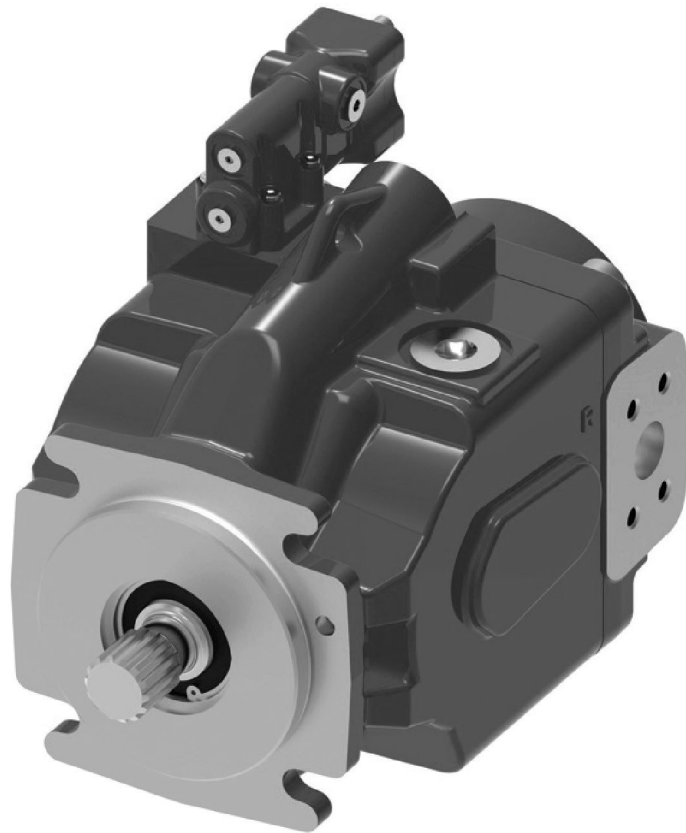


ENGINEERING
TOMORROW



Technical Information

620 Mobile Piston Pump



Revision history

Table of revisions

Date	Changed	Rev
September 2024	Changed document number	0202
October 2023	Updated to Danfoss Format	0201
October 2023	First edition	0101

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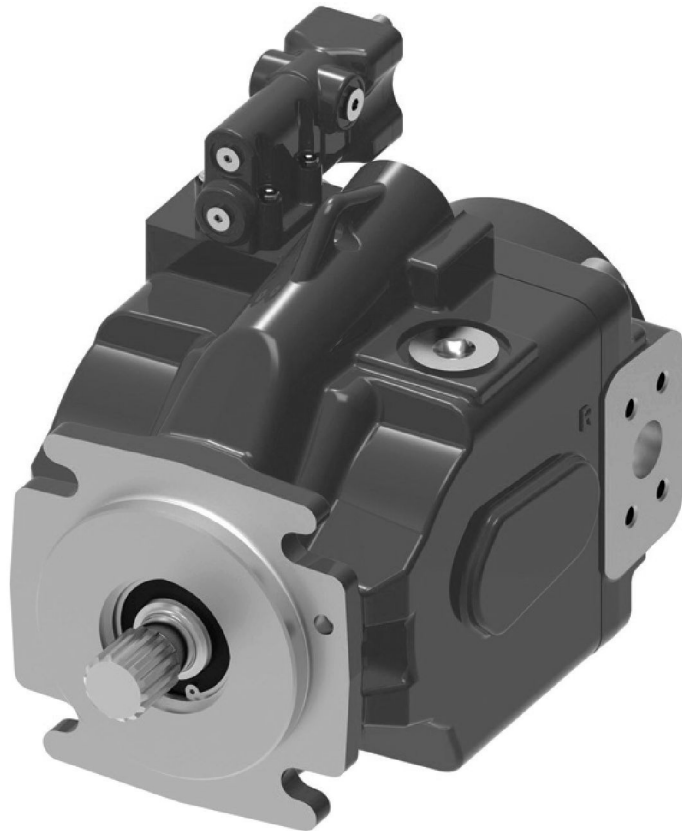
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Introduction



The Danfoss X20 portfolio of open-circuit piston pumps is built to maximize machine performance and productivity. With sophisticated controls that enhance system efficiency and a compact design that delivers incredible power, the X20 portfolio empowers mobile machine operators to do more work in less time using less fuel.

Sophisticated controls that improve performance while optimizing efficiency.

Excellent pressure responsiveness – The X20 portfolio delivers the fastest response and recovery times in the open circuit piston segment, helping customers get the job done faster.

Low standby pressure – The X20 portfolio can maintain low margin pressure (~150 psi) with exceptional stability, reducing heat generation and helping to eliminate wasted energy.

Stable fan drive functionality – Danfoss’s fan drive control reaches desired speed more quickly and remains stable once there, reducing energy-wasting oscillation.

Advanced electronic controls – The cold start and fan drive controls are Pro-FX Ready, meaning they can be easily configured with pre-programmed development tools and controlled electronically for maximum flexibility and precision.

Winning load sense combination – X20 works in conjunction with Danfoss’s CLS Load Sense Sectional Mobile Valve, providing OEMs one resource for their machine’s load sense needs.

Compact design that enables greater flexibility and cost savings.

Simplified pump architecture – The X20 pump has 25% fewer components than traditional pumps, reducing the number of leak points and simplifying maintenance.

Compact package size – The X20 portfolio’s small size satisfies Tier 4 requirements and provides more flexibility when designing the engine compartment.

More horsepower – The compact rotating group delivers a remarkable amount of horsepower, improving productivity without using more fuel.

Introduction

One-piece housing – Single-piece pump housing removes leak points and makes maintenance faster and easier versus more complicated multi-piece housings.

Multiple options that make it easy to specify exactly what you need.

Variety of control options – Including pressure control, load sense, cold start, torque control, remote pressure control, inverse proportional pressure control, proportional pressure control, electronic displacement control, and swash sensor feedback, giving you more ways to design more efficient, productive machines.

Several displacement options – With seven displacement options, there's an X20 pump to fit virtually any mobile application need.

Danfoss's 620 Series is currently available in 74cc (4.54 in³/r) and 98cc (5.98 in³/r) displacements. It is rated at 310 bar and is capable of generating over 100 kW (134 hp), making it the ideal pump for an array of different mobile and stationary applications. The 620 design also incorporates many new advances in product reliability. Once equipment is in the field, failures can prove to be extremely expensive by causing costly downtime. The 620 blends Danfoss's long tradition in providing quality pumps with the latest design and technology methods to ensure long lasting product reliability. The result is a very simple design with 25% fewer parts and a B-10 bearing life rated to over 80,000 hours at 2,000 psi far exceeding the requirements for most applications.

Variety of mounting options – The X20 series portfolio is available with SAE mounting flange configurations, can be side or rear-ported, and offers multiple drain ports to help overcome any installation challenges.

Exceptional quality that provides remarkable reliability.

Unique control piston design – Single-acting control piston with special coating helps minimize friction, increasing operating life .

Bronze piston shoes – Bronze piston shoes are robust against contamination should particles enter the fluid, enhancing system performance and component service life.

High-load bearings – Larger, more durable bearings resist wear and deliver industry-leading bearing life.

3-year manufacturer's warranty – Danfoss's warranty terms provide peace of mind for three full years, helping you get through your warranty period with complete confidence.

Global network of Danfoss-certified experts for end-to-end support.

More partners in more regions – Growing network of Danfoss distributors around the world ensures there's local service and support anywhere you need it.

World-class system design and assembly – Our expert distribution partners can help with everything from specifying to prototyping and assembly to commissioning, so you can focus on other areas of your business.

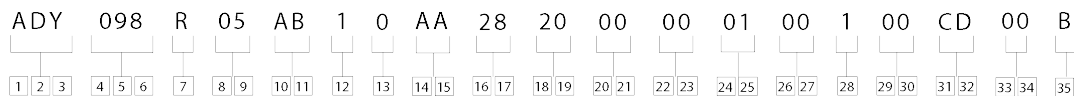
Danfoss-standardized practices and processes – Danfoss employs a unique system of tools and processes, known as the Danfoss Business System, to ensure quality development and delivery of the 220 X20 product. These tools and process include such known methods as Design for Six Sigma, Lean Manufacturing and ISO certification.

Model Codes

ADY 098 R 05 AB 1 0 AA 28 20 00 00 01 00 1 00 CD 00 B
 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35

1 2 3	Pump series	14 15	Controller type
ADY -	620 series open circuit piston pump	AA -	Pressure flow compensator with .4375 - 20 SAE O-ring load sense port
4 5 6	Pump displacement	AB -	Pressure flow compensator with M12 metric O-ring load sense port
074 -	74.4 cm ³ /r [4 .54 in ³ /r]	AC -	Pressure compensator only
098 -	98.0 cm ³ /r [5 .98 in ³ /r]	AH -	Pressure & flow compensator with torque control & .4375-20 SAE O-ring load sense port (left side)
7	Input shaft rotation	AP -	Remote pressure control M12 metric o-ring port, left side
R -	Right hand	AT -	Pressure and flow compensator with electronic displacement control - EP type
L -	Left hand	AV -	EH Inverse proportional pressure control
8 9	Front mount and shaft	AW -	Remote pressure control with .4375-20 SAE O-ring port, left side
05 -	4 Bolt C, 31 .8 mm (1 .25) Dia . keyed shaft	AY -	Pressure and flow compensator with electronic displacement control - EPD type
06 -	4 Bolt C, 14 Tooth 12/24 spline	16 17	Pressure compensator setting*
07 -	4 Bolt C, 38 .1 (1.50 in) Dia straight keyed	02 -	76 - 83 bar (1100 - 1200 psi)
08 -	4 Bolt C, 17 tooth 12/24 spline	17 -	159 - 166 bar (2300 - 2400 psi)
10 -	4 Bolt C, 31 .8 mm (1 .25 in) Dia . Tapered keyed shaft	26 -	196 - 203 bar (2850 - 2950 psi)
12 -	2/4 Bolt C, 14 Tooth 12/24 spline	34 -	234 - 241 bar (3400 - 3500 psi)
10 11	Main ports size & location	43 -	276 - 283 bar (4000 - 4100 psi)
AA -	098 rear ports, suction 2 .5" (code 61), pressure 1" (code 61)	18 19	Flow compensator/ remote pressure control setting*
AB -	098 side ports suction - 2 .5" (code 61); pressure - 1" (code 61)	00 -	No flow compensator setting
AC -	098 rear ports, suction 2 .5" (code 61), with M12 threads, pressure 1" (code 61) with M10 threads	15 -	13 - 15 bar (189 - 218 psi)
AD -	098 side ports suction - 2 .5" (code 61) with M12 threads; pressure - 1" (code 61) with M10 threads	32 -	19 - 21 bar (276 - 305 psi)
AF -	074 side ports suction - 2" (code 61); pressure - 1" (code 61)	30 -	29 - 31 bar (421 - 450 psi)
AG -	074 rear port, suction 2" (code 61) with M12 threads, pressure 1" (code 61) with M10 threads	20 21	Torque control setting*
AH -	074 side ports suction - 2" (code 61) with M12 threads; pressure - 1" (code 61) with M10 threads	00 -	No torque control
AJ -	074 rear ports, suction 2" (code 61), pressure 1" (code 61)	AB -	51 Nm [450 in-lb] (74cc)
12	Case drain ports	AE -	85 Nm [750 in-lb] (74, 98cc)
1 -	1.3125 - 12 SAE o-ring - top	AW -	243 Nm [2150 in-lb] (74, 98cc)
2 -	1.3125 - 12 SAE o-ring - bottom	BM -	401 Nm [3550 in-lb] (98cc)
3 -	M33 x 2 .0 o-ring - top	* Additional settings available by request	
4 -	M33 x 2 .0 o-ring - bottom	# - Recommend RPC pressure settings 10-21 bar (140-350 psi)	
13	Diagnostic pressure ports not available on thru-drive units		
0 -	No diagnostic pressure ports		
1 -	.5625 - 18 SAE O-ring - plugged (rear ports only)		
2 -	M14 plugged (both rear and side)		

Model Codes



<p>22, 23 Control special features</p> <p>00 – No control special features 0A – Bleed down orifice 0B – 24V electronic destroke (cold start) valve w/150 connector metri pack 0C – 24V electronic destroke (cold start) valve w/150 connector metri pack and bleed down orifice 0S – 12V DC solenoid AMP Jr connector (used with EH inverse proportional pressure control) 0T – 24V DC solenoid AMP Jr connector (used with EH inverse proportional pressure control) 0U – 12V DC solenoid deutsch connector (used with EH inverse proportional pressure control) 0V – 24V DC solenoid deutsch connector (used with EH inverse proportional pressure control)</p> <hr/> <p>24, 25 Maximum displacement option</p> <p>01 – Standard displacement (as given in code title) 02 – External manual stroke adjustment set at max</p> <hr/> <p>26, 27 Auxiliary (rear) mount & output shaft</p> <p>00 – No auxiliary mounting features AA – SAE A 2 Bolt, 9T 16/32 spline AB – SAE 2 Bolt, 11T 16/32 spline AC – SAE B 2/4 Bolt, 13T 16/32 spline AD – SAE B 2/4 Bolt, 15T 16/32 spline AE – SAE C 2/4 Bolt, 14T 12/24 spline AF – SAE C 2/4 Bolt, 17T 12/24 spline (98cc only) AG – Auxillary mount ready with cover plate</p>	<p>28 Shaft seal</p> <p>1 – Viton shaft seal 3 – Nitrile</p> <hr/> <p>29, 30 Pump special features</p> <p>00 – No special features AA – Auxiliary mounting cover plate AB – Swash position sensor</p> <hr/> <p>31, 32 Paint</p> <p>00 – No paint 0B – Black CD – Blue primer</p> <hr/> <p>33, 34 Identification/packaging</p> <p>00 – Standard Eaton identification box packaging</p> <hr/> <p>35 Design level</p> <p>B – Second design</p>
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* Additional settings available by request

Specifications and Performance

General performance specifications

		Units	ADY074	ADY098
Displacement		cc/r (in ³ /r)	74.4 (4.54)	98.0 (5.98)
Mounting	4 Bolt C, 2/4 Bolt C			
Pressure ²	Continuous	bar (psi)	310 (4495)	280 (4060)
	Intermittent ³		346 (5020)	320 (4600)
	Peak ⁴		373 (5410)	350 (5000)
Speed ⁵	Rated	rpm	2400	2200
	Max		2880	2640
	Min		600	600
Power	Max (theoretical)	kW (hp)	92.3 (123.7)	100.6 (134.9)
	Standby		2.1 (2.8)	2.6 (3.5)
Torque	Max (theoretical)	Nm (lb-ft)	367.3 (270.9)	436.7 (322.1)
Weight ¹		kg (lbf)	43.5 (96.1)	45.9 (101.3)
Bearing life ⁶	At 140 bar (2030 psi)	B10 Hours	125,200	81,400
	At 210 bar (3045 psi)		32,900	21,400
	At 280 bar (4060 psi)		12,100	7,900
	At 310 bar (4495 psi)		8,600	
Mass moment of inertia		kg-m ²	0.0089	0.0118
		(lbm-ft ²)	(0.211)	(0.279)

¹Standard SAE B non-through drive.

²The 620 is capable of running at higher pressures than shown. In order to not void the warranty, you must provide duty cycle information and receive written approval.

³Less than 10% of duty cycle.

⁴Momentary system pressure spikes only.

⁵Ratings based on Flange ports. Note: Tube ports are not available on the 62cc and 80cc displacements.

⁶Bearing life ratings at rated speed - 1 bar abs (0 psig) inlet.

Inlet pressure, case pressure, and operating temperature requirements

Inlet pressure			Case pressure			Operating temperature		
Rated	Minimum	Maximum	Maximum continuous	Maximum intermittent	Peak	Rated	Minimum temperature	Maximum intermittent
bar abs (psig)	bar abs (in. Hg)	bar abs (psig)	bar abs (psig)	bar abs (psig)	bar abs (psig)	°C (°F)	°C (°F)	°C (°F)
1.0 (0)	0.85 (5)	4.4 (50)	1.3 (5)	3.1 (30)	6.2 (75)	93 (200)	-37 (-35)	104 (220)

Hydraulic fluids

Fluid	Recommended operating viscosity range cSt (SUS)	Maximum continuous cSt (SUS)	Maximum viscosity at startup cSt (SUS)	Minimum viscosity @ max. temperature of 93°C (200°F) cSt (SUS)	Minimum intermittent cSt (SUS)
Use antiwear hydraulic oil, or automotive type crankcase oil (designations SC, SD, SE or SF) per SAE J183 FEB80	16 to 40 (80 to 188)	430 (1192)	2100 (9720)	10 (59)	6 (46)

Specifications and Performance

For more information, see Danfoss publication 579. For operation on other alternative or environmentally friendly fluids, please contact your Danfoss representative.

Control options

Pressure & Flow (Load Sense) Compensator

The pump will provide flow & pressure matching of pump output to system load demand, maximizing efficiency and improving load metering characteristics of any directional control valve installed between the pump and the load. Load sensing ensures that the pump always provides only the amount of flow needed by the load. The pump operating pressure adjusts to the load pressure plus a pressure differential required for the load sense margin. When the system is not demanding flow, the load sense control will operate in low pressure zero flow, energy saving stand-by mode. The differential pressure is the difference between the pressure inlet and service port of a proportionally controlled directional valve, or a load sensing directional control valve. See the model code for differential pressure settings for load sensing. If the load pressure exceeds the system pressure setting, the pressure compensator reduces pump displacement. The load sensing line must be as short as possible and can also be used for remote pressure control or unloading of the pump pressure. For remote pressure control purposes, it is recommended that you contact your Danfoss Representative for the correct configuration of the control.

Warning

1. When adjusting the pressure compensator, install a 0 to 350 bar (0 to 5000 psi) gage in the outlet gage port and limit the pressure setting to the continuous rated pressure for the pump displacement. It is possible to adjust the pressure compensator beyond the rated pressure of the pump. Doing so may void the warranty of the pump.
2. Danfoss recommends use of relief valve in all systems.

Pressure limit settings

The pressure compensator uses two springs to cover the full pressure range of the X20 pumps.

