QDE* PROPORTIONAL FLOW CONTROL VALVE WITH COMPENSATION
SERIES 11

SUBPLATE MOUNTING
ISO 6263-03
ISO 4401-05

p max 250 bar
Q max 80 l/min

OPERATING PRINCIPLE

— QDE* are compensated flow control valves with pressure compensation and proportional electric control, with mounting surface according to ISO 6263-03 and ISO 4401-05, supplied with 2 or 3 way design, depending on the use of port P.

— This valve is used for the flow control in branches of a hydraulic circuit or for the speed control of hydraulic cylinders.

— The valve can be controlled directly by a current control supply unit or by means of an electronic control unit, to exploit valve performance to the full (see paragraph 13).

— QDE* valves are available in two sizes, for 5 flow adjustment ranges of up to 80 l/min.

— The valve body is zinc-nickel coated.

PERFORMANCES
(values measured with viscosity of 36 cSt at 50°C with electronic control unit)

<table>
<thead>
<tr>
<th></th>
<th>QDE3</th>
<th>QDE5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maximum operating pressure</td>
<td>bar</td>
<td>250</td>
</tr>
<tr>
<td>Controlled flow (Q_b)</td>
<td>l/min</td>
<td>14</td>
</tr>
<tr>
<td>Max input flow (Q_A) (3-way)</td>
<td>l/min</td>
<td>40</td>
</tr>
<tr>
<td>Spring setting in pressure compensator</td>
<td>bar</td>
<td>4</td>
</tr>
<tr>
<td>Minimum pressure drop A &gt; B</td>
<td>bar</td>
<td>10</td>
</tr>
<tr>
<td>Hysteresis</td>
<td>% of Q_max</td>
<td>&lt; 6 %</td>
</tr>
<tr>
<td>Repeatability</td>
<td>% of Q_max</td>
<td>&lt; ± 1.5 %</td>
</tr>
<tr>
<td>Electrical characteristics</td>
<td>see paragraph 5</td>
<td></td>
</tr>
<tr>
<td>Fluid temperature range</td>
<td>°C</td>
<td>-20 / +60</td>
</tr>
<tr>
<td>Fluid temperature range</td>
<td>°C</td>
<td>-20 / +80</td>
</tr>
<tr>
<td>Fluid viscosity range</td>
<td>cSt</td>
<td>10 ÷ 400</td>
</tr>
<tr>
<td>Fluid contamination degree</td>
<td>according to ISO 4406:1999 class 18/16/13</td>
<td></td>
</tr>
<tr>
<td>Recommended viscosity</td>
<td>cSt</td>
<td>25</td>
</tr>
<tr>
<td>Mass</td>
<td>kg</td>
<td>1.4</td>
</tr>
</tbody>
</table>

HYDRAULIC SYMBOLS

TWO WAYS

THREE WAYS
1 - IDENTIFICATION CODE

Flow control valve direct operated
Electric proportional control

Size:
3 = ISO 6263-03
5 = ISO 4401-05

Controlled flow:
QDE3
14 = 14 l/min
20 = 20 l/min
30 = 30 l/min
40 = 40 l/min
QDE5
80 = 80 l/min

Option: manual override
(see at par. 10)

Coil electrical connection:
K1 = plug for connector type
EN 175301-803 (ex DIN 43650)
(standard)
K7 = plug for connector type
DEUTSCH DT04-2P male

Seals:
N = NBR seals (standard)
V = FPM seals for special fluids

Series no. (from 10 to 19 sizes and mounting dimensions remains unchanged)

NOTE: The zinc-nickel finishing on the valve body makes the valve suitable to ensure a salt spray resistance up to 240 hours.
(test operated according to EN ISO 9227 standards and test evaluation operated according to UNI EN ISO 10289 standards).
For a salt spray resistance up to 600 hours order the high corrosion resistance version.

1.1 - QDE3: high corrosion resistance version

This version features the zinc-nickel coating on all exposed metal parts of the valve, making it resistant to exposure to the salt spray for 600 hours (test performed according to UNI EN ISO 9227 and assessment test performed according to UNI EN ISO 10289).

The coil are specific for this version, featuring a zinc-nickel surface treatment. The boot manual override (CM) is installed as standard in order to protect the solenoid tube.

