

HSU can be used in the area of steering of vehicle and hydraulic rudder of ships where the operator can use it to control power steering force with light operating force.

It is safety, reliable and smooth in the function and operation.

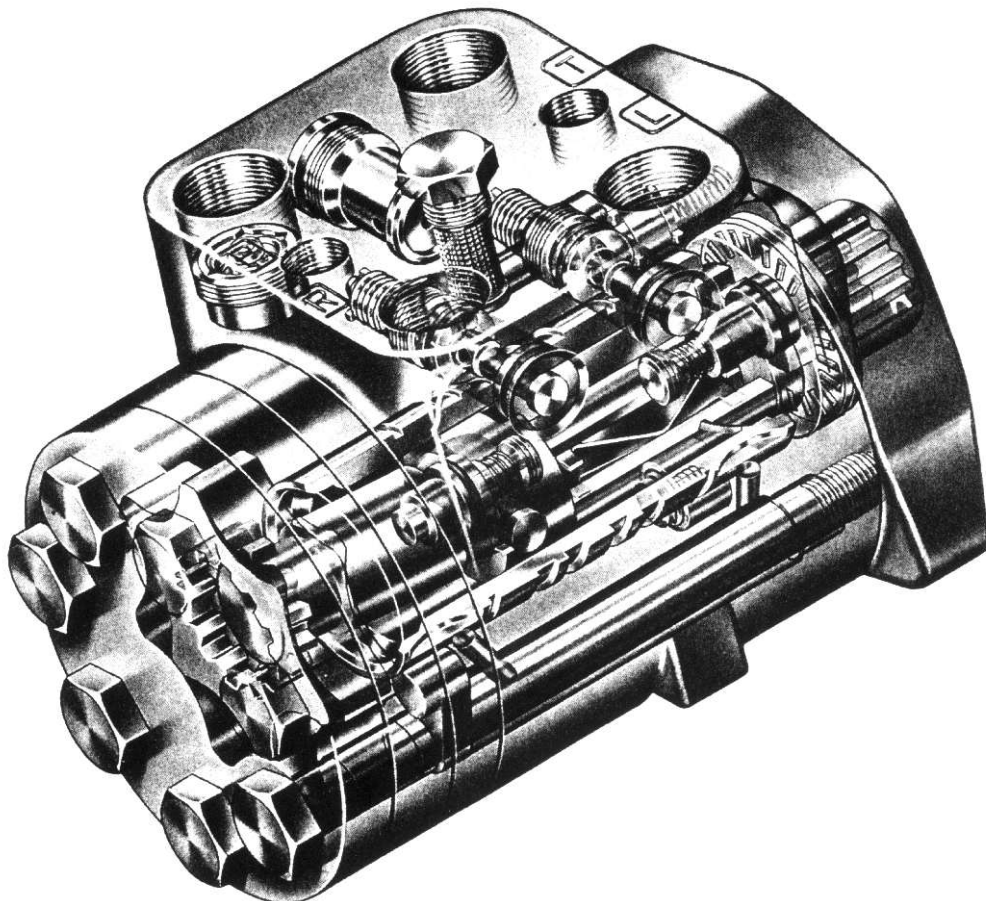
Model HSU1, HSU2, HSU3 offer the following advantages:

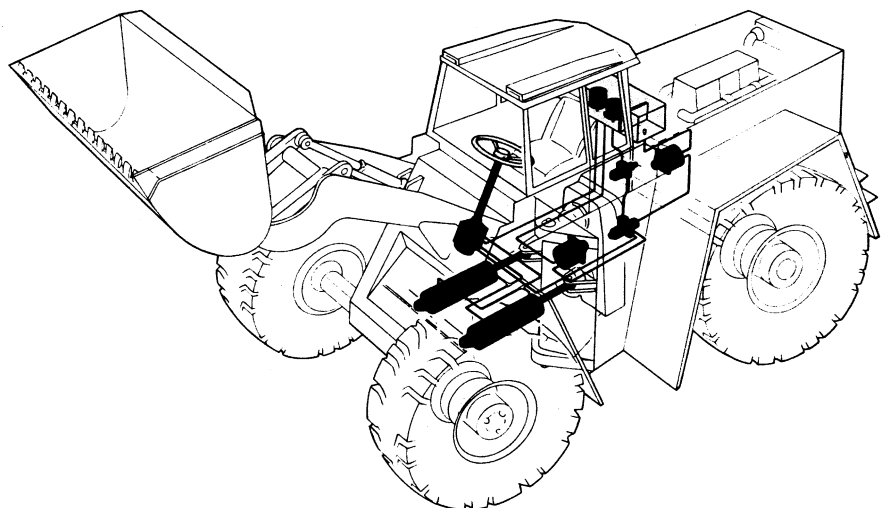
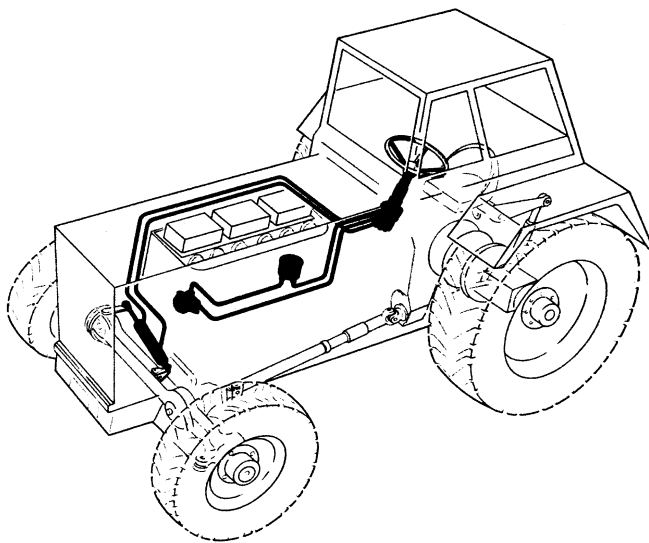
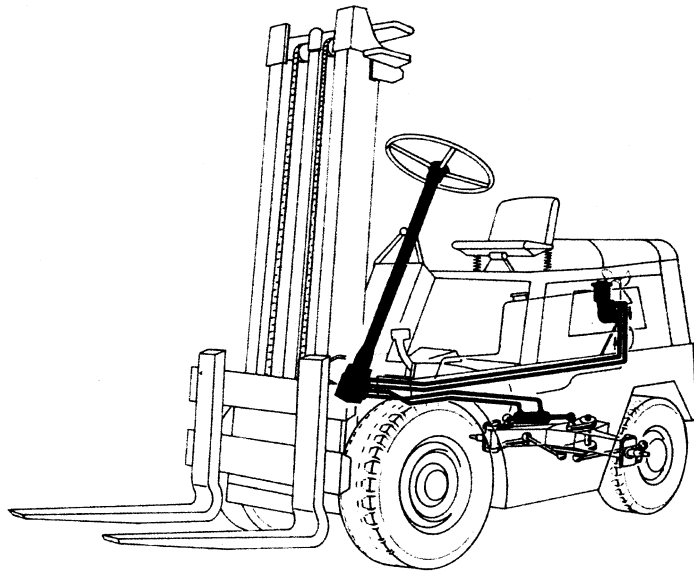
- \* Eliminate linkage-reduce cost, provide flexibility in design.
- \* Provide operator comfortable.
- \* Automatically reverts to emergency manual pump in case of engine failure.
- \* Provide continuous unlimited control circuits and meter sizes.
- \* Can work with many kinds of power steering pumps of fluid supply systems.

Model HSU/5 load sensing steering with above advantages, also has following features:

- \* Provide reliable, smooth pressure compensated steering, because pressure variations in the steering circuit always has flow priority.
- \* Only the flow required by the steering maneuver goes to the steering circuit.

Flow not required for steering is available for use in the auxiliary circuit. Therefore power loss is decreased, system efficiency is increased.





# *Hydrostatic Steering Unit & Accessories*

## **Contents**

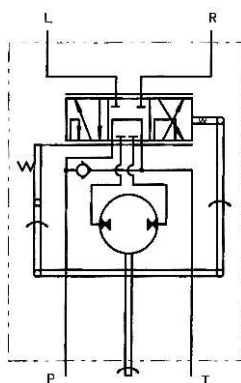


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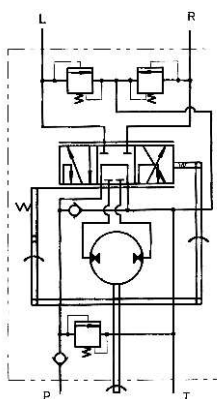


### DESCRIPTION OF UNIT HSUM :

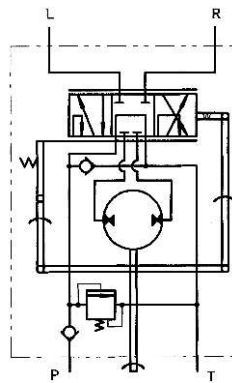
- Series HSUM hydraulic steering unit is the integrated orbital steering with unit 4/5 tooth structure.
- This kind of steering can have check valve, relief valve and chock valve, the structure is small and exquisite, mounting data corresponds to international standard.
- This kind of steering unit is widely used mini vehicles, such as mini forklift mini tractor (and other agricultural machinery), mini earthmoving machinery, mini municipal vehicle, etc.
- It can obtain more steering output torque through input of less power, with features of easy, flexible and reliable operation.



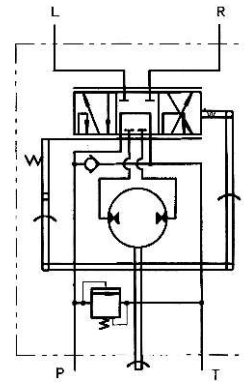
HSUM.../1 Version -1  
"Open Center"  
Non-Load Reaction



