Products from NEM ...

... for mobile hydraulic applications

### Mechanical and Electrical Cartridge Valves
- Pressure control valves $P_{\text{max}}$ 350 bar
- Counterbalance valves $Q_{\text{max}}$ 300 L/min
- Directional control valves Cavity up to SAE 20
- Flow control valves

### Parts-in-Body Valves
- Load holding / Motion control valves $P_{\text{max}}$ 420 bar
- Boom lowering control valves $Q_{\text{max}}$ 500 L/min
- PO check valves Ports up to 1/4 SAE 6000
- Pressure control valves
- Flow control valves

### Hydraulic Integrated Circuits
- Weight lifting $P_{\text{max}}$ 350 bar
- Earth moving $Q_{\text{max}}$ 200 L/min
- Agricultural vehicles
- Industrial vehicles

### Directional Control Valves
- Flow sensing (patented) $P_{\text{max}}$ 350 bar
- Load sensing $Q_{\text{max}}$ 70 L/min
- Load independent Ports BSP 3/8"
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NEM, founded in 1995, is a valve manufacturer specialising in the development of hydraulic solutions for mobile, agricultural and industrial applications.

Our goal is to be a reliable partner, providing for our customers a state of the art service, delivered by highly qualified technical staff, to achieve customized solutions.

At NEM we are aware that the future of the hydraulic industry is in system engineering. We are therefore developing and manufacturing top quality products, which can be fully integrated into many different applications. NEM components ensure the highest level of performance and safety in any application; this, together with our focus on innovation, has gained us the trust and appreciation of leading machine manufacturers worldwide.

NEM firmly believes that its internal synergy ensures that all customers receive the most efficient and effective service. This is why, each and every day, we explore advances in industry related knowledge, discuss solutions, and bring into play all our expertise to ensure we are utilizing the most advanced technologies.

In order to provide our customers with the highest possible quality, NEM employs some of the most skilled professionals within the industry, who work state of the art equipment and processes. This guarantees perfect functionality of components and systems produced at our facilities.

NEM’s philosophy has always been quality driven, with the customer first in mind. At NEM we understand that human capital is the most important resource and main reason for our joint success. Our company believes in people, in their talents and their personal expertise.

We source raw material and parts, develop and design components and systems, machine them using processes such as turning, grinding, lapping, drilling, honing, heat treatment, assemble and test and finally deliver to our customer’s specifications.

It’s our responsibility to take care of our customers as well as ensure total quality.

NEM’s capabilities cover a wide spectrum of control technologies by combining mechanics, electrics and electronics to supply perfect hydraulic operating components and systems.

Hundreds of customers in many industries trust us and have taken advantage of our expertise. Our applications can be found all over the globe, under the heaviest working conditions.

It goes without saying that in NEM people go the extra mile in order to satisfy our customers and the customer of our customers.

You are kindly invited to meet the people at NEM who listen and who deliver for the benefit of our customers.
Mechanical and Electrical Cartridge Valves
Pressure control valves \( p_{\text{max}} \) 350 bar
Counterbalance valves \( Q_{\text{max}} \) 300 L/min
Directional control valves Cavity up to SAE 20
Flow control valves

Parts-in-Body Valves
Load holding / Motion control valves \( p_{\text{max}} \) 420 bar
Boom lowering control valves \( Q_{\text{max}} \) 500 L/min
PO check valves Ports up to 1/4, SAE 6000
Pressure control valves
Flow control valves

Hydraulic Integrated Circuits
Weight lifting \( p_{\text{max}} \) 350 bar
Earth moving \( Q_{\text{max}} \) 200 L/min
Agricultural vehicles
Industrial vehicles

Directional Control Valves
Flow sensing (patented) \( p_{\text{max}} \) 350 bar
Load sensing \( Q_{\text{max}} \) 70 L/min
Load independent Ports BSP 3/8"
### PRESSURE CONTROL VALVES

#### PRESSURE RELIEF VALVES

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## COUNTERBALANCE VALVES

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### SPOOL DIRECTIONAL VALVES

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**ADJUSTABLE**

**FIXED**

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### DIRECTIONAL CONTROL VALVES

#### PILOT OPERATED CHECK VALVES

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# Product selection guide

## FLOW CONTROL VALVES

### 2 WAYS FLOW CONTROL VALVES

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### FLOW DIVIDER AND COMBINER VALVES

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Check valve cracking pressure (1→2) > 350 bar
### ON/OFF DIRECTIONAL VALVES

#### 2 WAY POPPET TYPE DIRECTIONAL VALVES

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## ON/OFF DIRECTIONAL VALVES

### 2 WAY SPOOL TYPE DIRECTIONAL VALVES

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## Product selection guide

### ON/OFF DIRECTIONAL VALVES

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## ELECTRO-PROPORTIONAL VALVES

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PRESSURE CONTROL VALVES
PRESSURE RELIEF VALVES

Pressure relief valves are normally closed hydraulic valves. They will open when a certain pressure is reached in order to dump the necessary flow to keep the hydraulic ducts pressurized. Their primary function is to protect circuits and/or components (pumps, motors, actuators and pipes) from overloads and pressure peaks. Pressure relief valves can be classified into two categories: direct acting and pilot operated valves.

Direct Acting Pressure Relief Valves are characterized by the presence of conical or differential poppets on which acts directly the pressure to be regulated. These valves are simple, reliable and tough (the spring acts directly on the poppet). Their external dimensions result bigger than the pilot operated ones for flows over 50 lt/min. Direct Acting Pressure Relief Valves find their application in circuits having less than 50 lt/min flows. They are particularly indicated for all those applications in which a good hydraulic sealing level is demanded (eg: hydraulic motors or actuators).

Pilot Operated Pressure Relief Valves are characterized by the presence of a logic element controller by a pilot stage. These are valves able to control big flows combining reduced dimensions. A certain leakage, due to the coupling of the logic element, must be taken into account. Pilot Operated Pressure Relief Valves are generally installed on pumps or hydraulic lines to control the maximum pressure.

Pressure Relief Valves must be considered also under the point of view of their reaction to the back-pressure. Generally these valves equilibrate the differential ratio on the basis of their setting (pin-pout). When a pressure relief valve is mounted before a pressurized line we must consider the effects of the back-pressure on its setting. In these cases the installation of compensated valves is advisable. These valves, thanks to their internal design, will not be affected by the back-pressure on the return line, guaranteeing a control of the maximum feeding pressure considering only their setting (Pin).

PRESSURE REDUCING VALVES

Pressure reducing valves are 3 ways normally open hydraulic valves able to feed a secondary circuit with a lower pressure than the main one.
The reduced pressure acts on a cylindric spool kept in open position by a spring. When the pressure of the secondary circuit overcomes the force of the spring the spool will move, assuring so that the pressure in the secondary line will not increase above its setting.

The third way, typical of pressure reducing valves, is connected to the tank in the direct acted type, and sometimes in the pilot operated ones as well. This connection is necessary to unload the exceeding flow in case the pressure of the secondary circuit would increase above its setting.

There are two different types of design for these valves as well: direct acted and pilot operated.

**Direct acted pressure reducing valves** are characterized by the presence of a cylindric spool on which the pressure to be regulated acts directly. Thanks to their simple design they are very tough and reliable, particularly indicated for feeding the pilot circuits that do not imply a continous oil flow. Their main application is on feeding units for earth moving servo-controls.

**Pilot operated pressure reducing valves** are characterized by the presence of a logic element controller by a pilot stage. Thanks to the logic element it is possible to guarantee a reduced pressure even when big amounts of flow are present. Depending on the type of spool it is possible to design the cartridge both in the basic way and in the way that combines the pressure reducing to the pressure relieving process.

It is very important to consider that the setting pressure of the pressure reducing valves increases when some backpressure is present in the drain line. To avoid this we advise to connect the drain line directly to the tank just in case some pressure losses due to filters and heat exchangers would be present.
**DIRECT ACTING RELIEF VALVE**

- Flow: 1.5 l/min
- Max working pressure: 450 bar
- Seals: NBR and PTFE
- Cartridge tightening torque: 40 Nm
- Weight: 0.05 Kg
- Tamper proof cap: cod. 9021015101
- Cavity: S000020  page 232

**Ordering code**

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<th>250</th>
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| Standard setting 20 cc/min [bar] | 20 | 50 | 100 | 250 |
DIRECT ACTING RELIEF VALVE

- Flow: 20 l/min
- Max working pressure: 420 bar
- Seals: NBR and PTFE
- Cartridge tightening torque: 40 Nm
- Weight: 0.085 Kg
- Tamper proof cap: cod.9021015101
- Cavity: C220000 page 208
- Body: 171202 page 186

Ordering code

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DIRECT ACTING RELIEF VALVE

- Flow ........................................... 30 l/min
- Max working pressure .......................... 350 bar
- Seals .......................................... NBR and PTFE
- Cartridge tightening torque ..................... 40 Nm
- Weight ......................................... 0,145 Kg
- Cavity ......................................... C222000 page 209

Note
This cartridge must be installed into the SAE 08/2 long cavity, according to the specifications of C222000.

This type of valve is characterized by a dumped plunger that enable stable relief characteristics.

Ordering code

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**DIRECT ACTING RELIEF VALVE**

- Flow: 40 l/min
- Max working pressure: 410 bar
- Seals: NBR and PTFE
- Cartridge tightening torque: 60 Nm
- Weight: 0.23 Kg
- Tamper proof cap: cod. 9021030190
- Cavity: C232000 page 212

Note

This cartridge must be installed into the SAE 10/2 long cavity, according to the specifications of C232000.

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**Ordering code**

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<th>2</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Setting range min.-max. [bar]</td>
<td>40 - 140</td>
<td>120 - 250</td>
<td>220 - 410</td>
</tr>
<tr>
<td>Pressure Increase [bar/turn]</td>
<td>23</td>
<td>31</td>
<td>53</td>
</tr>
<tr>
<td>Standard setting 4 l/min [bar]</td>
<td>50</td>
<td>150</td>
<td>250</td>
</tr>
</tbody>
</table>
DIRECT ACTING RELIEF VALVE WITH HARDENED SEALING BODY

- Flow .................. 40 l/min
- Max working pressure .......... 410 bar
- Seals .................. NBR and PTFE
- Cartridge tightening torque ..... 60 Nm
- Weight .................. 0.23 Kg
- Tamper proof cap ................ cod. 9021030190
- Cavity .................. C232000 page 212

Note
Hardened body cartridge, suggested for heavy duty applications (HD) and for lifting equipment.

For lifting equipments, cleanliness class ISO 4406 17/14 (NAS 1653 class 8) or better is recommended.

This cartridge must be installed into the SAE 10/2 long cavity, according the specifications of C232000.

Ordering code

0 0 2 3 4 0 0 0 0 0

SPRINGS

<table>
<thead>
<tr>
<th>SPRINGS</th>
<th>1</th>
<th>2</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Setting range min.-max. [bar]</td>
<td>40 - 140</td>
<td>120 - 250</td>
<td>220 - 410</td>
</tr>
<tr>
<td>Pressure Increase [bar/turn]</td>
<td>23</td>
<td>31</td>
<td>53</td>
</tr>
<tr>
<td>Standard setting 4 l/min [bar]</td>
<td>50</td>
<td>150</td>
<td>250</td>
</tr>
</tbody>
</table>
### DIRECT ACTING RELIEF VALVE

- **Flow** .................. 90 l/min
- **Max working pressure** .................. 350 bar
- **Seals** .................. NBR and PTFE
- **Cartridge tightening torque** .................. 90 Nm
- **Weight** .................. 0.35 Kg
- **Tamper proof cap** .................. code 9021020250
- **Cavity** .................. C240000 page 213
- **Body** .................. 171402 page 196

### Valve Dimensions

- Hex. 32:
- Hex. 13:
- Hex. 4:
- Hex. 32:

### Spring Settings

<table>
<thead>
<tr>
<th>SPRINGS</th>
<th>2</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Setting range min.-max. [bar]</td>
<td>60 - 250</td>
<td>200 - 350</td>
</tr>
<tr>
<td>Pressure Increase [bar/turn]</td>
<td>22</td>
<td>56</td>
</tr>
<tr>
<td>Standard setting 4 l/min [bar]</td>
<td>100</td>
<td>300</td>
</tr>
</tbody>
</table>

**Note**

Axial hole of the C240000 cavity: minimum Ø19mm.
PILOT OPERATED RELIEF VALVE

- Flow: 100 l/min
- Max working pressure: 350 bar
- Seals: NBR and PTFE
- Cartridge tightening torque: 60 Nm
- Weight: 0.25 Kg
- Tamper proof cap: cod. 4029250280
- Cavity: C230000 page 210
- Body: 171302 page 191

Adjustments

- SPRINGS
  - Setting range min.-max. [bar]: 20 - 350
  - Pressure Increase [bar by turn]: 136
  - Standard setting 4 l/min [bar]: 100

Hex socket screw
Handknob

Ordering code

0 0 3 3 0 0 0
DIRECT ACTING COMPENSATED RELIEF VALVE WITH HARDENED SEALING BODY

- Flow: 40 l/min
- Max working pressure: 410 bar
- Seals: NBR and PTFE
- Cartridge tightening torque: 60 Nm
- Weight: 0.23 Kg
- Tamper proof cap: cod. 9021030190
- Cavity: C232000 page 212

Note:
Hardened body cartridge, suggested for heavy duty applications (HD) and for lifting equipment.

For lifting equipments, cleanliness class ISO 4406 17/14 (NAS 1653 class 8) or better is recommended.

This cartridge must be installed into the SAE 10/2 long cavity, according to the specifications of C232000.

### Ordering code

0 0 2 3 5 0 0 0 0

<table>
<thead>
<tr>
<th>SPRINGS</th>
<th>2</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Setting range min.-max. [bar]</td>
<td>120 - 250</td>
<td>220 - 410</td>
</tr>
<tr>
<td>Pressure increase [bar/turn]</td>
<td>31</td>
<td>53</td>
</tr>
<tr>
<td>Standard setting 4 l/min [bar]</td>
<td>150</td>
<td>250</td>
</tr>
</tbody>
</table>
Fix Setting Direct Acting Pressure Reducing Valve

- Flow: 2 l/min
- Max working pressure in 2: 350 bar
- Max working pressure in 1: 18 bar
- Max working pressure in 3: 1 bar
- Seals: NBR and PTFE
- Cartridge tightening torque: 15 Nm
- Weight: 0.10 Kg
- Cavity: C310000 page 217

Note:
- In case of different setting from standard, contact NEM customer service.

Ordering code

0 1 2 1 2 0 3 0 0

Springs

<table>
<thead>
<tr>
<th>SPRINGS</th>
<th>0</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standard setting [bar]</td>
<td>18</td>
</tr>
</tbody>
</table>
DIRECT ACTING PRESSURE REDUCING VALVE

- Flow .............................................. 10 l/min
- Max working pressure in 2 .................. 350 bar
- Max working pressure in 1 .................. 100 bar
- Max working pressure in 3 .................. 1 bar
- Seals ............................................. NBR and PTFE
- Cartridge tightening torque .............. \[40\text{ Nm}\]
- Weight ........................................... \[0,25\text{ Kg}\]
- Cavity ........................................... \text{C320000 page 218}
- Body ........................................... \text{171212 page 187}

Note:
Unidirectional pressure reducing cartridge (without embedded relief function).

<table>
<thead>
<tr>
<th>SPRINGS</th>
<th>1</th>
<th>2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Setting range (bar)</td>
<td>5 - 50</td>
<td>20 - 100</td>
</tr>
<tr>
<td>Pressure Increase (bar/turn)</td>
<td>7</td>
<td>17</td>
</tr>
<tr>
<td>Standard setting (bar)</td>
<td>25</td>
<td>50</td>
</tr>
</tbody>
</table>

Ordering code
01221 00000
DIRECT ACTING PRESSURE REDUCING VALVE

- Flow .................................................. 30 l/min
- Max working pressure in 2 ............. 350 bar
- Max working pressure in 1 ............. 150 bar
- Max working pressure in 3 ............. 1 bar
- Seals .................................................. NBR and PTFE
- Cartridge tightening torque ........... 50 Nm
- Weight ............................................... 0.31 Kg
- Leakage with 350 bar in 2: ............ 70 cc/min
- Tamper proof cap. ......................... cod. 4029250280
- Cavity .................................................. C330000 page 220
- Body .................................................. 171312 page 192

<table>
<thead>
<tr>
<th>SPRINGS</th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Setting range [bar]</td>
<td>5 - 30</td>
<td>15 - 55</td>
<td>20 - 103</td>
<td>30 - 150</td>
</tr>
<tr>
<td>Pressure Increase [bar/turn]</td>
<td>5</td>
<td>8</td>
<td>20</td>
<td>30</td>
</tr>
<tr>
<td>Standard setting [bar]</td>
<td>25</td>
<td>50</td>
<td>100</td>
<td>140</td>
</tr>
</tbody>
</table>

Ordering code

0 1 2 3 2 0

Adjustments

- Without filter
- With filter

Hex socket screw
Handknob
PILOT OPERATED PRESSURE REDUCING VALVE

- Flow: 60 l/min
- Max working pressure in 2: 350 bar
- Max working pressure in 1: 350 bar
- Max working pressure in 3: 1 bar
- Seals: NBR and PTFE
- Cartridge tightening torque: 60 Nm
- Weight: 0.25 Kg
- Tamper proof cap: cod. 4029250280
- Cavity: C330000 page 220
- Body: 171312 page 192

Adjustments:

- SPRINGS
  - Setting range min.-max. [bar]: 20 - 350
  - Pressure increase [bar/turn]: 136
  - Standard setting 4 l/min [bar]: 100

- SPRINGS
  - Setting range min.-max. [bar]: 20 - 350
  - Pressure increase [bar/turn]: 136
  - Standard setting 4 l/min [bar]: 100

Ordering code: 0 1 3 3 2 0 0 0

Hex socket screw
Handknob
COUNTERBALANCE VALVES
Counterbalance valves are hydraulic valves designed specifically to hold and control negative or gravitational loads. They are meant to serve all those applications that involve the control of suspended loads, such as mechanical joints, lifting applications, extensible movable bridge, winches, etc... Counterbalance valves main functionalities are lowering velocity control and stationary load holding. Counterbalance valves hydraulic symbol is similar to an integrated micro-circuit, in which 3 characteristic components can be identified:

- A uni-directional valve, which allow a free feeding to the hydraulic actuator and lock load in the required position.
- A pressure relief valve, which, thanks to its specific configuration, holds the loads acting on hydraulic actuators (for instance, cylinders or motors) and limits max pressurization, allowing also stress control, where needed.
- A pilot piston, which opens the pressure relief valve, thanks to connection to hydraulic energy source.

Generally, counterbalance valves are installed directly on cylinders or hydraulic actuators (ex. Port A1-1).
That guarantees load control and holding even in case of rupture or external leakage of the hoses connecting valve and setting device (directional control valve). Picture nr. 2 shows an example of truck crane hydraulic scheme, which is a typical application for counterbalance valves.

