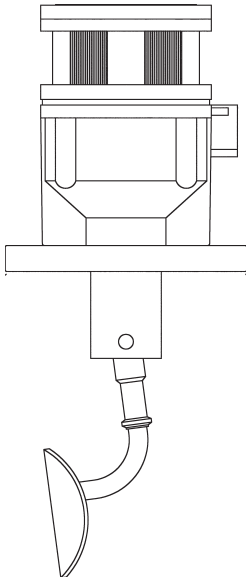


Vane Flow Switches
Colima FLU Series
Installation and Maintenance Instructions



1. General safety information
2. General product information
3. Installation and Maintenance
4. Spare parts

1. General 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, name-plate and Technical Information Sheet, check that the product is suitable for the intended use/application.

The products comply with the requirements of the European Pressure Equipment Directive: 2014/68/EU (PED) falling within category 'SEP'. It should be noted that products within this category are required by the Directive not to carry the C€ mark.

Products intended for use in the Naval and Marine sectors are RINA, and M.M.I (Italian navy) approved.

- i) The products have been specifically designed for use on steam, compressed air and inert industrial gases which are in Group 2 of the above mentioned Pressure Equipment Directive. The products' use on other fluids may be possible but, if this is contemplated, Spirax Sarco should be contacted to confirm the suitability of the product for the application being considered.
- 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 danger of burns and consider whether protective clothing (including safety glasses) is required.

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 some products may reach temperatures of 350°C. 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 Safety information (Specific to the product)

For any safety requirements relating to particular components and / or materials used in the product construction, please refer to installation and maintenance instructions below.

1.16 Disposal

This product is recyclable. No ecological hazard is anticipated with the disposal of this product providing due care is taken.

1.17 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 Description

Magnetically activated vane type flow switches for monitoring gas or liquid flow rates are present in most industrial applications.

The flow switches can be equipped with electrical contacts, SPDT or DPDT micro switches along with different protective housings and with optional two-colour visual indicator to suit most environmental and safety conditions.

2.1.1 Applications

- Protects pumps, motors and other equipment against low or no flow
- Controls sequential operation of pumps
- Automatically starts auxiliary pumps and engines
- Stops liquid cooled engines, machines and processing when coolant flow is interrupted
- Shuts down burner when air flow through heating coil fails

2.1.2 Operating principle

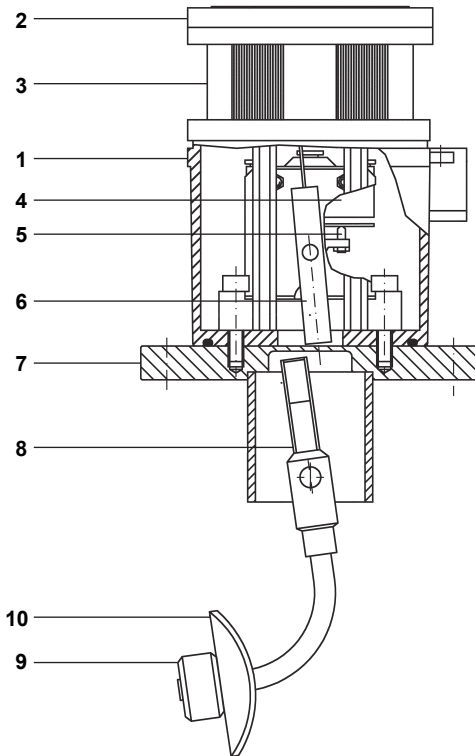
Two oscillating magnets on the same axis, one integral with the vane and one integral with the electrical equipment, repel each other reciprocally through a non-magnetic material flange. The flange separates the housing, containing the electrical equipment, from the vane that is inserted in the pipe. The vane in absence of flow is maintained in its resting position by balance weight and repulsion between the two magnets that face each other with the same polarity. When the flow pushes the vane, the integral vane magnet moves and the magnetic field pushes the integral switch magnet. The switching of the electrical contact is quick and reliable.

2.1.3 Mounting

The Flu flow switches can be installed horizontally, directly into a pipe, or in a dedicated chamber connected between two pipes. Several type of flanges are available upon customer request.

2.2 Materials

No.	Part	Material
1	Housing	ALU + Rilsan
2	Cover	ALU + Rilsan
3	Indicator	Plexiglass
4	Microswitch	Omron Z-15GW4-B
5	Screw	AISI 304
6	Magnet	Sm Co
7	Flange	AISI 304
8	Magnet	Sm Co
9	Counter weight	AISI 304
10	Vane	AISI 304



2.3 Design conditions

TMA	Maximum allowable temperature	Steel		-20°C to + 150°C
			with cooling extension	-20°C to + 350°C
PMA	Maximum allowable pressure	Steel	Colima's flange	< 16 bar g
			flange sized according to rating	< 100 bar g

2.4 Models

FLU A



Gas flow switch, with IP 67 aluminum housing.
Can not be fitted directly on the pipes but before the the cooling battery.

FLU O



Liquid flow switch, with IP 67 aluminum housing and two-colour visual indicator (optional).

3. Installation and Maintenance

Note: Before actioning any installation or maintenance work 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.

Check: materials, pressure and temperature to ensure compatibility of the product with the required application. Also make sure that the ambient temperature in proximity of the device is between the values reported on the label (-20 - 40 ° C).

Remove protective covers from all connections and the protective film from the name-plate.

3.1 Assembly

The Colima FLU magnetic flow switches are delivered packed.

