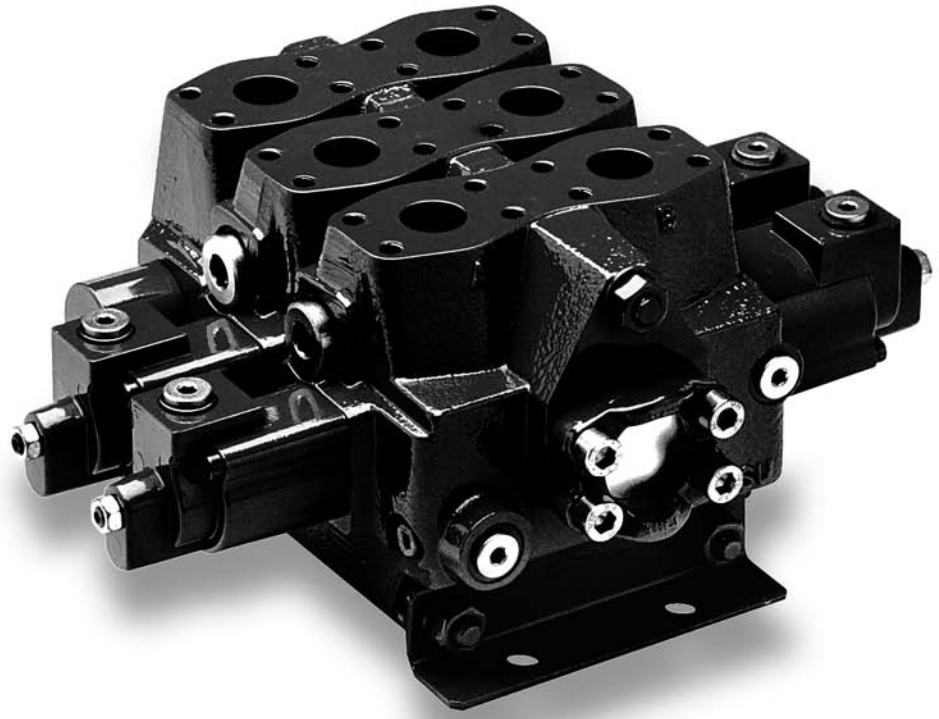




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process control
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HV08

Mobile Directional Control Valve

Proportional, Load Sensing



ENGINEERING YOUR SUCCESS.

Catalogue layout

This catalogue has been designed to give an overview of the HV08 valve and to show how easily it can be customized to meet your needs. Apart from general information and basic technical data, the catalogue contains descriptions of the variety of options available for the different functions within the valve. After you have studied the options and made your selection, we will tailor your valve to meet your operating and control criteria.

Each function area is given as a subheading, followed by a brief description. When options are available for the function, an "Item number" in square brackets follows the subheading, e.g. **Pressure relief valve [15]**. This is followed by a series of coded options, e.g. **PLS, PLB, PPS, PPB, Y1**, together with a brief description of what each code represents. Alternatively, one or more pressure, flow or voltage options are given.

On page 11 is a general circuit diagram showing the basic functions of the HV08 valve, together with the item numbers or letters used to represent them. Naturally, the same item numbers or letters are used in all sub-circuit diagrams that appear elsewhere in the catalogue in conjunction with descriptions of the respective functions. All sub-circuit diagrams have been extracted from the general circuit diagram. Please note that, unless stated otherwise, all sections and views of the valves have been drawn as seen from the inlet section.

How to order your valve

The next step is to fill in a "Customer Specification Form" (CSF) to specify the options and characteristics you wish to be incorporated into your valve. The CSF contains the same item numbers that appear in square brackets in this catalogue. To specify your valve, simply choose the common functions and spool-section specific options you require and enter the corresponding code or value into the box for the relevant item number in the CSF.

Should you require assistance completing the CSF, please do not hesitate to contact your nearest Parker representative, who will either help personally or refer you to the appropriate product specialist. The information in your CSF will be entered into our computerized valve specification program, which initiates the assembly process and generates a unique product ID

number that is subsequently stamped into the data plate on your valve. Your valve specifications remain on our database to facilitate rapid identification of your valve in the event of subsequent re-ordering or servicing matters.

Early consultation with Parker saves time and money

Our experienced application engineers have in-depth knowledge of the different types of hydraulic system and the ways in which they work. They are at your disposal to offer qualified advice on the various combinations of functions and control characteristics you may require, and to advise how to obtain the best possible economy.

By consulting Parker early in the project planning stage, you are assured of a comprehensive hydraulic system that will give your machine the best possible operating and control characteristics, together with outstanding economy.

Subject to alteration without prior notice. The graphs and diagrams in this catalogue are typical examples only. While the contents of the catalogue are updated continually, the validity of the information given should always be confirmed. For more detailed information, please contact Parker Hannifin.

Conversion factors

1 kg	= 2.2046 lb
1 N	= 0.22481 lbf
1 bar	= 14.504 psi
1 l	= 0.21997 UK gallon
1 l	= 0.26417 US gallon
1 cm ³	= 0.061024 in ³
1 m	= 3.2808 feet
1 mm	= 0.03937 in
9/5 °C + 32	= °F



WARNING – USER RESPONSIBILITY

FAILURE OR IMPROPER SELECTION OR IMPROPER USE OF THE PRODUCTS DESCRIBED HEREIN OR RELATED ITEMS CAN CAUSE DEATH, PERSONAL INJURY AND PROPERTY DAMAGE.

This document and other information from Parker-Hannifin Corporation, its subsidiaries and authorized distributors provide product or system options for further investigation by users having technical expertise.

The user, through its own analysis and testing, is solely responsible for making the final selection of the system and components and assuring that all performance, endurance, maintenance, safety and warning requirements of the application are met. The user must analyze all aspects of the application, follow applicable industry standards, and follow the information concerning the product in the current product catalog and in any other materials provided from Parker or its subsidiaries or authorized distributors.

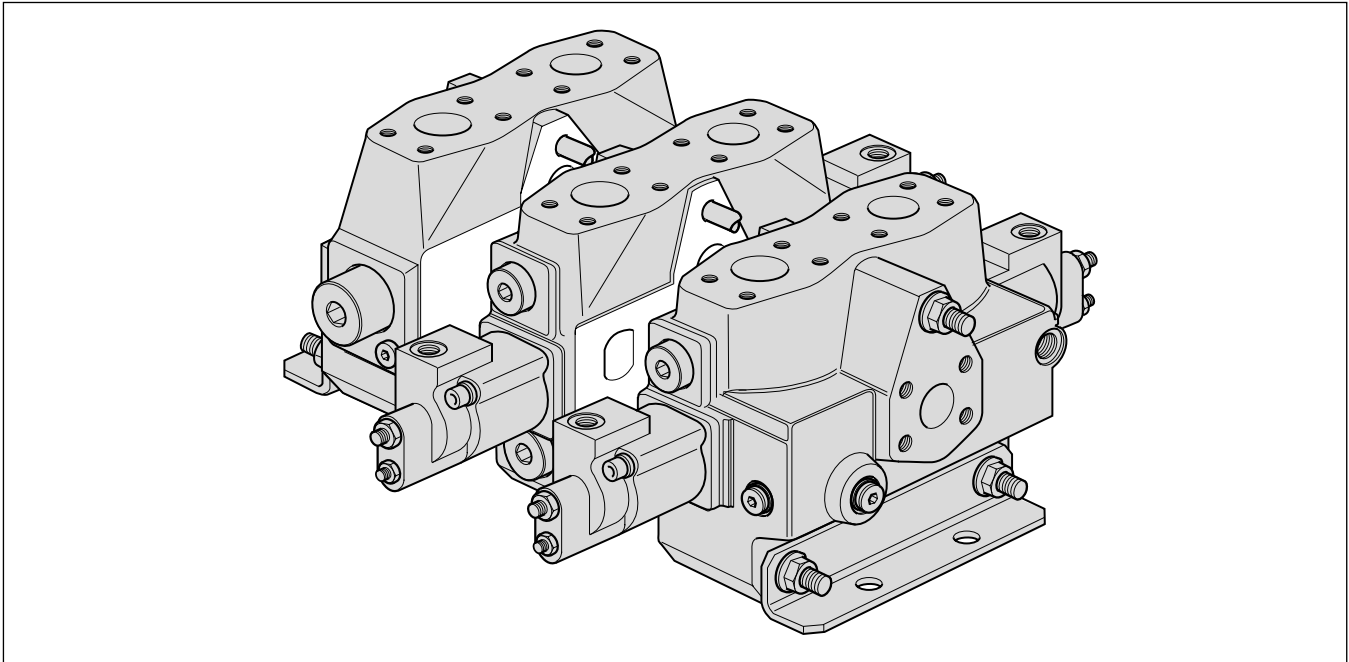
To the extent that Parker or its subsidiaries or authorized distributors provide component or system options based upon data or specifications provided by the user, the user is responsible for determining that such data and specifications are suitable and sufficient for all applications and reasonably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

Offer of Sale

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

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[00] Refers to item numbers in Customer Specification Form.



The HV08 is a load sensing, pressure compensated directional control valve intended for use in both load-sensing systems and constant-flow systems. The valve, which is stackable, is designed for many different applications in machines such as trucks, cranes, loaders and excavators.

Compact system construction

The HV08 is of modular construction and offers unique possibilities to integrate application-adapted function solutions into the valve to form a complete, compact system solution for the machine.

Freedom in machine design

The valve can be equipped for direct control by means of levers, or for electric, pneumatic or hydraulic remote control. Combinations of direct and remote control are also possible. These options give great freedom to the machine designer, since they enable the valve to be located ideally on the machine using the control medium best suited to the application in question.

Economy

Thanks to modular construction, the HV08 can be optimized for both simple and complex functions. The possibility of integrating complete function solutions into the valve gives low overall system costs. The HV08 can be re-built or expanded at any time to meet changing demands. Moreover, by combining function-adapted solutions with load-sensing systems, energy consumption can be kept to a minimum.

Design

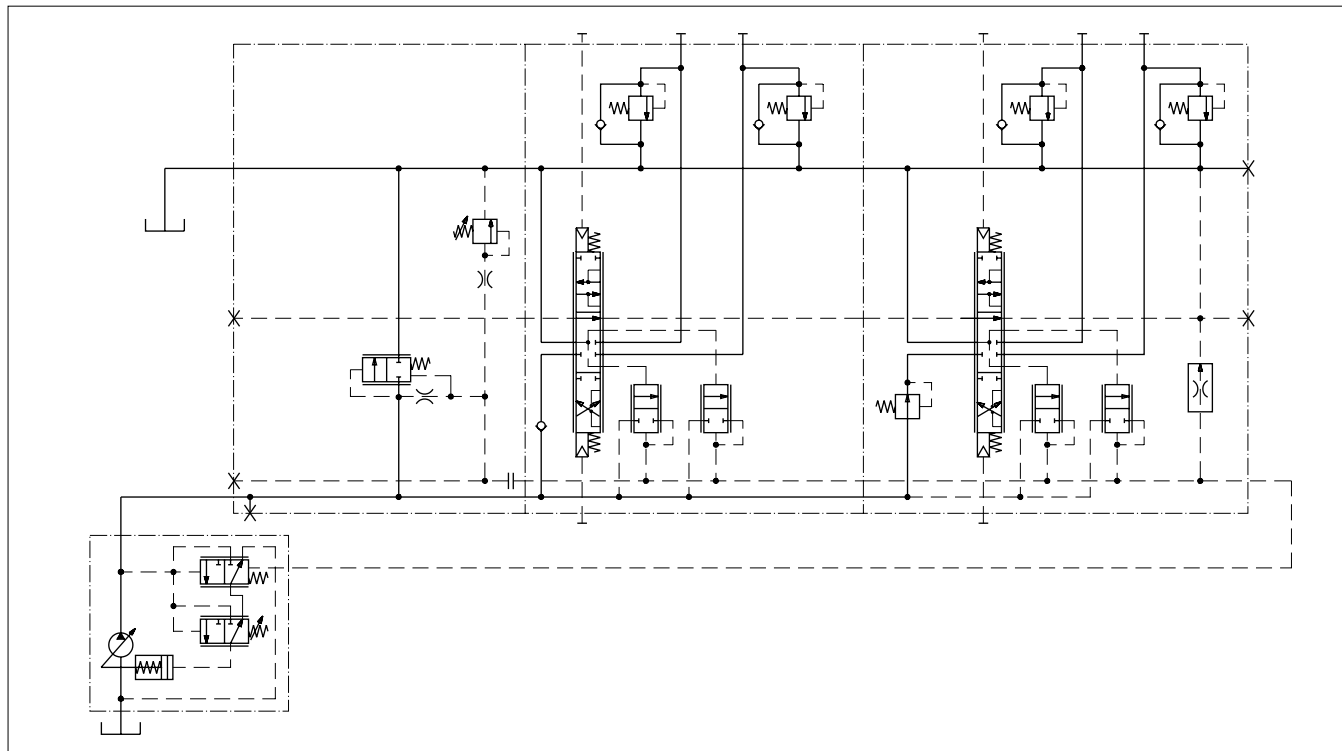
The HV08 is stackable and can be supplied in combinations of 1 to 6 spool sections. It can also be supplied in combination with function blocks, which are specially customized manifolds.

