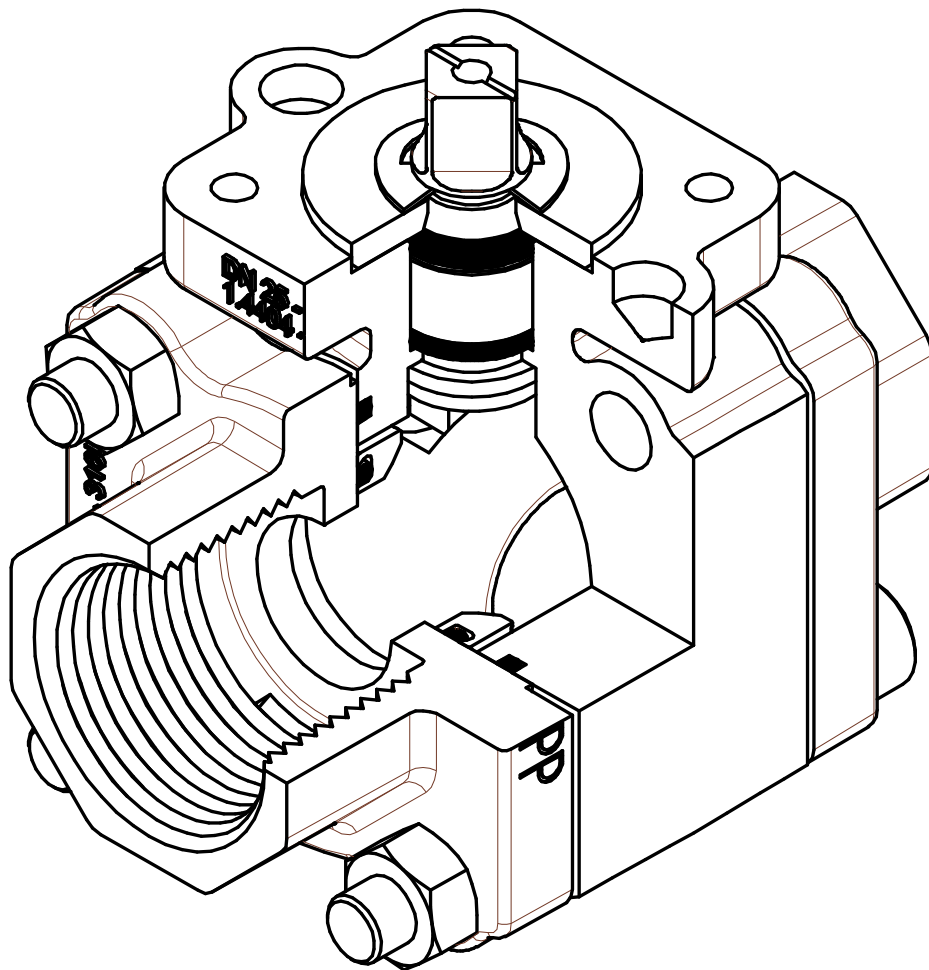


KINETROL PDK series

THREE-PIECE SEVERE DUTY BALL VALVE



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1.1. General

1.1.1 Safety instructions

Installation, operation, or maintenance of this product should only be undertaken by fully trained and qualified personnel.

Hearing protection is recommended before operating equipment. Always wear protective gloves, clothing and eyewear when performing any installation or maintenance operations.

Keep hands, clothing and hair clear of valve ports. An actuated valve could operate without warning causing damage to clothing or serious injury.

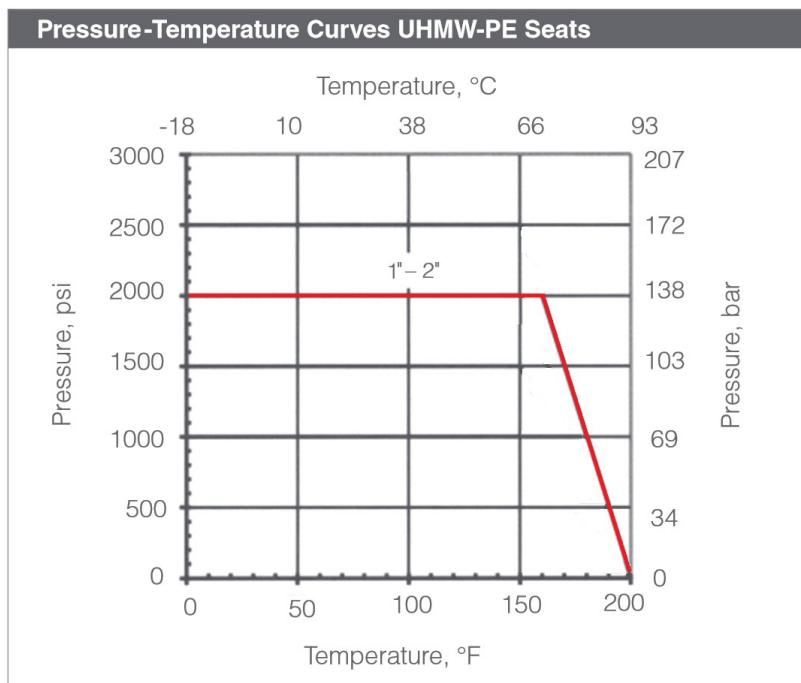
Ensure actuator is de-energised with the air supply disconnected and that the pipeline is de-pressurised and drained before removing valve.

