

POMPY TŁOCZKOWE SKOŚNE TYP TXV O ZMIENNEJ WYDAJNOŚCI



TXV series

pumps with

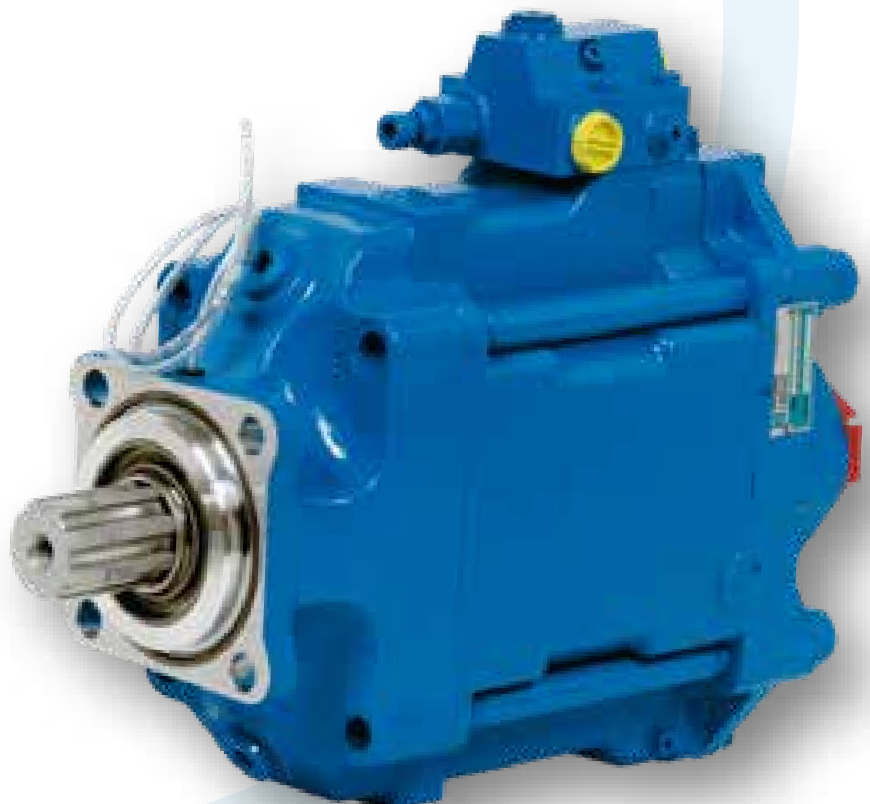
Load Sensing control

variable displacement piston pumps

ADVANTAGES

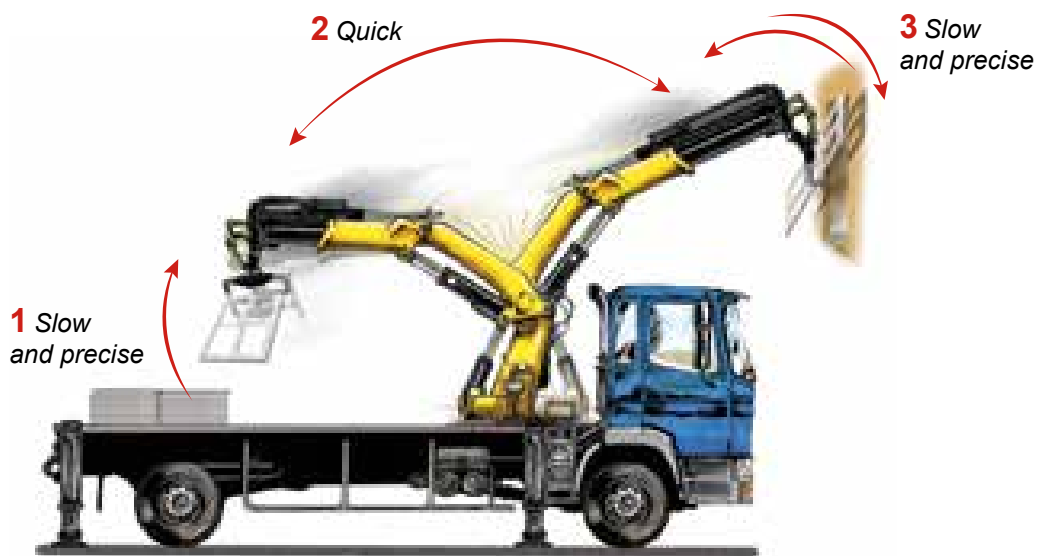
- ▶ *TXV series pumps are variable displacement with pressure-flow control – called **Load Sensing**. They **self-regulate to give just the flow required for each movement**.*
- ▶ *Specifically designed for the needs of the **truck hydraulics market**, TXV pumps are particularly well adapted for applications 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

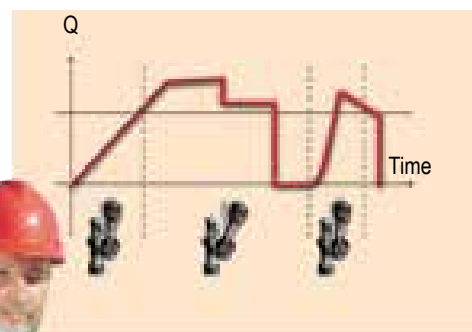
For slow and precise movements, the pump adjusts its flow to whatever the user needs, whilst also controlling maximum circuit pressure. Oil heating and lamination, and noise level, are considerably reduced compared to a fixed displacement pump.

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 α of the swashplate (Fig.1).
- ▶ To change displacement from maximum to zero (complete flow cancellation), the swashplate angle goes from α max (Fig. 1) to α min (=0) (Fig. 2).

