



# TXV series

pumps with

*Load Sensing* control

variable displacement piston pumps

## ADVANTAGES

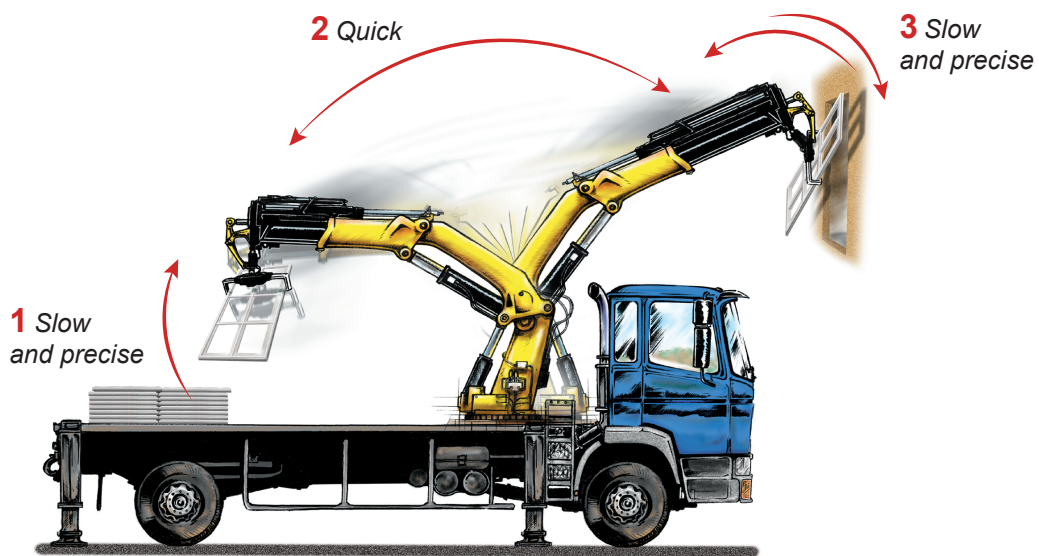
- ▶ TXV series pumps are variable displacement with pressure-flow control – called **Load Sensing**. They **self-regulate to give just the flow required for each movement**.
- ▶ Specifically designed for the needs of the *truck hydraulics market*, TXV pumps are particularly well adapted for applications in:
  - loader cranes,
  - forestry cranes,
  - refuse vehicles,
  - salt spreaders, snow and ice equipment,
  - construction equipment vehicles.
- ▶ Extremely compact in size to allow direct flange-mounting on vehicle engine or gearbox PTOs.
- ▶ TXV pumps are available in 11 models with maximum displacement from 40 to 150 cc/rev.

Maximum pressure is up to 420 bar depending on model.



## Why use a variable displacement pump?

- ▶ 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.
- ▶ The pump incorporates a load sensing device to control flow and maximum pressure. This control device is piloted by a proportional valve which informs the pump of the flow needed for the different circuits supplied by the pump, independently of pressure.



### 1 & 3

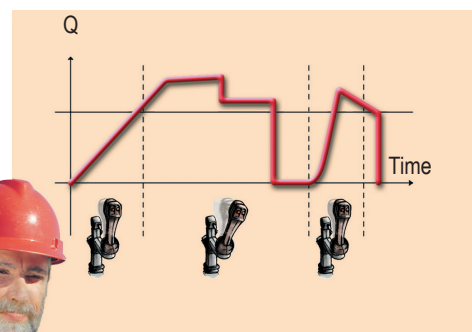
For slow and precise movements, the pump adjusts its flow to whatever the user needs, whilst also controlling maximum circuit pressure. Oil heating and lamination, and noise level, are considerably reduced compared to a fixed displacement pump.

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 by the pump.

## TXV - How does it work ?

- ▶ TXV variable displacement pumps are of axial piston design with 11 pistons, thus ensuring optimal regularity of flow and a low noise level.
- ▶ 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 (Fig.1).
- ▶ 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).

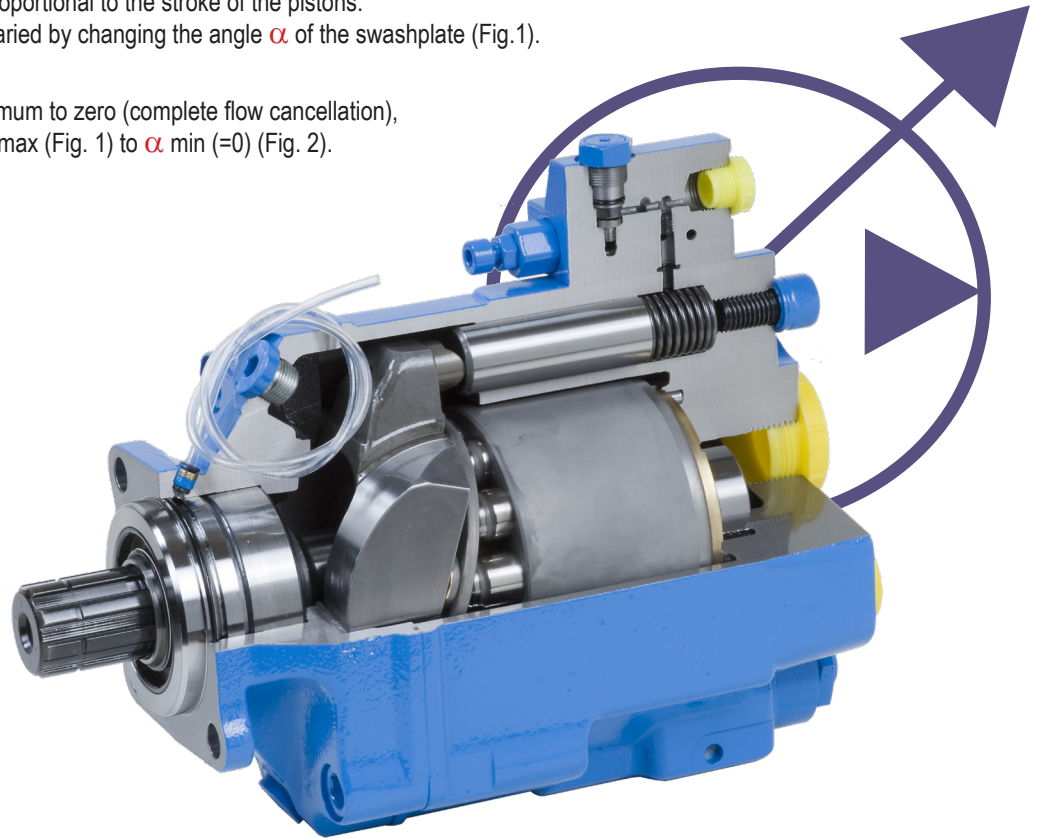


Figure 1 - Maximum displacement

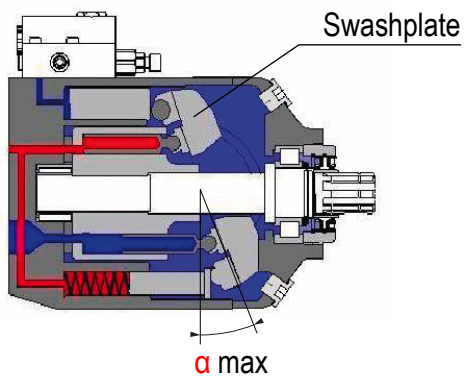
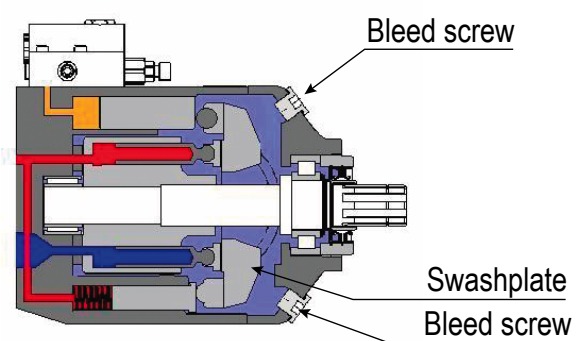
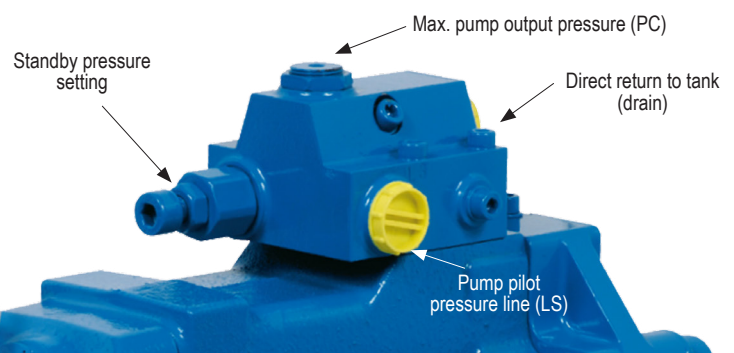
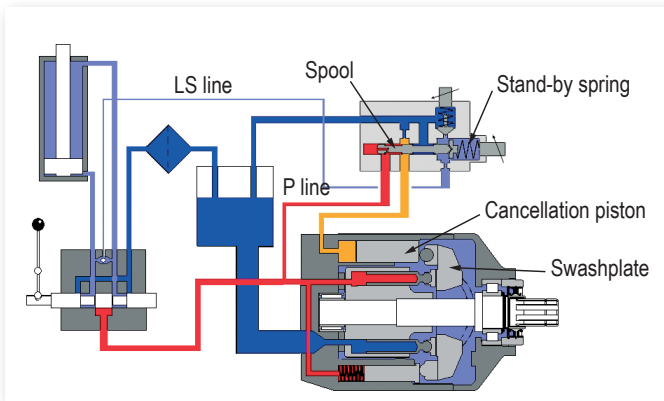


Figure 2 - zero displacement



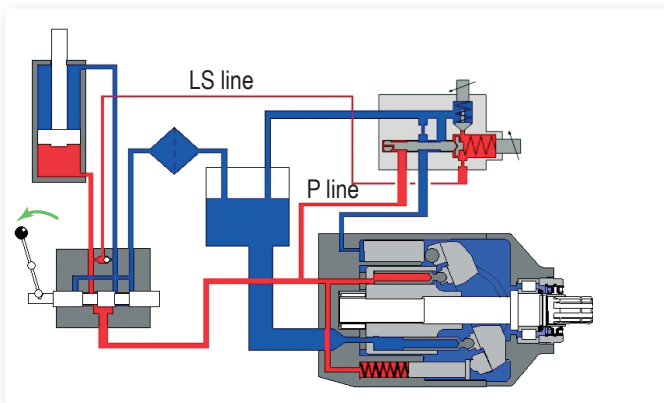
- ▶ Setting the servo pump.





