CASAPPA®
FLUID POWER DESIGN

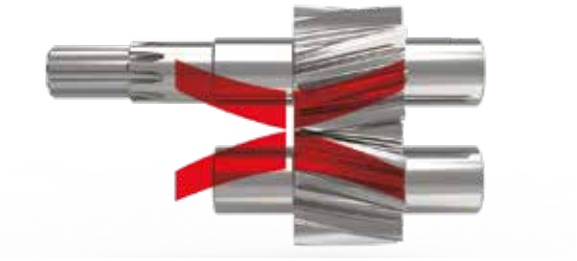
HYDRAULIC HELICAL GEAR PUMPS

XHP

INDEX

01/03.2024

X TECHNOLOGY



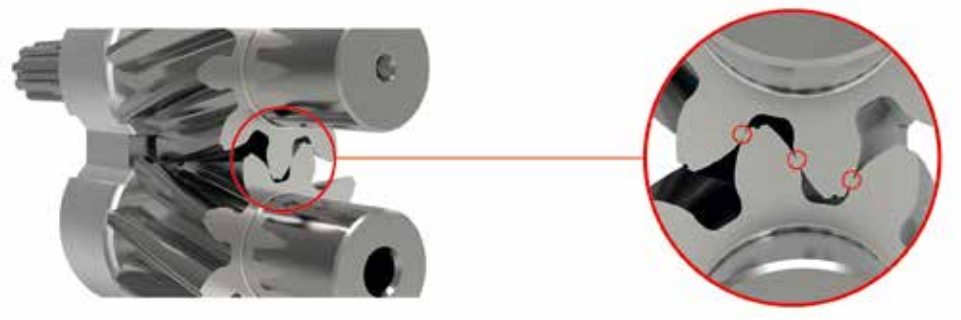
technology

The X technology is a step forward in involute external gear pumps thanks to innovative patented solutions.

PATENTED SOLUTIONS

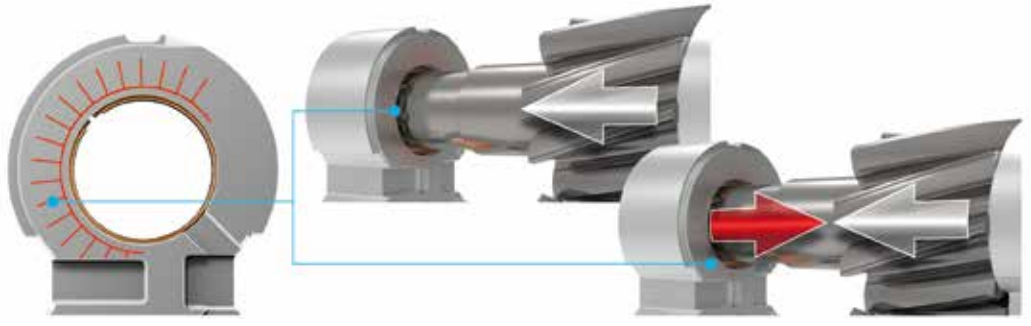
➢ **DUAL FLANK**

Dual flank meshing combined with helical gear design.



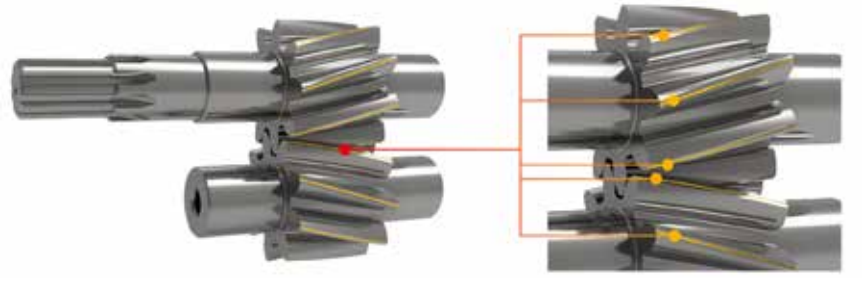
➢ **MICRO-GROOVES**

Micro-grooves on the bearing block balance the axial forces.



➢ **TIP GROOVE**

Tip groove on the teeth improves lubrication at high speed.



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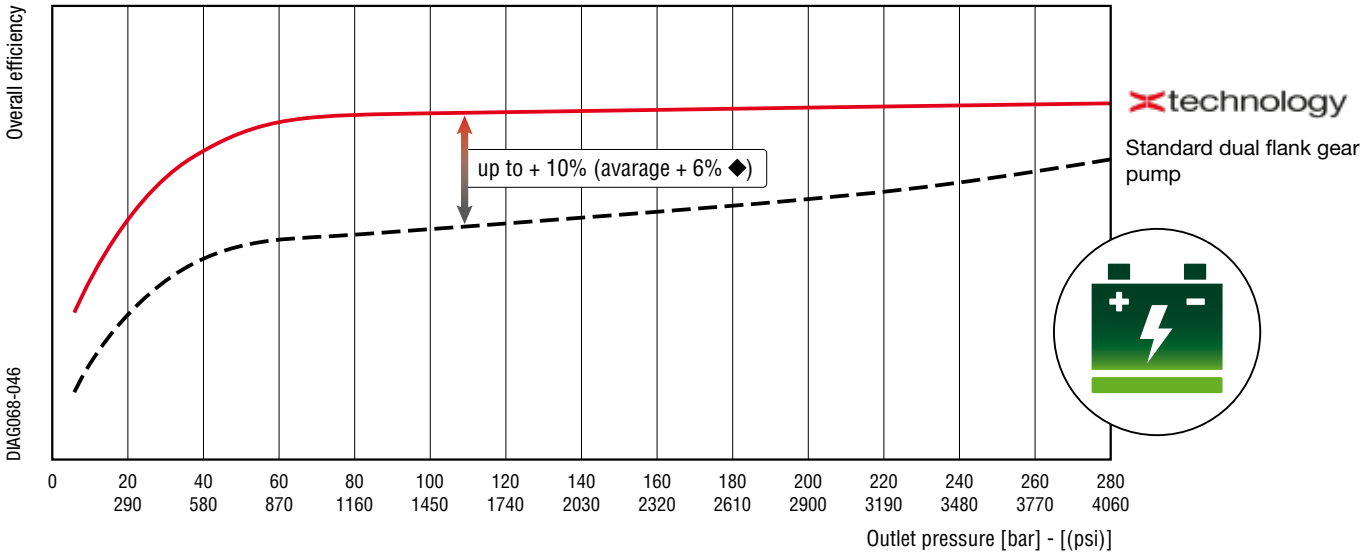
X TECHNOLOGY - BENEFITS

➢ SIGNIFICANT INCREASE OF PUMP EFFICIENCY

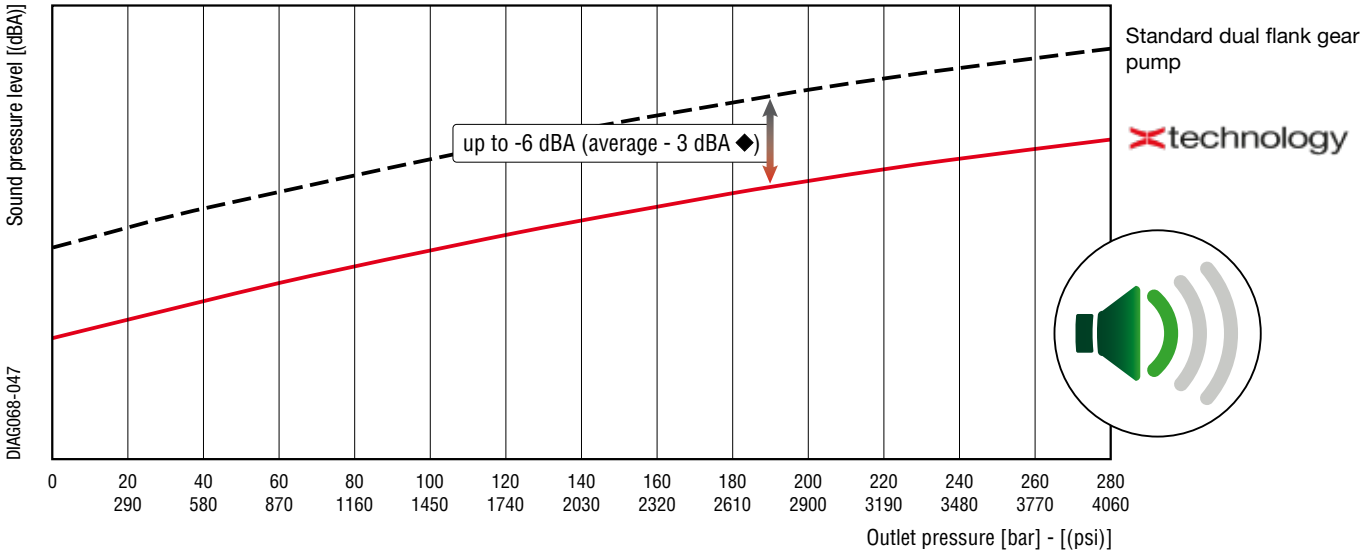


Both volumetric and hydro-mechanical efficiency are improved over the operating range, thanks to:

- Optimized pump design for higher stiffness
- Improved lubrication by the tip grooves
- Better meshing of the helical gears
- Optimized gear machining process

(◆) average over the entire operating range and displacement range.

➢ REMARKABLE REDUCTION OF PUMP NOISE



Thanks to the combination of the dual flank meshing and the high helix angle, the pump noise is further reduced compared to the standard dual flank technology.
In addition, the lower number of teeth of the new X technology reduces pump frequencies by 25%.
This results in a more pleasant sound quality.

(◆) average over the entire operating range and displacement range.

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INTRODUCTION

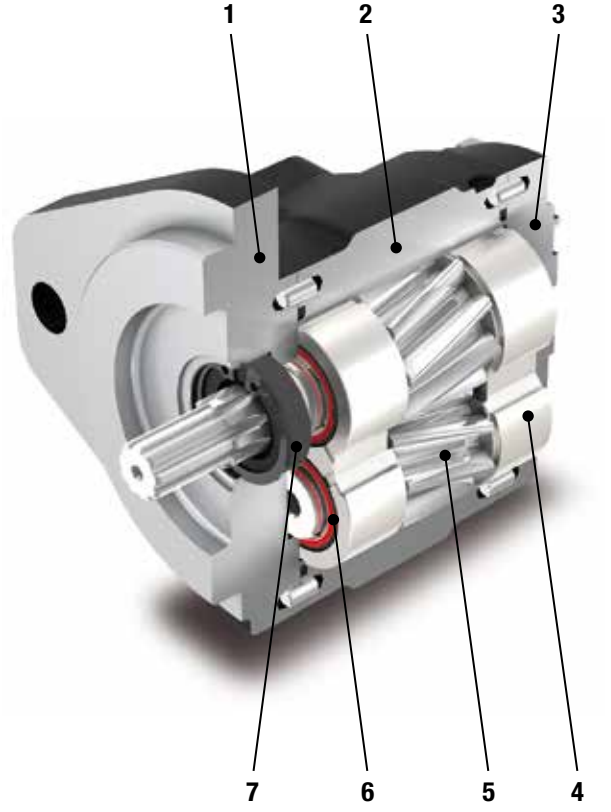
"XHP20" series Cast iron body hydraulic gear pumps with helical gear design.
Three pieces pump - Interchangeable with all Casappa's group 2 pumps.

DISPLACEMENTS
From 8,06 cm^3/rev (0.49 in^3/rev)
To 28,01 cm^3/rev (1.71 in^3/rev)

PRESSURE
Max. constant operating pressure 250 bar (3625 psi)
Max. system pressure (relief valve setting) 280 bar (4060 psi)
Max. peak of pressure 300 bar (4350 psi)

SPEED
Max. 4000 min^{-1}

TYPICAL APPLICATIONS
- Building & Construction
- Material Handling
- Agriculture
- Forestry
- Turf care & Mowers



1	Mounting flange
2	Body
3	Cover
4	Thrust plate
5	Gear
6	Seal
7	Shaft seal

- High temperature
- High pressure
- High reliability
- Multiple units available in standard version,common inlet and separated stages

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INSTRUCTIONS

INSTALLATION

Pump
The direction of rotation of single-rotation pumps must be the same as that of the drive shaft. Check that the coupling flange correctly aligns the transmission shaft and the pump shaft. Flexible couplings should be used (never rigid fittings) which will not generate an axial or radial load on the pump shaft.

TANK
Tank capacity must be sufficient for the system's operating conditions (~ 3 times the amount of oil in circulation) to avoid overheating of the fluid. A heat exchanger should be installed if necessary. The intake and return lines in the tank must be spaced apart (by inserting a vertical divider) to prevent the return-line oil from being taken up again immediately.

LINES
The lines must have a major diameter which is at least as large as the diameter of pump ports, and must be perfectly sealed. To reduce loss of power, the lines should be as short as possible, reducing the sources of hydraulic resistance (elbow, throttling, gate valves, etc.) to a minimum. A length of flexible tubing is recommended to reduce the transmission of vibrations. All return lines must end below the minimum oil level, to prevent foaming. Before connecting the lines, remove any plugs and make sure that the lines are perfectly clean.

HYDRAULIC FLUID
Use hydraulic fluid conforming to viscosity data as specified in the first pages of the catalogue.
Avoid using mixtures of different oils which could result in decomposition and reduction of the oil's lubricating power.

FILTERS
We recommend filtering the entire system flow. Filters on suction and return line must be fitted in according to the contamination class as indicated in the first pages of the catalogue. Casappa recommends to use its own production filters:

IKRON® Fluid Filtration

STORAGE
The storage must be in a dry environment. Max storage time in ideal conditions is 24 months. The ideal storage temperature is between 5 °C (41 °F) and 20 °C (68 °F).
No problem in case of temperature between -40 °C (-40 °F) and 50 °C (122 °F). Below -40 °C (-40 °F) please contact us.

STARTING UP
Check that all circuit connections are tight and that the entire system is completely clean. Insert the oil in the tank, using a filter. Bleed the circuit to assist in filling. Set the pressure relief valves to the lowest possible setting.
Turn on the system for a few moments at minimum speed, then bleed the circuit again and check the level of oil in the tank.
If the difference between pump temperature and fluid temperature exceeds 10 °C (18 °F), rapidly switch the system on and off to heat it up gradually. Then gradually increase the pressure and speed of rotation until the preset operating levels as specified in the catalogue are attained.

COLD START
Cold start is meant short term and low idle. During cold start of the machine the following limits can be applied:

Minimum inlet pressure	0,5 bar abs. (7 psi)
Outlet pressure (pumps)	≤ 50 bar (725 psi)
Speed	≤ 1500 min^{-1}
Minimum temperature	-40 °C (-40 °F)
Max oil viscosity	2000 mm^2/s (cSt) [9100 SSU]

If the ambient temperature is lower than -20 °C (-4 °F) the system speed and pressure must be limited until the hydraulic oil temperature exceeds -20 °C (-4 °F).

PERIODICAL CHECKS - MAINTENANCE
Keep the outside surface clean especially in the area of the drive shaft seal. In fact, abrasive powder can accelerate wear on the seal and cause leakage. Replace filters regularly to keep the fluid clean. The oil level must be checked and oil replaced periodically depending on the system's operating conditions.

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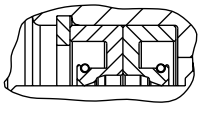
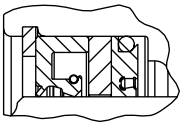
FEATURES

Construction	External helical gear pumps 3-piece construction
Mounting	EUROPEAN - SAE - GERMAN standard flanges
Ports	Threaded or split flange
Direction of rotation (looking at the drive shaft)	Anti-clockwise (S) - clockwise (D)
Inlet pressure range for pumps	0,7 ÷ 3 bar abs. (10 ÷ 44 psi) If p > 1,5 bar abs. (22 psi) specific shaft sealing have to be applied. Please contact us for more information.
Fluid temperature range	See table (1)
Fluid	Mineral oil based hydraulic fluids to ISO/DIN. Please contact us for other fluids
Viscosity range	From 12 to 100 mm²/s (cSt) [60 to 456 SSU] recommended
	Up to 750 mm²/s (cSt) [3410 SSU] permitted
Filtering requirement and recommended fluid contamination	See table (2) page 8

Tab. 1

Type	Fluid composition	Max pressure bar (psi)	Max speed min⁻¹	Temperature - °C (°F)			Seals (●)	Shaft seals option (◆)
				Min	Max continuous	Max peak		
ISO/DIN	Mineral oil basedhydraulic fluid to ISO/DIN	See page 7	See page 7	-25 (-13)	80 (176)	100 (212)	**N**	**D** **C1**
				-25 (-13)	110 (230)	125 (257)	**V**	
				-25 (-13)	110 (230)	125 (257)	**T-PV**	

(●) **N** = Buna NBR (standard) - **V** = Viton-FKM - **T-PV** = Hydrogenated buna HNBR seals with Viton-FKM shaft seals

	D (◆) shaft seals with wiper seal		**C1** (◆) High pressure special shaft seal with wiper seal	
Single rotation pumps	Max drain line pressure: 0,5 bar (7 psi)		Max drain line pressure: 10 bar (145 psi) @ 2000 min⁻¹	

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FEATURES

FILTRATION

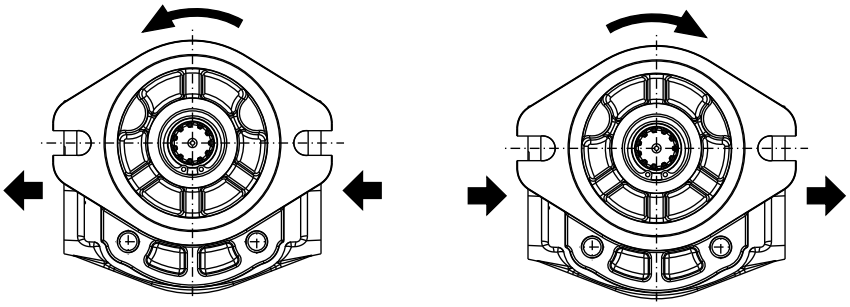
Tab. 2

Working pressure bar (psi)	Δp < 140 Δp < (2030)	140 < Δp < 210 (2030) < Δp < (3045)	Δp > 210 Δp > (3045)
Contamination class NAS 1638	10	9	8
Contamination class ISO 4406	21/19/16	20/18/15	19/17/14
Achieved with filter $ß_{10}$ (c) ≥ 200 ISO 16889	-	10 µm	10 µm
Achieved with filter $ß_{25}$ (c) ≥ 200 ISO 16889	25 µm	-	-

Casappa recommends to use its own production filters:

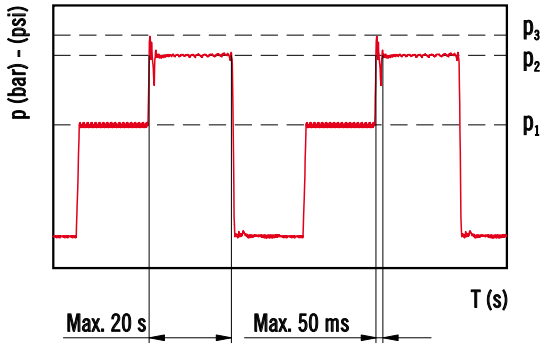
IKRON® Fluid Filtration

DEFINITION OF ROTATION DIRECTION LOOKING AT THE DRIVE SHAFT



Anti-clockwise rotation **Clockwise rotation**

PRESSURE DEFINITION



p_1 Constant operating pressure
p_2 System pressure (relief valve setting)
p_3 Peak of pressure

The peak of pressure is the max pressure allowed and it corresponds to the overshoot of the relief valve.

