Solenoid directional valves type DKE
direct, spool type

Spool type, two or three position direct operated valves with threaded solenoids certified according the North American standard cURus.
Solenoids are made by:
• wet type screwed tube, different for AC and DC power supply, with integrated manual override pin
• interchangeable coils, specific for AC or DC power supply, easily replaceable without tools - see section 5 for available voltages
Standard coils protection IP65, optional coils with IP67 AMP Junior Timer or lead wire connections.
The valve body is 5 chamber type for all DC versions and for AC safety version /F1 and FV
Standard AC version uses 3 chamber type body
Wide range of interchangeable spools, see section 2.
The body is made by shell-moulding casting with wide internal passages ensuring low pressure drops
Mounting surface: ISO 4401 size 10
Max flow: 150 l/min
Max pressure: 350 bar

1 MODEL CODE

Directional control valves size 10

Valve configuration, see section 2
61 = single solenoid, center plus external position, spring centered
63 = single solenoid, 2 external positions, spring offset
67 = single solenoid, center plus external position, spring offset
70 = double solenoid, 2 external positions, without springs
71 = double solenoid, 3 positions, spring centered
75 = double solenoid, 2 external positions, with detent

Spool type, see section 2.
Options, see note 1 at section 4.

2 CONFIGURATIONS and SPOOLS (representation according to ISO 1219-1)

Seals material, see section 4:
- = NBR
PE = FKM
BT = HNBR

Series number

Voltage code, see section 5

00-AC = AC solenoids without coils
00-DC = DC solenoids without coils
X = without connector
See section 5 for available connectors, to be ordered separately
Coils with special connectors, see section 5
XJ = AMP Junior Timer connector
XX = Deutsch connector
XS = Lead Wire connection

Note: see also section 4, note 3 for special shaped spools
3 MAIN CHARACTERISTICS, SEALS AND HYDRAULIC FLUIDS - for other fluids not included in below table, consult our technical office

Assembly position / location
Any position for all valves except for type - 170* (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)

MTTfD values according to EN ISO 13849
150 years, for further details see technical table P007

Ambient temperature
Standard = -30°C ÷ +70°C /PE option = -20°C ÷ +70°C /BT option = -40°C ÷ +70°C

Storage temperature
Standard = -30°C ÷ +80°C /PE option = -20°C ÷ +80°C /BT option = -40°C ÷ +80°C

Surface protection
Body: zinc coating with black passivation
Coil: zinc nickel coating (DC version) plastic incapsulation (AC version)

Corrosion resistance
Salt spray test (EN ISO 9227) > 200 h

Compliance
CE to Low Voltage Directive 2014/35/EU
RoHS Directive 2011/65/EU as last update by 2015/65/EU
REACH Regulation (EC) n°1907/2006

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
HNB 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

Recommended fluid temperature
Mineral oils
Flame resistant with water
Flame resistant without water

Operating pressure
Ports P,A,B: 350 bar;
Port T 210 bar for DC version (250 bar with option /Y); 160 bar for AC version

Maximum flow
150 l/min, see operating limits at section [8]

3.1 Coils characteristics
Insulation class
H (180°C) for DC coils, F (155°C) for AC coils

Protection degree DIN EN 60529
IP 65 (with connectors 666, 667, 669 correctly assembled)

Supply voltage and frequency
See electric feature [3]

Supply voltage tolerance
± 10%

Certification
cURus North American Standard

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 [2]
L7 and L8 are available only for spool type 0/1, 1/1, 3/1, 4 and 5.
Fi, FV = 5 chambers body for DC and AC versions with proximity switch for spool position monitoring: see tab. E110.
Y = external drain, only for DC version, to be selected if the pressure at T port is higher than the max allowed limits.

2 Accessories
WPDK/KE-DC = (only for DC supply) manual override with detent, to be ordered separately, see tab. K150

3 Special shaped 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.
- spool type 1 is also available as 1/1, properly shaped to reduce the water-hammer shocks during the switching.
- 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.

