

Bent axis hydraulic motors

MIX
Series



 **HYDRO
LEDUC**

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MX series motors

HYDRO LEDUC hydraulic motors of the MX series are of bent axis design, with an angle of 40°. They combine high performance and reduced size envelope:

- global efficiency of over 90% (guaranteed in most applications);
- suitable for use at operating speeds between 50 and 8,800 rpm;
- optimized weight and size.

Available in displacements from 18cc to 108cc, MX motors are designed for applications on trucks or construction type equipment, where intensive use is intermittent. (For heavy duty applications, HYDRO LEDUC offers M and MSI series motors, literature available on request.)

MX motors are designed for use in either closed or open loop systems.

To ensure the best service life from your motors, please take care to follow the installation and start-up recommendations (see pages 2 and 8).



HYDRO LEDUC also manufactures a range of semi-integrated (plug-in) motors, the **MSI** series and range of ISO flange motors: the **M** series type **M**. Literature on request or on our website : www.hydroleduc.com



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Advantages of MX series motors

■ Definition of function

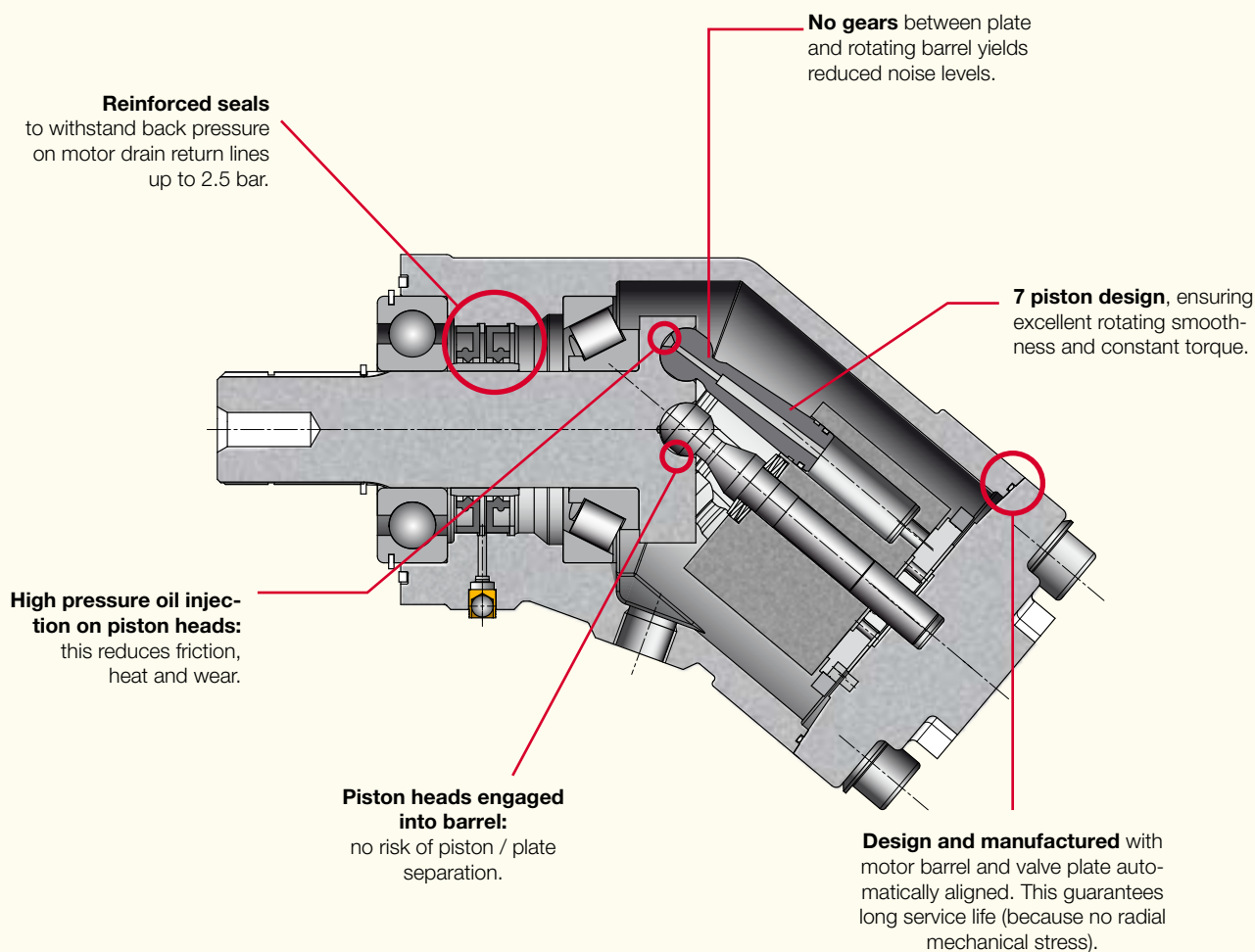
Hydraulic motors transform hydraulic flow into rotating speed and hydraulic pressure into mechanical torque.
Motor rotating speed is proportional to the flow which is supplied to it.
Torque produced is proportional to the hydraulic pressure the motor receives.

