
Intermot Brake Series

TECHNICAL CATALOGUE

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F21R AND F21DR

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F80 AND F80S

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F21R



F21DR



Freno modello Brake model		F21R
Coppia Statica * Static torque *	Nm	1800
Pressione minima di apertura completa ** Minimum complete opening pressure **	bar	35
Pressione massima sul cilindro Maximum pressure on the cylinder	bar	60
Massa a secco Dry mass	kg	26,3
Quantità olio lubrificante Lubrication oil quantity	cm ³	450
Quantità olio di pilotaggio Pilot oil quantity	cm ³	65,1
* La coppia statica è considerata con pressione di pilotaggio 0 bar all'interno del freno * The static torque is considered with internal pilot pressure at 0 bar		
** Disponibile anche con pressione di apertura maggiorata e ridotta qualità di olio di pilotaggio ** Available also with higher opening pressure, with less oil quantity		

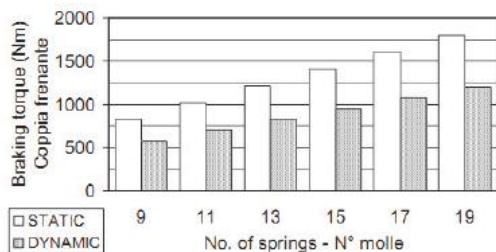
Freno modello Brake model		F21DR
Coppia Statica * Static torque *	Nm	1800
Pressione minima di apertura completa ** Minimum complete opening pressure **	bar	35
Pressione massima sul cilindro Maximum pressure on the cylinder	bar	60
Massa a secco Dry mass	kg	33,6
Quantità olio lubrificante Lubrication oil quantity	cm ³	450
Quantità olio di pilotaggio Pilot oil quantity	cm ³	65,1
* La coppia statica è considerata con pressione di pilotaggio 0 bar all'interno del freno * The static torque is considered with internal pilot pressure at 0 bar		
** Disponibile anche con pressione di apertura maggiorata e ridotta qualità di olio di pilotaggio ** Available also with higher opening pressure, with less oil quantity		

Braking torque in function of the number of brake disc springs.

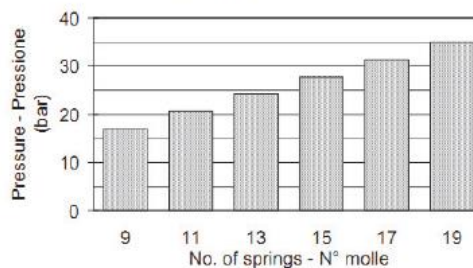
The standard version is supplied with 19 springs.

Coppia frenante in funzione del numero di molle spingi disco.

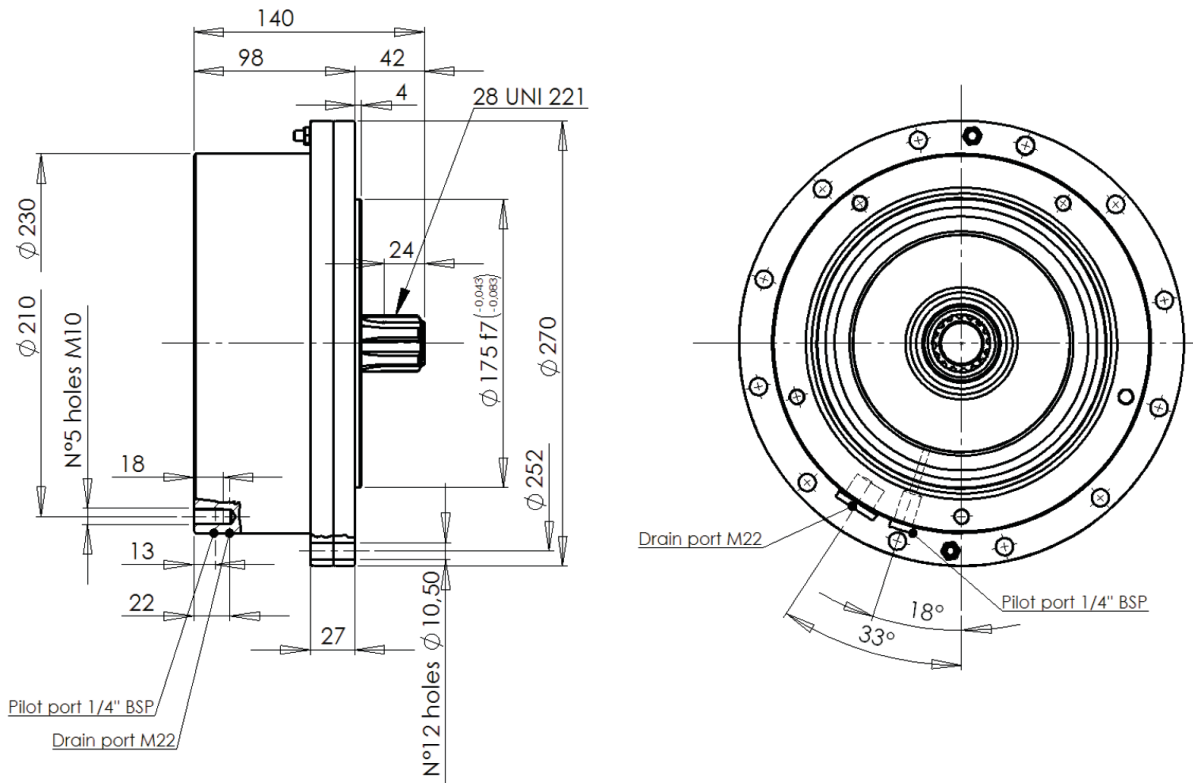
La versione standard viene fornita con 19 molle.



