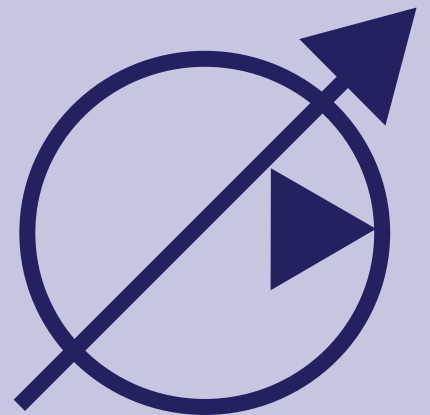
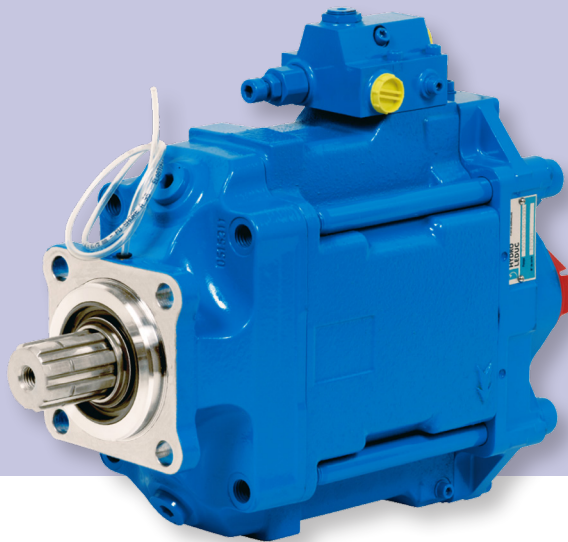
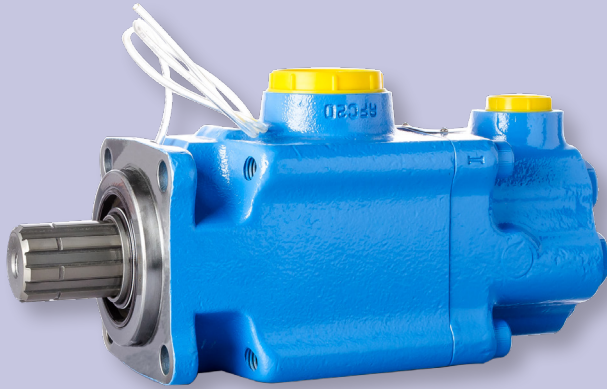
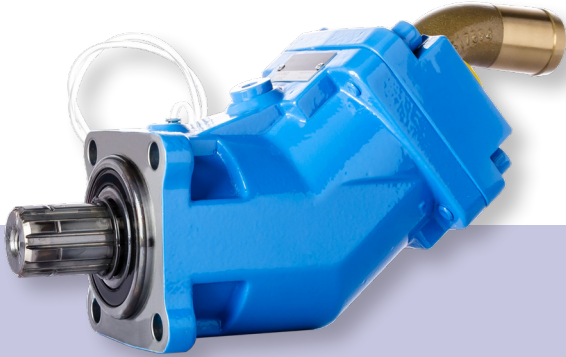


# PISTON PUMPS FOR TRUCKS

FIXED DISPLACEMENT

VARIABLE DISPLACEMENT



**FIXED  
DISPLACEMENT  
PUMPS**



**XPi series**

The DIN range .....	4
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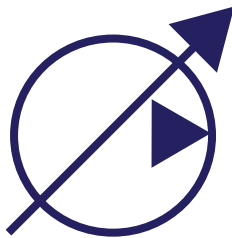
**XAi - SAE series**

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**PA - PAC series**

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**VARIABLE  
DISPLACEMENT  
PUMPS**



**TXV series**

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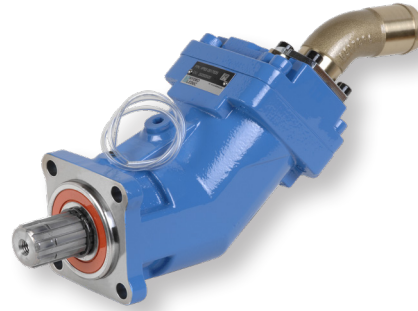
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## XPi

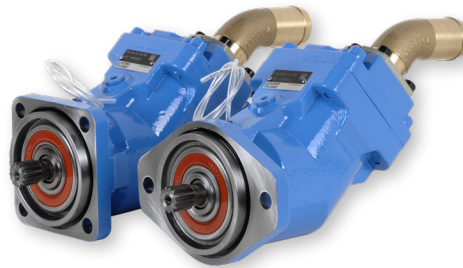
- Models from 0.73 to 7.92 cu.in/rev (12 to 130 cc/rev)
- 5511 psi (380 bar) continuous working pressure
- 6092 psi (420 bar) peak pressure
- Automatic adjustment to desired direction of rotation
- For use on DIN-mount PTO



XPi series

## XAi - SAE

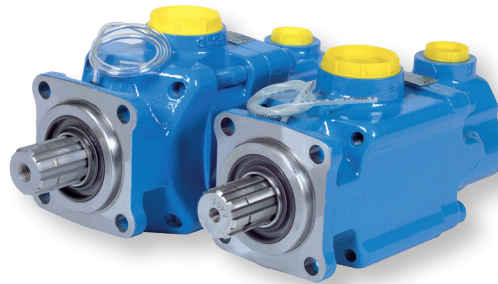
- Models from 1.1 to 3.84 cu.in/rev (18 to 63 cc/rev)
- SAE version of XPi bent axis piston pumps
- 5511 psi (380 bar) continuous working pressure
- 6092 psi (420 bar) peak pressure
- Automatic adjustment to desired direction of rotation
- For use on SAE-mount PTO



XAi - SAE series

## PA - PAC

- Single flow models from 1.53 to 6.95 cu.in/rev (25 to 114 cc/rev)
- Twin flow models from 2x1.53 to 2x4.58 cu.in/rev (2x25 to 2x75 cc/rev)
- Model with two different displacements
- 5800 psi (400 bar) continuous working pressure
- 7252 psi (500 bar) peak pressure
- Dual direction of rotation
- For use on DIN-mount PTO



PA - PAC Series series

## TXV

- Variable displacement pumps with Load-Sensing control
- Displacement from 40 to 150 cc/rev
- Maximum operating pressure up to 420 bar depending on model
- For use on DIN-mount PTO

### TXVA - SAE

- For use on SAE-mount PTO
- Models available : 4.60 and 5.60 cu.in/rev (75 and 92 cc/rev)

### TXV with Constant Torque

- Models from 2.44 to 9.15 cu.in/rev (40 to 150 cc/rev)
- TXV130 with constant torque control - with through shaft version



TXV series

# XPi series

## the *intelligent* pump

fixed displacement bent axis design



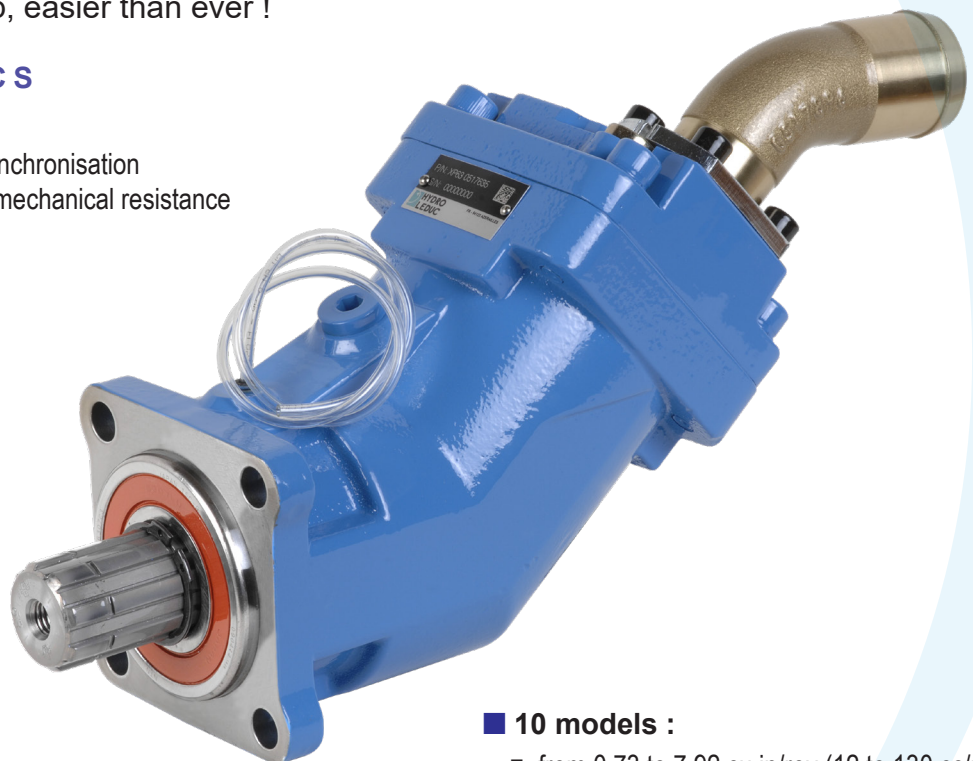
The compact size envelope of XPi pumps, together with their technology, means they can be installed in environments with little space available, and be used at relatively high rotating speeds.

### ADVANTAGES

- ▶ Pump automatically sets to required direction of rotation
- ▶ Mounting and start-up, easier than ever !

### CHARACTERISTICS

- 7 pistons
- Innovative plate - barrel synchronisation
- use of materials with high mechanical resistance
- reinforced sealing



#### ■ 10 models :

- from 0.73 to 7.92 cu.in/rev (12 to 130 cc/rev)
- 5511 psi (380 bar) continuous working pressure
- 6092 psi (420 bar) peak pressure
- max. speed from 1750 to 3150 rpm

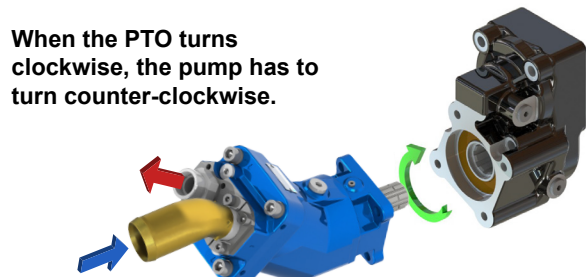
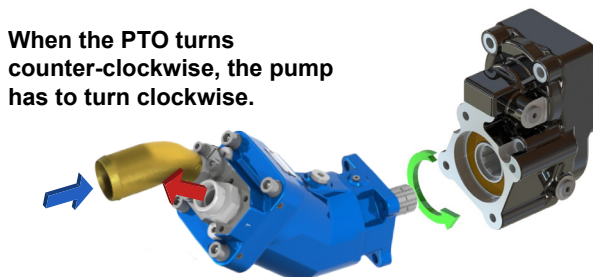
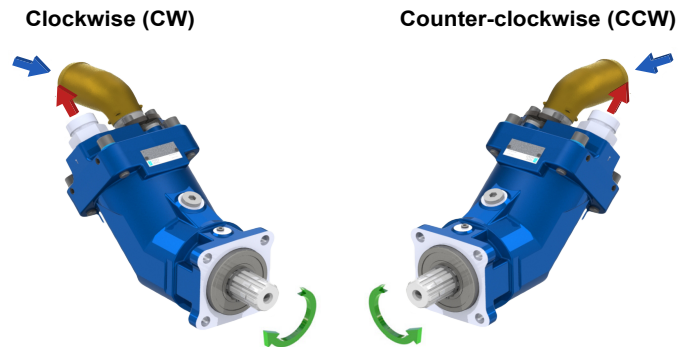
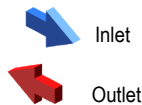


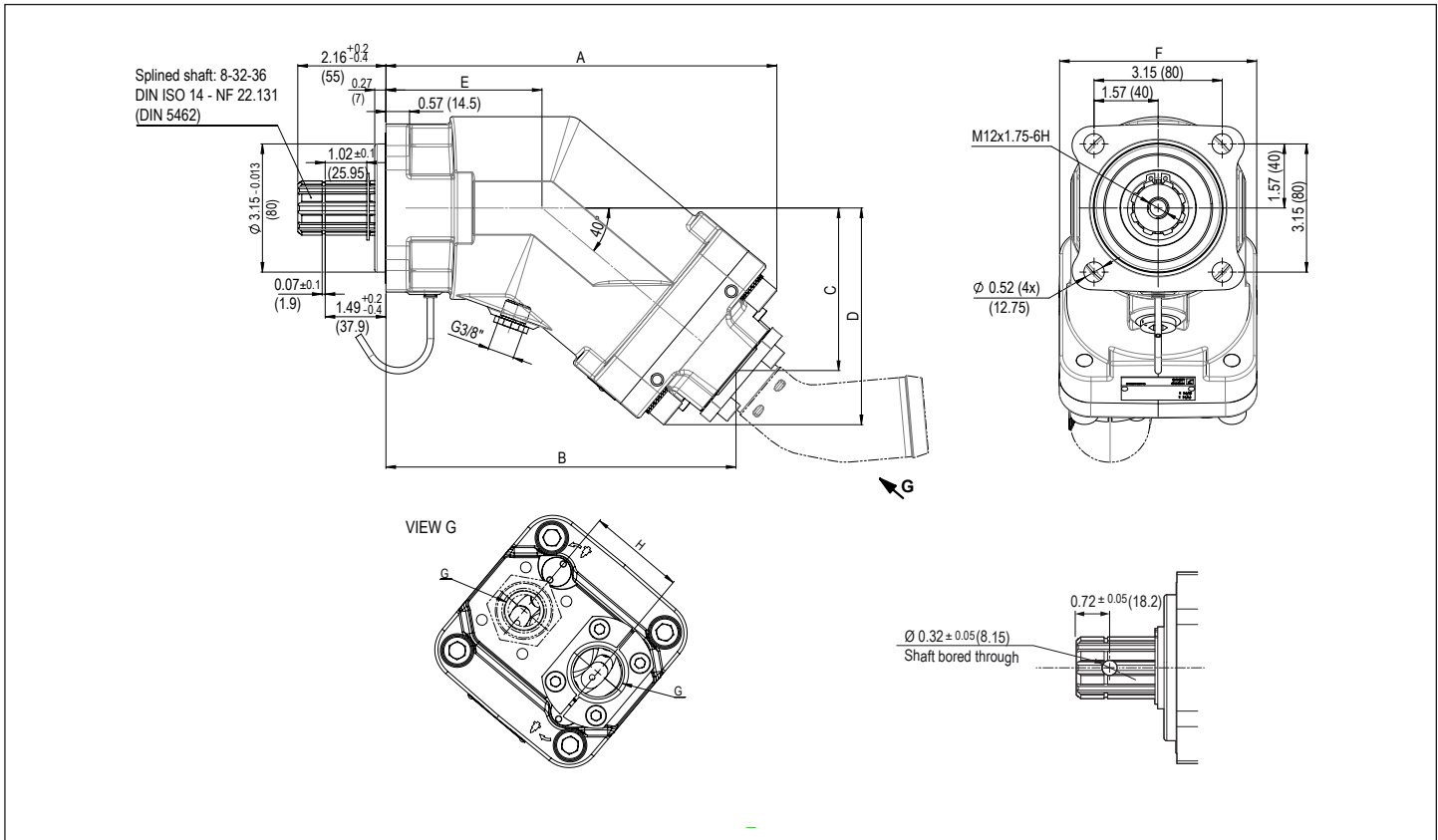
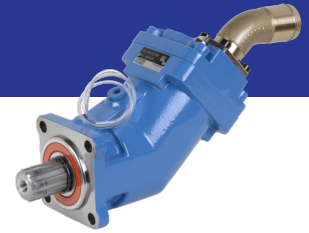
Pump reference	Displac. (cc/rev)	Maximum continuous pressure psi (bar)	Maximum intermittent peak pressure < 5 seconds psi (bar)	Max speed <sup>(1)</sup> (rpm)	Max. torque absorbed at 380 bar <sup>(2)</sup>		Weight				Overhang torque			
					lbf ft	(N.m)	without inlet fitting		with inlet fitting 2"		without inlet fitting		with inlet fitting 2"	
							lbs	(kg)	lbs	(kg)	lbf ft	(N.m)	lbf ft	(N.m)
XPi 12 0523820	0.73 (12)	5511 (380)	6092 (420)	3150	56	(76)	20.28	(9.2)	21.27	9.65	6.45	(8.74)	6.76	(9.17)
XPi 18 0523810	1.10 (18)	5511 (380)	6092 (420)	2900	84	(114)	20.40	(9.25)	21.38	9.7	6.48	(8.79)	6.79	(9.21)
XPi 25 0523800	1.52 (25)	5511 (380)	6092 (420)	2750	117	(159)	20.50	(9.3)	21.49	9.75	6.52	(8.84)	6.83	(9.26)
XPi 32 0523790	1.95 (32)	5511 (380)	6092 (420)	2700	150	(204)	24.47	(11.1)	25.46	11.55	8.19	(11.1)	8.52	(11.55)
XPi 41 0523780	2.50 (41)	5511 (380)	6092 (420)	2550	192.5	(261)	24.58	(11.15)	25.57	11.6	8.22	(11.15)	8.56	(11.6)
XPi 50 0523770	3.07 (50.3)	5511 (380)	6092 (420)	2450	234	(318)	24.69	(11.2)	25.68	11.65	8.67	(11.76)	9.02	(12.23)
XPi 63 0523760	3.84 (63)	5511 (380)	6092 (420)	2300	296	(401)	24.80	(11.25)	25.79	11.7	8.71	(11.81)	9.06	(12.28)
XPi 80 0523640	4.91 (80.4)	5511 (380)	6092 (420)	2150	375	(509)	32.73	(14.85)	33.73	15.3	13.14	(17.82)	13.54	(18.36)
XPi 108 0523750	6.61 (108.3)	5511 (380)	6092 (420)	1900	507	(687)	32.96	(14.95)	33.95	15.4	13.23	(17.94)	13.63	(18.48)
XPi 130 0523730	7.92 (129.8)	5511 (380)	6092 (420)	1750	640	(827)	33.84	(15.35)	34.83	15.8	13.81	(18.73)	14.22	(19.28)

(1) At absolute pressure 1 bar, ISO VG46 fluid at 77°F (25°C).  
 (2) Maximum torque given with a mechanical efficiency at 95%.

**DUAL DIRECTION OF ROTATION :**  
 this *intelligent* pump can operate in either direction of rotation.

Fit the inlet fitting on required side, depending on the direction of rotation of the PTO, and the pump will set itself accordingly.

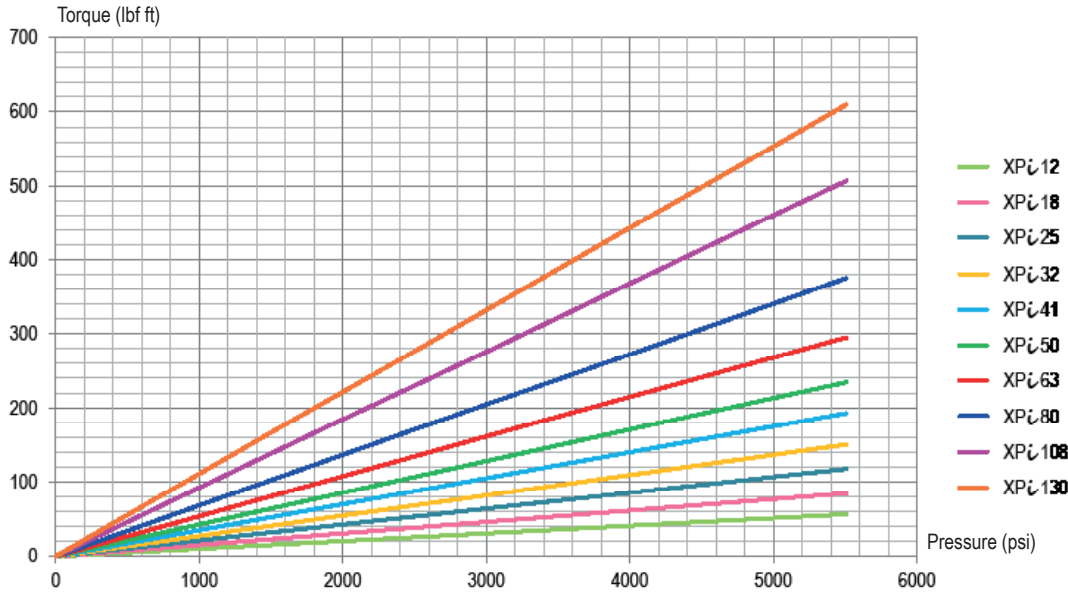




Pump reference		A	B	C	D	E	F	G	H
XPi 12	0523820	7.74 (196.7)	7.00 (177.8)	3.04 (77.1)	4.09 (103.9)	3.37 (85.7)	4.25 (108)	G 3/4"	2.13 (54)
XPi 18	0523810	7.74 (196.7)	7.00 (177.8)	3.04 (77.1)	4.09 (103.9)	3.37 (85.7)	4.25 (108)	G 3/4"	2.13 (54)
XPi 25	0523800	7.74 (196.7)	7.00 (177.8)	3.04 (77.1)	4.09 (103.9)	3.37 (85.7)	4.25 (108)	G 3/4"	2.13 (54)
XPi 32	0523790	7.98 (202.8)	7.24 (184)	3.24 (82.3)	4.30 (109.1)	3.37 (85.7)	4.25 (108)	G 3/4"	2.13 (54)
XPi 41	0523780	7.98 (202.8)	7.24 (184)	3.24 (82.3)	4.30 (109.1)	3.37 (85.7)	4.25 (108)	G 3/4"	2.13 (54)
XPi 50	0523770	8.44 (214.4)	7.70 (195.6)	3.62 (92)	4.68 (118.9)	3.37 (85.7)	4.25 (108)	G 3/4"	2.13 (54)
XPi 63	0523760	8.44 (214.4)	7.70 (195.6)	3.62 (92)	4.68 (118.9)	3.37 (85.7)	4.25 (108)	G 3/4"	2.13 (54)
XPi 80	0523640	9.52 (241.7)	8.70 (220.9)	4.07 (103.5)	5.25 (133.3)	3.83 (97.4)	4.84 (123)	G 1"	2.36 (60)
XPi 108	0523750	9.52 (241.7)	8.76 (222.5)	4.13 (104.8)	5.25 (133.3)	3.83 (97.4)	4.84 (123)	G 1"	2.36 (60)
XPi 130	0523730	9.61 (244)	8.85 (224.8)	4.20 (106.7)	5.32 (135.2)	3.83 (97.4)	4.84 (123)	G 1"	2.36 (60)

Dimensions in inches (mm).

