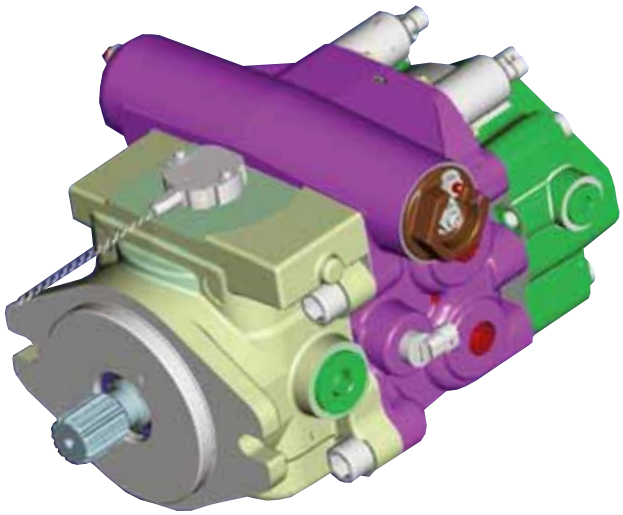
Dual Path Mobile Pump

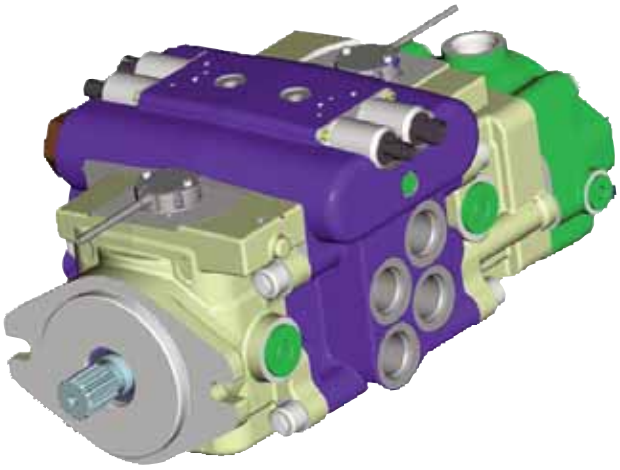
Technical Manual

350 Series

350 Series Mobile Pump Introduction



Single Assembly*



Dual Path Assembly

The 350 Series mobile pump is an advanced, closed circuit, servo controlled, axial piston design offered as either a single or dual pump (two pumps in one housing) for medium duty hydrostatic circuits. These pumps can be combined with an Eaton motor to transfer and control hydraulic power in many different ways.

An efficient, reliable and durable rotating piston group allows the 350 series pump to maintain continuous pressures to 280 bar (4000 psi) and 380 bar (5500 psi) rated levels. This pressure capability, coupled with high allowable input speed (3600 RPM), along with a compact package means superior power density in the market place.

*Not yet released

High load, taper roller bearings and a stiff drive shaft help provide long bearing life at rated mobile conditions, reducing operating costs and extending operating life.

350 Series pumps feature a needle bearing under the swash plate. This feature provides for better temperature and contamination resistance. The swash plate bearing offers low control hysteresis when matched with Eaton control technologies.

The 350 series pump offers the latest design in Eaton technologies for closed circuit piston pumps along with a wide variety of responsive controls. These controls include mechanically or electrically-actuated feedback controls, hydraulic or electronic proportional controls and a three position (Forward-Neutral-Reverse) electric control.

A large input shaft diameter allows more through put power, even with an integral charge pump. When the 350 series pump is fully loaded as much as 56 kW (75 hp) of through put power is available for auxiliary hydraulic power needs from the SAE B auxiliary mounting pad.

350 Series pumps operate at a level of quietness that exceeds the requirements of today's demanding work conditions. Another pump feature - a serviceable, bimetal valve plate - improves pump filling characteristics which, in turn, reduces fluid-borne noise and extends pump life. A highly engineered pump housing and swash plate also minimizes noise and vibration.

Mounting flanges are offered in SAE B and C configurations and ports are offered in SAE, ISO tube and flange and STC direct port versions. Opposite or same side port versions are available to facilitate plumbing and help the pump fit your machine space needs. An integral gerotor charge pump can be provided with up to four different displacement sizes allowing for either remote or inlet charge filter options.

The 350 series pump offers a full range of product features and has the ability to match the needs of many different customer platforms. It supports increased power requirements in Agricultural, Construction and Utility markets and allows for a wide variety of installation opportunities for global machine design.

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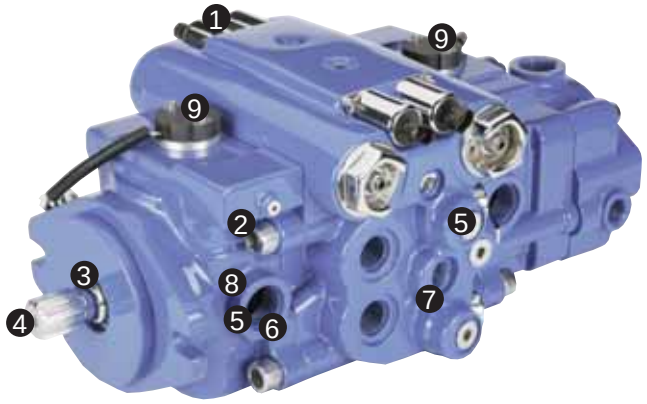


Controls

- Mechanical servo and Hydraulic (non-feedback)
- Electro-proportional "EP"
- Proportional valve control with electronic swash plate feedback
  - Non-contacting sensor
  - Fast response, precise, real-time pump control
  - Best electro-hydraulic control for mobile hydrostatic transmissions available on the market today*