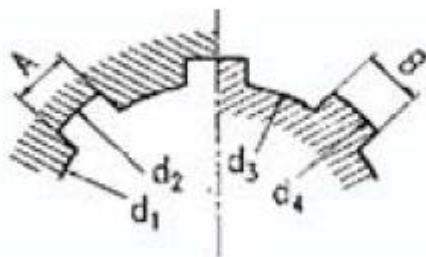
Opening pressure
Pressione di apertura



BRAKE F21R



SPLINE DATA 28 UNI 221

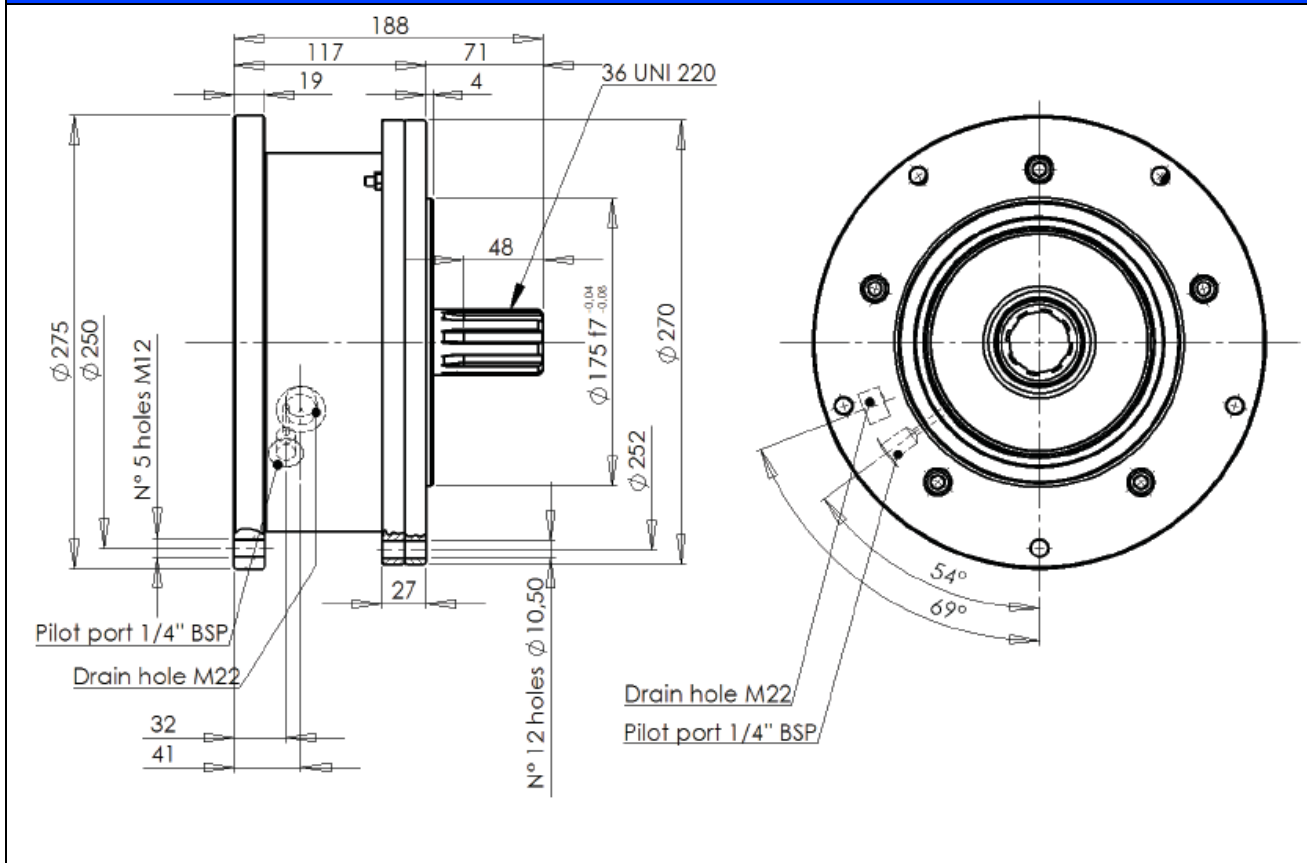


d ₁	Ø28.0	+0.021 +0	H7
d ₂	Ø34.1	+0.160 +0	H11
A	7.0	+0.028 +0.013	F7
d ₃	Ø28.0	-0.007 -0.020	g6
d ₄	Ø34.0	-0.065 -0.160	h14
B	7.0	-0.013 -0.028	f7

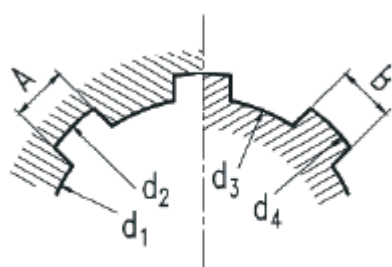
F21DR

Dimensional drawings

BRAKE F21DR



SPLINE DATA 36 UNI 220



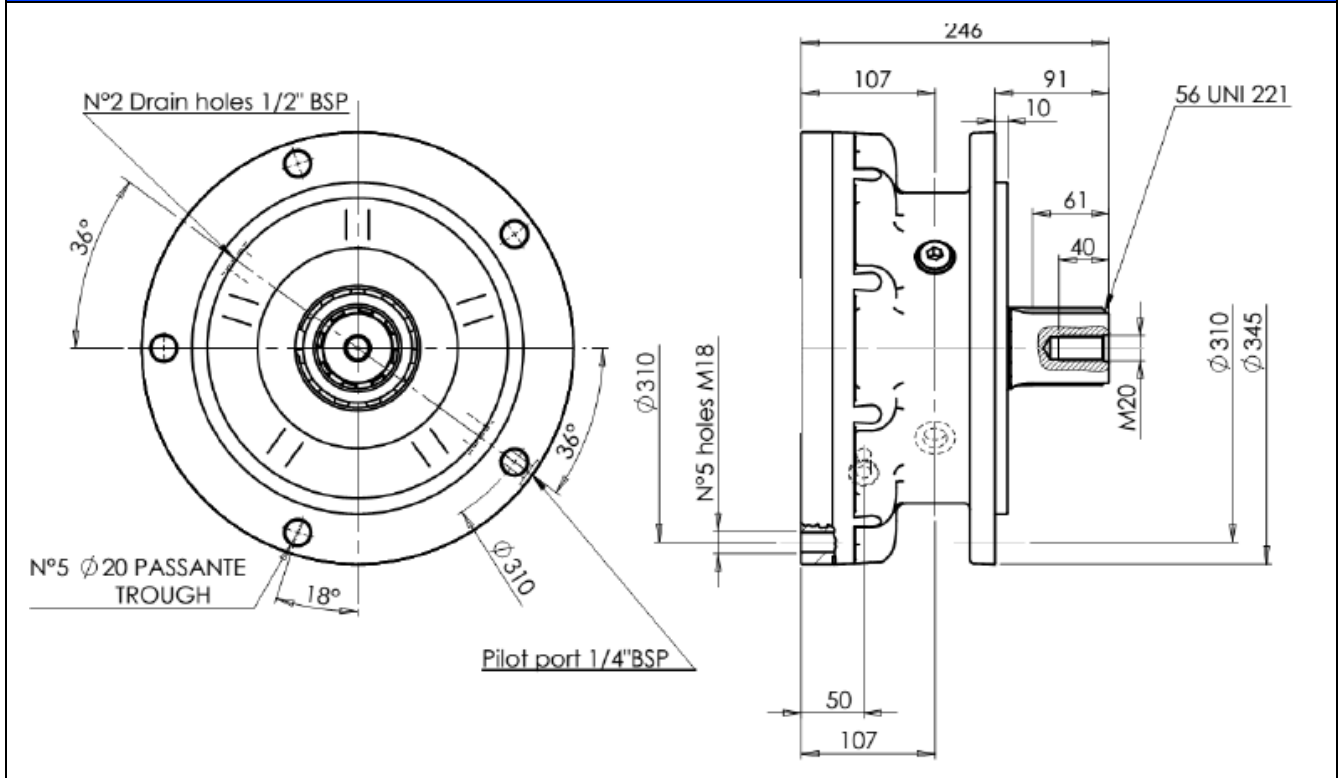
d_1	$\varnothing 36.0$	$+0.025$ $+0$	H7
d_2	$\varnothing 40.0$	$+0.160$ $+0$	H11
A	$\varnothing 7.0$	$+0.028$ $+0.013$	F7
d_3	$\varnothing 36.0$	-0.009 -0.025	g6
d_4	$\varnothing 40.0$	-0.065 -0.160	d11
B	$\varnothing 7.0$	-0.013 -0.028	f7

F80/F80S

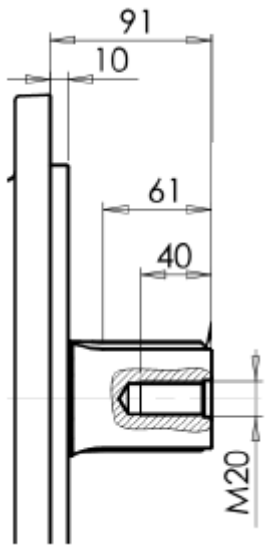
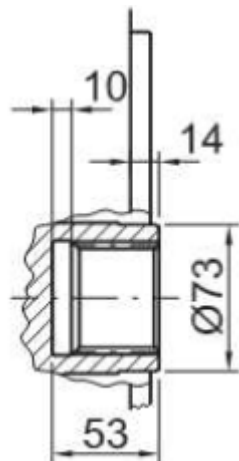
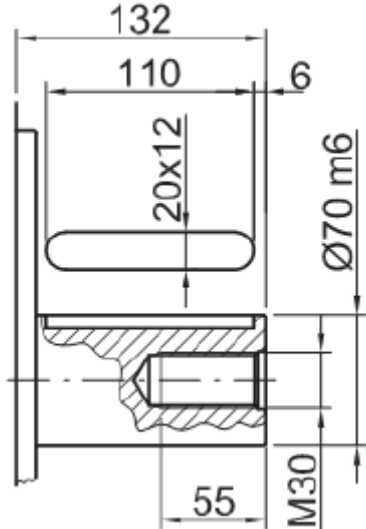


