Variable Displacement Axial Piston Pump

TH-A10VO

Series **52/53**

TECH HYDRO

Power. Precision. Performance.

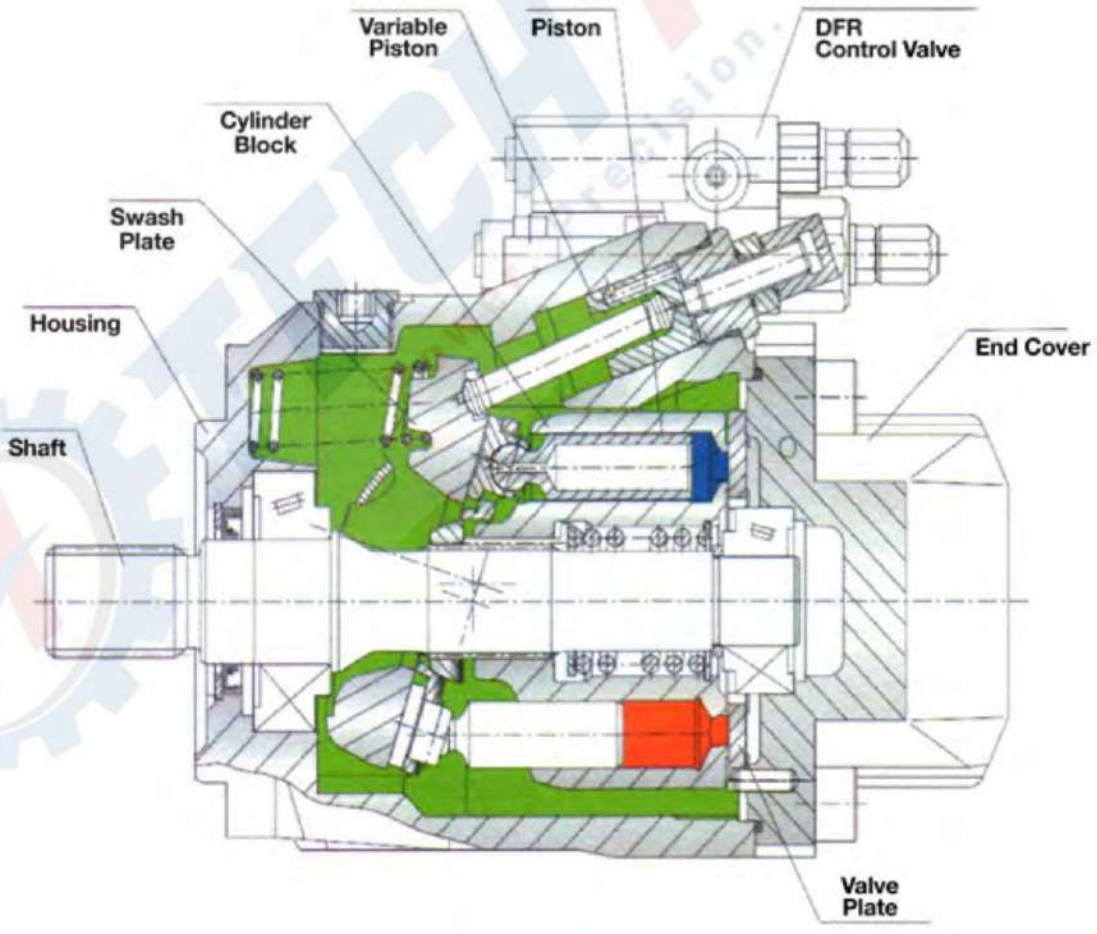
Contents

TH-A10VO Series 52

Features

Axial piston pump MA10VO is a swashplate design and is used in open loop circuits. Flow is proportional to drive speed and displacement. By adjusting the position of the swashplate, it is possible to smoothly vary the output flow of the pump.

- Flange connections available in SAE or Metric
- Two case drain ports
- Operating pressure of 3625 psi (250 bar)
- Good suction characteristics
- Low noise level
- High power/weight ratio
- Long service life
- Quick response times
- Axial and radial loading of drive shaft is possible
- Wide range of controls
- Through-drive options available for multi-circuit systems



TH-A10VO Series 52

Technical Data

1. Input operating pressure range
   Absolute pressure at port S (A)
   P_{abs} min.....11.6 psi (0.8 bar)
   P_{abs} max.....435 psi (30 bar)
2. Output operating pressure range
   Pressure at port B
   Nominal pressure P_N.....3625 psi (250 bar)
   Peak pressure P_{max}.....4500 psi (315 bar)
3. Case drain pressure
   Maximum pressure of leakage fluid (at ports L, L1 is 7 psi (0.5 bar) higher than input pressure at port S, but not higher than 30 psi (2 bar) absolute.
4. Direction of flow
   ("S" inlet port to "B" pressure port)
5. Table of values (theoretical values, without considering η_{mh} and η_v; values rounded)

Size			45	60
Displacement	V_{gmax}	cm³/rev (in³/rev)	45 (2.75)	60 (3.66)
Max. Speed	N_{omax}	rpm	2600	2600
Max. Flow	O_{omax}	L/min (gpm)	117 (31)	162 (43)
Max. Power Δp = 4000 psi (280 bar)	P_{omax}	kW (HP)	49 (65)	68 (90)
Max. Torque Δp = 4000 psi (280 bar)	T_{max}	Nm (ft-lb)	179 (132)	250 (184)
Weight (w/o fluid)		Kg (lbs)	18 (40)	22 (48.5)

Note: Values shown are valid for an absolute pressure of 1 bar at suction port. If the flow is reduced or if the inlet pressure is increased, the speed may be increased.

6. Determination of size

Flow $q_v = \frac{V_g \cdot n \cdot \eta_v}{231}$ [gpm] $\left(q_v = \frac{V_g \cdot n \cdot \eta_v}{1000} \text{ [L/min]} \right)$

