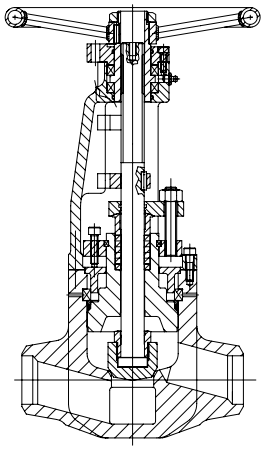
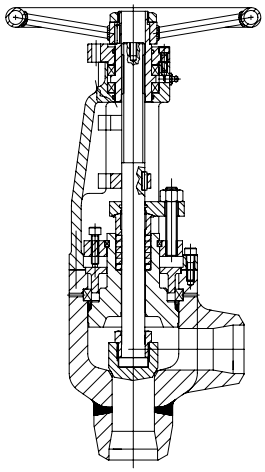
PENTAIR

RAIMONDI

Forged Steel Pressure Seal Globe Valves - T, Y and angle pattern Buttwelded or Flanged Ends





Contents

Section 1 - Valve Storage

1.1 Preparation and Preservation for Shipment

All valves are properly packed in order to protect the parts that are subject to deterioration during transportation and storage on site. In particular, the following precautions should be taken:

1. The valves must be packed with the plug in the closed position.

1a. Buttwelding end valves: weld ends surface shall be protected with suitable protective like Deoxaluminite. The ends shall be closed with plywood or plastic discs fixed at the edge by strips.

1b. Flanged end valves: the flange sealing surfaces (raised faces) of the valves shall be protected with suitable protective grease. The end faces of the valve must be protected with plastic or wooden discs fixed with straps.

2. All actuated valves must be securely palleted or crated,with particular attention, in order to ensure that parts of actuator do not extend beyond the packing size.

3. The type of packing must be defined in the Customer's order and shall be appropriate to ensure safe transportation to final destination and eventual conservation before installation.

1.2 Handling Requirements

A - Packed Valves

Pallets: Lifting and handling of the packed valves in pallets will be carried out by a fork lift truck, by means of the appropriate fork hitches.

Cases: The lifting of packed valves in cases will be carried out in the lifting points and at the center of gravity position which have been marked. The transportation of all packed material must be carried out safely and following the local safety regulations.

B - Unpacked Valves

1. The lifting and the handling of these valves have to be carried out by using appropriate means and by respecting the carrying limits. The handling must be carried out on pallets, protecting the machined surfaces to avoid any damage.
2. With large dimensions valves, the sling and the hooking of the load must be carried out by using the appropriate tools (brackets, hooks, fasteners, ropes) and load balancing tools in order to prevent them from falling or moving during the lifting and the handling.

Valve slinging

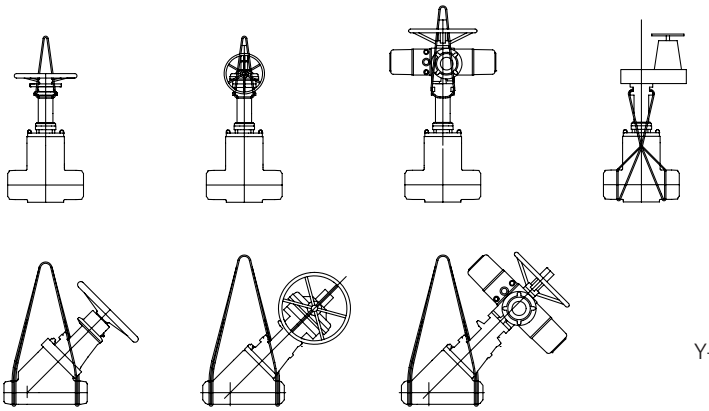


Figure no. 1

1.3 Storage and Preservation before Installation

In case the valves have to be stored before installation, the storage has to be carried out in a controlled way, and has to be performed in accordance with the following criteria:

1. The valves have to be stocked in a closed, clean and dry storage room.

2. The plug must be in the closed position, and the end faces must be protected with plastic or wooden discs fixed with straps. If possible, keep the original protection.

3. Periodical checks have to be carried out in the storage area to verify that the above mentioned conditions are maintained.

