M250LS
Mobile Directional Control Valve
Proportional, Load Sensing
Conversion factors

<table>
<thead>
<tr>
<th>Unit</th>
<th>Equivalent Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 kg</td>
<td>= 2.2046 lb</td>
</tr>
<tr>
<td>1 N</td>
<td>= 0.22481 lbf</td>
</tr>
<tr>
<td>1 bar</td>
<td>= 14.504 psi</td>
</tr>
<tr>
<td>1 l</td>
<td>= 0.21997 UK gallon</td>
</tr>
<tr>
<td>1 l</td>
<td>= 0.26417 US gallon</td>
</tr>
<tr>
<td>1 cm³</td>
<td>= 0.061024 in³</td>
</tr>
<tr>
<td>1 m</td>
<td>= 3.2808 feet</td>
</tr>
<tr>
<td>1 mm</td>
<td>= 0.03937 in</td>
</tr>
<tr>
<td>9/5 °C</td>
<td>+ 32 = °F</td>
</tr>
</tbody>
</table>

WARNING – USER RESPONSIBILITY

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To the extent that Parker or its subsidiaries or authorized distributors provide component or system options based upon data or specifications provided by the user, the user is responsible for determining that such data and specifications are suitable and sufficient for all applications and reasonably foreseeable uses of the components or systems.

Offer of Sale

Please contact your Parker representation for a detailed “Offer of Sale”.

Parker Hannifin
Mobile Controls Division Europe
Borås, Sweden
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<td>22-23</td>
</tr>
</tbody>
</table>

[00] refers to item numbers in customer specification.
Breadth of Line
Parker is the world's leading supplier of motion control components and system solutions serving the mobile, industrial and aerospace markets.

Parker is your single source for any hydraulic valve requirement. We provide a wide selection of open-centre and load-sense directional control valves for construction, off-highway, or on-highway applications. Many of our open-centre valves can be adapted and used as closed-centre constant-pressure, and constant-pressure unloaded valves. Each of these technologies offers unique features for improved machine performance over traditional, open-centre control valves.

When remote control is required, Parker provides a broad line of pilot controllers that are compact and pressure-matched with our control valves to provide consistent and optimized machine control. There are a variety of electric-switch handle options available for additional function control by the operator.

Parker's premier IQAN electronics packages range from simple stand-alone controllers to large, multiple CAN bus systems with colour displays. For example, IQAN interfaces with new electronic diesel engines over the SAE J1939 CAN bus.

State-of-the-Art Manufacturing
Parker is committed to using lean manufacturing to eliminate waste while streamlining processes. Lean technology helps us meet customer request dates quickly and cost-effectively. We also rely on state-of-the-art equipment and technology, such as computer-aided machining, to ensure product quality.

We regularly invest in our ISO 9001 certified manufacturing facilities because we are committed to meeting all international standards for safety and quality.

In addition, Parker hydraulic valves and valve manifolds are fully tested and certified before being released to the customer. You can expect Parker hydraulic valves to work the first time, every time.

Customer Service with A Global Reach
Parker's worldwide network of field sales engineers and Mobile Systems Engineers are the best in the business. A field sales engineer works closely with you, acting as a single point of contact to evaluate applications and design solutions. MSEs support field sales efforts by managing difficult design problems and complex circuit design.

You also benefit from Parker Mobile Technology Centers that are staffed by specially trained distributors who provide the highest levels of customer service. These one-stop shops offer complete hydraulic systems design for mobile applications, as well as technology services such as diagnostics, troubleshooting, computer design, testing, and integration of electronic controls.

Finally, our thousands of dependable distributors are strategically located in your markets. They carry inventory to meet specific, local market needs, and they ensure that products arrive when and where they are needed. You can count on Parker distributors to minimize downtime.

Total Machine Motion Control
You can turn to us for all your mobile motion control solutions. We offer stand-alone valves, as well as custom-designed manifolds with integrated directional control valves.
The M250LS is a directional valve intended for machines such as small and midsize wheel loaders, mine loaders, fork-lift trucks, etc. It is designed for use in closed-centre (LS) hydraulic systems with variable pumps, and is suitable for tough operating conditions.