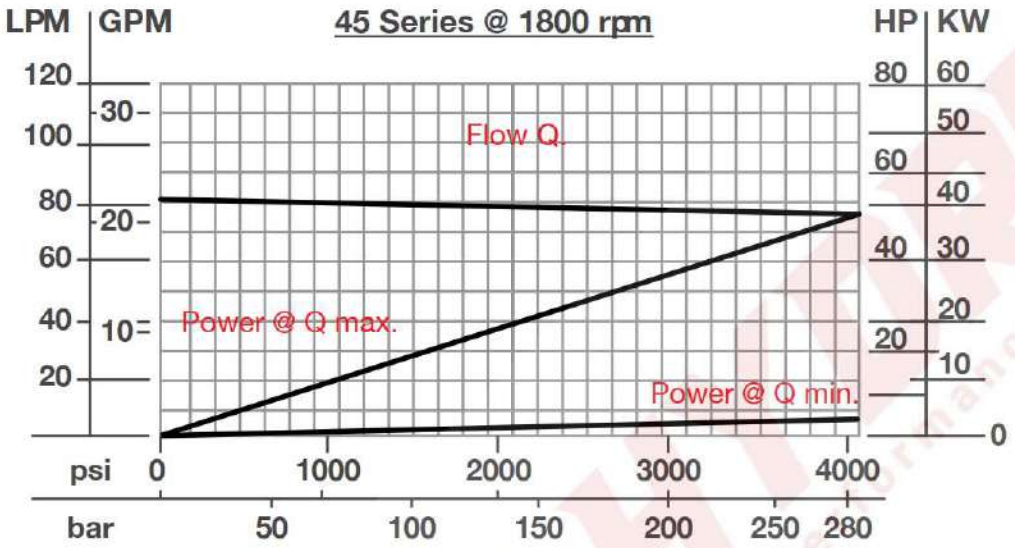
Torque $T = \frac{V_g \cdot \Delta p}{24 \cdot \pi \cdot \eta_{mh}}$ [lb-ft] $\left(T = \frac{V_g \cdot \Delta p}{20 \cdot \pi \cdot \eta_{mh}} \text{ [Nm]} \right)$

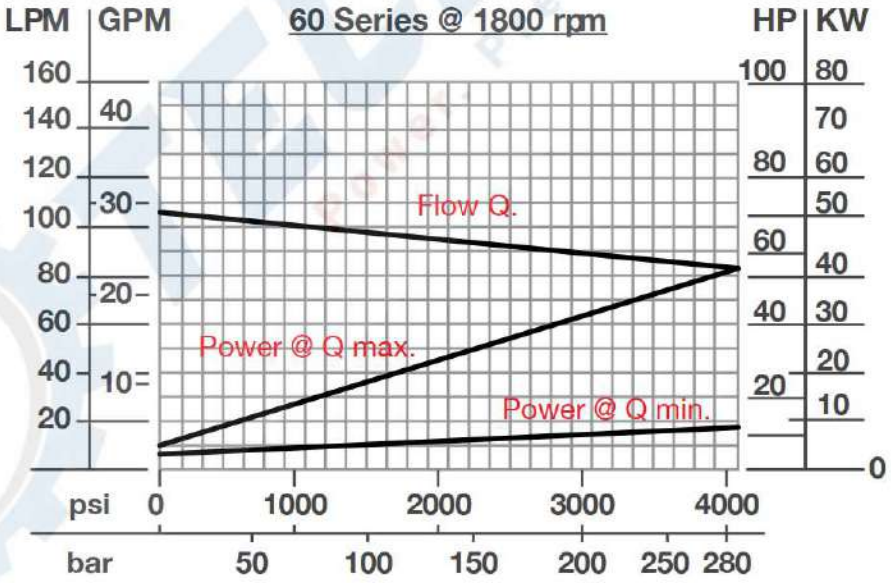
Power $P = \frac{q_v \cdot \Delta p}{1714 \cdot \eta_t}$ [HP] $\left(P = \frac{q_v \cdot \Delta p}{600 \cdot \eta_t} \text{ [kW]} \right)$

V_g = Displacement per revolution in in³ (cm³)
Δp = Differential pressure in psi (bar)
n = Speed in rpm (min⁻¹)
η_v = Volumetric efficiency
η_{mh} = Mechanical-hydraulic efficiency
η_t = Total efficiency

TH-A10VO Series 52

Performance Information





TH-A10VO Series 52

Model Code Breakdown

TH-A10V - O - 45 - DR - 52 - R - P - S - C - 62 - N00

Axial Piston Unit
TH-A10V = Swash Plate Variable Pump, for Industrial

Modes of Operation
O = Pump, Open Circuit

Displacement Size
cm³/r (in³/r)

45 (2.75)	60 (3.66)	85 (5.19)

Control Devices

	45	60	85
DR = Pressure Control **DRG** = G - Remote Control	•	•	•
DFR = Pressure and Flow Control **DFR1** = X Channel Plugged	•	•	•

Series
52 Series

Rotation
R = Clockwise CW
L = Counter-Clockwise CCW

Seals
P = Buna-N (NBR per DIN ISO 1629)
V = FPM (Fluorocarbon) Viton

Shafts

	45	60	85
S = SAE Splined Shaft	1"	1¼"	1½"
U = SAE Splined Shaft, Smaller Size (not for pumps w/Through-drive)	⅞"	1"	1¼"
W = SAE Splined Shaft, Reinforced U-type Shaft	⅞"	1"	1¼"
K = SAE Keyed Shaft	1"	1¼"	-
P = Parallel w/Key DIN 6885	25mm	32mm	-

Through-drive

	45	60	85
N00 = Without Through-drive	•	•	•

With through-drive to accept axial piston or gear pump

Mtg. Flange / Shaft/Coupling	45	60
K04 = 101-2 (B) 1" 15T (B-B) A10V45(S,R), 60(U,W)	•	•
K01 = 82-2 (A) ⅝" 9T (A) A10V18(U,W)	•	•
K02 = 101-2 (B) ⅞" 13T (B) A10V28(S,R), 45(U,W)	•	•

Service Ports

Pressure Port B & Suction Port S	45	60	85
61 = Rear Ports, UNC Mounting Screws	•	•	•
62 = Opposite Side Ports, UNC Mounting Screws	•	•	•
11 = Rear Ports, Metric Mounting Screws	•	•	-
12 = Opposite Side Ports, Metric Mounting Screws	•	•	-
64 = Rear ORB Ports	•	-	-

Port pos. 61, 11 and 64 only for version without Through-drive

Mounting Flange

	45	60	85
C = SAE 2-Bolt	4"	4"	5"
A = ISO 2-Bolt	100mm	-	-
D = SAE 4-Bolt	-	5"	5"

TH-A10VO Series 52

Fluid

1. Hydraulic fluid

   The TH-A10V open loop pump in the standard design should be used with a good quality, petroleum based anti-wear hydraulic fluid.

2. Operating viscosity range

   V opt = 16 mm² / s ~ 36 mm² / s (80-170 sus)

   For optimum efficiency and service life we recommend that the operating viscosity (at operating temperature) be selected from within the range:

   V opt = opt. operating viscosity 16 ~ 36 mm² / s

   Referred to tank temperature (open loop circuit).

