PDV 74 - PDV 74D
PROPORTIONAL DIRECTIONAL VALVES, I/O ELECTRONIC CONTROLLERS AND JOYSTICKS
PDV74 and PDV74D are new breakthrough products with upgraded hydraulic functions that fulfill the ever increasing market demands for improved machines productivity, safety requirements, energy efficient and environmental operation.

Based on load sensing technology, the ability to meter in or out any load actuators, provides a wide choice of control options, and are meant to be used in hazardous area also according to Atex 2014/34/UE Directive and IECEx protocol.
OMFB, established since 1951, today is among the worldwide leading manufacturers of hydraulic mobile powered solutions for off-highway vehicles, and our extensive products portfolio, ranging from:

- Power Take Off’s units
- Variable and fixed displacement piston pumps
- Proportional Directional Valves
- Electronic controls
- I/O controllers and related software
- Electronic joysticks
- Piston motors
- Gears pumps
- Tipping valves
- Pneumatic joysticks
- Integrated Hydraulic Manifolds

supplied as either components or package integrated system, make it possible to meet virtually any market needs. The evolution through 1951s to large globally positioned suppliers combined with clear system capabilities was what the worldwide marketplace told us they wanted, and that's what we organized OMFB to be.
Valve system

Based on load sensing technology and developed with the most advanced state-of-the-art valves element concept, to provide machine’s velvet smooth functionality control, easily tailored to customer needs and ensuring trouble free operation under demanding conditions.

The design principle of PDV74, allows an easier configuration according to pump supplying request with no need of changing any internal components, and carry out safely electrohydraulic circuits that shut the system down in the event of any failure or outputs not relevant to the demand.

PDV74 platforms can be matched with PDV74D, down stream pressure compensated valve, enabling a flow sharing function where it’s really needed.

Safety Conformity Assessment

FMEA, failure modes effects and diagnostic analysis, FMEDA, are systematic analysis technique to define and minimise the known and potential failure from a given system.

When it comes to more complex products and assemblies involving a combination of both electrical and hydraulic parts, the need to ensure that adequate surveillance over the design and manufacturing of key parts is paramount to be compliance with the on-going series Standards IEC 61508.

For hazards and risk analysis please refer to EN ISO 12100, the EU Machine Directive and the EN ISO 13849.
PDV74 general features

- Up-stream pressure compensated
- Load independent flow
- Can operates with both fixed and variable displacement pumps
- Excellent metering control
- Symmetrical spool flow characteristics
- High power capability control in compact dimension
- High repeatability flow accuracy
- Low hysteresis
- Flexible high-quality product

PDI pump side inlet section

- System pressure up to 400 bar
- Built-in system for inlet configuration / pump selection
- Open centre for fixed displacement pumps
- Closed centre for variable displacements pumps
- Built-in system for pump unloading
- Built-in system for LS unloading
- Built-in system for pilot oil supply
- MID inlet version
- Internal / external feeding pilot oil supply

PDW working sections modules

- Pilot LsA / LsB relief valves
- Electrical unloading pilot LsA / LsB pilot
- Shock and suction valve
- Pump cut-off version (for downstream working sections)
- Priority flow for steering unit version
- Symmetrical flow distribution
- Pressure compensator built-in check-valve

Electrohydraulic actuators

- **PEAC** – proportional closed loop spool control (diagnostic and fault monitoring built-in system)
  
  Input signal: Ratiometric
  $U_{dc} \in 0 – 10 \text{ V}, 4 – 20 \text{ mA}$
  
- **PEAP** – proportional open loop control, PWM input signal
  
- **PEAO** – on/off control
  
- **PEAZ** – CAN-Bus configuration
  (CAN-open or SAE J1939 communication protocol)

PDE – end section module

- With and without ports
- MID end section version
1) Main pressure reducing valve;
2) Shuttle valve pump configuration;
3) LsA/LsB pilot relief valve;
4) Pump unloading solenoid valve;
5) Pump unloading manual override;
6) Three way flow regulator plug;
7) Internal/external pilot oil supply cartridge;
8) Shock and suction valve;
9) Electric actuators drain line cartridge;
10) Pilot LsA/LsB/Ls ports;
11) Ls filter cartridge;
12) Manual spool control;
13) Mechanical spool flow adjustment;
14) PEAP electrohydraulic actuator, PWM open loop control;
15) PEAC electrohydraulic actuator, closed loop control;

