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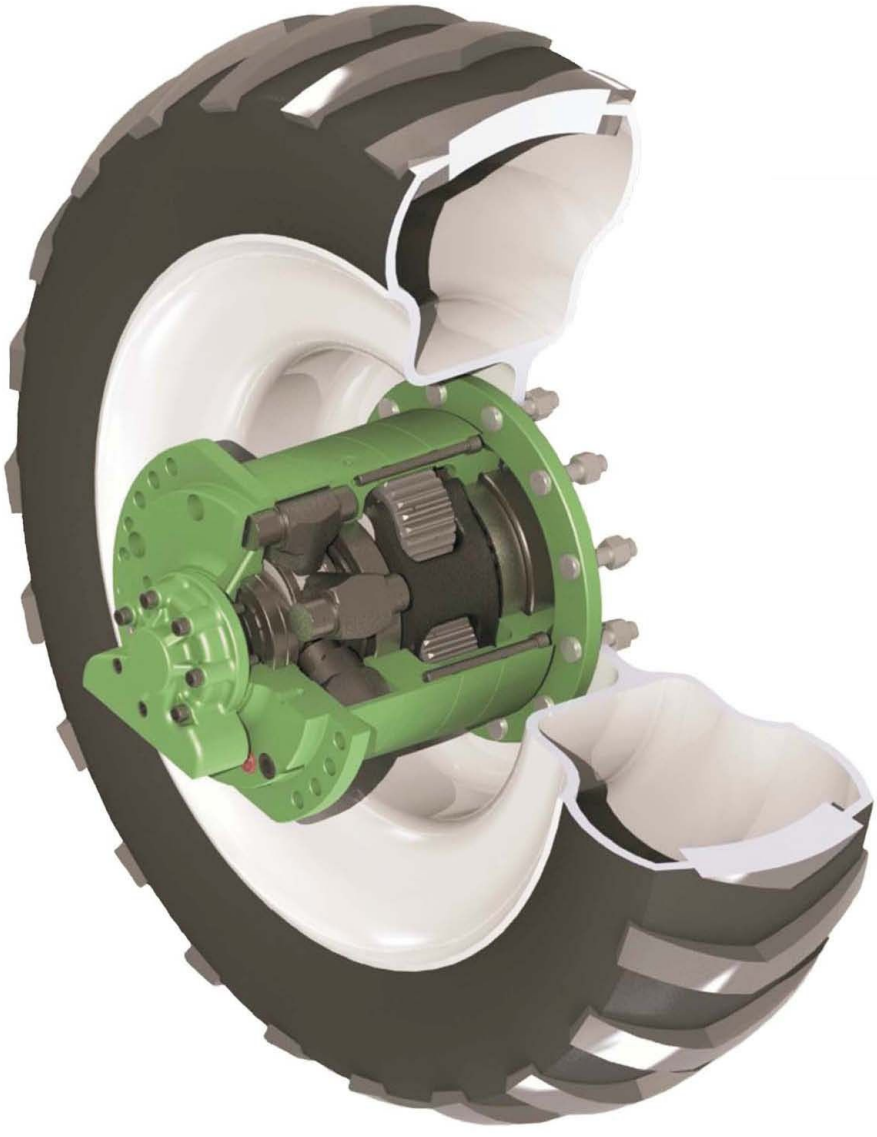
# Wheel Motors



## CONTENTS

## INTRODUCTION TO THE CATALOGUE AND SYMBOLS USED

This catalogue consists of:

- A topic index;
- An introduction page;
- Texts and warnings divided into chapters, paragraphs and subsections.

### SYMBOLS INDICATING DANGEROUS SITUATIONS OR VERY IMPORTANT INFORMATION.

**WARNING!**

Indicates risky situations for people, refers to accident prevention and suggests behavioral procedures.

**NOTE!**

Indicates useful information for the consultation of the manual and the smooth operation of the machine

## GENERAL INFORMATION

**Introduction**

Read and store this technical catalogue carefully.

The information in it contained will be needed to correctly select the product.

The manufacturer has designed the components in order to ensure safe usage conditions.

**Purpose of the catalogue**

This catalogue is aimed to present the products in it contained to aid in the selection of the most suitable component for the required application.

The hydraulic motors will not be held liable for damages, accidents or drawbacks resulting to the failure to comply to the instructions given in this manual.

We will also not be held liable for the modification and/or installation of non-authorized accessories.

**Updating the catalogue**

It is recommended to constantly keep this catalogue updated by adding amendments, updates or modifications made by the manufacturer.

New pages will be sent in the event of minor changes and it will be up to the user to integrate them within the catalogue, replacing the existing ones in the related chapters or paragraphs.

A revised copy of the catalogue will be sent to replace the existing version in the event of substantial changes to the components. At which point the old version of the catalogue must be destroyed.

## COMMON DEFINITIONS

In this catalogue and most of the documents the following specific terminology is used to describe specific key points of our products.

The peak values indicate the maximum working conditions that the product can withstand.

This means that the component can infact work at its peak working conditions for a period of time that does not exceed 1% per minute and not more than 10 times per hour.

The continuous working condition values are the ones that can be applied continuously without harming the product.

This means that it is the working conditions at which the component can run until the end of its calculated lifetime.

## COMMON HYDRAULIC FORMULA

**Torque**

$$Torque\ [Nm] = \frac{displacement\ [cc/rev] \times pressure[bar]}{62{,}83}$$

$$Torque\ [Nm] = specific\ torque\ [Nm/bar] \times pressure\ [bar]$$

**Power**

$$Power\ [kW] = \frac{torque\ [Nm] \times speed\ [rpm]}{9549{,}3}$$

**Shaft speed**

$$Speed\ [rpm] = \frac{flow\ rate\ [l/min] \times 1.000}{displacement\ [cc/rev]}$$

**Motor displacement**

$$Displacement\ [cc/rev] = \frac{maximum\ required\ torque\ [Nm] \times 62{,}83}{maximum\ pressure\ [bar]}$$

If gearbox is used:

$$Displacement\ [cc/rev] = \frac{maximum\ required\ torque\ [Nm] \times 62{,}83}{maximum\ pressure\ [bar] \times gearbox\ ratio}$$

**Required pump flow rate**

$$Flow\ [l/min] = \frac{displacement\ [cc/rev] \times maximum\ motor\ speed\ [rpm]}{1.000}$$

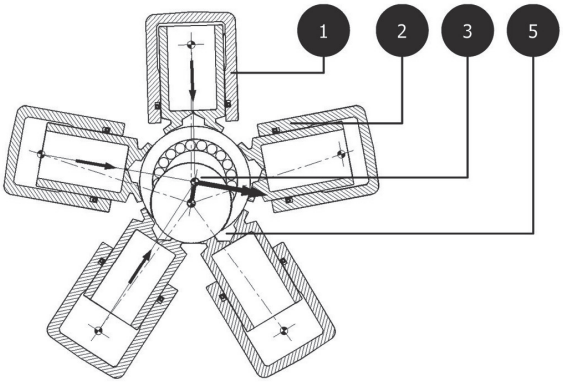
$$Speed\ [rpm] = \frac{vehicle\ speed\ [km/h] \times 5{,}305}{external\ wheel\ \emptyset\ [m]}$$

## CRANKSHAFT DESIGN RADIAL PISTON MOTORS

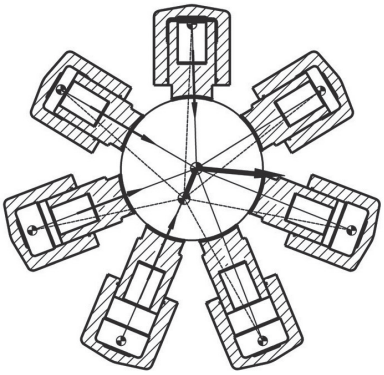
The main characteristics of this type of design are the high mechanical efficiency, especially at start up, and high volumetric efficiency.

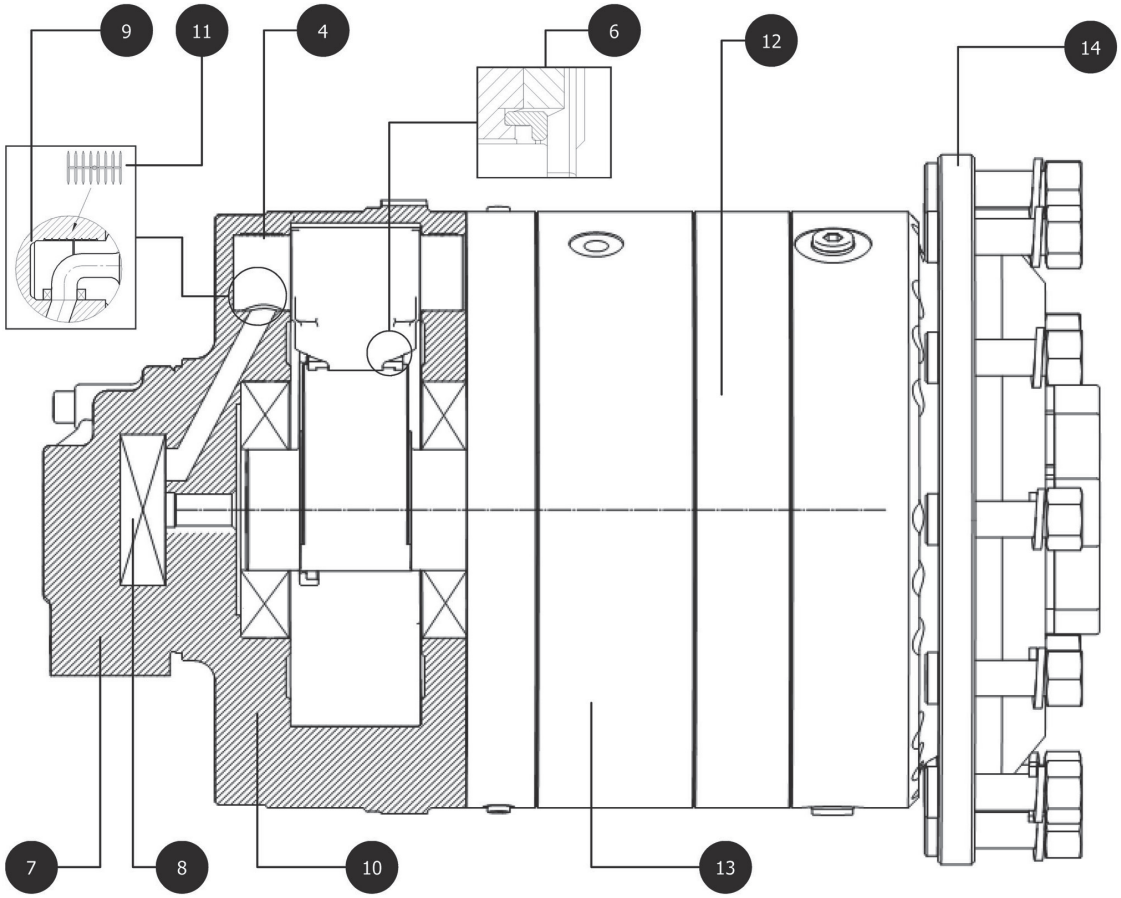
A number of features distinguish our motors from the other radial piston designs:

Fixed displacement, 5 piston motor.




Fixed displacement, 7 piston motor.





**Swivelling cylinder:**
The cylinder (1) always remains aligned with the eccentric (3) of the crank,
thus eliminating the stress between the walls of the piston (2) and the cylinder.
The articulation of the cylinder is done by the trunnions (4) that ensure low specific loads.

**Piston:**
The pistons transfer the load to the shaft through an hydrostatic bearing (5).
This bearing reduces the contact between metals and ensures an optimal lubrication and lowers the friction.

**Piston retaining rings (6):**
Ensure the contact between the foot of the piston and the shaft in all working conditions, even in the event of cavitation.

**Axial distribution rotary (8):**
Ensures an optimal distribution of the oil with short ducts with a wide diameter in order to reduce the power loss when high flow is present.
The high volumetric efficiency and the recovery of the tolerances by the seals ensure an optimal functionality throughout the entire life of the product and in conditions of thermal shock.

**Interchangeable distributor (7):**
A wide range of distributors is available for different motors with various pressure and flow control valves.

**Radial injection cylinder feed (9):**
Eliminates direct hydraulic axial load on the motor body.
These are also larger compared to previous products to reduce power loss with high flow rates.

**Stronger casting (10):**
To allow higher internal and external load capacity and bear higher stress levels compared to previous products.

**Larger cylinder trunnions (4):**
For increased resistance and reduced specific loads compared to previous products.

**Spigots with hydraulic balancer (11):**
To reduce friction and wear.
This also allows for a lower heat generation, allowing the product to work with higher powers and higher performances, thus improving efficiency.

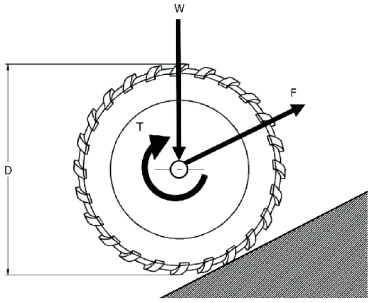
**Planetary wheel gearbox (12):**
The torque and speed of the motor are transformed by a single stage planetary gearbox.
This allows the unit to reach higher admissible radial loads and transmissible torques compared to the normal direct motors.

**Brake (13):**
The gearbox can be supplied with a hydraulic negative disc brake integrated in its design.

**Hub (14):**
The wheel hub can have different dimensions and shapes allow the unit to be coupled with the various types of wheel in commerce.

## MAXIMUM MOTOR TORQUE

F - traction force (N)
W - vehicle weight (kg)
T - motor torque (Nm)
D - external wheel diameter (m)
n - number of hydraulic motors
R - sin (slope angle°) or traction resistance (%)




$$F\ [N] = \frac{W \times R \times 9{,}81}{n}$$

$$T\ [Nm] = \frac{F \times D}{2}$$

## DISPLACEMENT VARIATION

Over the years we has developed a wide range of dual and variable displacement motors whilst keeping the outside dimensions the same within the size of the fixed displacement motor series originally made.
The dual and variable displacement motor technology satisfies awide operational range request.
The same power can be utilized from high torque-low speed to high speed-low torque working conditions.
With the technological advances the user can optimize the operating range of the application by adjusting the starting torque and the speed to meet the requirements of the application.
The displacement variation can occur whilst the vehicle is in motion and loaded, thus eliminating the need to stop the rotation of the motor to change the displacement of the motor.
Thanks to the design of the motors, we can, where possible, provide the motors with a minimum displacement equal to 0 cc/rev.

## WORKING KNOWLEDGE

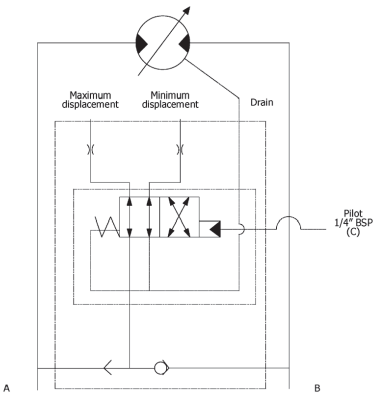
The displacement change is done by varying the stroke (2 x e) of the pistons, whilst keeping the bore and the number of “active” pistons unchanged.
This makes it possible to change displacement in motion.
The “reaction time”, or the time needed to change displacement, is specific for each application.
We can supply motors with various reaction times.

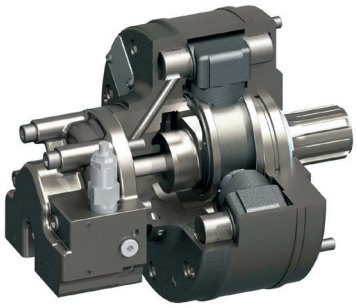
Real displacement = $\frac{d^2}{2} \times \pi \times nc \times e$ Nominal displacement= $\left(\frac{d^2}{2} \times \pi \times nc \times e\right) \times i$

where:
d = cylinders bore
nc = n° of cylinders
e = eccentricity (= ½ stroke)
i = reduction ratio of the gearbox

## DUAL DISPLACEMENT MOTOR

This type of control switches between two displacement positions: minimum and maximum.
The change of position of the directional valve occurs via a pilot signal PIL(c).
When there is no pressure in the pilot line, the valve maintains (or changes it into) maximum displacement. When the pressure in the pilot line is between 20 and 30 bar, the valve shifts the spool, changing the displacement to minimum.
Pilot pressure is affected by the case pressure and the motor speed.
The crankshaft eccentricity moves from maximum to minimum (and back), enabling the motor to switch displacement whilst running with no shock to the system.
The valves in the scheme are integrated in the motor.
Ratio between max. and min. displacement is available on all models as follows: 1:2 – 1:3 – 1:4.

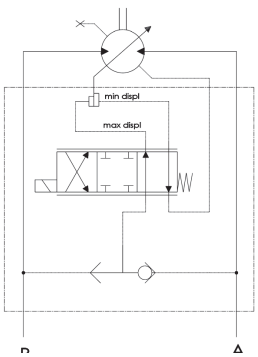


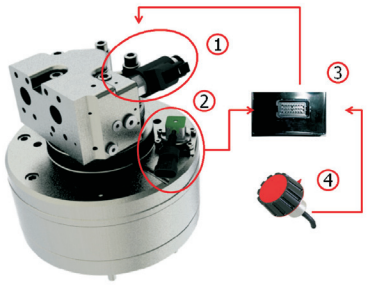



## VARIABLE DISPLACEMENT MOTOR

The variable displacement motor package includes:
1. Electroproportional valve driven by the controller;
2. Angular sensor, used to measure the oscillation angle of the cylinders;
3. Electronic controller, used for elaborating signals and control the electroproportional valve;
4. Potentiometer.

This allows the user to set the required displacement.
The control logic used by the CPU is of proportional-integral-derivative type (PID).
The user requires a displacement through the potentiometer.
The controller (CPU) compares the displacement request with the motor measured displacement and adjusts it varying the motor eccentricity through the electroproportional valve.

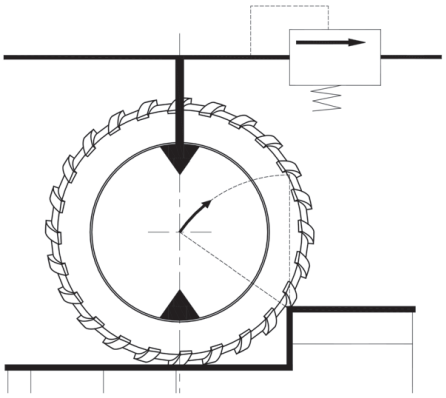


## CHARACTERISTICS AND INDICATIONS

### HIGH STARTING TORQUE

The design of the radial piston motor with crankshaft and oscillating cylinders ensures very high starting torque efficiencies, especially at high pressures which are required in most mobile applications.
The mechanical efficiency of the motor is typically higher than 90% at 400 bar.
The high starting torque is usually required when the vehicle is at standstill or during low speed operations.
For example when the mobile application accelerates from standstill or when it has to overcome an obstacle or a slope.
The motors with a high starting torque, therefore, improve vehicle performances and reduce energy consumption, especially with frequent start-stop working cycles.



### HIGH VOLUMETRIC EFFICIENCY

The motors have very high volumetric efficiency levels in all working conditions.
The seal system used ensures the maintenance of the volumetric efficiency even when the surfaces present signs of being worn over time.
The combination of high volumetric and mechanical efficiencies ensure a lower heat generation from the motors, which enables a reduction or, in some cases, removal of the heat exchanger.

### NOISE LEVELS

Our motors are extremely silent. The noise level can be reduced further with back pressure of 5-10 bar.
Please note that the structure and connections can be very efficient sound propagators and amplifiers.
The motors are available, on request, with a special distributor which ensures silent working conditions within wide operational ranges. Please contact our Technical Department for further information.

### ALLOWABLE BACK PRESSURE

The motors are capable of operating with high back pressures with high efficiency, e.g. for series circuit applications.
The allowable pressures vary in function of the piston diameter and other factors.
If the motors are required for an application with back pressure contact our Technical Department for further details. Typical allowable back pressure values are:

| | Port A | Port B | Port A+B |
|---|---|---|---|
| Continuous | 210 bar | 140 bar | 350 bar |
| Peak | 350 bar | 350 bar | 700 bar |

Pressure values have to be within the ones on the technical data sheet.

## CAVITATION RESISTANCE

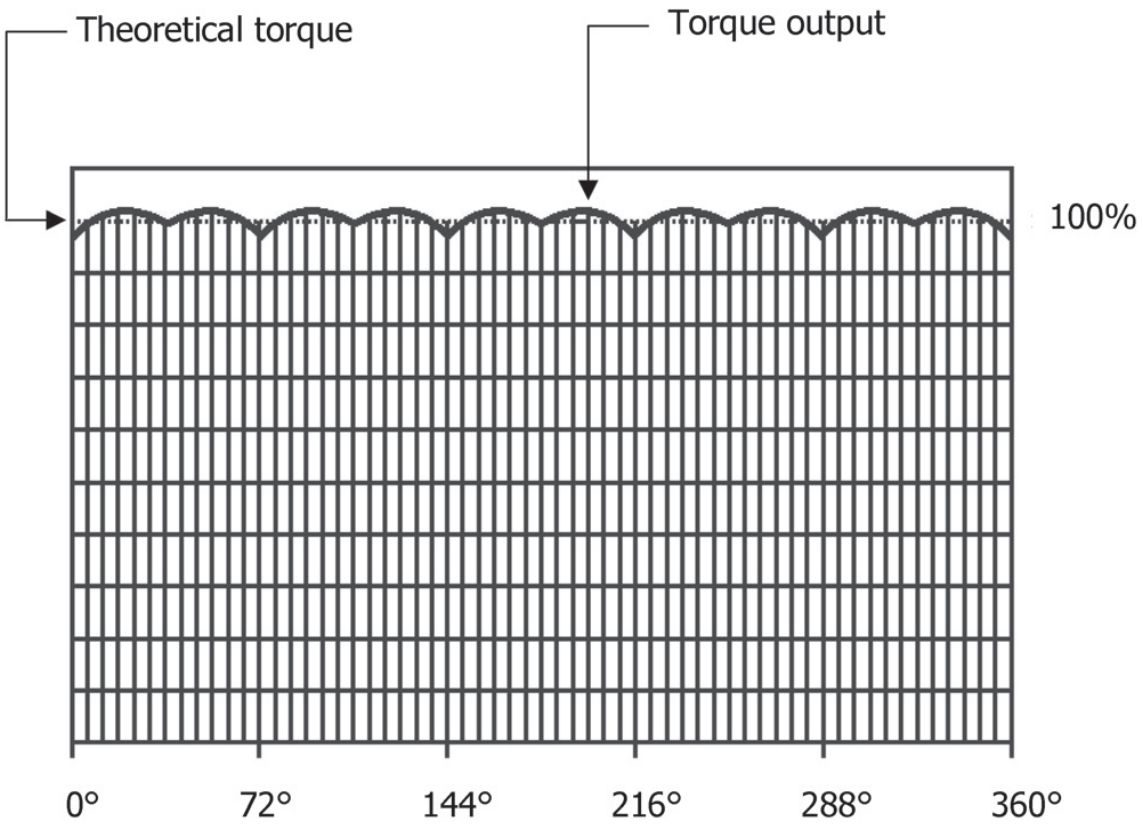
The piston retaining rings ensure that the pistons remain in full contact with the eccentric, no matter what the pressure conditions inside the cylinders or the motor casing are.
The retaining force counteracts continuously the separating force, thus preventing lifting, tilting or hammering of the piston during cavitation.

## MOTOR CASE PRESSURE

| **Standard shaft seal** | **High pressure shaft seals (option A)** |
|---|---|
| Continuous pressure 1 bar | Continuous pressure 5 bar |
| Peak pressure 5 bar | Peak pressure 15 bar |

## TORQUE

The theoretical torque of the motor may be obtained by multiplying the specific torque given in the tables by the $\Delta p$ value required.
The graph below shows the variation in output torque due to the pistons as the shaft rotates through a full 360° revolution.
The graph refer to five piston motor.



## HYDRAULIC FLUIDS

### MINERAL OILS

For the combined lubrication wheel motors it is possible to use the same oil stated in the motor catalogues: ISO VG 46. For the separated oil applications the lubricant suggested is: ISO VG 220 SAE 90 EP.
We suggests to use good quality hydraulic mineral oil, preferably with additives for high pressure, anti-corrosive, anti-wear and anti-foaming. The hydraulic fluid used has to be chosen in order for the viscosity is within the indicated range to the normal working temperature conditions.

