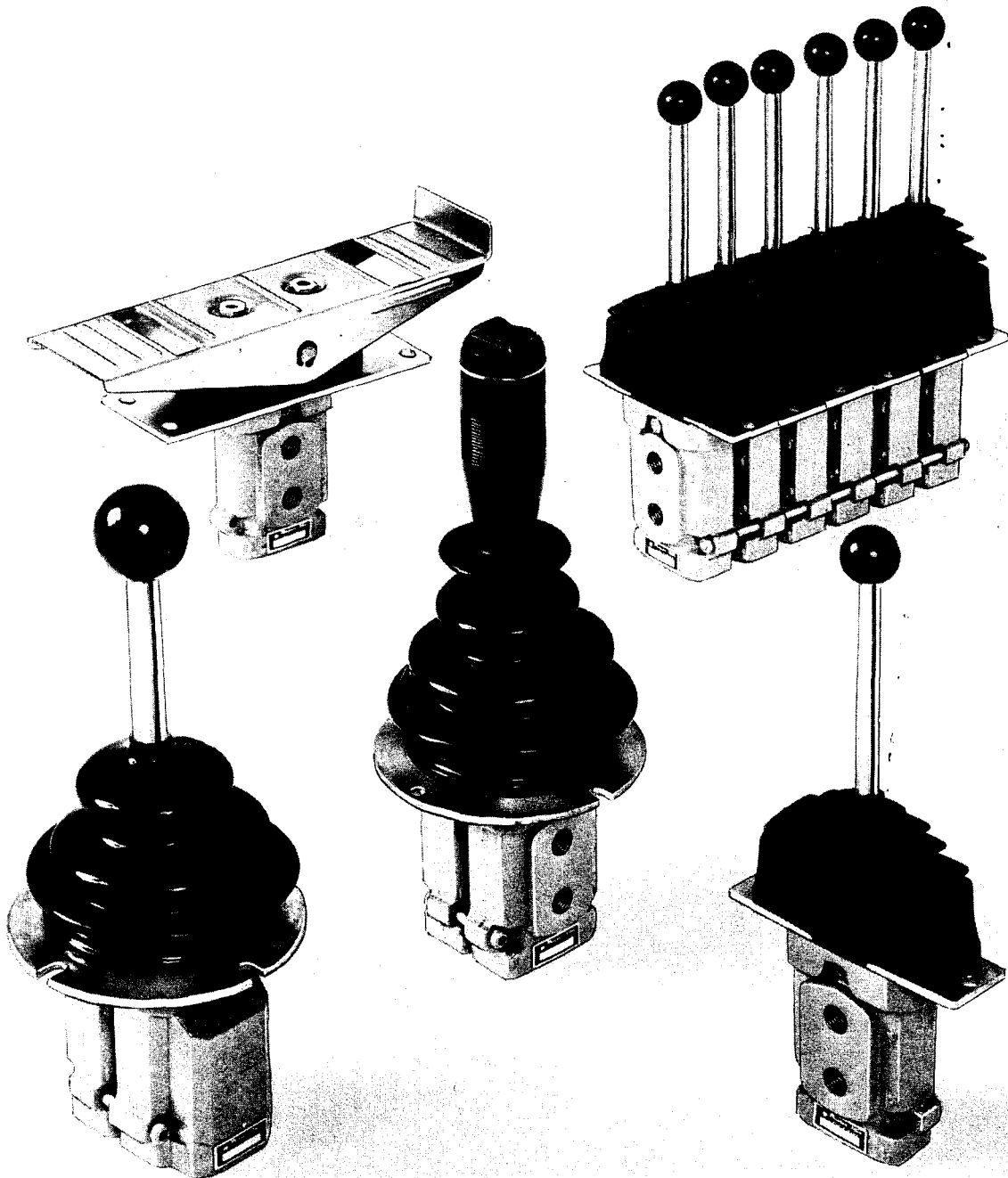


PCL 4

Hydraulic
Remote control valve



Monsun-Tijon



General

The PCL 4 series is a series of hand or foot operated pilot pressure valves intended for hydraulic remote control of directional valves, variable displacement pumps, servo cylinders etc.

