

MODEL GD-27BP

Pressure Reducing Valve with By-pass

PRODUCT MANUAL

Thank you very much for choosing the Yoshitake's product. To ensure the correct and safe use of the product, please read this manual before use. This manual shall be kept with care for future reference.

The symbols used in this manual have the following meanings.

| | | |
|---|----------------|---|
|  | Warning | This symbol indicates a potentially hazardous situation that, if not avoided, could result in death or serious injury. |
|  | Caution | This symbol indicates a hazardous situation that, if not avoided, may result in minor or moderate injury or may result in only property damage. |

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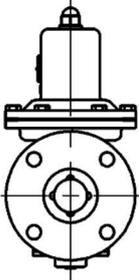
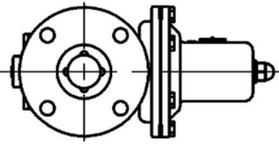
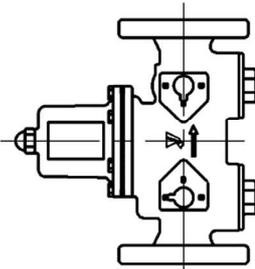
1. Specifications

1.1 Specifications

| | | |
|-------------------------------|------------|---|
| Model | | GD-27BP |
| Nominal size | | 20-100A |
| Application | | Cold and hot water |
| Inlet pressure | | 1.0 MPa or less |
| Reduced pressure | A | 0.05 - 0.35 MPa |
| | B | 0.30 - 0.70 MPa |
| Min. differential pressure | | 0.05 MPa |
| Max. pressure reduction ratio | | 10:1 |
| Application temperature | | 5~90°C |
| Material | Body | CAC406 |
| | Valve seat | CAC406 |
| | Valve disc | FKM |
| | Diaphragm | EPDM |
| Connection | | JIS 10K FF flanged |
| Installation posture | | Horizontal or vertical installation is possible (For 100A, horizontal piping with upward posture only. See *1 below.) |

- The product conforms to the standard of the Japanese Water Supply Act.
- The product does not use brass material for the wetted surface area.
- Pressure gauge connection port is JIS R1/4. The maximum temperature of the pressure gauge is 45°C. If the fluid temperature exceeds 45°C, please protect the pressure gauge by using a siphon tube or similar.
- Pressure reducing function is set when shipped from our factory.

*1 Installation posture of 100A

| OK | WRONG | |
|---|---|--|
| Horizontal piping with upward posture | Horizontal piping with sideways posture | Vertical piping |
|  |  |  |



Caution

Please confirm that the indications on the product correspond with the specifications of the ordered product model before use.

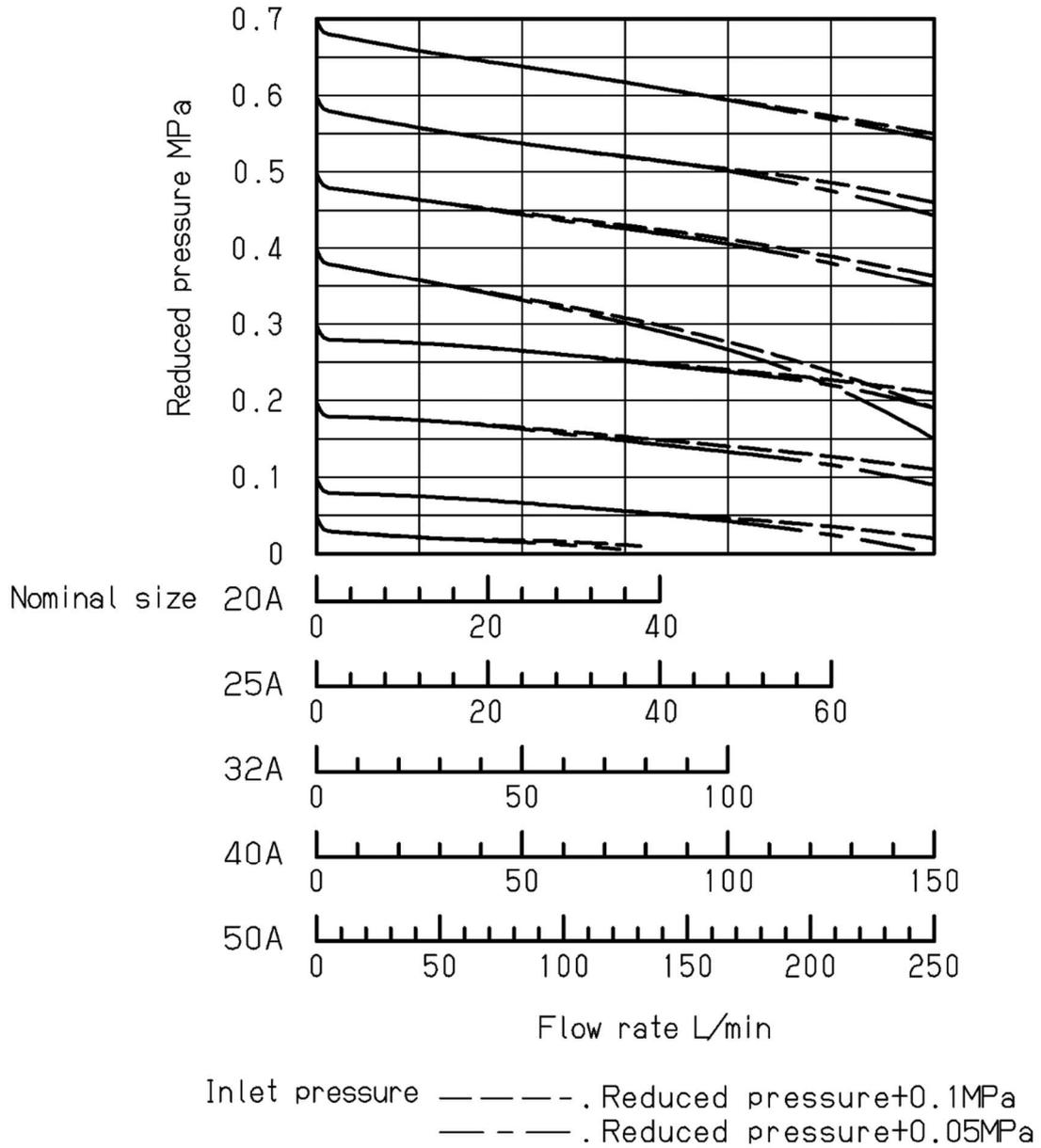
* If they are different, please contact us without using the product.