Admissible temperature range:
Ideal: +30°C to +50°C
Allowable: -20°C to +80°C
On request our motors can be manufactured to operate at lower
(down to -40°C) or higher (up to +120°C) temperatures.
Operating viscosity range:
Ideal: 40 cSt to 60 cSt
Allowable: 25 cSt to 150 cSt

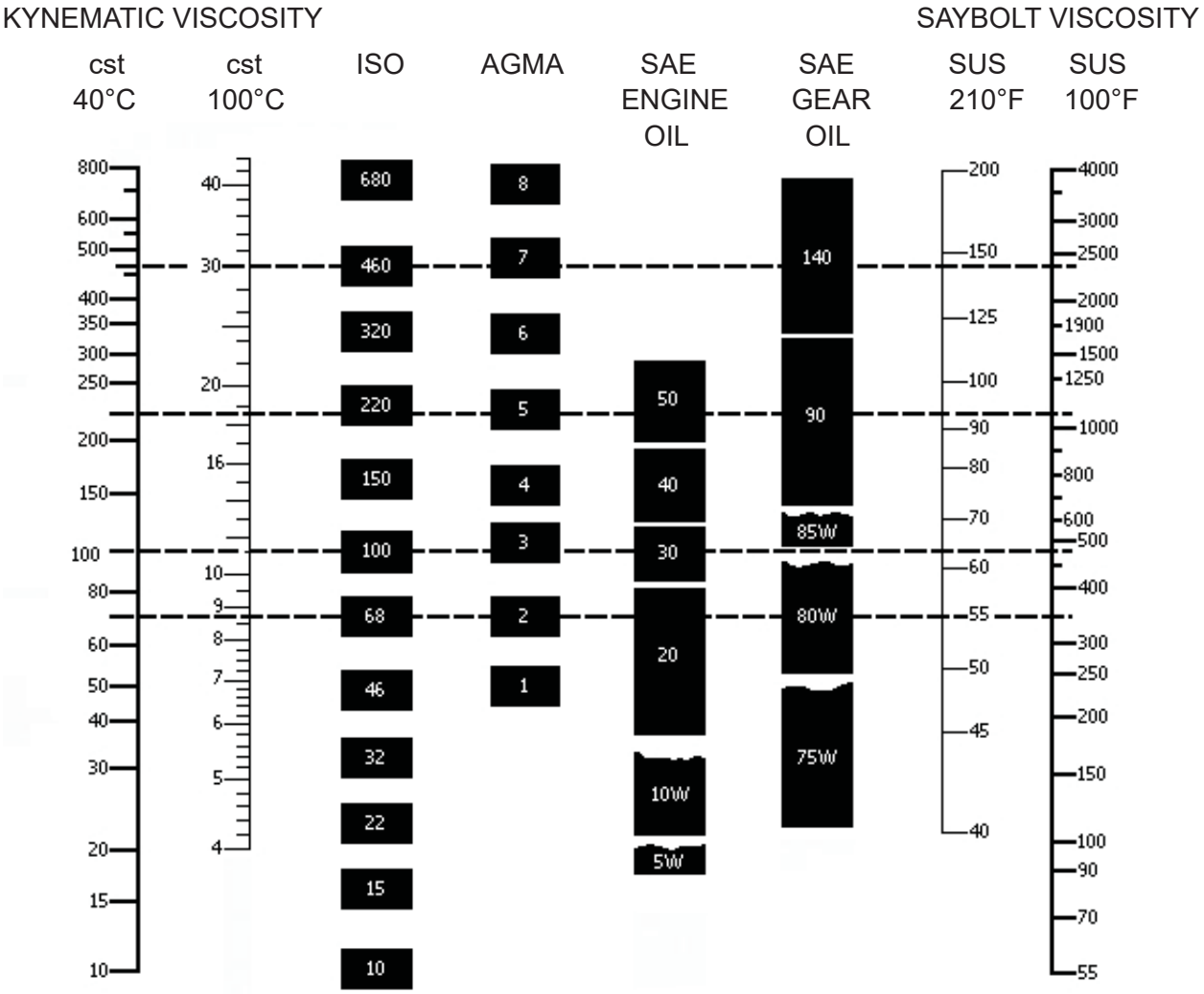
After the initial start up please verify the level of the lubricant periodically and top up whenever necessary. The first oil change has to be made after 15-20 hours of operation.
The following changes must be performed after 800-1000 hours, or one year of operation, whichever comes first.

### FIRE RESISTANT FLUIDS

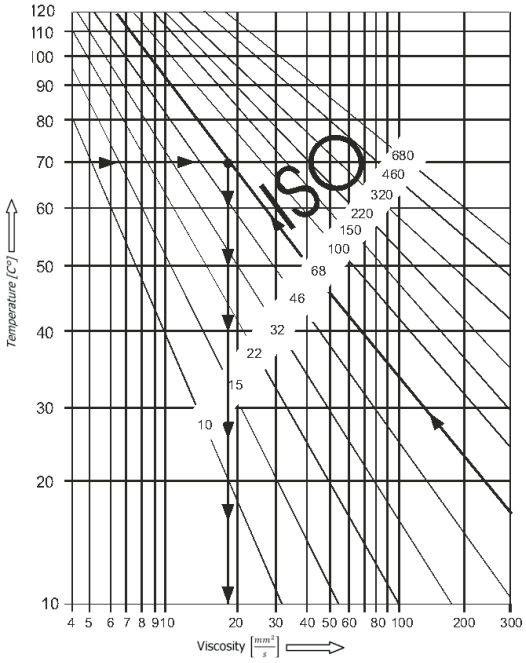
**(i) Synthetic fluids:** (phosphate esters, polyesters, …). These fluids have similar characteristics to mineral oils and the same temperature and viscosity ranges are applicable.
These kinds of fluids may, however, require seals of suitable material (such as FKM seals) which are available on request.
**(ii) Water based fluids:** (water-oil emulsions, water-glycol solutions, …) due to the low viscosity of these fluids the lifetime of the components is reduced.

## VISCOSITY REFERENCE TABLE

### GRADE SYSTEM



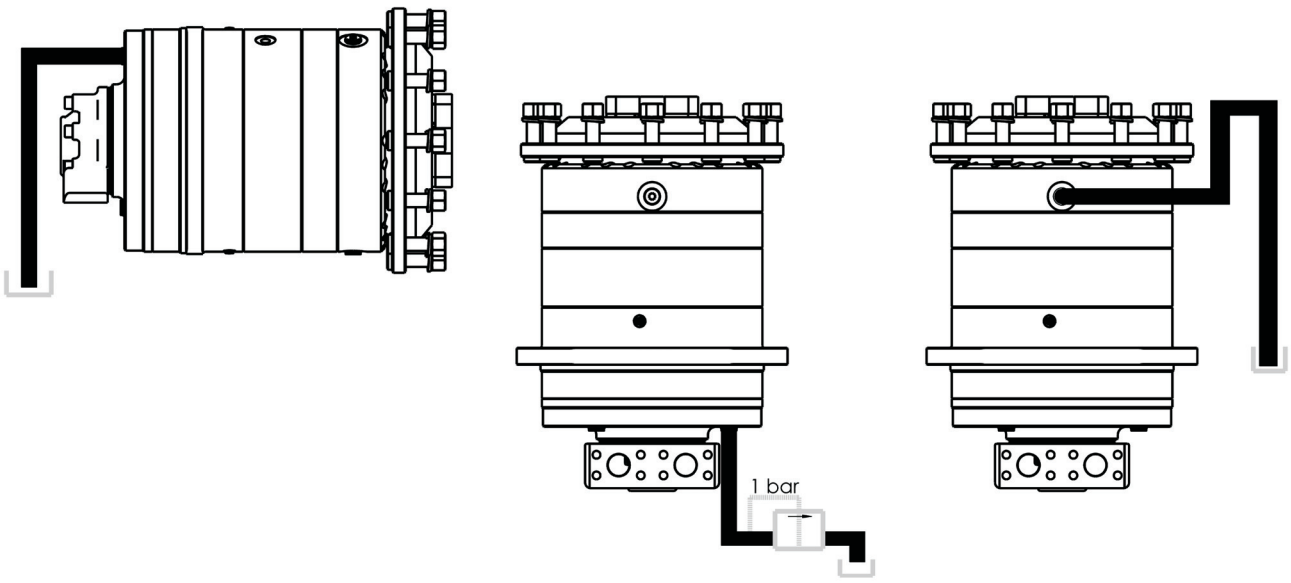

Viscosities can be COMPARED horizontally only.
For example, the following oils have similar viscosities:
ISO 460, AGMA 7 AND SAE GEAR OIL 140.
The relationships between temperature and viscosity are based on 95 VI oils and are usable only for mono-grade engine oils, gear oils and other 95 VI oils.
Crankcase oils and gear oils are based on 100°C viscosity.
The “W” grades are classified on low temperature properties.
ISO and AGMA grade oils are based on 40°C viscosity.



## DRAIN LINE POSITION

The position of the drain line must be placed in such a way that there is always sufficient oil in the casing for the lubrication of the shaft bearing. If the motor has to be installed with the shaft in horizontal position, the drain line should be connected to the uppermost drain line hole.

If the motor is installed with the shaft pointing upwards, the motor casing has to be entirely filled with oil and the drain line has to be connected in such a way that no air can enter the motor to avoid the bearing on the motor body to work without lubrication.



## START UP

Before connecting the pipes, make sure that they are clean and that there is no rust.
Before the initial start up, fill the motor and the gearbox with oil.
In the shared oil versions the motor has no shaft seal between motor and gearbox, therefore the unit can be filled either from the drain line in the motor cover or the one on the gearbox body.
In the separated oil versions the motor has to be filled with hydraulic oil from one of the drain lines on the motor cover and the gearbox has to be filled with gearbox oil from one of the drain lines on the gearbox body.
On the first start up remove all air from the hydraulic circuit. Make sure that there are no oil leaks from the joints and from the body. The products are tested at the factory and do not need a testing period.

## FILTRATION

We recommends using filters with gradation up to 25 µm, preferably 10 µm.
Our products have a good resistance to contaminated oil; however filter efficiency and therefore clean oil, are important for the correct functioning and reliability of all the components in the hydraulic system.
The efficiency of the filtering agents is greatly reduced with a progressive accumulation of filtered particles, therefore the filters have to be regularly checked. It is recommended to pay close attention at the first start up of the hydraulic system or in the event of a replacement of any component for damage or excessive usage. It is advisable to follow the filter manufacturer's recommendations for its life span and cleaning or substitution cycles.

## PIPES AND CONNECTIONS

We recommend the use of high quality piping and connections for high pressure hydraulic applications.
Follow manufacturer's recommendations for pipe sizes, in any case do not use pipes which are smaller than the port connections; to reduce the effects of oil compressibility, use pipes with minimum possible width and diameter and maximum rigidity; to reduce the effects of a load loss avoid sharp corners, restrictions and high flow speed.
The nominal diameter ND of a pipe depends on the flow (l/min) and average speed (m/s).
The formula to calculate the minimum recommended diameter, considering a maximum speed of 6 m/s, is:

$$ND\ [mm] = 4{,}607 \times \sqrt{\frac{Q\ [l/min]}{v\ [m/s]}}$$

Where:
Q = flow 6 [m/s] = v (average speed recommended)

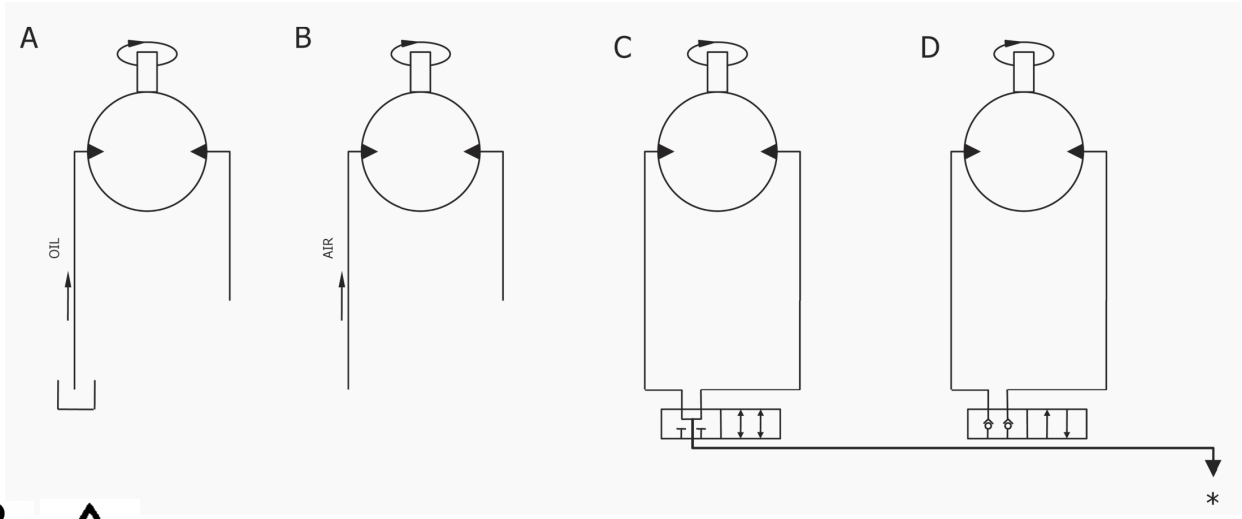
## OIL CHANGE

The first oil change has to be done after the first 20 hours of work, subsequently the oil changes will have to be carried out every 1000 hours of work. We suggests to perform an oil change once a year if the unit is used in machines that work on a seasonal basis.

## SPECIAL CONDITION FOR USE: FREE WHEELING

All our motors can be disconnected from the hydraulic circuit and driven externally for applications where freewheeling, free fall or breakdowns may be present.

The diagrams below show some possible circuit configurations for motor disconnection and/or operation in freewheeling:




**A - Freewheeling with oil in the circuit**. This condition is suitable only for low speeds. With the speed increase it will be necessary to pressurize the inlet to prevent noise due to cavitation.

**B - Freewheeling with air in the circuit.** This condition is ideal for high speed freewheeling applications. The transition from or to normal operation must be done at low speed and low pressure while the pistons are emptying or filling with oil.

**C - "Short circuit" freewheeling.** The motor runs with the inlet and outlet ports connected.

This condition is suitable to applications that require speed control with a throttle.

**WARNING!**

Danger of overheating in unfavourable conditions, especially with throttle.

**D - "Vacuum" freewheeling.** This is the favourable freewheeling condition for fixed displacement motors, especially for very high speeds. The check valves allow the oil to be expelled from the pistons which subsequently operate under vacuum conditions.

The motors can operate in these conditions for several hours without being damaged or overheating.

Torque absorption is constant with speed and equivalent to 2 - 3 bar of pressure.

The transition from or to normal operation must be done at low speed and low pressure while the pistons are emptying or filling with oil.

For further information on the T and B series motors, please contact our Technical Department.

*** BOOST PRESSURE SHOULD BE PROVIDED TO AVOID CAVITATION**

## BEARING LIFE TIME (ISO 281 - 1980)

The bearing lifetimes given in this catalogue and in most official documentations are L10 lifetimes.
The L10 lifetime is the period of work after which 10% of the bearings can be expected to show signs of wear.
The average lifetime of the bearing, L50 lifetime (where 50% show signs o wear), is approximately 5 times the L10 value.
To determine the lifetime of the bearings in an application, the values of constant or average pressures and speeds should be used, not peak or maximum values.
The continuous operating pressures of any motor should be chosen in function of the desired motor lifetime which can be calculated from the bearing lifetime graphs supplied in the technical documentation.

In any motor series the larger displacement models generally have shorter bearing lifetimes.
This is due to the larger diameter pistons which creates higher bearing loads.
The smaller displacement motors of any series are suitable for heavy duty applications, whereas the larger displacement motors are more suitable for high torque applications but with reduced continuous or average power.

## WORKING CYCLE FACTOR

Non-stop operation sometimes causes shorter than calculated lifetimes.
This is due to increases in oil temperature and/or contamination combined with a decrease in viscosity when operating continuously for long periods. If, however, the hydraulic system is continuously monitored, then the working cycle factor may be disregarded.

## MOTOR BEARING TYPE

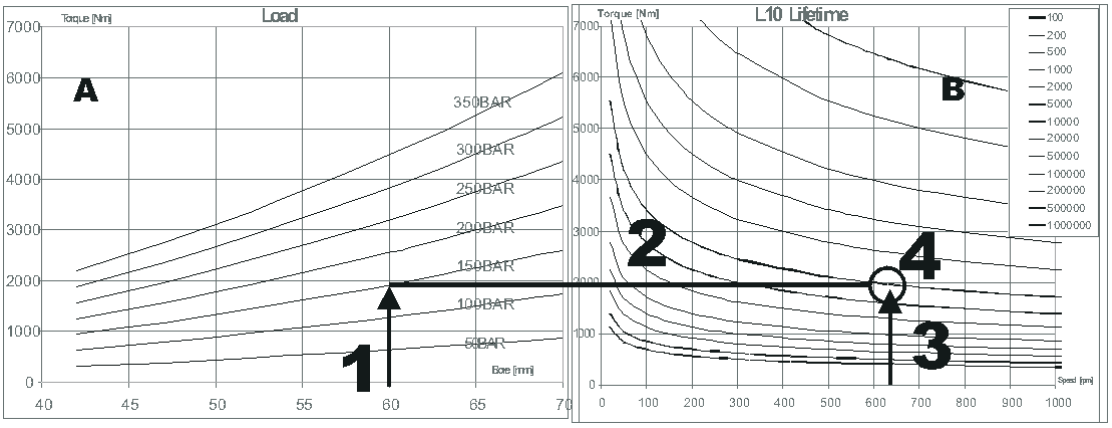
| H | G | FG |
|---|---|---|
| Cylindrical roller bearings | Spherical roller bearings | Reinforced spherical roller bearings |

## BEARING LIFE TIME GRAPHS

These graphs are found in every leaflet and in the catalogues and are used to determine the lifetime of a given motor for a given pressure input and speed output.

The graphs work as follows:

1. Choose the piston diameter on graph A;
2. Define the intersection with the pressure curve;
3. Define the speed on graph B;
4. Determine the lifetime using the curve on graph B found on the intersection between 2 and 3, indicated with O.




**Bearings lifetime calculation of the gearbox:**

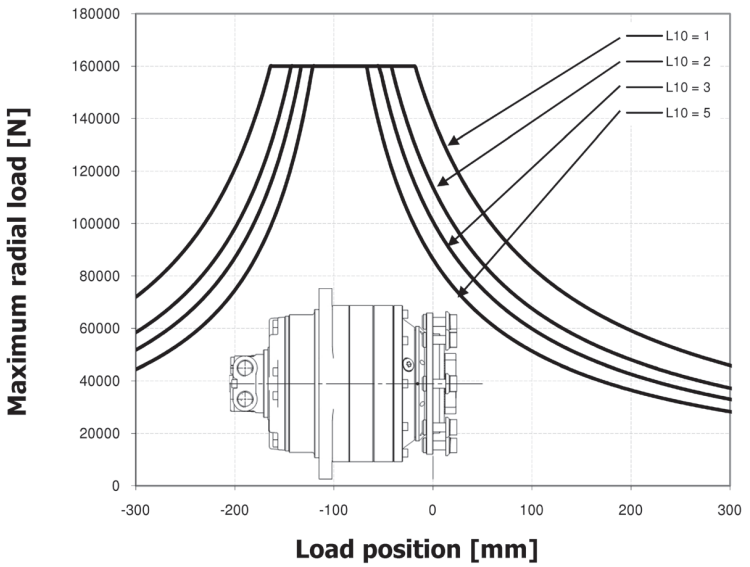
Permissible loads are calculated for different steps of lifetime L10 according to ISO 281:1990.

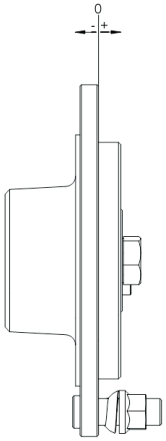
L10: lifetime of the bearing system in millions of revolutions.

L10 value can be converted in hours L10h using the formula*.

Permissible radial load in dynamic conditions at the maximum torque allowed by the gearbox.

**N.B. Diagrams are influenced by the shaft permissible radial loads.**



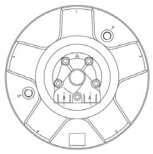

$$* L_{10h} = \frac{10^6}{60n} L_{10}$$

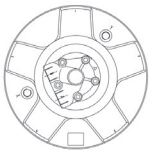
n: speed in rpm

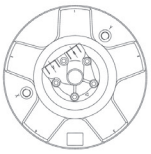
## DISTRIBUTOR COVER ORIENTATION

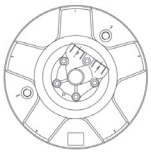
The motors can be provided with the distributor cover orientated in any of the following directions.
These are selectable among the following positions:
DM1 for position 1, DM2 for position 2, etc.
This position has to be stated at the end of the full description of the motor.
If no specification is made the standard position is DM1.

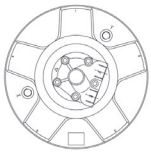
Five piston motor


Position 1
DM 1

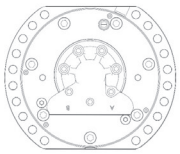

Position 2
DM 2

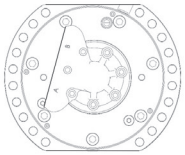

Position 3
DM 3

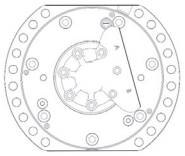

Position 4
DM 4


Position 5
DM 5

Seven piston motor

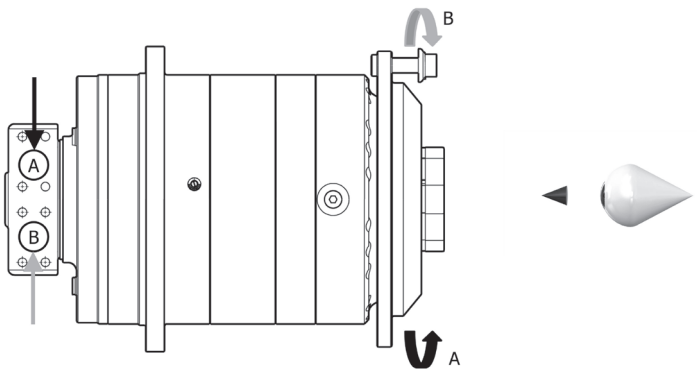

Position 1
DM 1


Position 2
DM 3


Position 3
DM 6

## DIRECTION OF SHAFT ROTATION

All motors are bidirectional.
The direction of the rotation of the shaft is determined by the direction of the oil flow.
The standard motor configuration is set to have the input flow through port A which causes the shaft to move clockwise, taking the shaft as the focal point.
Should the oil flow be supplied through port B, the shaft will turn anti-clockwise.
All motors can be supplied with the shaft rotating anticlockwise.
Should this option be needed it has to be pointed out in the order as instructed in the order codes tables.



## BOLT TORQUE SETTINGS

| NORM | | PITCH | | CLASS OF RESISTANCE | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | 5.8 | | 6.8 | | 8.8 | | 10.9 | | 12.9 | |
| DIN 267 | | | | 5S | | 6S | | 8G | | 10K | | 12K | |
| | | | | PITCH | | PITCH | | PITCH | | PITCH | | PITCH | |
| bolt Ø ↓ | hexagon | coarse | fine | coarse | fine | coarse | fine | coarse | fine | coarse | fine | coarse | fine |
| | mm | mm | mm | Nm | Nm | Nm | Nm | Nm | Nm | Nm | Nm | Nm | Nm |
| **M2** | **4** | 0,4 | - | 0,2 | - | 0,2 | - | 0,3 | - | 0,4 | - | 0,5 | - |
| | | | | 0,2 | - | 0,3 | - | 0,4 | - | 0,5 | - | 0,6 | - |
| **M2,5** | **5** | 0,45 | - | 0,4 | - | 0,5 | - | 0,6 | - | 0,9 | - | 1,1 | - |
| | | | | 0,5 | - | 0,6 | - | 0,8 | - | 1,1 | - | 1,3 | - |
| **M3** | **5,5** | 0,5 | - | 0,7 | - | 0,8 | - | 1,1 | - | 1,5 | - | 1,8 | - |
| | | | | 0,8 | - | 1,0 | - | 1,3 | - | 1,9 | - | 2,3 | - |
| **M3,5** | **6** | 0,6 | - | 1,1 | - | 1,3 | - | 1,7 | - | 2,4 | - | 2,8 | - |
| | | | | 1,3 | - | 1,5 | - | 2,1 | - | 2,9 | - | 3,5 | - |
| **M4** | **7** | 0,7 | - | 1,6 | - | 1,9 | - | 2,5 | - | 3,5 | - | 4,2 | - |
| | | | | 1,9 | - | 2,3 | - | 3,1 | - | 4,3 | - | 5,2 | - |
| **M5** | **8** | 0,8 | - | 3,1 | - | 3,7 | - | 4,9 | - | 6,9 | - | 8,3 | - |
| | | | | 3,8 | - | 4,5 | - | 6,0 | - | 8,5 | - | 10,0 | - |
| **M6** | **10** | 1,0 | - | 5,3 | - | 6,4 | - | 8,5 | - | 12,0 | - | 14,0 | - |
| | | | | 6,5 | - | 7,8 | - | 10,0 | - | 15,0 | - | 18,0 | - |
| **M7** | **11** | 1,0 | - | 8,7 | - | 10,0 | - | 14,0 | - | 20,0 | - | 24,0 | - |
| | | | | 11,0 | - | 13,0 | - | 17,0 | - | 24,0 | - | 29,0 | - |
| **M8** | **13** | 1,25 | 1,0 | 13,0 | 14,0 | 15,0 | 16,0 | 20,0 | 22,0 | 29,0 | 31,0 | 34,0 | 37,0 |
| | | | | 16,0 | 17,0 | 19,0 | 20,0 | 25,0 | 27,0 | 35,0 | 38,0 | 42,0 | 46,0 |
| **M10** | **17** | 1,5 | 1,25 | 25,0 | 26,0 | 30,0 | 32,0 | 40,0 | 42,0 | 57,0 | 59,0 | 68,0 | 71,0 |
| | | | | 31,0 | 33,0 | 37,0 | 39,0 | 50,0 | 53,0 | 70,0 | 74,0 | 84,0 | 89,0 |
| **M12** | **19** | 1,75 | 1,5 | 43,0 | 45,0 | 52,0 | 54,0 | 69,0 | 72,0 | 97,0 | 101,0 | 116,0 | 121,0 |
| | | | | 53,0 | 56,0 | 64,0 | 67,0 | 85,0 | 89,0 | 119,0 | 125,0 | 143,0 | 150,0 |
| **M14** | **22** | 2,0 | 1,5 | 68,0 | 74,0 | 82,0 | 89,0 | 110,0 | 118,0 | 154,0 | 166,0 | 185,0 | 199,0 |
| | | | | 84,0 | 92,0 | 101,0 | 111,0 | 135,0 | 148,0 | 190,0 | 208,0 | 228,0 | 250,0 |
| **M16** | **24** | 2,0 | 1,5 | 106,0 | 112,0 | 128,0 | 135,0 | 128,0 | 180,0 | 240,0 | 253,0 | 287,0 | 303,0 |
| | | | | 132,0 | 141,0 | 159,0 | 170,0 | 212,0 | 226,0 | 298,0 | 318,0 | 357,0 | 382,0 |
| **M18** | **27** | 2,5 | 2,0 | 147,0 | 155,0 | 176,0 | 186,0 | 235,0 | 248,0 | 330,0 | 349,0 | 397,0 | 419,0 |
| | | | | 182,0 | 194,0 | 218,0 | 233,0 | 290,0 | 310,0 | 402,0 | 436,0 | 490,0 | 523,0 |
| **M20** | **30** | 2,5 | 2,0 | 208,0 | 217,0 | 249,0 | 261,0 | 332,0 | 347,0 | 467,0 | 489,0 | 561,0 | 586,0 |
| | | | | 258,0 | 273,0 | 310,0 | 327,0 | 413,0 | 436,0 | 580,0 | 614,0 | 697,0 | 736,0 |
| **M22** | **34** | 2,5 | 2,0 | 284,0 | 296,0 | 341,0 | 355,0 | 454,0 | 474,0 | 639,0 | 666,0 | 767,0 | 799,0 |
| | | | | 355,0 | 373,0 | 426,0 | 448,0 | 568,0 | 597,0 | 798,0 | 840,0 | 958,0 | 1.008,0 |
| **M24** | **36** | 3,0 | 2,0 | 359,0 | 386,0 | 431,0 | 463,0 | 574,0 | 617,0 | 808,0 | 868,0 | 969,0 | 1.041,0 |
| | | | | 446,0 | 488,0 | 535,0 | 586,0 | 714,0 | 781,0 | 1.004,0 | 1.098,0 | 1.204,0 | 1.317,0 |
| **M27** | **41** | 3,0 | 2,0 | 525,0 | 561,0 | 630,0 | 673,0 | 840,0 | 897,0 | 1.181,0 | 1.261,0 | 1.418,0 | 1.513,0 |
| | | | | 656,0 | 712,0 | 788,0 | 855,0 | 1.050,0 | 1.139,0 | 1.477,0 | 1.602,0 | 1.772,0 | 1.923,0 |
| **M30** | **46** | 3,5 | 2,0 | 716,0 | 780,0 | 859,0 | 936,0 | 1.146,0 | 1.248,0 | 1.611,0 | 1.754,0 | 1.933,0 | 2.105,0 |
| | | | | 893,0 | 994,0 | 1.072,0 | 1.193,0 | 1.429,0 | 1.590,0 | 2.009,0 | 2.236,0 | 2.411,0 | 2.648,0 |
| **M33** | **50** | 3,5 | 2,0 | 968,0 | 1.045,0 | 1.162,0 | 1.254,0 | 1.549,0 | 1.673,0 | 2.179,0 | 2.351,0 | 2.614,0 | 2.821,0 |
| | | | | 1.213,0 | 1.335,0 | 1.456,0 | 1.602,0 | 1.941,0 | 2.136,0 | 2.792,0 | 3.004,0 | 3.275,0 | 3.605,0 |
| **M36** | **55** | 4,0 | 3,0 | 1.248,0 | 1.310,0 | 1.498,0 | 1.572,0 | 1.997,0 | 2.096,0 | 2.809,0 | 2.948,0 | 3.370,0 | 3.537,0 |
| | | | | 1.561,0 | 1.658,0 | 1.873,0 | 1.989,0 | 2.497,0 | 2.652,0 | 3.511,0 | 3.730,0 | 4.213,0 | 4.476,0 |
| **M39** | **60** | 4,0 | 3,0 | 1.615,0 | 1.690,0 | 1.938,0 | 2.028,0 | 2.584,0 | 2.703,0 | 3.633,0 | 3.802,0 | 4.360,0 | 4.562,0 |
| | | | | 2.026,0 | 2.144,0 | 2.431,0 | 2.573,0 | 3.242,0 | 3.430,0 | 4.559,0 | 4.824,0 | 5.471,0 | 5.789,0 |

