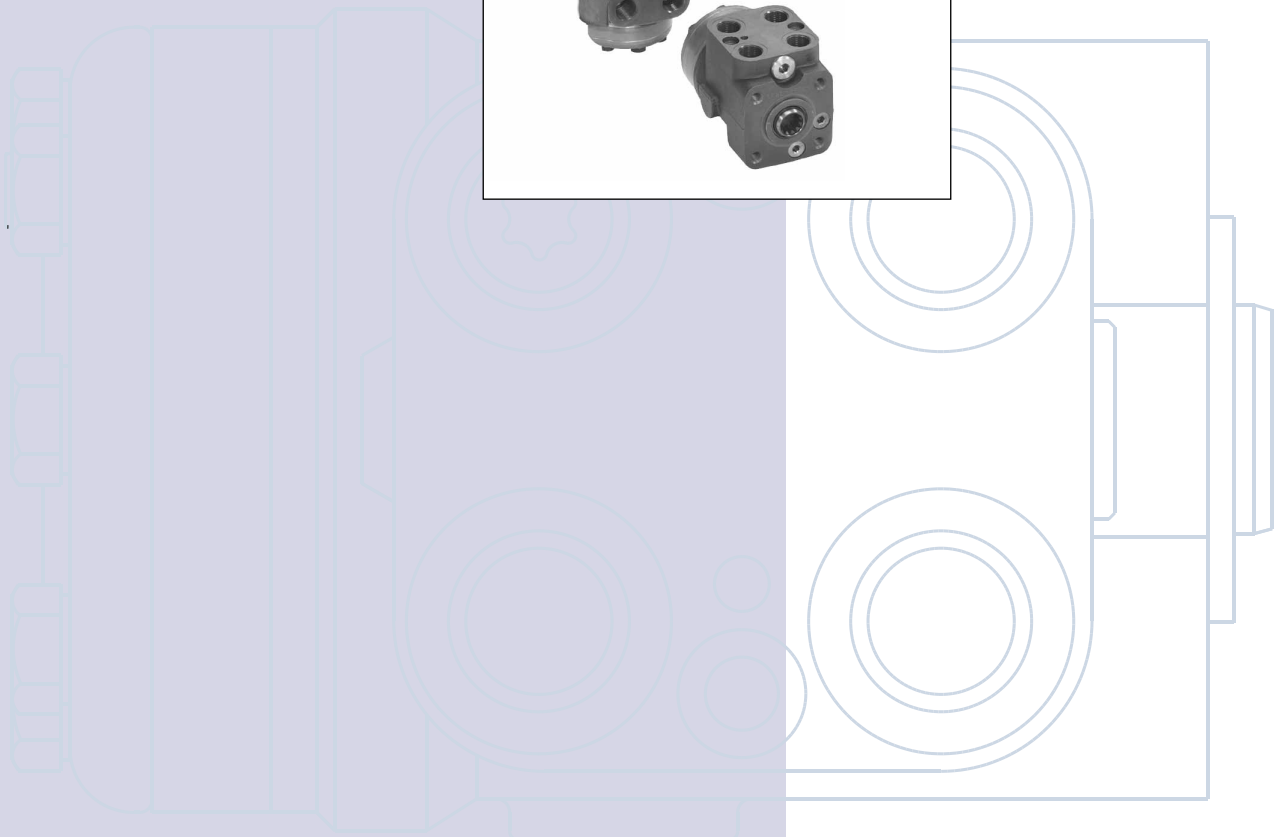




OSPB, OSPC, OSPD
Open Center
Steering Units

OSPB Closed Center
Steering Units

Technical
Information



**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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A Wide Range of Steering Components (continued)

For hydrostatic steering systems Sauer-Danfoss offers:

- Mini steering units with displacements from 32 to 100 cm³/rev [1.95 to 6.10 in³/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 cm³/rev [2.44 to 73.2 in³/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 ³	=	[0.061 in ³]
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 and Technical Literature Survey

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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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Open and Closed Center Steering Units
Technical Information
Notes

Notes

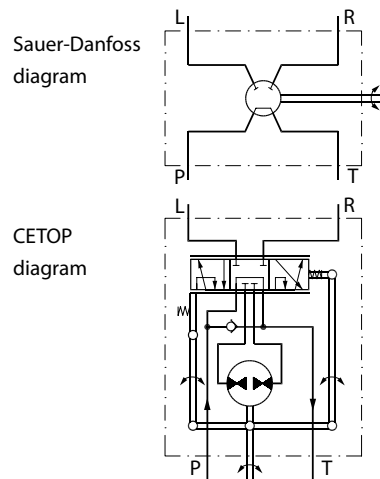
Versions

Open center steering units have open connection between pump and tank in the neutral position. In open center steering systems, pumps with fixed displacement are used.

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.

