

Safety modular valves with spool position monitoring

On-off, direct, conforming to Machine Directive 2006/42/EC - certified by



CE

SAFETY CERTIFIED

HF-0611/FV

- ① Body
- ② Spool
- ③ Inductive position switch **FV**
- ④ Sensor electric connector (supplied with the valve)
- ⑤ Coil electric connector (to be ordered separately)

HF are spool type, direct operated solenoid valves in modular execution, normally used for safety functions to shut-off or to by-pass the hydraulic user lines.

They are provided with **FV** inductive position switch for spool position monitoring, **CE** marked and certified by **TÜV** in accordance with safety requirements of Machine Directive 2006/42/EC.

The modular execution permits to make compact functional circuits, by the stack mounting with other modular valves and solenoid valves size 06.

Applications

Synco press brakes, vertical presses, plastic injection, ceramic presses.

Certification

The **TÜV** certificate can be downloaded from www.atos.com, catalog on line, technical information section.

Mounting Surface: **ISO 4401 size 06**

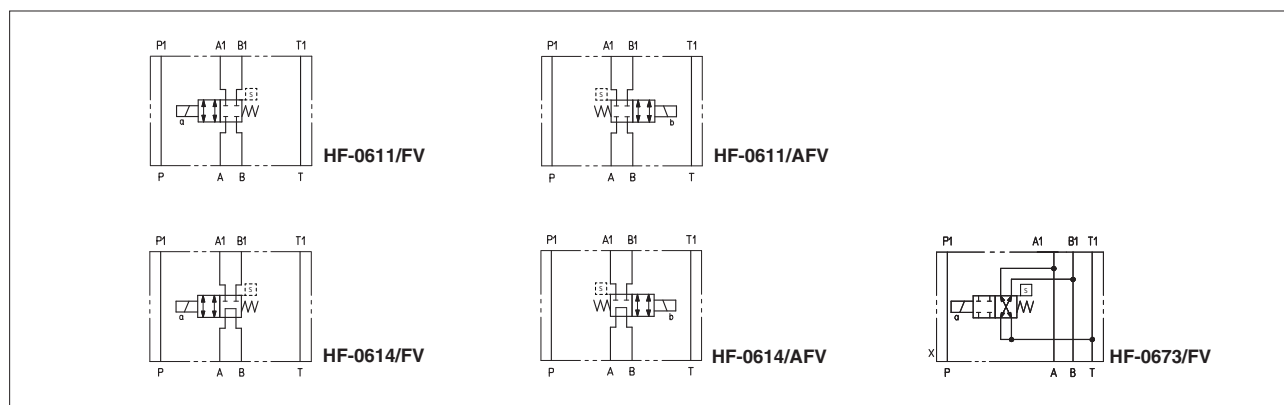
Max flow: **60 l/min**

Max pressure: **350 bar**

1 MODEL CODE

| | | | | | | | | | |
|--|-----------|----------|------------|-------------|------------|----------|--|---------------|--|
| HF-0 | 61 | 1 | / A | / FV | - E | X | 24DC | ** | /* |
| Modular directional valve size 06 | | | | | | | | Series number | Seals material, see section 4: - = NBR PE = FKM |
| <p>Valve configuration, see section 2</p> <p>61 = single solenoid, central plus external position, spring centered</p> <p>67 = single solenoid, central plus external position, spring offset</p> | | | | | | | <p>Voltage code, see section 7</p> | | |
| <p>Spool type: 1, 3, 4 see section 2</p> | | | | | | | <p>X = without connector See section 6 for available connectors, to be ordered separately</p> | | |
| <p>Options:</p> <p>A = solenoid mounted at side of port B</p> <p>B = orientation of coil and proximity connectors rotated of 180°</p> | | | | | | | <p>E = solenoid OE for AC and DC supply</p> | | |
| <p>Optional spool position monitor:</p> <p>FV = inductive position switch (only for HF-0611, HF-0614, HF-0673)</p> | | | | | | | | | |

2 CONFIGURATION



3 MAIN CHARACTERISTICS

| | |
|--|---|
| Assembly position / location | Any position |
| Subplate surface finishing | Roughness index Ra 0,4 - flatness ratio 0,01/100 (ISO 1101) |
| MTTFd values according to EN ISO 13849 | 150 years, for further details see technical table P007 |
| Compliance | CE to Machine Directive 2006/42/EC. - EC type-examination certificate for safety components (1) - ISO 13849 category 1, PLC in high demand mode CE to Low Voltage Directive 2014/35/EU and Machine Directive 2006/42/EC. RoHS Directive 2011/65/EU as last update by 2015/65/EU REACH Regulation (EC) n°1907/2006 |
| Ambient temperature | Standard = -30°C ÷ +70°C /PE option = -20°C ÷ +70°C |
| Flow direction | As shown in the symbols of table 2 |
| Operating pressure | Ports P,A,B: 350 bar ; Port T: 210 bar (DC solenoid); 160 bar (AC solenoid) |
| Maximum flow | 60 l/min |

