



RPCED1

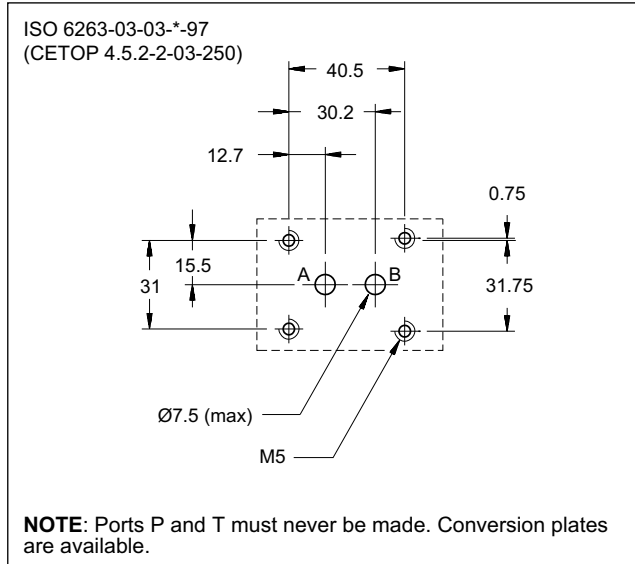
PROPORTIONAL FLOW CONTROL VALVE DIRECT OPERATED

SERIES 54

SUBPLATE MOUNTING ISO 6263-03

p max 250 bar
Q max (see table of performances)

MOUNTING INTERFACE



OPERATING PRINCIPLE

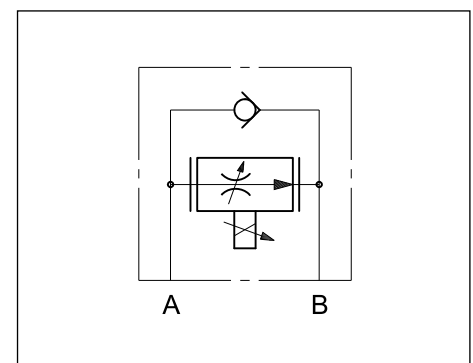
- The RPCED1 valve is a two-port pressure and temperature compensated flow control valve with mounting interface in compliance with ISO 6263 standards.
- It is used for flow rate control in hydraulic circuit branches or for speed control of hydraulic actuators.
- The flow rate can be modulated continuously in proportion to the current supplied to the solenoid.
- The valve can be controlled directly by a current control supply unit or by an external electronic card to maximize the valve performances (see point 10).
- It is available in five flow rate control ranges up to 25 l/min.

PERFORMANCES

(obtained with mineral oil with viscosity of 36 cSt at 50°C and electronic control card)

| | | |
|--|--|-----------------------|
| Maximum operating pressure | bar | 250 |
| Minimum Δp between A and B port | | 10 |
| Maximum controlled flow | l/min | 1,5 - 4 - 8 - 16 - 25 |
| Min. controlled flow (for 1 and 4 l/min. reg.) | | 0,025 |
| Maximum free-reverse flow | | 40 |
| Step response | see point 7 | |
| Hysteresis (with PWM 100 Hz) | % of p nom | < 6% |
| Repeatability | % of p nom | < ±2,5% |
| Electrical characteristic | see point 6 | |
| Ambient temperature range | °C | -20 / +50 |
| Fluid temperature range | °C | -20 / +80 |
| Fluid viscosity range | cSt | 10 ÷ 400 |
| Fluid contamination degree | According to ISO 4406:1999 class 18/16/13 (class 17/15/12 for flows < 0,5 l/min) | |
| Recommended viscosity | cSt | 25 |
| Mass | kg | 1,9 |

HYDRAULIC SYMBOLS



1 - IDENTIFICATION CODE

| | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|----|---|----|---|--|--|
| R | P | C | E | D | 1 | - | / | C | / | 54 | - | 24 | / | | |
|---|---|---|---|---|---|---|---|---|---|----|---|----|---|--|--|

Compensated flow control valve

Electric proportional control

Open loop control

Size: ISO 6263-03

Maximum controlled flow:
1 = 1,5 l/min **8** = 8 l/min **25** = 25 l/min
4 = 4 l/min **16** = 16 l/min

Built-in check valve

Option:
/ W7 = zinc-nickel surface treatment (see **NOTE**)
 Omit if not required.