► Torque absorbed as a function of pump output pressure (with a mechanical efficiency considered at 95%)

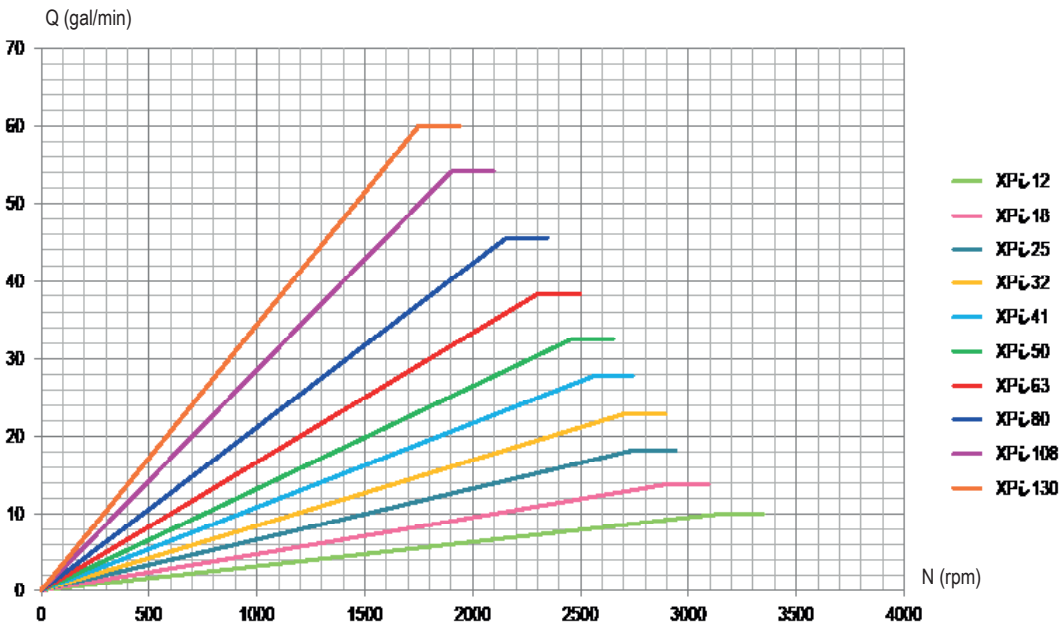


$$C = \frac{Cyl \times \Delta P}{62.8 \times \eta_{meca}}$$

With:

- C = Torque in lbf ft
- Cyl = Displacement in cu.in/rev
- ΔP = Differential pressure in psi
- η<sub>meca</sub> = Mechanical efficiency

► Flow as a function of rotating speed



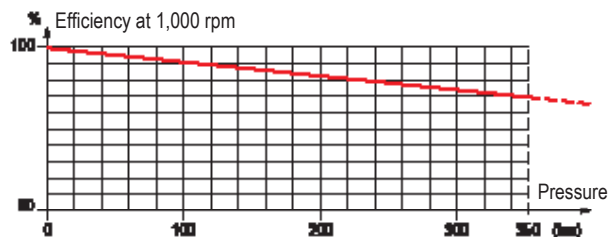
$$Q = \frac{Cyl \times N \times \eta_{vol}}{1000}$$

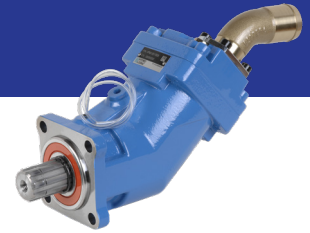
With:

- Q = Flow in gal/min
- N = Speed in rpm
- η<sub>vol</sub> = Volumetric efficiency
- Cyl = Displacement in cu.in/rev

► Volumetric efficiency

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 77°F (25°C) (~100 cSt) - disregarding the volumetric efficiency.





## INLET FITTINGS FOR XPi PUMPS

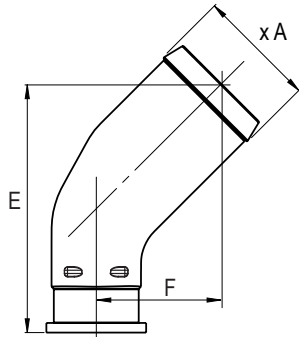
**⚠ See recommendations of the hosing dimensions on page 40.**

For high speeds, please consult.

All XPi pumps are supplied with their inlet fitting.

Please specify required fitting from the choice below when ordering.

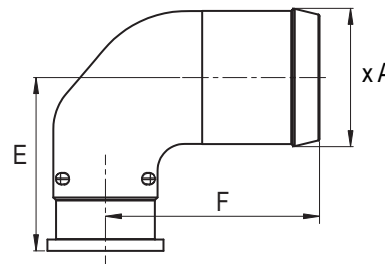
### 45° elbow fittings kit



Reference	Ø hose	Ø A	E	F
0519370	1 1/2"	1.54 (39.1)	3.61 (91.7)	1.84 (46.7)
0519373	42	1.69 (43)	3.61 (91.7)	1.84 (46.7)
0519374	1 3/4"	1.81 (46)	3.61 (91.7)	1.84 (46.7)
0519371	2"	2.04 (51.8)	4.27 (108.4)	2.14 (54.4)
0519372	2 1/2"	2.54 (64.5)	4.93 (125.2)	2.45 (62.2)

Dimensions in inches (mm).

### 90° elbow fittings kit



Reference	Ø hose	Ø A	E	F
0521740	1 1/2"	1.54 (39.1)	2.31 (58.6)	3.13 (79.5)
0521741	2"	2.04 (51.8)	2.56 (64.9)	3.16 (80.2)
0521742	2 1/2"	2.54 (64.5)	2.81 (71.3)	3.44 (87.5)

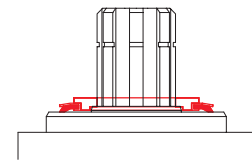
Dimensions in inches (mm).

## DEFLECTOR TO PROTECT SHAFT SEALS

This deflector ensures the protection of the pump shaft seals.

In particular, it protects the pump from projections of dirt from the road in cardan drive installations.

Reference: **DEF 054111**



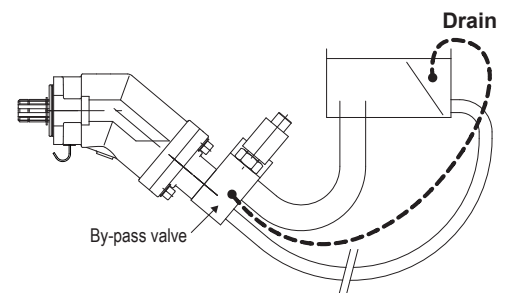
## BY-PASS VALVE FOR XPi PUMPS

For XPi pump applications where the pump is driven by a continuous running PTO (PTO which cannot be disengaged), this solution allows the continuous running of the pump:

- without creating problems of fluid overheating;
- without affecting pump service life;
- with no modifications necessary to the hydraulic circuit of the equipment.

⇒ **By-pass fitted on the back of the XPi pump.**

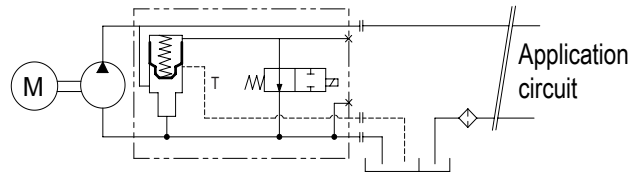
LEDUC references	24 Volts
XPi 12 to XPi 63	BP63 0517931
XPi 80 to XPi 130	BP80 0522140



► How does it work ?

The by-pass valve is a 24 Volts solenoid valve.

When not activated, it enables pump output to link up to pump inlet.  
When it is activated, the pump operates normally (output flow).



A drain line has to be installed between the By-Pass valve and the hydraulic tank of the vehicle to ensure sufficient oil circulation and a good cooling into the pump. In any case, the connection to the tank must be done below the oil level.

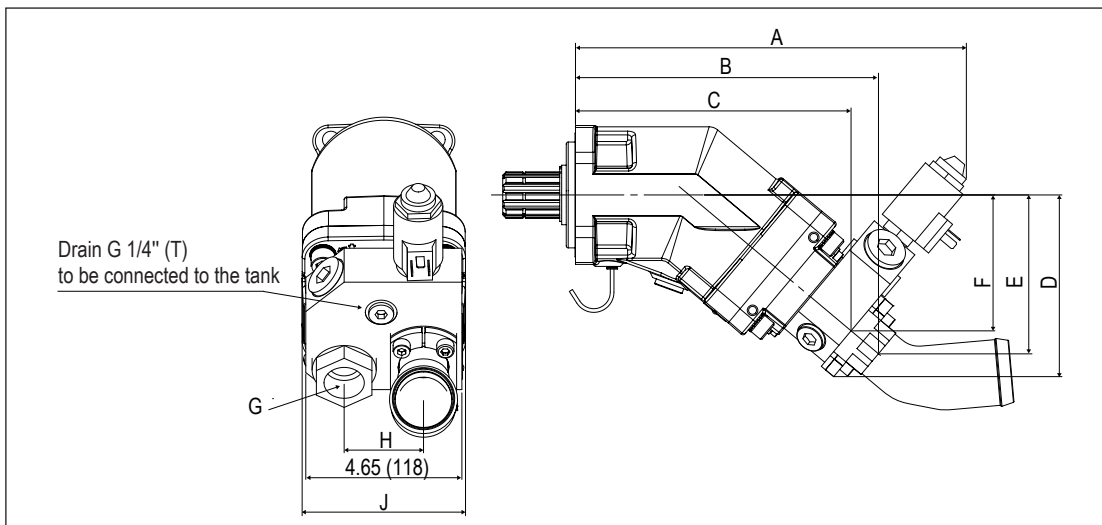
► XPi overhang torque with by-pass

Pump reference	Weight				Overhang torque			
	without inlet fitting		with inlet fitting 2"		without inlet fitting		with inlet fitting 2"	
	lbs	(kg)	lbs	(kg)	lbf ft	(N.m)	lbf ft	(N.m)
XPi 12	28.22	(12.8)	29.21	(13.25)	12.04	(16.32)	12.46	(16.90)
XPi 18	28.33	(12.85)	29.32	(13.30)	12.09	(16.39)	12.51	(16.96)
XPi 25	28.44	(12.9)	29.43	(13.35)	12.13	(16.44)	12.55	(17.02)
XPi 32	32.41	(14.7)	33.40	(15.15)	14.00	(18.98)	14.43	(19.56)
XPi 41	32.52	(14.75)	33.51	(15.20)	14.04	(19.04)	14.47	(19.62)
XPi 50	32.63	(14.8)	33.62	(15.25)	14.79	(20.05)	15.25	(20.67)
XPi 63	32.74	(14.85)	33.73	(15.30)	14.84	(20.12)	15.29	(20.73)
XPi 80	40.68	(18.45)	41.67	(18.90)	20.03	(27.16)	20.52	(27.82)
XPi 108	40.90	(18.55)	41.89	(19.00)	20.14	(27.31)	20.63	(27.97)
XPi 130	41.78	(18.95)	42.77	(19.40)	20.77	(28.16)	21.34	(28.93)

► Dimensions with by-pass valve

Pump reference	A		B		C		D		E		F		G		H		J	
XPi 12 / 18 / 25	11.39	(289.35)	8.78	(223.04)	7.96	(202.19)	5.20	(132.20)	4.52	(114.72)	3.84	(97.58)	3/4"	2.13	(54)	4.25	(108)	
XPi 32 / 41	11.63	(295.5)	9.02	(229)	8.20	(208.3)	5.41	(137.3)	4.73	(120.1)	4.04	(102.7)	3/4"	2.13	(54)	4.25	(108)	
XPi 50 / 63	12.09	(307.1)	9.46	(240.4)	8.66	(220)	5.79	(147.1)	5.11	(129.7)	4.43	(112.5)	3/4"	2.13	(54)	4.25	(108)	
XPi 80 / 108	13.15	(334)	10.59	(269)	9.71	(246.7)	6.21	(157.8)	5.67	(143.9)	4.91	(124.8)	1"	2.36	(60)	4.84	(123)	
XPi 130	13.24	(336.3)	10.68	(271.3)	9.80	(249)	6.29	(159.7)	5.74	(145.8)	4.99	(126.7)	1"	2.36	(60)	4.86	(123.5)	

Dimensions in inches (mm).





# XAi series

## the *intelligent* pump - SAE version

fixed displacement bent axis design



The compact size envelope of XAi pumps, together with their technology, means they can be installed in environments with little space available, and be used at relatively high rotating speeds.

### ADVANTAGES

- ▶ Pump automatically sets to required direction of rotation
- ▶ Mounting and start-up, easier than ever !

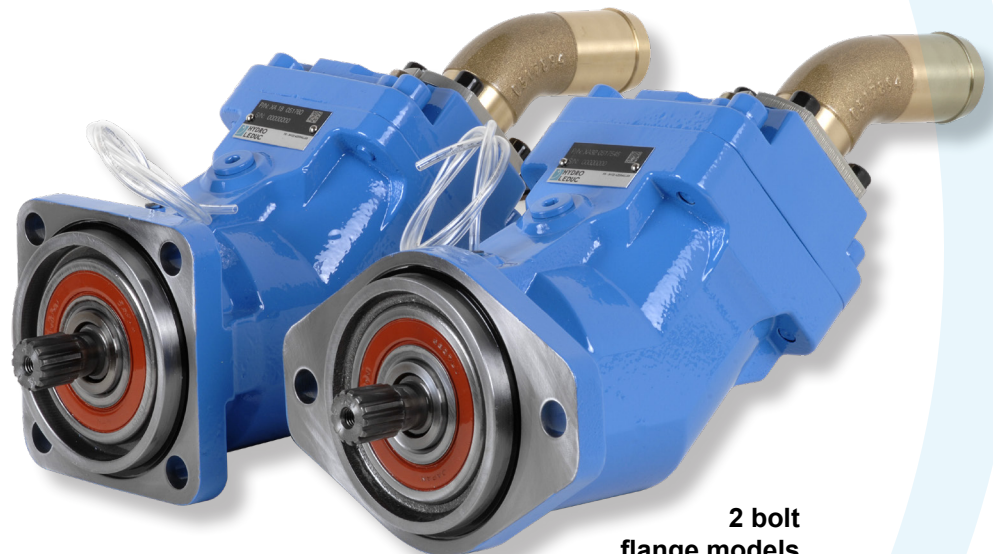
### CHARACTERISTICS

- 7 pistons
- original idea for plate - barrel synchronisation
- use of materials with high mechanical resistance
- reinforced sealing

#### ■ 10 models:

- from 18 to 63 cc/rev (1.1 to 3.84 cu.in/rev)
- 380 bar (5511 psi) continuous working pressure
- 420 bar (6092 psi) peak pressure
- maximum speed from 2300 to 2650 rpm

4 bolt  
flange models



2 bolt  
flange models

## ► 2 bolt flange - SAE J744

Pump reference	Displac. Cu.in/rev (cc/rev)	Maximum continuous pressure psi (bar)	Maximum peak pressure < 5 seconds psi (bar)	Max speed <sup>(1)</sup> rpm	Max. torque absorbed at 5511 psi (380 bar) <sup>(2)</sup> lbf ft (N.m)	Weight		Overhang torque	
						without inlet fitting lbs (kg)	with inlet fitting 2" lbs (kg)	without inlet fitting lbf ft (N.m)	with inlet fitting 2" lbf ft (N.m)
XAi 18 0524085	1.1 (18)	5511 (380)	6092 (420)	2400	84 (114)	22.15 (10.5)	23.14 (10.5)	7.04 (9.54)	7.35 (9.97)
XAi 25 0524095	1.52 (25)	5511 (380)	6092 (420)	2650	117 (159)	22.38 (10.15)	23.36 (10.6)	7.11 (9.64)	7.43 (10.07)
XAi 32 0524105	1.95 (32)	5511 (380)	6092 (420)	2600	150 (204)	26.34 (11.95)	27.67 (12.4)	8.81 (11.95)	9.15 (12.4)
XAi 41 0524115	2.5 (41)	5511 (380)	6092 (420)	2550	192 (261)	26.45 (12)	27.45 (12.45)	8.85 (12)	9.18 (12.45)

(1) At absolute pressure 14.50 psi (1 bar), ISO VG46 fluid at 77°F (25°C).

(2) Maximum torque given with a mechanical efficiency at 95%.

## ► 4 bolt flange - SAE J744

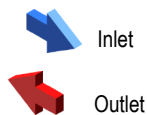
Pump reference	Displac. Cu.in/rev (cc/rev)	Maximum continuous pressure psi (bar)	Maximum peak pressure < 5 seconds psi (bar)	Max speed <sup>(1)</sup> rpm	Max. torque absorbed at 5511 psi (380 bar) <sup>(2)</sup> lbf ft (N.m)	Weight		Overhang torque	
						without inlet fitting lbs (kg)	with inlet fitting 2" lbs (kg)	without inlet fitting lbf ft (N.m)	with inlet fitting 2" lbf ft (N.m)
XAi 18 0524080	1.1 (18)	5511 (380)	6092 (420)	2400	84 (114)	22.59 (10.25)	23.59 (10.7)	7.18 (9.73)	7.49 (10.16)
XAi 25 0524090	1.52 (25)	5511 (380)	6092 (420)	2650	117 (159)	22.71 (10.3)	23.70 (10.75)	7.19 (9.75)	7.53 (10.21)
XAi 32 0524100	1.95 (32)	5511 (380)	6092 (420)	2600	150 (204)	26.68 (12.1)	27.67 (12.55)	8.92 (12.1)	9.26 (12.55)
XAi 41 0524110	2.5 (41)	5511 (380)	6092 (420)	2550	192 (261)	26.78 (12.15)	27.78 (12.6)	8.96 (12.15)	9.29 (12.6)
XAi 50 0524360 XAi 50 0524365	3.07 (50.3)	5511 (380)	6092 (420)	2450	234 (318)	26.89 (12.2)	27.89 (12.65)	9.45 (12.81)	9.80 (13.28)
XAi 63 0524125	3.84 (63)	5511 (380)	6092 (420)	2300	295 (401)	27.01 (12.25)	28 (12.7)	9.49 (12.86)	9.83 (13.33)

(1) At absolute pressure 14.50 psi (1 bar), ISO VG46 fluid at 77°F (25°C).

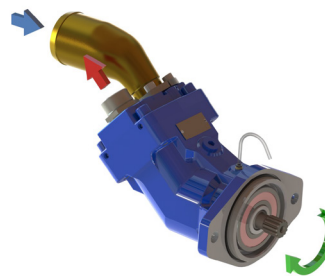
(2) Maximum torque given with a mechanical efficiency at 95%.

**DUAL DIRECTION OF ROTATION:**  
this *intelligent* pump can operate in either direction of rotation.

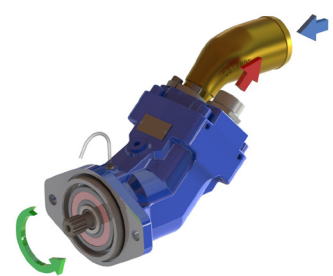
Fit the inlet fitting on required side, depending on the direction of rotation of the PTO, and the pump will set itself accordingly.