Freno modello Brake model		F80S 22 SPRINGS	F80S 15 SPRINGS
Coppia Statica * Static torque *	Nm	8000	4000
Pressione minima di apertura completa ** Minimum complete opening pressure **	bar	35	12
Pressione massima sul cilindro Maximum pressure on the cylinder	bar	60	60
Massa a secco Dry mass	kg	70	70
Quantità olio lubrificante Lubrication oil quantity	cm ³	1200	1200
Quantità olio di pilotaggio Pilot oil quantity	cm ³	70,8	70,8
<p>* La coppia statica è considerata con pressione di pilotaggio 0 bar all'interno del freno</p> <p>* The static torque is considered with internal pilot pressure at 0 bar</p> <p>** Disponibile anche con pressione di apertura maggiorata e ridotta qualità di olio di pilotaggio</p> <p>** Available also with higher opening pressure , with less oil quantity</p>			

BRAKE F80/F80S



SHAFTS

A0 Splined shaft 56 UNI 221	A1: Internal Splined shaft 55x3x17 DIN 5480	A2: Parallel shaft
 <p> 91 10 61 40 M20 </p>	 <p> 10 14 $\phi 73$ 53 </p>	 <p> 132 110 6 20x12 $\phi 70$ m6 55 M30 </p>

The data specified into this catalogue are for product description purpose only and must not be interpreted as warranted characteristic in legal sense. Intermot reserves the right to implement modification without notice.

WHEEL MOTORS WITH DRUM BRAKE RC SERIES TECHNICAL CATALOGUE

RC 100/150/195

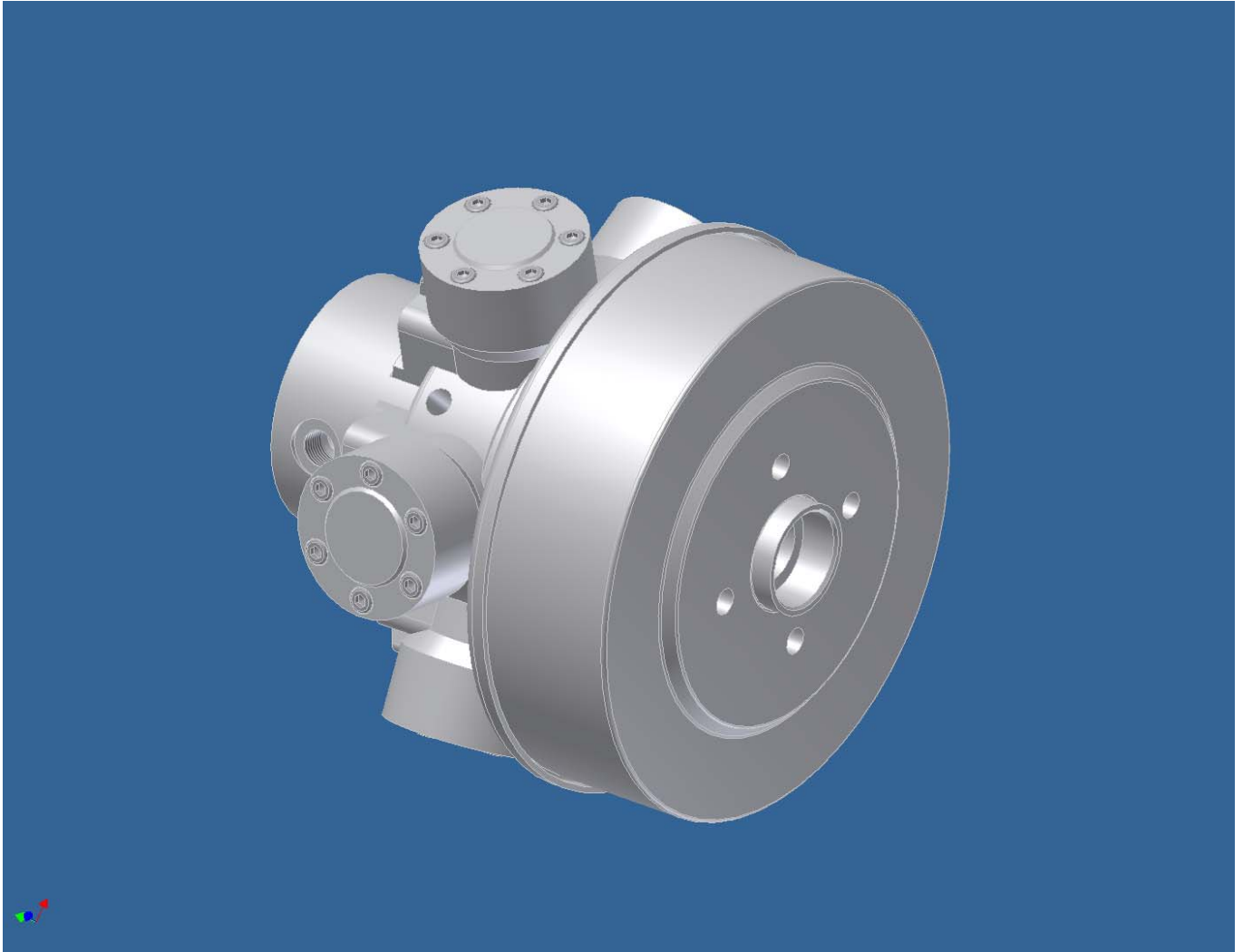
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GENERAL INFORMATION

INTERMOT produces RADIAL PISTON HYDRAULIC MOTORS since 1985: our yearly production is more than 13.000 units which we sell all over the world through our agents and authorized sellers. Our motor range varies from 20cc to 8500cc displacement and it is completed by two-speed motors and special motors created in cooperation with our clients for different applications such as : underwater, high & low speed and wheel motors and with the possibility to assemble valves, brakes or gear reductions. You can directly contact our Technical Department which will give you all the necessary support to find the right solutions to your problems.

INTERMOT is a flexible work reality and manages deliveries also within the same day of order; we produce motors exactly interchangeable with our competitors, always ready on stock which our clients particularly appreciate.



MOTOR TECHNICAL DATA

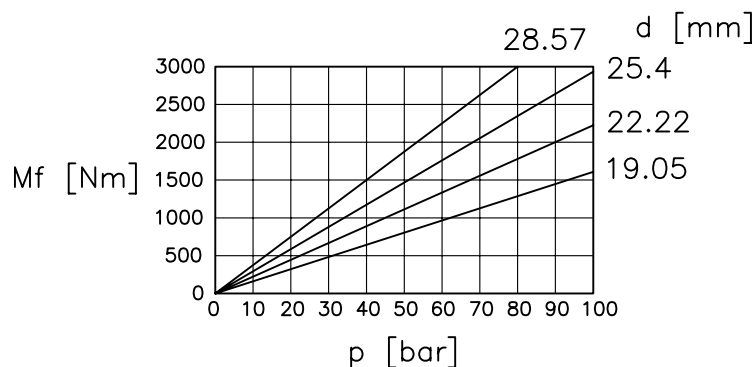
	DISPLACEMENT	SPECIFIC TORQUE	MAX CONTINUOUS PRESSURE	MAX INTERMITTENT PRESSURE	PEAK PRESSURE	MAX CONTINUOUS SPEED	PEAK SPEED	MAXIMUM FREEWHEELING SPEED (*)	MAX POWER	MAX TORQUE
	[cc/Rev]	[Nm/bar]	[bar]	[bar]	[bar]	[Rpm]	[Rpm]	[Rpm]	[kW]	[Nm]
RC 100	100	1.6	250	280	350	950	1050	1500	40	560
RC 150	157	2.5	250	280	350	950	1050	1500	40	875
RC 195	195	3.1	250	280	350	800	900	1500	40	1085

The motor is available in left and right configuration.

