

VARIABLE  
DISPLACEMENT  
AXIAL PISTON  
PUMPS

**LVP SERIES**

**PLATA**<sup>®</sup>

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# INDEX

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Replaces: 03/01.2007

04/04.2013



Modification from former edition.

## FEATURES

Variable displacement axial piston pumps with swash plate design. LVP pumps are ideally suited for medium and high pressure open circuit applications. They are available with a wide range of control options to regulate the pumps displacement. The drive shaft is designed for both radial and axial loads. The pumps are also available with a through drive option to have multiple pumps able to supply several hydraulic systems.

Replaces: 03/01.2007

### DISPLACEMENTS

From 14 cm<sup>3</sup>/rev (0.85 in<sup>3</sup>/rev)  
To 87,9 cm<sup>3</sup>/rev (5.36 in<sup>3</sup>/rev)

### PRESSURE

Max. continuous 280 bar (4060 psi)  
Max. intermittent 315 bar (4568 psi)  
Max. peak 350 bar (5075 psi)

### SPEED

Max. 3000 min<sup>-1</sup>

### APPLICATION

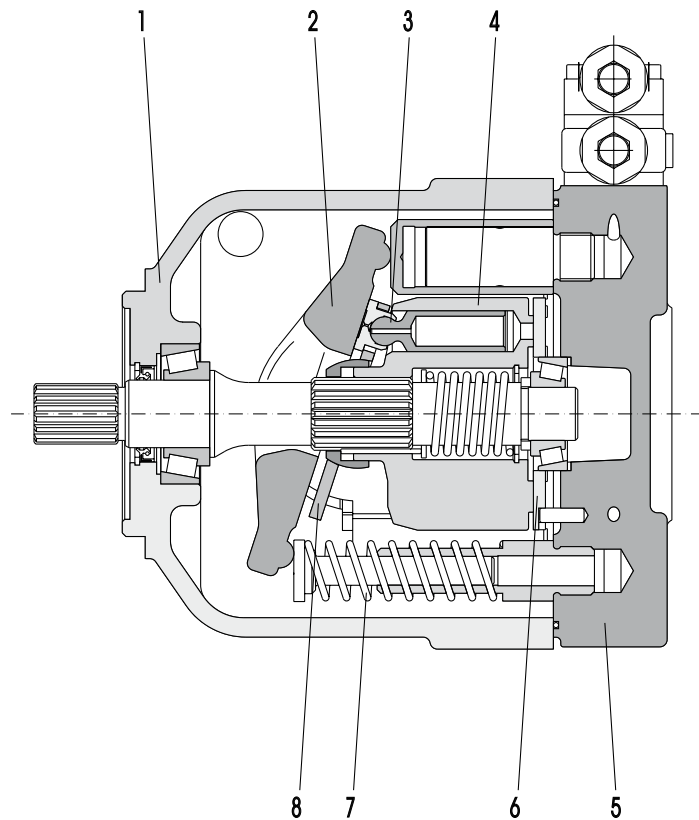
Medium, high pressure

### SECTOR

Mobile/Industrial

### TYPICAL APPLICATIONS

- Wheel Loaders-Backhoe Loaders
- Midi-Excavators
- Asphalt Pavers
- Telehandlers
- Windmills-Green Energy
- Hydraulic Presses
- Hydraulic Power Units
- Injection Molding Machines



1	Pump body
2	Swash plate
3	Piston
4	Cylinders block
5	Cover
6	Valve plate
7	Counterbalancing spring
8	Piston guide plate

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- Energy savings
- Low noise emission
- Operational flexibility
- Wide range of controls
- Short response time
- Drive shaft bearing suitable for radial and axial loads

## GENERAL INFORMATION / INSTRUCTIONS

### DIRECTION OF ROTATION

Clockwise or anti-clockwise defined looking at the drive shaft.

### HYDRAULIC FLUID

Mineral oil based hydraulic fluid conforming to DIN 51524, fire resistant fluids and biodegradable fluids according to the technical data shown in the tables at pages 4 ÷ 6. The system should be designed to prevent aeration of the hydraulic fluid.

### FLUID VISCOSITY

The fluid viscosity range for optimal use of LVP pump is between 15 and 35 cSt (77 and 163 SSU).

Functional limit conditions are:

max.: 1500 cSt (6818 SSU) at start up at -25 °C (-13 °F) with straight and short inlet line.

min.: 10 mm<sup>2</sup>/s (58 SSU) at maximum temperature of 110 °C (230 °F)

### FILTRATION

To ensure the optimal performance and the maximum life to the pump, the hydraulic fluid must have and maintain a fluid contamination within the values shown in the table below.

Working pressure bar (psi)	$\Delta p < 140$ (2030)	$140 < \Delta p < 210$ (2030) (3045)	$\Delta p > 210$ (3045)
Contamination class NAS 1638	9	8	7
Contamination class ISO 4406:1999	20/18/15	19/17/14	18/16/13
Achieved with filter $B_{x(e)} \geq 75$ according to ISO 16889	10 $\mu$ m	10 $\mu$ m	10 $\mu$ m

Casappa recommends to use its own production filters:



### INSTALLATION

Check that the maximum coupling eccentricity stays within 0,25 mm (0.0098 in) to reduce shaft loads due to misalignment. It is advised to use a flexible coupling suitable to absorb eventual rotational shocks. For applications with axial and radial loads exceeding published standards, consult our sales department. The direction of rotation of the pump must agree with the prime mover rotation. Before installation, the case of the pump must be filled with fluid.

### LINES

The lines must have a major diameter which is at least as large as the diameter of pump ports, and must be perfectly sealed.

To reduce loss of power, the lines should be as short as possible, reducing the sources of hydraulic resistance (elbow, throttling, gate valves, etc.) to a minimum. A length of flexible tubing is recommended to reduce the transmission of vibrations.

Before connecting the lines, remove any plug and make sure that the lines are perfectly clean. Check that the drain line is dimensioned in a way to guarantee a case pressure lower than 1,5 bar (22 psi) absolute. The drain line must be connected directly (no filter, no valves, no oil cooler) to the tank and must terminate below the oil level. Check that the dimensions of the suction line guarantee a pressure equal or superior to 0,8 bar (24 in Hg). Inlet pressure less than 0,8 bar (24 in Hg) could cause an increase of noise emission, the decrease of the pump performances and a reduction of its life expectancy.

### STARTING UP

Check that all connections are secure and that the entire system is completely clean. Add oil to the tank always using a filter. Bleed the air from the circuit to help the filling. Turn on the system for a few moments at minimum speed, then bleed the circuit again and check the level of oil in the tank. Gradually increase the pressure and speed of rotation up to the pre-set operating levels, which must stay within the stated limits as specified in the catalogue.

### FOR VERY LOW TEMPERATURE

#### STORAGE

No problem in case of temperature down to -40°C (-40°F). Below -40°C (-40°F) please consult our technical-sales department.

#### STARTING UP

We strongly recommend to warm up the oil before running the machine. If this is not possible, the warm up of the oil and of the pump should be carried out following these instructions:

- Start the pump in stand-by condition at minimum speed. Keep this working condition until the pump case reaches -20°C (-4°F)
- Increase slowly the displacement. Max pressure permitted: 50 bar (725 psi). The maximum permitted speed is strictly connected to the layout of the inlet circuit; check that there is no cavitation before increasing the speed.
- Keep this working condition until the oil temperature in the whole system is -10°C (14°F).
- Maximum pressure can be achieved from now on.
- Always check the outlet flow to prevent cavitation damage.

All the temperature are referred to oil with viscosity ISO VG 32 according to DIN 51 519.

#### SUGGESTIONS

To prevent cavitation at low temperature we suggest:

- To warm up the tank
- To pressurize the tank
- To oversize the inlet hose

Replaces: 03/01.2007

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## MOUNTING POSITIONS

Standard pump is supplied with the D2 drain hole open and D1 plugged.

Before installation fill the pump with hydraulic oil for at least 3/4 of the volume keeping it in horizontal position.

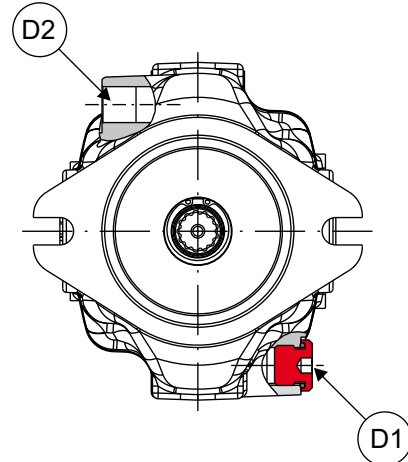
The pump can be mounted in a horizontal or vertical position. The highest of the case drain ports must be used to keep the required filling oil.

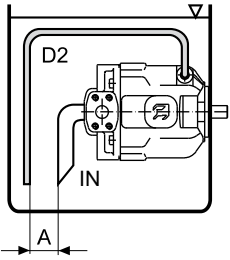
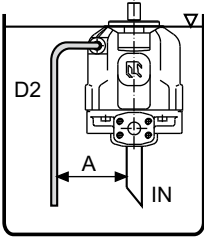
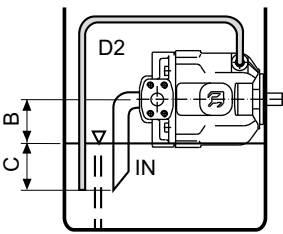
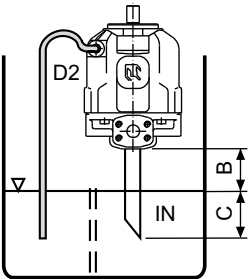
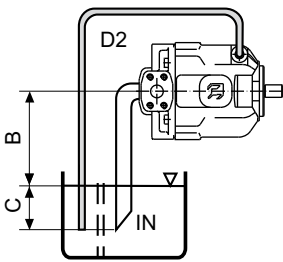
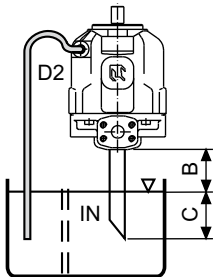
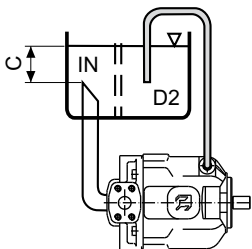
If D2 is not the highest drain port it must be closed by moving the plug from D1 hole chosen for the drain line.

The pump can be located above the oil level if the absolute pressure at the inlet port stays within the stated limits.

With exception of pump mounted below the oil level, we recommend to interpose a baffle plate between inlet and drain line.

To reduce further noise emission, we recommend to mount the pump below the oil level and avoid suction lines with sharp restrictions.



HORIZONTAL MOUNTING		VERTICAL MOUNTING	
	<p><b>Arrangement inside the tank.</b></p> <p>Minimum oil level equal or above the pump mounting face.</p> <p><math>A \geq 200 \text{ mm (7.874 in)}</math></p>		<p><b>Arrangement inside the tank.</b></p> <p>Minimum oil level equal or above the pump mounting face.</p> <p><math>A \geq 200 \text{ mm (7.874 in)}</math></p>
	<p><b>Arrangement inside the tank.</b></p> <p>Minimum oil level below the pump mounting face.</p> <p>Min. inlet pressure= 0,8 bar abs (24 in Hg)</p> <p><math>B \leq 800 \text{ mm (31.4961 in)}</math></p> <p><math>C = 200 \text{ mm (7.874 in)}</math></p>		<p><b>Arrangement inside the tank.</b></p> <p>Minimum oil level below the pump mounting face.</p> <p>Min. inlet pressure= 0,8 bar abs (24 in Hg)</p> <p><math>B \leq 800 \text{ mm (31.4961 in)}</math></p> <p><math>C = 200 \text{ mm (7.874 in)}</math></p>
	<p><b>Arrangement outside the tank above oil level.</b></p> <p>Min. inlet pressure= 0,8 bar abs (24 in Hg)</p> <p><math>B \leq 800 \text{ mm (31.4961 in)}</math></p> <p><math>C = 200 \text{ mm (7.874 in)}</math></p>		<p><b>Arrangement outside the tank above oil level.</b></p> <p>Min. inlet pressure= 0,8 bar abs (24 in Hg)</p> <p><math>B \leq 800 \text{ mm (31.4961 in)}</math></p> <p><math>C = 200 \text{ mm (7.874 in)}</math></p>
	<p><b>Arrangement outside the tank below oil level.</b></p> <p><math>C = 200 \text{ mm (7.874 in)}</math></p>		

03/01.2007

IN= inlet line - D1= drain line - A= min. distance between the line - B+C= permissible suction height - C= line immersion depth

## TECHNICAL DATA

### Technical data with mineral oil



HL or HLP mineral oil based hydraulic fluid to DIN 51524

Pump type			LVP 30	LVP 48	LVP 75	LVP 90
Max. displacement (theor.) $V_{max}$	cm <sup>3</sup> /rev (in <sup>3</sup> /rev)		28,7 (1.75)	45,4 (2.77)	73,6 (4.49)	87,9 (5.36)
Inlet pressure	bar abs. (in Hg)	min.	0.8 (24)			
	bar abs. (psi)	max.	25 (363)			
Max. outlet pressure $p_{max}$	bar (psi)	continuous	280 (4060)	280 (4060)	280 (4060)	250 (3625)
		intermittent	315 (4568)	315 (4568)	315 (4568)	280 (4060)
		peak	350 (5075)	350 (5075)	350 (5075)	315 (4568)
Max. drain line pressure	bar abs. (psi)		1,5 (22)			
Min. speed (recommended)	min <sup>-1</sup>		500			
Max. speed $n_{max}$	min <sup>-1</sup>	@ $V_{max}$ (1)	3000	2600	2600	2200
		@ $n_{max}$	86,1 (22.75)	118,04 (31.19)	191,36 (50.56)	193,4 (51.10)
Max. delivery (theor.)	l/min (US gpm)	@ 1800 min <sup>-1</sup>	51,7 (13.66)	81,7 (21.59)	132,5 (35.01)	158,2 (41.80)
		@ 1500 min <sup>-1</sup>	43,1 (11.39)	68,1 (17.99)	110,4 (29.17)	131,9 (34.85)
		@ $n_{max}$	40,2 (53.9)	55,1 (73.8)	89,3 (119.7)	80,6 (108.0)
Max. power (theor.) ( $\Delta p = p_{max}$ cont.)	kW (HP)	@ 1800 min <sup>-1</sup>	24,1 (32.3)	38,1 (51.1)	61,8 (82.8)	65,9 (88.3)
		@ 1500 min <sup>-1</sup>	20,1 (26.9)	31,8 (42.6)	51,5 (69.0)	54,9 (73.6)
		@ $p_{max}$ cont.	127,9 (1132)	202,3 (1791)	328,0 (2903)	349,8 (3096)
Max. torque (theor.)	Nm (lbf in)	@ 100 bar (1450 psi)	45,7 (404)	72,3 (640)	117,1 (1036)	139,9 (1238)
			0,0020 (0.05)	0,0030 (0.07)	0,0080 (0.19)	0,0080 (0.19)
Moment of inertia	kgm <sup>2</sup> (ft <sup>2</sup> lbs)					
Fill volume	l (US gallons)		0,7 (0.18)	0,9 (0.24)	1,5 (0.40)	1,5 (0.40)
Mass (without oil)	kg (lbs)		18 (39.69)	24 (52.92)	33 (72.77)	33 (72.77)
Seals			N= Buna		V= Viton	
		min.	-25 (-13)		-15 (5)	
Operating temperature	°C (°F)	max. cont.	80 (176)		110 (230)	
		max. peak	100 (212)		125 (257)	

Replaces: 03/01.2007

04/04.2013

(1) = with an inlet pressure of 1 bar abs (14.5 psi).

Reducing the displacement or increasing the inlet pressure the max. speed change. See table at page 7.

For different working conditions, please consult our technical sales department.

## TECHNICAL DATA

### Technical data restrictions with fire resistant fluid



(1) = with an inlet pressure of 1 bar abs (14.5 psi).

#### HFA - Oil emulsion in water (5 ÷ 15 % of oil)

Pump type			LVP 30	LVP 48	LVP 75	LVP 90
Max. outlet pressure $p_{max}$	bar (psi)	continuous			140 (2030)	
		intermittent			150 (2175)	
		peak			160 (2320)	
Max. speed $n_{max}$	$min^{-1}$	@ $V_{max}$ (1)	1900	1700	1600	1450
Seals					N= Buna	
Operating temperature	$^{\circ}C$ ( $^{\circ}F$ )	min.			2 (36)	
		max.			55 (131)	
Bearing life (ref. mineral oil)	%				20 %	

#### HFB - Water emulsion in oil (40 % of water)

Pump type			LVP 30	LVP 48	LVP 75	LVP 90
Max. outlet pressure $p_{max}$	bar (psi)	continuous			160 (2320)	
		intermittent			170 (2465)	
		peak			180 (2610)	
Max. speed $n_{max}$	$min^{-1}$	@ $V_{max}$ (1)	2050	1850	1700	1550
Seals					N= Buna	
Operating temperature	$^{\circ}C$ ( $^{\circ}F$ )	min.			2 (36)	
		max.			60 (140)	
Bearing life (ref. mineral oil)	%				40 %	

#### HFC - Water-glycol (35 ÷ 55 % of water)

Pump type			LVP 30	LVP 48	LVP 75	LVP 90
Max. outlet pressure $p_{max}$	bar (psi)	continuous			180 (2610)	
		intermittent			195 (2828)	
		peak			210 (3045)	
Max. speed $n_{max}$	$min^{-1}$	@ $V_{max}$ (1)	2050	1850	1700	1550
Seals					N= Buna	
Operating temperature	$^{\circ}C$ ( $^{\circ}F$ )	min.			-10 (14)	
		max.			60 (140)	
Bearing life (ref. mineral oil)	%				40 %	

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## TECHNICAL DATA

### Technical data restrictions with fire resistant fluid



(1) = with an inlet pressure of 1 bar abs (14.5 psi).

#### HFD - Phosphate ester

Pump type			LVP 30	LVP 48	LVP 75	LVP 90
Max. outlet pressure $p_{max}$	bar (psi)	continuous			200 (2900)	
		intermittent			220 (3190)	
		peak			240 (3480)	
Max. speed $n_{max}$	$min^{-1}$	@ $V_{max}$ (1)	2050	1850	1700	1550
Seals					V= Viton	
Operating temperature	$^{\circ}C$ ( $^{\circ}F$ )	min.			-10 (14)	
		max.			80 (176)	
Bearing life (ref. mineral oil)	%				90 %	

### Technical data restrictions with biodegradable fluids



#### HETG - Natural based fluid (the water content must never exceed 0,1 %)

Pump type			LVP 30	LVP 48	LVP 75	LVP 90
Max. outlet pressure $p_{max}$	bar (psi)	continuous			180 (2610)	
		intermittent			195 (2828)	
		peak			210 (3045)	
Max. speed $n_{max}$	$min^{-1}$	@ $V_{max}$ (1)	2050	1850	1700	1550
Seals					N= Buna	
Operating temperature	$^{\circ}C$ ( $^{\circ}F$ )	min.			-10 (14)	
		max.			60 (140)	
Bearing life (ref. mineral oil)	%				50 %	

#### HEPG - Polyglycol based synthetic fluid (the water content must never exceed 0,1 %)

Pump type			LVP 30	LVP 48	LVP 75	LVP 90
Max. outlet pressure $p_{max}$	bar (psi)	continuous			180 (2610)	
		intermittent			195 (2828)	
		peak			210 (3045)	
Max. speed $n_{max}$	$min^{-1}$	@ $V_{max}$ (1)	2050	1850	1700	1550
Seals					V= Viton	
Operating temperature	$^{\circ}C$ ( $^{\circ}F$ )	min.			-15 (5)	
		max.			90 (194)	
Bearing life (ref. mineral oil)	%				75 %	

#### HEES - Synthetic esters (the water content must never exceed 0,1 %)

Pump type			LVP 30	LVP 48	LVP 75	LVP 90
Seals					V= Viton	
Operating temperature	$^{\circ}C$ ( $^{\circ}F$ )	min.			-15 (5)	
		max.			80 (176)	
Bearing life (ref. mineral oil)	%				100 %	

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## TECHNICAL DATA

### Design calculations for pump

Replaces: 03/01.2007

<b>Q</b>	l/min (US gpm)	Flow
<b>M</b>	Nm (lbf in)	Torque
<b>P</b>	kW (HP)	Power
<b>V</b>	cm <sup>3</sup> /rev (in <sup>3</sup> /rev)	Displacement
<b>n</b>	min <sup>-1</sup>	Speed
<b>Δp</b>	bar (psi)	Pressure
$\eta_v = \eta_v(V, \Delta p, n)$		Volumetric efficiency
$\eta_{hm} = \eta_{hm}(V, \Delta p, n)$		Hydro-mechanical efficiency
$\eta_t = \eta_v \cdot \eta_{hm}$		Overall efficiency

**O**

$$Q = Q_{theor.} \cdot \eta_v$$

$$Q_{theor.} = \frac{V \text{ (cm}^3\text{/rev)} \cdot n \text{ (min}^{-1}\text{)}}{1000} \quad [\text{l/min}]$$

$$M = \frac{M_{theor.}}{\eta_{hm}}$$

$$M_{theor.} = \frac{\Delta p \text{ (bar)} \cdot V \text{ (cm}^3\text{/rev)}}{62,83} \quad [\text{Nm}]$$

$$P_{IN} = \frac{P_{OUT}}{\eta_t}$$

$$P_{OUT} = \frac{\Delta p \text{ (bar)} \cdot Q \text{ (l/min)}}{600} \quad [\text{kW}]$$

### Max. permissible load on drive shaft

Pump type		LVP 30	LVP 48	LVP 75	LVP 90	
	$F_{ax}$ Axial force	N (lbf)	1000 (225)	1500 (337)	2000 (450)	2000 (450)
	$F_{rad}$ Radial force	@ L/2 N (lbf)	1500 (337)	1500 (337)	3000 (675)	3000 (675)

