

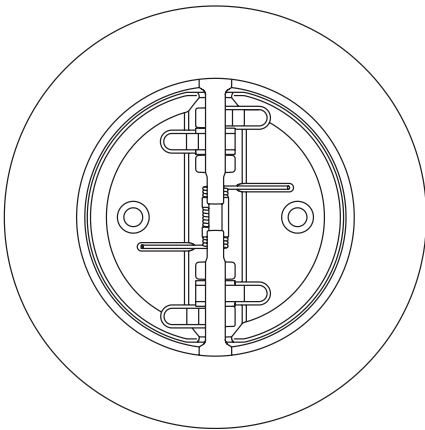
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**SDCV3, SDCV4, SDCV7 and SDCV8**  
**Split Disc Check Valves**  
Installation and Maintenance Instructions

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1. Safety information
2. General product information
3. Installation
4. Commissioning
5. Operation
6. Maintenance
7. Spare parts

# 1. Safety information

Safe operation of these products can only be guaranteed if they are properly installed, commissioned, used and maintained by qualified personnel (see Section 1.11) in compliance with the operating instructions. General installation and safety instructions for pipeline and plant construction, as well as the proper use of tools and safety equipment must also be complied with.

## 1.1 Intended use

Referring to the Installation and Maintenance Instructions, product markings and Technical Information Sheet, check that the product is suitable for the intended use/application. The products listed below comply with the requirements of the Pressure Equipment Directive (PED) and carry

the  mark when so required. The products fall within the following Pressure Equipment Directive (PED) categories:

Product	Group 1 Gases	Group 2 Gases	Group 1 Liquids	Group 2 Liquids	
<b>SDCV3</b> and	2" - 4"	2	2	1	SEP
	6" - 8"	3	2	2	SEP
<b>SDCV4</b>	10" - 12"	3	2	2	1
<b>SDCV7</b> and	DN50	2	SEP	1	SEP
	DN80 - DN100	2	2	1	SEP
<b>SDCV8</b>	DN150 - DN200	3	2	2	SEP
	DN250 - DN300	3	2	2	1

- i) The product has been specifically designed for use on steam, compressed air and water/ condensate which are in Group 2 of the above mentioned Pressure Equipment Directive.
- ii) Check material suitability, pressure and temperature and their maximum and minimum values. If the maximum operating limits of the product are lower than those of the system in which it is being fitted, or if malfunction of the product could result in a dangerous overpressure or overtemperature occurrence, ensure a safety device is included in the system to prevent such over-limit situations.
- iii) Determine the correct installation situation and direction of fluid flow.
- iv) Spirax Sarco products are not intended to withstand external stresses that may be induced by any system to which they are fitted. It is the responsibility of the installer to consider these stresses and take adequate precautions to minimise them.
- v) Remove protection covers from all connections and protective film from all name-plates, where appropriate, before installation on steam or other high temperature applications.

## 1.2 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.

## 1.3 Lighting

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

## 1.4 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.

## 1.5 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.

## 1.6 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.

## 1.7 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 labelling of closed valves. Do not assume that the system has depressurised even when the pressure gauge indicates zero.

## 1.8 Temperature

Allow time for temperature to normalise after isolation to avoid the danger of burns. Valves fitted with PTFE seats must not be subjected to temperatures above 260 °C (500 °F) and valves with Viton seats 315 °C (599 °F). Above these temperatures toxic fumes may be given off. Avoid inhalation of fumes or skin contact.

## 1.9 Tools and consumables

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

## 1.10 Protective clothing

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

## 1.11 Permits to work

All work must be carried out or be supervised by a suitably competent person. Installation and operating personnel should be trained in the correct use of the product according to the Installation and Maintenance Instructions.

Where a formal 'permit to work' system is in force it must be complied with. Where there is no such system, it is recommended that a responsible person should know what work is going on and, where necessary, arrange to have an assistant whose primary responsibility is safety.

Post 'warning notices' if necessary.