■ Main applications of hydraulic motors

Typical applications are those requiring high torque within a small size.
The hydraulic motor is essential for rotations where:
- mechanical solutions are complex or even impossible,
- electrical or pneumatic power sources are not available,
- environments are dangerous (i.e. risk of explosion or extreme temperatures).

■ Advantages of HYDRO LEDUC motors

All structural components are made from similar materials resulting in consistent thermal expansion and exceptional reliability.



Operating conditions of MX series motors

Hydraulic fluid

HYDRO LEDUC motors are designed to be powered 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 200 cSt;
- Maximum range: between 5 and 1600 cSt.

Filtration of hydraulic fluid

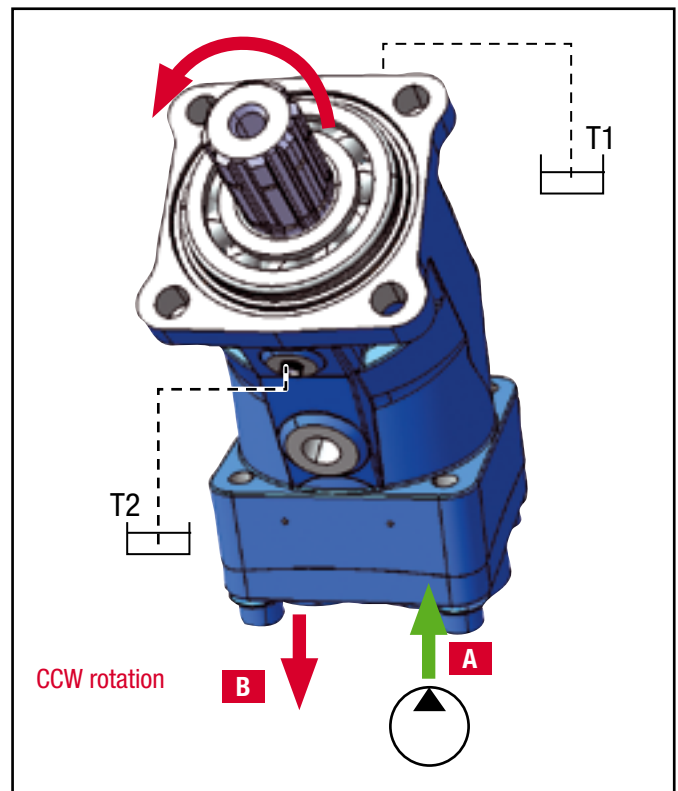
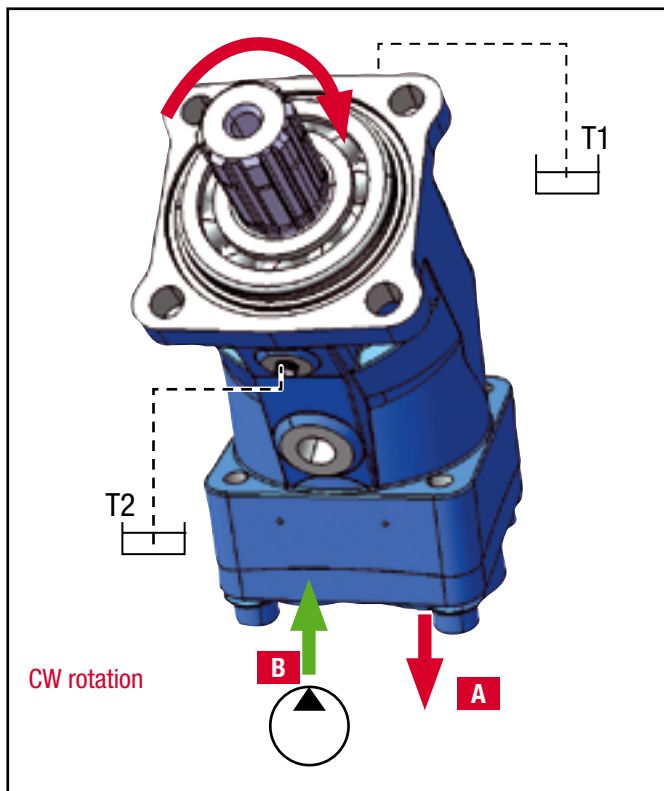
The service life of the motors depends greatly on the quality and the cleanliness of the hydraulic fluid.

