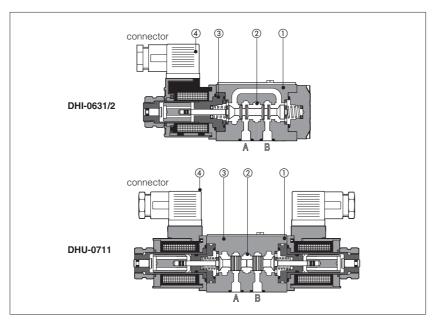
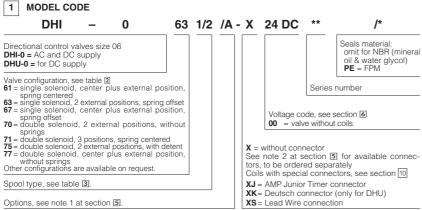


Solenoid directional valves type DHI and DHU

direct operated, ISO 4401 size 06





DHI and DHU are spool type, three or four way, two or three position direct operated solenoid valves designed to operate in oil hydraulic systems.

They are operated by wet and pressure sealed solenoid ③ with manual override and with coils certified according the North American standard **cURus**:

- **DHI** for AC and DC supply;
- DHU for DC supply with improved performances.

Moving parts are protected, lubricated and cushioned in oil.

Shell-moulding casting ① machined by transfer lines and then cleaned by thermal deburring.

Optimized flow paths largely cored with extrawide channels to tank for low pressure drops.

Interchangeable spools ② available in a wide variety of configurations.

DHU valves can be supplied with optional devices for control of switching times.

Standard electric/electronic connectors (4) able to satisfy the requirements of modern machines for electric interfaces characteristics.

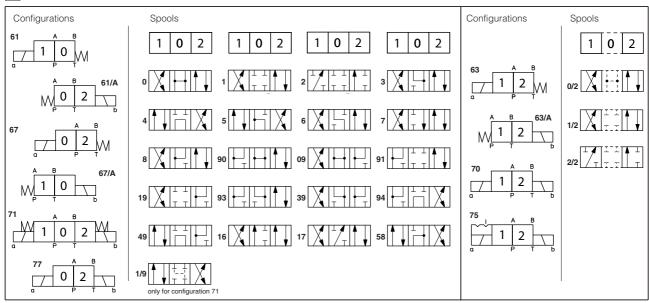
Coils are fully encapsulated (class H) and are easily replaceable without aid of tools

Rugged execution suitable for outdoor use.

Surface mounting ISO 4401 size 06. Max flow up to 60 l/min.

Max pressure: 350 bar.

2 CONFIGURATIONS and SPOOLS



3 MAIN CHARACTERISTICS OF DHI AND DHU DIRECTIONAL VALVES

| A 11 ''' /1 '' | | | | |
|--|-----|--|--|--|
| Assembly position / location | | Any position for all valves except for type - 070* (without springs) that must be installed with horizontal axis if operated by impulses | | |
| Subplate surface finishing | | Roughness index Ra 0,4 - flatness ratio 0,01/100 (ISO 1101) | | |
| Ambient temperature | | from -20°C to +70°C | | |
| Fluid | | Hydraulic oil as per DIN 51524 535; for other fluids see section □ | | |
| Recommended viscosity | | 15 ÷ 100 mm²/s at 40°C (ISO VG 15 ÷ 100) | | |
| Fluid contamination class | | ISO 4406 class 21/19/16 NAS 1638 class 10, in line filters of 25 μm (β25≥75 recommended) | | |
| Fluid temperature | | -20°C +60°C (standard seals and water glycol) -20°C +80°C (/PE seals) | | |
| Flow direction | | As shown in the symbols of tables 2 and 3 | | |
| Operating pressure | DHI | Ports P,A,B: 350 bar; | | |
| For versions with proximity swit- | | Port T: 120 bar | | |
| ches (/FI/NC and /FI/NO versions) maximum counter pressure | DHU | Ports P,A,B: 350 bar; | | |
| allowed on T port is 5 bar | | Port T 210 bar | | |
| Rated flow | | See diagrams Q/Δp at section 🛽 | | |
| Maximum flow | | 60 I/min see operating limits at section 8 | | |

4.1 Coils characteristics

| Insulation class | H (180°C) Due to the occuring surface temperatures of the solenoid coils, the European standar | | | | |
|---------------------------------------|--|--|--|--|--|
| | EN ISO 13732-1 and EN ISO 4413 must be taken into account | | | | |
| Connector protection degree DIN 43650 | IP 65 | | | | |
| Relative duty factor | 100% | | | | |
| Supply voltage and frequency | See electric feature 6 | | | | |
| Supply voltage tolerance | ± 10% | | | | |
| Certification | cURus | | | | |

4 NOTES

1 Options

A = Solenoid mounted at side of port B (only for single solenoid valves). In standard versions, solenoid is mounted at side of port A.

WP = prolonged manual override protected by rubber cap - see section 12.

SP-WPD/H = manual override with detent, to be ordered separately, see tab. K150

L1, L2, L3 = device for switching time control, installed in the valve solenoid (only for DHU models).