HSUMS.../1 Version -1  
"Open Center - Non Load Reaction"  
With Built-in Valves



HSUMV.../1 Version -1  
"Open Center - Non Load Reaction"  
With Built-in Valves

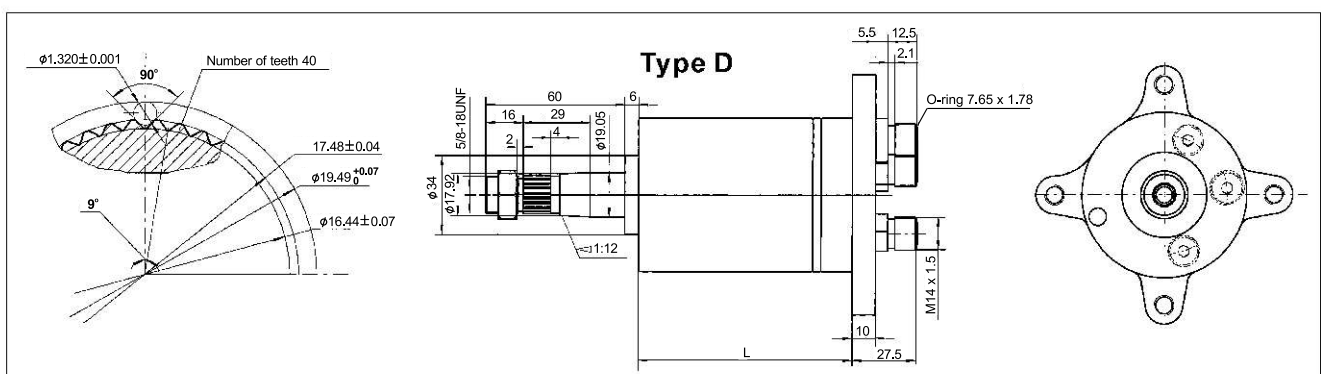
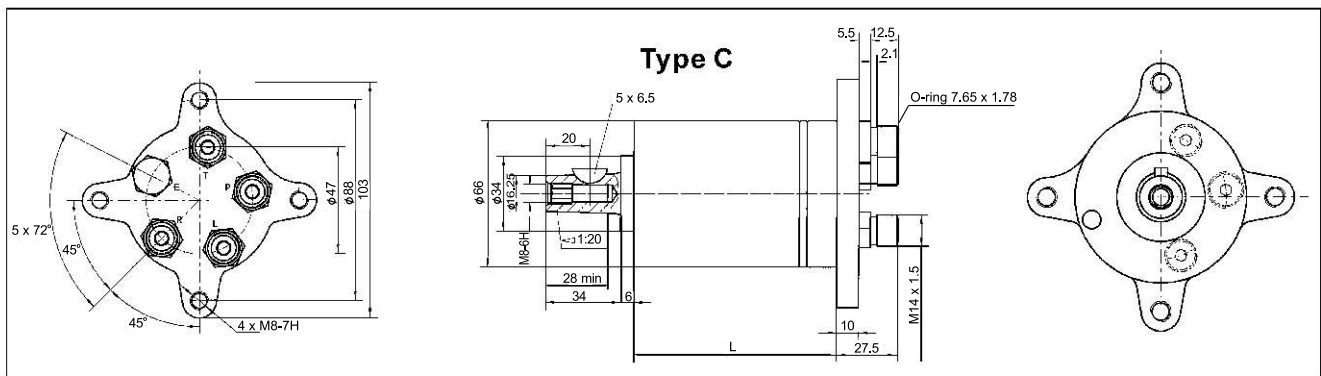
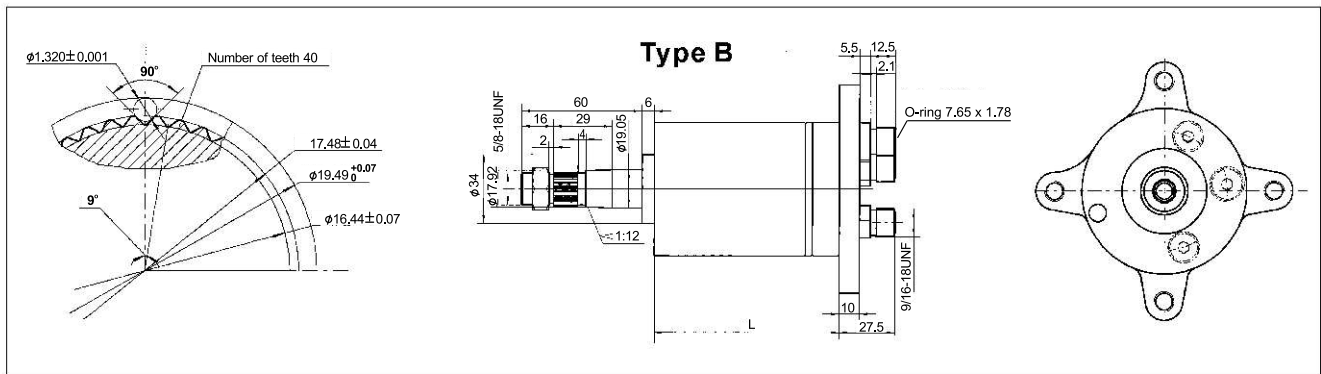
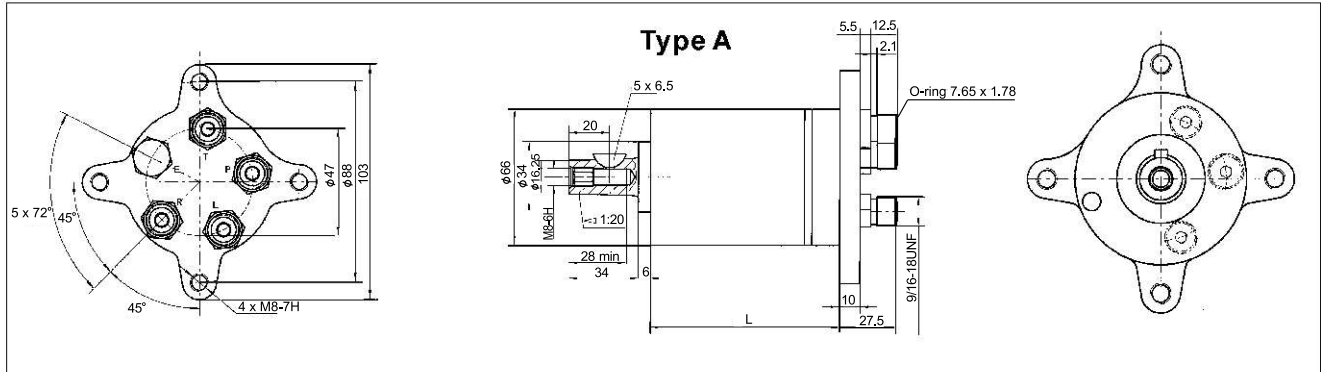


HSUMR.../1 Version -1  
"Open Center - Non Load Reaction"  
With Built-in Valves

## Specifications

| Parameters                                 | Type            |                 |                 |                 |                |                |
|--------------------------------------------|-----------------|-----------------|-----------------|-----------------|----------------|----------------|
|                                            | HSUM<br>20      | HSUM<br>30      | HSUM<br>40      | HSUM<br>50      | HSUM<br>63     | HSUM<br>80     |
| Integrated Valve                           | S / V / R       | S / V / R       | S / V / R       | S / V / R       | S / V / R      | S / V / R      |
| Version                                    | 1               | 1               | 1               | 1               | 1              | 1              |
| Displacement cc/rev<br>(cu.in)             | 20<br>(1.22)    | 32<br>(1.95)    | 40<br>(2.44)    | 50<br>(3.05)    | 63<br>(3.85)   | 80<br>(4.88)   |
| Rated Flow<br>l/min (gpm)                  | 3-20 (.79~5.29) |                 |                 |                 |                |                |
| Rated Pressure<br>bar (PSI)                | 125 (1800)      |                 |                 |                 |                |                |
| Relief Valve Pressure Setting<br>bar (PSI) | 60 (860)        | 70 (1000)       | 80 (1150)       | 90 (1300)       |                |                |
| Shock Valve Pressure Setting<br>bar (PSI)  | 120 (1720)      | 130 (1860)      | 140 (2000)      | 150 (2150)      |                |                |
| Max. Cont. Pressure in Line T<br>bar (PSI) | 10 (145)        |                 |                 |                 |                |                |
| Max. Torque-Powered<br>Nm (lb.-in.)        | 1.6 (142)       |                 |                 |                 |                |                |
| D Type Weight<br>kg (lb)                   | 5.75<br>(12.68) | 5.82<br>(12.83) | 5.89<br>(12.99) | 5.96<br>(13.14) | 6.1<br>(13.45) | 6.3<br>(13.89) |
| D Type Dimension L<br>mm (in.)             | 87<br>(3.425)   | 92<br>(3.622)   | 96<br>(3.78)    | 100<br>(3.937)  | 105<br>(4.133) | 113<br>(4.449) |

## Dimensions and Mounting Data



### Ordering Information

|      | 1 | 2 | 3 | 4 | 5 | 6 |
|------|---|---|---|---|---|---|
| HSUM |   |   | / | 1 | - |   |

#### Pos.1 Integrated Valve

|      |                                               |
|------|-----------------------------------------------|
| Omit | - Without Valve                               |
| S    | - With Relief Valve, Check Valve, Shock Valve |
| V    | - With Relief Valve, Check Valve              |
| R    | - With Relief Valve                           |

#### Pos.2 Displacement Code

|    |                        |
|----|------------------------|
| 20 | - 20cc / 1.22 [in.3/r] |
| 32 | - 32cc / 1.95 [in.3/r] |
| 40 | - 40cc / 2.44 [in.3/r] |
| 50 | - 50cc / 3.05 [in.3/r] |
| 63 | - 63cc / 3.85 [in.3/r] |
| 80 | - 80cc / 4.88 [in.3/r] |

#### Pos.3 Version Code

|   |                                   |
|---|-----------------------------------|
| 1 | - Open Center - Non Load Reaction |
|---|-----------------------------------|

#### Pos.4 Relief Valve Pressure Settings, bar(PSI)

|    |             |
|----|-------------|
| 60 | - 60 [860]  |
| 70 | - 70 [1000] |
| 80 | - 80 [1150] |
| 90 | - 90 [1300] |

#### Pos.5 Mounting Data

|   |                                                                |
|---|----------------------------------------------------------------|
| A | - Tapered 1:20, key 5 x 6.5<br>Ports:9/16-18UNF                |
| B | - Tapered 1:12 with 11/16 in-40 Serrations<br>Ports:9/16-18UNF |
| C | - Tapered 1:20, key 5 x 6.5<br>Ports:M14x1.5                   |
| D | - Tapered 1:12 with 11/16 in-40 Serrations<br>Ports:M14 x 1.5  |

#### Pos.6 Design Series

|      |                |
|------|----------------|
| Omit | - Factory Only |
|------|----------------|

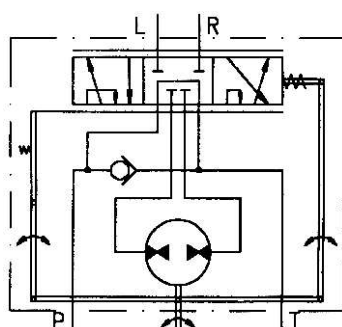


### APPLICATION :

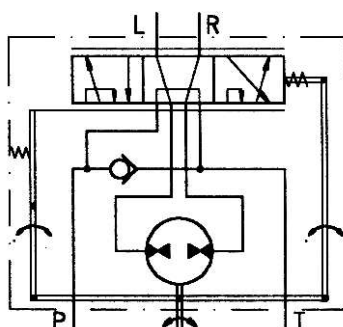
For use on steering of low speed vehicles, extensively used on such as forklifts, tractors, construction equipment, rudder of ship , mowers, mining and industrial positioning requirement.

### DESCRIPTION OF UNIT HSU :

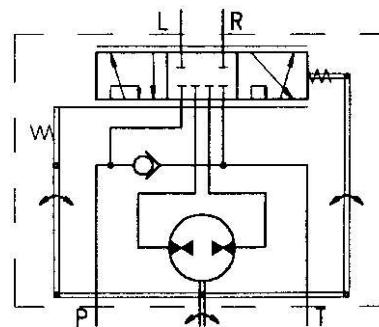
It can be used to control power steering force with light operating force. It is safe, reliable and smooth in the function and operation. This is achieved with hydraulic power from vehicle system entering the pressure port (P) of HSU unit and being directed to steering cylinders through tank posts L (left) and R (right) by turning input shaft either direction. Return flow from each cylinder is through tank port (T). The HSU unit is complete with metering pump and rotary positioning valve (see above hydraulic circuit diagrams).



