

Pressure switch Models 201, 203, 281

WIKA data sheet PV 35.54

Applications

- Hydraulics and pneumatics
- Steel
- Power
- Special purpose machine

Special features

- Internal Switch point adjustment for critical applications
- Stainless steel case option for corrosive environment
- Switch point repeatability of $\pm 0.5\%$ of FSR for reliable switching
- Two set-point option for controlling at different process levels



Fig. Left: Pressure switch, model 201, weatherproof
Fig. Right: Pressure switch, model 201, flameproof

Description

Series 200 Pressure Switches is a SWITZER mainstream product range for switching upto 75 bar and includes models for vacuum, compound and millibar ranges and high overload protection.

Precision mechanisms are of stainless steel for Hazardous atmospheres and high humidity. Enclosures, sensing elements and switching modes can be combined to offer the variety needed to suit the demands of rapidly expanding industrial processes.

Precise and accurate operation is obtained by using time proven seamless hydraulically formed bellows. Setpoint is continuously adjustable over the instrument range. A scale is provided for approximate switch setting.

Specifications

Basic information	
Switch enclosure	■ GM style aluminium pressure die cast weatherproof to IP66 with nitrile gasket ■ GA style CF8 (304 SS) casting, weatherproof to IP66, fit for off shore ■ GA6 style CF8M (316 SS) casting, weatherproof to IP66, fit for off shore ■ GK style (Type-1) aluminium pressure die cast, weatherproof and flameproof to group IIC as per IS/IEC 60079-1 ■ GR style (Type-1) aluminium pressure die cast, weatherproof to IP66 and flameproof to group IIC as per IS/IEC 60079-1 (available only in model 201)
Sealing	Nitrile
Measuring element	316L SS bellows
Wetted parts	316L SS / CF3M

Output signal	
Ranges	Several ranges from -1 ... +75 bar
Switching differential	■ Fixed ■ Wideband adjustable
Repeatability of the setpoint (note 3)	■ $\pm 0.5\%$ of FSR for 201 & 203 ■ $\pm 1.0\%$ of FSR for 281
Maximum working pressure	Refer table 1
Respond time	<1 second
Scale accuracy (note 4)	$\pm 5\%$ of FSR
Switching contacts with microswitch	■ 1 x SPDT (single pole double throw) ■ 2 x SPDT (single pole double throw)
Switching function (note 8)	Instrument quality snap acting microswitch

Operating condition	
Permissible ambient temperature	-10°C ... +60°C
Permissible medium temperature	170°C for bellows
Ingress protection	IP66
Process connection	1/4" NPT(F) per ASME B1.20.1 direct Other connections through adaptor
Electrical connection	1/2" NPT(F) per ASME B1.20.1 single entry standard Dual entry on request
Mounting	■ Panel ■ Wall ■ On-line ■ 2" pipe

Ordering matrix

Sample model number

GM 201 02 B02 ☐ ☐ ☐

Switch enclosure

GM style aluminium pressure die cast weatherproof to IP66 with nitrile gasket

GM

GA style CF8 (304 SS) casting, weatherproof to IP66, fit for off shore

GA

GA style CF8M (316 SS) casting, weatherproof to IP66, fit for off shore

GA6

GK style (Type-1) aluminium pressure die cast, weatherproof and flameproof to group IIC as per IS/IEC 60079-1

GK

GR style (Type-1) aluminium pressure die cast, weatherproof to IP66 and flameproof to group IIC as per IS/IEC 60079-1 (available only in model 201)

GR

Model

This is the basic pressure switch actuated by a seamless bellows having close fixed non-adjustable switching differential.

201

Same as 201, but with auxiliary mechanism permitting switching differential adjustment between 8–15% min. to 60% max. without disturbing the falling set point.

203

A variant of series 200, employs twin levers each operating a SPDT microswitch actuated by a single sensor through a unique linkage thereby providing two independent adjustable setpoints, each with its own setting scale, spring and switch. Minimum separation between setpoints must be more than sum of on-off differentials; or 10% of FSR whichever is higher.

