


Model GD-41, 41G, 43, 43G Series PRESSURE REDUCING VALVE


INSTRUCTION MANUAL

Thank you very much for purchasing our pressure reducing valve.
Please read this instruction manual thoroughly before using the pressure reducing valve, so that you may do so correctly and safely. Please carefully store this manual in a handy place. The following safety symbols are used in this manual.

 **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.

Specifications

 **Caution** Please confirm that the indications on the product label coincide with the specifications of the ordered product model before usage.
※ In case they do not coincide, do not use the product and contact us.

Model	GD-41	GD-43-10	GD-43-20	GD-41G	GD-43G-10	GD-43G-20
Connection	JIS Rc screwed	JIS10K FF Flanged	JIS20K RF Flanged	JIS Rc screwed	JIS10K FF Flanged	JIS20K RF Flanged
Nominal size	15A, 20A, 25A					
Application	Cold/hot water,			Air, Carbon dioxide gas, Nitrogen gas		
	Cleaning/sterilizing steam (Max. temperature 130°C, for continuous flow within 30 minutes)					
Inlet pressure	0.07-2.0 MPa (For cleaning/sterilizing steam: 0.2 MPa max.)					
Reduced pressure	Spring A (yellow) :0.02-0.1 MPa Spring B (red) :0.1-0.25 MPa Spring C (black) :0.25-0.5 MPa					
Min. differential pressure	0.05 MPa					
Max. pressure reduction ratio	10:1			20:1		
Operating temperature	5-90°C (Max. temperature 130°C for cleaning/sterilizing steam. Minimum interval between steam blows must be 4 hours.)					
Cv value	15A:0.4 20A:0.6 25A:0.8					
Pressure characteristic	Set pressure \pm 0.05 MPa					
Standard factory set pressure	Spring A		Spring B		Spring C	
	0.05 MPa		0.1 MPa		0.3 MPa	

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Installation

Warning

When installing a safety valve at the outlet side of the pressure reducing valve, connect a blow-off pipe to the outlet of the safety valve to lead the possible discharged fluid to a safety location.

Caution

- (1) Do not disassemble the pressure reducing valve unless it is necessary.
 - ※ Incorrectly disassembled, the pressure reducing valve cannot function as it should.
- (2) Before connecting the pressure reducing valve to the piping, remove foreign substances from the piping.
 - ※ If foreign substances are introduced into the pressure reducing valve, it cannot operate at the designed performance and may be damaged.
- (3) Attach a strainer (equivalent to 60 mesh) to the inlet of the pressure reducing valve.
 - ※ If foreign substances are introduced into the pressure reducing valve, it cannot operate at the designed performance and may be damaged. (Refer to Piping example.)
- (4) Installing a safety valve at the outlet side of the pressure reducing valve to protect the equipment.
 - ※ Without a safety valve, abnormal condition of the pressure reducing valve cannot be recognized and may damage the equipment.
- (5) Be sure to attach a pressure gauge to the inlet and the outlet of the pressure reducing valve.
 - ※ Without a pressure gauge, the pressure cannot be regulated correctly.
- (6) When installing a quick opening/closing device for example a solenoid valve, the distance between the pressure reducing valve must be at least 3 m.
 - ※ A shorter distance may cause malfunctioning and significantly shorten the life of the pressure reducing valve.
- (7) When two stage pressure reduction is employed, the distance between the two pressure reducing valves must be 3 m or more.
 - ※ A shorter distance may cause malfunctioning and the designed performance cannot be obtained.
- (8) Before installing, verify the location of the inlet and the outlet. The arrow on the pressure reducing valve shows the direction of fluid. Observe that the arrow coincides with direction of fluid.
 - ※ When installed in opposite direction, the pressure reducing valve cannot function as it should.
- (9) Piping to the pressure reducing valve must be so connected that excessive load, deflection and vibrations will not be applied to the valve.
 - ※ Incorrectly connected piping may cause malfunctioning and significantly shorten the life of the pressure reducing valve.
- (10) Secure the necessary maintenance space at the installation site of the pressure reducing valve.
 - ※ Refer to Fig.1 for dimensions of the maintenance space. If the space is smaller than these values, the valve cannot be disassembled for maintenance.
- (11) The set pressure of the safety valve must be higher than that of the pressure reducing valve.
 - ※ If re-seating pressure of the safety valve is lower than the pressure regulated by the pressure reducing valve, the safety valve will continue to blow.
- (12) Do not freeze the pressure reducing valve.
 - ※ Freezing may damage the pressure reducing valve.
- (13) Do not allow pipe adhesive materials to leak into the pressure reducing valve.
 - ※ If adhesive material is accumulated in the pressure reducing valve, it causes malfunctioning.

