



# NS 503 Series

## Pilot Operated Type Reducing Valve

### Instruction Manual

INS No. D-12E (Rev.0)

NAKAKITA SEISAKUSHO CO.LTD.  
 1-1 Fukunominami-machi, Daito-shi, Osaka, JAPAN  
 TEL (072)871-1341  
 (072)871-7871  
 FAX (072)874-7501

#### 1. Configuration and Function

This reducing valve is composed of a main valve and a piston for throttling, and a diaphragm, a pilot valve and an adjusting spring for secondary pressure detection. The secondary pressure working on the diaphragm through the pressure detecting port is balanced with the force of the adjusting spring, and the change in the balance of the forces is used to control the degree of opening of the pilot valve. The pilot valve uses the primary pressure as the control power source, and adjusts the pressure on the upper portion of the piston to control the degree of opening of the main valve. This chain of operations is repeated in a very short time to achieve automatic control of the secondary pressure within a specified range. Setting of the secondary pressure is effected through the adjust screw. Turning it clockwise raises the set pressure. Counterclockwise turning lowers the set pressure.

#### 2. Installation

- Install the reducing valve vertically on a horizontal run of piping. Provide a sufficient overhaul space around the valve. We suggest use of a drain valve and a strainer.
- The piping arrangement is as shown in Fig. 3. Always observe the specified dimensions A and B of the straight runs of the inlet and outlet of the reducing valve.

Portion	A	B
Length of straight run	10 d and over	15 d and over

(d: nominal size of the reducing valve)

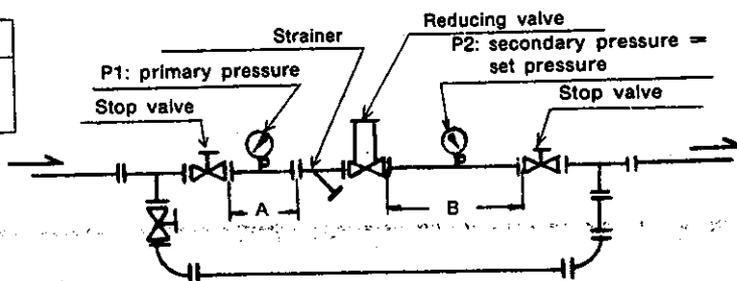
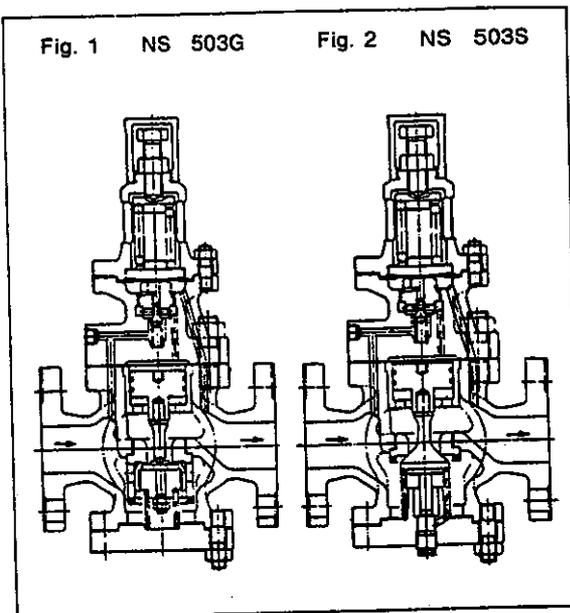