Seals:
 Omit for mineral oils
V = viton for special fluids

Nominal solenoid voltage 24 V DC

Series No.
 (from 50 to 59 sizes and mounting dimensions remain unchanged)

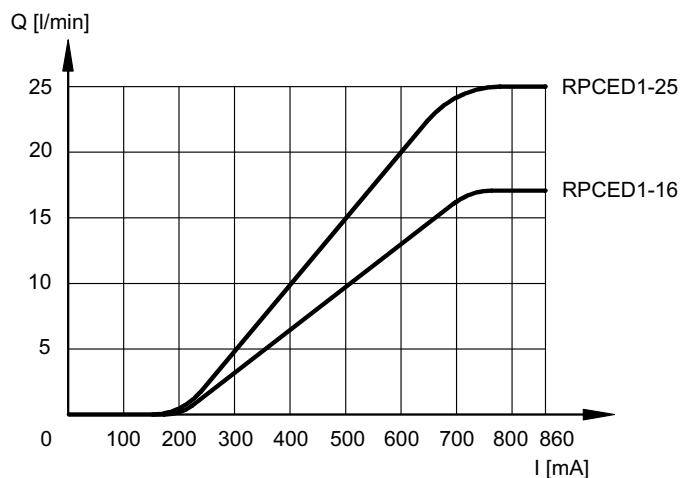
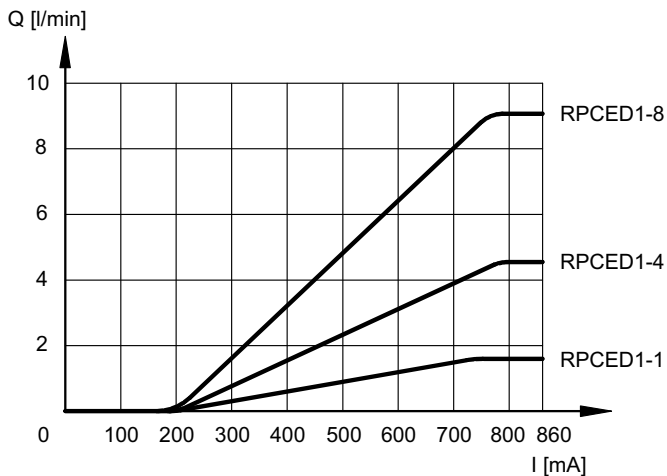
NOTE: The standard valve is supplied with surface treatment of phosphating black. The zinc-nickel finishing on the valve body makes the valve suitable to ensure a salt spray resistance up to 240 hours. (test operated according to UNI EN ISO 9227 standards and test evaluation operated according to UNI EN ISO 10289 standards).

2 - CHARACTERISTIC CURVES

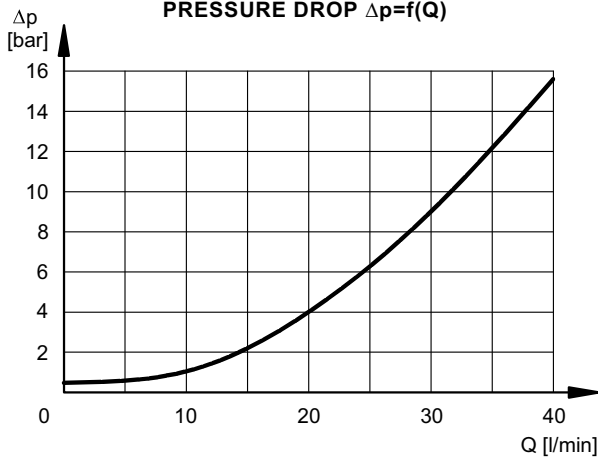
(measured with viscosity of 36 cSt at 50 °C)

Typical curves for flow rate A → B according to the current supplied to the solenoid for controlled flow rate of: 1- 4 - 8 - 16 - 25 l/min.