### % Variation of the max. speed in relation of the inlet pressure and/or displacement reduction

**O** 04/04.2013

Inlet pressure bar ass. (psi)	Displacement %					% Variation of the max. speed
	65	70	80	90	100	
0,8 (12)	120	115	105	97	90	
0,9 (13)	120	120	110	103	95	
1,0 (14,5)	120	120	115	107	100	
1,2 (17)	120	120	120	113	106	
1,4 (20)	120	120	120	120	112	
1,6 (23)	120	120	120	120	117	
2,0 (29)	120	120	120	120	120	

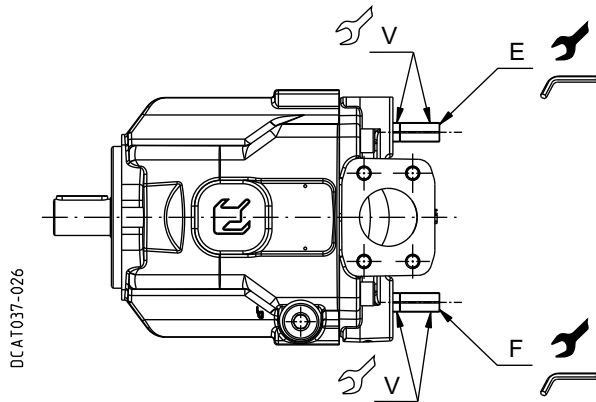
#### Example 1

Displacement: 100 %  
 Speed: 100 %  
 Inlet pressure: 1,0 bar abs. (14.5 psi)

#### Example 2

Displacement: 80 %  
 Inlet pressure: 1,0 bar abs. (14.5 psi)  
 Speed: 115 %

## DISPLACEMENT SETTING

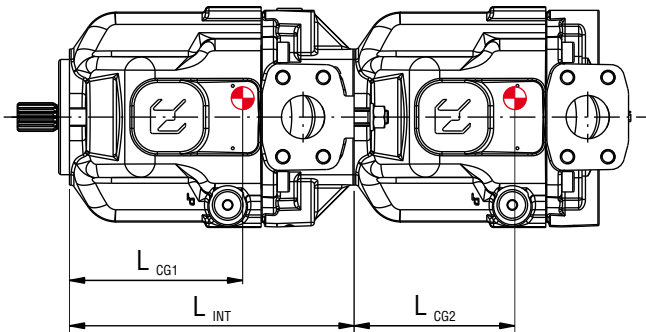


**E:** Max. displacement limiter  
**F:** Min. displacement limiter  
**G:** Min. and Max. displacement limiter

			LVP 30	LVP 48	LVP 75	LVP 90
Max. displacement setting range	cm <sup>3</sup> /rev (in <sup>3</sup> /rev)	from	20,1 (1.23)	31,8 (1.94)	36,8 (2.24)	44,0 (2.68)
		to	28,7 (1.75)	45,4 (2.77)	73,6 (4.49)	87,9 (5.36)
Min. displacement setting range	cm <sup>3</sup> /rev (in <sup>3</sup> /rev)	from	0	0	0	0
		to	7,2 (0.44)	4,5 (0.27)	36,8 (2.24)	44,0 (2.68)
One turn of screw changes pump displacement by approximately	cm <sup>3</sup> /rev (in <sup>3</sup> /rev)	E				
		F	1,5 (0.09)	2,2 (0.13)	3,2 (0.20)	3,2 (0.20)
			14	14	17	17
			4	4	5	5
Tightening torque	Nm (lbf in)	V	15 ±1 (124 ÷ 142)	15 ±1 (124 ÷ 142)	15 ±1 (124 ÷ 142)	15 ±1 (124 ÷ 142)

Setting ranges with standard limiter. For different setting ranges, please consult our technical sales department.

## CENTER OF GRAVITY



Center of gravity

$$M_{MF} = \frac{L_{CG1} \cdot m_1 + (L_{INT} + L_{CG2}) \cdot m_2}{102} \quad [\text{Nm}]$$

$M_{MF}$ : Load moment on mounting flange

$L_{CG}$ : Distance from center of gravity to mounting flange [mm]

$m$ : Weight (kg)

		LVP 30	LVP 48	LVP 75	LVP 90
$L_{CG1}$	mm (in)	110 (4.3307)	130 (5.1181)	145 (5.7087)	145 (5.7087)
$L_{CG2}$	mm (in)	102 (4.0157)	118 (4.6457)	125 (4.9213)	125 (4.9213)
$L_{INT}$	mm (in)	values at page 41			

For single pumps refer to ori  $L_{CG2}$  values

Values shown in the table are indicative only. For real values please consult our technical sales department.

04/04.2013

**LVP 30**

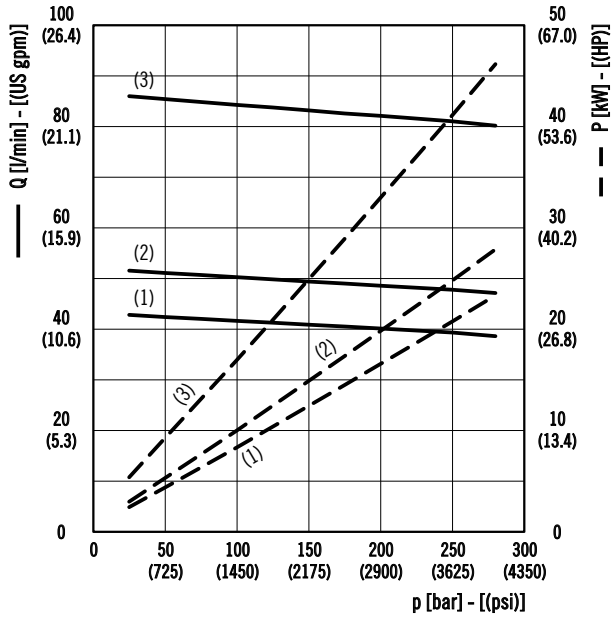
**OPERATING CURVES**

Each curve has been obtained at 50 °C (122 °F), using oil with viscosity 46 cSt (210 SSU) at 40 °C (104 °F) and at these speed: (1) 1500 min<sup>-1</sup>, (2) 1800 min<sup>-1</sup>, (3) 3000 min<sup>-1</sup>

Replaces: 03/01.2007

**Delivery / power**

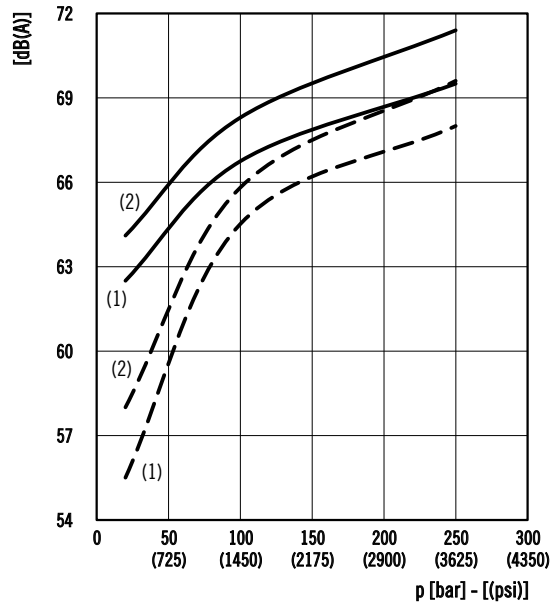
@ max. displacement



**Noise level**

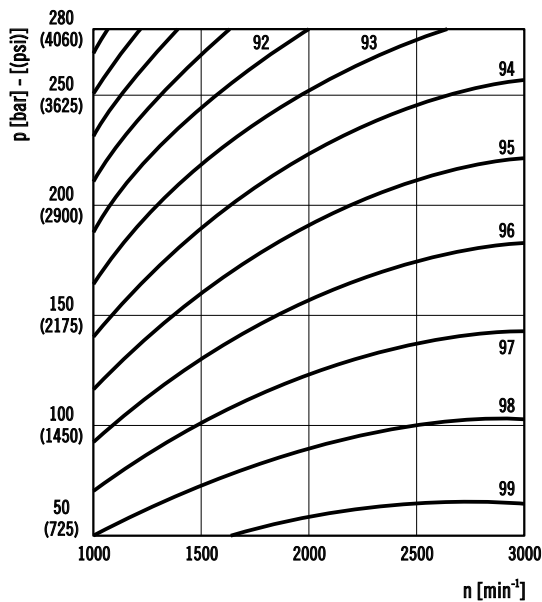
Distance from microphone to pump = 1 m (39.37 in)

— @ max. displacement    - - - @ min. displacement



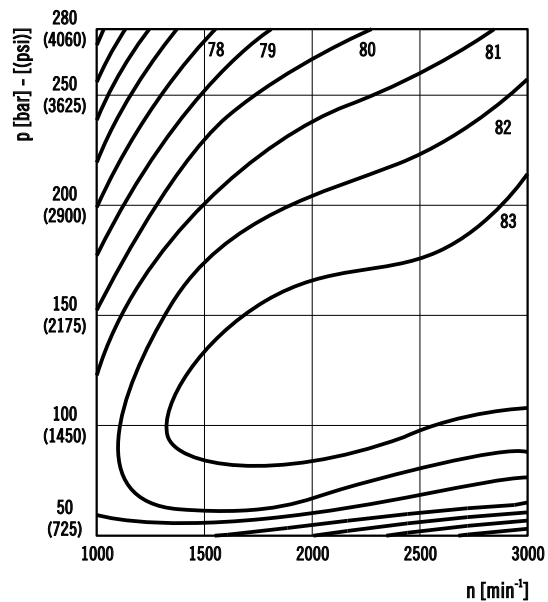
**Volumetric efficiency**

@ max. displacement



**Overall efficiency**

@ max. displacement



04/04.2013

Values shown in the diagrams are indicative only. Actual values may vary depending on the pump configuration.

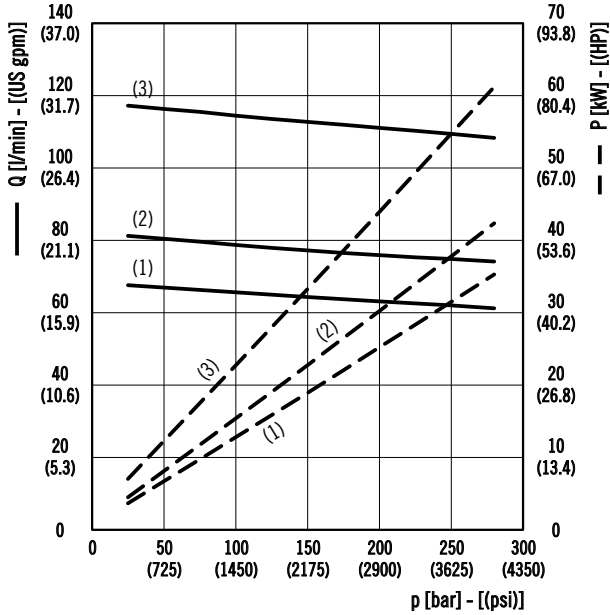
**LVP 48**

**OPERATING CURVES**

Each curve has been obtained at 50 °C (122 °F), using oil with viscosity 46 cSt (210 SSU) at 40 °C (104 °F) and at these speed: (1) 1500 min<sup>-1</sup>, (2) 1800 min<sup>-1</sup>, (3) 2600 min<sup>-1</sup>

**Delivery / power**

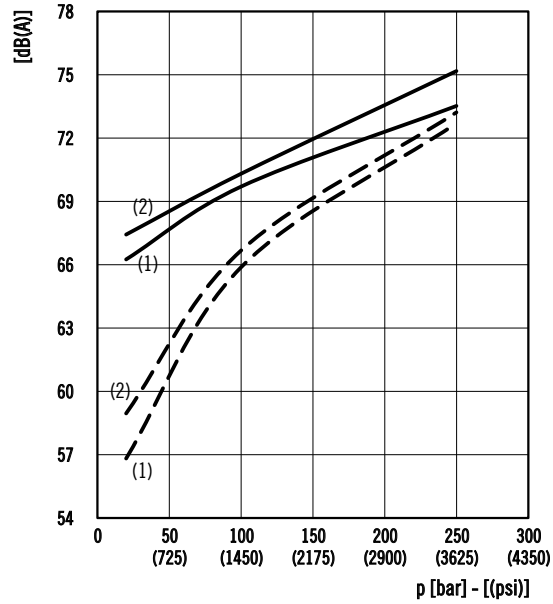
@ max. displacement



**Noise level**

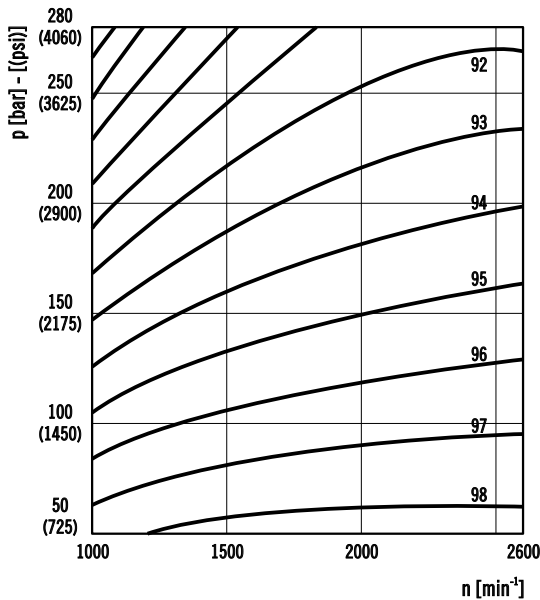
Distance from microphone to pump = 1 m (39.37 in)

— @ max. displacement - - - @ min. displacement



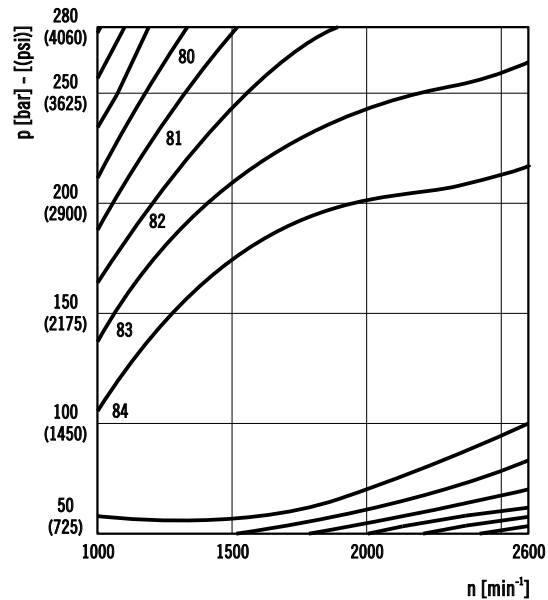
**Volumetric efficiency**

@ cilindrata max.



**Overall efficiency**

@ cilindrata max.



Replaces: 03/01.2007

04/04.2013

Values shown in the diagrams are indicative only. Actual values may vary depending on the pump configuration.

**LVP 75**

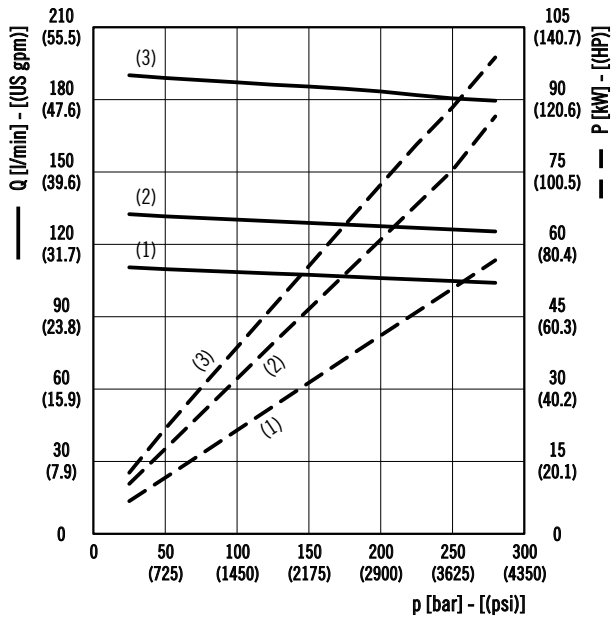
**OPERATING CURVES**

Each curve has been obtained at 50 °C (122 °F), using oil with viscosity 46 cSt (210 SSU) at 40 °C (104 °F) and at these speed: (1) 1500 min<sup>-1</sup>, (2) 1800 min<sup>-1</sup>, (3) 2600 min<sup>-1</sup>

Replaces: 03/01.2007

**Delivery / power**

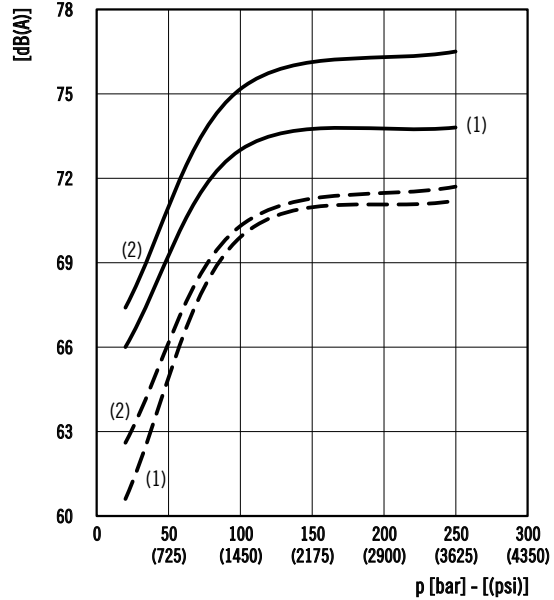
@ max. displacement



**Noise level**

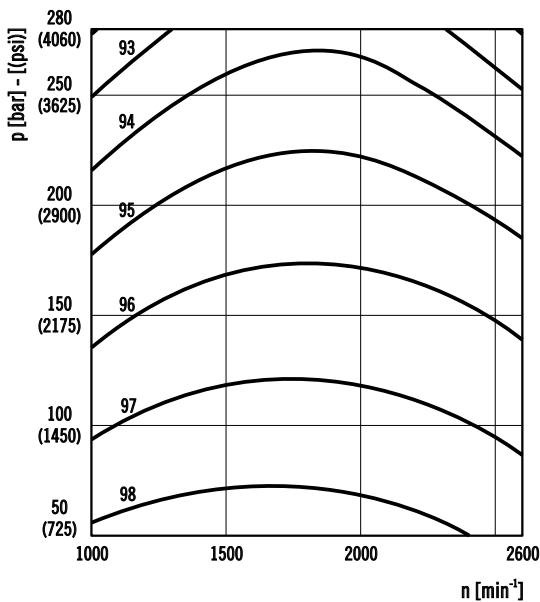
Distance from microphone to pump = 1 m (39.37 in)

— @ max. displacement    - - - @ min. displacement



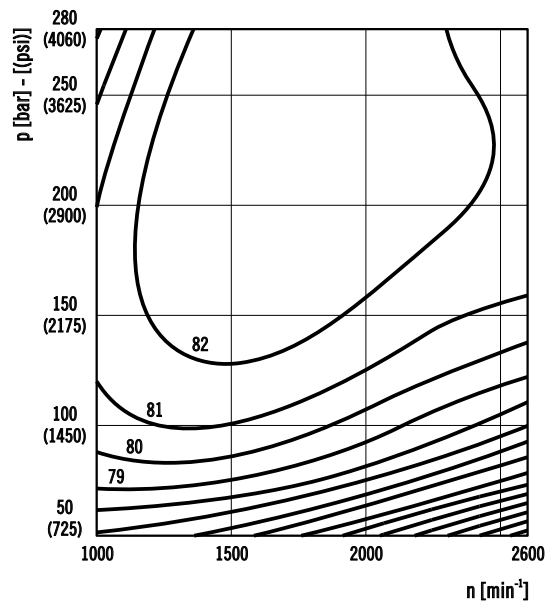
**Volumetric efficiency**

@ max. displacement



**Overall efficiency**

@ max. displacement



04/04.2013

Values shown in the diagrams are indicative only. Actual values may vary depending on the pump configuration.

