



P.A. - S.p.A. - EQUIPAGGIAMENTI TECNICI DEL LAVAGGIO

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FL7 – FLOW SWITCH

Technical manual: E 823-04

Electro-mechanical device in which the fluid passage moves a magnetized piston that closes an electric circuit.

DN 10



- **28.0400.10** G3/8 FF 350 bar – 35 MPa - BLACK
 - **28.0400.38** G3/8 FF 350 bar – 35 MPa - BLACK
 - **28.0450.00** G3/8 FF 500 bar – 50 MPa - INOX BLUE
- Magnetic drive obtained by the plunging piston movement
 - Electrical insulation: class **IP55**
 - Magnetic probe casing made of antiframe material.

TECHNICAL SPECIFICATIONS

| | | | |
|-----------------------|------------------|-------------------------------|-------------------------|
| Rated voltage: | 12 ÷ 230 V AC/DC | Max. commutable power: | 60VA |
| Cable length: | 1250 mm | Electric wire: | 2 x 0,50mm ² |
| Max. current: | 3 A | Type of action: | 1C |

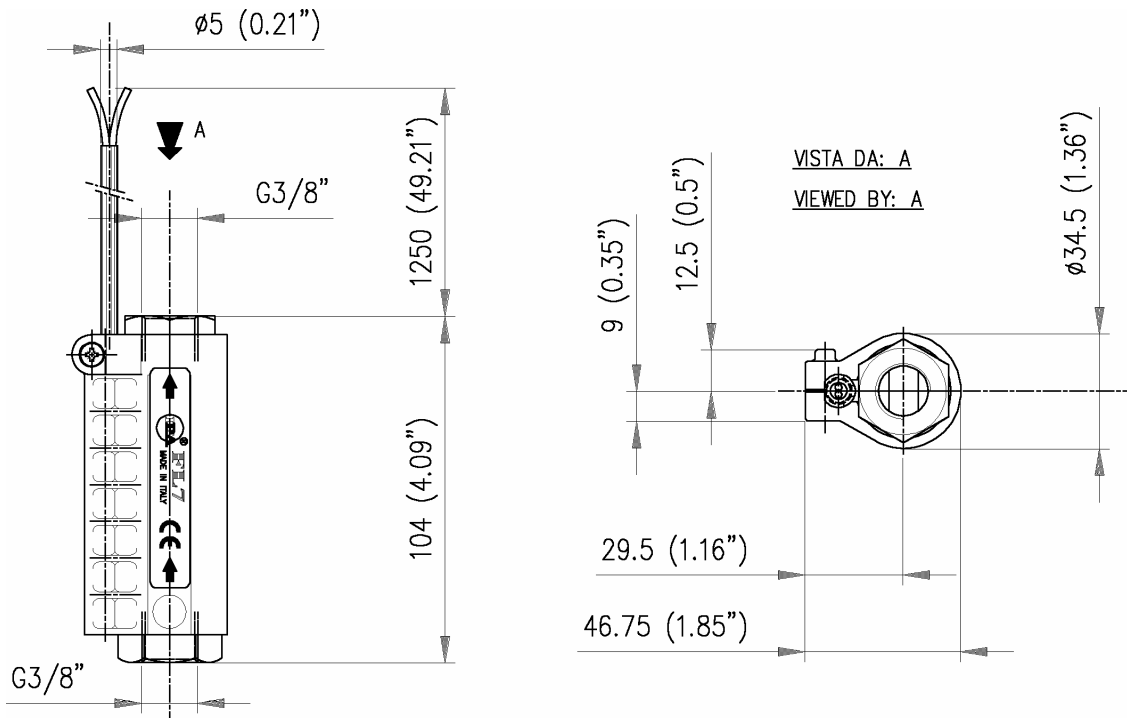
Electrical component life: from 100.000 to 1.000.000 commutations at max power

Pollution situation of the device control: High

| PART NUMBER | PERMISSIBLE PRESSURE | | MAX FLOW RATE IN PUMP DELIVERY (1) | | MIN FLOW RATE HORIZONTAL INTERVENTION | | MIN FLOW RATE VERTICAL INTERVENTION | | MAX WORK TEMPERATURE | | WEIGHT | | INLET OUTLET |
|-------------|----------------------|------|------------------------------------|-----|---------------------------------------|-----|-------------------------------------|-----|----------------------|-----|--------|-----|--------------|
| | bar | psi | l/min | USG | l/min | USG | l/min | USG | °C | °F | g | lbs | |
| 28.0400.10 | 390 | 5650 | 60 | 16 | 6 | 1.6 | 9 | 2.4 | 75 | 165 | 430 | 0.9 | G 3/8" F |
| 28.0400.38 | 390 | 5650 | 60 | 16 | 3 | 0.8 | 4.5 | 1.2 | 75 | 165 | 430 | 0.9 | G 3/8" F |
| 28.0450.00 | 560 | 8100 | 60 | 16 | 6 | 1.6 | 9 | 2.4 | 75 | 165 | 430 | 0.9 | G 3/8" F |