Spring 1 = < 140 bar (2050 psi)

Spring 2 = 145 - 280 bar (2100 - 4060 psi)

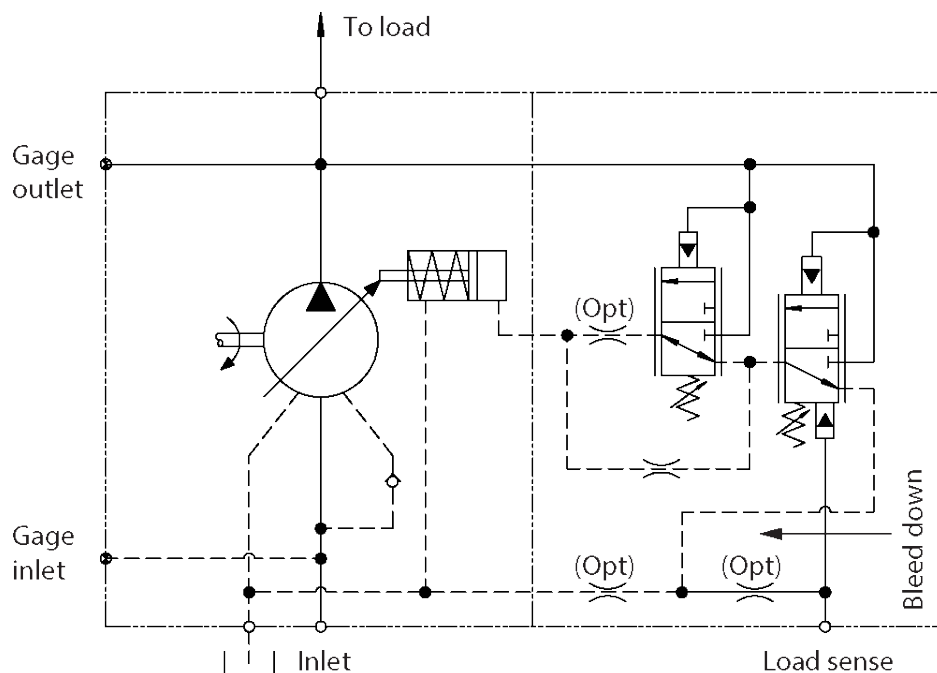
310 bar (4496 psi) for 74cc pump

Flow compensator (load sense) settings

There are two springs used to cover the load sense adjustment range of this control. Available load sense range is:

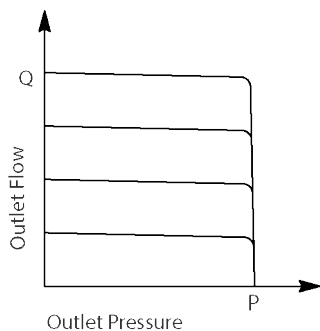
Spring 1 = < 20 bar (290 psi)

Spring 2 = 21-42 bar (300-609 psi)



Control options

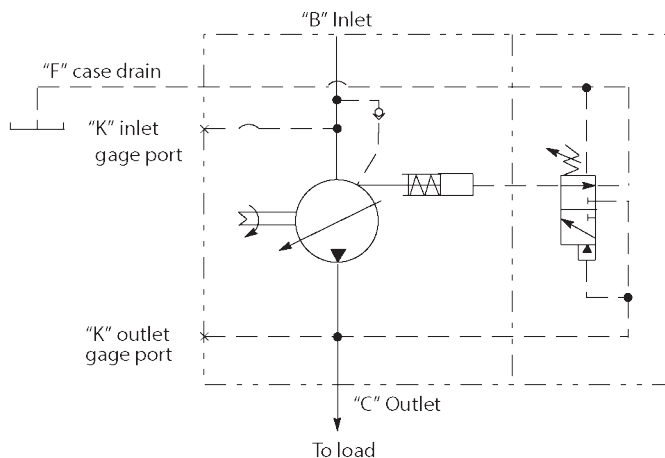
Typical operating curve



Dynamic response per SAE J745 (using swash plate position)

	Response (off stroke)	Recovery (on stroke)	Load sense recovery
	msec	msec	msec
ADY074	13	47	84
ADY098	24	68	94

Pressure Compensator



The pump will provide a continuously modulated flow to meet changing load demands at a pre-adjusted compensator pressure. At pressures below the compensator setting, the pump will operate at maximum displacement. See model code position #16, 17 for compensator pressure ranges.

Warning:

1. When adjusting the pressure limiter, install a 0 to 350 bar (0 to 5000 psi) gage in the outlet gage port and limit the pressure setting to the continuous rated pressure for the pump displacement. It is possible to adjust the pressure compensator beyond the rated pressure of the pump. Doing so, may void the warranty of the pump.
2. Danfoss recommends use of relief valve in all systems.

Pressure limit settings

The pressure compensator uses two springs to cover the full pressure range of the X20 pumps.

Spring 1 = <140 bar (2050 psi)

Spring 2 = 145 - 280 bar (2100 - 4060 psi)

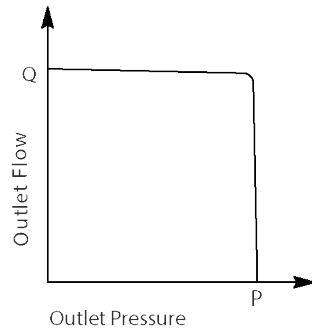
310 bar (4496 psi for 74 cc pump)

Control options

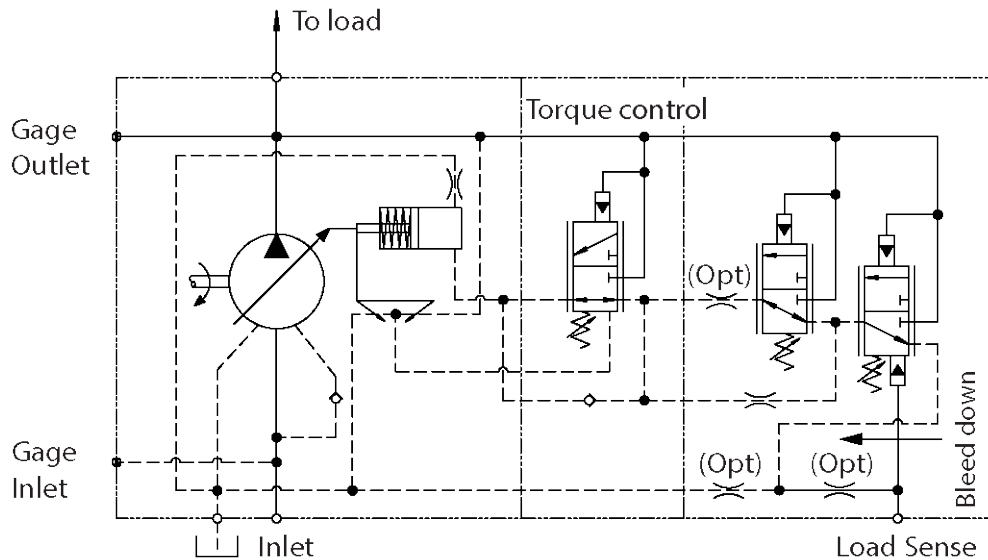
Dynamic response per SAE J745 (using swash plate position)

	Response (off stroke)	Recovery (on stroke)
	msec	msec
ADY074	30	90
ADY098	30	70

Pressure cutoff characteristics of pressure compensator control @ 49°C (120°F), static conditions.



Torque Control



The Torque Control limits the torque input to the pump preventing the engine from stalling while also optimizing the use of the engine power.

When combined with Pressure Compensator Control and/or Load Sense, it will allow the pump to remain inside the power envelope of the Pressure Flow curve. When the combination of pump flow and outlet pressure moves outside the envelop the pump displacement will automatically be reduced.

This maximum setting is easily calculated using the following steps:

- Select the 620 pump displacement you intend to use
- Identify the available engine horsepower (HP) and speed (rpm)
- Calculate the torque limit required by the system using the equations shown
- Select the MAX torque setting from the table shown

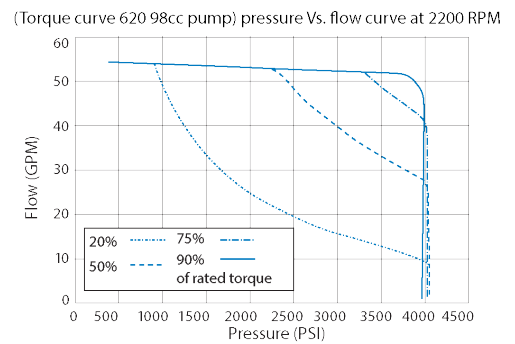
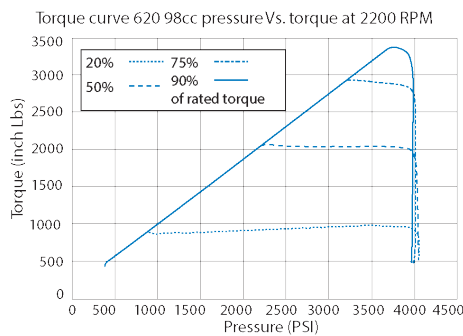
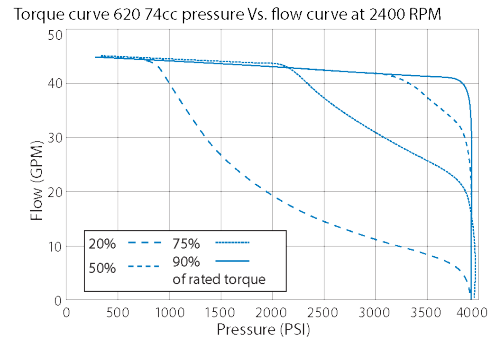
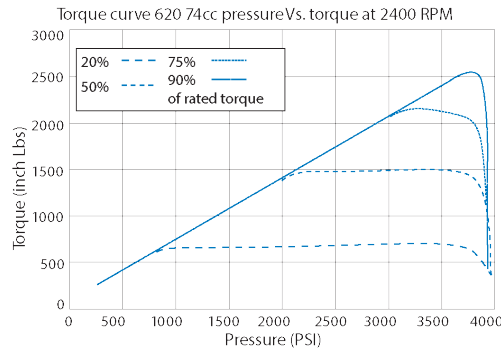
$$\text{Torque (in-lbs)} = \text{Horsepower (HP)} \times 63025 / \text{Engine RPM}$$

$$\text{Torque (Nm)} = \text{Horsepower (KW)} \times 9550 / \text{Engine RPM}$$

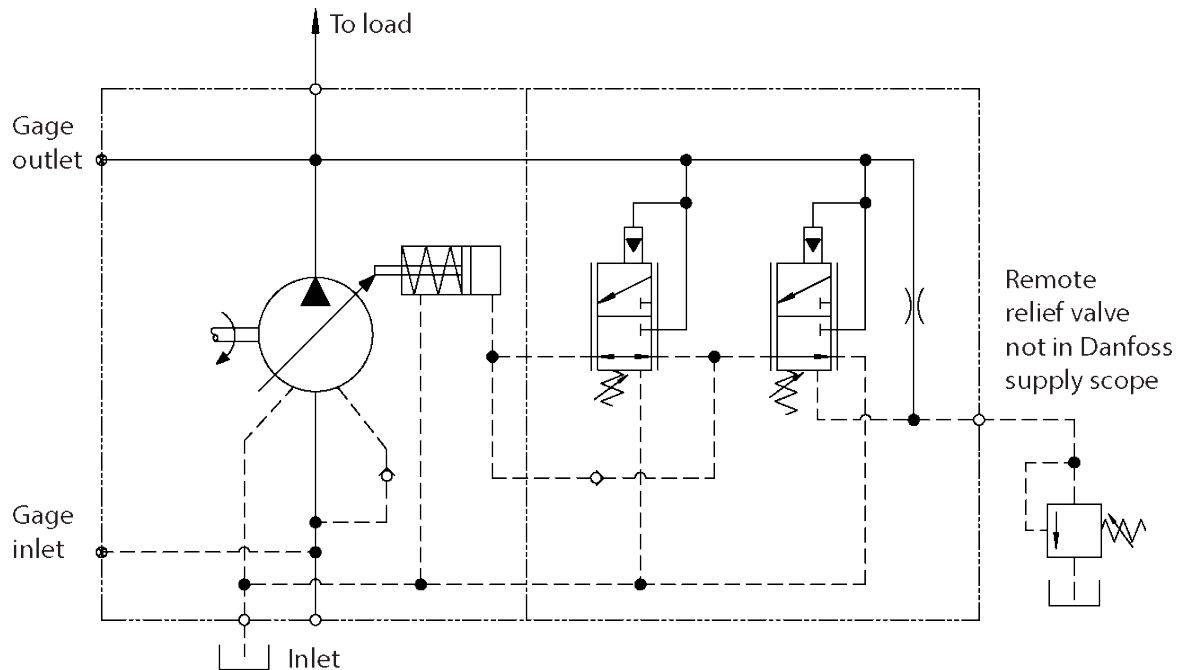
Control options

Pos #20, 21 Code	Torque Nm [lb·in]	74 cc	98 cc
AB	51 [450]	√	
AC	62 [550]	√	
AD	73 [650]	√	
AE	85 [750]	√	√
AF	96 [850]	√	√
AG	107 [950]	√	√
AH	119 [1050]	√	√
AJ	130 [1150]	√	√
AK	141 [1250]	√	√
AL	153 [1350]	√	√
AM	164 [1450]	√	√
AN	175 [1550]	√	√
AP	186 [1650]	√	√
AR	198 [1750]	√	√
AT	209 [1850]	√	√
AU	220 [1950]	√	√
AW	243 [2150]	√	√
AZ	266 [2350]	√	√
BB	288 [2550]	√	√
BD	311 [2750]	√	√
BF	333 [2950]	√	√
BH	356 [3150]	√	√
BK	379 [3350]		√
BM	401 [3550]		√
BN	286.5 [2536]	√	√
BP	184.4 [1632]	√	√
BR	303 [2682]	√	

Control options



Remote Pressure Control (RPC)



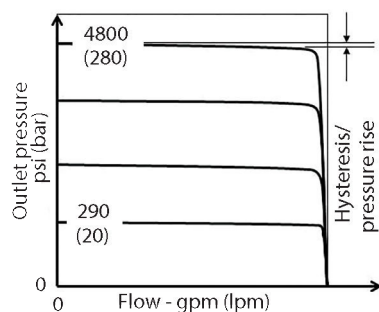
Remote relief valve is to be connected to pilot port "J" through necessary external piping. Standard differential pressure of 20 bar is set at RPC spool. The required outlet pressure (below 280 bar) can be set by adjusting remote relief valve setting. Once pressure reaches preset value, flow across remote relief valve starts, this results in RPC spool movement due to pressure imbalance. This will de-stroke the pump to maintain the set pressure.

Secondary fixed pressure compensator is provided to limit the max pressure setting as a fail safe measure.

Control options

Note

- Flow Compensator is not available with RPC.
- When selecting this option in the model code, a pressure setting value must be identified in the flow compensator field. Select a range of 10-24 bar (140-350 psi), default is 20. The setting selected is the RPC differential pressure.
- Remote relief valve is not included in supply scope of the pump.



Delta pressure setting at control valve - bar (psi)	14 - 24 (200-350)
Control fluid consumption- lpm (gpm)	4.5 (1.2) max.
Recommended flow rating of remote relief valve - lpm (gpm)	3 - 5 (0.8 - 1.32)
Recommended Danfoss Relief Valve part number	RV5-10-S-0-50

Electronic Displacement Control (EDC)

Pump displacement can be controlled infinitely, as per the current signal provided to the solenoid control valve. The integrated pump control makes use of an external current signal to vary the pump displacement. This control has a proportional characteristic i.e. with increasing current signal, the displacement increases proportionately.

This control is with manual override. Based on fail safe condition there are two types:

Min type (EP): Return to min displacement in case of power loss.

Max type (EPD): Return to max displacement in case of power loss

Warning:

1. When adjusting the pressure limiter, install a 0 to 350 bar (0 to 5000 psi) gage in the outlet gage port and limit the pressure setting to the continuous rated pressure for the pump displacement. It is possible to adjust the pressure compensator beyond the rated pressure of the pump. Doing so may void the warranty of the pump.
2. Danfoss recommends use of relief valve in all systems.

Pressure limit settings

The EDC can operate between 20 bar (290 psi) and 280 bar (4060 psi).

Electrical data

Voltage	12 V DC	24 V DC
Max Current	1500 mA	750 mA
R20, Resistance (ohm)	5.19 +/- 0.52%	20.8 +/- 2.08
Type of Control	Current	Current
Recommended PWM Frequency	250 Hz	250 Hz
Dither Frequency	75 Hz	75 Hz
Dither Amplitude	300mA	300mA
Duty Cycle	100%	100%

Control options

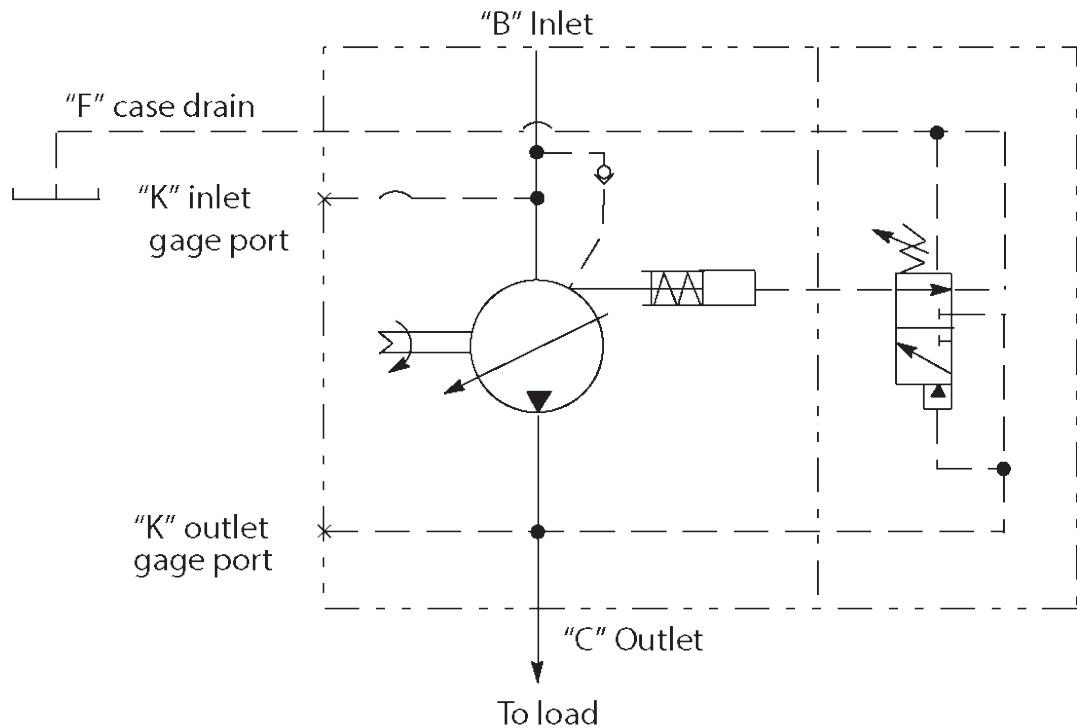
Electrical data (continued)

Insulation material	Class H, 180 deg C	Class H, 180 deg C
Protection Class	IP69K	IP69K
Connector	Deutsch	Deutsch
Operating Temperature	-40 deg C; 85 deg C	-40 deg C; 85 deg C

This control has manual override.