281

Sensor material

316L SS bellows

3

Wetted part

316L SS / CF3M

3

Range code

Refer table-1

☐

Switch code and rating

Refer table-6

☐

Electrical entry code

Refer table-7

☐

For available other options refer table-8

Table 1: Range code and availability

Range code	Range	201	203	281	Maximum working pressure bar
B001 / K087	- 1 ... 0 bar / Kg/Cm ²	✓	✓	✗	4
B003 / K007	- 0.5 ... +0.5 bar / Kg/Cm ²	✓	✓	✗	4
B002 / K078	- 1 ... +1.5 bar / Kg/Cm ²	✓	✓	✗	4
M041	5 ... 50 mbar	✓	✗	✗	2
M045	7.5 ... 75 mbar	✓	✗	✗	2
M046	10 ... 100 mbar	✓	✗	✗	2
M043	5 ... 200 mbar	✓	✗	✗	2
M044	5 ... 250 mbar	✓	✗	✗	2
B020 / K088	0.05 ... 0.16 bar	✓	✓	✗	2
B021 / K089	0.08 ... 0.4 bar / Kg/Cm ²	✓	✓	✓	4
B022 / K091	0.1 to 1.1 bar / Kg/Cm ² ★	✓	✓	✓	4
B027 / K092	0.2 ... 2 bar / Kg/Cm ² ★	✓	✓	✓	4
B030 / K093	0.4 ... 4 bar / Kg/Cm ² ★	✓	✓	✓	8
B031 / K094	0.6 ... 6 bar / Kg/Cm ² ★	✓	✓	✓	9
B033 / K095	1 ... 10 bar / Kg/Cm ² ★	✓	✓	✓	15
B035 / K096	1.6 ... 16 bar / Kg/Cm ² ★	✓	✓	✓	25
B036 / K097	2 ... 20 bar / Kg/Cm ² ★	✓	✓	✓	25
B038 / K098	8 ... 32 bar / Kg/Cm ² ★	✓	✓	✓	36
B039 / K076	10 ... 40 bar / Kg/Cm ² ★	✓	✓	✓	50
B040 / K099	10 ... 60 bar / Kg/Cm ² ★	✓	✓	✓	80
B041 / K100	15 ... 75 bar / Kg/Cm ² ★	✓	✓	✗	80
W037	50 ... 500 mmWC	✓	✗	✗	2
W173	75 ... 750 mmWC	✓	✗	✗	2
W038	100 ... 1000 mmWC	✓	✗	✗	2
W174	50 ... 2000 mmWC	✓	✗	✗	2
W186	50 ... 2500 mmWC	✓	✗	✗	2

★ Chemical seal options available, See datasheet DS 70.01. For SPDT function, the minimum switching differential shall be arrived by applying 1.3 multiplication factor to values given in differential Table. For DPDT function, the minimum switching differential shall be arrived by applying 1.5 multiplication factor to values given in differential Tables '2, 3, 4 & 5'.

