INSTRUCTION MANUAL

MODEL BM / BGM / GK–BM

FLOW SWITCHES (THREADED / FLANGED VERSION)

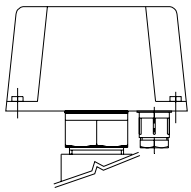
Switzer BM series flow switches with brass and stainless steel wetted parts are supplied for non aggressive and aggressive fluids respectively.

A stainless steel paddle fixed to the paddle arm and pivoted on a metallic bellows is deflected by the flowing fluid. The deflection is proportional to the velocity of flow. The movement of the paddle actuates a micro switch against a control spring. The bellows provides total isolation for the switch mechanism from the process fluid.

Series BM flow switch is supplied with the following enclosures.

Style BM

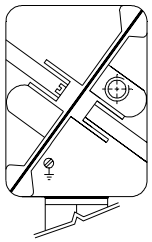
ABS plastic housing, weatherproof to IP : 65, with one SPCO, 15A, 230V AC, microswitch



BM

Style BGM

Pressure Die Cast Aluminium housing, Weatherproof to IP : 66, with one or two SPCO, 15A, 230 V AC microswitches as required.



BGM

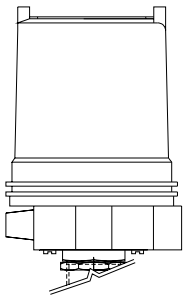
Style GK-BM

Die Cast Aluminium housing, watherproof to IP : 66 and flameproof to Gr.IIA & IIB or Gr. IIC, of IS : 2148, with one or two microswitches.

Caution :

An instrument is weatherproof only when the cover gasket and a weatherproof cable gland are properly fixed.

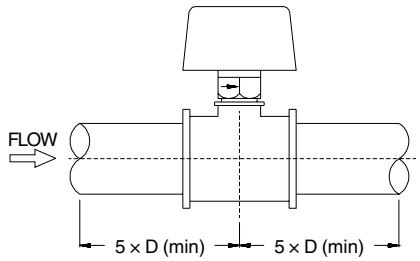
A flameproof instrument must be installed according to the relevant standards and codes of practices.



GK–BM

Location

The flow switch should be mounted in a horizontal section of the pipe where there is a straight run of at least 5 pipe diameters on both upstream and downstream sides of it. The straight run implies that there should be no bends, restrictions such as valves in the required length.



It is suggested that the flow switch be located in the suction side piping where less turbulent flow conditions exist.

Caution : ***Do not mount the flow switch on vertical pipe lines where liquid flows from 'top to bottom'.***

It can be mounted in vertical pipes where the flow is from 'bottom to top'. But the setting has to be corrected for the hydrostatic head produced by the liquid column above the paddle.

Installation of BM / BGM / GK–BM Flow Switch

Series BM flow switches are supplied with 1" BSP M threaded process connection or with a #150 or # 300 RF flange when specified.

When required to be used in 15, 20, 25 mm NB line sizes, the threaded version is fitted with a ***Screwed Tee*** at the factory to prevent damage to the paddle during installation.

The flanged version is not available for use in line sizes 15, 20, 25 and 32 mm NB.

Flow Switch with Integral Tee

The Tee has BSP(F) threads of the same size as the pipe. Use pipe nipples of adequate length to fix it in the

SWITZER INSTRUMENT LIMITED
Regd. Off : 14, Thanikachalam Road, P.B.No.1423, Chennai 600 017.

Internet web–site
www.switzerinstrument.com

SALES – HEAD OFFICE
9, South Boag Road, Chennai 600 017
Ph : 044–4340999 / 4343956 / 4344321
Fax : 044–4347887 **e-mail :** sales@switzerinstrument.com

WORKS OFFICE AT CHENNAI
127 Sidco Estate, Chennai 600 098
Ph : 044–6242244 / 6242255 / 6243355 / 6248849
Fax : 044–6258739 E–mail : works@switzerinstrument.com

0502 IM–BM/BGM/GK–BM Rev.1

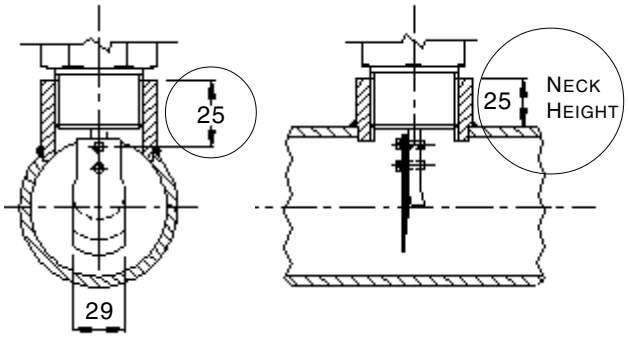
pipe. A pipe union is recommended to be used to facilitate easy removal for cleaning or maintenance.