## 1.12 Handling

Manual handling of large and/or heavy products may present a risk of injury. Lifting, pushing, pulling, carrying or supporting a load by bodily force can cause injury particularly to the back. You are advised to assess the risks taking into account the task, the individual, the load and the working environment and use the appropriate handling method depending on the circumstances of the work being done.

## 1.13 Residual hazards

In normal use the external surface of the product may be very hot. If used at the maximum permitted operating conditions the surface temperature of the product may reach temperatures in excess of 300 °C (572 °F).

Many products are not self-draining. Take due care when dismantling or removing the product from an installation (refer to 'Maintenance instructions').

## 1.14 Freezing

Provision must be made to protect products which are not self-draining against frost damage in environments where they may be exposed to temperatures below freezing point.

## 1.15 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 or PTFE seat, special care must be taken to avoid potential health hazards associated with decomposition/burning of these seats.

### Viton:

- Can be landfilled, when in compliance with National and Local regulations.
- Can be incinerated, but a scrubber must be used to remove Hydrogen Fluoride, which is evolved from the product and with compliance to National and Local regulations.
- Is insoluble in aquatic media.

### PTFE:

- Can only be disposed of by approved methods, not incineration.
- Keep PTFE waste in a separate container, do not mix it with other rubbish, and consign it to a landfill site.

## 1.16 Returning products

Customers and stockists are reminded that under EC Health, Safety and Environment Law, when returning products to Spirax Sarco they must provide information on any hazards and the precautions to be taken due to contamination residues or mechanical damage which may present a health, safety or environmental risk. This information must be provided in writing including Health and Safety data sheets relating to any substances identified as hazardous or potentially hazardous.

## 2. General product information


### 2.1 General description

SDCV split disc check valves are of a wafer pattern, designed to be sandwiched between ASME or PN flanges. Their function is to prevent reverse flow on a wide variety of fluids. The SDCV4 and SDCV8 are designed for use with aggressive fluids, vapours, acids and alkalines at high pressures and temperatures. The SDCV3 and SDCV7 are manufactured from carbon steel and are suitable for use in general purpose applications on steam and fluids at high pressures and lower temperatures. The face-to-face dimension of the SDCV3, SDCV4, SDCV7 and SDCV8 conforms to API 594. As standard the valves have a metal-to-metal seat.

### Optional extras

An optional soft seat is available made of Fluoroelastomer but must be requested at the point of order placement as the body will be stamped with the letter 'V'.

### Standards

These products fully comply with the requirements of the Pressure Equipment Directive (PED) and carry the  mark when so required.

### Standard shut-off

Metal-to-metal seat leakage is tested to API 598.

### Certification

These products are available with certification to EN 10204 3.1.

**Note:** All certification/inspection requirements must be stated at the time of order placement.

**Note:** For additional information see the following Technical Information Sheet TI-S19-02-EN-ISS1.

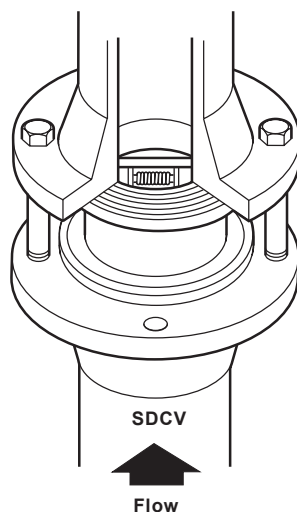


Fig. 1 An SDCV disc check valve shown sandwiched between flanged connections

## 2.2 Size and pipe connections

Body material	Type	Suitable for installation between the following flanges:	Size range
Carbon steel	<b>SDCV3</b>	ASME B16.5 Class 150 and ASME B16.5 Class 300	DN50 2" DN80 3" DN100 4" DN150 6" DN250 10" and DN300 12"
Austenitic stainless steel	<b>SDCV4</b>		
Carbon steel	<b>SDCV7</b>	EN 1092 PN16 and EN 1092 PN40	
Austenitic stainless steel	<b>SDCV8</b>		

