Hydraulic piston pumps

PA
PAC
PAD

Series

HYDRO LEDUC

TOHLO®

Contents

A complete range dedicated to truck hydraulics

XP Serie

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

XA SAE Series

The SAE version of XP bent axis pumps.
Literature on request or on our website: www.hydroleduc.com

TXV Series

Variable displacement pumps with flow and pressure regulation (Load Sensing), perfectly suited to truck hydraulics, extremely compact in size .
Displacement from 40 to 150 cc/rev.
Literature on request or on our website: www.hydroleduc.com

HYDRO LEDUC

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Design of PA-PAC-PAD series pumps

Of unique design, the PA-PAC-PAD 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 (patented) way the pumping elements are arranged means the pumps can rotate either clockwise or anti-clockwise without any user intervention.

As all LEDUC truck pumps, 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 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.
- square seal between pump and PTO to reinforce liaison between pump and PTO (instead of paper seal).

In short, the PA-PAC-PAD pumps are:
- simple to use;
- capable of withstanding difficult conditions:
  - pressure peaks;
  - slightly degraded fluids.
- and offer an economic solution for twin-flow requirements.

Dual direction of rotation

High output pressure:
350 bar continuous pressure
500 bar peak pressure

Simple and robust design

The PA-PAC-PAD pump series comprises three ranges, all designed for truck applications at working pressures up to 350 bar continuous and 500 bar peak.

PA pumps

- single flow from 12 cc to 114 cc/rev;
- twin-flow from 2 x 32 cc to 2 x 75 cc/rev;
- two different flows: 75-40 cc/rev.

PAC pumps

Series offering the most compact size envelope
- single flow from 25 to 80 cc/rev;
- twin-flow from 2 x 25 to 2 x 40 cc/rev.

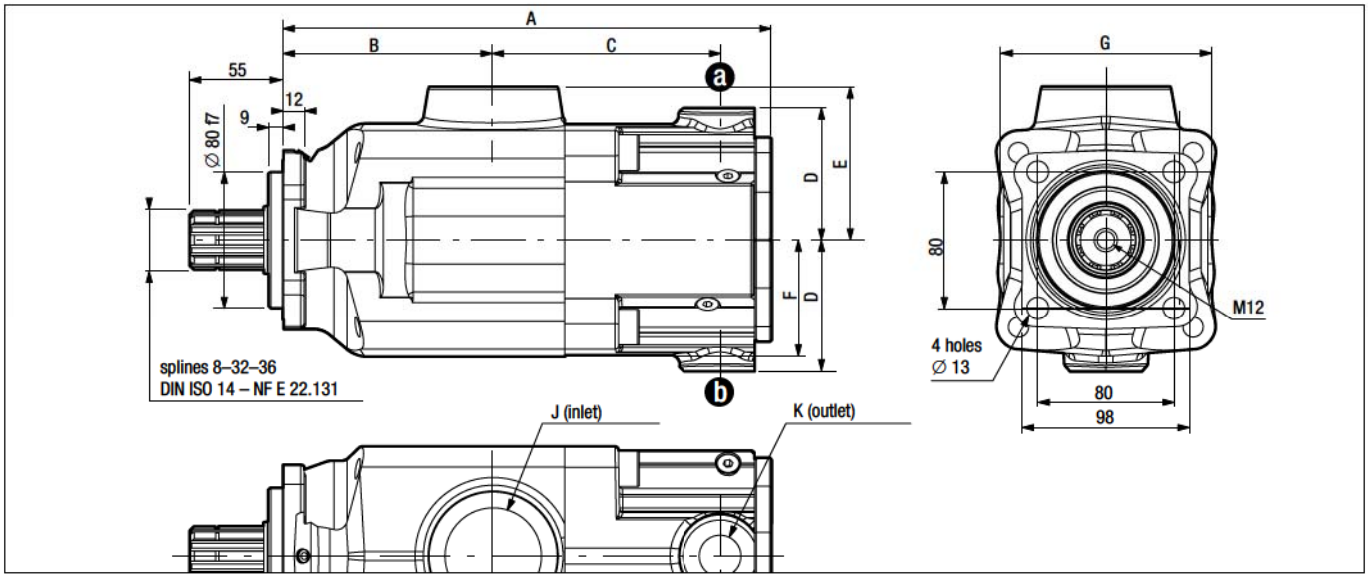
PAD pumps

New two-flow pumps, with 5 pistons for each flow, thus offering optimal flow regularity, within reduced size envelope:
- twin-flow: 2 x 32 à 2 x 67 cc/rev;
- two different flows: 55 - 33 et 67 - 40 cc/rev.