Table 2: Switching differential for model 201, GM / GA enclosure

Range code	Range	Unit	Switching differential for contact versions - GM/GA Enclosures					
			D, 3, 4	5	9, G	DD, 33, 44	55	99, GG
B001 / K087	- 1 ... 0	bar / Kg/Cm ²	0.04	0.07	0.12	0.052	0.09	0.155
B003 / K007	- 0.5 ... +0.5	bar / Kg/Cm ²	0.04	0.07	0.12	0.052	0.09	0.155
B002 / K078	- 1 ... +1.5	bar / Kg/Cm ²	0.045	0.075	0.15	0.059	0.1	0.195
M041	5 ... 50	mbar	5	6	10	7	8	13
M045	7.5 ... 75	mbar	5	6	10	7	8	13
M046	10 ... 100	mbar	8	8	12	11	10	16
M043	5 ... 200	mbar	10	10	15	13	12	20
M044	5 ... 250	mbar	10	10	15	13	12	20
B020 / K088	0.05 ... 0.16	bar / Kg/Cm ²	0.01	0.008	0.015	0.013	0.01	0.02
B021 / K089	0.08 ... 0.4	bar / Kg/Cm ²	0.012	0.016	0.025	0.013	0.021	0.032
B022 / K091	0.1 ... 1.1	bar / Kg/Cm ²	0.02	0.03	0.05	0.026	0.04	0.065
B027 / K092	0.2 ... 2	bar / Kg/Cm ²	0.025	0.04	0.08	0.033	0.05	0.104
B030 / K093	0.4 ... 4	bar / Kg/Cm ²	0.06	0.098	0.18	0.078	0.128	0.234
B031 / K094	0.6 ... 6	bar / Kg/Cm ²	0.075	0.12	0.27	0.098	0.156	0.351
B033 / K095	1 ... 10	bar / Kg/Cm ²	0.075	0.17	0.2	0.098	0.22	0.26
B035 / K096	1.6 ... 16	bar / Kg/Cm ²	0.15	0.22	0.3	0.195	0.3	0.39
B036 / K097	2 ... 20	bar / Kg/Cm ²	0.2	0.25	0.5	0.26	0.35	0.65
B038 / K098	8 ... 32	bar / Kg/Cm ²	0.25	0.35	0.6	0.325	0.455	0.78
B039 / K076	10 ... 40	bar / Kg/Cm ²	0.3	0.4	0.7	0.39	0.52	0.91
B040 / K099	10 ... 60	bar / Kg/Cm ²	0.5	0.9	1.4	0.65	1.17	1.82
B041 / K100	15 ... 75	bar / Kg/Cm ²	0.6	0.96	2	0.78	1.25	2.6
W037	50 ... 500	mmWC	50	60	100	70	80	130
W173	75 ... 750	mmWC	80	80	120	110	80	160
W038	100 ... 1000	mmWC	80	80	120	79	100	130
W174	50 ... 2000	mmWC	100	100	150	130	120	200
W186	50 ... 2500	mmWC	100	100	150	130	120	200

Table 3: Switching differential for model 201, GR / GK enclosure

Range code	Range	Unit	Switching differential for contact versions - GR/GK Enclosures					
			D, 3, 4	5	9,G	DD, 33, 44	55	99, GG
B001 / K087	- 1 ... 0	bar / Kg/Cm ²	0.07	0.1	0.19	0.084	0.12	0.228
B003 / K007	- 0.5 ... +0.5	bar / Kg/Cm ²	0.07	0.1	0.19	0.084	0.12	0.228
B002 / K078	- 1 ... +1.5	bar / Kg/Cm ²	0.08	0.13	0.245	0.096	0.156	0.294
M041	5 ... 50	mbar	8	9	14	9.6	10.8	17
M045	7.5 ... 75	mbar	8	9	16	9.6	9.6	19.2
M046	10 ... 100	mbar	12	12	18	14.4	14.4	21.6
M043	5 ... 200	mbar	15	15	20	18	18	24
M044	5 ... 250	mbar	15	15	20	18	18	24
B020 / K088	0.05 ... 0.16	bar / Kg/Cm ²	0.015	0.015	0.02	0.018	0.018	0.024
B021 / K089	0.08 ... 0.4	bar / Kg/Cm ²	0.018	0.024	0.035	0.022	0.029	0.042
B022 / K091	0.1 ... 1.1	bar / Kg/Cm ²	0.03	0.04	0.1	0.036	0.048	0.12
B027 / K092	0.2 ... 2	bar / Kg/Cm ²	0.04	0.05	0.135	0.048	0.06	0.162
B030 / K093	0.4 ... 4	bar / Kg/Cm ²	0.1	0.15	0.27	0.12	0.18	0.324
B031 / K094	0.6 ... 6	bar / Kg/Cm ²	0.125	0.195	0.405	0.15	0.234	0.486
B033 / K095	1 ... 10	bar / Kg/Cm ²	0.175	0.3	0.3	0.21	0.36	0.36
B035 / K096	1.6 ... 16	bar / Kg/Cm ²	0.26	0.325	0.45	0.312	0.39	0.54
B036 / K097	2 ... 20	bar / Kg/Cm ²	0.3	0.375	0.75	0.36	0.45	0.9
B038 / K098	8 ... 32	bar / Kg/Cm ²	0.36	0.5	0.9	0.432	0.60	1.08
B039 / K076	10 ... 40	bar / Kg/Cm ²	0.525	0.525	1	0.63	0.63	1.2
B040 / K099	10 ... 60	bar / Kg/Cm ²	0.85	1.2	2	1.02	1.44	2.4
B041 / K100	15 ... 75	bar / Kg/Cm ²	1	1.5	2.8	1.2	1.8	3.36
W037	50 ... 500	mmWC	80	90	140	100	100	170
W173	75 ... 750	mmWC	80	90	160	96	144	192
W038	100 ... 1000	mmWC	120	120	180	144	144	216
W174	50 ... 2000	mmWC	150	150	200	180	180	240
W186	50 ... 2500	mmWC	150	150	200	180	180	240