1.2 Nominal size selection

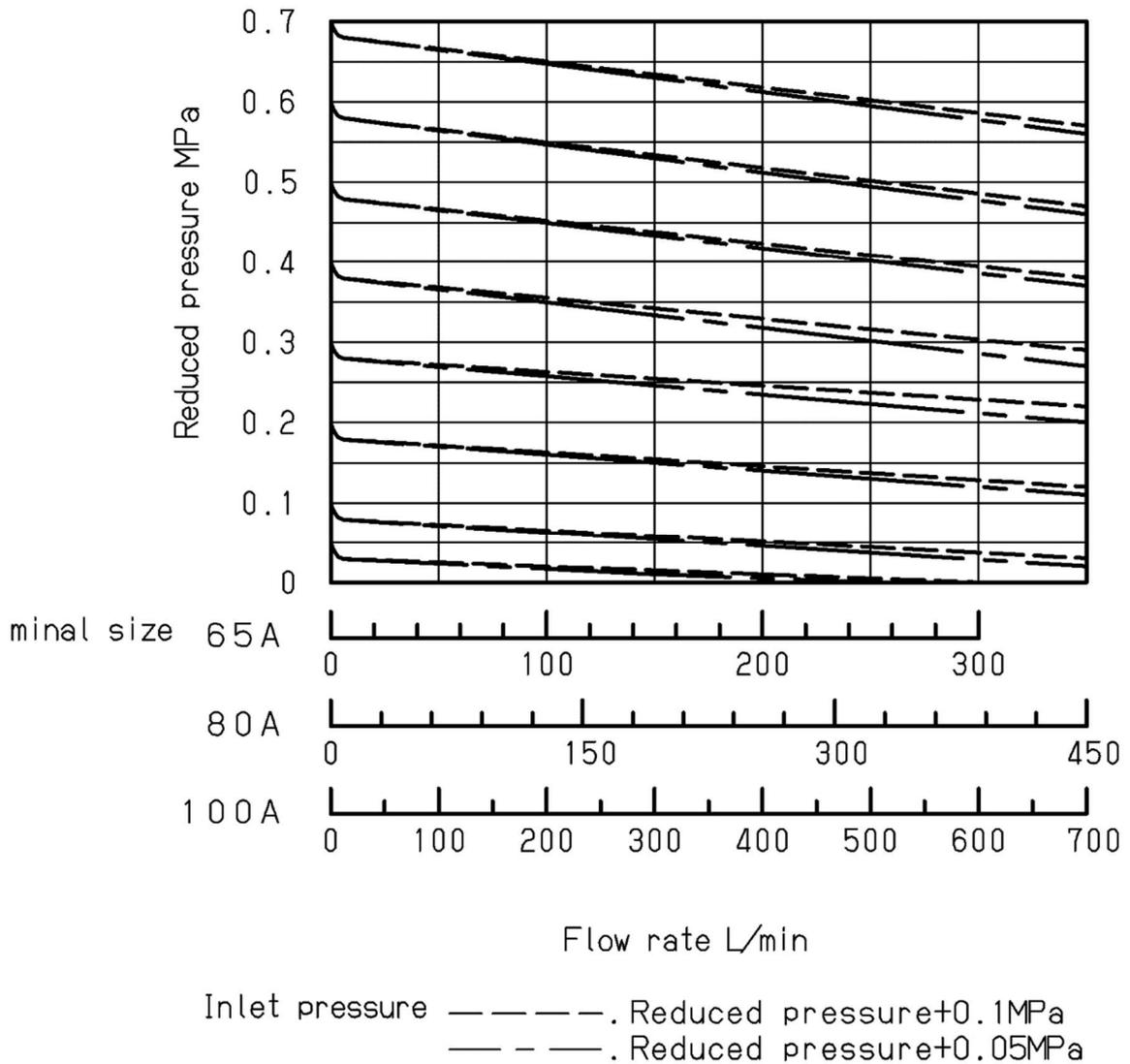
Rated flow table (The pressure difference before and after the product is 0.15 MPa or more)

| Nominal size | 20A | 25A | 32A | 40A | 50A | 65A | 80A | 100A |
|--------------------|-----|-----|-----|-----|-----|-----|-----|------|
| Rated flow (L/min) | 40 | 60 | 100 | 150 | 250 | 300 | 450 | 700 |

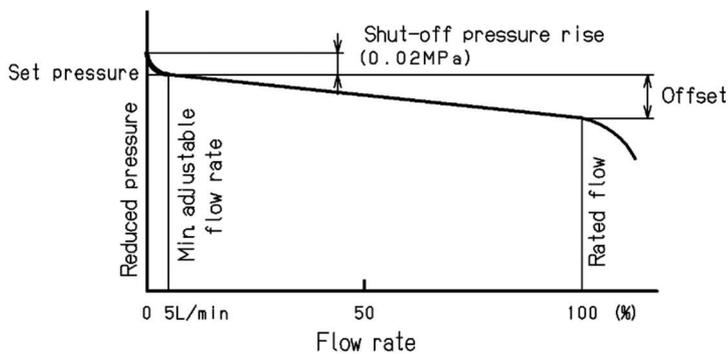
Nominal size selection chart
Nominal size 20A - 50A