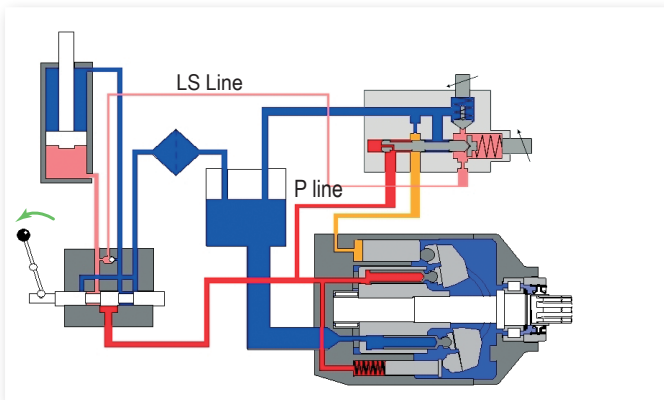
### ► Zero flow (standby)

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. The pump stays in standby mode.



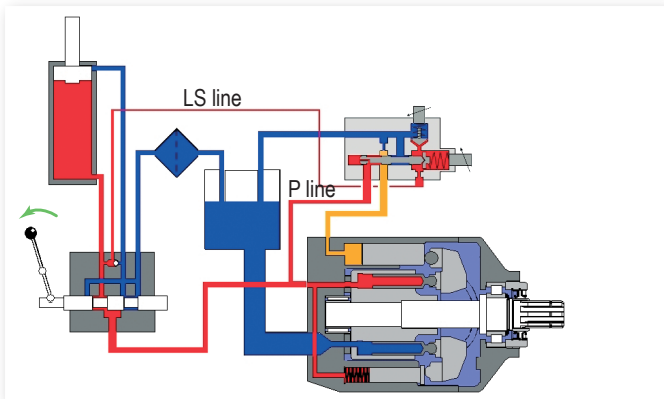
### ► Full flow

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 stand-by spring holds the spool in its closed position.  
 The cancellation piston is not supplied with oil.  
 The swashplate is at maximum angle  $\alpha$ : the pump is at full displacement.



### ► Flow control

As soon as the proportional valve tends to reduce the flow requested by the user, the pressure drop created allows the pump displacement setting piston to be piloted.  
 This setting piston automatically adjusts pump displacement to match the order given by the proportional valve.



### ► Zero flow (maximum pressure)

This is the case for example of a cylinder which arrives at a mechanical stop. The proportional valve is still open.  
 The pressure of the cylinder at a mechanical stop is sensed by the pump pressure relief valve which opens at the set pressure (PC).  
 This allows the pump displacement setting piston to be supplied and the pump sets itself to a displacement just sufficient to maintain the circuit pressure.



TXV pumps are available in 11 models from 40 to 150 cc/rev maximum displacement.

Pump reference	Direction of rotation	Maximum displac. <sup>(1)</sup> (cc/rev)	Max. operating pressure (bar)	Max. peak pressure (intermittent: 5%) (bar)	Torque at 300 bar <sup>(2)</sup> (N.m)	Max. speed at full displacement <sup>(3)</sup> rpm	Max. speed in stand-by rpm	Weight (kg)	Overhang torque <sup>(4)</sup> (N.m)
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#### ► Standard pump range

TXV 40	0512950 0512955	CW CCW	40	400	420	225	3000	3000	26	34
TXV 60	0512500 0512505	CW CCW	60	400	420	335	2600	3000	26	34
TXV 75	0512510 0512515	CW CCW	75	400	420	420	2000	3000	26	34
TXV 92	0512520 0512525	CW CCW	92	400	420	515	1900	3000	26	34
TXV 120	0515700 0515705	CW CCW	120	380	400	675	2100	3000	26	34
TXV 130	0515300 0515515	CW CCW	130	365	380	730	2100	3000	28,2	38,6
TXV 150	0518600 0518605	CW CCW	150	310	330	840	2000	3000	28,2	38,6

#### ► With through shaft\*

TXV 130	0518700 0518705	CW CCW	130	365	380	730	1900	3000	31,1	47,4
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\* For TXV 130 through shaft available with max displacement set at : 65-75-85-95-100-110 - other specific set (on request)

(1) TXV pumps can be set for smaller maximum displacements (see page 39).

(2) For a mechanical efficiency at 85%.

(3) Higher speed - at full displacement - possible depending on flow required : please contact us.

Viscosity affects maximum possible rotating speed. If viscosity > 400 cSt, please contact us to obtain corresponding speed possibilities.

(4) Value of the overhang torque of the only pump.

#### ► Calculation of power to be supplied to the shaft as a function of flow and pressure

$$P = \frac{\Delta P \times Q}{600 \times \eta_{\text{global}}}$$

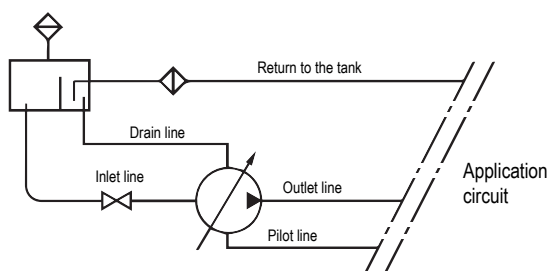
Calculation of torque to determine PTO,  
as a function of the displacement and the pressure

$$C = \frac{Cyl \times \Delta P}{62.8 \times \eta_{\text{meca}}}$$

With:

$P$	=	Hydraulic power in kW
$\Delta P$	=	Differential pressure in bar
$Q$	=	Flow in l/min
$C$	=	Torque in N.m
$Cyl$	=	Displacement in cc/rev
$\eta_{\text{meca}}$	=	Mechanical efficiency
$\eta_{\text{global}}$	=	Mechanical efficiency + volumetric efficiency

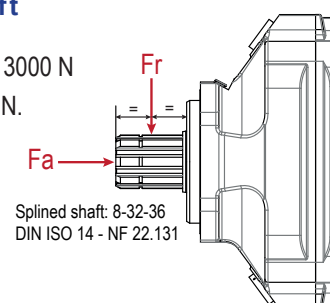
#### ► Ideal installation



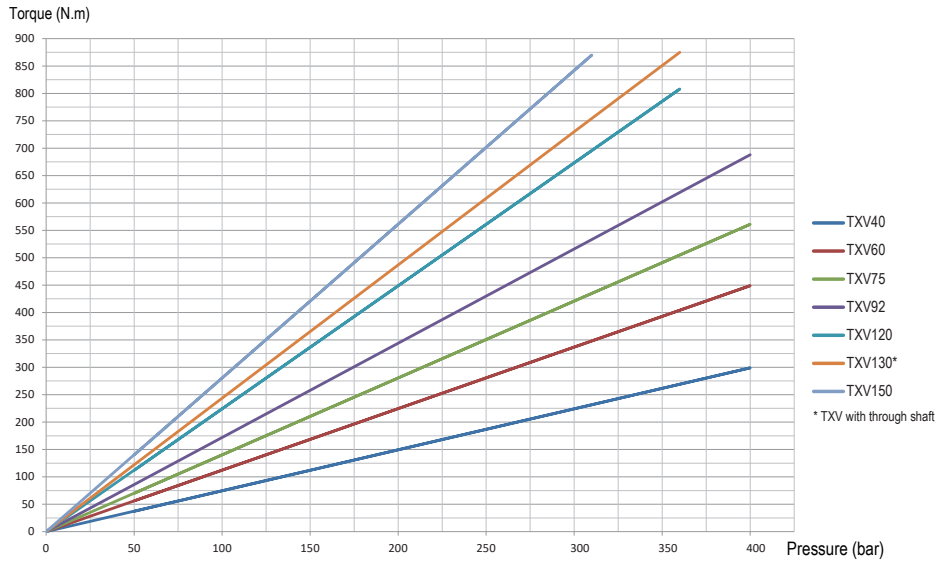
#### ► Force on pump shaft

$F_r$  : Acceptable max. radial force = 3000 N

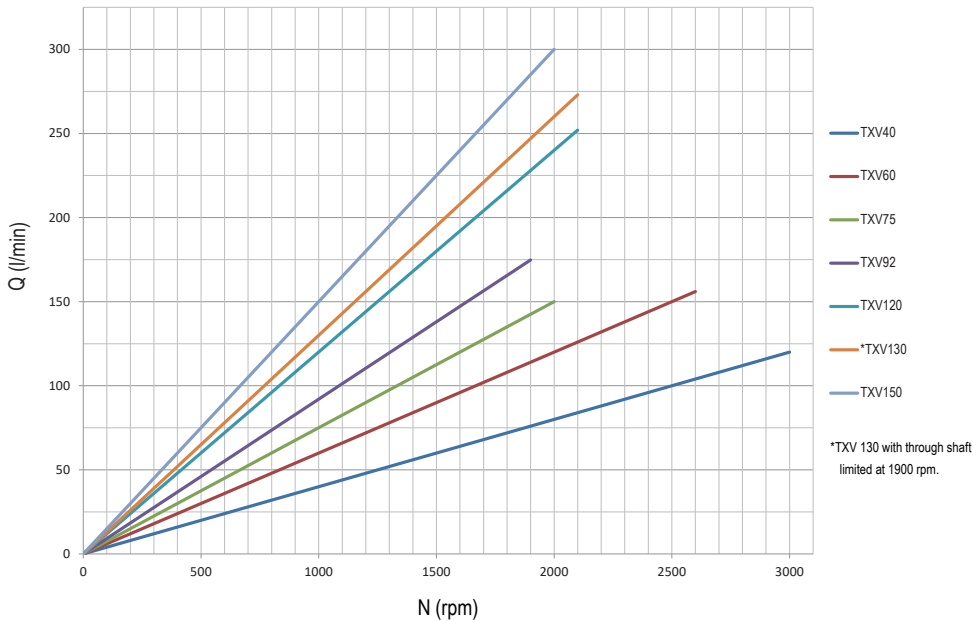
$F_a$  : Acceptable axial force = 1600 N.



