Italgroup®

HYDRAULIC MOTORS

ITALY

HCD

Single displacement high performance hydraulic motor

COMPANY WITH
QUALITY SYSTEM
CERTIFIED BY DNV GL
= ISO 9001 =

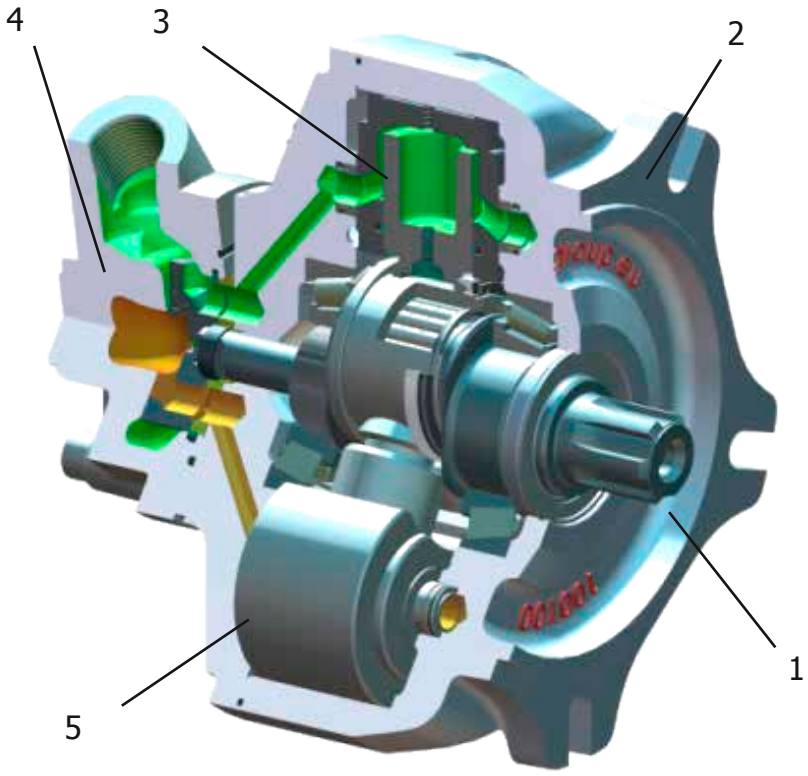
ITALGROUP MOTORS
HCD SERIES
TECHNICAL CATALOGUE
GENERAL INDEX

ITALGROUP MOTORS
HCD SERIES
TECHNICAL CATALOGUE
GENERAL INDEX

Carefully read the use and maintenance manual before start-up the motor. The use and maintenance manual must be placed near to motor installation location in order to guarantee operators easy access to the instruction manual. For further information please contact Italgroup.

Motor description

HC series motors are radial piston hydraulic motors (generally indicated as LSHT motors, low speed high torque motors) with a rotating shaft (1) and a stationary housing (2). The pistons (3) are located radially and the working fluid provide the mechanical force that push the pistons against the eccentric shaft , providing the shaft ouput torque. The inlet and outlet flow to and from the pistons is regulated by a distributor (4), that provides the oil distribution correct timing. The HC motor design is very compact because the piston and the connecting rod are realized in the same piece, to make this realizable an oscillating cylinder is present (5). Acting in the adequate way (increasing or reducing the oil flow coming from the pump) the motor rotational speed can be increased or reduced. The motor design guarantee extremely high starting torque and high mechanical working efficiency. Respecting the limitation of working parameters (indicated into the technical datasheets) and all recommendations (including fuid recommendations), high motor lifetimes are obtained and very low maintenance requirements are needed.



HCD SERIES

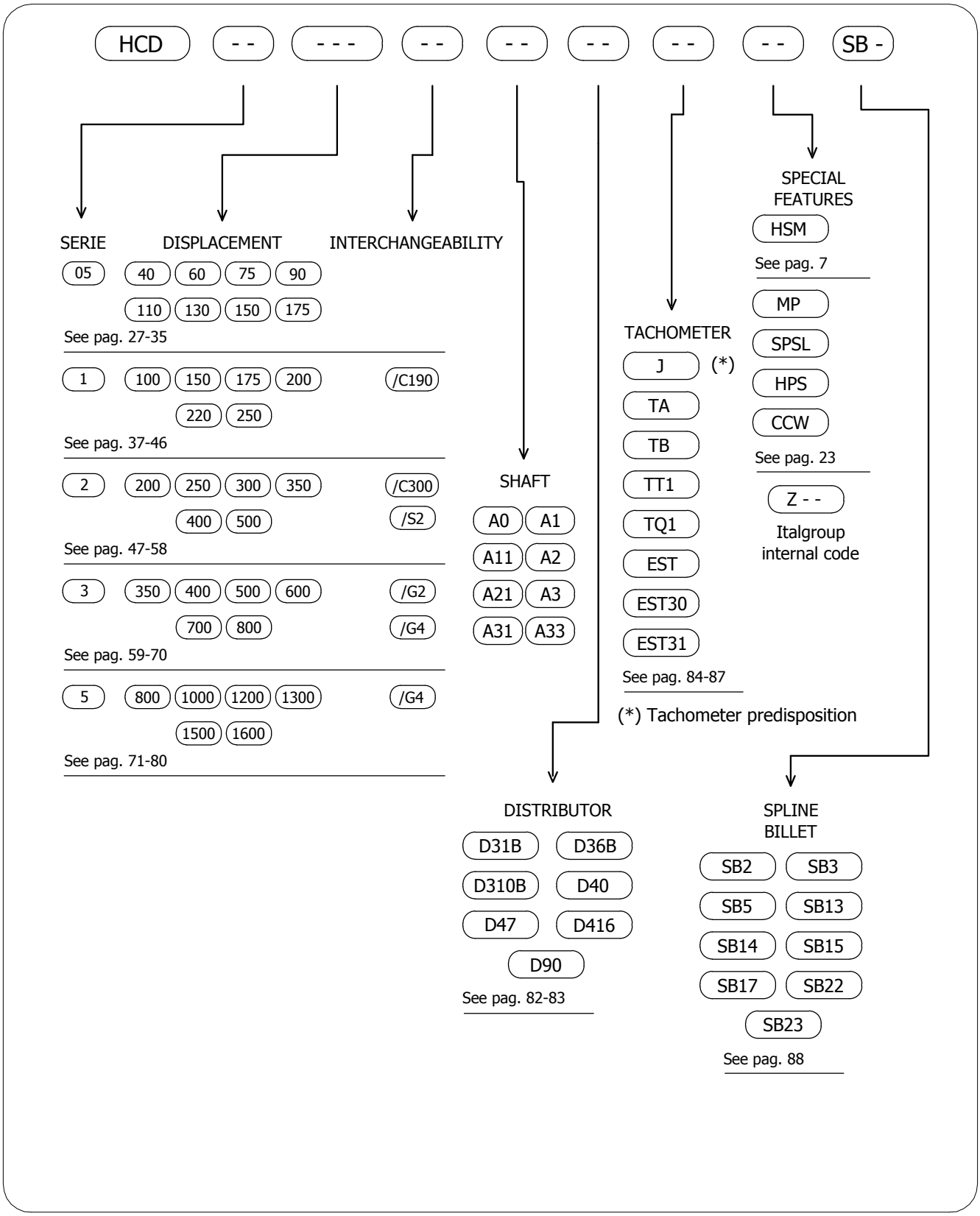
Hydraulic motors of the HCD series are single displacement crankshaft radial piston motors. Thanks to great variety of accessories HCD series can be used in a wide range of applications such as:

- Marine equipments
- Winches
- Offshore equipments
- Conveyors
- Injection moulding machines
- Steel bending machines
- Fork lifts trucks
- Skid steer loaders
- Dumpers
- Agricultural and forestry machines
- Municipal vehicles
- Airport machinery

Product Features:

- ✓ High volumetric and mechanical efficiencies
- ✓ Very smooth running at low speeds
- ✓ High starting torque / constant torque
- ✓ High freewheeling / cavitation resistance
- ✓ Wide speed range
- ✓ Compact Design
- ✓ Low maintenance and high reliability
- ✓ Bi-directional
- ✓ High radial and axial force allowed
- ✓ Speed sensor available
- ✓ Built-in valves available

HCD - ORDERING CODE



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HCD - MOTOR TECHNICAL DATA

Motor	Size	Displacement	Theoretical torque	Max cont. pressure	Max cont. speed (refer to next page for HSM version)	Peak speed (**) (refer to next page for HSM version)	Max. cont. power (*)	Peak power	Dry weight
		[cc]	[Nm/bar]	[bar]	[rpm]	[rpm]	[kW]	[kW]	[kg]
HCD05 40	05	40	0.62	300	1500	2000	26	52	30
HCD05 60	05	60	0.97	300	1400	1900	37	62	30
HCD05 75	05	74	1.20	300	1400	1900	38	62	30
HCD05 90	05	91	1.40	300	1300	1600	40	62	30
HCD05 110	05	115	1.84	300	1300	1600	40	62	30
HCD05 130	05	129	2.05	300	1300	1600	40	62	30
HCD05 150	05	151	2.40	275	1200	1500	40	62	30
HCD05 170	05	166	2.65	275	1200	1500	40	62	30
HCD1 100	1	98	1.57	300	1200	1500	52	80	35
HCD1 150	1	154	2.45	300	1100	1400	53	80	35
HCD1 175	1	173	2.74	300	1100	1400	53	80	35
HCD1 200	1	200	3.20	300	1100	1400	53	80	35
HCD1 220	1	221	3.52	275	1000	1300	53	80	35
HCD1 250	1	243	3.88	275	900	1200	53	80	35
HCD2 200	2	193	3.06	300	1250	1500	80	112	53
HCD2 250	2	251	4.00	300	1050	1200	80	112	53
HCD2 300	2	305	4.84	300	800	1150	80	112	53
HCD2 350	2	348	5.52	300	650	1150	80	112	53
HCD2 400	2	424	6.76	300	550	900	80	112	53
HCD2 500	2	493	7.84	275	550	900	80	112	53
HCD3 350	3	352	5.60	300	800	1050	102	142	92
HCD3 400	3	426	6.78	300	700	900	102	142	92
HCD3 500	3	486	7.73	300	550	850	102	142	92
HCD3 600	3	595	9.47	300	500	800	102	142	92
HCD3 700	3	689	11	275	450	800	102	142	92
HCD3 800	3	792	12.6	275	450	750	102	142	92
HCD5 800	5	837	13.3	300	580	720	150	210	190
HCD5 1000	5	1060	16.9	300	500	700	150	210	190
HCD5 1200	5	1200	19.1	300	500	650	150	210	190
HCD5 1300	5	1308	20.8	300	470	620	150	210	190
HCD5 1500	5	1462	23.3	275	470	620	150	210	190
HCD5 1600	5	1625	25.9	275	420	620	150	210	190

For all motors:
- Hydrostatic test pressure: see motor datasheets;
- Refer to motor performance diagrams for more information

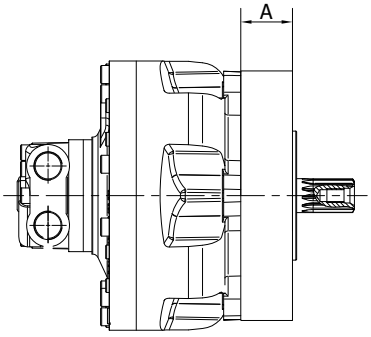
- (*) For motor operation with a continuous duty cycle at maximum continuous power the flushing is usually required. For more information please contact our technical department.
- (**) Do not exceed peak power.

HCD - MOTOR TECHNICAL DATA - HSM VERSION

Motor	Size	Displacement	Theoretical torque	Max cont. pressure	Max cont. speed	Peak speed (**)	Max. cont. power (*)	Peak power	Dry weight
		[cc]	[Nm/bar]	[bar]	[rpm]	[rpm]	[kW]	[kW]	[kg]
HCD05 40	05	40	0.62	300	1700	2200	33	45	30
HCD05 60	05	60	0.97	300	1600	2100	33	45	30
HCD05 75	05	74	1.20	300	1600	2100	40	62	30
HCD05 90	05	91	1.40	300	1500	1800	40	62	30
HCD1 100	1	98	1.57	300	1400	1700	53	80	35
HCD1 150	1	154	2.45	300	1300	1600	53	80	35
HCD1 175	1	173	2.74	300	1300	1600	53	80	35
HCD2 200	2	193	3.06	300	1400	1650	80	112	53
HCD2 250	2	251	4.00	300	1200	1350	80	112	53
HCD2 300	2	305	4.84	300	950	1300	80	112	53
HCD3 350	3	352	5.60	300	950	1200	98	142	92
HCD3 400	3	426	6.78	300	850	1050	102	142	92
HCD3 500	3	486	7.73	300	650	950	102	142	92
HCD5 800	5	837	13.3	300	700	800	150	210	190
HCD5 1000	5	1060	16.9	300	620	780	150	210	190

The HSM version is a special configuration with balanced shaft, in order to erase or reduce to very low values the motor vibration due to the motor rotation at high speeds. In this way the motor can works at higher speeds in a more efficient and less noisy way. In order to obtain the motor performance graphs for HSM version, please contact Italgroup technical department.

Motor type	Balancing flange additional thickness
HCD05	38 mm
HCD1	38 mm
HCD2	38 mm
HCD3	75 mm
HCD5	100 mm



For all motors:
- Hydrostatic test pressure: see motor datasheets;
- Refer to motor performance diagrams for more information

- (*) For motor operation with a continuous duty cycle at maximum continuous power the flushing is usually required. For more information please contact our technical department.
- (**) Do not exceed peak power.

Fluid selection

In general, we recommend the use of hydraulic oils with minimum viscosity index of 95, with anti-wear additives (ISO HM and HV). Once normal working temperature is reached, the drain oil viscosity must be at least 20 cSt, preferably in the range from 30 to 50 cSt.
HE oils (ecological fluids) are allowed, but must be used with particular attention, because them can influence the motor seals compatibility, and can reduce motor performances and life. Please contact us in case of HE oils usage.

Optimal viscosity selection

Referring the first approximated selection to the room temperature, we advice the following:

Room temperature	Oil
-20°C/0°C	BP ENERGOL HLP – HM 22
-15°C/+5°C	BP ENERGOL HLP – HM 32
-8°C/+15°C	BP ENERGOL HLP – HM 46
0°C/+22°C	BP ENERGOL HLP – HM 68
+8°C/+30°C	BP ENERGOL HLP – HM 100
-20°C/+5°C	BP BARTRAN HV 32
-15°C/+22°C	BP BARTRAN HV 46
0°C/+30°C	BP BARTRAN HV 68

ATF (automatic transmission fluid) oils, SAE 10-20-30 W oils, multigrade motor oils (SAE 15 W 40, 10 W 40), universal oils, can also be used. Always fill the motor (please refer to the "DRAIN RECOMMENDATIONS" section) with the selected hydraulic fluid before motor start-up. During cold start-up avoid high-speed operation until the system reach the working temperature, in order to provide an adequate lubrication. Every 5-8 °C of increase respect to the optimal working temperature for the selected oil, the hydraulic fluid life decrease of about 40-50% (refer to "OXIDATION" section). Consequently, the motor lifetime will be affected by the working temperature increase respect to the optimal working temperature of the selected oil. The maximum continuous working temperature is 70 °C, the temperature must be measured from motor drain line. If the motor doesn't have a drain line, the temperature must be evaluated at the return line port.

Fire resistant oil limitations

	Max cont. Pressure [bar]	Max int. Pressure [bar]	Max Speed [rpm]
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.

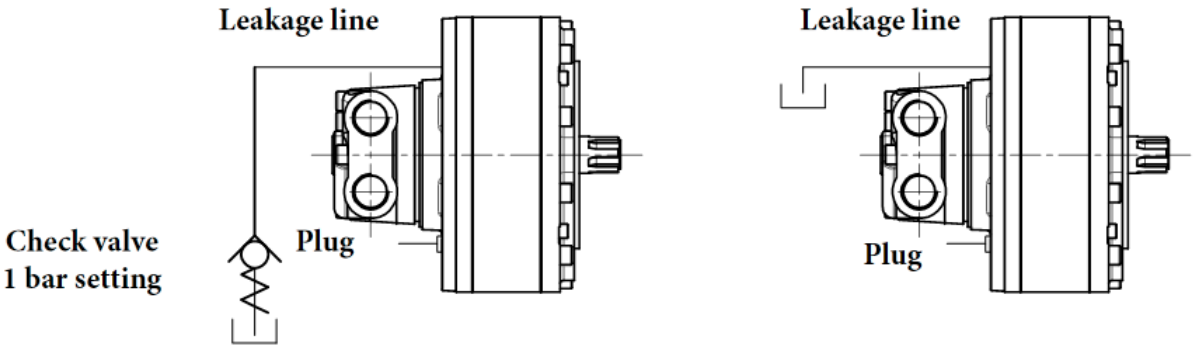
Degree of contamination

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

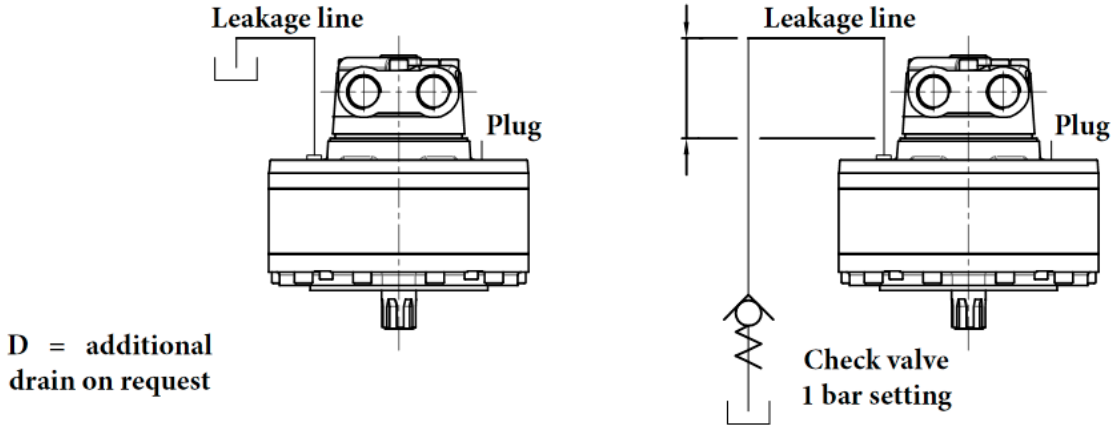
Analysis

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.

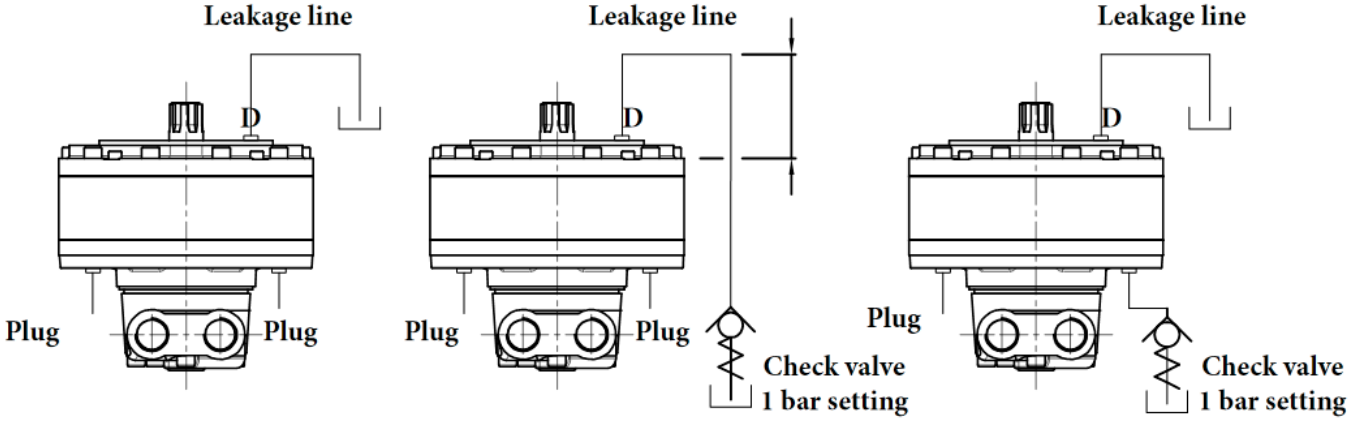
Motor axis horizontal



Motor axis vertical, shaft down



Motor axis vertical, shaft up



Leakage line connection

Always fill the motor with hydraulic fluid before start-up. Arrange piping in a way that the motor cannot drain off and cannot generates air bubbles into the motor case. Under certain conditions may be is necessary to arrange a check valve in order to help avoiding the motor drain off. Always check carefully that the leakage line pressure doesn't overcome 10 bar pressure: therefore leakage lines must be shorter as possible and with a minimum flow resistance.

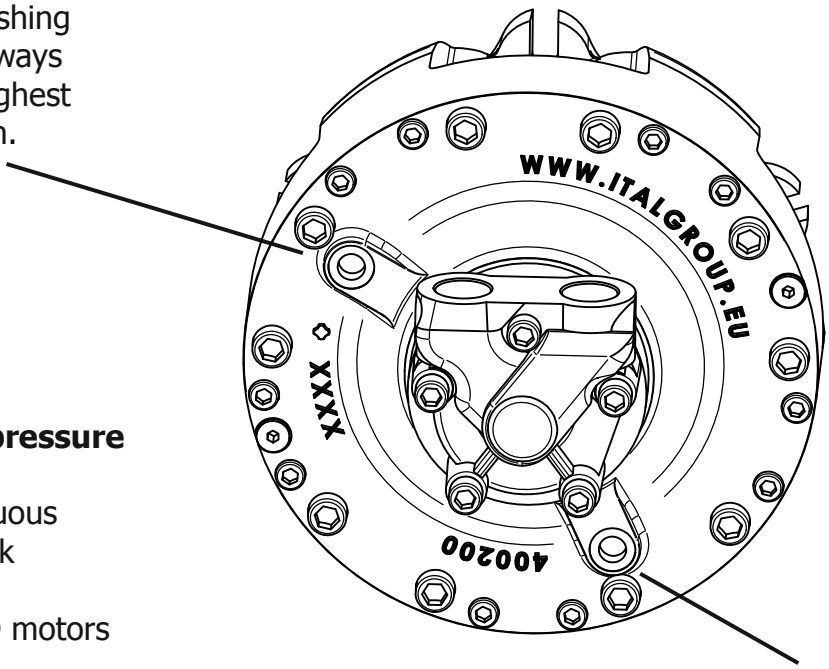
Motor	Flushing flow [l/min]
HCD05 40-60-75-90-110-130 HCD1 100	5
HCD05 150-175 HCD1 150-175-200-220-250 HCD2 200-250-300	6
HCD2 350-400-500 HCD3 350-400-500-600	8
HCD3 700-800 HCD5 800-1000-1200-1300-1500	10
HCD5 1600	15

Important note: the above value are approximated. The correct way to operate is the following: the flushing flow is adequate if during the motor operation the drain oil viscosity be at least 20 cSt, preferably in the range from 30 to 50 cSt.

Maximum continuous case pressure 10 bar (15 bar peak pressure). Special seals for 20 bar continuous case pressure (25 bar peak pressure) are available upon request (refer to page 23, ordering code: HPS).

Flushing outlet port

Please note: the flushing outlet port must always be located in the highest possible position.



Maximum case pressure

10 bar continuous
15 bar peak

For standard HCD motors

Flushing inlet port

STANDARD SHAFT SEAL FEATURES

Features	Type: BABSL Form: AS DIN 3760 Material: SIMRIT® 72 NBR 902 SIMRIT® 75 FKM 595
Material	SIMMERRING® radial shaft seal with rubber covered O.D., short, flexibility suspensed, spring loaded sealing lip and additional dust lip: see Part B/SIMMERRING®, sections 1.1 and 2.
Application	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
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 on next page, pressure is function of surface speed (i.e. of rotating speed and shaft diameter)

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

Pressure diagram

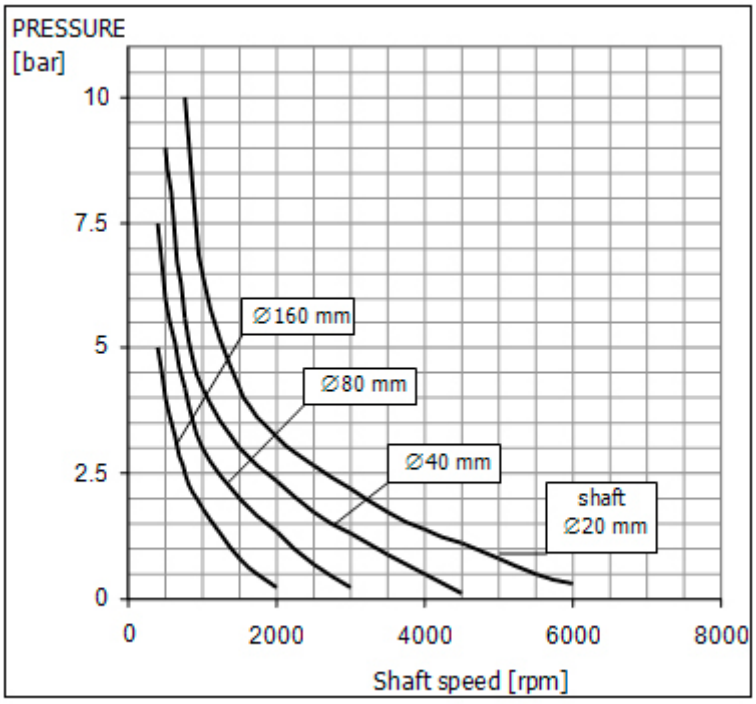


Diagram 1: Pressure Loading Limits

Special seals for 20 bar continuous case pressure are available upon request (ordering code: HPS). Refer to page 23 for more information.

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FORMULAS

LEGEND	
T	Torque [Nm]
T_S	Specific torque [Nm/bar]
P_1	Power [kW]
P_2	Power [CV]
S	Speed [rpm]
V	Displacement [cc/Rev]
F	Flow [l/min]
P_r	Pressure [bar]

FORMULA
$T = T_S * P_r = (V * P_r) / 62.8$
$P_1 = (T * S) / 9549$
$P_2 = (T * S) / 7023$
$S = (F * 1000) / V$
$V = (T * 62.8) / P_r$
$F = (V * S) / 1000$

LENGHT	1 m	= 39,3701 in
		= 3,2808 ft
		= 1,0936 yd
		= 1000 mm
	1 in	= 0,0833 ft
		= 25,4 mm
	1 ft	= 0,3048 m
		= 0,3333 yd
		= 12 in
	1 yd	= 0,9144 m
		= 3 ft
		= 36 in
	1 km	= 1000 m
		= 1093,6 yd
		= 0,6214 mile
	1 mile	= 1,609 km
		= 1760 yd
SPEED	1 m/s	= 3,6 km/h
		= 2,237 mph
		= 3,2808 ft/s
	1 km/h	= 0,2778 m/s
		= 0,6214 mph
		= 0,9113 ft/s
	1 mph	= 1,609 km/h
		= 0,447 m/s
		= 1,467 ft/s
	1 ft/s	= 0,3048 m/s
		= 1,0973 km/h
		= 0,6818 mph

MASS	1 kg	= 2,2046 lb
FORCE	1 N	= 0,102 kgf
		= 0,2248 lbf
	1 kgf	= 2,205 lbf
		= 9,806 N
	1 lbf	= 0,4536 kgf
		= 4,448 N
PRESSURE	1 bar	= 14,223 psi
		= 0,99 atm
		= 1,02 ata
		= 100000 Pa
		= 100 kPa
		= 0,1 MPa
	1 psi	= 0,0703 bar
FLOW	1 l/min	= 0,264 gpm
		= 1000 cc/Rev
	1 gpm	= 3,785 l/min
		= 3785 cc/min
	1 m^3/s	= 60000 l/min
		= 15852 gpm

POWER	1 kW	= 1,341 HP
		= 1,3596 CV
	1 HP	= 0,7457 kW
		= 1,0139 CV
VOLUME	1 m^3	= 1000 l
	1 l	= 61,023 in^3
		= 0,264 galUS
	1 in^3	= 0,01639 l
		= 16,39 cm^3
		= 0,004326 galUS
	1 galUS	= 3,7879 l
		=231,15 in^3
TORQUE	1 Nm	= 0,102 kgm
		= 0,7376 lbf ft
	1 kgm	= 9,806 Nm
		= 7,2325 lbf ft
	1 lbf ft	= 0,1383 kgm
		= 1,3558 Nm

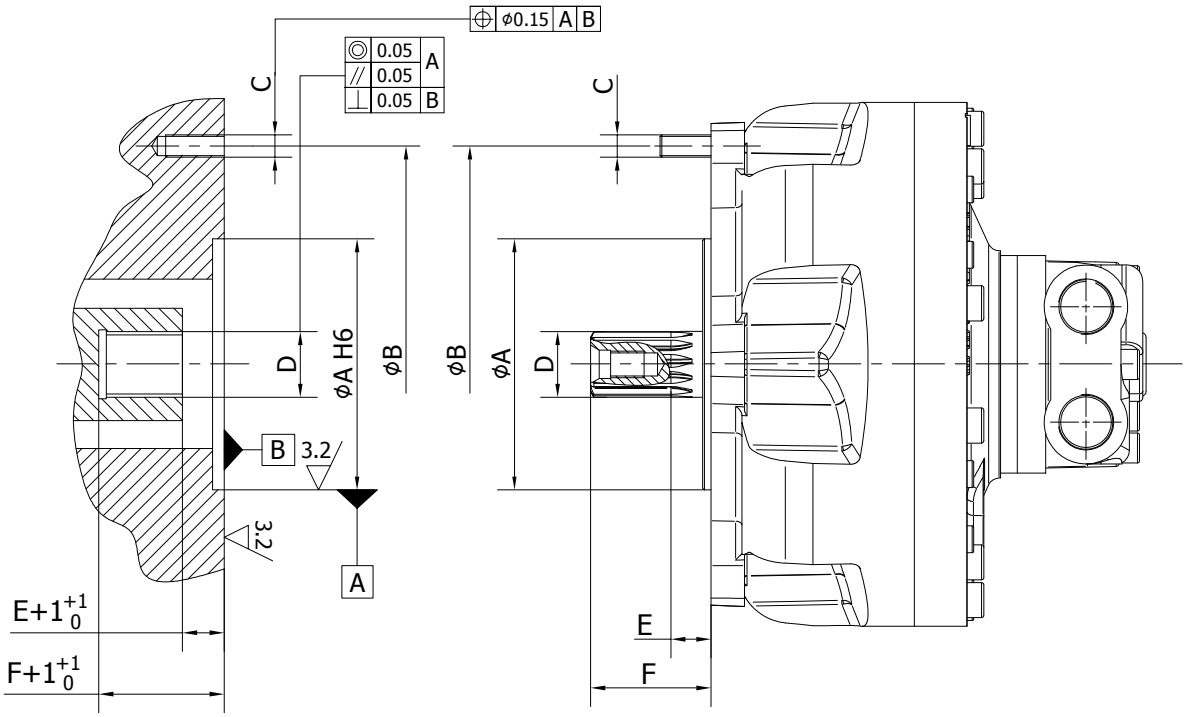
Motor installation and start-up

The motor, after testing, it's packed in different ways that depends by customer and/or logistic requirements. The motor must be carefully moved from his box or pallet, with the assistance of correctly sized movimentation tools, like eyebolts (all the motors has a thread hole in the shaft end, please refer to the HCD general catalogue, shafts section) or lifting slings.

When the motor is moved from one place to another always be very careful and act in a way that the motor is stable and under control during movimentation (refer to handling and storage section for more details).

Before mount the motor, check carefully the absence of damage happened for example during transportation and/or storing.

For mounting dimensions please refer to the HCD installation drawings. The motor must be installed using the correct screws size (we recommends the use of 10.9 and 12.9 class resistance fixing screws) and must be placed on a structure that is capable to correctly support the motor during functioning: for this reason the structure must not only be able to support the motor weight but must also assure the absence of vibration during operation and must win the reaction forces that are generated by the working torque. Regarding the motor fitting design, the concentricity between the centering diameter (spigot) and shaft (both splined or parallel) must be assured with a strict tolerance (please refer to the following general indication). If the concentricity between the shaft and the centering diameter and/or fixing holes is not respected, in the worst case the motor can have an unusual failure or can work only with low performances. Splined adaptors (splined billets) are available upon request.



Hoses and piping must be clean and free from contamination. Use proper hoses for oil connection, both for inlet and outlet main ports, and for drain line. Refer to hoses and fitting constructors in order to correctly size and select hoses and fittings. In order to keep control on the oil compressibility keep hoses to the minimum recommended size and select pipelines most rigid as possible.

The motor can be mounted in any position (refer also to drain recommendations section). In run-away conditions you must use counterbalance valves. 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.
Consider the use of relief valves, possibly directly mounted on motor distributor in case the application can generates pressure peaks at the motor ports: the relief valve should be able to discharge all the flow (or at least a good part of it) with a limited pressure increase. Italgroup can provide differents valve types that can be placed directly on the motor distributor (please refer to Italgroup valves technical catalogue section).

Motor case and pistons must be completely filled with oil before starting. Do not load motor to maximum working pressure instantly. During cold start-up avoid high-speed operation until the system reach the working temperature. Connect the case drain directly to tank, and avoid excessive drain line pressure losses (the case drain pressure must not exceed 10 bar continuous pressure for HCD serie standard motors). 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. (See drain recommendations page for more details)

Maximum oil temperature must not exceed 70°C. Heath exchangers must be used with higher temperatures. The operating fluid viscosity must always be higher than a certain minimum value (see "fluid recommendation" section) in order to guarantee an optimal motor internal lubrication. When the working conditions cause the motor case overheating above a critical value, the motor flushing is required. Flushing consists in the introduction of fresh oil (taken from the hydraulic circuit) into the motor case. Oil must be taken from the return line to avoid internal motor damage (the continuous motor case pressure must be maximum 6 bar). Flushing is an important operation that can be very effective to improve motor lifetime with heavy duty working conditions and improve the motor mechanical efficiency.
The motor flushing, if the motor works in one direction only, can be easily performed connecting the motor return line to the lowest motor drain port. The highest motor drain port must be connected to the tank. For D90 flow distributors, the side 1/4" metallic plugs can be used for flushing circuit installation: infact the plug (corresponding to the return line port) be removed and the connection between motor low pressure port and motor case can be correctly realized.

If the motor axis is not horizontal and/or the motor works in bidirectional operation, please contact Italgroup technical department, that can assist you to advice how to perform the desired operation in the best way. Just for your reference, Italgroup can provide you flushing valves in order to perform an effective flushing circuit.

Minimum speed is very low and can reach values near to 0.5-1 rpm (depending on motor displacement). In case of low speed vibration a reasonable back pressure can eliminate or minimize the vibration and noise level (a general guideline value can be defined by 5-8 bar back pressure). For more information please contact our technical department.

HC series motors can works in an effcient way with high back pressures (back pressure occurs for example when hydraulic motors are installed in series circuit). A general guideline for back pressure can be set limitating the inlet and outlet pressure sum to 400 bar. High back pressure values are often responsible of motor overheating, so if drain temperature reach values that bring the oil viscosity under the recommended limit (refer to fluid recommendations section), perform appropriate motor flushing and/or reduce the back pressure.

During start-up and in the period immediately after it, any hydraulic installation must be regurarly and carefully checked at frequent intervals. The working pressure must be checked in order to understand that it agrees with the design values. The drain line pressure for standard motors must not overcome 6 bar continuous. If leakage occurs, check the reason, correct it and carry out new measurements. Check all lines, connections, screws, etc, and tighten if necessary. Replace contaminated fluid immediately.

The motor installation and start-up must be performed by instructed and experienced personnel only.

Please contact us freely to obtain further information.

