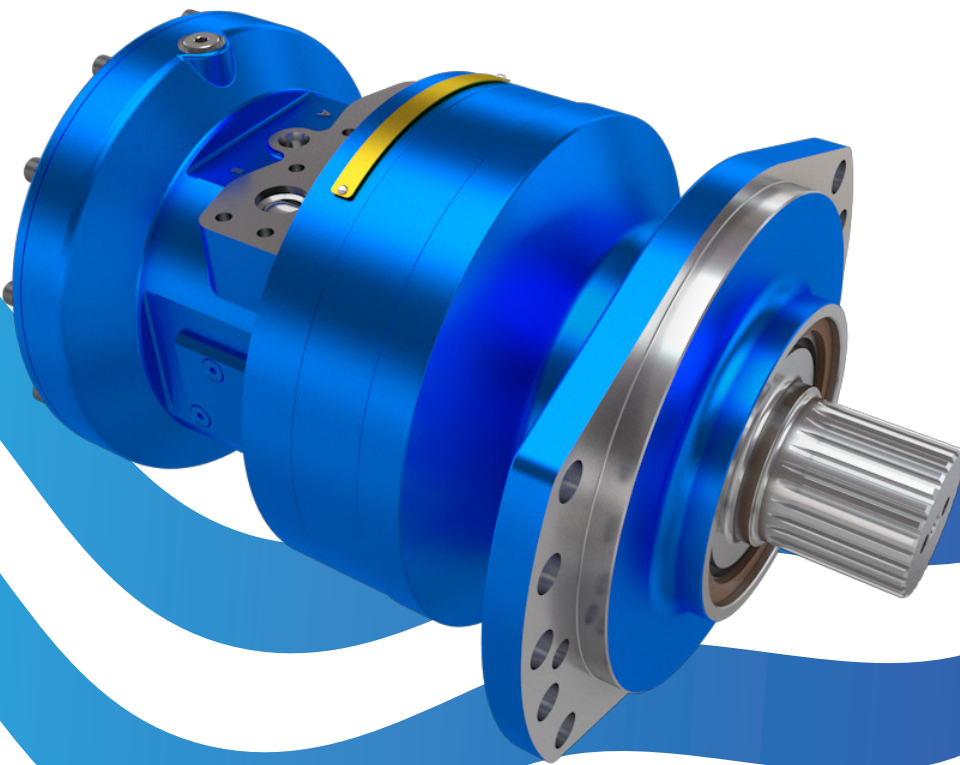


XJ20

RADIAL PISTON MOTOR



You are at the **centre**
of everything we do



CONTENTS

02	About us
03	XJ Range
04	Product features
05	Quick selection diagram
06	No load pressure drop Volumetric efficiency
07	Motor order code
09	Torque unit single speed option
10	Torque unit two speed option
11	Shaft motor single speed with spline
12	Shaft motor two speed with spline
13	Shaft motor output options
14	Shaft motor permissible dynamic and static radial load Shaft motor L10 life
15	Wheel motor single speed option
16	Wheel motor two speed option
17	Wheel motor output options
18	Wheel motor permissible dynamic and static radial load Wheel motor L10 life
19	Parking brakes
21	Direction of shaft rotation
22	Hydraulic connections
23	Extra options - speed sensor
24	Torque output Starting torque
25	Power envelope single speed Power envelope two speed - preferred direction
26	Power envelope two speed - non-preferred direction
27	Calculations

ABOUT US

Rotary Power specialises in the design, development and manufacture of hydraulic motors and pumps.

With a history dating back over 50 years, we understand the exacting and demanding requirements of today's hydraulic applications.

Operating from 18,000 sq. m. of purpose built manufacturing facilities, based in the North East of England and Bangalore, India, we continue to invest in the latest CNC machinery, automation and testing facilities. We have a clear focus on continuous improvement in lean cellular manufacturing. These facilities, alongside our European and US operations, offer sales, service and production support for the entire Rotary Power product range. A worldwide network of distribution partnerships provide additional support all over the world.

OUR BUSINESS

We recognise the importance of developing partnerships with our customers. That's why we offer flexibility in design, delivery and service to meet our customer's requirements.

Partnerships with our supply chain are key to Rotary Power's success and allow us to deliver excellent service in order to exceed expectations.

OUR PEOPLE

People are at the centre of everything we do. As an innovative engineering and manufacturing business we take recruitment and career development very seriously.

As part of the British Engines Group, we operate a training and development programme that maintains a strong focus on in-house manufacturing and a commitment to local employment. Our apprenticeship and graduate schemes provide the opportunity to develop and nurture engineering talent from an early stage.

OUR FUTURE

Whether in product design or internal processes and systems, our engineers are actively encouraged to develop new ideas within design and manufacturing. This ensures that we are at the forefront of customer and sector led innovation, whilst continuously improving our business.

Our team of in-house design engineers invest time into understanding our customer's application and work with them to deliver value added solutions, customised to their application.



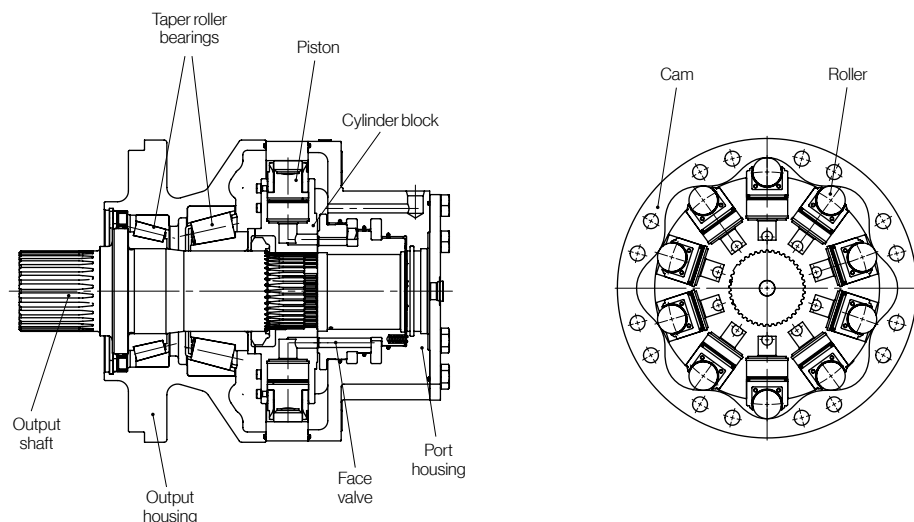
XJ RANGE

The XJ range of hydraulic motors offer displacements from 260 to 5,010 cc/rev. The XJ05 is the smallest of the range with displacements from 260 to 565 cc/rev, complemented by the larger XJ20 and XJ40 motors extending the displacement range to 2,505 and 5,010 cc/rev.

The XJ motor has a range of features and options designed to suit your specific application:

- Radial piston, multi-stroke operation
- Modular design
- Two speed options
- Parking brake options
- Freewheel capability
- Multiple mounting arrangements
- 350 bar continuous pressure
- Fast delivery options

The motor is designed with a rotating cylinder block connected to the drive shaft, which is mounted in taper roller bearings within the motor housing. This offers a high radial and axial load carrying capacity.



The pistons are located radially within the bores of the cylinder block. When oil is fed under pressure through the face valve and into the cylinder block, the pistons attempt to move outwards. The rollers react on the incline of the cam profile and this action produces rotation of the cylinder block.

The rate of flow to the motor will determine the speed at which the piston moves out against the cam ring and consequently the rotational speed of the motor. Once the power stroke is complete, the pistons return into the bore by the action of the reverse cam slope, ready for the next pressure cycle.

With units operating all over the world in a variety of applications including industrial, mobile and marine, the XJ range offers real application options for the future.

PRODUCT FEATURES

Fluids	HL; HLP to DIN 51524 Other specified fluids are possible.
Normal operating viscosity range	20 to 200 cSt
Maximum intermittent viscosity range	10 to 2,000 cSt
Normal operating temperature range	+15°C to +70°C [+59°F to +158°F]
Maximum intermittent temperature range	-20° to +80° C [-4°F to +176°F]
Fluid cleanliness	NAS 1638 class 9 / ISO code 18/15

FIRST DISPLACEMENT

Displacement option	A	B	C	D	E
Geometric displacement (cc/rev) [in ³]	1,666 [101.7]	1,884 [115]	2,092 [127.7]	2,301 [140.4]	2,505 [152.9]
Specific torque (Nm/bar) [lbf.ft/psi]	26.5 [1.3]	30.0 [1.5]	33.3 [1.7]	36.6 [1.9]	39.9 [2.0]
Max. continuous speed (rpm)	125	115	100	90	85
Max. continuous power (kW) [hp]	70 [93.9]	70 [93.9]	70 [93.9]	70 [93.9]	70 [93.9]
Max. continuous pressure (bar) [psi]	350 [5,076]	350 [5,076]	350 [5,076]	350 [5,076]	350 [5,076]
Max. pressure (bar)* [psi]	450 [6,527]	450 [6,527]	450 [6,527]	450 [6,527]	450 [6,527]

SECOND DISPLACEMENT

Nominal displacement (cc/rev)	A	B	C	D	E
Geometric displacement (cc/rev) [in ³]	833 [50.8]	942 [57.5]	1,046 [63.8]	1,150 [70.2]	1,252 [76.4]
Specific torque (Nm/bar) [lbf.ft/psi]	13.3 [0.7]	15 [0.8]	16.7 [0.9]	18.3 [1.0]	20.0 [1.0]
Max. continuous speed (rpm)	150	135	125	110	100
Max. continuous power (kW) preferred direction [hp]	47 [63]	47 [63]	47 [63]	47 [63]	47 [63]
Max. continuous power (kW) non-preferred direction [hp]	35 [46.9]	35 [46.9]	35 [46.9]	35 [46.9]	35 [46.9]
Max. continuous pressure (bar) [psi]	350 [5,076]	350 [5,076]	350 [5,076]	350 [5,076]	350 [5,076]
Max. pressure (bar)* [psi]	450 [6,527]	450 [6,527]	450 [6,527]	450 [6,527]	450 [6,527]

*Maximum values should only be applied for a small portion of the duty cycle.



