FIPA System monitoring

Vacuum and pressure switches

> Regulation and monitoring of vacuum circuits
> High degree of user flexibility thanks to models with digital, analogue, pneumatic or mechanical controls
> See next page for overview

> See page 691

Vacuum and pressure gauge

> Visual monitoring of vacuum circuits
> Analogue or digital display

> See page 696

FIPA System monitoring - Overview

	Item no.	Page	Vacuum and pressure switches						
			Product	Special applications	Signal output	Hysteresis	Protection class	Operation	Display
	20.002	687	Vacuum switch - pneumatic	No electrical connection required	1 x pneumatic	120 mbar	--	Adjustment screw	--
	20.011	686	Vacuum switch - electromechanical	NO/NC change-over contact function, for example for controlling solenoid valves	1 x electric, 250 V max.	6 % from switching point	IP65		
	20.007	688	Vacuum switch - electronic with analogue output	Monitoring of the continuous vacuum trend	1 x 1-5 V	0 - 30 % from switching point	IP50		
	20.040	689	Mini vacuum switch with digital output	Vacuum measurement at vacuum cup or ejector, Switch freely rotatable after mounting	1 x PNP	3 % from switching point	IP 40		Red LED
	20.041	689			1 x NPN				
	20.020	690	Vacuum switch - electronic with analogue and digital output	Switch freely rotatable after mounting	1 x PNP 1 x 1-5 V	freely programma-ble	IP65	Keys	Yellow LED
	20.021	691	Vacuum switch with two digital outputs	Monitoring of a pressure range possible, Switch freely rotatable after mounting	2 x PNP			Keys with menu navigation	Red / green LED 7-segment
	20.022	691		Round design, Monitoring of a pressure range possible, Switch freely rotatable after mounting					
	20.023	695	Pressure switch - electronic with two digital outputs						
	20.035	692	Vacuum switch - electronic with two digital outputs and analogue output	Monitoring of two switching points (digital) as well as of the continuous vacuum trend (analogue)	2 x PNP 1 x 1-5 V		IP40		
	20.036	692			2 x NPN 1 x 1-5 V				
	20.026 / 20.027	694	Vacuum pressure switch - electronic with two digital outputs	Small design Monitoring of a pressure window possible, 20.027 with plug-in connection for ejector or tubing line	1 x PNP		IP65	Self-learning via connection cable, PC or preset	Red / green LED

Vacuum switch - electromechanical

With NO/NC function for DC- and AC-connection

Product Description

> An electrical signal is triggered when set vacuum value is reached
> Switching point set via setscrew
> Hysteresis is fixed
> Standard vacuum connnection via galvanised steel G1/8 screw-in port
> Long service life due to high quality, robust design
> Can be mounted in any position

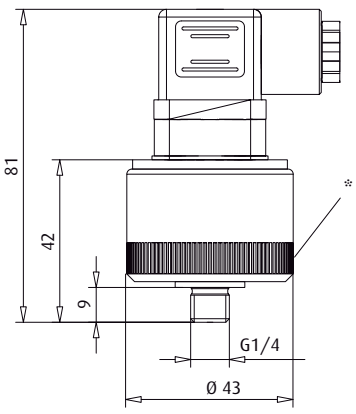
Ordering notes

> If desired the switching point can be preset

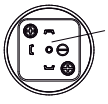
Technical data

Item no.	20.011
Adjustable range [mbar]	20 - 800
Hysteresis	6 % switch point
Switching capacity DC up to 28 V [A]	max. 2
Switching capacity AC up to 250 V [A]	max. 2
Max. switching frequency [Hz]	200
Protection class	IP65
Suitable media	Filtered, oiled or unoiled air or neutral gases
Operating temperature [°C]	-25 - 85
Weight [g]	120

Dimensions



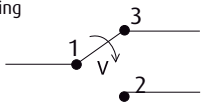
Electrical connection / changeover contact



Setting screw
M3 DIN 914

1. Completely screw in with hex-wrench
2. Apply switching vacuum
3. Ease screw until contact toggles

Wiring



* = Knurled screw

Vacuum switch - pneumatic

NEW

Product Description

> Switch outputs a pneumatic signal when the set vacuum level is reached
> No electrical connection required
> Usable as switch element for pneumatic valves