The valves have been designed for many different applications, both mobile and industrial, for example, front end loaders, cranes, backhoe loader, forestry and excavating machinery.

With its high degree of versatility and wide programme of standard accessories, the PCL 4 has been designed to make it possible for the user to optimize the system within the following areas:

- Freedom of option in locating components
- Ease of mounting and testing
- Excellent operating and manoeuvre properties
- Pleasant working environment for the operator

Design and Function

The valve is constructed from sections with two pressure reducing valves in each section. The sections may be used as single functions, be integrated to form double housings for coordinate operation or be stacked to the desired number for multi-lever operation.

The valve body which is of cast iron contains two pressure reducing valves. The hardened and precision-ground spools guarantee a high degree of wear resistance and minimum internal leakage.

Special low-friction plunger seals of nitrile rubber provide effective protection against external leakage. The valve is designed to give minimum hysteresis and excellent manoeuvre properties.

The hand levers are made of steel with an anticorrosive surface treatment and are provided with plastic handles of various designs. The pedal is manufactured from pressed steel plate with an corrosion-protective coating.

The PCL 4 series is available in different combinations of the following features:

- ☐ Lever operated, for one double-acting function
- ☐ Coordinate lever operated for two double-acting functions
- ☐ Multi-lever operated, for a desired number of double-acting functions
- ☐ Pedal operated for one double-acting function
- ☐ Ball-type lever handle
- ☐ Two-position electric switch handle
- ☐ Three-position electric switch handle
- ☐ Mechanical or electro-magnetic lever detents
- ☐ Continuous lever detents
- ☐ Straight line curves
- ☐ Broken line curves
- ☐ Optional starting and final pressure
- ☐ Optional lever actuation forces

The above features, in combination with a wide control pressure range, render the PCL 4 remote control valve suitable for a number of different applications, since it may be adapted to control practically every available type of main valve or pump regulator on the market.

The valve is provided with BSP 1/4" alternatively 9/16" - 18 UNF ports and can be supplied with all connections in the bottom plane or alternatively the pump and tank connections in the side plane.

The PCL 4 has the same mounting dimensions as the HVP03 and corresponding control units in the EHC 35 system.

Advantages

The PCL 4 has low, well-adapted control forces and short stroke lengths for both levers and pedals. Control systems with the PCL 4 provide excellent operating properties with smooth, proportional control. The PCL 4 may be adapted for any field of application, thanks to its available freedom of choice within a large controlling pressure range and the possibility of selecting straight line or broken line curves.

Different lever actuation forces with individual force for each lever direction are obtainable, making it possible to design the machine operator's workplace in accordance with ergonomic principles, for example, with the manipulators mounted in the armrests the machine can be operated by wrist- or finger movements, while the operator comfortably is seated in an upright position with ample support for the whole body. This armrest arrangement also reduces the mechanical feedback from a vibrating machine to its control system.

Designation

There are three basic models of the PCL 4. Each one of these is available in a large number of different design.

PCL 401 Coordinate lever for control of two double-acting functions

PCL 402 Linear lever for control of one double-acting function
May be stacked for control of up to six double-acting functions

PCL 404 Foot pedal for control of one double-acting function

When ordering, please contact Monsun-Tison for specification and confirmation of order number.

