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## TWO- AND THREE-WAY MOTORIZED ZONE VALVES WITH SPRING RETURN FOR HYDRAULIC CIRCUITS



These products meet the basic requirements of the following Directives:  
73/23/EC Low Voltage Directive  
89/336/EC Electromagnetic Compatibility

SERIE  
SF

### Introduction

This User's Guide is not a complete description of the valve nor a detailed illustration of how it works. Users, however, will find here all they normally need to know, how to use the valve safely. Valve selection is done based on its technical and hydraulic characteristics. The valves shall be installed as shown in Pic. 1, 2 and 3.

The flow direction is indicated on the valve body. Packing and all that is inside the packing (plastic bags, polystyrene etc.) must be kept out of the reach of children as they are potential sources of danger if ingested. The product must be stored in such environment where it is protected against dust and humidity. Failure to respect the instructions given in this Guide, negligence or poor and mistaken use of the valve will invalidate warranty and relieve the Manufacturer for any damage caused by it. The Manufacturer guarantees its products for a period of 24 months from the date of manufacture. Warranty coverage consists exclusively of free of charge repair or replacement of those parts that are found defective after a thorough examination by the engineering Office of the Manufacturer. **The Warranty, which excludes any responsibility for direct and indirect damage**, is limited exclusively to defects in materials and becomes null and void whenever the parts that are returned are found to have been dismantled, tampered with or repaired outside the Manufacturer's premises. Material that is returned, even if it is under Warranty, must be sent back carriage free.

Removal of the safety devices mounted on the valve automatically terminates the Warranty and the Manufacturer's responsibility.

Each valve has an identification label that indicates:

- name and address of the Manufacturer
- EC marking - indication of series or type
- possibly serial (lot) number
- year of manufacture
- main technical data

It is forbidden to use the valve in machines/systems before these have been declared to comply with EEC Machine Directive 89/392 and subsequent modifications. After its lifetime expires, the valve can be sent back carriage free to the Manufacturer.

The valve must be installed in systems that are compatible with its characteristics. Before connecting it to the system check that:

- system pipelines have been thoroughly cleaned to eliminate all residue
- the axes of paths A and B in the valve body are at least 135 mm from external restraints that could make it difficult or impossible to remove the valve cover
- the valve is not installed upside down, i.e. with the cover facing down
- electrical power is as indicated on the valve box
- pressure in the plumbing mains and the pressure difference between paths A and B or AB is suitable for valve operation (see Technical Characteristics).

It is also important to note that valve surface temperatures can be quite high when it is carrying high temperature fluids. We recommend that operators or users wear protective devices (gloves etc.).

### Warning: before start-up

Electrical safety of the valve is achieved only when the valve is correctly connected to an efficient ground system made according to system safety regulations. The valve must be wired to a single-phase supply grid using the three-pole cable and respecting ground phases. The electrical supply is controlled by an external control device (thermostat etc.). Make sure the label data correspond to supply grid data. If the power supply cable is replaced, it must be replaced by a standardized „HAR H05 VV-F“ or „ HAR HTI05“ 3x0.75 mm.

#### \* Access to electrical components

- **Always interrupt the electrical power supply before performing any electrical work**
- Unscrew the screw that fastens the cover and access the electrical connection zone

### Motor supply

- (L) = brown line
- (N) = light blue neutral
- ( ⊥ ) = yellow green ground

Auxiliary switches	Microswitch signal output			
	M1	M1S	M2S	M2S
No of microswitches installed	1	1	1°	2°
C (common)	black	black	black	green
NO (normally open)	black (or grey)	grey	orange	white
NC (normally closed)	/	red	grey	red

\* **M2S** have a motor supply cable with the 3 above indicated wires and a 6-wire cable for the signals from the 2 microswitches, standardized only according to „HAR H05 VV-F“.

### Manual lever

A lever is placed on the side of the cover and permits manual positioning of the shut-off in an intermediate position. This permits, in the case of a 2-way valve, the valve to be kept open and, in the case of a 3-way valve, to keep paths A and simultaneously open. To do this, just push it forward and lock it in the „MAN“ position, meshing it in the tooth (see Fig. 3). This is useful when emptying and refilling the pipeline system. The valve automatically returns to „AUTO“ from „MAN“ when electrically powered after manual use is terminated.

**NOTE: Push the manual lever slowly to prevent overstressing the motor + toothed segment since this may damage the motor or the toothed segment.**

### Auxiliary switches

All versions are also available with one or two auxiliary microswitches. These are activated by opening the valve using a cam. The microswitch contacts are independent from the valve's electric circuit. Versions with a single-pole microswitch (version M1) and a 2-pole microswitch (version M15) are available as well as versions with 2 microswitches (version M2 or M2S). A special kit can be furnished for installing an auxiliary single-pole microswitch on valve versions that are not equipped with it at the factory (kit M1). Kits M1S, M2 or M2S cannot be mounted on valve versions which did not mount them originally.