Motor handling

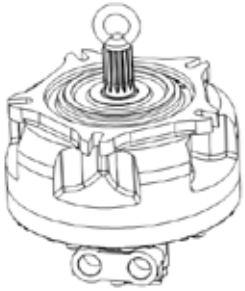
The motor must be correctly packed during transport and correctly stored into the warehouse in order to avoid eventual damages that can make the motor functioning not adequate.

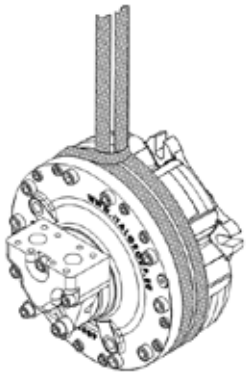
During handling operations, make sure that the motor shaft and tachometer shaft (if present) don't receive any hit, in order to avoid motor damage.

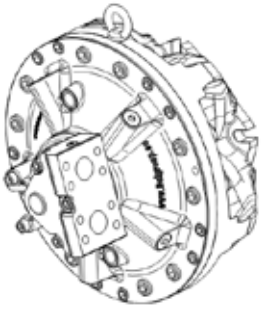
During all operations of lifting and handling, never movimentate motors by hand but use adequate tools. In order to avoid that motor can falls, creating danger for authorized working persons in the nearings, use one of following methods:

- use lifting slings of adequate capacity;
- use adequate eyebolt using the thread hole in the shaft end;
- HC2, HC3 and HC5 can be lifted and handled using an eyebolt located on the motor external diameter.

Refer to the following pictures.

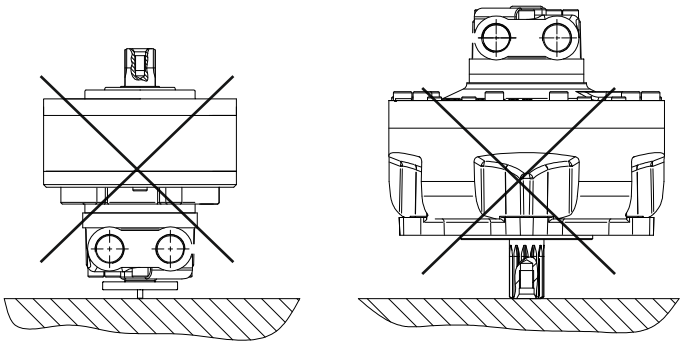






Motor storing

Storing must be carefully made using adequate storing tools (for example boxes, pallets, etc...) that can guarantee that the motor is stable and cannot move without control, in order to avoid damage problems. Make sure that the weight of the motor doesn't be substained by the motor shaft or by the tachometer shaft (if present).



HCD series motors are supplied together with plastic plugs, that keep the hydraulic oil (that was used during final test in Italgroup testing workbench) inside the motor. A thin oil film is present on the internal motor parts, whereas the external parts are covered with antirust oil that prevents damage from oxidation and corrosion.

Therefore the motors can be safely stored into the customer warehouse without performance losses for long periods (up to 4-6 months).
The storing location must has some important characteristics:
- room temperature comprised between -15°C and +55°C without fast and/or excessives temperature excursions;
- low relative humidity;
- absence of aggressive and corrosive medias in the motor nearings.

In particular, if motor should be motionless for more than 4-6 months, it must be protected against internal rust. Proceed as follows:
- fill the motor case with hydraulic oil. After that the motor case is full of oil, close it with a screw plug;
- fill the motor also from inlet or outlet port. Turn the shaft by hand (the shaft must make about one revolution) and finally close the inlet and outlet ports.

Please note that the plastic plugs are necessary not only to keep the hydraulic oil inside the motor, but even to avoid that dirt and other fluids (like water for example) can enter into the motor and create damage during storing or during motor start-up. Therefore make sure all drain ports, supply ports and discharge ports are closed during motor handling and storing. If plugs are missing, use plastic plugs or adequate systems in order to guarantee that the motor is well protected by dirt and other fluids.

Maintenance operations

All the assembly and maintenance works must be performed when the motor is stopped and not connected to any power source, in order to avoid an accidental start-up. In addition the pressure inside the motor must be set to zero (the motor must be depressurized) before to perform maintenance operations.
The motor maintenance must be performed by instructed and experienced personnel only, following carefully Italgroup advices and procedures.

HCD series motors are internally lubricated by the operating fluid, if the motors are used according to the technical data reported into the HCD catalogue, they need very limited maintenance operations. In order to achieve good performances, long bearings lifetime and safe working, the working fluid must be carefully selected in function of the operating parameters (a fundamental parameter is the ambient temperature range). In case of fire resistence fluid usage , some limitation on pressure and speed can be required. Refer to hydraulic fluid recommendations section for more information. If required please contact Italgroup technical department for further information.

Motor parts	Material
Motor shaft, cylinders, rollers, pins, screws, distributor bush, rotating distributor, distributor joint, pistons, ring for rod.	Steel
Motor case, motor flange, distributor body	Cast iron
Distributor disk	Bronze
Slippers	Charged PTFE, PTFE
O-Rings	Elastomer
Radial shaft seal rings	Elastomer

Bearings

The bearing life depends by different factors, like bearing type, motor speed, working pressure, external loads, duty cycle, fluid viscosity, oil cleanliness, type and temperature.

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.

Please refer to bearing lifetime diagrams reported in the following pages to obtain the theoretical bearing lifetime. **The lifetimes diagrams shown the L_{50}, median or average lifetime, that can be considered as 5 times L_{10}.**

Please note that the theoretical lifetime can be different from the real lifetime, especially in case of heavy duty applications with continuous work cycle. Please contact Italgroup S.r.l. for more information.

Motor creep speed

The hydraulic motor is able to hold the load acting as a brake (if proper valves or circuit are considered and installed), but a certain creep speed is always present: this is typical of all brands hydraulic motors.

The motor creep speed depends by many factors, like operating conditions (motor displacement and type, pressure load on the shaft, oil viscosity, type and temperature) and are represented in the creep speed diagrams (see performance diagrams for each motor size). **The creep speed diagrams are shown for an hydraulic oil at reference conditions of 40 cSt.**

If creep speed is higher than desired value a negative brake can be considered: Italgroup can supply negative brakes that can be fitted to the hydraulic motor. Please contact Italgroup S.r.l. for more information.

Special features

Marine painting

If needed, special painting or primers are available in order to guarantee optimal protection against normal corrosion and marine environment corrosion. The ordering code is MP. Please contact Italgroup S.r.l. for more information.

Speedy-sleeve

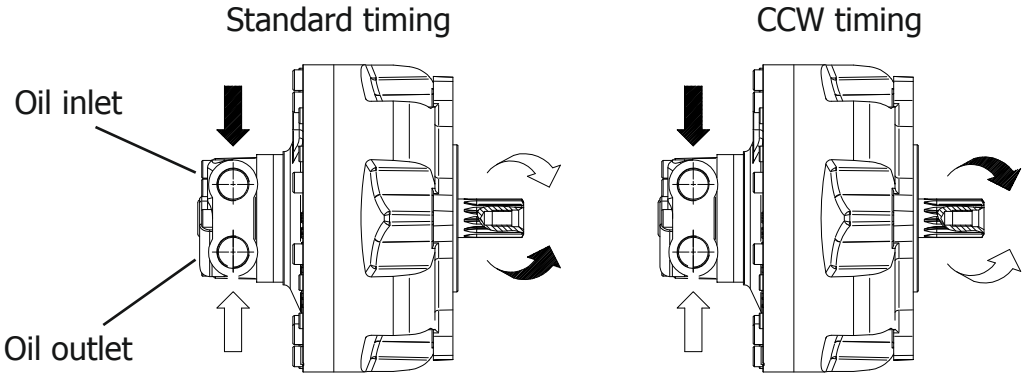
A special inox sleeve is available upon request. In case the motor is used in aggressive medias or environments, this can be very useful in order to protect the motor shaft surface located in proximity of the motor shaft seal. This improves the shaft and seal endurance respect to wear and corrosion. The ordering code is SPSL. Please contact Italgroup S.r.l. for more information.

High pressure shaft seal

Standard HCD motors are supplied with high pressure shaft seals, the continuous drain pressure must be maximum 10 bar, whereas the peak drain pressure must be maximum 15 bar. In case the drain line can or must has a higher pressure, special shaft seals are available upon request. The ordering code is HPS. The drain pressure with HPS shaft seal can reach 20 bar continuous pressure and 25 bar peak pressure. The HPS shaft seal is bi-directional also, so it can be used for example in underwater applications. Please contact Italgroup S.r.l. for more information.

Counterclockwise rotation

Standard HCD motors are supplied with clockwise distributor timing. Please refer to the installation drawings of each section for more information. With ordering code CCW the motor is supplied with counterclockwise rotation timing. Contact Italgroup for more information.

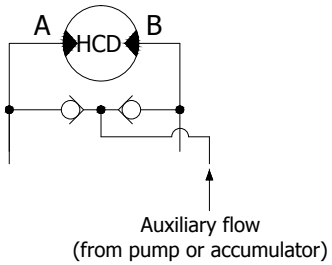


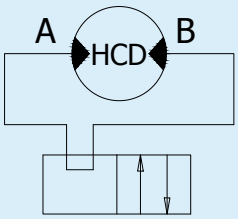
Cavitation and freewheeling

In hydraulic special applications like for example drilling machines, mobile applications, cavitation may be present. Infact when the motor is forced to run at a certain speed that requires an oil flow that is not disposable from the pump, in a transitory or continuous situation, the oil pressure inside the motor pistons decrease and can cause many problems like tractive forces on connecting rods retaining rings, metallic erosion (due to the air/vapour bubbles that develop when the piston pressure is very low and explodes when pressure rise above the equilibrium vapour pressure) and overheating.
It's always better to avoid motor cavitation or at least reduce it during operation (installing for example proper valves and using well designed circuits) but when this event cannot be avoided HCD series motors are a very good solution in order to guarantee the correct motor operation in a safe and efficient way. It's always good to take into consideration circuit modifications in order to avoid cavitation, mainly because the other components that are present in the circuit can be more sensible to the problem than the HCD motor, therefore the HCD can have an efficiency loss not due to the motor characteristics but to a bad cavitation resistance of the other ciruit components.

Pressurization circuit

Please notice that using an auxiliary pump or a proper designed oil accumulator, in many cases (through the low pressure pipe pressurization) cavitation can be avoided or in all cases much reduced.



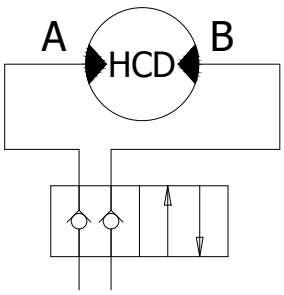


Low speed freewheeling circuit

When the freewheeling requested speed is not high, the circuit shown on the left can be used. The speed for example can be controlled through a variable throttle valve. The main problem is that especially when throttle is acting, oil temperature can reach critical values.

High speed freewheeling circuit

Realizing the freewheeling in this particular way the motor operates without oil into the pistons, so the energy consumption is always the same and independent by the motor speed. In addition this energy loss is very low. This is the most suitable circuit for high speed freewheeling operation.

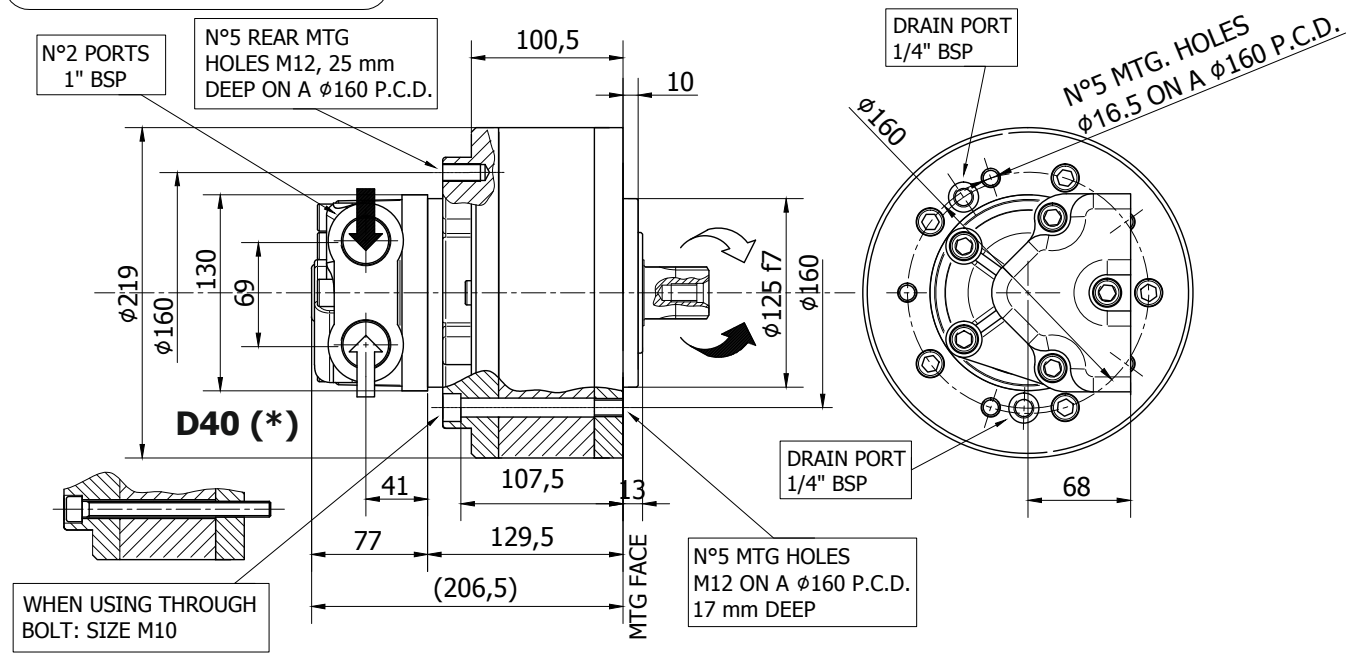


Problem	Possible cause	Solution
Excessive noises	Cavitation	Adopt an anti-cavitation system
	Mechanical vibrations	Check and fix damaged components
	Irregular pressure or flow	Check other components (pump, valves, accumulators) and check drain flow
	Air bubbles in the circuit	Bleed circuit
Unit overheating	Overflow	Check max allowed flow
	Overpressure	Check relief valve pressure setting
	Oil viscosity too low	Choose the appropriate oil according to the temperature
	Undersized cooling system	Improve cooling system
	Working without oil in the case	Overhaul the unit, fill with oil before start-up
Anomalous drainage flow	Worn motor internal components	Overhaul the motor
	Motor internal seals worn	Overhaul the motor
	Excessive pressure in the motor case	Check drain port size, pressure and flow, check piping connections
Insufficient torque	Pressure relief valve set incorrectly	Check relief valve pressure setting
	Undersized motor displacement	Replace with bigger displ. motor
	Pump not able to reach the design pressure	Check pump integrity
Insufficient speed	Oversized motor displacement	Replace with smaller displ. motor
	Pump not able to reach the design flow	Check pump integrity
	Undersized pump	Improve pump output flow
	Excessive drain flow	Overhaul the motor
Output shaft cannot rotate	Seized motor flow distributor	Overhaul the flow distributor
	Motor internal seizure	Overhaul the motor
	Motor internal seals worn	Check drain flow, overhaul the motor
	Air in the circuit	Bleed the circuit

Problem	Possible cause	Solution
Oil leakage	Worn seals	Replace seals
	Excessive pressure in the motor case	Check drain port size, pressure and flow, check piping connections
	Burst motor shaft seal	Check drain port size, pressure and flow, check piping connections
Incorrecte sense of rotation	Pipes incorrectly connected	Check pipe connections
	Incorrect rotating distributor timing	Change rotating distributor timing

ITALGROUP SRL
HCD SERIES - HCD05
GENERAL CATALOGUE
INDEX - HCD05

INSTALLATION DRAWING



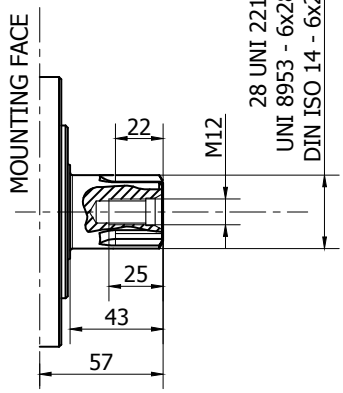
TECHNICAL DATA

		40	60	75	90	110	130	150	175
DISPLACEMENT	[cc]	40	60	74	91	115	129	151	166
SPECIFIC TORQUE	[Nm/bar]	0,62	0,97	1,20	1,40	1,84	2,05	2,40	2,65
MAX. CONT. PRESSURE	[bar]	300	300	300	300	300	300	275	275
HYDROSTATIC TEST PRESSURE	[bar]	450	450	450	450	450	450	420	420
MAX. CONT. SPEED	[rpm]	1500	1400	1400	1300	1300	1300	1200	1200
PEAK SPEED (***)	[rpm]	2000	1900	1900	1600	1600	1600	1500	1500
MAX. CONT. POWER (****)	[kW]	26	37	40	40	40	40	40	40
PEAK POWER	[kW]	52	62	62	62	62	62	62	62
MAX. CASE PRESSURE	[bar]	10	10	10	10	10	10	10	10
DRY WEIGHT	[kg]	30	30	30	30	30	30	30	30
TEMPERATURE RANGE (**)	[°C]	-30÷70	-30÷70	-30÷70	-30÷70	-30÷70	-30÷70	-30÷70	-30÷70

- (*) The standard distributor (D40) is shown. Please refer to distributors section (pag. 82-83) for differents distributor interfaces.
- (**) Please refer to the hydraulic fluid recommendations (pag. 8-9).
- (***) Do not exceed maximum continuous power with flushing (pag. 11).
- (****) For motor operation with a continuous duty cycle at maximum continuous power the flushing is usually required. For more information please contact our technical department.

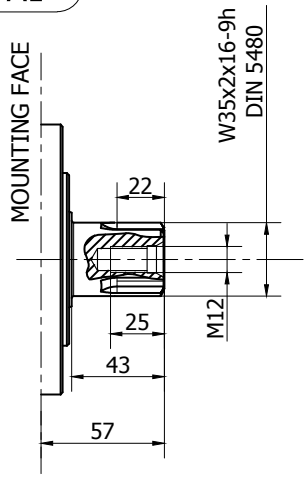
SHAFT CONFIGURATIONS

A0



Available spline billet: SB14

A1



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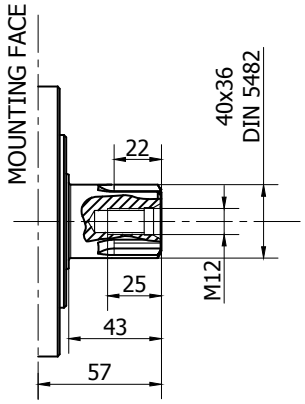

Available spline billet: SB13

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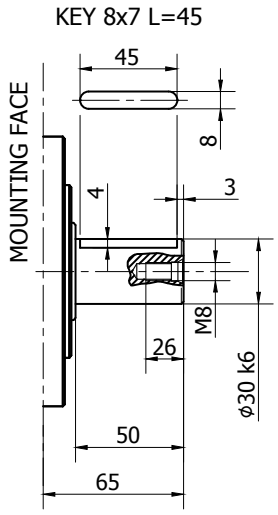

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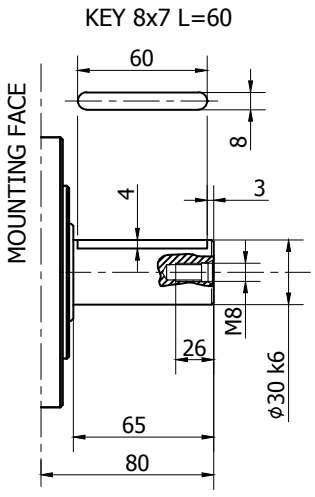

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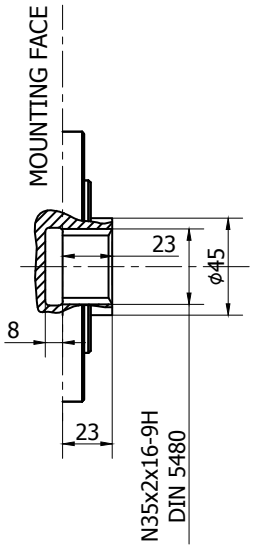

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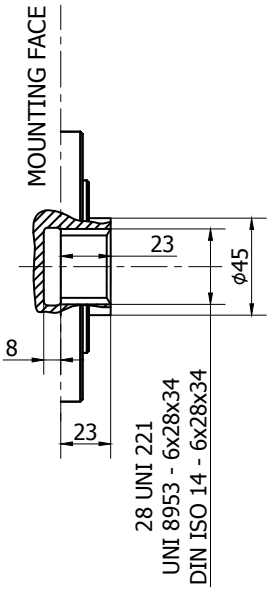
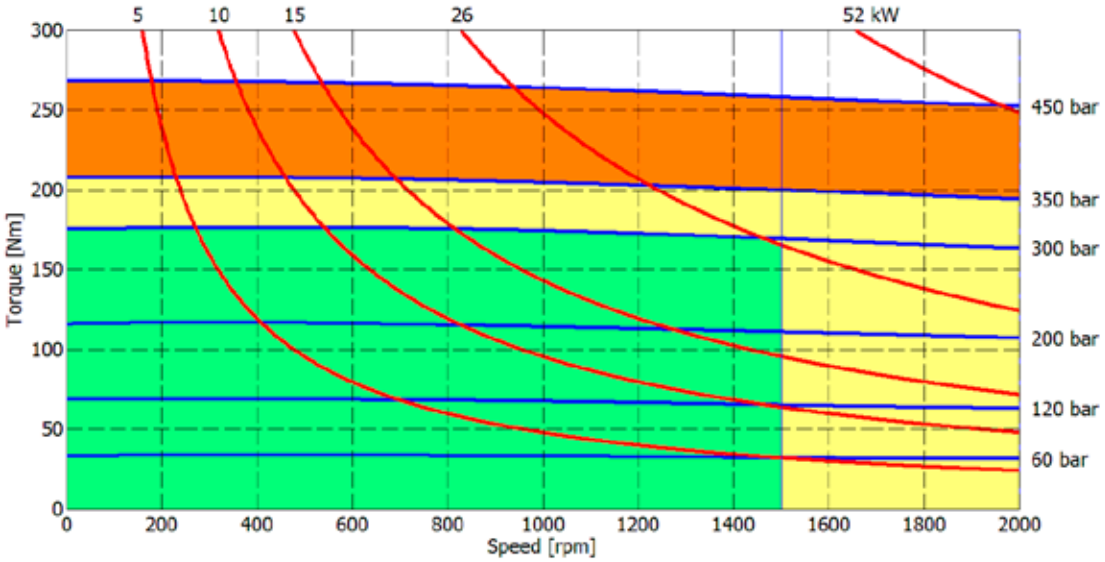
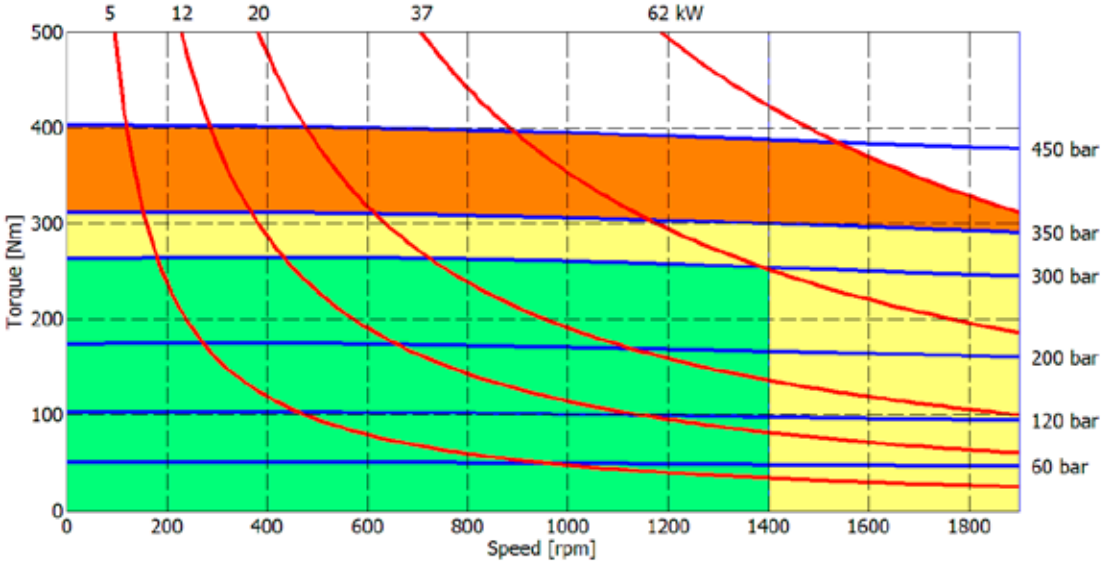


40 cc



60 cc



Continuous operation

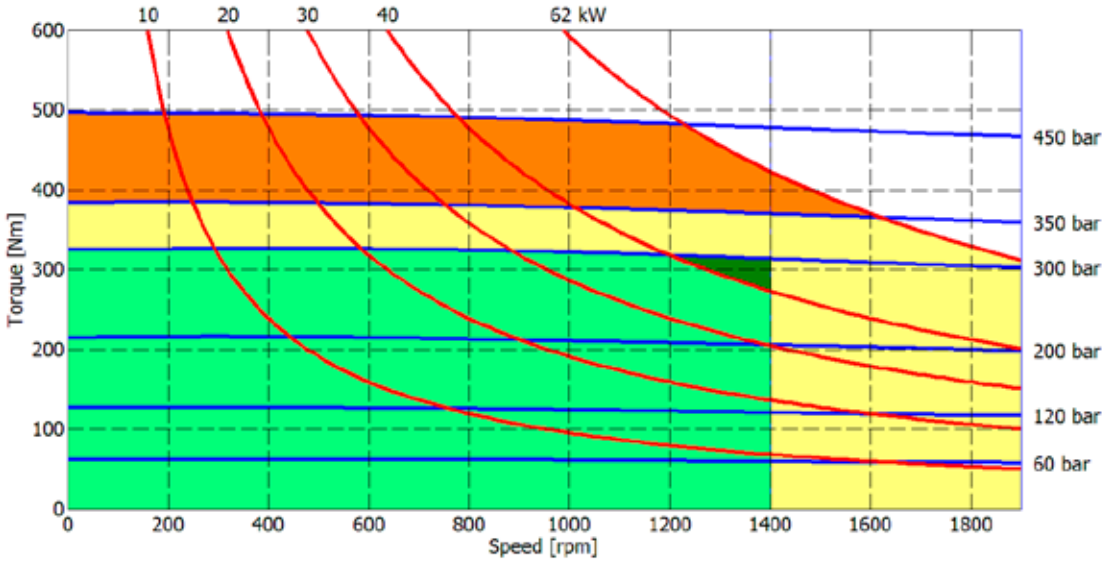
Continuous operation with flushing or intermittent operation (see below for intermittent operation)

Intermittent operation: permitted for a 15% of duty cycle, for 3 minutes maximum period

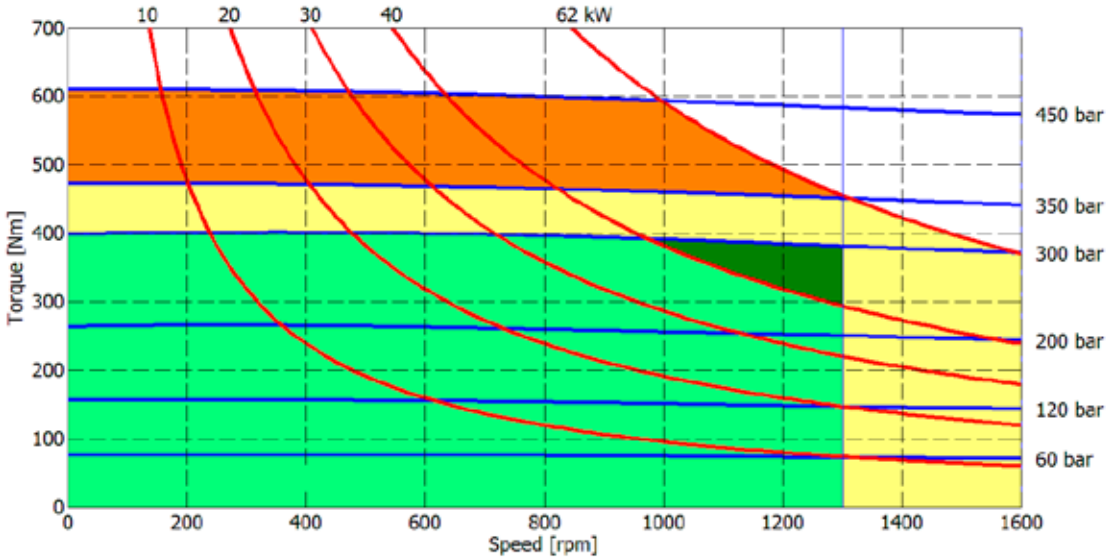
Peak operation: permitted for very short periods (3-5 seconds every 10-15 minutes)

The above diagrams are referring to the hydraulic motor working with a fluid in ideal conditions (viscosity at 40 cSt). In case the working temperature increases and viscosity reach values under the recommended values (see hydraulic fluid recommendations) flushing must be performed or ISO oil grade must be changed. The working temperature must not overcome 70 °C.

75 cc



90 cc



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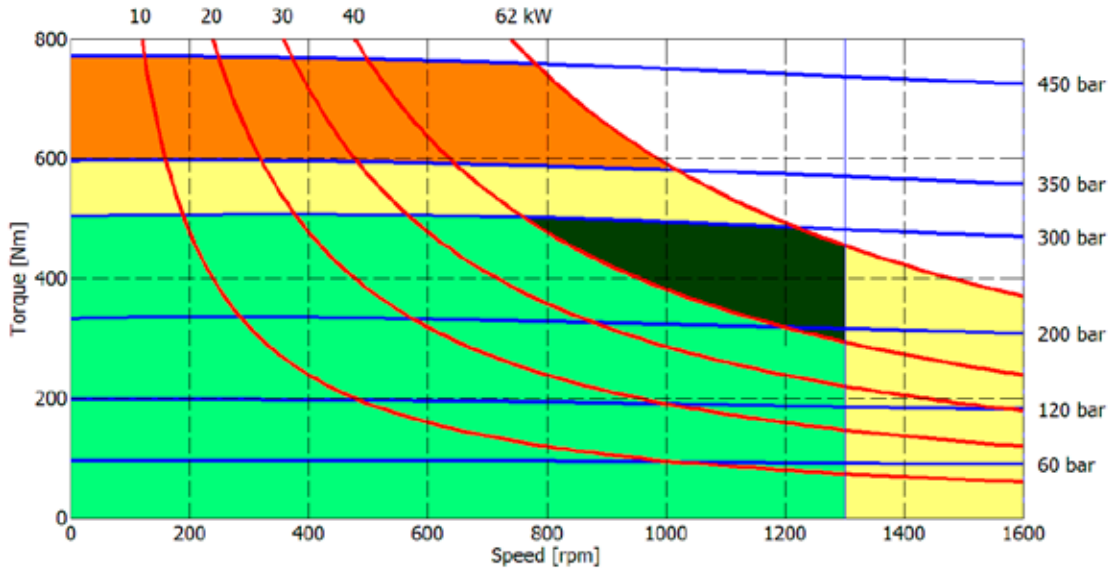
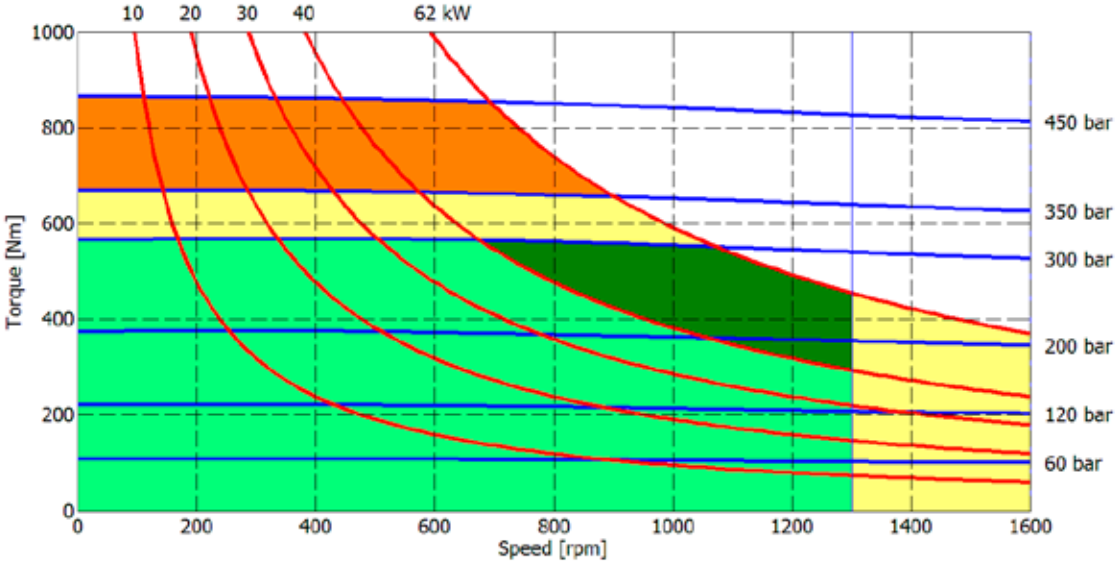
110 cc



130 cc



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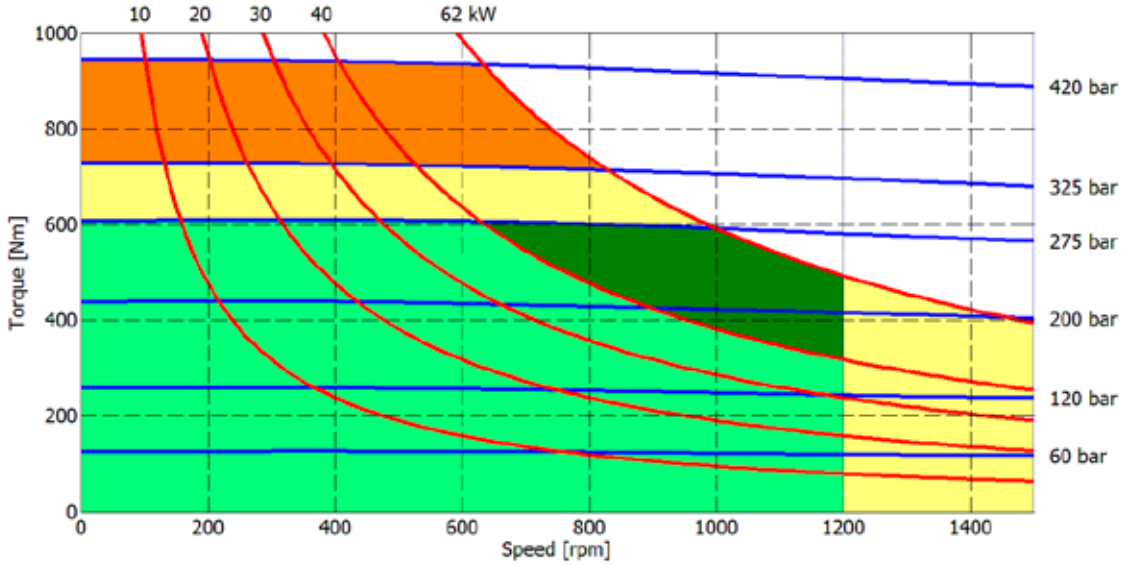
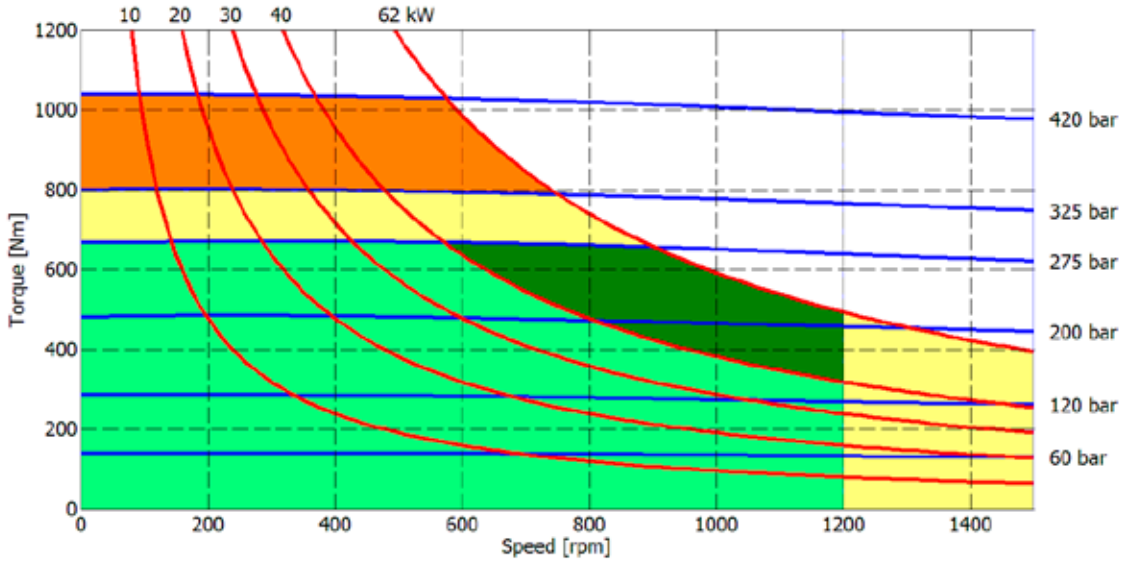
150 cc



175 cc



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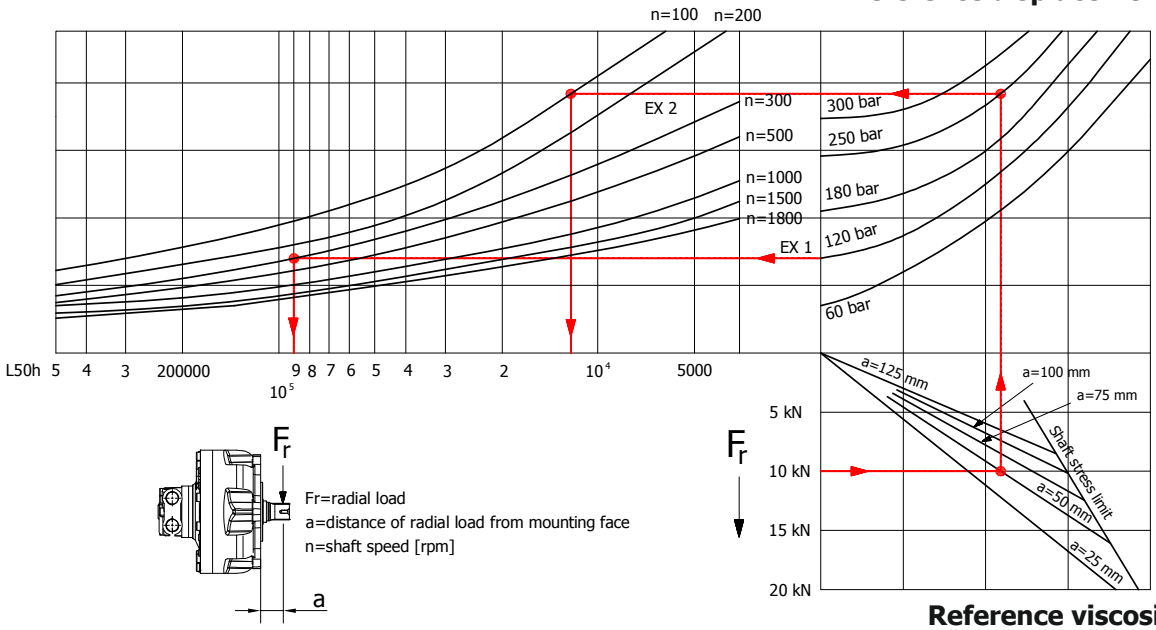
BEARING LIFE

Reference displacement 110 cc



Reference viscosity: 40 cSt

Example:
We suppose (EX1): p=120 [bar], n=300 [rpm]; we obtain an average lifetime of 90000 [h].
If we suppose (EX2): F_r=10 [kN], a=50 [mm], n=100 [rpm] and p=250 [bar] we obtain an average lifetime of 11000 [h].