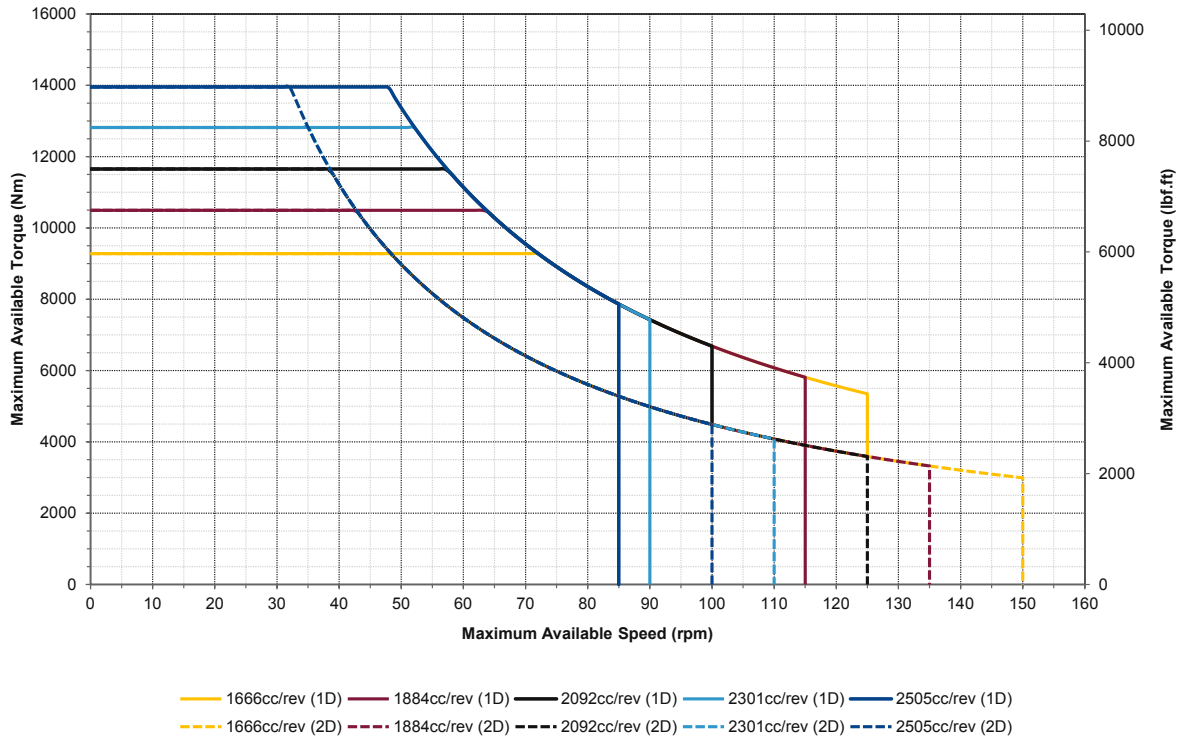
Weight of motor without oil



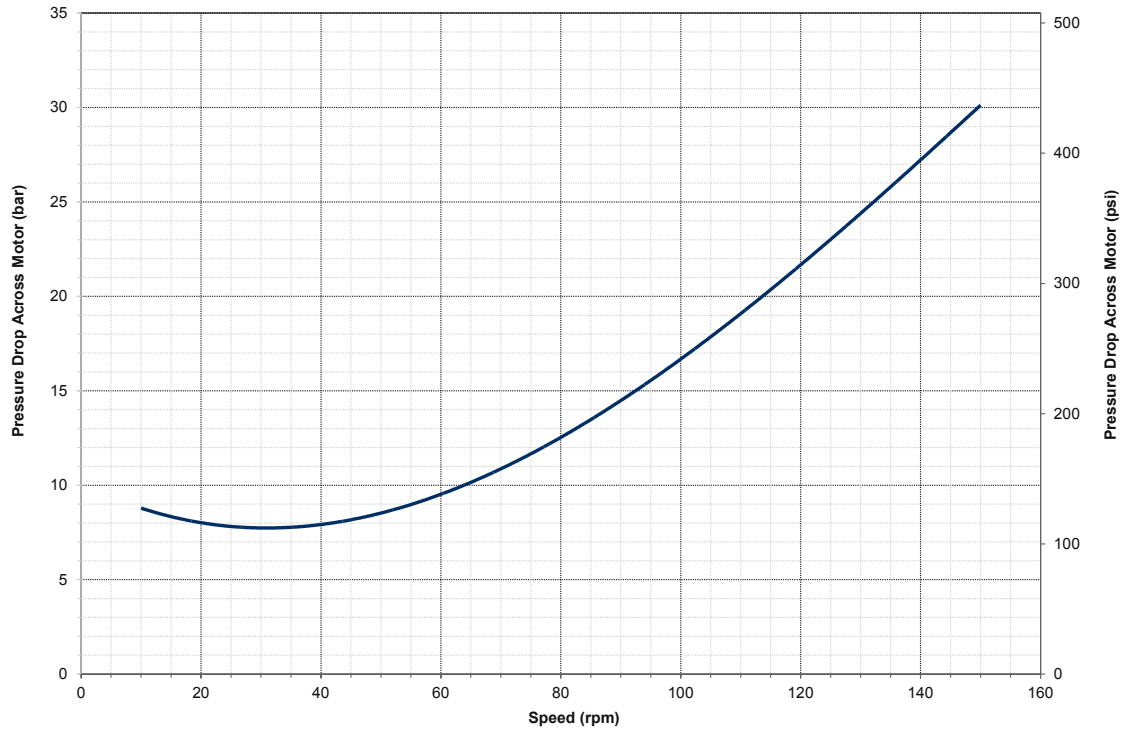
Sizes are listed in mm, inches shown in brackets

QUICK SELECTION DIAGRAM

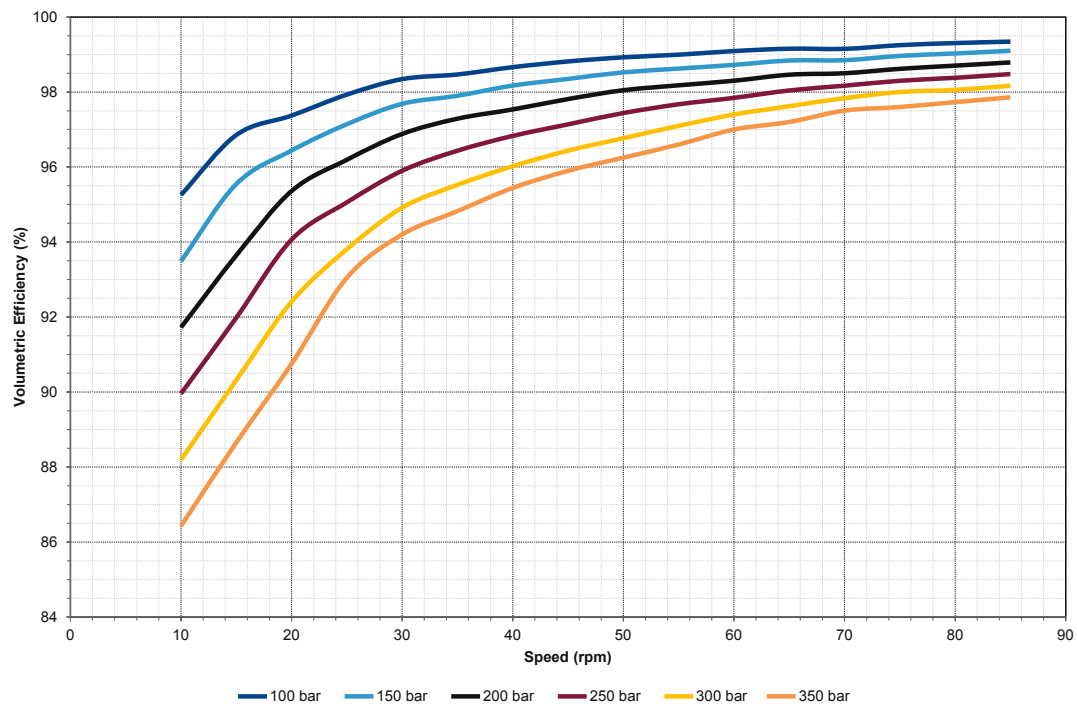
Based on your torque and speed requirements, the diagram below can be used to help determine which cam size best suits your application. Shown for both maximum displacement (1D) and minimum displacement (2D), the diagram outlines the limits of the motor based on its continuous power rating.



NO LOAD PRESSURE DROP

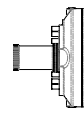
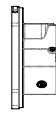
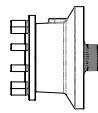


VOLUMETRIC EFFICIENCY



All performance graphs plotted for maximum displacement (2,505 cc/rev) using ISO46 fluid at 50°C.

MOTOR ORDER CODE



PRODUCT
01

CAM
02

FRONT MODULE
03 04 05 06 07

PORT MODULE
08 09 10 11 12

REAR BRAKE
13

OPTIONS
14 15 16

SPECIALS
17

DESIGN
18

XJ20

00

A2

PRODUCT

01	XJ20	Radial piston motor
----	-------------	---------------------

CAM - DISPLACEMENT

02	A	1,666 cc/rev
	B	1,884 cc/rev
	C	2,092 cc/rev
	D	2,301 cc/rev
	E	2,505 cc/rev

FRONT MODULE - CASE STYLE

03	T	Torque unit
	S	Shaft motor front case flange
	W	Wheel motor no case flange

FRONT MODULE - OUTPUT SHAFT

04	N	No shaft (torque unit DIN 5480 N85 x 2 x 30 x 41 x 9H spline)
	A	Keyed shaft - Ø90
	D	Splined shaft DIN 5480 - W90 x 3 x 30 x 28 x 8f
	K	Wheel output 10 off, Ø225 PCD, Ø175 spigot
	L	Wheel output 8 off, Ø275 PCD, Ø220 spigot
	P	Wheel output 12 off, Ø275 PCD, Ø220 spigot
	C (XJ40 HOUSING ONLY)	Keyed shaft - Ø100
	E (XJ40 HOUSING ONLY)	Splined shaft DIN 5480 - W120 x 5 x 30 x 22 7h
	Q (XJ40 HOUSING ONLY)	Wheel output 10 off, Ø335 PCD, Ø280 spigot

FRONT MODULE - OUTPUT FITTINGS


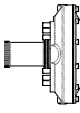
05	N	None (torque unit or shaft motor)
	A	Wheel flange with studs fitted - standard
	B	Wheel flange with studs and nuts fitted
	F	Wheel flange with through holes
	H	Wheel flange with tapped holes

FRONT MODULE - SHAFT SEAL CONFIGURATION

06	1	Standard
	2 (WHEEL MOTORS ONLY)	Mechanical face seal

FRONT MODULE - FRONT BRAKE

07	N	No brake (standard)
----	----------	---------------------

PRODUCT 01		FRONT MODULE				PORT MODULE					OPTIONS			SPECIALS	DESIGN		
02		03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18
XJ20																00	A2

PORT MODULE - MOUNTING FLANGE

08	N	No flange (torque units and shaft motors)
	L	Lug fixing flange (wheel motors only)

PORT MODULE - SPEED AND ROTATION

09	1R	Single speed - flow port A = CW rotation
	1L	Single speed - flow port A = ACW rotation
	RA	Two speed (Ratio 2:1) - flow port A = CW preferred rotation
	LA	Two speed (Ratio 2:1) - flow port A = ACW preferred rotation

PORT MODULE - HYDRAULIC CONNECTIONS (SEE PAGE 22 FOR PORT DESIGNATIONS)

10	0	No port block
	1 (XJ20 HOUSING ONLY)	ISO 6162 DN 32. All other ports SAE J514 (standard)
	2 (XJ20 HOUSING ONLY)	ISO 6162 DN 19. All other ports ISO 9947-1
	5 (XJ40 HOUSING ONLY)	ISO 6162 DN 32. All other ports SAE J514
	6 (XJ40 HOUSING ONLY)	ISO 6162 DN 25. All other ports ISO 9947-1

PORT MODULE - ADDITIONAL CIRCUIT VALVING

11	N	None
	B	Purge and relief valve with standard orifice (1.5 mm)

PORT MODULE - SPEED SENSOR

12	N	None
	S	Speed sensor port in port housing (M12 X 1.0p)
	T	Speed sensor port in port housing (incl. sensor)
	U	Speed sensor port in port housing (incl. sensor and connector)

REAR BRAKE

13	N	None
	P	"P" parking brake (13 kNm)
	Q	"Q" parking brake (18.6 kNm)

OPTIONS

14 15 16	0	None
	A	Strengthened port housing cover with side drain port
	B	Face valve with round porting
	G	Special paint (specify RAL number)
	P	Shaft-up vent port
	V	Viton seal material

SPECIALS

17	00	Specials (Rotary Power specified)
----	-----------	-----------------------------------

DESIGN SERIES

18	A2	Design series (Rotary Power specified)
----	-----------	--

TORQUE UNIT

SINGLE SPEED OPTION

PRODUCT
01

XJ20

CAM
02



FRONT MODULE

03	04	05	06	07
T	N	N	1	N

PORT MODULE

08	09	10	11	12
N		1	N	N

REAR BRAKE



OPTIONS

14	15	16

SPECIALS

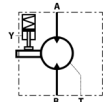
00

DESIGN

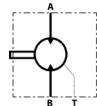
A2

(For models shown below)