**WORKING PRINCIPLE**

Thanks to the uni-directional valves, oil flow regulated by the directional control valve comes inside the cylinder facing minimum resistance. When directional spools are in neutral position, sealing devices are in rest position, locking connection between hydraulic actuator and directional control valve. Thanks to mechanical sealing obtained through grinded sealing point, it’s possible to avoid leakage through the spools of uni-directional valve. Counterbalance valves, in fact, are able to close with very small leakage (<10 drops/min). Since there are no dents nor saturation effects (possible even in case of clean oil), a perfect sealing will take place in a few minutes.

Pump Connection to pilot line (X-3)— consequence of directional spool change-over— determines the progressive opening of the counterbalance valves, up to the balance satisfying the flows continuity equation. That guarantees the absence of cavitations and also the control of dragged loads lowering velocity.

**SETTING**

Counterbalance valves setting corresponds to the opening pressure of pressure relief section. This pressure determines the max load which counterbalance valve is able to hold. Usually the setting pressure value must be at least 1.3 times the max load induced pressure to hold. That tolerance allows induced loads safe holding.

![Diagram](image)

**Standard setting pressure (Pt)** of counterbalance valves corresponds to pressure on port (1), while the valve is crossed by a 4 l/min flow (picture 3).

**es. Pt: 350 bar @ 4 l/min**

In particular cases, and generally upon customers’ request, the pressure can be set considering the initial opening value, corresponding almost to 20 ml/min. flow.

**es. Pt: 350 bar @ 20 ml/min**
PILOT RATIO

As mentioned before, counterbalance valves are characterized by a pilot area on which pressure coming from the actuator’s feeding line acts. Such pressure, together with the pressure due to the load, moves pilot piston, progressively contrasting the force generated by the setting spring. Hence the combined action of the two pressures is connected to the ratio between the pushing areas on which they act. This ratio is known as “Pilot Ratio” (pr), and it is the basic parameter for any counterbalance valve.

Pilot Ratio (pr) is defined as the geometrical ratio between the area on which the load acts (port 1) and the pilot area (port 3). Thanks to this parameter, it is possible to calculate the values of pilot pressures first opening (Px):

\[ Px = \frac{(Pt - P1)}{rp} \]

According the Pilot Ratio, counterbalance valves can be divided in 2 types:

**High Pilot Ratio (>6:1):** suitable for those applications where the loads are constant (for instance, hydraulic motors) and very stable, where low pilot pressures are demanded in favour of speed and energy savings.

**Low Pilot Ratio (<5:1):** suitable for those applications where loads can vary (for instance, trucks cranes) and for those mechanical structures are not stable, where more control and more stability are needed, an higher pilot pressure is required.

When counterbalance valves are installed on hydraulic actuators, to determine the correct value of pilot pressure it is necessary to introduce in the calculation the ratio between the areas of the actuator itself.

\[ Px = \frac{(Pt - P1)}{(rp + ra)} \]

ra: ratio between the areas of the hydraulic actuator

ra = cap area/annular area

ra = 1
COMPENSATION

Because of coupling counterbalance valves with directional control valves, considering the type of spool to use is needed. When the counterbalance valves are in charge of the pressure relief function, it’s essential to make a distinction between “closed-centre” spool applications and “open-centre” spool application. Generally, when “closed-centre” spools are installed, it’s necessary to use compensated counterbalance valves: since these valves are insensitive to back-pressure on return line (A-2), their pressure setting won’t change.

Two examples of compensated valves application are regenerative circuits and circuits in which draining of eventual pressure peaks must be relieved in series by the anti-shock valves installed inside the directional control valve.

In case of “open-centre” directional spool application, not-compensated valves are compulsory, in which the spring is connected to the return line (A-2).

In **Not-Compensated (N)** type valves, back-pressure affects both pressure setting and pilot pressure. In these valves, the return line is directly connected to the spring. Valves in which adjustable spring is connected to return line are not compensated ones.
Main use: open-centre spool application.

In **Fully-Compensated (C)** type valves, back-pressure does not affect neither pressure setting nor pilot pressure. Belong to this type the valves in which the adjustable spring is separated from return line (A-2) and is connected to a draining line or is air-vented.
In these valves, back-pressure (A-2) is balanced, so it won’t find any area to carry out its force, so that both setting and pilot pressures are independent from pressure on return line (A).
Main use: closed-centre spool applications, regenerative circuits.

In **Relief-Compensated (S)** valves, only pressure setting is independent from back-pressure, while pilot pressure is affected by back-pressures, which sometimes can be helpful in stabilizing the circuit.
To this kind of valves belong all the valves in which only the area subject to the load (A1-1) is balanced.
Main use: closed-centre spool applications.
NOT COMPENSATED COUNTERBALANCE VALVE

- Flow: 40 l/min
- Max working pressure: 350 bar
- Compensation: Not compensated
- Cartridge tightening torque: 40-45 Nm
- Seal lock nut tightening torque: 15-20 Nm
- Weight: 0.2 Kg
- Tamper proof cap: cod. 4029250280

To be ordered separately only for version 0-prearranged

- Cavity: C321000 page 219
- Body single cavity: 172212 page 188
- Body double cavity: 176212 page 189

Note
- Setting: 1.3 times the maximum load induced pressure.
- The back pressure (2) may affect the relief function (for circuits with back pressure use 0612.1 or 0612.2).

Ordering code

0 6 1 2 0 0 0

PILOT RATIO

| 5 | 5:1 |

SPRINGS

| 2 | 3 |
| Setting range [bar] | 120 - 210 | 170 - 350 |
| Pressure Increase [bar/turn] | 35 | 60 |
| Standard setting 4 l/min [bar] | 210 | 350 |

TAMPER PROOF OPTION

| PRE-ARRANGED | 0 |
| NOT PRE-ARRANGED | 2 |
**RELIEF COMPENSATED COUNTERBALANCE VALVE**

- Flow ........................................... 40 l/min
- Max working pressure ...................... 350 bar
- Compensation ................................. Relief compensated
- Cartridge tightening torque .............. 40-45 Nm
- Seal lock nut tightening torque .......... 15-20 Nm
- Weight ......................................... 0.2 Kg
- Tamper proof cap ............................ cod. 4029250280

*To be ordered separately only for version 0-prearranged*

- Cavity ......................................... C321000 page 219
- Body single cavity ......................... 172212 page 188
- Body double cavity ......................... 176212 page 189

**Note**
- Setting: 1,3 times the maximum load induced pressure.

**Ordering code**

<table>
<thead>
<tr>
<th>PILOT RATIO</th>
<th>SPRINGS</th>
<th>TAMPER PROOF OPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>5 5:1</td>
<td>2 3</td>
<td>PRE-ARRANGED 0</td>
</tr>
</tbody>
</table>

**SPRINGS**

- Setting range [bar]  
  - 120 - 210
  - 170 - 350
- Pressure Increase [bar/turn]  
  - 35
  - 60
- Standard setting 4 l/min [bar]  
  - 210
  - 350
FULLY COMPENSATED COUNTERBALANCE VALVE

- Flow: 40 l/min
- Max working pressure: 350 bar
- Compensation: Fully compensated
- Cartridge tightening torque: 40-45 Nm
- Seal lock nut tightening torque: 15-20 Nm
- Weight: 0.2 Kg
- Tamper proof cap: cod. 4029250280

To be ordered separately only for version 0-prearranged

- Cavity: C321000 page 219
- Body single cavity: 172212 page 188
- Body double cavity: 176212 page 189

Note
- Setting: 1.3 times the maximum load induced pressure.
- To be used only with A/B closed center spools.

Ordering code

<table>
<thead>
<tr>
<th>PILOT RATIO</th>
<th>SPRINGS</th>
<th>TAMPER PROOF OPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>5:1</td>
<td>0</td>
</tr>
<tr>
<td>0 6 1 2 1</td>
<td>2 3</td>
<td>0 0</td>
</tr>
<tr>
<td>3</td>
<td>4</td>
<td>2</td>
</tr>
</tbody>
</table>

| Setting range [bar] | 120 - 210 | 170 - 350 |
| Pressure Increase [bar/turn] | 35 | 60 |
| Standard setting 4 l/min [bar] | 210 | 350 |
**NOT COMPENSATED COUNTERBALANCE VALVE**

- Flow: 70 l/min
- Max working pressure: 350 bar
- Compensated: Not compensated
- Cartridge tightening torque: 50-55 Nm
- Seal lock nut tightening torque: 15-20 Nm
- Weight: 0.3 Kg
- Tamper proof cap: cod. 4029250280
  To be ordered separately only for version 0-predisposed
- Cavity: C331000 page 221
- Body single cavity: 172312 page 193
- Body double cavity: 176312 page 194

**Cartridge SAE 10**

- Pressure: 18.10
- Flow: 47

---

**TAMPER PROOF OPTION**

- PRE-ARRANGED: 0
- NOT PRE-ARRANGED: 2

**Note**

- Setting: 1.3 times the maximum load induced pressure.
- The back pressure (2) may affect the relief function
  (for circuits with back pressure use 0613.1 or 0613.2).

---

**Ordering code**

06130 00

**PILOT RATIO**

<table>
<thead>
<tr>
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</thead>
<tbody>
<tr>
<td>8</td>
<td>8:1</td>
</tr>
</tbody>
</table>

**SPRINGS**

<table>
<thead>
<tr>
<th>Setting range [bar]</th>
<th>80 - 210</th>
<th>180 - 350</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pressure Increase [bar/turn]</td>
<td>37</td>
<td>47</td>
</tr>
<tr>
<td>Standard setting 4 l/min [bar]</td>
<td>210</td>
<td>350</td>
</tr>
</tbody>
</table>
**RELIEF COMPENSATED COUNTERBALANCE VALVE**

- Flow: 70 l/min
- Max working pressure: 350 bar
- Compensation: Relief compensated
- Cartridge tightening torque: 50-55 Nm
- Seal lock nut tightening torque: 15-20 Nm
- Weight: 0.3 Kg
- Tamper proof cap: cod. 4029250280
  
  **To be ordered separately only for version 0-prearranged**

- Cavity: C331000  page 221
- Body single cavity: 172312  page 193
- Body double cavity: 176312  page 194

---

**Note:**

- Setting: 1,3 times the maximum load induced pressure.
FULLY COMPENSATED COUNTERBALANCE VALVE

- Flow: 70 l/min
- Max working pressure: 350 bar
- Compensation: Fully compensated
- Cartridge tightening torque: 50-55 Nm
- Seal lock nut tightening torque: 15-20 Nm
- Weight: 0.3 Kg
- Tamper proof cap: cod. 4029250280

To be ordered separately only for version 0-predisposed

- Cavity: C331000 page 221
- Body single cavity: 172312 page 193
- Body double cavity: 176312 page 194

Note:
- Setting: 1,3 times the maximum load induced pressure.
- To be used only with A/B closed center spools.

Flow [l/min] vs. Pressure [bar]

Ordering code:

0 6 1 3 1 0 0

PILOT RATIO
3 3.5:1

SPRINGS
2 3

<table>
<thead>
<tr>
<th>Setting range</th>
<th>Pressure Increase</th>
<th>Standard setting</th>
</tr>
</thead>
<tbody>
<tr>
<td>[bar]</td>
<td>[bar/turn]</td>
<td>[l/min/turn]</td>
</tr>
<tr>
<td>80 - 210</td>
<td>37</td>
<td>210</td>
</tr>
<tr>
<td>180 - 350</td>
<td>47</td>
<td>350</td>
</tr>
</tbody>
</table>

TAMPER PROOF OPTION

- PRE-ARRANGED 0
- NOT PRE-ARRANGED 2
NOT COMPENSATED COUNTERBALANCE VALVE

- Flow: 100 l/min
- Max working pressure: 410 bar
- Compensation: Not compensated
- Cartridge tightening torque: 60 Nm
- Seal lock nut tightening torque: 15-20 Nm
- Weight: 0.7 Kg
- Tamper proof cap: cod. 4029250280
- Cavity: C341000 page 223
- Body single cavity: 172412 page 199
- Body double cavity: 176412 page 200

Note:
- Setting: 1.3 times the maximum load induced pressure.
- The back pressure (2) may affect the relief function (for circuits with back pressure use 0614.2 or 0.614.1).

PILOT RATIO

<table>
<thead>
<tr>
<th>Setting range [bar]</th>
<th>Pressure Increase [bar/turn]</th>
<th>Standard setting 4 l/min [bar]</th>
</tr>
</thead>
<tbody>
<tr>
<td>230 - 410</td>
<td>34</td>
<td>350</td>
</tr>
</tbody>
</table>
**RELIEF COMPENSATED COUNTERBALANCE VALVE**

- Flow: 100 l/min
- Max working pressure: 410 bar
- Compensation: Relief compensated
- Cartridge tightening torque: 60 Nm
- Seal lock nut tightening torque: 15-20 Nm
- Weight: 0.7 Kg
- Tamper proof cap: cod. 4029250280
- Cavity: C341000 page 223
- Body single cavity: 172412 page 199
- Body double cavity: 176412 page 200

**Ordering code**

```
0 6 1 4 2 0 0 0
```

**PILOT RATIO**

| 5 | 5:1 |

**SPRINGS**

<table>
<thead>
<tr>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Setting range [bar]</td>
</tr>
<tr>
<td>Pressure Increase [bar/turn]</td>
</tr>
<tr>
<td>Standard setting 4 l/min [bar]</td>
</tr>
</tbody>
</table>

**Note:**

- Setting: 1.3 times the maximum load induced pressure.
FULLY COMPENSATED COUNTERBALANCE VALVE

- Flow: 100 l/min
- Max working pressure: 410 bar
- Compensation: Fully compensated
- Cartridge tightening torque: 60 Nm
- Seal lock nut tightening torque: 15-20 Nm
- Weight: 0.7 Kg
- Tamper proof cap: Cod. 4029250280
- Cavity: C341000 page 223
- Body single cavity: 172412 page 199
- Body double cavity: 176412 page 200

Note:
- Setting: 1.3 times the maximum load induced pressure.
- To be used only with A/B closed center spools.

Ordering code

<table>
<thead>
<tr>
<th>PILOT RATIO</th>
<th>SPRINGS</th>
</tr>
</thead>
<tbody>
<tr>
<td>5 5:1</td>
<td>4</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>SPRINGS</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Setting range [bar]</td>
<td>230 - 410</td>
</tr>
<tr>
<td>Pressure Increase [bar/turn]</td>
<td>34</td>
</tr>
<tr>
<td>Standard setting 4 l/min [bar]</td>
<td>350</td>
</tr>
</tbody>
</table>

Pressure [bar] vs. Flow [l/min] graph

Hex. 5
Hex. 17
Hex. 32
VENT
Ø 36
1 1/16-12 UN-2A

Note:
- Setting: 1.3 times the maximum load induced pressure.
- To be used only with A/B closed center spools.
NOT COMPENSATED COUNTERBALANCE VALVE

- Flow: 100 l/min
- Max working pressure: 410 bar
- Compensation: Not compensated
- Cartridge tightening torque: 60 Nm
- Seal lock nut tightening torque: 15-20 Nm
- Weight: 0.7 Kg
- Tamper proof cap: cod. 4029250280
- Cavity: M340000 page 234

Note:
- Setting: 1.3 times the maximum load induced pressure.
- The back pressure (2) may affect the relief function (for circuits with back pressure use 0.6441 or 0.6442).

Ordering code

<table>
<thead>
<tr>
<th>PILOT RATIO</th>
<th>SPRINGS</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>5:1</td>
</tr>
</tbody>
</table>

Setting range [bar]: 230 - 410
Pressure Increase [bar/turn]: 34
Standard setting 4 l/min [bar]: 350
RELIEF COMPENSATED COUNTERBALANCE VALVE

- Flow: 100 l/min
- Max working pressure: 410 bar
- Compensation: Relief compensated
- Cartridge tightening torque: 60 Nm
- Seal lock nut tightening torque: 15-20 Nm
- Weight: 0.7 Kg
- Tamper proof cap: cod. 4029250280
- Cavity: M340000 page 234

**Note:**

- Setting: 1.3 times the maximum load induced pressure.

**Ordering code**

```
06442 000
```

**PILOT RATIO**

```
5 5:1
```

**SPRINGS**

<table>
<thead>
<tr>
<th>Setting range [bar]</th>
<th>230 - 410</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pressure Increase [bar/turn]</td>
<td>34</td>
</tr>
<tr>
<td>Standard setting 4 l/min [bar]</td>
<td>350</td>
</tr>
</tbody>
</table>
FULLY COMPENSATED COUNTERBALANCE VALVE

- Flow: 100 l/min
- Max working pressure: 410 bar
- Compensation: Fully compensated
- Cartridge tightening torque: 60 Nm
- Seal lock nut tightening torque: 15-20 Nm
- Weight: 0.7 Kg
- Tamper proof cap: cod. 4029250280
- Cavity: M340000 page 234

Note:
- Setting: 1.3 times the maximum load induced pressure.
- To be used only with A/B closed center spools.

Ordering code

0644.1 000

Pilot Ratio
5:1

Springs

<table>
<thead>
<tr>
<th>Setting range [bar]</th>
<th>230 - 410</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pressure Increase [bar/turn]</td>
<td>34</td>
</tr>
<tr>
<td>Standard setting 4 l/min [bar]</td>
<td>350</td>
</tr>
</tbody>
</table>
DIRECTIONAL CONTROL VALVES
SPOOL TYPE DIRECTIONAL VALVE

Spool type cartridge directional valves are valves which allow to direct or to drive in-coming oil flow through different hydraulic circuit lines. Depending on their actuator type they can be commutated by an external pilot pressure or by a manual override.

The construction is based on matching a drilled cylindrical sleeve with a mobile spool. The spool commutation allows the opening and/or closing of the radial holes made on the cylindrical sleeve.

Example of uni-directional valve- spool type

These kind of valves are characterized by a radial clearance between the mobile spool and the cylindrical sleeve that determines an internal leakage of a few cc/min. This is why its use is not advised for gravitational loads holding without the installation of specific valves like: check valves or counterbalance valves.

UNI-DIRECTIONAL VALVES

Unidirectional valves are 2-way valves which allow oil flow only in single direction, with low pressure drops. Flow in the opposite direction is prevented by sealing devices like conical poppets or balls, kept in a closed position by a spring.

The function which prevents oil from crossing the valve in the opposite direction is characterized by an optimal hydraulic sealing (<0.25 cc/min), and by the fact that pressure inside the cartridge acts together with the spring, keeping the sealing device in a closed position.

The passage through uni-directional valve is called “free flow”, and it’s subject to closing spring strength, whose setting brings about initial opening pressure.
Pilot operated check valves, also known as lock valves, are uni-directional valves in which the opening of the a normally-closed passage can take place thanks to the pilot pressure. The sealing device’s opening through pilot pressure is of an on/off type (from fully closed to fully opened), so that check valves are used to lock hydraulic cylinders. It’s use is not advised at all for the applications intended to lower gravitational loads, on which modulation and/or control of lowering speed is required. This type of applications requires counterbalance valves.

