INSTALLATION AND OPERATION INSTRUCTION

FlowCon SM 15-40mm, 1/2”-1 1/2”

Install the **FlowCon SM** valve either in the supply or return pipe work for the unit. It is recommended that a strainer be installed prior to the valve body to prevent damage or blockage due to debris. INSTALL THE VALVE HOUSING WITH THE FLOW DIRECTIONAL ARROW POINTING IN THE CORRECT DIRECTION.

The valve body is available with double union end connections. Two types of end connections are available for use with the union nut:

Threaded (male or female):
The threads on both the connection and piping should be cleaned carefully.
As these models are union end connected, the union nuts and the end connections should be removed for installation.

O-rings are supplied with the valve body and are used to seal the connections. It is recommended to grease the o-rings with a silicone grease before installation. **IMPORTANT:** Never use mineral oil or petrol based grease or oil on the o-rings. Please make sure these are in place in the o-ring grooves in the inlet and outlet of the valve body, when installing the housing and REMEMBER TO TIGHTEN THE UNIONNUTS TO ENSURE SEALING.

For all threaded connections pls. clear threads on both valve and piping of debris. Sealant such as pipe dope or teflon tape is recommended. WHEN USING HEMP AS PIPE SEALANT, ENSURE NO STRANDS ARE LEFT IN THE VALVE OR PIPING.

Soldered end (sweat):
REMOVE THE END CONNECTIONS FROM THE HOUSING BEFORE SOLDERING. THIS ENSURES THAT THE O-RINGS AND INTERNAL PARTS ARE NOT DAMAGED BY HEAT.

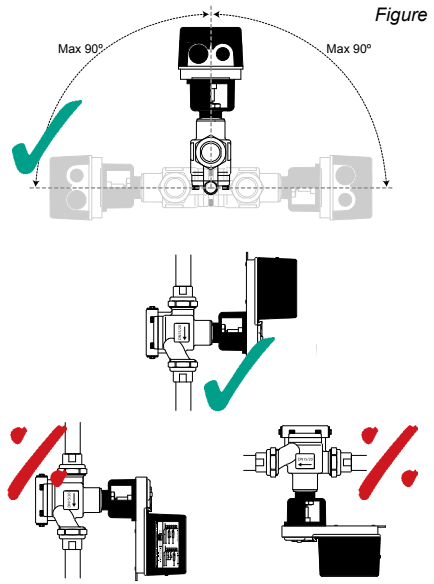
Valve bodies are as standard supplied with body tappings **plugged**, each plug sealed with a gasket.

Alternatively, **pressure/temperature fittings** (p/t plugs) are available. Before finger mounting the p/t plugs in the body tappings, pls. seal the threads of the p/t plugs (DO NOT OVER TIGHTEN).

Fitting and orientation of the actuator

Pls. install the valve so that the actuator is located upwards and not lower than the horizontal line to prevent condensation into the electronics (pls. see figure 1 below).

Figure 1



Valve and actuator mounting components and tool are shown in figure 2.

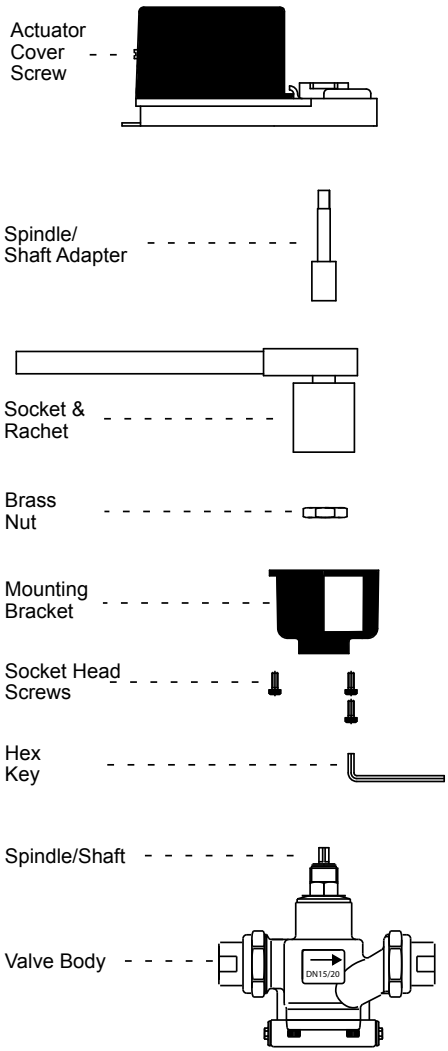


Figure 2

Actuator wiring and programming

Remove the actuator cover by loosening the cover screw. Figure 3 illustrates the actuator circuit board layout and all relevant components when programming the actuator. Set the maximum flow DIP switches (refer to table on page 6). If adjusting the DIP switch settings after power has been connected, press the reset button to input the new setting.