1.1.2 Operating limits

Operating temperature must NOT exceed limits of seat material as stated on valve labels, see figure 1.

Maximum operating pressure at maximum / minimum temperature is shown in table 1.

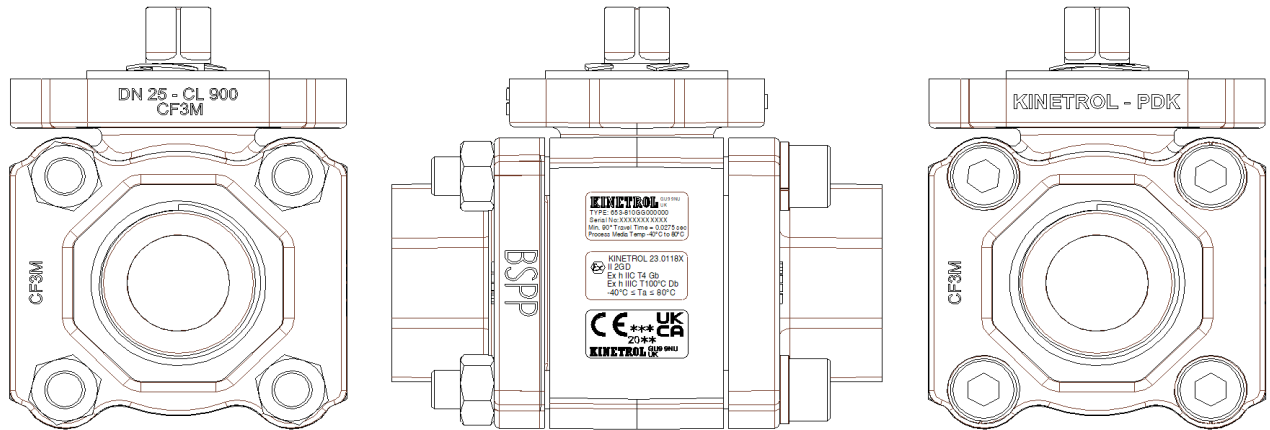
Table 1: Class 900 Pressure / Temperature ratings.



Valve media to be limited to Group 2 liquids and gases, chemical compatibility checks to be done on valve body and seal materials before use. See table 2.

1.1.3 Valve labelling

Figure 1: Valve showing cast and printed labels

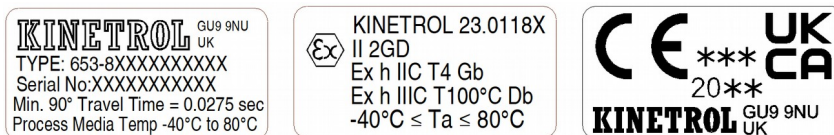


PED Approval : Category I Module A.

Valve information:

- DN Size
- Class designation
- Material
- Manufacturers name or trademark
- Serial Number
- Thread type
- Min and Max temperature
- Product Identification.
- Year of manufacture.
- ATEX Rating