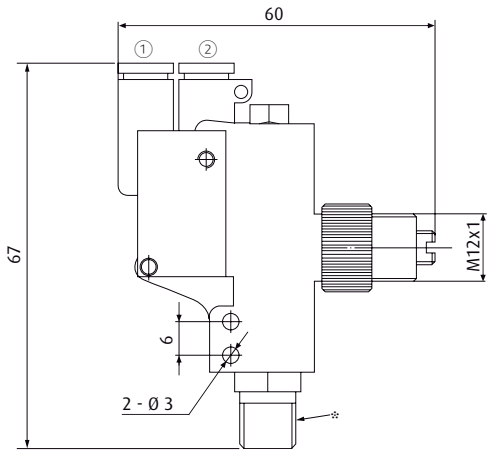
Notes

> Vacuum switch 20.002 is part of the air-saving function for multi-chamber ejectors 65.340-LSE to 65.390-LSE

Technical data

Item no.	20.002
Adjustable range [mbar]	-950 - -150
Hysteresis [mbar]	120
Operating pressure [bar]	1.5 - 8
Operating principle	NC
Repeat accuracy [%]	± 5
Suitable media	Dry, unoiled air and non-abrasive gases
Operating temperature [°C]	10 - 60
Weight [g]	44

Dimensions



① = Compressed air inlet, quick fitting Ø 4 mm ② = Compressed air output, quick fitting Ø 4 mm ※ = G1/8-male

Vacuum switch - electronic with analogue output

Product Description

> Analogue output enables monitoring of the continuous vacuum trend
> Compact and light design for installation directly on the vacuum cup
> LED display in plug connection

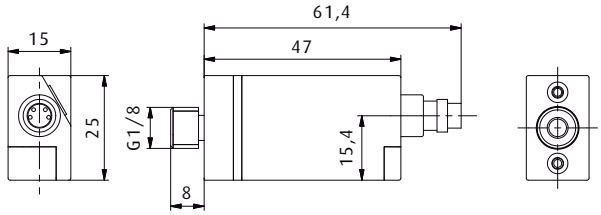
Notes

> As an option: Mounting rail 20.008-H incl. channel nut for mounting the vacuum switch, e.g. on FIPA SLine extrusions

Technical data

Item no.	20.007
Adjustable range [mbar]	-999 - 0
Hysteresis	0 - 30 %
Analogue output [VDC]	1 - 5
Switching logic	Contact breaker (NC)
Response time [ms]	< 5
Thermal error	± 3 % from measuring range
Overpressure safety [bar]	3
Supply voltage [VDC]	18 - 30
Current consumption [mA]	< 20
Protection class	IP50
Suitable media	Dry, unoiled air and non-abrasive gases
Operating temperature [°C]	0 - 50
Weight [g]	85
Electric connection	Plug M8x1, 4-pin
Suitable accessories	Mounting rail 20.008-H Connector cable 20.501 (p.717) Connector cable 20.502 (p.717)

Dimensions



Mini vacuum switch - electronic with digital output

Example: Mini vacuum switch 20.040 on ejector EBA.08H.2-A and flat vacuum cup Ø 40 mm

Product Description

> Switch outputs a digital signal when a specific vacuum level is reached
> Vacuum level is manually set with a potentiometer screw
> Hysteresis is fixed
> Red LED indicates set level reached
> Space-saving installation on ejectors thanks to very small design

