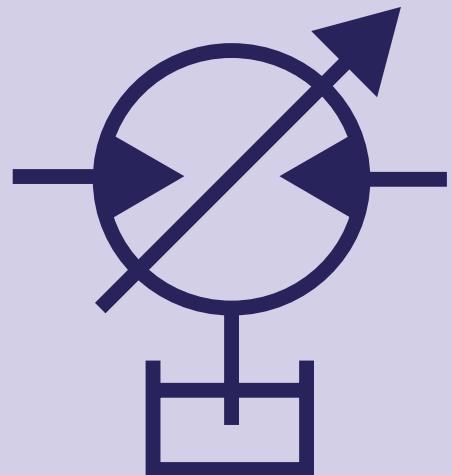
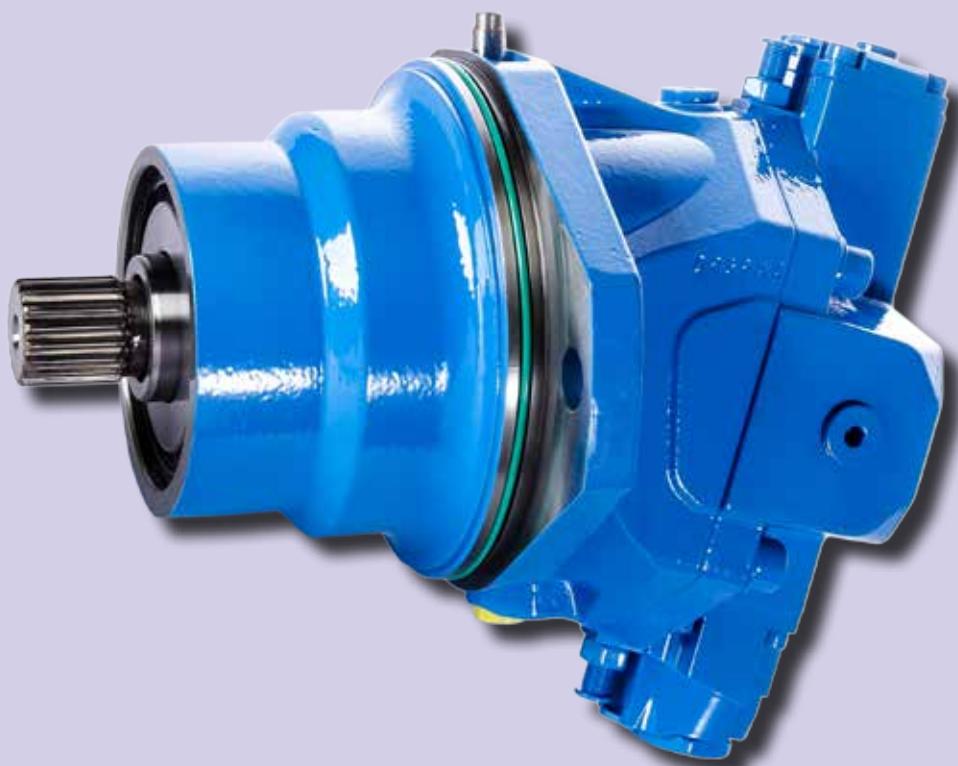


HYDRAULIC MOTORS

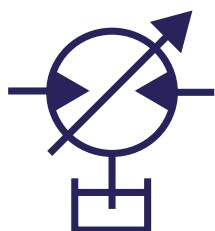
VARIABLE DISPLACEMENT



make it simple

 **HYDRO
LEDUC**

**HYDRAULIC
MOTORS**
VARIABLE DISPLACEMENT



Design, characteristics and advantages	3
Efficiency and operating conditions	4
Order code	6
Dimensions MV series motors	7
Dimensions MVSI series motors	9
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Displacement control	13
Options Accessories	14
Installation and start-up recommendations	15

Also find the **fixed displacement** LEDUC motors range
in the **BENT AXIS HYDRAULIC MOTORS - FIXED
DISPLACEMENT** catalogue
downloadable on www.hydroleduc.com

- Models from 0.31 to 11.02 cu.in/rev (5 to 180 cc/rev)
- Available in DIN and SAE versions
- In fixed displacement, special drainless motor.



Complete catalogues available at www.hydroleduc.com

► Main applications

- Suitable for use in either open or closed loop circuits
- Wheel drives
- Track drives
- Winches

► Advantages of the LEDUC variable displacement motors

- 9 pistons designed for high starting torque and reduced pulsations at low speed
- Continuous variation in displacement from V_{\max} to V_{\min} ($=0$)
- High operating ratio (5 :1)
- Compact size, high weight-power ratio
- High speed and high operating pressure
- Low noise level
- Long service life
- 3 choices of displacement control : see page 9 (HPA, H2N, E2N)

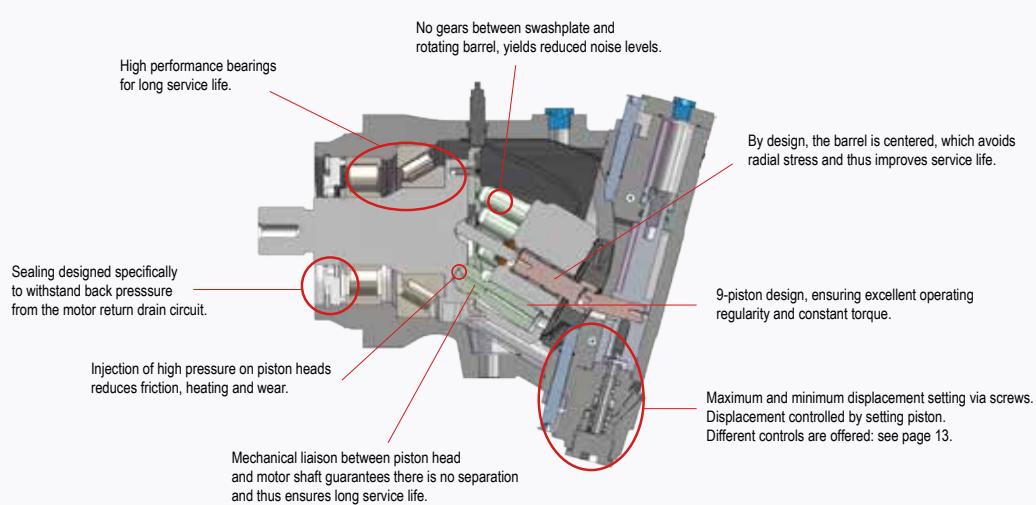
► Technical characteristics of LEDUC variable displacement motors

		85	115
Max. displacement cu.in (cc/rev)	V_{\max}	1.71 to 5.20 (28.1 \Rightarrow 85.2)	4.82 to 7.05 (79 \Rightarrow 115.6)
Min. displacement cu.in (cc/rev)	V_{\min}	0 to 3.64 (0 \Rightarrow 59.7)	0 to 2.45 (0 \Rightarrow 40.1)
Displacement ratio 5	V_{\max}/V_{\min}	1.04 (17 cc)	1.41 (23.1 cc)
Max. continuous operating pressure psi (bar)	P_{\max}	5800 (400)	5800 (400)
Max. peak pressure	P_p	6526 (450)	6526 (450)
Max. speed at max. displacement	$N_{\max} \text{ at } V_{\max}$	3900 rpm	3550 rpm
Max. speed at min. displacement	$N_{\max} \text{ at } V_{\min}$	6800 rpm	5600 rpm
Max. flow absorbed	Q_{\max}	331 l/min	408 l/min
Max. output power	P_{\max}	220 kW	271 kW
Max. output torque at P_{\max} and V_{\max}	C_{\max}	54 daN.m	73 daN.m