Dual direction of rotation

High output pressure:
350 bar continuous pressure
500 bar peak pressure

Simple and robust design

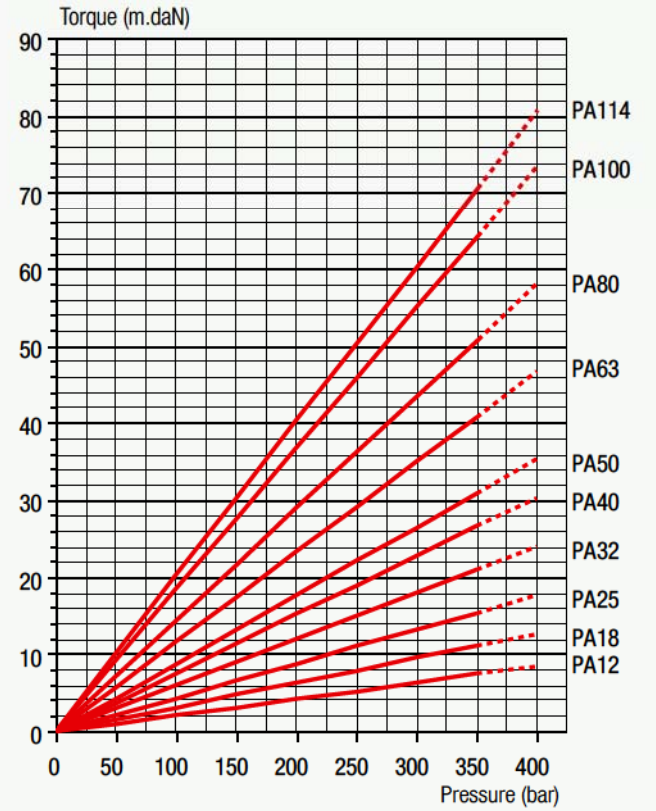


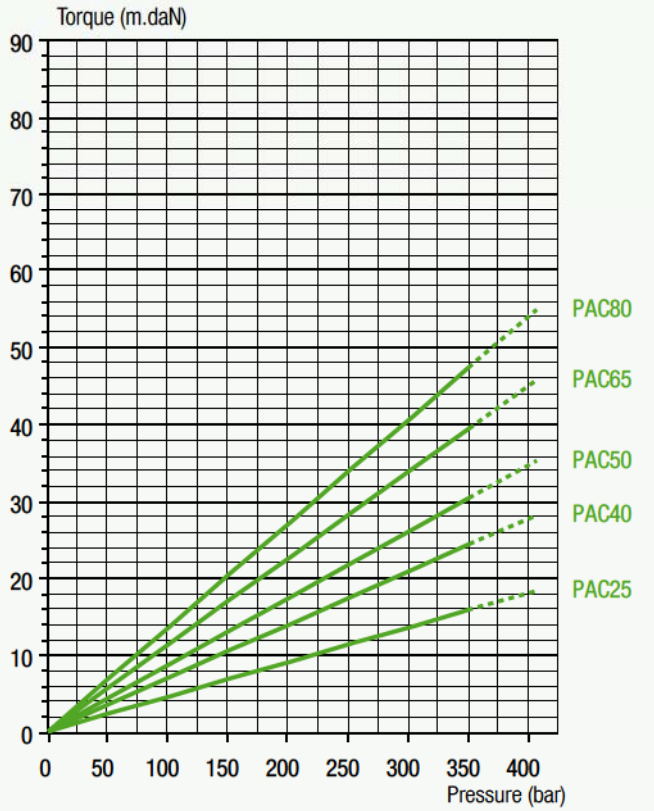
Pump reference		Displac. cc a	Displac. cc b	A	B	C	D	E	F	G	J	K	Weight kg
Single flow													
PA 12	0511445	12	-	226	94.9	103.3	62	73.2	54	98	G 1"1/2	G 3/4"	12.5
PA 18	0511450	18	-	226	94.9	103.3	62	73.2	54	98	G 1"1/2	G 3/4"	12.5
PA 25	0511510	25	-	261	102	126	47	78	64	107	G 1"1/2	G 3/4"	15
PA 32	0511515	34	-	261	102	126	47	78	64	107	G 1"1/2	G 3/4"	15
PA 40	0511520	43	-	261	102	126	47	78	64	107	G 1"1/2	G 3/4"	15
PA 50	0511525	50	-	261	102	126	47	78	64	107	G 1"1/2	G 3/4"	15
PA 63	0511530	66	-	290	123	138.8	69	90	69	124	G 2"	G 3/4"	23.5
PA 80	0511535	82	-	290	123	138.8	69	90	69	124	G 2"	G 3/4"	23.5
PA 100	0511565	104	-	290	123	138.8	69	90	69	124	G 2"	G 3/4"	23.5
PA 114	0511570	114	-	290	123	138.8	69	90	69	124	G 2"	G 3/4"	23.5
PAC 25	0511470	26	-	226	94.9	103.3	62	73.2	54	98	G 1"1/2	G 3/4"	12.5
PAC 40	0511460	40	-	226	94.9	103.3	62	73.2	54	98	G 1"1/2	G 3/4"	12.5
PAC 50	0511465	50	-	226	94.9	103.3	62	73.2	54	98	G 1"1/2	G 3/4"	12.5
PAC 65	0511490	65	-	243	102.5	112.8	63	78	65	107	G 1"1/2	G 3/4"	16