Table 4: Switching differential for model 203

Range code	Range	Unit	Switching differential for contact versions GM / GA Enclosures		Switching differential for contact versions GK Enclosures	
			W	WW	W	WW
B001 / K087	- 1 ... 0	bar / Kg/Cm ²	0.175 ... 0.6	0.23 ... 0.6	0.3 ... 0.6	0.36 ... 0.6
B003 / K007	- 0.5 ... +0.5	bar / Kg/Cm ²	0.175 ... 0.5	0.23 ... 0.5	0.3 ... 0.5	0.36 ... 0.5
B002 / K078	- 1 ... +1.5	bar / Kg/Cm ²	0.2 ... 1	0.26 ... 1	0.35 ... 1	0.42 ... 1
B021 / K089	0.08 ... 0.4	bar / Kg/Cm ²	0.05 ... 0.15	0.07 ... 0.15	0.08 ... 0.15	0.1 ... 0.15
B022 / K091	0.1 ... 1.1	bar / Kg/Cm ²	0.08 ... 0.6	0.1 ... 0.6	0.14 ... 0.6	0.17 ... 0.6
B027 / K092	0.2 ... 2	bar / Kg/Cm ²	0.15 ... 1.2	0.2 ... 1.2	0.25 ... 1.2	0.3 ... 1.2
B030 / K093	0.4 ... 4	bar / Kg/Cm ²	0.5 ... 2.5	0.65 ... 2.4	0.8 ... 2.4	0.96 ... 2.4
B031 / K094	0.6 ... 6	bar / Kg/Cm ²	0.8 ... 3.6	1.05 ... 3.6	1.3 ... 3.6	1.56 ... 3.6
B033 / K095	1 ... 10	bar / Kg/Cm ²	0.5 ... 6	0.65 ... 6	0.85 ... 6	1 ... 6
B035 / K096	1.6 ... 16	bar / Kg/Cm ²	1.2 ... 10	1.56 ... 10	2 ... 10	2.4 ... 10
B036 / K097	2 ... 20	bar / Kg/Cm ²	1.3 ... 12	1.7 ... 12	2.2 ... 12	2.65 ... 12
B038 / K098	8 ... 32	bar / Kg/Cm ²	1.8 ... 18	2.35 ... 18	2.8 ... 18	3.35 ... 18
B039 / K076	10 ... 40	bar / Kg/Cm ²	2.5 ... 24	3.25 ... 24	4.3 ... 24	5.5 ... 24
B040 / K099	10 ... 60	bar / Kg/Cm ²	4 ... 36	5.2 ... 36	6.8 ... 36	8.0 ... 36
B041 / K100	15 ... 75	bar / Kg/Cm ²	8 ... 40	10.4 ... 40	13.5 ... 40	16 ... 40