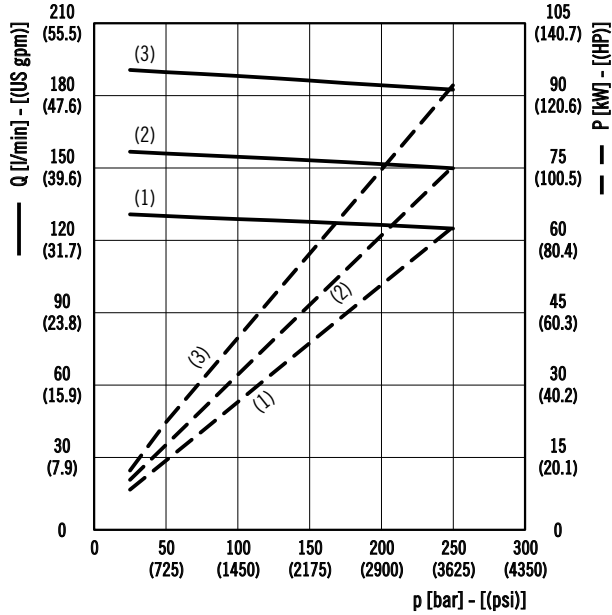
**LVP 90**

**OPERATING CURVES**

Each curve has been obtained at 50 °C (122 °F), using oil with viscosity 46 cSt (210 SSU) at 40 °C (104 °F) and at these speed: (1) 1500 min<sup>-1</sup>, (2) 1800 min<sup>-1</sup>, (3) 2200 min<sup>-1</sup>

**Delivery / power**

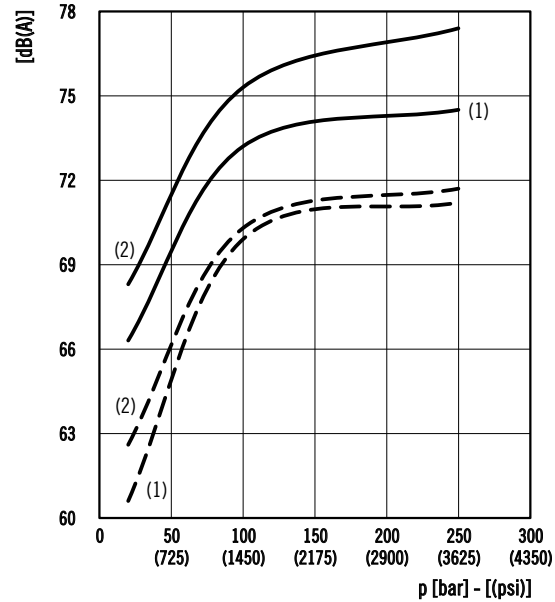
@ max. displacement



**Noise level**

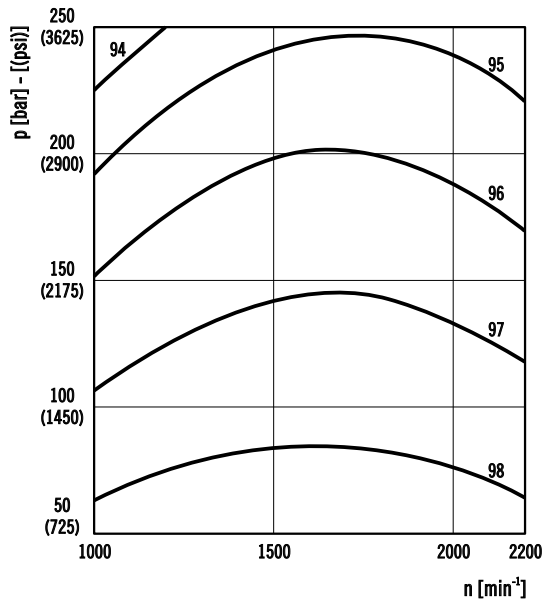
Distance from microphone to pump = 1 m (39.37 in)

— @ max. displacement - - - @ min. displacement



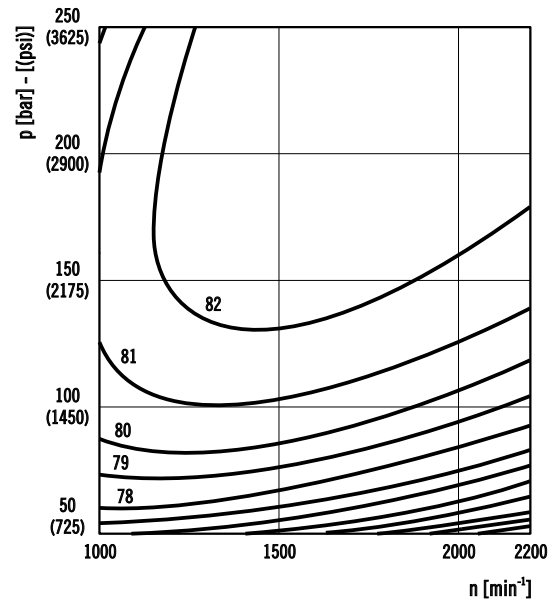
**Volumetric efficiency**

@ max. displacement



**Overall efficiency**

@ max. displacement

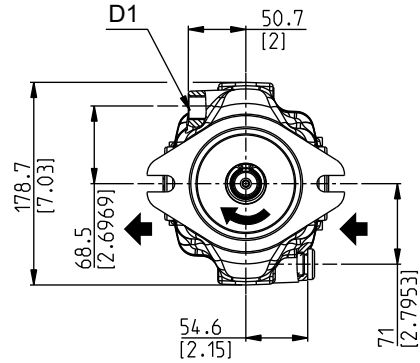
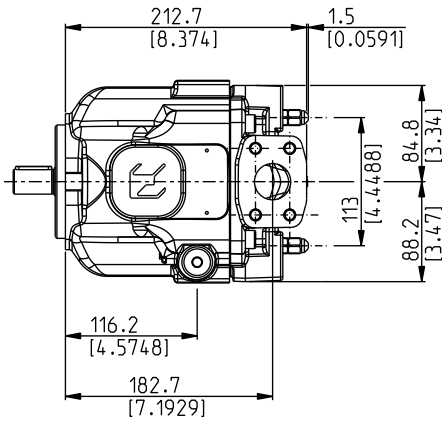


Replaces: 03/01.2007

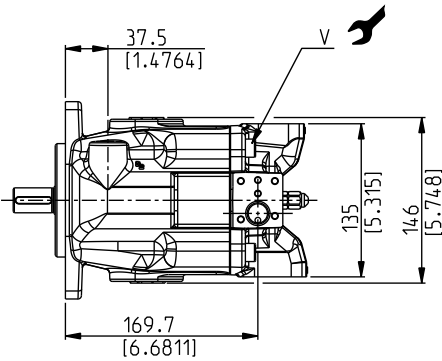
04/04.2013

Values shown in the diagrams are indicative only. Actual values may vary depending on the pump configuration.

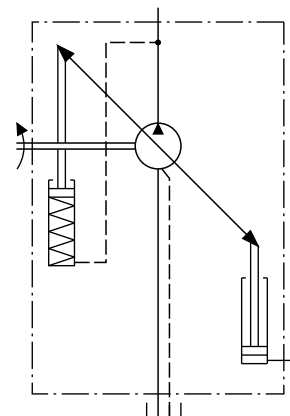
Replaces: 03/01.2007



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Drive shafts: page 19 ÷ 20  
Mounting flanges: page 21 ÷ 22



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Screws tightening torque Nm (lbf in)

<b>V</b>
70 ±7 (558 ÷ 682)

Ports (nominal size)

IN	OUT	D1, D2
SAE 3000	SAE 6000	
1" 1/4	3/4"	Drain port

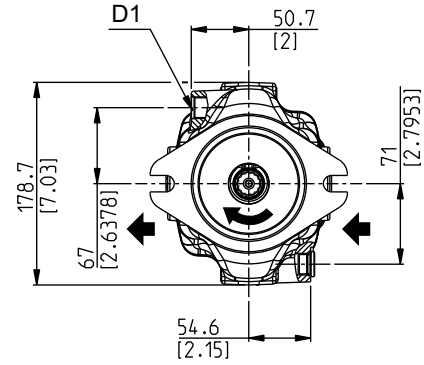
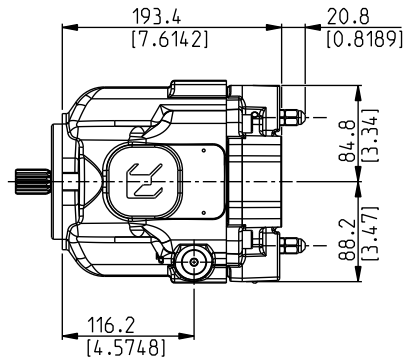
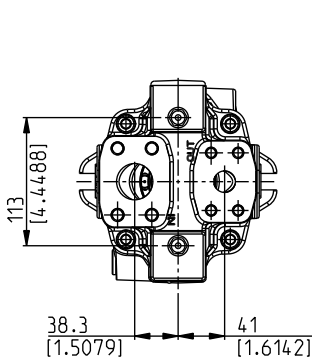
Dimensions at page 23 ÷ 25

**LVP 30**

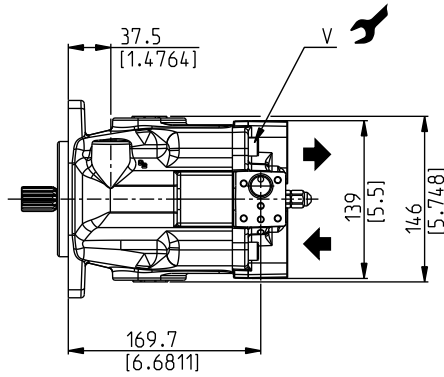
**REAR PORTS - DIMENSIONS**

**P**

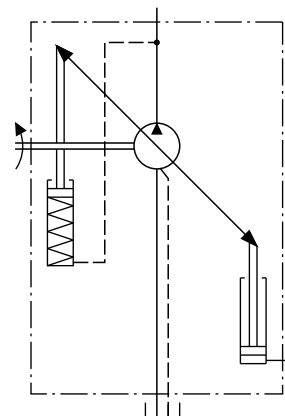
○



DCAT037-021



Drive shafts: page 19 ÷ 20  
Mounting flanges: page 21 ÷ 22



Replaces: 03/01.2007

○ 04/04.2013

Screws tightening torque Nm (lbf in)

<b>V</b>
70 ±7 (558 ÷ 682)

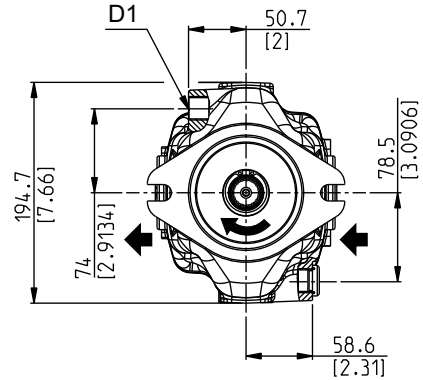
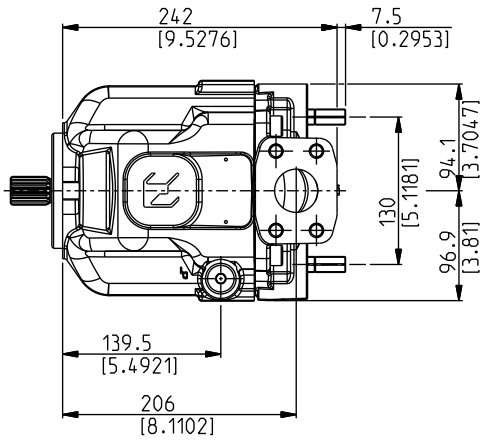
Ports (nominal size)

IN	OUT	D1, D2
SAE 3000	SAE 6000	
1" 1/4	3/4"	Drain port

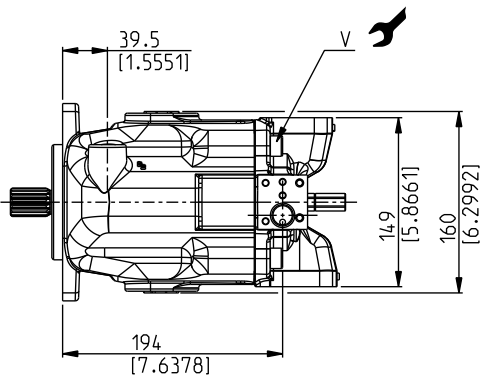
Dimensions at page 23 ÷ 25



Replaces: 03/01.2007

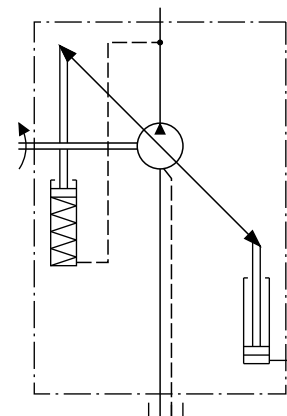


DCAT037-022



Drive shafts: page 19 ÷ 20  
Mounting flanges: page 21 ÷ 22

04/04.2013



Screws tightening torque Nm (lbf in)

V
100 ±10 (797 ÷ 974)

Ports (nominal size)

IN	OUT	D1, D2
SAE 3000	SAE 6000	
1" 1/2	1"	Drain port

Dimensions at page 23 ÷ 25

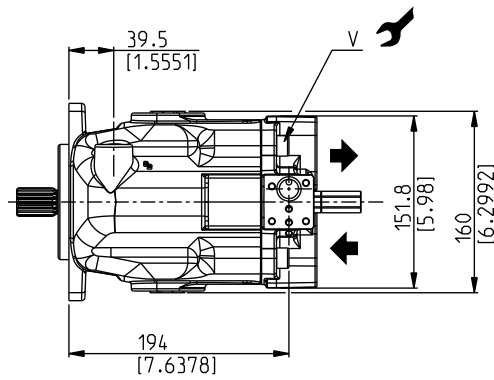
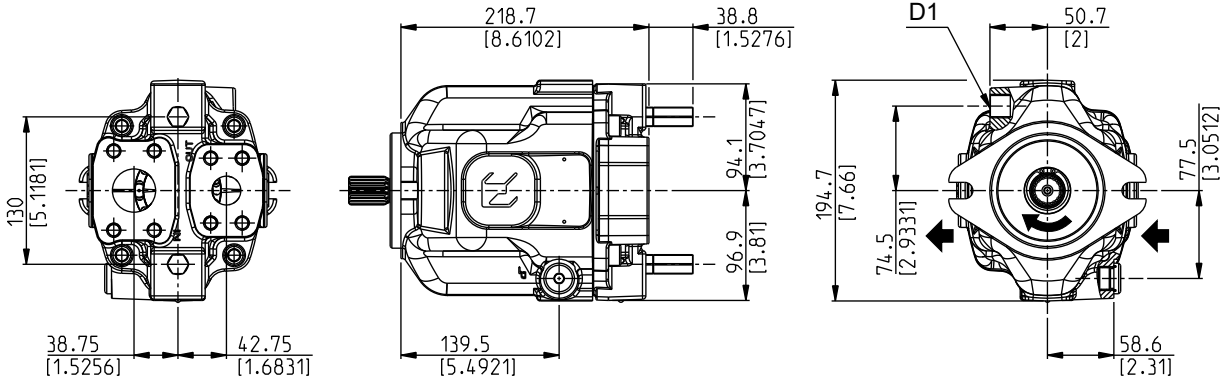
**LVP 48**

**REAR PORTS - DIMENSIONS**

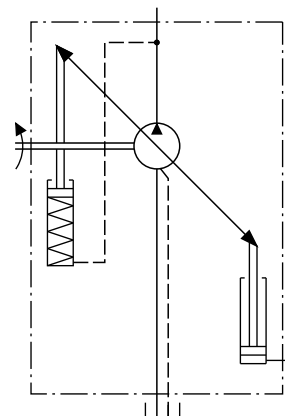
**P**

Replaces: 03/01.2007

○



Drive shafts: page 19 ÷ 20  
Mounting flanges: page 21 ÷ 22



DCAT037-023

○ 04/04.2013

Screws tightening torque Nm (lbf in)

V
100 ±10 (797 ÷ 974)

Ports (nominal size)

IN	OUT	D1, D2
SAE 3000	SAE 6000	
1" 1/2	1"	Drain port

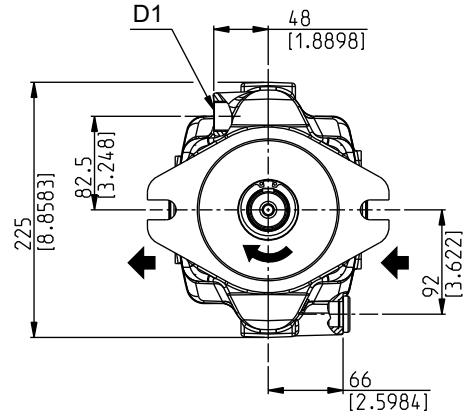
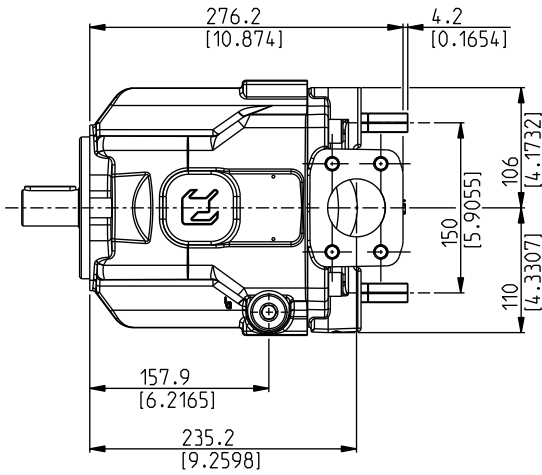
Dimensions at page 23 ÷ 25

**LVP 75-90**

**SIDE PORTS - DIMENSIONS**

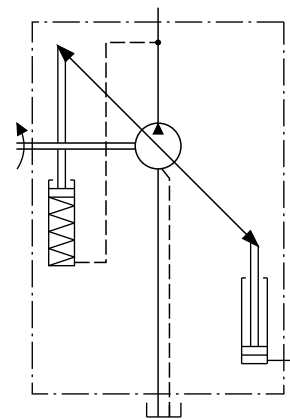
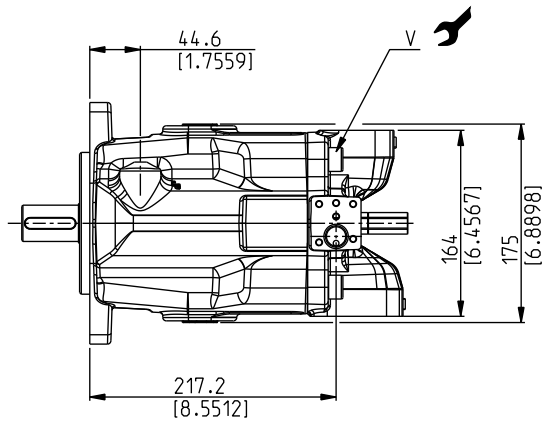
**L**

Replaces: 03/01.2007



Drive shafts: page 19 ÷ 20  
Mounting flanges: page 21 ÷ 22

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04/04.2013

Screws tightening torque Nm (lbf in)

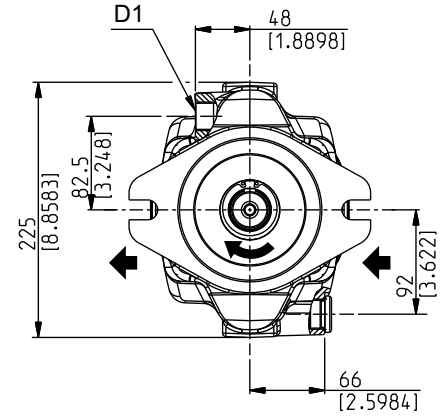
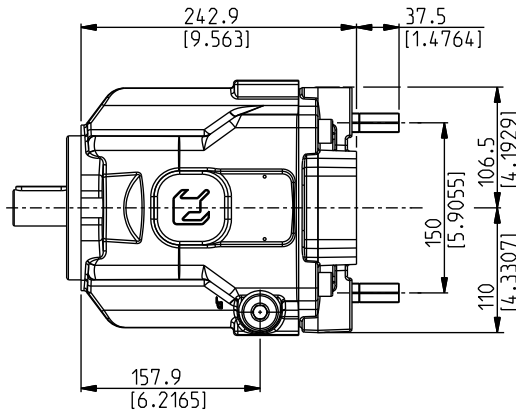
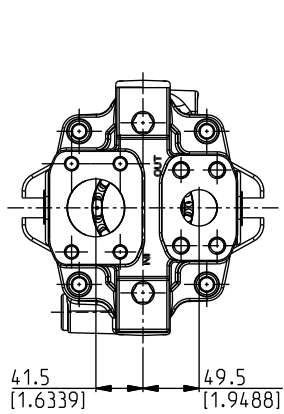
<b>V</b>
130 <sup>±13</sup>
(1036 ÷ 1266)

Ports (nominal size)

IN	OUT	D1, D2
SAE 3000	SAE 6000	
2"	1" 1/4	Drain port

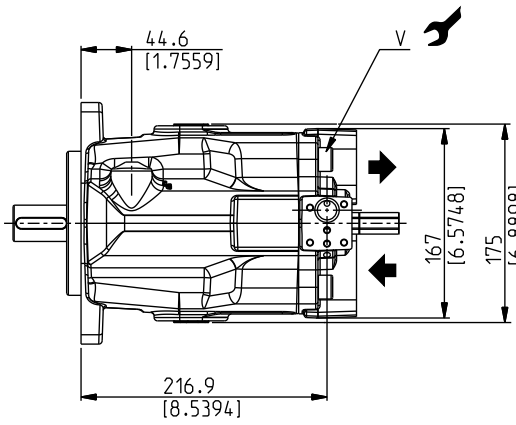
Dimensions at page 23 ÷ 25

○

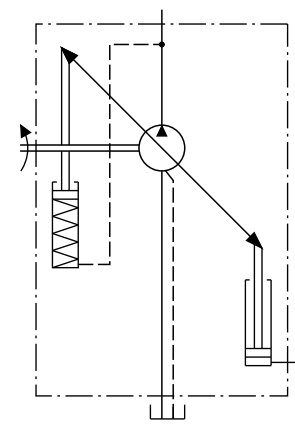


Replaces: 03/01.2007

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Drive shafts: page 19 ÷ 20  
Mounting flanges: page 21 ÷ 22



○ 04/04.2013

Screws tightening torque Nm (lbf in)
<b>V</b>
130 ±13 (1036 ÷ 1266)

Ports (nominal size)		
<b>IN</b>	<b>OUT</b>	<b>D1, D2</b>
SAE 3000	SAE 6000	
2"	1" 1/4	Drain port

