

Flow switches Model BM, BGM, GABM, GK-BM

Switzer data sheet FS-BM

Applications

- Lube oil skids
- Water treatment
- Furnace
- Pumps
- Fire fighting

Special features

- Proven design for liquids
- Line size 15 ... 300 mm
- Robust construction
- Only for water flow measurement

Description

Style BM / BGM / GABM / GK-BM flow switches are versatile instruments designed to accept different paddle sizes to handle any line size. Materials of construction and glandless design render the switches compatible with most of the corrosive and toxic fluids. The easy-to-fix design reduces installation costs and time. Simple mechanical parts ensure high reliability and near-zero failures.

The microswitch of the instrument is operated by the deflection of the paddle assembly due to velocity of flowing fluid against the restraining force of the range spring through a bellows sealed lever at a pre-determined flow rate.



Fig. top: Flow switch, model BM

Fig. bottom: Flow switch, model BGM

Standard version

Model

- BM: ABS plastic, weatherproof to IP65
- BGM: GM style aluminium pressure die cast weatherproof to IP66
- GABM4 / GABM6: "GA" style stainless steel casting weatherproof to IP66
- GK-BM: GK style aluminium pressure die cast, weatherproof to IP66 and flameproof to Group IIC as per IS/IEC 60079

Sensor

316 SS paddle and phosphor bronze bellows

Wetted parts

Brass

Ranges

Refer tables

Differential

- ≤25% of maximum flow for 15 NB line with SPDT
- ≤37% of maximum flow for 15 NB line with DPDT
- ≤10% of maximum flow for all other line sizes with SPDT
- ≤15% of maximum flow for all other line sizes with DPDT

Repeatability

±2% FSR

Switching

Instrument quality SPDT microswitch

Maximum line pressure

- 15 bar for Brass body
- 30 bar for SS body

Permissible ambient temperature

-10 ... 60°C

Permissible medium temperature

- -10 ... 110°C for brass
- -10 ... 170° C for SS

Pressure loss

60 ... 80 mbar at maximum flow

Process connection

BM – Threaded

- Integral Tee for line size upto 1"
- Above 1" line size 1" BSPM standard

BM – Flanged

- 1½" or 2" ANSI #150RF flanges are available from the line size 40 ... 300 mm

Process connection sealing

Buna-N

Ingress protection

- IP65: BM
- IP66: BGM, GABM4, GABM6, GK-BM

Electrical connection

- M16 Nylon cable gland suitable for 8 mm OD cable for model BM
- 1/2" NPTF for model BGM, GABM, GK-BM

Mounting

- Horizontal
- Vertical (flow must be top to bottom only)

Options

- 304 and 316 SS body
- PVC paddle
- 316L SS bellows
- Dual cable entry in BGM, GABM and GK-BM
- 7 pin plug for BGM and GABM
- 9 pin plug for BGM and GABM
- M20 × 1.5 for BGM, GABM and GK-BM
- 3/4" NPTF and M16 × 1.5 cable entries through adaptors for BGM and GABM
- NACE preparation
- Viton seal 'O' ring
- EPDM seal 'O' ring
- Teflon seal 'O' ring

Ordering matrix

Switch enclosure

ABS plastic enclosure weatherproof to IP65 ————— BM
 GM style aluminium pressure die cast, weatherproof to IP66 ————— BGM
 GA style 304 stainless steel casting, weatherproof to IP66 ————— GABM4
 GA style 316 stainless steel casting, weatherproof to IP66 ————— GABM6
 GK style aluminium pressure die cast, weatherproof to IP66 and
 flameproof to group IIC as per IS/IEC 600079 ————— GK-BM

Line size(Refer Table-3 and 4)

Specify nominal line size in "mm"