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

OSPB: Steering unit with no valve functions



OSPB ON
Open center Non-reaction

150-181.10



F300619

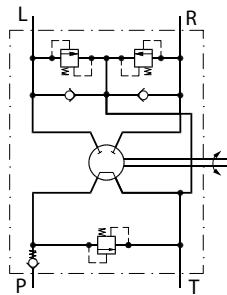
Versions

OSPC: Steering unit with integrated valve functions

OSPC ON

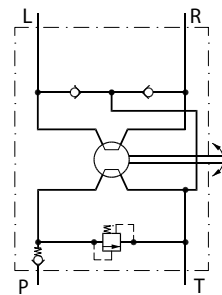


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150-370.10

OSPC ON
 Open center Non-reaction



150-434.10

OSPC OR
 Open center Reaction

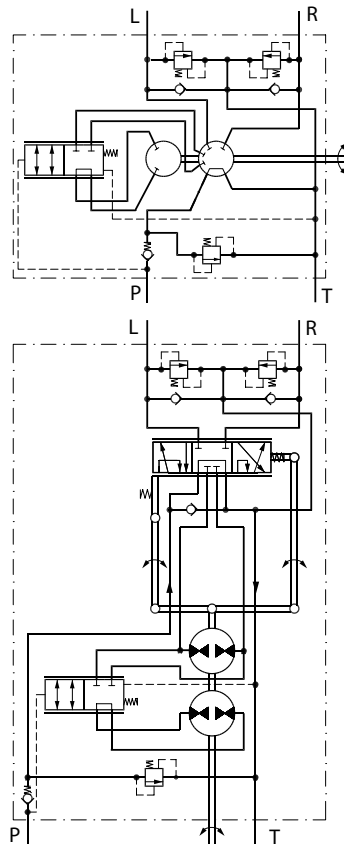
Versions

OSPD: Steering unit with 2 rotary meters and with integrated valve functions

The OSPD has 2 rotary meters (gear wheel sets). In the case of no pump supply only one rotary meter is active for emergency steering. In normal steering situations both rotary meters are active.



F300613



150-581.10

OSPD ON
 Open center Non-reaction

**Code Numbers
and Weights**

**OSPB Open Center
Non-Reaction
Steering Units**

OSPB has no valve functions.

Steering unit	Code Numbers		Pump flow range l/min [US gal/min]	Weight kg [lb]
	Connections			
	European version G 1/2	US version 3/4-16UNF O*		
OSPB 50 ON	150N0039	150N0025	5-18 [1.32-4.76]	5.2 [11.46]
OSPB 80 ON	150N0040	150N0026	10-30 [2.64-7.93]	5.3 [11.68]
OSPB 100 ON	150N0041	150N0027		5.4 [11.90]
OSPB 125 ON	150N0042	150N0024	20-50 [5.28-13.21]	5.5 [12.13]
OSPB 160 ON	150N0043	150N0028		5.6 [12.35]
OSPB 200 ON	150N0044	150N0023		5.8 [12.79]
OSPB 250 ON	150N0052	150N0022		6.0 [13.23]
OSPB 315 ON	150N0045	150N0030	20-70 [5.28-18.49]	6.2 [13.67]
OSPB 400 ON	150N0046	150N0031		7.0 [15.43]
OSPB 500 ON	150N0047	150N0032		7.6 [16.76]

O*: O-ring chamfer on port connections

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

Code Numbers and Weights

OSPC Open Center Non-Reaction Steering Units

OSPC ON in the table below have all the following valve functions incorporated:

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

Steering unit	Code Numbers		Pump flow range l/min [US gal/min]	Valve settings		Weight kg [lb]
	Connections			Relief valve	Shock valve	
	European version G 1/2 S**	US version 3/4-16 UNF O*		bar [psi]	bar [psi]	
OSPC 40 ON	150N2148	-	5-18 [1.32-4.76]	140 [2030]	200 [2900]	5.2 [11.46]
OSPC 50 ON	150N2149	150N2136				5.2 [11.46]
OSPC 80 ON	150N2150	150N2137	10-30 [2.64-7.93]			5.3 [11.68]
OSPC 100 ON	150N2151	150N2138				5.4 [11.90]
OSPC 125 ON	150N2152	150N2139				5.5 [12.13]
OSPC 160 ON	150N2153	150N2140	20-50 [5.28-13.21]	170 [2465]	225 [3263]	5.6 [12.35]
OSPC 200 ON	150N2154	150N2141				5.8 [12.79]
OSPC 250 ON	150N2155	150N2168				6.0 [13.23]
OSPC 315 ON	150N2156	150N2142				6.2 [13.67]
OSPC 400 ON	150N2157	-	20-70 [5.28-18.49]			7.0 [15.43]
OSPC 500 ON	150N2158	-				7.6 [16.78]

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 wish other port connection displacements, combination of displacement and pump flow range, valve combinations and/or other valve settings, please fill in the order form on page 14 and contact the Sauer-Danfoss Sales Organisation.

