

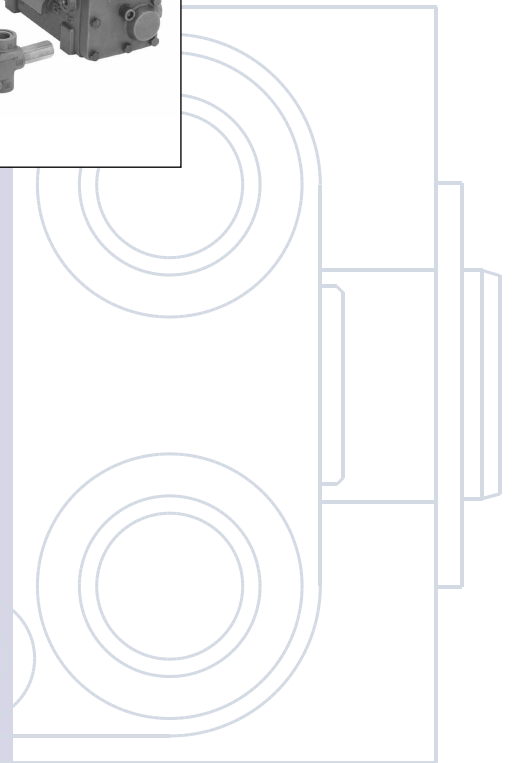
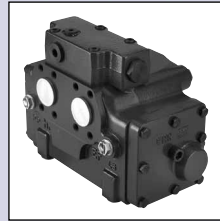


OSPB, OSPC, OSPF,  
OSPD, OSPQ, OSPL  
Load Sensing  
Steering Units

OLS Priority Valves

OSQ Flow Amplifiers

Technical  
Information



#### Revision History

#### Table of Revisions

| Date     | Page    | Changed                      | Rev |
|----------|---------|------------------------------|-----|
| Nov 2009 | Many    | Steering column deleted      | BA  |
| Sep 2010 | 88      | New back cover               | BB  |
| Feb 2011 | 4-5, 13 | Typos                        | BC  |
| Jun 2011 | 33      | Flow range                   | BD  |
| Feb 2012 | 80      | Max pressure options changed | BE  |

#### A Wide Range of Steering Components



F500 026

Sauer-Danfoss is the largest producer in the world of steering components for hydrostatic steering systems on off-road vehicles. Sauer-Danfoss offer steering solutions both at component and system levels. Our product range makes it possible to cover applications of all types - ranging from ordinary 2-wheel steering (also known as Ackermann steering) to articulated steering, complicated 4-wheel steering, automatic steering (e.g. by sensor) and remote controlled steering via satellite. We can offer more than 1500 different steering units and 250 different priority valves categorized in types, variants and sizes.

T301033

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Frontpage: F300 611, F300 612, F300 615, F300 617, F300 620, F300 622, F301 256, F301 470, F300 601. Drawing 151-577

#### A Wide Range of Steering Components (continued)

#### For hydrostatic steering systems Sauer-Danfoss offers:

- Mini steering units with displacements from 32 to 100 cm<sup>3</sup>/rev [1.95 to 6.10 in<sup>3</sup>/rev], flow up to 20 l/min [5.28 US gal/min], steering pressure up to 125 bar [1813 psi].
- Steering units with displacements from 40 to 1200 cm<sup>3</sup>/rev [2.44 to 73.2 in<sup>3</sup>/rev], flow up to 100 l/min [26.4 US gal/min], steering pressure up to 240 bar [3481 psi].
- Priority valves for rated flows at 40, 80, 120, 160 and 320 l/min [10.6, 21.1, 31.7, 42.3 and 84.5 US gal/min], pressure up to 350 bar [5076 psi].
- Pilot operated flow-amplifiers with amplification factors of 4, 5, 8, 10 or 20 for rated oil flows of 240 and 400 l/min [63.4 and 105.7 US gal/min], steering pressure up to 210 bar [3045 psi].
- Pilot operated steering valve with steering flow up to 100 l/min [26.4 US gal/min], steering pressure up to 250 bar [3625 psi] and with integrated priority valve for pump flow up to 120 l/min [31.7 US gal/min].

#### For electro hydraulic steering systems Sauer-Danfoss offers:

- Pilot operated steering valves (pilot operated by hydrostatic steering unit or by electrical signal) with steering flows up to 100 l/min [26.4 US gal/min], steering pressure up to 250 bar [3625 psi].
- Steering units with integrated electrical operated steering valve with steering flow up to 50 l/min [13.2 US gal/min], steering pressure up to 210 bar [3045 psi].
- Electrical operated steering valves with steering flow up to 40 l/min [10.57 US gal/min], steering pressure up to 210 bar [3045 psi].

#### Characteristic features for steering units:

- Low steering torque: From 0.5 Nm to 3 Nm in normal steering situations
- Low noise level
- Low pressure drop
- Many types available: Open center None reaction, Open center Reaction, Closed center None reaction, Load Sensing, Load Sensing Reaction
- One or more built-in valve functions: relief valve, shock valves, suction valves, none return valve in P-line and in LS-line
- Optional port connections (according to ISO, SAE or DIN standards)

#### Characteristic features for electrohydraulic steering system:

- Electrohydraulic steering valve EHPS: High steering pressure requiring smaller cylinders and flow
- EHPS: Low pilot pressure and flow giving extremely low noise in the cabin
- EHPS: The possibility of manual steering even on very heavy vehicles
- EHPS can be combined with Sauer-Danfoss PVG 32 proportional valve
- Minimization of side acceleration with articulated steering
- Possibility of GPS-, row sensor-, joy stick- steering and variable steering ratio

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#### Conversion Factors

|       |   |                |                   |   |                          |
|-------|---|----------------|-------------------|---|--------------------------|
| 1 N·m | = | [8.851 lbf·in] | 1 cm <sup>3</sup> | = | [0.061 in <sup>3</sup> ] |
| 1 N   | = | [0.2248 lbf]   | 1 l               | = | [0.264 US gal]           |
| 1 bar | = | [14.50 psi]    | °F                | = | [1.8°C + 32]             |
| 1 mm  | = | [0.0394 in]    |                   |   |                          |

T301035

#### Contents

|                                                                                    |           |
|------------------------------------------------------------------------------------|-----------|
| <b>A Wide Range of Steering Components.....</b>                                    | <b>2</b>  |
| Conversion Factors .....                                                           | 3         |
| Survey of Literature with Technical Data on Sauer-Danfoss Steering Components..... | 6         |
| <b>LS Steering Units OSPB, OSPC, OSPF, OSPD, OSPQ, OSPL .....</b>                  | <b>7</b>  |
| Versions.....                                                                      | 7         |
| Code Numbers and Weights .....                                                     | 13        |
| OSPB load sensing static non-reaction steering units.....                          | 13        |
| OSPB load sensing dynamic non-reaction steering units.....                         | 14        |
| OSPC load sensing static non-reaction steering unit .....                          | 15        |
| OSPC load sensing dynamic non-reaction steering units.....                         | 16        |
| OSPC load sensing dynamic reaction steering units .....                            | 17        |
| OSPF load sensing dynamic non-reaction steering units .....                        | 18        |
| OSPD load sensing non-reaction steering units.....                                 | 19        |
| OSPQ load sensing dynamic non-reaction steering units .....                        | 20        |
| OSPL load sensing static non-reaction steering units.....                          | 21        |
| OSPL load sensing dynamic non-reaction steering units .....                        | 21        |
| OSPBX and OSPLX load sensing static steering units for OSQ static .....            | 23        |
| OSPCX load sensing dynamic steering units for OSQ dynamic .....                    | 23        |
| Specification Table for Non Catalogue Numbers of LS Steering Units.....            | 24        |
| Port Thread Versions and Valve Combinations .....                                  | 26        |
| Technical Data .....                                                               | 29        |
| Displacement, flow and pressure: OSPB LS, OSPC LS, OSPC LSR.....                   | 29        |
| Displacement, flow and pressure: OSPF LS .....                                     | 30        |
| Displacement, Flow and Pressure: OSPD LS, OSPQ LS.....                             | 31        |
| Displacement, flow and pressure: OSPL LS, OSPBX LS, OSPCX LS, OSPLX LS .....       | 32        |
| Valve functions in OSPC, OSPF, OSPD, OSPQ and OSPL LS steering units.....          | 33        |
| Port Thread Versions.....                                                          | 35        |
| Dimensions.....                                                                    | 36        |
| OSPB LS for OLS, OSPBX LS for OSQ.....                                             | 36        |
| OSPC LS/LSR and OSPF LS for OLS, OSPCX LS for OSQ .....                            | 37        |
| OSPD LS/LSR for OLS .....                                                          | 38        |
| OSPQ LS/LSR for OLS .....                                                          | 39        |
| OSPL LS for OLS and OSPLX LS for OSQ.....                                          | 40        |
| OSPL 1200 LS for OLS .....                                                         | 41        |
| <b>Valve Block OVPL.....</b>                                                       | <b>42</b> |
| Versions.....                                                                      | 42        |
| Code Numbers and Weights .....                                                     | 42        |
| Technical Data .....                                                               | 46        |
| Installation .....                                                                 | 48        |
| Dimensions.....                                                                    | 49        |
| <b>Angle Block OVR .....</b>                                                       | <b>51</b> |
| Version.....                                                                       | 51        |
| Code Numbers and Weight .....                                                      | 51        |
| Installation .....                                                                 | 51        |
| Dimensions.....                                                                    | 52        |

## Contents

|                                                                                      |           |
|--------------------------------------------------------------------------------------|-----------|
| <b>Priority Valves OLSA and OLS .....</b>                                            | <b>53</b> |
| Versions.....                                                                        | 53        |
| System Sizing .....                                                                  | 56        |
| Code Numbers and Weights .....                                                       | 56        |
| OLS/OLSA static priority valves for load sensing static steering units .....         | 56        |
| OLS/OLSA static priority valves for load sensing statics steering units .....        | 57        |
| OLS/OLSA dynamic priority valves for load sensing dynamic steering units .....       | 57        |
| OLS/OLSA dynamic priority valves for load sensing dynamic steering units .....       | 58        |
| OLS dynamic priority valves for OSPF LS dynamic steering units.....                  | 59        |
| Specification Table for Non Catalogue Numbers of Sauer-Danfoss Priority Valves.....  | 61        |
| Technical Data .....                                                                 | 62        |
| Max. Pressure on Connections .....                                                   | 62        |
| Pressure Drop in Priority Valves.....                                                | 63        |
| Dimensions.....                                                                      | 70        |
| OLSA .....                                                                           | 70        |
| OLS 40, OLS 80 .....                                                                 | 71        |
| OLS 120.....                                                                         | 72        |
| OLS 160.....                                                                         | 73        |
| OLSP 80.....                                                                         | 74        |
| OLS 320 in-line.....                                                                 | 75        |
| <b>Flow Amplifiers OSQA, OSQB and OSQB/OLSQ.....</b>                                 | <b>76</b> |
| Versions.....                                                                        | 76        |
| Code Numbers and Weights .....                                                       | 78        |
| Specification Table for Non Catalogue Numbers of Sauer-Danfoss Flow Amplifiers ..... | 79        |
| Technical Data .....                                                                 | 80        |
| Flow and Pressure.....                                                               | 80        |
| Total Displacement of Steering System .....                                          | 80        |
| Installation.....                                                                    | 80        |
| Valve functions in the flow amplifiers .....                                         | 81        |
| Dimensions.....                                                                      | 85        |
| OSQA .....                                                                           | 85        |
| OSQB .....                                                                           | 86        |
| OSQB with OLSQ .....                                                                 | 87        |

#### Survey of Literature with Technical Data on Sauer-Danfoss Steering Components

Detailed data on all Sauer-Danfoss steering components and accessories can be found in our steering component catalogues, which is divided in to 6 individual sub catalogues:

- |                                                                                                                                                  |                                                                     |
|--------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------|
| • General information                                                                                                                            | Steering components                                                 |
| • Technical data on mini steering units                                                                                                          | OSPM                                                                |
| • Technical data on open center, and closed center steering units                                                                                | OSPB, OSPC, and OSPD                                                |
| • Technical data on load sensing steering units, priority valves and flow amplifiers                                                             | OSPB, OSPC, OSPF, OSPD, OSPQ, OSPL, OSPBX, OSPLX, OVPL, OLS and OSQ |
| • Technical data on hydraulic and electro-hydraulic pilot operated steering valves, electrical actuation modules and appropriate steering units. | EHPS, EHPS w. OLS 320, PVE for EHPS and OSPCX                       |
| • Technical data on combined steering unit/electro hydraulic steering valves and steering wheel sensors                                          | OSPE and SASA                                                       |

The most important data on all Sauer-Danfoss steering components is highlighted in a general survey brochure.

For technical information on individual variants, please contact the Sauer-Danfoss Sales Organization.

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#### Versions

##### Load sensing

In load sensing steering systems both the steering system and the working hydraulics can be supplied with oil from the same pump, using a load sensing pump, also delivers the potential for energy saving.

Load sensing steering units have an extra connection for load sensing (LS), so that a load pressure signal can be directed via the steering unit to a Sauer-Danfoss priority valve and/or an LS pump. The load sensing signal controls the oil flow from the priority valve (and/or the LS pump) to the steering unit. The LS connection is open to tank when the steering unit is in the neutral position.

##### Load sensing static

Load sensing static steering units require load sensing static priority valves and/or load sensing static variable displacement pumps. Load sensing static steering systems have no oil flow in the LS connection when the steering unit is in neutral position.

##### Load sensing dynamic

Load sensing dynamic steering units require load sensing dynamic priority valves and/or load sensing dynamic variable displacement pumps. Load sensing dynamic steering systems have a constant oil flow in the LS connection in the direction of the steering unit even when the steering unit is in neutral position.

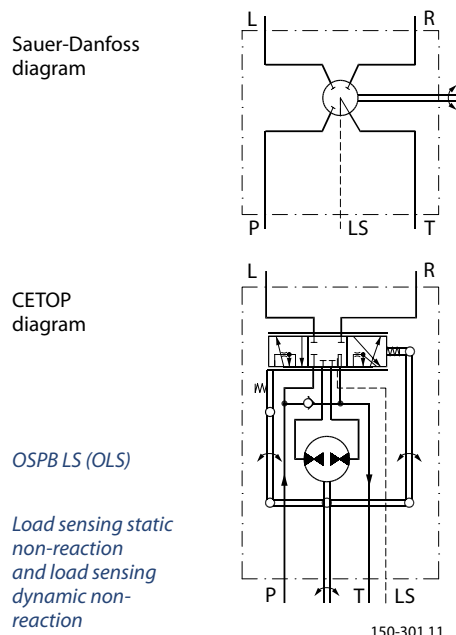
##### Reaction

With reaction steering units any external forces acting on the steered wheels result in a corresponding movement of the steering wheel when the driver is not steering the vehicle.

##### Non-reaction

With non-reaction steering units there is no corresponding movement of the steering wheel when the driver is not steering the vehicle

#### OSPB LS: Steering unit with no valve functions



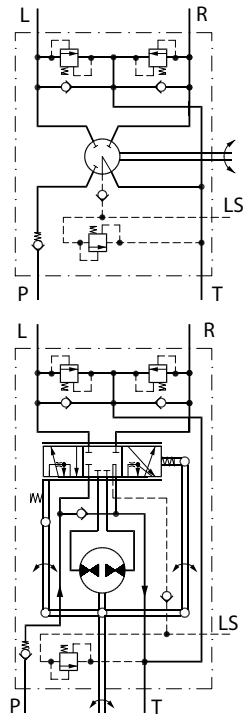
F300614

**Versions**



F300614

**OSPC LS: Steering unit load sensing  
with integrated valve functions for in  
line priority valve OLS**



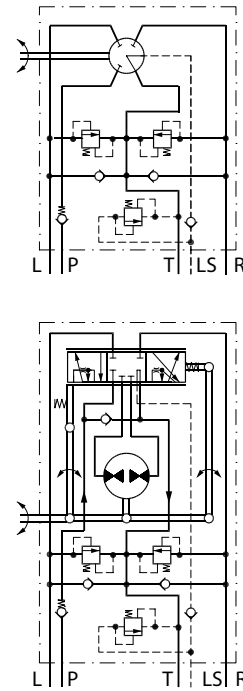
150-595.11

*OSPC LS (OLS)  
Load sensing dynamic non-reaction*



F300724

**OSPC LS: Steering unit load sensing  
with integrated valve functions for  
flange on priority valve OLSA**



150-596.10

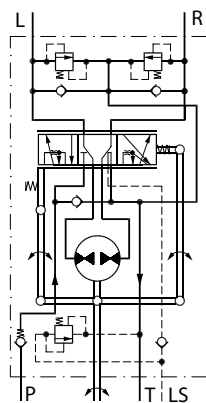
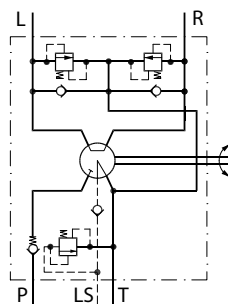
*OSPC LS (OLSA)  
Load sensing dynamic non-reaction*

## Versions



F300617

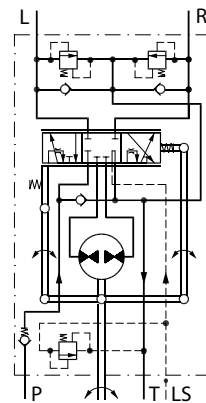
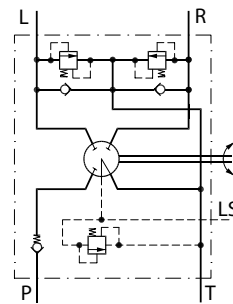
**OSPC LSR: Steering unit load sensing dynamic with integrated valve functions**



150-598.11

*OSPC LSR (OLS)  
 Load sensing dynamic reaction*

**OSPF LS : Steering unit full drain load sensing dynamic and with integrated valve functions**



150-597.11

*OSPF LS (OLS)  
 Load sensing dynamic non-reaction*

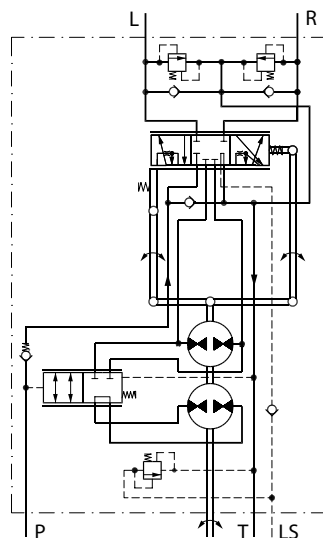
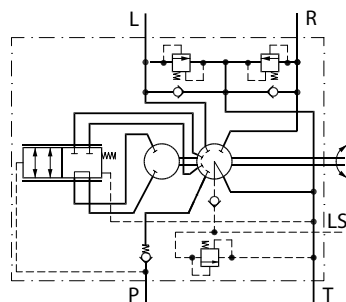
#### Version

#### OSPD LS: Steering unit load sensing dynamic with 2 rotary meters and with integrated valve functions

The OSPD has 2 rotary meters (gear wheel sets). Should the pump supply be lost, only one rotary meter is active for emergency steering. In normal steering situations both rotary meters are active.



F300612



150-599.11

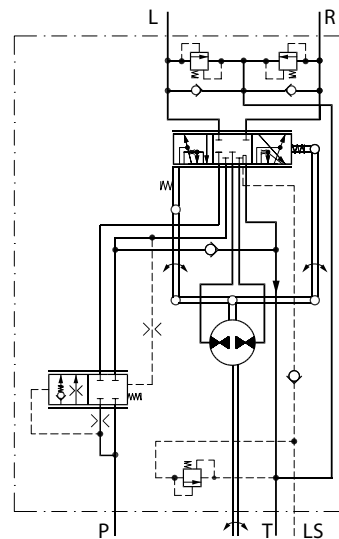
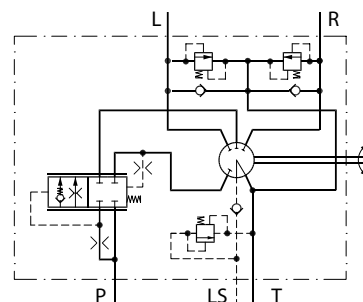
*OSPD LS (OLS)*  
*Load sensing dynamic non-reaction*

#### OSPQ LS: Steering unit load sensing dynamic with flow amplification and with integrated valve functions

The OSPQ has incorporated amplification valve. Should pump supply fail or the steering wheel speed be less than approximate 10 rev/min only the rotary meter determines the displacement. In normal steering situations or at higher steering wheel speed, oil is also led to the steering cylinder via the built in amplification valve.



F300615



150-600.11

*OSPQ LS (OLS)*  
*Load sensing dynamic non-reaction*

#### Version

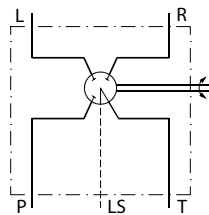
#### OSPL LS:

Steering unit load sensing for high steering flow, displacement larger than 500 cm<sup>3</sup>/rev [30.5 in<sup>3</sup>/rev].

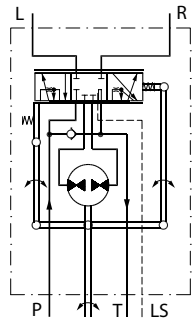
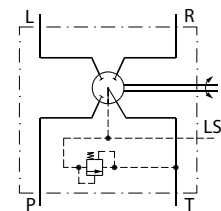


F300611

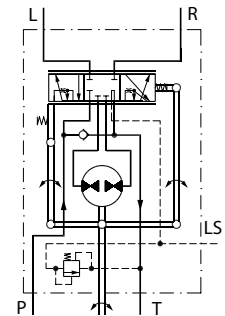
*OSPL LS (OLS)  
Load sensing static  
non-reaction*



*OSPL LS (OLS)  
Load sensing dynamic  
non-reaction*

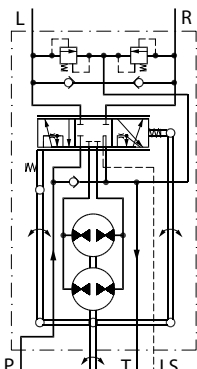
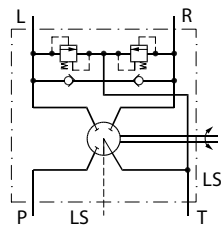


150-301.11



150-601.10

*OSPL 1200 (OLS) Load  
sensing dynamic non-  
reaction*



150-613.10



F301 082

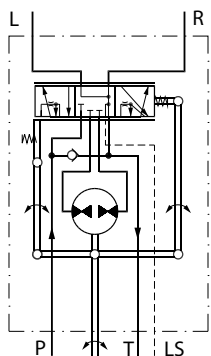
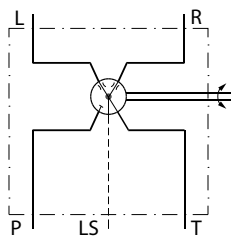
#### Versions

#### **OSPBX LS, OSPCX LS and OSPLX LS: Steering units load sensing for flow amplifiers.**

OSPBX LS, OSPCX LS and OSPX LS are load sensing steering units with the L and the R connections open to tank when in neutral position. OSPBX LS, OSPCX LS and OSPX LS can only be used with Sauer-Danfoss flow-amplifiers OSQA or OSQB. OSPBX LS, OSPCX LS and OSPX LS steering units must not be connected directly to the steering cylinder. OSPCX LS is for OSQ dynamic without pilot pressure relief valve.

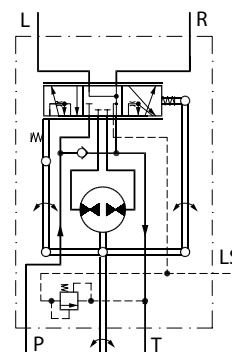
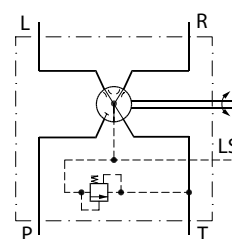


. 300614



150-310.12

OSPBX LS, OSPLX LS  
Load sensing static



150-602.10

OSPCX LS  
Load sensing dynamic

#### Code Numbers and Weights

#### OSPB load sensing static non-reaction steering units

OSPB LS Static steering units have no valve functions.

OSPB LS in the table below have all standard neutral setting springs, see page 24

| Steering unit | Code Numbers                                     |                                                                 | Weight<br><br>kg [lb] |
|---------------|--------------------------------------------------|-----------------------------------------------------------------|-----------------------|
|               | Connections                                      |                                                                 |                       |
|               | European version for OLS<br>G 1/2<br>G 1/4 - S** | US version for OLS<br>3/4-16 UNF - O*<br>7/16-20 UNF - O* + S** |                       |
| OSPB 50 LS    | -                                                | 150G6085                                                        | 5.2 [11.46]           |
| OSPB 80 LS    | -                                                | 150G6086                                                        | 5.3 [11.68]           |
| OSPB 100 LS   | -                                                | 150G6087                                                        | 5.4 [11.90]           |
| OSPB 125 LS   | -                                                | 150G6088                                                        | 5.5 [12.13]           |
| OSPB 160 LS   | -                                                | 150G6089                                                        | 5.6 [12.35]           |
| OSPB 200 LS   | 150-0103                                         | 150G6090                                                        | 5.8 [12.79]           |
| OSPB 315 LS   | 150-0104                                         | 150-0116                                                        | 6.2 [13.67]           |
| OSPB 400 LS   | 150-0105                                         | 150-0117                                                        | 7.0 [15.43]           |

O\*: O-ring chamfer on port connections

S\*\*: Spot face around port connection

Valve blocks OVP and OVR can be mounted on all of the OSPB steering units from the above table.

#### Code Numbers and Weights

#### OSPB load sensing dynamic non-reaction steering units

OSPB LS Dynamic steering units have no valve functions.

OSPB LS in the table below have all standard neutral setting springs, see page 24

| Steering unit | Code Numbers                                                                   | Weight<br>kg [lb] |
|---------------|--------------------------------------------------------------------------------|-------------------|
|               | Connections<br>US version for OLS<br>3/4-16 UNF - O*<br>7/16-20 UNF - O* + S** |                   |
| OSPB 50 LS    | 150-8204                                                                       | 5.2 [11.46]       |
| OSPB 80 LS    | 150-8205                                                                       | 5.3 [11.68]       |
| OSPB 100 LS   | 150-8206                                                                       | 5.4 [11.90]       |
| OSPB 125 LS   | 150-8207                                                                       | 5.5 [12.13]       |
| OSPB 160 LS   | 150-8208                                                                       | 5.6 [12.35]       |
| OSPB 200 LS   | 150-8209                                                                       | 5.8 [12.79]       |
| OSPB 315 LS   | 150-8210                                                                       | 6.2 [13.67]       |
| OSPB 400 LS   | 150-8211                                                                       | 7.0 [15.43]       |

O\*: O-ring chamfer on port connections

S\*\*: Spot face around port connection

Valve blocks OVP and OVR can be mounted on all of the OSPB steering units from the above table

#### Code Numbers and Weights

#### OSPC load sensing static non-reaction steering unit

OSPC LS Static steering units in the table below incorporate all the following valve functions:

- check valve in P-port
- pilot pressure relief valve
- shock valves
- suction valves

OSPC LS in the table below have all standard neutral setting springs, see page 24

| Steering unit | Code numbers                                |                                           |                                                                 | Valve settings               |                             | Weight<br>kg [lb] |
|---------------|---------------------------------------------|-------------------------------------------|-----------------------------------------------------------------|------------------------------|-----------------------------|-------------------|
|               | European<br>for OLS<br>G 1/2<br>G 1/4 - S** | European<br>and<br>US version<br>for OLSA | US version for OLS<br>3/4-16 UNF - O*<br>7/16-20 UNF - O* + S** | Relief<br>valve<br>bar [psi] | Shock<br>valve<br>bar [psi] |                   |
| OSPC 80 LS    | 150-1230                                    | 150-1188                                  | 150-1222                                                        | 170<br>[2465]                | 225<br>[3263]               | 5.3 [11.68]       |
| OSPC 100 LS   | 150-1231                                    | 150-1189                                  | 150-1221                                                        |                              |                             | 5.4 [11.90]       |
| OSPC 125 LS   | 150-1232                                    | 150-1190                                  | 150-1220                                                        |                              |                             | 5.5 [12.13]       |
| OSPC 160 LS   | 150-1233                                    | 150-1191                                  | 150-1219                                                        |                              |                             | 5.6 [12.35]       |
| OSPC 200 LS   | 150-1234                                    | 150-1192                                  | 150-1218                                                        |                              |                             | 5.8 [12.79]       |
| OSPC 315 LS   | 150-1235                                    | -                                         | 150G6091                                                        |                              |                             | 6.2 [13.67]       |
| OSPC 400 LS   | 150-1240                                    | -                                         | -                                                               |                              |                             | 7.0 [15.43]       |

O\*: O-ring chamfer on port connections

S\*\*: Spot face around port connections

If you require other port connections, valve combinations and/or other valve settings or other displacements, please fill in the order form on page 24 and contact the Sauer-Danfoss Sales Organization.

#### Code Numbers and Weights

#### OSPC load sensing dynamic non-reaction steering units

OSPC LS Dynamic steering units in the table below incorporate all the following valve functions:

- check valve in P-port
- pilot pressure relief valve
- shock valves
- suction valves
- check valve in LS-line for all OSPC LS Dynamic up to and including 200 cm<sup>3</sup>/rev

OSPC LS in the table below have all standard neutral setting springs, see page 24

| Steering unit | Code numbers                                           |                                  |                                                               | Valve settings            |                          | Weight<br>kg [lb] |
|---------------|--------------------------------------------------------|----------------------------------|---------------------------------------------------------------|---------------------------|--------------------------|-------------------|
|               | European version for OLS<br>G 1/2 - S**<br>G 1/4 - S** | European and US version for OLSA | US version for OLS<br>3/4-16 UNF - O*<br>7/16-20 UNF - O*+S** | Relief valve<br>bar [psi] | Shock valve<br>bar [psi] |                   |
| OSPC 50 LS    | 150-8233                                               | 150-8222                         | 150-8215                                                      | 140<br>[2030]             | 200<br>[2900]            | 5.2 [11.46]       |
| OSPC 80 LS    | 150-8234                                               | 150-8223                         | 150-8216                                                      | 170<br>[2465]             | 225<br>[3263]            | 5.3 [11.68]       |
| OSPC 100 LS   | 150-8235                                               | 150-8224                         | 150-8217                                                      |                           |                          | 5.4 [11.90]       |
| OSPC 125 LS   | 150-8236                                               | 150-8225                         | 150-8218                                                      |                           |                          | 5.5 [12.13]       |
| OSPC 160 LS   | 150-8237                                               | 150-8226                         | 150-8219                                                      |                           |                          | 5.6 [12.35]       |
| OSPC 200 LS   | 150-8238                                               | 150-8227                         | 150-8220                                                      |                           |                          | 5.8 [12.79]       |
| OSPC 315 LS   | 150-8239                                               | -                                | 150-8221                                                      |                           |                          | 6.2 [13.67]       |
| OSPC 400 LS   | 150-8240                                               | -                                | -                                                             |                           |                          | 7.0 [15.43]       |

O\*: O-ring chamfer on port connections

S\*\*: Spot face around port connections

If you require other port connections, valve combinations and/or other valve settings or other displacements please fill in the order form on page 24 and contact the Sauer-Danfoss Sales Organization.

