

# FlowCon SM

**Pressure Independent Control Valves**  
**50-250 mm / 2"-10"**



## SPECIFICATIONS

### **Valve:**

Static pressure:	4000 kPa / 580 psi
Ambient temperature:	-10°C to +50°C / +14°F to +122°C
Media temperature:	-20°C to +120°C / -4°F to +248°C
Material:	
- Housing and covers:	Ductile iron ASTM A395 Grade 60-40-18
- Metal components (internal):	Stainless steel
- Stem seal and O-rings:	EPDM
- Diaphragm:	Hydrogenated acrylonitrile-butadiene-rubber
Stroke:	2160° (SM.6: 3600°)
Maximum close off pressure:	800 kPa / 116 psi
Maximum operational ΔP:	800 kPaD / 116 psid
Maximum allowable operating pressure:	1600 kPaD / 232 psid
Control characteristic:	Linear flow (may be converted to equal%, linear rotation or linear signal on actuator)
Control range:	1:1000 / IEC 60534
Rangeability:	>100:1
Turn down ratio:	228:1
Shut-off leakage:	ANSI / FCI 70-2 206 / IEC 60534-4 - Class IV
Flow rate range:	1.48-76.8 l/sec / 23.4-1220 GPM
End connection:	Universal flange connections which can be used with both ISO and ANSI flanges. Mounting kits are not supplied by FlowCon
Body taps:	1/4" ISO

## SPECIFICATIONS

### FlowCon Actuator:

#### FlowCon SM.0.0.0.3, SM.0.0.0.4, SM.0.0.0.5 (with BACnet) and SM.0.0.0.6 (with BACnet) actuators<sup>1</sup>

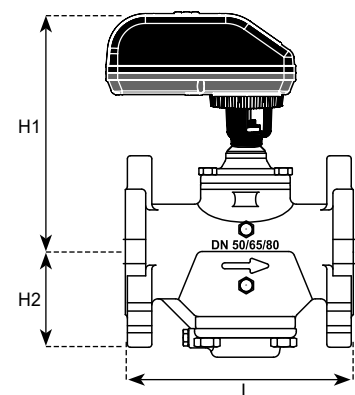
Supply voltage:	22-26V AC, 50/60 Hz or 28-32V DC
Type:	Electrical, Bi-directional synchronous motor
Power consumption:	12VA For failsafe versions: 25VA (peak)
Control signal:	Analog 0(2)-10V DC or 0(4)-20mA and digital 3-point-floating or 2-position
Resolution:	1:1000 (0-10V analog) and 1:800 (2-10V analog)
Feedback:	Linear signal Auto (equal to analog control signal), 0-10V DC, 2-10V DC or 4-20mA
Control mode:	Linear flow, Equal percentage, Linear rotation or Linear signal
Failsafe function:	Yes (on SM.0.0.0.4 and SM.0.0.0.6)
Manual override:	Yes
Position indicator:	No
Operation time:	SM.3-5: 190 sec (from closed to fully open valve) SM.6: 317 sec (from closed to fully open valve)
Ambient temperature:	-10°C to +50°C / +14°F to +122°F
Humidity rating:	5..95% rH, no condensation
Protection:	IP54 including upside-down mounting
CE conformity:	EN 60730, class II
Housing material:	UL94 V0-rated plastic
Programming:	Programming of all settings on interface with buttons and display or via BACnet
Cable:	Fixed, 5 wires x 0.80 mm <sup>2</sup> , halogen free, 1 meter Fixed, 5 wires x AWG18, halogen free, 3.2 ft Additional for BACnet versions: Fixed, 3 wires x 0.80 mm <sup>2</sup> , halogen free, 1 meter Fixed, 3 wires x AWG18, halogen free, 3.2 ft
Calibration:	Automatic at startup
Valve-actuator coupling:	Easy snap coupling
BACnet device profile:	BACnet Application Specific Controller (B-ASC) type server
BACnet protocol:	BACnet Master Slave/Token passing (MS/TP)
BACnet baud rates supported:	9600, 19200, 38400 and 76800
BACnet services (BIBBS) supported:	DS-RP-B, DS-WP-B, DM-DDB-B, DM-DOB-B and DM-DCC-B

Note 1: FlowCon warranty is voided using other actuators than supplied or recommended by FlowCon International.