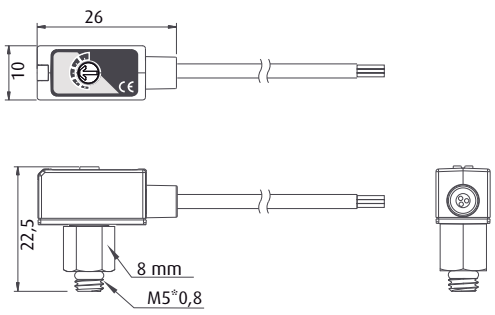
Ordering notes

> Included in scope of delivery: Cable 1.5 meter, 3-pole, open wire

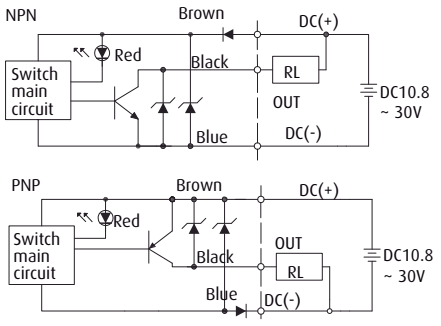
Technical data

Item no.	20.040	20.041
Adjustable range [mbar]	-990 - 0	-990 - 0
Hysteresis	3 % from default setting	3 % from default setting
Digital switching outputs	PNP	NPN
Response time [ms]	~ 1	~ 1
Repeat accuracy [%]	≤ ± 1 % from measuring range	≤ ± 1 % from measuring range
Overpressure safety [bar]	2	2
Supply voltage [VDC]	10.8 - 30	10.8 - 30
Max. Current consumption [mA]	10	10
Vacuum connection	M5	M5
Protection class	IP40	IP40
Suitable media	Filtered, oiled or unoiled air or neutral gases	Filtered, oiled or unoiled air or neutral gases
Operating temperature [°C]	0 - 60	0 - 60
Weight [g]	20	20

Dimensions



Wiring diagrams



Vacuum switch - electronic with analogue and digital output

Product Description

> Monitoring of vacuum levels e.g. in handling systems
> Intelligent sensor with "teaching" feature
> Suitable for all vacuum levels due to flexible setting of switching point and hysteresis
> Small and robust
> Easy operation
> Protection class IP65 (no ventilation tube required)
> Flexible mounting: Control panel can be rotated 360° after installation

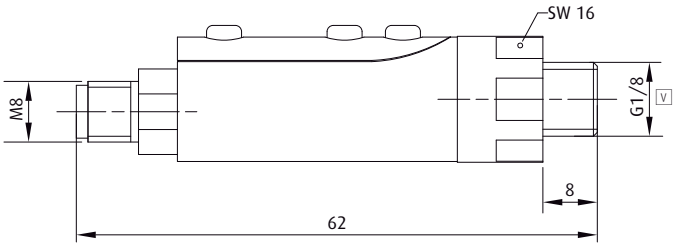
Notes

> Transient emissions: EN 61000-6-4:2007; EN 61326-2-3:2006
> Interference resistance: EN 61000-6-2:2005; EN 61326-2-3:2006

Technical data

Item no.	20.020
Measuring range [bar]	-1 - 0
Digital switching outputs	1x PNP (NO or NC)
Analogue output [V]	1 - 5
Repeat accuracy [%]	± 0.2 % from measuring range
Overpressure safety [bar]	6
Supply voltage [VDC]	11 - 30
Current consumption [mA]	< 25
Maximum switching current [mA]	125
Electric connection	Plug M8x1, 4-pin
Protection class	IP65
Suitable media	Dry, unoiled air and non-abrasive gases
Operating temperature [°C]	0 - 50
Weight [g]	20
Suitable accessories	Connector cable 20.501 (p.717), Connector cable 20.502 (p.717), Adapter 20.511 (p.698), Adapter 20.523 (p.698), Adapter 20.522 (p.698), Wall clip 20.520 (p.700)

Dimensions



V = Vacuum connection

Vacuum switch - electronic with two digital outputs and display

Product Description

> Monitoring of vacuum levels, e.g. in handling systems
> Optimisation of cycle times to improve the economy of vacuum systems
> Two freely adjustable digital outputs to set lower and upper threshold values
> Additional analogue output
> 7-segmet LED-display
> Protection class IP65 (no ventilation tube required)
> Integrated reverse voltage protection
> Compact, lightweight and robust design
> Flexible mounting: 20.021 can be rotated 360° after installation

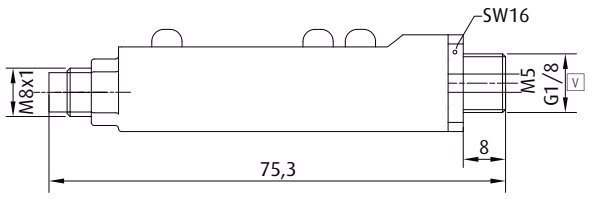
Notes

> Transient emissions: EN 61000-6-4:2007; EN 61326-2-3:2006
> Interference resistance: EN 61000-6-2:2005; EN 61326-2-3:2006
> Vacuum values can be displayed and adjusted by the customer in following units: MPa, bar, inHg, mmHg