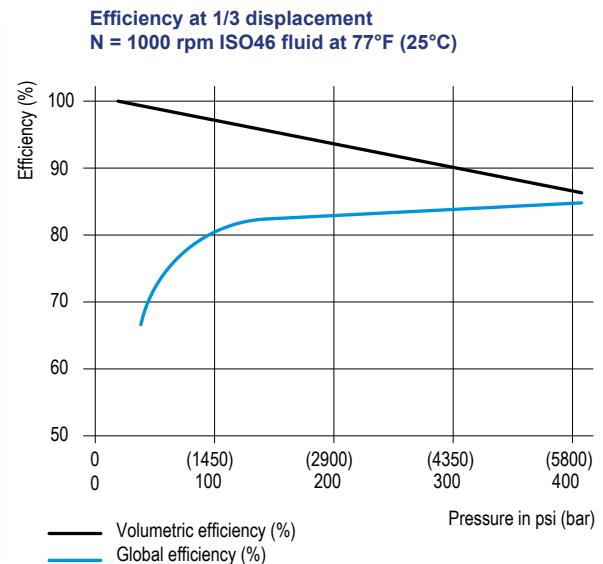
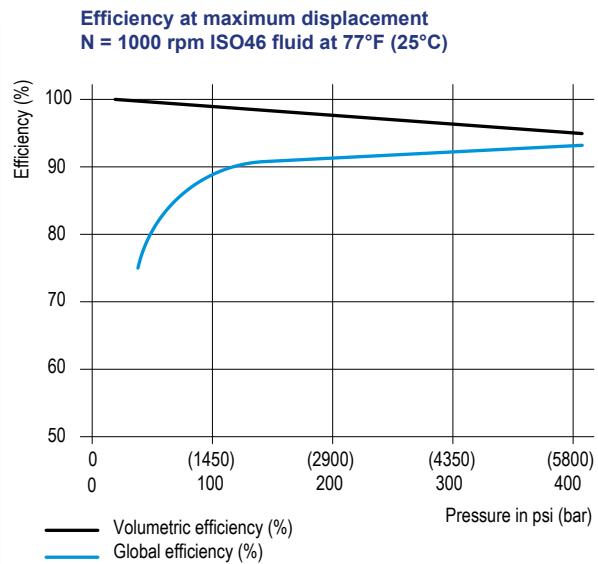
Currently two models of motor are offered : 5.19 cu.in (85cc/rev) and 7.02 cu.in (115 cc/rev). Models to extend the range are currently being developed.

► Advantages of LEDUC variable motors

High quality know-how and materials. The design choices below ensure the reliability and long service life of LEDUC motors.



► Efficiency of the MV, MVA, and MVSI motors



These graphs are given as an indication only; for further information, please contact our Technical Service.

► Preparation of the motor

Bleeding of control device is done automatically during initial commissioning.

► The fluid

LEDUC motors are designed for use with mineral based hydraulic fluid. Using other fluids is possible but may require a modified motor. Please contact us with details of fluid.

Recommended viscosity:

- Ideally: between 15 and 400 cSt,
- Maximum range: between 5 and 1600 cSt.



► Filtration of the hydraulic fluid

The service life of the motors depends greatly on the quality and the cleanliness of the hydraulic fluid.

We recommend minimum cleanliness as follows:

- NAS 1638 class 9,
- SAE class 6,
- ISO/DIS 4406 class 20/18/15.

For fluids at very high temperatures 194 to 239 °F (90 to 115 °C), we recommend a minimum cleanliness class of 19/17/14 according to ISO 4406.

► Rotating speeds

Minimum rotating speed to obtain continuous rotation is 200 rpm (however, in certain conditions, the motor can run at speeds as low as 50 rpm). Maximum rotating speed is given for each model of motor.

► Installation positions

LEDUC motors are made to operate in all positions (see details on page 15).

► Operating temperatures

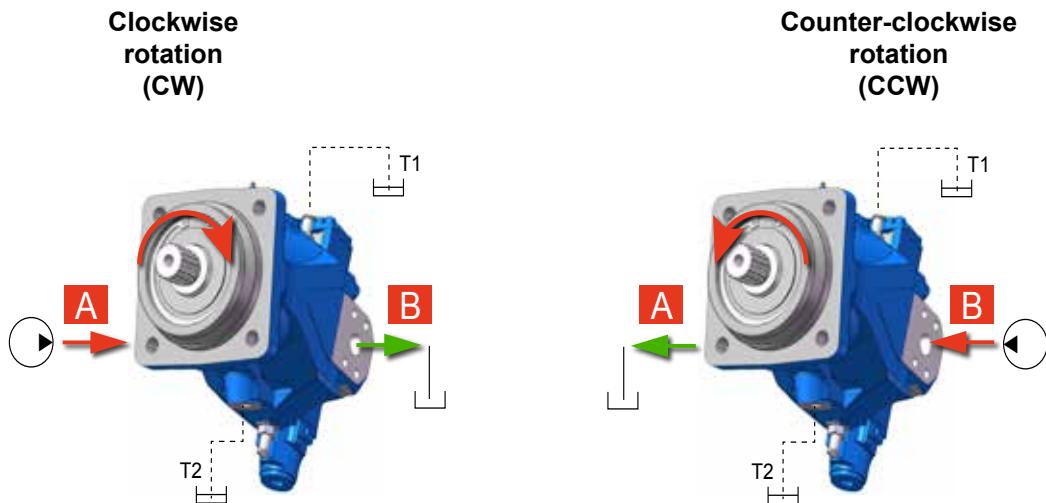
- As standard, LEDUC motors are fitted with FKM seals (Viton ®). Operating temperatures: from -13 to 239 °F (-25 à 115 °C).
- As an option, HYDRO LEDUC proposes NBR seals, for operating temperatures from -40 to 176°F (-40 to 80°C).

IMPORTANT NOTE:

Before start up, ensure the motor is filled with hydraulic fluid: See section on installation and start-up, page 15.

► Direction of rotation

The motors rotate clockwise or counter-clockwise depending on the direction of hydraulic flow entering the motor.

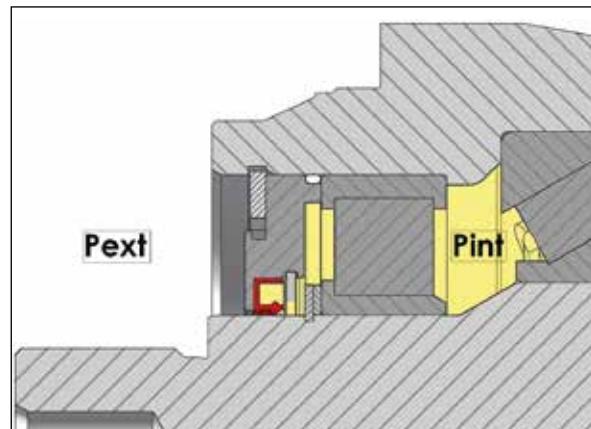


► Drain pressure

It is essential to drain the motor, T1 and T2, to avoid excessive pressures on the shaft seal. Maximum acceptable internal pressure depends on motor rotation speed.

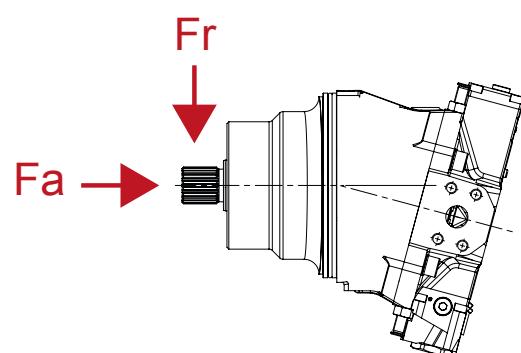
However, following these guidelines will avoid problems during operation:

- Maximum internal pressure (Int P) regardless of rotating speed (continuous): 58 psi (4 bar).
- Maximum pressure regardless of rotating speed: 80 psi (5.5 bar).
- The maximum pressure in the motor housing must be greater than the external pressure (ext P).