- Do not place consignment packages directly on the ground.
- Do not expose consignment packages to the weather or directly to the sun.
- Check the packaging every two months.

Note

Storage in an open area for a limited period can be considered only in case the valves have appropriate packing (packed in cases lined with tarred paper, and contents well protected with barrier sacks).

Caution
For valve handling and/or lifting, the lifting equipment (fasteners, hooks, etc.) must be sized and selected while taking into account the valve weight indicated in the packing list and/or delivery note. Lifting and handling must be made only by qualified personnel.
Do not use the lifting points located on the actuator, if any, to lift the valve. These lifting points are for the actuator only.

Caution must be taken during the handling to avoid that this equipment passes over the workers or over any other place where a possible fall could cause damage. In any case, the local safety regulations must be respected.

Section 2 - Installation

2.1 Preparation before Installation

1. Carefully remove the valve from the shipping package (box or pallet) avoiding any damage to the valve or, in case of automated valves, to the electric or pneumatic/hydraulic actuator or instrumentation.
2. The valves are shipped with the ends protected with caps and a thin layer of protective grease. Before installing the valve, remove the caps and clean carefully, then de-grease both surfaces with a solvent. Clean the inside of the valve with a clean cloth.
3. Confirm that the materials of construction listed on the valve nameplates (service and temperature) are appropriate for the service intended and are as specified.
4. Define the preferred mounting orientation with respect to the system pressure. If any (see arrow on the body), identify the upstream side and downstream side.

Warning

See the actuator user manual for the actuator preparation.

2.2 Installation Instructions

Globe valves are normally installed in horizontal pipe with vertical stem.
These valves can also be installed in vertical or horizontal pipe with stem other than vertical, but the maintenance is much more difficult.
Globe valves are usually installed on horizontal pipe with the same flow direction of the arrow stamped on the body.
For operating temperatures above 200°C (392°F) a thermal insulation of the valve body is recommended.

Warning

Before lifting or handling the valve or the valve/actuator assembly, make sure you have no limitation to do it. Check if there are some safety messages attached to the lifting points of the valve or to the actuator (RED RIGID LABEL) and, if any, find the proper document in the user manual which describes how you can operate under safety conditions.

Handling and lifting of the valves during installation MUST be performed following the same criteria and instruction described in previous points “1.2 Handling Requirements” and “1.3 Storage and Preservation” before installation.

Warning

Verify that the direction of the flow of the line corresponds to the arrow indicated on the valve body. Valves without the arrow are bi-directional.

A - Buttweld Valves

1. Open the valve.
2. Position the valve and check for alignment with the pipe, then proceed with welding, in accordance with the applicable welding procedure.

Warning

Before welding, make sure the valve is completely open.

B - Flanged Valves

1. Position the valve between the two flanges of the pipe and put the seal gasket between valve flange and pipe flange. Ensure that it is correctly positioned.
2. Assemble the valve to the pipe by means of bolts which shall be tightened by using the crossover method.
3. Progressively reach the requested torque.

Important

It is recommended to perform piping flushing before installation of valve. If this is not possible, the valves must be set with the plug in full open position before starting with flushing.

2.3 Valve Verification before Start Up

1. Tighten the packing just enough to prevent stem leakage. Over-tightening will decrease packing life and increase the operating torque. The bolt torque figures for the packing bolts can be calculated as indicated in Table I.

2. Check the operation of the valve by stroking it to “full open” and “full close”.

Important

If piping system is pressurized with water for testing, and in case the piping system has been shut down after testing for a long time, the following recommendations should be adopted.
a. Use corrosion inhibitor with water to pressurize the piping system
b. After testing, the piping system should be depressurized and the test water completely drained.

3. Should the valve be equipped with electric actuator, please refer to paragraph 2.5 for actuator adjustment instruction.

2.4 Periodic Valve Verification during Service

A - Normal Checks

1. Verify every month that there is no leakage from packing or in the body/bonnet area. If the leakage has been detected from the packing, tighten the gland nuts (fig. 4, pos. 17) slowly and evenly until the leakage stops, as indicated in Table I.
   If the leakage has been detected from the body/bonnet, tighten the nuts (fig. 4, pos. 10) as indicated in Table II.
   If the leakage does not stop, it is necessary to replace the body/bonnet gasket or to replace the packing.
2. Every 3-6 months, depending on operating frequency, verify the greasing of bearings and the stem thread.
3. For actuated valves, in addition to above, please refer also to the warnings in the actuator manual.