●Maintenance space for disassembling the pressure reducing valve

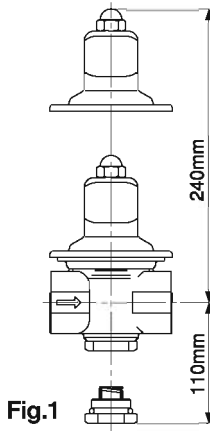


Fig.1

Operation

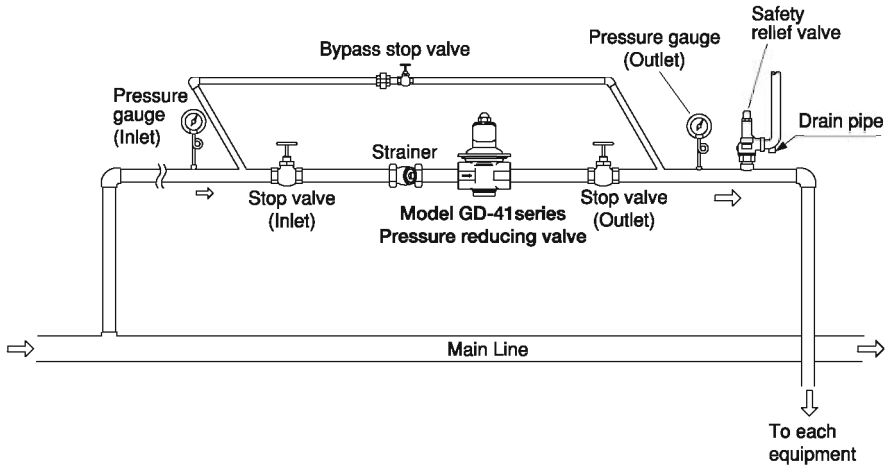
⚠ Warning

- (1) Never touch the pressure reducing valve with bare hands while any after hot fluid flows.
※Doing so may result in burns.
- (2) Before flowing hot fluid, make sure that the fluid will not cause any risk through the end of the piping system and that the pipes are positively connected.
※Blowout of hot fluid will cause burns.

⚠ Caution

- (1) When using the pressure reducing valve for a steam line, the maximum temperature limit must be 130°C and the maximum inlet pressure limit must be 0.2 MPa.
※Operation outside these limits will cause damage to the pressure reducing valve and make troubles.
- (2) Before flowing fluid, close the stop valves at upstream and downstream of the pressure reducing valve and completely remove any foreign substances by using the bypass pipe.
※Foreign substances in the pressure reducing valve degrades the valve performance.
- (3) When delivering steam, carbon dioxide gas or nitrogen gas after cold/hot water, open each stop valve gradually to avoid water hammer.
※If stop valves are opened quickly, hunting, water hammer will generate which will damage the pressure reducing valve and the equipment.
- (4) When opening the bypass stop valve, ensure that the secondary pressure will not exceed the set pressure of the safety valve.
※If the secondary pressure exceeds the safety valve set pressure, the safety valve operates and blows out fluid.
- (5) When discontinuing the operation for a long period, completely purge fluid from the pressure reducing valve and the piping system and close the stop valves located upstream and downstream of the pressure reducing valve.
※Scale developed in the piping may cause erratic operation of the pressure reducing valve.
- (6) Damage to the diaphragms of Model GD-41G and GD-43G causes the fluid blowout because the spring covers used for these models have holes.
※The fluid blowout may cause injury or burns, or contaminate surroundings.

Piping example



Adjustment

Wrong or poor adjustment may cause hunting, scale buildup or water hammer, or severely damage relevant parts. Be sure to follow these steps to complete proper adjustment.

- (1) Close the stop valves placed upstream and downstream of the pressure reducing valve and open the bypass stop valve to allow the fluid pass through the piping to fully discharge foreign substances. Be aware of the reduced pressure and adjust the opening of bypass stop valve as necessary so that the safety valve will not be activated. After expelling foreign substances from the piping, be sure to close the bypass stop valve.
- (2) Gradually open the inlet stop valve.
- (3) Remove the domed cap nut. Observing the outlet pressure gauge, gradually adjust the adjusting screw (dihedral section) to the desired pressure. While adjusting, be aware of the reduced pressure to keep the safety valve inactive. (To increase the pressure, turn the screw clockwise; to reduce the pressure, turn it counterclockwise, when viewed from the top of the product.)
- (4) Finely adjust the reduced pressure by gradually opening the outlet stop valve. After adjustment, fit the domed cap nut to the dihedral section.