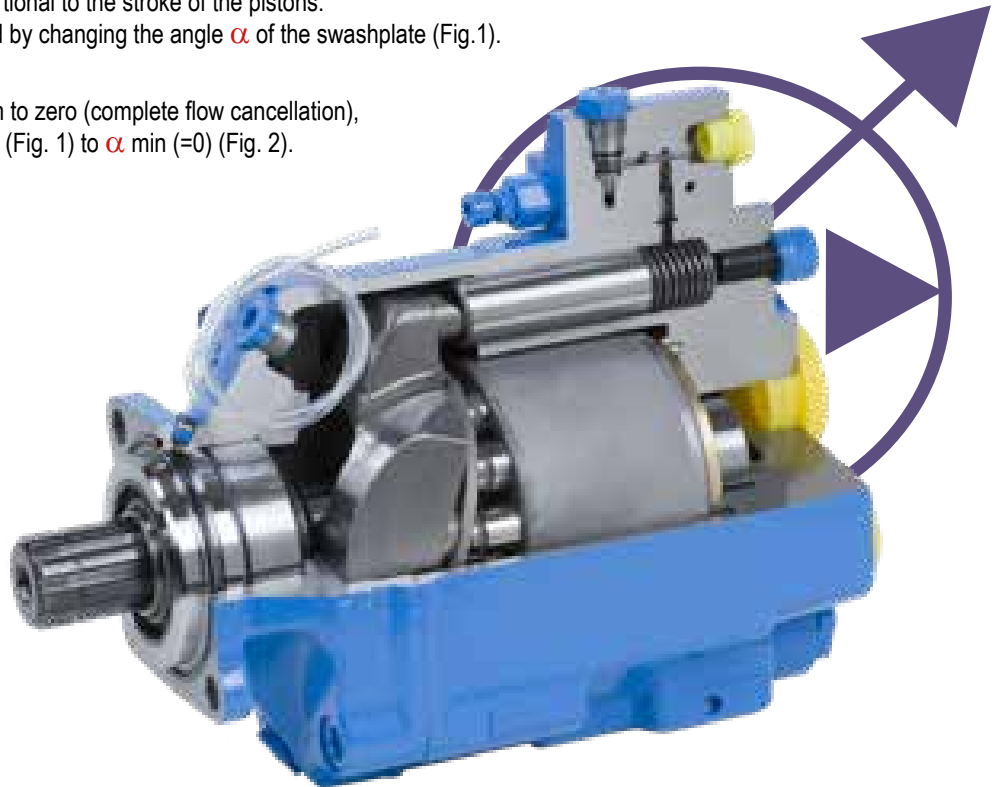


Figure 1 - Maximum displacement

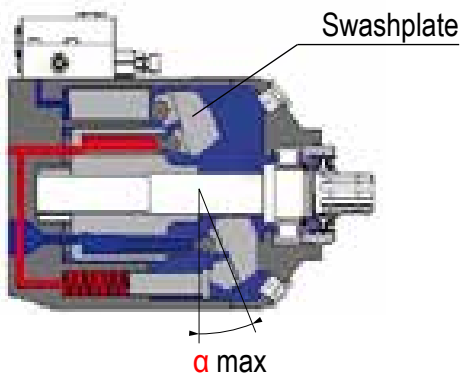
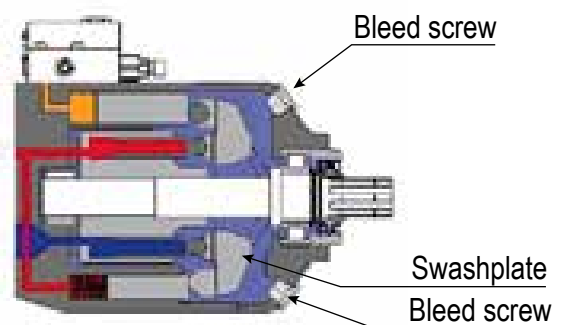
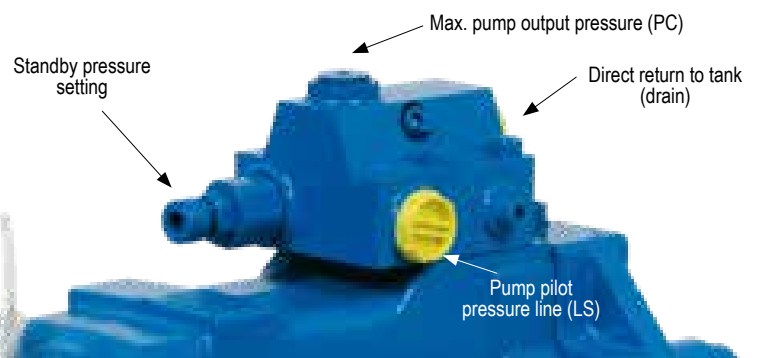
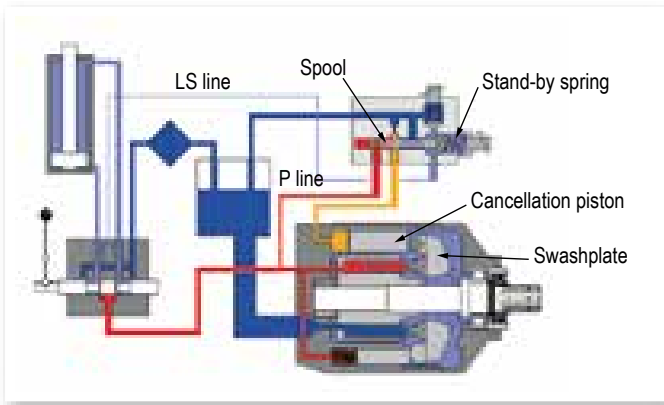


Figure 2 - zero displacement



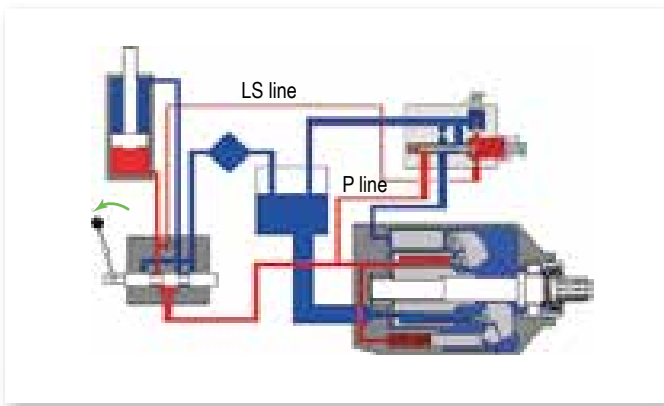
- ▶ Setting the servo pump.





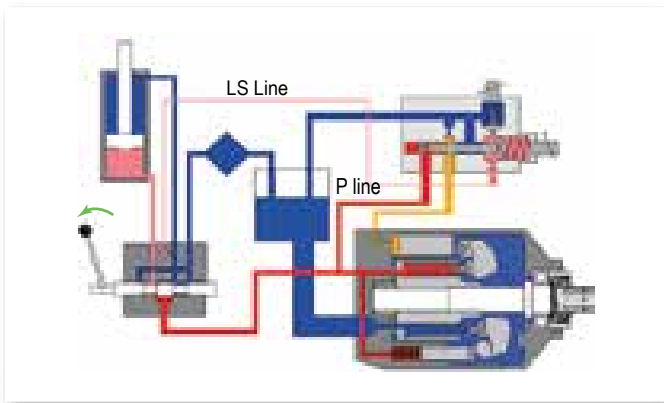
► Zero flow (standby)

The proportional valve is closed.
 The pressure in the P line increases until it reaches the value at which the stand-by 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.



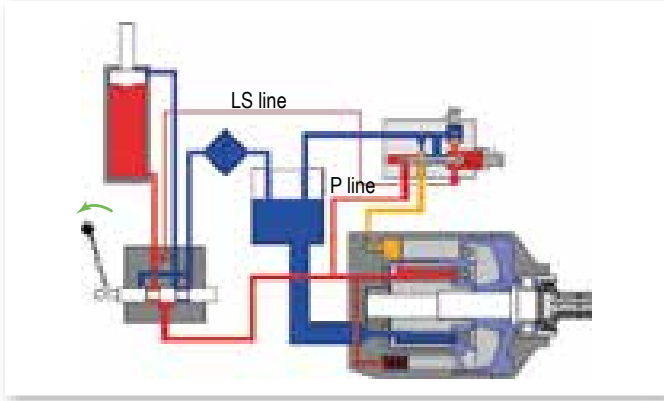
► Full flow

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 α : 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. ⁽¹⁾ (cc/rev)	Max. operating pressure (bar)	Max. peak pressure (intermittent: 5%) (bar)	Torque at 300 bar ⁽²⁾ (N.m)	Max. speed at full displacement ⁽³⁾ rpm	Max. speed in stand-by rpm	Weight (kg)	Overhang torque ⁽⁴⁾ (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
TXV 130 <i>indexable</i>	0520300	CW/CCW	130	365	380	730	1750	3000	29,3	42
TXV 150 <i>indexable</i>	0525070	CW/CCW	150	310	330	840	1750	3000	29,3	42

► With through shaft

TXV 130	0518700 0518705	CW CCW	130	365	380	730	1900	3000	31,1	47,4
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(1) TXV pumps can be set for smaller maximum displacements (see page 41).

(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.

indexable series: see pages 34 and 35.

(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

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

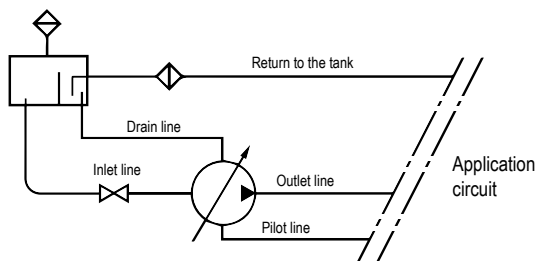
Calculation of torque to determine PTO,
as a function of the displacement and the pressure

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

Avec :

