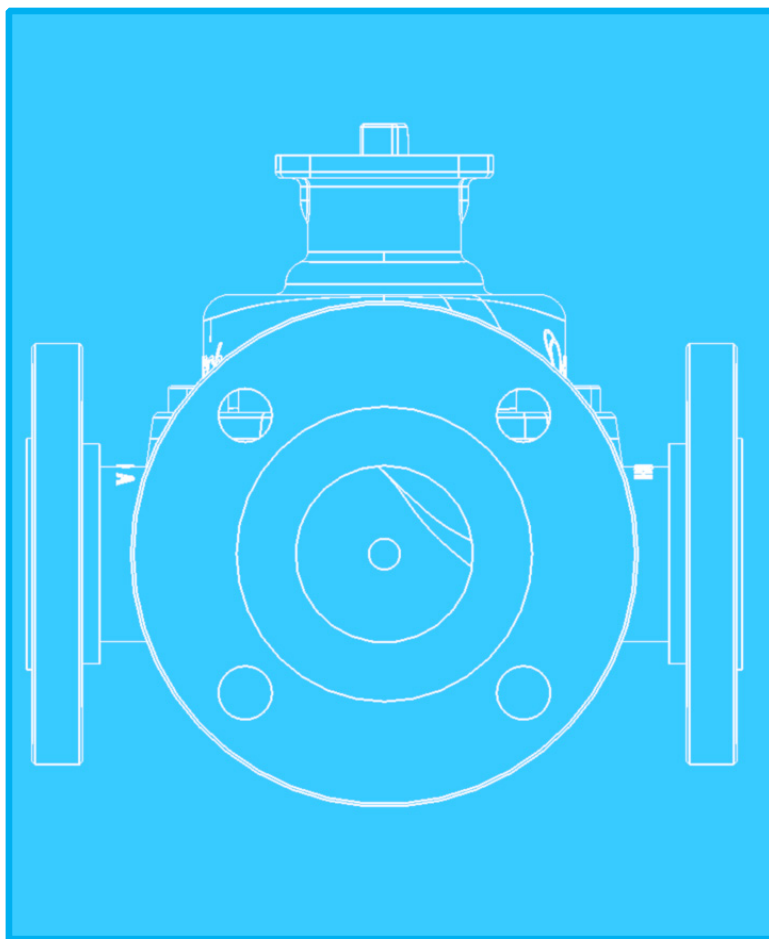


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**Emech®**

# **Hot/Cold Water Mixing Valve Model F3 Flanged Installation, Operation & Maintenance Manual**



**Please read and save  
these instructions**



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## Introduction

Congratulations on selecting the Emech™ product from Armstrong. Armstrong devotes considerable care and attention to the design of its products. To obtain the best performance from them, the customer should read this manual from cover to cover. It contains important installation and operating instructions.

The customer must strictly adhere to the safety tips, troubleshooting advice, cautions and warnings appearing throughout this manual. Along with the warnings, instructions and procedures in this manual, the customer should also observe such other procedures generally applicable to equipment of the same type.

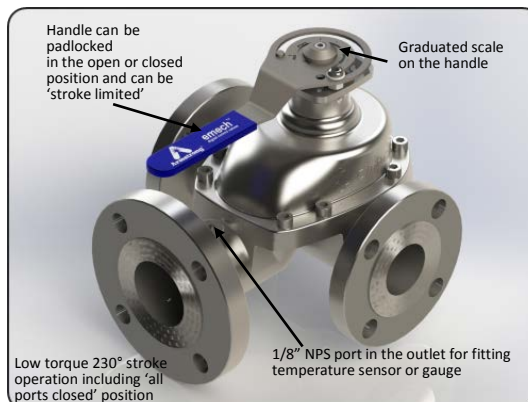
If the customer does not follow these and other such warnings, instructions and procedures, the product may not perform as expected. More seriously, it may cause property damage, personal injury, production down-time and other losses.

The customer should train its employees and contractors in the safe use of Armstrong products in relation to the customer's specific application. If the customer does not understand a point in this manual, contact Armstrong or its authorized representative.

## F3 Flanged Valve General Features

The Emech valve utilizes zirconia shear action disc technology to provide tight shut-off, high pressure differential capability, and long life integrity. Combined with the Emech electronic actuator, high performance stand-alone closed loop temperature control is possible.

The extremely hard nature of zirconia produces outstanding resistance to wear and cavitation damage compared with conventional elastomer and plastic seated valves, minimizing seal replacement requirements and plant down time.



## Valve Features

- ISO 5211, 5210 actuator flange mounting
- Constructed of CF8M (316) stainless steel
- Zirconia Disc: Durable and corrosion resistant
- End connection 150 Class Flanges
- Elastomer seal material options
- Top entry allows inline access to internal valve parts
- Size range: 2"(50mm)
- Temperature range: -13°F to 257° (-25°C to 125°C)
- Rated Pressure: 145psi (10bar), designed to ASME B16.34
- Bubble Tight (zero leakage) shut off\*
- Manual handle option lockable in both open closed position
- Manual handle kit includes stroke limiting feature

## Features of the Emech G1 Actuated Digital Mixer

- Analog (4-20mA input and output ports)
- Electrical stepper motor control
- Speed, position, and acceleration control
- User defined '2-speed' stroke can eliminate water hammer
- Precise positioning achieving 0.03° valve seat placement
- Local closed loop control of temperature
- External RS232 connection (cable supplied) communication for special mode configuration.
- Local/remote control options
- Two operating modes: Stand-alone control via onboard keypad or remote control via external 4-20mA
- Failsafe position feedback (non-contact absolute encoder)
- Keypad: 4 membrane switches with 'dual touch' safety features
- Display: 3.5 digit LCD display with backlight
- Push button power switch providing soft start electronic control

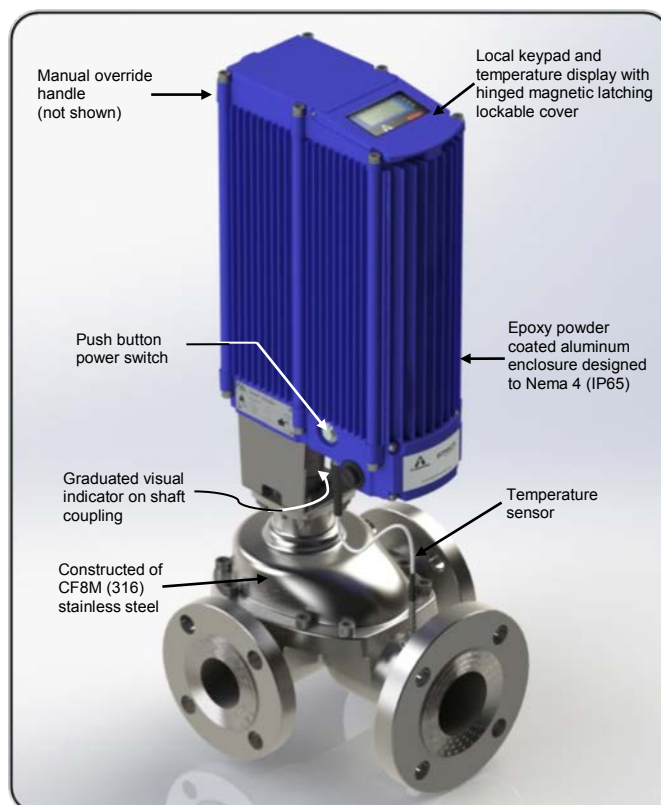
(See CPAC0002 IOM for details about the Emech G1 Digital Actuator)

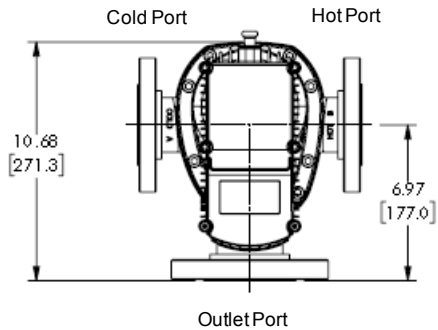
## Emech Electronic Mixing Control

The Emech F3 3-port flange valve can be fitted with the Emech G1 electronic actuator, and Emech temperature probe. The calibrated temperature probe (NTC) fits the tapping in the outlet port, and connects via cable for the G1 actuator. With this temperature feedback signal, the G1 actuator provides temperature control accuracy +/-0.9°F (0.5°C) over 32°-212°F (0°-100°C) control range.