PAC 80	0511705	78	-	247	102.5	116.3	63	78	65	107	G 1"1/2	G 3/4"	17
Twin-flow													
PA2 32	0511545	32	32	290	123	138.8	69	90	69	124	G 2"	G 3/4"	23.5
PA2 40	0511550	39	39	290	123	138.8	69	90	69	124	G 2"	G 3/4"	23.5
PA2 50	0511555	52	52	290	123	138.8	69	90	69	124	G 2"	G 3/4"	23.5
PA2 57	0511560	57	57	290	123	138.8	69	90	69	124	G 2"	G 3/4"	23.5
PA2 75	0516100	75	75	302	126	147.8	72.5	90	72.5	135	G 2"	G 3/4"	26.8
PAC2 25	0511480	25	25	243	102.5	112.8	63	78	65	107	G 1"1/2	G 3/4"	16
PAC2 32	0511485	32	32	243	102.5	112.8	63	78	65	107	G 1"1/2	G 3/4"	16
PAC2 40	0511710	39	39	247	102.5	116.3	63	78	65	107	G 1"1/2	G 3/4"	17
Two different flows													
PA 75-40	0516810	75	40	302	126	147.8	72.5	90	72.5	135	G 2"	G 3/4"	27.4
2 x 5 piston													
PAD 2 x 32	0521240	32	32	287	123	133.8	77.5	90	69	124	G 2"	G 3/4"	24.6
PAD 2 x 40	0521230	40	40	287	123	133.8	77.5	90	69	124	G 2"	G 3/4"	24.6
PAD 2 x 55	0521210	55	55	287	123	133.8	77.5	90	69	124	G 2"	G 3/4"	24.6
PAD 2 x 67	0518270	67	67	287	123	133.8	77.5	90	69	124	G 2"	G 3/4"	24.6
PAD 55-33	0521250	55	33	287	123	133.8	77.5	90	69	124	G 2"	G 3/4"	24.6
PAD 67-40	0518290	67	40	287	123	133.8	77.5	90	69	124	G 2"	G 3/4"	24.6

Rotation speed: see graphs on page 5.

