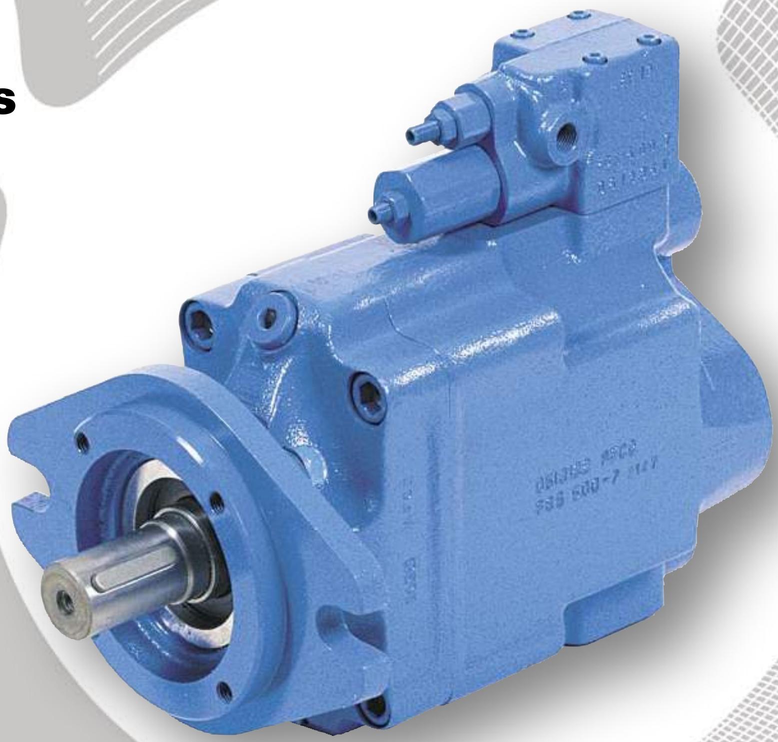
variable displacement **pumps**

DELTA SAE

for **industrial applications**



HYDRO LEDUC

summary

Designed for open loop hydraulic circuits, the **DELTA** range of variable displacement pumps allow optimized performance for a given application. The flow supplied by the pump is automatically regulated according to the hydraulic load. This guarantees:

- minimized energy consumption,
- minimized heating of fluid,
- reduced noise levels.

Built on 40 years know-how and experience, the **DELTA pumps** are the result of advanced development work and analysis on the needs of the hydraulic end-user.

The **DELTA pumps** satisfy the needs of the more demanding users. The pump provides:

- long service life,
- no pressure pulsations,
- low noise level,
- exceptional power to weight ratio,
- high outlet pressure,
- easy start-up thanks to good self-priming and suction characteristics.

Displacements in production include 40, 60, 75 and 92 cc/rev;
120 and 130 cc/rev can be delivered on request.

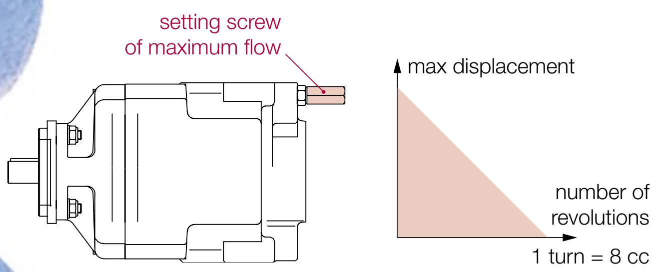
HYDRO LEDUC
Head office and factory
BP 9
F-54122 AZERAILLES
(FRANCE)
Tel. +33 (0)3 83 76 77 40
Fax +33 (0)3 83 75 21 58

pumps to be equipped with control devices

pump		direction of rotation	max displacement (cc)	maximum operating pressure (bar)	maximum peak pressure (intermittent 5%)	max operating pressure at flow cancellation (bar)	torque at 300 bar (Nm)	max speed (rpm)	weight (kg)
DELTA **40**	*0512370* *0512375*	CW CCW	40	400	420	440	220	3000	29
DELTA **60**	*0513140* *0513145*	CW CCW	60	400	420	440	295	2600	29
DELTA **75**	*0512340* *0512345*	CW CCW	75	400	420	440	410	2000	29
DELTA **92**	*0512350* *0212355*	CW CCW	92	380	400	420	483	1900	29

features of DELTA pumps

The DELTA pumps are equipped with a maximum displacement control.



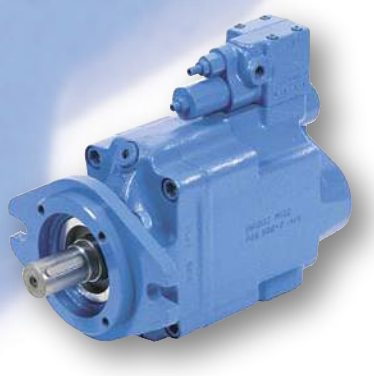
DELTA 40: can be set from 25 to 40 cc/rev
DELTA 60: can be set from 35 to 60 cc/rev
DELTA 75: can be set from 55 to 75 cc/rev
DELTA 92: can be set from 70 to 92 cc/rev

capacity to have a high speed rotation

The rotating speed of the DELTA pumps depends on:

- flow supplied by the pump,
- the fluid viscosity,
- the pressure at inlet point of the pump.

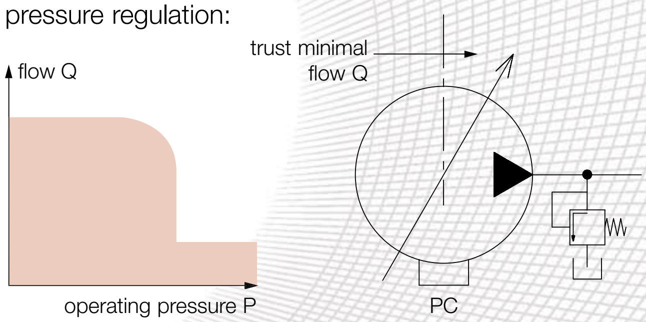
For applications at higher speeds than those indicated, please contact our Technical Department with details of these parameters, to enable us to advise what can be recommended.