119 kg [262 lb] with P brake
106 kg [234 lb] with Q brake



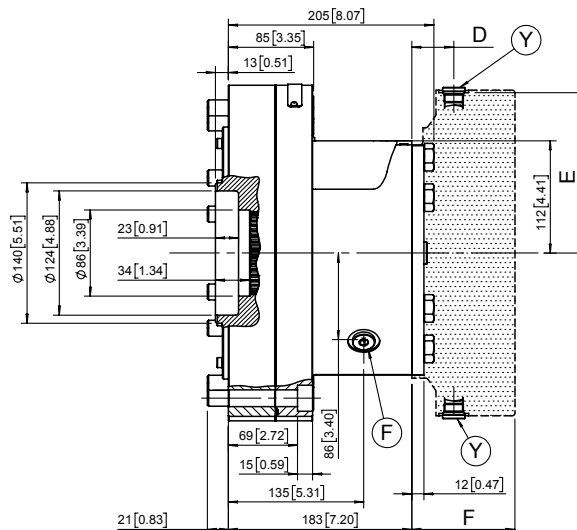
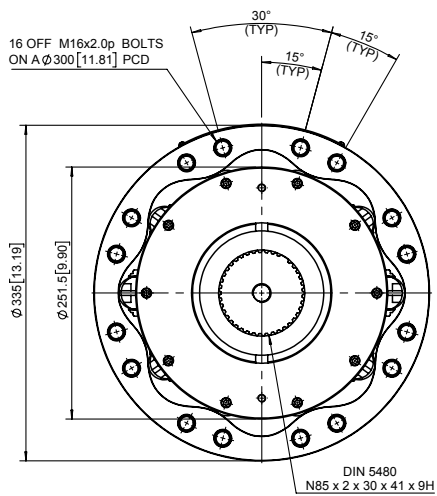
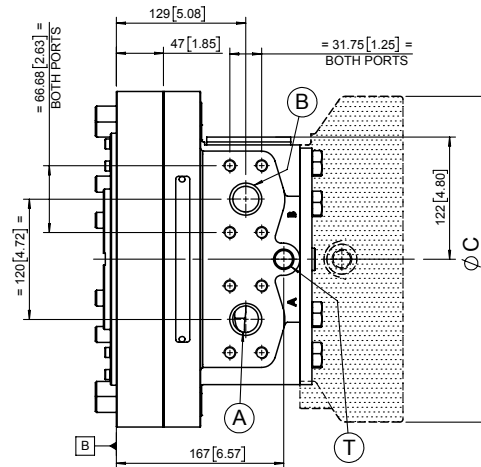
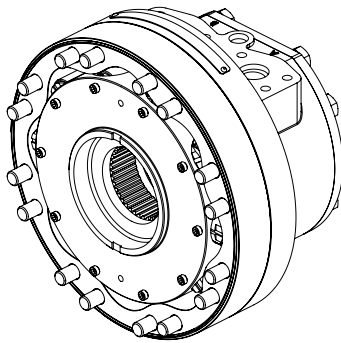
72 kg [159 lb] without brake



Option	Rated holding torque	C	D	E	F	Weight
P	13 kNm [9,588 lbf.ft]	Ø325 [12.80]	27 [1.06]	160 [6.30]	107 [4.21]	47 kg [104 lb]
Q	18.6 kNm [13,718 lbf.ft]	Ø250 [9.84]	37 [1.46]	123 [4.84]	106 [4.17]	34 kg [75 lb]

Rotor spline
DIN 5480: N85 x 2 x 30 x 41 x 9H

Other spline options available, contact us for more information.
See page 22 for hydraulic connection options.




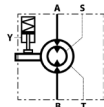
TORQUE UNIT


TWO SPEED OPTION

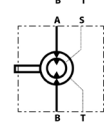
PRODUCT 01	CAM 02	FRONT MODULE					PORT MODULE				REAR BRAKE	OPTIONS			SPECIALS	DESIGN	
XJ20		03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18
		T	N	N	1	N	N		1	N	N					00	A2

(For models shown below)

 122 kg [269 lb] with P brake
109 kg [240 lb] with Q brake



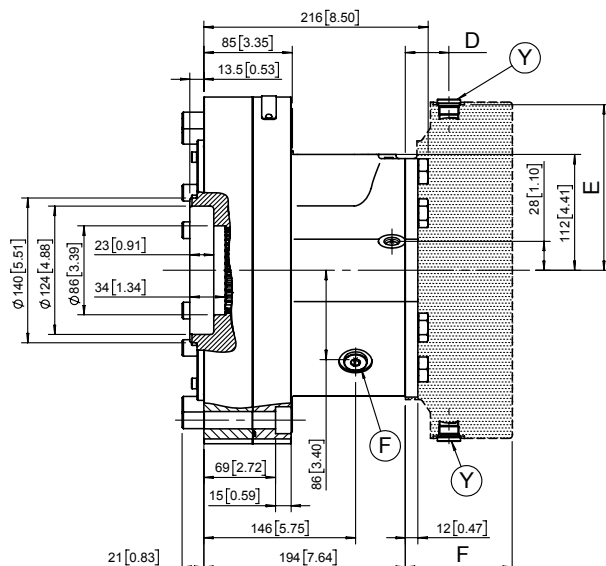
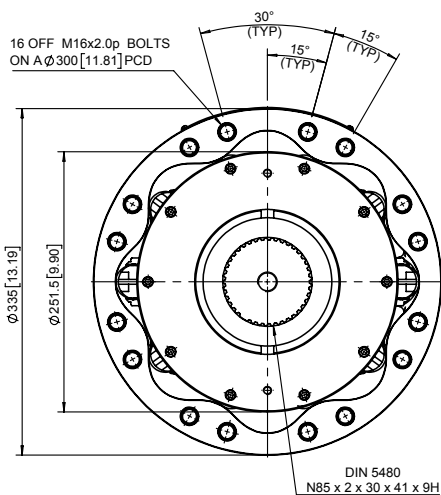
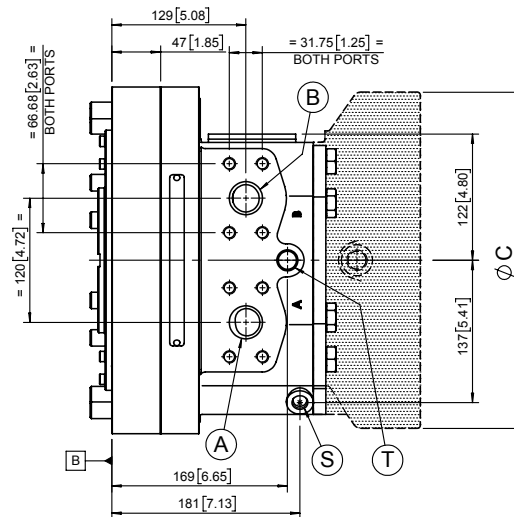
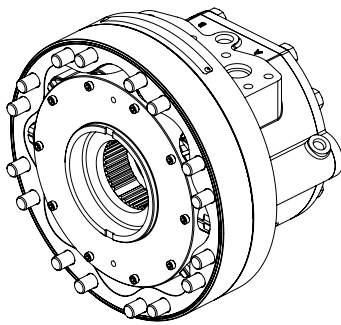
 75 kg [165 lb] without brake



Option	Rated holding torque	C	D	E	F	Weight
P	13 kNm [9,588 lbf.ft]	Ø325 [12.80]	27 [1.06]	160 [6.30]	107 [4.21]	47 kg [104 lb]
Q	18.6 kNm [13,718 lbf.ft]	Ø250 [9.84]	37 [1.46]	123 [4.84]	106 [4.17]	34 kg [75 lb]

Rotor spline
DIN 5480: N85 x 2 x 30 x 41 x 9H

Other spline options available, contact us for more information.
See page 22 for hydraulic connection options.



SHAFT MOTOR

SINGLE SPEED WITH SPLINE

PRODUCT
01

XJ20

CAM
02



FRONT MODULE

03 04 05 06 07
S D N 1 N

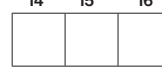
PORT MODULE

08 09 10 11 12
N 1 N N

REAR BRAKE



OPTIONS



SPECIALS

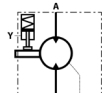
17
00

DESIGN

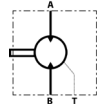
18
A2

(For models shown below)

178 kg [392 lb] with P brake
165 kg [364 lb] with Q brake

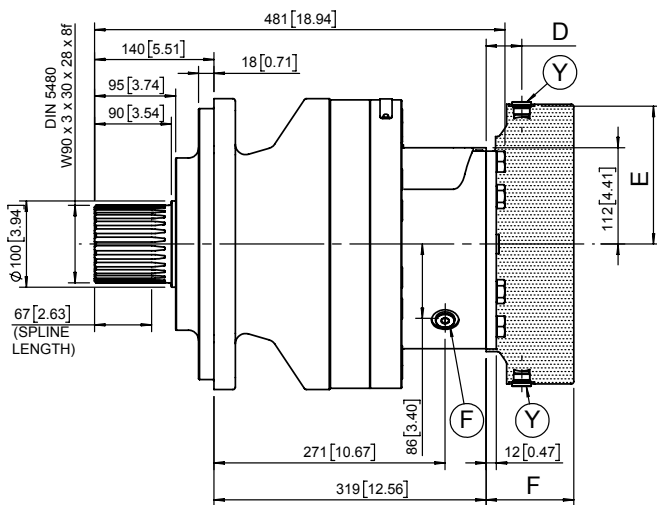
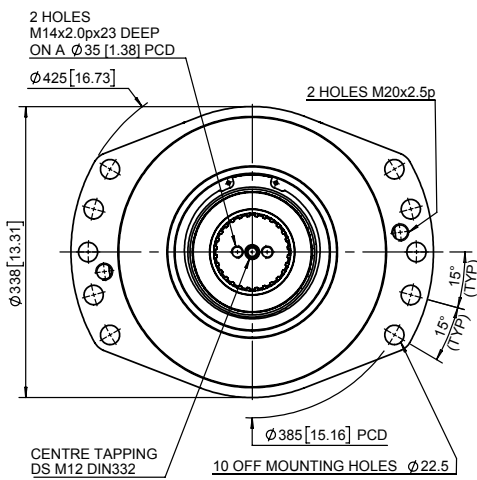
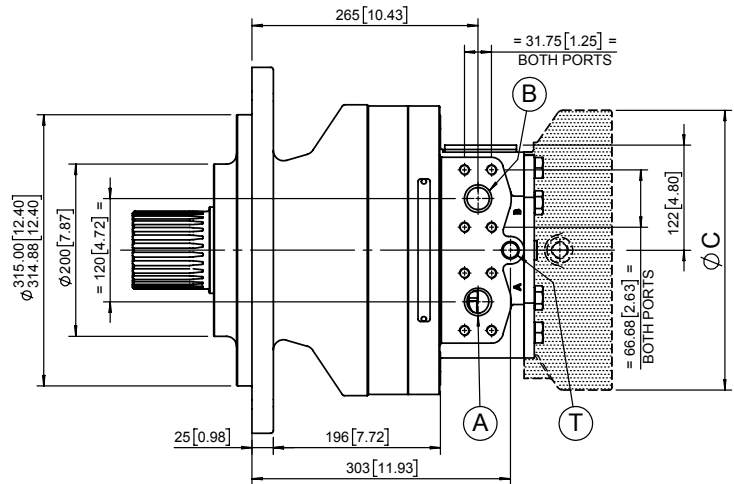
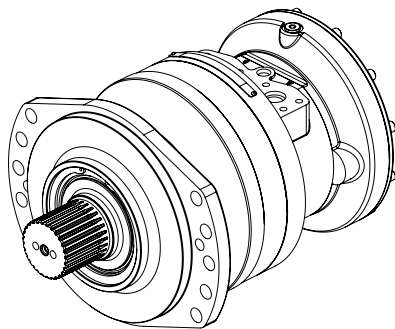


131 kg [289 lb] without brake



Option	Rated holding torque	C	D	E	F	Weight
P	13 kNm [9,588 lb.ft]	Ø325 [12.80]	27 [1.06]	160 [6.30]	107 [4.21]	47 kg [104 lb]
Q	18.6 kNm [13,718 lb.ft]	Ø250 [9.84]	37 [1.46]	123 [4.84]	106 [4.17]	34 kg [75 lb]


See page 22 for hydraulic connection options.