* Interface requires proprietary Eaton electronic control or control algorithms

Features

- Symmetrical 4-Bolt design
- Polyacrylate Shaft Seal
- 15-Tooth splines, 14-Tooth splines, Taper Input Shafts
- Case Drains location (one connection needed)
- Shaft mounted on Tapered roller bearings
- Optional Speed Pickup Location
- Swash plate bearings
- Same Side or Opposite Side Main Work Ports

Typical Applications

- Pavers, Rollers
- Telescopic Booms
- Boring Machines
- Trenching Machines
- Sweepers
- Small Sprayers
- Telehandlers
- Stump Grinders
- Compact Wheel Loaders
- Rough Terrain Fork Lifts
- Material Handling Equipment
- Skid Steer Loaders
- Windrowers/Sprayers

Specifications:

Continuous Pressure:
280 Bar (4000 psi)

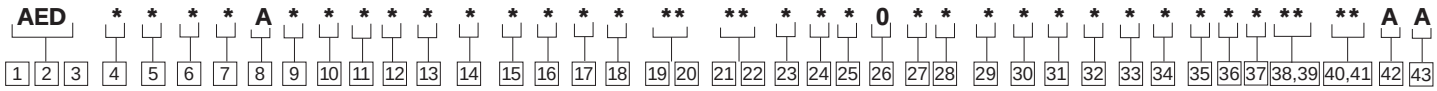
Rated Pressure:
380 Bar (5500 psi)

Displacements:
41cc (2.50 cid), 49 cc (3.00 cid), 62 cc (3.8 cid).

Estimated weight for a 350 series pump with opposite side main ports with charge pump - 81.8 Kg (181 lbs).

	UNITS	41	49	62
Displacement	cc/rev (cid)	41 (2.50)	49 (3.00)	62 (3.80)
Input Speed	Min RPM	500	500	500
	Max RPM	3600	3600	3600
Continuous Pressure	Bar (psi)	280 (4000)	280 (4000)	280 (4000)
Rated Pressure	Bar (psi)	380 (5500)	380 (5500)	380 (5500)
Charge Pressure	Bar (psi)	15-31 (220-450)	15-31 (220-450)	15-31 (220-450)
Flow at Rated Speed	LPM (GPM)	139 (37)	166 (44)	210 (56)
Mounting		2-Bolt SAE B	2-Bolt SAE B	
		4-Bolt SAE C	4-Bolt SAE C	2-Bolt SAE C
		2-Bolt SAE C	2-Bolt SAE C	4-Bolt SAE C

Model Code



1 2 3 **Code Title**

AED – Dual Servo Controlled Variable Displacement Axial Piston Pump

4 **Displacement & Rotating Kit- Front**

1 – 41.0 cm³/r [2.50 in³/r]
2 – 49.2 cm³/r [3.00 in³/r]
3 – 62.3 cm³/r [3.80 in3/r]
4 – 35.0 cm³/r [2.10in3/r]
Destroked from -
41.0 cm³/r [2.50 in³/r]
5 – 45.0 cm³/r [2.75 in³/r]
Destroked FROM -
49.2 cm³/r [3.00 in³/r]
6 – 54.0 cm³/r [3.30 in³/r]
Destroked FROM -
62.3 cm³/r [3.80 in³/r]

5 **Input Shaft Rotation**

L – Left hand rotation (CCW)
R – Right hand rotation (CW)

6 **Front Mounting**

A – 2 Bolt C (SAE J744-127-2)
B – 4 Bolt C (SAE J744-127-4)
C – 2 Bolt B (SAE J744-101-2)

7 **Input Shaft**

A – Taper shaft 1.0 dia 1.5 taper
B – 14 Tooth 12/24 Pitch Spline Shaft
C –15 Tooth 16/32 Pitch Spline Shaft
D –19 Tooth 16/32 Pitch Spline Shaft

8 **Valve Plate - Front**

A – Type 1- Standard

9 **Relief Setting for Front Main Port A - Front**

0 – None, no relief valve or check valve
A – Check valve only
J – 207 bar [3000 lbf/in²]
K – 224 bar [3250 lbf/in²]
L – 241 bar [3500 lbf/in²]
M – 259 bar [3750 lbf/in²]
N – 280 bar [4000 lbf/in²]
R – 310 bar [4500 lbf/in²]
T – 345 bar [5000 lbf/in²]
U – 362 bar [5250 lbf/in²]
V – 380 bar [5500 lbf/in²]

10 **Relief Setting for Front Main Port B - Front**

0 – None, no relief valve or check valve
A – Check valve only
J – 207 bar [3000 lbf/in²]
K – 224 bar [3250 lbf/in²]
L – 241 bar [3500 lbf/in²]
M – 259 bar [3750 lbf/in²]
N – 280 bar [4000 lbf/in²]
R – 310 bar [4500 lbf/in²]
T – 345 bar [5000 lbf/in²]
U – 362 bar [5250 lbf/in²]
V – 380 bar [5500 lbf/in²]

11 **Displacement & Rotating Kit - Rear**

1 – 41.0 cm³/r [2.50 in³/r]
2 – 49.2 cm³/r [3.00 in³/r]
3 – 62.3 cm³/r [3.80 in3/r]
4 – 35.0 cm³/r [2.10in3/r]
Destroked from -
41.0 cm³/r [2.50 in³/r]
5 – 45.0 cm³/r [2.75 in³/r]
Destroked FROM -
49.2 cm³/r [3.00 in³/r]
6 – 54.0 cm³/r [3.30 in³/r]
Destroked FROM -
62.3 cm³/r [3.80 in³/r]