B - Preventive Actions

1. Every 3 months verify the tightness of gland bolts.
2. Every 6 months on motorized valves and every 8 months on hand operated valves, grease the stem and the bearings.
3. Every 4 years disassemble the critical service valves and/or actuated valves, verify the seat surfaces and lap them again when necessary. Replace the bonnet gasket and the packing, clean the stem.
4. For the actuator, proceed as indicated in its maintenance manual.

Table I: Bolt Torque for Packing Bolts

Stem Diameter		Bolt Diameter	Torque
in	mm	mm	Nm
1	25,4	M16	14
1,25	31,75	M16	14
1,375	34,92	M20	18
1,75	44,45	M20	18
2	50,8	M24	20
2,25	57,15	M24	20
2,5	63,5	M27	23
2,75	69,85	M27	23
3	76,2	M27	23
3,25	82,55	M30	28
3,75	95,25	M33	35

Table II: Bolt Torque for Bonnet Bolts

Diameter		Torque
in	mm	Nm
3/8	M10	30
1/2	M12	70
5/8	M16	140
3/4	M20	260
1	M24	580
1 1/8	M27	760
1 1/4	M30	1350

Troubleshooting Guide

Symptom	Possible Cause	Solution
Stem packing leaking	1. Gland flange nuts too loose	1. Tighten gland flange nuts. Check the given torque
	2. Packing damaged	2. Replace packing
Body-Bonnet leaking	1. Gasket bolting loose (fig. 4, pos.10)	1. Tighten bolting (fig. 4, pos.10)
	2. Gasket damage	2. Replace the gasket
Valve leaking	1. Valve not fully closed	1. Close the valve
	2. Debris trapped in valve	2. Cycle and flush (with valve open) to remove debris
	3. Sealing surface damaged	3. Recondition the seat surface
Jerky operation	1. Packing is too tight	1. Loosen gland nuts, cycle the valve, retighten
Back seat leaking	1. Back seat damage	1. Recondition the back seat surface

2.5 Adjustment of electric actuators

1. For each valve equipped with actuator, a torque calculation has been made. The size of the actuator is selected on the base of the calculation.

2. The calculated torque is adjusted in the open and close direction on the actuator. This torque is calculated to suit the valve.

3. Before assembling an actuator to a valve, it is necessary to check:
   - the technical data of the actuator;
   - the correct adjustment torque;
   - the operation instruction.

4. Adjustment of the actuator for GLOBE valves.

Warning

- In the open direction, only the stop has to be set with the limit switch. In case the limit switch is not adjusted, the backseat will be destroyed by the high torque.
- In the close direction, the torque switch shall be set.
- The adjustment of the limit switches has to be handled when the actuator is assembled to the valve according to the operation instructions.

For this reason note that:
- the calculated torque must be adjusted;
- the closing time must not be too short, because the energy in the close blocked position depends on the actuator speed;
- the test performed without pressure under the piston must be avoided, because the actuator runs with full speed into the seat without any reaction.

Section 3 - Operation and maintenance instructions

Raisteam valves do not require special care to work properly. The following instruction will help provide a satisfactory and long life service.

Cautions

- Ensure to perform periodic valve verification as described in paragraph 2.4.
- In case of actuated valves, always follow the specific instruction given by the actuator's manufacturer.
- Never change the setting of torque and/or limit switches which have been carefully set during the final test at our workshop.

Important

- To ensure tightness of pressure seal gasket, pull up bolts must be tightened when the valve is under fully hydrostatic pressure test or twenty-four hours in operation.
- Yearly checking of bolt torque is recommended.

3.1. Operation and Maintenance Instructions

Please refer to fig. 4.