Figures 4-8 illustrate the different signal requirements, i.e. **Analog 2-10V, Analog 4-20mA** and **Digital Tri-state** and how to apply resistors and wires. Connect the wiring according to the selected input signal.

500ohm resistors (the blue ones) are supplied for 4-20mA to 2-10V conversion and connected as illustrated in figure 4 (2-10V) or figure 5 (4-20mA).

Two 2.2Kohm resistors (the brown ones) are supplied for special consideration for digital/ tri-state control. In this mode the actuator is sensitive to induced electrical voltages from other sources. To prevent such interference, wire one 2.2Kohm resistor between pins 1 and 4 and the second 2.2Kohm resistor between pins 1 and 3 (see figures 6 and 7).

Figure 3

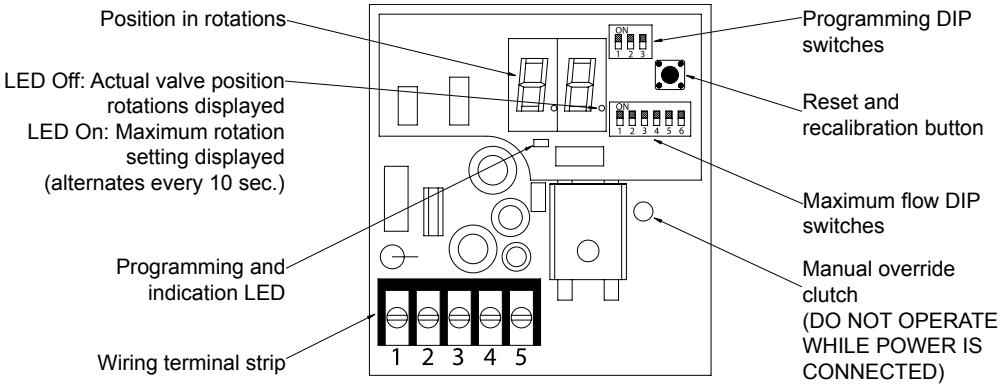


Figure 4

ANALOG

2-10VDC input and
2-10VDC feedback

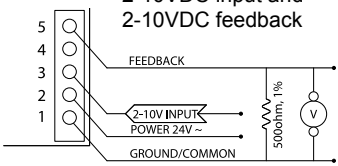


Figure 5

ANALOG

4-20mA input and
4-20mA feedback

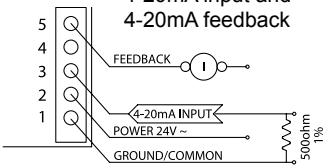


Figure 6

DIGITAL TRI-STATE

2-10VDC feedback

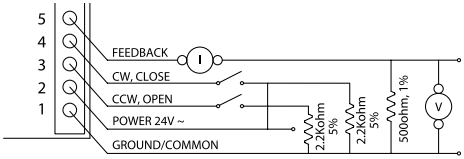
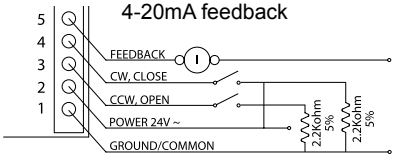


Figure 7

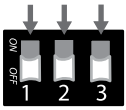
DIGITAL TRI-STATE

4-20mA feedback



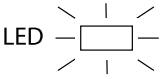
The actuator is factory preset for an analog signal. If the signal requirement must be changed, proceed with the instruction below:

Remove power and set all programming DIP switches to OFF.



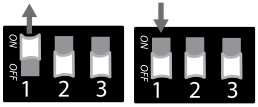
Apply power and within 10 seconds, press and release the reset button.

The programming and indication LED should start blinking.

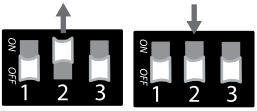


Turn programming DIP switch #1, #2 or #3 ON, then OFF to select signal requirement.