- 3.1.1** Fit the flow switch into the tank paying attention to avoid any damage at vane. Any damage can interfere with the correct operation of the unit.
- 3.1.2** Place the supplied gasket between the flanges.
- 3.1.3** Fix the flanges with bolts. Firmly secure the fixing by tightening the flange bolts.
- 3.1.4** In case of threaded connection, tighten the instrument and place it in the direction indicated by the arrow on the housing base.

Caution:

Always ensure that correct earthing of the equipment is carried out. Specific points are set inside and outside the housing.

Caution:

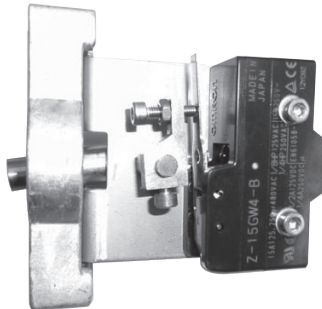
These products should only be used for what they are designed for. Anything outside of the stipulated application range may be subject to unforeseen and dangerous circumstances and full responsibility will be with the installer.

3.2 Electrical equipment and housings for Colima FLU series flow switches

The electrical equipment for the FLU series level switches comprises a support and a contact.

The oscillating element includes a magnet whose south pole points towards the flange that separates the electrical equipment from the liquid or gas contained in the pipe. According to the pressure on the vane provided by the liquid or gas flow in the pipe, the vane works by pivoting a sealed cartridge containing a magnet, with south polarity on the end towards the flange.

As the two magnets on the two oscillating devices repel each other, they are never in line on the same axis. Consequently, the status of the electrical equipment switches from the normally open (NO) to normally closed (NC) position or vice versa.



Requisiti dei contatti elettrici

Standard SPDT Contact

Standard microswitches are recommended for general purpose

Contact resistance: 15 mOhm Max (Initial value)

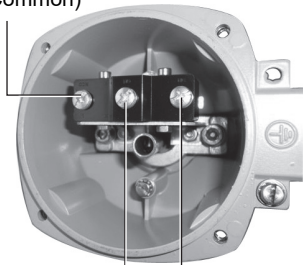
Mechanical life: >106

Electrical life: >105

V	~	A	=	Load
250	15		0,25	Resistive
	15		0,03	Inductive
125	15		0,5	Resistive
	15		0,05	Inductive
30	NA		6	Resistive
	NA		5	Inductive

SPDT execution

COM
(Common)



NO
(Normally Open)

NC
(Normally Closed)

DPDT execution

(two simultaneous SPDT contacts)

COM
(Common)



NO
(Normally Open)

NC
(Normally Closed)

3.3 Disassembly

Before disassembly of the flow switch disconnect or isolate any electricity supply or circuit and depressurize the pipe.

Warning: do not disassemble the level switch before the pipe has been emptied.

3.3.1 Open the housing.

3.3.2 Disconnect the electric circuit cables. Close the housing.

3.3.3 Unscrew the connection bolts.

3.3.4 Extract the instrument from its slot paying attention to avoid any damage to the vane.

Periodical inspections are necessary to guarantee complete efficiency of the unit. A regular maintenance programme starting from its initial installation is recommended. The suggested precautions are important to obtain the best operating conditions of the level control.

The instrument does not require preventive maintenance, however it is recommended that from time-to-time a check of the liquid fluidity is actioned to avoid any suspensions or deposits that can influence wetted parts.

4. Spare parts

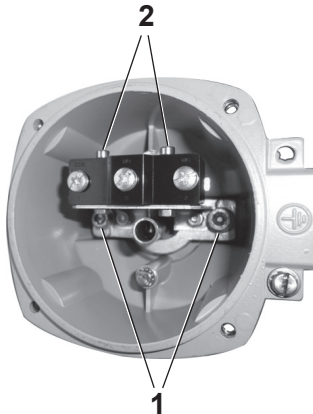
The available spare parts are detailed below. No other parts are supplied as spares.

Available spares

Contacts

To replace the contact:

1. Open the housing and remove the visual indicator (if present).
2. Disconnect cables from the electrical circuit, taking note of their position on the microswitch.
3. Unscrew the screws (1) and remove the block with the switch.
4. Unscrew the screws (2) and remove the switch from the bracket.
5. Place the new switch onto the bracket and secure it by tightening the screws (2).
6. Place the block with the switch and secure it by tightening the screws (1).
7. Reconnect the electrical cables and close the housing after repositioning the visual indicator (if present).



How to order spares

Always order spares by using the description given in the column headed 'Available spares' and state the size and serial number of the unit which is indicated on the name-plate:



Example: N°1 off Contact for flow switch for Spirax Sarco Colima FLU series having DN50 flanged ASME 150 RF connections - Serial number 123456.

SERVICE

For technical support, please contact our local Sales Engineer or our Head Office directly:

Spirax Sarco S.r.l. - Technical Assistance

Via per Cinisello, 18 - 20834 Nova Milanese (MB) - Italy

Tel.: (+39) 0362 4917 257 - (+39) 0362 4917 211 - Fax: (+39) 0362 4917 315

E-mail: support@it.spiraxsarco.com

LOSS OF GUARANTEE

Total or partial disregard of above instructions involves loss of any rights to guarantee.

Spirax-Sarco S.r.l. - Via per Cinisello, 18 - 20834 Nova Milanese (MB) - Tel.: 0362 49 17.1 - Fax: 0362 49 17 307