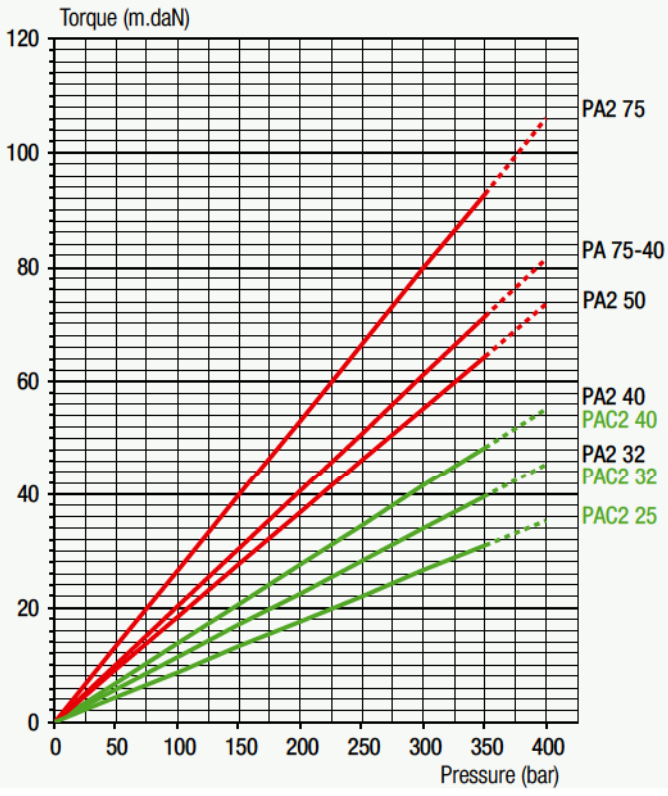
Torque absorbed as a function of pump output pressure

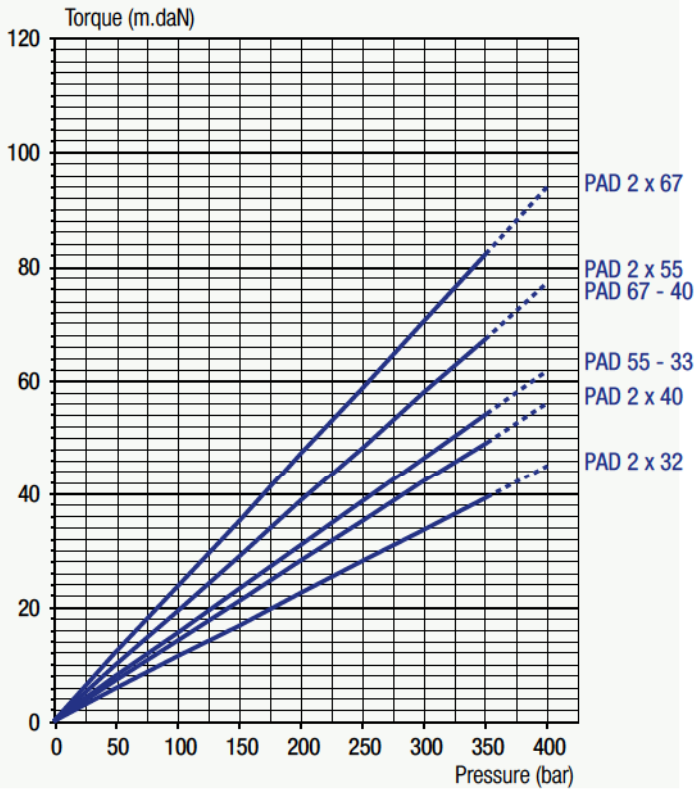
Single flow models





Twin-flow models





Calculating power as a function of torque

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

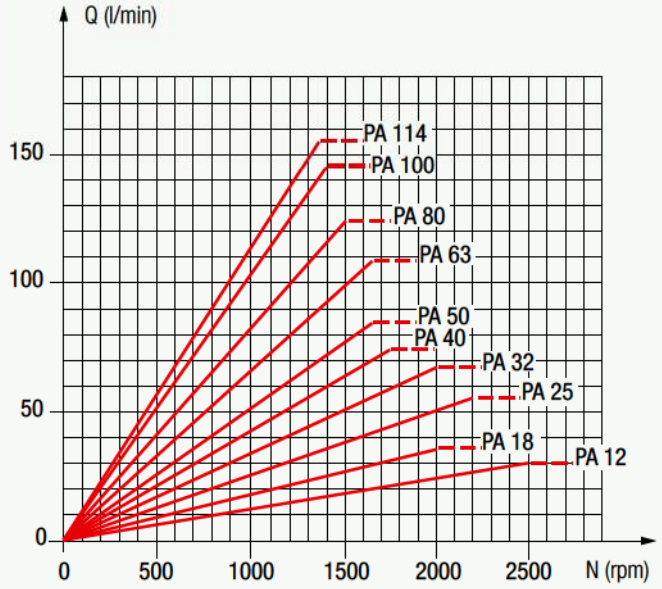
$$\omega = \frac{\pi N}{30} \qquad \mathcal{P}(kW) = \frac{\Delta P \times Q}{600}$$

