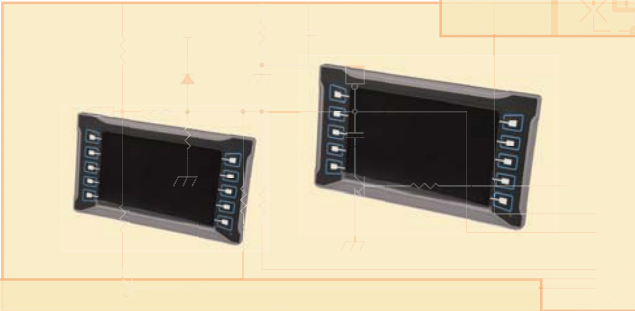
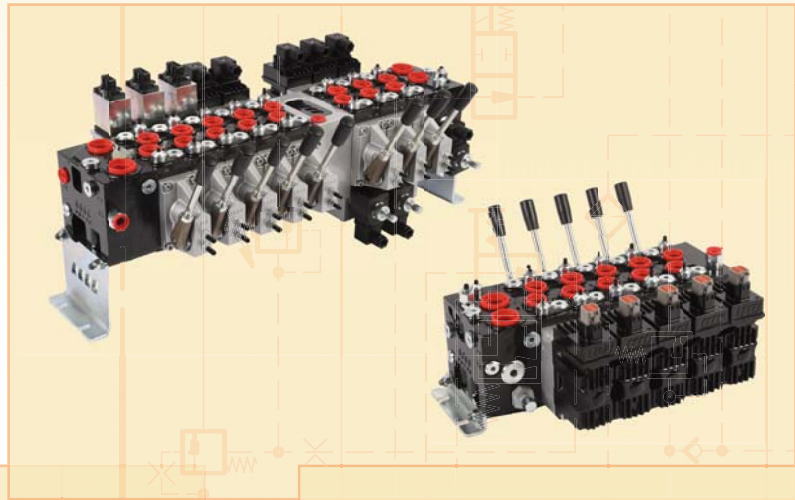




HYDRAULIC POWER CONTROL

PDV 74 - PDV 74D

PROPORTIONAL DIRECTIONAL VALVES, I/O ELECTRONIC CONTROLLERS AND JOYSTICKS





HYDRAULIC POWER CONTROL



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.



HYDRAULIC POWER CONTROL

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:

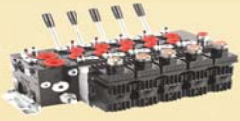
- Power Take Off's units
- Variable and fixed displacement piston pumps
- Proportional Directional Valves
- Electronic controls
- I/O controllers and related software
- Electronic joysticks
- Piston motors
- Gears pumps
- Tipping valves
- Pneumatic joysticks
- Integrated Hydraulic Manifolds

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.



HYDRAULIC POWER CONTROL



PDV 74 PROPORTIONAL DIRECTIONAL VALVE *upstream pressure compensated*

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.

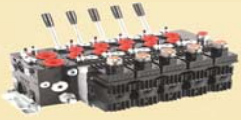
PDV74 platforms can be matched with PDV74D, down stream pressure compensated valve, enabling a flow sharing function where it's really needed.

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 operate 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} , 0 – 10 V, 4 – 20 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

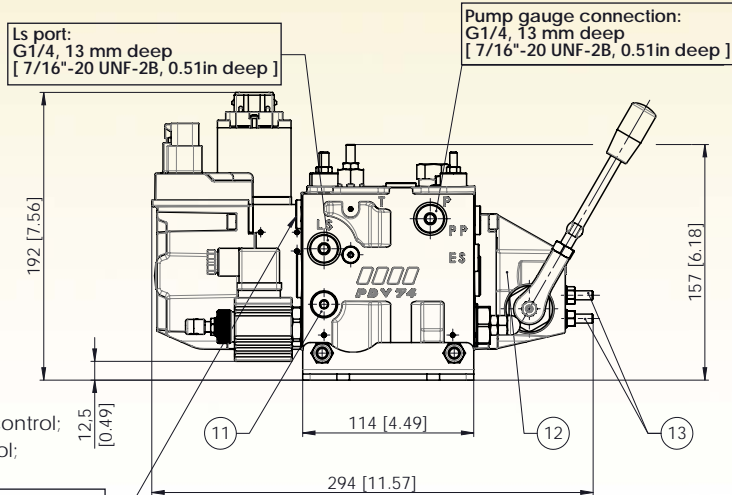
- With and without ports
- MID end section version