We recommend minimum cleanliness as follows:

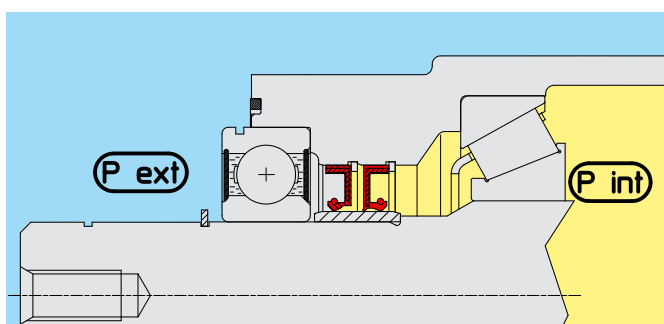
- NAS 1638 class 9
- SAE class 6
- ISO/DIS 4406 class 18/15.

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 or T2, to avoid excessive pressures on the shaft seal.

Maximum acceptable internal pressure depends on motor rotating speed.

However, following these guidelines will avoid problems during operation:

- maximum internal pressure (**P int**) regardless of rotating speed (continuous): 2.5 bar (60psi);
- maximum internal pressure (**P int**) regardless of rotating speed (peak): 3 bar (80psi);
- minimum pressure in the motor housing: must be greater than ambient (external) pressure (**P ext**).

Determination MX series motors

How to determine the correct motor for your application

Calculations using usual mechanical units:

- N = rotating speed in rpm
- C = torque in N.m
- P = pressure supplied by the generator (hydraulic pump), in bar
- ΔP = pressure difference between A and B, in bar
- Disp. = displacement in cc
- Q = flow in litres per minute
- η = efficiency (%)

1. Torque supplied by the hydraulic motore

$$\text{Theoretical torque} = \frac{\text{Disp.} \times \Delta P}{20 \pi} = C_{th}$$

$$\text{Torque } C = C_{th} \times \eta_{\text{motor}}$$

For example: a 50cc motor with a ΔP of 250 bar will supply a theoretical torque of : 200 N.m.
Average global efficiency of the motor is 90%, actual torque is thus: 180 N.m

2. Rotating speed of the motor

The rotating speed of the hydraulic motor depends on the flow Q which goes through it, and on the displacement of the motor.

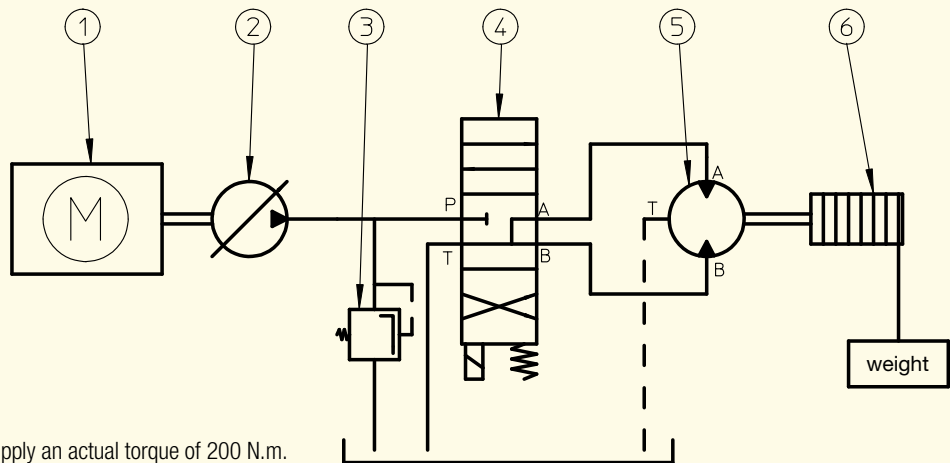
$$N = \frac{Q}{\text{Disp.}} \times 1000$$