Nominal size selection chart
Nominal size 65A -100A



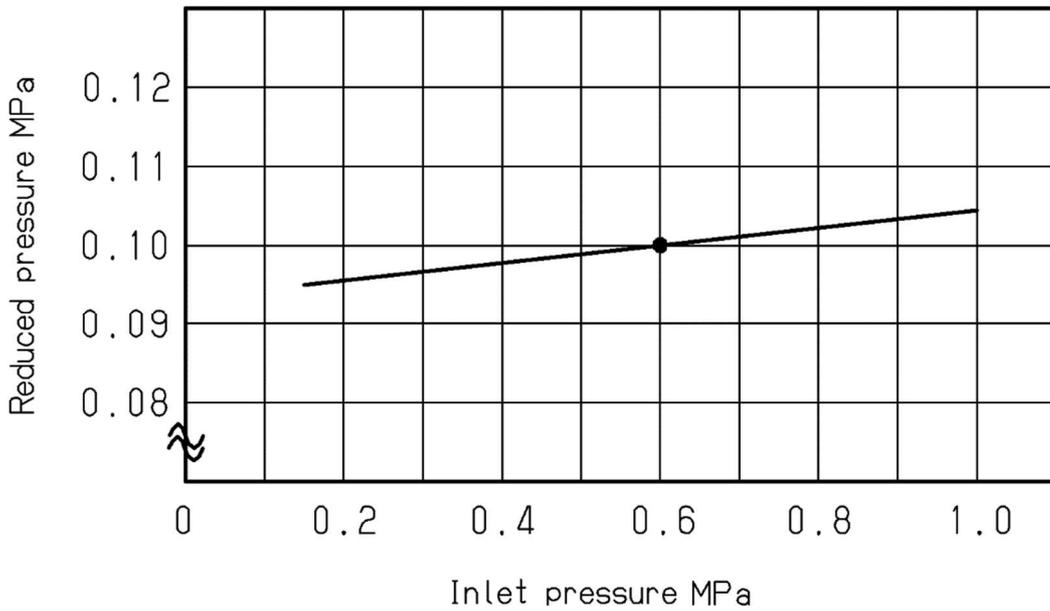
1.3 Flow rate characteristics chart



Offset

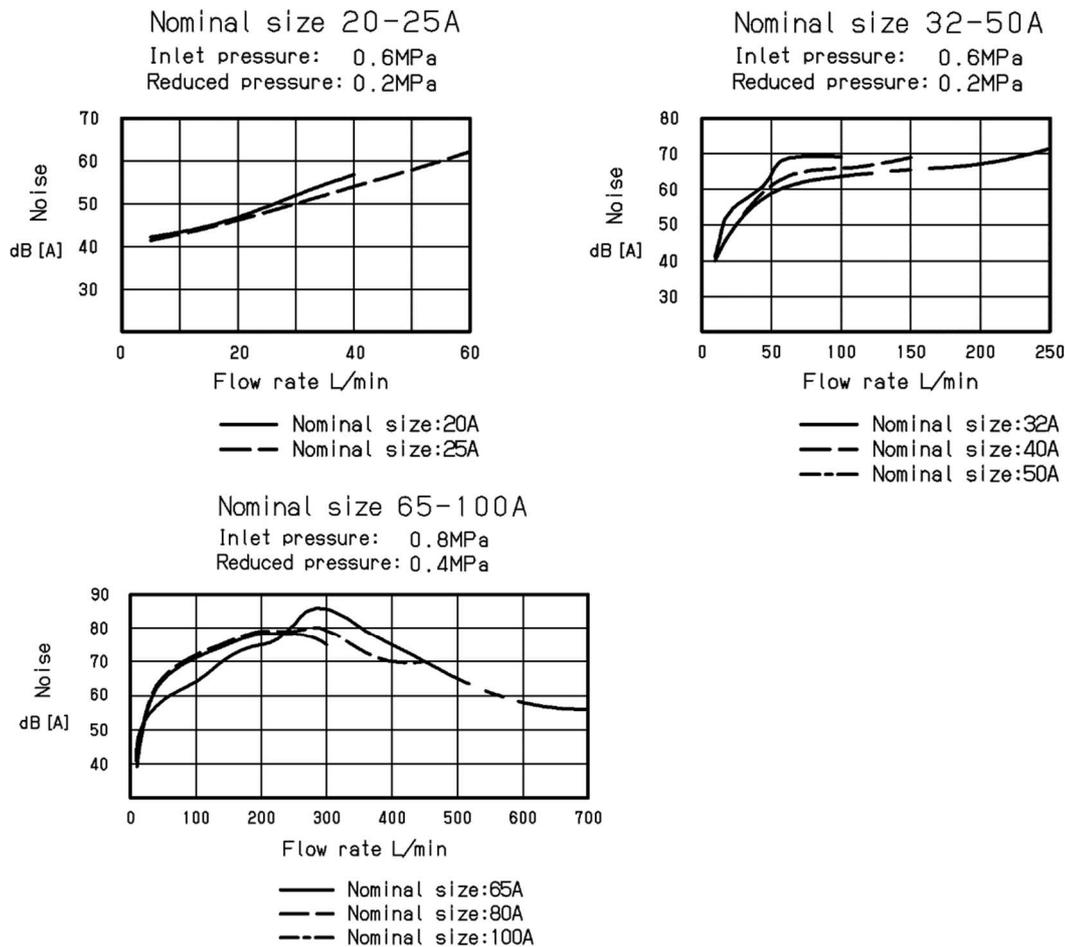
| | Reduced pressure range | Offset |
|---|------------------------|-------------------|
| A | 0.05 - 0.35 MPa | 0.10 MPa or below |
| B | 0.30 - 0.70 MPa | 0.15 MPa or below |

