

# Pressure switch P01

## Sensors

### KEY FEATURES

- Compact and robust design for use in harsh environments
- Pressure switch for mobile hydraulics, alternative drives (H<sub>2</sub>, CNG, LPG) and industrial sectors
- Maximum flexibility through modular design, customization and individualization possible
- Designed for OEM needs
- With ECE type approval
- UL-Listed

### TECHNICAL DATA

- Pressure ranges from 0...10 bar to 0...1200 bar (relative)
- Overload pressure at least 2X nominal pressure
- Media temperatures up to 150 °C / 302 °F
- Ingress Protection Rating up to IP6K9K
- NPN and PNP output available

### ACCESSORIES

- Optional setup interface available

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## TECHNICAL DATA

Pressure range, gauge	0 ... 10 bar to 0 ... 1200 bar, other ranges available						
Standard pressure range	25 bar	50 bar	100 bar	250 bar	400 bar	800 bar	1200 bar
Overload (per DIN EN 60770-1)	40 bar	100 bar	200 bar	500 bar	800 bar	1000 bar	1600 bar
Bursting pressure (per DIN EN 60770-1)	70 bar	500 bar	1000 bar	2500 bar	4000 bar	> 4000 bar	> 4000 bar
Linearity, pressure hysteresis and repeatability	< 0.5 % FS						
Switch point accuracy	$\leq 1,0\% \text{ FS } (0 \dots +80 \text{ }^\circ\text{C}) / (+32 \dots +176 \text{ }^\circ\text{F})$ $\leq 1,5\% \text{ FS } (-25 \dots 0 \text{ }^\circ\text{C and } +80 \dots +100 \text{ }^\circ\text{C}) / (-13 \dots +32 \text{ }^\circ\text{F and } +176 \dots +212 \text{ }^\circ\text{F})$ $\leq 2,5\% \text{ FS } (-40 \dots -25 \text{ }^\circ\text{C and } +100 \dots +125 \text{ }^\circ\text{C}) / (-40 \dots 13 \text{ }^\circ\text{F and } +212 \dots +257 \text{ }^\circ\text{F})$						
Long term stability	< 0,2 % FS p.a.						
Media temperature	-40 ... +150 °C / -40 ... +302 °F						
Operating temperature	-40 ... +125 °C / -40 ... +257 °F						
Storage temperature	-40 ... +125 °C / -40 ... +257 °F						
Voltage supply	9 ... 36 VDC (allowable ripple @ 50 Hz: 10%)						
Output signal	1x PNP, 2 x PNP, 1x NPN, 2 x NPN (Output current up to 500 mA)						
Electronical protection	Short circuit protected, signal on GND/VCC and inverse-polarity protection						
Electrical connection	M12 connector, DIN-Bayonet (per DIN 72585), DT04-3P, AMP Superseal 1.5; Cable output, other connectors on request						
Pressure connection	G 1/4, 1/4 NPT, G 1/4 with manometer, SAE04 (7/16-20UNF), SAE06 (9/16-18UNF), other pressure connectors on request, possible limitations of the pressure range						
Protection class	IP67 or IP6K9K (depends on the electrical connection)						
Installation torque	up to 35 Nm						
Material with medium contact	Stainless Steel AISI 630 (DIN EN 1.4542), AISI 316 L (DIN EN 1.4435) on request						
Material housing	AISI 304 (DIN EN 1.4301)						
Material connector	PBT-GF30						

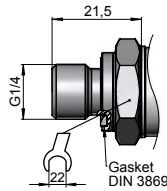
### Functional safety

Pressure switch P01	Acc. DIN EN ISO 13849-1: Performance Level b Cat. = B $\text{MTTF}_d = \text{High}$ DC = None CCF = Not relevant
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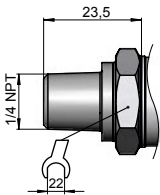
# TECHNICAL DRAWINGS AND PIN ASSIGNMENTS

## Pressure connection

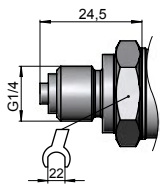
G 1/4, DIN 3852 T 11  
(Form E)



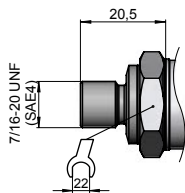
1/4 NPT per „Nominal width for US-standard bevelled pipe thread NPT“



G 1/4 according to EN837-1  
(formerly DIN 16288)

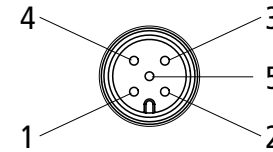
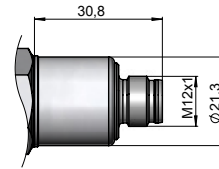


SAE04 - O-Ring



## Electrical connection Protection class IP per IEC 60529

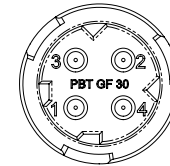
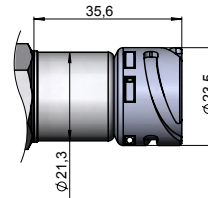
Circular plug-in connector  
M12x1, 5-pole, IP67



Pin	1 Output	2 Outputs
1	VCC	VCC
2	-	OUT2
3	GND	GND
4	OUT	OUT
5	-	-

Do not connect the pins marked with „-“!