#### Code Numbers and Weights

#### OSPC load sensing dynamic reaction steering units

OSPC LSR Dynamic steering units in the table below incorporate all the following valve functions:

- check valve in P-port
- pilot pressure relief valve
- shock valves
- suction valves
- check valve in LS-line

OSPC LSR in the table below have all standard neutral setting springs, see page 24

| Steering unit | Code numbers                                                          | Valve settings            |                          | Weight<br>kg [lb] |
|---------------|-----------------------------------------------------------------------|---------------------------|--------------------------|-------------------|
|               | Connections<br>European version for OLS<br>G 1/2 - S**<br>G 1/4 - S** | Relief valve<br>bar [psi] | Shock valve<br>bar [psi] |                   |
| OSPC 80 LSR   | 150-8241                                                              | 170 [2465]                | 225 [3263]               | 5.3 [11.68]       |
| OSPC 200 LSR  | 150-8242                                                              |                           |                          | 5.8 [12.79]       |

O\*: O-ring chamfer on port connections

S\*\*: Spot face around port connections (can not be used in connection with OVR angular block)

If you require other port connections, valve combinations, valve settings and/or other displacements, please fill in the order form on page 24 and contact the Sauer-Danfoss Sales Organization.

#### Code Numbers and Weights

#### OSPF load sensing dynamic non-reaction steering units

OSPF LS Dynamic steering units in the table below incorporate all the following valve functions:

- check valve in P-port
- pilot pressure relief valve
- shock valves
- suction valves

OSPF LS in the table below have all soft neutral setting springs, see page 24

| Steering unit | Code numbers                                                          | Valve settings            |                          | Weight<br>kg [lb] |
|---------------|-----------------------------------------------------------------------|---------------------------|--------------------------|-------------------|
|               | Connections<br>European version for OLS<br>G 1/2 - S**<br>G 1/4 - S** | Relief valve<br>bar [psi] | Shock valve<br>bar [psi] |                   |
| OSPF 80 LS    | 150G5079                                                              | 170 [2465]                | 225 [3263]               | 5.3 [11.68]       |
| OSPF 100 LS   | 150G5080                                                              |                           |                          | 5.4 [11.90]       |
| OSPF 125 LS   | 150G5081                                                              |                           |                          | 5.5 [12.13]       |
| OSPF 160 LS   | 150G5082                                                              |                           |                          | 5.6 [12.35]       |
| OSPF 200 LS   | 150G5083                                                              |                           |                          | 5.8 [12.79]       |
| OSPF 315 LS   | 150G5084                                                              |                           |                          | 6.2 [13.67]       |
| OSPF 400 LS   | 150G5085                                                              |                           |                          | 7.0 [15.43]       |

O\*: O-ring chamfer on port connections

S\*\*: Spot face around port connections (can not be used in connection with OVR angular block)

If you require other port connections, valve combinations, valve settings and/or other displacements, please fill in the order form on page 24 and contact the Sauer-Danfoss Sales Organization.

#### Code Numbers and Weights

#### OSPD load sensing non-reaction steering units

OSPD LS Dynamic steering units in the table below incorporate all the following valve functions:

- check valve in P-port
- pilot pressure relief valve
- shock valves
- suction valves
- check valve in LS-line

OSPD LS in the table below have all standard neutral setting springs, see page 24

| Steering unit   | Code numbers                                                  | Valve settings            |                          | Weight<br>kg [lb] |
|-----------------|---------------------------------------------------------------|---------------------------|--------------------------|-------------------|
|                 | Connections<br>European version<br>G 1/2 - S**<br>G 1/4 - S** | Relief valve<br>bar [psi] | Shock valve<br>bar [psi] |                   |
| OSPD 70/230 LS  | 150G8112                                                      | 170 [2465]                | 225 [3263]               | 7.7 [17.00]       |
| OSPD 70/270 LS  | 150G8113                                                      |                           |                          | 7.9 [17.41]       |
| OSPD 70/385 LS  | 150G8114                                                      |                           |                          | 8.4 [18.52]       |
| OSPD 125/325 LS | 150G8128                                                      |                           |                          | 8.1 [12.79]       |
| OSPD 125/440 LS | 150G8129                                                      |                           |                          | 8.6 [18.96]       |

S\*\*: Spot face around port connections (can not be used in connection with OVR angular block)

If you require other port connections, valve combinations, valve settings and/or other displacements, please fill in the order form on page 24 and contact the Sauer-Danfoss Sales Organization.

#### Code Numbers and Weights

#### OSPQ load sensing dynamic non-reaction steering units

OSPQ LS Dynamic steering units in the table below incorporate all the following valve functions:

- check valve in amplification valve, act as check valve in P-port
- pilot pressure relief valve
- shock valves
- suction valves
- check valve in LS-line

OSPQ LS in the table below have all standard neutral setting springs, see page 24

| Steering unit   | Code numbers                                                                      | Valve settings            |                          | Weight<br>kg [lb] |
|-----------------|-----------------------------------------------------------------------------------|---------------------------|--------------------------|-------------------|
|                 | Connections<br>European version<br>M 18 x 1.5 - O* + S**<br>M 12 x 1.5 - O* + S** | Relief valve<br>bar [psi] | Shock valve<br>bar [psi] |                   |
| OSPQ 80/125 LS  | 150G8012                                                                          | 170 [2465]                | 225 [3263]               | 5.3 [11.68]       |
| OSPQ 125/250 LS | 150G8011                                                                          |                           |                          | 5.5 [12.79]       |
| OSPQ 160/320 LS | 150G8030                                                                          |                           |                          | 5.6 [12.35]       |

O\*: O-ring chamfer on port connections

S\*\*: Spot face around port connections (can not be used in connection with OVR angular block)

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If you require other valve combinations, valve settings and/or other displacements, please fill in the order form on page 24 and contact the Sauer-Danfoss Sales Organization.

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#### Code Numbers and Weights

#### OSPL load sensing static non-reaction steering units

OSPL LS Static steering units have no valve functions.

OSPL LS in the three tables below have all strong neutral setting springs, see page 24

| Steering unit | Code numbers                                        |                                                                       |                                                                          | Weight<br><br>kg [lb] |
|---------------|-----------------------------------------------------|-----------------------------------------------------------------------|--------------------------------------------------------------------------|-----------------------|
|               | European version<br>for OLS<br>G 1/2<br>G 1/4 - S** | US version for<br>OLS<br>3/4-16 UNF - O*<br>7/16-20 UNF - O*<br>+ S** | US version for<br>OLS and OVPL LS<br>- port<br>7/16-20 UNF - O*<br>+ S** |                       |
| OSPL 520 LS   | 150-7169                                            | 150-7167                                                              | 150-7168                                                                 | 8.1 [17.86]           |
| OSPL 630 LS   | 150-7107                                            | 150-7164                                                              | 150-7113                                                                 | 8.4 [18.52]           |
| OSPL 800 LS   | 150-7108                                            | 150-7165                                                              | 150-7114                                                                 | 8.8 [19.40]           |
| OSPL 1000 LS  | 150-7110                                            | 150-7166                                                              | 150-7115                                                                 | 10.0 [22.05]          |

O\*: O-ring chamfer on port connections

S\*\*: Spot face around port connection

#### OSPL load sensing dynamic non-reaction steering units

OSPL LS Dynamic steering units in the table below have no valve functions.

| Steering unit | Code numbers                             | Weight<br><br>kg [lb] |
|---------------|------------------------------------------|-----------------------|
|               | Connections                              |                       |
|               | US version for OLS                       |                       |
|               | 3/4-16 UNF - O*<br>7/16-20 UNF - O* +S** |                       |
| OSPL 520 LS   | 150-8243                                 | 8.1 [17.86]           |
| OSPL 630 LS   | 150-8212                                 | 8.4 [18.52]           |
| OSPL 800 LS   | 150-8213                                 | 8.8 [19.40]           |
| OSPL 1000 LS  | 150-8214                                 | 10.0 [22.05]          |

O\*: O-ring chamfer on port connections

S\*\*: Spot face around port connection

OSPL LS Dynamic steering units in the table below incorporate all the following valve function:

- pilot pressure relief valve

| Steering unit | Code numbers                                            | Valve settings | Weight       |
|---------------|---------------------------------------------------------|----------------|--------------|
|               | Connections                                             |                |              |
|               | European version<br>for OLS and OVPL<br>LS: G 1/4 - S** |                |              |
| OSPL 520 LS   | 150-8244                                                | 170 [2465]     | 8.1 [17.86]  |
| OSPL 1000 LS  | 150-8245                                                |                | 10.0 [22.05] |

S\*\*: Spot face around port connection

If you require other displacements or other valve setting, please fill in the order form on page 24 and contact the Sauer-Danfoss Sales Organization.

#### Code Numbers and Weights

OSPL 1200 LS Dynamic steering unit in the table below incorporate all the following valve function:

- shock valves
- suction valves

OSPL 1200 LS in the table below has strong neutral setting springs, see page 24

| Priority valve | Code numbers                                                                                             | Valve settings            | Weight<br>kg [lb] |
|----------------|----------------------------------------------------------------------------------------------------------|---------------------------|-------------------|
|                | Connections<br>US version for OLS<br>3/16 - 16 UNF - O*<br>CF: 11/16 - 12 UN<br>7/16 - 20 UNF - O* + S** | Shock valves<br>bar [psi] |                   |
| OSPL 1200 LS   | 150-7175                                                                                                 | 280 [4061]                | 11 [24.25]        |

O\*: O-ring chamfer on port connections

S\*\*: Spot face around port connection

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If you require other displacements or other valve setting, please fill in the order form on page 24 and contact the Sauer-Danfoss Sales Organization.

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#### Code Numbers and Weights

#### OSPBX and OSPLX load sensing static steering units for OSQ static

OSPBX LS and OSPLX LS Static steering units in the table below have no valve functions.

OSPBX LS in the table below have all standard neutral setting springs, see page 24

OSPLX LS in the table below have all strong neutral setting springs, see page 24

| Steering unit | Code numbers                             |                                                         | Weight<br><br>kg [lb] |
|---------------|------------------------------------------|---------------------------------------------------------|-----------------------|
|               | Connections                              |                                                         |                       |
|               | European version<br>G 1/2<br>G 1/4 - S** | US version<br>3/4-16 UNF - O*<br>7/16-20 UNF - O* + S** |                       |
| OSPBX 160 LS  | 150-1082                                 | 150-1078                                                | 5.6 [12.35]           |
| OSPBX 200 LS  | 150-1083                                 | 150-1079                                                | 5.8 [12.79]           |
| OSPBX 315 LS  | 150-1084                                 | 150-1080                                                | 6.2 [13.67]           |
| OSPBX 400 LS  | 150-1085                                 | 150-1081                                                | 7.0 [15.43]           |
| OSPLX 520 LS  | 150-7170                                 | 150-7173                                                | 8.1 [17.86]           |
| OSPLX 630 LS  | 150-7171                                 | 150-7174                                                | 8.4 [18.52]           |
| OSPLX 800 LS  | 150-7172                                 | 150-7155                                                | 8.8 [19.40]           |

O\*: O-ring chamfer on port connections

S\*\*: Spot face around port connection

#### OSPCX load sensing dynamic steering units for OSQ dynamic

OSPCX LS Dynamic steering unit in the table below incorporates the following valve function:

- pilot pressure relief valve

OSPCX LS in the table below has standard neutral setting springs, see page 24

| Steering unit | Code numbers                                        | Valve settings            | Weight<br><br>kg [lb] |
|---------------|-----------------------------------------------------|---------------------------|-----------------------|
|               | Connections<br>European version<br>for OLS and OVPL | Relief valve<br>bar [psi] |                       |
|               | G ½ - S**      G ¼ - S**                            |                           |                       |
| OSPCX 160 LS  | 150-8188                                            | 200 [2900]                | 5.6 [12.35]           |

S\*\*: Spot face around port connection

If you require other displacements or other valve setting, please fill in the order form on page 24 and contact the Sauer-Danfoss Sales Organization.

#### Specification Table for Non Catalogue Numbers of LS Steering Units

Fill in your company data and place x's in the table where appropriate, then send to your Sauer-Danfoss Sales Organisation.

| Your company                         | Name                                                |                 | Vehicle                                      |                                   | Potential pcs/year                                    |         | Completed by                                |         | Date                                                |         |         |                 |         |     |
|--------------------------------------|-----------------------------------------------------|-----------------|----------------------------------------------|-----------------------------------|-------------------------------------------------------|---------|---------------------------------------------|---------|-----------------------------------------------------|---------|---------|-----------------|---------|-----|
| Steering unit type                   | OSPC                                                |                 | OSPF                                         |                                   | OSPD                                                  |         | OSPQ                                        |         | OSPL                                                |         |         |                 |         |     |
| Reaction type                        | LS ( Non-reaction)                                  |                 |                                              |                                   |                                                       |         | LSR (Reaction: only OSPC, OSPF, OSPD, OSPQ) |         |                                                     |         |         |                 |         |     |
| Load Sensing type                    | Static (Only OSPC, OSPL, OSPLX, OSPCX)              |                 |                                              |                                   |                                                       |         | Dynamic                                     |         |                                                     |         |         |                 |         |     |
| DP, cm <sup>3</sup> /rev<br>OSPC LS  | 40                                                  | 50              | 60                                           | 70                                | 80                                                    | 100     | 125                                         | 160     | 185                                                 | 200     | 230     | 250             | 315     | 400 |
| OSPF LS                              |                                                     |                 |                                              |                                   |                                                       |         |                                             |         |                                                     |         |         |                 |         |     |
| DP, cm <sup>3</sup> /rev<br>OSPC LSR | 40                                                  | 50              | 60                                           | 70                                | 80                                                    | 100     | 125                                         | 160     | 185                                                 | 200     |         |                 |         |     |
| OSPD LS                              |                                                     |                 |                                              |                                   |                                                       |         |                                             |         |                                                     |         |         |                 |         |     |
| DP, cm <sup>3</sup> /rev<br>OSPD LSR | 60/185                                              | 60/220          | 60/260                                       | 70/195                            | 70/230                                                | 70/270  | 70/385                                      | 100/200 | 100/260                                             | 100/300 | 125/285 | 125/325         | 125/440 |     |
| OSPL LSR                             |                                                     |                 |                                              |                                   |                                                       |         |                                             |         |                                                     |         |         |                 |         |     |
| DP, cm <sup>3</sup> /rev<br>OSPD LSR | 60/185                                              | 60/220          | 60/260                                       | 70/195                            | 70/230                                                | 70/270  | 70/385                                      | 100/200 | 100/260                                             | 100/300 | 125/285 | 125/325         | 125/440 |     |
| OSPL LSR                             |                                                     |                 |                                              |                                   |                                                       |         |                                             |         |                                                     |         |         |                 |         |     |
| DP, cm <sup>3</sup> /rev<br>OSPQ LS  | 80/125                                              | 80/140          | 80/160                                       | 100/160                           | 100/180                                               | 100/200 | 125/200                                     | 125/250 | 160/250                                             | 160/320 |         |                 |         |     |
| OSPQ LSR                             |                                                     |                 |                                              |                                   |                                                       |         |                                             |         |                                                     |         |         |                 |         |     |
| DP, cm <sup>3</sup> /rev<br>OSPQ LSR | 80/125                                              | 80/140          | 80/160                                       | 100/160                           | 100/180                                               | 100/200 | 125/200                                     | 125/250 | 160/250                                             | 160/320 |         |                 |         |     |
| OSPL, OSPLX                          |                                                     |                 |                                              |                                   |                                                       |         |                                             |         |                                                     |         |         |                 |         |     |
| DP, cm <sup>3</sup> /rev<br>OSPCX    | 160                                                 | 200             | 250                                          | 315                               | 400                                                   |         |                                             |         |                                                     |         |         |                 |         |     |
| OSPCX LSR                            |                                                     |                 |                                              |                                   |                                                       |         |                                             |         |                                                     |         |         |                 |         |     |
| Port threads<br>OSPC, OSPF           | G1/2                                                | G1/2- S**       | M18 × 1.5 - O* + S**                         | 3/4-16 UNF - O*                   | for OLSA (only OSPC)                                  |         |                                             |         |                                                     |         |         |                 |         |     |
| OSPD LSR                             |                                                     |                 |                                              |                                   |                                                       |         |                                             |         |                                                     |         |         |                 |         |     |
| Port threads<br>OSPD                 | G1/2                                                | 3/4-16 UNF - O* | For OPVL and without RV (LS = 7/16 - 20 UNF) | For OVPL and with RV (LS = G 1/4) |                                                       |         |                                             |         |                                                     |         |         |                 |         |     |
| OSPL, OSPLX                          |                                                     |                 |                                              |                                   |                                                       |         |                                             |         |                                                     |         |         |                 |         |     |
| Relief valve***<br>bar               | 70                                                  | 80              | 90                                           | 100                               | 110                                                   | 120     | 140                                         | 170     | 190                                                 | 200     | 210     | no relief valve |         |     |
| Shock valves<br>bar                  | 160                                                 | 180             | 200                                          | 225                               | 240                                                   | 280     | no shock valves                             |         |                                                     |         |         |                 |         |     |
| Suction<br>valves                    | Yes                                                 |                 |                                              |                                   |                                                       |         | No                                          |         |                                                     |         |         |                 |         |     |
| Check valve<br>in LS                 | Yes (Only for OSPC dynamic, OSPD and OSPQ)          |                 |                                              |                                   |                                                       |         | No (Only for OSPC, OSPF and OSPL)           |         |                                                     |         |         |                 |         |     |
| Neutral<br>setting<br>springs        | Soft:<br>0.5 - 1.8 Nm in normal steering situations |                 |                                              |                                   | Standard:<br>0.8 - 3 Nm in normal steering situations |         |                                             |         | Strong:<br>1.5 - 4 Nm in normal steering situations |         |         |                 |         |     |
| Unit black<br>painted                | Yes                                                 |                 |                                              |                                   |                                                       |         | No                                          |         |                                                     |         |         |                 |         |     |

**Specification Table for  
Non Catalogue Numbers  
of LS Steering Units  
(continued)**

DP = Displacement, RV = Pilot pressure relief valve.

O\*: O-ring chamfer on port connections.

S\*\*: Spot face around port connections (can not be used in connection with OVR angular block).

RV\*\*\* see "Technical data" page 29-30 for limitation in maximum pressure depending on displacements.

Port and valve combinations possible: see tables page 26 - 28.

Types not mentioned with port connections in the table above, are only available in the version(s) stated in the code number tables.

An alternative way to specify a variant is to state an existing code number and add the modifications, you would like to have implemented in the basic steering unit.

Code number of basic steering unit: \_\_\_\_\_

Requested modifications: \_\_\_\_\_

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#### Port Thread Versions and Valve Combinations

The following combinations of port threads and valves are available for OSPC LS/LSR:  
Housings for low flow: 40 - 200 cm<sup>3</sup>/rev [2.44 - 12.20 in<sup>3</sup>/rev] gear wheel set.

| Threads                                                        |                                                                   |                           | Valves                            |                 |                   |                                               |
|----------------------------------------------------------------|-------------------------------------------------------------------|---------------------------|-----------------------------------|-----------------|-------------------|-----------------------------------------------|
| Main ports<br>(P, T, L, R)                                     | LS-port                                                           | For<br>steering<br>column | Pilot<br>pressure<br>relief valve | Shock<br>valves | Suction<br>valves | Check valve in<br>LS (only for LS<br>Dynamic) |
| DIN 3852-2<br>G 1/2                                            | DIN 3852-2<br>G 1/4 w. spot face                                  | M10 x 1.5                 | Yes                               | Yes             | Yes               | Yes                                           |
|                                                                |                                                                   |                           | Yes                               | Yes             | Yes               | No                                            |
| DIN 3852-2<br>G 1/2 w. spot face                               | DIN 3852-2<br>G 1/4 w. spot face                                  | M10 x 1.5                 | Yes                               | Yes             | Yes               | Yes                                           |
|                                                                |                                                                   |                           | Yes                               | Yes             | Yes               | No                                            |
| ISO 6149-1<br>M18 x 1.5,<br>w. O-ring chamfer<br>and spot face | ISO 6149-1<br>M12 x 1.5,<br>w. O-ring chamfer<br>and spot face    | M10 x 1.5                 | Yes                               | Yes             | Yes               | Yes                                           |
|                                                                |                                                                   |                           | Yes                               | Yes             | Yes               | No                                            |
| ISO 11926-1<br>3/4 - 16 UNF,<br>O-ring boss port               | ISO 11926-1<br>7/16 - 20 UNF<br>O-ring boss port<br>and spot face | 3/8 - 16 UNC              | Yes                               | Yes             | Yes               | Yes                                           |
|                                                                |                                                                   |                           | Yes                               | No              | No                | No                                            |
| ISO 11926-1<br>3/4 - 16 UNF,<br>O-ring boss port               | ISO 11926-1<br>7/16 - 20 UNF<br>O-ring boss port<br>and spot face | M10 x 1.5                 | Yes                               | Yes             | Yes               | Yes                                           |
|                                                                |                                                                   |                           | Yes                               | Yes             | Yes               | Yes                                           |
| For OLSA                                                       | For OLSA                                                          | M10 x 1.5                 | Yes                               | Yes             | Yes               | Yes                                           |
|                                                                |                                                                   |                           | Yes                               | Yes             | Yes               | No                                            |
|                                                                |                                                                   |                           | Yes                               | No              | No                | No                                            |

The following combinations of port threads and valves are available for OSPC LS/LSR:  
Housings for high flow: 250 - 400 cm<sup>3</sup>/rev [15.25 - 24.4 in<sup>3</sup>/rev] gear wheel set.

| Threads                                          |                                                                   |                           | Valves                            |                 |                   |                                               |
|--------------------------------------------------|-------------------------------------------------------------------|---------------------------|-----------------------------------|-----------------|-------------------|-----------------------------------------------|
| Main ports<br>(P, T, L, R)                       | LS-port                                                           | For<br>steering<br>column | Pilot<br>pressure<br>relief valve | Shock<br>valves | Suction<br>valves | Check valve in<br>LS (only for LS<br>Dynamic) |
| DIN 3852-2<br>G1/2                               | DIN 3852-2<br>G 1/4 w. spot face                                  | M10 x 1.5                 | Yes                               | Yes             | Yes               | No                                            |
|                                                  |                                                                   |                           | No                                | Yes             | Yes               | No                                            |
| DIN 3852-2<br>G 1/2 w. spot face                 | DIN 3852-2<br>G 1/4 w. spot face                                  | M10 x 1.5                 | Yes                               | Yes             | Yes               | No                                            |
|                                                  |                                                                   |                           | Yes                               | No              | No                | Yes                                           |
| ISO 11926-1<br>3/4 - 16 UNF,<br>O-ring boss port | ISO 11926-1<br>7/16 - 20 UNF<br>O-ring boss port<br>and spot face | 3/8 - 16 UNC              | Yes                               | Yes             | Yes               | No                                            |
|                                                  |                                                                   |                           | Yes                               | No              | No                | No                                            |
|                                                  |                                                                   |                           | No                                | Yes             | Yes               | No                                            |
|                                                  |                                                                   |                           | No                                | Yes             | No                | No                                            |
| ISO 11926-1<br>3/4 - 16 UNF,<br>O-ring boss port | ISO 11926-1<br>7/16 - 20 UNF<br>O-ring boss port<br>and spot face | M10 x 1.5                 | Yes                               | Yes             | Yes               | No                                            |
|                                                  |                                                                   |                           | Yes                               | No              | No                | No                                            |
| For OLSA                                         | For OLSA                                                          | M10 x 1.5                 | Yes                               | Yes             | Yes               | No                                            |

Housings with spot face around port connections on main ports cannot be used in connection with OVR angular block.

#### Port Thread Versions and Valve Combinations (continued)

The following combinations of port threads and valves are available for OSPF LS:

| Threads                                                        |                                                                   |                           | Valves                            |                 |                |
|----------------------------------------------------------------|-------------------------------------------------------------------|---------------------------|-----------------------------------|-----------------|----------------|
| Main ports<br>(P, T, L, R)                                     | LS-port                                                           | For<br>steering<br>column | Pilot<br>pressure<br>relief valve | Shock<br>valves | Suction valves |
| DIN 3852-2<br>G 1/2                                            | DIN 3852-2<br>G 1/4 w. spot face                                  | M10 x 1.5                 | Yes                               | Yes             | Yes            |
| DIN 3852-2<br>G 1/2 w. spot face                               | DIN 3852-2<br>G 1/4 w. spot face                                  | M10 x 1.5                 | Yes                               | Yes             | Yes            |
| ISO 6149-1<br>M18 x 1.5,<br>w. O-ring chamfer<br>and spot face | ISO 6149-1<br>M12 x 1.5,<br>w. O-ring chamfer<br>and spot face    | M10 x 1.5                 | Yes                               | Yes             | Yes            |
|                                                                |                                                                   |                           | No                                | Yes             | Yes            |
| ISO 11926-1<br>3/4 - 16 UNF,<br>O-ring boss port               | ISO 11926-1<br>7/16 - 20 UNF<br>O-ring boss port<br>and spot face | 3/8-16 UNC                | Yes                               | Yes             | Yes            |
| ISO 11926-1<br>3/4 - 16 UNF,<br>O-ring boss port               | ISO 11926-1<br>7/16 - 20 UNF<br>O-ring boss port<br>and spot face | M10 x 1.5                 | Yes                               | Yes             | Yes            |

The following combinations of port threads and valves are available for OSPD LS/LSR:

| Threads                                                        |                                                                   |                           | Valves                            |                 |                   |                                               |
|----------------------------------------------------------------|-------------------------------------------------------------------|---------------------------|-----------------------------------|-----------------|-------------------|-----------------------------------------------|
| Main ports<br>(P, T, L, R)                                     | LS-port                                                           | For<br>steering<br>column | Pilot<br>pressure<br>relief valve | Shock<br>valves | Suction<br>valves | Check valve in<br>LS (only for LS<br>Dynamic) |
| DIN 3852-2 G 1/2 w.<br>spot face                               | DIN 3852-2 G 1/4 w.<br>spot face                                  | M10 x 1.5                 | Yes                               | Yes             | Yes               | Yes                                           |
| ISO 6149-1<br>M18 x 1.5,<br>w. O-ring chamfer<br>and spot face | ISO 6149-1<br>M12 x 1.5,<br>w. O-ring chamfer<br>and spot face    | M10 x 1.5                 | Yes                               | Yes             | Yes               | Yes                                           |
| ISO 11926-1<br>3/4 - 16 UNF,<br>O-ring boss port               | ISO 11926-1<br>7/16 - 20 UNF<br>O-ring boss port<br>and spot face | M10 x 1.5                 | Yes                               | Yes             | Yes               | Yes                                           |
|                                                                |                                                                   |                           | Yes                               | Yes             | Yes               | No                                            |

#### Port Thread Versions and Valve Combination (continued)

The following combinations of port threads and valves are available for OSPQ LS/LSR:

| Threads                                                        |                                                                |                           | Valves                            |                 |                   |                                               |
|----------------------------------------------------------------|----------------------------------------------------------------|---------------------------|-----------------------------------|-----------------|-------------------|-----------------------------------------------|
| Main ports<br>(P, T, L, R)                                     | LS-port                                                        | For<br>steering<br>column | Pilot<br>pressure<br>relief valve | Shock<br>valves | Suction<br>valves | Check valve in<br>LS (only for LS<br>Dynamic) |
| ISO 6149-1<br>M18 x 1.5,<br>w. O-ring chamfer<br>and spot face | ISO 6149-1<br>M12 x 1.5,<br>w. O-ring chamfer<br>and spot face | M10 x 1.5                 | Yes                               | Yes             | Yes               | Yes                                           |
|                                                                |                                                                |                           | No                                | Yes             | Yes               | Yes                                           |

Housings with spot face around port connections on main ports cannot be used in connection with OVR angular block.

For OSPL, OSPBX, OSPCX and OSPLX only the versions listed in the tables with code numbers are available.

#### Technical Data

#### Displacement, flow and pressure: OSPB LS, OSPC LS, OSPC LSR

Common data: Look in sub catalogue: "General Steering Components"

| Steering unit            | Displacement<br>cm³/rev<br>[in³/rev] | *Rated oil flow<br>l/min<br>[US gal/min] | Max. pressure on connections |             |                |
|--------------------------|--------------------------------------|------------------------------------------|------------------------------|-------------|----------------|
|                          |                                      |                                          | P bar [psi]                  | T bar [psi] | L. R bar [psi] |
| OSPC 40 LS Static        | 40 [2.44]                            | 4 [1.06]                                 | 140 [2030]                   | 40 [580]    | 280 [4061]     |
| OSPB/OSPC 50 LS Static   | 50 [3.05]                            | 5 [1.32]                                 |                              |             |                |
| OSPC 60 LS Static        | 60 [3.66]                            | 6 [1.58]                                 |                              |             |                |
| OSPC 70 LS Static        | 70 [4.27]                            | 7 [1.85]                                 | 175 [2538]                   |             |                |
| OSPB/OSPC 80 LS Static   | 80 [4.88]                            | 8 [2.11]                                 |                              |             |                |
| OSPB/OSPC 100 LS Static  | 100 [6.10]                           | 10 [2.64]                                |                              |             |                |
| OSPB/OSPC 125 LS Static  | 125 [7.63]                           | 13 [3.43]                                | 175 [2538]                   |             |                |
| OSPB/OSPC 160 LS Static  | 160 [9.76]                           | 16 [4.23]                                |                              |             |                |
| OSPC 185 LS Static       | 185 [11.29]                          | 19 [5.02]                                |                              |             |                |
| OSPB/OSPC 200 LS Static  | 200 [12.20]                          | 20 [5.28]                                |                              |             |                |
| OSPC 230 LS Static       | 230 [14.03]                          | 23 [6.07]                                |                              |             |                |
| OSPC 250 LS Static       | 250 [15.25]                          | 25 [6.60]                                |                              |             |                |
| OSPB/OSPC 315 LS Static  | 315 [19.22]                          | 32 [8.45]                                |                              |             |                |
| OSPB/OSPC 400 LS Static  | 400 [24.41]                          | 40 [10.57]                               |                              |             |                |
| OSPC 40 LS Dynamic       | 40 [2.44]                            | 4 [1.06]                                 | 140 [2030]                   | 40 [580]    | 280 [4061]     |
| OSPB/OSPC 50 LS Dynamic  | 50 [3.05]                            | 5 [1.32]                                 |                              |             |                |
| OSPC 60 LS Dynamic       | 60 [3.66]                            | 6 [1.58]                                 |                              |             |                |
| OSPC 70 LS Dynamic       | 70 [4.27]                            | 7 [1.85]                                 | 175 [2538]                   |             |                |
| OSPB/OSPC 80 LS Dynamic  | 80 [4.88]                            | 8 [2.11]                                 |                              |             |                |
| OSPB/OSPC 100 LS Dynamic | 100 [6.10]                           | 10 [2.64]                                |                              |             |                |
| OSPB/OSPC 125 LS Dynamic | 125 [7.63]                           | 13 [3.43]                                | 210 [3045]                   |             |                |
| OSPB/OSPC 160 LS Dynamic | 160 [9.76]                           | 16 [4.23]                                |                              |             |                |
| OSPC 185 LS Dynamic      | 185 [11.29]                          | 19 [5.02]                                |                              |             |                |
| OSPB/OSPC 200 LS Dynamic | 200 [12.20]                          | 20 [5.28]                                |                              |             |                |
| OSPC 230 LS Dynamic      | 230 [14.03]                          | 23 [6.07]                                |                              |             |                |
| OSPC 250 LS Dynamic      | 250 [15.25]                          | 25 [6.60]                                |                              |             |                |
| OSPB/OSPC 315 LS Dynamic | 315 [19.22]                          | 32 [8.45]                                |                              |             |                |
| OSPB/OSPC 400 LS Dynamic | 400 [24.41]                          | 40 [10.57]                               |                              |             |                |
| OSPC 40 LSR Dynamic      | 40 [2.44]                            | 4 [1.06]                                 | 140 [2030]                   | 40 [580]    | 280 [4061]     |
| OSPC 50 LSR Dynamic      | 50 [3.05]                            | 5 [1.32]                                 |                              |             |                |
| OSPC 60 LSR Dynamic      | 60 [3.66]                            | 6 [1.58]                                 |                              |             |                |
| OSPC 70 LSR Dynamic      | 70 [4.27]                            | 7 [1.85]                                 | 175 [2538]                   |             |                |
| OSPC 80 LSR Dynamic      | 80 [4.88]                            | 8 [2.11]                                 |                              |             |                |
| SPC 100 LSR Dynamic      | 100 [6.10]                           | 10 [2.64]                                |                              |             |                |
| OSPC 125 LSR Dynamic     | 125 [7.63]                           | 13 [3.43]                                | 210 [3045]                   |             |                |
| OSPC 160 LSR Dynamic     | 160 [9.76]                           | 16 [4.23]                                |                              |             |                |
| OSPC 185 LSR Dynamic     | 185 [11.29]                          | 19 [5.02]                                |                              |             |                |
| OSPC 200 LSR Dynamic     | 200 [12.20]                          | 20 [5.28]                                |                              |             |                |

\*Rated flow at 100 rpm

## Technical Data

### Displacement, flow and pressure: OSPF LS

Common data: Look in sub catalogue: "General Steering Components "

| Steering unit       | Displacement<br>cm <sup>3</sup> /rev<br>[in <sup>3</sup> /rev] | *Rated oil flow<br>l/min<br>[US gal/min] | Max. pressure on connections |             |                |
|---------------------|----------------------------------------------------------------|------------------------------------------|------------------------------|-------------|----------------|
|                     |                                                                |                                          | P bar [psi]                  | T bar [psi] | L. R bar [psi] |
| OSPF 50 LS Dynamic  | 50 [3.05]                                                      | 5 [1.32]                                 | 140 [2030]                   | 40 [580]    | 280 [4061]     |
| OSPF 60 LS Dynamic  | 60 [3.66]                                                      | 6 [1.58]                                 |                              |             |                |
| OSPF 70 LS Dynamic  | 70 [4.27]                                                      | 7 [1.85]                                 |                              |             |                |
| OSPF 80 LS Dynamic  | 80 [4.88]                                                      | 8 [2.11]                                 | 175 [2538]                   |             |                |
| OSPF 100 LS Dynamic | 100 [6.10]                                                     | 10 [2.64]                                |                              |             |                |
| OSPF 125 LS Dynamic | 125 [7.63]                                                     | 13 [3.43]                                |                              |             |                |
| OSPF 160 LS Dynamic | 160 [9.76]                                                     | 16 [4.23]                                | 210 [3045]                   |             |                |
| OSPF 185 LS Dynamic | 185 [11.29]                                                    | 19 [5.02]                                |                              |             |                |
| OSPF 200 LS Dynamic | 200 [12.20]                                                    | 20 [5.28]                                |                              |             |                |
| OSPF 230 LS Dynamic | 230 [14.03]                                                    | 23 [6.07]                                |                              |             |                |
| OSPF 250 LS Dynamic | 250 [15.25]                                                    | 25 [6.60]                                |                              |             |                |
| OSPF 315 LS Dynamic | 315 [19.22]                                                    | 32 [8.45]                                |                              |             |                |
| OSPF 400 LS Dynamic | 400 [24.41]                                                    | 40 [10.57]                               |                              |             |                |

\*Rated flow at 100 rpm

## Technical Data

### Displacement, Flow and Pressure: OSPD LS, OSPQ LS

OSPD and OSPQ steering units in the table below are all Load Sensing Dynamic type.