► Acceptable forces applied to motor shaft

Variable motors MV MVS1 MVA		85	115
Fr	daN	1300	1500
Fa	N/bar	80	60



MV	...	A	M2	F
01	02	03	04	05	06	07	08	09	10	11

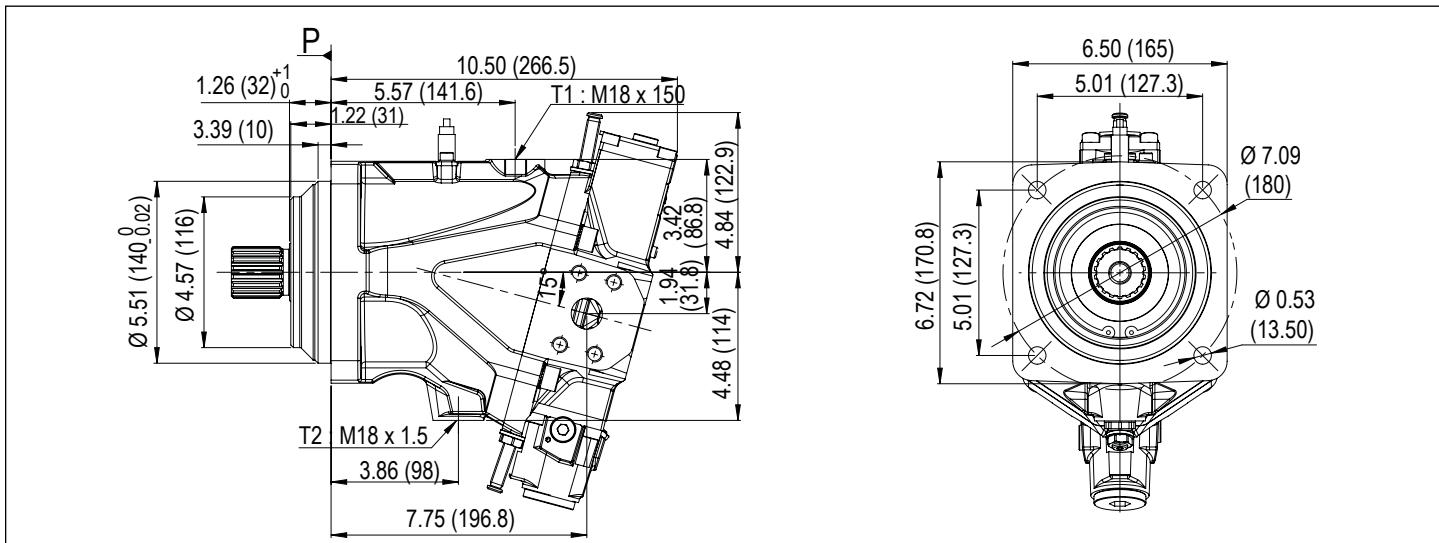
To obtain the code for your motor, complete the different parameters 01 to 11 in the table on the left according to the options you require (see table below).

Motor												
01			MV		MVISI		MVA		MV	MVISI	MVA	
Displacement												
02			85		115		85		115	85	115	
Mounting flange												
03			ISO 3019-2, 4 bolts		ISO 3019-2, 2 bolts		SAE C 4 bolts		SAE D 4 bolts	A	B	C
Shaft												
04	DIN 5480 splined	W40		W40		W40		W40		–	–	W1
	SAE J744 splined	1½" 17T 12/24 DP		1¾" 13T 8/16 DP		–		–		1½" 17T 12/24 DP	1¾" 13T 8/16 DP	S1
Inlet ports												
05	Flange	Rear	•	•	•	•	•	•	•	•	M0	
		Side	•	•	•	•	•	•	•	•	N0	
		(–)	(–)	(–)	(–)	(–)	(–)	(–)	(–)	(–)	N1	
Drain												
06			2	2	2	2	2	2	2	M2	M2	U2
Regulation												
07	Automatic high pressure		•	•	•	•	•	•	•	•	HPA	
	Hydraulic 2 speeds		•	•	•	•	•	•	•	•	H2N	
	Electric 2 speeds		•	•	•	•	•	•	•	•	E2N	
Suitable for use of speed sensor												
08	Yes	•	•	•	•	•	•	•	•	1	1	
	No	•	•	•	•	•	•	•	•	0	0	
Speed sensor												
09	Yes	•	•	•	•	•	•	•	•	1	1	
	No	•	•	•	•	•	•	•	•	0	0	
Flushing valve												
10	Without	•	•	•	•	•	•	•	•	SV	SV	
	With flushing valve	(–)	(–)	(–)	(–)	(–)	(–)	(–)	(–)	VB	VB	
Seal												
11	FKM	•	•	•	•	•	•	•	•	F	F	

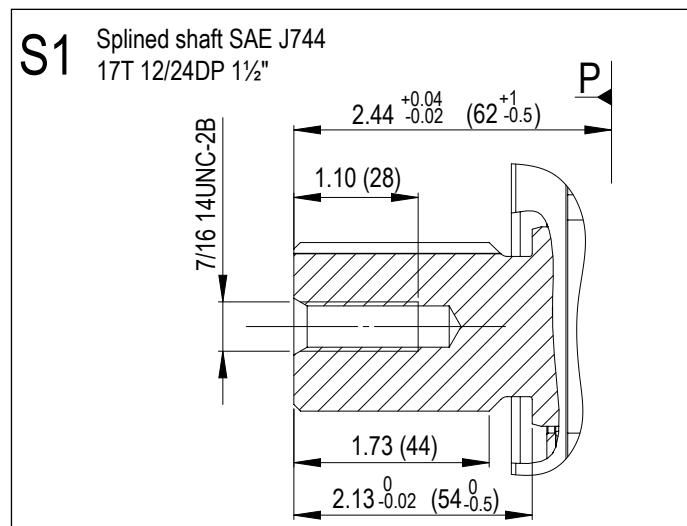
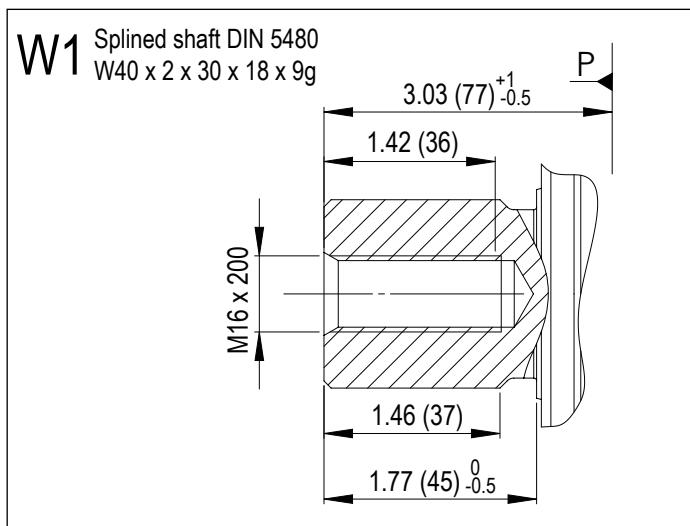
Legend:

- Existing model
- Not yet existing
- (–) Possible on request.