FLOW CONTROL $Q=f(I)$



PRESSURE DROP $\Delta p=f(Q)$



Pressure drop with free flow B → A through the check valve.

3 - PRESSURE COMPENSATION

Two throttles in series are in the valve. The first is controlled by the proportional solenoid; the second throttle assures a constant pressure drop, controlled by the pressure upstream and downstream the first throttle.

In these conditions, the set flow rate value stays constant within a tolerance range of $\pm 2\%$ of the full scale flow rate for maximum pressure variation between the valve inlet and outlet ports.

4 - THERMAL COMPENSATION

Thermal compensation of the valve is obtained by adopting the principle of restricted fluid passage, so that the fluid is not influenced significantly by variations in oil viscosity.

For controlled flow rates of lower than 0.5 l/min and with a temperature change of 30°C, flow rate varies by 13% of the set value approximatively. For higher flow rates at the same temperature change the flow rate variation is <4% of the set flow rate.

5 - HYDRAULIC FLUIDS

Use mineral oil-based hydraulic fluids HL or HM type, according to ISO 6743-4. For these fluids, use NBR seals. 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.

6 - ELECTRICAL CHARACTERISTICS

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.

| | | |
|---|-------------------------|------|
| NOMINAL VOLTAGE | V DC | 24 |
| RESISTANCE (AT 20°C) | Ω | 17.6 |
| MAXIMUM CURRENT | A | 0.86 |
| DUTY CYCLE | | 100% |
| ELECTROMAGNETIC COMPATIBILITY (EMC) | According to 2014/30/EU | |
| CLASS OF PROTECTION Atmospheric agents (IEC EN 60529) | IP65 | |

7 - STEP RESPONSE

(obtained with mineral oil with viscosity of 36 cSt at 50°C and electronic control card)

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

The table illustrates typical response times with valve flow rate of 16 l/min and with input pressure of 100 bar.

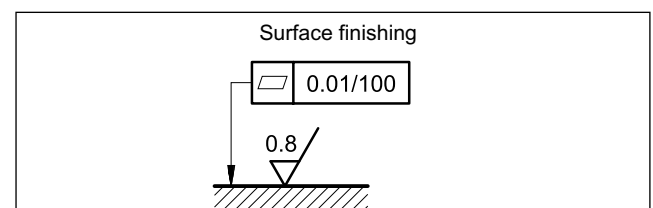
| REFERENCE SIGNAL STEP | 0 → 100% | 100 → 0% | 25→75% | 75→25% |
|-----------------------|----------|----------|--------|--------|
| Step response [ms] | 60 | 80 | 50 | 70 |