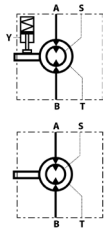
SHAFT MOTOR TWO SPEED WITH SPLINE

PRODUCT	CAM	FRONT MODULE					PORT MODULE					REAR BRAKE	OPTIONS			SPECIALS	DESIGN
01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18
XJ20		S	D	N	1	N	N		1	N	N					00	A2

(For models shown below)

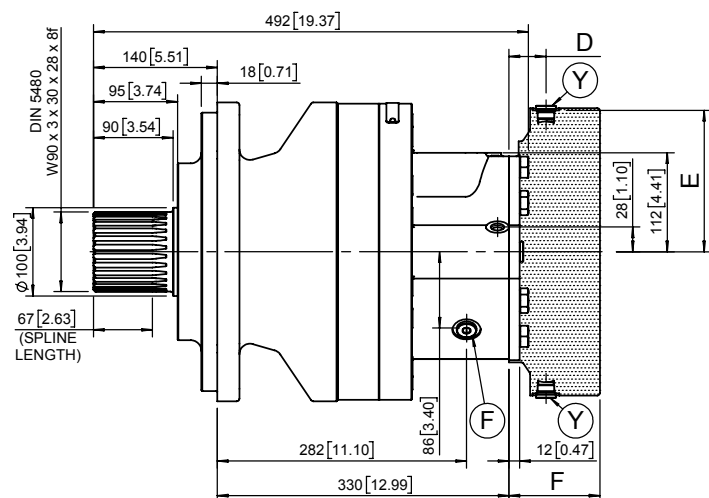
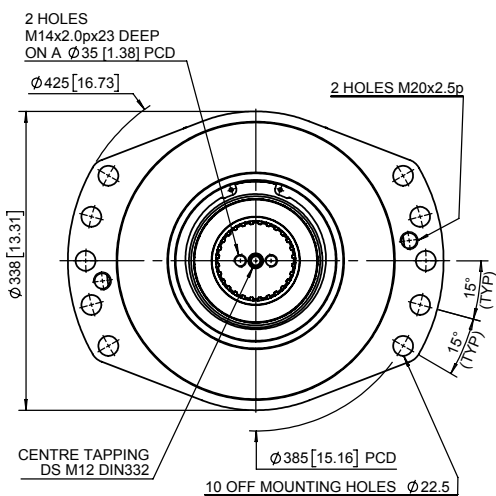
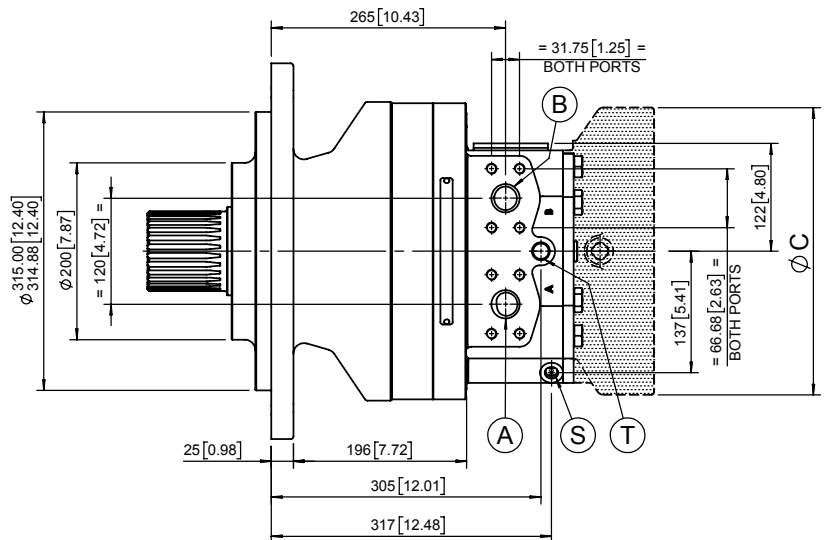
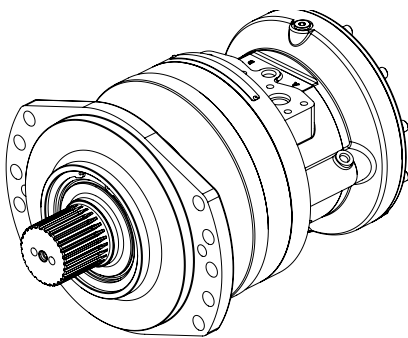
 181 kg [399 lb] with P brake
168 kg [370 lb] with Q brake

 134 kg [295 lb] without brake



Option	Rated holding torque	C	D	E	F	Weight
P	13 kNm [9,588 lbf.ft]	Ø325 [12.80]	27 [1.06]	160 [6.30]	107 [4.21]	47 kg [104 lb]
Q	18.6 kNm [13,718 lbf.ft]	Ø250 [9.84]	37 [1.46]	123 [4.84]	106 [4.17]	34 kg [75 lb]

See page 22 for hydraulic connection options.

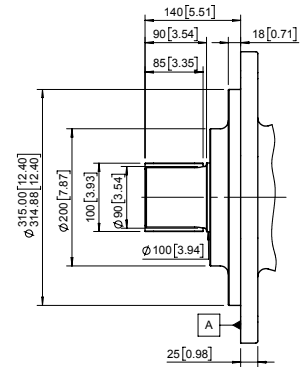
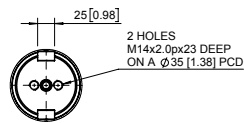


SHAFT MOTOR OUTPUT OPTIONS

PRODUCT 01	CAM 02	FRONT MODULE 03 04 05 06 07					PORT MODULE 08 09 10 11 12					REAR MODULE 13	OPTIONS 14 15 16			SPECIALS 17	DESIGN 18
XJ20																00	A2

XJ20 HOUSING - KEYED OUTPUT

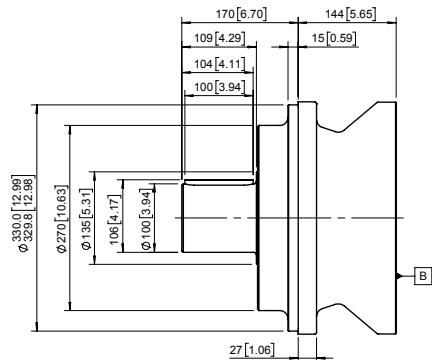
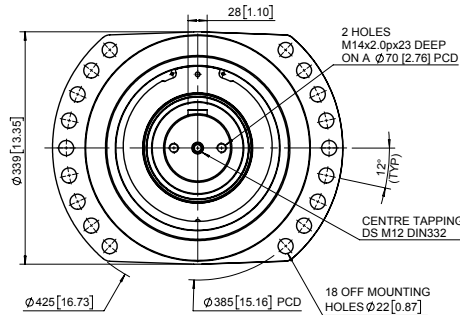
FRONT MODULE				
03	04	05	06	07
S	A	N	1	N



NOTE: ALL DIMENSIONS BEYOND FACE [A] ARE AS PER MAIN DRAWING

XJ40 HOUSING - KEYED OUTPUT

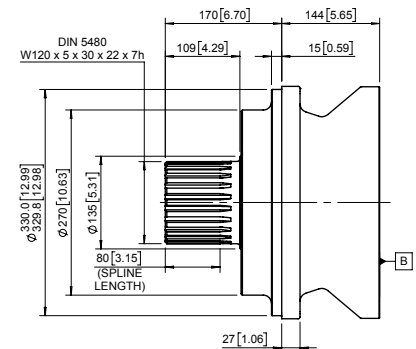
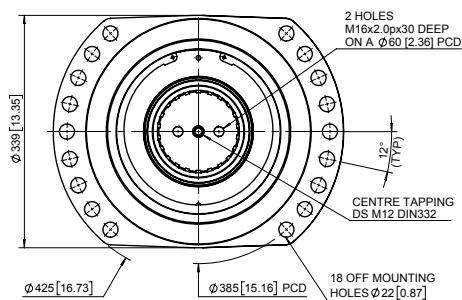
FRONT MODULE				
03	04	05	06	07
S	C	N	1	N



NOTE: TORQUE UNIT BEYOND FACE [B] IS AS PER MAIN DRAWINGS

XJ40 HOUSING - SPLINED OUTPUT

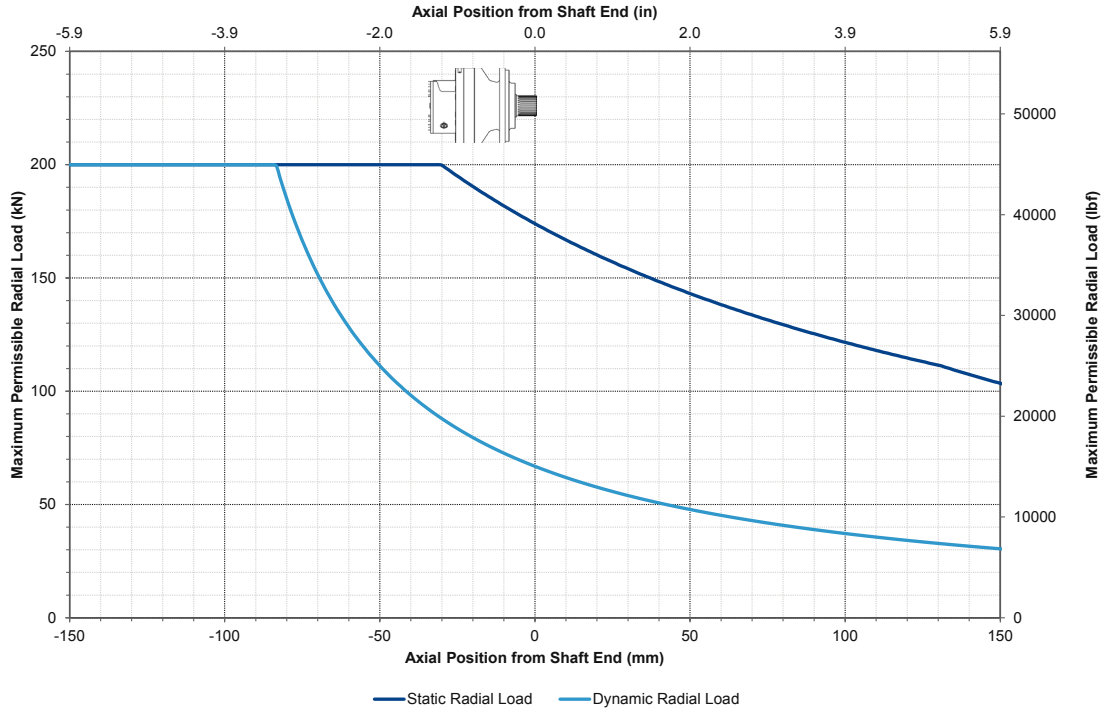
FRONT MODULE				
03	04	05	06	07
S	E	N	1	N



NOTE: TORQUE UNIT BEYOND FACE [B] IS AS PER MAIN DRAWINGS

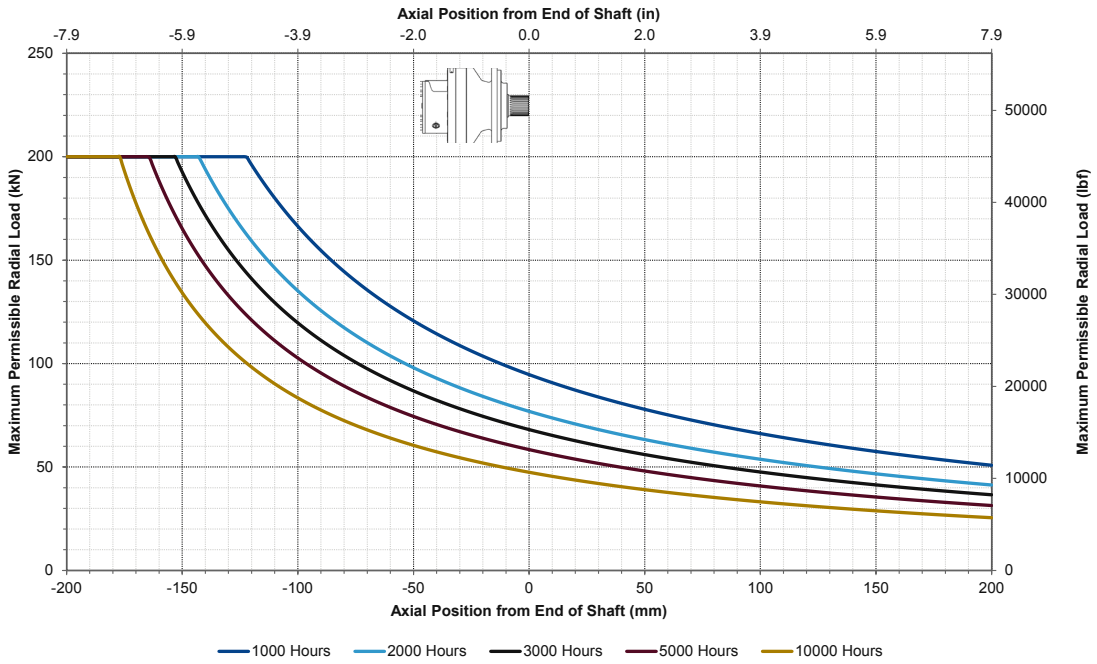
SHAFT MOTOR

PERMISSIBLE DYNAMIC AND STATIC RADIAL LOAD



SHAFT MOTOR

L10 LIFE AT 150 BAR, 42.5 RPM



$$\text{New life (hours)} = \frac{\text{plotted speed (rpm)} \times \text{plotted life (hours)}}{\text{desired speed (rpm)}}$$

Contact us for alternative cycle duties.
 All data is based on the standard spline motor output shaft, option D.
 All data is based on theoretical calculations.