1.4 Pressure characteristics chart

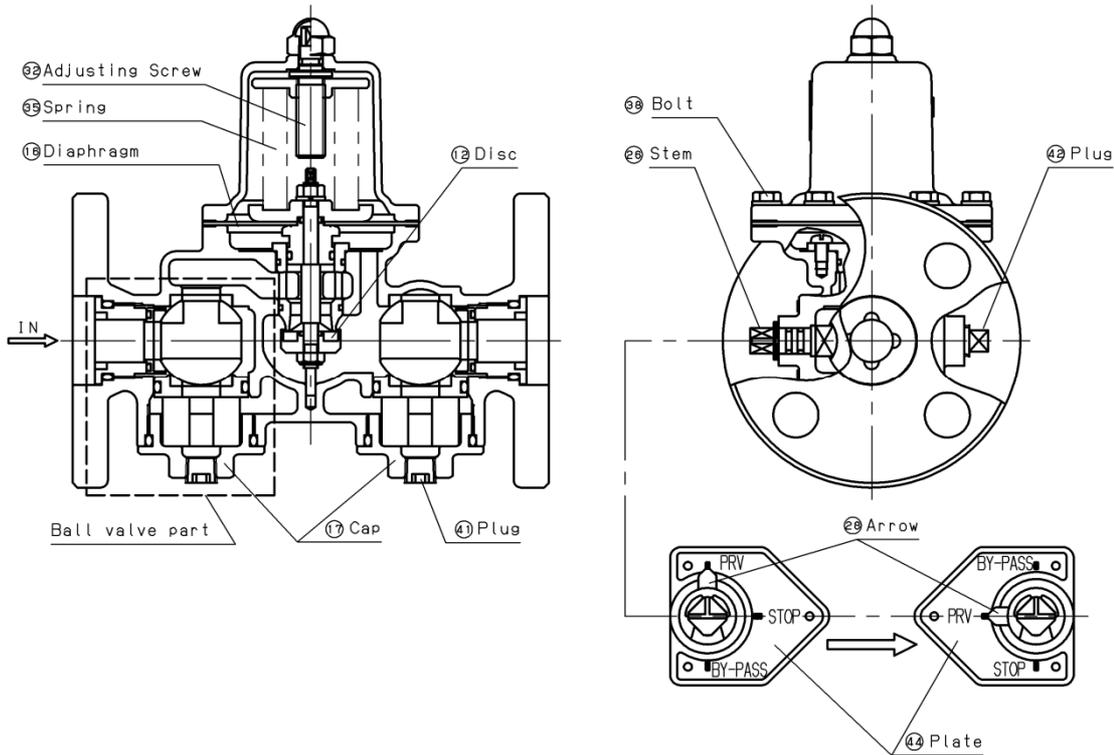


This chart shows variation in the reduced pressure when the inlet pressure of 0.6 MPa is changed between 0.15 MPa and 1.0 MPa after the reduced pressure is set at 0.1 MPa.

1.5 Noise characteristics chart (Fluid: Water)



2. Structure

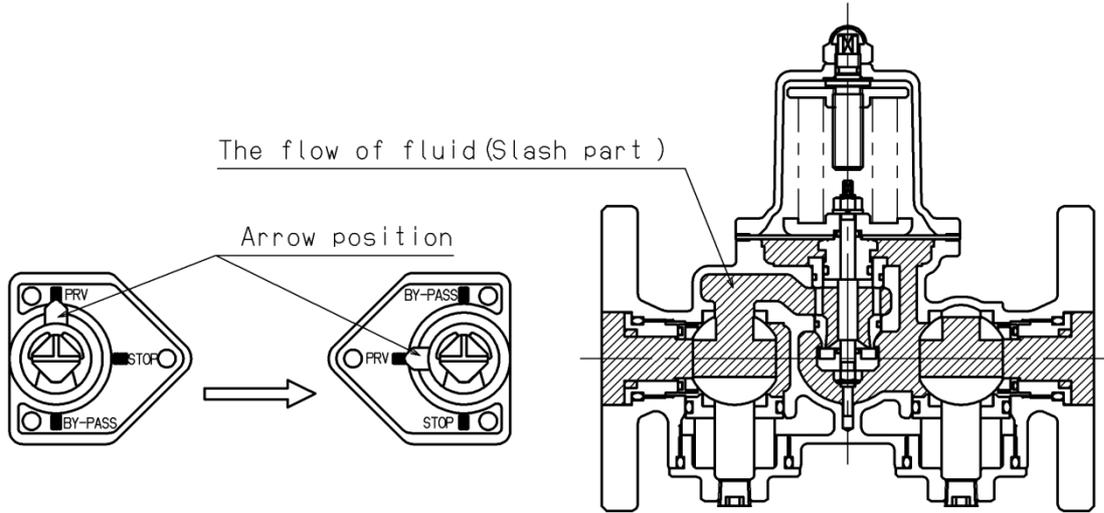


Switching of three functions (pressure reducing function, by-pass function and stop function) is conducted by operating stems (recommended wrench length is 20A-50A: 300mm, 65A-100A:600mm) at inlet side and outlet side and pointing the arrow at a certain point of the plate. See the next page for the arrow position and fluid flow in each function.

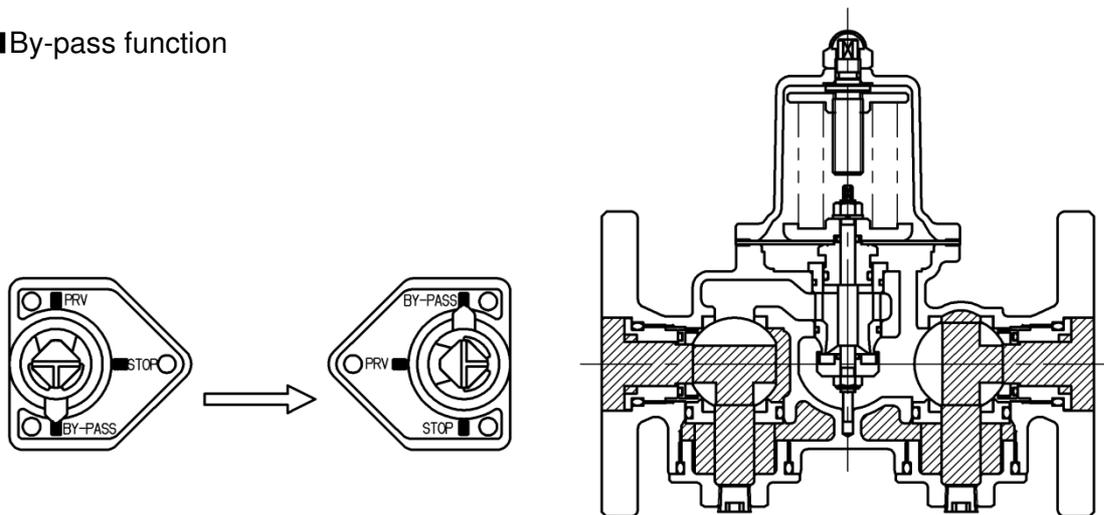
! Caution

1. Do not switch to stop function and by-pass function for purpose other than inspection or blow.
2. The insertion port of plug [42] is for installation of pressure gauge. Do not use this port for the purpose of airtight or pressure capacity test.
* Failure to follow this notice may result in damage to the product.
3. When installing pressure gauge to the insertion port of plug [42], pressure is not applied to pressure gauge at outlet side while in by-pass function due to structure of the product. To check pressure while in by-pass function, see the value shown by pressure gauge at inlet side