Follow the identification code below to order it:

Choices as in standard identification code

Coil electrical connection
WK1 = plug for connector type EN 175301-803
(ex DIN 43650)
WK7 = plug DEUTSCH DT04-2P,
for male connector type DEUTSCH DT06-2S.
2 - CONFIGURATIONS AND MOUNTING INTERFACE

The function of two or three ways is obtained realizing the mounting interface according to ISO 6263-03 for QDE3 and ISO 4401-05 for QDE5, using the port P for three way configuration only. The port T will never be used.

To use the valve in two ways for QDE3 is also possible to interpose a subplate with plug (code 0113388 and 0530384) be ordered separately.

ISO 6263-03-03-*-97
(CETOP 4.5.2-2-03-250)

ISO 4401-05-04-0-05
(CETOP 4.5.4-05-250)
3 - CHARACTERISTIC CURVES QDE3
(obtained with viscosity of 36 cSt a 50°C)

3.1 - Two ways
FLOW CONTROL \( Q = f \) (command)

![Graph showing flow control characteristics.]

Typical flow rate characteristics A → B for controlled flow rate:
14 - 20 - 30 - 40 l/min in function of the current supplied to the solenoid (D24 version, maximum current 860 mA, PWM 100 Hz)

3.2 - Three ways
FLOW CONTROL \( Q = f \) (command)

![Graph showing flow control characteristics.]

Typical flow rate characteristics A → B for controlled flow rate:
14 - 20 - 30 - 40 l/min in function of the current supplied to the solenoid (D24 version, maximum current 860 mA, PWM 100 Hz)

\[ \Delta p \text{ [bar]} \]

PRESSURE DROPS \( \Delta p \) A→P \( (Q_B = 0) \)

![Graph showing pressure drops.]

Pressure drops with flow A→P.
Obtained with \( Q_B = 0 \) (no current)
4 - CHARACTERISTIC CURVES QDE5
(Obtained with viscosity of 36 cSt at 50°C)

4.1 - Two ways
FLOW CONTROL $Q = f(\text{command})$

Typical flow rate characteristics $A \rightarrow B$ in function of the current supplied to the solenoid (D12 version, max current 2.8 A, PWM 100 Hz).

4.2 - Three ways
FLOW CONTROL $Q = f(p_B)$

Typical flow rate characteristics $A \rightarrow B$ in function of the current supplied to the solenoid (D12 version, max current 2.8 A, PWM 100 Hz).

Pressure drops with flow $A \rightarrow P$.
Obtained with $Q_B = 0$ (no current)
5 - ELECTRICAL CHARACTERISTIC

Proportional solenoid
The proportional solenoid comprises two parts: tube and coil.

The tube, screwed to the valve body, contains the armature which is designed to maintain friction to a minimum thereby reducing hysteresis.

The coil is mounted on the tube secured by means of a lock nut and can be rotated through 360° depending on installation clearances.

| DUTY CYCLE | 100% |
| ELECTROMAGNETIC COMPATIBILITY (EMC) | According to 2014/30/EU |
| CLASS OF PROTECTION: | class F |
| coil insulation (VDE 0580) Impregnation | |

| REFERENCE SIGNAL STEP | 0 → 100% |
| Step response [ms] | < 70 |

Protection from atmospheric agents IEC 60529
The IP protection degree is guaranteed only with both valve and connectors of an equivalent IP grade correctly connected and installed.

| NOMINAL VOLTAGE | QDE3 | QDE5 |
| RESISTANCE (at 20°C) | VDC | 12 | 24 | 12 | 24 |
| NOMINAL CURRENT | A | 1,88 | 0,86 | 2,8 | 1,6 |
| PWM FREQUENCY | Hz | 100 | 100 |

6 - STEP RESPONSE
(values measured with viscosity of 36 cSt at 50°C with electronic control unit)

Step response is the time taken for the valve to reach 90% of the set flow value following a step change of reference signal.

The table illustrates typical response times with Δp = 8 bar.
7 - ELECTRIC CONNECTIONS

Connectors for K1 and WK1 connections are always delivered together with the valve.