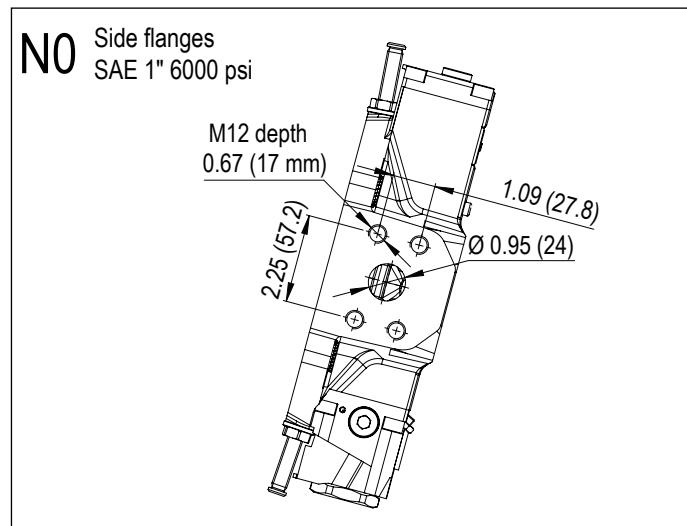
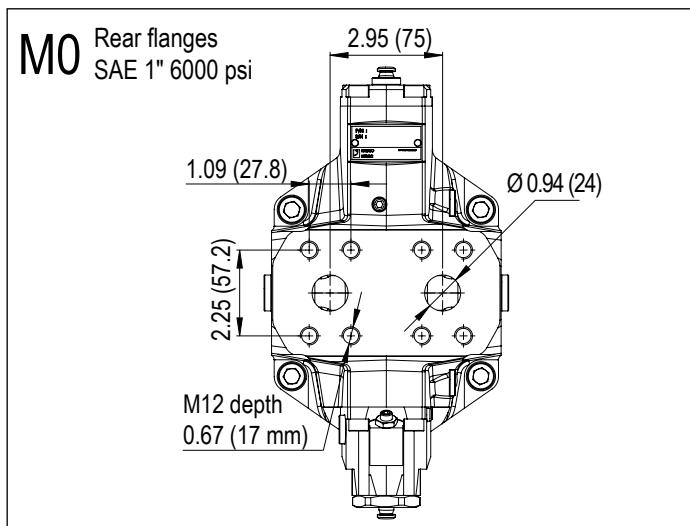
Requires a N1 flange.



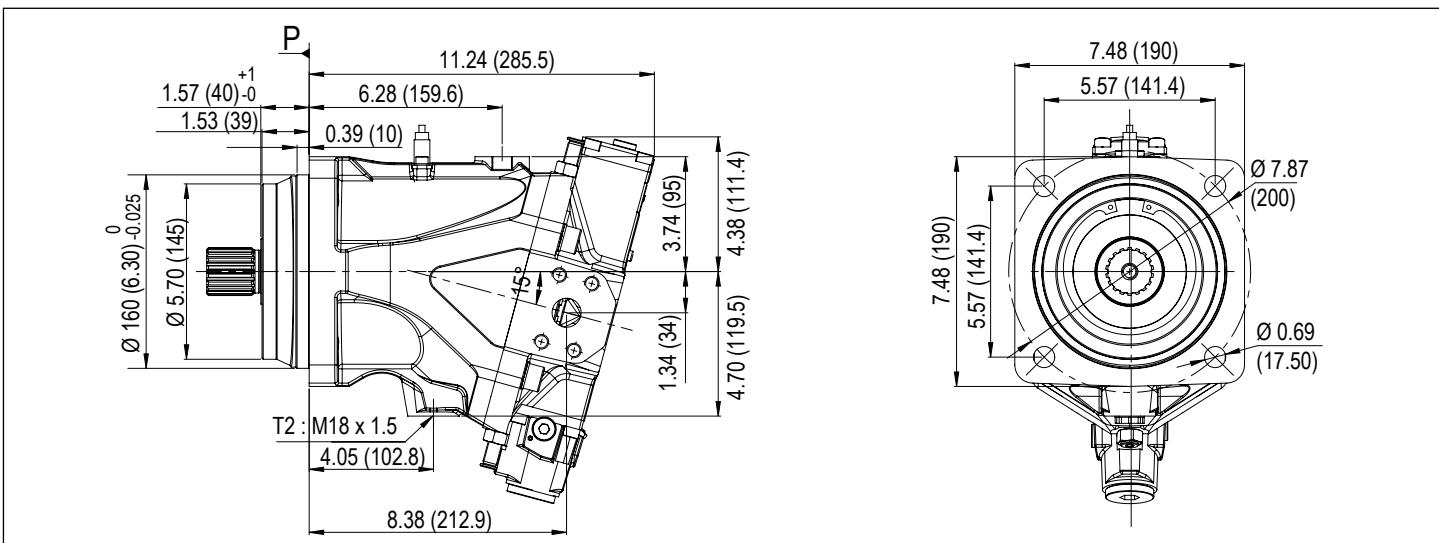
► Shaft - code 04



► Inlet ports - code 05

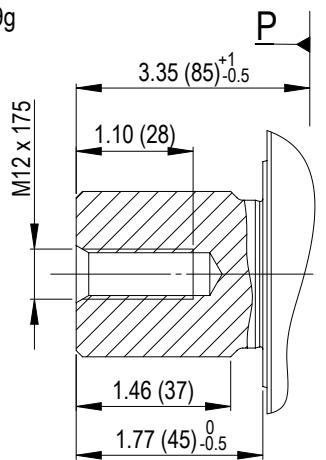


Dimensions in inches (mm) are given only as an indication.

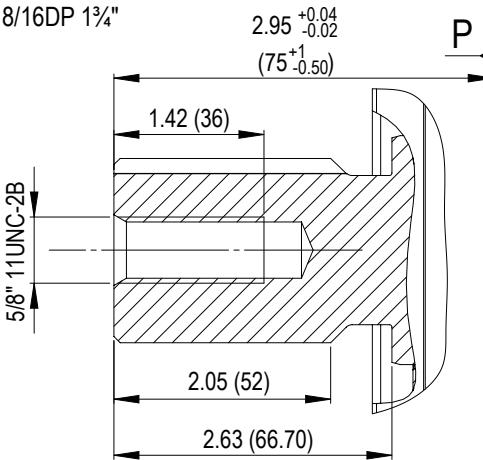


► Shaft - code 04

W1 Splined shaft DIN 5480
W40 x 2 x 30 x 18 x 9g

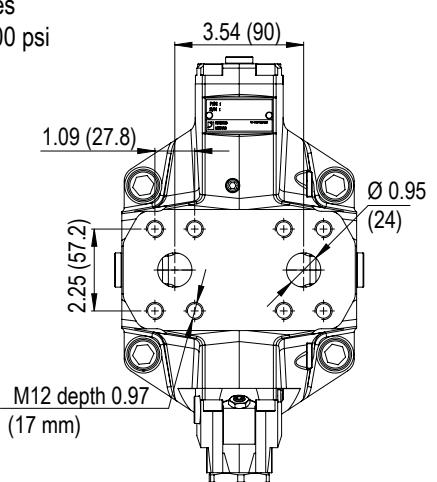


S1 Splined shaft SAE J744
13T 8/16DP 1 $\frac{3}{4}$ "