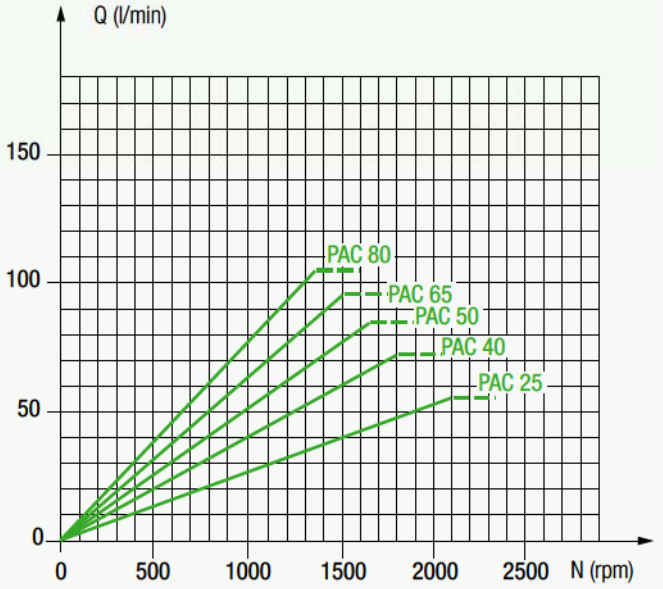
where :

$\mathcal{P}$ = theoretical hydraulic power
C = torque
N = rotating speed in rpm
P = service pressure in bar
Q = flow in *l*/min