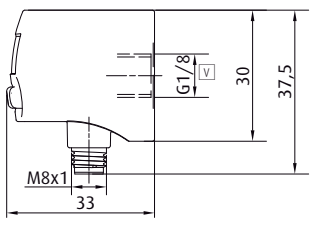
Technical data

Item no.	20.021	20.022
Measuring range [bar]	-1 - 0	-1 - 0
Digital switching outputs	2x PNP (NO or NC)	2x PNP (NO or NC)
Repeat accuracy [%]	± 0.2 % from measuring range	± 0.2 % from measuring range
Overpressure safety [bar]	6	6
Supply voltage [VDC]	11 - 30	11 - 30
Current consumption [mA]	< 55	< 55
Maximum switching current [mA]	125	125
Electric connection	Plug M8x1, 4-pin	Plug M8x1, 4-pin
Protection class	IP65	IP65
Suitable media	Filtered, oiled or unoiled air or neutral gases	Filtered, oiled or unoiled air or neutral gases
Operating temperature [°C]	0 - 50	0 - 50
Weight [g]	25	45
Suitable accessories	Connector cable 20.501, 20.502 (p.717), Adapter 20.522, 20.523, 20.511 (p.698), Wall clip 20.520 (p.700)	Connector cable 20.501, 20.502 (p.717), Mounting bracket 20.514 (p.699), Mounting bracket 20.515 (p.699)

Dimensions



20.021



20.022

V = Vacuum connection

Vacuum switch - electronic with two digital outputs and analogue output

Product Description

> Monitoring of vacuum levels, e.g. in handling systems
> Optimisation of cycle times to improve the economy of vacuum systems
> Two freely adjustable digital outputs to set lower and upper threshold values
> Analogue output for continuous monitoring of vacuum level
> Stable measurement even with short fluctuations of the supply pressure due to anti-chattering function
> 7-segmet 3 digit LED display
> Integrated reverse voltage protection
> Compact and lightweight design

Notes

> Vacuum values can be displayed and adjusted by the customer in following units: kPa, kgf/cm², bar, psi, inHg, mmHg

Ordering notes

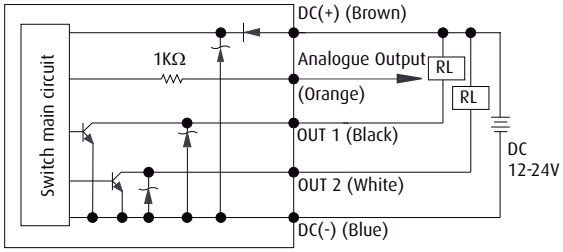
> Connector cable 0.3 meter with plug (M12 5-pin, straight) included in delivery
> Connector cable optional
20.508: M12, 5-pin, straight, open wires, 2 m
20.509: M12, 5-pin, 90°, open wires, 2 m

Technical data

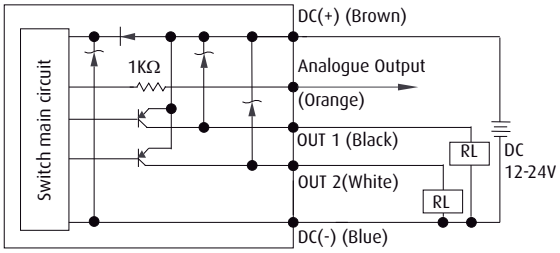
Item no.	20.035	20.036
Measuring range [bar]	-1 - 0	-1 - 0
Digital switching outputs	2 x PNP	2 x NPN
Analogue output [V]	1 - 5	1 - 5
Repeat accuracy [%]	≤ ± 0.2 % from measuring range	≤ ± 0.2 % from measuring range
Overpressure safety [bar]	3	3
Supply voltage [VDC]	10.8 - 30	10.8 - 30
Current consumption [mA]	≤ 55	≤ 55
Maximum switching current [mA]	80	80
Electric connection	Plug M12x1, 5-pin	Plug M12x1, 5-pin
Protection class	IP40	IP40
Suitable media	Dry, unoiled air and non-abrasive gases	Dry, unoiled air and non-abrasive gases
Operating temperature [°C]	0 - 50	0 - 50
Weight [g]	35	35
Suitable connector cable	20.508 (p.717) 20.509 (p.717)	20.508 (p.717) 20.509 (p.717)