Hysteresis less than 5%. For cold start function,

Control type	Supply current (mA)	
	12V	24V
EP	0	0
EPD	480	240



EH Inverse Proportional Pressure Control (IPPC)

The EH Inverse Proportional Pressure control allows for stepless variation of the max pump output pressure, as per the current signal provided to the control valve solenoid.

The integrated pump control makes use of an external current signal to vary the pump output pressure

This control has an inverse proportional characteristic i.e. with increasing current signal, the max output pressure is proportionately reduced

Warning:

1. When adjusting the pressure limiter, install a 0 to 350 bar (0 to 5000 psi) gage in the outlet gage port and limit the pressure setting to the continuous rated pressure for the pump displacement. It is possible to adjust the pressure compensator beyond the rated pressure of the pump. Doing so, may void the warranty of the pump.
2. Danfoss recommends use of relief valve in all systems.

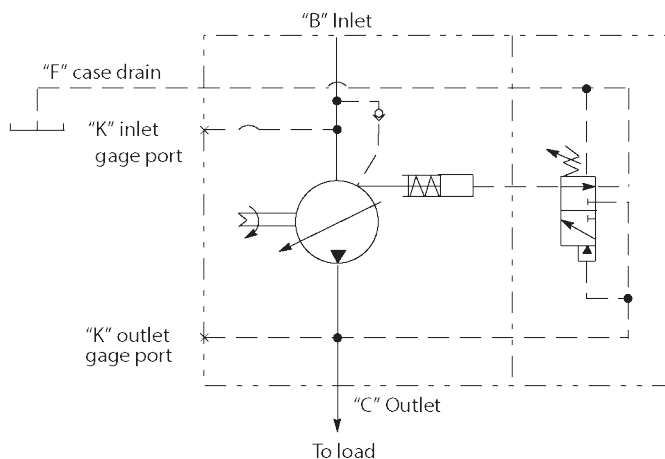
Control options

Pressure limit settings

The EH IPPC covers pressure range of the X20 pumps. The Minimum is 110 bar and max pressure can be set from 140 bar (2050 psi) to 280 bar (4060 psi).

Electrical data

Voltage	12 V	24 V
Max Current	1500 mA	750 mA
R20, Resistance (ohm)	5.3 +/- 5%	21.2 +/- 5%
Type of Control	Current	Current
Recommended PWM Frequency	100Hz	100 Hz
Duty Cycle	100%	100%
Insulation material	Class H, 180 deg C	Class H, 180 deg C
Protection Class	IP6K6/IP69K	IP6K6/IP69K
Connector	AMP Junior Power	AMP Junior Power
	Timer/Deutsch	Timer/Deutsch
	Connector DT04-2P	Connector DT04-2P
Operating Temperature	-30 deg C; 105 deg C	-30 deg C; 105 deg C



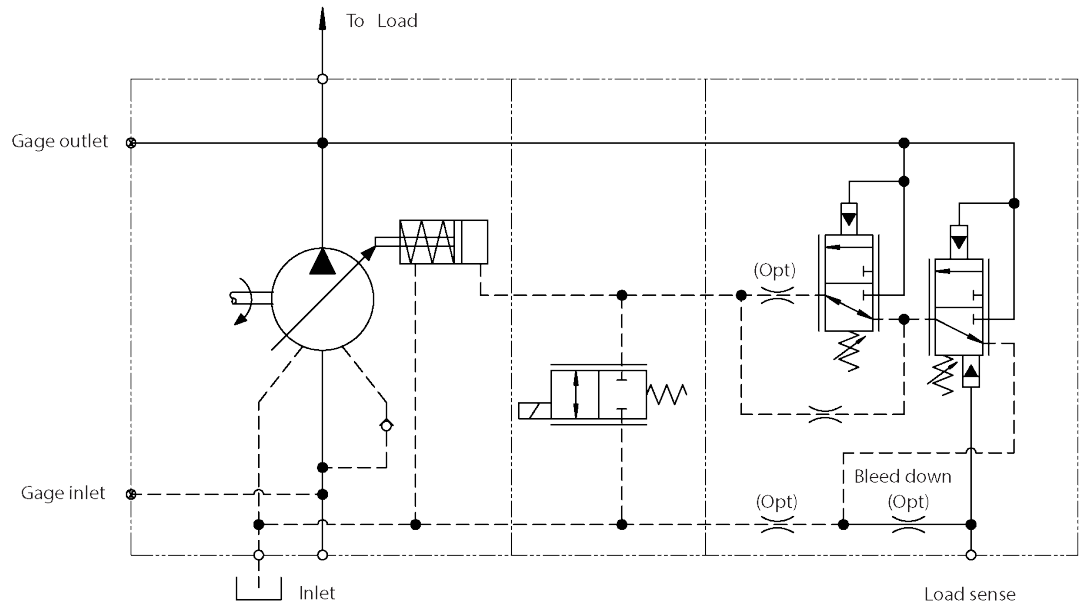
Electronic Destroke (Cold Start) Valve

The Electronic Destroke Valve reduces pump start-up torque by directing outlet pressure to the control piston.

It is primarily used in cold weather applications and includes a 12 or 24 VDC directional control valve mounted between the pump housing and compensator.

Refer model code position 22,23 - control special features for available connector option.

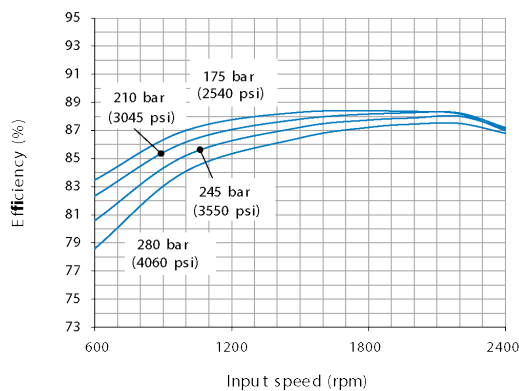
Control options



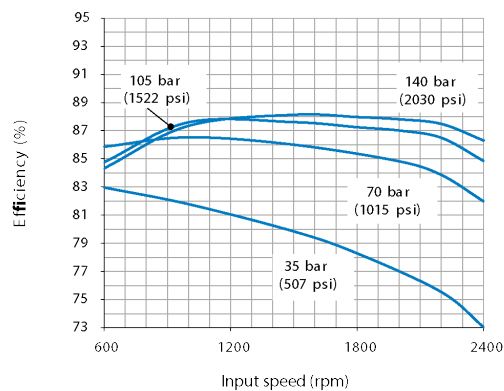
Performance

ADY074

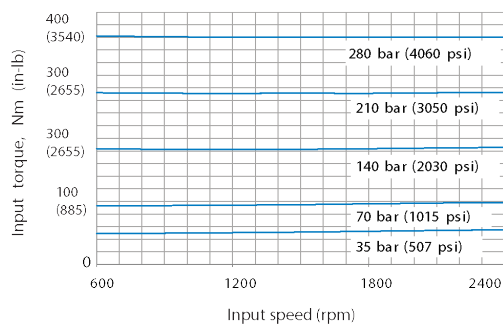
Overall efficiency versus speed @ 49°C (120°F), full flow, and 1.0 bar (0 psi) inlet



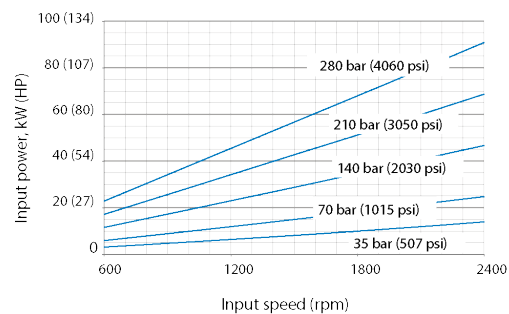
Overall efficiency versus speed @ 49°C (120°F), full flow, and 1.0 bar (0 psi) inlet



Input torque versus speed @ 49°C (120°F), full flow, and 1.0 bar (0 psi) inlet

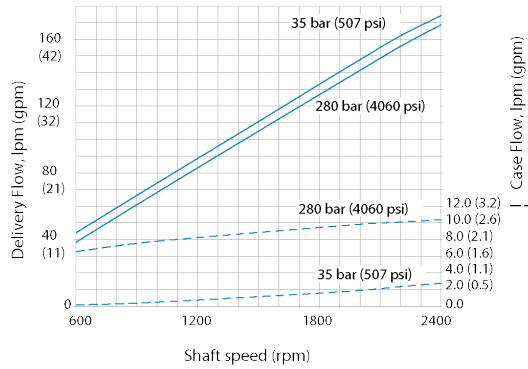


Input Power versus speed @ 49°C (120°F), Full Flow, and 1.0 bar (0 psi) inlet

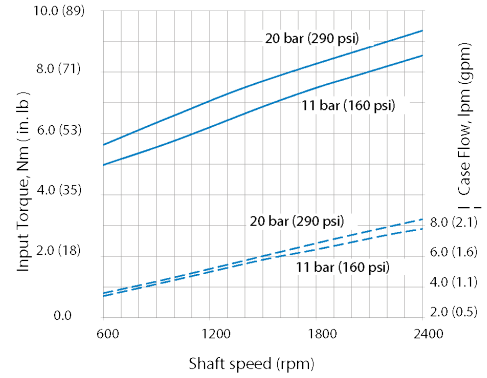


Performance

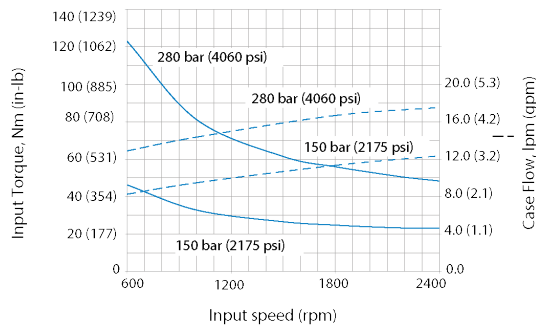
Delivery and case flow versus speed @ 49°C (120°F)



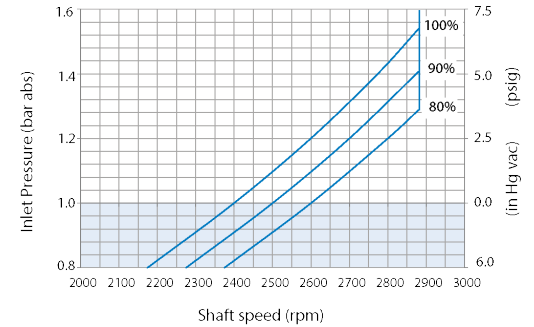
Input torque and case flow vs. speed @ stand-by and 49°C (120°F)



Input torque and case flow vs. speed @ Cut-off and 49°C (120°F)



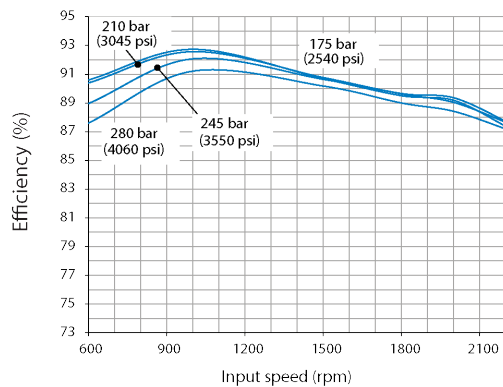
Inlet pressure vs. Speed @ 49°C (120°F)



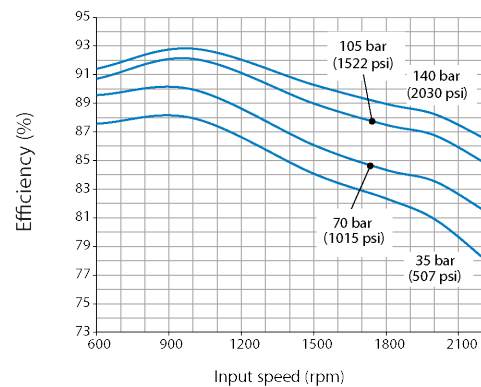
Performance

ADY098

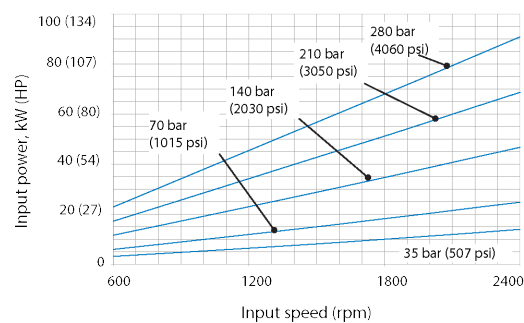
Overall efficiency versus speed @ 49°C (120°F), full flow, and 1.0 bar (0 psi) inlet



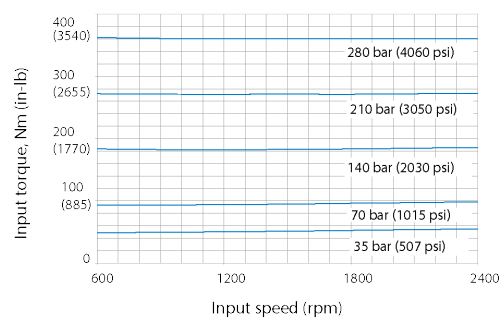
Overall efficiency versus speed @ 49°C (120 F), full flow, and 1.0 bar (0 psi) inlet



Input power versus speed @ 49°C (120°F), full flow, and 1.0 bar (0 psi) inlet

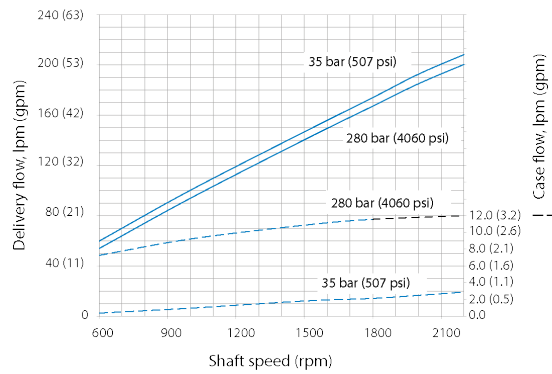


Input torque versus speed @ 49°C (120°F), full flow, and 1.0 bar (0 psi) inlet

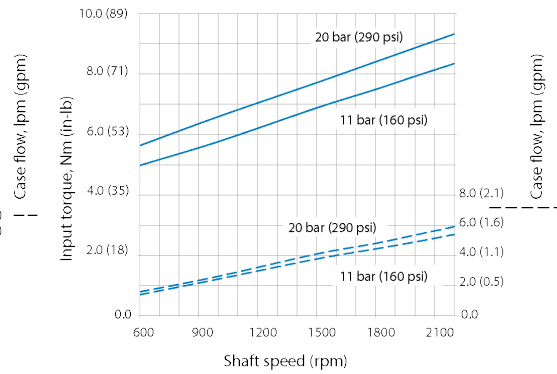


Performance

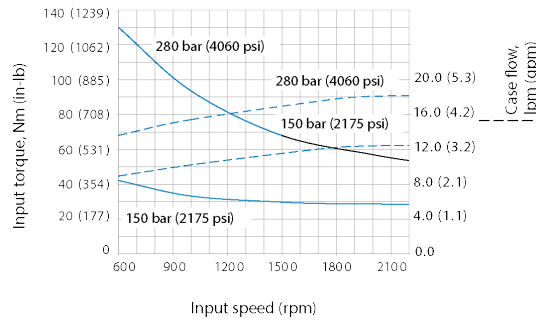
Delivery and case flow versus speed @ 49°C (120°F)



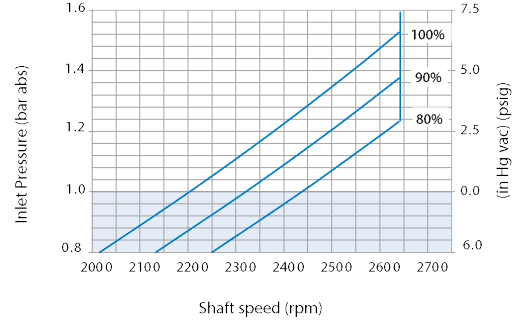
Input torque and case flow stand-by @ 49°C (120°F)



Input torque and case flow cut-off @ 49°C (120°F)