Technical data

| | |
|---------------------------------|---------------------------------|
| Input pressure, max. | 100 bar (1450 psi) |
| Control pressure range | 1-65 bar (15-950 psi) |
| Recommended input pressure | p_c max plus 15 bar |
| Return line pressure, max. | 3 bar (45 psi) |
| Control flow, max. | 15 l/min. (4 US gal.) |
| Oil temperature range | -20 °C to +70 °C |
| Ambient temperature range | -40 °C to +60 °C |
| Hysteresis, max. | 0.5 bar (7 psi) |
| Viscosity range | 10-380 mm ² /s (cSt) |
| Filtration | 10 µm nom. |
| Leakage* | 20 cm ³ /min. spool |
| Angular stroke, joy stick lever | ± 17° |
| Angular stroke, linear lever | ± 23.5° |
| Angular stroke, pedal | ± 10° |

| | |
|--|-----------------|
| Weight, | |
| Linear lever | 1.6 kg (3.5 lb) |
| Joy-stick | 3.4 kg (7.5 lb) |
| Footpedal | 4.5 kg (9.9 lb) |
| Addition for valve with pump and tank ports in bottom plane | 0.4 kg (0.9 lb) |

*At 50 °C, 30 cSt and 40 bar input pressure.

Lever forces

Normal joy stick lever torque with two directions of movement:

| | |
|---|--------|
| One function fully actuated at 30 bar* | 3.0 Nm |
| Two functions fully actuated at 30 bar* | 4.2 Nm |

Normal linear lever torque

| | |
|---------------------------|--------|
| fully actuated at 30 bar* | 2.7 Nm |
|---------------------------|--------|

Normal pedal torque fully actuated at 30 bar*

| |
|--------|
| 6.5 Nm |
|--------|

* 435 psi

Electrical data

Lever E1

Two position switch breaking capacity:

| | |
|--------------------------|----------|
| DC, resistive load | 2 A/24 V |
| DC or AC, inductive load | 1 A/24 V |

Levers E2, E3, E4

Three position switch breaking capacity:

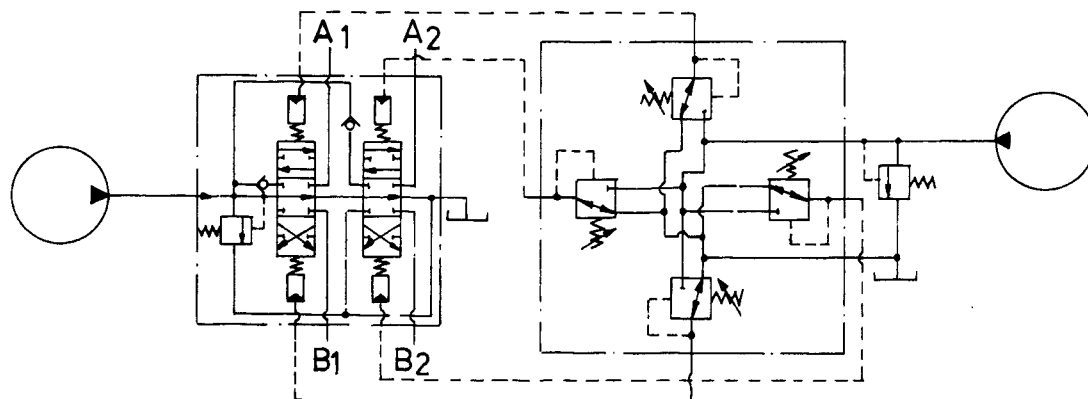
| | |
|--------------------------|----------|
| DC, resistive load | 8 A/24 V |
| DC or AC, inductive load | 5 A/24 V |

Ports

All ports are BSP 1/4" or alternatively 9/16" -18 UNF.

Recommended control pressure lines, inner diameter 7 mm (1/4").

Symbols



WARNING

Failure to comply with the 10 micro-metre filtration requirement or mechanical failure may cause valve plungers to bind or stick in a power position. Plungers that bind cannot be returned to neutral with the handle.

