**Solenoid modular valves**

direct, modular, spool type

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

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

Mounting Surface: ISO 4401 size 06  
Max flow: 60 l/min  
Max pressure: 350 bar

---

**1 MODEL CODE**

<table>
<thead>
<tr>
<th>HF-0</th>
<th>61</th>
<th>1</th>
<th>A</th>
<th>E</th>
<th>X</th>
<th>24DC</th>
<th>**</th>
<th></th>
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</thead>
<tbody>
<tr>
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<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
</tbody>
</table>

Modular directional valve, size 06

Valve configuration, see section 2
61 = single solenoid, central plus external position, spring centered
67 = single solenoid, central plus external position, spring offset

Spool type: 1, 3, 4 see section 2

Options:
- A = solenoid mounted at side of port B
- B = orientation of coil and proximity connectors rotated of 180°
- WP = prolonged manual override protected by a rubber cap

**Voltage code. see section 7**

- X = without connector, only for E solenoid
- See section 6 for available connectors, to be ordered separately
- Coils with special connectors
  - XJ = AMP Junior Timer connector
  - XX = Deutsch connector
  - XS = Lead Wire connection

**Series number**
- **E** = NBR
- **PE** = FKM
- **BT** = HNBR

**Seals material, see section 7**
- **X**

---

**2 CONFIGURATION**

---

Table D050-0/E
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
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 /BT option -40°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

3.1 Coils characteristics

Insulation class
H (180°C) for DC coils  F (155°C) for AC coils

Protection degree to DIN EN 60529
IP 65 (with mating connectors correctly assembled)

Relative duty factor
100%

Supply voltage and frequency
See electric features

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
HNBR seals (/BT option) = -40°C + 60°C, with HFC hydraulic fluids = -40°C + 50°C

Recommended viscosity
15÷100 mm²/s - max allowed range 2.8 ÷ 500 mm²/s

Max fluid contamination level
ISO4406 class 20/15 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, HNBR
HL, HLP, HLPD, HVLP, HVLPD
DIN 51524

Flame resistant without water
FKM
HFDU, HFDR
ISO 12922

Flame resistant with water
NBR, HNBR
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°

WP = Prolonged manual override protected by a rubber cap (not for FV)

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

<table>
<thead>
<tr>
<th>666, 667</th>
<th>669</th>
</tr>
</thead>
<tbody>
<tr>
<td>(for AC or DC supply)</td>
<td>(for AC supply)</td>
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</table>

**CONNECTOR WIRING**

<table>
<thead>
<tr>
<th>666, 667</th>
<th>669</th>
</tr>
</thead>
<tbody>
<tr>
<td>666</td>
<td></td>
</tr>
<tr>
<td>667</td>
<td></td>
</tr>
<tr>
<td>669</td>
<td></td>
</tr>
</tbody>
</table>

**SUPPLY VOLTAGES**

<table>
<thead>
<tr>
<th>666</th>
<th>667</th>
<th>669</th>
</tr>
</thead>
<tbody>
<tr>
<td>24 AC or DC</td>
<td>110 AC or DC</td>
<td>110/50 AC</td>
</tr>
<tr>
<td>220 AC or DC</td>
<td>230/50 AC</td>
<td>230/60 AC</td>
</tr>
</tbody>
</table>

Note: for electronic connectors type E-SD, see tab. K500
7 ELECTRIC FEATURES

<table>
<thead>
<tr>
<th>External supply nominal voltage ± 10%</th>
<th>Voltage code</th>
<th>Type of connector</th>
<th>Power consumption (W)</th>
<th>Code of spare coil</th>
</tr>
</thead>
<tbody>
<tr>
<td>12 DC</td>
<td>12 DC</td>
<td></td>
<td>666 or 667</td>
<td></td>
</tr>
<tr>
<td>14 DC</td>
<td>14 DC</td>
<td></td>
<td>666 or 667</td>
<td></td>
</tr>
<tr>
<td>24 DC</td>
<td>24 DC</td>
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<td>666 or 667</td>
<td></td>
</tr>
<tr>
<td>28 DC</td>
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<td>48 DC</td>
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<td>110 DC</td>
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<td>666 or 667</td>
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<tr>
<td>125 DC</td>
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<td></td>
</tr>
<tr>
<td>220 DC</td>
<td>220 DC</td>
<td></td>
<td>666 or 667</td>
<td></td>
</tr>
<tr>
<td>110/50 AC</td>
<td>110/50/60 AC</td>
<td></td>
<td>666 or 667</td>
<td></td>
</tr>
<tr>
<td>230/50 AC</td>
<td>230/50/60 AC</td>
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<td>666 or 667</td>
<td></td>
</tr>
<tr>
<td>115/60 AC</td>
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<td>666 or 667</td>
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<td>666 or 667</td>
<td></td>
</tr>
<tr>
<td>110/50 AC - 120/60 AC</td>
<td>110 RC</td>
<td></td>
<td>666 or 667</td>
<td></td>
</tr>
<tr>
<td>230/50 AC - 230/60 AC</td>
<td>230 RC</td>
<td></td>
<td>666 or 667</td>
<td></td>
</tr>
</tbody>
</table>

(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 preformed 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 QAP DIAGRAMS based on mineral oil ISO VG 46 at 50°C

9 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 (Vnom - 10%).
ISO 4401: 2005
Mounting surface: 4401-03-02-0-05
Seals: 4 OR 108
Ports P, A, B, T: Ø = 7.5 mm (max).

= Power supply connector code 666, 667 or 669, to be ordered separately