Common data: Look in sub catalogue: "General Steering Components"

| Steering unit    | Displacement<br>manual steer<br>mode<br>cm <sup>3</sup> /rev [in <sup>3</sup> /rev] | Displacement<br>*normal steer<br>mode<br>cm <sup>3</sup> /rev [in <sup>3</sup> /rev] | Rated<br>oil flow**<br>l/min<br>[US gal/min] | Max. pressure on connections |             |                |
|------------------|-------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|----------------------------------------------|------------------------------|-------------|----------------|
|                  |                                                                                     |                                                                                      |                                              | P bar [psi]                  | T bar [psi] | L. R bar [psi] |
| OSPD 60/185 LS   | 60 [3.66]                                                                           | 185 [11.29]                                                                          | 19 [5.02]                                    | 210 [3045]                   | 40 [580]    | 280 [4061]     |
| OSPD 60/220 LS   | 60 [3.66]                                                                           | 220 [13.42]                                                                          | 22 [5.81]                                    |                              |             |                |
| OSPD 60/260 LS   | 60 [3.66]                                                                           | 260 [15.87]                                                                          | 26 [6.87]                                    |                              |             |                |
| OSPD 70/195 LS   | 70 [4.27]                                                                           | 195 [11.90]                                                                          | 20 [5.28]                                    |                              |             |                |
| OSPD 70/230 LS   | 70 [4.27]                                                                           | 230 [14.03]                                                                          | 23 [6.07]                                    |                              |             |                |
| OSPD 70/270 LS   | 70 [4.27]                                                                           | 270 [16.48]                                                                          | 27 [7.13]                                    |                              |             |                |
| OSPD 70/385 LS   | 70 [4.27]                                                                           | 385 [23.49]                                                                          | 39 [10.30]                                   |                              |             |                |
| OSPD 100/200 LS  | 100 [6.10]                                                                          | 200 [12.20]                                                                          | 20 [5.28]                                    |                              |             |                |
| OSPD 100/260 LS  | 100 [6.10]                                                                          | 260 [15.87]                                                                          | 26 [6.87]                                    |                              |             |                |
| OSPD 100/300 LS  | 100 [6.10]                                                                          | 300 [18.31]                                                                          | 30 [7.93]                                    |                              |             |                |
| OSPD 125/285 LS  | 125 [7.63]                                                                          | 285 [17.39]                                                                          | 29 [7.66]                                    |                              |             |                |
| OSPD 125/325 LS  | 125 [7.63]                                                                          | 325 [19.83]                                                                          | 33 [8.72]                                    |                              |             |                |
| OSPD 125/440 LS  | 125 [7.63]                                                                          | 440 [26.85]                                                                          | 44 [11.62]                                   |                              |             |                |
| SPD 60/185 LSR   | 60 [3.66]                                                                           | 185 [11.29]                                                                          | 19 [5.02]                                    | 210 [3045]                   | 40 [580]    | 280 [4061]     |
| OSPD 60/220 LSR  | 60 [3.66]                                                                           | 220 [13.42]                                                                          | 22 [5.81]                                    |                              |             |                |
| OSPD 70/195 LSR  | 70 [4.27]                                                                           | 195 [11.90]                                                                          | 20 [5.28]                                    |                              |             |                |
| OSPD 100/200 LSR | 100 [6.10]                                                                          | 200 [12.20]                                                                          | 20 [5.28]                                    |                              |             |                |
| OSPQ 80/125 LS   | 80 [4.88]                                                                           | 125 [7.63]                                                                           | 13 [3.43]                                    | 210 [3045]                   | 40 [580]    | 280 [4061]     |
| OSPQ 80/140 LS   | 80 [4.88]                                                                           | 140 [8.54]                                                                           | 14 [3.70]                                    |                              |             |                |
| OSPQ 80/160 LS   | 80 [4.88]                                                                           | 160 [9.76]                                                                           | 16 [4.23]                                    |                              |             |                |
| OSPQ 100/160 LS  | 100 [6.10]                                                                          | 160 [9.76]                                                                           | 16 [4.23]                                    |                              |             |                |
| OSPQ 100/180 LS  | 100 [6.10]                                                                          | 180 [10.98]                                                                          | 18 [4.75]                                    |                              |             |                |
| OSPQ 100/200 LS  | 100 [6.10]                                                                          | 200 [12.20]                                                                          | 20 [5.28]                                    |                              |             |                |
| OSPQ 125/200 LS  | 125 [7.63]                                                                          | 200 [12.20]                                                                          | 20 [5.28]                                    |                              |             |                |
| OSPQ 125/250 LS  | 125 [7.63]                                                                          | 250 [15.25]                                                                          | 25 [6.60]                                    |                              |             |                |
| OSPQ 160/250 LS  | 160 [9.76]                                                                          | 250 [15.25]                                                                          | 25 [6.60]                                    |                              |             |                |
| OSPQ 160/320 LS  | 160 [9.76]                                                                          | 320 [19.53]                                                                          | 32 [8.45]                                    |                              |             |                |
| OSPQ 80/125 LSR  | 80 [4.88]                                                                           | 125 [7.63]                                                                           | 13 [3.43]                                    | 210 [3045]                   | 40 [580]    | 280 [4061]     |
| OSPQ 80/140 LSR  | 80 [4.88]                                                                           | 140 [8.54]                                                                           | 14 [3.70]                                    |                              |             |                |
| OSPQ 80/160 LSR  | 80 [4.88]                                                                           | 160 [9.76]                                                                           | 16 [4.23]                                    |                              |             |                |
| OSPQ 100/160 LSR | 100 [6.10]                                                                          | 160 [9.76]                                                                           | 16 [4.23]                                    |                              |             |                |
| OSPQ 100/180 LSR | 100 [6.10]                                                                          | 180 [10.98]                                                                          | 18 [4.75]                                    |                              |             |                |
| OSPQ 100/200 LSR | 100 [6.10]                                                                          | 200 [12.20]                                                                          | 20 [5.28]                                    |                              |             |                |
| OSPQ 125/200 LSR | 125 [7.63]                                                                          | 200 [12.20]                                                                          | 20 [5.28]                                    |                              |             |                |

\* normal steer mode: OSPQ: at a steering wheel speed higher than approximately 20 rpm, the amplification is fully active, and the displacements in the table are valid.

\*\* Rated flow at 100 rpm

#### Technical Data

#### Displacement, flow and pressure: OSPL LS, OSPBX LS, OSPCX LS, OSPLX LS

Common data: Look in sub catalogue: "General Steering Components"

| Steering unit        | Displacement<br>cm <sup>3</sup> /rev<br>[in <sup>3</sup> /rev] | *Rated oil flow<br>l/min<br>[US gal/min] | Max. pressure on connections |             |                |
|----------------------|----------------------------------------------------------------|------------------------------------------|------------------------------|-------------|----------------|
|                      |                                                                |                                          | P bar [psi]                  | T bar [psi] | L. R bar [psi] |
| OSPL 520 LS Static   | 520 [31.73]                                                    | 52 [13.74]                               | 210 [3045]                   | 40 [580]    | 280 [4061]     |
| OSPL 630 LS Static   | 630 [38.44]                                                    | 63 [16.64]                               |                              |             |                |
| OSPL 800 LS Static   | 800 [48.82]                                                    | 70** [18.49]                             |                              |             |                |
| OSPL 1000 LS Static  | 1000 [61.02]                                                   | 70** [18.49]                             |                              |             |                |
| OSPL 520 LS Dynamic  | 520 [31.73]                                                    | 52 [13.74]                               | 240 [3081]                   | 40 [580]    | 280 [4061]     |
| OSPL 630 LS Dynamic  | 630 [38.44]                                                    | 63 [16.64]                               |                              |             |                |
| OSPL 800 LS Dynamic  | 800 [48.82]                                                    | 70** [18.49]                             |                              |             |                |
| OSPL 1000 LS Dynamic | 1000 [61.02]                                                   | 70** [18.49]                             |                              |             |                |
| OSPL 1200 Dynamic    | 1200 [73.22]                                                   | 70** [18.49]                             | 210 [3045]                   | 40 [580]    | 280 [4061]     |
| OSPBX 160 LS Static  | 160 [9.76]                                                     | 16 [4.23]                                |                              |             |                |
| OSPBX 200 LS Static  | 200 [12.20]                                                    | 20 [5.28]                                |                              |             |                |
| OSPBX 250 LS Static  | 250 [15.25]                                                    | 25 [6.60]                                |                              |             |                |
| OSPBX 315 LS Static  | 315 [19.22]                                                    | 32 [8.45]                                |                              |             |                |
| OSPBX 400 LS Static  | 400 [24.41]                                                    | 40 [10.57]                               |                              |             |                |
| OSPCX 160 LS Dynamic | 160 [9.76]                                                     | 16 [4.23]                                | 210 [3045]                   | 40 [580]    | 280 [4061]     |
| OSPCX 200 LS Dynamic | 200 [12.20]                                                    | 20 [5.28]                                |                              |             |                |
| OSPCX 250 LS Dynamic | 250 [15.25]                                                    | 25 [6.60]                                |                              |             |                |
| OSPCX 315 LS Dynamic | 315 [19.22]                                                    | 32 [8.45]                                |                              |             |                |
| OSPCX 400 LS Dynamic | 400 [24.41]                                                    | 40 [10.57]                               | 210 [3045]                   | 40 [580]    | 280 [4061]     |
| OSPLX 520 LS Static  | 520 [31.73]                                                    | 52 [13.74]                               |                              |             |                |
| OSPLX 630 LS Static  | 630 [38.44]                                                    | 63 [16.64]                               |                              |             |                |
| OSPLX 800 LS Static  | 630 [38.44]                                                    | 70** [18.49]                             |                              |             |                |

\* Rated flow at 100 rpm

\*\* Please contact Sauer-Danfoss Sales Organization for flow higher than 70l/min [18.49 US gal/min].

70l/min [18.49 US gal/min] results in lower max. speed than 100 rpm on steering wheel for OSPL 800 and OSPL 1000 :

OSPL 800 max. speed at 70l/min [18.49 US gal/min] 87 rpm

OSPL 1000 max speed at 70l/min [18.49 US gal/min] 70 rpm

#### Technical Data

#### Valve functions in OSPC, OSPF, OSPD, OSPQ and OSPL LS steering units

##### Pilot pressure relief valve; (P - T, Q<sub>p</sub>) characteristic

The pilot pressure relief valve protects the steering unit against excessive pressure. The pilot pressure relief valve in the OSPC LS, OSPF LS, OSPD LS, OSPQ LS and OSPL LS steering unit together with the priority valve limit the maximum steering pressure P-T. The pilot pressure relief valve is set at an oil flow to the priority valve of 25 l/min [6.60 US gal/min].

For OSPC, OSPD, OSPQ and OSPL load sensing dynamic steering units, the setting values are valid at a dynamic flow of 0.6 l/min [0.16 US gal/min].

For OSPF load sensing dynamic steering units, the setting values are valid at a dynamic flow of 1.1 l/min [0.29 US gal/min].

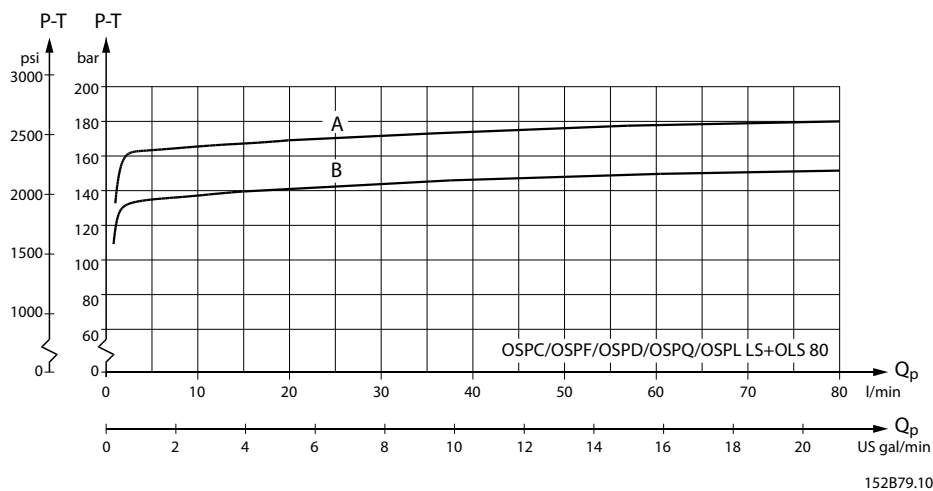
Setting tolerance:

<= 170 bar: rated value +5 bar [72.5 psi].

> 170 bar: rated value +10 bar [145 psi].

$$A = 170 \begin{matrix} +5 \\ -0 \end{matrix} \text{ bar } [2465 \begin{matrix} +73 \\ -0 \end{matrix} \text{ psi}]$$

$$B = 140 \begin{matrix} +5 \\ -0 \end{matrix} \text{ bar } [2030 \begin{matrix} +73 \\ -0 \end{matrix} \text{ psi}]$$



#### Shock valves

The shock valves protect the steering unit and reduce external forces on the steering cylinder by limiting the pressure difference from L to T and from R to T.

The shock valves are set at 3 l/min [0.792 US gal/min]

At higher flow pressure peaks may occur.

The shock valves are of the direct acting type, so they react very quickly.

Setting tolerance: rated value +20 bar [290 psi].

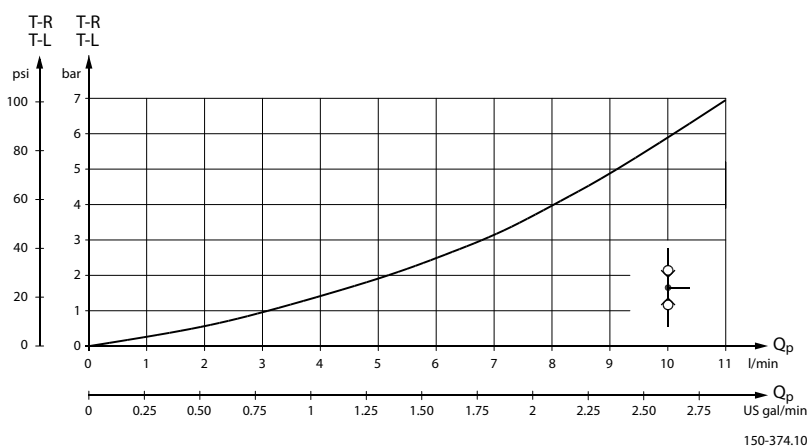
#### Technical Data

#### Suction Valves

The suction valves allow oil suction to avoid cavitation in the steering cylinder. To provide correct suction, a back pressure valve must be fitted in the tank line from the steering unit.

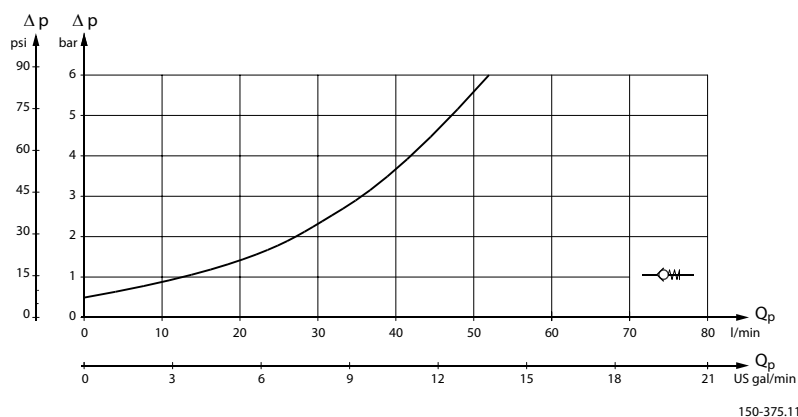
Generally Sauer-Danfoss recommend a back pressure of 2 bar [29 psi], but on vehicles with strong self straightening tendencies and on articulated steered vehicles, we recommend 5-10 bar [72.5 - 145 psi]. For further advice, please contact the Sauer-Danfoss Sales Organisation.

Note: A connection which incorporates a check valve must be established to allow oil flow to by-pass the back pressure valve (and filter) from the tank to steering unit. See diagramme examples in sub catalogue "General Steering Components" page 37 - 39.



#### Check valves

The check valve in the P connection of the steering unit protects the driver against steering wheel jerks. The check valve prevents oil from flowing backwards into the pump line when steering against a high pressure on the cylinder side. The pressure drop across the check valve is indicated on the following graph, which assumes the use of port adaptors with 11 mm [0.43 in] minimum bore.

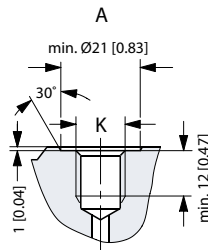


The check valve in the LS line of OSPC LS, OSPD LS and OSPQ LS dynamic steering units also protects the driver against steering wheel jerks. The check valve prevents oil from flowing backwards into the LS line to the priority valve when steering against a high pressure on the cylinder side.

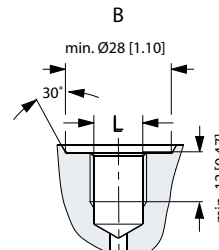
In OSPF LS oil cannot flow backwards into the LS line, look in sub catalogue: "General Steering Components" page 26.

#### Port Thread Versions for

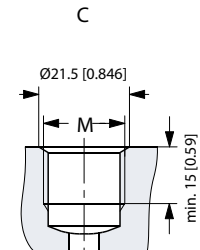
OSPB LS,  
OSPC LS/LSR,  
OSPF LS,  
OSPD LS/LSR,  
OSPQ LS/LSR,  
OSPL LS,  
OSPBX LS,  
OSPCX LS,  
OSPLX LS



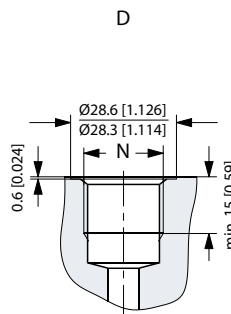
A: G port w. spot face  
(LS in OSPB and OSPL  
with no valves)  
K: DIN 3852-2 - G ¼



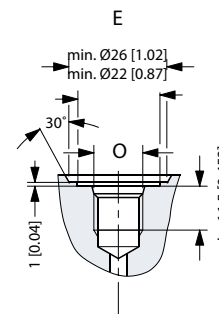
B: G port w. spot face  
(LS in OSPC/F/D/Q  
and OSPL with valves)  
L: DIN 3852-2 - G ¼



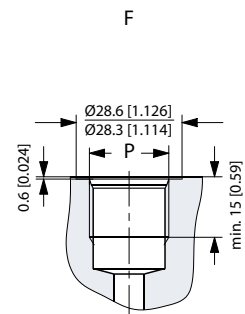
C: G ports (P, T, L, R)  
M: DIN 3852-2 - G ½



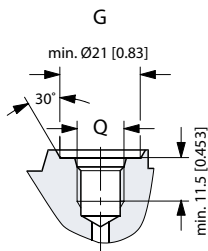
D: G ports w. spot face  
(P, T, L, R)  
N: DIN 3852-2 - G ½



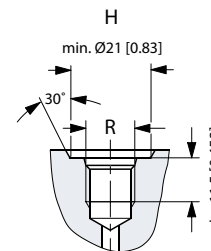
E: Metric port w. spot  
face and O-ring  
chamfer (LS)  
O: ISO 6149-1 - M12 x 1.5



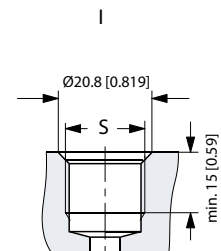
F: Metric ports  
w. spot face and  
O-ring chamfer  
(P, T, L, R)  
P: ISO 6149-1 - M18 x 1.5



G: UNF port w. O-ring chamfer  
(LS in OSPB  
and OSPL with  
no valves)  
Q: ISO 11926-1 - 7/16-20UNF  
O-ring boss port



H: UNF ports w. O-ring  
chamfer (LS in OSPC/  
F/D and OSPL  
with valves)  
R: ISO 11926-1 - 7/16-20 UNF  
O-ring boss port

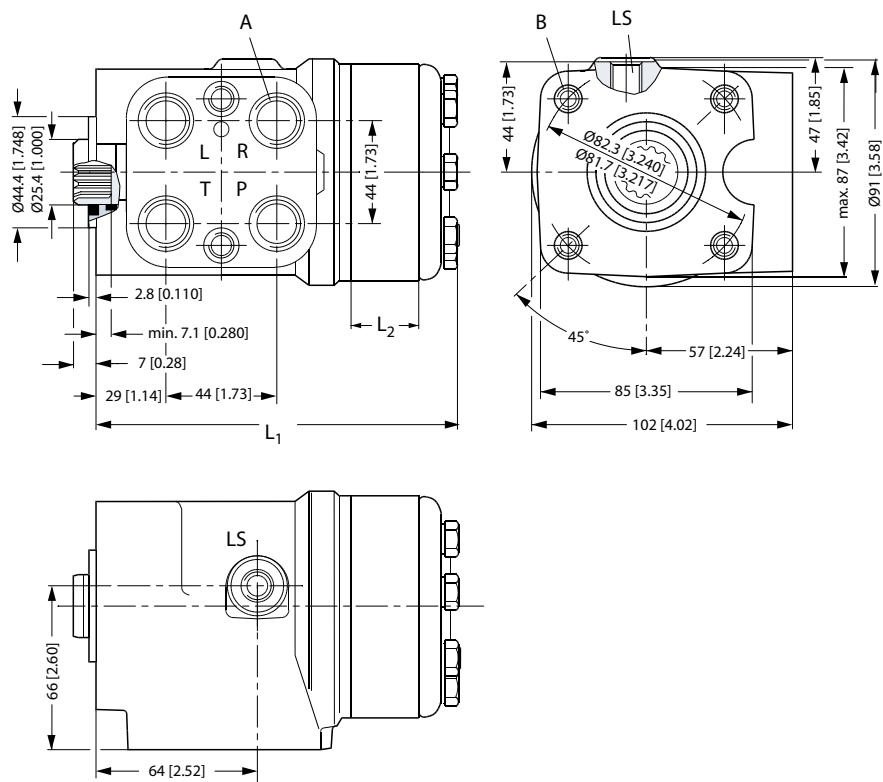


I: UNF ports w. O-ring<sup>150-603.10</sup>  
chamfer (P, T, L, R)  
S: ISO 11926-1 - ¾-16UNF  
O-ring boss port

#### Dimensions

*OSPB LS for OLS, OSPBX LS for OSQ*

| Type               | mm<br>L <sub>1</sub> [in] | mm<br>L <sub>2</sub> [in] |
|--------------------|---------------------------|---------------------------|
| OSPB 50            | 126<br>[4.96]             | 6.5<br>[0.26]             |
| OSPB 80            | 129<br>[5.08]             | 10.4<br>[0.41]            |
| OSPB 100           | 132<br>[5.20]             | 13.0<br>[0.51]            |
| OSPB 125           | 135<br>[5.31]             | 16.2<br>[0.64]            |
| OSPB/<br>OSPBX 160 | 140<br>[5.51]             | 20.8<br>[0.82]            |
| OSPB/<br>OSPBX 200 | 145<br>[5.71]             | 26.0<br>[1.02]            |
| OSPB/<br>OSPBX 250 | 151<br>[5.94]             | 32.5<br>[1.28]            |
| OSPB/<br>OSPBX 315 | 160<br>[6.30]             | 40.9<br>[1.61]            |
| OSPB/<br>OSPBX 400 | 171<br>[6.73]             | 52.0<br>[2.05]            |



#### European version:

A: G ½; 15 mm [0.59 in] deep

B: M10 × 1.5,  
16 mm [0.63 in] deep

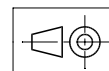
LS: G ¼ with spot face, 11 mm  
[0.43 in] deep

#### US version:

A: ¾ - 16 UNF O-ring boss;  
15 mm [0.59 in] deep

B: 3/8 - 16 UNC,  
16 mm [0.63 in] deep

LS: G 7/16 - 20 UNF O-ring boss,  
11.5 mm [0.45 in] deep

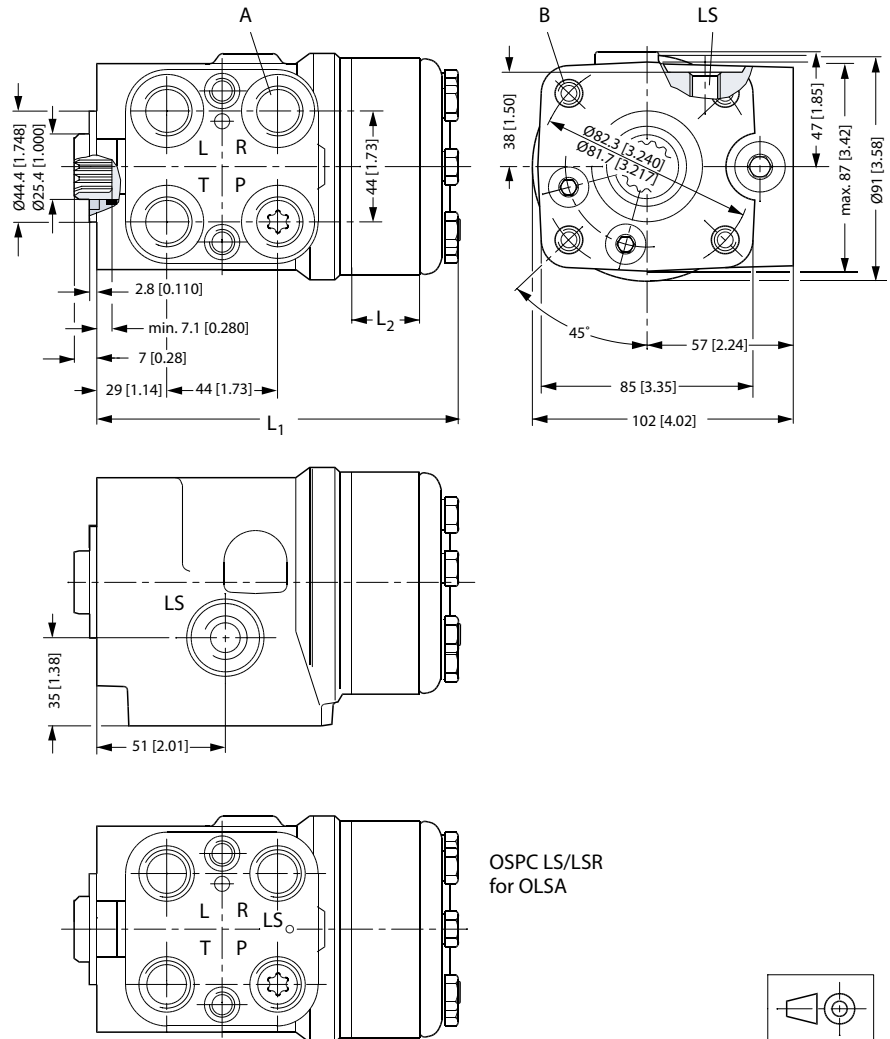


150-590.11

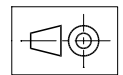
#### Dimensions

*OSPC LS/LSR and OSPF LS for OLS, OSPCX LS for OSQ*

| Type          | mm<br>L <sub>1</sub> [in] | mm<br>L <sub>2</sub> [in] |
|---------------|---------------------------|---------------------------|
| OSPC 40       | 126<br>[4.96]             | 6.5<br>[0.26]             |
| OSPC/OSPF 50  | 126<br>[4.96]             | 6.5<br>[0.26]             |
| OSPC/OSPF 60  | 128<br>[5.04]             | 9.1<br>[0.36]             |
| OSPC/OSPF 70  | 128<br>[5.04]             | 9.1<br>[0.36]             |
| OSPC/OSPF 80  | 129<br>[5.08]             | 10.4<br>[0.41]            |
| OSPC/OSPF 100 | 132<br>[5.20]             | 13.0<br>[0.51]            |
| OSPC/OSPF 125 | 135<br>[5.31]             | 16.2<br>[0.64]            |
| OSPC/OSPF 140 | 140<br>[5.51]             | 20.8<br>[0.82]            |
| OSPC/OSPF 185 | 143<br>[5.63]             | 24.0<br>[0.94]            |
| OSPC/OSPF 200 | 145<br>[5.71]             | 26.0<br>[1.02]            |
| OSPC/OSPF 230 | 154<br>[6.06]             | 35.1<br>[1.38]            |
| OSPC/OSPF 250 | 151<br>[5.94]             | 32.5<br>[1.28]            |
| OSPC/OSPF 315 | 160<br>[6.30]             | 40.9<br>[1.61]            |
| OSPC/OSPF 400 | 171<br>[6.73]             | 52.0<br>[2.05]            |



OSPC LS/LSR  
for OLSA



150-591.11

European version:

- A: G ½ or G ½ w. spot face  
or M18 x 1.5 ISO 6149,  
15 mm [0.59 in] deep
- B: M10 x 1.5, 16 mm [0.63 in]  
deep
- LS: G ¼ w. spot face  
or M12 x 1.5 ISO 6149,  
11.5 mm [0.45 in] deep