12 **Valve Plate - Rear**

A – Type 1- Standard

13 **Relief Setting For Front Main Port A - Rear**

Ref Position 9 for options

14 **Relief Setting For Front Main Port B - Rear**

Ref Position 10 for options

15 **Charge Pump**

0 – No Charge Pump
1 – 13.9 cm³/r [.85in³/r], 1.3125-12 UN-2B SAE O-Ring Suction Inlet Port (S)
2 – 17.4 cm³/r [1.06 in³/r], 1.3125-12 UN-2B SAE O-Ring Suction Inlet Port (S)
3 – 21.0 cm³/r [1.28 in³/r], 1.3125-12 UN-2B SAE O-Ring Suction Inlet Port (S)
4 – 23.1 cm³/r [1.41 in³/r], 1.3125-12 UN-2B SAE O-Ring Port for Suction Inlet (S)

16 **Charge Relief Setting**

0 – No Charge Relief Setting
1 – 17.2 - 20.7 bar [250-300 lbf/in²] Relieved to Case
2 – 20.7 - 24.1 bar [300-350 lbf/in²] Relieved to Case
3 – 24.1 - 27.6 bar [350-400 lbf/in²] Relieved to Case
4 – 27.6 - 31 bar [400-450 lbf/in²] Relieved to Case
5 – 13.8 - 17.2 bar [400-450 lbf/in²] Relieved to Case

17 **Charge Port Location**

0 – None
1 – Inlet Right Side C2 (Only with Main Ports opposite side)
2 – Inlet Left Side C1
3 – Inlet Bottom C3 (Only with Main Ports Same Side, No Bypass Valve)

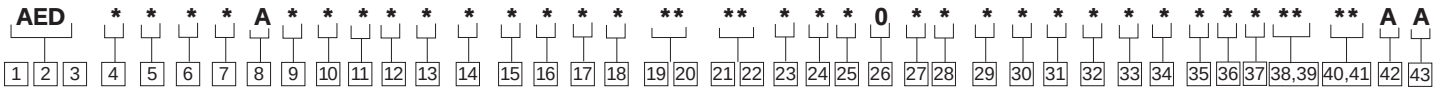
18 **Auxiliary (Rear) Mount & Output Shaft**

A – 2 Bolt B (SAE J744-101-2) Accepts 13T, 16/32 Pitch Spline
B – 2 Bolt B (SAE J744-101-2) Accepts 15T, 16/32 Pitch Spline
C – 2 Bolt A (SAE J744- 82-2) Accepts 11T, 16/32 Pitch Spline
D – 2 Bolt A (SAE J744-82-2) Accepts 9T, 16/32 Pitch Spline

19 20 **Control Assembly - Front**

SA – Solenoid Control - 12 Volt With Non-Contact Feedback Sensor with Metri-Pak Electrical Connectors
SB – Solenoid Control - 12 Volt
SC – Solenoid Control - 12 Volt
HA – Hydraulic Remote - Non Feedback, 5-15 bar [72-217 lbf/in2] Pilot Pressure
MA – Manual Control,Wide Band Neutral
MB – Manual Control, Standard
MC – Manual Control, High Gain
MD – Manual Control, Wide Band Neutral, Neutral Lockout switch
ME – Manual Control, Standard, Neutral Lockout switch
MF – Manual Control, High Gain, Neutral Lockout switch

Model Code



21 22 **Control Assembly - Rear**

SA – Solenoid Control - 12 Volt with Non-Contact Feedback Sensor
SB – Solenoid Control - 12 Volt with Redundant Non-Contact Feedback Sensor
SC – Solenoid Control - 12 Volt
HA – Hydraulic Remote - Non Feedback, 5-15 bar [72-217 lbf/in2] Pilot Pressure
MA – Manual Control, Wide Band Neutral
MB – Manual Control, Standard
MC – Manual Control, High Gain
MD – Manual Control, Wide Band Neutral, Neutral Lockout switch
ME – Manual Control, Standard, Neutral Lockout switch
MF – Manual Control, High Gain, Neutral Lockout Switch

23 **Destroke Valve - Front**

0 – Not required
1 – Destroke With 12 VDC Coil & Weather Pack Connector
2 – Destroke With 24 VDC Coil & Weather Pack Connector
3 – 12 VDC Coil & DIN 43650-A Connector
4 – Destroke with 24 VDC Coil & DIN 43650-A Connector

24 **Control Supply Orifice (p) - Front**

0 – No control, supply orifice
B – Diameter 0.71 [.028]
C – Diameter 0.91 [.036]
D – Diameter 1.12 [.044]
E – Diameter 1.32 [.052]

25 **Control Servo Orifice (s1 and s2) - Front**

0 – No control, servo orifice
B – Diameter 0.71 [.028]
C – Diameter 0.91 [.036]
D – Diameter 1.12 [.044]
E – Diameter 1.32 [.052]

26 **Special Control Options - Front**

0 – No Special Control Options
1 – Manual Control Lever

27 **Destroke Valve - Rear**

Ref Position 23 for options

28 **Control Supply Orifice (p) - Rear**

Ref Position 24 for options

29 **Control Servo Orifice (s1 and s2) - Rear**

Ref Position 25 for options

30 **Special Control Options - Rear**

0 – No Special Control Options
1 – Manual Control Lever
2 – Control Pressure EPRV Valve 12 VDC, Deutsch, -4 SAE O-ring Port