Simple installation
Good machine design and the right hydraulic system gives a cost-effective installation, which in turn gives a competitive product. The pump and work ports in the M250LS are arranged in such a way that hosing and piping can be kept to an absolute minimum. The valve is equipped with double work ports at 180°, which eliminates T-connectors and gives the shortest and simplest path to the cylinders. This also enables dimensions to be kept small, since only half the flow passes through each work port.

Double pump connections, located optimally for easy installation, enable the simple connection of a second pump.

When the valve is mounted upright on the bottom plate good access for installation and work is obtained.

Safety
The M250LS is of robust construction. Many of the components are of the cartridge or module types, which facilitate servicing. It has both spool and poppet elements that give double safety in the case of hanging loads. The valve is also extremely well sealed, which prevents unintentional load sinking.

Design
The M250LS is a monoblock valve with the possibility to add up to 4 extra auxiliary sections. It is of LS design for variable pumps. It is casted in high quality material to enable it to withstand high pressures without deformation. The valve is of spool type to give safe and precise regulation of the flow. To ensure tight sealing in the case of hanging loads, there is also a poppet element which, together with the spool, effectively blocks the hanging load. The poppet elements are controlled via a logic system and opened by pilot pressure. The poppet element also functions as a Load-hold check valve and as a prioritizing poppet for bucket up priority.

The gallery system in the valve housing is generously dimensioned to give minimal pressure drop. This enables low pressure regeneration in order to save energy and avoid cavitation.

Essential characteristics
• Excellent sealing: work ports closed by means of poppet valves.
• Not sensitive to temperature shocks: poppet-valve concept gives relatively large clearance between spool and bore.
• Good energy efficiency: low pressure drops for high function speeds; gives low energy consumption.
• Easy to install: designed with simple installation in mind.
• Stackable up to 4 auxiliary functions.
• Optional float-position function: built-in, pressure-controlled float-position function eliminates the need for external components and signals.
• Great precision: low hysteresis gives precise control and good operator comfort.
• Pressure compensated lift and lowering functions gives superior controllability.
• Easy to service.
• Long service life: efficient port-relief and anti-cavitation valves reduce the number of pressure peaks and cavitations in the system, thus prolonging the life of the machine.
**Pressure**

- **Pump connection** max. 350 bar* (5075 psi)
- **Work port** max. 400 bar* (5800 psi)
- **Tank connection, static** max. 20 bar (290 psi)
- **Pressure in drain line** recommended 1 bar (14.5 psi)

*Stated pressures are maximum absolute shock pressures at 10 bar tank pressure.

**Flow rate (recommended)**

- **Return from work port**
  - 320 l/min (84.5 US gpm)
  - at $\Delta p = 15$ bar (218 psi)
- **To work port**
  - 300 l/min** (79.5 US gpm)
  - at $\Delta p = 20$ bar (290 psi)

**Temperature**

- Oil temperature, working range 20 to +90 °C** (68 to 194 °F)

**Filtration**

Filtration must be arranged so that Target Contamination Class 20/18/14 according to ISO 4406 is not exceeded. For the pilot circuit, Target Contamination Class 18/16/13 according to ISO 4406 must not be exceeded.

**Installation**

- While the valve can be mounted in any direction, it is best mounted upright (i.e. with lifting eye upwards) to give good access for servicing and enable simple handling. The base must be flat and stable to avoid stressing the valve on mounting.

**Hydraulic fluids**

- Best performance is obtained using mineral-base oil of high quality and cleanness in the hydraulic system.
- Hydraulic fluids of type HLP (DIN 51524), oil for automatic gearboxes Type A and engine oil type API CD can be used.

- Viscosity, working range 15-380 mm²/s

**Technical information in this catalogue is applicable at an oil viscosity of 30 mm²/s and temperature of 50 °C (122 °F) using nitrile rubber seals.**

- Performance efficiency will be reduced if outside the ideal values.