Please note that both relief valve setting and overshoot must be lower than their limits.
If the relief setting is compliant but the overshoot is higher than the limit, the relief setting must be decreased until the overshoot is compliant to Casappa limit.

Please contact us for high frequency applications.

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FEATURES

Pump type	Displacement	Max. pressure			Max. speed	Min. speed
		p_1	p_2	p_3		
	cm^3/rev (in^3/rev)	bar (psi)			min^{-1}	
XHP 20•8	8,06 (0.49)	250 (3600)	280 (4060)	300 (4350)	4000	500
XHP 20•10	10,05 (0.61)	250 (3600)	280 (4060)	300 (4350)	4000	500
XHP 20•12	12,09 (0.74)	250 (3600)	280 (4060)	300 (4350)	4000	400
XHP 20•14	14,02 (0.86)	250 (3600)	280 (4060)	300 (4350)	4000	400
XHP 20•16	16,03 (0.98)	250 (3600)	280 (4060)	300 (4350)	3500	400
XHP 20•18	18,05 (1.10)	250 (3600)	280 (4060)	300 (4350)	3500	400
XHP 20•20	20,00 (1.22)	250 (3600)	280 (4060)	300 (4350)	3500	400
XHP 20•22	22,46 (1.37)	250 (3600)	280 (4060)	300 (4350)	3500	400
XHP 20•24	24,01 (1.46)	230 (3335)	260 (3770)	280 (4060)	3000	400
XHP 20•26	26,03 (1.59)	230 (3335)	260 (3770)	280 (4060)	3000	400
XHP 20•28	28,01 (1.71)	200 (2900)	230 (3335)	250 (3625)	3000	400

For configuration with common inlet or with SAE threaded ports max. pressure and speed can change.
Please contact us for more information.

Q	l/min (US gpm)	Flow
M	Nm (lbf in)	Torque
P	kW (HP)	Power
V	cm^3/rev (in^3/rev)	Displacement
n	min^{-1}	Speed
Δp	bar (psi)	Pressure
$\eta_v = \eta_v$ (V, Δp, n)		Volumetric efficiency
$\eta_{hm} = \eta_{hm}$ (V, Δp, n)		Hydro-mechanical efficiency
$\eta_t = \eta_v \bullet \eta_{hm}$		Overall efficiency

DESIGN CALCULATIONS FOR PUMP

$$Q = Q_{theor.} \bullet \eta_v \quad [l/min]$$

$$Q_{theor.} = \frac{V \bullet n}{1000} \quad [l/min]$$

$$M = \frac{M_{theor.}}{\eta_{hm}} \quad [Nm]$$

$$M_{theor.} = \frac{\Delta p \bullet V}{62,83} \quad [Nm]$$

$$P_{IN} = \frac{P_{OUT}}{\eta_t} \quad [kW]$$

$$P_{OUT} = \frac{\Delta p \bullet Q}{600} \quad [kW]$$

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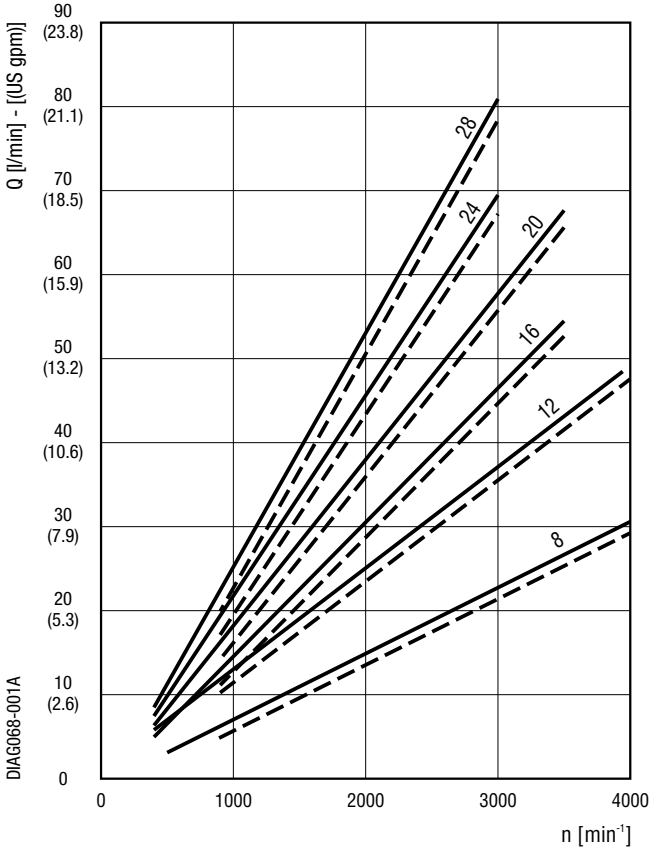
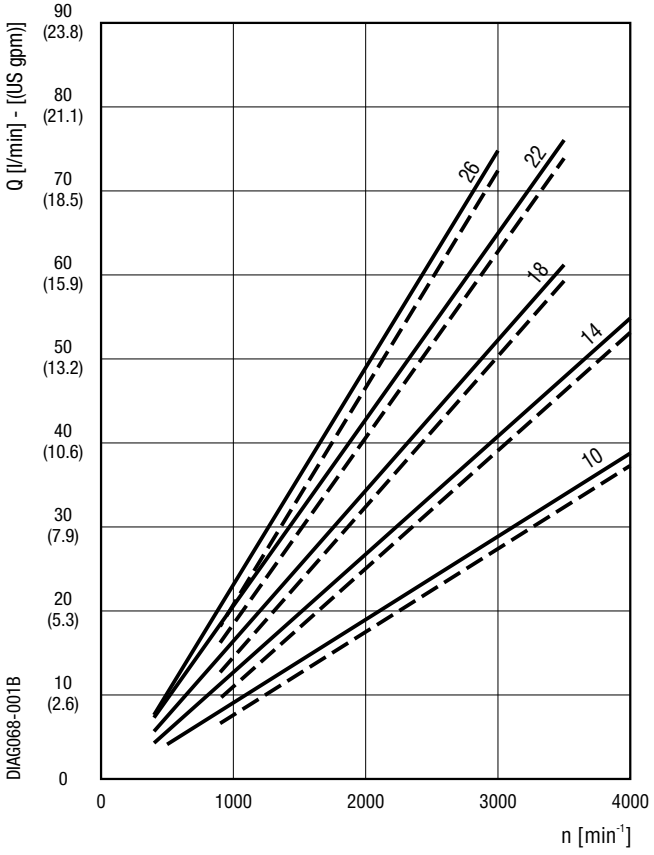
GEAR PUMPS PERFORMANCE CURVES



Each curve has been obtained at 50°C (122 °F), using oil with viscosity 46 cSt (210 SSU) at 40°C (104 °F) and at these pressures.

XHP 20•8	———	20 bar (290 psi)
	– – –	250 bar (3625 psi)
XHP 20•12	———	20 bar (290 psi)
	– – –	250 bar (3625 psi)
XHP 20•16	———	20 bar (290 psi)
	– – –	250 bar (3625 psi)
XHP 20•20	———	20 bar (290 psi)
	– – –	250 bar (3625 psi)
XHP 20•24	———	20 bar (290 psi)
	– – –	230 bar (3335 psi)
XHP 20•28	———	20 bar (290 psi)
	– – –	200 bar (2900 psi)



XHP 20•10	———	20 bar (290 psi)
	– – –	250 bar (3625 psi)
XHP 20•14	———	20 bar (290 psi)
	– – –	250 bar (3625 psi)
XHP 20•18	———	20 bar (290 psi)
	– – –	250 bar (3625 psi)
XHP 20•22	———	20 bar (290 psi)
	– – –	250 bar (3625 psi)
XHP 20•26	———	20 bar (290 psi)
	– – –	230 bar (3335 psi)

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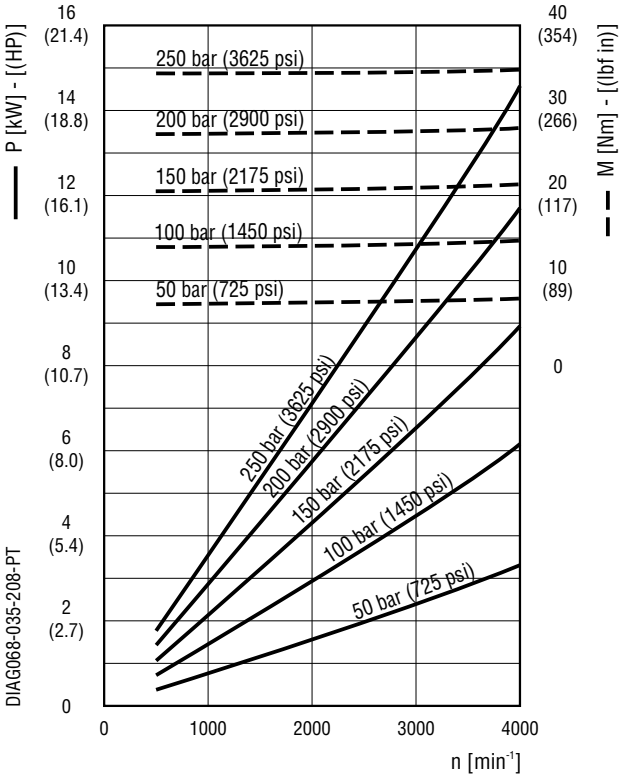
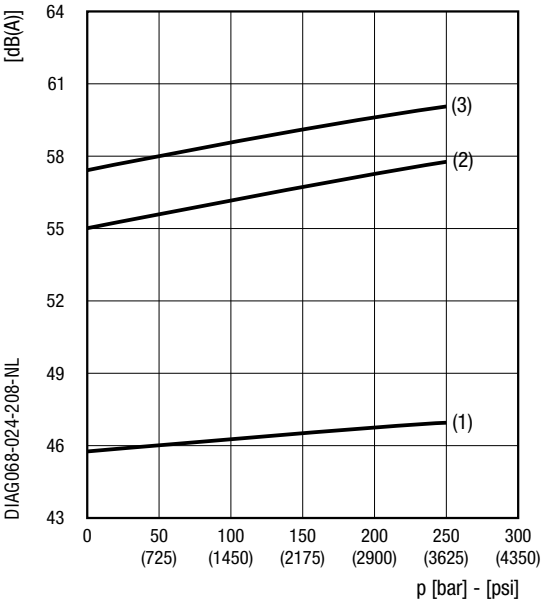
XHP20•8 OPERATING CURVES

Power and torque

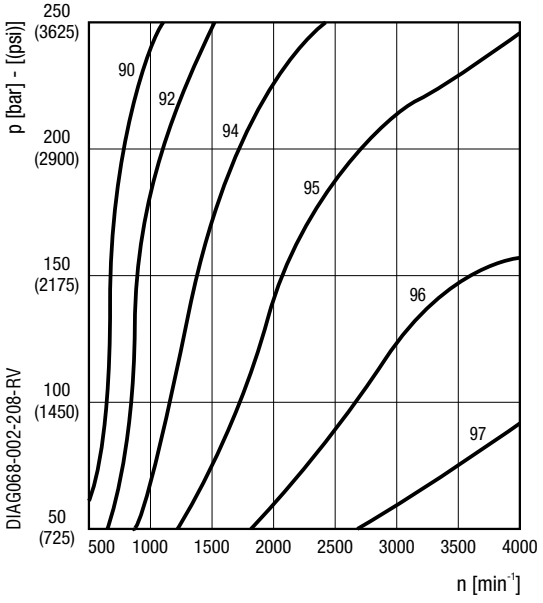


Noise level

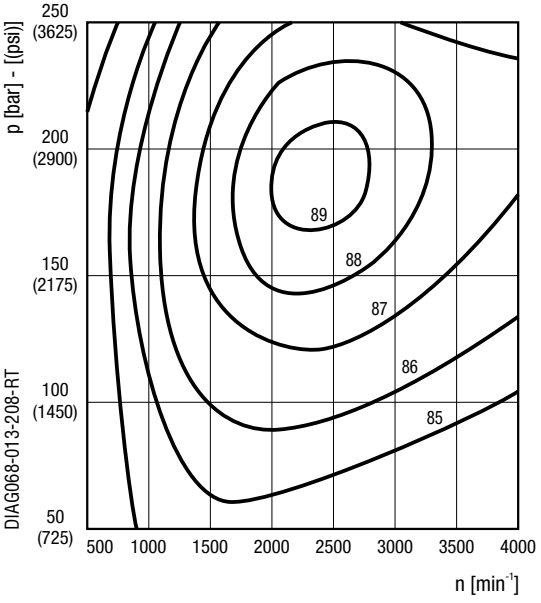
Distance from microphone to pump = 1 m (39.37 in)
1) 1000 min^{-1} (2) 2000 min^{-1} (3) 3000 min^{-1}



Volumetric efficiency



Overall efficiency



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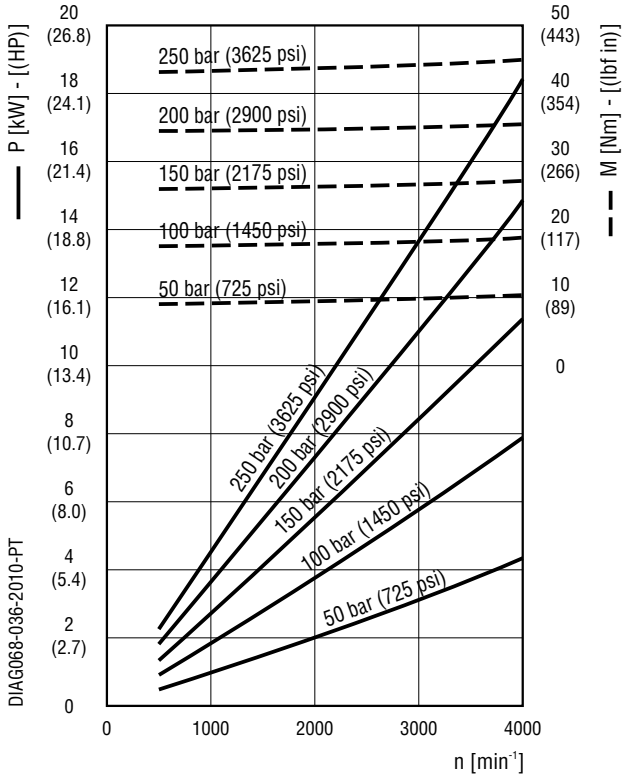
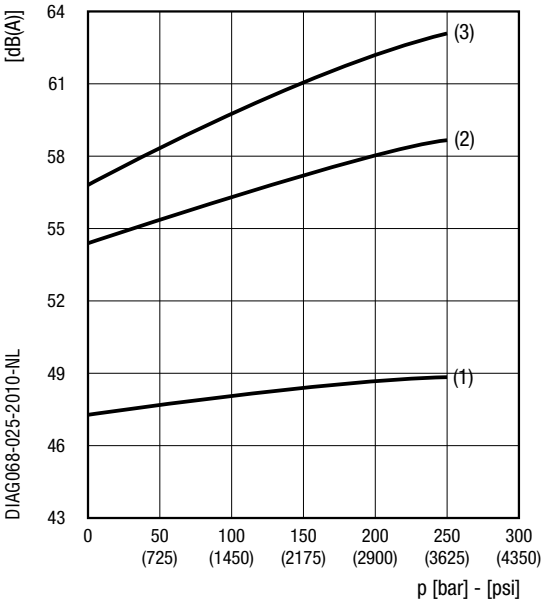
XHP20•10 OPERATING CURVES