Dimensions at page 23 ÷ 25

## DRIVE SHAFTS

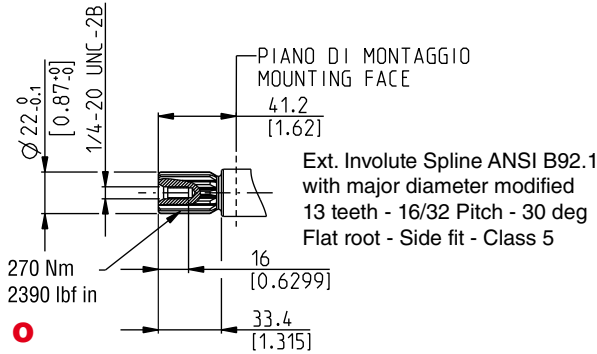
### SAE "B" SPLINE

04

Mounting face refers to flange code S5

Replaces: 03/01.2007

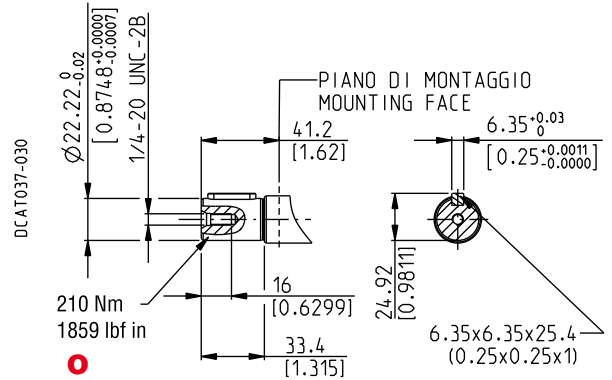
DCAT037-027



### SAE "B" STRAIGHT

32

Mounting face refers to flange code S5

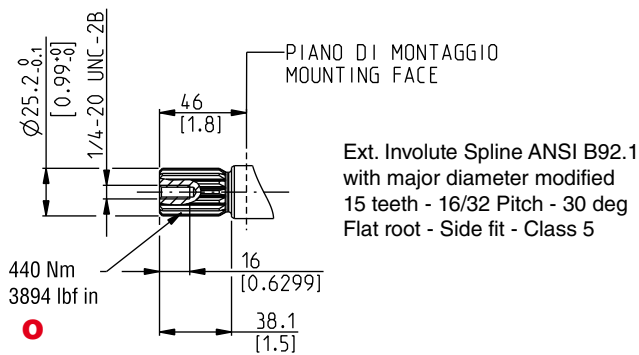


### SAE "BB" SPLINE

05

Mounting face refers to flange code S5

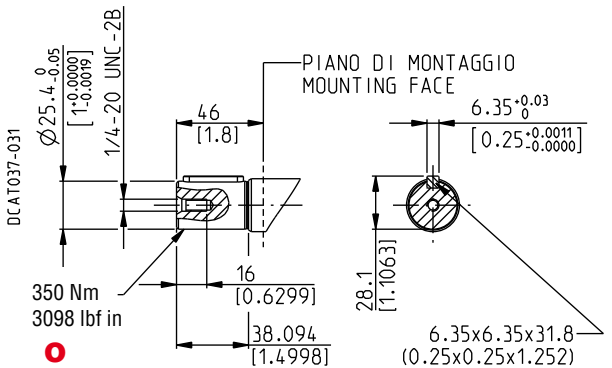
DCAT037-027



### SAE "BB" STRAIGHT

33

Mounting face refers to flange code S5



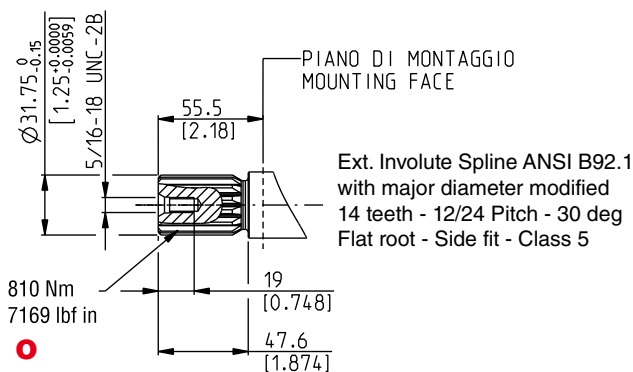
### SAE "C" SPLINE

06

Mounting face refers to flange code S7

04/04.2013

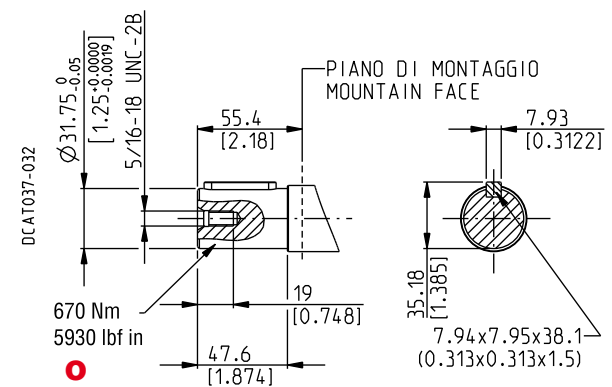
DCAT037-029



### SAE "C" STRAIGHT

34

Mounting face refers to flange code S7

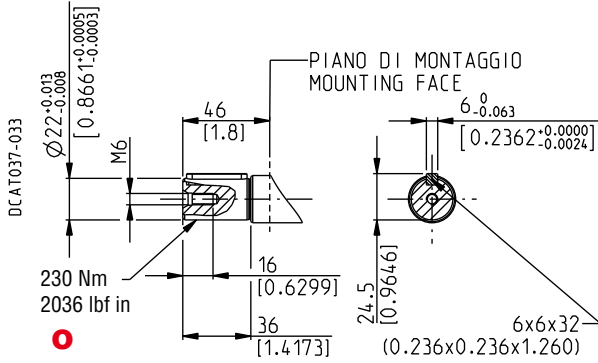


## DRIVE SHAFTS

### STRAIGHT Ø 22

68

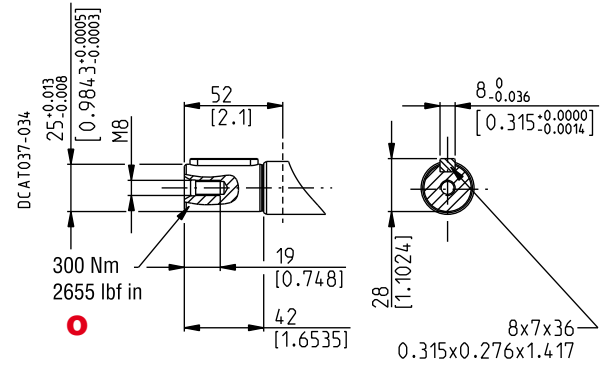
Mounting face refers to flange code Z1



### STRAIGHT Ø 25

69

Mounting face refers to flange code Z1

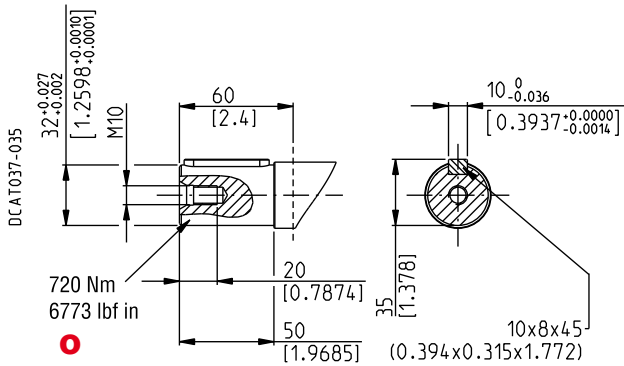


Replaces: 03/01.2007

### STRAIGHT Ø 32

70

Mounting face refers to flange code Z2



○ 04/04.2013

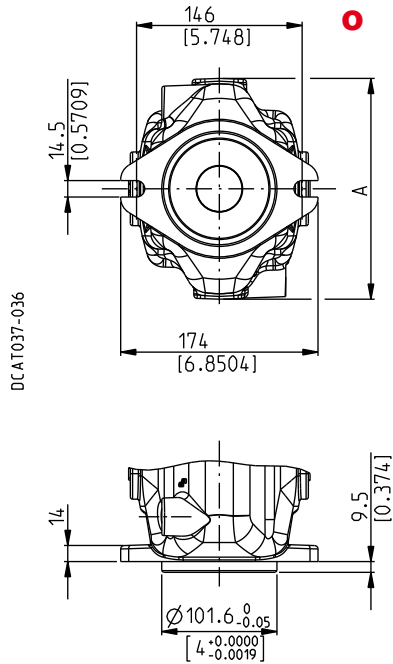
## MOUNTING FLANGES AND TABLE OF COMPATIBILITY

### SAE "B" 2 HOLES

**S5**

Conforms to SAE J744

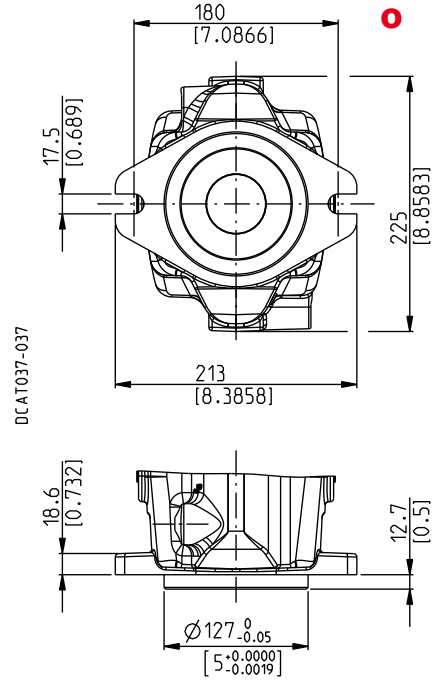
Replaces: 03/01.2007



### SAE "C" 2 HOLES

**S7**

Conforms to SAE J744



#### DRIVE SHAFTS

See page 19

Pump type	<b>○</b> A mm (in)	<b>04</b>	<b>32</b>	<b>05</b>	<b>33</b>
<b>LVP 30</b>	178,7 (7.03)	<b>X</b>	<b>X</b>		
<b>LVP 48</b>	194,7 (7.66)	<b>X</b>		<b>X</b>	<b>X</b>

X Available combination

#### DRIVE SHAFTS

See page 19

Pump type	<b>06</b>	<b>34</b>
<b>LVP 75</b>	<b>X</b>	<b>X</b>
<b>LVP 90</b>	<b>X</b>	<b>X</b>

X Available combination

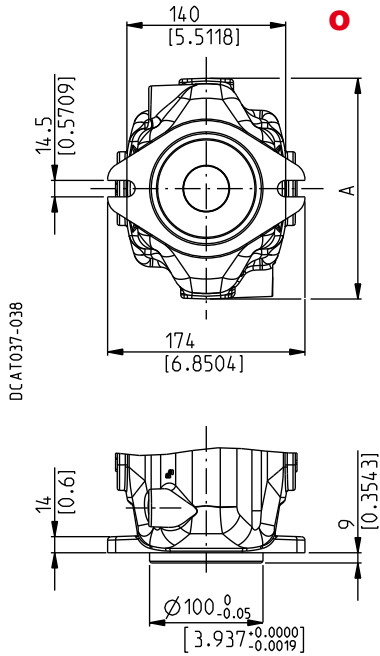
**○** 04/04.2013

## MOUNTING FLANGES AND TABLE OF COMPATIBILITY

### ISO Ø 100

**Z1**

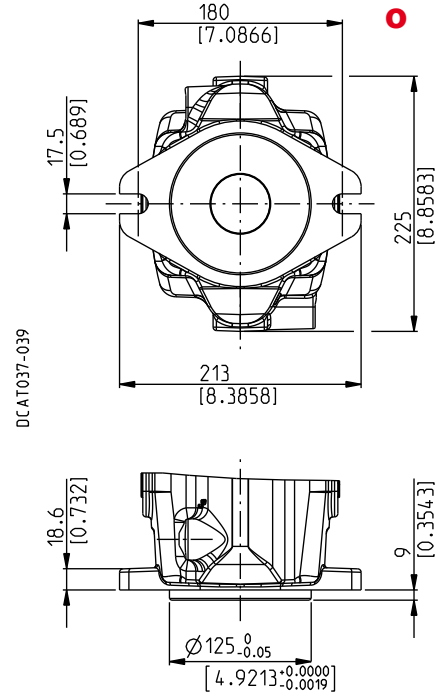
Conforms to ISO 3019/2



### ISO Ø 125

**Z2**

Conforms to ISO 3019/2



Replaces: 03/01.2007

#### DRIVE SHAFTS

See page 20

Pump type	<b>○</b> A mm (in)	<b>68</b>	<b>69</b>
<b>LVP 30</b>	178,7 (7.03)	<b>X</b>	
<b>LVP 48</b>	194,7 (7.66)		<b>X</b>

X Available combination

#### DRIVE SHAFTS

See page 20

Pump type	<b>70</b>
<b>LVP 75</b>	<b>X</b>
<b>LVP 90</b>	<b>X</b>

X Available combination

**○** 04/04.2013



## PORTS SIZES

Ports type	INLET / OUTLET PORTS				DRAIN PORTS		LOAD SENSING PORTS	
	Split SSM		Split SSS		Gas BSPP	SAE ODT (●)	Gas BSPP	SAE ODT (●)
	IN	OUT	IN	OUT	D1 - D2	D1 - D2	X	X
<b>LVP 30</b>	MD	QB	SD	VB	GD	OB	GA	03
<b>LVP 48</b>	ME	QC	SE	VC	GD	OC	GA	03
<b>LVP 75</b>	MF	QD	SF	VD	GE	OC	GA	03
<b>LVP 90</b> ○	MF	QD	SF	VD	GE	OC	GA	03

(●) Available only with inlet and outlet ports type Split SSS.

Tightening torque for low pressure side port

Tightening torque for high pressure side port [values obtained at 350 bar (5075 psi)]

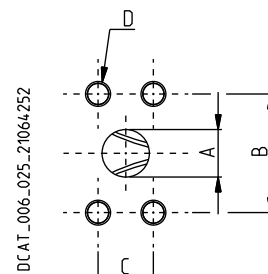
### SAE FLANGED PORTS J518

**SSM**

Metric thread ISO 60° conforms to ISO/R 262

#### INLET PORT - IN (SAE 3000 STANDARD PRESSURE)

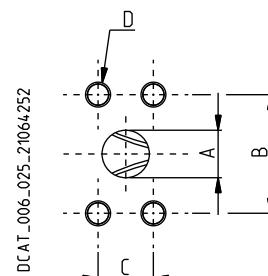
CODE	Nominal size	A	B	C	D	○	○
		mm (in)	mm (in)	mm (in)	Thread Depth mm (in)	Nm (lbf in)	Nm (lbf in)
<b>MD</b>	1" 1/4	32 (1.2598)	58,7 (2.3110)	30,2 (1.1890)	M 10 28 (1.1024)	20 <sup>+1</sup> (177 ÷ 186)	—
<b>ME</b>	1" 1/2	38,1 (1.5000)	69,9 (2.7520)	35,7 (1.4055)	M 12 26 (1.0236)	30 <sup>+2,5</sup> (266 ÷ 288)	—
<b>MF</b>	2"	51 (2.0079)	77,8 (3.0630)	42,9 (1.6890)	M 12 25 (0.9843)	30 <sup>+2,5</sup> (266 ÷ 288)	—



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#### OUTLET PORT - OUT (SAE 6000 HIGH PRESSURE)


CODE	Nominal size	A	B	C	D	○	○
		mm (in)	mm (in)	mm (in)	Thread Depth mm (in)	Nm (lbf in)	Nm (lbf in)
<b>QB</b>	3/4	19 (0.7480)	50,8 (2.0000)	23,8 (0.9370)	M 10 24 (0.9449)	—	45 <sup>+2,5</sup> (398 ÷ 420)
<b>QC</b>	1"	38,1 (1.5000)	69,9 (2.7520)	35,7 (1.4055)	M 12 26 (1.0236)	—	70 <sup>+5</sup> (620 ÷ 664)
<b>QD</b>	1" 1/4	51 (2.0079)	77,8 (3.0630)	42,9 (1.6890)	M 12 25 (0.9843)	—	60 <sup>+5</sup> (531 ÷ 575)




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○ 03/01.2007

## PORTS SIZES

 Tightening torque for low pressure side port



 Tightening torque for high pressure side port [values obtained at 350 bar (5075 psi)]

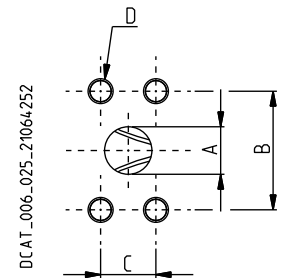
### SAE FLANGED PORTS J518

**SSS**



American straight thread UNC-UNF 60° conforms to ANSI B 1.1

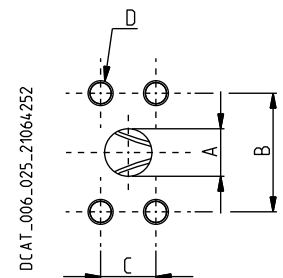
#### INLET PORT - IN (SAE 3000 STANDARD PRESSURE)

CODE	Nominal size	A	B	C	D		
		mm (in)	mm (in)	mm (in)	Thread Depth mm (in)	Nm (lbf in)	Nm (lbf in)
<b>SD</b>	1" 1/4	32 (1.2598)	58,7 (2.3110)	30,2 (1.1890)	7/16-14 UNC-2B 28 (1.1024)	25 <sup>+1</sup> (221 ÷ 230)	—
<b>SE</b>	1" 1/2	38,1 (1.5000)	69,9 (2.7520)	35,7 (1.4055)	1/2-13 UNC-2B 26 (1.0236)	30 <sup>+2,5</sup> (266 ÷ 288)	—
<b>SF</b>	2"	51 (2.0079)	77,8 (3.0630)	42,9 (1.6890)	1/2-13 UNC-2B 25 (0.9843)	30 <sup>+2,5</sup> (266 ÷ 288)	—



#### OUTLET PORT - OUT (SAE 6000 HIGH PRESSURE)


CODE	Nominal size	A	B	C	D		
		mm (in)	mm (in)	mm (in)	Thread Depth mm (in)	Nm (lbf in)	Nm (lbf in)
<b>VB</b>	3/4	19 (0.7480)	50,8 (2.0000)	23,8 (0.9370)	3/8-16 UNC-2B 24 (0.9449)	—	45 <sup>+2,5</sup> (398 ÷ 420)
<b>VC</b>	1"	25,4 (1.0000)	57,2 (2.2520)	27,8 (1.0945)	7/16-14 UNC-2B 20 (0.7874)	—	65 <sup>+5</sup> (575 ÷ 620)
<b>VD</b>	1" 1/4	32 (1.2598)	66,7 (2.6260)	31,8 (1.2520)	1/2-13 UNC-2B 23 (0.9055)	—	65 <sup>+5</sup> (575 ÷ 620)




Replaces: 03/01.2007

04/04.2013

## PORTS SIZES

 Tightening torque for low pressure side port

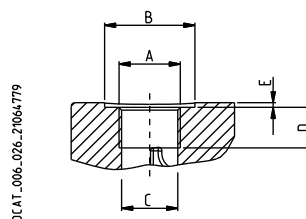
 Tightening torque for high pressure side port [values obtained at 350 bar (5075 psi)]




Replaces: 03/01.2007

### GAS STRAIGHT THREAD PORTS

**BSPP**

British standard pipe parallel (55°) conforms to UNI - ISO 228



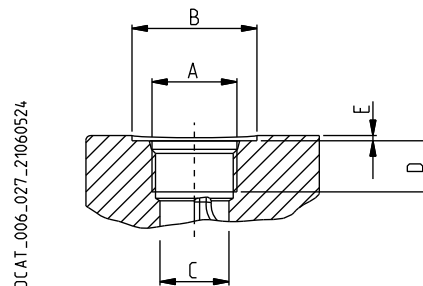
CODE	Nominal size	A	B	C	D	E		
			mm (in)	mm (in)	mm (in)	mm (in)	Nm (lbf in)	Nm (lbf in)
<b>GA (X)</b>	1/8"	G 1/8	—	8,75 (0.3444)	12 (0.4724)	—	—	 5 <sup>+0.25</sup> (44 ÷ 46)
<b>GD (●)</b>	1/2"	G 1/2	36 (1.4173)	19 (0.7480)	—	1 (0.0394)	20 <sup>+1</sup> (177 ÷ 186)	—
<b>GE (●)</b>	3/4"	G 3/4	38 (1.4961)	24,5 (0.9646)	—	1 (0.0394)	30 <sup>+2,5</sup> (266 ÷ 288)	—




(X)= Load sensing port

(●)= Drain port

### SAE STRAIGHT THREAD PORTS J514

American straight thread UNC-UNF 60° conforms to ANSI B 1.1



CODE	Nominal size	A	B	C	D	E		
			mm (in)	mm (in)	mm (in)	mm (in)	Nm (lbf in)	Nm (lbf in)
<b>03 (X)</b>	1/4"	7/16" - 20 UNF - 2B	—	9,5 (0.3740)	—	—	—	 12 <sup>+1</sup> (106 ÷ 115)
<b>0B (●)</b>	1/2"	3/4" - 16 UNF - 2B	33 (1.2992)	17,5 (0.6890)	—	1 (0.0394)	20 <sup>+1</sup> (177 ÷ 186)	—
<b>0C (●)</b>	5/8"	7/8" - 14 UNF - 2B	38 (1.4961)	20,5 (0.8071)	—	1 (0.0394)	30 <sup>+2,5</sup> (266 ÷ 288)	—

(X)= Load sensing port

(●)= Drain port

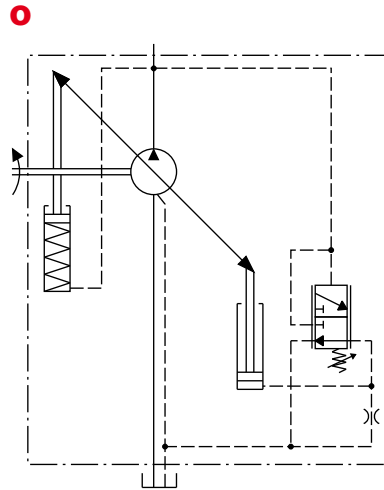
 04/04.2013

# PRESSURE COMPENSATOR

**RPO**

Regulates the pump displacement automatically to maintain the pressure below the fixed pre-adjusted limit.

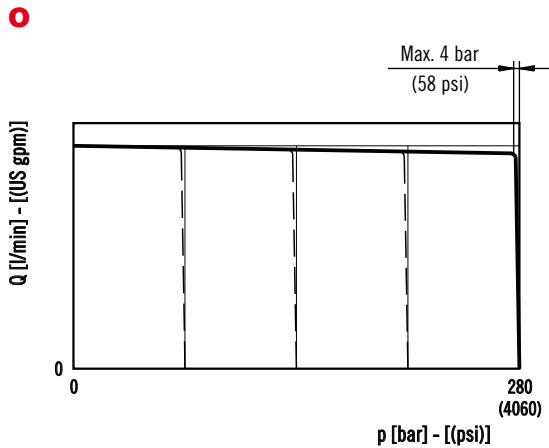
Compensator type	Pump type	Pressure setting range	Standard setting
		bar (psi)	bar (psi)
<b>RPO</b>	<b>LVP 30</b>	20 ÷ 280 (290 ÷ 4060)	280 (4060)
	<b>LVP 48</b>	20 ÷ 280 (290 ÷ 4060)	280 (4060)
	<b>LVP 75</b>	20 ÷ 280 (290 ÷ 4060)	280 (4060)
	<b>LVP 90</b>	20 ÷ 250 (290 ÷ 3625)	250 (3625)



Replaces: 03/01.2007

## OPERATING CURVES

Curves have been obtained at the speed of 1500 min<sup>-1</sup> and oil temperature 50 °C (122 °F).