WHEEL MOTOR

SINGLE SPEED OPTION

PRODUCT
01

XJ20

CAM
02



FRONT MODULE

03 04 05 06 07
W L 1 N N

PORT MODULE

08 09 10 11 12
L 1 N N

REAR BRAKE



OPTIONS



SPECIALS

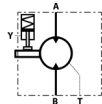
00

DESIGN

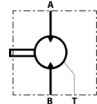
A2

(For models shown below)

178 kg [392 lb] with P brake
165 kg [364 lb] with Q brake

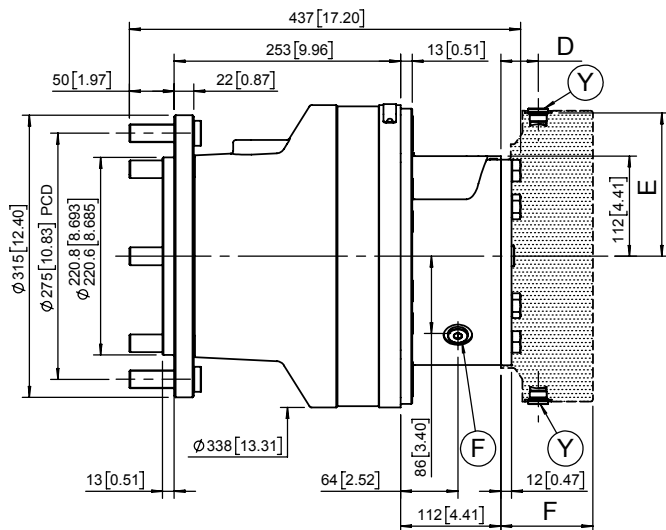
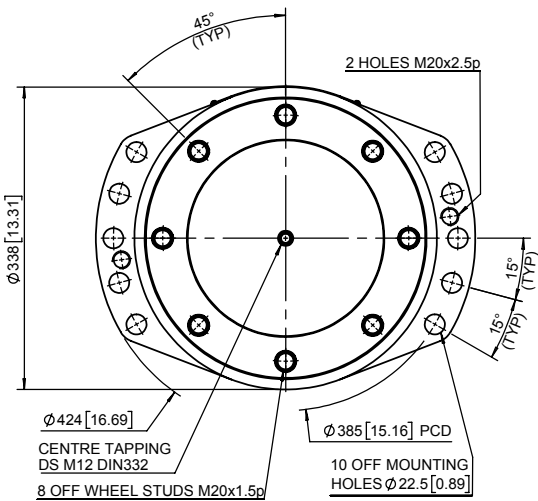
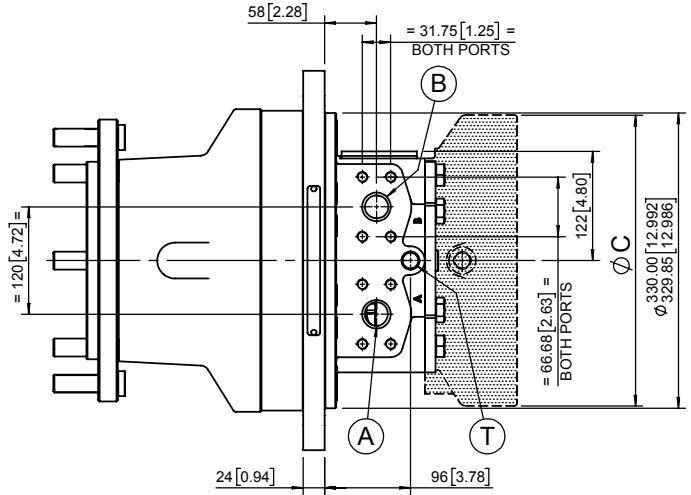
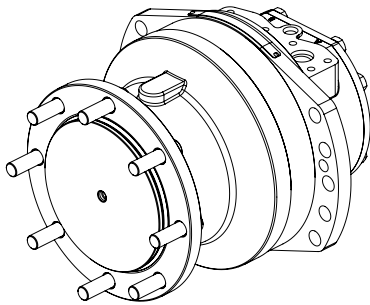


131 kg [289 lb] without brake



Option	Rated holding torque	C	D	E	F	Weight
P	13 kNm [9,588 lbf.ft]	Ø325 [12.80]	27 [1.06]	160 [6.30]	107 [4.21]	47 kg [104 lb]
Q	18.6 kNm [13,718 lbf.ft]	Ø250 [9.84]	37 [1.46]	123 [4.84]	106 [4.17]	34 kg [75 lb]

See page 22 for hydraulic connection options.




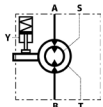
WHEEL MOTOR


TWO SPEED OPTION

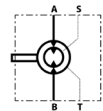
PRODUCT	CAM	FRONT MODULE					PORT MODULE					REAR BRAKE	OPTIONS			SPECIALS	DESIGN
01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18
XJ20		W	L	1	N	N	L		1	N	N					00	A2

(For models shown below)

 181 kg [399 lb] with P brake
168 kg [370 lb] with Q brake

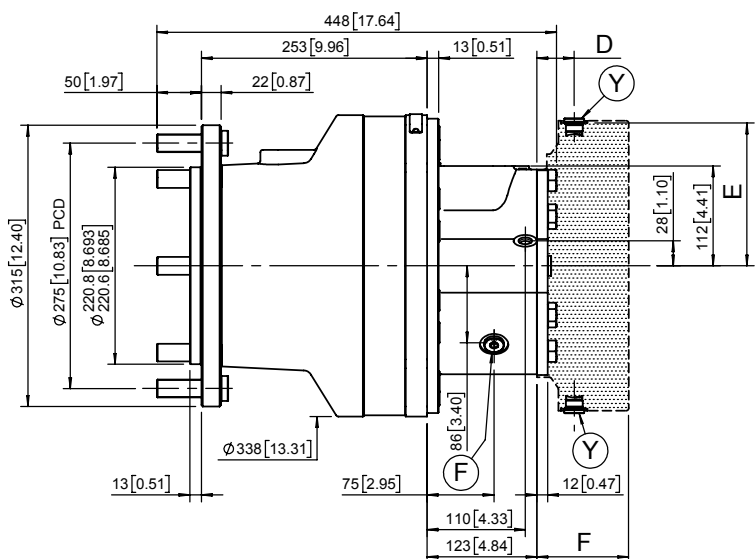
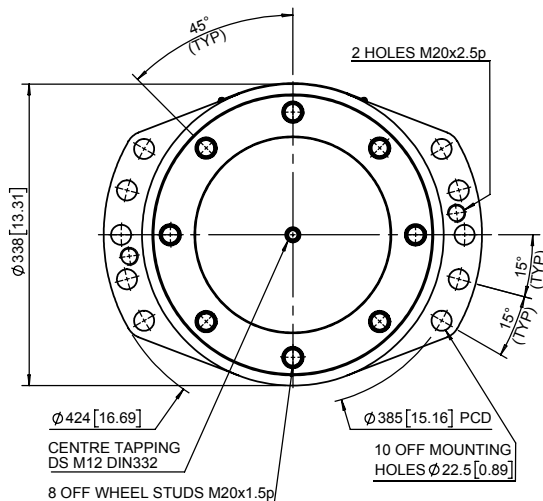
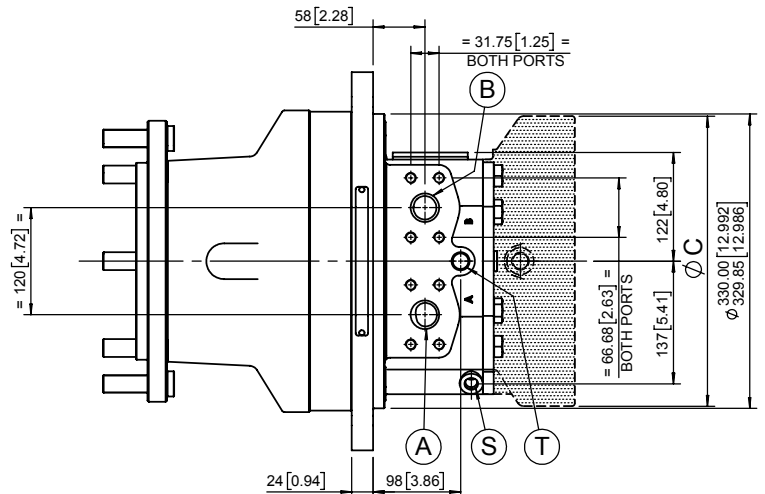
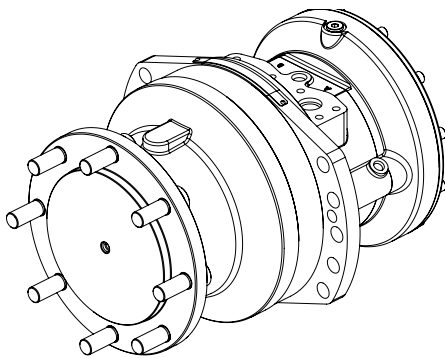


 134 kg [295 lb] without brake



Option	Rated holding torque	C	D	E	F	Weight
P	13 kNm [9,588 lbf.ft]	Ø325 [12.80]	27 [1.06]	160 [6.30]	107 [4.21]	47 kg [104 lb]
Q	18.6 kNm [13,718 lbf.ft]	Ø250 [9.84]	37 [1.46]	123 [4.84]	106 [4.17]	34 kg [75 lb]

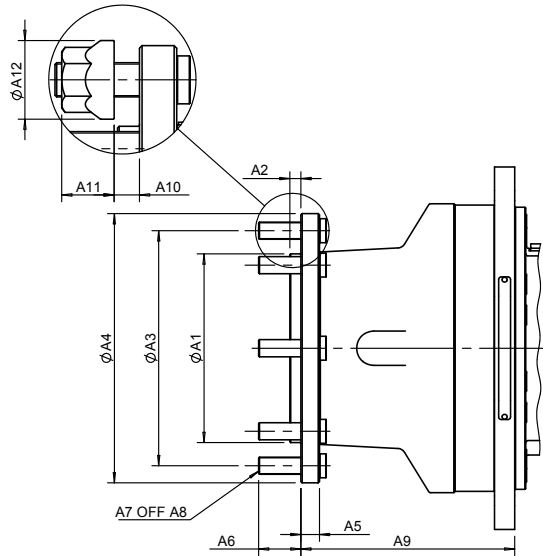
See page 22 for hydraulic connection options.



