Directional valve elements with compensated proportional control of Tank unloaded excess flow

L808103C... (ED4-PTC1)

General specifications
Valve element with direct proportional pressure compensated control of inlet, P line, flow.
Three way pressure compensator included.
Wet pin proportional tube for removable DC coil.
In the de-energized condition, the control spool is held in normal position by return spring.
Solenoid tube with push rod for mechanical override; nickel plated surface.
Manual override (push-button, screw type) available as option.
Plug-in connectors available: EN 175301-803 (Was DIN 43650); DT04-2P (Deutsch); Amp Junior.

Contents
Ordering details 2
Example of application 3
Functional description 3
Technical data 4
Characteristic curves 5
External dimensions and fittings 6
Electric connection 8
Electronic feed regulator 9

Size 6
Series 00
Maximum operating pressure 250 bar (3625 psi)
Maximum flow 50 l/min (13.2 gpm)

NEW spool position sensor available for this valve. See RE18300-30
## Ordering details

<table>
<thead>
<tr>
<th>01</th>
<th>02</th>
<th>03</th>
<th>04</th>
<th>05</th>
<th>06</th>
<th>07</th>
<th>08</th>
</tr>
</thead>
<tbody>
<tr>
<td>L</td>
<td>80</td>
<td>81</td>
<td>03</td>
<td>00</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Family**
- 01 Directional Valve elements ED

**Type**
- 02 Size 6 proportional

**Coil type**
- 03 GP45

**Spool variants**
- 04 Proportional pressure compensated flow control

**Nominal flow**
- 05 10 l/min (2.6 gpm) C2
- 20 l/min (5.3 gpm) C4
- 30 l/min (7.9 gpm) C6
- 40 l/min (10.6 gpm) C8
- 50 l/min (12.9 gpm) C9

**Voltage supply**
- 06 Without coil
- 12V DC
- 24V DC

**Electric connections**
- 07 Without coils
- With coils, without mating connector DIN EN 175301-803
- With coils, without mating connector vertical Amp-Junior
- With coils, without mating connector DT04-2P

**Options**
- 08 No options
- Push-button type manual override
- Screw type manual override
- Lever type manual override

### Symbols

- P
- T
- P1

### Notes
1. With ∆P (P > T) 10 bar (145 psi).
2. For connectors ordering code see data sheet RE 18325-90.
3. As lever type manual override a choice of options is available and each one implies a specific ordering code (refer to page 7).
Example of application

The sandwich plate design elements L808103C... are 3 way proportional pressure compensated direct solenoid operated valves. They control the inlet (P) flow and allow through (out of P1) only the flow required by the downstream operators; the excess oil, pressurized at working pressure, is diverted from the inlet P line to Tank. The combination of the proportional regulator with the unloading compensator guarantees stable and constant flow, independently from the working pressure.

The proportional control is achieved by a wet pin proportional screwed-in tube, with removable coil which is energized by an external electronic feed regulator; the electronic regulator performs an “open loop” control of the current supplied to the coil.

These elements basically consist of a stackable housing (1) with a control spool (2), a solenoid (3), and one return spring (4); additionally there is a compensator (6), with a preset spring (7), a spring retainer plug (8) and a drain orifice (9). A coil (5) is held to the solenoid tube by the ring nut (10).

With the solenoid de-energized, the spool stays in the closed position; the pressure overcomes the compensator spring (7) and the inlet (P) oil is unloaded to Tank at the Δp value shown by the characteristic curve. Pressure at (P1) is drained to Tank through the orifice and drops to zero.

By energizing the solenoid (3) through the electronic feed regulator, the control spool (2) is displaced from its rest position proportionally to the current; the corresponding opening allows a pressure compensated flow to proceed to P1, while the excess flow is diverted to Tank.