Table 5: Switching differential for model 281

Range code	Range	Unit	Switching differential for contact versions GM / GA Enclosures			Switching differential for contact versions GK Enclosures		
			D, 3, 4	5	9, G	D, 3, 4	5	9, G
B021 / K089	0.08 ... 0.4	bar / Kg/Cm ²	0.015	0.03	0.05	0.02	0.038	0.085
B022 / K091	0.1 ... 1.1	bar / Kg/Cm ²	0.03	0.055	0.1	0.055	0.08	0.15
B027 / K092	0.2 ... 2	bar / Kg/Cm ²	0.04	0.065	0.15	0.055	0.08	0.215
B030 / K093	0.4 ... 4	bar / Kg/Cm ²	0.09	0.18	0.3	0.125	0.233	0.435
B031 / K094	0.6 ... 6	bar / Kg/Cm ²	0.11	0.233	0.45	0.16	0.3	0.645
B033 / K095	1 ... 10	bar / Kg/Cm ²	0.15	0.31	0.5	0.21	0.4	0.475
B035 / K096	1.6 ... 16	bar / Kg/Cm ²	0.225	0.42	0.51	0.315	0.55	0.715
B036 / K097	2 ... 20	bar / Kg/Cm ²	0.25	0.45	0.85	0.35	0.6	1.2
B038 / K098	8 ... 32	bar / Kg/Cm ²	0.35	0.72	1.1	0.5	1	1.53
B039 / K076	10 ... 40	bar / Kg/Cm ²	0.45	0.77	1.2	0.63	1.5	1.665
B040 / K099	10 ... 60	bar / Kg/Cm ²	0.75	1.5	2.4	1	1.9	3.3

Table 6: Switch code, rating and availability (note 9)

Switch code		Contact version	AC rating	DC rating in Ampere						Availability in models	
SPDT	DPDT			Resistive			Inductive				
				250V	125V	30V	250V	125V	30V	SPDT	DPDT
D	DD	General purpose	15A 250 / 125V	0.2	0.4	2.0	0.02	0.03	1.0	201 & 281	201
3	33	General purpose	15A 250 / 125V	-	-	-	-	-	-	201 & 281	201
W	WW	General purpose	15A 250 / 125V	-	-	-	-	-	-	203	203
4	44	With Gold alloy contact.	1A 125V	-	0.5	0.5	-	0.25	0.25	201 & 281	201
5	55	General purpose with good DC rating.	5A 250 / 125V	0.2	0.4	4.0	0.2	0.4	3.0	201 & 281	201
9	99	Hermetically sealed, inert gas filled with Silver alloy contact.	1A 115V 400 Hz.	-	-	3.0 ★	-	-	1.0 ★	201 & 281	201
G	GG	Hermetically sealed, inert gas filled with Gold plated contact.	-	-	-	1.0 ★	-	-	0.25 ★	201 & 281	201

Note : In model 281 DPDT for individual set point is not available,

For model 281 specify only one character for switch code D, 4, etc

★ For Codes 9, 99, G, GG; DC Rating of Resistive and Inductive is 28V

Table 7: Electrical entry

Size ★	Single entry		Dual entry	
	GM / GA	GK/GR	GM / GA	GK/GR
1/2" NPT(F) per ASME B1.20.1	A	A	N	N
3/4" NPT(F) per ASME B1.20.1 through adaptor	L	-	O	-
M20 × 1.5 per ISO724 ★★	E	E	EB	EB
7 pin plug through connector ★★★	C	-	-	-
9 pin plug through connector	D	-	-	-

★ Cable gland available on request

★★ Possible in GK and GR enclosure as direct. Others through adaptor.

★★★ Possible only in GM enclosure.

