

45 Series Installation and Maintenance Manual



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1. Warranty term

Hiter Controls guarantees, subject to the conditions described below, to repair and replace as free of charge, including labor, any components that fail within 1 year of delivery of the product to the end customer. Such failure must have occurred due to a defect in material or workmanship, and not as a result of the product not having been used in accordance with the instructions in this instruction.

This warranty does not apply to products that require repair or replacement due to normal wear and tear on the product or products that are subject to accidents, misuse or improper maintenance. Hiter Controls only obligation with the Warranty Term is to repair or replace any product that we deem defective. Spirax Sarco reserves the right to inspect the product at the end customer's facility or request the return of the product with prepaid freight by the buyer.

Hiter Controls can replace with new equipment or improve any parts that are found to be defective without further liability. All repairs or services carry out ed by Hiter Controls , which are not covered by this warranty term, will be charged according to the current Hiter Controls price list.

THIS IS HITER CONTROLS ONLY WARRANTY TERM AND ONLY THROUGH HITER CONTROLS IS EXPRESSED AND THE BUYER DISCLAIMS ALL OTHER WARRANTIES, IMPLIED BY LAW, INCLUDING ANY MARKET WARRANTY FOR A PARTICULAR PURPOSE.

2. General safety information

Access.

Ensure safe access and if necessary a safe working platform (suitably guarded) before attempting to work on the product. Arrange suitable lifting gear if required.

Lighting.

Ensure adequate lighting, particularly where detailed or intricate work is required

Hazardous liquids or gases in the pipeline.

Consider what is in the pipeline or what may have been in the pipeline at some previous time. Consider; flammable materials, substances hazardous to health, extremes of temperature.

Hazardous environment around the product.

Consider; explosion risk areas, lack of oxygen (e.g. tanks, pits), dangerous gases, extremes of temperature, hot surfaces, fire hazard (e.g. during welding), excessive noise, moving machinery.

The system.

Consider the effect on the complete system of the work proposed. Will any proposed action (e.g. closing isolation valves, electrical isolation) put any other part of the system or any personnel at risk? Dangers might include isolation of vents or protective devices or the rendering ineffective of controls or alarms. Ensure isolation valves are turned on and off in a gradual way to avoid system shocks.

Pressure systems.

Isolation (double block and bleed) and the locking or labelling of closed valves. Do not assume that the system has depressurised even when the pressure gauge indicates zero.

Temperature.

Allow time for temperature to normalise after isolation to avoid danger of burns.

Tools and consumables

Before starting work ensure that you have suitable tools and/or consumables available. Use only genuine Spirax Sarco replacement parts.

Protective clothing

Consider whether any protective clothing is required by yourself and/or others in the vicinity to protect against the hazards of, for example, chemicals, high/low temperature, noise, falling objects, and dangers to eyes and face.

Permits to work

All work must be carried out or be supervised by a suitably competent person.

Commissioning

After installation or maintenance, make sure that the system is working properly. Carry out tests on all alarms and protective devices.

Handling and Storage

The equipment and materials must be stored in their own premises and in a safe manner. See item 5.

Disposal

Unless otherwise stated in the Installation and Maintenance Instructions, this product is recyclable and no ecological hazard is anticipated with its disposal providing due care is taken. However, if the valve is fitted with a Viton seal, special care must be taken to avoid potential health hazards associated with decomposition/burning of this item.

Additional Information

Additional information and help is available worldwide at any Spirax Sarco service center. produto, se realizado de maneira apropriada

3. Introduction

The 45 Series is a pilot valve usually used together with a control valve (plug or butterfly-type, etc.), measuring the pressure of a process, comparing it to the desired pressure and commanding the control valve in order to keep pressure under control.

It may be used according to the application in the following functions:

Relief – Used to keep the pressure upstream the control valve constant. (Type 01).

Reducer – Used to keep the pressure downstream control valve constant. (Type 01).