   Limits of viscosity range
   (The following values are valid for extreme operating conditions):

   V min = 10 mm² / s (60 sus)
   For short periods (t ≤ 1 minute) at max. leakage oil temperature of 80°C (176°F)

   V max = 1000 mm² / s
   For short periods upon cold start

3. Temperature range

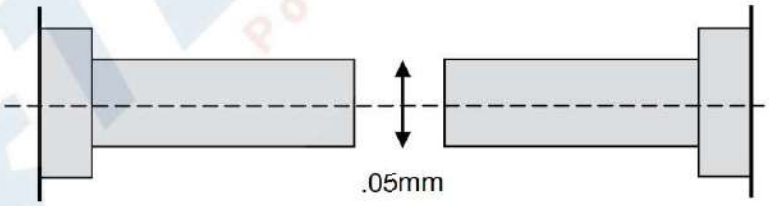
   T min = -20°C (-13°F); T max = +80°C (+176°F)

4. Filtration

   In order to ensure reliable operation of the axial piston unit, the operating fluid must be maintained to a cleanliness ISO class of at least 16/19 to ISO4406. This may be achieved with filter elements with a cleanliness code of 10µm.

Installation Note

The pump housing must be filled with clean hydraulic fluid prior to pump start up and remain full during operation.
The concentricity between the prime mover drive shaft and the pump shaft must be less than 0.05 mm (0.002 in).



TH-A10VO Series 52

Pump Installation Notes

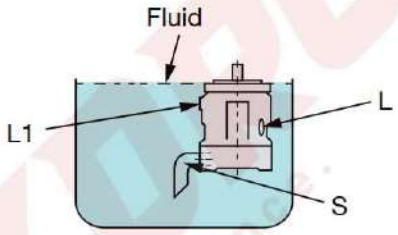
The installation position of the pump is optional.

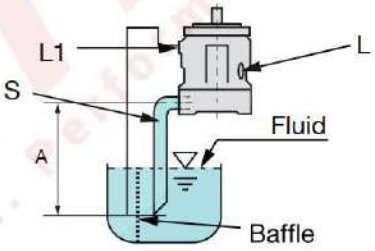
The pump housing must be filled with fluid both when commissioning and in operation. In order to achieve low noise levels, all connecting lines (inlet, case drain) should be isolated from the tank by flexible lines.

Vertical Installation (Shaft end upwards)

The following conditions should be noted:

- Before installing the pump inside a tank, fill the pump case with fluid
- Make sure the ports are below the oil level (L), (L1) & S
- Avoid mounting above the tank whenever possible in order to maintain a low noise level
- The permissible inlet height is a result of the overall pressure loss "A" may not be greater than 32 inches (800 mm)

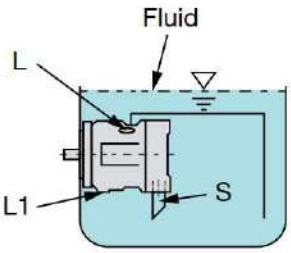


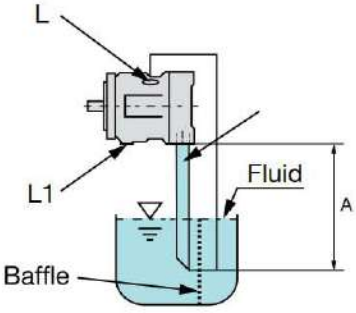


Horizontal Installation

The following conditions should be noted:

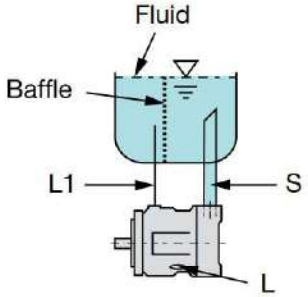
- The pump must be installed in such a manner, that either (L) or (L1) (case drain) is at the top
- If the minimum fluid level is below the ports of the pump, pipe the ports (L) or (L1) & S below the minimum oil level
- Avoid mounting above the tank whenever possible in order to maintain a low noise level
- The permissible inlet height (h) is a result of the overall pressure loss, "A" may not be greater than 32 inches (800 mm)





Horizontal Installation (Below the reservoir tank)

- Pipe (L), (L1) and S must be mounted below the oil level

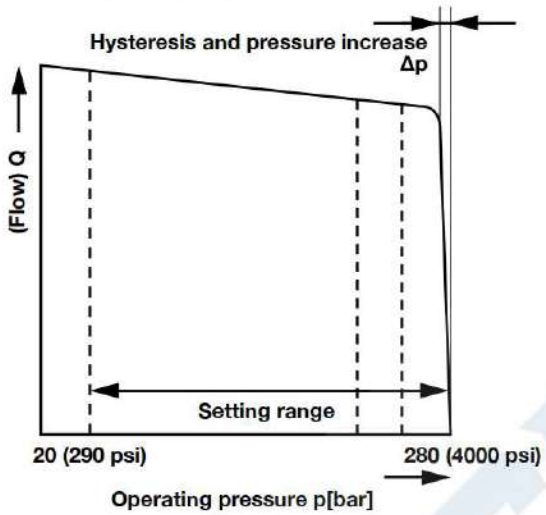


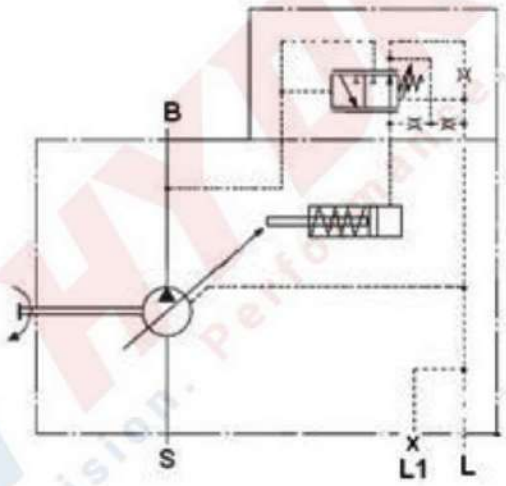
TH-A10VO Series 52

DR Pressure Control

The pressure control serves to maintain a constant pressure in the hydraulic system within the control range of the pump. The pump therefore supplies only the amount of hydraulic fluid required by the actuators. Pressure may be smoothly set at the pilot valve.