The ratio between the sealing device’s area and pilot area determines the valve pilot ratio \( rp \), which is the essential parameter for calculating the opening pilot pressure. Normally, given a generic load induced pressure \( Pp \), the pilot pressure \( Ppil \) required for opening the valve is calculated dividing the load induced pressure \( Pp \) by pilot ratio \( rp \):

\[
Ppil = \frac{Pp}{rp}
\]

When check valves are used on hydraulic actuators (i.e. Cylinders), due to area ratio \( ra \) of the actuator itself, the effects of inner pressure must also be considered.

\[
Ppil = \frac{Pp}{(rp – ra)}
\]

On the hydraulic cylinders, the areas ratio “Ra” is calculated with reference to the type of movements.

\[
\begin{align*}
\text{Cylinders out (Extension)} & \quad ra = \frac{Afo}{Aan} (>1) \\
\text{Cylinders in} & \quad ra = \frac{Aan}{Afo} (<1)
\end{align*}
\]

It’s very important to remember that, in case of double acting cylinders, pilot ratio must be always higher than areas ratio:

\[
rp > ra
\]

If this rule is not respected, then it is not possible to pilot the check valve during the cylinder extension.
Selector valves are designed for pilot circuits or for circuits intended to transfer load sensing (LS) signals inside integrated circuits or directional control valves. According to their hydraulic schematic, there are 2 types of selector valves:

**Bidirectional Selector Valves:** These valves compare 2 pressure signals, and allow a bi-directional flow of the highest.

![Bidirectional Selector Valve Diagram]

**Uni-Directional Selector Valves:** These valves compare 2 pressure signals, and allow a uni-directional flow of the highest.

![Uni-Directional Selector Valve Diagram]
2 WAY 2 POSITION ROTARY SPOOL DIRECTIONAL VALVE

- Max Flow: 30 l/min
- Max Pressure: 350 bar
- Seals: NBR and PTFE
- Cartridge tightening torque: 50 Nm
- Weight: 0.25 Kg
- Cavity: C230000 page 210
- Body: 171302 page 191

Notes:
- Valve regulation angle is 45° starting lever position can be set through CH6 nut.

Ordering code

0 4 9 3 1 0 0 0

Hand lever frictioned
3 WAY 2 POSITION ROTARY SPOOL DIRECTIONAL VALVE

- Max Flow: 30 l/min
- Max Pressure: 350 bar
- Seals: NBR and PTFE
- Cartridge tightening torque: 50 Nm
- Weight: 0.2 Kg
- Cavity: C330000 page 220
- Body: 171312 page 192

Notes:
- Valve regulation angle is 45° starting lever position can be set through CH6 nut.

Ordering code

0 4 9 3 2 0 0 0

3
Hand lever frictioned

7
Handknob
**ADJUSTABLE SETTING DIRECTIONAL VALVE**

- Max Flow: \( 50 \text{ l/min} \)
- Max Pressure: \( 350 \text{ bar} \)
- Seals: NBR and PTFE
- Cartridge tightening torque: \( 50 \text{ Nm} \)
- Weight: \( 0.35 \text{ Kg} \)
- Cavity: \( C430000 \) page 226
- Body: \( 171322 \) page 195

### SPRINGS

<table>
<thead>
<tr>
<th>Setting</th>
<th>1</th>
<th>2</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bar/turn</td>
<td>1.9</td>
<td>3</td>
<td>10.3</td>
</tr>
<tr>
<td>Standard setting</td>
<td>5</td>
<td>8</td>
<td>20</td>
</tr>
</tbody>
</table>

### Graphs

- Pressure vs. Flow

### Ordering code

048341 00

### Adjustments

- Screw
- Tamper proof
- Handknob
**FIXED SETTING DIRECTIONAL VALVE**

- Max Flow: 50 l/min
- Max Pressure: 350 bar
- Seals: NBR and PTFE
- Cartridge tightening torque: 50 Nm
- Weight: 0.2 Kg
- Cavity: C430000 page 226
- Body: 171322 page 195

---

**Ordering code**

0 4 8 3 4 1 0 0

- **SPRINGS**
  - Setting [bar]: 6

- **3**
  - Fix setting Adjustments

---

**Dimensions**

- Hex.27
- 7/8"-14 UNF-2A
- 171322 page 195
- C430000 page 226

---

**Graph**

- Flow [l/min] vs. Pressure [bar] graph

---

**Image**

- Drawing of the directional valve

---

**Additional Information**

- 18.10 64
**CHECK VALVE**

- Max Flow: 40 l/min
- Max Pressure: 350 bar
- Leakage: 0.25 cc/min
- Seals: NBR and PTFE
- Cartridge tightening torque: 40 Nm
- Weight: 0.1 Kg
- Cavity: C220000 page 208
- Body: 171202 page 186

**Ordering code**

<table>
<thead>
<tr>
<th>SPRINGS</th>
<th>1</th>
<th>2</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cracking pressure [bar]</td>
<td>0.35</td>
<td>2.5</td>
<td>5</td>
</tr>
</tbody>
</table>

**Diagram**

- Hex.24
- 3/4"-16 UNF 2A
- Pressure [bar] vs Flow [l/min]
- Cracking pressure [bar] vs SPRINGS 1, 2, 3

---

**Cartridge SAE 08**

---

**Dimensions: 612.3x858.9**
CHECK VALVE

- Max Flow: 80 l/min
- Max Pressure: 350 bar
- Seals: NBR and PTFE
- Cartridge tightening torque: 50 Nm
- Weight: 0.1 Kg
- Cavity: C230000 page 210
- Body: 171302 page 191

SPRINGS

<table>
<thead>
<tr>
<th>SPRING</th>
<th>CRACKING PRESSURE [BAR]</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0.35</td>
</tr>
<tr>
<td>2</td>
<td>2.5</td>
</tr>
<tr>
<td>3</td>
<td>5</td>
</tr>
</tbody>
</table>

Ordering code

0 7 0 3 1 0 0 0 0
CHECK VALVE

- Max Flow: 130 l/min
- Max Pressure: 350 bar
- Leakage: 0.25 cc/min
- Seals: NBR and PTFE
- Cartridge tightening torque: 60 Nm
- Weight: 0.2 Kg
- Cavity: C240000 page 213
- Body: 171402 page 196

Ordering code

0 7 0 4 1 0 0 0 0

<table>
<thead>
<tr>
<th>SPRINGS</th>
<th>1</th>
<th>2</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cracking pressure [bar]</td>
<td>0.35</td>
<td>2.5</td>
<td>5</td>
</tr>
</tbody>
</table>

Spring 1
CHECK VALVE

- Max Flow: 150 l/min
- Max Pressure: 350 bar
- Leakage: 0,25 cc/min
- Seals: NBR and PTFE
- Cartridge tightening torque: 75 Nm
- Weight: 0,3 Kg
- Cavity: C250000 page 215
- Body: 171502 page 201

**Ordering code**

070510

<table>
<thead>
<tr>
<th>SPRINGS</th>
<th>1</th>
<th>2</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cracking pressure [bar]</td>
<td>0,35</td>
<td>2,5</td>
<td>5</td>
</tr>
</tbody>
</table>
PILOT OPERATED CHECK VALVE

- Max Flow: 30 l/min
- Max working pressure: 350 bar
- Seals: NBR and PTFE
- Leakage: 0.1 cc/min @ 350 bar
- Cartridge tightening torque: 40 Nm
- Weight: 0.075 Kg
- Cavity: C321000 (page 219)
- Body single cavity: 172212 (page 188)
- Body double cavity: 176212 (page 189)

**Ordering code**

- **SEALS**
  - 1: Without seals
  - 2: With seals

- **SPRINGS**
  - 2: Cracking pressure [bar]
  - 3: 5: 7

- **PILOT RATIO**: 3:1

**Diagram**

- Hex.22
- 3/4"-16 UNF

**Graph**

- Pressure Drop [bar] vs Flow [l/min]

- Springs: 1, 3, 5, 7
PILOT OPERATED CHECK VALVE

- Max Flow: 60 l/min
- Max working pressure: 350 bar
- Seals: NBR and PTFE
- Leakage: 0.1 cc/min @ 350 bar
- Cartridge tightening torque: 50 Nm
- Weight: 0.11 Kg
- Cavity: C331000 page 221
- Body single cavity: 172312 page 193
- Body double cavity: 176312 page 194

Ordering code

<table>
<thead>
<tr>
<th>SEALS</th>
<th>SPRINGS</th>
<th>PILOT RATIO</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>3:1</td>
</tr>
<tr>
<td></td>
<td>5</td>
<td></td>
</tr>
<tr>
<td></td>
<td>7</td>
<td></td>
</tr>
</tbody>
</table>

SEALS
- 1: Without seals
- 2: With seals

SPRINGS
- Cracking pressure [bar]
  - 2
  - 3
  - 5
  - 7

PILOT RATIO
- 1: 3:1
PILOT OPERATED CHECK VALVE

- Max Flow .................. 50 l/min
- Max working pressure .......... 350 bar
- Seals ......................... NBR and PTFE
- Cartridge tightening torque .......... 50 Nm
- Weight ......................... 0,13 Kg
- Cavity ......................... N330000 page 233

SPRINGS

| Cracking pressure [bar] | 10 |

PILOT RATIO

| 1 | 3,4:1 |

Ordering code

0 7 2 3 1 2 N 0
**INSERT SHUTTLE VALVE**

- Max Flow: 10 l/min
- Max Pressure: 350 bar
- Cartridge tightening torque: 12-15 Nm
- Weight: 0.010 Kg
- Cavity: S000004 page 230

---

**Ordering code**

0742100000

---
UNIDIRECTIONAL INSERT SHUTTLE VALVE

- Max Flow: 2 l/min
- Max Pressure: 350 bar
- Cartridge tightening torque: 12-15 Nm
- Weight: 0.010 Kg
- Cavity: S000005 page 231

Ordering code

0742200000
FLOW CONTROL VALVES
Thanks to this type of valves, it’s possible to regulate flow passage inside an hydraulic circuit. The flow restriction brings about a non-compensated load loss which depends on the loads themselves. These valves allow to obtain compensated flow regulators, when coupled with pressure compensators.

These valves regulate flow passage only in one direction, keeping the flow passage free in the opposite direction. Flow restriction brings about a non-compensated load loss which depends on the loads themselves. These valves act as compensated flow regulators, when coupled with pressure compensators.

These valves regulate oil flow inside an hydraulic line, independently from the feeding pressure. They are composed by an adjusting device for flow setting and a pressure compensator connected to it in series which keeps a constant pressure drop across the adjusting device flow area. 2-way compensated flow regulators are usually installed in parallel to the main line:
1) to reduce feeding on secondary circuits, which work at lower pressures compared to the main feeding line pressure;
2) to reduce inertial/dragged maximum speed.
In the first case, it’s important to provide draining of oil in excess in comparison with set flow, installing a pressure relief valve.
These valves regulate oil flow inside an hydraulic line, draining excess flow through a third line which makes the regulated flow independent from the working pressure.

There are different types of 3-way regulators:

**Cartridge type**: this type is very compact and enable a constant regulated flow, independently from pressure on both lines. The excess flow line can be pressurized even at higher values than the regulated line. Regulated flow has priority over any line connected to the excess port.

**Integrated circuit type**: these valves are flow regulators designed using cartridges installed in a manifold. Their main characteristic is that they’re able to manage higher flows than the cartridge type. Main components are: (1) flow control device; (2) 2-way normally closed compensator. For an optimal functionality, pressure on third line (T) must be lower than pressure on regulated line (A).
These valves enable the division of the inlet oil flow (3) in equal parts or with a predetermined ratio on ports (2) and (4), so that flow onto the actuators is pressure compensated. This function is guaranteed also in the opposite direction, where the flows from the hydraulic actuators are reunified in port (3).

2-way N/O pressure compensators are cartridges designed for 3-way cavities, which allow to obtain 2-way compensated flow regulator, since they are series connected to a flow restrictor or to a 2/2 proportional valve.
2-way N/C pressure compensators are cartridges designed for 3-way cavities, which act as a 3-way compensated flow regulator, since they are connected in parallel to a flow restrictor or to a 2/2 proportional valve.

For an optimal functionality, pressure on port (2-T) must be lower than pressure on regulated line (3-A).

Example of 2 way compensated flow regulator

3-way post-regulated pressure compensators are cartridges designed for 4-way cavities. If connected to a flow restrictor or to 2/2 proportional valve, they act as a 3-way compensated flow regulator, which enables a constant regulated flow independently from the pressure on ports (4) and (2).

As its main characteristic, this type of compensator is able to feel the pressures to be balanced on line (4-A), i.e. it’s able to work on regulated line pressure.

So that it’s possible to regulate pressure or even to intercept regulated flow, by adding the necessary components.

Feeding circuits for accumulators (braking systems) are interesting applications of these type of compensators.
4-way pressure compensators are cartridges designed for 4-way cavities. Connected to a flow restrictor or to a 2/2 proportional valve, they act as a 3-way compensated flow regulator which is able to keep a constant regulated flow independently from pressure on ports (2) and (3).
As its main characteristic, this type of compensator is able to feel pressures to be balanced on line (4-IN), i.e. It is able to work on pressure picked up-stream the compensator. Only flow regulations can be done with this type of compensator.
BIDIRECTIONAL FLOW CONTROL VALVE

- Max Flow: 30 l/min
- Max working pressure: 350 bar
- Seals: NBR and PTFE
- Cartridge tightening torque: 40 Nm
- Weight: 0.15 Kg
- Tamper proof cap: cod. 4029250280
- Adjustment range: 5 turns
- Cavity: C220000 page 208
- Body: 171202 page 186

Ordering code

0302000 01

Adjustments

Screw

Handknob

Flow [l/min]

Pressure [bar]

Fully open adjustment pressure drop
BIDIRECTIONAL FLOW CONTROL VALVE

- Max Flow: 0.60 l/min
- Max working pressure: 350 bar
- Seals: NBR and PTFE
- Cartridge tightening torque: 50 Nm
- Weight: 0.2 Kg
- Tamper proof cap: cod. 4029250280
- Adjustment range: 5 turns
- Cavity: C230000 page 210
- Body: 171302 page 191

![Flow vs Pressure Drop Graph](image)

Ordering code

0 3 0 3 0 0 0 0

- 0: Screw
- 4: Handknob
- 5: Handknob frictioned

Adjustments

- 0
- 1

18.10 82
UNIDIRECTIONAL FLOW CONTROL VALVE

- Max Flow: 30 l/min
- Max working pressure: 350 bar
- Seals: NBR and PTFE
- Cartridge tightening torque: 40 Nm
- Weight: 0.15 Kg
- Tamper proof cap: cod.4029250280
- Adjustment range: 5 turns
- Cavity: C220000 page 208
- Body: 171202 page 186

Ordering code

0 3 7 2 0 0 0 0 1

Screw

Handknob

Adjustments
UNIDIRECTIONAL FLOW CONTROL VALVE

- Max Flow: 60 l/min
- Max working pressure: 350 bar
- Seals: NBR and PTFE
- Cartridge tightening torque: 50 Nm
- Weight: 0,2 Kg
- Tamper proof cap: cod.4029250280
- Adjustment range: 5 turns
- Cavity: C230000 page 210
- Body: 171302 page 191

Ordering code 0373000 01
0 4 5
Screw Handknob Handknob frictioned
Adjustments

Pressure [bar] vs Flow [l/min]

Graph showing pressure and flow relationship.
3 WAY COMPENSATED FLOW CONTROL VALVE

- Max Flow in (1) ...................... 50 l/min
- Max Regulated Flow (3) ............ 30 l/min
- Max working pressure ................ 350 bar
- Seals .................................. NBR and PTFE
- Cartridge tightening torque .......... 50 Nm
- Weight .................................. 0.31 Kg
- Tamper proof cap: ..................... cod.4029250280
- Cavity ................................. C330000 page 220
- Body ..................................... 171312 page 192

Handknob
Adjustments
0323000 01

Screw
Handknob
3 WAY COMPENSATED FLOW CONTROL VALVE

- Max Flow in (1) ...................... 90 l/min
- Max Regulated Flow (3) ............. 50 l/min
- Max working pressure ................... 350 bar
- Seals .................................. NBR and PTFE
- Cavity .................................. C340000
- Cartridge tightening torque .......... 60 Nm
- Weight ................................ 0.4 Kg
- Tamper proof cap: ..................... cod.4029250280
- Cavity .................................. C340000 page 222
- Body .................................. 171412 page 197
FLOW DIVIDER AND COMBINER VALVE

- Flow: 40 l/min
- Max working pressure: 350 bar
- Seals: NBR and PTFE
- Division ratio: 50% ÷ 50%
- Accuracy: < ±5%
- Cartridge tightening torque: 40 Nm
- Weight: 0.15 Kg
- Cavity: C430000 page 226
- Body: 171322 page 195

Note:
- PATENDED FLOW DIVIDER AND COMBINER VALVE

Ordering code

0 8 2 3 0 0 0 0 0

<table>
<thead>
<tr>
<th>SETTING RANGE</th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Qmin + Qmax l/min</td>
<td>20 + 40</td>
<td>2 + 6</td>
<td>5 + 12</td>
<td>12 + 30</td>
</tr>
</tbody>
</table>

![Diagram of the valve with dimensions and settings]
FLOW DIVIDER AND COMBINER VALVE

- Flow: 150 l/min
- Max working pressure: 250 bar
- Seals: NBR and PTFE
- Division ratio: 50% ± 50%
- Accuracy: < +/-3%
- Cartridge tightening torque: 70 Nm
- Weight: 0.40 Kg
- Cavity: C450000 page 228
- Body: 171512 page 202

**Ordering code**

08250 0000

<table>
<thead>
<tr>
<th>SETTING RANGE</th>
<th>1</th>
<th>2</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Qmin + Qmax</td>
<td>28 + 55</td>
<td>56 + 95</td>
<td>90 + 150</td>
</tr>
</tbody>
</table>

**Diagram:**

- CH38
- 1” 5/16-12 UN-2A
- Diameter: 42, 28.53, 26.93, 25.36
- Dimensions: 117, 104, 13, 3

**Graph:**

- Pressure drop [bar] vs Inlet flow rate [l/min]
- Setting range 1, 2, 3
2 WAY NORMALLY OPEN SPOOL LOGIC ELEMENT

- Max Flow: 100 l/min
- Max working pressure: 350 bar
- Seals: NBR and PTFE
- Cartridge tightening torque: 60 Nm
- Weight: 0.3 Kg
- Cavity: C341000 page 223
- Body: 172412 page 199