HYDRAULIC POWER CONTROL

PDV 74 PROPORTIONAL DIRECTIONAL VALVE
upstream pressure compensated

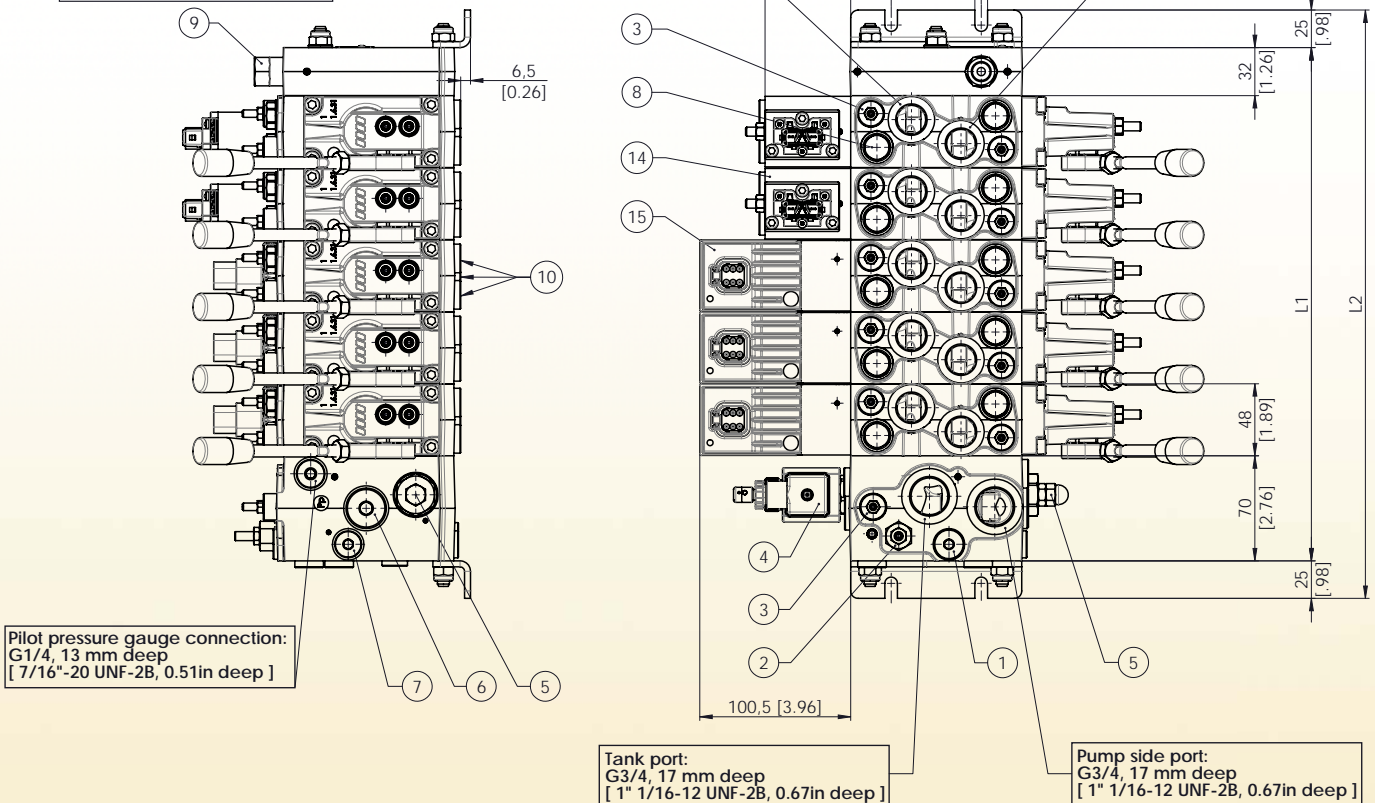
- 1) Main pressure reducing valve;
- 2) Shuttle valve pump configuration;
- 3) LsA/LsB pilot relief valve;
- 4) Pump unloading solenoid valve;
- 5) Pump unloading manual override;
- 6) Three way flow regulator plug;
- 7) Internal/external pilot oil supply cartridge;
- 8) Shock and suction valve;
- 9) Electric actuators drain line cartridge;
- 10) Pilot 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;



G1/4, 13 mm deep
[7/16"-20 UNF-2B, 0.51in deep]

A port:
G1/2, 17 mm deep
[7/8"-14 UNF-2B, 0.67in deep]

B port:
G1/2, 17 mm deep
[7/8"-14 UNF-2B, 0.67in deep]