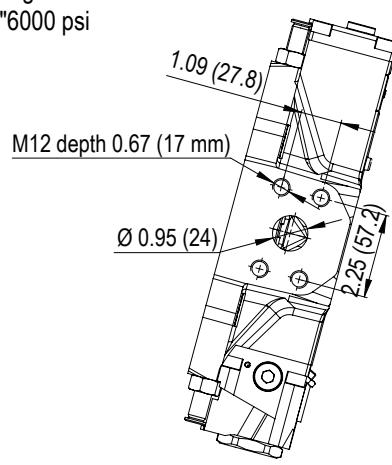


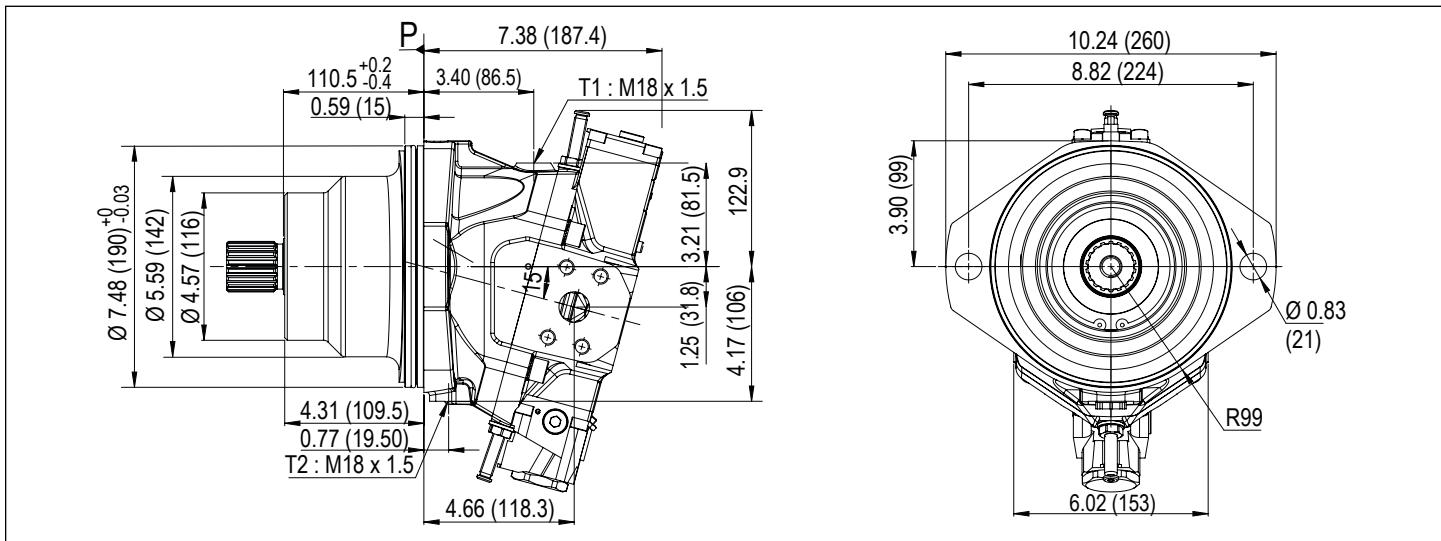
► Inlet ports - code 05

M0 Rear flanges
SAE 1" 6000 psi



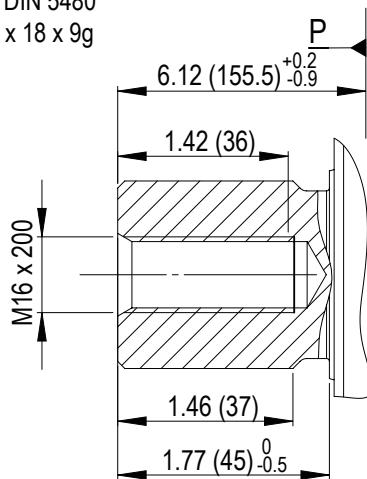
N0 Side flanges
SAE 1" 6000 psi





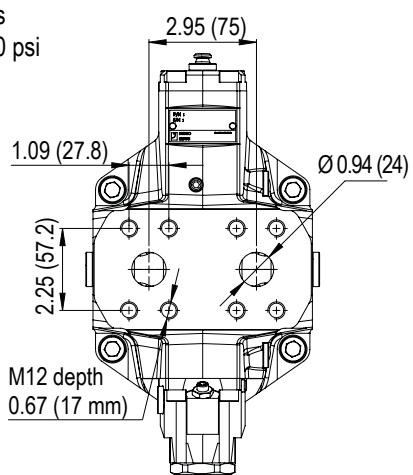
► Shaft - code 04

W1 Splined shaft DIN 5480
W40 x 2 x 30 x 18 x 9g

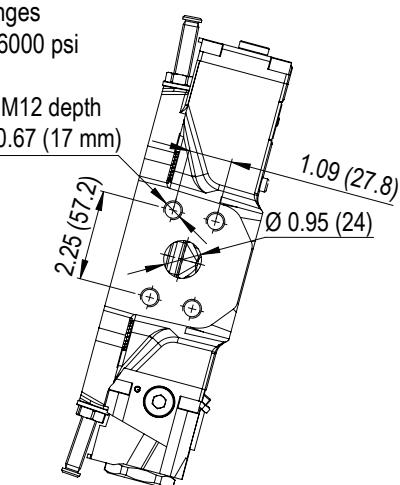


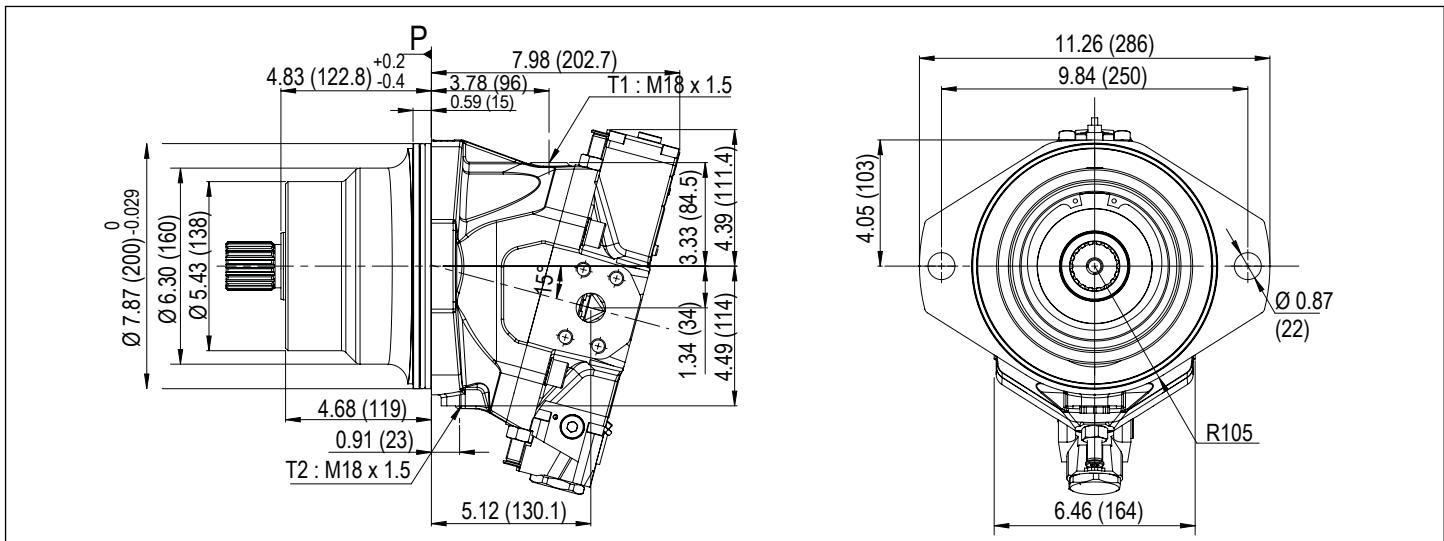
► Inlet ports - code 05

M0 Rear flanges
SAE 1" 6000 psi



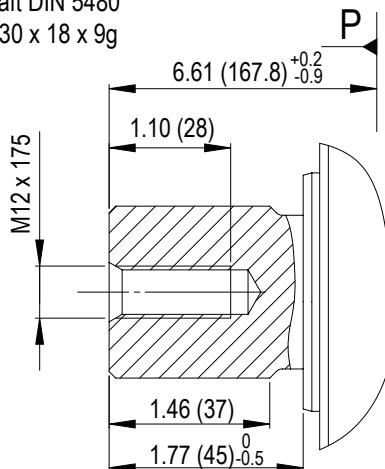