Open and Closed Center Steering Units

Technical Information

Steering Units, OSPB, OSPC, OSPD Open Center

Code Numbers and Weights

OSPC Open Center Reaction Steering Units

OSPC OR in the table below have all the following valve functions incorporated:

- check valve in P-port
- relief valve
- suction valves

Steering unit	Code Numbers	Pump flow range l/min [US gal/min]	Valve settings Relief valve bar [psi]	Weight kg [lb]
	Connections European version G 1/2			
OSPC 80 OR	150N2159	10-30 [2.64-7.93]	170 [2465]	5.3 [11.68]
OSPC 200 OR	150N2160	20-50 [5.28-13.21]		5.8 [12.79]

If you wish other displacements, port connections, pump flow range, valve combinations and/or other valve settings, please fill in the order form on page 14 and contact the Sauer-Danfoss Sales Organisation.

OSPD Open Center Non-Reaction Steering Units

OSPD ON in the table below has the following valve functions incorporated:

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

Steering unit	Code Numbers	Pump flow range l/min [US gal/min]	Valve settings		Weight kg [lb]
	Connections European version G1/2 S**		Relief valve bar [psi]	Shock valve bar [psi]	
OSPD 70/195 ON	150G4051	20-50 [5.28-13.21]	170 [2465]	225 [3263]	7.6 [16.76]

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

If you wish other displacements, reaction type, pump flow range and/or other valve settings, please fill in the order form on page 14 and contact the Sauer-Danfoss Sales Organisation.



Open and Closed Center Steering Units
Technical Information
Notes

Notes

**Specification Table
 for Non Catalogue
 Numbers**

Specification table for Sauer-Danfoss open center steering units type OSPC and OSPD which are not available in the code number tables.
 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						OSPD									
Reaction type	ON (Open center Non-reaction)						OR (Open center Reaction)									
DP, cm ³ /rev OSPC ON	40	50	60	70	80	100	125	160	185	200	230	250	315	400	500	
DP, cm ³ /rev OSPC OR	40		50		60		70		80		100		125		200	
DP, cm ³ /rev OSPD ON	60/185		60/220		60/260		70/195		70/230		70/270		100/260		100/300	
DP, cm ³ /rev OSPD OR	60/185			60/220			70/195			70/230						
Pump flow range l/min	5-18			10-30			20-50			20-70						
Port threads OSPC***	G1/2			G1/2 - S**			M18 x 1.5 - O* S**			M22 x 1.5/M18 x 1.5 - S**			3/4-16UNF - O*			
Relief valve bar	70	80	90	100	110	120	140	170	190	200	210	no relief valve				
Shock valves bar	150	180	200	225	240	no shock valves										
Suction valves	Yes						No									
Neutral setting springs****	Soft: 0.5 - 1.8 Nm in normal steering situations					Standard: 0.8 - 3 Nm in normal steering situations					Strong: 1.5 - 4 Nm in normal steering situations					
Unit black painted	Yes						No									

- DP: Displacement
- O*: O-ring chamfer on port connections
- S**: Spot-face around port connections (can not be used in connection with OVR angular block)
- OSPC***: The different port connections are only available for OSPC ON/OR, see also the form on page 15.
- Neutral setting springs****: Soft springs only allowed for pump flow up to 30 l/min

All OSPC and OSPD steering units specified by code numbers in this catalogue have check valve in P-connection.
 All steering units specified by code numbers in this catalogue have standard neutral setting springs.
 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: _____

Port Thread Versions and Valve Combinations

The following combinations of port threads and valves are available for OSPC ON/OR:

Threads		Valves		
Ports	For steering column	Relief valve	Shock valves	Suction valves
DIN 3852-2 G 1/2	M10×1.5	Yes	Yes	Yes
		Yes	Yes	No
		Yes	No	Yes
		Yes	No	No
DIN 3852-2 G 1/2 w. spot-face	M10×1.5	Yes	Yes	Yes
		Yes	Yes	No
		No	Yes	Yes
ISO 6149-1 M18×1.5, w. O-ring chamfer and spot-face	M10×1.5	Yes	Yes	Yes
		Yes	Yes	No
		Yes	No	Yes
		Yes	No	No
DIN 3852-1 P and T: M22×1.5, L and R: M18×1.5 w. spot-face	M10×1.5	Yes	Yes	Yes
		Yes	No	Yes
		Yes	No	No
ISO 11926-1 3/4-16 NF, O-ring boss port	3/8-16 UNC	Yes	Yes	Yes
		Yes	Yes	No
		Yes	No	Yes
		Yes	No	No
		No	Yes	Yes
ISO 11926-1 3/4-16 NF, O-ring boss port	M10×1.5	Yes	Yes	Yes
		Yes	Yes	No
		Yes	No	Yes

Housings with spot-face around port connections can not be used in connection with OVR angular block.

Shock valves are not needed for reaction type steering units.

For OSPD ON/OR only the versions listed in the tables with code numbers are available.