## 2.3 Materials

No.	Part	Type	Material	Valve bodies that are marked with a:	
1	Body	<b>SDCV3</b> and <b>SDCV7</b>	Carbon steel	ASTM A352 LCC	'V' - have a Fluoroelastomer seating face
		<b>SDCV4</b> and <b>SDCV8</b>	Austenitic stainless steel	ASTM A351 CF8M	
2	Retainer		Austenitic stainless steel	ASTM A351 CF8M	
3	Pin		Austenitic stainless steel	AISI 316	
4	Spring		Nickel alloy	INCONEL X750	
5	Retainer clip		Austenitic stainless steel	AISI 316	
6	Spacer washer		Austenitic stainless steel	AISI316	
7	Plate		Austenitic stainless steel	ASTM A351 CF8M	

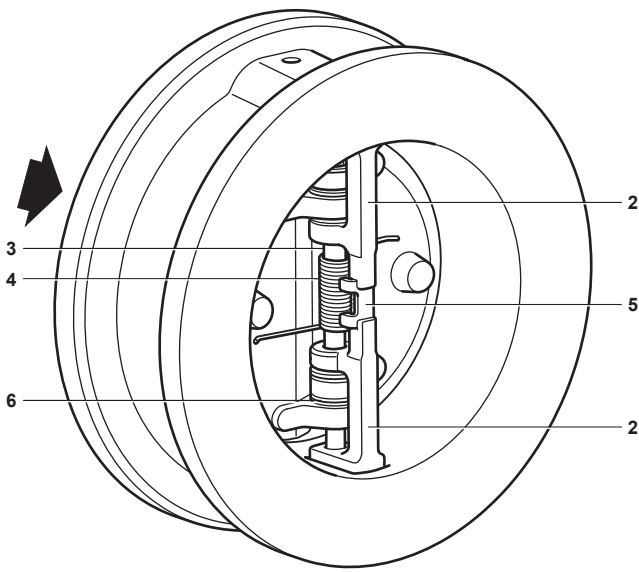
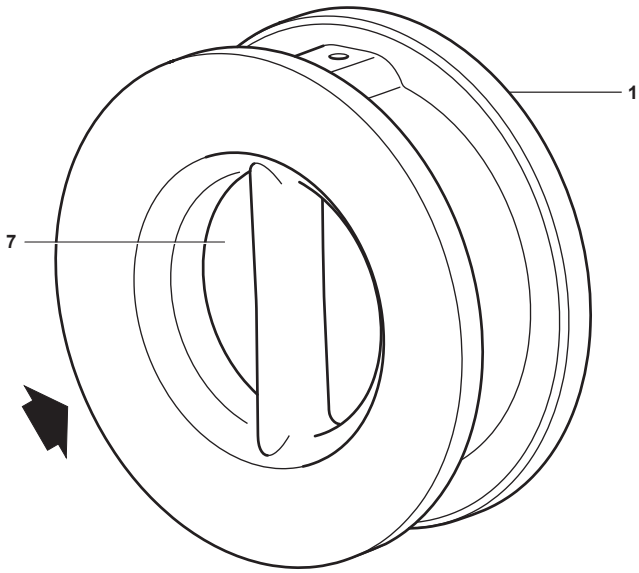


Fig. 2 Materials

## 2.4 $K_v$ values

Size	DN50	DN80	DN100	DN150	DN200	DN250	DN300
<b><math>K_v</math></b>	48	118	325	747	1 361	2 274	3 349

For conversion:

$$C_v \text{ (UK)} = K_v \times 0.963$$

$$C_v \text{ (US)} = K_v \times 1.156$$

## 2.5 Opening pressures in mbar

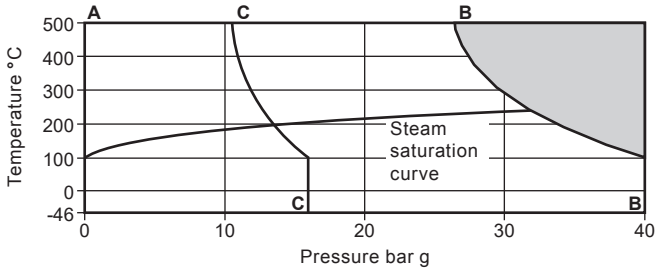
Differential pressures with zero flow.