Differential – Used to keep the pressure differential constant between two distinct lines.(Type 02).

Due to the component responsibility for an adequate valve performance and maintenance, use only original parts supplied by **HITER**.

4. Installation

4.1 The valve is inspected and shipped in a special packing with protection covers in the body openings. However, a carefully inspection should be performed in order to ensure there is no damage and that no material has penetrated in the valve during transportation or storage.

4.2 Several valves are damaged when they are firstly in service due to the lack of a proper and complete internal cleaning of piping before the installation. Make a complete internal cleaning in the system lines and also inside of valve, aiming to remove rust, dust, welding debris and other debris.

4.3 Preferably the installation position should be performed so that the valve actuator is in a vertical position. In some cases, an actuator support is required.

4.4 Do not install a valve in a system whose pressure and temperature values are not satisfying valve classes. When a valve is manufactured, the internal component materials are selected for a specific service condition. So, do not apply the valve in a more critical service without firstly consulting HITER.

4.5 Valves must be installed in an easy-maintenance place, with enough space for actuator removal and internal parts disassembly.

4.6 Consult the Actuator Installation and Maintenance Manual for installation and respective adjustments.

4.7 The 45 Series pilot valve can be assembled directly on main valve or away of it.

Type 01 – Relief or Reducer

4.8 The **45 Series** Type 01 pilot valve fittings (figure 1), reducer or relief, should be performed as follows:

- Controlled pressure of the process – It shall be connected to the diaphragm top chamber. This chamber shall be fulfilled with water or other neutral liquid. During steams and other condensable fluid application, the fitting pipeline should form a siphon or coil in order to keep a liquid sealing in the diaphragm.

- Feeding and escape air of the actuator - E2 and E1 fittings should be used, according to the following table:

TABLE 1 – FITTINGS

Function	Valve Action	Fittings	
		Feeding	Escape
Reducer	Air for opening	E2	E1
	Air for closing	E1	E2
Relief	Air for opening	E1	E2
	Air for closing	E2	E1

Type 02 – Differential

4.9 **45 Series** Type 02 pilot valve fittings (figure 2), differential, should be performed as follows:

- Process pressure – The greatest pressure shall be connected to diaphragm bottom chamber and the least pressure shall be connected to top chamber.

- These chambers shall be fulfilled with water or other neutral liquid. In steams and other condensable fluids applications, the fittings pipeline to the pilot shall form a siphon or coil in order to keep liquid sealing in the diaphragm.

Feeding air and escape of the actuator – Fittings E2 and E1 (Table 1) shall be used, taking into account the valve action type (air-for-opening or air-for-closing) and the ponto de tomada de pressão controlada by valve (upstream or downstream the valve).

Signal for the actuator – S-fitting shall be used.

Figure 4 shows a typical installation of control valve with differential pilot.

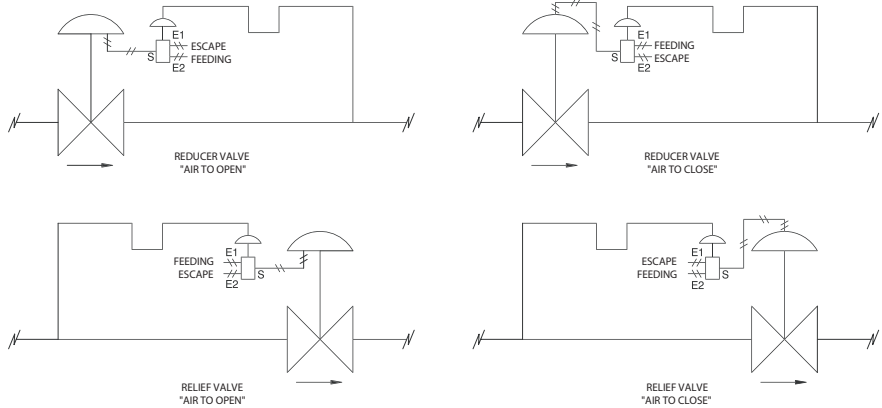


Fig. 1 – Typical installations of valves with type-01 pilot

5. Maintenance

WARNING

For personnel safety and to avoid damage to the system, before starting the piping check valve removal, isolate it through block valves and relieve all pressure therein contained.