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

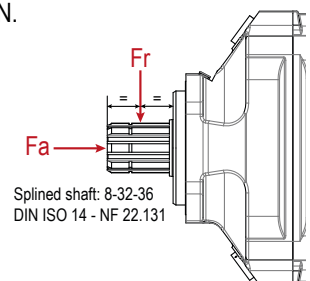
► Ideal installation



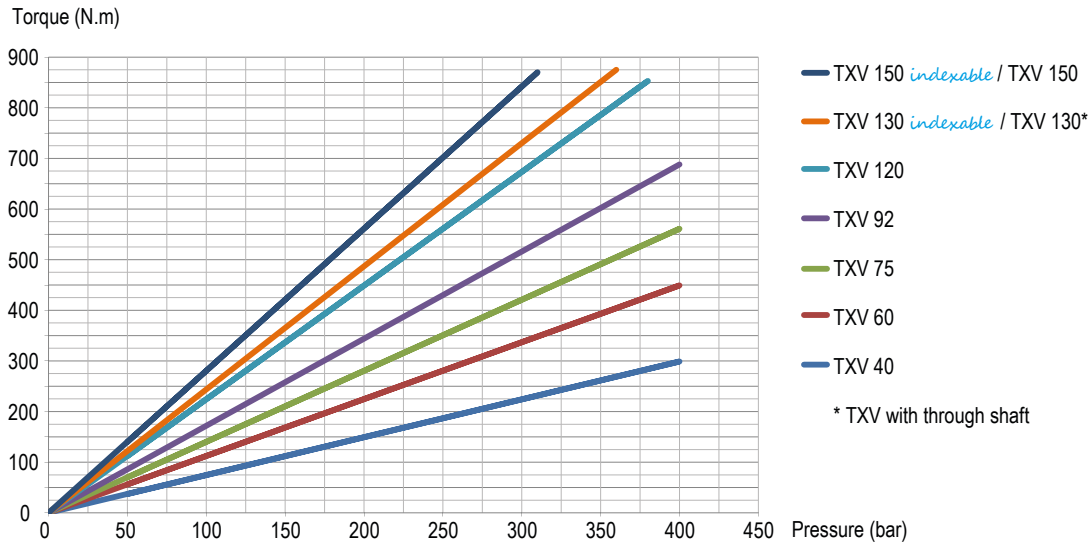
► Force on pump shaft

Fr : Acceptable max. radial force = 3000 N

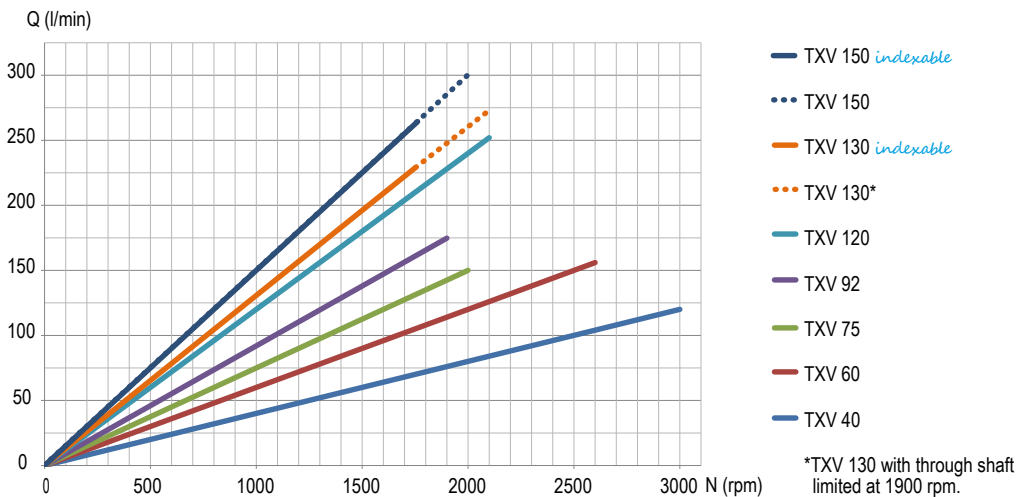
Fa : Acceptable axial force = 1600 N.



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



► Flow as a function of rotating speed

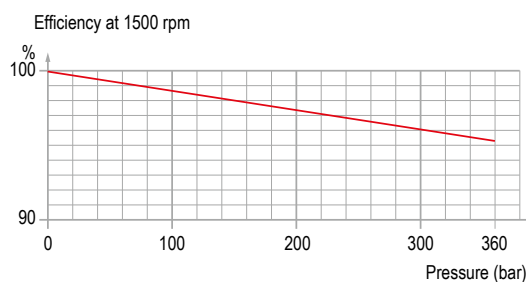


⚠ Attention: the TXV indexables pumps are limited at 1750 rpm maximum.

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

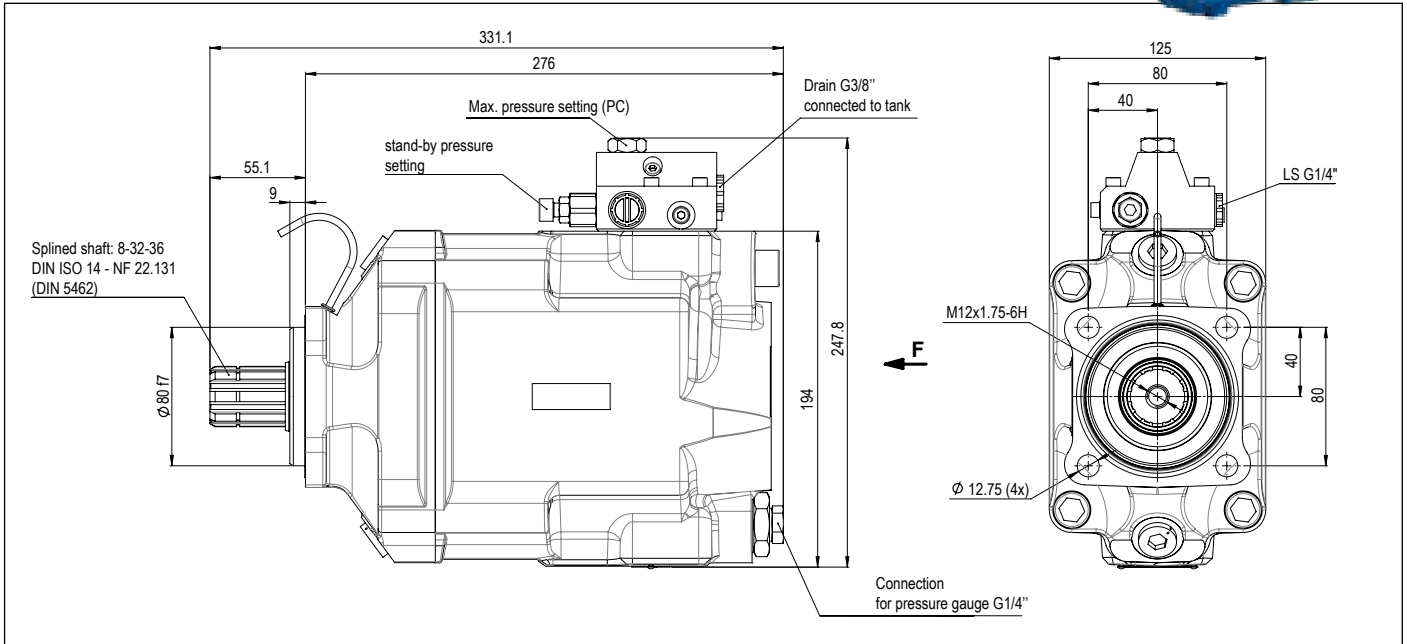
These graphs are the results of testwork done in HYDRO LEDUC R&D laboratory, on a specific test bench with a mineral hydraulic fluid ISO VG46 at 25°C (~100 cSt) - disregarding the volumetric efficiency.

► Volumetric efficiency





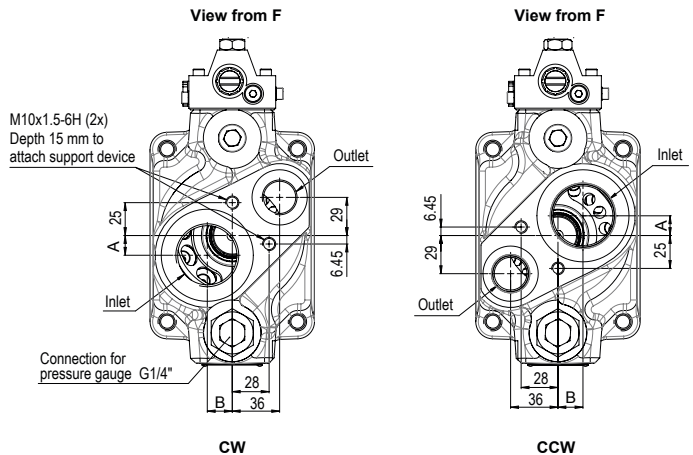
TXV 40 TO 120



Dimensions in mm.

TXV connections

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

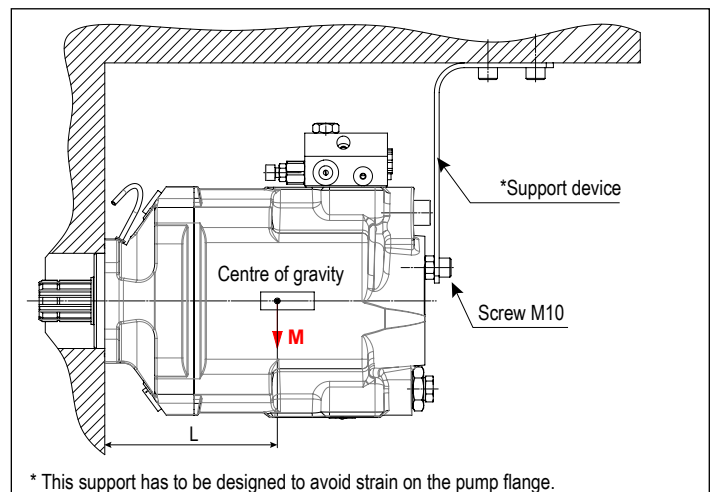


Support device

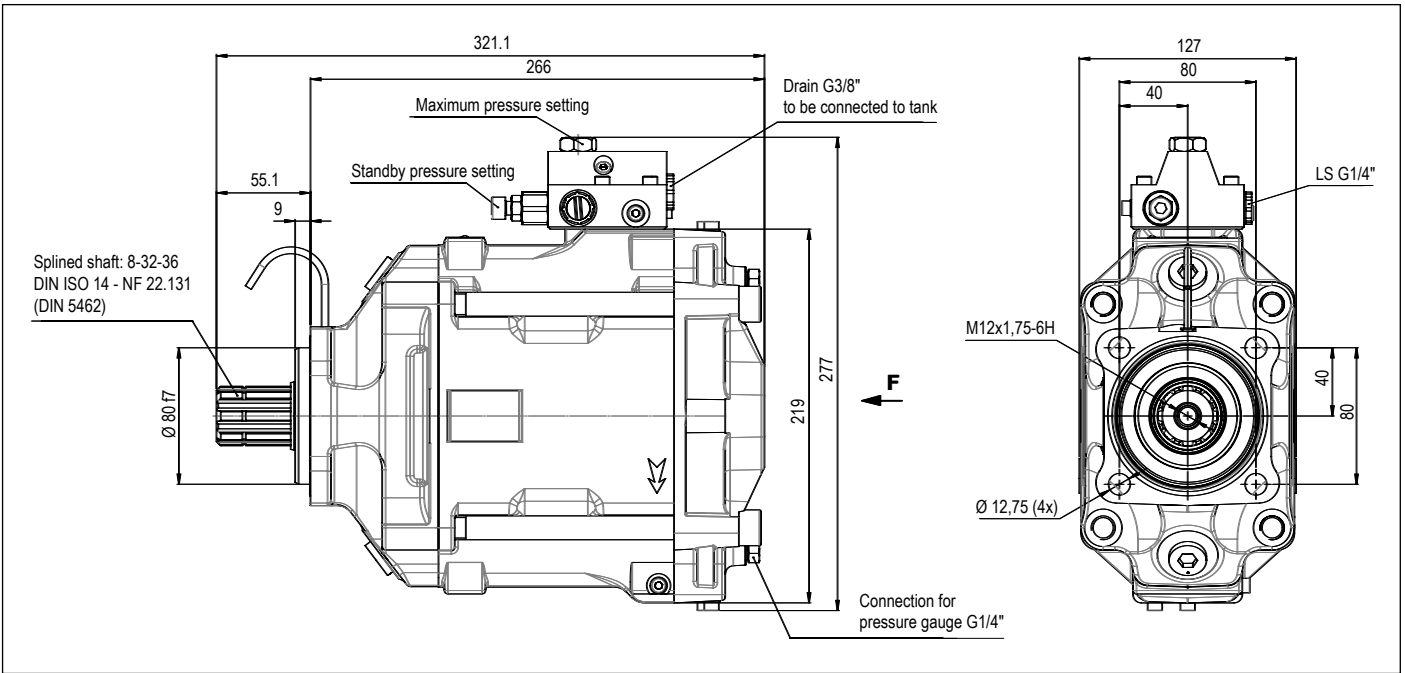
In cases where it is necessary to use a support device (overhang torque) for the pump, this must be fixed to the same part which the pump is mounted on.