→ Flow direction

Direction	DN50	DN80	DN100	DN150	DN200	DN250	DN300
→	13.8	13.8	13.8	13.8	13.8	13.8	13.8
↑	36.0	36.0	36.0	40.0	47.0	48.0	51.0



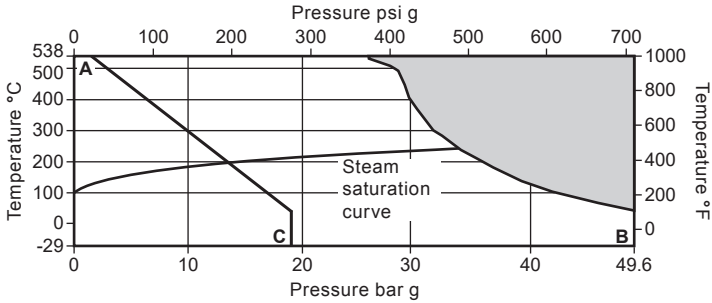
## 2.6 Pressure/temperature limits (ISO 6552) - Flanged EN 1092



The product **must not** be used in this region or beyond the parameter of the PMA or TMA of the relative end connection.

		<b>SDCV7</b> Carbon steel and <b>SDCV8</b> Stainless steel		
<b>EN 1092 PN40</b>		Body design condition	PN40	
		PMA Maximum allowable pressure	40 bar g @ 100 °C	
		TMA Maximum allowable temperature	500 °C @ 26.4 bar g	
		Minimum allowable temperature	Metal seat	-196 °C
			Fluoroelastomer soft seat	-10 °C
		<b>A - B - B</b> PMO Maximum operating pressure	40 bar g @ 100 °C	
		TMO Maximum operating temperature	Metal seat	500 °C @ 26.4 bar g
			Fluoroelastomer soft seat	200 °C @ 40 bar g
		Minimum operating temperature	Metal seat	-196 °C
			Fluoroelastomer soft seat	-10 °C
	Designed for a maximum cold hydraulic test pressure of:	76 bar g		
<b>EN 1092 PN16</b>		Body design condition	PN16	
		PMA Maximum allowable pressure	16 bar g @ 100 °C	
		TMA Maximum allowable temperature	500 °C @ 10.5 bar g	
		Minimum allowable temperature	Metal seat	-196 °C
			Fluoroelastomer soft seat	-10 °C
		<b>A - C - C</b> PMO Maximum operating pressure	16 bar g @ 100 °C	
		TMO Maximum operating temperature	Metal seat	500 °C @ 10.5 bar g
			Fluoroelastomer soft seat	200 °C @ 13.4 bar g
		Minimum operating temperature	Metal seat	-196 °C
			Fluoroelastomer soft seat	-10 °C
	Designed for a maximum cold hydraulic test pressure of:	24 bar g		

## 2.7 Pressure/temperature limits (ISO 6552) - Flanged ASME



The product **must not** be used in this region or beyond the parameter of the PMA or TMA of the relative end connection.

