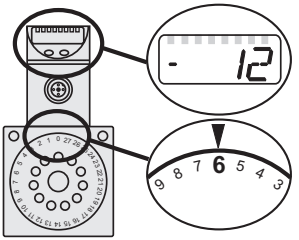
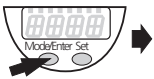
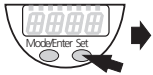
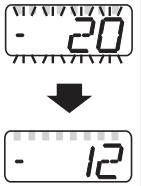
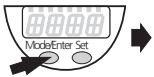


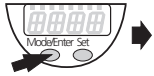
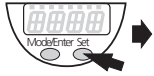
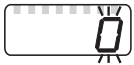
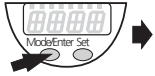
Core colours of ifm sockets:
1 = BN (brown), 2 = WH (white), 3 = BU (blue), 4 = BK (black)

8 Setting (adjustment of the pneumatic bridge)



Adjustment of the pneumatic bridge	Turn the setting dial (zero adjuster) until the smallest positive or negative value is displayed. Procedure: 1. Pull the dial until the end stop is reached. 2. Turn it to the required position and let it snap into place.	
Fine adjustment (optional)	Set the current differential pressure as switch point: Press the setting keys (3) (teach switch points or enter displayed value as switch point).	
The individual steps (example for 1 nozzle with ø = 2 mm):		
Step 1 **- no object at the** **- backpressure nozzle** **- pressure supplied (here: 700 mbar)**		- Measuring branch (I) fully open, complete airflow via backpressure nozzle. - Reference branch (II) closed (dial on position 0). → Pneumatic bridge imbalanced. Differential pressure is displayed (here: 600 mbar).
Step 2 **- object at backpressure nozzle here: 0.03 mm** **- dial closed**		- Measuring branch (I) with reduced airflow (backpressure exists). - Reference branch (II) without airflow (dial on position 0). → Pneumatic bridge imbalanced. Differential pressure is displayed (here: 26 mbar).

Step 3 **- Adjustment of the pneumatic bridge by turning the setting dial)**			- Pressure in the measuring and reference branches adjusted as far as possible, (here: dial on position 6). → The current differential pressure is displayed (here: -12 mbar).
Step 4 **- Fine adjustment (select current differential pressure as switch point)**			Press the Mode/Enter button until TSP1 is displayed
			Press the Set button and keep it pressed. The current setting is flashing inthe display for 5 s, then the currently measured value is displayed (here -12 mbar). As long as the Set button is pressed, the measured value is updated continuously, when it is released the value is retained. When the Set button is pressed again the new current measured value is displayed.
			Press the Mode/Enter button briefly (= acknowledgement). The unit adopts the currently measured value as switch point.

Optional	Setting of a tolerance range (-150 mbar...+150 mbar; if for example workpieces with different surfaces are machined):		
			Press the Mode/Enter button until TOL1 is displayed.
		  	Press the Set button and keep it pressed. The current setting is flashing in the display for 5 s then the value is increased* (incremental by pressing briefly or scrolling by holding pressed).
			Press the Mode/Enter button briefly (= acknowledgement). The parameter is displayed again, the new parameter value becomes effective.
For further setting options for the pressure sensor (→ page 12)	*Decrease the value: Let the display of the parameter value move to the maximum setting value. Then the cycle starts again at the minimum setting value.		

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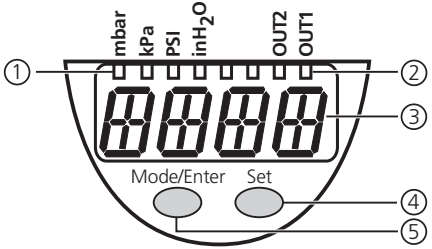
9 Technical information (pressure sensor)

Controls and visual indication of the pressure sensor



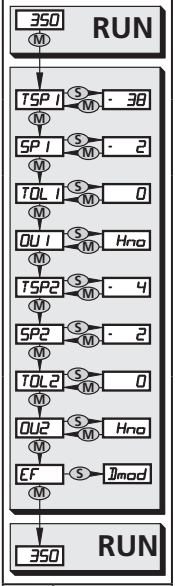
1	4 x LED green	llit LED = set display unit
2	2 x LED yellow	switching status; lights if the respective output has switched
3	4-digit alphanumerical display	display of the system pressure, display of parameters and parameter values
4	Set button	• The parameter names are scrolled with each pressing of the button Mode / Enter. • When button Set is pressed briefly, the corresponding parameter value is displayed for 15 s. • When the button Mode / Enter is pressed for > 5s, the current parameter value flashes for 5 s, then the value is increased (incremental by pressing briefly or scrolling by holding pressed). • When the button Mode / Enter is pressed briefly, the parameter is displayed again the set parameter value becomes effective.
5	Mode / Enter button	