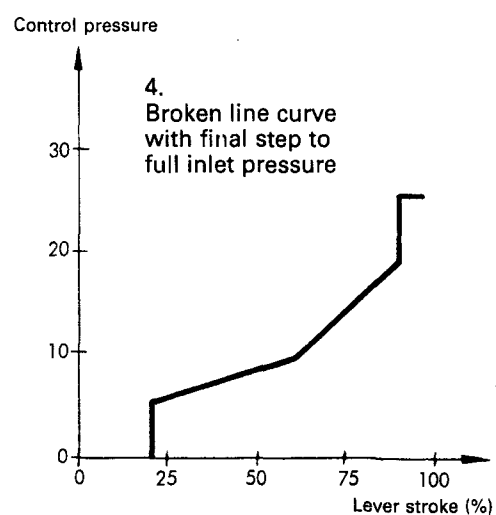
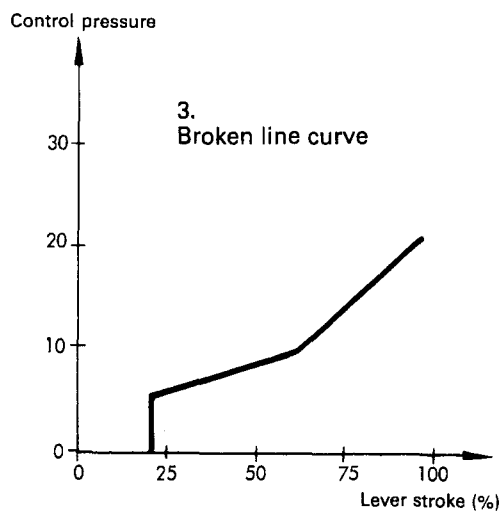
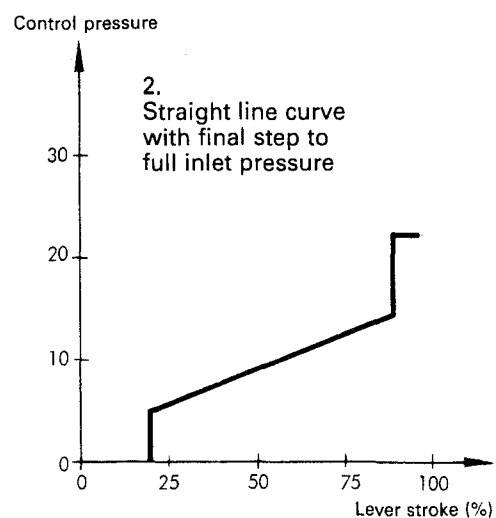
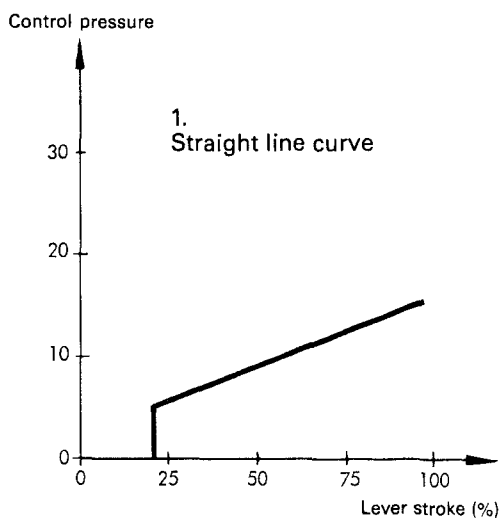
Pressure characteristics

The diagrams below show the principle of the four different control pressure characteristics available using the PCL 4.

No. 2 is recommended for most cases, the purpose of the final step being to ensure full spool or servo piston movement, irrespective of return spring tolerances.

Control pressure ranges from starting pressure of 1 to 10 bar (15 to 145 psi) up between 10 and 65 bar (145 and 945 psi) full pressure are obtainable.