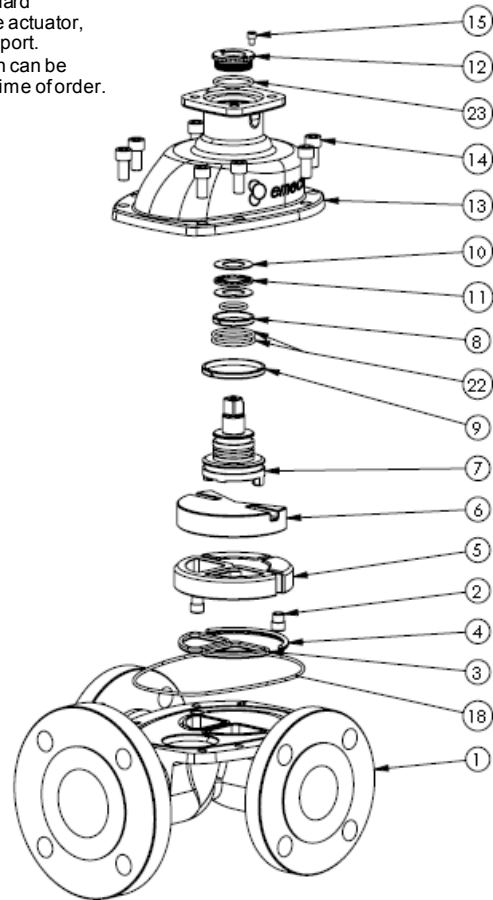
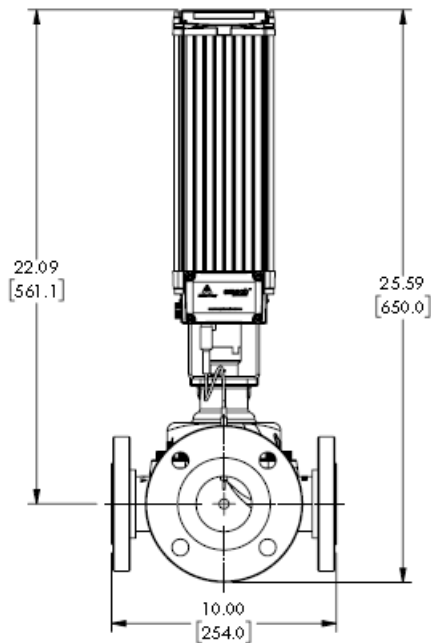
Even with sudden changes of inlet pressure and temperature to the valve, the G1 actuator aggressively minimizes outlet temperature variations. Contact Armstrong for this and other mix control options.

Note: \* Seat seal performs beyond the requirements of ANSI B16.104 and FCI 70-2, Classes V and VI.





This is the standard orientation of the actuator, facing the outlet port. Other orientation can be specified at the time of order.



F3050R SPARE PARTS AND ACCESSORIES		
PART NUMBER	DESCRIPTION	
CPSK0022	Seal Kit	
D85626	Disc Set	
CPAC0021	Sensor	
CPMV0089	Gland Nut Spanner	
SPARE PARTS INCLUDED IN VALVE TRIM		ITEM NO
CPMV0296	Body	1
CPME0080	Locating Pins x2	2
CPMV0020	Spindle	7
CPMV0072	Gland Nut	12
CPMV0101	Bonnet	13
Actuator Options	Model Code	Description
Electric Options	G13	G13 885 in.lb (100Nm)
Manual Options	CPSK0004	Handle Kit F3/040/050

ITEM NO	QTY	DESCRIPTION	MATERIAL
1	1	Body	CF8M (316) Stainless
2	2	Pin	Stainless Steel 316
3	2	Inlet Energizers	Silicon Rubber
4	1	Disc Energizer	Silicon Rubber
5	1	Bottom Disc	Trim Dependent
6	1	Top Disc	Trim Dependent
7	1	Spindle	Stainless Steel SS
8	1	Top Wear Ring	Trim Dependent
9	1	Bottom Wear Ring	Trim Dependent
10	2	O-Ring Spindle	Trim Dependent
11	2	Thrust Washer	C-Cr Steel
12	1	Needle Roller Bearing	C-Cr Steel
13	1	Gland Nut	Stainless Steel SS
14	1	O-Ring Gland Nut	Trim Dependent
15	1	O-Ring Gland Nut	Trim Dependent
16	1	Bonnet	CF8M (316) Stainless
17	8	Screw Body/Bonnet	Stainless Steel 304
18	1	Screw Locking	Stainless Steel 304
19	1	Nameplate	Stainless Steel 316
20	2	Screw Hammer Drive	Stainless Steel 316
21	1	O-Ring Body/Bonnet	Trim Dependent

Enech F3050R Flange – Standard Model Codes			
Valve Model Code	Description	End Connection	Hot/Cold Water Mixing Unit Model Code
F3050R	F3050R 2" Flange	Class 150 Flange	E50WR

The Hot/Cold Water Mixing Units includes Valve, Actuator, Mounting Kit, Serial Cable, Temperature Sensor, Spanner and all relevant IO

**Operational Stroke °rotational**

With Handle Kit	230
With Actuator	350

**Flange Size (150 Class)**

Inlet	2" (50mm)
Outlet	2-1/2" (65mm)

**Flow Characteristics – 2 Ports Open (160°)**

Cv (Kv): USgpm at dP=1 psi, 68°F (m3/h at dP=1 bar, 20°C)	8.1 (7)	47.5 (41.3)
Flow @ 29psi dPUSgpm (lpm)		257 (973)

**Minimum controllable flow\* U.S. Gpm (lpm)**

*With Emech G1 actuator	19.0 (70)
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**Flow characteristics - 2 Ports Open (90° open)**

Cv (Kv): USgpm at dP=1 psi, 68°F (m3/h at dP=1 bar, 20°C)	40.3 (35)
Flow @ 29psi dP U.S.gpm (lpm)	218 (825)

**Leakage Characteristics**

The Emech zirconia discs shear action valves have bubble tight (zero leakage) shut-off.  
The Emech seat seal performs beyond the requirements of ANSI B16.104 and FCI 70-2 Classes V and VI.

**Body Pressure Rating - Designed to ASME B16.34**

Operating Pressure @ <257°F (125°C) psi (bar) dPmax	145 (10)
---	----------

**Physical Characteristics Weight (approximate) lbs (kg)**

Valve only	42 (19)
Valve and Emech G1 Actuator	71 (33)

**Valve Topworks Dimensions For Actuator Mounting (Spigot/bolts as per ISO 5210/ISO 5211)**

Shaft/Stem Connection	sw.std (mm)	0.55" (14)
Topworks 4 holes	PCD (mm)	2.76" (70)
Topworks, PCD hole Ø	inch (mm)	0.33" (8.5)
Topworks, Spigot diameter	inch (mm)	2.17" (55.1)
Valve mounting restrictions		None

**NOTES:**

- (1) The G13 is recommended for the F3 size 2" (50 mm) valve.
- (2) All specifications are for water.
- (3) Flows are quoted without terminal fittings, restrictors, or non-return valves on the inlets. (Non-return valves are recommended.)
- (4) If operating at more than one maximum rated condition, contact Armstrong to confirm the application is appropriate.

**Definitions:**

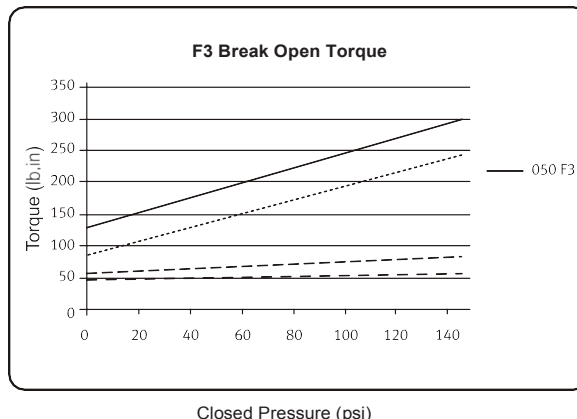
dP	Differential pressure across the valve from inlet to outlet.
dP max.	Maximum allowable valve closed differential pressure across the valve from inlet to outlet Operating Pressure Valve body pressure rating.