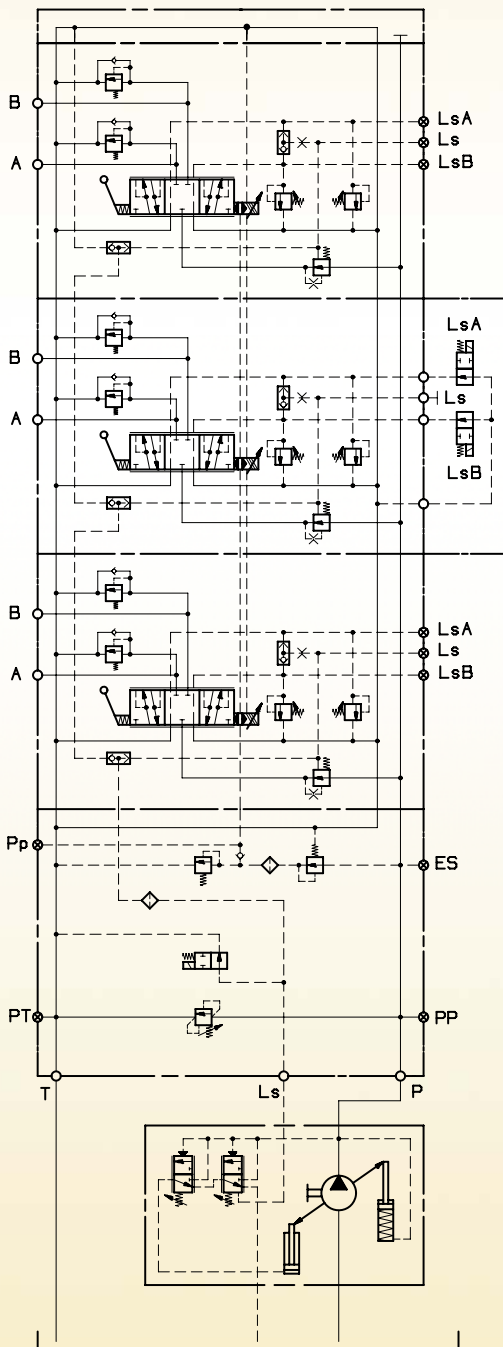


Tank port:
G3/4, 17 mm deep
[1" 1/16-12 UNF-2B, 0.67in deep]

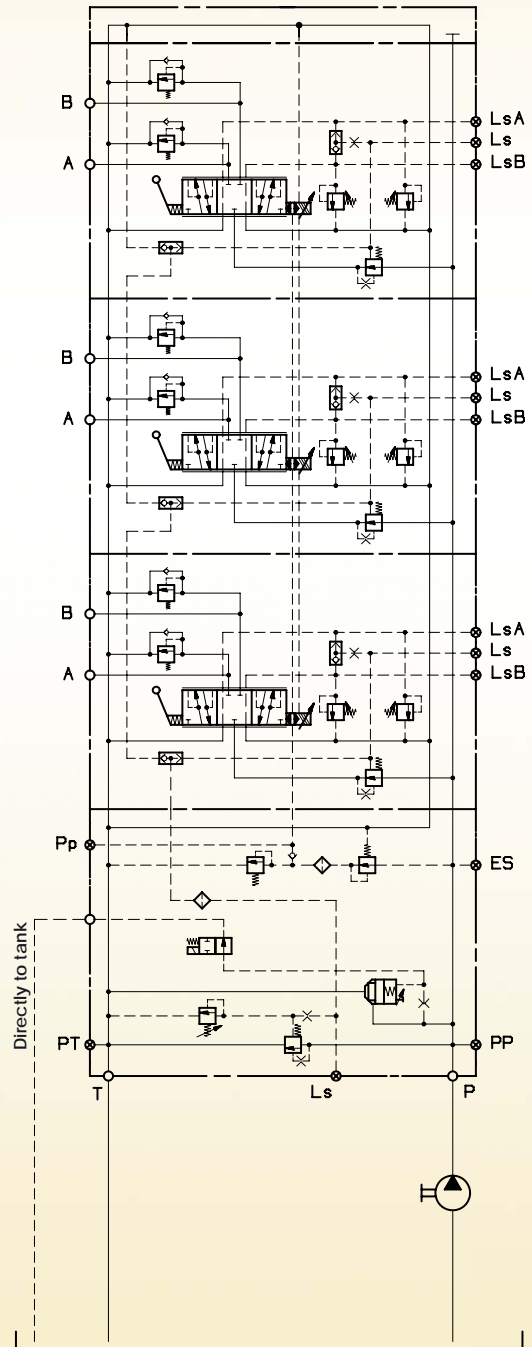
Pump side port:
G3/4, 17 mm deep
[1" 1/16-12 UNF-2B, 0.67in deep]

N° Working sections		1	2	3	4	5	6	7	8	9	10
L1	mm	150	198	246	294	342	390	438	486	534	582
	[in]	[5.90]	[7.79]	[9.68]	[11.57]	[13.46]	[15.35]	[17.24]	[19.13]	[21.02]	[22.91]
L2	mm	200	248	296	344	392	440	488	536	584	632
	[in]	[7.87]	[9.76]	[11.65]	[13.54]	[15.43]	[17.32]	[19.21]	[21.10]	[22.99]	[24.88]