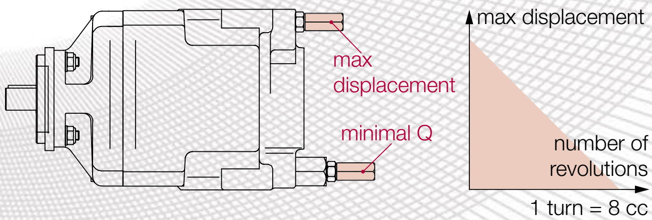


capacity to control minimum displacement

The DELTA pumps are designed to regulate flow from maximum flow to flow cancellation mode. However, some applications require a minimum outlet flow to be maintained, regardless of how flow is controlled from maximum to minimum.

Example of minimum flow control with constant pressure regulation:

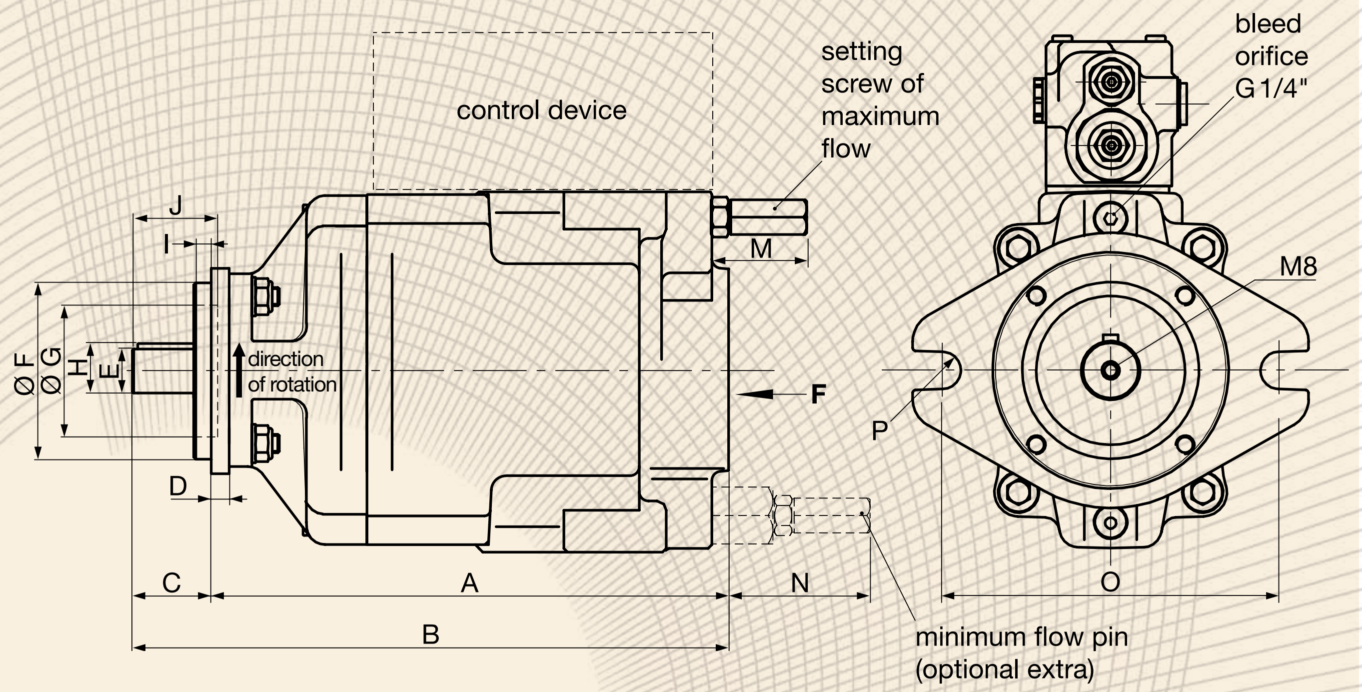




control devices

reference		designation	weight (kg)
PC	*0512590*	constant pressure	2.1
PCDM	*0512295* *0512602*	constant pressure with minimum flow control	2.6
PCD	*0512595*	remote control constant pressure	2.5
LS	*0514020*	flow-pressure regulation	2.1
LSD	*0512605*	remote control flow-pressure regulation	2.1
KCR	*0512365*	adjustable displacement kit (close-off plate+fixation screw)	0.2

pumps DELTA dimensions in mm

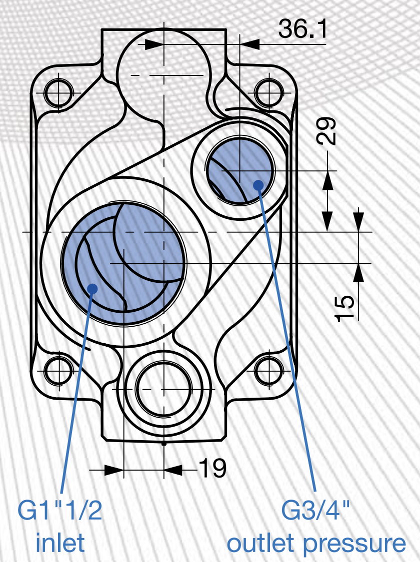


pump	dimensions (mm)													
	A	B	C	D	Ø E	Ø F	Ø G	H	I	J	M	N	O	P
DELTA **40**	282	329	47	10	25.4 h9	101.6 h8	80	28.1 JS13 (bey width 6.38h9)	9.5	46	62	97	146	R8
DELTA **60** to **92**	282	339.1	57.1	13	31.75 h8	127 h7	95	35.2 JS13 (bey width 8e9)	12.7	58.4	62	97	181	R10

For other shafts, please contact our Technical Department.