Table 8: Options

Details	Model		
	201	203	281
Chemical Seal	✓	✓	#
Special Range	✓	✓	✓
Zero Starting §	✓	✓	NP
Optional MWP #	✓	✓	NP
PVC Cover for Armour of chemical seal	✓	✓	#
Full Vacuum withstandability	✓	✓	NP
Ammonia Service	✓	✓	NP
Oxygen Service	✓	✓	✓
Nuclear grade cleaning	✓	✓	✓
EPDM cover gasket (only for GM / GA / GR)	✓	✓	✓
NACE Preparation ★	✓	✓	✓
Blow out disc (not available in GR)	✓	✓	✓
Special repeatability	NP	NP	✓
Optional scale accuracy ±2% (not available in GR)	✓	✓	✓

NP Not possible

Consult sales department

★ Available only with '316L SS / CF3M' wetted parts

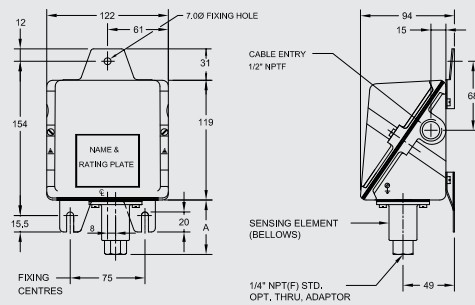
§ Available only in M041, M045, M046, M043, M044, B020, B021, B022, B027, B030, B031, B033.
Chemical seal is not possible with zero starting.

NOTES

1. Style GM/GA is weatherproof only if all entries and joint faces are properly sealed. Style GK / GR is weatherproof only if cover 'O' ring is retained in position and flameproof only if proper FLP cable gland is used. It is recommended to procure cable glands along with GK / GR instruments to avoid neglect of it while installation.
2. Intrinsic Safety (Exi) — Pressure switches are classified as simple apparatus as they neither generate nor store energy. Hence pressure switches in weatherproof (GM/GA) enclosures also may be used in intrinsically safe systems without certification provided the power source is certified IS. Because of the low voltages and currents it is recommended to use gold contact and / or sealed contacts.
3. Accuracy & Repeatability are not different for all blind pressure switches. A shift of $\pm 2\%$ may be observed in setpoint when pressure falls from full static pressure. Settings will also shift with varying temperature.
4. The instrument is calibrated in the mounting position depicted in the drawing. Mounting in any other direction will cause a minor range shift, especially in low and compound ranges. Ranges above 1 bar will not experience this shift.
5. A pressure switch is a switching device and not a measuring instrument — eventhough it has a scale to assist setting. For this reason, Test Certificates will not contain individual ON-OFF switching values at different scale readings. Maximum differential obtained alone will be declared, besides other specifications.
6. Select working range of the instrument such that the set value lies in the mid 35% of the range i.e., between 35% and 70% of range span.
7. For switching differential values refer differential tables. Switching differentials furnished are nominal values under test conditions at mid-scale and will vary with range settings and operating conditions.
8. On and off settings should not exceed the upper or lower range value.
9. DPDT action is achieved by two SPDT switches synchronised to practical limits i.e., $\pm 2\%$ of FSR. (Synchronisation is applicable at Setpoint only. Not applicable at Reset points.) Deadband for DPDT contacts are higher than that of SPDT as force required to actuate the contacts are more. Please refer respective range table for exact values.
10. Contact life of microswitches are 5×10^5 switching cycles for nominal load. To quench DC sparks, use diode in parallel with inductance, ensuring polarity. A 'R-C' network is also recommended with 'R' value in Ohms equal to coil resistance and 'C' value in micro Farads equal to holding current in Amps.
11. Higher Maximum Working Pressure is available on request for some ranges; but ON-OFF differentials will be higher.
12. Ambient temperature range: All models are suitable for operating within a range of ambient temperature from $(-) 10^\circ\text{C}$ to $(+) 60^\circ\text{C}$ provided the process does not freeze within this range. Below 0°C , precautions should be taken in humid atmospheres to prevent frost formation inside the instrument from jamming the mechanism. Occasional excursions beyond this range are possible but accuracy might be impaired. The microswitch is the limiting factor which should never exceed the limits $(-) 50^\circ\text{C}$ to $(+) 80^\circ\text{C}$.
13. Fluid Temperature: A pressure switch when connected to the process is not subjected to through flow and therefore is not fully exposed to the fluid temperature. Use of adequate length of impulse piping will greatly reduce excessive heating of the sensing element. For e.g., connection of 7.5 cm of 12 mm dia impulse piping will reduce water temperature of 100°C to 65°C at an ambient temperature of 50°C . Ask factory for piping nomogram #441184-4 for different temperatures.
14. Ensure that impulse pipework applies no stress on sensing element housing and use spanners to hold pressure port/housing when connections are made.
15. For pressure above 75 bar, Switzer S20/920 Series and PS01 Series are available. Complementary instrumentation for differential pressure is available in Series 300.
16. Custom built instruments are available for special service requirements under Special Engineering Category.
17. Accuracy figures are exclusive of test equipment tolerance on the claimed values.
18. All performance data are guaranteed to $\pm 5\%$.