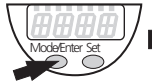
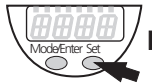
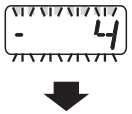
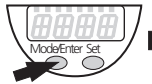
Faults displayed during operation:

OL	overload = (above measuring range of the sensor)
UL	underload = (below measuring range of the sensor)
SC 1	(flashing) = short circuit in the switching output 1*

	SC2	(flashing) = short circuit in the switching output 2*
	SC	(flashing) = short circuit in both switching outputs*
	Err	error during teaching of the switch points (fine adjustment)
	*The output concerned is switched off as long as the short circuit exists.	
Locking / Unlocking	The unit can be electronically locked to prevent unwanted adjustment of the set parameters: Press both setting buttons until Loc ais displayed. To unlock: Press both setting buttons until uLoc is displayed. Units are delivered from the factory in the unlocked state. With the unit in the locked state Loc iis indicated briefly when you try to change parameter values.	
Timeout	If no button is pressed for 15 s during the setting procedure, the unit returns to the Run mode with unchanged values.	

9.1 Technical information (pressure sensor)



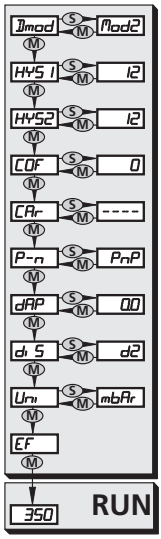
1			Press the Mode/Enter button several times until the respective parameter is displayed.
2			Press the Set button and keep it pressed. The current parameter value flashes for 5 s,
			then the value is increased* (incremental by pressing briefly or scrolling by holding pressed).
3			Press the Mode/Enter button briefly (= acknowledgement). The parameter is displayed again, the set parameter value becomes effective.
4	Change more parameters: Start again with step 1.		Finish programming: Wait for 15 s or press the Mode/Enter button until the current measured value is indicated again.

S	= Set button: set values
M	= Mode/Enter button: acknowledgement
M	= Mode/ Enter button: scrolling

*Decrease the value: Let the display of the parameter value move to the maximum setting value. Then the cycle starts again at the minimum setting value.

9.1.1 Adjustable parameters

TSP 1 TSP2	**Teach function for switch point 1 /switch point 2** When the Set button is pressed the current measured value is displayed; when it is released the value is retained. When the Set button is pressed again the new current measured value is displayed; when the Mode button is pressed it is stored as switch point.
SP 1 SP2	**Manual setting of witch point 1 / 2 (optional)** Upper limit value at which the output changes its switching status. The desired value is set by pressing the buttons. • Setting range: -800 ... +800 mbar, in steps of von 2mbar. • Display in mbar, PSI, kPa or in H_2O. The hysteresis is preset (12 mbar). It is in the positive range of the switch point, adapted to the features of the pneumatic system.
TOL 1 TOL2	**Tolerance value for switch point 1 / 2** Value by which the switch point can be shifted. • Setting range: -150 ... +150 mbar • in steps of 2mbar. • Display in mbar, PSI, kPa or in H_2O. For explanations see → page 14.
OU 1 OU2	**Switch functions of the switching outputs** 2 switching functions can be set: • Hno = hysteresis / normally open • Hnc = hysteresis / normally closed
EF	**Enhanced functions** This menu item contains a submenu with additional parameters. You can access these parameters by pressing the SET button briefly.



S	= Set button: set values
M	= Mode/Enter button: acknowledgement

Dmod

Display mode
3 settings can be selected:
Mod1 = displayed differential pressure.
Mod2 = displayed differential pressure, after locking: trend display of the gap (gap between the differential pressure and switch point 1).
Mod3 = in the Run mode the trend display of the gap is shown, when the Mode button is pressed: differential pressure is displayed for 15 s as numerical value in the set display unit.
Factory setting: Dmod = Mod2

Trend display:

-1 1	gap between the differential pressure and SP1 > 150 mbar
-- -1 1	gap decreasing
-- -- -1 1	
-- -- -- -11	SP1 switched

HYS 1
HYS2

Hysteresis for SP1 / SP2
The gap between the switch-on and switch-off points is set
- Setting range: 8...50 mbar.
- Default value: 12 mbar.