(1) The type-examination certificate can be download from www.atos.com

3.1 Coils characteristics

| | |
|-----------------------------------|--|
| Insulation class | H (180°C) for DC coils F (155°C) for AC coils Due to the occurring surface temperatures of the solenoid coils, the European standards EN ISO 13732-1 and EN ISO 4413 must be taken into account |
| Protection degree to DIN EN 60529 | IP 65 (with mating connectors correctly assembled) |
| Relative duty factor | 100% |
| Supply voltage and frequency | See electric features 7 |
| Supply voltage tolerance | ± 10% |
| Certification | cURus North American standard |

4 SEALS AND HYDRAULIC FLUID - for other fluids not included in below table, consult our technical office

| | | | |
|--------------------------------------|--|----------------------------|----------------------|
| Seals, recommended fluid temperature | NBR seals (standard) = -20°C ÷ +80°C, with HFC hydraulic fluids = -20°C ÷ +50°C FKM seals (/PE option) = -20°C ÷ +80°C | | |
| Recommended viscosity | 15 ÷ 100 mm ² /s - max allowed range 2,8 ÷ 500 mm ² /s | | |
| Max fluid contamination level | ISO4406 class 20/18/15 NAS1638 class 9, see also filter section at www.atos.com or KTF catalog | | |
| Hydraulic fluid | Suitable seals type | Classification | Ref. Standard |
| Mineral oils | NBR, FKM | HL, HLP, HLPD, HVLP, HVLPD | DIN 51524 |
| Flame resistant without water | FKM | HFDR, HFDR | ISO 12922 |
| Flame resistant with water | NBR | HFC | |

5 OPTIONS

A = Solenoid mounted at side of port B. In standard versions, solenoid is mounted at side of port A.

B = Orientation of coil and proximity connectors rotated of 180°



the manual operation is not permitted for safety valves, than they are provided with solenoid blind rings to prevent the access to the manual override.

6 ELECTRIC CONNECTORS ACCORDING TO DIN 43650 (to be ordered separately)

| | | | |
|---------------------------------------|---|--|---|
| 666, 667 (for AC or DC supply) | 669 (for AC supply) | CONNECTOR WIRING | |
| | | 666, 667 1 = Positive ⊕ 2 = Negative ⊖ ⊕ = Coil ground | 669 1,2 = Supply voltage V _{ac} 3 = Coil ground |
| | | SUPPLY VOLTAGES | |
| 666 All voltages | 667 24 AC or DC 110 AC or DC 220 AC or DC | 669 110/50 AC 110/60 AC 230/50 AC 230/60 AC | |

Note: for electronic connectors type **E-SD**, see tab. K500

7 ELECTRIC FEATURES

| External supply nominal voltage $\pm 10\%$ | Voltage code | Type of connector | Power consumption (2) | Code of spare coil | |
|--|---------------------|-------------------|-----------------------|--------------------|---------------------|
| 12 DC | 12 DC | 666 or 667 | 30 W | COE-12DC | |
| 14 DC | 14 DC | | | COE-14DC | |
| 24 DC | 24 DC | | | COE-24DC | |
| 28 DC | 28 DC | | | COE-28DC | |
| 48 DC | 48 DC | | | COE-48DC | |
| 110 DC | 110 DC | | | COE-110DC | |
| 125 DC | 125 DC | | | COE-125DC | |
| 220 DC | 220 DC | | | COE-220DC | |
| 110/50 AC | 110/50/60 AC | | | 58 VA (3) | COE-110/50/60AC (1) |
| 230/50 AC | 230/50/60 AC | | | | COE-230/50/60AC (1) |
| 115/60 AC | 115/60 AC | 80 VA (3) | COE-115/60AC | | |
| 230/60 AC | 230/60 AC | | COE-230/60AC | | |
| 110/50 AC - 120/60 AC | 110 RC | 669 | 30 W | COE-110RC | |
| 230/50 AC - 230/60 AC | 230 RC | | | COE-230RC | |

(1) Coil can be supplied also with 60 Hz of voltage frequency: in this case the performances are reduced by 10 ÷ 15% and the power consumption is 52 VA.

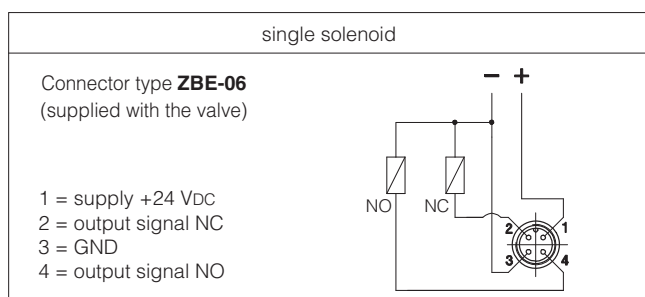
(2) Average values based on tests performed at nominal hydraulic condition and ambient/coil temperature of 20°C.