Mass and position of centre of gravity

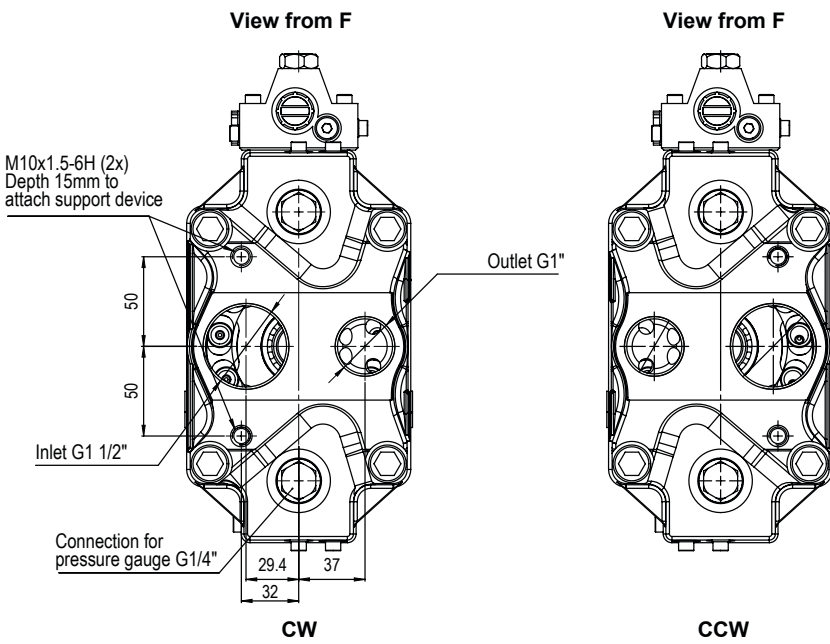
Pump type	L (mm)	Weight (kg)	Overhang torque (N.m)
TXV 40 à 92	130	26	34
TXV 120	130	26	34
TXV 130 et TXV 150	128	28.2	38.6
TXV 130 et TXV 150 <i>indexable</i>	128	29.3	42
TXV 130 with through shaft	152.6	31.1	47.4
TXV 130 constant torque	143	28.3	40



TXV 150



Dimensions in mm.





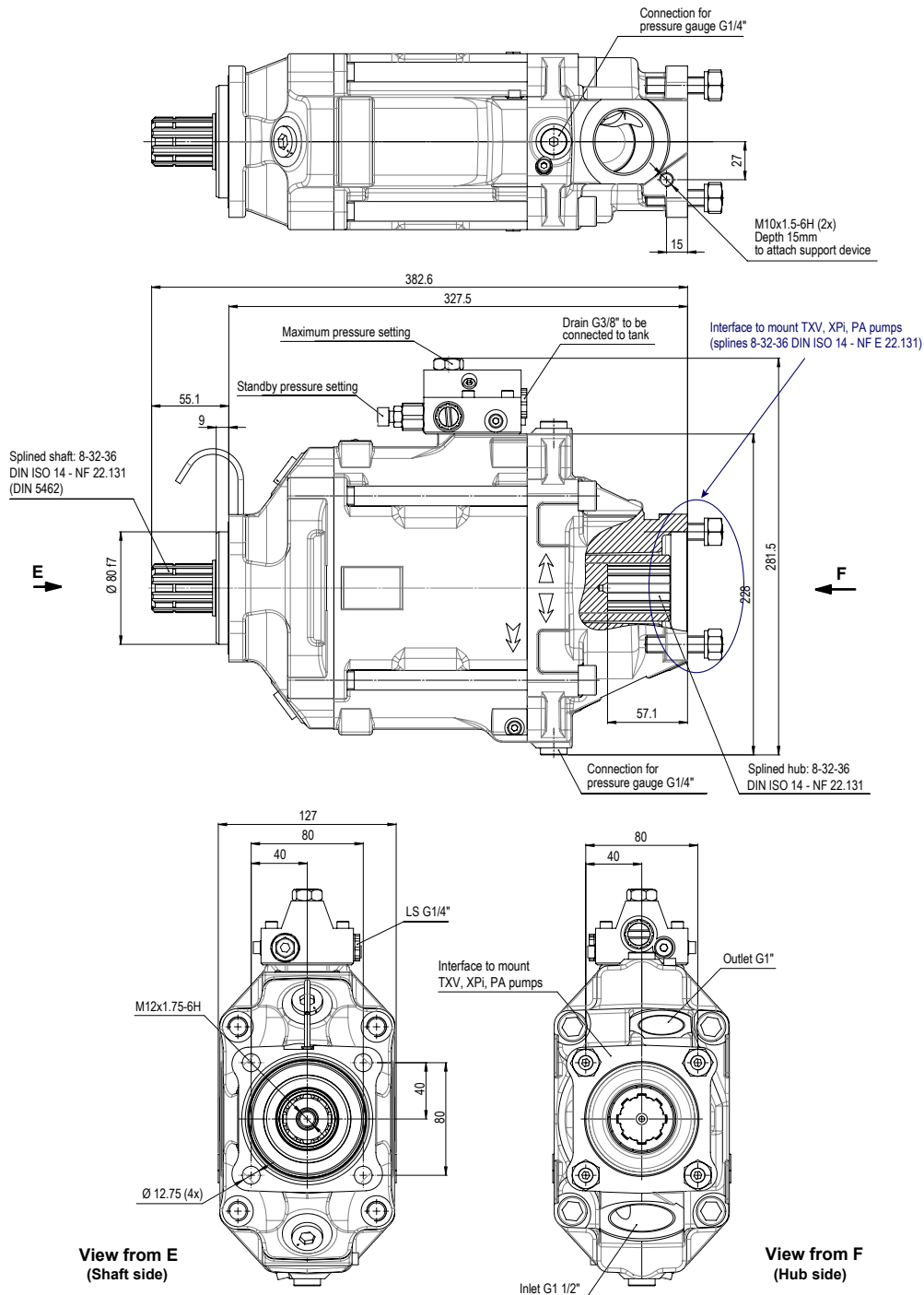
TXV 130 THROUGH SHAFT PUMP

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 130 cc/rev.

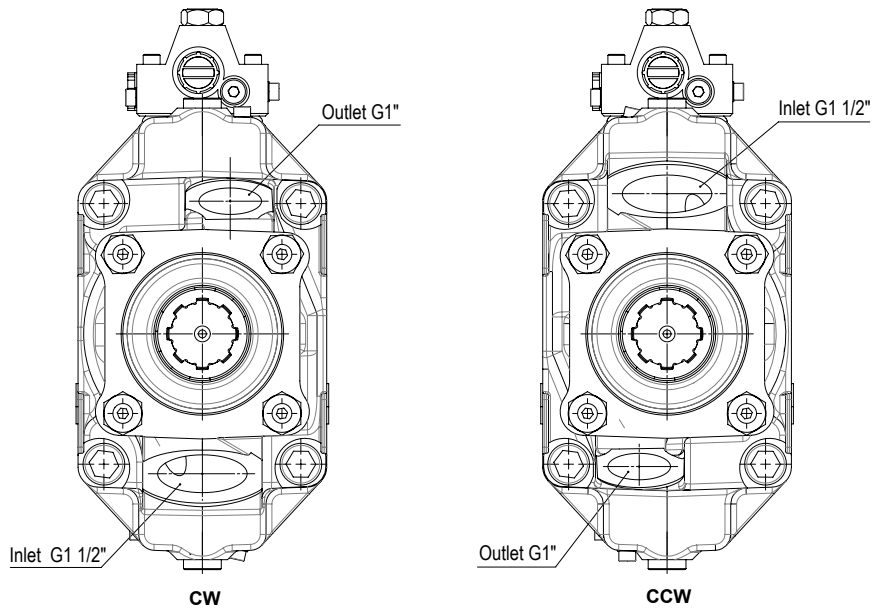
It is important to check that maximum torque to be transmitted by the shaft of the "through shaft" TXV 130 does not exceed 900 N.m.