The valve is designed for system pressures up to 320 bar and can be equipped with port relief valves in the service ports for pressures up to 350 bar. The flow range is up to 300 l/min, depending on how the valve is equipped.

The valve is designed for use in systems with fixed or variable pumps.

Essential features and benefits

- Modular construction: makes the HV08 very flexible, in that it is easy to re-build or expand the valve at any time to meet changing needs.
 - Broad system compatibility: can be used in LS, CFC, CP and CPU systems, thus giving you the freedom to choose the hydraulic system best suited to the machine and application in question.
 - Good control characteristics: give precise control of the machine in both lifting and lowering movements.
 - Can be equipped for both multi-pump and multi-valve systems: increases further the HV08's range of applications in different types of hydraulic system.
 - Can be flanged to specially customized function manifolds: enables the integration of even more functions (even total system solutions) into a compact, single unit that does not require any extra external hoses or pipes, thus making the installation simple, tidy and especially reliable.
- Wide range of spool actuators for either direct or remote control: enables the valve to be located in the most practical place on the machine. The range includes both hand-operated and remote-controlled spool actuators of different types, thus enabling the best combination of economy and control characteristics to be obtained. The remote control system can be of the electric, pneumatic or hydraulic type.
 - Individual load-hold check valves in each spool section: effectively prevent undesirable sinking of the load, thus improving operational safety.
 - Individual port relief valves in each service port: enable port-specific limitation of maximum pressure to suit precisely the respective functions being controlled.
 - Quality and precision: quality materials and high manufacturing precision ensure a superior product with low internal leakage and long service life.
 - Simplicity and serviceability: an emphasis on simple design makes the HV08 easy to service.



Basic circuit diagram for LS system

Load-sensing systems (LS)

In load-sensing systems, both pressure and flow are adapted according to demand. The HV08 controls pump displacement by means of a load signal, so that a constant pressure differential between the pump line and the signal line is obtained, i.e. the pump pressure is determined by the heaviest load controlled by the valve. While some suppliers and certain publications refer to CFC systems (see page 7) as load sensing, Parker reserves the LS denomination exclusively for systems that contain a variable pump and load-sensing valve.

Since load-sensing systems contain more complex control technology compared with constant-flow and constant-pressure systems, there are greater demands on the machine builder's knowledge of control technology. The combination of high efficiency and good control characteristics require the main spools in the HV08 to be customized to the respective functions. As in constant-flow systems, simultaneously operated functions should have roughly the same pressure demands. If not, they should be divided into separate circuits so that optimal efficiency may be obtained. Mechanical construction should be rigid, since load-sensing systems can translate vibration in the construction into varying pressure demands, which can result in self-induced oscillation (hunting) in the system.

Load-signal systems can be built up in different ways. The HV08 is designed so that oil can circulate in the system without any oil being taken from the service ports, with the result that the pump reacts quickly even in cold weather. Even the pump regulators can be designed in different ways. Certain regulators consume no oil from the load-signal line, while others have a leakage restrictor that maintains a certain consumption. A third variant feeds oil into the load-signal line (a flow that must be drained off in a suitable way). The HV08 can be equipped with a built-in load-signal drainage facility that drains off approx. 1 l/min from the load-signal line, regardless of the pressure.

LS systems have outstanding characteristics when designed in the right way. For this reason, customers are advised to consult Parker for assistance with the design of the entire LS system, so that its advantages may be exploited in full.

Load sensing and pressure compensation

The pressure differential regulated by the pump regulator results in the flow to the heaviest load always being pressure compensated, i.e. the flow through the service port is independent of variations in the load pressure.

Functions can be pressure compensated in two ways. The first involves exploiting the effect of the flow forces on a hydraulic proportionally controlled (force controlled) valve spool. This gives simple and reliable function, with pressure compensation of both lifting and lowering movements, without the need for extra components. The second way is to equip each spool section with a compensator that maintains a constant pressure drop over the inlet restriction. This enables even directly controlled valves to be pressure compensated, but makes the valve more complex. The HV08 is pressure compensated through exploitation of the flow forces. See diagram on page 6. Parker does, however, make directional valves equipped with pressure compensators, e.g. our L and K series valves.

Control characteristics

The use of pressure-compensated spools in the HV08 helps to achieve good control characteristics.

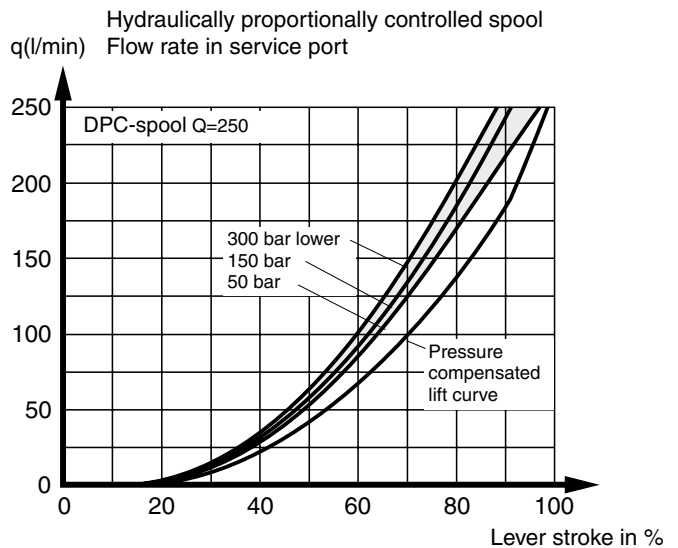
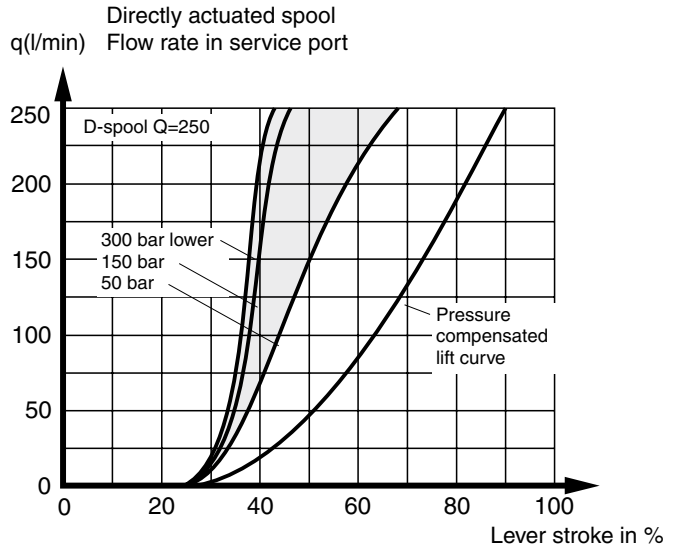
When lowering a load at a speed higher than the available pump flow, great demands are placed on the replenishing characteristics of the valve. In the HV08, these demands are met by equipping the service ports of the valve with special anti-cavitation valves. To further improve the replenishing capabilities, a counter pressure valve can be placed in the tank outlet of the valve. In HV08 valves with closed spool actuators (PC and EHC), the spools are pressure compensated. The influence of the load on speed is therefore negligible. When more than one load-lifting function is operated simultaneously, it is the heaviest load that is pressure compensated.

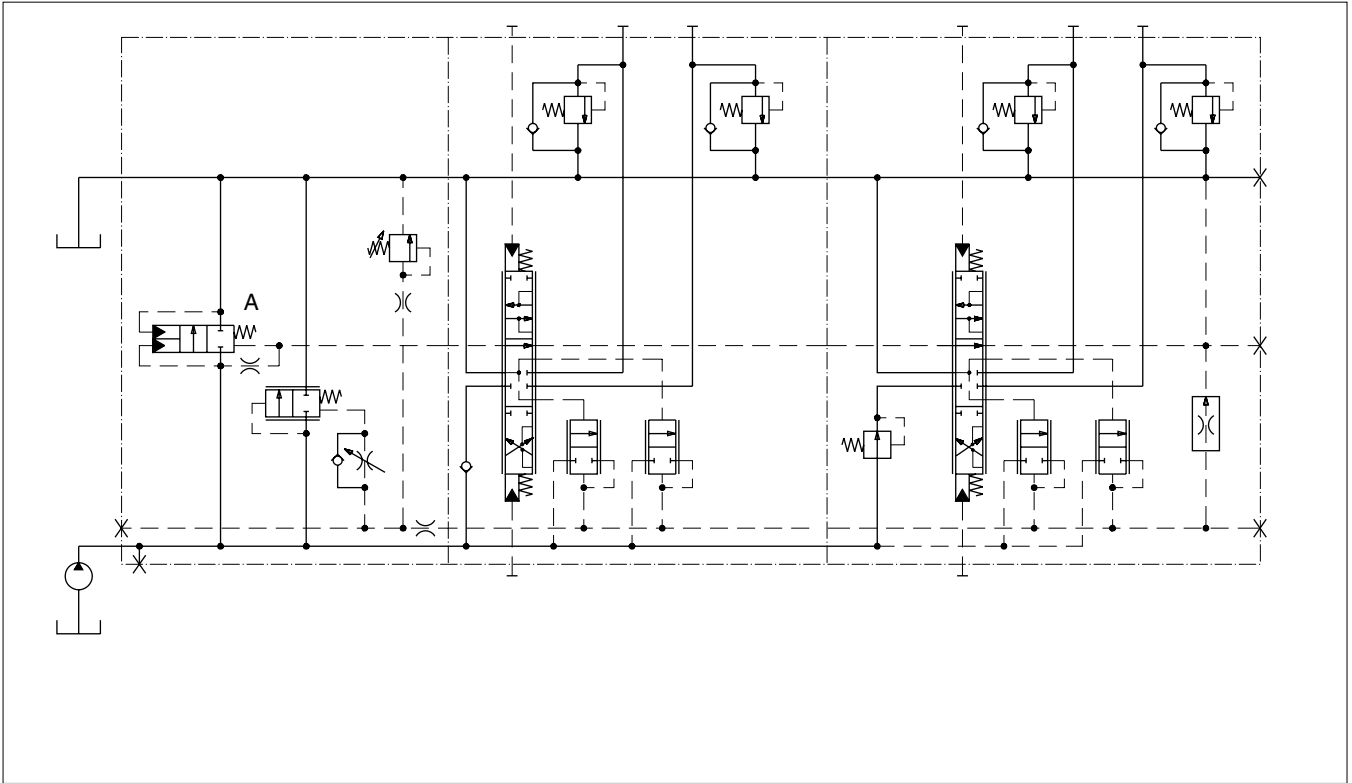
Constant-pressure systems (CP)

The distinguishing feature of a constant-pressure system is that the pressure is kept constant while the flow is varied according to demand.

The constant-pressure system is of simple construction. It employs a pump with variable displacement that is regulated to keep the pressure constant. The pump-regulating unit is simpler than the one in a load-sensing system. The constant-pressure system has outstanding control characteristics.

With the HV08, the control characteristics in constant-pressure systems are equal to those in load-sensing systems.





Basic circuit diagram for CFC system

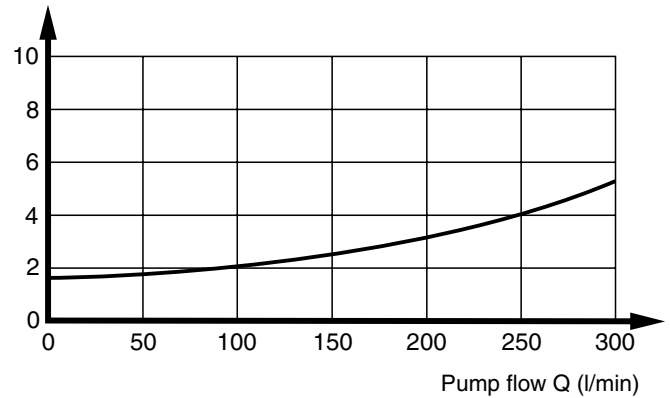
Constant-flow systems (CFC)

A constant-flow system is a system in which the flow is constant at a given engine speed, while the pressure is adapted according to demand.

Two different kinds of directional valve can be used in constant-flow systems: the open-centre valve (CFO) and the closed-centre valve (CFC). The HV08 is available in a CFC version. (Parker also makes CFO valves, e.g. the P70 and F130 and H170 valves.) The difference between a CFO valve and a CFC valve is that, in the former, oil that is not used passes through the valve’s free-flow gallery and back to tank, whereas the CFC valve has a bypass function that drains the surplus oil back to tank. In the HV08, this is achieved in two stages for the purpose of minimizing the no-load losses. When no functions are operated, an idling-unloading poppet (A) opens to connect the pump line with the tank. Thanks to the design of the bypass in the HV08, the spool sections work in the same way as in load-sensing systems, i.e. the same control and pressure-compensation characteristics are obtained.

When more than one lifting function is operated at the same time, the pressure is determined by the heaviest load. For this reason, simultaneously operated functions should have roughly the same pressure demand. If not, they should be divided into separate circuits in order to minimize cross-functional interference and give good operating economy. Provided that the bulk of the pump capacity is used, constant-flow systems are very economical. It is therefore important to dimension the pump correctly.

Δp connection P – T1 Idling-unloading characteristic



The graph above shows the pressure drop over the valve (regardless of the number of spool sections) when all spools are in neutral.