31 **Main Ports (A and B)**

A – 4X 1.3125-12 UN-2B SAE O-Ring Ports; Same Side, Right
B – 4X 1.3125-12 UN-2B SAE O-Ring Ports; Same Side, Left
C – 4X 1.3125-12 UN-2B SAE O-Ring Ports; Opposite Side
D – 4X -16 STC TYPE II+ Direct Port; Same Side, Right
E – 4X -16 STC TYPE II+ Direct Port; Same Side, Left
F – 4X -16 STC TYPE II+ Direct Port; Opposite Side

32 **Drain Port Size and Location - Front**

0 – No Drain Port
1 – 1.0625 -12 UN-2B SAE O-Ring Port - Left (D1)
2 – 1.0625 -12 UN-2B SAE O-Ring Port - Right (D2)
3 – 1.0625 -12 UN-2B SAE O-Ring Port - Left (D1) and Right (D2)
4 – 1.0625 -12 UN-2B SAE O-Ring Port - Left (D1) and Right (D2), Left Side Plugged
5 – 1.0625 -12 UN-2B SAE O-Ring Port - Left (D1) and Right (D2), Right Side Plugged

33 **Drain Port Size and Location - Rear**

0 – No Drain Port
1 – 1.0625 -12 UN-2B SAE O-Ring Port - Left (D3)
2 – 1.0625 -12 UN-2B SAE O-Ring Port - Right (D4)
3 – 1.0625 -12 UN-2B SAE O-Ring Port - Left (D3) and Right (D4)
4 – 1.0625 -12 UN-2B SAE O-Ring Port - Left (D3) and Right (D4), Left Side Plugged
5 – 1.0625 -12 UN-2B SAE O-Ring Port - Left (D3) and Right (D4), Right Side Plugged

34 **Auxiliary Port**

0 – No Auxiliary Port
A – .750-16 UNF-2B SAE O-Ring Port - Left (C1) and Right (C2), Left Side Plugged
B – .750-16 UNF-2B SAE O-Ring Port - Left (C1) and Right (C2), Right Side Plugged
C – .750-16 UNF-2B SAE O-Ring Port - Left (C1) and Right (C2)
D – .750-16 UNF-2B SAE O-Ring Port - Left (C1) and Right (C2), Left Side Plugged, Remote Filter, Return from Filter to Charge Port Required

(#34 continues next column)

(continued from previous column)

E – .750-16 UNF-2B SAE O-Ring Port - Left (C1) and Right (C2), Right Side Plugged, Remote Filter, Return from Filter to Charge Port Required

35 **Bypass Valve**

0 – No Bypass Valve
A – With Bypass Valve

36 **Sensor Options**

0 – No Sensor
A – Magnetic Speed Sensor

37 **Shaft Seal**

A – Polyacrylate
B – Nitrile
C – Viton

38 39 **Special Features**

00 – No Special Features
AA – Diagnostic Ports - Front Pump 2X .3125-24 SAE O-ring Ports (s1 & s2), Rear Pump 2X .3125-24 SAE O-ring Ports (s1 & s2)
AB – Externally Adjustable Displacement Limiters
AC – Diagnostic Ports - Front Pump 2X .3125-24 SAE O-ring Ports (s1 & s2), Rear Pump 2X .3125-24 SAE O-ring Ports (s1 & s2), Externally Adjustable Displacement Limiters