**The following table is Armstrong's recommendation for trim selection**

Compound	Maximum recommended fluid temperature in Emech valves	Application	Compound compatibility recommendations
EPDM	-13° to + 257°F (-25° to +125°C)	All Water and Glycol applications	Water, hydroxides, solvents, alcohols, several acids, ketone & silicon oils

### F3 Break Open Torques

Break Open Torque			
Valve Size	Shut off Pressure (psi)		
	0	72.5	145
050R F3	132	217	302



#### Note:

1. The charted seating and unseating torques are the sum of all friction and resistance for opening and closing of the disc against the indicated pressure differential for normal service
2. The relationship between values are linear, and can therefore be interpolated between nominated values.
3. The effect of dynamic torque is not considered in the table.
4. In sizing operators it is not necessary to include safety factors.
5. Break-open torques are approximately equal to the shut-off torques.

The charted values are based on clean liquid service at temperatures between 32°F to 212°F (0°C to 100°C) with no internal deposition or chemical attack, operated a minimum of once a day. \*

For conditions that vary from those noted above, apply the following application factors.

#### \* Frequency of operation

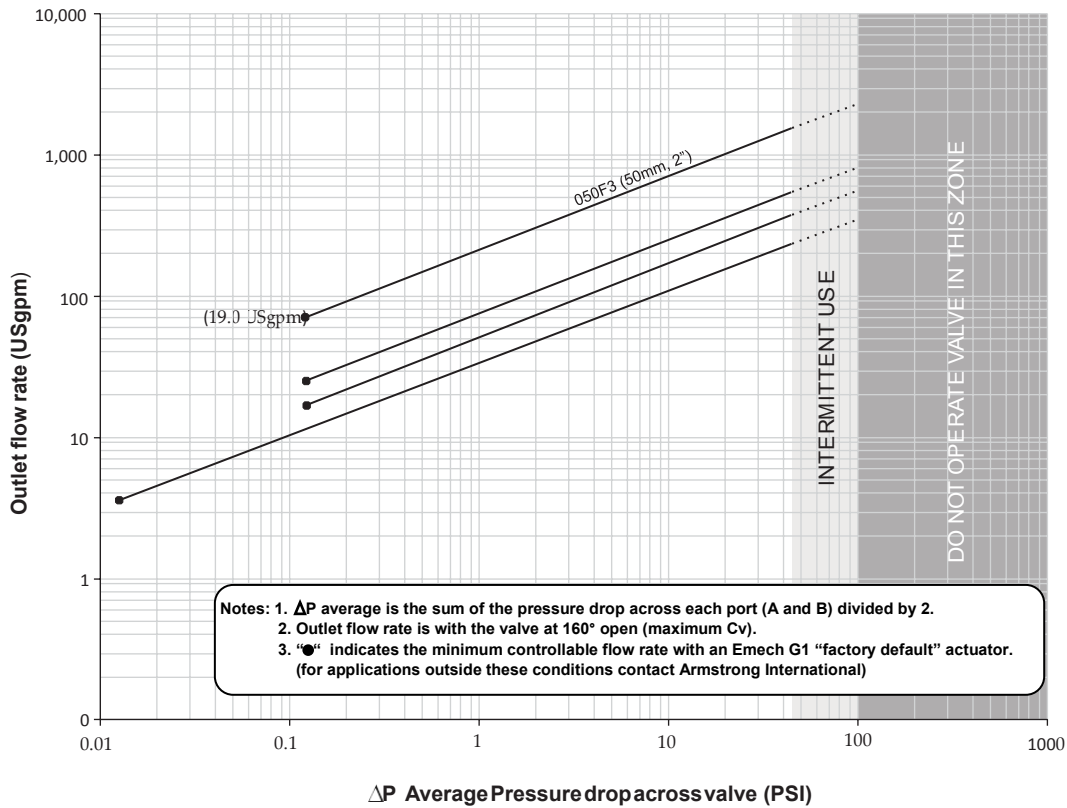
< once per day	+15%
< once per week	+25%
< once per month	+40%
< once per year	+80%

#### Service conditions

Dry service	+30%
Light slurry semi-solids	+40%
Heavy slurry and some solids	+70%
Temperature	
-13°F to 14°F (-25°C to -10°C)	+40%
14°F to 32°F (-10°C to 0°C)	+15%
Over 212°F to 257°F (100°C to 125°C)	+30%

Note: The above factors are cumulative but never more than 2 x the value shown in the Break Open Torque tables above.

### F3 Flow chart



Metric flowrate co-efficients - Cv values															
Valve size (Inch)	Valve Opening (Degrees)														
	10	30	60	90	120	150	160	170	200	230	260	270	300	330	350
2"	0.0	20.1	30.2	40.3	43.4	46.5	47.5	46.5	43.4	40.3	36.9	26.8	16.8	6.7	0.0

#### Note:

- 1) Cv = The flow rate of water in U.S. gpm that will pass through a valve with a pressure drop of 1 psi @68°F.
- 2) When the F3 valve is opened between 110° and 210° the valve is mixing. In this range use  $\Delta P$  average in the sizing formula.
- 3) For accurate sizing for temperature control mixing see Armstrong website for sizing program.

#### Simplified sizing formula

##### LIQUID

$$Cv (1 \text{ port}) = Q \sqrt{\frac{S.G.}{\Delta P}}$$

$$Cv (\text{mixing}) = Q \sqrt{\frac{S.G.}{\Delta P \text{ average}}}$$

$$\text{WHERE: } P \text{ average} = \frac{\Delta P \text{ port A} + \Delta P \text{ port B}}{2}$$

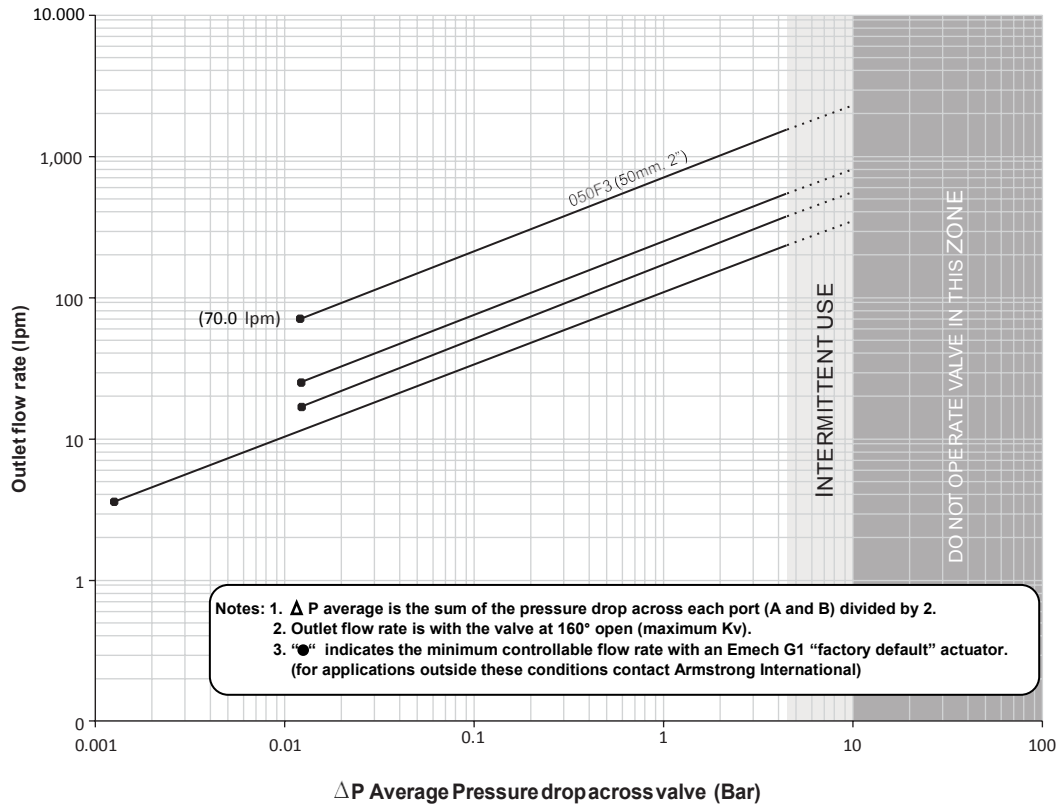
Q= Flow through valve (USgpm)

S.G. = Specific gravity (water = 1)

$\Delta P$  = Pressure drop across open valve ports (psi)



### F3 Flow chart



Metric flowrate co-efficient - Kv values															
Valve size (mm)	Valve Opening (Degrees)														
	10	30	60	90	120	150	160	170	200	230	260	270	300	330	350
50	0.0	17.5	26.3	35.0	37.7	40.4	41.3	40.4	37.7	35.0	32.1	23.3	14.6	5.8	0.0

#### Note:

- 1) Kv = The flow rate of water in m<sup>3</sup>/hr that will pass through a valve with a pressure drop of 1 bar (100kpa) @ 20°C.
- 2) When the F3 valve is opened between 110° and 210° the valve is mixing. In this range use  $\Delta P$  average in the sizing formula.
- 3) For accurate sizing for temperature control mixing see Armstrong website for sizing program.