Maintenance

Be aware of foreign substances in the piping since many of faults in the pressure reducing valve are due to the existence of foreign substances.

Our warranty does not cover damages due to pinched foreign substances resulting from usage by the customer.

Faulty pressure gauge, clogged strainer and leaking of bypass stop valve develop symptoms that look like those from faulty pressure reducing valve. Clogged strainer will decrease the reduced pressure and leaking bypass pipe will increase the reduced pressure. Before troubleshooting the pressure reducing valve, check these symptoms of the strainer and stop valve.

Warning

- (1) When disassembling or inspection, completely release the pressure from the pressure reducing valve, piping and equipment and cool the pressure reducing valve. Never touch the pressure reducing valve with bare hands before it completely cools down.
 - ※Residual pressure may cause injury or burns or contaminate surroundings.
- (2) Before disassembling, check to see if drain residues have been eliminated.
 - ※Residual drain may cause injury or burns or contaminate surroundings during disassembling.

Caution

- (1) To maintain the functions and performance of the pressure reducing valve, perform periodic inspection.
 - ※User should refer such tasks to specialist or maintenance agency.
- (2) Only properly trained individuals or service representatives should disassemble and inspect the equipment.
 - ※If problem is found, consult the vendor.
- (3) During disassembling, internal fluid flows out. Discharge it into a suitable container. Disassemble the pressure reducing valve after all fluid has been discharged.
 - ※Fluid spills will contaminate surroundings without a container.
- (4) Before flowing fluid, close the stop valve at upstream and downstream of the pressure reducing valve and completely remove the foreign substances by using the bypass pipe.
 - ※Foreign substances in the pressure reducing valve degrades the valve performance.

※GD-41, GD-41G, GD-43 and GD-43G use the same internal components. Maintenance, check, disassembling and assembling procedures are common to all these models.

● Periodic replacement of consumable parts

Longevity of consumable parts depends on frequency and condition of use. Rough standard of life estimation is given below. (Part number shown in the table below refers to the number in Fig. 2 Exploded drawing of Model GD-41.)

Component	Part number	Replacement interval
Diaphragm set	7	3 years
Disc	4	3 years
O Ring	18, 19, 20	3 years

Troubleshooting

Troubleshooting (Refer to Fig. 2) ※Common to GD-41, 41G, 43 and 43G

Trouble	Possible Cause	Measures and treatment
I. Reduced pressure is higher than set pressure	1. Damaged diaphragm ⑦	1. Replace the diaphragm set
	2. Foreign substances pinched between disc ④ and valve seat. Dents or scratches are seen on the disc or valve seat.	If foreign substances are pinched between disc ④ and valve seat, clean the assembly. If the disc ④ is damaged, replace it with a new one. If the valve seat is damaged, replace the body ① with a new one.
	3. Poor seal of spindle O ring ⑳.	3. Replace the spindle O ring ⑳ with a new one.
II. Reduced pressure is lower than the desired pressure. Fluid fails to flow.	4. Spindle O ring ⑳ is locked.	4. Replace the spindle O ring ⑳ with a new one.
	5. Disc ④ and valve seat is locked.	5. Clean disc ④ and valve seat . If the disc ④ is damaged, replace it with a new one. If the valve seat section is damaged, replace the body ① with a new one.
III. External leakage	6. Loosened set screws ⑮.	6. Tighten set screws ⑮.
	7. Loosened cap ③.	7. Tighten cap ③.
	8. Broken O ring ⑱ for cap.	8. Replace O ring ⑱ for cap with a new one.