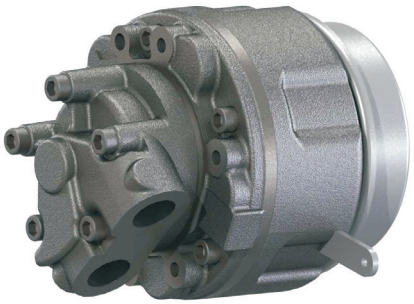
The torque values are to be considered as reference only as they can vary depending on the kind of coupling (rigid, semi-rigid, elastic, etc.), on the material on wich the bolts have to be fixed on, on the lenght of the bolt, on the kind of the wrench used (impact wrench, friction wrwnch, continuous torque wrench, etc.), on the finishing condition of the thread etc. Therefore it is advised to test the coupling to identify the most correct way to tighten them. In the event that the coupling is done with locknuts or self-locking nuts, the value of the torque has to be increased by approximately 15%.

# WHEEL MOTORS

## WHEEL MOTORS WITHOUT GEARBOX

### P05R 20/A

### P05R F 25



## TECHNICAL SPECIFICATION

| | | 60 | 75 | 110 | 130 | 150 | 170 | 200 |
|---|---|---|---|---|---|---|---|---|
| Displacement | [cc/rev] | 59 | 74 | 115 | 129 | 151 | 166 | 191 |
| Bore | [mm] | 25 | 28 | 35 | 37 | 40 | 42 | 45 |
| Stroke | [mm] | | | | 24 | | | |
| Specific torque | [Nm/bar] | 0,94 | 1,18 | 1,84 | 2,05 | 2,40 | 2,65 | 3,04 |
| Continuous pressure | [bar] | | | | 250 | | | |
| Peak pressure (1) | [bar] | 450 | 425 | 400 | 375 | 325 | 325 | 280 |
| Peak power (2) | [kW] | 20 | 33 | 33 | 33 | 33 | 33 | 33 |
| Continuous speed (3) | [rpm] | 700 | 700 | 650 | 650 | 650 | 600 | 600 |
| Maximum speed (3) | [rpm] | 1000 | 1000 | 900 | 900 | 900 | 800 | 800 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Approximative weight with hub | [kg] | 15 | unit | Approximative weight with brake | [kg] | 16 | unit |
| Maximum casing pressure | [bar] | 1 | continuous | Admissible temperatures | [°C] | -20 | minimum |
| | | 5 | peak | | | +80 | maximum |
| Type of brake | | Positive drum brake | | Static braking torque | [Nm] | 500 | |
| Unit oil capacity | [l] | 0,8 | | Maximum cable force | [N] | 1250 | |
| Bolt torque setting | [Nm] | 69,0<br>85,0 | coarse | Suggested bolt type | M12 | 8,8 | |
| | | 72,0<br>89,0 | fine | | | | |

NOTES

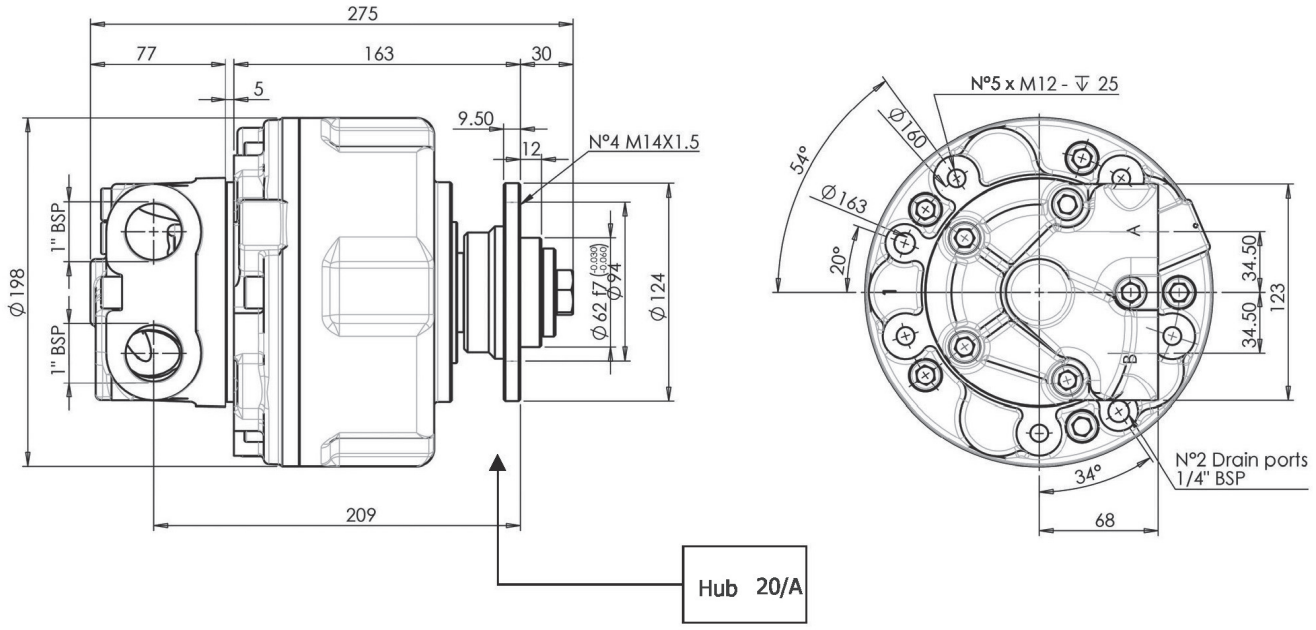
(1) For higher peak pressure please contact our Tech. Dept.

(2) For higher peak power please contact our Tech. Dept.

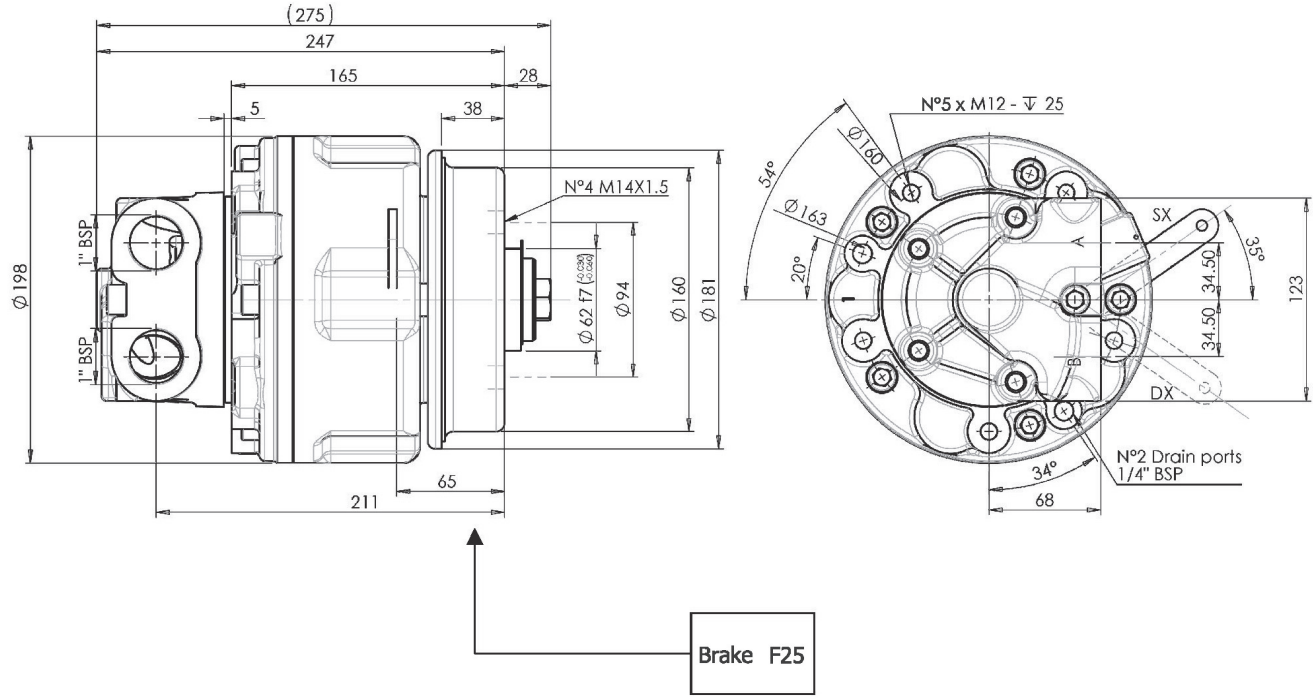
(3) For higher continuous and maximum speed please contact our Tech. Dept.

## P05R 20/A - P05R F 25
## DIMENSIONAL DRAWINGS

### P05R 20/A

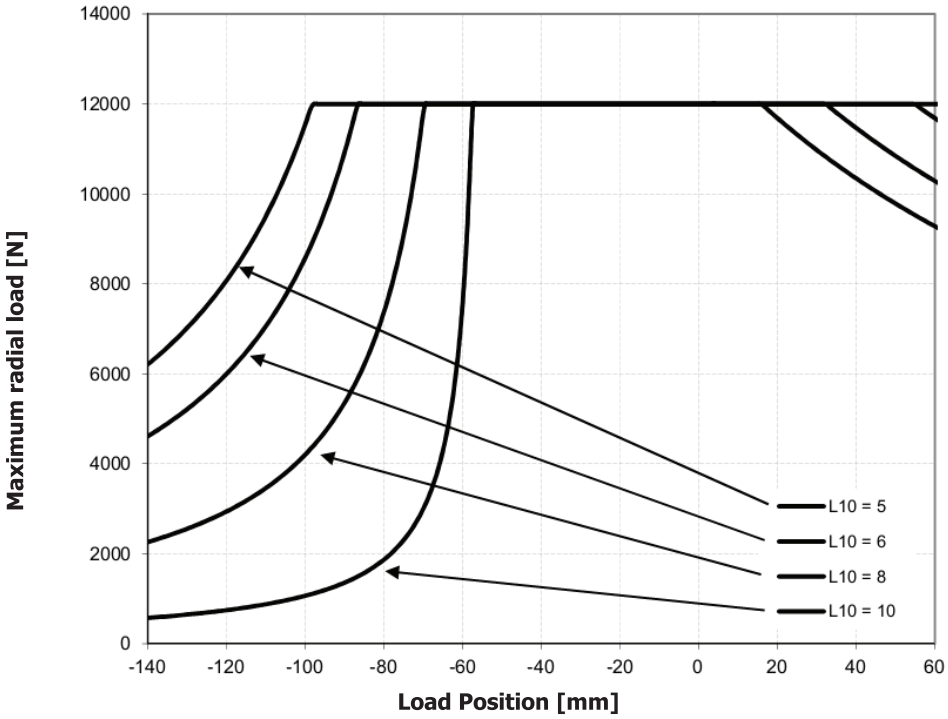



### P05R F 25



## P05R 20/A - P05R F 25
## GRAPHS

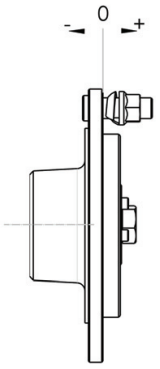
P05R 20/A




Bearing lifetime has been estimated according to $L_{10}$ (according to ISO 281:1990).

Working pressure: 150 bar

Displacement: 191 cc

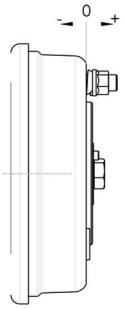


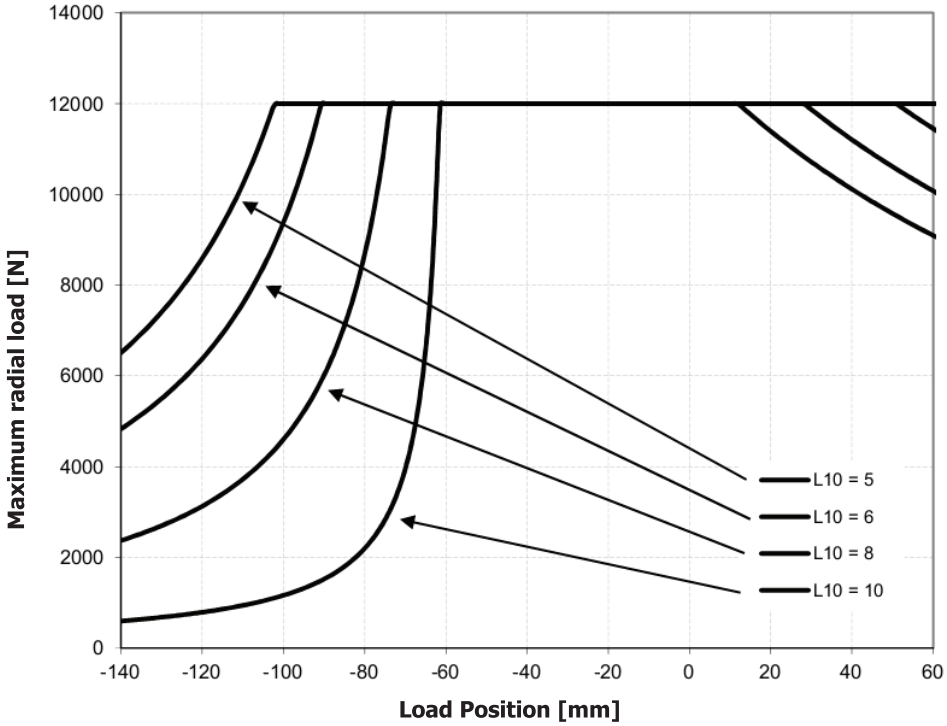

P05R F25

Bearing lifetime has been estimated according to $L_{10}$ (according to ISO 281:1990).

Working pressure: 150 bar

Displacement: 191 cc



# P05R 20/A - P05R F 25
# ORDER CODE

| 1 | | 2 | | 3 | | 4 | | 5 | | 6 |
|---|---|---|---|---|---|---|---|---|---|---|
| P05R | + | | + 2HGPD | + | | + D40 | + | | + | | + | |

| | | |
|---|---|---|
| 1 | **Displacement** | see table |
| 2 | **Options** | V = FKM seals<br>I = breath valve |
| 3 | **Distributor** | see distributors section<br>D40 standard |
| 4 | **Direction of rotation**<br>(viewed from the output side)<br>with flow in port A, out in port B | No code = clockwise rotation<br>L = anti-clockwise rotation |
| 5 | **Distributor cover orientation** | No code = position 1<br>DM2 = position 2<br>DM3 = position 3<br>DM4 = position 4<br>DM5 = position 5 |
| 6 | **Brake or hub option** | 20/A = hub 20/A<br>F25SX = F25 brake left<br>F25DX = F25 brake right |

Example

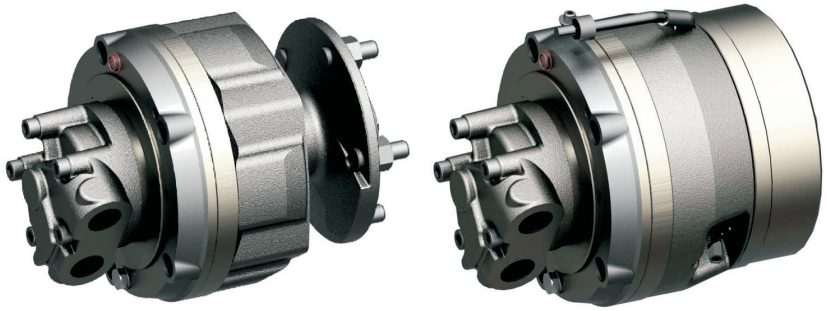
P05 200 2HGPD D40 (standard)

P05R 220 2HGPDV D40L F25DX
(options: FKM seals and anti-clockwise sense of rotation)

## WHEEL MOTORS WITHOUT GEARBOX

### P1G 30/A

### P1G F 30/D



## TECHNICAL SPECIFICATION

| | | 100 | 110 | 130 | 150 | 175 | 200 | 220 | 250 | 300 |
|---|---|---|---|---|---|---|---|---|---|---|
| Displacement | [cc/rev] | 99 | 115 | 129 | 154 | 172 | 201 | 222 | 243 | 290 |
| Bore | [mm] | 28 | 35 | 32 | 35 | 37 | 40 | 42 | 44 | 48 |
| Stroke | [mm] | 32 | 24 | 32 | 32 | 32 | 32 | 32 | 32 | 32 |
| Specific torque | [Nm/bar] | 1,58 | 1,83 | 2,05 | 2,45 | 2,74 | 3,20 | 3,50 | 3,87 | 4,62 |
| Continuous pressure | [bar] | 250 | | | | | | | | |
| Peak pressure (1) | [bar] | 425 | 400 | 400 | 400 | 375 | 350 | 350 | 350 | 300 |
| Peak power (2) | [kW] | 48 | | | | | | | | |
| Continuous speed (3) | [rpm] | 550 | 550 | 550 | 550 | 550 | 550 | 550 | 450 | 350 |
| Maximum speed (3) | [rpm] | 1000 | 1000 | 1000 | 1000 | 900 | 800 | 700 | 700 | 650 |

| | | | | | |
|---|---|---|---|---|---|
| Approximative weight with hub | [kg] | 36 unit | Approximative weight with brake | [kg] | 44 unit |
| Maximum casing pressure | [bar] | 1 continuous<br>5 peak | Admissible temperatures | [°C] | -20 minimum<br>+80 maximum |
| Type of brake | | Positive drum brake | Static braking torque | [Nm] | 2000 |
| Unit oil capacity | [l] | 0,8 | Maximum cable force | [N] | 1800 |
| Brake pilot volume | [cm³] | 6,5 | Maximum brake pilot pressure | [bar] | 100 |
| Bolt torque setting | [Nm] | 110,0 / 135,0 coarse — 118,0 / 148,0 fine | Suggested bolt type | M14 | 8,8 |

NOTES

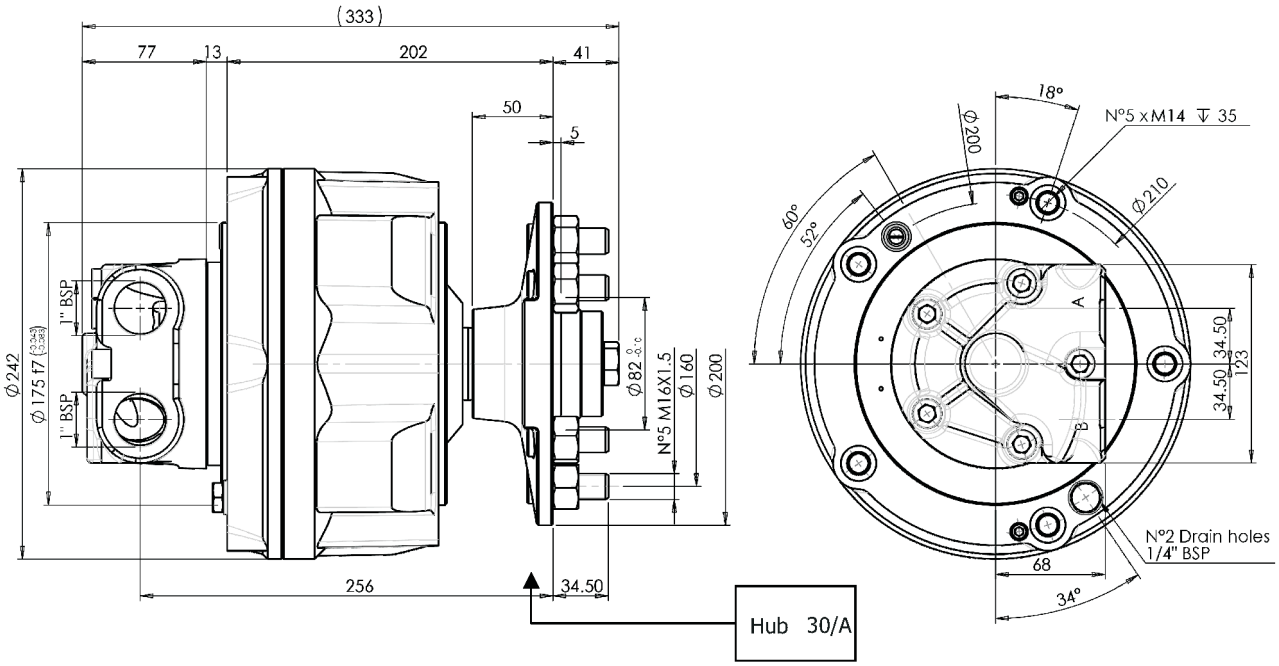
(1) For higher peak pressure please contact our Tech. Dept.

(2) For higher peak power please contact our Tech. Dept.

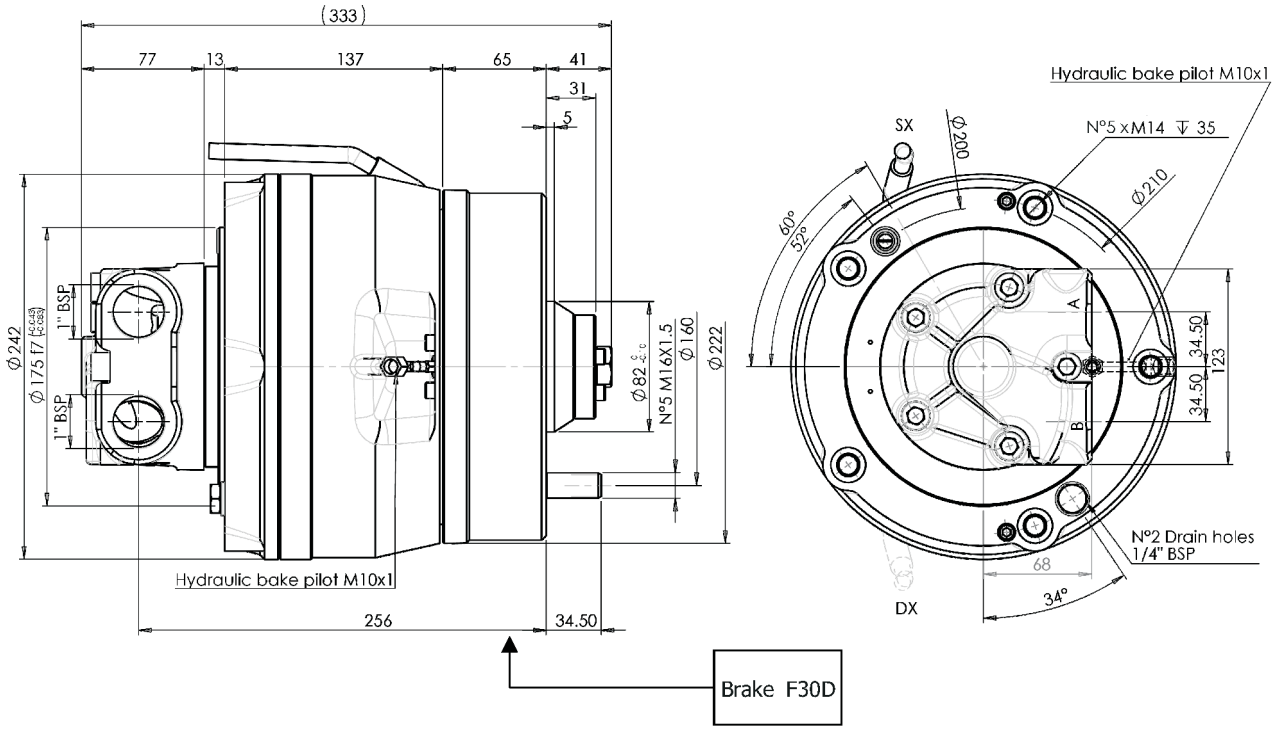
(3) For higher continuous and maximum speeds please contact our Tech. Dept.