Assembly

1. All the parts must be cleaned. It is necessary a visual examination to ensure that there are no foreign parts inside.
2. The internal seat surface (1.3) must be carefully lapped in order to avoid any defect.
3. The surfaces of the plug seat (28.1) must be lapped in order to avoid any defect.
4. Assemble the plug (28) with the plug nut (30) and screw to the stem (20). Insert now this unit into the body.
5. Insert the bonnet (2) into the body. Take care that the operator wears gloves in order to ensure a careful assembly of the pure graphite gasket (7), covered with stainless steel inlets.
6. The ring (6) and the four pieces of the segment ring (5) must be assembled over the gasket (7). The segment ring has to be put into the body groove.

Important

The segment ring has to be fixed by the safety ring. Ensure that the segment ring is in the correct position.

7. The bonnet must be brought into position with the necessary bolts and nuts. For the necessary torque, see Table 2.
8. Install the ground ring (13), the packing of pure graphite and two rings to the stuffing room (see fig.2). The operator MUST wear gloves.
9. The packing shall be compressed by the gland (15) and the gland flange (16) with the cut ring (19) inside. Screw the nuts to the bolts with the torque indicated in Table I.
10. Install the indicator (25) on the stem.
11. Assemble the yokenut (21), the two bearings (22) and the two O-rings (32) to the yoke with the lubrication nipple, then the gear/actuator connection flange with the bolts.
12. Assemble the handwheel, the gear or the actuator to the valve.

Disassembly

1. For a correct disassembly it is necessary to follow in reverse the assembly instructions.
2. Follow this special remark to disassemble the seat ring: in the upper part of the body, in the area of the segment ring, there are some holes to drive out two parts of the segment ring by using a pin and a hammer.

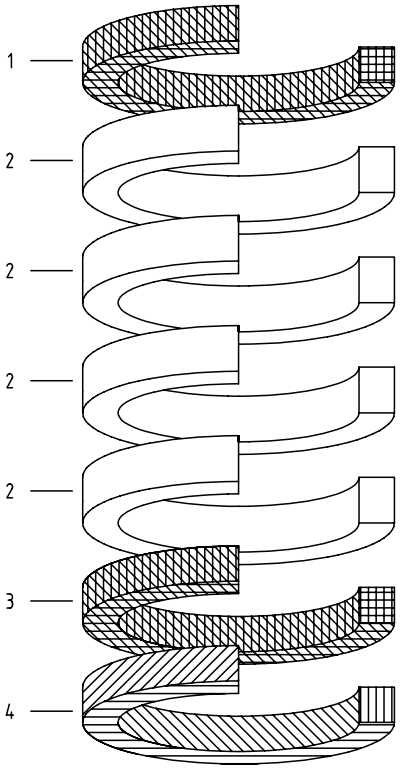
Cautions

First, drive out the two parts of the segment ring as indicated in fig. 3, then the remaining two parts.

Recommended Spare Parts

Please refer to figure no. 4

- Gasket (7)
- Ground ring (13)
- Packing (14)
- Globe plug (28) with the plug nut (30)
- Yoke nut (21)
- Bearings (22)
- Stem (20)



1 = Wired pure graphite
2 = 3 to 4 pure graphite rings with a density of 1,8 g/cm^3
3 = Wired pure graphite
4 = Ground ring

Figure no. 2

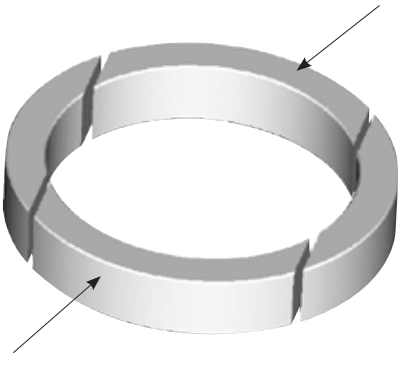


Figure no. 3

Figure 6022 to 6025

Fig.	Class	PN
6022	900	09 (160)
6023	1500	15 (250)
6024	2500	25 (500)
6025	4500	45 (720)

Trim Material to API 600

Item	Body Seat Surface 1.3	Plug Seating Surface 28.1	Stem 20
1	13% Cr	13% Cr	13% Cr
5	Stellite	Stellite	13% Cr 17% Cr *
8	Stellite	13% Cr	13% Cr
12	F316/Stellite	F316/Stellite	F316 or 17.4 PH below 450°C