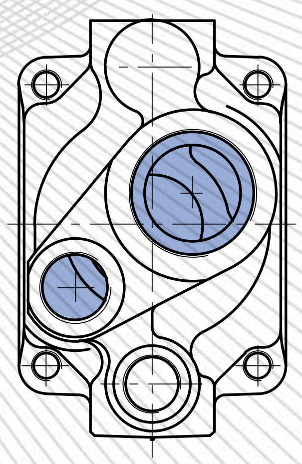
connection dimensions in mm (other port styles available)

view from **F**

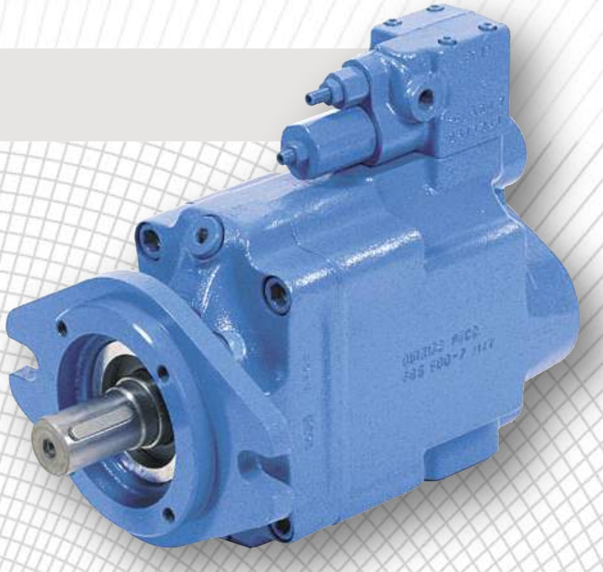


CW

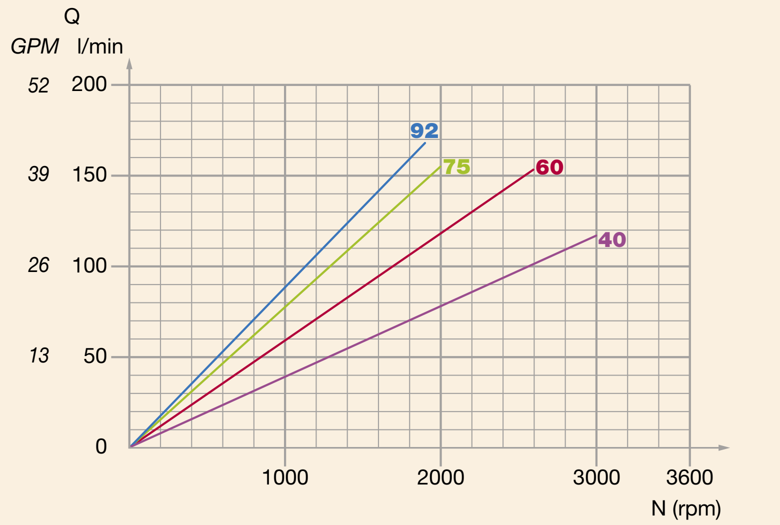
view from **F**



CCW

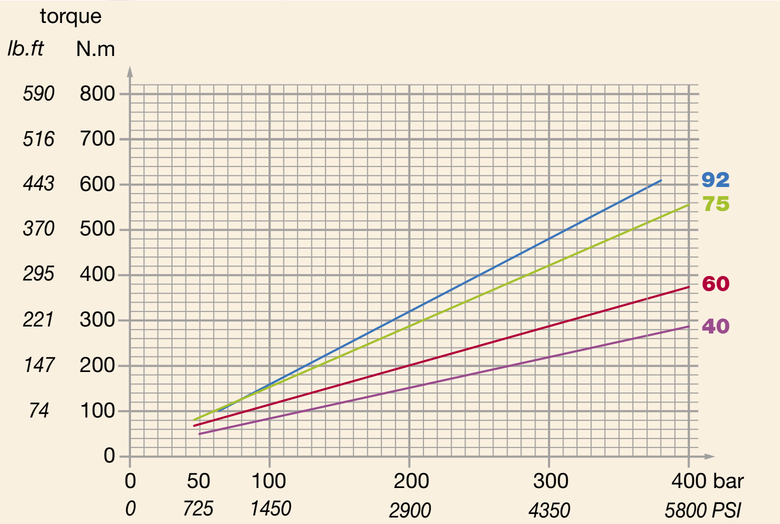


flow



Graph of flow as a function of speed and displacement of the pump.
These graphs are the results of tests carried out by the HYDRO LEDUC Research Laboratory, on a specific test bench, with ISO 46 fluid at 25°C (100 cSt), a 1” diameter supply line 5 ft long, and a tank with oil level at the same height as the pump.

required torque at maximum displacement



calculating power as a function of torque

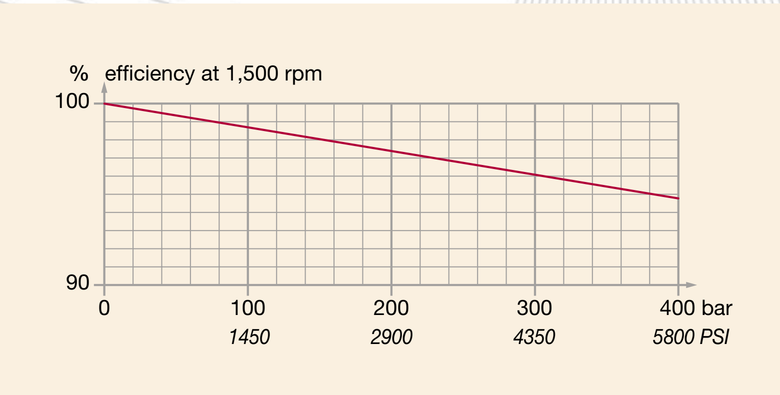
$$C = \frac{P\,(kW)}{\omega} \times 100 = m.daN$$