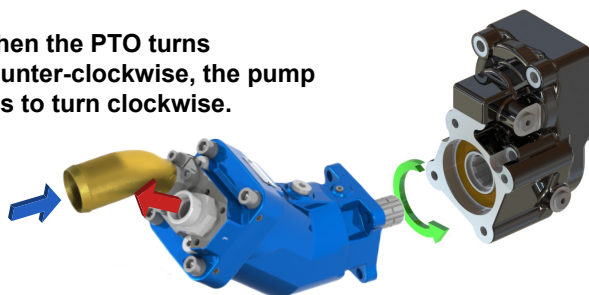
**Clockwise (CW)**



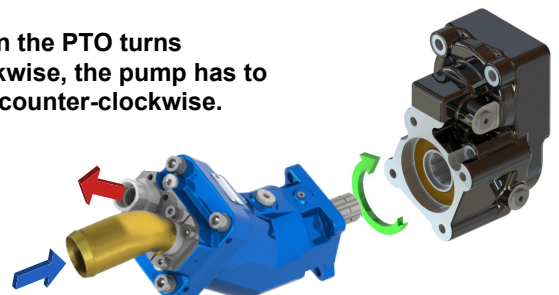
**Counter-clockwise (CCW)**

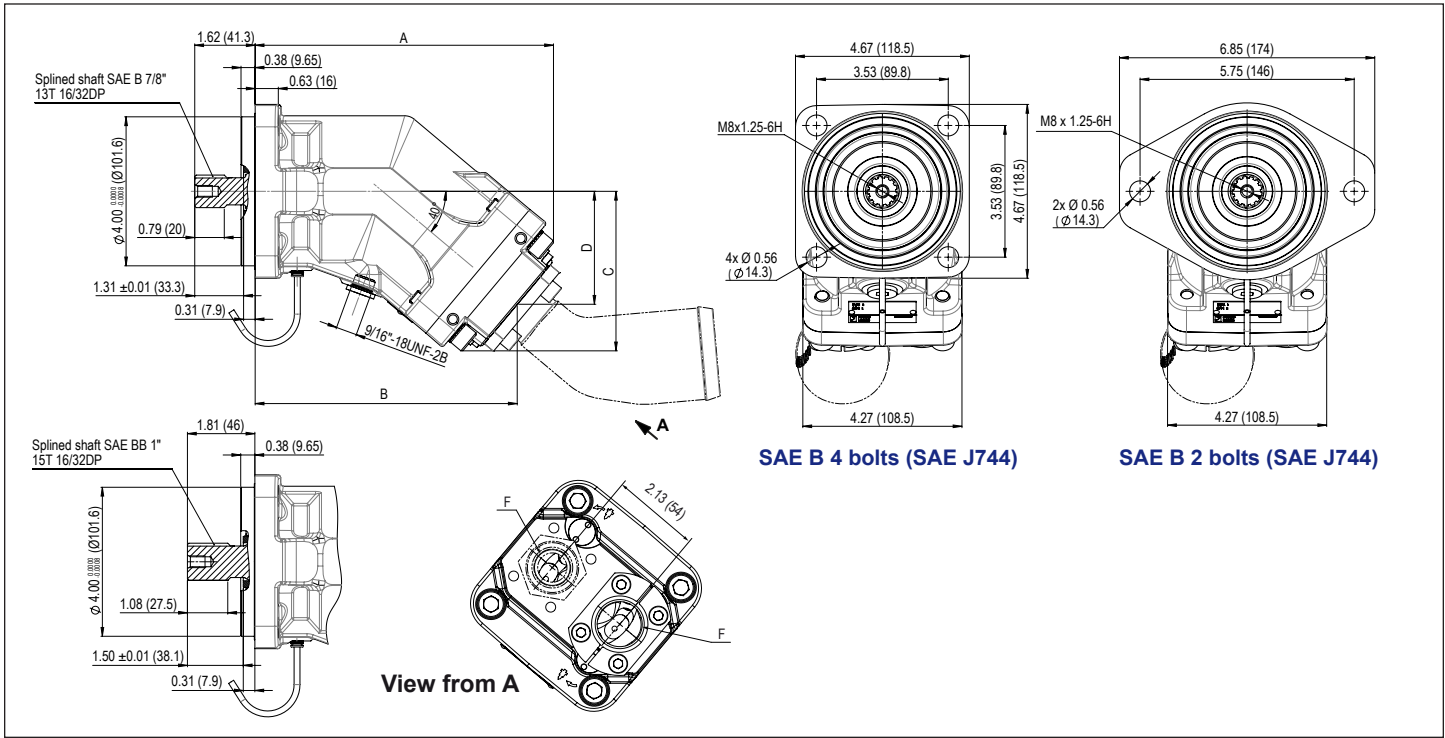


**When the PTO turns counter-clockwise, the pump has to turn clockwise.**



**When the PTO turns clockwise, the pump has to turn counter-clockwise.**





### ► SAE B - 2 bolt mounting configurations (SAE J744)

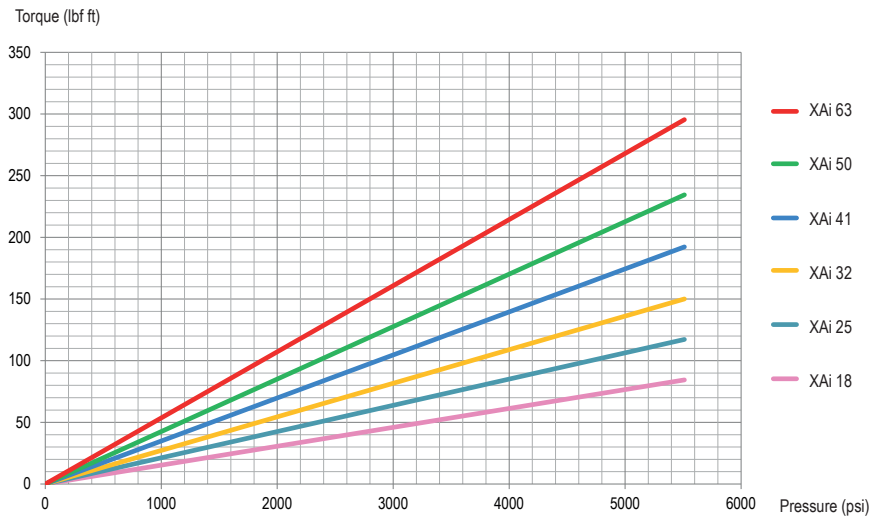
Pump type	A	B	C	D	F	Shaft
XAi 18 0524085	7.76 (197.2)	6.79 (172.5)	4.08 (103.7)	2.87 (73)	1 1/16"-12 UNF-2B	SAE B 7/8" 13T-16/32DP
XAi 25 0524095	7.76 (197.2)	6.79 (172.5)	4.08 (103.7)	2.87 (73)	1 1/16"-12 UNF-2B	SAE B 7/8" 13T-16/32DP
XAi 32 0524105	8 (203.2)	7.03 (178.5)	4.28 (108.7)	3.03 (77)	1 1/16"-12 UNF-2B	SAE B 7/8" 13T-16/32DP
XAi 41 0524115	8 (203.2)	7.03 (178.5)	4.28 (108.7)	3.03 (77)	1 1/16"-12 UNF-2B	SAE B 7/8" 13T-16/32DP

### ► SAE B - 4 bolt mounting configurations (SAE J744)

Pump type	A	B	C	D	F	Shaft
XAi 18 0524080	7.76 (197.2)	6.79 (172.5)	4.08 (103.7)	2.87 (73)	1 1/16"-12 UNF-2B	SAE B 7/8" 13T-16/32DP
XAi 25 0524090	7.76 (197.2)	6.79 (172.5)	4.08 (103.7)	2.87 (73)	1 1/16"-12 UNF-2B	SAE B 7/8" 13T-16/32DP
XAi 32 0524100	8 (203.2)	7.02 (178.5)	4.28 (108.7)	3.03 (77)	1 1/16"-12 UNF-2B	SAE B 7/8" 13T-16/32DP
XAi 41 0524110	8 (203.2)	7.02 (178.5)	4.28 (108.7)	3.03 (77)	1 1/16"-12 UNF-2B	SAE B 7/8" 13T-16/32DP
XAi 50 0524360	8.45 (214.7)	7.48 (190)	4.65 (118.2)	3.4 (86.5)	1 1/16"-12 UNF-2B	SAE B 7/8" 13T-16/32DP
XAi 50 0524365	8.45 (214.7)	7.48 (190)	4.65 (118.2)	3.4 (86.5)	1 1/16"-12 UNF-2B	SAE BB 1" 15T-16/32DP
XAi 63 0524125	8.45 (214.7)	7.48 (190)	4.65 (118.2)	3.4 (86.5)	1 1/16"-12 UNF-2B	SAE BB 1" 15T-16/32DP

Dimensions in inches (mm).

## ► Torque absorbed as a function of pump output pressure (with a mechanical efficiency considered at 95%)

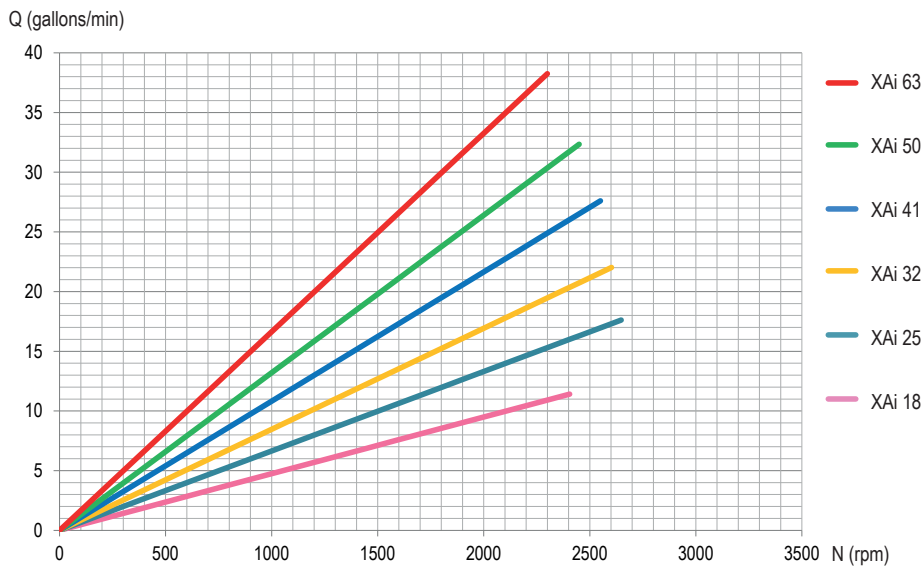


$$C = \frac{Cyl \times \Delta P}{62.8 \times \eta_{meca}}$$

With:

- C = Torque in lbf ft
- Cyl = Displacement in cu.in/rev
- ΔP = Differential pressure in psi
- η<sub>meca</sub> = Mechanical efficiency

## ► Flow as a function of rotating speed



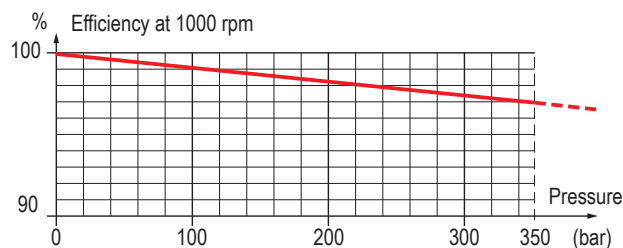
$$Q = \frac{Cyl \times N \times \eta_{Vol}}{1000}$$

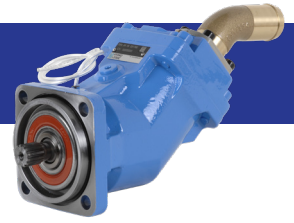
With:

- Q = Flow in gal/min
- N = Speed in rpm
- η<sub>Vol</sub> = Volumetric efficiency
- Cyl = Displacement in cu.in/rev

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 77°F (25°C) (~100 cSt) - disregarding the volumetric efficiency.

## ► Volumetric efficiency





## INLET FITTINGS FOR XAi PUMPS

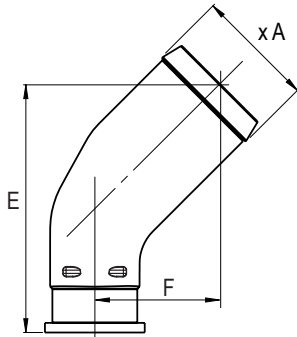
**⚠ See recommendations of the hosing dimensions on page 40.**

For high speeds, please consult.

All XAi pumps are supplied with their inlet fitting.

Please specify required fitting from the choice below when ordering.

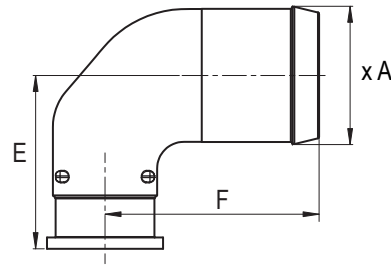
### 45° elbow fittings kit



Reference	Ø hose	Ø A	E	F
0519370	1 1/2"	1.54 (39.1)	3.61 (91.7)	1.84 (46.7)
0519373	42	1.69 (43)	3.61 (91.7)	1.84 (46.7)
0519374	1 3/4"	1.81 (46)	3.61 (91.7)	1.84 (46.7)
0519371	2"	2.04 (51.8)	4.27 (108.4)	2.14 (54.4)
0519372	2 1/2"	2.54 (64.5)	4.93 (125.2)	2.45 (62.2)

Dimensions in inches (mm).

### 90° elbow fittings kit



Reference	Ø hose	Ø A	E	F
0521740	1 1/2"	1.54 (39.1)	2.31 (58.6)	3.13 (79.5)
0521741	2"	2.04 (51.8)	2.56 (64.9)	3.16 (80.2)
0521742	2 1/2"	2.54 (64.5)	2.81 (71.3)	3.44 (87.5)

Dimensions in inches (mm).

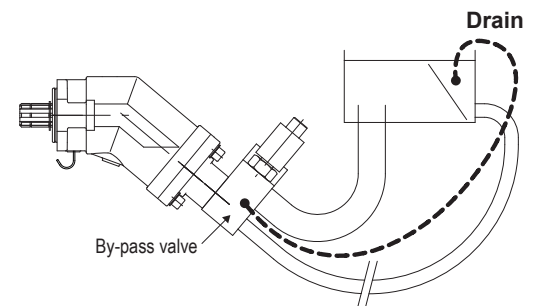
## BY-PASS VALVE FOR XAi PUMPS

For XAi pump applications where the pump is driven by a continuous running PTO (PTO which cannot be disengaged), this solution allows the continuous running of the pump:

- without creating problems of fluid overheating;
- without affecting pump service life;
- with no modifications necessary to the hydraulic circuit of the equipment.

⇒ **By-pass fitted on the back of the XAi pump.**

References	24 Volts	12 Volts
XAi 18 to XAi 63	BPA63 0521715	BPA63 0518520

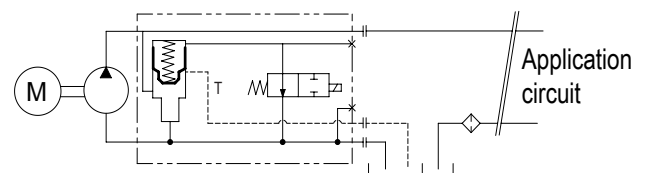


### ► How does it work ?

The by-pass valve is a 12 or 24 Volts solenoid valve.

When not activated, it enables pump output to link up to pump inlet.

When it is activated, the pump operates normally (output flow).



A drain line has to be installed between the By-Pass valve and the hydraulic tank of the vehicle to ensure sufficient oil circulation and a good cooling into the pump. In any case, the connection to the tank must be done below the oil level.



► XAi overhang torque with by-pass

2 bolt flange - SAE J744

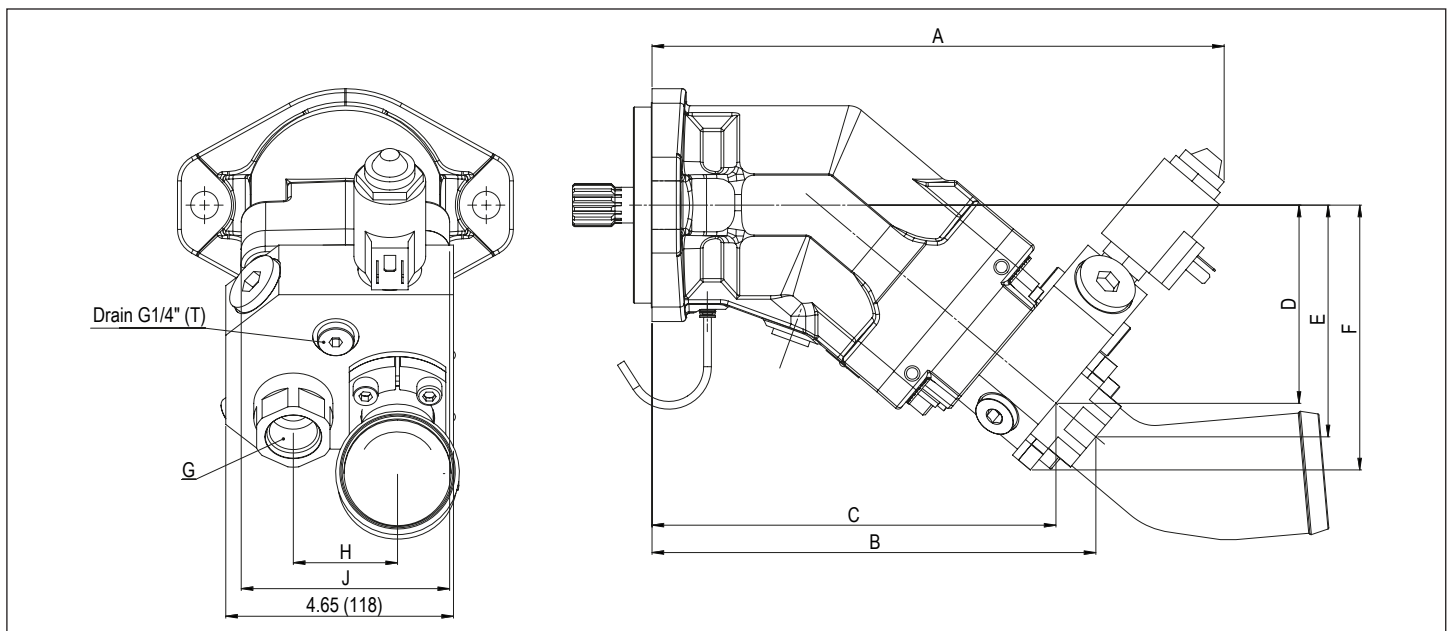
Pump reference	Weight		Overhang torque	
	without inlet fitting lbs (kg)	with inlet fitting 2" lbs (kg)	without inlet fitting lbf ft (N.m)	with inlet fitting 2" lbf ft (N.m)
XAi 18 - 2 bolts	28.33 (12.85)	29.32 (13.30)	9.87 (13.38)	12.51 (16.96)
XAi 25 - 2 bolts	28.44 (12.90)	29.43 (13.35)	12.13 (16.45)	12.55 (17.02)
XAi 32 - 2 bolts	32.41 (14.70)	33.40 (15.15)	14 (18.98)	14.43 (19.56)
XAi 41 - 2 bolts	32.52 (14.75)	33.51 (15.20)	10.36 (14.04)	14.47 (19.62)

4 bolt flange - SAE J744

Pump reference	Weight		Overhang torque	
	without inlet fitting lbs (kg)	with inlet fitting 2" lbs (kg)	without inlet fitting lbf ft (N.m)	with inlet fitting 2" lbf ft (N.m)
XAi 18 - 4 bolts	28.77 (13.05)	29.76 (13.50)	12.27 (16.64)	12.69 (17.21)
XAi 25 - 4 bolts	28.77 (13.05)	29.76 (13.50)	12.27 (16.64)	12.69 (17.21)
XAi 32 - 4 bolts	32.74 (14.85)	33.73 (15.30)	14.14 (19.17)	14.57 (19.75)
XAi 41 - 4 bolts	32.85 (14.90)	33.84 (15.35)	14.19 (19.24)	14.62 (19.82)
XAi 50 - 4 bolts	32.63 (14.80)	33.62 (15.25)	14.79 (20.05)	15.24 (20.66)
XAi 63 - 4 bolts	32.74 (14.85)	33.73 (15.30)	14.84 (20.12)	15.29 (20.73)

► Dimensions with by-pass valve

Pump reference	A	B	C	D	E	F	G	H	J
XAi 18 / 25	11.43 (290.4)	8.81 (223.9)	8.00 (203.2)	5.20 (132.1)	4.53 (115)	3.84 (97.6)	1 1/16"-12 UNF-2B	2.13 (54)	4.25 (108)
XAi 32 / 41	11.67 (296.5)	9.06 (230)	8.24 (209.2)	5.41 (137.3)	4.73 (120.1)	4.04 (102.7)	1 1/16"-12 UNF-2B	2.13 (54)	4.25 (108)
XAi 50 / 63	12.13 (308.2)	9.52 (241.7)	8.70 (221)	5.79 (147)	5.11 (129.9)	4.43 (112.5)	1 1/16"-12 UNF-2B	2.13 (54)	4.25 (108)



Dimensions in inches (mm).