Power and torque

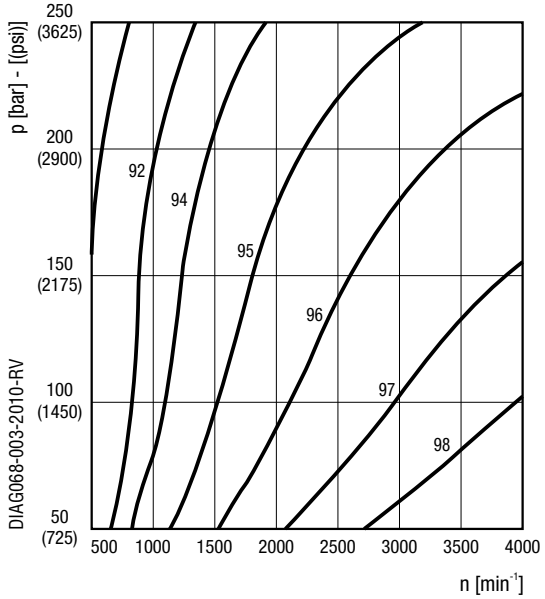


Noise level

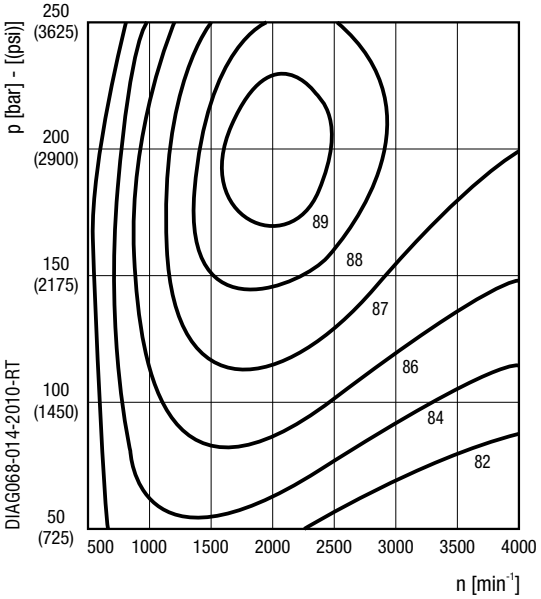
Distance from microphone to pump = 1 m (39.37 in)
1) 1000 min^{-1} (2) 2000 min^{-1} (3) 3000 min^{-1}



Volumetric efficiency



Overall efficiency



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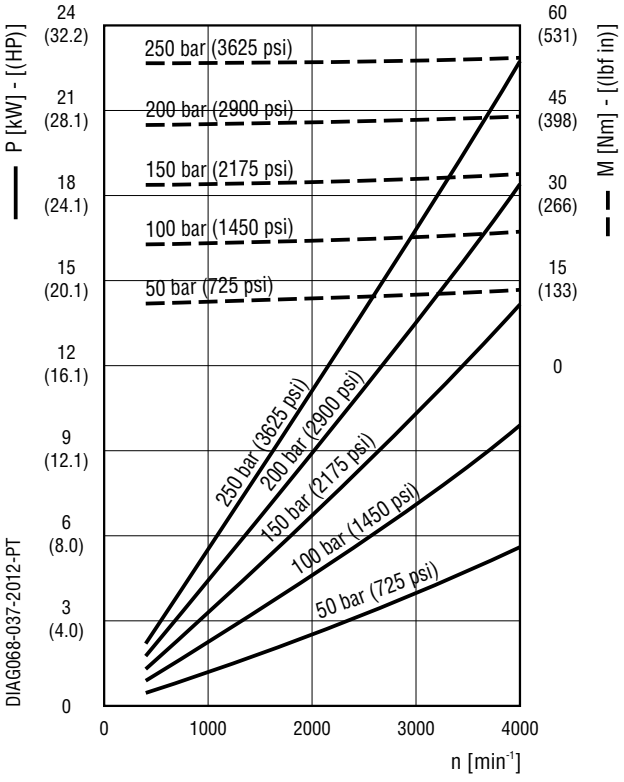
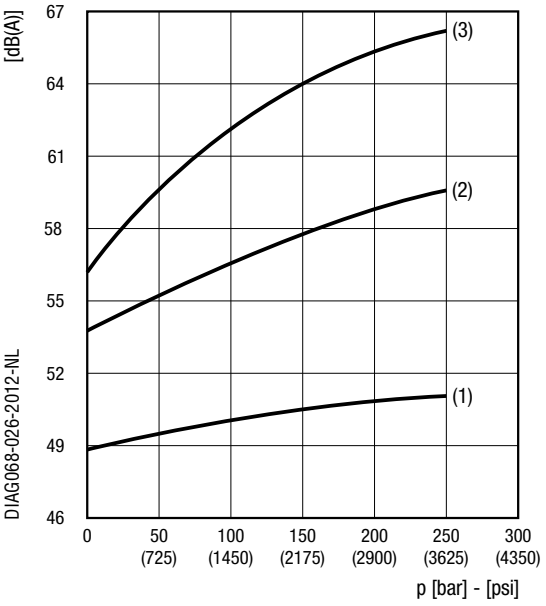
XHP20•12 OPERATING CURVES

Power and torque

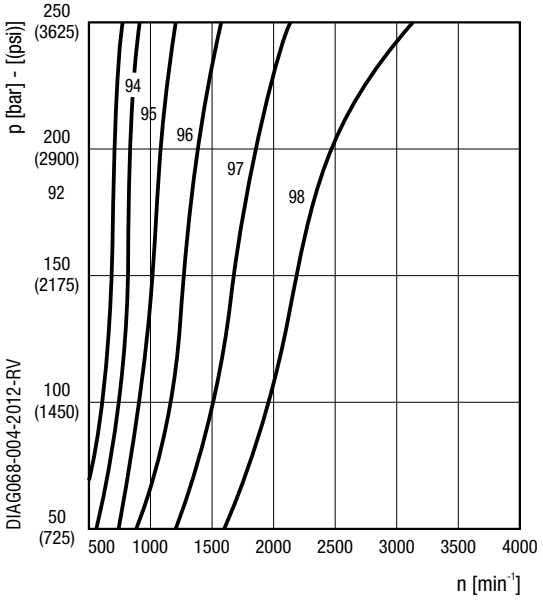


Noise level

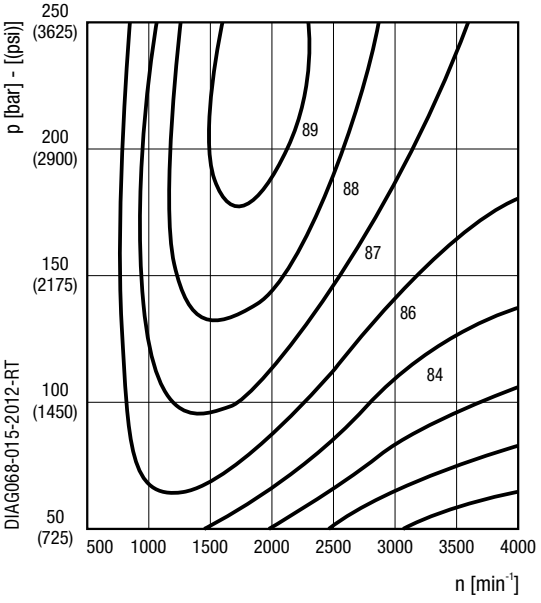
Distance from microphone to pump = 1 m (39.37 in)
1) 1000 min^{-1} (2) 2000 min^{-1} (3) 3000 min^{-1}



Volumetric efficiency



Overall efficiency



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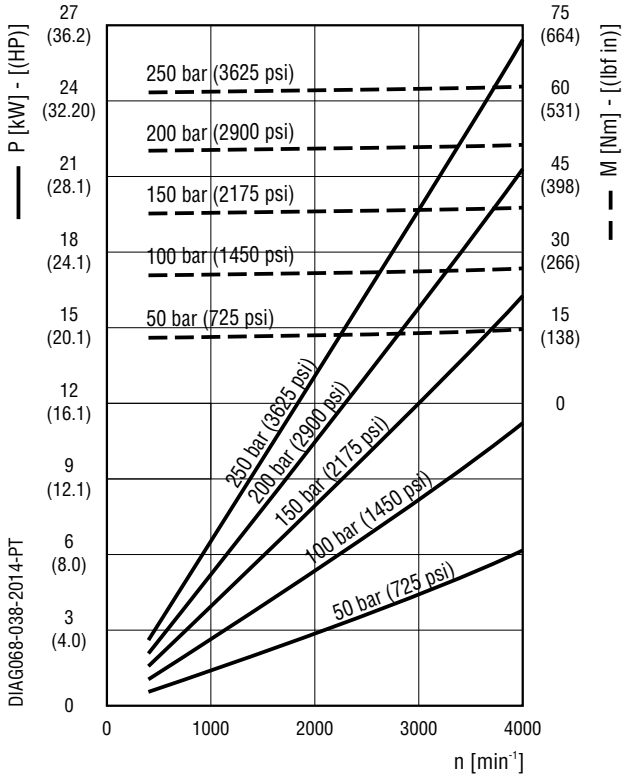
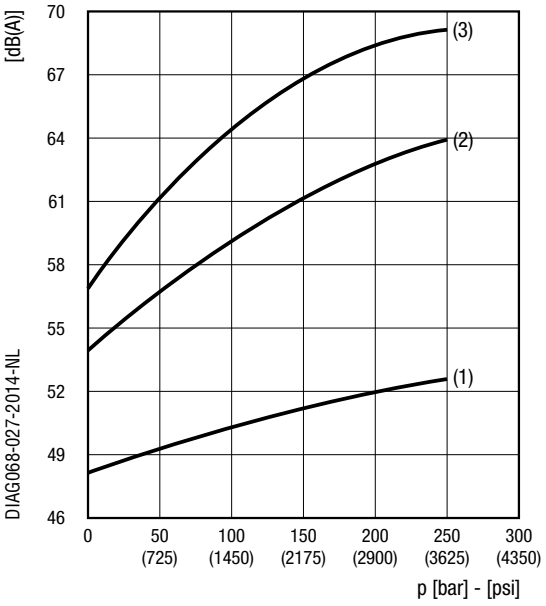
XHP20•14 OPERATING CURVES

Power and torque

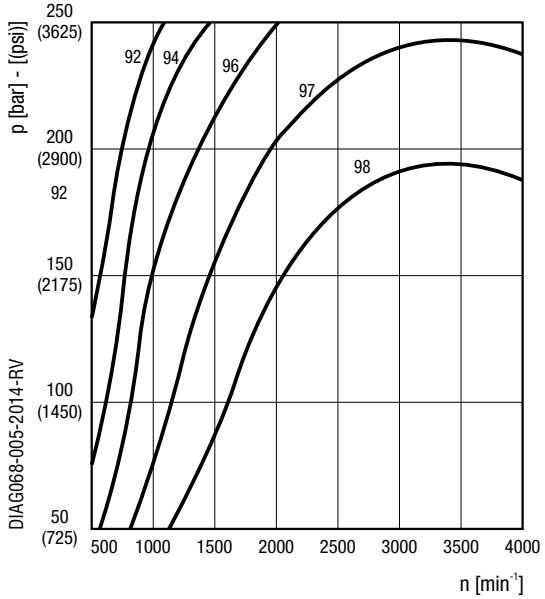


Noise level

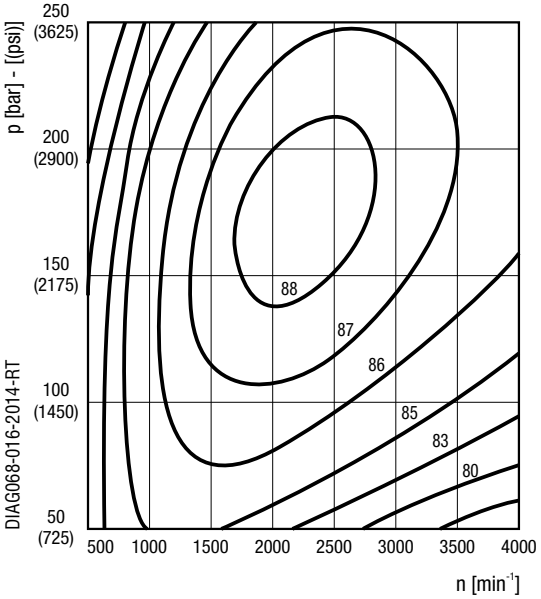
Distance from microphone to pump = 1 m (39.37 in)
1) 1000 min^{-1} (2) 2000 min^{-1} (3) 3000 min^{-1}



Volumetric efficiency



Overall efficiency



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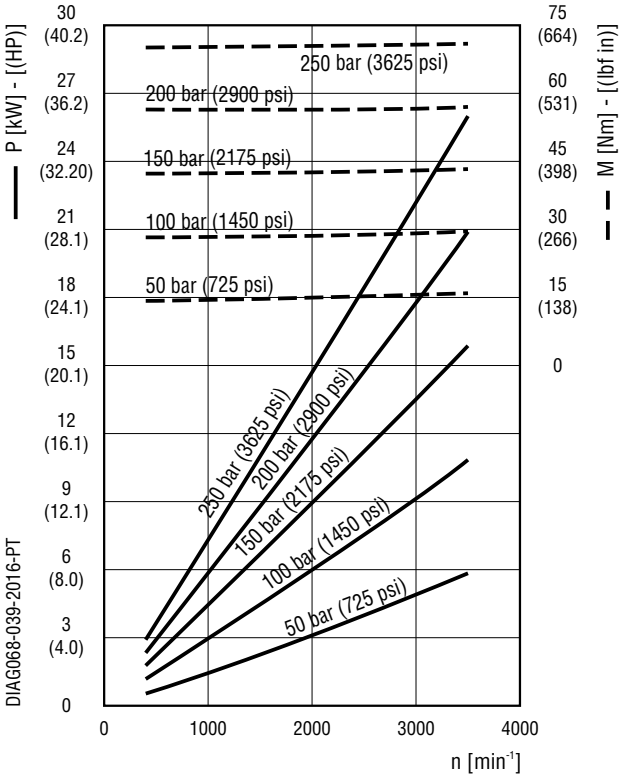
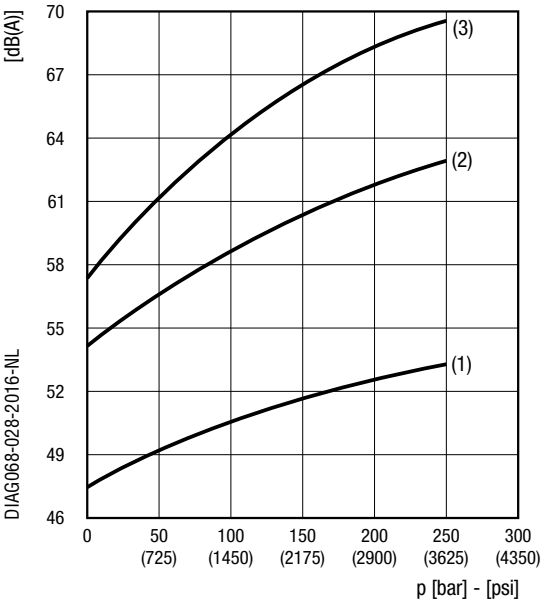
XHP20•16 OPERATING CURVES

Power and torque

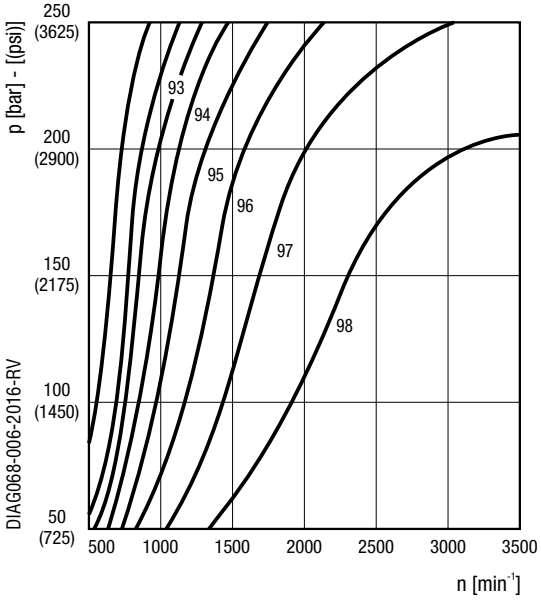


Noise level

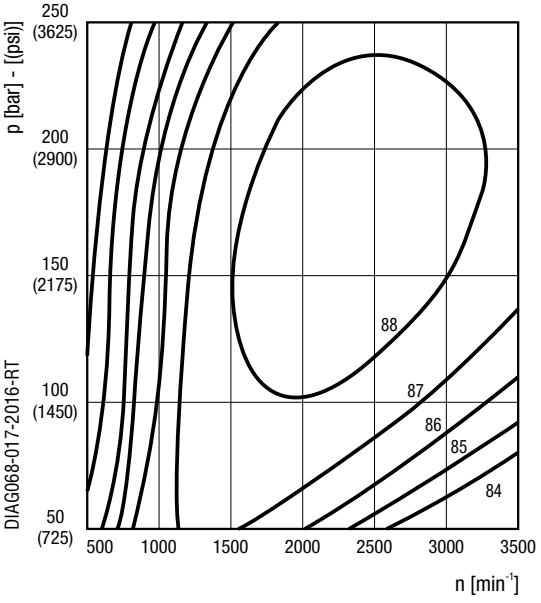
Distance from microphone to pump = 1 m (39.37 in)
1) 1000 min^{-1} (2) 2000 min^{-1} (3) 3000 min^{-1}