Diagram



Dimensions

Function of E type levers

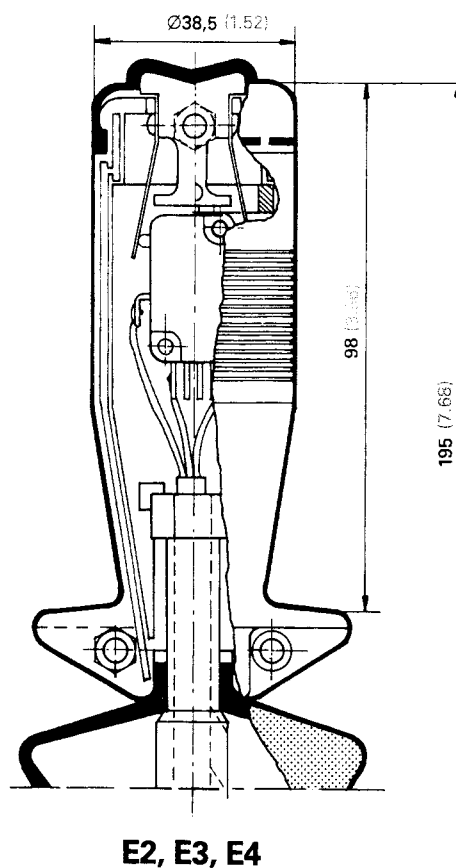
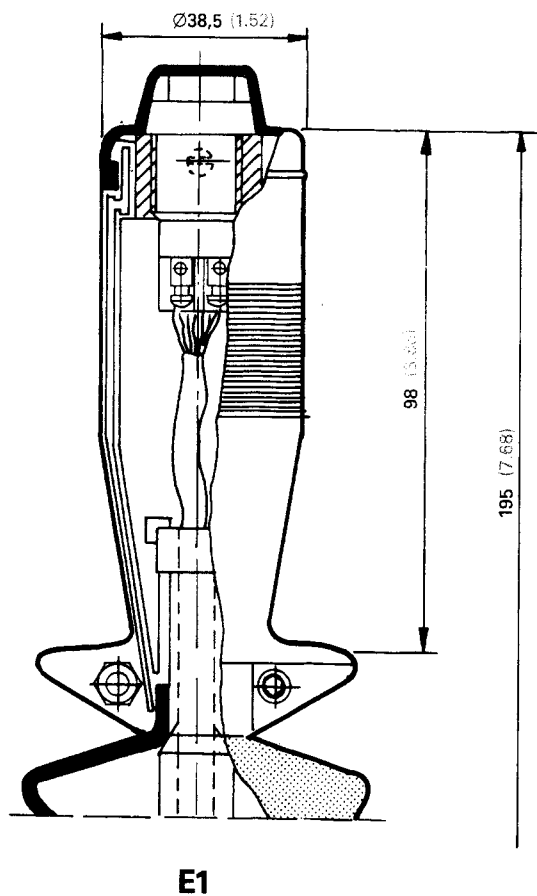
- E1 Lever with 2-position push-button switch
- E2 Lever with 3-position non-locking toggle switch
- E3 Lever with 3-position toggle switch. The switch has a detent in one end pos.
- E4 Lever with 3-position toggle switch. The switch locks in all positions

Cable markings

E2, E3 and E4 levers:

- Red cable to supply
- Black cable to consumer
- Grey cable to consumer

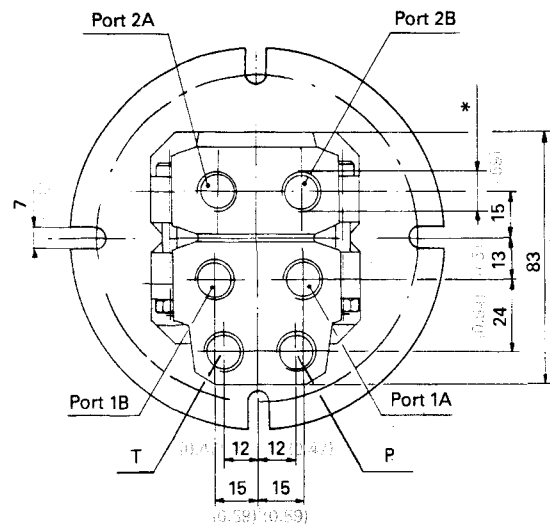
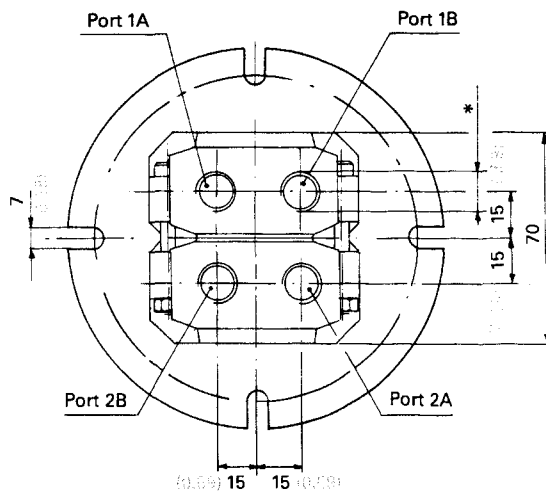
Red and black cables are used for E1 levers at open function and yellow and green cables at closed function.



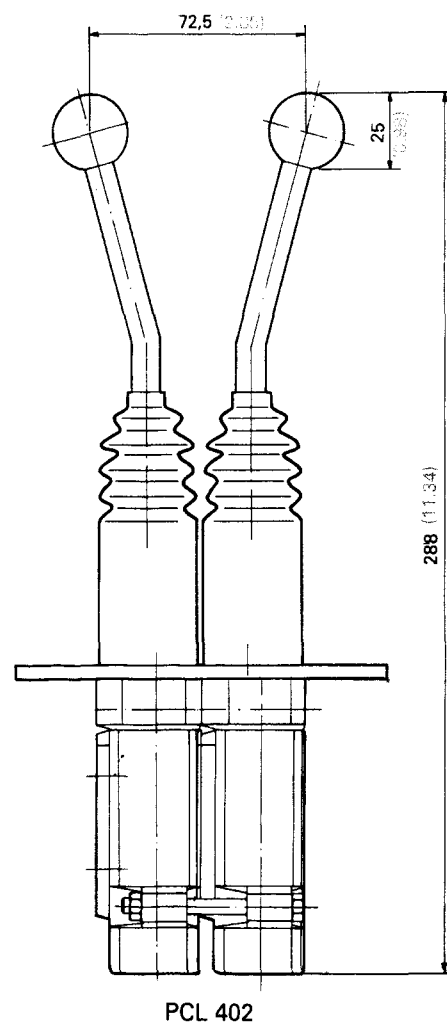
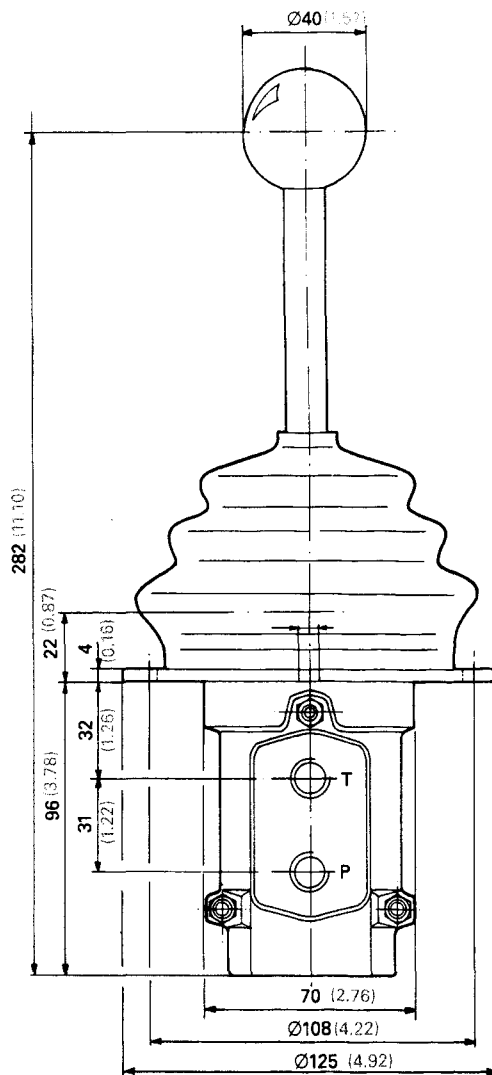
Dimensions