test bench for motors

Example

- ① Motor
- ② Variable displacement pump
- ③ Pressure relief valve
- ④ Valve
- ⑤ Hydraulic motor
- ⑥ Winch and load



The receiving organ (winch) ⑥ needs to rotate at $N = 400$ rpm and supply an actual torque of 200 N.m.

The hydraulic pump ① is capable of operating at pressure P up to 350 bar.

1. Calculating the displacement of the hydraulic motor:

$$C_{th} = \frac{\text{Disp.} \times \Delta P}{20 \pi} \text{ thus Disp. } \mathbf{Cy = 35.9 \text{ cc}}$$

..... → In the HYDRO LEDUC range, choose a motor with a displacement of **32 cc** or **41 cc**.

2. Calculating the flow Q which the pump needs to supply:

$$N = \frac{Q}{\text{Disp.}} \times 1000 \text{ thus } \mathbf{Q = 14.36 \text{ l/min}}$$

Corresponding flow :
- for **32 cc** motor, $Q = 12.8 \text{ l/min}$
- for **41 cc** motor, $Q = 16.4 \text{ l/min}$

Range and characteristics MX series motors



Characteristics of the MX series motors

MX series motors are designed for use on:

- truck equipment;
- construction equipment;
- agricultural machinery;

for intermittent service applications.

These motors are designed with a DIN interface.

Displacement (cc)	continuous max. speed ⁽¹⁾ (rpm)	Intermittent max. speed ⁽¹⁾ (rpm)	Max. flow absorbed (l/mn)	Torque bar (m.N/bar)	Torque at 350 bar (m.N)	Motor max./min. temperature* (°C)	Max. allowable pressure continuous / peak (bar)	weight (kg)
18	8000	8800	144	0.28	98	-25 / 110	400 / 450	9
25	6300	6900	158	0.4	140	-25 / 110	400 / 450	9
32	6300	6900	202	0.5	175	-25 / 110	400 / 450	9.2
41	5600	6200	230	0.65	227	-25 / 110	400 / 450	9.2
50,3	5000	5500	252	0.8	280	-25 / 110	400 / 450	10.8
63	5000	5500	315	1	350	-25 / 110	400 / 450	10.8
80,4	4500	5000	362	1.27	445	-25 / 110	400 / 450	14.2
108,3	4000	4400	435	1.7	595	-25 / 110	400 / 450	14.2

* for wider extreme temperatures, please contact us.

(1) for higher speeds, please contact us.

For special fluids, please contact us.

4

Acceptable forces applied to motor shaft

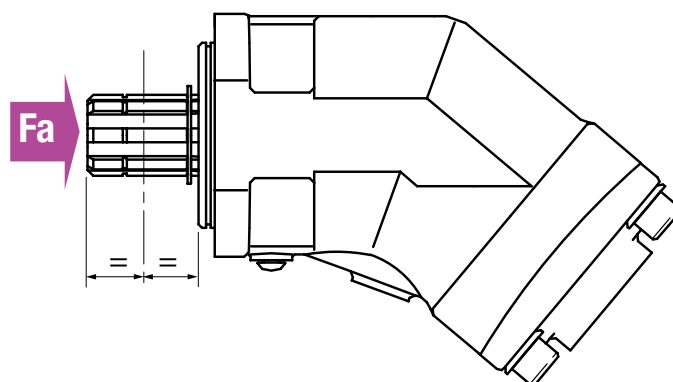
Fr : radial force measured at mid point of length of shaft.