Volumetric efficiency



Overall efficiency



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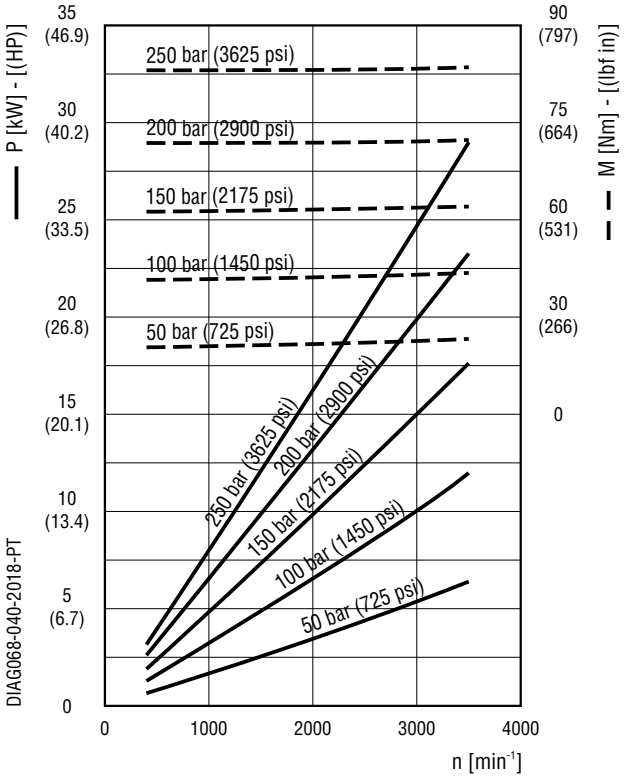
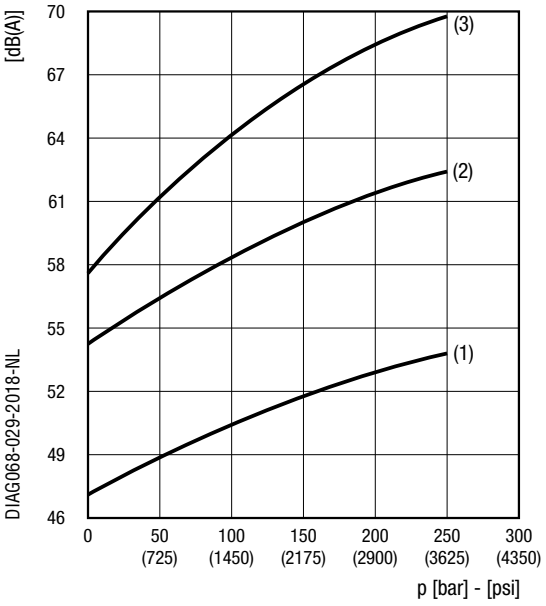
XHP20•18 OPERATING CURVES

Power and torque

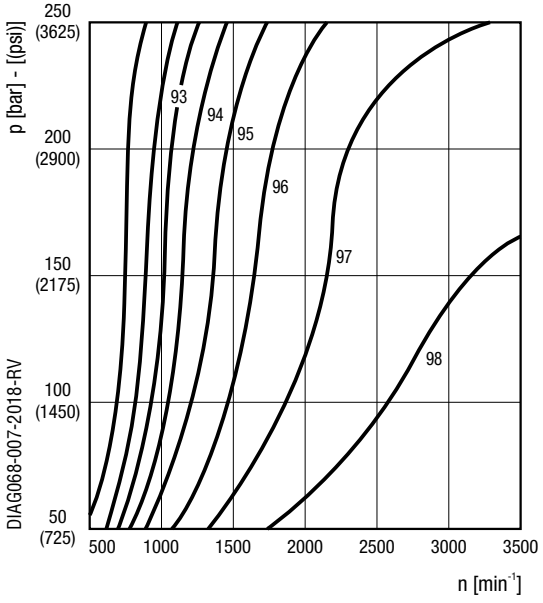


Noise level

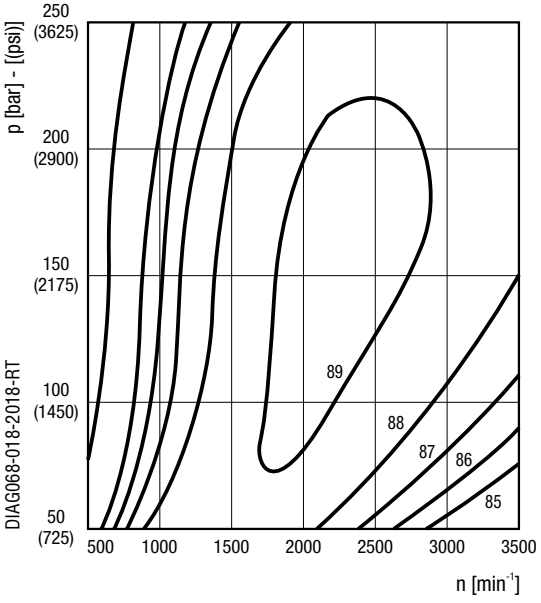
Distance from microphone to pump = 1 m (39.37 in)
1) 1000 min^{-1} (2) 2000 min^{-1} (3) 3000 min^{-1}



Volumetric efficiency



Overall efficiency



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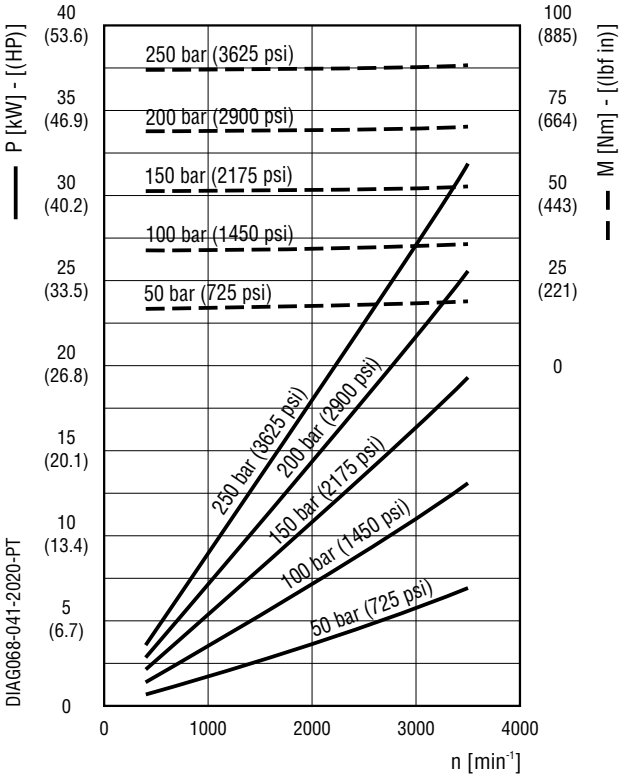
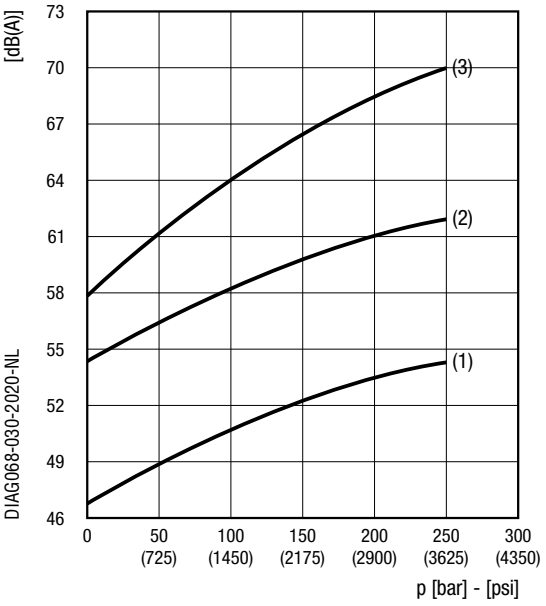
XHP20•20 OPERATING CURVES

Power and torque

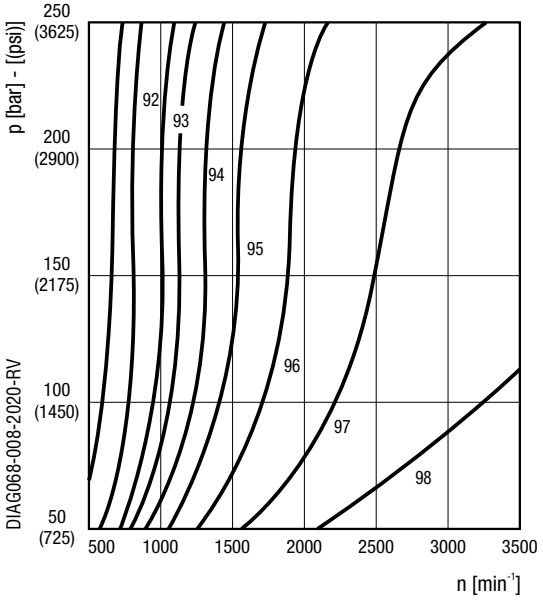


Noise level

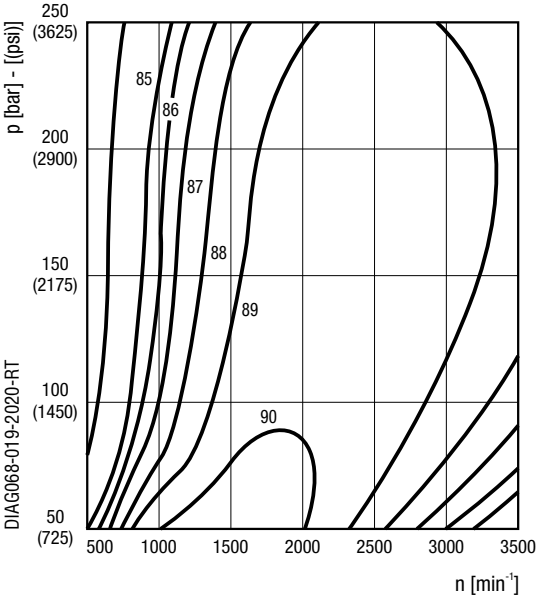
Distance from microphone to pump = 1 m (39.37 in)
1) 1000 min^{-1} (2) 2000 min^{-1} (3) 3000 min^{-1}



Volumetric efficiency



Overall efficiency



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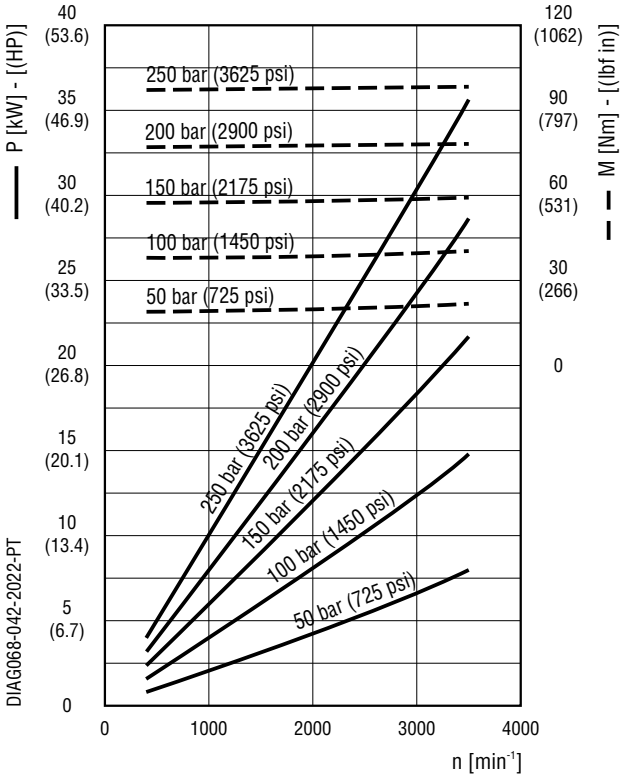
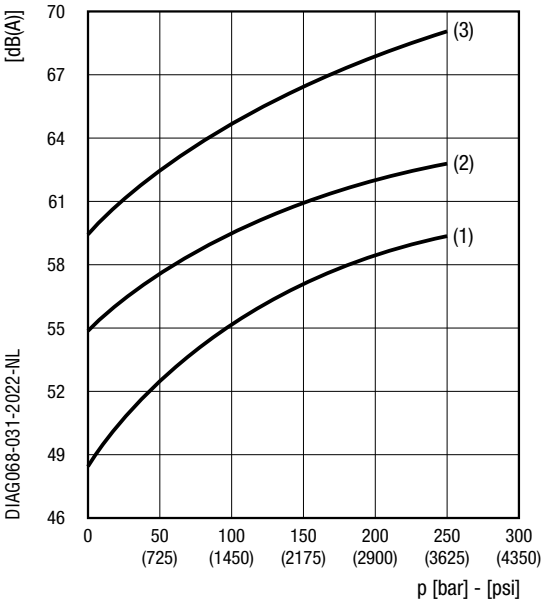
XHP20•22 OPERATING CURVES

Power and torque

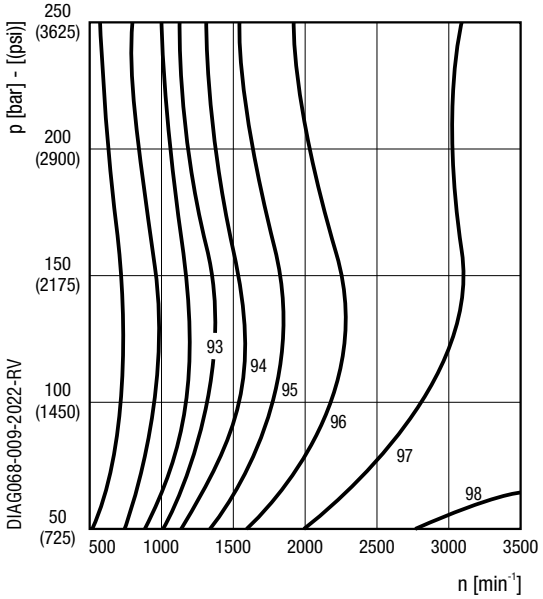


Noise level

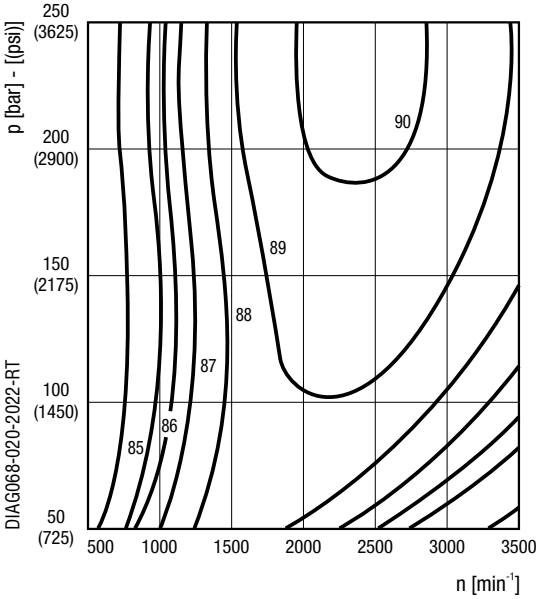
Distance from microphone to pump = 1 m (39.37 in)
1) 1000 min^{-1} (2) 2000 min^{-1} (3) 3000 min^{-1}