8 - INSTALLATION

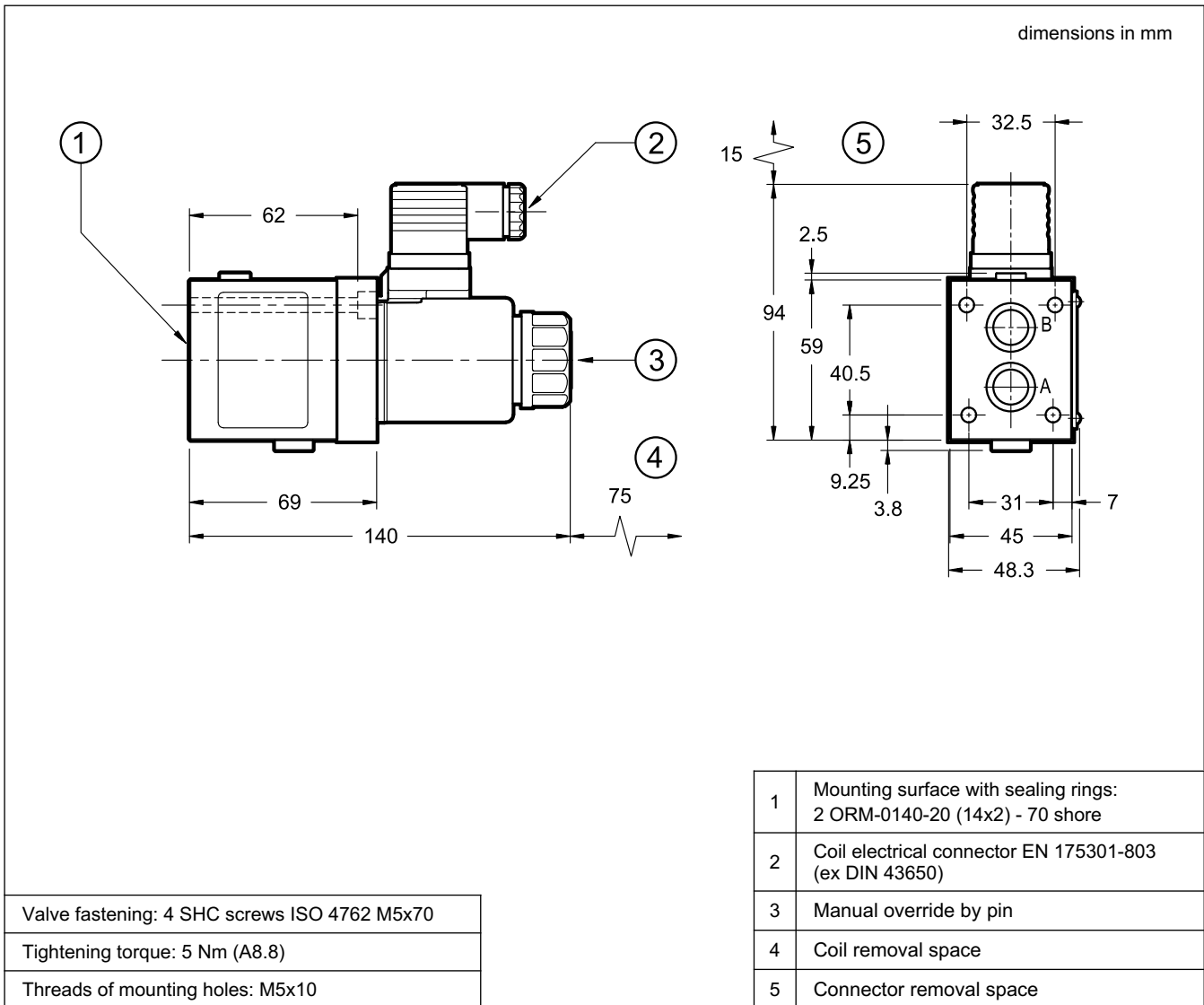
RPCED1 valves can be installed in any position without impairing correct operation.

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.



9 - OVERALL AND MOUNTING DIMENSIONS



10 - ELECTRONIC CONTROL UNITS

| | | | |
|-----------------|------------------------|-------------------------------|--------------------|
| EDC-111 | for solenoid 24V DC | plug version | see cat. 89 120 |
| EDM-M111 | for solenoid 24V DC | DIN EN 50022 rail mounting | see cat. 89 251 |

11 - SUBPLATES

(see cat. 51 000)

| | | |
|---------------------|---------------------|---|
| rear ports 3/8" BSP | side ports 3/8" BSP | ISO 6263 subplate with P e T blind ports |
| PMRPC1-AI3G | PMRPC1-AL3G | code 0113388 P port to be plug (M4) |