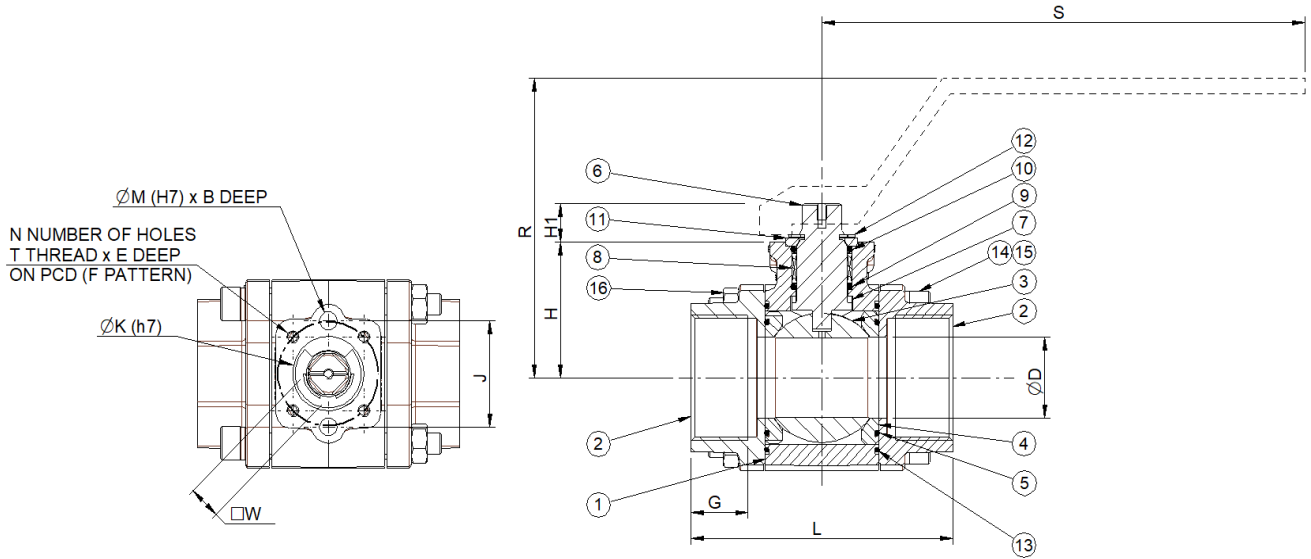
Figure 2: Standard ATEX CAT 2 Label



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1.1.4 Valve configuration

Figure 3: Section view of typical ball valve (see Table 3)



1.1.5 Materials

Table 2: Valve components (see Figure 3).

No.	Part Name	Material	No.	Part Name	Material
1	Body	CF3M	9	Stem O-ring	Nitrile
2	End Cap	CF3M	10	Bush O-ring	Nitrile
3	Ball	CF8M	11	Stem Washer	316
4	Ball Seat	UHMWPE	12	Circlip	Plated Carbon Steel
5	Seat O-ring	Nitrile	13	Body O-ring	Nitrile
6	Stem	17-4PH / 316SS	14	Bolt	A4-70
7	Thrust Washer	UHMWPE	15	Washer	A4-70
8	Stem Bearing	UHMWPE	16	Nut	A4-70

1.1.6 Dimensions

Table 3: Reduce Bore (see Figure 3).

DN	NPS	D	G	L	R	S	H	H1	W	J	K	ØM	B	F	N	T	E	PCD	Cv	Torque (Nm)
25	1	20	22	96	64	175	42.5	15	9.5	50.8	36	8.8	4	F05	4	M6	10	50	27	10
50	2	37.1	29	130	144	240	65	18.5	16	50.8	36	8.8	4	F05	4	M6	10	50	96	45

Note: valve torque does not include Safety Factor

Table 4: Suggested Media Safety Factors

Media	Safety Factor
Clean, particle free, non-lubricating	1
Slurries / heavy corroded and contaminated	2
Gas clean and wet	1
Gas clean and dry	1.3
Gas dirty	1.5

1.1.7 Maintenance

- 1) Maintenance should be carried out when wear affects valve performance.
- 2) Valve life will vary according to application conditions, cycle frequency, temperature, type of process media, etc.
- 3) Detailed maintenance and replacement instructions in section 1.2.

Warning

Before dismantling valve, manually open to relieve any residual pressure and ensure any hazardous materials have been discharged from the valve.

1.1.8 Recommended spare parts

Standard seal kits available for each valve size, consist of the following:

- 2 off ball seats (4) - 2 off seat O-ring (5) - 1 off thrust washer (7)
- 1 off stem O-ring (9) - 1 off bush O-ring (10) - 1 off circlip (12)
- 2 off body O-ring (13)

Table 5: Standard spare part ordering codes

	Size	Seal Kit	Stem	Endcap BSPP	Endcap NPT	Ball
Reduced Bore	DN25 / NPS 1	PDK-025-001	PDK-025-002	PDK-025-003	PDK-025-003NPT	PDK-025-004RB
	DN50 / NPS 2	PDK-050-001	PDK-050-002	PDK-050-003	PDK-050-003NPT	PDK-050-004RB

Note: Non standard spares available upon request.

1.2. Ball valve service instructions

1.2.1 Dismantling ball valve

Follow stages A to G (Figure 4), inspect and replace parts as necessary.

Note: Circlip pliers will be needed to remove circlip (item 12) do NOT re-use circlip once removed.