In the disassembly procedure description, our reference shall be figures 2 and 3, except when adversely recommended.

5.1 DISASSEMBLY

Type 01 – Relief or Reducer

5.1.1. Using a fixing wrench, fasten the stem (14) and loose the plug nut (10). If necessary, press the spring regulator (11) to show the nut (10).

5.1.2. Remove the locking nut (2) and bottom seat (1).

5.1.3. Using the groove in the plug (5) bottom end, unthread it out of stem (14), removing it from body (4).

- 5.1.4. Relieve all the spring pressure (15) through regulator (11).
- 5.1.5. Remove the yoke bolts (20), cover (19) and diaphragm (18). In case of pilot with metallic diaphragm, also remove the yoke gasket (21).
- 5.1.6. Pull up the diaphragm disk assembly (17), stem (14) and stem nut (16).
- 5.1.7. In case of pilots with pressure range from 31 to 600 psig, remove the reducer (24).
- 5.1.8. Remove the spring (15).
- 5.1.9. Lose the stem nut (16) and remove the stem (14) from diaphragm disk (17).
- 5.1.10. Remove the spring regulator (11), threading it up.
- 5.1.11. Remove the fixing nut (8) from body (4) and remove the yoke (9).
- 5.1.12. Using a type nail wrench, unthread the top seat (6) inside body (4).
- 5.1.13. Check the following parts for damage and replace when necessary: bottom seat (1), seat O-rings (3), plug (5), top seat (6), plug O-ring (7), backing rings (12), spring (15) and diaphragm (18). In case of pilot with metallic diaphragm, also check the yoke gasket (21).

Type 02 – Differential

- 5.1.1. Relieve all spring pressure (17) through regulator (21).
- 5.1.2. Unthread and remove the ring box (19).
- 5.1.3. Remove the cover bolt (14), spring housing (16), spring disk (18) and spring (17).
- 5.1.4. Remove the locking nut (2) and bottom seat (1).
- 5.1.5. Using the groove at the plug bottom end (5), unthread the cap (15) and remove the top disk (13).
- 5.1.6. Remove the diaphragm (11) and the bottom disk (12). In case of pilot with metallic diaphragm, remove also the bottom cover gasket (22) and diaphragm gaskets (23).
- 5.1.7. Remove the plug (5) inside body (4).
- 5.1.8. Loose the fixing nut (8) and remove the bottom cover (10) and body gasket (9).
- 5.1.9. Using a type-nail wrench, unthread the top seat (6) inside body (4).
- 5.1.10. Check the following parts for damage and replace when necessary: bottom seat (1), seat O-rings (3), plug (5), top seat (6), plug O-ring (7), body gasket (9), diaphragm (11), spring (17) and regulator o-ring. In case of pilot with metallic diaphragm, also check the bottom cover gasket (22) and diaphragm gasket (23).