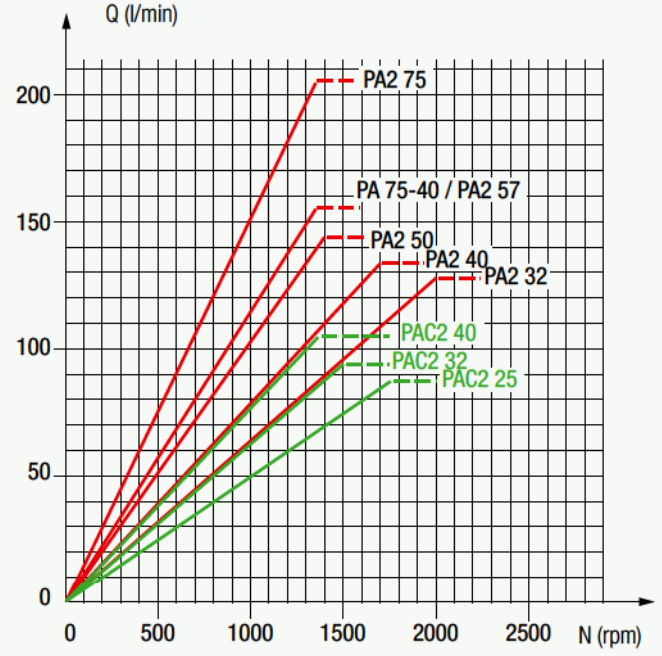
Flow

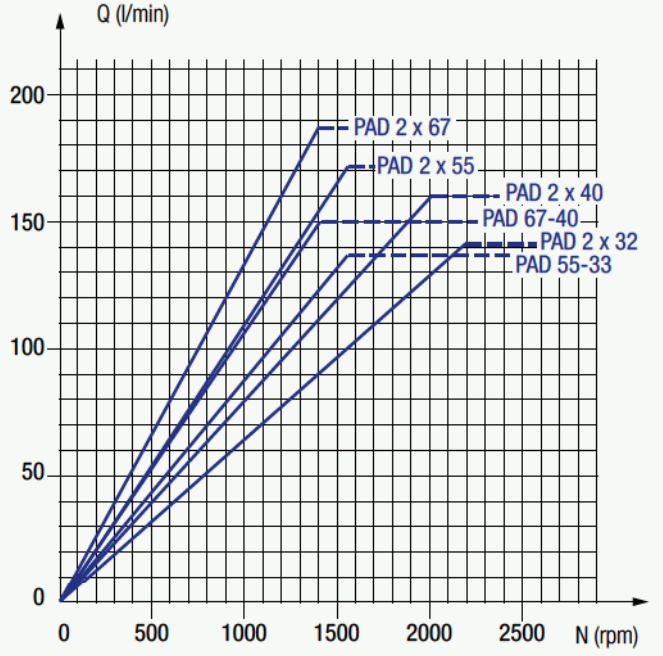
Single flow models





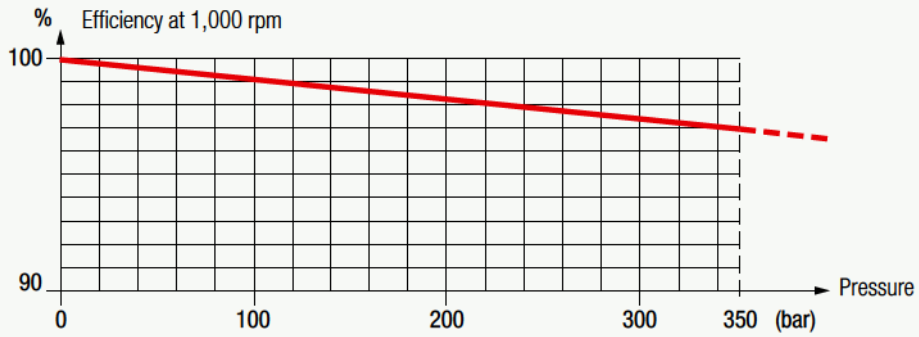
Twin-flow models





Volumetric efficiency

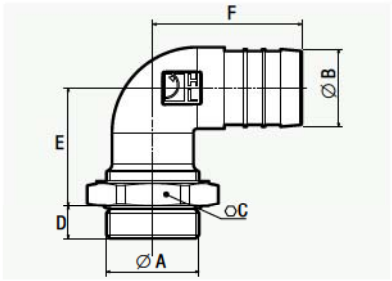
These graphs are the results of test-work done in the HL R&D laboratory, on a specific test bench, with an ISO 46 fluid at 77°F/25°C (100 cSt), the pump is fitted with a 2" HL inlet fitting, hosing is 13 feet (4 metres) long, and tank situated slightly above pump.



Inlet fittings for PA-PAC-PAD pumps

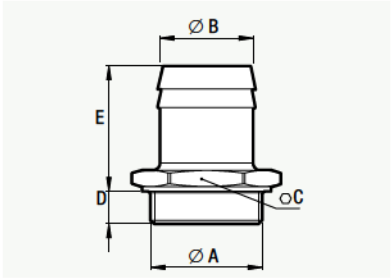
90° elbow fittings, swivel

Reference	A	∅ B	C	D	E	F	Pump types
240131	G 1"½	40	60	17	61	77	PA and PAC
240133	G 1"½	50	60	17	65	82	PA and PAC
240135	G 2"	50	70	17	65	82	PA, PAC and PAD



Straight fittings

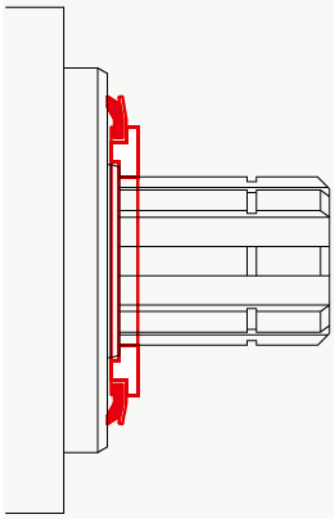
Reference	A	∅ B	C	D	E	Pump types
240182	G 1"½	40	56	14	54	PA and PAC
240067	G 1"½	50	52	14	66	PA and PAC
240066	G 1"½	60	64	14	69	PA and PAC
240186	G 1"½	63.5	64	14	69	PA and PAC
240183	G 2"	50	66	14	54	PA, PAC and PAD
240170	G 2"	60	66	14	72	PA, PAC and PAD
240201	G 1"½	76.2	80	14	89	PA, PAC



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 crankshaft drive installations.