		<b>SDCV3 Carbon steel and SDCV4 Stainless steel</b>		
<b>ASME 300</b>	Body design condition		ASME 300	
	PMA	Maximum allowable pressure	49.6 bar g @ 38 °C / 719 psi g @ 100 °F	
	TMA	Maximum allowable temperature	538 °C @ 25.2 bar g / 1000 °F @ 365.5 psi g	
	Minimum allowable temperature	Metal seat	-21 °C / -5.8 °F	
		Fluoroelastomer soft seat	-10 °C / 14 °F	
	A - B	PMO	Maximum operating pressure	49.6 bar g @ 38 °C / 719 psi g @ 100 °F
		TMO	Maximum operating temperature	Metal seat: 538 °C @ 25.2 bar g / 1000 °F @ 365.5 psi g Fluoroelastomer soft seat: 200 °C @ 35.7 bar g / 392 °F @ 518 psi g
	Minimum operating temperature		Metal seat	-21 °C / -5.8 °F
		Fluoroelastomer soft seat	-10 °C / 14 °F	
	Designed for a maximum cold hydraulic test pressure of:		76 bar g / 1102 psi g	
<b>ASME 150</b>	Body design condition		ASME 150	
	PMA	Maximum allowable pressure	19 bar g @ 38 °C / 275.5 psi g @ 100 °F	
	TMA	Maximum allowable temperature	538 °C @ 1.4 bar g / 1000 °F @ 20.3 psi g	
	Minimum allowable temperature	Metal seat	-21 °C / -5.8 °F	
		Fluoroelastomer soft seat	-10 °C / 14 °F	
	A - C	PMO	Maximum operating pressure	19 bar g @ 38 °C / 275.5 psi g @ 100 °F
		TMO	Maximum operating temperature	Metal seat: 538 °C @ 1.4 bar g / 1000 °F @ 20.3 psi g Fluoroelastomer soft seat: 200 °C @ 13.7 bar g / 192 °F @ 198.7 psi g
	Minimum operating temperature		Metal seat	-21 °C / -5.8 °F
		Fluoroelastomer soft seat	-10 °C / 14 °F	
	Designed for a maximum cold hydraulic test pressure of:		30 bar g / 435 psi g	

# 3. Installation

**Note: Before actioning any installation observe the 'Safety information' in Section 1.**

Referring to the Installation and Maintenance Instructions, name-plate and Technical Information Sheet, check that the product is suitable for the intended installation:

- 3.1** Check materials, pressure and temperature and their maximum values. If the maximum operating limit of the product is lower than that of the system in which it is being fitted, ensure that a safety device is included in the system to prevent overpressurisation.
- 3.2** Determine the correct installation situation and the direction of fluid flow. Disc check valves are opened by the pressure of the fluid and closed by the spring as soon as the flow ceases and before the reverse flow occurs.
- 3.3** Remove protective covers from all connections.
- 3.4** Before installing the SDCV remove the corrosion inhibitor from the flange faces and clean the machined faces on the disc and body seats using paraffin or a similar liquid. This will remove the last traces of protective coating.
- 3.5** Split disc check valves simply fit between two pipe flanges (see Figure 1, page 5). Standard gaskets are used either side of the valve together with longer bolts or studs. **Note: Flanges, bolts (or studs), nuts and joint gaskets are to be provided by the installer.** Normal sensible flange practice should be followed e.g. torque tightening the bolts in opposite sequence. Install the SDCV in the pipeline checking that it has been fitted with the flow in the direction of the arrow on the valve body. If the valve is in a horizontal pipeline the hinge pin must be in the vertical position for correct operation. Split disc check valves can be installed with the liquid/gas flowing horizontally into the valve (Figure 3 valve shown in the open position), or with the liquid/gas flowing vertically upwards through the valve (Figure 4 valve shown in the closed position). Split disc check valves are not recommended for installation with the liquid/gas flowing vertically down through the valve.
- 3.6** Split disc check valves are not suitable for use where heavily pulsating flow exists, such as close to a compressor.
- 3.7** Ensure suitable slinging/lifting/support equipment and procedures are used relevant to the valve size and weight.
- 3.8** Where valves are used on boiler sequencing applications it is recommended that they are fitted with an Fluoroelastomer soft seat as a minimum.
- 3.9** After any installation ensure that the system is fully functional. Carry out tests on any alarms or protective devices.

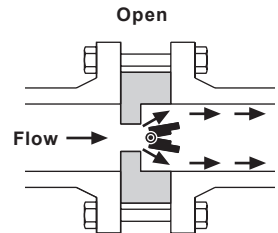


Fig. 3

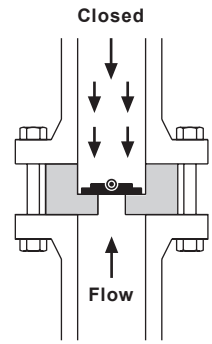


Fig. 4

# 4. Commissioning

After installation or maintenance ensure that the system is fully functional. Carry out tests on any alarms or protective devices.

# 5. Operation

Disc check valves are opened by the pressure of the fluid and closed by the spring as soon as the flow ceases and before the reverse flow occurs.