Dimensions in mm.

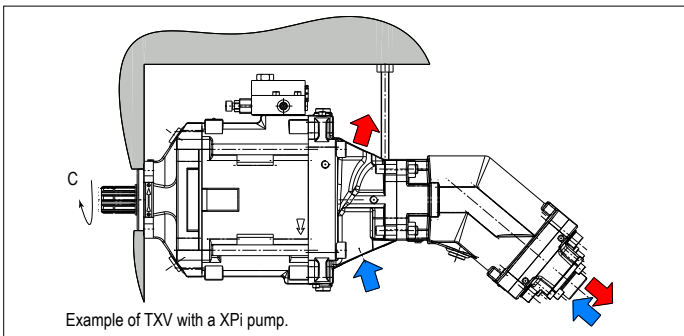
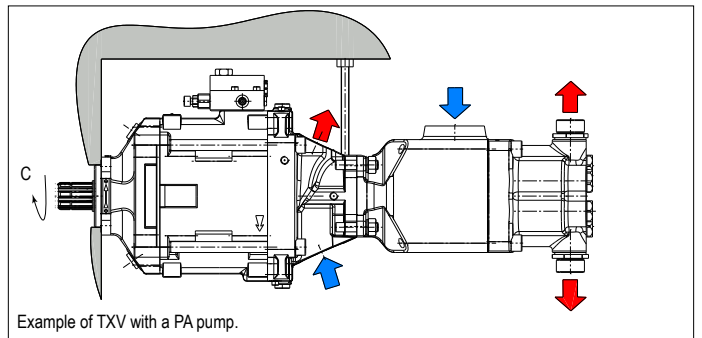
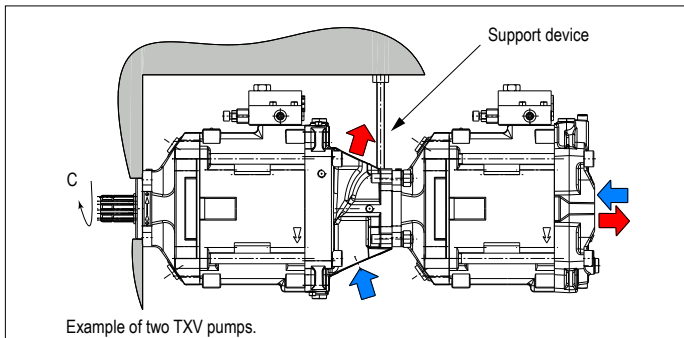
TXV 130 THROUGH SHAFT PUMP

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.

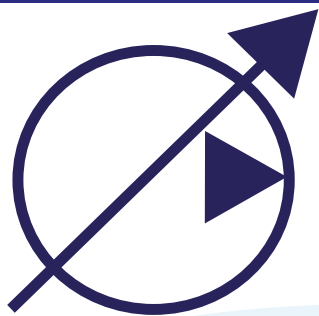


Maximum torque transferable by the shaft of the pump driven by the PTO:

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

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

pump with *Load Sensing*
control - SAE version

variable displacement piston pumps

► Characteristics

Pump ref.	Direction of rotation	Max. displacement ⁽¹⁾		Maximum operating pressure		Max. peak pressure (intermittent: 5%)		Torque at 300 bar (4350 psi) ⁽²⁾		Max. speed at full displacement ⁽³⁾	Max. speed in stand-by	Weight		Overhang torque ⁽⁴⁾	
		cu.in/rev	(cc/rev)	psi	(bar)	psi	(bar)	lbf ft	(N.m)	rpm	rpm	lbs	(kg)	lbf ft	(N.m)
TXVA 75	CC CCW	4.60	(75)	5800	(400)	6090	(420)	310	(420)	2000	3000	64	(29)	26	(35.2)
TXVA 92	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 41).

(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

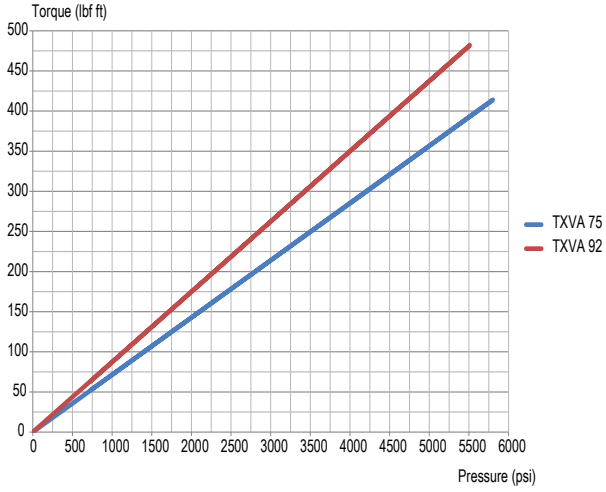
To obtain order code for your pump, fill in the parameters (2, 3, 4, 5) depending on the options required, using the table below.

TXVA	L1
1	2	3	4	5	6

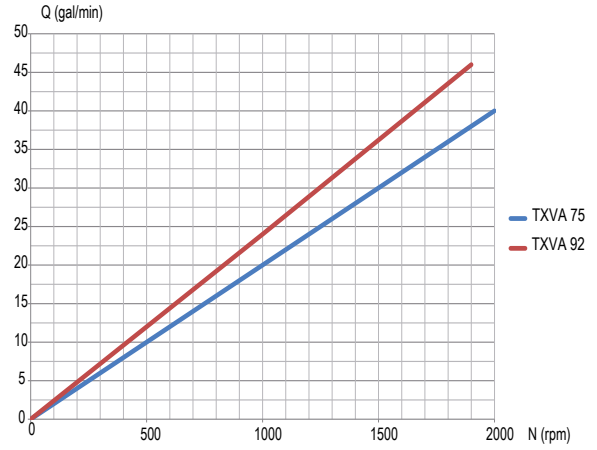
1	TXVA pump			
2	Displacement	4.60 cu.in/rev (75 cc/rev)	5.60 cu.in/rev (92 cc/rev)	
3	Direction of rotation			CW CCW
4	Flange	SAE C - 2 bolts		C1
		SAE C - 4 bolts		C2
5	Shaft end	Splined SAE J744	14T 12/24 DP - SAE C	S1
		Keyed SAE J744	Ø1 1/4" UNF 2A - SAE C	K1
6	Ports	Threaded	Inlet: 1 7/8" 12UN 2B Outlet: 1 1/16" 12UN 2B	L1



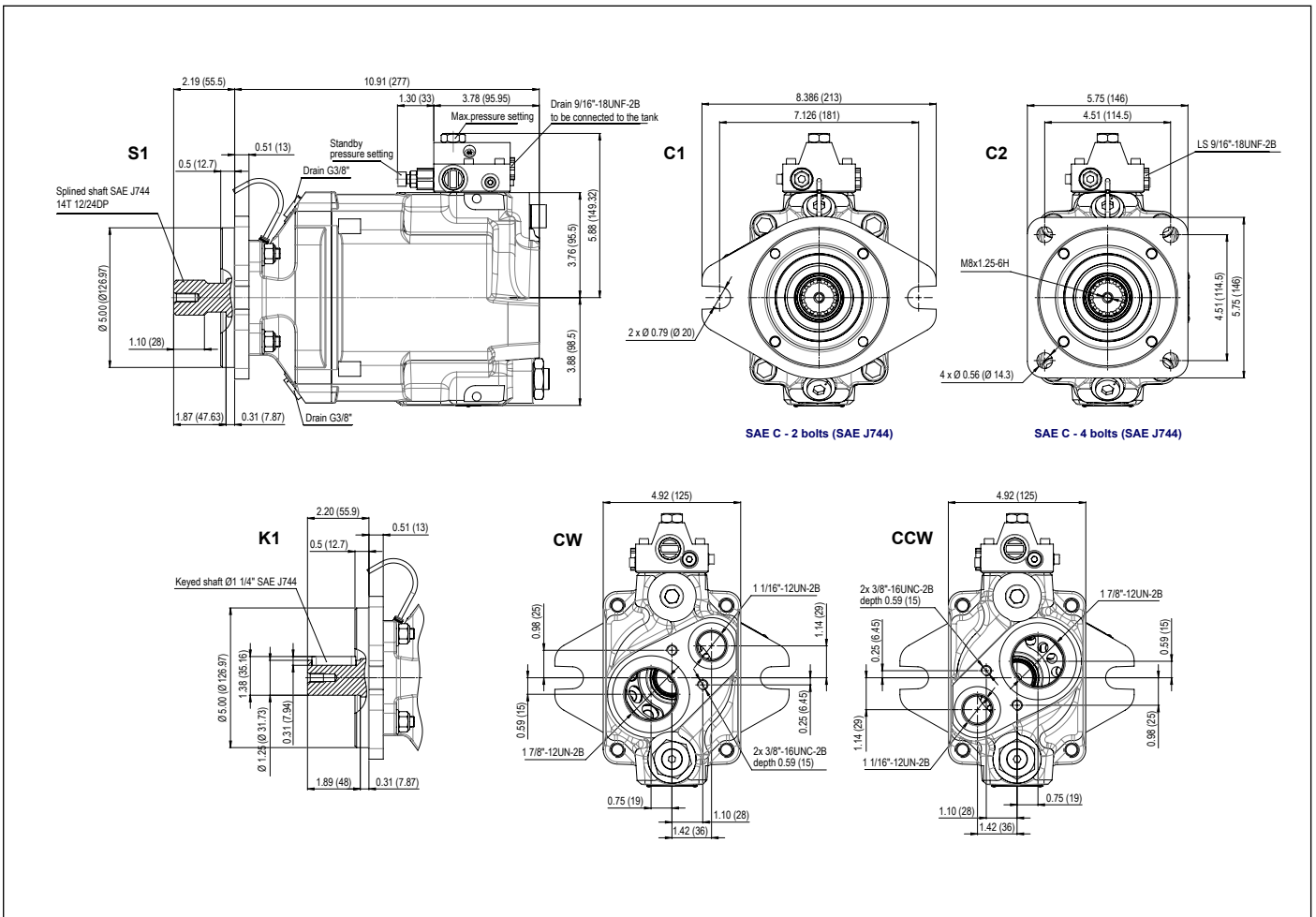
► Torque absorbed as a function of pump output pressure (with a mechanical efficiency considered at 85%)