Static characteristic
(at n1 = 1500 rpm; oil temp. = 125°F / 51°C)





B	Pressure Port
S	Suction Port
L, L1	Case Drain Ports (L1 sealed)

Control Data

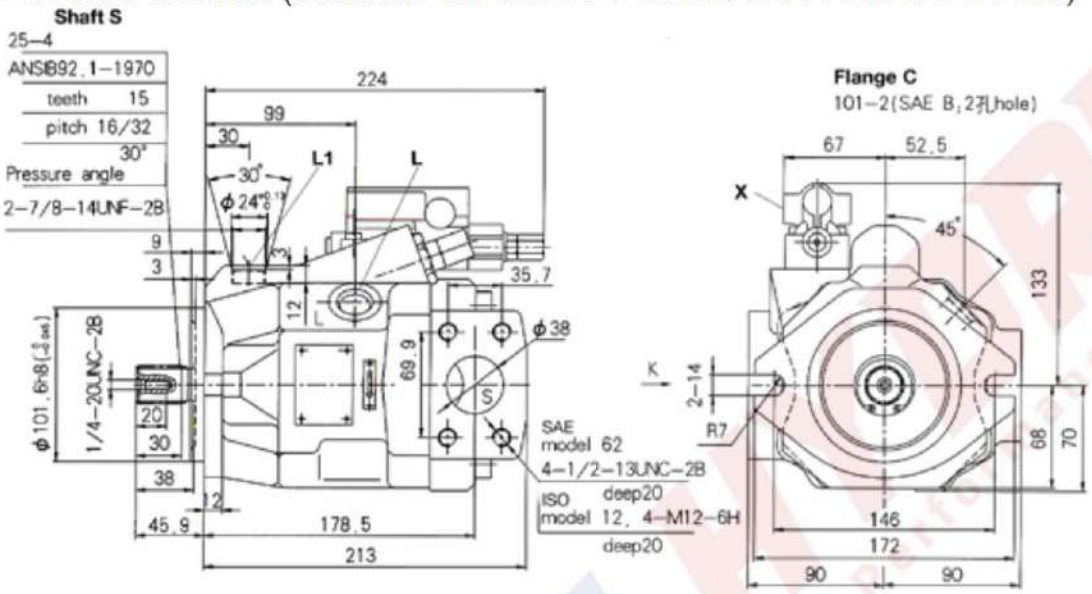
Hysteresis and repetition accuracy Δp.....max. 3 bar (45 psi)

Size		45	60
Δp	Bar (psi)	6 (87)	8 (116)

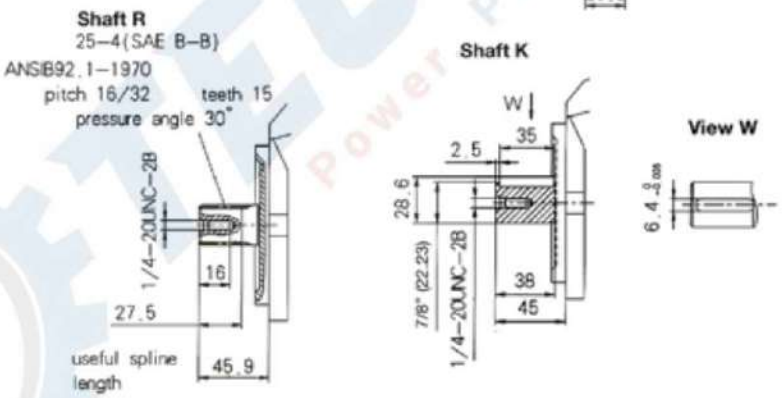
Pilot oil consumption.....max. approx. 3 L/min (0.8 gpm)

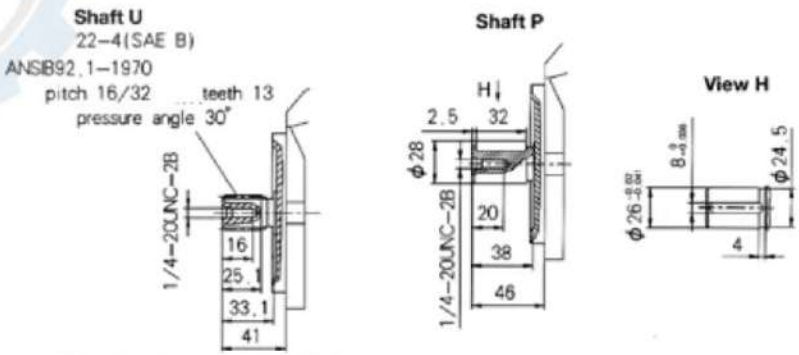
TH-A10VO Series 52

Mounting Dimension, Sizes 45
DR Pressure Control (Version: TH-A10VO45DR/52R-XXC62/12N00)



Standard Size	
L & L1	X
7/8-14UNF	7/16-30UNF





TH-A10VO Series 52

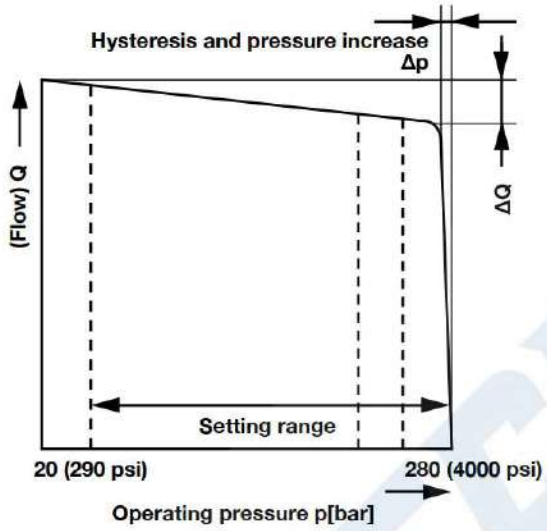
DRG Pressure Control, Remote Control

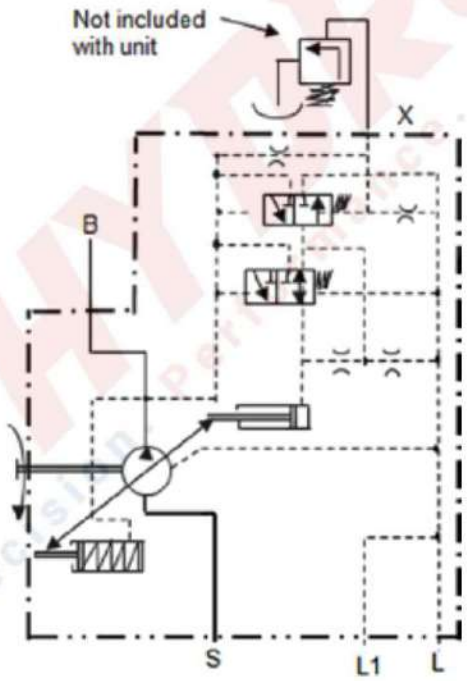
A pressure relief valve may be externally piped to port X for remote control purposes.
It is not, however, included with the DRG control.