40 41 **Paint**

0A – Primer Red
0B – Primer Black
CD – Primer Blue

42 **Identification**

A – Standard

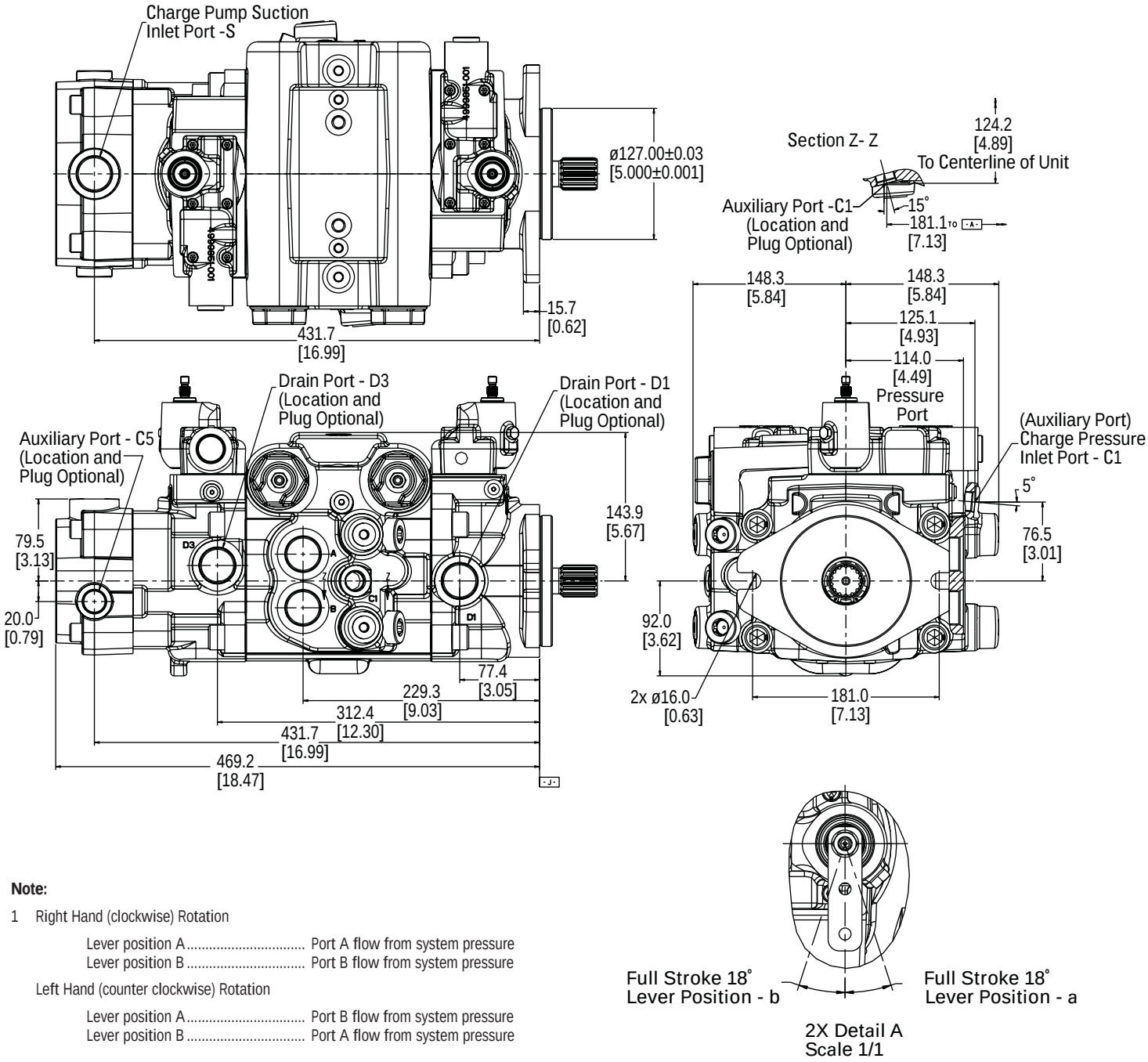
43 **Design Code**

A –

Dimensional Drawings - Manual Servo Displacement Control

350 Series Dual Pump, Manual Servo displacement control, SAE C mounting flange, 14-tooth, 12/24 pitch spline, opposite side ports, SAE B aux. mount with charge pump.

Dimensions are in mm(in) unless noted otherwise.



Note:

1 Right Hand (clockwise) Rotation

Lever position A..... Port A flow from system pressure
Lever position B..... Port B flow from system pressure

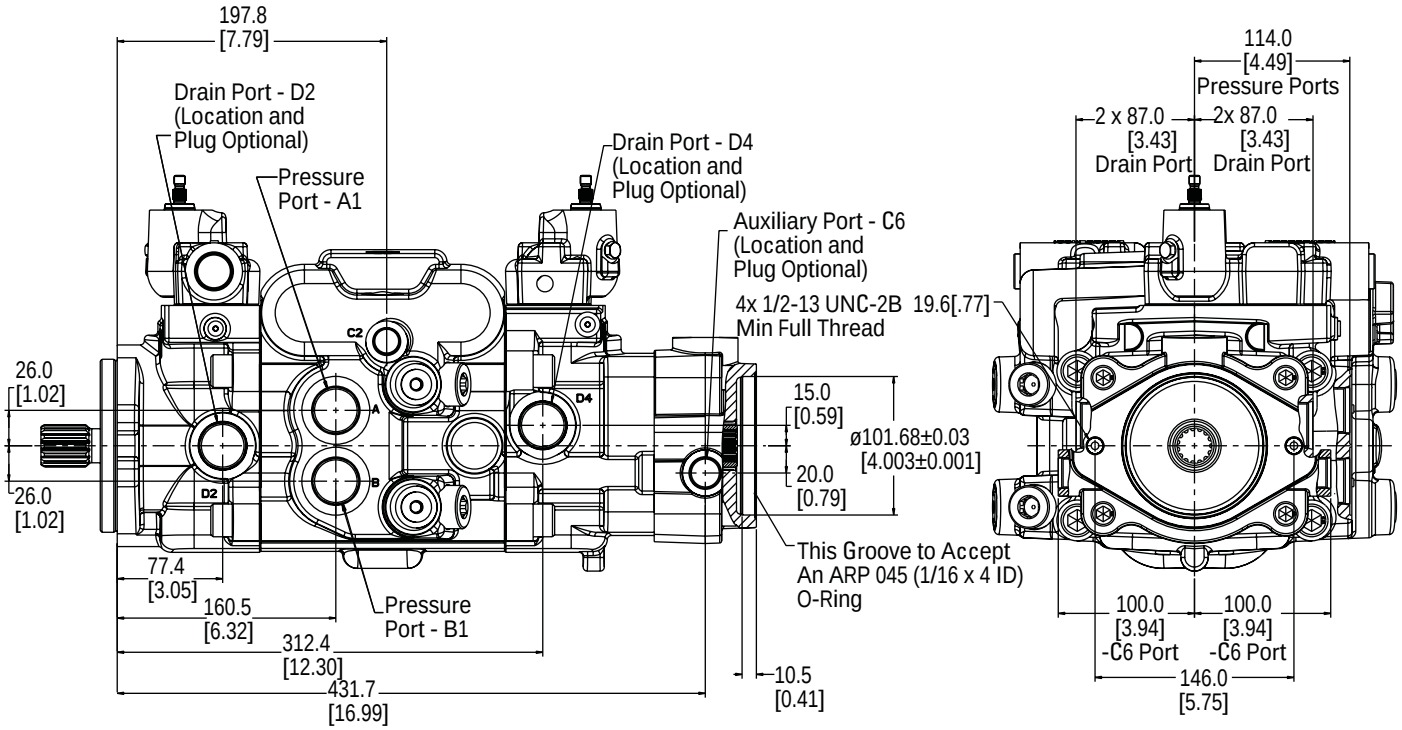
Left Hand (counter clockwise) Rotation

Lever position A..... Port B flow from system pressure
Lever position B..... Port A flow from system pressure

Dimensional Drawings - Manual Servo Displacement Control

350 Series Dual Pump, Manual Servo displacement control, SAE C mounting flange, 14-tooth, 12/24 pitch spline, opposite side ports, SAE B aux. mount with charge pump.