**Weight**

- See pages 21 and 23.
### Connections

Pump, tank and work-port connections are of the SAE flange type.

<table>
<thead>
<tr>
<th>Valve block</th>
<th>U3 [09]</th>
<th>U6 [09]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Connection (see pages 20-23)</td>
<td>Flange/Thread (U-version)</td>
<td>Flange/Thread (U-version)</td>
</tr>
<tr>
<td>Pump, P</td>
<td>SAE 1&quot; -S**</td>
<td>M10x18</td>
</tr>
<tr>
<td>Work ports A1, B1, A2, B2</td>
<td>SAE 1&quot; -S**</td>
<td>M10x18</td>
</tr>
<tr>
<td>Tank, T</td>
<td>SAE 1 1/4&quot; -S**</td>
<td>M10x18</td>
</tr>
<tr>
<td>Drainage, LS, LSP, pilot pressure, priority, pilot tank 2, gauge port</td>
<td>9/16-18 UNF</td>
<td>9/16-18 UNF</td>
</tr>
<tr>
<td>Pilot tank 1</td>
<td>3/4-16 UNF</td>
<td>3/4-16 UNF</td>
</tr>
<tr>
<td>Pilot pressure MP</td>
<td>G1/4</td>
<td>G1/4</td>
</tr>
<tr>
<td>Mounting hole</td>
<td>M12x20</td>
<td>M12x20</td>
</tr>
<tr>
<td>Work ports section 3 - 6</td>
<td>7/8-14 UNF</td>
<td>7/8-14 UNF</td>
</tr>
<tr>
<td>Extra ports A2, B2, pump</td>
<td>7/8-14 UNF</td>
<td>7/8-14 UNF</td>
</tr>
</tbody>
</table>

* High pressure (400 bar) according to ISO 6162.
** Standard pressure (330 bar) according to ISO 6162.

### Pressure drop

Pressure drop measured with fully open spool intended for max. flow.

\[ \Delta p \] (bar) Pressure drop - work port to tank

\[ \Delta p \] (bar) Pressure drop - P1/P2 to work port A/B

Pressure drop from work port A/B to tank connection T.

Pressure drop from pump connection P1/P2 to work port A/B.
Hydraulic circuit diagram for hydraulic remote controlled valve (PC)

<table>
<thead>
<tr>
<th>Pos.</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Counter pressure valve [10]</td>
</tr>
<tr>
<td>2</td>
<td>Section 1</td>
</tr>
<tr>
<td>3</td>
<td>Sequence valve, A1</td>
</tr>
<tr>
<td>4</td>
<td>Load-hold check valve, A1 [34 A]</td>
</tr>
<tr>
<td>5</td>
<td>Port relief valve, A1 [32 A, 33 A]</td>
</tr>
<tr>
<td>6</td>
<td>Load-hold check valve, B1 [34 B]</td>
</tr>
<tr>
<td>7</td>
<td>Sequence valve, B1</td>
</tr>
<tr>
<td>8</td>
<td>Port relief valve, B1 [32 B, 33 B]</td>
</tr>
<tr>
<td>9</td>
<td>Shuttle valve LS</td>
</tr>
<tr>
<td>10</td>
<td>Section 2</td>
</tr>
<tr>
<td>11</td>
<td>Float position device</td>
</tr>
<tr>
<td>12</td>
<td>Sequence valve, B2</td>
</tr>
<tr>
<td>13</td>
<td>Load-hold check valve, B2 [54 B]</td>
</tr>
<tr>
<td>14</td>
<td>Sequence spool float position</td>
</tr>
<tr>
<td>15</td>
<td>Restrictor, priority</td>
</tr>
<tr>
<td>16</td>
<td>Port relief valve, B2 [52 B, 53 B]</td>
</tr>
<tr>
<td>17</td>
<td>Load-hold check valve, A2 [54 A]</td>
</tr>
<tr>
<td>18</td>
<td>Sequence valve, A2</td>
</tr>
<tr>
<td>19</td>
<td>Port relief valve, A2 [52 A, 53 A]</td>
</tr>
<tr>
<td>20</td>
<td>Section 3</td>
</tr>
<tr>
<td>21</td>
<td>Section 4</td>
</tr>
<tr>
<td>22</td>
<td>Port relief valves [72 A/B, 73 A/B, 92 A/B, 93 A/B]</td>
</tr>
<tr>
<td>23</td>
<td>Pilot reducer</td>
</tr>
</tbody>
</table>