HSU.../1 Version -1  
Non-Load Reaction  
"Open Center"



HSU.../2 Version -2  
Load Reaction  
"Open Center"



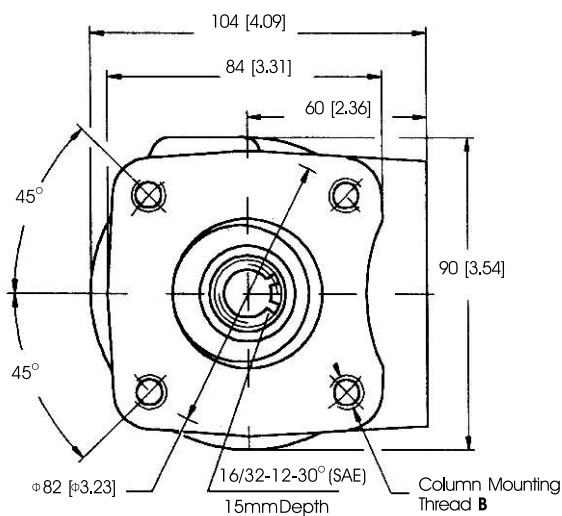
HSU.../3 Version -3  
Non-Load Reaction  
"Closed Center"

## Specifications

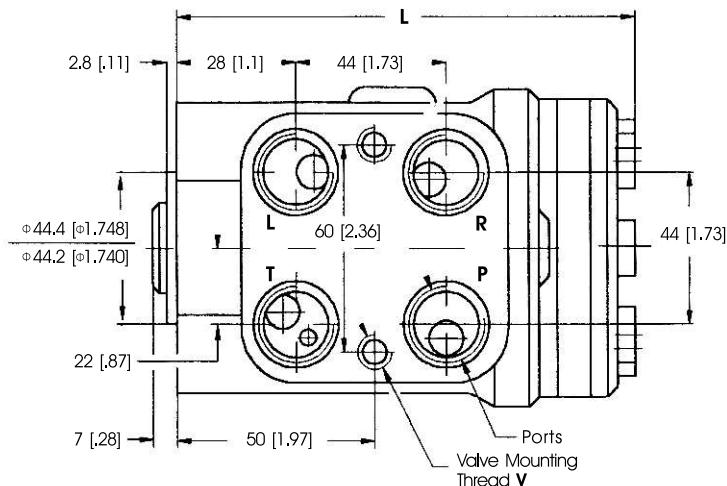
| Parameters                           |                    | Type            |                 |                 |                 |                |                |                 |                 |                 |                 |                 |                 |                  |
|--------------------------------------|--------------------|-----------------|-----------------|-----------------|-----------------|----------------|----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|------------------|
|                                      |                    | HSU 50          | HSU 63          | HSU 80          | HSU 100         | HSU 125        | HSU 160        | HSU 200         | HSU 250         | HSU 315         | HSU 400         | HSU 500         | HSU 630         | HSU 800          |
| Version                              |                    | 1 / 2 / 3       | 1 / 2 / 3       | 1 / 2 / 3       | 1 / 2 / 3       | 1 / 2 / 3      | 1 / 2 / 3      | 1 / 2 / 3       | 1 / 2 / 3       | 1 / 2 / 3       | 1 / 2 / 3       | 1 / 3           | 1 / 3           | 1 / 3            |
| Displacement                         | cc/rev<br>(cu. in) | 50.8<br>(3.1)   | 62.9<br>(3.8)   | 79.8<br>(4.9)   | 99.6<br>(6.1)   | 124.5<br>(7.6) | 159.6<br>(9.8) | 199.4<br>(12.2) | 249.2<br>(15.2) | 316.5<br>(19.4) | 399.7<br>(24.4) | 499.0<br>(30.6) | 629.5<br>(38.5) | 799.2<br>(48.9)  |
| Rated Flow                           | l/min<br>(gpm)     | 5<br>(1.3)      | 6<br>(1.6)      | 8<br>(2.1)      | 9<br>(2.4)      | 11<br>(2.9)    | 15<br>(4)      | 17<br>(4.5)     | 24<br>(6.3)     | 30<br>(7.9)     | 40<br>(10.6)    | 50<br>(13.3)    | 63<br>(16.8)    | 80<br>(21.3)     |
| Rated Pressure<br>bar (PSI)          |                    | 160 (2320)      |                 |                 |                 |                |                |                 |                 |                 |                 |                 | 140 (2030)      |                  |
| Max. Pressure in Line T<br>bar (PSI) |                    | 20 (290)        |                 |                 |                 |                |                |                 |                 |                 |                 |                 |                 |                  |
| Max. Torque-Powered<br>Nm ( lb.-in.) |                    | 5 (44)          |                 |                 |                 |                |                |                 | 8 (70)          |                 |                 |                 |                 |                  |
| D Type Weight                        | kg<br>(lb)         | 5.75<br>(12.68) | 5.82<br>(12.83) | 5.89<br>(12.99) | 5.96<br>(13.14) | 6.1<br>(13.45) | 6.3<br>(13.89) | 6.5<br>(14.33)  | 6.73<br>(14.98) | 7.1<br>(15.65)  | 7.5<br>(16.53)  | 8.38<br>(18.47) | 9.43<br>(20.79) | 10.89<br>(24.01) |
| E Type Weight                        | kg<br>(lb)         | 6.04<br>(13.31) | 6.11<br>(13.47) | 6.18<br>(13.62) | 6.27<br>(13.82) | 6.4<br>(14.11) | 6.6<br>(14.55) | 6.79<br>(14.97) | 7.02<br>(15.48) | 7.39<br>(16.29) | 7.79<br>(17.17) | 8.67<br>(19.11) | 9.72<br>(21.43) | 11.18<br>(24.65) |
| D Type Dimension L                   | mm (in.)           | 130<br>(5.12)   | 132<br>(5.2)    | 134<br>(5.28)   | 137<br>(5.39)   | 140<br>(5.51)  | 145<br>(5.71)  | 150<br>(5.91)   | 156<br>(6.14)   | 166<br>(6.54)   | 176<br>(6.93)   | 189<br>(7.44)   | 208<br>(8.19)   | 228<br>(8.98)    |
| E Type Dimension L                   | mm (in.)           | 140<br>(5.51)   | 142<br>(5.59)   | 144<br>(5.67)   | 146<br>(5.75)   | 149<br>(5.87)  | 154<br>(6.06)  | 159<br>(6.26)   | 165<br>(6.5)    | 175<br>(6.89)   | 185<br>(7.28)   | 198<br>(7.80)   | 217<br>(8.54)   | 237<br>(9.33)    |

### D Type

### Dimensions and Mounting Data



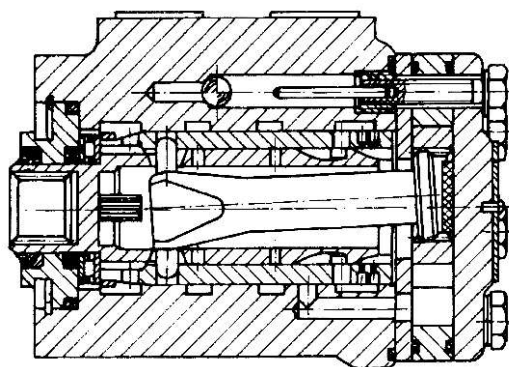
(Inch) show in brackets [ ]



### Thread Ports

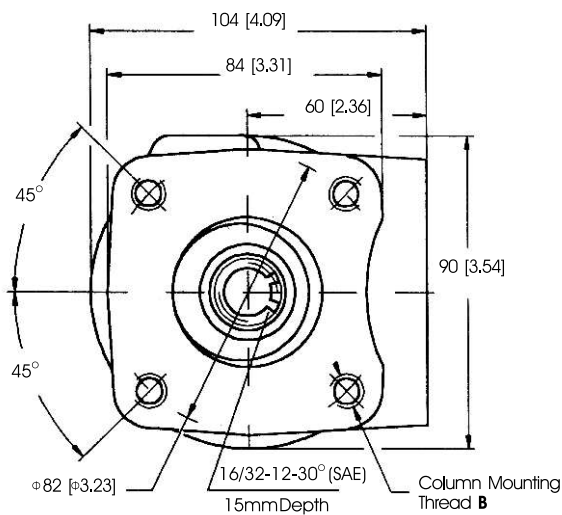
| Code | Ports – P, T, R, L<br>Thread       | Column Mounting<br>Thread - B      | Valve Mounting<br>Thread - V       |
|------|------------------------------------|------------------------------------|------------------------------------|
| -    | G 1/2<br>14 mm depth               | 4 x M10 x 1.5<br>16 mm depth       | 2 x M10 x 1<br>16 mm depth         |
| GA*  | G 3/8<br>14 mm depth               | 4 x M10 x 1.5<br>16 mm depth       | 2 x M10 x 1<br>16 mm depth         |
| U    | 3/4 – 16UNF<br>O-ring 14 mm depth  | 4 x 3/8 – 16UNC<br>0.63 [16] depth | 2 x 3/8 – 24UNF<br>0.63 [16] depth |
| UA*  | 9/16 – 18UNF<br>O-ring 14 mm depth | 4 x 3/8 – 16UNC<br>0.63 [16] depth | 2 x 3/8 – 24UNF<br>0.63 [16] depth |
| M    | M22 x 1.5<br>14 mm depth           | 4 x M10 x 1.5<br>16 mm depth       | 2 x M10 x 1<br>16 mm depth         |

\* These threads are for displacements from HSU50 to HSU125 only.

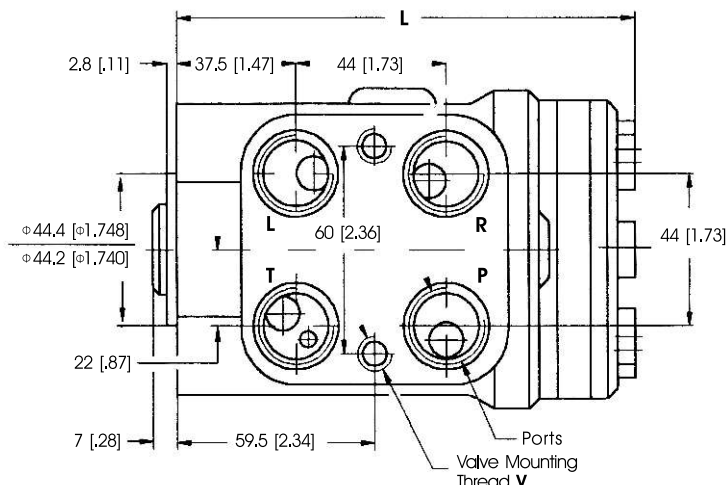


### E Type

### Dimensions and Mounting Data



(Inch) show in brackets [ ]



### Ordering Information

|     | 1 | 2 | 3 | 4 | 5 |
|-----|---|---|---|---|---|
| HSU |   | / | - |   |   |

#### Pos.1 Displacement Code

|     |   |                         |
|-----|---|-------------------------|
| 50  | - | 50.8cc / 3.1 [in.3/r]   |
| 63  | - | 62.9cc / 3.8 [in.3/r]   |
| 80  | - | 79.8cc / 4.9 [in.3/r]   |
| 100 | - | 99.6cc / 6.1 [in.3/r]   |
| 125 | - | 124.5cc / 7.6 [in.3/r]  |
| 160 | - | 159.6cc / 9.8 [in.3/r]  |
| 200 | - | 199.4cc / 12.2 [in.3/r] |
| 250 | - | 249.2cc / 15.2 [in.3/r] |
| 315 | - | 316.5cc / 19.4 [in.3/r] |
| 400 | - | 399.7cc / 24.4 [in.3/r] |
| 500 | - | 499.0cc / 30.6 [in.3/r] |
| 630 | - | 629.5cc / 38.5 [in.3/r] |
| 800 | - | 799.2cc / 48.9 [in.3/r] |

#### Pos.2 Versions Code

|   |   |                                     |
|---|---|-------------------------------------|
| 1 | - | "Open Center - Non Load Reaction"   |
| 2 | - | "Open Center - Load Reaction"       |
| 3 | - | "Closed Center - Non Load Reaction" |

#### Pos.3 Ports Code

|      |   |                       |
|------|---|-----------------------|
| Omit | - | G 1/2                 |
| GA   | - | G 3/8                 |
| U    | - | 3/4 - 16 UNF "O" Ring |
| UA   | - | 9/16-18 UNF "O" Ring  |
| M    | - | Metric                |

#### Pos.4 Type Code

|      |   |        |
|------|---|--------|
| Omit | - | D Type |
| E    | - | E Type |

#### Pos.5 Design Series

|      |   |                  |
|------|---|------------------|
| Omit | - | Factory use only |
|------|---|------------------|

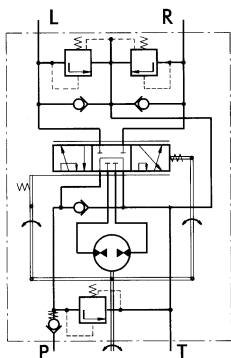


### APPLICATION :

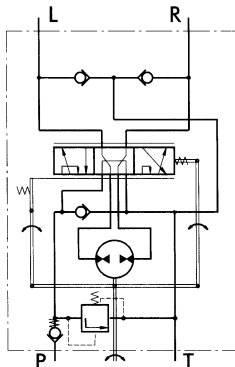
For use on steering of low speed vehicles, extensively used on such as forklifts, tractors, construction equipment, rudder of ship , mowers, mining and industrial positioning requirement.