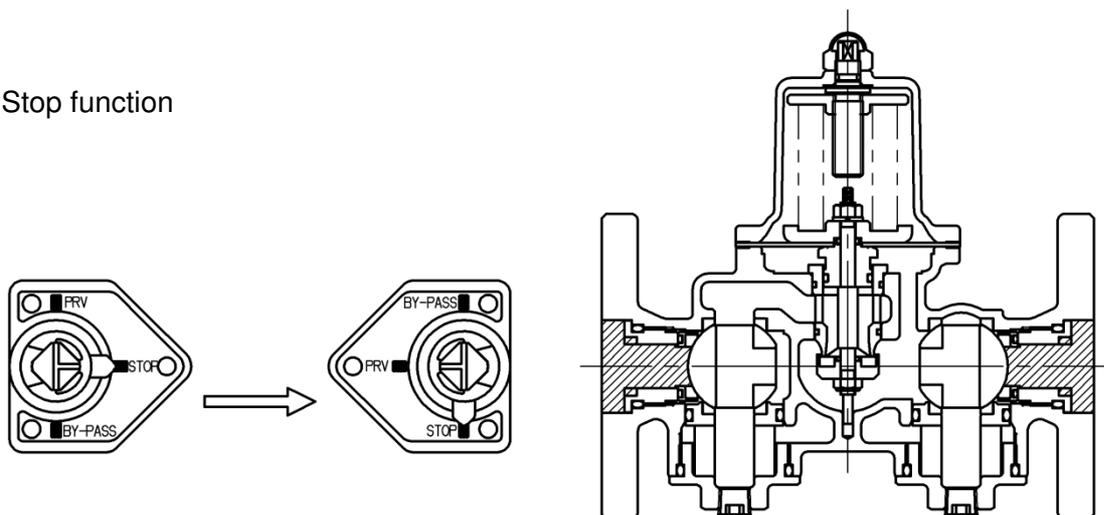
■ Pressure reducing function



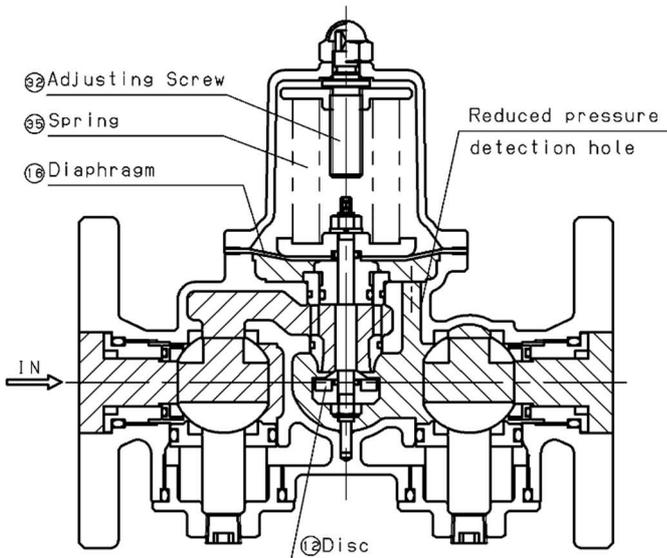
■ By-pass function



■ Stop function



3. Operation



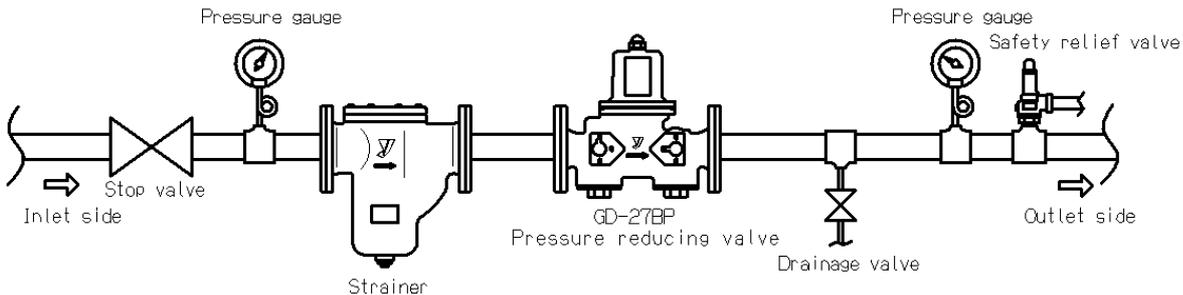
Spring [35] is compressed by adjusting screw [32] and make diaphragm [16] pushed down, and thereby open disc [12] directly connected to it.

Fluid coming in from the inlet side flows out from the upper part of disc [12] to the outlet side, and passes through the reduced pressure detection hole, and is led to the bottom of diaphragm [16].

Load of spring [35] and the reduced pressure act to diaphragm [16], and the upper and lower force keeps a balance and regulates the valve opening. As a result, diaphragm [16] keeps reduced pressure constant.

4. Installation

4.1 Piping example



4.2 Precaution for installation

⚠ Warning

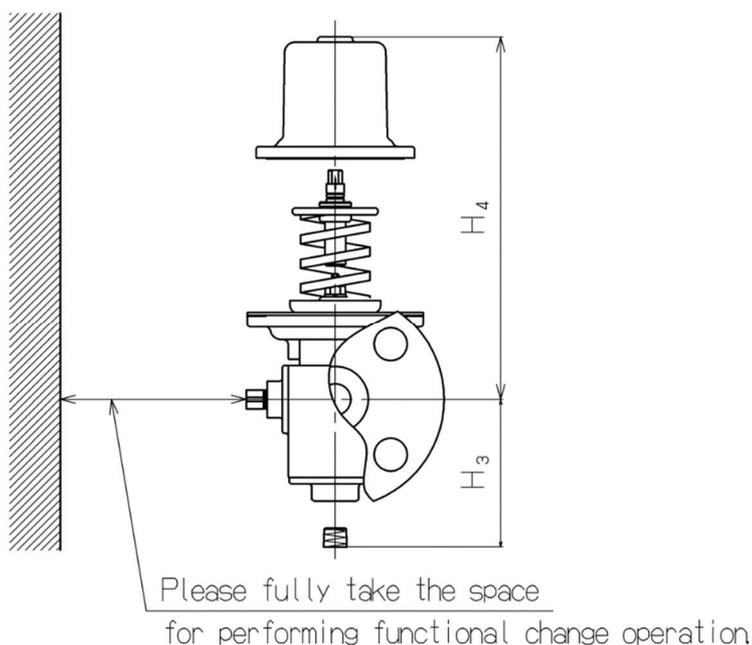
1. Since the product is heavy, securely support it using lifting devices or the like when installing. See the product weight specified in "2. Dimensions and Weights" on Page 5.
* Failure to follow this notice may cause a falling accident of the product, resulting in an injury.
2. Connect a blow-off pipe to the outlet side of safety relief valve, and lead it to a place where there is no risk of physical damage even if fluid blows out.
* Failure to follow this notice may result in injury and scalds in the event that high temperature fluid blows out.