N0 Side flanges
SAE 1" 6000 psi





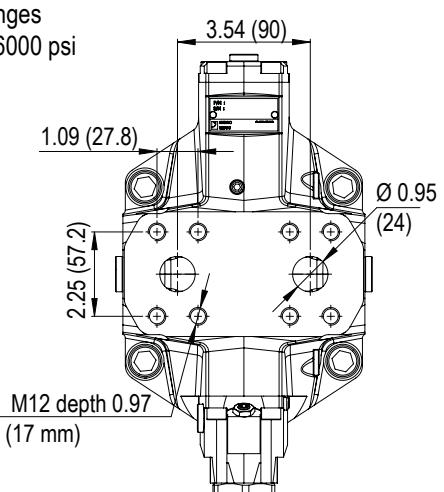
► Shaft - code 04

W1 Splined shaft DIN 5480
 $W40 \times 2 \times 30 \times 18 \times 9g$

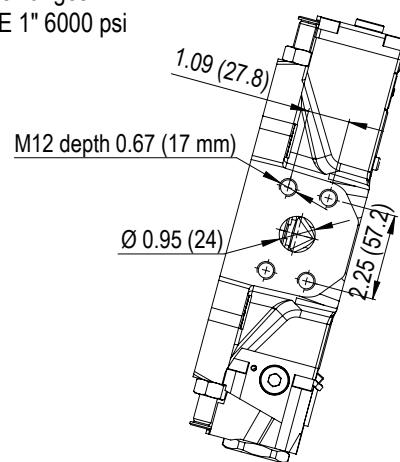


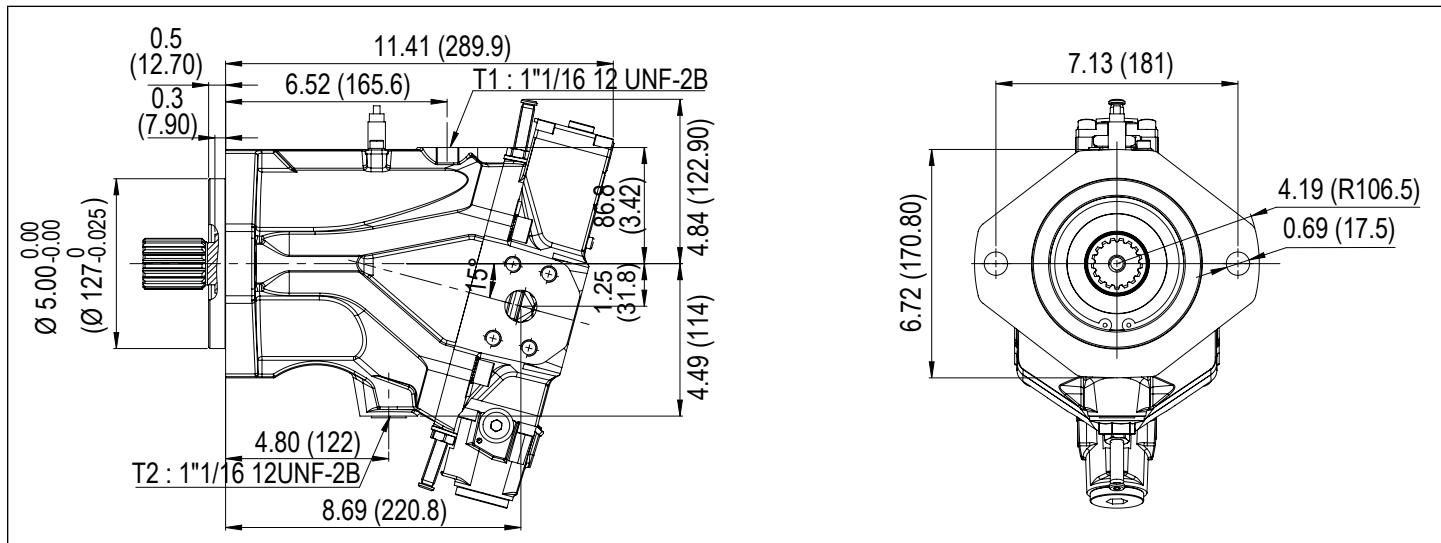
► Inlet ports - code 05

M0 Rear flanges
SAE 1" 6000 psi



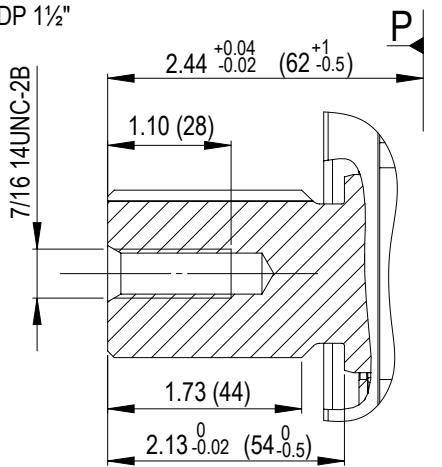
N0 Side flanges
SAE 1" 6000 psi





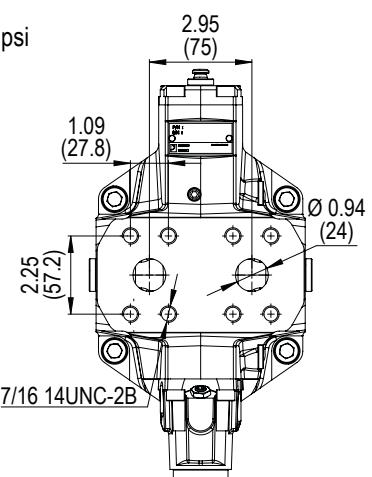
► Shaft - code 04

S1 Splined shaft SAE J744
17T 12/24DP 1½"