Exploded drawing

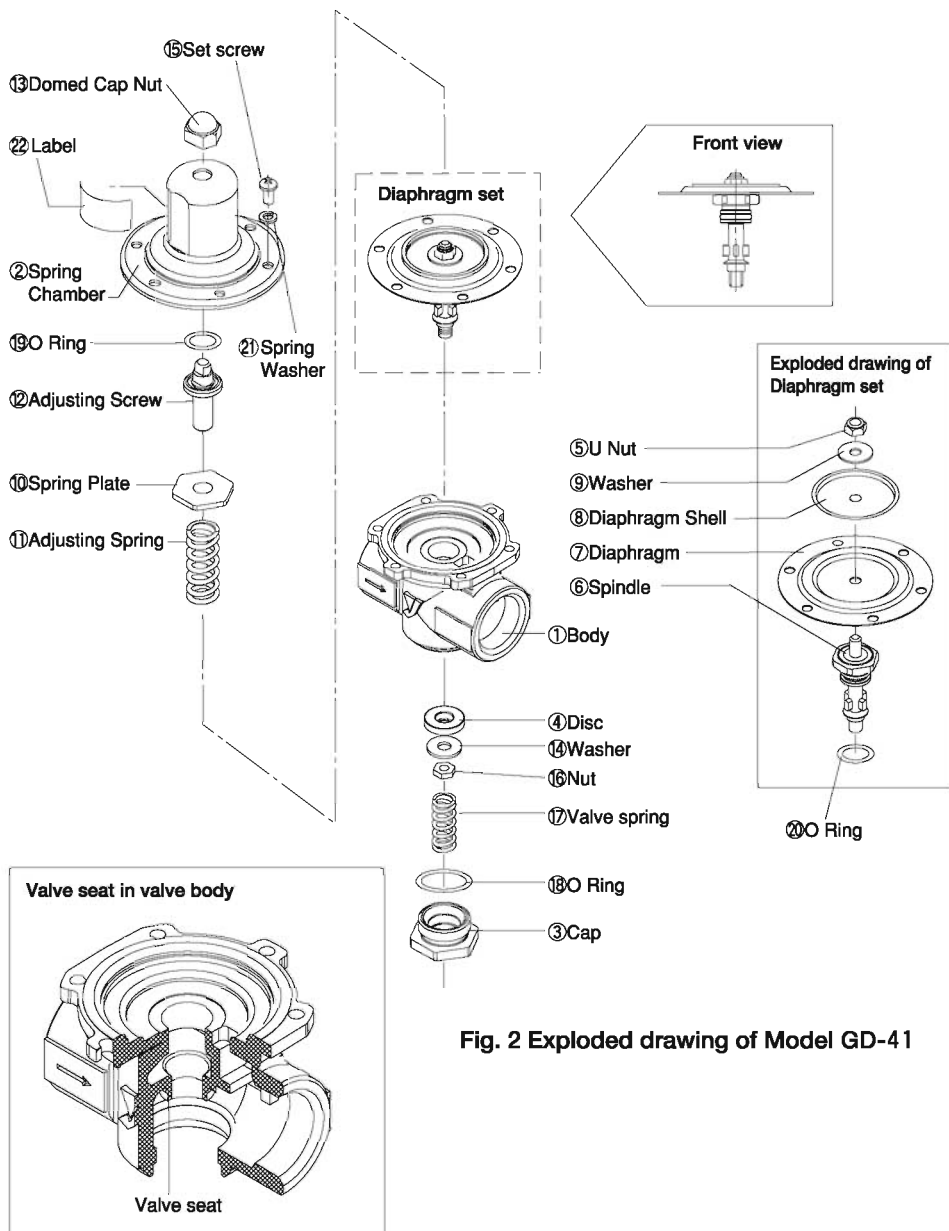


Fig. 2 Exploded drawing of Model GD-41

Measures and treatment for trouble

Trouble I. Reduced pressure exceeds the set pressure

I.i Diaphragm is damaged

1) Remove Domed cap nut.



2) Turn dihedral adjusting screw counterclockwise to completely remove the spring load.



3) Remove 6 set screws.



4) Remove spring chamber, adjusting spring and adjusting screw.



5) Verify that the diaphragm is damaged.

6) Remove cap. (Nominal designation of socket is 32.)



7) Remove valve spring.



8) Applying, respectively but simultaneously, a socket wrench of nominal designation 10 to the U nut on the top of diaphragm and the nut inside the body, remove the nut inside the body. Remove washer and then disc. (If the U nut on the diaphragm becomes loose, remove the U nut first and then go to the step 9'-1.)



9) Remove disc, washer and nut. Go to step 10).



9'-1) Remove washer, diaphragm shell and diaphragm in that order.



10) Remove the diaphragm set.



9'-2) Apply a suitable tool to the hexagon portion of the spindle and remove the nut from the disc.