### DESCRIPTION OF UNIT HSUS :

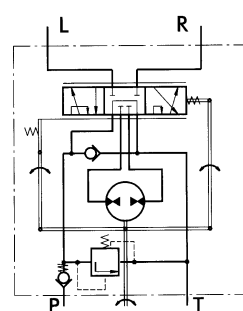
It can be used to control power steering force with light operating force. It is safe, reliable and smooth in the function and operation. This is achieved with hydraulic power from vehicle system entering the pressure port (P) of HSUS unit and being directed to steering cylinders through tank posts L (left) and R (right) by turning input shaft either direction. Return flow from each cylinder is through tank port (T). The HSUS unit is complete with metering pump and rotary positioning valves and integral relief valves (see above hydraulic circuit diagrams)..



HSUS.../1 Version -1  
"Open Center - Non Load Reaction"  
With Built-in Valves



HSUS.../2 Version -2  
"Open Center - Load Reaction"  
With Built-in Valves



HSUS.../4 Version -4  
"Open Center - Non Load Reaction"  
With Built-in Valves

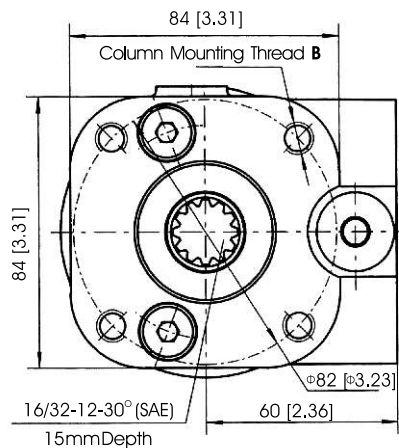
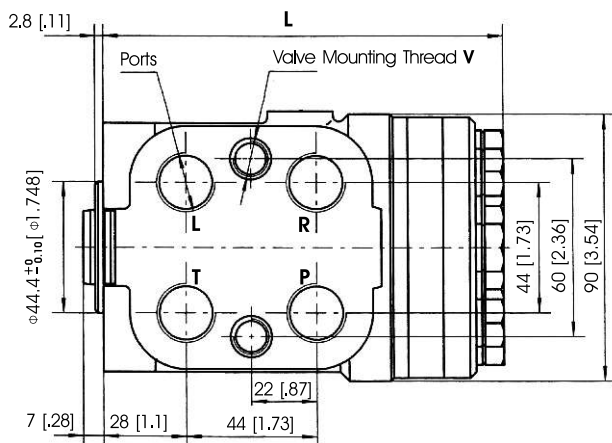
## Specifications

| Parameters                    |                   | Type            |                 |                 |                 |                |                |                 |                 |                 |                 |
|-------------------------------|-------------------|-----------------|-----------------|-----------------|-----------------|----------------|----------------|-----------------|-----------------|-----------------|-----------------|
|                               |                   | HSUS<br>50      | HSUS<br>63      | HSUS<br>80      | HSUS<br>100     | HSUS<br>125    | HSUS<br>160    | HSUS<br>200     | HSUS<br>250     | HSUS<br>315     | HSUS<br>400     |
| Version                       |                   | 1 / 2 / 4       | 1 / 2 / 4       | 1 / 2 / 4       | 1 / 2 / 4       | 1 / 2 / 4      | 1 / 2 / 4      | 1 / 2 / 4       | 1 / 2 / 4       | 1 / 2 / 4       | 1 / 2 / 4       |
| Displacement                  | cc/rev<br>(cu.in) | 50.8<br>(3.1)   | 62.9<br>(3.8)   | 79.8<br>(4.9)   | 99.6<br>(6.1)   | 124.5<br>(7.6) | 159.6<br>(9.8) | 199.4<br>(12.2) | 249.2<br>(15.2) | 316.5<br>(19.4) | 399.7<br>(24.4) |
| Rated Flow                    | l/min<br>(gpm)    | 5<br>(1.3)      | 6<br>(1.6)      | 8<br>(2.1)      | 9<br>(2.4)      | 11<br>(2.9)    | 15<br>(4)      | 17<br>(4.5)     | 24<br>(6.3)     | 30<br>(7.9)     | 40<br>(10.6)    |
| Rated Pressure                | bar (PSI)         | 160 (2320)      |                 |                 |                 |                |                |                 |                 |                 |                 |
| Relief Valve Pressure Setting | bar (PSI)         | 80 (1160)       |                 | 100 (1450)      |                 | 120 (1740)     |                | 140 (2030)      |                 | 160 (2320)      |                 |
| Shock Valve Pressure Setting  | bar (PSI)         | 140 (2030)      |                 | 160 (2320)      |                 | 180 (2610)     |                | 200 (2900)      |                 | 220 (3190)      |                 |
| Max. Cont. Pressure in Line T | bar (PSI)         | 20 (290)        |                 |                 |                 |                |                |                 |                 |                 |                 |
| Max. Torque-Powered           | Nm (lb.-in.)      | 5(44)           |                 |                 |                 |                |                |                 |                 |                 |                 |
| D Type Weight                 | kg<br>(lb)        | 5.75<br>(12.68) | 5.82<br>(12.83) | 5.89<br>(12.99) | 5.96<br>(13.14) | 6.1<br>(13.45) | 6.3<br>(13.89) | 6.5<br>(14.33)  | 6.73<br>(14.98) | 7.1<br>(15.65)  | 7.5<br>(16.53)  |
| E Type Weight                 | kg<br>(lb)        | 6.04<br>(13.31) | 6.11<br>(13.47) | 6.18<br>(13.62) | 6.27<br>(13.82) | 6.4<br>(14.11) | 6.6<br>(14.55) | 6.79<br>(14.97) | 7.02<br>(15.48) | 7.39<br>(16.29) | 7.79<br>(17.17) |
| D Type Dimension L            | mm<br>(in.)       | 130<br>(5.12)   | 132<br>(5.2)    | 134<br>(5.28)   | 137<br>(5.39)   | 140<br>(5.51)  | 145<br>(5.71)  | 150<br>(5.91)   | 156<br>(6.14)   | 166<br>(6.54)   | 176<br>(6.93)   |
| E Type Dimension L            | mm<br>(in.)       | 140<br>(5.51)   | 142<br>(5.59)   | 144<br>(5.67)   | 146<br>(5.75)   | 149<br>(5.87)  | 154<br>(6.06)  | 159<br>(6.26)   | 165<br>(6.5)    | 175<br>(6.89)   | 185<br>(7.28)   |

### D Type

### Dimensions and Mounting Data

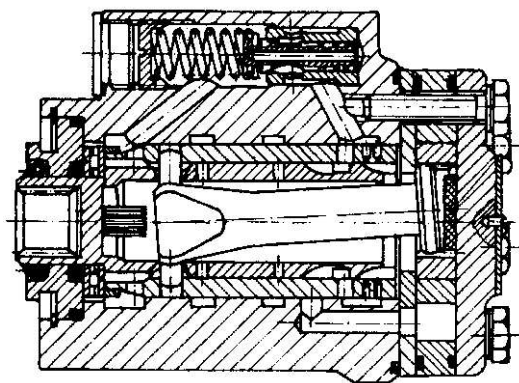
(Inch) show in brackets[ ]



### Thread Ports

| Code | Ports – P, T, R, L<br>Thread       | Column Mounting<br>Thread - B      | Valve Mounting<br>Thread - V       |
|------|------------------------------------|------------------------------------|------------------------------------|
| -    | G 1/2<br>14 mm depth               | 4 x M10 x 1.5<br>16 mm depth       | 2 x M10 x 1<br>16 mm depth         |
| GA*  | G 3/8<br>14 mm depth               | 4 x M10 x 1.5<br>16 mm depth       | 2 x M10 x 1<br>16 mm depth         |
| U    | 3/4 – 16UNF<br>O-ring 14 mm depth  | 4 x 3/8 – 16UNC<br>0.63 [16] depth | 2 x 3/8 – 24UNF<br>0.63 [16] depth |
| UA*  | 9/16 – 18UNF<br>O-ring 14 mm depth | 4 x 3/8 – 16UNC<br>0.63 [16] depth | 2 x 3/8 – 24UNF<br>0.63 [16] depth |
| M    | M22 x 1.5<br>14 mm depth           | 4 x M10 x 1.5<br>16 mm depth       | 2 x M10 x 1<br>16 mm depth         |

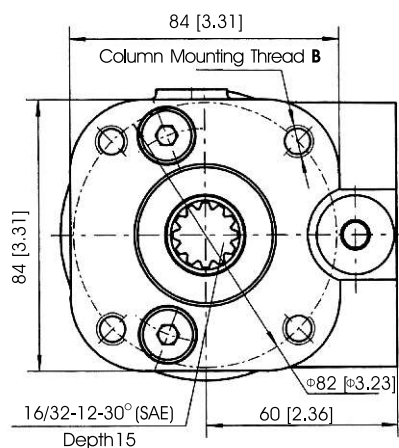
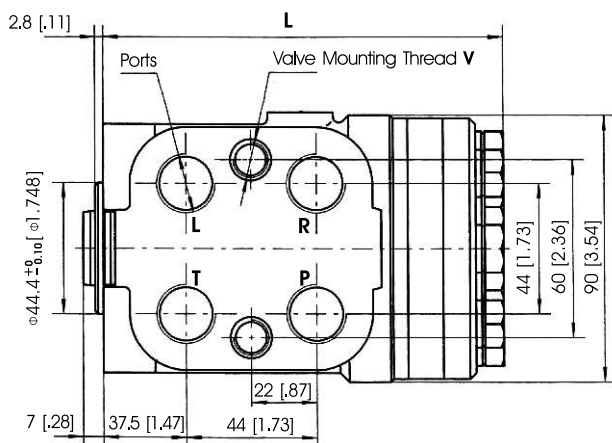
\* These threads are for displacements from HSUS50 to HSUS125 only.



### E Type

### Dimensions and Mounting Data

(Inch) show in brackets[ ]



### Ordering Information

|      | 1 | 2 | 3 | 4 | 5 | 6 |
|------|---|---|---|---|---|---|
| HSUS |   | / | - |   |   |   |

#### Pos.1 Displacement Code

|     |   |                         |
|-----|---|-------------------------|
| 50  | - | 50.8cc / 3.1 [in.3/r]   |
| 63  | - | 62.9cc / 3.8 [in.3/r]   |
| 80  | - | 79.8cc / 4.9 [in.3/r]   |
| 100 | - | 99.6cc / 6.1 [in.3/r]   |
| 125 | - | 124.5cc / 7.6 [in.3/r]  |
| 160 | - | 159.6cc / 9.8 [in.3/r]  |
| 200 | - | 199.4cc / 12.2 [in.3/r] |
| 250 | - | 249.2cc / 15.2 [in.3/r] |
| 315 | - | 316.5cc / 19.4 [in.3/r] |
| 400 | - | 399.7cc / 24.4 [in.3/r] |

#### Pos.2 Versions Code

|   |   |                                   |
|---|---|-----------------------------------|
| 1 | - | "Open Center - Non Load Reaction" |
| 2 | - | "Open Center - Load Reaction"     |
| 4 | - | "Open Center - Non Load Reaction" |

#### Pos.3 Relief Valve Pressure Settings, bar(PSI)

|     |   |            |
|-----|---|------------|
| 80  | - | 80 [1160]  |
| 100 | - | 100 [1450] |
| 120 | - | 120 [1740] |
| 140 | - | 140 [2030] |
| 160 | - | 160 [2320] |

#### Pos.4 Ports Code

|      |   |                       |
|------|---|-----------------------|
| Omit | - | G 1/2                 |
| GA   | - | G 3/8                 |
| U    | - | 3/4 - 16 UNF "O" Ring |
| UA   | - | 9/16-18 UNF "O" Ring  |
| M    | - | Metric                |

#### Pos.5 Type Code

|      |   |        |
|------|---|--------|
| Omit | - | D Type |
| E    | - | E Type |

#### Pos.6 Design Series

|      |   |                  |
|------|---|------------------|
| Omit | - | Factory use only |
|------|---|------------------|



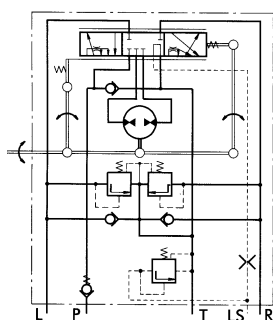
### APPLICATION :

For use on steering of low speed vehicles, extensively used on such as forklifts, tractors, construction equipment, rudder of ship , mowers, mining and industrial positioning requirement.