$$\omega = \frac{\pi N}{30}$$

$$P\,(kW) = \frac{\Delta P \times Q}{600}$$

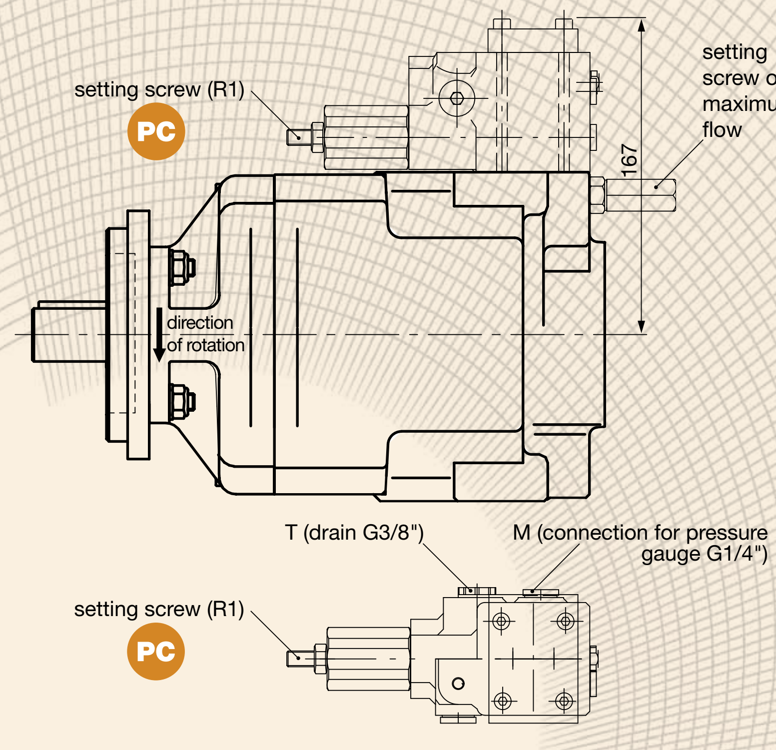
(theoretical hydraulic power) where:
N = speed in rpm
ΔP = working pressure in bar
Q = flow in l/minute

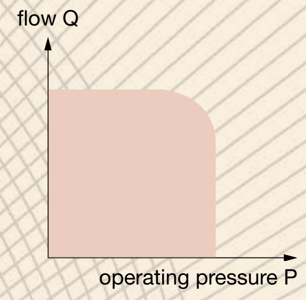
volumetric efficiency

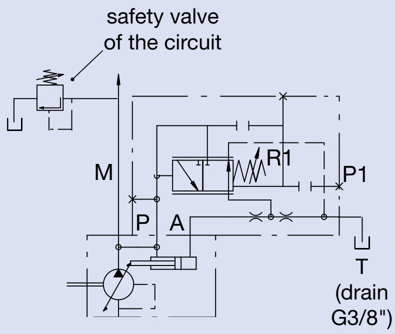


Viscosity 100 cSt,
inlet at air pressure.