Italgroup® HYDRAULIC MOTORS ITALY

HCD | 05 | - - - | - - | - - | - - | - - | SB -

DISPLACEMENT

40 | 60 | 75 | 90 | 110 | 130 | 150 | 175

SHAFT

A0 | A1 | A11 | A2 | A21 | A3 | A31

TACHOMETER

J (*) | TA | TB | TT1 | TQ1 | EST | EST30 | EST31

See pag. 84-87

(*) Tachometer predisposition

SPECIAL FEATURES

HSM

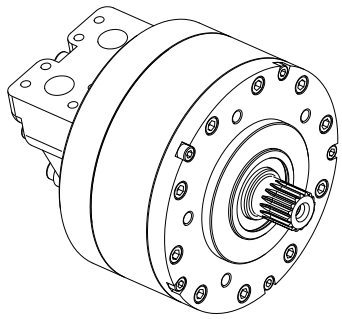
See pag. 7

MP | SPSL | HPS | CCW

See pag. 23

Z - -

Italgroup internal code



DISTRIBUTOR

D31B | D36B | D310B | D40 | D47 | D416

See pag. 82-83

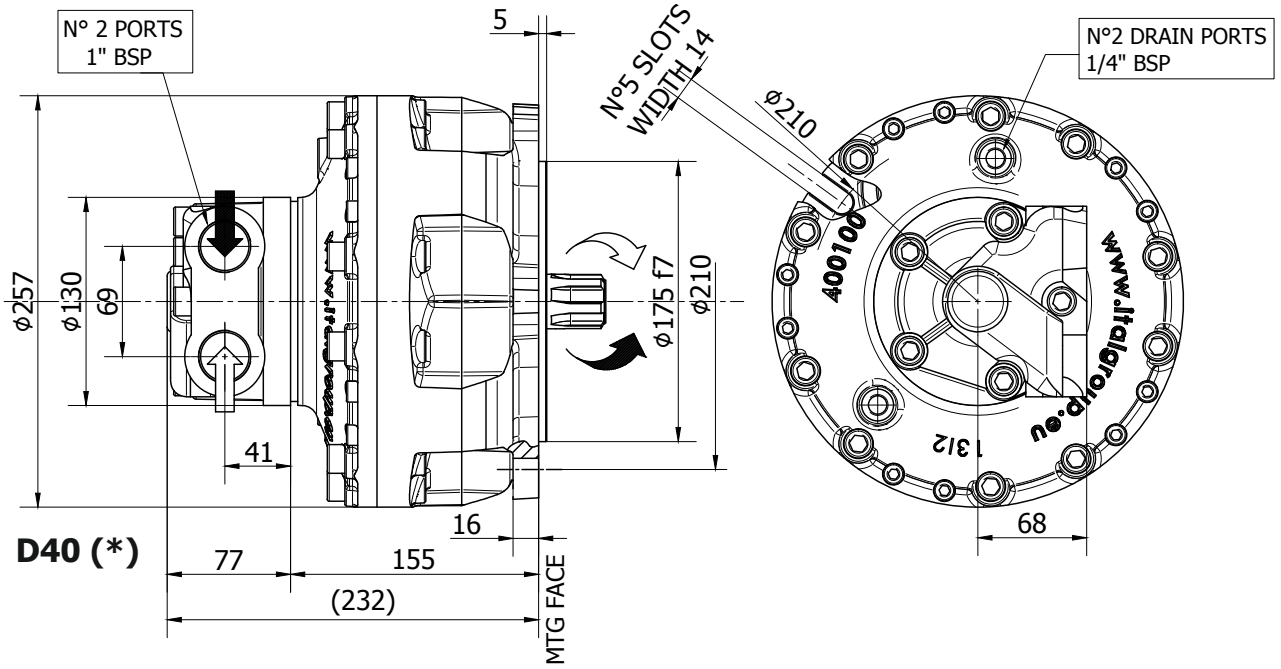
SPLINE BILLET

SB13 | SB14

See pag. 88

ITALGROUP SRL
HCD SERIES - HCD1
GENERAL CATALOGUE
INDEX - HCD1

INSTALLATION DRAWING



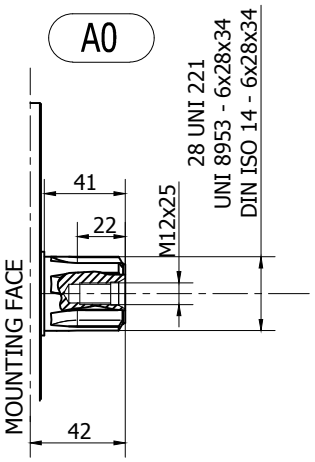
TECHNICAL DATA

		100	150	175	200	220	250
DISPLACEMENT	[cc]	98	154	173	200	221	243
SPECIFIC TORQUE	[Nm/bar]	1,57	2,45	2,74	3,20	3,52	3,88
MAX. CONT. PRESSURE	[bar]	300	300	300	300	275	275
HYDROSTATIC TEST PRESSURE	[bar]	450	450	450	450	420	420
MAX. CONT. SPEED	[rpm]	1200	1100	1100	1100	1000	900
PEAK SPEED (***)	[rpm]	1500	1400	1400	1400	1300	1200
MAX. CONT. POWER (****)	[kW]	52	53	53	53	53	53
MAX. CONT. POWER WITH FLUSHING	[kW]	80	80	80	80	80	80
MAX. CASE PRESSURE	[bar]	10	10	10	10	10	10
DRY WEIGHT	[kg]	35	35	35	35	35	35
TEMPERATURE RANGE (**)	[°C]	-30÷70	-30÷70	-30÷70	-30÷70	-30÷70	-30÷70

- (*) The standard distributor (D40) is shown. Please refer to distributors section (pag. 82-83) for differents distributor interfaces.
- (**) Please refer to the hydraulic fluid recommendations (pag. 8-9).
- (***) Do not exceed maximum continuous power with flushing (pag. 11).
- (****) For motor operation with a continuous duty cycle at maximum continuous power the flushing is usually required. For more information please contact our technical department.

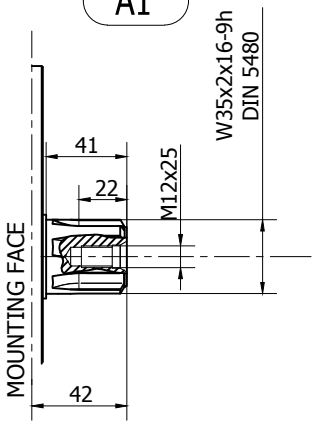
SHAFT CONFIGURATIONS

A0

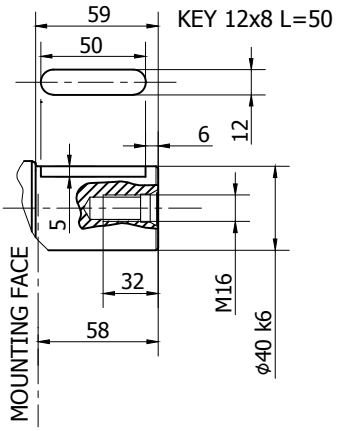


Available spline billet: SB14

A1



A2



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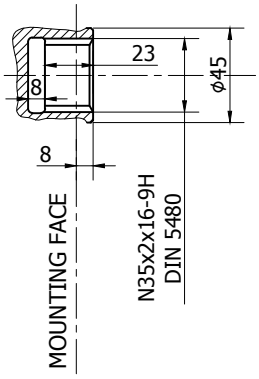

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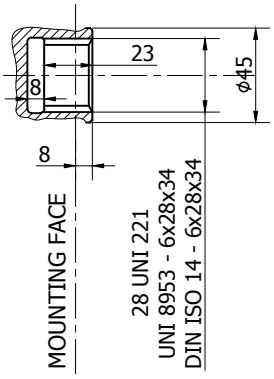

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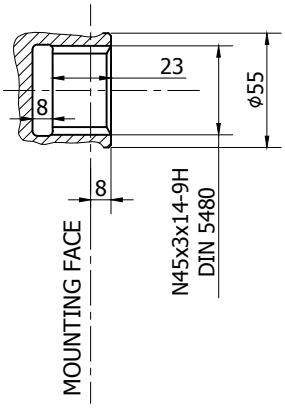
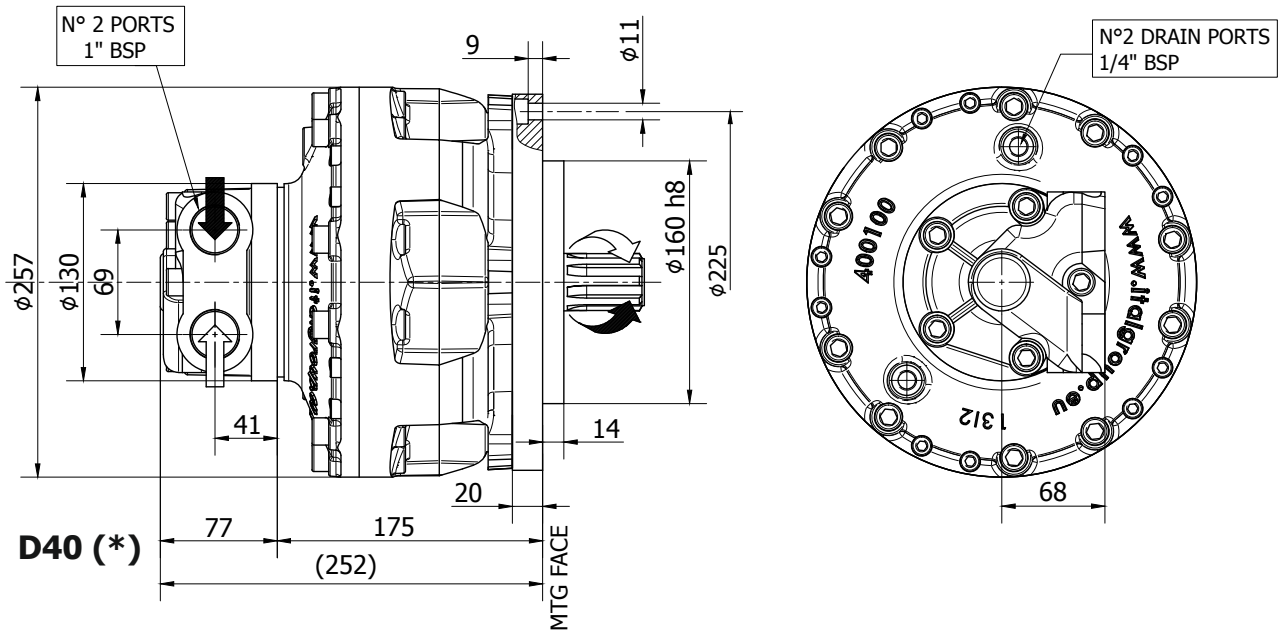


INSTALLATION DRAWING



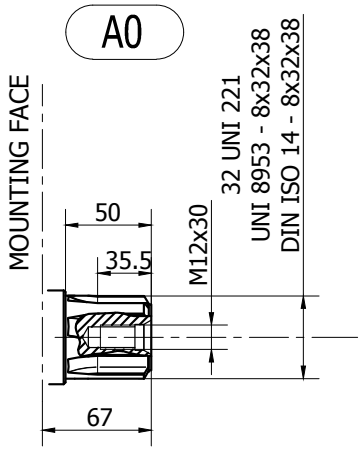
TECHNICAL DATA

		100	150	175	200	220	250
DISPLACEMENT	[cc]	98	154	173	200	221	243
SPECIFIC TORQUE	[Nm/bar]	1,57	2,45	2,74	3,20	3,52	3,88
MAX. CONT. PRESSURE	[bar]	300	300	300	300	275	275
HYDROSTATIC TEST PRESSURE	[bar]	450	450	450	450	420	420
MAX. CONT. SPEED	[rpm]	1200	1100	1100	1100	1000	900
PEAK SPEED (***)	[rpm]	1500	1400	1400	1400	1300	1200
MAX. CONT. POWER (****)	[kW]	52	53	53	53	53	53
MAX. CONT. POWER WITH FLUSHING	[kW]	80	80	80	80	80	80
MAX. CASE PRESSURE	[bar]	10	10	10	10	10	10
DRY WEIGHT	[kg]	35	35	35	35	35	35
TEMPERATURE RANGE (**)	[°C]	-30÷70	-30÷70	-30÷70	-30÷70	-30÷70	-30÷70

- (*) The standard distributor (D40) is shown. Please refer to distributors section (pag. 82-83) for differents distributor interfaces.
- (**) Please refer to the hydraulic fluid recommendations (pag. 8-9).
- (***) Do not exceed maximum continuous power with flushing (pag. 11).
- (****) For motor operation with a continuous duty cycle at maximum continuous power the flushing is usually required. For more information please contact our technical department.

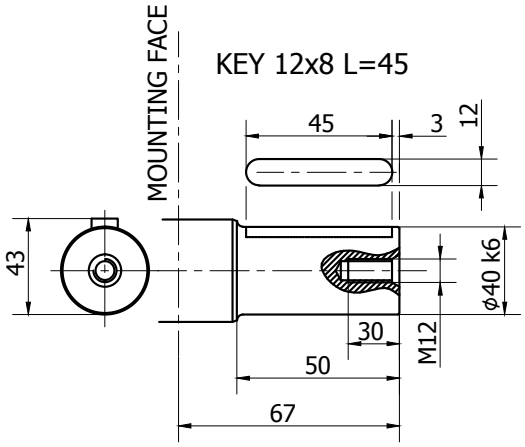
SHAFT CONFIGURATIONS

A0



Available spline billet: SB2

A2



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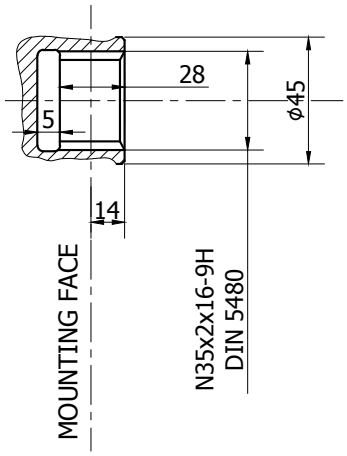
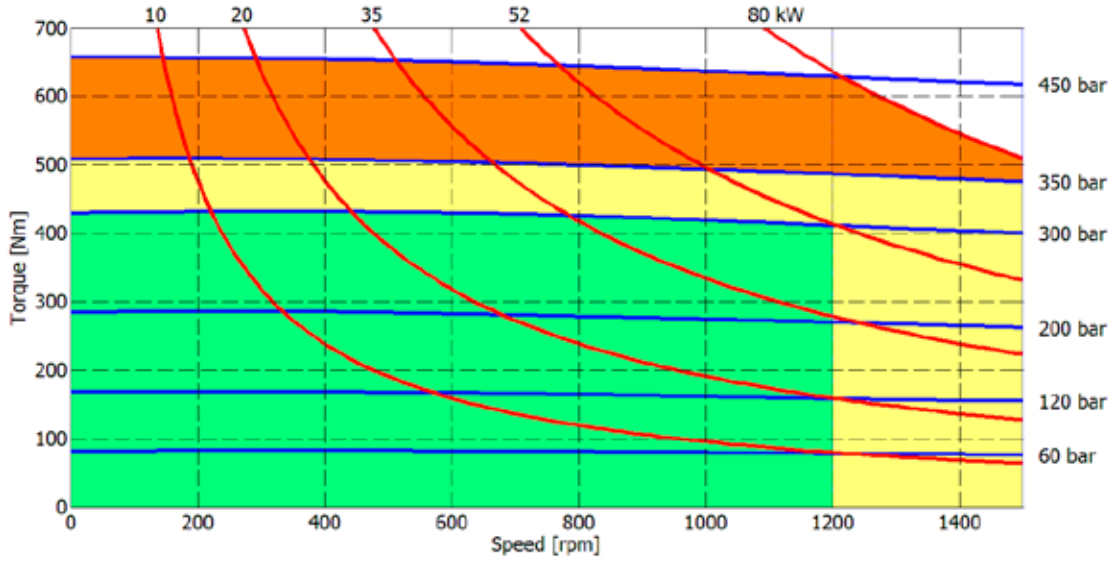
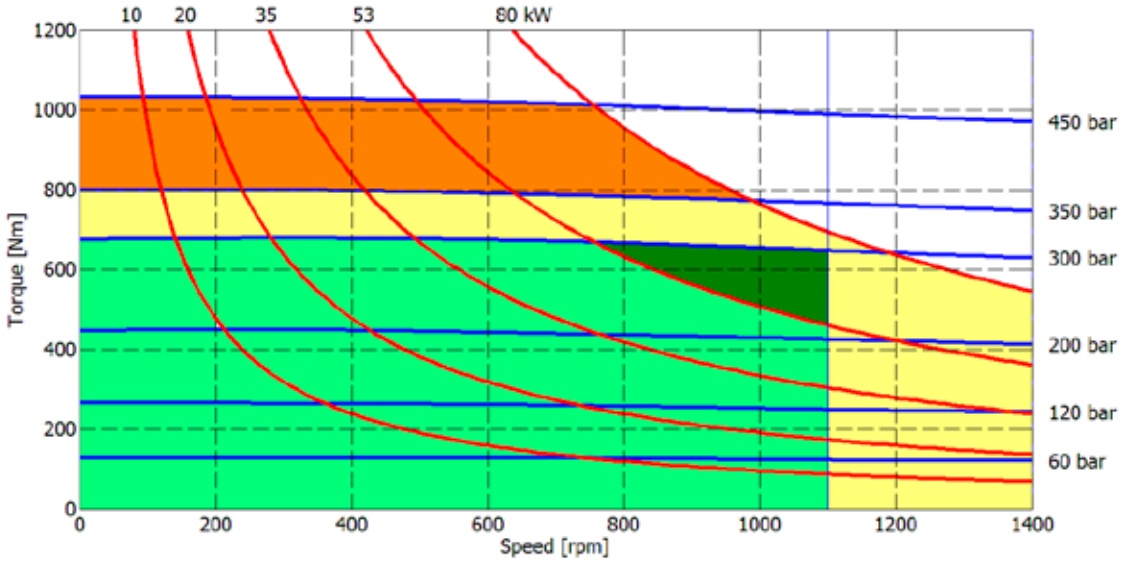


100 cc



150 cc



Continuous operation

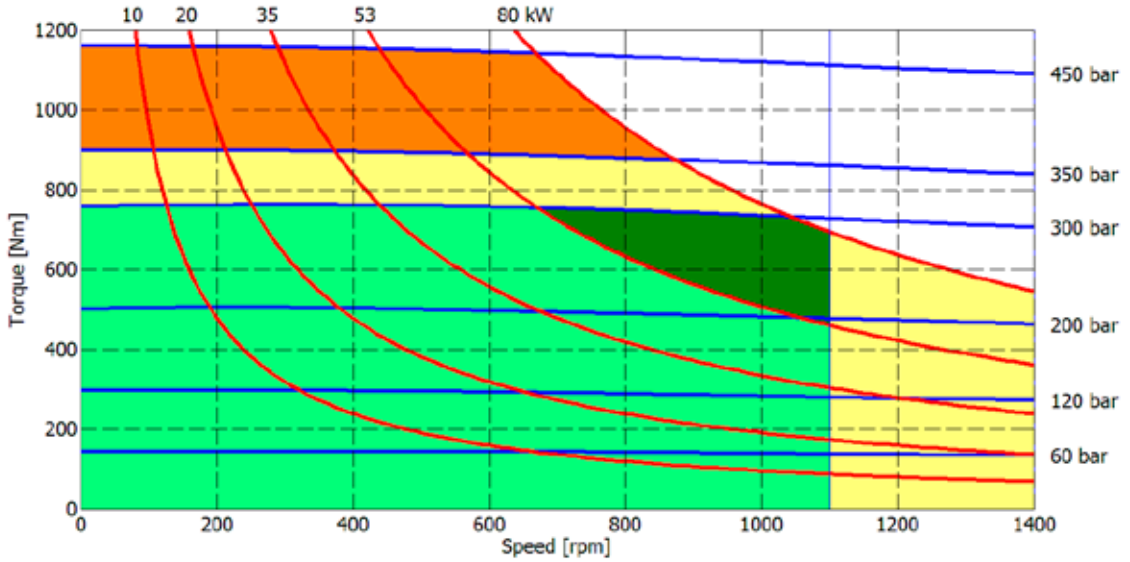
Continuous operation with flushing or intermittent operation (see below for intermittent operation)

Intermittent operation: permitted for a 15% of duty cycle, for 3 minutes maximum period

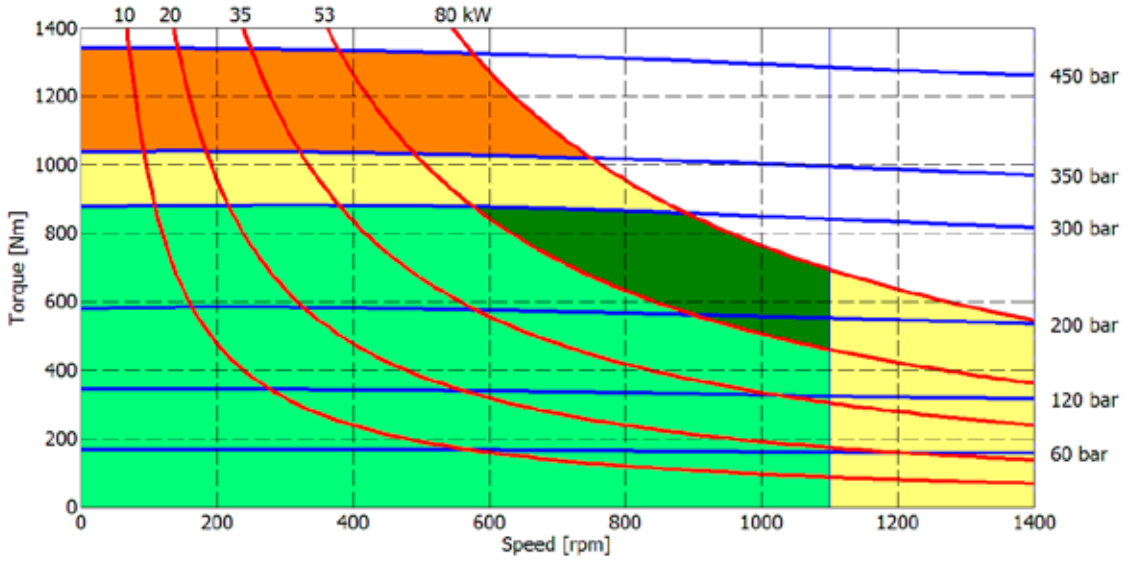
Peak operation: permitted for very short periods (3-5 seconds every 10-15 minutes)

The above diagrams are referring to the hydraulic motor working with a fluid in ideal conditions (viscosity at 40 cSt). In case the working temperature increases and viscosity reach values under the recommended values (see hydraulic fluid recommendations) flushing must be performed or ISO oil grade must be changed. The working temperature must not overcome 70 °C.

175 cc



200 cc



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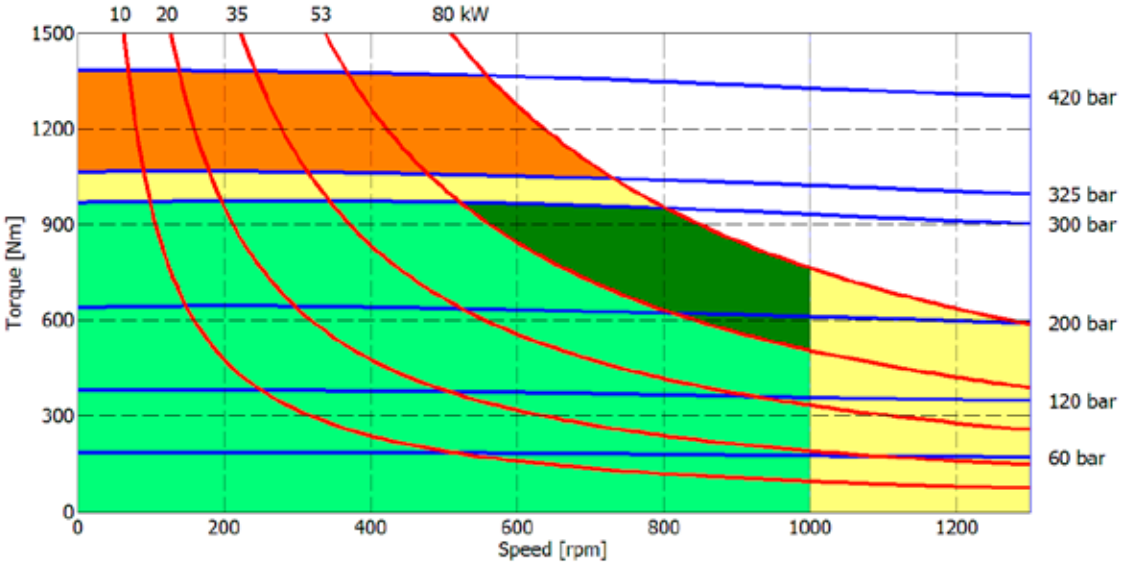
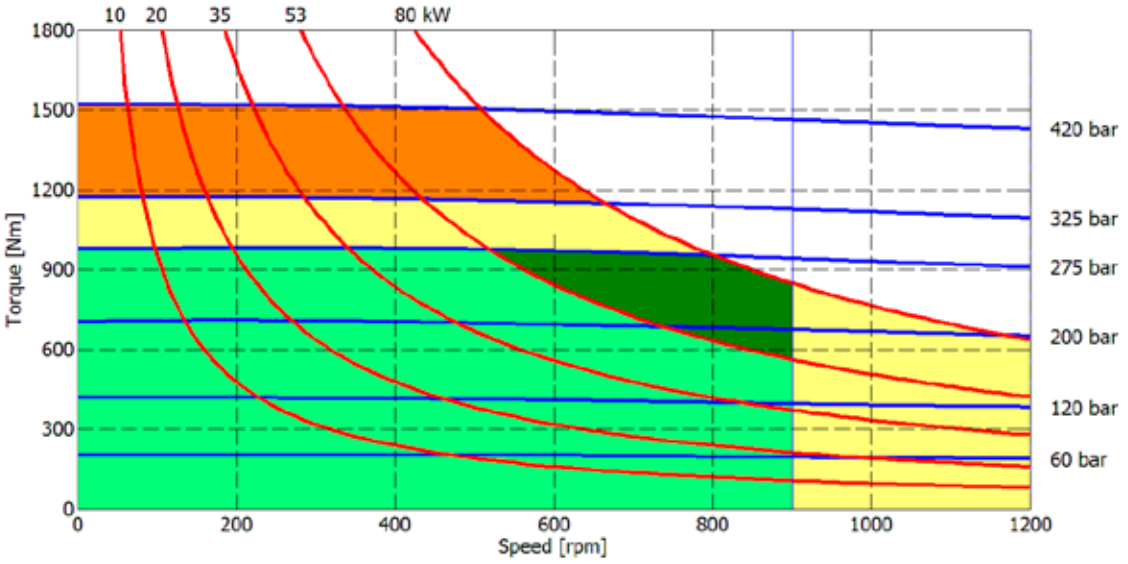
Peak operation: permitted for very short periods (3-5 seconds every 10-15 minutes)

The above diagrams are referring to the hydraulic motor working with a fluid in ideal conditions (viscosity at 40 cSt). In case the working temperature increases and viscosity reach values under the recommended values (see hydraulic fluid recommendations) flushing must be performed or ISO oil grade must be changed. The working temperature must not overcome 70 °C.

220 cc



250 cc



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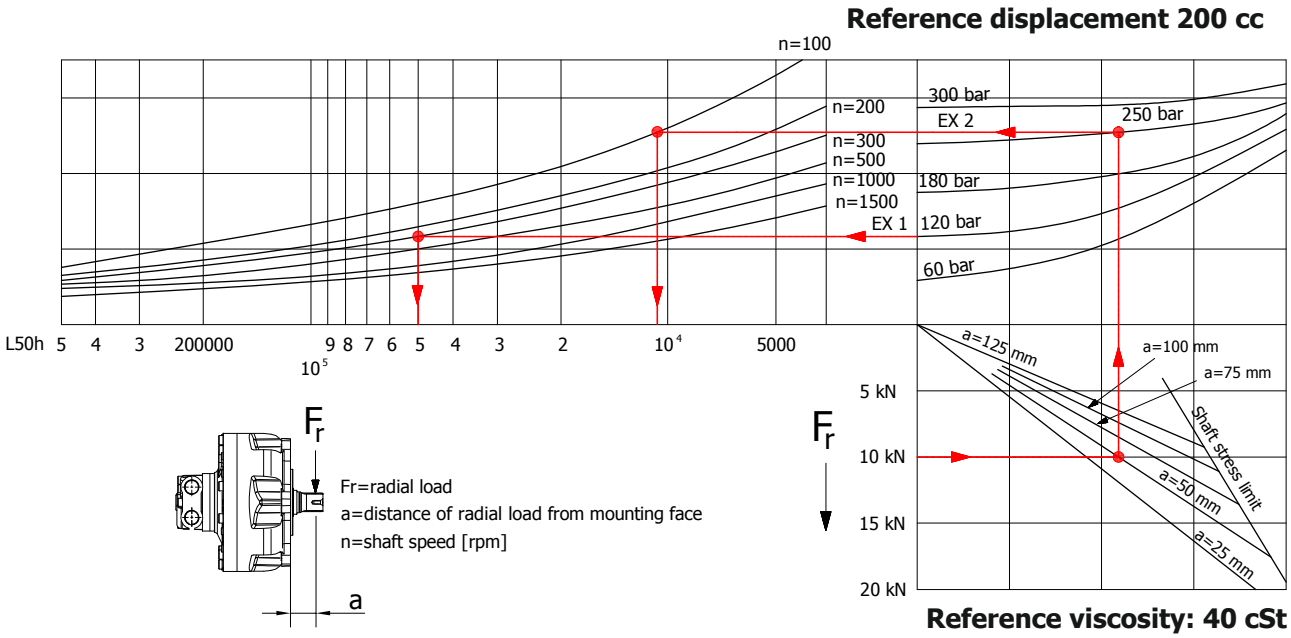
The above diagrams are referring to the hydraulic motor working with a fluid in ideal conditions (viscosity at 40 cSt). In case the working temperature increases and viscosity reach values under the recommended values (see hydraulic fluid recommendations) flushing must be performed or ISO oil grade must be changed. The working temperature must not overcome 70 °C.

BEARING LIFE



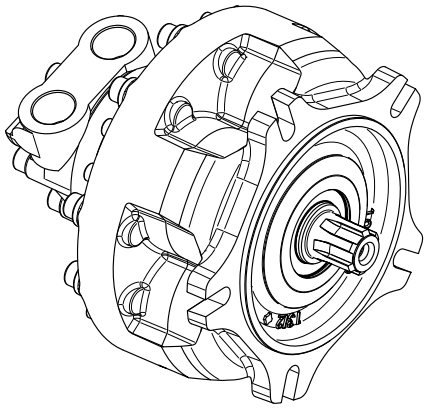
Example:
We suppose (EX1): p=120 [bar], n=300 [rpm]; we obtain an average lifetime of 50000 [h].
If we suppose (EX2): F_r=10 [kN], a=50 [mm], n=100 [rpm] and p=250 [bar] we obtain an average lifetime of 10500 [h].