PDV 74 PROPORTIONAL DIRECTIONAL VALVE upstream pressure compensated



CLOSED CENTER CIRCUIT



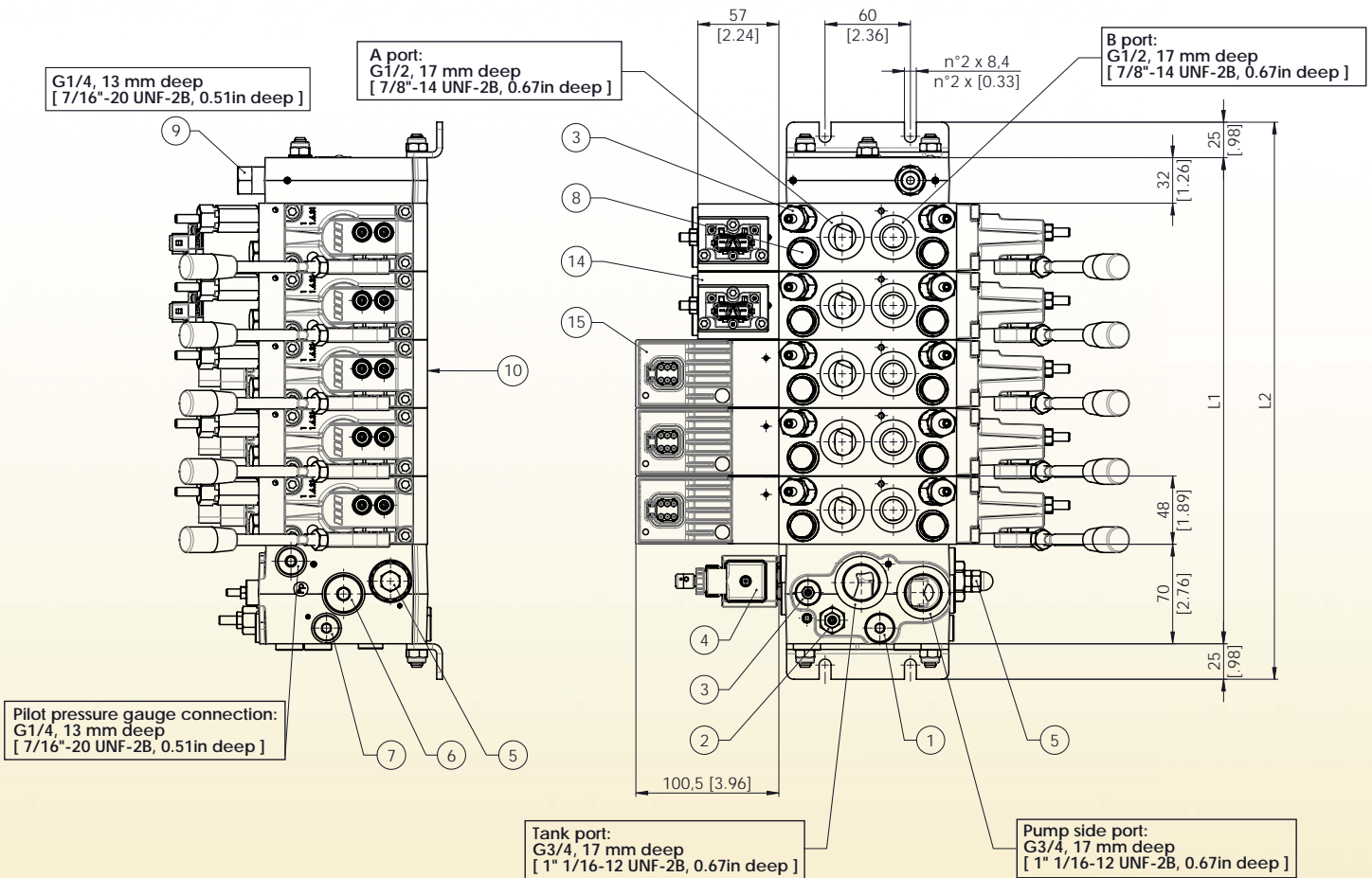
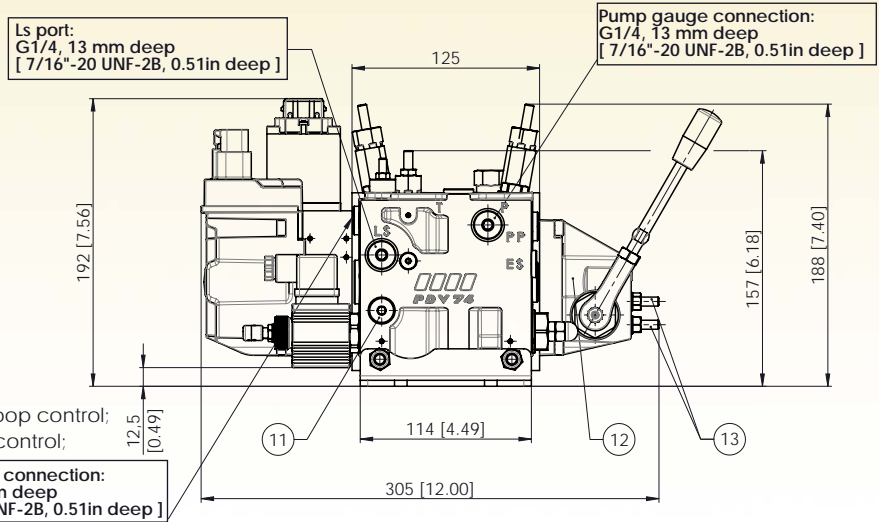
OPEN CENTER CIRCUIT