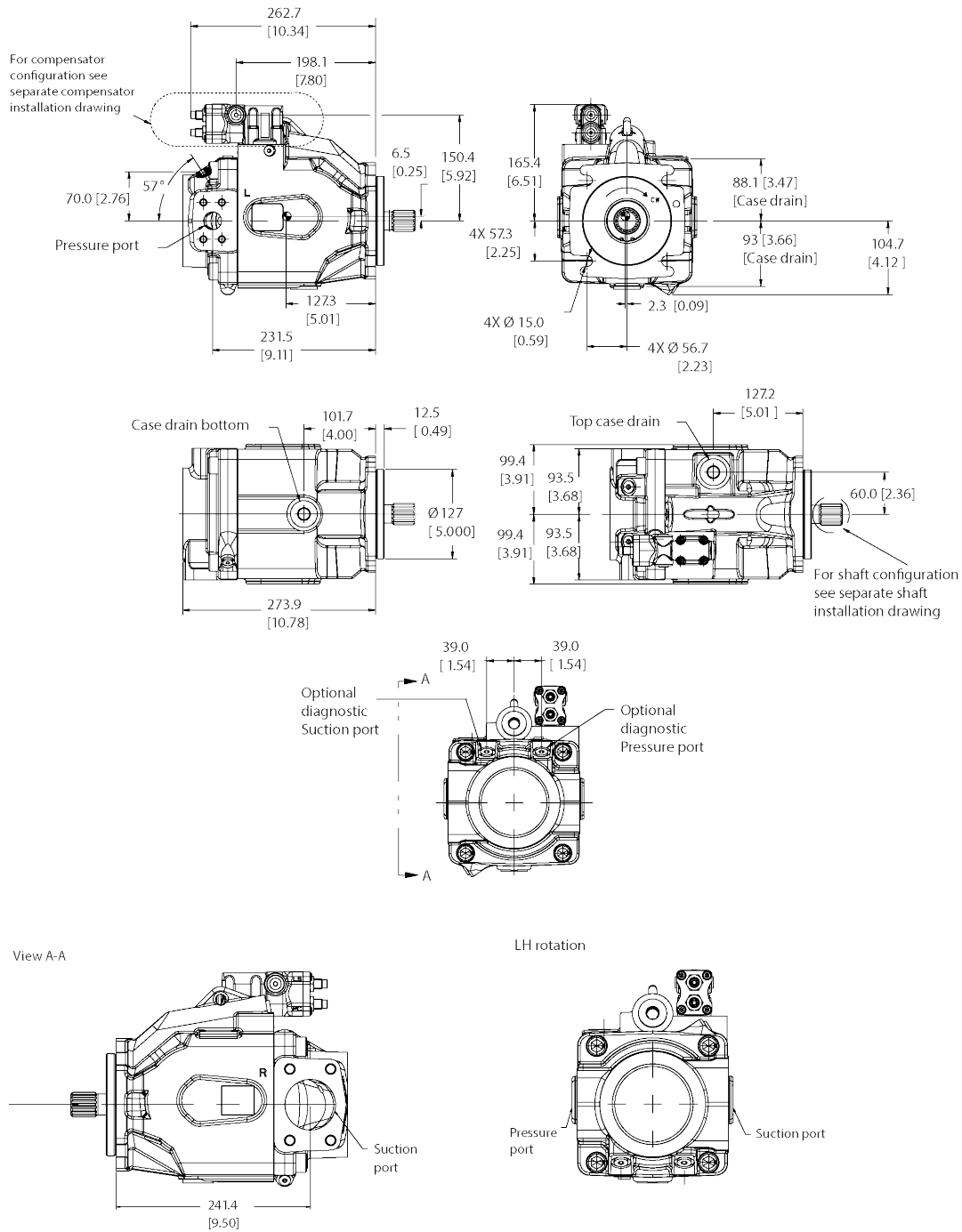
Inlet pressure versus speed @ 49°C (120°F)