HCD1 - ORDERING CODE

HCD | 1 | - - - | - - | - - | - - | - - | - - | SB -

DISPLACEMENT
200 | 250 | 300 | 350 | 400 | 500

INTERCHANGEABILITY
/C300 | /S2



SHAFT
A0 | A1 | A2 | A3 | A31

TACHOMETER
J (*) | TA | TB | TT1 | TQ1 | EST | EST30 | EST31

See pag. 84-87

(*) Tachometer predisposition

SPECIAL FEATURES
HSM

See pag. 7

MP | SPSL | HPS | CCW

See pag. 23

Z - -
Italgroup internal code

DISTRIBUTOR
D31B | D36B | D310B | D40 | D47 | D416

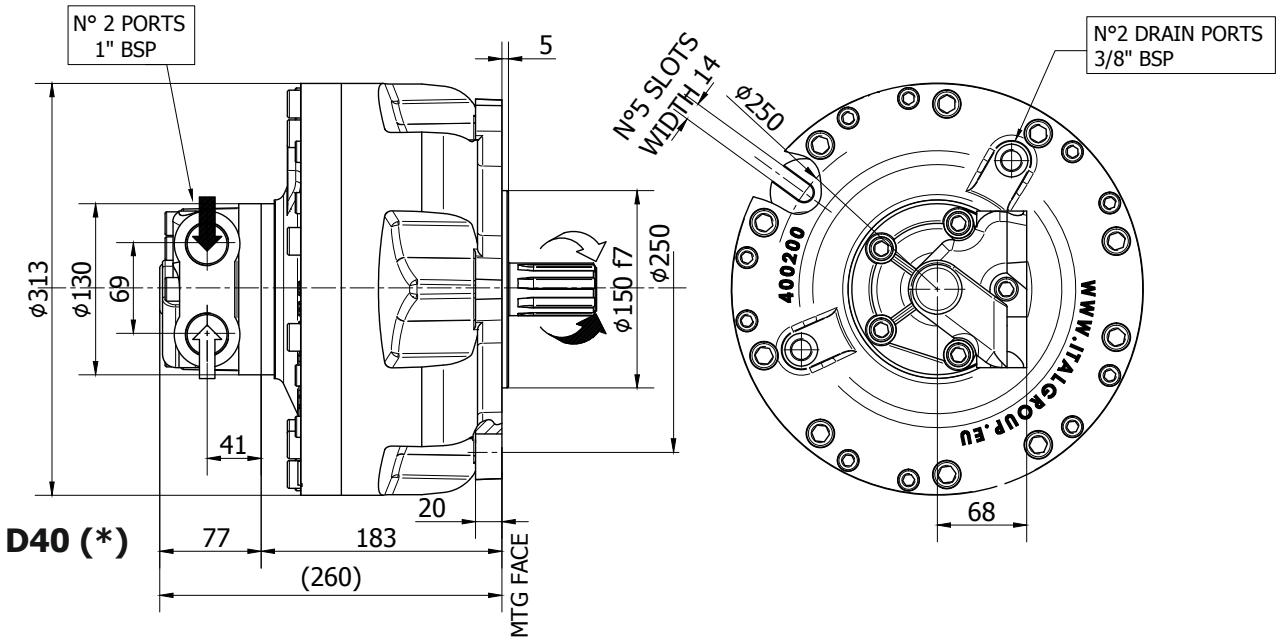
See pag. 82-83

SPLINE BILLET
SB3 | SB15 | SB22

See pag. 88

ITALGROUP SRL
HCD SERIES - HCD2
GENERAL CATALOGUE
INDEX - HCD2

INSTALLATION DRAWING



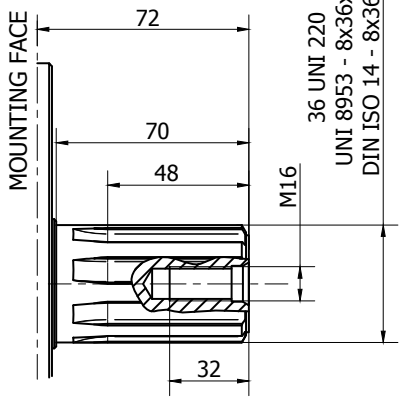
TECHNICAL DATA

		200	250	300	350	400	500
DISPLACEMENT	[cc]	193	251	305	348	424	493
SPECIFIC TORQUE	[Nm/bar]	3,06	4,00	4,84	5,52	6,76	7,84
MAX. CONT. PRESSURE	[bar]	300	300	300	300	300	275
HYDROSTATIC TEST PRESSURE	[bar]	450	450	450	450	450	420
MAX. CONT. SPEED	[rpm]	1250	1050	800	650	550	550
PEAK SPEED (***)	[rpm]	1500	1200	1150	1150	900	900
MAX. CONT. POWER (****)	[kW]	80	80	80	80	80	80
MAX. CONT. POWER WITH FLUSHING	[kW]	112	112	112	112	112	112
MAX. CASE PRESSURE	[bar]	10	10	10	10	10	10
DRY WEIGHT	[kg]	53	53	53	53	53	53
TEMPERATURE RANGE (**)	[°C]	-30÷70	-30÷70	-30÷70	-30÷70	-30÷70	-30÷70

- (*) The standard distributor (D40) is shown. Please refer to distributors section (pag. 82-83) for differents distributor interfaces.
- (**) Please refer to the hydraulic fluid recommendations (pag. 8-9).
- (***) Do not exceed maximum continuous power with flushing (pag. 11).
- (****) For motor operation with a continuous duty cycle at maximum continuous power the flushing is usually required. For more information please contact our technical department.

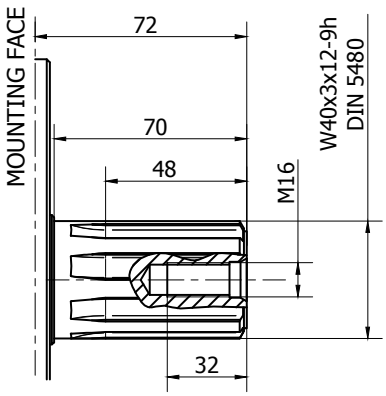
SHAFT CONFIGURATIONS

A0



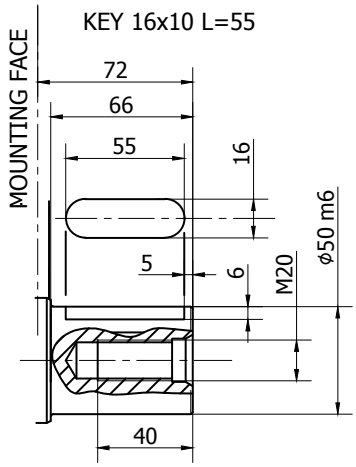
Available spline billet: SB3

A1

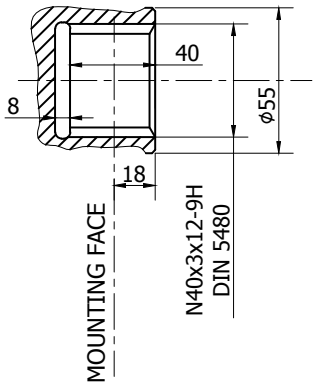


Available spline billet: SB22

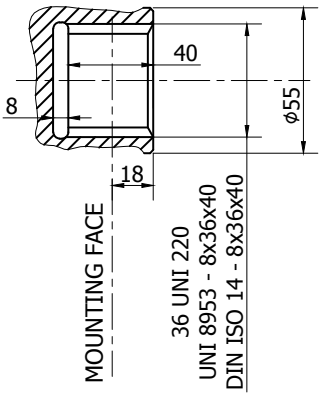
A2



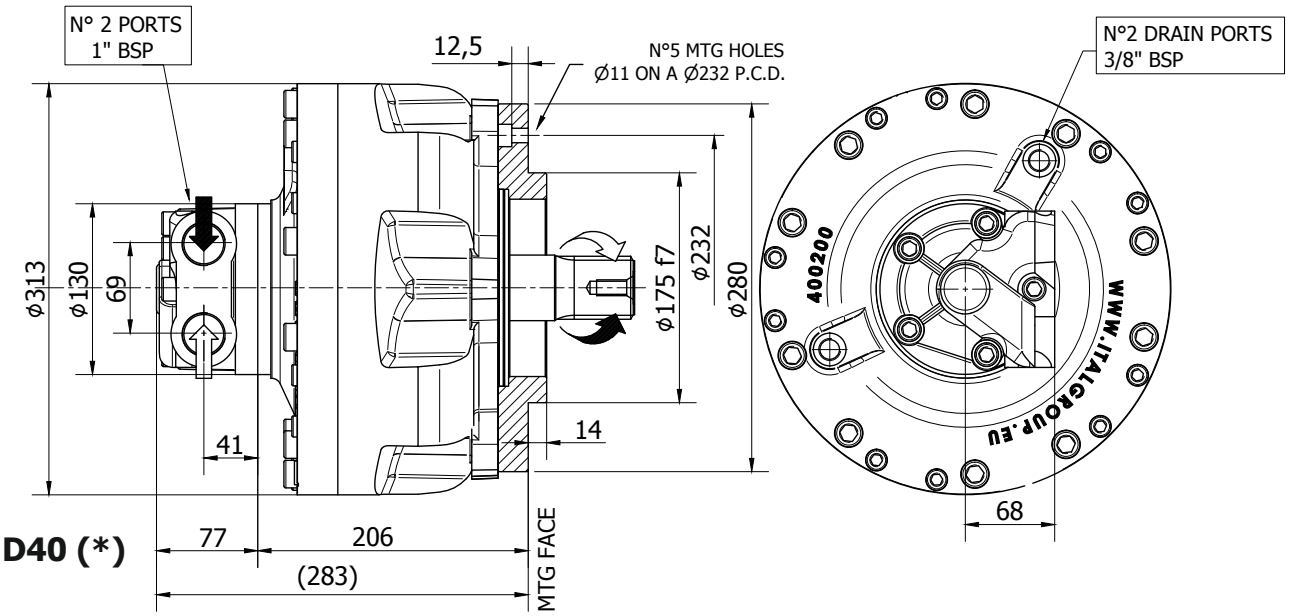
A3



A31



INSTALLATION DRAWING



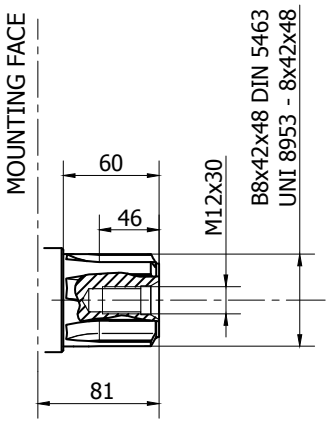
TECHNICAL DATA

		200	250	300	350	400	500
DISPLACEMENT	[cc]	193	251	305	348	424	493
SPECIFIC TORQUE	[Nm/bar]	3,06	4,00	4,84	5,52	6,76	7,84
MAX. CONT. PRESSURE	[bar]	300	300	300	300	300	275
HYDROSTATIC TEST PRESSURE	[bar]	450	450	450	450	450	420
MAX. CONT. SPEED	[rpm]	1250	1050	800	650	550	550
PEAK SPEED (***)	[rpm]	1500	1200	1250	1200	900	900
MAX. CONT. POWER (****)	[kW]	80	80	80	80	80	80
MAX. CONT. POWER WITH FLUSHING	[kW]	112	112	112	112	112	112
MAX. CASE PRESSURE	[bar]	10	10	10	10	10	10
DRY WEIGHT	[kg]	53	53	53	53	53	53
TEMPERATURE RANGE (**)	[°C]	-30÷70	-30÷70	-30÷70	-30÷70	-30÷70	-30÷70

- (*) The standard distributor (D40) is shown. Please refer to distributors section (pag. 82-83) for differents distributor interfaces.
- (**) Please refer to the hydraulic fluid recommendations (pag. 8-9).
- (***) Do not exceed maximum continuous power with flushing (pag. 11).
- (****) For motor operation with a continuous duty cycle at maximum continuous power the flushing is usually required. For more information please contact our technical department.

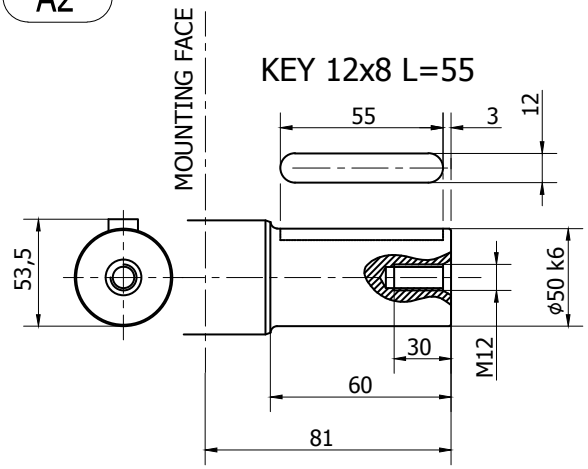
SHAFT CONFIGURATIONS

A0

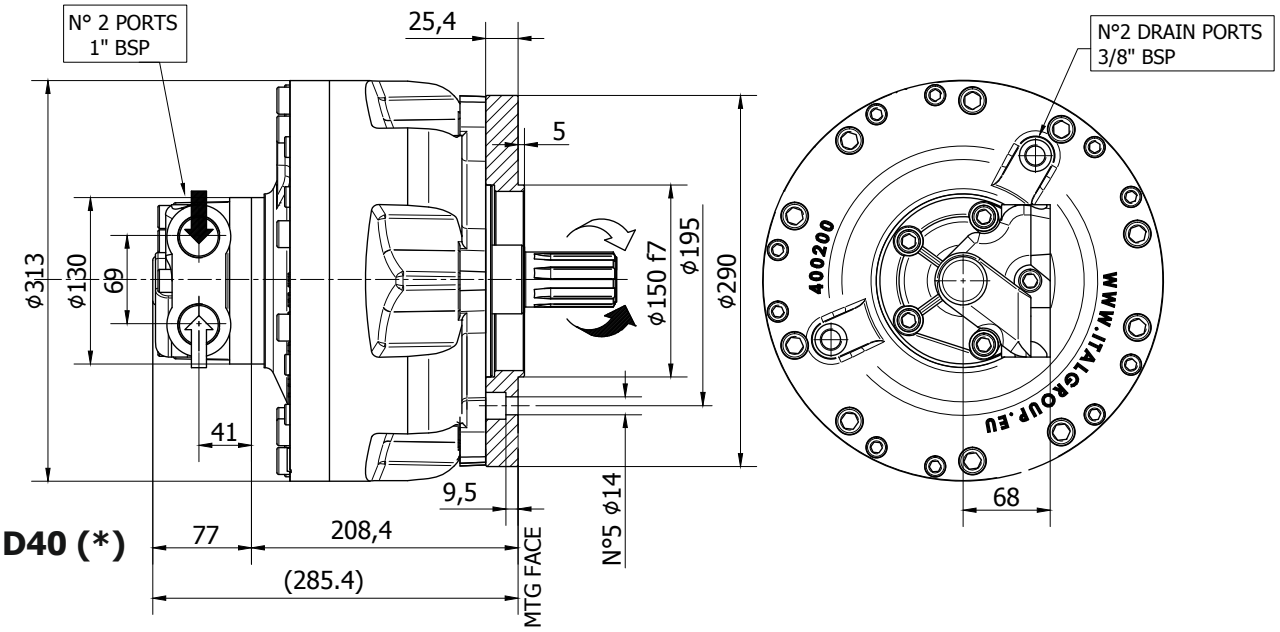


Available spline billet: SB15

A2



INSTALLATION DRAWING



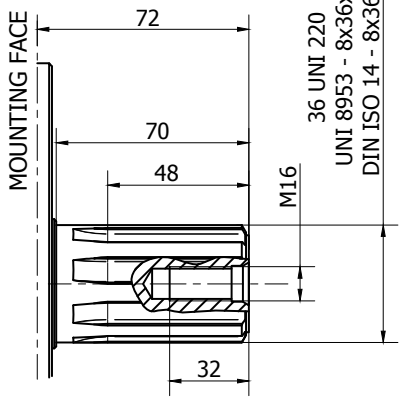
TECHNICAL DATA

		200	250	300	350	400	500
DISPLACEMENT	[cc]	193	251	305	348	424	493
SPECIFIC TORQUE	[Nm/bar]	3,06	4,00	4,84	5,52	6,76	7,84
MAX. CONT. PRESSURE	[bar]	300	300	300	300	300	275
HYDROSTATIC TEST PRESSURE	[bar]	450	450	450	450	450	420
MAX. CONT. SPEED	[rpm]	1250	1050	800	650	550	550
PEAK SPEED (***)	[rpm]	1500	1200	1250	1200	900	900
MAX. CONT. POWER (****)	[kW]	80	80	80	80	80	80
MAX. CONT. POWER WITH FLUSHING	[kW]	112	112	112	112	112	112
MAX. CASE PRESSURE	[bar]	10	10	10	10	10	10
DRY WEIGHT	[kg]	53	53	53	53	53	53
TEMPERATURE RANGE (**)	[°C]	-30÷70	-30÷70	-30÷70	-30÷70	-30÷70	-30÷70

- (*) The standard distributor (D40) is shown. Please refer to distributors section (pag. 82-83) for differents distributor interfaces.
- (**) Please refer to the hydraulic fluid recommendations (pag. 8-9).
- (***) Do not exceed maximum continuous power with flushing (pag. 11).
- (****) For motor operation with a continuous duty cycle at maximum continuous power the flushing is usually required. For more information please contact our technical department.

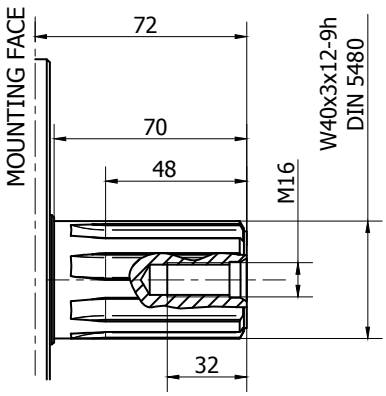
SHAFT CONFIGURATIONS

A0



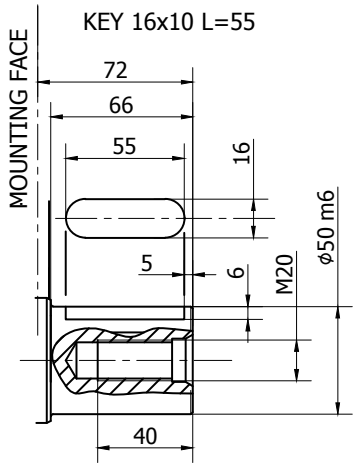
Available spline billet: SB3

A1

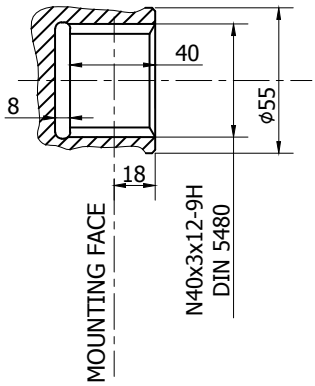


Available spline billet: SB22

A2



A3



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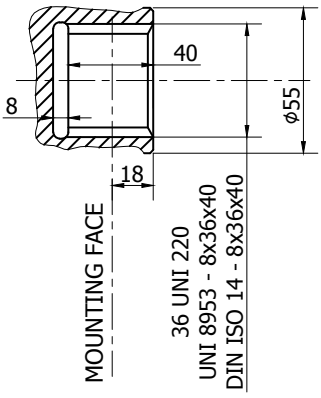
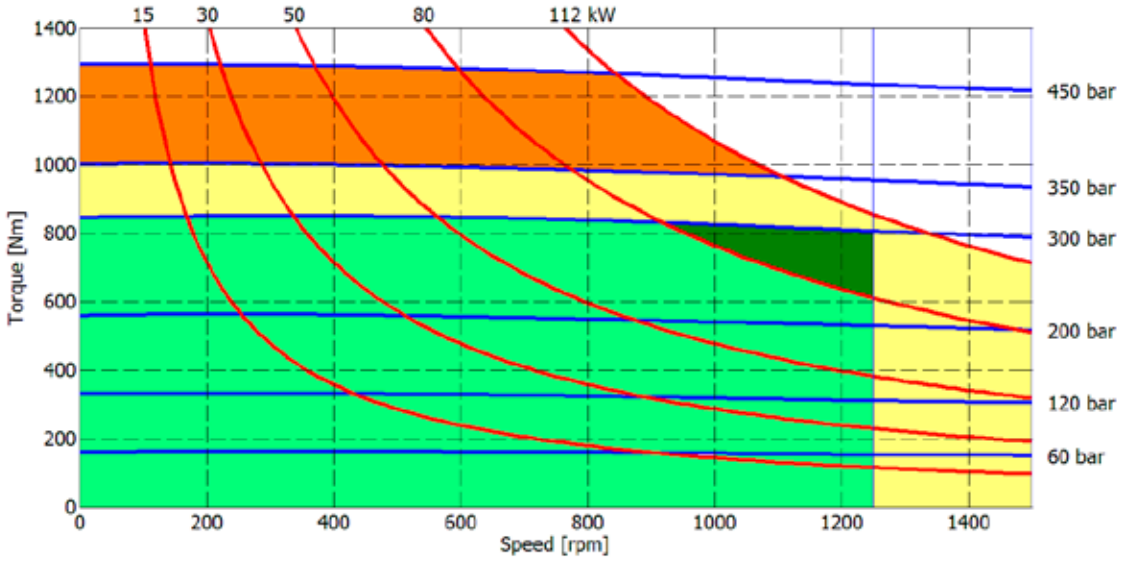
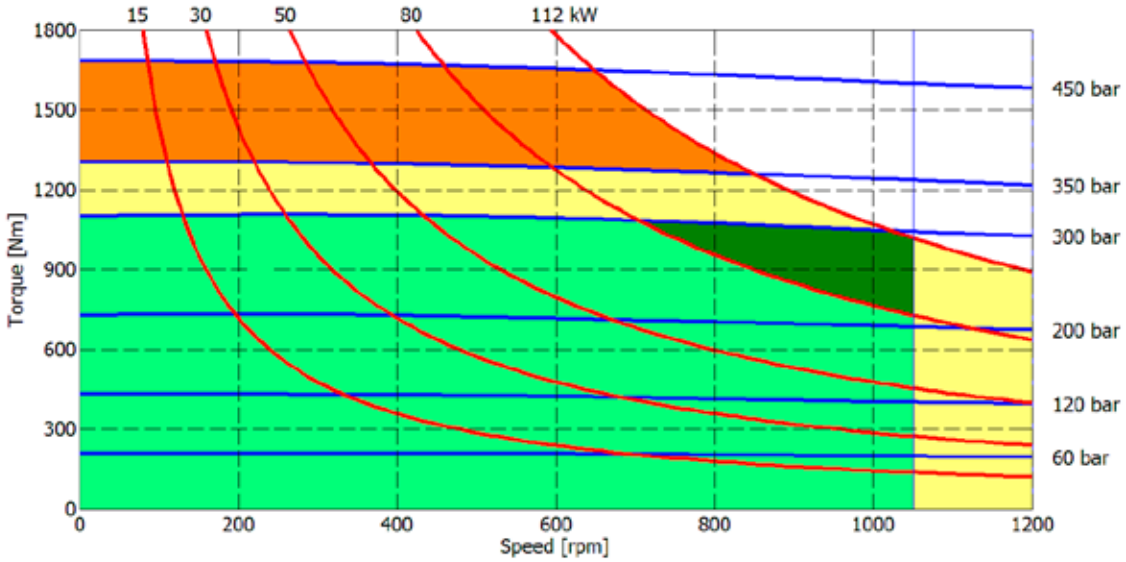


200 cc



250 cc



Continuous operation

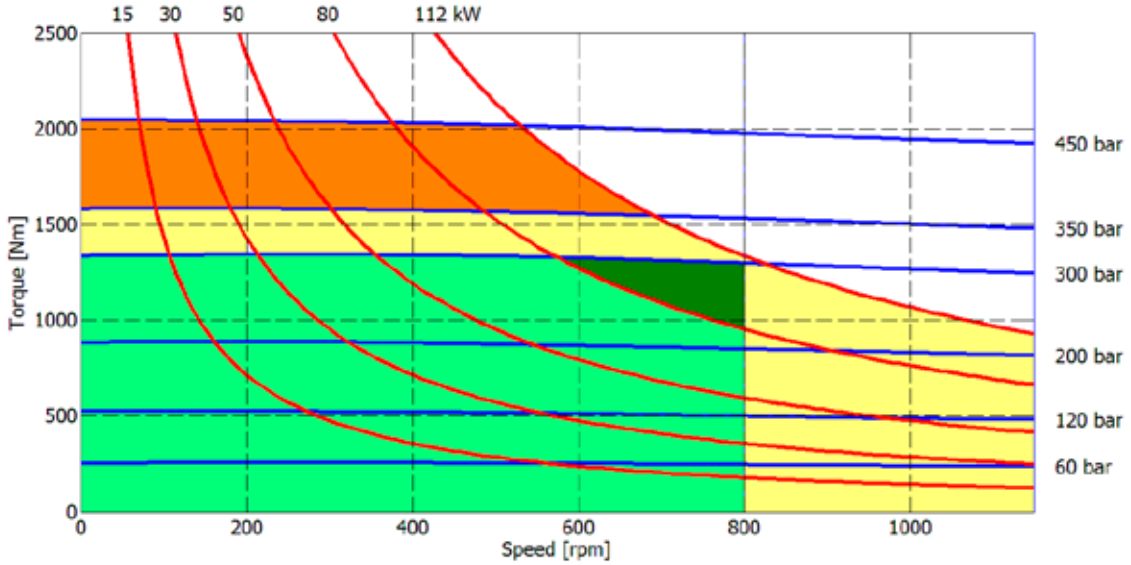
Continuous operation with flushing or intermittent operation (see below for intermittent operation)

Intermittent operation: permitted for a 15% of duty cycle, for 3 minutes maximum period

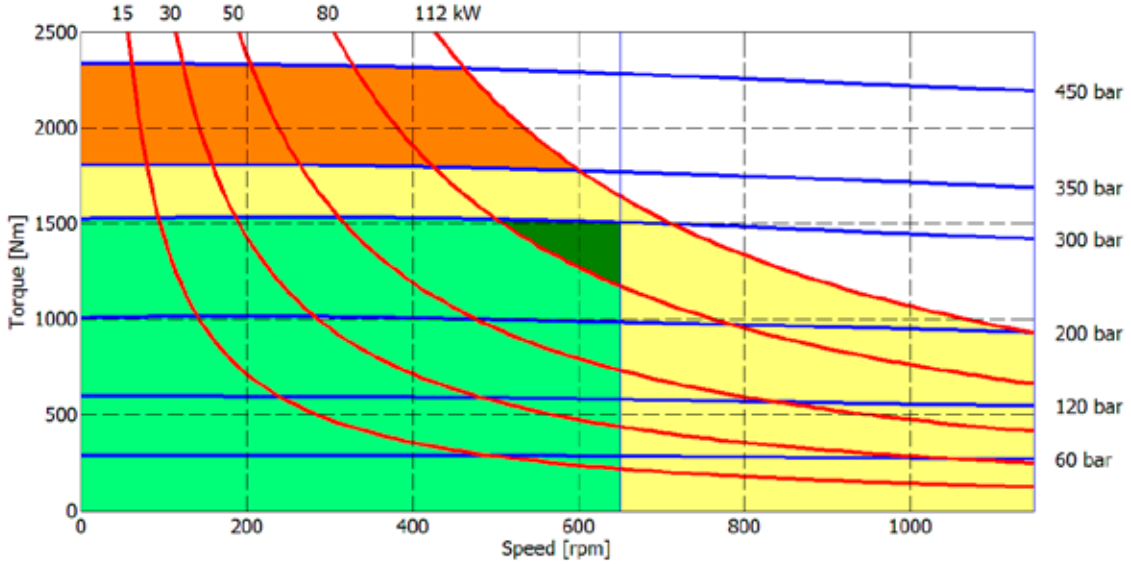
Peak operation: permitted for very short periods (3-5 seconds every 10-15 minutes)

The above diagrams are referring to the hydraulic motor working with a fluid in ideal conditions (viscosity at 40 cSt). In case the working temperature increases and viscosity reach values under the recommended values (see hydraulic fluid recommendations) flushing must be performed or ISO oil grade must be changed. The working temperature must not overcome 70 °C.

300 cc



350 cc



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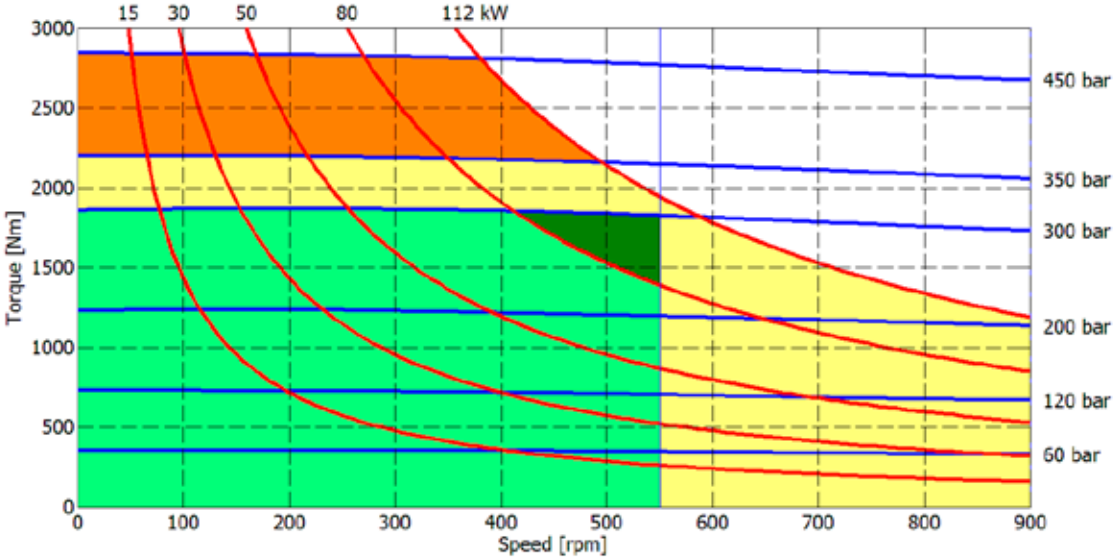
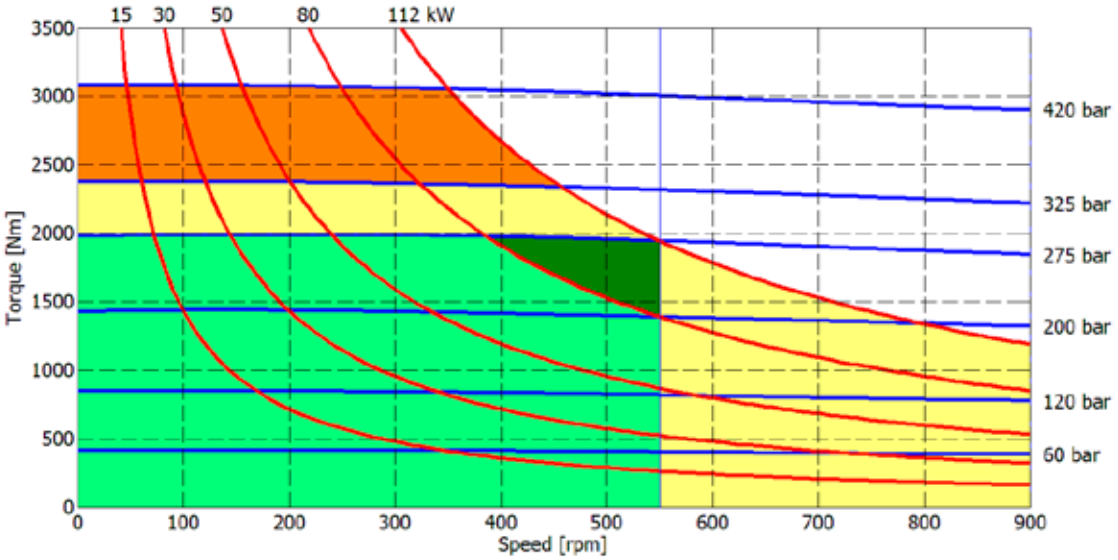
400 cc



500 cc



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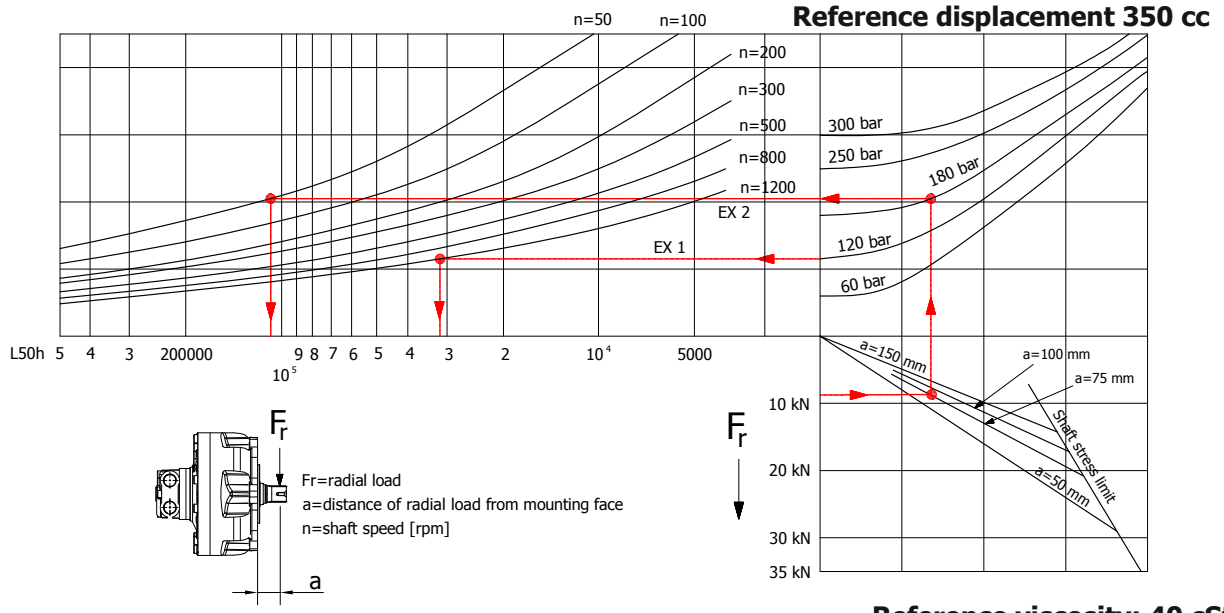
Intermittent operation: permitted for a 15% of duty cycle, for 3 minutes maximum period

Peak operation: permitted for very short periods (3-5 seconds every 10-15 minutes)

The above diagrams are referring to the hydraulic motor working with a fluid in ideal conditions (viscosity at 40 cSt). In case the working temperature increases and viscosity reach values under the recommended values (see hydraulic fluid recommendations) flushing must be performed or ISO oil grade must be changed. The working temperature must not overcome 70 °C.

BEARING LIFE



Example:
We suppose (EX1): p=120 [bar], n=1200 [rpm]; we obtain an average lifetime of 31000 [h].
If we suppose (EX2): F_r=9 [kN], a=75 [mm], n=50 [rpm] and p=180 [bar] we obtain an average lifetime of 105000 [h].