**PDV 74 PROPORTIONAL DIRECTIONAL VALVE**

*upstream pressure compensated*
PDV 74  PROPORTIONAL DIRECTIONAL VALVE
upstream pressure compensated

CLOSED CENTER CIRCUIT

OPEN CENTER CIRCUIT
PDV 74D PROPORTIONAL DIRECTIONAL VALVE
downstream pressure compensated

1) Main pressure reducing valve;
2) Shuttle valve pump configuration;
3) LsA/LsB pilot relief valve;
4) Pump unloading solenoid valve;
5) Pump unloading manual override;
6) Three way flow regulator plug;
7) Internal/external pilot oil supply cartridge;
8) Shock and suction valve;
9) Electric actuators drain line cartridge;
10) Pilot Ls port;
11) Is filter cartridge;
12) Manual spool control;
13) Mechanical spool flow adjustment;
14) PEAP electrohydraulic actuator; PWM open loop control;
15) PEAC electrohydraulic actuator; closed loop control;

<table>
<thead>
<tr>
<th>Nº Working sections</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
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<tr>
<td>L1</td>
<td>mm</td>
<td>150</td>
<td>198</td>
<td>246</td>
<td>294</td>
<td>342</td>
<td>390</td>
<td>438</td>
<td>486</td>
<td>534</td>
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<td>[ in]</td>
<td>[5.90]</td>
<td>[7.79]</td>
<td>[9.68]</td>
<td>[11.57]</td>
<td>[13.46]</td>
<td>[15.35]</td>
<td>[17.24]</td>
<td>[19.13]</td>
<td>[21.02]</td>
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<tr>
<td>L2</td>
<td>mm</td>
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<td>248</td>
<td>296</td>
<td>344</td>
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<td>440</td>
<td>488</td>
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<td>584</td>
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<td>[9.76]</td>
<td>[11.65]</td>
<td>[13.54]</td>
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<td>[17.32]</td>
<td>[19.21]</td>
<td>[21.10]</td>
<td>[22.99]</td>
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</table>
PDV 74D  PROPORTIONAL DIRECTIONAL VALVE

downstream pressure compensated

PDV 74 + PDV 74D
(downstream pressure compensated)

PDV 74D

CLOSED CENTER CIRCUIT

CLOSED CENTER CIRCUIT
### PDV 74 / PDV74D HYDRAULIC FEATURES

<table>
<thead>
<tr>
<th><strong>Max. working pressure</strong></th>
<th><strong>P port</strong></th>
<th><strong>Pressure relief valve setting</strong></th>
<th>400 bar</th>
<th>[5800 psi]</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Working pressure</td>
<td>370 bar</td>
<td>[5370 psi]</td>
<td></td>
</tr>
<tr>
<td></td>
<td>A - B ports</td>
<td>Working pressure</td>
<td>370 bar</td>
<td>[5370 psi]</td>
</tr>
<tr>
<td></td>
<td>T port</td>
<td>Static</td>
<td>25 bar</td>
<td>[363 psi]</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Dynamic</td>
<td>35 bar</td>
<td>[508 psi]</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Oil flow rated</strong></th>
<th><strong>Inlet section standard</strong></th>
<th>160 l/min</th>
<th>[42 US gal/min]</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mid inlet section</td>
<td>250 l/min</td>
<td>[66 US gal/min]</td>
</tr>
<tr>
<td></td>
<td>A,B ports with pressure compensator</td>
<td>130 l/min</td>
<td>[34 US gal/min]</td>
</tr>
<tr>
<td></td>
<td>A,B ports without pressure compensator</td>
<td>140 l/min</td>
<td>[37 US gal/min]</td>
</tr>
</tbody>
</table>

| **Pilot pressure oil supply** | 18 to 22 bar | [260 to 320 psi] |
| **Main pressure reducing valve oil consumption** | 0,9 l/min | [0,24 US gal/min] |