Avoid having any radial or axial force on the shaft of MX motors. If that is not possible, please contact our Technical Department with details of application.

Displacement	cc	18	25	32	41	50.3	63	80.4	108.3
Fa	N/bar*	20	30	30	40	40	50	60	80

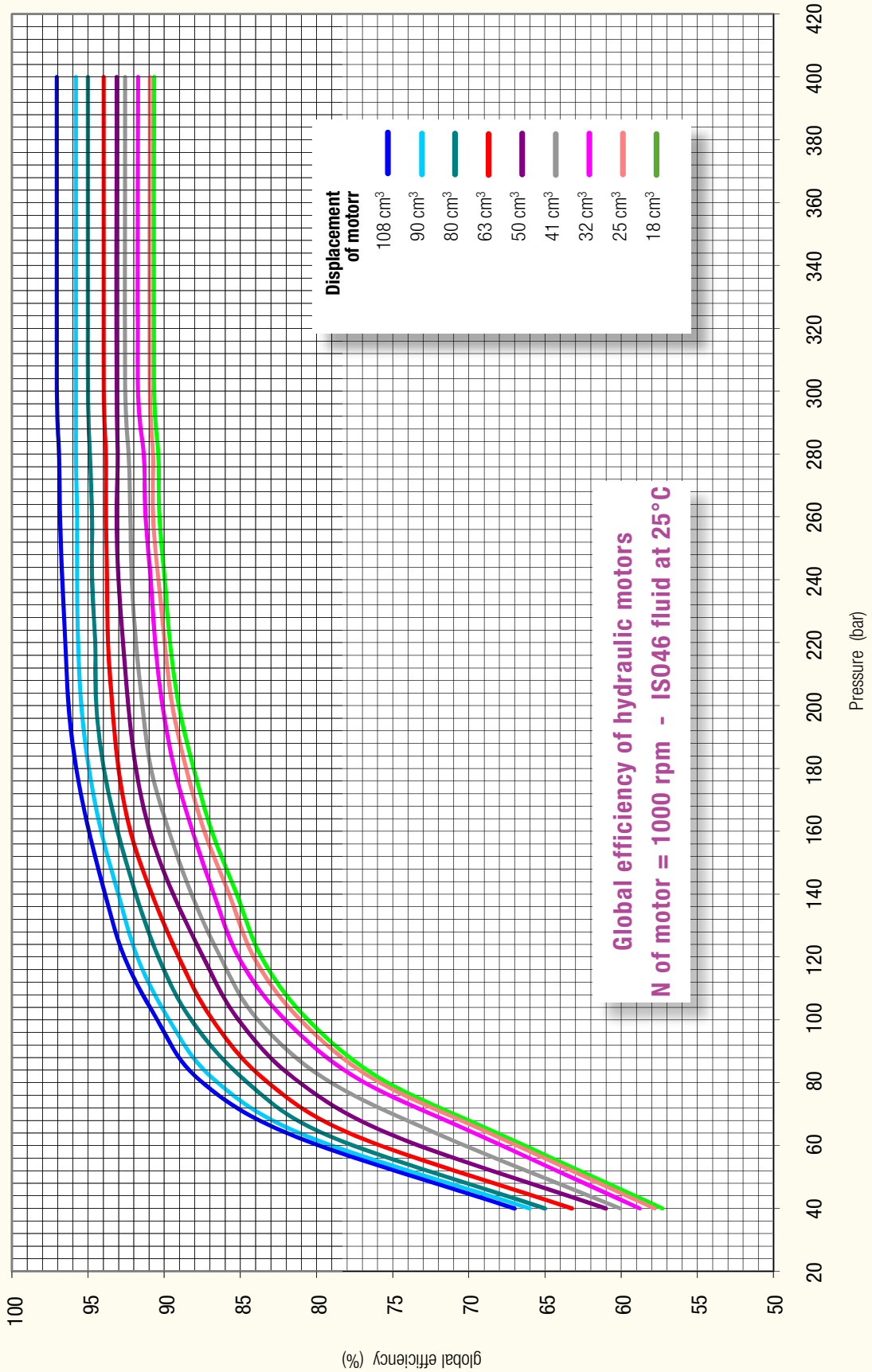
* differential pressure between A and B.