# PA | PAC series

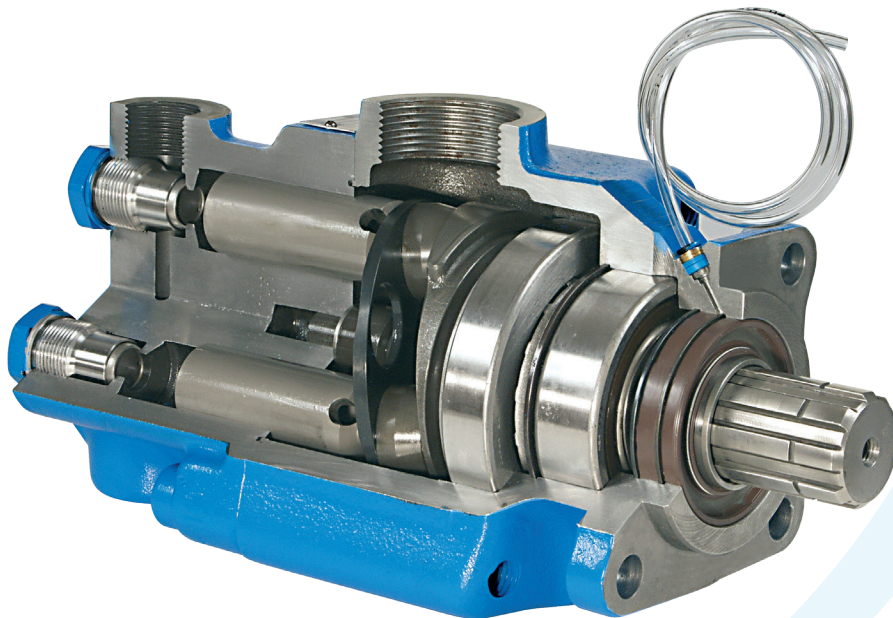
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## piston pumps

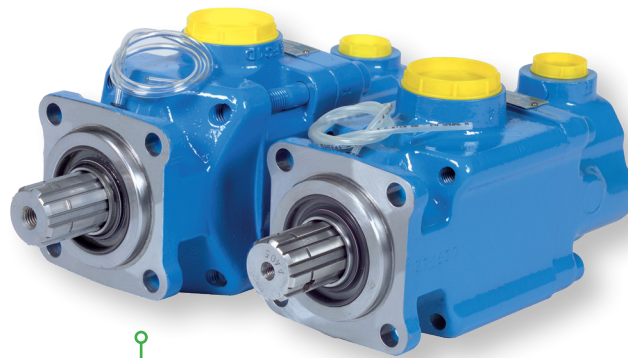
fixed displacement in-line design

### ADVANTAGES

- ▶ *Of unique design, the PA, PAC and pumps offer a robust solution with **long service life** for high pressure requirements in truck hydraulics.*
- ▶ *Relatively insensitive to contamination, these pumps are particularly **well suited to the harshest environments**.*
- ▶ *The design means the pumps can rotate either clockwise or counter-clockwise **without any user intervention**.*
- ▶ *Like all truck pumps designed by HYDRO LEDUC, this range is fitted with the **latest innovation in terms of sealing** :*
  - *Front of pump fitted with two shaft seals: externally, a seal capable of resisting the high temperatures of the gearbox, and internally, a seal adapted to the hydraulic requirements.*
  - *A transparent flexible tube fitted between the two seals, to protect these seals from dirt from the road, and from high pressure water jet during washing of vehicle etc...*



The PA, PAC pump series comprises two ranges, all designed for truck applications at working pressures up to 5800 psi (400 bar) continuous and 7252 psi (500 bar) peak.



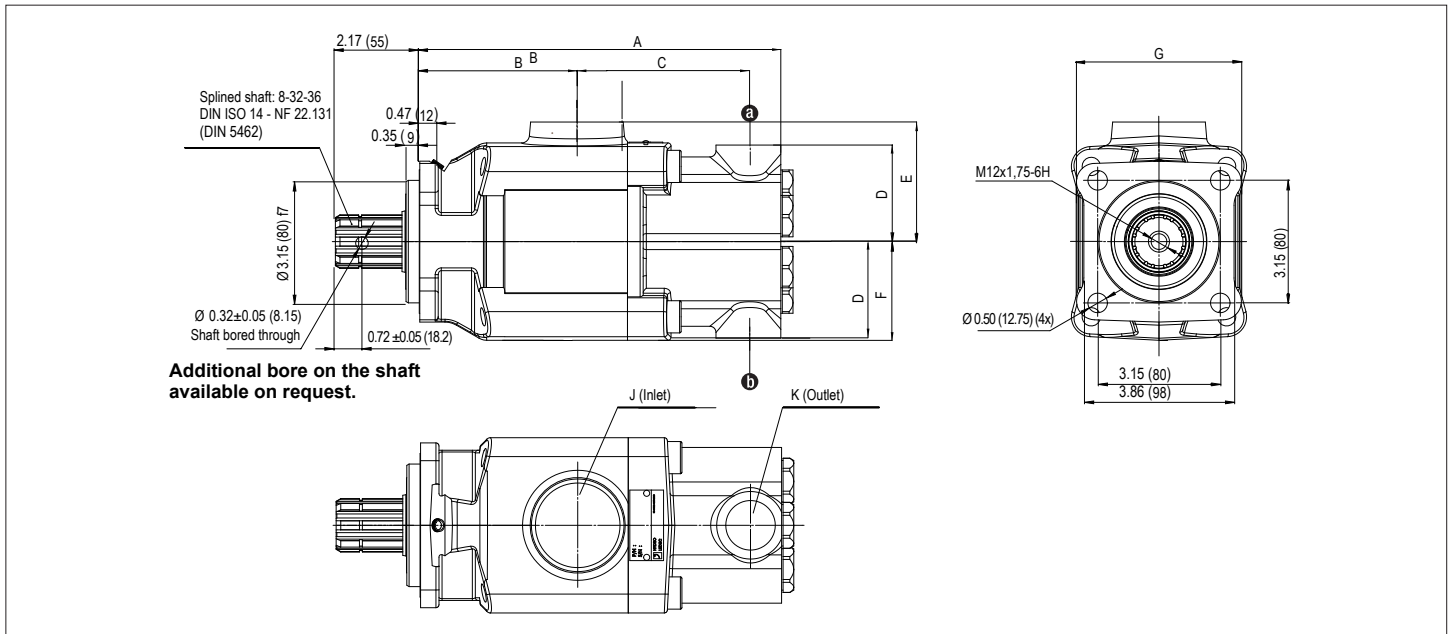
➤ **PA pumps**

- single flow from 1.53 to 6.95 cu.in/rev (25 to 114 cc/rev)
- twin-flow from 2x3.05 to 2x4.6 cu.in/rev (2x50 to 2x75 cc/rev)
- two different flows: 4.6-2.4 cu.in/rev (75 - 40 cc/rev)

➤ **PAC pumps**

Series offering the most compact size envelope:

- single flow from 2.62 to 4.9 cu.in/rev (40 to 80 cc/rev)
- twin-flow from 2x1.5 to 2x2.4 cu.in/rev (2x25 to 2x40 cc/rev)



Pump reference	Displacement		A	B	C	D	E	F	G	J	K	Weight	Overhang torque	Max. speed	Max. torque absorbed at 5800 psi (400 bar) <sup>(1)</sup>	
	a	b														
		cu.in/rev (cc/rev)														

#### ► Single flow

PA25	0511510	1.53	(25)	-	-	10.28 (261)	4.02 (102)	4.96 (126)	1.85 (47)	3.07 (78)	2.52 (64)	4.21 (107)	G 1½"	G ¾"	33.07 (15)	12.54 (17)	2200	131 (177)
PA32	0511515	2.07	(34)	-	-	10.28 (261)	4.02 (102)	4.96 (126)	1.85 (47)	3.07 (78)	2.52 (64)	4.21 (107)	G 1½"	G ¾"	33.07 (15)	12.54 (17)	2000	177 (240)
PA40	0511520	2.62	(43)	-	-	10.28 (261)	4.02 (102)	4.96 (126)	1.85 (47)	3.07 (78)	2.52 (64)	4.21 (107)	G 1½"	G ¾"	33.07 (15)	12.54 (17)	1750	224 (304)
PA50	0511525	3.05	(50)	-	-	10.28 (261)	4.02 (102)	4.96 (126)	1.85 (47)	3.07 (78)	2.52 (64)	4.21 (107)	G 1½"	G ¾"	33.07 (15)	12.54 (17)	1650	261 (354)
PA100	0511565	6.35	(104)	-	-	11.42 (290)	4.84 (123)	5.46 (138.8)	2.72 (69)	3.54 (90)	2.72 (69)	4.88 (124)	G 2"	G ¾"	51.81 (23.5)	23.23 (31.5)	1400	543 (736)
PA114	0511570	6.95	(114)	-	-	11.42 (290)	4.84 (123)	5.46 (138.8)	2.72 (69)	3.54 (90)	2.72 (69)	4.88 (124)	G 2"	G ¾"	51.81 (23.5)	23.23 (31.5)	1350	595 (807)
PAC40	0511460	2.44	(40)	-	-	8.90 (226)	3.74 (94.9)	4.07 (103.3)	2.44 (62)	2.88 (73.2)	2.13 (54)	3.86 (98)	G 1½"	G ¾"	27.56 (12.5)	9.29 (12.6)	1800	209 (283)
PAC50	0511465	3.05	(50)	-	-	8.90 (226)	3.74 (94.9)	4.07 (103.3)	2.44 (62)	2.88 (73.2)	2.13 (54)	3.86 (98)	G 1½"	G ¾"	27.56 (12.5)	9.29 (12.6)	1650	261 (354)
PAC65	0511490	3.96	(65)	-	-	9.57 (243)	4.03 (102.5)	4.44 (112.8)	2.48 (63)	3.07 (78)	2.56 (65)	4.21 (107)	G 1½"	G ¾"	35.27 (16)	9.29 (12.6)	1500	339 (460)
PAC80	0511705	4.76	(78)	-	-	9.72 (247)	4.03 (102.5)	4.58 (116.3)	2.48 (63)	3.07 (78)	2.56 (65)	4.21 (107)	G 1½"	G ¾"	37.48 (17)	15.71 (21.3)	1350	407 (552)

#### ► Twin-flow - 2 x 3 pistons

PA2x50	0511555	3.17	(52)	3.17	(52)	11.42 (290)	4.84 (123)	5.46 (138.8)	2.72 (69)	3.54 (90)	2.72 (69)	4.88 (124)	G 2"	G ¾"	51.81 (23.5)	23.23 (31.5)	1400	543 (736) <sup>(2)</sup>
PA2x57	0511560	3.48	(57)	3.48	(57)	11.42 (290)	4.84 (123)	5.46 (138.8)	2.72 (69)	3.54 (90)	2.72 (69)	4.88 (124)	G 2"	G ¾"	51.81 (23.5)	23.23 (31.5)	1350	595 (807) <sup>(2)</sup>
PA2x75	0516100	4.58	(75)	4.58	(75)	11.89 (302)	4.96 (126)	5.82 (147.8)	2.85 (72.5)	3.54 (90)	2.85 (72.5)	5.31 (135)	G 2"	G ¾"	59.08 (26.8)	28.54 (38.7)	1350	783 (1062) <sup>(2)</sup>
PA75-40	0516810	4.58	(75)	2.44	(40)	11.89 (302)	4.96 (126)	5.82 (147.8)	2.85 (72.5)	3.54 (90)	2.85 (72.5)	5.31 (135)	G 2"	G ¾"	60.41 (27.4)	28.54 (38.7)	1350	595 (807) <sup>(2)</sup>
PAC2x25	0511480	1.53	(25)	1.53	(25)	9.57 (243)	4.03 (102.5)	4.44 (112.8)	2.48 (63)	3.07 (78)	2.56 (65)	4.21 (107)	G 1½"	G ¾"	35.27 (16)	12.98 (17.6)	1750	261 (354) <sup>(2)</sup>
PAC2x32	0511485	1.95	(32)	1.95	(32)	9.57 (243)	4.03 (102.5)	4.44 (112.8)	2.48 (63)	3.07 (78)	2.56 (65)	4.21 (107)	G 1½"	G ¾"	35.27 (16)	12.98 (17.6)	1500	339 (460) <sup>(2)</sup>
PAC2x40	0511710	2.38	(39)	2.38	(39)	9.72 (247)	4.03 (102.5)	4.58 (116.3)	2.48 (63)	3.07 (78)	2.56 (65)	4.21 (107)	G 1½"	G ¾"	37.48 (17)	15.71 (21.3)	1350	407 (552) <sup>(2)</sup>

(1) Maximum torque given with a mechanical efficiency at 90%.

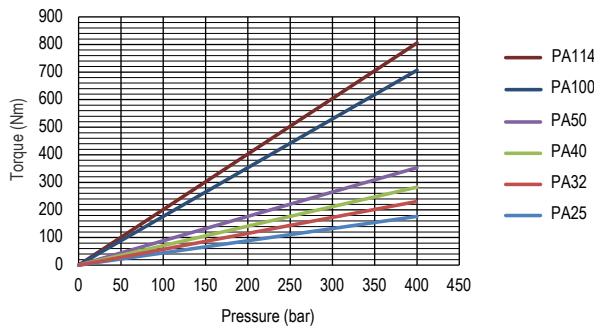
(2) Maximum torque for the two pressure ports at 5800 psi (400 bar).

► Torque absorbed as a function of pump output pressure (with a mechanical efficiency considered at 90%)

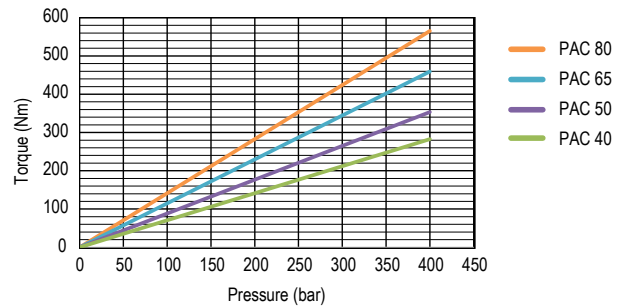
## Single flow models

Single flow models PA

PA series



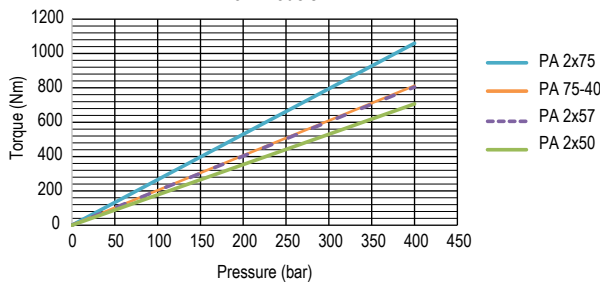
Single flow models PAC



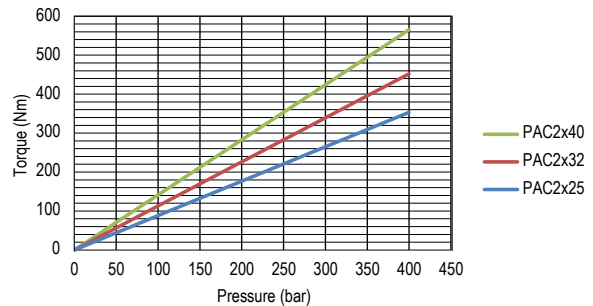
## Twin-flow models

Twin flow models PA

PA series



Twin flow models PAC



PA - PAC series

► 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

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

- P = Hydraulic power in kW
- Q = Flow in l/min
- $\eta_{\text{global}}$  = Volumetric efficiency + mechanical efficiency
- C = Torque in N.m
- Cyl = Displacement in cu.in/rev
- $\Delta P$  = Differential pressure at the pump terminals, in bar
- $\eta_{\text{meca}}$  = Mechanical efficiency

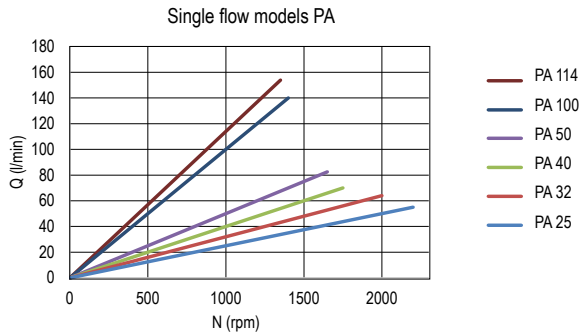




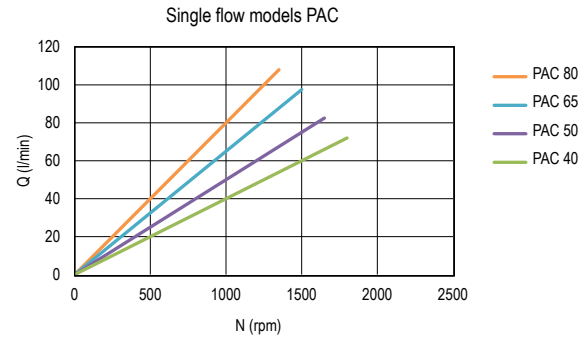
## ► Flow as a function of rotating speed

### Single flow models

#### PA series

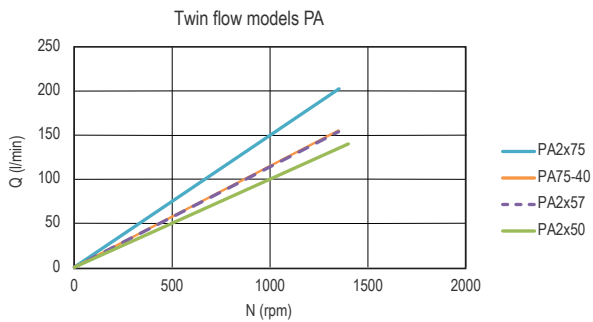


#### PAC series

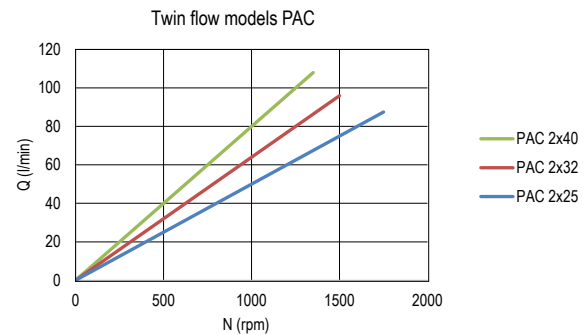


### Twin-flow models

#### PA series



#### PAC series



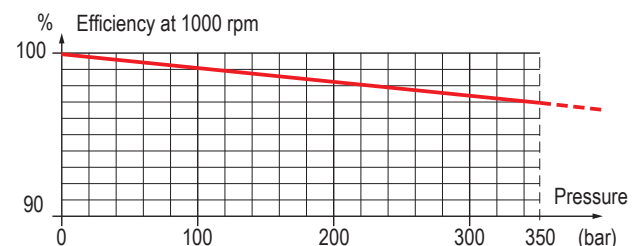
## ► Calculation of the flow

$$Q = \frac{\text{Cyl} \times N \times \eta_{\text{Vol}}}{1000}$$

Avec :

Q	=	Flow in l/min
Cyl	=	Displacement in cu.in/rev
N	=	Speed in rpm
$\eta_{\text{Vol}}$	=	Volumetric efficiency

## ► Volumetric efficiency



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 77°F (25°C) (~100 cSt) - disregarding the volumetric efficiency.

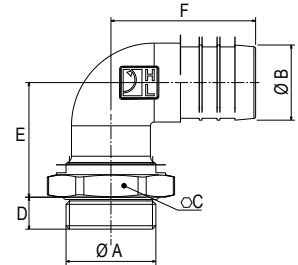
## INLET FITTINGS FOR PA | PAC PUMPS

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

### 90° elbow fittings, swivel

Reference	Ø A	Ø B	C	D	E	F
240131	G 1 1/2"	1.57 (40)	2.36 (60)	0.67 (17)	2.40 (61)	3.03 (77)
240133	G 1 1/2"	1.97 (50)	2.36 (60)	0.67 (17)	2.56 (65)	3.23 (82)
240135	G 2"	1.97 (50)	2.76 (70)	0.67 (17)	2.56 (65)	3.23 (82)

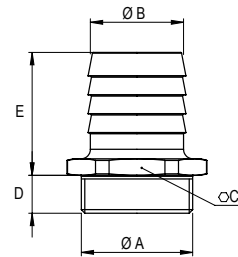
Dimensions in inches (mm).



### Straight fittings

Reference	Ø A	Ø B	C	D	E
240182	G 1 1/2"	1.57 (40)	2.17 (55)	0.63 (16)	2.05 (52)
240067	G 1 1/2"	1.89 (48)	2.17 (55)	0.63 (16)	2.52 (64)
240066	G 1 1/2"	2.36 (60)	2.56 (65)	0.63 (16)	2.64 (67)
240186	G 1 1/2"	2.50 (63.5)	2.56 (65)	0.63 (16)	2.64 (67)
240183	G 2"	1.97 (50)	2.56 (65)	0.63 (16)	2.05 (52)
240170	G 2"	2.36 (60)	2.56 (65)	0.63 (16)	2.76 (70)
240201	G 1 1/2"	3.00 (76.2)	3.15 (80)	0.63 (16)	3.43 (87)

Dimensions in inches (mm).



## DEFLECTOR TO PROTECT SHAFT SEALS

This deflector ensures the protection of the pump shaft seals.  
In particular, it protects the pump from projections of dirt from the road in cardan drive installations.