Hydraulic Circuit Diagram

Mobile Directional Control Valve
M250LS
Hydraulic circuit diagram for electro hydraulic remote controlled valve (EC)

<table>
<thead>
<tr>
<th>Pos.</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Counter pressure valve [16]</td>
</tr>
<tr>
<td>2</td>
<td>Section 1</td>
</tr>
<tr>
<td>3</td>
<td>Sequence valve, A1</td>
</tr>
<tr>
<td>4</td>
<td>Load-hold check valve, A1 [34 A]</td>
</tr>
<tr>
<td>5</td>
<td>Port relief valve, A1 [32 A, 33 A]</td>
</tr>
<tr>
<td>6</td>
<td>Load-hold check valve, B1 [34 B]</td>
</tr>
<tr>
<td>7</td>
<td>Sequence valve, B1</td>
</tr>
<tr>
<td>8</td>
<td>Port relief valve, B1 [32 B, 33 B]</td>
</tr>
<tr>
<td>9</td>
<td>Shuttle valve LS</td>
</tr>
<tr>
<td>10</td>
<td>Section 2</td>
</tr>
<tr>
<td>11</td>
<td>Float position device</td>
</tr>
<tr>
<td>12</td>
<td>Sequence valve, B2</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Pos.</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>13</td>
<td>Load-hold check valve, B2 [54 B]</td>
</tr>
<tr>
<td>14</td>
<td>Sequence spool float position</td>
</tr>
<tr>
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<td>Restrictor, priority</td>
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<td>16</td>
<td>Port relief valve, B2 [52 B, 53 B]</td>
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<td>Load-hold check valve, A2 [54 A]</td>
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<tr>
<td>18</td>
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</tr>
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<td>19</td>
<td>Port relief valve, A2 [52 A, 53 A]</td>
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<td>20</td>
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</tr>
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<td>Section 4</td>
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<td>Pilot reducer</td>
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<tr>
<td>24</td>
<td>Pilot valves</td>
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</table>
Connections [09]
Also see table on page 7.
U6 Connections with UNF threads,
SAE 6000 psi.
U3 Connections with UNF threads,
SAE 3000 psi.

Counter pressure function [10]
The valve can be equipped with a counter pressure valve in the
tank connection to ensure that oil from the cylinders is used
primarily to replenish the system. This is possible thanks to the
generous gallery dimensions and anti-cavitation valves. The valve
is factory set.
MX No counter pressure valve in tank gallery.
MF4 Counter pressure valve set to 4 bar at 20 l/min.
MP Pilot operated counter pressure valve.

Number of sections [11]
You can choose from 2 up to 6 sections, where the first 2 sections
is the main valve and sections after are for the auxiliary functions.

Surface treatment (painted) [12]
P Default value - unless otherwise stated valve will be
supplied painted with a single coat of black primer.
X Unpainted.
For full corrosion protection, the valve must be painted with an
outer coat.

Prioritizing function [16]
Section 1 can be pressure prioritized over section 2. This means
that if there is a light load on section 2, heavier loads can be
handled with section 1, e.g. so that an empty bucket can be tilted
up at the same time as the main loading arms are lowered (priori-
tizing pressure approx. 50 bar). Prioritization is automatic and is
controlled via pilot signal logic.
PRB Prioritizing function blocked.
PR1 Port A1 has priority over port B2 (approx. 50 bar).
Choice of spool
The spool is the most important link between the actions of the machine operator and the movement of the controlled function. Parker therefore goes to great lengths to optimize spools for different flows, load conditions and functions. This ongoing development work results in the continual introduction of new spools. For this reason, it is not practical to list in this catalogue the different spools available at any one time. For assistance in the choice of spool, we therefore ask you to contact Parker directly.