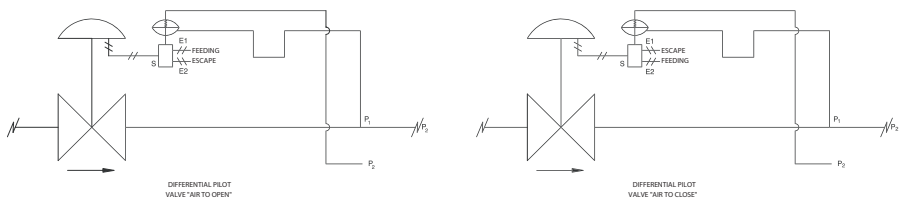


Fig. 2 – Typical installations of valves with type 02 pilot

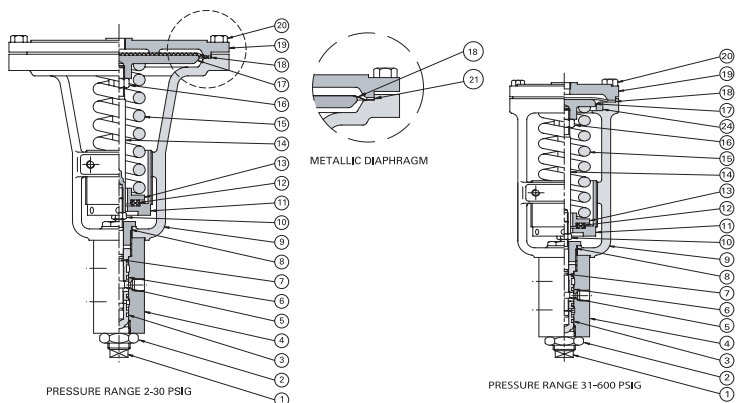


Fig. 3 – Type-01 pilot

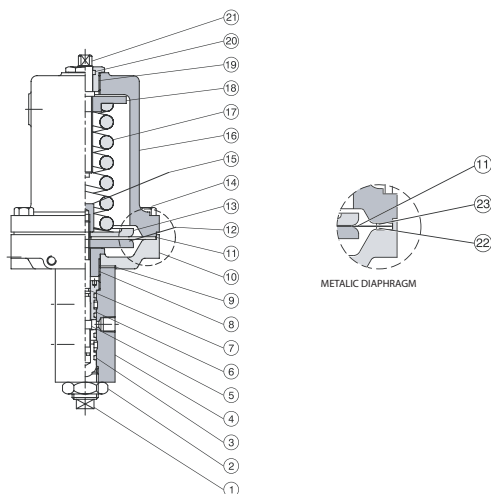


Fig. 4 – Type 02 pilot

5.2 CLEANING, INSPECTION AND REPAIR

All valve metallic parts must be cleaned using solvent and dried with compressed air after inspection. Those approved should be kept clean and very well protected up to the assembly. The oil protector application to the steel carbon non-painted parts is recommended. If there is a damage that can not be resolved by parts replacement and/or corrective actions, the valve should be returned properly assembled to Hiter for general revision.

5.2.1 Inspect the seal surfaces (seat areas). Deep scratches or other imperfections on this area may compromise the valve sealing, damaging the seat. They only can be eliminated through the surface rectifying. Any barbs in bore edges must be removed using fine sandpaper, as they can cause cuts.

5.2.2 Check the seat conditions. Material flowing in resilient seats means the valve has been submitted to differentials of pressure above the allowed limit, or operated with elevated temperature. Deep scratches in the seat sealing area with the valve body also may cause leaking in operation. In these cases it is recommended seat replacement.

5.2.3 Small scratches on metallic seat sealing surface by lapidating. In market place there is a great variety of pastes used for rectifying, thus a good quality paste can be used.

In the disassembly procedure description, our reference shall be Figures 3 and 4, except when adversely recommended.

5.3 ASSEMBLY

Type 01 – Relief or Reducer

5.3.1 Thread the top seat (6) inside body (4), using a type-nail wrench.

5.3.2 Place the yoke (7) on body (4) and fix it through the nut (8).

5.3.3 Install the spring regulator (11) threading it, from top to bottom

5.3.4 Install the stem (14) on diaphragm disk (17) and fasten it using the nut (16).

5.3.5 Insert the backing rings (12), spring disk (13) and spring (15) inside of regulator (11).

5.3.6 Install the reducer ring (24) on pilots for pressure range from 31 to 600 psig

5.3.7 Insert the assembly constituted of diaphragm disk (17), stem (14) and stem nut (16) on yoke (9) with stem (14) passing inside of spring (15), spring disk (11) and regulator (11).

5.3.8 Install the diaphragm (18) and for metallic diaphragm pilot, install also the yoke gasket (21). Place the cover (19), fasten it using the yoke screws (20).