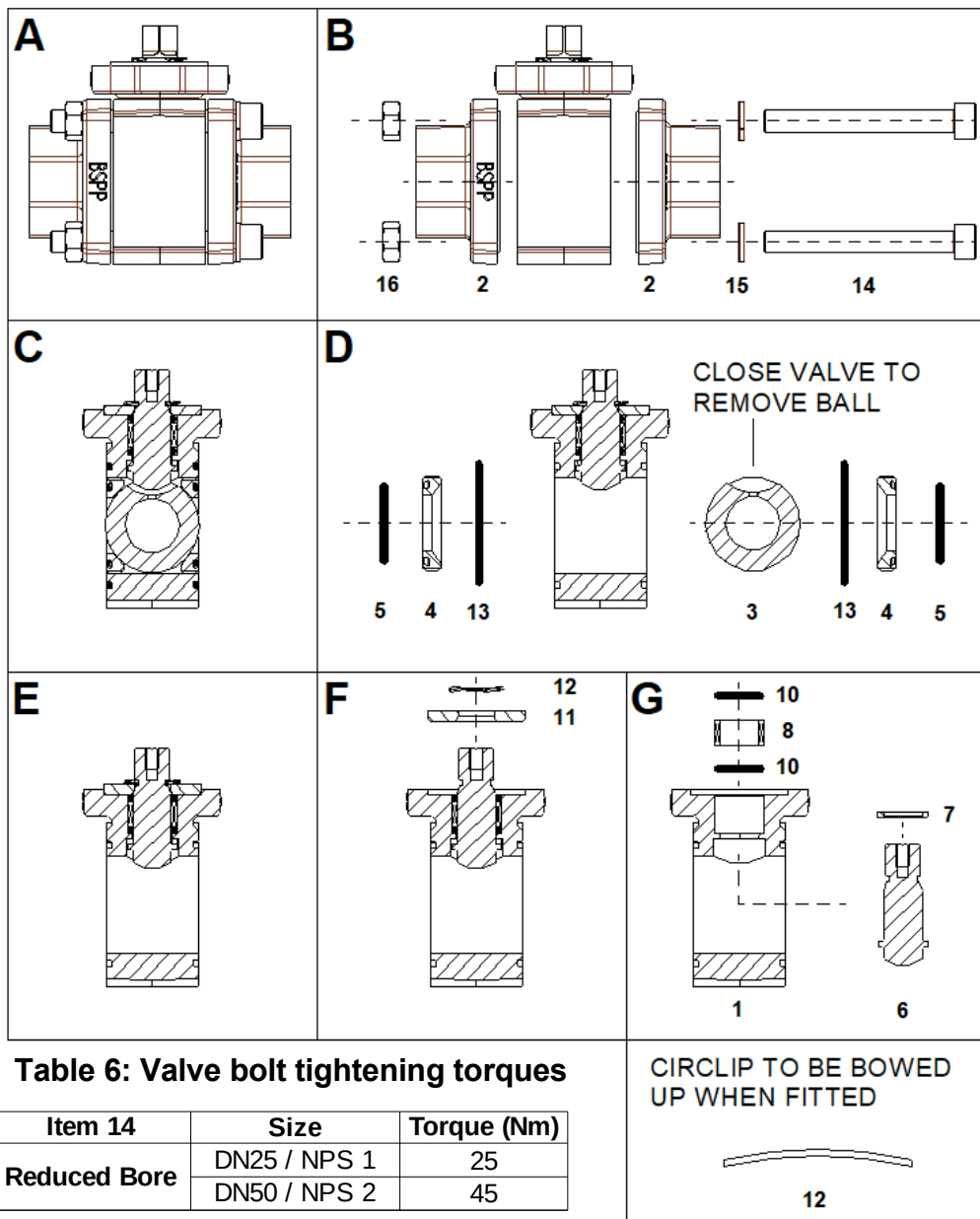
1.2.2 Re-assembling ball valve

Follow stages G to A (Figure 4), tighten bolts (item 14 as per table 6).

Note: Circlip (item 12) is bowed so orientation is important.

Important: Always build valve in the closed position.

Figure 4: Typical ball valve assembly procedure



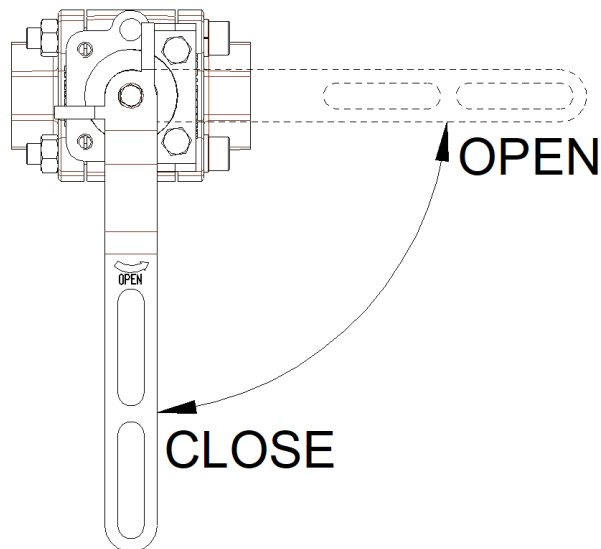
1.3 Installation and operation of ball valve

1.3.1. General Installation Information

- 1) Before installing the valve into pipeline, operate manually 5 times open / closed to bed seat in, see figure 5. Any feel of chopping or sticking may indicate a damaged seat. This can occur if the valve has been rebuilt incorrectly, most likely from tightening valve bolts (item 14 on table 4) with the valve in the open position. The ball can only self centre when built in the closed position.