[Eg. 015 for 15 mm NB (or 150 for 150 mm NB)] ————— 015

Range code

Refer Table-3 and 4 ————— □

Switch actuation

Raising ————— R

Falling ————— F

Wetted parts

Brass body, phosphor bronze bellows & 316 SS paddle ————— 1

304 SS body, 316L SS bellows & 316 SS paddle ————— 4

316 SS body, 316L SS bellows & 316 SS paddle ————— 2

316L SS body, 316L SS bellows & PVC paddle ————— 3

Process connection

For line size up to 25 mm

Integral Tee, BSPF Threads (upto 1" line size) ————— SL

Integral Tee, NPTF threads (upto 1" line size) ————— SM

For line size from 32 ... 300 mm

Threaded 1" BSPM ————— TH

Threaded 1" NPTM ————— TN

Flanged to 1½" ANSI 150 RF for line size 40 mm and above ————— FA

Flanged to 2" ANSI 150 RF for line size 40 mm and above ————— FB

Flanged to 1½" ANSI 300 RF for line size 40 mm and above ————— FC

Flanged to 2" ANSI 300 RF for line size 40 mm and above ————— FD

Special process connection ————— S3

Process connection material

Mild steel ————— C

304 SS ————— 4

316 SS ————— 2

316L SS ————— 3

Switch code and rating

Refer Table-1 ————— □

Electrical entry code

Refer Table-2 ————— □

Options

NACE preparation (available only with code '3') ————— SC

Seal 'O' ring Viton ————— OV

Seal 'O' ring EPDM ————— OE

Seal 'O' ring Teflon ————— OT

Integral tee for line size 32 ... 50 mm ————— ST

Table 1: Switch code, rating and availability

Switch code		Contact version	AC rating	DC rating in Ampere					
SPDT	DPDT			Resistive			Inductive		
				220V	110V	24V	220V	110V	24V
D	DD	General purpose	15A 250, 125V	0.2	0.4	6.0	0.02	0.05	5.0
9	99	Hermetically sealed, inert gas filled with Silver alloy contact	1A 115V, 400 Hz	N.A.	N.A.	3.0	N.A.	N.A.	1.0
G	GG	Hermetically sealed, inert gas filled with gold plated contact	N.R.	N.R.	N.R.	1.0	N.R.	N.R.	0.25
J	JJ	Argon sealed micro switch with silver contact	15A 250V	N.A.	N.A.	2.0	N.A.	N.A.	N.A.
K	KK	Argon sealed micro switch with gold contact	1A 125V 0.5A 250V	N.A.	N.A.	0.5	N.A.	N.A.	N.A.

Table 2: Electrical entry

Size *	Single entry			Dual entry	
	BGM / GABM4 / GABM6	GK-BM	BM	BGM / GABM4 / GABM6	GK-BM
1/2" NPTF	B	B	---	N	N
3/4" NPTF	C	---	---	O	---
M20 × 1.5	D	D	---	P	P
M16 × 1.5	E	---	---	Q	---
M16 Nylon elbow cable gland	---	---	F	---	---
Through connector					
7 pin plug	3	---	---	---	---
9 pin plug	4	---	---	---	---

* Cable gland available on request.

Table 3

Line size NB mm	Range code	Switching range – LPM				Max. flow (LPM water)
		On falling flow code 'F'		On rising flow code 'R'		
		Min.	Max.	Min.	Max.	
15	A	3	9	8	12	21
20	A	4	11	9	14	38
25	A	10	30	16	33	60
32	A	13	50	23	52	100
40	A	16	60	30	70	150
50	A	36	90	60	95	250
65	A	45	120	85	135	400
80	A	65	175	120	200	600
100	A	190	460	290	500	1000
	B	100	280	190	310	1000
125	A	380	890	530	930	1500
	B	150	420	300	470	1500
150	A	600	1360	800	1400	2000
	B	200	510	400	600	2000
200	A	1210	2760	1580	2900	3700
	B	650	1510	1020	1700	3700
250	A	1970	3830	2600	4200	6000
	B	1240	2410	1850	2800	6000
300	A	2600	4830	3500	5300	8500
	B	2000	3080	2800	3600	8500

BM / BGM / GABM / GK-BM instruments are suitable up to 100 CST only.