With the solenoid (3) de-energized, the return spring (4) pushes the spool (2) to its rest position “0” fully closed. No flow goes to P1 and any residual pressure at P1 is drained through the orifice. The compensator (6) is pushed fully open all the oil is unloaded to Tank.
Technical data

General
Valve element with 1 solenoid, pins EN175301-803 kg (lbs) 1.53 (3.37)
Ambient Temperature °C (°F) -30....+90 (-22....+194) (NBR seals)

Hydraulic
Maximum pressure at P bar (psi) 250 (3625)
Maximum flow rated at P1 l/min (gpm) 40 (10.6)
Maximum inlet flow l/min (gpm) 50 (13.2)
Hydraulic fluid
General properties: it must have physical lubricating and chemical properties suitable for use in hydraulic systems such as, for example:
Mineral oil based hydraulic fluids HL (DIN 51524 part 1).
Mineral oil based hydraulic fluids HLP (DIN 51524 part 2).
For use of environmentally acceptable fluids (vegetable or polyglycol base) please consult us.
Fluid Temperature °C (°F) -30....+100 (-22....+212) (NBR seals)
Permissible degree of fluid contamination ISO 4572: β x≥75 X=12...15
ISO 4406: class 20/18/15
NAS 1638: class 9
Viscosity range mm²/s 20....380 (optimal 30....46)

Electrical
Voltage type PWM 120 Hz
Voltage tolerance (nominal voltage) % -10 .... +10
Duty Continuous, with ambient temperature ≤ 90°C (194°F)
Coil wire temperature not to be exceeded °C (°F) 180 (356)
Insulation class H
Coil weight kg (lbs) 0.335 (0.732)
Voltage V 12 24
Nominal 100% current A 1.8 1.2
Coil resistance (Cold nominal value at 20°C (68°F)) Ω 3.3 7.2

Note
For applications with different specifications consult us

<table>
<thead>
<tr>
<th>Code</th>
<th>Voltage [V]</th>
<th>Connector type</th>
<th>Coil description</th>
<th>Marking</th>
<th>Coil Mat no.</th>
</tr>
</thead>
<tbody>
<tr>
<td>=OB 01</td>
<td>12 DC</td>
<td>EN 175301-803 (Ex. DIN 43650)</td>
<td>GP45 01 - 45 K4</td>
<td>12 DC</td>
<td>R901022180</td>
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<tr>
<td>=OB 03</td>
<td>12 DC</td>
<td>AMP JUNIOR</td>
<td>GP45 03 - 45 C4</td>
<td>12 DC</td>
<td>R901022680</td>
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<tr>
<td>=OB 07</td>
<td>12 DC</td>
<td>DEUTSCH DT 04-2P</td>
<td>GP45 07 - 45 K40</td>
<td>12 DC</td>
<td>R901272648</td>
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<tr>
<td>=OC 01</td>
<td>24 DC</td>
<td>EN 175301-803 (Ex. DIN 43650)</td>
<td>GP45 01 - 45 K4</td>
<td>24 DC</td>
<td>R901022174</td>
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<tr>
<td>=OC 03</td>
<td>24 DC</td>
<td>AMP JUNIOR</td>
<td>GP45 03 - 45 C4</td>
<td>24 DC</td>
<td>R901022683</td>
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<tr>
<td>=OC 07</td>
<td>24 DC</td>
<td>DEUTSCH DT 04-2P</td>
<td>GP45 07 - 45 K40</td>
<td>24 DC</td>
<td>R901272647</td>
</tr>
</tbody>
</table>
Characteristic curves

\[ \text{psi} \quad \text{bar} \]
217.5 200 150 120 90 60 30 0
0 1 2 3 4 5 6 7 8 9 10 11 12 13,2 gpm
0 1 2 3 4 5 6 7 8 9 10 11 12 13,2 gpm

\[ \text{Flow Q} \]

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

<table>
<thead>
<tr>
<th>Curve no.</th>
<th>Nominal flow</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>C2 - C4 - C6</td>
</tr>
<tr>
<td>2</td>
<td>C8 - C9</td>
</tr>
</tbody>
</table>

\[ \text{%A} = \text{Percentage of the maximum current supplied to the coil} \]

Compensated flow curves

\[ \text{gpm l/min} \]

\[ \text{Flow Q} \]

\[ \text{Pressure } p \]

<table>
<thead>
<tr>
<th>Curve no.</th>
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<tbody>
<tr>
<td>1</td>
<td>C2</td>
</tr>
<tr>
<td>2</td>
<td>C4</td>
</tr>
<tr>
<td>3</td>
<td>C6</td>
</tr>
<tr>
<td>4</td>
<td>C8</td>
</tr>
<tr>
<td>5</td>
<td>C9</td>
</tr>
</tbody>
</table>