Ordering code: 02140200

<table>
<thead>
<tr>
<th>SPRINGS</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cracking pressure [bar]</td>
<td>5</td>
</tr>
</tbody>
</table>
2 WAY NORMALLY CLOSED PRESSURE COMPENSATOR

- Max Flow: 70 l/min
- Max working pressure: 350 bar
- Seals: NBR and PTFE
- Cavity: C331000
- Cartridge tightening torque: 50 Nm
- Weight: 0.17 Kg
- Cavity: C331000 page 221
- Body: 172312 page 193

Ordering code: 0 2 0 3 0 0 0 0

<table>
<thead>
<tr>
<th>MAX FLOW</th>
<th>1</th>
<th>2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q [l/min]</td>
<td>40 l/min</td>
<td>70 l/min</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>SPRINGS</th>
<th>1</th>
<th>2</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cracking pressure [bar]</td>
<td>2.5</td>
<td>7.5</td>
<td>11</td>
</tr>
</tbody>
</table>
2 WAY NORMALLY CLOSED PRESSURE COMPENSATOR

- Max Flow: 150 l/min
- Max working pressure: 350 bar
- Seals: NBR and PTFE
- Cartridge tightening torque: 60 Nm
- Weight: 0.26 Kg
- Cavity: C341000 page 223
- Body: 172412 page 199

Ordering code

0 2 0 4 0 0 2 0 0

<table>
<thead>
<tr>
<th>SPRINGS</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cracking pressure [bar]</td>
<td>5</td>
</tr>
</tbody>
</table>
2 WAY NORMALLY CLOSED PRESSURE COMPENSATOR

- Max Flow: 200 l/min
- Max working pressure: 350 bar
- Seals: NBR and PTFE
- Cartridge tightening torque: 0.75 Nm
- Weight: 0.3 Kg
- Cavity: C351000 page 224
- Body: 172512 page 203

Max Flow: 200 l/min
Max working pressure: 350 bar
Seals: NBR and PTFE
Cartridge tightening torque: 0.75 Nm
Weight: 0.3 Kg
Cavity: C351000 page 224
Body: 172512 page 203

Ordering code

```
0 2 0 5 0 0 2 0 0
```

<table>
<thead>
<tr>
<th>SPRINGS</th>
<th>1</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cracking pressure [bar]</td>
<td>2.8</td>
<td>4.8</td>
</tr>
</tbody>
</table>
3 WAY POST COMPENSATED PRESSURE COMPENSATOR

- Max flow from 3 to 2: 50 l/min
- Max flow from 3 to 4: 40 l/min
- Max working pressure: 350 bar
- Seals: NBR and PTFE
- Cartridge tightening torque: 50 Nm
- Weight: 0.2 Kg
- Cavity: C533000 page 229

Ordering code

0253002 00

<table>
<thead>
<tr>
<th>SPRINGS</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cracking pressure [bar]</td>
<td>5</td>
</tr>
</tbody>
</table>
**4 WAY PRESSURE COMPENSATOR**

- Flow: 50 l/min
- Max working pressure: 350 bar
- Leakage: 100 cc/min
- Seals: NBR and PTFE
- Cartridge tightening torque: 50 Nm
- Weight: 0.21 Kg
- Cavity: C430000 page 226
- Body: 171322 page 195

**Ordering code**

```
0 2 4 3 0 0 2 0 0
```

<table>
<thead>
<tr>
<th>SPRINGS</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cracking pressure [bar]</td>
<td>5</td>
</tr>
</tbody>
</table>

**Diagram**

- Hex.27
- 7/8"-14 UNF-2A
- Ø19
- Ø17.4
- Ø15.8

**Graph**

- Pressure Drop [bar] vs Flow [l/min]

---

18.10 94
Ordering code

0205202

SPRINGS 4

Cracking pressure [bar] 4.8

*Note:
- When starting the system it is recommended to bleed air from the cap-cartridges.
2 WAY NORMALLY CLOSED LOGIC ELEMENT

- Max Flow: 200 l/min
- Max working pressure: 350 bar
- Seals: NBR and PTFE
- Cartridge tightening torque: 75 Nm
- Weight: 0.3 Kg
- Cavity: C351000, page 224
- Body: 172512, page 203

Ordering code
0 2 0 5 1 0 2 0 0

<table>
<thead>
<tr>
<th>SPRINGS</th>
<th>1</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cracking pressure [bar]</td>
<td>2.8</td>
<td>4.8</td>
</tr>
</tbody>
</table>

Hex.38
1"5/16-12 UN-2A

Spring 4
Spring 1

Pressure [bar]
Flow [l/min]
2 WAY NORMALLY CLOSED POPPET LOGIC ELEMENT

- Flow: 200 l/min
- Max working pressure: 350 bar
- Seals: NBR and PTFE
- Cavity: C351000
- Cartridge tightening torque: 75 Nm
- Weight: 0.3 Kg
- Cavity: C351000 (page 224)
- Body: 172512 (page 203)

Ordering code

0 2 3 5 0 0 2 0 0

<table>
<thead>
<tr>
<th>SPRINGS</th>
<th>1</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cracking pressure [bar]</td>
<td>2.5</td>
<td>4.8</td>
</tr>
</tbody>
</table>
ON/OFF DIRECTIONAL VALVES
INTRODUCTION

The hydraulic circuits of mobile machinery, are often equipped with automatic devices or remote controls that require the use of electro hydraulic systems to generate hydraulic power from an electric signal.

The components capable of doing this are called electric valves or solenoid valves. These valves are hydraulic components that by using a specific mechanical devices can obtain linear movements using the force generated by a magnetic field of a coil fed with current.

NEM production of solenoid cartridge valves is based on SAE cavity and can cover most of the available circuit: 2 and 3 way 2 positions direct acting lock valves, 2 way 2 position pilot operated lock valves and spool valves 2, 3 and 4 way.

The main characteristics of NEM solenoid cartridge valves is the design and construction of the “Tube”: without any kind of welding, the working principle is based on the tube magnetic saturation, it makes the valve stronger and reliable at high pressures, with an excellent electromagnetic performance.

Each NEM solenoid cartridge valve has a dedicated coil (to be ordered as separate item). The coil has to be selected through the specifications available on the technical sheet, with respect to required voltage and type of connector.
2 WAY 2 POSITION ELECTRIC POPPET VALVE, DIRECT ACTING NC

- Flow: 20 l/min
- Max working pressure: 250 bar
- Leakage: 0.25 cc/min
- Seals: NBR
- Cartridge tightening torque: 30 Nm
- Ring nut tightening torque: 5 Nm
- Weight (with coil): 0.32 Kg
- Cavity: C220000 page 208
- Body: 171202 page 186
- Coil (to be ordered separately): 09400 page 179

Application limits from 1 in 2 and 2 in 1

Pressure drop with energized coil

Ordering code

0 5 0 2 1 0 0 0

0 4 5

No emergency  Push Button  Push and Twist
2 WAY 2 POSITION ELECTRIC POPPET VALVE, DIRECT ACTING NC

- Flow ........................................ 30 l/min
- Max working pressure .................. 350 bar
- Leakage ...................................... 0.25 cc/min
- Seals ........................................... NBR and PTFE
- Cartridge tightening torque .......... 40 Nm
- Ring nut tightening torque .......... 5 Nm
- Weight (with coil) ...................... 0.56 Kg
- Cavity ......................................... C230000 page 210
- Body ........................................... 171302 page 191
- Coil (to be ordered separately) .... 09800 page 180

Note: proportional coil 09800 applied to provide the operating needed power (ED 50%).
For ED 100% contact NEM customer care service.
2 WAY 2 POSITION ELECTRIC POPPET VALVE, PILOT OPERATED NO

- Flow .................. 40 l/min
- Max working pressure ........... 350 bar
- Leakage .................. 0.25 cc/min
- Seals ..................... NBR and PTFE
- Cartridge tightening torque ........ 30 Nm
- Ring nut tightening torque ........ 5 Nm
- Weight (with coil) ........ 0.32 Kg
- Cavity ..................... C220000 page 208
- Body ..................... 171202 page 186
- Coil (to be ordered separately) ........ 09400 page 179
2 WAY 2 POSITION ELECTRIC POPPET VALVE, PILOT OPERATED NO

- Flow: 60 l/min
- Max working pressure: 350 bar
- Leakage: 0.25 cc/min
- Seals: NBR and PTFE
- Cartridge tightening torque: 40 Nm
- Ring nut tightening torque: 5 Nm
- Weight (with coil): 0.56 Kg
- Cavity: C230000
- Body: 171302
- Coil (to be ordered separately): 09801

Ordering code: 0513000000

- 0: No emergency
- 1: Push pin
- 4: Push Button
- 5: Push and Twist

Push pin
Push and Twist
2 WAY 2 POSITION ELECTRIC POPPET VALVE, PILOT OPERATED NO

- Flow: 150 l/min
- Max working pressure: 350 bar
- Leakage: 0.25 cc/min
- Seals: NBR and PTFE
- Cavity: C240000
- Cartridge tightening torque: 50 Nm
- Ring nut tightening torque: 5 Nm
- Weight (with coil): 0.58 Kg
- Cavity: C240000
- Body: 171402
- Coil (to be ordered separately): 09801

Application limits from 2 to 1 and 1 to 2

Pressure drop from 2 to 1 and from 1 to 2

Ordering code

```
0 5 1 4 0 0 0 0 0
```

0: No emergency
4: Push Button
5: Push and Twist
Flow .............................................. 40 l/min
Max working pressure .................. 350 bar
Leakage ........................................ 0,25 cc/min
Seals ......................................... NBR and PTFE
Cartridge tightening torque .............. 30 Nm
Ring nut tightening torque ............... 5 Nm
Weight (with coil) ......................... 0,32 Kg
Cavity ........................................ C220000 page 208
Body .......................................... 171202 page 186
Coil (to be ordered separately) ........... 09400 page 179

2 WAY 2 POSITION ELECTRIC POPPET VALVE, PILOT OPERATED NC

Application limits from 2 to 1 and 1 to 2

Pressure drop from 2 to 1 and from 1 to 2

Ordering code
0 5 1 2 1 0 0 0 0

No emergency Unscrew type
2 WAY 2 POSITION ELECTRIC POPPET VALVE, PILOT OPERATED NC

- Flow: 60 l/min
- Max working pressure: 350 bar
- Leakage: 0.25 cc/min
- Seals: NBR and PTFE
- Cartridge tightening torque: 40 Nm
- Ring nut tightening torque: 5 Nm
- Weight (with coil): 0.56 Kg
- Cavity: C230000 page 210
- Body: 171302 page 191
- Coil (to be ordered separately): 09801 page 181

Application limits from 2 to 1 and 1 to 2

Pressure drop from 2 to 1 and from 1 to 2

Ordering code: 0513100

No emergency Unscrew type
2 WAY 2 POSITION ELECTRIC POPPET VALVE, PILOT OPERATED NC

- Flow: 150 l/min
- Max working pressure: 350 bar
- Leakage: 0.25 cc/min
- Seals: NBR and PTFE
- Cartridge tightening torque: 50 Nm
- Ring nut tightening torque: 5 Nm
- Weight (with coil): 0.58 Kg
- Cavity: C240000 page 213
- Body: 171402 page 196
- Coil (to be ordered separately): 09801 page 181

Ordering code

0 5 1 4 1 0 0 0 0

- Unscrew type
- No emergency

Pressure drop from 2 to 1 and from 1 to 2

Application limits from 2 to 1 and 1 to 2
2 WAY 2 POSITION ELECTRIC VALVE, DIRECT ACTING NO

- Flow .................. 2 l/min
- Max working pressure in 1 ........... 350 bar
- Max working pressure in 2 ........... 20 bar
- Leakage .................. 0.25 cc/min
- Seals ........................ NBR and PTFE
- Cartridge tightening torque .......... 30 Nm
- Ring nut tightening torque .......... 5 Nm
- Weight (with coil) ..................... 0.32 Kg
- Cavity ........................ C220000 page 208
- Body .......................... 171202 page 186
- Coil (to be ordered separately) ...... 09400 page 179

Note:
- Check valve cracking pressure (1→2) > 350 bar.
2 WAY 2 POSITION ELECTRIC POPPET VALVE, DIRECT ACTING NC

- Flow: 2 l/min
- Max working pressure in 1: 350 bar
- Max working pressure in 2: 20 bar
- Leakage: 0.25 cc/min
- Seals: NBR and PTFE
- Cartridge tightening torque: 30 Nm
- Ring nut tightening torque: 5 Nm
- Weight: 0.32 Kg
- Cavity: C220000 page 208
- Body: 171202 page 186
- Coil (to be ordered separately): 09400 page 179

Note:
- Check valve cracking pressure (1→2) > 350 bar.

Ordering code

05321100

0

6

No emergency
Unscrew type

Pressure Drop [bar]
Flow [l/min]
2 WAY 2 POSITION ELECTRIC POPPET VALVE, PILOT OPERATED NO

- Flow ........................................ 30 l/min
- Max working pressure ....................... 300 bar
- Leakage ........................................ 0.25 cc/min
- Seals ........................................... NBR and PTFE
- Cartridge tightening torque ............... 30 Nm
- Ring nut tightening torque .................. 5 Nm
- Weight (with coil) ............................. 0.32 Kg
- Filter ........................................... 280 micron
- Cavity ........................................... C220000 page 208
- Body ............................................. 171202 page 186
- Coil (to be ordered separately) .......... 09300 page 178
  09400 page 179

Without filter
  1 = Pressure drop from 2 to 1 without filter
  2 = Pressure drop from 2 to 1 with filter

With filter
  1 = Pressure drop from 2 to 1 without filter
  2 = Pressure drop from 2 to 1 with filter

Ordering code

0552500 0

0

Without filter

4

Push Button

5

Push and Twist

1

With filter

0

No emergency

0

1
2 WAY 2 POSITION ELECTRIC POPPET VALVE, PILOT OPERATED NO

- Flow .............................................. 40 l/min
- Max working pressure .................... 350 bar
- Leakage ...................................... 0,25 cc/min
- Seals ........................................ NBR and PTFE
- Cartridge tightening torque .......... 30 Nm
- Ring nut tightening torque ............... 5 Nm
- Weight (with coil) .......................... 0,32 Kg
- Cavity ........................................... C220000 page 208
- Body ............................................. 171202 page 186
- Coil (to be ordered separately) ......... 09400 page 179

Hydraulic Scheme

Application limits from 1 to 2 and 2 to 1

Pressure drop with energized coil

Ordering code

0 5 5 2 0 0 0 0

Hydraulic Scheme

No emergency

Push Button

Push and Twist
2 WAY 2 POSITION ELECTRIC POPPET VALVE, PILOT OPERATED NO

- Flow: 60 l/min
- Max working pressure: 350 bar
- Leakage: 0.25 cc/min
- Seals: NBR and PTFE
- Cartridge tightening torque: 40 Nm
- Ring nut tightening torque: 5 Nm
- Weight (with coil): 0.56 Kg
- Cavity: C230000 page 210
- Body: 171302 page 191
- Coil (to be ordered separately): 09801 page 181

Hydraulic scheme

Ordering code

0 5 5 3 0 0 0

Hydraulic scheme

No emergency
Push pin
Push Button
Push and Twist

Application limits from 2 to 1 and 1 to 2

Pressure drop from 2 to 1 and from 1 to 2
2 WAY 2 POSITION ELECTRIC POPPET VALVE, PILOT OPERATED NO

- Flow: 150 l/min
- Max working pressure: 350 bar
- Leakage: 0,25 cc/min
- Seals: NBR and PTFE
- Cartridge tightening torque: 50 Nm
- Ring nut tightening torque: 5 Nm
- Weight (with coil): 0,56 Kg
- Cavity: C240000 page 213
- Body: 171402 page 196
- Coil (to be ordered separately): 09801 page 181

Ordering code:

| 0 | 5 | 5 | 4 | 0 | 0 | 0 |

Hydraulic scheme:

- No emergency Push
- Push Button
- Push and Twist

Application limits from 1 in 2 and 2 in 1

Pressure drop with energized coil
2 WAY 2 POSITION ELECTRIC Poppet Valve, Pilot Operated NC

- Flow ................... 30 l/min
- Max working pressure .......................... 300 bar
- Leakage .......................... 0.25 cc/min
- Seals .................................. NBR and PTFE
- Cartridge tightening torque ............... 30 Nm
- Ring nut tightening torque ............... 5 Nm
- Weight (with coil) ....................... 0.32 Kg
- Filter .................................. 280 micron
- Cavity .......................... C220000 page 208
- Body .................................. 171202 page 186
- Coil (to be ordered separately) .......... 09300 page 178
  09400 page 179

Ordering code

0 5 5 2 6 0 0

0 1

0

0

No emergency

Unscrew type

1 = Application limits from 2 to 1 without filter
2 = Application limits with filter

1 = Pressure drop from 2 to 1 without filter
2 = Pressure drop from 2 to 1 with filter
2 WAY 2 POSITION ELECTRIC POPPET VALVE, PILOT OPERATED NC

- Flow: 40 l/min
- Max working pressure: 350 bar
- Leakage: 0.25 cc/min
- Seals: NBR and PTFE
- Cartridge tightening torque: 30 Nm
- Ring nut tightening torque: 5 Nm
- Weight (with coil): 0.32 Kg
- Cavity: C220000 page 208
- Body: 171202 page 186
- Coil (to be ordered separately): 09400 page 179

Ordering code: 0 5 5 2 1

Hydraulic scheme:

- Scheme 0
- Scheme 1

Pressure drop from 2 to 1 and from 1 to 2

Application limits from 2 to 1 and 1 to 2
2 WAY 2 POSITION ELECTRIC POPPET VALVE, PILOT OPERATED NC

- Flow ........................................ 60 l/min
- Max working pressure .................. 350 bar
- Leakage ...................................... 0.25 cc/min
- Seals ........................................ NBR and PTFE
- Cartridge tightening torque ............ 40 Nm
- Ring nut tightening torque .............. 5 Nm
- Weight (with coil) ......................... 0.56 Kg
- Cavity ........................................ C230000 page 210
- Body .......................................... 171302 page 191
- Coil (to be ordered separately) ......... 09801 page 181

Scheme 0

Scheme 1

Application limits from 2 to 1 and 1 to 2

Pressure drop from 2 to 1 and from 1 to 2

Ordering code

0 5 5 3 1 0 0 0

Hydraulic scheme

0 1

No emergency

Unscrew type

Hex.27

7/8-14 UNF-2A

Ø38

Ø 15.8

3.15

80.8
2 WAY 2 POSITION ELECTRIC POPPET VALVE, PILOT OPERATED NC

- Flow: 150 l/min
- Max working pressure: 350 bar
- Leakage: 0.25 cc/min
- Seals: NBR and PTFE
- Cartridge tightening torque: 50 Nm
- Ring nut tightening torque: 5 Nm
- Weight (with coil): 0.58 Kg
- Cavity: C240000 page 213
- Body: 171402 page 196
- Coil (to be ordered separately): 09801 page 181

