

Installation and Operation Instruction

The actuator types **FlowCon FN.0.2**, **FN.0.2-BUS** and **FN.0.4** are electrical actuators.

- FN.0.2 is 24V modulating.
- FN.0.2-BUS is 24V modulating with Modbus or BACnet communication.
- FN.0.4 is 24V 3-point floating and 2-position.

Fitting and Re-fitting



Do not connect power to the actuator unless the actuator is already fitted on the valve and NEVER install the actuator in closed position - this may damage the valve. Actuator is supplied in open position to ensure easy commissioning of the system.

Mount the actuator on the valve and finger tighten the connection union. Do not use additional tools.

In case the actuator will have to be removed, it is recommended for FN.0.2 and FN.0.4 to electrically open the actuator by activating DIP switch #6 for easier removal.

For FN.0.2-BUS set DIP switch #1-6 to OFF and wait until the LED indicator is blinking green. Hereafter, disconnect power and finger loosen the connection union. Again, no need for additional tools. Please make sure that the actuator is electrically opened, before re-fitting it on the valve.

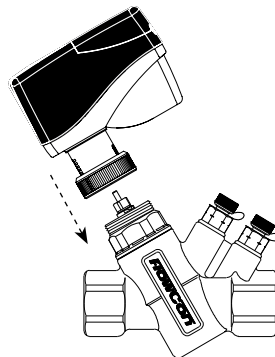


Figure 1

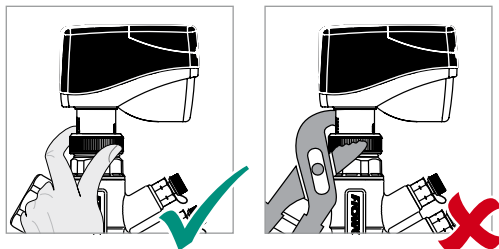


Figure 2

Orientation

Upside-down installation is allowed along with the standard horizontal and vertical installation.

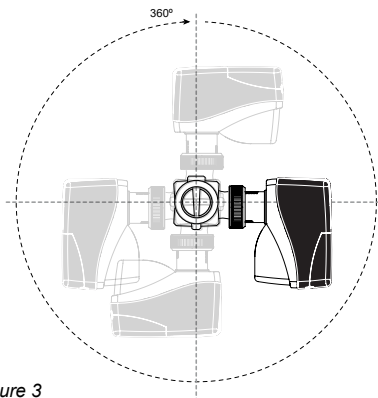
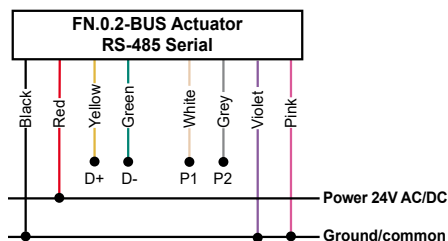
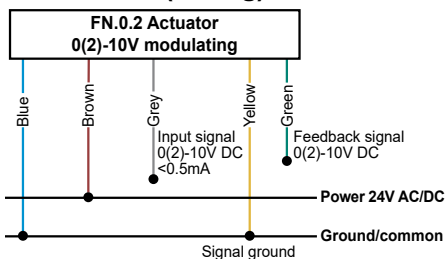


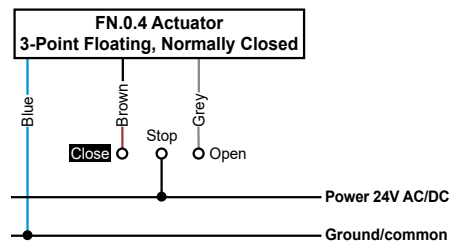
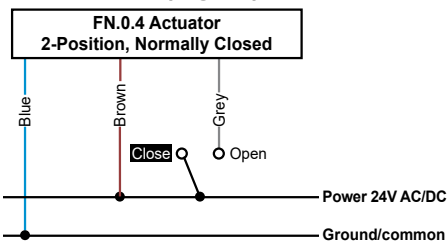
Figure 3

Wiring

FlowCon FN (analog)



FlowCon FN (digital)



PLEASE NOTE: FN.0.4 has a reaction time of 0.8 sec.
This is the time from giving a 24V power signal until
the actuator starts to move. This is particular important
if using a **pulse power signal**.