Spool function [21, 41]
Parker spools are divided into different groups depending on their basic functions.

D  Double-acting spool for, e.g. double-acting cylinder. Blocked in the neutral position.

Db Double-acting spool with drainage B to T, which prevents pressure build-up in the B-port in the neutral position. The spool is used as a double spool in combination with, e.g. an over-centre valve.

Dm Double-acting spool with drainage A to T and B to T, which prevents pressure build-up in the neutral position. The spool is used as a double-acting spool in combination with, e.g. an overcentre valve.

EA Single-acting spool for, e.g. single-acting cylinder. Blocked in the neutral position. Work port B blocked.

EAm Single-acting spool for, e.g. single-acting cylinder. Blocked in the neutral position. Work port B blocked. Drainage of work port A to tank.

M  Double-acting spool for, e.g. hydraulic motor. Work ports connected to tank (float position) in the neutral position.

F  Double-acting spool with fourth position in which both work ports are connected to tank (float position). Blocked in the neutral position.

Spool designations [22, 42]
Every spool is given a letter code, which is stamped on the spool. This facilitates identification of the spool when servicing is carried out.

Area relationships [25, 45]
The area relationship for the section in question is calculated by dividing the cylinder area connected to the B-port by the cylinder area connected to the A-port. When the big side of the cylinder is connected to the A-port, the area relationship is less than 1. The area relationship for a motor is 1.
PC

PC pilot connection

Also see dimensional drawings on pages 20 to 21 for location of all connections.

PC-PC

Both section 1 and section 2 have hydraulic, proportionally controlled, spring-centred spool actuators. Best controlled by a PCL4 remote control valve (see catalogue HY17-8357/UK).

- Breakaway pressure: \* 6.5 bar
- Final pressure: \* 16 bar (max 35 bar)

Connection thread: 9/16-18 UNF

PC-FPC

Both section 1 and section 2 have hydraulic, proportionally controlled, spring-centred spool actuators with a fourth position for shifting the spool into the float position in section 2.

- Breakaway pressure: \* 6.5 bar
- Final pressure: \* 16 bar
- Pressure for float position: min 24 bar (max 35 bar)

Connection thread: 9/16-18 UNF

\* The breakaway pressure refers to the pressure needed for the directional valve to open the connection “pump to work port”. The final pressure is the lowest pressure needed to effect full actuation of a spool in the directional valve. With the FPC spool actuator, the float position is obtained by further increasing the final pressure from max. 18 bar to min. 24 bar. The foregoing data must be taken into consideration when choosing control units, since the opening pressure of the control unit must be lower than the breakaway pressure of the spool actuator in order to avoid jerky starting and stopping. However, the control unit’s final pressure must be higher than the final pressure of the directional valve in order to ensure that the spools can be fully actuated.
EC-EC Both section 1 and section 2 have electro-hydraulically, proportionally controlled, spring-centred spool actuators. The EC spool actuator is best controlled by means of a Parker electric remote-control system (see catalogue HY17-8368/UK).

<table>
<thead>
<tr>
<th>Voltage</th>
<th>Breakaway current: *</th>
<th>Final current: *</th>
</tr>
</thead>
<tbody>
<tr>
<td>12 V</td>
<td>max 640 mA</td>
<td>min 1020 mA</td>
</tr>
<tr>
<td>24 V</td>
<td>max 300 mA</td>
<td>min 500 mA</td>
</tr>
</tbody>
</table>

EC-FEC Both section 1 and section 2 have electro-hydraulically, proportionally controlled, spring-centred spool actuators. FEC is a proportionally controlled, spring-centred spool actuator with a fourth position for shifting the spool into the float position in section 2. The FEC spool actuator is best controlled by means of a Parker electric remote-control system (see catalogue HY17-8368/UK).