► Flow



► Dimensions



Dimensions in inches (mm).



TXV *indexable* series

displacements 130 and 150 cc/rev

pumps with *Load Sensing* control

variable displacement piston pumps

ADVANTAGES OF THE *indexable* SERIES

- ▶ Able to rotate in either direction, simply by changing position of the indexing screw !
- ▶ Stock optimisation: only one reference regardless of direction of rotation !
- ▶ Pump supplied with its inlet fitting.

Minimum size envelope
High rotating speeds
High output pressure



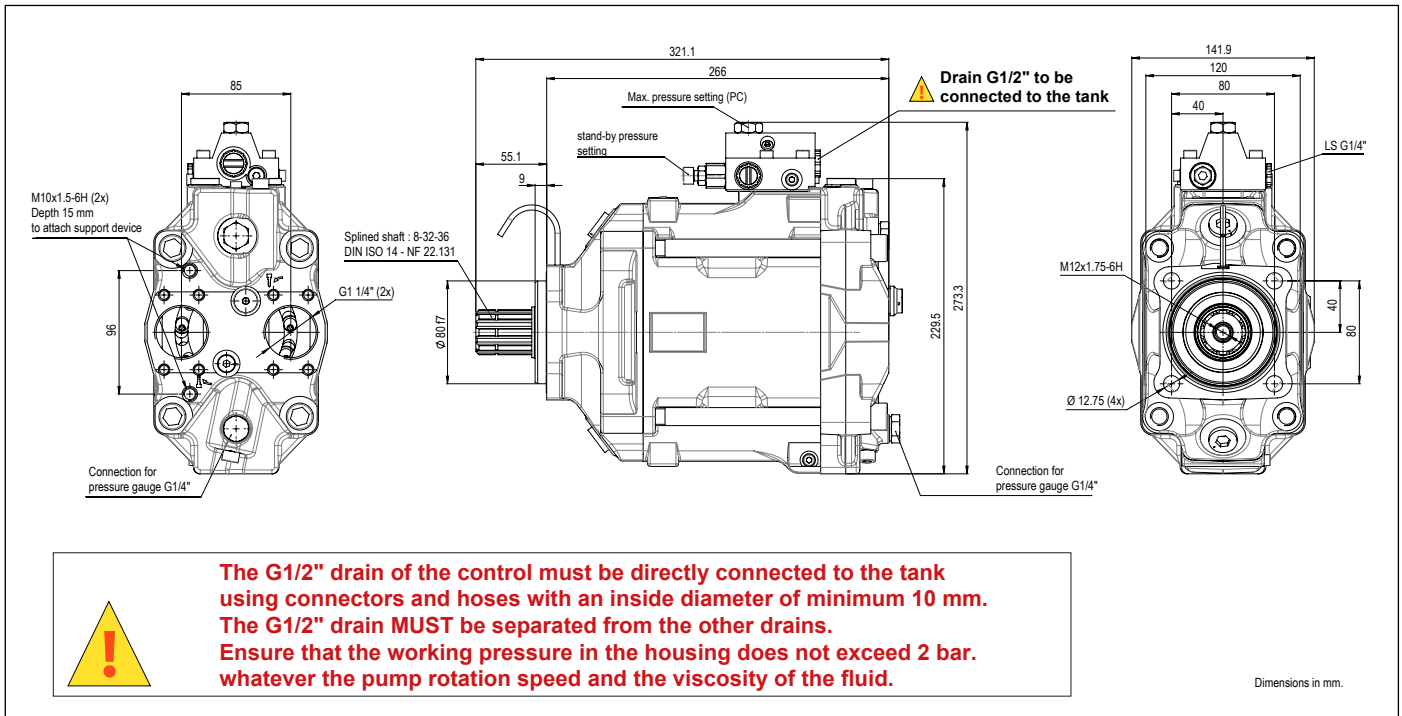
Pump reference	Direction of rotation	Max. displacement ⁽¹⁾ (cc/rev)	Maximum operating pressure (bar)	Maximum peak pressure (intermittent: 5%) (bar)	Torque at 300 bar ⁽²⁾ (N.m)	Max. speed at full displacement ⁽³⁾ (rpm)	Max. speed in stand-by (rpm)	Weight (kg)	Overhang torque ⁽⁴⁾ (N.m)	
TXV 130 <i>indexable</i>	0520300	CW/CCW	130	365	380	730	1750	3000	29.3	42
TXV 150 <i>indexable</i>	0525070	CW/CCW	150	310	330	840	1750	3000	29.3	42

(1) TXV pumps can be set for smaller maximum displacements (see page 41).

(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.

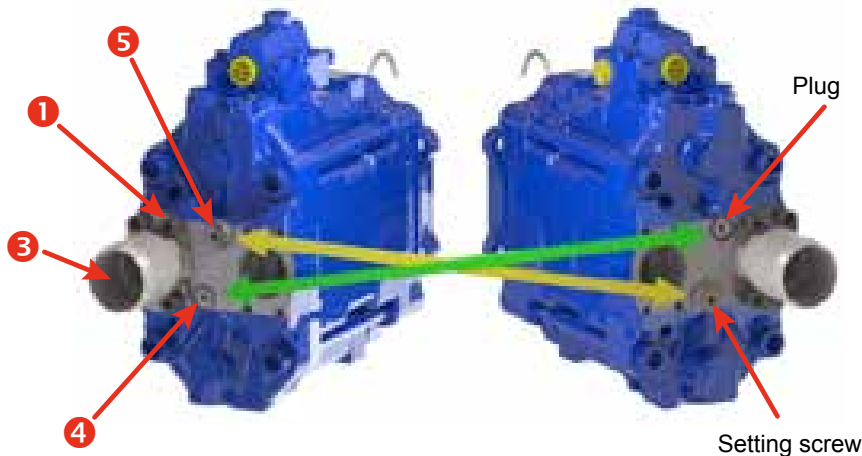


Clockwise (CW)

Figure 1

Counter-clockwise (CCW)

Figure 2



► **How to change direction of rotation**

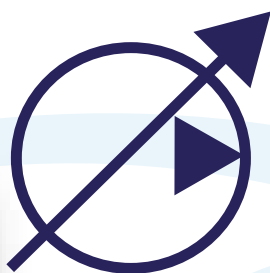
Figure 1

- Remove the 4 screws **1**.
- Take off the 2 half-flanges **2** and the inlet fitting **3**. Take care not to lose the seal from the inlet fitting.
- Remove the plug **4** and the setting screw **5**.
- Do not turn the pump shaft when the setting screw is not in place.

Figure 2

- Put the setting screw **5**.
- in the place where the plug **4** was, and put the plug **4** where the setting screw **5** was.
- Check the inlet fitting **3** seal is present, and in good condition.
- Put the inlet fitting **3**, half-flanges **2** and screws **1** onto the side where the plug **4** is.