PCL 401

PCL 401 with all ports in the bottom plane

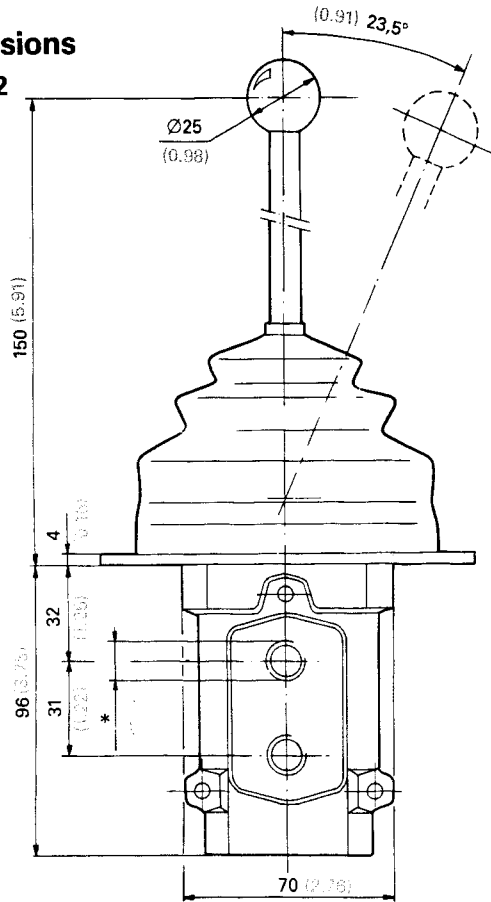


* Valve ports BSP 1/4" alt. UNF 9/16" - 18 SAE

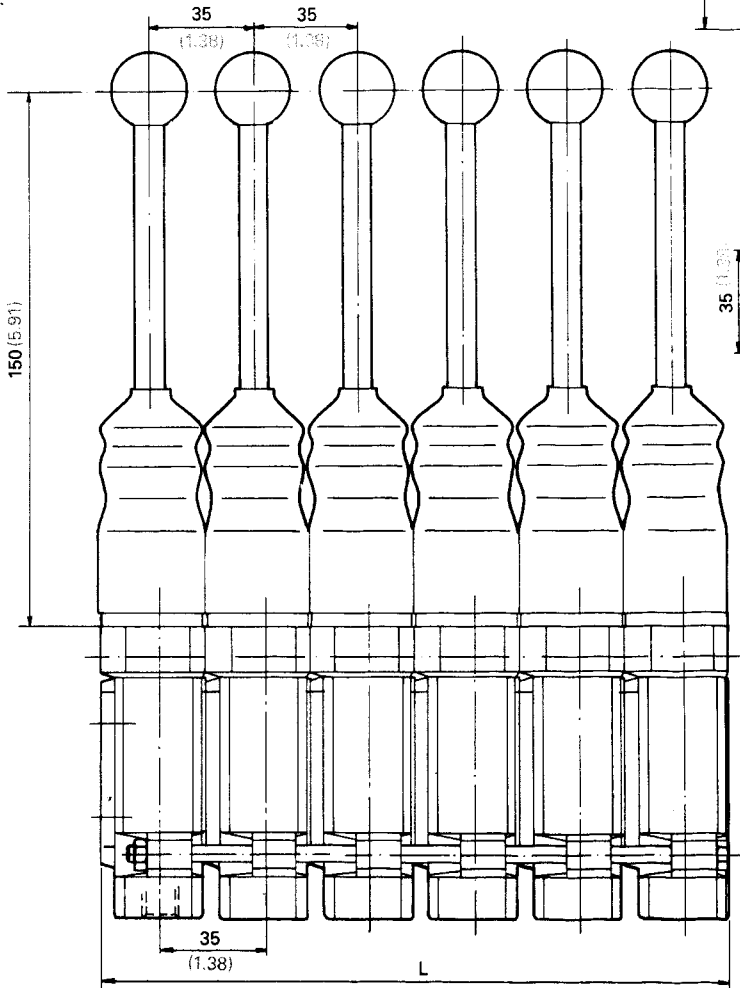


PCL 402

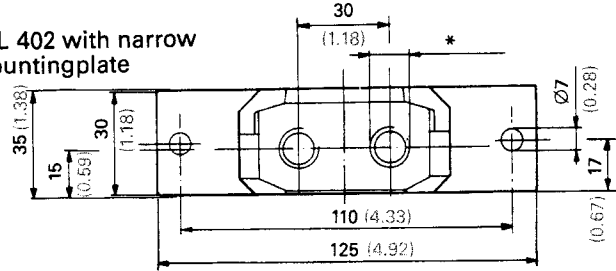
Dimensions
PCL 402



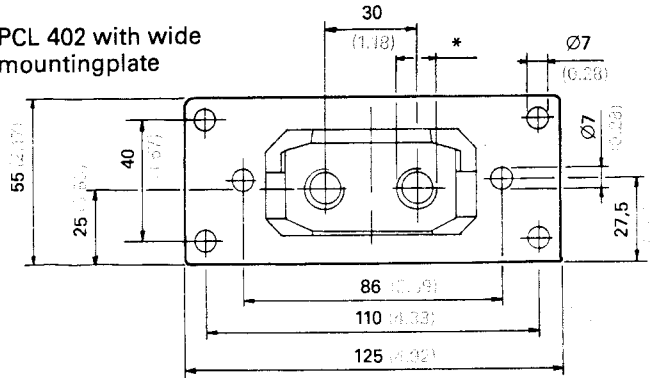
* Valve ports BSP 1/4" alt. UNF 9/16" - 18 SAE