For other forces, please contact us.

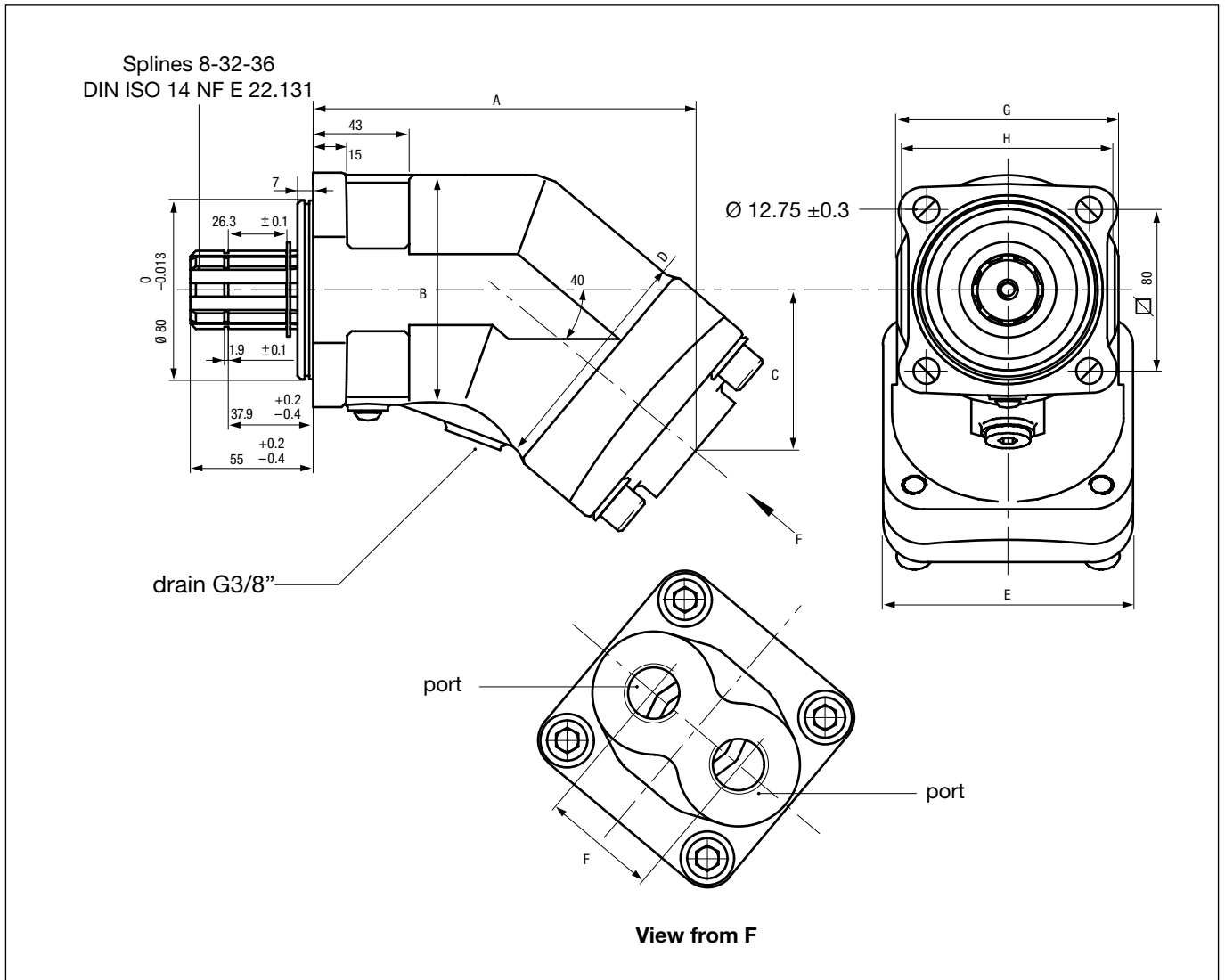


Efficiency MX series motors

■ Efficiency of motors $f(\text{displacement})$



Dimensions MX series motors



Motor model	Dis. (cc)	A	B	C	D	E	F	G	H	ports	weight (kg)
MX18-090330	18	167.5	103	68.5	103	108	45	98	98	G3/4"	9
MX25-090340	25	167.5	103	68.5	103	108	45	98	98	G3/4"	9
MX35-090050	32	178.4	103	77.8	103	108	49.7	98	98	G3/4"	9.2
MX40-090480	41	178.4	103	77.8	103	108	49.7	98	98	G3/4"	9.2
MX50-090040	50.3	192.2	103	89.4	103	108	49.7	98	98	G3/4"	10.8
MX65-090030	63	192.2	103	89.4	103	108	49.7	98	98	G3/4"	10.8
MX80-090010	80.4	219.2	114	102.3	114	123	56.3	109	105	G1"	14.2
MX110-090020	108.3	219.2	114	102.3	114	123	56.3	109	105	G1"	14.5

■ HYDRO LEDUC motors are certified ATEX.

As standard, all HYDRO LEDUC motors are classed in Group II category 2 **D T4**.

On request, motors may be supplied for:

- Group II category **2G**;