(1) Max flow rate allowed for use in pump intake: **30 l/min (8 USGpm)**

DIMENSIONAL DRAWING



SELECTION

This product is to be utilized with clean fresh water, even slightly additivated with normal detergents. For use involving different or corrosive liquids, contact the PA Technical department.

Choose the flow switch in line with the work data of the system (max pressure, max flow and max temperature of the system) . In any case, the pressure of the machine must not exceed the **permissible pressure** imprinted on the flow switch.

Verify also the real value of voltage and current of the system: they have to be kept within the indicated max value.

FUNCTION

The flow switch detects the presence of water flow on the inside of the system by means of a piston which is shifted by the water itself. When the piston is moved by the water flow, the magnets contained internally, stimulate a reed switch that closes the electric circuit.

INSTALLATION

This accessory can be installed horizontally or vertically. The water flow has to be directed as per the direction of the arrows inscribed on the plastic casing of the flow switch.

Connection to the Hydraulic system.

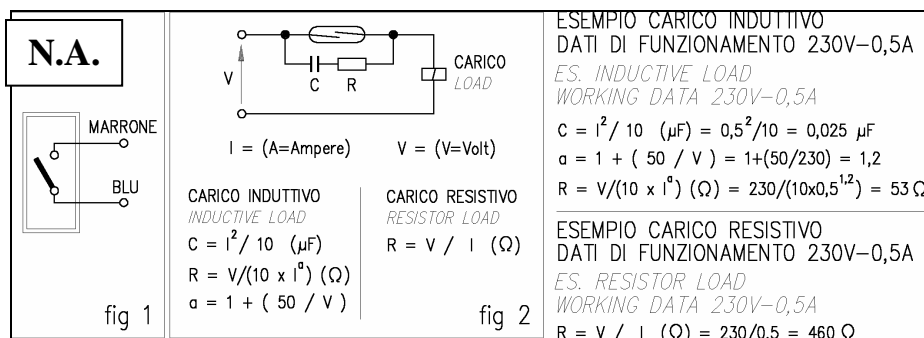
Use correct fittings in line with the system performance. Avoid restrictions on the passage diameters that may cause malfunctions. This accessory, on a machine that produces hot water, must be fitted upstream of the heat generator.

Connection to the Electric circuit.

For the connection of the electric circuit, see **fig. 1**

Electrical installation is to be carried out by qualified personnel.

This product must be fitted on an earthed hydraulic system.



ELECTRICAL LIFETIME OF THE CONTACT

The electric circuit, contained in the probe, consists of a reed switch that can function up to 1 million operations. Current or Voltage in excess, superior to the allowed limits, damage considerably the contacts reducing the electric lifetime (pitting; sticking). To prevent these phenomena, it is necessary to evacuate with attention the transient situations in which the take off current might be 10/12 times the normal current. Even the interruption of inductive loads can make the circuit reach high voltage readings in the order of thousands of volts. Therefore, take care in these situations of overload and excess voltage which are created during starting with the circuit closure (start current) and, at closure, with the circuit aperture (detached tension).

In order to prevent these distortions it is necessary to install adequate protections for the system. There are many circuits to choose from and one of the most common with effective remedy is seen on **fig.2**.

In order to prevent malfunctions, the flow switch must not be set near heat or magnetic sources. Do not store or handle on full metal structures nor test the magnetic strength of the piston on magnetic material. It is advisable to properly clean the system before operation in order to expel possible residual metal in case found in the tubes. The electric probe is stamped at the end of the exit cable, indicating the setting in relation to the brass body and allows a correct assembly of the "reed" bulb. In case of intervention or repair, follow this indication: incorrect positioning could damage the probe.

PROBLEMS AND SOLUTIONS

| PROBLEMS | PROBABLE CAUSES | SOLUTIONS |
|--------------------------|---|---|
| The piston does not move | <ul style="list-style-type: none"> - Insufficient flow - Incorrect flow direction - Piston jammed by scale and debris | <ul style="list-style-type: none"> - Check and eliminate eventual leaks in the line - Reassemble and respect the correct flow direction - Clean or replace |
| No electric signal | <ul style="list-style-type: none"> - Damaged electric contacts or "reed" switch - Electric connection incorrect or disconnected - Un-phased probe or displaced | <ul style="list-style-type: none"> - Replace electric probe; install protective circuit if absent - Renew - Renew in correct position |

MAINTENANCE

Every 400 working hours or 10,000 cycles, check the magnetic pin (pos. 5 in exploded view) and clean. Use only original PA spares, in order to benefit for a correct function and long reliability.