## DIMENSIONS AND WEIGHT (NOMINAL)

Model no.	Valve size mm (in)	L mm (in)	H1 mm (in)	H2 mm (in)	Weight <sup>2</sup> kg (lb)
SM.3.X	50 (2)	224 (8.82)	252 (9.92)	95.0 (3.74)	14.0 (30.9)
	65 (2 1/2)				
	80 (3)				
SM.4.X	80 (3)	320 (12.6)	292 (11.5)	135 (5.31)	31.0 (68.3)
	100 (4)				32.0 - SM.4.3 (70.5 - SM.4.3)
SM.5.X	125 (5)	422 (16.6)	343 (13.5)	180 (7.09)	61.0 (134)
	150 (6)				
SM.6.2	200 (8)	725 (28.5)	472 (18.6)	292 (11.5)	248 (547)
	250 (10)				

Note 2: Weight includes valve and actuator.



## MODEL NUMBER SELECTION<sup>3</sup>

SM . . . . . B . . . . .

Insert valve body size:  
**3**=DN50-80 / 2"-3"    **4**=DN80-100 / 3"-4"    **5**=DN125-150 / 5"-6"    **6**=DN200-250 / 8"-10"

Insert dP control range:  
**0**=30-800 kPaD, 4.5-116 psid (SM.3 only)  
**1**=30-800 kPaD, 4.5-116 psid  
**2**=35-800 kPaD, 5.1-116 psid  
**3**=50-800 kPaD, 7.3-116 psid (SM.4 only)

Insert p/t plug requirements:  
**B**=p/t plugs (standard)

Insert actuator selection:  
**3**=display (SM.0.0.0.3)    **4**=display and failsafe (SM.0.0.0.4)    **5**=display and BACnet (SM.0.0.0.5)    **6**=display, BACnet and failsafe (SM.0.0.0.6)

Example: FlowCon SM.3.1.B.4=SM DN50-80 body for 30-800 kPaD with p/t plugs and failsafe actuator.

Note 3: Model no. and pressure range are indicated on label affixed to body.

## FLANGE MATCH

Model no.	Flange size (inch)	ASME B16.5 weld neck		Flange size (mm)	EN1092-1 weld neck			
		Class 150	Class 300		PN10	PN16	PN25	PN40
SM.3.X	2			50	✓	✓	✓	✓
	2 1/2	✓	✓	65	✓	✓	✓	✓
	3	✓	✓	80	✓	✓	✓	✓
SM.4.X	3	✓	✓	80	✓	✓	✓	✓
	4	✓	✓	100	✓	✓	✓	✓
SM.5.X	5	✓	✓	125	✓	✓	✓	✓
	6	✓		150	✓	✓	✓	✓
SM.6.2	8		✓	200			✓	✓
	10	✓		250	✓	✓	✓	✓