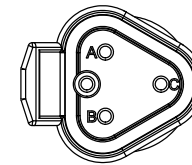
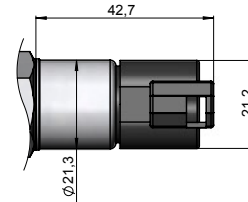
Bayonet connector  
DIN 72 585, 4-pole, IP67



Pin	Function
1	VCC
2	OUT
3	GND
4	-

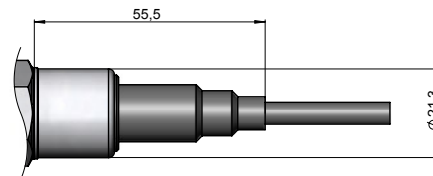
Do not connect the pins marked with „-“!

Connector DT04-3P  
3-pole, IP67



Pin	Function
A	VCC
B	GND
C	OUT

Cable output IP69K  
(Oil-resistant cable on request)



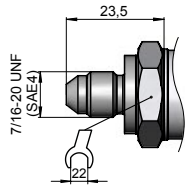
Litz wire	1 Output	2 Outputs
brown	VCC	VCC
white	-	OUT2
blue	GND	GND
black	OUT	OUT
grey	-	-

Do not connect the litz wires marked with „-“!

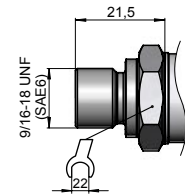
# TECHNICAL DRAWINGS AND PIN ASSIGNMENTS

## Pressure connection

SAE04 - Cone

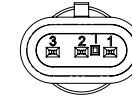
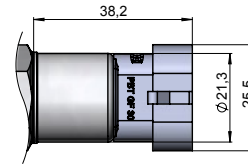


SAE06 - O-Ring



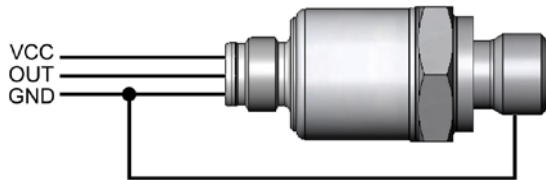
## Electrical connection Protection class IP per IEC 60529

Connector for AMP  
Superseal 1.5  
3-pole, IP67



Pin	Function
1	GND
2	OUT
3	VCC

## Recommended terminal layout



# QUALIFICATION

Certification	CE E1: All vehicle types with a 12V resp. 24V - electrical wiring and battery (-) at the body	
<b>Environmental Conditions</b>	<b>(Functional test at the beginning and the end, opt. between the tests)</b>	<b>Requirements</b>
EMC industrial (CE)	RF Emission 150 kHz to 30 MHz conducted, 30 MHz to 1GHz, group 1 class B	EN 61000-6-3 residential, commercial and light-industrial environments
	Electromagnetic immunity	EN 61000-6-2 industrial environments
	ESD: 330 $\Omega$ / 150 pF; contact: +/-4 kV, air: +/-8 kV	EN 61000-4-2
	RF immunity: 80 - 2700 MHz, 10 V/m, 3 m, hor./vert.	EN 61000-4-3
	Burst: 5/50 ns, 5 kHz; signal wire.: +/-1 kV, power supply wire: +/-2 kV	EN 61000-4-4
	Surge: 1,2/50 $\mu$ s; symm., asymm.: +/-0,5 kV	EN 61000-4-5
	Conducted. RF immunity: 0,15-80 MHz, 10 V, 80 %AM sine 1 kHz	EN 61000-4-6
FCC, 47 CFR Part15, Subpart B	Equivalent to FCC Docket 92-152	Confirmation
EMC automotive	RF emission 150 kHz to 3 GHz, 1m, 120 kHz bandwidth	DIN EN 55025:2003-11, IEC/CISPR 25:2002
	RF immunity: stripline: 0,01MHz - 400 MHz, 200 V/m, 80 %AM sine with 1 kHz; antenna: 400 MHz - 2 GHz, 50 V/m, PM tON, 577 $\mu$ s, period 4600 $\mu$ s	ISO 11452-5:2002-04, ISO 11452-2:2000-03
	Road vehicles, electrical disturbances, test pulse (power supply wires):	ISO 7637-2:2004-09
	<ul style="list-style-type: none"> <li>• Pulse 1: -600 V, 5000 pulses</li> <li>• Pulse 2a: +50 V, 5000 pulses, 2 <math>\Omega</math></li> <li>• Pulse 2b: +20 V, 10 pulses</li> <li>• Pulse 3a: -200 V, 1h</li> <li>• Pulse 3b: +200 V, 1h</li> <li>• Pulse 4: -16 V, 2 pulses</li> <li>• Pulse 5: 62 V, 400 ms, 2 <math>\Omega</math>, 1 pulse</li> </ul>	
	Road vehicles, electrical disturbances, test pulses (data wires):	ISO 7637-3:1995-07
	<ul style="list-style-type: none"> <li>• Pulse a: -80 V, 1h</li> <li>• Pulse b: +80 V, 1h</li> </ul>	
	Electrostatic discharge; 2 k $\Omega$ /330 pF, 2 k $\Omega$ /150 pF; kontakt: +/-8 kV, air: +/-15 kV	ISO 10605:2001-12
	Packaging and handling (contact: +/-8 kV)	ISO 10605:2001-12

