1000A Classes 900 to 2500 ANSI
Installation and Maintenance Guide

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1. Warranty

Spirax Sarco warrants, subject to the conditions described below, to repair and replace without charge, including labor costs, any components which fail within 1 year of product delivery to the customer. Such failure must have occurred because of defect in material or manufacturing and not as a result of product not being used in accordance with the instructions of this manual.
This warranty does not apply to products which require repair or replacement due to normal wear out or products that are subject to accident, misuse or improper maintenance.
Spirax Sarco Hiter only obligation with Warranty is to repair or replace any product that we consider defective. Spirax Sarco Hiter reserves the right to inspect the product in customer installations or request the return of the product with freight prepaid by the buyer.
Spirax Sarco Hiter may replace or repair any parts that are deemed defective without further responsibilities. All repairs or services executed by Spirax Sarco Hiter, which are not covered by this warranty, will be charged according to the current price list.

THIS IS THE ONLY SPIRAX SARCO HITER WARRANTY TERM AND ONLY HEREBY SPIRAX SARCO HITER EXPRESS.BUYER DISCLAIMS ALL OTHER WARRANTIES IMPLIED BY LAW, INCLUDING ANY MARKET WARRANTY FOR A PARTICULAR PURPOSE.

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
Ensure that any pressure is isolated and safely vented to atmospheric pressure.
Consider double isolation (double block and bleed) and the locking or labeling of closed valves.
Do not assume that the system has depressurized even when the pressure gauge indicates zero.

Temperature
Allow time for temperature to normalize 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 Hiter replacement parts.

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

Protective clothing
Consider whether any protective clothing 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. Post 'warning notices' if necessary.

Electrical works
Before starting work study the wiring diagram and wiring instructions, and check any special requirements. Consider special emphasis on primary and phase source, local isolation of the major systems, fuse requirements, grounding, special cables, cable entries and electrical voltage selection.

Commissioning
After installation or maintenance, ensure that the system is working properly.
Perform tests on all alarms and protective devices.

Storage
Equipment and materials shall be stored in a proper place and securely.

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.

3. Introduction

The **1000 Control Series** which is considered a high quality globe valve providing excellent sensitivity, fine con- trol and easy adjustment. For continued reliability and valve performance, only original spare parts from **Spirax Sarco Hiter** should be used for the maintenance of this product.

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 the valve, aiming to remove rust, dust, welding debris and other debris.

4.3 In case of small bore valves, such as low-noise or anti-cavitation cages, it is recommended that a suitable strainer be installed upstream of the control valve in order to prevent debris from either blocking or damaging the valve internals.

4.4 Connecting pipe flanges must be perfectly aligned. The misalignment may cause installation problems and seriously compromise the equipment performance due to abnormal stresses appearing.

4.5 Be sure the flange face is free of imperfections, sharp edges and burrs.

4.6 During the installation the actuator must be positioned on the valve and in vertical position (figure 1). If this is not possible, look for a position closer the vertical one. The horizontal position should be avoided and, in some cases, there should be a support to the actuator.

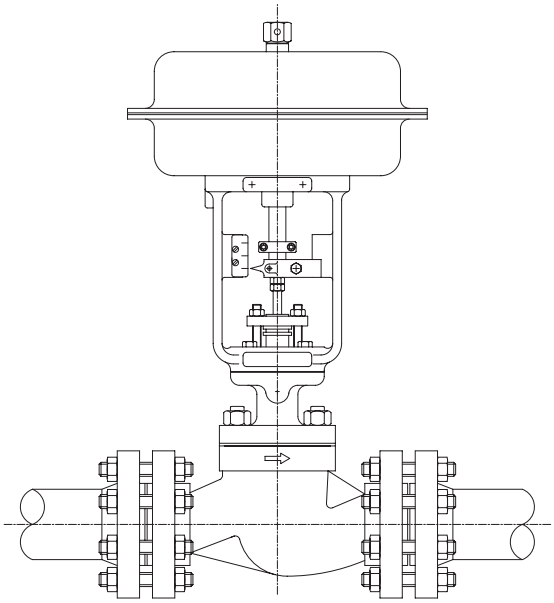

Fig. 1 - Valve installation

4.7 Install the valve obeying the flow direction indicated by the arrow in the body.

4.8 For flanged valves, use a proper gasket between the valves and piping flanges.

4.9 Insert the stud bolt and tighten the nuts alternately in a diametrically crossed sequence. The full torque values must not be applied to one nut at a time. The crossed sequence should be repeated several times, increasing the stud-bolt torque in a gradual and uniform way, until the recommended value is reached (table 2 - page 11).

