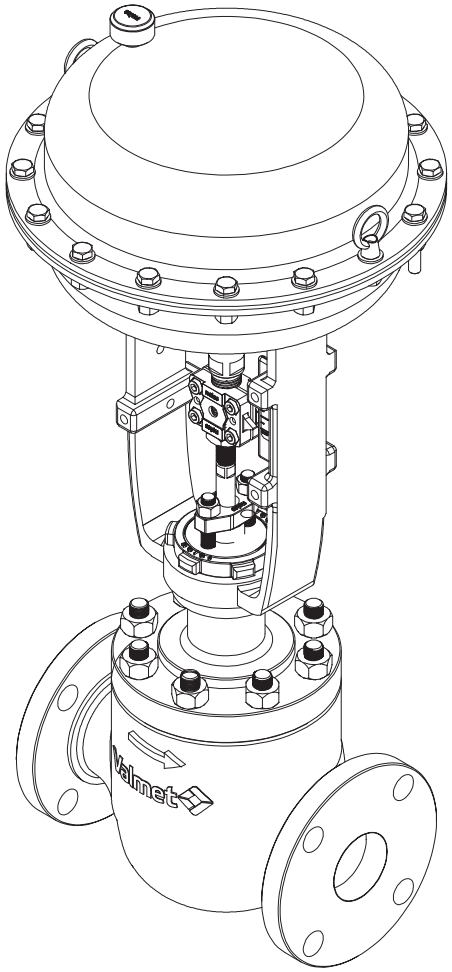
Neles™ cage-guided globe valve
Series GB

Installation, maintenance and operating instructions



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EAC This product meets the requirements set by the Customs Union of the Republic of Belarus, the Republic of Kazakhstan and the Russian Federation.

READ THESE INSTRUCTIONS FIRST!

These instructions provide information about safe handling and operation of the valve.

If you require additional assistance, please contact the manufacturer or manufacturer's representative.

SAVE THESE INSTRUCTIONS!

Addresses and phone numbers are printed on the back cover.

1. GENERAL

1.1 Scope of the manual

This manual provides essential information on series GB, Globe-Balanced single seated, cage guide sliding stem globe valves. Actuators and positioners are only discussed briefly. Refer to the individual manuals for further information on their installation, operation and maintenance.

NOTE:
Selection and use of the valve in a specific application requires close consideration of detailed aspects. Due to the nature of the product, this manual cannot cover all the individual situations that may occur when the valve is used.

If you are uncertain about use of the valve or its suitability for your intended purpose, please contact Valmet for more information.

For valves in oxygen service, please see also the separate installation, maintenance and operating instructions for oxygen service (see Neles document id:10O270EN.pdf).

1.2 Valve construction

Series GB, Globe-Balanced cage guide valves are flanged (weld end available) single seated sliding stem control valves. The valve seat ring and cage and plug with stem is a module accessible through the bonnet opening (top entry) of the body.

Our standard design provides a cage guide with a piston type plug with a quick change seat ring. The two split cages and inserted plug seal ring makes strong support to ensure valve alignment.

This series is available with series of reduced Cv trims and the standard seat tightness is class III~IV, optional trims can meet to class V, ANSI/FCI 70-2.

The detailed structure is revealed by the type code shown on the valve identification plate. The type code is explained in Section 11.

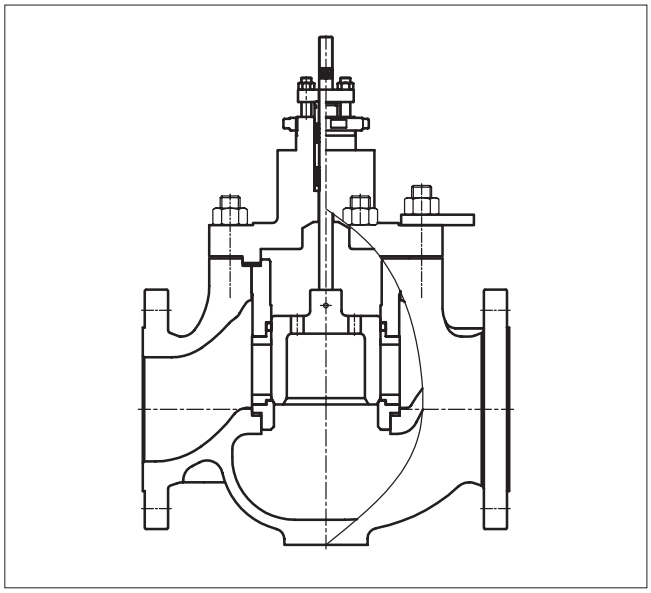


Fig. 1 Construction of a Neles Globe-Balanced Single Seated, Cage Guide Valve

1.3 Valve markings

The body markings are: manufacturer's trademark, nominal size, pressure rating and material of the body. The identification plate is attached on an actuator yoke side.

Markings on the identification plate:

1. Type designation (Valve code)
2. Size, Rating
3. Cv
4. Body material
5. Plug, Stem material
6. Seat material
7. Temp. min./max.
8. Maximum (shut-off) pressure
9. Valve manufacturing date
10. Tag No.
11. CO No.

Depending on manufacturing location, information on the identification plate may differ.

1.4 Technical specifications

Face-to-face length:	ANSI/ISA-75.08.01, 03, 04, 05 & ANSI/ISA-75.08.06 (Long) EN 558 series 1
Body rating:	Class 150 to Class 2500 PN 10 to PN 320
Max. pressure differential:	acc. to pressure class
Temperature range:	-196° to +593 °C (depending on the body materials and bonnet type)
Flow direction:	indicated by an arrow on the body
Actuator mounting:	threaded bonnet with yoke nut or bolted yoke
Stem connection:	clamp with bolts/nuts
Dimensions:	see Section 10
Weights:	see Section 10

Note that the max. shut-off pressure is based on the mechanical maximum differential pressure at ambient temperature. You must always observe the fluid temperature when deciding on applicable pressure values. When selecting a valve you must also check the noise level, cavitation intensity, flow velocity, actuator load factor, etc.using Nelprof.

1.5 Valve seat leakage class

The valve follows the seat leakage classifications of ANSI/FCI 70-2 requirement.

1.6 Recycling and disposal

Most valve parts can be recycled if sorted according to material. Most parts have a material marking. A material list is supplied with the valve. In addition, separate recycling and disposal instructions are available from the manufacturer. A valve can also be returned to the manufacturer for recycling and disposal for a fee.

1.7 Safety precautions

CAUTION:
Do not exceed the valve performance limitations!
Exceeding the limitations marked on the valve may cause damage and lead to uncontrolled pressure release.
Damage or personal injury may result

CAUTION:
Do not dismantle the valve or remove it from the pipeline while the valve is pressurised!
Dismantling or removing a pressurised valve will result in uncontrolled pressure release. Always isolate the relevant part of the pipeline, release the pressure from the valve and remove the medium before dismantling the valve.
Be aware of the type of medium involved. Protect yourself and the environment from any harmful or poisonous substances. Make sure that no medium can enter the pipeline during valve maintenance.
Failure to do this may result in damage or personal injury.

CAUTION:
Be aware of plug motion!
To avoid personal inquiries resulting from movement of a plug, keep any part of your body, especially fingers out of the flow port. Any tools or any other foreign stuff also must be kept out of this flow ports. During valve maintenance, make sure that air pressure supply line is disconnected to the actuator.
Failure of this may cause personal inquiry and product damage.

CAUTION:
Protect yourself from noise!
The valve may produce noise in the pipeline. The noise level depends on the application. It can be measured or calculated using the Neles Nelprof software. Observe the relevant working environment regulations in terms of noise emission.

CAUTION:
Beware of a very cold or hot valve!
The valve body may be very cold or very hot during use. Protect yourself against cold injuries or burns.

CAUTION:
When handling the valve or the control valve assembly, take its weight into account!
Never lift the valve or control valve assembly by the positioner, the limit switch or their piping. Place the lifting ropes securely around the valve body (see Fig. 2).
Damage or personal injury may result from falling parts.

CAUTION:
Follow the proper procedures when handling and servicing Oxygen valves.

CAUTION:
Hexavalent chromium(VI) or Cr(VI), is known to cause cancer. Be sure to use all appropriate personal protective equipment (PPE) when welding metals containing chromium.

CAUTION:
Ensure that any weld splatter does not fall onto the valve trim. This may prevent proper trim movement or damage critical seating surfaces causing leaks.

CAUTION:
Make sure the valve is not pressurized when removing the actuator.

CAUTION:
Potential electrostatic charging hazard. Ensure the protection in the process.

CAUTION:
Improper stud and nuts or any other parts are not to be used. Use of unapproved stud and nuts or any other parts may cause an accident which results in personal inquires and property damage.

2. TRANSPORTATION, RECEPTION AND STORAGE

Check the valve and the accompanying devices for any damage that may have occurred during transport.

The valve is delivered in the closed position. A valve equipped with a spring-return actuator is delivered in the position determined by the spring.

Store the valve carefully before installation, preferably indoors in a dry place.

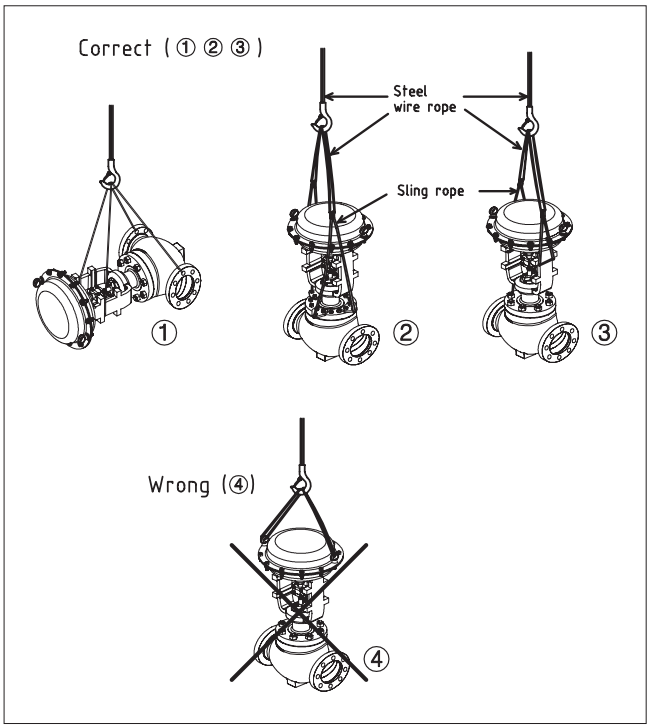


Fig. 2 Lifting the valve

3. VALVE INSTALLATION

3.1 General

Remove the flow port protectors and check that the valve is clean inside.

CAUTION:
When handling the valve or the control valve assembly, take its weight into account!

NOTE:
Heat insulation should be installed when valve design temperature is over 260ºC to protect actuator, positioner and accessories from heat.

3.2 Installation into the pipeline

Pipeline cleaning

Make sure no foreign particles, such as sand or pieces of welding electrode, are in the pipeline, they may damage the sealing surfaces.

Installation valve

The valve has an arrow indicating the flow direction. Install the valve in the pipeline so that the flow direction of the valve corresponds to the flow direction marked on the pipe.

The mounting orientation of the valve should be vertical position as it is shown on Fig. 3.

CAUTION:
Hexavalent chromium(VI) or Cr(VI), is known to cause cancer. Be sure to use all appropriate personal protective equipment (PPE) when welding metals containing chromium.

CAUTION:
Ensure that any weld splatter does not fall onto the valve trim. This may prevent proper trim movement or damage critical seating surfaces causing leaks.

NOTE:
For any other mounting position, please consult the factory.

Choose flange gaskets according to the operating conditions.

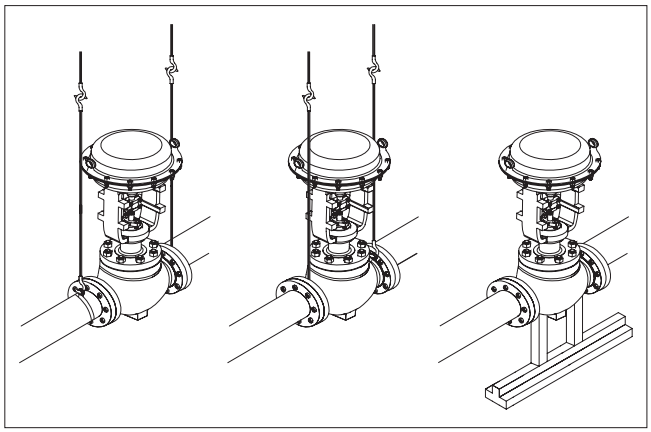


Fig. 3 Installing the control valve into pipeline using supports

Do not attempt to correct a pipeline misalignment by means of flange bolting.

Loads on the valve body from pipeline vibrations can be reduced by supporting the pipeline properly. Reduced vibration also increases the lifetime of the positioner.

Where necessary, you can support the valve by the body, using regular pipe clamps and supports. Do not fasten supports to the valve or flange bolting or to the actuator, see Fig. 3.

3.3 Hydrostatic testing and line flushing

When performing the hydrostatic test and flushing on the line, the control valve should not be used as an isolating valve. Ensure that the control valve is always in the open position before starting this process; otherwise, it may lead to valve and trim damage or failure of the seals. Flushing and hydrostatic test kits can be purchased from Valmet.

3.4 Control valve assembly

Check all joints, piping and cables.

Check that the actuator stop screws, positioner and limit switches are calibrated. Refer to their installation, maintenance and operating manuals.

3.5 Valve insulation

If necessary, the valve may be insulated. Insulation must not continue above the upper level of the valve body, see Figure 4.

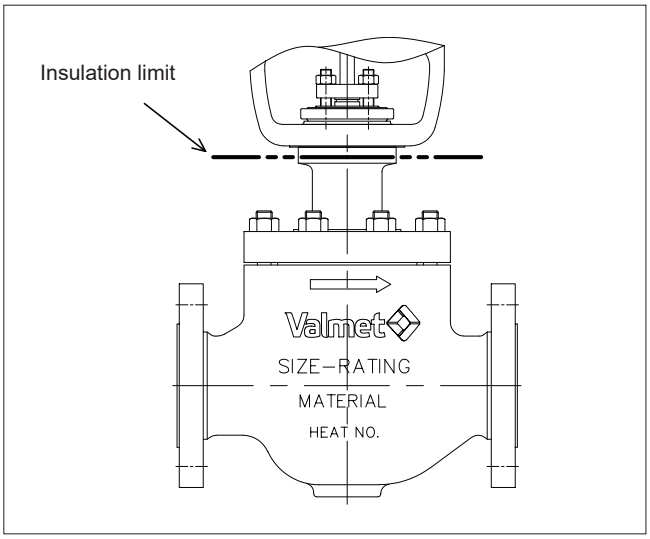


Fig. 4 Insulation of the valve

4. MAINTENANCE

CAUTION:
Observe the safety precautions listed in Section 1.7 before starting work!