WHEEL MOTOR OUTPUT OPTIONS

PRODUCT 01	CAM 02	FRONT MODULE					PORT MODULE					REAR BRAKE 13	OPTIONS			SPECIALS 17	DESIGN 18
XJ20		W		1	N	N										00	A2

(For models shown below)

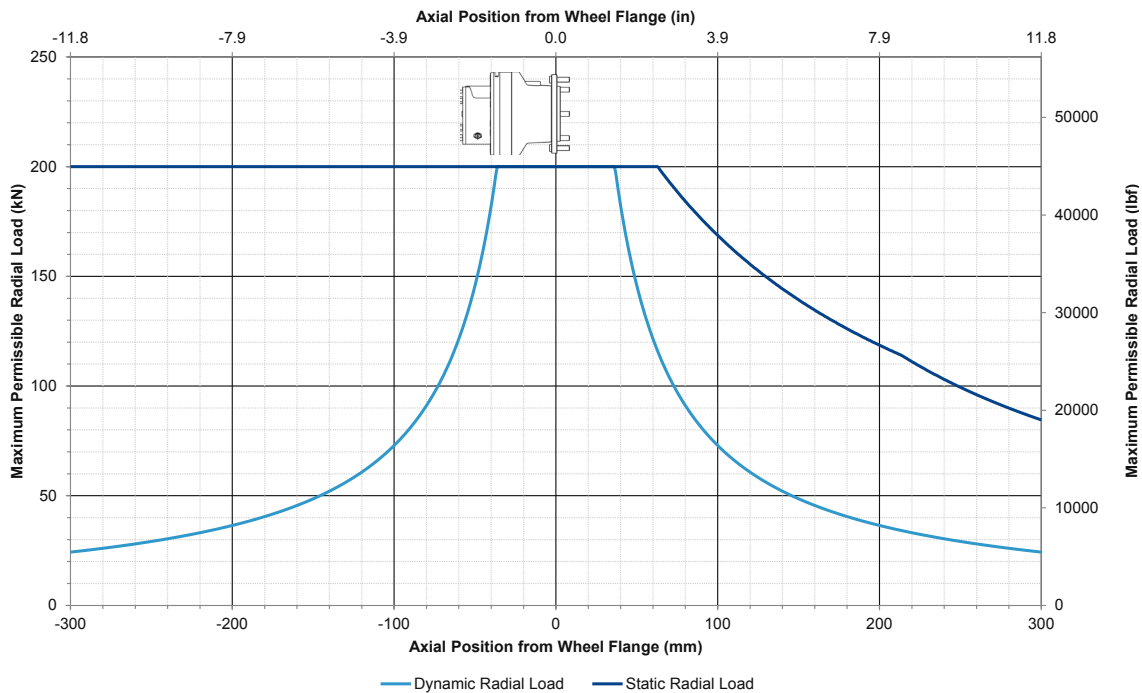


WHEEL MOTOR - OUTPUT SHAFT

Option	Type	A1	A2	A3	A4	A5	A6	A7	A8	A9	A10 (min)	A11	A12
K	XJ20 housing	Ø175 [6.89]	13 [0.51]	Ø225 [8.86]	Ø280 [11.02]	22 [0.87]	59 [2.32]	10	M22 x 1.5p Ø14 [0.55]	253 [10]	5 [0.20]	31 [1.22]	Ø46 [1.81]
L	XJ20 housing (as standard)	Ø220 [8.66]	13 [0.51]	Ø275 [10.83]	Ø315 [12.40]	22 [0.87]	50 [1.97]	8	M20 x 1.5p Ø22 [0.86]	253 [10]	5 [0.20]	26 [1.02]	Ø43 [1.69]
P	XJ20 housing	Ø220 [8.66]	13 [0.51]	Ø275 [10.83]	Ø314 [12.36]	18 [0.71]	55 [2.17]	12	M22 x 1.5p Ø24 [0.95]	253 [10]	5 [0.20]	31 [1.22]	Ø46 [1.81]
Q	XJ40 housing	Ø280 [11.02]	25 [0.98]	Ø335 [13.19]	Ø280 [11.02]	25 [0.98]	58 [2.28]	10	M22 x 1.5p Ø24 [0.95]	291 [11]	5 [0.20]	31 [1.22]	Ø46 [1.81]

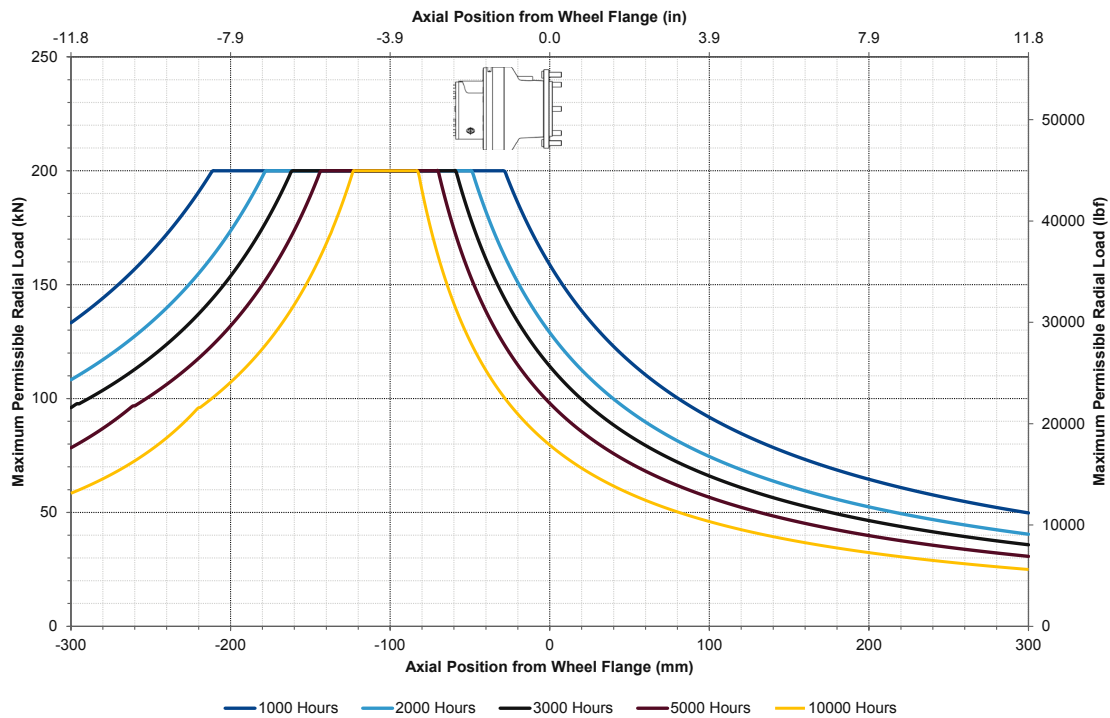
WHEEL MOTOR

PERMISSIBLE DYNAMIC AND STATIC RADIAL LOAD



WHEEL MOTOR

L10 LIFE AT 150 BAR, 42.5 RPM



$$\text{New life (hours)} = \frac{\text{plotted speed (rpm)} \times \text{plotted life (hours)}}{\text{desired speed (rpm)}}$$

Contact us for alternative cycle duties.
 All data is based on the standard wheel motor output shaft, option L.
 All data is based on theoretical calculations.

PARKING BRAKES

PRODUCT 01	CAM 02	FRONT MODULE 03 04 05 06 07					PORT MODULE 08 09 10 11 12					REAR BRAKE 13	OPTIONS 14 15 16			SPECIALS 17	DESIGN 18
XJ20																00	A2

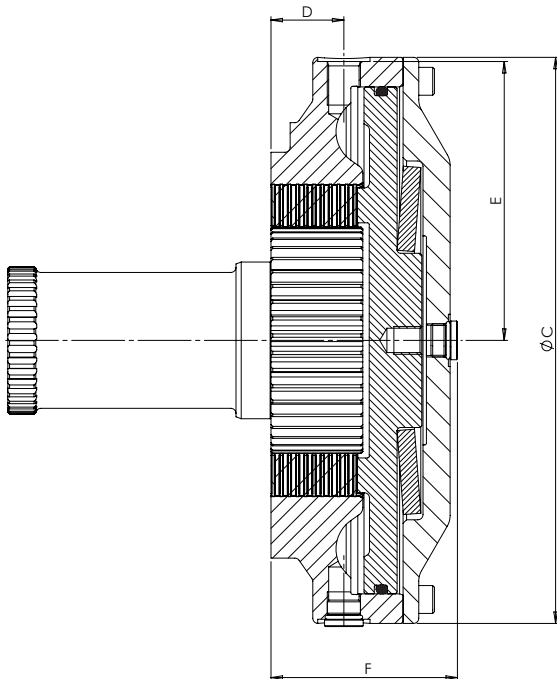
Option	Rated holding torque	C	D	E	F	Weight
P	13 kNm [9,588 lbf.ft]	Ø325 [12.80]	27 [1.06]	160 [6.30]	107 [4.21]	47 kg [104]
Q	18.6 kNm [13,718 lbf.ft]	Ø250 [9.84]	37 [1.46]	123 [4.84]	106 [4.17]	34 kg [75]

The XJ20 multi-disc parking brake is a spring applied, hydraulic release, fail safe brake designed to be used with XJ20 motors in static situations.

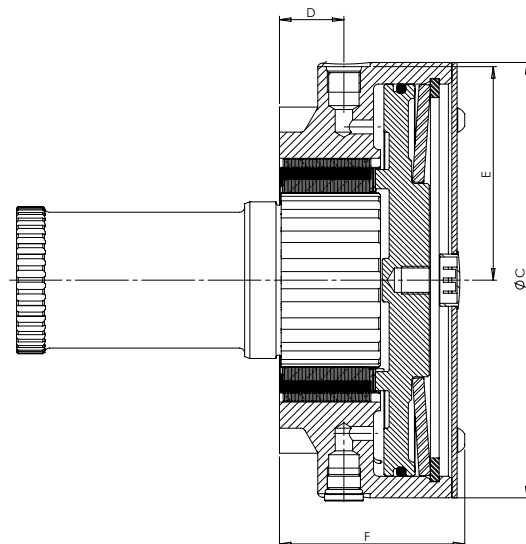
The multi-disc brake has a modular design which ensures it can be connected to any variant of the XJ20 motor.

The brake has two hydraulic release ports, one at the top of the housing and one at the bottom. The brake can be manually released by removing the plug in the cover and using an M16 screw to pull the piston back.

P BRAKE



Q BRAKE



	P	Q
Brake static capacity when new	13 kNm [9,588 lbf.ft]	18.6 kNm [13,276 lbf.ft]
Static capacity after ten dynamic uses	10 - 11.3 kNm ⁽¹⁾ ⁽²⁾ ⁽³⁾ [7,375 - 8,334 lbf.ft] ⁽¹⁾ ⁽²⁾ ⁽³⁾	14 - 16.2 kNm ⁽¹⁾ ⁽²⁾ ⁽³⁾ [10,326 - 11,950 lbf.ft] ⁽¹⁾ ⁽²⁾ ⁽³⁾
Volume to fill	800 cc [48.8 in ³]	470 cc [28.7 in ³]
Volume to fully release brake	180 cc [11 in ³]	70 cc [4.3 in ³]
Min. pressure to fully release brake	20 bar [290 psi]	12 bar [174 psi]
Max. acceptable pressure	30 bar [435 psi]	30 bar [435 psi]
Time to release brake	< 0.5 seconds ⁽⁴⁾ ⁽⁵⁾	< 0.5 seconds ⁽⁴⁾ ⁽⁵⁾
Time to engage brake	< 1 second ⁽⁴⁾ ⁽⁵⁾	< 1 second ⁽⁴⁾ ⁽⁵⁾
Emergency release fitting	M16 torqued to 350 Nm [M16 torqued to 258 lbf.ft]	M16 torqued to 350 Nm [M16 torqued to 258 lbf.ft]
Weight	47 kg [104 lbs]	34 kg [75 lbs]

(1) Do not run in brake, wearing the plates will reduce the static capacity.