HCD2 - ORDERING CODE

HCD | 2 | - - - | - - | - - | - - | - - | - - | SB -

DISPLACEMENT

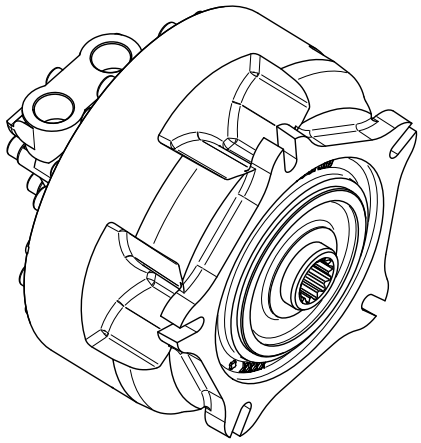
100 | 150 | 175 | 200 | 220 | 250

INTERCHANGEABILITY

/C190

SHAFT

A0 | A1 | A2 | A3 | A31 | A33



TACHOMETER

J (*) | TA | TB | TT1 | TQ1 | EST | EST30 | EST31

See pag. 84-87

(*) Tachometer predisposition

SPECIAL FEATURES

HSM

See pag. 7

MP | SPSL | HPS | CCW

See pag. 23

Z - - Italgroup internal code

DISTRIBUTOR

D31B | D36B | D310B | D40 | D47 | D416

See pag. 82-83

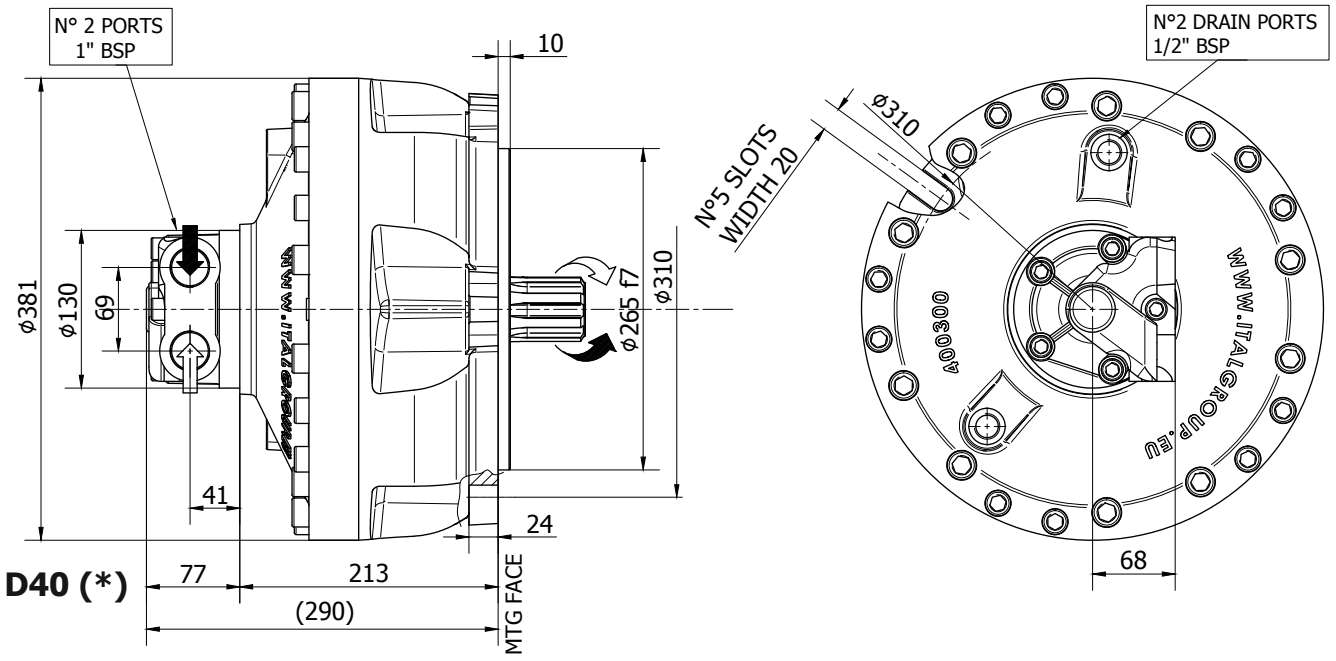
SPLINE BILLET

SB2 | SB14

See pag. 88

ITALGROUP SRL
HCD SERIES - HCD3
GENERAL CATALOGUE
INDEX - HCD3

INSTALLATION DRAWING



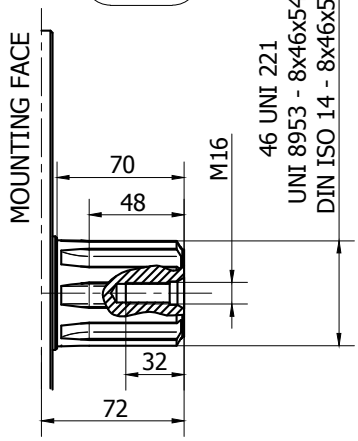
TECHNICAL DATA

		350	400	500	600	700	800
DISPLACEMENT	[cc]	352	426	486	595	689	792
SPECIFIC TORQUE	[Nm/bar]	5,60	6,78	7,73	9,47	11	12,6
MAX. CONT. PRESSURE	[bar]	300	300	300	300	275	275
HYDROSTATIC TEST PRESSURE	[bar]	450	450	450	450	420	420
MAX. CONT. SPEED	[rpm]	800	700	550	500	450	450
PEAK SPEED (***)	[rpm]	1050	900	850	800	800	750
MAX. CONT. POWER (****)	[kW]	98	102	102	102	102	102
MAX. CONT. POWER WITH FLUSHING	[kW]	142	142	142	142	142	142
MAX. CASE PRESSURE	[bar]	10	10	10	10	10	10
DRY WEIGHT	[kg]	92	92	92	92	92	92
TEMPERATURE RANGE (**)	[°C]	-30÷70	-30÷70	-30÷70	-30÷70	-30÷70	-30÷70

- (*) The standard distributor (D40) is shown. Please refer to distributors section (pag. 82-83) for differents distributor interfaces.
- (**) Please refer to the hydraulic fluid recommendations (pag. 8-9).
- (***) Do not exceed maximum continuous power with flushing (pag. 11).
- (****) For motor operation with a continuous duty cycle at maximum continuous power the flushing is usually required. For more information please contact our technical department.

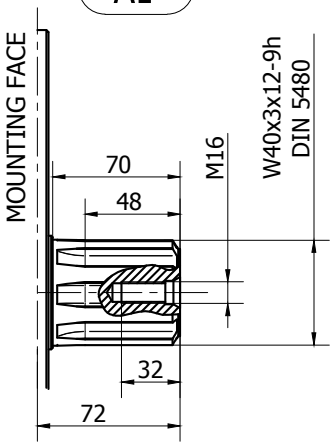
SHAFT CONFIGURATIONS

A0



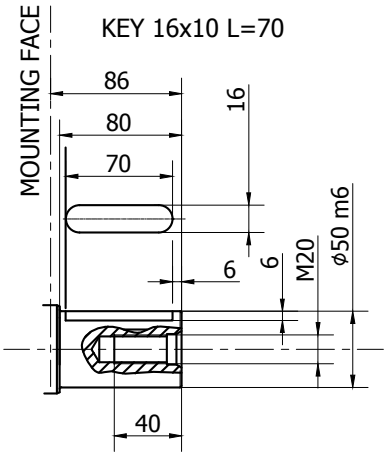
Available spline billet: SB5

A1

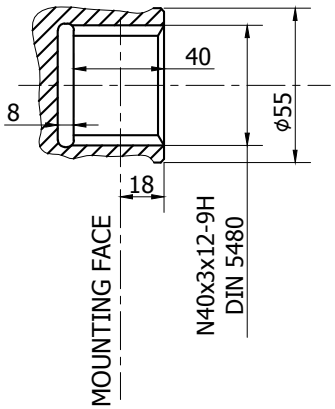


Available spline billet: SB22

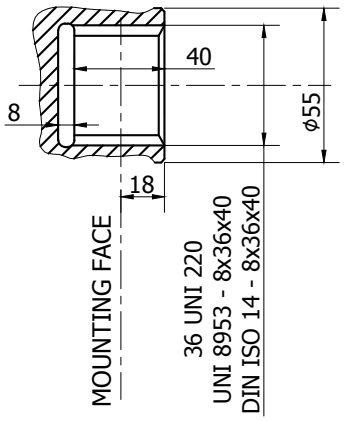
A2



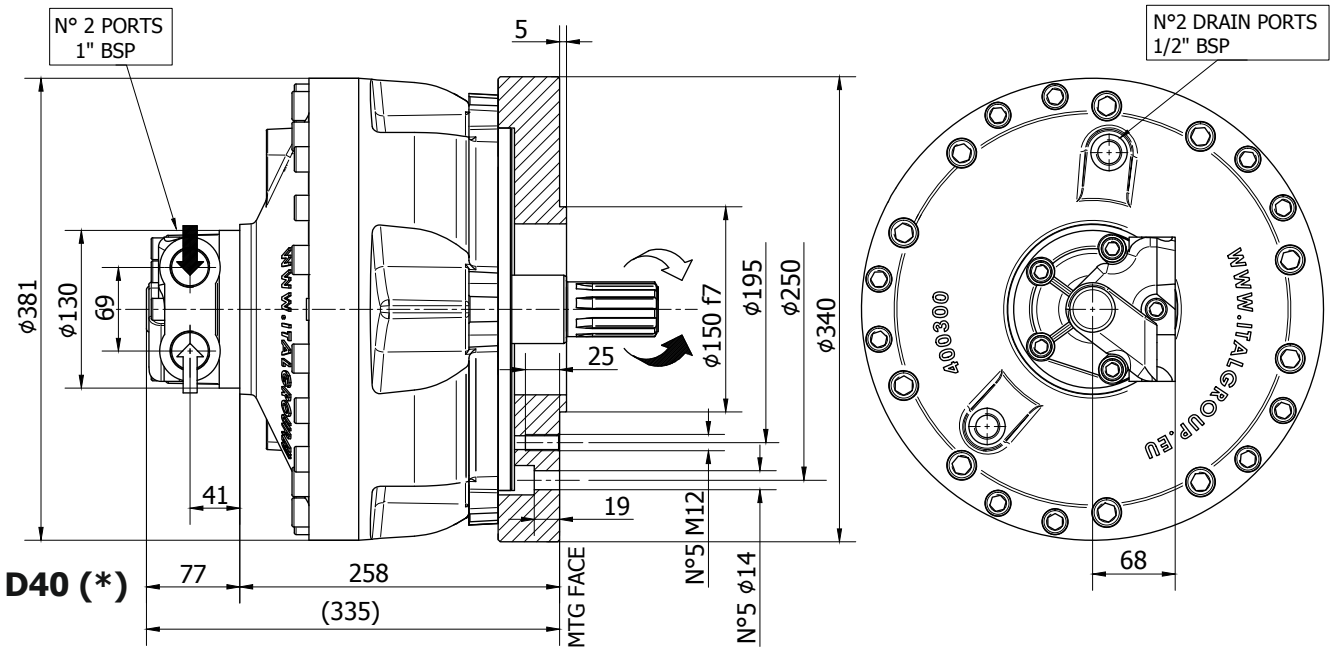
A3



A31



INSTALLATION DRAWING



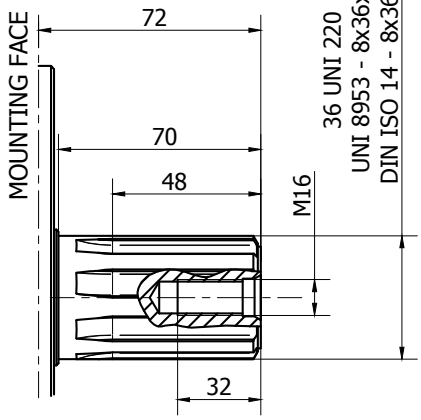
TECHNICAL DATA

		350	400	500	600	700	800
DISPLACEMENT	[cc]	352	426	486	595	689	792
SPECIFIC TORQUE	[Nm/bar]	5,60	6,78	7,73	9,47	11	12,6
MAX. CONT. PRESSURE	[bar]	300	300	300	300	275	275
HYDROSTATIC TEST PRESSURE	[bar]	450	450	450	450	420	420
MAX. CONT. SPEED	[rpm]	800	700	550	500	450	450
PEAK SPEED (***)	[rpm]	1050	900	850	800	800	750
MAX. CONT. POWER (****)	[kW]	98	102	102	102	102	102
MAX. CONT. POWER WITH FLUSHING	[kW]	142	142	142	142	142	142
MAX. CASE PRESSURE	[bar]	10	10	10	10	10	10
DRY WEIGHT	[kg]	92	92	92	92	92	92
TEMPERATURE RANGE (**)	[°C]	-30÷70	-30÷70	-30÷70	-30÷70	-30÷70	-30÷70

- (*) The standard distributor (D40) is shown. Please refer to distributors section (pag. 82-83) for differents distributor interfaces.
- (**) Please refer to the hydraulic fluid recommendations (pag. 8-9).
- (***) Do not exceed maximum continuous power with flushing (pag. 11).
- (****) For motor operation with a continuous duty cycle at maximum continuous power the flushing is usually required. For more information please contact our technical department.

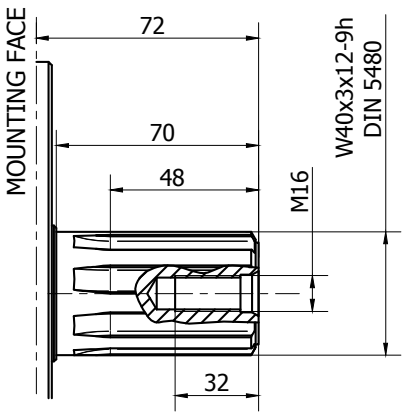
SHAFT CONFIGURATIONS

A0



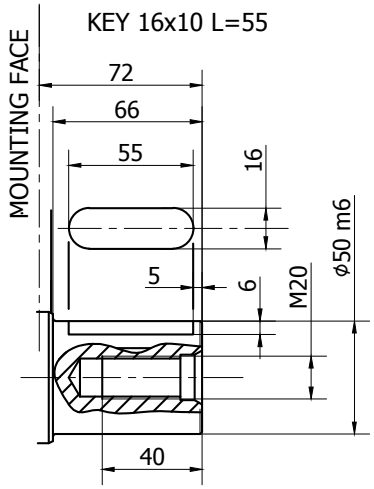
Available spline billet: SB3

A1

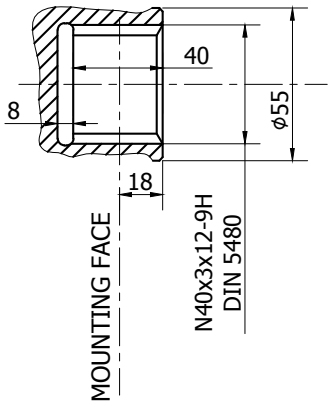


Available spline billet: SB22

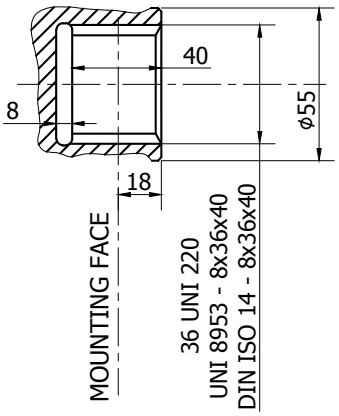
A2



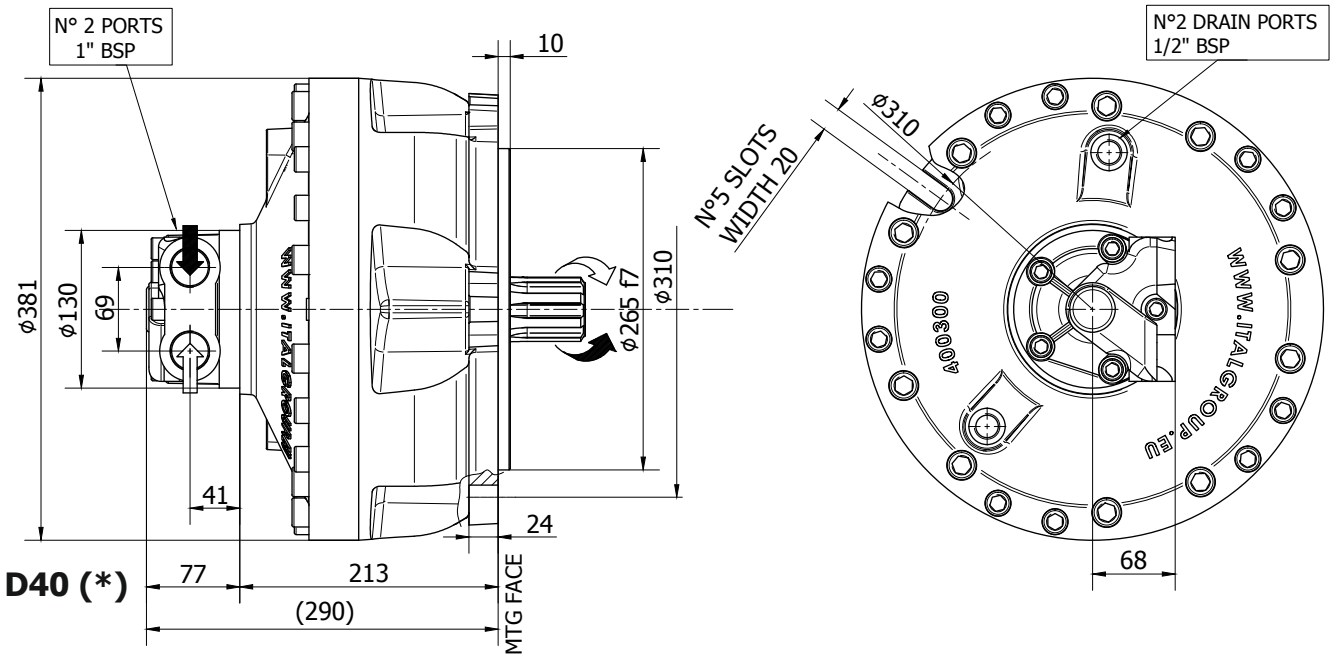
A3



A31



INSTALLATION DRAWING



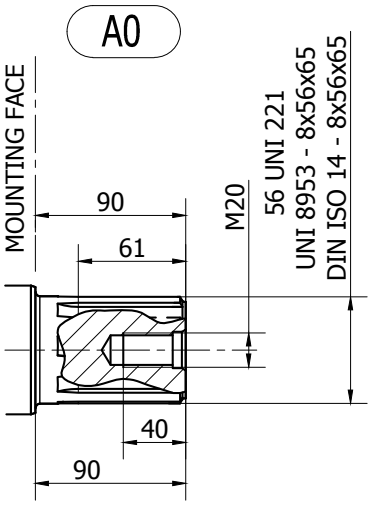
TECHNICAL DATA

		350	400	500	600	700	800
DISPLACEMENT	[cc]	352	426	486	595	689	792
SPECIFIC TORQUE	[Nm/bar]	5,60	6,78	7,73	9,47	11	12,6
MAX. CONT. PRESSURE	[bar]	300	300	300	300	275	275
HYDROSTATIC TEST PRESSURE	[bar]	450	450	450	450	420	420
MAX. CONT. SPEED	[rpm]	800	700	550	500	450	450
PEAK SPEED (***)	[rpm]	1050	900	850	800	800	750
MAX. CONT. POWER (****)	[kW]	98	102	102	102	102	102
MAX. CONT. POWER WITH FLUSHING	[kW]	142	142	142	142	142	142
MAX. CASE PRESSURE	[bar]	10	10	10	10	10	10
DRY WEIGHT	[kg]	92	92	92	92	92	92
TEMPERATURE RANGE (**)	[°C]	-30÷70	-30÷70	-30÷70	-30÷70	-30÷70	-30÷70

- (*) The standard distributor (D40) is shown. Please refer to distributors section (pag. 82-83) for differents distributor interfaces.
- (**) Please refer to the hydraulic fluid recommendations (pag. 8-9).
- (***) Do not exceed maximum continuous power with flushing (pag. 11).
- (****) For motor operation with a continuous duty cycle at maximum continuous power the flushing is usually required. For more information please contact our technical department.

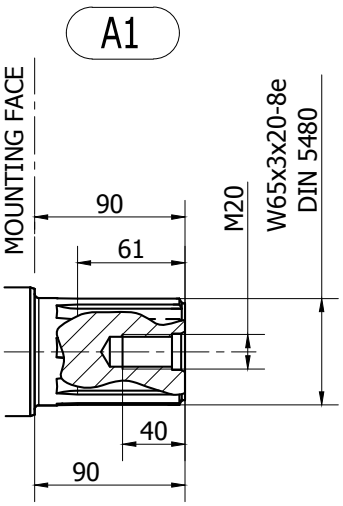
SHAFT CONFIGURATIONS

A0



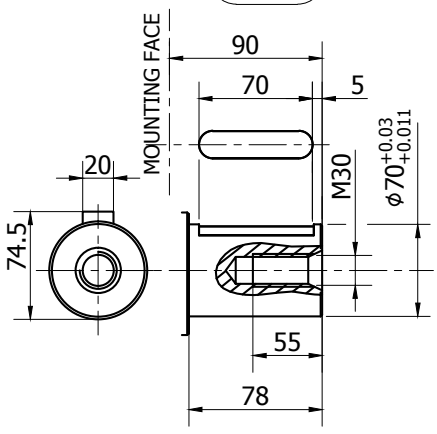
Available spline billet: SB17

A1

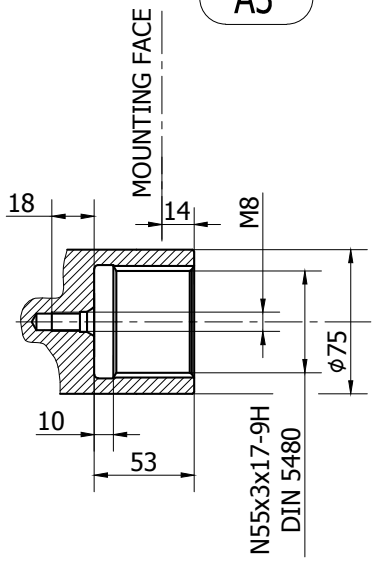


Available spline billet: SB23

A2



A3



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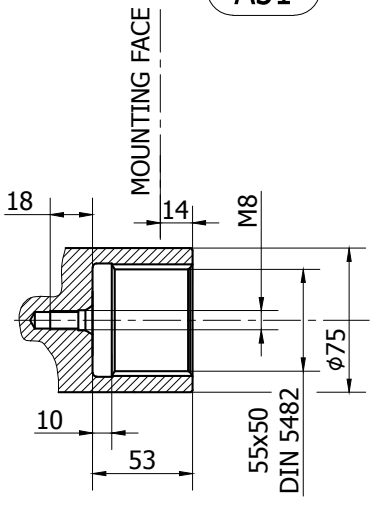
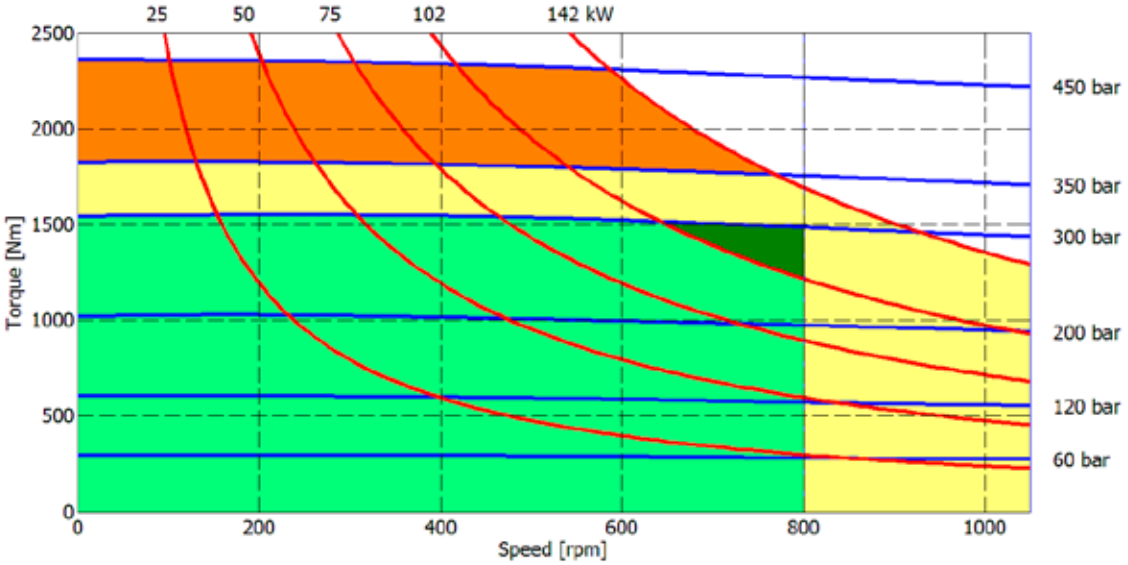
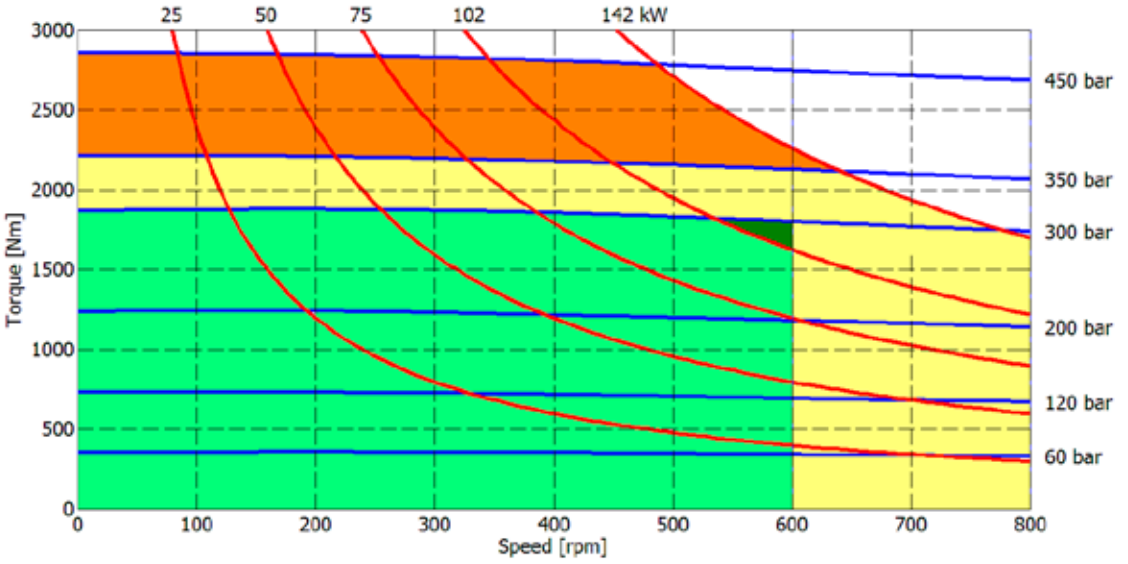


350 cc



400 cc



Continuous operation

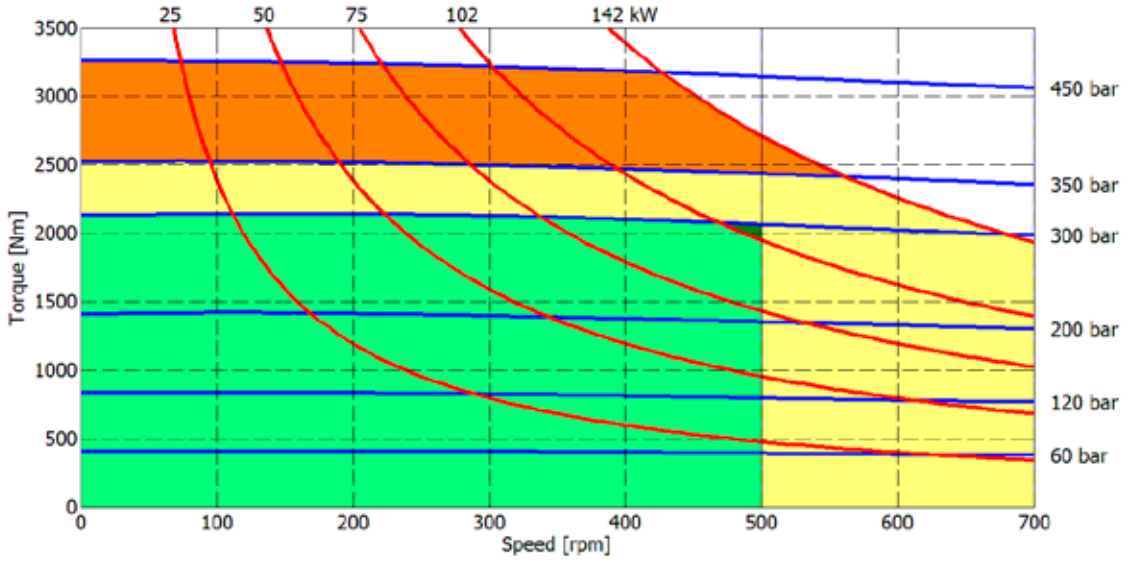
Continuous operation with flushing or intermittent operation (see below for intermittent operation)

Intermittent operation: permitted for a 15% of duty cycle, for 3 minutes maximum period

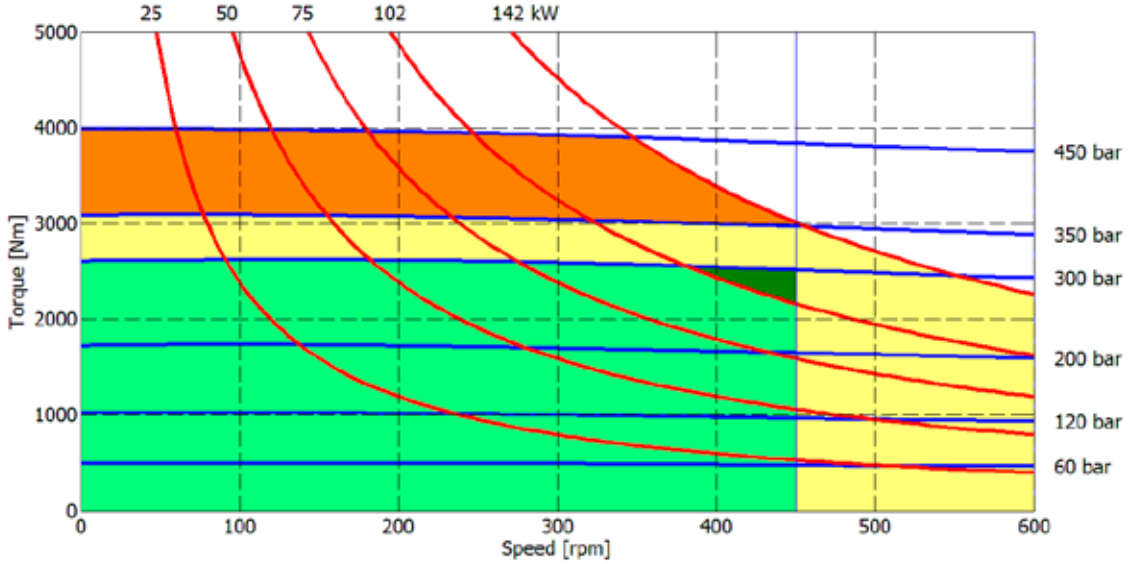
Peak operation: permitted for very short periods (3-5 seconds every 10-15 minutes)

The above diagrams are referring to the hydraulic motor working with a fluid in ideal conditions (viscosity at 40 cSt). In case the working temperature increases and viscosity reach values under the recommended values (see hydraulic fluid recommendations) flushing must be performed or ISO oil grade must be changed. The working temperature must not overcome 70 °C.

500 cc



600 cc



Continuous operation

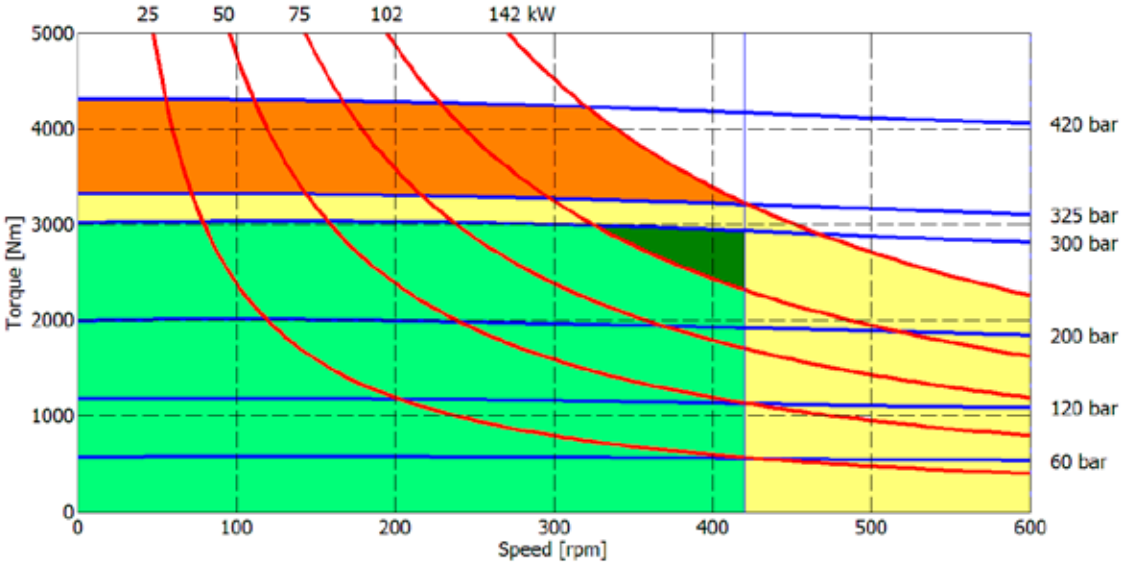
Continuous operation with flushing or intermittent operation (see below for intermittent operation)

Intermittent operation: permitted for a 15% of duty cycle, for 3 minutes maximum period

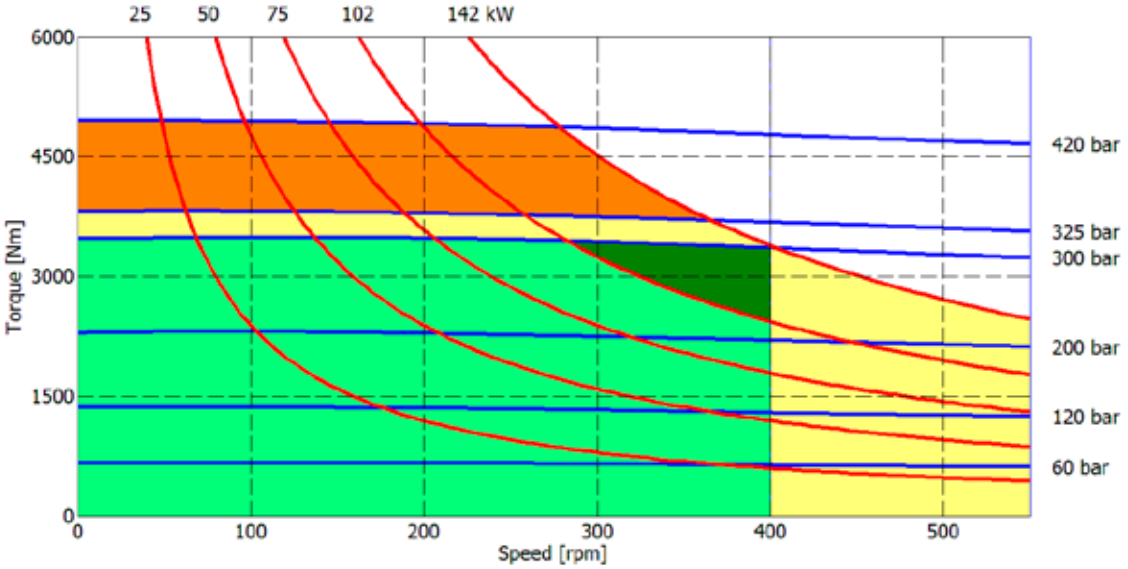
Peak operation: permitted for very short periods (3-5 seconds every 10-15 minutes)

The above diagrams are referring to the hydraulic motor working with a fluid in ideal conditions (viscosity at 40 cSt). In case the working temperature increases and viscosity reach values under the recommended values (see hydraulic fluid recommendations) flushing must be performed or ISO oil grade must be changed. The working temperature must not overcome 70 °C.