Start-up Sequence

When power to the actuator is turned on, the actuator will automatically calibrate to determine closing point. Hereafter it will proceed to normal operation mode (according to control signal).

For FN.0.2-BUS, bus address configuration is required and must be done immediate after first power on. Calibration mode and then normal operation mode will follow thereafter.

Auto Cycle Sequence

Auto Cycle can be activated during commissioning. It prevents the valve from jamming when the valve is not moved for a longer period of inactivity. For FN.0.2 and FN.0.4 Auto Cycle is activated by moving DIP switch #1 from OFF to ON. The actuator will then perform 50% stroke cycle every 3 weeks if not stroke movement has occurred.

For FN.0.2-BUS Auto Cycle is activated and cycle time configured via the bus (Modbus register 136 and BACnet AV.10; 0= not activated).

Override

For FN.0.2 and FN.0.4 electrical override is activated by moving DIP switch #6 from OFF to ON. Then the valve will open fully. During override mode the LED indicator will blink red and green. When DIP switch #6 is moved back to OFF, the actuator will re-calibrate and thereafter go into normal operation mode. Electrical override is performed with power supply on.

When performing the manually override procedure on the FN.0.2-BUS, set DIP switches 1 to 6 to OFF and the spindle will fully retract, and the LED will rapidly blink green. In this state the valve can be manually close or opened using a magnet.

To extend actuator spindle and fully close the valve, briefly swipe the magnet along the right-hand side of the actuator (top view and wires downwards). LED indicator is blinking yellow during this 'manual spindle adjustment' mode. To retract the actuator spindle and open the valve fully (mounting position), again briefly swipe the magnet along the right-hand side of the actuator. LED is blinking rapidly green to indicate 'mounting position' mode. Manually override can be repeated as often as necessary.

















Flush Mode (FN.0.2-BUS)

The automatic Flush Mode is activated and cycle time configured via the bus (Modbus register 132 and BACnet AV.35; 0= not activated). In Flush Mode, the valve is temporarily fully opened independent of the control signal to allow easy system flushing.

























DIP Switch Settings

The valve functions are set on DIP switches found under the connection cover. PCB mounted electrical components will not be directly exposed when DIP switches are to be set. Factory setting for all switches is OFF.






FlowCon FN.0.2 Actuator

DIP switch	Function ON		Function OFF
#6	 Electrical override ON	 6  5  4  3  2  1 ON OFF	 Electrical override OFF
#5	No function		No function
#4	 Equal percentage		 Linear
#3	 Normally Open		 Normally Closed
#2	 Control signal 2-10V		 Control signal 0-10V
#1	 Auto cycle ON		 Auto cycle OFF

FlowCon FN.0.2-BUS Actuator

DIP switch	Function ON		Function OFF
#8	 Terminal resistor active	 8  7  6  5  4  3  2  1 ON OFF	 Terminal resistor inactive
#7	 Modbus		 BACnet
#6	 BIT 5 = 1		 BIT 5 = 0
#5	 BIT 4 = 1		 BIT 4 = 0
#4	 BIT 3 = 1		 BIT 3 = 0
#3	 BIT 2 = 1		 BIT 2 = 0
#2	 BIT 1 = 1		 BIT 1 = 0
#1	 BIT 0 = 1		 BIT 0 = 0

FlowCon FN.0.4 Actuator

DIP switch	Function ON		Function OFF
#6	 Electrical override ON		 Electrical override OFF
#5	No function		No function
#4	No function		No function
#3	 Normally Open		 Normally Closed
#2	No function		No function
#1	No function		No function

LED Status

The LED indicator is visible through the dark colored transparent connection cover.
The LED indication will give the following statuses.

	FN.0.2	FN.0.2-BUS	FN.0.4
Normal operation mode	Full on green	Full on green	Full on green
Charging mode (60 sec)	n/a	n/a	n/a
Calibration mode (closing point adjustment)	Blinking green	Blinking green	Blinking green
Bus communication mode	n/a	Flickering green	n/a
Mounting position mode	n/a	Rapid blinking green	n/a
Electrical override mode	Blinking red/green	n/a	Blinking red/green
Failsafe mode	n/a	n/a	n/a
Manuel spindle adjustment	n/a	Blinking yellow	n/a
Perpetual failure mode	Full on red	Full on red	Full on red

Re-Calibration

FN.0.2

Re-calibration can be achieved in one of 2 ways:

1. Forced individual actuator re-calibration can also be performed by flipping DIP switch #6 from OFF to ON and back to OFF on the relevant actuator.
2. Forced concurrent re-calibration for all modulating actuators is electrically possible. Within 60 sec. provide the following electrical control signal sequence to the grey wire: 10V-2V-10V-2V-10V-2V to achieve re-calibration.