* over 450°C

Globe Valves

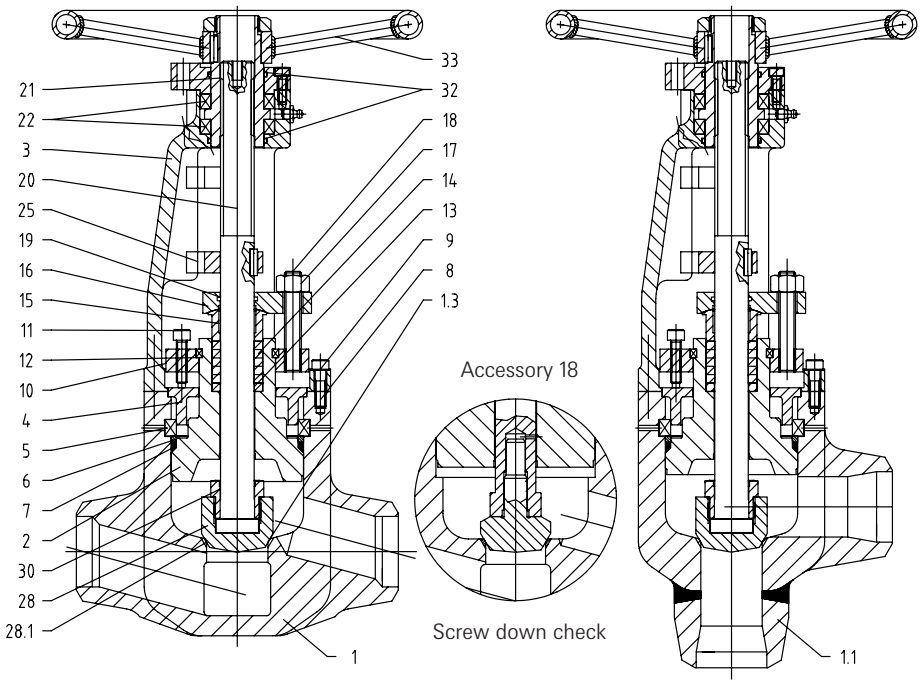


Figure no. 4

Material Specifications

Item		21	22	23	24	25	26	28
		-20°C - 425°C	-46°C - 425°C	200°C - 540°C	250°C - 550°C	400°C - 575°C	500°C - 650°C	130°C - 650°C
		A105 C22.8 1.0460	LF2 TT5 1.0411	F1 15Mo3 1.5415	F12 13CrMo44 1.7335	F22 10CrMo910 1.7380	F91 P91 1.4903	F316 X6CrNiNb1810 1.4550
1	Body	A105 C22.8	LF2 TT5	F1 15Mo3	F12 13CrMo44	F22 10CrMo910	F91	F316 X6CrNiNb1810
1.1	Body	A105 C22.8	LF2 TT5	F1 15Mo3	F12 13CrMo44	F22 10CrMo910	F91	F316 X6CrNiNb1810
2	Bonnet	A105 C22.8	LF2 TT5	F1 15Mo3	F12 13CrMo44	F22 10CrMo910	F91	F316 X6CrNiNb1810
3	Yoke	A105	A105	A105	A105	A105	A105	A105
4	Safety Ring	A105	A105	A105	A105	A105	A105	A105
5	Segment Ring	A105 C22.8	LF2 TT5	F1 15Mo3	F12 13CrMo44	F22 10CrMo910	F91	F316 X6CrNiNb1810
6	Ring	A105 C22.8	LF2 TT5	F1 15Mo3	F12 13CrMo44	F22 10CrMo910	F91	F316 X6CrNiNb1810
7	Gasket	Pure Graphite	Pure Graphite	Pure Graphite	Pure Graphite	Pure Graphite	Pure Graphite	Pure Graphite
8	Bolts	A193 B7	A193 B7	A193 B7	A193 B7	A193 B7	A193 B7	A193 B7
9	Nuts	A194 2H	A194 2H	A194 2H	A194 2H	A194 2H	A194 2H	A194 2H
10	Plate	A194 2H	A194 2H	A194 2H	A194 2H	A194 2H	A194 2H	A194 2H
11	Screw	A193 B7	A193 B7	A193 B7	A193 B7	A193 B7	A193 B7	A193 B7
13	Ground Ring	17Cr 1.4122	17Cr 1.4122	17Cr 1.4122	17Cr 1.4122	17Cr 1.4122	17Cr 1.4122	17Cr 1.4122
14	Packing	Pure Graphite	Pure Graphite	Pure Graphite	Pure Graphite	Pure Graphite	Pure Graphite	Pure Graphite
15	Gland	F6	F6	F6	F6	F6	F6	F6
16	Gland Flange	A105	A105	A105	A105	A105	A105	A105
17	Gland Nuts	A194 2H	A194 2H	A194 2H	A194 2H	A194 2H	A194 2H	A194.8
18	Bolts	A193 B7	A193 B7	A193 B7	A193 B8	A193 B8	A193 B8	A193 B8
19	Cut Ring	Pure Graphite	Pure Graphite	Pure Graphite	Pure Graphite	Pure Graphite	Pure Graphite	Pure Graphite
21	Yoke Nut	Bronze B 148 gr.B or Ni-resist D2	Bronze B 148 gr.B or Ni-resist D2	Bronze B 148 gr.B or Ni-resist D2	Bronze B 148 gr.B or Ni-resist D2	Bronze B 148 gr.B or Ni-resist D2	Bronze B 148 gr.B or Ni-resist D2	Bronze B 148 gr.B or Ni-resist D2
22	Bearings	Steel	Steel	Steel	Steel	Steel	Steel	Steel
25	Indicator	A105	A105	A105	A105	A105	A105	F316
28	Plug	F6	F6	F6	F6	F6	F6	F6
30	Plug Nut	F6	F6	F6	F6	F6	F6	F6
32	O-ring	Viton	Viton	Viton	Viton	Viton	Viton	Viton
33	Handwheel	Steel	Steel	Steel	Steel	Steel	Steel	Steel

Section 4 - Valve Removal

To remove a valve from the line, it is necessary to operate as follows:

1. Obtain permission to work.

Warning

Depressurize the line before starting any operation with the valve in open position.
Then close the valve.

2. During the valve cutting operation proceed with care in order to prevent any damage to the seats.
3. After the removal, clean carefully the valve and close the ends with plastic or wooden discs.

Section 5 - Lubricants and Special Tools

5.1 Lubricants

It is recommended to lubricate the yoke nut, if any, through the yoke nut lubricator every 2 months by using the following products:

- The bearings are lubricated with usual lubrications for bearings.
- Smear the stem threads with Molykote.
- All other bolts and nuts are assembled with usual lubricator or Molykote.

5.2 Special Tools

No special tool is required for the maintenance operations described in this manual.

Table III: Grease and Lubricant List

Manufacturer	Grease
AGIP	GRMUEP2
API	PGX2
BP	GREASE LTX2
ESSO	BEACON 2
FINA	FINAGREASE HP FINAGREASE EPL2
MOBIL	MOBILUX EP2
Q8	REMBRANDT EP2
SHELL	ALVANIA R2 SUPERGREASE A
TEXACO	MULTIFAK EP2 GREASE L2
TOTAL	MULTIS EP2 MULTIS 2
VISCOL	SIGNAL ROLSFER 2
STATOIL	UHIWAYLI LI G2

Section 6 - Operational Safety Instructions (O.S.I.) in accordance with PED requirements

According to PED-ESR, par. 3.3 and related, the service pressure and temperature are indicated on the nameplate fixed on the valve (see Fig. 5).
The Operation Safety Instructions (internal document TD-PED-0020) are indicated in the attached document (when applicable).

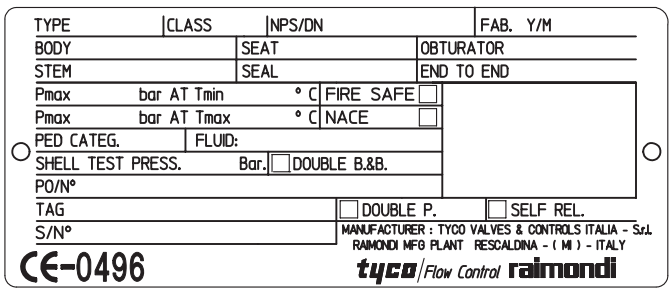


Fig. 5
Example of General Nameplate