Scheme 0
Scheme 1

Hydraulic scheme

Ordering code
0 5 5 4 1 0 0

Pressure drop from 2 to 1 and from 1 to 2

Application limits from 2 to 1 and 1 to 2
2 WAY 2 POSITION ELECTRIC POPPET VALVE, PILOT OPERATED NO

- Flow ........................................... 30 l/min
- Max working pressure ....................... 300 bar
- Leakage ......................................... 0,25 cc/min
- Seals ........................................... NBR and PTFE
- Cartridge tightening torque ............... 30 Nm
- Ring nut tightening torque ................. 5 Nm
- Weight (with coil) ............................ 0,32 Kg
- Filter ........................................... 280 micron
- Cavity ........................................... C220000 page 208
- Body ............................................ 171202 page 186
- Coil (to be ordered separately) .......... 09300 page 178
  09400 page 179

Ordering code

0 5 6 2 5 0 0

0

0 4 5

Without filter  With filter

No emergency  Push Button  Push and Twist

1 = Application limits from 2 to 1 without filter
2 = Application limits with filter

1 = Pressure drop from 2 to 1 without filter
2 = Pressure drop from 2 to 1 with filter
2 WAY 2 POSITION ELECTRIC POPPET VALVE, PILOT OPERATED NO

- Flow: 40 l/min
- Max working pressure: 350 bar
- Leakage: 0.25 cc/min
- Seals: NBR and PTFE
- Cartridge tightening torque: 30 Nm
- Ring nut tightening torque: 5 Nm
- Weight (with coil): 0.32 Kg
- Cavity: C220000 page 208
- Body: 171202 page 186
- Coil (to be ordered separately): 09400 page 179

Application limits from 2 to 1 and 1 to 2
Pressure drop from 2 to 1 and from 1 to 2

Ordering code: 0562000

- No emergency
- Push Button
- Push and Twist
2 WAY 2 POSITION ELECTRIC POPPET VALVE, PILOT OPERATED NO

- Flow ................................. 60 l/min
- Max working pressure ........... 350 bar
- Leakage ............................... 0,25 cc/min
- Seals ................................ NBR and PTFE
- Cartridge tightening torque .................. 40 Nm
- Ring nut tightening torque .............. 5 Nm
- Weight (with coil) ..................... 0,56 Kg
- Cavity ................................. C230000 page 210
- Body .................................. 171302 page 191
- Coil (to be ordered separately) ....... 09801 page 181

Ordering code

0 5 6 3 0 0 0 0

0 No emergency
1 Push pin
4 Push Button
5 Push and Twist

Application limits from 2 to 1 and 1 to 2

Pressure drop from 2 to 1 and from 1 to 2

Pressure [bar]

Flow [l/min]
2 WAY 2 POSITION ELECTRIC POPPET VALVE, PILOT OPERATED NO

- Flow ........................................ 150 l/min
- Max working pressure .................. 350 bar
- Leakage .................................... 0,25 cc/min
- Seals ........................................ NBR and PTFE
- Cartridge tightening torque .......... 50 Nm
- Ring nut tightening torque .......... 5 Nm
- Weight (with coil) ..................... 0,58 Kg
- Cavity ........................................... C240000 page 213
- Body ............................................ 171402 page 196
- Coil (to be ordered separately) .... 09801 page 181

Application limits from 2 to 1 and 1 to 2

Pressure drop from 2 to 1 and from 1 to 2

Ordering code

```
0 5 6 4 0 0 0 0 0
```

- 0: No emergency
- 4: Push Button
- 5: Push and Twist
2 WAY 2 POSITION ELECTRIC POPPET VALVE, PILOT OPERATED NO

- Flow: 200 l/min
- Max working pressure: 350 bar
- Leakage: 0.25 cc/min
- Seals: NBR and PTFE
- Cartridge tightening torque: 65 Nm
- Ring nut tightening torque: 5 Nm
- Weight (with coil): 0.58 Kg
- Cavity: C250000 page 215
- Body: 171502 page 201
- Coil (to be ordered separately): 09400 page 179

28.5

1 2

Flow [l/min]

1 > 2
2 > 1

Pressure [bar]

Flow [l/min]

Ordering code

0 5 6 5 0 0 0 0

0 4 5

No emergency Push Button Push and Twist
2 WAY 2 POSITION ELECTRIC POPPET VALVE, PILOT OPERATED NO

- Flow: 300 l/min
- Max working pressure: 350 bar
- Leakage: 0.25 cc/min
- Seals: NBR and PTFE
- Cartridge tightening torque: 100 Nm
- Ring nut tightening torque: 5 Nm
- Weight (with coil): 0.95 Kg
- Cavity: C260001 page 216
- Coil (to be ordered separately): 09400 page 179

Ordering code

0566000 0

0: No emergency
4: Push Button
5: Push and Twist
2 WAY 2 POSITION ELECTRIC POPPET VALVE, PILOT OPERATED NC

- Flow: 30 l/min
- Max working pressure: 300 bar
- Leakage: 0.25 cc/min
- Seals: NBR and PTFE
- Cartridge tightening torque: 30 Nm
- Ring nut tightening torque: 5 Nm
- Weight (with coil): 0.32 Kg
- Filter: 280 micron
- Cavity: C220000 page 208
- Body: 171202 page 186
- Coil (to be ordered separately): 09300 page 178
  09400 page 179

Ordering code

0 5 6 2 6 0 0

Without filter  With filter

No emergency  Unscrew type

1 = Application limits from 2 to 1 without filter
2 = Application limits with filter

1 = Pressure drop from 2 to 1 without filter
2 = Pressure drop from 2 to 1 with filter
• Flow .................................................. 40 l/min
• Max working pressure .......................... 350 bar
• Leakage ............................................. 0,25 cc/min
• Seals .............................................. NBR and PTFE
• Cartridge tightening torque .................... 30 Nm
• Ring nut tightening torque ...................... 5 Nm
• Weight (with coil) ................................. 0,32 Kg
• Cavity .............................................. C220000 page 208
• Body .............................................. 171202 page 186
• Coil (to be ordered separately) ............... 09400 page 179

2 WAY 2 POSITION ELECTRIC POPPET VALVE, PILOT OPERATED NC

45,2

16,40

67,3

27,5

2

1

Ø 12,6

3/4-16 UNF2A

Hex.24

Application limits from 2 to 1 and 1 to 2

Pressure drop from 2 to 1 and from 1 to 2

Ordering code

05621 0 00

Hydraulic scheme

0

1

0

6

No emergency

Unscrew type

Scheme 0

Scheme 1
2 WAY 2 POSITION ELECTRIC POPPET VALVE, PILOT OPERATED NC

- Flow: 60 l/min
- Max working pressure: 350 bar
- Leakage: 0.25 cc/min
- Seals: NBR and PTFE
- Cartridge tightening torque: 40 Nm
- Ring nut tightening torque: 5 Nm
- Weight (with coil): 0.56 Kg
- Cavity: C230000 page 210
- Body: 171302 page 191
- Coil (to be ordered separately): 09801 page 181

Ordering code

0 5 6 3 1 0 0 0

Hydraulic scheme

0 1

No emergency

0 6

Unscrew type
2 WAY 2 POSITION ELECTRIC POPPET VALVE, PILOT OPERATED NC

- Flow ........................................... 150 l/min
- Max working pressure .................. 350 bar
- Leakage .................................... 0,25 cc/min
- Seals ........................................ NBR and PTFE
- Cartridge tightening torque .......... 50 Nm
- Ring nut tightening torque .......... 5 Nm
- Weight (with coil) ......................... 0,58 Kg
- Cavity ........................................ C240000 page 213
- Body .......................................... 171402 page 196
- Coil (to be ordered separately) .... 09801 page 181

Pressure [bar]  
Flow [l/min]

Pressure drop from 2 to 1 and from 1 to 2

Application limits from 2 to 1 and 1 to 2

Ordering code

05641000

0 6

No emergency  
Unscrew type
2 WAY 2 POSITION ELECTRIC POPPET VALVE, PILOT OPERATED NC

- Flow: 200 l/min
- Max working pressure: 350 bar
- Leakage: 0.25 cc/min
- Seals: NBR and PTFE
- Cartridge tightening torque: 65 Nm
- Ring nut tightening torque: 5 Nm
- Weight (with coil): 0.58 Kg
- Cavity: C250000 page 215
- Body: 171502 page 201
- Coil (to be ordered separately): 09400 page 179

Ordering code

0 5 6 5 1 0 0 0 0

Hex.38

1" 5/16-12 UN-2A

1 > 2

1 < 2

No emergency Unscrew type
2 WAY 2 POSITION ELECTRIC POPPET VALVE, PILOT OPERATED NC

- Flow: 300 l/min
- Max working pressure: 350 bar
- Leakage: 0.25 cc/min
- Seals: NBR and PTFE
- Cartridge tightening torque: 100 Nm
- Ring nut tightening torque: 5 Nm
- Weight (with coil): 0.95 Kg
- Cavity: C260001 page 216
- Coil (to be ordered separately): 09400 page 179

Ordering code

0566100

<table>
<thead>
<tr>
<th>0</th>
<th>6</th>
</tr>
</thead>
</table>

No emergency
Unscrew type
2 WAY 2 POSITION ELECTRIC SPOOL VALVE, DIRECT ACTING NO

- Max working flow (P in port 1) ............... 8 l/min
- Max working flow (P in port 2) ............... 15 l/min
- Max working pressure ......................... 210 bar
- Leakage ....................................... 40 cc/min
- Seals ........................................ NBR and PTFE
- Cartridge tightening torque .................... 27 Nm
- Ring nut tightening torque ..................... 5 Nm
- Weight (with coil) ............................. 0.35 Kg
- Cavity ........................................ C220000 page 208
- Body .......................................... 171202 page 186
- Coil (to be ordered separately) .............. 09400 page 179

Ordering code

0 4 3 2 0 0 0 0 0

0 No emergency
4 Push Button
5 Push and Twist

Pressure Drop [bar]

Pressure @ PORT 1 [bar]

Maximum working flow [l/min]

Flow [l/min]
2 WAY 2 POSITION ELECTRIC SPOOL VALVE, DIRECT ACTING NC

- Max working flow (P in port 1) ............... 9 l/min
- Max working flow (P in port 2) ............... 15 l/min
- Max working pressure ....................... 210 bar
- Leakage ........................................ 40 cc/min
- Seals ............................................ NBR and PTFE
- Cartridge tightening torque ................. 27 Nm
- Ring nut tightening torque ................. 5 Nm
- Weight (with coil) ......................... 0.35 Kg
- Cavity ........................................ C220000 page 208
- Body ........................................... 171202 page 186
- Coil (to be ordered separately) ........... 09400 page 179
3 WAY 2 POSITION ELECTRIC SPOOL VALVE, DIRECT ACTING

- Max working flow (P in port 1) ............... 6 l/min
- Max working flow (P in port 2) ............... 15 l/min
- Max working flow (P in port 3) ............... 5,5 l/min
- Max working pressure ............................... 250 bar
- Max Leakage at 250 bar ......................... 40 cc/min
- Seals .................................................. NBR and PTFE
- Cartridge tightening torque ................. 30 Nm
- Ring nut tightening torque ....................... 5 Nm
- Weight (with coil) ................................. 0,35 Kg
- Cavity .................................................. C320000 page 218
- Body ..................................................... 171212 page 187
- Coil (to be ordered separately) ............... 09400 page 179

Ordering code

0 4 0 2 1 0 0 0 0

No emergency Push Button Push and Twist

Pressure Drop [bar] 15 12 9 6 3 0
Flow [l/min] 0 3 6 9 12 15
0402.31 Low Pressure
Cartridge SAE 08

3 WAY 2 POSITION ELECTRIC SPOOL VALVE, DIRECT ACTING - LOW PRESSURE

- Flow: 0.5 l/min
- Max working pressure: 50 bar
- Leakage: 20 cc/min
- Seals: NBR
- Cartridge tightening torque: 30 Nm
- Ring nut tightening torque: 5 Nm
- Weight (with coil): 0.35 Kg
- Cavity: C320000 page 218
- Body: 171212 page 187
- Coil (to be ordered separately): 09400 page 179

Ordering code
0402310001
3 WAY 2 POSITION ELECTRIC SPOOL VALVE, DIRECT ACTING

- Max working flow (P in port 1) ................. 7 l/min
- Max working flow (P in port 2) ................. 15 l/min
- Max working flow (P in port 3) ................. 15 l/min
- Max working pressure ......................... 250 bar
- Max Leakage at 250 bar ..................... 40 cc/min
- Seals .............................................. NBR and PTFE
- Cartridge tightening torque .................. 30 Nm
- Ring nut tightening torque .................... 5 Nm
- Weight (with coil) ............................. 0,35 Kg
- Cavity ............................................ C320000 page 218
- Body .............................................. 171212 page 187
- Coil (to be ordered separately) ........... 09400 page 179

Hex.24

3/4"-16-UNF-2A

Ø 15,8

¿ 15,2

1

Ø 14,2

Ordering code

0 4 0 2 3 0 0

0

4

5

No emergency

Push Button

Push and Twist
Max working flow (P in port 1) .................. 7 l/min
Max working flow (P in port 2) ............... 15 l/min
Max working flow (P in port 3) ............... 15 l/min
Max working pressure .......................... 250 bar
Max Leakage at 250 bar ...................... 40 cc/min
Seals .............................................. NBR and PTFE
Cartridge tightening torque ................. 30 Nm
Ring nut tightening torque .................. 5 Nm
Weight (with coil) ............................. 0.35 Kg
Cavity .............................................. C320000 page 218
Body .............................................. 171212 page 187
Coil (to be ordered separately) .............. 09400 page 179
3 WAY 2 POSITION ELECTRIC SPOOL VALVE, DIRECT ACTING

- Max working flow (P in port 1) .......... 7 l/min
- Max working flow (P in port 2) .......... 13,5 l/min
- Max working flow (P in port 3) .......... 5,5 l/min
- Max working pressure .......... 250 bar
- Max Leakage at 250 bar .......... 40 cc/min
- Seals .......... NBR and PTFE
- Cartridge tightening torque .......... 30 Nm
- Ring nut tightening torque .......... 5 Nm
- Weight (with coil) .......... 0,35 Kg
- Cavity .......... C320000 page 218
- Body .......... 171212 page 187
- Coil (to be ordered separately) .......... 09400 page 179

Ordering code

0 4 0 2 2 0 0 0 0

No emergency Push Button Push and Twist
3 WAY 2 POSITION ELECTRIC SPOOL VALVE, DIRECT ACTING

- Flow ........................................... 20 l/min
- Max working pressure ....................... 250 bar
- Leakage .................................... 100 cc/min
- Seals ........................................ NBR and PTFE
- Cartridge tightening torque ............... 40 Nm
- Ring nut tightening torque ............... 5 Nm
- Weight (with coil) .......................... 0,56 Kg
- Cavity ....................................... C330000 page 220
- Body .......................................... 171312 page 192
- Coil (to be ordered separately) ............ 09801 page 181

Application limits from 2 in 1 and 2 in 3

1 = Pressure drop from 2 in 1
2 = Pressure drop from 3 in 2

Ordering code

0 4 0 3 2 0 0 0 0
3 WAY 2 POSITION ELECTRIC SPOOL VALVE, DIRECT ACTING

- Flow ................................. 50 l/min
- Max working pressure in 1:2:3 ............. 250 bar
- Leakage ................................ 150 cc/min
- Seals .................................. NBR and PTFE
- Cartridge tightening torque .................. 50 Nm
- Ring nut tightening torque .................... 5 Nm
- Weight (with coil) .......................... 0.70 Kg
- Cavity .................................. C340000 page 222
- Body .................................... 171412 page 197
- Coil (to be ordered separately) ....... 09800 page 180

Note: proportional coil 09800 applied to provide the operating needed power (ED 50%).
For ED 100% contact NEM customer care service.
3 WAY 2 POSITION ELECTRIC POPPET VALVE, DIRECT ACTING

- Flow ............................................. 30 l/min
- Max working pressure in 3:2:1 ................ 350 bar
- Leakage ........................................... 0,25 cc/min
- Seals ............................................. NBR and PTFE
- Cartridge tightening torque .................. 40 Nm
- Ring nut tightening torque ................. 5 Nm
- Weight (with coil) ............................. 0,56 Kg
- Cavity ............................................ C330000 page 220
- Body ............................................. 171312 page 192
- Coil (to be ordered separately) ........... 09800 page 180

Note: proportional coil 09800 applied to provide the operating needed power (ED 50%).
For ED 100% contact NEM customer care service.
4 WAY 2 POSITION ELECTRIC SPOOL VALVE, DIRECT ACTING

- Flow ........................................... 25 l/min
- Max working pressure ...................... 250 bar
- Leakage ........................................ 100 cc/min
- Seals .......................................... NBR and PTFE
- Cartridge tightening torque .............. 40 Nm
- Ring nut tightening torque ............... 5 Nm
- Weight (with coil) ............................ 0,56 Kg
- Cavity .......................................... C430000 page 226
- Body ............................................ 171322 page 195
- Coil (to be ordered separately) ........... 09801 page 181

![Diagram of 4 WAY 2 POSITION ELECTRIC SPOOL VALVE]

Ordering code

0 4 1 3 1 0 0

- 0: No emergency
- 1: Push pin
- 4: Push Button
- 5: Push and Twist
- 7: Handknob

Application limits from 3 in 2/4

Pressure drop from 3 to 2/4
4 WAY 2 POSITION ELECTRIC SPOOL VALVE, DIRECT ACTING

- Flow: 10 l/min
- Max working pressure: 210 bar
- Leakage: 60 cc/min
- Seals: NBR and PTFE
- Cartridge tightening torque: 30 Nm
- Ring nut tightening torque: 5 Nm
- Weight (with coil): 0.35 Kg
- Cavity: C420000 page 225
- Body: 171222 page 190
- Coil (to be ordered separately): 09400 page 179

Ordering code:

0412000000

- 0: No emergency
- 4: Push Button
- 5: Push and Twist

Application limits from 3 in 2/4

Pressure [bar] vs Flow [l/min]

1 = Pressure drop from 2/4 to 3
2 = Pressure drop from 3 to 2/4

Pressure [bar] vs Flow [l/min]

Application limits from 3 in 2/4

Flow [l/min]

0 2 4 6 8 10 12

Pressure [bar]

0 4 8 12 16

Flow [l/min]

0 2 4 6 8 10 12

Pressure [bar]

0 50 100 150 200 250 300

Application limits from 3 in 2/4

Flow [l/min]
4 WAY 2 POSITION ELECTRIC SPOOL VALVE, DIRECT ACTING

- Flow: 25 l/min
- Max working pressure: 250 bar
- Leakage: 100 cc/min
- Seals: NBR and PTFE
- Cartridge tightening torque: 40 Nm
- Ring nut tightening torque: 5 Nm
- Weight (with coil): 0.56 Kg
- Cavity: C430000 page 226
- Body: 171322 page 195
- Coil (to be ordered separately): 09801 page 181