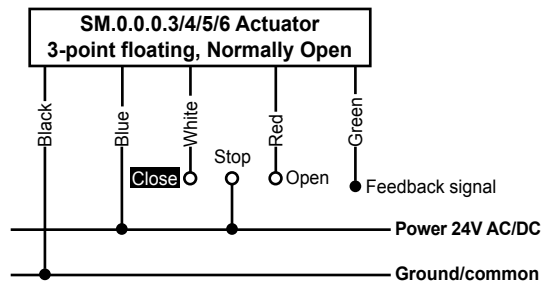
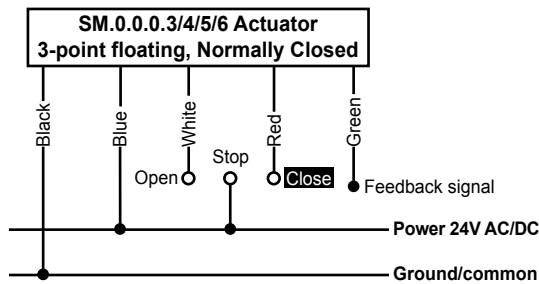
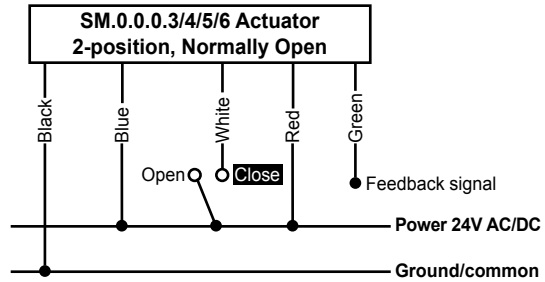
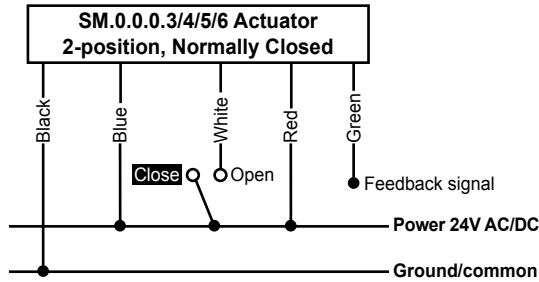
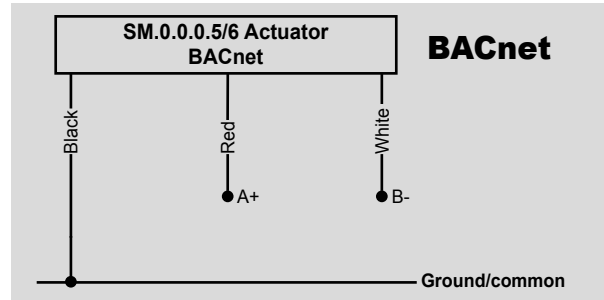
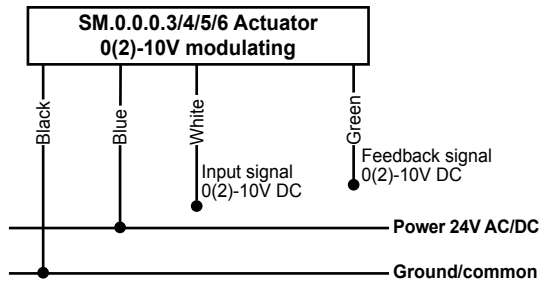
## DESCRIPTION

The SM series is a range of self-balancing dynamic flow control valves that are pressure independent and 2-way and ready to accept digital or analog input signals. Each valve has an adjustable maximum flow rate setting to enable flow limitation to and balancing of the coil or zone which the valve is controlling.

All SM actuators are microprocessor based with a self-calibrating feature. The SM actuator range includes standard incl. feedback, failsafe and BACnet. All SM actuators are programmable and with display. The SM actuators accept analog 0(2)-10V DC or 0(4)-20mA as well as digital 3-point floating or 2-position input signals and work with selectable control mode of Linear flow, Equal percentage, Linear rotation or Linear signal.

The larger range of SM-valves are all designed for double flange connection. They are available in four different valve body sizes. All shall have snap connection for fast mounting of actuator.

## WIRING INSTRUCTION



Note: If feedback signal is not required, leave green wire detached.

## FLOW RATE TABLE

Model no.	Valve size		Control range		Lowest settable max flow			Turn down ratio lowest max flow	Highest settable max flow			Turn down ratio highest max flow
	mm	inch	kPaD	psid	l/sec	l/hr	GPM		l/sec	l/hr	GPM	
SM.3.0	50/65/80	2 / 2 1/2 / 3	30-800	4.5-116	1.48	5310	23.4	38:1	4.16	15000	65.9	228:1
SM.3.1	50/65/80	2 / 2 1/2 / 3	30-800	4.5-116	2.57	9240	40.7		7.15	25700	113	
SM.3.2	50/65/80	2 / 2 1/2 / 3	35-800	5.1-116	3.55	12800	56.3		9.89	35600	157	
SM.4.1	80/100	3 / 4	30-800	4.5-116	3.49	12600	55.4		9.38	33800	149	
SM.4.2	80/100	3 / 4	35-800	5.1-116	4.73	17000	75.0		14.2	51000	225	
SM.4.3	80/100	3 / 4	50-800	7.3-116	3.68	13300	58.3		20.2	72700	320	
SM.5.1	125/150	5 / 6	30-800	4.5-116	6.48	23400	103		23.3	83800	369	
SM.5.2	125/150	5 / 6	35-800	5.1-116	7.10	25600	113		29.5	106000	468	
SM.6.2	200/250	8 / 10	35-800	5.1-116	9.21	33100	146		76.8	277000	1220	

Accuracy: Greatest of either  $\pm 5\%$  of controlled flow rate or  $\pm 2\%$  of maximum flow rate.