HYDRAULIC POWER CONTROL

PDV 74D PROPORTIONAL DIRECTIONAL VALVE
downstream pressure compensated

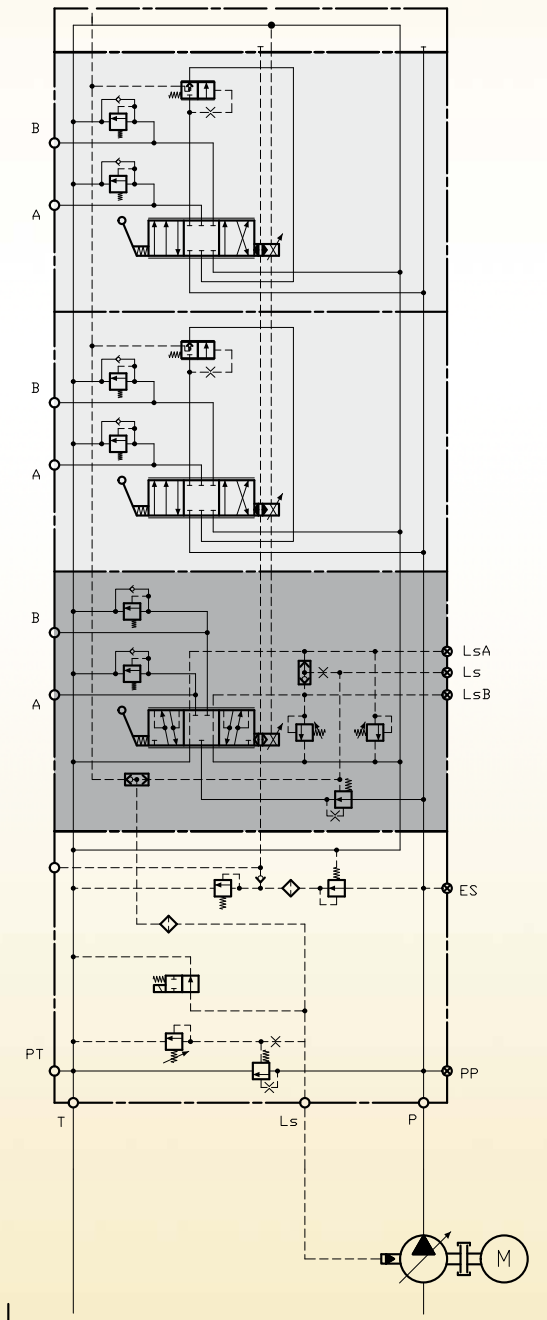
- 1) Main pressure reducing valve;
- 2) Shuttle valve pump configuration;
- 3) Ls/LsB pilot relief valve;
- 4) Pump unloading solenoid valve;
- 5) Pump unloading manual override;
- 6) Three way flow regulator plug;
- 7) Internal/external pilot oil supply cartridge;
- 8) Shock and suction valve;
- 9) Electric actuators drain line cartridge;
- 10) Pilot Ls port;
- 11) 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;



N° Working sections		1	2	3	4	5	6	7	8	9	10
L1	mm	150	198	246	294	342	390	438	486	534	582
	[in]	[5.90]	[7.79]	[9.68]	[11.57]	[13.46]	[15.35]	[17.24]	[19.13]	[21.02]	[22.91]
L2	mm	200	248	296	344	392	440	488	536	584	632
	[in]	[7.87]	[9.76]	[11.65]	[13.54]	[15.43]	[17.32]	[19.21]	[21.10]	[22.99]	[24.88]

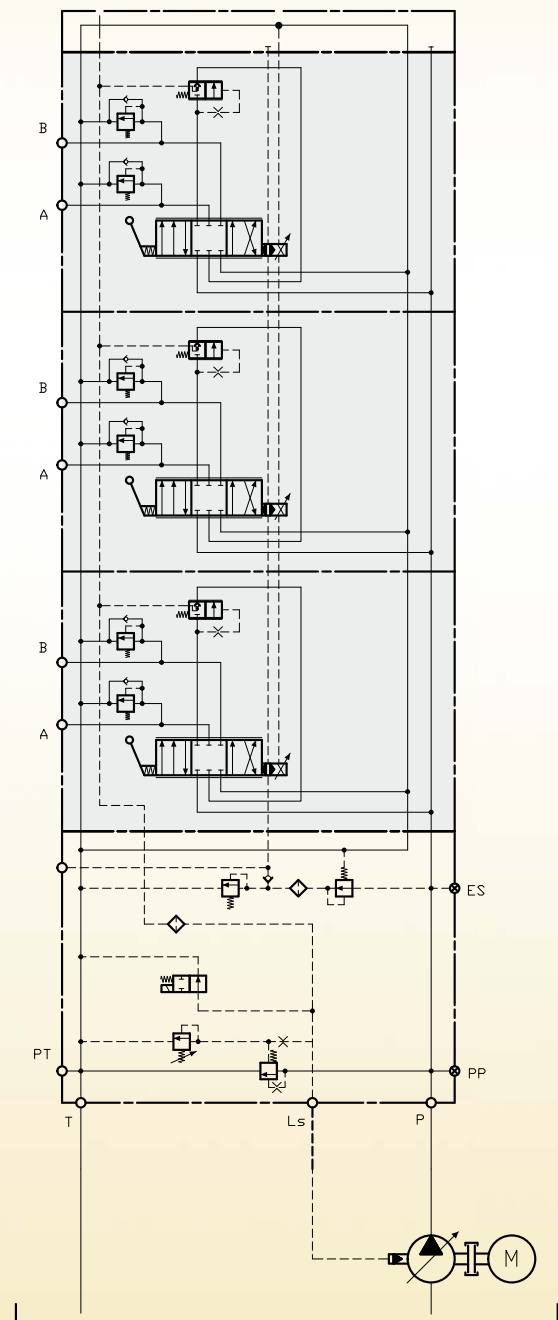
PDV 74D PROPORTIONAL DIRECTIONAL VALVE downstream pressure compensated