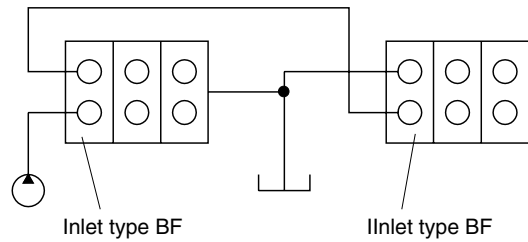
See page 6 for control curves. Load-sensing systems and constant-flow systems have the same excellent control curves thanks to the design of the bypass in the HV08 valve.

Connecting up the system

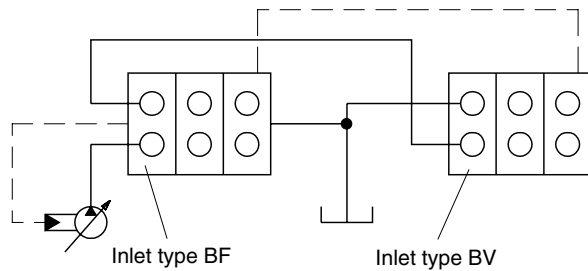
When a system contains more than one valve, it can be connected up in different ways. A few examples are given below.

A. Series connection

The pump is connected to valve 1. Any flow not directed to a consumer by valve 1 continues to valve 2. This means that valve 1 has priority, i.e. in the event of full flow demand through valve 1, no flow continues to valve 2. See also [10] on page 14.



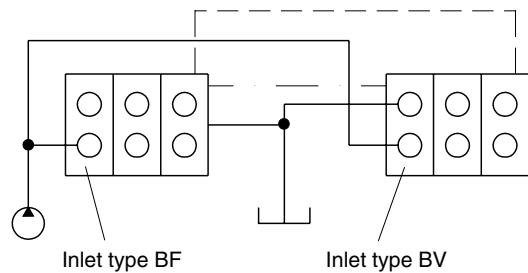
Series connection, CFC



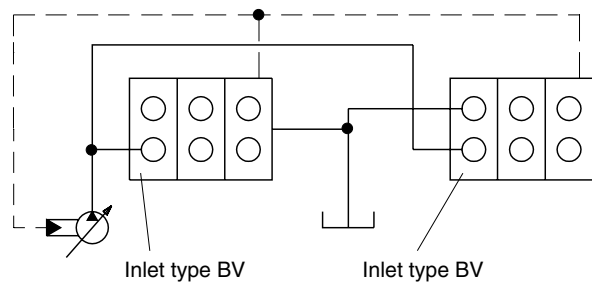
Series connection, LS

B. Parallel connection

In parallel connection, one pump is connected to more than one valve in such a way that they all function as though they were a single valve.



Parallel connection, CFC

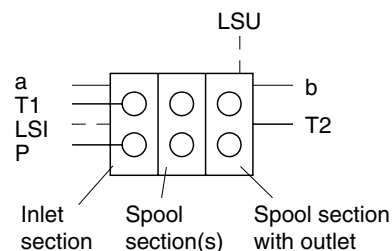


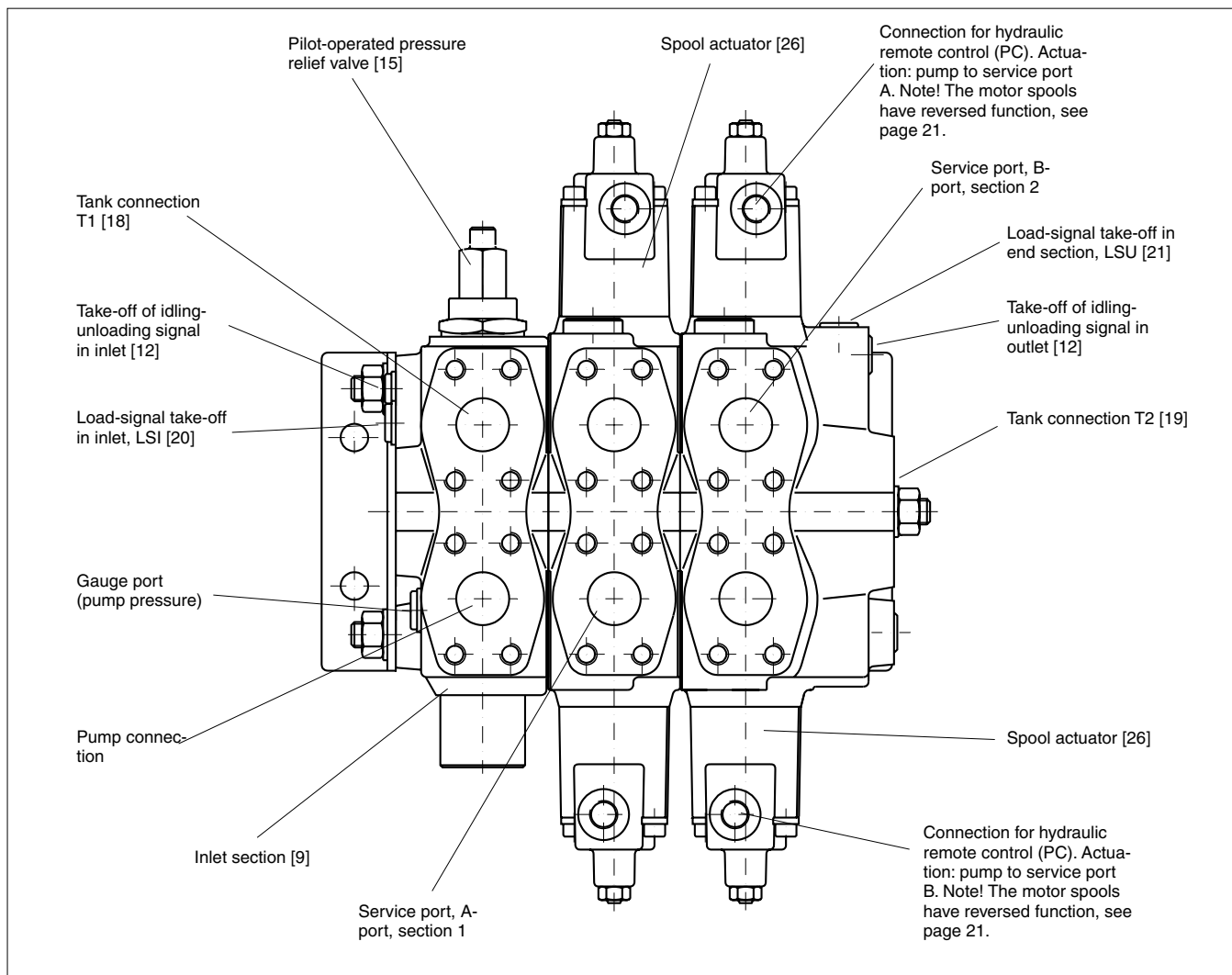
Parallel connection, LS

Key

- P = Pump connection
- T1 = Tank connection T1
- T2 = Tank connection T2
- LSI = LS connection in inlet section (used only in series connection in LS systems)
- LSU = LS connection in outlet section (normally connected to the pump regulator, LS)
- a = Connection for idling unloading signal in inlet section
- b = Connection for idling unloading signal in end section

See page 12 for description of inlet section.





Pressures

Pump connection	max. 320 bar (4600 psi)
Service port	max. 350 bar (5000 psi)
Tank connection, static	max. 20 bar (220 psi)

Flow rate (recommended)

Pump connection	max. 300 l/min* (79 USgpm)
Return from service port	max. 250 l/min (66 USgpm)

* Max. recommended flow rate is dependent on choice of spool.

Feed reducer

Adjustment range	20 – 220 bar (290 – 3200 psi)
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Internal pilot pressure

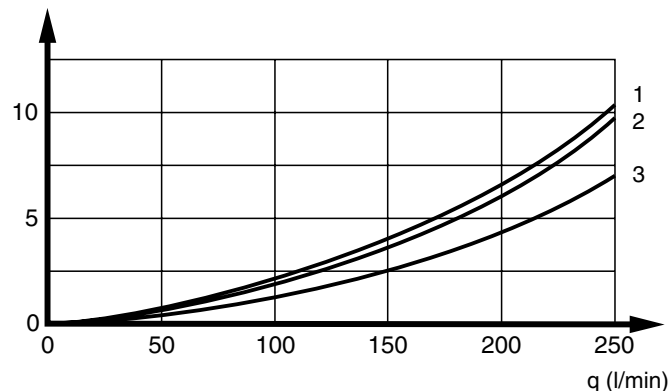
25, 35 or 50 bar (applies to EHC spool actuator)
 (360, 500 or 725 psi approx.)

Leakage from service port over spool

From A or B port: max. 15 cm³/min at 100 bar, temperature 50 °C and viscosity 30 mm²/s (cSt).

Pressure drops

Δp (bar) Pressure-drop curves



- 1 Pressure drop P – A/B with double-acting spool for 250 l/min.
- 2 Pressure drop A/B – T1 with double-acting spool for 250 l/min.
- 3 Pressure drop A/B – T1 with motor spool for 250 l/min.

Connections

All standard signal connections are available in two versions, unless stated otherwise:

- G1/4 (BSP pipe thread) for flat seal (type Tredo) according to ISO 228/1
- 9/16-18 UNF-2B for O-ring seal according to SAE J1926/1

The pump, tank and service-port connections are available in three different versions: two split-flange types and a pipe-thread version.

- 1" flange plane according to SAE J518 standard pressure, but with M10 or UNC 3/8-16 fixing screws. Thread depth in both cases: 20 mm.
- BSP pipe-thread G1 for flat seal (type Tredo) according to ISO 228/1.

Weight

Weight varies somewhat depending on the configuration of the valve. The details below are therefore approximate.

Complete valve	Weight	
1 spool section	24 kg	53 lb
2 spool sections	34 kg	75 lb
3 spool sections	44 kg	97 lb
4 spool sections	54 kg	119 lb
5 spool sections	64 kg	141 lb
6 spool sections	74 kg	163 lb

Environmental characteristics

The valve is delivered painted with an anti-corrosion base paint. Steel parts subject to the risk of corrosion are protected by means of zinc-plating and yellow chromating, nitro-carburizing or similar. Certain spool actuators are supplied ready greased.

The O-rings in the valve are usually of nitrile rubber. For constant-pressure systems, however, we recommend that A30 [14] be selected to give O-rings of Viton in parting surfaces between the sections, since Viton withstands heat better than nitrile rubber. (Much heat is generated in constant-pressure systems that work hard.)

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.

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 gear-boxes 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 using nitrile rubber seals.

* Product operating limits are broadly within the above range, but satisfactory operation within the specification may not be accomplished. Leakage and response will be affected when used at temperature extremes and it is up to the user to determine acceptability at these levels.

** Performance efficiency will be reduced if outside the ideal values. These extreme conditions must be evaluated by the user to establish suitability of the products performance.