CAUTION:
When handling the valve or the control valve assembly, take its weight into account!

4.1 General

The Neles Globe-Balanced Single Seated valves require no regular maintenance. However, check the gland packing for leakage. This section outlines the maintenance that can be carried out by the user.

The numbers in parentheses refer to the parts lists and the exploded views of the valve in Section 9.

NOTE:
If you send the valve to the manufacturer for repair, do not dismantle it. Clean the valve carefully, including the inside. For safety reasons, inform the manufacturer of the nature of the medium when you send the valve.

NOTE:
Always use original spare parts to make sure the valve functions as intended.

4.2 Gland packing adjustment & bellows seal

In the event of a packing leakage tighten the hexagon nuts (18) in ¼ turn steps each until the leakage is stopped. Do not tighten more than necessary.

NOTE:
In case of the bellows seal bonnet construction, the gland packings are installed up at the top of the bellows bonnet(8L).

CAUTION:
Bellows assembly(8M) is welded with a the plug set. The bellows assembly should not be twisted.

CAUTION:
The bellows seal valve will be shipped from the factory with the plug (8P) inserted into the monitoring port. Customers should connect their leakage detection system to this monitoring port to receive warnings in the event of a bellows seal leakage.

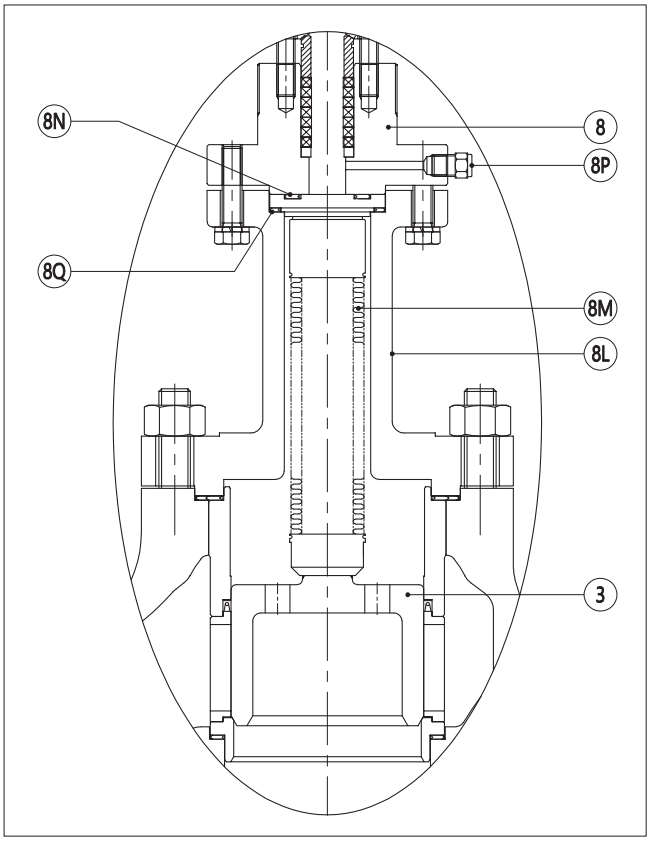


Fig. 5 Bellows seal construction

4.3 Replacing the gland packing

CAUTION:
Do not dismantle the valve or remove it from the pipeline while the valve is pressurised!

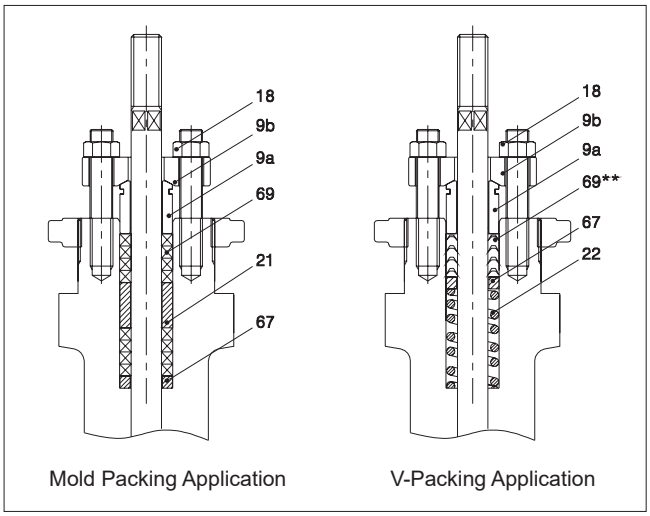


Fig. 6 Gland packing

- Make sure the valve is not pressurised.
- Remove the actuator from the valve stem according to the instructions given in the actuator manual.
- Loosen and remove the gland flange nuts (18).
- Remove the gland flange (9b), and gland (9a) up to the valve stem.

- Remove the old packing rings (69) using a pointed tool, avoid damaging the seal surfaces and valve stem.
- Clean the packing ring counterbore.
- Mount the new packing rings one by one into the packing gland box using the gland as a tool and mount the gland with hand-tightened nuts.

CAUTION:
Be careful when using a hammer.

- Each packing ring (69) shall be firmly seated into the stuffing box using the packing tamping tool
- Joints of successive braided type packing rings (69 and part 69a if applicable) must be inserted 180 degrees against the previously inserted packing rings (69 and part 69a if applicable).
- Apply lubricant which is suitable for the process type and temperature to the inner surface of the packing rings excluding PTFE packing and emission packing. (69)(& 69a if applicable). However, lubricant is not allowed for oxygen service or in any processes with temperature higher than 260 °C (550 °F).
- Apply lubricant suitable for process temperature to the gland studs (14) and nuts (18) properly. However, lubricants for special services which are flammable should not be used.
- Fasten the gland by tightening the hexagon nuts(18). Refer to the torque table to avoid over-tightening which may cause high friction and wearing.
- Check leakage when the valve is pressurised.

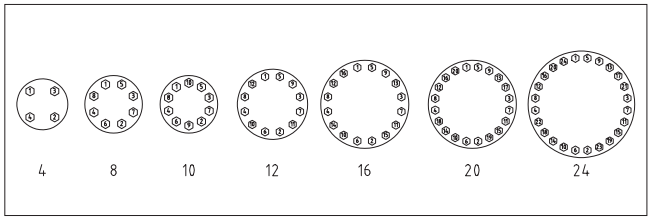


Fig. 7 Tightening sequence of the bonnet nuts

Table 1 Required torques for bonnet nuts

Valve Size		Rating (ANSI)	Bonnet Stud Bolts		Required Torques (±5% allowable)	
mm	in		Size	Q'ty	Nm	lbf ft
50	2	150-300	1/2"-13UNC	8	45	33
		600	9/16"-12UNC	8	65	48
		900	7/8"-9UNC	8	250	184
		1500	7/8"-9UNC	8	250	184
		2500	1-1/8"-8UN	8	560	413
75	3	150-300	5/8"-11UNC	8	90	66
		600	5/8"-11UNC	10	90	66
		900	1-1/8"-8UN	8	560	413
		1500	1-1/8"-8UN	8	560	413
		2500	1-3/8"-8UN	8	1100	811
100	4	150-300	3/4"-10UNC	8	160	118
		600	3/4"-10UNC	10	160	118
		900	1-3/8"-8UN	8	1100	811
		1500	1-3/8"-8UN	8	1100	811
		2500	1-1/2"-8UN	8	1400	1033
150	6	150-300	3/4"-10UNC	8	160	118
		600	7/8"-9UNC	12	250	184
		900	1-1/8"-8UN	12	560	413
		1500	1-3/8"-8UN	12	1100	811
		2500	1-1/2"-8UN	12	1400	1033
200	8	150-300	7/8"-9UNC	12	250	184
		600	1"-8UNC	12	380	280
		900	1-5/8"-8UN	12	1810	1335
		1500	1-5/8"-8UN	12	1810	1335
250	10	150-300	1"-8UNC	16	380	280
		600	1-1/4"-8UN	16	790	583
		900	1-3/8"-8UN	12	1100	811
		1500	1-5/8"-8UN	16	1810	1335
300	12	150-300	1-1/8"-8UN	16	560	413
		600	1-1/4"-8UN	16	790	583
		900	1-3/8"-8UN	20	1100	811
		1500	2-1/4"-8UN	12	4970	3666
		2500	2-3/4"-8UN	12	9225	6804
350	14	150-300	1-1/4"-8UN	16	790	583
		600	1-3/8"-8UN	16	1100	811
		900	1-1/2"-8UN	20	1400	1033
		1500	2-1/2"-8UN	12	6880	5074
400	16	150-300	1-1/4"-8UN	20	790	583
		600	1-3/8"-8UN	20	1100	811
		900	1-5/8"-8UN	20	1810	1335
		1500	2-1/2"-8UN	12	6880	5074
450	18	150	1-1/4"-8UN	20	790	583
		300	1-1/4"-8UN	20	790	583
		600	1-5/8"-8UN	20	1810	1335
500	20	150	1-3/4"-8UN	20	2280	1682
		300	1-3/4"-8UN	20	2280	1682
		600	1-3/4"-8UN	24	2280	1682
600	24	150	1-3/4"-8UN	24	2280	1682
		300	1-3/4"-8UN	24	2280	1682
		600	2"-8UN	24	3455	2548

Table 2 Required torques for packing nuts

Packing Type	Stem Size	Rating (ANSI)	Required Torques	
	mm		Min. Nm(lbf ft)	Max. Nm(lbf ft)
Graphite & PTFE packing	Ø12.7	150-300	5(4)	7(5)
		600	6(4)	8(6)
		900	7(5)	10(7)
		1500	9(7)	12(9)
		2500	10(7)	14(10)
	Ø19.05	150-300	11(8)	16(11)
		600	14(10)	19(14)
		900	17(12)	23(17)
		1500	19(14)	27(20)
		2500	22(16)	31(23)
	Ø25.4	150-300	18(13)	25(18)
		600	23(17)	32(24)
		900	27(20)	38(28)
		1500	32(24)	44(32)
		2500	36(27)	51(38)
	Ø36	150-300	26(19)	36(27)
		600	32(24)	45(33)
		900	39(29)	54(40)
		1500	45(33)	64(47)
		2500	52(38)	73(54)
	Ø43	150-300	46(34)	64(47)
		600	58(43)	81(60)
	Ø50.8	150-300	68(50)	95(70)
		600	85(63)	119(88)
V-ring packing (PTFE)	Ø12.7	150-300	3(2)	5(4)
		600	4(3)	6(4)
		900	5(4)	7(5)
		1500	6(4)	8(6)
		2500	7(5)	10(7)
	Ø19.05	150-300	8(6)	11(8)
		600	10(7)	14(10)
		900	12(9)	16(12)
		1500	14(10)	19(14)
		2500	16(12)	22(16)
	Ø25.4	150-300	13(10)	18(13)
		600	16(12)	22(16)
		900	19(14)	27(20)
		1500	22(16)	31(23)
		2500	25(18)	35(26)
	Ø36	150-300	18(13)	25(18)
		600	23(17)	32(24)
		900	27(20)	38(28)
		1500	32(24)	44(32)
		2500	36(27)	51(38)
	Ø43	150-300	32(24)	45(33)
		600	40(30)	57(42)
	Ø50.8	150-300	47(35)	66(49)
		600	59(44)	83(61)

4.4 Replacing the general trim and body reassembly

NOTE:
The general trim set consists of the seat, plug and stem, cage, cage guide, seal ring and gaskets (for seat and body). The high temperature trim set consists of the seat, plug and stem, cage, 3 seal rings and gaskets (for seat and body). Please refer to chapter 4.6

- Make sure the valve is not pressurised.
- Remove the actuator from the valve stem according to the instructions given in the actuator manual and Section 6.
- Loosen the gland nuts (18) slightly.
- Remove the hexagon nuts (17).
- Remove the bonnet (8)
- Remove the stem and plug (5 & 3) with the cage (15).
- Remove the cage (15), cage guide (16) and the seal ring (64). Avoid from damaging the seal ring between the cage and cage guide.
- Remove the body gasket (65), seat ring (7), seat gasket (63)

CAUTION:
Do not reuse the spiral wound gaskets (63 & 65), this is need to be replace each time the valve is disassembled.

- Remove the hexagon nuts (18), gland flange (9b) and packing gland (9a).
- Remove the old packing rings (69).

NOTE:
If the valve have excess leakage, the plug and seating surface need lapping and cleaning.

- Clean the body gasket surface.
- Insert a new seat gasket (63) and the seat ring (7) into the body.
- Install the cage (15), seal ring (64), cage guide (16) and plug stem assembly (3, 5, 6) very carefully.
- Insert the body gasket (65).
- Mount the bonnet on the body carefully maintaining alignment with the plug and the stem and with the cage in the closed position, so that the arrow on the body and on the bonnet point in the same direction.
- Apply lubricant which is suitable for the process type and temperature to the studs(13), gland studs(14), hexagon nuts(17), nuts(18), stem(5) and thread area properly.
  However, lubricant is not allowed for oxygen service or in any processes with temperature higher than 260'C(550'F).
- Insert the hexagon nuts (17) into studs (13) and tight slightly the nuts.

CAUTION:
Do not excessively tighten stud nuts at this time.

- Insert the packing (69) according to above 4.3

CAUTION:
The all related parts (seat ring, cages, plug & stem, bonnet) must be properly aligned in the body.

- Tighten hexagon nuts(17) according to the torque table to make proper contact between a plug and a seat ring.
- Fasten the glad by tightening the packing flange nuts according to the torque table.