#### Simplified sizing formula

LIQUID

HEAD LOSS

WHERE:  $\Delta P \text{ average} = \frac{\Delta P \text{ port A} + \Delta P \text{ port B}}{2}$ 

$$Kv (1 \text{ port}) = Q \sqrt{\frac{S.G.}{\Delta P}}$$

$$HL (1 \text{ port}) = \frac{10.194 \Delta P}{S.G.}$$

$$Kv (\text{mixing}) = Q \sqrt{\frac{S.G.}{\Delta P \text{ average}}}$$

$$HL (\text{mixing}) = \frac{10.194 \Delta P \text{ average}}{S.G.}$$

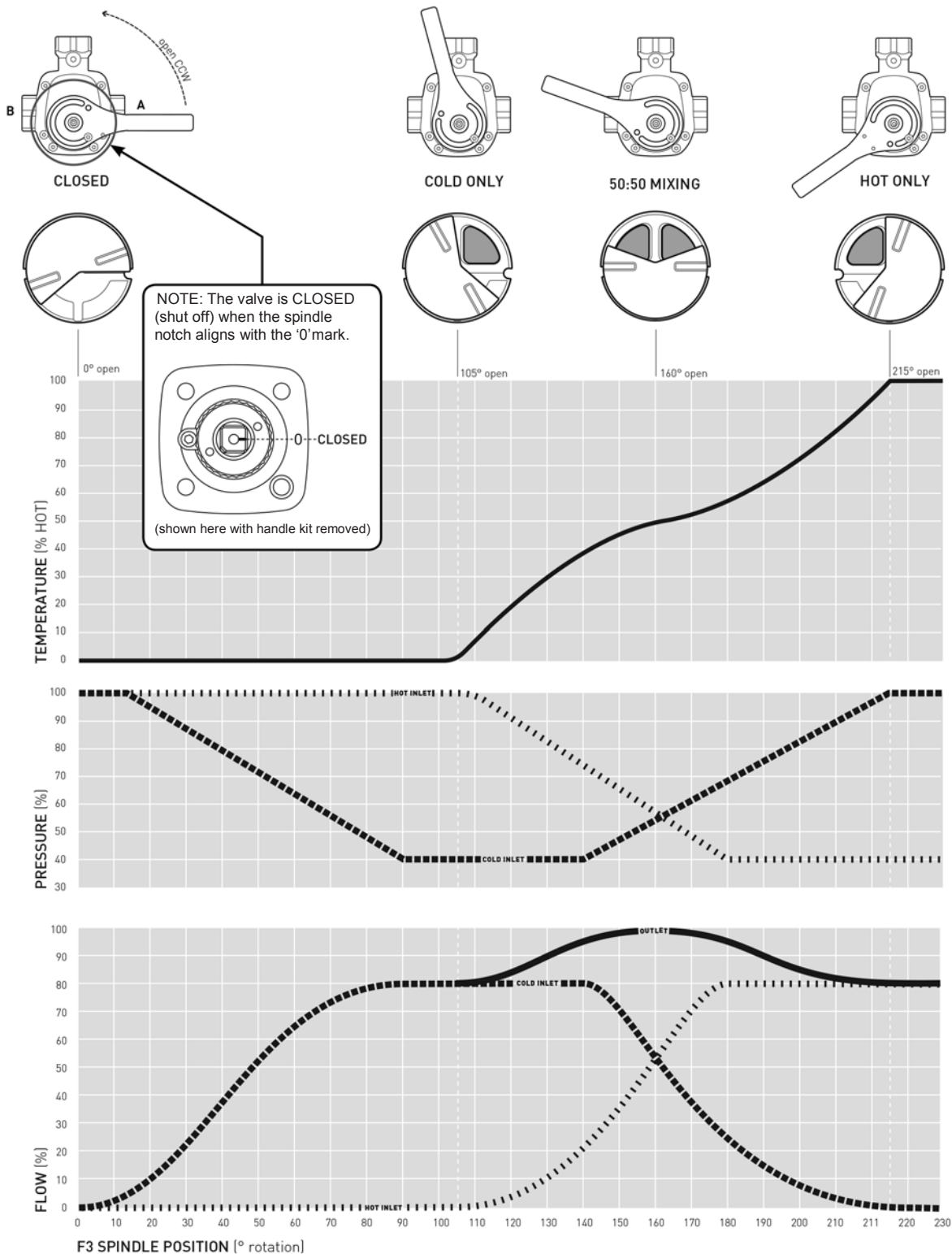
Q = Flow through valve (m<sup>3</sup>/hr)

S.G. = Specific gravity (water = 1)

 $\Delta P$  = Pressure drop across open valve ports (bar)

HL = Head loss (m)

Representation of typical flow, pressure and temperature characteristics of the F3 valve through 215° of rotation.



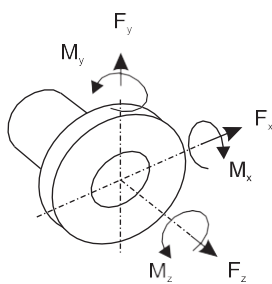
**CAUTION:** Prior to installation ensure that the pipes leading to the valve are clear from debris which may block or damage the valve on commissioning.

**WARNING:** Only trained personnel familiar with pipe work and pressure systems should install and maintain Emech equipment. Failure to do so may result in serious personal injury!

**WARNING:** Depressurize pipe work to atmospheric pressure and drain all fluids from the pipe work before working on the valve. Failure to do so may result in serious personal injury!

**WARNING:** Ensure that the intended maximum operating pressure of the line does not exceed the pressure rating of the valve. Failure to do so may result in serious personal injury!

**WARNING:** Check valves are strongly recommended upstream of the valve inlets. Failure to install them may cause undesirable back-flow and may result in serious personal injury and equipment damage!



Nozzle load orientations

5

**Table 2.1: Maximum Nozzle Forces and Moments**

Valve size	Force – $F_x F_y F_z$	Moment – $M_x M_y M_z$
2" (50mm)	450 lbf.in (2000 Nm)	5310 lbf.in (600Nm)

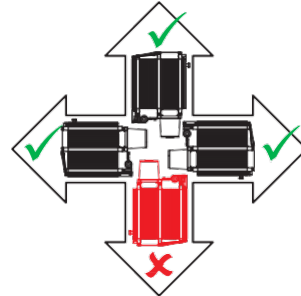
## Recommended Installation

**NOTE:** The Emech E50WR Model code, is shipped fully assembled and factory set to the customers requirements specified at time of purchase.

### Step 1: Location Considerations

For the F3 flange valve mounted with an Emech G1 electronic actuator ensure the installation location offers suitable access to the electrical connection terminals, the manual override handle, actuator power switch, display and keypad.

Do not install the actuator near or in high pressure wash down areas. The units must NOT be installed upside down. For manually operated F3 flange valves ensure suitable access to the handle for safe operation.



### Step 2: Recommended Installation

See Figure 2.6 (page 15) for a recommended F3 valve installation schematic.

#### MUST HAVE

- Check valves (poppet style) **MUST** be fitted upstream of the valve inlet ports and as close as practicable to the inlets.
- Pipe work adequately supported.
- A 24Vdc regulated power supply.



#### RECOMMENDED

- Isolation valves are **RECOMMENDED** on the supply lines.
- A failsafe solenoid operated spring to close isolation valve linked at an external temperature switch post valve outlet is highly **RECOMMENDED** for over temperature failure modes (see item 2 on figure 2.6).
- Ensure mechanical protection of the wiring (e.g. use armour conduit).
- It is **RECOMMENDED** to place wiring in screened conduit or cables.
- Ensure pipe works are straight for as long as practicable to the Emech valve inlets and any cable conduit is fully sealed on both ends against water ingress.
- Use appropriate inlet pipe diameters and supply pressure to cope with required application flows.

#### CONSIDERATIONS

- Consider strainers if water supply carries pipe scale or other particulates that may damage valve seat and seals.
- Consider gauge points for temperature and pressure on inlets and outlets.