<table>
<thead>
<tr>
<th>Voltage</th>
<th>Breakaway current: *</th>
<th>Final current: *</th>
</tr>
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<tbody>
<tr>
<td>12 V</td>
<td>max 640 mA</td>
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</tr>
<tr>
<td>24 V</td>
<td>max 300 mA</td>
<td>min 500 mA</td>
</tr>
</tbody>
</table>

- The breakaway current refers to the current needed for the directional valve to open the connection "pump to work port". The final current is the lowest current needed to effect full actuation of a spool in the directional valve. With the FEC spool actuator, the float position is obtained by further increasing the final current, see table. The foregoing data must be taken into consideration when choosing control units, since the opening current of the control unit must be lower than the breakaway current of the spool actuator in order to avoid jerky starting and stopping. However, the control unit's final current must be higher than the final current of the directional valve in order to ensure that the spools can be fully actuated.

Voltage

- 12 V
- 24 V

Breakaway current: *

- min 1020 mA
- min 500 mA

Final current: *

- min 1020 mA
- min 500 mA

Voltage

- 12 V
- 24 V

Breakaway current: *

- max 640 mA
- max 300 mA

Final current: *

- min 1020 mA
- min 500 mA

Connector Type[04]
The connector of the solenoid is of type:

- A AMP Junior-Timer type C.
- D Deutsch type DT06-2P.

The connector must be ordered separately.

*The breakaway current refers to the current needed for the directional valve to open the connection "pump to work port". The final current is the lowest current needed to effect full actuation of a spool in the directional valve. With the FEC spool actuator, the float position is obtained by further increasing the final current, see table. The foregoing data must be taken into consideration when choosing control units, since the opening current of the control unit must be lower than the breakaway current of the spool actuator in order to avoid jerky starting and stopping. However, the control unit's final current must be higher than the final current of the directional valve in order to ensure that the spools can be fully actuated.
Port relief valves [32A/B, 52 A/B]
In spool sections the cartridge can be used as a combined port-relief and anti-cavitation valve in the work ports to protect the valve and consumer from high system pressure and pressure surges.

The cartridge is a direct-acting pressure relief valve with a fast response and good pressure characteristic. The interchangeable cartridge is factory set. The make-up function enables oil to flow from the tank gallery to the work-port side in the event of negative pressure in the work ports, in order to prevent cavitation.

- **Port relief valve type PA.**
- **Anti-cavitation valve type N2.**
- **Port relief valve type PAY.**
- **No port-relief or anti-cavitation valve fitted. Connection work port to tank gallery is blocked, type Y2.**
- **No port relief valve fitted. Work port connected to valve's tank gallery, type X2.**
Spool Section

Mobile Directional Control Valve
M250LS

Port relief valve [32 A/B, 52 A/B]
- **PA**: Combined port-relief and anti-cavitation valve fitted. Valve is factory set.
- **PAY**: Port relief valve without anti-cavitation function fitted. Valve is factory set.
- **N2**: Only anti-cavitation function fitted.
- **Y2**: No port-relief or anti-cavitation valve fitted. Connection work port to tank gallery is blocked.
- **X2**: No port relief valve fitted. Work port connected to valve’s tank gallery.

Pressure settings [33 A/B, 53 A/B]
Setting range: 40 - 400 bar.
Pressure settings are made at a flow of 20 l/min through the valve.

Load-hold check valve [34 A/B, 54 A/B]
The valve is normally equipped with pilot operated Load-hold check valves for operations that demand low leakage. These check valves are optional if the machine is equipped with outer Load-holding valves.
- **N**: Fitted with Load-hold check valve.
- **X3**: Without Load-hold check valve.