COF

Calibration offset
The internal measured value (operating value of the sensor) is offset against the real measured value.
- Setting range: -5...+5 % of the span,
- in steps of 0.1 % of the span.

M	= Mode/ Enter button: scrolling	CAr	**Calibration reset** Resets the calibration set by COF to the value set at the factory. - Press the "Mode/Enter" button until CAr is displayed. - Press the "Set" button and keep it pressed until "- - -" is displayed. - Then press the "Mode/Enter" button briefly.
		P-n	**Output polarity** 2 options can be selected: - PnP = positive switching - nPn = negative switching This setting applies to both switching outputs.
		dAP	**Damping for the switching outputs** Pressure peaks of short duration or high frequency can be filtered out. dAP-value = response time between pressure change and change of the switching status in seconds (s). • Setting range: 0 ... 4 s (0 = dAP is not active), • in steps of 0.01 s. Correlation between switching frequency and dAP: $f_{max} = \frac{1}{2 \times dAP}$
		di S	**Setting of the display** 7 options can be selected: d1 = update of the measured value every 50 ms d2 = update of the measured value every 200 ms d3 = update of the measured value every 600 ms The update interval only refers to the display. It has no effect on the outputs. rd1, rd2, rd3, = display as d1, d2, d3; rotated 180° OFF = In the Run mode the display of the measured value is deactivated. If one of the buttons is pressed, the current measured value is displayed for 15 s. If the Mode/ Enter button is pressed once again, the Display mode is activated. The LEDs remain active even if the display is deactivated. Setting at the factory: dis = d3.

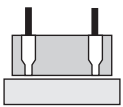
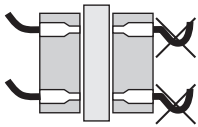
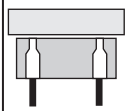
	Uni	**Display unit** The measured value and the values for TSPx, SPx, TOLx, HYSx can be displayed in the following units: mbAr (mbar), PSI, kPA (kPa), IH2O (= inH2O). Select the display unit before setting the the values for TSPx, SPx, TOLx, HYSx. This avoids rounding errors generated internally during the conversion of the units and enables exact setting of the values. Setting at the factory: Uni = mbAr.
TOL1 / TOL2 Changes in the roughness of the surface of the measured object	The switch point can be adapted to changes in the surface via the menu items TOL1/TOL2. The basic settings of the unit (bridge adjustment and values of the switch point) are not changed by this.	
	Please consider: $SP_{Real\ (TOL1\ /\ 2)}$ = SP1 / 2 + TOL1 / 2 Example: - SPx = -20 mbar - TOLx = 30 mbar → The unit switches at 10 mbar. The real switch point should be as near as possible to the value "0" (see page 5).	
Safe reset of the output	If the output is to be safely reset (changing from "OK signal" to "BAD signal") in the event of a failure of the supply pressure (P-SUP = 0): • Turn the setting dial until just below the value "-20" in the • display, or • set the switch point (SPx) to the value "-20" or smaller	

10 Technical information (pneumatic system)

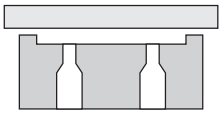
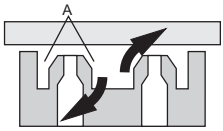
Rating of the measuring tubes	The response time of the system is mainly determined by the design of the pneumatic system. • The electronic pressure sensor reacts to changes in differential pressure within a fraction of a second. • However changes in pneumatic pressure are transferred with a time delay since air is compressible. **This means:** If a workpiece is placed on the backpressure nozzles, the pressure in the chamber of the pneumatic bridge is compressed (decompressed) until a balanced state is achieved. • Smaller air volume in the measuring system results in smaller flow resistance of the measuring tubes and smaller system pressure (primary pressure). • Therefore, the system can pass into the balanced state faster when • the backpressure has changed (gap), causing shorter response time. **So please note:** • Minimize the flow resistance of the measuring tubes (surface quality, cross-section changes, connections, etc.). • Ensure that all air connections are sealed. Leakage can result in a change of the measurement result. • The inside diameter of the measuring tubes should not be smaller than 4 mm. The response time of the system can be affected by different factors: - Number and diameter of the backpressure nozzles. - Detected gap. - Setting of the dial. - Position of the workpiece relative to the gap setting.