► Torque absorbed as a function of pump output pressure (with a mechanical efficiency considered at 85%)



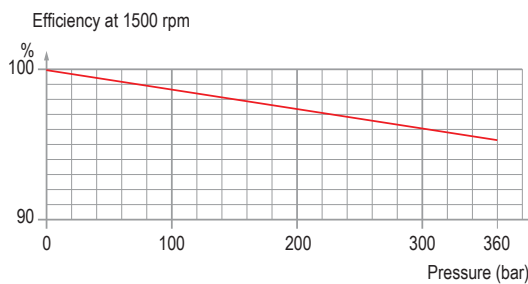
► Flow as a function of rotating speed

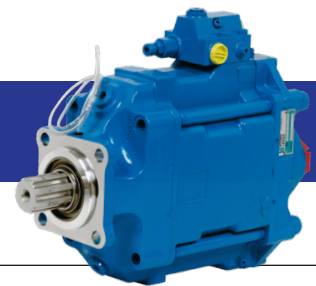


Flow as a function of speed, with pump in maximum displacement position and oil level in tank above the pump.

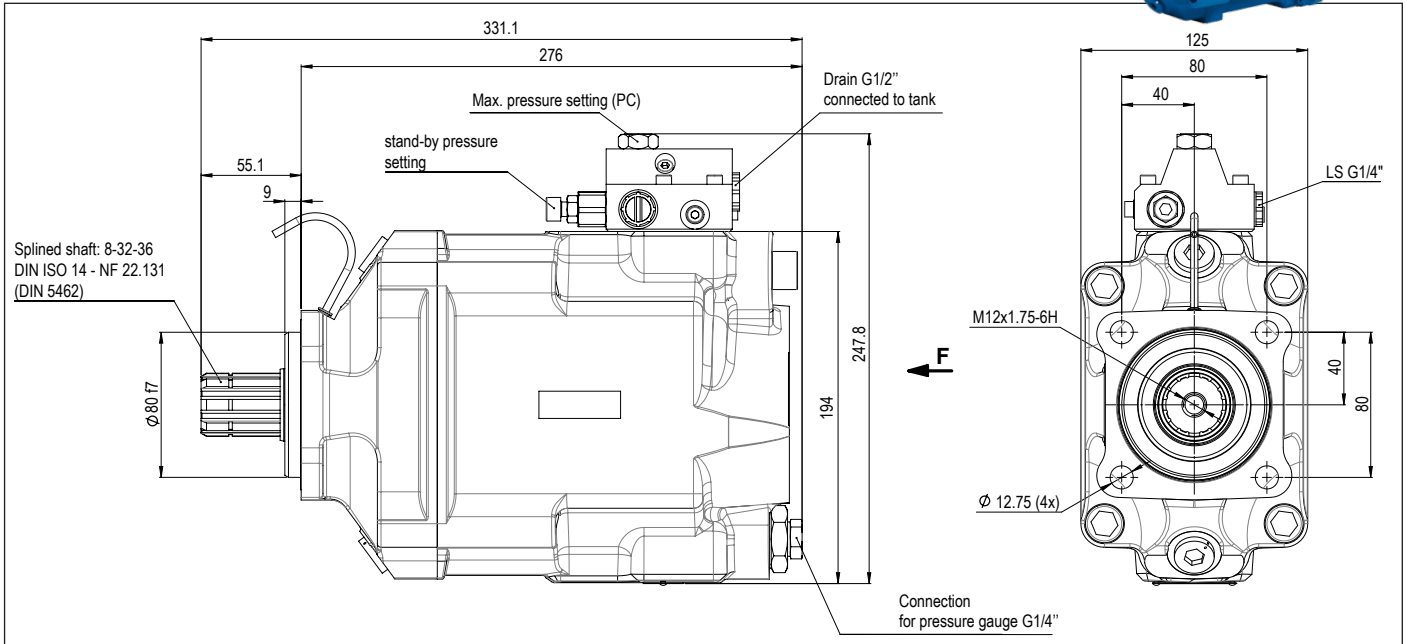
These graphs are the results of testwork done in HYDRO LEDUC R&D laboratory, on a specific test bench with a mineral hydraulic fluid ISO VG46 at 25°C (~100 cSt) - disregarding the volumetric efficiency.

► Volumetric efficiency





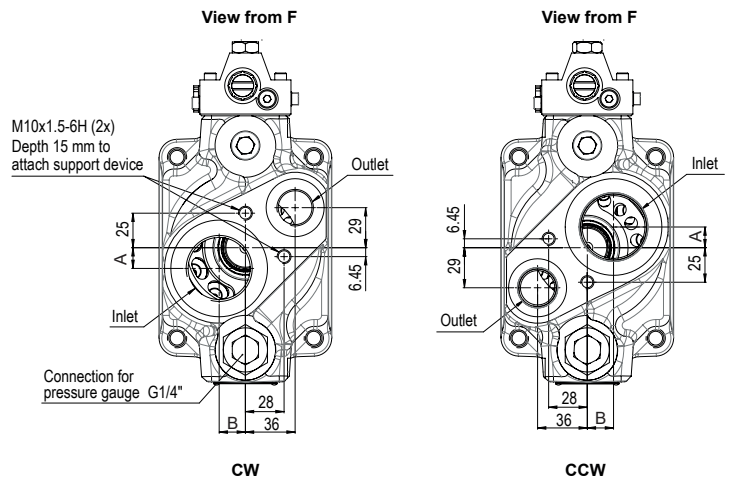
## TXV 40 TO 120



Dimensions in mm.

### TXV connections

Pump reference	Outlet	Inlet	A	B
	( $\phi$ )	( $\phi$ )	(mm)	(mm)
TXV 40 to 92	G 3/4"	G 1"1/2	15	19
TXV 120	G 1"		6	23.57

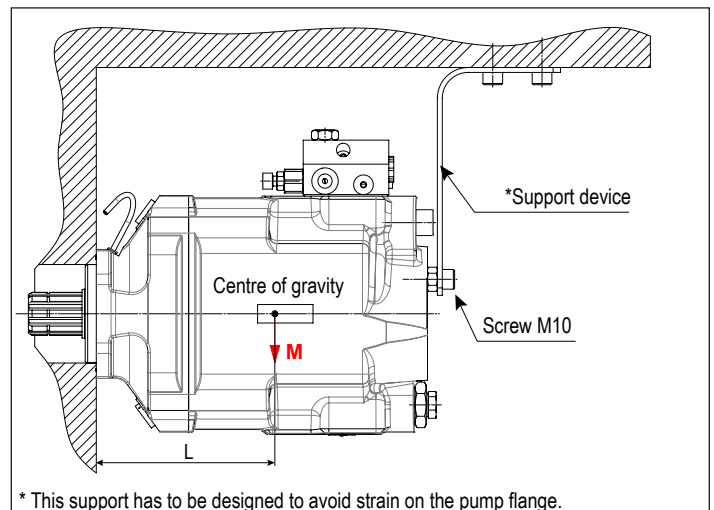


### Support device

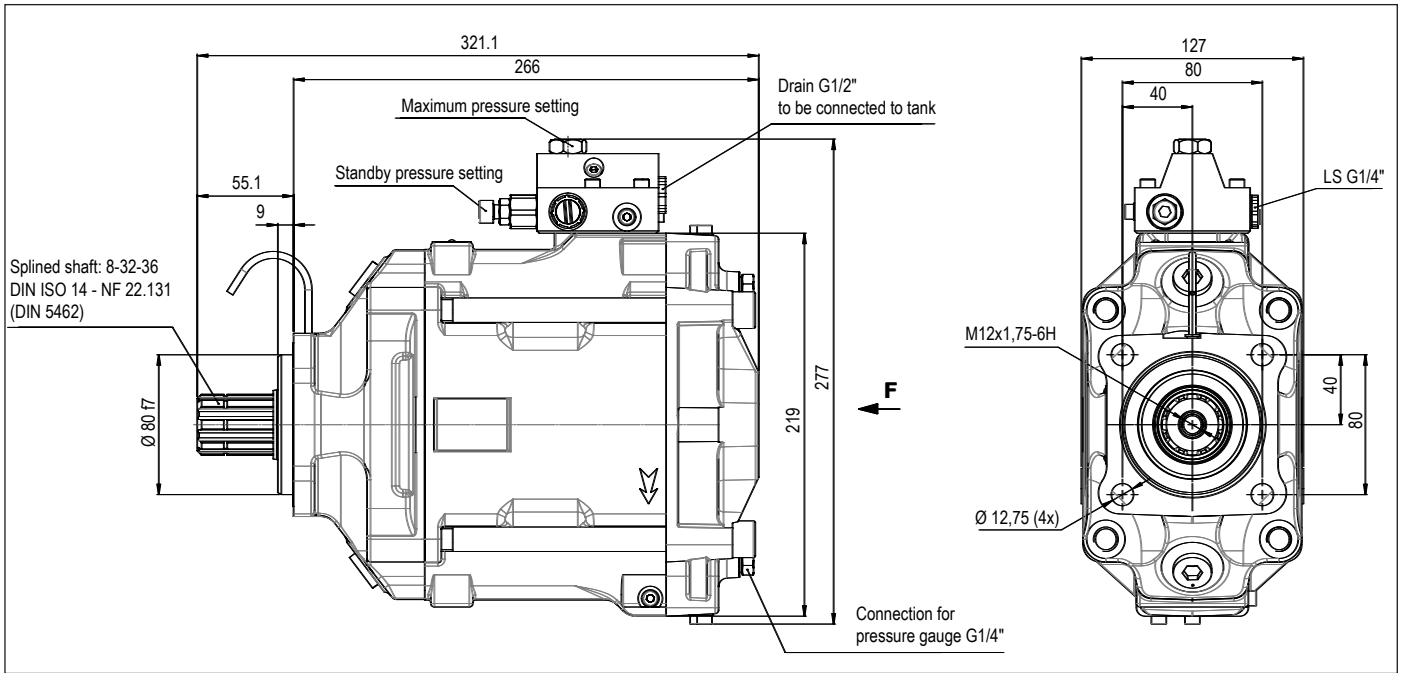
In cases where it is necessary to use a support device (overhang torque) for the pump, this must be fixed to the same part which the pump is mounted on.

