

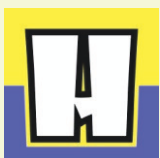
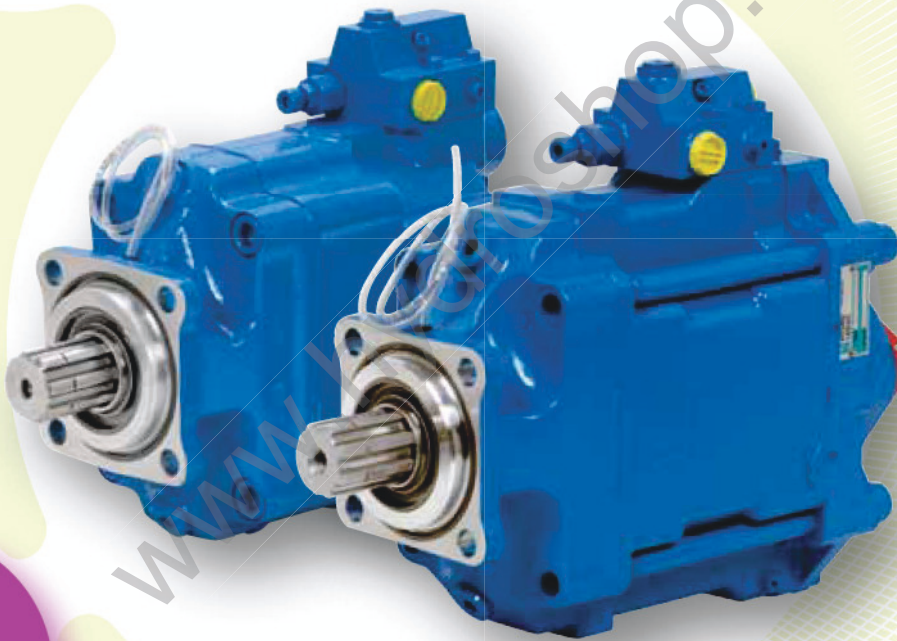
# Variable displacement pumps



HYDROSHOP

**TXV**  
Series

for  
**trucks**



 **HYDRO  
LEDUC**

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## TXV pumps

LEDUC TXV pumps are intelligent pumps! With variable displacement and pressure-flow control – called Load Sensing – they automatically regulate to give just what is needed for each movement. Specifically designed for the needs of the truck hydraulic market, the TXV pumps are particularly attractive solutions for applications in loading cranes, forestry cranes, refuse vehicles, salt spreaders and snow and ice equipment, and construction equipment vehicles.

Extremely compact in size (only 125mm wide) to allow direct flange-mounting on motor PTOs or gearbox PTOs, TXV pumps are available in 7 models from 40cc to 150cc maximum displacement. Maximum service pressure is up to 440 bar depending on models.

## A complete range dedicated to truck hydraulics

### XP Serie

XP bent axis piston pumps, displacement from 12 to 130 cc/rev.  
Literature on request or on our website: [www.hydroleduc.com](http://www.hydroleduc.com)



### PA-PAC-PAD Series

The PA-PAC-PAD pump series comprises three ranges: single flow 12 to 114 cc/rev, twin-flow of 2x25 to 2x75 cc/rev and two different flows 75-40 cc/rev.

Literature on request or on our website: [www.hydroleduc.com](http://www.hydroleduc.com)



### XA SAE Series

The SAE version of XP bent axis pumps.  
Literature on request or on our website: [www.hydroleduc.com](http://www.hydroleduc.com)



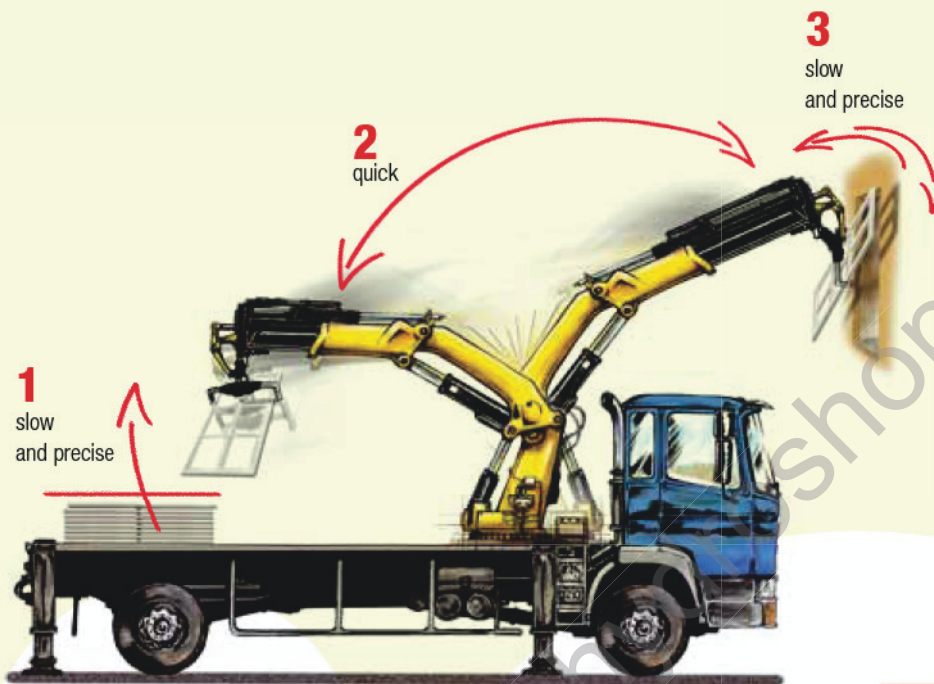
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# Why use a variable displacement pump?

## Variable displacement: only advantages!

Installing a TXV variable displacement pump will transform your hydraulic equipment. Slow or rapid movements are done with precision, due to the constant adjustment of pump flow rate.



precise control of all movements

### multi-function capabilities:

- simultaneous movements, all independant of load
- avoid problems of fluid over-heating
- reduce energy consumption

The pump incorporates a load sensing device to control flow and maximum pressure.

This is piloted by a proportional valve which sends a signal directly to the pump to advise of the flow needed by the hydraulic circuits, as a function of required speed but regardless of load.

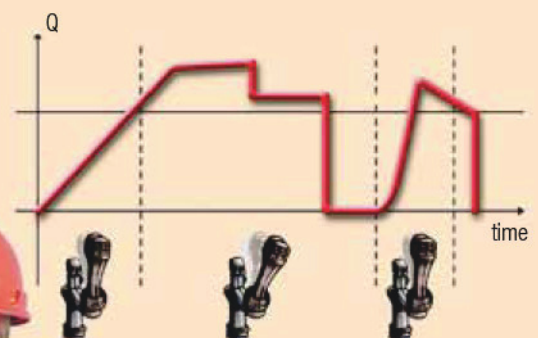
### 1 & 3

For slow, precise movements, the pump can adjust its flow whilst also controlling pressure. This avoids over-heating of fluid, excessive noise and fluid degradation which can occur with fixed displacement pumps.

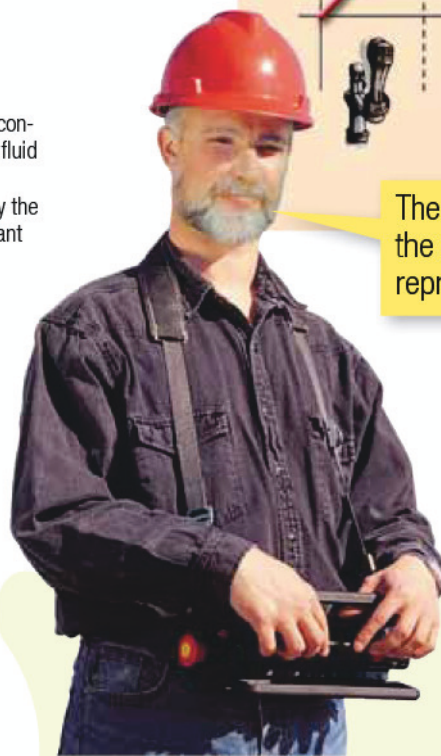
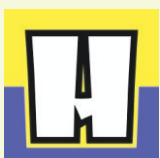
The motor driving the pump only provides the power actually needed by the equipment, thus ensuring longer service life of that equipment, significant gains in energy consumption, and overall a more environmentally friendly solution.