#### Manual Operations Considerations

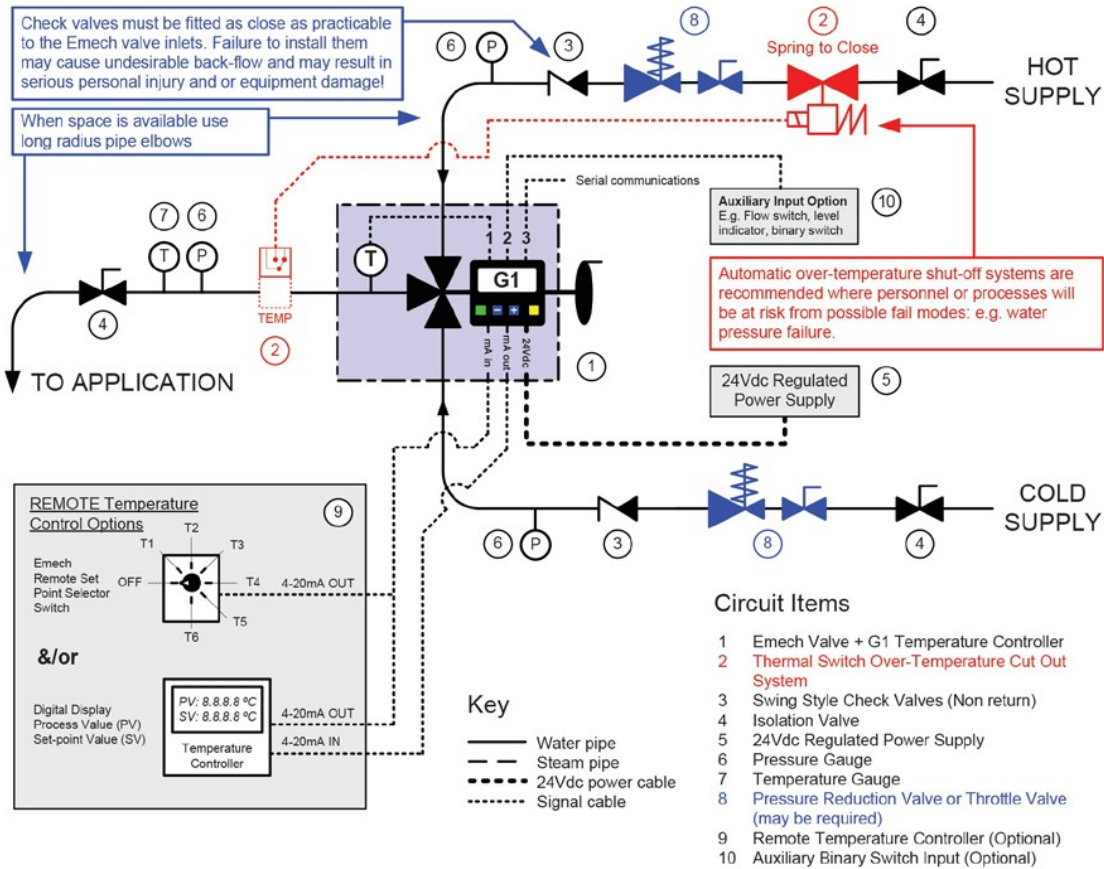
- By setting the position of the "stroke limiting" stop, an approximate maximum temperature setting can be made. This is a safety feature to minimize the possibility of operator injury. Handle kits are supplied with fitting instructions (CPMI0029).
- The flow rate control can be achieved by either a throttle valve on the inlets or outlet, or by presetting the supply pressures. For most circuits throttle valves at the mixing valve inlets work best.



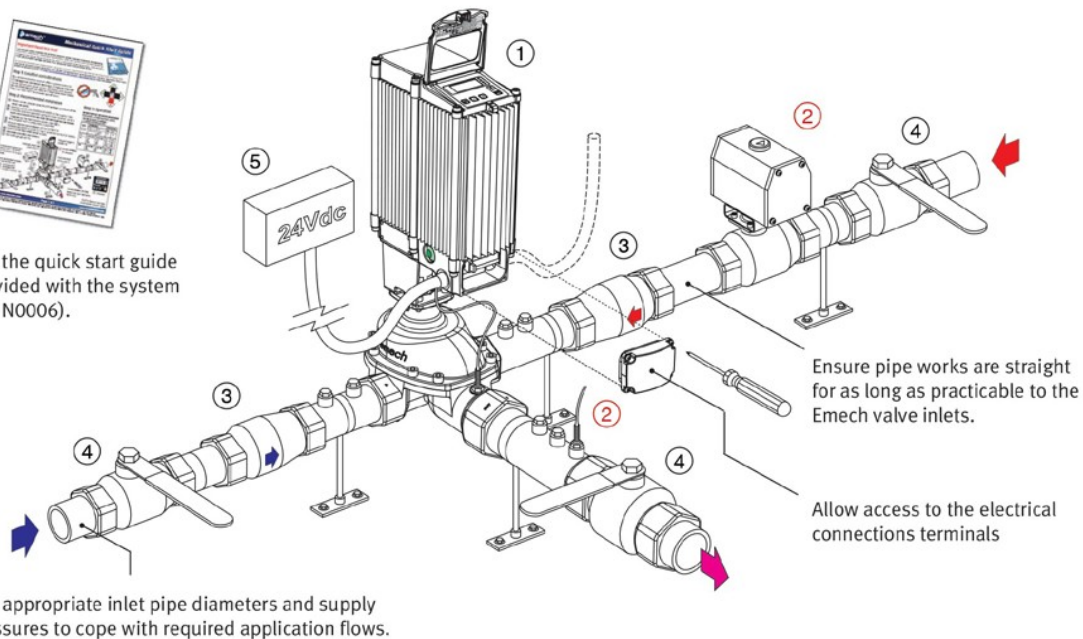
**IMPORTANT:** Users must consider safety implications when designing their installations using manually operated F3's. Emech recommend a spring to close isolation valve prior to the hot inlet of the F3 valve triggered by a failsafe temperature switch near the valve outlet.  
(See items highlighted red in Figure 2.6 on page 11).

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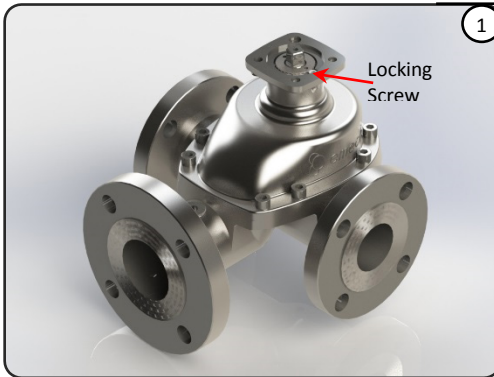
Figure 2.6: Recommended Emech water mixing valve installation schematic.



See the quick start guide provided with the system (EOIN0006).





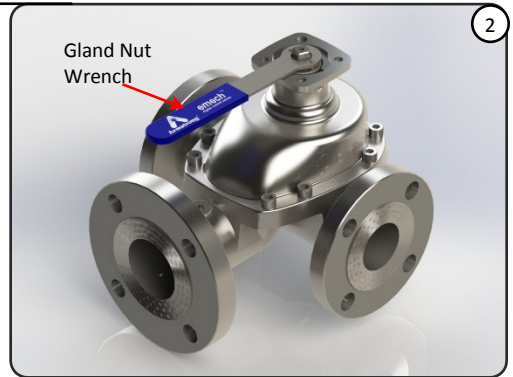


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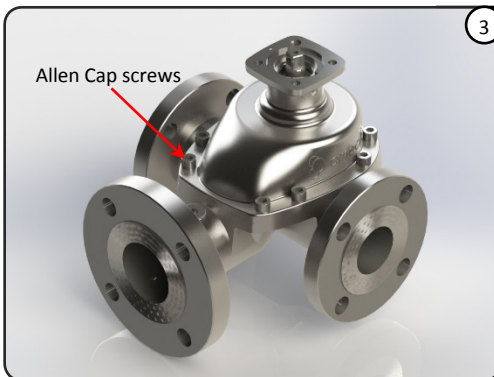
### CAUTION!

Before dismantling the Emech™ valve, ensure all upstream and downstream pressurized pipe work is isolated approximately. Ensure the pressure and fluids are drained from the valve and pipework.

Remove the gland nut locking screw (image 1).  
Fit the gland nut wrench into the two holes provided in the top of the gland nut and unwind counterclockwise to remove the gland nut from the bonnet (image 2).