Always install valve in the fully closed position.

Figure 5: Valve operation



1.3.2. Throttling operation

Warning do NOT throttle the valve. Leaving the valve in the partly open (throttled) position can severely reduce the life of the seats and ball.

1.3.3. Closing operation

It is important to fully close the valve so the lever rests against the stop plate, as shown in figure 5. While the valve will seal before the lever rests on the stop plate, the seat (item 4 on figure 4) will not be fully supported on the ball and can distort, causing the valve to fail prematurely. See figure 6 for an example of what can occur.

Figure 6: Distorted valve seat due to incorrect closure position



1.3.4. Installation into pipeline

- 1) Before installing valve, flush through and clean the pipeline to remove any built up materials which may damage the ball and seats.
- 2) To install valve remove the protective bungs from the ends and install the valve into the pipeline as per your preferred sealing method. When tightening the threaded pipe to the endcaps only apply torque to the hex of the endcaps, do NOT apply torque to the valve handle or body.
- 3) Always install valve in the closed position.
- 4) After installation make sure there is no stress left on the pipeline.

1.3.5. Refitting valve into pipeline.

- 1) When refitting valve after repair or replacement, if you choose to reuse the end caps due to being hard piped, then they must be inspected for scratches and wear as the raised register on the endcaps acts as a sealing face. If deemed useable then they should be cleaned and lubricated to allow easy insertion of the valve body as Shown in figure 7.
- 2) When sliding body between endcaps, as per figure 7, ensure o-ring seals (items 5 and 13 on figure 4) are retained and do NOT become dislodged as they are critical to the operation of the valve. A dislodged o-ring could become pinched or Cut when clamped causing the valve to fail prematurely, see figure 8.
- 3) Once in place fit fasteners (items 14,15 & 16 on figure 4) and torque as per table 6.

Figure 7: Sliding body in and out of pipeline

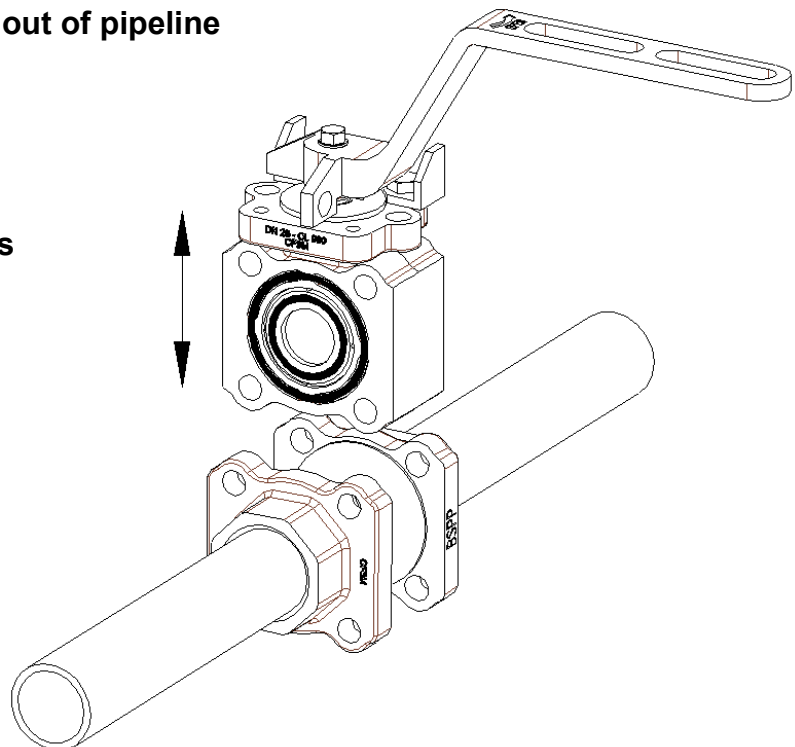
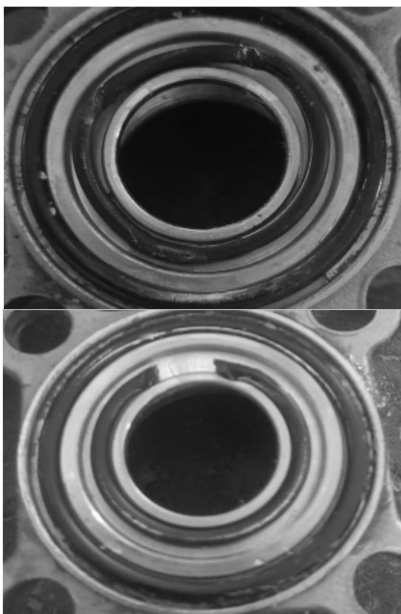