Drain to tank

\[ \text{gpm l/min} \]

\[ \text{Flow Q} \]

\[ \text{Pressure } p \]
External dimensions and fittings

1 Solenoid tube Ø 23 (0.9 inch).
2 Ring nut for coil locking (Ø 30.3 mm (1.18 inch)); torque 6–7 Nm (4.4 – 5.2 ft-lb).
3 Flange specifications for coupling to ED intermediate elements.
4 For tie rod and tightening torque information see data sheet RE 18301-90.
5 Clearance needed for connector removal.
6 Identification label.
7 Optional push-button manual override, 0P type, for spool opening: it is pressure stuck to the ring nut for coil locking. Mat no. R933003424.
8 Optional screw type manual override, 0F type, for spool opening: it is screwed (torque 6-7 (4.4-5.2 ft-lb)) to the tube as replacement of the coil ring nut. Mat no. R930056486.
9 Optional push-button manual override NP (black) and RP (red) type, for spool opening. It is screwed (torque 6-7Nm (4.4-5.2 ft-lb)) to the tube as replacement of the coil ring nut. Mat no.R930056488 (black) - R930056489 (red)
10 Optional twist type manual override, 0T type, for spool opening and locking in the energised position. It is screwed (torque 6-7Nm (4.4-5.2 ft-lb)) to the tube as replacement of the coil ring nut. Mat no. R930056487
1 Ordering Details: HA (if fitted to side A) or HB (if fitted to side B)
2 Ordering Details: VA (if fitted to side A) or VB (if fitted to side B)

3 Ordering Details: H1 (if fitted to side A) or H9 (if fitted to side B)
4 Ordering Details: V1 (if fitted to side A) or V9 (if fitted to side B)
Electric connection

01 Protection class: IP 65 when connector with seal is properly screwed down.

03 Protection class: IP 65 with female connector properly fitted (see drawing).

07 Protection class: IP 69 K with female connector properly fitted.
Electronic feed regulator

Supply: yellow LED, lit up with power ON.
Off Set: minimum current adjustment. Adjust solenoid current so that the desired minimum value is obtained. Clockwise rotation increases current.
Ramp up: Ramping up time adjustment.
Ramp down: Ramping down time adjustment.
For longer ramping times, turn potentiometers clockwise; for shorter ramping times, turn the potentiometers counterclockwise.
Full load current: Maximum current adjustment. Adjust solenoid current so that the desired maximum value is obtained (up to 2A). Clockwise rotation increases current.
Frequency adjustment: it is possible to set the PWM frequency obtaining the desired control sensitivity. After removing the external plastic cover, turn the adjusting screw; clockwise rotation increases frequency from 100 to 500 Hz.

<table>
<thead>
<tr>
<th>Electronic feed regulator</th>
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</tr>
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<tbody>
<tr>
<td>Regulator ordering code</td>
<td>R933003290</td>
</tr>
<tr>
<td>Supply voltage</td>
<td>12-30 VDC</td>
</tr>
<tr>
<td>Control Signal</td>
<td>0-10 VDC</td>
</tr>
<tr>
<td>Max. output current</td>
<td>2 A</td>
</tr>
<tr>
<td>Minimum output current</td>
<td>0....0.6 A</td>
</tr>
<tr>
<td>Ramp adjustment up/down</td>
<td>0.1....10 s</td>
</tr>
<tr>
<td>PWM Frequency adjustment</td>
<td>100....500 Hz</td>
</tr>
<tr>
<td>Ambient operating temperature</td>
<td>-10....+60 °C (14....+140 °F)</td>
</tr>
<tr>
<td>Weight</td>
<td>0.12 kg (26.4 lbs)</td>
</tr>
<tr>
<td>Electromagnetic compatibility</td>
<td>EN50081-1/2EN61000-4-2/3/4/5/6</td>
</tr>
<tr>
<td>Potentiometer resistance</td>
<td>5....10 kΩ</td>
</tr>
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</table>
Directional valve elements

Electric connection