### Mass and position of centre of gravity

Pump type	L (mm)	Weight (kg)	Overhang torque (N.m)
TXV 40 to 92	130	26	34
TXV 120	130	26	34
TXV 130 and TXV 150	128	28.2	38.6
TXV 130 with through shaft	152.6	31.1	47.4



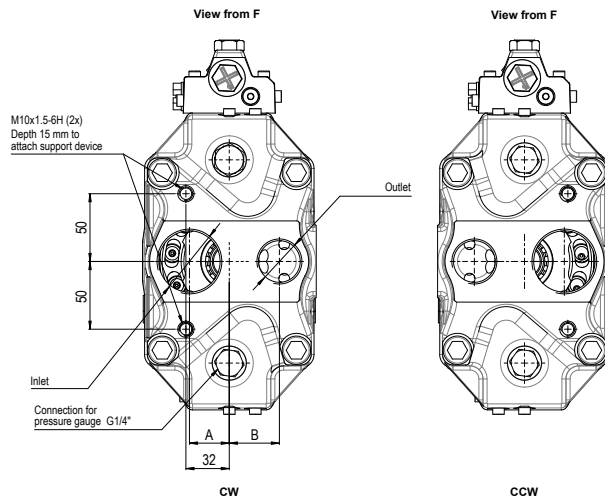
TXV 130 - 150



Dimensions in mm.

► TXV130 and 150 connections

Pump reference	Outlet (Ø)	Inlet (Ø)	A (mm)	B (mm)
TXV 130 and TXV 150	G 1"	G 1"1/2	29,4	37
TXV 130 with through shaft				



► Support device

In cases where it is necessary to use a support device (overhang torque) for the pump, this must be fixed to the same part which the pump is mounted on.

► Mass and position of centre of gravity

Pump type	L (mm)	Weight (kg)	Overhang torque (N.m)
TXV 130 et TXV 150	128	28,2	38,6
TXV 130 arbre traversant	152,6	31,1	47,4





## TXV 130 THROUGH SHAFT PUMP

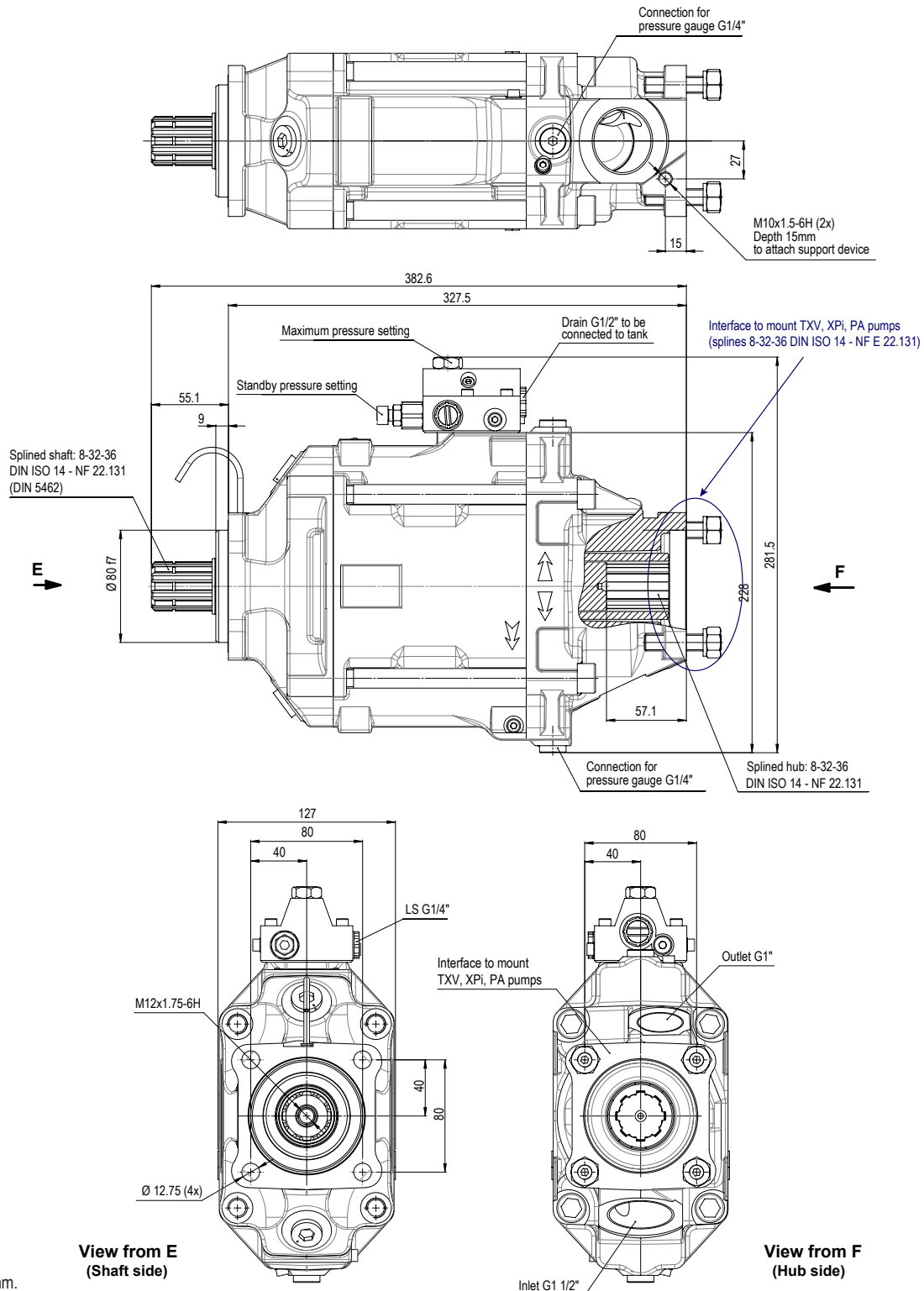
The TXV 130 pump exists in a "through shaft" version.

With side porting for inlet and output, this "through shaft" TXV 130 configuration means any LEDUC TXV pump, or fixed displacement XPI or PA pump, can be mounted on the back.

The maximum displacement of the "through shaft" TXV 130 can be factory set, on request, between 60 and 110 cc/rev on request.

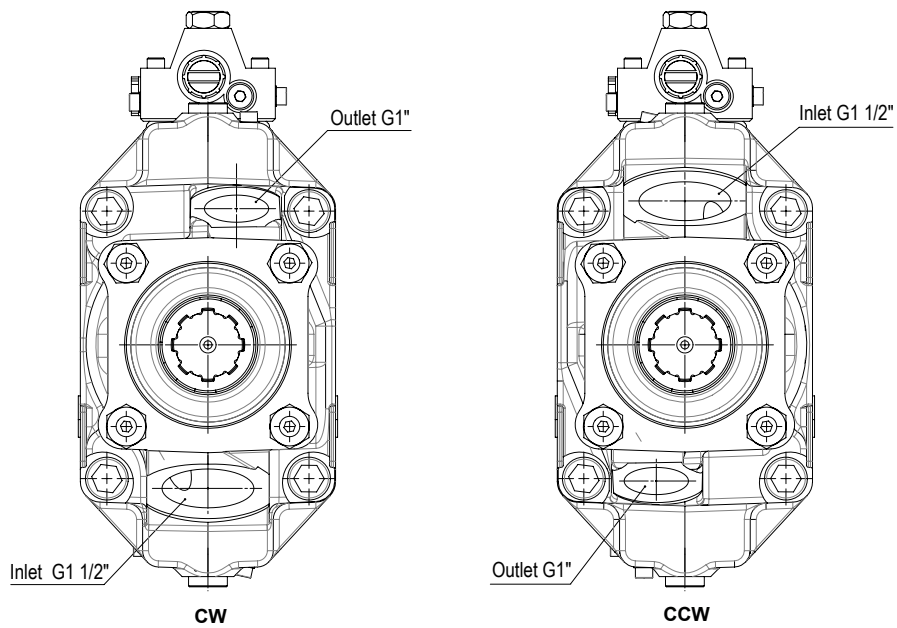
It is important to check that maximum torque to be transmitted by the shaft of the "through shaft" TXV 130 does not exceed 900 N.m.

A closing plate must be used when using the pump alone (see page 37).