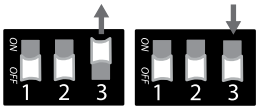
Switch #1:
Digital/3-Point-Floating/Tri-state.



Switch #2:
PWM Pulse Width Modulation.
(not available on SM.0.0.0.1)



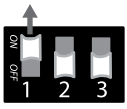
Switch #3:
Analog
2-10V or 4-20mA.



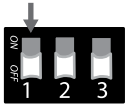
Normally Open or Normally Closed function setting

The actuator is delivered from factory set to Normally Closed and an analog control signal so that a minimum signal of 2V or 4mA will close the valve and maximum signal of 10V or 20mA will open the valve to selected maximum flow. If changing to Normally Open, see below:

For Normally Open set programming switch #1 to ON.



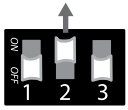
For Normally Closed set programming switch #1 to OFF.



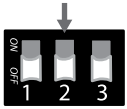
Failsafe Open or Failsafe Closed function setting

This function applies to battery back up failsafe models only. It provides power storage to drive the actuator either open to the maximum flow setting or fully closed in the event of a power supply failure. As standard the actuator is set to Failsafe Closed.

For Failsafe Open set programming switch #2 to ON.

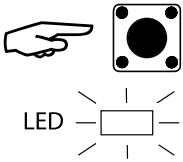


For Failsafe Closed set programming switch #2 to OFF.

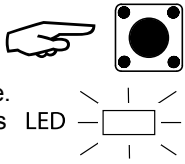


Actuator Zero and Span adjustment

Remove power from the actuator. Re-apply power to terminal 2 and within 10 seconds, press and hold the reset button until the indication LED blinks once.
Release the reset button. The indication LED should remain illuminated.

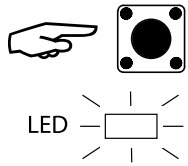


Apply the new zero voltage to terminal 3 (any value between 0 and 7VDC).
Press and release the reset button to memorize this value.
The LED should blink once as confirmation.



Apply the new maximum voltage to terminal 3 (any value between 3 and 10VDC and at least 3VDC greater than the zero value).

Press and release the reset button to memorize this value. The indication LED should blink once as confirmation and then cease to be illuminated.



The actuator will now operate with the new zero value and span.

FAILURE: If the LED provides 3 sequences of 4 blinks, the zero and span programming was unsuccessful. This may occur if the difference between the zero and maximum voltages was not equal or grater than 3VDC.

NOTE: The feedback signal will always be 4-20mA or 2-10V and independent of the zero and span adjustment.

Circuit board diode over-torque warning signal

Continual blinking indicates that the actuator torque output limit has been exceeded.
This may have been caused by debris in the valve internals. Disconnect power and manually operate the valve to clear the debris.
Re-apply power. The actuator will automatically recalibrate and reset. If the problem re-occurs, remove the valve body and check for debris.

Manual over-ride operation

Remove actuator cover and DISCONNECT POWER. Failure to disconnect power may cause damage to the actuator gears. Fit the manual over-ride key (FlowCon No. ACC0001) onto the valve spindle. Press the clutch. Rotate the manual over-ride key to open or close the valve as required.

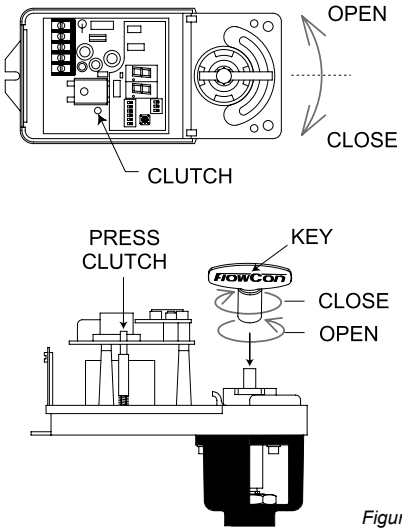


Figure 8

General

Water must always be suitable treated, clean and free of debris. It is recommended that a strainer be installed prior to the valve body to prevent damage or blockage due to debris. Ensure that the valve is not in the fully closed position when filling the system with water. Further, it is recommended not to exceed maximum differential pressure control range.

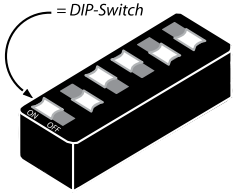
Warranty obligation

Failure to abide by all recommendations as per this installation and operation instruction will void warranty.