Figure 8: Pinched / cut o-rings



1.3.6. Installation onto manifold

- 1) Before installing valve, flush through and clean the pipeline to remove any built up materials which may damage the ball and seats.
- 2) Always install valve in the closed position.
- 3) To install valve onto manifold block remove the protective bungs from the ends and remove the retaining nuts and washers (item 16 on figure 4). Do NOT remove the bolts or spring washers (items 14 & 15 on figure 4) as the valve will come apart and o-rings may fall out. If possible affix some tape to the endcap, body and spacer plate to hold it together while you bolt it to the manifold.
- 4) Ensure o-ring seals (items 5 and 13 on figure 4) are retained and do NOT become dislodged as they are critical to the operation of the valve., A dislodged o-ring could become pinched or cut when clamped causing the valve to fail prematurely. See Figure 8 for an example of this.
- 4) Apply a suitable thread sealant, such as Loctite 222, to the bolts and torque up as per Table 6.
- 5) On smaller valves the mount boss may protrude further than the body. Therefore either use a spacer or notch the manifold so the boss clears see figures 9 & 10.

Figure 9: Valve mounted to manifold with spacer.

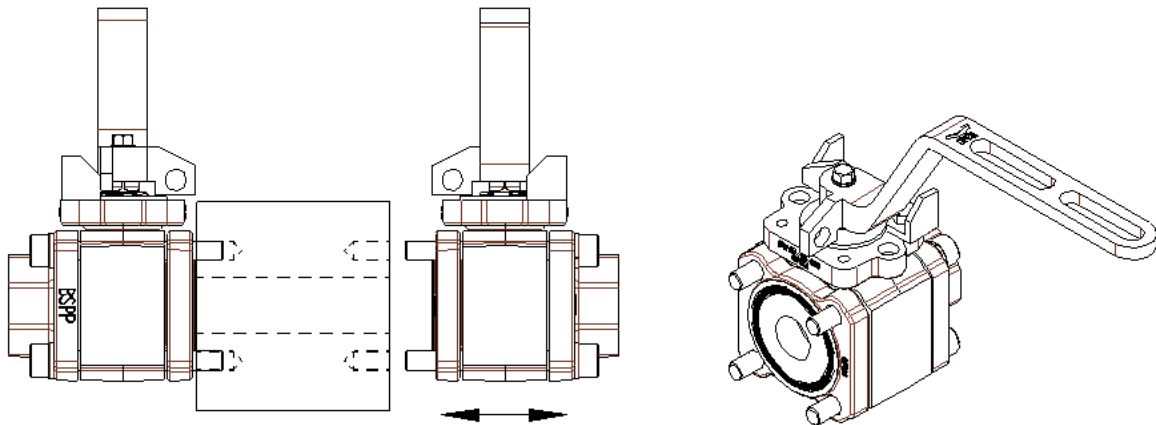
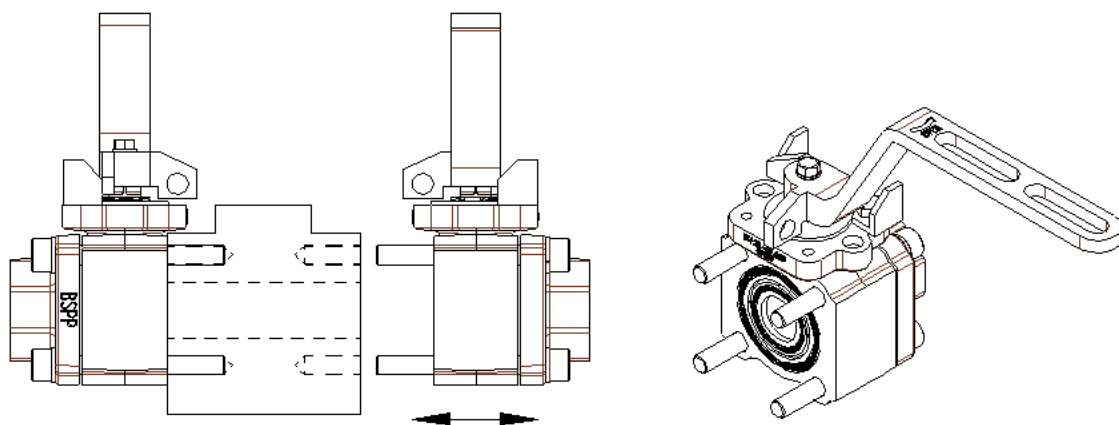


Figure 10: Valve mounted to manifold without spacer.