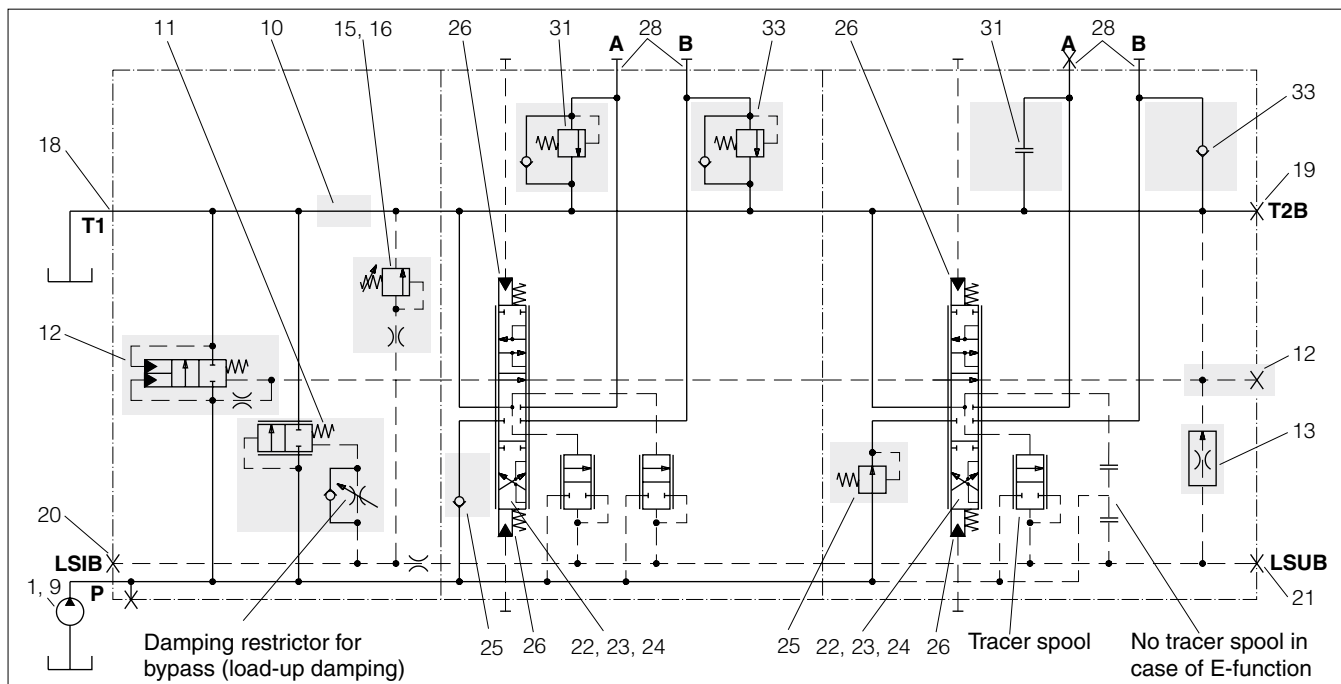
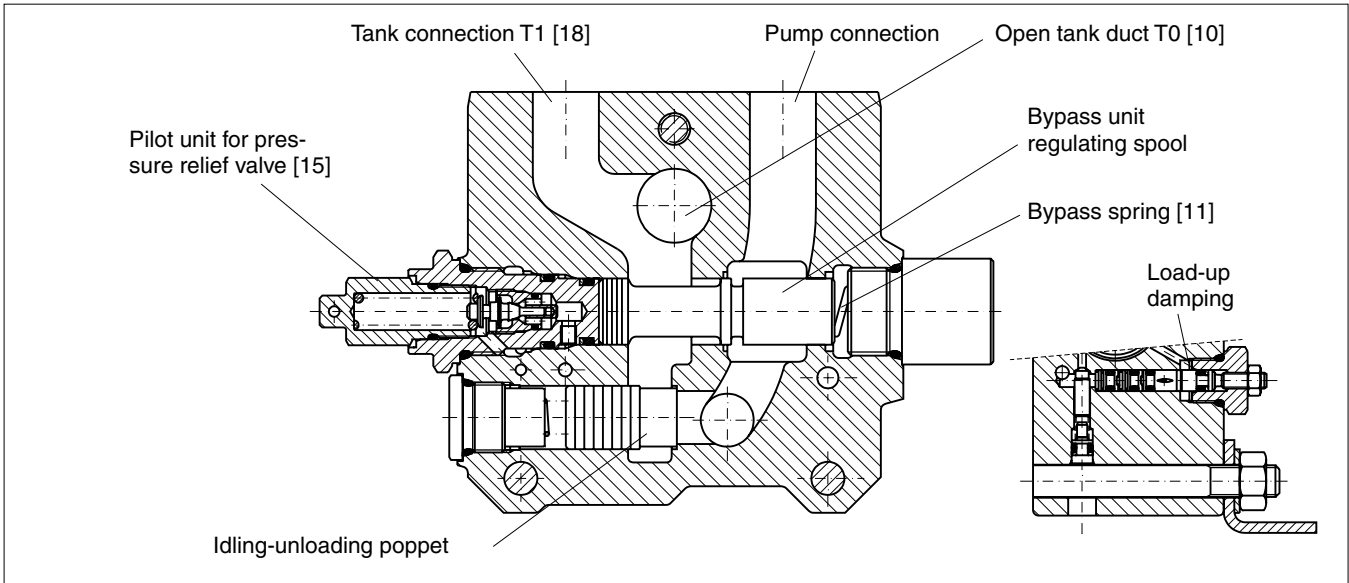


Diagram for basic functions shows HV08 in CFC version with two spool sections.

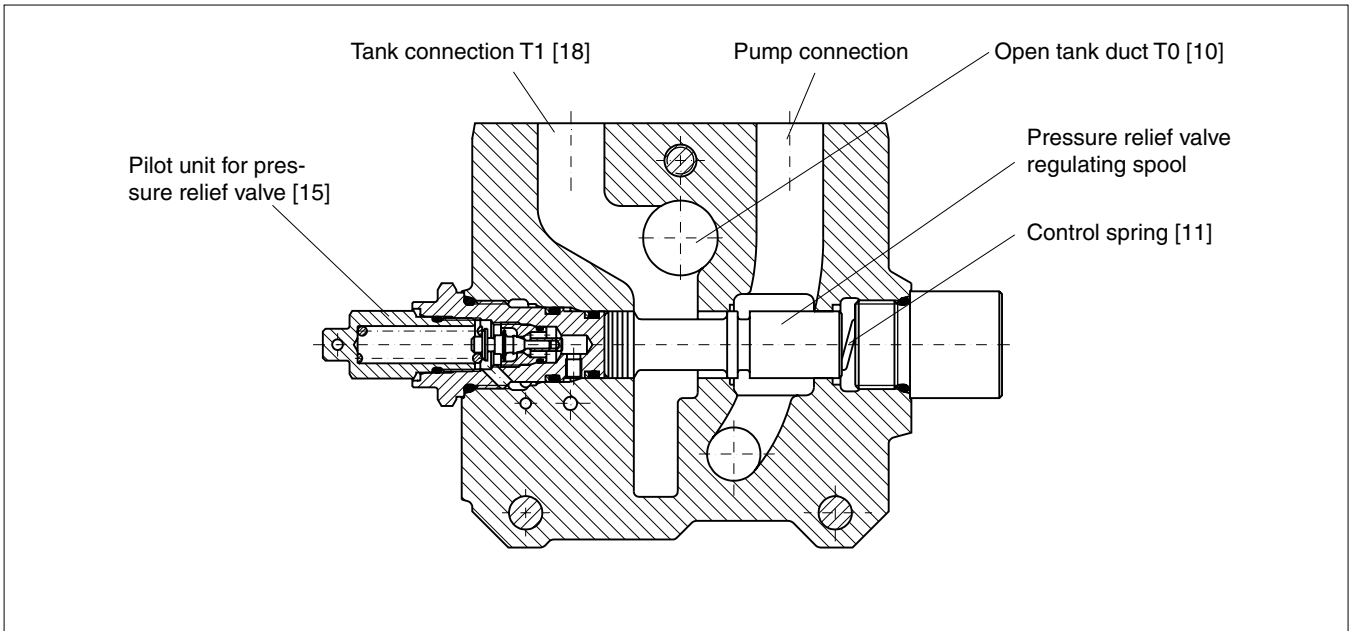
The item numbers in the hydraulic circuit diagram above and in the columns below refer to different function areas for which different options can be selected. The valve above is

equipped according to the description below. For other equipment options, please see under respective function area [item number] further on in catalogue.

Item Code	Description	Item Code	Description
1	CFC Valve configured for constant-flow system.	23	PA Spool with code "PA" fitted.
9	BF Inlet for fixed pump (CFC).	24	0.7 Spool selected for section 1 is intended to control a hydraulic cylinder with area relationship 0.7.
10	TO Open tank duct.	25	N1 Section 1 equipped with check valve to prevent undesirable sinking of load.
11	F1 Spring for 13 bar, Δp P-LS.		MR Section 2 equipped with feed reducer to limit max. pressure.
12	X Inlet section equipped with idling-unloading poppet. In the end section, the connection for the idling-signal line is plugged and the signal line connected with tank.	26	PC2 Spool actuator for proportional remote control by means of pilot pressure.
13	LD Valve equipped with pressure-compensated load-signal drainage.	28	8SM Service ports in split-flange version with metric fixing screws. Other connections in BSP pipe thread version.
15	PLS Adjustable pilot-operated pressure relief valve (controlled by pressure in load-signal line).	31	PA Section 1 service port A protected against overloading and cavitation by combined port-relief and anti-cavitation valve.
16	200 Pressure relief valve set at 200 bar.		Y2 No port-relief or anti-cavitation valve in section 2, service port A.
18	T1 Tank connection T1 open.	33	PA Section 1 service port B protected against overloading and cavitation by combined port-relief and anti-cavitation valve.
19	T2B Tank connection in end section plugged.		N2 Section 2 service port B protected against cavitation by anti-cavitation valve.
20	LSIB Load-signal connection in inlet plugged.		
21	LSUB Load-signal connection in end section plugged.		
22	DPC Section 1 equipped with double acting, hydraulically remote controlled spool for one double acting function.		
	EPCB Section 2 equipped with double-acting, hydraulically remote controlled spool. Absence of load signal (no tracer spool fitted on A-side) makes EPCB function single acting. Service port A is plugged.		



Inlet section type BF for systems with fixed pump



Inlet section type BV for systems with variable pump

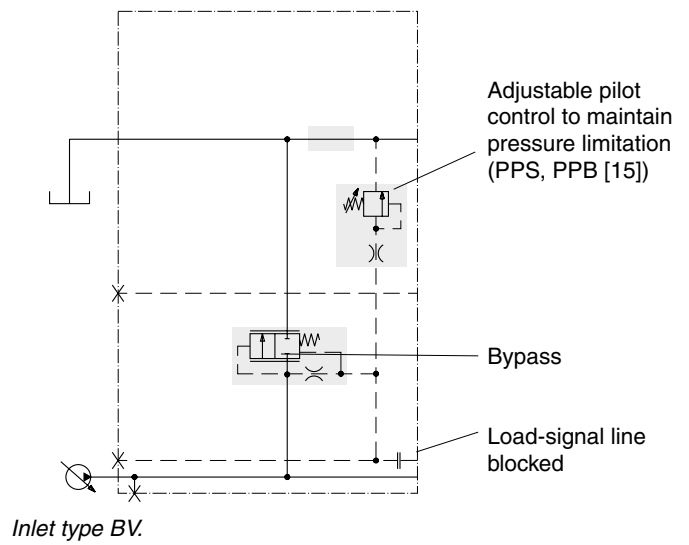
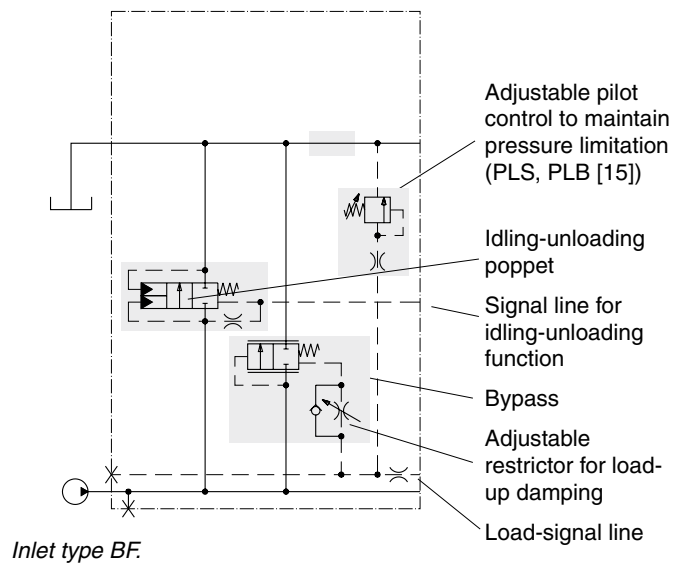
The inlet section is available in two basic versions, one for pumps with fixed displacement and one for pumps with variable displacement. Both contain an adjustable, pilot-operated pressure relief valve. The inlet for fixed pumps also contains a bypass unit that drains surplus oil to tank, as well as an idling-unloading valve that reduces the Pump-to-Tank pressure when no functions are being

used. The bypass unit incorporates an adjustable restrictor that is used to set the response time on receipt of a signal.

Type of inlet section [9]

In addition to the aforementioned functions, the inlet sections contain connections for the pump, tank and various signals. A counter pressure nipple [10] can also be fitted in the inlet section.

- BF** Inlet section for systems with fixed pump (CFC).
- BV** Inlet section for systems with variable pump (CP, LS)



Tank gallery [10]

The tank gallery in the inlet section can be equipped with a counter pressure valve to raise the pressure in the tank gallery to improve the replenishing characteristics (see items [31] and [33]). This function is particularly important in LS systems, in which the return flow should not be restricted too severely. The counter pressure valve is located in such a way that it does not raise the no-load losses in CFC systems.

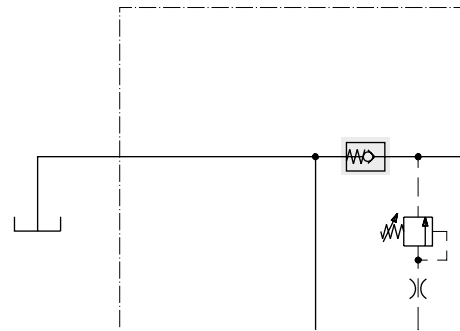
Alternatively, a plug can be fitted to separate the T1 and T2 tank connections (see "Connecting up the system" on page 8).

- PT** Counter pressure valve in tank gallery. Tank line must always be connected to T1 connection [18].
- SP** Series connection plug – used in the first valve in series connection. T1 connection [18] connected to pump connection on subsequent valve. Tank connection T2 must be open.
- T0** Open tank duct in inlet section. Normal version.

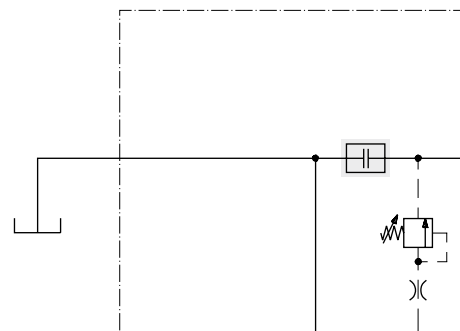
Regulating spool (bypass) [11]

In the BF type inlet section [9], the bypass function consists of two parts; a no-load poppet and a regulating spool. When all spools are in neutral, the no-load poppet is open, i.e. the flow passes to tank with a low pressure drop. As soon as a spool is actuated, the no-load poppet closes and the regulating spool comes into force. The pressure drop over the regulating spool is determined by the heaviest load plus the spring force of the bypass. This means that the pump pressure will always be a few bar higher than what the heaviest load requires. By selecting a stronger spring, the pressure differential can be increased so that more flow can be obtained from the service port.