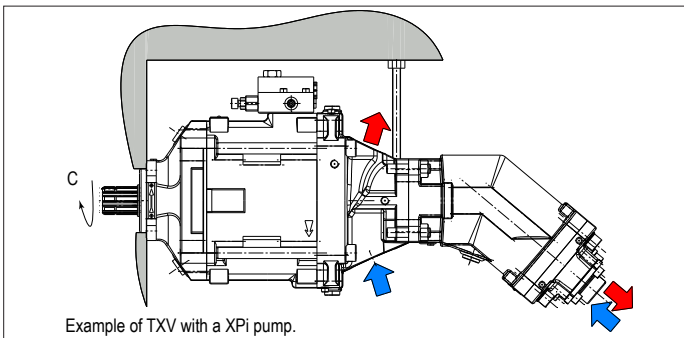
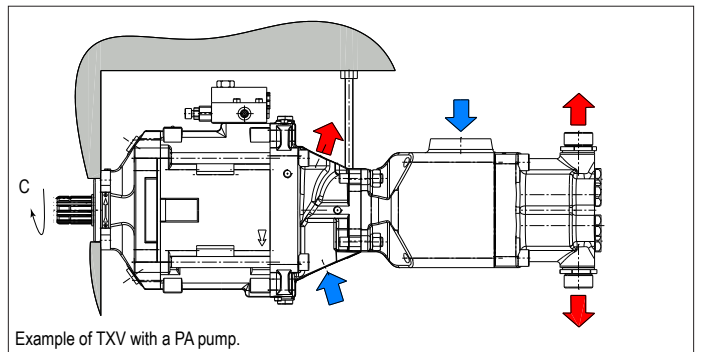
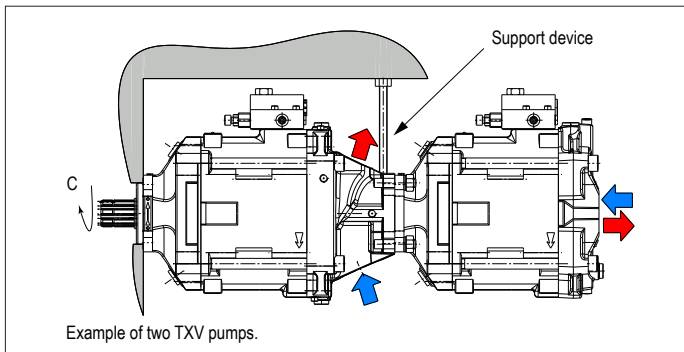
**TXV 130 THROUGH SHAFT PUMP**

View from F (see p.30)



► **Support device**

The support device for the pump must be fixed to the same part which the pump is mounted on (see diagram below) and has to be designed to avoid strain on the pump flange.

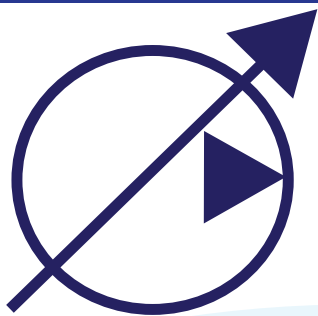


**Maximum torque transferable by the shaft of the pump driven by the PTO:**

$$C = 900 \text{ N.m}$$

That is, the sum of torque for both pumps must be < 900 N.m.

Please consult our Technical Department for advice regarding your installations.



# TXVA series

variable displacement  
piston pumps  
SAE version

## ► Characteristics

Pump ref.	Direction of rotation	Max. displacement <sup>(1)</sup>		Maximum operating pressure		Max. peak pressure (intermittent: 5%)		Torque at 300 bar (4350 psi) <sup>(2)</sup>		Max. speed at full displacement <sup>(3)</sup>	Max. speed in stand-by	Weight		Overhang torque <sup>(4)</sup>	
		cu.in/rev	(cc/rev)	psi	(bar)	psi	(bar)	lbf ft	(N.m)	rpm	rpm	lbs	(kg)	lbf ft	(N.m)
<b>TXVA 75</b>	CC CCW	4.60	(75)	5800	(400)	6090	(420)	310	(420)	2000	3000	64	(29)	26	(35.2)
<b>TXVA 92</b>	CC CCW	5.60	(92)	5500	(380)	5800	(400)	380	(515)	1900	3000	64	(29)	26	(35.2)

(1) TXV pumps can be set for smaller maximum displacements (see page 39).

(2) For a mechanical efficiency at 85%.

(3) Higher speed - at full displacement - possible depending on flow required : please contact us.

(4) Value of the overhang torque of the only pump.

## ► Configurator for TXVA pumps

To obtain order code for your pump, fill in the parameters (2, 3, 4, 5, 6, 7)

depending on the options required,

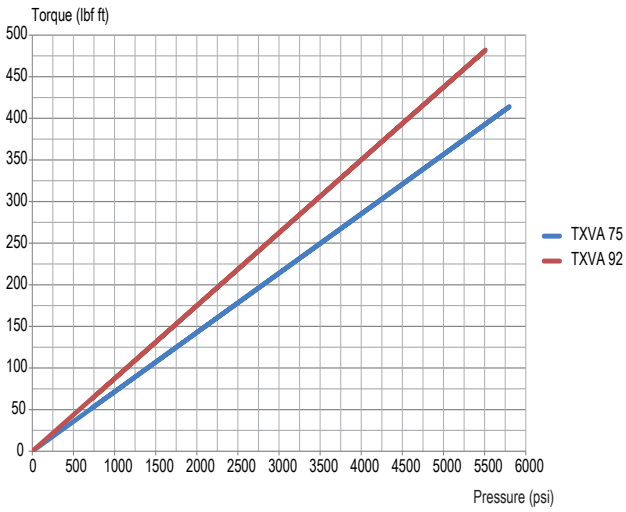
using the table below.

TXVA	...	...	...	...	...	...
1	2	3	4	5	6	7

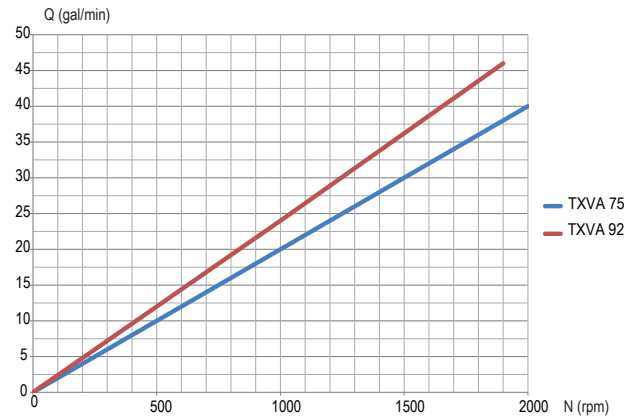
1	<b>TXVA pump</b>				
2	<b>Displacement</b>	75	92	...	
3	<b>Direction of rotation</b>	CW CCW			
4	<b>Flange</b>	SAE C - 2 bolts SAE C - 4 bolts	C1 C2		
5	<b>Shaft end</b>	Splined SAE J744 Keyed SAE J744	14T 12/24 DP - SAE C Ø 1 1/4" UNF 2A - SAE C	S1 K1	
6	<b>Ports</b>	UNF Threaded BSP Threaded	Inlet : 1 7/8" 12UN 2B Outlet : 1 1/16" 12UN 2B Inlet : G1 1/2" Outlet : G 3/4"	U1 G1	
7	<b>Control types</b>	Constant Pressure Flow-Pressure Regulator Closure Plate			PC LS PF



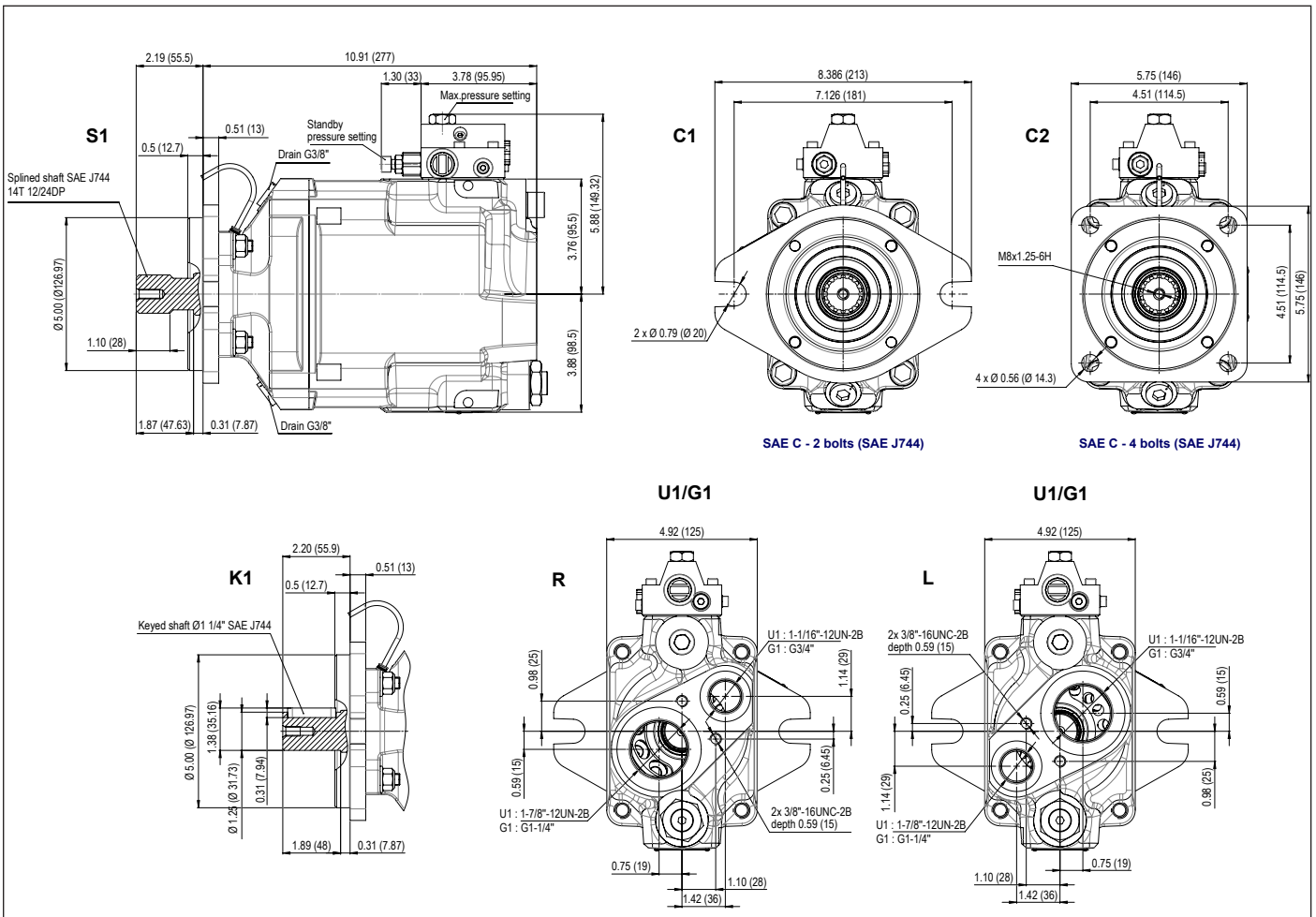
► **Torque absorbed as a function of pump output pressure (with a mechanical efficiency considered at 85%)**