Wiring diagrams

20.035 (NPN)

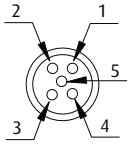


20.036 (PNP)



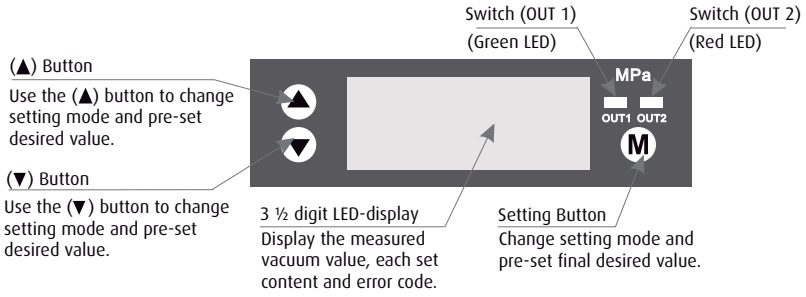
Plug assignment

20.035 and 20.036

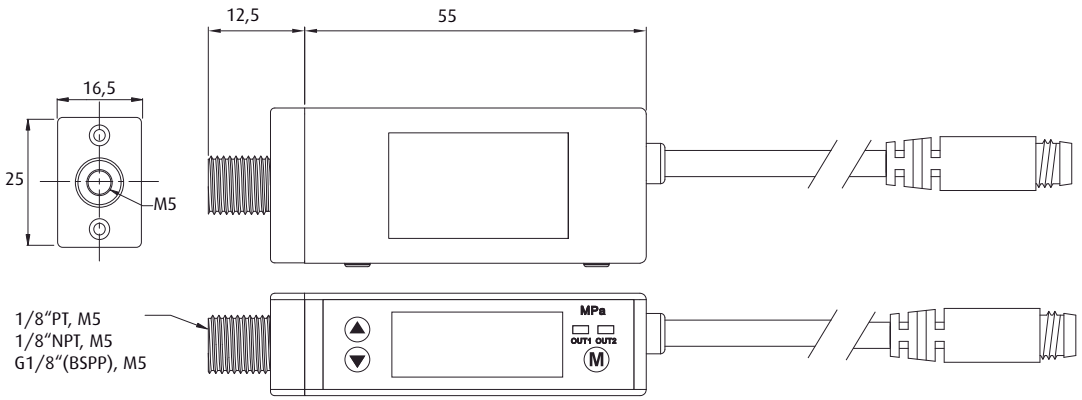


(1) Brown (+)
(2) White (OUT 2)
(3) Blue (-)
(4) Black (OUT 1)
(5) Orange (analogue OUT 1-5)

Panel instructions



Dimensions



Vacuum / Pressure switches - electronic with digital output

Compact design

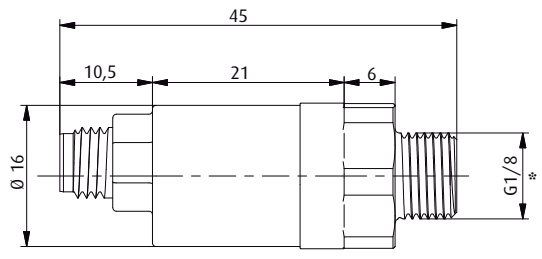
Product Description

> Digital monitoring of vacuum and pressure in handling and automation systems
> Small, lightweight and compact
> Transistor output
> Simple programming of the switching point, hysteresis and switching logic NC/NO
> Monitoring of a pressure window is possible
> Locking feature
> LED operation and status indication
> Item 20.027: With fitting pipe Ø 6 mm to be inserted into tubing or ejectors (e.g. inline or base ejectors)