<table>
<thead>
<tr>
<th><strong>Oil temperature</strong></th>
<th><strong>Recommended</strong></th>
<th>30 to 60 °C</th>
<th>[+86 to 140 °F]</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Min</td>
<td>- 25 °C</td>
<td>[-13 °F]</td>
</tr>
<tr>
<td></td>
<td>Max</td>
<td>+ 80 °C</td>
<td>[+176 °F]</td>
</tr>
<tr>
<td><strong>Ambient temperature</strong></td>
<td>-30 to 60 °C</td>
<td>[-22 to 140 °F]</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Oil viscosity</strong></th>
<th><strong>Recommended</strong></th>
<th>12 to 80 mm²/s</th>
<th>[65 to 366 SUS]</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Min</td>
<td>4 mm²/s</td>
<td>[39 SUS]</td>
</tr>
<tr>
<td></td>
<td>Max</td>
<td>460 mm²/s</td>
<td>[2090 SUS]</td>
</tr>
</tbody>
</table>

| **Filtration according to ISO 4406** | 20/18/15 |
| **Spool travel** | **Total stroke** | ± 7 mm | [± 0.276 in] |
|                   | **Proportional stroke** | ± 5.5 mm | [± 0.217 in] |
| **Dead band** | ± 1.5 mm | [± 0.059 in] |

| **Maximum internal leakage at 180 bar [2611 psi] and 21 mm²/s [102 SUS]** | **With shock/suction valves** | 29 cm³/min | [1.77 in³/min] |
|                                                                           | **Without shock/suction valves** | 23 cm³/min | [1.4 in³/min] |
### Supply voltage \( U_{DC} \)

<table>
<thead>
<tr>
<th>Rated</th>
<th>11 V to 32 V</th>
</tr>
</thead>
<tbody>
<tr>
<td>Range</td>
<td>11 V to 32 V</td>
</tr>
<tr>
<td>Max ripple</td>
<td>5%</td>
</tr>
</tbody>
</table>

### Input signal control

| Neutral | \( 0,5 \cdot U_{DC} \) |
| Control range | \( 0,25 \cdot U_{DC} \) to \( 0,75 \cdot U_{DC} \) |
| Neutral spool position current consumption | 30 mA |
| End stroke spool position current consumption | 680 mA |
| Input impedance in relation to \( 0,5 \cdot U_{DC} \) | 12 k\( \Omega \) |

### Input signal control

| Neutral | \( 5 \cdot V_{DC} \) |
| Control range | \( 0,25 \cdot V_{DC} \) to \( 0,75 \cdot V_{DC} \) |
| Neutral spool position current consumption | 30 mA |
| End stroke spool position current consumption | 680 mA |
| Input impedance in relation to \( 0 \div 10 \ V_{DC} \) | 20 k\( \Omega \) |

### Input signal control

| Neutral | \( 12 \cdot mA \) |
| Control range | \( 0,25 \cdot 16 \cdot mA \) to \( 0,75 \cdot 16 \cdot mA \) |
| Neutral spool position current consumption | 30 mA |
| End stroke spool position current consumption | 680 mA |
| Input impedance in relation to \( 4 \div 20 \ mA \) | 0,5 k\( \Omega \) |

### CAN - BUS

- CAN Open Protocol
- SAE J1939 Protocol

| Current consumption at end stroke | 510 mA (12V) | 250 mA (24V) |
| Current consumption in neutral   | 35 mA (12V)  | 45 mA (24V)  |
| Power consumption                | 7 W          |
| Material temperature class       | F (155°C)    |

### Fault monitoring system

- Max current on safety output: 55 mA
- Reaction time at fault: 540 ms

### Reaction time (constant voltage)

- From neutral position to max spool travel: 105 ms to 135 ms
- From max spool travel to neutral position: 65 ms to 85 ms

### Reaction time (neutral switch)

- From neutral position to max spool travel: 125 ms to 165 ms
- From max spool travel to neutral position: 65 ms to 85 ms

### Connector

- PEAC standard
- DIN 43650/ISO 4400
- Enclosure to IEC 529: IP 65
- PEAC advanced
- Deutsch DT04 - 6P
- Enclosure to IEC 529: IP 68
**PHSC–8401 and 9801 High Performance Safety Controllers**

Are high standards electronic controls units that use a master – slave principle of operation. The essential function of input / output controller in an industrial automation is to broker conversations between the physical machines’ world and the digital world of today’s microprocessor based controllers.