700 cc



800 cc



Continuous operation

Continuous operation with flushing or intermittent operation (see below for intermittent operation)

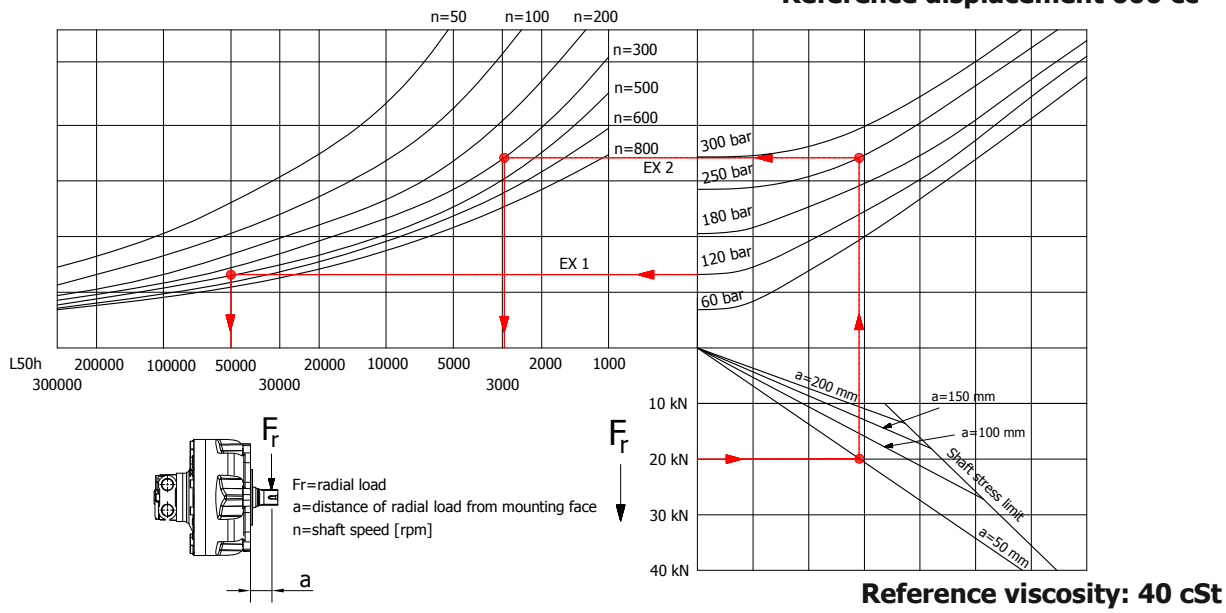
Intermittent operation: permitted for a 15% of duty cycle, for 3 minutes maximum period

Peak operation: permitted for very short periods (3-5 seconds every 10-15 minutes)

The above diagrams are referring to the hydraulic motor working with a fluid in ideal conditions (viscosity at 40 cSt). In case the working temperature increases and viscosity reach values under the recommended values (see hydraulic fluid recommendations) flushing must be performed or ISO oil grade must be changed. The working temperature must not overcome 70 °C.

BEARING LIFE

Reference displacement 600 cc



Reference viscosity: 40 cSt

Example:
We suppose (EX1): p=120 [bar], n=500 [rpm]; we obtain an average lifetime of 50000 [h].
If we suppose (EX2): F_r=20 [kN], a=50 [mm], n=300 [rpm] and p=250 [bar] we obtain an average lifetime of 2900 [h].

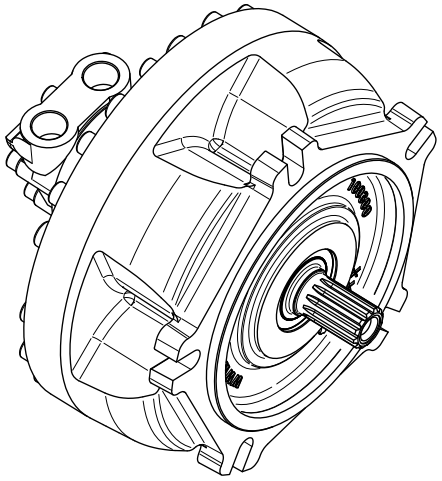
HCD3 - ORDERING CODE

HCD | 3 | - - - | - - | - - | - - | - - | - - | SB -

DISPLACEMENT
350 | 400 | 500 | 600 | 700 | 800

INTERCHANGEABILITY
/G2 | /G4

SHAFT
A0 | A1 | A2 | A3 | A31



TACHOMETER
J (*) | TA | TB | TT1 | TQ1 | EST | EST30 | EST31

See pag. 84-87

(*) Tachometer predisposition

SPECIAL FEATURES
HSM

See pag. 7

MP | SPSL | HPS | CCW

See pag. 23

Z - -
Italgroup internal code

DISTRIBUTOR
D31B | D36B | D310B | D40 | D47 | D416 | D90

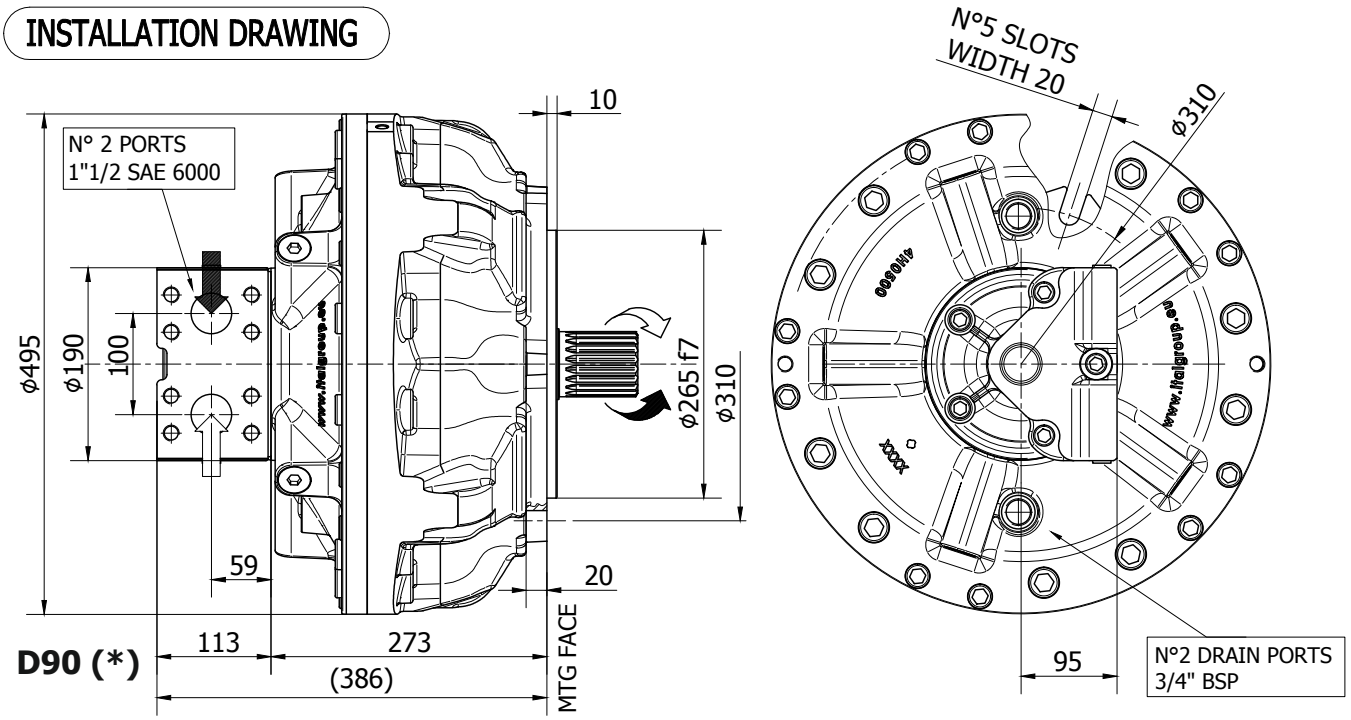
See pag. 82-83

SPLINE BILLET
SB3 | SB5 | SB17 | SB22 | SB23

See pag. 88

ITALGROUP SRL
HCD SERIES - HCD5
GENERAL CATALOGUE
INDEX - HCD5

INSTALLATION DRAWING



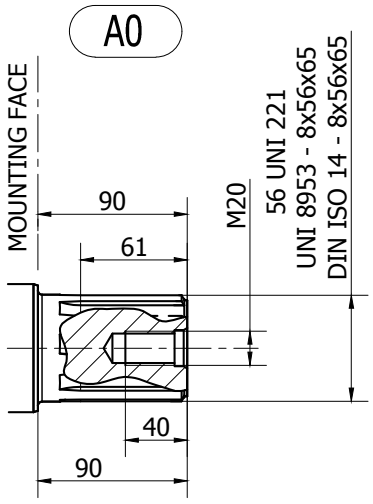
TECHNICAL DATA

		800	1000	1200	1300	1500	1600
DISPLACEMENT	[cc]	837	1060	1200	1308	1462	1625
SPECIFIC TORQUE	[Nm/bar]	13,3	16,9	19,1	20,8	23,3	25,9
MAX. CONT. PRESSURE	[bar]	300	300	300	300	275	275
HYDROSTATIC TEST PRESSURE	[bar]	450	450	450	450	420	420
MAX. CONT. SPEED	[rpm]	580	500	500	470	470	420
PEAK SPEED (***)	[rpm]	720	700	650	620	620	620
MAX. CONT. POWER (****)	[kW]	150	150	150	150	150	150
MAX. CONT. POWER WITH FLUSHING	[kW]	210	210	210	210	210	210
MAX. CASE PRESSURE	[bar]	10	10	10	10	10	10
DRY WEIGHT	[kg]	178	178	178	178	178	178
TEMPERATURE RANGE (**)	[°C]	-30÷70	-30÷70	-30÷70	-30÷70	-30÷70	-30÷70

- (*) The standard distributor (D90) is shown. Please refer to distributors section (pag. 82-83) for differents distributor interfaces.
- (**) Please refer to the hydraulic fluid recommendations (pag. 8-9).
- (***) Do not exceed maximum continuous power with flushing (pag. 11).
- (****) For motor operation with a continuous duty cycle at maximum continuous power the flushing is usually required. For more information please contact our technical department.

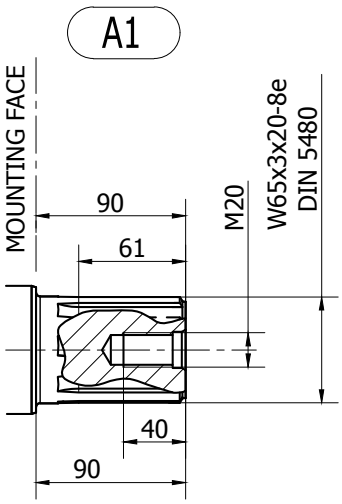
SHAFT CONFIGURATIONS

A0



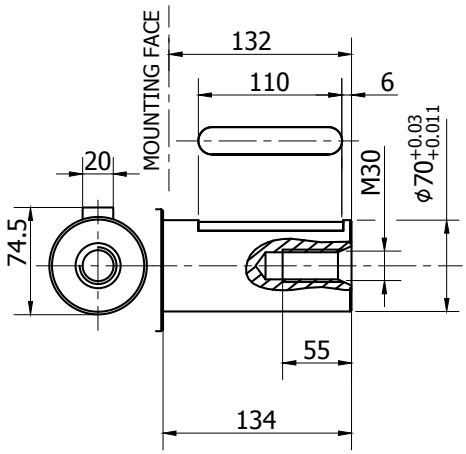
Available spline billet: SB17

A1

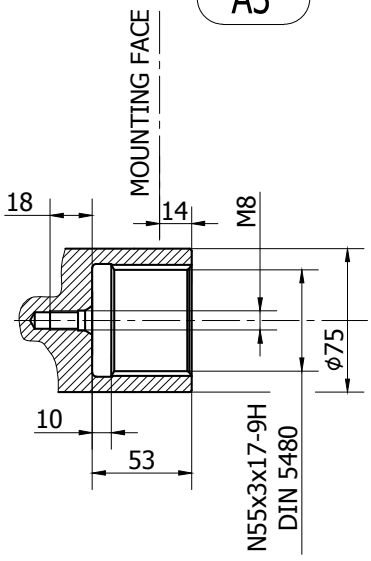


Available spline billet: SB23

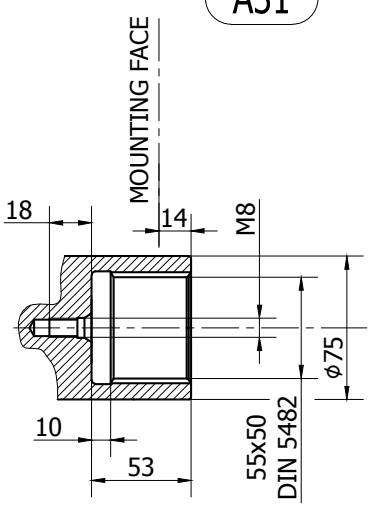
A2



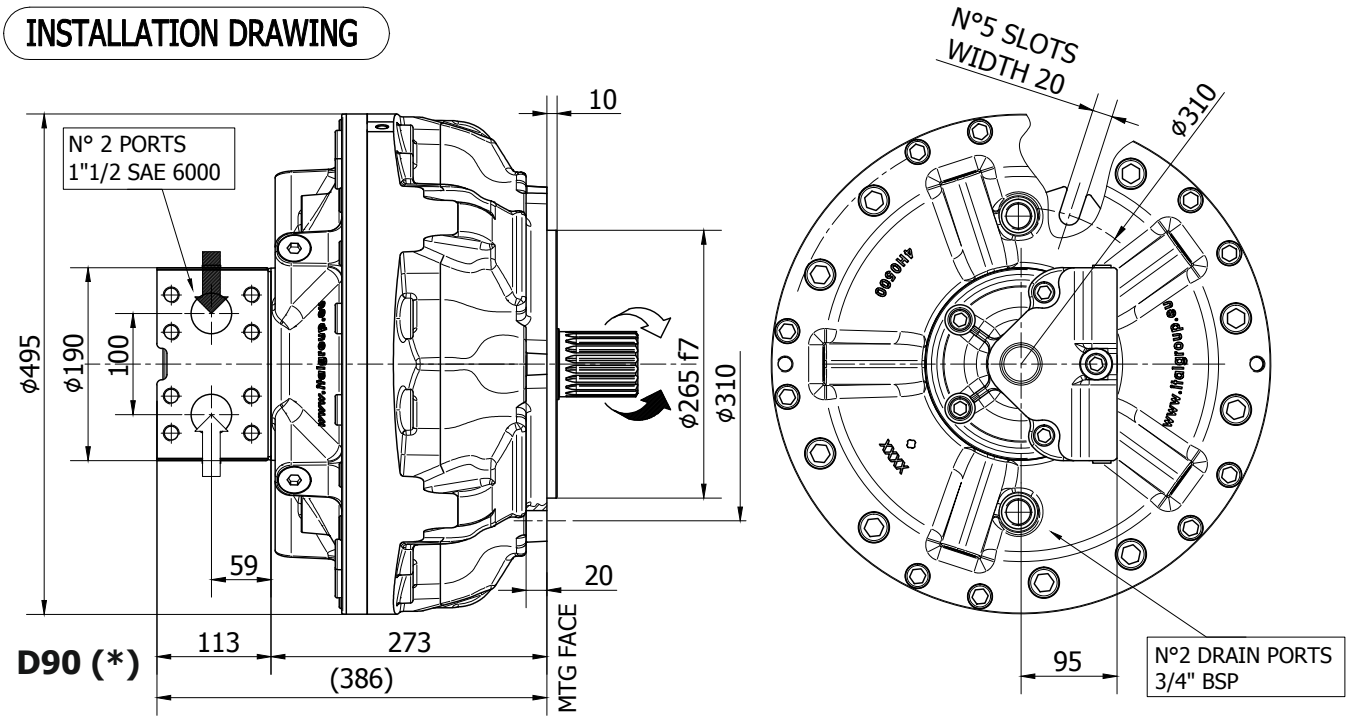
A3



A31



INSTALLATION DRAWING



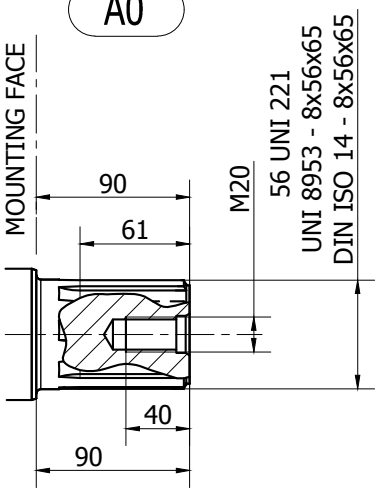
TECHNICAL DATA

		800	1000	1200	1300	1500	1600
DISPLACEMENT	[cc]	837	1060	1200	1308	1462	1625
SPECIFIC TORQUE	[Nm/bar]	13,3	16,9	19,1	20,8	23,3	25,9
MAX. CONT. PRESSURE	[bar]	300	300	300	300	275	275
HYDROSTATIC TEST PRESSURE	[bar]	450	450	450	450	420	420
MAX. CONT. SPEED	[rpm]	580	500	500	470	470	420
PEAK SPEED (***)	[rpm]	720	700	650	620	620	620
MAX. CONT. POWER (****)	[kW]	150	150	150	150	150	150
MAX. CONT. POWER WITH FLUSHING	[kW]	210	210	210	210	210	210
MAX. CASE PRESSURE	[bar]	10	10	10	10	10	10
DRY WEIGHT	[kg]	178	178	178	178	178	178
TEMPERATURE RANGE (**)	[°C]	-30÷70	-30÷70	-30÷70	-30÷70	-30÷70	-30÷70

- (*) The standard distributor (D90) is shown. Please refer to distributors section (pag. 82-83) for differents distributor interfaces.
- (**) Please refer to the hydraulic fluid recommendations (pag. 8-9).
- (***) Do not exceed maximum continuous power with flushing (pag. 11).
- (****) For motor operation with a continuous duty cycle at maximum continuous power the flushing is usually required. For more information please contact our technical department.

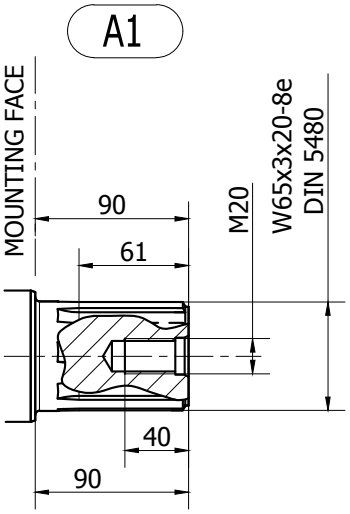
SHAFT CONFIGURATIONS

A0



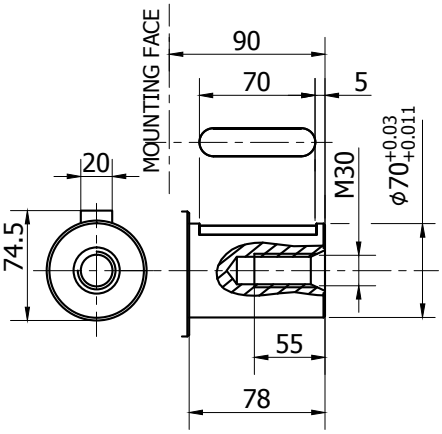
Available spline billet: SB17

A1

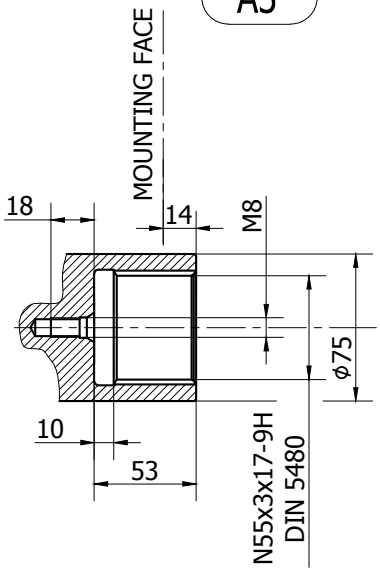


Available spline billet: SB23

A2



A3



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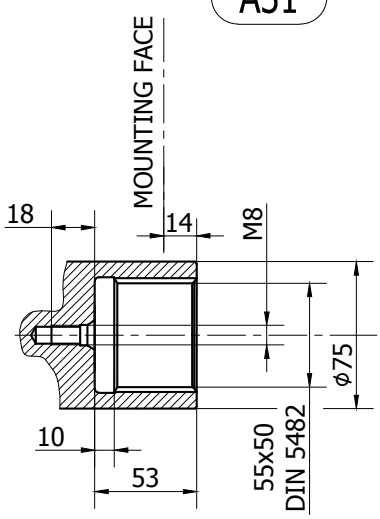
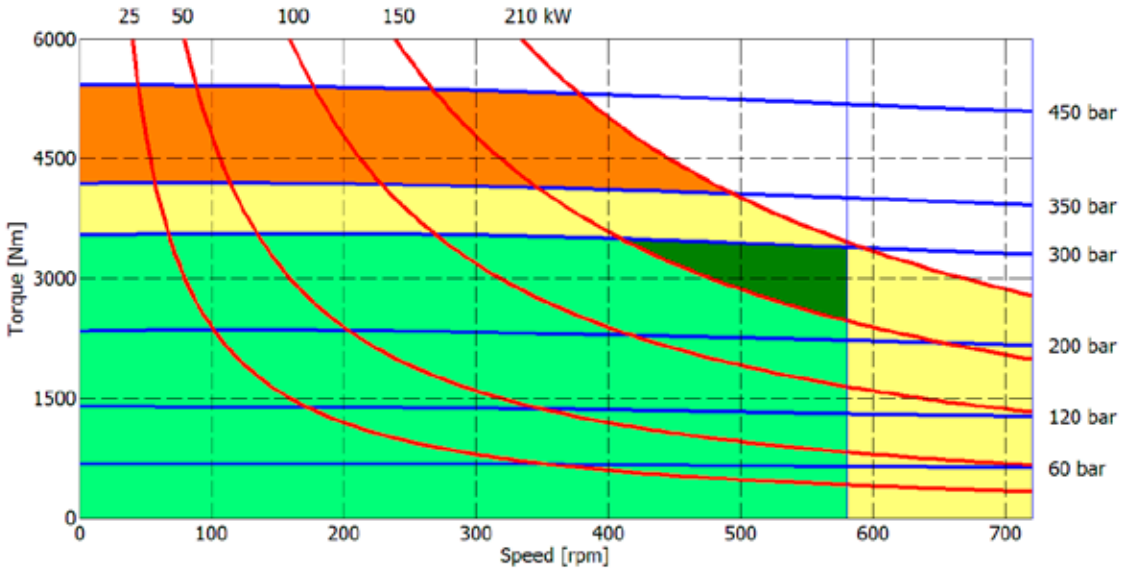
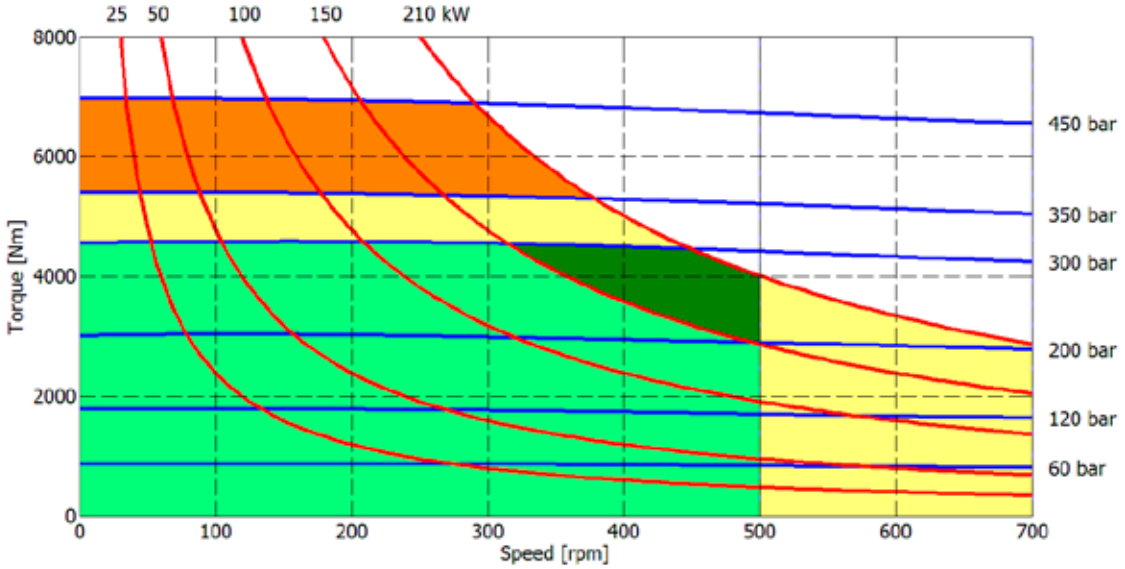


800 cc



1000 cc



Continuous operation

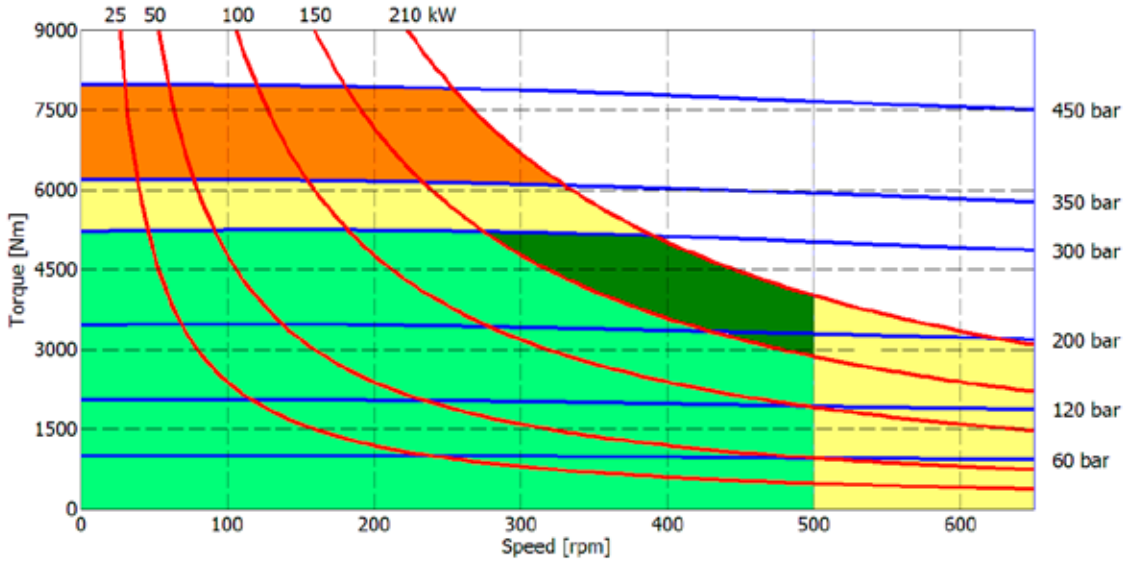
Continuous operation with flushing or intermittent operation (see below for intermittent operation)

Intermittent operation: permitted for a 15% of duty cycle, for 3 minutes maximum period

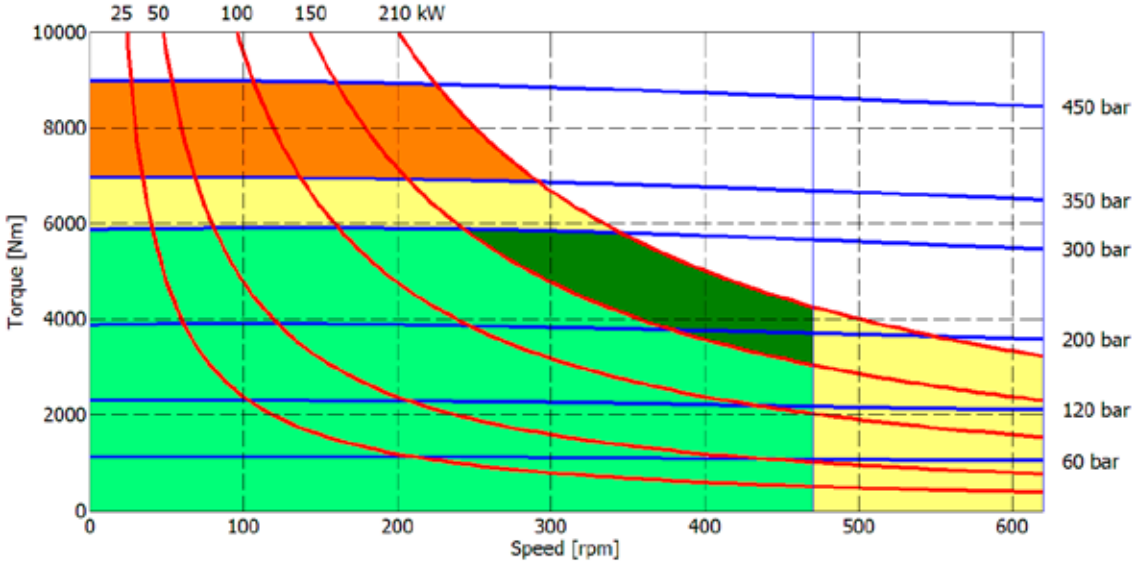
Peak operation: permitted for very short periods (3-5 seconds every 10-15 minutes)

The above diagrams are referring to the hydraulic motor working with a fluid in ideal conditions (viscosity at 40 cSt). In case the working temperature increases and viscosity reach values under the recommended values (see hydraulic fluid recommendations) flushing must be performed or ISO oil grade must be changed. The working temperature must not overcome 70 °C.

1200 cc



1300 cc



Continuous operation

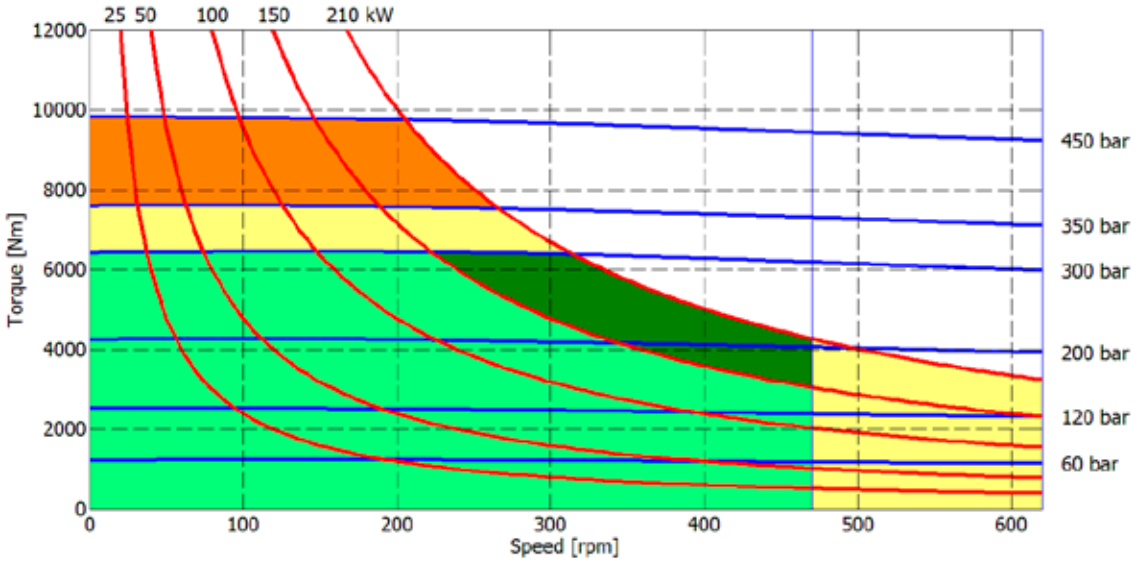
Continuous operation with flushing or intermittent operation (see below for intermittent operation)

Intermittent operation: permitted for a 15% of duty cycle, for 3 minutes maximum period

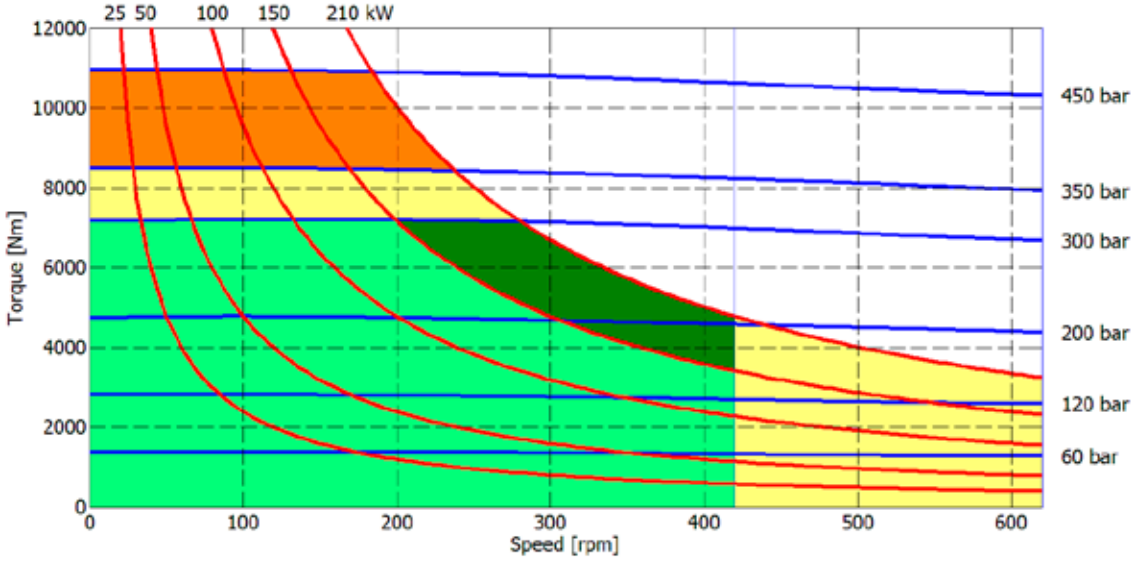
Peak operation: permitted for very short periods (3-5 seconds every 10-15 minutes)

The above diagrams are referring to the hydraulic motor working with a fluid in ideal conditions (viscosity at 40 cSt). In case the working temperature increases and viscosity reach values under the recommended values (see hydraulic fluid recommendations) flushing must be performed or ISO oil grade must be changed. The working temperature must not overcome 70 °C.

1500 cc



1600 cc



Continuous operation

Continuous operation with flushing or intermittent operation (see below for intermittent operation)

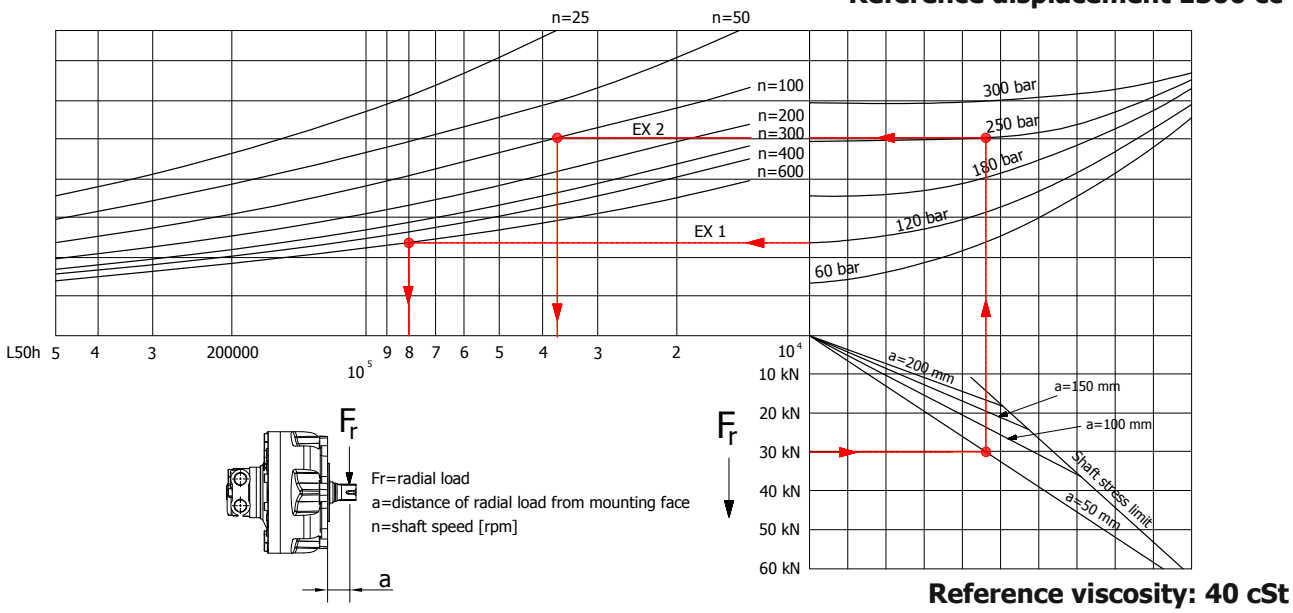
Intermittent operation: permitted for a 15% of duty cycle, for 3 minutes maximum period

Peak operation: permitted for very short periods (3-5 seconds every 10-15 minutes)

The above diagrams are referring to the hydraulic motor working with a fluid in ideal conditions (viscosity at 40 cSt). In case the working temperature increases and viscosity reach values under the recommended values (see hydraulic fluid recommendations) flushing must be performed or ISO oil grade must be changed. The working temperature must not overcome 70 °C.