4.10 For valves welded into piping, with internal elastomers, the removal of all inner components before welding is recommended. If the valve body material requires post-welding heat treatment, the internal parts also must be removed to avoid damage.

4.11 The straight piping length upstream the valve must be in accordance with the valve installation standards or recommendations.

4.12 For long-bonnet valves, in case of installation with thermal isolation, do not isolate the valve bonnet. Only the body must be isolated.

4.13 In continuous operation units, the installation should include isolation and by-pass systems, with three manual valves.

4.14 Be careful to not install the valve in a system whose pressure and temperature values are outside of the 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 Spirax Sarco Hiter.

4.15 The valves must be installed in an easy maintenance place, with enough space for the actuator removal and the internal parts disassembly.

4.15 Consult the Actuator Installation and Maintenance Manual for installation and the respective adjustments

WARNING

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

In the disassembly procedure description, our reference shall be the figures 2 and 3, except otherwise is indicated.

5.1 Disassembly

5.1.1 Separate the actuator from the valve, according to the disassembly procedure described in the Actuator Installation and Maintenance Manual.

5.1.2 Remove the stem nuts (25), the packing flange nuts (22), the packing flange (21) and the packing (20).

5.1.3 Remove the nuts (12), bonnet (14) and the plug (4) together with the stem (24). Be careful not to damage the packing (16) when the stem thread (24) passes through them.

5.1.4 Remove the plug (4) with the stem (24).

5.1.5 The 1010 valves have a seal ring (7) in the plug (4). Depending on the construction, the seal-ring types are: O-ring, PTFE strip or a split graphite ring.

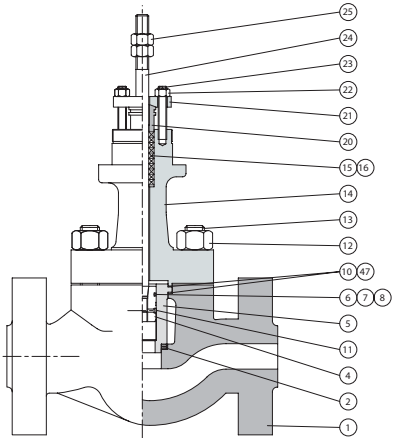

Fig. 2 - 1000 Series

5.1.6 If necessary, remove the stem (24) from the plug (4) and also remove the pin (11). The stem (24) only can be removed from the plug (4) in case of replacement. In case of plug (4) replacement, a new stem (24) should be installed.

WARNING
Never install a new plug (4) on a used stem. The plug installation requires a new bore for pin and, if the stem already has a bore, the threads will be loose.

5.1.7 Remove the cage (5) and the respective gaskets.

5.1.8 Remove the metallic ring (2). Be careful not to damage the cams surface at ring faces (2) and the respective support surfaces in the cage (5) and body (1), once they are lapped (see figure 4).

5.1.9 Remove the packings (16) and other bonnet internal components.

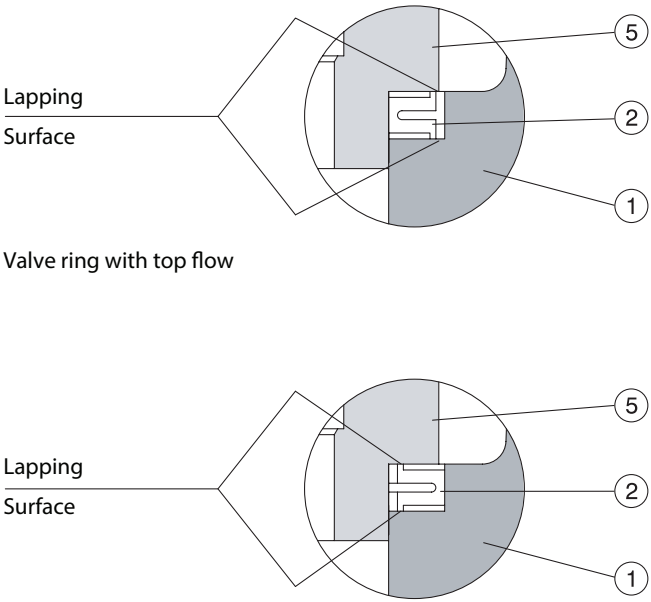

Fig. 3 - Reduced Port Size

Table 1 - Parts List (Figures 2 and 3)