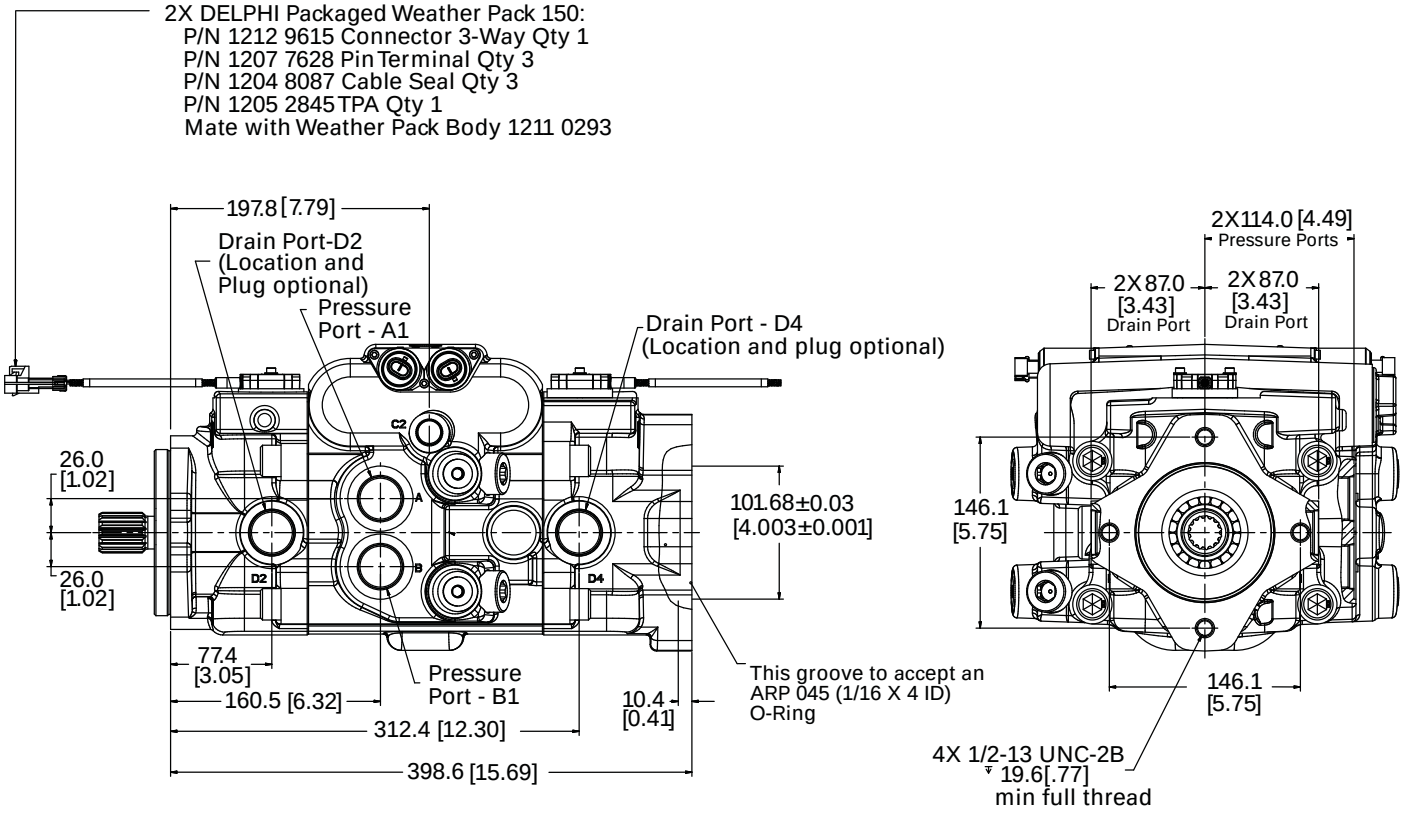
Dimensions are in mm(in) unless noted otherwise.



Dimensional Drawings - Solenoid Displacement Control

350 Series Dual Pump, Solenoid displacement control, SAE C mounting flange, 14-tooth, 12/24 pitch spline, SAE B Aux mount without charge pump, opposite side ports.

Dimensions are in mm(in) unless noted otherwise.