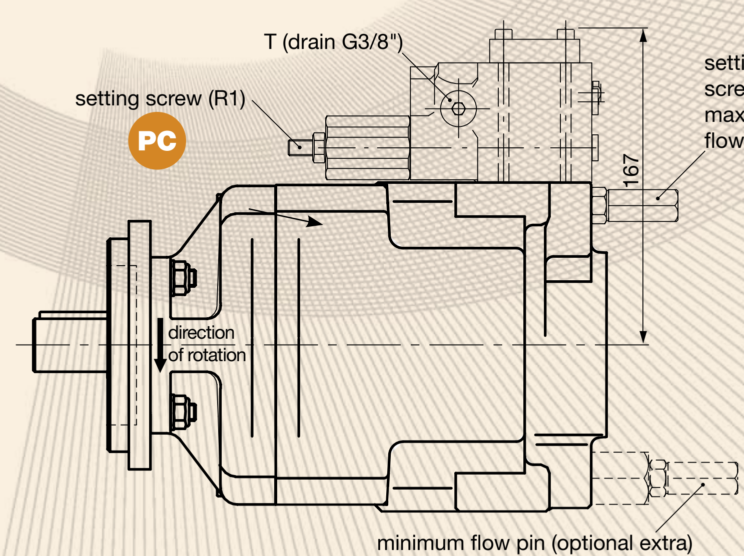
PC - constant pressure



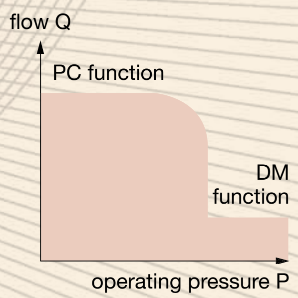


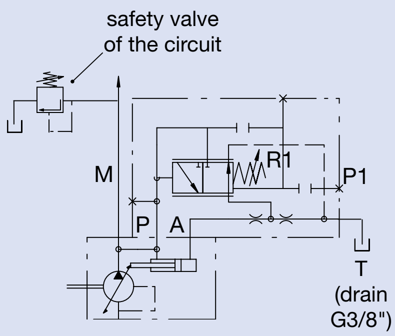


PCDM - constant pressure with minimum flow control

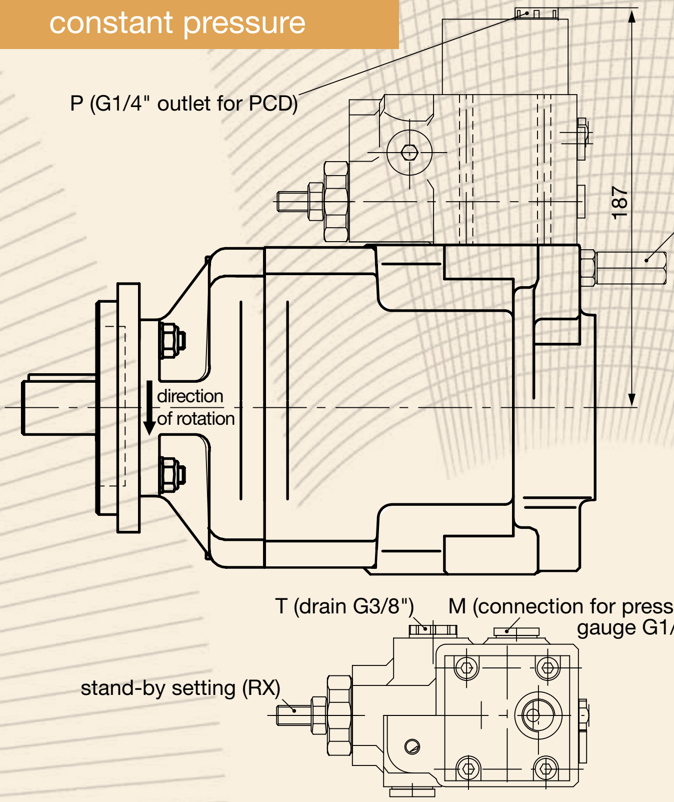


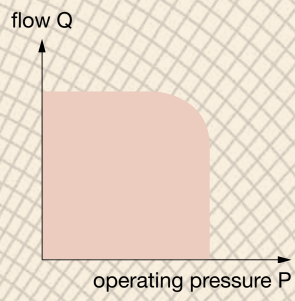
(the tightening of the setting screw increases the minimum flow)