Maintenance has to be carried out by specialized technicians.

The Manufacturer is not to be considered responsible for damage as a result from incorrect fitting and maintenance.

REGULATIONS

The accessory hereby described bears the CE marking in accordance with the Norms and Directives applied on the **Declaration of Conformity**.

For a correct utilization, follow the directions described in this manual and re-print them on the Use and maintenance manual of the machine.

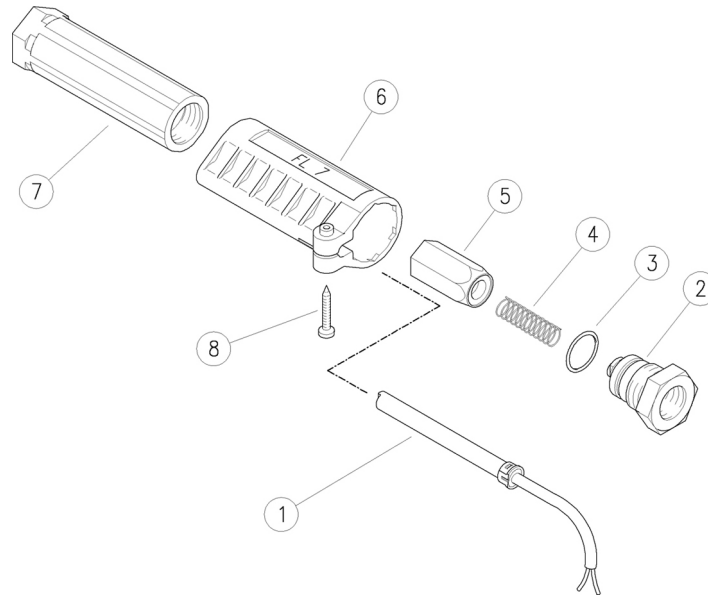
Make sure that you are given the original Conformity Declaration for the accessory chosen. The present manual is valid for all Flow switches named **FL7**

Technical data, descriptions and illustrations are indicative and liable to modification without notice.

| | |
|---|---------------|
| Instruction manual, maintenance, installation, spare parts. For a correct utilization follow the directions of this manual. <u>Re-print them on the use and maintenance booklet of the machine.</u> | n. 12.9803.04 |
| | |