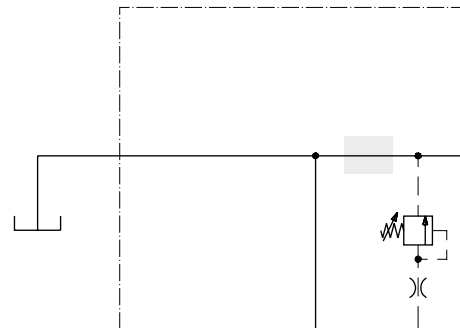
- F1** Weak spring: gives pump pressure approx. 13 bar higher than load pressure. Gives nominal flow through service port.
- F2** Strong spring: gives pump pressure approx. 19 bar higher than load pressure. Gives approx. 20% more flow through service port than F1.
- F3** Extra strong spring: gives pump pressure approx. 25 bar higher than load pressure. Gives approx. 40% more flow through service port than F1.
- F0** Without spring (normally not used).



PT – Counter pressure valve in tank gallery.



SP – Series-connection plug in tank gallery.



T0 – Open tank duct.

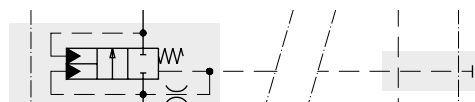
Inlet Section

HV08

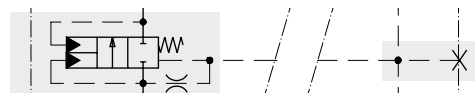
No-load signal [12]

When more than one valve is connected in parallel in CFC systems, the idling-unloading signal must be transmitted between the different valves. See "Connecting up the system" on page 8.

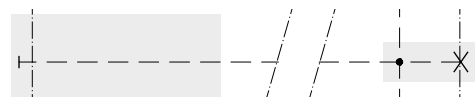
- L** No-load poppet in inlet section. Nipple for parallel connection fitted in end section. BF inlet only [9].
- X** No-load poppet in inlet section. Signal line connected with tank in end section. BF inlet only [9]. Normal version.
- AO** Signal connection in inlet open. In end section, signal line is connected with tank. BV inlet only [9]. Normal version.
- AB** Signal connection in inlet plugged. In end section, signal line is connected with tank. BV inlet only [9].
- LA** Signal connection in inlet open. Parallel connection nipple fitted in end section.



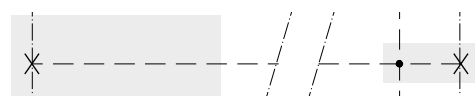
L – No-load poppet in inlet section. Nipple for parallel connection in end section.



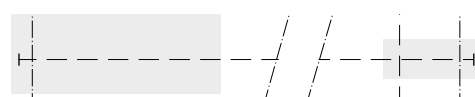
X – No-load poppet in inlet section. Signal line connected with tank in end section.



AO – Signal line open in inlet section and connected with tank in end section.



AB – Signal line plugged in inlet section and connected with tank in end section.



LA – Signal line open in inlet section. Nipple for parallel connection fitted in end section.

Pressure relief valve [15 – 17]

The pressure relief valve is pilot operated, which gives it an excellent pressure characteristic. A small, adjustable, direct-acting pressure limiter pilot-controls the regulating spool [11]. The pilot flow is taken from either the pump line or the load-signal line. In systems in which it is possible to take the pilot pressure from the load signal, this option is recommended, since the pressure limiter cuts pressure peaks that are greater than the spring force of the regulating spool [11], regardless of the pump pressure. This gives more gentle regulation.

Pressure relief valve [15]

- PLS** Adjustable, pilot-operated pressure relief valve. Controlled by pressure in load-signal line.
- PLB** Adjustable, sealed, pilot-operated pressure relief valve. Controlled by pressure in load-signal line.
- PPS** Adjustable, pilot-operated pressure relief valve. Controlled by pressure in pump line.
- PPB** Adjustable, sealed, pilot-operated pressure relief valve. Controlled by pressure in pump line.
- Y1** Without pressure relief valve.

Pressure setting [16]

State the pressure at which you wish the pressure relief valve to be set.

- Max. 250 bar for gray-iron version of valve.
- Max. 320 bar for nodular-iron version of valve.

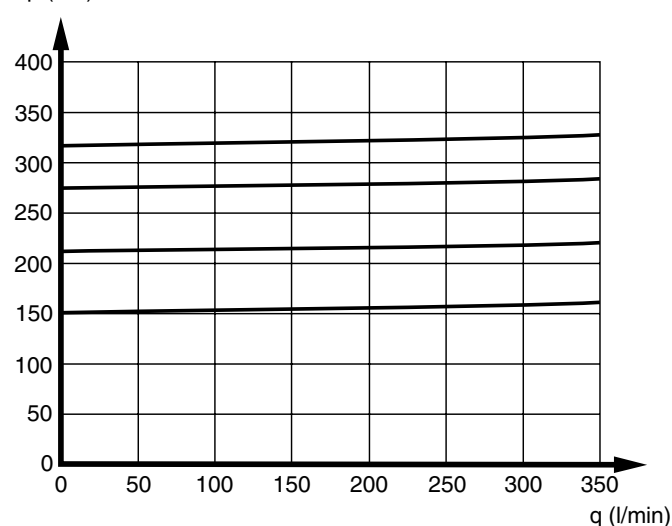
Tank connection T1 [18]

- T1** Tank connection T1 open. Normal version.
- T1B** Tank connection T1 plugged.

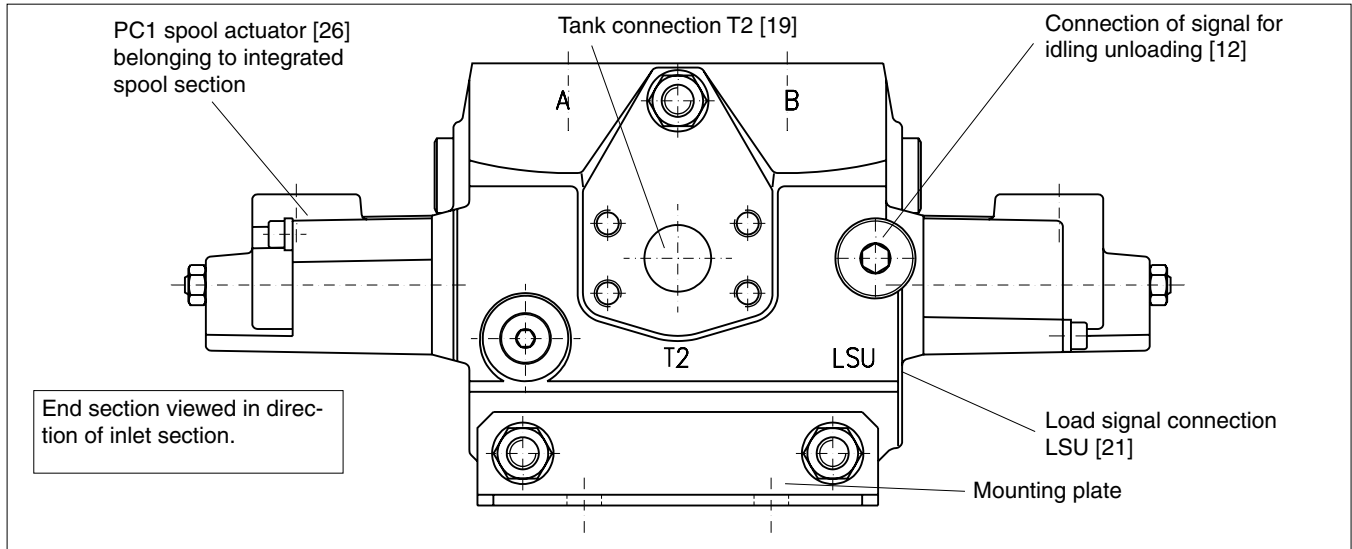
Load-signal connection LSI [20]

- LSI** Load-signal connection in inlet open. Only in case of series connection in LS systems.
- LSIB** Load-signal connection in inlet plugged. Normal version.

Δp (bar) Pressure relief characteristic



End Section



Load-signal system [13]

The load-signal system consists of one tracer spool (load-sensing spool) per service port. The tracer spool also functions as a shuttle valve. It copies the load pressure, and the dominating signal is directed to the LSU connection [21] in the end section. See also diagram on page 8.

In the CFC version, the load signal goes to the bypass, which regulates the pressure in the pressure gallery to approx. 13, 19 or 25 bar above the load-signal pressure, depending on the choice of bypass spring - [11] page 14.

The load pressures from service ports A and B are directed to their respective tracer spools. If a single-acting spool function is required (EA or EB at item [22]), one of the tracer spools is removed. See diagram page 11.

The system permits a certain consumption in the load-signal line to the pump without affecting the load-signal level. This permits simpler system construction and the possibility of installing logic systems in the LS circuit. In the case of draining in the pump's LS regulator, the system has better operating characteristics in winter, with quicker response times, since the oil in the LS circuit is always warm. Moreover, the system prevents disruptive micro-sinking of the load at the beginning of the lifting phase, since the signal oil is taken from the pump instead of the load. Since the tracer spools are two-way, it is necessary for the load signal to be "leaked off" continuously for the pump to be able to regulate when the load-signal pressure falls.

- LD** Pressure compensated load-signal drainage (gives approx. 1 l/min)
- LB** Blocked load-signal drainage.
- LX** Load-signal duct open to tank. Used in constant-pressure systems (CP/CPU).

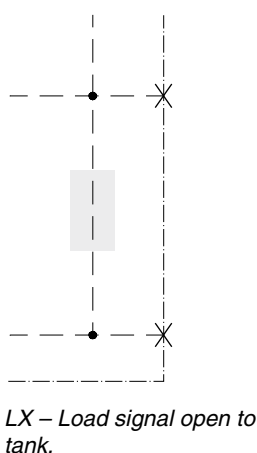
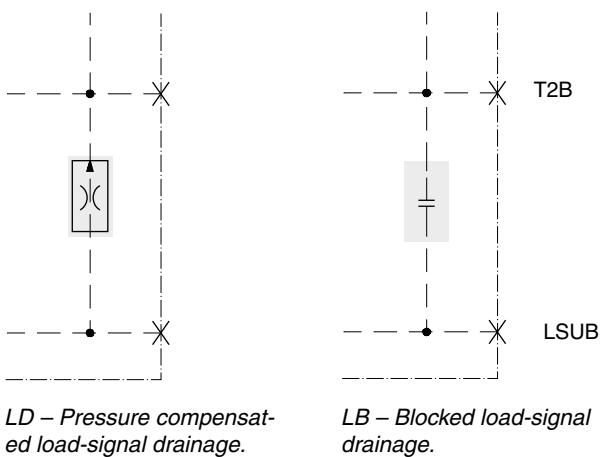
Tank connection T2 [19]

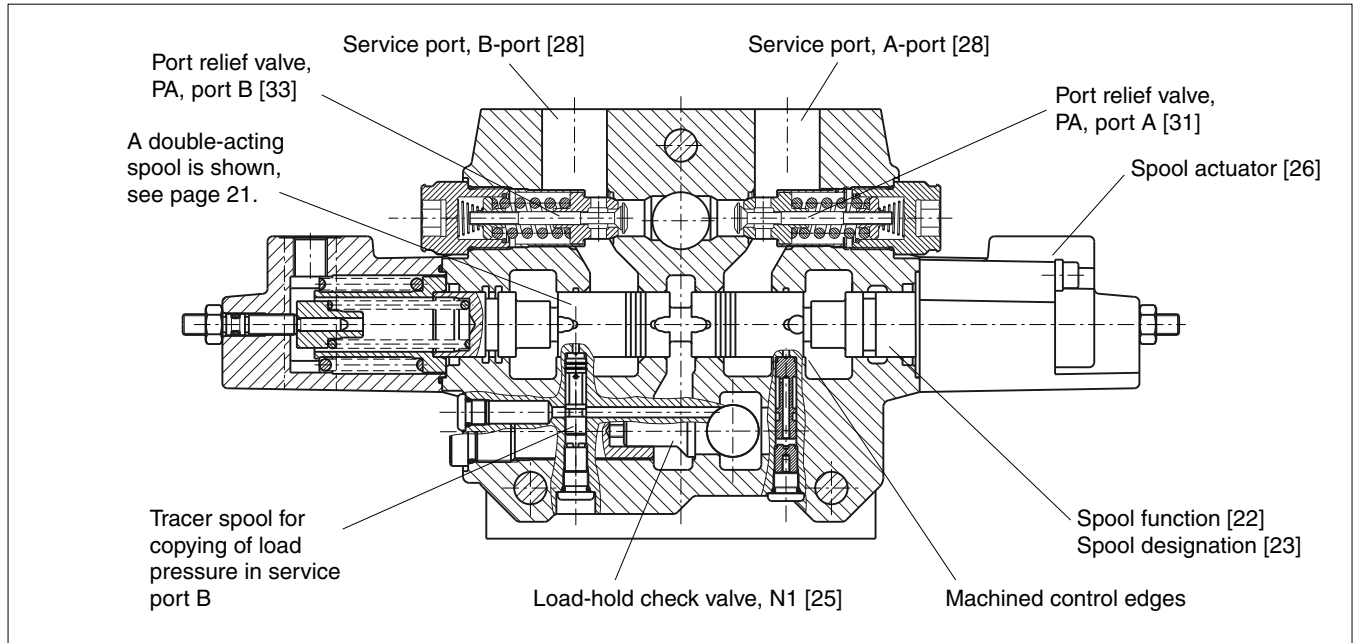
- T2** Tank connection T2 open. Normal version.
- T2B** Tank connection T2 plugged.