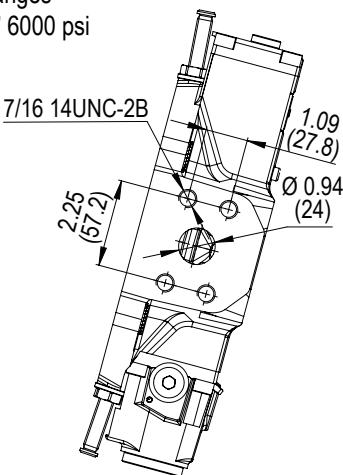


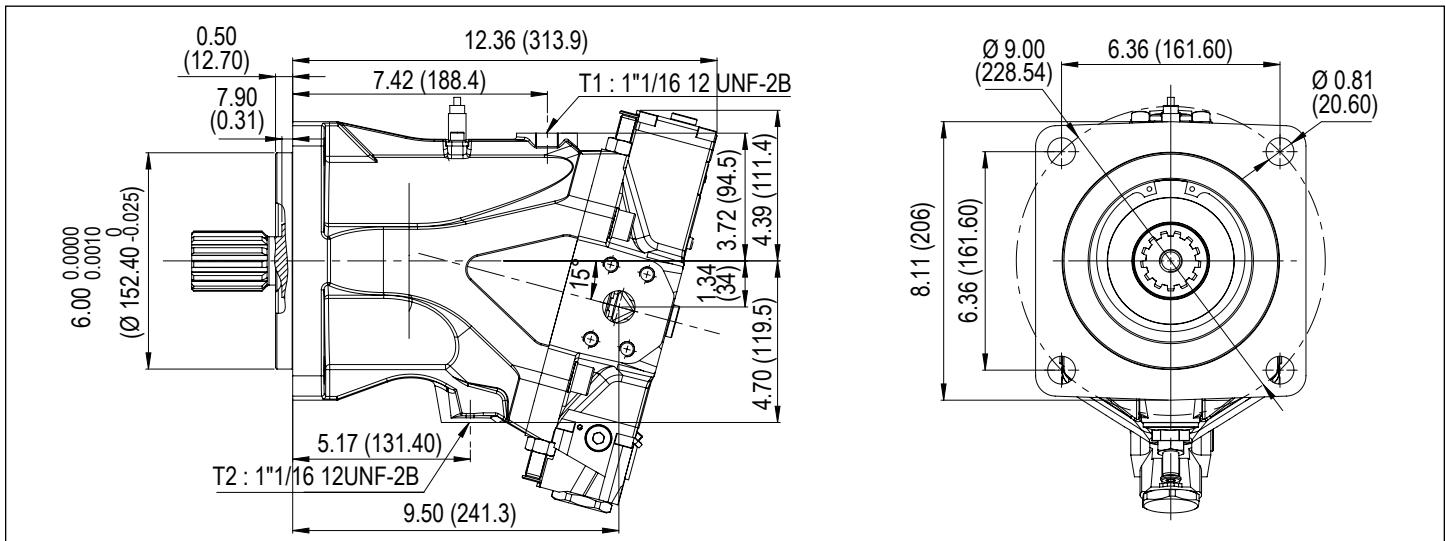
► Inlet ports - code 05

M0 Rear flanges
SAE 1" 6000 psi

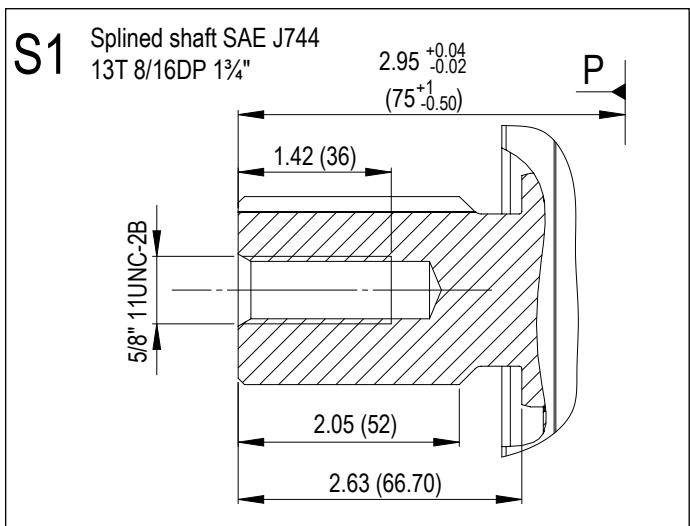


N0 Side flanges
SAE 1" 6000 psi

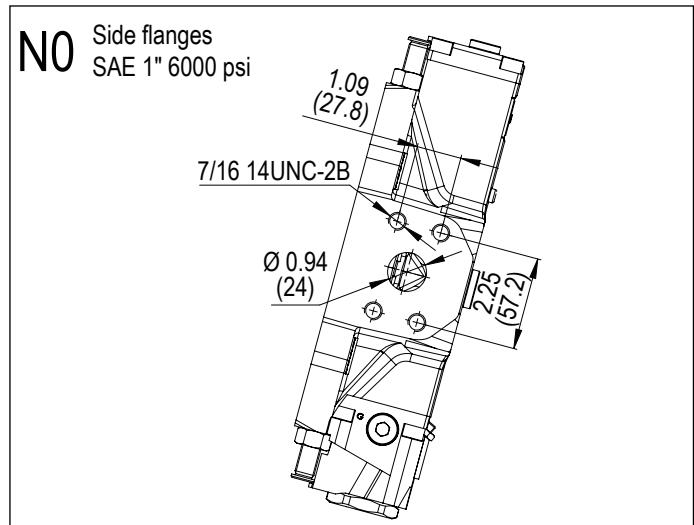
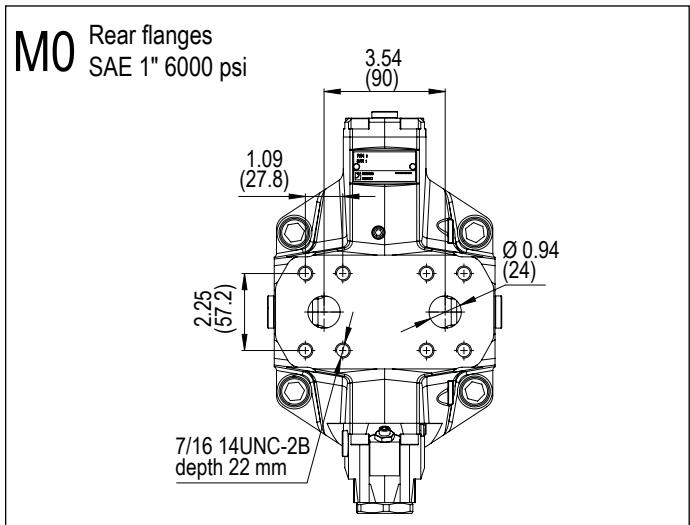




► Shaft - code 04



► Inlet ports - code



Dimensions in inches (mm) are given only as an indication.

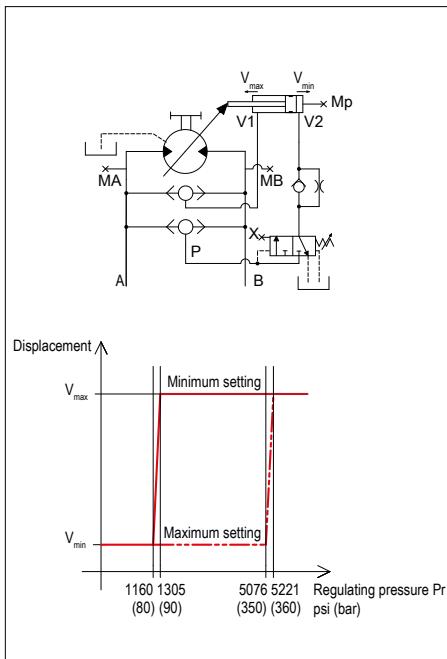
► Displacement settings - code

07

Automatic displacement control,
high pressure
HPA

Two speed hydraulic adjustment of
displacement:
H2N

Two speed electric adjustment of
displacement:
E2N

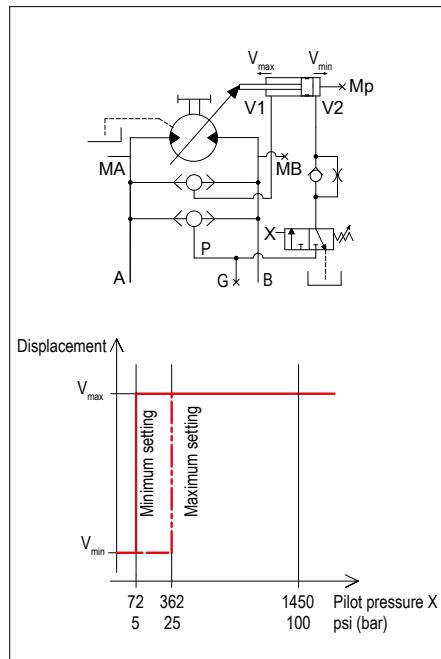


The automatic displacement control, high pressure, automatically adjusts displacement as a function of the set pressure level.

This can be set between 1160 and 5076 psi (80 and 350 bar).

Once set pressure has been reached, the motor starts changing displacement from V_{min} to V_{max} . Pressure remains stable, torque increases and speed decreases until V_{max} is reached.

Once V_{max} has been reached, motor pressure can exceed set pressure if required.

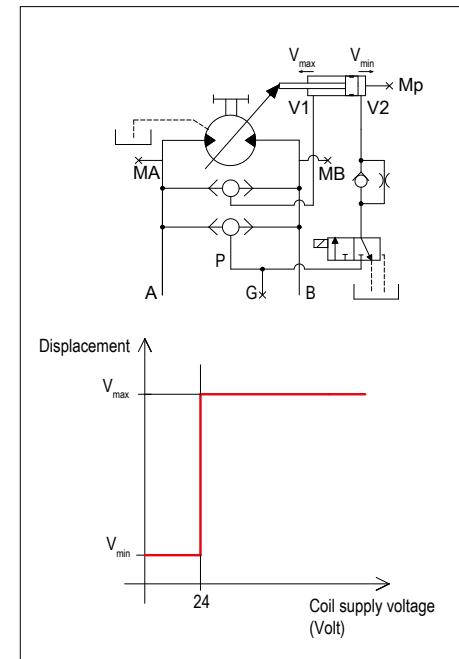


Setting V_{min} or V_{max} displacement is done by applying an external pilot pressure, or not.