1.4. Actuating the valve

1.4.1. Mounting actuator to valve mount boss.

- 1) Before mounting actuator to valve ensure valve has been set fully closed, as shown in figure 11. The orientation line on the valve stem must be set $90^\circ \pm 0.5^\circ$, failure to do this could result in damage to seats, as shown in figure 6, and allow the process media to pass through the pipe line.

Figure 11: Ball Orientation line correct setting.

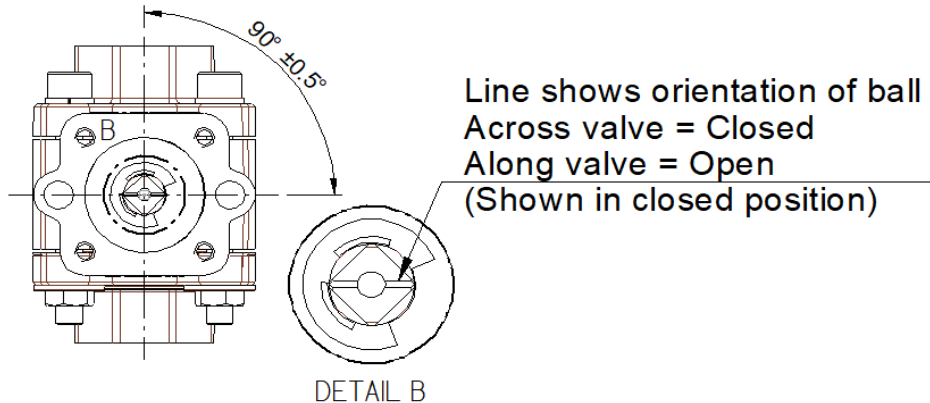
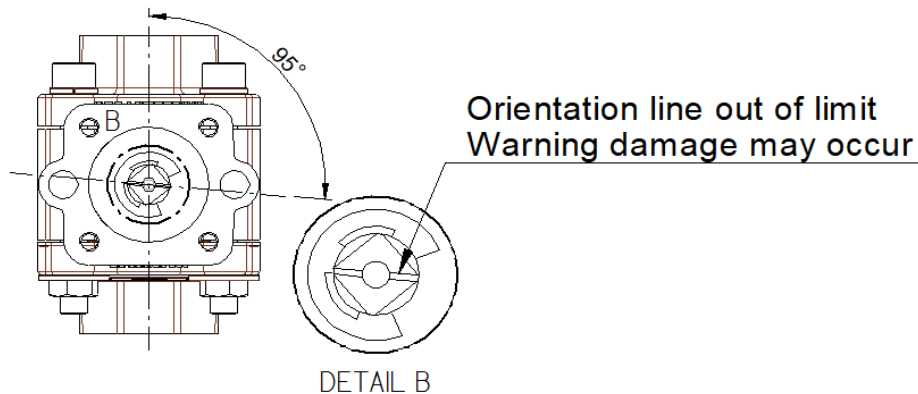
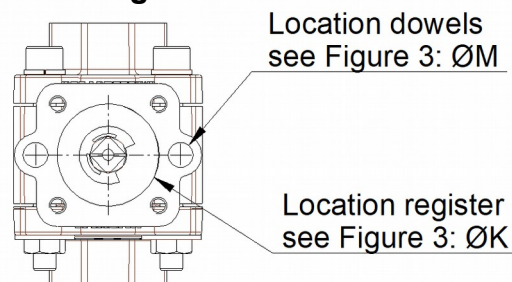


Figure 12: Ball Orientation line incorrect setting.