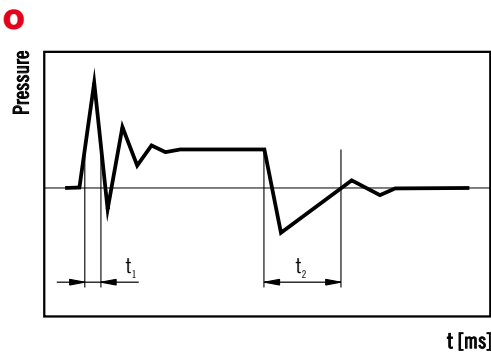


## REMOTE CONTROL

For remote pressure compensator LS3 see page 30.

## RESPONSE AND RECOVERY TIME

According to SAE J745 (using outlet pressure).



	$t_1$	$t_2$
Pump type	Response time [ms] (off stroke)	Recovery time [ms] (on stroke)
<b>LVP 30</b>	36	140
<b>LVP 48</b>	42	140
<b>LVP 75</b>	44	160
<b>LVP 90</b>	44	160

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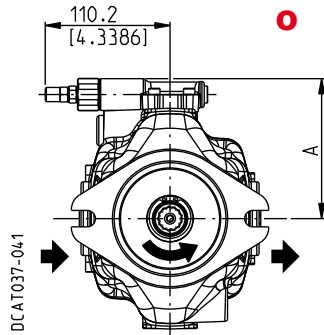
**PRESSURE COMPENSATOR**

**RPO**

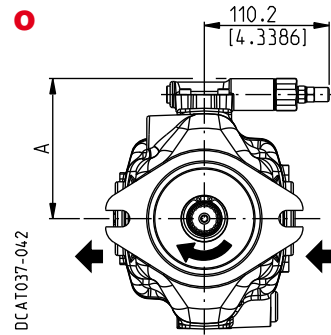
**Side ports**

Replaces: 03/01.2007

**Anti-clockwise rotation**

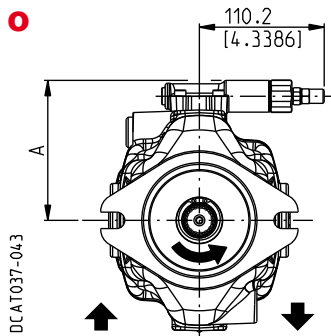


**Clockwise rotation**

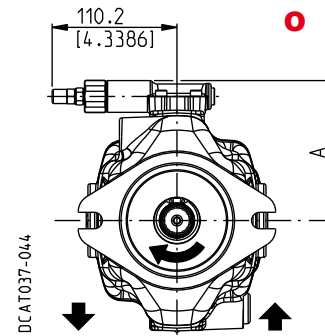


**Rear ports**

**Anti-clockwise rotation**



**Clockwise rotation**



04/04.2013

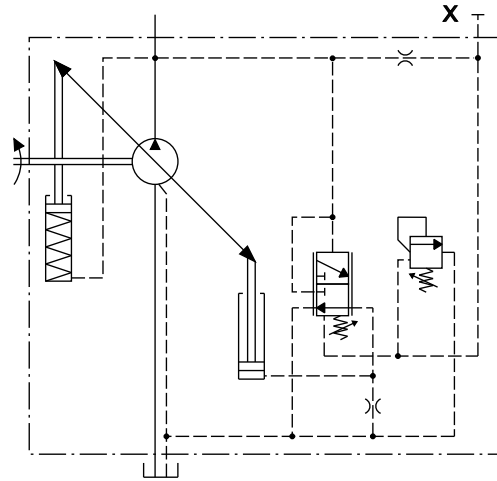
Pump type	<b>A</b>
	mm (in)
<b>LVP 30</b>	114 (4.4882)
<b>LVP 48</b>	124 (4.8819)
<b>LVP 75</b>	136 (5.3543)
<b>LVP 90</b>	136 (5.3543)

# PRESSURE COMPENSATOR

**RP1**

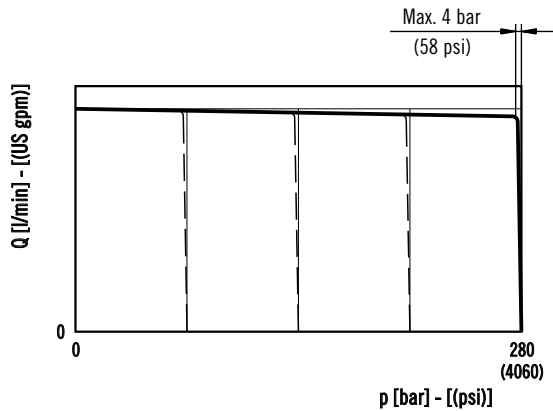
Regulates the pump displacement automatically to maintain the pressure below the fixed pre-adjusted limit.  
Designed to work at high frequency  $\geq 1$  cycle/min and/or at pressure  $> 280$  bar (4060 psi).

## RP1



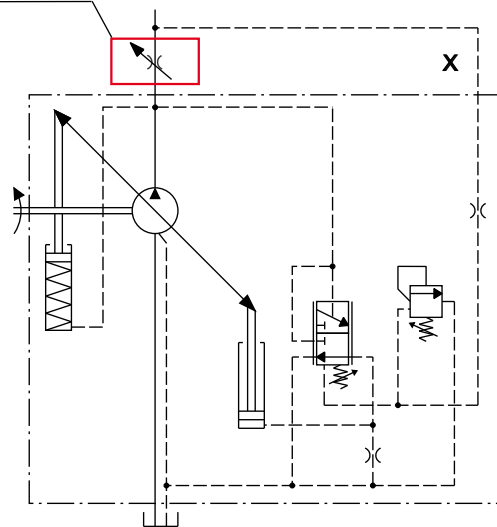
## OPERATING CURVES

Curves have been obtained at the speed of  $1500 \text{ min}^{-1}$  and oil temperature  $50 \text{ }^\circ\text{C}$  ( $122 \text{ }^\circ\text{F}$ ).



## RP1 - LS2 (with flow control)

Not included in supply



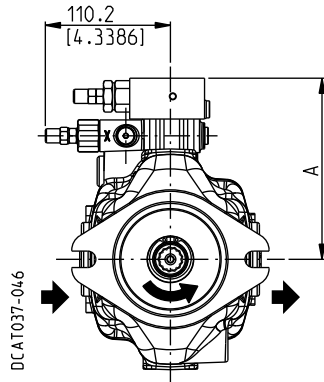
04/04.2013

**PRESSURE COMPENSATOR**

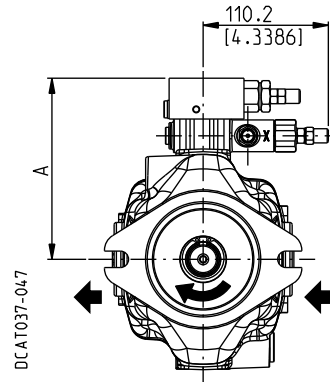
**RP1**

**Side ports**

**Anti-clockwise rotation**

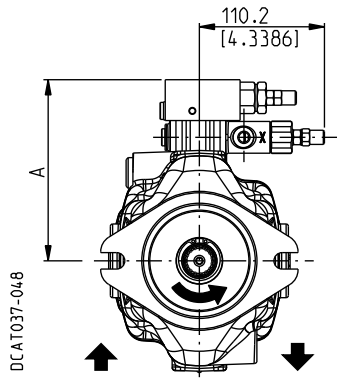


**Clockwise rotation**

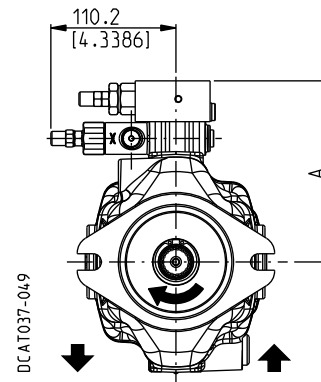


**Rear ports**

**Anti-clockwise rotation**



**Clockwise rotation**



04/04.2013

Pump type	<b>A</b>
	mm (in)
<b>LVP 30</b>	151 (5.9449)
<b>LVP 48</b>	161 (6.3386)
<b>LVP 75</b>	173 (6.8110)
<b>LVP 90</b>	173 (6.8110)

# FLOW COMPENSATOR (Load-sensing)

**LS**

Regulates the pump displacement to maintain a constant (load independent) pressure drop across a flow metering device. In the standard version the flow compensator is combined with pressure compensator.

Flow compensator type	Pressure compensator	Differential pressure setting range	Standard setting
		bar (psi)	bar (psi)
<b>LS0 (■)</b>	<b>RPO</b>		
<b>LS2 (◆)</b>	<b>RPO</b>	10 ÷ 40 (145 ÷ 580)	14 (203)
<b>LS3 (●)</b>	<b>RPO</b>		

- (■): Suggested when the directional control valve does not have the bleed function.
- (◆): Y is plugged. Suggested when the directional control valve has the bleed function.
- (●): For remote pressure control.

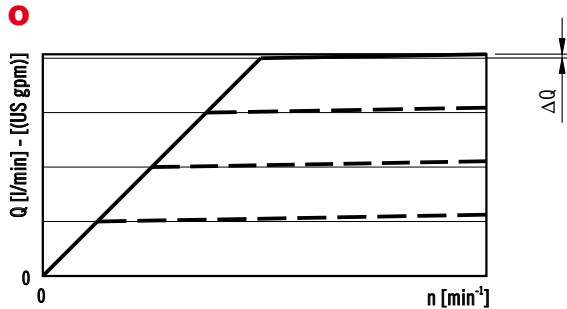
Pilot flow ≈ 1,3 ÷ 1,5 l/min (0.34 ÷ 0.40 US gpm).

In standard setting conditions 14 bar (203 psi) the stand-by pressure is 15<sup>+2</sup> bar (218<sup>+29</sup> psi).

## OPERATING CURVES

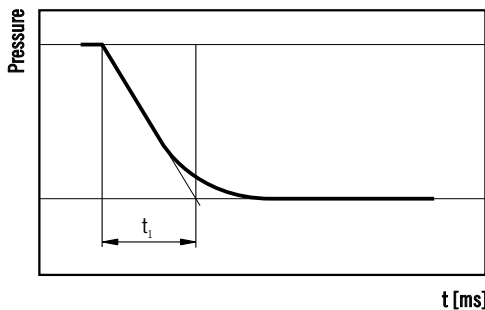
Curves have been obtained at the speed of 1500 min<sup>-1</sup> and oil temperature 50 °C (122 °F).

Curve at variable speed

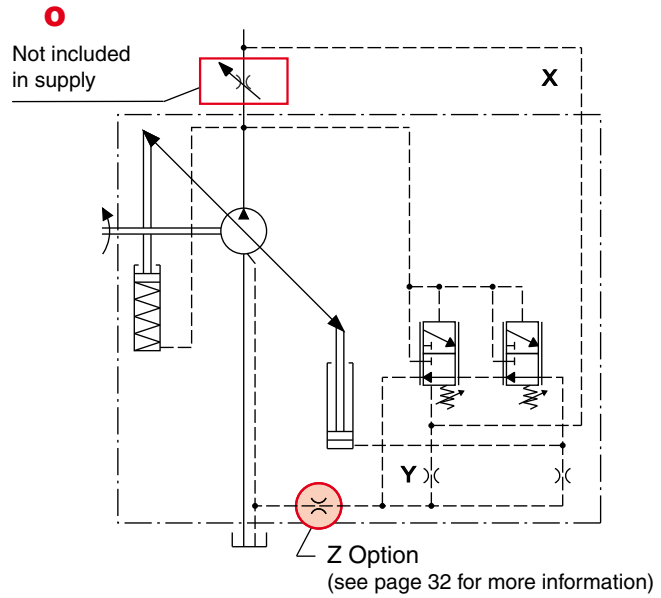


## RESPONSE TIME

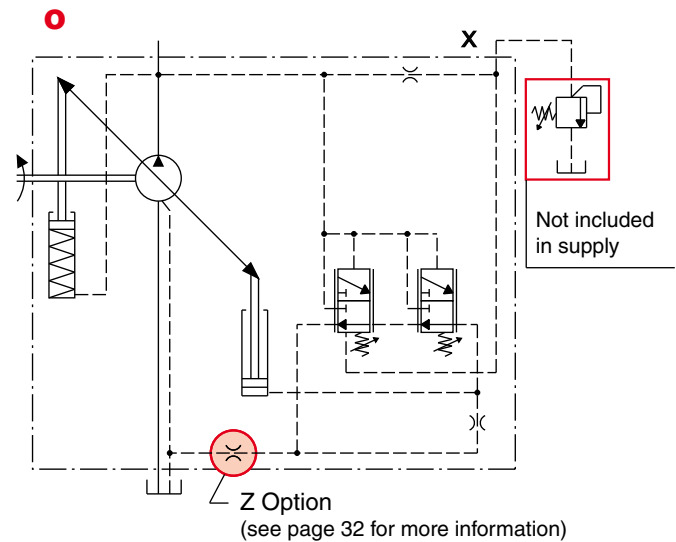
According to SAE J745 (using outlet pressure).



### LS0 - LS2



### LS3 - remote pressure compensator



Replaces: 03/01.2007

04/04.2013

Pump type	l/min (US gpm)	$\Delta Q$ max	$t_1$ (●) ○
		Response time [ms] (off stroke)	
<b>LVP 30</b>	0,9 (0.24)		115
<b>LVP 48</b>	1,7 (0.45)		117
<b>LVP 75</b>	2,5 (0.66)		120
<b>LVP 90</b>	2,5 (0.66)		120

(●) According to SAE J745 (using outlet pressure).



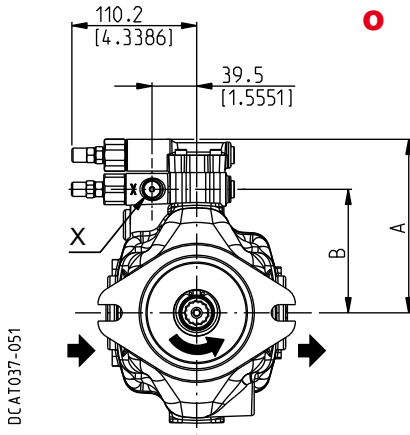
# FLOW COMPENSATOR (Load-sensing)

**LS**

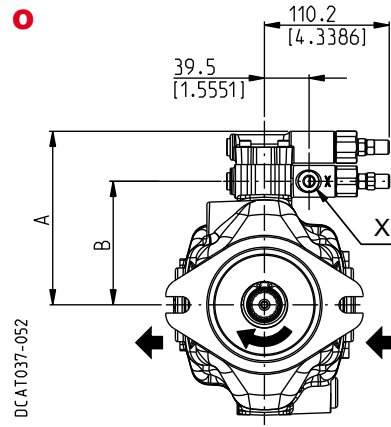
## Side ports

Replaces: 03/01.2007

**Anti-clockwise rotation**

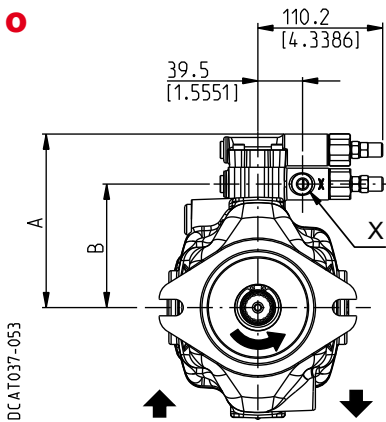


**Clockwise rotation**

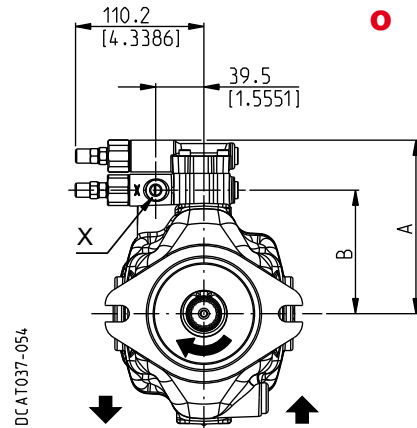


## Rear ports

**Anti-clockwise rotation**



**Clockwise rotation**



04/04.2013

Pump type	<b>A</b>	<b>B</b>
	mm (in)	mm (in)
<b>LVP 30</b>	145 (5.7087)	101 (3.9764)
<b>LVP 48</b>	154 (6.0630)	110 (4.3307)
<b>LVP 75</b>	167 (6.5748)	123 (4.8425)
<b>LVP 90</b>	167 (6.5748)	123 (4.8425)

X: Load-sensing port. Dimensions at page 25

# TORQUE LIMITER

**RN**

Regulates the pump displacement according to the system pressure, to maintain the pre-adjusted torque value and protect the prime mover from overload. To have the best torque limiter regulation, the pre-adjusted absorbed torque has to be higher than the value shown in the following table.

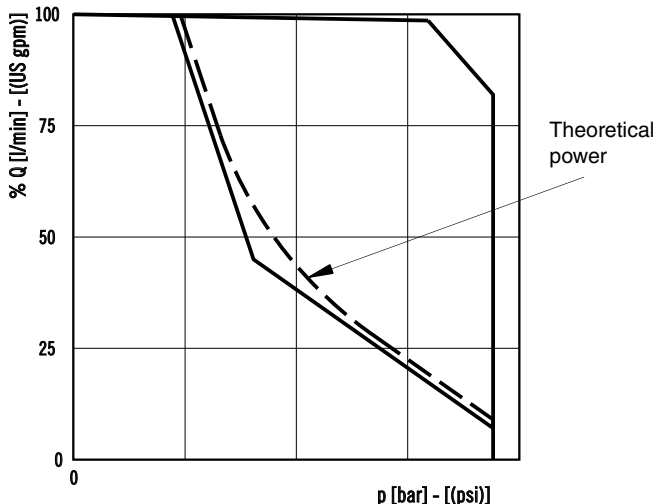
Pump type	Min. torque	Min. power (●)
	Nm (lbf in)	kW (HP)
<b>LVP 30</b>	43 (381)	6,7 (9.0)
<b>LVP 48</b>	68 (602)	10,7 (14.3)
<b>LVP 75</b>	113 (1000)	17,8 (23.9)
<b>LVP 90</b>	132 (1168)	20,7 (27.7)

(●) @ 1500 min<sup>-1</sup>

For lower torque setting values, the regulator limits the maximum working pressure to a value lower than the standard setting for the pressure regulator 280 bar (4060 psi).

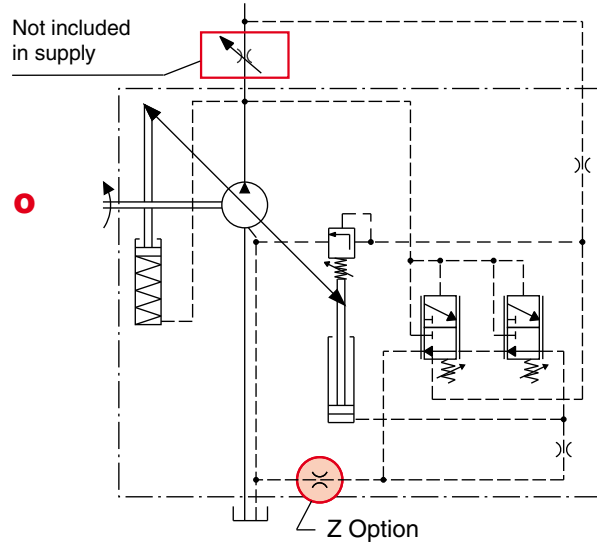
When ordering the torque limiter please specify the requested value of torque [eg. 70 Nm (620 lbf in)] or the requested power and speed [eg. 10 kW (13.4 HP) at 1500 min<sup>-1</sup>].

## OPERATING CURVES



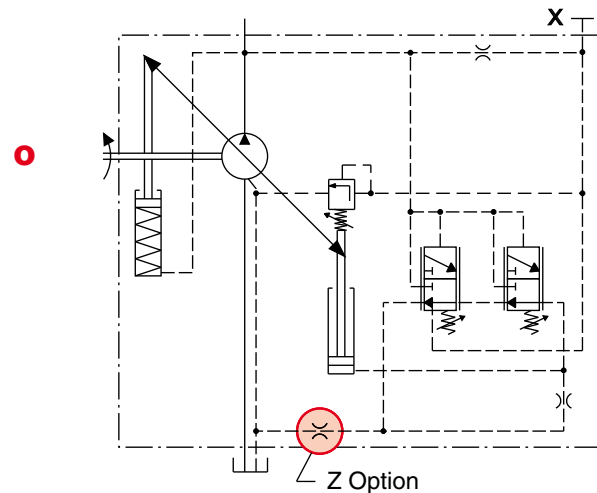
### RN0 - Standard

Torque limitation for closed center valve.



### RN1 - Internal pilot

Torque limitation for open center valve.



### Z Option

Damping restrictor for critical applications. In case of system instability or pressure oscillations, the additional damping restrictor slows down the pump control system, damping the regulation transients. The pump regulation response time increases. The use of the damping restrictor must be evaluated and approved by Casappa technical sales department for the specific application.