2

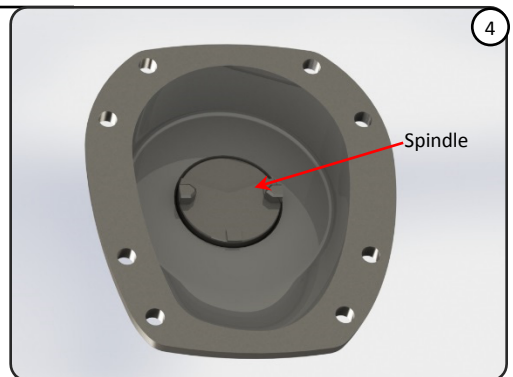


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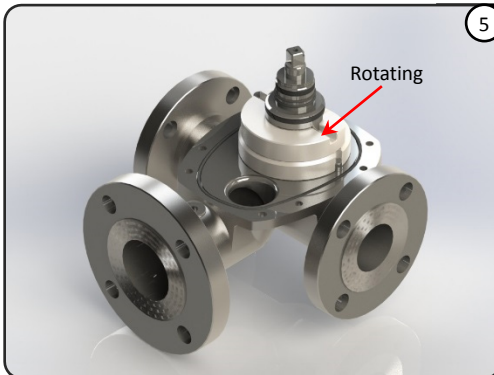
Use an allen wrench to remove the allen cap screws that fasten the bonnet to the body (image 3).

Carefully remove the bonnet from the body particularly if the valve is mounted in a vertical position.

The spindle may detach from the rotating disc and remain in the bonnet, this will need to be removed (image 4).



4

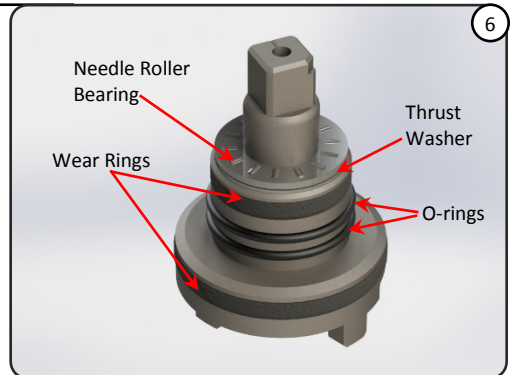


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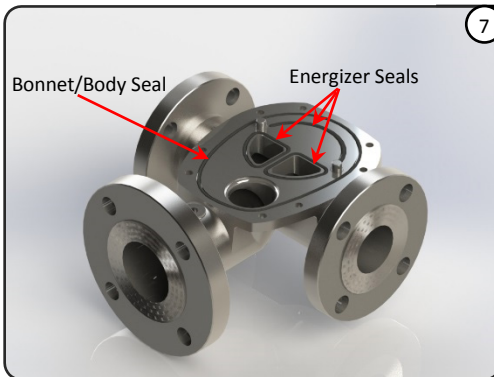
### Note:

The rotating disc is not fastened to the spindle. Take care that the rotating disc is not dropped as the bonnet assembly is removed (image 5).

The spindle may separate the two discs. In which case remove the bottom disc. If the discs are stuck together, remove both from the valve body. Check that the thrust washers and needle roller bearing assembly is on the spindle (image 6). You may have to remove these from the bonnet bore. Remove the two O-rings and two wear rings from the spindle.



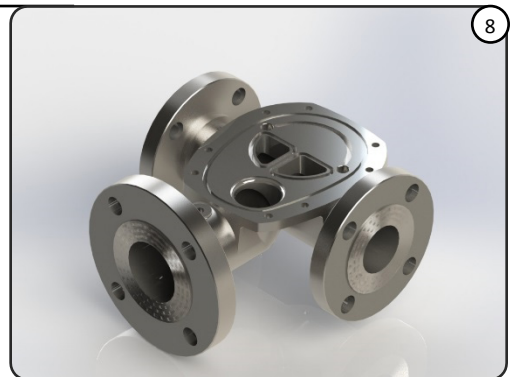
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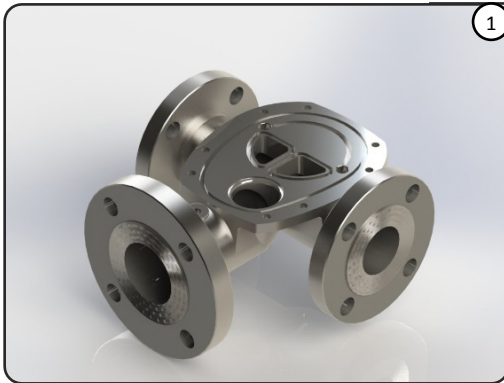
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Remove the bonnet/body seal, and the three energizer seals found under the discs (image 7). Inspect the pins and check for wear. Replace if worn. See page 6, Spare Item 3 for replacement pins.

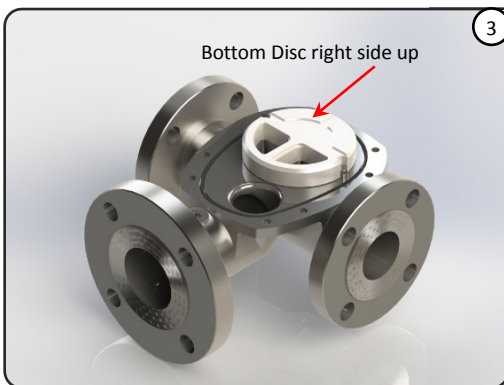
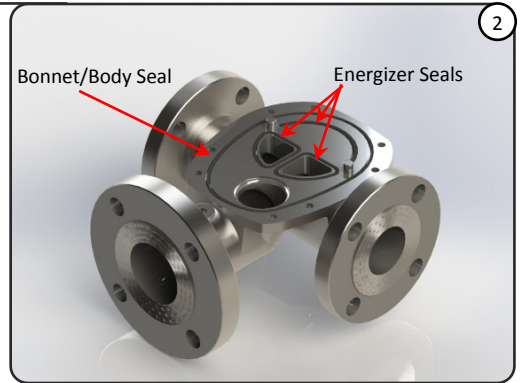
Clean all grease and dirt from parts not being replaced. Ensure that the spindle seal surfaces are protected from damage while the valve is disassembled (image 8).



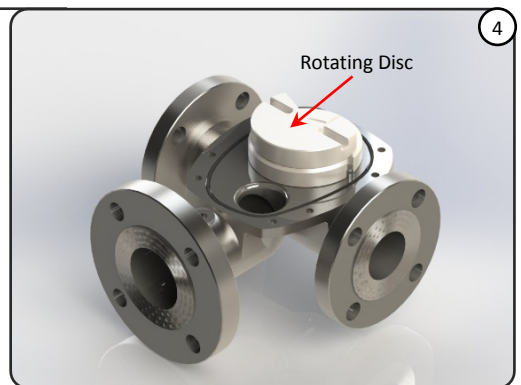
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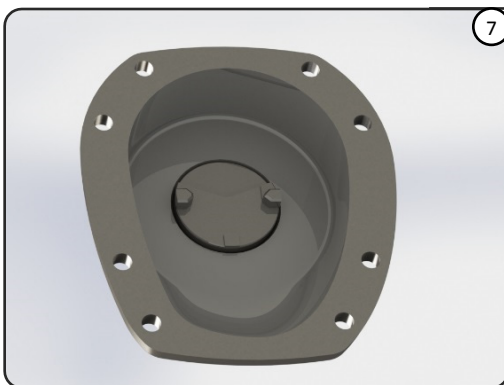
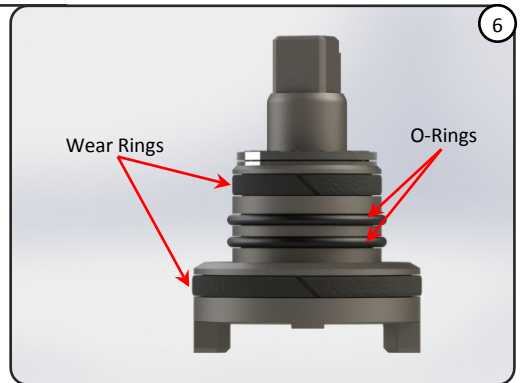
- 1 PREPARATION:**  
Ensure the assembly area is completely dirt free. Ensure that the valve parts are clean and ready to be reassembled. Check all valve parts for damage or wear.
- NOTE:**  
The energizers are not symmetrical. Correct orientation will allow the energizers to be inserted easily with no distortion. Lightly grease the energizer seals before fitting. In the valve body fit the bonnet/body seal and energizer seals (image 2)