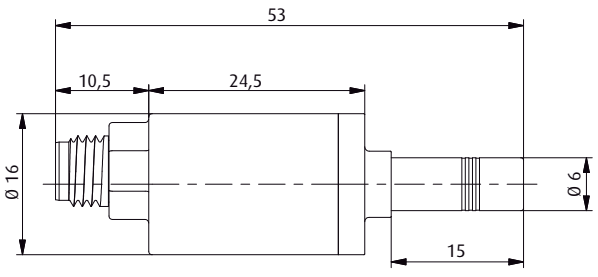
Technical data

Item no.	20.026	20.027
Adjustable range [mbar]	-999 - 999	-999 - 999
Hysteresis	0 - 100 %	0 - 100 %
Digital switching outputs	PNP Transistor	PNP Transistor
Switching logic	NO/NC	NO/NC
Repeat accuracy [%]	± 0.2 % from measuring range	± 0.2 % from measuring range
Supply voltage [VDC]	9 - 30 (reverse polarity, short circuit protected)	9 - 30 (reverse polarity, short circuit protected)
Current consumption [mA]	< 20	< 20
Maximum switching current [mA]	250	250
Voltage at the output	ca. Ub -1,5 V	ca. Ub -1,5 V
EMI / EMC	According to EU-directive 2004 / 108 / EG	According to EU-directive 2004 / 108 / EG
Protection class	IP65	IP65
Suitable media	Dry, unoiled air and non-abrasive gases	Dry, unoiled air and non-abrasive gases
Operating temperature [°C]	-10 - 80	-10 - 80
Electric connection	Plug M8x1, 4-pin	Plug M8x1, 4-pin
Suitable accessories	Connector cable 20.501 (p.717) Connector cable 20.502 (p.717) Adapter 20.511 (p.698), Adapter 20.522 (p.698) Adapter 20.523 (p.698)	Connector cable 20.501 (p.717) Connector cable 20.502 (p.717) Adapter 20.511 (p.698), Adapter 20.522 (p.698) Adapter 20.523 (p.698)

Dimensions



20.026



20.027

* = M5-female

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Pressure switches - electronic with two digital switching outputs

Diagram with installation kit 20.515 for control panel installation

Product Description

> Intelligent sensor for pressure monitoring
> Adjustable with "teaching" feature
> Switching point and hysteresis can be programmed as desired
> Simple operation using button functions and LCD display
> Small and robust

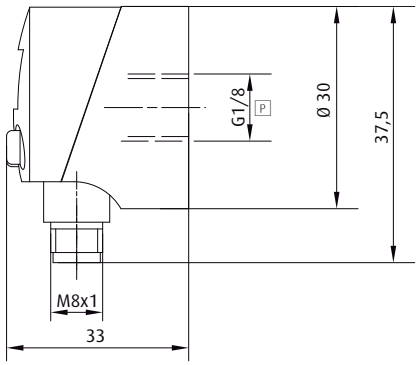
Notes

> Transient emissions: EN 61000-6-4:2007; EN 61326-2-3:2006
> Interference resistance: EN 61000-6-2:2005; EN 61326-2-3:2006
> Vacuum values can be displayed and adjusted by the customer in following units: MPa, bar, psi

Technical data

Item no.	20.023
Measuring range [bar]	0 - 10
Digital switching outputs	2x PNP (NO/NC)
Repeat accuracy [%]	± 0.2 % from measuring range
Overpressure safety [bar]	0.2
Supply voltage [V]	11 - 30
Current consumption [mA]	< 55
Maximum switching current [mA]	125
Electric connection	Plug M8x1, 4-pin
Protection class	IP65
Suitable media	Filtered, oiled or unoiled air or neutral gases
Operating temperature [°C]	0 - 50
Weight [g]	40
Suitable accessories	Connector cable 20.501 (p.717), Connector cable 20.502 (p.717), Mounting bracket 20.514 (p.699), Mounting bracket 20.515 (p.699)

Dimensions



P = Compressed air connection

Vacuum - and pressure gauge

With red-green indication

Vacuum gauge

Pressure gauge

Product Description

> Visual monitoring of the vacuum and/or pressure level in gripper systems
> Standardised design for flexible use in vacuum and/or pressure systems

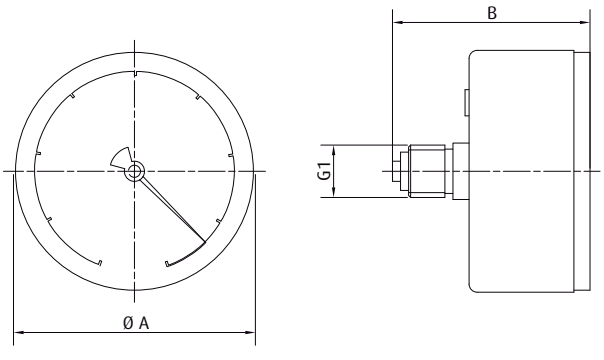
Technical data

Item no.	Measuring range [bar]	Measuring range [mbar]	Connection	Weight [g]
91.001	--	0 - -1,000	At the rear	45
91.001-R	--	0 - -1,000	At the rear	40
91.003	--	0 - -1,000	At the rear	90
91.000	--	0 - -1,000	At the bottom	47
91.002	--	0 - -1,000	At the bottom	92
91.004	--	0 - -1,000	At the bottom	975
91.013	1 - 10	--	At the bottom	90
91.014	1 - 10	--	At the rear	90