Other Models Available

Models	Details
HR	For viscous and high pressure
HM	All plastic version for corrosive chemicals
CM-G	OEM version, high range
CM-S	Sprinkler application
UZ	Flow switch with 6" Dial Indicator
HRM	Flow switch with indicator of 6" Dial Indicator of 2½" dial

■ For further details consult Sales.

Table 4

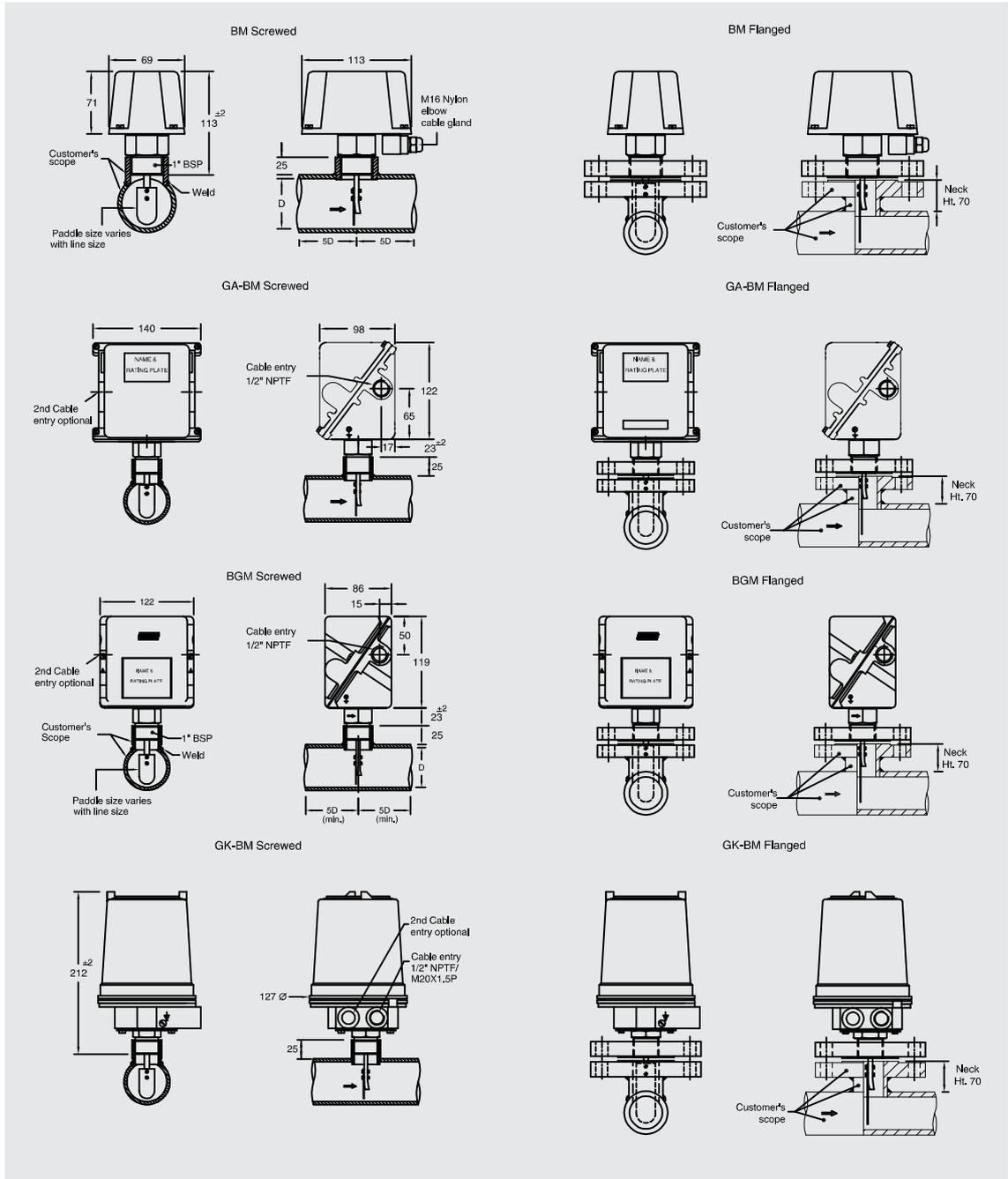
Line size NB mm	Range code	Switching range LPM	Max. flow (LPM water)
		On falling flow code 'F'	
20	L16	9 ... 14	38
25	L154	30 ... 60	60
25	L155	20 ... 40	60
25	L109	25 ... 50	60
25	L112	22 ... 55	60
25	L113	10 ... 36	60
25	L116	50 ... 100	100
32	L148	15 ... 60	100
32	L141	35 ... 85	100
32	L149	40 ... 90	100
40	L114	40 ... 110	150
40	L77	40 ... 76	150
40	L150	30 ... 180	180
40	L151	80 ... 240	240
50	L115	80 ... 160	250
50	L151	80 ... 240	250
50	L79	100 ... 170	250
50	L142	135 ... 420	420
50	L116	50 ... 100	250
65	L116	50 ... 100	400
65	L115	80 ... 160	400
65	L45	100 ... 200	400
65	L143	140 ... 220	400
65	L152	120 ... 260	400
65	L153	150 ... 300	400
80	L37	45 ... 120	600
80	L111	125 ... 300	600
80	L144	100 ... 400	600
100	L117	200 ... 525	1000
100	L145	190 ... 660	1000
100	L146	210 ... 1250	1250
100	L147	230 ... 770	1000
100	L137	240 ... 810	1000
25...100 *	L135	10 ... 460	60 ... 1000