(*) For the hydraulic circuit, please refer to page 4 (freewheeling operation).

BRAKE TECHNICAL DATA

BRAKE PISTON CODE	BRAKE PISTON DIAMETER	MAX BRAKING TORQUE	MAX BRAKING PRESSURE
	[mm]	[Nm]	[bar]
1	19.05	1600	100
2	22.22	2250	100
3	25.4	2950	100
4	28.57	3000	80

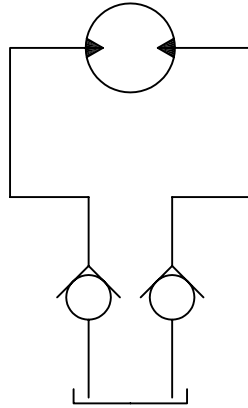


The drum brake is equipped with a cylinder for dynamic brake and a hand cable for the parking brake. The user can choose, according to the required braking torque and pressure, among four different brake cylinder dimensions (see the diagram). The user can use brake oil or mineral oil.

The brake is equipped by an air bleeder to remove periodically the air from the brake, because the air presence in the brake can cause braking problems.

For further information contact Intermot technical department.

FREEWHEELING OPERATION

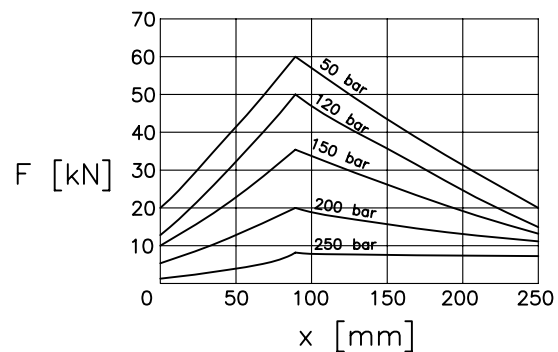
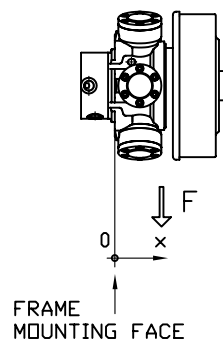


This is the most suitable circuit for high speed freewheeling. The motor operates under vacuum conditions, therefore it can work several hours without causing any damage and overheating.

The switch from normal to freewheeling operation (and viceversa) must be done at low speed and pressure.

For further informations please contact Intermot technical department.

RADIAL LOAD

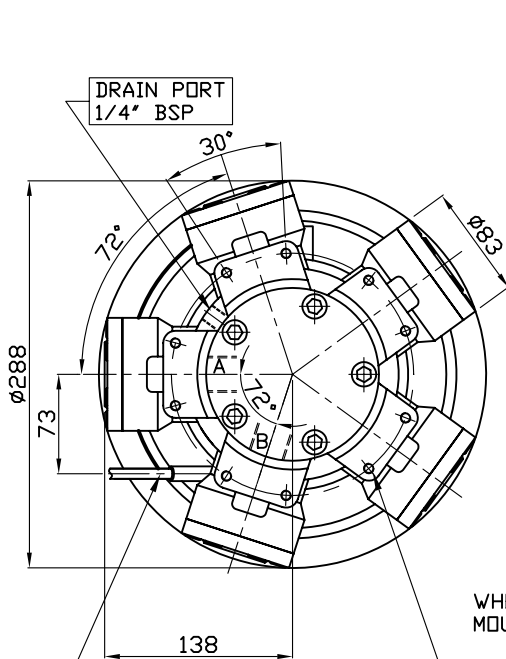


In the above diagram it is shown the maximum radial load to ensure a minimum life of 100000 revolutions.

For further information contact Intermot technical department.

SIZE

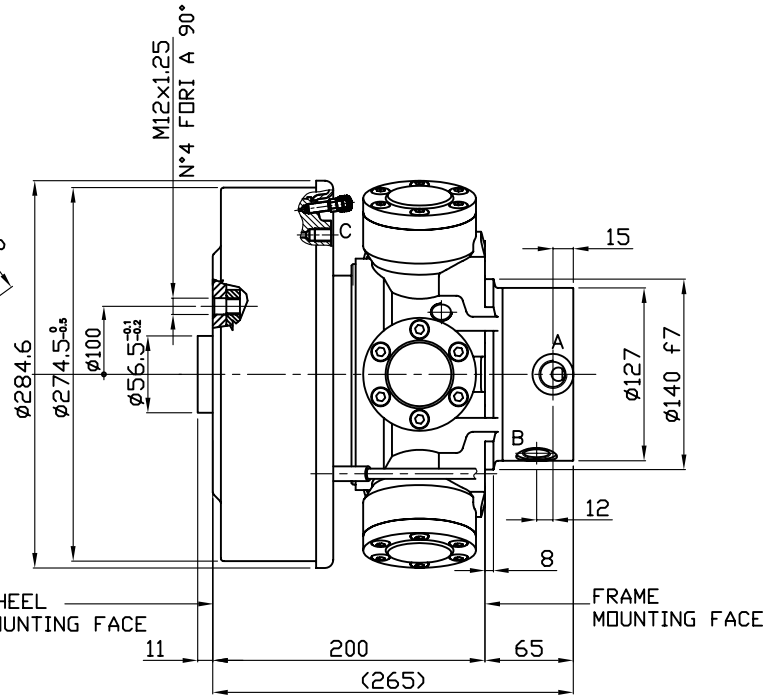
RC 100-150-195 DX



DRAIN PORT
1/4" BSP

HAND CABLE
LENGTH 1300 mm

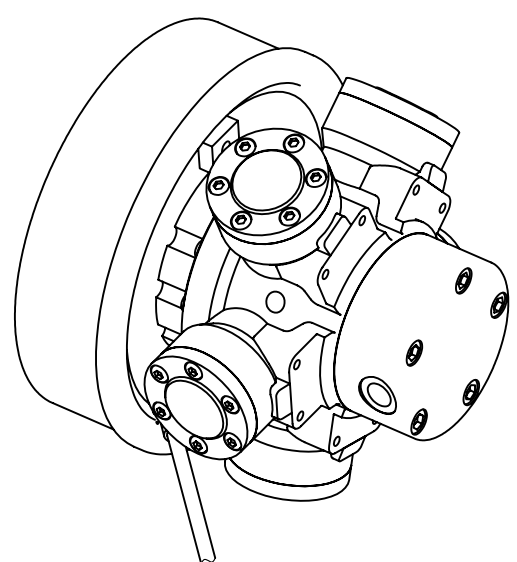
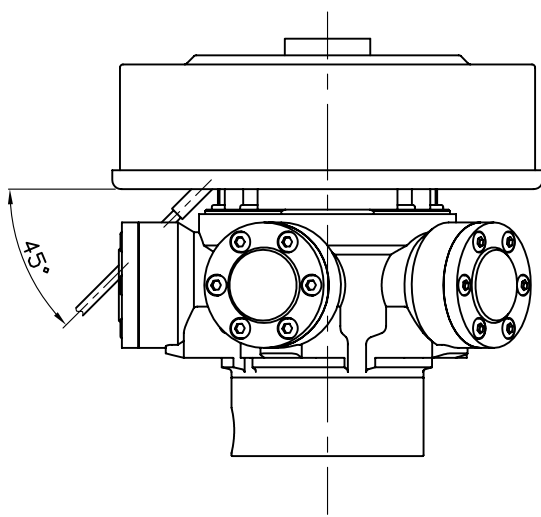
M8 N°10 MOUNTING HOLES
SPACED ON A 178 DIAMETER