⚠ Caution

1. Do not disassemble the product unless it is necessary.
* Failure to follow this notice may prevent the product from functioning properly.
2. Before installing the product in the piping, be sure to remove foreign substances and scale (seal material ect.) from the piping.
* Failure to follow this notice may prevent the product from achieving its intended performance due to the ingress of foreign substances and scale into the product.
3. Be sure to install a strainer at the inlet side of the product.
* Failure to follow this notice may prevent the product from achieving its intended performance due to the ingress of foreign substances and scale into the product. It is recommended to use a strainer of 40 mesh or more.

4. Install a safety relief valve at the outlet side of the product for protection of equipment at outlet side.
* Failure to follow this notice may result in damage of the equipment.
 5. Be sure to install pressure gauges at the inlet and outlet sides of the product.
* Failure to follow this notice hampers correct pressure adjustment.
 6. If a quick operating valve such as a solenoid valve is installed, place it at a distance of at least 3 meters from the product.
* Failure to follow this notice may result in malfunction or a drastically shortened service life of the product.
 7. For two-stage pressure reduction, keep a distance of at least 3 meters between each product.
* Failure to follow this notice may prevent the product from functioning properly due to malfunction.
 8. Install the product properly by checking the inlet, outlet and in proper posture.
* Installing the product in wrong directions prevents the product from functioning properly.
 9. Install pipes so that excessive load, torque or vibration is not applied to the product.
 10. On water pressure test for inlet side piping of the product, close stop valve at inlet side of the product or switch the product function to stop function before the test. On water pressure test for outlet side piping of the product, switch the product function to stop function before the test.
11. Install stop valve at inlet side of the product since stop valve is necessary for strainer cleaning or pressure control at by-pass function.
 12. The product can be installed either horizontally or vertically (For 100A, horizontal installation only).
 13. When using a product with a pressure gauge outdoors, provide a canopy or other protection to prevent rainwater from directly hitting the pressure gauge.
 14. Secure enough space for function switching operation. For disassembly and inspection, space more than the space indicated by H₃ and H₄ below is needed.

| Nominal size | (mm) | | | | | | | |
|----------------|------|-----|-----|-----|-----|-----|-----|------|
| | 20A | 25A | 32A | 40A | 50A | 65A | 80A | 100A |
| H ₃ | 160 | 160 | 170 | 170 | 190 | 200 | 210 | 230 |
| H ₄ | 260 | 260 | 320 | 320 | 330 | 440 | 460 | 550 |



5. Operation procedure

5.1 Precaution for operation



Warning

- (1)When the product is used for hot fluid, do not touch the product with bare hands.
* The product having hot fluid may scald your skin.
- (2)Before leading fluid, make sure that there is no danger even if fluid leads to the piping end.



Caution

1. Before leading fluid into the product, switch the product function to by-pass function and remove foreign substances and scale from the piping completely.
* Failure to follow this notice may prevent the product from functioning properly due to the ingress of foreign substances and scale into the product.
2. To adjust the set pressure, turn the adjusting screw slowly.
* Failure to follow this notice may result in damage to the product and other equipment due to hunting or other cause.
3. If there is a possibility of freezing or the product is not used for an extended period, completely discharge fluid from the product and pipes, and close the stop valve. If water remains in by-pass line, remove the plug and discharge water.
* Failure to follow this notice may cause malfunction of the product due to rusting inside the product and the pipes or damaged by freezing.
4. The setting pressure may change depending on the temperature around the product (external temperature) and fluid temperature. Do not do piping that directly hits sunlight.

5.2 Adjusting procedure

(See “2. Structure” and “7. Exploded view” .)

Following a wrong adjusting procedure may cause hunting, scale problems or other problem, and can heavily damage the main parts of the valve. To avoid these problems, be sure to follow the procedure given below:

1. Close stop valve at inlet side of the product.
 2. Turn stem to switch the product function to by-pass function.
 3. Open stop valve at inlet side of the product and blow out fluid enough.
- When reduced pressure exceed set pressure it is dangerous since safety relief valve at outlet side of the product blows out. Regulate opening of stop valve at inlet side so that reduced pressure do not exceed set pressure.
4. Close stop valve at inlet side of the product.
 5. Turn stem and switch the product function to pressure reducing function.
 6. Slowly open stop valve at inlet side of the product fully.
 7. Remove domed cap nut [40], and turn adjusting screw [32] while watching the pressure gauge at the outlet side.
 - Turn the adjusting screw to the right (clockwise) to increase reduced pressure.
 - Turn the adjusting screw to the left (counterclockwise) to decrease reduced pressure.
 8. After the adjustment is complete, tighten domed cap nut [40].

6. Maintenance

6.1 Troubleshooting

(See “2. Structure” and “7. Exploded view”.)

| Trouble | Cause | Remedy |
|--|---|---|
| Reduced pressure rises and exceeds set pressure. | <ol style="list-style-type: none"> 1. There are foreign substances stuck between disc [12] and valve seat [3], or scratches on them. 2. O-ring [8] is damaged. 3. Diaphragm [16] is damaged. 4. Packing at ball valve part is worn or damaged. 5. By-pass function is set. | <ol style="list-style-type: none"> 1. Disassemble the product and remove the foreign substances. If scratch is observed on disc [12] or valve seat [3], replace it. 2. Replace O-ring [8]. 3. Replace diaphragm [16]. 4. Please contact us. 5. Switch the functions. |
| Pressure does not reach the desired value. | <ol style="list-style-type: none"> 1. Working pressure is improper. 2. Nominal size of the product is too small for the flow rate for use. 3. Pressure adjustment is improper. 4. Strainer at inlet side of the product is clogged. 5. Domed cap nut [40] is loosened. 6. Stop function is set. | <ol style="list-style-type: none"> 1. Change to appropriate value. (See “1.1 Specifications” on Page 1.) 2. Replace the product with the proper nominal size. (See “1.2 Nominal size selection” on Page 2.) 3. Readjust the pressure in accordance with the given procedure. (See “6.2 Adjusting procedure” on Page 10.) 4. Clean the strainer. 5. Tighten domed cap nut [40]. 6. Switch the functions. |
| Outside leakage | <ol style="list-style-type: none"> 1. Bolt [38] is loosened. 2. Plug [41] is loosened. 3. Plug [42] is loosened. | <ol style="list-style-type: none"> 1. Tighten bolt [38]. 2. Replace plug [41]. 3. Tighten plug [42]. |
| Abnormal sound | <ol style="list-style-type: none"> 1. Nominal size of the product is too large for the specifications. 2. Pressure reduction ratio is too large. 3. Air binding has occurred. 4. Quick operating valve is located near the product. | <ol style="list-style-type: none"> 1. Replace the product with the proper nominal size. (See “1.2 Nominal size selection” on Page 2.) 2. Reduce pressure in two stages. (See “1.1 Specifications” on Page 1.) 3. Install an air vent device. 4. Keep a distance between them as large as possible (3 m at least). |

- Most of problems with the pressure reducing valve are caused by foreign substances and scale in the piping. Avoid the ingress of dust and dirt to the product with caution.
- A phenomenon similar to valve failure could occur due to the failure of the pressure gauge, clogging of the strainer, and other causes. Check the above possible causes and take a proper remedy and preventive measures.