► **Flow**



► **Dimensions**



Dimensions in inches (mm).

## PC | Constant Pressure

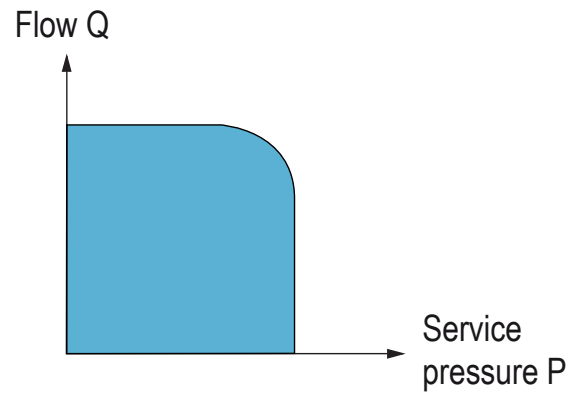
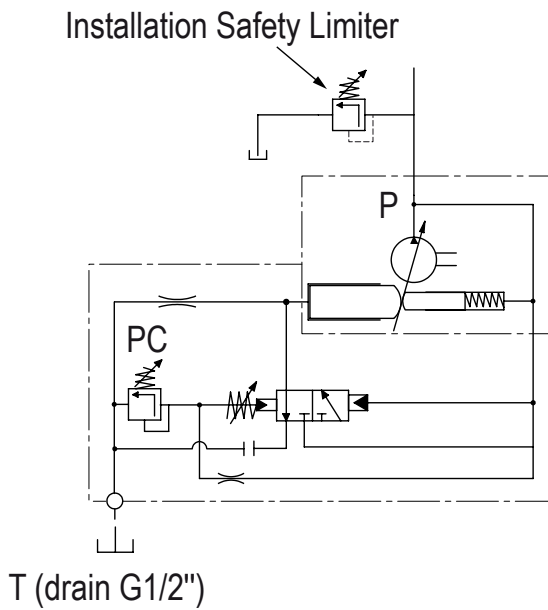
The constant pressure regulator maintains the pressure within a hydraulic receiver. As soon as the set pressure is reached, the pump's flow adjusts automatically to match the receiver's consumption. This arrangement prevents overheating and power consumption for all pressure maintenance applications.

### Examples:

- Hydraulic press
- Compression molds
- Manufacturing of bonded composites

### IMPORTANT:

Without further specifications in the order:  
PC set at 100 bar.



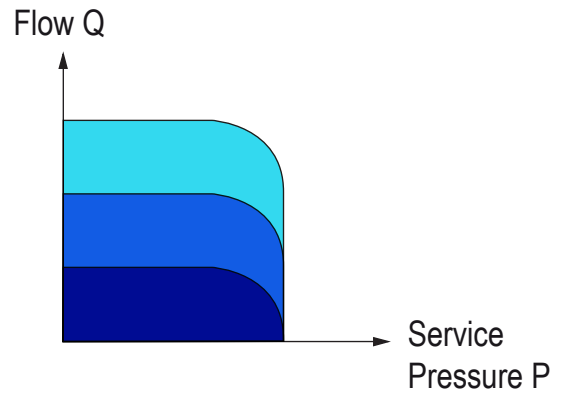
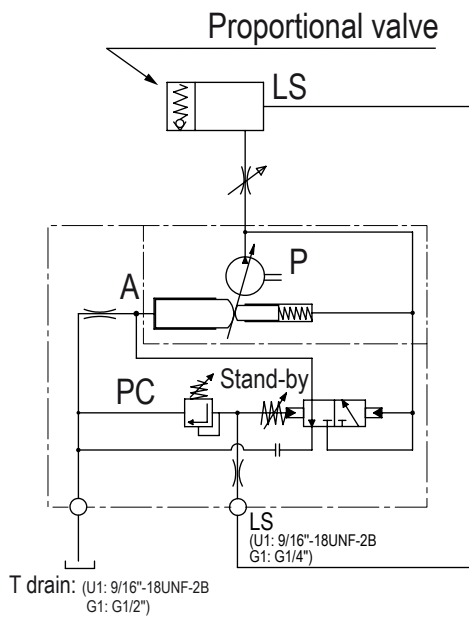
LS | Flow-Pressure Regulator

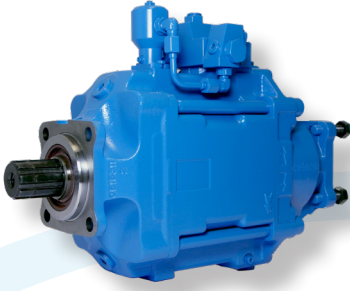
► Control of Q and P (LS: "Load-Sensing")

**IMPORTANT:**  
Without further specifications in the order:  
PC set at 100 bar, Stand-by at 30 bar.

This regulation (LS) allows continuous control of the flow and maximum discharge pressure of the pump. With this arrangement, it is easy to envision all possible combinations:

- High flow and low pressure,
- High pressure and low flow.





## ADVANTAGES OF THE CONSTANT TORQUE REGULATION

- ▶ TXV pumps with constant torque control which ensures regulation to maintain Pressure X Flow = Constant
- ▶ Control device available for the entire range of TXV pumps from 40 to 150 cc/rev., including the TXV130 model with through shaft
- ▶ Maximum torque between 90 and 700 Nm depending on models
- ▶ Torque/power adjustment screw

### ▶ Characteristics

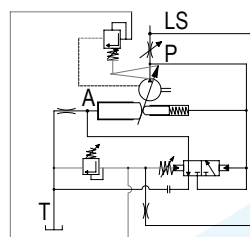
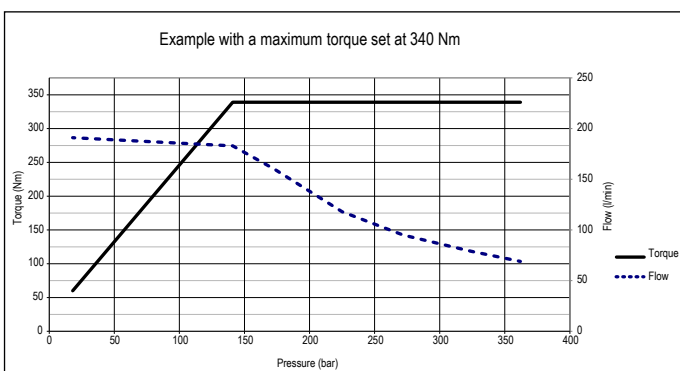
Pump	Reference	Direction of rotation	Max. displacement <sup>(1)</sup> (cc)	Max. operating pressure (bar)	Max. peak pressure (intermittent 5%) (bar)	Max. torque range <sup>(3)</sup> (daN.m)	Max. speed at full displacement <sup>(2)</sup> (rpm)	Max. speed in stand-by mode (rpm)	Weight (kg)	Overhang torque (N.m)
TXV 40	P002685	CW	40	400	420	9 to 43.5	3000	3000	25.8	34
	P002686	CCW								
TXV 60	P002673	CW	60	400	420	9 to 43.5	2600	3000	25.8	34
	P002674	CCW								
TXV 75	P002683	CW	75	400	420	9 to 43.5	2000	3000	25.8	34
	P002684	CCW								
TXV 92	P002681	CW	92	400	420	9 to 43.5	1900	3000	25.8	34
	P002682	CCW								
TXV 120	P002441	CW	120	380	400	12 to 56.5	2100	3000	25.8	34
	P002442	CCW								
TXV 130	P002763	CW	130	365	380	13 to 60.5	2100	3000	28	38.6
	P002764	CCW								
TXV 150	P002765	CW	150	310	330	15 to 70	2000	3000	28.2	38.6
	P002766	CCW								
TXV 130 (through shaft version)	P002741	CW	130	365	380	13 to 60.5	1900	3000	31.1	47.4
	P002743	CCW								

(1) The pumps can be set for a lower maximum displacement.