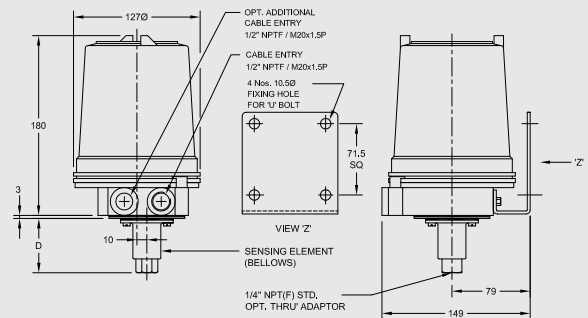
Dimensions in mm

Models 201, 203 & 281 in GM enclosure



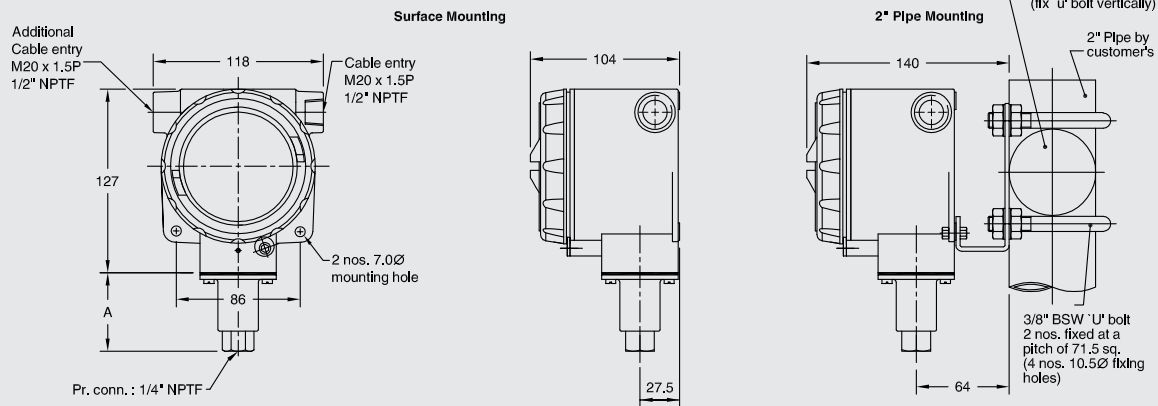
Dim 'A' varies from 42 to 92 ± 2 depending on range

Models 201, 203 & 281 in GK enclosure



Dim 'D' varies from 42 to 92 ± 2 depending on range

Models 201 in GR enclosure



Dim 'A' varies from 42 to 92 ± 2 depending on range

Note: Unspecified general tolerance ± 1

Ordering information

Switch enclosure / Model / Sensor material / Wetted part / Range code / Switch code and rating / Electrical entry code

© 2022 WIKA Alexander Wiegand SE & Co. KG, all rights reserved.
The specifications given in this document represent the state of engineering at the time of publishing.
We reserve the right to make modifications to the specifications and materials.



WIKAI Instruments India Pvt. Ltd.
128 SIDCO North Phase
Ambattur Industrial Estate, Chennai 600 098
Tel. +91 44 2625 2017 / 2018 / 9840919318
switch.sales@wika.com
www.wika.co.in