Load-signal connection LSU [21]

- LSU** LS connection in end section open.
- LSUB** LS connection in end section plugged.

The end section on the HV08 is integrated with a spool section. In addition to the functions of the spool section (see under "Spool section"), the end section contains load-signal drainage and connections for the tank, idling unloading and load signal.





The HV08 is stackable and can be supplied with 1-6 spool sections. Each spool section can be equipped individually with many different optional functions, spools and spool actuators, so that it can be customized optimally for the application and controlled function.

Spool sections come in two basic versions:

- single spool section for one spool
- single spool section combined with end section.

Spool sections are available in two different materials: gray iron for a max. pump pressure of 250 bar, or nodular iron for a max. pump pressure of 320 bar. To further assist machine builders, three different types of connection are available for the service ports in the HV08: two split-flange options (with different fixing screws) and a BSP pipe thread option.

Connections [28]

See also page 10.

- 8SM** Service ports with 1" split-flange connections for M10 fixing screws. Other connections: G1/4.
- 8SU** Service ports with 1" split-flange connections for 3/8-16 UNC fixing screws. Other connections: 9/16-18 UNF-2B.
- 8R** Service ports with G1 threads. Other connections: G1/4.

Spool actuators [26]

There are a number of different spool actuators for the HV08. They are divided into three groups: hand-operated, ON/OFF remote controlled and proportionally remote controlled.

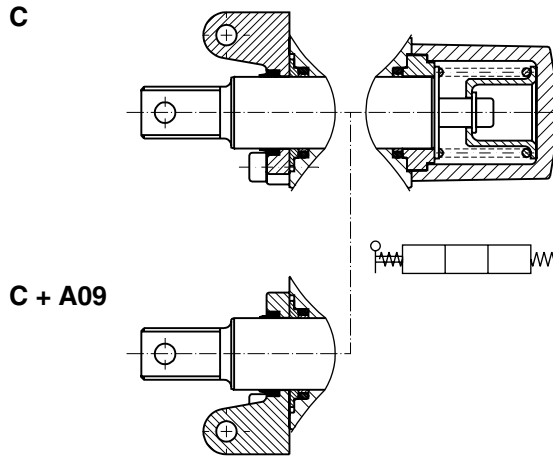
Hand-operated spool actuator with open spool end

- C** Spring-centred spool actuator.
Steplessly operated spool actuator with spring-return to neutral.

Lever bracket for spool actuators with open spool end and facility for operation by hand

- A09** All spool actuators with open spool end come with a lever bracket. The bracket is fitted in such a way that, when the operator pulls the lever toward him, the connection pump-to-service port A is opened. With the A09 option, however, the lever bracket is fitted upside down, so that the connection pump-to-service port B is opened when the operator pulls the lever toward him. Note! The motor spools have reversed function, see page 21. If the standard and A09 bracket options are used on the same valve, the levers will be of different heights. For this reason, such a combination is not recommended.

(Please see page 24 for details of the levers themselves.)



ON/OFF remote controlled spool actuators with facility for operation by hand

AC2 Pneumatically remote-controlled ON/OFF spool actuator.

The AC2 is a pneumatically controlled ON/OFF spool actuator with spring centring and the possibility of local stepless control by means of a hand lever (optional).

Control pressure: min. 4 bar
 max. 10 bar.

Connection thread: G1/8 or NPTF 1/8-27

ACE2 Electro-pneumatically remote-controlled ON/OFF spool actuator.

The ACE2 is an electro-pneumatically controlled ON/OFF spool actuator with spring centring and the possibility of local stepless control by means of a hand lever (optional).

Primary air: 4-10 bar
 Control current: (12 VDC) min. 0.85 A
 (24 VDC) min. 0.42 A

Voltage tolerance: ±20%

Connection thread: G1/8 or NPTF 1/8-27

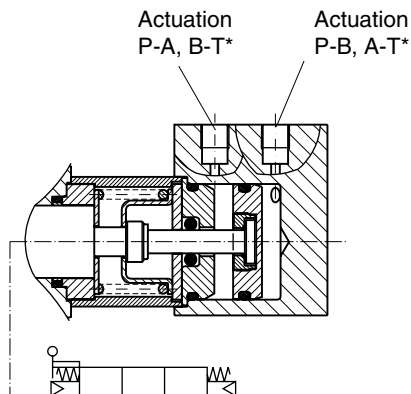
ACE2F Electro-pneumatically remote-controlled ON/OFF spool actuator.

The ACE2F is identical to the ACE2 except that it has a common pressure gallery for primary air. The primary air can be connected to either the last or the first valve section that is equipped with an ACE2F spool actuator.

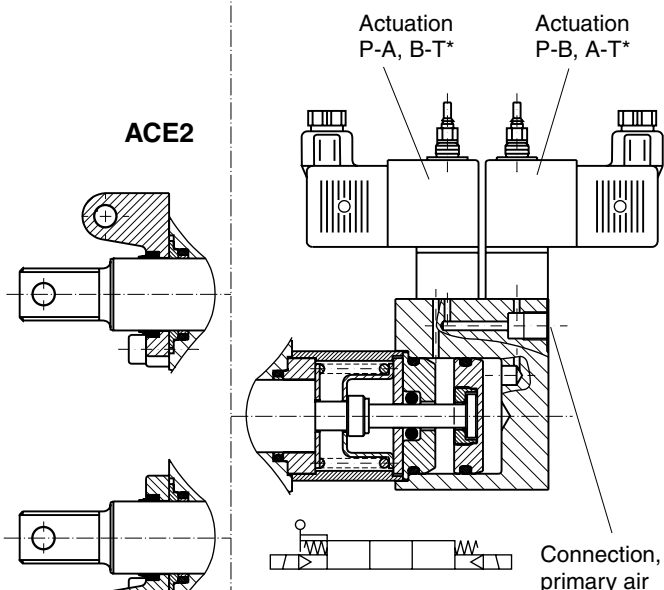
Connection thread: G1/8 or NPTF 1/8-27.

* Note! The motor spools have reversed function, see page 21.

AC2

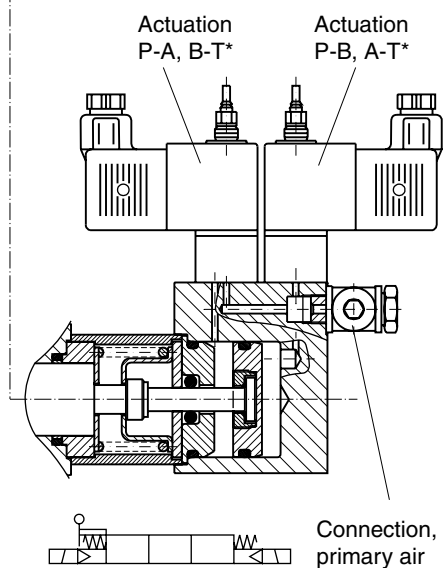


ACE2



**ACE2/ACE2F
 +A09**

ACE2F



Remote controlled, proportional spool actuators with closed spool end

PC1 Hydraulic proportional spool actuator.
PC2 The PC1 and PC2 are hydraulically, proportionally controlled, spring-centred spool actuators. The PC1 is used for flows up to 100 l/min through the service port. For flows greater than this, the PC2 is used. The PC1 and PC2 are best controlled by the Parker PCL4 remote control valve (see separate brochure).

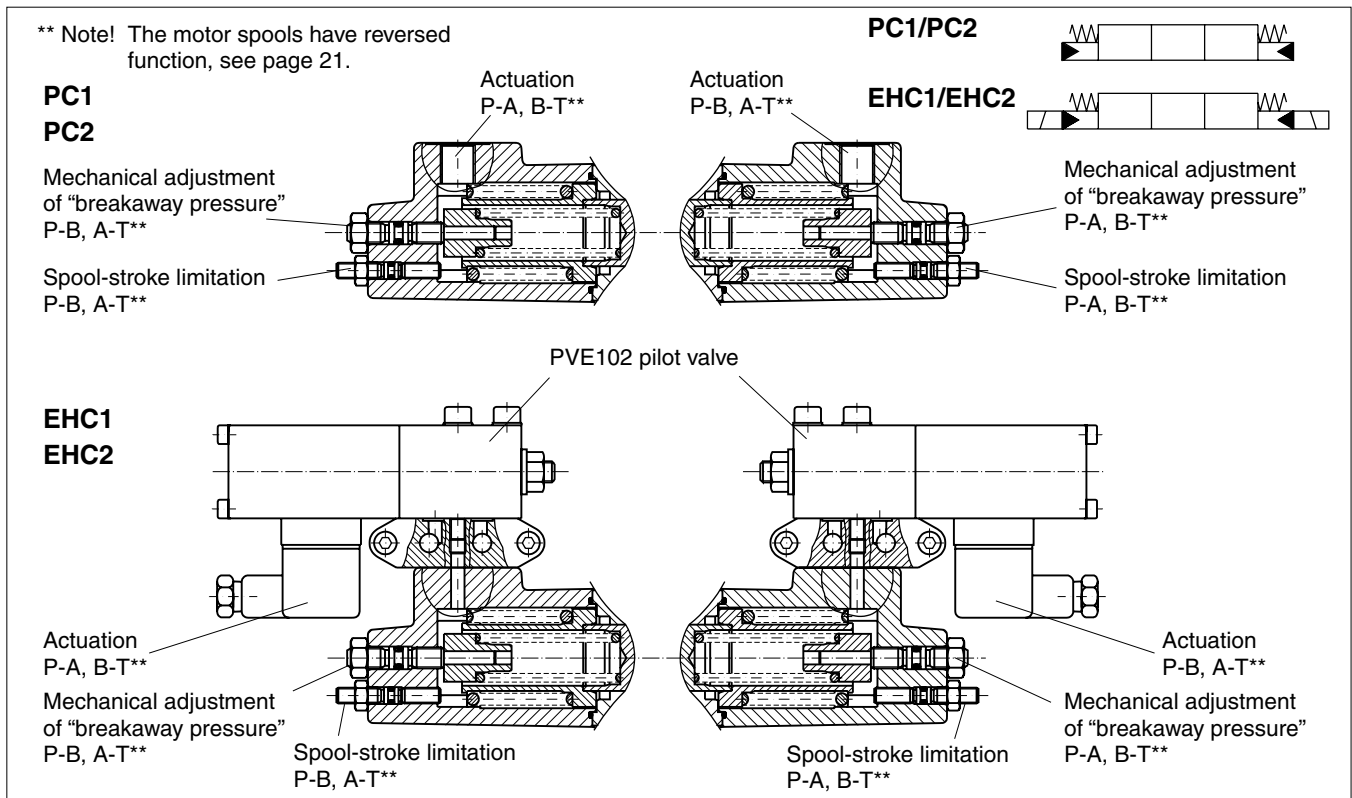
	PC1	PC2
Breakaway pressure:*	5 bar	5 bar
Final pressure:*	15 bar (max. 35 bar)	25 bar (max. 35 bar)
Connection thread:	G1/4 or 9/16-18 UNF-2B.	

PC1+ Indicates that PC1 or PC2 has been equipped with adjustment screw for stepless limitation of spool stroke length.
A13
PC2+
A13

* The breakaway pressure and breakaway current refer to the pressure/current needed for the directional valve to open the connection "service-port to tank".
 The final pressure and final current are the lowest pressure/current needed to effect full actuation of a spool in the directional valve.
 This data must be taken into consideration when choosing pilot valves, since the opening pressure/current of the pilot valve must be lower than the breakaway pressure/current of the spool actuator in order to avoid jerky starting and stopping.
 Moreover, the pilot valve's final pressure/current must be higher than the final pressure/current of the directional valve to ensure that the directional valve can be fully actuated.

EHC1 Electro-hydraulic proportional spool actuator.
EHC2 The EHC1 and EHC2 are electro-hydraulically, proportionally controlled, spring-centred spool actuators. The EHC1 is used for flows up to 100 l/min through the service port. For flows greater than this, the EHC2 is used. The EHC1 and EHC2 are best controlled by means of a Parker electric remote-control system (see separate brochure). The Parker PVE102 is used as a pilot valve.

	EHC1	EHC2
Voltage:	12 V	12 V
Breakaway current:*	max. 360 mA	max. 360 mA
Final current:*	min. 700 mA	min. 1050 mA
Pump pressure:	max. 35 bar	max. 35 bar
Tank pressure:	max. 15 bar	max. 15 bar
Solenoid (PVE102):	max. 1250 mA 100% ED	max. 1250 mA 100% ED
Coil resistance at +20 °C:	7.2 ohms	7.2 ohms
Inductance:	10 mH	10 mH
Voltage:	24 V	24 V
Breakaway current:*	max. 220 mA	max. 220 mA
Final current:*	min. 400 mA	min. 600 mA
Pump pressure:	max. 35 bar	max. 35 bar
Tank pressure:	max. 15 bar	max. 15 bar
Solenoid (PVE102):	max. 680 mA 100% ED	max. 680 mA 100% ED
Coil resistance at +20 °C:	24.6 ohms	24.6 ohms
Inductance:	32 mH	32 mH
Connection thread:	G1/4 or 9/16-18 UNF-2B.	