Diagram of the valve configurations and flow characteristics.
**Spool function** [61, 81, 101, 121]

| D | Double-acting spool for, e.g. double-acting cylinder. Blocked in the neutral position. |

**Flow requirements** [63, 64, 83, 84, 103, 104, 123, 124]

Without individual pressure-compensators, flows up to 125 l/min per spool section are obtainable, depending on the adjusted differential between the load-signal pressure and the pump pressure.

The maximum flow is then set by limiting the spool stroke by means of adjustment screws on the spool actuators or, in the case of electro-hydraulic remote control, by tuning the electronics.

**Area ratios** [65, 85, 105, 125]

The area ratio for a spool section is calculated by dividing the cylinder area that is connected to the B-port by the area connected to the A-port. When the large side of the cylinder is connected to the A-port, the area ratio is less than 1. The area ratio for a motor is 1.

**Load-hold check valve** [66, 86, 106, 126]

| N | Section equipped with load-hold check valve. |

*Typical curves showing flow as a function of spool stroke.*
Proportionally remote-controlled actuators, with enclosed spool-ends and facility for manual control

[67, 87, 107, 127]

**PC**

**Hydraulic spool-actuator**

The PC and PCH are proportional, hydraulically controlled spool actuators with spring-centring to neutral. They are intended to be controlled by the PCL4 remote-control valve. When determining a suitable control pressure for the PCL4, bear in mind that its breakaway pressure should be approx. 0.5 bar lower than that of the directional valve in order to ensure gentle starting and stopping. The pilot pressure for the PCL4 can be tapped from the internal pilot-pressure supply in the end section of the directional valve, via the PS connection.

- **Breakaway pressure**: 5.5 bar
- **Final pressure**: 15.0 bar
- **Permissible pressure in pilot cap**: max. 35 bar
- **Connections**: 9/16-18 UNF

*The breakaway pressure is the pressure needed for the directional valve to open the connection “pump to work port”. The final pressure is the lowest pressure needed to effect full actuation of a spool in the directional valve. This data must be taken into consideration when choosing control units, since the opening pressure of the control unit must be lower than the breakaway pressure of the spool actuator in order to avoid jerky starting and stopping. However, the control unit’s final pressure must be higher than the final pressure of the directional valve in order to ensure that the spools can be fully actuated.*

See also separate catalogue HY17-8357/UK for PCL4.
Proportionally remote-controlled actuators, with enclosed spool-ends [67, 87, 107, 127]

EC Electro-hydraulic spool actuator
The EC are proportional, electro-hydraulically controlled spool actuators with spring centering to neutral. They are intended to be controlled remotely by the IQAN control systems. Pilot-pressure oil is led to the spool actuators through internal ducts in the directional valve. This means that only the cable connectors from the control system to the converter valve needs to be connected externally.

Control current for 12 V
- Breakaway*: min. 550 mA
- Fully actuated: max. 980 mA

Control current for 24 V
- Breakaway*: min. 260 mA
- Fully actuated: max. 510 mA

The control current must be regulated for temperature compensation and with ripple to minimise hysteresis. Measuring connections: 9/16-18 UNF

* The breakaway current refers to the current needed for the directional valve to open the connection "pump to work port". The final current is the lowest current needed to effect full actuation of a spool in the directional valve. This data must be taken into consideration when choosing control units, since the opening current of the control unit must be lower than the breakaway current of the spool actuator in order to avoid jerky starting and stopping. However, the control unit's final current must be higher than the final current of the directional valve in order to ensure that the spools can be fully actuated.

Connector types [04]
- A AMP Junior-Timer type C.
- D Deutsch type DT06-2P.

For ordering of connector, see page 19.

Pilot restrictor [68 A/B, 88 A/B, 108 A/B, 128 A/B]
To give gentle control characteristics, remote-controlled spool actuators with enclosed spool-ends are fitted with pilot restrictors, which can be chosen individually for each work port. The restrictor gives a kind of ramp function.