PDV 74 + PDV 74D
(downstream pressure compensated)



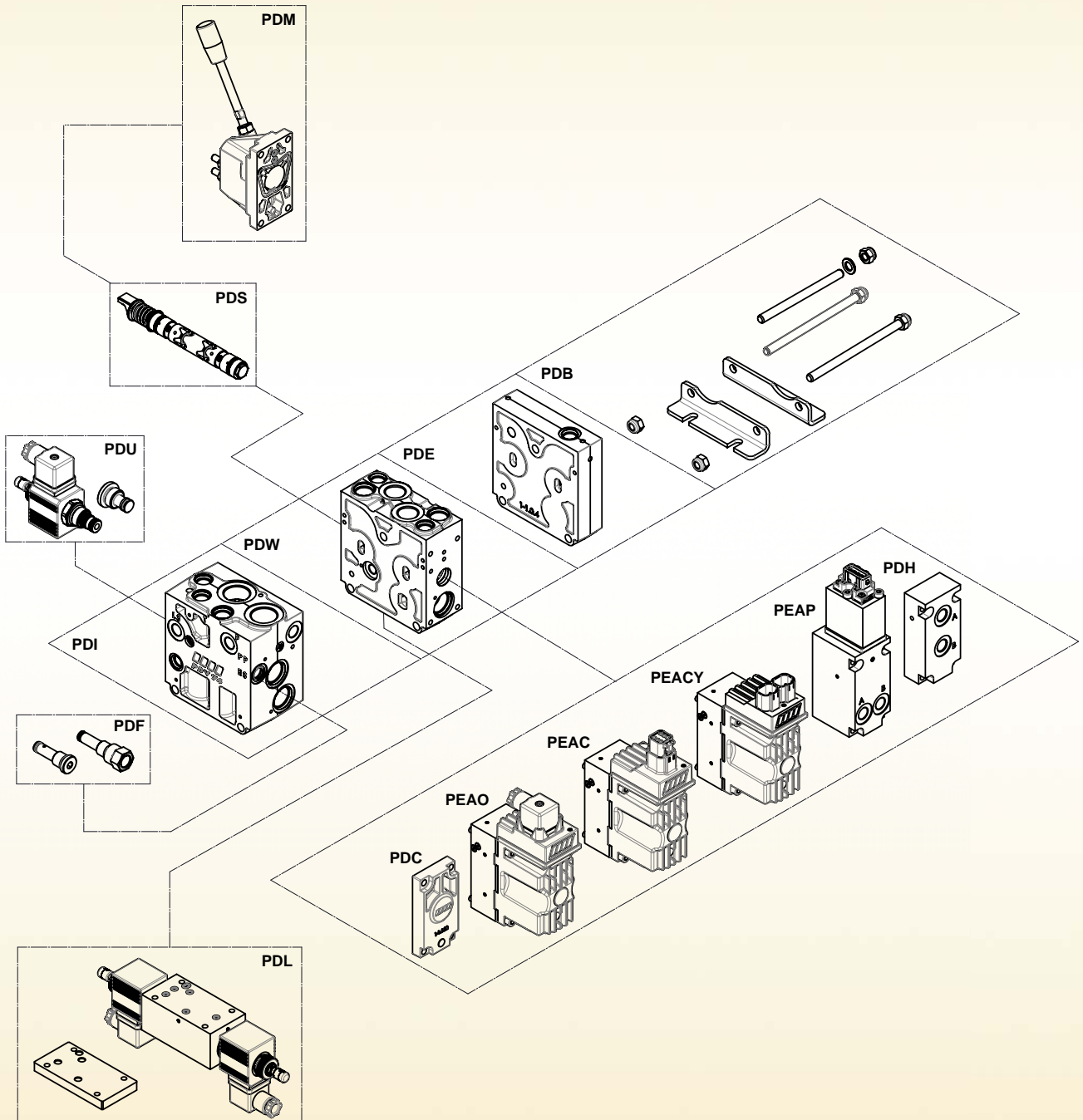
CLOSED CENTER CIRCUIT

PDV 74D

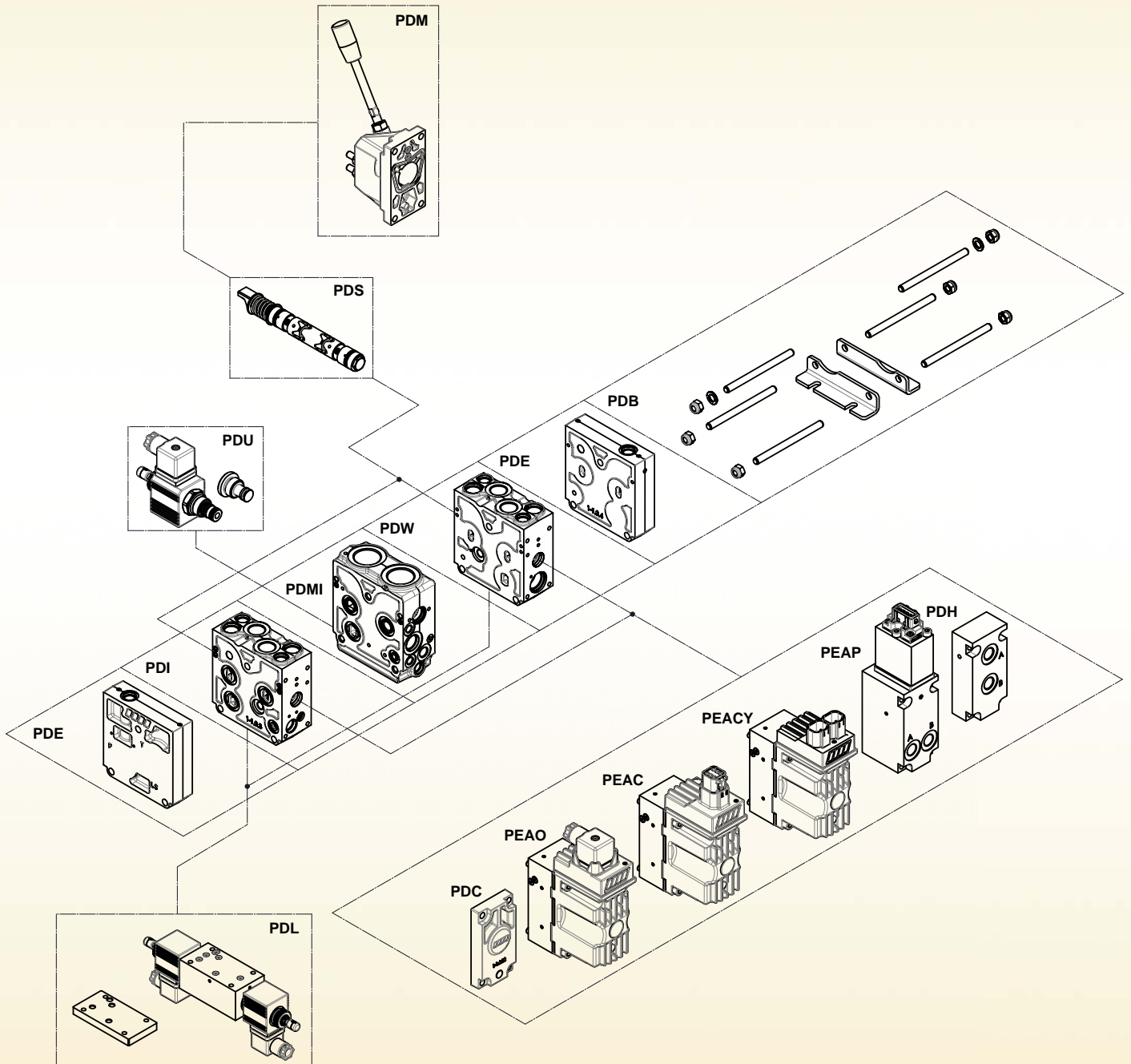


CLOSED CENTER CIRCUIT

PDV 74 MODULE ASSEMBLING CHART



PDV 74 MODULE ASSEMBLING CHART





HYDRAULIC POWER CONTROL

PDV 74 / PDV74D HYDRAULIC FEATURES

Max. working pressure	P port	Pressure relief valve setting	400 bar	[5800 psi]
		Working pressure	370 bar	[5370 psi]
	A - B ports	Working pressure	370 bar	[5370 psi]
		T port	Static	25 bar
	Dynamic		35 bar	[508 psi]
Oil flow rated	Inlet section standard		160 l/min	[42 US gal/min]
	Mid inlet section		250 l/min	[66 US gal/min]
	A,B ports with pressure compensator		130 l/min	[34 US gal/min]
	A,B ports without pressure compensator		140 l/min	[37 US gal/min]
Pilot pressure oil supply			18 → 22 bar	[260 → 320 psi]
Main pressure reducing valve oil consumption			0,9 l/min	[0,24 US gal/min]
Oil temperature	Recommended		30 → 60 °C	[+86 → 140 °F]
	Min		- 25 °C	[- 13 °F]
	Max		+ 80 °C	[+ 176 °F]
Ambient temperature			-30 → 60 °C	[-22 → 140 °F]
Oil viscosity	Recommended		12 → 80 mm ² /s	[65 → 366 SUS]
	Min		4 mm ² /s	[39 SUS]
	Max		460 mm ² /s	[2090 SUS]
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 mm ² /s [102 SUS]	With shock/suction valves		29 cm ³ /min	[1,77 in ³ /min]
	Without shock/suction valves		23 cm ³ /min	[1,4 in ³ /min]

PDV 74 / PDV74D ELECTRICAL ACTUATIONS FEATURES

	Supply voltage U_{DC}		Rated	11 V to 32 V
			Range	11 V to 32 V
			Max ripple	5%
K	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 Ω		
M	Input signal control		$0 \rightarrow 10 V_{DC}$	
			Neutral	5 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 Ω		
Z	Input signal control		$4 \rightarrow 20 mA$	