Real world measurements must be communicated and converted into controller’s decisions, which in turn, will be translated into the real world of proportional directional valve input signals and actuators movements.

**PHSC-8401 and 9801** are parts of a complete and compatible product family, and are protected by a compact automotive style housing suited to mobile applications.
**CPU CORE**
- 32-Bit TI TMS570, ARM cortex-R4F based
- Dual-core lockstep CPU and memory protection for safety-relevant applications
- 180 MHz, 298 DMIPS, Floating-Point Unit
- 3 MB int. Flash, 256 kB int. RAM
- 2 MB ext. Flash, 2 MB ext. RAM, 64 kB ext. EEPROM
- Safety Companion CPU

**INTERFACES**
- 4 x CAN 50 kbit/s up to 1 Mbit/s
- 4 x CAN bus termination configurable via connector pins

**OUTPUTS**
- 28 x PWM OUT or digital OUT, up to 4 A, high side, with high side current-measurement
- 8 x digital OUT up to 4 A, high side, overload and open load detection, current sense alternative use as LED control OUT or analog IN 0 – 32 V, with configurable pull-up/down
- Wiring option to use up to 8 of the digital OUT, high side and 8 digital OUT, low side, as full H-bridge for motor control

**INPUTS**
- 8 x analog IN 12 bit, 0 - 5 V, 0 - 25 mA, 0 - 100 kOhm
- 8 x analog IN 12 bit, 0 - 5 V, 0 - 10 V, 0 - 25 mA
- 8 x analog IN 12 bit, 0 - 5 V, 0 - 32 V, 0 - 25 mA
- 6 x digital timer IN (0.1 Hz - 20 kHz), encoder supporting digital voltage sensors with configurable pull-up/down, digital (7/14 mA) current loop speed-sensor alternative use as analog IN 12 bit, 0 – 32 V
- 6 x digital timer IN (0.1 Hz - 20 kHz), encoder supporting digital voltage sensors with configurable pull-up/down, alternative use as analog IN 12 bit, 0 – 32 V
- 8 x digital timer IN (0.1 Hz - 10 kHz) with pull-up
- 8 x analog IN 12 bit, 0 – 32 V
- K15 and wake up

**CPU CORE**
- 32-Bit TI TMS570, ARM cortex-R4F based
- Dual-core lockstep CPU and memory protection for safety-relevant applications
- 180 MHz, 298 DMIPS, Floating-Point Unit
- 3 MB int. Flash, 256 kB int. RAM
- 8 MB ext. Flash, 2 MB ext. RAM, 64 kB ext. EEPROM
- Safety Companion CPU

**INTERFACES**
- 7 x CAN 50 kbit/s up to 1 Mbit/s
- 4 x CAN bus termination configurable via connector pins
- 1 x Ethernet (10 Mbit/s), for download/debug purpose
- 1 x LIN, 1 x RS232
- 1 x Real Time Clock

**OUTPUTS**
- 36 x PWM OUT or digital OUT, up to 4 A, high side, with high side current-measurement
- 8 of these outputs can be alternatively used as digital timer IN (0.1 Hz - 10 kHz)
- 8 x digital OUT up to 4 A, high side, overload and open load detection, current sense alternative use as LED control OUT or analog IN 12 bit, 0 – 32 V with configurable pull-up/down
- 8 x digital OUT up to 4 A, low side, current sense, overload and open load detection, alternative use as analog IN 12 bit, 0 – 32 V
- Wiring option to use up to 8 of the digital OUT, high side and 8 digital OUT, low side, as full H-bridge for motor control