Volumetric efficiency



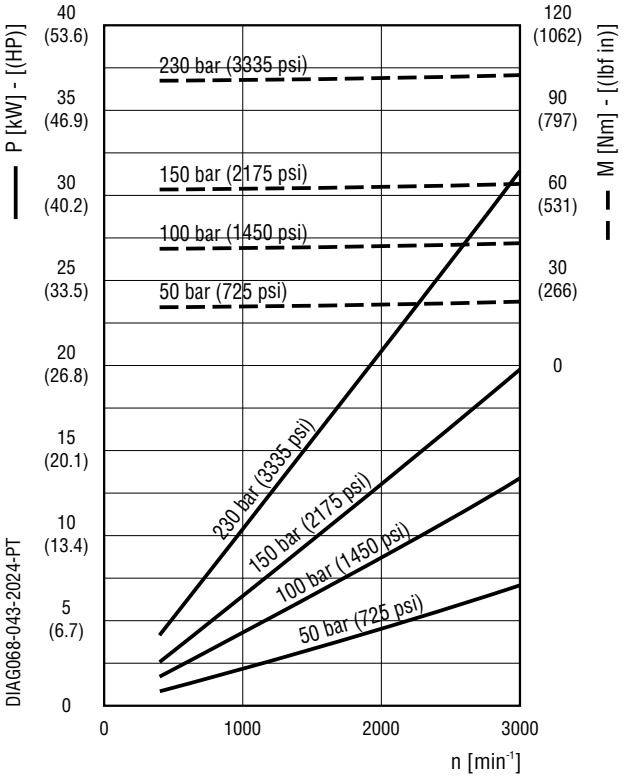
Overall efficiency



01/03.2024

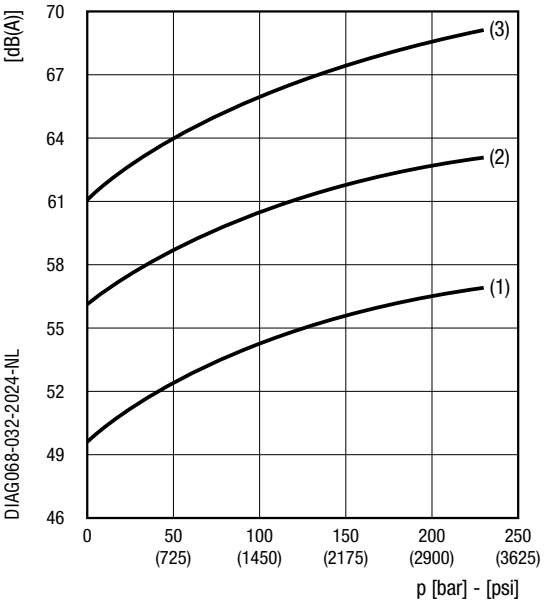
XHP20•24 OPERATING CURVES

Power and torque

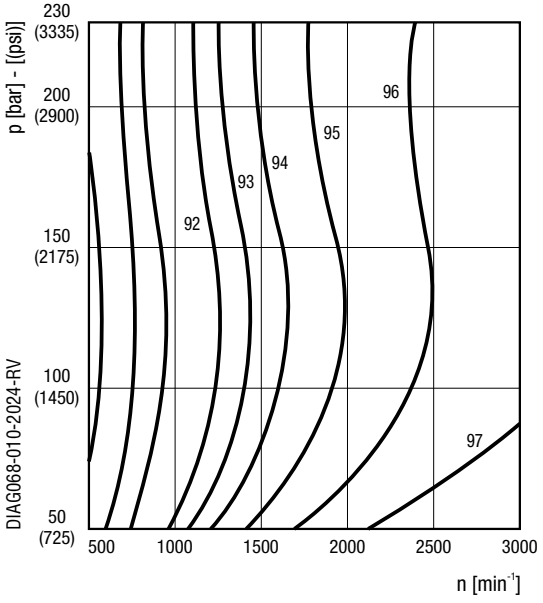


Noise level

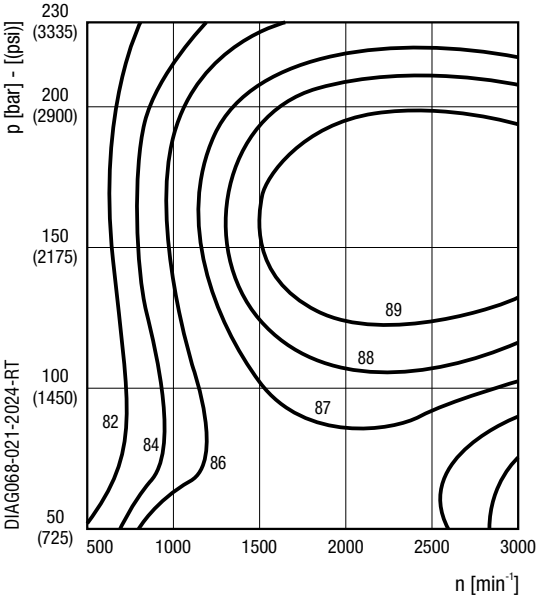
Distance from microphone to pump = 1 m (39.37 in)
1) 1000 min^{-1} (2) 2000 min^{-1} (3) 3000 min^{-1}



Volumetric efficiency



Overall efficiency



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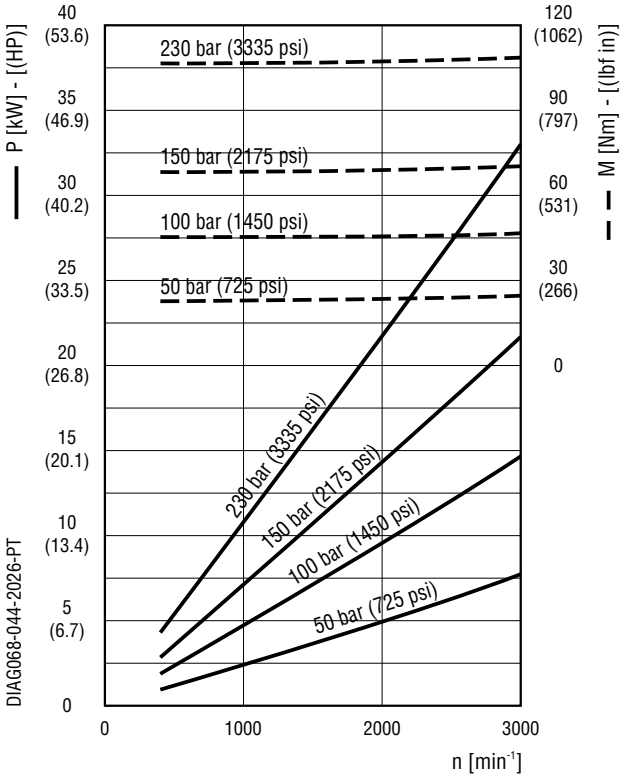
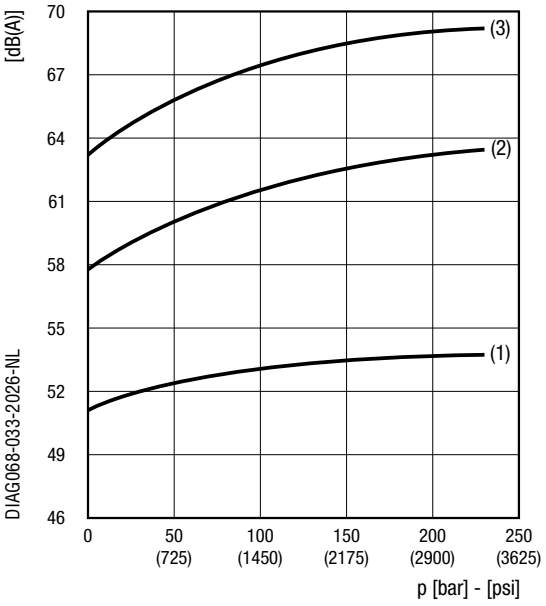
XHP20•26 OPERATING CURVES

Power and torque

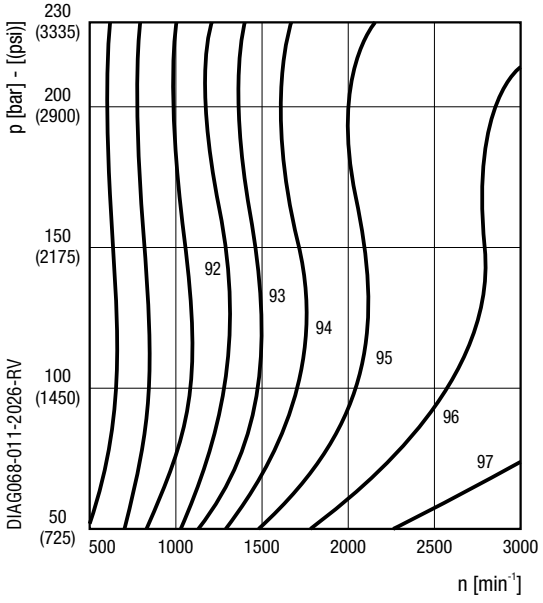


Noise level

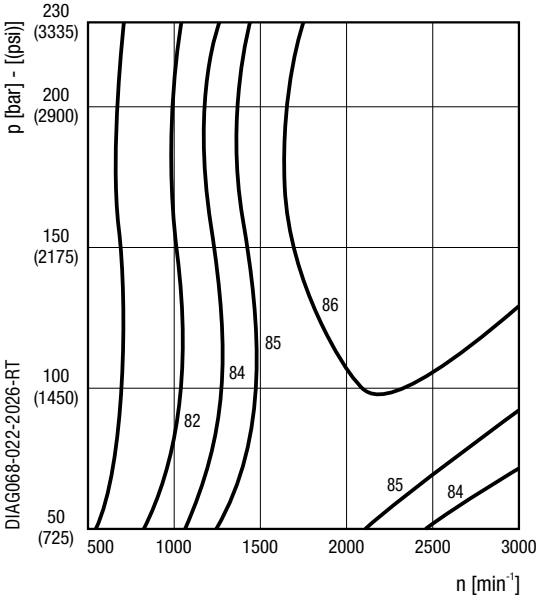
Distance from microphone to pump = 1 m (39.37 in)
1) 1000 min^{-1} (2) 2000 min^{-1} (3) 3000 min^{-1}



Volumetric efficiency



Overall efficiency



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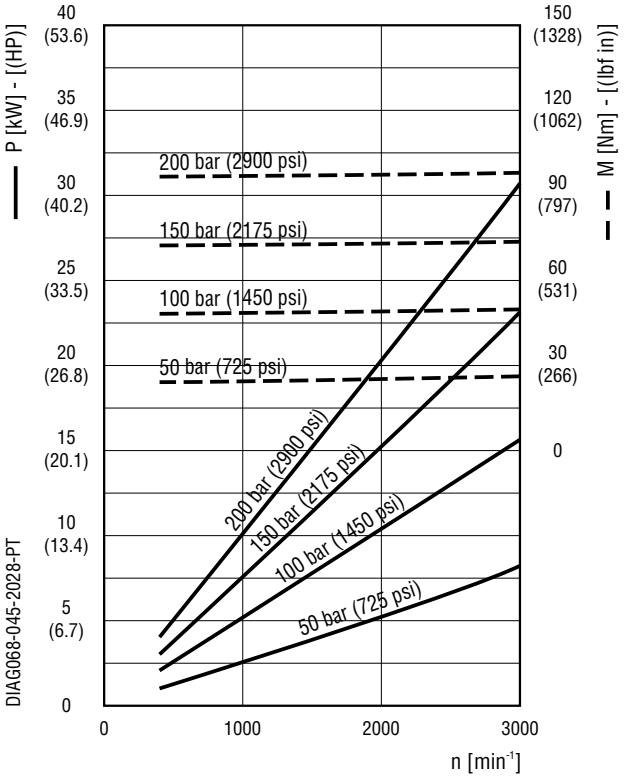
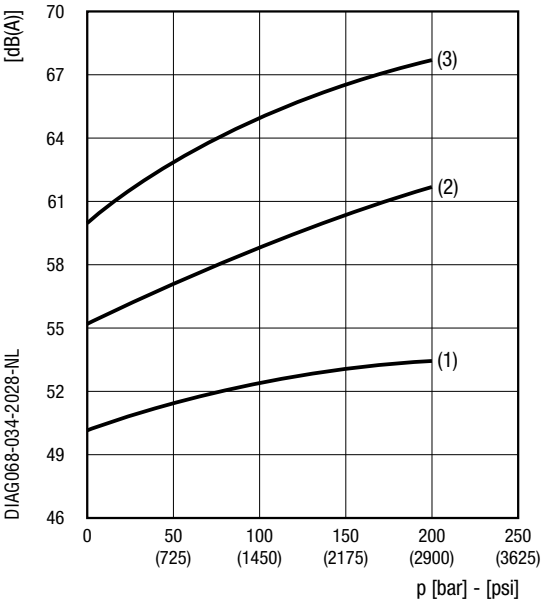
XHP20•28 OPERATING CURVES

Power and torque

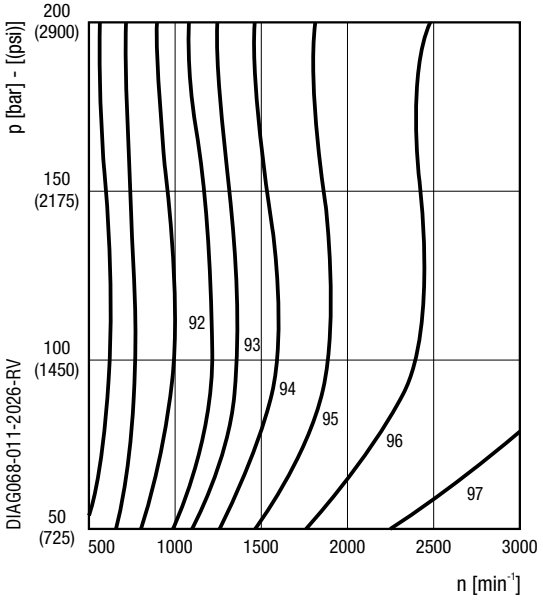


Noise level

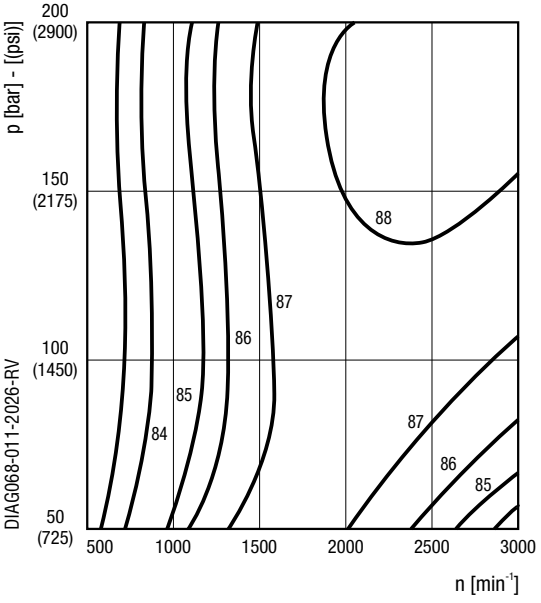
Distance from microphone to pump = 1 m (39.37 in)
1) 1000 min^{-1} (2) 2000 min^{-1} (3) 3000 min^{-1}



Volumetric efficiency



Overall efficiency



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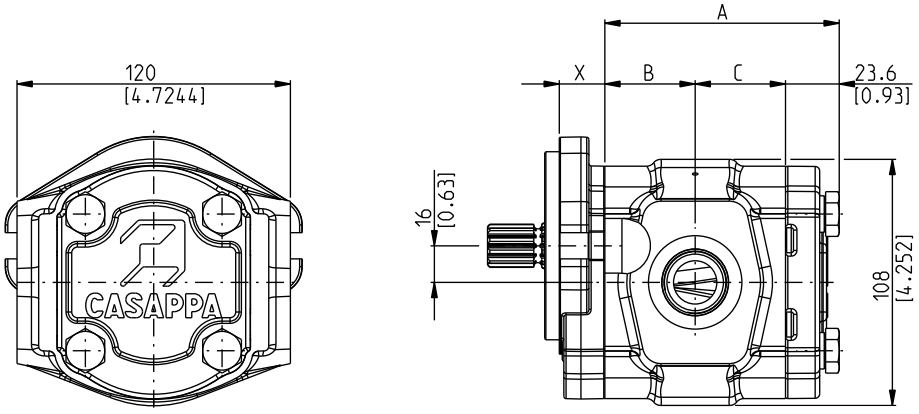
XHP 20 SINGLE PUMPS DIMENSIONS - SIDE PORTS L

Drive shafts: page 28 ÷ 29
Mounting flange: for X dimension see page 30 ÷ 33
Ports availability: European, Split, Gas, SAE and German. See page 34



XHP-DCAT034-002

Mounting flange and rear cover are available in cast iron only.

Pump type	A	B	C
	mm (inch)	mm (inch)	mm (inch)
XHP 20•8	75 (2.95)	28 (1.10)	24 (0,94)
XHP 20•10	77,7 (3.06)	30,7 (1.21)	24 (0,94)
XHP 20•12	80,4 (3.17)	33,4 (1.31)	24 (0,94)
XHP 20•14	83,1 (3.27)	36,1 (1.42)	24 (0,94)
XHP 20•16	86,3 (3.40)	39,3 (1.55)	24 (0,94)
XHP 20•18	89,1 (3.51)	33,05 (1.30)	33,05 (1.30)
XHP 20•20	91,8 (3.61)	34,4 (1.35)	34,4 (1.35)
XHP 20•22	95,4 (3.76)	36,2 (1.43)	36,2 (1.43)
XHP 20•24	97,6 (3.84)	37,3 (1.47)	37,3 (1.47)
XHP 20•26	100,4 (3.95)	38,7 (1.52)	38,7 (1.52)
XHP 20•28	103,2 (4.06)	40,1 (1.58)	40,1 (1.58)

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MULTIPLE PUMPS

XHP series pumps can be coupled together in combination. In applications where the input power requirement of each section varies, the section with the greater requirement must be at the drive shaft end, and progressively smaller to the rear.
Features and performances are the same as the corresponding single pumps, but pressures must be limited according to the transmissible torque of the drive and connecting shafts. To have appropriate data, use the formula below.

The maximum rotational speed is the one of the lowest rated speed of the single units incorporated.

Available with common inlet and separated stages. Please contact us for more information.

M	Nm (lbf in)	Torque
V	cm_3/rev (in_3/rev)	Displacement
Δp	bar (psi)	Pressure
$\eta_{hm} = \eta_{hm}$ (V, Δp, n)		Hydro-mechanical effciency

$$\mathbf{M} = \frac{M_{theor.}}{\eta_{hm}} \text{ [Nm]}$$

$$\mathbf{M_{theor.}} = \frac{\Delta p \text{ (bar)} \bullet V \text{ (cm}^3\text{/rev)}}{62{,}83} \text{ [Nm]}$$

NOTE
The torque absorbed from the shaft of the first pump results from the sum of the torques of all the single stages. The achieved value must not exceed the maximum torque limit given for the shaft of the first pump.