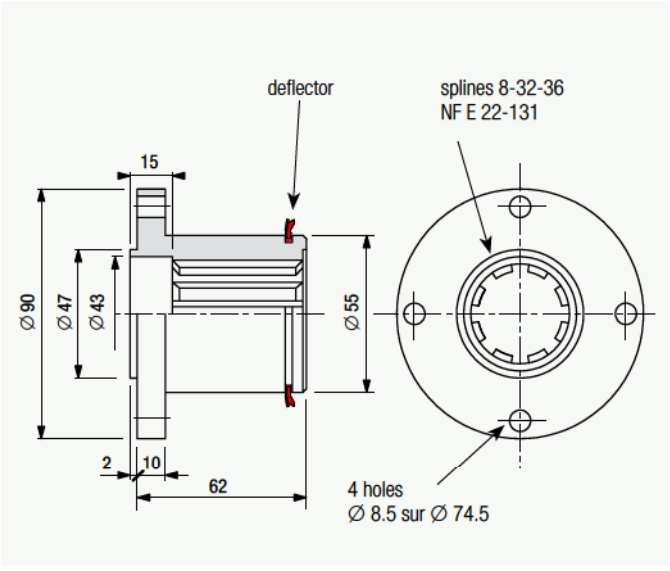
Reference: **DEF 054111**



Cardan plate

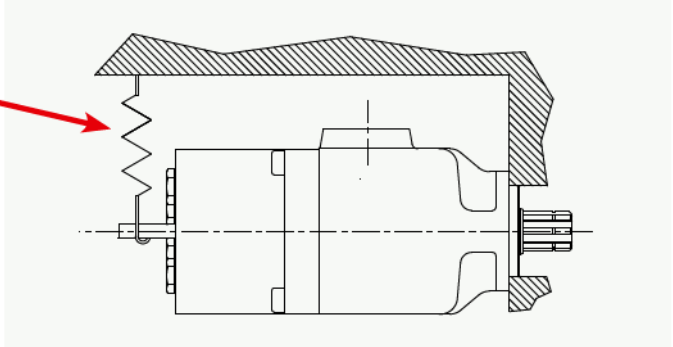
The PLT 056315 cardan plate enables the pump shaft to be connected to a cardan shaft with interface as on drawing on the right.

Reference: **PLT 056315**



Elastic support device

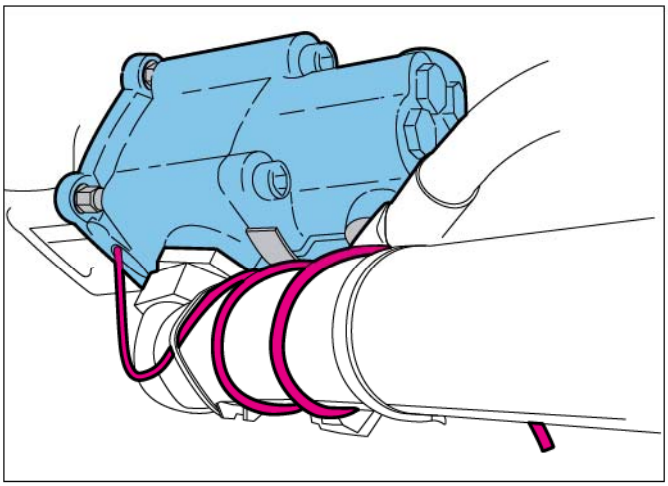
For PA 2X75 and PA 75-40 pumps, we recommend using an elastic support device.



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

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

Example of tube attachment



Recommendations for attaching the protective tube:

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

Avoid:

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

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 via a frontal square section ring seal ensuring metal to metal contact between pump and PTO.

Make sure your pump lives a long happy life !

The tank:

Generally, hydraulic pumps much prefer a tank above the pump.
LEDUC pumps can also operate with oil level beneath the pump, for further information on such installations, please contact our Technical Department.
Correct inlet conditions are between 0.8 to 2 bar absolute pressure.

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

Hosing:

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

Filtration:

HYDRO LEDUC recommends using a very clean tank, filtered during filling and with filter on air vent.
The pump supply line must be cleaned (decontaminated) and the return line should be filtered as follows:
- for relatively simple circuits (e.g. tippers): use a 20 micron filter on pump return line.
- for more complex circuits (e.g. cranes):

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

The fluid:

Use a mineral hydraulic oil with viscosity between 10 and 400 cSt. It is in this viscosity range that the pumps keep their volumetric characteristics. If you wish to use other fluids, please consult our Technical Department.
Maximum temperature of fluid in the pump should not exceed 100°C.

Drive and assembly recommendations:

For PTO mount applications, be careful to respect the tightening recommendations in terms of pump onto PTO and PTO onto vehicle gearbox.
PA-PAC-PAD pumps are not designed to withstand any axial load on the pump shaft. Check your installation conforms to this requirement.

Preparation of the pump:

PA, PAC and PAD pumps rotate either clockwise or anti-clockwise (no user intervention necessary).
Before start-up, the pumps should preferably be filled with oil.