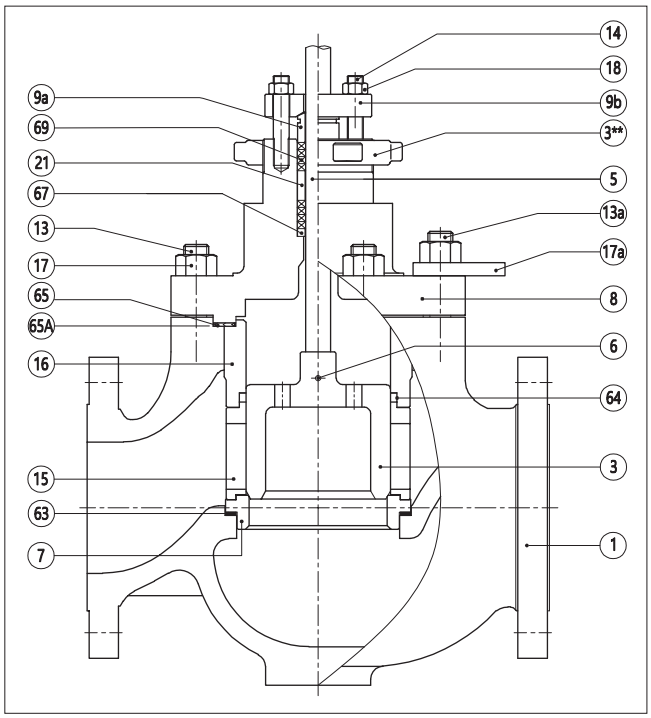


Fig. 8 Conventional Cage-Balance Trim

4.5 Pilot balanced plug

Disassembly & Assembly

- After removing the plug stem assembly from the body, mount the plug and stem assembly on the lathe chuck, push the stem to compress the spring inside of the plug.
- Remove the pilot wire (76).
- Remove the pilot bolts (75).

CAUTION:
Make sure to balance when loose the pilot bolts, and be careful the spring tension to bounced off the pilot plug and stem.

- Remove the pilot cover (74)
- Remove the pilot plug (73) and stem (5) from pilot main plug (71).
- Remove the pilot spring (77) carefully.
- Inspect the pilot plug (73) and the pilot seat as well as the surface inside of the pilot main plug (71). If there is damage, scratches or grooves, it should be replaced or repaired.
- Insert the cleaned pilot spring (77) into the upper side of main plug.
- Install the pilot plug (73) & stem (5) on the spring (77).
- Install the pilot cover (74) and fasten the pilot bolts (75) keep in balance.
- Install wire (76) for connecting the all pilot bolts to prevent loose on operation.

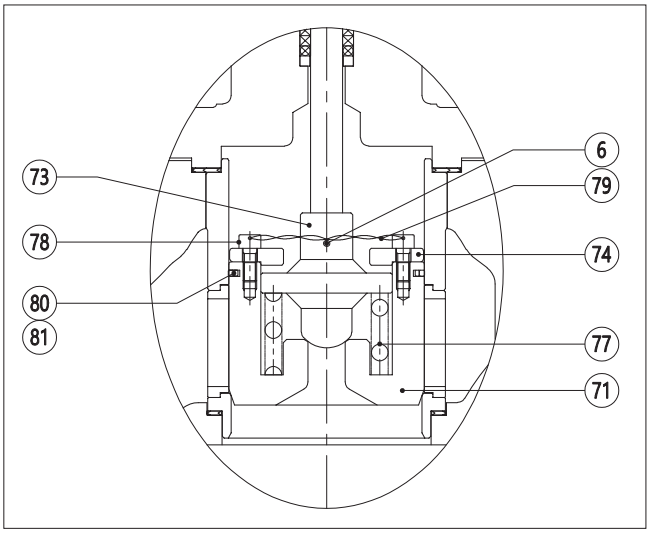


Fig. 9 Pilot balance trim

4.6 High temp balanced plug

Disassembly & Assembly

CAUTION:
Disassemble the graphite seal from the cage and plug and stem assembly when the sticking issue or weird noise happens during the valve operation in normal process condition. If not happen, then no need to disassemble the graphite seal.

- After removing the plug stem assembly from the body, mount the cage (15), plug and stem assembly (5) on the lathe chuck horizontally.
- Pull out the plug and stem assembly (5) from the cage (15) by hammering on bottom surface of plug.
- Remove the graphite seal (64) from plug groove one by one.

CAUTION:
Plug and stem assembly will be separated from the cage when 3 sets of graphite seal are out.

- Inspect the cage (15), plug and stem assembly (5) and seat ring (7).
- If there is damage, scratches on grooves, it should be replaced or repaired.
- Mount the half of new graphite seal (64) on the chuck.
- Grab the graphite seal (64) by both hands, and push and cut it into the two pieces.
- Repeat to cut the other seal in order to prepare 3 sets of graphite seal.
- Mount the cage (15) on the chuck (or similar instrument) vertically so that the plug and stem assembly (5) can be inserted from up to down.
- Make to align the position of plug and stem assembly (5) in order to insert it to the inside of cage.
- Insert each graphite seal (64) to the plug groove one by one
- Hammering the stem ends carefully in order to insert the graphite plug seal (64) without the damage.

CAUTION:
When insert each graphite seal to the plug groove, do not mix the cut graphite seal ring each other.

CAUTION:
Make the cut surfaces of graphite seal perfectly fits each other during the inserting to the plug groove.

CAUTION:
Make the graphite plug seal will not be out of groove during the inserting by hammering.

5. TESTING THE VALVE

CAUTION:
Pressure testing should be carried out using equipment conforming to the correct pressure class!

We recommend that the valve body is pressure-tested after the valve has been assembled.

The pressure test should be carried out in accordance with an applicable standard for the pressure rating. The valve must be in the open position during the test.

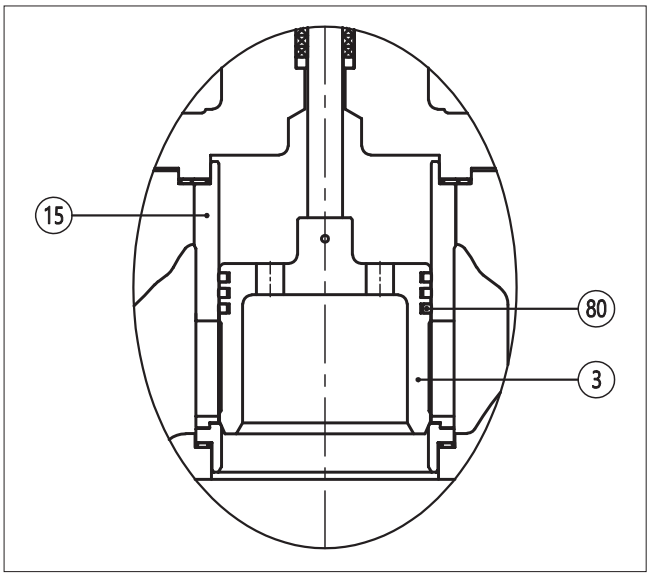
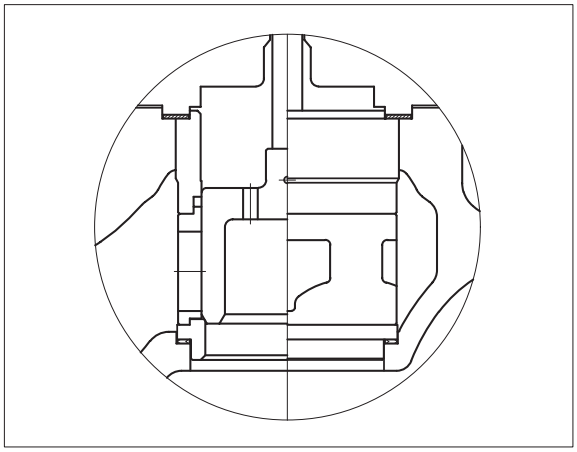
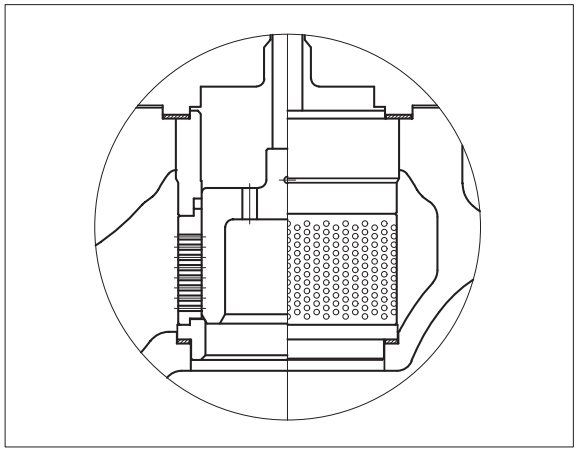


Fig. 10 High temp balanced trim

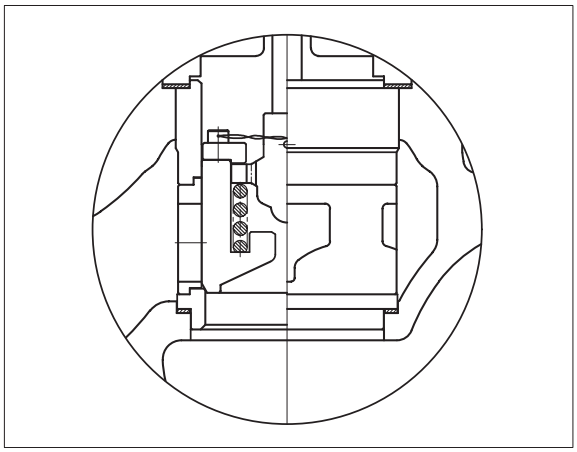
Trim Design application



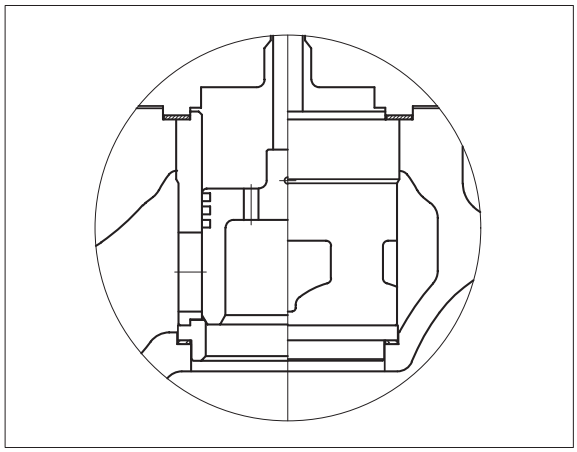
Quick change, standard cage trim



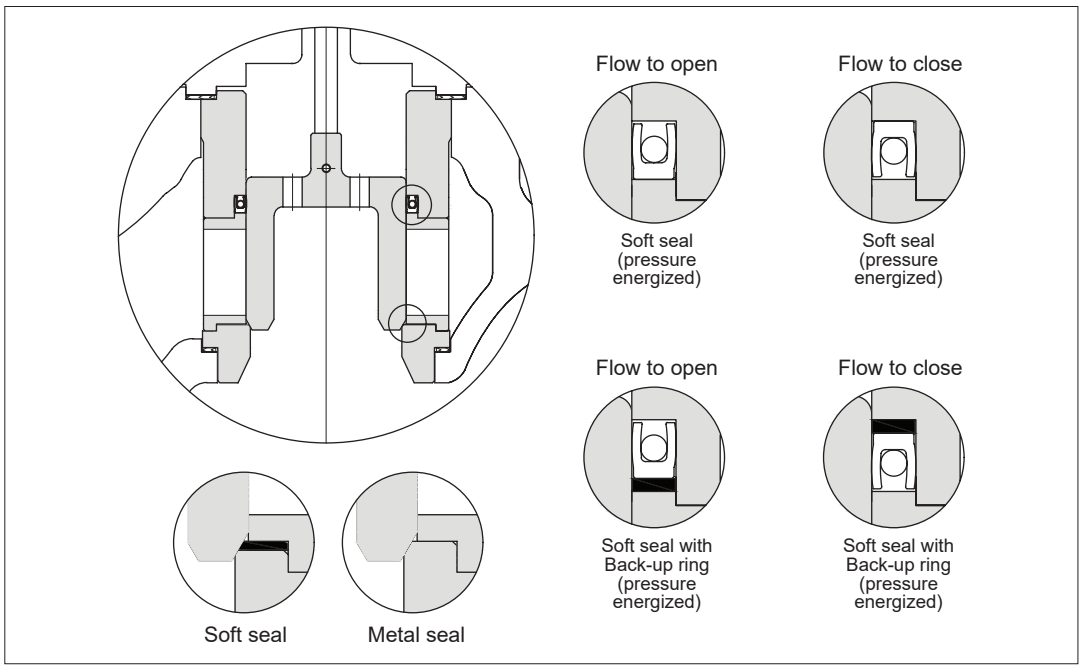
Tendril Multi-hole trim



Pilot balanced trim



High temperature trim



Seal-ring & seat solutions for GB valve trims

Fig. 11 Different trim designs

6. REMOVAL & MOUNTING THE ACTUATOR

Actuator is to be mounted on the valve assembly and is to be reconnected to the valve plug stem according to this manual. There are several types of actuators such as VDR/VDD diaphragm actuator, VBR/VBD spring return cylinder actuator and VBC/VCC spring-less double acting cylinder actuator which requires different clamping. In this manual, VD actuator mounting and removal will be handled. For other types of actuator, please refer to separate IMOs.

CAUTION:
Make sure the valve is not pressurized when removing the actuator.

CAUTION:
Beware of the plug movement!
Do not use air pressure higher than what specified on the identification plate.

NOTE:
Threaded area is required to apply lubricant suitable for process temperature to yoke nut(3**) and clamp(1**).

A. Actuator removal for Reverse <air to open, stem retract> actuator (Fig. 13)

- To prevent personal injury during dismantling, use compressed air to raise the valve plug approximately 20% from the seat ring. Failure to do so may cause clamps to spring out. This is because the actuator stem and valve stem are clamped together under pressure. Therefore, it is necessary to relieve the pressure by lifting the plug before disassembling the clamps.
- Loosen the stem lock nut (5**) and socket head screws (1a**) and hexagon nuts (1b**).
- Remove the clamp (1**).
- Shut off and disconnect air supply line.
- Support actuator with the suitable lifting device.
- Use compressed air to lift the valve stem, and then proceed to remove the yoke nut.
- Remove the actuator from the valve body assembly.

B. Actuator removal for Direct <air to close, stem extend > actuator (Fig. 13)

- Before dismantling the clamps, it is crucial to disconnect the air supply from the actuator to prevent personal injury. Failure to do so may result in the clamps being forcefully ejected, as the actuator stem and valve stem are clamped together under pressure. Therefore, ensure that you remove the pressure by disconnecting the air supply before proceeding with clamp disassembly.
- Loosen stem lock nut (5**) and socket head screws (1a**) and hexagon nuts (1b**).
- Remove the clamp (1**).
- Support actuator with the suitable lifting device.
- Use compressed air to lift the valve stem, and then proceed to remove the yoke nut.
- Remove the actuator from the valve body assembly.