### 2

For rapid movements, the pump supplies the required flow virtually instantaneously.



The proportional movement of the control lever is perfectly reproduced.



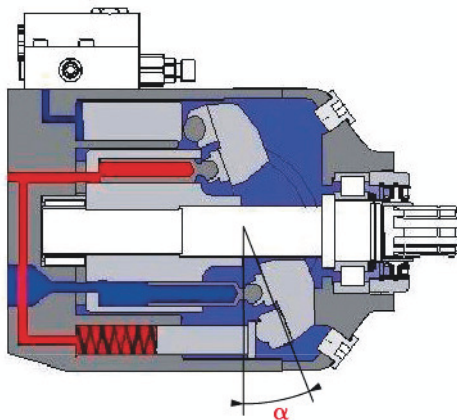
# Why use a variable displacement pump?

The TXV variable displacement pumps are of axial piston design, with 11 pistons, thus allowing very slim size envelope (125mm wide), optimal regularity of flow, and low noise levels.

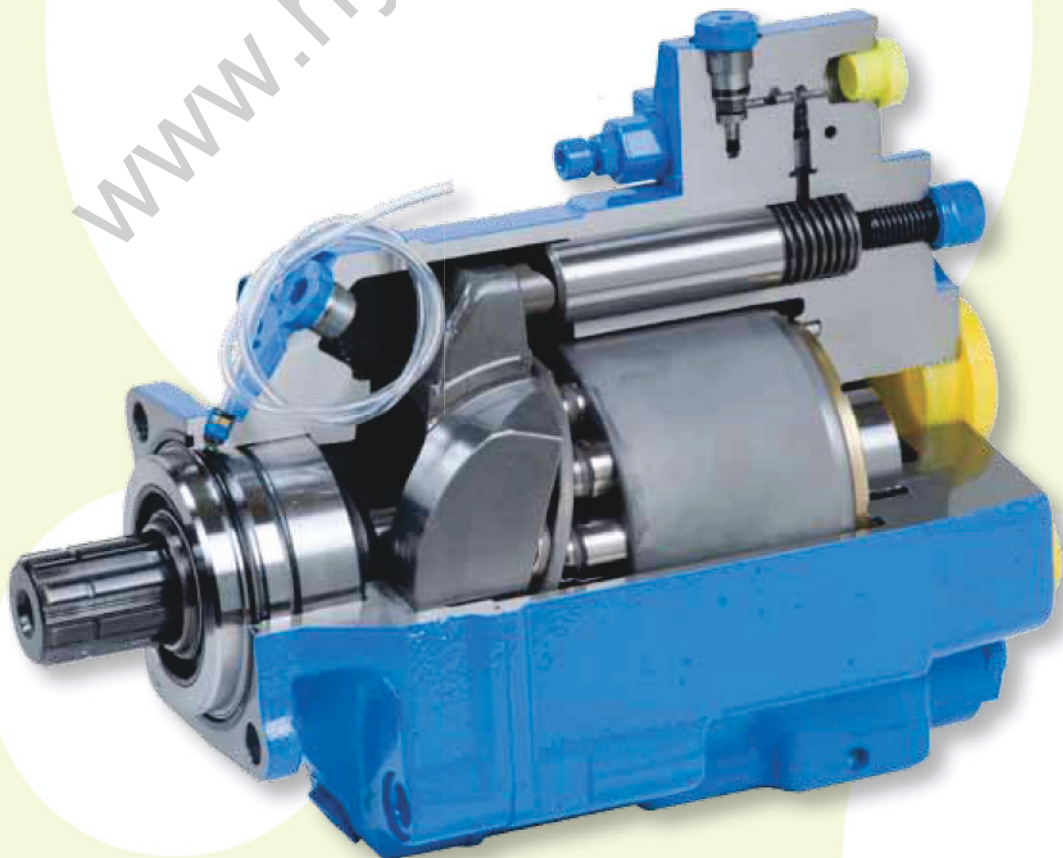
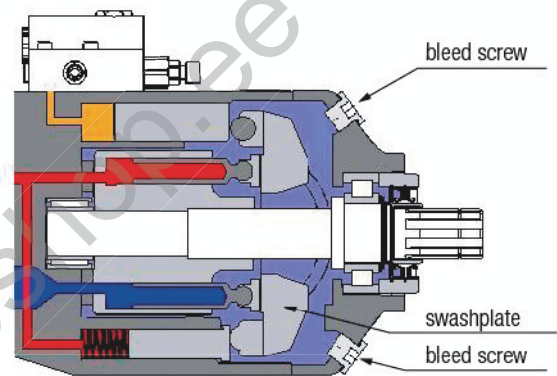
The displacement of the pump is proportional to the stroke of the pistons. Displacement – and thus flow – is varied by changing the angle  $\alpha$  of the swashplate.

To change displacement from maximum to zero (complete flow cancellation), the swashplate angle goes from  $\alpha$  max. (Fig. 1) to  $\alpha$  min. (=0) (Fig. 2).

1. Maximum displacement

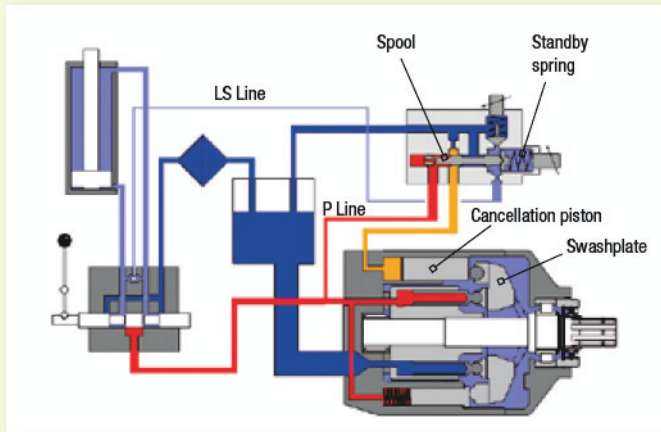


2. Zero displacement



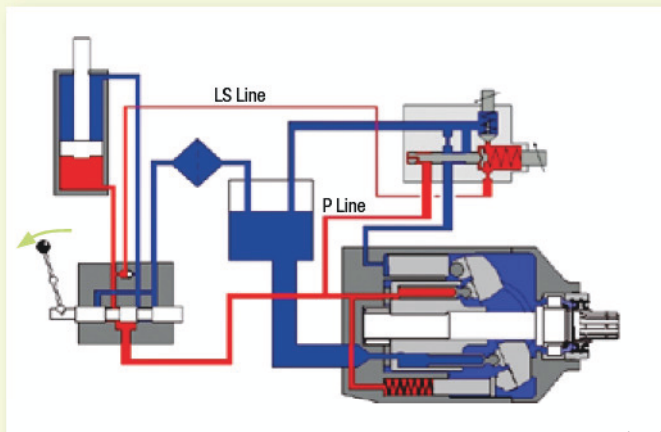


## Flow- pressure control (LS)



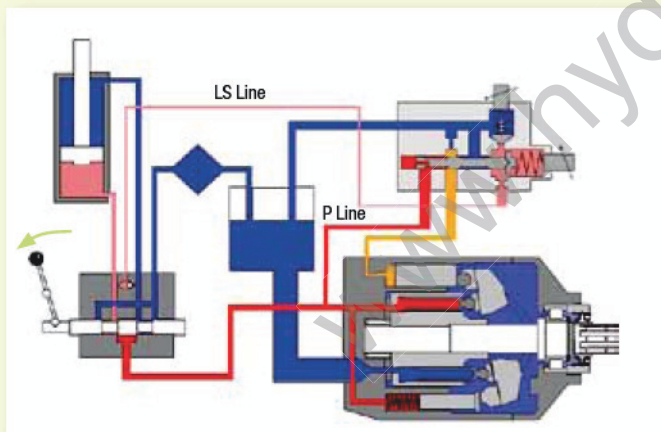
### Zero flow, standby

The proportional valve is closed. The pressure in the P line increases until it reaches the value at which the standby spring is set. Under the pressure in the P line, the spool moves and oil flow supplies the setting piston which moves the swashplate into vertical position (angle  $\alpha = 0$ ): no flow, but standby pressure is maintained.