# P1G 30/A - P1G F 30/D
# DIMENSIONAL DRAWINGS

## P1G 30/A

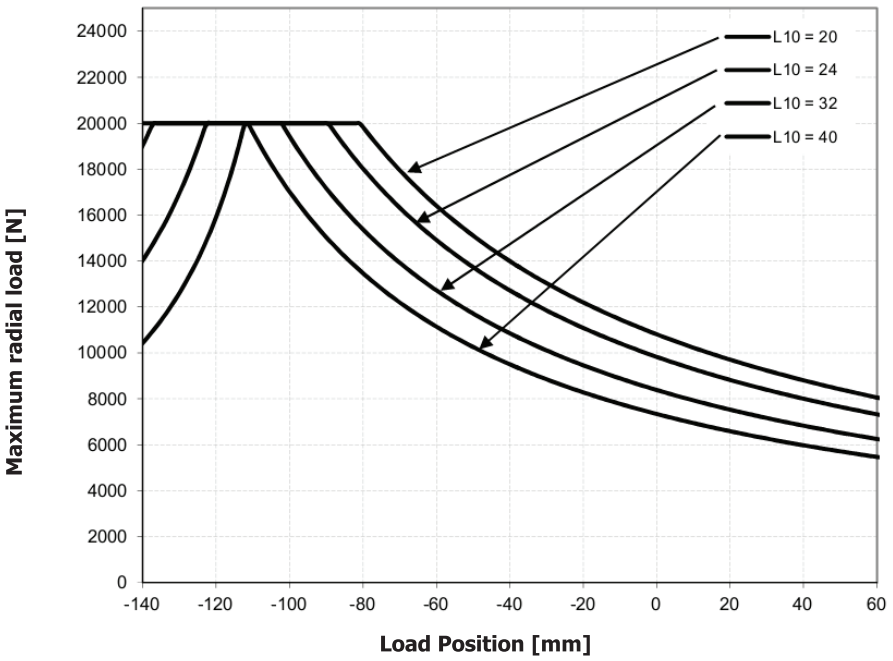



## P1G F 30/D



# P1G 30/A - P1G F 30/D
# GRAPHS

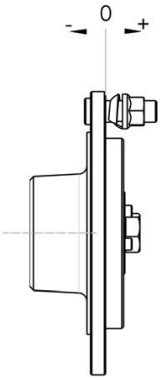
P1G 30/A




Bearing lifetime has been estimated according to $L_{10}$ (according to ISO 281:1990).

Working pressure: 200 bar

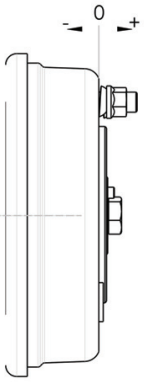
Displacement: 201 cc



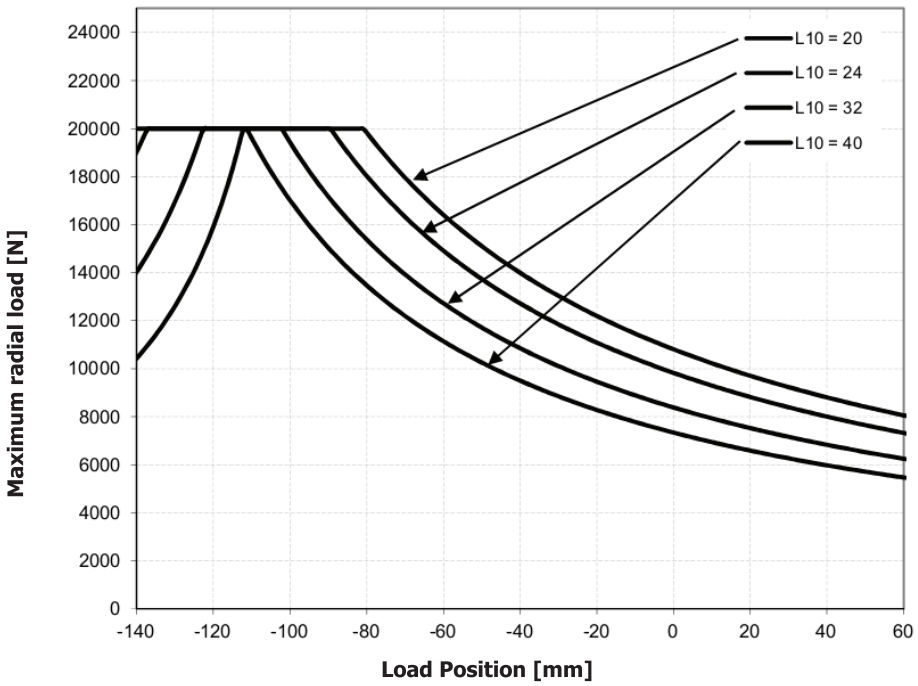

Bearing lifetime has been estimated according to $L_{10}$ (according to ISO 281:1990).

Working pressure: 200 bar

Displacement: 201 cc




P1G F30D



# P1G 30/A - P1G F 30/D
# ORDER CODE

| | 1 | | 2 | | 3 | | 4 | | 5 | | 6 | | 7 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| P1G | + | | + | 2HGP | + | | + | D40 | + | | + | | + | |

| | | | | |
|---|---|---|---|---|
| 1 | **Displacement** | see table | | |
| 2 | **Additional options** | V | = | FKM seals |
| | | I | = | breath valve |
| | | A | = | high pressure shaft seal |
| | | RS | = | integrated speed sensor |
| 3 | **Distributor** | see distributors section | | |
| | | D40 standard | | |
| 4 | **Direction of rotation** (viewed from the output side) with flow in port A, out in port B. | No code | = | clockwise rotation |
| | | L | = | anti-clockwise rotation |
| 5 | **Distributor cover orientation** | No code | = | position 1 |
| | | DM2 | = | position 2 |
| | | DM3 | = | position 3 |
| | | DM4 | = | position 4 |
| | | DM5 | = | position 5 |
| 6 | **Brake or hub option** | 30/A | = | hub 30/A |
| | | F30DSX | = | F30D brake left |
| | | F30DDX | = | F30D brake right |
| 7 | **Brake cable lenght** | 1600 mm | | |
| | | 2195 mm | | |
| | | 6000 mm | | |

Example

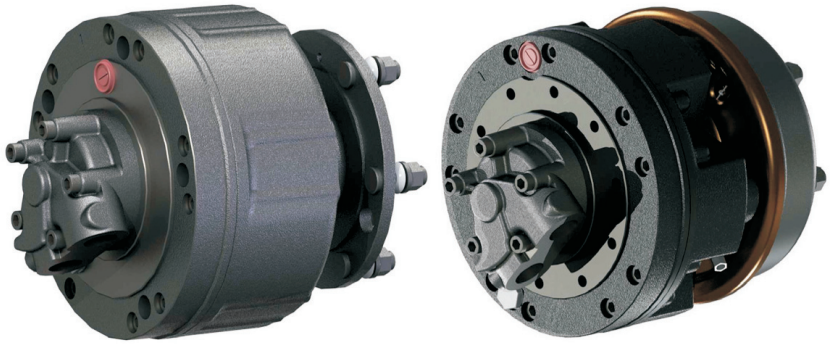
P1G 200 2HGP D40
(standard)

P1G 200 2HGPV D40L F30DSX
(options: FKM seals and anti-clockwise sense of rotation)

## WHEEL MOTORS WITHOUT GEARBOX

### P2G 22/B

### P2G F 32



## TECHNICAL SPECIFICATION

| | | 200 | 250 | 300 | 350 | 420 | 500 | 600 |
|---|---|---|---|---|---|---|---|---|
| Displacement | [cc/rev] | 192 | 251 | 304 | 347 | 425 | 493 | 565 |
| Bore | [mm] | 35 | 40 | 44 | 47 | 52 | 56 | 60 |
| Stroke | [mm] | 40 | | | | | | |
| Specific torque | [Nm/bar] | 3,00 | 3,92 | 4,84 | 5,52 | 6,77 | 7,85 | 9,50 |
| Continuous pressure | [bar] | 250 | | | | | | |
| Peak pressure (1) | [bar] | 425 | 425 | 400 | 375 | 350 | 350 | 300 |
| Peak power (2) | [kW] | 59 | | | | | | |
| Continuous speed (3) | [rpm] | 550 | 550 | 500 | 500 | 450 | 450 | 450 |
| Maximum speed (3) | [rpm] | 800 | 800 | 750 | 750 | 750 | 700 | 700 |

| | | | | | |
|---|---|---|---|---|---|
| Approximative weight with hub | [kg] | 58 unit | Approximative weight with brake | [kg] | 61 unit |
| Maximum casing pressure | [bar] | 1 continuous<br>5 peak | Admissible temperatures | [°C] | -20 minimum<br>+80 maximum |
| Type of brake | | Positive drum brake | Static braking torque | [Nm] | 2000 |
| Unit oil capacity | [l] | 0,8 | Maximum cable force | [N] | 800 |
| Brake pilot volume | [cm³] | 6,5 | Maximum brake pilot pressure | [bar] | 100 |
| Bolt torque setting | [Nm] | 69,0 coarse 72,0 fine<br>85,0 89,0 | Suggested bolt type | | M12 8,8 |

NOTES

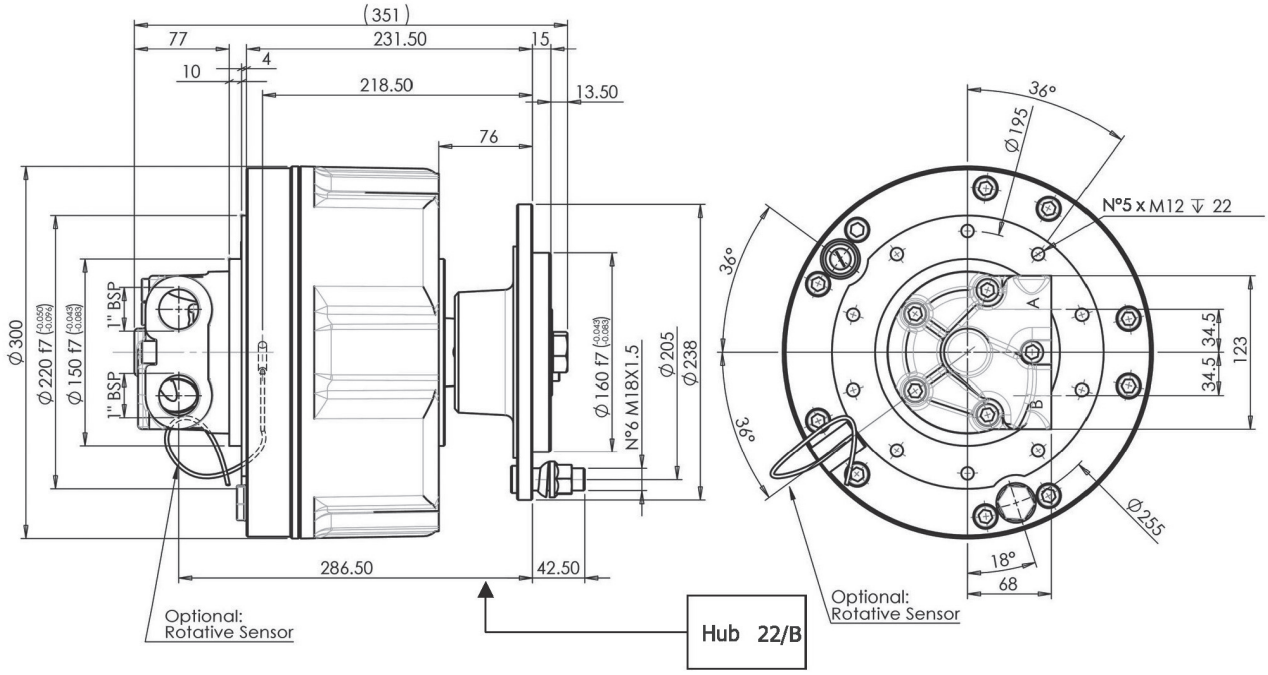
(1) For higher peak pressure please contact our Tech. Dept.

(2) For higher peak power please contact our Tech. Dept.

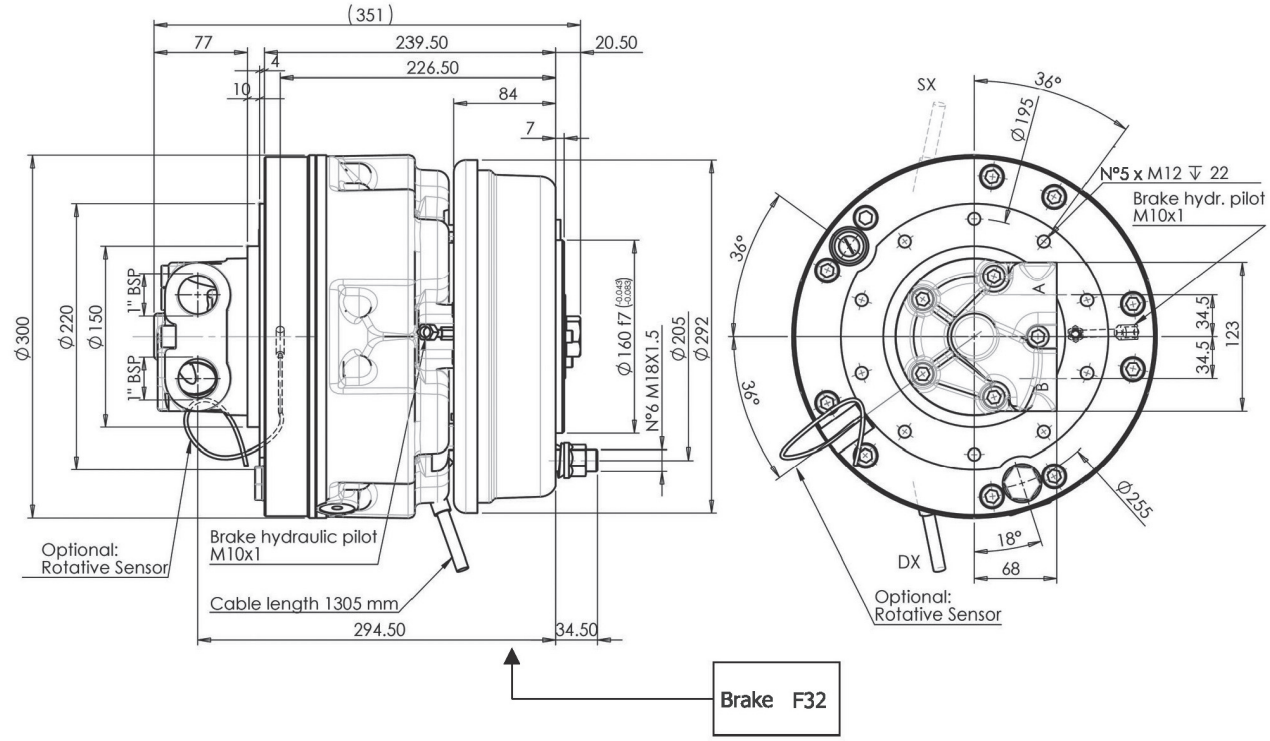
(3) For higher continuous and maximum speed please contact our Tech. Dept.

## P2G 22/B - P2G F 32
## DIMENSIONAL DRAWINGS

### P2G 22/B

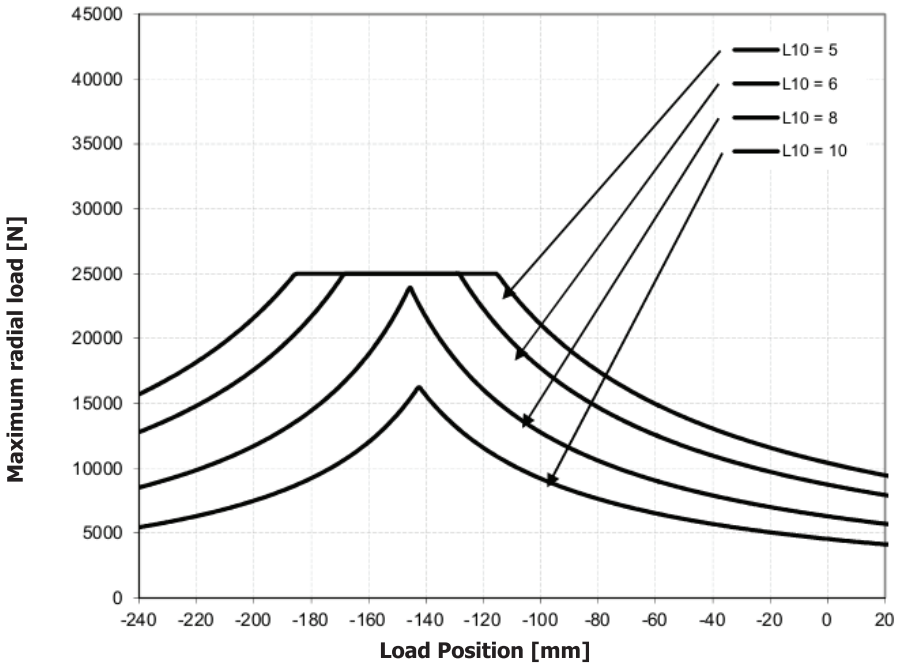



### P2G F 32



## P2G 22/B - P2G F 32
## GRAPHS

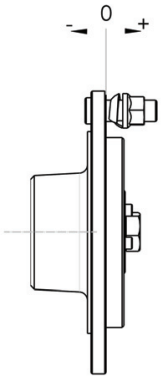
P2G 22/B



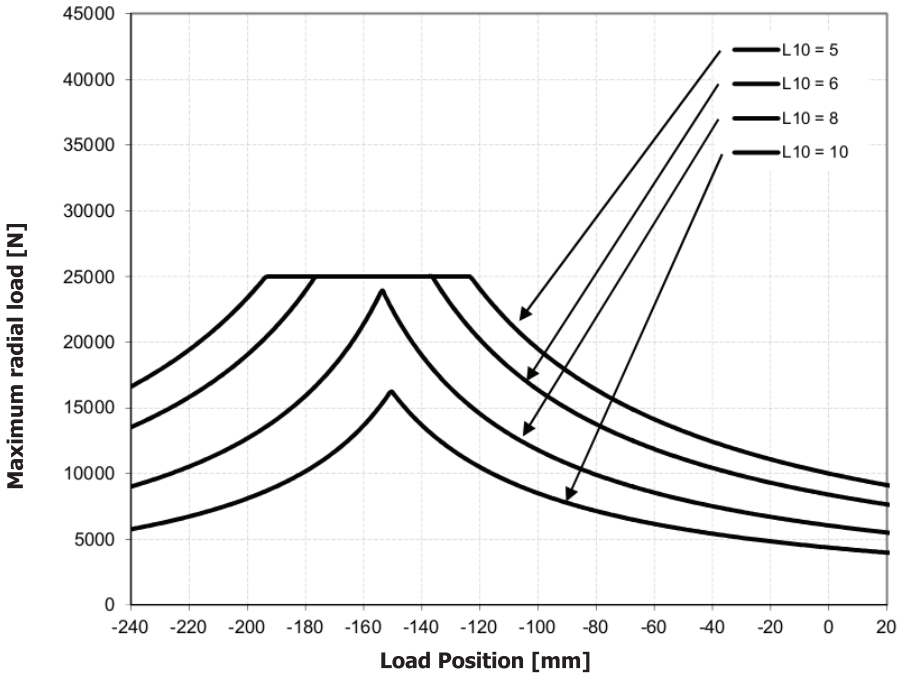

Bearing lifetime has been estimated according to $L_{10}$ (according to ISO 281:1990).

Working pressure: 200 bar

Displacement: 595 cc



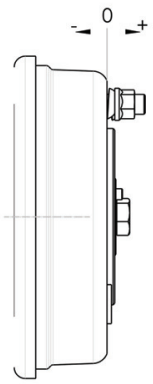

P2G F32




Bearing lifetime has been estimated according to $L_{10}$ (according to ISO 281:1990).

Working pressure: 200 bar

Displacement: 595 cc



# P2G 22/B - P2G F 32
# ORDER CODE

| 1 | | 2 | | 3 | | 4 | | 5 | | 6 | | 7 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| P2G | + | | + | 2HGPD | + | | + | D40 | + | | + | | + | | + | |

| | | | |
|---|---|---|---|
| 1 | **Displacement** | see table | |
| 2 | **Additional options** | V | = FKM seals |
| | | I | = breath valve |
| | | A | = high pressure shaft seal |
| | | RS | = integrated speed sensor |
| 3 | **Distributor** | see distributors section | |
| | | D40 standard | |
| 4 | **Direction of rotation** (viewed from the output side) with flow in port A, out in port B. | No code | = clockwise rotation |
| | | L | = anti-clockwise rotation |
| 5 | **Distributor cover orientation** | No code | = position 1 |
| | | DM2 | = position 2 |
| | | DM3 | = position 3 |
| | | DM4 | = position 4 |
| | | DM5 | = position 5 |
| 6 | **Brake or hub option** | 22/B | = hub 22/B |
| | | F32SX | = F32 brake left |
| | | F32DX | = F32 brake right |
| 7 | **Brake cable lenght** | 1305 mm | |
| | | 1500 mm | |

Example

P2G 200 2HGPD D40
(standard)

P2G 200 2HGPD D40 F30DSX
(options: FKM seals and anti-clockwise sense of rotation)

## WHEEL MOTORS WITHOUT GEARBOX

**BD2 22/B** (dual displacement)

**BD2 F 32** (dual displacement)

## TECHNICAL SPECIFICATION

| | | 500 | 250 | 500 | 125 | 350 | 175 | 350 | 90 | 250 | 125 | 250 | 65 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Displacement | [cc/rev] | 493 | 246 | 493 | 123 | 347 | 173 | 347 | 87 | 251 | 126 | 251 | 63 |
| Bore | [mm] | 56 | | 56 | | 47 | | 47 | | 40 | | 40 | |
| Stroke | [mm] | 40 | 20 | 40 | 10 | 40 | 20 | 40 | 10 | 40 | 20 | 40 | 10 |
| Specific torque | [Nm/bar] | 7,85 | 3,91 | 7,80 | 2,00 | 5,50 | 2,80 | 5,50 | 1,40 | 4,00 | 2,00 | 4,00 | 1,00 |
| Continuous pressure | [bar] | 250 | | 250 | | 250 | | 250 | | 250 | | 250 | |
| Peak pressure (1) | [bar] | 350 | | 350 | | 375 | | 375 | | 425 | | 425 | |
| Peak power (2) | [kW] | 75 | 65 | 75 | 62 | 75 | 65 | 75 | 65 | 75 | 65 | 70 | 60 |
| Continuous speed (3) | [rpm] | 400 | 800 | 400 | 1500 | 700 | 1500 | 700 | 1500 | 700 | 1500 | 700 | 1500 |
| Maximum speed (3) | [rpm] | 800 | 1600 | 800 | 2200 | 1000 | 1800 | 1000 | 2200 | 1000 | 1800 | 1000 | 2400 |

| | | | | | | |
|---|---|---|---|---|---|---|
| Approximative weight with hub | [kg] | 58 | unit | Approximative weight with brake | [kg] | 61 unit |
| Maximum casing pressure | [bar] | 1 continuous<br>5 peak | | Admissible temperatures | [°C] | -20 minimum<br>+80 maximum |
| Type of brake | | Positive drum brake | | Static braking torque | [Nm] | 2000 |
| Motor oil capacity | [l] | 3 | | Maximum cable force | [N] | 800 |
| Volume pilot change displacement | [cm³] | 5,568 | | Pilot pressure change displacement | [bar] | 25 minimum<br>35 maximum |
| Brake pilot volume | [cm³] | 6,5 | | Maximum cylinder pressure | [bar] | 100 |
| Suggested bolt type | M18 | 8,8 | | Maximum brake pilot pressure | [bar] | 100 |
| Bolt torque setting | [Nm] | 235,0<br>290,0 coarse | 248,0<br>310,0 fine | | | |

NOTES

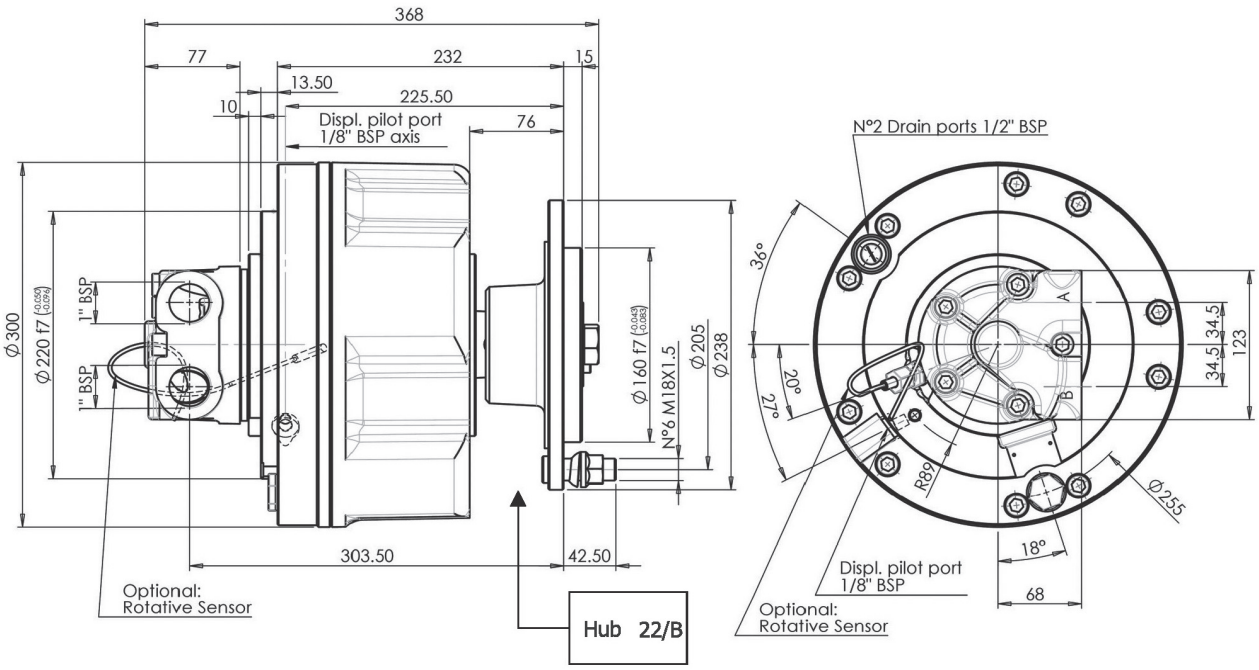
(1) For higher peak pressure please contact our Tech. Dept.