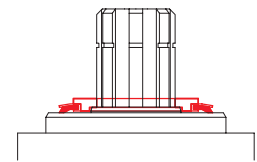
Reference: **DEF 054111**

### 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.

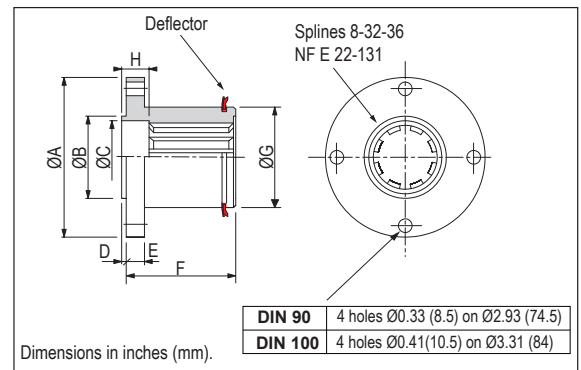
Note: the maximum admissible torque is limited by the drive shaft.

The deflector is supplied with the cardan plate.



Type	LEDUC code	ØA	ØB	C	D	E	F	ØG	H
<b>DIN 90</b>	<b>056315</b>	3.54 (90)	1.85 (47)	1.69 (43)	0.08 (2)	0.39 (10)	2.44 (62)	2.16 (55)	0.59 (15)
<b>DIN 100</b>	<b>0519040</b>	3.94 (100)	2.24 (57)	1.69 (43)	0.08 (2)	0.39 (10)	2.52 (64)	2.16 (55)	0.59 (15)

Dimensions in inches (mm).





# TXV series

pumps with

*Load Sensing* control

variable displacement piston pumps

## ADVANTAGES

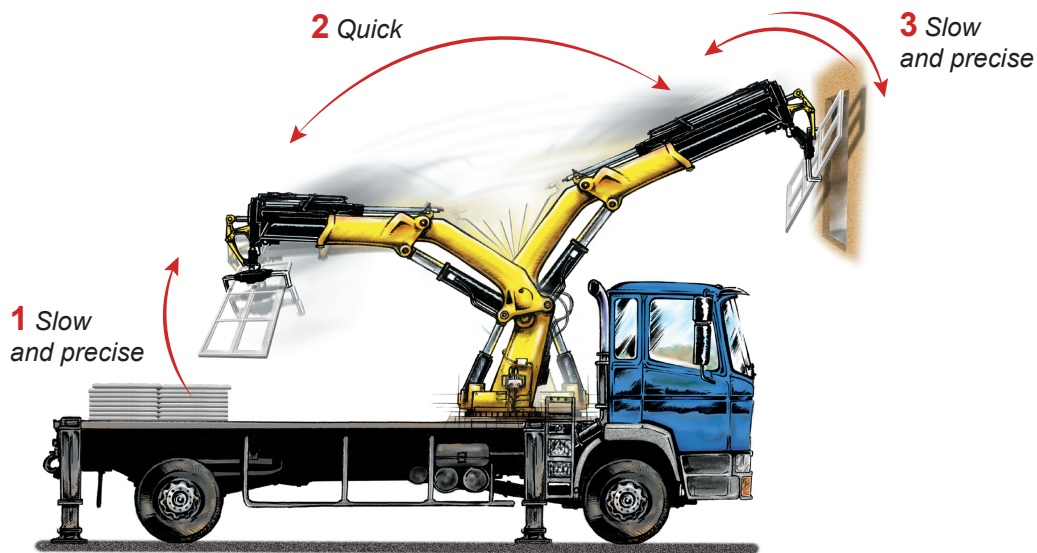
- ▶ TXV series pumps are variable displacement with pressure-flow control – called **Load Sensing**. They **self-regulate to give just the flow required for each movement**.
- ▶ Specifically designed for the needs of the *truck hydraulics market*, TXV pumps are particularly well adapted for applications 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 9 models with maximum displacement from 2.44 to 9.15 cu.in/rev (40 to 150 cc/rev).

Maximum pressure is up to 6092 psi (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

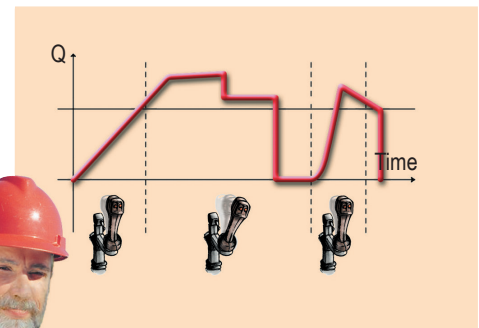
For slow and precise movements, the pump adjusts its flow to whatever the user needs, whilst also controlling maximum circuit pressure. Oil heating and lamination, and noise level, are considerably reduced compared to a fixed displacement pump.

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).

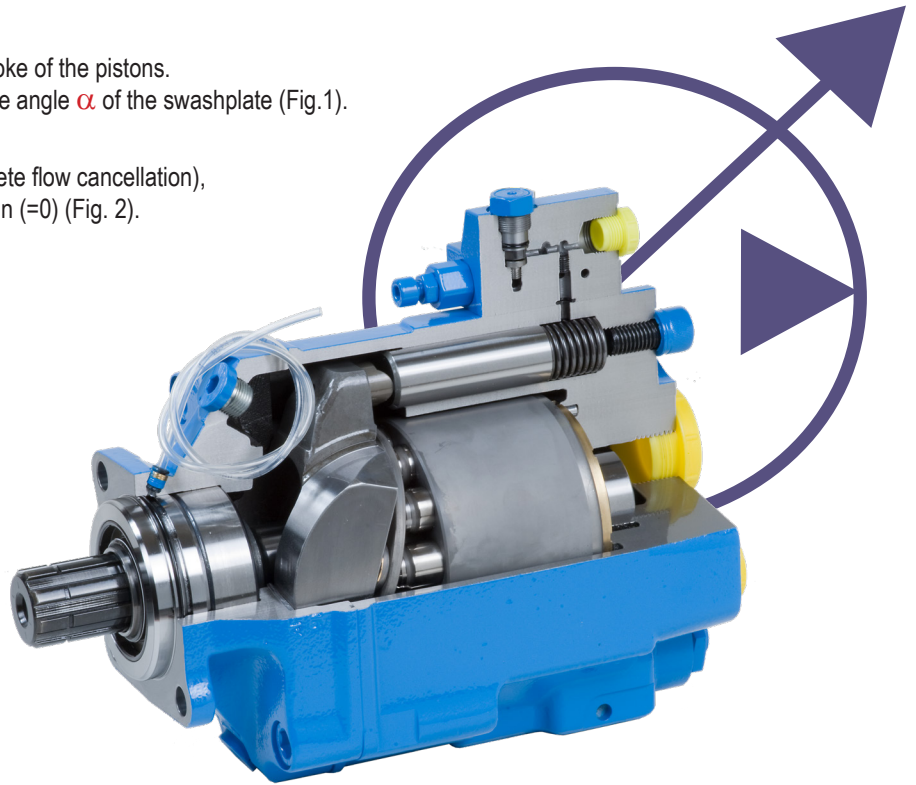


Figure 1 - Maximum displacement

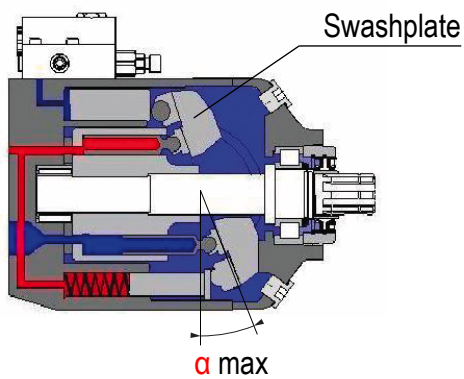
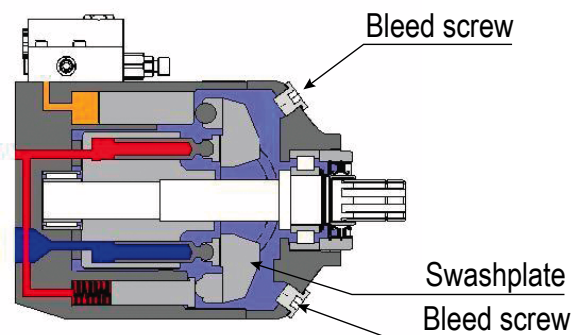
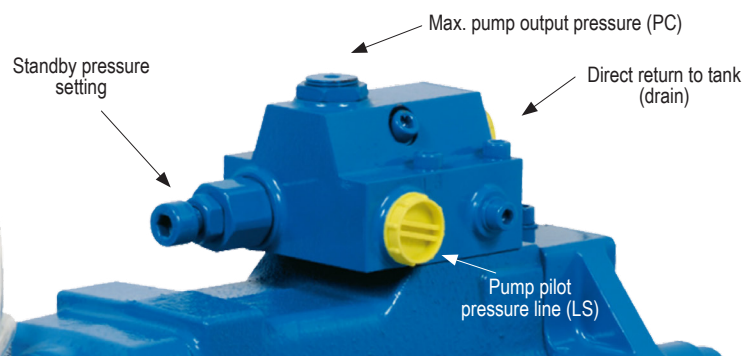


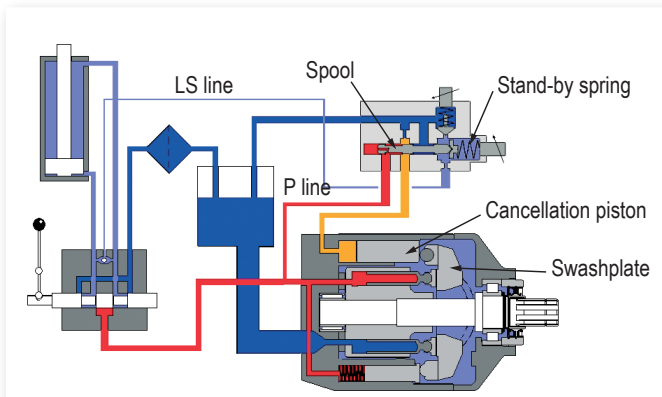
Figure 2 - zero displacement



- ▶ Setting the servo pump.





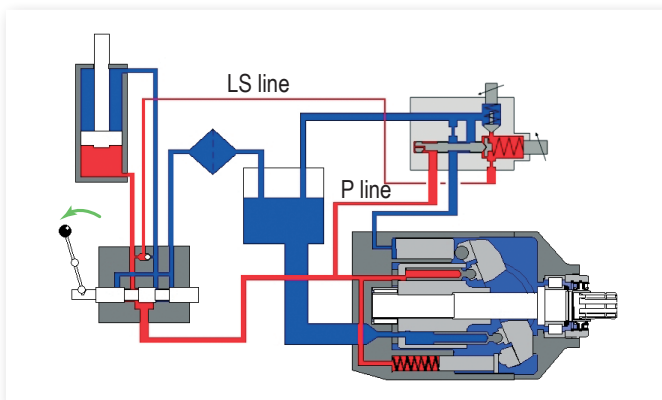


## ► Zero flow (standby)

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.

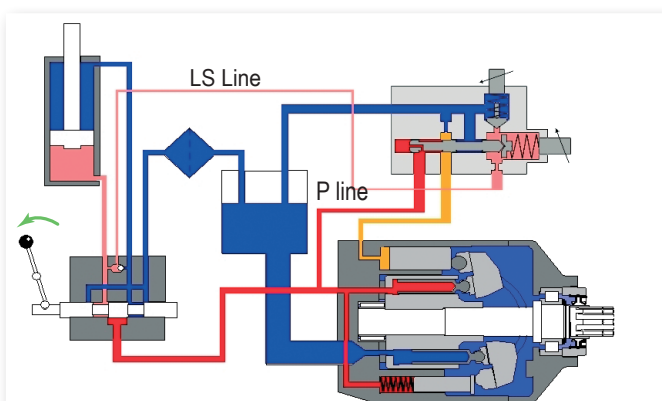
The pressure in the LS line is the same as in the P line.

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.

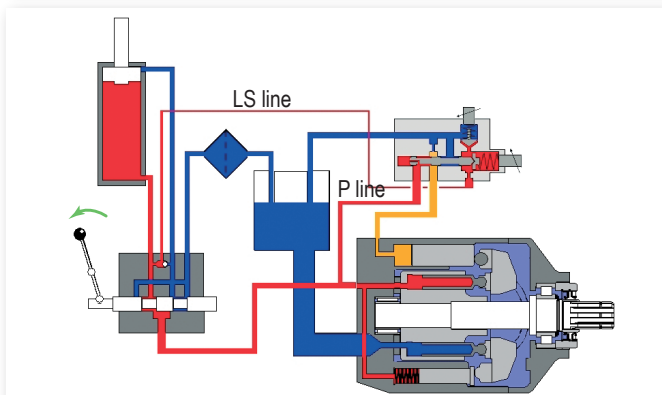
The swashplate is at maximum angle  $\alpha$ : the pump is at full displacement.



## ► 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 - Characteristics



TXV pumps are available in 9 models from 2.44 to 9.15 cu.in/rev (40 to 150 cc/rev) maximum displacement.

Pump reference	Direction of rotation	Maximum displac. <sup>(1)</sup>		Max. operating pressure		Max. peak pressure (intermittent: 5%)		Torque at 300 bar <sup>(2)</sup>		Max. speed at full displacement <sup>(3)</sup>	Max. speed in stand-by	Weight		Overhang torque <sup>(4)</sup>		
		cu.in (cc/rev)	psi	(bar)	psi	(bar)	lbf ft	(N.m)	rpm	rpm	lbs	(kg)	lbf ft	(N.m)		
TXV 40	0512950	CW	2.44	(40)	5802	(400)	6092	(420)	166.00	(225)	3000	3000	57.3	(26)	25.08	(34)
	0512955	CCW														
TXV 60	0512500	CW	3.66	(60)	5802	(400)	6092	(420)	247.08	(335)	2600	3000	57.3	(26)	25.08	(34)
	0512505	CCW														
TXV 75	0512510	CW	4.58	(75)	5802	(400)	6092	(420)	309.78	(420)	2000	3000	57.3	(26)	25.08	(34)
	0512515	CCW														
TXV 92	0512520	CW	5.61	(92)	5802	(400)	5802	(420)	379.84	(515)	1900	3000	57.3	(26)	25.08	(34)
	0512525	CCW														
TXV 120	0515700	CW	7.32	(120)	5511	(380)	5511	(400)	497.85	(675)	2100	3000	57.3	(26)	25.08	(34)
	0515705	CCW														
TXV 130	0515300	CW	7.93	(130)	5294	(365)	5511	(380)	538.42	(730)	2100	3000	62.2	(28.2)	28.47	(38.6)
	0515515	CCW														
TXV 150	0518600	CW	9.15	(150)	4496	(310)	4786	(330)	619.55	(840)	2000	3000	62.2	(28.2)	28.47	(38.6)
	0518605	CCW														

## ► Standard pump range

TXV 40	0512950	CW	2.44	(40)	5802	(400)	6092	(420)	166.00	(225)	3000	3000	57.3	(26)	25.08	(34)
	0512955	CCW														
TXV 60	0512500	CW	3.66	(60)	5802	(400)	6092	(420)	247.08	(335)	2600	3000	57.3	(26)	25.08	(34)
	0512505	CCW														
TXV 75	0512510	CW	4.58	(75)	5802	(400)	6092	(420)	309.78	(420)	2000	3000	57.3	(26)	25.08	(34)
	0512515	CCW														
TXV 92	0512520	CW	5.61	(92)	5802	(400)	5802	(420)	379.84	(515)	1900	3000	57.3	(26)	25.08	(34)
	0512525	CCW														
TXV 120	0515700	CW	7.32	(120)	5511	(380)	5511	(400)	497.85	(675)	2100	3000	57.3	(26)	25.08	(34)
	0515705	CCW														
TXV 130	0515300	CW	7.93	(130)	5294	(365)	5511	(380)	538.42	(730)	2100	3000	62.2	(28.2)	28.47	(38.6)
	0515515	CCW														
TXV 150	0518600	CW	9.15	(150)	4496	(310)	4786	(330)	619.55	(840)	2000	3000	62.2	(28.2)	28.47	(38.6)
	0518605	CCW														

## ► With through shaft\*

TXV 130	0518700	CW	7.93	(130)	5294	(365)	5511	(380)	538.42	(730)	1900	3000	68.6	31.1	34.96	(47.4)
	0518705	CCW														

\* 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

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

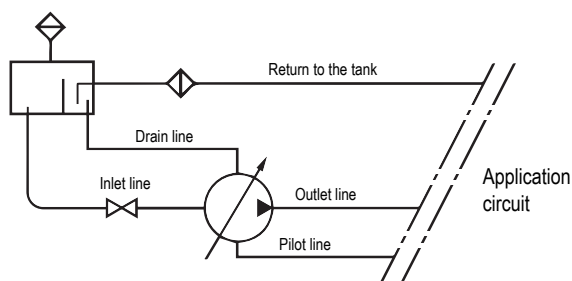
Calculation of torque to determine PTO, as a function of the displacement and the pressure

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

With :

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

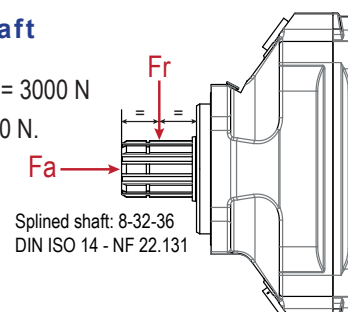
## ► Ideal installation



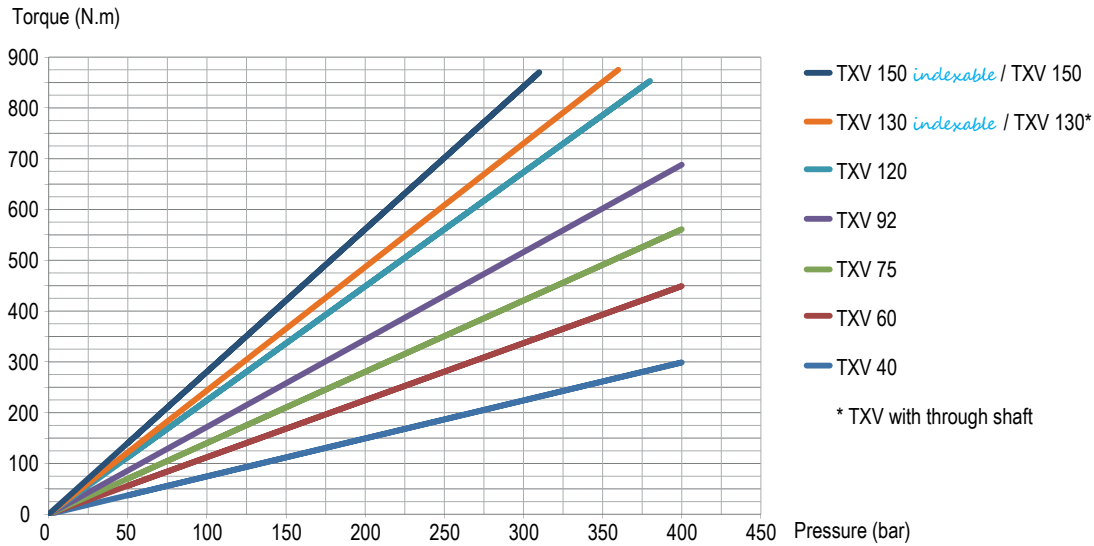
## ► Force on pump shaft

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

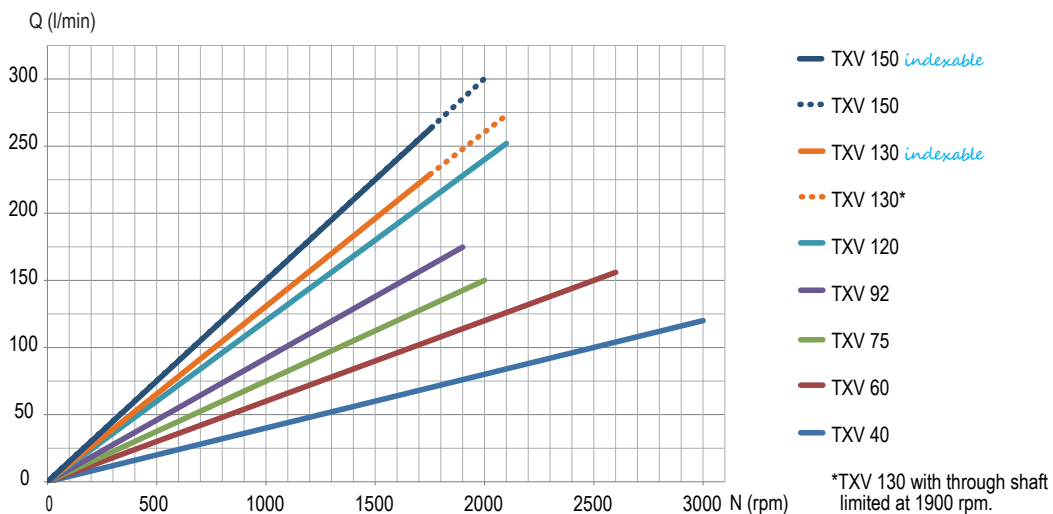
$F_a$  : Acceptable axial force = 1600 N.