WHEEL MOUNTING FACE
11

FRAME MOUNTING FACE
65

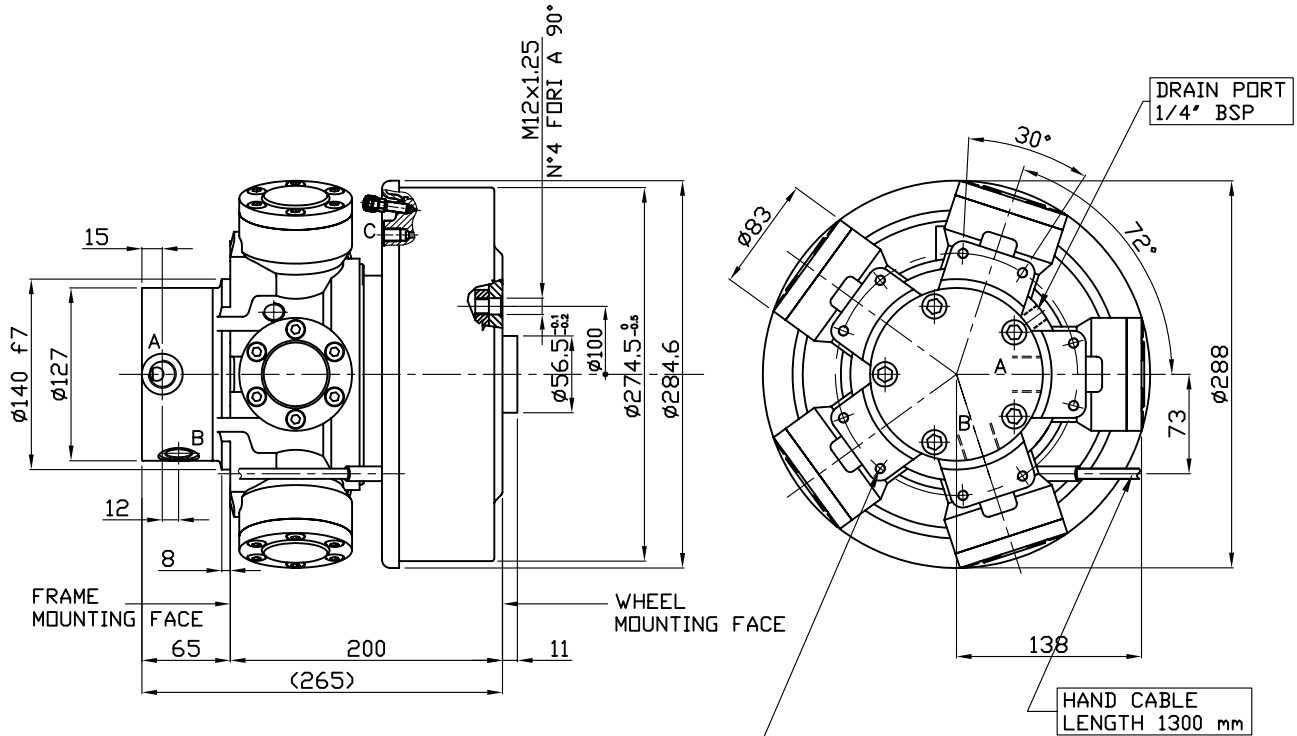
PORTS DIMENSION	
A,B	3/4" BSPP
C	M10x1



The Drum-Brake is equipped by cylinder for dynamic brake and cable for parking brake

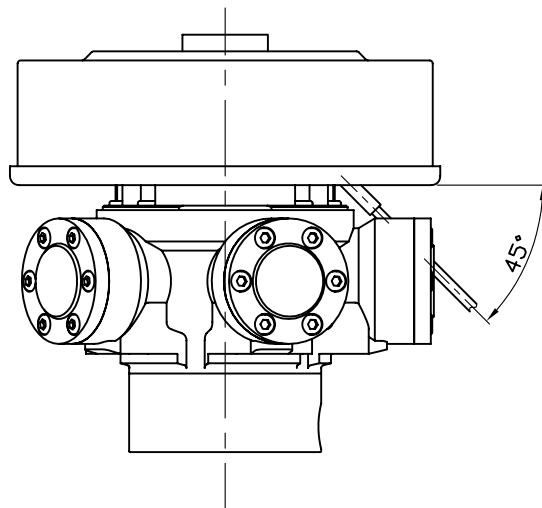
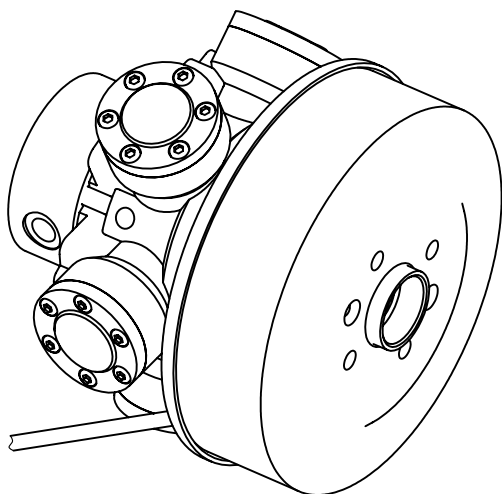
SIZE