(2) For higher peak power please contact our Tech. Dept.

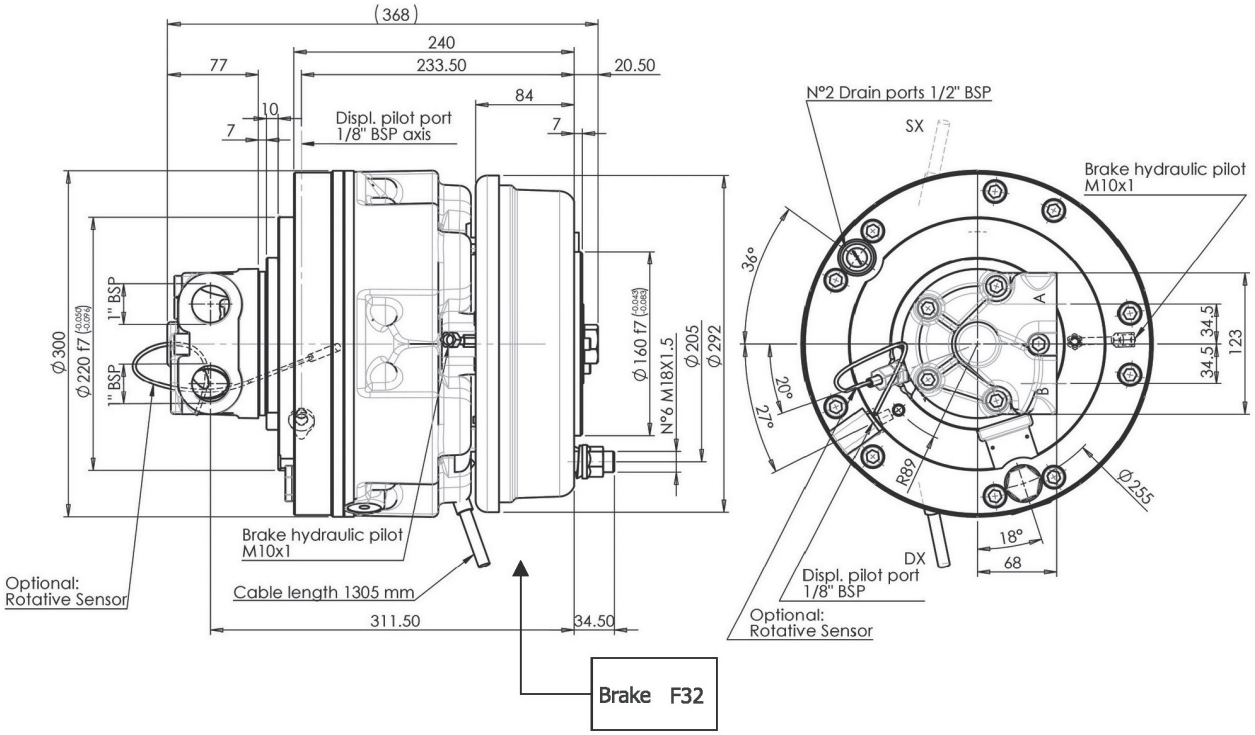
(3) For higher continuous and maximum speeds please contact our Tech. Dept.

# BD2 22/B - BD2 F 32
# DIMENSIONAL DRAWINGS

## BD2 22/B

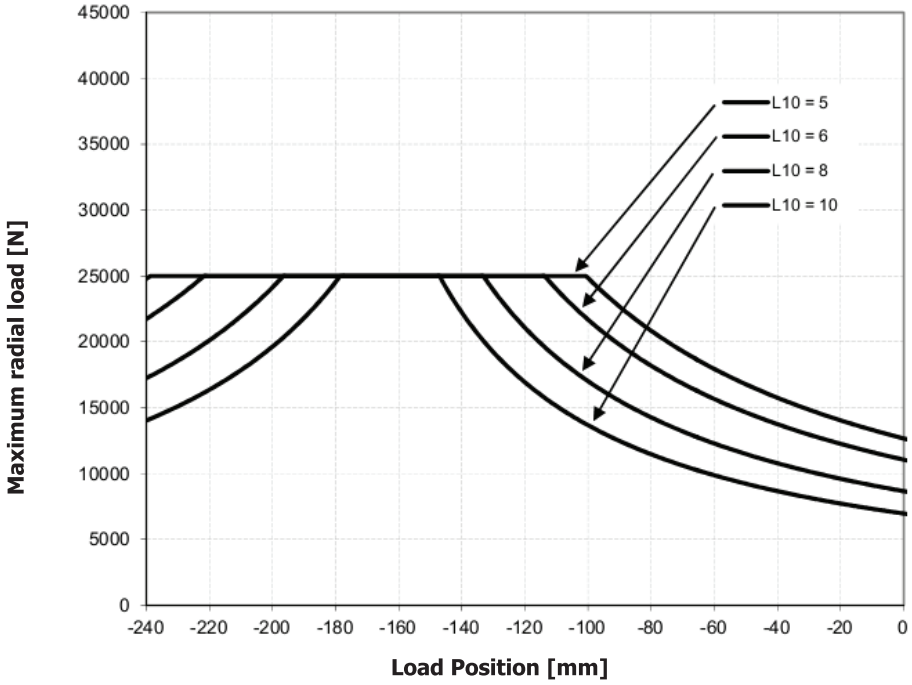



## BD2 F 32



## BD2 22/B - BD2 F 32
## GRAPHS

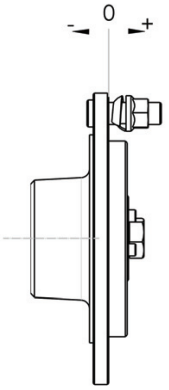
BD2 22/B




Bearing lifetime has been estimated according to $L_{10}$ (according to ISO 281:1990).

Working pressure: 200 bar

Displacement: 493 cc

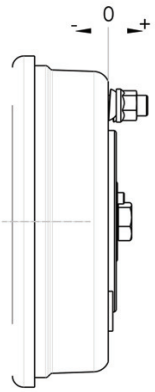


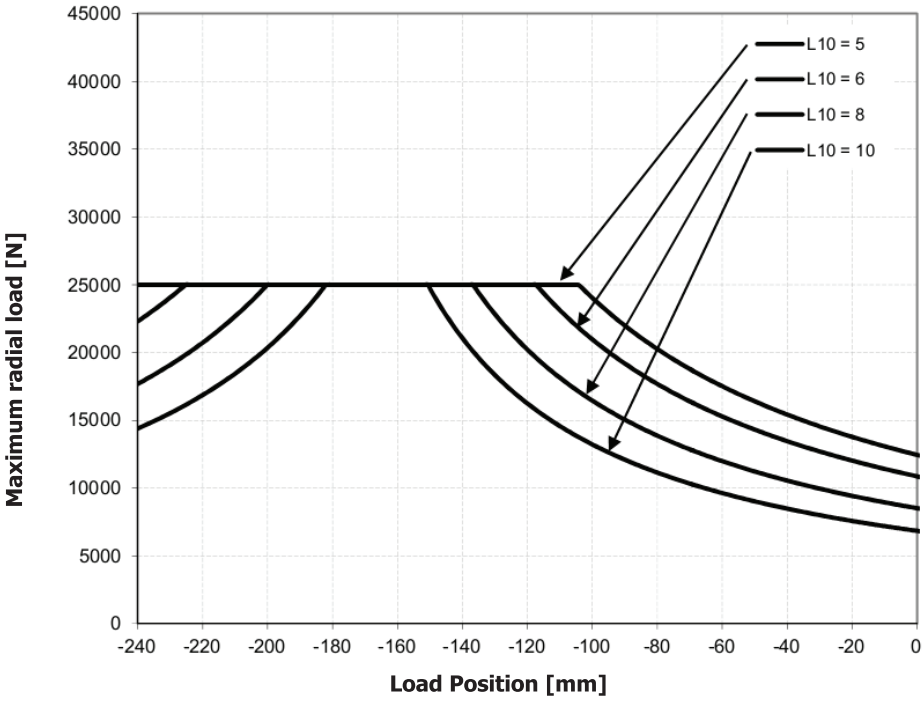

BD2 F32

Bearing lifetime has been estimated according to $L_{10}$ (according to ISO 281:1990).

Working pressure: 200 bar

Displacement: 493 cc



# BD2 22/B - BD2 F 32
# ORDER CODE

| | 1 | | 2 | | | 3 | | 4 | | 5 | | 6 | | 7 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| BD2 | + | | + | | + | 2HGPMD | + | | + | D40 | + | | + | | + | |

| | | | | |
|---|---|---|---|---|
| 1 | **Maximum displacement** | see table | | |
| 2 | **Minimum displacement** | see table | | |
| 3 | **Additional options** | V | = | FKM seals |
| | | I | = | breath valve |
| | | RS | = | rotative sensor |
| 4 | **Distributor** | see distributors section | | |
| | | D40 standard | | |
| 5 | **Direction of rotation** (viewed from the output side) with flow in port A, out in port B. | No code | = | clockwise rotation |
| | | L | = | anti-clockwise rotation |
| 6 | **Distributor cover orientation** | No code | = | position 1 |
| | | DM2 | = | position 2 |
| | | DM3 | = | position 3 |
| | | DM4 | = | position 4 |
| | | DM5 | = | position 5 |
| 7 | **Brake or hub option** | 22/B | = | hub 22/B |
| | | F32SX | = | F32 brake left |
| | | F32DX | = | F32 brake right |

Example

*Esempio*

BD2 500 125 2HGPMD D40

(standard)

BD2 500 125 2HGPMD D40L F30DSX

(options: FKM seals and anti-clockwise sense of rotation)

## WHEEL MOTORS WITH GEARBOX WR Series

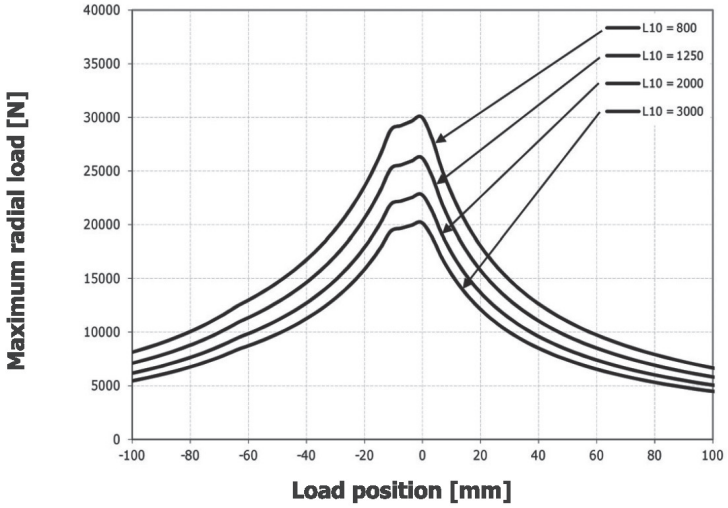
## PRODUCT OVERVIEW

| | | | WR6B | WR10 | WR20 |
|---|---|---|---|---|---|
| Maximum continuous torque | [Nm] | | 3000 | 6500 | 9650 |
| Peak torque | [Nm] | | 4200 | 10000 | 14300 |
| Reduction ratio | | | 5:1 | 4,80:1 | 6,60:1 |
| Maximum braking torque | [Nm] | | 3000 | 7000 | 10000 |
| Brake pilot pressure | [bar] | minimum | 18 | 15 | 15 |
| | | maximum | 60 | 60 | 60 |
| Gearbox weight | [kg] | | 47 | 75 | 90 |
| Type of brake | | | Negative disk brake | Negative disk brake | Negative disk brake |
| Applicable motors | | | GM05<br>GS05*<br>GM1<br>GS1*<br>BD1<br>BV1 | GM05<br>GS05*<br>GM1<br>GS1*<br>BD1<br>BV1<br>GM2<br>GS2*<br>BD2<br>BV2 | GM05<br>GS05*<br>GM1<br>GS1*<br>BD1<br>BV1<br>GM2<br>GS2*<br>BD2<br>BV2 |

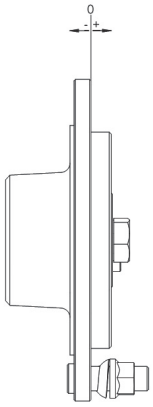
* For further information on the use of the high speed GS Series Motors on these gearboxes please contact our Tech. Dept.

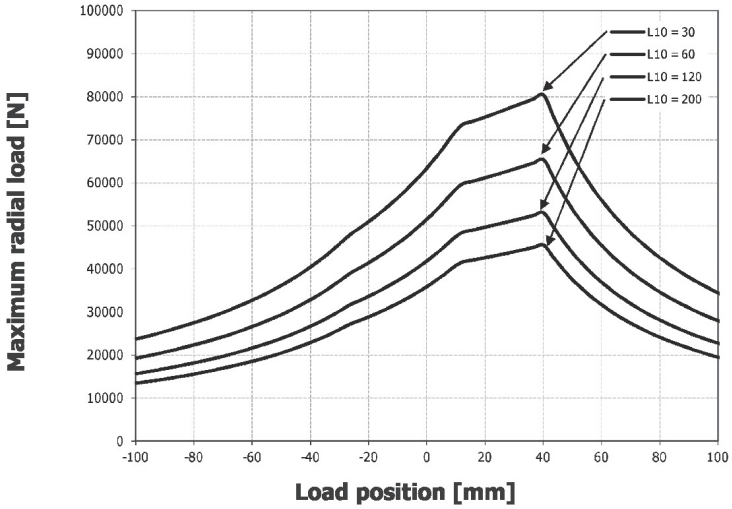
## WHEEL MOTORS WITH GEARBOX WR Series

## LOAD GRAPHS

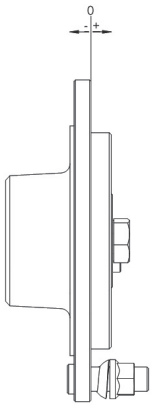


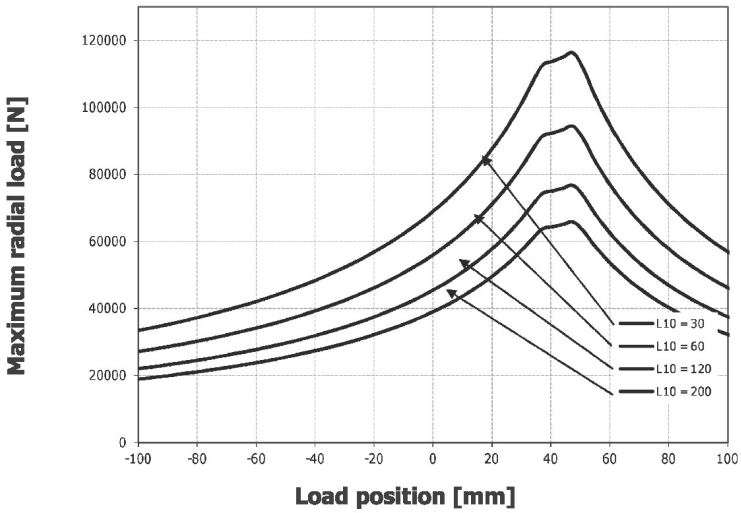

WR6B



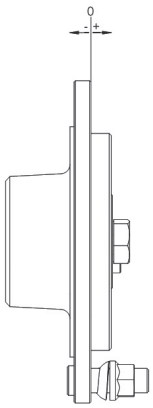




WR10




WR20



## WHEEL MOTORS WITH GEARBOX WR Series

### GM05 + WR6B (fixed displacement)

### TECHNICAL SPECIFICATION

| | | 200 | 300 | 400 | 450 | 600 | 650 | 750 | 850 | 950 |
|---|---|---|---|---|---|---|---|---|---|---|
| Equivalent displacement (1) | [cc/rev] | 196 | 295 | 369 | 430 | 577 | 645 | 754 | 831 | 954 |
| Reduction ratio | | | | | | 5:1 | | | | |
| Bore | [mm] | 25 | 25 | 28 | 37 | 35 | 37 | 40 | 42 | 45 |
| Stroke | [mm] | 16 | 24 | 24 | 16 | 24 | 24 | 24 | 24 | 24 |
| Specific torque | [Nm/bar] | 3,10 | 4,70 | 5,90 | 6,85 | 9,15 | 10,25 | 12,00 | 13,20 | 15,20 |
| Continuous pressure | [bar] | 250 | 250 | 250 | 250 | 250 | 250 | 250 | 250 | 250 |
| Peak pressure (2) | [bar] | 450 | 450 | 425 | 375 | 400 | 375 | 325 | 315 | 275 |
| Peak power (3) | [kW] | 20 | 20 | 33 | 33 | 33 | 33 | 33 | 33 | 33 |
| Continuous speed (4) | [rpm] | 140 | 140 | 140 | 140 | 130 | 130 | 130 | 120 | 120 |
| Maximum speed (4) | [rpm] | 200 | 200 | 200 | 200 | 180 | 180 | 180 | 160 | 160 |

| | | | | | |
|---|---|---|---|---|---|
| Approximative weight | [kg] | 72 unit | Type of brake | Negative disc brake | |
| Maximum casing pressure | [bar] | 1 continuous<br>5 peak | Admissible temperatures | [°C] | -20 minimum<br>+80 maximum |
| Motor oil capacity | [l] | 0,8 | Static braking torque (5) | [Nm] | 3000 |
| Gearbox oil capacity | [l] | 0,5 | Minimum brake pilot pressure | [bar] | 18 |
| Brake pilot volume | [cm³] | 14 | Maximum brake pilot pressure | [bar] | 60 |
| Bolt torque setting | [Nm] | 287,0 coarse 303,0 fine<br>357,0 382,0 | Suggested bolt type | M16 | 12.9 |

NOTES

(1) Equivalent displacement = motor displacement x reduction ratio of gearbox (5:1)

(2) For higher peak pressure please contact our Tech. Dept.

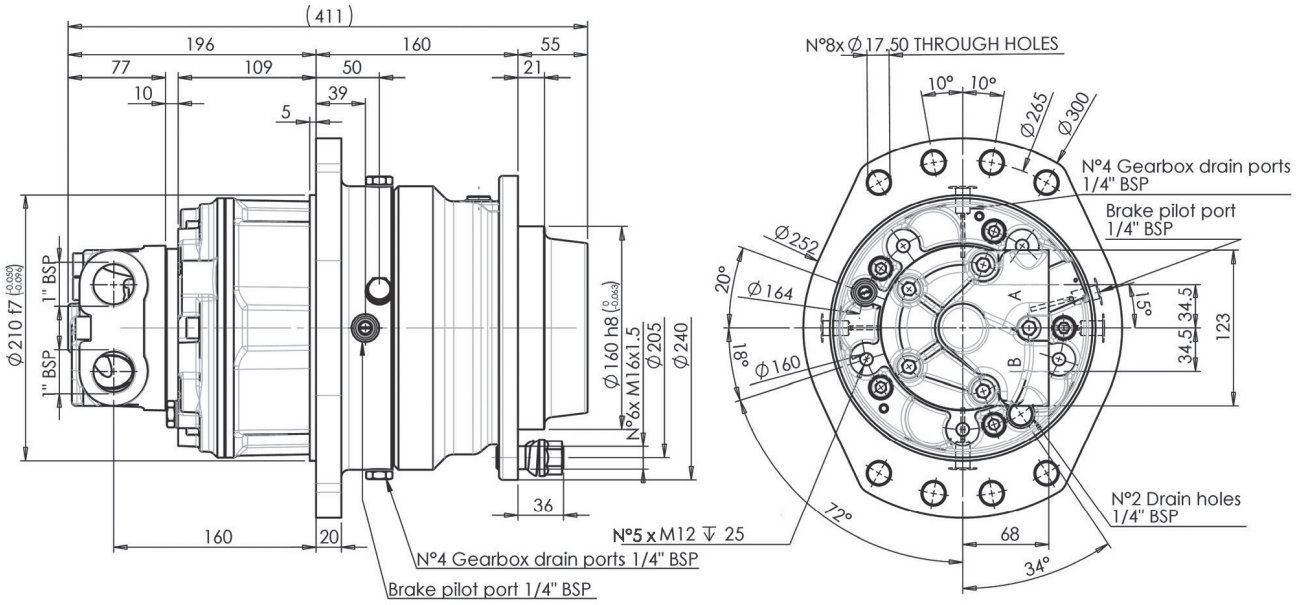
(3) For higher peak power please contact our Tech. Dept.

(4) For higher continuous and maximum speed please contact our Tech. Dept.

(5) If the brake is engaged for a long time, the braking torque could increase considerably.
The brake requires to be periodically engaged and disengaged to mantain the desired performance.

## WHEEL MOTORS WITH GEARBOX WR Series

## GM05 + WR6B - INSTALLATION DRAWINGS

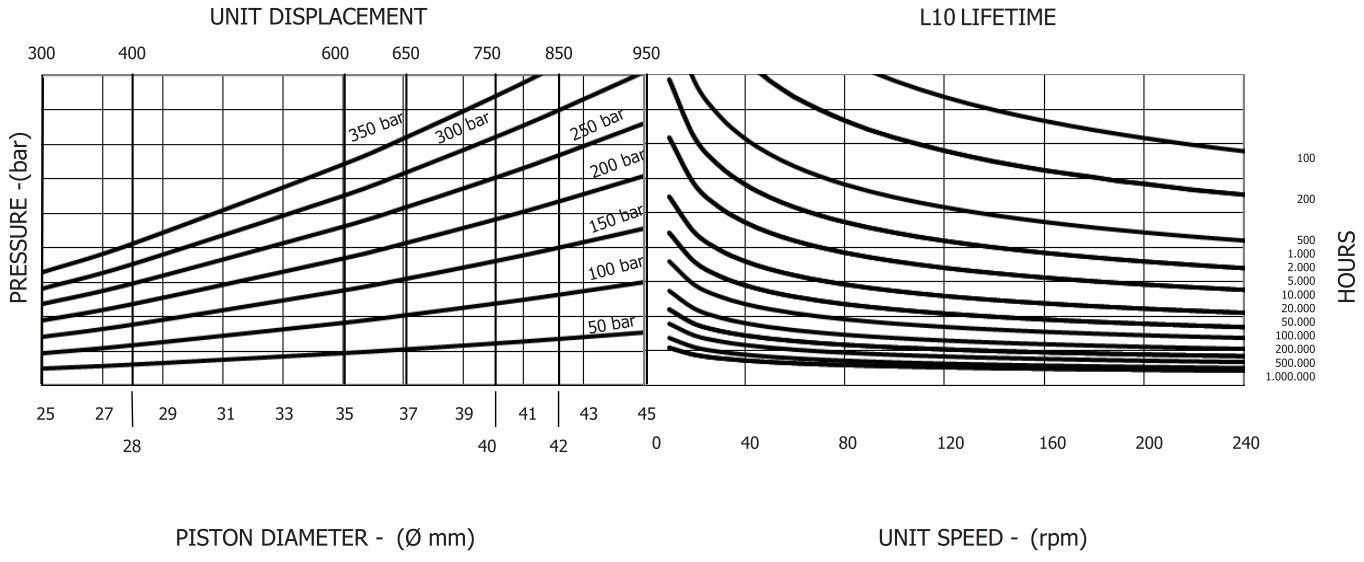



## BEARING LIFETIME GRAPHS

Bearing lifetime has been estimated according to L10 (according to ISO 281:1990).

The following graph has been plotted using the stroke of 24 mm.

Please contact our Technical Department for other graphs relating to this product.



## WHEEL MOTORS WITH GEARBOX WR Series

### GM1 + WR6B (fixed displacement)

### TECHNICAL SPECIFICATION

| | | 500 | 650 | 775 | 860 | 1000 |
|---|---|---|---|---|---|---|
| Equivalent displacement (1) | [cc/rev] | 495 | 645 | 770 | 860 | 1005 |
| Reduction ratio | | | | 5:1 | | |
| Bore | [mm] | 28 | 32 | 35 | 37 | 40 |
| Stroke | [mm] | | | 32 | | |
| Specific torque | [Nm/bar] | 7,84 | 10,27 | 12,26 | 13,69 | 16,00 |
| Continuous pressure | [bar] | 250 | 250 | 250 | 250 | 250 |
| Peak pressure (2) | [bar] | 425 | 400 | 400 | 375 | 250 |
| Peak power (3) | [kW] | | | 48 | | |
| Continuous speed (4) | [rpm] | 110 | 110 | 110 | 110 | 110 |
| Maximum speed (4) | [rpm] | 200 | 200 | 200 | 180 | 160 |

| | | | | | |
|---|---|---|---|---|---|
| Approximative weight | [kg] | 79 unit | Type of brake | Negative disc brake | |
| Maximum casing pressure | [bar] | 1 continuous<br>5 peak | Admissible temperatures | [°C] | -20 minimum<br>+80 maximum |
| Motor oil capacity | [l] | 1 | Static braking torque (5) | [Nm] | 3000 |
| Gearbox oil capacity | [l] | 0,5 | Minimum brake pilot pressure | [bar] | 18 |
| Brake pilot volume | [cm³] | 14 | Maximum brake pilot pressure | [bar] | 60 |
| Bolt torque setting | [Nm] | 287,0 coarse 303,0 fine<br>357,0 382,0 | Suggested bolt type | M16 | 12.9 |

NOTES

(1) Equivalent displacement = motor displacement x reduction ratio of gearbox (5:1)

(2) For higher peak pressure please contact our Tech. Dept.