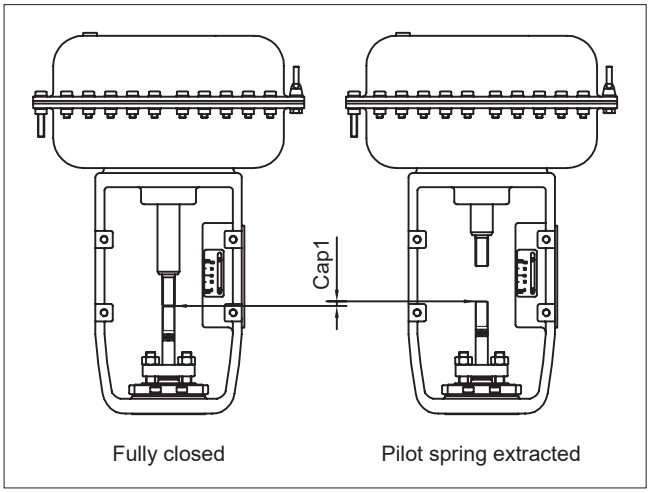


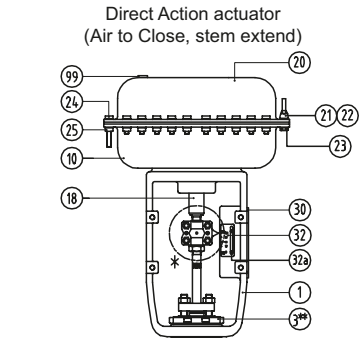
Fig. 12 Measurement of Gap 1

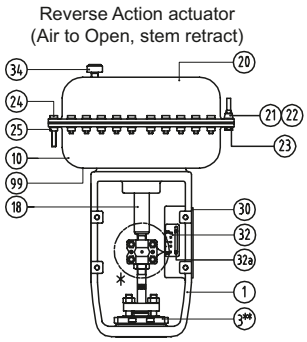
C. Actuator installation

General & high temp balanced trim constructions

1. Using the handwheel or pneumatic pressure, lower the valve stem until the plug makes contact with the seat ring. Place a flat object between the valve stem and actuator stem when pushing them down to ensure proper contact between the plug and the seat ring. Ensure that the handwheel indication is in the neutral position before operating the valve pneumatically.
2. Employing the handwheel or pneumatic pressure, elevate the actuator stem to its fully retracted position.
3. Align the starting point (0) of the ruler with the end of the retracted actuator stem.
4. By releasing compressed air, lower the actuator stem by valve stroke and clamp the valve stem and actuator stem together. The actuator stem is to be lifted up by Gap 1 (Gap 1 = Distance between the actuator stem end when fully extended and the actuator stem end when fully retracted - valve stroke). This compression of the actuator springs in this manner can generate shut-off pressure (VDR) and open pressure (VDD) in the event of valve failure.

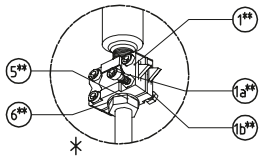
For more detailed information, please contact your Valmet sales office or service center.





VD Actuator part

1. YOKE	10. LOWER CASE	18 TOP STEM	20. UPPER CASE
21. LIFTING EYE NUT	22. WASHER	23. HEXAGON SCREW	24. HEXAGON SCREW
25. HEXAGON NUT	30. IDENTIFICATION PLATE	32. INDICATOR	32a. ROUND HEAD SCRREW
34. VENT CAP	99. AIR SUPPLY PORT		



V-A (Valve-Actuator) Mounting Part (**)

1**	CLAMP	1a**	SOCKET HEAD SCREW
1b**	HEXAGON NUT	3**	YOKE NUT (see above VD fig.)
5**	STEM LOCK NUT	6**	LOCK WASHER

Fig. 13 VD Actuator

Pilot valve construction

- With the handwheel or pneumatically, push the valve stem and plug to be slightly touched with seat ring to make sure if valve is fully closed. And mark the valve stem end location by a line on the yoke or travel indicator.
- And move up the top stem. And mark the valve stem end location by a line on the yoke or travel indicator after valve stem is moved by a spring inside pilot plug.
- Measure the distance between two lines, which is gap 2.
- Stroke the actuator to the fully open.
- Measure the maximum distance between the valve stem and actuator top stem.
- Calculate the gap (measured value – rated travel – gap 2 = gap 3)
- Move down the top stem so that the distance between the valve stem and actuator top stem should be gap 2
- Fit the clamp to align with both stems thread
- Close the valve fully.
- Line up the stroke indicator with the clamp indicator arrow and check actuator for operation.
- Tighten the socket head screws after adjusted the rated stroke.

D. Installing VB, VC piston actuator

- VBD and VBR actuators are spring piston actuators for single acting. Please refer to its IMOs for further information.
- VBC and VCC actuators are double acting piston actuators without spring. Please refer to its IMOs for further information.

CAUTION:
Avoid to turn the valve plug and stem when plug is on seat ring to prevent the seating line from being damaged.

7. TOOLS

Removal of the actuator

- L- wrench set (mm)
- hex socket wrench set
- chisel and hammer (10 pound)
- +,- drivers)
- Special tool for packing insertion
- Special tool for packing removal

8. ORDERING SPARE PARTS

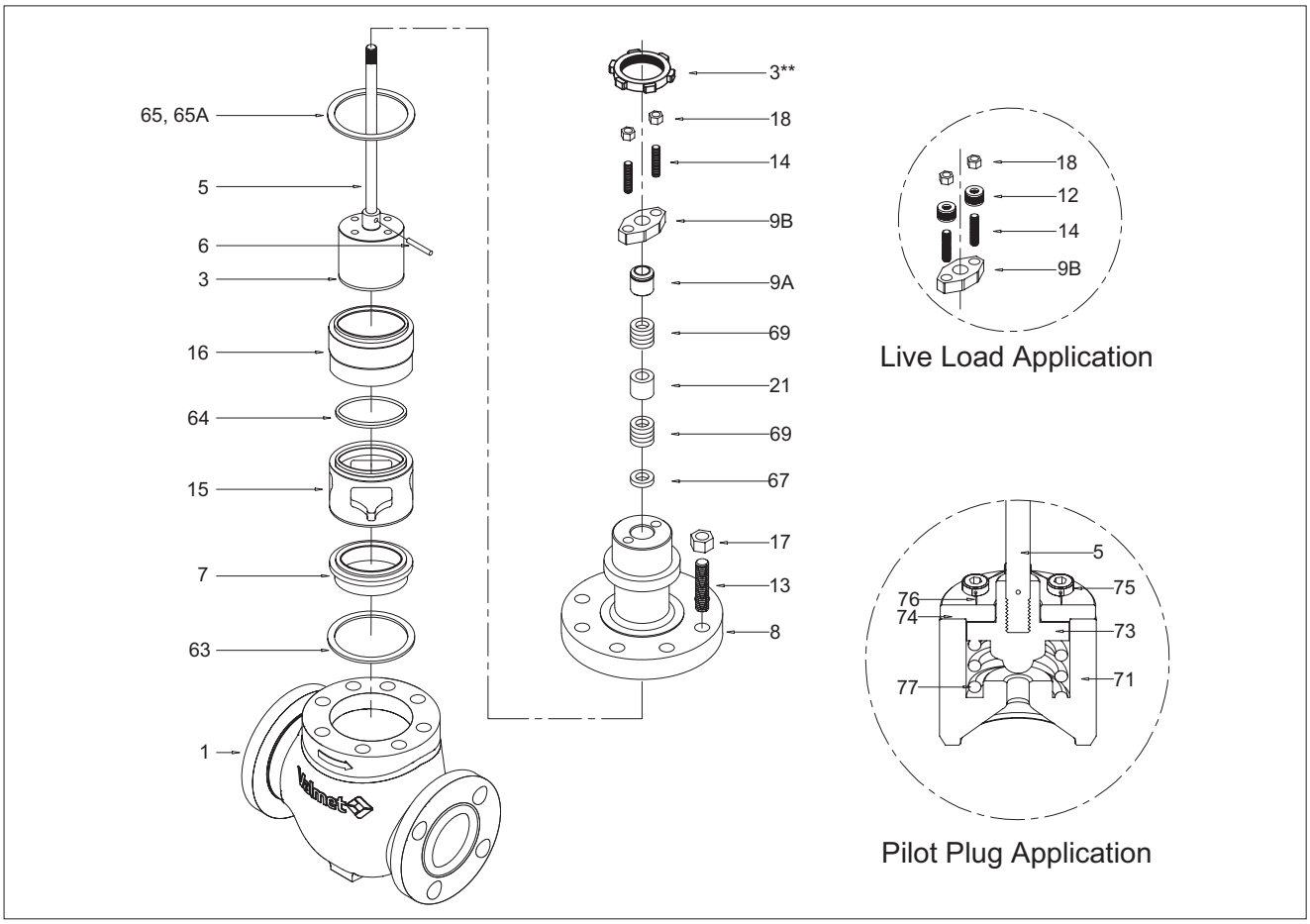
NOTE:
Always use original spare parts to make sure that the valve functions as intended.

When ordering spare parts, always include the following information:

- type code, sales order number, serial number
- number of the parts list, part number, name of the part and quantity required

This information can be found from the identification plate or documents.

9. EXPLODED VIEW AND PARTS LIST

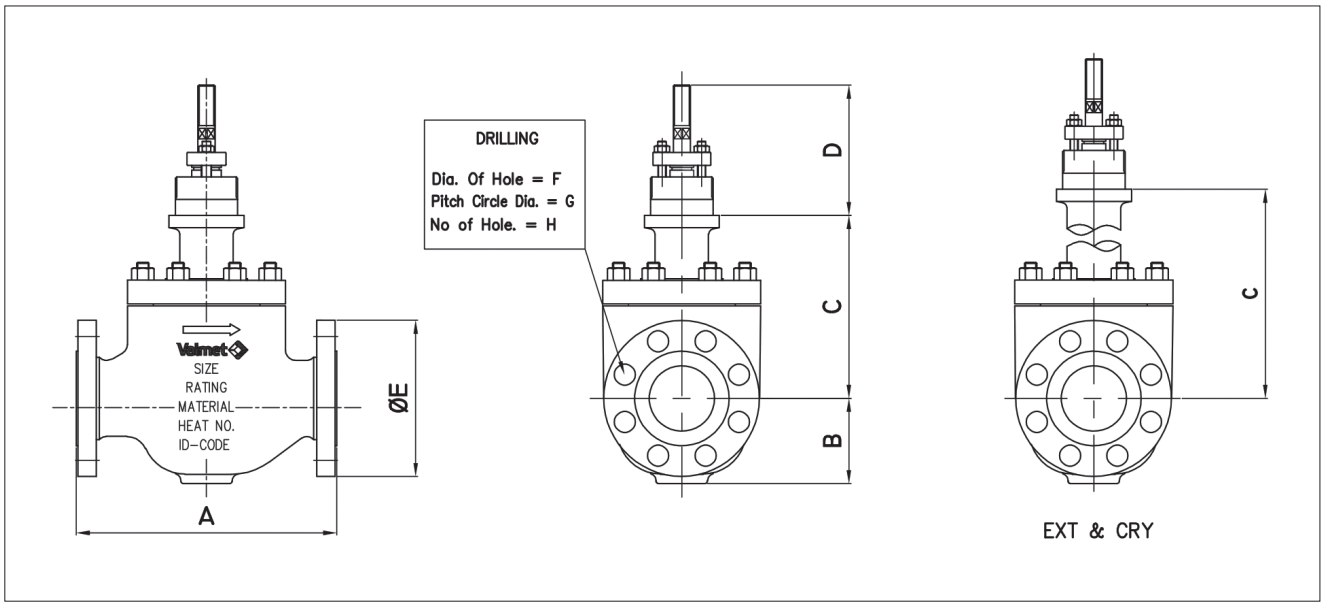


Item	Description	Recommended spare part
1	BODY	
	2*PLUG SET	
	3*PLUG	
	5*STEM	
	6*PLUG PIN	
3**	YOKE NUT	
7	SEAT RING	
8	BONNET	
9a	GLAND	
9b	GLAND FLANGE	
12	DISK SPRING ASS'Y	
13	STUD	
14	STUD	
15	CAGE	
16	CAGE GUIDE	
17	HEXAGON NUT	
18	HEXAGON NUT	
19	IDENTIFICATION PLATE	
19A	RIVET	
21	LANTERN RING	
63	SEAT GASKET	X
64	SEAL RING	X
65	BODY GASKET	X
65A	BODY GASKET	X
67	PACKING SPACER	
69	PACKING RING	X
71	PILOT MAIN PLUG	
73	PILOT PLUG	
74	PILOT COVER	
75	PILOT BOLT	
76	PILOT WIRE	
77	PILOT SPRING	

*) Delivered as a set
**) V-A Mounting Parts
***) Part no. 65A applicable only for 20" and 24"

10. DIMENSIONS AND WEIGHTS

10.1 Valve GB



150 # / 300 # / 600 #

Dimension (mm) / Size (mm)	A			B			C			D	E			F			G			H			Weight (kg) (Approximate)		
	150#	300#	600#	150#	300#	600#	STD	EXT	CRY	COMMON	150#	300#	600#	150#	300#	600#	150#	300#	600#	150#	300#	600#	150#	300#	600#
50	254	267	286	83	83	83	178	333	458	110	150	165	165	19.1	19.1	19.1	120.7	127	127	4	8	8	51	57	57
80	298	318	337	109	109	109	222	395	545	115	190	210	210	19.1	22.2	22.2	152.4	168.3	168.3	4	8	8	97	97	109
100	352	368	394	135	135	135	248	402	552	140	230	255	275	19.1	22.2	25.4	190.5	200	215.9	8	8	8	156	156	183
150	451	473	508	170	170	170	340	467	642	150	280	320	355	22.2	22.2	28.6	241.3	269.9	292.1	8	12	12	245	284	330
200	543	568	610	230	230	230	451	557	732	150	345	380	420	22.2	25.4	31.8	298.5	330.2	349.2	8	12	12	346	406	546
250	673	708	752	275	275	275	488	670	870	150	405	445	510	25.4	28.6	34.9	362	387.4	431.8	12	16	16	523	638	911
300	737	775	819	350	350	350	543	716	916	150	485	520	560	25.4	31.8	34.9	431.8	450.8	489	12	16	20	832	975	1153
350	889	927	972	385	385	385	616	846	1046	210	535	585	605	28.6	31.8	38.1	476.3	514.4	527	12	20	20	1331	1518	1920
400	1016	1057	1108	440	440	440	692	909	1109	220	595	650	685	28.6	34.9	41.3	539.8	571.5	603.2	16	20	20	1791	2033	2808
450	1137	1190	1308	450	450	450	790	1008	1208	189	635	711	743	31.8	34.9	44.5	577.8	628.6	654	16	24	20	2060	2308	2893
500	1662	1704	1767	540	540	540	860	1109	1349	210	698	775	813	31.8	34.9	44.5	635	685.8	723.9	20	24	24	3562	3905	5033
600	1999	2056	2120	630	630	630	1079	1309	1509	217	813	914	940	34.9	41.3	50.8	749.3	812.8	838.2	20	24	24	5840	6834	8143