RC 100-150-195 SX



PORTS DIMENSION	
A,B	3/4" BSPP
C	M10x1

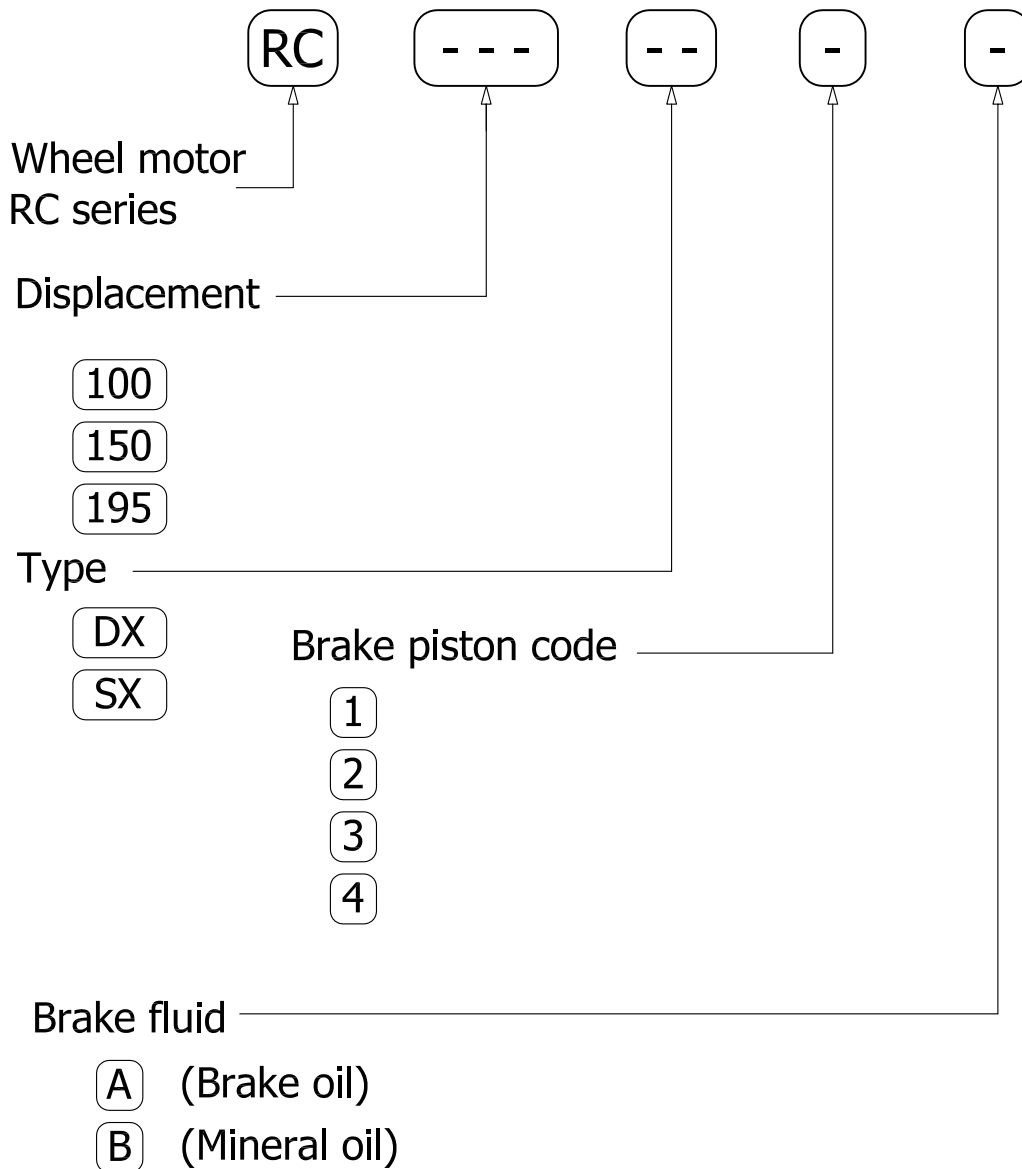
M8 N°10 MOUNTING HOLES
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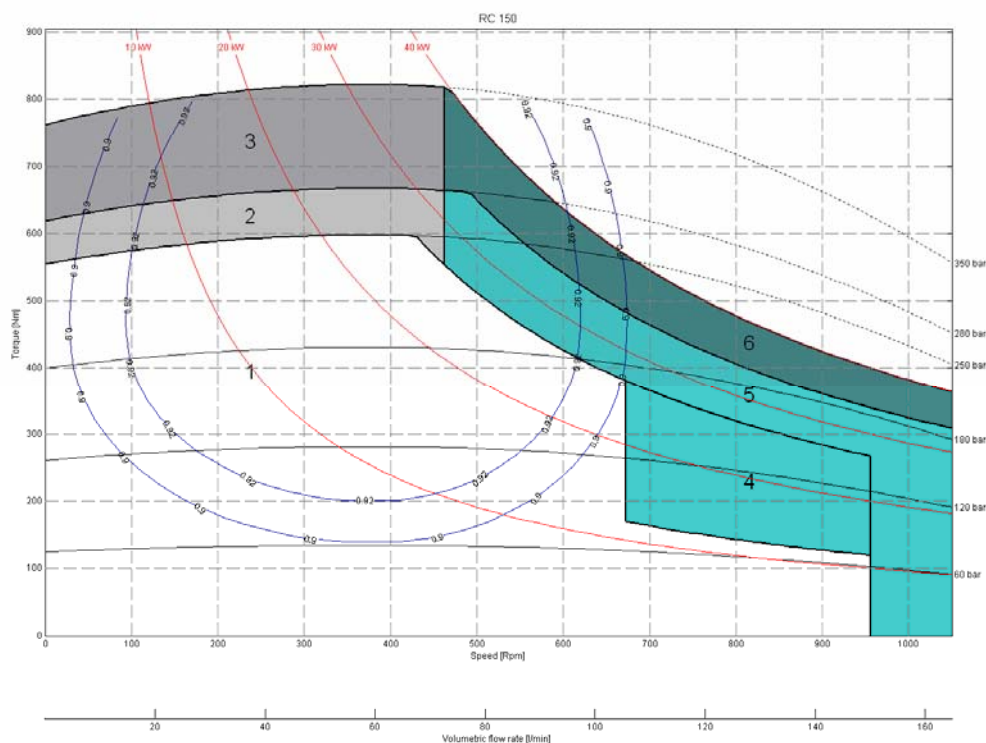
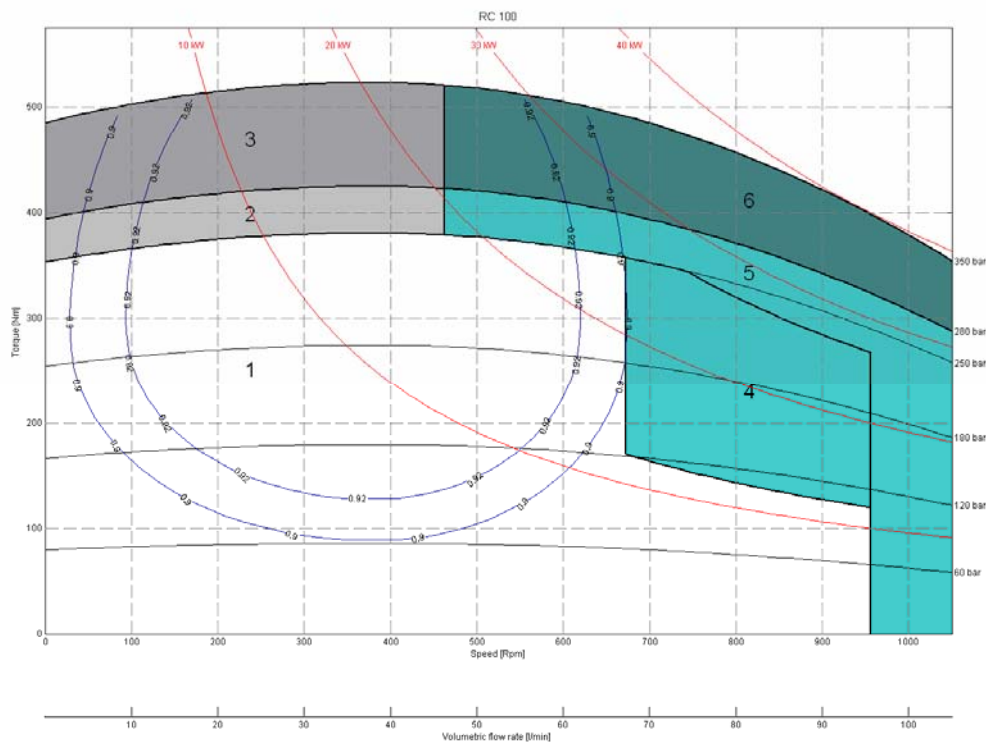
ORDERING INSTRUCTIONS

RC



EXAMPLE: RC.150.DX.4.A
RC.195.SX.3.A
RC.195.SX.3.B
RC.100.DX.4.B

PERFORMANCES

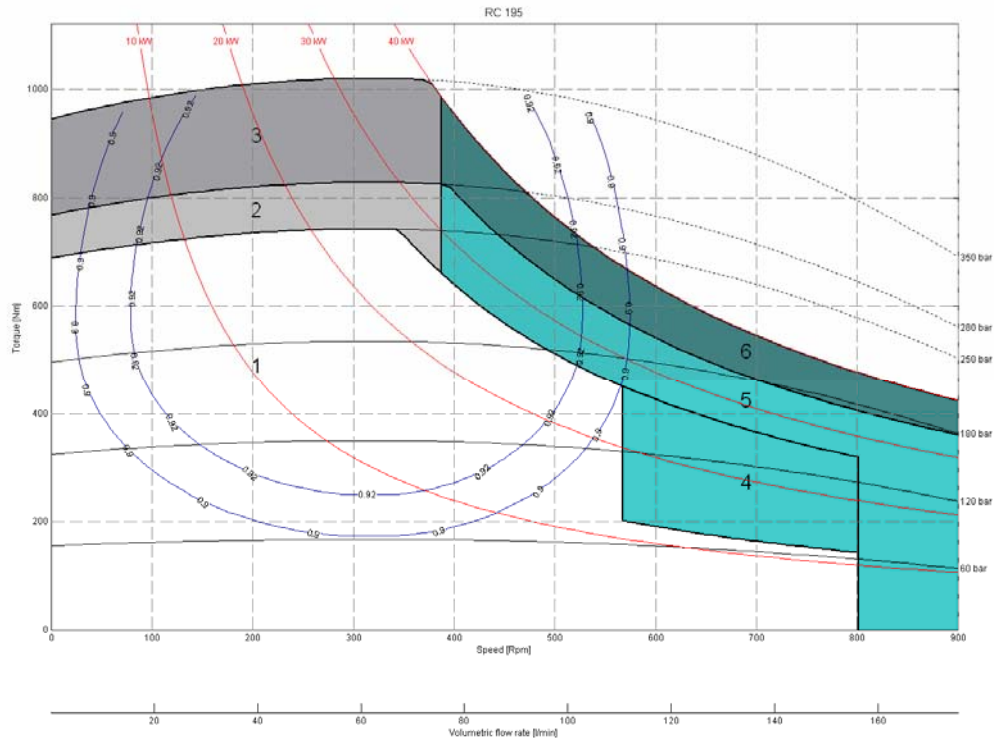


1	Continuous operation
2	Intermittent operation for period 3-5 minute every 10-15 minute
3	Intermittent operation for very short period (3-5 seconds every 10-15 minutes)

4	Continuous operation with flushing
5	Intermittent operation for period 3-5 minute every 10-15 minute with flushing
6	Intermittent operation for very short period (3-5 seconds every 10-15 minutes) with flushing

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For more details please contact our Technical Department.