Pump Installation

ADY074 C-Mount – side-ported

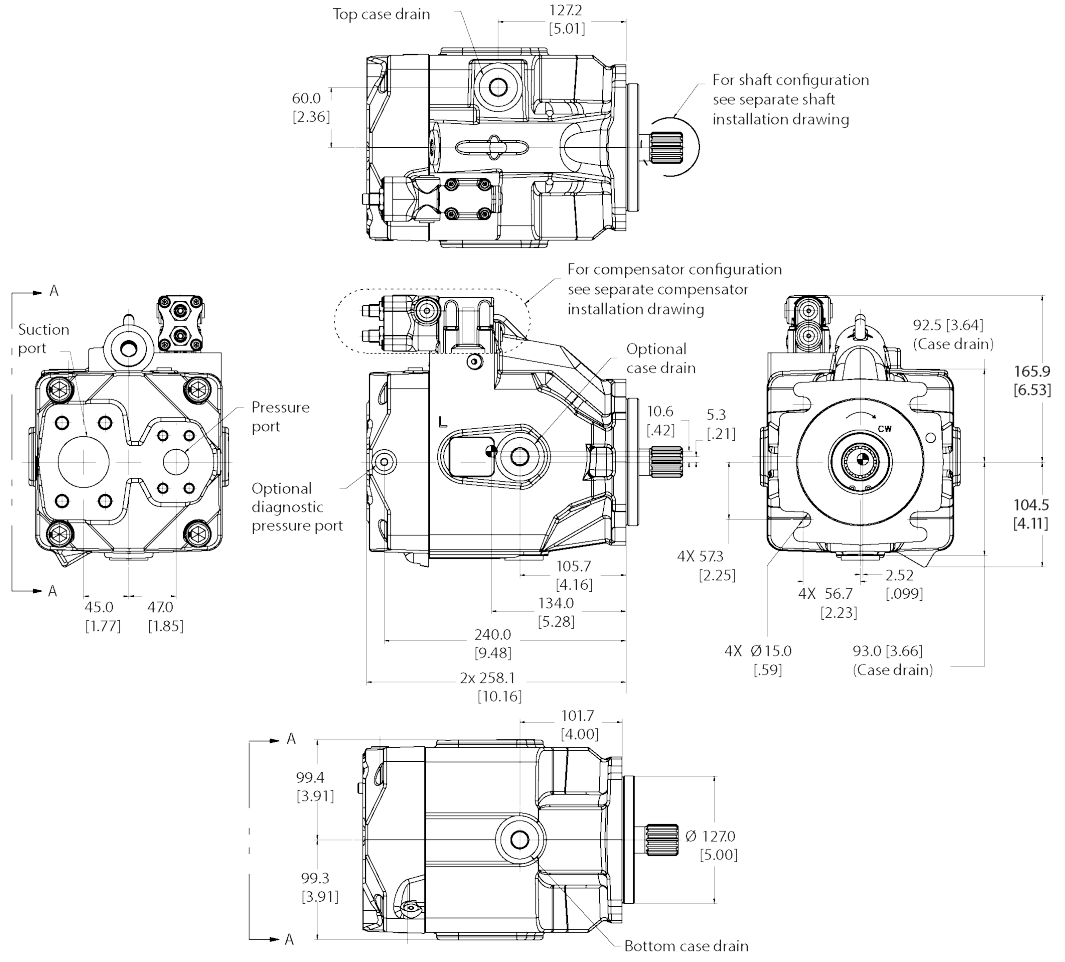
74cc side ported RH rotation



Pump Installation

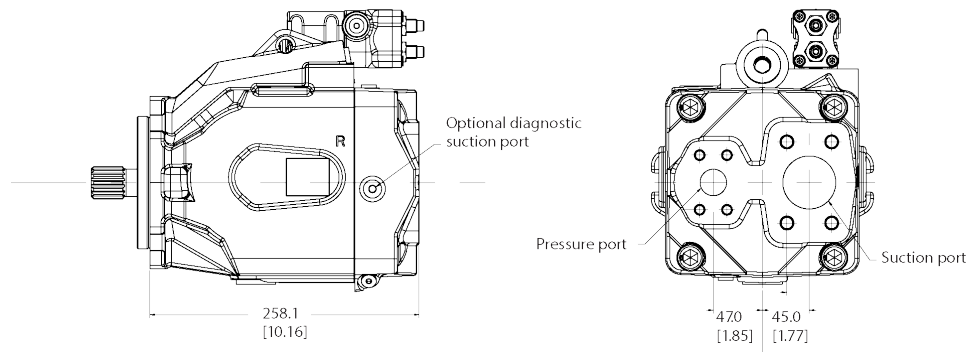
ADY074 C-Mount – rear-ported

74cc rear ported RH rotation



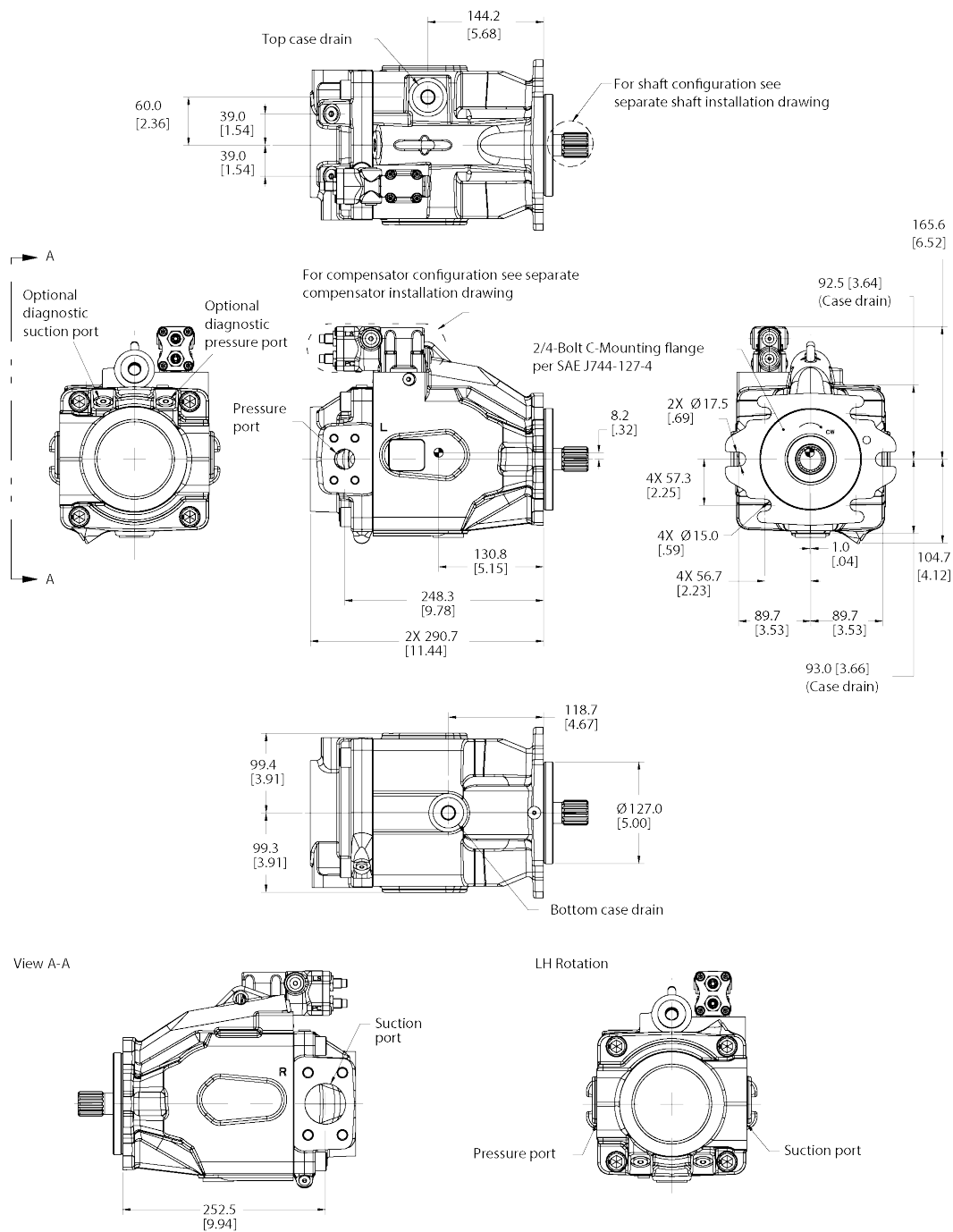
View A-A

LH Rotation



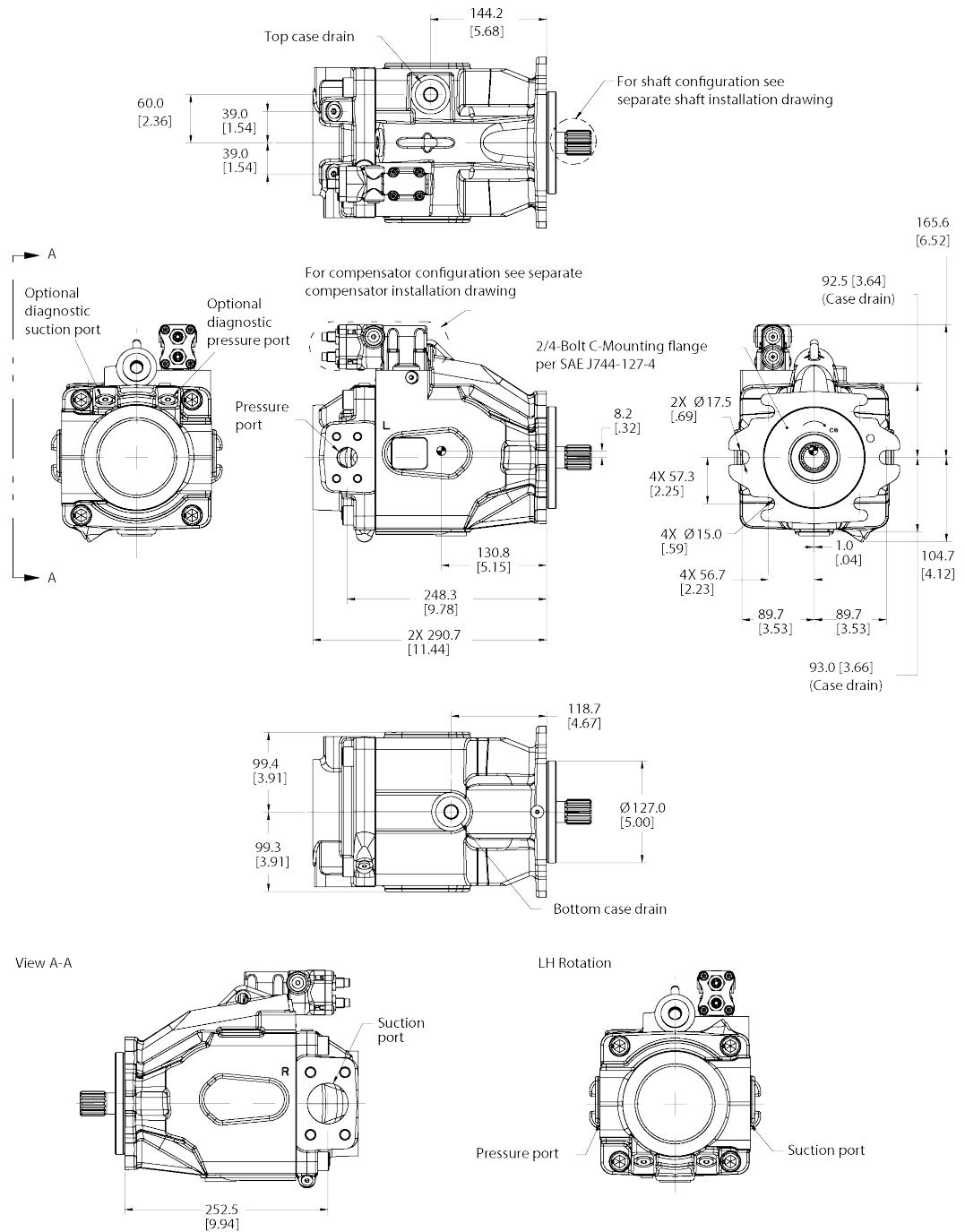
Pump Installation

ADY074 - 2/4 bolt C mount - side-ported



Pump Installation

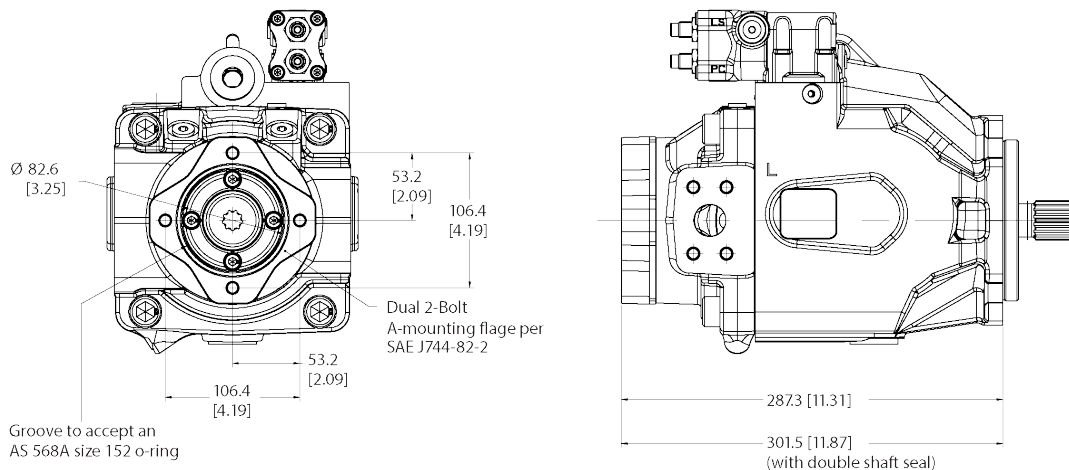
ADY074 -2/4 bolt C mount - rear-ported



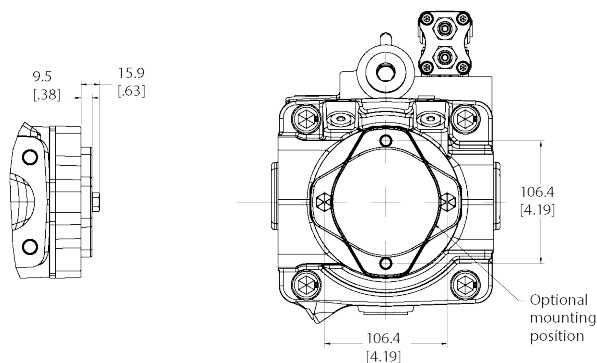
Pump Installation

ADY074 Thru-drive SAE A option

74cc thru drive SAE-A

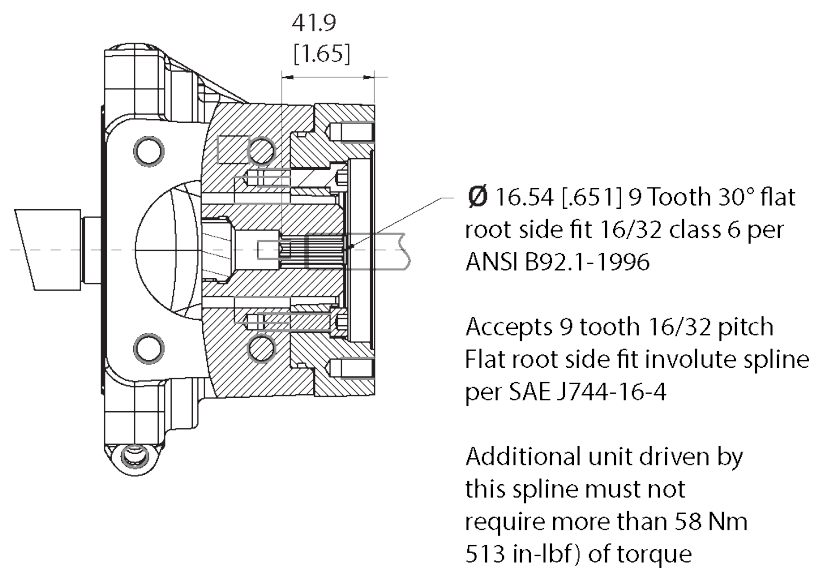


SAE-A thru-drive cover plate installation



Output shaft installation 9T spline

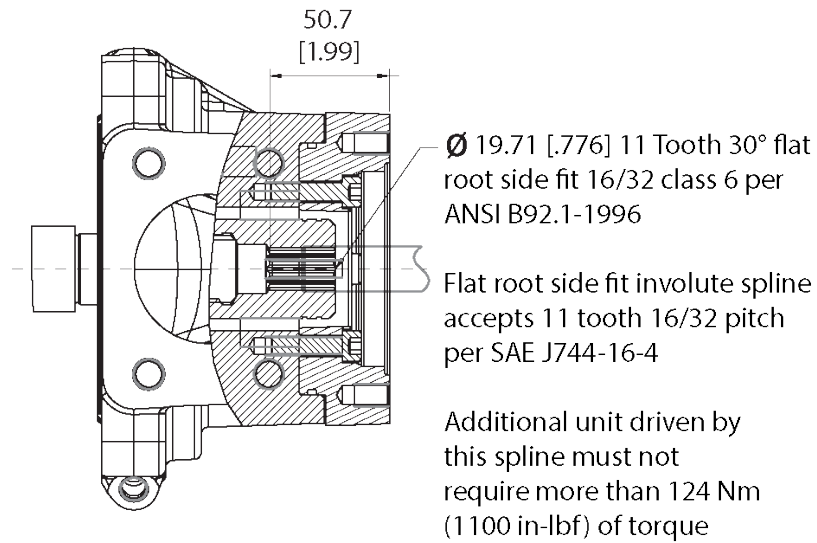
Maximum torque 58 Nm [513 in-lbf]



Pump Installation

Output shaft installation 11T spline

Maximum torque 124 Nm [1100 in-lbf]



Pump Installation

ADY074 Thru-drive SAE B option

74cc thru drive SAE-B

Groove to accept an AS 568A size 1520 - ring

6 X .500-13 UNC-2B

Ø 101.7
[4.00]

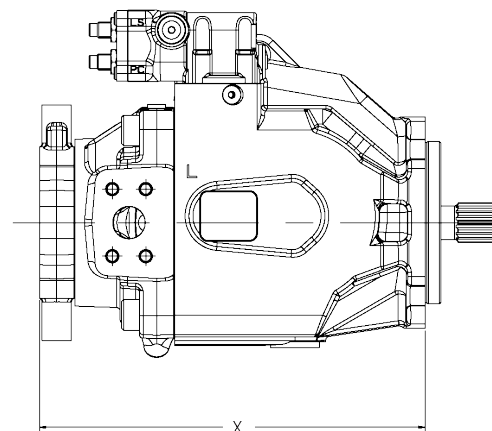
118
[4.65]

For output shaft configuration see separate shaft installation drawing

89.8
[3.535]

146
[5.748]

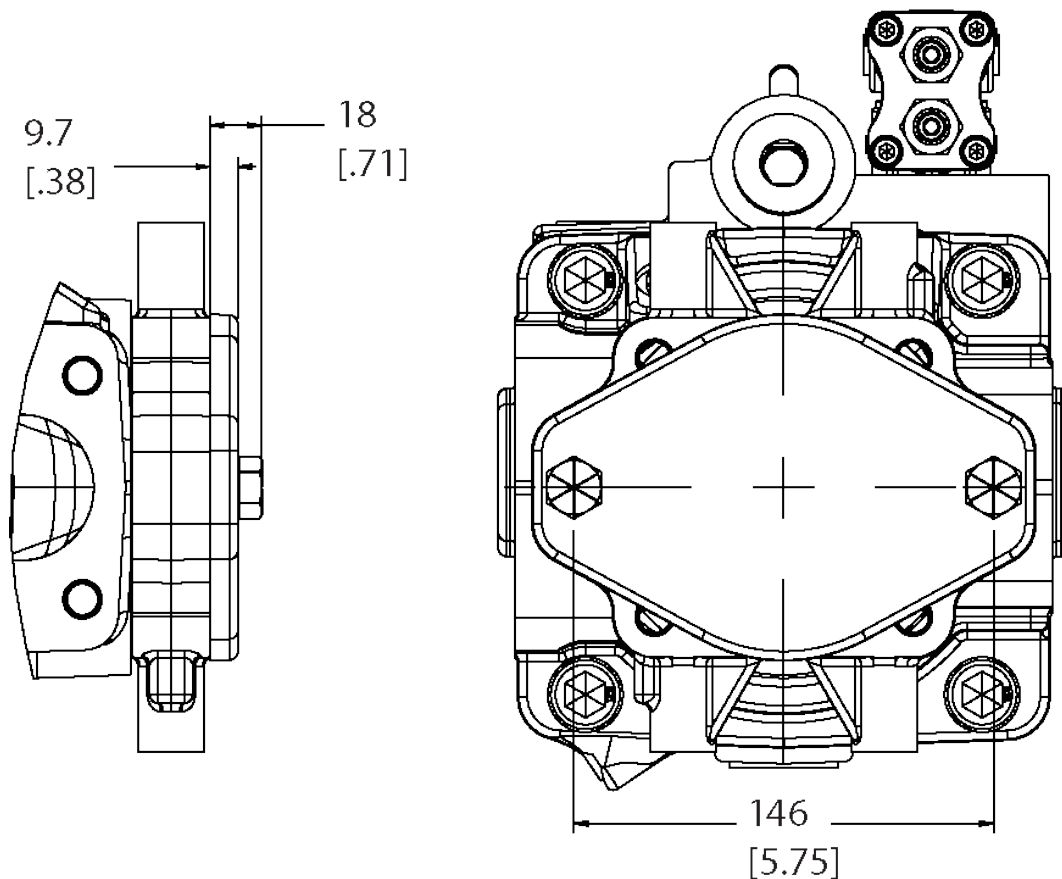
175.2
[6.90]



SAE - B thru drive cover plate installation

9.7
[.38]

18
[.71]



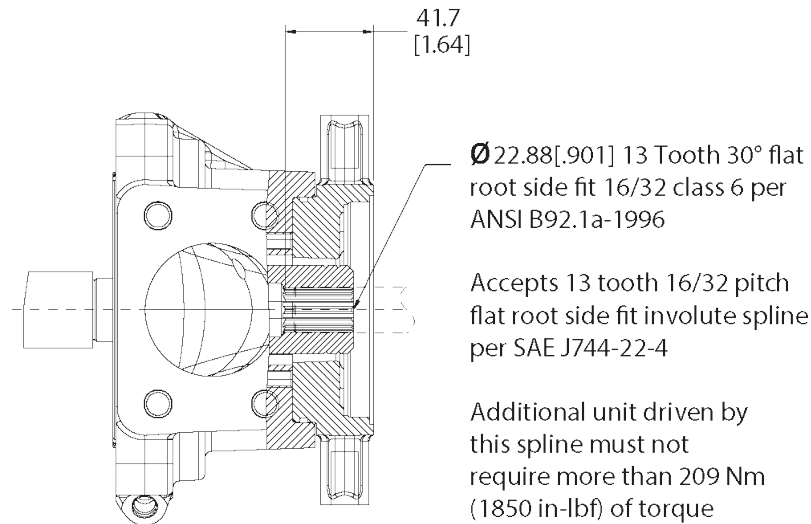
146
[5.75]

Output Shaft	Dim "A"
13 T spline	301.5 [11.87]
15 T spline	317.4 [12.50]

Pump Installation

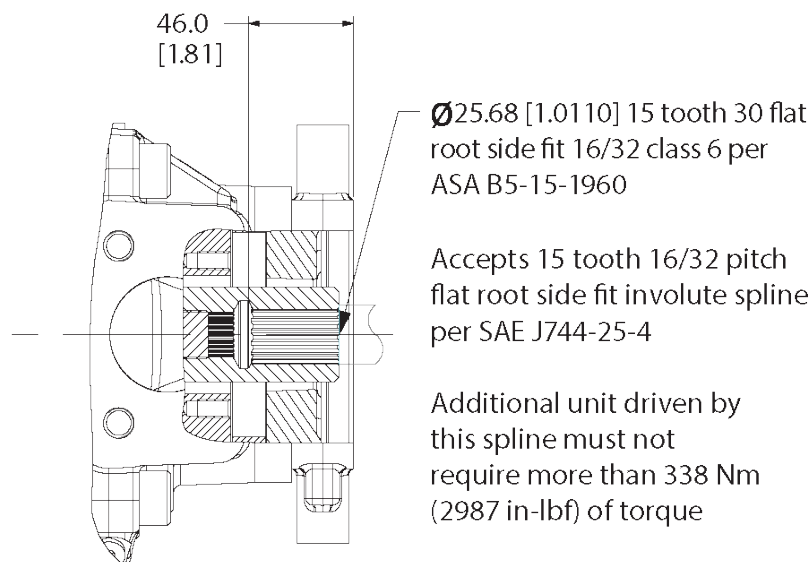
Output shaft installation 13T spline

Maximum torque 209 Nm [1850 in-lbf]



Output shaft installation 15T spline

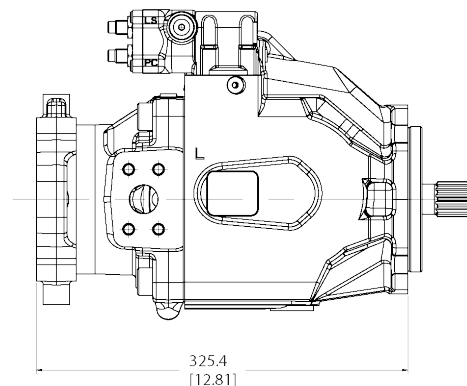
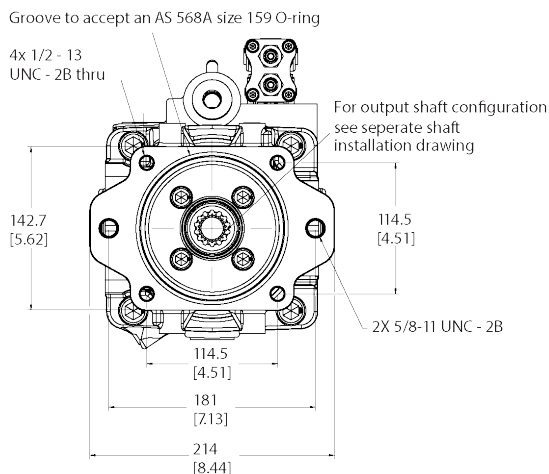
Maximum torque 338 Nm [2987 in-lbf]



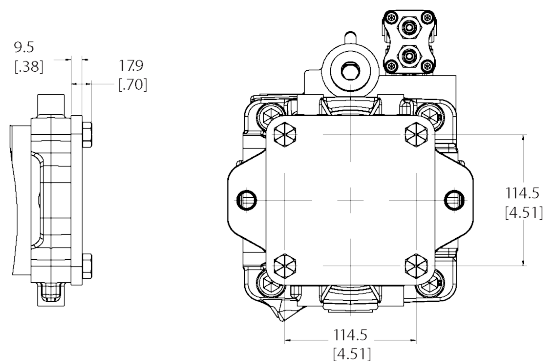
Pump Installation

ADY074 Thru-drive SAE C option

74cc thru drive SAE-C

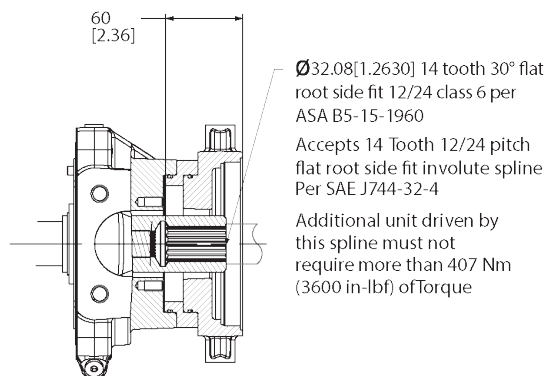


SAE-C thru drive cover plate installation



Output shaft installation 14T spline

Maximum torque 407 Nm [3600 in-lbf]