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



► Flow as a function of rotating speed

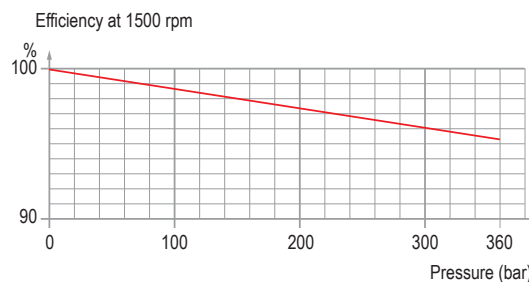


**⚠ Attention: the TXV indexables pumps are limited at 1750 rpm maximum.**

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

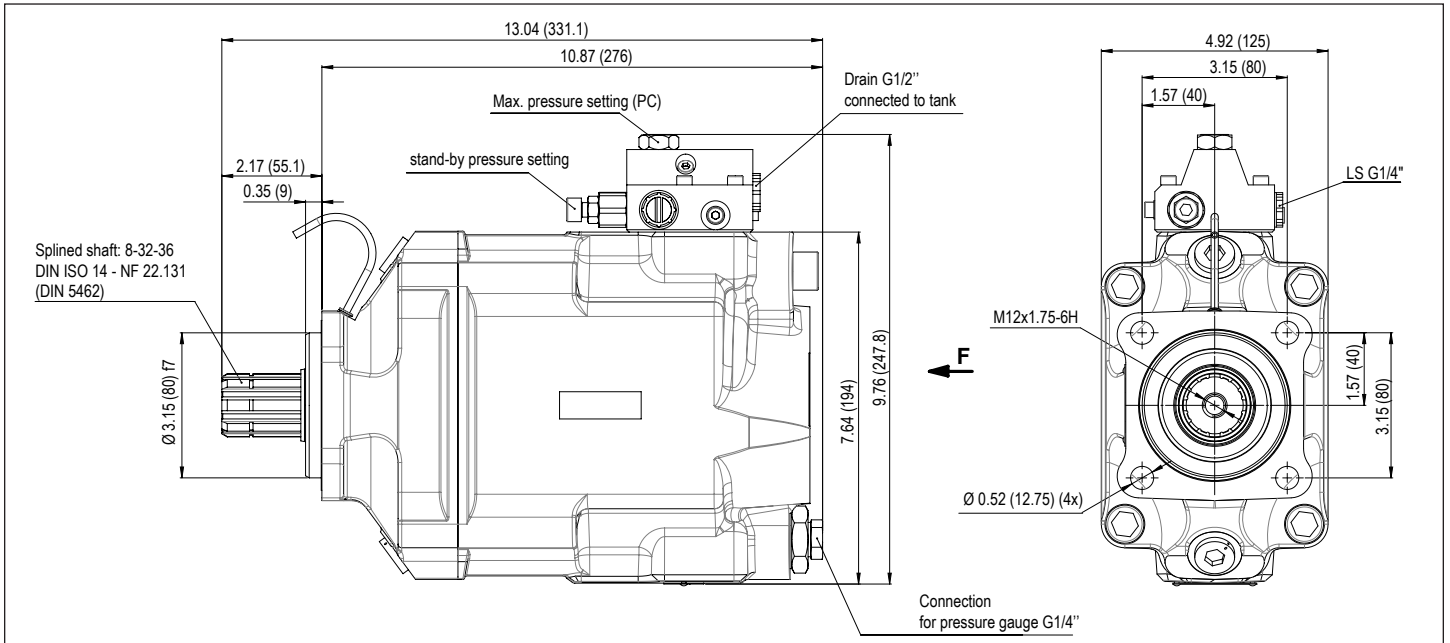
These graphs are the results of testwork done in HYDRO LEDUC R&D laboratory, on a specific test bench with a mineral hydraulic fluid ISO VG46 at 77°F/25°C (~100 cSt) - disregarding the volumetric efficiency.

► Volumetric efficiency





## TXV 40 TO 120



Dimensions in inches (mm).

### TXV connections

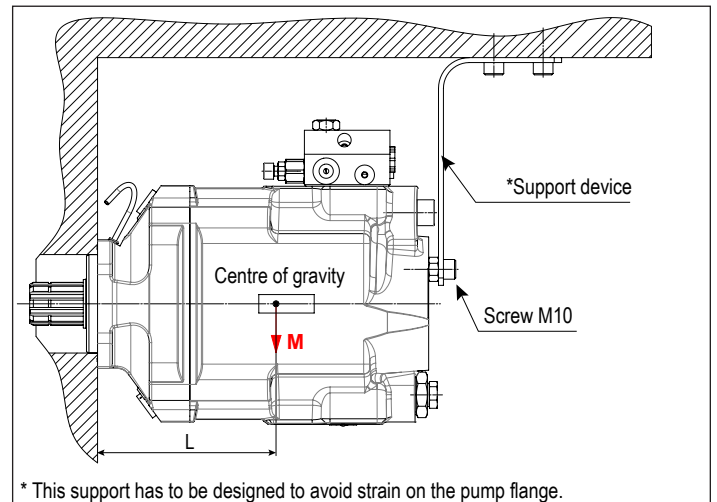
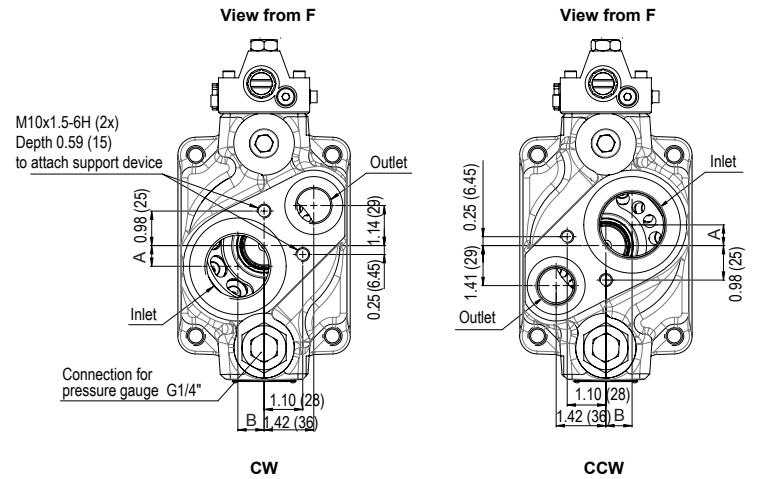
Pump reference	Outlet (Ø)	Inlet (Ø)	A inches (mm)	B inches (mm)
TXV 40 to 92	G 3/4"	G 1 1/2"	0.59 (15)	0.75 (19)
TXV 120	G 1"		0.24 (6)	0.93 (23.57)

### Support device

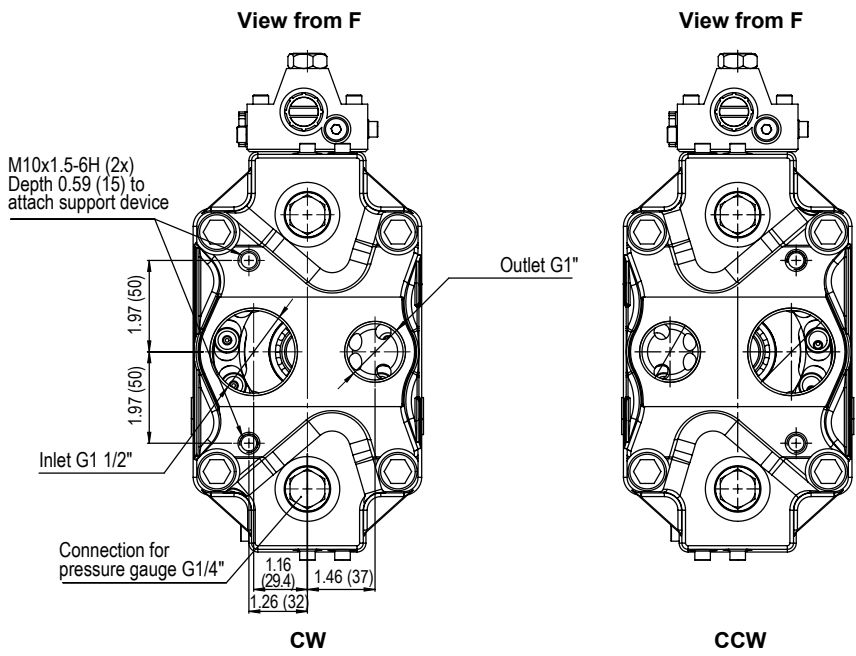
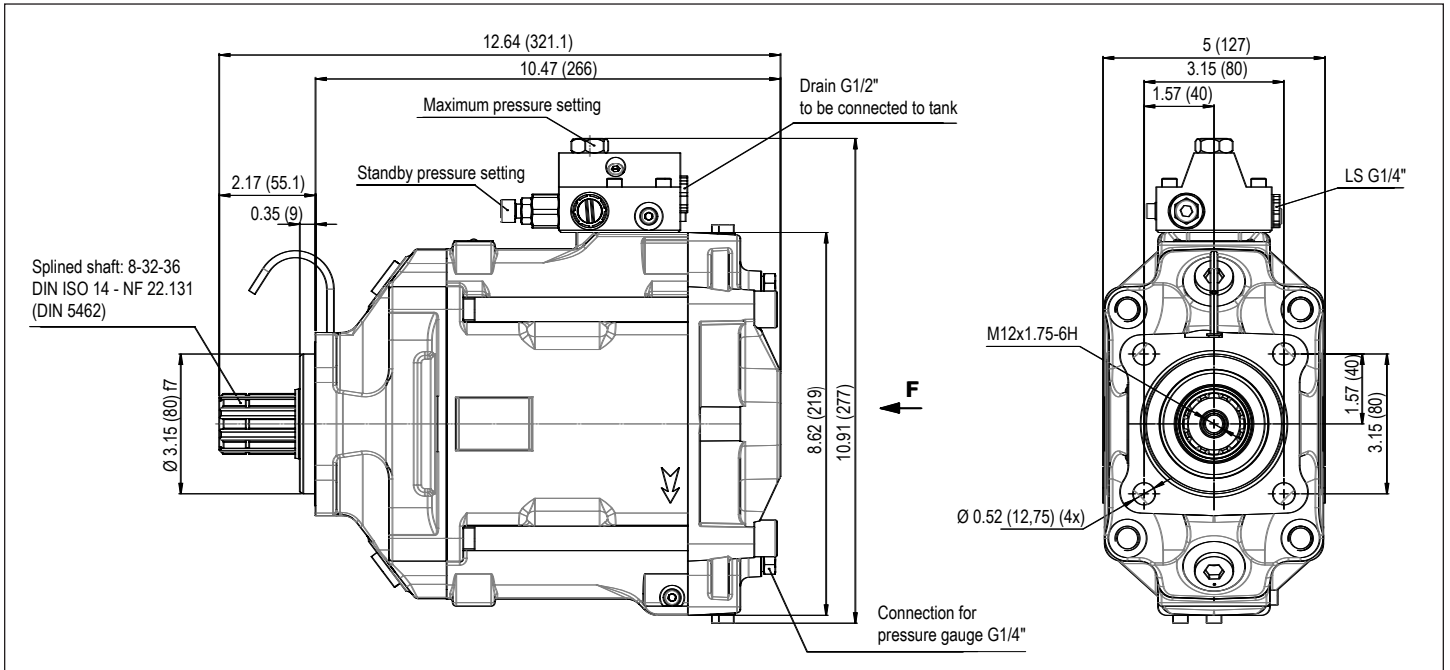
In cases where it is necessary to use a support device (overhang torque) for the pump, this must be fixed to the same part which the pump is mounted on.

### Mass and position of centre of gravity

Pump type	L inches (mm)	Weight lbs (kg)	Overhang torque lbf ft (N.m)
TXV 40 to 92	5.11 (130)	57.3 (26)	25.08 (34)
TXV 120	5.11 (130)	57.3 (26)	25.08 (34)
TXV 130 and TXV 150	5.04 (128)	62.2 (28.2)	28.5 (38.6)
TXV 130 with through shaft	6.01 (152.6)	68.6 (31.1)	35 (47.4)



TXV 150



Dimensions in inches (mm).



## TXV 130 THROUGH SHAFT PUMP

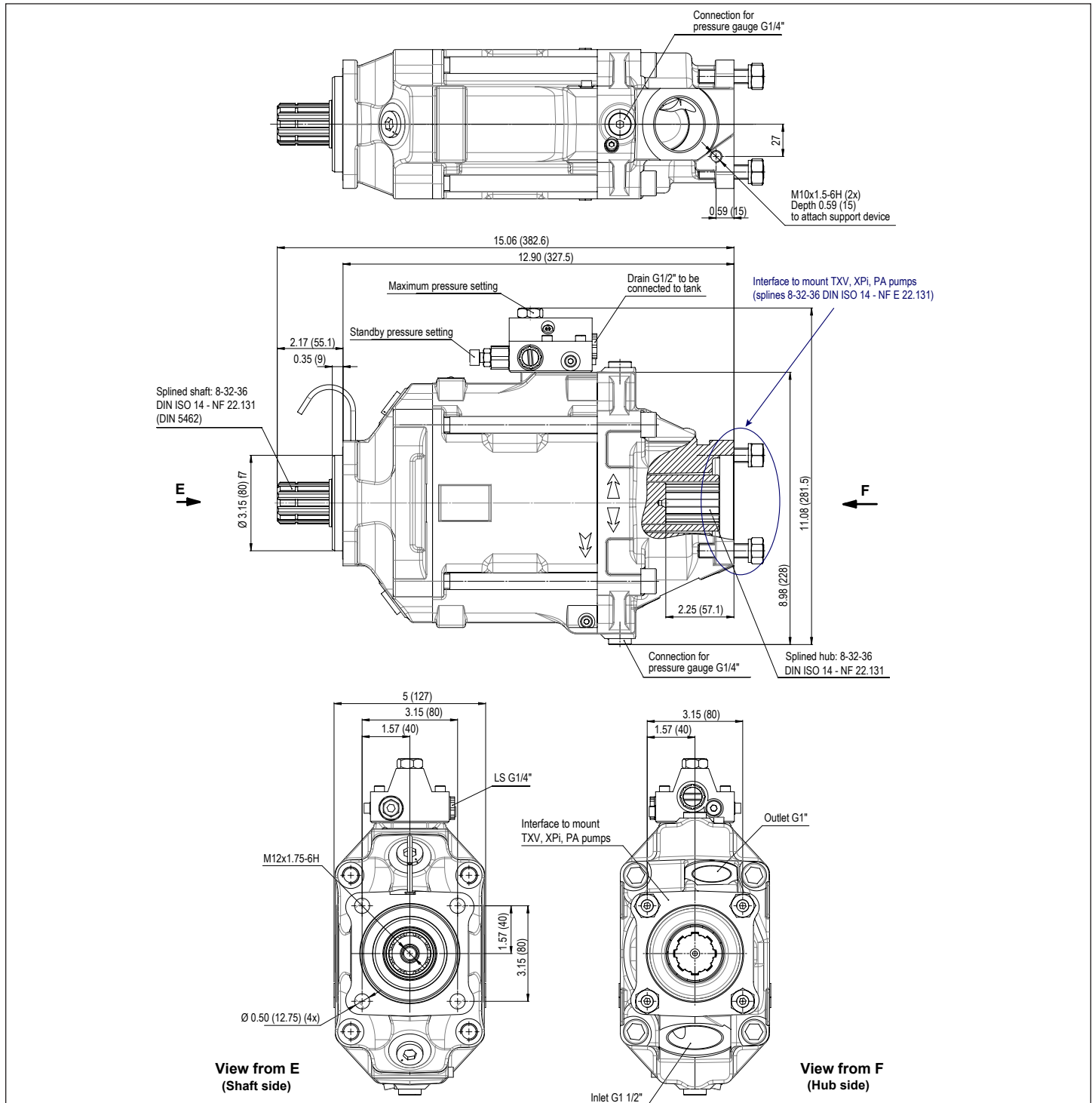
The TXV 130 pump exists in a "through shaft" version.

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 3.66 and 6.71 cu.in (60 and 110 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 664 lbf ft (900 N.m).

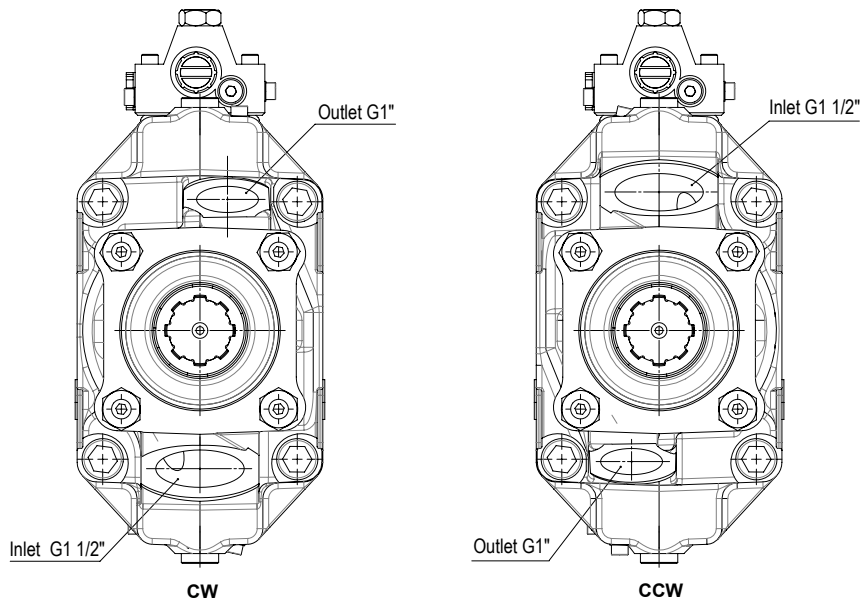
A flange must be used when using the pump alone (see page 37).



Dimensions in inches (mm).

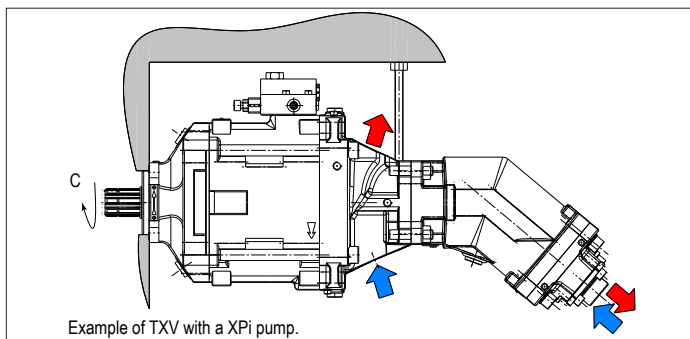
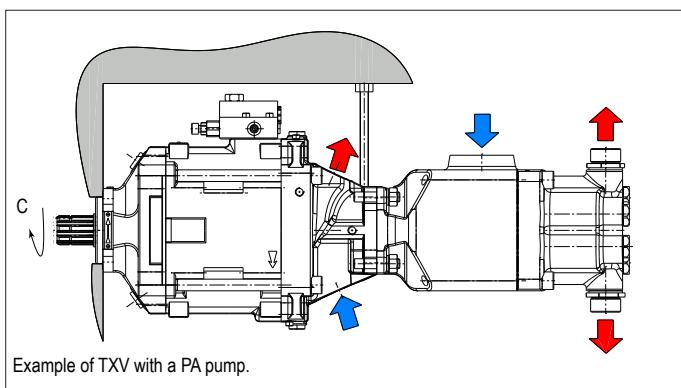
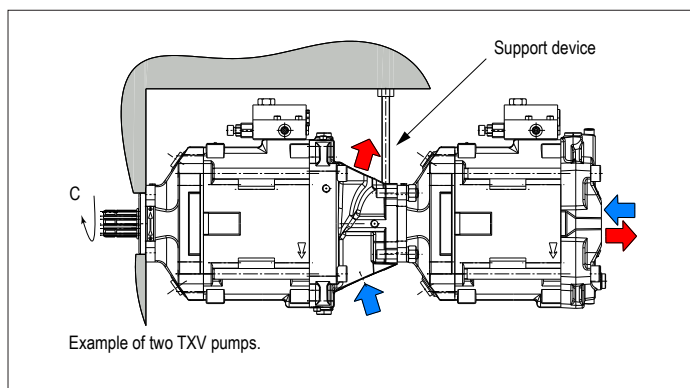


**TXV 130 WITH THROUGH SHAFT PUMP**



► **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.

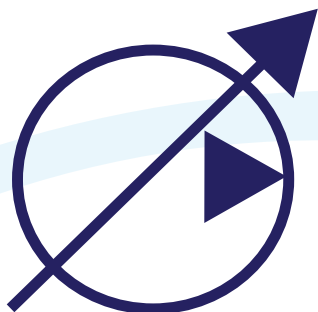


**Maximum torque transferable by the shaft of the pump driven by the PTO:**

$$C = 664 \text{ lbf f (900 N.m)}$$

That is, the sum of torque for both pumps must be < 664 lbf f (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 <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)
<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.

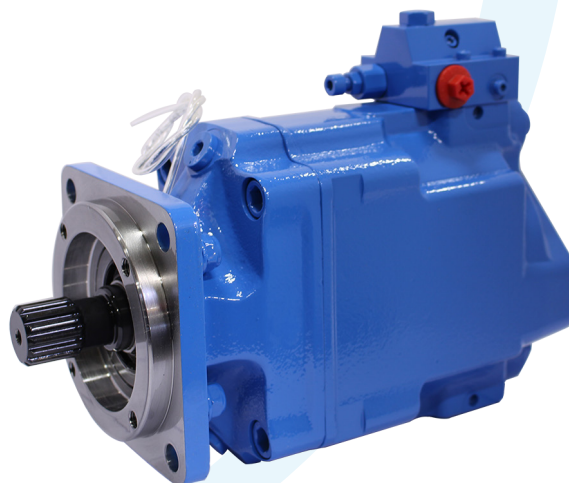
(4) Value of the overhang torque of the only pump.