PERFORMANCES



1	Continuous operation
2	Intermittent operation for period 3-5 minute every 10-15 minute
3	Intermittent operation for very short period (3-5 seconds every 10-15 minutes)

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For more details please contact our Technical Department.

HYDRAULIC FLUIDS RECOMMENDATIONS

HYDRAULIC FLUIDS

We recommend the use of hydraulic oils with anti-wear additives (ISO HM or HV) and minimum viscosity index of 95. Once normal working temperature is reached, oil viscosity must be at least 12 cSt, preferably in the range from 20 to 60 cSt.

Hydraulic oils meeting Denison MF-O, Vickers M-2952-S I - 286-S performance requirements and DIN 51524 specifications, are preferred.

Mineral hydraulic oils are divided into four main types, designated by the International Standards Organisation (ISO) as HH, HL, HM and HV. We advise to use only products with HM or HV specifications.

HM type

These are the most widely employed hydraulic oils. They include small quantities of anti-wear additives to provide significant improvement in wear reduction. "Superior" quality HM type oils can be used for all equipment, with the added assurance that they will be suitable for the highest temperature.

HV type

HV hydraulic oils show minimal change in viscosity with temperature variations.

OIL VISCOSITY RECOMMENDATION

Room temperature HM type ISO-VG

- -20°C / 0°C BP ENERGOL HLP - HM 22
- -15°C / +5°C BP ENERGOL HLP - HM 32
- -8°C / +15°C BP BNERGOL HLP - HM 46
- 0°C / +22°C BP ENERGOL HLP - HM 68
- +8°C / +30°C BP ENERGOL HLP - HM100
- -20°C / +5°C BP BARTRAN HV 32
- -15°C / +22°C BP BARTRAN HV 46
- 0°C / +30°C BP BARTRAN HV 68

Our motors have been designed to work also with:

- oils type ATF (Automatic Transmission Fluid)
- oils with viscosity SAE 10W - 20 -30
- multigrade motor oils SAE 10 W/40 or 15 W/40
- universal oils

During cold start-up, avoid high-speed operation until the system is warmed up to provide adequate lubrication.

Continuous working temperature must not exceed 70°C.

FIRE RESISTANT OIL LIMITATIONS

	Max cont. pressure	Max int. pressure	Max speed
HFA, 5-95% oil-water	103	138	50%
HFB, 60-40% oil-water	138	172	100%
HFC, water-glycol	103	138	50%
HFD, ester phosphate	250	293	100%

FILTRATION

Hydraulic systems oil must always be filtered.

The choice of filtration grade derives from needs of service life and money spent. In order to obtain stated service life it is important to follow our recommendations concerning filtration grade.

When choosing the filter it is important to consider the amount of dirt particles that filter can absorb and still operate satisfactorily. For that reason we recommend filters showing when you need to substitute filtering cartridge.

- 25 µm filtration required in most applications
- 10 µm filtration in closed circuit applications

OXIDATION

Hydraulic oil oxidizes with time of use and temperature. Oxidation causes changes in colour and smell, acidity increase or sludge formation in the tank. Oxidation rate increases rapidly at surface temperatures above 60°C, in these situations oil should be checked more often.

The oxidation process increases the acidity of the fluid; the acidity is stated in terms of the "neutralization number". Oxidation is usually slow at the beginning and then it increases rapidly.

A sharp increase (by a factor of 2 to 3) in neutralization number between inspections shows that oil has oxidized too much and should be replaced immediately.

WATER CONTENT

Oil contamination by water can be detected by sampling from the bottom of the tank. Most hydraulic oils repel the water, which then collects at the bottom of the tank. This water must be drained off at regular intervals. Certain types of transmission oils and engine oils emulsify the water; this can be detected by coatings on filter cartridges or a change in the colour of the oil. In such cases, obtain your oil supplier advice.

DEGREE OF CONTAMINATION

Heavy contamination of the oil causes wear rising in hydraulic system components. Contamination causes must be immediately investigated and remedied.

ANALYSIS

It is recommended oil being analyzed every 6 months. The analysis should cover viscosity, oxidation, water content, additives and contamination. Most oil suppliers are equipped to analyze oil state and to recommend appropriate action. Oil must be immediately replaced if the analysis shows that it is exhausted.

INSTRUCTIONS AND ADVICES

INSTALLATION

Hoses and piping must be clean and free from contamination. No other special requirements are necessary.

- Motor can be mounted in any position
- In run-away conditions you must use counterbalance valves
- Consult factory for intermittent applications

Splined adaptors (sleeves) are available upon request.

INSTALLATION CIRCUIT

The choice of open or closed loop circuit will be determined by the application.

Open loop circuits are cheaper and simpler to install.

Closed loop circuit is a superior circuit and usually takes up less space. It also offers better control features.

START UP

Motor case and pistons must be completely filled with oil before starting.

Do not load motor to maximum working pressure. Increase load gradually at start-up.

CASE DRAIN – CASE PRESSURE

Connect the case drain directly to tank.

The case drain port on the motor must be located on the highest point of the installation to ensure that the motor will always be full of oil. The case drain pressure must not exceed 6 bar continuous pressure.

IMPORTANT

When the motor is installed vertically with shaft pointing upwards, consult our Technical Department. If the motor is connected to high inertial loads, the hydraulic system must be designed to prevent peaks of pressure and cavitation.

TEMPERATURE

Maximum oil temperature must not exceed 70°C. Heat exchangers must be used with higher temperatures.

VISCOSITY

The motor works satisfactory in a range of 3°E to 10°E oil viscosity. Best performance is obtained at the highest viscosity.

BACK PRESSURE

Don't exceed 70 bar back pressure.

HIGH PEAKS APPLICATIONS

In case of high pressure peaks applications, a Nitemper treatment on motor body or in cylinders it is suggested to increase wear and tear resistance.

CONTINUOUS HIGH SPEED DUTY

In case of continuous high speed duty, it is suggested to mount a central reinforced bearing on motor shaft, please contact our Technical Department.

MINIMUM SPEED

Standard minimum speed is about 5 to 40 rpm (depending on motor displacement). If you need less speed, it is possible to modify some parts of the distributor.

FLUSHING

In the need of Flushing, a 2nd drain hole is available upon request. When flushing is not available, it is possible to create an inner motor drain to help cooling.

COOLING FLOW

If the motor operates in the Intermittent Power zone, it may require a cooling flow of 20 l/min (5 gpm) to keep a drain flow viscosity of 40 cSt minimum.

FOR MORE DETAILS ON THE ABOVE MENTIONED ARGUMENTS AND FOR ANY FURTHER INFORMATION PLEASE CONTACT OUR TECHNICAL DEPARTMENT.

BEARINGS

Bearings lifetime depends on the type of bearing, on motor speed and on working loads.