Note:

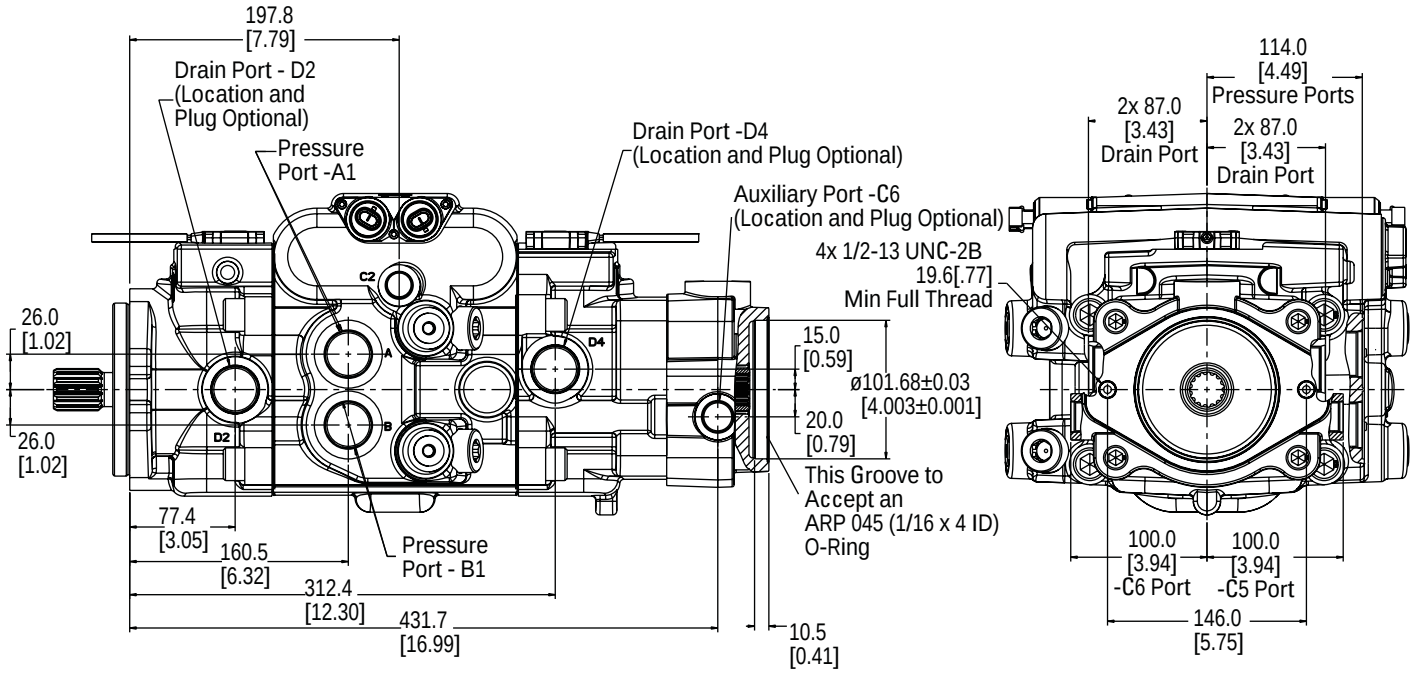
1 Unit must be installed in such a position that the case drain assures an oil level at or above unit centerline before starting.

② One auxiliary port must be used for charge pressure inlet additional auxiliary ports can be used for charge pressure discharge.

Dimensional Drawings - Solenoid Displacement Control

350 Series Dual Pump, Solenoid displacement control, SAE C mounting flange, 14-tooth, 12/24 pitch spline, SAE B Aux mount with charge pump, opposite side ports.

Dimensions are in mm(in) unless noted otherwise.