## FLOW RATE SETTINGS<sup>5</sup> - VALVE SIZE DN125-DN250

<b>Maximum Flow Rate</b>					
Valve size: DN125 and DN150 · 5"-6"					
30-800 kPaD 4.5-116 psid			35-800 kPaD 5.1-116 psid		
<b>SM.5.1</b>			<b>SM.5.2</b>		
l/sec	l/hr	GPM	l/sec	l/hr	GPM
6.48	23300	103	7.10	25600	113
7.24	26100	115	8.06	29000	128
7.98	28700	126	8.98	32300	142
8.70	31300	138	9.87	35500	157
9.39	33800	149	10.7	38600	170
10.1	36200	160	11.6	41600	183
10.7	38600	170	12.4	44500	196
11.4	40900	180	13.1	47300	208
12.0	43100	190	13.9	50000	220
12.6	45200	199	14.6	52600	232
13.1	47300	208	15.3	55100	243
13.7	49300	217	16.0	57500	253
14.2	51200	226	16.6	59800	264
14.8	53100	234	17.2	62100	273
15.3	54900	242	17.8	64200	283
15.7	56600	249	18.4	66300	292
16.2	58300	257	19.0	68300	301
16.6	59900	264	19.5	70200	309
17.1	61500	271	20.0	72100	317
17.5	63000	277	20.5	73800	325
17.9	64400	284	21.0	75500	333
18.3	65800	290	21.4	77200	340
18.6	67100	295	21.9	78700	347
19.0	68300	301	22.3	80200	353
19.3	69500	306	22.7	81700	360
19.6	70700	311	23.1	83100	366
19.9	71700	316	23.4	84400	372
20.2	72800	320	23.8	85700	377
20.5	73800	325	24.1	86900	383
20.7	74700	329	24.5	88100	388
21.0	75600	333	24.8	89200	393
21.2	76400	336	25.1	90300	398
21.4	77200	340	25.4	91400	402
21.6	77900	343	25.7	92400	407
21.8	78600	346	25.9	93400	411
22.0	79200	349	26.2	94300	415
22.2	79800	351	26.5	95200	419
22.3	80300	354	26.7	96100	423
22.5	80800	356	26.9	97000	427
22.6	81300	358	27.2	97800	431
22.7	81700	360	27.4	98600	434
22.8	82100	361	27.6	99400	438
22.9	82400	363	27.8	100000	441
23.0	82700	364	28.1	101000	445
23.0	83000	365	28.3	102000	448
23.1	83200	366	28.5	102000	451
23.2	83400	367	28.7	103000	455
23.2	83500	368	28.9	104000	458
23.2	83600	368	29.1	105000	461
23.3	83700	369	29.3	105000	464
23.3	83800	369	29.5	106000	468