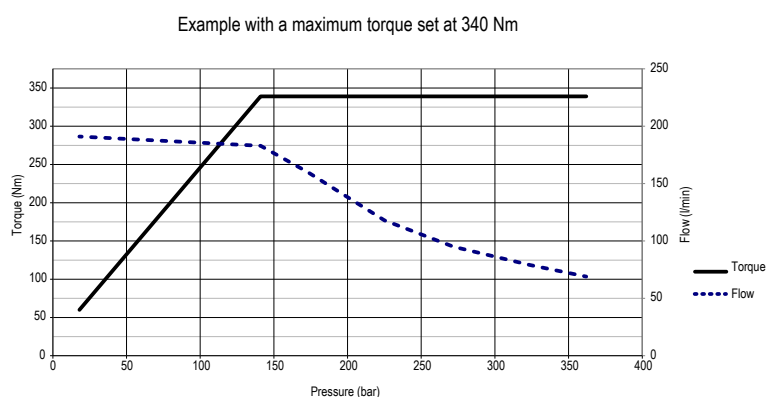
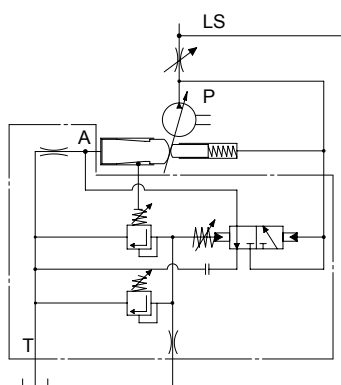
PLEASE NOTE: Unless otherwise specified, TXV pumps are supplied from factory set for clockwise (CW) rotation.



TXV 130 cc

With Constant Torque

- ▶ New TXV 130 pump with Constant Torque Control.
- ▶ This control system ensures that the torque absorbed does not exceed the PTO capability. Whilst still allowing control of the flow and maximum pressure.
- ▶ The constant torque device means the pump regulates continuously to keep:
 $pressure \times flow = constant$



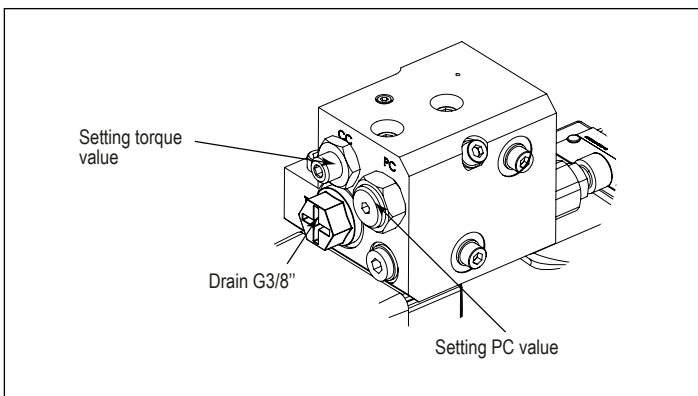
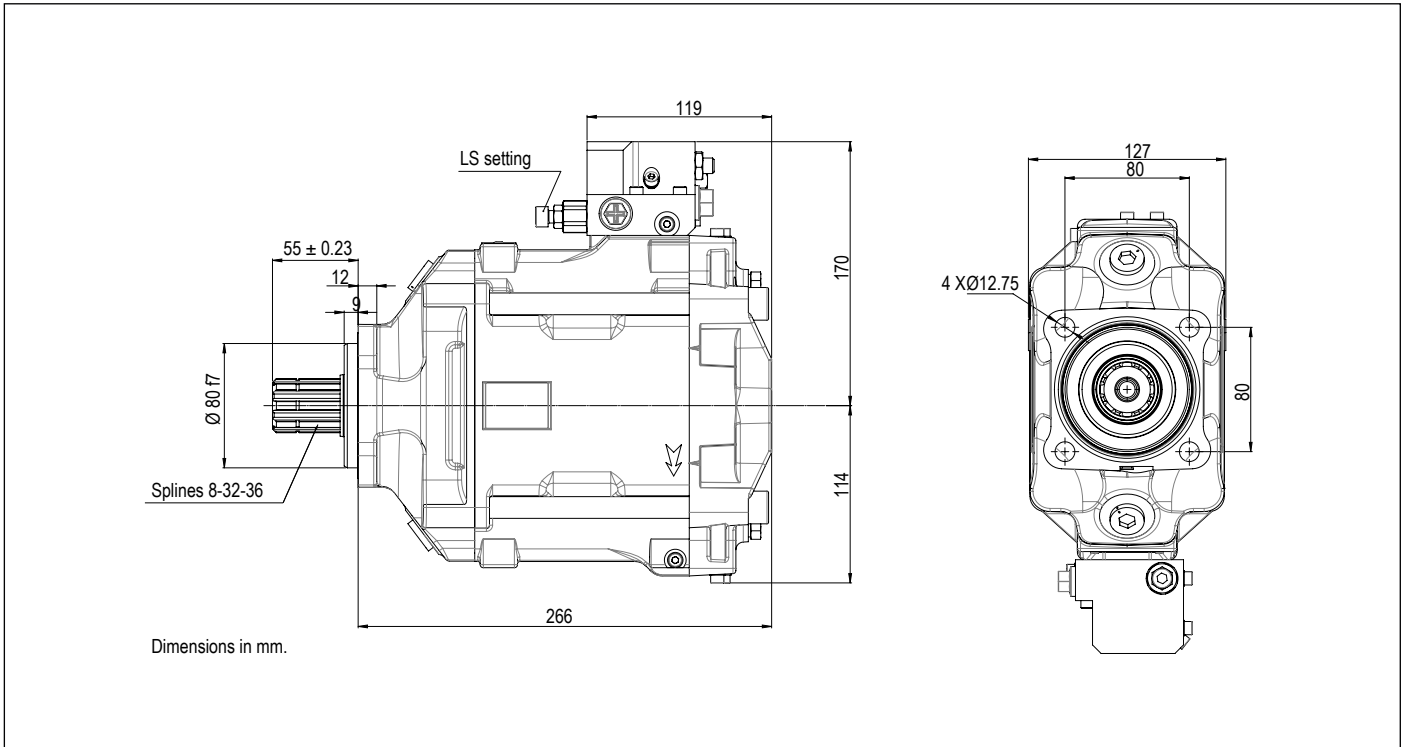
- ▶ When ordering this type of control, please indicate the maximum torque to be set, according the torque ranges possible in the table page 37. This is possible to adjust the torque setting with the torque value screw.
- ▶ This device is compact, only added 10.5 mm in height to the standard TXV 130 pump.

Pump reference		Direction of rotation	Max. displacement ⁽¹⁾ (cc/rev)	Maximum operating pressure (bar)	Maximum peak pressure (intermittent: 5%) (bar)	Max. speed at full displacement ⁽²⁾ (rpm)	Max. speed stand-by (rpm)	Weight (kg)	Overhang torque (N.m)
TXV 130 CC	0522380 0522385	CW CCW	130	365	380	2100	3000	28,3	40

(1) TXV pumps can be set for smaller maximum displacements (see page 41).

(2) Speed - at full displacement- possible higher depending on flow required : please contact us.

TXV 130 cc



Spring reference	Torque range (N.m)
C001623	550 - 710
0522224	450 - 490
0522450	375 - 405
0522451	296 - 316
0522452	230 - 245
0522453	170 - 185
0522454	130

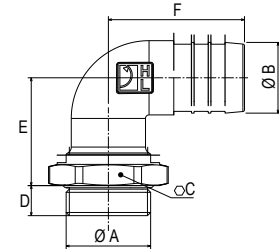
INLET FITTINGS FOR TXV PUMPS (optional)



See recommendations of the hosing dimensions on page 42.
For high speeds, please consult.

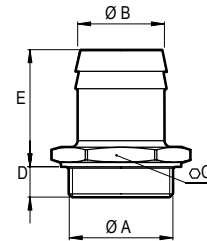
90° elbow fittings, swivel

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

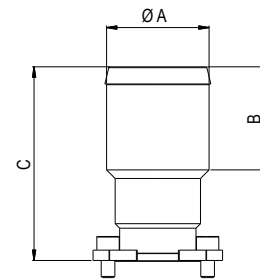
Reference	A	Ø B	C	D	E	Pump type
240182	G 1 1/2"	40	56	14	54	TXV
240067	G 1 1/2"	50	52	14	66	TXV
240066	G 1 1/2"	60	64	14	69	TXV
240186	G 1 1/2"	63.5	64	14	69	TXV
240201	G 1 1/2"	76.2	80	14	89	TXV



INLET FITTINGS KIT FOR TXV - *indexable* PUMPS

Straight fittings

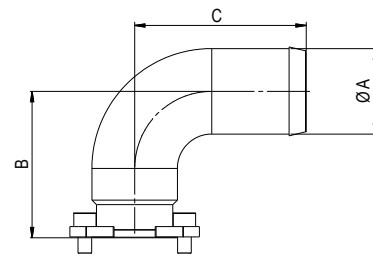
Reference	Ø A	B	C	Pump type
0523921	50	50	72	TXV <i>indexable</i>
0523922	60	57	113	TXV <i>indexable</i>
0523924	76.2	74	138	TXV <i>indexable</i>



90° elbow fitting

Reference	Ø A	B	C	Pump type
0523919	50	66	82	TXV <i>indexable</i>
C001475	60	85	145	TXV <i>indexable</i>
C001476	63	85	145	TXV <i>indexable</i>

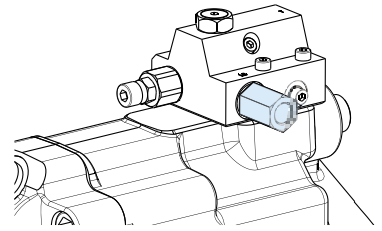
Dimensions in mm.