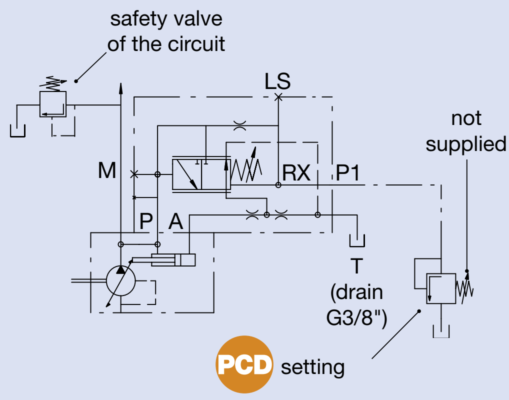




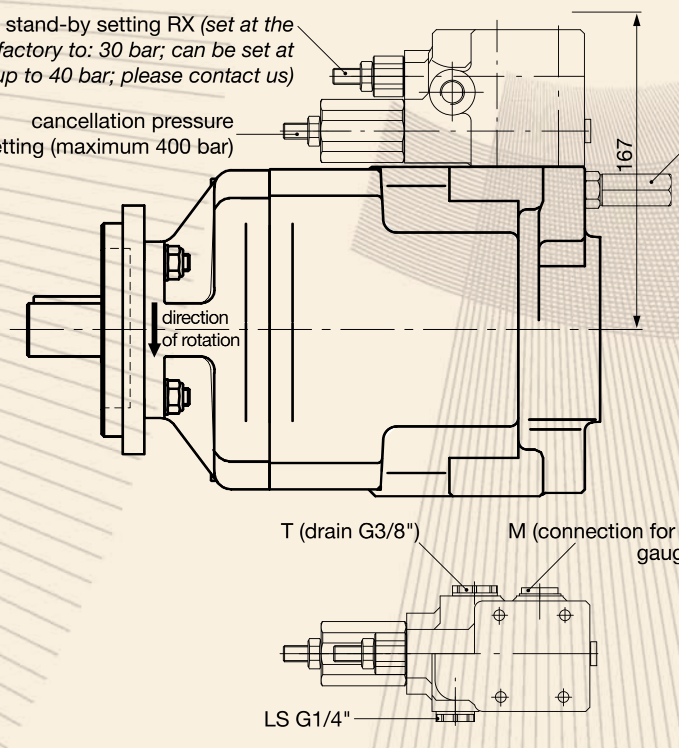
PCD - remote control constant pressure

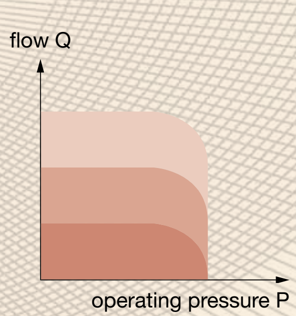


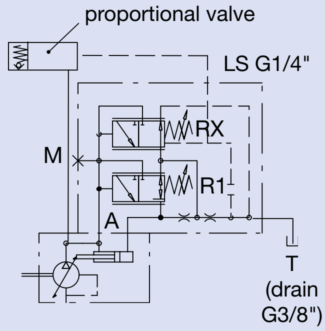




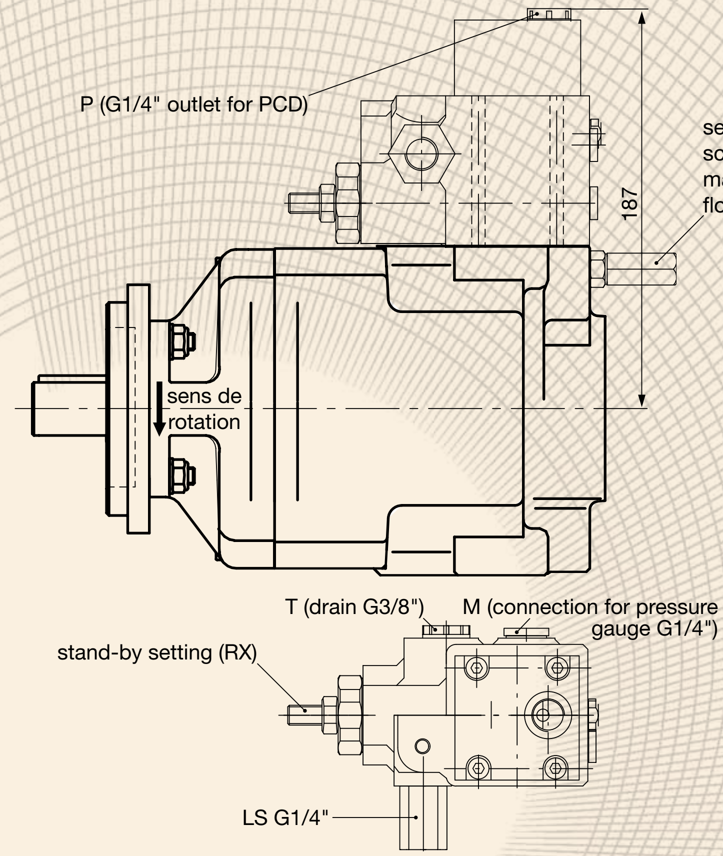
LS - flow-pressure regulation

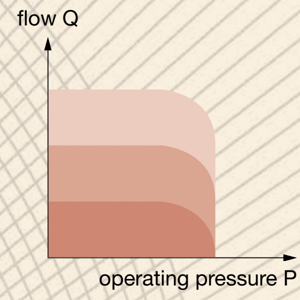




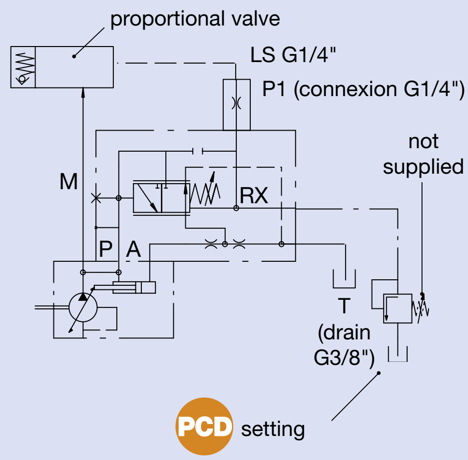


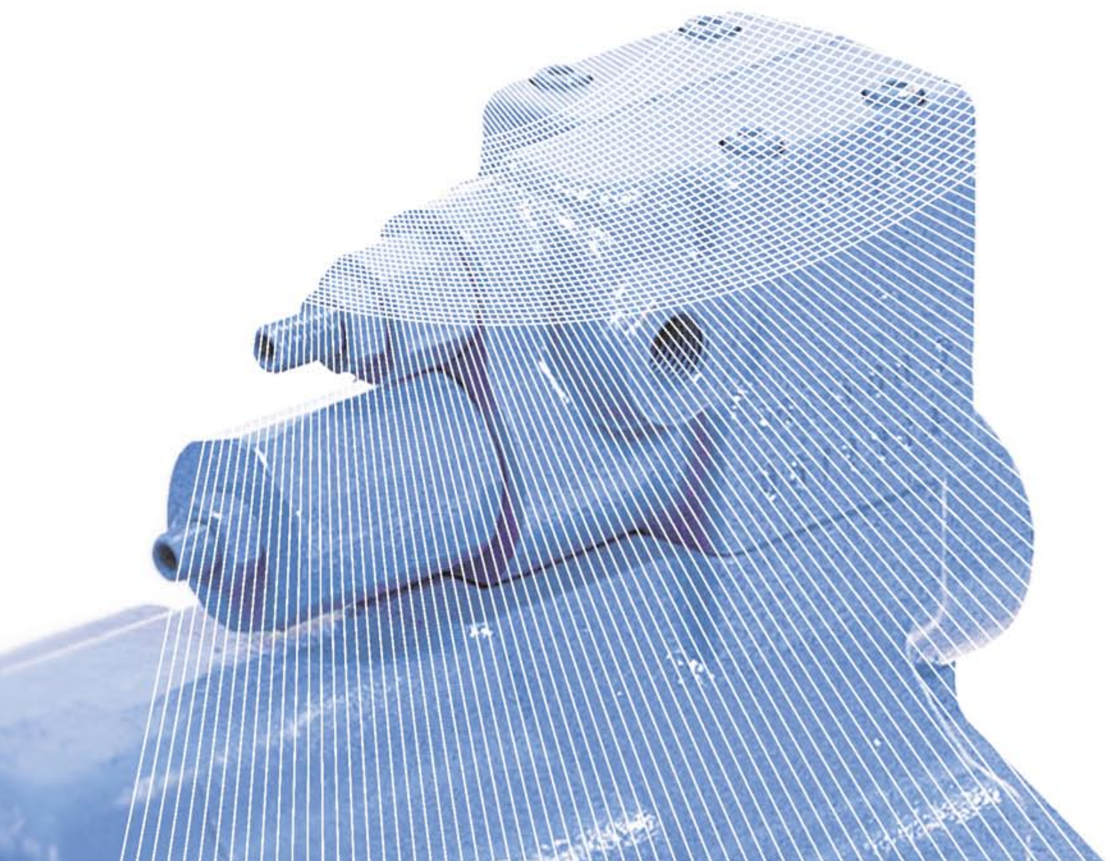
LSD - remote control flow-pressure regulation





Example: safety valve at 330 bar, PCD: 300 bar.