**Steering Units, OSPB
 Closed Center**

Version

Closed center

Closed center steering units are blocked on their P port in the neutral position. In closed center steering systems, variable oil flow is required.

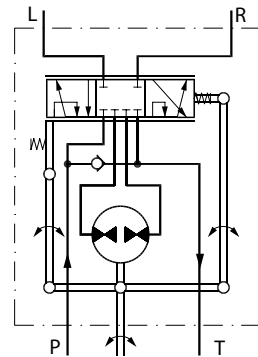
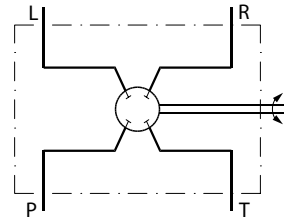
Non-reaction

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



F300619

OSPB CN
 Closed center Non-reaction



150-184.10

**Code Numbers
 and Weights**

OSPB has no valve functions.

**OSPB Closed Center
 Non-Reaction
 Steering Units**

Steering unit	Code Numbers	Weight kg [lb]
	Connections US version 3/4-16UNF O*	
OSPB 50 CN	150-0125	5.2 [11.46]
OSPB 80 CN	150-0126	5.3 [11.68]
OSPB 100 CN	150-0127	5.4 [11.90]
OSPB 125 CN	150-0129	5.5 [12.13]
OSPB 160 CN	150-0128	5.6 [12.35]
OSPB 200 CN	150-0146	5.8 [12.79]
OSPB 315 CN	150G4104	6.2 [13.23]
OSPB 400 CN	150G4105	7.0 [15.43]

O*: O-ring chamfer on port connections

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

Technical Data

Common data:

Look in sub catalogue: "General, Steering Components" page 28.

Displacement, Flow and Pressure

Steering unit	Displacement cm ³ /rev [in ³ /rev]	Recommended* oil flow l/min [US gal/min]	Max. pressure on connections		
			P bar [psi]	T bar [psi]	L, R bar [psi]
OSPC 40 ON	40 [2.44]	4-18 [1.05-4.76]	140 [2030]	40 [580]	280 [4061]
OSPB/OSPC 50 ON	50 [3.05]	5-18 [1.32-4.76]			
OSPC 60 ON	60 [3.66]	6-18 [1.59-4.76]			
OSPC 70 ON	70 [4.27]	7-18 [1.85-4.76]	175 [2538]		
OSPB/OSPC 80 ON	80 [4.88]	8-30 [2.11-7.93]			
OSPB/OSPC 100 ON	100 [6.10]	10-30 [2.64-7.93]	210 [3045]		
OSPB/OSPC 125 ON	125 [7.63]	13-50 [3.43-13.21]			
OSPB/OSPC 160 ON	160 [9.76]	16-50 [4.23-13.21]			
OSPB/OSPC 185 ON	185 [11.29]	19-50 [5.02-13.21]			
OSPB/OSPC 200 ON	200 [12.20]	20-50 [4.23-13.21]			
OSPB/OSPC 230 ON	230 [14.04]	23-50 [6.08-13.21]			
OSPB/OSPC 250 ON	250 [15.26]	25-50 [6.60-13.21]			
OSPB/OSPC 315 ON	315 [19.22]	32-70 [8.45-18.49]			
OSPB/OSPC 400 ON	400 [24.41]	40-70 [10.57-18.49]			
OSPB/OSPC 500 ON	500 [30.51]	50-70 [13.21-18.49]			
OSPC 40 OR	40 [2.44]	4-18 [1.05-4.76]	140 [2030]	40 [580]	280 [4061]
OSPC 50 OR	50 [3.05]	5-18 [1.32-4.76]			
OSPC 60 OR	60 [3.66]	6-18 [1.59-4.76]	175 [2538]		
OSPC 70 OR	70 [4.27]	7-18 [1.85-4.76]			
OSPC 80 OR	80 [4.88]	8-30 [2.11-7.93]			
OSPC 100 OR	100 [6.10]	10-30 [2.64-7.93]	210 [3045]		
OSPC 125 OR	125 [7.63]	13-50 [3.43-13.21]			
OSPC 160 OR	160 [9.76]	16-50 [4.23-13.21]			
OSPC 185 OR	185 [11.29]	19-50 [5.02-13.21]			
OSPC 200 OR	200 [12.20]	20-50 [4.23-13.21]			
OSPB 50 CN	50 [3.05]	5 [1.32]	140 [2030]	40 [580]	280 [4061]
OSPB 80 CN	80 [4.88]	8 [2.11]	175 [2538]		
OSPB 100 CN	100 [6.10]	10 [2.64]			
OSPB 125 CN	125 [7.63]	13 [3.43]			
OSPB 160 CN	160 [9.76]	16 [4.23]			
OSPB 200 CN	200 [12.20]	20 [5.28]			
OSPB 315 CN	315 [19.22]	32 [8.45]			
OSPB 400 CN	400 [24.41]	40 [10.57]			