6.2 Precaution for maintenance and inspection

(See “2. Structure” and “7. Exploded view”.)

Warning

1. Completely discharge the pressure inside of the product, piping and equipment before disassembly and inspection. Disassembly and inspection must be done by experienced professional or valve manufacturer.
* Failure to follow this notice may result in scalds, injury or contamination on the surroundings due to the residual pressure.
2. When disassembling the product at by-pass function or stop function is necessary, make sure not to switch functions during disassembly.
* Failure to follow this notice may result in injury or contamination on the surroundings due to fluid blowout.
3. If fluid is hot, do not touch the product directly with bare hands.
* Failure to follow this notice may result in scalds.

Caution

1. If problem occurs for a cause other than listed in "7.1 Troubleshooting" on Page 10, please contact us.
2. When the product is disassembled, internal fluid flows out. Receive it in a container.
* Failure to follow this notice may result in making the surroundings dirty.
3. Synthetic rubber is a consumable part. The replacement interval of the synthetic rubber part greatly varies depending on the use conditions. The general guide for the replacement interval is shown below.

| Recommended replacement year | Part name |
|------------------------------|---------------------------------------|
| 3 years | Diaphragm [16], O-ring [8], Disc [12] |
| 5 years | O-rings (except for [8]) |

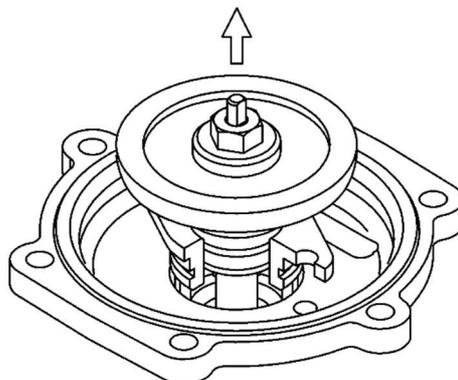
4. Ball valve part cannot be disassembled.

6.3 Disassembly

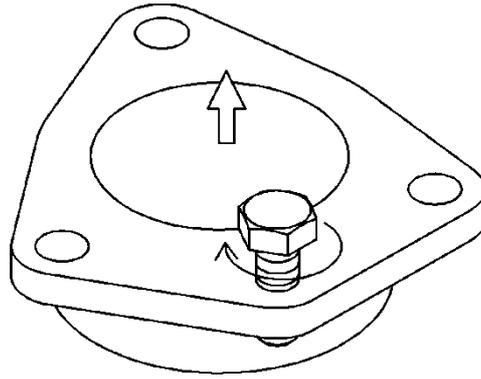
(See “7. Exploded view”.)

1. Remove domed cap nut [40] and turn adjusting screw [32] counterclockwise, and set spring [35] free (no load).
2. Remove bolts [38] of spring chamber [2] and remove spring chamber [2]. Then take out spring [35] and spring plate [31].
3. Remove nut [36], and then diaphragm shell [30] and diaphragm [16].
4. Remove set screw [15] (bolts [15] in the case of nominal size 65A to 100A) of valve seat [3], and remove a set of the valve seat (valve seat [3], spindle [6], disc [12], and retainer [7], etc).

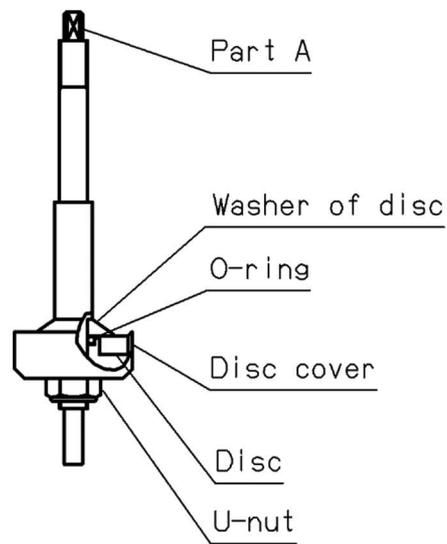
Nominal size 20A to 50A: Attach diaphragm shell [30] to spindle [6], and pull them up together.



Nominal size 65A to 100A: Screw bolt [15] into valve seat [3], and pull them up together.



5. Secure the part A of the spindle [6] (two faces), loosen the U-nut [14] with a tool, and remove disc [12], and O-ring [11].



6.4 Precaution for reassembly

(See “7. Exploded view”.)

Caution

1. Check to see that there is no foreign substances inside the body and on each part.
*Foreign substances prevent the product from functioning properly. To avoid the problem, remove foreign substances.
2. Check that there is no scratch on disc or O-ring.
*A scratch on the relevant part prevents the product from functioning properly. Replace the damaged part.
3. Apply silicone grease to the O-ring.
*Failure to follow this notice may damage O-ring.

Assemble the parts in reverse order of disassembly.
Tighten U-nut [14] and nut [36] by torque as below.

(N·m)

| U-nut [14] | |
|--------------|-------------------|
| Nominal size | Tightening torque |
| 20-25A | 8 |
| 32-40A | 12 |
| 50A | 13 |
| 65-80A | 18 |
| 100A | 23 |

(N·m)