The differential pressure at the pilot valve is set as standard to 20 bar (290 psi) and this results in a pilot flow of 1.5 L/min (0.4 gpm). If another setting is required (in the range 10-22 bar), please indicate that specifically and clearly.

The remote pilot valve should be mounted no more then 78in (2 meters) from the pump.

Static characteristic
(at n1 = 1500 rpm; oil temp. = 125°F / 51°C)





B	Pressure Port
S	Suction Port
L, L1	Case Drain Ports (L1 sealed)
X	Pilot Pressure Port

Control Data

Hysteresis and repetition accuracy Δp.....max. 3 bar (45 psi)

Size		45	60
Δp	Bar (psi)	6 (87)	8 (116)

Pilot oil consumption.....max. approx. 4.5 L/min (1.19 gpm)

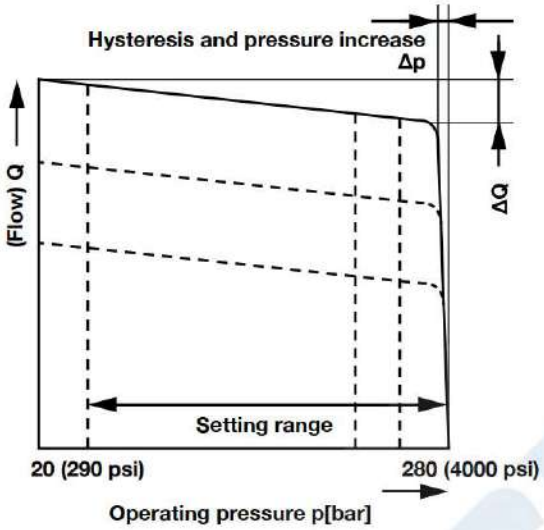
TH-A10VO Series 52

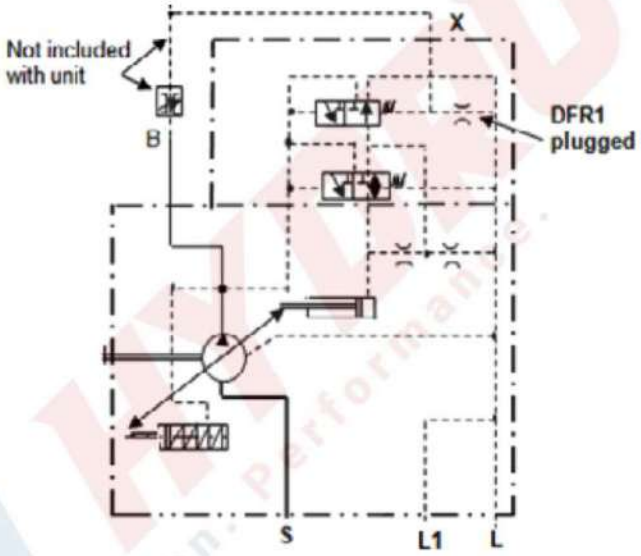
DFR/DFR1 Pressure/Flow Control

In addition to the pressure control function, the pump flow may be varied by means of a differential pressure at the actuator (e.g. an orifice).

In model DFR1, the X orifice is plugged.

Static characteristic
(at n1 = 1500 rpm; oil temp. = 125°F / 51°C)





B	Pressure Port
S	Suction Port
L, L1	Case Drain Ports (L1 sealed)
X	Pilot Pressure Port

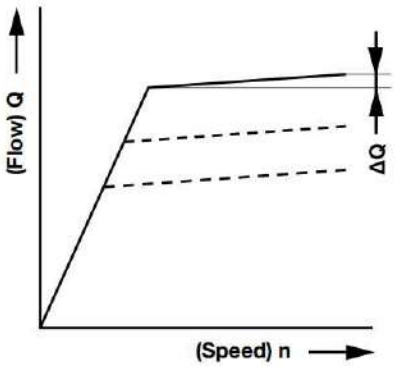
Flow Control/Differential Pressure Δp

Adjustable between 10 and 22 bar (higher values on request).

Standard setting: 14 bar. If a different setting is required, please specify clearly.

When port X is unloaded to tank, a zero stroke pressure ('stand by') of p = 18 ± 2 bar (260 ± 30 psi) results.

Static characteristic at variable speed



Control Data

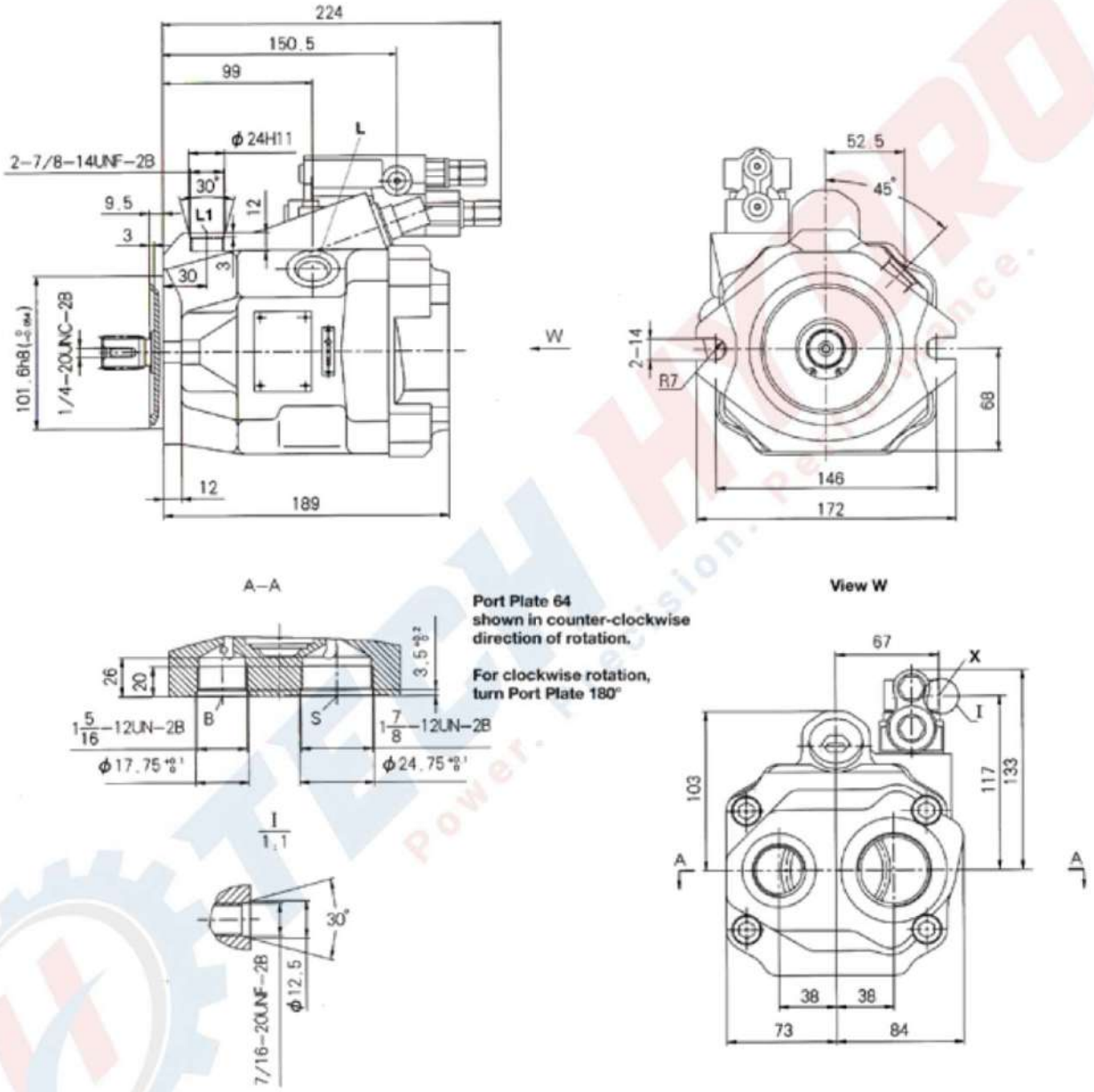
For pressure control technical data see DR pressure control.
Max. flow deviation (hysteresis and increase) measured at drive speed n = 1450 rpm.