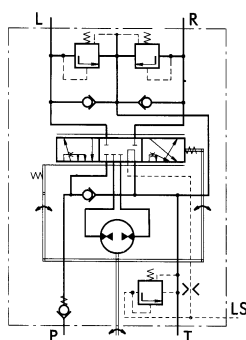
### DESCRIPTION OF UNIT HSU(S) :

In load sensing steering system, the oil for steering system and working circuit may be supplied by pump via a priority valve of which can support extra amount of steering system oil into operating system. In addition when uses a pump with which is connected load reaction, energy of system will be saved.

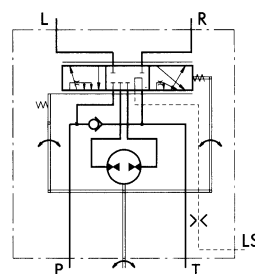
A LS inlet of load sensing steering unit is connected with a priority valve or with a LS inlet of pump with load reaction. Via the oil hose the pressure signal of the steering load transfers from the steering unit to the priority valve or the pump with load reaction, so as to control the oil volume which is supplied to steering unit. In the neutral position of load sensing steering unit, only less than 2L/min oil of steering system direct to flow back to the tank.



HSUS.../5. "Close Center"  
Non-Load Reaction - Load Sensing  
Manifold Mount



HSUS.../5T. "Close Center"  
Non-Load Reaction - Load Sensing  
Threaded Ports



HSU.../5T. "Close Center"  
Non-Load Reaction - Load Sensing  
Threaded Ports

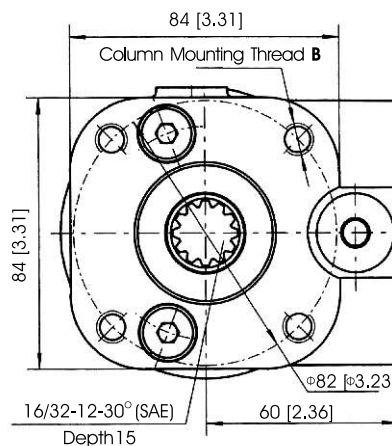
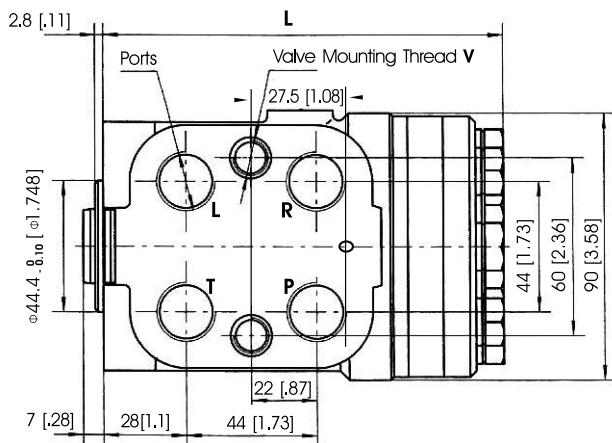
## Specifications

| Parameters                    |                   | Type                   |                        |                        |                         |                         |                         |                         |                         |                         |                         |
|-------------------------------|-------------------|------------------------|------------------------|------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|
|                               |                   | HSU<br>HSUS<br>50/5(T) | HSU<br>HSUS<br>63/5(T) | HSU<br>HSUS<br>80/5(T) | HSU<br>HSUS<br>100/5(T) | HSU<br>HSUS<br>125/5(T) | HSU<br>HSUS<br>160/5(T) | HSU<br>HSUS<br>200/5(T) | HSU<br>HSUS<br>250/5(T) | HSU<br>HSUS<br>315/5(T) | HSU<br>HSUS<br>400/5(T) |
| Displacement                  | cc/rev<br>(cu.in) | 50.8<br>(3.1)          | 62.9<br>(3.8)          | 79.8<br>(4.9)          | 99.6<br>(6.1)           | 124.5<br>(7.6)          | 159.6<br>(9.8)          | 199.4<br>(12.2)         | 249.2<br>(15.2)         | 316.5<br>(19.4)         | 399.7<br>(24.4)         |
| Rated Flow                    | l/min<br>(gpm)    | 5<br>(1.3)             | 6<br>(1.6)             | 8<br>(2.1)             | 9<br>(2.4)              | 11<br>(2.9)             | 15<br>(4)               | 17<br>(4.5)             | 24<br>(6.3)             | 30<br>(7.9)             | 40<br>(10.6)            |
| Rated Pressure                | bar (PSI)         | 160 (2320)             |                        |                        |                         |                         |                         |                         |                         |                         |                         |
| Relief Valve Pressure Setting | bar (PSI)         | 80 (1160)              |                        | 100 (1450)             |                         | 120 (1740)              |                         | 140 (2030)              |                         | 160 (2320)              |                         |
| Shock Valve Pressure Setting  | bar (PSI)         | 140 (2030)             |                        | 160 (2320)             |                         | 180 (2610)              |                         | 200 (2900)              |                         | 220 (3190)              |                         |
| Max. Cont. Pressure in Line T | bar (PSI)         | 20 (290)               |                        |                        |                         |                         |                         |                         |                         |                         |                         |
| Max. Torque-Powered           | Nm (lb.-in.)      | 5 (44)                 |                        |                        |                         |                         |                         |                         |                         |                         |                         |
| D Type Weight                 | kg<br>(lb)        | 5.75<br>(12.68)        | 5.82<br>(12.83)        | 5.89<br>(12.99)        | 5.96<br>(13.14)         | 6.1<br>(13.45)          | 6.3<br>(13.89)          | 6.5<br>(14.33)          | 6.73<br>(14.98)         | 7.1<br>(15.65)          | 7.5<br>(16.53)          |
| E Type Weight                 | kg<br>(lb)        | 5.94<br>(13.31)        | 6.00<br>(13.47)        | 6.08<br>(13.62)        | 6.14<br>(13.82)         | 6.3<br>(14.11)          | 6.5<br>(14.55)          | 6.7<br>(14.97)          | 6.9<br>(15.48)          | 7.29<br>(16.29)         | 7.79<br>(17.17)         |
| D Type Dimension L            | mm<br>(in.)       | 130<br>(5.12)          | 132<br>(5.2)           | 134<br>(5.28)          | 137<br>(5.39)           | 140<br>(5.51)           | 145<br>(5.71)           | 150<br>(5.91)           | 156<br>(6.14)           | 166<br>(6.54)           | 176<br>(6.93)           |
| E Type Dimension L            | mm<br>(in.)       | 140<br>(5.51)          | 142<br>(5.59)          | 144<br>(5.67)          | 146<br>(5.75)           | 149<br>(5.87)           | 154<br>(6.06)           | 159<br>(6.26)           | 165<br>(6.5)            | 175<br>(6.89)           | 185<br>(7.28)           |

## D Type

## Dimensions and Mounting Data HSUS.../5

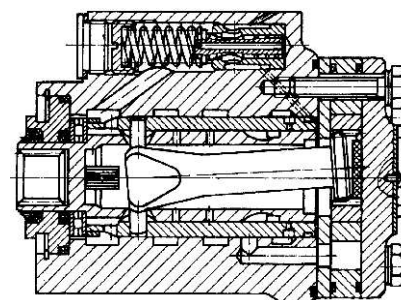
(Inch) show in brackets[ ]



## Thread Ports

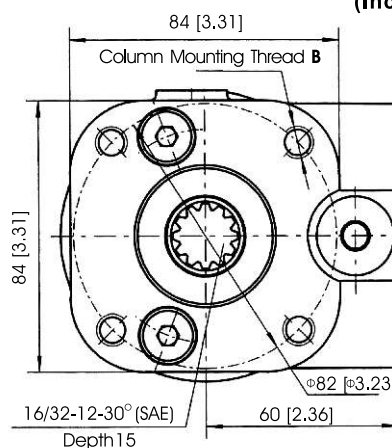
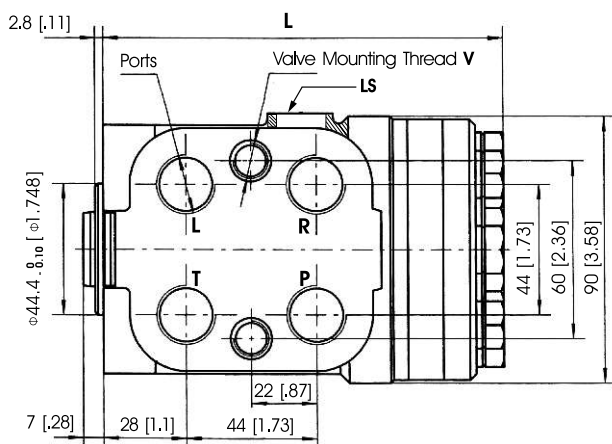
| Code | Ports – P, T, R, L<br>Thread       | Column Mounting<br>Thread - B      | Valve<br>Mounting<br>Thread - V    | LS-Port                        |
|------|------------------------------------|------------------------------------|------------------------------------|--------------------------------|
| -    | G 1/2<br>14 mm depth               | 4 x M10 x 1.5<br>16 mm depth       | 2 x M10 x 1<br>16 mm depth         | G 1/4<br>12 mm depth           |
| GA*  | G 3/8<br>14 mm depth               | 4 x M10 x 1.5<br>16 mm depth       | 2 x M10 x 1<br>16 mm depth         | G 1/4<br>12 mm depth           |
| U    | 3/4 – 16UNF<br>O-ring 14 mm depth  | 4 x 3/8 – 16UNC<br>0.63 [16] depth | 2 x 3/8 – 24UNF<br>0.63 [16] depth | 7/16 -20UNF<br>12 [0.55] depth |
| UA*  | 9/16 – 18UNF<br>O-ring 14 mm depth | 4 x 3/8 – 16UNC<br>0.63 [16] depth | 2 x 3/8 – 24UNF<br>0.63 [16] depth | 7/16 -20UNF<br>12 [0.55] depth |
| M    | M22 - x 1.5<br>14 mm depth         | 4 x M10 x 1.5<br>16 mm depth       | 2 x M10 x 1<br>16 mm depth         | G 1/4<br>12 mm depth           |

\* These threads are for displacements from HSUS50 to HSUS125 only.