After re-calibration the actuator will go into normal operation mode.

FN.0.2-BUS

For FN.0.2-BUS change MSV.1 to 2 (BACnet) or register 138 to 1 (Modbus).

After re-calibration the actuator will go into normal operation mode.

FN.0.4

Forced individual actuator re-calibration can also be performed by flipping DIP switch #6 from OFF to ON and back to OFF on the relevant actuator.

After re-calibration the actuator will go into normal operation mode.

**BUS programming of
FlowCon FN.0.2-BUS**

When using FN.0.2-BUS actuator and BUS communication, setting on the Green/GreEQ insert **MUST BE** be 5.0.

In this instruction default values are underlined. Please see FlowCon FN.0.2-BUS Modbus Data Point List or BACnet PICS for more detailed information.

Initiate by setting **Baud Rate** (register 105 or MSV.7). Set actuator DIP switches 1-6 to writeable mode, i.e. 1-1-1-1-1-1 and set **MAC Address** via bus communication (register 104 or AV.28) and proceed by selecting your **PICV valve** in register 110 or MSV.8:

Reg. 110	MSV.8	Selected valve
0	1	(generic linear)
1	2	Green.0
2	3	Green.1
3	4	Green.2
4	5	Green.1HF
5	6	GreEQ.0
6	7	GreEQ.1
7	8	GreEQ.2
8	9	(generic EQ%)
9	10	user-valve

And select your **PICV control mode** in register 103 or MSV.13:

Reg. 103	MSV.13	Selected control mode
0	0	(linear)
1	1	Equal%

Basic Functions with FN.0.2-BUS
Set **Operating Mode** in register 200 or SMV.4.

① **Control Signal**

With register 200=0 or MSV.4=1 you control based on Control Signal in register 400 or AV.1 (0% to 100%).

② **Room Temperature**

With register 200=6 or MSV.4=7 your control Room Temperature based on actual room temperature (register 403 or AV.17) and setpoint (register 300 or AV.18)

③ **Thermal Power**

With register 200=7 or MSV.4= 8 you control by Thermal Power based on current thermal power (register 410 or AI.16) and setpoint (register 301 or AV.19)

④ **Control Return Water Temperature**

With register 200=8 or MSV.4=9 you control Return Water Temperature based on current return water temperature (register 405 or AV.5) and setpoint (register 302 or AV.20).

Input to Room Temperature and Return Water Temperature can also be provided with sensors connected to the actuator's port 1 or 2.

Activate **Flush Mode** in register 132 or AV.35 to temporarily setting the valve in fully open position independent of control signal to allow for easy system flushing. In addition, an **Anti-Valve Blocking Function** is available (register 136 or AV.10) which will protect the valve from jamming when the valve is inactive for a longer period.

Check the **Current Flow** (not measured) in register 402 or AI.7. NOTE: the minimum differential pressure must be maintained. Check the **Current Thermal Power** (not measured) in register 410 or AI.16. **Service Commands** and re-setting is available in register 138 or MSV.1.

Limitation Functions with FN.0.2-BUS

FN.0.2-BUS includes two limitation functions;

- ① **Return Temperature** set in reg. 315 or AV.23
- ② **Thermal Power** set in register 314 or AV.22

System Monitoring with FN.0.2-BUS

Leak Detection is possible based on measured values of supply and return temperature (register 424 and 425 or AI.2 and AI.3), when the valve is closed. A temperature difference greater than 8°C for at least 6 hours is detected as a leak and shown in register 407 or BI.7.

Failure Messaging such as:

- ① **Actuator Fault** (register 318 or BI.3 and BI.4)
- ② **Calibration Error** (register 318 or BI.5) and
- ③ **Valve Blocking** (register 318 or BI.6)

is built in features in the FN.0.2-BUS.

In addition is a **failure reaction** (register 134 or AV.8) possible in case of BUS communication failure or invalid control function.