28.0400.10 FL7 Flow switch 3/8FF Bsp

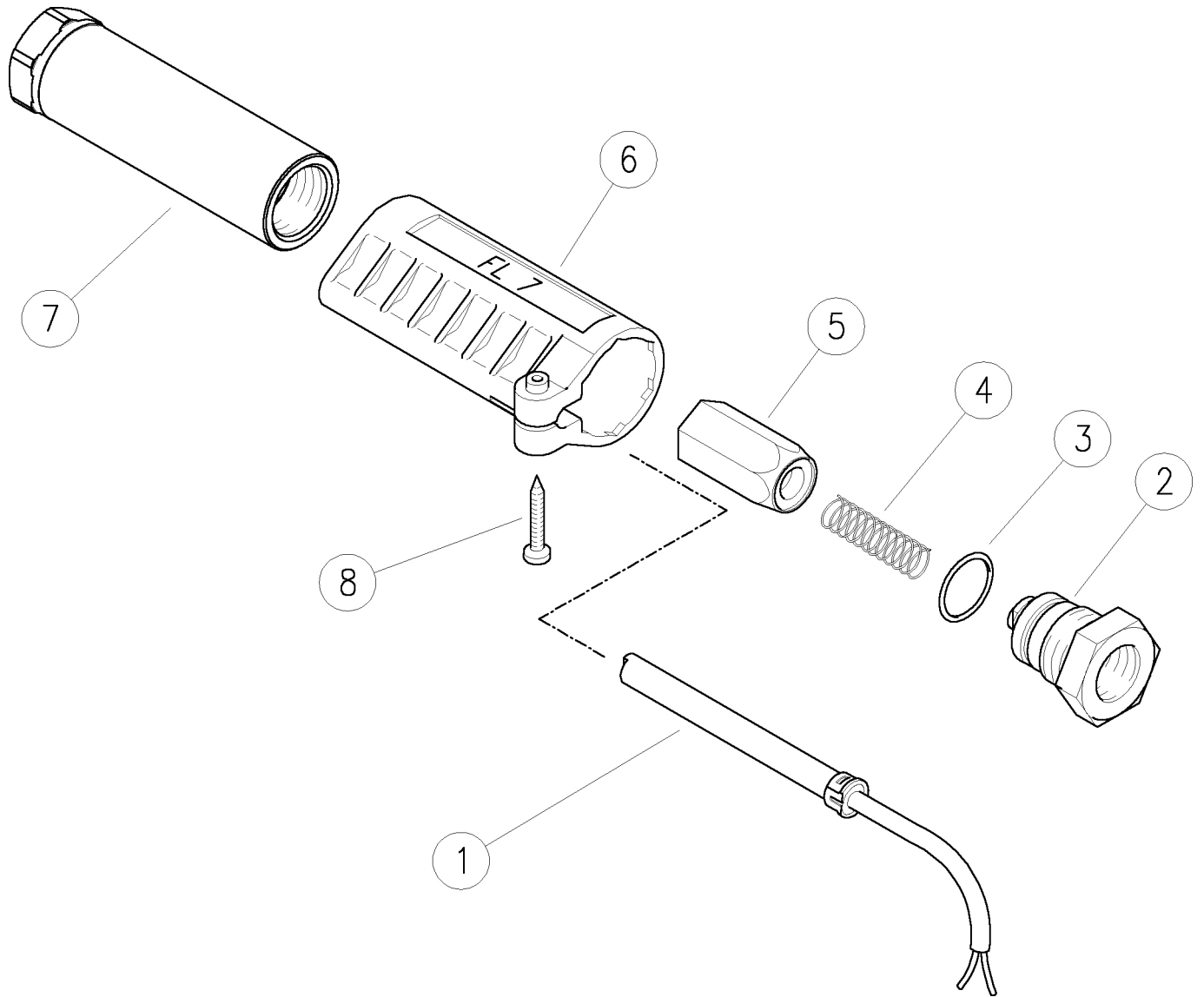
28.0400.38 FL7 Flow switch 3/8FF Bsp, 4 l/min



| Pos. | P/N | Description | Q.ty | K1 | K2 | K3 | K4 | |
|------|------------|---|------|----|----|----|----|----|
| 1 | 28.0518.23 | Feeler, 3A +1250 mm cable | 1 | | | | | 5 |
| 2 | 28.0404.31 | Fl/sw. coupl., M22M-3/8F Bsp br. | 1 | | | | | 3 |
| 3 | 10.3066.01 | O-ring, 1,78x15,6 mm Ni 85 | 1 | | | | | 10 |
| 4 | 28.0406.51 | Spring, 0,4x8,4x33 mm Sst. | 1 | | | | | 5 |
| 5 | 28.0410.23 | Magnet holder, brass | 1 | | | | | 5 |
| 5 | 28.0418.23 | Magnet holder, brass (1) | 1 | | | | | 5 |
| 6 | 28.0408.84 | Flow switch housing, PA | 1 | | | | | 5 |
| 7 | 28.0401.31 | Fl/sw. housing, M22x1,5F-3/8F Bsp brass | 1 | | | | | 3 |
| 8 | 16.3021.18 | S/tapping screw, DIN7981 2,5x16 mm | 1 | | | | | 10 |

(1) 28.0400.38

28.0450.00 FL7 inox Flow switch 3/8Bsp FF-50MPa



| Pos. | P/N | Description | Q.ty | K1 | K2 | K3 | K4 | | Pos. | P/N | Description | Q.ty | K1 | K2 | K3 | K4 | |
|------|------------|----------------------------|------|----|----|----|----|----|------|------------|---------------------------------------|------|----|----|----|----|----|
| 1 | 28.0518.23 | Feeler, 3A +1250 mm cable | 1 | | | | | 5 | 5 | 28.0453.23 | Sst. magnet holder | 1 | | | | | 5 |
| 2 | 28.0456.51 | Sst plug M22-3/8 F Bsp | 1 | | | | | 3 | 6 | 28.0452.84 | Flow switch housing, blue | 1 | | | | | 5 |
| 3 | 10.3066.01 | O-ring, 1,78x15,6 mm Ni 85 | 1 | | | | | 10 | 7 | 28.0451.51 | FI/sw. housing, M22x1,5F-3/8F Bsp sst | 1 | | | | | 3 |
| 4 | 28.0406.51 | Spring, 0,4x8,4x33 mm Sst. | 1 | | | | | 5 | 8 | 16.3021.18 | S/tapping screw, DIN7981 2,5x16 mm | 1 | | | | | 10 |

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