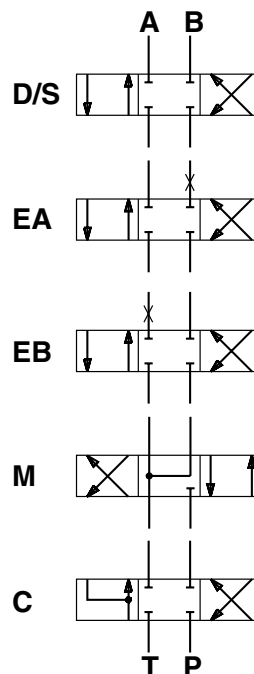
Choice of Spool

The spool is the most important link between the actions of the operator and the movement of the controlled function. Parker Hydraulics therefore goes to great lengths to optimize spools for different flows, load conditions, functions and applications. Since this is a continuous development process, new spools are being introduced all the time. For this reason, the many different spools available are not detailed in this catalogue. For assistance with the choice of spool therefore, please contact your nearest Parker representative.

Spool function [22]

Spools are divided into different groups, depending on their basic function.

- D** Double-acting spool for, e.g. double-acting cylinder. Blocked in the neutral position.
- EA** Single-acting spool for, e.g. single-acting cylinder. Blocked in the neutral position. Service port and tracer spool B blocked. See diagram page 11.
- EB** Single-acting spool for, e.g. single-acting cylinder. Blocked in the neutral position. Service port and tracer spool A blocked. See diagram page 11.
- M** Double-acting spool for, e.g. hydraulic motor. Service ports connected with tank (float position) in neutral. Note! The reversed flow direction at actuation compared to the other spool types.
- S** Double-acting spool for double-acting function. S spools are specially designed to handle light-load functions such as swing, slew, rotate, etc.
- C** Regenerative spool for rapid feeding of a cylinder, or for flow saving.



In addition to division into groups according to function, spools are grouped according to whether the spool end is open or closed. Spools with closed spool end are used for the PC1, PC2, EHC1 and EHC2 spool actuators and have the letters PC as a suffix to the spool designation. The following "PC-function spools" are available: DPC, EPCA, EPCB, MPC, SPC and CPC. Other spool actuators have spools with open spool end.

Spools with closed spool end are designed in such a way that the flow forces can be exploited to pressure-compensate the spool, i.e. when the load pressure or pump pressure changes, the flow to the service port remains almost unaffected. See page 6 for more information.

Spool designation [23]

Each spool has an imprinted letter code to facilitate identification during tuning or servicing in the field.

Area relationship (cap) [24]

The area relationship, κ , for the section in question is calculated by dividing the cylinder area connected to service port B by the cylinder area connected to service port A. The spools for the HV08 are reversible and are installed in the valve according to the way in which the cylinder (the consumer) is connected to the valve. The value in [24] therefore determines the direction in which the spool is to be installed. When the large 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.

$$\kappa = \frac{\text{Cylinder area, B-port}}{\text{Cylinder area, A-port}}$$

Spool Section

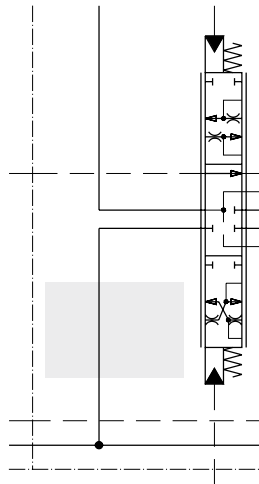
Options in the spool sections

Accessories in the pressure gallery [25]

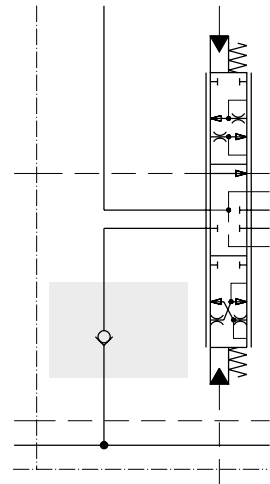
The spool-section pressure gallery can be fitted with different accessories to give the best system construction.

- O** Without load-hold check valve.
- N1** Load-hold check valve to prevent undesirable load sinking. Normal version.
- MR** Common feed reducer for service ports A and B fitted and factory-set at the desired pressure (from 20-220 bar at a flow of 10 l/min). The reduced pressure is practically independent of variations in either the primary pressure or the flow take-off. MR contains a load-hold function. MR limits the flow capacity of the spool to approx. 85% of the stated flow.

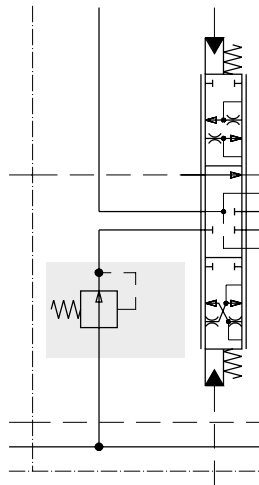
Feed reducers are used to limit the pressure from the valve when the section's maximum pressure is below that of the main pressure relief valve, e.g. in the case of a clamping function. By using MR as a pressure limiter, energy losses can be kept down, since MR uses a pilot flow only. The pressure setting should be chosen so that it is as close as possible to the setting of the port relief valve, but at least 20 bar lower.
- PR** A prioritizing function that governs the section in the event of excessive flow take-off. It does this by limiting or stopping the flow to the spool section in which it is fitted.



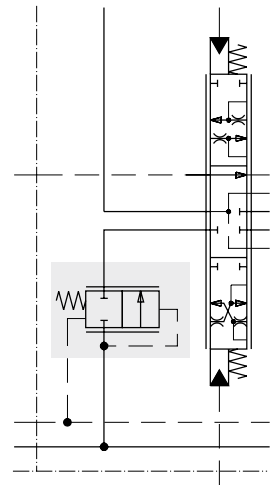
O - Pressure gallery open.



N1 - Check valve in pressure gallery.

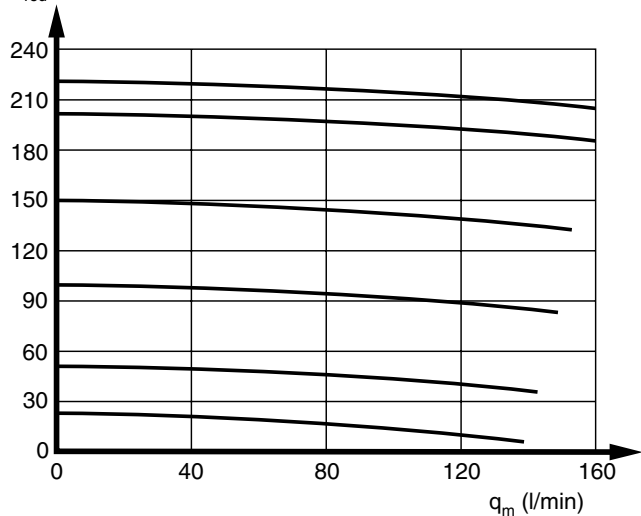


MR - Feed reducer in pressure gallery.



PR - Prioritizing valve in pressure gallery.

P_{red} (bar) Feed reducers for service ports A and B



P_{red} = reduced pressure in service port
 q_m = flow through service port

Pressure limiters in the service ports

(port relief valves) [31]-[34]

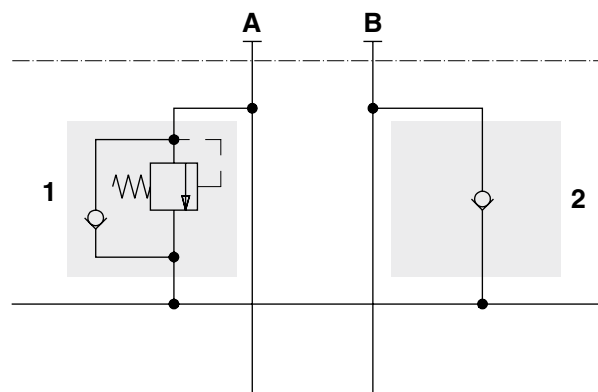
A specially designed cartridge valve is used as a port relief and anti-cavitation valve, PA, in the service ports. Its function is to protect the valve and consumer from pressure peaks and excessive pressure in the system. The very rapid opening sequence and good pressure characteristics make the cartridge valve an excellent port relief valve. The anti-cavitation valve causes oil to flow from the tank gallery to the service port side in the event of under-pressure in the service ports.

Port relief valve [31] and [33]

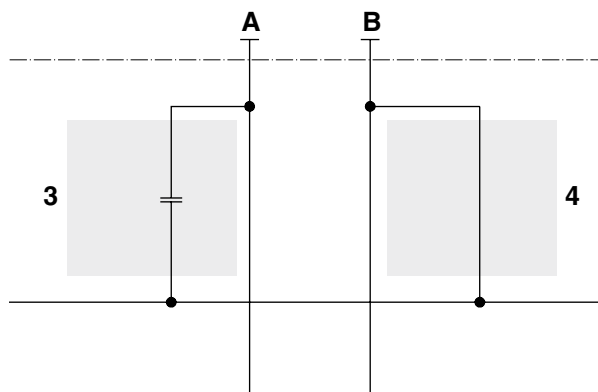
- X2** No port relief valve fitted. Service port connected to valve's tank gallery.
- Y2** No port-relief or anti-cavitation valve fitted. Connection between service port and tank gallery blocked.
- PA** Combined port-relief and anti-cavitation valve PLC182 fitted. Valve is factory-set.
- N2** Anti-cavitation valve only fitted.

Pressure settings [32] + [34]

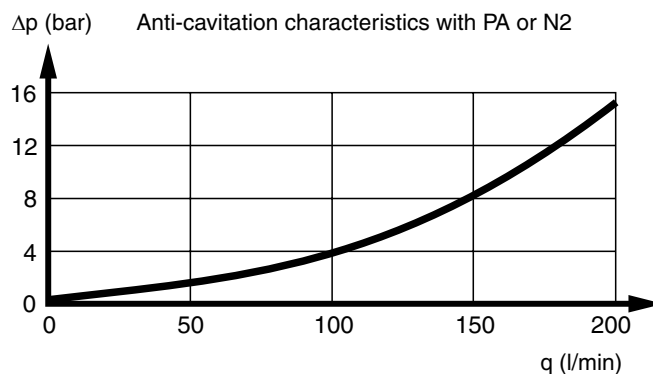
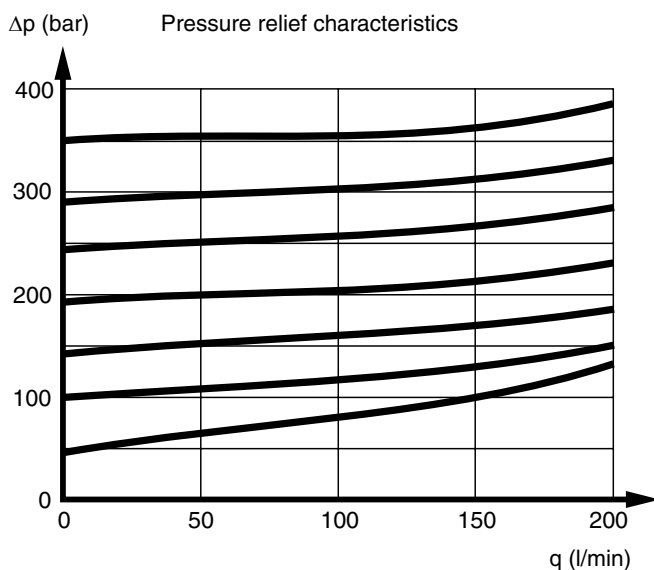
Max. 280 bar for valves of gray iron (G at item [8]).
 Max. 350 bar for valves of nodular iron (S at item [8]).
 Optional standard settings:
 40, 50, 63, 80, 100, 125, 140, 160, 175, 190, 210, 230, 250, 280, 300, 330 and 350 bar.



In the diagram above, service port A is equipped with a combined port-relief and anti-cavitation valve PA (1) to limit the pressure and prevent cavitation. Service port B is fitted with an anti-cavitation valve N2 (2) to prevent cavitation.



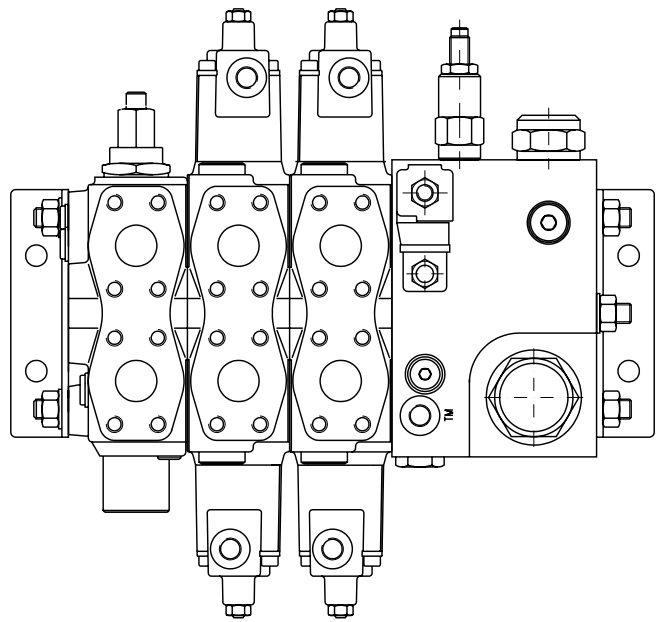
In the diagram above, the connection between service port A and the tank is plugged, Y2 (3). This solution is used for spools with a single-acting function and in other cases when a connection between the service port and tank is not required. Service port B is open to tank continuously, X2 (4).