(3) When solenoid is energized, the inrush current is approx 3 times the holding current.

8 TECHNICAL CHARACTERISTICS OF FV INDUCTIVE POSITION SWITCH

| Type of switch | contactless inductive position switch with integrated amplifier | |
|-------------------------|---|--|
| Supply voltage [V] | 20÷32 | |
| Ripple max [%] | ≤ 10 | |
| Max current [mA] | 400 | |
| Reaction time [ms] | 15 | |
| Max peak pressure [bar] | 400 | |
| Mechanical life | virtually infinite | |
| Switch logic | PNP | |

9 CONNECTING SCHEME OF FV INDUCTIVE POSITION SWITCH



Note: the /FV position switch is not provided with a protective earth connection

10 STATUS OF OUTPUT SIGNAL FOR MODULAR VALVES WITH /FV INDUCTIVE POSITION SWITCH

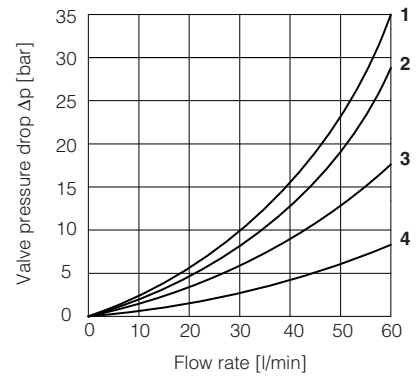
| | Configuration 611 | Configuration 614 | Configuration 673 |
|-------------------------|--------------------------|--------------------------|--------------------------|
| Hydraulic configuration | | | |
| spool position | | | |
| pin 2 | ON: | ON: | ON: |
| pin 4 | ON: | ON: | ON: |
| | OFF: | OFF: | OFF: |
| | OFF: | OFF: | OFF: |

Note: FV position switch can be electrically wired by the customer as NO or NC and then the status of the output signal will be in accordance to the selected configuration

= intermediate spool position corresponding to the hydraulic configuration change

11 Q/ΔP DIAGRAMS based on mineral oil ISO VG 46 at 50°C

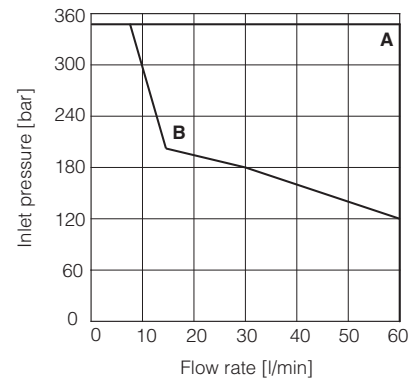
| Flow direction \ Valve type | A→A1 | B→B1 | A→B | A1→T | B1→T |
|-----------------------------|------|------|-----|------|------|
| HF-0611 | 1 | 2 | | | |
| HF-0614 | 1 | 2 | 3 | | |
| HF-0673 | 3 | 3 | | 4 | 4 |



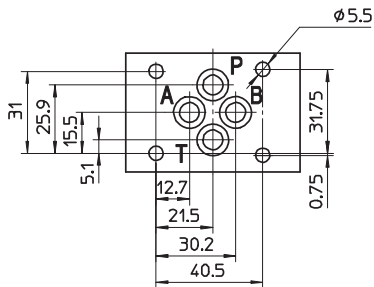
12 OPERATING LIMITS based on mineral oil ISO VG 46 at 50°C

The diagrams have been obtained with warm solenoids and power supply at lowest value ($V_{nom} - 10\%$)

| Valve type | Curve |
|------------------|----------|
| HF-0611 | A |
| HF-0614, HF-0673 | B |

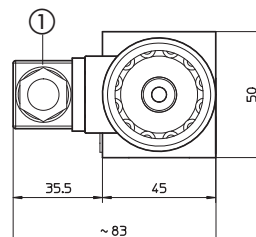
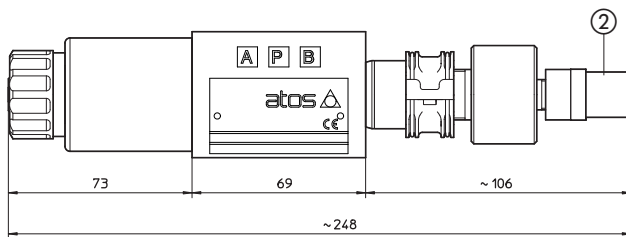


13 DIMENSIONS [mm]



ISO 4401: 2005
Mounting surface: 4401-03-02-0-05
 Seals: 4 OR 108
 Ports P, A, B, T: $\varnothing = 7.5$ mm (max).

HF-0611/FV
HF-0614/FV
HF-0673/FV



- ① = Power supply connector code 666, 667 or 669, to be ordered separately
- ② = Inductive position switch connector code ZBE-06, supplied with the valve