Restrictors from 0.8, 1.5 and 2.0 mm available.
As standard 0.8 mm is recommended.
Port relief valves
[72 A/B, 92 A/B, 112 A/B, 132 A/B]
In spool sections the cartridge can be used as a combined port-relief and anti-cavitation valve in the work ports to protect the valve and consumer from high system pressure and pressure surges.

The cartridge is a direct-acting pressure relief valve with a fast response and good pressure characteristic. The interchangeable cartridge is factory set. The make-up function enables oil to flow from the tank gallery to the work-port side in the event of negative pressure in the work ports, in order to prevent cavitation.

X2 Section machined for port relief valve. Work port open to tank.

Y2 Section machined for port relief valve. Connection work ports to tank blocked with plug.

N2 Work ports of section equipped with anti-cavitation valve.

PA Combined port-relief and anti-cavitation valve fitted. Valve is pre-set.

Pressure settings
[73 A/B, 93 A/B, 113 A/B, 133 A/B]
Setting range: 50 - 350 bar.
Pressure settings are made at a flow of 20 l/min through the valve.

Connectors
Connectors are not included with spool actuators, and should be ordered separately as per the lists below or ordered from your local connector supplier.

Spool actuators EC, FEC
Suitable connectors for option A in pos [04] are:
AMP Junior-Timer type C, 963040-3,
Bosch 1 928 402 404.

Assembly kits complete with pins and seals can be ordered on following kit numbers:

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<tr>
<th>Amount</th>
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<tr>
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<td>393000K826</td>
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<td>100 off</td>
<td>393000K827</td>
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For more information, see catalogue HY17-8558/UK.

Suitable connectors for option D in pos [04] are:
Deutsch type DT06-2S.
Hydraulic remote controlled (PC - PC) / (PC - FPC)

Catalogue HY17-8562/UK
Mobile Directional Control Valve
M250LS

Dimensional Drawings

Work port A2
Work port B2
Additional connection pump

Work port A1
Work port B1
Gauge port B1

Gauge port A1
Spool actuation P-B-A-T
PS connection

Spool actuation P-A-B-T
Gauge port A1
PS connection

Fastening point M12 (3x)
Thread depth 20
Pilot connection
Counter pressure

Spool actuation P-B-A-T
LS connection

Drain

Pump

mm (inch)
Hydraulic remote controlled (PC - PC) / (PC - FPC)

<table>
<thead>
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<th>Number of sections</th>
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<th>L inch</th>
<th>Weight kg</th>
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<td>50</td>
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<tr>
<td>3</td>
<td>424</td>
<td>(16.69)</td>
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<td>4</td>
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<td>6</td>
<td>544</td>
<td>(21.42)</td>
<td>70</td>
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</tbody>
</table>
Electro-hydraulic remote controlled (EC - EC) / EC - FEC

mm (inch)

mm (inch)

Fastening point M12 (x3)  
Thread depth 20

Pilot connection  
counter pressure

PS connection  
LS connection

Gauge port A2  
Gauge port A1

Gauge port B1

Work port B1

Additional connection pump

Work port B2

Work port A2

Work port A1

Pump

Drain

14 (0.55)  
37 (1.44)

114 (4.49)  
160 (6.30)

14 (0.55)  
37 (1.44)

114 (4.49)  
160 (6.30)

16 (0.63)  
35 (1.36)

66 (2.60)  
99 (3.90)

124 (4.88)  
172 (6.77)

157 (6.20)  
200 (7.87)

96 (3.78)  
130 (5.12)

124 (4.88)  
172 (6.77)

157 (6.20)  
200 (7.87)

96 (3.78)  
130 (5.12)
Electro-hydraulic remote controlled (EC - EC) / EC - FEC

- Work port B2
- Work port A2
- Additional connection B2
- Additional connection A2
- PS connection

- Spool actuation P-B-A-T
- Spool actuation P-B1-A1-T
- Spool actuation P-B2-A2-T
- Spool actuation P-A2-B2-T
- Spool actuation P-A1-B1-T

- Pump connection
- Tank connection

<table>
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<th>L (inch)</th>
<th>Weight (kg)</th>
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