BEARING LIFE

Reference displacement 1300 cc



Reference viscosity: 40 cSt

Example:
We suppose (EX1): p=120 [bar], n=600 [rpm]; we obtain an average lifetime of 80000 [h].
If we suppose (EX2): F_r=30 [kN], a=50 [mm], n=100 [rpm] and p=250 [bar] we obtain an average lifetime of 38000 [h].

HCD5 - ORDERING CODE

HCD | 5 | - - - | - - | - - | - - | - - | - - | SB -

DISPLACEMENT
800 | 1000 | 1200 | 1300 | 1500 | 1600

INTERCHANGEABILITY
/G4

SHAFT
A0 | A1 | A2 | A3 | A31

TACHOMETER
J (*) | TA | TB | TT1 | TQ1 | EST | EST30 | EST31

See pag. 84-87

(*) Tachometer predisposition

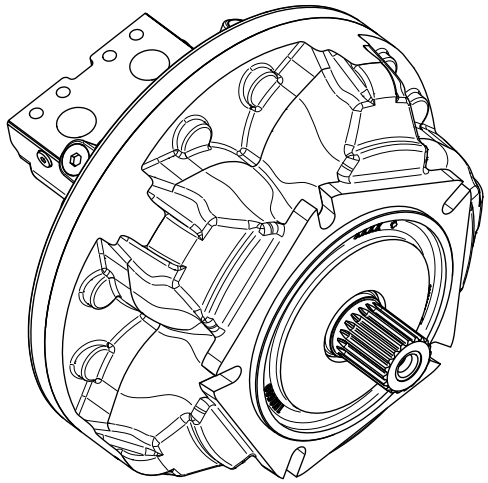
SPECIAL FEATURES
HSM

See pag. 7

MP | SPSL | HPS | CCW

See pag. 23

Z - -
Italgroup internal code



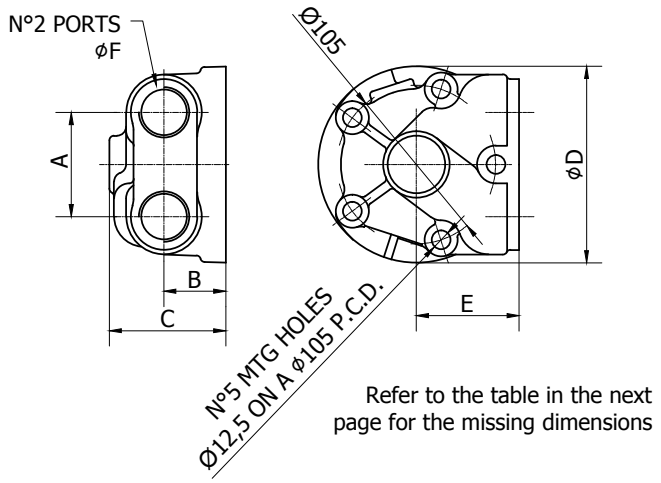
DISTRIBUTOR
D31B | D36B | D310B | D40 | D47 | D416 | D90

See pag. 82-83

SPLINE BILLET
SB17 | SB23

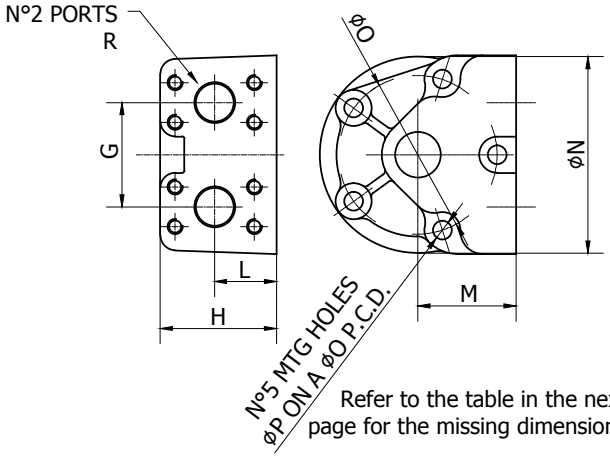
See pag. 88

D40-D416-D31B-D310B-D36B-D316B



Refer to the table in the next page for the missing dimensions

D47-D90



Refer to the table in the next page for the missing dimensions

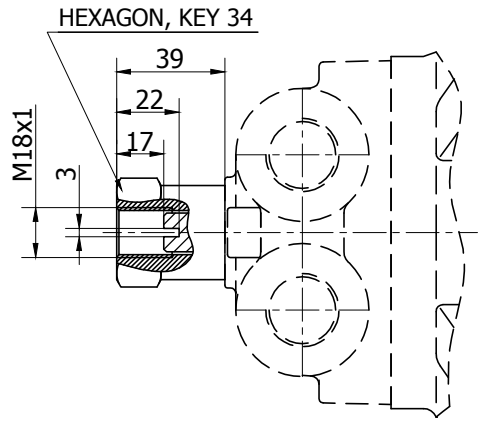
		D40	D416	D31B	D310B	D36B	D316B	D47	D90
A	[mm]	69	69	56	56	56	56		
B	[mm]	41	41	32	32	32	32		
C	[mm]	77	77	60	60	60	60		
D	[mm]	130	130	125	125	125	125		
E	[mm]	68	68	65	65	65	65		
F	[]	1" BSP	1" SAE	3/4" BSP	1" BSP	3/4" SAE	1" SAE		
G	[mm]							69	100
H	[mm]							77	113
L	[mm]							41	59
M	[mm]							65	95
N	[mm]							130	190
O	[mm]							105	149
P	[mm]							12,5	14,5
R	[]							1" SAE 3000	1"1/2 SAE 6000

		D31B	D310B	D36B	D316B	D40	D416	D47	D90
MAX. CONT. FLOW	[l/min]	200	300	200	300	300	300	300	700
MAX. FLOW	[l/min]	400	400	400	400	400	400	400	1200
MAX. CONT. PRESSURE	[bar]	300	300	300	300	300	300	300	300
PEAK PRESSURE	[bar]	500	500	500	500	500	500	500	500
HCD05		●	●	●	●	●	●	●	
HCD1		●	●	●	●	●	●	●	
HCD2		●	●	●	●	●	●	●	
HCD3		●	●	●	●	●	●	●	◒
HCD5		◒	◒	◒	◒	◒	◒	◒	●

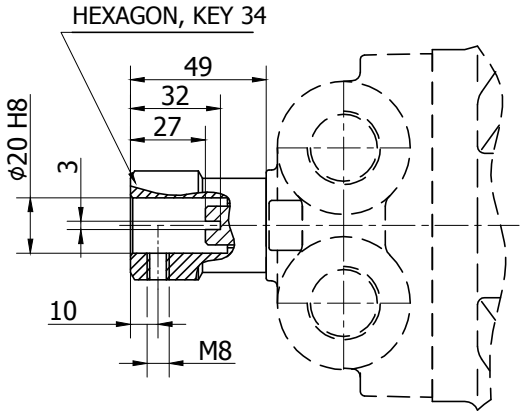
● Standard version

◒ Special version: available on request. Please contact Italgroup for more details

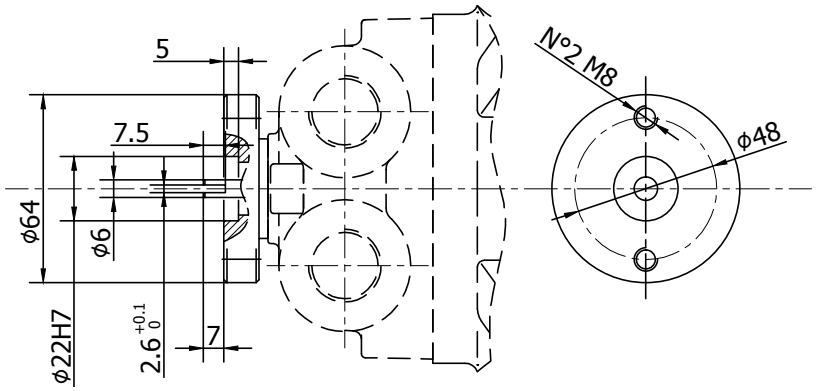
TA



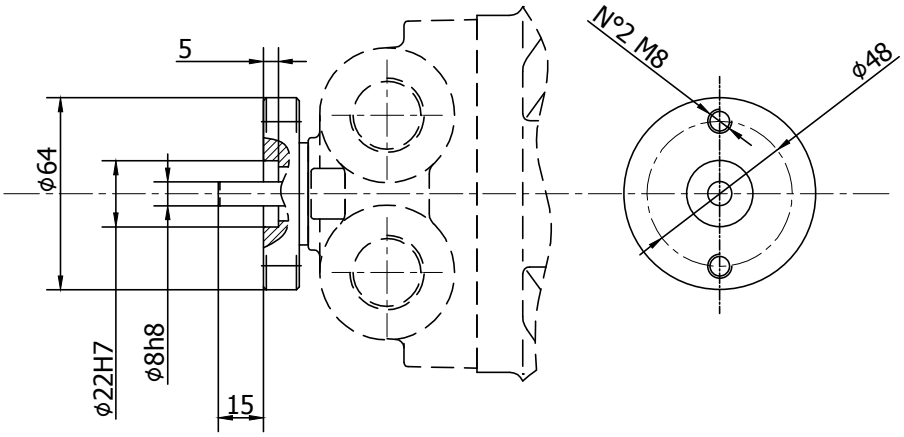
TB



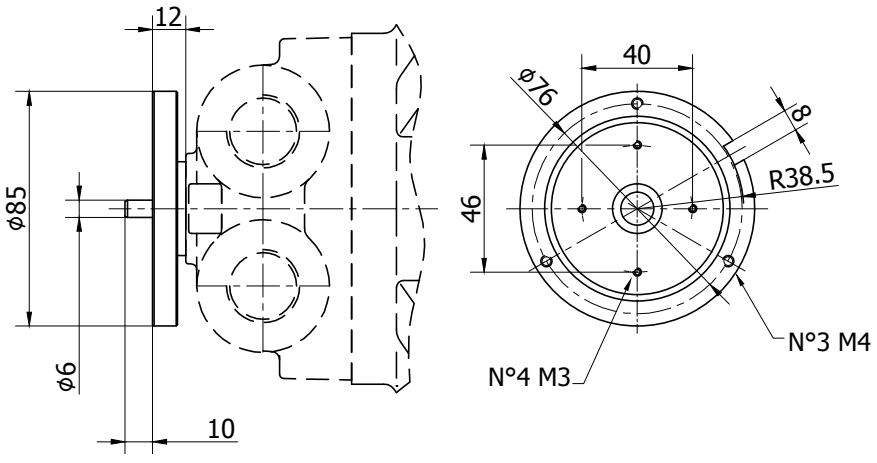
TT1



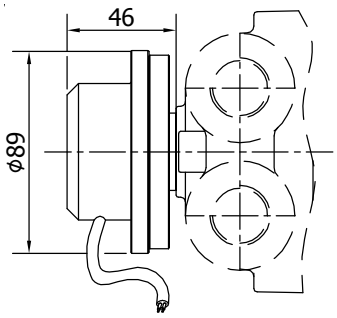
TQ1



EST



EST30

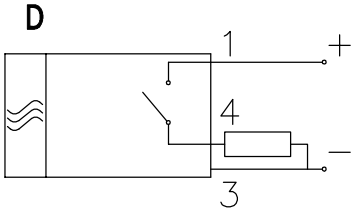


Operating parameters	E-...../3
Power supply (VDC)	10-30
Switching current (mA)	150
Frequency (Hz) 100rpm	50
Impulse/rpm	30
Operating temp. (°C)	-24/+70
Protection degree	IP67
Output	NPN
Motor type	All types

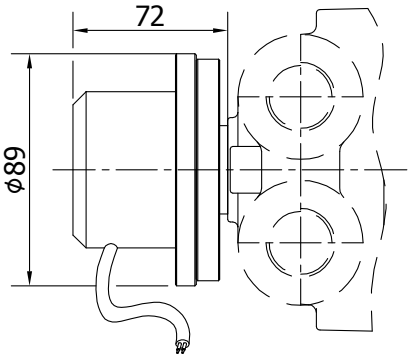
MODEL	ø5
Torque	1 Nm

Model	Output	Fig.
E-..../.AP/....	PNP	D

D

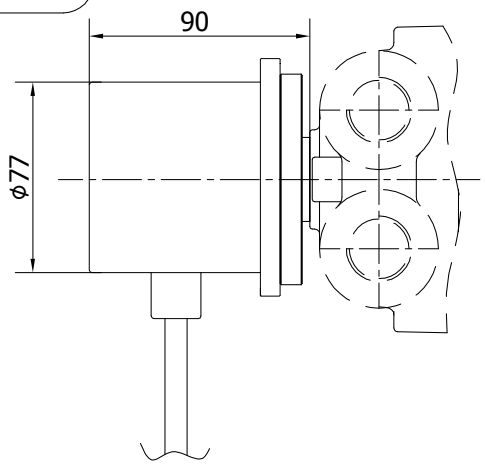


EST31



Power supply (VDC)	8-24
Impulse/rpm	500
Operating temp. (°C)	0/+60
Protection degree	IP65
Output	Push-pull
Motor type	All types
MODEL	ø5
Torque	1 Nm

EST32

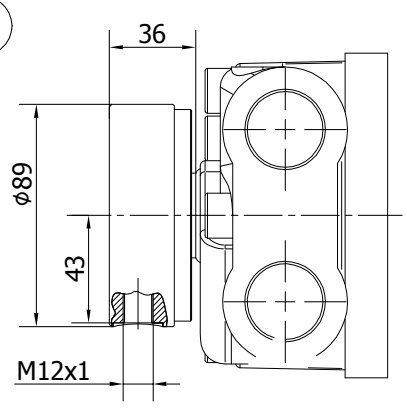


Power supply (VDC)	8-24
Position control	4096 positions/rpm
Memory space	4096 rpm
Operating temp. (°C)	-20/+100
Protection degree	IP67
Output	SSI interface
Motor type	All types

MODEL	ϕ6
Torque	1 Nm

Encoder type: EAM 36 F 12/12 G8/30 S P Z E 6x6 PR2

EST33

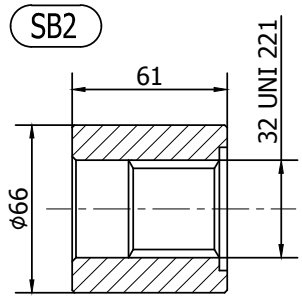


Impulse/rpm	12
Motor type	All types

Sensor NOT included

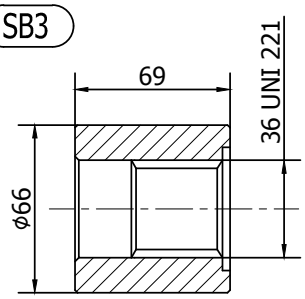
SPLINED BILLETS

SB2



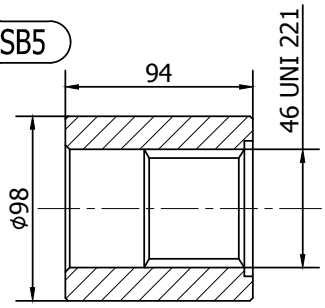
For: HCD1/C190 A0

SB3



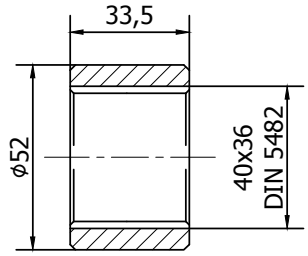
For: HCD2 A0
HCD2/S2 A0
HCD3/G2 A0

SB5



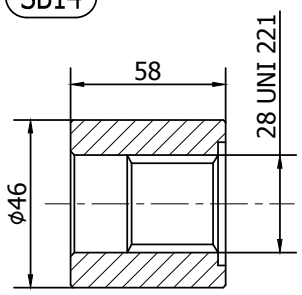
For: HCD3 A0

SB13



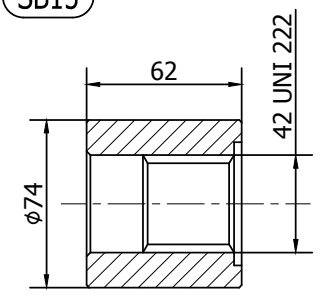
For: HCD05 A11

SB14



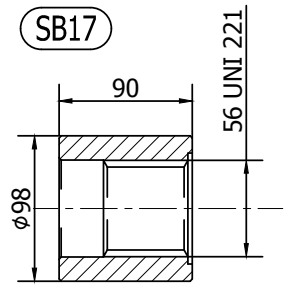
For: HCD05 A0
HCD1 A0

SB15



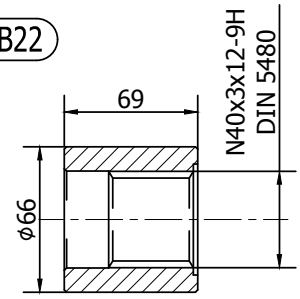
For: HCD2/C300 A0

SB17



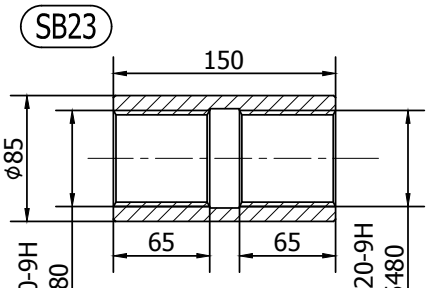
For: HCD3/G4 A0
HCD5/G4 A0
HCD5 A0

SB22



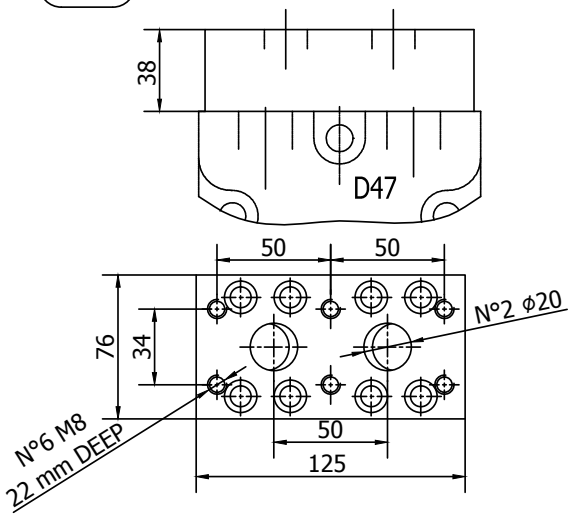
For: HCD2 A0
HCD2/S2 A0
HCD3/G2 A0
HCD3 A0

SB23



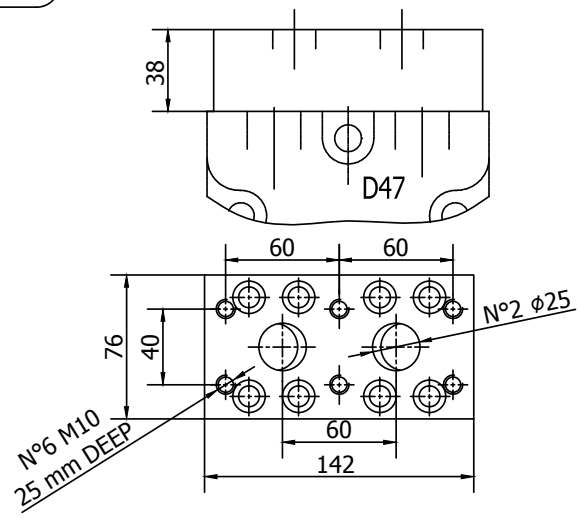
For: HCD3/G4 A1
HCD5/G4 A1
HCD5 A1

FL1



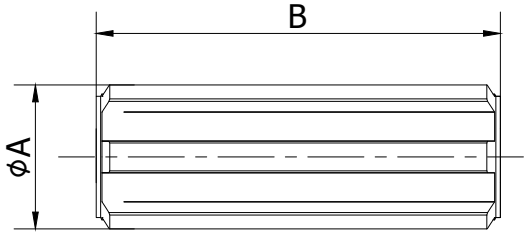
Connection block, fitting D47 distributor, for motor MR 125/160/190/200/250/300/330

FL2



Connection block, fitting D47 distributor, for motor MR 350/450/500/600/700/800

SPLINED BARS

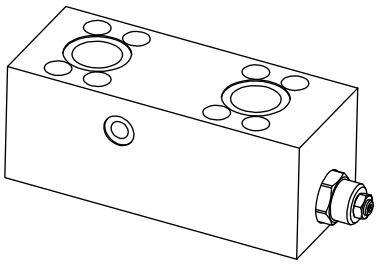


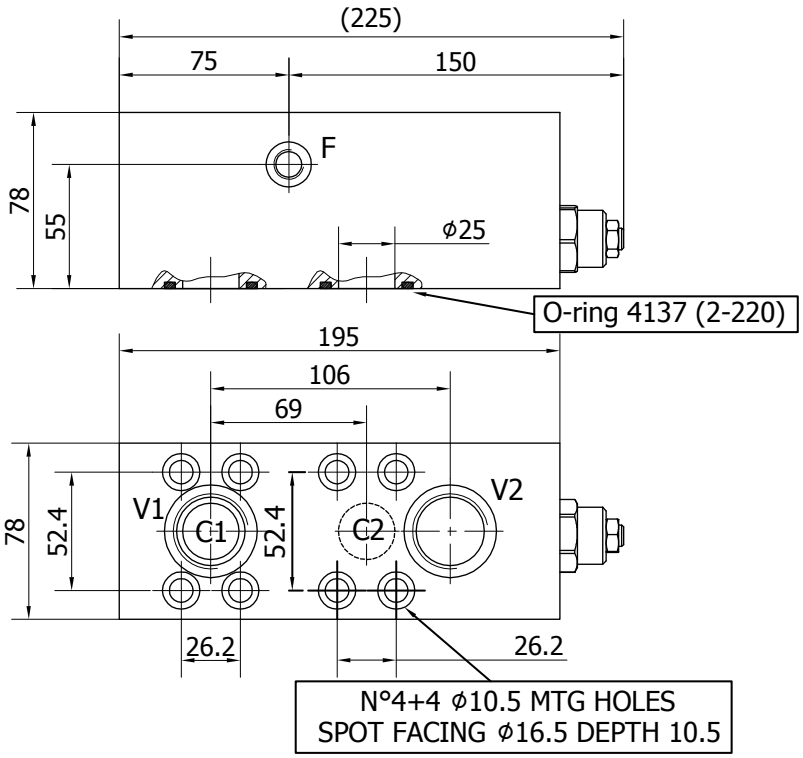
	A	B
B8075	W35x2x16-8e DIN 5480	100
B8076	W40x3x12-8e DIN 5480	100
B8077	28 UNI 221	100
B8078	36 UNI 220	100

ITALGROUP MOTORS
IAMD SERIES - VALVES
TECHNICAL CATALOGUE
INDEX - VALVES

SINGLE OVERCENTER VALVE - OVSA 160

INSTALLATION DRAWING





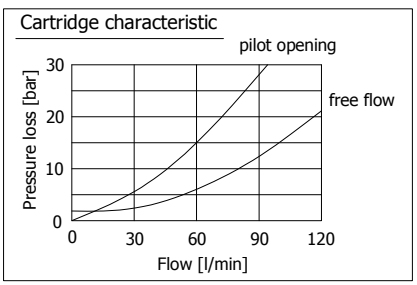
PORTS DIMENSION

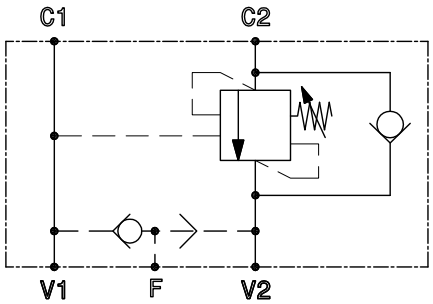
V1,V2	1" BSP
F	1/4" BSP
C1,C2	O-ring 4137 Parker code 2-220

TECHNICAL DATA - OVSA 160

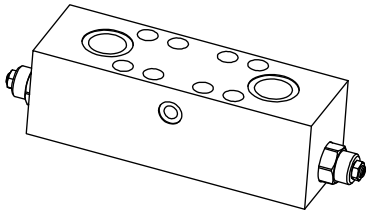
		OVSA.160.1.A.D47	OVSA.160.2.C.D47	OVSA.160.3.C.D47
NOMINAL FLOW	[l/min]	120	120	120
MAXIMUM FLOW	[l/min]	160	160	160
MAXIMUM PRESSURE	[bar]	350	350	350
PILOT RATIO	[]	3:1	4.5:1	10:1
RELIEF VALVE SETTING RANGE	[bar]	70-280	140-350	140-350
STANDARD RELIEF SETTING	[bar]	210	210	210
BLOCK MATERIAL	[]	steel	steel	steel
DISTRIBUTOR FITTING	[]	D47	D47	D47

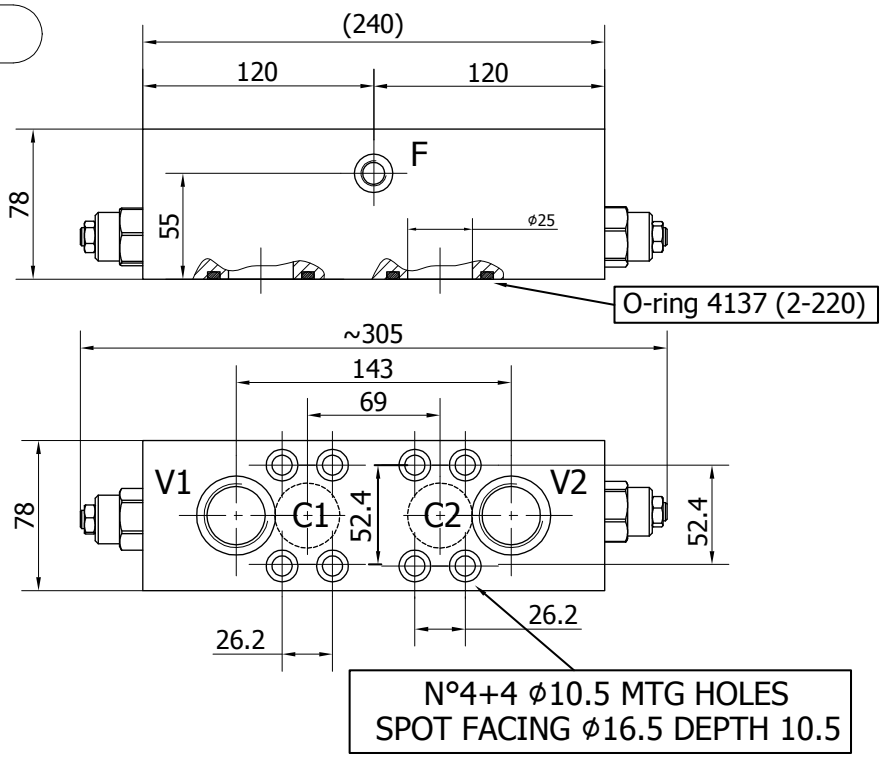
- (*) Standard version. Usually ready on stock.





INSTALLATION DRAWING



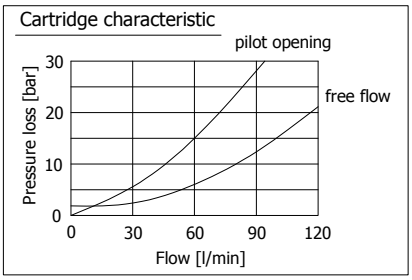


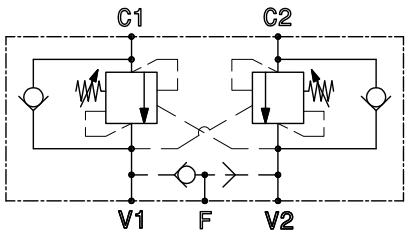
PORTS DIMENSION

V1,V2	1" BSP
F	1/4" BSP
C1,C2	O-ring 4137 Parker code 2-220

TECHNICAL DATA - OVDA 160

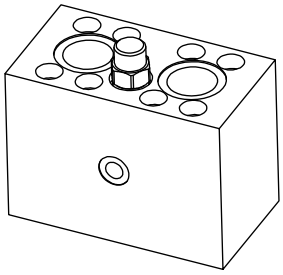
		OVDA.160.1.A.D47	OVDA.160.2.C.D47	OVDA.160.3.C.D47
NOMINAL FLOW	[l/min]	120	120	120
MAXIMUM FLOW	[l/min]	160	160	160
MAXIMUM PRESSURE	[bar]	350	350	350
PILOT RATIO	[]	3:1	4.5:1	10:1
RELIEF VALVE SETTING RANGE	[bar]	70-280	140-350	140-350
STANDARD RELIEF SETTING	[bar]	210	210	210
BLOCK MATERIAL	[]	steel	steel	steel
DISTRIBUTOR FITTING	[]	D47	D47	D47

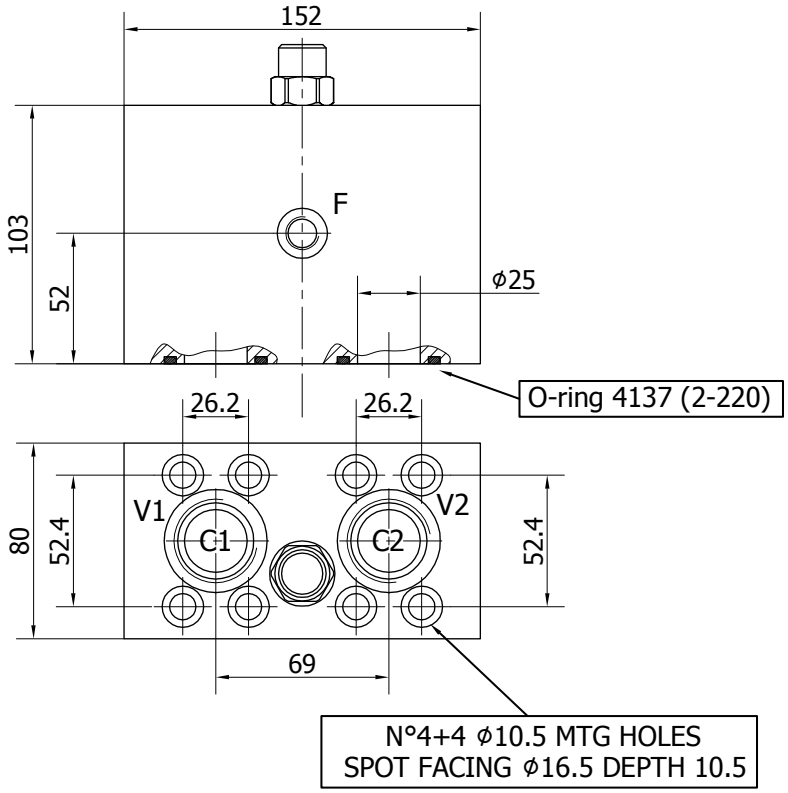




FLUSHING VALVE - AP40

INSTALLATION DRAWING



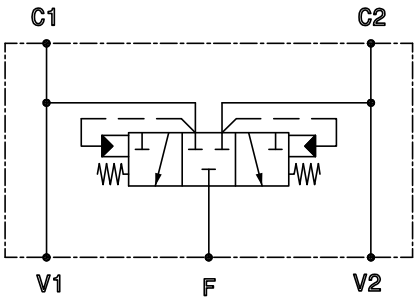


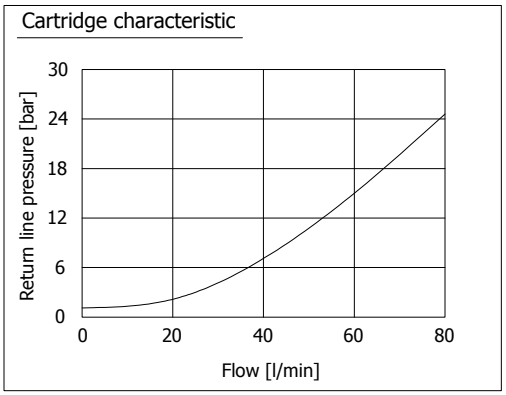
PORTS DIMENSION

V1,V2	1" BSP
F	1/4" BSP
C1,C2	O-ring 4137 Parker code 2-220

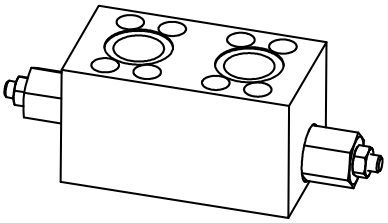
TECHNICAL DATA - AP40

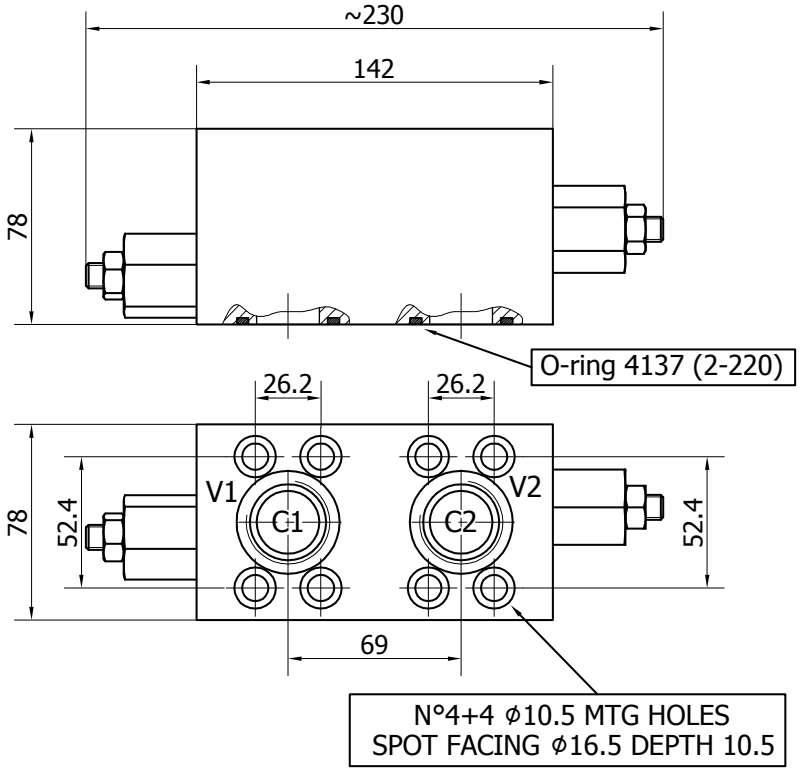
		AP40.D47
MAXIMUM FLUSHING FLOW	[l/min]	80
MAXIMUM PRESSURE	[bar]	350
BLOCK MATERIAL	[]	steel
DISTRIBUTOR FITTING	[]	D47