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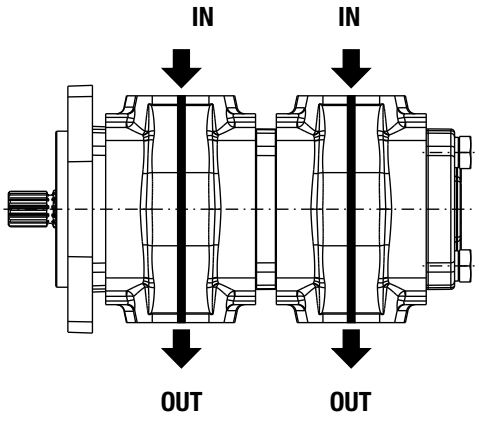
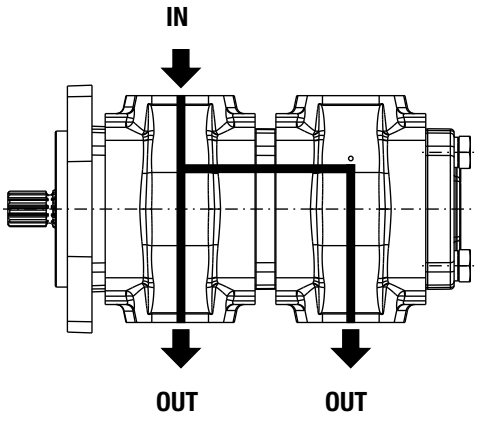
INLET PORTS CONFIGURATION

STANDARD VERSION



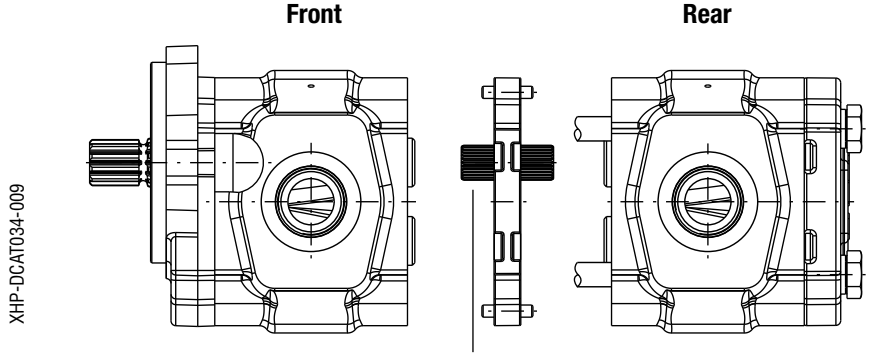
COMMON INLET



Reduced inlets provide overall systems savings by reducing the cost of redundant inlet hose and fittings.
Please contact us for other combinations.

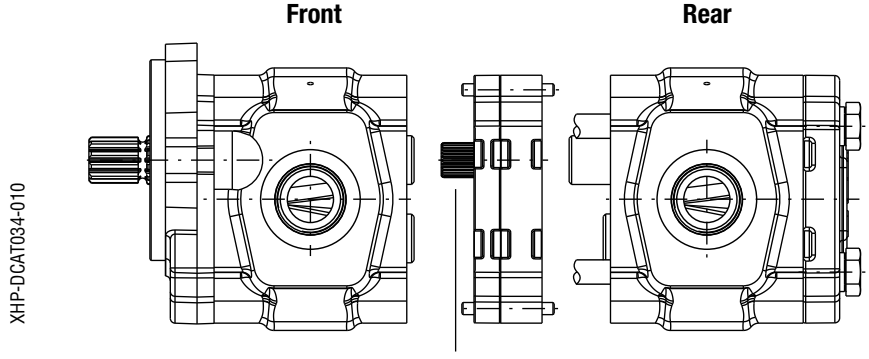
MULTIPLE PUMPS COMBINATION

XHP 20/20	**STANDARD VERSION**	**S6**
XHP 20/20	**COMMON INLET VERSION**	**S7**



86 MAX 110 Nm (974 lbf in)

XHP 20/20	**SEPARATED STAGES VERSION**	**Z6**



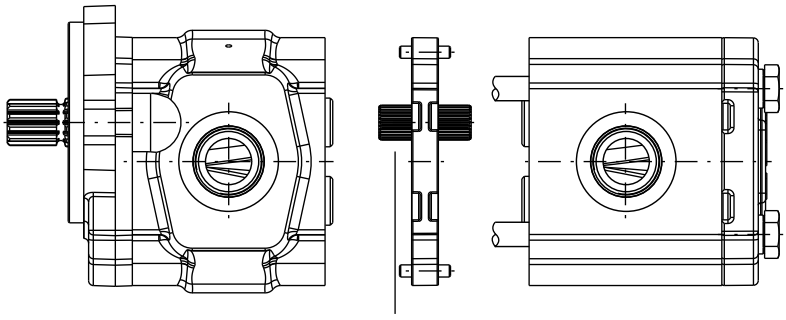
86 MAX 110 Nm (974 lbf in)

01/03.2024

MULTIPLE PUMPS COMBINATION

XHP 20/XLP 20	**STANDARD VERSION**	**S6**
XHP 20/XLP 20	**COMMON INLET VERSION**	**S7**

Front **Rear**

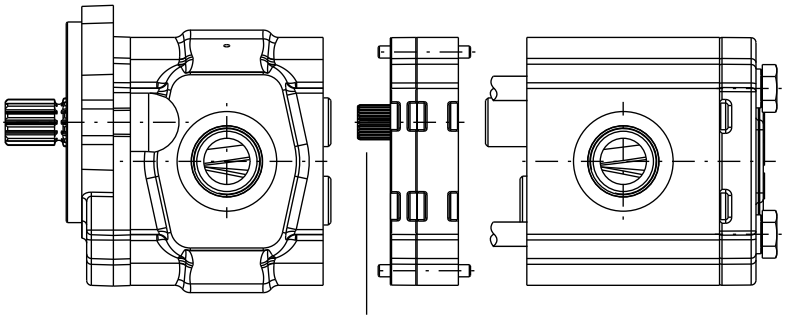


XHP-DCAT034-011

86 MAX 110 Nm (974 lbf in)

XHP 20/XLP 20	**SEPARATED STAGES VERSION**	**Z6**

Front **o** **Rear**



XHP-DCAT034-012

86 MAX 110 Nm (974 lbf in)

01/03.2024

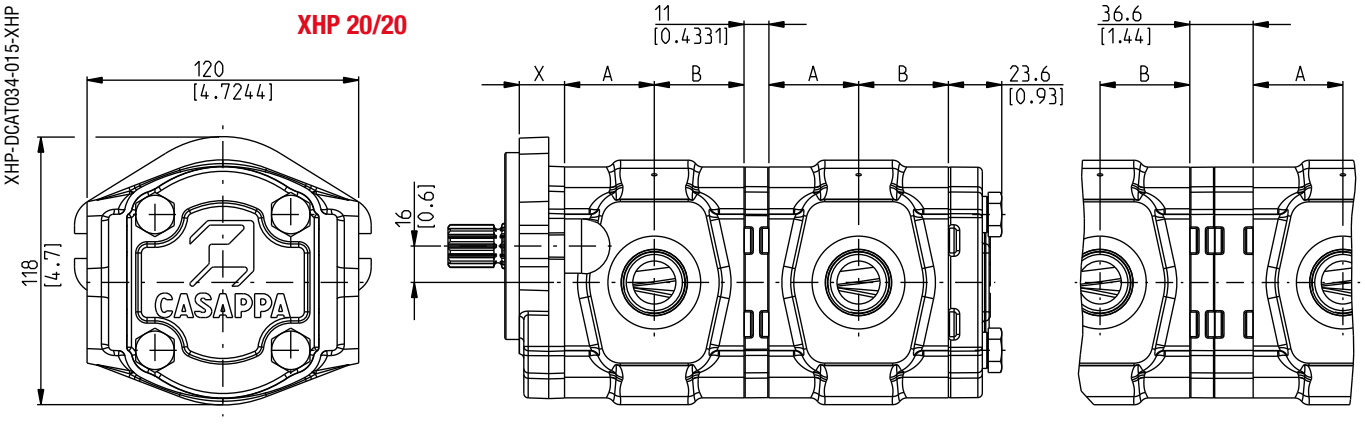
XHP 20 MULTIPLE PUMPS DIMENSIONS - SAME GROUPS

Drive shafts: page 28 ÷ 29
Mounting flange: for X dimension see page 30 ÷ 33

Ports availability: European, Split, Gas, SAE and German. See page 34

XHP-DCAT034-015-XHP

XHP 20/20



Separated stages

Mounting flange and rear cover are available in cast iron only.

Pump type	A	B
	mm (inch)	mm (inch)
XHP 20•8	28 (1.10)	24 (0,94)
XHP 20•10	30,7 (1.21)	24 (0,94)
XHP 20•12	33,4 (1.31)	24 (0,94)
XHP 20•14	36,1 (1.42)	24 (0,94)
XHP 20•16	39,3 (1.55)	24 (0,94)
XHP 20•18	33,05 (1.30)	33,05 (1.30)
XHP 20•20	34,4 (1.35)	34,4 (1.35)
XHP 20•22	36,2 (1.43)	36,2 (1.43)
XHP 20•24	37,3 (1.47)	37,3 (1.47)
XHP 20•26	38,7 (1.52)	38,7 (1.52)
XHP 20•28	40,1 (1.58)	40,1 (1.58)

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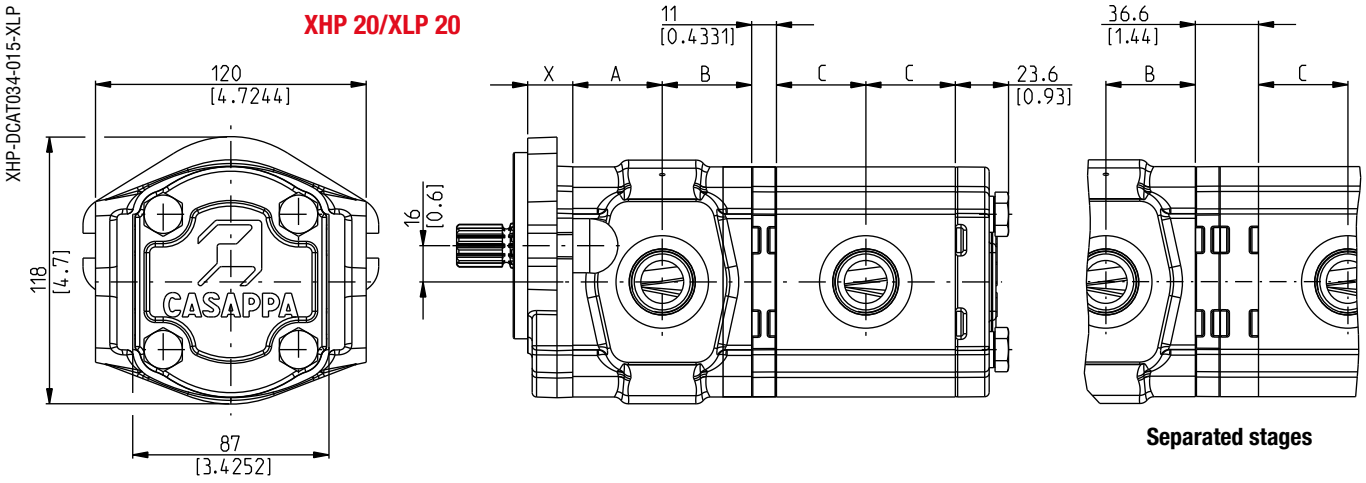
XHP 20 DOUBLE PUMPS DIMENSIONS - XHP 20/XLP 20

Drive shafts: page 28 ÷ 29
Mounting flange: for X dimension see page 30 ÷ 33

Ports availability: European, Split, Gas, SAE and German. See page 34



Mounting flange and rear cover are available in cast iron only.

Pump type	A	B
	mm (inch)	mm (inch)
XHP 20•8	28 (1.10)	24 (0.94)
XHP 20•10	30,7 (1.21)	24 (0.94)
XHP 20•12	33,4 (1.31)	24 (0.94)
XHP 20•14	36,1 (1.42)	24 (0.94)
XHP 20•16	39,3 (1.55)	24 (0.94)
XHP 20•18	33,05 (1.30)	33,05 (1.30)
XHP 20•20	34,4 (1.35)	34,4 (1.35)
XHP 20•22	36,2 (1.43)	36,2 (1.43)
XHP 20•24	37,3 (1.47)	37,3 (1.47)
XHP 20•26	38,7 (1.52)	38,7 (1.52)
XHP 20•28	40,1 (1.58)	40,1 (1.58)

Pump type	C
	mm (inch)
XLP 20•8	26 (1.02)
XLP 20•10	27,35 (1.08)
XLP 20•12	28,7 (1.13)
XLP 20•14	30,05 (1.18)
XLP 20•16	31,65 (1.25)
XLP 20•18	33,05 (1.30)
XLP 20•20	34,4 (1.35)
XLP 20•22	36,2 (1.43)
XLP 20•24	37,3 (1.47)
XLP 20•26	38,7 (1.52)
XLP 20•28	40,1 (1.58)

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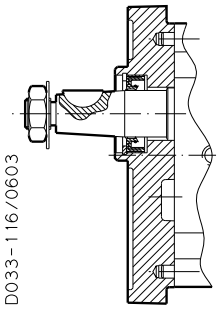
OUTBOARD BEARING OPTIONS - DRIVE SHAFTS

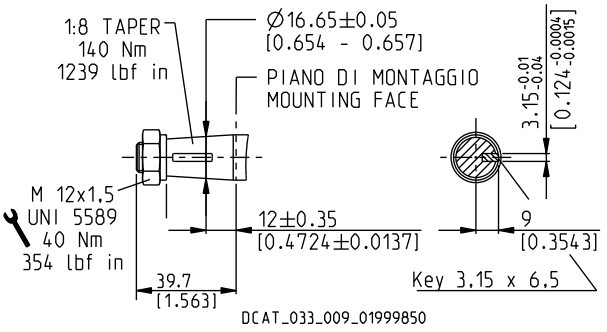
VERSION 0



Version for applications without radial and axial load on the drive shaft.

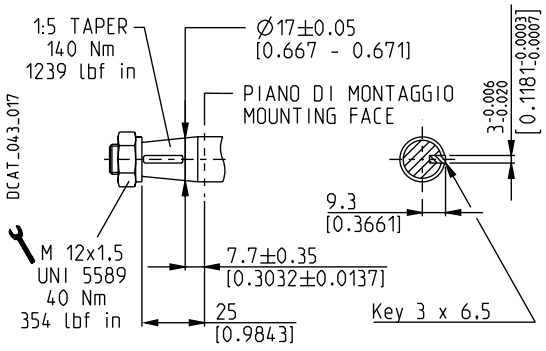
EUROPEAN TAPERED 1:8 82

Mounting face refer to flange code **E2**



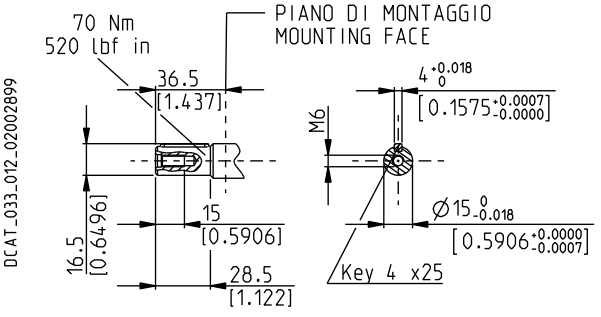
GERMAN TAPERED 1:5 54

Mounting face refer to flange code **B2**



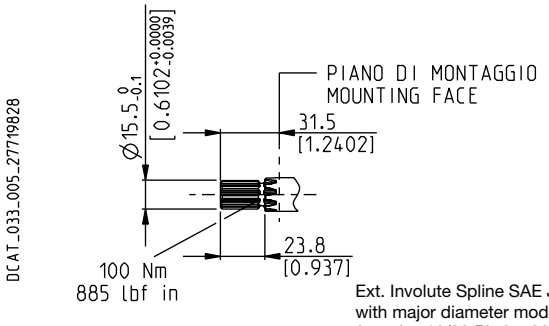
STRAIGHT 46

Mounting face refer to flange code **E2**



SAE "A" SPLINE 03

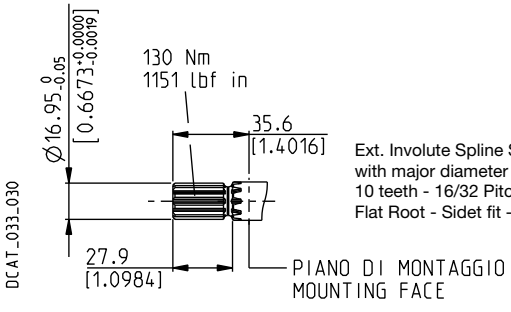
Mounting face refer to flange code **S9**



Ext. Involute Spline SAE J498B
with major diameter modified
9 teeth - 16/32 Pitch - 30 deg
Flat Root - Sidet fit - Class 1

SPLINE 01

Mounting face refer to flange code **S9**



Ext. Involute Spline SAE J498B
with major diameter modified
10 teeth - 16/32 Pitch - 30 deg
Flat Root - Sidet fit - Class 1

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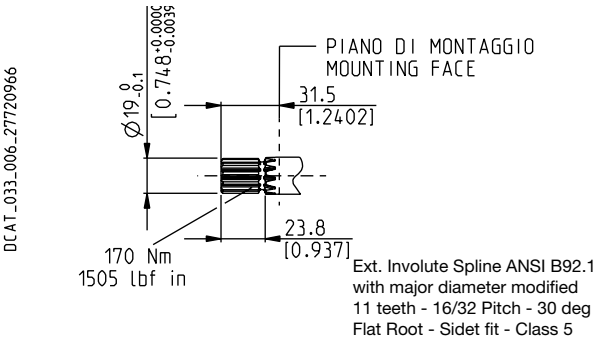
DRIVE SHAFTS