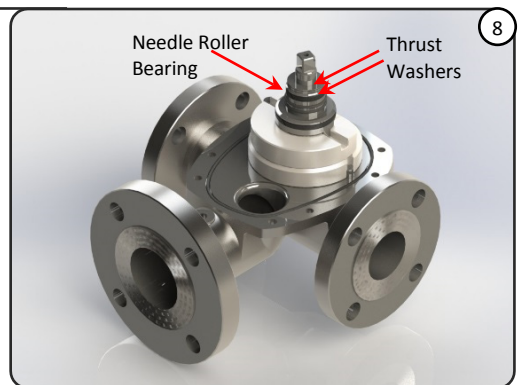
- 3 NOTE:**  
**Wash the discs thoroughly.**
- Place the bottom disc onto the valve body. Make sure the disc is placed right side up as shown in (image 3).
- Apply a thin layer of grease on the bottom of the rotating disc.
- Place the rotating disc on the bottom disc and bed it down by rotating one on the other (image 4)



- 5 NOTE:**  
The spindle is not symmetrical and inserts in only one orientation. Ensuring the spindle grooves are clear of dust or dirt, check that the spindle fits neatly into the slots on the top disc. If the spindle does not sit flat, check for burring on the lugs and remove if necessary (image 5).
- Fit the top and bottom Wear rings before fitting the O-rings onto the spindle. Apply a light even coat of grease to the Wear rings and the O-rings (image 6).



- 7** Check the fit of the spindle in the bonnet (image 7) then remove and place on the top of the disc (image 8).
- Lightly grease both sides of the thrust washer and place on the spindle. Place on the needle roller bearing (image 8) and apply further grease (approx. 60% of the void space). Lightly grease both sides of the second thrust washer and place on the bearing.

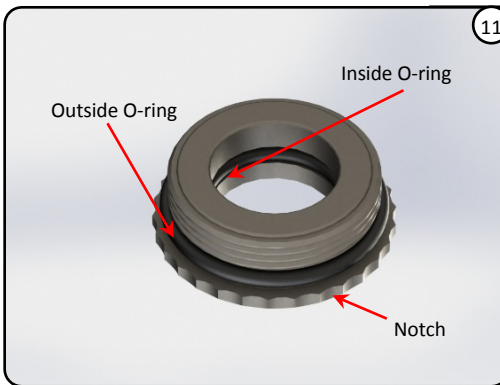


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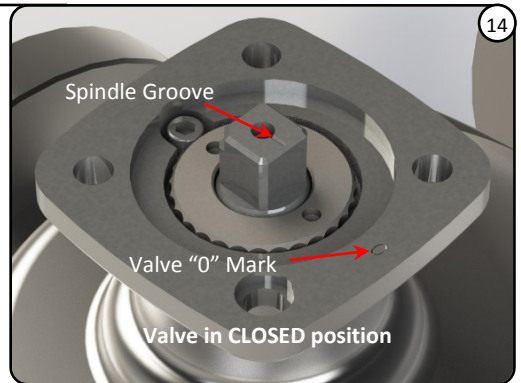
- 9 Grease the bores of the bonnet. Align the discs with the spindle on top before gently lowering the bonnet over the spindle down to the body (image 9). Secure the bonnet to the body with the allen cap screws using an allen wrench (image 10).
- Tighten the allen cap screws as per torque values given in table 4.1.
- Rotate the spindle one full rotation. The movement should be smooth and even with no variation in torque.



- 11 Grease the O-rings for the gland nut. Insert the inside O-ring in the gland nut and then the external O-ring (image 11). Grease the thread of the gland nut before inserting the gland nut into the bonnet.
- With the gland wrench provided, screw the gland nut down until it bottoms out. Do not over-tighten! (Image 12).
- Back off the gland nut 12 to 14 notches.** If the notch does not align with the locking screw head, back the gland nut off further to align.



- 13 Insert the locking screw after applying a thread locking adhesive (e.g. Loctite 262) (image 13). Tighten the locking screw as per the torque values given in table 4.1. Note: Rotate the spindle 1-2 times to ensure the operating torque is constant, and the rotating action is smooth.
- NOTE: The valve MUST be in the CLOSED position before mounting the actuator or handle kit (image 14). The groove on the spindle must point towards the "0" mark on the valve**



See section 5.0 for EmechG1 actuator mounting kit. Note: Handle kits are supplied with separate assembly instructions.

Table 4.1: Nominal Tightening Torques for Lubricated Stainless Allen Cap Screws

Screw Size	Torque (inlb)	Torque (Nm)
#10-24 3/8"	49 345	5.5 39

Table 4.2: Recommended Lubricant

Description	Manufacturer/Model Code	Used for:
Premium Food Grade PTFE Grease	mx6 NOX	Ceramic discs; O-rings; Wear rings; Bonnet bore Lubrication; Roller thrust bearing lubricant All Stainless Steel Fasteners

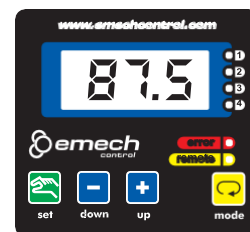


## 1.0 Preparing the actuator for assembly onto Emech™ valves

Before fitting the actuator to the valve assembly, ensure the actuator is in the zero position. All new or replacement Emech actuators are shipped in the zero position. To check the actuator position or to re-zero an actuator follow section 1.1 if a power supply is available or section 1.2 for manual re-zeroing.

### 1.1 Automatically zeroing the actuator (24Vdc power supply required)

Power on the actuator (a 24Vdc regulated power supply is required). Refer Section 3 of the G1 actuator installation, operation and maintenance manual for electrical installation. With a temperature sensor connected to Port 1 of the actuator ensure the actuator is in Temperature Controller mode (hold mode and press down (-) on the actuator keypad to toggle between Positioner or Temperature mode). Now disconnect the temperature probe from the actuator. The actuator will move automatically to the 'zero' position and display "E2" on the keypad display.

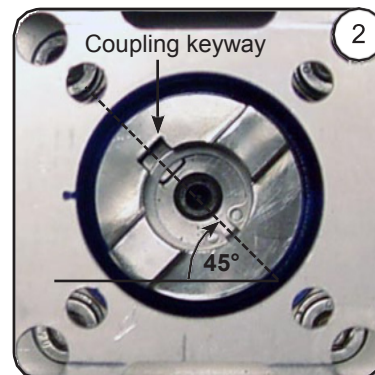
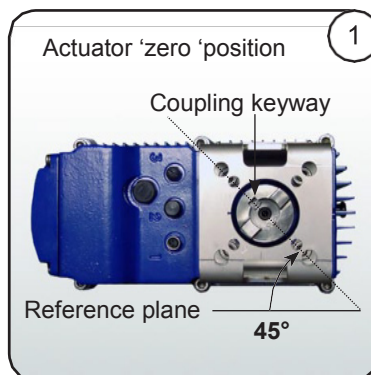


G1 actuator keypad

### 1.2 Manually zeroing the actuator

If there is no power available to 'zero' the actuator it is possible to use the actuator's manual override handle to adjust the actuator shaft position.

The actuator 'zero' is achieved when the coupling keyway is at 45° to the reference plane as indicated in images 1 and 2.



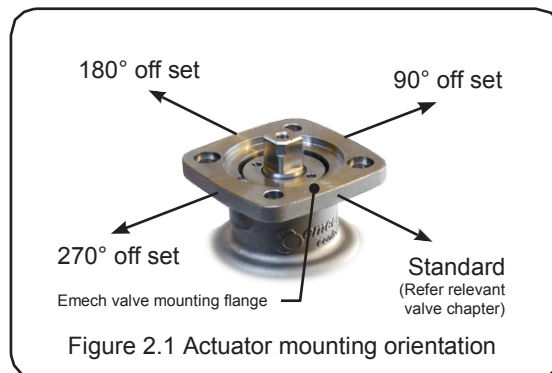
## 2.0 Actuator mounting orientation

To accommodate installation space restrictions the actuator may be mounted to an Emech valve in any one of four positions. The instructions provided in this document explain how to mount the actuator in the standard orientation for each type of Emech valve. To mount the actuator in one of the other three off-set orientations (see figure 2.1) follow the directions outlined in section 2.1.

### 2.1 Nonstandard mounting orientations

Ensure the valve is in the "0" position by following the standard mounting instructions for the valve in the relevant chapter of this document. When it comes to placing the graduated coupling onto the valve spindle orientate the coupling so the "0" mark aligns with the desired off set direction as indicated in figure 2.1.