Dimension (inch) / Size (inch)	A			B			C			D	E			F			G			H			Weight (lbs) (Approximate)		
	150#	300#	600#	150#	300#	600#	STD	EXT	CRY	COMMON	150#	300#	600#	150#	300#	600#	150#	300#	600#	150#	300#	600#	150#	300#	600#
2"	10.0	10.5	11.3	3.3	3.3	3.3	7.0	13.1	18.0	4.3	5.9	6.5	6.5	0.75	0.75	0.75	4.8	5.0	5.0	4	8	8	112	126	126
3"	11.7	12.5	13.3	4.3	4.3	4.7	8.7	15.6	21.5	4.5	7.5	8.3	8.3	0.75	0.875	0.875	6.0	6.6	6.6	4	8	8	214	214	240
4"	13.9	14.5	15.5	5.3	5.3	5.3	9.8	15.8	21.7	5.5	9.1	10.0	10.8	0.75	0.875	1.00	7.5	7.9	8.5	8	8	8	344	344	403
6"	17.8	18.6	20.0	6.7	6.7	7.0	13.4	18.4	25.3	5.9	11.0	12.6	14.0	0.875	0.875	1.125	9.5	10.6	11.5	8	12	12	540	626	728
8"	21.4	22.4	24.0	9.1	9.1	9.1	17.8	21.9	28.8	5.9	13.6	15.0	16.5	0.875	1.00	1.25	11.8	13.0	13.7	8	12	12	763	895	1204
10"	26.5	27.9	29.6	10.8	10.8	10.8	19.2	26.4	34.3	5.9	15.9	17.5	20.1	1.00	1.125	1.375	14.3	15.3	17.0	12	16	16	1153	1407	2008
12"	29.0	30.5	32.2	13.8	13.8	13.8	21.4	28.2	36.1	5.9	19.1	20.5	22.0	1.00	1.25	1.375	17.0	17.7	19.3	12	16	20	1834	2150	2542
14"	35.0	36.5	38.3	15.2	15.2	15.2	24.3	33.3	41.2	8.3	21.1	23.0	23.8	1.125	1.25	1.50	18.8	20.3	20.7	12	20	20	2934	3347	4233
16"	40.0	41.6	43.6	17.3	17.3	17.3	27.2	35.8	43.7	8.7	23.4	25.6	27.0	1.125	1.375	1.625	21.3	22.5	23.7	16	20	20	3948	4482	6191
18"	44.8	46.9	51.5	17.7	17.7	17.7	31.1	39.7	47.6	7.4	25.0	28.0	29.3	1.25	1.375	1.75	22.7	24.7	25.7	16	24	20	4542	5088	6378
20"	65.4	67.1	69.6	21.3	21.3	21.3	33.9	43.7	53.1	8.3	27.5	30.5	32.0	1.25	1.375	1.75	25.0	27.0	28.5	20	24	24	7853	8609	11096
24"	78.7	80.9	83.5	24.8	24.8	24.8	42.5	51.5	59.4	8.5	32.0	36.0	37.0	1.375	1.63	2.00	29.5	32.0	33.0	20	24	24	12875	15066	17952

900 # / 1500

Dimension (mm) / Size (mm)	A		B		C			D	E		F		G		H		Weight (kg) (Approximate)	
	900#	1500#	900#	1500#	STD	EXT		COMMON	900#	1500#	900#	1500#	900#	1500#	900#	1500#	900#	1500#
50	375	375	113	113	300	400		110	215	215	25.4	25.4	165.1	165.1	8	8	126	126
80	441	460	142	142	330	430		115	240	265	25.4	31.8	190.5	203.2	8	8	196	203
100	511	530	182	182	350	450		150	290	310	31.8	34.9	235	241.3	8	8	344	348
150	714	768	210	210	393	500		150	380	395	31.8	38.1	317.5	317.5	12	12	579	900
200	914	972	290	290	480	600		150	470	485	38.1	44.5	393.7	393.7	12	12	1045	1430
250	991	1067	310	310	518	650		150	545	585	38.1	50.8	469.9	482.6	16	12	1130	2255
300	1130	1219	385	385	680	800		150	610	675	38.1	54	533.4	571.5	20	16	1930	3520
350	1257	1257	420	420	770	920		210	640	750	41.3	60.3	558.8	635	20	16	2440	4560
400	1422	1422	450	470	850	1050		220	705	825	44.5	66.7	616	704.8	20	16	3425	6640

Dimension (inch) / Size (inch)	A		B		C			D	E		F		G		H		Weight (lbf) (Approximate)	
	900#	1500#	900#	1500#	STD	EXT		COMMON	900#	1500#	900#	1500#	900#	1500#	900#	1500#	900#	1500#
2"	14.8	14.8	4.4	4.4	11.8	15.7		4.3	8.5	8.5	0.875	0.875	6.5	6.5	8	8	278	278
3"	17.4	18.1	5.6	5.6	13.0	16.9		4.5	9.4	10.4	0.875	0.875	7.5	8.0	8	8	432	448
4"	20.1	20.9	7.2	7.2	13.8	17.7		5.9	11.4	12.2	1.25	1.375	9.3	9.5	8	8	758	767
6"	28.1	30.2	8.3	8.3	15.5	19.7		5.9	15.0	15.6	1.25	1.5	12.5	12.5	12	12	1276	1984
8"	36.0	38.3	11.4	11.4	18.9	23.6		5.9	18.5	19.1	1.5	1.75	15.5	15.5	12	12	2304	3153
10"	39.0	42.0	12.2	12.2	20.4	25.6		5.9	21.5	23.0	1.5	2.0	18.5	19.0	16	12	2491	4971
12"	44.5	48.0	15.2	15.2	26.8	31.5		5.9	24.0	26.6	1.5	2.125	21.0	22.5	20	16	4255	7760
14"	49.5	49.5	16.5	16.5	30.3	36.2		8.3	25.2	29.5	1.625	2.375	22.0	25.0	20	16	5379	10053
16"	56.0	56.0	17.7	18.5	33.5	41.3		8.7	27.8	32.5	1.75	2.625	24.3	27.7	20	16	7551	14639

DIN Valve (PN10-PN40)

Face to Face acc. to DIN 3202-1 / EN 558 series 1

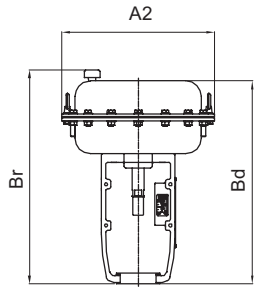
Flange acc. to EN1092-1 type 21

Dual material marking (ASTM & EN) will be available on pressure retaining parts.

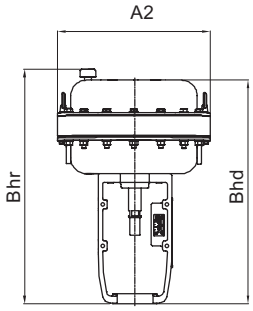
e.g. A216 gr. WCB/1.0619, A351 gr. CF8M/1.4408

Dimension (mm) / Size (mm)	A		B		C			D	E		F		G		H		Weight (kg)	
	PN 10-16	PN 25-40	PN 10-16	PN 25-40	STD	EXT	CRY	COMMON	PN 10-16	PN 25-40	PN 10-16	PN 25-40	PN 10-16	PN 25-40	PN 10-16	PN 25-40	PN 10-16	PN 25-40
50	230	230	75	75	178	333	458	110	165	165	19.1	19.1	120.7	127	4	8	25	27
80	310	310	109	109	222	395	545	115	200	200	22.2	22.2	152.4	168.3	4	8	55	57
100	350	350	130	130	248	402	552	140	220	235	22.2	25.4	190.5	200	8	8	80	83

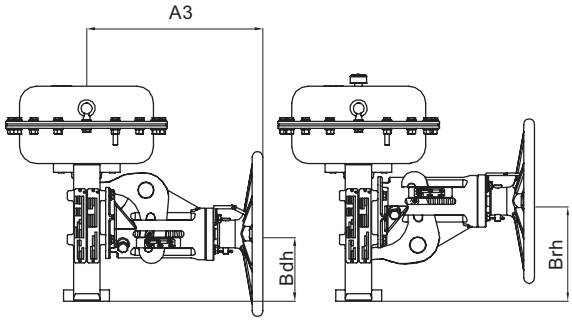
10.2 Actuator VDD/VDR



VDD/R E
Standard spring



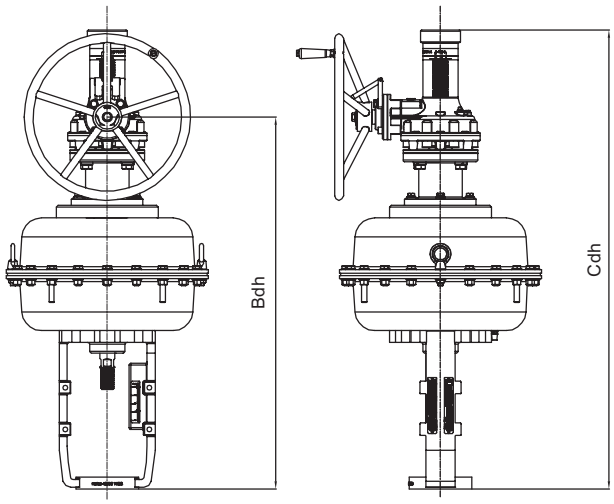
VDD/R D
High spring



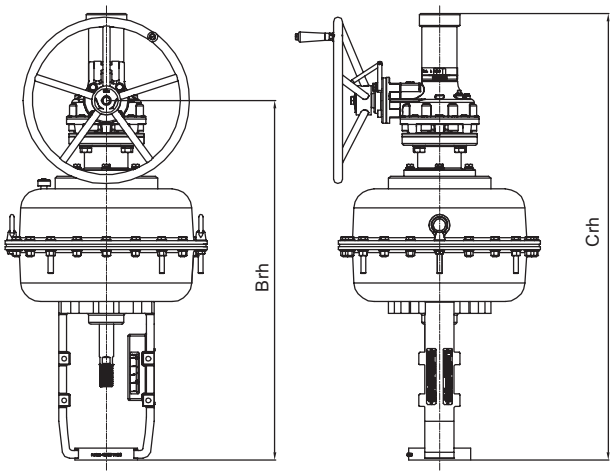
Side handwheel (25/29/37)
Standard spring

Dimension (mm) / Size (mm)	Without handwheel				With handwheel				
	A2	Bd / Bhd	Br / Bhr	Weight (kg)	A2	A3	Bdh	Brh	Weight (kg)
VD_25 E	255	348	373	12	255	312	110	170	23
VD_25 D	255	373	395	17	255	312	110	170	28
VD_29 E	295	391	416	18	295	312	122	182	29
VD_29 D	295	431	453	26	295	312	122	182	32
VD_37 E	375	464	489	28	375	352	131	211	43
VD_37 D	375	514	535	46					

Dimension (inch) / Size (inch)	Without handwheel				With handwheel				
	A2	Bd / Bhd	Br / Bhr	Weight (lbs)	A2	A3	Bdh	Brh	Weight (lbs)
VD_25 E	10	14	15	26	10	12	4	7	51
VD_25 D	10	15	16	37	10	12	4	7	62
VD_29 E	12	15	16	40	12	12	5	7	64
VD_29 D	12	17	18	57	12	12	5	7	82
VD_37 E	15	18	19	62	15	14	5	8	95
VD_37 D	15	20	21	101					



Top side handwheel (VDD48/55)



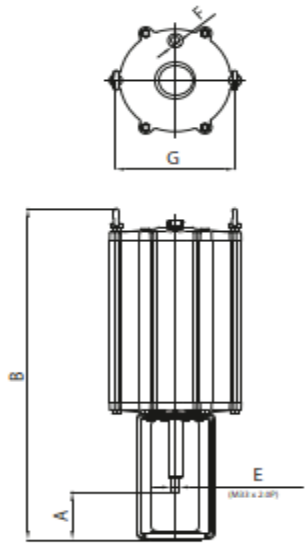
Top side handwheel (VDR48/55)

Dimension (mm) / Size (mm)	Without handwheel				With handwheel				
	A2	Bd / Bhd	Br / Bhr	Weight (kg)	Bdh	Brh	Cdh	Crh	Weight (kg)
VD_48 E	486	652	677	86	896	865	1102	1072	112
VD_48 D	486	702	724	118	946	915	1152	1122	144
VD_55 E	566	695	720	112	940	910	1145	1115	145
VD_55 D	566	745	767	152					

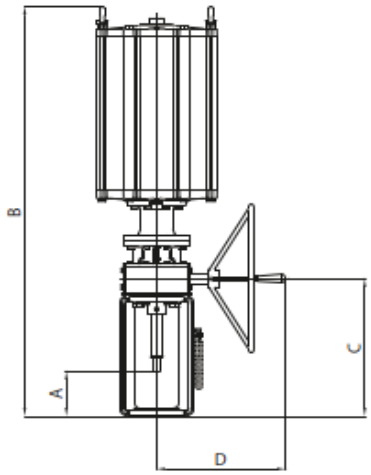
Dimension (inch) / Size (inch)	Without handwheel				With handwheel				
	A2	Bd / Bhd	Br / Bhr	Weight (lbs)	Bdh	Brh	Cdh	Crh	Weight (lbs)
VD_48 E	19	26	27	190	35	34	43	42	247
VD_48 D	19	28	29	260	37	36	45	44	317
VD_55 E	22	27	28	247	37	36	45	44	320
VD_55 D	22	29	30	335					