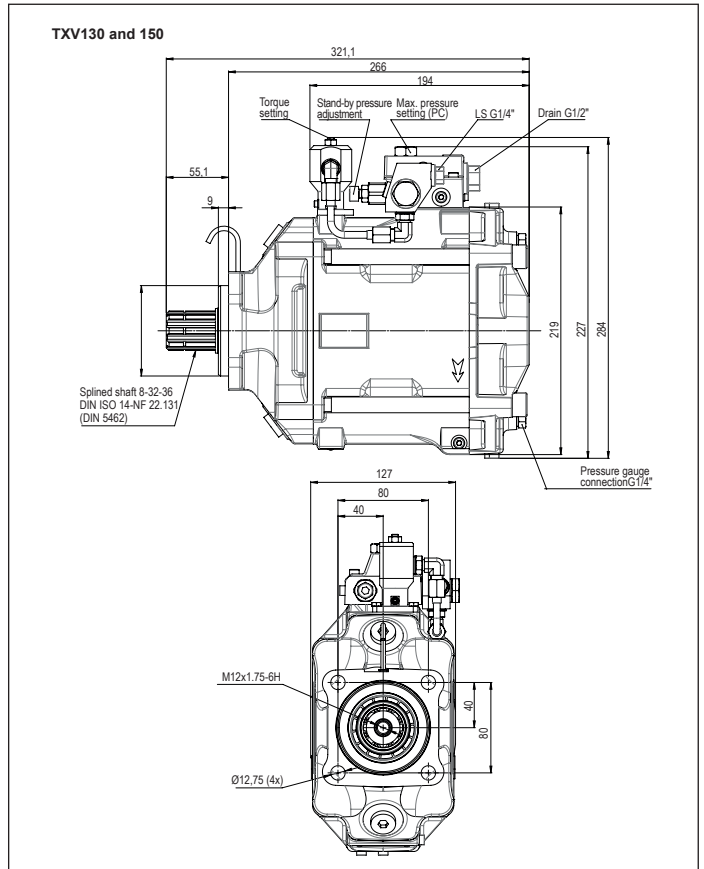
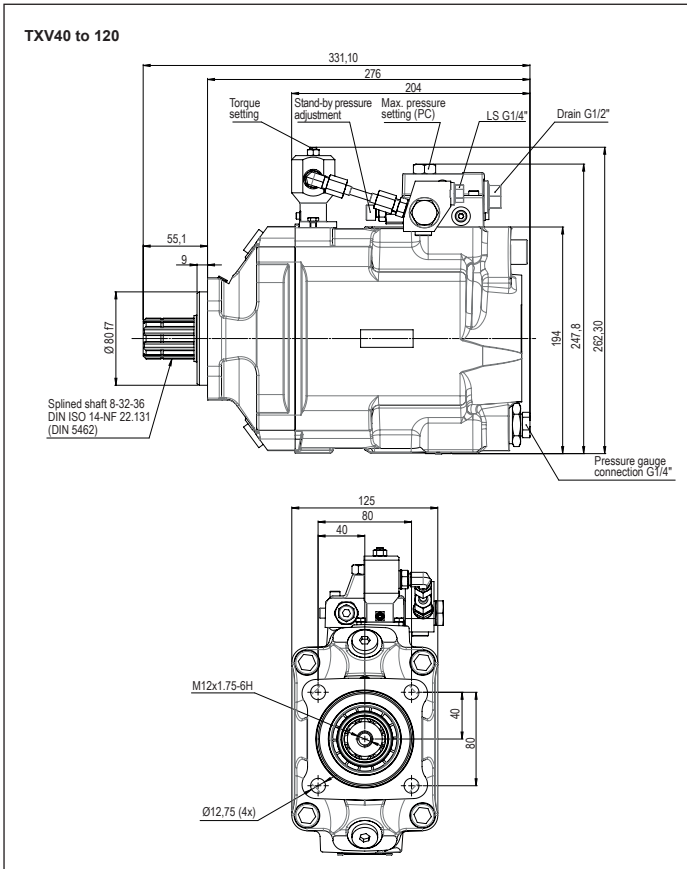
(2) Higher speed possible - at full displacement - depending on flow required : please contact Customer Service.

(3) Required torque setting to be specified on order.

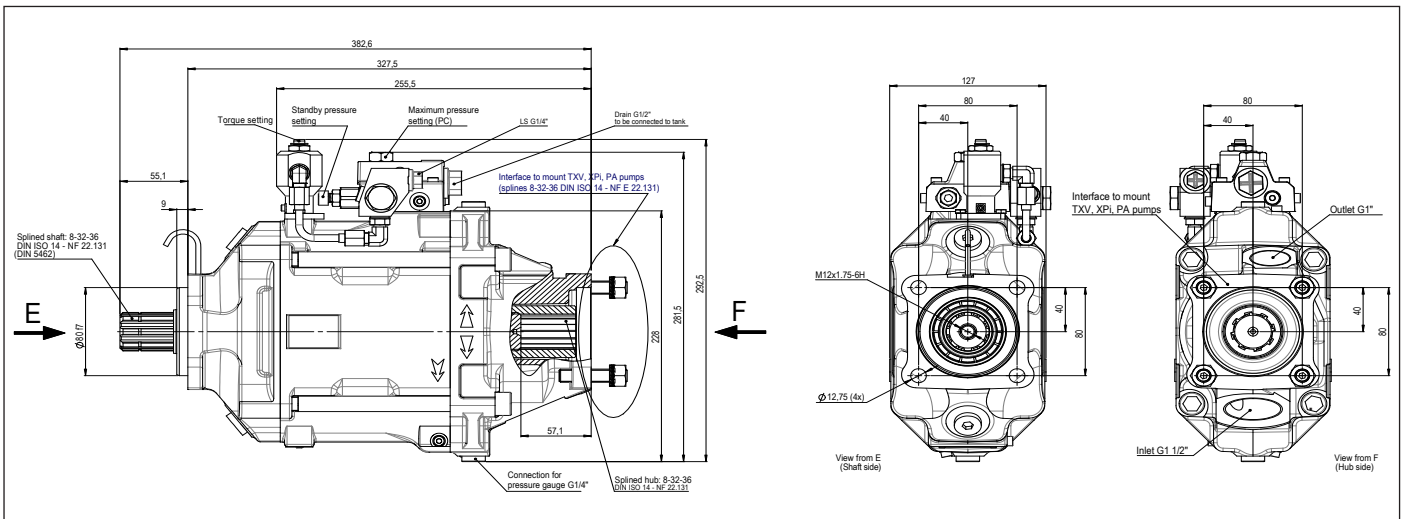
### ▶ Torque and flow as a function of pressure : ▶ Constant torque control device :



► **Standard pumps dimensions :**




► **TXV130 model with through shaft :**





## INLET FITTINGS FOR TXV PUMPS (optional)

 See recommendations of the hosing dimensions on page 40.  
For high speeds, please consult.

### 90° elbow fittings, swivel

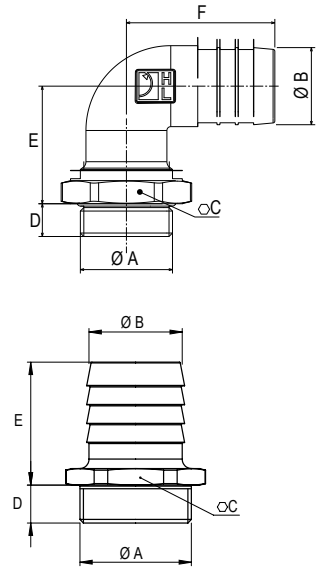
Reference	A	Ø B	C	D	E	F	Pump type
240131	G 1 1/2"	40	60	17	61	77	TXV
240133	G 1 1/2"	50	60	17	65	82	TXV

### Straight fittings

Reference	A	Ø B	C	D	E	Pump type
240182	G 1 1/2"	40	55	16	52	TXV
240067	G 1 1/2"	48	55	16	64	TXV
240066	G 1 1/2"	60	65	16	67	TXV
240186	G 1 1/2"	63.5	65	16	67	TXV
240201*	G 1 1/2"	76.2	80	16	87	TXV

\*Except for TXV130 model with through shaft.

Dimensions in mm.



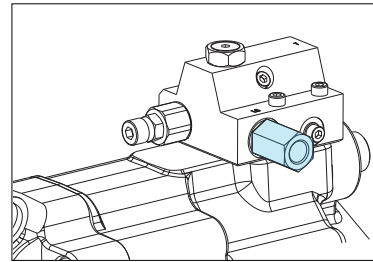
**LS adapter with integrated filter | LEDUC CODE**

Filter fitting for LS line connection

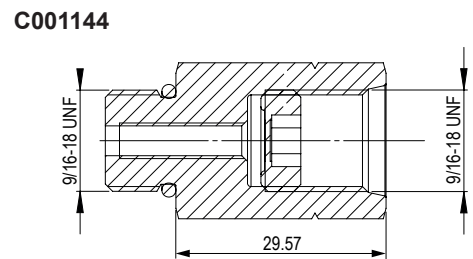
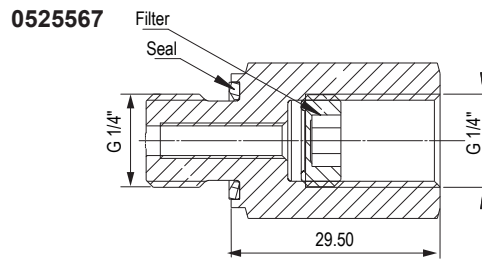
Kit reference	LS dimension	Type of pump
0525567	G1/4"	TXV
C001144	9/16-18 UNF	TXVA (SAE)

► **Technical characteristics**

- It protects the LS regulator against contamination coming from the circuit.
- Filter can be removed for maintenance.
- Filtration: 150 microns.



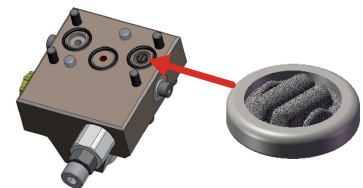
► **Drawings for both versions of the kit ( dimensions in mm):**



**SEAL + FILTER | LEDUC CODE K000028**

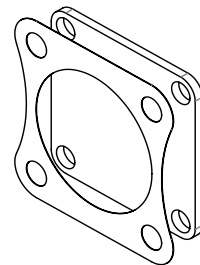
The LS filter protects the TXV's Load Sensing valve against contaminations coming from the hydraulic circuit.