Item	Description	Item	Description	Item	Description
1	BODY	10 ●	BODT GASKET	20	PACKING FOL-LOWER
2	METALLIC RING	11 ●	PIN	21	PACKING FLANGE
4 ●	PLUG	12	BODY NUT	22	PACKING NUT
5 ●	EXPANSION LAMINA (1)	13	BONNET	23	STEM
6 ●	SEAL RINGS (2)	14	PACKING SPRING	24●	STEM
7 ●	SEAL RING	15 ●	PACKING SPRING (3)	25	STEM NUT
8 ●	"PARBAK" RING	16 ●	PACKING	47●	GRAPHITE GASKET

(1) Used only for PTFE seal ring.
(2) Used only for sealing O-ring and pressures over 1000 psig.
(3) Used only for V-shaped PTFE packings.
● Recommended spare parts

5.2 Cleaning, Inspection and Repair

All valve metallic parts must be cleaned using solvent and dried with compressed air after inspection. All parts must be kept clean and very well protected up to the assembly. Corrosion inhibitor can be used to protect component parts, but the selection and use of these products must be determined by the process in which the valve will operate. If there is a damage that cannot be resolved by parts replacement and/or corrective actions, the valve should be returned properly assembled to **Spirax Sarco Hiter** for general revision.

5.2.1 Inspect the sealing surface areas. Deep scratches or other imperfections in this area compromise the valve sealing, damaging the seat and only can be eliminated when these surfaces are rectified.

5.2.2 Normally it is not possible to get total sealing in metal-to-metal sealing valves. However, the leakage caused by small grooves or imperfections of the surfaces can be reduced by lapping the plug and seat. For heavier damage, the seat must be machined or replaced with a genuine spare part available from Spirax Sarco Hiter.

5.2.3 For lapping of plug and seat, a proper paste with 600 grit is the maximum recommended for use.

5.2.4 Final polishing/lapping with a proper compound/abrasive should be used for applications where shut off is critical.

5.2.5 To help the plug (4) alignment to the seat (5) and also to position the cage, assemble the bonnet on body and the respective gaskets. For plug with seal ring (7), it should not be installed.

5.2.6 After operation, remove the bonnet, clean the seating surfaces and make a seal testing. If needed, repeat the operation.

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

5.3 Assembly

5.3.1 When reassembling the valve, use only new gaskets and clean the bore surfaces which shall contact them.

5.3.2 Be sure the metallic ring sealing surfaces (2) and the respective contact surfaces in the cage (5) and body (1) are lapped (figure 3). For surface preparation, see Section 2.2.

5.3.3 Install the metallic ring (2).

5.3.4 Put in the body: (1) the graphite gasket (47), the body gasket (10) and other graphite gasket (47) over the latter.

5.3.5 Install the cage (5) over the metallic ring (2) ensuring it is perfectly adapted. Any rotary position of the cage regarding the body is accepted.

5.3.6 Put over the cage a graphite gasket (47), another body gasket (10) and another graphite gasket (47) over the latter.

5.3.7 Replace the sealing ring (7) with or without back-sealing ring (8), when there are visible damages. Take care not to scratch the sealing ring surfaces (7) or the housing channel of the ring in the plug (4) if this procedure is neglected it is impossible to attain the proper sealing. In case of PTFE sealing ring, firstly install the metallic lamina (6).The 1020, 1070 and 1210 valves do not have sealing ring.

5.3.8 In case of stem replacement, screw the new stem (24) in the plug (4) up to the end of the thread, so that it is very well tightened. Make a new bore for the pin (11) through the plug (4) and the stem (24) using the plug bore (4) as a guide. Install a new pin (11) and lock it.

WARNING

Never install a new plug (4) on a used stem. The plug installation requires a new bore for pin and, if the stem already has a bore, the threads shall be weakened,

5.3.9 Insert the plug set (4) and the stem (24) in the cage (5). Be careful in case of plugs with seal ring (7), it can become damaged if it is not in perfect alignment to the bevel at the cage (5) superior entrance.

5.3.10 Assembly the bonnet (14) on the body (1). Tighten the nuts (12) using the torques showed in table 2 as reference for cleaned threads.