NOTE
1. “E” refers to Spring range 0.8~2.6
2. “D” refers to Spring range 1.5~3.4
3. “Br / Bhr” refers to reverse acting actuator, VDR E / D
4. “Bd / Bhd” refers to direct acting actuator, VDD E / D
5. “Cdh / Crh” Top side handwheel actuator, VD_48/55

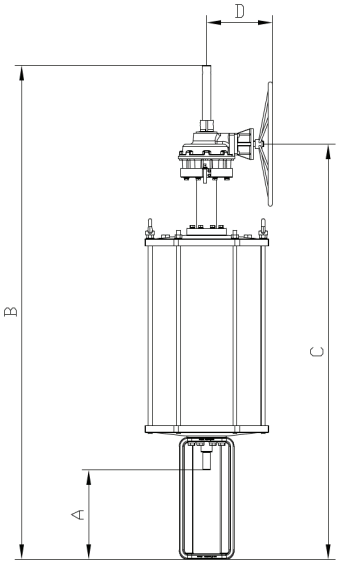
10.3 Actuator VBD/R



All VBD/R
Without handwheel



VBD/R 32/40/50
With optional handwheel

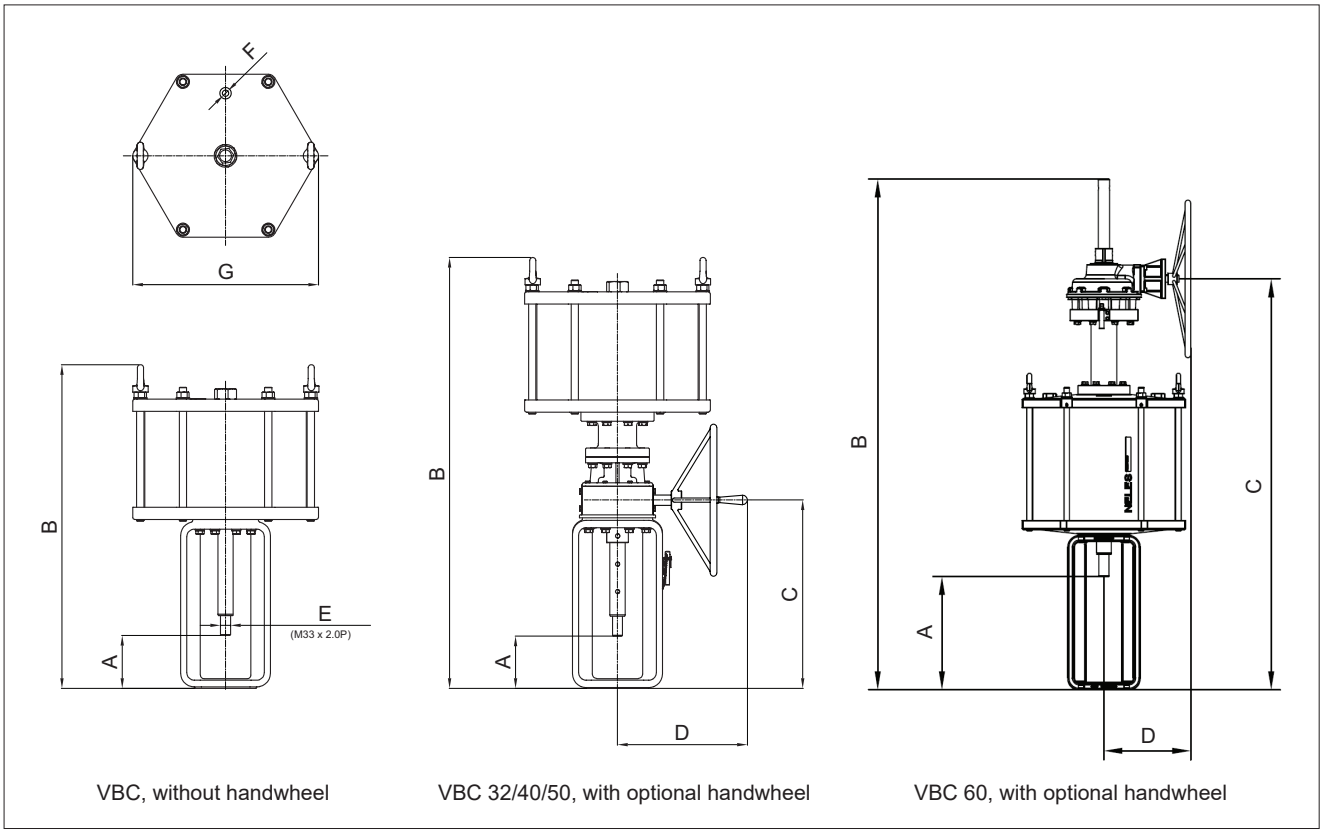


VBD/R 60
With optional handwheel

Dimension (mm) / Size (mm)	Stroke Range	Without handwheel					With handwheel				
		A	B	F	G	Weight (kg)	A	B	C	D	Weight (kg)
VBD/R32	50, 60, 70, 80, 120	173	1064	3/4" NPT	392	145	173	1388	466	401	199
VBD/R40	60, 70, 80, 120, 140, 160, 180	200	1450	3/4" NPT	497	290	200	1800	619	427	368
VBD/R50	60, 70, 80, 120, 140, 160, 180	200	1535	1" NPT	610	485	200	1885	619	427	563
VBD/R60	140, 160, 180, 200, 240, 280	222	1913	1" NPT	724	1167	222	2899	2332	399	1258

Dimension (inch) / Size (inch)	Stroke Range	Without handwheel					With handwheel				
		A	B	F	G	Weight (lbs)	A	B	C	D	Weight (lbs)
VBD/R32	50, 60, 70, 80, 120	6.8	41.9	3/4" NPT	15.4	320	6.8	54.6	18.3	15.8	439
VBD/R40	60, 70, 80, 120, 140, 160, 180	7.8	57.1	3/4" NPT	19.6	639	7.8	70.9	24.4	16.8	811
VBD/R50	60, 70, 80, 120, 140, 160, 180	7.8	60.4	1" NPT	24	1069	7.8	74.2	24.4	16.8	1241
VBD/R60	140, 160, 180, 200, 240, 280	8.7	75.3	1" NPT	28.5	2567	8.7	114.1	91.8	15.7	2768

10.4 Actuator VBC

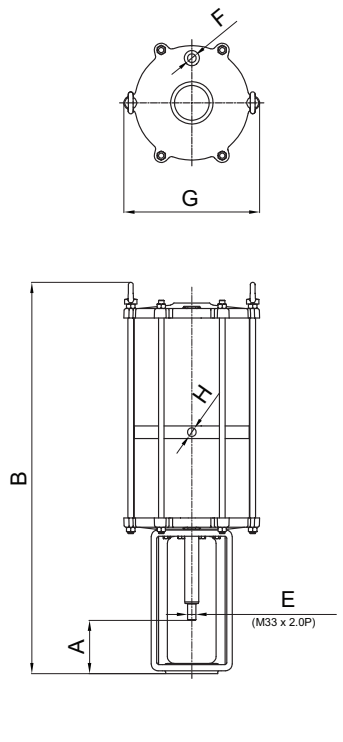


VBC, without handwheel | VBC 32/40/50, with optional handwheel | VBC 60, with optional handwheel

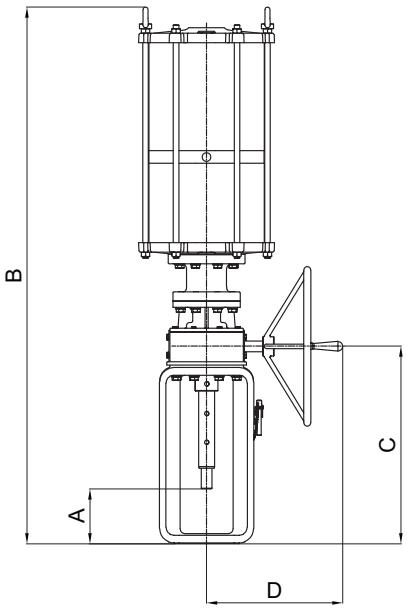
Dimension (mm) / Size (mm)	Stroke Range	Without handwheel					With handwheel				
		A	B	F	G	Weight (lbs)	A	B	C	D	Weight (lbs)
VBC32	50, 60, 70, 80, 120	173	769	3/4" NPT	392	96	173	1090	466	401	150
VBC40	60, 70, 80, 120, 140, 160, 180	200	1054	3/4" NPT	499	190	200	1405	619	427	268
VBC50	60, 70, 80, 120, 140, 160, 180	200	1066	1" NPT	610	297	200	1415	619	427	375
VBC60	140, 160, 180, 200, 240, 280	222	1404	1" NPT	724	505	222	2390	1823	399	600

Dimension (inch) / Size (inch)	Stroke Range	Without handwheel					With handwheel				
		A	B	F	G	Weight (lbs)	A	B	C	D	Weight (lbs)
VBC32	50, 60, 70, 80, 120	6.8	30.3	3/4" NPT	15.4	211	6.8	42.9	18.3	15.8	331
VBC40	60, 70, 80, 120, 140, 160, 180	7.8	41.5	3/4" NPT	19.6	418	7.8	55.3	24.4	16.8	591
VBC50	60, 70, 80, 120, 140, 160, 180	7.8	42	1" NPT	24	653	7.8	55.7	24.4	16.8	827
VBC60	140, 160, 180, 200, 240, 280	8.7	55.3	1" NPT	28.5	1111	8.7	94.1	71.8	15.7	1320

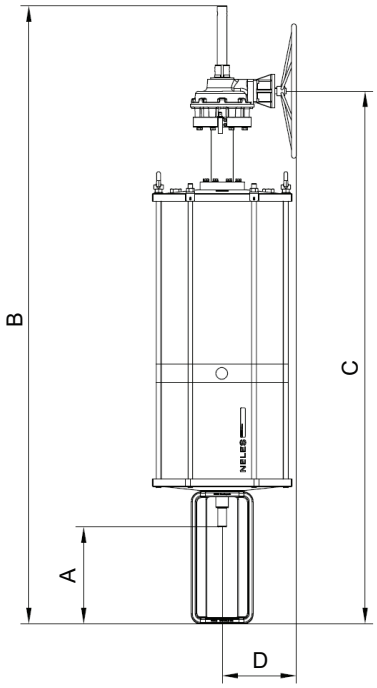
10.5 Actuator VBC with volume chamber



VBC, without handwheel
& with volume chamber



VBC 32/40/50, with optional handwheel
& volume chamber

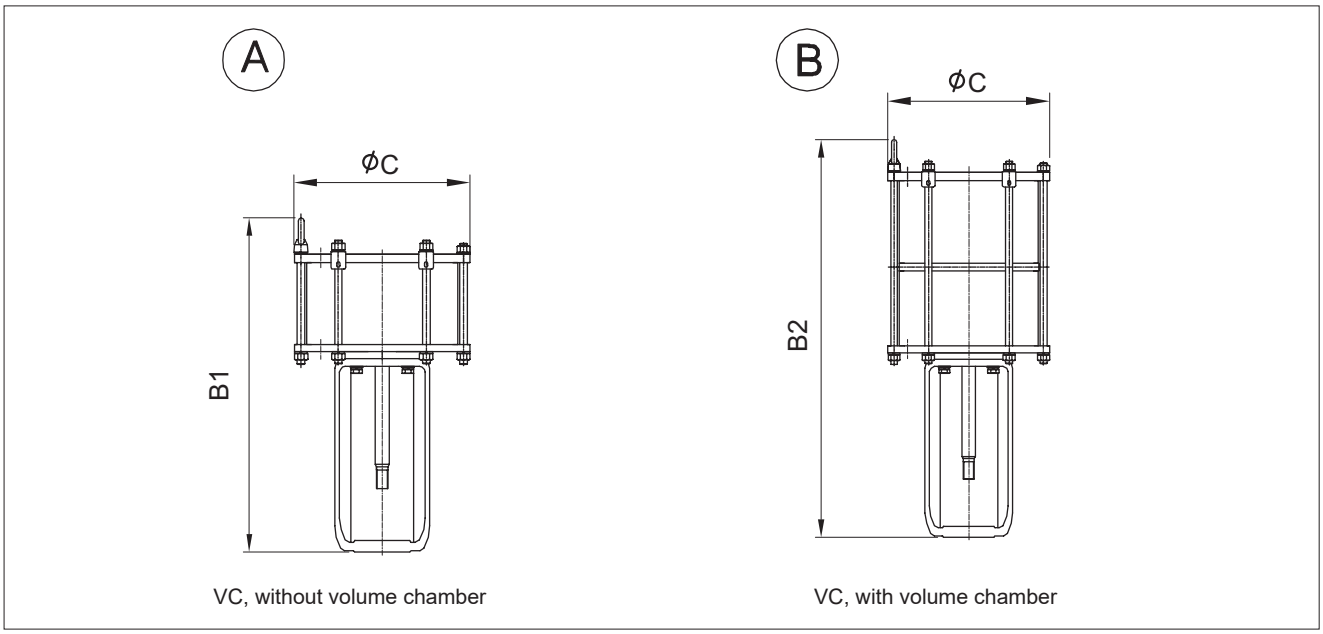


VBC 60, with optional handwheel
& volume chamber

Dimension (mm) / Size (mm)	Stroke Range	Without handwheel						With handwheel				
		A	B	F	G	H	Weight (kg)	A	B	C	D	Weight (kg)
VBC32_V	50, 60, 70, 80, 120	173	1123	3/4" NPT	392	3/4" NPT	134	173	1444	466	401	188
VBC40_V	60, 70, 80, 120, 140, 160, 180	200	1540	3/4" NPT	499	3/4" NPT	255	200	1891	619	427	333
VBC50_V	60, 70, 80, 120, 140, 160, 180	200	1530	1" NPT	610	1" NPT	414	200	1879	619	427	492
VBC60_V	140, 160, 180, 200, 240, 280	222	2187	1" NPT	724	1" NPT	731	222	3170	2603	399	839