US version:

- A: ¾-16 UNF O-ring boss,  
15 mm (0.59 in) deep
- B: 3/8 - 16 UNC or M10 x 1.5,  
16 mm  
[0.63 in] deep
- LS: 7/16 - 20 UNF O-ring boss,  
11.5 mm [0.45 in] deep

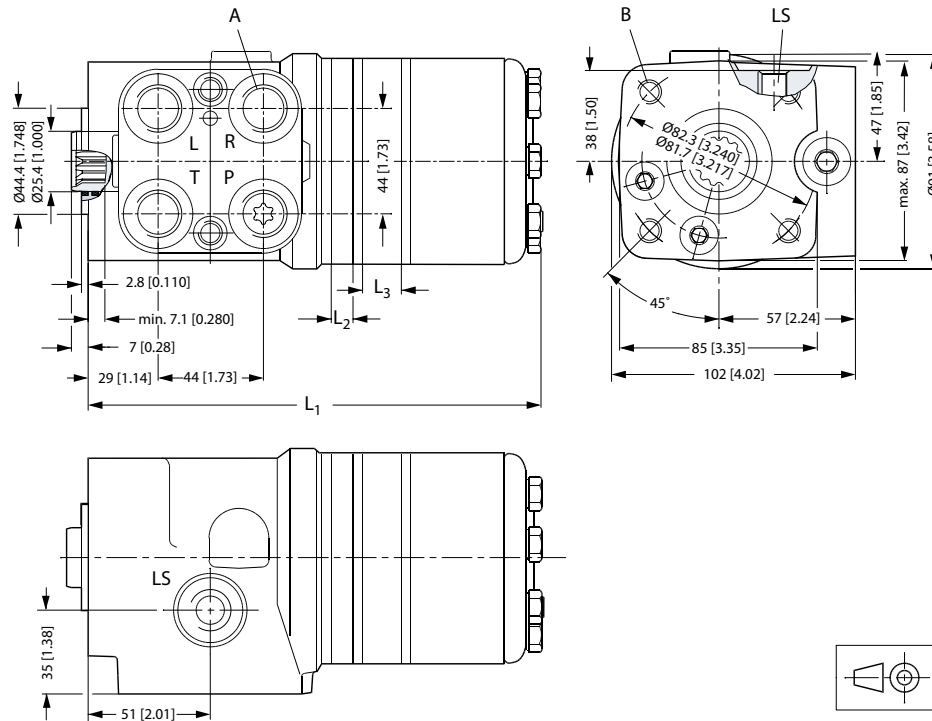
OSPC LS/LSR for OLSA:

- B: M10 x 1.5,  
16 mm [0.63 in] deep

#### Dimensions

#### OSPD LS/LSR for OLS

| Type         | mm<br>L <sub>1</sub> [in] | mm<br>L <sub>2</sub> [in] | mm<br>L <sub>3</sub> [in] |
|--------------|---------------------------|---------------------------|---------------------------|
| OSPD 60/185  | 195<br>[7.70]             | 9.1<br>[0.36]             | 20.8<br>[0.82]            |
| OSPD 60/220  | 200<br>[7.87]             | 9.1<br>[0.36]             | 26.0<br>[1.02]            |
| OSPD 70/195  | 190<br>[7.48]             | 9.1<br>[0.36]             | 16.2<br>[0.65]            |
| OSPD 70/230  | 195<br>[7.70]             | 9.1<br>[0.36]             | 20.8<br>[0.82]            |
| OSPD 70/270  | 200<br>[7.87]             | 9.1<br>[0.36]             | 26.0<br>[1.02]            |
| OSPD 70/385  | 215<br>[8.46]             | 9.1<br>[0.36]             | 40.9<br>[1.61]            |
| OSPD 100/200 | 191<br>[7.52]             | 13.0<br>[0.51]            | 13.0<br>[0.51]            |
| OSPD 100/260 | 199<br>[7.83]             | 13.0<br>[0.51]            | 20.8<br>[0.82]            |
| OSPD 100/300 | 204<br>[8.03]             | 13.0<br>[0.51]            | 26.0<br>[1.02]            |
| OSPD 125/285 | 202<br>[7.95]             | 16.2<br>[0.64]            | 20.8<br>[0.82]            |
| OSPD 125/325 | 207<br>[8.15]             | 16.2<br>[0.64]            | 26.0<br>[1.02]            |
| OSPD 125/440 | 222<br>[8.74]             | 16.2<br>[0.64]            | 40.9<br>[1.61]            |



#### European version:

A: G ½ w. spot-face  
or M18 × 1.5 ISO 6149  
15 mm [0.59 in] deep

B: M10 × 1.5, 16 mm [0.63 in]  
deep

LS: G ¼ w. spot face or  
M 12 × 1.5 ISO 6149  
11.5 mm [0.45 in] deep

#### US version:

A: ¾ - 16 UNF O-ring boss;  
15 mm [0.59 in] deep

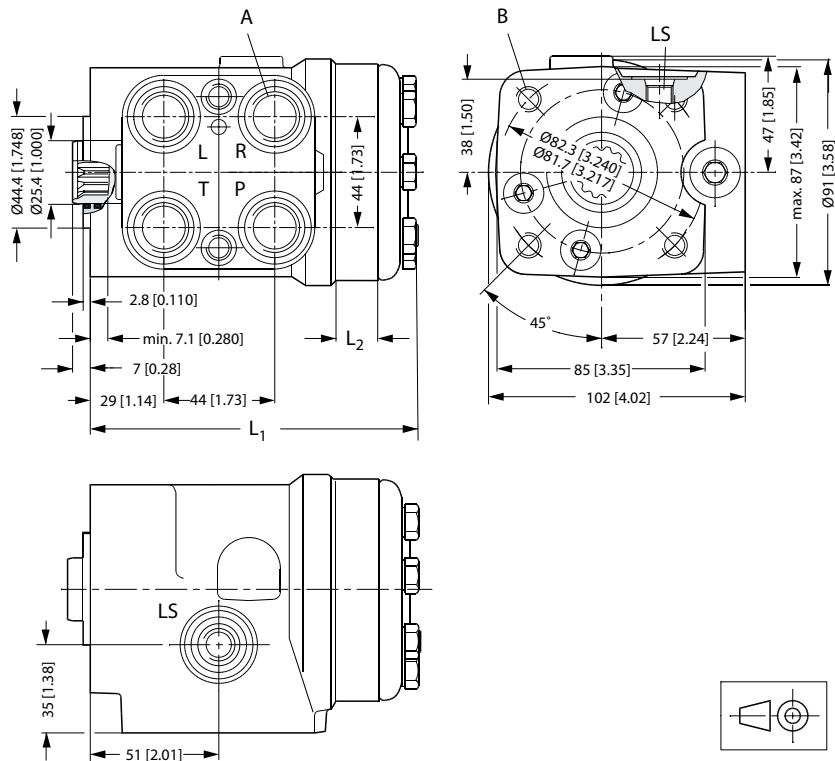
B: M 10 × 1.5, 16 mm [0.63 in]  
deep,

LS: 7/16 - 20 UNF o-ring boss,  
11.5 mm [0.45 in] deep

## Dimensions

### OSPQ LS/LSR for OLS

| Type         | mm<br>L <sub>1</sub> [in] | mm<br>L <sub>2</sub> [in] |
|--------------|---------------------------|---------------------------|
| OSPQ 80/125  | 129<br>[5.08]             | 10.4<br>[0.41]            |
| OSPQ 80/140  | 129<br>[5.08]             | 10.4<br>[0.41]            |
| OSPQ 80/160  | 129<br>[5.08]             | 10.4<br>[0.41]            |
| OSPQ 100/160 | 132<br>[5.20]             | 13.0<br>[0.51]            |
| OSPQ 100/180 | 132<br>[5.20]             | 13.0<br>[0.51]            |
| OSPQ 100/200 | 132<br>[5.20]             | 13.0<br>[0.51]            |
| OSPQ 125/200 | 135<br>[5.31]             | 16.2<br>[0.64]            |
| OSPQ 125/250 | 135<br>[5.31]             | 16.2<br>[0.64]            |
| OSPQ 160/250 | 140<br>[5.51]             | 20.8<br>[0.82]            |
| OSPQ 160/320 | 140<br>[5.51]             | 20.8<br>[0.82]            |



European version:

A: M18 x 1.5 ISO 6149,  
 15 mm [0.59 in] deep

B: M10 x 1.5, 16 mm [0.63 in]  
 deep

LS: M12 x 1.5 ISO 6149,  
 11.5 mm [0.45 in] deep

150-594.12

#### Dimensions

#### OSPL LS for OLS and OSPLX LS for OSQ

| Type           | mm<br>L <sub>1</sub> [in] | mm<br>L <sub>2</sub> [in] |
|----------------|---------------------------|---------------------------|
| OSPL/OSPLX 520 | 197<br>[7.76]             | 67.8<br>[2.67]            |
| OSPL/OSPLX 630 | 211<br>[8.31]             | 82.0<br>[3.23]            |
| OSPL/OSPLX 800 | 233<br>[9.17]             | 104.0<br>[4.09]           |
| OSPL 1000      | 263<br>[10.35]            | 134.0<br>[5.27]           |

#### European version:

A: G 1/2; 15 mm [0.59 in] deep

B: M10 x 1.5, 16 mm [0.63 in] deep

LS: G 1/4 w. spot face,  
11.5 mm [0.45 in] deep

#### US version:

A: 3/4-16 UNF O-ring boss,  
15 mm [0.59 in] deep  
or for OVPL

B: M10 x 1.5, 16 mm [0.63 in] deep

LS: 7/16-20 UNF O-ring boss,  
11.5 mm [0.45 in] deep

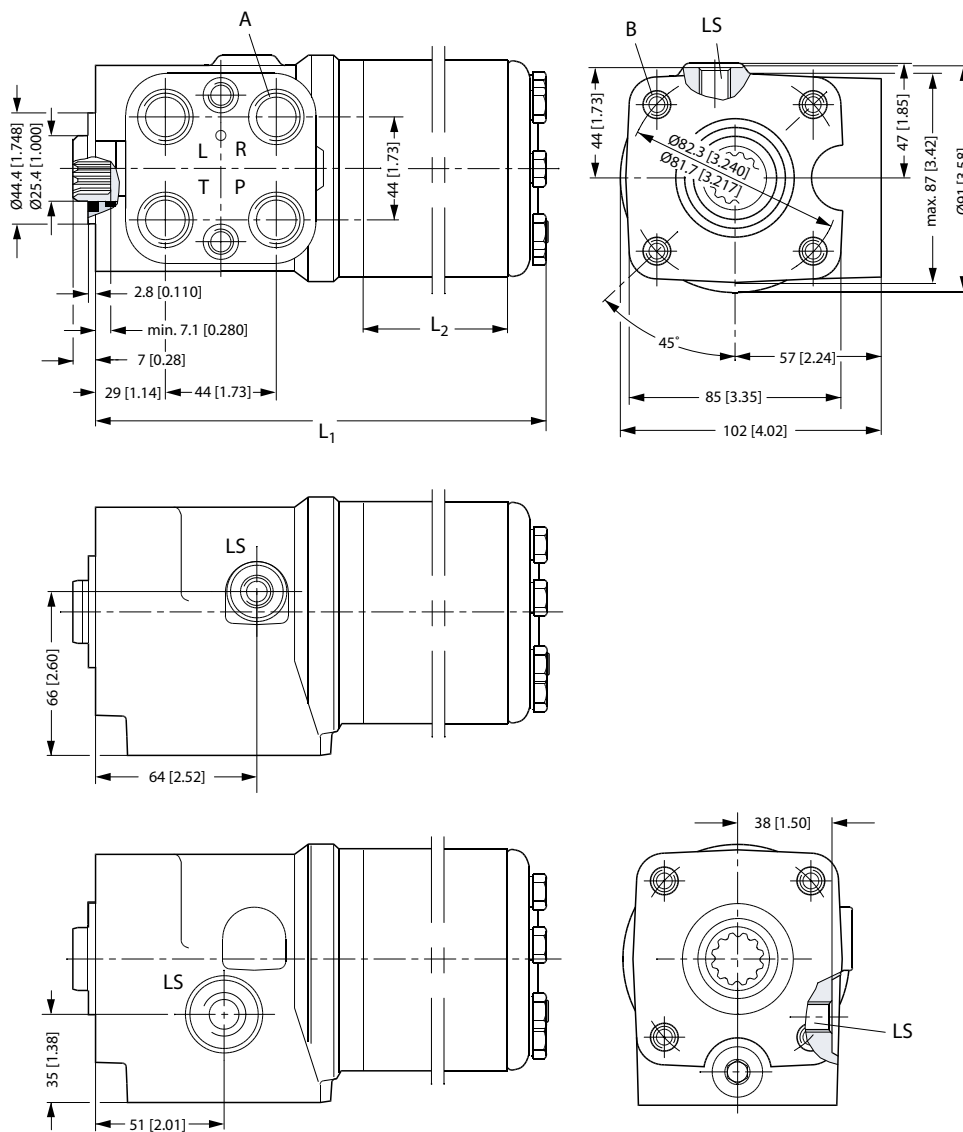
#### OSPL LS with pilot pressure relief valve:

#### European version:

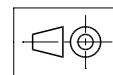
A: for OVPL

B: M10 x 1.5, 16 mm [0.63 in] deep

LS: G 1/4 w. spot face,  
11.5 mm [0.45 in] deep



OSPL LS with relief valve



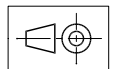
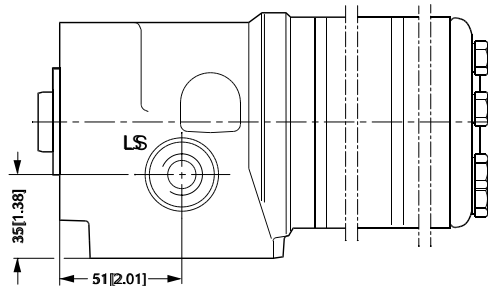
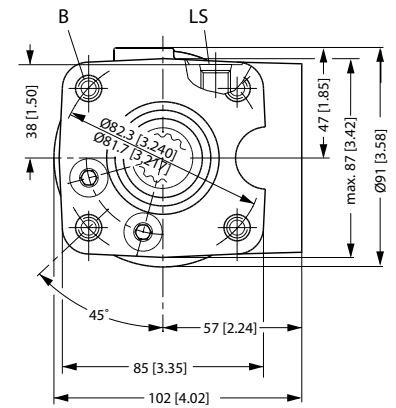
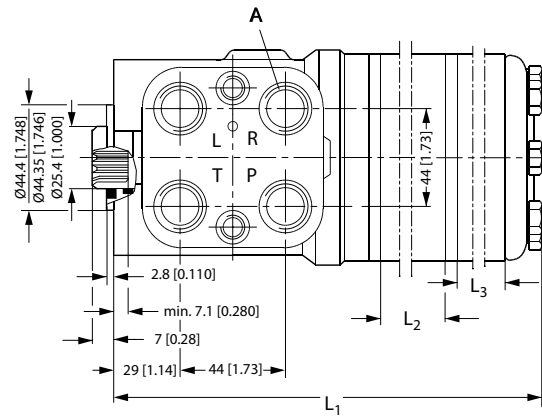
P301 030

## Dimensions

### OSPL 1200 LS for OLS

| Type            | mm<br>L <sub>1</sub> [in] | mm<br>L <sub>2</sub> [in] | mm<br>L <sub>3</sub> [in] |
|-----------------|---------------------------|---------------------------|---------------------------|
| OSPL<br>1200 LS | 288<br>[10.34]            | 104<br>[4.09]             | 52<br>[2.05]              |

- A:  $\frac{3}{4}$ -16 UNF O-ring boss,  
 15 mm [0.59 in] deep  
 B: M10 x 1.5, 16 mm [0.63 in] deep  
 LS:  $\frac{7}{16}$ -20 UNF O-ring boss  
 11.5 mm [0.45 in] deep



150-612.10

#### Valve Block OVPL

OVPL valve blocks can be flanged onto Sauer-Danfoss steering units type OSPL, which are prepared for OVPL mounting.

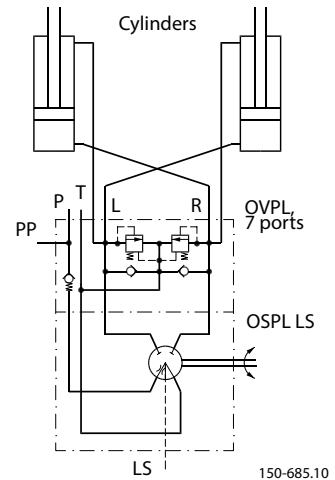
#### Versions

OVPL valve blocks contain shock valves, suction valves, check valve and back-pressure valve. OVPL valve blocks are available with 4, 5 or 7 connections. OVPL with 7 connections have 2 L and 2 R connections, which means that 2 steering cylinders can be connected directly to the valve block.



F300629

OVPL, 7 ports



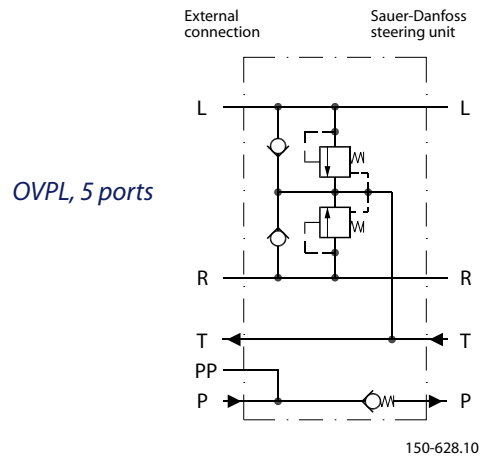
150-685.10

#### Code Numbers and Weights

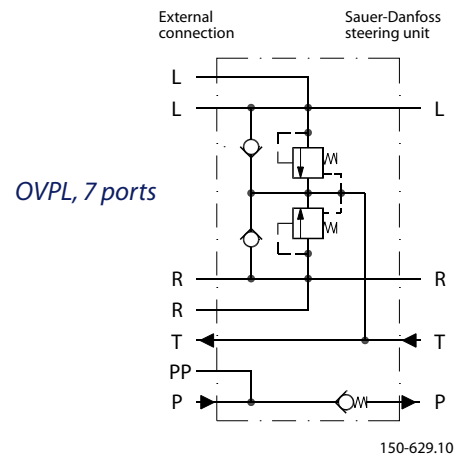
#### OVPL Valve blocks

OVPL in the table below have all the following valve functions incorporated:

- Check valve in P-port
- Shock valves
- Suction valves



150-628.10



150-629.10

| Valve block | Code numbers                                                              | Number of ports | Valve settings           | Weight |        |
|-------------|---------------------------------------------------------------------------|-----------------|--------------------------|--------|--------|
|             | Connections<br>European version<br>P, T, L, R: G 1/2-S**<br>PP: G 1/4-S** |                 | Shock valve<br>bar [psi] | kg     | [lb]   |
| OVPL 24     | 152-1117                                                                  | 5               | 240 [3480]               | 2.0    | [4.41] |
| OVPL 28     | 152-1114                                                                  | 5               | 280 [4061]               | 2.0    | [4.41] |
| OVPL 28     | 152-1116                                                                  | 7               | 280 [4061]               | 2.0    | [4.41] |

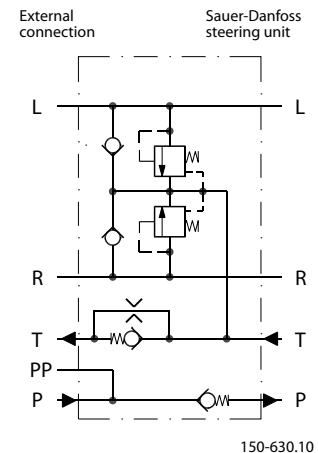
S\*\* : Spot face around port connections

#### Code Numbers and Weights (continued)

OVPL in the table below has the following valve functions incorporated:

- Check valve in P-port
- Shock valves
- Suction valves
- Backpressure valve, with by-pass to reduce stand-by pressure in neutral position.

*OVPL, 5 ports and backpressure valve with by-pass*



150-630.10

| Valve block | Code numbers                                                              | Number of ports | Valve settings           | Weight |        |
|-------------|---------------------------------------------------------------------------|-----------------|--------------------------|--------|--------|
|             | Connections<br>European version<br>P, T, L, R: G 1/2-S**<br>PP: G 1/4-S** |                 | Shock valve<br>bar [psi] | kg     | [lb]   |
| OVPL 24     | 152-1120                                                                  | 5               | 240 [3480]               | 2.0    | [4.41] |
| OVPL 28     | 152-1130                                                                  | 5               | 280 [4061]               | 2.0    | [4.41] |

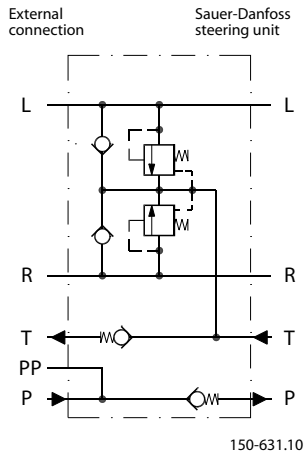
S\*\* : Spot face around port connections

#### Code Numbers and Weights (continued)

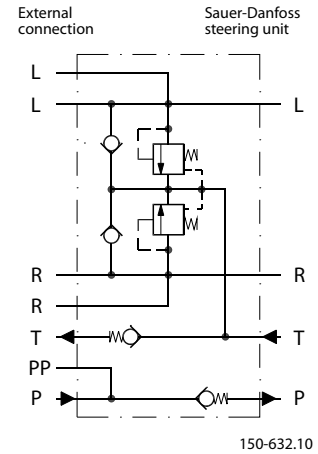
OVPL in the table below have all the following valve functions incorporated:

- Check valve in P-port
- Shock valves
- Suction valves
- Backpressure valve, without by-pass.

*OVPL, 5  
ports and  
backpressure  
valve*



*OVPL, 7  
ports and  
backpressure  
valve*



| Valve block | Code numbers                                                              | Number of ports | Valve settings           | Weight |        |
|-------------|---------------------------------------------------------------------------|-----------------|--------------------------|--------|--------|
|             | Connections<br>European version<br>P, T, L, R: G 1/2-S**<br>PP: G 1/4-S** |                 | Shock valve<br>bar [psi] | kg     | [lb]   |
| OVPL 24     | 152-1132                                                                  | 5               | 240 [3480]               | 2.0    | [4.41] |
| OVPL 28     | 152-1115                                                                  | 7               | 280 [4061]               | 2.0    | [4.41] |

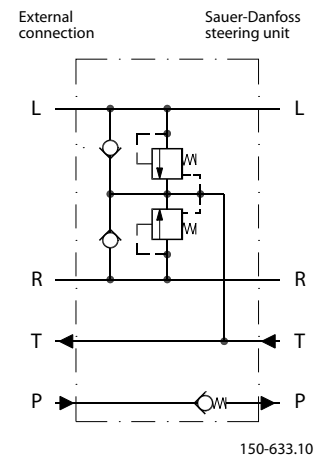
S\*\* : Spot face around port connections

#### Code Numbers and Weights (continued)

OVPL in the table below has following valve functions incorporated:

- Check valve in P-port
- Shock valves
- Suction valves

*OVPL, 4 ports*



| Valve block | Code numbers                                          | Number of ports | Valve settings           | Weight |        |
|-------------|-------------------------------------------------------|-----------------|--------------------------|--------|--------|
|             | Connections<br>US version<br>3/4 - 16 UNF<br>O* + S** |                 | Shock valve<br>bar [psi] | kg     | [lb]   |
| OVPL 28     | 152-1133                                              | 4               | 280 [4061]               | 2.0    | [4.41] |

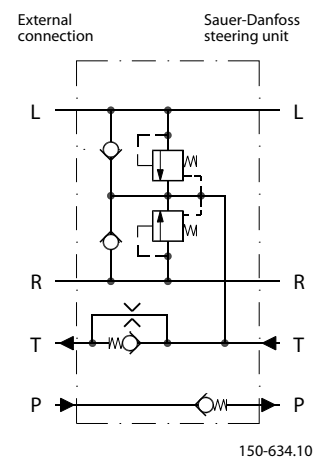
O\* : O-ring chamfer on port connections

S\*\* : Spot face around port connections

OVPL in the table below has the following valve functions incorporated:

- Check valve in P-port
- Shock valves
- Suction valves
- Backpressure valve with by-pass to reduce stand-by pressure in neutral position.

*OVPL, 4 ports and backpressure valve with by-pass*



| Valve block | Code numbers                                          | Number of ports | Valve settings           | Weight |        |
|-------------|-------------------------------------------------------|-----------------|--------------------------|--------|--------|
|             | Connections<br>US version<br>3/4 - 16 UNF<br>O* + S** |                 | Shock valve<br>bar [psi] | kg     | [lb]   |
| OVPL 28     | 152-1136                                              | 4               | 280 [4061]               | 2.0    | [4.41] |

O\* : O-ring chamfer on port connections

S\*\* : Spot face around port connections

#### Technical Data

#### Common data

Look in sub-catalogue: "General, steering components"

#### Valve functions

The data below come from measurements on a representative sample of valve blocks from production.

An oil with a viscosity of 21 mm<sup>2</sup>/s [SUS] at 50°C [122°F] was used during measuring.

| Valve block | Max. Oil flow<br>l/min [US gal/min] |         | Max. pressure on connections |                |                   |  |
|-------------|-------------------------------------|---------|------------------------------|----------------|-------------------|--|
|             |                                     |         | P, PP<br>bar [psi]           | T<br>bar [psi] | L, R<br>bar [psi] |  |
| OVPL 24     | 100                                 | [26.42] | 190 [2756]                   | 15 [218]       | 240 [3480]        |  |
| OVPL 28     | 100                                 | [26.42] | 225 [3263]                   | 15 [218]       | 280 [4061]        |  |

#### Shock valves

The shock valves protect the valve block and steering unit and limit maximum external forces on the steering cylinder. The shock valves in the valve block limit the maximum pressure drop from L to T and from R to T.

The shock valves are set at 10 l/min. [2.64 US gal/min].

The shock valves are of the direct acting type, so they react very quickly.

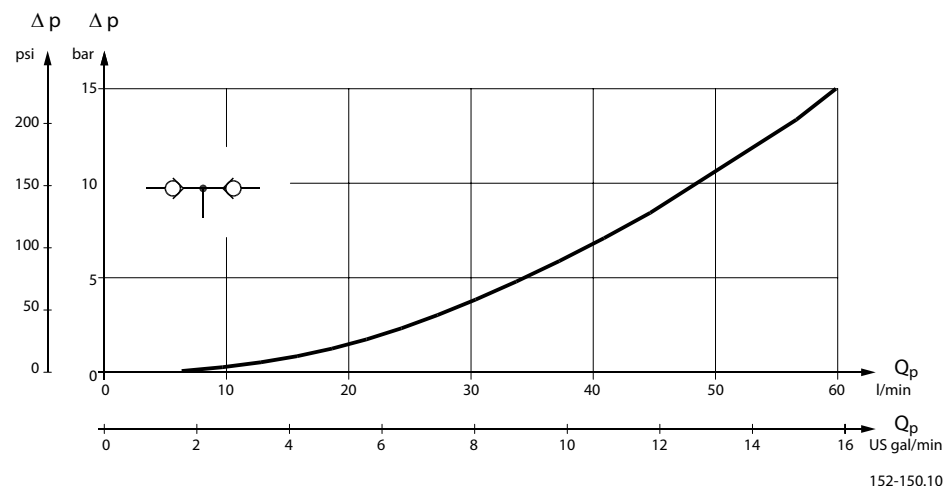
Setting tolerance: rated value +/- 10 bar [145 psi], ex. 240 [3480 psi] +/- 10 bar [145 psi].

#### Suction valves

The suction valves ensure oil suction to avoid cavitations in the steering cylinder. To provide correct suction, a back pressure valve must be fitted in the tank line from the steering unit.

The capacity of the suction valves can be increased by building in a back pressure in the valve block.

*The curve below shows pressure drop across a suction valve*



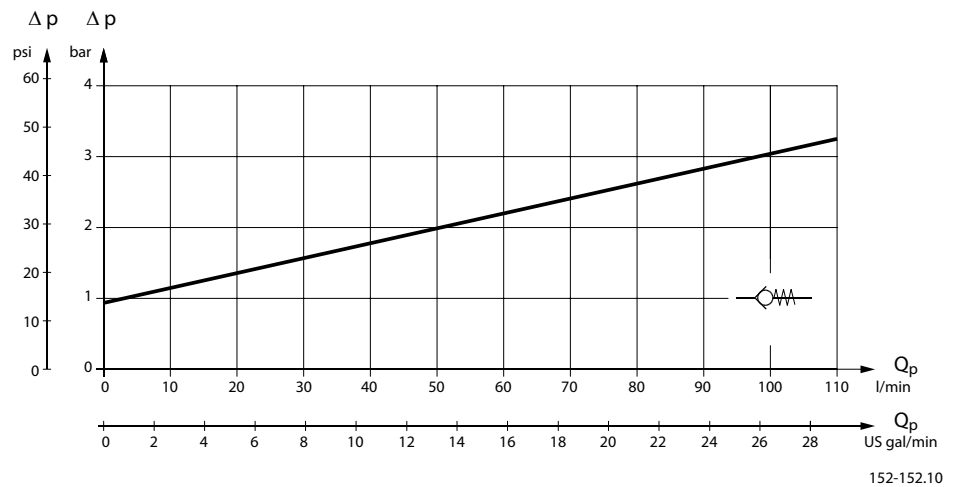
#### Technical Data (continued)

#### Check valve

The check valve protects the driver against steering wheel jerks. The check valve prevents oil from flowing backwards into the pump line when steering against a high pressure on the cylinder side.

The check valve is built into the P connection of the valve block.

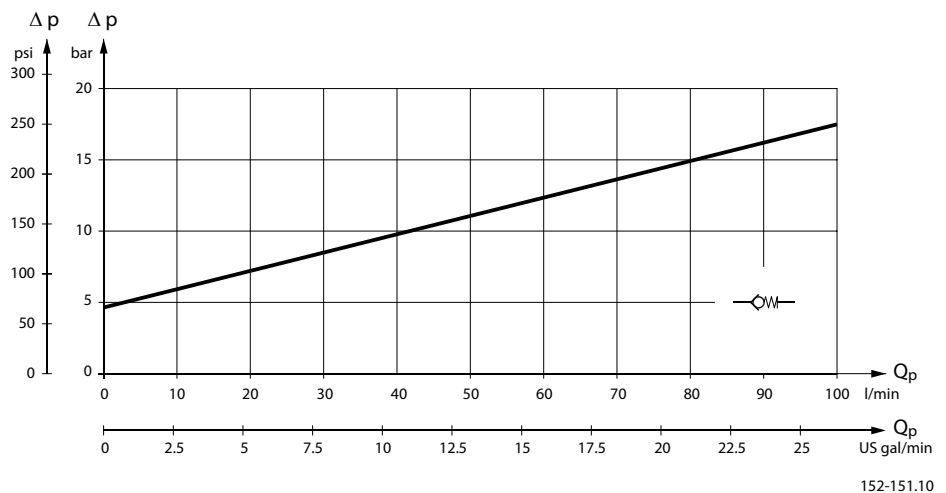
*The curve below shows pressure drop across the check valve in p-connection*



#### Backpressure valve

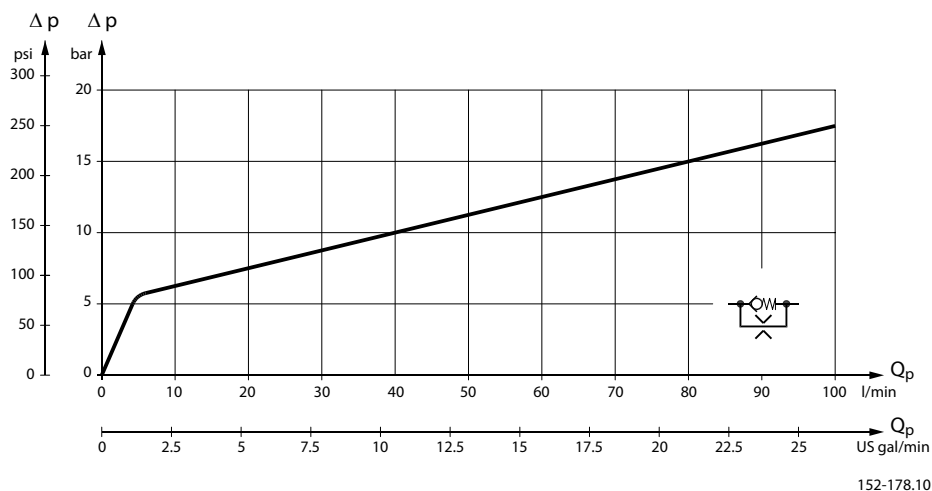
A backpressure valve increases the capacity of the suction valves.