Table 2 - Orientative Torque for Assembly

Thread (In)	MATERIAL - SCREWS / STUDS / NUTS											
	Torque for Carbon Steel						Torque for Stainless Steel					
	lbf.ft		N.m		lbf.in		lbf.ft		N.m		lbf.in	
	Mín	Máx	Mín	Máx	Mín	Máx	Mín	Máx	Mín	Máx	Mín	Máx
1/4"	4	5	6	7	53	65	1	1	2	2	15	16
5/16"	9	11	12	15	109	134	3	3	4	4	31	32
3/8"	16	20	22	27	193	238	5	5	6	6	55	57
7/16"	26	32	35	43	309	380	7	8	10	10	88	91
1/2"	39	48	53	66	471	580	11	12	15	16	135	139
9/16"	57	70	77	95	679	836	16	17	22	23	194	200
5/8"	78	96	106	130	937	1154	22	23	30	31	268	277
3/4"	139	171	188	232	1665	2050	40	41	54	55	476	491
7/8"	223	275	303	373	2681	3302	64	66	87	89	766	791
1"	335	413	454	559	4020	4951	96	99	130	134	1148	1186
1.1/8"	492	606	667	821	5901	7268	141	145	190	197	1686	1741
1.1/4"	691	851	937	1154	8293	10214	197	204	268	276	2369	2446
1.3/8"	938	1155	1272	1566	11255	13863	268	277	363	375	3216	3320
1.1/2"	1237	1524	1678	2066	14850	18290	354	365	479	495	4243	4381
1.5/8"	1595	1964	2162	2663	19138	23571	456	470	618	638	5468	5646
1.3/4"	2015	2482	2732	3365	24180	29782	576	594	781	806	6909	7133
1.7/8"-8UN	2503	3083	3394	4180	30038	36997	715	738	970	1001	8582	8861
2"-8UN	3064	3774	4155	5117	36772	45291	876	904	1187	1226	10506	10848
2.1/4"-8UN	3198	3939	4336	5341	38379	47270	914	943	1239	1279	10965	11322
2.3/4"-8UN	4426	5452	6001	7391	53114	65419	1265	1306	1715	1770	15175	15669
3"-8UN	7465	9199	10121	12472	89575	110389	2357	2434	3196	3300	28287	29206

Note: The values above mentioned are considering lubricated fasteners by graphite-based grease (NEVER SEEZ PURE NICKEL SPECIAL or equivalent).

Table 3 - Orientative Torque for Packings

Stem Ø (in)	Packing Type	Torque		
		lbf.ft	N.m	lbf.in
3/8"	PTFE (TP)	3	4	35
	Graphite (GG)	5	7	62
1/2"	PTFE (TP)	7	10	89
	Graphite (GG)	11	15	133
3/4"	PTFE (TP)	18	25	221
	Graphite (GG)	22	30	266
1"	PTFE (TP)	30	40	354
	Graphite (GG)	48	65	575
1.1/2"	PTFE (TP)	50	68	602
	Graphite (GG)	59	80	708

Note: The values above mentioned are considering lubricated fasteners by graphite-based grease (NEVER SEEZ PURE NICKEL SPECIAL or equivalent).

ATTENTION

- The metallic ring (2) must be compressed so that it can load and seal in the body and in the cage.
- The metallic ring (2) must not be compressed in excess, once it shall be permanently deformed.
- The tightening procedure also compresses the external part of the body gasket (10) to seal the joint between body (1) and bonnet (14).
- The torque tightening procedure must be repeated in the field when the valve reaches the operation temperature.

5.3.11 Clean carefully the stuffing box and the internal metallic components. Replace the packings and other components. When inserting the packings, be careful not to damage them when they pass by the stem threaded part (24).

5.3.12 Assemble the packing follower (20), the packing flange (21) and tighten the flange nuts (22) only the enough to eliminate the leakage.

5.3.13 When the assembly is over, replace the stem nuts (25); assemble the actuator in the valve and remake the connection between the valve stem and the actuator stem. The instructions related to this step can be found in the Actuator Installation and Maintenance Manual.

6. Action of the Valve and Position by Failure

6.1 Due to the construction, the action of the valve and the safety position by failure in the 1000 Series valves depends exclusively on the actuator. A straight action actuator shall supply a normally opened valve (air to close). An inverse action actuator shall supply a normally closed valve (air to open).

6.2 The instructions for connection between the valve and the actuator are described in the Actuator Installation and Maintenance Manual related to this step can be found in the Actuator Installation and Maintenance Manual.

Notes

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