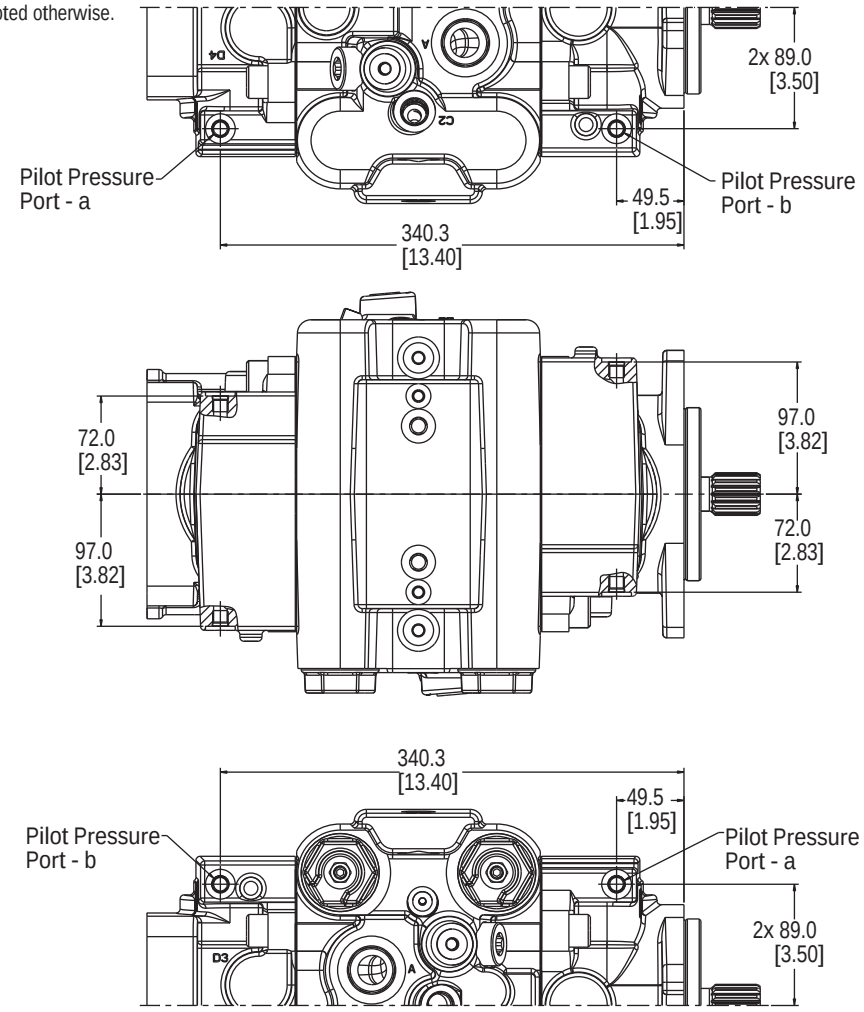
Solenoid Displacement Control

SPECIFICATIONS	
3 ways proportional reducing pressure valve	
Hysteresis	max 2.5 bar
Pressure drop	10 bar for 10 L/min
Leakages (P.A. ➔ T)	
Without electric supply (P_{supply} = 60 bar, fluid viscosity 11 cSt)	< 8 cc/min
During regulation ($P_{controll}$ = 25 bar)	< 30 cc/min
Response time	0-60 bar < 20ms 60-0 bar < 20ms
Frequency response from 0.3 to 35Hz	Pressure gain +/- 3 dB Frequency phase < -90˚C
Maximum control current	2.4A
Supply current	Dither 100Hz
Coil resistance	2.5 Ohm

Dimensional Drawings - Hydraulic Remote Control

350 Series Double Pump, Hydraulic Remote Control

Dimensions are in mm(in) unless noted otherwise.



Pilot pressure ports a, b - 0.4375-20UNF-2B SAE O-ring ports

Note:

1 Left Hand (counter clockwise) Rotation

Pilot Pressure Port a ..... Port a flow from system pressure
Pilot Pressure Port b ..... Port b flow from system pressure

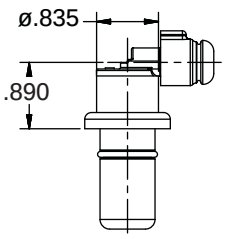
Right Hand (clockwise) Rotation

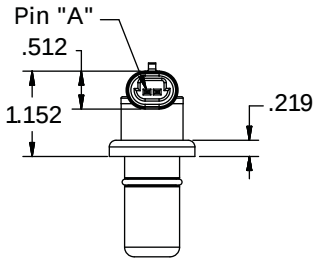
Pilot Pressure Port a ..... Port b flow from system pressure
Pilot Pressure Port b ..... Port a flow from system pressure

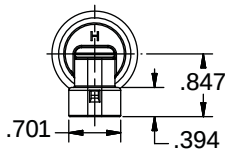
2 Threshold Pressure .....5 bar (72.5 lbf/in^2)
Max. Displacement Pressure .....15 bar (217.8 lbf/in^2)

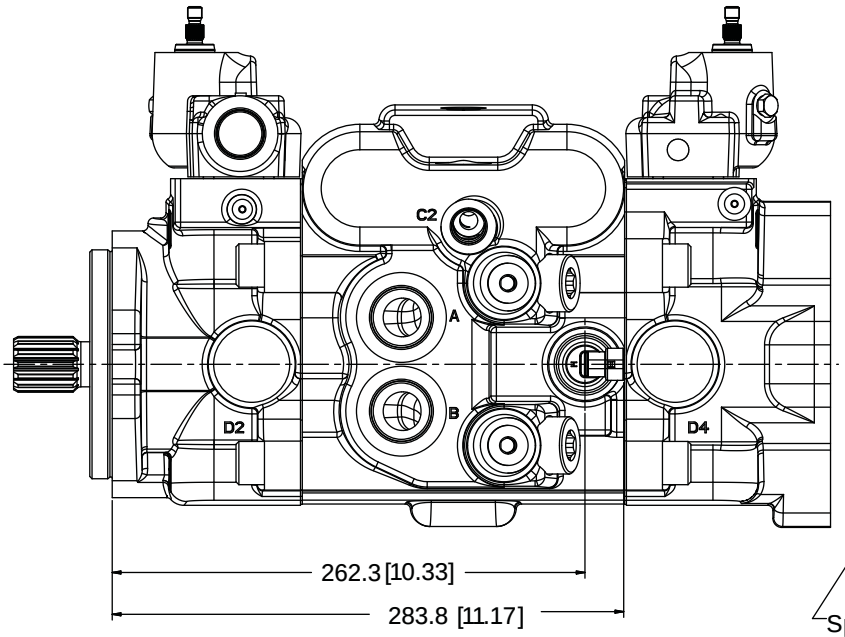
Dimensional Drawings - Magnetic Speed Sensor

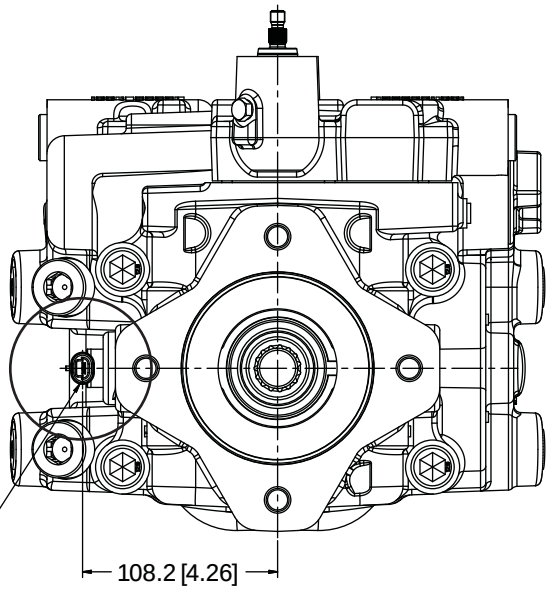
Dimensions are in mm(in) unless noted otherwise.











Speed Sensor Mating 2 Way Connector Packard Electric P/N 1216 2192 Connector Body P/N 1204 0751 Cable Seal P/N 1204 0750 Connector Seal P/N 1212 4075 Socket

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