LS adapter with integrated filter | LEDUC CODE

Filter fitting for LS line connection

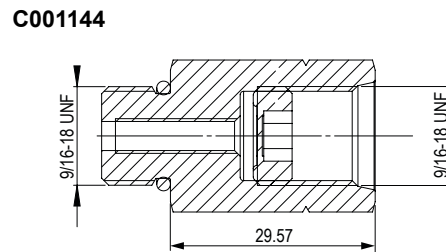
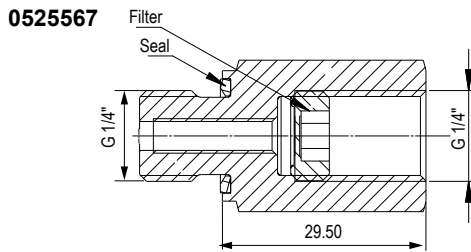
Kit reference	LS dimension	Type of pump
0525567	G1/4"	TXV
C001144	9/16-18 UNF	TXVA (SAE)



► **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 0526420

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

Mounted as standard on all TXV pumps (except for Constant Torque).

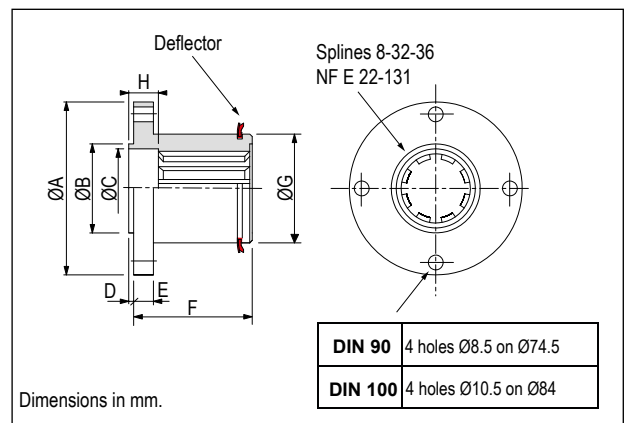


CARDAN PLATE - DIN 90 and DIN 100

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.

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

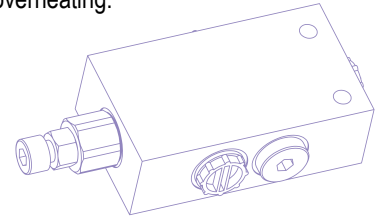


FCV - FLUID VALVE CIRCULATION | LEDUC CODE: 0524940

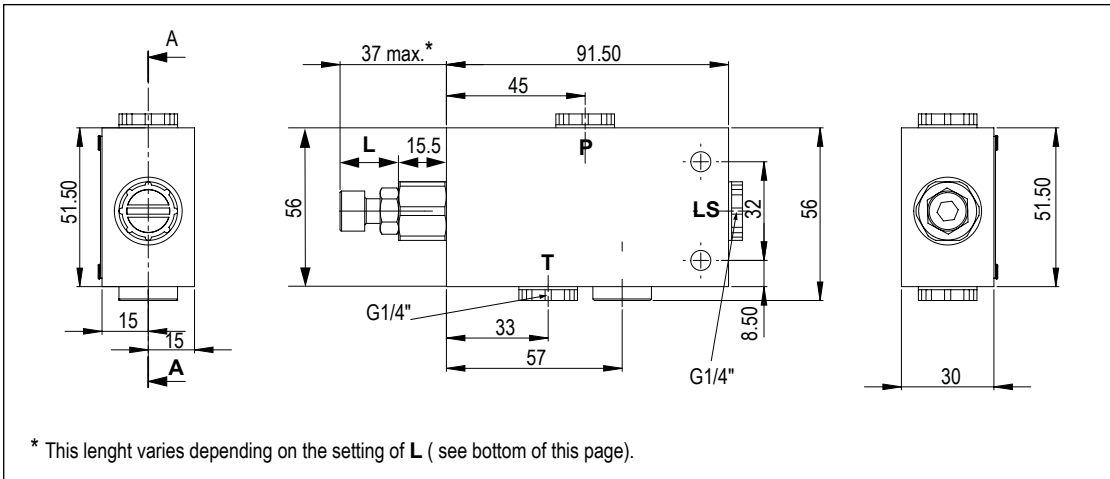
The fluid circulation (FCV) is designed for applications where the hydraulic variable displacement pump is used in standby mode for a long period of time, for example engine PTO, to protect the pump against overheating.

► Technical characteristics

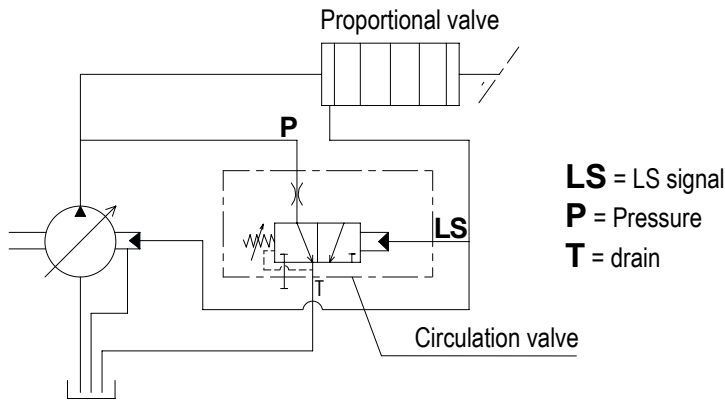
- The valve flow varies between 20 and 22 l/min for a ΔP at 30 bar.
- Maximum pressure is 420 bar.
- The closing pressure is 2 bar min. and 7 bar max.



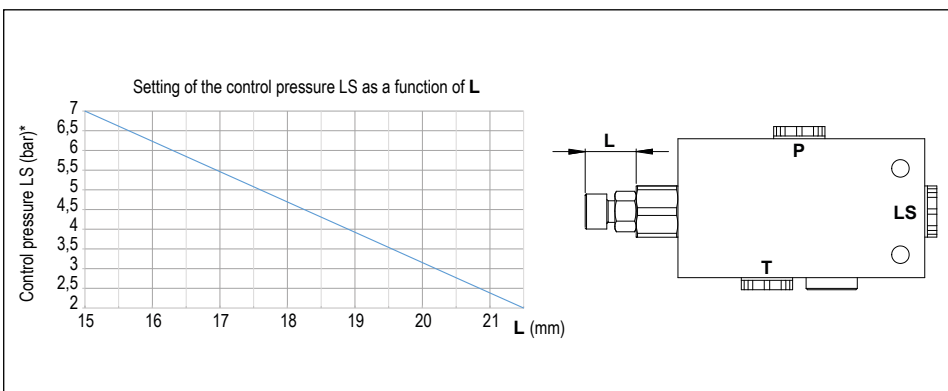
► Dimensions



► 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 *indexable*

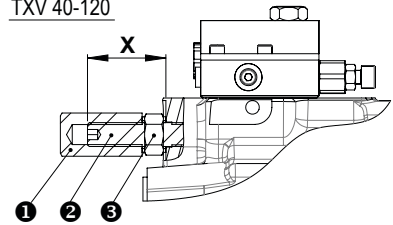
The pump displacement can thus be adjusted to exactly what is needed.

► How to set maximum displacement

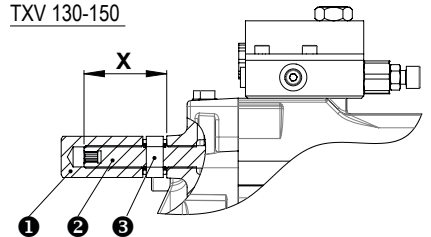
Unscrew ❶ completely, loosen nut ❸ and screw ❷ to obtain dimension **X** on graph below, and the corresponding displacement (see figure).

- For TXV 150 *indexable*: 1 turn of the screw changes the displacement by 7.5 cc.
- For TXV 130 *indexable*: 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.

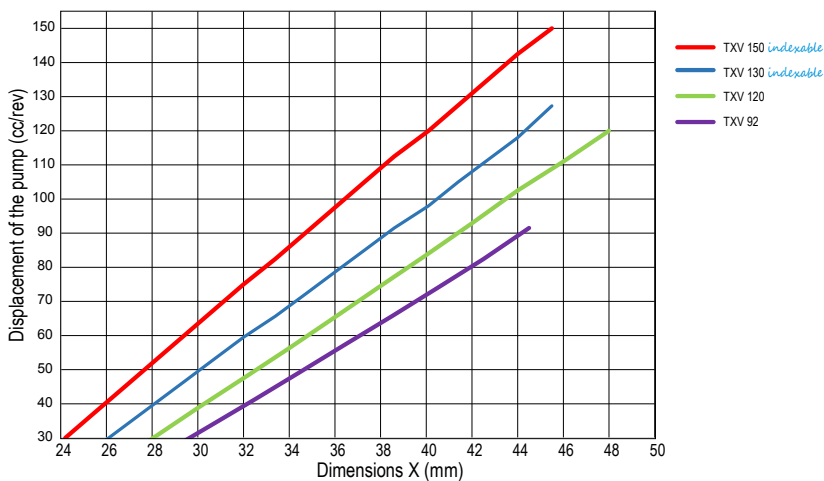
TXV 40-120



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.

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