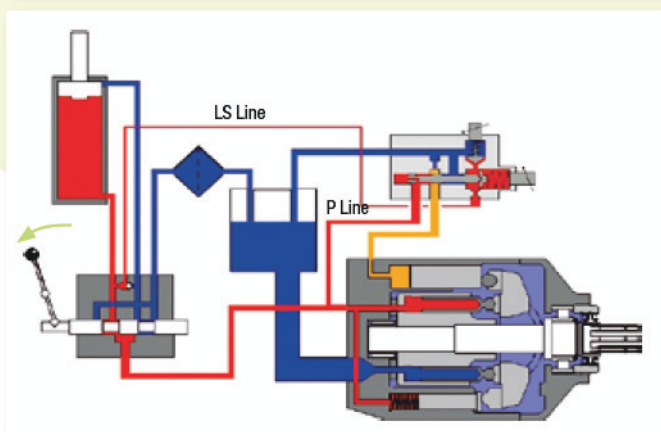
### Full flow

The proportional valve is fully open, allowing passage of pump flow. The pressure in the LS line is the same as in the P line. Hydraulic pressure is the same on either side of the spool. The standby spring holds the spool in its initial position. The cancellation piston is not supplied with oil. The swashplate is at maximum angle  $\alpha$ : the pump is at full displacement.



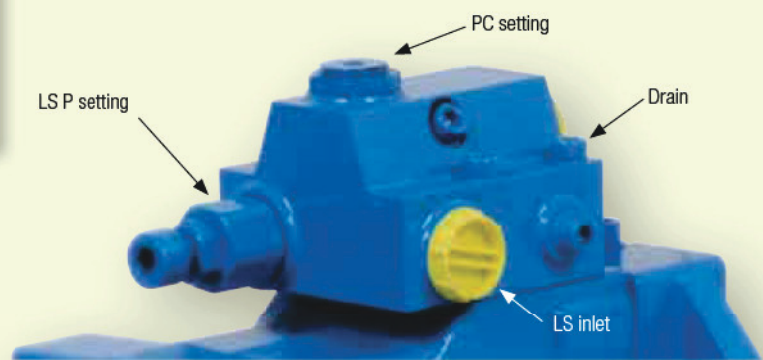
### Flow control

The proportional valve is partly open. Not all of the pump flow can go through the valve. Pressure increases in the P line. The pressure in the LS line is the same as the effort required by the application. Pressures in the P line and in the LS line + the force of the standby spring balance. Under the pressure in the P line, the spool moves and an oil flow supplies the cancellation piston which pushes the swashplate into the position which will give the required flow.



### Zero flow (maximum pressure)

The proportional valve is open, but the cylinder in the application is at a mechanical stop. Pressure in the system increases to reach the pressure at which the PC spring is set. This relief valve opens and connects the LS line to the drain. The pressure drops on the standby spring side. Under the pressure in the P line, the spool moves and an oil flow supplies the cancellation piston which pushes the swashplate to vertical position (angle  $\alpha = 0$ ): no flow, but maximum pressure maintained.



# TXV series pumps main characteristics

Pump	Direction of rotation	Displacement <sup>(1)</sup> maxi (cc)	Maximum operating pressure (bar)	Maximum peak pressure (intermittent : 5%) (bar)	Maximum operating pressure at flow-cancellation (bar)	Max torque at 300 bar (Nm)	Max speed <sup>(2)</sup> (rpm)	Weight (kg)	Overhang torque (N.m)
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## ■ standard pump range

TXV 40	0512950 0512955	SH SIH	40	400	420	440	220	3000	26.8	35
TXV 60	0512500 0512505	SH SIH	60	400	420	440	295	2600	26.8	35
TXV 75	0512510 0512515	SH SIH	75	400	420	440	410	2000	26.8	35
TXV 92	0512520 0512525	SH SIH	92	380	400	420	483	1900	26.8	35
TXV 120	0515700 0515705	SH SIH	120	360	380	400	680	2100	26.8	35
TXV 130	0515300 0515515	SH SIH	130	360	380	400	730	2100	27.2	35
TXV 150	0518600 0518605	SH SIH	150	310	330	350	840	2000	27.2	35

## ■ with through shaft

TXV 130	0518700 0518705	SH SIH	130	360	380	400	730	1900	31.1	47.4 <sup>(3)</sup>
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(1) TXV pumps can be set for smaller maximum displacements: please contact us.

(2) Higher speed possible depending on flow required : please contact us

(3) Overhang torque of the pump only.

Viscosity affects maximum possible rotating speed. If viscosity > 150 cSt, please contact us to obtain corresponding speed possibilities.

4

## ■ Setting pump maximum displacement

The TXV pumps from 40cc to 120cc are made as standard to be able to use the setting screw reference 0518386.

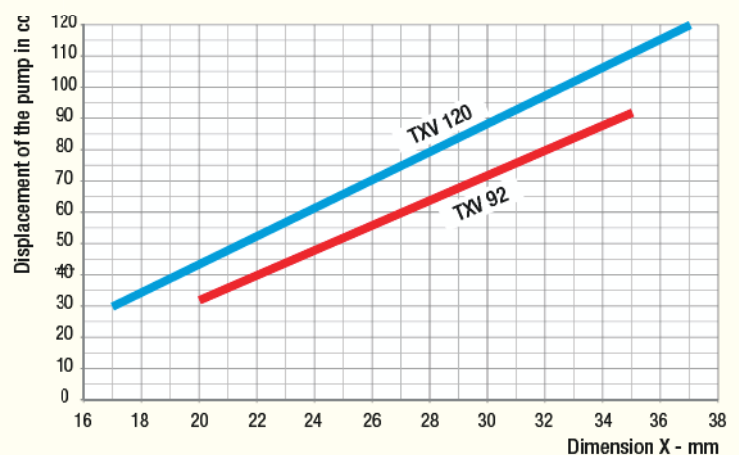
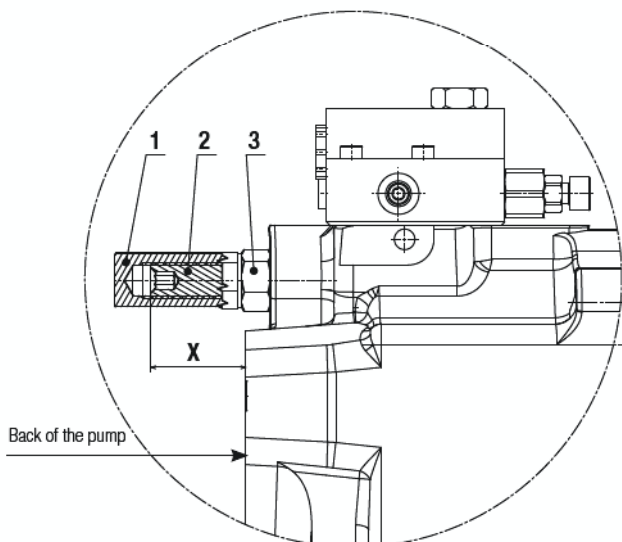
The pump displacement can thus be adjusted to exactly what is needed.

## ■ How to use the setting screw

Unscrew **1** completely, loosen **3** and screw **2** to the required displacement. See figure above.

For TXV: 1 turn of the screw changes the displacement by 9 cc.

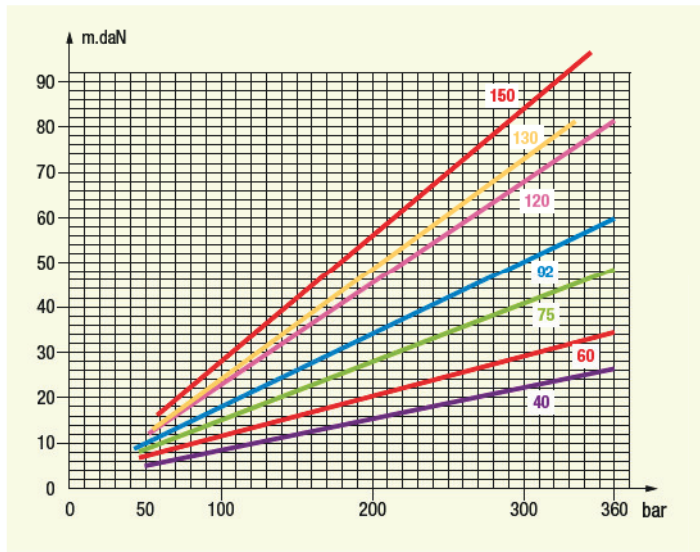
For TXV92 to TXV40: 1 turn of the screw changes the displacement by 8 cc.