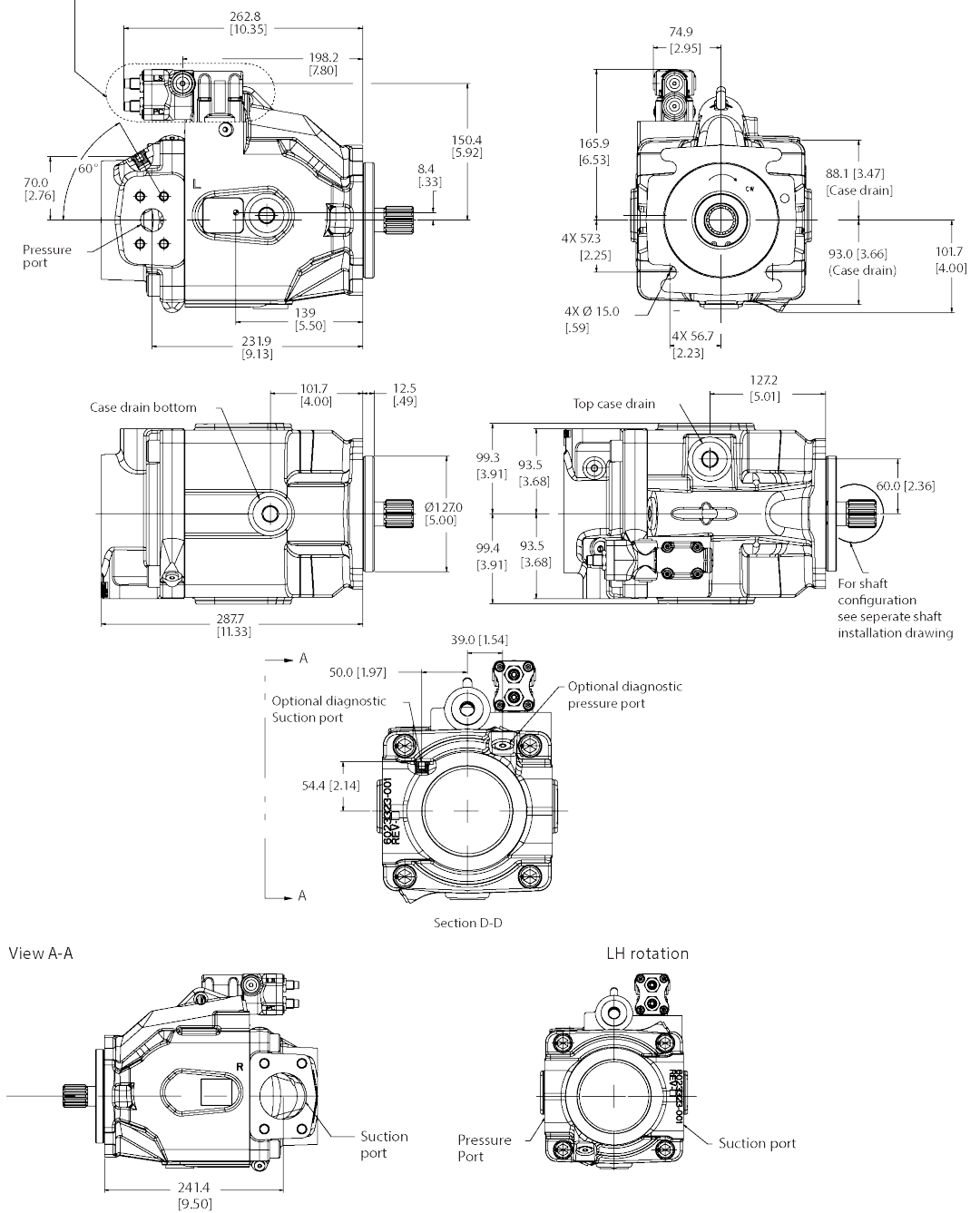


Pump Installation

ADY098 C-mount – side-ported

98cc side ported

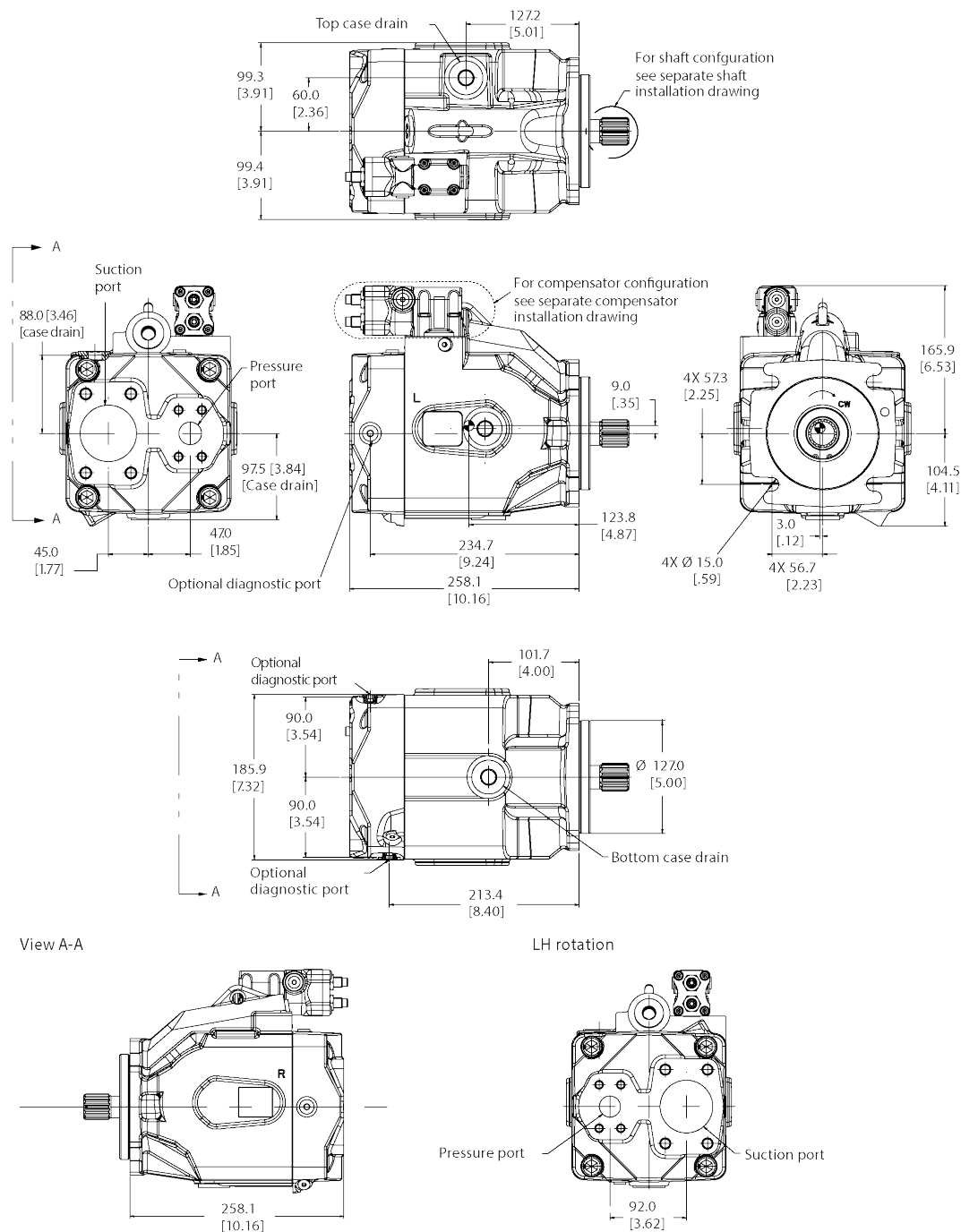
For compensator configuration see separate compensator installation drawing



Pump Installation

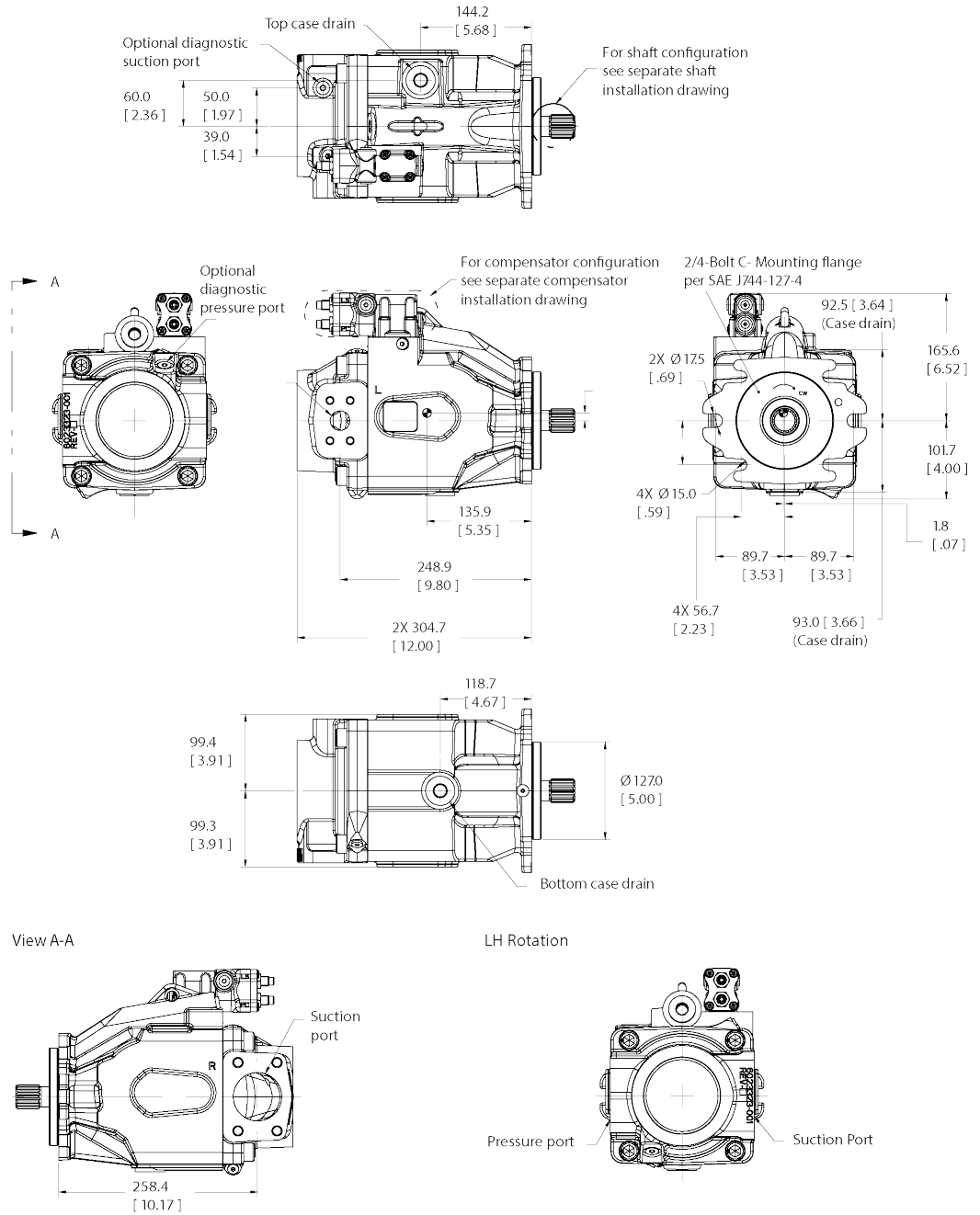
ADY098 C-mount – rear-ported

98cc Rear ported RH rotation



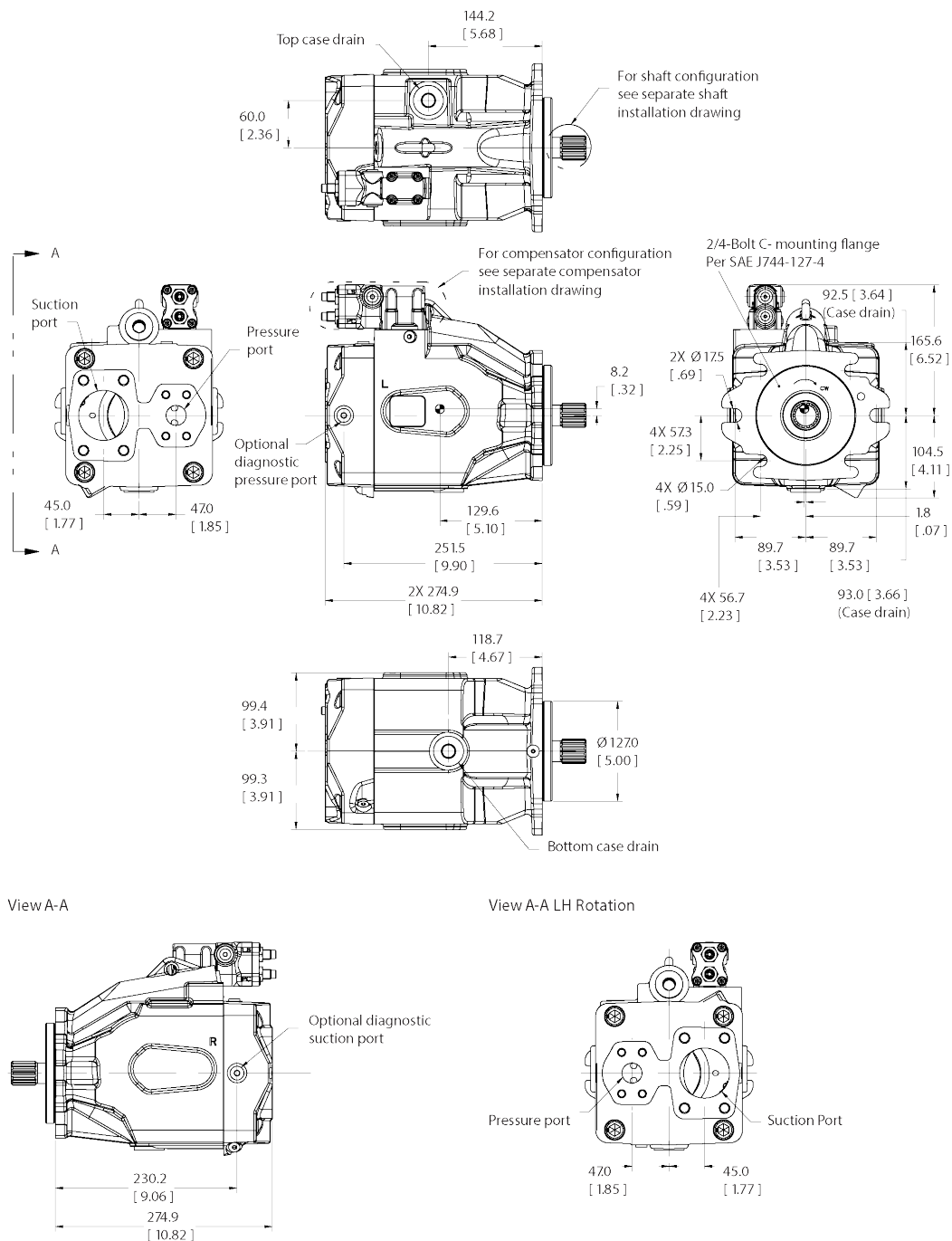
Pump Installation

ADY098 -2/4 bolt C mount - side-ported



Pump Installation

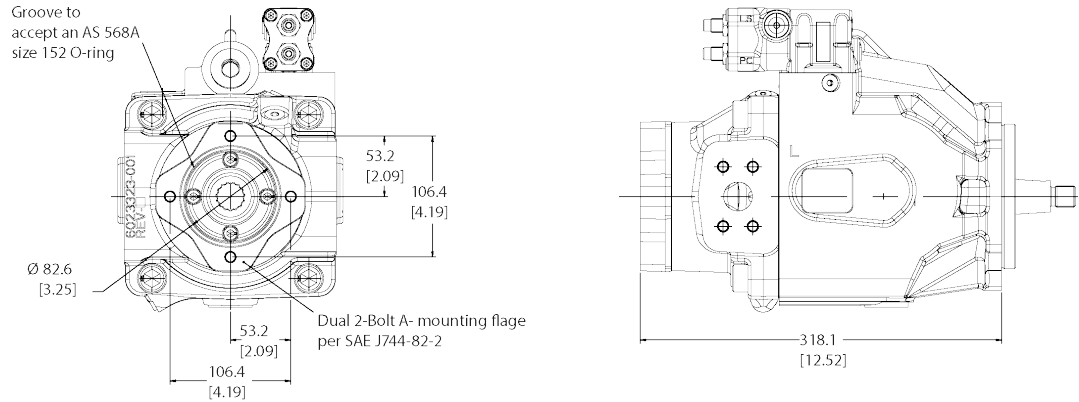
ADY098 -2/4 bolt C mount - rear-ported



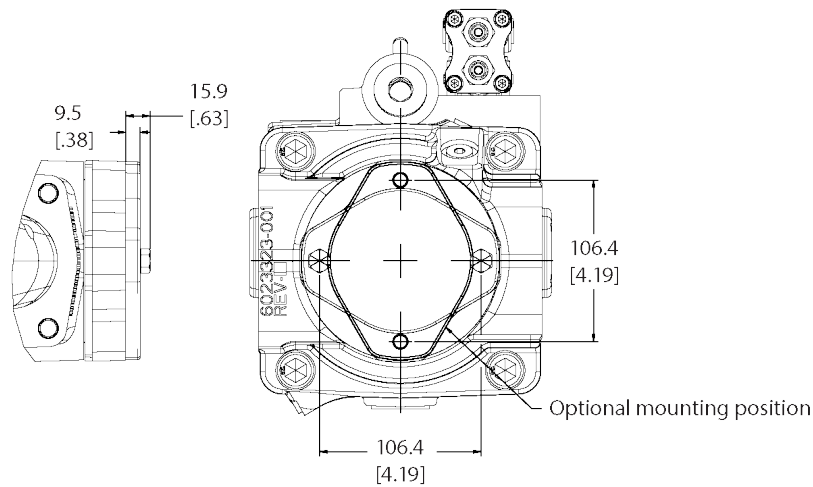
Pump Installation

ADY098 Thru-drive SAE A option

98cc thru drive SAE-A

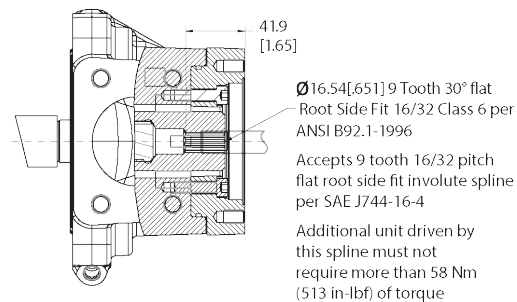


SAE-A thru-drive cover plate installation



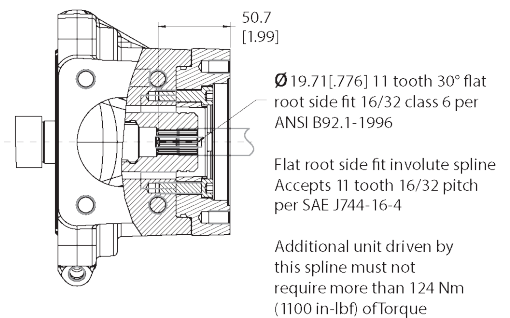
Output shaft installation 9T spline

Maximum torque 58 Nm [513 in-lbf]



Output shaft installation 11T spline

Maximum torque 124 Nm [1100 in-lbf]



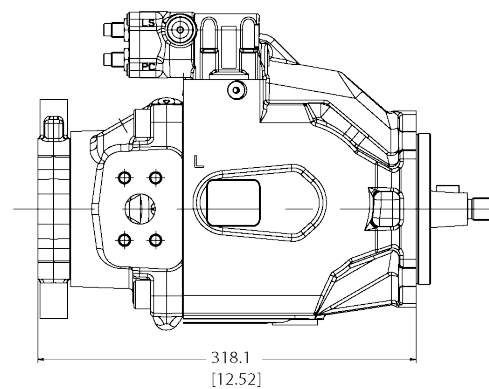
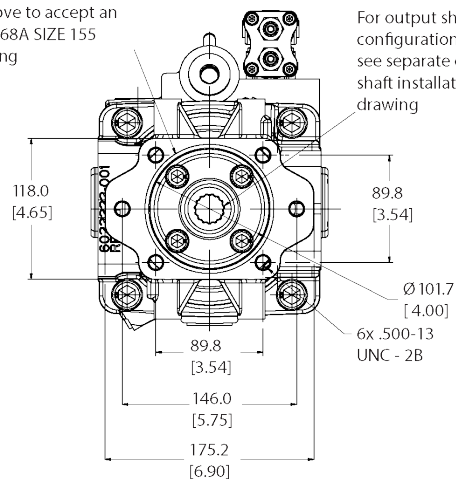
Pump Installation

ADY098 Thru-drive SAE B option

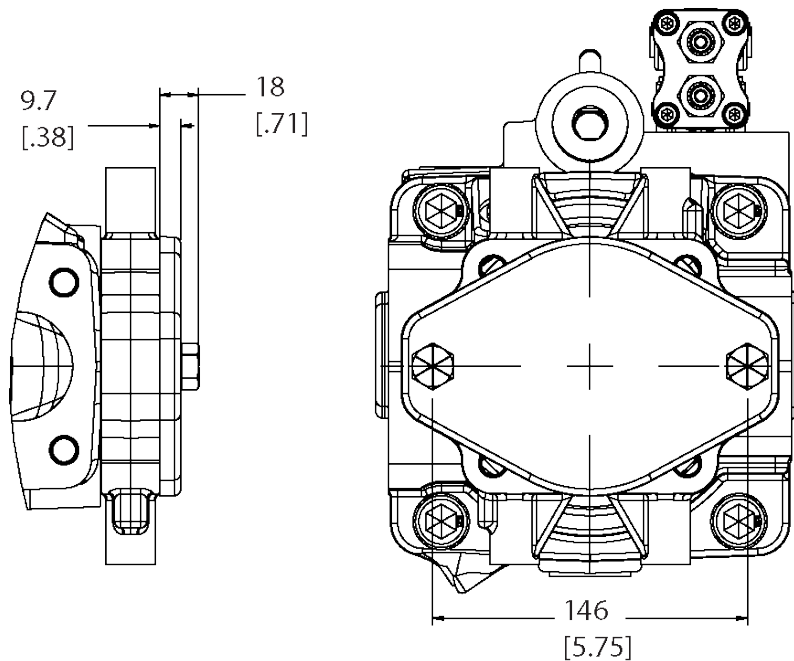
98cc thru drive SAE-B

Groove to accept an
 AS 568A SIZE 155
 O-ring

For output shaft
 configuration
 see separate output
 shaft installation
 drawing