Replaces: 03/01.2007

04/04.2013

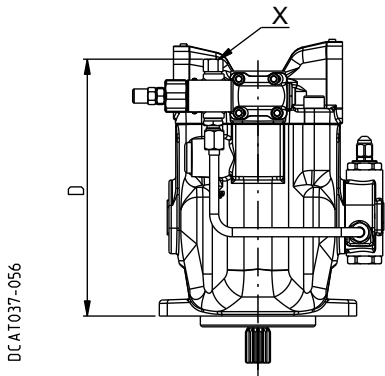
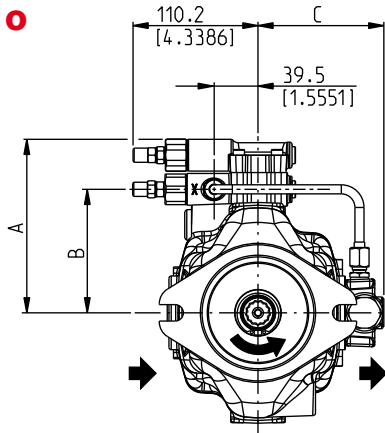
**TORQUE LIMITER**

**RN**

**Side ports**

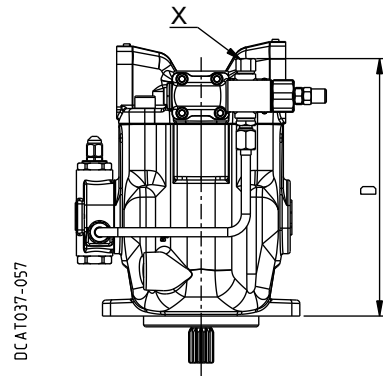
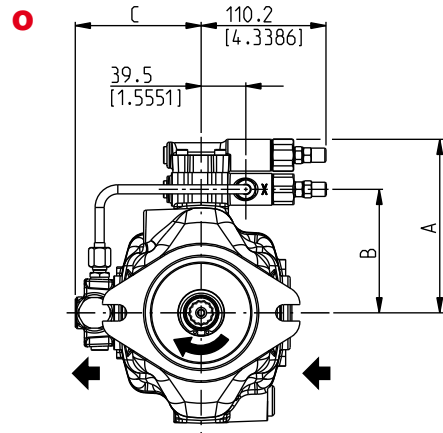
Replaces: 03/01.2007

**Anti-clockwise rotation**



DCAT037-056

**Clockwise rotation**



DCAT037-057

04/04.2013

Pump type	A	B	C	D
	mm (in)	mm (in)	mm (in)	mm (in)
<b>LVP 30</b>	145 (5.7087)	101 (3.9764)	104 (4.0945)	203 (7.9921)
<b>LVP 48</b>	154 (6.0630)	110 (4.3307)	111 (4.3701)	227 (8.9370)
<b>LVP 75</b>	167 (6.5748)	123 (4.8425)	120 (4.7244)	250 (9.8425)
<b>LVP 90</b>	167 (6.5748)	123 (4.8425)	120 (4.7244)	250 (9.8425)

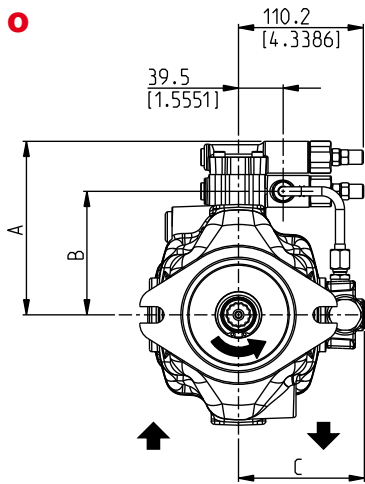
X: Load-sensing port. Dimensions at page 25

**TORQUE LIMITER**

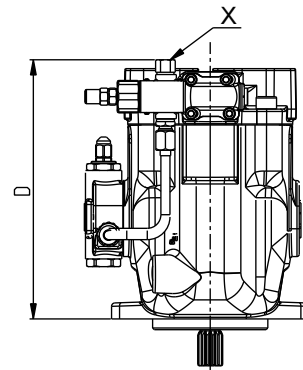
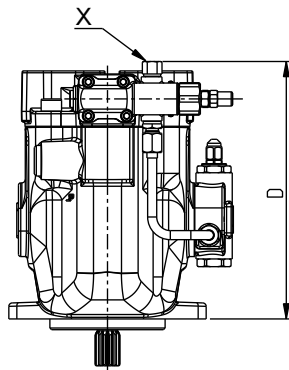
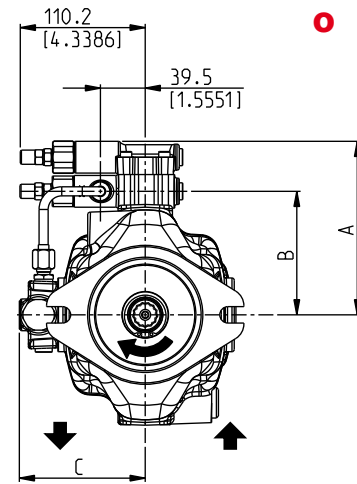
**RN**

**Rear ports**

**Anti-clockwise rotation**



**Clockwise rotation**



DCAT037-058

DCAT037-059

Replaces: 03/01.2007

Pump type	A	B	C	D
	mm (in)	mm (in)	mm (in)	mm (in)
<b>LVP 30</b>	145 (5.7087)	101 (3.9764)	104 (4.0945)	203 (7.9921)
<b>LVP 48</b>	154 (6.0630)	110 (4.3307)	111 (4.3701)	227 (8.9370)
<b>LVP 75</b>	167 (6.5748)	123 (4.8425)	120 (4.7244)	250 (9.8425)
<b>LVP 90</b>	167 (6.5748)	123 (4.8425)	120 (4.7244)	250 (9.8425)

X: Load-sensing port. Dimensions at page 25

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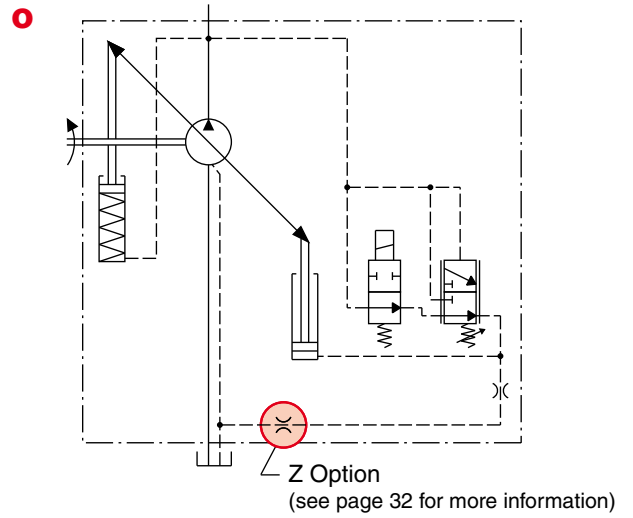
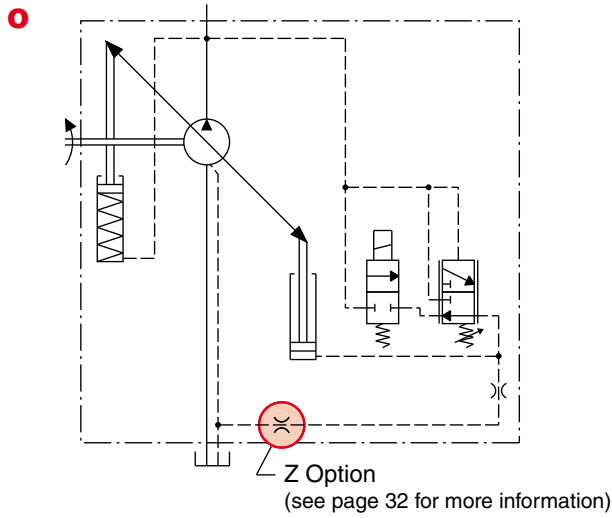
# UNLOADING VALVE

**U ..**

**NC** (normally closed)

**NA** (normally open)

Replaces: 03/01.2007



With the valve NC type (normally closed), energizing the solenoid valve the displacement is reset and the pump is unloaded.

With the valve NA type (normally open), energizing the solenoid valve the pump works at the maximum displacement.

**NOTES**

Unloading valve can be supplied only with pressure compensator RP.

**VALVE FEATURES**

04/04.2013

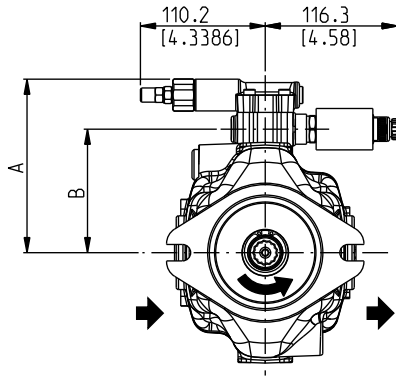
Valve type	Arrangement	Volt
<b>U1</b>	Normally closed	12 VDC
<b>U2</b>	Normally closed	24 VDC
<b>U3</b>	Normally closed	24 VAC
<b>U4</b>	Normally closed	110 VAC
<b>U5</b>	Normally closed	220 VAC
<b>U6</b>	Normally open	12 VDC
<b>U7</b>	Normally open	24 VDC
<b>U8</b>	Normally open	24 VAC
<b>U9</b>	Normally open	110 VAC
<b>U10</b>	Normally open	220 VAC

# UNLOADING VALVE

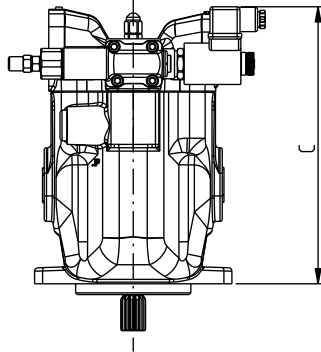
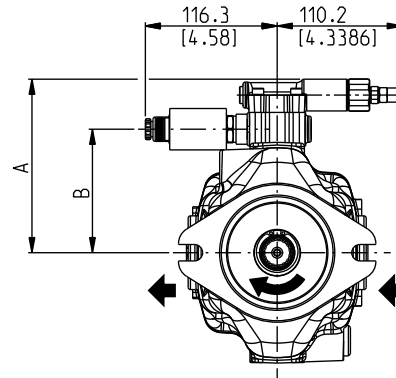
U..

## Side ports

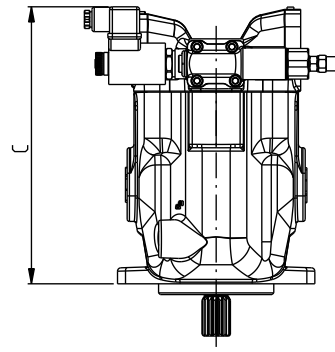
Anti-clockwise rotation



Clockwise rotation



DCAT037-061



DCAT037-062

Pump type	A	B	C
	mm (in)	mm (in)	mm (in)
<b>LVP 30</b>	145 (5.7087)	101 (3.9764)	220 (8.6614)
<b>LVP 48</b>	154 (6.0630)	110 (4.3307)	244 (9.6063)
<b>LVP 75</b>	167 (6.5748)	123 (4.8425)	267 (10.5118)
<b>LVP 90</b>	167 (6.5748)	123 (4.8425)	267 (10.5118)

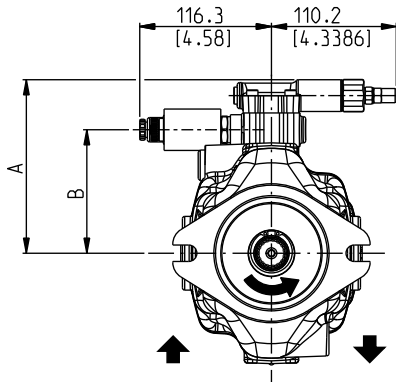
04/04.2013

# UNLOADING VALVE

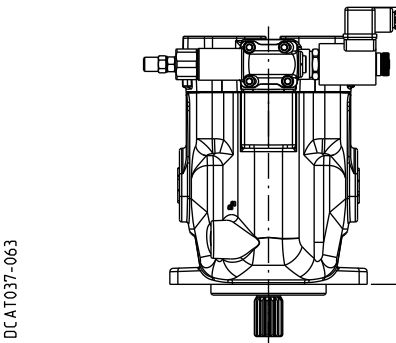
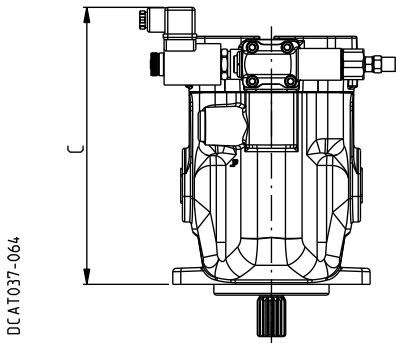
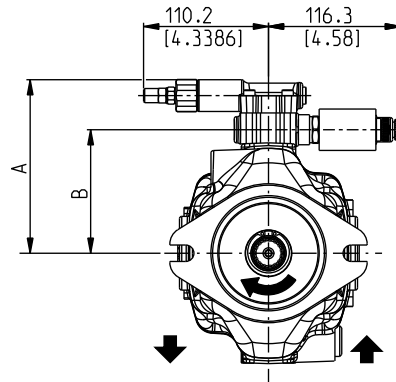
U ..

## Rear ports

Anti-clockwise rotation



Clockwise rotation



04/04.2013

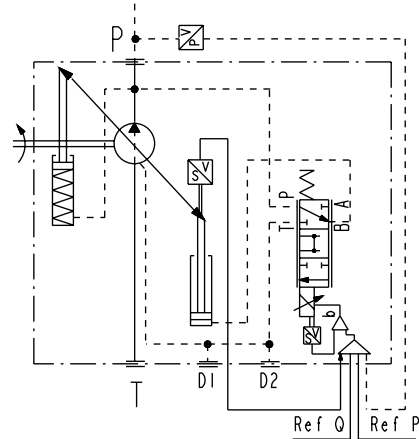
Pump type	A	B	C
	mm (in)	mm (in)	mm (in)
<b>LVP 30</b>	145 (5.7087)	101 (3.9764)	220 (8.6614)
<b>LVP 48</b>	154 (6.0630)	110 (4.3307)	244 (9.6063)
<b>LVP 75</b>	167 (6.5748)	123 (4.8425)	267 (10.5118)
<b>LVP 90</b>	167 (6.5748)	123 (4.8425)	267 (10.5118)

**DIGITAL INTEGRATED DRIVERS**

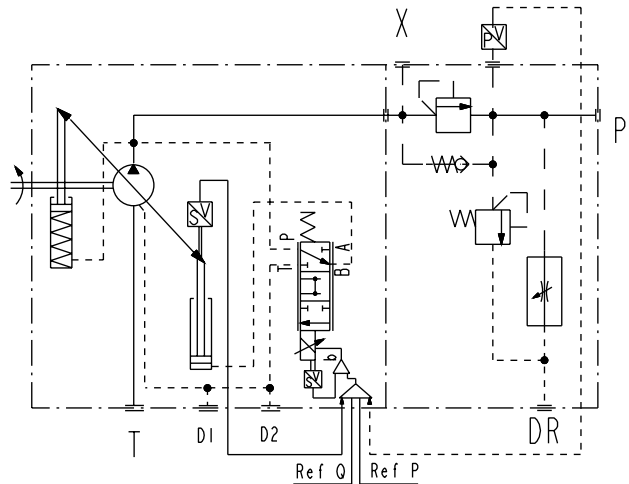
**DES..**

Digital drivers, integrated to the pump, realize combined closed loop controls of pressure, flow and maximum power limitation. These controls provide fast dynamics and fine regulations directly commanded from PC or from the machine controller. They are also available with an optional sequence module that allows the circuit to operate with minimum pressure (close to zero). A remote pressure transducer must be installed on the system and its feedback has to be interfaced to the pump digital driver. If the real pressure value in the system (measured by the pressure transducer) remains below the respective reference signal provided by the machine controller, the digital driver regulates in closed loop the pump swash plate position according to the flow reference signal. When the real pressure becomes close to the respective reference signal, the driver automatically performs the closed loop control of the pressure. The digital control ensures high performance regulating flow and pressure linearity, better flow knee and internal leakage compensation.

**DES Hydraulic circuit**



**DESR Hydraulic circuit**



- DES** Basic version, without sequence module and without pressure transducer which has to be installed on the outlet line and wired to the 12 poles connectors of the integral digital electronics.
- DESR** Version with sequence module RES which grant a minimum piloting pressure [18 bar (261 psi)] when the actual pressure falls below that value. Without pressure transducer.

**Technical data for digital electronic drivers**

**Driver section**

Format	Sealed box on the valve - Protection: IP67 DIN 40050 - Insulation: VDE0110
Electromagnetic compatibility (EMC)	Emission: EN 50081-2 - Immunity: EN 50082-2
Max power consumption	50 W (0.07 HP)
Current supplied to solenoid	$I_{max} = 3,3$ A square wave PWM type
Analog input signal impedance	Voltage signal $R_i > 50$ K $\Omega$
Operating temperature	-20 °C ÷ +60 °C (-4 °F ÷ +140 °F) [storage -20 °C ÷ +70 °C (-4 °F ÷ +158 °F)]
Alarm messages	Electronic overcurrent and overtemperature
Features	Pressure control by P.I.D. - Rapid solenoid excitation and switching off - Output to solenoids protected against accidental short circuits - Feedback cable break produces an inhibition of the driver, zeroing the current to the solenoid

NOTE: For functional parameters of the digital valves as the bias, scale, ramp and linearization of the regulation characteristic, please consult our sales department.

03/01.2007



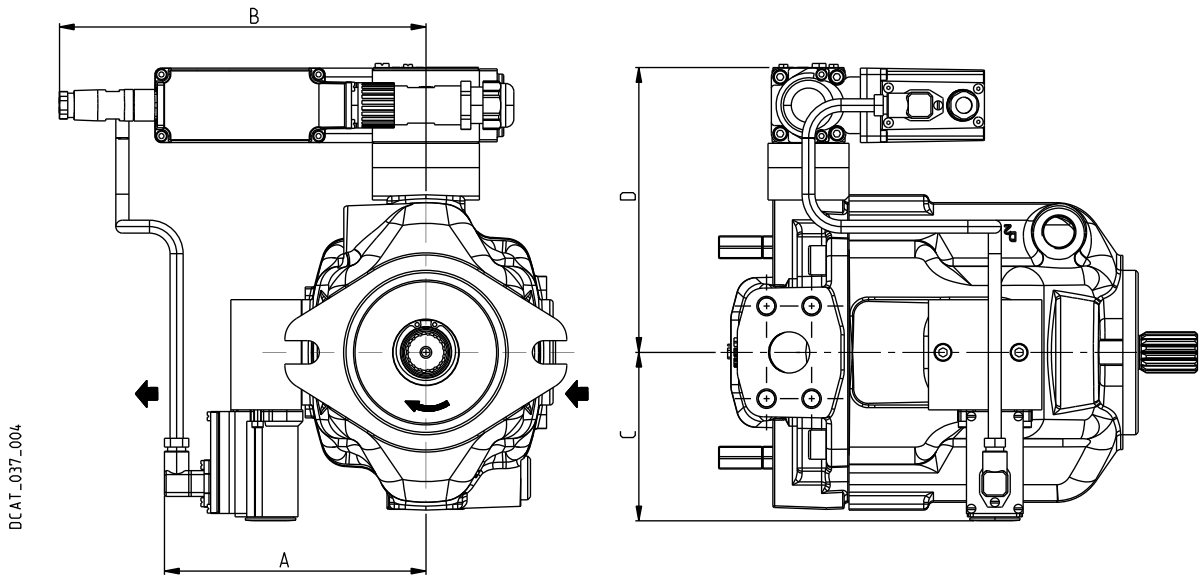
**DIGITAL INTEGRATED DRIVERS**

**DES**

**Side ports**

Replaces: 03/01.2007

**Clockwise rotation**



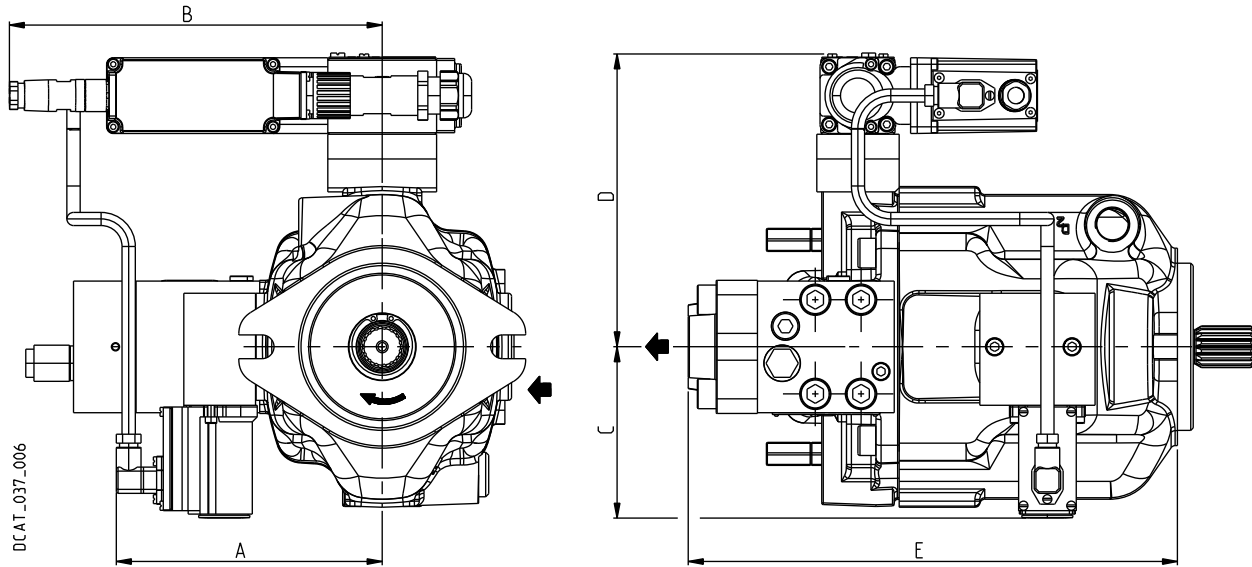
For anti-clockwise rotation, please consult our sales department.

04/04.2013

Pump type	A	B	C	D
	mm (in)	mm (in)	mm (in)	mm (in)
<b>LVP 30</b>	155 (6.1024)	246 (9.6850)	103,5 (4.0748)	170 (6.6929)
<b>LVP 48</b>	162 (6.3780)	246 (9.6850)	103,5 (4.0748)	178 (7.0079)
<b>LVP 75</b>	171 (6.7323)	246 (9.6850)	103,5 (4.0748)	190 (7.4803)
<b>LVP 90</b>	171 (6.7323)	246 (9.6850)	103,5 (4.0748)	190 (7.4803)

Side ports

Clockwise rotation



Replaces: 03/01.2007

For anti-clockwise rotation, please consult our sales department.