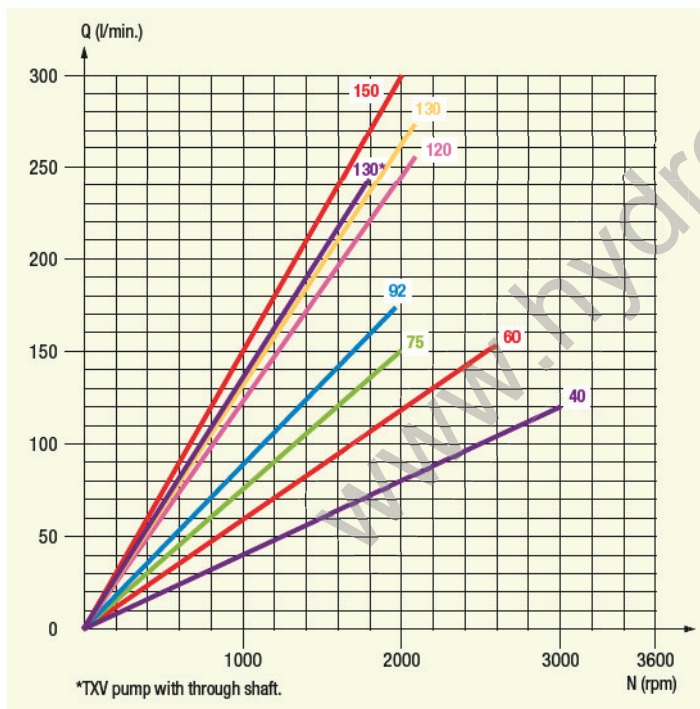


# Performances TXV series pumps

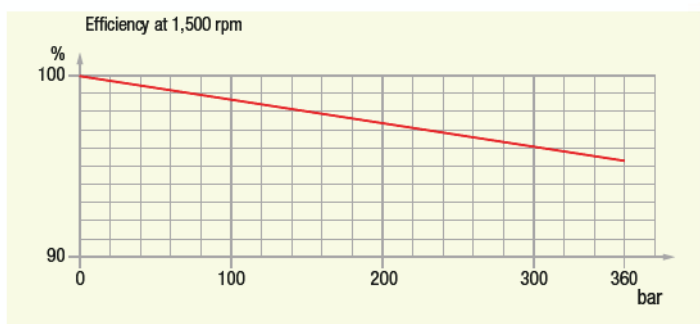
## Absorbed torque at maximum displacement



## Flow



## Volumetric efficiency



## Calculating power as a function of torque

$$C = \frac{\mathcal{P}(\text{kW})}{\omega} \times 100 = \text{m.daN}$$

$$\omega = \frac{\pi N}{30} \quad \mathcal{P}(\text{kW}) = \frac{\Delta P \times Q}{600}$$

where:

$\mathcal{P}$  = theoretical hydraulic power

C = torque

N = speed in rpm

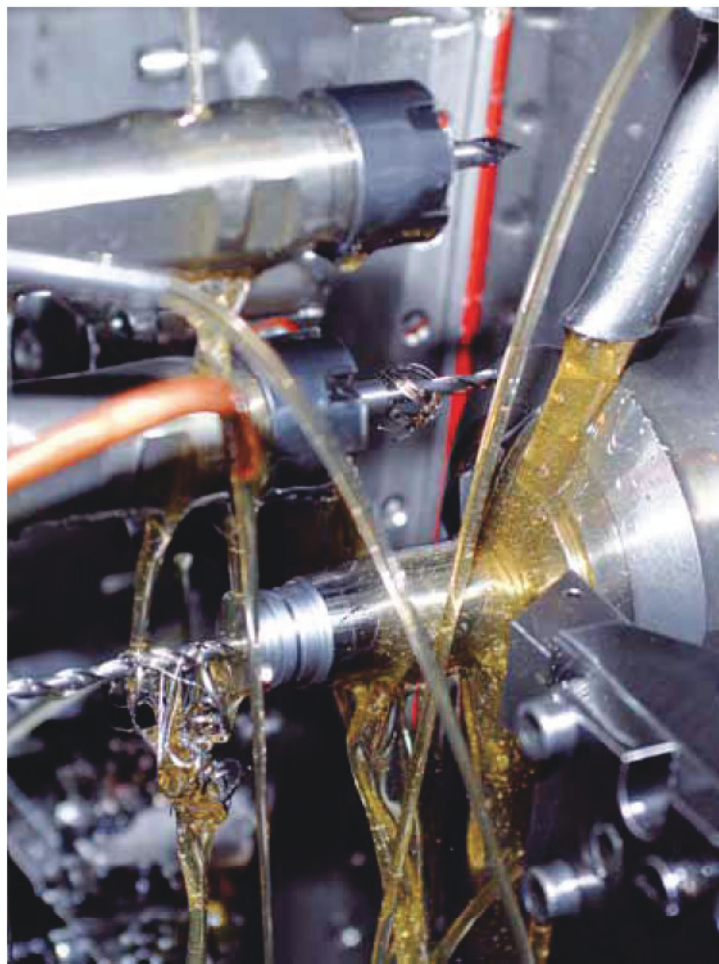
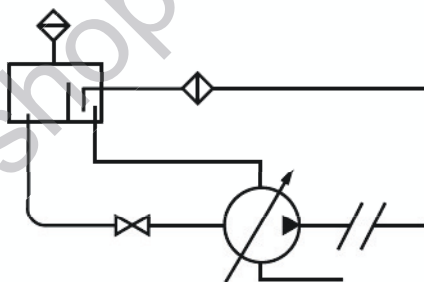
P = working pressure in bar

Q = flow in l/minute

Graph of flow as a function of speed, displacement and inlet pressure. These graphs are the results of tests carried out by the HYDRO LEDUC Research Laboratory, on a specific test bench, with ISO 46 fluid at 25°C (100 cSt), a 50 mm diameter supply line 1.5 m long, and a tank with oil level at the same height as the pump.

## Ideal installation

Tank above the pump



Technical drawing of the 328.2 hydraulic pump, showing front and side views with dimensions and labels.

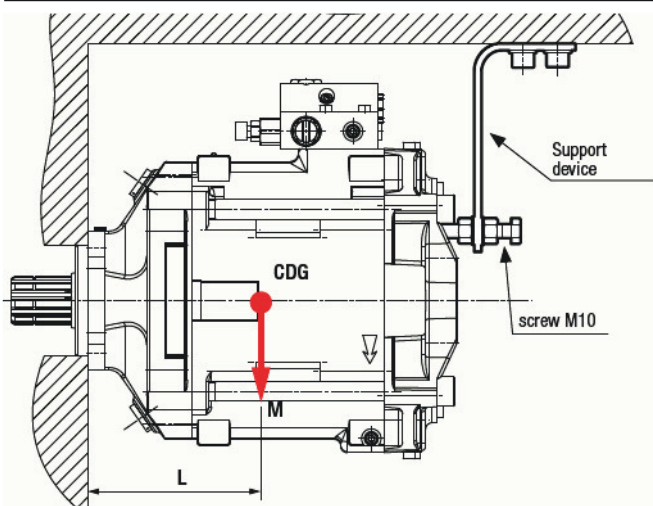
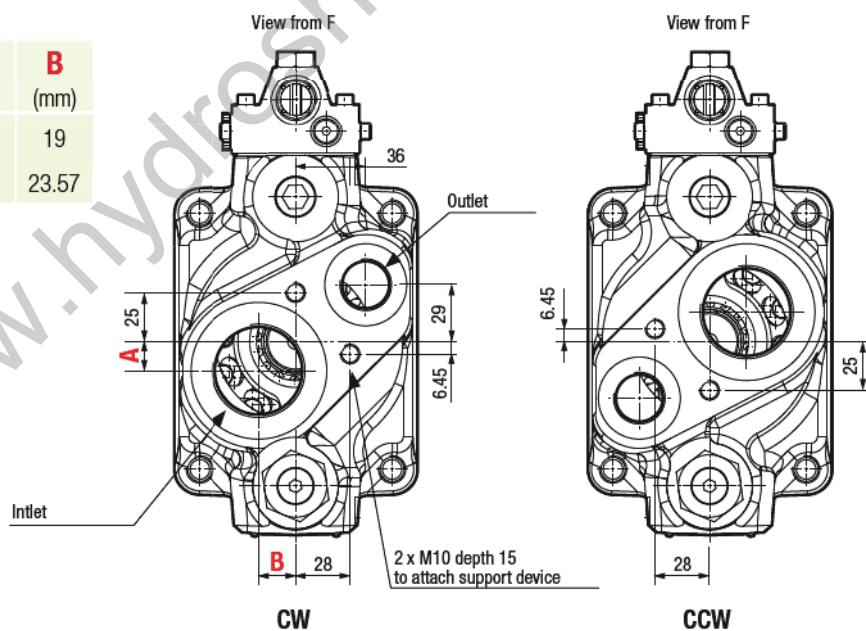
**Front View Dimensions:**