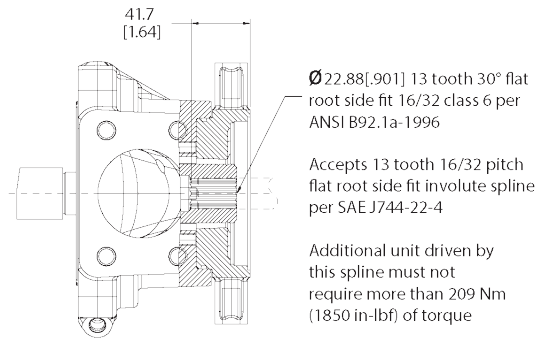
SAE-B thru drive cover plate installation



Pump Installation

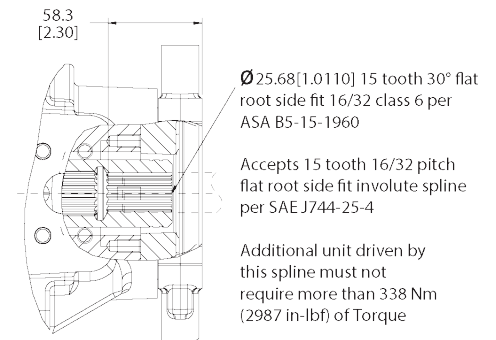
Output shaft installation 13T spline

Maximum torque 209 Nm [1850 in-lbf]



Output shaft installation 15T spline

Maximum torque 338 Nm [2987 in-lbf]

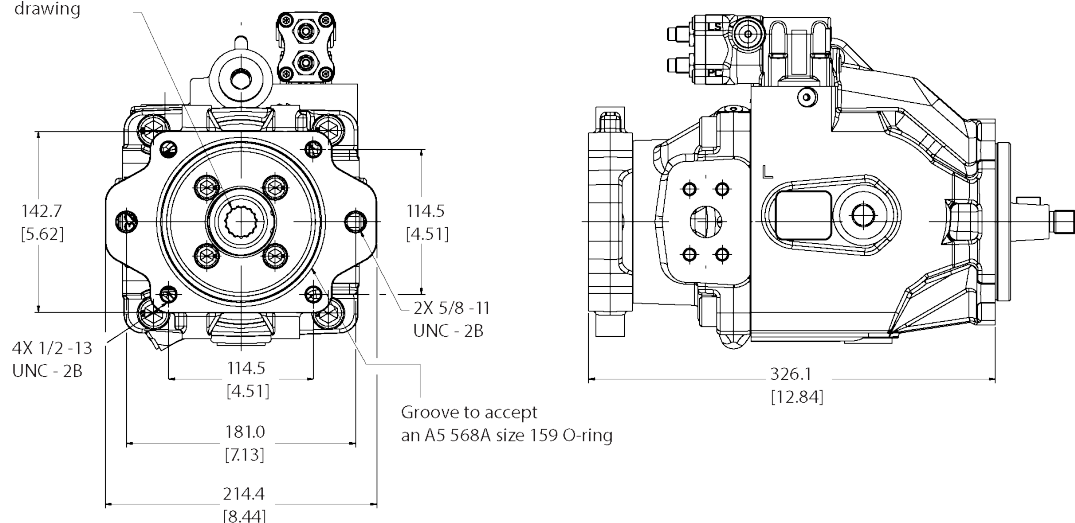


Pump Installation

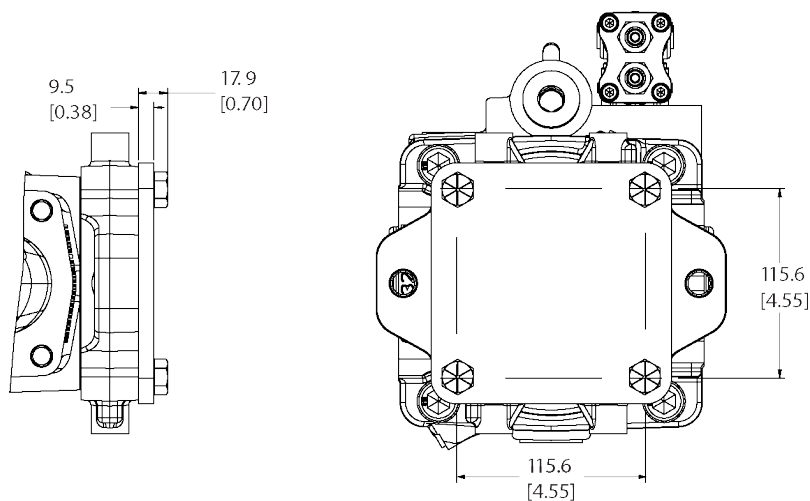
ADY098 Thru-drive SAE C option

98cc thru drive SAE-C

For output shaft configuration see separate output shaft installation drawing

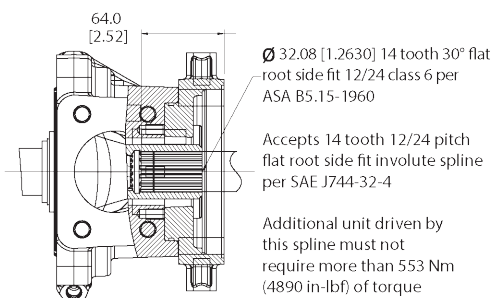


SAE-C thru drive cover plate installation



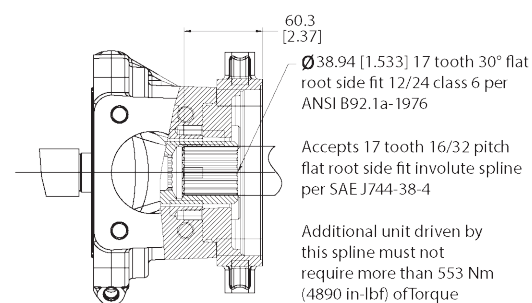
Output shaft installation 14T spline

Maximum torque 553 Nm [4890 in-lbf]



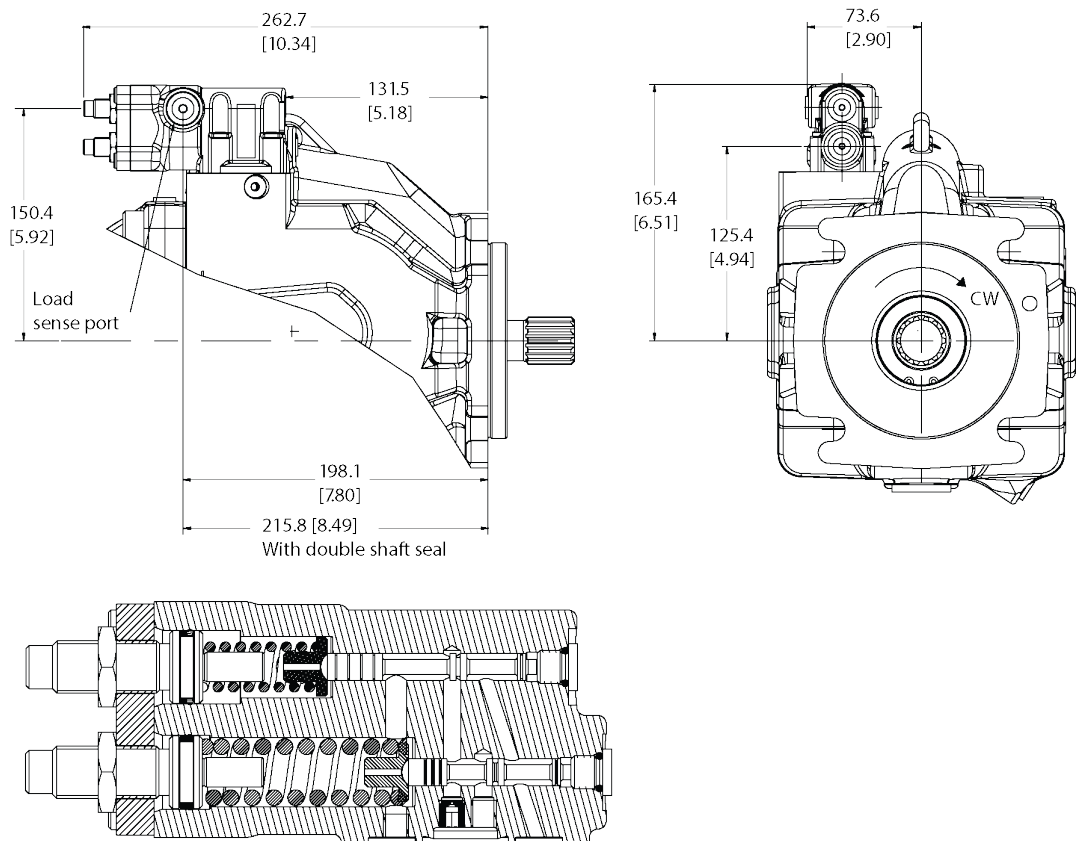
Output shaft installation 17T spline

Maximum torque 553 Nm [4890 in-lbf]

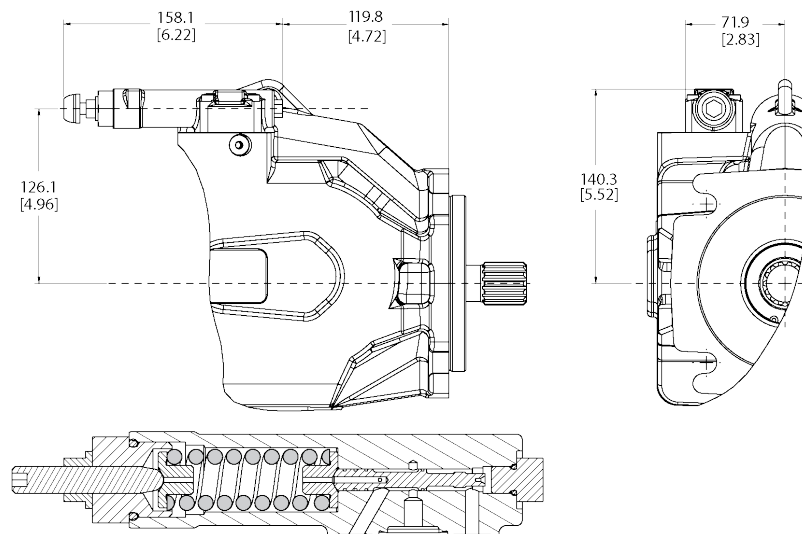


Control Installation

Pressure & Flow Compensator

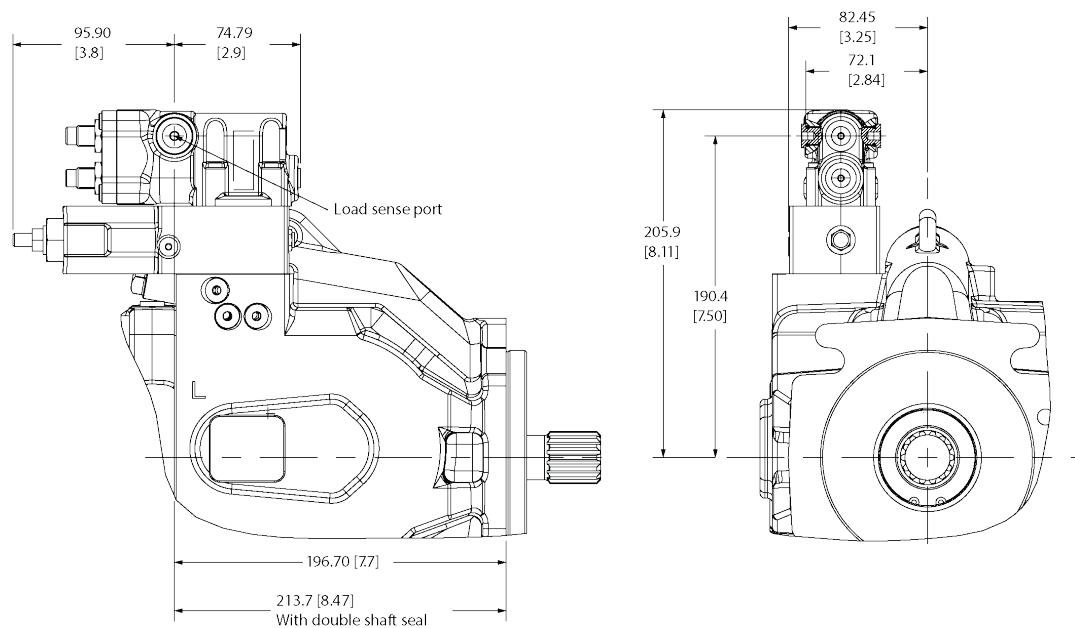


Pressure Compensator Control

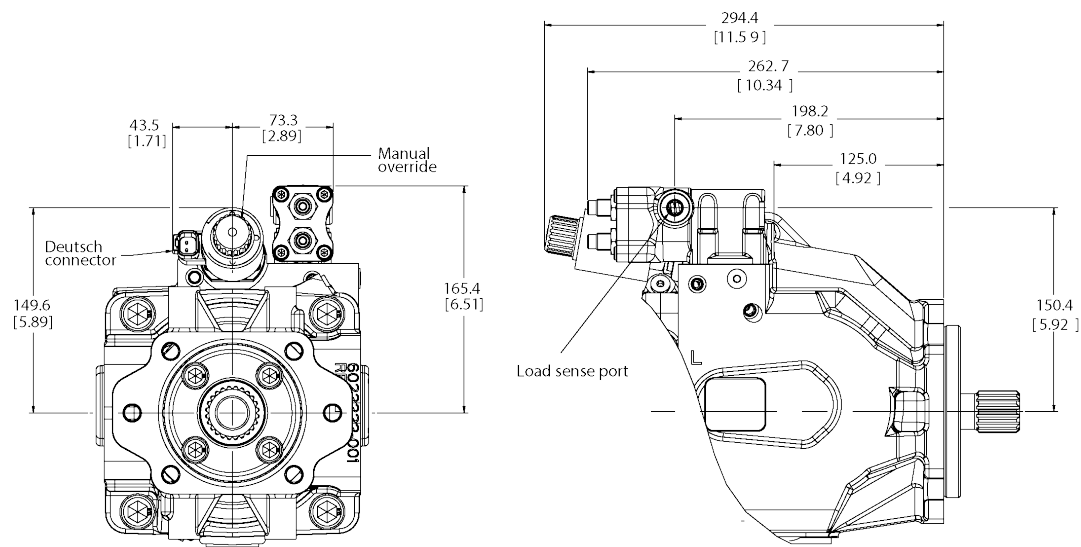


Control Installation

Pressure & Flow (Load Sense) Compensator

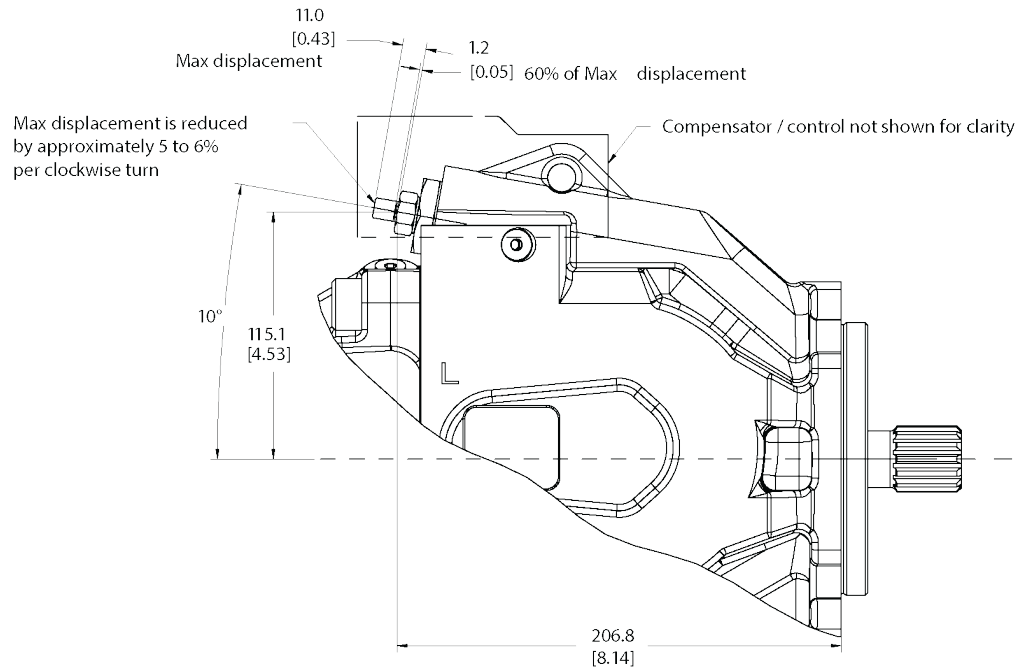


Electronic Displacement Control (EDC)



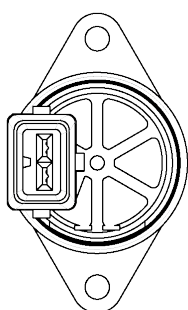
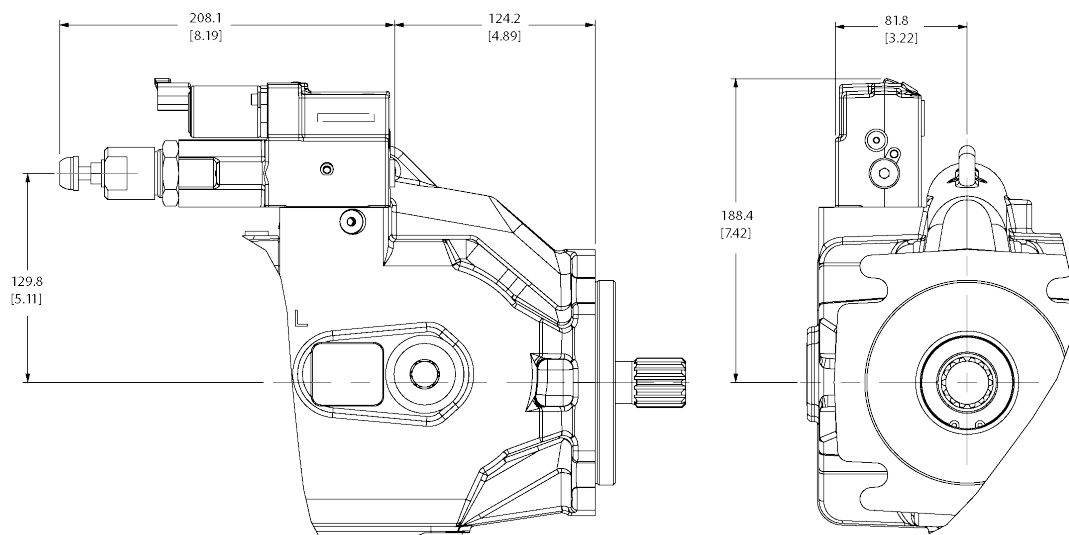
Control Installation