Size	45	60
ΔQmax L/min (gpm)	1.8 (0.48)	2.8 (0.74)

Pilot oil consumption DFR.....max. approx. 3-4.5 L/min (0.70-1.19 gpm)
Pilot oil consumption DFR1.....max. approx. 3 L/min (0.70 gpm)

TH-A10VO Series 52

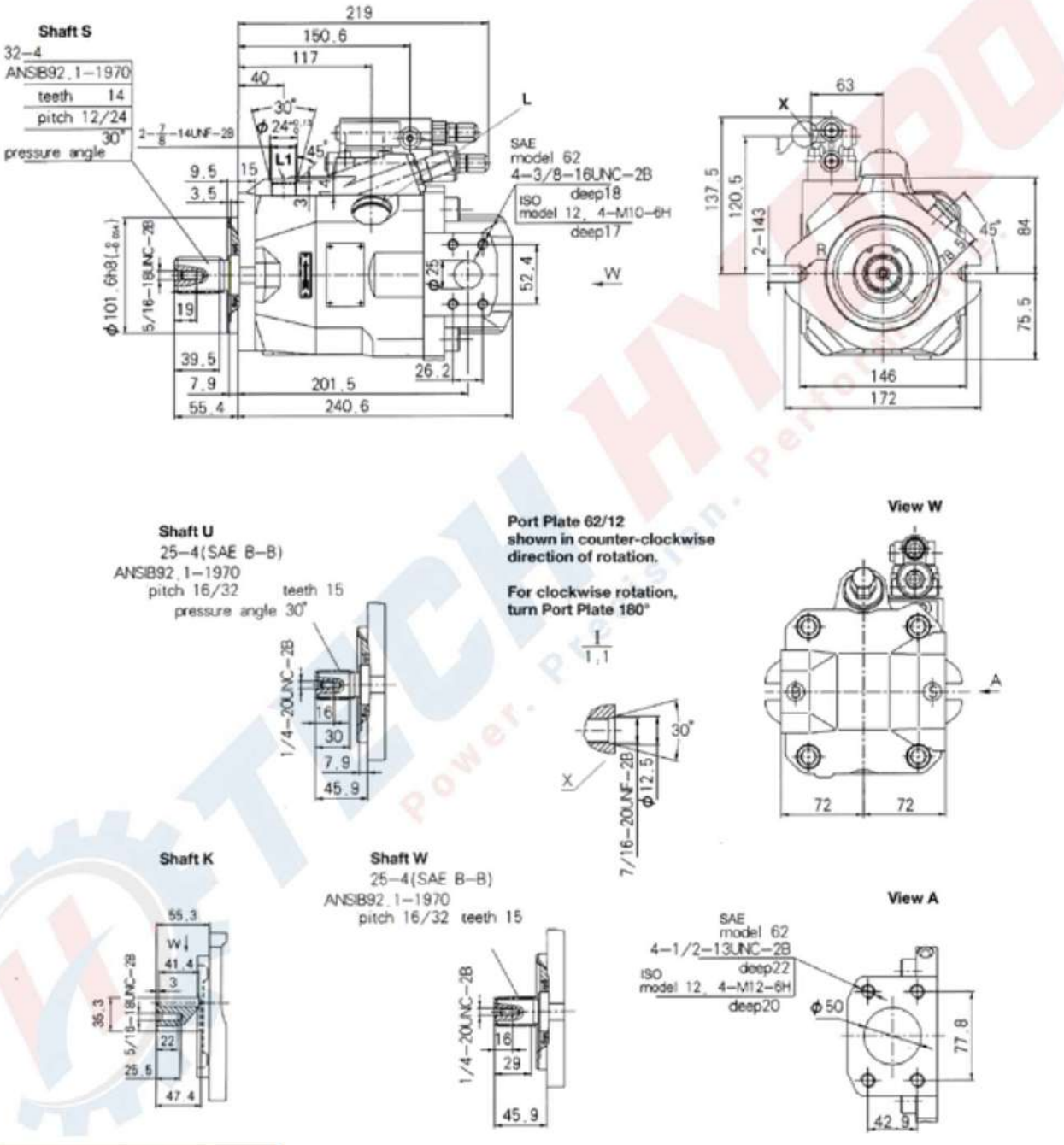
Mounting Dimension, Sizes 45
DFR, DFR1 & DRG Controls (Version: TH-A10VO45***/52L-XXC64N00)