* Criteria for determining the recommended oil flow:

- As a minimum the oil flow it takes to ensure sufficient steering speed at engine idle speed
- Ensures the least possible pressure loss at full engine speed

Technical Data

Common data:

Look in sub catalogue: "General, steering components"

Displacement, Flow and Pressure

Steering unit	Displacement manual steer mode cm ³ /rev [in ³ /rev]	Displacement normal steer mode cm ³ /rev [in ³ /rev]	Recommended* oil flow l/min [US gal/min]	Max. pressure on connections		
				P bar [psi]	T bar [psi]	L, R bar [psi]
OSPD 60/185 ON	60 [3.66]	185 [11.29]	20-50 [5.28-13.21]	210 [3045]	40 [580]	280 [4060]
OSPD 60/220 ON	60 [3.66]	220 [13.43]	22-50 [5.81-13.21]			
OSPD 60/260 ON	60 [3.66]	260 [15.87]	26-50 [6.87-13.21]			
OSPD 70/195 ON	70 [4.27]	195 [11.90]	20-50 [5.28-13.21]			
OSPD 70/230 ON	70 [4.27]	230 [14.04]	23-50 [6.08-13.21]			
OSPD 100/260 ON	100 [6.10]	260 [15.87]	26-50 [6.87-13.21]			
OSPD 100/300 ON	100 [6.10]	300 [18.31]	30-50 [7.93-13.21]			
OSPD 125/285 ON	125 [7.63]	285 [17.39]	30-50 [7.93-13.21]			
OSPD 125/325 ON	125 [7.63]	325 [19.83]	33-70 [8.72-18.49]			
OSPD 125/440 ON	125 [7.63]	440 [26.85]	44-70 [11.62-18.49]			
OSPD 60/185 OR	60 [3.66]	185 [11.29]	20-50 [5.28-13.21]	210 [3045]	40 [580]	280 [4060]
OSPD 60/220 OR	60 [3.66]	220 [13.43]	22-50 [5.81-13.21]			
OSPD 70/195 OR	70 [4.27]	195 [11.90]	20-50 [5.28-13.21]			
OSPD 70/230 ON	70 [4.27]	230 [14.04]	23-50 [6.08-13.21]			

* Criteria for determining the recommended oil flow:

- As a minimum the oil flow it takes to ensure sufficient steering speed at idle engine speed
- Ensures the least possible pressure loss at full engine speed

Please contact the Sauer-Danfoss Sales Organisation regarding steering units with code numbers not mentioned in this catalogue. They may have different technical data.

Technical Data

Valve Functions in OSPC and OSPD Steering Units

The data below comes from measurements on a representative sample of steering units from production. Oil with a viscosity of 21 mm²/s [100 SUS] at 50°C [122°F] was used during measuring.

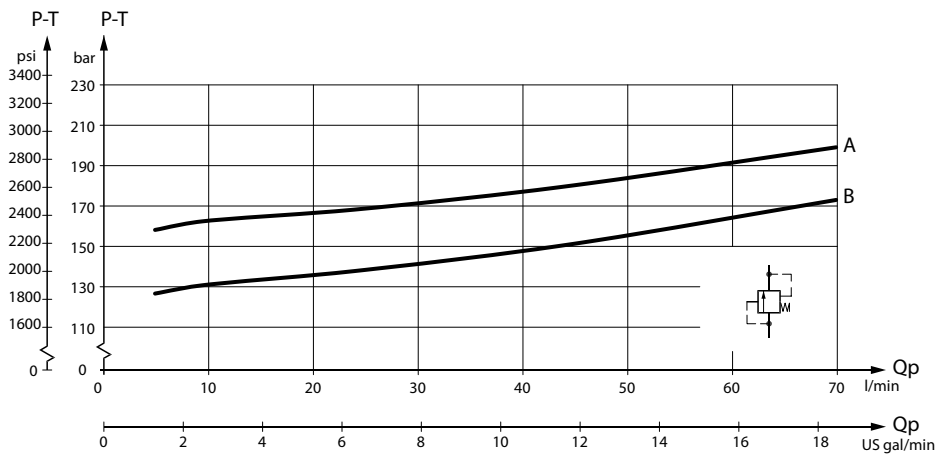
Pressure Relief Valve

The pressure relief valve protects pump and steering unit against excessive pressure and limits the system pressure while steering. The pressure relief valve is set at 25 l/min [6.60 US gal/min] flow.

Setting tolerances:

170 bar [2466 psi]: rated value +5 bar [+73 psi]

> 170 bar [2466 psi]: rated value +10 bar [+145 psi]



P301 240

$$A = 170^{+5}_{-0} \text{ bar [2465}^{+73}_{-0} \text{ psi]}$$

$$B = 140^{+5}_{-0} \text{ bar [2030}^{+73}_{-0} \text{ psi]}$$

$$Q = 25 \text{ l/min [6.60 US gal/min]}$$

Shock Valves

The shock valves protect the steering unit and limit maximum external forces on the steering cylinder. The shock valves in the steering unit limit the maximum pressure drop from L to T and from R to T. The shock valves are set at 3 l/min [0.792 US gal/min].