*The curve below shows pressure drop for backpressure valve without by-pass.*



#### Technical Data (continued)

The curve below shows pressure drop for backpressure valve with by-pass.



#### Installation

Connection P in the valve block must be placed over the connection P in the steering unit, so OVPL is provided with a positioning pin to fit the positioning hole in the steering unit.

The valve block is supplied inclusive of 2 mounting screws and 4 O-rings for building onto the steering unit.

Tightening torque  $65 \pm 5 \text{ N}\cdot\text{m}$  [ $575 \pm 44 \text{ lbf}\cdot\text{in}$ ]. It is only allowed to mount OVPL blocks on steering units with a flat port flange, no spot face is allowed.

## Dimensions

OVPL, 5 ports

European version:

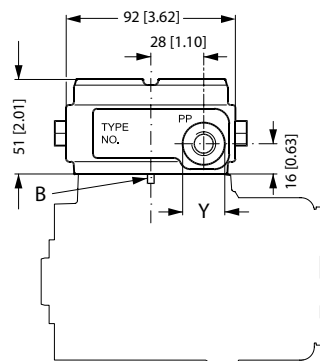
P, T, L and R:

G ½ w. spot face,  
15 mm (0.59 in) deep

PP: G ¼, w. spot face,  
11,5 mm (0.45 in) deep

X: 30,2 +0,2

Y: 21,3 +/- 0,2



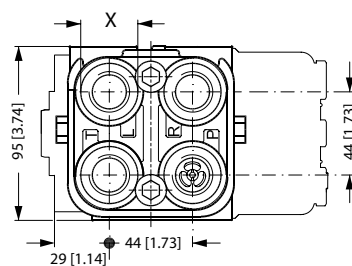
OVPL, 4 ports (no PP)

US version:

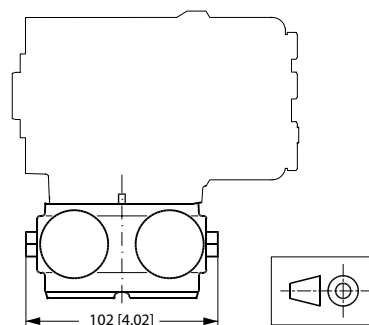
P, T, L and R:

¾ -16 UNF O-ring boss  
15 mm (0.59 in) deep

X: 30,2 +0,2



B: Positioning pin  
premounted in OVPL



152-149.10

## Dimensions (continued)

OVPL, 7 ports

European version:

P, T, 2xL and 2xR:

G ½ w. spot face,

15 mm (0.59 in) deep

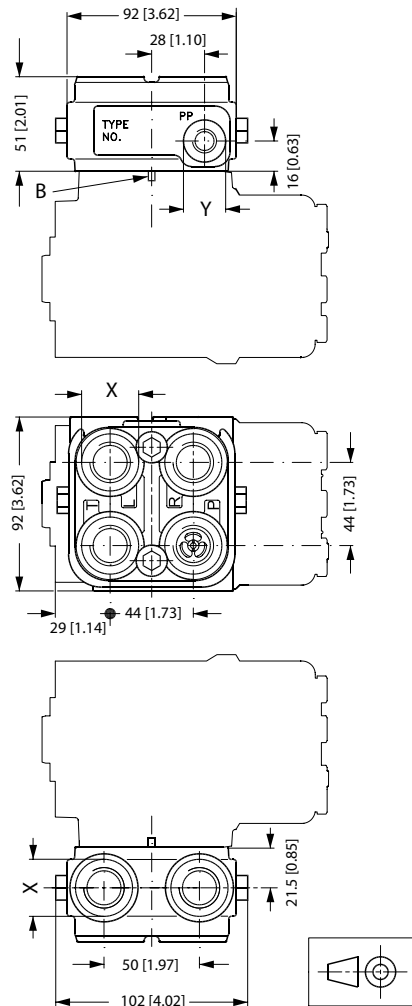
PP: G ¼, w. spot face,

11,5 mm (0.45 in) deep

X: 30,2 +0,2

Y: 21,3 +/- 0,2

B: Positioning pin  
premouted in OVPL



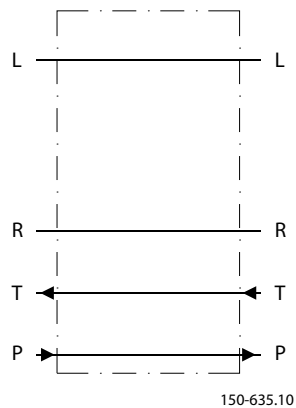
152-148.10

#### Angle Block OVR

OVR angle blocks are especially designed for applications in which pipes and/or hoses must run parallel with the steering column axis, and where space is limited. The valve block can be flanged onto Sauer-Danfoss steering unit OSPB, OSPC, OSPD, OSPF, OSPQ and OSPL, which have no spot face around the ports. Use the angle block makes angle and swivel connections and pipe bends unnecessary. The OVR connections are positioned away from the steering wheel. (see [dimensions](#) page 53)

#### Version

OVR



F300 626

#### Code Numbers and Weight

OVR in the table below has no valve functions incorporated.

| Angle block | Code numbers                                                | Weight |        |
|-------------|-------------------------------------------------------------|--------|--------|
|             | Connections<br>European version<br>P, T, L, R: G 1/2<br>S** | kg     | [lb]   |
| OVR         | 152-0201                                                    | 2.0    | [4.41] |

S\*\* : Spot face around port connections

#### Installation

The valve block is supplied inclusive of 2 mounting screws and 4 O-rings for building onto the steering unit. Tightening torque  $65 \pm 5$  N·m [ $575 \pm 44.3$  lbf·in]. OVR blocks may only be mounted on steering units with a flat port flange, (no spot facing).

For OVR blocks with other thread ore kind of valves mounted, please contact the Sauer-Danfoss Sales organisation.

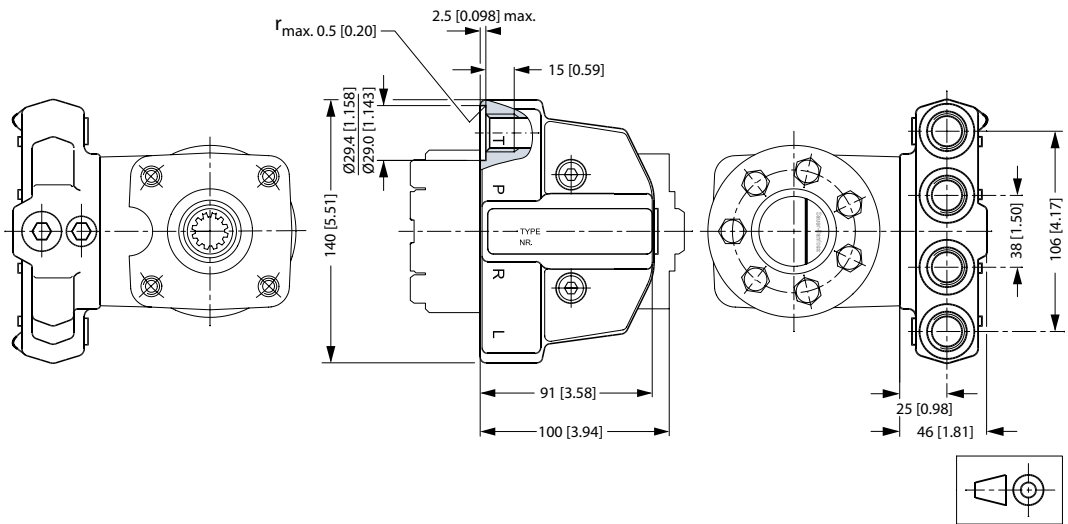
## Dimensions

OVR

European version:

P, T, L and R:

G ½, 15 mm (0.59 in) deep



152-31.10

#### Versions

**Sauer-Danfoss priority valves are used in steering systems with load sensing steering units. In such systems steering always has first priority**

#### *Load sensing static priority valves*

Load sensing static steering units require load sensing static priority valves. Load sensing static steering systems have no oil flow in the LS connection when the steering unit is in neutral position.

#### *Load sensing dynamic priority valves*

Load sensing dynamic steering units require load sensing dynamic priority valves. Load sensing dynamic steering systems have a constant oil flow in the LS connection from the priority valve to the steering unit even when the steering unit is in neutral position.

Ports:

P = pump,  
CF = controlled flow (priority oil flow),  
EF = excess flow,  
L = left,  
R = right,  
T = tank,  
LS = load sensing,  
PP = pilot pressure

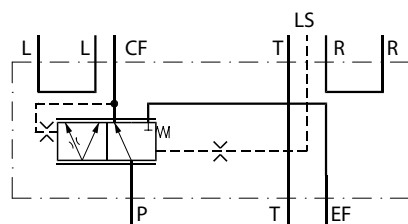
#### OLSA 40/80

The OLSA 40 and OLSA 80 "flange on" priority valves are used in load sensing steering systems, built onto OSPC LS (OLSA) steering units.



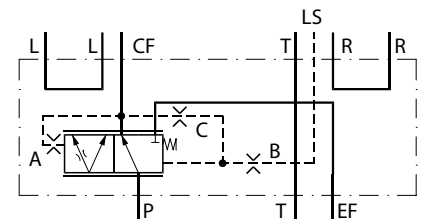
F300625

#### *OLSA static*



152B135.11

#### *OLSA dynamic*



152B170.11

A: PP-damping orifice  
B: LS-orifice  
C: Dynamic-orifice

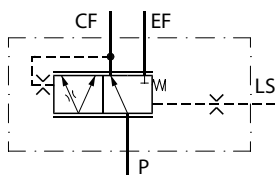
#### Versions

The OLS 40, OLS 80 and OLS 120 "in line" priority valves are used in load sensing steering systems together with OSPB LS, OSPC LS, OSPF LS, OSPD LS, OSPQ LS and OSPL LS steering units.

#### OLS 40/80



F300624



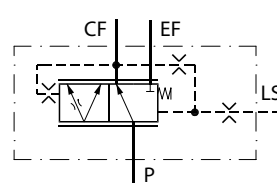
152B134.10

*OLS static*

#### OLS 120



F300623



152B171.10

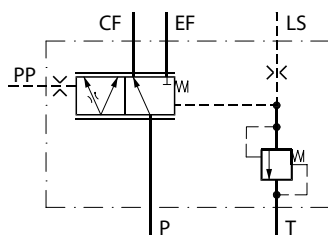
*OLS dynamic*

The OLS 160 "in line" priority valve is used in load sensing steering systems together with OSPB LS, OSPC LS, OSPF LS, OSPD LS, OSPQ LS and OSPL LS steering units.

#### OLS 160

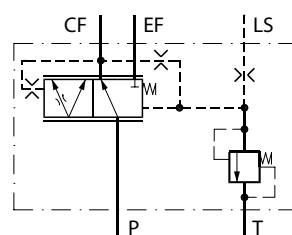


F300622



152B137.11

*OLS static*



152B172.11

*OLS dynamic*

OLS 160 is also available without pilot pressure relief valve.

#### Versions (continued)

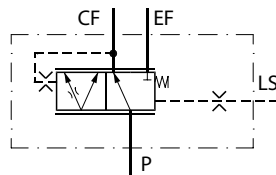
The priority valve OLSP 80 is to be used in connection with e.g. Sauer-Danfoss gear pumps type SNP and steering units type OSPB LS, OSPC LS, OSPF LS, OSPD LS and OSPQ LS in load sensing steering systems, where maximum oil flow doesn't exceed 80 l/min [21.7 USgal/min].

OLSP 80 priority valves are to be flanged on gear pumps with outlet ports square flange type 35 (35 mm pitch diameter of 4x M6 bolt holes for fixing the priority valve on pump).

#### OLSP 80

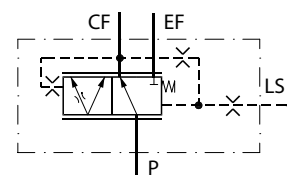


F301 266



152B134.10

*OLSP static*



152B171.10

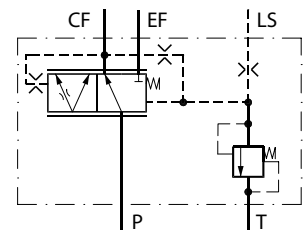
*OLSP dynamic*

The priority valve OLS 320 is to be used in connection with large pumps and steering units type OSPB LS, OSPC LS, OSPF LS, OSPD LS, OSPQ LS and OSPL LS or with EHPS steering valve in load sensing steering systems, where maximum oil flow doesn't exceed 320 l/min [84.5 USgal/min].

#### OLS 320



F301 470



152B172.11

EHPS steering valve has build in priority valve, but for max. pump flow 120 l/min [31.7 USgal/min] In systems with EHPS and pump flow between 120 l/min [31.7 USgal/min] and 320 l/min [84.5 USgal/min] a combination of EHPS and OLS 320 gives a good compact solution to reduce hosing and installation cost compared with stand alone components. For further details of this OLS 320: look in EHPS catalogue 520L0521.



F301 471

#### System Sizing

The steering system pump is sized so that satisfactory performance is achieved for both steering and working hydraulics - even at idle.

Before selecting a priority valve, consider

- the type of steering unit (LS static, LS dynamic or OSPF LS dynamic)
- the displacement of the steering unit
- the pump flow
- the application's requirement for energy optimization, initial steering response time and stability, as these all govern the selection for control spring pressure
- whether the priority valve should have internal PP (Pilot Pressure) or external PP-connection depends on the pressure drop in the pump line between the priority valve's CF-port (Controlled Flow) and the steering unit's P-port. With normal hose and tube dimensions and less than 5 m distance between priority valve and steering unit, the immediate choice is normally a priority valve with internal PP.

The following survey lists the code numbers of the priority valves that are the most frequently used in connection with the above Sauer-Danfoss steering unit types. All priority valves in the code number tables, except OLS 160 static, have internal PP connection. OLS 160 static in the code number table all have external PP connection.

#### Code Numbers and Weights

##### OLS/OLSA static priority valves for load sensing static steering units

*OLSA 40 static and OLSA 80 static*

| Priority valve | Code Numbers                                       |                                                             | Control spring pressure<br>bar [psi] | Weight<br>kg [lb] |
|----------------|----------------------------------------------------|-------------------------------------------------------------|--------------------------------------|-------------------|
|                | European version<br>T, R, L: G 3/8<br>P, EF: G 1/2 | US version<br>T, R, L: 9/16 - 18 UNF<br>P, EF: 7/8 - 14 UNF |                                      |                   |
| OLSA 40        | 152B0001                                           | -                                                           | 4 [58]                               | 2.1 [4.63]        |
| OLSA 40        | 152B0002                                           | 152B0122                                                    | 7 [101.5]                            | 2.1 [4.63]        |
| OLSA 40        | 152B0003                                           | 152B0124                                                    | 10 [145]                             | 2.1 [4.63]        |
| OLSA 80        | 152B0016                                           | 152B0019                                                    | 4 [58]                               | 2.1 [4.63]        |
| OLSA 80        | 152B0017                                           | 152B0020                                                    | 7 [101.5]                            | 2.1 [4.63]        |
| OLSA 80        | 152B0015                                           | 152B0125                                                    | 10 [145]                             | 2.1 [4.63]        |

*OLS 40 static and OLS 80 static*

| Priority valve | Code Numbers                                      |                                                                            | Control spring pressure<br>bar [psi] | Weight<br>kg [lb] |
|----------------|---------------------------------------------------|----------------------------------------------------------------------------|--------------------------------------|-------------------|
|                | European version<br>LS: G 1/4<br>P, EF, CF: G 1/2 | US version<br>LS: 7/16 - 20 UNF<br>CF: 3/4 - 16 UNF<br>P, EF: 7/8 - 14 UNF |                                      |                   |
| OLS 40         | 152B0231                                          | 152B0237                                                                   | 4 [58]                               | 1.0 [2.2]         |
| OLS 40         | 152B0232                                          | 152B0238                                                                   | 7 [101.5]                            | 1.0 [2.2]         |
| OLS 40         | 152B0233                                          | 152B0253                                                                   | 10 [145]                             | 1.0 [2.2]         |
| OLS 80         | 152B0261                                          | 152B0267                                                                   | 4 [58]                               | 1.0 [2.2]         |
| OLS 80         | 152B0262                                          | 152B0268                                                                   | 7 [101.5]                            | 1.0 [2.2]         |
| OLS 80         | 152B0263                                          | 152B0280                                                                   | 10 [145]                             | 1.0 [2.2]         |

**Code Numbers and  
Weights  
(continued)**

**OLS/OLSA static priority valves for load sensing static steering units**

*OLS 120 static*

| Priority valve | Code Numbers                                               |                                                                              | Control spring pressure | Weight     |
|----------------|------------------------------------------------------------|------------------------------------------------------------------------------|-------------------------|------------|
|                | Connections                                                |                                                                              |                         |            |
|                | European version<br>LS: G 1/4<br>CF: G 1/2<br>P, EF: G 3/4 | US version<br>LS: 7/16 -20 UNF<br>CF: 3/4 - 16 UNF<br>P, EF: 1 1/16 - 12 UNF | bar [psi]               | kg [lb]    |
| OLS 120        | 152B2232                                                   | 152B2238                                                                     | 7 [101.5]               | 2.1 [4.63] |
| OLS 120        | 152B2233                                                   | 152B2239                                                                     | 10 [145]                | 2.1 [4.63] |

*OLS 160 static*

OLS 160 static

| Priority valve | Code Numbers                                                      |                                                                                      | Control spring pressure<br><br>bar [psi] | Pilot pressure relief valve<br><br>bar [psi] | Weight<br><br>kg [lb] |
|----------------|-------------------------------------------------------------------|--------------------------------------------------------------------------------------|------------------------------------------|----------------------------------------------|-----------------------|
|                | Connections                                                       |                                                                                      |                                          |                                              |                       |
|                | European version<br>LS, PP, T: G 1/4<br>CF: G 1/2<br>P, EF: G 3/4 | US version<br>LS, PP, T: 7/16 - 20 UNF<br>CF: 3/4 - 16 UNF<br>P, EF: 1 1/16 - 12 UNF |                                          |                                              |                       |
| OLS 160        | 152B1005                                                          | 152B1085                                                                             | 7 [101.5]                                | 170 [2465]                                   | 4.4 [9.7]             |
| OLS 160        | 152B1006                                                          | 152B1086                                                                             | 10 [145]                                 | 170 [2465]                                   | 4.4 [9.7]             |

**OLS/OLSA dynamic priority valves for load sensing dynamic steering units**

*OLSA 40 dynamic and OLSA 80 dynamic for OSPC LS dynamic*

| Priority valve | Code Numbers                                    |                                                          | Control spring pressure | Weight     |
|----------------|-------------------------------------------------|----------------------------------------------------------|-------------------------|------------|
|                | Connections                                     |                                                          |                         |            |
|                | European version<br>T,R,L: G 3/8<br>P/EF: G 1/2 | US version<br>T,R,L: 9/16 - 18 UNF<br>P/EF: 7/8 - 14 UNF | bar [psi]               | kg [lb]    |
| OLSA 40        | 152B8001                                        | -                                                        | 4 [58]                  | 2.1 [4.63] |
| OLSA 40        | 152B8041                                        | 152B8042                                                 | 7 [101.5]               | 2.1 [4.63] |
| OLSA 40        | 152B8046                                        | 152B8043                                                 | 10 [145]                | 2.1 [4.63] |
| OLSA 80        | 152B8047                                        | -                                                        | 4 [58]                  | 2.1 [4.63] |
| OLSA 80        | 152B8048                                        | 152B8044                                                 | 7 [101.5]               | 2.1 [4.63] |
| OLSA 80        | 152B8049                                        | 152B8045                                                 | 10 [145]                | 2.1 [4.63] |

**Code Numbers and  
Weights  
(continued)**

**OLS/OLSA dynamic priority valves for load sensing dynamic steering units**

*OLS 40 dynamic and OLS 80 dynamic for OSPB, OSPC, OSPD, OSPQ and OSPL LS dynamic*

| Priority valve | Code Numbers                                      |                                                                            | Control spring pressure<br><br>bar [psi] | Weight<br><br>kg [lb] |
|----------------|---------------------------------------------------|----------------------------------------------------------------------------|------------------------------------------|-----------------------|
|                | Connections                                       |                                                                            |                                          |                       |
|                | European version<br>LS: G 1/4<br>P, EF, CF: G 1/2 | US version<br>LS: 7/16 - 20 UNF<br>CF: 3/4 - 16 UNF<br>P, EF: 7/8 - 14 UNF |                                          |                       |
| OLS 40         | 152B8231                                          | -                                                                          | 4 [58]                                   | 1.0 [2.20]            |
| OLS 40         | 152B8232                                          | 152B8253                                                                   | 7 [101.5]                                | 1.0 [2.20]            |
| OLS 40         | 152B8233                                          | 152B8254                                                                   | 10 [145]                                 | 1.0 [2.20]            |
| OLS 80         | 152B8261                                          | -                                                                          | 4 [58]                                   | 1.0 [2.20]            |
| OLS 80         | 152B8256                                          | 152B8268                                                                   | 7 [101.5]                                | 1.0 [2.20]            |
| OLS 80         | 152B8257                                          | 152B8260                                                                   | 10 [145]                                 | 1.0 [2.20]            |

*OLS 80 dynamic with low pressure drop (P-EF) spool for OSPB, OSPC, OSPD, OSPQ and OSPL LS dynamic*

| Priority valve | Code Numbers                                                     | Control spring pressure<br><br>bar [psi] | Weight<br><br>kg [lb] |
|----------------|------------------------------------------------------------------|------------------------------------------|-----------------------|
|                | Connections<br>European version<br>LS: G 1/4<br>P, EF, CF: G 1/2 |                                          |                       |
| OLS 80         | 152B8259                                                         | 7 [101.5]                                | 1.0 [2.20]            |

*OLS 120 dynamic for OSPB, OSPC, OSPD, OSPQ and OSPL LS dynamic*

| Priority valve | Code Numbers                                               |                                                                             | Control spring pressure<br><br>bar [psi] | Weight<br><br>kg [lb] |
|----------------|------------------------------------------------------------|-----------------------------------------------------------------------------|------------------------------------------|-----------------------|
|                | Connections                                                |                                                                             |                                          |                       |
|                | European version<br>LS: G 1/4<br>CF: G 1/2<br>P, EF: G 3/4 | US version<br>LS: 7/16 - 20 UNF<br>CF: ¾ - 16 UNF<br>P, EF: 1 1/16 - 12 UNF |                                          |                       |
| OLS 120        | 152B8132                                                   | 152B8143                                                                    | 7 [101.5]                                | 2.1 [4.63]            |
| OLS 120        | 152B8133                                                   | 152B8144                                                                    | 10 [145]                                 | 2.1 [4.63]            |

*OLS 160 dynamic for OSPB, OSPC, OSPD, OSPQ and OSPL LS dynamic*

| Priority valve | Code Numbers                                                  |                                                                                  | Control<br>spring<br>pressure | Pilot<br>pressure<br>relief valve | Weight    |
|----------------|---------------------------------------------------------------|----------------------------------------------------------------------------------|-------------------------------|-----------------------------------|-----------|
|                | Connections                                                   |                                                                                  |                               |                                   |           |
|                | European version<br>LS, T: G 1/4<br>CF: G 1/2<br>P, EF: G 3/4 | US version<br>LS, T: 1/16 - 20 UNF<br>CF: 3/4 - 16 UNF<br>P, EF: 1 1/16 - 12 UNF | bar [psi]                     | bar [psi]                         | kg [lb]   |
| OLS 160        | 152B8159                                                      | 152B8154                                                                         | 7 [101.5]                     | 170 [2465]                        | 4.4 [9.7] |
| OLS 160        | 152B8160                                                      | 152B8155                                                                         | 10 [145]                      | 170 [2465]                        | 4.4 [9.7] |
| OLS 160        | 152B8105                                                      | -                                                                                | 12 [174]                      | 170 [2465]                        | 4.4 [9.7] |
| OLS 160        | 152B8161                                                      | 152B8156                                                                         | 7 [101.5]                     | 210 [3045]                        | 4.4 [9.7] |
| OLS 160        | 152B8162                                                      | 152B8157                                                                         | 10 [145]                      | 210 [3045]                        | 4.4 [9.7] |

**Code Numbers and  
Weights  
(continued)**

**OLS dynamic priority valves for OSPF LS dynamic steering units**

*OLS 40 dynamic and OLS 80 dynamic*

| Priority valve | Code Numbers                                                     | Control spring pressure<br>bar [psi] | Weight<br>kg [lb] |
|----------------|------------------------------------------------------------------|--------------------------------------|-------------------|
|                | Connections<br>European version<br>LS: G 1/4<br>P, EF, CF: G 1/2 |                                      |                   |
| OLS 40         | 152B8031                                                         | 10 [145]                             | 1.0 [2.20]        |
| OLS 80         | 152B8258                                                         | 7 [101.5]                            | 1.0 [2.20]        |

*OLS 120 dynamic*

| Priority valve | Code Numbers                                                                | Control spring pressure<br>bar [psi] | Weight<br>kg [lb] |
|----------------|-----------------------------------------------------------------------------|--------------------------------------|-------------------|
|                | Connections<br>European version<br>LS: G 1/4, CF: G 1/2<br>P, EF, CF: G 3/4 |                                      |                   |
| OLS 120        | 152B8147                                                                    | 7 [101.5]                            | 2.1 [4.63]        |

*OLS 160 dynamic*

| Priority valve | Code Numbers                                                                | Control spring pressure<br>bar [psi] | Pilot pressure relief valve<br>bar [psi] | Weight<br>kg [lb] |
|----------------|-----------------------------------------------------------------------------|--------------------------------------|------------------------------------------|-------------------|
|                | Connections<br>European version<br>LS: G 1/4, CF: G 1/2<br>P, EF, CF: G 3/4 |                                      |                                          |                   |
| OLS 160        | 152B8158                                                                    | 7 [101.5]                            | none                                     | 4.4 [9.7]         |
| OLS 160        | 152B8113                                                                    | 10 [145]                             | none                                     | 4.4 [9.7]         |

*OLSP static and dynamic*

| Priority valve           | Code Numbers                                                           | Control spring pressure<br>bar [psi] | Weight<br>kg [lb] |
|--------------------------|------------------------------------------------------------------------|--------------------------------------|-------------------|
|                          | Connections<br>European version<br>LS: G 1/4<br>CF: G 3/8<br>EF: G 1/2 |                                      |                   |
| OLSP 80 static           | 152B5002                                                               | 4 [58]                               | 1.0 [2.2]         |
| OLSP 80 dynamic          | 152B5200                                                               | 7 [101.5]                            | 1.0 [2.2]         |
| OLSP 80 dynamic for OSPF | 152B5201                                                               | 7 [101.5]                            | 1.0 [2.2]         |

#### OLS Dynamic Priority Valves for OSPF LS Dynamic Steering Units (continued)

*OLS 320 dynamic in-line/stand alone with pilot pressure relief valve, black painted*

| Priority valve | Code Numbers                                                           | Control spring pressure<br>bar [psi] | Pilot pressure relief valve<br>bar [psi] | Weight<br>kg [lb] |
|----------------|------------------------------------------------------------------------|--------------------------------------|------------------------------------------|-------------------|
|                | Connections<br>European version<br>LS, T: G ¼<br>CF: G ½<br>P, EF: G 1 |                                      |                                          |                   |
| OLS 320        | 11006593                                                               | 7 [101.5]                            | 170 [2465]                               | 5.9 [13.0]        |

*OLS 320 dynamic in-line/stand alone without pilot pressure relief valve, black painted*

| Priority valve | Code Numbers                                                                                | Control spring pressure<br>bar [psi] | Weight<br>kg [lb] |
|----------------|---------------------------------------------------------------------------------------------|--------------------------------------|-------------------|
|                | Connections<br>US version<br>LS: 7/16 - 20 UNF<br>CF: 11/16 - 12 UN<br>P, EF: 15/16 - 12 UN |                                      |                   |
| OLS 320        | 11007475                                                                                    | 10 [145]                             | 5.9 [13.0]        |

OLS 320 for EHPS: look in EHPS catalogue 520L0521

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If you require other port connections, other control spring pressure and/or other PP connection, go to the survey on page 50, and tick off the desired specifications, then consult the Sauer-Danfoss Sales Organization.