Ordering code: 04132000

No emergency | Push pin | Push Button | Push and Twist | Handknob

Application limits from 3 in 2/4

Pressure drop from 3 to 2/4
4 WAY 2 POSITION ELECTRIC SPOOL VALVE, DIRECT ACTING

- Flow: 10 l/min
- Max working pressure: 210 bar
- Leakage: 60 cc/min
- Seals: NBR and PTFE
- Cartridge tightening torque: 30 Nm
- Ring nut tightening torque: 5 Nm
- Weight (with coil): 0.35 Kg
- Cavity: C420000 page 225
- Body: 171222 page 190
- Coil (to be ordered separately): 09400 page 179

Ordering code
0412300000

0 = No emergency
4 = Push Button
5 = Push and Twist

Application limits from 3 in 2/4

Graphs showing pressure drop and flow rate.
Ordering code

0 4 1 3 3 0 0 - 0 0

- Flow ........................................ 25 l/min
- Max working pressure ...................... 250 bar
- Leakage ..................................... 100 cc/min
- Seals ........................................ NBR and PTFE
- Cartridge tightening torque .............. 40 Nm
- Ring nut tightening torque .............. 5 Nm
- Weight (with coil) ......................... 0.56 Kg
- Cavity ..................................... C430000 page 226
- Body ....................................... 171322 page 195
- Coil (to be ordered separately) .......... 09801 page 181

Application limits from 3 in 2/4

Pressure drop from 3 to 2/4

Ordering code

0 4 1 3 3 0 0 - 0 0

- No emergency
- Push pin
- Push Button
- Push and Twist
- Handknob
4 WAY 2 POSITION ELECTRIC SPOOL VALVE, DIRECT ACTING

- Flow ........................................ 25 l/min
- Max working pressure .................. 250 bar
- Leakage .................................... 100 cc/min
- Seals ........................................ NBR and PTFE
- Cartridge tightening torque ............ 40 Nm
- Ring nut tightening torque ............. 5 Nm
- Weight (with coil) ....................... 0.56 Kg
- Cavity .......................... C430000 page 226
- Body ........................................ 171322 page 195
- Coil (to be ordered separately) ....... 09801 page 181

Ordering code

0 4 1 3 4 0 0 0 0

0 1 4 5 7

No emergency  Push pin  Push Button  Push and Twist  Handknob
4 WAY 2 POSITION ELECTRIC SPOOL VALVE, DIRECT ACTING

- Flow: 10 l/min
- Max working pressure: 210 bar
- Leakage: 60 cc/min
- Seals: NBR and PTFE
- Cartridge tightening torque: 30 Nm
- Ring nut tightening torque: 5 Nm
- Weight (with coil): 0.35 Kg
- Cavity: C420000 page 225
- Body: 171222 page 190
- Coil (to be ordered separately): 09400 page 179

Ordering code

0 4 1 2 5 0 0 0

0 4 5

No emergency Push Button Push and Twist
4 WAY 2 POSITION ELECTRIC SPOOL VALVE, DIRECT ACTING

- Flow: 25 l/min
- Max working pressure: 250 bar
- Leakage: 100 cc/min
- Seals: NBR and PTFE
- Cartridge tightening torque: 40 Nm
- Ring nut tightening torque: 5 Nm
- Weight (with coil): 0.56 Kg
- Cavity: C430000 page 226
- Body: 171322 page 195
- Coil (to be ordered separately): 09801 page 181

Ordering code:

0 4 1 3 5 0 0 0 0

- No emergency
- Push pin
- Push Button
- Push and Twist
- Handknob
4 WAY 2 POSITION ELECTRIC SPOOL VALVE, DIRECT ACTING

- Flow ........................................ 60 l/min
- Max working pressure .................. 250 bar
- Leakage .................................... 100 cc/min
- Seals ........................................ NBR and PTFE
- Cartridge tightening torque ........... 50 Nm
- Ring nut tightening torque ............ 5 Nm
- Weight (with coil) ....................... 0.54 Kg
- Cavity ...................... C440000 page 227
- Body ......................... 171422 page 198
- Coil (to be ordered separately) ....... 09800 page 180

Note:
proportional coil 09800 applied to provide the operating needed power (ED 50%).
For ED 100% contact NEM customer care service.

Ordering code

0 4 A 4 2 0 0 0

0 6

No emergency Unscrew type
4 WAY 3 POSITION ELECTRIC SPOOL VALVE, DIRECT ACTING

- Flow ........................................ 10 l/min
- Max working pressure in 2:3:4 ........ 210 bar
- Max working pressure in 1 ............ 20 bar
- Leakage .................................... 60 cc/min
- Seals ...................................... NBR and PTFE
- Cartridge tightening torque .......... 40 Nm
- Ring nut tightening torque .......... 5 Nm
- Weight (with coil) ....................... 0.70 Kg
- Cavity ................................... C420000 page 225
- Body ..................................... 171222 page 190
- Coil (to be ordered separately) ...... 09400 page 179

Pressure [bar] vs. Flow [l/min]

Application limits from 3 in 2/4

Ordering code

0 4 6 2 1 0 0 0 0

No emergency Push Button
4 WAY 3 POSITION ELECTRIC SPOOL VALVE, DIRECT ACTING

- Flow: 25 l/min
- Max working pressure in 2:3:4: 250 bar
- Max working pressure in 1: 20 bar
- Leakage: 100 cc/min
- Seals: NBR and PTFE
- Cartridge tightening torque: 40 Nm
- Ring nut tightening torque: 5 Nm
- Weight (with coil): 0.9 Kg
- Cavity: C430000 page 226
- Body: 171322 page 195
- Coil (to be ordered separately): 09801 page 181

![Diagram of the 4 WAY 3 POSITION ELECTRIC SPOOL VALVE, DIRECT ACTING](image)

**Ordering code:**

0 4 6 3 1 0 0 0
4 WAY 3 POSITION ELECTRIC SPOOL VALVE, DIRECT ACTING

- Flow: 10 l/min
- Max working pressure in 2:3:4: 210 bar
- Max working pressure in 1: 20 bar
- Leakage: 60 cc/min
- Seals: NBR and PTFE
- Cartridge tightening torque: 30 Nm
- Ring nut tightening torque: 5 Nm
- Weight (with coil): 0.70 Kg
- Cavity: C420000 page 225
- Body: 171222 page 190
- Coil (to be ordered separately): 09400 page 179

Ordering code: 0 4 6 2 2 0 0

Application limits from 3 in 2/4:

1 = Pressure drop from 2/4 to 3
2 = Pressure drop from 3 to 2/4

No emergency Push Button
4 WAY 3 POSITION ELECTRIC SPOOL VALVE, DIRECT ACTING

- Flow: 25 l/min
- Max working pressure in 2:3:4: 250 bar
- Max working pressure in 1: 20 bar
- Leakage: 100 cc/min
- Seals: NBR and PTFE
- Cartridge tightening torque: 40 Nm
- Ring nut tightening torque: 5 Nm
- Weight (with coil): 0.9 Kg
- Cavity: C430000 page 226
- Body: 171322 page 195
- Coil (to be ordered separately): 09801 page 181
4 WAY 3 POSITION ELECTRIC SPOOL VALVE, DIRECT ACTING

- Flow: 10 l/min
- Max working pressure in 2:3:4: 210 bar
- Max working pressure in 1: 20 bar
- Leakage: 40 cc/min
- Seals: NBR and PTFE
- Cartridge tightening torque: 30 Nm
- Ring nut tightening torque: 5 Nm
- Weight (with coil): 0.20 Kg
- Cavity: C420000 page 225
- Body: 171222 page 190
- Coil (to be ordered separately): 09400 page 179

Ordering code

0 4 6 2 3 0 0

No emergency

Push Button
4 WAY 3 POSITION ELECTRIC SPOOL VALVE, DIRECT ACTING

- Flow .................................................. 25 l/min
- Max working pressure in 2:3:4 .......................... 250 bar
- Max working pressure in 1 ................................ 20 bar
- Leakage ............................................... 100 cc/min
- Seals .............................................. NBR and PTFE
- Cartridge tightening torque ...................... 40 Nm
- Ring nut tightening torque ......................... 5 Nm
- Weight (with coil) ................................ 0.9 Kg
- Cavity ............................................. C430000 page 226
- Body ................................................ 171322 page 195
- Coil (to be ordered separately) .................. 09801 page 181

Ordering code
0 4 6 3 0 0 0 0

0 3

No emergency Safety lever

Application limits from 3 to 4 or 2

Pressure [bar]
Flow [l/min]

1 = Pressure drop graph from 3 to 1

Pressure [bar]
Flow [l/min]
4 WAY 3 POSITION ELECTRIC SPOOL VALVE, DIRECT ACTING

- Flow: 10 l/min
- Max working pressure in 2:3:4: 210 bar
- Max working pressure in 1: 20 bar
- Leakage: 40 cc/min
- Seals: NBR and PTFE
- Cartridge tightening torque: 30 Nm
- Ring nut tightening torque: 5 Nm
- Weight (with coil): 0.7 Kg
- Cavity: C420000 page 225
- Body: 171222 page 190
- Coil (to be ordered separately): 09400 page 179
4 WAY 3 POSITION ELECTRIC SPOOL VALVE, DIRECT ACTING

- Flow: 25 l/min
- Max working pressure in 2:3:4: 250 bar
- Max working pressure in 1: 20 bar
- Leakage: 100 cc/min
- Seals: NBR and PTFE
- Cartridge tightening torque: 40 Nm
- Ring nut tightening torque: 5 Nm
- Weight (with coil): 0.9 Kg
- Cavity: C430000 page 226
- Body: 171322 page 195
- Coil (to be ordered separately): 09801 page 181

Application limits from 3 to 4 or 2

Ordering code
04634000

No emergency  Safety lever
ELECTRO-PROPORTIONAL VALVES
**ELECTRO-PROPORTIONAL VALVES**

In the follow of this chapter, NEM presents the electro-proportional flow control cartridges, the flow regulator cartridges and the pressure regulator cartridges. The flow control valves, equipped with proportional solenoid, provide the adjustment of the efflux area by imposing energy to the electric coils. The proportional cartridges are seat in standard cavities and can be connected to pressure compensators in order to obtain flow regulator circuits.

Below, a glossary of technical terms, which have been used in this catalogue, has been reported.

- **Current**: electrons flow produced by voltage across a coil. whose power is proportional to the crossing current and the number of coils. Common abbreviation is I.
- **No load current**: power consumed by the proportional controller when no coil output is available.
- **Threshold current** (or polarization): point where increasing input current causes a flow or pressure variation
- **Maximum working current**: is the point where input current no longer results into a flow pressure variation.
- **I min - I max**: is the minimum and maximum control current fed to the solenoid of the proportional cartridge.
- **Hysteresis**: is the measure of the output current difference between increasing and decreasing current in the solenoid. Example: when current is increasing you need 1200 mA current to produce a 3L/min flow. When current is decreasing, you need 1140 mA current to get the same flow. So there is a 60 mA difference in input current to achieve 3 gpm flow depending on whether current is increasing or decreasing. If I max = 1600mA, and Imin = 350 mA the total input difference is = 1250 mA. Hysteresis=(60/1250)100 = 4.8%.
- **Pulse with modulation (PWM)**: amount method used to vary the average current induced in a coil by a square wave of fixed frequency and variable time ratios.

**Proportional controller or amplifier**: electronic device converting a low - power input signal into an output signal capable of operating the valve. This output signal can be modified to include PWM ramping or dither.

**Ramping**: a system for adjustment of output current variation of a proportional control.

**Compensator**: hydraulic device combined to proportional control valves to provide fixed outlet flow when pressure change.

**Voltage**: current flow potential in an electric circuit. It is measured in units called volts (and is sometimes abbreviated V). Generally, higher voltage will induce a higher current.
ELECTRIC CONTROL REQUIREMENTS

NEM spa offers a range of electro proportional controls equipped with 12 and 24 Vcc coils. On going test indicates that a current from 110 to 150 Hz significantly improves the valve performance, as against operation with straight Vcc. The graphs on the side show how the addition of PWM noticeably reduces hysteresis. This feature is available from virtually all standard controls manufacturers at low cost. For valves, hysteresis is represented by a double tracking curve where as the lower and upper track show decreasing and increasing current respectively. These valves are not designed for rapid operation rates. Please consult the factory if relatively fast valve response is required. One way of enhancing operation rates is to add a control function for (I min - I max) adjustment. This function will allow control across the full range. Again, this feature is widely available on commercial products. Many commercially available controllers also include ramping control.

TYPICAL HYSTERESIS

RAMP SLOPE CONTROL

\[ \text{Pressure/Flow} \]
\[ \text{Current} \]

\[ \text{Pressure/Flow} \]
\[ \text{Current} \]

\[ \text{Current (A)} \]
\[ \text{ramp on time} \]
\[ \text{ramp off time} \]

\[ \text{Time (S)} \]
• Flow ........................................... 30 l/min
• Max working pressure in 1:2. ................. 350 bar
• Application limits with \( \Delta p \) max from 1 to 2. .... 15 bar
• Leakage ..................................... 150 cc/min
• Seals .......................................... NBR and PTFE
• Max current at 12 Vcc ........................ 1800mA
• Max current at 24 Vcc ......................... 900mA
• PWM .......................................... 120 Hz
• Hysteresis .................................... 5%
• Cartridge tightening torque ............... 40 Nm
• Ring nut tightening torque ............... 4 Nm
• Weight (with coil) ............................ 0,48 Kg
• Cavity ........................................ C230000 page 210
• Body ........................................... 171302 page 191
• Coil (to be ordered separately) ........ 09800 page 180

Graph flow/current with \( \Delta p \) from 1 to 2 of 7 bar

Graph pressure drop with energized coil

Ordering code

0 3 4 3 1 0 1

100% Q.max 30% Q.max 50% Q.max 80% Q.max

Flow range

No emergency Push pin Handknob
2 WAY NORMALLY CLOSED SPOOL VALVE, ELECTRO-PROPORTIONAL FLOW CONTROL

- Flow: 75 l/min
- Max working pressure in 1:2: 350 bar
- Application limits with Δp max from 1 to 2: 10 bar
- Leakage: 150 cc/min
- Seals: NBR and PTFE
- Max current at 12 Vcc: 1800mA
- Max current at 24 Vcc: 900mA
- PWM: 120 Hz
- Hysteresis: 5%
- Cartridge tightening torque: 50 Nm
- Ring nut tightening torque: 4 Nm
- Weight (with coil): 0.61 Kg
- Cavity: C240001 page 214
- Coil (to be ordered separately): 09800 page 180

Ordering code

0 3 4 4 1 0 0 1

Flow range

Qmax 75 l/min

Qmax 50 l/min

No emergency

Push pin

Handknob

Graph flow/current with Δp from 1 to 2 of 5 bar

Pressure drop from 1 to 2
2 WAY NORMALLY CLOSED POPPET VALVE, ELECTRO-PROPORTIONAL FLOW CONTROL

- Flow: 40 l/min
- Max working pressure in 1:2: 250 bar
- Leakage: 0.25 cc/min
- Seals: NBR and PTFE
- Max current at 12 Vcc: 1800 mA
- Max current at 24 Vcc: 900 mA
- PWM: 120 Hz
- Hysteresis: 5%
- Cartridge tightening torque: 40 Nm
- Ring nut tightening torque: 5 Nm
- Weight (with coil): 0.53 Kg
- Cavity: C230000 page 210
- Body: 171302 page 191
- Coil (to be ordered separately): 09800 page 180

Graph flow/current with Δp from 2 to 1

Graph pressure drop from 2 to 1

Ordering code

Flow range

100% Q.max  50% Q.max

Push pin
Push Button
Push and Twist
Handknob

Cavity: C230000 page 210
Body: 171302 page 191
Coil (to be ordered separately): 09800 page 180
3 WAY NORMALLY OPEN SPOOL VALVE, ELECTRO-PROPORTIONAL FLOW CONTROL

- Flow .................................................. 30 l/min
- Max working pressure in 1:2:3 .................. 350 bar
- Application limits with Δp max from 2 to 3 .... 15 bar
- Leakage ........................................... 150 cc/min
- Seals .............................................. NBR and PTFE
- Max current at 12 Vcc ......................... 1800mA
- Max current at 24 Vcc ......................... 900mA
- PWM ............................................. 120 Hz
- Hysteresis ....................................... 0.5%
- Cartridge tightening torque .................. 40 Nm
- Ring nut tightening torque ................... 4 Nm
- Weight (with coil) .............................. 0.56 Kg
- Cavity ............................................. C330000 page 220
- Body .............................................. 171312 page 192
- Coil (to be ordered separately) .......... 09800 page 180

Ordering code

0 3 5 3 4 0 0

100% Q.max 30% Q.max 50% Q.max 80% Q.max

Flow range

No emergency Push pin Handknob

Graph flow/current with Δp from 2 to 3 of 7 bar

Graph pressure drop with de-energized coil

- Flow [l/min]
- Pressure [bar]
- Current (Amp.)
3 WAY NORMALLY CLOSED SPOOL VALVE, ELECTRO-PROPORTIONAL FLOW CONTROL

- Flow ........................................... 30 l/min
- Max working pressure in 1:2:3. ............... 350 bar
- Application limits with Δp max from 3 to 2. .... 15 bar
- Leakage ........................................ 150 cc/min
- Seals ............................................. NBR and PTFE
- Max current at 12 Vcc .......................... 1800mA
- Max current at 24 Vcc ......................... 900mA
- PWM ........................................... 120 Hz
- Hysteresis ..................................... 5%
- Cartridge tightening torque .................. 40 Nm
- Ring nut tightening torque ................... 5 Nm
- Weight (with coil) ............................ 0,56 Kg
- Cavity .......................................... C330000 page 220
- Body ........................................... 171312 page 192
- Coil (to be ordered separately) .............. 09800 page 180

Graph flow/current with Δp from 3 to 2 of 7 bar

Pressure drop with de-energized coil
3 WAY NORMALLY CLOSED SPOOL VALVE, ELECTRO-PROPORTIONAL FLOW CONTROL

- Flow ............................................. 70 l/min
- Max working pressure ....................... 350 bar
- Max working pressure in 1 ..................... 10 bar
- Application limits with Δp max from 3 to 2 ....... 15 bar
- Leakage .......................................... 250 cc/min
- Seals ................................................ NBR and PTFE
- Max current at 12 Vcc ......................... 1800mA
- Max current at 24 Vcc ......................... 900mA
- PWM ............................................... 120 Hz
- Hysteresis ........................................... 5%
- Cartridge tightening torque .................... 50 Nm
- Ring nut tightening torque ..................... 5 Nm
- Weight (with coil) ............................... 0,70 Kg
- Cavity .............................................. C340000 page 222
- Body ............................................... 171412 page 197
- Coil (to be ordered separately) ............... 09800 page 180