5 ELECTRICAL 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>666 or 667</td>
<td>36 W</td>
<td>CAE-12DC</td>
</tr>
<tr>
<td>14 DC</td>
<td>14 DC</td>
<td>666 or 667</td>
<td>36 W</td>
<td>CAE-14DC</td>
</tr>
<tr>
<td>24 DC</td>
<td>24 DC</td>
<td>666 or 667</td>
<td>36 W</td>
<td>CAE-24DC</td>
</tr>
<tr>
<td>28 DC</td>
<td>28 DC</td>
<td>666 or 667</td>
<td>36 W</td>
<td>CAE-28DC</td>
</tr>
<tr>
<td>110 DC</td>
<td>110 DC</td>
<td>666 or 667</td>
<td>36 W</td>
<td>CAE-110DC</td>
</tr>
<tr>
<td>125 DC</td>
<td>125 DC</td>
<td>666 or 667</td>
<td>36 W</td>
<td>CAE-125DC</td>
</tr>
<tr>
<td>220 DC</td>
<td>220 DC</td>
<td>666 or 667</td>
<td>36 W</td>
<td>CAE-220DC</td>
</tr>
<tr>
<td>110/50/60 AC</td>
<td>110/50/60 AC</td>
<td>666 or 667</td>
<td>100 VA (3)</td>
<td>CAE-110/50/60AC (1)</td>
</tr>
<tr>
<td>230/50/60 AC</td>
<td>230/50/60 AC</td>
<td>666 or 667</td>
<td>130 VA (3)</td>
<td>CAE-230/50/60AC (1)</td>
</tr>
<tr>
<td>115/60 AC</td>
<td>115/60 AC</td>
<td>666 or 667</td>
<td>130 VA (3)</td>
<td>CAE-115/60AC</td>
</tr>
<tr>
<td>230/60 AC</td>
<td>230/60 AC</td>
<td>666 or 667</td>
<td>130 VA (3)</td>
<td>CAE-230/60AC</td>
</tr>
<tr>
<td>110/50/60 AC</td>
<td>110 DC</td>
<td>666 or 667</td>
<td>36 W</td>
<td>CAE-110DC</td>
</tr>
</tbody>
</table>

(1) In case of 60 Hz voltage frequency the performances are reduced by 10–15% and the power consumption is 90 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.
**Q/P DIAGRAMS** based on mineral oil ISO VG 46 at 50°C

**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%). 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.

**SWITCHING TIMES** (average values in msec)

<table>
<thead>
<tr>
<th>Valve</th>
<th>Switch-on AC</th>
<th>Switch-on DC</th>
<th>Switch-off AC</th>
<th>Switch-off DC</th>
</tr>
</thead>
<tbody>
<tr>
<td>DKE + 666 / 667</td>
<td>40</td>
<td>60</td>
<td>25</td>
<td>35</td>
</tr>
<tr>
<td>DKE + 669</td>
<td>60</td>
<td>—</td>
<td>90</td>
<td>—</td>
</tr>
<tr>
<td>DKE- V/L*</td>
<td>—</td>
<td>75±150</td>
<td>—</td>
<td>45±150</td>
</tr>
<tr>
<td>DKE- V/L7 - DKE- V/L8</td>
<td>—</td>
<td>100±150</td>
<td>—</td>
<td>100±150</td>
</tr>
</tbody>
</table>

Test conditions:
- 50 l/min; 150 bar
- nominal supply voltage
- 2 bar of back 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.

**SWITCHING FREQUENCY**

<table>
<thead>
<tr>
<th>Valve</th>
<th>AC (cycles/h)</th>
<th>DC (cycles/h)</th>
</tr>
</thead>
<tbody>
<tr>
<td>DKE + 666 / 667</td>
<td>7200</td>
<td>15000</td>
</tr>
</tbody>
</table>

**DEVICES FOR SWITCHING TIME CONTROL**

These devices are only available for DC valve version (5 chambers body) and can control the switching time and therefore reduce the coil hammering in the hydraulic circuit. The different types are available shown in the figure:

- **L**: controls and regulates the switching time in both moving directions of the spool; regulation is carried out by screwing/unscrewing the element itself (regulating choke);
- **L1/L2/L3**: controls the switching time in both moving directions of the spool by means of fixed calibrated restrictor (gauged flow). The restrictor is positioned in the valve’s body ØL1 = 1,25 mm; ØL2 = 1 mm; ØL3 = 0,75 mm;
- **LR**: controls and regulates the switching time in the B→A direction of the spool movement.
- **L7/L8**: controls the switching time in both moving directions of the spool by means of fixed calibrated restrictor (gauged flow). The restrictor is installed in the solenoid’s anchor.

For a correct operation of the switching time control, the passage in which the control device is installed must be completely filled with oil.
ISO 4401: 2005
Mounting surface according to 4401-05-05-0-05
(without X port, Y port optional)
Fastening bolts:
4 socket head screws M6x40 class 12.9
Tightening torque = 15 Nm
Seals: 5 OR 2050 and 1 OR 108
Ports P, A, B, T: Ø = 11.5 mm (max)
Ports Y: Ø = 5 mm

The subplates are supplied with 4 fastening bolts M6x40. Also available are multi-station subplates and modular subplates.

For further details see table K280.