**INPUTS**
- 8 x analog IN 12 bit, 0 - 5 V, 0 - 25 mA, 0 - 100 kOhm
- 8 x analog IN 12 bit, 0 - 5 V, 0 - 10 V, 0 - 25 mA
- 8 x analog IN 12 bit, 0 - 5 V, 0 - 32 V, 0 - 25 mA
- 6 x digital timer IN (0.1 Hz - 20 kHz), encoder supporting digital voltage sensors with configurable pull-up/down, digital (7/14 mA) current loop speed-sensor alternative use as analog IN 12 bit, 0 – 32 V
- 6 x digital timer IN (0.1 Hz - 20 kHz), encoder supporting digital voltage sensors with configurable pull-up/down, alternative use as analog IN 12 bit, 0 – 32 V
- 8 x analog IN 12 bit, 0 – 32 V
- K15 and wake up

**MULTI-PURPOSE I/O’S**
- 8 x configurable as
  - Ratiometric OUT, 10 - 90% of BAT+ or
  - Voltage OUT, 0 - 100% of BAT+ or
  - Digital OUT up to 4 A high side or
  - LED control OUT or
  - Analog IN 12 bit, 0 - 32 V

**INPUTS**
- 8 x analog IN 12 bit, 0 - 5 V, 0 - 25 mA, 0 - 100 kOhm
- 8 x analog IN 12 bit, 0 - 5 V, 0 - 10 V, 0 - 25 mA
- 8 x analog IN 12 bit, 0 - 5 V, 0 - 32 V, 0 - 25 mA
- 6 x digital timer IN (0.1 Hz - 20 kHz), encoder supporting digital voltage sensors with configurable pull-up/down, digital (7/14 mA) current loop speed-sensor alternative use as analog IN 12 bit, 0 – 32 V
- 6 x digital timer IN (0.1 Hz - 20 kHz), encoder supporting digital voltage sensors with configurable pull-up/down, alternative use as analog IN 12 bit, 0 – 32 V
- K15 and wake up
PDHI – visualization & HMI solutions

Are robust interactive operator interface, that gather and handling almost seamless data and informations. Dashboard design, allows you to get fully customized graphics developed with customer specifications, and operators can visualize and identify machine key informations, then take the right actions.

The modularity designed operator terminals are available in a large 10.4-inch variant with touchscreen, and a smaller 7-inch version with or without touchscreen.

Key Features

- Best-in-class CPU performance and boot-up time
- Capable of displaying two simultaneous video feeds - everything in sight
- Excellent sunlight readability
- Interface for Ethernet cameras
- Ability to display and generate PDF documents
- Dashboard Design Elements library with more than 6000 pre-designed elements like buttons, gauges or icons
- High-end graphics (picture-in-picture, overlay, 3D, transparency effects)
- Sleep mode - wake up within < 0,5 sec
- Software update of display and connected ECUs via USB
- Up to 4 CAN interfaces
- GPS, GSM as well as WLAN enabled (fleet management / remote maintenance)
- Robust and easy to clean
CAN (Controller Area Network) was originally thought in 1986 by Robert Bosch GmbH, as an internal project to develop an in-vehicle network to replace the complex wiring harness with a two-wire bus.

Defined by ISO 11898 architecture, it has become one of the most successful network protocols ever. CAN is a serial bus system with multi-master capabilities that allows ECUs to communicate to each other without complex dedicated wiring in between, and in turn allows for several features to be added via software simultaneously.

The specification calls for high immunity to electrical interference and the ability to self-diagnose and repair data errors, which have led the CAN's popularity in a variety of industries including building and manufacturing.
PEJS - PEJD – electronic joysticks series

Is a fast growing area of machine control,
where OEMs shift from traditional hydraulic / mechanical solutions.

Our joysticks range, as a part of an integrated system solution, is under constant development in close cooperation with our costumers and can be tailored to specific end-user requirements.

These devices have been designed and built with particular adaptation to the PDV directional proportional valve and are used in industrial and mobile markets including construction, drilling, agriculture, forestry, utility, offshore and material handling.

Today, the Company offers a wide variety of electronics products and it is committed to meet industry’s most demanding design standards.

PEJS - PEJD single and double joysticks are compact and ragged electronics devices designed to control mobile machine work functions, and to meet operator input needs.
Oil & Diesel tanks for industrial & agricultural applications.

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