- Top flange: M 12
- Top flange hole: 4 x Ø 12.75
- Top flange width: 80
- Top flange height: 194.2
- Top flange outer diameter: 248.1
- Top flange inner diameter: 80
- Top flange thickness: 125

**Side View Dimensions:**

- Top flange: Drain G 3/8"
- Top flange: LS G 1/4"
- Top flange: PC setting
- Top flange: LS setting Stand-by
- Top flange: Splines 8-32-36 DIN ISO 14 - NF E 22.131
- Top flange: 9
- Top flange: Ø 80 f7
- Top flange: 55.1
- Top flange: 328.2
- Top flange: Connection for pressure gauge G 1/4"
- Top flange: F

Pump	Outlet pressure (Ø)	Inlet (Ø)	<b>A</b> (mm)	<b>B</b> (mm)
TXV 40 to 92	G 3/4"	G 1 1/2"	15	19
TXV 120	G 1"		6	23.57



In cases where it is necessary to use a support device for the pump, this **MUST** be fixed to the same part which the pump is mounted on.

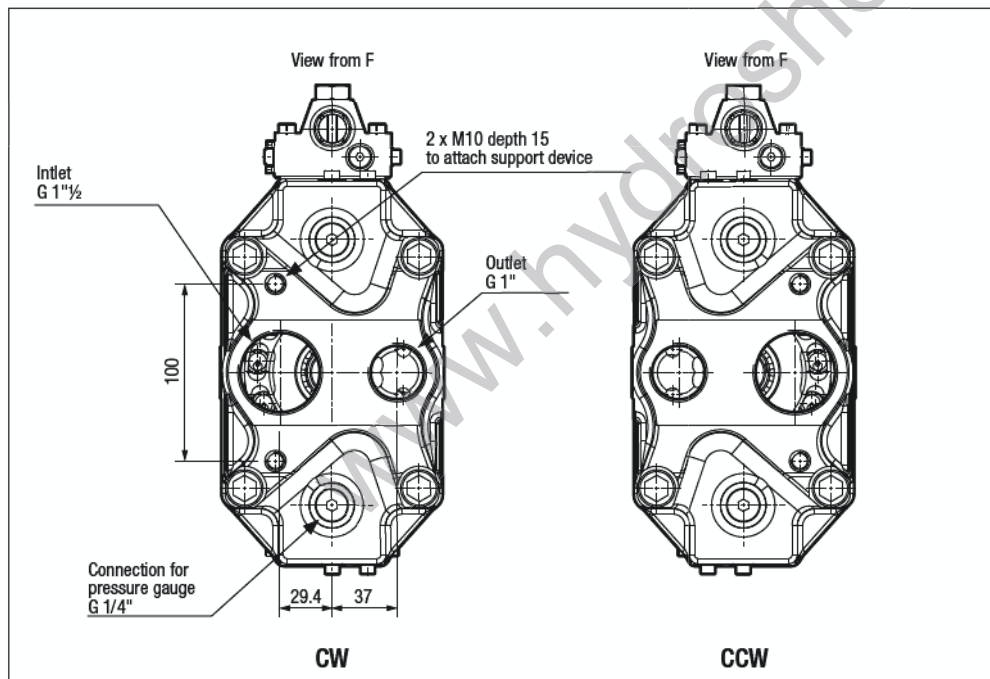
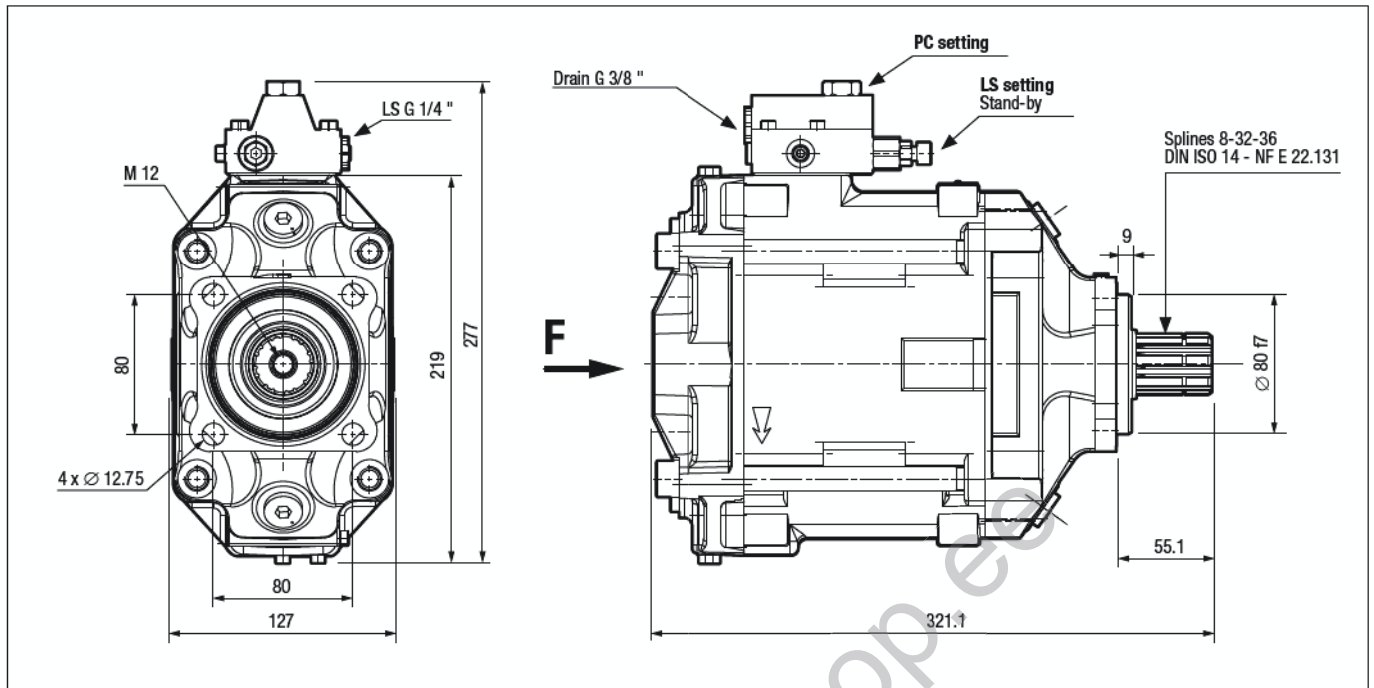
	L (mm)	M (kg)
TXV 92 to 40	130	26.8
TXV 120	130	26.8
TXV 130-150	128	27.2
TXV 130 with through shaft	152.6	31.1

Dimensions are given only as an indication.