Start-up:

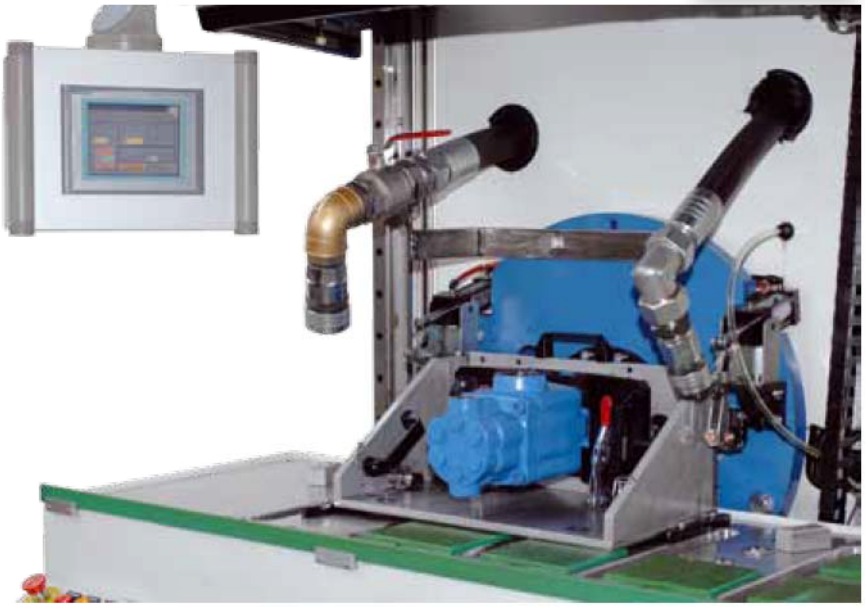
- open the supply valve if there is one;
- check the valve is in “back to tank” position;
- partially unscrew the output fitting;
- start up at low speed, or by successive starts/stops;
- retighten the output connector as soon as air bubbles have disappeared;
- let the pump run for one to two minutes,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

Maintenance:

Some regular checks are necessary, namely:
- tightening of pump to PTO;
- cleanliness of fluid;
- state of filter;

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

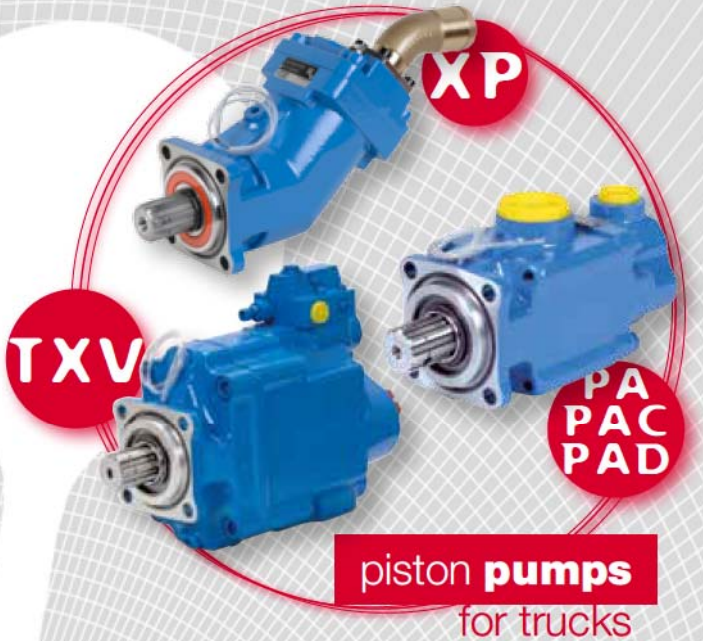
Each LEDUC pump is supplied with a leaflet with installation and start-up recommendations.



other product lines

hydraulic **motors**

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



piston **pumps** for trucks

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

mobile and industrial **pumps**

Fixed displacement pumps, the W series, and variable displacement pumps, the DELTA series. High pressure capabilities within minimal size.
W series: flanges to ISO 3019/2, shafts to DIN 5480.
DELTA series: SAE shafts and flanges.

micro-hydraulics

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

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

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

hydro-pneumatic **accumulators**

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

we are passionate about hydraulics...

HYDRO LEDUC

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

a passion for hydraulics

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HYDRO LEDUC

TOHO

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SAS with capital of 4 065 000 euros

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