* For range code L135 all set of paddles shall be supplied along with the instrument, to be used in the line size between 25 ... 100 mmNB

Notes

1. Gr.IIC of IS/IEC:60079-1 is equivalent to NEC CL.1, Gr.A, B, C & D.
2. The maximum line pressure is the limiting value for flanged versions irrespective of the flange ratings. The flange is not integral, but screwed on to the body with a lock nut. Flange mounting is not available upto 32 mm.
3. Accuracy & Repeatability are one and the same for all blind switches. Settings will slightly shift with varying temperature.
4. Instruments can be supplied with hermetically sealed microswitches other than Code 'D' general purpose microswitch. On-off differentials will be different. *Consult sales.*
5. All the ranges are in LPM water. For calculating equivalent airflow in NM³/Hr. consult sales. For any liquid other than water, the setting range depends on the specific gravity of the fluid at flow conditions. To get equivalent ranges for such liquids, a specific gravity correction factor has to be applied. *Consult sales.*
6. Maximum flow setting range is referred to as FSR herein. The maximum flow value mentioned in the table 3 and 4 are based on a nominal flow velocity of 2.0 metre/second. The instrument can handle higher flow if the process flow velocity is more than 2.0 metre/second. For special ranges, *consult sales.*
7. DPDT action is achieved by two SPDT switches synchronized to practical limits i.e., $\pm 2\%$ of FSR. ON-OFF differentials of DPDT contacts are 1.5 times than that of SPDT as force required to actuate the contacts are more.
8. MWP : The value mentioned herein is the highest permissible pressure that can be applied. Cannot be proof tested for any higher pressure value.
9. Contact life of microswitches are 5×10^5 switching cycles for nominal load. To quench DC sparks, use a 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.
10. Different lengths of paddles are used for different line sizes and ranges. Refer Instruction Manual for details.
11. **Accuracy figures are exclusive of test equipment tolerance on the claimed values.**
12. **All performance data are guaranteed to $\pm 5\%$.**

Dimensions in mm



Ordering information

Switch enclosure / Line size / Range code / Switch actuation / Wetted parts / Process connection / Switch code and rating / Electrical entry code / Options

© 2018 Switzer Process Instruments Pvt. Ltd., 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.