# Dimensions TXV series pumps

## TXV 130 and TXV 150



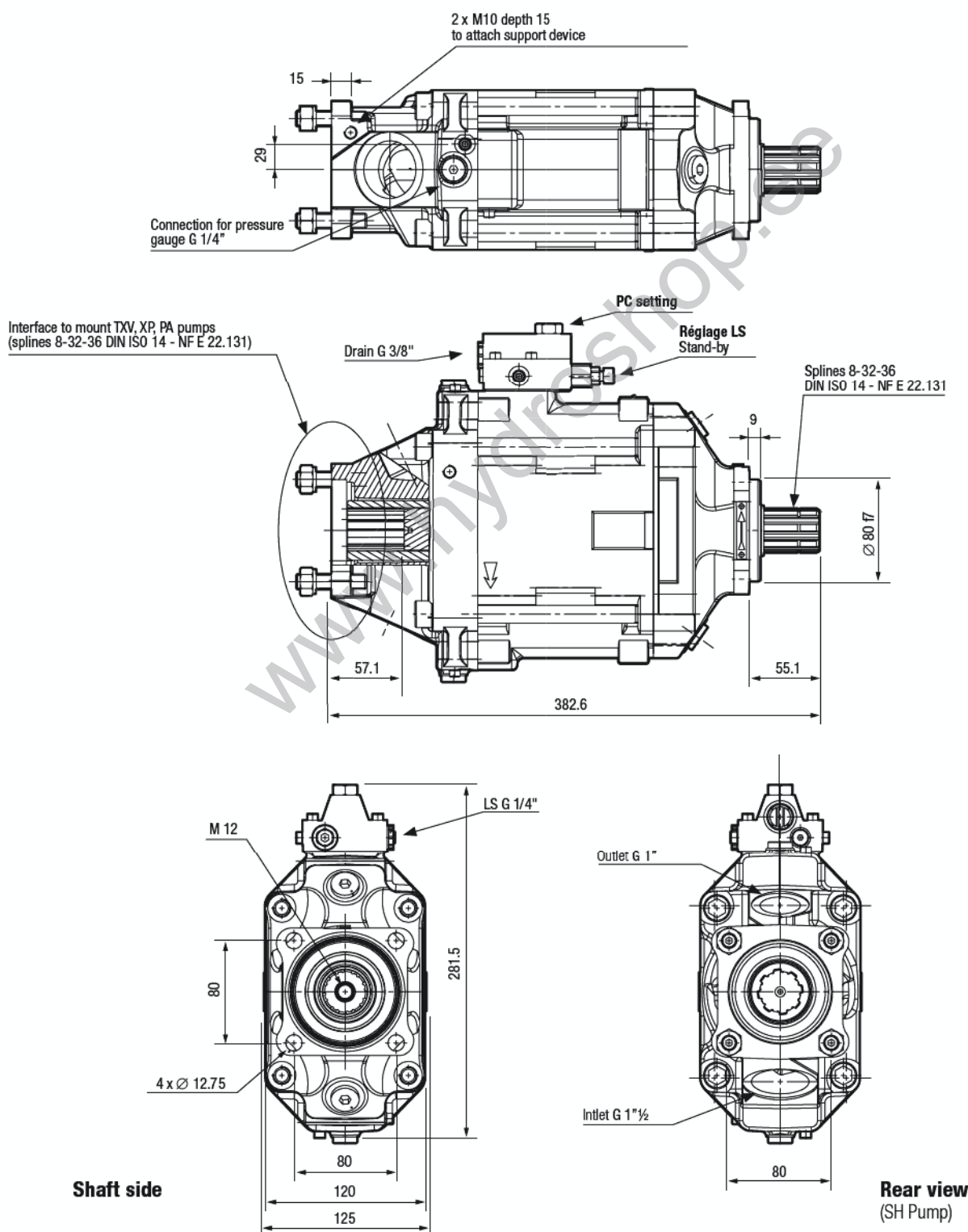
## TXV130 with through shaft pump

The TXV130 pump exists in a « through shaft » version.

With side porting for inlet and output, this "through shaft" TXV130 configuration means any LEDUC TXV pump, or fixed displacement XP or PA pump, can be mounted on the back.

As for all the TXV130 pumps, the maximum displacement of the "through shaft" TXV130 can be factory set, on request, between 60cc/rev. and 130 cc/rev.

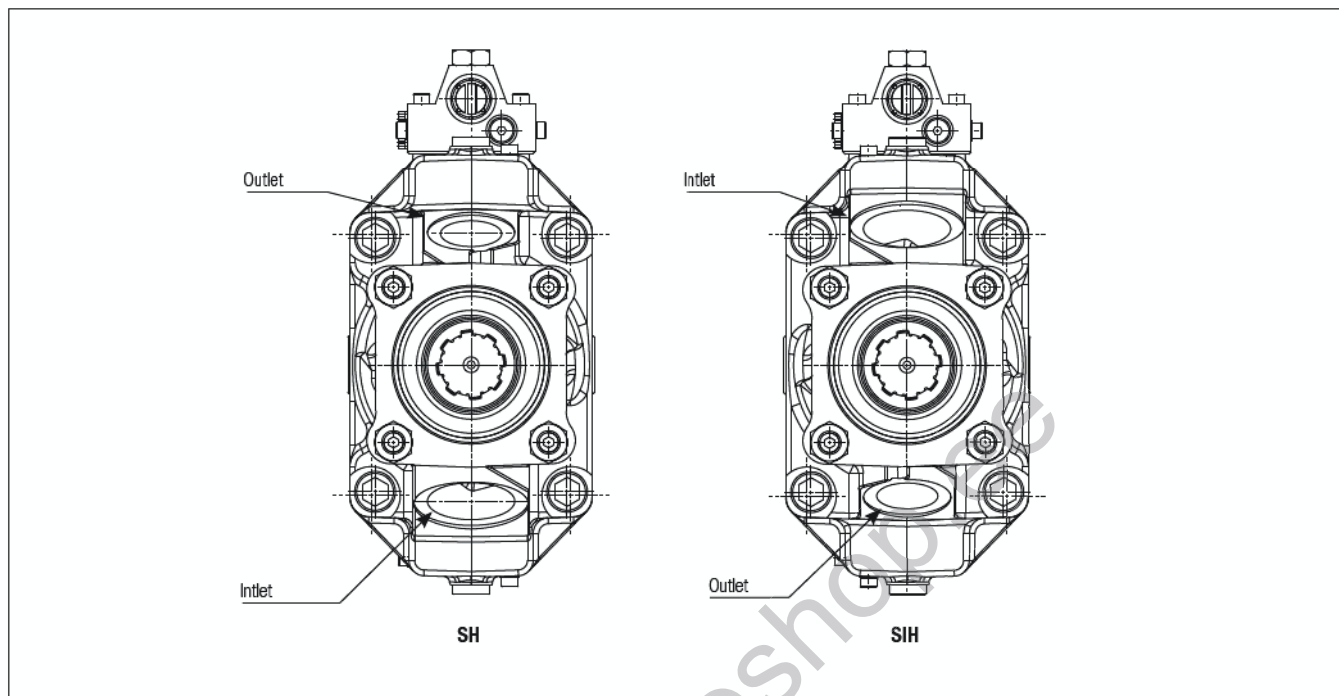
It is important to check that maximum torque to be transmitted by the shaft of the "through shaft" TXV130 does not exceed 90 m.daN.





## TXV130 with through shaft pump

On request, the displacement of the TXV130 with through shaft pump can be set for any maximum displacement between 60cc and 130cc.