	Example: Standard tube with an inside diameter of 4 mm and 5 m length, 1 measuring nozzle with a diameter of 1.5 mm. • Fastest response time (when the measuring nozzle is completely closed): approx. 0.4 s. • The normal response time (selected gap slightly exceeded) can be max. double of this value. **Recommendation:** For a response time < 1 second a measuring tube with an inside diameter of 4 mm should not be longer than 6 m.
Supply pressure	During the measurement of the backpressure fast primary pressure fluctuations (< 1 Hz) should be avoided. Damping of the basic signal in the sensor (→ menu point dAP, page 13) can compensate for fast pressure fluctuations. However this can slightly change the response time. **So please note:** • Ensure a sufficient air supply (primary pressure). Recommendation: Cross-section of the tubes 6mm or higher. • Use a pressure regulator which should not be followed by any additional devices. Set the pressure regulator to a pressure < 1.5 bar (150 kPa / 22 psi) before you install the control unit.
Series connection	You can couple several blocks in series to detect several backpressure nozzles at the same workpiece. If you detect several workpieces using coupled pneumatic blocks, there should be a time interval between each detection to ensure stable pressure conditions in the primary pressure tube during the signal detection.
Recommendation for the backpressure nozzles	• Outlet of the nozzle bore hole should have a sharp edge. • Ratio of the length to diameter of the nozzle bore hole: 1.5 to 1. • Expanding the access bore hole to an angle of 120°. • Ratio of the diameter of the access bore hole to the diameter of the nozzle bore hole: 2.5 to 1.

Harsh operating conditions	Make sure that the coolant does not clog the backpressure nozzles. For the different mounting conditions please note the following: • Vertical arrangement of the backpressure nozzles, from the top into the machine section (figure 1). This arrangement is best to prevent the ingress of coolant into the backpressure nozzles even if the air supply is interrupted (unless the coolant is forced into the gap between the detection surface and the workpiece at a high pressure). • Horizontal arrangement of the backpressure nozzles, from the side into the machine section; the pipes should be inclined (figure 2) therefore allowing any ingress of coolant to drain from the nozzles when the air supply is interrupted. Attention: Do not allow the pipes to form a collection point for coolant (figure 2). • Vertical arrangement of the backpressure nozzles, from the bottom into the machine section (figure 3). Coolant may ingress into the backpressure nozzles when the air supply is interrupted and it may not be fully removed by the normal airflow. As an option, the connection of purging air to the backpressure nozzles is possible. While the contact surface is absent the backpressure nozzles are supplied with a higher air quantity (and possibly higher pressure). Attention: The purging air connected to the backpressure nozzles should not flow through the measuring block (the orifices of the measuring block are bypassed)! Ensure an automatic changeover in the measuring tube (e.g. using a valve, logic OR function, possibly combined with a backpressure valve) and simultaneously switch off the primary pressure supply at the measuring block.

1	2	3
		

Maximum measuring range	The measuring distance between backpressure nozzle(s) and workpiece / contact surface should not exceed a maximum distance. In general the following applies: $A_{max} \leq ¼$ diameter of the backpressure nozzle(s). The following reference values apply (determined under laboratory conditions):				
	Backpressure nozzles [ø in mm]	Number of nozzles / max. measuring range [mm]			
		1	2	3	4
	1,0	0,12	0,12	0,12	0,12
	1,1	0,30	0,30	0,30	0,30
	1,2	0,40	0,40	0,30*	0,20*
	1,3	0,50	0,40	0,25*	0,15*
	1,4	0,60	0,40	0,20*	0,10*
	1,5	0,70	0,40	0,20*	0,10*
	2,0	0,80	0,40	0,20*	0,10*
	*Air quantity limited by orifice in the measuring system				

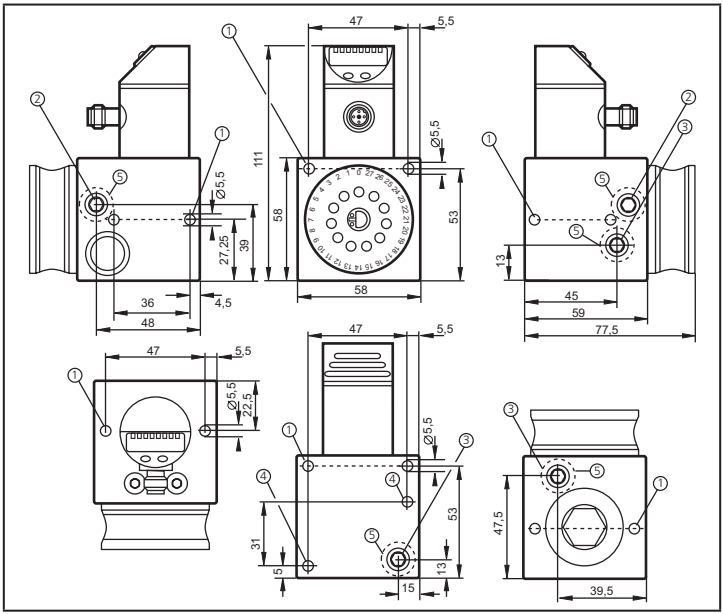
<table>
<tr><td>Minimum measuring range</td><td colspan="2">In case of very small gap distances / nozzle diameters please note:
• The air must be allowed to vent at the detection surfaces.
• The pressure change between the conditions "contact surface present" / "contact surface absent" must at least amount to 10...20 mbar.
• The hysteresis set for the pressure sensor must be inferior to the pressure change between "contact surface present" and "contact surface absent".
For the detection of gap distances of less than 0.03mm the following may be advisable.
• Relocate the openings of the nozzles backwards by 0.02 ... 0.05 mm (fig. 4).
• Ensure sufficient space surrounds the nozzle openings (fig. 5). Attention: Airflow should be possible, the coolant should not be pressed into the backpressure nozzles.</td></tr>
<tr><td></td><td>4</td><td>5</td></tr>
<tr><td>A: nozzle surround</td><td>  </td><td> 
</td></tr>
</table>