**Mounted as standard on all TXV pumps.**



**KIT CLOSING PLATE + SEAL | LEDUC CODE P001512**

**FOR TXV 130 THROUGH SHAFT**



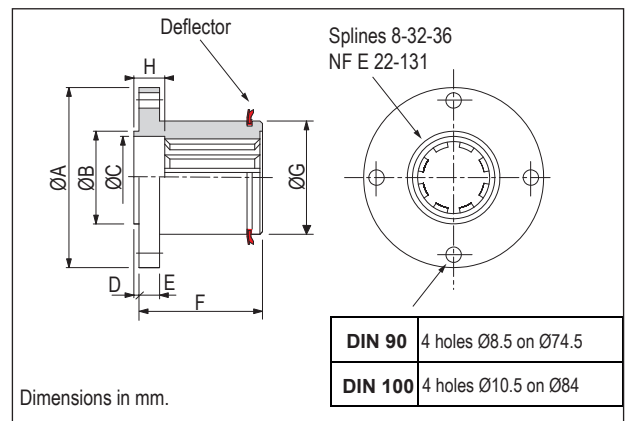
**CARDAN PLATE - DIN 90 and DIN 100**

The cardan plate enables the pump shaft to be connected to a cardan shaft with interface as on drawing on the right.

Note: the maximum admissible torque is limited by the drive shaft.

The deflector is supplied with the cardan plate.

Type	LEDUC code	ØA	ØB	C	D	E	F	ØG	H
DIN 90	056315	90	47	43	2	10	62	55	15
DIN 100	0519040	100	57	43	2	10	64	55	15

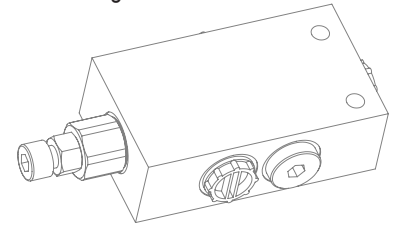


## FCV - FLUID VALVE CIRCULATION | LEDUC CODE: 0524940

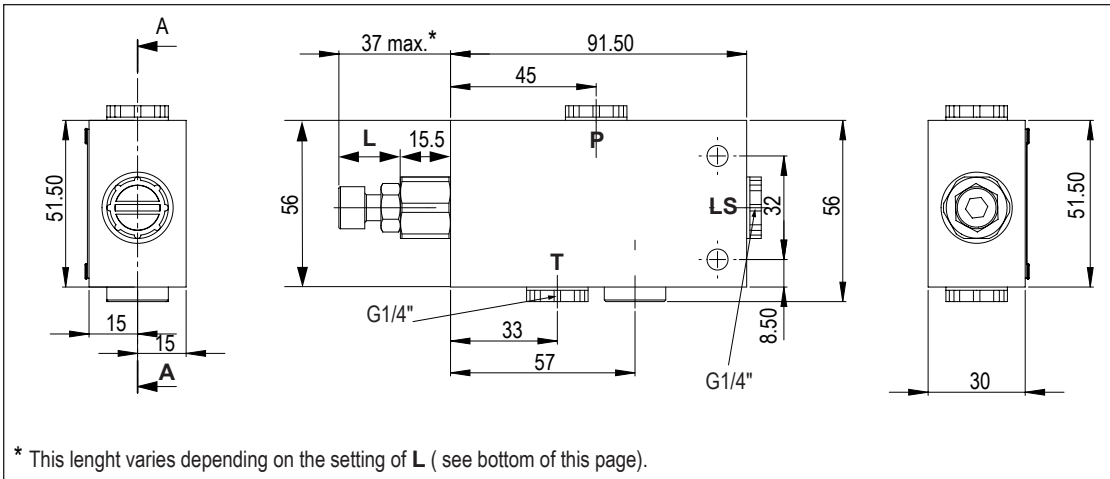
The fluid circulation (FCV) is designed for applications where the hydraulic variable displacement pump is used in standby mode for a long period of time, for example engine PTO, to protect the pump against overheating.

### ► Technical characteristics

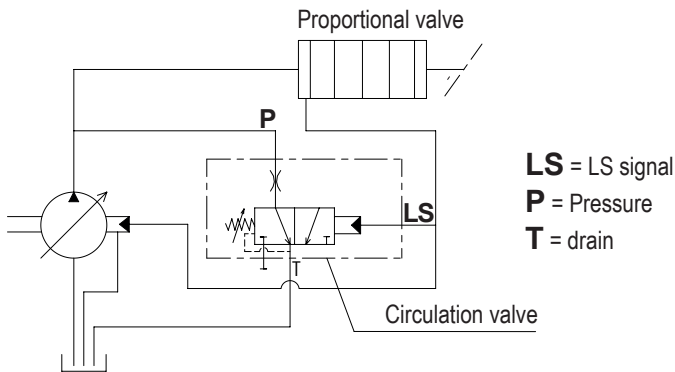
- The valve flow varies between 20 and 22 l/min for a  $\Delta P$  at 30 bar.
- Maximum pressure is 420 bar.
- The closing pressure is 2 bar min. and 7 bar max.



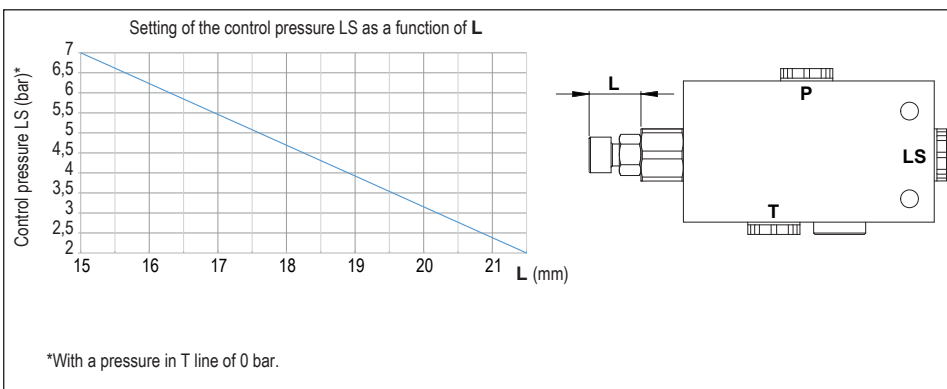
### ► Dimensions



### ► Schematics



### ► Setting of the control pressure



## MAXIMUM DISPLACEMENT SETTING SCREW

The TXV pumps from 40 to 150 cc/rev are made as standard to be able to use a setting screw:

- Reference : **0518386** for TXV 40 to 120 pumps
- Reference : **0523899** for the TXV 130\* and TXV 150\*

\*Except TXV through shaft and constant torque.

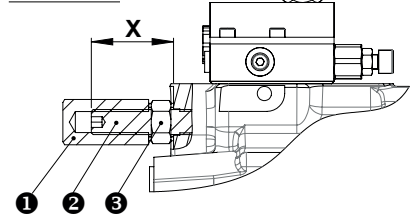
The pump displacement can thus be adjusted to exactly what is needed.

### ► How to set maximum displacement

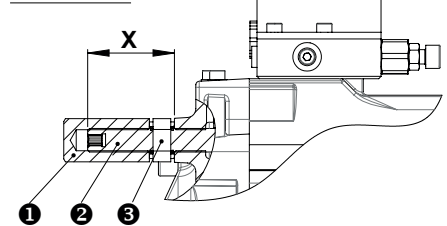
Unscrew **1** completely, loosen nut **3** and screw **2** to obtain dimension **X** on graph below, and the corresponding displacement (see figure).

- For TXV 150 : 1 turn of the screw changes the displacement by 7.5 cc.
- For TXV 130 : 1 turn of the screw changes the displacement by 6.5 cc.
- For TXV 120: 1 turn of the screw changes the displacement by 9 cc.
- For TXV 92 to TXV 40: 1 turn of the screw changes the displacement by 8 cc.

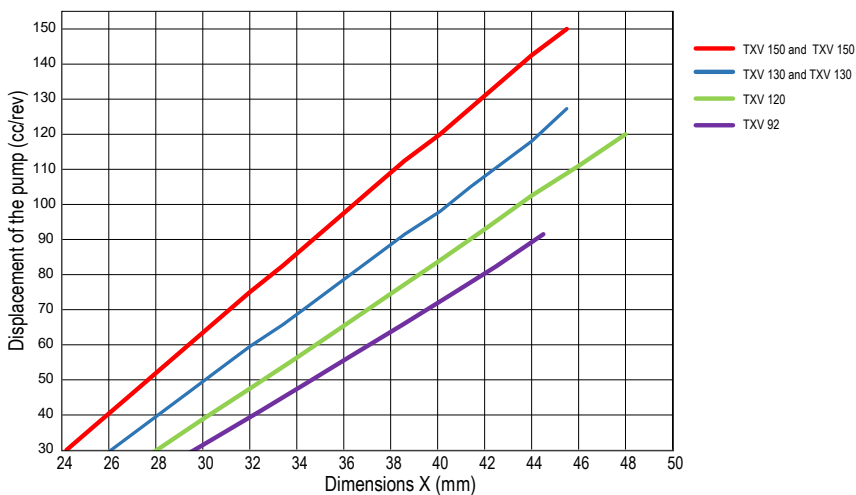
TXV 40-120



TXV 130-150



TXV pump | Maximum displacement setting



## SETTING OF THE REGULATION

### ► 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 working pressure of your installation. This PC pressure should be specified in the order. If no PC setting is specified, 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 adapted.

*For further information or advice, please contact our Customer Service Department.*