For latest updates please see www.flowcon.com

Maximum flow rate limitation DIP switch settings

Maximum Flow Rate						Maximum Flow Rate DIP Switch Settings						Stem Rotations From Closed
DN15-DN25 · 1/2"-1"			DN25-DN40 · 1"-1 1/2"									
32-320 kPaD · 4.6-46 psid			40-320 kPaD · 5.8-46 psid									
SM.1.1			**SM.2.1**									
l/sec	l/hr	GPM	l/sec	l/hr	GPM	1	2	3	4	5	6	Rotations
0.176	634	2.79	0.513	1850	8.14	ON	ON	ON	ON	ON	ON	1.0
0.195	703	3.10	0.573	2060	9.09	OFF	ON	ON	ON	ON	ON	1.1
0.214	771	3.40	0.632	2280	10.0	ON	OFF	ON	ON	ON	ON	1.2
0.233	838	3.69	0.690	2480	10.9	OFF	OFF	ON	ON	ON	ON	1.3
0.251	902	3.97	0.746	2690	11.8	ON	ON	OFF	ON	ON	ON	1.4
0.268	964	4.25	0.802	2890	12.7	OFF	ON	OFF	ON	ON	ON	1.5
0.285	1020	4.52	0.856	3080	13.6	ON	OFF	OFF	ON	ON	ON	1.6
0.301	1080	4.78	0.909	3270	14.4	OFF	OFF	OFF	ON	ON	ON	1.7
0.317	1140	5.03	0.961	3460	15.2	ON	ON	ON	OFF	ON	ON	1.8
0.332	1200	5.27	1.01	3640	16.0	OFF	ON	ON	OFF	ON	ON	1.9
0.347	1250	5.51	1.06	3820	16.8	ON	OFF	ON	OFF	ON	ON	2.0
0.362	1300	5.74	1.11	4000	17.6	OFF	OFF	ON	OFF	ON	ON	2.1
0.376	1350	5.96	1.16	4170	18.4	ON	ON	OFF	OFF	ON	ON	2.2
0.390	1400	6.18	1.20	4330	19.1	OFF	ON	OFF	OFF	ON	ON	2.3
0.403	1450	6.39	1.25	4500	19.8	ON	OFF	OFF	OFF	ON	ON	2.4
0.416	1500	6.60	1.29	4660	20.5	OFF	OFF	OFF	OFF	ON	ON	2.5
0.428	1540	6.79	1.34	4810	21.2	ON	ON	ON	ON	OFF	ON	2.6
0.440	1590	6.98	1.38	4970	21.9	OFF	ON	ON	ON	OFF	ON	2.7
0.452	1630	7.17	1.42	5120	22.5	ON	OFF	ON	ON	OFF	ON	2.8
0.463	1670	7.35	1.46	5260	23.2	OFF	OFF	ON	ON	OFF	ON	2.9
0.474	1710	7.52	1.50	5400	23.8	ON	ON	OFF	ON	OFF	ON	3.0
0.485	1750	7.69	1.54	5540	24.4	OFF	ON	OFF	ON	OFF	ON	3.1
0.495	1780	7.86	1.58	5680	25.0	ON	OFF	OFF	ON	OFF	ON	3.2
0.505	1820	8.01	1.61	5810	25.6	OFF	OFF	OFF	ON	OFF	ON	3.3
0.515	1850	8.17	1.65	5940	26.2	ON	ON	ON	OFF	OFF	ON	3.4
0.524	1890	8.31	1.69	6070	26.7	OFF	ON	ON	OFF	OFF	ON	3.5
0.533	1920	8.46	1.72	6190	27.3	ON	OFF	ON	OFF	OFF	ON	3.6
0.542	1950	8.60	1.75	6310	27.8	OFF	OFF	ON	OFF	OFF	ON	3.7
0.550	1980	8.73	1.79	6430	28.3	ON	ON	OFF	OFF	OFF	ON	3.8
0.559	2010	8.86	1.82	6550	28.8	OFF	ON	OFF	OFF	OFF	ON	3.9
0.567	2040	8.99	1.85	6660	29.3	ON	OFF	OFF	OFF	OFF	ON	4.0
0.574	2070	9.11	1.88	6770	29.8	OFF	OFF	OFF	OFF	OFF	ON	4.1
0.582	2090	9.23	1.91	6870	30.3	ON	ON	ON	ON	ON	OFF	4.2
0.589	2120	9.34	1.94	6980	30.7	OFF	ON	ON	ON	ON	OFF	4.3
0.596	2150	9.45	1.97	7080	31.2	ON	OFF	ON	ON	ON	OFF	4.4
0.603	2170	9.56	1.99	7180	31.6	OFF	OFF	ON	ON	ON	OFF	4.5
0.609	2190	9.66	2.02	7280	32.1	ON	ON	OFF	ON	ON	OFF	4.6
0.616	2220	9.76	2.05	7370	32.5	OFF	ON	OFF	ON	ON	OFF	4.7
0.622	2240	9.86	2.07	7460	32.9	ON	OFF	OFF	ON	ON	OFF	4.8
0.628	2260	9.96	2.10	7550	33.3	OFF	OFF	OFF	ON	ON	OFF	4.9
0.634	2280	10.0	2.12	7640	33.7	ON	ON	ON	OFF	ON	OFF	5.0
0.639	2300	10.1	2.15	7730	34.0	OFF	ON	ON	OFF	ON	OFF	5.1
0.645	2320	10.2	2.17	7810	34.4	ON	OFF	ON	OFF	ON	OFF	5.2
0.650	2340	10.3	2.19	7890	34.8	OFF	OFF	ON	OFF	ON	OFF	5.3
0.655	2360	10.4	2.21	7970	35.1	ON	ON	OFF	OFF	ON	OFF	5.4
0.661	2380	10.5	2.24	8050	35.5	OFF	ON	OFF	OFF	ON	OFF	5.5
0.666	2400	10.6	2.26	8130	35.8	ON	OFF	OFF	OFF	ON	OFF	5.6
0.671	2410	10.6	2.28	8200	36.1	OFF	OFF	OFF	OFF	ON	OFF	5.7
0.676	2430	10.7	2.30	8280	36.5	ON	ON	ON	ON	OFF	OFF	5.8
0.680	2450	10.8	2.32	8350	36.8	OFF	ON	ON	ON	OFF	OFF	5.9
0.685	2470	10.9	2.34	8420	37.1	ON	OFF	ON	ON	OFF	OFF	6.0