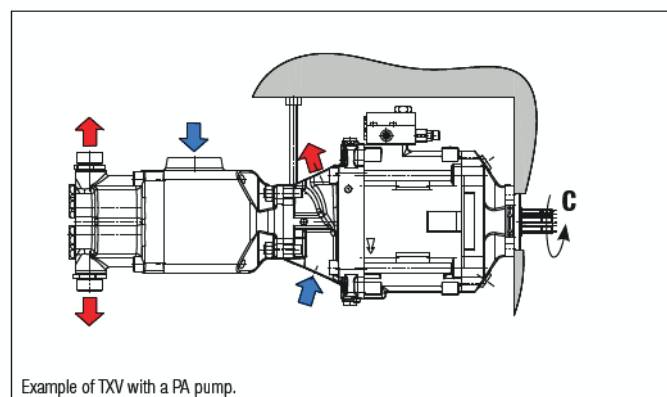
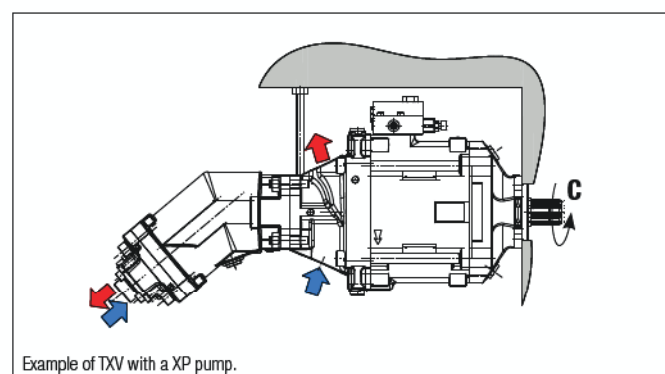
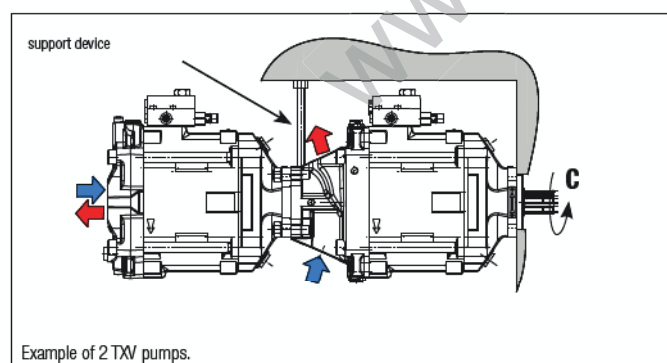


### Support device

The support device for the pump MUST be fixed to the same part which the pump is mounted on.

Maximum torque transferable by the shaft of the pump driven by the PTO:  
 $C = 90 \text{ m.daN}$ .

That is, the sum of torque for both pumps must be  $< 90 \text{ m.daN}$ .



Dimensions are given only as an indication.

## Setting maximum displacement

See page 4.

## Stand-by

TXV pumps are supplied as standard with standby pressure set at 30 bar. On request, this standby pressure can be set between 25 and 60 bar.

## Maximum pressure

Cancellation pressure PC of the pump must be the same as the maximum pressure in the installation: this PC pressure should be stipulated in the order. If no PC setting is stipulated, pumps will be supplied with PC set at 100 bar.

## Relief valve in the entry plate of proportional valve:

Must be set 25 to 30 bar higher than the chosen PC pressure

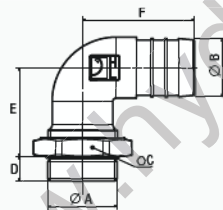
## Response time

Response time of TXV pumps, from zero flow up to full flow, can be made shorter (quicker) on request.

## Inlet fittings

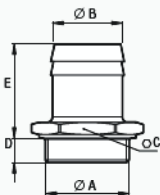
Pour utilisation sur l'orifice d'aspiration des pompes TXV.

90° elbow fittings, swivel



Reference	A	ØB	C	D	E	F
240131	G 1 1/2	40	60	17	61	77
240133	G 1 1/2	50	60	17	65	82

Straight fittings



Reference	A	ØB	C	D	E
051523	G 1 1/2	40	56	14	54
240067	G 1 1/2	50	52	14	66
240066	G 1 1/2	60	64	14	69
240186	G 1 1/2	63.5	64	14	69
240201	G 1 1/2	76.2	80	14	89

## TXV pump with constant torque LS control

Under development

### Description

This constant torque control for the TXV pumps ensures that the power installed in the circuit cannot be exceeded, whilst still allowing control of flow and of maximum circuit pressure.

The constant torque LS control is available for TXV pumps of 40, 60, 75, 92 and 120cc.

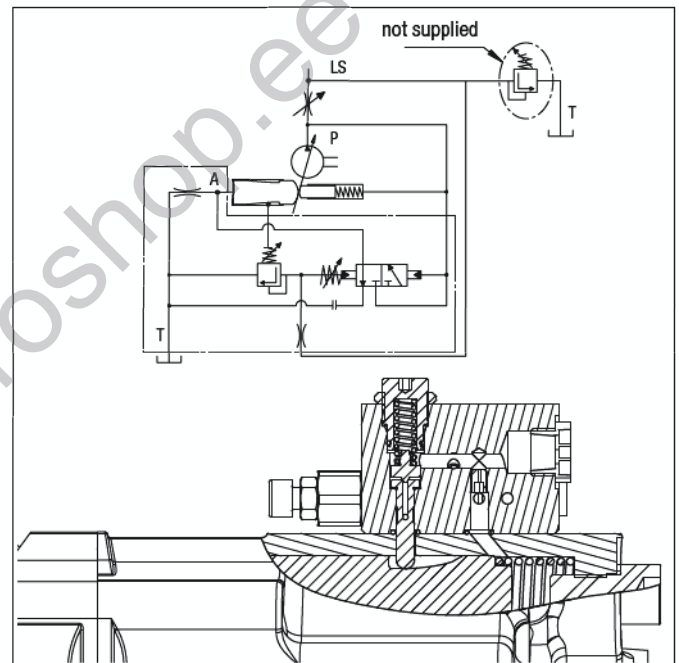
This device does not change the external dimensions of the pump.

### Principle

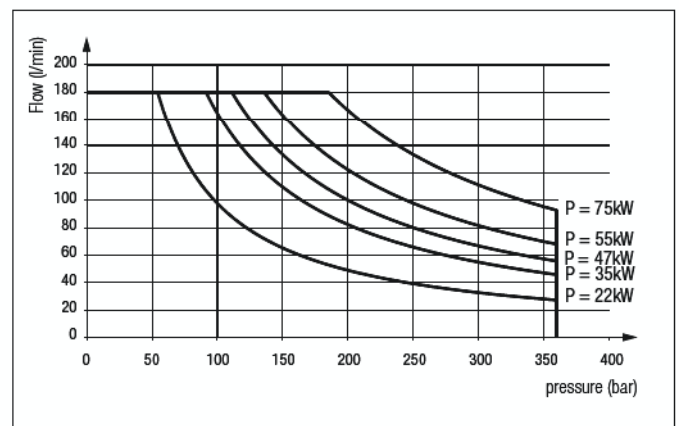
The constant torque control means "pressure x flow = constant" is permanently achieved.

Precision is 5% to 10% around the theoretical curve. The setting is done at the factory. For each order, please stipulate the pump displacement, standby pressure, and the constant torque level required.

The constant torque control is always complete with constant pressure (PC) control and flow control.



## Example: graph of flow as a function of power



The constant torque control on the TXV pump shaft is controlled by the Load Sensing device (flow and pressure regulation).



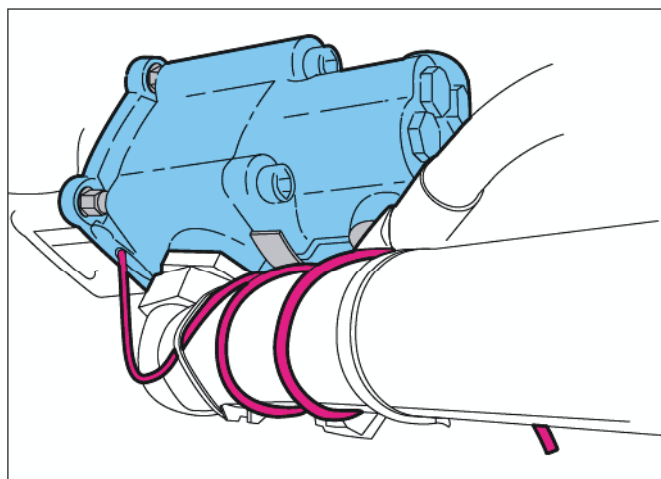


LEDUC pumps destined for truck hydraulics are all fitted with reinforced sealing comprising:

- two radial seals: an external seal adapted to the needs of PTOs and gear-boxes; and an internal seal adapted to the needs of hydraulic performance;
- an original protection of the pump shaft seals. This is a flexible transparent tube which avoids any entry of contaminants between the two seals, and guarantees high pressure water jet cleaning of vehicle will not damage the sealing area. It also allows air vent of the chamber between the two seals.



## ■ Example of tube attachment



### ✓ Recommendations for attaching the protective tube:

- make a siphon with the tube so as to avoid any introduction of:
  - dirt from road;
  - water or damp from high pressure washing of vehicle.
- put the end of the tube downwards, or in a place sheltered from any projections;
- fix the tube in place using a collar/clip.