Function blocks

Function blocks (manifolds) can be flanged to the HV08 to enable total system solutions to be integrated into the valve. In addition to the standard units available, our experienced product and system designers can tailor function blocks to meet your needs exactly. For more information about total system solutions, please contact your local Parker representative.

The example opposite shows a specially customized function block mounted to a two-section valve in place of the end section. Like most Parker function blocks, it was constructed using cartridge valves, i.e. only the housing is a unique component.

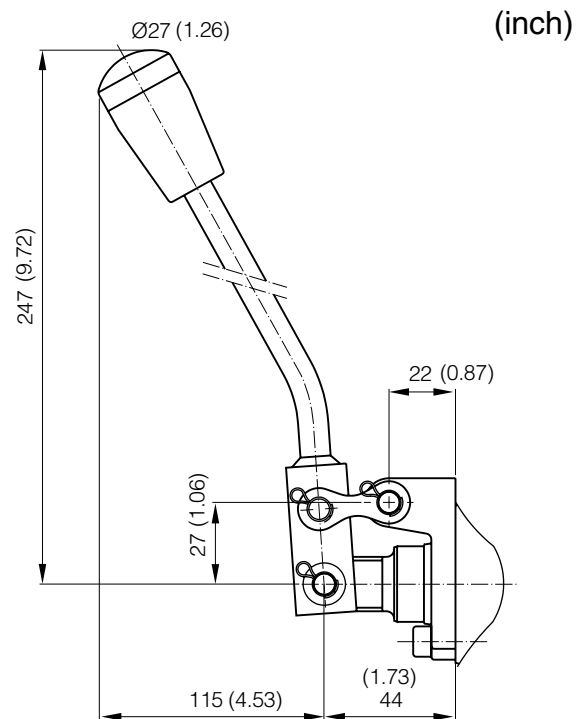


Levers

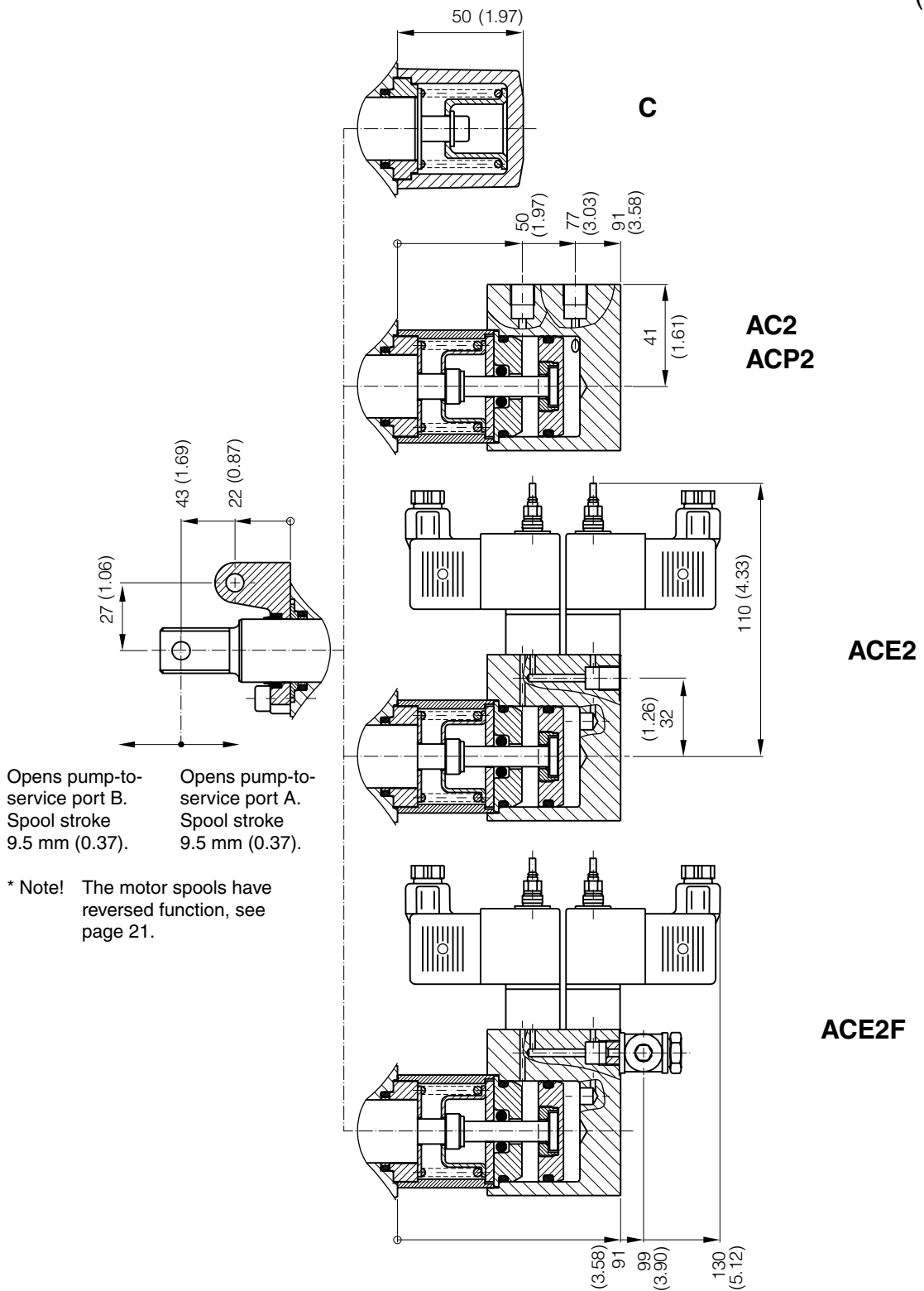
Levers are not supplied with the valve and must be ordered separately. The standard levers for HV08 valves are of steel, which is surface treated to give resistance to corrosion. Lever knobs are of black plastic, with a window under which a function symbol can be inserted to illustrate the function of the lever. Levers are supplied complete with pin kits for mounting to the directional valve.

Lever:
M8 (Window knob)

Ordering No.
9126 1757 01

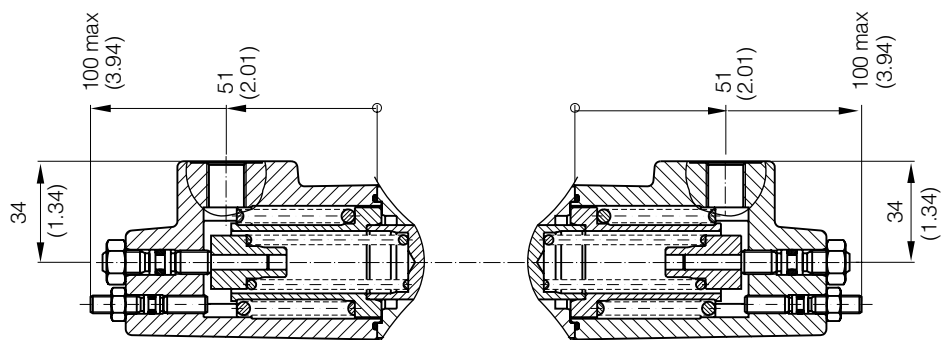


(inch)

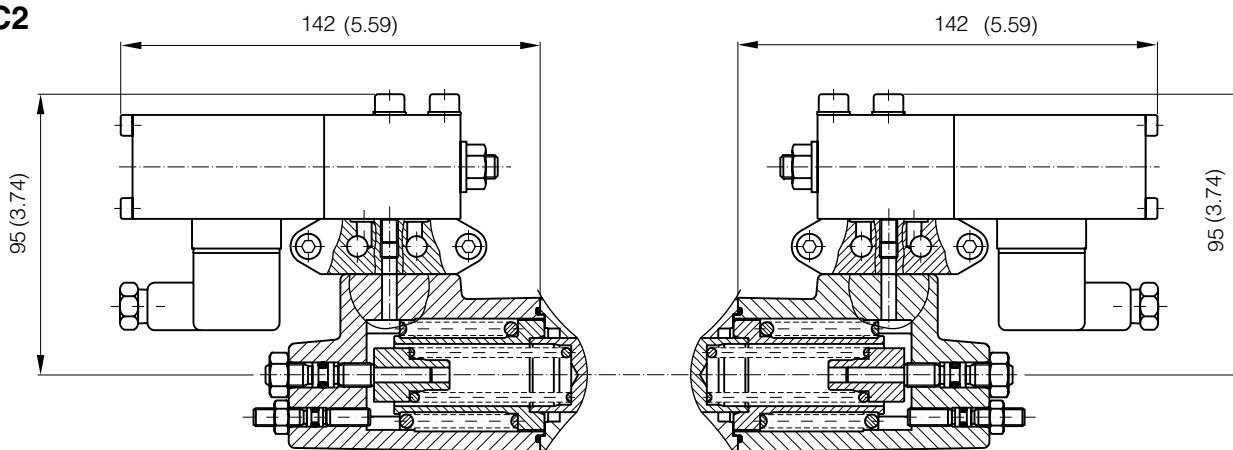


(inch)

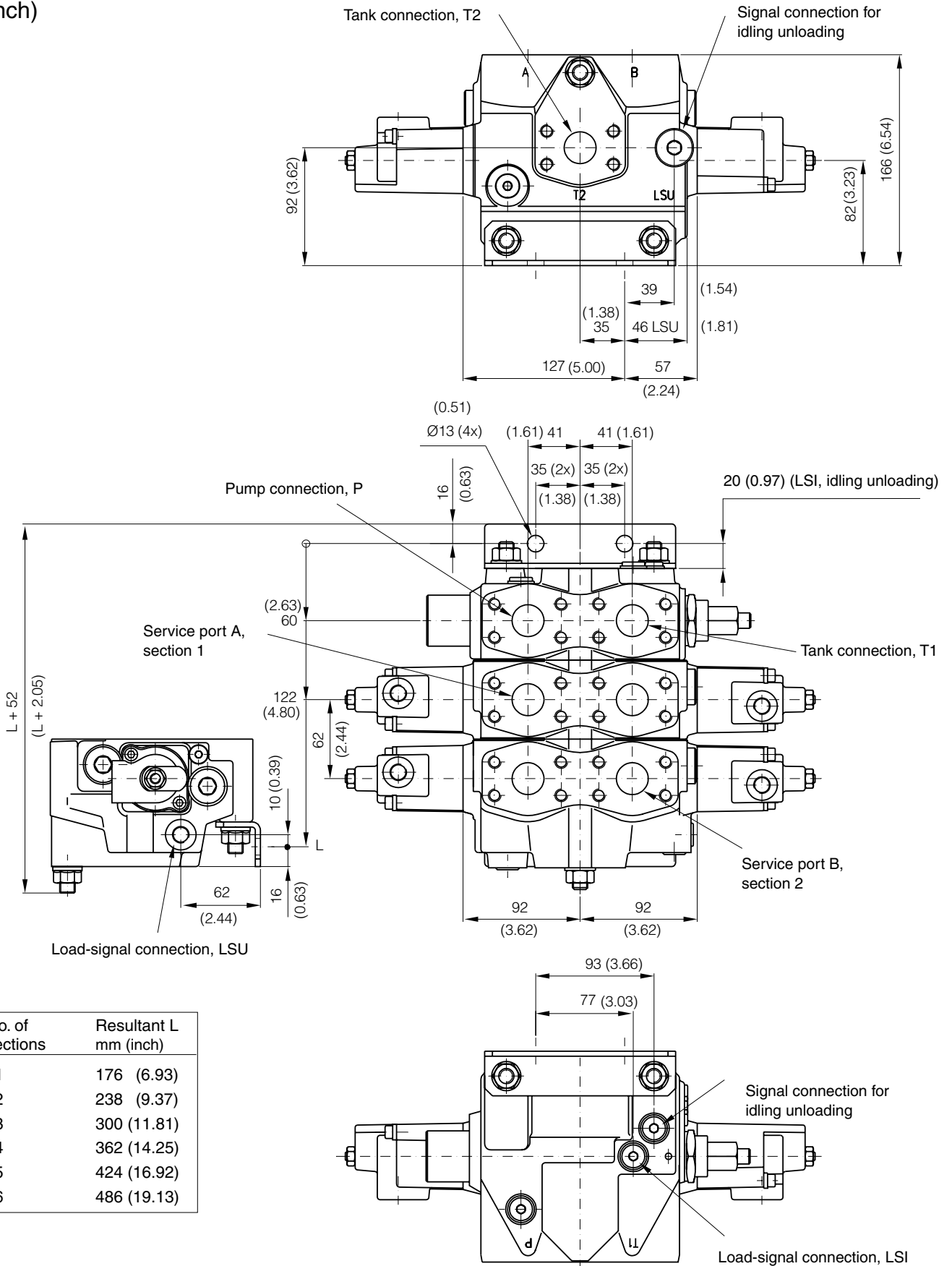
**PC1
PC2**



**EHC1
EHC2**



(inch)



No. of sections	Resultant L mm (inch)
1	176 (6.93)
2	238 (9.37)
3	300 (11.81)
4	362 (14.25)
5	424 (16.92)
6	486 (19.13)

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