## Dimensions and Mounting Data HSUS.../5T

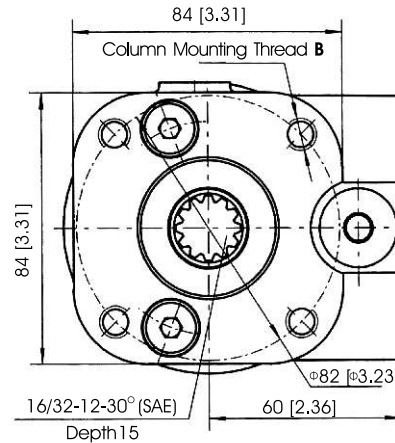
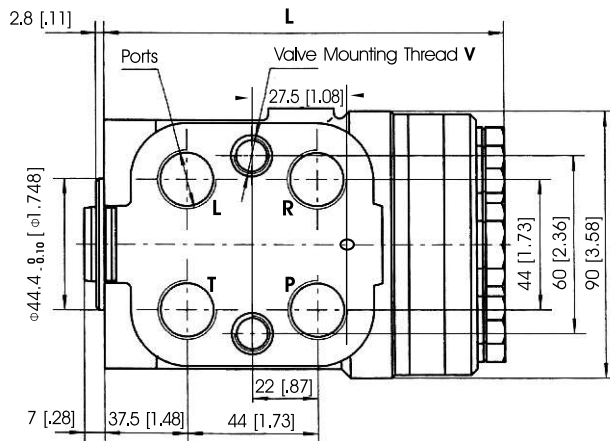
(Inch) show in brackets[ ]



## E Type

## Dimensions and Mounting Data HSUS.../5

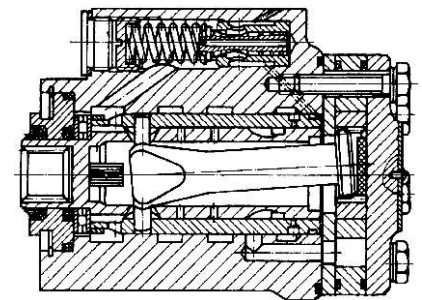
(Inch) show in brackets[ ]



## Thread Ports

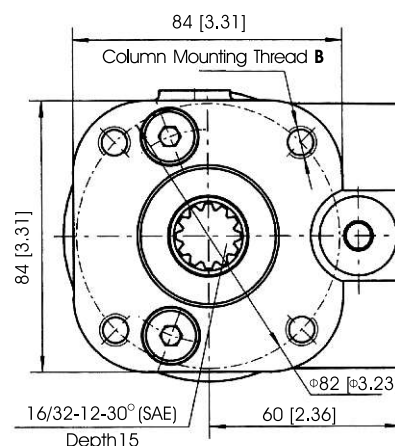
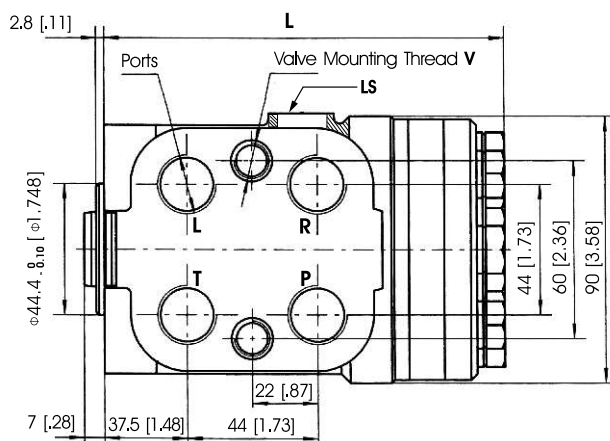
| Code | Ports – P, T, R, L<br>Thread       | Column Mounting<br>Thread - B      | Valve<br>Mounting<br>Thread - V    | LS-Port                        |
|------|------------------------------------|------------------------------------|------------------------------------|--------------------------------|
| -    | G 1/2<br>14 mm depth               | 4 x M10 x 1.5<br>16 mm depth       | 2 x M10 x 1<br>16 mm depth         | G 1/4<br>12 mm depth           |
| GA*  | G 3/8<br>14 mm depth               | 4 x M10 x 1.5<br>16 mm depth       | 2 x M10 x 1<br>16 mm depth         | G 1/4<br>12 mm depth           |
| U    | 3/4 – 16UNF<br>O-ring 14 mm depth  | 4 x 3/8 – 16UNC<br>0.63 [16] depth | 2 x 3/8 – 24UNF<br>0.63 [16] depth | 7/16 -20UNF<br>12 [0.55] depth |
| UA*  | 9/16 – 18UNF<br>O-ring 14 mm depth | 4 x 3/8 – 16UNC<br>0.63 [16] depth | 2 x 3/8 – 24UNF<br>0.63 [16] depth | 7/16 -20UNF<br>12 [0.55] depth |
| M    | M22 - x 1.5<br>14 mm depth         | 4 x M10 x 1.5<br>16 mm depth       | 2 x M10 x 1<br>16 mm depth         | G 1/4<br>12 mm depth           |

\* These threads are for displacements from HSUS50 to HSUS160 only.



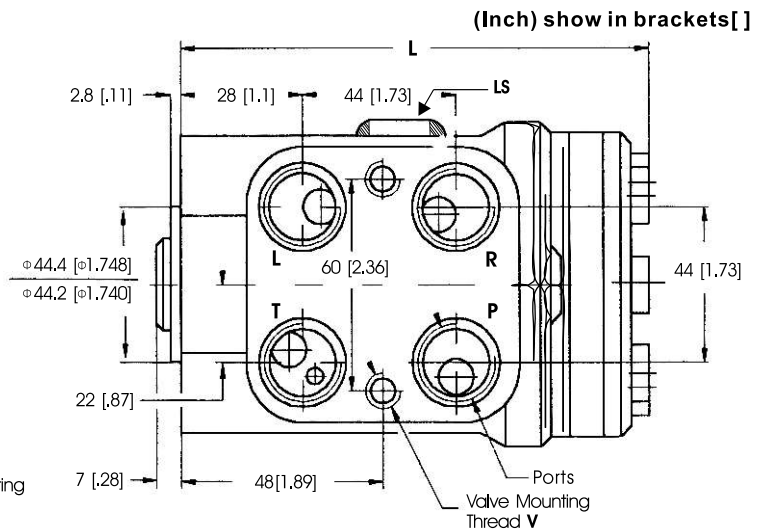
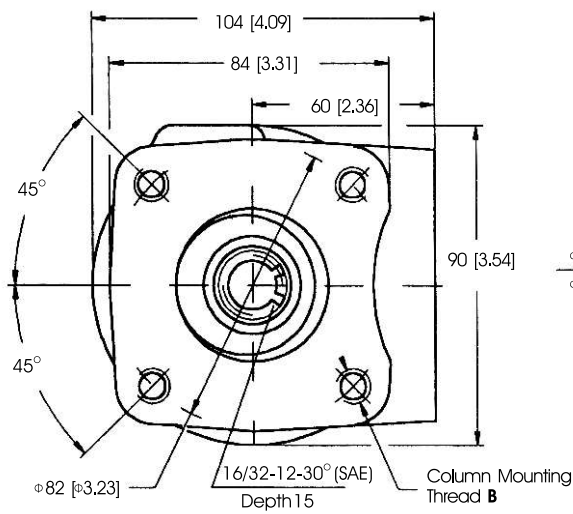
## Dimensions and Mounting Data HSUS.../5T

(Inch) show in brackets[ ]



### D Type

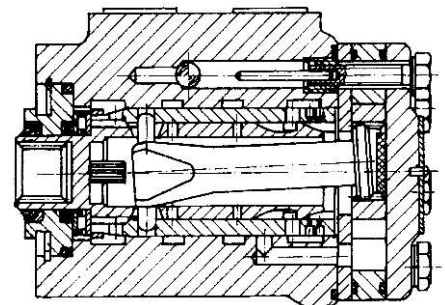
### Dimensions and Mounting Data HSU.../5T



### Thread Ports

| Code | Ports – P, T, R, L<br>Thread       | Column Mounting<br>Thread - B      | Valve<br>Mounting<br>Thread - V    | LS-Port                        |
|------|------------------------------------|------------------------------------|------------------------------------|--------------------------------|
| -    | G 1/2<br>14 mm depth               | 4 x M10 x 1.5<br>16 mm depth       | 2 x M10 x 1<br>16 mm depth         | G 1/4<br>12 mm depth           |
| GA*  | G 3/8<br>14 mm depth               | 4 x M10 x 1.5<br>16 mm depth       | 2 x M10 x 1<br>16 mm depth         | G 1/4<br>12 mm depth           |
| U    | 3/4 – 16UNF<br>O-ring 14 mm depth  | 4 x 3/8 – 16UNC<br>0.63 [16] depth | 2 x 3/8 – 24UNF<br>0.63 [16] depth | 7/16 -20UNF<br>12 [0.55] depth |
| UA*  | 9/16 – 18UNF<br>O-ring 14 mm depth | 4 x 3/8 – 16UNC<br>0.63 [16] depth | 2 x 3/8 – 24UNF<br>0.63 [16] depth | 7/16 -20UNF<br>12 [0.55] depth |
| M    | M22 – x 1.5<br>14 mm depth         | 4 x M10 x 1.5<br>16 mm depth       | 2 x M10 x 1<br>16 mm depth         | G 1/4<br>12 mm depth           |

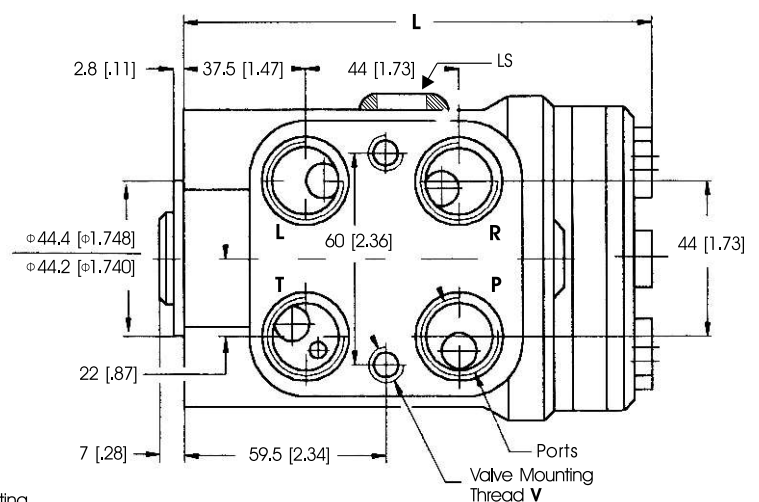
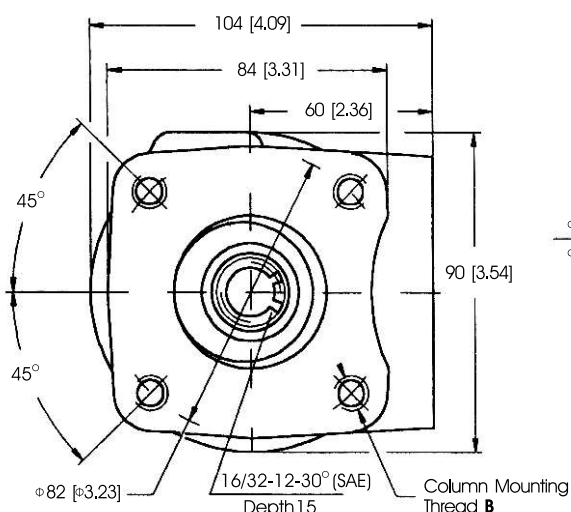
\* These threads are for displacements from HSU50 to HSU125 only.