### ✗ Avoid:

- attaching the tube to any parts which may move, this could lead to it being damaged or torn off;
- any pinching or folds in the tube when fixing it in place;
- any obturation of the end of the tube.



HHYDRO LEDUC stresses that on non-sealed PTO installations it is the hydraulic pump which ensures the sealing of the vehicle gearbox. This is why HYDRO LEDUC offers tried and tested solutions approved by vehicle manufacturers.

Note in particular the pump – PTO sealing via a frontal square section ring seal ensuring metal to metal contact between pump and PTO.



## Make sure your pump lives a long happy life !

### ■ The tank:

Generally, hydraulic pumps much prefer a tank above the pump.

LEDUC pumps can also operate with oil level beneath the pump, for further information on such installations, please contact our Technical Department.

Correct inlet conditions are between 0.8 to 2 bar absolute pressure.

The tank should preferably have a separation between inlet side and return. This avoids fluid emulsion and the introduction of air into the hydraulic circuit. Ensure also that the suction is not from the very bottom of the tank, so as to protect the pump from any deposits (particles).

### ■ Hosing:

Should be dimensioned to ensure flow between 0.5 and 0.8 m/second. Choose as direct a supply line as possible, avoiding sharp bends.

### ■ Filtration:

HYDRO LEDUC recommends using a very clean tank, filtered during filling and with filter on air vent.

The pump supply line must be cleaned (decontaminated) and the return line should be filtered as follows:

- for relatively simple circuits (e.g. tippers):  
use a 20 micron filter on pump return line.
- for more complex circuits (e.g. cranes):

Ideal solution:

- high pressure filter between the pump and the crane hydraulic circuit;
- 10 to 20 micron filter;
- clogging indicator.

### ■ The fluid:

Use a mineral hydraulic oil with viscosity between 10 and 400 cSt. It is in this viscosity range that the pumps keep their volumetric characteristics. If you wish to use other fluids, please consult our Technical Department.

Maximum temperature of fluid in the pump should not exceed 100°C.

### ■ Drive and assembly recommendations:

For PTO mount applications, be careful to respect the tightening recommendations in terms of pump onto PTO and PTO onto vehicle gearbox.

TXV pumps are not designed to withstand any axial load on the pump shaft. Check your installation conforms to this requirement.

### ■ Preparation of the pump:

Before start-up, the pumps should preferably be filled with oil.

### ■ Start-up:

- open the supply valve if there is one;
- check the valve is in "back to tank" position;
- partially unscrew the output fitting;
- start up at low speed, or by successive starts/stops;
- retighten the output connector as soon as air bubbles have disappeared;
- let the pump run for one to two minutes, and check that the flow is well established;
- check the pump is running correctly, with no vibrations nor abnormal noise;
- after several hours of operation, check the tightening torque of the pump fixture to PTO.

### ■ Maintenance:

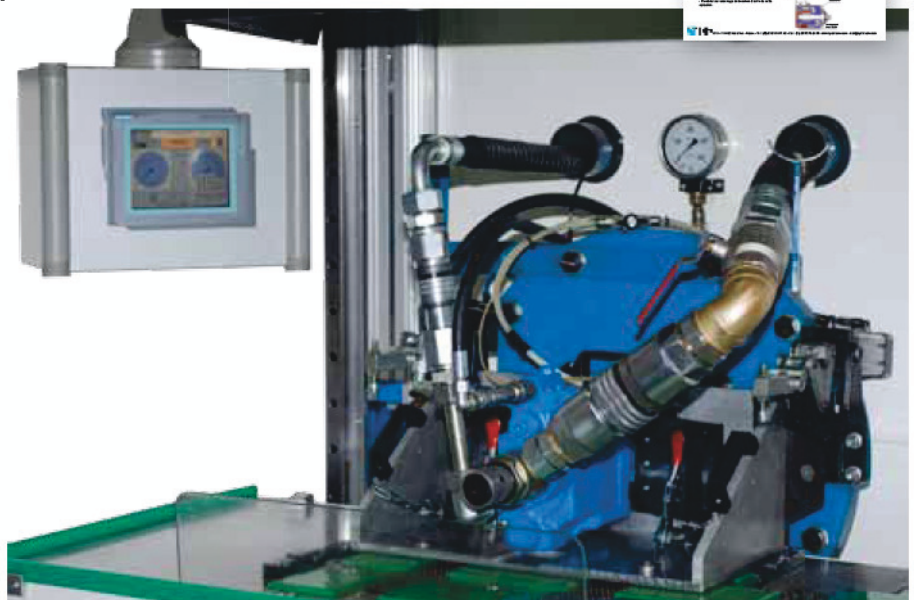
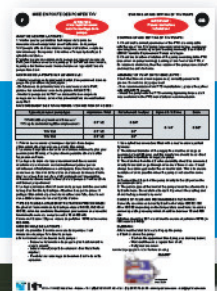
Some regular checks are necessary, namely:

- tightening of pump to PTO;
- cleanliness of fluid;
- state of filter;



if you notice traces of oil in the plastic tube, it is essential to check the sealing between PTO and pump.

Each LEDUC pump is supplied with a leaflet with installation and start-up recommendations.

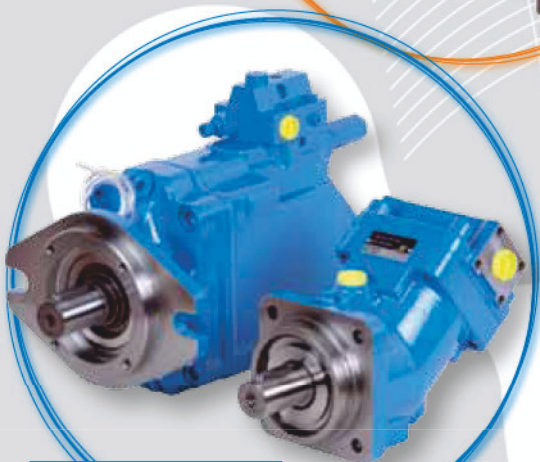
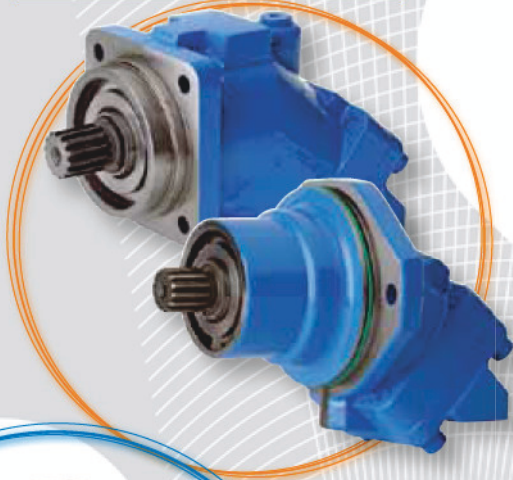




## other product lines

### hydraulic motors

Fixed displacement bent-axis pistons motors. Models from 12 to 126 cc. Available both in ISO and SAE versions.



### mobile and industrial pumps

Fixed displacement pumps, the W series, and variable displacement pumps, the DELTA series. High pressure capabilities within minimal size.

**W** series: flanges to ISO 3019/2, shafts to DIN 5480.

**DELTA** series: SAE shafts and flanges.



### hydro-pneumatic accumulators

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

**TXV**

**XP**

**PA  
PAC  
PAD**

### piston pumps for trucks

HYDRO LEDUC offers 3 types of piston pumps perfectly suited to all truck and PTO-mount applications. Fixed and variable displacement from 12 to 150 cc.

### 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.



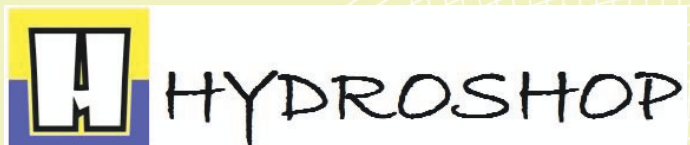
**we are passionate  
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A dedicated R&D team means HYDRO LEDUC is able to adapt or create products to meet specific customer requirements. Working in close cooperation with the decision-making teams of its customers, HYDRO LEDUC optimizes proposals based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



a passion for hydraulics



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