Ordering code

Hydraulic scheme

0 3 5 4

0 1

Flow range

100% Q.max 50% Q.max 70% Q.max

Pressure drop with energized coil

Graph flow/current with Δp from 3 to 2 of 7 bar

Graph 0 with Δp from 3 to 2 of 11 bar

Scheme 0  Scheme 1

No emergency  Push pin  Handknob
4 WAY SPOOL VALVE, ELECTRO-PROPORTIONAL FLOW CONTROL

- Maximum flow: 24 l/min
- Max working pressure in 2:3:4: 250 bar
- Max working pressure in 1: 20 bar
- Application limits with ∆p max from 3 to 4/2: 15 bar
- Leakage: 100 cc/min
- Seals: NBR and PTFE
- Max current at 12 Vcc: 1800 mA
- Max current at 24 Vcc: 900 mA
- PWM: 120 Hz
- Hysteresis: 5%
- Cartridge tightening torque: 0.40 Nm
- Ring nut tightening torque: 5 Nm
- Weight (with coil): 0.9 Kg
- Cavity: C430000 page 226
- Body: 171322 page 195
- Coil (to be ordered separately): 09800 page 180

Graph flow/current with ∆p from 3 to 4/2 of 7 bar

Graph pressure drop with energized coil from 3 to 4/2

Ordering code:

- Hydraulics scheme: 04730000
- Qmax 9 l/min: 3
- Qmax 15 l/min: 5
- Qmax 24 l/min: 8

Flow range

No emergency

Safety lever
ELECTRO-PROPORTIONAL PRESSURE RELIEF VALVE, DIRECT ACTING

- Flow ........................................... 2 l/min
- Max working pressure in 1 ............... 350 bar
- Max working pressure in 2 ............... 20 bar
- Seals ........................................ NBR and PTFE
- Max current at 12 Vcc ................... 1800mA
- Max current at 24 Vcc ................... 900mA
- PWM .......................................... 120 Hz
- Hysteresis .................................. 5%
- Cartridge tightening torque ............. 30 Nm
- Ring nut tightening torque ............... 4 Nm
- Weight (with coil) ......................... 0,46 Kg
- Cavity ....................................... C220000 page 208
- Body ......................................... 171202 page 186
- Coil (to be ordered separately) ......... 09800 page 180

<table>
<thead>
<tr>
<th>SETTING RANGE</th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Min - Max [bar]</td>
<td>10 ÷ 80</td>
<td>30 ÷ 150</td>
<td>40 ÷ 250</td>
<td>70 ÷ 350</td>
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</table>

Ordering code

0 0 5 2 0 0 0
ELECTRO-PROPORTIONAL PRESSURE RELIEF VALVE, PILOT OPERATED

- Flow ........................................ 60 l/min
- Max working pressure ...................... 350 bar
- Seals ........................................ NBR and PTFE
- Max current at 12 Vcc ..................... 1800mA
- Max current at 24 Vcc ..................... 900mA
- PWM ........................................ 120 Hz
- Hysteresis .................................... 5%
- Cartridge tightening torque ................ 40 Nm
- Ring nut tightening torque ................ 4 Nm
- Weight (with coil) .......................... 0.48 Kg
- Cavity ........................................ C230000 page 210
- Body .......................................... 171302 page 191
- Coil (to be ordered separately) ......... 09800 page 180

<table>
<thead>
<tr>
<th>Setting Range</th>
<th>1</th>
<th>2</th>
<th>3</th>
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</thead>
<tbody>
<tr>
<td>Min - Max [bar]</td>
<td>0 ÷ 150</td>
<td>0 ÷ 250</td>
<td>0 ÷ 350</td>
</tr>
</tbody>
</table>

Ordering code

Hex.27
7/8" - 14 UNF2A

Pressure [bar] vs. Current (Amp.)

Pressure [bar] vs. Flow [l/min]

No emergency
Push pin
Handknob
ELECTRO-PROPORTIONAL PRESSURE REDUCING VALVE

- Flow: 4 l/min
- Max working pressure in 2: 210 bar
- Max working pressure in 1: 30 bar
- Max working pressure in 3: 1 bar
- Seals: NBR and PTFE
- Leakage: 150 cc/min
- Max current at 12 Vcc: 1200mA
- Max current at 24 Vcc: 600mA
- PWM: 120 Hz
- Hysteresis: 5%
- Cartridge tightening torque: 30 Nm
- Ring nut tightening torque: 5 Nm
- Weight (with coil): 0.4 Kg
- Cavity: C320000 page 218
- Body: 171212 page 187
- Coil (to be ordered separately): 09400 page 179

![Diagram of the valve](image)
3 WAY FLOW REGULATOR VALVE

- Max working flow in 1: 50 l/min
- Max working pressure in 1:2:3: 250 bar
- Leakage: 150 cc/min
- Seals: NBR and PTFE
- Cartridge tightening torque: 40 Nm
- Ring nut tightening torque: 5 Nm
- Weight (with coil): 0.56 Kg
- PWM: 120 Hz
- Hysteresis: 5%
- Max current at 24 Vcc: 900mA
- Max current at 12 Vcc: 1800mA
- Cavity: C330000 page 220
- Body: 171312 page 192
- Coil (to be ordered separately): 09800 page 180

<table>
<thead>
<tr>
<th>FLOW RANGE</th>
<th>0</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Min - Max [l/min]</td>
<td>0-25</td>
<td>0-15</td>
</tr>
</tbody>
</table>

Ordering code

0 3 6 3 1 0 1

Port 3 under pressure
Port 2 under pressure

Flow [l/min]

Current (Amp.)

Flow [l/min]

P2-P3 [bar]
3 WAY FLOW REGULATOR VALVE

- Max flow range in 1: 80 l/min
- Max working pressure in 1: 250 bar
- Leakage: 150 cc/min
- Seals: NBR and PTFE
- Cartridge tightening torque: 50 Nm
- Ring nut tightening torque: 5 Nm
- Weight (with coil): 0.7 Kg
- PWM: 120 Hz
- Hysteresis: 5%
- Max current at 24 Vcc: 900mA
- Max current at 12 Vcc: 1800mA
- Cavity: C340000 page 222
- Body: 171412 page 197
- Coil (to be ordered separately): 09800 page 180

**Ordering code**

<table>
<thead>
<tr>
<th>FLOW RANGE</th>
<th>0</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Min - Max</td>
<td>0-50</td>
<td>0-35</td>
</tr>
</tbody>
</table>

**Port 1 under pressure**

**Port 2 flow pressure**

**Flow Range [l/min]**

**Flow [l/min]**

**Current (Amp.)**

**Flow Range [l/min]**

**Current (Amp.)**
COILS AND CONNECTORS
INTRODUCTION

For each NEM electrically operated valve, indication of coil type is available, the coil must be selected through the technical specification, referring to feeding voltage and connector type.

Here follows some technical definitions of the coil's characteristics.

**Feeding voltage**

In order to obtain correct functionality and long life of the coil it is strongly recommended to maintain the feeding voltage always at +/-10% of the nominal value.

**Thermal insulation class (DIN VDE 0580)**

The insulation class of the coil gives max absolute working temperature (T).

- Class F - T = 155°C
- Class H - T = 185°C

The max absolute working temperature value “T” is the sum of the working temperature ΔT of the coil energized for 1 hour and of the ambient temperature Ta:

\[ T = \Delta T + Ta \]

The insulation class of the wire gives the max working temperature inside the coil, before a short circuit damages of the wire insulation.

All NEM coil are produced with “H” class insulation copper wire, with >185°C resistance capability.

**ED - Working intermittent (DIN VDE 0580)**

Intermittent working (ED) is the max acceptable percentage of energized time “ti” versus the total cicle time “tc” (tc=ti+tr / tr=rest time).

\[ ED = (tr/tc) \times 100 \text{ [100%]} \]

All coils can be used with ED=100%, as long as the max acceptable insulation class temperature is not exceeded.

Moreover, all NEM proportional coils can be considered as ON-OFF coils with ED=50% if the maximum total cycle time is defined as 5 minutes (according to the DIN VDE 0580).

**Protection class (EN60529)**

The protection class IP is a code based on two numbers that gives the level of protection for an electric equipment against the acid. or inadv. contact with human body or objects and the water resistance.

The first value gives the level of protection against external solid objects, the second value gives the level of protection against liquid penetration.

Some example of protection class:

<table>
<thead>
<tr>
<th>IP RATE</th>
<th>DEFINITION</th>
</tr>
</thead>
<tbody>
<tr>
<td>IP 65</td>
<td>• Total protection against accid. or inadv. contact. Protection against dust.</td>
</tr>
<tr>
<td></td>
<td>• Protection against water (out of a nozzle) from all direction</td>
</tr>
<tr>
<td>IP 67</td>
<td>• Total protection against accid. or inadv. contact. Protection against dust.</td>
</tr>
<tr>
<td></td>
<td>• Protection against water plunging</td>
</tr>
</tbody>
</table>
**COIL - TUBE Ø 13**

- Wire insulation class: H (>185°C)
- ED: 100%
- Coil power at 20°C: 22 W
- Ambient temperature: -20°C to +40°C
- Weight: 0.19 Kg

**ELECTRIC CIRCUITS**

- **STANDARD**
- **WITH DIODE (BI-DIRECTIONAL)**

**CABLE**

- **AMP - JUNIOR**
- **AMP - SUPER SEAL**

**COIL - TUBE Ø 13**

**Note:**
- Coil interchangeable with CT-9400 model.

---

<table>
<thead>
<tr>
<th>CONNECTOR</th>
<th>PROTECTION CLASS</th>
<th>COIL THERMAL INSULATION CLASS</th>
<th>VOLTAGE [V]</th>
<th>RESISTANCE [Ω]</th>
<th>CIRCUIT</th>
<th>ORDERING CODE</th>
</tr>
</thead>
<tbody>
<tr>
<td>DIN 43650</td>
<td>IP65*</td>
<td>F</td>
<td>12 V dc</td>
<td>6.5</td>
<td>STANDARD</td>
<td>092001130</td>
</tr>
<tr>
<td>DIN 43650</td>
<td>IP65*</td>
<td>F</td>
<td>14 V dc</td>
<td>8.9</td>
<td>STANDARD</td>
<td>092001132</td>
</tr>
<tr>
<td>DIN 43650</td>
<td>IP65*</td>
<td>F</td>
<td>24 V dc</td>
<td>26.5</td>
<td>STANDARD</td>
<td>092002130</td>
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<tr>
<td>DIN 43650</td>
<td>IP65*</td>
<td>F</td>
<td>26 V dc</td>
<td>30.6</td>
<td>STANDARD</td>
<td>092002132</td>
</tr>
<tr>
<td>AMP-JUNIOR</td>
<td>IP65*</td>
<td>F</td>
<td>12 V dc</td>
<td>6.5</td>
<td>STANDARD</td>
<td>092201130</td>
</tr>
<tr>
<td>AMP-JUNIOR</td>
<td>IP65*</td>
<td>F</td>
<td>24 V dc</td>
<td>26.5</td>
<td>STANDARD</td>
<td>092202130</td>
</tr>
<tr>
<td>AMP-JUNIOR</td>
<td>IP65*</td>
<td>H</td>
<td>26 V dc</td>
<td>32.5</td>
<td>WITH DIODE</td>
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<tr>
<td>CABLE L=300mm</td>
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<td>F</td>
<td>14 V dc</td>
<td>8.9</td>
<td>STANDARD</td>
<td>092601130</td>
</tr>
<tr>
<td>CABLE L=300mm</td>
<td>IP65*</td>
<td>F</td>
<td>26 V dc</td>
<td>30.6</td>
<td>STANDARD</td>
<td>092602130</td>
</tr>
<tr>
<td>AMP-SUPER SEAL</td>
<td>IP67*</td>
<td>F</td>
<td>24 V dc</td>
<td>26.5</td>
<td>STANDARD</td>
<td>092702130</td>
</tr>
</tbody>
</table>

* Protection index with standard connector
**COIL - TUBE Ø 13**

18 W

- Wire insulation class: H (>185°C)
- ED: 100%
- Coil power at 20° C: 18 W
- Ambient temperature: -20 +40° C
- Weight: 0,15 Kg

---

### ELECTRIC CIRCUITS

```
\[ \text{\begin{array}{c}
\text{CONNECTOR} \\
\text{PROTECTION} \\
\text{CLASS} \\
\text{COIL} \\
\text{THERMAL} \\
\text{INSULATION} \\
\text{CLASS} \\
\text{VOLTAGE} \\
\text{[V]} \\
\text{RESISTANCE} \\
\text{[Ω]} \\
\text{CIRCUIT} \\
\text{ORDERING} \\
\text{CODE}
\end{array}} \]
```

<table>
<thead>
<tr>
<th>CONNECTOR</th>
<th>PROTECTION CLASS</th>
<th>COIL THERMAL INSULATION CLASS</th>
<th>VOLTAGE [V]</th>
<th>RESISTANCE [Ω]</th>
<th>CIRCUIT</th>
<th>ORDERING CODE</th>
</tr>
</thead>
<tbody>
<tr>
<td>DIN 43650</td>
<td>IP65*</td>
<td>F</td>
<td>12 V dc</td>
<td>7.5</td>
<td>STANDARD</td>
<td>093001131</td>
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<tr>
<td>DIN 43650</td>
<td>IP65*</td>
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<td>24 V dc</td>
<td>30.1</td>
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<td>093002131</td>
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<tr>
<td>DIN 43650</td>
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<td>F</td>
<td>24 V rac**</td>
<td>25.6</td>
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<td>093007130</td>
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<tr>
<td>KOSTAL M27x1</td>
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<td>F</td>
<td>12 V dc</td>
<td>7.5</td>
<td>STANDARD</td>
<td>093401131</td>
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<tr>
<td>KOSTAL M27x1</td>
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<td>F</td>
<td>24 V dc</td>
<td>30.1</td>
<td>STANDARD</td>
<td>093402131</td>
</tr>
</tbody>
</table>

* Protection index with standard connector
** Rectifier not included
COIL - TUBE Ø 13

• Wire insulation class: H (>185°C)
• ED: 100%
• Coil power at 20°C: 20.5 W
• Ambient temperature: -20 to +40°C
• Weight: 0.16 Kg

Note:
- Coil interchangeable with CT-9200 model.

<table>
<thead>
<tr>
<th>CONNECTOR</th>
<th>PROTECTION CLASS</th>
<th>COIL THERMAL INSULATION CLASS</th>
<th>VOLTAGE [V]</th>
<th>RESISTANCE [Ω]</th>
<th>CIRCUIT</th>
<th>ORDERING CODE</th>
</tr>
</thead>
<tbody>
<tr>
<td>DIN 43650</td>
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<td>12 V dc</td>
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<td>STANDARD</td>
<td>094001000</td>
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<tr>
<td>DIN 43650</td>
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<td>H</td>
<td>24 V dc</td>
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<td>094002000</td>
</tr>
<tr>
<td>DEUTSCH DT 4</td>
<td>IP67</td>
<td>H</td>
<td>12 V dc</td>
<td>7</td>
<td>WITH DIODE</td>
<td>094101000</td>
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<td>DEUTSCH DT 4</td>
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<td>24 V dc</td>
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<td>094102000</td>
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<td>H</td>
<td>12 V dc</td>
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<td>STANDARD</td>
<td>094201000</td>
</tr>
<tr>
<td>AMP - JUNIOR</td>
<td>IP65*</td>
<td>H</td>
<td>24 V dc</td>
<td>28</td>
<td>STANDARD</td>
<td>094202000</td>
</tr>
</tbody>
</table>

* Protection index with standard connector
• Wire insulation class. .................................................. H (>185°C)
• ED * ................................................................. 100%
• Coil power at 20° C .................................................. 36 W
• Max current at 24 V dc ............................................. 0,9 A
• Max current at 12 V dc ............................................. 1,8 A
• Ambient temperature .............................................. -20° +40° C
• Weight ................................................................. 0,28 Kg

* ON/OFF use allowed only with ED 50% max (ED 50% according to the DIN VDE 0580)

<table>
<thead>
<tr>
<th>CONNECTOR</th>
<th>PROTECTION CLASS</th>
<th>COIL THERMAL INSULATION CLASS</th>
<th>VOLTAGE [V]</th>
<th>RESISTANCE [Ω]</th>
<th>CIRCUIT</th>
<th>ORDERING CODE</th>
</tr>
</thead>
<tbody>
<tr>
<td>DIN 43650</td>
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<td>H</td>
<td>12 V dc</td>
<td>3,9</td>
<td>STANDARD</td>
<td>098001190</td>
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<tr>
<td>DIN 43650</td>
<td>IP65*</td>
<td>H</td>
<td>24 V dc</td>
<td>14,5</td>
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<td>DEUTSCH DT 4</td>
<td>IP67</td>
<td>F</td>
<td>12 V dc</td>
<td>3,9</td>
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<td>WITH DIODE</td>
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<tr>
<td>AMP - JUNIOR</td>
<td>IP65*</td>
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<td>24 V dc</td>
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<td>WITH DIODE</td>
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<tr>
<td>AMP - JUNIOR</td>
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<td>26 V dc</td>
<td>18,8</td>
<td>WITH DIODE</td>
<td>098212192</td>
</tr>
</tbody>
</table>

* Protection index with standard connector
Coil - Tube Ø 19

- Wire insulation class: H (>185°C)
- ED: 100%
- Coil power at 20° C: 24 W
- Ambient temperature: -20 +40° C
- Weight: 0.28 Kg

Electric Circuits

<table>
<thead>
<tr>
<th></th>
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<td>12 V dc</td>
<td>6.8</td>
<td>WITH DIODE</td>
<td>098111190</td>
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<td>DEUTSCH DT 4</td>
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<td>F</td>
<td>24 V dc</td>
<td>24</td>
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<tr>
<td>AMP - JUNIOR</td>
<td>IP65*</td>
<td>F</td>
<td>12 V dc</td>
<td>6.8</td>
<td>WITH DIODE</td>
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<tr>
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<td>F</td>
<td>24 V dc</td>
<td>24</td>
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<td>AMP - JUNIOR</td>
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<td>H</td>
<td>26 V dc</td>
<td>28.1</td>
<td>WITH DIODE</td>
<td>098212193</td>
</tr>
</tbody>
</table>

* Protection index with standard connector

** Rectifier not included - Power 25W
CONNECTOR DIN 43650 - ISO 4400

- Insulation class: VDE 0110-1/89
- Protection index: IP 65
- Distance between poles: 18 mm
- Poles resistance at 20°C: 6 < Ohm
- Ambient temperature: -40 +90° C
- Max conductor cross sett.: 1,5 mm
- Weight: 0,05 Kg

Ordering code

4 3 5 2 2 0 1 0 0 0

NITRILE SEAL
The power supply voltage must be in the 12 to 24 V DC range. It is necessary to power the system with rectified and filtered voltage. The use of a 4700 mF 35V electrolytic capacitor is recommended to filter the power voltage supply. The electronic controller can drive valves with coil powered at 12 or 24 Vdc. In order to assure the nominal maximum current value of the coil it is necessary that the voltage supply of the controller exceeds the nominal voltage supply of the coil valve at least of 1,5V.
APPLICATIONS

1 - On-Off application mode with switch and ramp setting for acceleration and deceleration uses.