External manual stroke adjustment

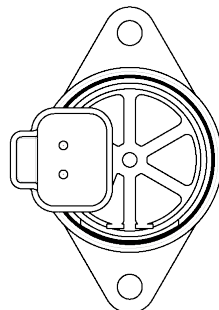


Control Installation

EH Inverse Proportional Pressure Control (IPPC)



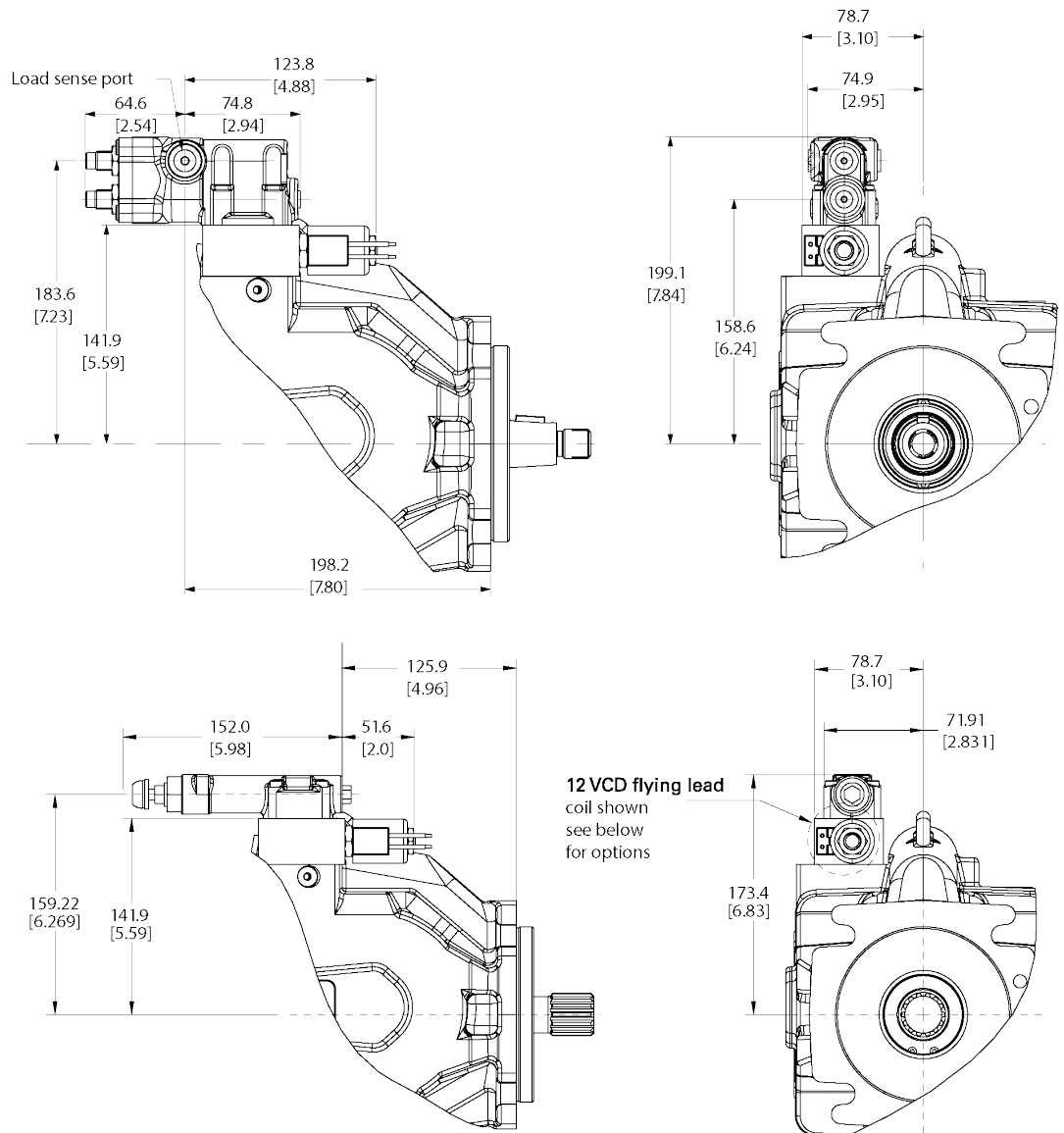
Amp connector



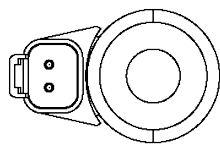
Deutsch connector

Control Installation

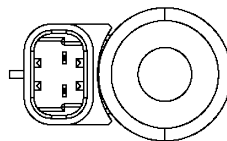
Electronic Destroke (Cold Start) Valve



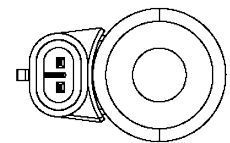
Optional connectors



Deusch option



Metri-Pack 280 option

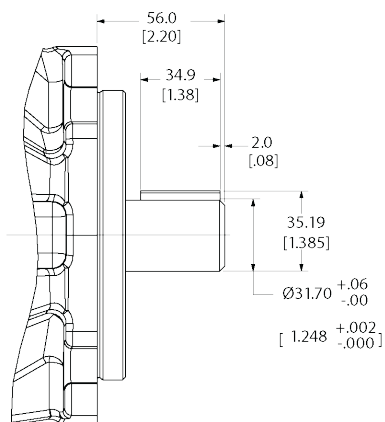
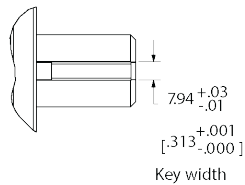


Metri-Pack 150 option

Input shaft options

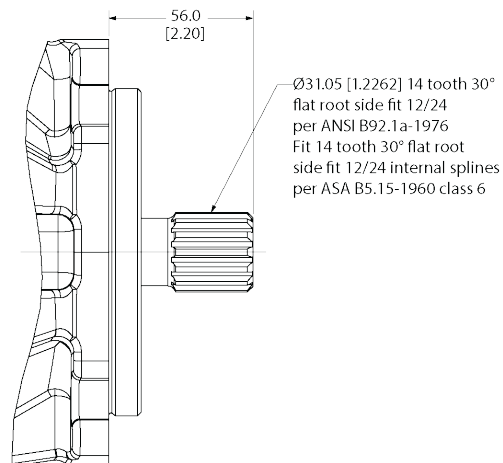
05 Code

Maximum torque
 450 Nm [3980 in-lbf]



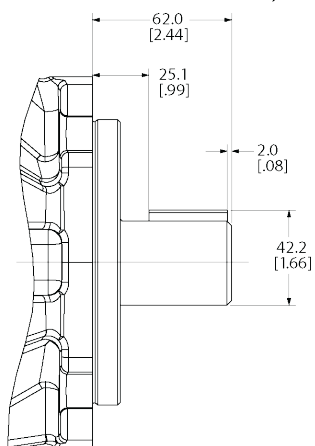
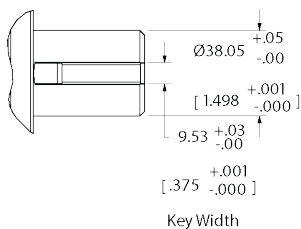
06 Code

Maximum torque
 640 Nm [5660 in-lbf]



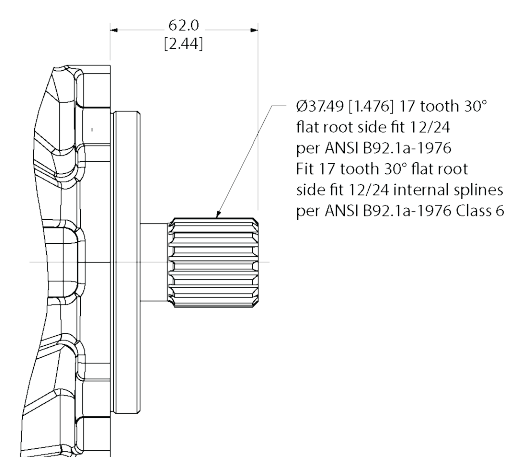
07 Code

Maximum torque
 765 Nm [6770 in-lbf]

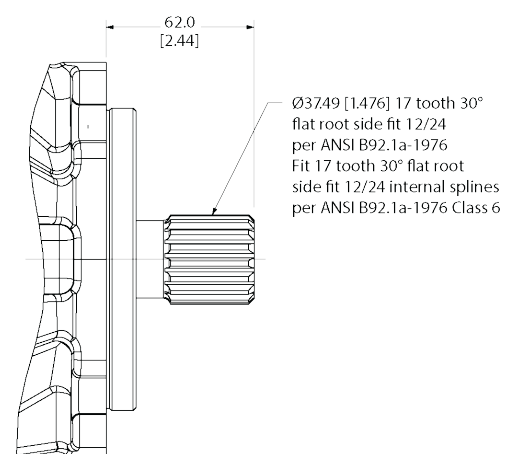
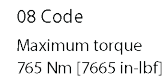
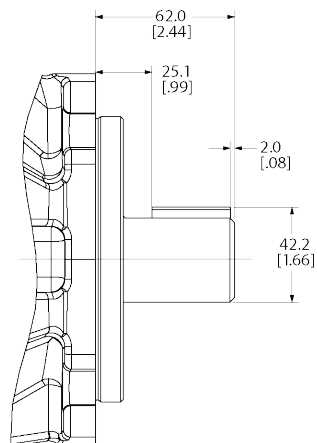
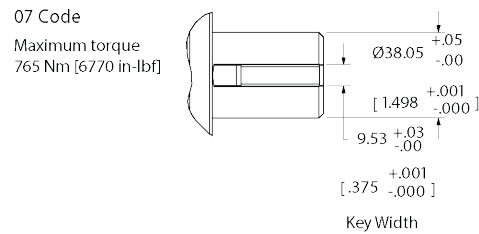
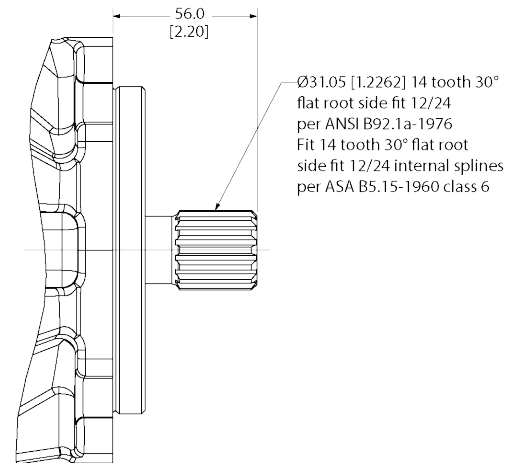
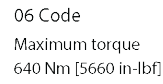
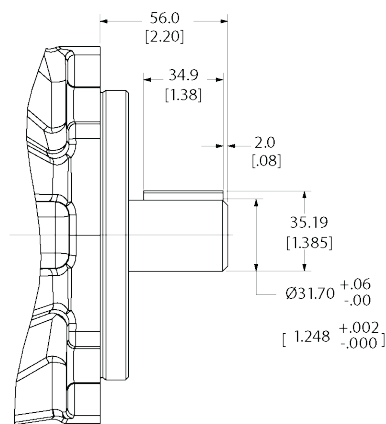
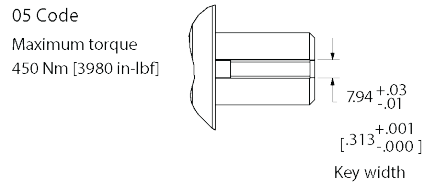


08 Code

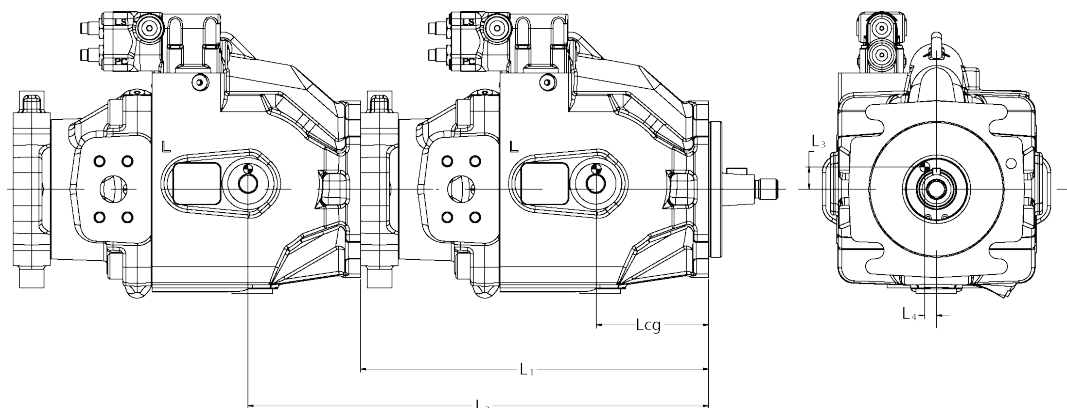
Maximum torque
 765 Nm [6765 in-lbf]



Input shaft options



Center of gravity



Side Port				Thru-Drive SAE Pad			Length	
ADY074	Lcg	L3	L4		Lcg	L3	L4	Lt
	138.5 (5.45)	8.0 (0.31)	2.3 (0.09)	A	140.8 (5.54)	8.5 (0.34)	2.2 (0.09)	301.5 (11.87)
				B (13T SPLINE)	144.1 (5.67)	8.3 (0.33)	2.2 (0.09)	301.5 (11.87)
				B (15T SPLINE)	147.9 (5.82)	7.6 (0.30)	2.1 (0.08)	317.4 (12.50)
				C	152.7 (6.01)	7.9 (0.31)	2.1 (0.08)	325.4 (12.81)
ADY098	139.7 (5.50)	8.4 (0.33)	3.2 (0.12)	A	145.8 (5.74)	7.9 (0.31)	2.8 (0.11)	318.1 (12.52)
				B	149.3 (5.88)	7.6 (0.30)	2.7 (0.11)	318.1 (12.52)
				C	153.8 (6.06)	7.5 (0.30)	2.6 (0.10)	326.1 (12.84)

Examples: Calculation L_2

Tandem ADY098 Thru-drive with ADY098 Side ported

$$L_2 = L_t + L_{cg}$$

$$318.1 \text{ mm} + 139.7 \text{ mm} = 457.8 \text{ mm (18.0 in)}$$

Tandem pump applications

Danfoss recommends that tandem pump applications be provided with additional support to limit overhung loading of the mounting flange. The thru-drive alternate attachment points on the rear flange may be used with a customer designed support.

Installation and start-up

Warning: Care should be taken that mechanical and hydraulic resonances are avoided in the application of the pump. Such resonances can seriously compromise the life and/or safe operation of the pump.

Drive data

Mounting attitude should be horizontal using the appropriate case drain ports to ensure that the case remains full of fluid at all times. Consult your local Danfoss Representative if a different arrangement is required.

In those cases where geometric tolerances of mounting are critical, or where specific tolerance ranges are required and not specified, consult Danfoss Engineering for specific limits.

Direction of shaft rotation, viewed from the prime mover end, must be as indicated in the model designation on the pump – either right hand (clockwise) or left hand (counterclockwise).

Direct coaxial drive through a flexible coupling is recommended. If drives imposing radial shaft loads are considered, please consult your Danfoss Representative.

Start-up procedure

Make sure the reservoir and circuit are clean and free of dirt/debris prior to filling with hydraulic fluid.

Fill the reservoir with filtered oil and fill to a level sufficient enough to prevent vortexing at the suction connection to pump inlet. It is good practice to clean the system by flushing and filtering, using an external slave pump.

Caution: Before the pump is started, fill the case through the uppermost drain port with hydraulic fluid of the type to be used. The case drain line must be connected directly to the reservoir and must terminate below the oil level. Once the pump is started, it should prime within a few seconds. If the pump does not prime, check to make sure that there are no restrictions between the reservoir and the inlet to the pump, and that the pump is being rotated in the proper direction, and that there are no air leaks in the inlet line and connections. Also check to make sure that trapped air can escape at the pump outlet.

After the pump is primed, tighten the loose outlet connections, then operate for five to ten minutes (unloaded) to remove all trapped air from the circuit.

If the reservoir has a sight gage, make sure the fluid is clear – not milky.

Fluid cleanliness

The 620 Series pumps are rated in anti-wear petroleum fluids with a contamination level of 21/18/13 per ISO 4406. Operation in fluids with levels more contaminated than this is not recommended. Fluids other than petroleum, severe service cycles, or temperature extremes are cause for adjustment of these codes. Please contact your Danfoss Representative for specific duty cycle recommendation.

Danfoss 620 Series pumps, as with any variable displacement piston pumps, will operate with apparent satisfaction in fluids up to the rating specified here. Experience has shown however, that pump and hydraulic system life is not optimized with high fluid contamination levels (high ISO cleanliness codes).

Proper fluid condition is essential for long and satisfactory life of hydraulic components and systems. Hydraulic fluid must have the correct balance of cleanliness, materials, and additives for protection against wear of components, elevated viscosity and inclusion of air.

Essential information on the correct methods for treating hydraulic fluid is included in Danfoss publication 561 – “Danfoss Guide to Systemic Contamination Control” – available from your local Danfoss distributor. In this publication, filtration and cleanliness levels for extending the life of axial piston pumps and other system components are listed. Included is an excellent discussion of the selection of products needed to control fluid condition.

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