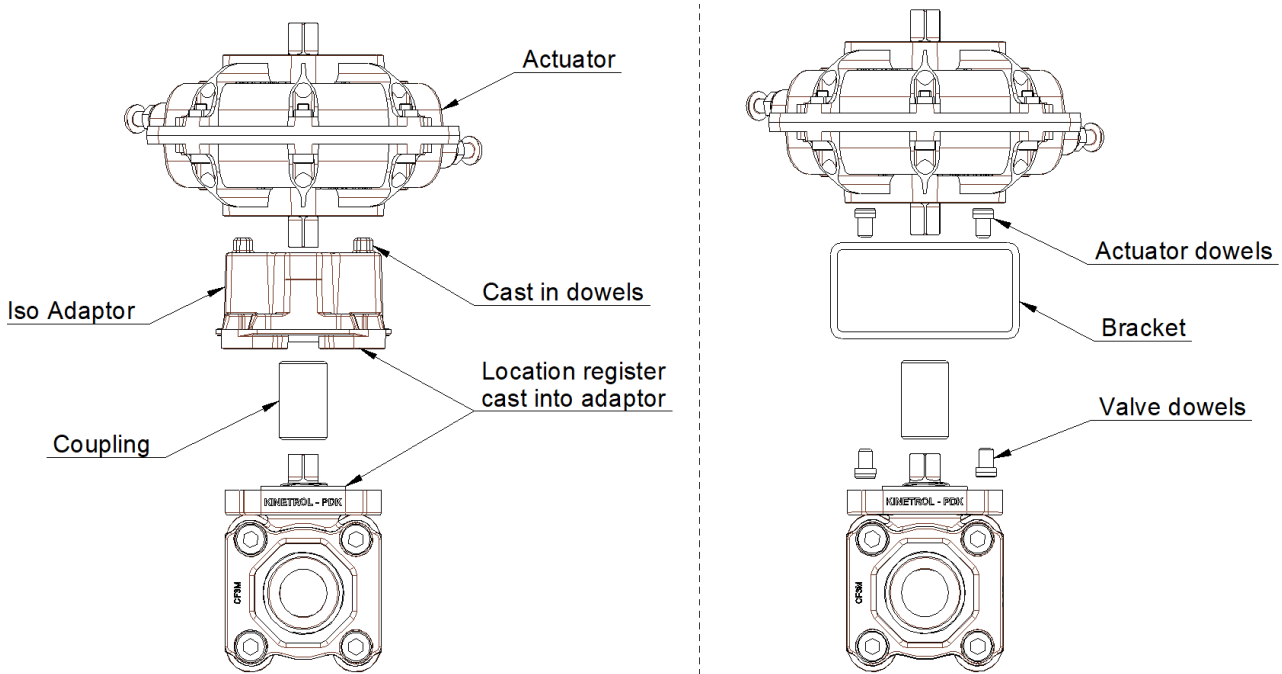
- 2) The actuator and valve must be assembled together in such a way that excessive sideloading due to misalignment of the components is avoided, as this can result in premature failure. Misalignment can be avoided by using the location dowels or mount boss register as shown on figure 13.

Figure 13: Location dowels / register



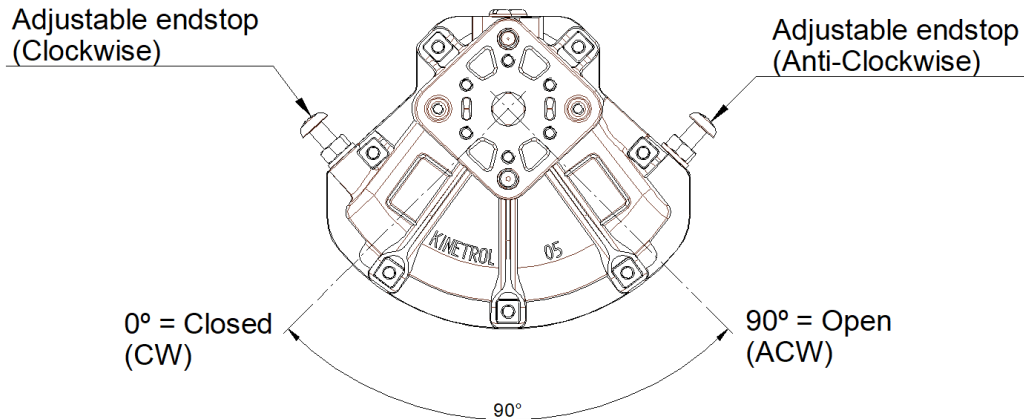
- 2) There are two options for mounting the actuator and valve together, either via a bracket and coupling or via an ISO adaptor and coupling, see figure 14. It is recommended when available to use the ISO adaptor as it has dowels and a location register cast in, therefore removing the need to fit loose dowels which can be troublesome to fit and are easily dropped and lost.

Figure 14: Actuator / Valve mount options



- 3) Warning. If using the bracket it is important that the dowels are used, see figure 14, as they prevent misalignment which can create excessive side loads.
- 4) Mount the bracket / ISO adaptor to the actuator and torque up the fasteners as per the instructions provided or consult TD111 if none provided.
- 5) Fit the coupling onto the valve and then fit the actuator complete with bracket / ISO adaptor, onto the valve.
- 6) Warning. Do NOT disturb the orientation of the valve square. The actuator endstops may need to be adjusted to enable fitting onto the valve, if the dowels / ISO mount holes do not line up, see figure 15.
- 7) The actuator stop screws should be set to allow the valve to fully open and fully close.
- 8) Once endstops are set and you have checked the valve is still fully closed when the actuator is fitted, torque the valve fasteners as per table 7.

Figure 15: Actuator endstop adjustment



Note actuator is viewed from above with valve below actuator.

Table 7: Valve mount boss tightening torques.

	Size	Thread size	Torque (Nm)
Reduced Bore	DN25 / NPS 1	M6	10
	DN50 / NPS 2	M6	10

9) Connect air supply to actuator and remotely actuate to confirm correct operation.