Dimension (inch) / Size (inch)	Stroke Range	Without handwheel						With handwheel				
		A	B	F	G	H	Weight (lbs)	A	B	C	D	Weight (lbs)
VBC32_V	50, 60, 70, 80, 120	6.8	44.2	3/4" NPT	15.4	3/4" NPT	295	6.8	56.9	18.3	15.8	414
VBC40_V	60, 70, 80, 120, 140, 160, 180	7.8	60.6	3/4" NPT	19.6	3/4" NPT	562	7.8	74.5	24.4	16.8	734
VBC50_V	60, 70, 80, 120, 140, 160, 180	7.8	60.2	1" NPT	24	1" NPT	913	7.8	74	24.4	16.8	1085
VBC60_V	140, 160, 180, 200, 240, 280	8.7	86.1	1" NPT	28.5	1" NPT	1608	8.7	124.8	102.5	15.7	1846

10.6 Actuator VCC without handwheel



VC, without volume chamber

VC, with volume chamber

VC actuator without handwheel

Stroke (mm)	# 30			# 40			# 50		
	C	370		C	460		C	560	
	B1	Weight (kg)		B1	Weight (kg)		B1	Weight (kg)	
	B2	A	B	B2	A	B	B2	A	B
40	640	92	115	810	120	148	810	186	234
	760			935			935		
50	650	94	118	820	123	152	820	189	237
	790			965			965		
60	660	97	121	830	126	155	830	192	242
	820			995			995		
70	670	100	124	840	128	159	840	195	246
	850			1025			1025		
80	680	103	127	850	131	162	850	198	251
	880			1055			1055		
90	690	106	130	860	134	166	860	201	256
	910			1085			1085		
100	700	108	133	870	137	173	870	203	261
	940			1115			1115		
120	720	114	139	890	142	177	890	209	270
	1000			1175			1175		
140				910	148	184	910	215	279
				1235			1235		
180				950	159	198	950	227	298
				1355			1355		

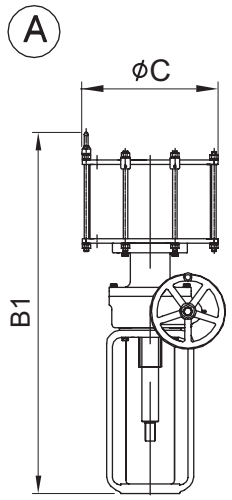
Stroke (mm)	# 60			# 70			# 80		
	ØC	660		ØC	710		ØC	820	
	B1	Weight (kg)		B1	Weight (kg)		B1	Weight (kg)	
	B2	A	B	B2	A	B	B2	A	B
100	873	255	344	1126	322	438	1390	378	519
	1120			1380			2340		
120	893	262	355	1146	330	450	1410	386	531
	1180			1440			2400		
140	913	269	365	1166	338	461	1430	394	543
	1240			1500			2460		
180	953	283	386	1206	354	484	1470	410	567
	1360			1620			2580		
240	1013	303	417	1266	377	518	1530	435	604
	1540			1800			2760		
280	1053	313	437	1306	400	552	1570	451	628
	1660			1920			2880		

VC actuator without handwheel

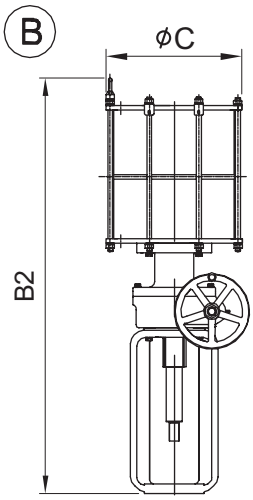
Stroke (mm)	# 30			# 40			# 50		
	C	15		C	18		C	22	
	B1	Weight (lbs)		B1	Weight (lbs)		B1	Weight (lbs)	
	B2	A	B	B2	A	B	B2	A	B
40	25	203	254	32	265	326	32	410	516
	30			37			37		
50	26	207	260	32	271	335	32	417	522
	31			38			38		
60	26	214	267	33	278	342	33	423	534
	32			39			39		
70	26	220	273	33	282	351	33	430	542
	33			40			40		
80	27	227	280	33	289	357	33	437	553
	35			42			42		
90	27	234	287	34	295	366	34	443	564
	36			43			43		
100	28	238	293	34	302	381	34	448	575
	37			44			44		
120	28	251	306	35	313	390	35	461	595
	39			46			46		
140				36	326	406	36	474	615
				49			49		
180				37	351	437	37	500	657
				53			53		

Stroke (mm)	# 60			# 70			# 80		
	ØC	26		ØC	28		ØC	32	
	B1	Weight (lbs)		B1	Weight (lbs)		B1	Weight (lbs)	
	B2	A	B	B2	A	B	B2	A	B
100	34	562	758	44	710	966	55	833	1144
	44			54			92		
120	35	578	783	45	728	992	56	851	1171
	46			57			94		
140	36	593	805	46	745	1016	56	869	1197
	49			59			97		
180	38	624	851	47	780	1067	58	904	1250
	54			64			101		
240	40	668	919	50	831	1142	60	959	1332
	61			71			109		
280	41	690	963	51	882	1217	62	994	1385
	65			76			113		

10.7 Actuator VCC with handwheel



VC, with optional handwheel



VC, with optional handwheel
& volume chamber

VC actuator with handwheel

Stroke (mm)	#30			#40			#50		
	C	370		C	460		C	560	
	B1	Weight (kg)		B1	Weight (kg)		B1	Weight (kg)	
	B2	A	B	B2	A	B	B2	A	B
40	930	134	157	1095	180	208	1095	246	294
	1055			1220			1220		
50	940	137	160	1105	183	212	1105	249	299
	1085			1250			1250		
60	950	139	163	1115	186	215	1115	252	303
	1115			1280			1280		
70	960	142	167	1125	188	219	1125	255	308
	1145			1310			1310		
80	970	144	170	1135	191	222	1135	258	313
	1175			1340			1340		
90	980	147	173	1145	194	226	1145	261	318
	1205			1370			1370		
100	990	150	176	1155	197	230	1155	263	322
	1235			1400			1400		
120	1010	155	183	1175	202	237	1175	269	332
	1295			1460			1460		
140				1195	208	244	1195	275	341
				1520			1520		
180				1235	219	258	1235	287	360
				1640			1640		

Stroke (mm)	#60			#70			#80		
	C	660		C	710		C	820	
	B1	Weight (kg)		B1	Weight (kg)		B1	Weight (kg)	
	B2	A	B	B2	A	B	B2	A	B
100	1158	315	404	1551	368	502	1815	438	579
	1405			1805			2765		
120	1178	322	415	1571	376	514	1835	446	591
	1465			1865			2825		
140	1198	329	425	1591	384	525	1855	454	603
	1525			1925			2885		
180	1238	343	446	1631	400	548	1895	470	627
	1645			2045			3005		
240	1298	363	477	1691	423	582	1955	495	664
	1825			2225			3185		
280	1338	383	508	1731	446	616	1995	520	701
	1945			2345			3305		

VC actuator with handwheel

Stroke (mm)	#30			#40			#50		
	C	15		C	18		C	22	
	B1	Weight (lbs)		B1	Weight (lbs)		B1	Weight (lbs)	
	B2	A	B	B2	A	B	B2	A	B
40	37	295	346	43	397	459	43	542	648
	42			48			48		
50	37	302	353	44	403	467	44	549	659
	43			49			49		
60	37	306	359	44	410	474	44	556	668
	44			50			50		
70	38	313	368	44	414	483	44	562	679
	45			52			52		
80	38	317	375	45	421	489	45	569	690
	46			53			53		
90	39	324	381	45	428	498	45	575	701
	47			54			54		
100	39	331	388	45	434	507	45	580	710
	49			55			55		
120	40	342	403	46	445	522	46	593	732
	51			57			57		
140				47	459	538	47	606	752
				60			60		
180				49	483	569	49	633	794
				65			65		

Stroke (mm)	#60			#70			#80		
	C	26		C	28		C	32	
	B1	Weight (lbs)		B1	Weight (lbs)		B1	Weight (lbs)	
	B2	A	B	B2	A	B	B2	A	B
100	46	694	891	61	811	1107	71	966	1276
	55			71			109		
120	46	710	915	62	829	1133	72	983	1303
	58			73			111		
140	47	725	937	63	847	1157	73	1001	1329
	60			76			114		
180	49	756	983	64	882	1208	75	1036	1382
	65			81			118		
240	51	800	1052	66	933	1283	77	1091	1464
	72			88			125		
280	53	844	1120	68	983	1358	79	520	701
	77			92			130		

11. TYPE CODE

Globe Balanced, Cage Guided Type, Series GB																				
1.	**2.**	**3.**	**4.**	**5.**	**6.**	**7.**	**8.**	**9.**	**10.**	**11.**	**12.**	**13.**	**14.**	**15.**	**16.**	**17.**	**18.**	**19.**	**20.**	**21.**	**22.**
GB	03	C	W	A	J2	B	P1	X	BC	S1	R1	X	S	G	G	S	G	X	G	E	FC

VALVE CONSTRUCTIONS

1.	VALVE SERIES
GB	Globe Balanced, Cage guided type

2.	BODY SIZE		
02	2" / DN 50	03	3" / DN 80
04	4" / DN 100	06	6" / DN 150
08	8" / DN 200	10	10" / DN 250
12	12" / DN 300	14	14" / DN 350
16	16" / DN 400	18	18" / DN 450
20	20" / DN 500	24	24" / DN 600
28	28" / DN 700	30	30" / DN 750
32	32" / DN 800	36	36" / DN 900
YY	Special		

3.	PRESSURE RATING		
C	ASME class 150	D	ASME class 300
F	ASME class 600	G	ASME class 900
H	ASME class 1500	I	ASME Class 2500
J	EN PN 10	K	EN PN 16
L	EN PN 25	M	EN PN 40
N	EN PN 63	P	EN PN 100
B	EN PN 160	E	EN PN 250
Y	EN PN 320	R	JIS 10K
T	JIS 20K		

4.	END CONNECTION
W	Flanged RF, ASME B16.5
C	Flanged RF, EN1092-1 (ISA 75.08.01/EN 558 series 38,39)
D	Flanged RF, EN1092-1 (DIN 3202-1 / EN 558 series 1)
V	Socket welding, ASME B16.11
Q	Butt welding, ASME B16.25
Z	Ring joint flange, ASME B16.5
Y	Special

5.	BONNET CONSTRUCTION	
	Bonnet type	**Actuator connection**
A	General	Applicable for VD_25/29/37
B	General	Applicable for VD_48/55
C	General	Applicable for VC_30, VB_32
D	General	Applicable for VC/VB_40/50
T	General	Applicable for VC/VB_60/70
E	Extension	Applicable for VD_25/29/37
F	Extension	Applicable for VD_48/55
G	Extension	Applicable for VC_30, VB_32
H	Extension	Applicable for VC/VB_40/50
U	Extension	Applicable for VC/VB_60/70
P	Cryogenic	Applicable for VD_25/29/37
Q	Cryogenic	Applicable for VD_48/55
R	Cryogenic	Applicable for VC_30, VB_32
S	Cryogenic	Applicable for VC/VB_40/50
V	Cryogenic	Applicable for VC/VB_60/70
J	Bellows seal	Applicable for VD_25/29/37
K	Bellows seal	Applicable for VD_48/55
L	Bellows seal	Applicable for VC_30, VB_32
M	Bellows seal	Applicable for VC/VB_40/50/60/70
Y	Special	Special

6.	BODY MATERIAL		
J2	A216 gr. WCB	S6	A351 gr. CF8M
J4	A217 gr. WC6	CG	A217 gr. WC9
S1	A351 gr. CF3M	J1	A216 gr. WCC
YY	Special		

- Bonnet material is equivalent to Body material.

7.	MODEL CODE
B	Model B

TRIM CONSTRUCTIONS

8.	PLUG MATERIAL	
	Material	Description
P1	CA15	General for carbon steel valve
T6	CF8M	General for stainless steel valve
P2	CA40	General for high temp. Cr-Mo Valve
S1	CF3M	
YY	Special	Special materials

9.	PLUG APPLICATION
X	Not Applicable
A	Cobalt based alloy
Y	Special

10.	STEM MATERIAL	
	Material	Description
BC	630 SS	General for carbon steel valve
TC	316 SS	General for stainless steel valve
FC	316L SS	
VX	XM-19	

11.	SEAT TYPE
S1	Single metal seat
T1	Single soft seat
YY	Special

12.	SEAT / CAGE MATERIAL		
	Seat	Cage	Cage guide
R1	CA15	CB7Cu-1 + HCr	CB7Cu-1 + HCr
R6	CF8M	CF8M + HCr	CF8M + HCr
P2	CA40	CA40	CA40
R3	CF3M	CF3M + HCr	CF3M + HCr
YY	Special	Special	Special

- CA15 / AISI 410 is general for carbon steel valve.
- CF8M / AISI 316 is general for stainless steel valve.

13.	SEAT APPLICATION
X	Not Applicable
A	Cobalt based alloy
P	Insert PTFE
Q	Insert PTFE + Cobalt based alloy
Y	Special

OTHERS

14.	PACKING / BELLOWS TYPE
S	General packing
E	Low emission, Live loaded
C	Bellows Seal (316L SS, Formed)
Y	Special

15.	PACKING MATERIAL
G	PTFE + Carbon fiber
F	Graphite
C	PTFE + Carbon fiber (ATEX)
T	PTFE V-Ring
H	Hi-Graphite
Y	Special

16.	SEALS RING MATERIAL
G	PTFE + Graphite
H	PTFE + Graphite + Carbon
M	Graphite
T	PTFE

17.	GASKET MATERIAL
S	S/W gasket type, 316L SS + Graphite for general
L	S/W gasket type, 316L SS + PTFE
H	S/W gasket type, 316L SS + Hi-Graphite
Y	Special

18.	STUD / NUT MATERIAL
G	A193 gr. B7M / A194 gr. 2HM
D	A193 gr. B8M / A194 gr. 8M
K	A320 gr. B8M cl. 2 / A194 gr. 8M
H	A193 gr. B16 / A194 gr. 7
E	A453 gr. 660 / A453 gr. 660
Y	Special

19.	OPTIONS
X	Not applicable
E	Anti-erosion
L	Lub. & Isol. valve
W	Water seal
Y	Not Applicable

* Face to face length according to ISA 75.08 (EN558 series 38, 39) and DIN3202-1 (EN558 series 1).
* For DIN f to f valve, dual material marking (ASTM & EN) will be available on pressure retaining parts.
Þ.g. A216 gr. WCB/1.0619, A351 gr. CF8M/1.4408
- The body, bonnet, trim materials are subject to change as equivalent depending on detail design.
* See 'Neles Globe Typecode Instruction' for further options and explanations.
* Round bar material such as AISI 410SS (for A743 gr. CA 15), AISI 316SS (for A351 gr. CF8M), SUS420J2 (for A743 gr. CA40) and AISI 630SS (for A747 gr. CB7Cu-1) can be used depending on manufacturing process.