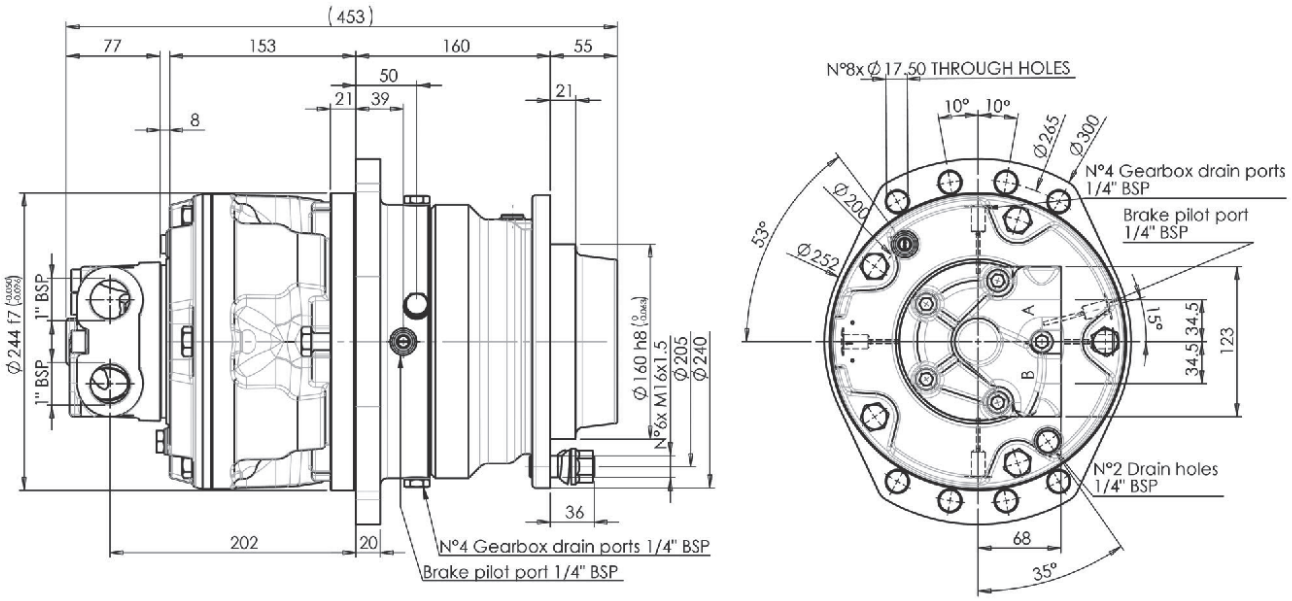
(3) For higher peak power please contact our Tech. Dept.

(4) For higher continuous and maximum speed please contact our Tech. Dept.

(5) If the brake is engaged for a long time, the braking torque could increase considerably.
The brake requires to be periodically engaged and disengaged to mantain the desired performance.

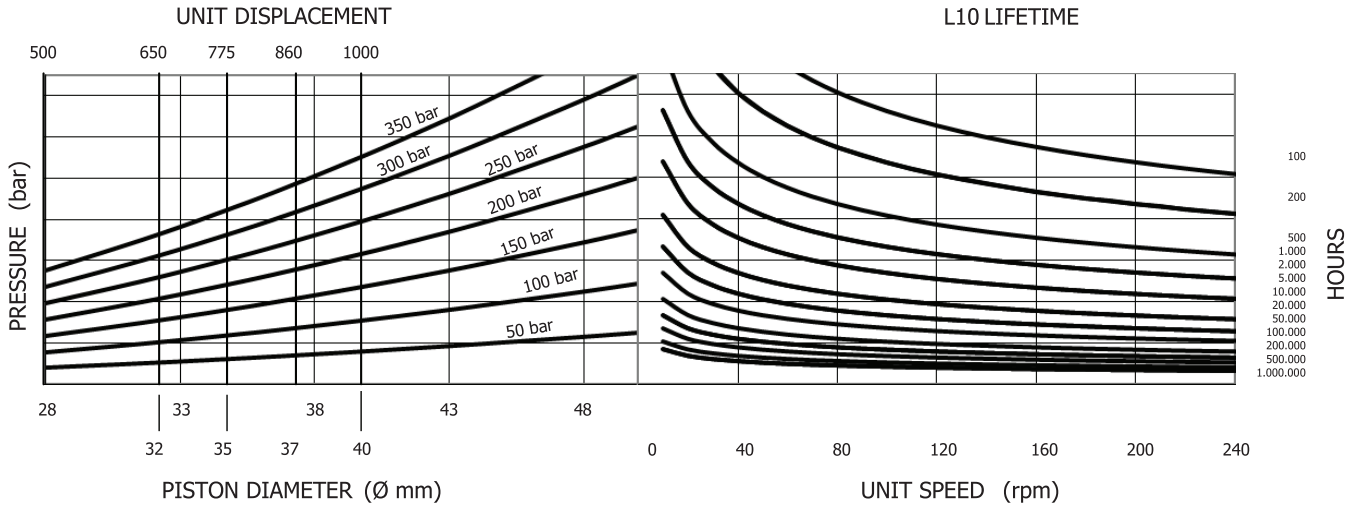
## WHEEL MOTORS WITH GEARBOX WR Series

## GM1 + WR6B - INSTALLATION DRAWINGS




## BEARING LIFETIME GRAPHS

Bearing lifetime has been estimated according to L10 (according to ISO 281:1990).
Please contact our Technical Department for other graphs relating to this product.



## WHEEL MOTORS WITH GEARBOX WR Series

### BD1 + WR6B (dual displacement)
### BV1 + WR6B (variable displacement)

### TECHNICAL SPECIFICATION

| | | 500 | 270 | 875 | 225 | 875 | 400 | 1250 | 300 | 1250 | 600 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Equivalent displacement (1) | [cc/rev] | 510 | 270 | 860 | 215 | 880 | 380 | 1215 | 305 | 1215 | 608 |
| Reduction ratio | | 5:1 | | | | | | | | | |
| Bore | [mm] | 37 | 37 | 37 | 37 | 44 | 44 | 44 | 44 | 44 | 44 |
| Stroke | [mm] | 19 | 10 | 32 | 8 | 23 | 10 | 32 | 8 | 32 | 16 |
| Specific torque | [Nm/bar] | 8,10 | 4,50 | 13,68 | 3,50 | 14,00 | 6,04 | 19,40 | 4,85 | 19,50 | 9,67 |
| Continuous pressure | [bar] | 250 | 250 | 220 | 250 | 210 | 250 | 150 | 250 | 150 | 250 |
| Peak pressure (2) | [bar] | 425 | 425 | 310 | 400 | 300 | 400 | 215 | 375 | 215 | 375 |
| Peak power (3) | [kW] | 55 | 42 | 55 | 42 | 55 | 42 | 55 | 42 | 55 | 42 |
| Continuous speed (4) | [rpm] | 100 | 250 | 100 | 250 | 100 | 250 | 100 | 250 | 100 | 250 |
| Maximum speed (4) | [rpm] | 250 | 250 | 200 | 250 | 200 | 250 | 170 | 250 | 170 | 250 |

| | | | | | | |
|---|---|---|---|---|---|---|
| Approximative weight | [kg] | 85 | unit | Type of brake | | Negative disc brake |
| Maximum casing pressure | [bar] | 1 | continuous | Admissible temperatures | [°C] | -20 minimum |
| | | 5 | peak | | | +80 maximum |
| Motor oil capacity | [l] | 1,5 | | Static braking torque (5) | [Nm] | 3000 |
| Gearbox oil capacity | [l] | 0,5 | | Minimum brake pilot pressure | [bar] | 18 |
| Brake pilot volume | [cm³] | 14 | | Maximum brake pilot pressure | [bar] | 60 |
| Volume pilot change displacement | [cm³] | 2,12 | | Pilot pressure change displacement | [bar] | 25 minimum |
| | | | | | | 35 maximum |
| Suggested bolt type | M16 | 12.9 | | | | |
| Bolt torque setting | [Nm] | 287,0 – 357,0 | coarse | 303,0 – 382,0 | fine | |

NOTES

(1) Equivalent displacement = motor displacement x reduction ratio of gearbox (5:1)

(2) For higher peak pressure please contact our Tech. Dept.

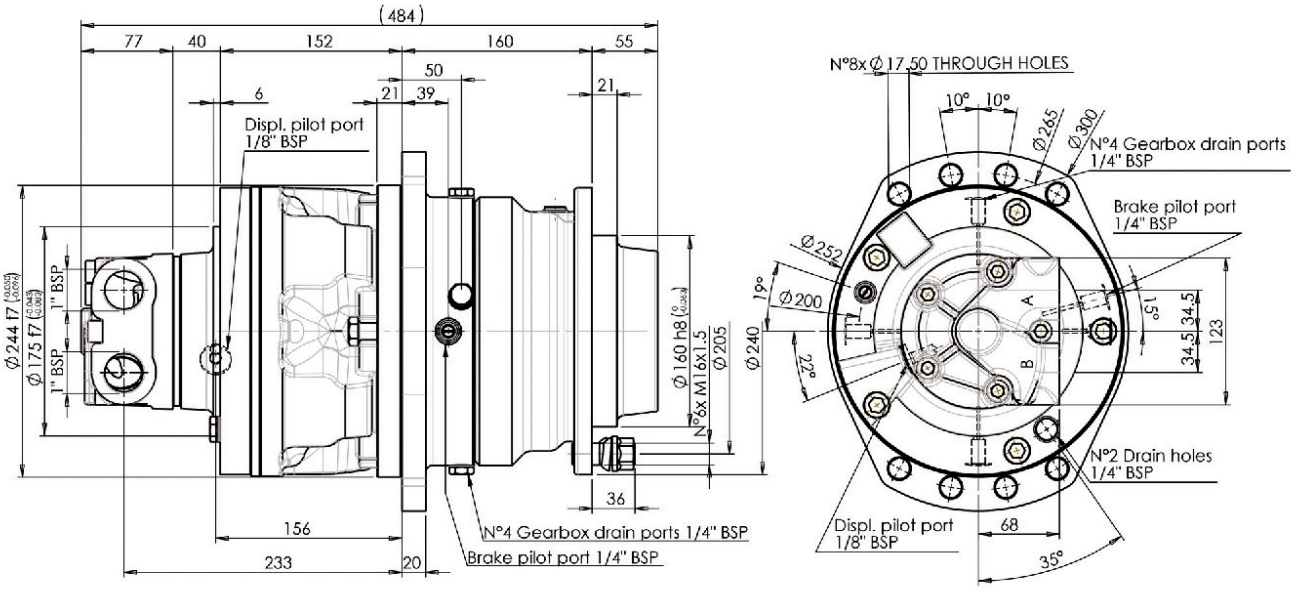
(3) For higher peak power please contact our Tech. Dept.

(4) For higher continuous and maximum speed please contact our Tech. Dept.

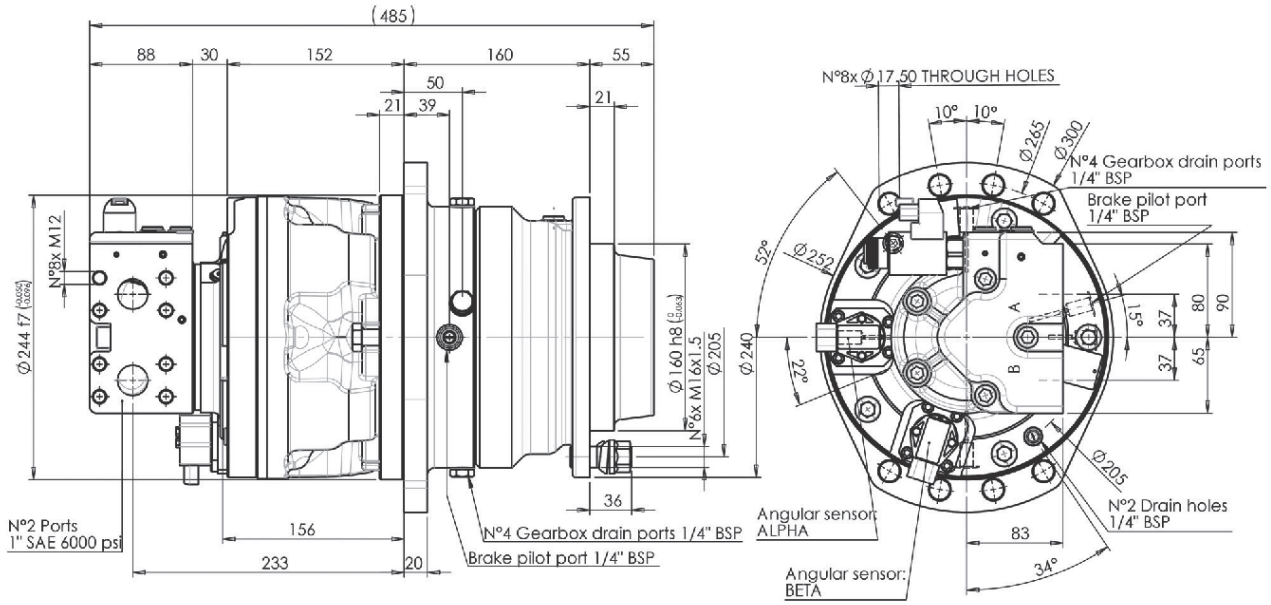
(5) If the brake is engaged for a long time, the braking torque could increase considerably.
The brake requires to be periodically engaged and disengaged to mantain the desired performance.

## WHEEL MOTORS WITH GEARBOX WR Series

## BD1 + WR6B - INSTALLATION DRAWINGS




## BV1 + WR6B - INSTALLATION DRAWINGS

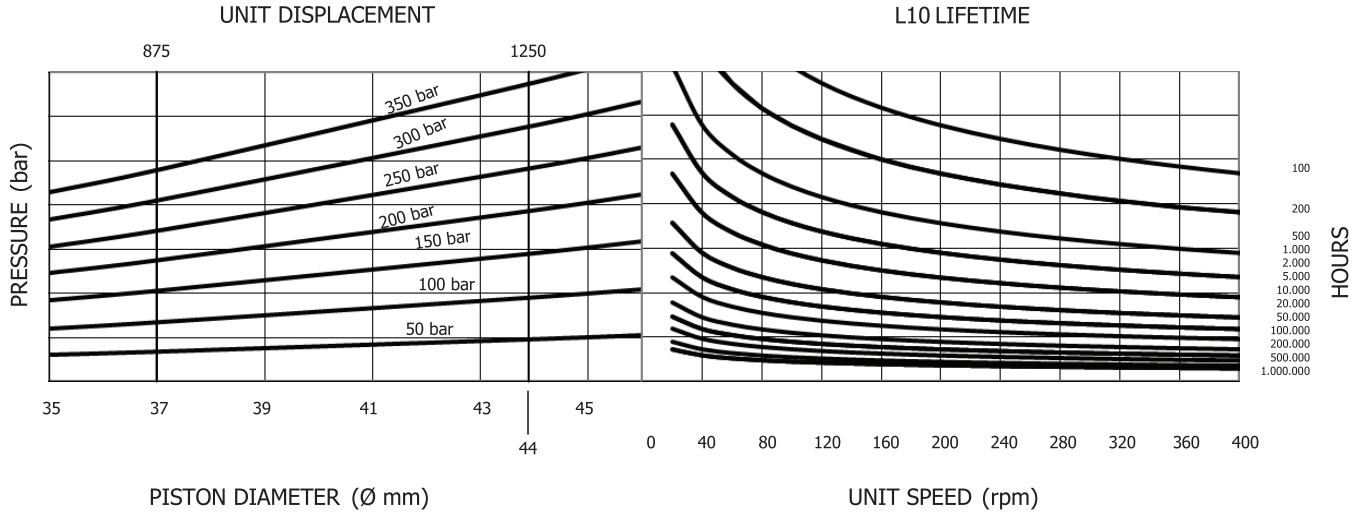


## WHEEL MOTORS WITH GEARBOX WR Series

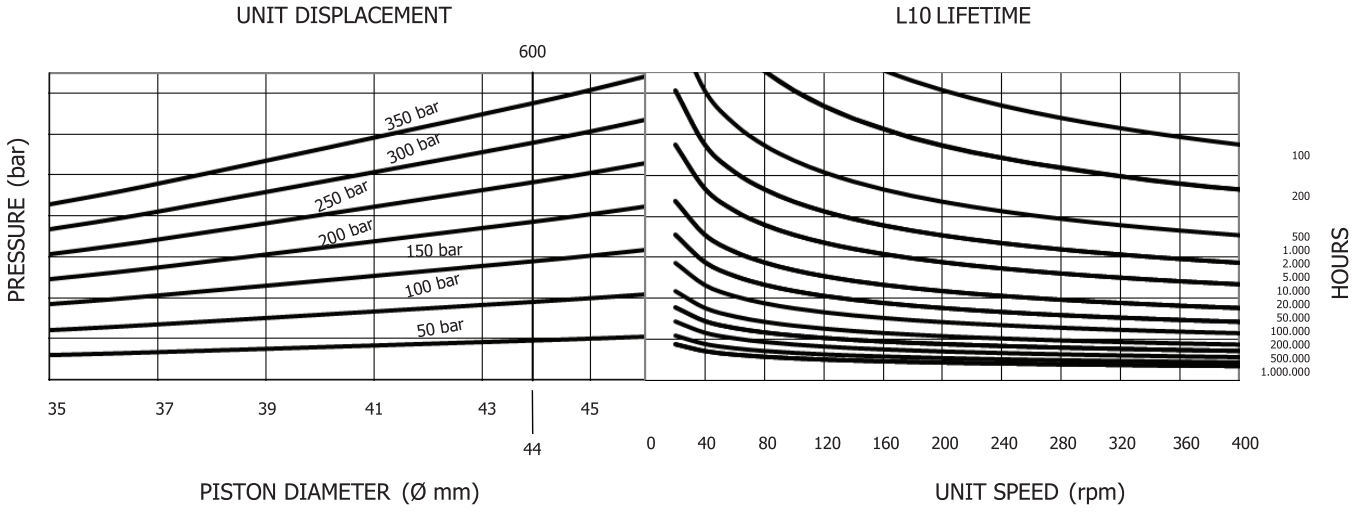
## BD1 + WR6B
## BV1 + WR6B

## BEARING LIFETIME GRAPHS

Bearing lifetime has been estimated according to L10 (according to ISO 281:1990).
The following graph has been plotted using the stroke of 32 mm.
Please contact our Technical Department for other graphs relating to this product.




Bearing lifetime has been estimated according to L10 (according to ISO 281:1990).
The following graph has been plotted using the stroke of 16 mm.
Please contact our Technical Department for other graphs relating to this product.



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## WHEEL MOTORS WITH GEARBOX WR Series

### GM05 + WR10 (fixed displacement)

### TECHNICAL SPECIFICATION

| | | 200 | 300 | 350 | 400 | 550 | 620 | 725 | 775 | 900 |
|---|---|---|---|---|---|---|---|---|---|---|
| Equivalent displacement (1) | [cc/rev] | 187 | 283 | 355 | 412 | 552 | 619 | 724 | 772 | 916 |
| Reduction ratio | | | | | | 4,8:1 | | | | |
| Bore | [mm] | 25 | 25 | 28 | 37 | 35 | 37 | 40 | 42 | 45 |
| Stroke | [mm] | 16 | 24 | 24 | 16 | 24 | 24 | 24 | 24 | 24 |
| Specific torque | [Nm/bar] | 2,98 | 4,51 | 5,66 | 6,56 | 8,78 | 9,84 | 11,52 | 12,29 | 14,59 |
| Continuous pressure | [bar] | | | | | 250 | | | | |
| Peak pressure (2) | [bar] | 450 | 450 | 425 | 375 | 400 | 375 | 325 | 315 | 280 |
| Peak power (3) | [kW] | 20 | 20 | 33 | 33 | 33 | 33 | 33 | 33 | 33 |
| Continuous speed (4) | [rpm] | 145 | 145 | 145 | 145 | 135 | 135 | 135 | 125 | 125 |
| Maximum speed (4) | [rpm] | 200 | 200 | 200 | 200 | 185 | 185 | 185 | 165 | 165 |

| | | | | | |
|---|---|---|---|---|---|
| Approximative weight | [kg] | 97 unit | Type of brake | Negative disc brake | |
| Maximum casing pressure | [bar] | 1 continuous<br>5 peak | Admissible temperatures | [°C] | -20 minimum<br>+80 maximum |
| Motor oil capacity | [l] | 0,8 | Static braking torque (5) | [Nm] | 7000 |
| Gearbox oil capacity | [l] | 0,75 | Minimum brake pilot pressure | [bar] | 15 |
| Brake pilot volume | [cm³] | 37,5 | Maximum brake pilot pressure | [bar] | 60 |
| Bolt torque setting | [Nm] | 767,0 coarse 799,0 fine<br>958,0 1008,0 | Suggested bolt type | M22 | 12.9 |

NOTES

(1) Equivalent displacement = motor displacement x reduction ratio of gearbox (4,8:1)

(2) For higher peak pressure please contact our Tech. Dept.

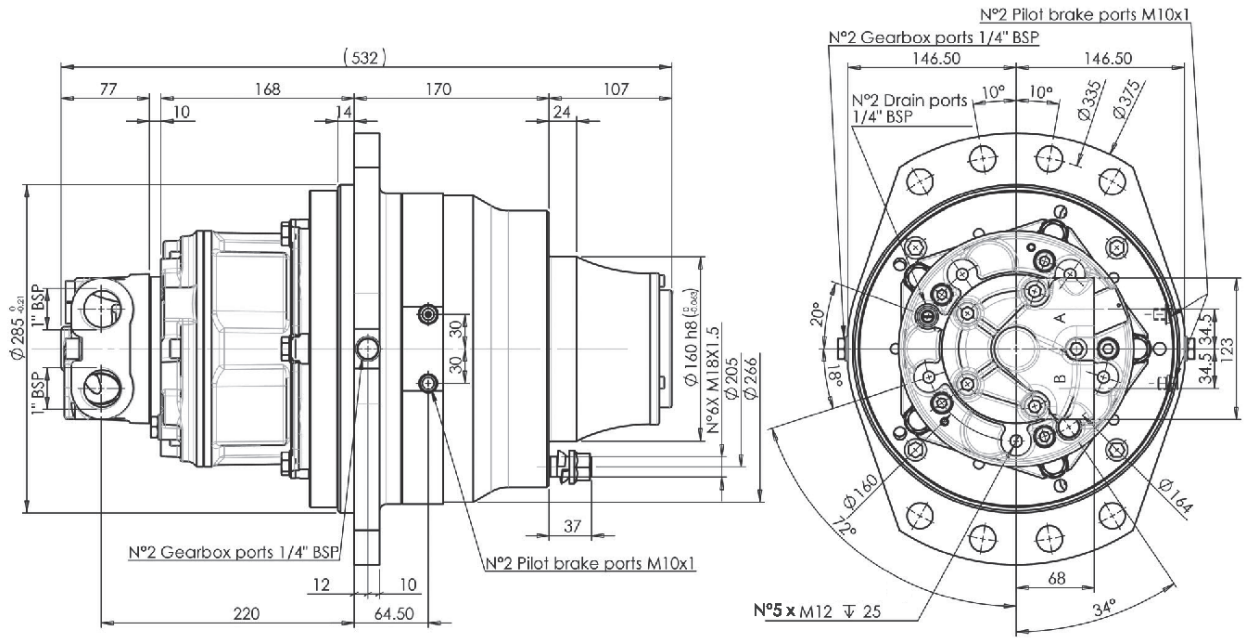
(3) For higher peak power please contact our Tech. Dept.

(4) For higher continuous and maximum speed please contact our Tech. Dept.

(5) If the brake is engaged for a long time, the braking torque could increase considerably.
The brake requires to be periodically engaged and disengaged to mantain the desired performance.

## WHEEL MOTORS WITH GEARBOX WR Series

## GM05 + WR10 - INSTALLATION DRAWINGS

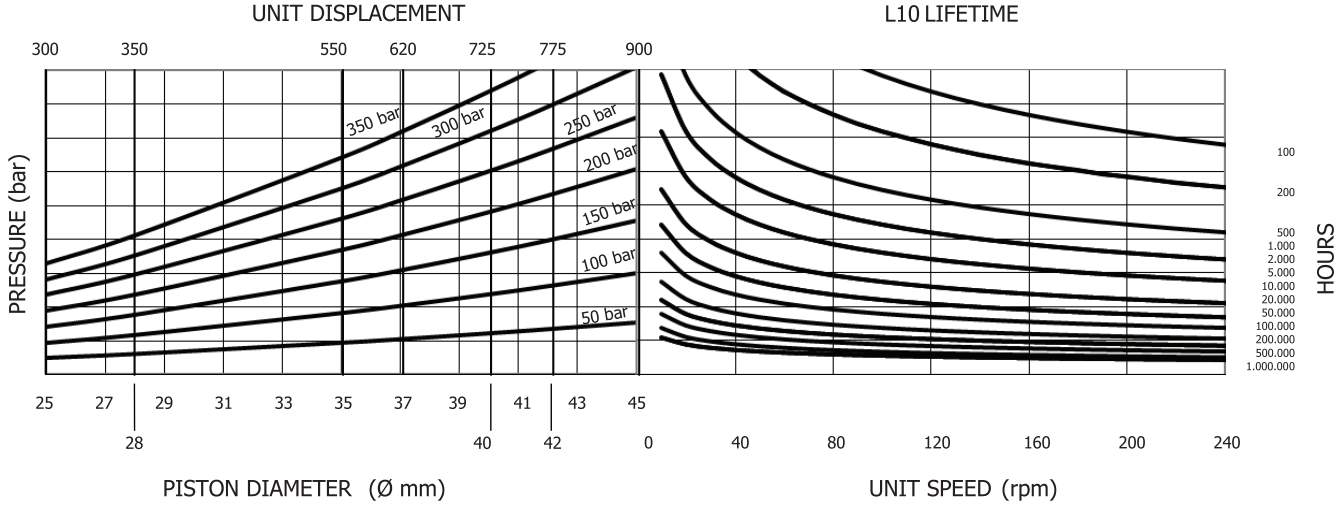



## BEARING LIFETIME GRAPHS

Bearing lifetime has been estimated according to L10 (according to ISO 281:1990).