# QUALIFICATION

Environmental Conditions	(Functional test at the beginning and the end, opt. between the tests)	Requirements
Climatic and mechanical tests	Temperature range	-40 ... +125°C (-40 ... +257°F)
	Thermal-cycling test na: -40°C and +125°C (-40°C and +257°F); 10 cyc.; retaining of limit temperature for 1h; temperature change rate 30 sec., active	DIN EN 60068-2-14:2000-08
	Thermal-cycling test na: -50°C and +125°C (-58°C and +257°F); 216 cyc.; retaining of limit temperature for 0,5 h; temperature change rate 30 sec., passiv	DIN EN 60068-2-14:2000-08
	Thermal-cycling test nb: -40°C und +125°C (-40°C and +257°F); 10 cyc.; retaining of limit temperature for 1h; temperature change rate 3K/min., active	DIN EN 60068-2-14:2000-08
	Cold test -40°C (-40°F), duration: 96 h, active	DIN EN 60068-2-1:1995-03
	Dry heat +125°C (+257°F), duration: 96 h, active	DIN EN 60068-2-2 :1994-08 DIN EN 60068-2-2/A2 :1995-01
	Damp heat, steady state: 21 days at +40°C (+104°F) and 96 % r.F.	DIN EN 60068-2-78:2002-09
	Damp heat cyclic +25°C (+77°F) to +55°C (+131°F); at 96 % r.F.; 6 cycles each 24 h, active	DIN EN 60068-2-30:2000-02 DIN 50016:1962-12
	Free fall: 1 m free fall on iron plate, 6 axes	DIN EN 60068-2-32:1995-03
	Degree of protection (water/dust) IP67 and IP69K; depending on connector type	DIN EN 60529:2000-09 DIN 40050-9:1993-05
	Vibration (sinusoidal) 20 g, test with temperature variation, 5-2000-5 Hz, 1 oct/min., -40 ... +125°C (-40 ... +257°F), 3 K/min, tv=15 min, tw=60 min, 2 temp.cycles/axis (->3x5h)	DIN EN 60068-2-6 DIN EN 60068-2-14Nb
	Shock: 50 g / 11 ms; sine; 3 shocks per axis; not active	DIN EN 60068-2-27:1995-03
	Shock 500 g, 1-2 ms, 18 shocks, 6/axis	DIN EN 60068-2-27:1995-03
	Bump: 30 g / 6 ms, sine, 1000 bumps per axis	DIN EN 60068-2-29:1995-03
	Salt mist, cyclic (sodium chloride solution): 5 % NaCl, 4 cycles a 24 h, 35°C (95°F), 2 h/22 h	DIN EN 60068-2-52:2000-02
	Immersion and splash: gasoline, diesel, degreaser, antifreezing agent, afterwards drying at +125°C (+257°F) for 48 h	SAE J 1211 part 4.4:1978-11
	chemical resistance: diesel, motor oil, hydraulic oil, gear oil, bio-diesel, E10, urea „Caelo“ afterwards drying at +70°C (+158°F) for 48 h	ISO 16750-5
	Ice-water shock test	ISO16750-4
	Flowing mixed gas corrosion test: sulfur dioxide SO2, hydrogen sulfide H2S, nitrogen dioxide NO2, chlorine Cl2	DIN EN 60068-2-60 (16750-4)

# ORDER CODES

model			pressure range				unit			reference	output		pressure connection		electrical connection		
<b>P</b>	<b>0</b>	<b>1</b>	-					-				-			-		
									<b>R</b> gauge	<b>1 0</b> 1 x PNP	<b>0 1</b> G 1/4"	<b>0 1</b> M12 (plastic)					
									<b>p s i</b>	<b>1 1</b> 2 x PNP	<b>0 4</b> 1/4" NPT	<b>0 4</b> bayonet mount (DIN 72585)					
										<b>1 2</b> 1 x NPN	<b>0 8</b> G 1/4" with manometer	<b>0 5</b> AMP Superseal 1.5					
										<b>1 3</b> 2 x NPN	<b>0 9</b> SAE04 (7/16-20 UNF with cone)	<b>0 6</b> cable (2 m)					
										...	<b>1 0</b> SAE04 (7/16-20 UNF with o-ring)	<b>0 7</b> cable (5 m)					
										<b>9 9</b> custom specific	<b>1 1</b> SAE06 (9/16-18 UNF with o-ring)	<b>0 8</b> cable (custom specific length)					
											...	<b>1 0</b> DT04 3-pole					
											<b>9 9</b> custom specific	...					
												<b>9 9</b> custom specific					