Example illustrated above:
ON-OFF-ON-ON-OFF-OFF
which gives a max flow of:

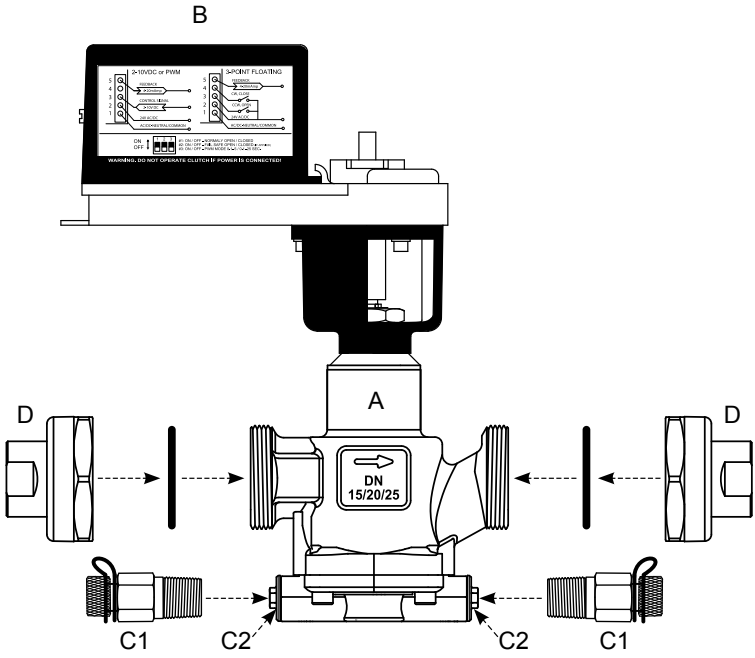
SM.1.1 - 0.685l/sec and
SM.2.1 - 2.34l/sec
(rotation 6.0).

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

Assembly drawing
FlowCon SM

A: Valve housing
B: Actuator
C1: P/t plug (2 pcs.)
C2: Plug and gasket (2 of each)
D: Union end connections.

Figure 9



Own Notes: