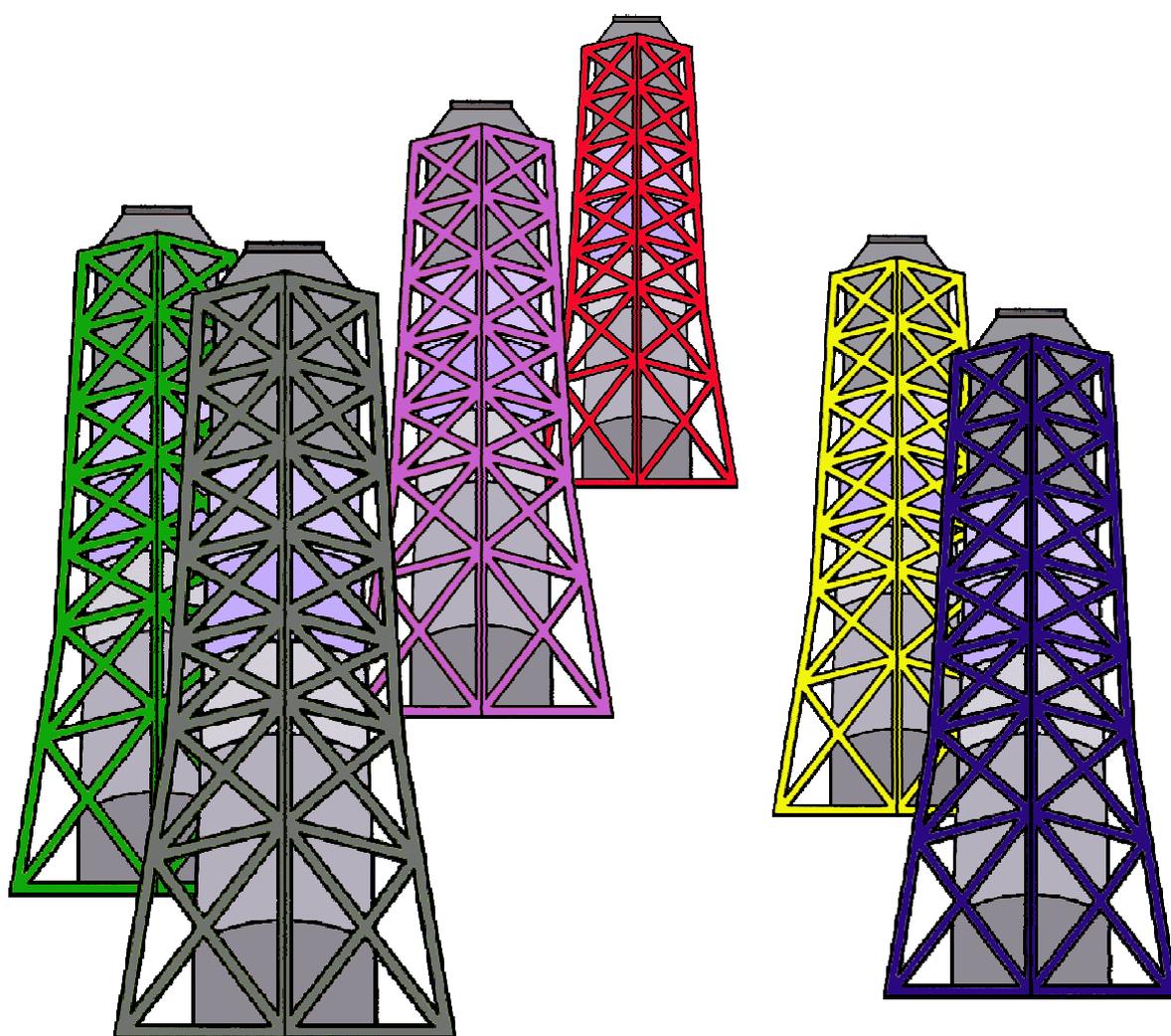


FORGED STEEL VALVE USER GUIDE

NON BONNET (NB) TYPE



SHORITSU SEISAKUSHO CO., LTD.

Cover designed by Mr. Mitsuo Nakane

- Cover design is the sketch of the image of the concentric stack of the thermal power plant design.

FOREWORD

Thank you really for purchasing our valves. Read this valve user guide thoroughly to use our valve properly. Keep this valve user guide in the place where handling person can use immediately.

REQUEST

- As for your inconvenience, which occurred by the mentioned items of this valve, user guide weren't observed, and please consent in advance because our company is hardly responsible.
- Please contact the following our Sales Department if there are unclear and noticeable points, though we made and expected with assurance about the contents of this valve user guide.
- For the details of specifications and parts of product, please refer to the assembly drawings with respective valve.

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This valve user guide covers globe valve with NON-BONNET type.

Safety Notice and Signs

When handling of valve is improper, the harm and the damage will be occurred. The degree of the harm and the damage is classified in the "Warning" and the "Caution" indications, and the contents of the indication throughout this valve user guide are as follow.



Indicates a potentially hazardous situation, which could result in death or serious injury if you do not follow instructions.



Indicates a potentially hazardous situation, which if not avoided, may result in minor injury or property damage.

Be sure to KEEP it because they are important contents about the safety.

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Section 1

SPECIAL FEATURES

- Non-bonnet type valve provides only stuffing box in the valve body to fit for gland packing and namely there is no bonnet and gasket in it.
- It is unnecessary to consider “Creep” (Note 1) on bonnet bolts when the valve is applied for high-pressure service use.
- Special Feature on Construction
 - Body-Yoke Connection
Yoke has an internally screw-threaded annular portion, which is screw-threaded on to the head of body externally screw-threaded.
On this account, there is no need to seal between a valve body and bonnet. Therefore, seal portion of the valve inside and the outside become only gland packing.
 - Neck bushing with backseat provides in the valve body.
So, gland packings can change by operating the backseat, if even the valve is under internal pressure.
 - Annular neck bushing having an externally threaded portion, which is left hand screwed, screw-threaded into the body. However, it is reverse with the stem thread (valve stem is right hand screw, neck bush is left hand screw). Therefore, when operate the back seat, it is impossible to loose of seal between neck bush and valve body.

(Note 1) Creep means a movement of one point of a structure relative to those parts with which it is in contact. Creep is the phenomenon that deformation occurs when the bolts are under certain minute amount of external force during long-term service.

Section 2

STRUCTURE AND FUNCTION

1. Globe Valve

■ Structure

The names of each part and the structure are as shown in Figures 2.1.

■ Function

- To open and close the globe valve, the valve stem shall be up and down by rotating the hand wheel. Clockwise rotation of the hand wheel shall close the globe valve. Counterclockwise rotation of the hand wheel shall open the globe valve.
- The centerline of inlet and outlet of valve is in the straight line and the flow of fluid is S letter-shaped. Globe valve has high shut-off efficiency due to the closure the valve disc against the flow of the fluid.
- The quantity of flow and fluid pressure can be adjusted by using the globe valve under the condition of halfway open position.
- The flow direction shall be one direction.

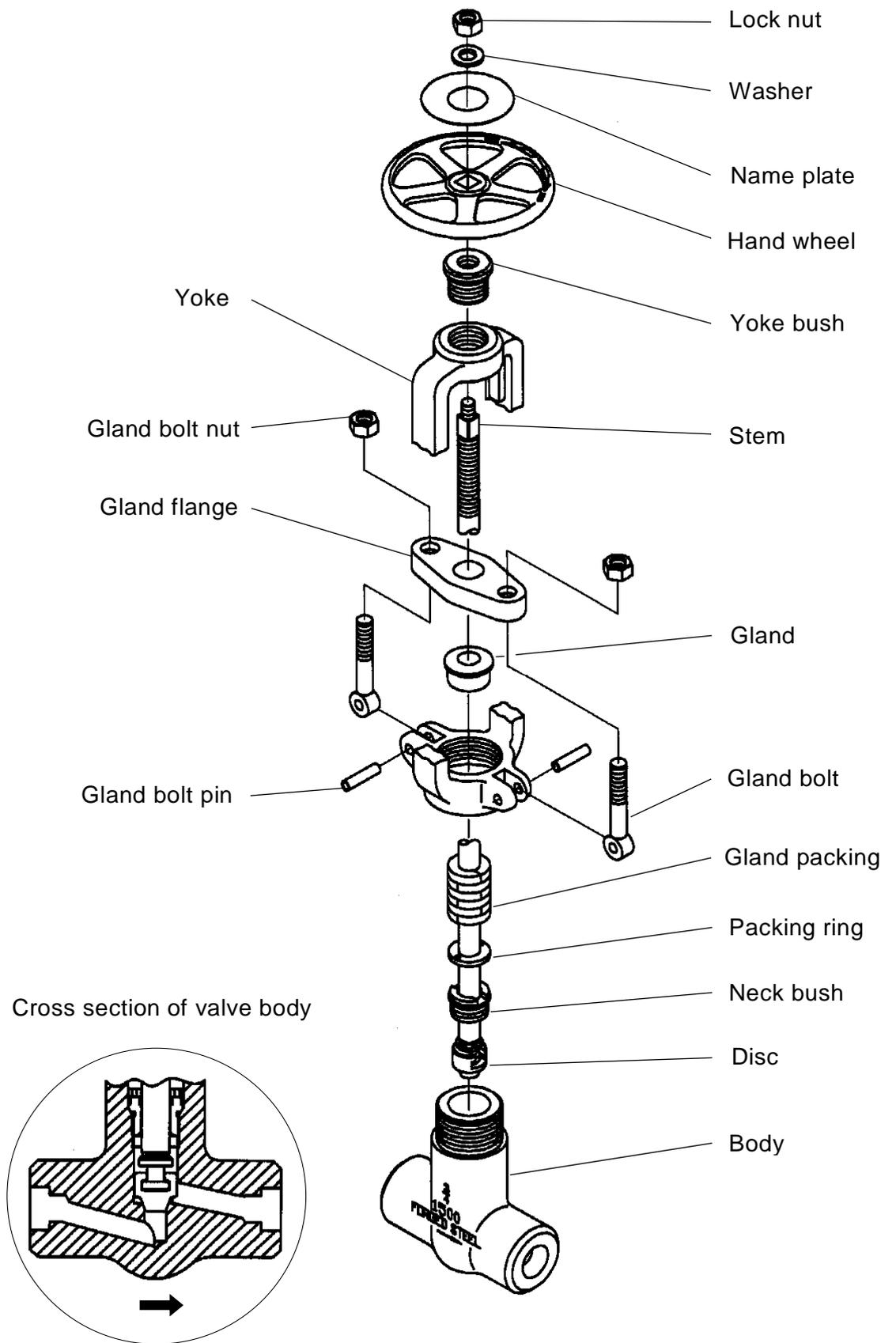


Figure 2.1 Typical Example for Class 1500 Globe Valve

Section 3 INSTALLATION

■ Caution to Installation of Valve



CAUTION

- Hand wheel, gland and stem should not be used as lifting points, when hanging the valve.
- For safety, do not allow entering any people under hanging load, when hanging the valve.
- Do not use the hand wheel of valve as a foothold. It may cause damage the valve.
- Perform the work after securing the surrounding safety.

■ About Installation

- When weld the socket-welding end valves into pipeline, care must be taken to ensure that welded valves shall be in slightly open position.
- For globe valve, it is designed that the direction of fluid flow is from the downstream side of valve disc. So, installation of the globe valve shall be according to the arrow of the direction of flow.

(Note 1) If globe valve is required to install the opposite side of the flow direction, please consult with our company for using it. And, we will consider it as a precondition when the design, manufacture, and inspection of valve are performed.

Section 4 SHIPPING, UNPACKING, AND STORAGE

■ Caution to Shipping



CAUTION

- Be careful the handling of product packed in corrugated cardboard when it is wet in the water, the strength of corrugated cardboard is declined, and packing is broken, and the product will be damaged.
- Do not allow entering any people under the load during transfer and shipment of valve with hoist and hook.
- Do not load under unstable condition.
- Handle the valve carefully during unloading.

■ Caution to Unpacking



CAUTION

- Confirm the weight of valve, and do not allow entering any people under the load during raising the valve.
- Do not shock the valve due to the drop, the turnover, and so on.

■ About Unpacking

- Confirm the contents of the package of valve by the shipping instruction.
- The kind of valve, the material of valve body and bonnet, trim material, nominal pressure and nominal diameter of valve shall be confirmed by name plate, which attached on the hand wheel of the valve.
- Please refer to "Section 8, NAME PLATE SPECIFICATION" for how to read the name plate.

■ Caution to Storage of Valves



CAUTION

- The polyethylene caps on the inlet and outlet end of valves shall not be removed until immediately prior to valve installation. It may cause damage to valve seat when the entering of the foreign materials within the metal touch of valve seats.
- The valves shall not be kept outdoors or in humid and dusty places. They shall be kept indoors, well-ventilated places.
- Coat rust preventives again to the inside and outside of the valve when keeping it in the period any further because coating effect declines when it passes through three months, though rust preventives is applied to the inside and outside of the valve.
- To avoid keeping it on the ground floors or the concrete floor directly, and to keep away from the moisture by placing them on adequate blocks or sleepers.

Section 5

HANDLING AND OPERATION

1. Handling

■ Caution about Valve Handling



CAUTION

- Do not apply the excessive force and impact force in the opening and closing operation of the valve. The function of the valve is likely to be spoilt.
- Handle the valve gradually so that water hammer may not occur and confirming that there is no vibration, noise and leakage in the valve.

■ Handling of Valve

- Valves can be opened and closed by turning the hand wheel to the direction of “0” and “S” markings on it, respectively. After valves are fully opened or closed, they shall not be additionally opened or closed by using auxiliary levers such as the wrench. Additional opening or closing may cause damage to seat surfaces.
- When the valve cannot close fully, open the valve first, and then close it. It is possible that owing to foreign matters such as scale, which has come into the seat surface, the valve does not close. In such cases, open the valve and blow the foreign matters off. If the valve can not still close satisfactorily, repeat the above operation several times.
- When the valve is put into services, it is necessary to adjust the tightness to the gland packing by tightening the gland bolt nut. For increasing the tightness, care must be given so that the tightening force should be added evenly. Too much tightening may cause the trouble to movement of the hand wheel. Tighten the gland packing adequately so as to stop the leak of the fluid.
- For the valves, which are not closed or opened frequently, apply grease periodically to the stem thread. Although the stem is made of the rust resistant material, it is still necessary to protect the stem against rusting. Lubrication is required also for smooth operation of the valves.

2. Operation

■ Caution about Valve Operation



CAUTION

- Do not loosen lock nut of hand wheel and gland bolt nuts while the valve is under pressure.
- Take the measures of prevention of freezing when freezing of valve is predicted.

3. Daily Inspection

■ About Daily Inspection

Daily inspections are important to find out the signs of abnormal conditions of the operating valve in advance and to take measure the stoppage of operation. Daily inspections items in the valve operating condition is as follows;

Condition	Type of Valve	Portion to be checked	Inspection Method	Troubleshooting in abnormal
Leakage to the outside of valve	Globe valve	Surface of valve	Visual Soap water	<ul style="list-style-type: none"> Replace the whole valve
		At the gland	Visual Soap water	<ul style="list-style-type: none"> Tightening up the eye bolt nuts Replace the relative parts
Abnormal noise		The whole valve	Listening	<ul style="list-style-type: none"> Contact the responsible person and department, and troubleshooting
Defective appearance		Hand wheel	Visual	<ul style="list-style-type: none"> Replace when the handwheel is damaged
		The whole valve	Visual	<ul style="list-style-type: none"> Apply rust preventive after removal of rust when rust occurs.
Improper motion		Movable parts	Touch by fingers	<ul style="list-style-type: none"> Apply grease on the movable parts, however, oxygen service valve is coated only grease for oxygen service.

Section 6

ROUTINE INSPECTION

■ About Routine Inspection

- Perform the routine inspection of the valve once in one year at least under the installed condition.
- Confirm the condition of valve that it is under smooth operation and there is no hindrance of safety.

■ Inspection when Disassembling

Perform valve leakage test, operation test, disassembling inspection, and so on if necessary when the equipment that a valve was installed is opened for the inspection of public safety. Perform disassembling inspection and necessary troubleshooting when there are leakage inside of the valve, inferior operation, imperfect function, and so on.

■ Caution to Disassembling Valve



WARNING

- Disassemble the valve carefully and slowly, after confirming that the pressure in pipeline falls down completely and there is no remaining pressure inside of the valve and pipeline.
- Be sure to wear safety belt on your waist when dismantling work. Tie up the safety belt without fail when dismantling work in elevation.
- Be careful the safety of work and take the measures that no permit to enter under working.



CAUTION

- Perform the work by person who learned sufficient skill and technical knowledge.
- Perform the work with protection guards (protection glasses, gloves for the work, safety shoes).
- Use suitable tools properly.

■ Disassembling

Refer to “Section 7, DISASSEMBLING AND ASSEMBLING” for disassembling the valve.

■ Inspection Items when Disassembling

Method of the inspection and troubleshooting for the valve defects are as follows.

Name of Part	Kind of Valve	Portion to be Inspected	Inspection Method	Criterion	Troubleshooting
Valve body	globe valve	Seat surface	Visual Inspection	No corrosion, No crack	Replace
				No damage	Lapping the seat surface
		PT inspection	No crack, No pinhole	Replace	
Inside surface		Visual Inspection	No foreign materials	Cleaning and air-blow the inside surface	
Valve disc		Surface	Visual Inspection	No damage	Machining after stellite welded and change
					Contact surface

Name of Part	Kind of Valve	Portion to be Inspected	Inspection Method	Criterion	Trouble-shooting
Valve Stem	globe valve	Valve stem, disc and relative parts	Visual Inspection	No corrosion, No wear	Replace
		Screw parts	Visual Inspection	No rupture No damage No wear	Replace
		Outside surface	Visual Inspection	No corrosion, No wear No bending	Replace
		Shape	Visual Inspection	No bending No damage in threads	Replace
Yoke bush		Valve stem and moving face	Touch by fingers	Smooth operation	Apply grease
		Screw parts	Visual Inspection	No wear	Replace
		Flange parts	Visual Inspection	No crack, No bending	Replace
Gland packing		The whole	Visual Inspection	—	Replace
Gland and Gland flange	The face of gland	Visual Inspection	No damage, No crack, No bending	Replace	

■ Assembling

Refer to “Section 7, DISASSEMBLING AND ASSEMBLING” for assembling the valve.

Section 7

DISASSEMBLING AND ASSEMBLING

1 . Globe Valves

■ Disassembling Procedure

Since all valves have been correctly assembled and tested, an easy-going disassembling of valves should be avoided.

● Caution to Disassembling Valve



WARNING

- Disassemble the valve carefully and gradually, after confirming that the pressure in pipeline falls down completely and there is no remaining pressure inside of the valve and pipeline.



CAUTION

- Perform the work by person who learned sufficient skill and technical knowledge.
- Perform the work with protection guards (protection glasses, gloves for the work, safety shoes).
- Use suitable tools properly.

■ Before Disassembling

- Keep necessary lighting in the disassembling workshop.
- Perform disassembling in the workshop where there is no vibration, no dust and no moisture.

■ Disassembling

- 1) Turn the hand wheel of the fully closed valve to the left to obtain an intermediate valve opening.
- 2) Loosen the hand wheel nut and remove it and take the washer from the stem.
- 3) Remove the hand wheel by pulling it to upward.
- 4) Yoke is attached to valve body by spot-welding. So, after grinding and slightly tap spot-weld between yoke and valve body, remove the yoke from the body by turning it to the counter-clockwise direction.

- 5) Remove the yoke attached with yoke bush from the valve body by turning it counter-clockwise direction. If the pressure is remained inside the valve, the leakage will occurs and leakage sound can hear. If leakage still occurs, leave and slightly crack-open it until there is no remaining pressure.

After confirming the safety, continue to operate disassembling work.

- 6) Remove the gland and gland packings from the stem.
- 7) Remove the gland packings from the stuffing box, change with new one.
- 8) Remove the neck bush from the valve stem by turning it into clock-wise direction.
- 9) Take out the valve stem from valve body by pulling it upward direction.
- 10) Remove the valve disc from the stem.

■ Assembling Procedure

● Caution to Assembling

 CAUTION
<ul style="list-style-type: none">● Perform the work by person who learned sufficient skill and technical knowledge.● Perform the work with protection guards (protection glasses, gloves for the work, safety shoes).● Use suitable tools properly.

■ Before Assembling

- Every part shall be assembled after have been cleaned and checked free from injurious defects or damage. If there is defect or damage in assembled parts, do not use again and replace with new one.
- Keep necessary lighting in the assembling workshop.
- Perform assembling in the workshop where there is no vibration, no dust and no moisture.

■ Assembling

- 1) The assembling procedure shall be in the reverse order of the disassembling order.
- 2) In this case, the gland bolts, bonnet bolts and screw parts shall be coated with grease (Note) in order to prevent them from seizure.
- 3) When insert the gland packings in the stuffing box, each packing ring shall be inserted successively by tightening up the gland each time. Make sure that there is no overlap of cut of gland packing, which must be staggered. Apply proper insert force on the gland when inserting.

- 4) When tightening up the gland bolt nuts, the hand wheel should be turn now and then so to adjust the tightness of the gland packing, as shown in Figure 7.1. Tightening up the gland bolt nuts gradually and uniformly in order to avoid tendency to twist.

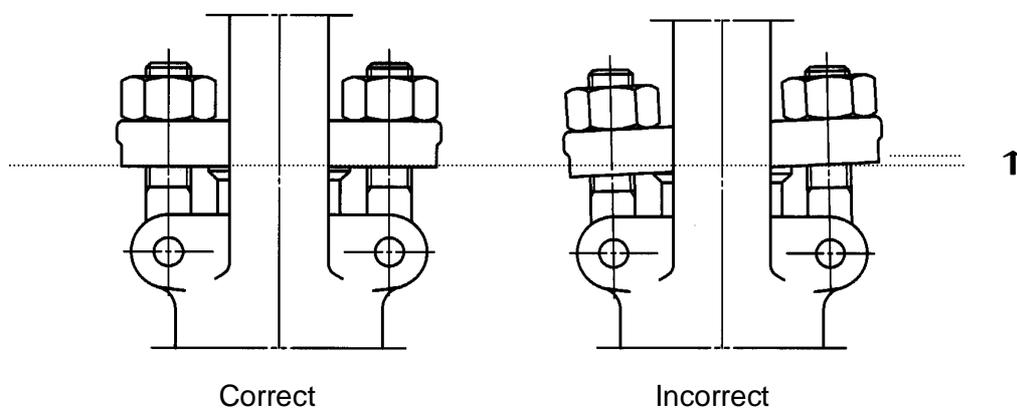


Figure 7.1 Examples for Adjustment (Tightening) of Gland Bolt Nuts

- 5) Tightening torque range (reference data) for gland bolt nut shall be recommended in accordance with Table 7.1.

Table 7.1 Tightening torque range (reference data) for gland bolt nut

Class	Shoritsu's Valve Type No.	Unit	Nominal Size (Inch)				
			1/2 "	3/4 "	1 "	1-1/2 "	2 "
Class 1500	H02	kg f-cm	290~310	380~400	410~430	940~1000	1840~1900
		N-m	29~ 31	38~ 40	41~ 43	94~ 100	184~ 190
Class 2500	K02	kg f-cm	330~350	440~460	470~490	1080~1140	2100~2160
		N-m	33~ 35	44~ 46	47~ 49	108~ 114	210~ 216

Note: Unless otherwise specified, threads on the valve stem shall be coated with Molykote G-n Paste(anti-friction coating), manufactured by Dow Corning Toray Co.,Ltd.

Section 8 TROUBLESHOOTING GUIDE

■ Caution to Disassembling Valve

 <h2 style="margin: 0; display: inline-block; vertical-align: middle;">CAUTION</h2>
<ul style="list-style-type: none"> ● Perform the work by person who learned sufficient skill and technical knowledge. ● Perform the work with protection guards (protection glasses, gloves for the work, safety shoes). ● Use suitable tools properly. ● The practice of repacking under pressure is not recommended because the backseat of the valve which being used several years cannot prevent the valve leakage.

■ Trouble and Troubleshooting

Trouble	Cause	Troubleshooting
Leakage from the gland	1) Sealing efficiency of 2) gland packings becomes inferior. 3) Lack of the tightening pressure on the gland.	1) Open the valve fully so that the leakage will stop because of back seat. 2) Then, loosen gland bolt nuts, leave the valve as it is for five to ten minutes until the leakage disappear. 3) Retighten the gland bolt nuts in order to further compress the gland packing. 4) If necessary, renew the gland packing. If necessary, add the gland packing.

Trouble	Cause	Troubleshooting
Seat leakage	1) Foreign materials & scale accumulate and stick to the valve disc.	1) Disassemble the valve and lap the valve, after the pressure in the pipe line falls down completely and confirm that there is no remaining pressure inside the pipe and valve. 2) Washing and cleaning the valve after valve lapping.
Operation is heavy	1) Foreign materials accumulate in the valve stem screw and at the bottom of valve body inside.	1) Open the valve, and remove the accumulated foreign materials by the flow of fluid. 2) Disassemble and clean the valve when operation is still heavy. Refer to “Section 7, Assembling & Disassembling” for the procedure of disassembling.

Section 9

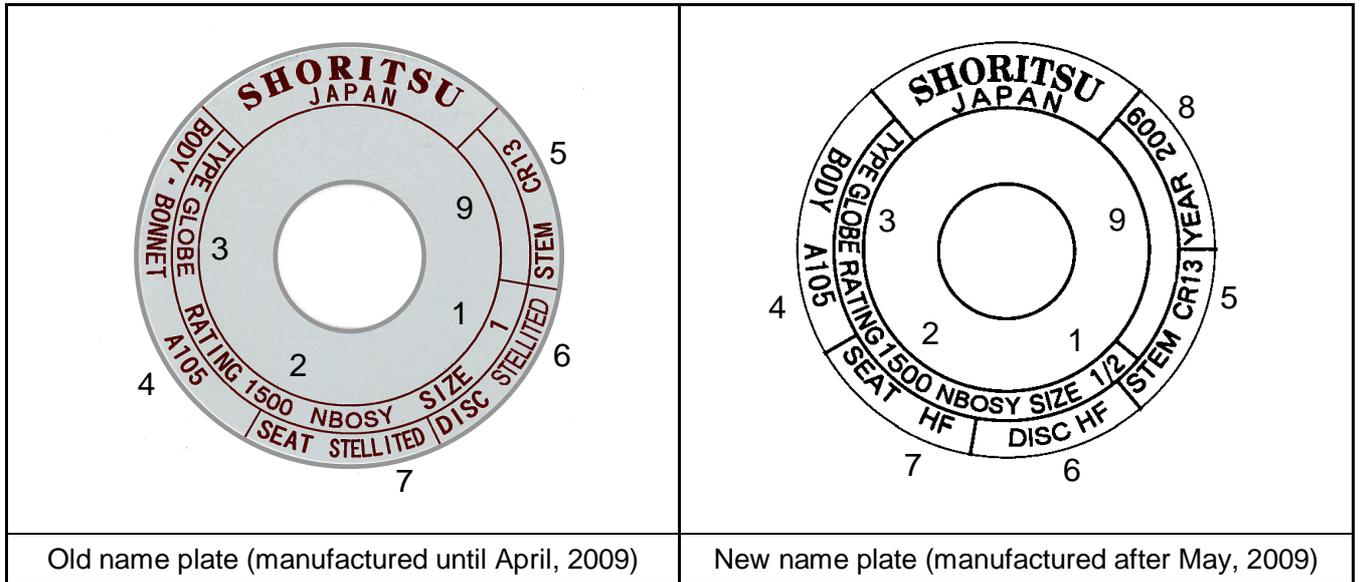
NAME PLATE SPECIFICATION

The name plate indicates manufacturer's name, country of origin, the kind and type of the valve, nominal size, applicable pressure rating at 100° F (38°C), body material and trim material. The position and method of attachment for name plate shall be as follows.

- The position and method of attachment for name plate

Kind of valve	Attached Position	Method for Attachment
Globe valve	Upper side of hand wheel	By fitting of hand wheel nut

- Example of name plate for exported valve



Legend 1~9 of above figure represent as per following table.

No.	Marking item	Meaning of marking	Example for Marking (old name plate)	Change existence	Example of Marking (new name plate)
—	Material	Material of name plate	Aluminum	Not changed	Aluminum
—	Thickness	Thickness of name plate	0.5 mm	Not changed	0.5 mm
—	Color of material	Color of material for name plate	Gray	→	White
—	Letter	Color of letter	Red	Not changed	Red
1	SIZE	Nominal size of valve (Inch)	1	Not changed	1/2
2	RATING	Rating	1500	Not changed	1500
3	TYPE	Marking for type in capital letter	GLOBE	Not changed	GLOBE
4	BODY	Body and bonnet material	A105	Not changed	A105
5	STEM	Stem material	CR13	Not changed	CR13
6	DISC	Disc seat material ■ Stellite on body seat ■ No stellite	STELLITED	→	HF
7	SEAT	Seat material ■ Stellite on body seat ■ No stellite	STELLITED	→	HF
8	YEAR	Year of manufacture (Christian era)	—	Standard specification	2009
9	VALVE NUMBER	Valve number	Not specified	Customer specification	Not specified

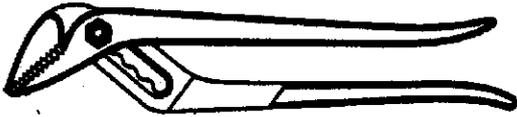
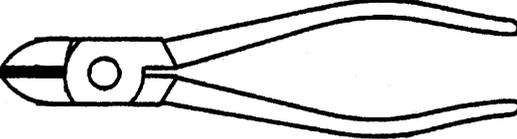
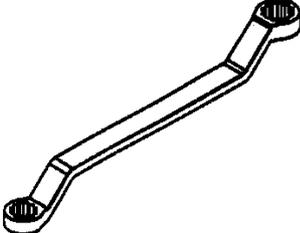
Section 10 GUARANTEE

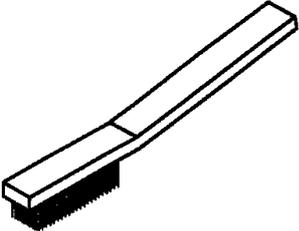
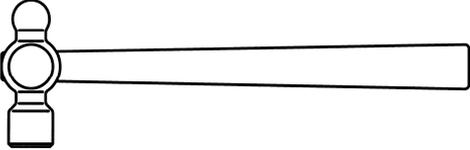
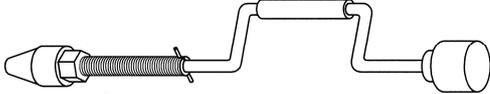
- All valves have been correctly assembled and tested. Please contact to our company if and there are unclear points, troubles, repairs and your request.
- Guarantee period of the valve shall be in accordance with purchase order and an agreement between the purchaser and the manufacturer.
- Consult to our company if there are specification changes in accordance with customer's specification, new design, and new product, and so on except for our product specification.
- Please inform the following information when the valve is required to repair and in trouble.
 1. Company name, address, telephone number, post and person in charge
 2. The address of the establishment place, telephone number, post and person in charge
 3. Product name (product type, kind of valve, nominal diameter and so on)
 4. Purchased date and established date
 5. The conditions of trouble and repair (as concretely as possible)
 6. The conditions of applications, the environment (kind of the fluid, pressure, temperature and frequency of application)
 7. The deadline or expected date for valves repair

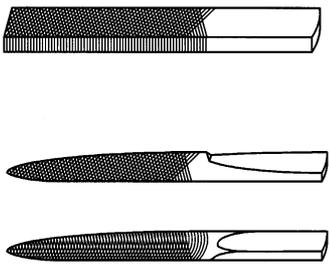
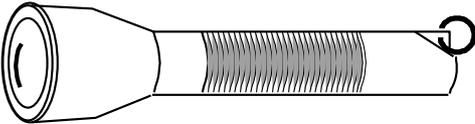
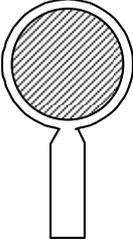
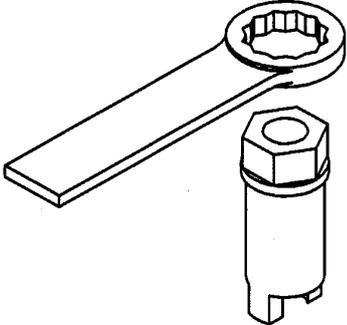
Section 11 NECESSARY TOOLS

Necessary tools to be used when disassembling, assembling and repairing are as shown in the Table.

Table. Necessary tools when disassembling, assembling and repair

Tool Name	Typical Tool	Use
Water Pump Pliers		Use for tightening and loosening the bolt.
Nipper		Use for cutting the gasket when it is expanded.
Pincers		Use for dismantling the gasket from the valve bonnet.
Adjustable Spanner		Use for tightening and loosening of hand wheel nut.
Offset Wrench		Use for tightening and loosening of bolts and nuts.

Tool Name	Typical Tool	Use
Handwheel Key		Use for turning the handwheel for additional force.
Extractors for Gland packing		Use for extracting of gland packing.
Wire Brush		Use for removal of dust, rust, foreign materials and so on.
Pin Set		Use it as an auxiliary tool when cleaning the corner of valve body and the neighborhood of the hole for the valve disc.
Hammer		Use for installation and dismantling of the handwheel.
Tool for Valve Lapping		the tool is used for valve seat lapping by rotating it which the water-proof abrasive paper puts on its surface end with double-stick tape.

Tool Name	Typical Tool	Use
Files		Use for removal of burrs.
Portable Flashlight		Use it for the confirmation of the existence of the seat damage and, the scale in the corner.
Handy Mirror		Use it when the point can't be confirmed directly with the naked eyes, opposite and back sides of the view, and so on.
Tightening Tool for Neck Bush		It is used for tightening of neck bush. For tightening of neck bush, first, fit the concave part of neck bush and the convex part of a tool, and second, put the offset wrench on the hexagonal head of tool, and finally, strike the handle of offset wrench with hammer to the counter-clockwise direction.

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NON BONNET (NB)TYPE

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KHK ISO CENTER, QUALITY SYSTEM CERTIFICATE (ISO 9001)

PRODUCT/SERVICE RANGE : DESIGN AND MANUFACTURE OF FORGED STEEL VALVE

- Please contact the following our Sales Department if there are unclear and noticeable points.
- Keep this valve user guide in the place where handling person can use immediately.

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