Caution : ***Do not remove the integral tee while installing as this will lead to damage to the paddle.***

Flow Switch with Threaded Connection

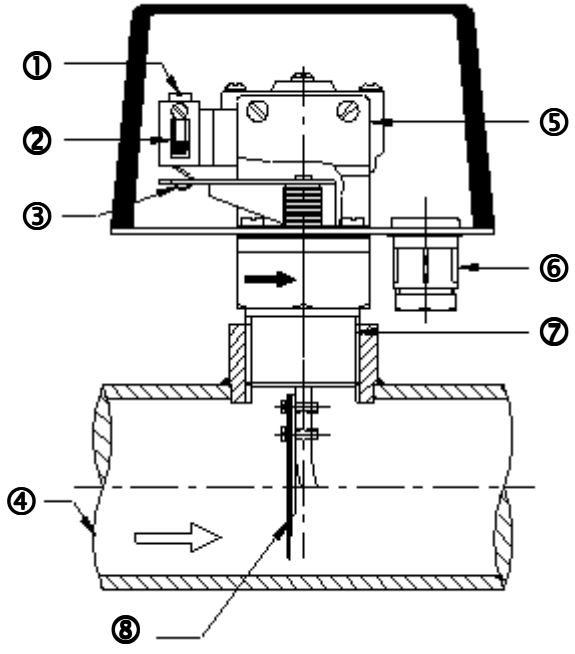
Drill or burn a 30 mm dia (min) hole in the pipe. Ensure that the hole is free of sharp edges or bur.

Weld a 1" BSP female boss to the pipe. Ensure that the boss height does not exceed 25mm from the top surface of the pipe line and also that the boss is perfectly vertical.



Before installation remove the top cover and unhook the range spring from the balancing plate. This will ensure that no strain is caused to bellows if the paddle rubs the pipe slightly while screwing down the flow switch to the threaded boss. Failure to do so might strain the bellows and damage it irreparably.

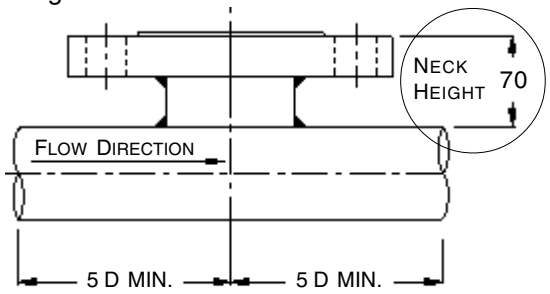
After installing rehook the spring without fail and refix the cover properly. Refer ③ in figure below.



① Range Adj. Screw
② Range Lock Plate
③ Spring Hook
④ Customer's Scope
⑤ Microswitch Rated 230V; 12 Amps AC
⑥ M16 PVC Cable Gland O.D 7.5 to 8.5 (std fitting)
⑦ 1" BSPM Process Connection
⑧ Paddle assembly

Flow Switch with Flanged Connection

Weld a mating flange of correct size and rating to the pipe. Ensure that the height of the raised face of the flange is 70 mm from the top surface of the pipe. The flange must be vertical and the entry hole must be free from rough edges and bur.



Notes for Installation

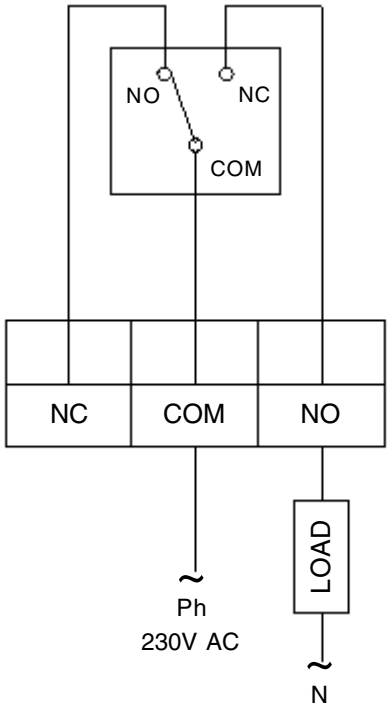
1. Flush the pipe system before fitting the flow switch.
2. Adjust the flow switch in position such that the paddle is at right angles to the flow and the arrow mark shown on the body is in the same direction flow.
3. Tighten the flow switch properly. Apply thread seal if necessary. Ensure gasket is in position in flanged version.
4. Carry out wiring referring to the wiring diagram.