5.3.9 Lightly tighten the spring (15) through regulator (11) up to diaphragm (18) makes contact to the cover (19).

5.3.10 Insert the plug (5) inside body (4) and in thread the plug nut (10) to its end. Using the groove of plug (5) bottom end, thread it in the stem (14) until it makes contact to the top seat (6)

5.3.11 Install the bottom seat (1) and locking nut (2).

5.3.12 Fasten the stem (14) using a fixed wrench and tighten the plug nut (10). If need, tighten the spring regulator (11) to show the nut (10).

Type 02 – Differential

5.3.1 Thread the top seat (6) inside body (4), using a type-nail wrench.

5.3.2 Install the body gasket (9) and bottom cover (10) on body (4) and fasten them using the nut (8).

5.3.3 Insert the plug (5) inside body (4).

5.3.4 Install the bottom disk (12) and diaphragm (11). In case of metallic diaphragm pilot, also install the bottom cover (22) gasket and diaphragm gasket (23).

5.3.5 Thread the bottom disk (12) on plug (5) until it makes contact to the fixing nut (8) and back half-turn.

5.3.6 Place the top disk (13) and using the groove of the plug bottom end (5), thread the hood (15).

5.3.7 Install the bottom seat (1) and the locking nut (2).

5.3.8 Place the spring (17) on top disk (13) and the disk (18) on it.

5.3.9 Assemble the spring housing (16), fasten it using the cover bolt (14).

On the disassembly procedure description, our reference shall be the figures 3 and 4, except when adversely recommended.

5.4 ADJUSTMENTS

5.4.1 For type 01 pilot valves, the controlled pressure adjustment is performed by rotating the spring regulator (11).

5.4.2 For type 02 pilot valves, the controlled differential adjustment is performed by rotating the spring regulator (21).

5.4.3 For pilot sensibility adjustments the locking nut (2) must be loosen and the bottom sea (1) must be rotated.

6. Part List

TABLE 2 – PART LIST – TYPE 01 (Fig. 3)

Item	Description	Qty
• 1	BOTTOM SEAT	1
2	LOCKING NUT	1
• 3	SEAT O-RING	4
4	BODY	1
• 5	PLUG	1
• 6	TOP SEAT	1
• 7	PLUG O-RING	2
8	FIXING NUT	1
9	YOKE	1
10	PLUG NUT	1
11	SPRING REGULATOR	1
• 12	BACKING RING	2
13	SPRING DISK	1
14	STEM	1
• 15	SPRING	1
16	STEM NUT	1
17	DIAPHRAGM DISK	1
• 18	METALLIC METÁLICO	1
	DIAPHRAGM	
19	COVER	1
20	YOKE BOLT (2-30 psig)	6
	YOKE BOLT (31-600 psig)	4
• 21	YOKE GASKET	1
24	REDUCER RING	1

• Recommended spare parts.

TABLE 3 – PART LIST – TYPE 02 (Fig. 4)

Item	Description	Qty
• 1	BOTTOM SEAT	1
2	LOCKING NUT	1
• 3	SEAT O-RING	4
4	BODY	1
• 5	PLUG	1
• 6	TOP SEAT	1
• 7	PLUG O-RING	2
8	FIXING NUT	1
• 9	BODY GASKET	1
10	BOTTOM COVER	1
11	METALLIC DIAPHRAGM	1
	DIAPHRAGM	2
12	BOTTOM DISK	1
13	TOP DISK	1
14	COVER BOLT	1
15	CAP	1
16	SPRING HOUSING	1
• 17	SPRING	1
18	SPRING DISK	1
• 19	RING BOX	1
• 20	REGULATOR O-RING	1
21	SPRING REGULATOR	1
• 22	BOTTOM COVER GASKET	1
• 23	DIAPHRAGM GASKET	1

• Recommended spare parts.

More information on
our website in English:



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