constant pressure: PC

The pressure control maintains constant pressure in the hydraulic system.
As soon as pressure reaches the level set on the control, the flow of the pump automatically regulates itself according to what the application requires. This minimizes system heat and energy for those applications requiring pressure to be held constant.
Examples:
- hydraulic press,
- compression mold,
- manufacturing of composites…

remote control constant pressure: PCD

This allows to control the pressure setting according to the requirements of the different devices within the circuit.
Examples:
- control of a cylinder under maximum pressure of 300 bar,
- control of a hydraulic motor at 200 bar.

constant pressure with minimum flow control: PCDM

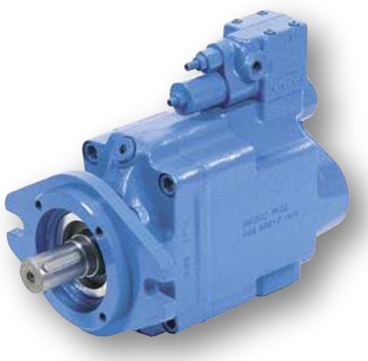
(can also be remote PCD-DM)

This is used in every case where the reduction of the main flow must still allow the flow of a separate device.

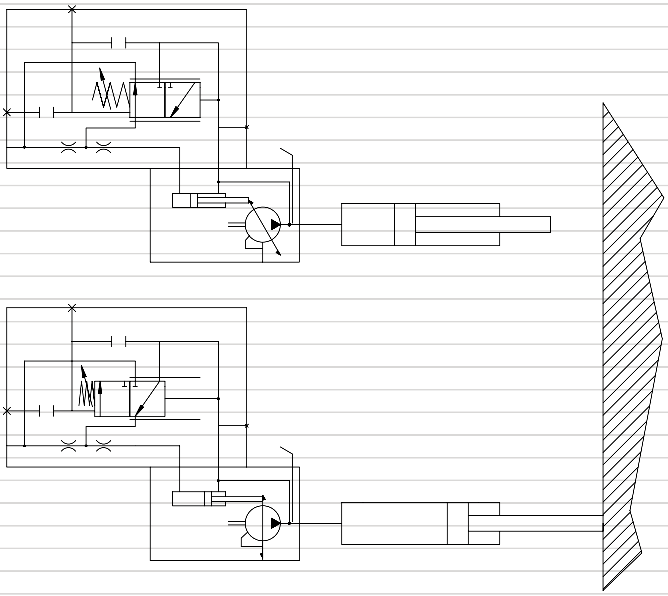
flow–pressure control (LS: Load-Sensing)

This control device (LS) enables the flow and the maximum output pressure of the pump to be controlled continuously.
From this, it is easy to imagine all possible combinations:
- large flow and small pressure,
- high pressure and small flow.

This type of control can be fitted with remote control to control pressure and flow.



principle of pressure control

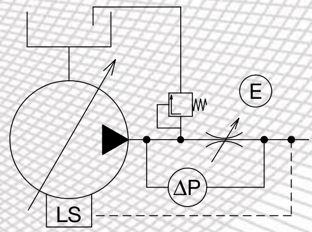


principle of flow-pressure control

The flow of the pump Q through the application E must ensure a constant ΔP set at 20 to 30 bar.
This ΔP is proportional to:

$$\frac{Q2}{S2} \qquad \cancel{so}\ \Delta P = f\left(\frac{Q2}{S2}\right)$$

Each time the ΔP varies due to a change at E, the pump will vary its flow Q to suit and to ensure:
ΔP = constant.
E can be:
- a flow control,
- a proportional valve,
- a simple restriction device.



Important note!
unless otherwise specified by customer, **constant pressure is set at 1450 PSI** (100 bar), **stand-by is set at 435 PSI** (30 bar)

inlet

Recommended inlet pressure: up to 4 bar maximum. Accepted negative pressure: 0.2 bar maximum.

output

Pumps capable of 400 bar with pressure peaks up to 420 bar.

drainage

Maximum pressure of 0.5 bar above the inlet pressure of the pump.

fluid

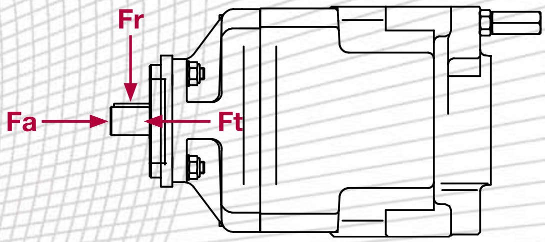
Mineral based hydraulic fluid (for other fluids, please contact us). Recommended viscosity: from 15 to 400 cSt. Minimum viscosity: 10 cSt. Maximum viscosity: not to exceed 1000 cSt.

filtration

The good operation of DELTA pumps depends on the cleanliness quality of fluid. HYDRO LEDUC recommends: class 9 according to NAS 1638, class 6 according to SAE or 18/15 to ISO/DIS standard 4406.

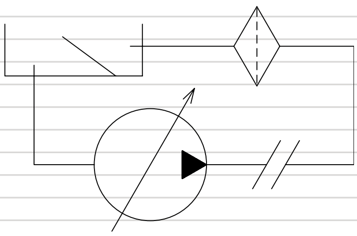
force on pump shaft

Fr: maximum acceptable force = 675 lbf (3000 N),
Ft: acceptable force = 340 lbf (1500 N),
Fa: acceptable force = 23 lbf/bar (100 N/bar)*.
**output pressure in the pump.*

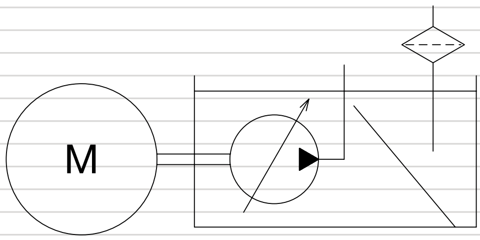


mounting positions

Tank above pump (gravity-fed):
- inlet to guarantee an inlet speed of 3 ft/sec (1 m/s) if possible (6 ft/sec maximum),
- avoid pressure drop on inlet.