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**Specification Table for Non Catalogue Numbers of Sauer-Danfoss Priority Valves**

| Your company                         | Name                                                        |    |                                                    |     | Vehicle                                                                                           |     |        |     | Potential, pcs/year                                                                                  |     |                |  | Completed by                                                                                    |                 | Date              |  |
|--------------------------------------|-------------------------------------------------------------|----|----------------------------------------------------|-----|---------------------------------------------------------------------------------------------------|-----|--------|-----|------------------------------------------------------------------------------------------------------|-----|----------------|--|-------------------------------------------------------------------------------------------------|-----------------|-------------------|--|
|                                      |                                                             |    |                                                    |     |                                                                                                   |     |        |     |                                                                                                      |     |                |  |                                                                                                 |                 |                   |  |
| Your application                     | Pump flow to OLS/OLSA at idle, l/min [USgal/min]            |    |                                                    |     |                                                                                                   |     |        |     | Pump flow to OLS/OLSA at max. engine speed, l/min [USgal/min]                                        |     |                |  |                                                                                                 |                 |                   |  |
|                                      |                                                             |    |                                                    |     |                                                                                                   |     |        |     |                                                                                                      |     |                |  |                                                                                                 |                 |                   |  |
| Priority valve type                  | OLSA 40                                                     |    | OLSA 80                                            |     | OLS 40                                                                                            |     | OLS 80 |     | OLS 120                                                                                              |     | OLS 160        |  | OLSP 80                                                                                         |                 | OLS 320 in-line   |  |
|                                      |                                                             |    |                                                    |     |                                                                                                   |     |        |     |                                                                                                      |     |                |  |                                                                                                 |                 |                   |  |
| Load sensing type                    | Static                                                      |    |                                                    |     | Dynamic                                                                                           |     |        |     | Dynamic for OSPF steering unit                                                                       |     |                |  |                                                                                                 |                 |                   |  |
|                                      |                                                             |    |                                                    |     |                                                                                                   |     |        |     |                                                                                                      |     |                |  |                                                                                                 |                 |                   |  |
| Spool type                           | Standard                                                    |    | Low pressure drop, P-EF (only OLS/OLSA 80 dynamic) |     |                                                                                                   |     |        |     | No CF cut-off (only for OLS 320 for flanging on EHPS)                                                |     |                |  |                                                                                                 |                 |                   |  |
|                                      |                                                             |    |                                                    |     |                                                                                                   |     |        |     |                                                                                                      |     |                |  |                                                                                                 |                 |                   |  |
| Control spring, bar                  | 4 (only OLS 80, 120, 160, OLSP 80)                          |    |                                                    |     | 5.5 (only OLS/OLSA 40/80)                                                                         |     |        |     | 7                                                                                                    |     | 10             |  | 12 (only OLS 160)                                                                               |                 | 16 (only OLS 160) |  |
|                                      |                                                             |    |                                                    |     |                                                                                                   |     |        |     |                                                                                                      |     |                |  |                                                                                                 |                 |                   |  |
| PP connection                        | Internal                                                    |    |                                                    |     |                                                                                                   |     |        |     | External (not OLSP)                                                                                  |     |                |  |                                                                                                 |                 |                   |  |
|                                      |                                                             |    |                                                    |     |                                                                                                   |     |        |     |                                                                                                      |     |                |  |                                                                                                 |                 |                   |  |
| Ports, OLSA                          | G: P, EF: G½ - S**<br>T, L, R: G3/8 - S**                   |    |                                                    |     | Metric 1: P, EF, T, L, R: M18 • 1.5 -O*** +S**                                                    |     |        |     | Metric 2: P, EF: M22 • 1.5 - O*** +S**<br>T, L, R: M18 • 1.5 - O*** +S**                             |     |                |  | P, EF: 7/8 - 14 UNF - O***<br>UNF: T, L, R : 9/16 - 18 UNF - O***                               |                 |                   |  |
|                                      |                                                             |    |                                                    |     |                                                                                                   |     |        |     |                                                                                                      |     |                |  |                                                                                                 |                 |                   |  |
| Ports, OLS 40/80                     | G: P, CF, EF: G½ - S**<br>LS: G½ - S**                      |    |                                                    |     | Metric: P, EF: M22 • 1.5 - O*** +S**<br>CF: M18 • 1.5 - O*** +S**<br>LS: M12 • 1.5 - O*** +S**    |     |        |     | UNF: P, EF: 7/8 - 14 UNF - O***<br>CF: 3/4 - 16 UNF - O***<br>LS: 7/16 - 20 UNF - O***               |     |                |  |                                                                                                 |                 |                   |  |
|                                      |                                                             |    |                                                    |     |                                                                                                   |     |        |     |                                                                                                      |     |                |  |                                                                                                 |                 |                   |  |
| Ports, OLS 120                       | G: P, EF: G¾ - S**<br>CF: G½ - S**<br>LS, PP: G¼ - S**      |    |                                                    |     | Metric: P, EF: M27 • 2 - O*** +S**<br>CF: M18 • 1.5 - O*** +S**<br>LS: M12 • 1.5 - O*** +S**      |     |        |     | UNF: P, EF: 11/16 - 14 UNF - O***<br>CF: 3/4 - 16 UNF - O***<br>LS: 7/16 - 20 UNF - O***             |     |                |  |                                                                                                 |                 |                   |  |
|                                      |                                                             |    |                                                    |     |                                                                                                   |     |        |     |                                                                                                      |     |                |  |                                                                                                 |                 |                   |  |
| Ports, OLS 160                       | P, EF: G¾ - S**<br>G 1: CF: G½ - S**<br>LS, PP, T: G¼ - S** |    |                                                    |     | P, EF: G1 - S**<br>G 2: CF: G¾ - S**<br>LS, PP, T: G¼ - S**                                       |     |        |     | P, EF: 11/16 - 12 UN - O***<br>UNF 1: CF: 3/4 - 16 UNF - O***<br>LS, PP, T: 7/16 - 20 UNF - O***     |     |                |  | P, EF:15/16 - 12 UN - O***<br>UNF 2: CF: 7/8 - 14 UNF - O***<br>LS, PP, T: 7/16 - 20 UNF - O*** |                 |                   |  |
|                                      |                                                             |    |                                                    |     |                                                                                                   |     |        |     |                                                                                                      |     |                |  |                                                                                                 |                 |                   |  |
| Ports, OLSP 80 (P: square flange 35) | G: EF: G½ - S**<br>CF: G3/8 - S**<br>LS: G¼ - S**           |    |                                                    |     | Metric: EF: M22 • 1.5 - O*** +S**<br>CF: M18 • 1.5 - O*** +S**<br>LS: M12 • 1.5 - O*** +S**       |     |        |     | UNF: EF: 7/8 - 14 UNF - O***<br>CF: 3/4 - 16 UNF - O***<br>LS: 7/16 - 20 UNF - O***                  |     |                |  |                                                                                                 |                 |                   |  |
|                                      |                                                             |    |                                                    |     |                                                                                                   |     |        |     |                                                                                                      |     |                |  |                                                                                                 |                 |                   |  |
| Ports, OLS 320 in-line               | G: P, EF: G1 - S**<br>CF: G½ - S**<br>LS, PP: G¼ - S**      |    |                                                    |     | UNF 1: P, EF: 1 5/16 - 12 UN - O***<br>CF: 3/4 - 16 UNF - O***<br>LS, PP, T: 7/16 - 20 UNF - O*** |     |        |     | UNF 2: P, EF: 1 5/16 - 12 UN - O***<br>CF: 1 1/16 - 12 UNF - O***<br>LS, PP, T: 7/16 - 20 UNF - O*** |     |                |  |                                                                                                 |                 |                   |  |
|                                      |                                                             |    |                                                    |     |                                                                                                   |     |        |     |                                                                                                      |     |                |  |                                                                                                 |                 |                   |  |
| RV-bar OLS 160 OLS 320               | 80                                                          | 90 | 100                                                | 110 | 120                                                                                               | 140 | 170    | 190 | 200                                                                                                  | 210 | Other settings |  |                                                                                                 | No relief valve |                   |  |
|                                      |                                                             |    |                                                    |     |                                                                                                   |     |        |     |                                                                                                      |     | bar            |  |                                                                                                 |                 |                   |  |
| Unit black painted                   | Yes                                                         |    |                                                    |     |                                                                                                   |     |        |     | No                                                                                                   |     |                |  |                                                                                                 |                 |                   |  |
|                                      |                                                             |    |                                                    |     |                                                                                                   |     |        |     |                                                                                                      |     |                |  |                                                                                                 |                 |                   |  |

#### Specification Table for Non Catalogue Numbers of Sauer-Danfoss Priority Valves (continued)

Ports: PP-port only exists when external PP connection is used. T-port only exists for OLS 160 and OLS 320 with integrated pilot pressure relief valve (RV)

O\*: O-ring chamfer on port connections

S\*\*: Spot face around port connections

An alternative way to specify a variant is to state an existing code number and add the modifications, you would like to have implemented in the basic steering unit.

Code number of basic steering unit: \_\_\_\_\_

Requested modifications: \_\_\_\_\_

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#### Technical Data

##### Max. Pressure on Connections

| Priority valve | Rated flow to P-connection |              | P, EF |        | CF  |        | Max. pressure on connections |        |     |        | T   |       | PP  |        |
|----------------|----------------------------|--------------|-------|--------|-----|--------|------------------------------|--------|-----|--------|-----|-------|-----|--------|
|                | l/min                      | [US gal/min] | bar   | [psi]  | bar | [psi]  | L, R                         |        | LS  |        | bar | [psi] | bar | [psi]  |
| OLSA 40        | 40                         | [10.57]      | 250   | [3625] | 210 | [3045] | 280                          | [4061] | 210 | [3045] | 20  | [290] |     |        |
| OLSA 80        | 80                         | [21.13]      | 250   | [3625] | 210 | [3045] | 280                          | [4061] | 210 | [3045] | 20  | [290] |     |        |
| OLS 40         | 40                         | [10.57]      | 250   | [3625] | 210 | [3045] |                              |        | 210 | [3045] |     |       | 210 | [3045] |
| OLS 80         | 80                         | [21.13]      | 250   | [3625] | 210 | [3045] |                              |        | 210 | [3045] |     |       | 210 | [3045] |
| OLS 120        | 120                        | [31.70]      | 250   | [3625] | 210 | [3045] |                              |        | 210 | [3045] |     |       | 210 | [3045] |
| OLS 160        | 160                        | [42.27]      | 350   | [5076] | 210 | [3045] |                              |        | 210 | [3045] | 15  | [217] | 210 | [3045] |
| OLSP 80        | 80                         | [21.13]      | 250   | [3625] | 210 | [3045] |                              |        | 210 | [3045] |     |       |     |        |
| OLS 320        | 320                        | [84.54]      | 300   | [4351] | 280 | [4061] |                              |        | 280 | [4061] | 40  | [580] | 280 | [4061] |

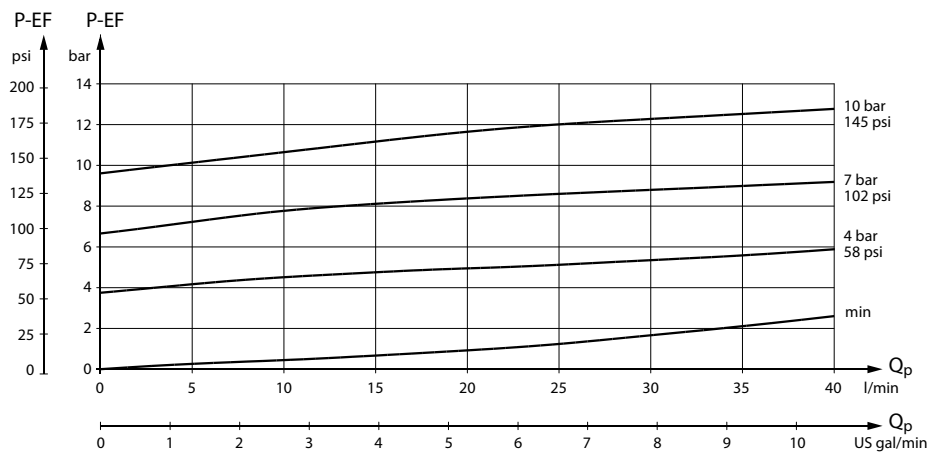
#### Pressure Drop in Priority Valves

#### Pressure drop in priority valves

This data comes from measurements on a representative sample of priority valves from production. Oil with viscosity of 21 mm<sup>2</sup>/s at 50 °C [102 SUS at 122 °F] was used during measuring. Measurement made when pressure on the LS connection is zero (steering unit in neutral position). The minimum curves apply when the pressure on the EF connection is higher than the actual control spring pressure. The curves for control spring pressure of 4, 7, 10 or 12 bar [58, 101, 145 or 174 psi] apply when pressure on the EF connection is zero.

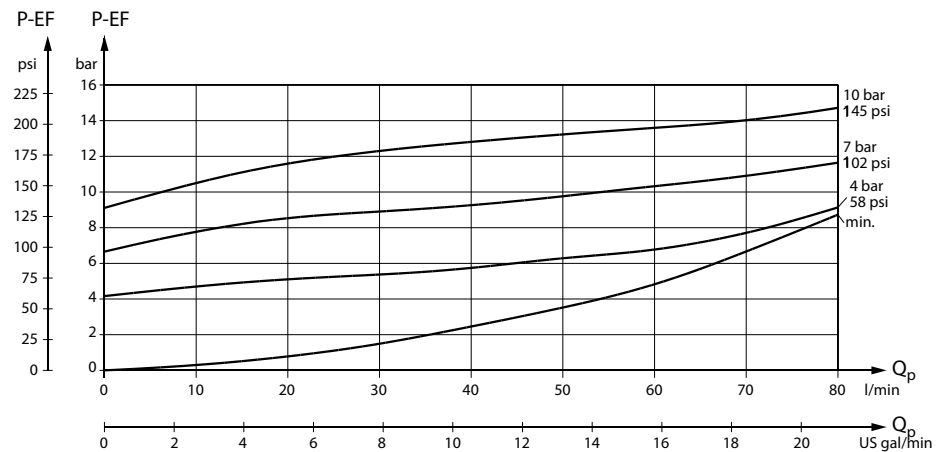
#### Pressure drop P-EF for static priority valves

##### OLSA/OLS 40



152B139.11

##### OLSA/OLS 80

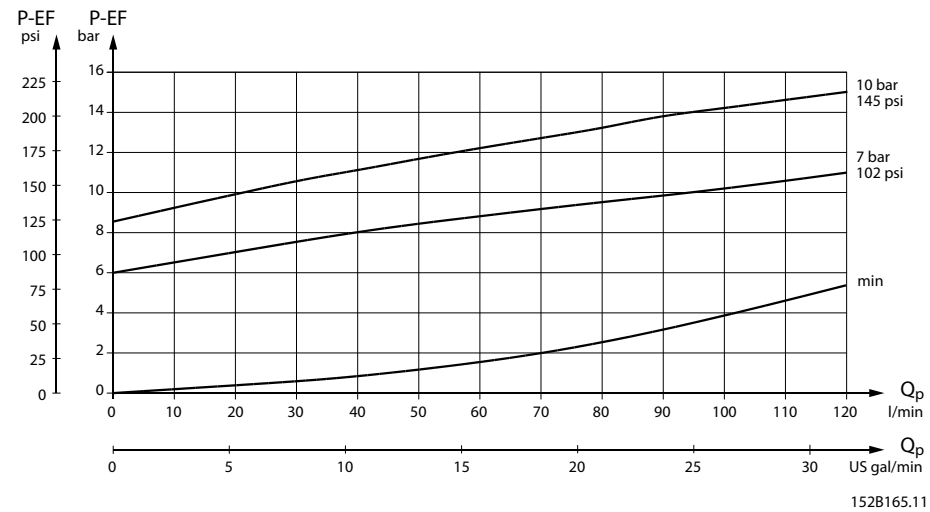


152B80.11

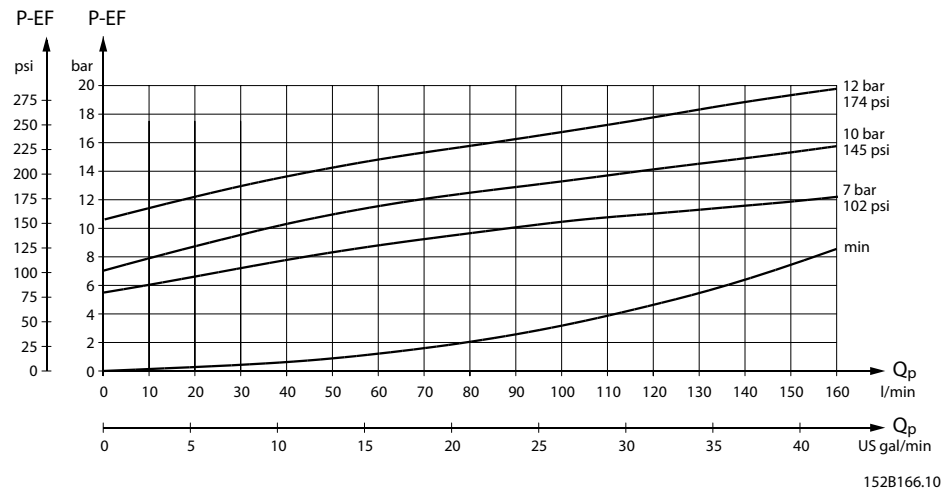
## Technical Data

### Pressure drop P-EF for static priority valves

#### OLS 120



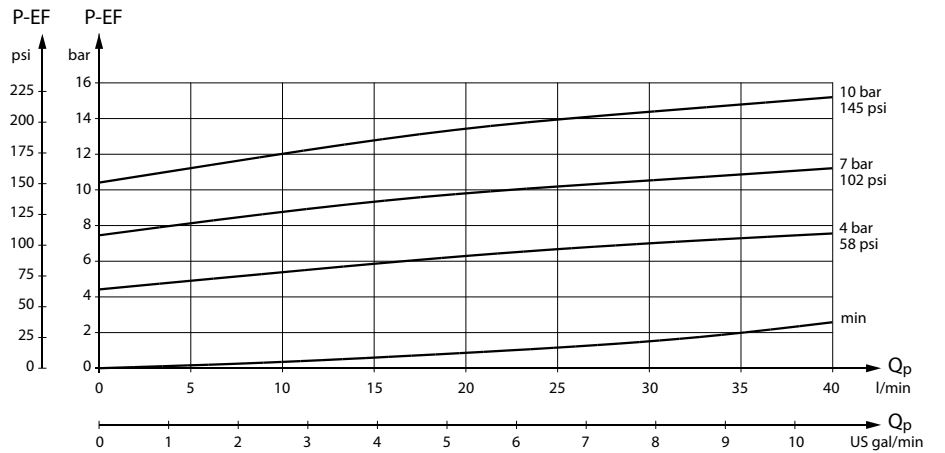
#### OLS 160



#### Technical Data (continued)

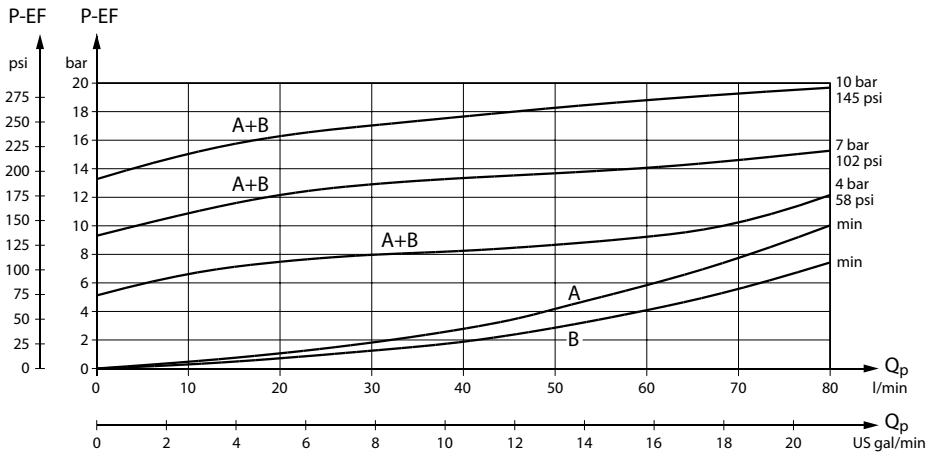
#### Pressure drop P-EF for dynamic priority valves

##### OLSA/OLS 40



152B174.10

##### OLSA/OLS 80



152B175.10

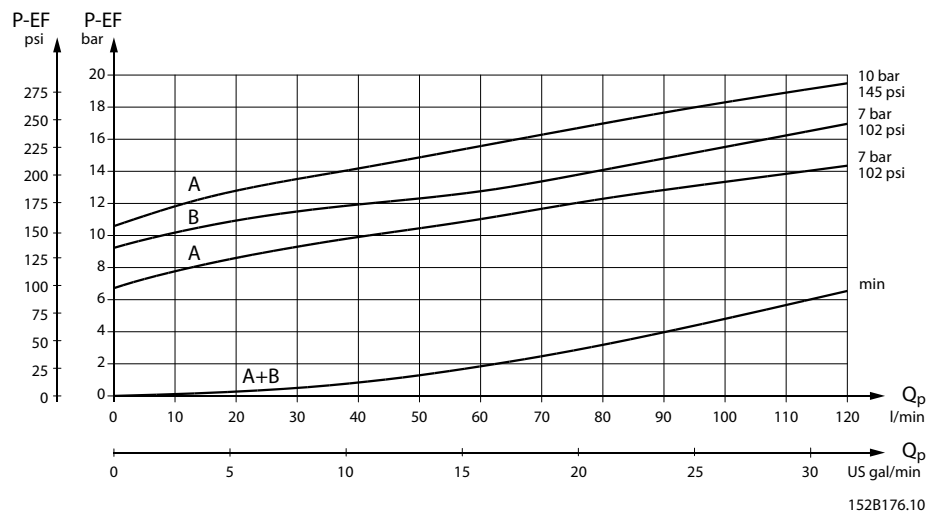
A: OLS/OLSA 80 Dynamic for OSPB, OSPC, OSPF, OSPD, OSPQ, OSPL LS Dynamic

B: OLS/OLSA 80 Dynamic with low pressure drop (P-EF) spool for OSPB, OSPC, OSPD, OSPQ, OSPL LS Dynamic

#### Technical Data (continued)

#### Pressure drop P-EF for dynamic priority valves

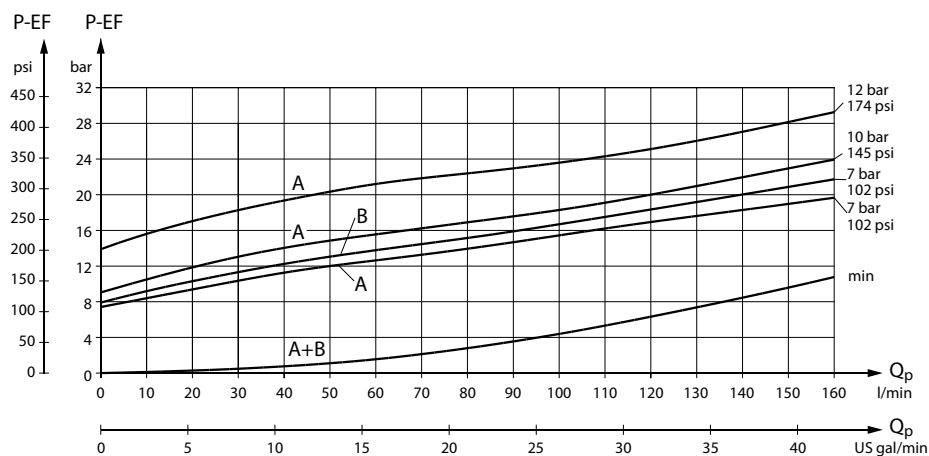
##### OLS 120



A: OLS 120 Dynamic for OSPB, OSPC, OSPD, OSPQ, OSPL LS Dynamic

B: OLS 120 Dynamic for OSPF LS Dynamic

##### OLS 160



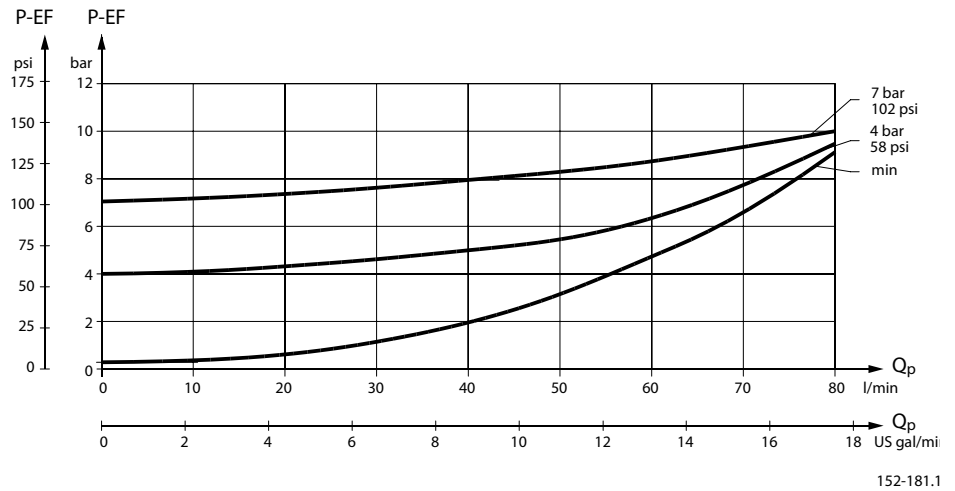
A: OLS 160 Dynamic for OSPB, OSPC, OSPD, OSPQ, OSPL LS Dynamic

B: OLS 160 Dynamic for OSPF LS Dynamic

#### Technical Data (continued)

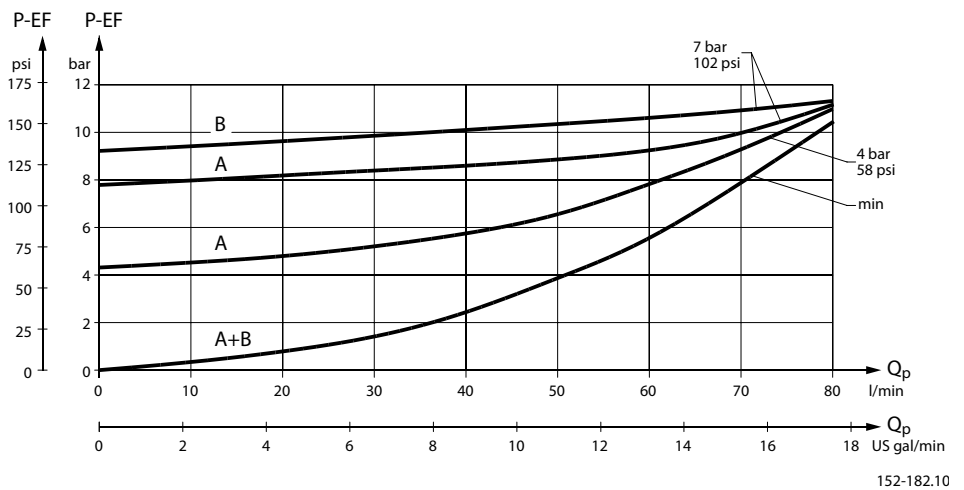
#### Pressure drop P-EF for OLSP static priority valves

##### OLSP 80



#### Pressure drop P-EF for OLSP dynamic priority valves

##### OLSP 80



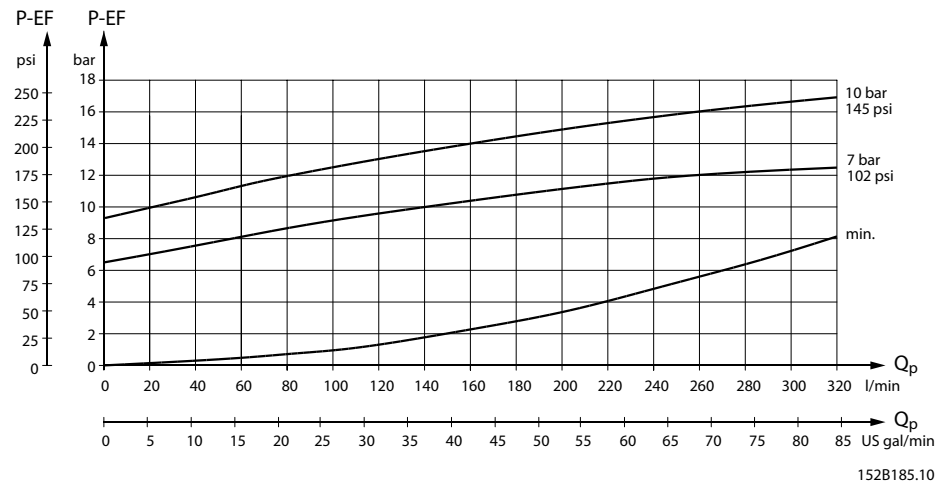
A: OLSP 80 dynamic for OSPB, OSPC, OSPD, OSPQ LS dynamic

B: OLSP 80 dynamic for OSPF LS dynamic

Technical Data  
 (continued)

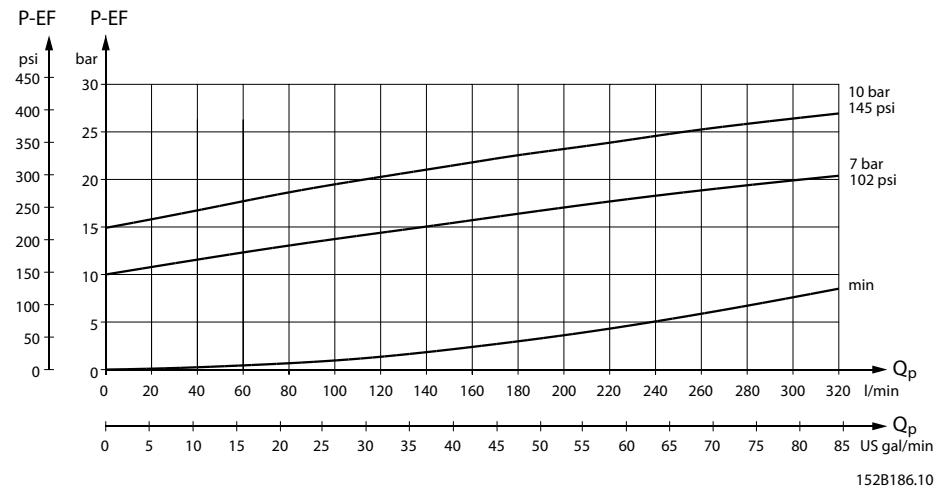
Pressure drop P-EF for OLS 320 static priority valves

OLS 320



Pressure drop P-EF for OLS 320 dynamic priority valves

OLS 320



#### Technical Data (continued)

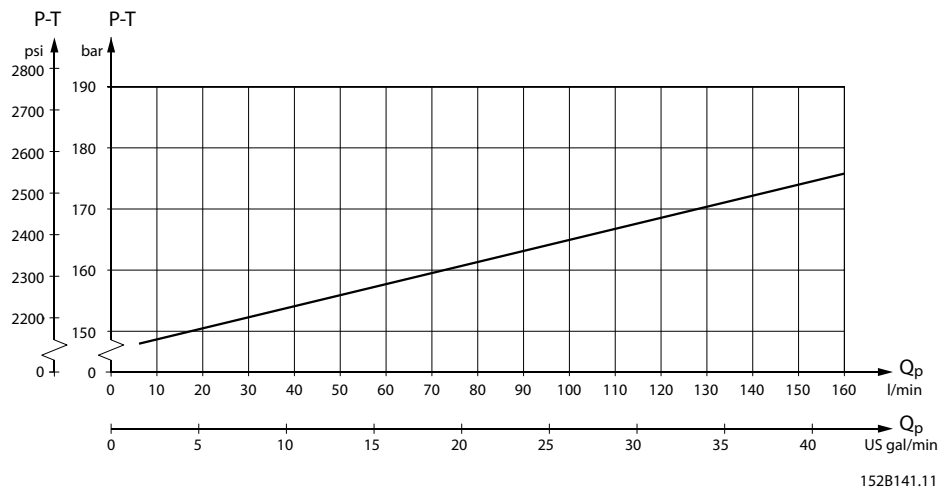
#### OLS 160, pilot pressure relief valve (P - T, Q<sub>p</sub>) characteristic

OLS 160 with pilot pressure relief valve is used in connection with Sauer-Danfoss steering units without pilot pressure relief valve, normally steering unit type OSPL. The pilot pressure relief valve protects the steering unit against excessive pressure. The pilot pressure relief valve in OLS 160 operates with the priority valve spool in the OLS 160 to limit the maximum steering pressure P-T measured across the steering unit ports. The pilot pressure relief valve is set when an oil flow of 80 l/min [21 US gal/min] is supplied to OLS 160.