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

Settings: rated value +20 bar [290 psi], ex: 200 +20 bar [2900 +290 psi].

Technical Data

Valve Functions in OSPC and OSPD Steering Units

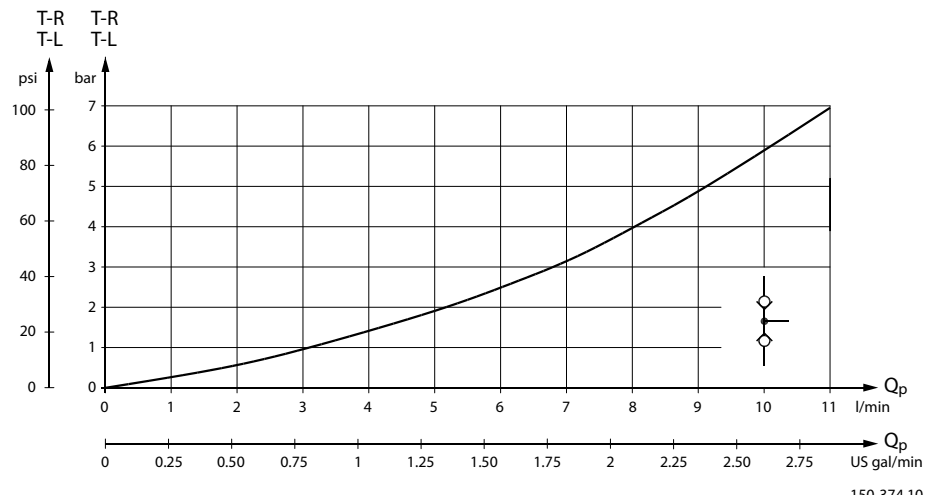
Suction Valves

The suction valves ensure 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 we recommended a back pressure of 2 bar [29 psi], but on vehicles with strong selfstraightening tendencies, we recommend 5-10 bar [72-145 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.



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 steering unit P connection. The pressure drop across the check valve depends on the use of port adoptors with 11 mm [0.43 in] minimum bore and is indicated on the graph on page 21.

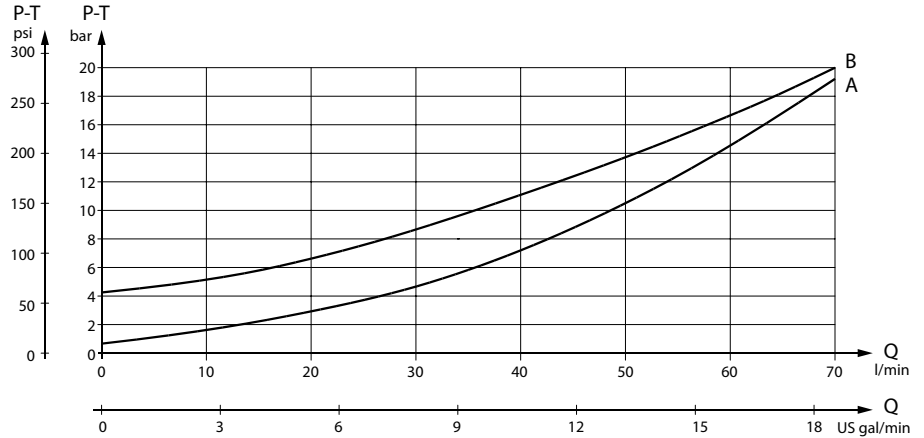
Technical Data

Pressure Drop in Neutral

The pressure drop is measured on Open Center steering units, and with the steering unit in neutral position.

The pressure drop is measured from P to T.

The values are valid at an oil temperature of 50°C (122°F) and a viscosity of 21 mm²/s (100 SUS).



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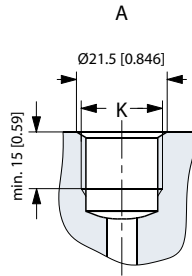
A: OSPB ON and OSPC ON/OR

B: OSPD ON/OR

The pressure drop curves are solely valid for selected spool sets within the recommended flow range.

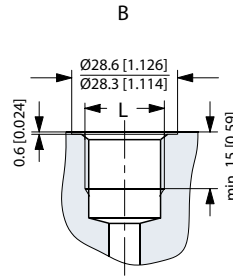
E.g. OSPC 50 ON with a spool set for 5-18 l/min [1.32-4.76 US gal/min], pressure drop curve A solely applies within the interval from 0-18 l/min [0-4.76 US gal/min]. A higher flow supply to the steering unit (e.g. 30 l/min [7.93 US gal/min]) will make the pressure drop exceed the value, which curve A shows at 30 l/min [7.93 US gal/min].