Continue with the standard mounting instructions. Ensure the notch (zero indication on bracket) in the actuator bracket aligns with the coupling "0" when the actuator is fitted to the valve.



The valve and actuator will operate as per a standard mounting assembly

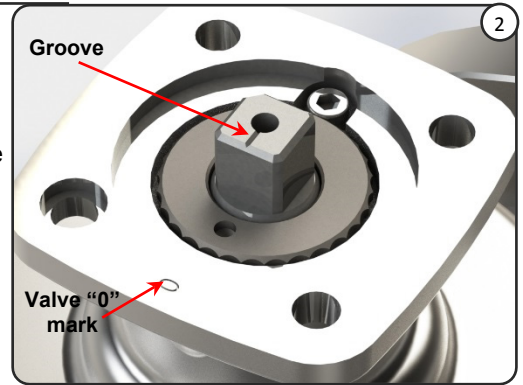
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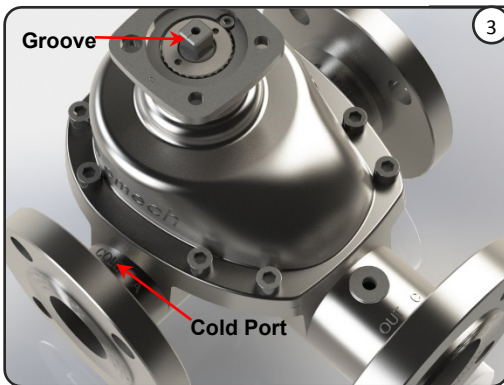
1

The instructions below explain how to mount the actuator facing the outlet port as per (image 1)

Before mounting the actuator onto the valve, set the Valve position to close, this is done by pointing the groove on the spindle points towards the valve "0" mark (image 2) and the cold port (image 3) which is the fully closed position for the valve seats and the default cold port.

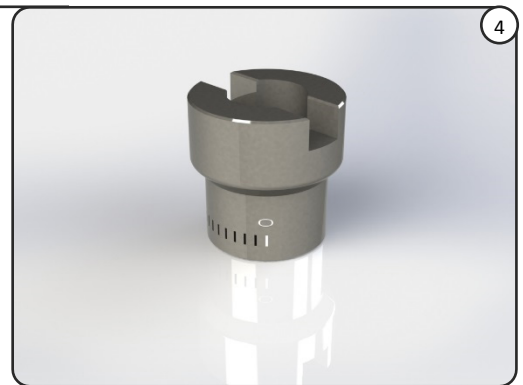


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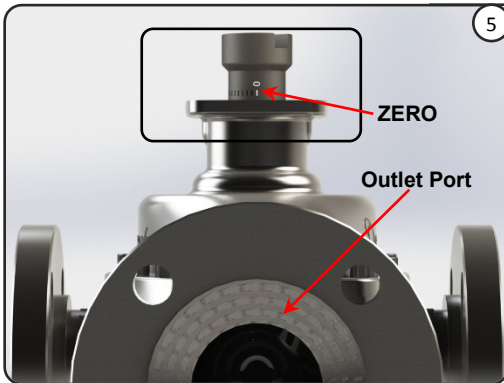


3

Place the graduated coupling (image 4) on the spindle & ensure the "0" points to the outlet port (image 5 & 6)



4



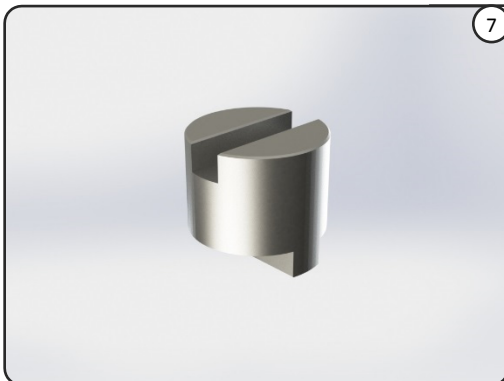
5

If the actuator is to be mounted in one of the other three positions, rotate the graduated coupling so that the "0" mark will line up with the notch of the bracket (image 8) of the actuator, when the valve is fully coupled to the actuator.

**DO NOT MOVE THE SPINDLE FROM ITS ZERO POSITION WHEN USING ONE OF THE OTHER ACTUATOR ORIENTATIONS.**



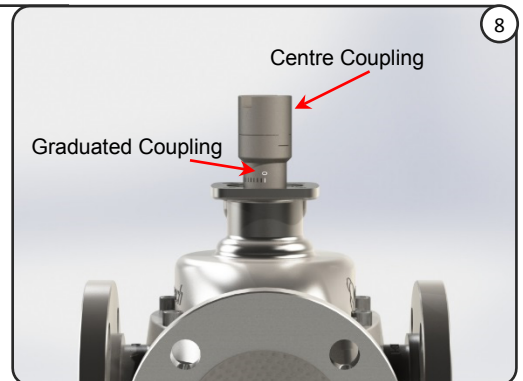
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7

Place the center coupling (image 7) on the graduated coupling (image 8)

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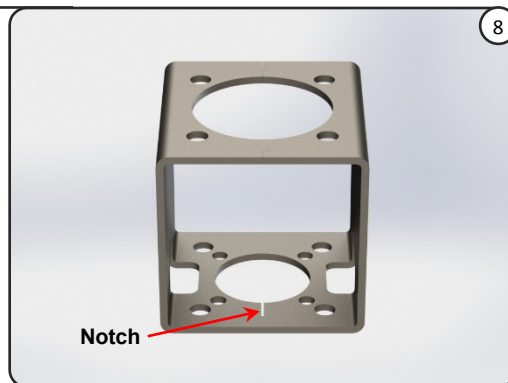


8

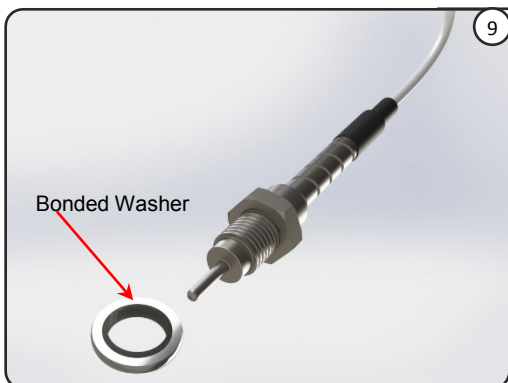


7 Place the actuator on the valve in the desired position (image 7). The zero mark on the coupling (image 4) should align with the notch on the bracket (image 8).

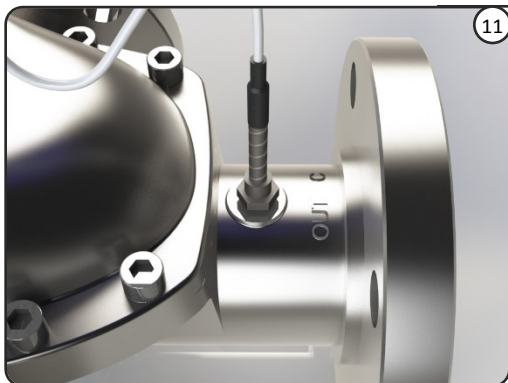
Insert one M8 X 25 socket cap screw into one of the mounting holes with M8 Spring Washer and Nut. Insert the remaining three cap screws and fasten.



Notch



9 Ensure the bonded washer (image 9) is on the sensor (image 10).

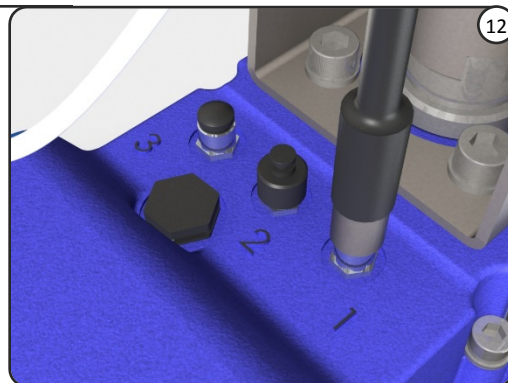


11 Screw the sensor into the outlet port of the valve (image 11) and tighten before connecting the sensor to the actuator.

Plug the sensor connector into the actuator input port labelled "1" and hand tighten (image 12).

**WARNING!! DO NOT USE A WRENCH TO SCREW THE SENSOR INTO THE ACTUATOR.**

The actuator is now assembled correctly (image 13).





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# Hot/Cold Water Mixing Valve Model F3 Flange Installation, Operation & Maintenance Manual

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