Standard Size	
L & L1	X
7/8-14UNF	7/16-30UNF

TH-A10VO Series 52

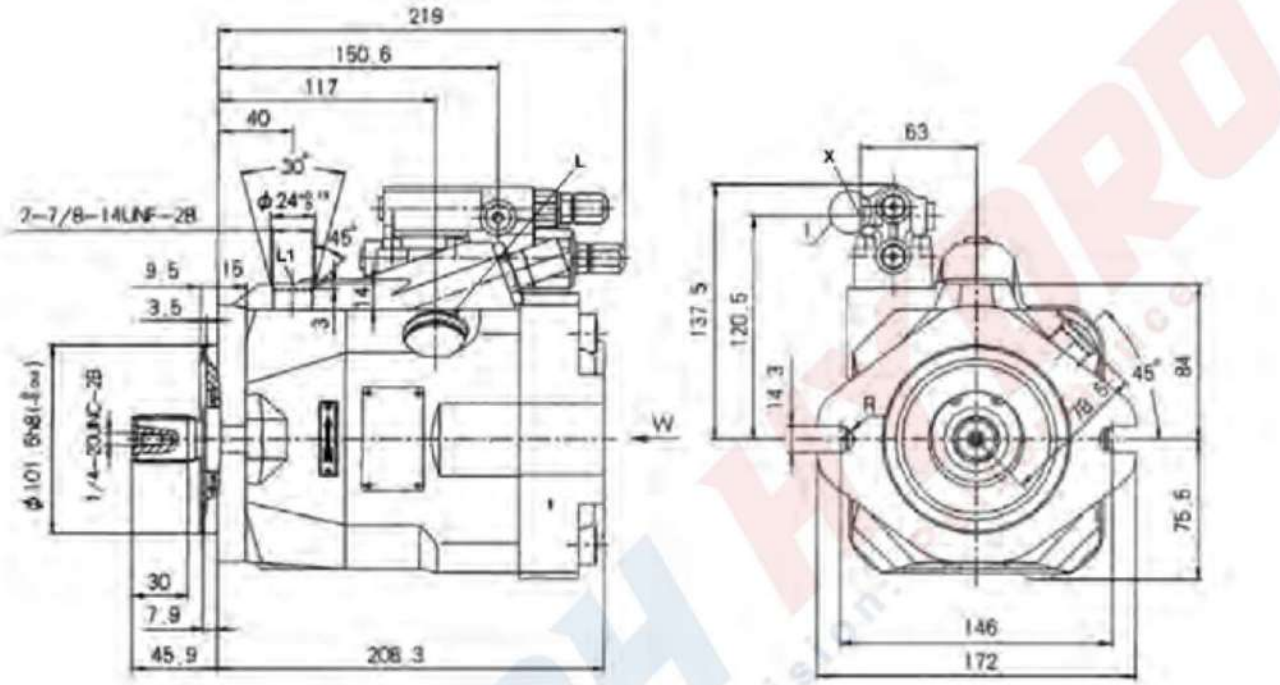
Mounting Dimension, Sizes 60
DFR, DFR1 & DRG Controls (Version: TH-A10VO60***/52L-XXC62/12N00)



Standard Size	
L & L1	X
7/8-14UNF	7/16-30UNF

TH-A10VO Series 52

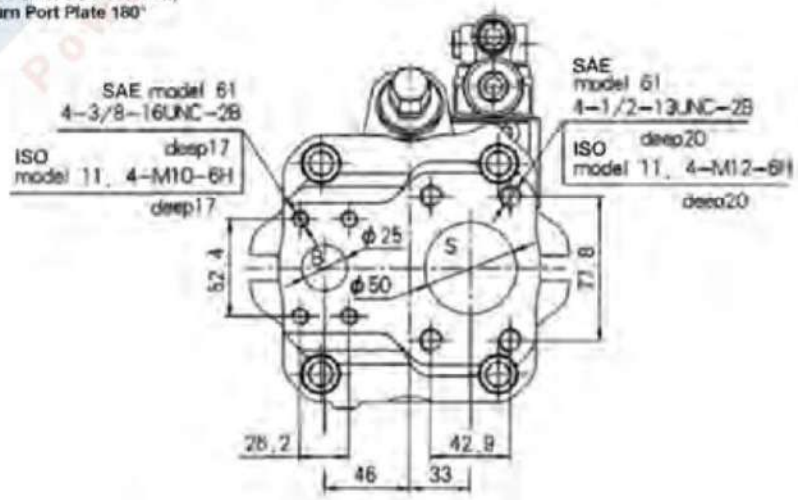
Mounting Dimension, Sizes 60
DFR, DFR1 & DRG Controls (Version: TH-A10VO60***/52L-XXC61/11N00)



Port Plate 61/11
shown in counter-clockwise direction of rotation.