#### ► Configurator for TXVA pumps

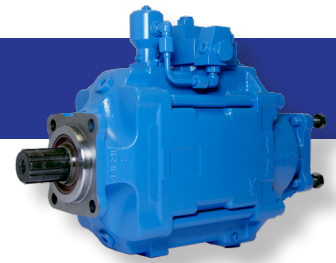
To obtain order code for your pump, fill in the parameters (2, 3, 4, 5) depending on the options required, using the table below.

TXVA	...	...	...	...	L1
①	②	③	④	⑤	⑥

①	<b>TXVA pump</b>			
②	<b>Displacement</b>	4.60 cu.in/rev (75 cc/rev)	5.60 cu.in/rev (92 cc/rev)	
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	14T 12/24 DP - SAE C	S1
		Keyed SAE J744	Ø1 1/4" UNF 2A - SAE C	K1
⑥	<b>Ports</b>	UNF Threaded	Inlet : 1 7/8" 12UN 2B	L1
			Outlet : 1 1/16" 12UN 2B	
		BSP Threaded	Inlet : G1 1/2"	L2
			Outlet : G 3/4"	







## 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 2.44 to 9.15 cu.in/rev (40 to 150 cc/rev.) including the TXV130 model with through CWaft
- ▶ Maximum torque between 66.4 to 516.3 lbf ft (90 and 700 Nm) depending on models
- ▶ Torque/power adjustment screw

### ▶ Characteristics

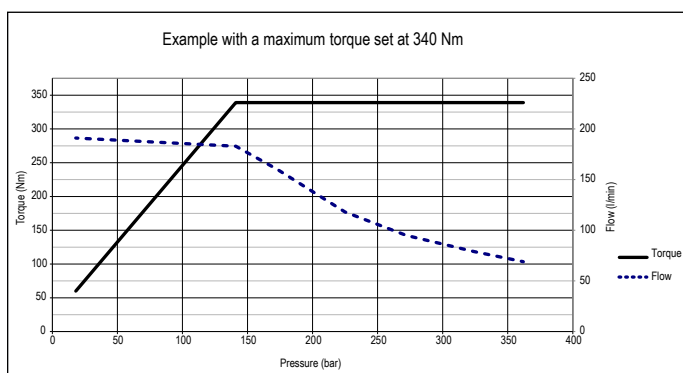
Pump	Ref.	Direction of rotation	Max. displacement <sup>(1)</sup>	Max. operating pressure	Max. peak pressure (intermittent 5%)	Max. torque range <sup>(3)</sup>	Max. speed at full displacement <sup>(2)</sup>	Max. speed in stand-by mode	Weight	Overhang torque
			cu.in/rev (cc/rev)	psi (bar)	psi (bar)	lbf (daN.m)	(rpm)	(rpm)		
TXV 40	P002685	CW	2.44 (40)	5800 (400)	6091 (420)	20.2 to 97.8 (9 to 43.5)	3000	3000	56.9 (25.8)	25.1 (34)
	P002686	CCW								
TXV 60	P002673	CW	3.66 (60)	5800 (400)	6091 (420)	20.2 to 97.8 (9 to 43.5)	2600	3000	56.9 (25.8)	25.1 (34)
	P002674	CCW								
TXV 75	P002683	CW	4.60 (75)	5800 (400)	6091 (420)	20.2 to 97.8 (9 to 43.5)	2000	3000	56.9 (25.8)	25.1 (34)
	P002684	CCW								
TXV 92	P002681	CW	5.61 (92)	5800 (400)	6091 (420)	20.2 to 97.8 (9 to 43.5)	1900	3000	56.9 (25.8)	25.1 (34)
	P002682	CCW								
TXV 120	P002441	CW	7.32 (120)	5511 (380)	5800 (400)	27 to 127 (12 to 56.5)	2100	3000	56.9 (25.8)	25.1 (34)
	P002442	CCW								
TXV 130	P002763	CW	7.93 (130)	5294 (365)	5511 (380)	29.2 to 136 (13 to 60.5)	2100	3000	61.7 (28)	28.0 (38.6)
	P002764	CCW								
TXV 150	P002765	CW	9.15 (150)	4496 (310)	4786 (330)	33.7 to 157 (15 to 70)	2000	3000	62.2 (28.2)	28.0 (38.6)
	P002766	CCW								
TXV 130 (through CWaft version)	P002741	CW	7.93 (130)	5294 (365)	5511 (380)	29.2 to 136 (13 to 60.5)	1900	3000	68.6 (31.1)	34.7 (47.4)
	P002743	CCW								

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

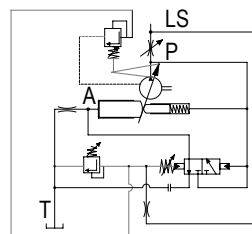
(2) Higher speed possible - at full displacement - depending on flow required : please contact Customer Service.

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

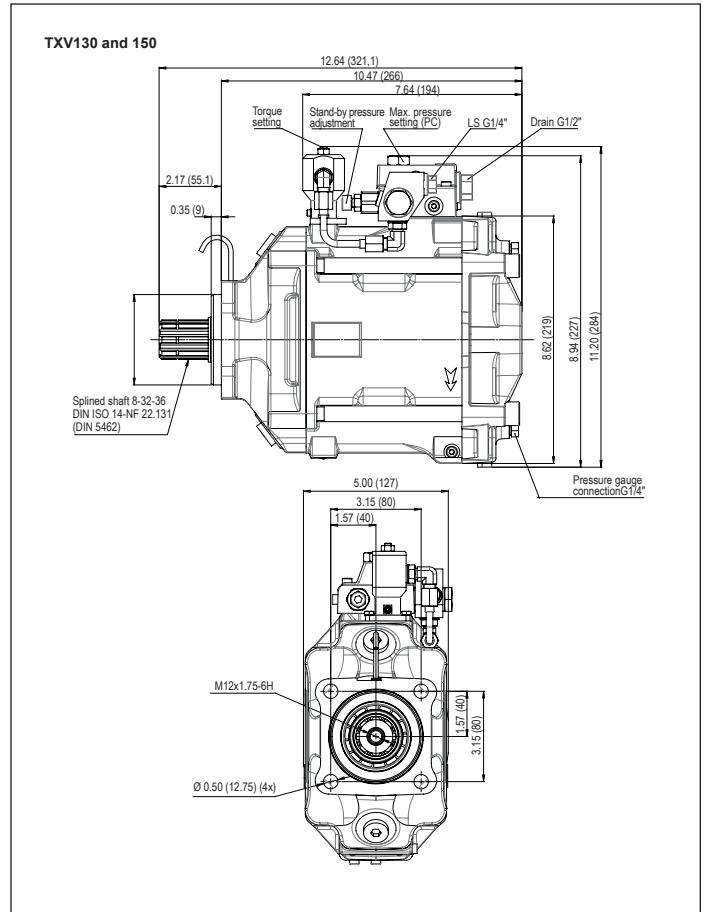
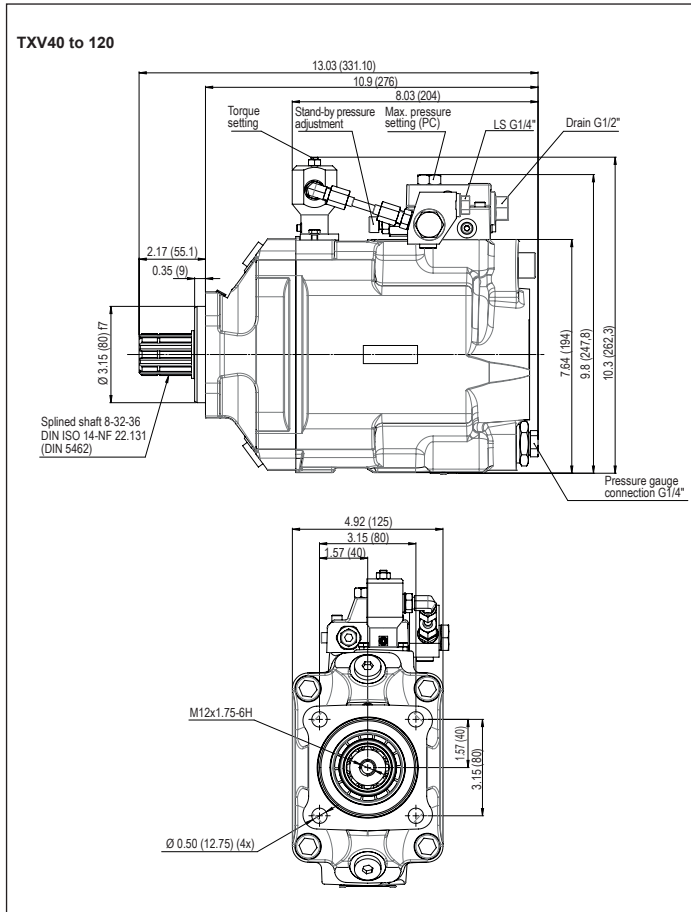
### ▶ Torque and flow as a function of pressure :



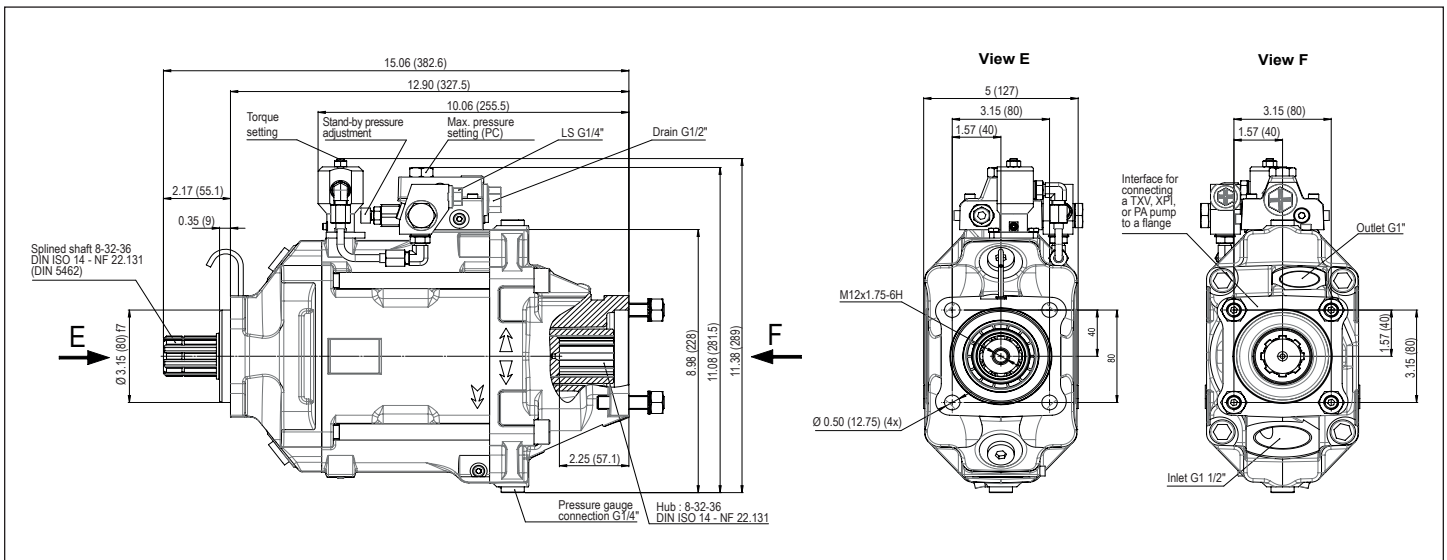
### ▶ Constant torque control device :



► standard pumps dimensions :



► TXV130 model with through shaft :



TXV series

## INLET FITTINGS FOR TXV PUMPS (optional)

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

### 90° elbow fittings, swivel

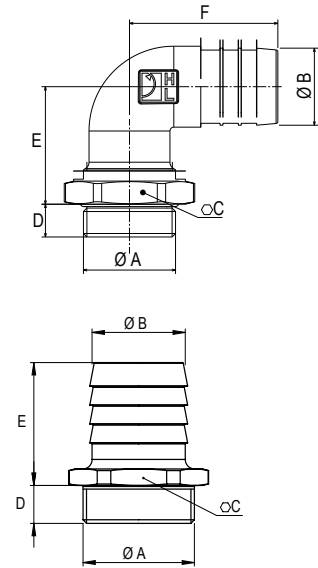
Reference	A	Ø B	C	D	E	F	Pump type
240131	G 1 1/2"	1.57 (40)	2.36 (60)	0.67 (17)	2.40 (61)	3.03 (77)	TXV
240133	G 1 1/2"	1.97 (50)	2.36 (60)	0.67 (17)	2.56 (65)	3.23 (82)	TXV

### Straight fittings

Reference	A	Ø B	C	D	E	Pump type
240182	G 1 1/2"	1.57 (40)	2.17 (55)	0.63 (16)	2.05 (52)	TXV
240067	G 1 1/2"	1.89 (48)	2.17 (55)	0.63 (16)	2.52 (64)	TXV
240066	G 1 1/2"	2.36 (60)	2.56 (65)	0.63 (16)	2.64 (67)	TXV
240186	G 1 1/2"	2.50 (63.5)	2.56 (65)	0.63 (16)	2.64 (67)	TXV
240201*	G 1 1/2"	3.00 (76.2)	3.15 (80)	0.63 (16)	3.43 (87)	TXV

\*Except for TXV130 model with through shaft.

Dimensions in inches (mm).



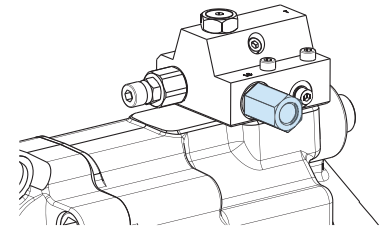
**LS adapter with integrated filter | LEDUC CODE**

Filter fitting for LS line connection

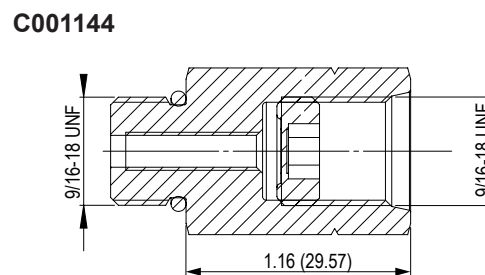
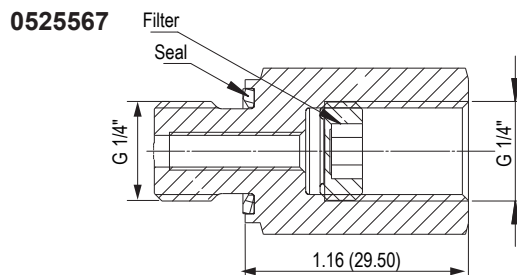
Kit reference	LS dimension	Type of pump
0525567	G1/4"	TXV
C001144	9/16-18 UNF	TXVA (SAE)

► **Technical characteristics**

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



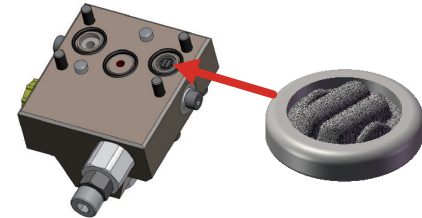
► **Drawings for both versions of the kit ( dimensions in mm):**



**SEAL + FILTER | LEDUC CODE K00028**

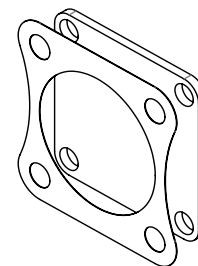
The LS filter protects the TXV's Load Sensing valve against contaminations coming from the hydraulic circuit.

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



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

FOR TXV 130 THROUGH SHAFT



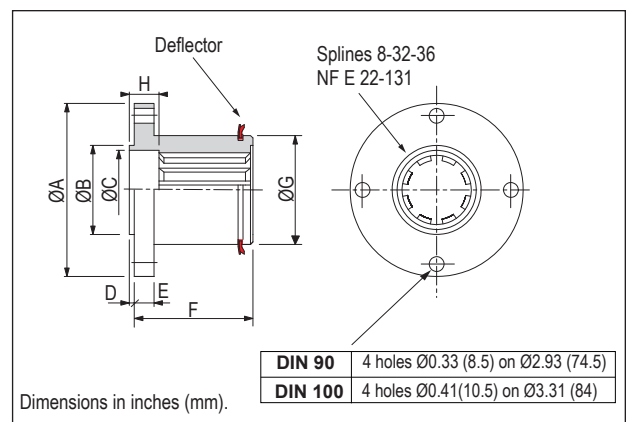
**CARDAN PLATE - DIN 90 and DIN 100**

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
<b>DIN 90</b>	<b>056315</b>	3.54 (90)	1.85 (47)	1.69 (43)	0.08 (2)	0.39 (10)	2.44 (62)	2.17 (55)	0.59 (15)
<b>DIN 100</b>	<b>0519040</b>	3.94 (100)	2.24 (57)	1.69 (43)	0.08 (2)	0.39 (10)	2.52 (64)	2.17 (55)	0.59 (15)



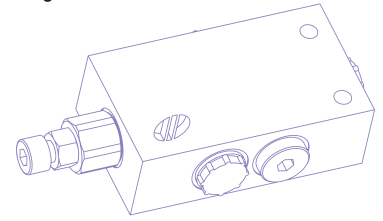


**FCV - FLUID VALVE CIRCULATION | LEDUC CODE: 0524940**

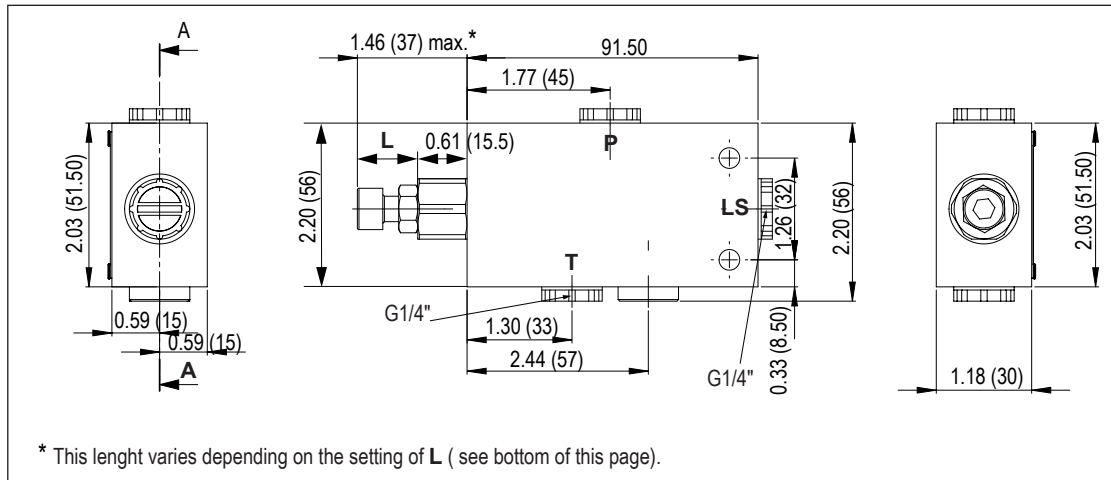
The fluid circulation (FCV) is designed for applications where the hydraulic variable displacement pump is used in standby mode for a long period of time, for example engine PTO, to protect the pump against overheating.

► **Technical characteristics**

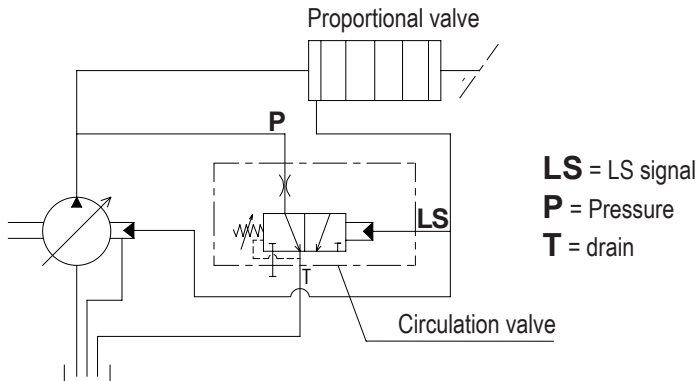
- The valve flow varies between 5.28 to 5.81 gal/min (20 and 22 l/min) for a  $\Delta P$  at 435 psi (30 bar).
- Maximum pressure is 6092 psi (420 bar).
- The closing pressure is 29 psi (2 bar) min. and 101 psi (7 bar) max.