Fig. 3

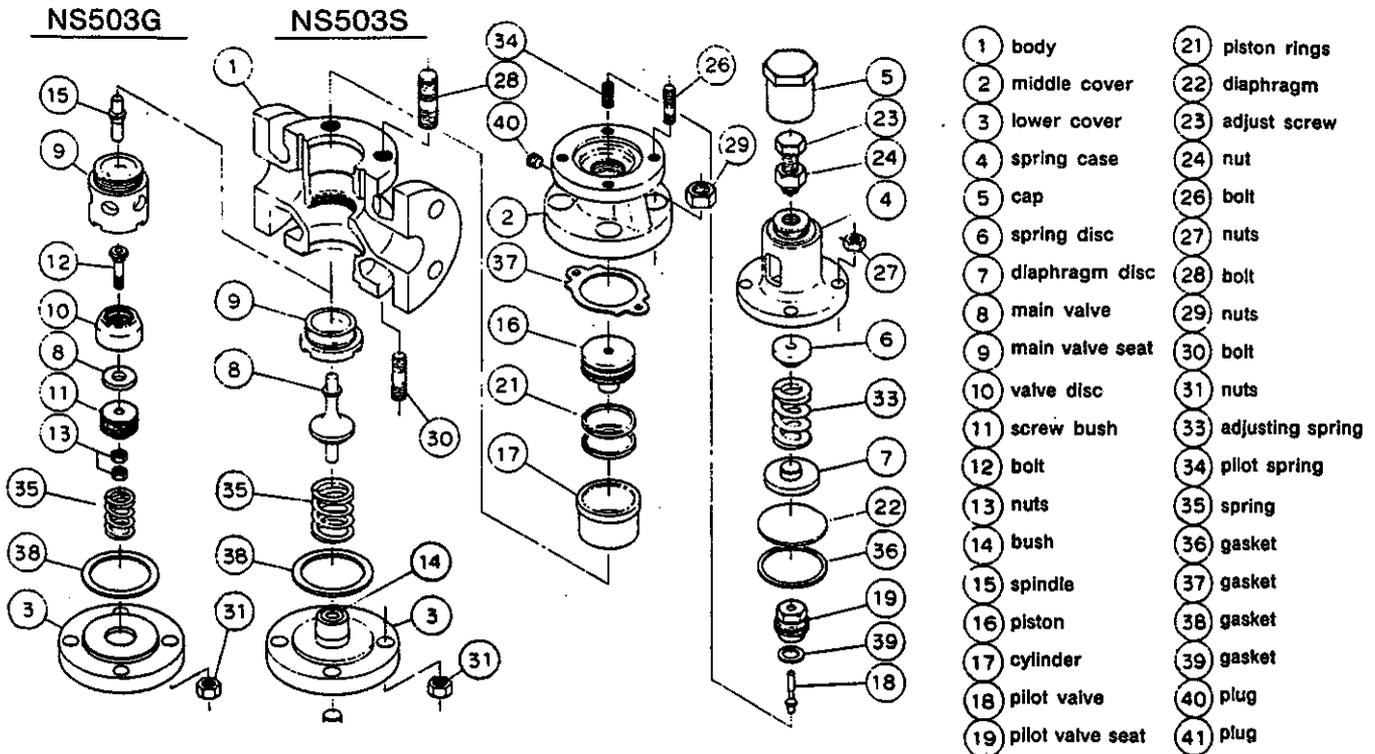


#### 3. Operation and Adjustment

- The procedure of operation and adjustment is as follows:
  - Slightly open the stop valve on the outlet side of the reducing valve.
  - Gradually open the stop valve on the inlet side of the reducing valve to the full.
  - Open the drain valve of the strainer to blow down the drain.
  - Make sure the primary pressure is at the specified value, then adjust the pressure with the adjust screw.
  - Gradually open the stop valve on the outlet side to the full.
  - As the secondary pressure or set pressure will drop slightly, readjust it.
- As the reducing valve has a slight leakage, pay due care when raising the pressure of the apparatus including the reducing valve.

#### 4. Disassembly and Inspection

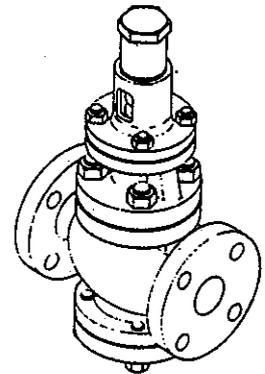
- Before starting disassembly, always examine the construction drawings (Figs. 1 and 2) and the assembly drawing (Fig. 4), understand the construction, and determine the procedure.
- Before disassembly, make sure there is a sufficient space for disassembly work. Determine the space for placing disassembled parts. Pay extra care to prevent loss of small parts, intrusion of foreign substances, damage on parts.
- In principle, replace the gaskets whenever a disassembly is made.



#### 4.1 Disassembly

To disassemble the reducing valve, first fully close the stop valves upstream and downstream of the reducing valve. Then make sure there is no residual pressure in the reducing valve. Disassemble the valve according to the following procedure.

- (1) Give match marks to the sides of the respective cover flanges.
- (2) Turn the adjust screw 23 counterclockwise and free the adjusting spring 33.
- (3) Loosen and remove the nuts 27, and remove the spring case 4.
- (4) Remove the spring disc 6, adjusting spring 33, and diaphragm disc 7.
- (5) Remove the diaphragm 22 and gasket 36.
- (6) Turn the pilot valve seat 19 counterclockwise and remove it.
- (7) Remove the pilot valve 18, gasket 39, and pilot spring 34.
- (8) Loosen and remove the nuts 29 and dismount the middle cover 2.
- (9) Remove the gasket 37 and take out the piston 16 (use the tap hole at the center).
- (10) Disconnect the piston rings 21 from the piston 16. In removing a piston ring, do not force it to open at one place. Evenly expand the ring by exerting forces at 2 or 3 points.
- (11) Remove the cylinder 17.
- (12) Loosen the nuts 31.
- (13) Remove the lower cover 3, and take out the gasket 38, spring 35, and valve trim including the main valve 8 (for NS 503S, the main valve 8).
- (14) In the case of NS 503G, the main valve is an assembly including the main valve 8. Disassemble it in the following manner.
  - 1) Fix the assembly of the main valve 8 on a vice. Remove the nuts 13 and bolt 12.
  - 2) Loosen and remove the screw bush 11, and take out the main valve 8.



#### 4.2 Assembly

When cleaning of the reducing valve, inspection and replacement of parts are completed, assemble the valve in the reverse order of the abovementioned disassembly (4.1).

- a. Replace the gaskets, diaphragm, and main valve made of rubber, etc. with new parts.
- b. Make sure the covers are assembled in such a way that their match marks are aligned with each other.
- c. Tighten the bolts in a diagonal manner to achieve even tightening. Coat the threads of the bolts and the seat of the nuts with a lubricant.

#### 5. Enquiries to Us

When making an enquiry concerning the reducing valve, always let us know the serial number (example: 86E 1123). The serial number is shown on the nameplate or the approved drawings of the product.