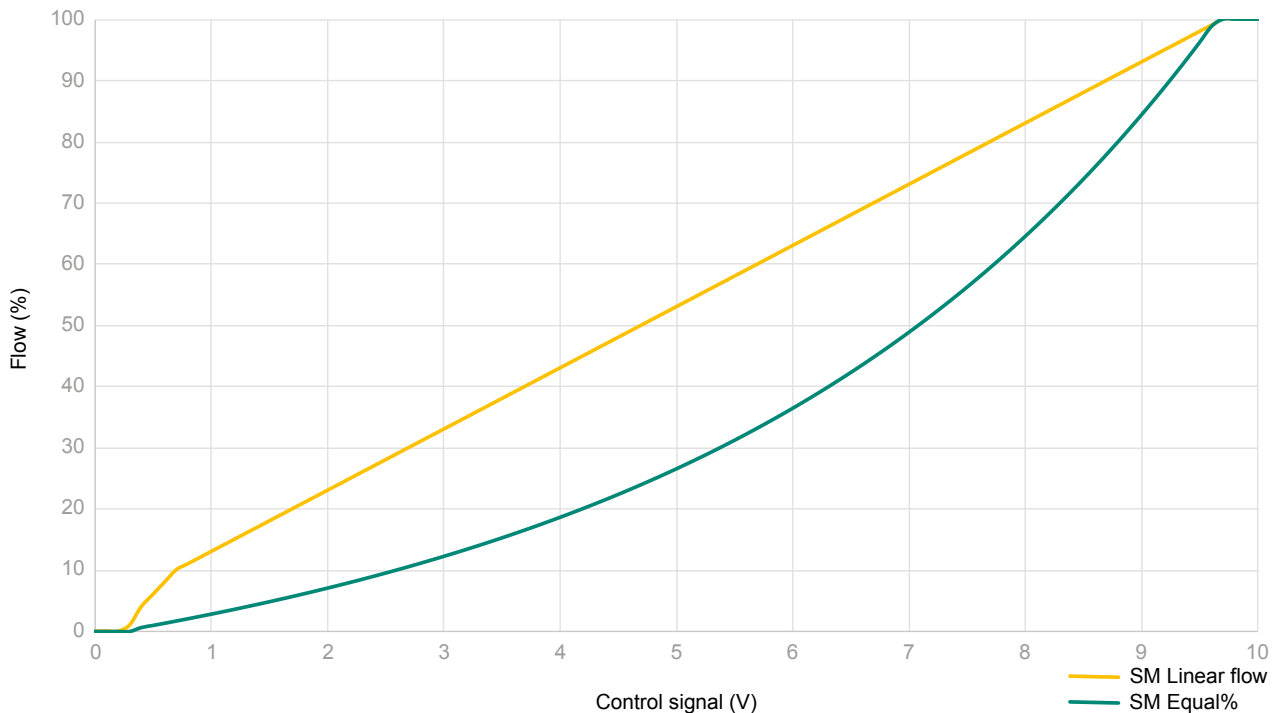
<b>Maximum Flow Rate</b>					
Valve size: DN200 and DN250 · 8"-10"					
35-800 kPaD 5.1-116 psid					
<b>SM.6.2</b>					
l/sec	l/hr	GPM	l/sec	l/hr	GPM
9.21	33100	146	57.5	207000	911
9.69	34900	154	58.3	210000	924
10.2	36800	162	59.1	213000	936
10.8	38900	171	59.8	215000	948
11.5	41200	182	60.6	218000	960
12.1	43700	192	61.3	221000	972
12.9	46300	204	62.0	223000	983
13.6	49100	216	62.7	226000	994
14.5	52000	229	63.4	228000	1000
15.3	55100	242	64.0	230000	1010
16.2	58200	256	64.6	233000	1020
17.1	61500	271	65.2	235000	1030
18.0	64900	286	65.8	237000	1040
19.0	68400	301	66.4	239000	1050
20.0	71900	317	66.9	241000	1060
21.0	75600	333	67.4	243000	1070
22.0	79300	349	68.0	245000	1080
23.1	83100	366	68.4	246000	1080
24.1	86900	383	68.9	248000	1090
25.2	90800	400	69.4	250000	1100
26.3	94700	417	69.8	251000	1110
27.4	98700	435	70.2	253000	1110
28.5	103000	452	70.6	254000	1120
29.6	107000	470	71.0	256000	1130
30.8	111000	488	71.4	257000	1130
31.9	115000	506	71.8	258000	1140
33.0	119000	523	72.1	260000	1140
34.2	123000	541	72.5	261000	1150
35.3	127000	559	72.8	262000	1150
36.4	131000	577	73.2	263000	1160
37.5	135000	595	73.5	265000	1170
38.6	139000	613	73.8	266000	1170
39.8	143000	630	74.2	267000	1180
40.9	147000	648	74.5	268000	1180
41.9	151000	665	74.8	269000	1190
43.0	155000	682	75.1	270000	1190
44.1	159000	699	75.5	272000	1200
45.2	163000	716	75.8	273000	1200
46.2	166000	732	76.1	274000	1210
47.2	170000	749	76.5	275000	1210
48.3	174000	765	76.8	277000	1220
49.3	177000	781			
50.2	181000	796			
51.2	184000	812			
52.2	188000	827			
53.1	191000	842			
54.0	194000	856			
54.9	198000	870			
55.8	201000	884			
56.6	204000	898			
57.5	207000	911			

Accuracy: Greatest of either ±5% of controlled flow rate or ±2% of maximum flow rate.

FlowCon International recommends that SM valves are selected to ensure that the set maximum flow rate is minimum 50% of the rated valve maximum capacity.

Note 5: Above indicates selectable maximum flow rates defining the flow through the valve at maximum control signal, normally 10V. Each valve includes up to 1000 positions between the selected max.flow and closed valve with control signal selected to 0-10V.

## CONTROL CURVE



## GENERAL SPECIFICATIONS

### 1. PRESSURE INDEPENDENT DYNAMIC CONTROL VALVES – FLOWCON SM

- 1.1. Contractor shall install pressure independent dynamic control valves where indicated in drawings.
- 1.2. Valve shall be an electronic, dynamic, modulating, 2-way pressure independent control device.
- 1.3. Valve shall accurately control flow, independent of system pressure fluctuation.