For spools 4 and 4/8 only device L3 is available.

F* = with proximity switch for monitoring spool position: see tab. E110.

MV, MO = auxiliary hand lever positioned vertically (MV) or horizontally (MO). For available configuration and dimensions see table E138.

Type of electric/electronic connector DIN 43650, to be ordered separately

= standard connector IP-65, suitable for direct connection to electric supply source.

eas 666, but with built-in signal led.

= with built-in rectifier bridge for supplying DC coils by alternate current (AC 110V and 230V - Imax 1A).

E-SD = electronic connector which eliminates electric disturbances when solenoid valves are de-energized.

3 Spools

- spools type 0 and 3 are also available as 0/1 and 3/1 with restricted oil passages in central position, from user ports to tank.
- spools type 1, 4 and 5 are also available as 1/1, 4/8 and 5/1. They are properly shaped to reduce water-hammer shocks during the swiching.
- spools type 1, 3, 8 and 1/2 are available as 1P, 3P, 8P and 1/2P to limit valve internal leakages.
- spool type 1/9 has closed center in rest position but it avoids the pressurization of A and B ports due to the internal leakages.
- Other types of spools can be supplied on request.

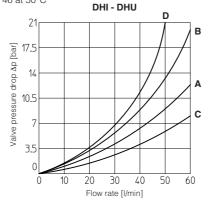
5 ELECTRIC FEATURES

| External supply nominal voltage | Voltage | Type of connector | Power consumption | Code o | Colour of | | |
|---------------------------------|--------------|-------------------|-------------------------|-------------------------|-------------------------|------------|------------|
| ± 10% | code | (2) | | DHI | DHU | coil label | |
| 6 DC | 6 DC | | | COU-6DC/ 80 | COU-6DC/ 80 | brown | |
| 9 DC | 9 DC | | | COU-9DC /80 | COU-9DC /80 | light blue | |
| 12 DC | 12 DC | | | COU-12DC /80 | COUR-12DC /10 | green | |
| 14 DC | 14 DC | | | COU-14DC /80 | COUR-14DC /10 | brown | |
| 18 DC | 18 DC | | | COU-18DC /80 | COU-18DC /80 | blue | |
| 24 DC | 24 DC | | 33 W | COU-24DC /80 | COUR-24DC /10 | red | |
| 28 DC | 28 DC | | | COU-28DC /80 | COUR-28DC /10 | silver | |
| 48 DC | 48 DC | | | COU-48DC /80 | COU-48DC /80 | silver | |
| 110 DC | 110 DC | 666 | 60 VA | COU-110DC /80 | COUR-110DC /10 | black | |
| 125 DC | 125 DC | or 667 | | COU-125DC /80 | COU-125DC /80 | silver | |
| 220 DC | 220 DC | | | COU-220DC /80 | COUR-220DC /10 | black | |
| 24/50 AC | 24/50/60 AC | | | 001 04/50/0040 (00 (4) | | | |
| 24/60 AC | 24/50/60 AC | | | COI-24/50/60AC /80 (1) | - | pink | |
| 48/50 AC | 48/50/60 AC | | | COL 48/E0/C04 C (80 (1) | | | |
| 48/60 AC | | | | COI-48/50/60AC /80 (1) | - | white | |
| 110/50 AC | 110/50/60 AC | (3) | COI-110/50/60AC /80 (1) | | yellow | | |
| 120/60 AC | 120/60 AC | | | COI-120/60AC /80 | - | white | |
| 230/50 AC | 230/50/60 AC | | | | COI-230/50/60AC /80 (1) | | light blue |
| 230/60 AC | 230/60 AC | | | COI-230/60AC /80 | - | silver | |
| 110/50 AC | 11000 | | 40 VA | COU-110RC /80 | COUR-110RC /10 | gold | |
| 120/60 AC | 110RC 669 | | 35 VA | | | gold | |
| 230/50 AC | 230RC | 003 | 40 VA | COU-230RC /80 | COUR-230RC /10 | blue | |
| 230/60 AC | | | 35 VA | 000-230110 /60 | | blue | |

- (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 55 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. Inrush current values correspond to a power consumption of about 150 VA.

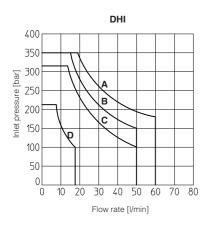
Q/∆P DIAGRAMS based on mineral oil ISO VG 46 at 50°C

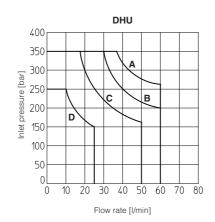
| Flow direction Spool type | P→A | P→B | А→Т | В→Т | P→T |
|---------------------------|-----|-----|-----|-----|-----|
| 0 | С | С | С | O | |
| 0/2, 1, 1/2 | Α | А | Α | Α | |
| 2, 3 | Α | А | С | С | |
| 2/2, 4, 5, 9* | D | D | D | D | А |
| 6 | А | А | С | Α | |
| 7 | Α | А | А | С | |
| 8 | С | С | В | В | |



7 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%). The curves refer to application with symmetrical flow through the valve (i.e. P→A and B→T). In case of asymmetric flow and if the valves have the devices for controlling the switching times the operating limits must be reduced.