Pilot pressure can be set by a screw from 72 to 363 psi (5 to 25 bar).

Once pilot pressure has been reached, the motor starts changing displacement from V_{min} to V_{max} (standard configuration). From V_{max} to V_{min} on request.

Important note: the pilot pressure line X must be drained when it is not under pressure (to ensure evacuation of leakage flow).



Setting V_{min} or V_{max} displacement is done by applying an external electrical current via a solenoid, or not.

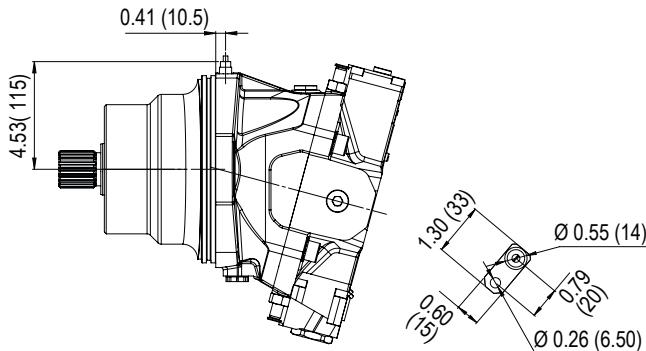
Standard voltage of the coil is 24V (12V on request).

When the coil is activated, the motor starts changing displacement from V_{min} to V_{max} (standard configuration). From V_{max} to V_{min} on request.

SPEED SENSOR & INDICATOR OF DIRECTION OF ROTATION LEDUC CODE: 093327

Codes 08 and 09

MV, MVA, MVI series motors can be fitted with an induction type speed sensor, to measure rotating speed and also direction of rotation. This accessory may only be used on motors which are suitably adapted to take it (see the order code system).



► Technical data for the sensor

Supply voltage	5...32 V DC
Current consumption	maximum 6 mA without load
Output frequency	0 Hz...20 kHz
Protection type	IP 69 k
Operating temperature	-104°F...+257°F (-40°C...+125°C)
Weight	around 0.14 lbs (65 g)
Cable length	19.7 inches (50 cm)

FLUSHING VALVE | LEDUC CODE : VBS 091180

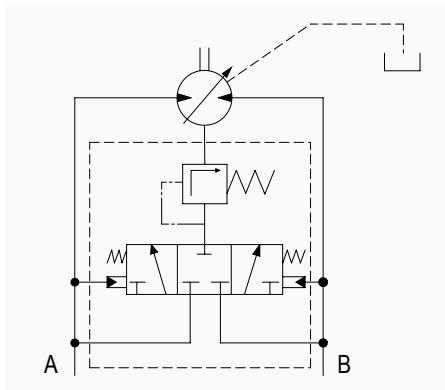
Code 10

Used to create flow to cool the motor. This valve is essential for all intensive uses of motors and contributes to long service life.

The valve takes some hydraulic fluid from the return connection port (low pressure) and reinjects it into the motor housing. This is then evacuated via the motor drain line.

Flushing valves are only available for use with motors with side ports (N1).

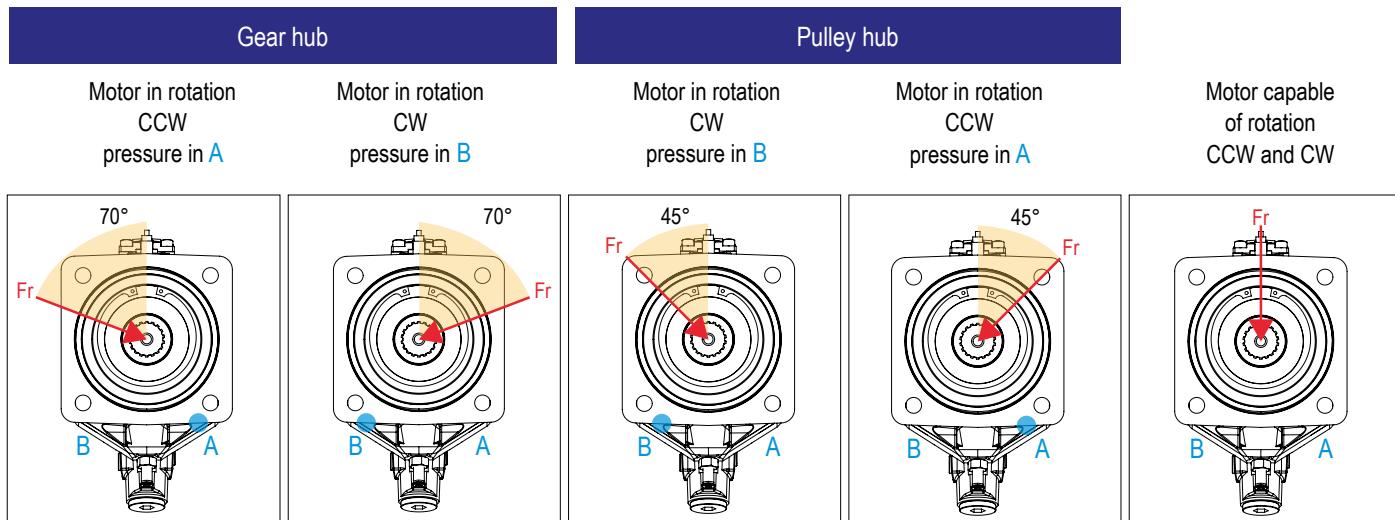
► Schematic drawing of the flushing valve



Dimensions in inches (mm) are given only as an indication.

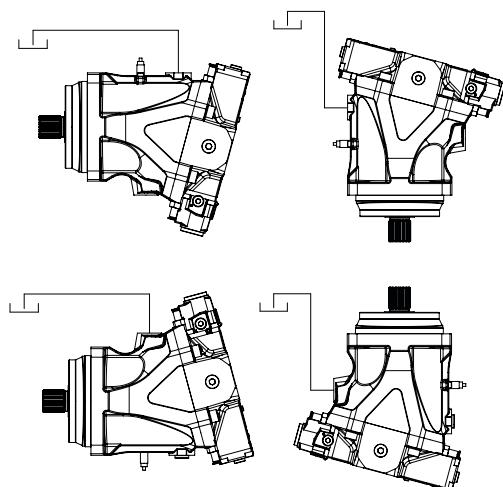
► Maximizing service life of bearings

In cases where there is a radial force on motor shaft, keeping the direction of that force within the shaded areas shown below will improve service life of the motor.

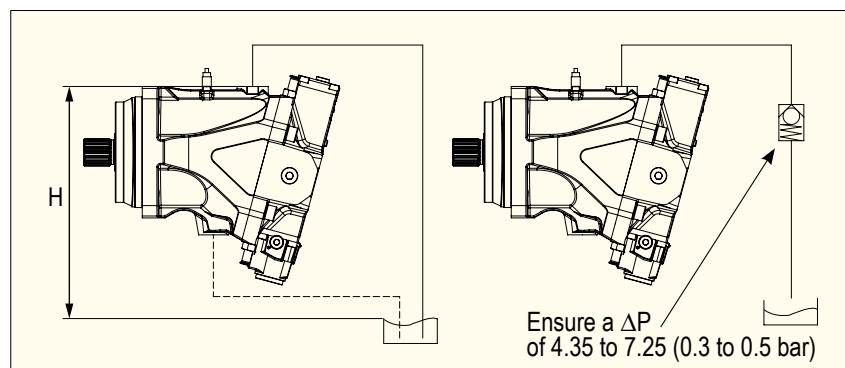


► Mounting position of motors

LEDUC motors can be used in only mounting position. In "shaft upwards" position, make sure that the motor housing is completely filled with fluid.



In installations where the position of the motor (H) is above the tank for the drain return, be sure the drain line is always submerged in fluid. If this is not the case, it is necessary to add a check valve on the drain line as shown the figure on right.



A passion for hydraulics

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