The following graph has been plotted using the stroke of 24 mm.

Please contact our Technical Department for other graphs relating to this product.



## WHEEL MOTORS WITH GEARBOX WR Series

### GM1 + WR10 (fixed displacement)

### TECHNICAL SPECIFICATION

| | | 500 | 620 | 750 | 800 | 950 | 1050 | 1150 | 1400 | 1500 |
|---|---|---|---|---|---|---|---|---|---|---|
| Equivalent displacement (1) | [cc/rev] | 475 | 619 | 739 | 825 | 964 | 1060 | 1166 | 1392 | 1507 |
| Reduction ratio | | | | | | 4,8:1 | | | | |
| Bore | [mm] | 28 | 32 | 35 | 37 | 40 | 42 | 44 | 48 | 50 |
| Stroke | [mm] | | | | | 32 | | | | |
| Specific torque | [Nm/bar] | 7,53 | 9,83 | 11,76 | 13,14 | 15,36 | 16,93 | 18,59 | 22,12 | 24,00 |
| Continuous pressure | [bar] | | | | | 250 | | | | |
| Peak pressure (2) | [bar] | 425 | 400 | 400 | 375 | 350 | 350 | 350 | 300 | 280 |
| Peak power (3) | [kW] | | | | | 48 | | | | |
| Continuous speed (4) | [rpm] | 115 | 115 | 115 | 115 | 115 | 115 | 90 | 70 | 70 |
| Maximum speed (4) | [rpm] | 200 | 200 | 200 | 185 | 165 | 145 | 145 | 135 | 125 |

| | | | | | |
|---|---|---|---|---|---|
| Approximative weight | [kg] | 102 unit | Type of brake | Negative disc brake | |
| Maximum casing pressure | [bar] | 1 continuous<br>5 peak | Admissible temperatures | [°C] | -20 minimum<br>+80 maximum |
| Motor oil capacity | [l] | 1 | Static braking torque (5) | [Nm] | 7000 |
| Gearbox oil capacity | [l] | 0,75 | Minimum brake pilot pressure | [bar] | 15 |
| Brake pilot volume | [cm³] | 37,5 | Maximum brake pilot pressure | [bar] | 60 |
| Bolt torque setting | [Nm] | 767,0 coarse 799,0 fine<br>958,0 1008,0 | Suggested bolt type | M22 | 12.9 |

NOTES

(1) Equivalent displacement = motor displacement x reduction ratio of gearbox (4,8:1)

(2) For higher peak pressure please contact our Tech. Dept.

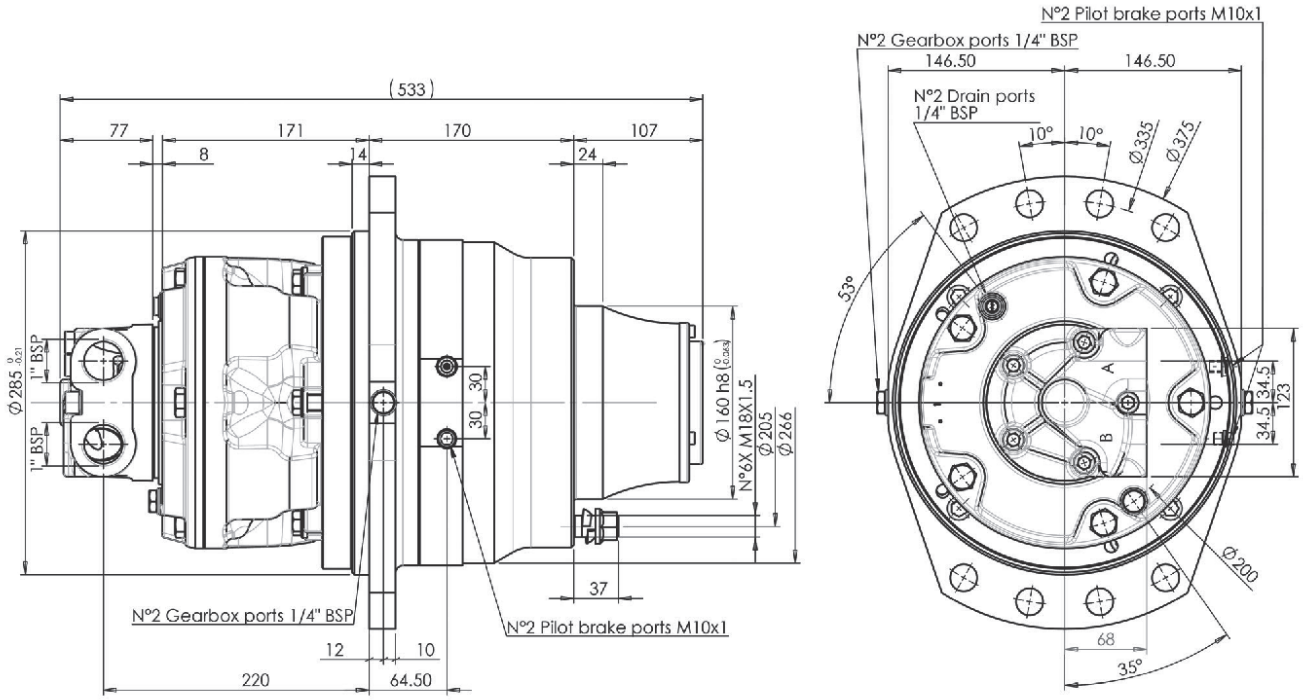
(3) For higher peak power please contact our Tech. Dept.

(4) For higher continuous and maximum speed please contact our Tech. Dept.

(5) If the brake is engaged for a long time, the braking torque could increase considerably.
The brake requires to be periodically engaged and disengaged to mantain the desired performance.

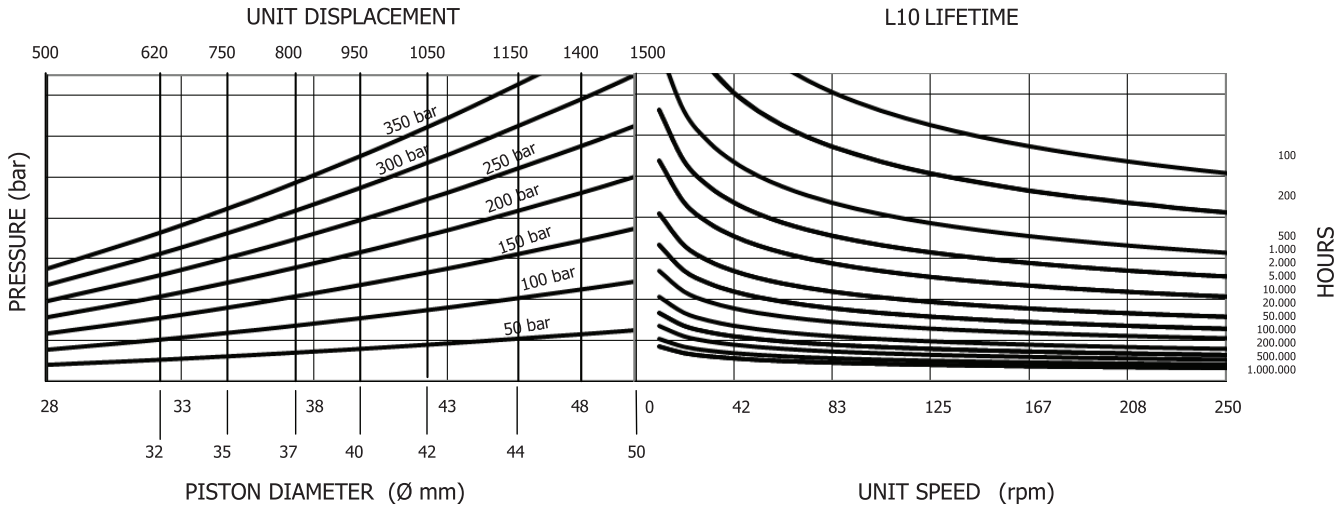
## WHEEL MOTORS WITH GEARBOX WR Series

## GM1 + WR10 - INSTALLATION DRAWINGS




## BEARING LIFETIME GRAPHS

Bearing lifetime has been estimated according to L10 (according to ISO 281:1990).
Please contact our Technical Department for other graphs relating to this product.



## WHEEL MOTORS WITH GEARBOX WR Series

### BD1 + WR10 (dual displacement)
### BV1 + WR10 (variable displacement)

### TECHNICAL SPECIFICATION

| | | 500 | 250 | 800 | 200 | 850 | 375 | 1200 | 300 | 1200 | 600 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Equivalent displacement (1) | [cc/rev] | 489 | 259 | 825 | 206 | 845 | 365 | 1166 | 292 | 1166 | 584 |
| Reduction ratio | | 4,8:1 | | | | | | | | | |
| Bore | [mm] | 37 | 37 | 37 | 37 | 44 | 44 | 44 | 44 | 44 | 44 |
| Stroke | [mm] | 19 | 10 | 32 | 8 | 23 | 10 | 32 | 8 | 32 | 16 |
| Specific torque | [Nm/bar] | 7,80 | 4,11 | 13,14 | 3,29 | 13,36 | 5,81 | 18,59 | 4,65 | 18,59 | 9,29 |
| Continuous pressure | [bar] | 250 | 250 | 250 | 250 | 250 | 250 | 250 | 250 | 250 | 250 |
| Peak pressure (2) | [bar] | 425 | 425 | 400 | 400 | 400 | 400 | 375 | 375 | 375 | 375 |
| Peak power (3) | [kW] | 55 | 42 | 55 | 42 | 55 | 42 | 55 | 42 | 55 | 42 |
| Continuous speed (4) | [rpm] | 100 | 200 | 100 | 200 | 100 | 200 | 100 | 200 | 100 | 200 |
| Maximum speed (4) | [rpm] | 200 | 200 | 200 | 200 | 200 | 200 | 175 | 200 | 175 | 200 |

| | | | | | |
|---|---|---|---|---|---|
| Approximative weight | [kg] | 110 | unit | | |
| Maximum casing pressure | [bar] | 1 | continuous | | |
| | | 5 | peak | | |
| Motor oil capacity | [l] | 1,5 | | | |
| Gearbox oil capacity | [l] | 0,75 | | | |
| Brake pilot volume | [cm³] | 37,5 | | | |
| Volume pilot change displacement | [cm³] | 2,12 | | | |
| Suggested bolt type | | M22 | 12.9 | | |
| Bolt torque setting | [Nm] | 767,0<br>958,0 | coarse | 799,0<br>1008,0 | fine |

| | | | | |
|---|---|---|---|---|
| Type of brake | | Negative disc brake | | |
| Admissible temperatures | [°C] | -20 | minimum | |
| | | +80 | maximum | |
| Static braking torque (5) | [Nm] | 7000 | | |
| Minimum brake pilot pressure | [bar] | 15 | | |
| Maximum brake pilot pressure | [bar] | 60 | | |
| Pilot pressure change displacement | [bar] | 25 | minimum | |
| | | 35 | maximum | |

NOTES

(1) Equivalent displacement = motor displacement x reduction ratio of gearbox (4,8 :1)

(2) For higher peak pressure please contact our Tech. Dept.

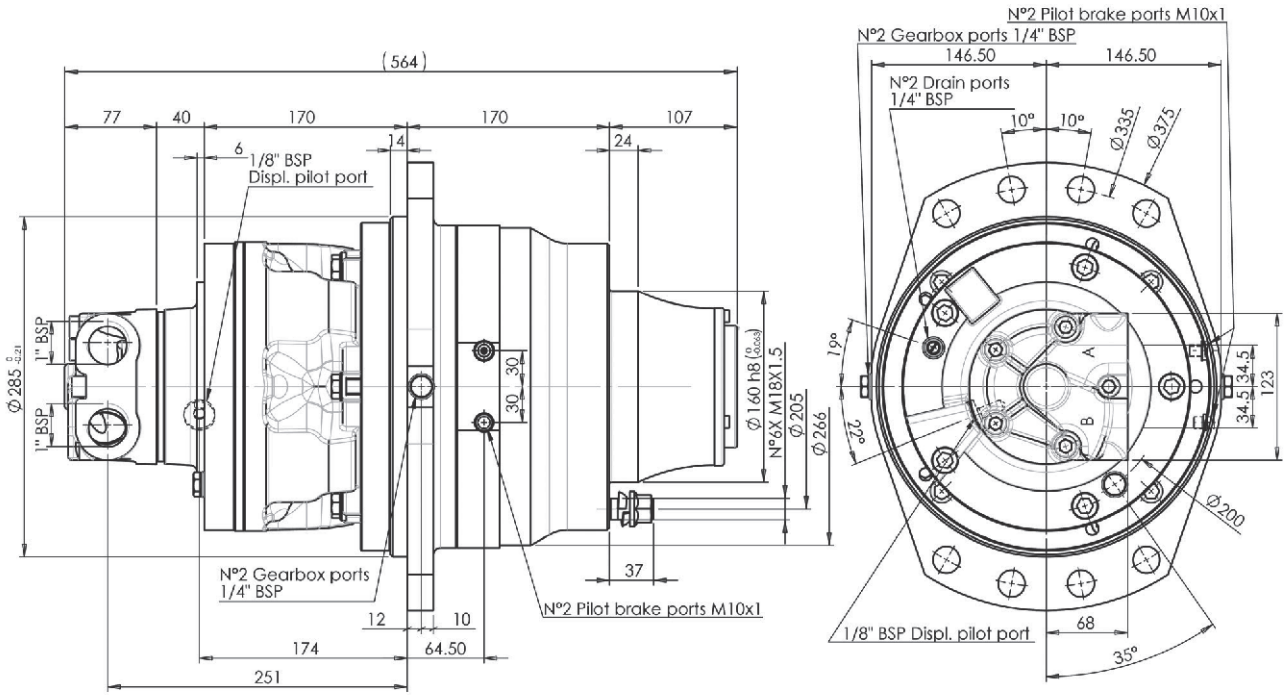
(3) For higher peak power please contact our Tech. Dept.

(4) For higher continuous and maximum speed please contact our Tech. Dept.

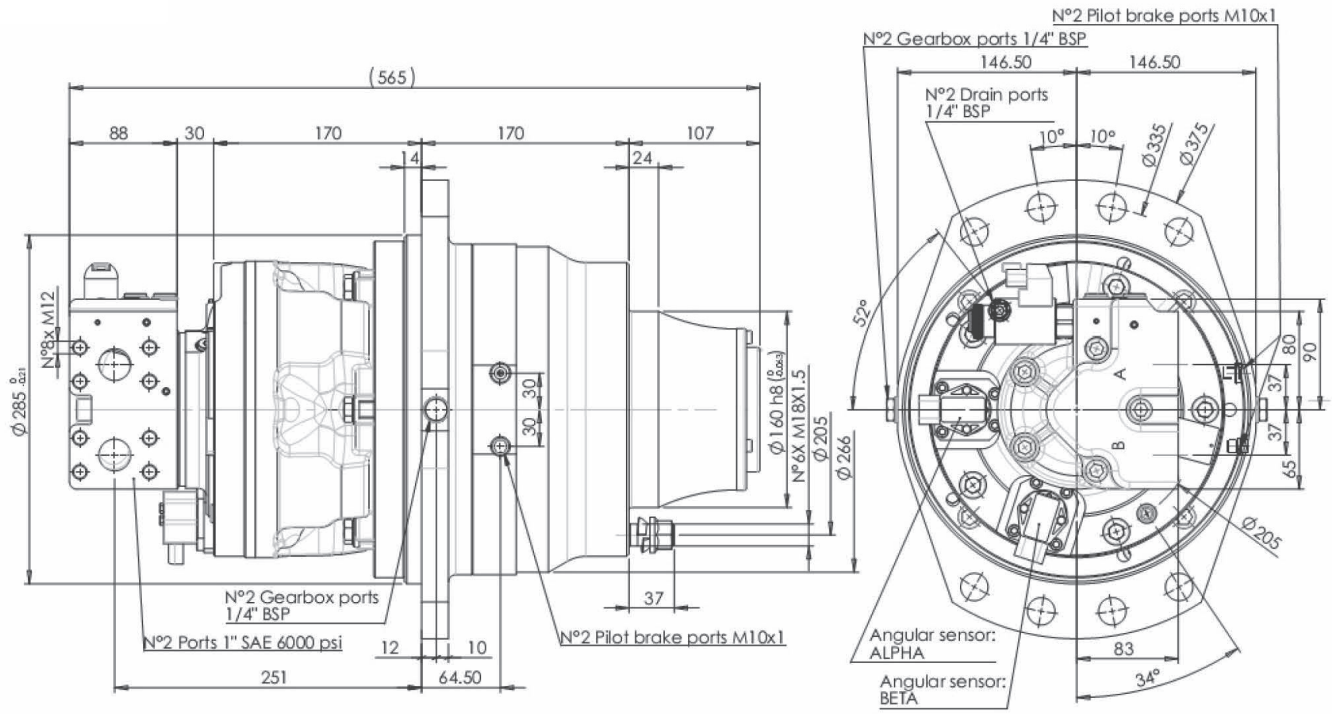
(5) If the brake is engaged for a long time, the braking torque could increase considerably.
The brake requires to be periodically engaged and disengaged to mantain the desired performance.

## WHEEL MOTORS WITH GEARBOX WR Series

## BD1 + WR10 - INSTALLATION DRAWINGS




## BV1 + WR10 - INSTALLATION DRAWINGS



## WHEEL MOTORS WITH GEARBOX WR Series

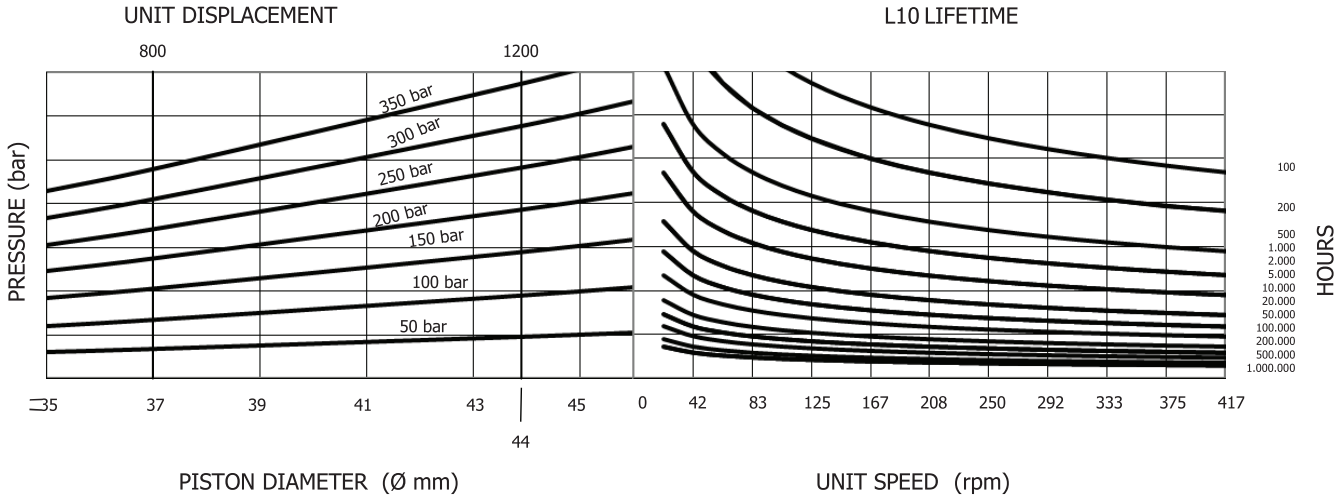
## BD1 + WR10
## BV1 + WR10

## BEARING LIFETIME GRAPHS

Bearing lifetime has been estimated according to L10 (according to ISO 281:1990).

The following graph has been plotted using the stroke of 32 mm.

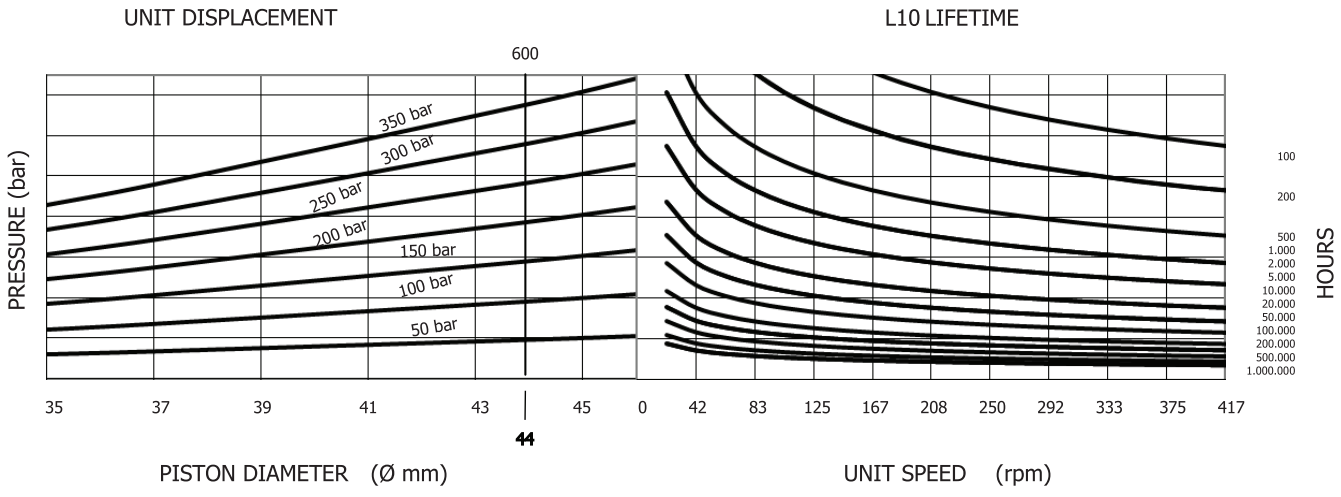
Please contact our Technical Department for other graphs relating to this product.




Bearing lifetime has been estimated according to L10 (according to ISO 281:1990).

The following graph has been plotted using the stroke of 16 mm.

Please contact our Technical Department for other graphs relating to this product.



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## WHEEL MOTORS WITH GEARBOX WR Series

### GM2 + WR10 (fixed displacement)

### TECHNICAL SPECIFICATION

| | | 900 | 1200 | 1450 | 1650 | 2000 | 2350 | 2700 | 3000 |
|---|---|---|---|---|---|---|---|---|---|
| Equivalent displacement (1) | [cc/rev] | 921 | 1204 | 1459 | 1665 | 2040 | 2366 | 2712 | 2990 |
| Reduction ratio | | | | | 4,8:1 | | | | |
| Bore | [mm] | 35 | 40 | 44 | 47 | 52 | 56 | 60 | 63 |
| Stroke | [mm] | | | | 40 | | | | |
| Specific torque | [Nm/ bar] | 14,70 | 19,20 | 23,23 | 26,51 | 32,45 | 37,63 | 43,20 | 47,63 |
| Continuous pressure | [bar] | 250 | 250 | 250 | 250 | 200 | 175 | 150 | 135 |
| Peak pressure (2) | [bar] | 425 | 400 | 400 | 375 | 310 | 270 | 235 | 210 |
| Peak power (3) | [kW] | | | | 59 | | | | |
| Continuous speed (4) | [rpm] | 110 | 110 | 100 | 100 | 90 | 90 | 90 | 80 |
| Maximum speed (4) | [rpm] | 165 | 155 | 155 | 155 | 155 | 145 | 145 | 135 |

| | | | | | |
|---|---|---|---|---|---|
| Approximative weight | [kg] | 126 unit | Type of brake | Negative disc brake | |
| Maximum casing pressure | [bar] | 1 continuous / 5 peak | Admissible temperatures | [°C] | -20 minimum / +80 maximum |
| Motor oil capacity | [l] | 2 | Static breaking torque (5) | [Nm] | 7000 |
| Gearbox oil capacity | [l] | 0,75 | Minimum brake pilot pressure | [bar] | 15 |
| Brake pilot volume | [cm³] | 37,5 | Maximum brake pilot pressure | [bar] | 60 |
| Bolt torque setting | [Nm] | 767,0 / 958,0 coarse — 799,0 / 1008,0 fine | Suggested bolt type | M22 | 12.9 |

NOTES

(1) Equivalent displacement = motor displacement x reduction ratio of gearbox (4,8 :1)

(2) For higher peak pressure please contact our Tech. Dept.