TRIM TYPE & RATED Cv

20.	TRIM TYPE	21.	TRIM CHARACTERISTIC	22.		RATED Cv																							
Sign		Sign		Sign	Description	Body Size and Stroke																							
						2"	Str.	3"	Str.	4"	Str.	6"	Str.	8"	Str.	10"	Str.	12"	Str.	14"	Str.	16"	Str.	18"	Str.	20"	Str.	24"	Str.
A	General plug	L	Linear	FC	General / Full capacity	74	(40)	142	(50)	230	(50)	380	(60)	600	(70)	950	(80)	1270	(120)	1740	(140)	2215	(160)	2700	(180)	4700	(240)	6400	(280)
A	High temp balanced plug			1A	General / 1-Step reduction	48	(40)	98	(50)	160	(50)	275	(60)	455	(70)	700	(80)	970	(120)	1300	(140)	1530	(160)	1900	(180)	2500	(240)	3700	(280)
P	Pilot balanced plug			2A	General / 2-Step reduction	26	(40)	56	(50)	86	(50)	150	(60)	254	(70)	398	(80)	550	(120)	776	(140)	940	(160)	1140	(180)	1500	(240)	2350	(280)
				3A	General / 3-Step reduction	16	(40)	34	(50)	52	(50)	90	(60)	152	(70)	238	(80)	340	(120)	464	(140)	568	(160)	680	(180)	900	(240)	1350	(280)
				FT	Tendril 1 / Full capacity	52	(40)	102	(50)	160	(50)	290	(60)	460	(70)	630	(80)	980	(120)	1300	(140)	1580	(160)	2100	(180)	2800	(240)	4000	(280)
				1T	Tendril 1 / 1-Step reduction	40	(40)	42	(50)	120	(50)	220	(60)	340	(70)	460	(80)	735	(120)	985	(140)	1145	(160)	1450	(180)	2000	(240)	2800	(280)
				2T	Tendril 1 / 2-Step reduction	27	(40)	10	(50)	70	(50)	130	(60)	195	(70)	255	(80)	405	(120)	565	(140)	670	(160)	870	(180)	1200	(240)	1700	(280)
				3T	Tendril 1 / 3-Step reduction	10	(40)	21	(50)	46	(50)	75	(60)	105	(70)	140	(80)	240	(120)	310	(140)	410	(160)	520	(180)	720	(240)	1000	(280)
				FM	Tendril 2 / Full capacity	50	(40)	100	(50)	155	(50)	280	(60)	425	(70)	590	(80)	920	(120)	1240	(140)	1530	(160)	1900	(180)	2500	(240)	3650	(280)
				1M	Tendril 2 / 1-Step reduction	35	(40)	74	(50)	115	(50)	215	(60)	330	(70)	450	(80)	720	(120)	970	(140)	1130	(160)	1350	(180)	1750	(240)	2550	(280)
				2M	Tendril 2 / 2-Step reduction	23	(40)	33	(50)	65	(50)	12	(60)	190	(70)	240	(80)	380	(120)	550	(140)	640	(160)	800	(180)	1050	(240)	1530	(280)
				3M	Tendril 2 / 3-Step reduction	8	(40)	18	(50)	38	(50)	67	(60)	100	(70)	130	(80)	220	(120)	290	(140)	390	(160)	480	(180)	630	(240)	920	(280)
		E	Equal %	FC	General / Full capacity	71	(40)	138	(50)	210	(50)	340	(60)	560	(70)	830	(80)	1240	(120)	1650	(140)	2090	(160)	2700	(180)	4700	(240)	6400	(280)
				1A	General / 1-Step reduction	50	(40)	110	(50)	160	(50)	270	(60)	450	(70)	655	(80)	960	(120)	1275	(140)	1680	(160)	1900	(180)	2500	(240)	3700	(280)
				2A	General / 2-Step reduction	24	(40)	50	(50)	82	(50)	136	(60)	236	(70)	374	(80)	524	(120)	746	(140)	854	(160)	1140	(180)	1500	(240)	2350	(280)
				3A	General / 3-Step reduction	14	(40)	32	(50)	50	(50)	82	(60)	142	(70)	224	(80)	314	(120)	446	(140)	512	(160)	680	(180)	900	(240)	1350	(280)
				FT	Tendril 1 / Full capacity	50	(40)	82	(50)	135	(50)	235	(60)	370	(70)	500	(80)	840	(120)	1110	(140)	1400	(160)	1900	(180)	2500	(240)	3600	(280)
				1T	Tendril 1 / 1-Step reduction	35	(40)	58	(50)	95	(50)	170	(60)	265	(70)	370	(80)	600	(120)	785	(140)	1020	(160)	1300	(180)	1800	(240)	2550	(280)
				2T	Tendril 1 / 2-Step reduction	20	(40)	35	(50)	58	(50)	100	(60)	170	(70)	225	(80)	355	(120)	480	(140)	600	(160)	780	(180)	1100	(240)	1550	(280)
				3T	Tendril 1 / 3-Step reduction	10	(40)	20	(50)	32	(50)	58	(60)	105	(70)	125	(80)	205	(120)	290	(140)	350	(160)	470	(180)	650	(240)	900	(280)
				FM	Tendril 2 / Full capacity	47	(40)	74	(50)	130	(50)	230	(60)	330	(70)	470	(80)	770	(120)	1050	(140)	1320	(160)	1700	(180)	2200	(240)	3300	(280)
				1M	Tendril 2 / 1-Step reduction	33	(40)	56	(50)	92	(50)	165	(60)	245	(70)	330	(80)	570	(120)	720	(140)	960	(160)	1220	(180)	1570	(240)	2300	(280)
				2M	Tendril 2 / 2-Step reduction	19	(40)	33	(50)	52	(50)	95	(60)	145	(70)	190	(80)	330	(120)	430	(140)	550	(160)	720	(180)	950	(240)	1360	(280)
				3M	Tendril 2 / 3-Step reduction	8	(40)	16	(50)	25	(50)	52	(60)	80	(70)	110	(80)	190	(120)	270	(140)	295	(160)	430	(180)	570	(240)	830	(280)
Y	Special	Y	Special	YY	Special	Contact Valmet for Cv details																							

- Rated Cv is different by the trim type and characteristic.
- Str. means valve stroke in mm.

12. GENERAL SAFETY WARNINGS AND DISCLAIMERS

General safety warnings

Lifting

1. Always use a lifting plan created by a qualified person to lift this equipment. Lifting guidance is provided in this IMO (Installation, Maintenance and Operation manual) to assist in lifting plan development. Think about the point center of gravity (CG) of the equipment being lifted. Make sure the CG is always under the central lifting point.
2. Valves may be equipped with lifting threads on the body or on the flanges. These are which are intended for use with the lifting plan.
3. Use only correct and approved lifting devices. Ensure that lifting devices and straps are securely attached to the equipment prior to lifting.
4. Check, that lifting devices are not damaged and in good condition with a valid check stamp prior to use.
5. Workers must be trained for lifting and handling valves.
6. Never lift an assembly by the instrumentation (solenoid, positioner, limit switch, etc.) or by the instrumentation piping. Straps and lifting devices should be fitted to prevent damage to instrumentation and instrumentation piping. Failure to follow the lifting guidance provided may result in damage and personal injury from falling objects.

Work activities on the valve

1. Wear your personal safety equipment. Personal safety equipment includes but is not limited to protective shoes, protective clothing, safety glasses, helmet, hearing protection and working gloves.
2. Always follow the local safety instructions in addition to the Valmet instructions. If Valmet instructions conflict with local safety instructions, stop work and contact Valmet for more information.
3. Before beginning service on the equipment, make sure that the actuator is disconnected from any kind of power source (pneumatic, hydraulic, and/or electric), and no stored energy is applied on the actuator (compressed spring, compressed air volumes, etc.). Do not attempt to remove a spring return actuator unless the stop screw is carrying the spring force.
4. Make sure that there is a LOTOTO (Lock Out / Tag Out / Try Out) procedure in place for the system in which the valve is installed and strictly follow it.
5. Always make sure that the pipeline is depressurized and in ambient temperature condition before maintenance work is started.
6. Keep hands and other body parts out of the flow port when the valve is being serviced and the actuator is connected to the valve. There is a high risk of serious injury to hands and/or fingers due to malfunction if the valve suddenly starts to operate.

General disclaimers

Receive, handle and unpacking

1. Respect the safety warnings above!
2. Valves are critical components for pipelines to control high pressure fluids and must therefore be handled with care.
3. Store valves and equipment in a dry and protected area until the equipment is installed.
4. Keep the original packaging on the valve as long as possible to avoid environmental contamination by dust, water, dirt, etc.
5. Remove the valve endcaps just before mounting into the pipeline.
6. FOR YOUR SAFETY IT IS IMPORTANT THE FOLLOWING PRECAUTIONS BE TAKEN PRIOR TO REMOVAL OF THE VALVE FROM THE PIPELINE OR BEFORE ANY DISASSEMBLY:
   - Be sure you know what fluid is in the pipeline. If there is any doubt, confirm with the proper supervisor.
   - Wear any personal protective equipment (PPE) required for working with the fluid involved in addition to any other PPE normally required.
   - Depressurize the pipeline, bring to ambient temperature, and drain the pipeline fluid.
   - Cycle the valve to relieve any residual pressure in the body cavity.
   - After removal but before disassembly, cycle the valve again until no evidence of trapped pressure remains.
7. The identification plate (nameplate, or engraved markings) on the valve gives the information of max. process conditions to the valve.
8. Temperatures and pressures must never exceed values marked on the valve. Exceeding these values may cause uncontrolled release of pressure and process fluid. Damage or personal injury may result.
9. Valmet valves typically are designed to be used in atmospheric conditions. Do not use valves under external pressurized conditions unless specifically designed and explicitly marked for this service.
10. Avoid Pressure shocks or water hammer. Systems with high pressure valves should be equipped with a bypass to reduce the differential pressure before opening the valve to avoid pressure shock.
11. Avoid thermal shock. High temperature, Low temperature and cryogenic valves should be operated in a way that limits the rate of increase or decrease in temperature. The valve should be thermally stabilized before being pressurized.
12. Materials of the valve are carefully selected for the process conditions. Changes to the process media can have a major impact on function and safety of the valve. Always confirm the materials are suitable for the service prior to installation.
13. As the use of the valve is application specific, a number of factors should be taken into account when selecting a valve for a given application. Therefore, some situations in which the valves are used are outside the scope of this manual.
14. It is the end user’s responsibility to confirm compatibility of the valve materials with the intended service, however if you have questions concerning the use, application, or compatibility of the valve for the intended service, contact Valmet for more information.
15. Never use a valve with enriched or pure oxygen if the valve is not explicitly designed and cleaned for oxygen. Selected materials and design have a major impact on the safety to operate the valve with oxygen.
16. Valves intended for use in or with explosive atmospheres must be equipped with a grounding device and marked according ATEX (or equivalent international standards).

Maintenance

17. Respect the safety warnings above!
18. Plan service and maintenance actions, that spare parts, lifting devices and service personnel is available.

19. Maintain the valve within the recommended minimum maintenance intervals or within the recommended maximum operating cycles.
20. Always make sure that the valve and the pipeline is depressurized before starting any kind of maintenance work at a valve.
21. Always check the position of the valve before starting maintenance work. Follow the Lock out /tag out (LOTO) rules at the site before starting any maintenance activity.
    - See IMO for the correct stem position.
    - Consider that the positioner may give the wrong signals.
22. Sealing materials (soft sealing parts) should be changed when the valve is maintained. Always use original equipment manufacturers (OEM) spare parts to ensure proper performance of the repaired valve.
23. All pressure containing parts must be inspected visually for damage or corrosion. Damaged parts must be replaced.
24. Valve pressure bearing parts and all internals must be inspected for corrosion or erosion which may result in reduced wall thickness on pressure bearing parts. Damaged pressure bearing parts must be replaced with original equipment manufacturer's (OEM) replacement parts or repaired to factory specifications by an authorized Valmet service partner in order to maintain the warrantee.
25. Do not use sharp tools, grinding machines, or files to work on functional surfaces such as sealing, seating or bearing surfaces as this can damage these surfaces.
26. Do not weld on pressure bearing parts without an ASME and PED qualified procedure and personnel.
27. Pressure bearing parts of valves in high temperature applications must be carefully examined for the effects of material creep and fatigue.
28. Make sure that the valve is positioned in the correct flow direction into the pipeline.
29. If the valves are marked to be suitable for explosive atmospheres, the correct function of the discharging device must be tested before returning to service.
30. Always work in a clean environment. Avoid getting particles inside the valve due to machining, grinding, or welding nearby.
31. Never store a maintained valve without flow port protection.
32. When pressure testing valve seats, never exceed the maximum operating pressure of the system or the maximum shut-off pressure marked on the valve identification plate.
33. Actuator mounting and unmounting:
    - Before installing the actuator on to the valve, be sure the actuator is properly indicating the valve position. Failure to assemble these to indicate correct valve position may result in damage or personal injury.
    - When installing or removing a linkage kit, best practice is to remove the entire linkage assembly, including couplings which may fall off the valve during lifting or when position changes.
    - Mounting sets have been designed to support the weight of the Valmet actuator and recommended accessories. Use of the linkage to support additional equipment or additional weight such as people, ladders, etc. may result in equipment damage or personal injury.
34. The valve should be installed between flanges using appropriate gaskets and fasteners that are compatible with the application, and in compliance with applicable piping codes and standards. Center the gaskets carefully when fitting the valve between the flanges. Do not attempt to correct pipeline misalignment by means of the flange bolting.
35. Repairs on valves for special service like Oxygen, Chlorine, and Peroxide, have special requirements.
    - Parts must be cleaned appropriate to the service and protected from contamination prior to assembly.
    - Assembly areas and tools must be clean and dry to prevent contamination of the parts during assembly.
    - Test equipment must be clean and dry to prevent contamination during testing. This includes the test equipment internals that may allow particles or other contamination into the test fluid during the test.
    - Lubrication shall be used only if specifically required in the instructions. Where lubrication is required, the lubricant must be approved for the service by the end user.

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