# 6. Maintenance

**Before actioning any maintenance programme observe: Section 1 'Safety information'.**

- 6.1** Before undertaking any maintenance on the valve it must be isolated from both the supply line and return line and any pressure allowed to safely normalise to atmosphere. The valve should then be allowed to cool. When reassembling, ensure that all joint faces are clean.
- 6.2** Remove the valve from the pipeline by loosening all flange nuts and removing sufficient bolts or studs to allow the valve to be withdrawn from between the flanges.  
**Note:** Ensure suitable slinging/lifting/support equipment and safety procedures are used relevant to the valve size and weight.
- 6.3** Clean the valve removing any aggressive media. Valves should be checked every 6 months.
- 6.4** To replace the internals:
- Dismantle the valve by easing back the crimped legs on the retaining clip (5) until they both run parallel to the groove in the retainers (2), this will allow you to slide the retaining clip back and free from the groove, allowing sideways movement on the retainers (2) when the retainers are clear of the body (1), the pin (3) can be removed from the SDCV as one unit (pin 3, spring 4, spacer washers 6, and plates 7).
  - Degrease/clean all parts with a suitable solvent, based on the process Inspect and replace any faulty parts of the assembly. All metal seated check valves should be relapped to the seat before reassembly.
  - Reassemble the SDCV by fitting the retainers (2), pin (3), spring (4), spacer washers (6) and plates (7) as one unit, the internals.  
Move the retainers as a unit inward to allow the internals to drop into the recess in the body of the SDCV, once in place, slide the retainers back fully into the recess in the body and proceed to fit the retaining clip (5) and crimp the legs over at 90°.
  - The refurbished unit is now ready to be installed in the pipeline.
- 6.5** Manually check the SDCV for correct operation.
- 6.6** Refit the SDCV into the pipeline using the correct new pipeline gaskets.
- 6.7** Torque tighten the flange bolts in opposite sequence (normal sensible flange practice).
- 6.8** After any maintenance programme ensure that the system is fully functional and carry out tests on any alarms or protective devices.

# 7. Spare parts

## Spare parts

The spare parts available are shown in solid outline. Parts drawn in a grey line are not supplied as spares.

## Available spares

Overhaul kit

4, 5, 6 (4 off) and 7 (2 off)

## How to order spares

Always order spares by using the description given in the column headed 'Available spares' and state the size and type of check valve.

**Example:** 1 - Overhaul kit for a DN200 Spirax Sarco SDCV8 split disc check valve with metal seat.

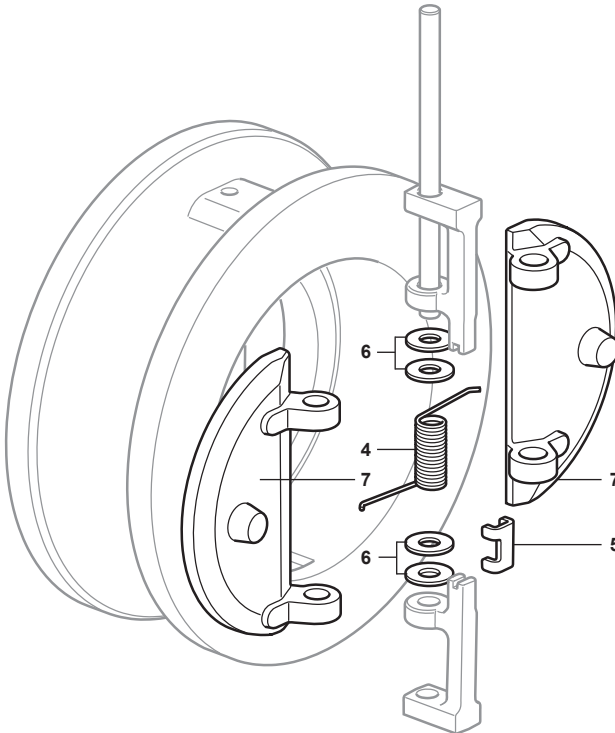


Fig. 5