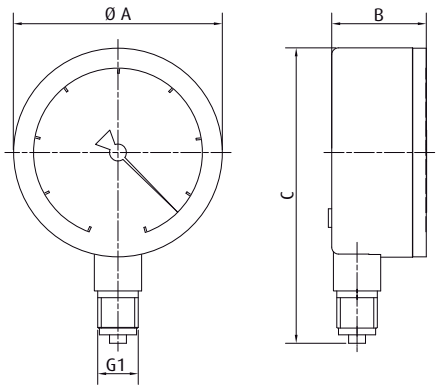
Dimensions

G1	Ø A [mm]	B [mm]	C [mm]
G1/8	40	41	--
R1/8	40	41	--
G1/4	63	49	--
G1/8	40	26.5	55.5
G1/4	63	27.5	86
G1/2	160	50	200
G1/4	63	27.5	86
G1/4	63	27.5	86

Dimensions



91.001 | 91.001-R | 91.003 | 91.014



91.000 | 91.002 | 91.004 | 91.013

Material in Motion
Phone +49 (0)89 / 96 24 89-0

Digital pressure gauge - connection at the bottom

Diagram with installation kit 20.515 for front panel mounting

Product Description

> Visual monitoring of the vacuum and/or pressure level in gripper systems
> Calibration feature
> Very compact
> LCD display with selectable pressure units
> Robust aluminium housing

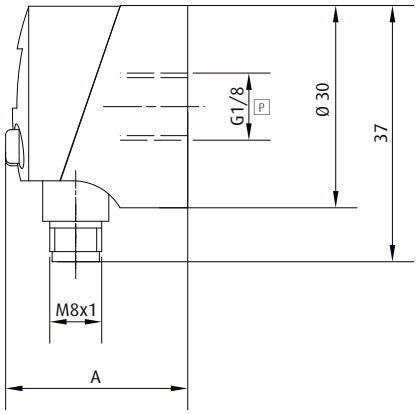
Notes

> Vacuum values can be displayed and adjusted by the customer in following units: MPa, bar, psi

Technical data

Item no.	**91.012**
Measuring range [bar]	-1 - 1
Overpressure safety [bar]	5
Supply voltage [VDC]	10.8 - 30 (with reverse current protection)
Current consumption [mA]	< 30
Response time [ms]	2.5
Insulation resistance [mOhm]	> 100 (500 VDC)
Electric connection	Plug M8x1, 4-pin
Mounting position	any
EMI / EMC	According to EN 50081-1 / 50082-2
Operating temperature [°C]	-10 - 0
Weight [g]	45
Suitable accessories	Connector cable 20.501 (p.717), Connector cable 20.502 (p.717), Mounting bracket 20.514 (p.699), Mounting bracket 20.515 (p.699)