### 2. VALVE ACTUATOR

- 2.1. Valve-actuator coupling shall be snap coupling for fast mounting and de-mounting.
- 2.2. Actuator housing shall be rated to IP54 including upside-down mounting.
- 2.3. Actuator shall be driven by a 24V AC/DC motor and shall accept 0(2)-10V, 0(4)-20mA, 3-point floating or 2-position control signal.
- 2.4. Actuator control mode shall be selectable to Linear flow, Equal percentage, Linear rotation or Linear signal.
- 2.5. Actuator shall be capable of providing linear feedback signal to the control system. Feedback signal shall be selectable to Auto (equal to input signal), 4-20mA, 0-10V DC or 2-10V DC.
- 2.6. Automatic calibration of valve position shall be standard.
- 2.7. Actuator shall include buttons for external programming of all settings.
- 2.8. Actuator display showing current valve flow, maximum valve flow, input signal, feedback signal, operational direction and control mode shall be standard.
- 2.9. Optional failsafe versions shall be available. Failsafe versions shall be able to operate valve to either open (max. setting) or closed position from any position in case of power failure.
- 2.10. Optional BACnet versions shall be available. BACnet versions shall provide remote setting and control of actuator.

### 3. VALVE HOUSING

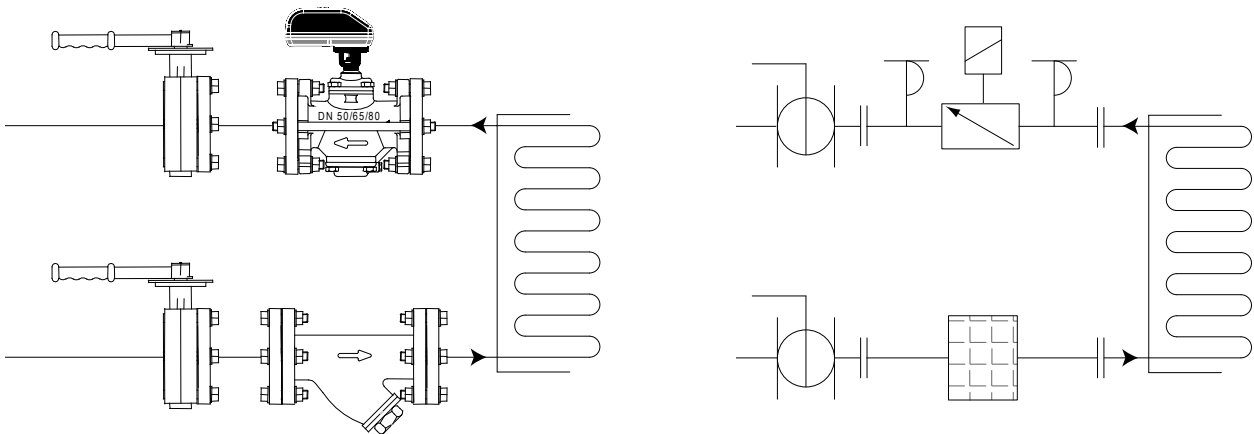
- 3.1. Housing shall consist of ductile iron ASTM A395 Grade-40-18 rated at no less than 4000 kPa (580 psi) static pressure and +120°C (+248°F).
- 3.2. Housing shall be permanently marked to show direction of flow.
- 3.3. Housing shall be for installation between flanges.
- 3.4. Dual pressure/temperature test plugs for verifying accuracy of flow performance shall be standard on all valve sizes.
- 3.5. Identification label according to PED-requirements shall be available for all valves.

## GENERAL SPECIFICATIONS (...continued)

### 4. FLOW REGULATOR / AUTOMATIC BALANCING UNIT

- 4.1. Maximum flow setting shall be adjustable to minimum 51 different settings within the range of the valve size.
- 4.2. Flow regulation unit shall be manufactured of stainless steel and hydrogenated acrylonitrile-butadiene-rubber and shall be capable of controlling flow within  $\pm 5\%$  of controlled flow rate of  $\pm 2\%$  of maximum flow rate.
- 4.3. Flow regulation unit shall be accessible for change-out or maintenance.

## APPLICATION AND SCHEMATIC EXAMPLE



## UPDATES

For latest updates please see [www.flowcon.com](http://www.flowcon.com)

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