Port Thread Versions



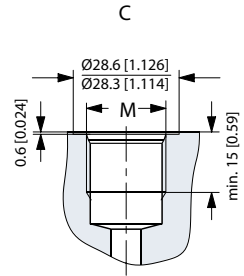
A: G main ports

K: DIN 3852-2 - G½



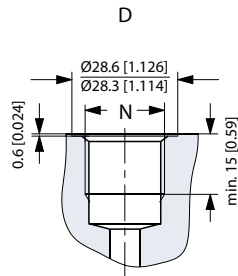
B: G main ports
w.spot-face

L: DIN 3852-2 - G½



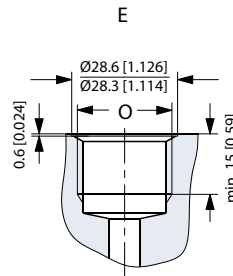
C: Metric main ports
w.spot-face and
O-ring chamfer

M: ISO 6149-1 -
M18×1.5



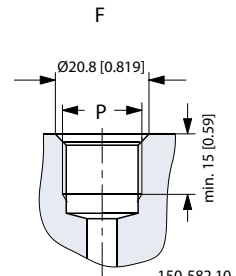
D: Metric main ports
w. spot-face

N: DIN 3852-1 -
M18×1.5



E: Metric main ports
w. spot-face

O: DIN 3852-1 -
M22×1.5



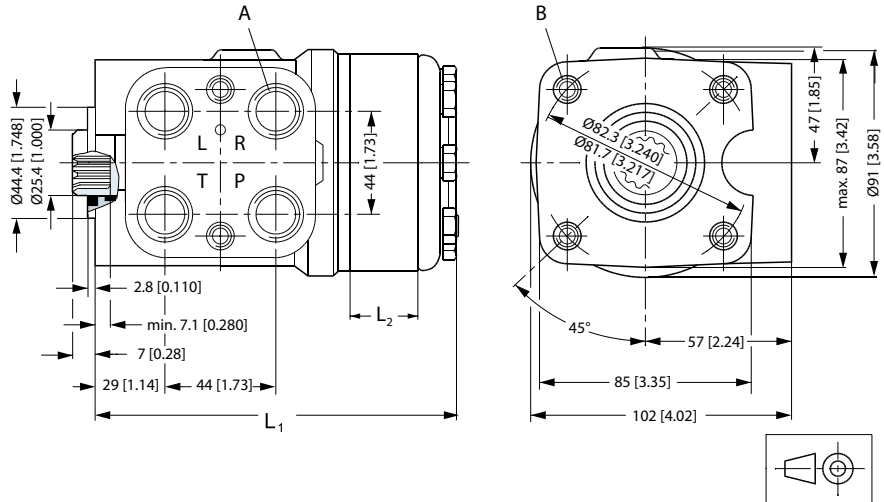
F: UNF main ports
w. O-ring chamfer
P: ISO 11926-1 -
¾-16UNF
O-ring boss port

150-582.10

Dimensions

OSPB ON and OSPB CN

Type	L1 mm [in]	L2 mm [in]
OSPB 50	126 [4.96]	6.5 [0.26]
OSPB 80	129 [5.08]	10.4 [0.41]
OSPB 100	132 [5.20]	13.0 [0.51]
OSPB 125	135 [5.31]	16.2 [0.64]
OSPB 160	140 [5.51]	20.8 [0.82]
OSPB 200	145 [5.71]	26.0 [1.02]
OSPB 250	151 [5.94]	32.5 [1.28]
OSPB 315	160 [6.30]	40.9 [1.61]
OSPB 400	171 [6.73]	52.0 [2.05]
OSPB 500	184 [7.24]	65.0 [2.56]



European version:

- A: G ½; 15 mm [0.59 in] deep
- B: M10 × 1.5,
16 mm [0.63 in] deep

US version:

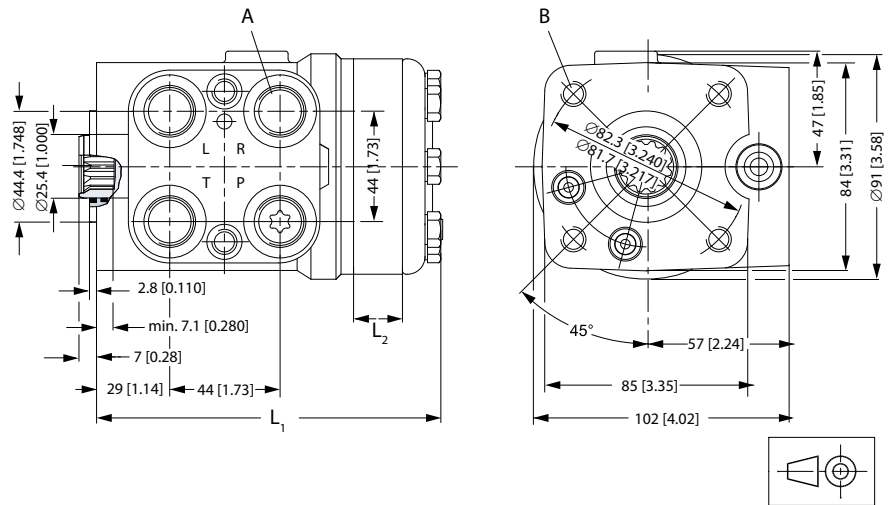
- A: ¾ - 16 UNF O-ring boss;
15 mm [0.59 in] deep
- B: 3/8 - 16 UNC,
16 mm [0.63 in] deep