Dimensions



P = Pressure / Vacuum connection

Adapter and mounting brackets for vacuum switches and pressure switches

20.522 | 20.523

20.511

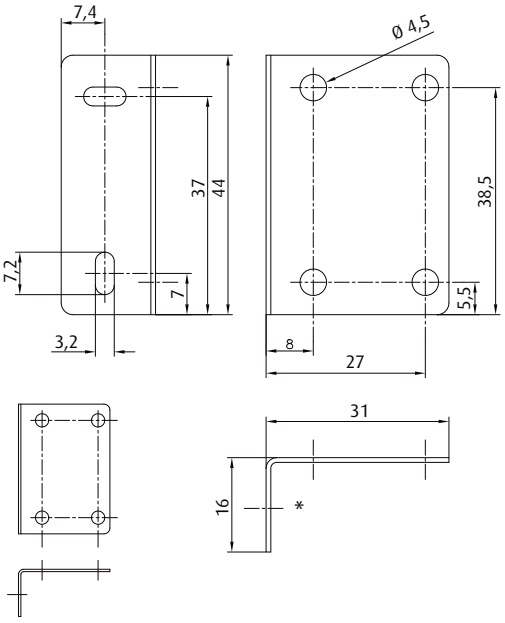
Ordering notes

> Mounting material included in scope of delivery

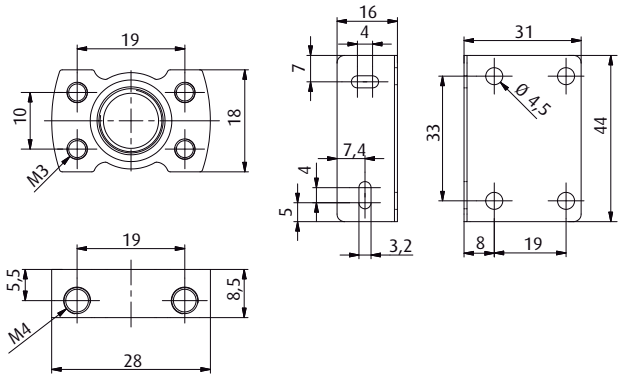
Technical data

Item no.	Description	Suitable for vacuum / pressure switches
20.511	Push-In Fitting G1/8, tubing-Ø 6 mm with mounting angle	20.020, 20.021, 20.026, 20.027
20.522	Adapter with angle bracket for flange assembly	20.020, 20.021, 20.026, 20.027
20.523	Adapter for flange assembly	20.020, 20.021, 20.026, 20.027

Dimensions



20.511

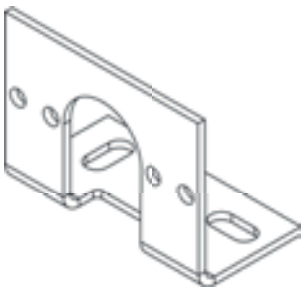


20.522 | 20.523

* = Push-In Fitting G1/8, tubing-Ø 6 mm not displayed

Mounting frame and brackets for front panel mounting

NEW



Example application: Gauge 20.023 with installation kit 20.515

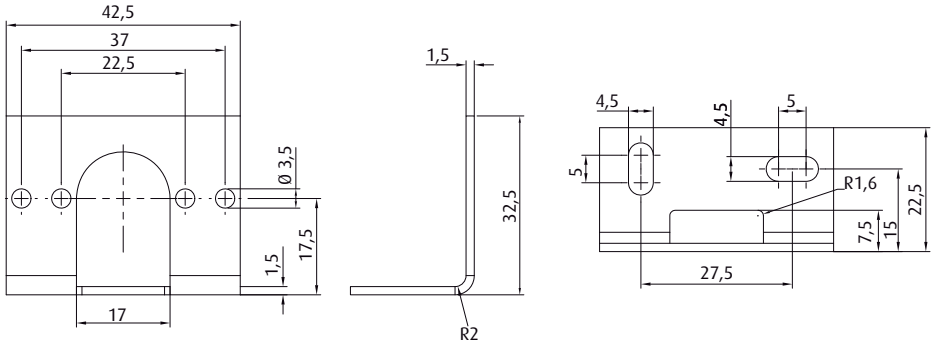
Ordering notes

> Mounting material included in scope of delivery

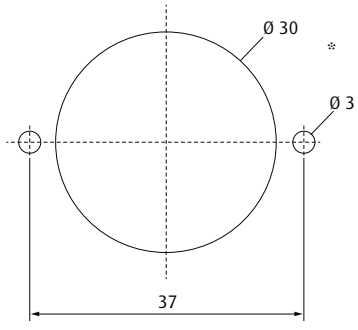
Technical data

Item no.	Description	Suitable for vacuum / pressure switches
20.514	Bracket	20.022, 20.023, 91.012
20.515	Mounting frame with bracket	20.022, 20.023, 91.012

Dimensions



20.514



20.515

* = Installation frame drilling dimensions

Clip 16 mm for wall mounting

Suitable for vacuum switches 20.020 and 20.021

NEW

Notes

> Mounting via through hole Ø 5 mm located centric at bottom side

Technical data

Item no.	Suitable for vacuum / pressure switches
20.520	20.020, 20.021