Pump type	A	B	C	D	E
	mm (in)	mm (in)	mm (in)	mm (in)	mm (in)
<b>LVP 30</b>	155 (6.1024)	246 (9.6850)	103,5 (4.0748)	170 (6.6929)	262,5 (10.3346)
<b>LVP 48</b>	162 (6.3780)	246 (9.6850)	103,5 (4.0748)	178 (7.0079)	299 (11.7717)
<b>LVP 75</b>	171 (6.7323)	246 (9.6850)	103,5 (4.0748)	190 (7.4803)	337 (13.2677)
<b>LVP 90</b>	171 (6.7323)	246 (9.6850)	103,5 (4.0748)	190 (7.4803)	337 (13.2677)

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## MULTIPLE PUMPS

### THROUGH DRIVE

LVP through drive axial piston pumps offer the flexibility to obtain different groups able to supply several hydraulic systems. The operating characteristics of each assembled pumps are the same as the corresponding single pumps according to the following conditions:

- 1) Do not exceed the maximum transmissible torque.
- 2) The maximum rotational speed is that of the lowest rated speed of the single unit incorporated.

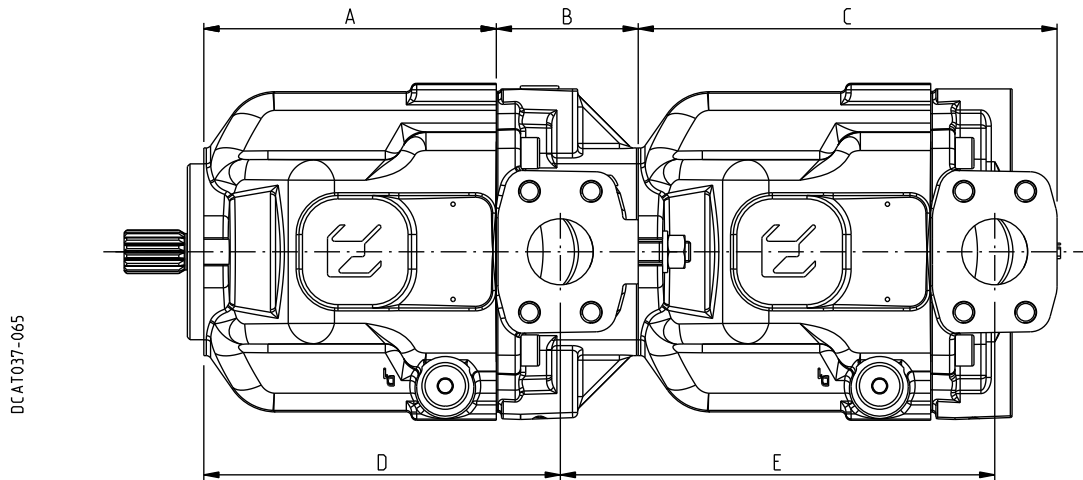
Replaces: 03/01.2007

<b>M</b>	Nm (lbf in)	Torque
<b>V</b>	cm <sup>3</sup> /rev (in <sup>3</sup> /rev)	Displacement
<b>Δp</b>	bar (psi)	Pressure
$\eta_{hm} = \eta_{hm}(V, \Delta p, n)$		Hydro-mechanical efficiency

$$M = \frac{\Delta p \text{ (bar)} \cdot V \text{ (cm}^3\text{/rev)}}{62,83 \cdot \eta_{hm}} \quad [\text{Nm}]$$



Note: The torque absorbed from the shaft of the first pump results from the sum of the torques due to all the single stages. The achieved value must not exceed the maximum torque limit given for the shaft of the first pump.



Pump type	A		B (●)		C	D	E
	mm (in)	mm (in)	Flanged for	Code			
<b>LVP 30</b>	145 (5.7087)	77 (3.0315)	SAE A	AS1	213 (8.3858)	183 (7.2047)	222 (8.7402)
			SAE B	AS5			
<b>LVP 48</b>	169 (6.6535)	82 (3.2283)	SAE A	AS1	242 (9.5276)	206 (8.1102)	251 (9.8819)
			SAE B	AS5			
<b>LVP 75</b>	192 (7.5591)	99 (3.8976)	SAE A	AS1	276 (10.8661)	235 (9.2520)	291 (11.4567)
			SAE B	AS5			296 (11.6535)
			SAE C	AS7			
<b>LVP 90</b>	192 (7.5591)	99 (3.8976)	SAEA	AS1	276 (10.8661)	235 (9.2520)	291 (11.4567)
			SAE B	AS5			296 (11.6535)
			SAE C	AS7			

04/04.2013

Overall dimensions: the same as the single pumps.

Ports dimensions at pages 23 ÷ 25. - Screws are supplied with the first pump.

(●) Cover kit are available to obtain single pumps starting from front sections of multiple pumps. Dimensions at page. 49