Lifetime is measured by L_{10} which is called "theoretic lifetime". It represents the number of cycles that 90% of identical bearings can effort at the same load without showing wear and tear. It is calculated by the following equation:

$$L_{10} = \left(\frac{C}{P} \right)^p$$

where: C = theoretical dynamic coefficient (depending on the bearing size)

P = radial load

p = exponent (p=3 for ball bearings, p=10/3 for roller bearings)

When you work at constant speed, you can calculate the lifetime in hours with the following equation:

$$L_{10h} = \frac{10^6 \cdot L_{10}}{60 \cdot \text{rpm}} = \frac{10^6}{60 \cdot \text{rpm}} \left(\frac{C}{P} \right)^p \text{ [h]}$$

When you don't have only radial or axial loads, you have to calculate an equivalent load:

$$P = X \cdot F_R + Y \cdot F_A$$

Where

F_R = radial load,

X = radial coefficient,

F_A = axial load,

Y = axial coefficient

While F_R and F_A come from working conditions (i.e. torque),

X and Y depend on the type of bearing and on the ratio $\frac{F_A}{F_R}$.

For further information please contact Intermot technical department.

SHAFT SEAL FEATURES

Type: BABSL
 Form: AS DIN 3760
 Material: SIMRIT® 72 NBR 902
 SIMRIT® 75 FKM 595

1. Features

SIMMERRING® radial shaft seal with rubber covered O.D., short, flexibility suspended, spring loaded sealing lip and additional dust lip: see Part B/ SIMMERRING®, sections 1.1 and 2.

2. Material

Sealing lip and O.D.:

- Acrylonitrile-butadiene rubber with 72 Shore
- A hardness (designation: SIMRIT® 72 NBR 902)
- Fluoro rubber with 75 Shore A hardness (designation: SIMRIT® 75 FKM 595)

Metal insert:

- Plain steel DIN 1624

Spring:

- Spring steel DIN 17223

3. Application

For sealing pressurised media without additional backup ring, e. g. for rotational pressure sealing in hydraulic pumps, hydraulic motors, hydrodynamic clutches. Rubber covered O.D. assures sealing in the housing bore even in case of considerable surface roughness, thermal expansion or split housing.

Particularly suitable for sealing low viscosity and gaseous media.

Where high thermal stability and chemical resistance are required, SIMRIT® 75 FKM 595 material should be used.

Additional dust lip to avoid the entry of light and medium dust and dirt.

4. Operating conditions

See Part B/ SIMMERRING®, sections 2. 4.

Media: mineral oils, synthetic oils
 Temperature: -40°C to +100°C (SIMRIT® 72 NBR 902)
 -40°C to +160°C (SIMRIT® 75 FKM 595)

Surface speed: up to 5 m/s

Working pressure: see diagram 1

Maximum permitted values, depending on other operating conditions.

5. Housing and Machining Criteria

See Part B/ SIMMERRING®, sections 2.

Shaft:	Tolerance:	ISO h11
	Concentricity:	IT 8
	Roughness:	Ra=0.2-0.8 µm Rz=1-4 µm Rmax=6 µm
	Hardness:	45-60 HRc
	Roughness:	non oriented; preferably by plunge grinding
Housing:	Tolerance:	ISO H8
	Roughness:	Rmax<25 µm

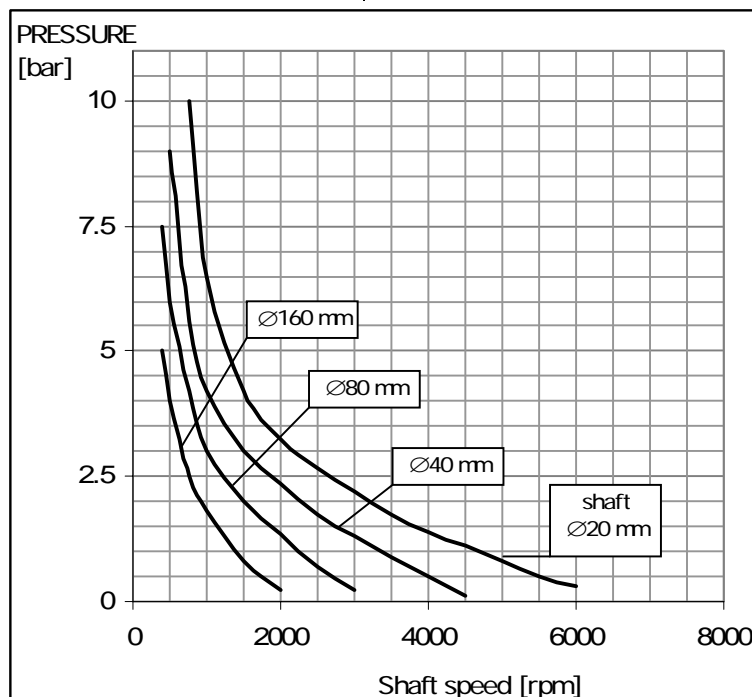


Diagram 1: Pressure Loading Limits

For more details please contact our Technical Department.

FORMULAS

• TORQUE (1)	Torque = (specific torque) · (pressure)
• TORQUE (2)	Torque [Nm] = $\frac{\text{displacement [cc/rev]} \cdot \text{pressure [bar]}}{62.8}$
• POWER (1)	Power [kW] = $\frac{\text{Torque [Nm]} \cdot \text{speed [rpm]}}{9549}$
• POWER (2)	Power [CV] = $\frac{\text{Torque [Nm]} \cdot \text{speed [rpm]}}{7023}$
• SPEED	speed [rpm] = $\frac{\text{flow rate [l/min]} \cdot 1000}{\text{displacement [cc/rev]}}$
• REQUIRED MOTOR DISPLACEMENT	displacement [cc/rev] = $\frac{\text{max required torque [Nm]} \cdot 62.8}{\text{max pressure [bar]}}$
• REQUIRED PUMP FLOW RATE	flow [l/min] = $\frac{\text{displacement [cc/rev]} \cdot \text{max speed [rpm]}}{1000}$

CONVERSIONS

LENGTH	1 m	=	39.3701 in	FORCE	1 N	=	0.102 kgf
		=	3.2808 ft			=	0.2248 lbf
		=	1.0936 yd		1 kgf	=	2.205 lbf
		=	1000 mm			=	9.806 N
	1 in	=	0.0833 ft		1 lbf	=	0.4536 kgf
		=	25.4 mm			=	4.448 N
	1 ft	=	0.3048 m	PRESSURE	1 bar	=	14.223 psi
		=	0.3333 yd			=	0.99 atm
		=	12 in			=	1.02 ata
	1 yd	=	0.9144 m			=	100000 Pa
		=	3 ft			=	100 kPa
		=	36 in			=	0.1 MPa
	1 km	=	1000 m		1 psi	=	0.0703 bar
		=	1093.6 yd	FLOW	1 l/min	=	0.264 gpm
		=	0.6214 mile			=	1000 cc/min
	1 mile	=	1.609 km		1 gpm	=	3.785 l/min
		=	1760 yd			=	3785 cc/min
MASS	1 kg	=	2.2046 lb		1 m ³ /s	=	60000 l/min
	1 lb	=	0.4536 kg			=	15852 gpm
SPEED	1 m/s	=	3.6 km/h	POWER	1 kW	=	1.341 HP
		=	2.237 mph			=	1.3596 CV
		=	3.2808 ft/s		1 HP	=	0.7457 Kw
	1 km/h	=	0.2778 m/s			=	1.0139 CV
		=	0.6214 mph	TORQUE	1 Nm	=	0.102 kgm
		=	0.9113 ft/s			=	0.7376 lbf ft
	1 mph	=	1.609 km/h		1 kgm	=	9.806 Nm
		=	0.447 m/s			=	7.2325 lbf ft
		=	1.467 ft/s		1 lbf ft	=	0.1383 kgm
	1 ft/s	=	0.3048 m/s			=	1.3558 Nm
		=	1.0973 km/h				
		=	0.6818 mph				