The GND and 3 terminals are connected to the two terminals of the switch (normally open). When the switch is closed, the input reference signal is tied to the maximum voltage value and consequently the current of the solenoid reaches the maximum value. When the switch is open the current flowing into the solenoid reaches the minimum value. The ramp up and ramp down potentiometers allow to adjust, using linear ramp, respectively the time delay between the switching from minimum to maximum current and the delay between the switching from maximum to minimum current. The minimum and maximum current values are adjusted with the offset and full load potentiometers.

2 - Control mode using a voltage generator as input signal.

The external signal control must be connected to terminal 3 and ground (0V) must be connected to terminal 2. The input voltage on the terminal 3 can be regulated from 0 to 10V. The current on the valve coil is proportional to the input command voltage. Set this signal to the maximum value (10V), then proceed to the adjustment of the full load potentiometer, in order to set the maximum current value on the solenoid.

3 - Control mode with potentiometer.

Pins 1, 2 and 3 of the potentiometer must be connected respectively to the GND, 3 and 2 terminals of the controller. To setup the controller, rotate the potentiometer fully clockwise and follow the “Adjustment instructions”. A 5KOhm potentiometer is recommended. In any case the potentiometer value must be between 2KOhm and 5KOhm.

4 - Two axes control with joystick.

This control can be done using a joystick with two axes and two EPC-H02 devices. The joystick is connected to a voltage converter; this converters supplies the input reference signals for the two devices. The currents and the ramps of the two devices are independent. By doubling the above said system, it is possible to realize a four axes system.

ADJUSTMENT INSTRUCTIONS

After the system is connected, verify that it is possible to move the hydraulic cylinder using the potentiometer or the switch. Set the ramp up and ramp down potentiometers to zero, rotating the cursor completely counter clockwise. Set the external potentiometer to zero (or open the external switch) and set the minimum current of the solenoid using the offset potentiometer, rotating it until the hydraulic device begins to move: with this setting, the system will operate without delay. Set the full load potentiometer to zero and rotate the external control potentiometer completely clockwise (or close the external switch): rotate the full load potentiometer clockwise until the hydraulic cylinder reaches the maximum displacement, then rotate the full load potentiometer back until the hydraulic cylinder comes back slightly. Once the tuning of the start and end positions of the hydraulic cylinder stroke is complete, it is possible to regulate the switching speed between the two extreme positions of the stroke using the ramp up and ramp down potentiometers. This further adjustment doesn’t affect the previously tuned settings.
STANDARD BODIES
STANDARD BODY FOR LINE MOUNTING

Ordering code

1 7 1 2 0 2 0 0

<table>
<thead>
<tr>
<th>PORTS SIZE</th>
<th>ALUMINIUM</th>
<th>STEEL</th>
</tr>
</thead>
<tbody>
<tr>
<td>G1/4 = 1</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>G3/8 = 2</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
STANDARD BODY FOR LINE MOUNTING

Ordering code

1 7 1 2 1 2 0 0

PORTS SIZE
G1/4 = 1
G3/8 = 2

ALUMINIUM STEEL
0 1
STANDARD BODY FOR LINE MOUNTING COUNTERBALANCE VALVES

Ordering code

<table>
<thead>
<tr>
<th>PORTS SIZE</th>
<th>1-2</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>G3/8</td>
<td>G1/4</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>ALUMINIUM</th>
<th>STEEL</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>1</td>
</tr>
</tbody>
</table>
STANDARD BODY FOR LINE MOUNTING COUNTERBALANCE VALVES DOUBLE CAVITY

Ordering code

<table>
<thead>
<tr>
<th>PORTS SIZE</th>
<th>A1-B1</th>
<th>A-B</th>
<th>ALUMINIUM</th>
<th>STEEL</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>G3/8</td>
<td>G3/8</td>
<td>0</td>
<td>1</td>
</tr>
</tbody>
</table>

176212  00
STANDARD BODY FOR LINE MOUNTING

Ordering code

171222 00

<table>
<thead>
<tr>
<th>PORTS SIZE</th>
<th>ALUMINIUM</th>
<th>STEEL</th>
</tr>
</thead>
<tbody>
<tr>
<td>G1/4 = 1</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>G3/8 = 2</td>
<td>0</td>
<td>1</td>
</tr>
</tbody>
</table>
STANDARD BODY FOR LINE MOUNTING

SAE-10/2

Port Size

G3/8 = 2

G1/2 = 3

Cavity

C230000

Ordering code

1 7 1 3 0 2

0 0

Aluminium

Steel

0

1
STANDARD BODY FOR LINE MOUNTING

Ordering code

<table>
<thead>
<tr>
<th>PORTS SIZE</th>
<th>1</th>
<th>2</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>PORTS 1-2-3</td>
<td>G1/4</td>
<td>G3/8</td>
<td>G1/2</td>
</tr>
<tr>
<td>a</td>
<td>60</td>
<td>60</td>
<td>70</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>ALUMINIUM</th>
<th>STEEL</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>1</td>
</tr>
</tbody>
</table>

Cavity C330000

171312 0 0
STANDARD BODY FOR LINE MOUNTING COUNTERBALANCE VALVES

Ordering code

<table>
<thead>
<tr>
<th>PORTS</th>
<th>SIZE</th>
<th>ALUMINIUM</th>
<th>STEEL</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>1-2</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>G3/8</td>
<td></td>
<td>G1/4</td>
</tr>
</tbody>
</table>
STANDARD BODY FOR LINE MOUNTING COUNTERBALANCE VALVES DOUBLE CAVITY

Ordering code

1 7 6 3 1 2 0 0

PORTS SIZE
A1-B1 A-B
G3/8 G3/8

ALUMINIUM STEEL
0 1
STANDARD BODY FOR LINE MOUNTING

Ordering code

171322 00

PORTS SIZE
G3/8 = 2  G1/2 = 3

ALUMINIUM  STEEL
0    1
STANDARD BODY FOR LINE MOUNTING

Ordering code

<table>
<thead>
<tr>
<th>PORT SIZE</th>
<th>ALUMINIUM</th>
<th>STEEL</th>
</tr>
</thead>
<tbody>
<tr>
<td>G1/2 = 3</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>G3/4 = 4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>G1 = 5</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>a</th>
<th>b</th>
<th>c</th>
<th>d</th>
<th>e</th>
<th>f</th>
<th>g</th>
</tr>
</thead>
<tbody>
<tr>
<td>40</td>
<td>80</td>
<td>60</td>
<td>50</td>
<td>72</td>
<td>20</td>
<td>52</td>
</tr>
<tr>
<td>40</td>
<td>80</td>
<td>60</td>
<td>50</td>
<td>72</td>
<td>20</td>
<td>52</td>
</tr>
<tr>
<td>50</td>
<td>85</td>
<td>70</td>
<td>55</td>
<td>77</td>
<td>25</td>
<td>62</td>
</tr>
</tbody>
</table>
STANDARD BODY FOR LINE MOUNTING

Ordering code

<table>
<thead>
<tr>
<th>PORTS SIZE</th>
<th>ALUMINIUM</th>
<th>STEEL</th>
</tr>
</thead>
<tbody>
<tr>
<td>G1/2 = 3</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>G3/4 = 4</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

171412 00
STANDARD BODY FOR LINE MOUNTING

SAE-12/4

Ordering code

171422 00

PORTS SIZE
4 5
G3/4 G1

ALUMINIUM STEEL
0 1
STANDARD BODY FOR LINE MOUNTING COUNTERBALANCE VALVES

Ordering code

172412 0 0

<table>
<thead>
<tr>
<th>PORTS SIZE</th>
<th>ALUMINIUM</th>
<th>STEEL</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>4</td>
<td>0</td>
<td>1</td>
</tr>
</tbody>
</table>

PORTS 1-2  | G1/2 | G3/4 |
PORT 3     | G1/4 | G1/4 |
a            | 80   | 90   |
STANDARD BODY FOR LINE MOUNTING COUNTERBALANCE VALVES DOUBLE CAVITY

PORTS SIZE

A1-B1 A-B

3 G1/2 G1/2

ALUMINIUM STEEL

0 1
**Note:**
*manifold specific for flow divider/combiner SAE 16 (p/n 0825.0, pag. xxx).*
STANDARD BODY FOR LINE MOUNTING COUNTERBALANCE VALVES

Cavity C351000

Ordering code

172512 00

<table>
<thead>
<tr>
<th>PORTS SIZE</th>
<th>1-2</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>G3/4</td>
<td>G1/4</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>ALUMINIUM</th>
<th>STEEL</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>1</td>
</tr>
</tbody>
</table>
STANDARD BODY FOR LINE MOUNTING COUNTERBALANCE VALVES DOUBLE CAVITY

Ordering code

<table>
<thead>
<tr>
<th>PORTS SIZE</th>
<th>PORTS</th>
<th>ALUMINIUM</th>
<th>STEEL</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>A1-B1</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>A-B</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>G1</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td></td>
<td>G1</td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>

Cavity C351000 55
Cavity C351000 38

50 90 50

176512 SAE-16/3 SHORT
STANDARD BODY FOR LINE MOUNTING

Ordering code

1 7 1 6 0 2 0 0

PORTS SIZE
G1 = 5  G1-1/4 = 6

ALUMINIUM  STEEL
0          1
CAVITIES
C240000
SAE 12/2

CAVITIES

Ø38
Ø29.23 ± 0.05
1”1/16-12 UN-2B
Ø24.73 ± 0.05

Ø22.25 ± 0.025

Ø18 MAX
Ø19 MAX

± 0.025 Ø22.25

0.05 A
0.025 A
0.05 B
0.025 B

15°
1.6
45°
0.50
3.56

R0.25

18.10
213
MAX HOLE Ø 36
MAX HOLE Ø 13
MAX HOLE Ø 19

SAE 12/3
CAVITIES

1/16”-12 UN-2B

MAX HOLE Ø19
MAX HOLE Ø 14
FILTRATION
The state of oil used for hydraulic systems and machines is one of the main factors for proper use and performance. Use of excessive dirty oil may lead to earlier wearing of parts and components, faster hardening and thus functional troubles of your equipment. Due to filtration is a must to assure top efficiency and life of your hydraulic equipment. Selection of the most suitable filtration systems must be done according to the technical features of your equipment. However, the following table provides most current oil recommendations.

<table>
<thead>
<tr>
<th>Filtration type</th>
<th>Type of equipment</th>
<th>Absolute Filtration as for ISO 4572</th>
<th>Polluting class</th>
</tr>
</thead>
<tbody>
<tr>
<td>High pressure equipment (&gt;200 bar) Proportional valves reaching to dirty</td>
<td>5</td>
<td>X=5...........10</td>
<td>19/17/14, 8</td>
</tr>
<tr>
<td>Medium pressure equipment (&lt;200 Bar)</td>
<td>10</td>
<td>X=10...........15</td>
<td>20/18/15, 9</td>
</tr>
</tbody>
</table>

HYDRAULIC OILS
The use of mineral based oil is recommended (like HLP to DIN 51524). All performances and calibrations are carried out by using hydraulic oil with approximate viscosity of 46 cSt at 40°C.

VISCOSITY CLASS
Normally expressed as ISO-VG in accordance to ISO DIN standards. Average viscosity is figured at 40°C (mm²/s or centistokes - cSt). Recommended oil viscosity for NEM parts is: from 15 cSt to 250 cSt.

VOLLUTING CLASS ISO 4406
with two figures respectively showing the quantity of 5 and 15µ or larger particles in 1 ml oil.

POLLUTING CLASS NAS 1653
Expressed with one figure showing the quantity of variable size particles in 100 ml oil.

MATERIALS
The valves are made out high quality steel, while all movable parts are hardened and rectified. Manifolds are produced in steel or aluminum in relation to the max working pressure.

SEALING
O-RING, made out of butadiene/acrylonitril (BUNA N or NBR according to ASTM standards). The ASTM standards D76 set a brittleness safety temperature of -30°C +125°C. For use at higher temperature consult our technical office.
BACK UP RINGS
Made out of poly-tetrafluoroethylene (PTFE).

Q - RINGS: special sealing gaskets with 4 shaped lobes designed to prevent gaskets pull-off chances in case of dynamic applications. All O-rings are made out of Acrylonitril-Butadiene (NBR).

CARTRIDGE VALVE INSTALLATION
PLEASE CAREFULLY READ THESE INSTRUCTIONS
BEFORE VALVE INSTALLATION
Check-up general valve conditions and make sure there is no dirt. Check-up gaskets and seals conditions identifying their exact location. Lubricate the sals. First hand screw the cartridge in. Tightening should be performed according to the technical datas listed for each product.

TEST CURVES
All diagrams in this catalogue report performance curves obtained by use of mineral oil at ISO viscosity VG46 and at 40°C temperature.

STORAGE
Keep valves away and protected from the sunlight and any other heat/ozone source. Make sure that an ideal storage temperature of -20° +50°C is available.

TELLER CURVES
All diagrams in this catalogue report performance curves obtained by use of mineral oil at ISO viscosity VG46 and at 40°C temperature.

TEMPERATURE LIMITS
Ambient temperature: from -20° C to +40°C
Oil temperature: from -20° C to +90°C

DESIGN AND INSTALLATION WORK
All NEM valves and manifolds are function tested after assembly. Technical features and operation limits are statistically tested. As for all components which are then to be mounted on other equipment, real working conditions may not be lab simulated at the manufacturer’s. This means that the customer is always ultimately responsible for the choice and final use of the product. Valves and manifolds in this catalogue are very versatile. However they are strictly recommended for use on equipment complying with the European regulation no. 89/392 and following amendements. No installation should be done on equipment without above mentioned European approval.

DISPOSAL INDICATIONS
All the products, protections, plugs and packaging material at the end of their utilization have to be disposed in accordance with the regulations in force.
1. GENERAL

1.1 These general conditions are applicable to all the supplies which NEM s.r.l. will carry out, on the base of purchasing orders forwarded from the Customer.

1.2 Terms like EXW, DDP and so on are referred to the so called Incoterms published by the International Chamber of Commerce, current at the date of conclusion of these General Conditions.

2. PURCHASING ORDERS MANAGEMENT

2.1 Purchasing orders are binding for NEM s.r.l. only if confirmed in writing with order confirmations.

2.2 NEM s.r.l. engages itself to supply goods up to the order confirmations.

2.3 Any complaints regarding the content of the order confirmation must be notified in writing to NEM s.r.l. by 5 days and no later the forwarding of the order confirmation.

2.4 The Customer undertakes to pay the goods supplied by NEM s.r.l., according to the prices listed on the order confirmation.

3. PAYMENT CONDITIONS

3.1 The Parties agree upon the payment conditions at the beginning of the supply.

3.2 In case of delay of payment, NEM s.r.l. will have the right to request of moratory interests equal to the Euribor, increased by 2 points.

3.3 In case of delay of payment, NEM s.r.l. will have the right to not execute the eventual purchasing orders in progress, even if confirmed.

4. DELIVERY AND SHIPMENT

4.1 The supply of the goods will always be Ex-Works, even in the case that NEM s.r.l. had agreed with the Customer that NEM s.r.l. takes care of the shipment, or part of it.

4.2 In any case, the risks about perishment or damage of the goods will pass to the Customer, at latest, when the goods are delivered to the first carrier.

5. CHARACTERISTICS OF PRODUCTS

5.1 NEM s.r.l. engages itself to supply good quality products, up to the technical specifications contained in technical schedules or in the catalogue.

5.2 NEM s.r.l. reserves the exclusive right to make any change to the products, which, without altering their essential features, appear to be necessary or suitable.

6. COMPLAINTS

6.1 The complaints regarding the apparent defects of the Products (such as, for instance, the packing, quantity, number or exterior features of the Products) must be notified in writing to NEM s.r.l. by 7 days and no later upon the receipt of the goods. Failing such notification, the Customer’s right to claim the above defects will be forfeited.

6.2 The hidden defects (defects which cannot be discovered by the Customer on the basis of a careful inspection upon the receipt) shall be notified in writing to NEM s.r.l. by 7 days and no later from the discovery of the defects, and in any case no later than 18 months from the delivery of the Goods. Failing such notification, the Customer’s right to claim the above defects will be forfeited.

6.3 It’s agreed that, even in case of any complaint or objection, the Customer will not have the right to suspend or delay the payments due to NEM s.r.l., as well as payment of any other supplies.

7. WARRANTY

7.1 In case of any defects, lack of quality or non-conformity of the supplied Products, NEM s.r.l., at its exclusive choice, engages itself to replace or repair the defective Products provided such defects or non-conformity have been timely notified in writing to NEM s.r.l., in accordance to point nr. 6, by 18 months from the delivery of the Goods and no later.

7.2 Products repaired or replaces under warranty as above described are submitted to the same guarantee, for a period of 18 months from the date of repair or replacement.

7.3 Except in case of fraud or gross negligence, in case of defects, lack of quality or non-conformity, NEM s.r.l. undertakes only to repair or replace the defective Products, in accordance to what above described.

7.4 This guarantee (i.e. the obligation of repairing or replacing the Products) is in lieu of any other legal guarantee or liability of the Supplier, with the exclusion of any other guarantee or liability – whether contractual or non-contractual – in connection with the Products supplied (i.e. compensation for damages, loss of profit, recall campaigns, ...).

7.5 NEM s.r.l. is covered by appropriate policy of Product Legal Liability.

8. RETENTION OF TITLE

8.1 The Goods supplied by NEM s.r.l. remain property of NEM s.r.l. until the complete payment of the supply is received.

9. SECRECY BOND

9.1 NEM s.r.l. engages itself to treat as highly confidential all the technical or commercial information should learnt from the Customer, which are not already of public divulgence.
10. PATENTS

10.1 Except preventive written authorization of NEM s.r.l., the Customer cannot use the supplied Products, or part of them, or the descriptions or the drawings of them – whether registered patented or not – to project or make similar goods.

10.2 Even in case of preventive written authorization of NEM s.r.l., all the patents, labels and registered design, royalties and intellectual property rights related or in connection with Products supplied by NEM s.r.l., are and remain property of NEM s.r.l. The Customer undertakes to treat all of them as highly confidential.

11. APPLICABLE LAW AND JURISDICTION

11.1 The supplies carried out by NEM S.r.l. are governed by these present General Conditions and, for what here not expressly provided, by the Italian Law.

11.2 The competent Law Courts of Reggio Emilia have the exclusive jurisdiction in any controversies regarding the supplies of Products by NEM s.r.l., or from the supplies arising out or to the supplies connected, in which NEM s.r.l. is part.