			Neutral	12 mA
			Control range	$0,25 \cdot 16 mA$ to $0,75 \cdot 16 mA$
	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 Ω		
Y	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 temperaure 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 \rightarrow 135 ms
		From max spool travel to neutral position		65 \rightarrow 85 ms
Reaction time (neutral switch)		From neutral position to max spool travel		125 \rightarrow 165 ms
		From max spool travel to neutral position		65 \rightarrow 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



HYDRAULIC POWER CONTROL

PDV 74 / PDV74D HIGH PERFORMANCE ELECTRONIC CONTROLLERS

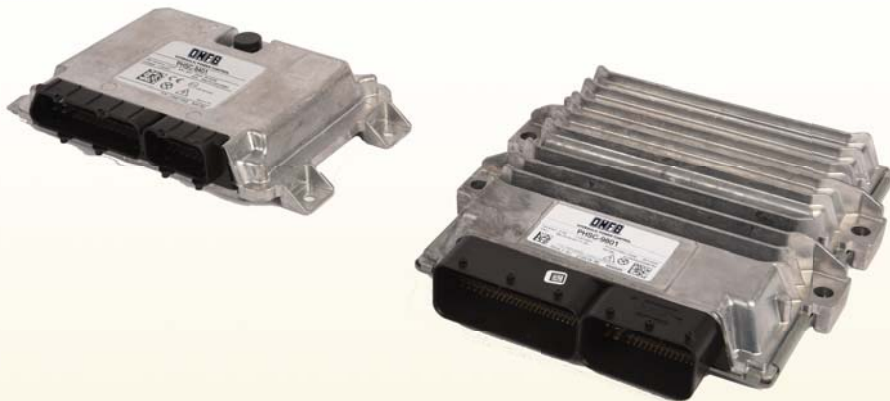
PHSC-8401 and 9801 High Performance Safety Controllers

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.





PDV 74 / PDV74D HIGH PERFORMANCE ELECTRONIC CONTROLLERS

PHSC-8401
<p>CPU CORE</p> <ul style="list-style-type: none"> • 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
<p>INTERFACES</p> <ul style="list-style-type: none"> • 4 x CAN 50 kbit/s up to 1 Mbit/s • 4 x CAN bus termination configurable via connector pins
<p>OUTPUTS</p> <ul style="list-style-type: none"> • 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 • 8 x digital OUT up to 4 A, low side, current sense, overload and open load detection, alternative use as analog IN, 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
<p>INPUTS</p> <ul style="list-style-type: none"> • 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 12bit, 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 12bit, 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

PHSC-9801
<p>CPU CORE</p> <ul style="list-style-type: none"> • 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
<p>INTERFACES</p> <ul style="list-style-type: none"> • 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
<p>OUTPUTS</p> <ul style="list-style-type: none"> • 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
<p>MULTI-PURPOSE I/O'S</p> <ul style="list-style-type: none"> • 8 x configurable as <ul style="list-style-type: none"> - 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
<p>INPUTS</p> <ul style="list-style-type: none"> • 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 <ul style="list-style-type: none"> - 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 <ul style="list-style-type: none"> - 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 operatos 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 Bus
A ring of intelligence to customize
total machine control



CAN (Controller Area Network) was originally thought in 1986 by Robert Bosch GmbH, as internal project to develop an invehicle network to replace the complex wiring harness with a two-wire bus.

Defined by ISO 11898 architecture, has become one of the most successful network protocol 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 this 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, have led the CAN's popularity in variety of industries fields 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 rugged electronics devices designed to control mobile machine work functions, and to meet operator input needs.



HYDRAULIC POWER CONTROL

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HYDRAULIC POWER CONTROL



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Hydraulic valves & blocks.

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Fax +39 0522 1722343
www.vbrhydraulics.com