- Group II category **D T4**.

In these cases, the motors are not painted and are open to risk of corrosion.

Explanation of the different groups:

- **group II category 2** means it is possible to operate in an ATEX **1** zone (probable gas atmosphere) or ATEX **21** zone (probable dusty atmosphere).
- **G** = may operate in a gas zone.
- **D** = may operate in a dusty atmosphere.
- **T4** : maximum surface temperature of 135°C.

■ Precautions regarding ATEX

The operating temperatures of the motors must be guaranteed by the end user.

Check all parts connected to the motor for conformity with ATEX.

■ Markings on motors

Example of ATEX marking on motors:

CE  **II 2 D c T4 (135°C) HL 1**

If you have different requirements, please contact us.



- 1
- 2
- 3
- 4

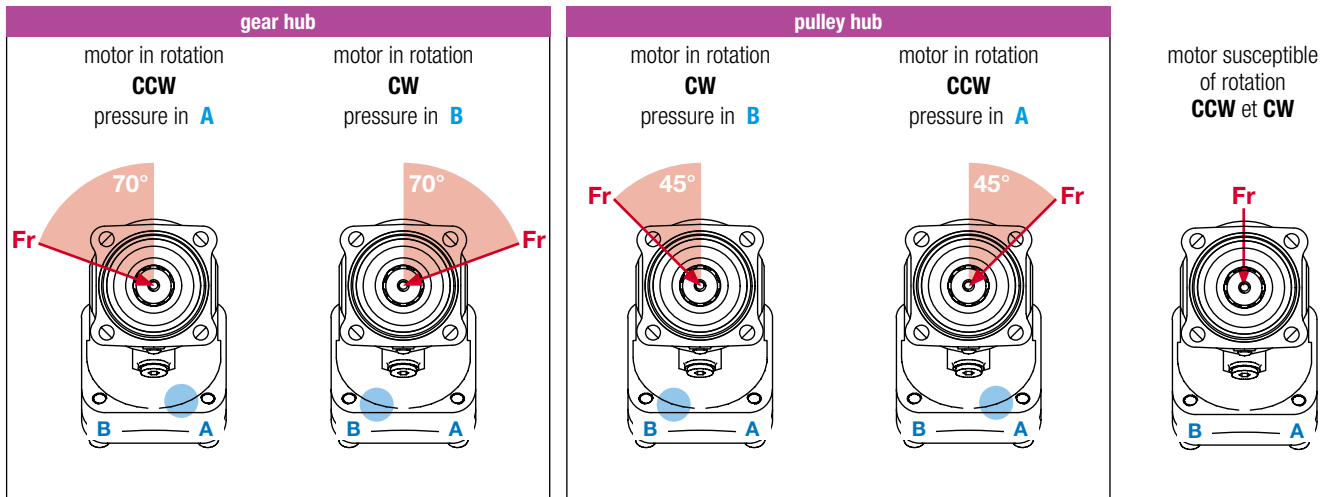
- 1 Dimensional control of M motor housing
- 2 Assembly of M motor
- 3 Spline cutting (shaft)
- 4 MSI motors