INSTALLATION DRAWING



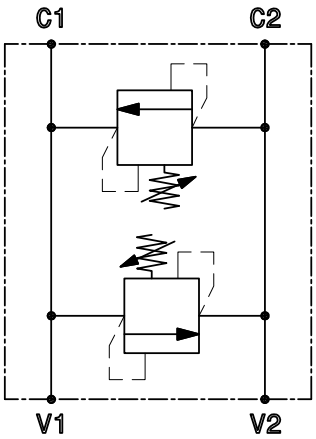


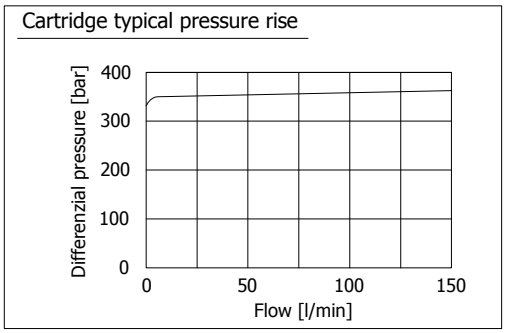
PORTS DIMENSION

V1,V2	1" BSP
C1,C2	O-ring 4137 Parker code 2-220

TECHNICAL DATA - RVDA 80

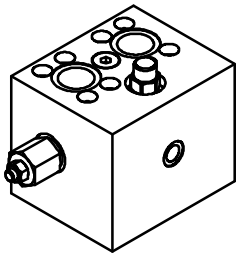
		RVDA.80.C.D47
NOMINAL FLOW	[l/min]	150
MAXIMUM FLOW	[l/min]	200
MAXIMUM PRESSURE	[bar]	350
RELIEF VALVE SETTING RANGE	[bar]	20-350
STANDARD RELIEF SETTING	[bar]	20
BLOCK MATERIAL	[]	steel
DISTRIBUTOR FITTING	[]	D47

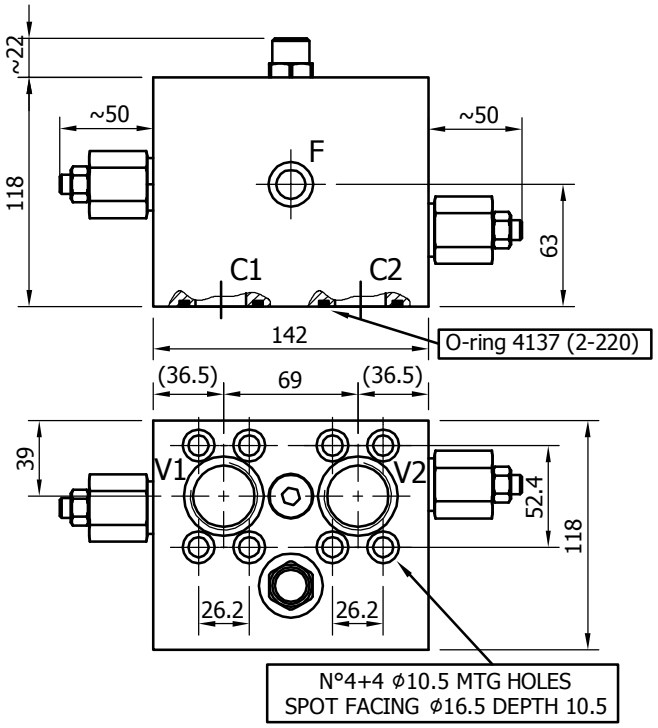




DOUBLE RELIEF WITH FLUSHING - RVDAP80

INSTALLATION DRAWING



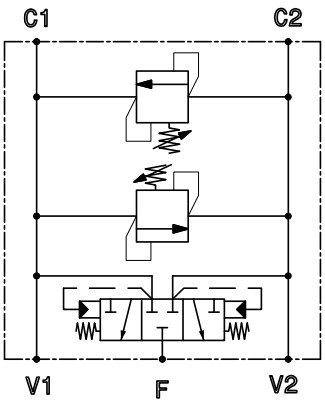


PORTS DIMENSION

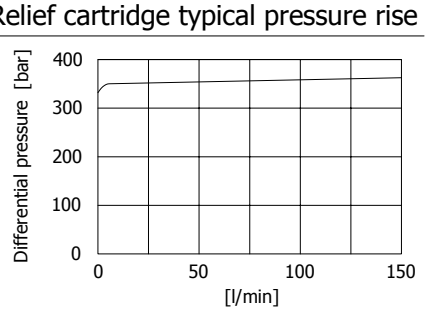
V1,V2	1" BSP
F	1/4" BSP
C1,C2	O-ring 4137 Parker code 2-220

TECHNICAL DATA - RVDAP 80

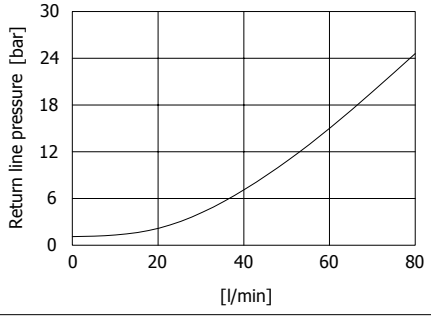
		RVDAP 80
RELIEF VALVE MAXIMUM FLOW	[l/min]	200
RELIEF VALVE SETTING RANGE	[bar]	20-350
STANDARD RELIEF SETTING	[bar]	70
MAXIMUM FLUSHING FLOW	[l/min]	80
MAXIMUM PRESSURE	[bar]	350
BLOCK MATERIAL	[]	steel
DISTRIBUTOR FITTING	[]	D47



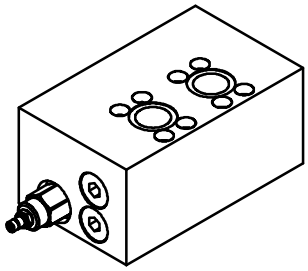
Relief cartridge typical pressure rise

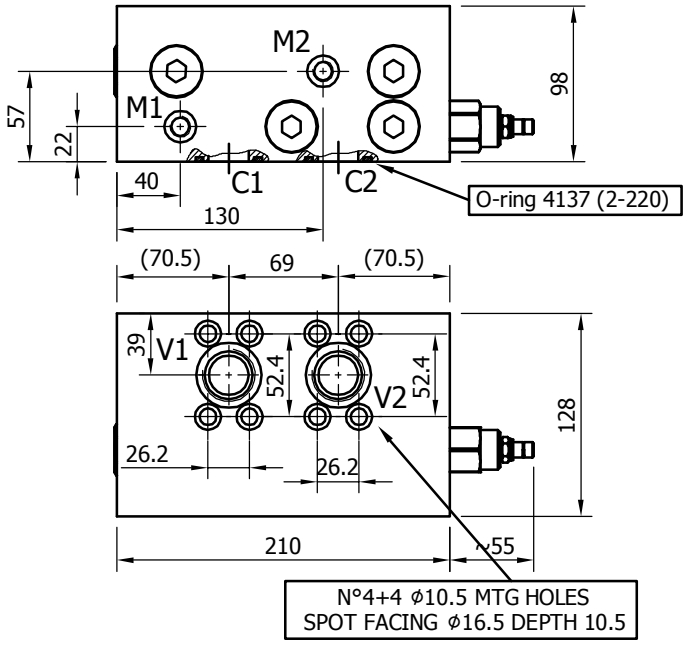


Flushing valve characteristic



INSTALLATION DRAWING



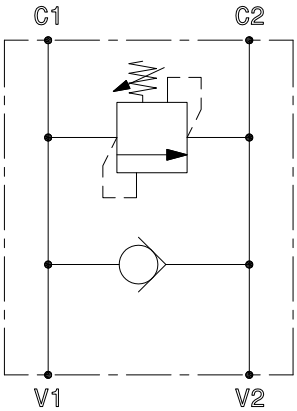


PORTS DIMENSION

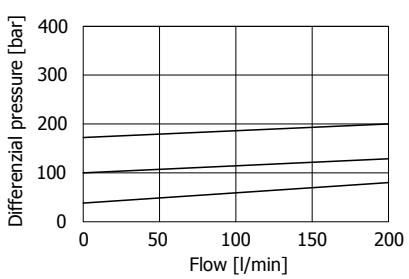
V1,V2	1" BSP
M1,M2	1/4" BSP
C1,C2	O-ring 4137 Parker code 2-220

TECHNICAL DATA - RVSAC 200

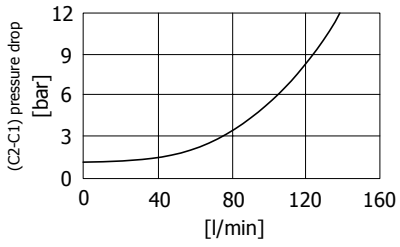
		RVSAC200
RELIEF VALVE MAXIMUM FLOW	[l/min]	200
MAXIMUM PRESSURE	[bar]	350
RELIEF VALVE SETTING RANGE	[bar]	70-420
STANDARD RELIEF SETTING	[bar]	70
CHECK VALVE MAXIMUM FLOW	[l/min]	160
BLOCK MATERIAL	[]	steel
DISTRIBUTOR FITTING	[]	D47



Cartridge typical pressure rise

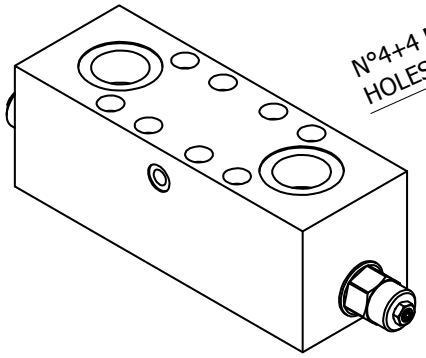


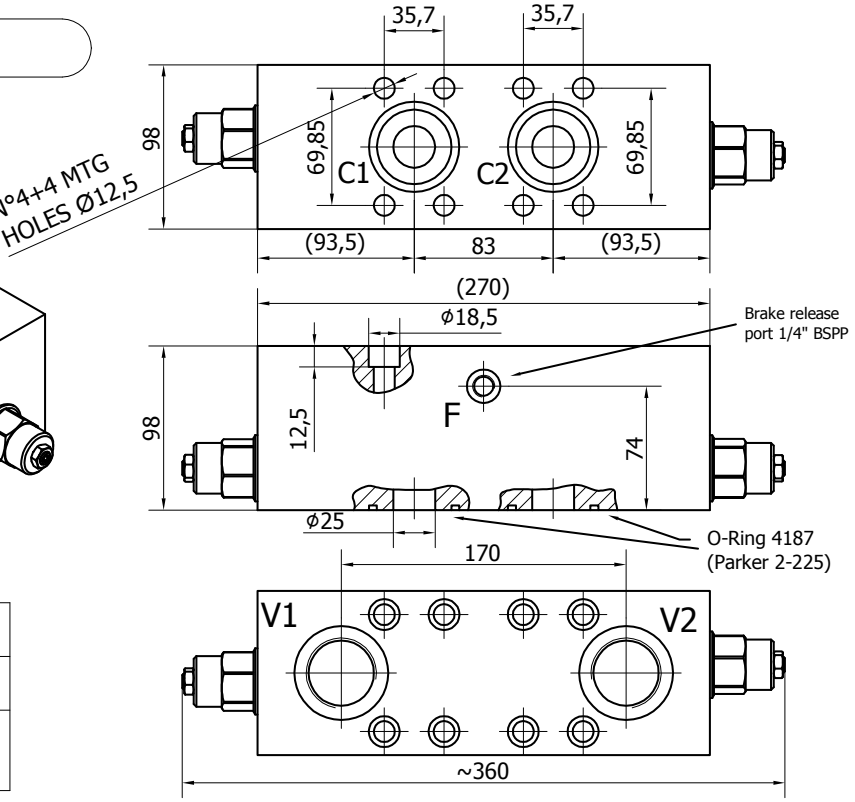
Oil supply flow (from C2 to C1)



DOUBLE OVERCENTER VALVE - OVDA 300

INSTALLATION DRAWING



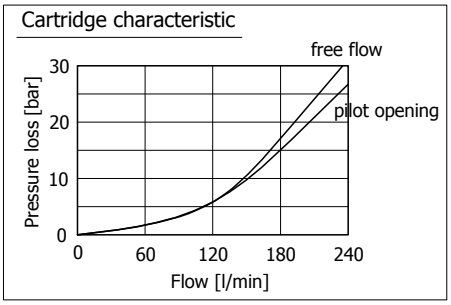


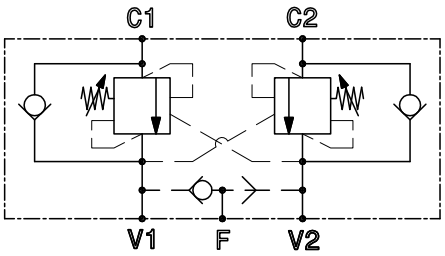
PORTS DIMENSION

V1,V2	1"1/4 BSPP
F	1/4" BSPP
C1,C2	O-ring 4187 Parker code 2-225

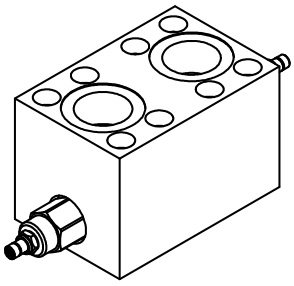
TECHNICAL DATA - OVDA 300

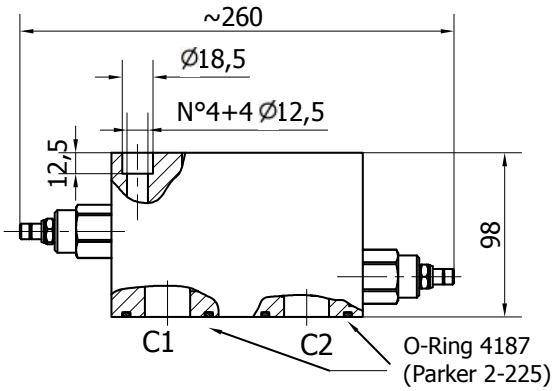
		OVDA.300.1.A.D75	OVDA.300.4.C.D75	OVDA.300.2.C.D75
NOMINAL FLOW	[l/min]	240	240	240
MAXIMUM FLOW	[l/min]	300	300	300
MAXIMUM PRESSURE	[bar]	350	350	350
PILOT RATIO	[]	3:1	10:1	4.5:1
RELIEF VALVE SETTING RANGE	[bar]	70-280	140-350	140-350
STANDARD RELIEF SETTING	[bar]	210	210	210
BLOCK MATERIAL	[]	steel	steel	steel
DISTRIBUTOR FITTING	[]	D75	D75	D75





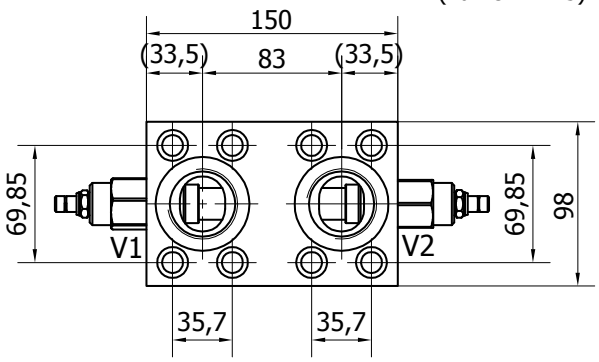
INSTALLATION DRAWING





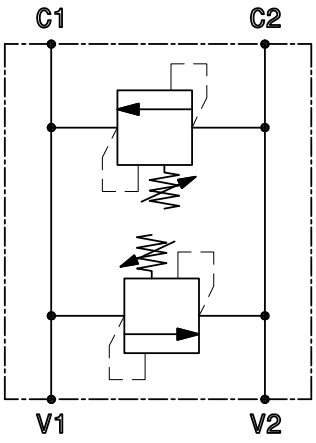
PORTS DIMENSION

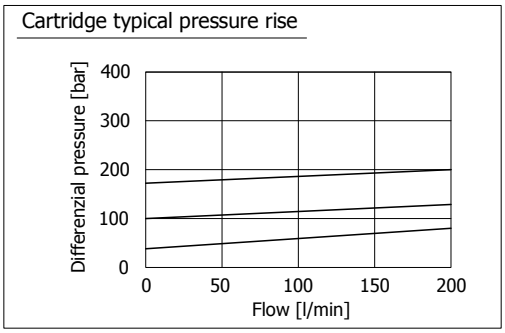
V1,V2	1"1/4 BSP
C1,C2	O-ring 4187 Parker code 2-225



TECHNICAL DATA - RVDA 200

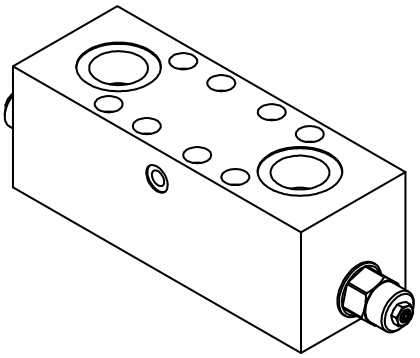
		RVDA.200.C.D75
RELIEF VALVE MAXIMUM FLOW	[l/min]	200
MAXIMUM PRESSURE	[bar]	350
RELIEF VALVE SETTING RANGE	[bar]	70-420
STANDARD RELIEF SETTING	[bar]	70
BLOCK MATERIAL	[]	steel
DISTRIBUTOR FITTING	[]	D75

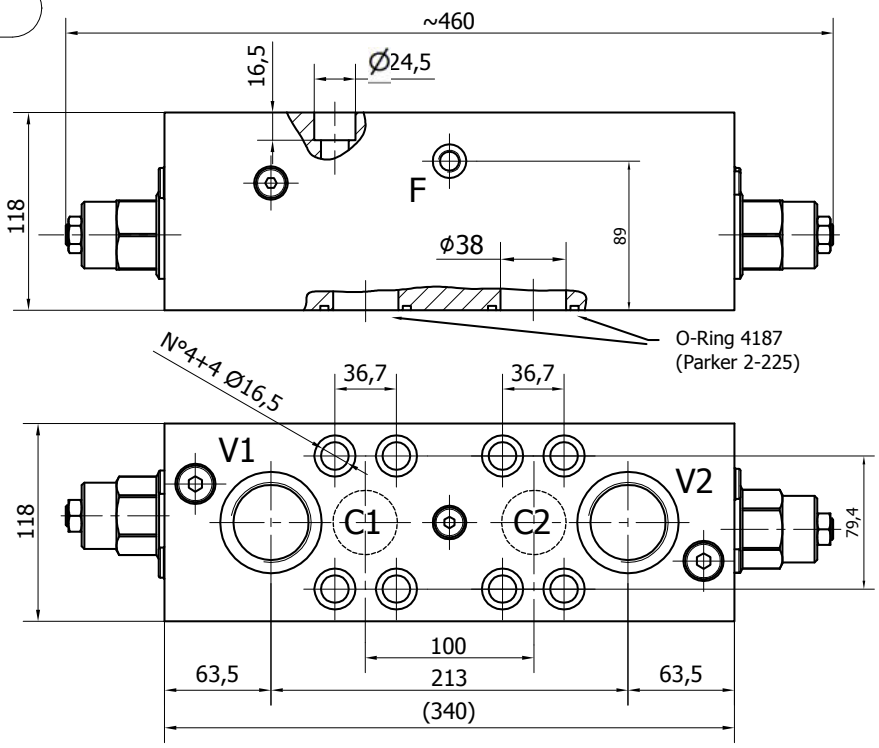




DOUBLE OVERCENTER VALVE - OVDA 480

INSTALLATION DRAWING



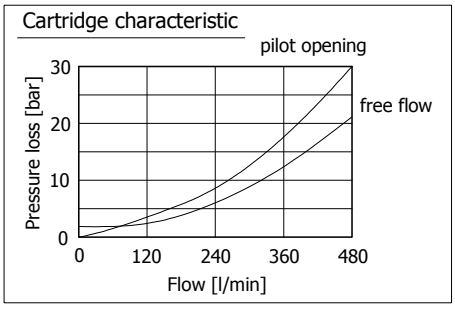


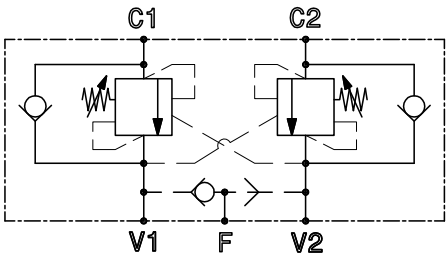
PORTS DIMENSION

V1,V2	1"1/2 BSPP
F	1/4" BSPP
C1,C2	O-ring 4187 Parker code 2-225

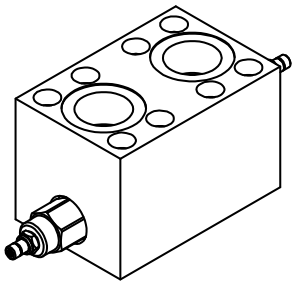
TECHNICAL DATA - OVDA 480

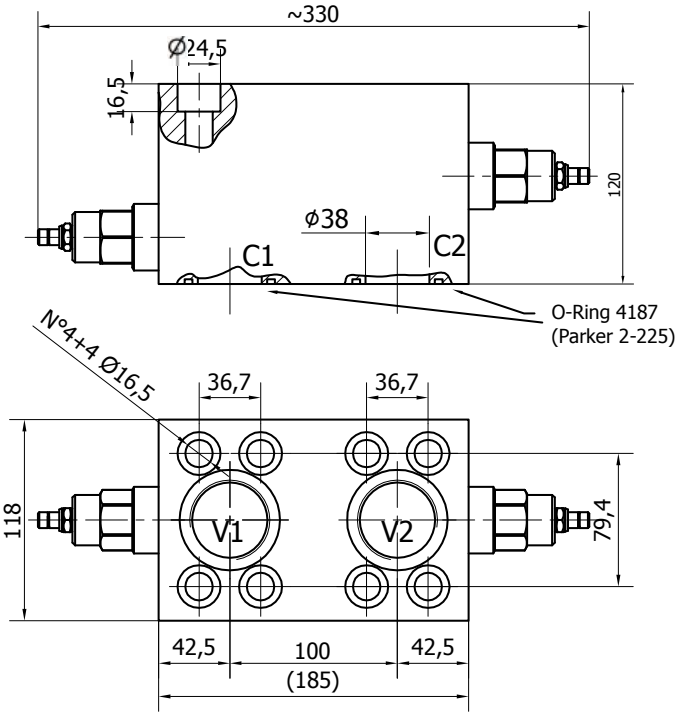
		OVDA.480.1.A.D90	OVDA.480.4.C.D90	OVDA.480.2.C.D90
NOMINAL FLOW	[l/min]	480	480	480
MAXIMUM FLOW	[l/min]	600	600	600
MAXIMUM PRESSURE	[bar]	350	350	350
PILOT RATIO	[]	3:1	10:1	4.5:1
RELIEF VALVE SETTING RANGE	[bar]	70-280	140-350	140-350
STANDARD RELIEF SETTING	[bar]	210	210	210
BLOCK MATERIAL	[]	steel	steel	steel
DISTRIBUTOR FITTING	[]	D90	D90	D90





INSTALLATION DRAWING



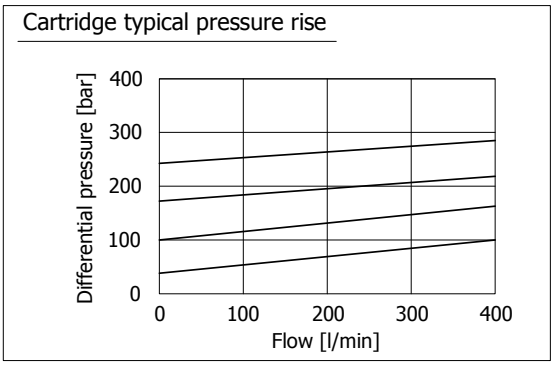


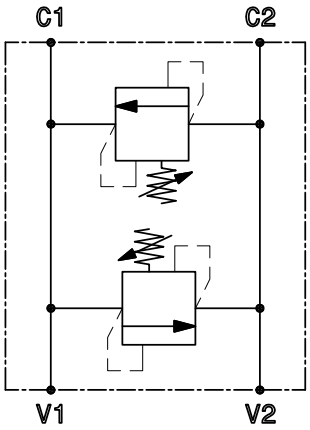
PORTS DIMENSION

V1,V2	1"1/2 BSP
C1,C2	O-ring 4187 Parker code 2-225

TECHNICAL DATA - RVDA 380

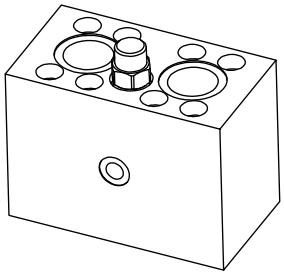
		RVDA.380.C.D90
RELIEF VALVE MAXIMUM FLOW	[l/min]	380
MAXIMUM PRESSURE	[bar]	350
RELIEF VALVE SETTING RANGE	[bar]	70-420
STANDARD RELIEF SETTING	[bar]	70
BLOCK MATERIAL	[]	steel
DISTRIBUTOR FITTING	[]	D90

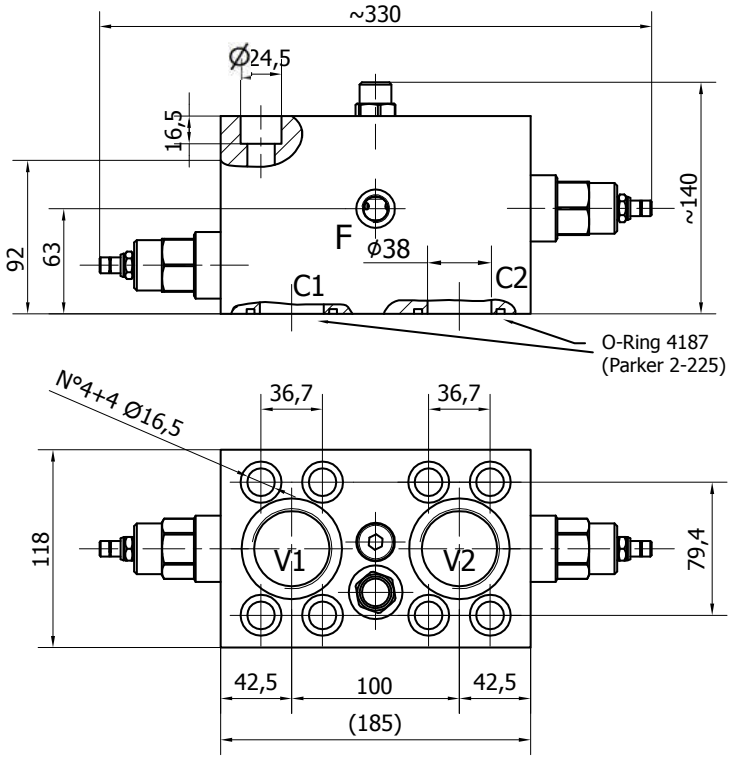




DOUBLE RELIEF WITH FLUSHING - RVDAP 90

INSTALLATION DRAWING



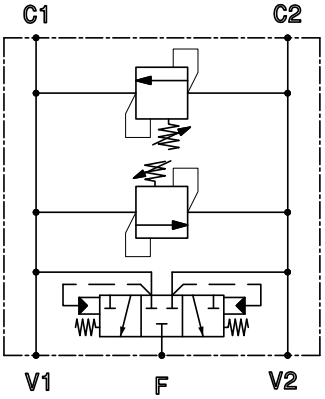


PORTS DIMENSION

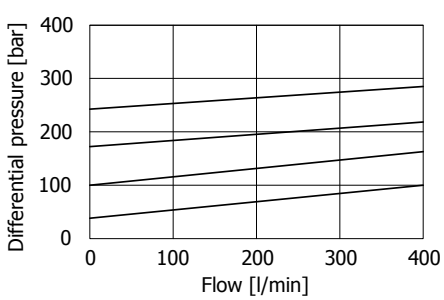
V1,V2	1"1/2 BSP
F	1/4" BSP
C1,C2	O-ring 4187 Parker code 2-225

TECHNICAL DATA - RVDAP 90

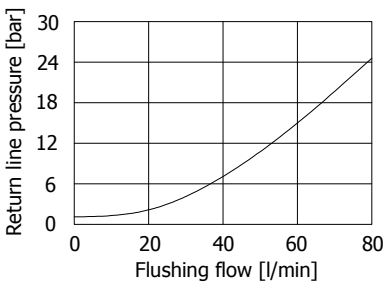
		RVDAP 90
RELIEF VALVE MAXIMUM FLOW	[l/min]	380
RELIEF VALVE SETTING RANGE	[bar]	70-420
STANDARD RELIEF SETTING	[bar]	70
MAXIMUM FLUSHING FLOW	[l/min]	80
MAXIMUM PRESSURE	[bar]	350
BLOCK MATERIAL	[]	steel
DISTRIBUTOR FITTING	[]	D90

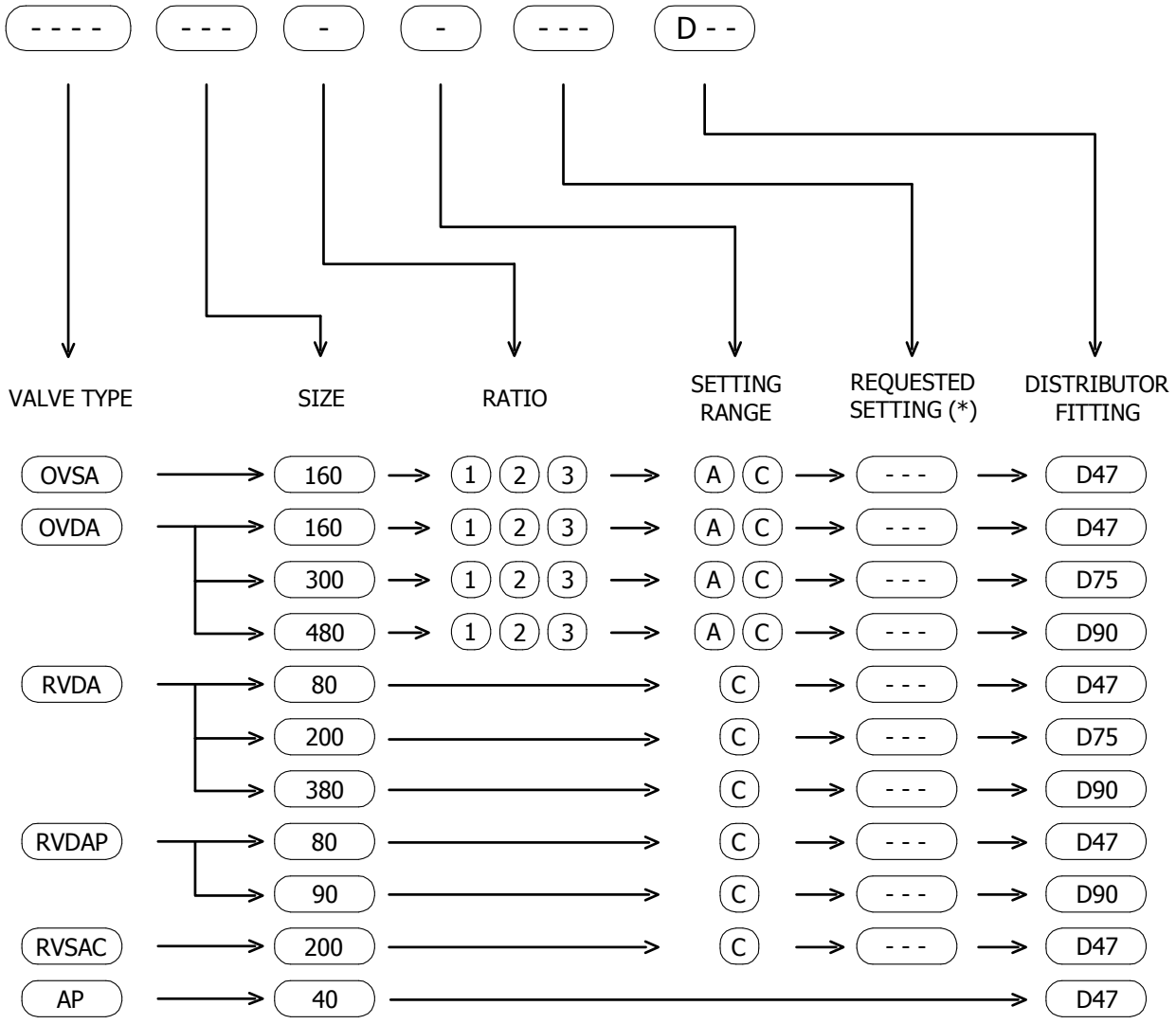


Relief valve typical pressure rise



Flushing cartridge characteristic





(*) If not specified, the valve will be supplied with the standard setting. Refer to the valves datasheets for the standard setting value.

EXAMPLES:

OVDA 160 1 A 200 D47
AP40 D47
RVDA 380 C D90

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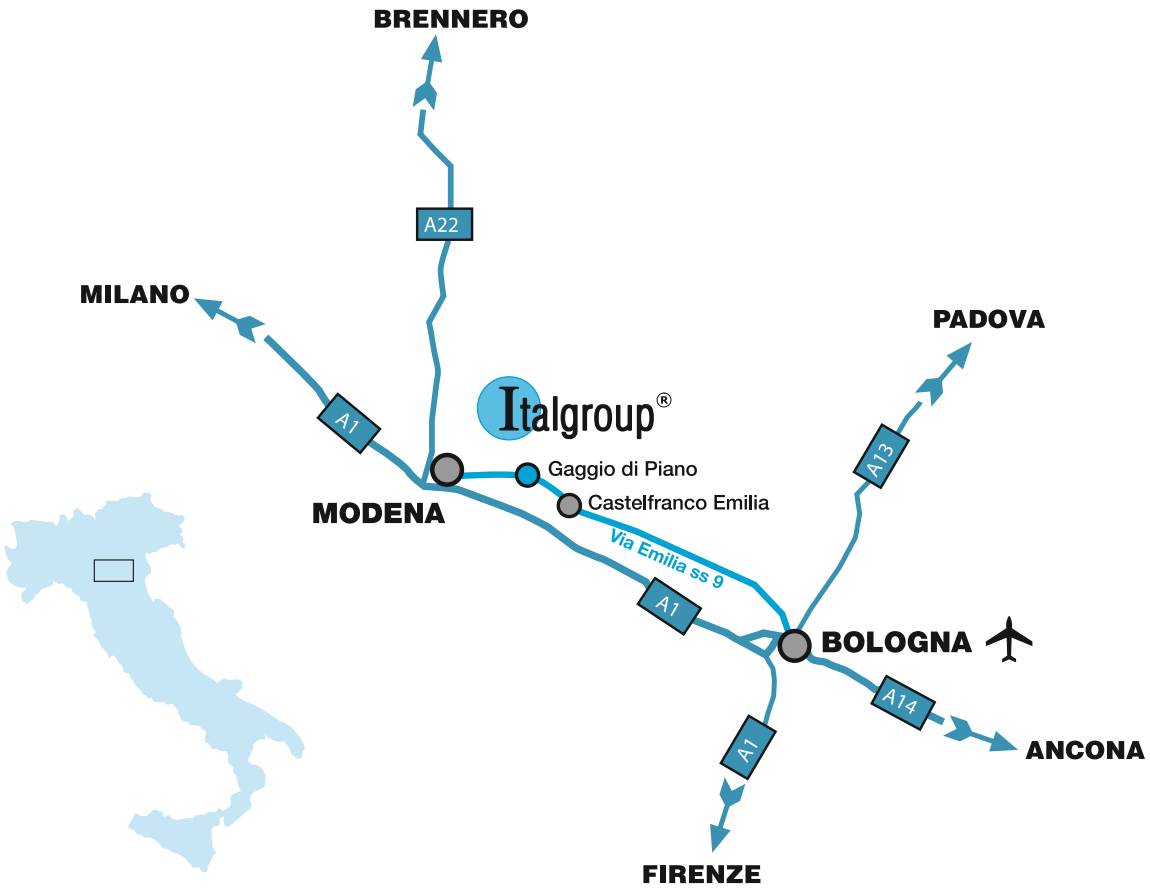

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