Note : The microswitch is in 'actuated' condition, when the flow switch is in non-operated condition i.e., 'NO Flow' or 'Low Flow' conditions. In this condition, the "NO" contact is in 'Closed' position and the "NC" contact is in 'Open' position.

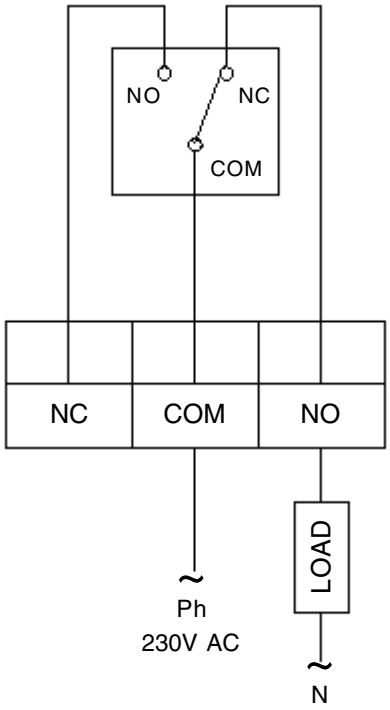
When flow is established, the paddle is deflected and the microswitch changes to 'de-actuated' position. The "NO" contact gets 'Open' and "NC" contact 'Closed'.

So carry out wiring as indicated in the wiring schematics ignoring the markings on the microswitch.

Wiring Diagram — Before Paddle Actuation



Wiring Diagram — After Paddle Actuation



Commissioning

1. Check operation of flow switch to ensure that the paddle is free to move inside the pipe and does not rub the sides.

2. Prior to operation fill the system completely with process liquid and eliminate air.

3. Ensure that the control circuit does not overload the contacts of the microswitch.

4. Ensure that the minimum & maximum pressures and operating temperature are well within the specified limits.

5. Ascertain the availability of minimum flow required for proper operation.

Switch Setting

The flow switch is preset at factory prior to despatch as specified in the purchase order. In case the order does not specify the actuation point, it is factory set to actuate at the minimum limit on falling flow.

If it is necessary to change the setting of the flow or no-flow conditions at side, proceed as below.

a. Remove cover

b. Allow fluid to flow through the pipe line and monitor the volume following over a period of time. From this arrive at flow rate in litres per miniute (LPM).

c. Regulate flow to desired limit. For falling flow the flow switch should actuate when rate of flow comes down from above the limit and vice versa for rising flow.

d. Turn adjustment screw clockwise to reduce actuating point and anti-clockwise to increase setpoint.

e. After setting the switch re-confirm by increasing and decreasing flow a few times.

f. Replace cover.

Now the flow switch is in service.

MAINTENANCE

No specific maintenance is required.

Periodic checking of the following will ensure trouble free performance over long period.

1. Check contacts of wires connected to the microswitch terminals.

2. Smear a little grease where the microswitch lever screw touches the balancing arm once in six month.

3. Keep, the cover screw and the cable gland tight to ensure weatherproofness.

Notes on Precautions

1. Do not exceed maximum operating pressure and temperature specified.

2. Use the device only for the medium for which it was intended. Changes in the medium's physical characteristics such as viscosity, density will affect the set values. Change in the chemical properties may adversely affect the wetted parts. Consult Switzer when in doubt.