### E Type

### Dimensions and Mounting Data HSU.../5T

(Inch) show in brackets[ ]



### Ordering Information

|             | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|-------------|---|---|---|---|---|---|---|
| <b>HSUS</b> |   | / | 5 | - | - |   |   |

#### Pos.1 Displacement Code

|     |                           |
|-----|---------------------------|
| 50  | - 50.8cc / 3.1 [in.3/r]   |
| 63  | - 62.9cc / 3.8 [in.3/r]   |
| 80  | - 79.8cc / 4.9 [in.3/r]   |
| 100 | - 99.6cc / 6.1 [in.3/r]   |
| 125 | - 124.5cc / 7.6 [in.3/r]  |
| 160 | - 159.6cc / 9.8 [in.3/r]  |
| 200 | - 199.4cc / 12.2 [in.3/r] |
| 250 | - 249.2cc / 15.2 [in.3/r] |
| 315 | - 316.5cc / 19.4 [in.3/r] |
| 400 | - 399.7cc / 24.4 [in.3/r] |

#### Pos.2 Versions Code

|   |                                                                   |
|---|-------------------------------------------------------------------|
| 5 | - Version 5 "Cloas Cneter - Non Reaction and Load Sensing Outlet" |
|---|-------------------------------------------------------------------|

#### Pos.3 Priority Valves Connection

|      |                    |
|------|--------------------|
| Omit | - Modular Mounting |
| T    | - Pipe Mounting    |

#### Pos.4 LS - Valve Pressure Settings, bar(PSI)

|     |              |
|-----|--------------|
| 80  | - 80 [1160]  |
| 100 | - 100 [1450] |
| 120 | - 120 [1740] |
| 140 | - 140 [2030] |
| 160 | - 160 [2320] |

#### Pos.5 Ports Code

|      |                         |
|------|-------------------------|
| Omit | - G 1/2                 |
| GA   | - G 3/8                 |
| U    | - 3/4 - 16 UNF "O" Ring |
| UA   | - 9/16-18 UNF "O" Ring  |
| M    | - Metric                |

#### Pos.6 Type Code

|      |          |
|------|----------|
| Omit | - D Type |
| E    | - E Type |

#### Pos.7 Design Series

|      |                     |
|------|---------------------|
| Omit | - Factory specified |
|------|---------------------|

|            | 1 | 2 | 3 | 4 | 5 | 6 |
|------------|---|---|---|---|---|---|
| <b>HSU</b> |   | / | 5 | T | - |   |

#### Pos.1 Displacement Code

|     |                           |
|-----|---------------------------|
| 50  | - 50.8cc / 3.1 [in.3/r]   |
| 63  | - 62.9cc / 3.8 [in.3/r]   |
| 80  | - 79.8cc / 4.9 [in.3/r]   |
| 100 | - 99.6cc / 6.1 [in.3/r]   |
| 125 | - 124.5cc / 7.6 [in.3/r]  |
| 160 | - 159.6cc / 9.8 [in.3/r]  |
| 200 | - 199.4cc / 12.2 [in.3/r] |
| 250 | - 249.2cc / 15.2 [in.3/r] |
| 315 | - 316.5cc / 19.4 [in.3/r] |
| 400 | - 399.7cc / 24.4 [in.3/r] |

#### Pos.2 Versions Code

|   |                                                                    |
|---|--------------------------------------------------------------------|
| 5 | - Version 5 "Closed Center - Non Reaction and Load Sensing Outlet" |
|---|--------------------------------------------------------------------|

#### Pos.3 Priority Valves Connection

|   |                 |
|---|-----------------|
| T | - Pipe Mounting |
|---|-----------------|

#### Pos.4 Ports Code

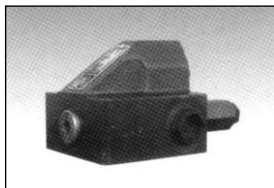
|      |                         |
|------|-------------------------|
| Omit | - G 1/2                 |
| GA   | - G 3/8                 |
| U    | - 3/4 - 16 UNF "O" Ring |
| UA   | - 9/16-18 UNF "O" Ring  |
| M    | - Metric                |

#### Pos.5 Type Code

|      |          |
|------|----------|
| Omit | - D Type |
| E    | - E Type |

#### Pos.6 Design Series

|      |                     |
|------|---------------------|
| Omit | - Factory specified |
|------|---------------------|



The Priority Valves distribute and trace the hydraulic flow from the supply pump of the hydraulic system to the hydraulic components which control and run the vehicle.

The Priority Valves are used only with the HSUS.../5(T) hydrostatic steering units. When connected, the steering unit and the priority valve represent sophisticated hydraulic tracing system that controls the flow in both main pipelines of the hydraulic system (the working and control one) at any time of its operation.

As a static signal, the "LS" signal must be used in systems with circuit stability. The connection between the priority valves and the HSUS.../5T steering units has to be as short as possible, but should not exceed 1.5m (for iron pipe with 4).

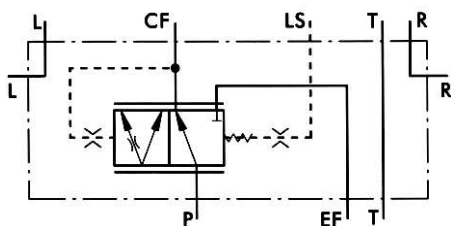
## Specifications

| Parameters                       |             | Type           |   |      |         |   |      |
|----------------------------------|-------------|----------------|---|------|---------|---|------|
|                                  |             | PVF(D), PVT(D) |   |      | PVTA(D) |   |      |
| Rate Flow (l/min)                |             | 40, 80         |   |      |         |   |      |
| Control Spring Pressure (bar)    |             | 4.5            | 7 | 10.5 | 4.5     | 7 | 10.5 |
| Max. Pressure in Oil Ports (bar) | P, EF, R, L | 200            |   |      |         |   |      |
|                                  | LS, CF      | 175            |   |      |         |   |      |
|                                  | T           | 20             |   |      |         |   |      |
| Weight, avg. (Kg)                |             | 2.7            |   |      | 1.2     |   |      |

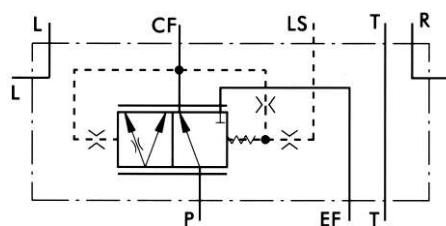
P- Pump, EF- Excess Flow, CF- Control Flow(first priority flow),

L- Left , R- Right, LS- Load Sensing, T- Tank

## Modular Mounting

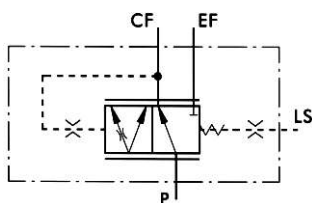


Static Signal  
PVF ...40, 80/...

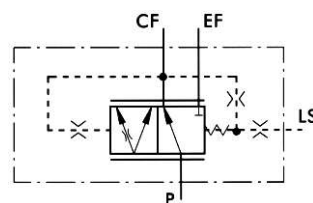


Dynamic Signal  
PVFD... 40, 80/...

## Pipe Mounting

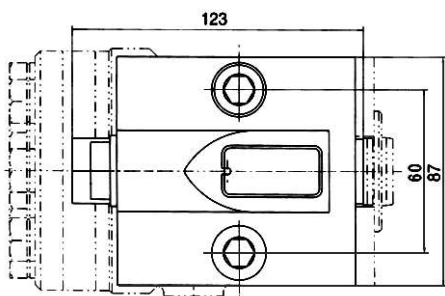
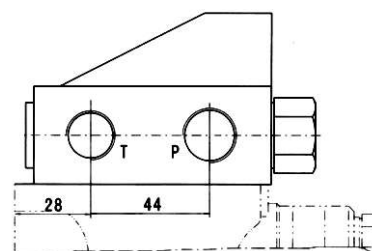
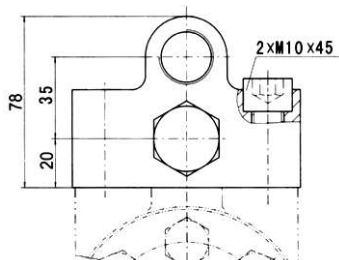
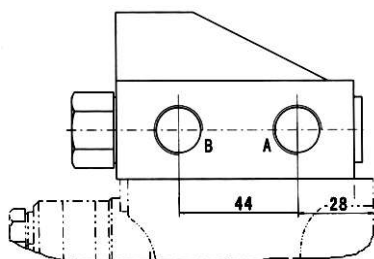


Static Signal  
PVT40, 80 , PVTA 40/80



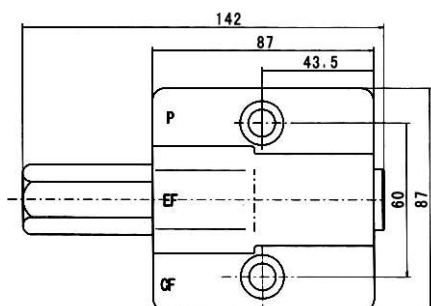
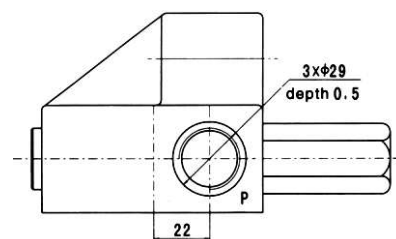
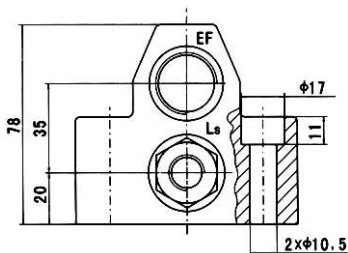
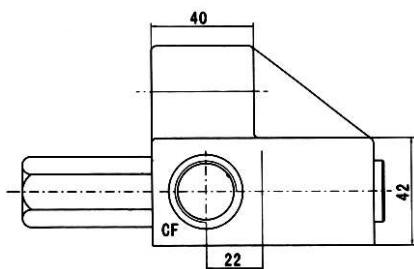
Dynamic Signal  
PVTD40, 80 , PVTAD40,80

## Dimensions and Mounting Data for PVF(D) 40,80/...



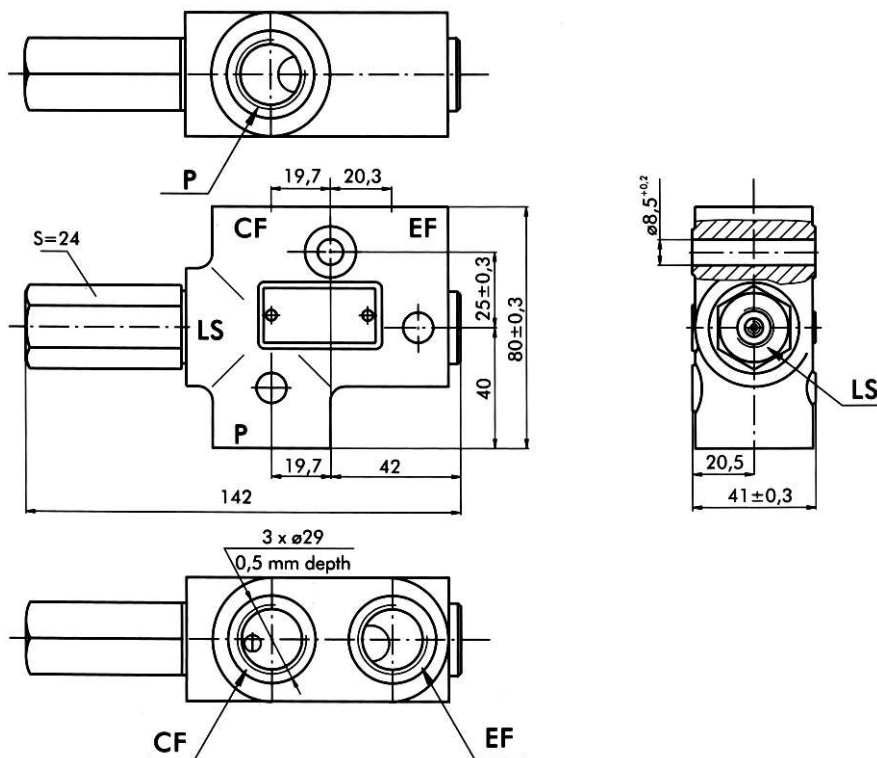
| Code | Ports – P, EF<br>Thread           | Ports – T, RL<br>Thread           |
|------|-----------------------------------|-----------------------------------|
| -    | G 1/2<br>14 mm depth              | G 3/8<br>14 mm depth              |
| M    | M22 x 1.5<br>14 mm depth          | M18 x 1.5<br>14 mm depth          |
| U    | 7/8 – 14UNF<br>O-ring 14 mm depth | 3/4 – 16UNF<br>O-ring 14 mm depth |

## Dimensions and Mounting Data for PVT(D) 40,80/...

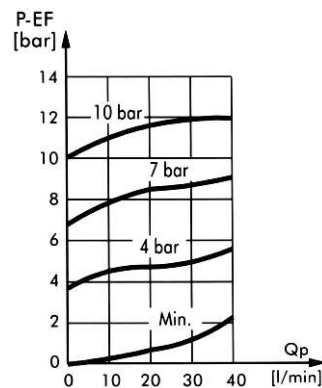


| Code | Ports – P, EF<br>Thread           | Ports – CF<br>Thread              | LS - Ports                          |
|------|-----------------------------------|-----------------------------------|-------------------------------------|
| -    | G 1/2<br>14 mm depth              | G 1/2<br>14 mm depth              | G 1/4<br>14 mm depth                |
| M    | M22 x 1.5<br>14 mm depth          | M22 x 1.5<br>14 mm depth          | G1/4<br>14 mm depth                 |
| U    | 7/8 – 14UNF<br>O-ring 14 mm depth | 3/4 – 16UNF<br>O-ring 14 mm depth | 7/8 – 20UNF<br>O-ring 12,7 mm depth |

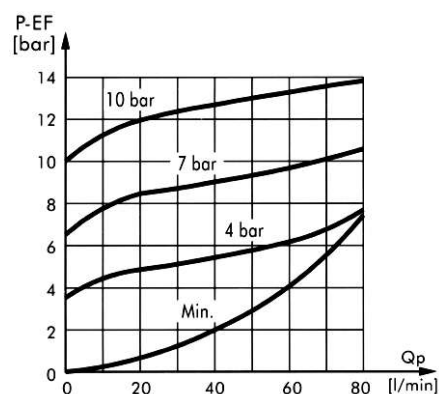
## Dimensions and Mounting Data for PVTA 40,80/...