DHI

A = Spools 1, 1/2, 8

B = Spools 0, 0/1, 0/2, 1/1 C = Spools 3, 3/1

D = Spools 4, 4/8, 5, 5/1, 6, 7, 19, 39, 58, 58/1, 09, 90, 91, 93, 94

E = Spools 2, 2/2

DHU

A = Spools 0, 0/1, 1, 1/2, 3, 8 B = Spools 0/2, 1/1, 6, 7 C = Spools 3/1, 4, 4/8, 5, 5/1, 19, 39, 58, 58/1, 09,

90, 91, 93, 94 D = Spools 2, 2/2

8 SWITCHING TIMES (average values in msec)

| ипі | | | | | | |
|------------------|-----------------|-----------------|------------|--|--|--|
| Valve | Switch-on AC | Switch-on DC | Switch-off | | | |
| DHI + 666 667 | 30 | 45 | 20 | | | |
| DHI + 669 | 45 | _ | 80 | | | |
| DHI + F-SD | 30 | 45 | 50 | | | |

| DHU | | | | | | |
|------------------|-----------------|-----------------|------------|--|--|--|
| Valve | Switch-on AC | Switch-on DC | Switch-off | | | |
| DHU + 666 667 | _ | 45 | 20 | | | |
| DHU + 669 | 45 | _ | 80 | | | |
| DHU + E-SD | _ | 45 | 50 | | | |
| DHU-*/L1 | _ | 60 | 60 | | | |
| DHU-*/L2 | _ | 80 | 80 | | | |
| DHU-*/L3 | _ | 110 | 150 | | | |

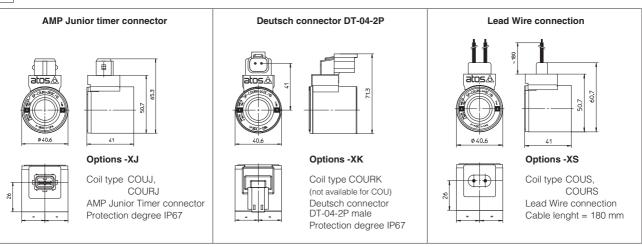
Test conditions:

- 36 l/min; 150 bar- nominal voltage- 2 bar of counter pressure on port T

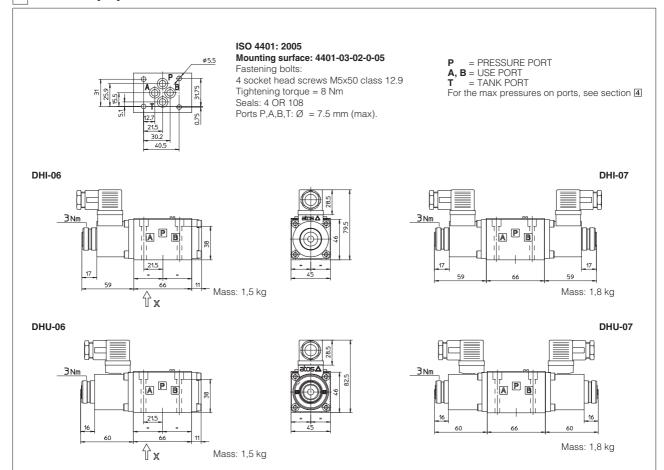
- mineral oil: ISO VG 46 at 50°C

The elasticity of the hydraulic circuit and the variations of the hydraulic characteristics and temperature affect the response time.

9 COILS WITH SPECIAL CONNECTORS

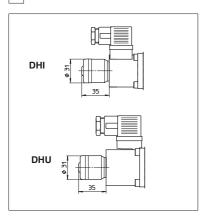


Note: The above coils are available only for voltage supply 12, 14, 24 and 28 VDC. For the characteristics refer to standard coils features - see sect. 6



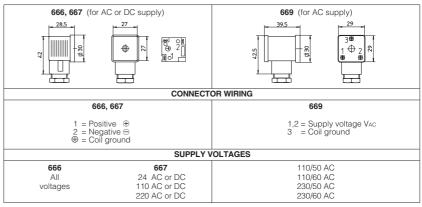
Overall dimensions refer to valves with connectors type 666

11 OPTION /WP



12 ELECTRIC CONNECTORS ACCORDING TO DIN 43650

The connectors must be ordered separately



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

13 MOUNTING SUBPLATES

| Model | Ports location | GAS Ports A-B-P-T | Ø Counterbore [mm] A-B-P-T | Mass [kg] |
|--------|---|----------------------|----------------------------------|--------------|
| BA-202 | Ports A, B, P, T underneath; | 3/8" | _ | 1,2 |
| BA-204 | Ports P, T underneath; ports A, B on lateral side | 3/8" | 25,5 | 1,8 |
| BA-302 | Ports A, B, P, T underneath | 1/2" | 30 | 1,8 |

The subplates are supplied with 4 fastening bolts M5x50. Also available are multi-station subplates and modular subplates. For further details see table K280.