Read "Reassembling" described below before going to Step 11).

9'-3) Removed spindle, disc, washer and nut.



Read "Reassembling" described below before going to Step 11).

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Reassembling

Caution

- (1) Verify that the disc and valve seat are free from damage, dent and dirt.
※ Any damage, dent or dirt on the seat surface will cause increased reduced pressure. If dirty, clean the part; if damaged, replace it.
- (2) Check to see that the spindle smoothly moves up and down.
※ Smooth-less movement causes malfunction.
- (3) Replace the O ring on the spindle with a new one at the time of maintenance.
※ The O ring is a consumable part. Excessively worn O ring causes malfunction.
※ Before attaching the O ring to the spindle, coat it with fluorine grease. (If the pressure reducing valve is applied to a cleaning/sterilizing steam line, apply heat-resistant fluorine grease.) Recommended grease: SOLVEST 245 (STT Co.)
- (4) Before rassembling, make sure that the valve seat, diaphragm, spindle O ring and cap O ring are clean.
※ Dirty parts cause malfunction and fluid leakage.

- 11) Replace the diaphragm set with a new one. Apply fluorine grease to the spindle O ring.



Apply the grease here
Recommended product:
SOLVEST 245 (STT Co.)

- 12) Insert the new diaphragm set into the body.



- 13) Place the disc, washer and nut onto the spindle, and tighten the nut by hand.



- 14) Apply a socket wrench of nominal designation 10 to the U nut of the diaphragm set and tighten the nut on the disc by applying a torque of 6 N-m (80 kgf·cm) using a torque wrench.



- 15) Place the adjusting spring on the diaphragm shell.



- 16) Place the adjusting screw on the adjusting spring.



- 17) Place the spring chamber.



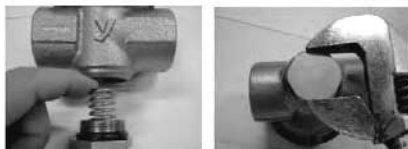
- 18) Put spring washers and set screws into the holes on the spring chamber and lightly turn the screws with Phillips screwdriver. Fully retighten the screws in an even, crisscross pattern.



- 19) Slip a new O ring on the cap. Apply a coat of grease to the O ring. (For the type of grease to be used, refer to step 11).



- 20) Place the valve spring on the cap and screw the cap into the body.



- 21) After adjusting the pressure, mount the domed cap nut on the thread of the adjusting screw.



I.II Pinched foreign substances or damage found on disc or valve seat

(For valve seat, see Fig. 2 Exploded drawing of Model GD-41.)

Pinched foreign substances or damage found on disc

Follow steps 6) to 10) in section I.i. After replacing the disc with a new one, go to steps 12) through 21) in section I.i to restore original state.

Pinched foreign substances or damage found on valve seat

Follow steps 6) to 10) in section I.i. After replacing the body with a new one, go to steps 12) through 21) in section I.i to restore original state.

I.III Spindle O ring is locked

- 1) Press down the U nut on the top of the spindle by hand and check to see that the spindle moves smoothly. It should move downward by 2.5 mm.



Top of the spindle
(U nut)

If the spindle won't move under the pressure, go to section I.i, steps 6) to 10) and replace the spindle O ring with a new one. After replacing, go to steps 12) through 21) in section I.i to restore original state.

If the spindle moves under the pressure, go to section I.i, steps 6) to 10) and visually inspect the spindle O ring for damage. If damage is found, replace the O ring with a new one and go to steps 12) through 21) in section I.i to restore original state.

Trouble II. Reduced pressure does not reach the desired pressure/Fluid does not flow

II.i Spindle O ring is locked

Go to section I.i, steps 1) through 4) and then proceed to section I.iii. If the spindle O ring is not damaged, go to section II.ii.

II.ii Disc and valve seat are locked

Follow steps 1) through 10) in section I.i and replace the disc with a new one. After replacing, go to section I.i, steps 12) to 21) to restore original state.

If damage is found on the valve seat, replace the body with a new one by following steps 1) to 10) in section I.i. After replacing, go to section I.i, steps 12) to 21) to restore original state.

Trouble III. External leakage observed

III.i Loosened set screws

Retighten the screws by following step 18) in section I.i.

III.ii Loosened cap

Retighten the cap. If leakage persists, go to step 6) and 7) in section I.i. Replace the O ring with a new one and go to section I.i, step 19) to restore original state.

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.
- (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.



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