3. Do not exceed the maximum flow rate (design maximum).

4. The system pressure should be sufficiently high to overcome the pressure drop across the Flow switch.

5. Avoid pressure shocks and excess deflection which may otherwise reduce the life of the switch.

6. In processes where sediments and suspended particles exist use dirt trap or filter.

7. Inverted installation is recommended only when used for clean medium.

8. Ensure that the control circuit does not overload the contacts of the microswitch.

9. Use arc suppresses across switch contacts to enhance contact life.

TABLE – 1 : FLOW DATA FOR SCREWED VERSION BM, BGM, GK–BM

Line Size in mm NB	Paddle Length in mm 'L'	Switching Range LPM Water Diffl. ± 10% of Max. Flow				Max. Flow (LPM Water)
		ON Falling Flow		ON Rising Flow		
		Min.	Max.	Min.	Max.	
15 *	Special Paddle	3	9	8	12	21
20 *		4	11	9	14	38
25 *	34	10	30	16	33	60
32	34	13	50	23	52	100
32 §	34, 37	13	50	23	52	100
40	34, 37	16	60	30	70	150
40 §	34, 40	16	60	30	70	150
50	34, 50	36	90	60	95	250
50 §	34, 57.5	36	90	60	95	250
65	34, 50, 65	45	120	85	135	400
80	34, 65, 80	65	175	120	200	600
100	34, 65, 80	190	460	290	490	1000
100	34, 65, 80, 100	100	280	190	300	1000
125	34, 65, 80	380	890	530	910	1500
125	34, 65, 100, 120	150	420	300	470	1500
150	34, 65, 80	600	1360	840	1420	2000
150	34, 65, 110, 145	200	510	415	635	2000
200	34, 65, 80	1210	2760	1610	2700	3700
200	34, 80, 120, 166	650	1510	1130	1750	3700
250	34, 65, 80	1970	3830	2700	4500	6000
250	34, 80, 135, 180	1240	2410	2000	3130	6000
300	34, 65, 80	2600	4830	3700	6000	8500
300	34, 100, 166, 210	2000	3000	3200	4800	8500

* *With Integral Tee only* § *Integral Tee optional*

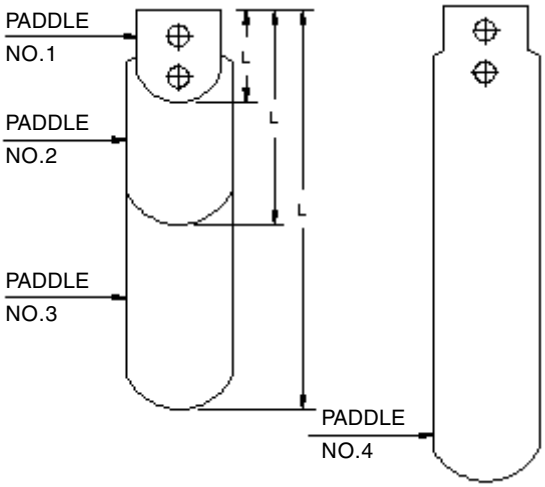
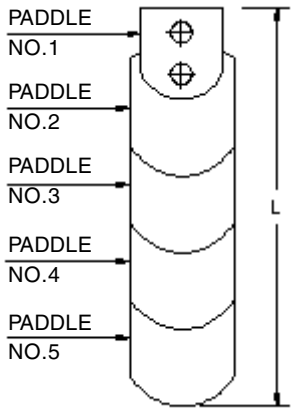


TABLE – 2 : FLOW DATA FOR FLANGED VERSION BM, BGM, GK–BM

Line Size in mm NB	Paddle Length in mm 'L'	Switching Range LPM Water Diffl. ± 10% of Max. Flow				Max. Flow (LPM Water)
		ON Falling Flow		ON Rising Flow		
		Min.	Max.	Min.	Max.	
40	72, 89, 89, 100, 100	16	60	30	70	150
50	89, 100, 100, 110, 110	36	90	60	95	250
65	100, 110, 110, 120, 120	45	120	85	135	400
80	110, 120, 120, 135, 135	65	175	120	200	600
100	110, 120, 120, 135, 135	190	460	290	490	1000
100	120, 135, 135, 145, 145	100	280	190	300	1000
125	110, 120, 120, 135, 135	380	890	535	910	1500
125	135, 145, 145, 166, 166	150	420	300	470	1500
150	110, 120, 120, 135, 135	600	1360	840	1420	2000
150	145, 166, 166, 180, 180	200	510	415	635	2000
200	110, 120, 120, 135, 135	1210	2760	1610	2700	3700
200	166, 180, 180, 210, 210	650	1510	1130	1750	3700
250	110, 120, 120, 135, 135	1970	3830	2700	4500	6000
250	180, 210, 210, 225, 225	1240	2410	2000	3130	6000
300	110, 120, 120, 135, 135	2600	4830	3700	6000	8500
300	210, 225, 225, 250, 250	2000	3000	3200	4800	8500

* ***Flanged version not available for 15, 20, 25 & 32 mm NB Lines.***



Note : Depending upon the flow range upto 5 paddles are provided. It is necessary to retain smaller paddles to provide structural strength to the longer paddles.

So ***do not remove or discard*** smaller paddles.