For clockwise rotation, turn Port Plate 180°

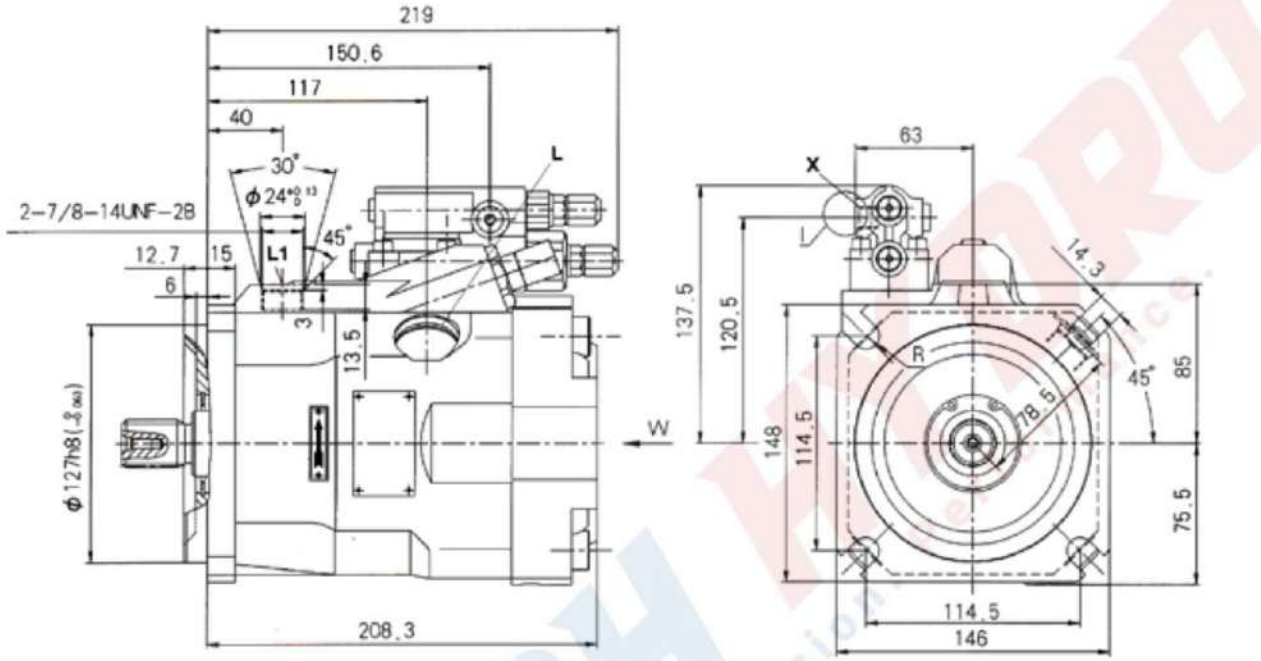
View W



Standard Size	
L & L1	X
7/8-14UNF	7/16-30UNF

TH-A10VO Series 52

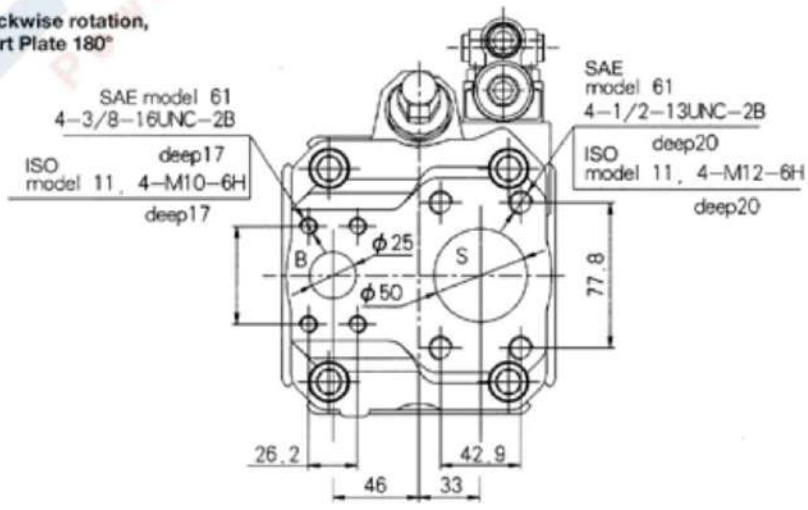
Mounting Dimension, Sizes 60
DFR, DFR1 & DRG Controls (Version: TH-A10VO60***/52L-XXD61/11N00)



Port Plate 61/11 shown in counter-clockwise direction of rotation.

For clockwise rotation, turn Port Plate 180°

View W

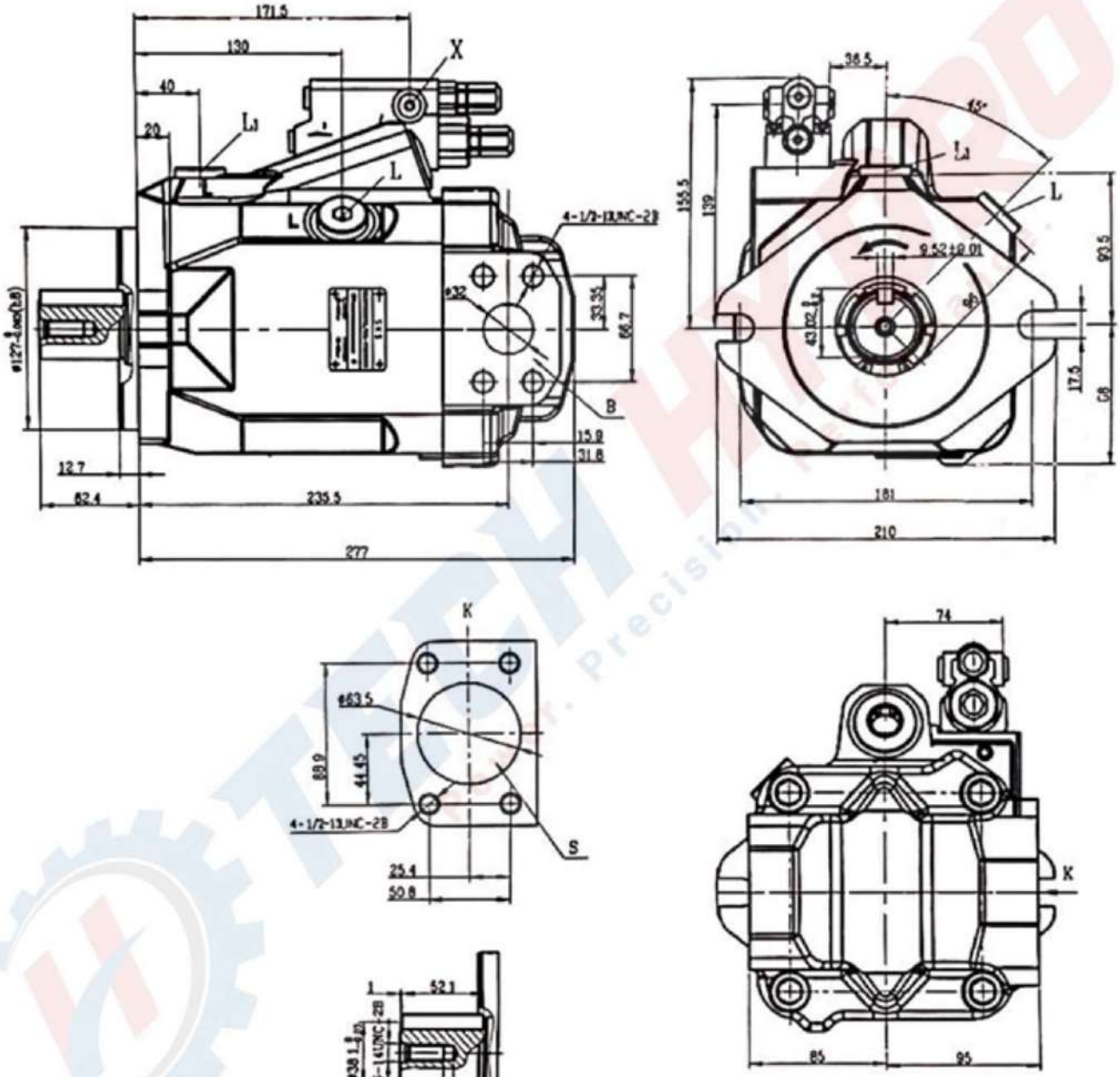


Standard Size	
L & L1	X
7/8-14UNF	7/16-30UNF

TH-A10VO Series 52

Mounting Dimension, Size 85

DFR/DFR1 Controls (Version: MA10VO85DFR/52L-PKC62N00)



Standard Size	
L & L1	X
7/8-14UNF	7/16-20UNF

NOTES

FOR MORE INFORMATION PLEASE CONTACT US

SALES@TECHYDRO.COM.CN

TECHYDRO

+86-15869517019

SALES@techydro.com.cn

WWW.TECHYDRO.COM.CN

whatsapp/Wechat: +86-15869517019

TEL: +86(0574) -87021030