(2) Dynamic use of the brake is not recommended and should only be used in emergency situations.

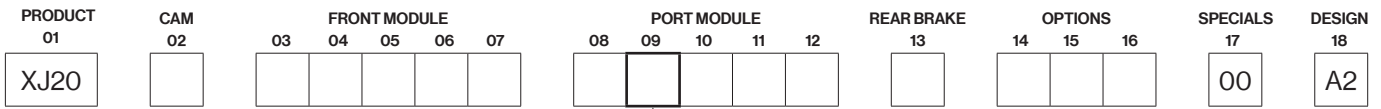
(3) The disc pack should be replaced after ten dynamic uses.

(4) Times may vary depending on fluid viscosity and valves used.

(5) During low temperature applications, flushing the brake housing is recommended to maintain a constant oil viscosity.

All data is based on ISO46 fluid at 50°C/122°F. If a different fluid will be used, please consult Rotary Power.

DIRECTION OF SHAFT ROTATION



PORT MODULE - SPEED AND ROTATION

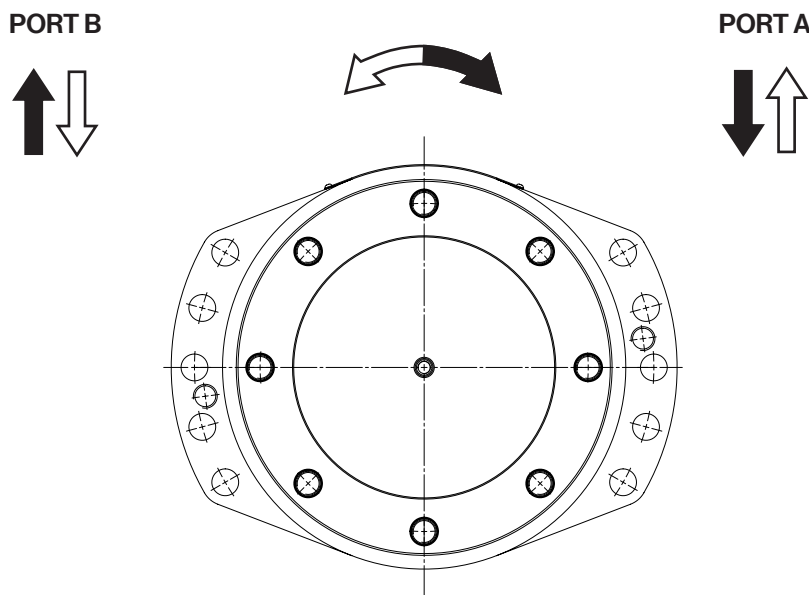
1R	Single speed - flow to port A = CW rotation
1L	Single speed - flow to port A = ACW rotation
RA	Two speed (Ratio 2:1) - flow to port A = CW preferred rotation
LA	Two speed (Ratio 2:1) - flow to port A = ACW preferred rotation

The XJ motor code defines the starting direction of the motor. This is selected by the customer to best suit their application needs.

The starting direction is based on flow being supplied to port A. A single speed motor can have its starting direction reversed by supplying flow to port B.

In two speed motors, pressurising port A is preferred as this prevents the motor from recirculating high pressure oil when shifted into second displacement. It is important to select the correct starting direction of a two speed motor to ensure optimum performance in the required direction.

DIRECTION OF SHAFT ROTATION VIEWED FROM THE SHAFT END



HYDRAULIC CONNECTIONS

PRODUCT 01	CAM 02	FRONT MODULE 03 04 05 06 07					PORT MODULE 08 09 10 11 12					REAR BRAKE 13	OPTIONS 14 15 16			SPECIALS 17	DESIGN 18
XJ20																00	A2

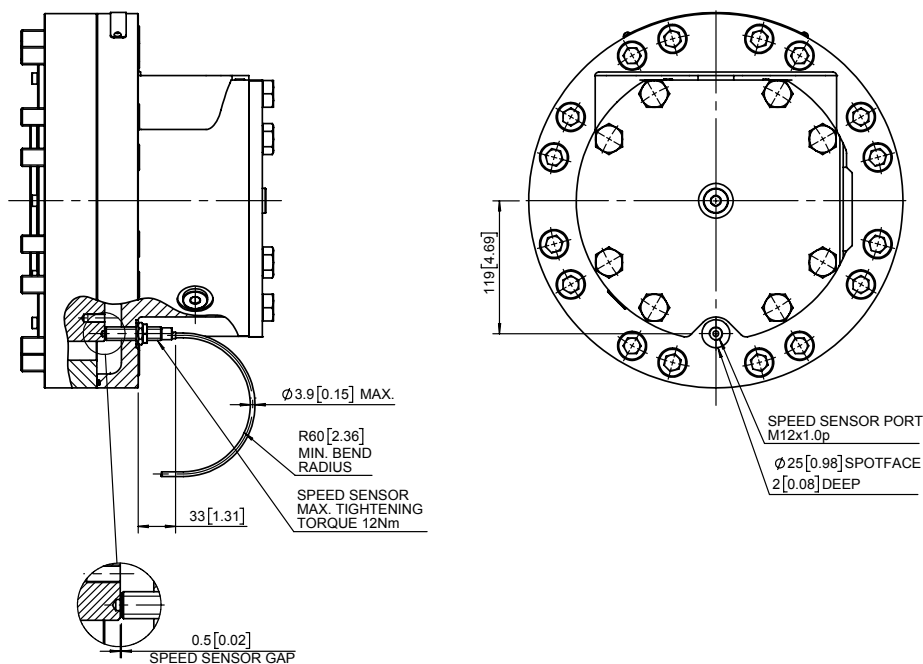
	Port	Power supply		Drain	Speed change	Flushing	Parking brake
		A	B	T	S	F	Y
XJ20 housing options	1	ISO 6162 DN 32 (Standard)		1/2" SAE J514 (3/4"-16 UNF)	3/8" SAE J514 (9/16"-18 UNF)	1/2" SAE J514 (3/4"-16 UNF)	1/2" SAE J514 (3/4"-16 UNF)
	2	ISO 6162 DN 19		M22x1.5	M22x1.5	M22x1.5	M16x1.5
XJ40 housing options	5	ISO 6162 DN 32		1/2" SAE J514 (3/4"-16 UNF)	3/8" SAE J514 (9/16"-18 UNF)	1/2" SAE J514 (3/4"-16 UNF)	1/2" SAE J514 (3/4"-16 UNF)
	6	ISO 6162 DN 25		M22x1.5	M18x1.5	M22x1.5	M16x1.5
Max. pressures	bar [psi]	450 [6,527]		6 [90]	40 [580]	6 [90]	30 [435]

EXTRA OPTIONS

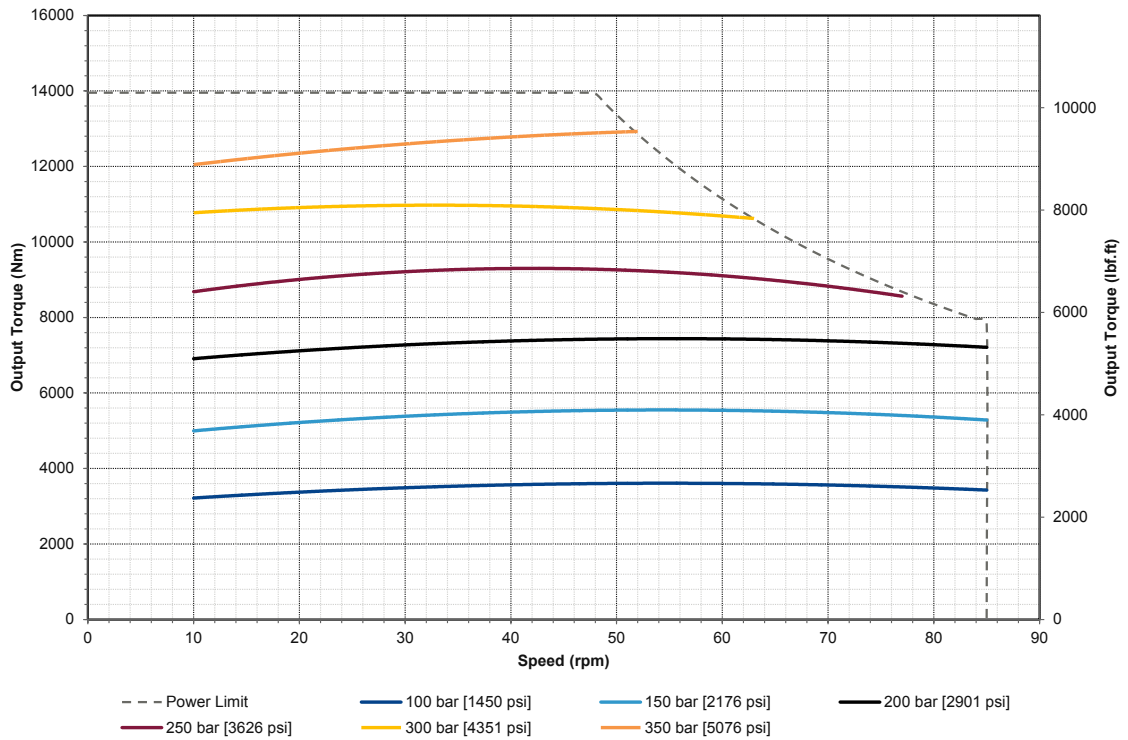
SPEED SENSOR

This sensor provides a square wave signal used to calculate motor speed. Note that the sensor target is constructed using a modified XJ20 rotor. Integrating the sensor target into the rotor allows the envelope of the motor to remain consistent with standard sizes.

Sensor type	Differential hall effect speed sensor
Rotary Power part number	W949000005
Supply voltage	8 – 32 VDC
Current consumption	<ul style="list-style-type: none"> Max. without load: 15 mA Max. with load: 30 mA
Plug type	AMP 282105-1, 3 pins <ul style="list-style-type: none"> Integrated cable and connector only Cable length (including connector): 350 mm ± 20 mm
Signal output	<ul style="list-style-type: none"> Square wave Push-pull outputs: $I_{max} = \pm 20$ mA <ul style="list-style-type: none"> With pull-up resistor (for R=560 Ohm): $U_{low} < 2.5V, U_{high} > 0.95 * U_{supply}$ With pull-down resistor (for R=560 Ohm): $U_{low} < 0.1V, U_{high} > U_{supply} - 4.0 V$
Frequency range	5 Hz – 20 kHz
Standard number of pulses per revolution	60
Operating temperature	-40°C to +125°C [-40°F to +257°F]
Protection rating	<ul style="list-style-type: none"> Sensor head: IP68 Cable outlet: IP67