7.1 - QDE3

Connection for EN 175301-803 (ex DIN 43650) connector
code K1 (standard)
code WK1 (W7 version)

Connection for DEUTSCH DT06-2S male connector
code K7

Connection for DEUTSCH DT06-2S male connector
code WK7 (W7 version)

7.2 - QDE5

Connection for EN 175301-803 (ex DIN 43650) connector
code K1 (standard)

Connection for DEUTSCH DT06-2S male connector
code K7
**8 - QDE3 OVERALL AND MOUNTING DIMENSIONS**

Dimensions in mm

1. Mounting surface with sealing rings:
   - 4 OR type 2037 (9.25 x 1.78) - 90 shore
2. Standard manual override, integrated in the solenoid tube
3. Coil removal space
4. Electric connector type EN 175301-803 (ex DIN 43650)
5. Connector removal space

**Fastening bolts:** 4 bolts M5x30 - ISO 4762

**Torque:** 5 Nm (A8.8)

**Threads of mounting holes:** M5x10

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**9 - QDE5 OVERALL AND MOUNTING DIMENSIONS**

Dimensions in mm

1. Mounting surface with sealing rings:
   - N. 5 OR type 2050 (12.42x1.78) - 90 Shore
2. Standard manual override, integrated in the solenoid tube
3. Coil removal space
4. Electric connector type EN 175301-803 (ex DIN 43650)
5. Connector removal space

**Fastening bolts:** 4 bolts M6x40 - ISO 4762

**Torque:** 8 Nm (A8.8)

**Threads of mounting holes:** M6x10
10 - MANUAL OVERRIDE

Standard valves have the pin for the manual operation integrated in the solenoid tube. The operation of this override must be executed with a suitable tool, minding not to damage the sliding surface.

For QDE3 are available:
- **CM**: manual override boot protected (mandatory for WK1 coils).
- **CK1** version, knob.

For QDE5 only available:
- **CK** version, knob. When the set screw is screwed and its point is aligned with the edge of the knob, tighten the knob till it touches the spool: in this position the override is not engaged and the valve is de-energized. After adjusting the override, tighten the set screw in order to avoid the knob loosing.

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**CM Version**

Code: 3401150006

**CK1 Version**

Code: 3401150015

**CK Version**

Spanner for set screw: 3 mm

Code: 3803260003
11 - HYDRAULIC FLUIDS

Use mineral oil-based hydraulic fluids HL or HM type, according to ISO 6743-4. For these fluids, use NBR seals (code N). For fluids HFDR type (phosphate esters) use FPM seals (code V). For the use of other kinds of fluid such as HFA, HFB, HFC, please consult our technical department. Using fluids at temperatures higher than 80 °C causes a faster degradation of the fluid and of the seals characteristics.

The fluid must be preserved in its physical and chemical characteristics.

12 - INSTALLATION

QDE* valves can be installed in any position without impairing correct operation. Ensure that there is no air in the hydraulic circuit.

Valves are fixed by means of screws or tie rods on a flat surface with planarity and roughness equal to or better than those indicated in the relative symbols.

If minimum values are not observed fluid can easily leak between the valve and support surface.

13 - ELECTRONIC CONTROL UNITS

**QDE3**

<table>
<thead>
<tr>
<th>Part number</th>
<th>Description</th>
<th>Fixing</th>
<th>Catalogue number</th>
</tr>
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<tbody>
<tr>
<td>EDM-M111</td>
<td>24V DC solenoids</td>
<td>rail mounting</td>
<td>see catalogue 89 251</td>
</tr>
<tr>
<td>EDM-M141</td>
<td>12V DC solenoids</td>
<td></td>
<td></td>
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<tr>
<td>EWM-A-PV</td>
<td>12V / 24V DC software config.</td>
<td></td>
<td>see catalogue 89 620</td>
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**QDE5**

<table>
<thead>
<tr>
<th>Part number</th>
<th>Description</th>
<th>Fixing</th>
<th>Catalogue number</th>
</tr>
</thead>
<tbody>
<tr>
<td>EDM-M131</td>
<td>24V DC solenoids</td>
<td>rail mounting</td>
<td>see catalogue 89 251</td>
</tr>
<tr>
<td>EDM-M151</td>
<td>12V DC solenoids</td>
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<td></td>
</tr>
<tr>
<td>EWM-A-PV</td>
<td>12V / 24V DC software config.</td>
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