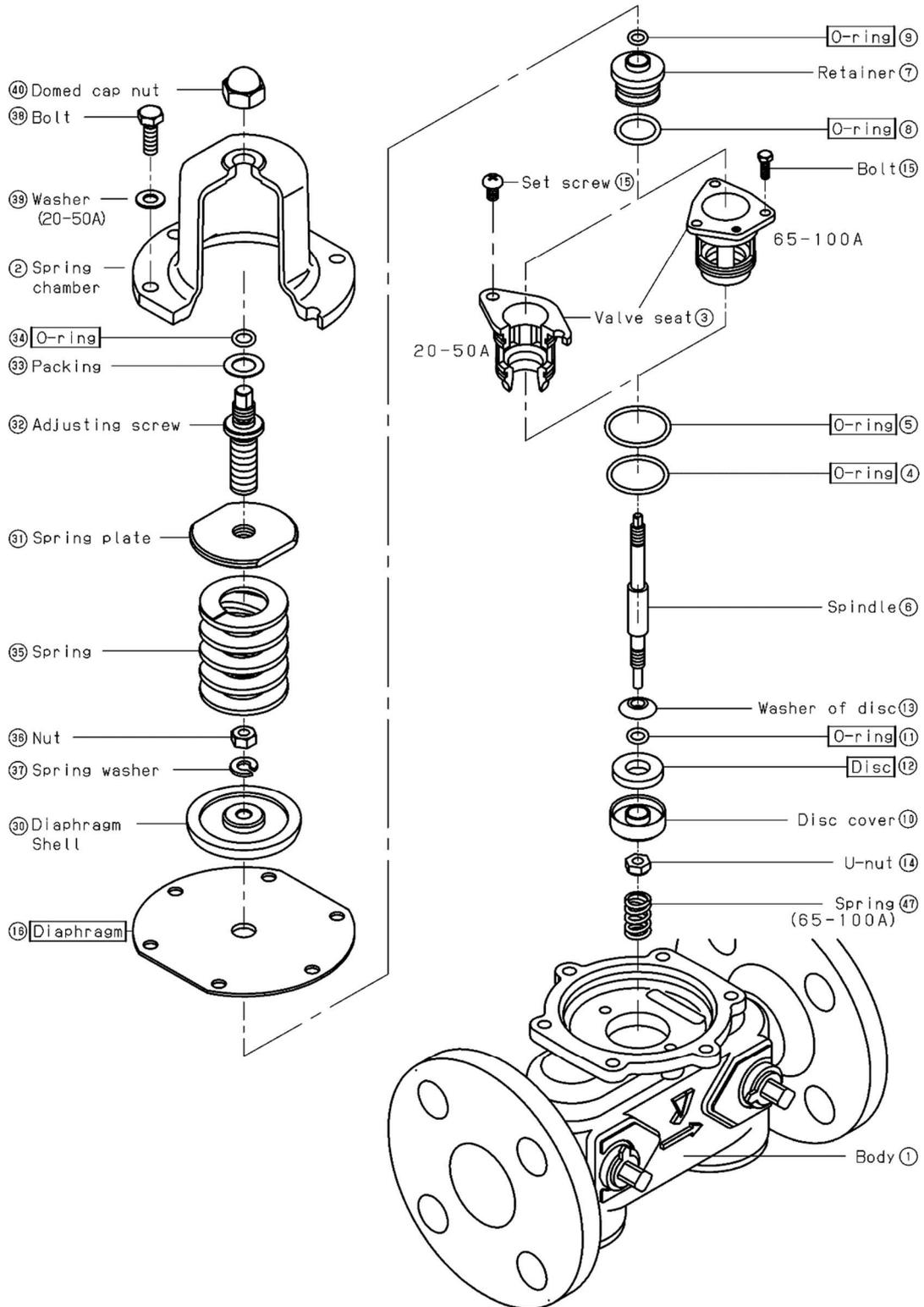
| Nut [36] | |
|--------------|-------------------|
| Nominal size | Tightening torque |
| 20-25A | 8 |
| 32-50A | 12 |
| 65-80A | 18 |
| 100A | 23 |

Tighten bolts [38] of spring chamber [2] evenly in the diagonal order.

6.5 Tool for regulation and maintenance

| Part No. | Parts | Size of tool | Tool name |
|----------|--------------------|---|--------------------------|
| 6 | Spindle | 20-25A:3 mm 32-50A:4 mm 65-80A:6 mm 100A: 7 mm | Spanner or monkey wrench |
| 14 | U-nut | 20-25A:10 mm 32-40A:13 mm 50-80A: 17 mm 100A: 19 mm | |
| 26 | Stem | 20-25A: 9 mm 32-40A: 12 mm 50A: 14 mm 65-80A: 17 mm 100A: 19 mm | |
| 32 | Adjusting screw | 20-50A: 7 mm 65-100A: 11 mm | |
| 36 | Nut | 20-25A: 10 mm 32-50A: 13 mm 65-80A: 17 mm 100A: 19 mm | |
| 38 | Bolt | 20-25A: 10 mm 32-50A: 13 mm 65-100A: 17 mm | |
| 40 | Domed cap nut | 20-25A: 17 mm 32-50A: 19 mm 65-100A: 24 mm | |
| 42 | Plug | 20-100A: 9 mm | |
| 15 | Set screw (15-50A) | | Cross-head screwdriver |
| 15 | Bolt (65-100A) | 65-100A: 13 mm | Socket wrench |
| 41 | Plug | 20-100A: 6 mm | Hex key |

7. Exploded view



Note) Parts shown in the rectangle boxes are available as consumable supply and parts kit
Parts included are below.

| Parts kit name | Parts included |
|----------------|---------------------------------------|
| Diaphragm | Diaphragm [16] |
| Disc | Disc [12] |
| O-ring set | O-ring([4],[5],[8],[9],[11] and [34]) |

- Ball valve part cannot be disassembled.

Warranty Information

1. Limited warranty

This product has been manufactured using highly-advanced techniques and subjected to strict quality control. Please be sure to use the product in accordance with instructions on the manual and the label attached to it.

Yoshitake warrants the product to be free from any defects in material and workmanship under normal usage for a period of one year from the date of receipt by the original user, but no longer than 24 months from the date of shipment from Yoshitake's factory.

2. Parts supply after product discontinuation

This product may be subject to discontinuation or change for improvement without any prior notice. After the discontinuation of the product, Yoshitake supplies the repair parts for 5 years otherwise individually agreed.

3. This warranty does not cover the damage due to any of below:

- (1) Valve seat leakage or malfunction caused by foreign substances inside piping.
- (2) Improper handling or misuse.
- (3) Improper supply conditions such as abnormal water pressure/quality.
- (4) Water scale or freezing.
- (5) Trouble with power/air supply.
- (6) Any alteration made by other than Yoshitake.
- (7) Use under severe conditions deviating from the design specifications (e.g. in case of corrosion due to outdoor use).
- (8) Fire, flood, earthquake, thunder and other natural disasters.
- (9) Consumable parts such as O-ring, gasket, diaphragm and etc.

Yoshitake is not liable for any damage or loss caused by malfunction or defect of the product.