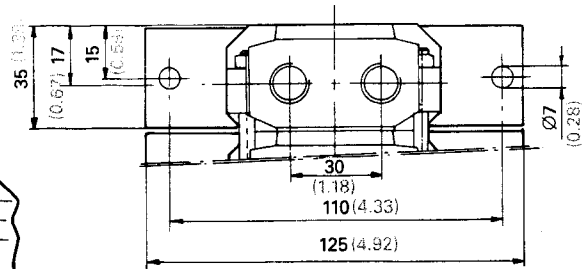
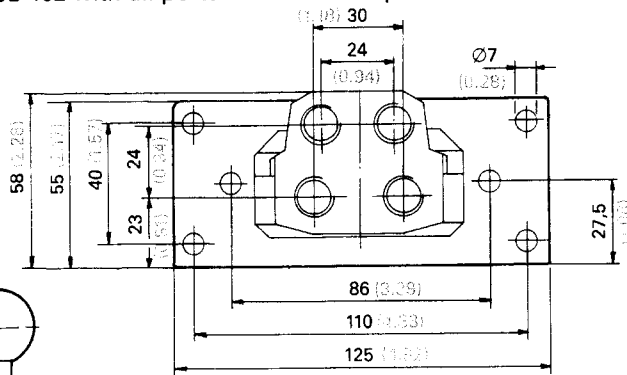
PCL 402 with narrow mountingplate



PCL 402 with wide mountingplate



PCL 402 with all ports in the bottom plane



| No. of levers | L |
|---------------|------------|
| 1 | 35 (1.38) |
| 2 | 70 (2.76) |
| 3 | 105 (4.13) |
| 4 | 140 (5.51) |
| 5 | 175 (6.89) |
| 6 | 210 (8.27) |