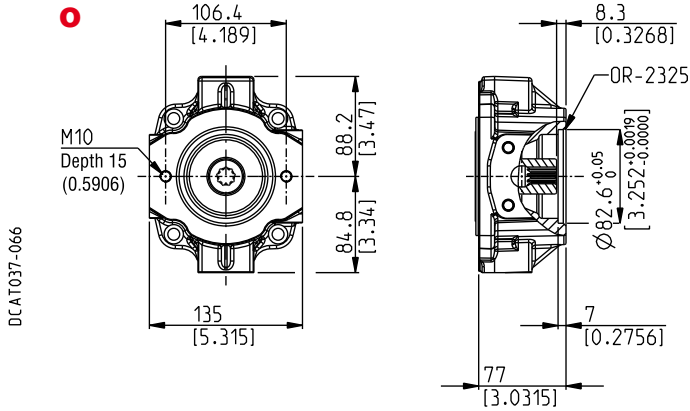
**INTERMEDIATE FLANGES**

**LVP 30**

**SAE "A" 2 HOLES**

**AS1**

SAE J744



Replaces: 03/01.2007

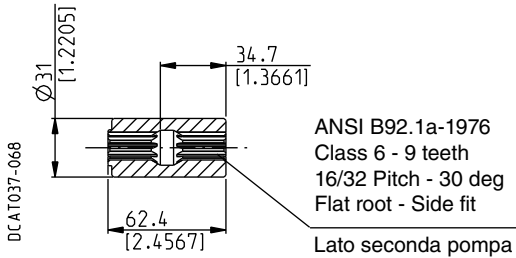
**COUPLINGS - DIMENSIONS**

**LVP 30**

**SAE "A" SPLINE**

**03**

Available with flange code **AS1**

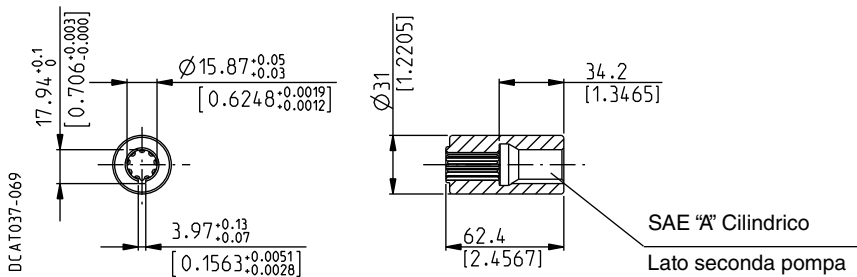


**MAX 100 Nm (885 lbf in)**

**SAE "A" STRAIGHT**

**31**

Available with flange code **AS1**



**MAX 70 Nm (620 lbf in)**

Replaces: 04/04.2013

**INTERMEDIATE FLANGES**

**LVP 30**

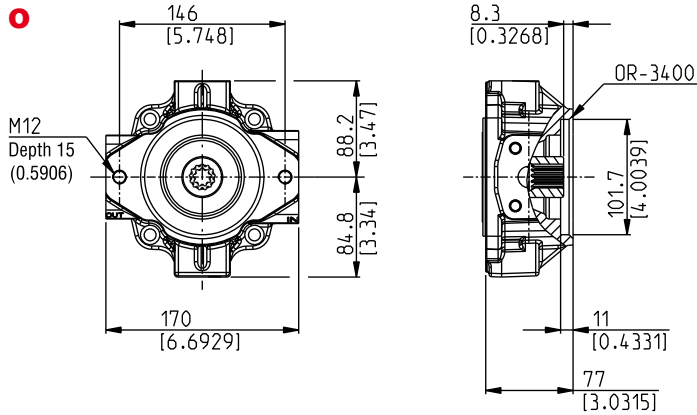
**SAE "B" 2 HOLES**

**AS5**

SAE J744

Replaces: 03/01.2007

DCAT037-067



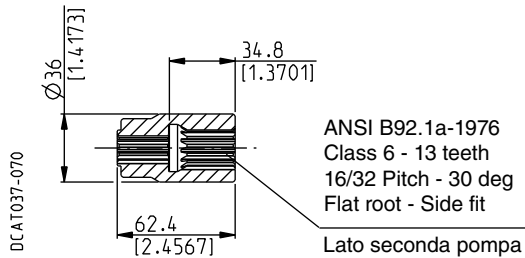
**COUPLINGS - DIMENSIONS**

**LVP 30**

**SAE "B" SPLINE**

**04**

Available with flange code **AS5**



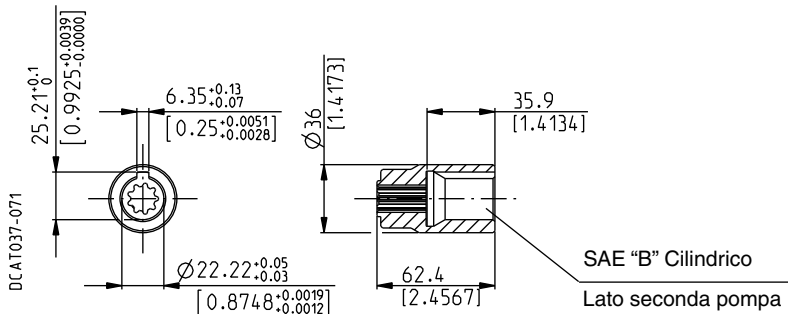
**MAX 100 Nm (885 lbf in)**

**SAE "B" STRAIGHT**

**32**

Available with flange code **AS5**

04/04.2013



**MAX 100 Nm (885 lbf in)**

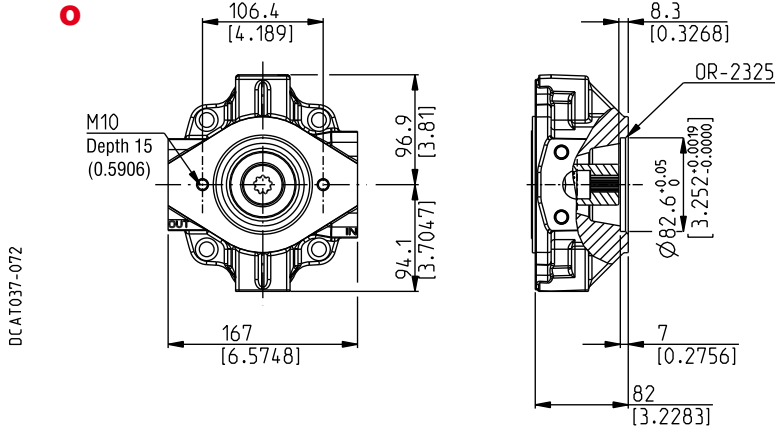
**INTERMEDIATE FLANGES**

**LVP 48**

**SAE "A" 2 HOLES**

**AS1**

SAE J744



Replaces: 03/01.2007

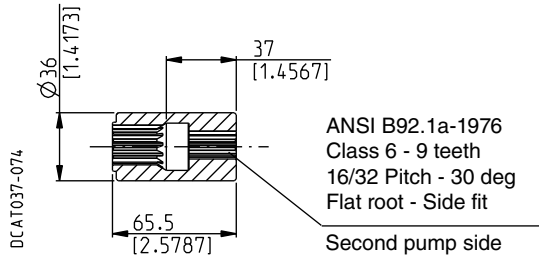
**COUPLINGS - DIMENSIONS**

**LVP 48**

**SAE "A" SPLINE**

**03**

Available with flange code **AS1**

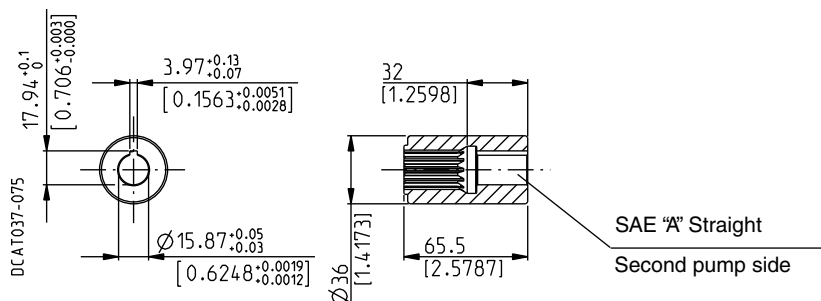


**MAX 100 Nm (885 lbf in)**

**SAE "A" STRAIGHT**

**31**

Available with flange code **AS1**



**MAX 70 Nm (620 lbf in)**

Replaces: 04/04.2013

**INTERMEDIATE FLANGES**

**LVP 48**

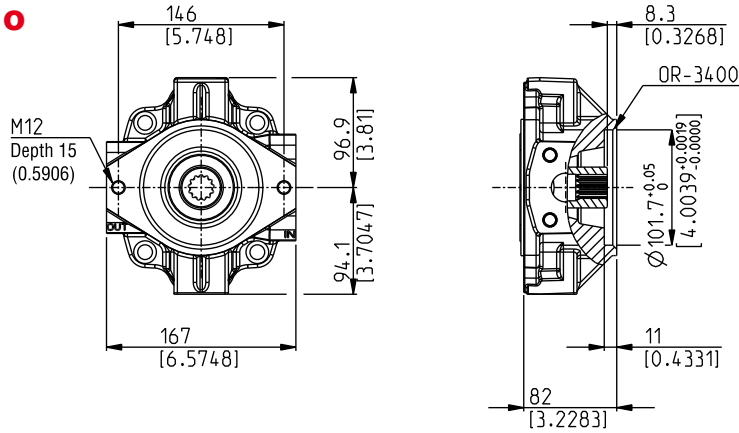
**SAE "B" 2 HOLES**

**AS5**

SAE J744

Replaces: 03/01.2007

DCAT037-073



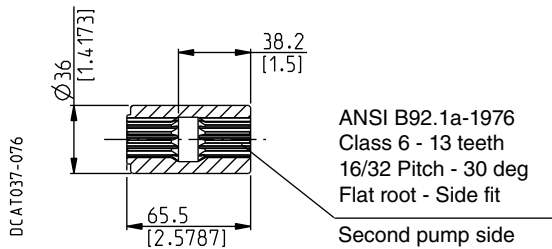
**COUPLINGS - DIMENSIONS**

**LVP 48**

**SAE "B" SPLINE**

**04**

Available with flange code **AS5**

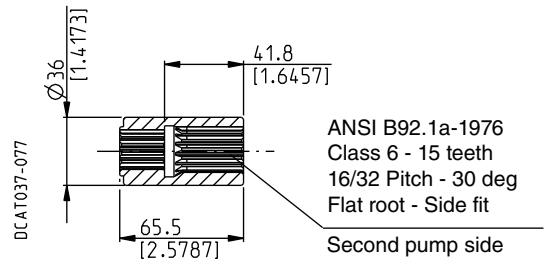


**MAX 200 Nm (1770 lbf in)**

**SAE "BB" SPLINE**

**05**

Available with flange code **AS5**

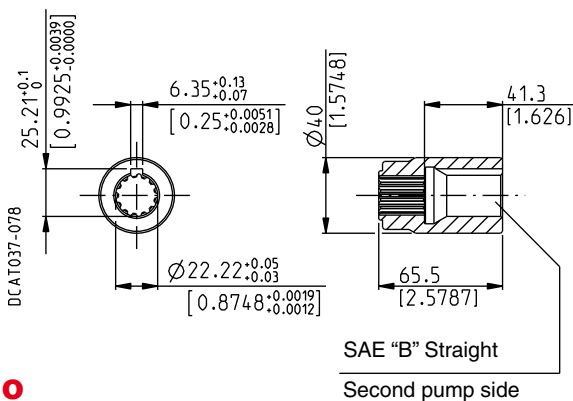


**MAX 250 Nm (2213 lbf in)**

**SAE "B" STRAIGHT**

**32**

Available with flange code **AS5**

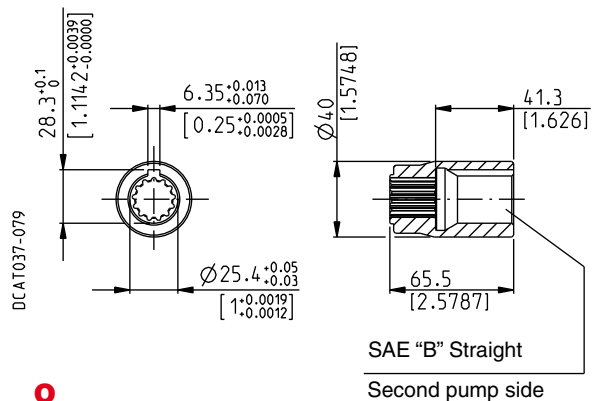


**MAX 250 Nm (2213 lbf in)**

**SAE "BB" STRAIGHT**

**33**

Available with flange code **AS5**



**MAX 250 Nm (2213 lbf in)**

04/04.2013

**INTERMEDIATE FLANGES**

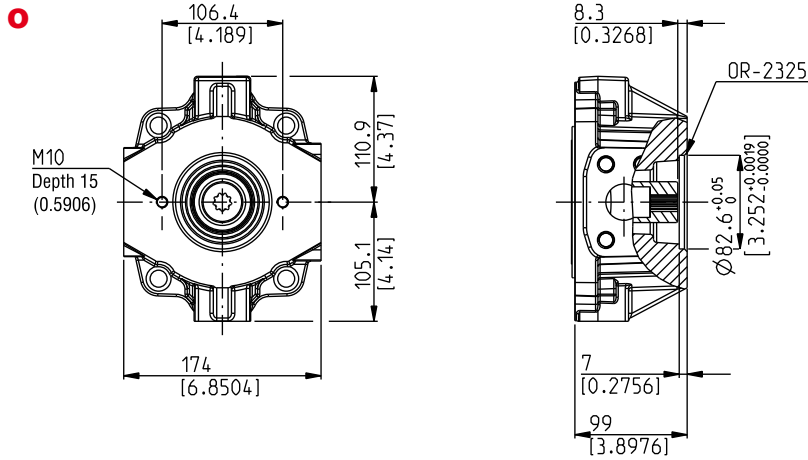
**LVP 75 - 90**

**SAE "A" 2 HOLES**

**AS1**

SAE J744

DCAT037-080



Replaces: 03/01.2007

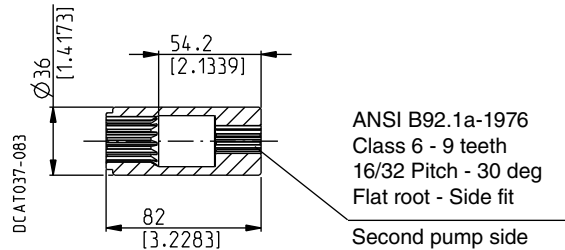
**COUPLINGS - DIMENSIONS**

**LVP 75 - 90**

**SAE "A" SPLINE**

**03**

Available with flange code **AS1**

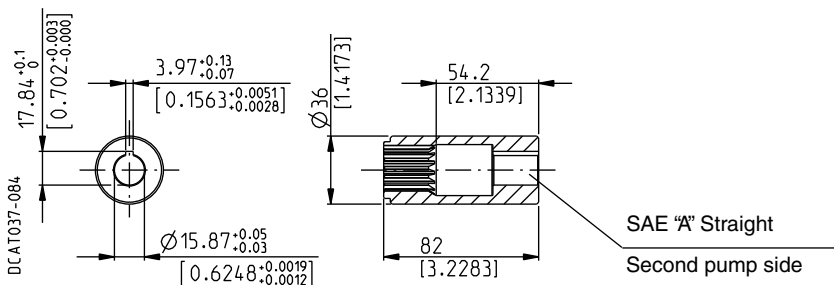


**MAX 100 Nm (885 lbf in)**

**SAE "A" STRAIGHT**

**31**

Available with flange code **AS1**



**MAX 70 Nm (620 lbf in)**

04/04.2013



**INTERMEDIATE FLANGES**

**LVP 75 - 90**

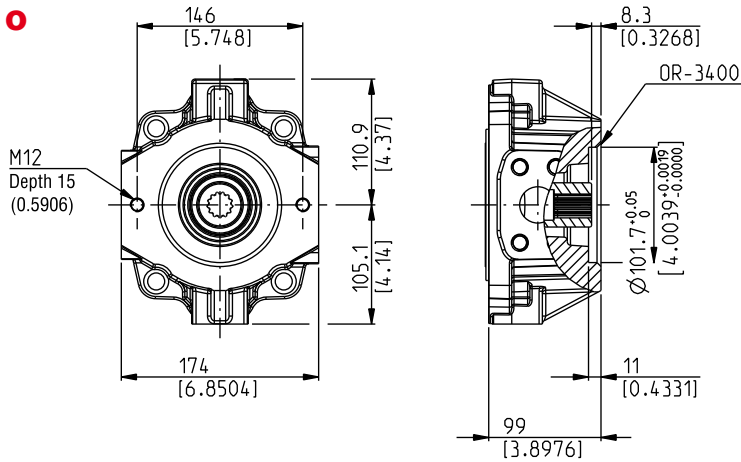
**SAE "B" 2 HOLES**

**AS5**

SAE J744

Replaces: 03/01.2007

DCAT037-081



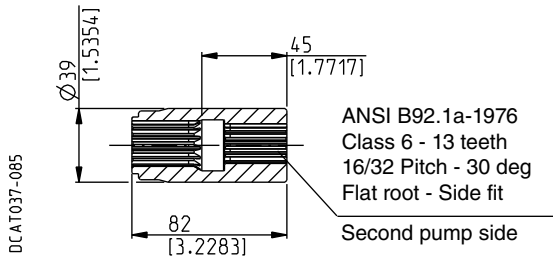
**COUPLINGS - DIMENSIONS**

**LVP 75 - 90**

**SAE "B" SPLINE**

**04**

Available with flange code **AS5**

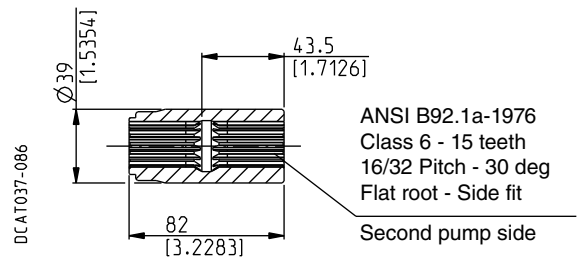


**MAX 200 Nm (1770 lbf in)**

**SAE "BB" SPLINE**

**05**

Available with flange code **AS5**



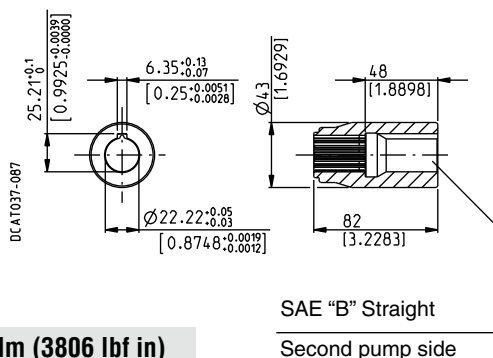
**MAX 250 Nm (2213 lbf in)**

04/04.2013

**SAE "B" STRAIGHT**

**32**

Available with flange code **AS5**

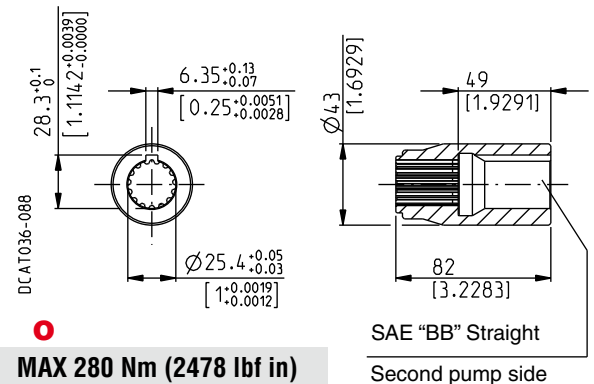


**MAX 430 Nm (3806 lbf in)**

**SAE "BB" STRAIGHT**

**33**

Available with flange code **AS5**



**MAX 280 Nm (2478 lbf in)**

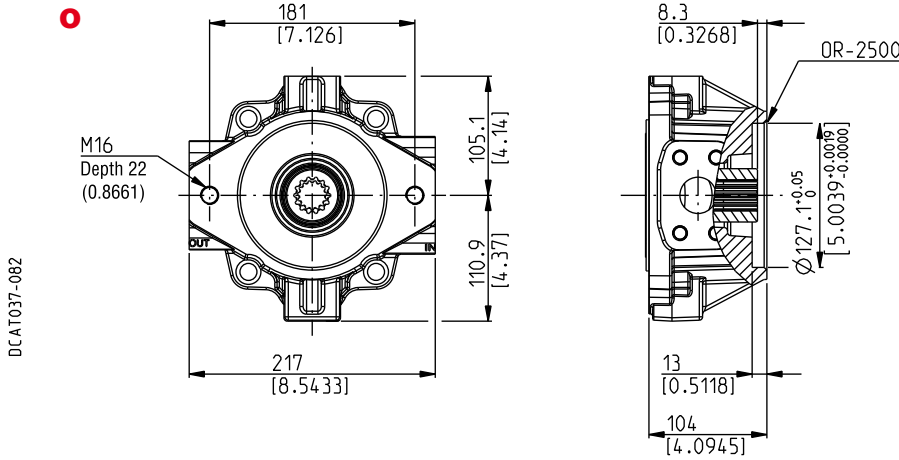
**INTERMEDIATE FLANGES**

**LVP 75 - 90**

**SAE "C" 2 HOLES**

**AS7**

SAE J744



Replaces: 03/01.2007

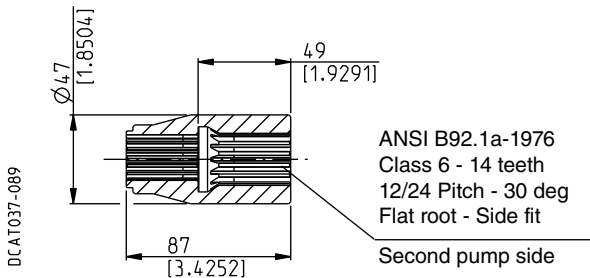
**COUPLINGS - DIMENSIONS**

**LVP 75 - 90**

**SAE "C" SPLINE**

**06**

Available with flange code **AS7**

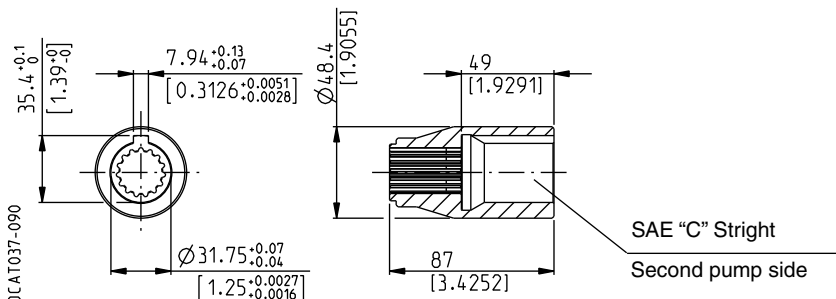


**MAX 430 Nm (3806 lbf in)**

**SAE "C" STRAIGHT**

**34**

Available with flange code **AS7**

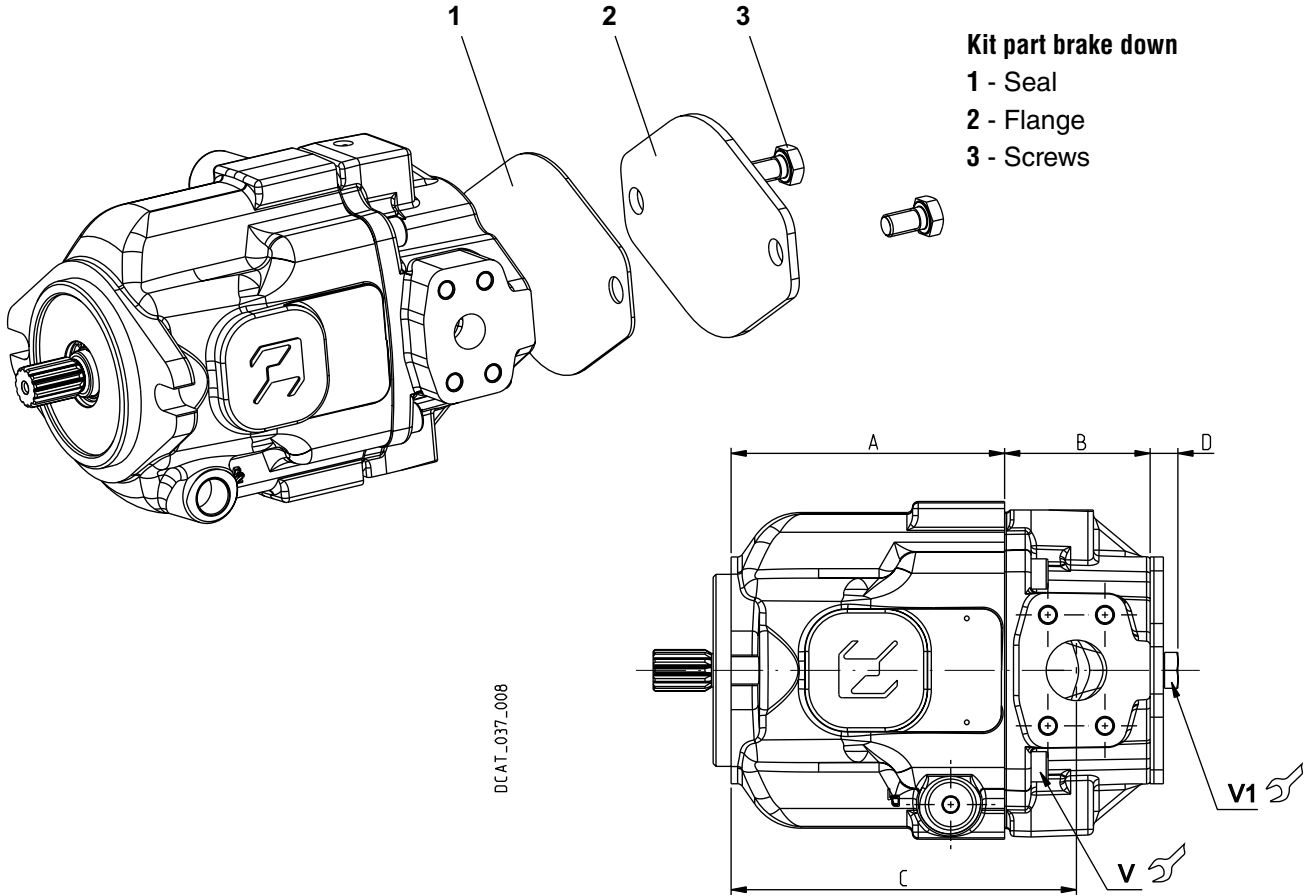


**MAX 430 Nm (3806 lbf in)**

04/04.2013

## FRONT SECTION KIT COVER

Kit cover is available to obtain single pumps starting from the front sections of multiple pumps.  
Before closing the intermediate flange check that the coupling has been removed.



Screws tightening torque Nm (lbf in)

V			V1
LVP 30	LVP 48	LVP 75 - LVP 90	
70 ±7 (558 ÷ 682)	100 ±10 (797 ÷ 974)	130 ±13 (1036 ÷ 1266)	20 ±1 (159 ÷ 195)

Pump type	A		B		C		D
	mm (in)	mm (in)	Flanged for	Code	mm (in)	mm (in)	Kit code
<b>LVP 30</b>	145 (5.7087)	77 (3.0315)	SAE A	AS1	183 (7.2047)	13,4 (0.5276)	<b>62082200</b>
			SAE B	AS5		14,5 (0.5709)	<b>62082300</b>
<b>LVP 48</b>	169 (6.6535)	82 (3.2283)	SAE A	AS1	206 (8.1102)	13,4 (0.5276)	<b>62082200</b>
			SAE B	AS5		14,5 (0.5709)	<b>62082300</b>
<b>LVP 75</b>	192 (7.5591)	99 (3.8976)	SAE A	AS1	235 (9.2520)	13,4 (0.5276)	<b>62082200</b>
			SAE B	AS5		14,5 (0.5709)	<b>62082300</b>
		104 (4.0945)	SAE C	AS7		17 (0.6693)	<b>62082400</b>
<b>LVP 90</b>	192 (7.5591)	99 (3.8976)	SAE A	AS1	235 (9.2520)	13,4 (0.5276)	<b>62082200</b>
			SAE B	AS5		14,5 (0.5709)	<b>62082300</b>
		104 (4.0945)	SAE C	AS7		17 (0.6693)	<b>62082400</b>

Overall dimensions: the same as the single pumps.

Ports dimensions at pages 23 ÷ 25. - Screws are supplied with the first pump.

03/01.2007

## HOW TO ORDER SINGLE PUMPS

1	2	3	4	5	6	7	8 ...
<b>LVP 30</b>	<b>S</b>	<b>- 04</b>	<b>S5</b>	<b>- L</b>	<b>MD/QB</b>	<b>- N</b>	<b>- ...</b>

1	Pump type (max. displacement)	Code
	28,7 cm <sup>3</sup> /rev (1.75 in <sup>3</sup> /rev)	<b>LVP 30</b>
	45,4 cm <sup>3</sup> /rev (2.77 in <sup>3</sup> /rev)	<b>LVP 48</b>
	73,6 cm <sup>3</sup> /rev (4.49 in <sup>3</sup> /rev)	<b>LVP 75</b>
	87,9 cm <sup>3</sup> /rev (5.36 in <sup>3</sup> /rev)	<b>LVP 90</b>

2	Rotation	Code
	Anti-clockwise	<b>S</b>
	Clockwise	<b>D</b>

3	Drive shaft (a)	Code
	SAE "B" spline (13 teeth)	<b>04</b>
	SAE "B" straight	<b>32</b>
	Straight Ø 22	<b>68</b>
	SAE "BB" spline (15 teeth)	<b>05</b>
	SAE "BB" straight	<b>33</b>
	Straight Ø 25	<b>69</b>
	SAE "C" spline (14 teeth)	<b>06</b>
	SAE "C" straight	<b>34</b>
	Straight Ø 32	<b>70</b>

4	Mounting flange (a)	Code
	SAE "B" 2 holes	<b>S5</b>
	ISO Ø 100	<b>Z1</b>
	SAE "C" 4 holes	<b>S7</b>
	ISO Ø 125	<b>Z2</b>

5	Ports position	Code
	Side	<b>L</b>
	Rear	<b>P</b>

Code	Inlet/outlet ports		6
	Nominal size		
	Inlet IN	Outlet OUT	Pump type
	SAE 3000	SAE 6000	
<b>SAE FLANGED PORTS METRIC THREAD (SSM)</b>			
<b>MD/QB</b>	1" 1/4	3/4"	LVP 30
<b>ME/QC</b>	1" 1/2	1"	LVP 48
<b>MF/QD</b>	2"	1"	LVP 75
<b>MF/QD</b>	2"	1" 1/4	LVP 90
<b>SAE FLANGED PORTS UNC THREAD (SSS)</b>			
<b>SD/VB</b>	1" 1/4	3/4"	LVP 30
<b>SE/VC</b>	1" 1/2	1"	LVP 48
<b>SF/VD</b>	2"	1"	LVP 75
<b>SF/VD</b>	2"	1" 1/4	LVP 90

Code	Seals		7
<b>N</b>	Buna (standard)		
<b>V</b>	Viton		

Code	<b>O</b>	Regulators	8
<b>...</b>		See how to order at page 51	

Replaces: 03/01.2007

04/04.2013

- (a) Drive shafts availability at pages 19 ÷ 20 and mounting flanges availability at pages 21 ÷ 22

## HOW TO ORDER REGULATORS

	8	9	10	11	12	13
Pressure compensator	<b>RP0</b>	-		<b>G</b>		
Pressure compensator	<b>RP1</b>	-		<b>G</b>		
Pressure compensator with flow control	<b>RP1</b>	-	<b>LS2</b>	-	<b>G</b>	
Flow compensator	<b>LS0</b>	-	<b>Z</b>	-	<b>G</b>	
Flow compensator without bleed	<b>LS2</b>	-	<b>Z</b>	-	<b>G</b>	
Pressure compensator for remote control	<b>LS3</b>	-	<b>Z</b>	-	<b>G</b>	
Torque limiter - standard	<b>RN0</b>	-	<b>Z</b>	-	<b>G</b>	- ... / ...
Torque limiter - internal pilot	<b>RN1</b>	-		<b>G</b>	-	... / ...
Unloading valve	<b>U..</b>	-	<b>Z</b>	-	<b>G</b>	
Pressure and flow digital regulator	<b>DES.</b>					

Replaces: 03/01.2007

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8	Regulators type	Code
	Pressure compensator	<b>RP0</b>
	Pressure compensator	<b>RP1</b>
	Flow compensator	<b>LS0</b>
	Flow compensator without bleed	<b>LS2</b>
	Pressure compensator for remote control	<b>LS3</b>
	Torque limiter - standard	<b>RN0</b>
	Torque limiter - internal pilot	<b>RN1</b>
	Unloading valve - Normally closed 12 VDC	<b>U1</b>
	Unloading valve - Normally closed 24 VDC	<b>U2</b>
	Unloading valve - Normally closed VAC	<b>U3</b>
	Unloading valve - Normally closed 110 VAC	<b>U4</b>
	Unloading valve - Normally closed 220 VAC	<b>U5</b>
	Unloading valve - Normally open 12 VDC	<b>U6</b>
	Unloading valve - Normally open 24 VDC	<b>U7</b>
	Unloading valve - Normally open 24 VAC	<b>U8</b>
	Unloading valve - Normally open 110 VAC	<b>U9</b>
	Unloading valve - Normally open 220 VAC	<b>U10</b>
	Pressure and flow digital regulator (a)	<b>DES</b>
	Pressure and flow digital regulator with sequence module RES (a)	<b>DESR</b>

Code	Flow control option (b)	9
<b>LS2</b>	With flow control	

Code	Restrictor option (c)	10
...	Without restrictor (standard - no code)	
<b>Z</b>	Damping restrictor (only for critical applications)	

Code	Displacement limiter	11
...	Without limiter (standard - no code)	
<b>E</b>	Max. displacement limiter	
<b>F</b>	Min. displacement limiter	
<b>G</b>	Max. and min. displacement limiter	

Code	Torque limiter setting (d) (f)	12
...	Please specify the requested torque value in Nm	

Code	Torque limiter setting speed (e) (f)	13
...	Please specify the requested speed value	

(a) To order please consult our sales department

(b) Only for RP1

(c) Only for LS..., RN0 and U.. unloading valve

(d) Refer to page 32 for more information

(e) Do not exceed the maximum speed shown at page 4 ÷ 6

(f) For multiple pumps please write these codes at the end

## HOW TO ORDER MULTIPLE PUMPS

o

1	2	3	4	5	6	7	8 ... 13	14	15
LVP 48	S ♦ - 05	S5 - L	ME/QC - N # - ... - AS5 - 04	/ ... / ... /					
Front section (through drive)									

LVP 30	S # - 04	S5 - L	MD/QB - N - ... - - - / ... / ...
Rear section (single pump)			

1	<b>Pump type (max. displacement) (a)</b>	Code
The same of single pumps		LVP ...

2	<b>Rotation</b>	Code
Anti-clockwise		S
Clockwise		D

3	<b>Drive shaft (b)</b>	Code
SAE "B" spline (13 teeth)		04
SAE "B" straight		32
Straight Ø 22		68
SAE "BB" spline (15 teeth)		05
SAE "BB" straight		33
Straight Ø 25		69
SAE "C" spline (14 teeth)		06
SAE "C" straight		34
Straight Ø 32		70

4	<b>Mounting flange (b)</b>	Code
SAE "B" 2 holes		S5
ISO Ø 100		Z1
SAE "C" 4 holes		S7
ISO Ø 125		Z2

5	<b>Ports position</b>	Code
Side		L
Rear (only for rear section)		P

6	<b>Inlet/outlet ports</b>	Code	
Pump type	Nominal size		
	Inlet IN	Outlet OUT	
	SAE 3000	SAE 6000	
<b>SAE FLANGED PORTS METRIC THREAD (SSM)</b>			
LVP 30	1" 1/4	3/4"	MD/QB
LVP 48	1" 1/2	1"	ME/QC
LVP 75	2"	1" 1/4	MF/QD
LVP 90	2"	1" 1/4	MF/QD

Code	<b>Inlet/outlet ports</b>		6
	Nominal size		
	Inlet IN	Outlet OUT	Pump type
	SAE 3000	SAE 6000	
<b>SAE FLANGED PORTS UNC THREAD (SSS)</b>			
SD/VB	1" 1/4	3/4"	LVP 30
SE/VC	1" 1/2	1"	LVP 48
SF/VD	2"	1" 1/4	LVP 75
SF/VD	2"	1" 1/4	LVP 90

Code	<b>Seals</b>	7
N	Buna (standard)	
V	Viton	

Code	<b>Regulators</b>	8 ... 13
...	See how to order at page 51	

Code	<b>Intermediate flange (c)</b>	14
AS1	SAE "A" 2 holes	
AS5	SAE "B" 2 holes	
AS7	SAE "C" 2 holes	

Code	<b>Coupling (c)</b>	15
03	SAE "A" spline (9 teeth)	
31	SAE "A" straight	
04	SAE "B" spline (13 teeth)	
32	SAE "B" straight	
05	SAE "BB" spline (15 teeth)	
33	SAE "BB" straight	
06	SAE "C" spline (14 teeth)	
34	SAE "C" straight	

- ◆ Write the rotation code letter at the end of the complete ordering code
- # Omit code only if ordering assembled multiple pumps
- (a) Displacements at page 50
- (b) Drive shafts availability at pages 19 ÷ 20 and mounting flanges availability at pages 21 ÷ 22
- (c) Intermediate flanges and couplings availability at pages 42 ÷ 48

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## ORDER EXAMPLE



### SINGLE PUMPS

Replaces: 03/01.2007

With pressure compensator and flow control

**LVP 30 S-04S5-L MD/QB-N-RP1-LS2**

With flow compensator without bleed

**LVP 30 S-04S5-L MD/QB-N-LS2**

With torque limiter - internal pilot

**LVP 30 S-04S5-L MD/QB-N-RN1-150/2100**

### ASSEMBLED MULTIPLE PUMPS

With pressure compensator and flow control

**LVP 30-04S5-L MD/QB-N-RP1-LS2-AS5-04/30-28-04S5-L MD/QB-N-RP1-LS2-S**

With flow compensator without bleed

**LVP 30-04S5-L MD/QB-N-LS2-AS5-04/30-28-04S5-L MD/QB-N-LS2-S**

### INDIVIDUAL SECTIONS

04/04.2013

Front section with pressure compensator and flow control

**LVP 30 S-04S5-L MD/QB-N-RP1-LS2-AS5-04/30-28-04S5-L MD/QB-N-RP1-LS2**

Rear section with pressure compensator and flow control

**LVP 30 S-04S5-L MD/QB-N-RP1-LS2**

Our policy is one of continuous improvement in product. Specification of items may, therefore, be changed without notice.

LVP 04 T A

Edition: 04/04.2013

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