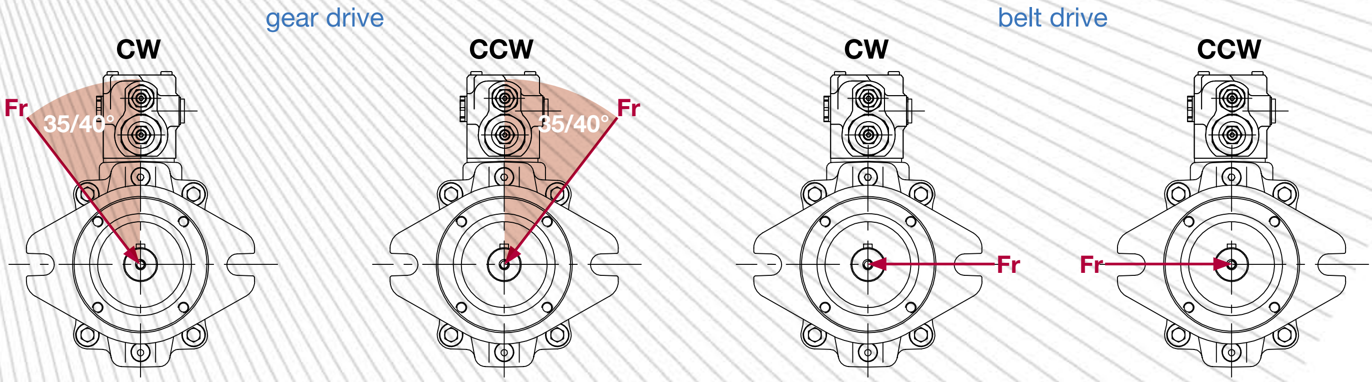


Pump submerged in oil:
- in every case, opt for filter on fluid return line.



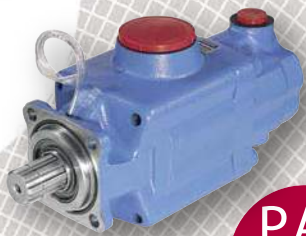
The DELTA pumps are designed to operate any orientation.
However, the positions shown below are preferable.

optimization of the transmission of power to the shaft of the pump



inne serie produktów

X XA



PA PAC

TXV

pompy tłoczkowe do pojazdów

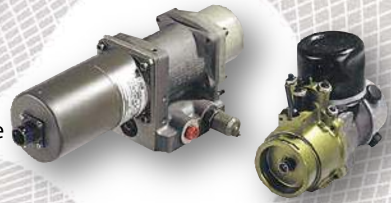
HYDRO LEDUC oferuje 3 typy pomp tłoczkowych przeznaczonych do ciężarówek, pojazdów budowlanych i wszystkich zastosowań z przystawkami odbioru mocy.

MXR MX M

silniki hydrauliczne tłoczkowe

Silniki hydrauliczne tłoczkowe o stałej wydajności w technologii skośnego wału. Modele od 18 do 130 cm^3, dostępne w wersjach DIN i SAE.

mikrohydraulika



Oto pole wyjątkowego know-how firmy HYDRO LEDUC:

- pompy tłoczkowe osiowe i promieniowe o stałej i zmiennej wydajności,
- mikrosilniki hydrauliczne tłoczkowe
- jednostki mikrohydrauliczne zawierjące pompy, silniki elektryczne, zawory, sterowanie, etc.

Użytkownikom układów hydraulicznych, które muszą zmieścić się w bardzo małych przestrzeniach, HYDRO LEDUC oferuje kompletne, oryginalne i trwałe rozwiązania dla najbardziej wymagających środowisk.

akumulatory hydrauliczne

Hydroakumulatory pęcherzowe, membranowe, tłokowe, sferyczne i cylindryczne - skręcane i spawane.
Objętości od 20 cl do 50 litrów.
Ciśnienia do 500 bar.
Akcesoria do montażu i sprawdzania hydroakumulatorów.

jesteśmy pasjonatami hydrauliki siłowej...

HYDRO LEDUC

Własny dział badawczo-rozwojowy sprawia, że HYDRO LEDUC jest w stanie zaoferować produkty, które sprostają wysokim wymaganiom klientów. Ścisła współpraca z zespołami decyzyjnymi swoich klientów sprawia, że HYDRO LEDUC optymalizuje rozwiązania w oparciu o przedstawione specyfikacje.

Polskim partnerem HYDRO LEDUC w zakresie hydrauliki siłowej dla przemysłu jest HEKTOS Sławomir Pokraka
www.hektos.eu

a passion for hydraulics

HYDRO LEDUC

HYDRO LEDUC
Head office and factory
BP 9 F-54122 AZERAILLES (FRANCE)
Tel. +33 (0)3 83 76 77 40
Fax +33 (0)3 83 75 21 58

HYDRO LEDUC GmbH
Haselwander Str. 5
D-77746 SCHUTTERWALD (DEUTSCHLAND)
Tel. +49 (0) 781-9482590
Fax +49 (0) 781-9482592

HYDRO LEDUC L.P.
14515 Briar Hills Parkway - Suite 116
HOUSTON, TEXAS 77077 (USA)
Tel. +1 281 679 9654
Fax +1 281 596 0903

HEKTOS hydraulika przemysłowa industrial hydraulics
HEKTOS Sławomir Pokraka
Wojska Polskiego 36
08-440 Pilawa - Polska
Tel. 48 / 022 2035079
Fax 49 / 022 2035080

www.hektos.eu
info@hektos.eu

HYDRO LEDUC

SAS with capital of 4 065 000 euros

Siret 319 027 421 00019

RC Nancy B 319 027 421

mail@hydroleduc.com