Setting tolerance:

rated value +10 bar [145 psi]

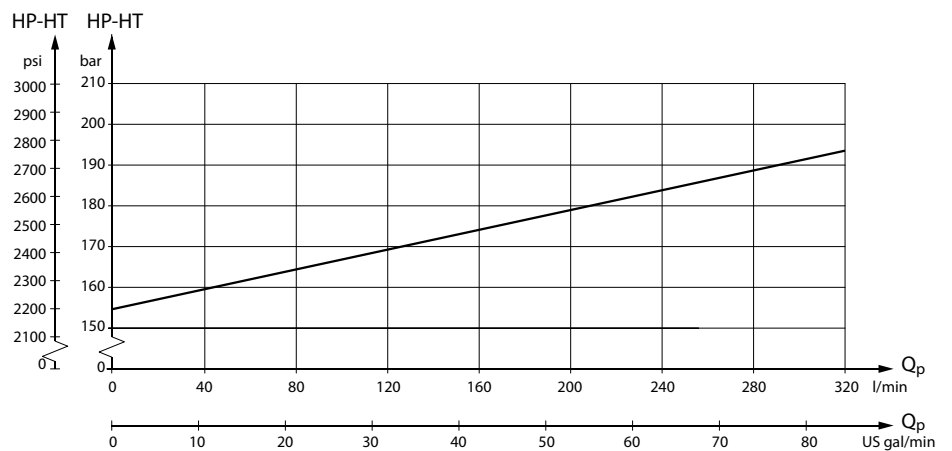
#### OLS 160



152B141.11

Q<sub>p</sub> = Pump flow

#### OLS 320



152B187.10

#### Dimensions

#### OLSA

European version:

P, EF:

G ½ w. spot face  
14 mm [0.55 in] deep  
x = 34 mm [1.34 in],  
max. 1,5 mm [0.06 in] deep  
or M18 x 1.5 ISO 6149  
14,5 mm [0.57 in] deep  
x = 29 mm [1.14 in],  
max. 1,5 mm [0.06 in] deep  
or M22 x 1.5 ISO 6149,  
15,5 mm [0.61 in] deep  
x = 34 mm [1.34 in],  
max. 1,5 mm [0.06 in] deep

T, L, R:

G ¾ w. spot face  
12 mm [0.47 in] deep  
y = 34 mm [1.34 in],  
max. 1,5 mm [0.06 in] deep  
or M18 x 1.5 ISO 6149,  
15 mm [0.59 in] deep  
y = 29 mm [1.14 in],  
max. 1.5 mm [0.06 in] deep

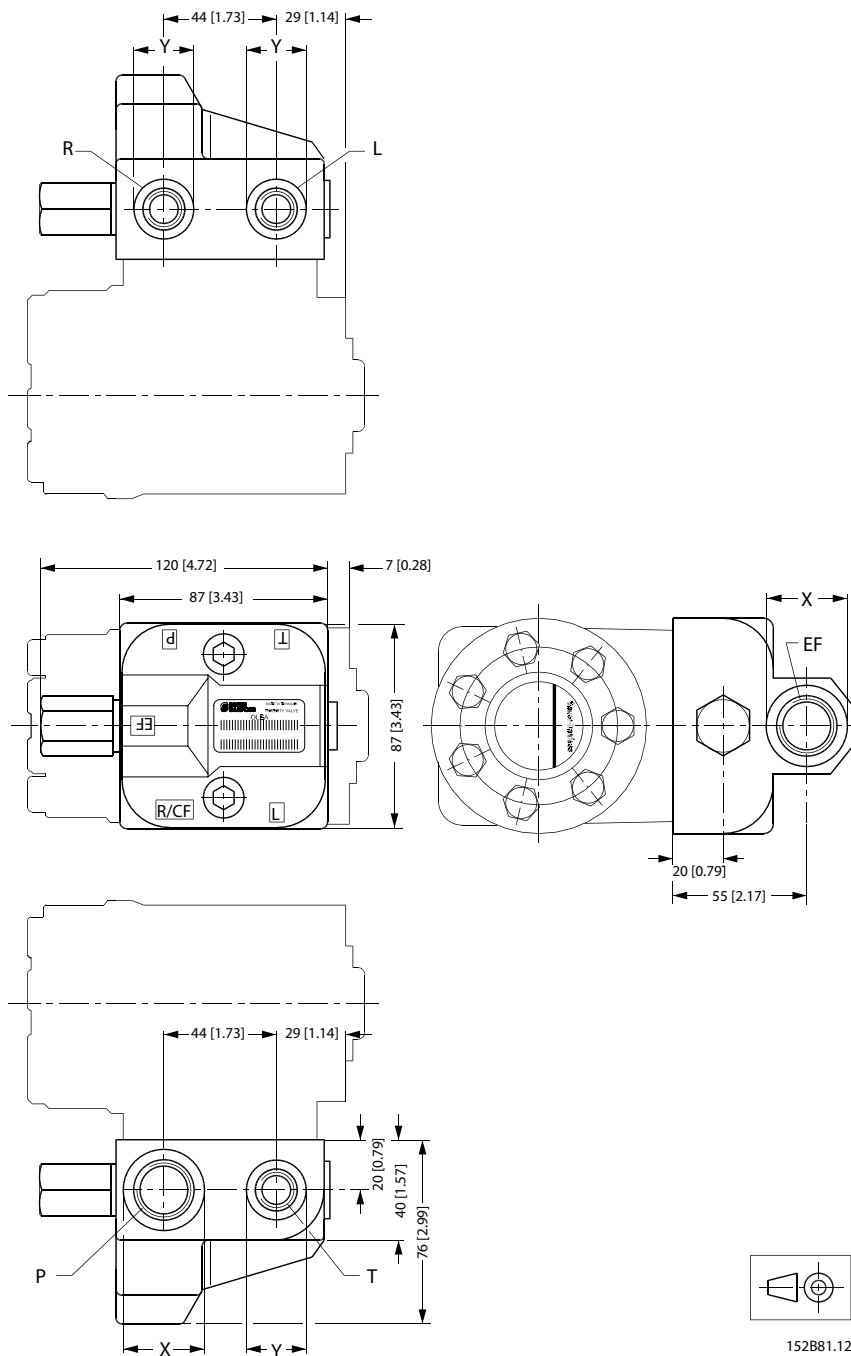
US version:

P, EF:

7/8-14 UNF O-ring boss  
16.7 mm [0.66 in] deep  
x = 34 mm [1.34 in],  
max. 1.5 mm [0.06 in] deep

T, L, R:

9/16-18 UNF O-ring boss  
12.7 mm [0.50 in] deep  
y = 25 mm [0.98 in],  
max. 1.5 mm [0.06 in] deep



## Dimensions

OLS 40, OLS 80

European version:

P, EF:

G ½ w. spot face  
15 mm [0.59 in] deep  
x = 29 mm [1.14 in],  
max. 1.5 mm [0.06 in] deep  
or M22 x 1.5 ISO 6149  
15 mm [0.59 in] deep,  
x = 34 mm [1.34 in],  
max. 1 mm [0.04 in] deep

CF:

G ½ w. spot face  
14 mm [0.55 in] deep  
y = 29 mm [1.14 in],  
max. 1.5 mm [0.06 in] deep  
or M18 x 1,5 ISO 6149  
12 mm [0.47 in] deep,  
y = 29 mm [1.14 in],  
max. 1 mm [0.04 in] deep

LS:

G ¼ w. spot face  
12.5 mm [0.49 in] deep  
z = 21 mm [0.83 in],  
max. 1 mm [0.04 in] deep  
or M12 x 1,5 ISO 6149  
12,5 mm [0.49 in] deep,  
z = 22 mm [0.86 in]  
0 mm deep

US version:

P, EF:

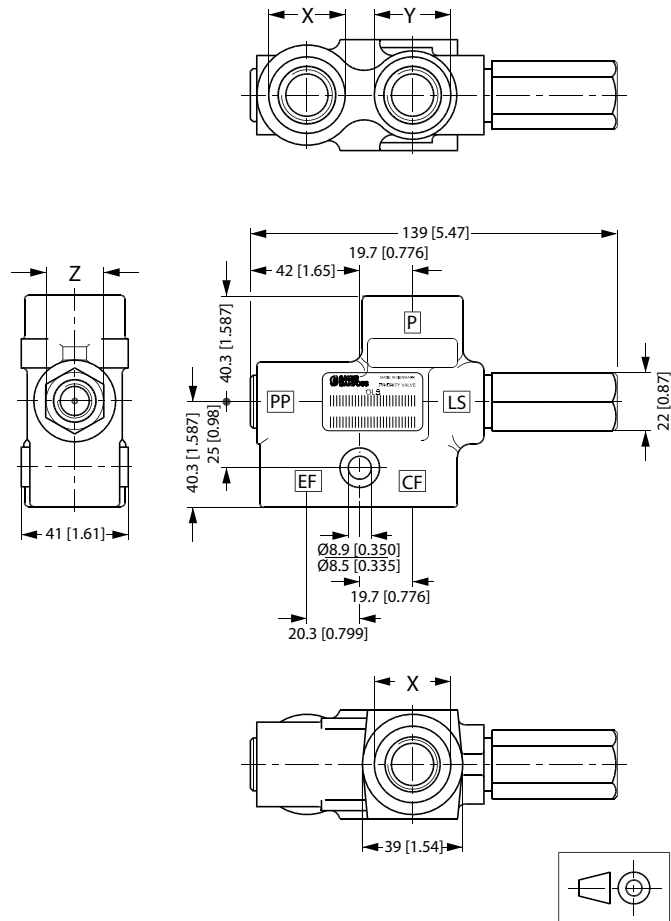
$\frac{7}{8}$  - 14 UNF O-ring boss  
15 mm [0.59 in] deep  
x = 34 mm [1.14 in],  
max. 1.3 [0.05] deep

CF:

3/4-16 UNF O-ring boss  
14,3 mm [0.56 in] deep  
y = 30 mm [1.18 in],  
max. 1.3 mm [0.05 in] deep

LS:

$\frac{7}{16}$ -20 UNF O-ring boss  
12.5 mm [0.49 in] deep  
z = 21 mm [0.83 in],  
max. 1 mm [0.04 in] deep



152B136.11

## Dimensions

## OLS 120

European version:

P, EF:

G ¾ w. spot face  
x = 42 mm [1.65 in],  
max. 2.5 mm [0.10 in] deep  
or M27 x 2 ISO 6149  
x = 40 mm [1.57 in],  
max. 2.5 mm [0.10 in] deep

CF:

G ½ w. spot face  
y = 34 mm [1.34 in],  
max. 2.5 mm [0.10 in] deep  
or M18 x 1.5 ISO 6149  
y = 29 mm [1.14 in],  
max. 2.5 mm [0.10 in] deep

LS, PP:

G ¾ w. spot face  
12 mm [0.47 in] deep  
z = 19 mm [0.75 in]  
0 mm deep  
or M12 x 1.5 ISO 6149  
11.5 mm [0.45 in] deep,  
z = 19 mm [0.75 in]  
0 mm deep

US version:

P, EF:

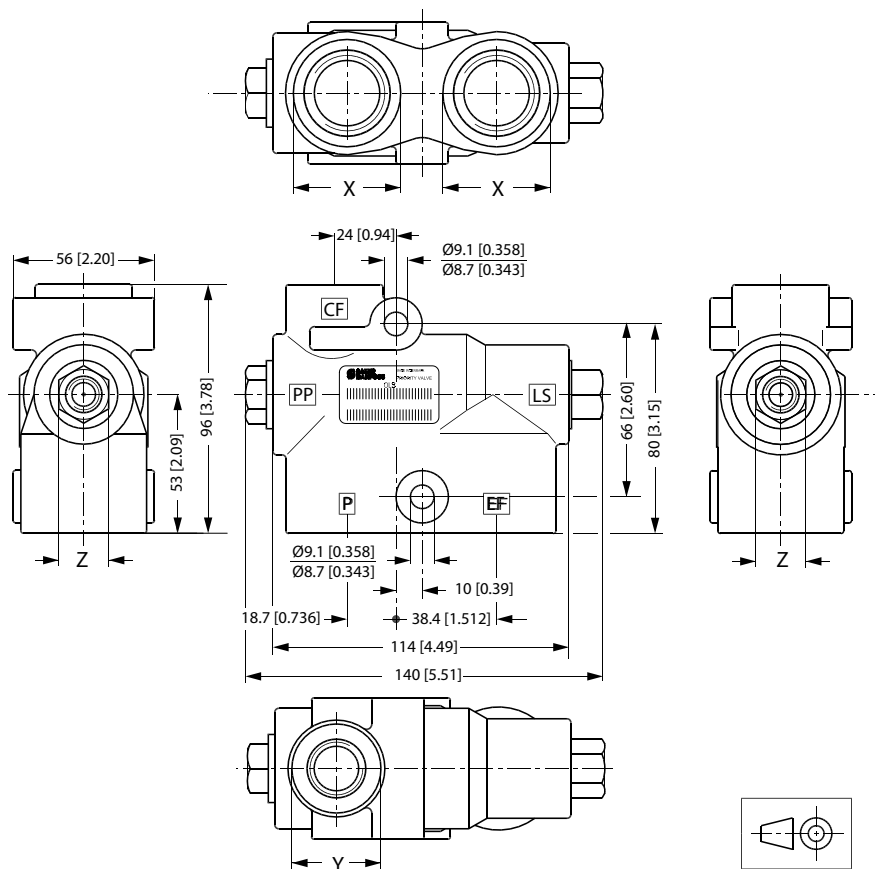
1 1/16 - 12 UN O-ring boss  
x = 41 mm [1.61 in],  
max. 1.5 mm [0.06 in] deep

CF:

¾ - 16 UNF O-ring boss  
y = 30 mm [1.18 in],  
max. 1.5 mm [0.06 in] deep

LS, PP:

7/16 - 20 UNF O-ring boss  
11.5 mm [0.45 in] deep  
z = 19 mm [0.75 in] 0 mm deep



152B173.11

#### Dimensions

#### OLS 160

European version:

P, EF:

G  $\frac{3}{4}$  w. spot face  
 $x = 42 \text{ mm}$  [1.65 in],  
 max. 2.5 mm [0.10 in] deep  
 or G 1 w. spot face  
 $x = 47 \text{ mm}$  [1.85 in],  
 max 2.5 mm [0.10 in] deep

CF:

G  $\frac{1}{2}$  w. spot face  
 $y = 34 \text{ mm}$  [1.34 in],  
 max. 2.5 mm [0.10 in] deep  
 or G  $\frac{3}{4}$  w. spot face  
 $y = 38 \text{ mm}$  [1.50 in],  
 max. 2.5 mm [0.10 in] deep

LS, PP, T:

G  $\frac{1}{4}$  w. spot face  
 $12 \text{ mm}$  [0.47 in] deep  
 $z = 22.8 \text{ mm}$  [0.89 in],  
 max. 1 mm [0.04 in] deep  
 $u = 25 \text{ mm}$  [0.98 in]  
 max. 1.5 mm [0.06 in] deep

US version:

P, EF:

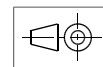
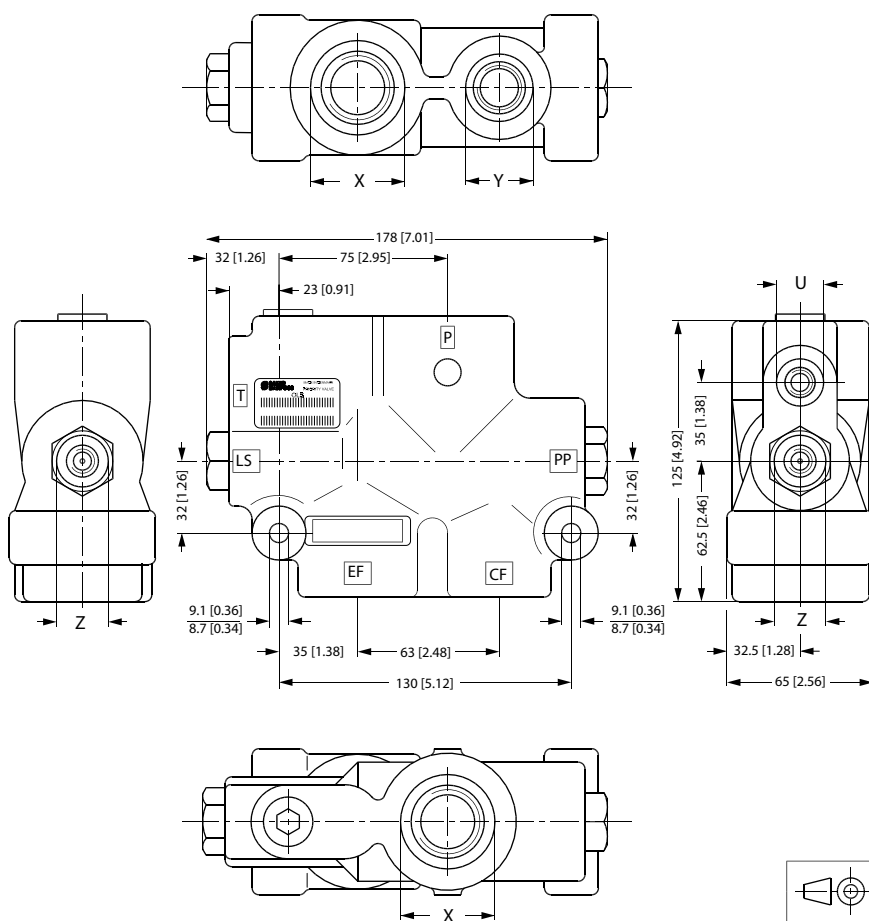
1  $\frac{1}{16}$ -12 UNF O-ring boss  
 $x = 41 \text{ mm}$  [1.61 in],  
 max. 2.5 mm [0.10 in] deep  
 or 1  $\frac{5}{16}$ - 12 UNF O-ring boss  
 $x = 49 \text{ mm}$  [1.93 in],  
 max. 2.5 mm [0.10 in] deep

CF:

$\frac{3}{4}$ -16 UNF O-ring boss  
 $y = 32 \text{ mm}$  [1.26 in],  
 max. 2.5 mm [0.10 in] deep  
 $\frac{7}{8}$  - 14 UNF O-ring boss  
 $y = 30 \text{ mm}$  [1.18 in],  
 max. 2.5 mm [0.10 in] deep

LS, PP, T:

$\frac{7}{16}$  - 20 UNF O-ring boss  
 $11.5 \text{ mm}$  [0.45 in] deep  
 $z = 22.8 \text{ mm}$  [0.89 in],  
 max. 1.5 mm [0.06 in] deep  
 $u = 21 \text{ mm}$  [0.83 in],  
 max. 1.6 mm [0.06 in] deep



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#### Dimensions

#### OLSP 80

European version:

CF:

G  $\frac{3}{8}$  w. spot face  
15 mm [0.59 in] deep  
x =  $\varnothing$ 28, max. 1.5 mm [0.06 in] deep  
or  
M18 • 1.5 ISO 6149  
15 mm [0.59 in] deep  
y =  $\varnothing$ 29, max. 1.5 mm [0.06 in]

EF:

G  $\frac{1}{2}$  w. spot face  
15 mm [0.59 in] deep  
y =  $\varnothing$ 34, max. 1.5 mm [0.06 in]  
or  
M22 • 1.5 ISO 6149  
15 mm [0.59 in] deep  
x =  $\varnothing$ 34, max. 1.5 mm [0.06 in]

LS:

G  $\frac{1}{4}$  w. spot face  
12.5 mm [0.49 in] deep  
or  
M12 • 1.5 ISO 6149  
12.5 mm [0.49 in] deep

US version:

CF:

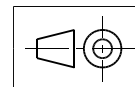
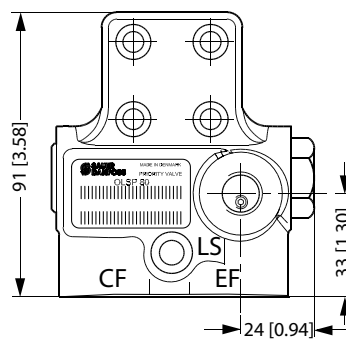
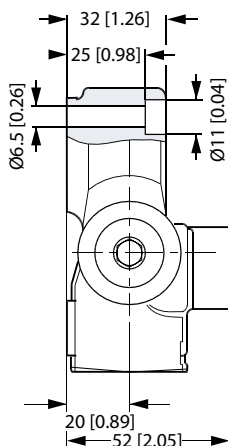
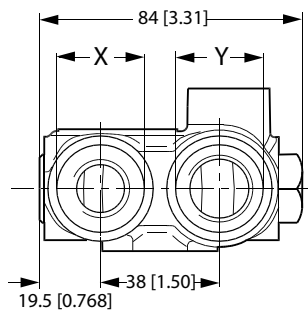
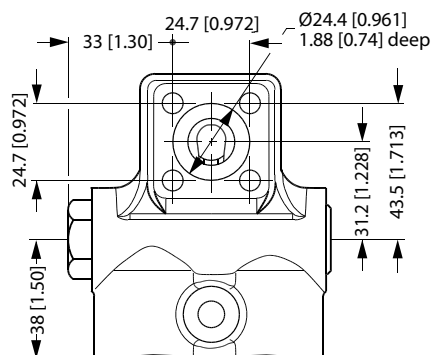
$\frac{3}{4}$ -16 UNF O-ring boss  
15 mm [0.59 in] deep  
x =  $\varnothing$ 29 [1.14 in]  
max. 1.5 mm [0.06 in] deep

EF:

$\frac{7}{8}$  - 14 UNF O-ring boss  
16.7 mm [0.66 in] deep  
y =  $\varnothing$ 34 [1.34 in]  
max. 1.5 mm [0.06 in] deep

LS:

$\frac{7}{16}$  - 20 UNF O-ring boss  
12.5 mm [0.49 in] deep



152-180.11

## Dimensions

OLS 320 in-line

European version:

P, EF:

G 1 w. spot face  
x =  $\varnothing 47$  mm [1.85 in]  
max 1 mm [0.04 in] deep

CF:

G ½ w. spot face  
y =  $\varnothing 34$  mm [1.34 in]  
max 2.5 mm [0.10 in] deep

LS, PP:

G ¼ w. spot face

T:

G ¼ w. spot face  
z = ø25 mm [0.98 in]  
max 1.5 mm [0.06 in] deep

US version:

P, EF:

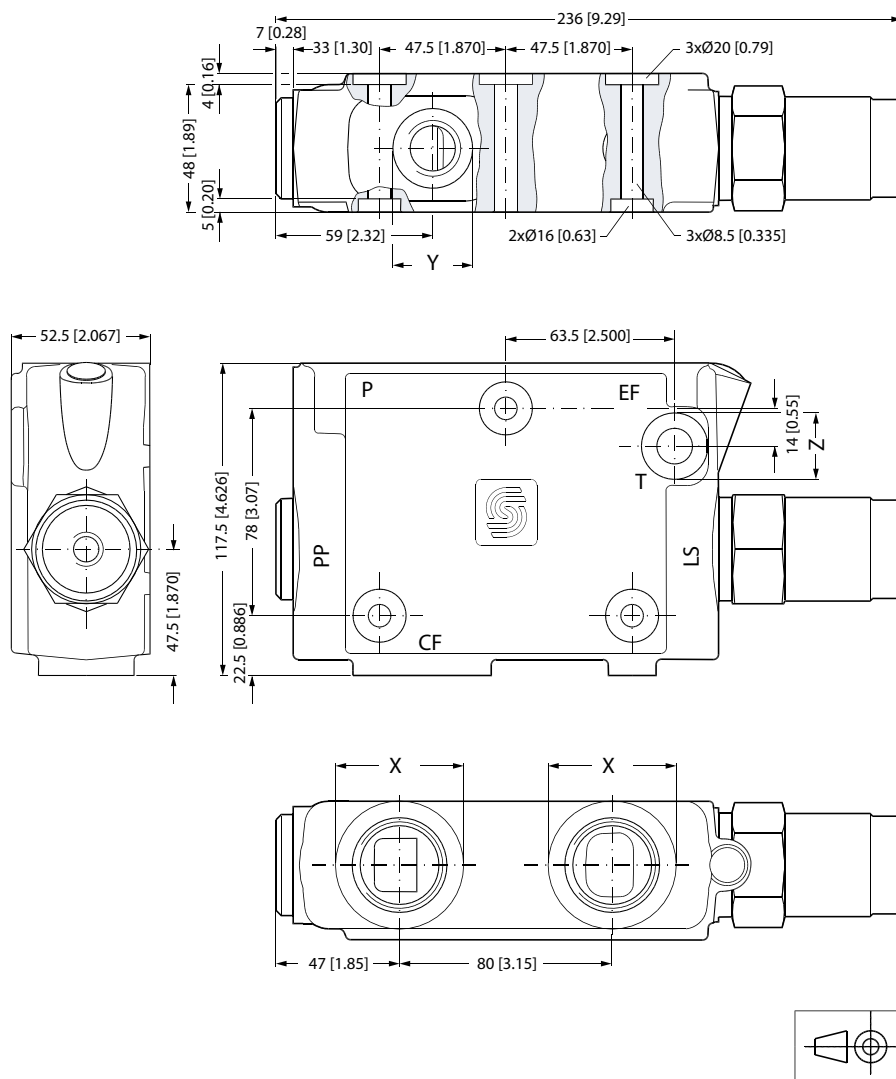
1 5/16-12 UN O-ring boss  
x =  $\varnothing 49$  mm [1.93 in]  
max 0.2 mm [0.01 in] deep

CF:

1 1/16-12 UN O-ring boss  
y =  $\varnothing 41$  mm [1.61 in]  
max 0.2 mm [0.01 in] deep  
or  
3/4-16UNF O-ring boss  
y =  $\varnothing 30$  mm [1.18 in]  
max 0.2 mm [0.01 in] deep

LS, PP, T:

7/16-20 UNF O-ring boss



150H26.10

#### Versions

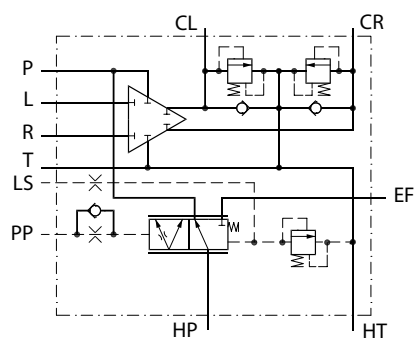
#### OSQA and OSQB static

Flow amplifier OSQ is used in steering systems of large vehicles and vessels that need high oil flow for their steering. A steering system of this nature consists of a steering unit and a flow amplifier.

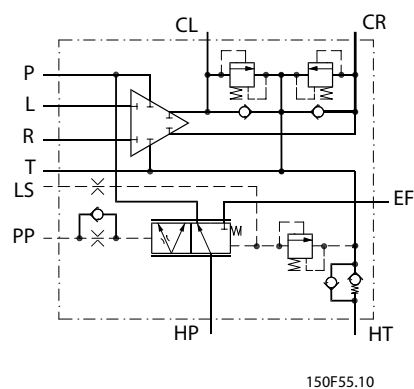


F300630

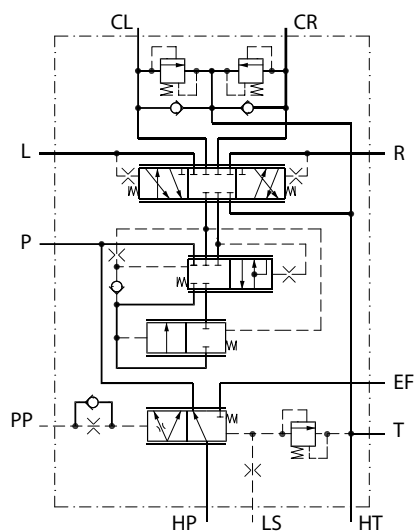
#### OSQA static



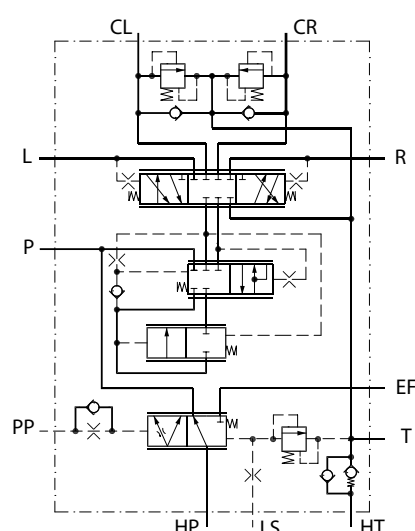
#### OSQB static



150F55.10



150F69.10



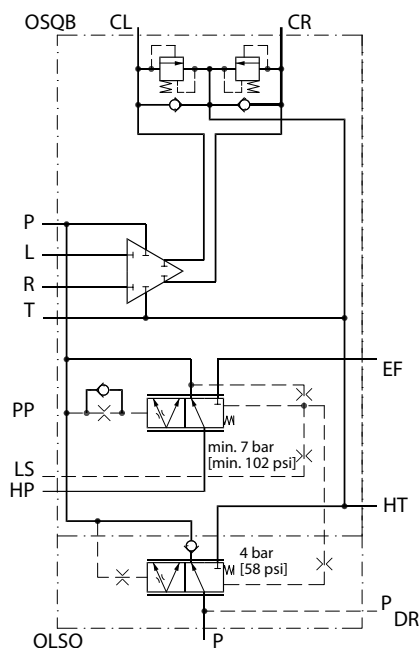
150F54.10

## Versions

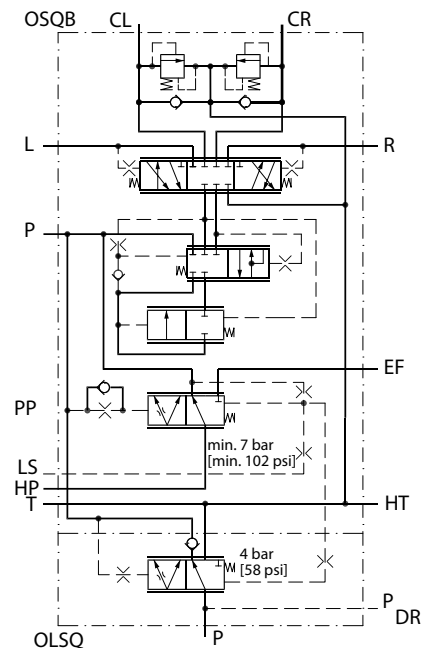
### OSQB dynamic with OLSQ priority valve for emergency steering



F301 256



150F74.11



150F73.11

#### Code Numbers and Weights

#### OSQA and OSQB static flow amplifiers for load sensing static steering units

These flow amplifiers have to be used in connection with steering units type OSPBX LS or OSPLX LS.

| Flow<br>amplifier | Code Numbers                     |            | Setting pressures                           |                               | Control<br>spring<br>pressure | Weight<br><br>kg [lb] |
|-------------------|----------------------------------|------------|---------------------------------------------|-------------------------------|-------------------------------|-----------------------|
|                   | Connections:<br>see “dimensions” |            | Pilot pressure<br>relief valve<br>bar [psi] | Shock valves<br><br>bar [psi] |                               |                       |
|                   | European<br>version              | US version |                                             |                               | bar [psi]                     | bar [psi]             |
| OSQA 4            | 150F0040                         | 150F0043   | 170 [2465]                                  | 230 [3335]                    | 7 [101]                       | 29 [64]               |
| OSQA 5            | 150F0041                         | 150F0044   | 170 [2465]                                  | 230 [3335]                    | 7 [101]                       | 29 [64]               |
| OSQA 8            | 150F0042                         | 150F0045   | 170 [2465]                                  | 230 [3335]                    | 7 [101]                       | 29 [64]               |
| OSQB 4            | 150F0030                         | 150F0053   | 170 [2465]                                  | 230 [3335]                    | 7 [101]                       | 29 [64]               |
| OSQB 5            | 150F0031                         | 150F0054   | 170 [2465]                                  | 230 [3335]                    | 7 [101]                       | 29 [64]               |
| OSQB 8            | 150F0032                         | 150F0055   | 170 [2465]                                  | 230 [3335]                    | 7 [101]                       | 29 [64]               |
| OSQB 10           | -                                | 150F0094   | 170 [2465]                                  | 260 [3770]                    | 7 [101]                       | 29 [64]               |

#### OSQB/OLSQ dynamic flow amplifier for load sensing dynamics steering units.

OSQB with OLSQ has no pilot pressure relief valve.

This flow amplifier has to be used in connection with steering unit type OSPCX LS, which has incorporated pilot pressure relief valve

| Flow amplifier | Code Numbers                                        | Setting pressures        | Control spring pressure<br><br>bar [psi] | Weight<br><br>kg [lb] |
|----------------|-----------------------------------------------------|--------------------------|------------------------------------------|-----------------------|
|                | Connections<br>see “dimensions”<br>European version | Shockvalves<br>bar [psi] |                                          |                       |
| OSQB 8/OLSQ    | 150F8010                                            | 260 [3770 psi]           | 7 [101.5]                                | 32 [70.6]             |

If you require other amplification factors, other valve settings or other control spring pressures, please fill in the order form on page 68 and contact the Sauer-Danfoss Sales Organization.