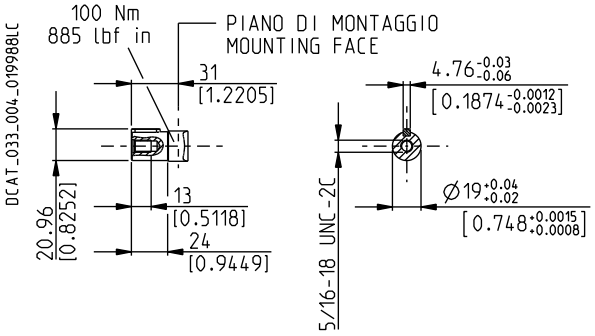
SAE SPLINE 07

Mounting face refer to flange code **S9**



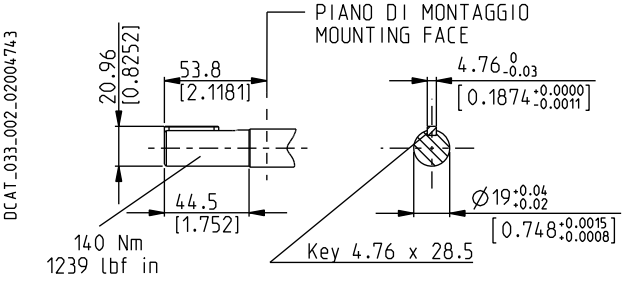
SAE "A" STRAIGHT 31

Mounting face refer to flange code **S9**



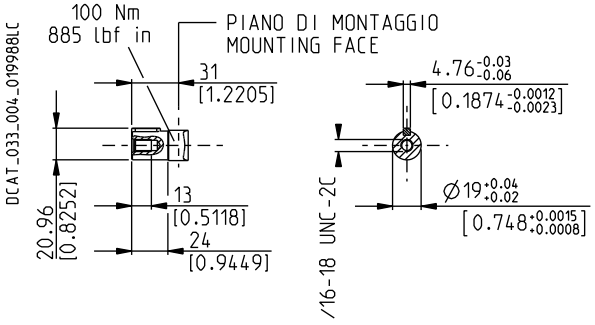
STRAIGHT 49

Mounting face refer to flange code **S9**



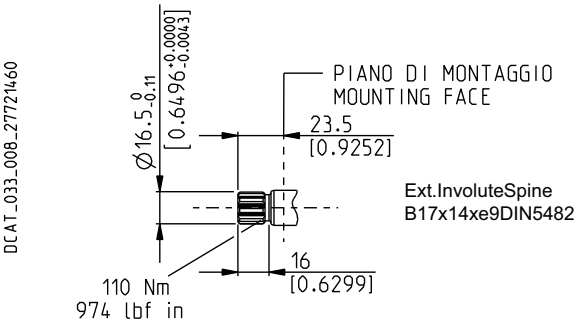
STRAIGHT 50

Mounting face refer to flange code **S9**



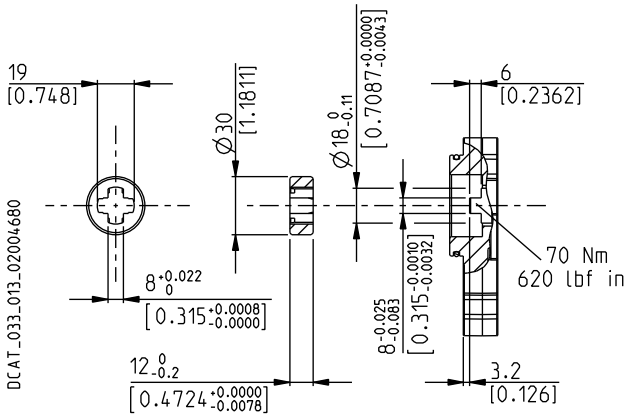
DIN 5482 SPLINE 12

Mounting face refer to flange code **B2**



TANG 95

Mounting face refer to flange code **B6**



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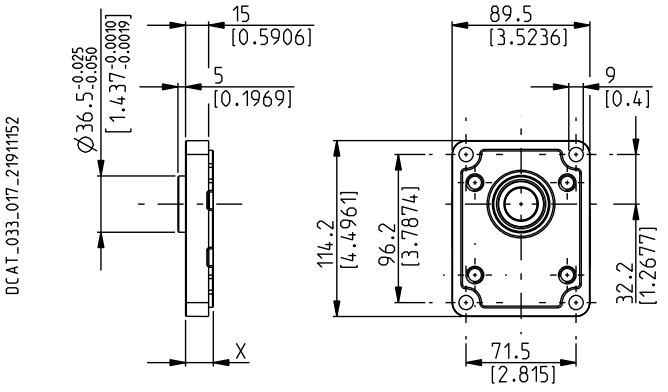
MOUNTING FLANGES AND TABLE OF COMPATIBILITY

EUROPEAN E2

Material: cast iron



DRIVE SHAFTS
See page 28 ÷ 29

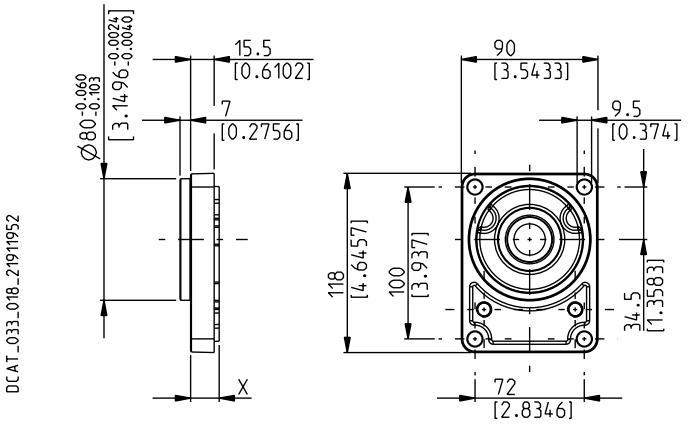
VERSIONS See page 28	X mm (in)	82	46	03	07	12	31	48	49	50	54
0	18 (0.71)	■	■	●	●	●	●	●	●	●	●

■ Standard combination

● Available combination

GERMAN B2

Material: cast iron



DRIVE SHAFTS
See page 28 ÷ 29

VERSIONS See page 28	X mm (in)	12	54	01	03	31	46	49	82
0	18,8 (0.74)	■	■	●	●	●	●	●	●

■ Standard combination

● Available combination

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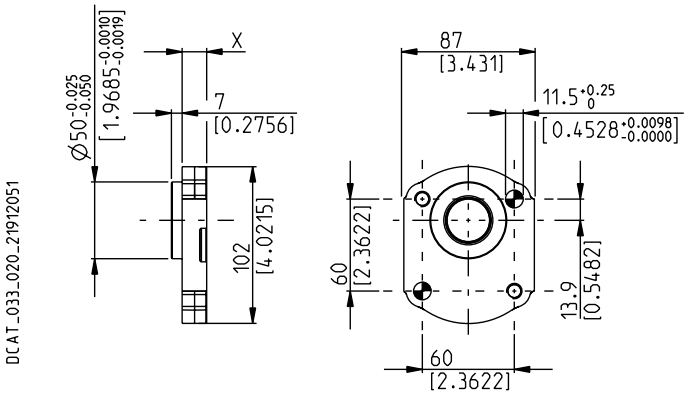
MOUNTING FLANGES AND TABLE OF COMPATIBILITY

GERMAN 2 BOLTS — B4

Material: cast iron

◔ Through hole



VERSIONS See page 28	X mm (in)	DRIVE SHAFTS See page 28 ÷ 29 54	03	12	31	49	82
0	16 (0.63)	■	●	●	●	●	●

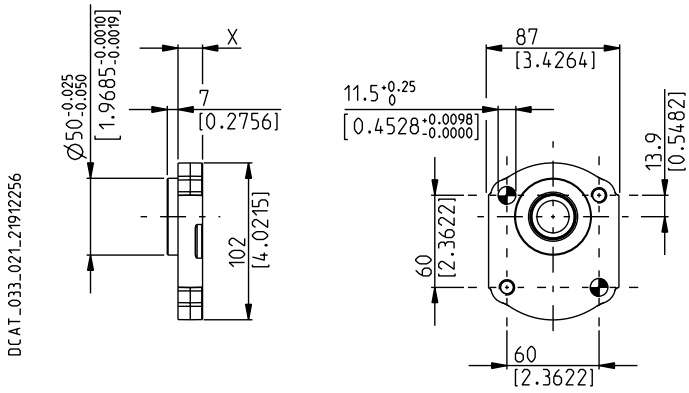
■ Standard combination

● Available combination

GERMAN 2 BOLTS — B5

Material: cast iron

◔ Through hole



VERSIONS See page 28	X mm (in)	DRIVE SHAFTS See page 28 ÷ 29 54	03	12	31	49	82
0	16 (0.63)	■	●	●	●	●	●

■ Standard combination

● Available combination

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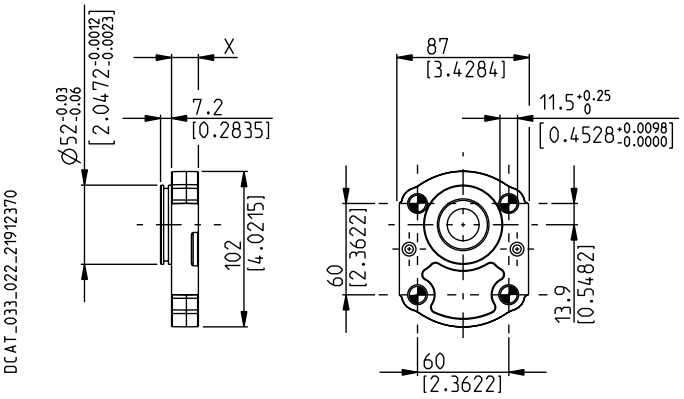
MOUNTING FLANGES AND TABLE OF COMPATIBILITY

GERMAN 4 BOLTS — B6

Material: cast iron

◔ Through hole



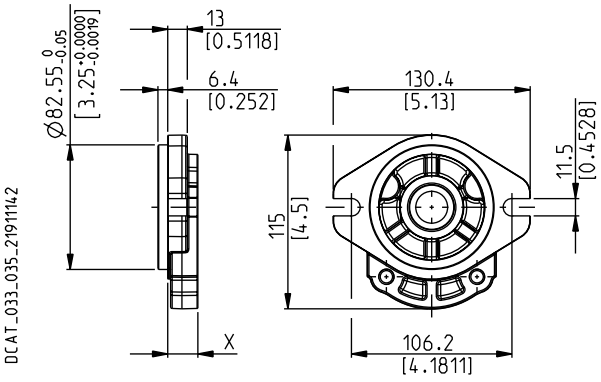
VERSIONS See page 28	X mm (in)	DRIVE SHAFTS See page 29 95	07	12
0	17,7 (0.70)	■	●	●

■ Standard combination

● Available combination

SAE "A" 2 BOLTS — S9

Material: cast iron



VERSIONS See page 28	X mm (in)	DRIVE SHAFTS See page 28 ÷ 29 01	03	07	12	31	46	49	50	54	82
0	20 (0.79)	■	■	■	●	■	●	■	●	●	●

■ Standard combination

● Available combination

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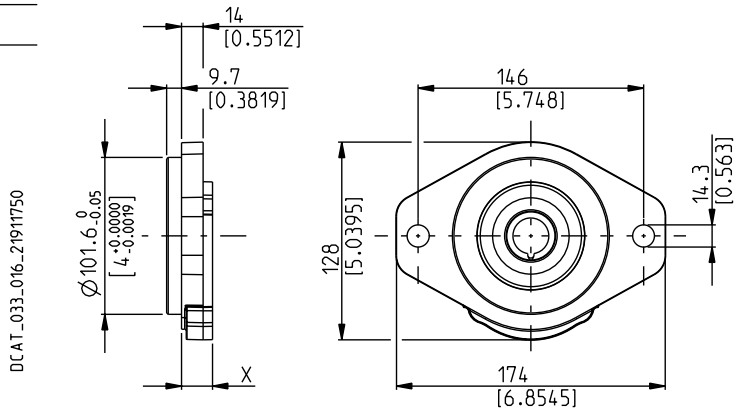
MOUNTING FLANGES AND TABLE OF COMPATIBILITY

SAE “B” 2 BOLTS **S5**

Material: cast iron



DRIVE SHAFTS
See page 29

VERSIONS See page 28	**X** mm (in)	**49**
0	20 (0.79)	●

■ Standard combination

● Available combination

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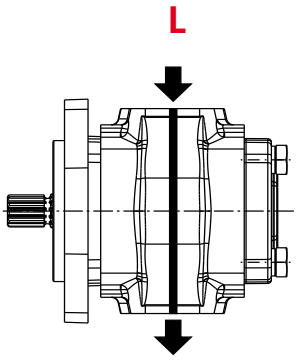
PORTS POSITION AND TYPE



	SIDE PORTS											
PORTS TYPE	European		Split SSM		Split SSS		Gas BSPP		SAE ODT		German	
Pump type	IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT
XHP 20•8	EA	EA	MA	MA	SA	SA	GD	GD	OC	OC	BE	BC
XHP 20•10	EA	EA	MA	MA	SA	SA	GD	GD	OC	OC	BE	BC
XHP 20•12	EA	EA	MA	MA	SA	SA	GD	GD	OC	OC	BE	BC
XHP 20•14	EB	EA	MB	MA	SB	SA	GE	GD	OD	OC	BE	BC
XHP 20•16	EB	EA	MB	MA	SB	SA	GE	GD	OD	OC	BE	BC
XHP 20•18	EB	EA	MB	MA	SB	SA	GE	GD	OD	OC	BE	BC
XHP 20•20	EB	EA	MB	MA	SB	SA	GE	GD	OD	OC	BE	BC
XHP 20•22	EB	EA	MC	MB	SC	SB	GF	GD	OF	OC	BE	BC
XHP 20•24	EB	EA	MC	MB	SC	SB	GF	GD	OF	OC	BE	BC
XHP 20•26	EB	EA	MC	MB	SC	SB	GF	GD	OF	OC	BE	BC
XHP 20•28	EB	EA	MC	MB	SC	SB	GF	GD	OF	OC	BE	BC

Different inlet and outlet ports are available.
Please contact us for more information.

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PORT SIZES

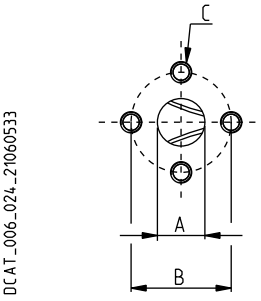
Tightening torque for low pressure side port.

Tightening torque for high pressure side port.

EUROPEAN FLANGED PORTS - 4 Bolts — EUROPEAN

Metric thread ISO 60° conforms to ISO/R 262

CODE	A	B	C		
	mm (in)	mm (in)	Thread Depth mm (in)	Nm (lbf in)	Nm (lbf in)
EA	13 (0.51)	30 (1.18)	M 6 13 (0.51)	8 $^{+0,5}$ (71 ÷ 75)	8 $^{+0,5}$ (71 ÷ 75)
EB	19 (0.75)	40 (1.57)	M 8 14 (0.55)	15 $^{+1}$ (133 ÷ 142)	20 $^{+1}$ (177 ÷ 186)

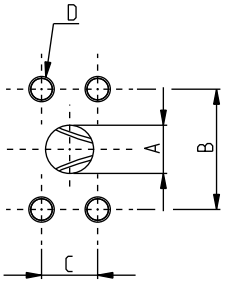


DCAT_006_024_21060533

SAE FLANGED PORTS J518 - Standard pressure series 3000 PSI — SSM

Metric thread ISO 60° conforms to ISO/R 262

CODE	A	B	C	D		
	mm (in)	mm (in)	mm (in)	Thread Depth mm (in)	Nm (lbf in)	Nm (lbf in)
MA	12,5 (0.49)	38,1 (1.50)	17,5 (0.69)	M 8 14 (0.55)	15 $^{+1}$ (133 ÷ 142)	15 $^{+1}$ (133 ÷ 142)
MB	19 (0.75)	47,6 (1.87)	22,2 (0.87)	M 10 14 (0.55)	20 $^{+1}$ (177 ÷ 186)	25 $^{+1}$ (266 ÷ 288)
MC	25,4 (1.00)	52,4 (2.06)	26,2 (1.03)	M 10 14 (0.55)	20 $^{+1}$ (177 ÷ 186)	25 $^{+1}$ (266 ÷ 288)



DCAT_006_025_21064252

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PORT SIZES

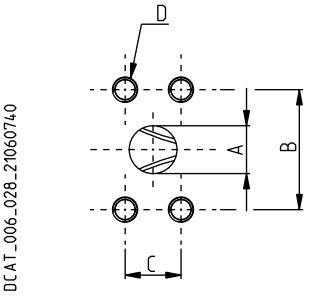
Tightening torque for low pressure side port.

Tightening torque for high pressure side port.