11 Technical data

Technical data pressure sensor	Operating voltage [V] ..... 20...32 DC Current consumption [mA] ..... < 60 Current rating [mA] ..... 250 Short-circuit prot., reverse polarity prot. / overload prot., watchdog Voltage drop [V] ..... < 2 Power-on delay time [s] ..... 0,2 Min. response time switching outputs [ms] ..... 3 Switching frequency [Hz] ..... 170...0,125
	Accuracy / deviations (in% of the span)[1)] - Accuracy of switch point ..... < ± 0,5 - Characteristics deviation (inearity, incl. hysteresis and repeatability) [2)] ..... < ± 0,6 - Linearity ..... < ± 0,5 - Hysteresis ..... < ± 0,1 - Repeatability (with temperature fluctuations < 10K) ..... < ± 0,1 - Long-time stability (in% of the span per year) ..... < ± 0,1 - Temperature coefficients (TEMPCO) in the compensated temperature range 0 ... +80°C (in% of the span per 10 K) - greatest TEMPCO of the zero point ..... < ± 0,1 - greatest TEMPCO of the span ..... < ± 0,2
	Materials (wetted parts)..stainless steel (303S22); ceramics; FPM (Viton) Housing material.....stainless steel (304S15); PC (Macrolon); Pocan; .....PA; FPM (Viton); EPDM/X (Santoprene) Protection ..... IP 65, III Insulation resistance [MΩ] ..... > 100 (500 V DC) Shock resistance [g] .....50 (DIN / IEC 68-2-27, 11 ms) Vibration resistance [g] .....20 (DIN / IEC 68-2-6, 10 - 2000 Hz) Switching cycles min. ..... 100 Millionen Operating temperature [°C] .....-25...+80 Medium temperature [°C] .....-25...+80 Storage temperature [°C] .....-40...+100 EMC IEC 1000 / 4 / 2 ESD:.....4 / 8 KV IEC 1000 / 4 / 3 HF radiated::: .....10 V / m IEC 1000 / 4 / 4 Burst:.....2 KV IEC 1000 / 4 / 4 Surge: .....0,5 / 1 KV IEC 1000 / 4 / 6 HF conducted::.....10 V
	1: all indications are referred to a turn down of 1:1 2: limit value setting to DIN 16086

Technical data pneumatic block	Material..... aluminium (AlCuMgPbF38) .....brass (MS58) .....nickel-plated steelt .....stainless steel (304S15) ..... FPM (VITON) .....NBR Shock resistance [g].....5 (DIN / IEC 68-2-27, 11 ms) Vibration resistance [g].....5 (DIN / IEC 68-2-6, 10 - 2000 Hz)

12 Scale drawing



1	Mounting hole
2	Supply pressure (P-SUP) 1/8" thread for push-in air fitting (→ accessories 1); thread recessed for coupling sleeve (→ accessories 2), ø 15 mm, length 10 mm, integrated O-ring for coupling sleeve
3	Measuring branch (P-OUT) 1/8" thread for push-in air fitting (→ accessories 1), thread recessed for coupling sleeve (→ accessories 2) ø 15 mm, length 10 mm
4	Thread M5
5	5 Sealing chamfer

Accessories 1:	Push-in air fitting for tubes diameter 6 mm (available as accessories, order no. E30076), push-in air fitting for tubes diameter 8mm (order no. E30077), thread extensions (E30075).
Accessories 2:	Coupling sleeves (supplied as accessories).