### Specification Table for Non Catalogue Numbers of Sauer-Danfoss Flow Amplifiers

Fill in your company data and place x's in the table where appropriate, then send to your Sauer-Danfoss Sales Organization

| Your company                          | Name                                                                                                                                | Vehicle    | Potential pcs/year                                                                                                                 | Completed by | Date       |
|---------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------|------------|------------------------------------------------------------------------------------------------------------------------------------|--------------|------------|
| Your application                      | Pump flow to OSQ at idle, l/min [US gal/min]                                                                                        |            | Pump flow to OSQ at max engine speed, l/min [US gal/min]                                                                           |              |            |
| Flow amplifier type                   | OSQA                                                                                                                                | OSQB       | OSQB/OLSQ                                                                                                                          |              |            |
| Amplification factor                  | 4                                                                                                                                   | 5          | 8                                                                                                                                  | 9.1          | 16.5       |
| Load sensing type                     | Static                                                                                                                              |            | Dynamic                                                                                                                            |              |            |
| Control spring bar                    | 7 [101]                                                                                                                             | 10 [145]   | 16 [232]                                                                                                                           |              |            |
| PP-connection                         | Internal                                                                                                                            |            | External                                                                                                                           |              |            |
| Ports, OSQA                           | G: European version<br>HP, EF, HT, CL, CR: G 3/4<br>P, T, L, R: G 1/2<br>PP, LS: G 1/4                                              |            | UNF: US version<br>HP, EF, HT, CL, CR: 1 1/16 - 12 UN<br>P, T, L, R: 3/4 - 16 UNF<br>PP, LS: 7/16 - 20 UNF                         |              |            |
| Ports, OSQB                           | G: European version<br>HP, EF: 1 1/4 in SAE flange<br>HT, CL, CR: 1 in SAE flange<br>P, T, L, R: G 1/2<br>PP, LS: G 1/4             |            | UNF: US version<br>HP, EF: 1 1/4 in SAE flange<br>HT, CL, CR: 1 in SAE flange<br>P, T, L, R: 3/4 - 16 UNF<br>PP, LS: 7/16 - 20 UNF |              |            |
| Ports, OSQB/OLSQ                      | G: (European version)<br>HP, EF: 1 1/4 in SAE flange<br>HT, CL, CR: 1 in SAE flange<br>POSQ, POLSQ, T, L, R: G 1/2<br>PP, LS: G 1/4 |            |                                                                                                                                    |              |            |
| Pilot pressure relief valve bar [psi] | 100 [1450]                                                                                                                          | 120 [1740] | 140 [2030]                                                                                                                         | 170 [2465]   | 210 [3045] |
| Shock valves, bar [psi]               | 165 [2393]                                                                                                                          | 200 [2900] | 230 [3335]                                                                                                                         | 260 [3770]   | 270 [3916] |
| Back pressure valve                   | Yes (Only OSQB)                                                                                                                     |            | No                                                                                                                                 |              |            |
| Unit black painted                    | Yes                                                                                                                                 |            | No                                                                                                                                 |              |            |

An alternative way to specify a variant is to state an existing code number and add the modifications, you would like to have implemented in the basic flow amplifier.

Code number of basic flow amplifier: \_\_\_\_\_

Requested modifications: \_\_\_\_\_

## Technical Data

## Flow and Pressure

| Flow amplifier | Rated flow to HP-connection<br>l/min [US gal/min] | Max. pressure on connections |                              |                 |                |
|----------------|---------------------------------------------------|------------------------------|------------------------------|-----------------|----------------|
|                |                                                   | HP, EF, CL CR<br>bar [psi]   | LS, PP, P, L, R<br>bar [psi] | HT<br>bar [psi] | T<br>bar [psi] |
| OSQA           | 240 [63.4]                                        | 280 [4061]                   | 210 [3045]                   | 15 [217.5]      | 15 [217.5]     |
| OSQB           | 400 [106]                                         | 280 [4061]                   | 210 [3045]                   | 10 [145]        | 15 [217.5]     |

## Total Displacement of Steering System

| Flow amplifier | Amplification factor | Steering unit                                         |                                                       |                                                       |                                                       |                                                       |                                                       |                                                       |
|----------------|----------------------|-------------------------------------------------------|-------------------------------------------------------|-------------------------------------------------------|-------------------------------------------------------|-------------------------------------------------------|-------------------------------------------------------|-------------------------------------------------------|
|                |                      | OSPBX/OSPCX LS                                        |                                                       |                                                       |                                                       | OSPLX LS                                              |                                                       |                                                       |
|                |                      | 160<br>cm <sup>3</sup> /rev<br>[in <sup>3</sup> /rev] | 200<br>cm <sup>3</sup> /rev<br>[in <sup>3</sup> /rev] | 315<br>cm <sup>3</sup> /rev<br>[in <sup>3</sup> /rev] | 400<br>cm <sup>3</sup> /rev<br>[in <sup>3</sup> /rev] | 520<br>cm <sup>3</sup> /rev<br>[in <sup>3</sup> /rev] | 630<br>cm <sup>3</sup> /rev<br>[in <sup>3</sup> /rev] | 800<br>cm <sup>3</sup> /rev<br>[in <sup>3</sup> /rev] |
| OSQA 4         | 4                    | 640<br>[39]                                           | 800<br>[49]                                           | 1260<br>[77]                                          | 1600<br>[98]                                          | 2080<br>[127]                                         |                                                       |                                                       |
| OSQA 5         | 5                    | 800<br>[49]                                           | 1000<br>[61]                                          | 1575<br>[96]                                          | 2000<br>[122]                                         |                                                       |                                                       |                                                       |
| OSQA 8         | 8                    | 1280<br>[78]                                          | 1600<br>[98]                                          |                                                       |                                                       |                                                       |                                                       |                                                       |
| OSQA 10        | 9.1                  | 1456<br>[89]                                          |                                                       |                                                       |                                                       |                                                       |                                                       |                                                       |
| OSQB 4         | 4                    |                                                       |                                                       |                                                       |                                                       | 2080<br>[127]                                         | 2520<br>[154]                                         | 3200<br>[195]                                         |
| OSQB 5         | 5                    |                                                       |                                                       |                                                       | 2000<br>[122]                                         | 2600<br>[159]                                         | 3150<br>[192]                                         | 4000<br>[244]                                         |
| OSQB 8         | 8                    |                                                       |                                                       | 2520<br>[154]                                         | 3200<br>[195]                                         | 4160<br>[254]                                         |                                                       |                                                       |
| OSQB 10        | 9.1                  |                                                       | 1820<br>[111]                                         | 2865<br>[175]                                         | 3640<br>[222]                                         |                                                       |                                                       |                                                       |
| OSQB 20        | 16.5                 | 2640<br>[161]                                         | 3300<br>[201]                                         |                                                       |                                                       |                                                       |                                                       |                                                       |

## Installation

*The flow amplifier has to be mounted on a flat surface.*

| Mounting screw | Tightening torque, Nm [lbf.in] |
|----------------|--------------------------------|
| M 10 x 1.5     | 30 ±5 [265 ±44]                |
| 3/8 - 16 UNC   | 40 ±5 [354 ±44]                |
| 7/16 - 14 UNC  | 55 ±5 [487 ±44]                |

Tightening torque for fittings: Look in sub catalogue "General Steering Components" page 36.

#### Technical Data

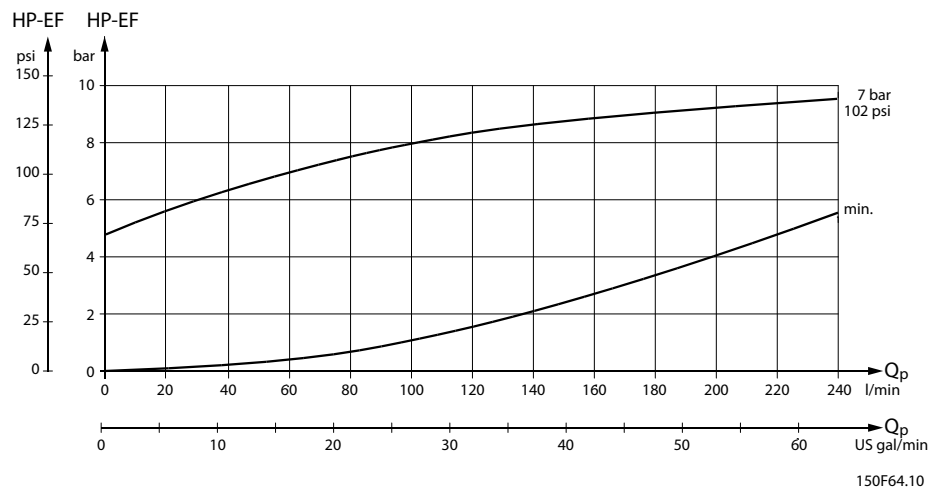
#### Valve functions in the flow amplifiers

The datas below come from measurements on a representative sample of flow amplifiers from production. Oil with viscosity of 21 mm<sup>2</sup>/s [102 SUS] at 50 °C [122 °C] was used during measuring.

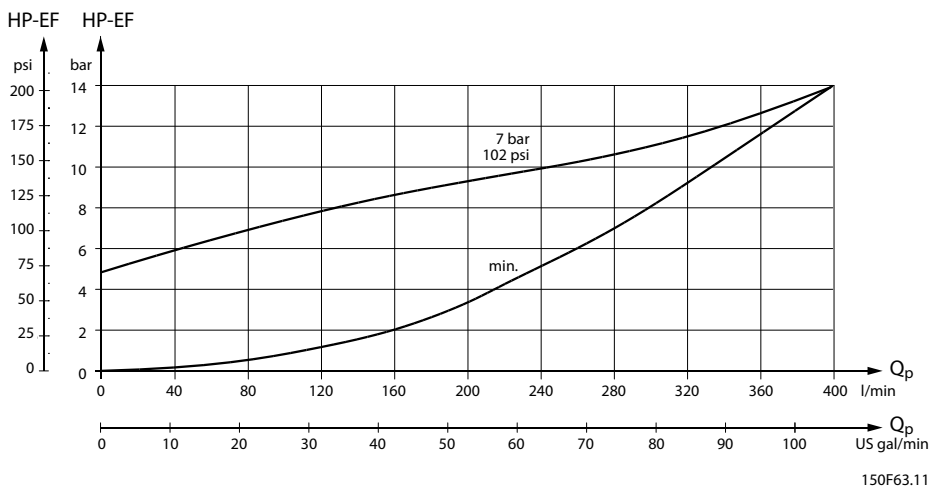
#### Priority valve

The priority valve is used in load sensing systems where the same pump supplies oil to both the steering system and working hydraulics. The steering system always has first priority. Measurements were made when the pressure on the LS connection is zero. (steering unit is in neutral position). The minimum curves apply when the pressure on the EF connection is higher than the actual control spring pressure. The curves for control spring pressure of 7 bar [101.5 psi] apply when the pressure on the EF connection is zero

#### OSQA



#### OSQB



#### Technical Data

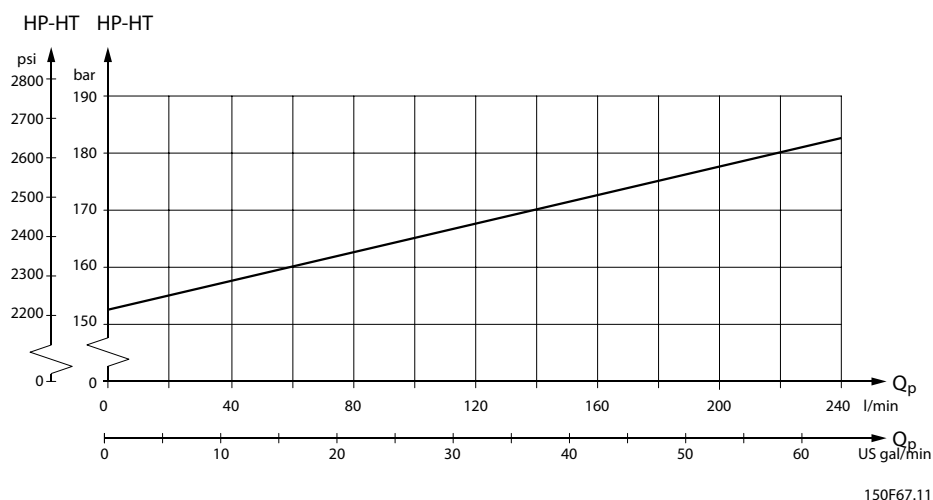
#### OSQ pilot pressure relief valve (HP - HT, $Q_p$ ) characteristic

The pilot pressure relief valve protects the steering unit against excessive pressure. The pilot pressure relief valve together with the priority valve limit the maximum steering pressure HP-HT.

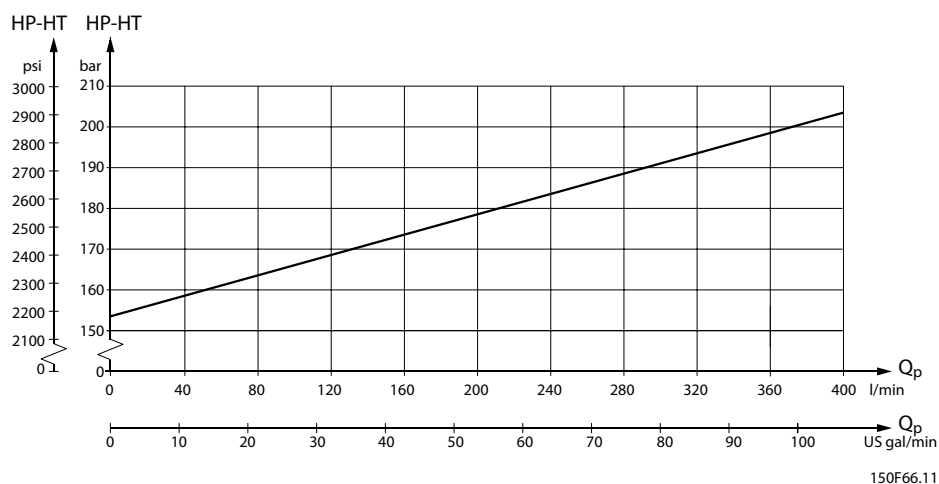
The pilot pressure relief valve in OSQ is set with an oil flow of 140 l/min [37 US gal/min] supplied to the HP connection.

Setting tolerance: rated value +10 bar [+145 psi]. The curves below are valid for rated settings 170 bar [2466 psi].

#### OSQA



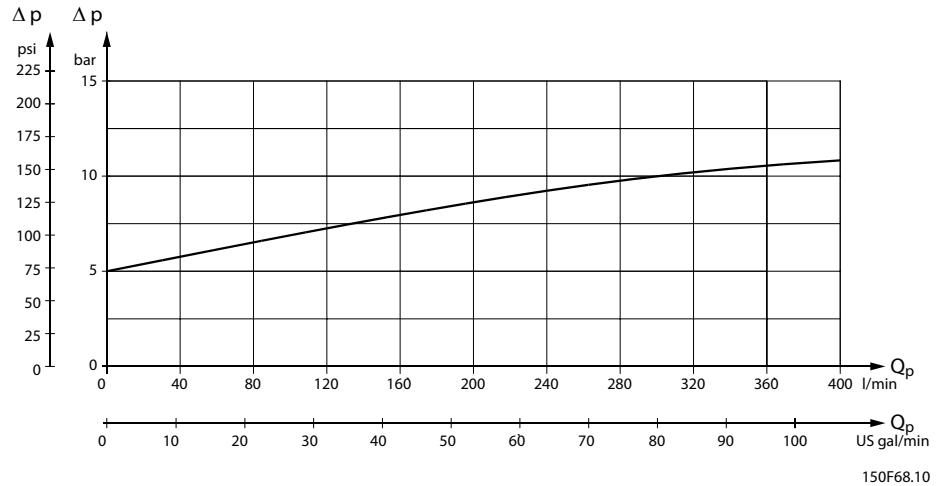
#### OSQB



## Technical Data

### Back pressure valve

The back pressure valve in (OSQB only) increases the capacity of the suction valves. The pressure drop shown applies to the back pressure valve only.



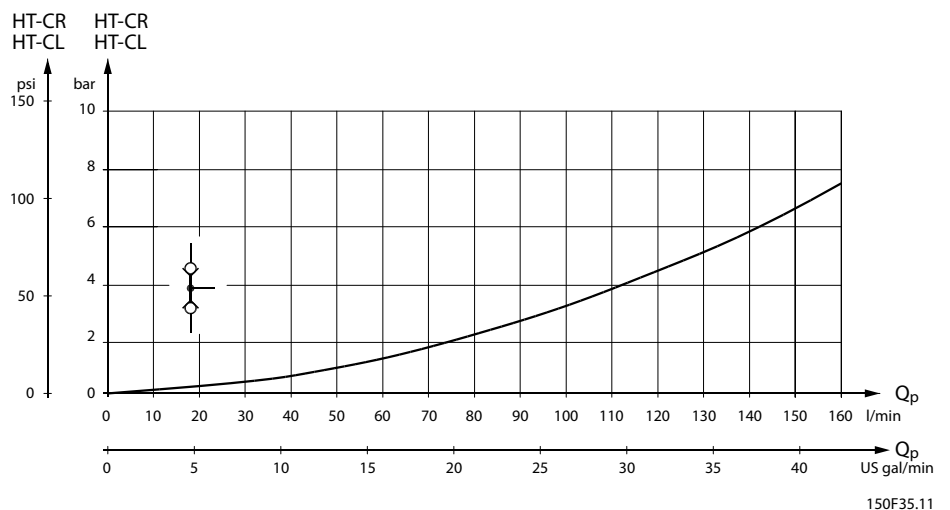
### Shock valves

The shock valves protect the flow amplifier against shock from external forces on the steering cylinders. The shock valves in OSQA and OSQB limit the maximum pressure drop from CL to HT and from CR to HT. The shock valves are set at 10 l/min [2.64 US gal/min].

Setting tolerance: rated value +20 bar [290 psi].

### Suction valves

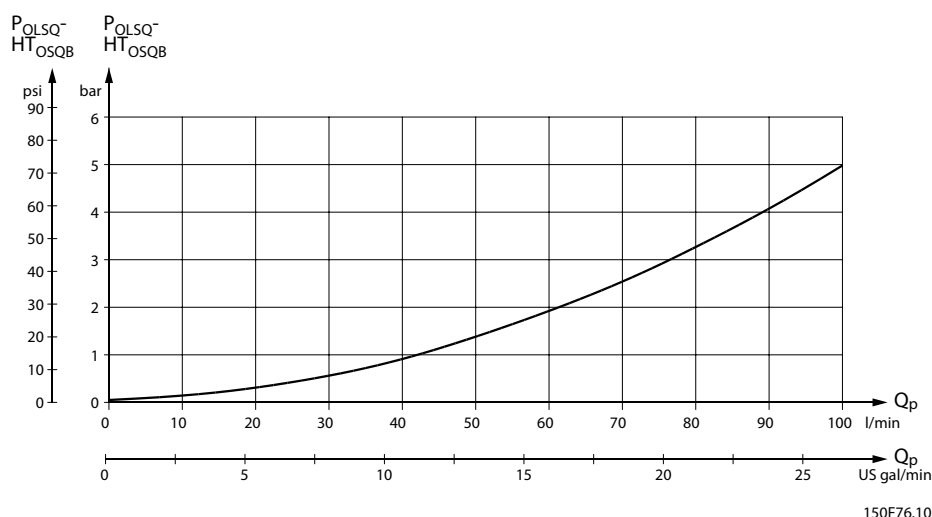
The suction valves ensure oil suction on the side of the steering cylinder pistons where in unfavorable conditions cavitation might occur. The capacity of the suction valves is increased in OSQB by the built-in back pressure valve.



#### Technical Data

#### Priority valve OLSQ for emergency circuit in OSQB/OLSQ

When under normal steering conditions the stand-by pressure in the main circuit (minimum 7 bar [101.5 psi] priority valve spring in OSQ) overrules the spring pressure in OLSQ (4 bar [58 psi] spring), OLSQ's priority valve will pass oil from the emergency steering pump across OLSQ's P-connection to the flow amplifier's HT tank connection. If the oil supply from the main pump should fail, the stand-by pressure of OSQ's priority valve in the main pump circuit disappears and relocates the spool in OLSQ to enable the oil from the emergency steering pump to enter the pump circuit in the OSQ. The curve shows the pressure drop from OLSQ's P-connection to OSQ's HT-connection with an active main pump and neutral positioned steering. The curve solely applies to OSQs without any back pressure valve in the tank line.



## Dimensions OSQA

European version:

HP, EF, HT, CL, CR: G 3/4

P, T, L, R: G 1/2

PP, LS: G 1/4

A: M10 x 1.5, 21 mm [0.83 in] deep

B: M10 x 1.5, 16 mm [0.63 in] deep

US version:

HP, EF, HT, CL, CR: 1 1/16 - 12 UN

P, T, L, R: 3/4 - 16 UNF

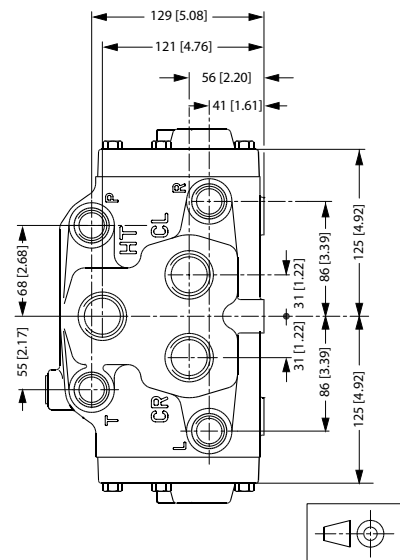
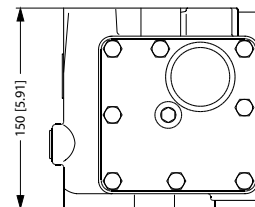
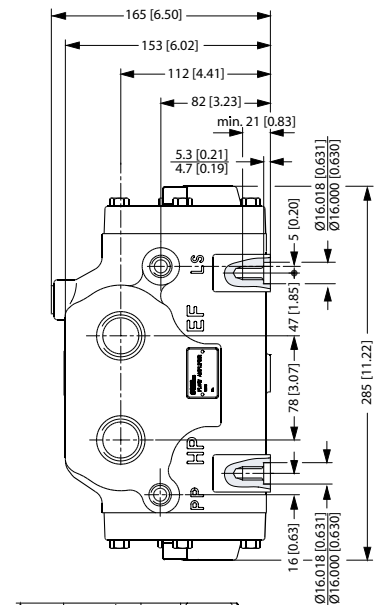
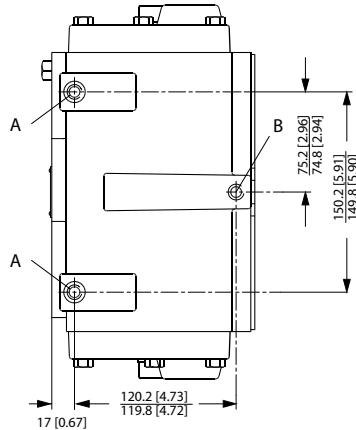
PP, LS: 7/16 - 20 UNF

A:

7/16 - 14 UNC, 21 mm [0.83 in] deep

B:

7/16 - 14 UNC, 16 mm [0.63 in] deep



150F36.11

#### Dimensions OSQB

European version:

HP, EF:

1 ¼ in SAE flange

7/16 - 14 UNC

18 mm [0.71 in] deep (8)

HT, CL, CR:

1 in SAE flange

3/8 - 16 UNC

18 mm [0.71 in] deep (12)

P, T, L, R: G ½

PP, LS: G ¼

A: M10 x 1,5, 21 mm [0.83 in] deep

B: M10 x 1,5, 16 mm [0.63 in] deep

US version:

HP, EF:

1 ¼ in SAE flange

7/16 - 14 UNC

18 mm [0.71 in] deep (8)

HT, CL, CR:

1 in SAE flange

3/8 - 16 UNC

18 mm [0.71 in] deep (12)

P, T, L, R: ¾ - 16 UNF

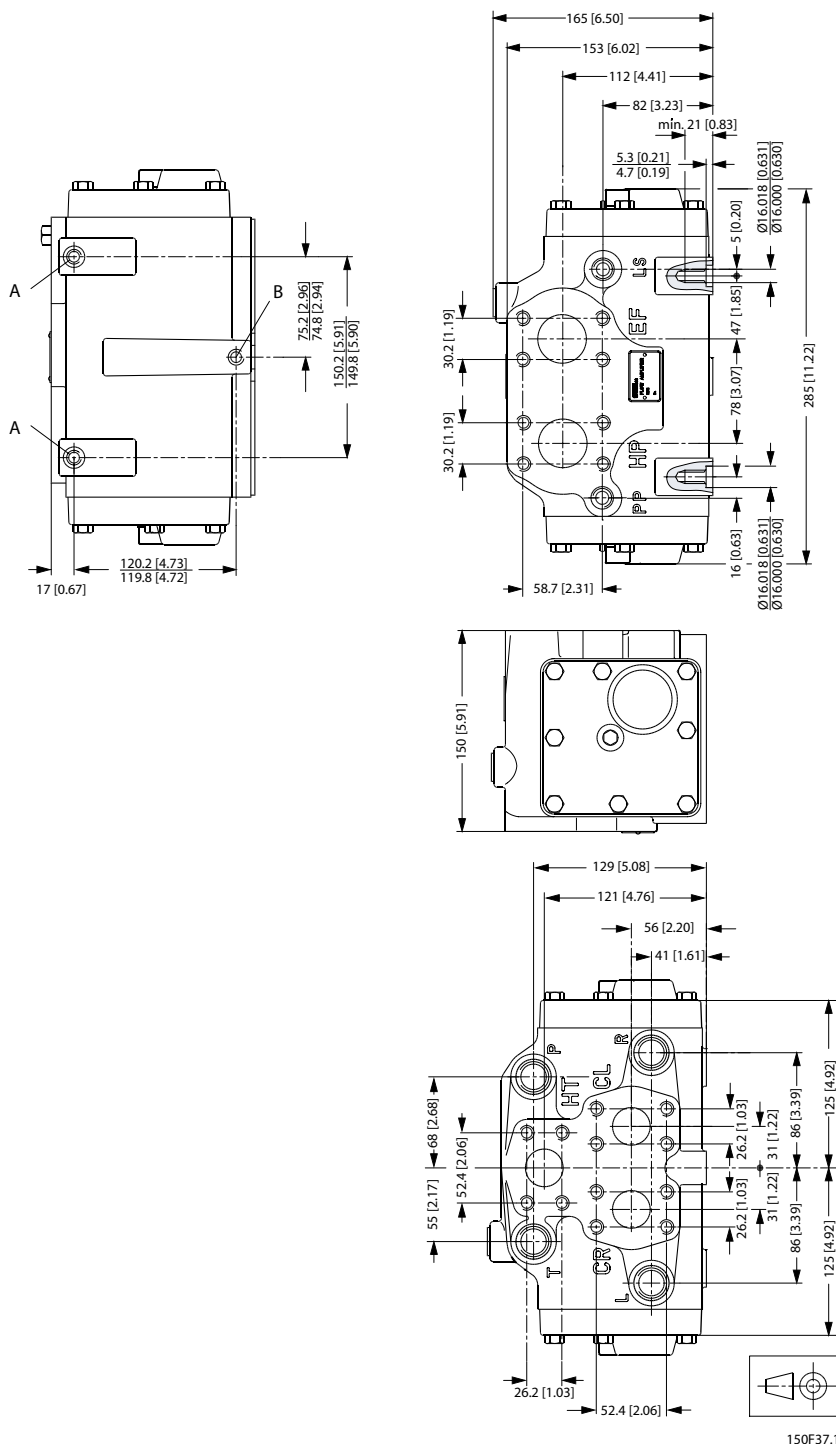
PP, LS: 7/16 - 20 UNF

A:

7/16 - 14 UNC, 21 mm [0.83 in] deep

B:

7/16 - 14 UNC, 16 mm [0.63 in] deep



150F37.10

## Dimensions OSQB with OLSQ

## European version

HP, EF:

1 ¼ in SAE flange

7/16 - 14 UNC

18 mm [0.71 in] deep (8)

HT, CL, CR:

1 in SAE flange

 $3/8 - 16 \text{ UNC}$ 

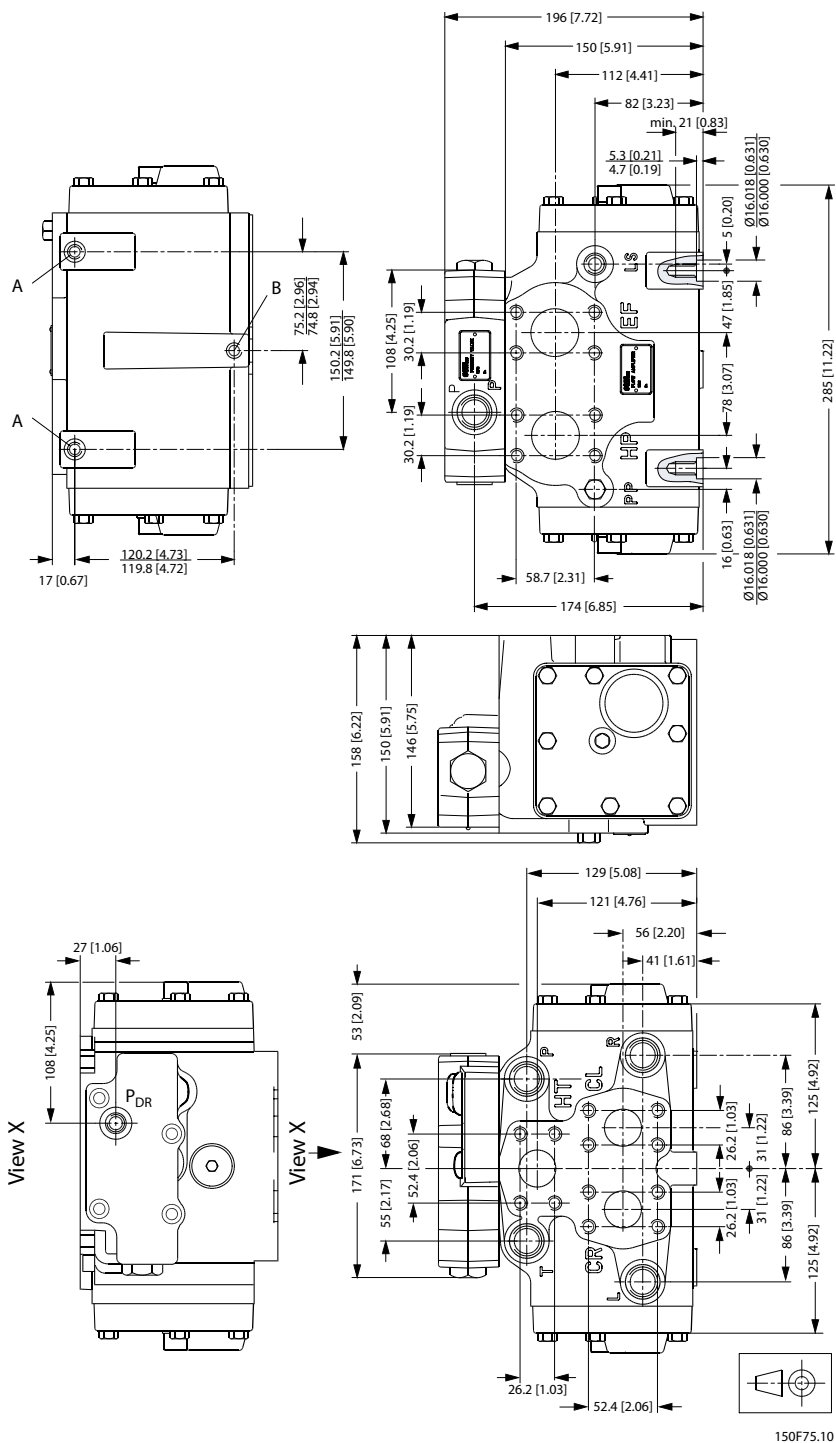
18 mm [0.71 in] deep (12)

P<sub>OSO</sub>, P<sub>OISO</sub>, T, L, R: G ½

PP, LS, P<sub>DP</sub>: G ¼

A:  
M10 x 1.5, 21 mm [0.83 in] deep

B:  
M10 x 1.5, 16 mm [0.63 in] deep





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