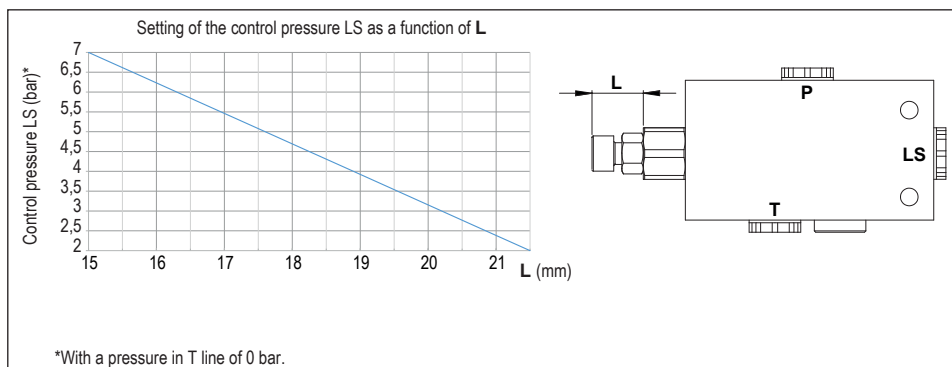
► **Dimensions**



► **Schematics**



► **Setting of the control pressure:**



## MAXIMUM DISPLACEMENT SETTING SCREW

The TXV pumps from 2.44 to 9.15 cu.in/rev (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\*

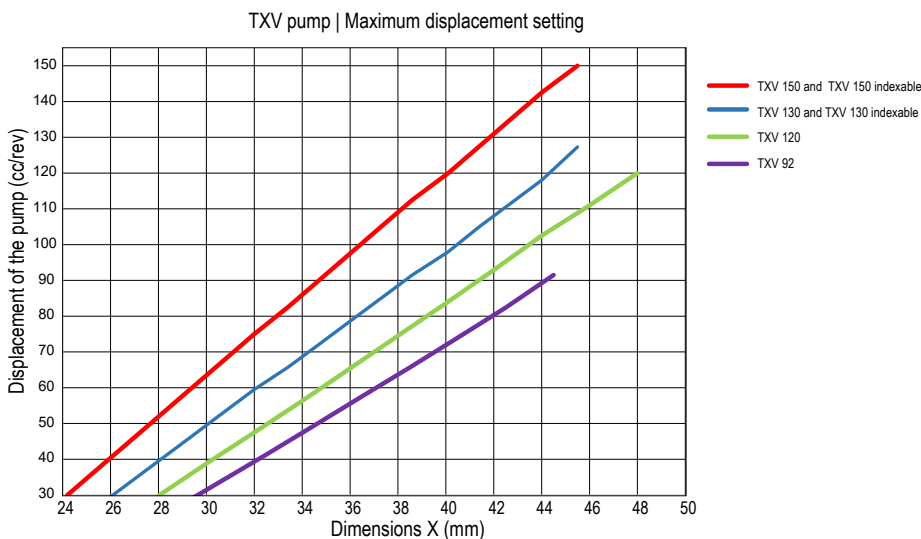
\*Except TXV through shaft and constant torque.

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

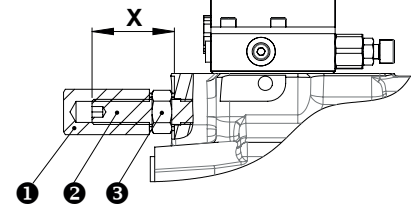
### ► How to set maximum displacement

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

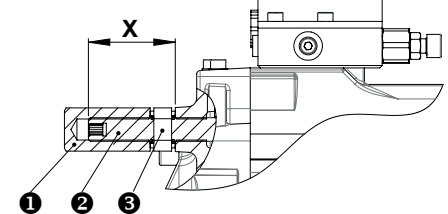
- For TXV 150 : 1 turn of the screw changes the displac. by 0.46 cu.in (7.5 cc).
- For TXV 130 : 1 turn of the screw changes the displac. by 0.40 cu.in (6.5 cc).
- For TXV 120: 1 turn of the screw changes the displac. by 0.55 cu.in (9 cc).
- For TXV 92 to TXV 40: 1 turn of the screw changes the displac. by 0.50 cu.in (8 cc).



TXV 40-120



TXV 130-150



## SETTING OF THE REGULATION

### ► Stand-by

TXV pumps are supplied as standard with standby pressure set at 435 psi (30 bar).  
On request, this standby pressure can be set between 362 and 870 psi (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 1450 psi (100 bar).

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

Must be set 362 to 435 psi (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.*

# OPTIMIZE THE SERVICE LIFE OF YOUR LEDUC PUMP

## ► Tank

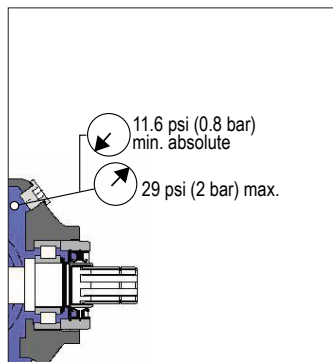
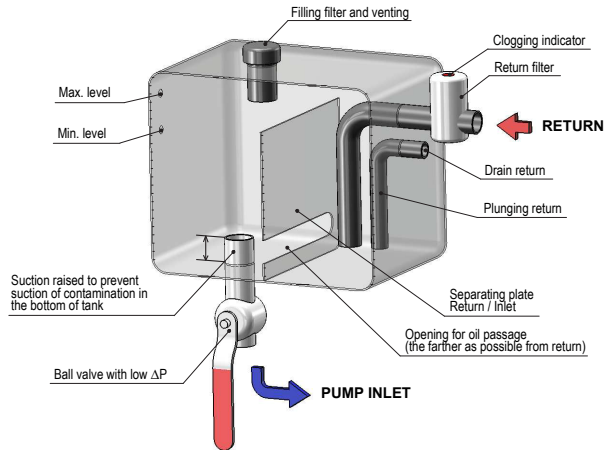
Generally, hydraulic pumps perform better when the tank is above the pump. LEDUC pumps can also operate with oil level beneath the pump.

For further information on such installations, please contact our Technical Department.

Correct inlet conditions are between 1.60 to 29 psi (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).

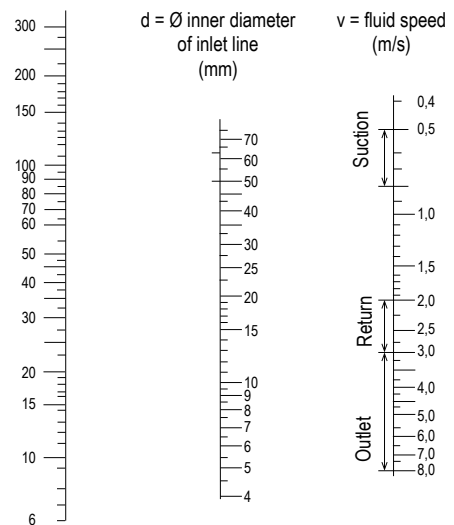


## ► Hosing

The supply line should be dimensioned to ensure fluid speed between 0.5 and 0.8 m/second.

Choose as direct a supply line as possible, avoiding sharp bends.

Q = Flow (l/min)



## ► Filtration

The service life of the pumps is highly dependent on the quality of the hydraulic fluid and level of cleanliness.

We recommend the following minimum cleanliness:

- Cleanliness class 9 according to NAS1638;
- Cleanliness class 6 according to SAE;
- Cleanliness class 20/18/15 according to ISO/DIS 4406.

We recommend using of a return filter of 20 µm absolute maximum.

## ► Drain pressure

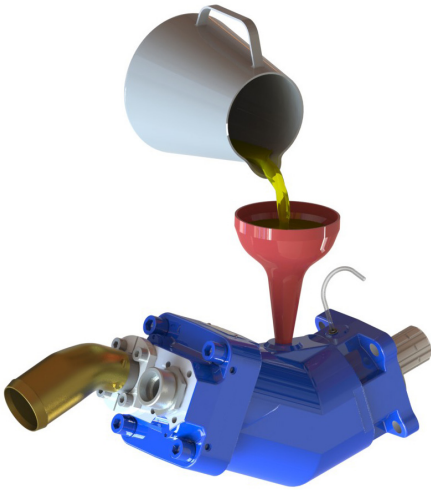
It is essential to drain the pump, to avoid excessive pressures on the shaft seal. Maximum acceptable internal pressure depends on pump rotating speed.

Ensure that the working pressure in the housing does not exceed 29 psi (2 bar), whatever the pump rotation speed and the viscosity of the fluid. Other operating may be possible; please consult our Technical Department.

## ► Preparation of the pump

Before start-up, the pumps should be filled with clean hydraulic oil. (minimum 50%).

### ► Fluid

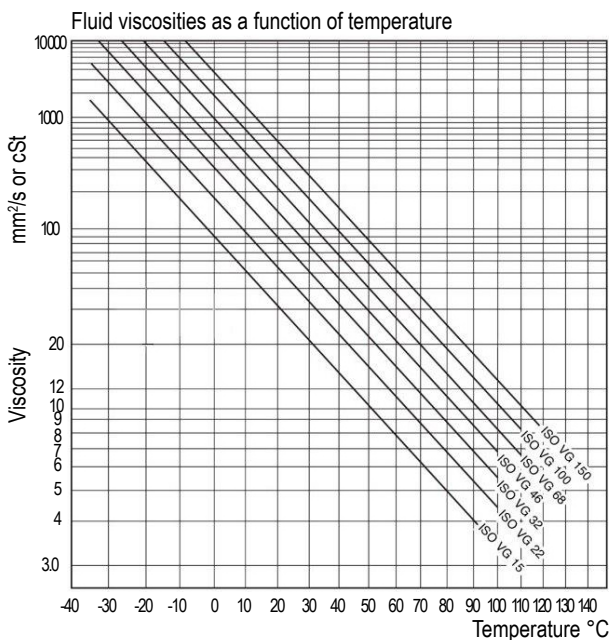


Use a mineral hydraulic oil type HLVP according to DIN 51502 (or HV according to ISO 11158) with viscosity between 10 and 400 cSt. It is in this viscosity range that the pump keeps its volumetric characteristics.

The optimal viscosity range is between 20 and 30 cSt. A maximum viscosity of 1000 cSt is accepted when starting up at low speed and without pressure.

If you wish to use other fluids, please consult our Customer Service Department.

Maximum temperature of fluid in the pump should not exceed 80°C.



## ► Drive and assembly recommendations

If cardan shaft drive: check the quality and correct installation of the cardan shaft.

For PTO mount applications, be careful to respect the tightening recommendations in terms of pump onto PTO and PTO onto vehicle gearbox. (according to the PTO manufacturer's specifications).

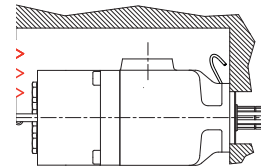
If the mounting on the PTO is not lubricated, grease the splines with graphite grease (example Molycote G rapide).

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

### ► Elastic support device

For pumps with a greater overhang torque than that accepted by the PTO, it is recommended to use an elastic support device to support the weight of the pump.

This support has to be designed to avoid strain on the pump flange.



*We do not sell the elastic support.  
It must be suitable for the environment of the pump assembly.*

### ► Start-up

- Open the supply valve if there is one.
- Check the valve is in "back to tank" position.
- Start up at low speed, or by successive starts/stops.
- Let the pump run for one to two minutes, and check that the flow is regular.
- Check the pump is running correctly, with neither vibrations nor a normal noise.
- After several hours of operation, check the tightening torque of the pump on the PTO according to the PTO manufacturer's specifications.

### ► Maintenance

Some regular checks are necessary, namely:

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

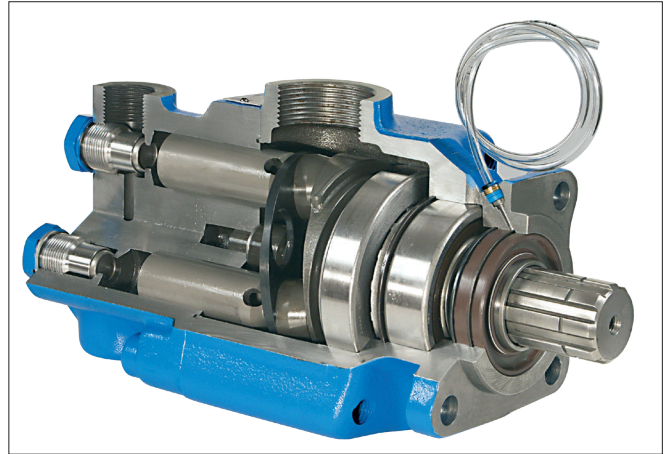
LEDUC pumps designed for truck hydraulics are all fitted with reinforced sealing comprising:

▶ **two radial seals:**

- an outer seal adapted to the needs of PTOs and gearboxes;
- an inner seal adapted to the hydraulic requirement.

▶ **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.



**WARNING** : if you notice any trace of oil in the tube, the tightness of PTO-pump should be checked immediately.

## RECOMMENDATIONS FOR ATTACHING THE PROTECTIVE TUBE

- ✓ Make a siphon with the tube so as to avoid any introduction of dirt from road, and 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. ✗
- ✗ Avoid any pinching or folds in the tube when fixing it in place.
- ✗ Make sure the end of the tube is not blocked.



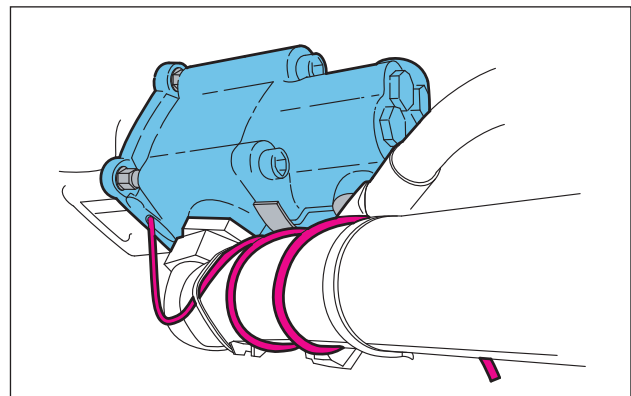
### INFORMATION

HYDRO 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.

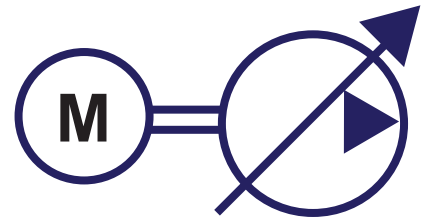
Note in particular the pump - PTO sealing has to be done via the seal C002510 supplied with the pump.

### Example of tube attachment



# GEP573

## 5kW powerpack

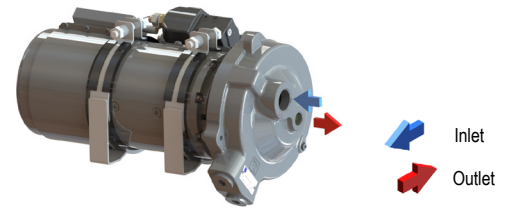


The GEP573 is a unit comprising :

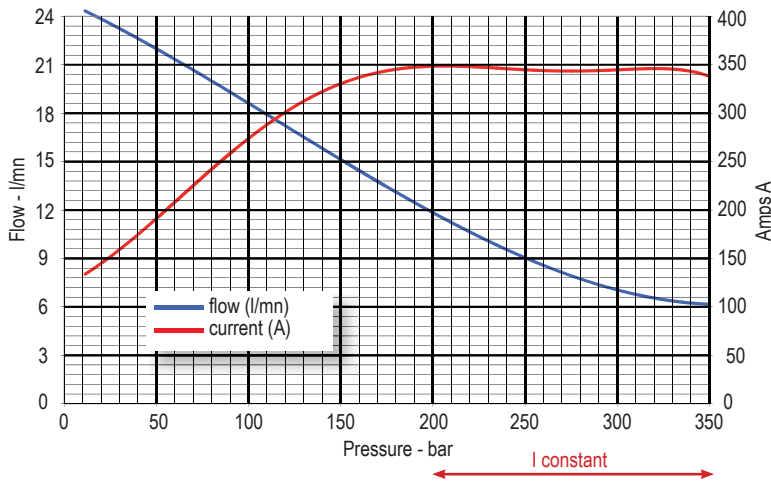
- a 5 kW electric motor
- a variable displacement piston pump with constant torque regulation.

The automatic variation in displacement of the hydraulic pump allows the GEP573 to supply high flow when it is used at low pressure and to reach high pressure by reducing pump output flow.

Its performs an unit using the optimized power of the electric motor. (see curves below). This pump is not self-priming, and the service time will be as a function of the duty cycle (for further information or advice, please contact our Customer Service Department).



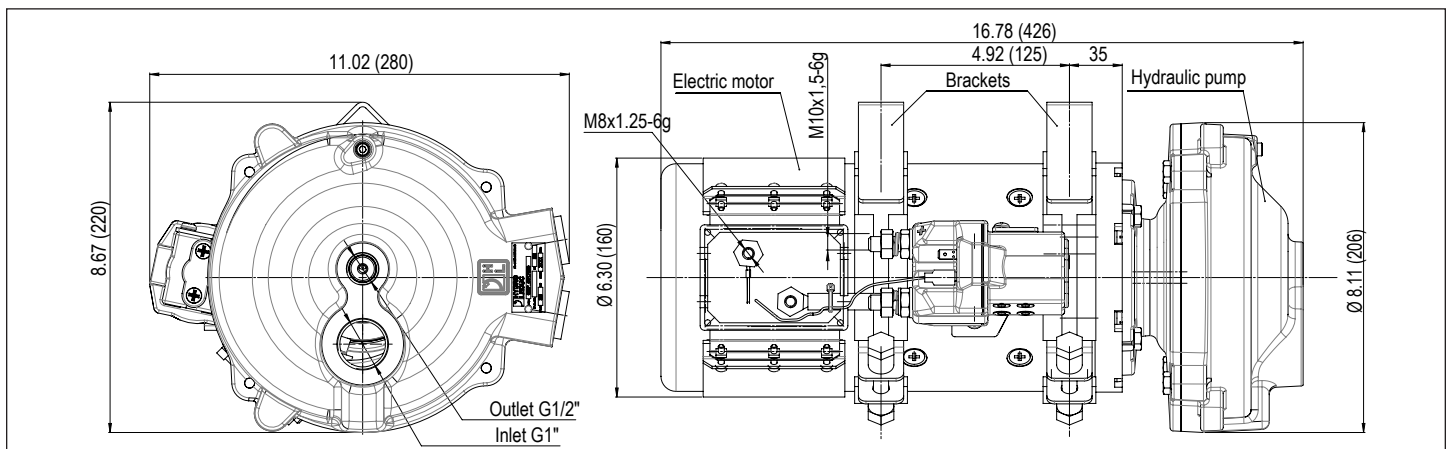
### ► Flow and current as a function of pressure



### CHARACTERISTICS

- Displacement: 0.45 cu.in/rev (7.3 cc/rev)
- Voltage: 24 Vdc
- Max. continuous power: 6.7 HP (5000 W)
- Max. peak power: 7.4 HP (5500 W)
- Weight: 81.57 lbs (37 kg)
- Protection class of the electric motor: IP 54

### ► Dimensions in inches (mm).





# The LEDUC range

## PISTON PUMPS FOR TRUCKS



HYDRO LEDUC offers 3 types of piston pumps perfectly suited to all truck and PTO-mount applications.

- Fixed displacement from 0.73 to 7.93 cu.in/rev (12 to 130 cc/rev)
- Fixed displacement, twin-flow, from 2x 1.53 to 4.58 cu.in (2x25 to 2x75 cc/rev)
- Variable displacement, with LS control (load sensing) from 2.44 to 9.15 cu.in/rev (40 to 150 cc/rev).

## MOBILE & INDUSTRIAL PUMPS



The W range is composed of fixed displacement pumps, and the DELTA range, of variable displacement pumps. These pumps can operate at high pressures within minimal size.

### ► W and WA (SAE)\* pumps:

- Fixed displac. from 0.73 to 7.65 cu.in/rev (12 to 125 cc/rev)
- ISO 3019/2 or SAE flanges.
- DIN 5480 or SAE shafts.

### ► DELTA pumps:

- Variable displac. from 2.44 to 5.61 cu.in/rev (40 to 92 cc/rev)
- SAE shafts and flanges.

\* For SAE version, please ask.

## HYDRAULIC MOTORS



Fixed and variable displacement piston motors

- Models from 0.31 to 15.26 cu.in/rev (5 to 250 cc/rev).
- Available in DIN and SAE versions
- In fixed displacement, special drainless motor.





*Complete catalogue available at [www.hydroleduc.com](http://www.hydroleduc.com)*

## HYDROPNEUMATIC ACCUMULATORS

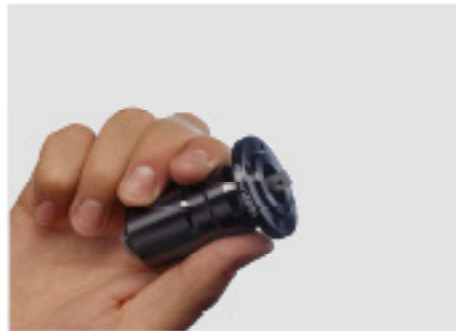


Diaphragm, bladder, bladder-diaphragm and piston accumulators.

Capacities from 0.005 to 13.21 gallons (0.02 to 50 liters).

- Operating pressure up to 5800 psi 400 bar
- Accessories for use with hydraulic accumulators.

## 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.

HYDRO LEDUC offers complete, original and reliable solutions for even the most difficult environments, and within the smallest size envelopes.

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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*make it simple*

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HYDRO LEDUC

SAS au capital de 4 065 000 €

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