### PV...40



### PV...80



| Code | Ports – P, EF<br>Thread           | Ports – CF<br>Thread              | LS - Ports                          |
|------|-----------------------------------|-----------------------------------|-------------------------------------|
| -    | G 1/2<br>14 mm depth              | G 1/2<br>14 mm depth              | G 1/4<br>14 mm depth                |
| M    | M22 x 1.5<br>14 mm depth          | M22 x 1.5<br>14 mm depth          | G1/4<br>14 mm depth                 |
| U    | 7/8 – 14UNF<br>O-ring 14 mm depth | 3/4 – 16UNF<br>O-ring 14 mm depth | 7/8 – 20UNF<br>O-ring 12.7 mm depth |

## Ordering Information

|    |   |   |   |   |   |   |
|----|---|---|---|---|---|---|
| 1  | 2 | 3 | 4 | 5 | 6 | 7 |
| PV |   |   | / | - |   |   |

### Pos.1 Mounting

- F** - Modularly Mounting
- T** - Pipe Mounting (Mode 1)
- TA** - Pipe Mounting (Mode 2)

### Pos.2 Signal Type

- Omit** - With Static Signal
- D** - With Dynamic Signal

### Pos.3 Rated Flow, l/min

40 80

### Pos.4 Control Spring Pressure, bar

4.5 7 10.5

### Pos.5 Ports

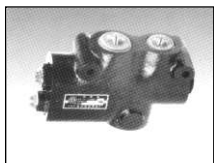
- Omit** - G 1/2
- U** - SAE (ANSI B1.1 - 1982)
- M** - Metric (ISO 262)

### Pos.6 Option (Paint)

- Omit** - Grey
- B** - Black
- 00** - No Paint

### Pos.7 Design Series

- Omit** - Factory specified



The Priority Valves PRT .../160 have built-in a pilot pressure relief valve, who protect the steering unit against excess pressure. The pilot pressure relief valve operates with the Shuttle of the Priority Valve to limit the maximum steering pressure P-T measured across the steering unit ports.

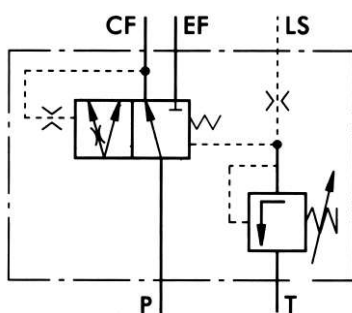
## Specifications

| Parameters                                    |         | Type            |   |      |
|-----------------------------------------------|---------|-----------------|---|------|
|                                               |         | PRT(E), PRTD(E) |   |      |
| Rate Flow                                     | (l/min) | 40, 80, 160     |   |      |
| Control Spring Pressure                       | (bar)   | 4.5             | 7 | 10.5 |
| Max. Pressure in Oil Ports<br>(bar)           | P, EF   | 200             |   |      |
|                                               | LS, CF  | 175             |   |      |
|                                               | T       | 15              |   |      |
|                                               | PP      | 175             |   |      |
| Standard Relief Valve Pressure Settings (bar) |         | 175*            |   |      |
| Weight, avg.                                  | (Kg)    | 5.1             |   |      |

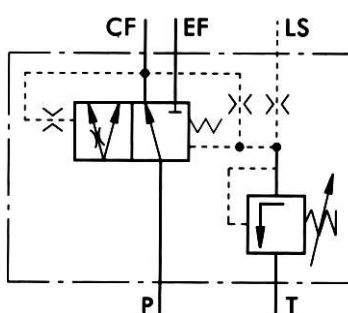
\*- Adjusted valve pressure from 80 till 210 bar upon customer request.

**P**- Pump, **EF**- Excess Flow, **CF**- Control Flow(first priority oil flow),

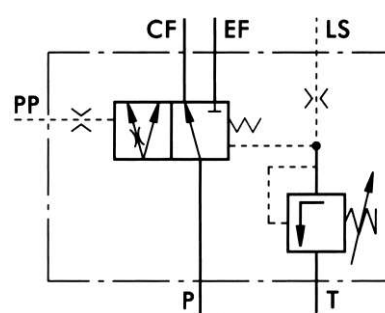
**LS**- Load Sensing, **T**- Tank, **PP**-Pilot Pressure



Static Signal  
PRT 40, 80, 160/....

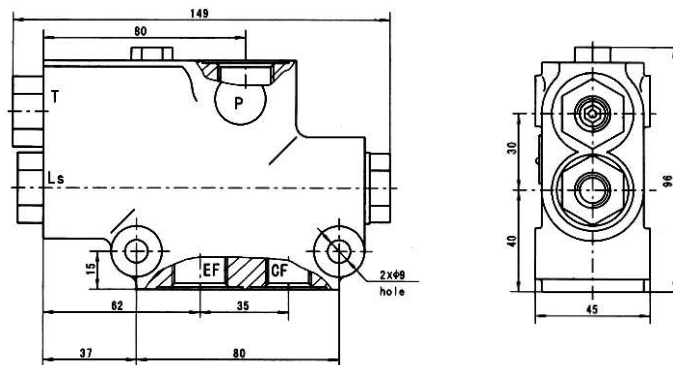


Dynamic Signal  
PRTD 40, 80, 160/....



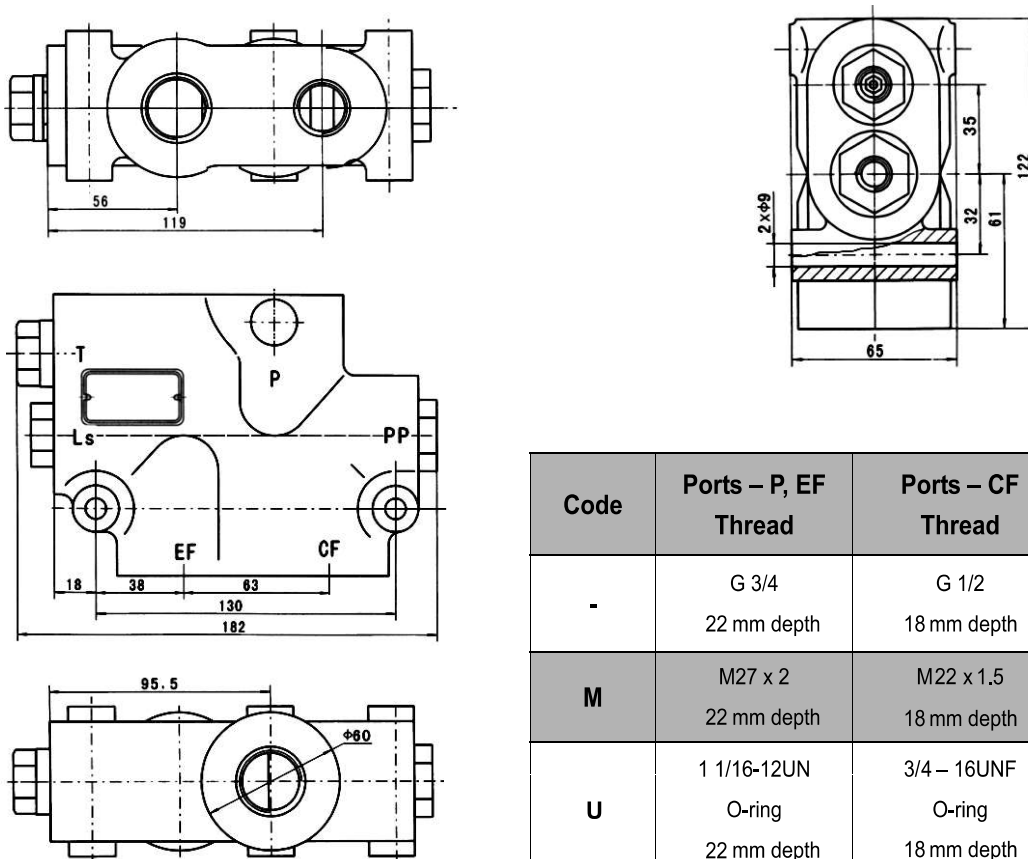
Static Signal with External Pilot  
PRTE 160/....

## Dimensions and Mounting Data for PRT(D) 40,80/...



| Code | Ports – P, EF Thread              | Ports – CF Thread                  | LS - Ports                         |
|------|-----------------------------------|------------------------------------|------------------------------------|
| -    | G 1/2<br>16 mm depth              | G 3/8<br>16 mm depth               | G 1/4<br>14 mm depth               |
| M    | M22 x 1.5<br>16 mm depth          | M18 x 1.5<br>16 mm depth           | M12 x 1.5<br>14 mm depth           |
| U    | 7/8 – 14UNF<br>O-ring 16 mm depth | 3/4 – 16 UNF<br>O-ring 16 mm depth | 7/16 – 20UNF<br>O-ring 14 mm depth |

## Dimensions and Mounting Data for PRT(D) 160/...



| Code | Ports – P, EF Thread                 | Ports – CF Thread                    | LS, PP, T - Ports                  |
|------|--------------------------------------|--------------------------------------|------------------------------------|
| -    | G 3/4<br>22 mm depth                 | G 1/2<br>18 mm depth                 | G 1/4<br>14 mm depth               |
| M    | M27 x 2<br>22 mm depth               | M22 x 1.5<br>18 mm depth             | M12 x 1.5<br>14 mm depth           |
| U    | 1 1/16-12UN<br>O-ring<br>22 mm depth | 3/4 – 16UNF<br>O-ring<br>18 mm depth | 7/16-20UN<br>O-ring<br>14 mm depth |

## Ordering Information

|            | 1 | 2 | 3 | 4 | 5 | 6 |
|------------|---|---|---|---|---|---|
| <b>PRT</b> |   | - | - |   |   |   |

### Pos.1 Signal Type

- ☐ Omit - With Static Signal  
☐ D - With Dynamic Signal  
☐ E\* - With Static Signal w/External Pilot

### Pos.2 Rated Flow, l/min

|    |    |     |
|----|----|-----|
| 40 | 80 | 160 |
|----|----|-----|

### Pos.3 Control Spring Pressure, bar

|     |   |      |
|-----|---|------|
| 4.5 | 7 | 10.5 |
|-----|---|------|

### Pos.4 Ports

- ☐ Omit - G 1/2 for PRT(D)40, 80 G 3/4 for PRT160  
☐ M - Metric (ISO 262)  
☐ U - SAE (ANSI B1.1 - 1982)

### Pos.5 Option (Paint)

- ☐ Omit - Grey  
☐ B - Painted  
☐ 00 - No Paint

### Pos.6 Design Series

- ☐ Omit - Factory specified

Note: \* Only for PRT 160/...

The priority valves are mangano-phosphatized as standard.