### Ordinary maintenance instructions

The valve does not require maintenance when the plumbing system is not in use. The valve does not require specific cleaning or maintenance procedures. Check that its electrical supply cable is in good condition. If it is necessary to operate or clean the valve, make sure to interrupt the electrical power supply and that fluid is not passing through the valve. Turn to a Service Center whenever problems are encountered.

## Technical characteristics

Rated supply voltage	230 V a.c. (24, 110 a 240 V a.c.;50Hz) are available
Power input	5 ÷ 6 W
El. protection	IP 20 IEC 529 Ref. European Standards CEI EN 60529
Aux. contact load	3 A 250 V a.c.
Maximum pressure differential	for standard valves see table of hydraulic characteristics otherwise see the data printed on the cover label
PN Nominal pressure	10 kg/cm <sup>2</sup>
Flow temperature limits	5 ÷ 110 °C
Max. ambient temperature	60° C
Nominal opening time	10 s for 2-way valves, 20 s for 3-way valves
Nominal closing time	4 s for 3-way valves, 6 s for 3-way valves
Weight	1 ÷ 1.1 kg
Total length of standard cable	550 mm

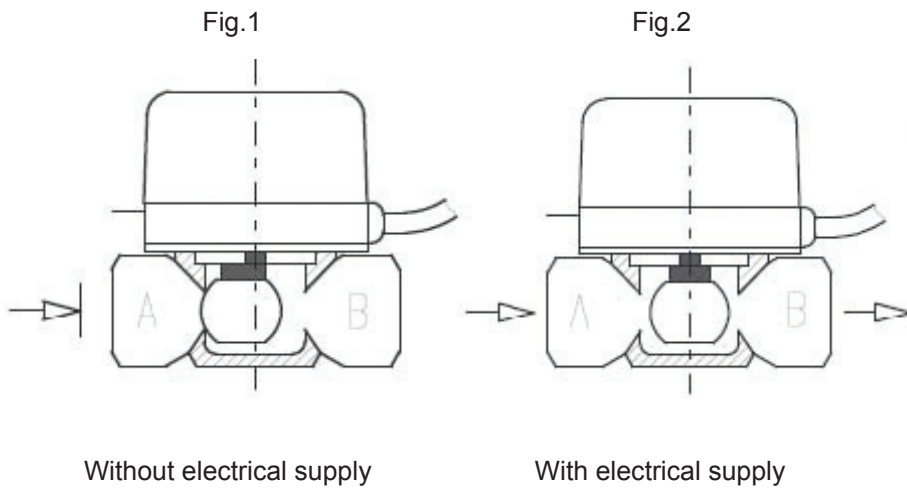
### Hydraulic Characteristics (for standard valves)

Valve	3-way (diverter) valves		2-way valves	
	Maximum pressure differential	KVS	Maximum pressure differential	KVS
SF 15, SF 15 EB, SF 16 EB	1.57 kg/cm <sup>2</sup> (154 kPa)	6.6m <sup>3</sup> /h	0.92 kg/cm <sup>2</sup> (90.2kPa)	6m <sup>3</sup> /h
SF 20, SF 20-E, SF 20 EB	1.57 kg/cm <sup>2</sup> (154 kPa)	7.8m <sup>3</sup> /h	0.92 kg/cm <sup>2</sup> (90.2kPa)	7m <sup>3</sup> /h
SF 25, SF 25-E, SF 25 B	0.63 kg/cm <sup>2</sup> (61.8kPa)	12.6m <sup>3</sup> /h	0.92 kg/cm <sup>2</sup> (90.2kPa)	9m <sup>3</sup> /h

## Two-way valves

These valves are furnished with path **A** normally closed (without electrical supply, see Fig. 1), where the shut-off ball closes path **A** because of the elastic force exercised by the return springs. When the electrical supply is activated, the servomotor overcomes the force of the springs and moves the ball in that position until the electrical supply is interrupted (Fig. 2). When the electrical supply is interrupted the return springs put the valve back on path **A** in about 4 seconds.

The version marked N.O. (NORMALLY OPEN) acts in reverse, i.e. the ball is in open position when not energized.



## Three-way (diverter) valves

These valves are furnished with path **A** normally closed (without electrical supply, see Fig. 1), where the shut-off ball closes path **A** because of the elastic force exercised by the return springs. When the electrical supply is activated, the motor overcomes the force of the springs and moves the ball from path **A** to path **B** in about 20 s and keeps it in that position until the electrical supply is interrupted (Fig. 2). When the electrical supply is interrupted, the return springs shift the valve back on path **A** in about 6 s.