Installation and start-up MX series motors

Maximizing service life of bearings

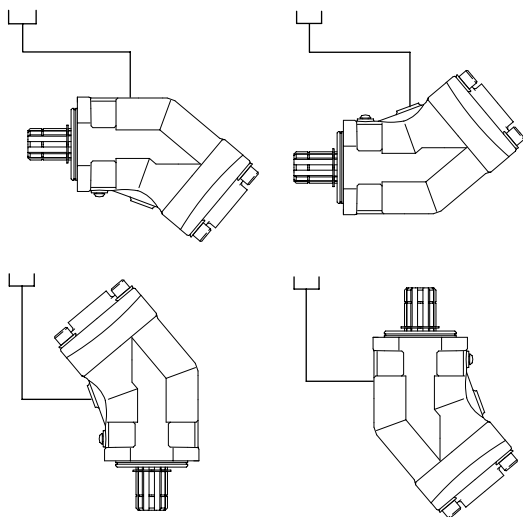
In cases where there is a radial force on motor shaft, keeping the direction of that force within the shaded areas shown below will improve service life of the motor.

For acceptable radial and axial forces, see page 4.

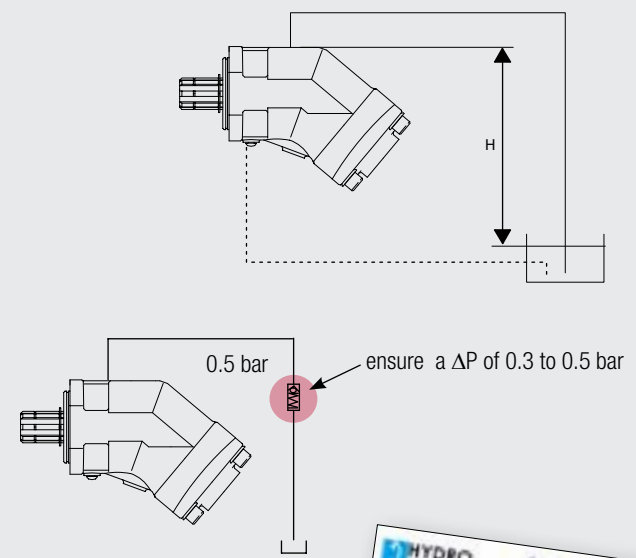


Mounting position of motors

HYDRO LEDUC motors can be used in any position.



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 following the figure below.



Operating conditions

See page 2.

Instructions for use

Each motor is supplied with an instruction leaflet, also available via e-mail on request mail@hydroleduc.com.



other product lines

piston pumps for trucks

HYDRO LEDUC offers 3 ranges of piston pumps perfectly suited to all truck, construction equipment, and PTO-mount applications.



**DELTA
SAE**

Industrial applications

Variable displacement pumps with Load Sensing control, pressure compensation or other control device. Capable of operating at high pressure, in a small space envelope. SAE shafts and flanges.

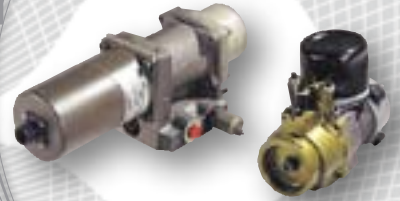
TXV

micro-hydraulics

This is a field of exceptional HYDRO LEDUC know-how:

- axial and radial piston pumps, of fixed and variable displacement,
- axial piston micro-hydraulic motors,
- micro-hydraulic units incorporating pump, electric motors, valving, controls, etc.

To users of hydraulic components which have to be housed in extremely small spaces, HYDRO LEDUC offers complete, original and reliable solutions for even the most difficult environments.



**PA
PAC**

hydro-pneumatical accumulators

Bladder, diaphragm and piston accumulators. Spherical and cylindrical accumulators. Volume capacities from 20 cl to 50 litres. Pressures up to 500 bar. Accessories for use with hydraulic accumulators.



**we are passionate
about hydraulics...**

**HYDRO
LEDUC**

A dedicated R&D team means HYDRO LEDUC is able to adapt or create products to meet specific customer requirements. Working in close cooperation with the decision-making teams of its customers, HYDRO LEDUC optimises proposals based on the specifications submitted.

A passion for hydraulics

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