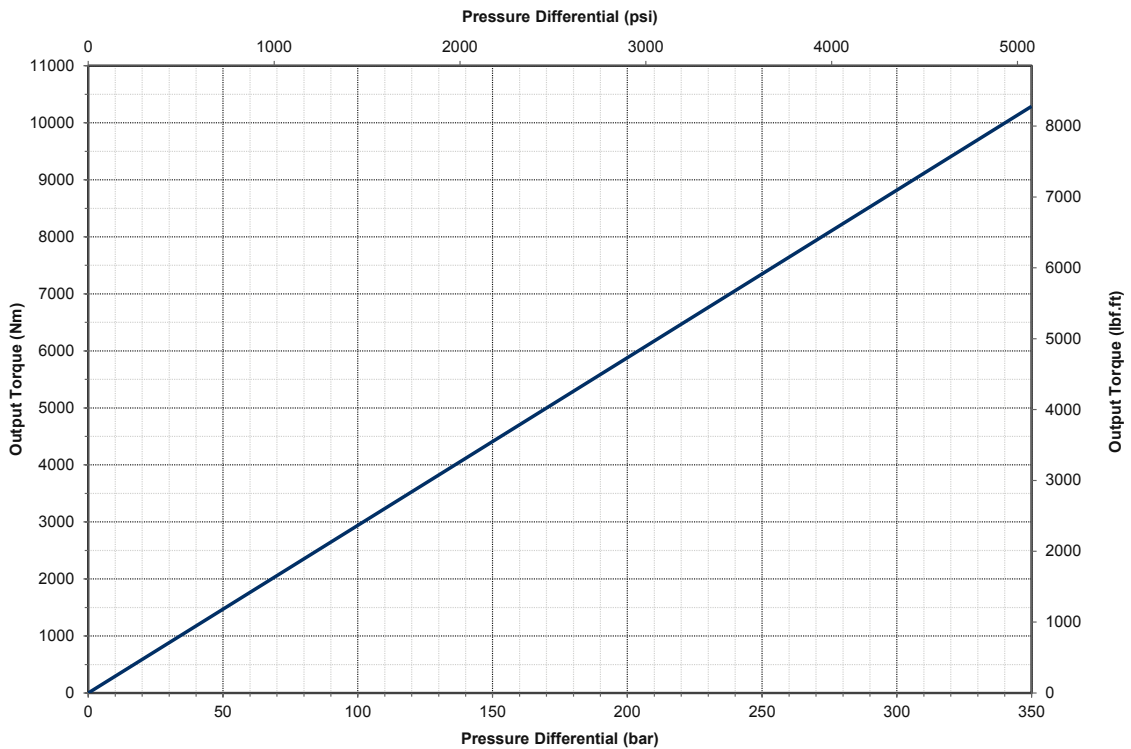


TORQUE OUTPUT



STARTING TORQUE

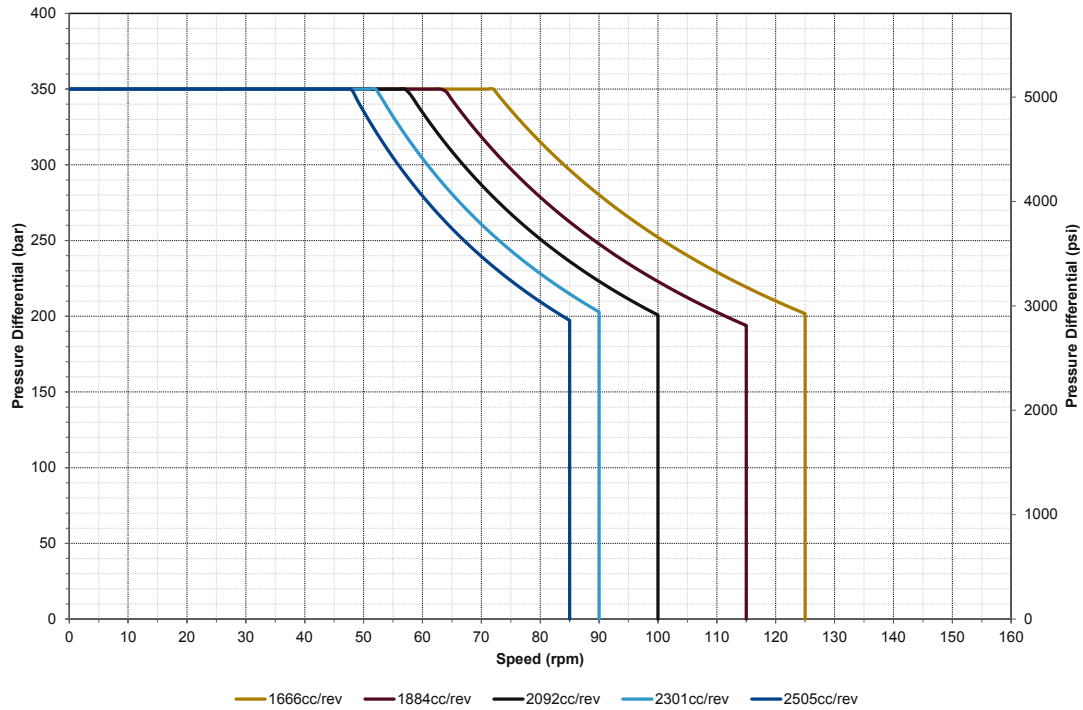
MAX. AVAILABLE TORQUE AT ZERO RPM



All performance graphs plotted for maximum displacement (2,505 cc/rev) using ISO46 fluid at 50°C.

POWER ENVELOPE

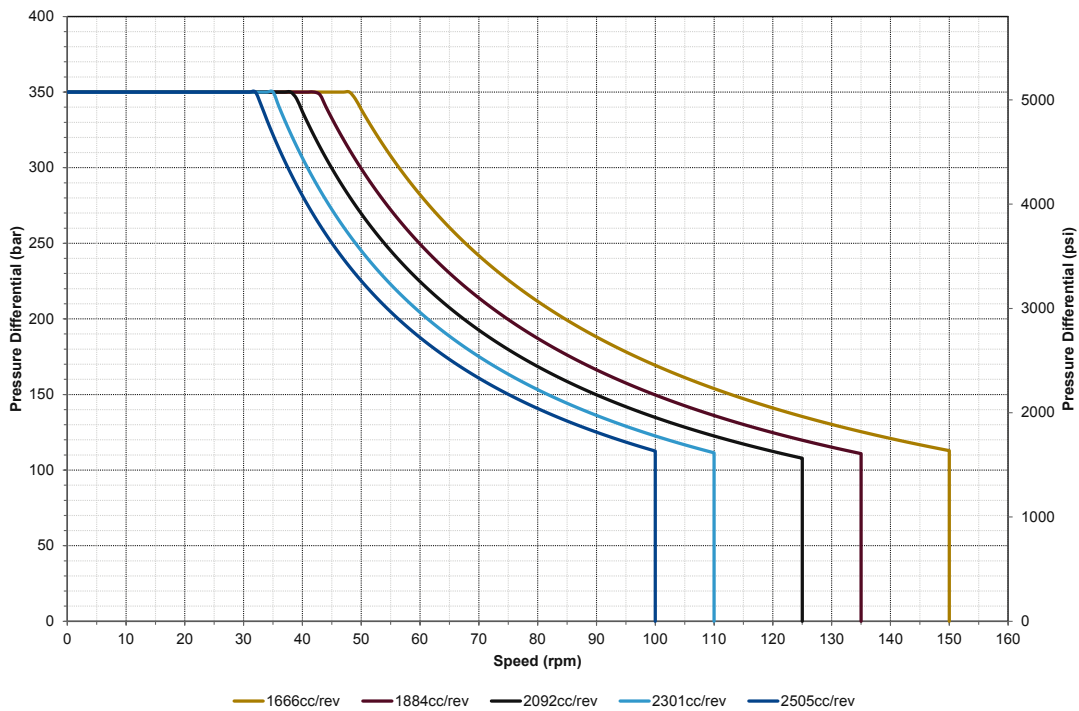
SINGLE SPEED 70KW MAX. CONTINUOUS POWER



POWER ENVELOPE

TWO SPEED 47KW MAX. CONTINUOUS POWER

MIN. DISPLACEMENT - PREFERRED DIRECTION

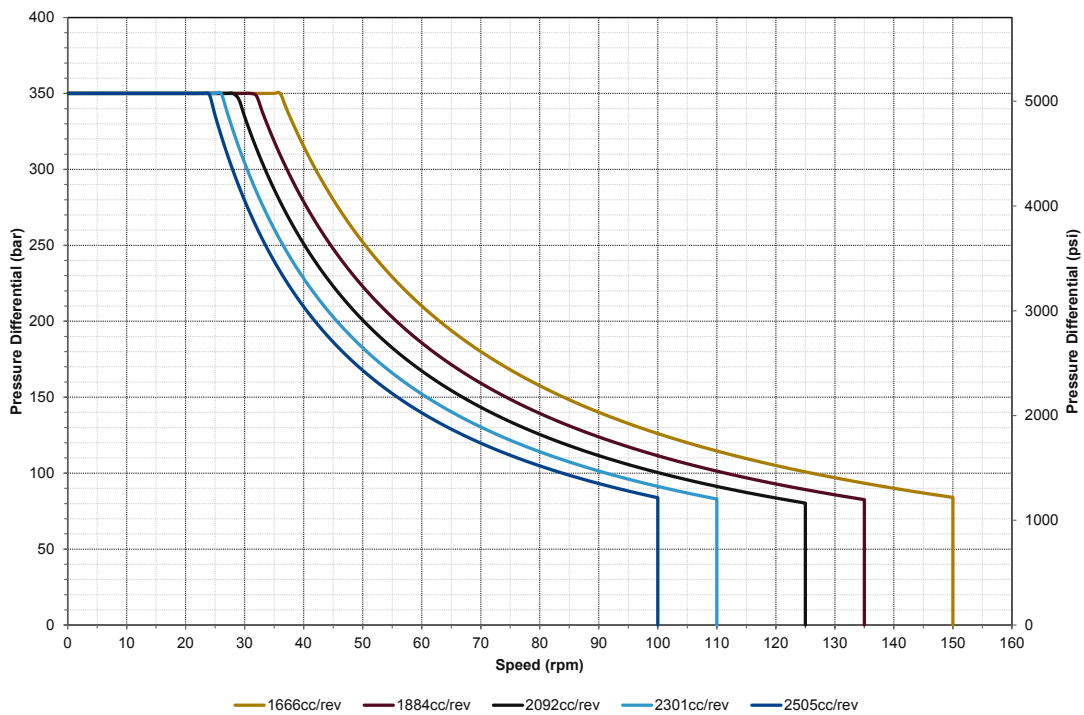


All performance graphs plotted for maximum displacement (2,505 cc/rev) using ISO46 fluid at 50°C.

POWER ENVELOPE

TWO SPEED 35KW MAX CONTINUOUS POWER

MIN. DISPLACEMENT - NON PREFERRED DIRECTION



All performance graphs plotted for maximum displacement (2,505 cc/rev) using ISO46 fluid at 50°C.

CALCULATIONS

$$\text{Output torque (Nm)} = \frac{\text{Motor displacement (cc)} \times \text{delta pressure (bar)} \times \eta_m}{20\pi}$$

$$\text{Flow (lpm)} = \frac{\text{Motor displacement (cc)} \times \text{rotational speed (rpm)}}{1000 \times \eta_v}$$

$$\text{Output power (kW)} = \frac{\text{Output torque (Nm)} \times \text{rotational speed (rpm)}}{9,550}$$

Where:

η_m = Mechanical efficiency

η_v = Volumetric efficiency

For approximate estimates of performance use:

$\eta_m = 0.95$

$\eta_v = 0.95$

CONVERSIONS

Nm → lbf.ft = x 0.7376

N → lbf = x 0.2248

bar → psi = x 14.5038

cc → in³ = x 0.061

lpm → U.S. gpm = x 0.2641

kW → hp = x 1.341

kg → lb = x 2.2046

NOTES

UK

Rotary Power
Waldrige Way
Simonside East Industrial Park
South Shields
Tyne and Wear
NE34 9PZ
T: +44 (0) 191 276 4444
F: +44 (0) 191 276 4462
E: enquiries@rotarypower.com

Germany

Rotary Power
Vertriebsgesellschaft mbH
Nordstrasse 78
52078 Aachen-Brand
Germany
T: +49 (0) 241 955190
F: +49 (0) 241 9551919
E: info.ac@rotarypower.com

USA

Rotary Power Inc.
3952 West Tickman Street
Unit 4
Sioux Falls
SD 57107
T: +1 (605) 361 5155
F: +1 (605) 362 1949
E: info@rotarypower.com

India

Rotary Power
6A, Attibele Industrial Area
Anekal Taluk
Bangalore
562 107
T: +91 (80) 782 0011
F: +91 (80) 782 0013
E: indiaenquiries@rotarypower.com

© Rotary Power Ltd 2019. All images and text, along with any intellectual property rights, contained in this catalogue are owned by Rotary Power Ltd and may not be used, reproduced or manipulated without the written permission of Rotary Power Ltd. The information contained in this catalogue is illustrative only. Rotary Power Ltd shall have no liability or responsibility in respect of reliance on the information contained in the catalogue. The information contained in the catalogue shall not form part of any contract subsequently put in place. We reserve the right to revise this document at any time, please check the Rotary Power Ltd website for the latest revision.