150-139.11

Dimensions

OSPC ON and OSPC OR

Type	L1 mm [in]	L2 mm [in]
OSPC 40	126 [4.96]	6.5 [0.26]
OSPC 50	126 [4.96]	6.5 [0.26]
OSPC 60	128 [5.04]	9.1 [0.36]
OSPC 70	128 [5.04]	9.1 [0.36]
OSPC 80	129 [5.08]	10.4 [0.41]
OSPC 100	132 [5.20]	13.0 [0.51]
OSPC 125	135 [5.31]	16.2 [0.64]
OSPC 160	140 [5.51]	20.8 [0.82]
OSPC 185	143 [5.63]	24.0 [0.94]
OSPC 200	145 [5.71]	26.0 [1.02]
OSPC 230	149 [5.87]	29.9 [1.18]
OSPC 250	151 [5.94]	32.5 [1.28]
OSPC 315	160 [6.30]	40.9 [1.61]
OSPC 400	171 [6.73]	52.0 [2.05]
OSPC 500	184 [7.24]	65.0 [2.56]



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European version:

A: G ½ w. spot-face

or M18 × 1.5 ISO 6149

or M22 × 1.5 (P and T) +

M18 × 1.5 (L and R) DIN 3852;

15 mm [0.59 in] deep

B: M10 × 1.5,

16 mm [0.63 in] deep

US version:

A: ¾ - 16 UNF O-ring boss;

15 mm [0.59 in] deep

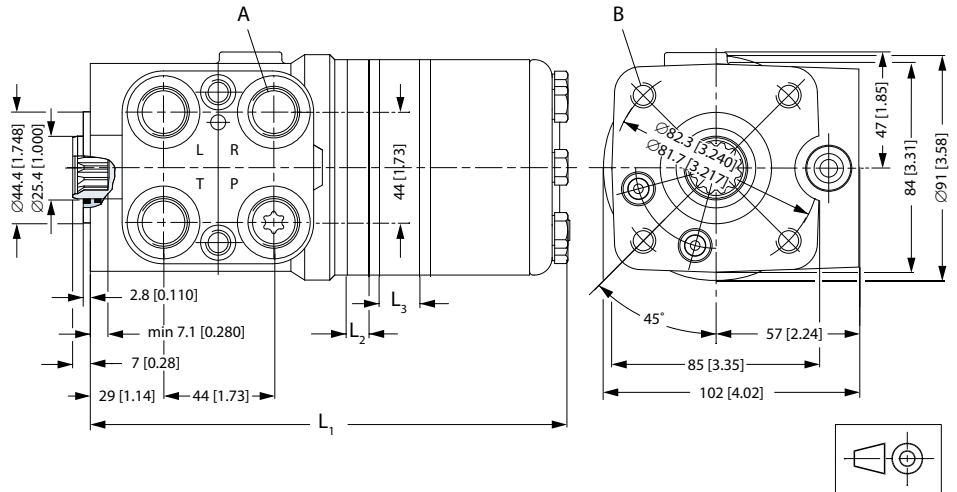
B: ¾ - 16 UNC,

16 mm [0.63 in] deep

Dimensions

OSPD ON and OSPD OR

Type	L1 mm [in]	L2 mm [in]	L3 mm [in]
OSPD 60/185	195 [7.68]	9.1 [0.36]	20.8 [0.82]
OSPD 60/220	200 [7.87]	9.1 [0.36]	26.0 [1.92]
OSPD 70/195	190 [7.48]	9.1 [0.36]	16.2 [0.64]
OSPD 70/230	195 [7.68]	9.1 [0.36]	20.8 [0.82]
OSPD 100/260	199 [7.83]	13.0 [0.51]	20.8 [0.82]
OSPD 100/300	204 [8.03]	13.0 [0.51]	26.0 [1.02]
OSPD 125/285	202 [7.95]	16.2 [0.64]	20.8 [0.82]
OSPD 125/325	207 [8.15]	16.2 [0.64]	26.0 [1.02]
OSPD 125/440	222 [8.74]	16.2 [0.64]	40.9 [1.61]



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European version:

- A: G 1/2; 15 mm [0.59 in] deep
w. spot-face;
- B: M10 × 1.5,
16 mm [0.63 in] deep



Open and Closed Center Steering Units
Technical Information
Notes

Notes



Open and Closed Center Steering Units
Technical Information
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Notes



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