SAE FLANGED PORTS J518 - Standard pressure series 3000 PSI — SSS

American straight thread UNC-UNF 60° conforms to ANSI B 1.1

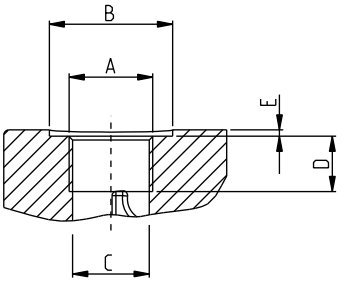
CODE	A	B	C	D		
	mm (in)	mm (in)	mm (in)	Thread Depth mm (in)	Nm (lbf in)	Nm (lbf in)
SA	12,5 (0.49)	38,1 (1.50)	17,5 (0.69)	5/16-18 UNC-2B 14 (0.55)	15 +1 (133 ÷ 142)	20 +1 (177 ÷ 186)
SB	19 (0.75)	47,6 (1.87)	22,2 (0.87)	3/8 - 16 UNC-2B 14 (0.55)	20 +1 (177 ÷ 186)	25 +1 (266 ÷ 288)
SC	25,4 (1.00)	52,4 (2.06)	26,2 (1.03)	3/8 - 16 UNC-2B 14 (0.55)	20 +1 (177 ÷ 186)	25 +1 (266 ÷ 288)



DCAT_006_028_21060740

GAS STRAIGHT THREAD PORTS — BSPP

British standard pipe parallel (55°) conforms to UNI - ISO 228



DCAT_006_026_21064779

CODE	Nominal size	A	Ø B	Ø C	D	E		
			mm (in)	mm (in)	mm (in)	mm (in)	Nm (lbf in)	Nm (lbf in)
GD	1/2”	G 1/2	–	19 (0.75)	17 (0.67)	–	20 +1 (177 ÷ 186)	50 +2,5 (443 ÷ 465)
GE	3/4”	G 3/4	–	24,5 (0.96)	18 (0.71)	–	30 +2,5 (266 ÷ 288)	90 +5 (797 ÷ 841)
GF	1”	G 1	–	30,5 (1.20)	18 (0.71)	–	50 +2,5 (443 ÷ 465)	130 +10 (1151 ÷ 1239)

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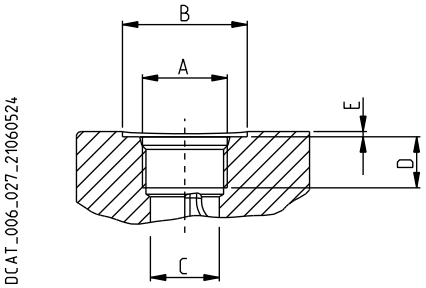
PORT SIZES

Tightening torque for low pressure side port.

Tightening torque for high pressure side port.

SAE STRAIGHT THREAD PORTS J514 — ODT

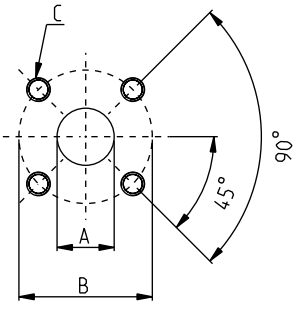
American straight thread UNC-UNF 60° conforms to ANSI B 1.1



CODE	Nominal size	A	Ø B	Ø C	D	E		
			mm (in)	mm (in)	mm (in)	mm (in)	Nm (lbf in)	Nm (lbf in)
OC	5/8”	7/8” - 14 UNF - 2B	35 (1.38)	20,5 (0.81)	17 (0.67)	0,5 (0.02)	30 $^{+2,5}$ (266 ÷ 288)	70 $^{+5}$ (620 ÷ 664)
OD	3/4”	1 1/16” - 12 UNF - 2B	42 (1.65)	24,8 (0.98)	20 (0.79)	0,5 (0.02)	40 $^{+2,5}$ (354 ÷ 376)	120 $^{+10}$ (1062 ÷ 1151)
OF	1”	1 5/16” - 12 UNF - 2B	49 (1.93)	30,5 (1.20)	20 (0.79)	0,5 (0.02)	60 $^{+5}$ (531 ÷ 575)	170 $^{+10}$ (1505 ÷ 1593)

GERMAN FLANGED PORTS - 4 Bolts — GERMAN

Metric thread ISO 60° conforms to ISO/R 262



CODE	A	B	C		
	mm (in)	mm (in)	Thread Depth mm (in)	Nm (lbf in)	Nm (lbf in)
BC	15 (0.60)	35 (1.38)	M 6 12 (0.47)	8 $^{+0,5}$ (71 ÷ 75)	8 $^{+0,5}$ (71 ÷ 75)
BE	20 (0.79)	40 (1.57)	M 6, 12 (0.47)	8 $^{+0,5}$ (71 ÷ 75)	8 $^{+0,5}$ (71 ÷ 75)

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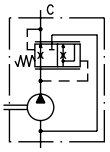
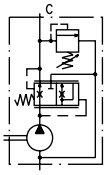
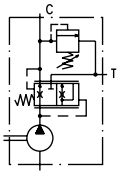
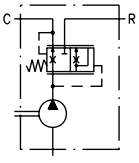
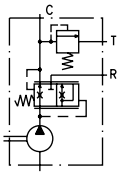
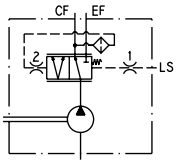
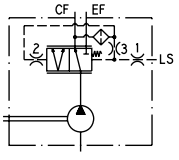
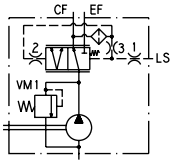
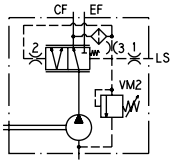
VALVE OPTIONS

PRIORITY VALVE

P1	Costant delivery and internal recirculation of excess flow.	
P2	Costant delivery at controlled pressure. Internal recirculation of excess flow and drain valve.	
P3	Costant delivery at controlled pressure. Excess flow and drain valve must be connected to tank.	
P4	Costant delivery and excess flow can both be used under load.	
P5T	Costant delivery at controlled pressure with drain valve connected to tank. Excess flow can be used under load.	

LOAD SENSING VALVE

...	Static.	
...	Dynamic.	
...	Dynamic with relief valve fitted on the main line.	
...	Dynamic with relief valve fitted on controlled line.	

For more information please refer to our built-in valves technical catalogues.

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NOTES

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HOW TO ORDER - SINGLE PUMPS

1	2	3		4	5		6	7		8		9		10
XHP 20•8	S	0	-	82	E2	-	L	EB/EA	-	N	-	D	-	FS

1 Type	Pump type
8,06 cm³/rev (0.49 in³/rev)	XHP 20•8
10,05 cm³/rev (0.61 in³/rev)	XHP 20•10
12,09 cm³/rev (0.74 in³/rev)	XHP 20•12
14,02 cm³/rev (0.86 in³/rev)	XHP 20•14
16,03 cm³/rev (0.98 in³/rev)	XHP 20•16
18,05 cm³/rev (1.10 in³/rev)	XHP 20•18
20,00 cm³/rev (1.22 in³/rev)	XHP 20•20
22,46 cm³/rev (1.37 in³/rev)	XHP 20•22
24,01 cm³/rev (1.46 in³/rev)	XHP 20•24
26,03 cm³/rev (1.59 in³/rev)	XHP 20•26
28,01 cm³/rev (1.71 in³/rev)	XHP 20•28

2 Rotation	Code
Left	S
Right	D

3 Outboard bearing options	Code
Without outboard bearing	0

4 Drive shaft	Code
European tapered 1:8	82
German tapered 1:5	54
Straight	46
SAE “A” spline (9 teeth)	03
SAE spline (10 teeth)	01
SAE “A” spline (11 teeth)	07
SAE “A” straight	31
Straight	49
Straight	50
DIN 54 82 spline	12
Tang	95

5 Mounting flange	Code
European	E2
German	B2
German 2 bolt	B4
German 2 bolt	B5
German 4 bolt	B6
SAE “A” 2 bolt	S9
SAE “B” 2 bolt	S5

Code	6 Ports position
L	IN/OUT side

Code	7 Ports IN/OUT	
GERMAN FLANGED PORTS		
Side		Type
BE/BC	XHP 20	8-10-12-14-16-18-20-22-24- 26-28
EUROPEAN FLANGED PORTS		
Side		Type
EA/EA	XHP 20	8-10-12
EB/EA	XHP 20	14-16-18-20 22-24-26-28
SAE FLANGED PORTS (SSM)		
Side		Type
MA/MA	XHP 20	8-10-12
MB/MA	XHP 20	14-16-18-20
MC/MB	XHP 20	22-24-26-28
SAE FLANGED PORTS (SSS)		
Side		Type
SA/SA	XHP 20	8-10-12
SB/SA	XHP 20	14-16-18-20
SC/SB	XHP 20	22-24-26-28
GAS STRAIGHT THREAD PORTS (BSPP)		
Side		Type
GD/GD	XHP 20	8-10-12
GE/GD	XHP 20	14-16-18-20
GF/GD	XHP 20	22-24-26-28
SAE STRAIGHT THREAD PORTS (ODT)		
Side		Type
OC/OC	XHP 20	8-10-12
OD/OC	XHP 20	14-16-18-20
OF/OC	XHP 20	22-24-26-28

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HOW TO ORDER - SINGLE PUMPS

8	**Seals (a)**	Code
Buna (standard)		**N**
Viton		**V**
Hydrogenated buna HNBR seals with Viton-FKM shaft seals		**T-PV**

9	**Shaft seal options**	Code
Standard shaft seal with wiper seal		**D**
High pressure special shaft seal with wiper seal		**C1**

10	**Shaft arrangement**	Code
Female spline		**FS**

(a) Choose the seals according to the temperature shown on page 7

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HOW TO ORDER - XHP 20 DOUBLE PUMPS

1	2	3	4	5	6	7	8	9	10	11
XHP 20•22	-	82	E2	-	L	EB/EA	/			
Front section										
20•18	-				L	**/EA	-	S7	-	S
Rear section										

1 Type	Pump type
8,06 cm³/rev (0.49 in³/rev)	XHP 20•8
10,05 cm³/rev (0.61 in³/rev)	XHP 20•10
12,09 cm³/rev (0.74 in³/rev)	XHP 20•12
14,02 cm³/rev (0.86 in³/rev)	XHP 20•14
16,03 cm³/rev (0.98 in³/rev)	XHP 20•16
18,05 cm³/rev (1.10 in³/rev)	XHP 20•18
20,00 cm³/rev (1.22 in³/rev)	XHP 20•20
22,46 cm³/rev (1.37 in³/rev)	XHP 20•22
24,01 cm³/rev (1.46 in³/rev)	XHP 20•24
26,03 cm³/rev (1.59 in³/rev)	XHP 20•26
28,01 cm³/rev (1.71 in³/rev)	XHP 20•28

2 Drive shaft	Code
European tapered 1:8	82
German tapered 1:5	54
Straight	46
SAE “A” spline (9 teeth)	03
SAE spline (10 teeth)	01
SAE “A” spline (11 teeth)	07
SAE “A” straight	31
Straight	49
Straight	50
DIN 54 82 spline	12
Tang	95

3 Mounting flange	Code
European	E2
German	B2
German 2 bolt	B4
German 2 bolt	B5
German 4 bolt	B6
SAE “A” 2 bolt	S9
SAE “B” 2 bolt	S5

Code	4 Ports position
L	IN/OUT side

Code	5 Ports IN/OUT	
GERMAN FLANGED PORTS		
Side		Type
BE/BC	XHP 20	8-10-12-14-16-18-20-22-24- 26-28
EUROPEAN FLANGED PORTS		
Side		Type
EA/EA	XHP 20	8-10-12
EB/EA	XHP 20	14-16-18-20 22-24-26-28
SAE FLANGED PORTS (SSM)		
Side		Type
MA/MA	XHP 20	8-10-12
MB/MA	XHP 20	14-16-18-20
MC/MB	XHP 20	22-24-26-28
SAE FLANGED PORTS (SSS)		
Side		Type
SA/SA	XHP 20	8-10-12
SB/SA	XHP 20	14-16-18-20
SC/SB	XHP 20	22-24-26-28
GAS STRAIGHT THREAD PORTS (BSPP)		
Side		Type
GD/GD	XHP 20	8-10-12
GE/GD	XHP 20	14-16-18-20
GF/GD	XHP 20	22-24-26-28
SAE STRAIGHT THREAD PORTS (ODT)		
Side		Type
OC/OC	XHP 20	8-10-12
OD/OC	XHP 20	14-16-18-20
OF/OC	XHP 20	22-24-26-28

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HOW TO ORDER - XHP 20 DOUBLE PUMPS

6	**Combination type**	Code
Standard		**S6**
Common inlet		**S7**
Separate stages		**Z6**

7	**Rotation**	Code
Left		**S**
Right		**D**

8	**Outboard bearing options**	Code
Without outboard bearing (standard) no code		**...**

Code	**Shaft arrangement**	9
FS	Female spline	

Code	**Seals (a)**	10
N	Buna (standard)	
V	Viton	
T-PV	Hydrogenated buna HNBR seals with Viton-FKM shaft seals	

Code	**Shaft seal options**	11
D	Standard shaft seal with wiper seal	
C1	High pressure special shaft seal with wiper seal	

(a) Choose the seals according to the temperature shown on page 7

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HOW TO ORDER - XHP 20 DOUBLE PUMPS DIFFERENT GROUPS

XHP 20/XLP 20

1		2	3		4	5	6	7	8	9		10		11
XHP 20•22	-	82	E2	-	L	EB/EA	/							
Front section														
XLP 20•18	-				L	EB/EA	-	S	0	/	FS	-	N	- C1
Rear section														

1	**Type (a)**	Code
The same of double pumps XHP 20/20		XHP..

2	**Drive shaft**	Code
The same of double pumps XHP 20/20		...

3	**Mounting flange**	Code
The same of double pumps XHP 20/20		...

4	**Ports position**	Code
Side		L

5	**Ports IN/OUT**	Code
The same of double pumps XHP 20/20		../..

6	**Combination type**	Code
XHP 20/XLP 20 Standard - No code		S6
XHP 20/XLP 20 Common inlet		S7
XHP 20/XLP 20 Separate stages		Z6

7	**Rotation**	Code
The same of double pumps XHP 20/20		...

Code	**Outboard bearing options**	8
...	The same of double pumps	

Code	**Shaft arrangement**	9
FS	Female spline	

Code	**Seals**	10
...	The same of double pumps XHP 20/20	

Code	**Shaft seal options**	11
...	The same of double pumps XHP 20/20	

(a) XLP20: displacements and ports are the same of XHP20. Please contact us for more information.

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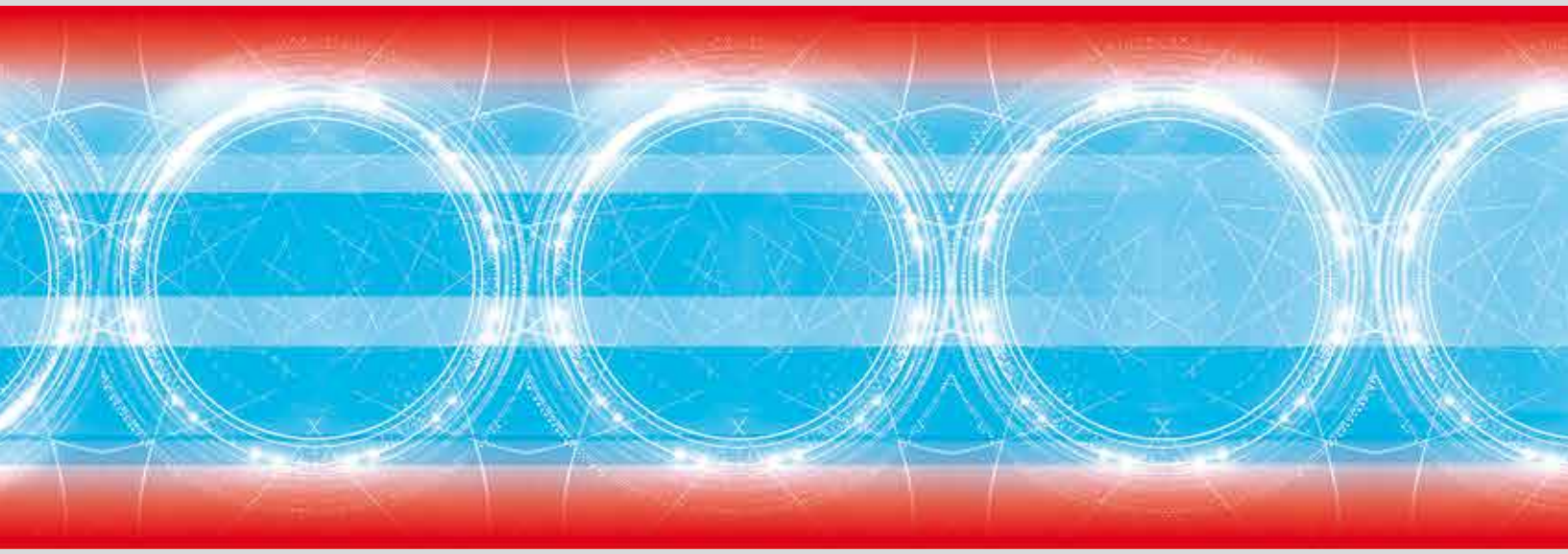
XHP20 01 T A Edition: 01/03.2024



CASAPPA®
FLUID POWER DESIGN

Headquarters:
CASAPPA S.p.A.
Via Balestrieri, 1
43044 Lemignano di Collecchio
Parma (Italy)
Tel. (+39) 0521 30 41 11
E-mail: info@casappa.com
www.casappa.com