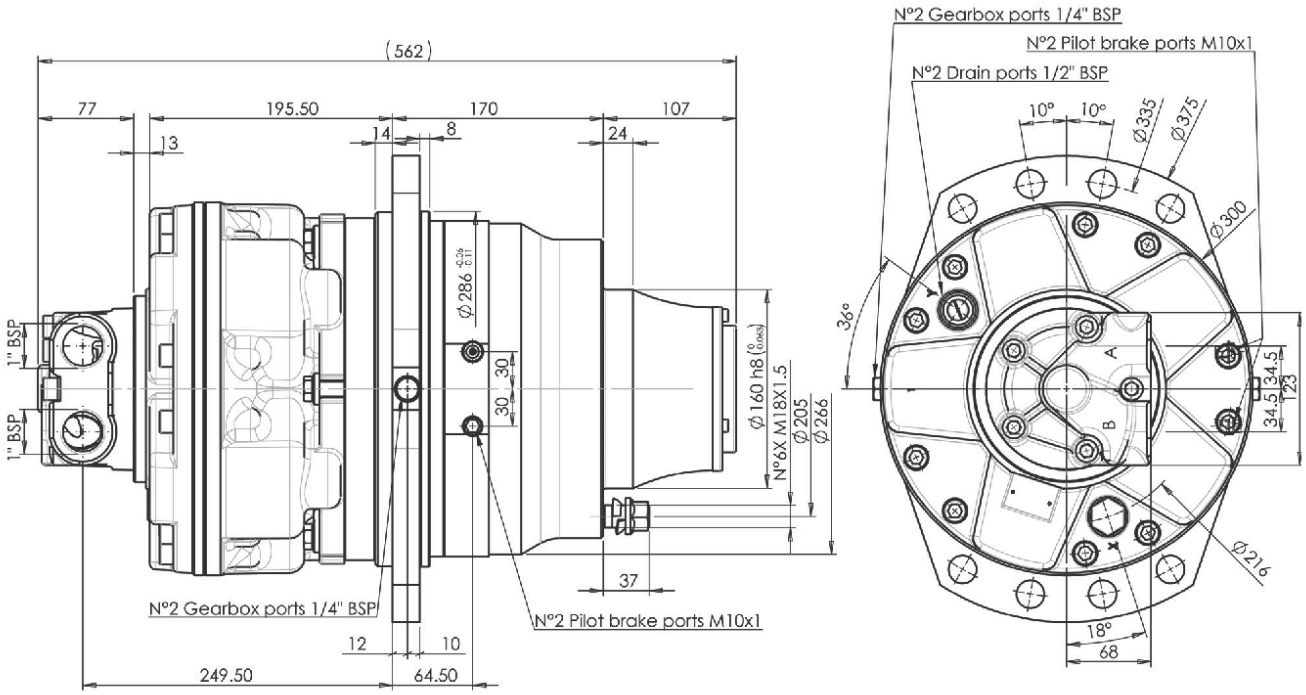
(3) For higher peak power please contact our Tech. Dept.

(4) For higher continuous and maximum speed please contact our Tech. Dept.

(5) If the brake is engaged for a long time, the braking torque could increase considerably.
The brake requires to be periodically engaged and disengaged to mantain the desired performance.

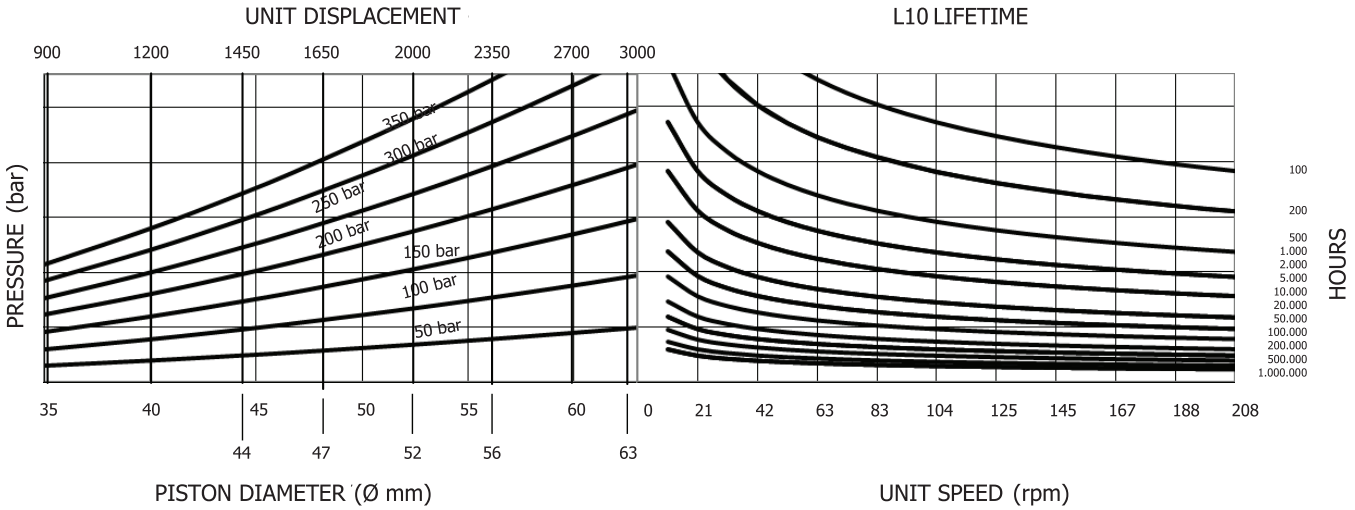
## WHEEL MOTORS WITH GEARBOX WR Series

## GM2 + WR10 - INSTALLATION DRAWINGS




## BEARING LIFETIME GRAPHS

Bearing lifetime has been estimated according to L10 (according to ISO 281:1990).
Please contact our Technical Department for other graphs relating to this product.



## WHEEL MOTORS WITH GEARBOX WR Series

### BD2 + WR10 (dual displacement)
### BV2 + WR10 (variable displacement)

### TECHNICAL SPECIFICATION

| | | 1200 | 300 | 1200 | 600 | 1650 | 420 | 1650 | 850 | 2350 | 600 | 2350 | 1200 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Equivalent displacement (1) | [cc/rev] | 1204 | 302 | 1204 | 604 | 1665 | 417 | 1665 | 830 | 2366 | 590 | 2366 | 1180 |
| Reduction ratio | | 4,8:1 | | | | | | | | | | | |
| Bore | [mm] | 40 | | 40 | | 47 | | 47 | | 56 | | 56 | |
| Stroke | [mm] | 40 | 10 | 40 | 20 | 40 | 10 | 40 | 20 | 40 | 10 | 40 | 20 |
| Specific torque | [Nm/bar] | 19,20 | 4,80 | 19,20 | 9,60 | 26,51 | 6,63 | 26,51 | 13,25 | 37,63 | 9,41 | 37,63 | 18,82 |
| Continuous pressure | [bar] | 250 | 250 | 250 | 250 | 250 | 250 | 250 | 250 | 170 | 250 | 170 | 250 |
| Peak pressure (2) | [bar] | 425 | 425 | 425 | 425 | 375 | 375 | 375 | 375 | 265 | 350 | 265 | 350 |
| Peak power (3) | [kW] | 75 | 65 | 75 | 65 | 75 | 65 | 75 | 65 | 75 | 65 | 75 | 65 |
| Continuous speed (4) | [rpm] | 145 | 200 | 145 | 200 | 140 | 200 | 140 | 200 | 140 | 200 | 140 | 200 |
| Maximum speed (4) | [rpm] | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 165 | 200 | 165 | 200 |

| | | | | | |
|---|---|---|---|---|---|
| Approximative weight | [kg] | 125 unit | Type of brake | | Negative disc brake |
| Maximum casing pressure | [bar] | 1 continuous<br>5 peak | Admissible temperatures | [°C] | -20 minimum<br>+80 maximum |
| Motor oil capacity | [l] | 3 | Static braking torque (5) | [Nm] | 7000 |
| Gearbox oil capacity | [l] | 0,75 | Minimum brake pilot pressure | [bar] | 15 |
| Brake pilot volume | [cm³] | 37,5 | Maximum brake pilot pressure | [bar] | 60 |
| Bolt torque setting | [Nm] | 767,0 coarse 799,0 fine<br>958,0 1008,0 | Suggested bolt type | M22 | 12.9 |

NOTES

(1) Equivalent displacement = motor displacement x reduction ratio of gearbox (4,8 :1)

(2) For higher peak pressure please contact our Tech. Dept.

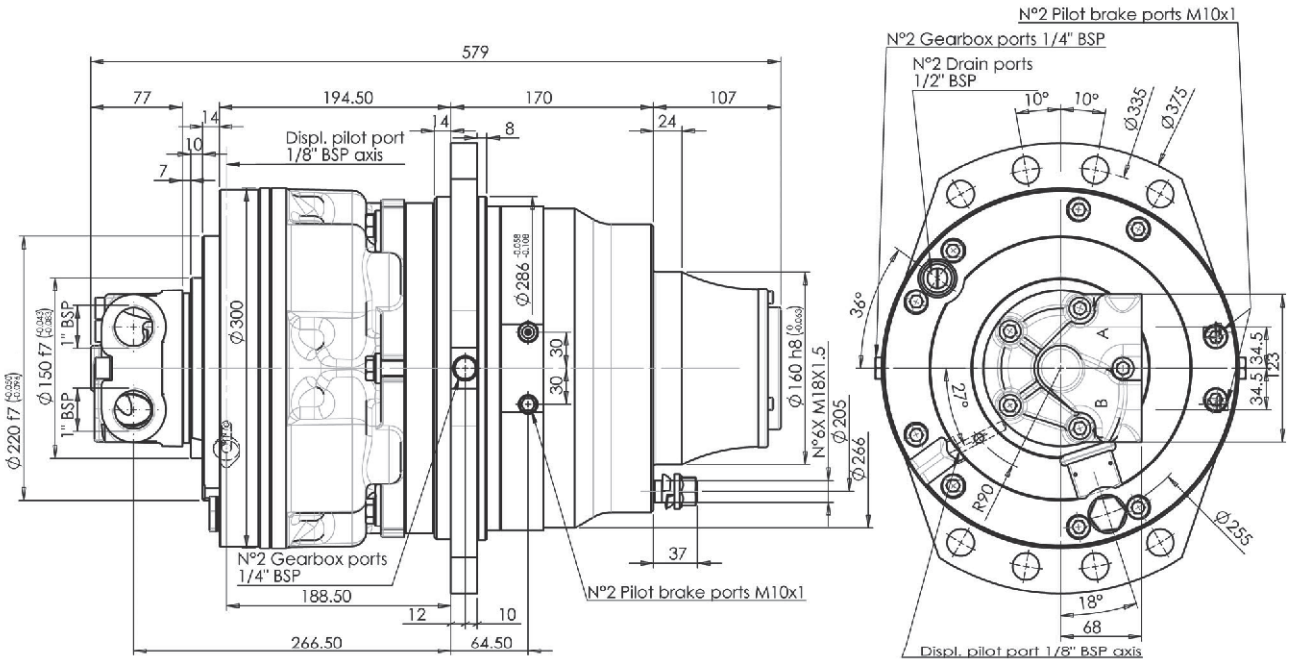
(3) For higher peak power please contact our Tech. Dept.

(4) For higher continuous and maximum speed please contact our Tech. Dept.

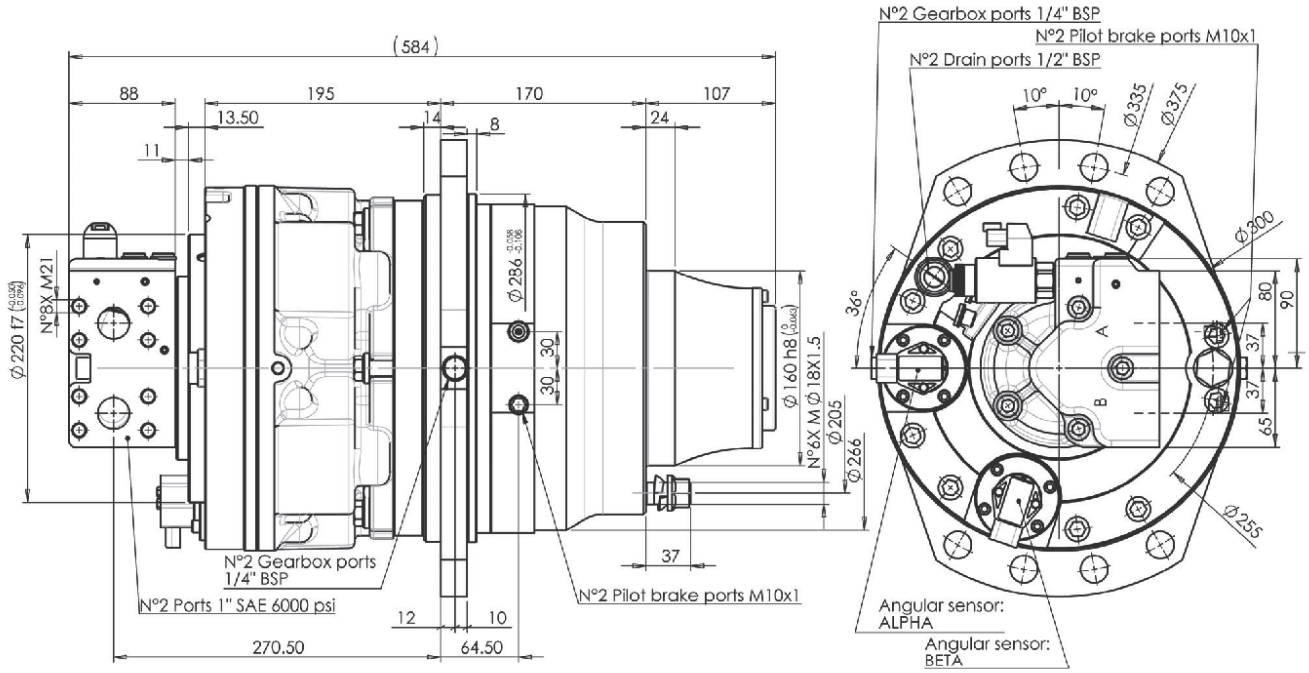
(5) If the brake is engaged for a long time, the braking torque could increase considerably.
The brake requires to be periodically engaged and disengaged to mantain the desired performance.

## WHEEL MOTORS WITH GEARBOX WR Series

## BD2 + WR10 - INSTALLATION DRAWINGS




## BV2 + WR10 - INSTALLATION DRAWINGS

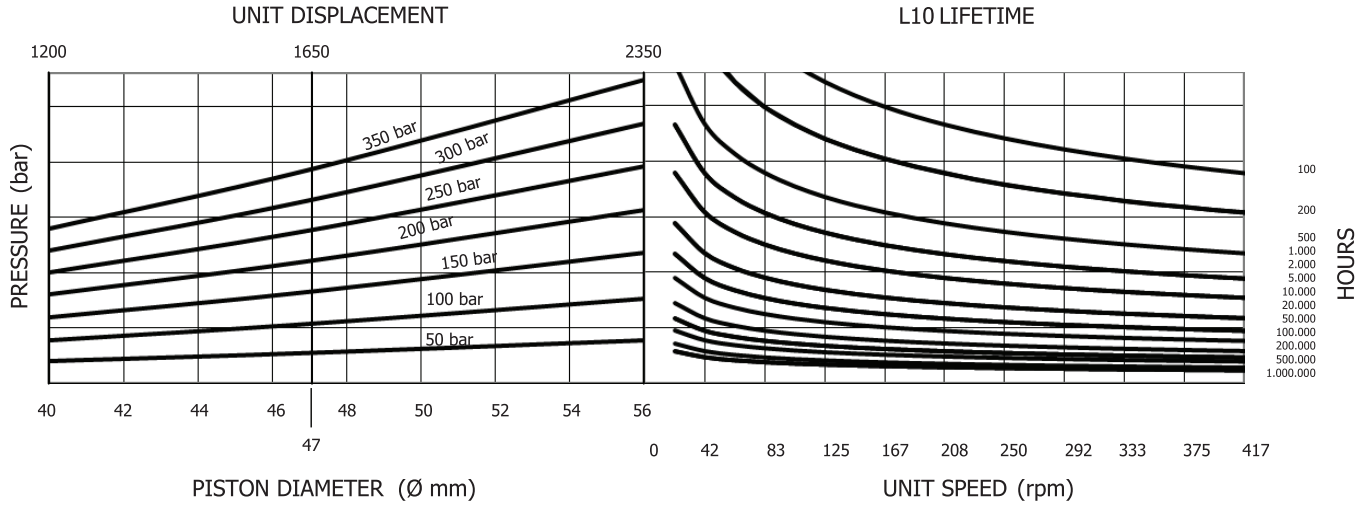


## WHEEL MOTORS WITH GEARBOX WR Series

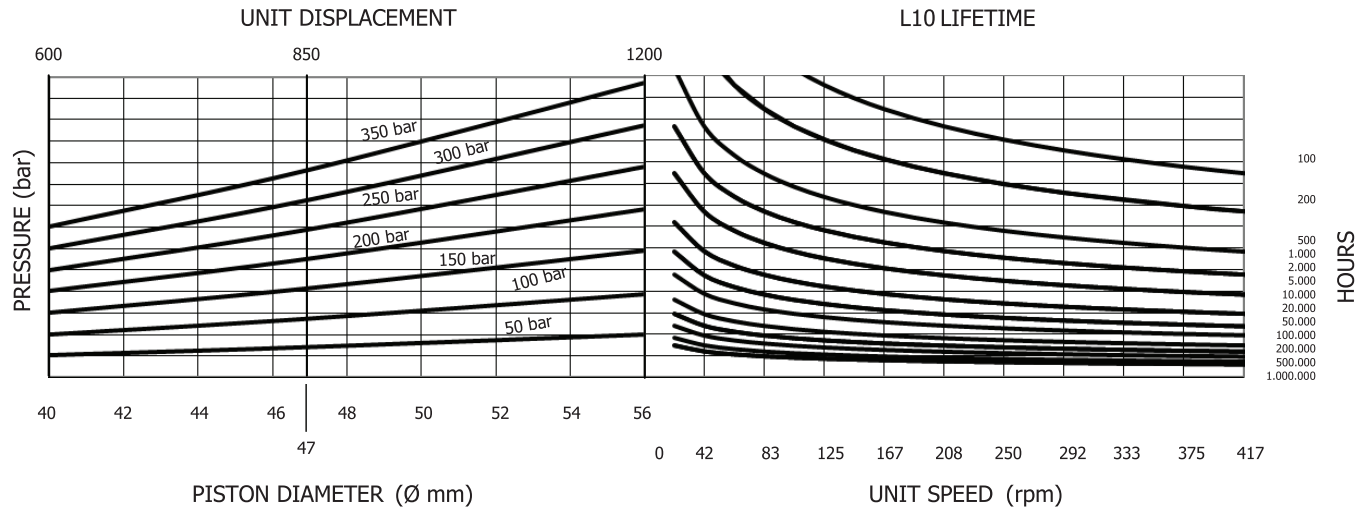
## BD2 + WR10
## BV2 + WR10

## BEARING LIFETIME GRAPHS

Bearing lifetime has been estimated according to L10 (according to ISO 281:1990).
The following graph has been plotted using the stroke of 40 mm.
Please contact our Technical Department for other graphs relating to this product.




Bearing lifetime has been estimated according to L10 (according to ISO 281:1990).
The following graph has been plotted using the stroke of 20 mm.
Please contact our Technical Department for other graphs relating to this product.



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## WHEEL MOTORS WITH GEARBOX WR Series

### GM1 + WR20 (fixed displacement)

### TECHNICAL SPECIFICATION

| | | 650 | 850 | 1000 | 1100 | 1300 | 1450 | 1600 | 1900 | 2050 |
|---|---|---|---|---|---|---|---|---|---|---|
| Equivalent displacement (1) | [cc/rev] | 653 | 851 | 1016 | 1135 | 1326 | 1458 | 1603 | 1914 | 2072 |
| Reduction ratio | | | | | | 6,6:1 | | | | |
| Bore | [mm] | 28 | 32 | 35 | 37 | 40 | 42 | 44 | 48 | 50 |
| Stroke | [mm] | | | | | 32 | | | | |
| Specific torque | [Nm/bar] | 10,35 | 13,52 | 16,17 | 18,07 | 21,12 | 23,28 | 25,56 | 30,41 | 33,00 |
| Continuous pressure | [bar] | | | | | 250 | | | | |
| Peak pressure (2) | [bar] | 425 | 400 | 400 | 375 | 350 | 350 | 350 | 300 | 280 |
| Peak power (3) | [kW] | | | | | 48 | | | | |
| Continuous speed (4) | [rpm] | 80 | 80 | 80 | 80 | 80 | 80 | 65 | 50 | 50 |
| Maximum speed (4) | [rpm] | 150 | 150 | 150 | 135 | 120 | 105 | 105 | 95 | 90 |

| | | | | | |
|---|---|---|---|---|---|
| Approximative weight | [kg] | 117 unit | Type of brake | Negative disc brake | |
| Maximum casing pressure | [bar] | 1 continuous<br>5 peak | Admissible temperatures | [°C] | -20 minimum<br>+80 maximum |
| Motor oil capacity | [l] | 1 | Static braking torque (5) | [Nm] | 10000 |
| Gearbox oil capacity | [l] | 1 | Minimum brake pilot pressure | [bar] | 15 |
| Brake pilot volume | [cm³] | 37,5 | Maximum brake pilot pressure | [bar] | 60 |
| Bolt torque setting | [Nm] | 767,0 coarse 799,0 fine<br>958,0 1008,0 | Suggested bolt type | M22 | 12.9 |

NOTES

(1) Equivalent displacement = motor displacement x reduction ratio of gearbox (6,6 :1)

(2) For higher peak pressure please contact our Tech. Dept.

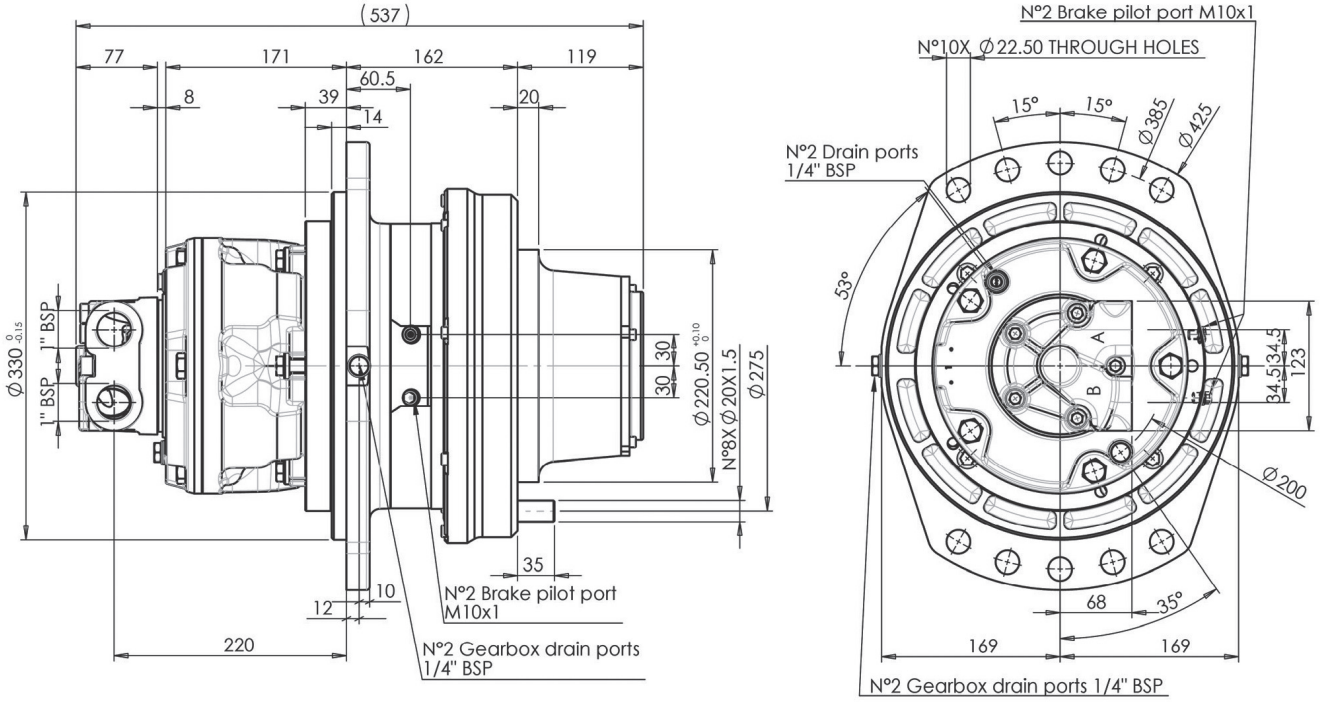
(3) For higher peak power please contact our Tech. Dept.

(4) For higher continuous and maximum speed please contact our Tech. Dept.

(5) If the brake is engaged for a long time, the braking torque could increase considerably.
The brake requires to be periodically engaged and disengaged to mantain the desired performance.

## WHEEL MOTORS WITH GEARBOX WR Series

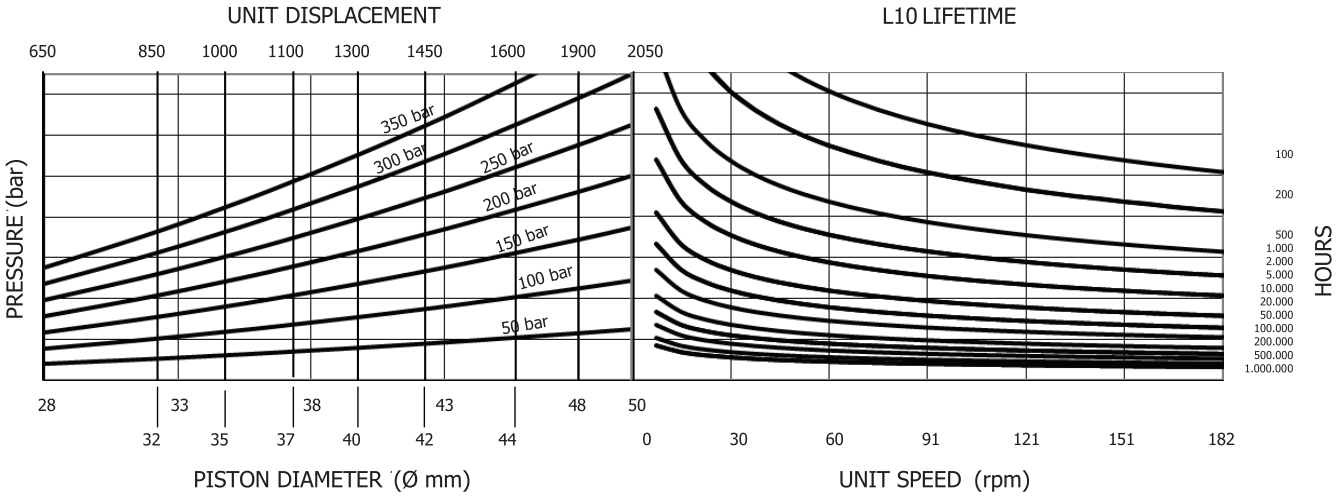
## GM1 + WR20 - INSTALLATION DRAWINGS




## BEARING LIFETIME GRAPHS

Bearing lifetime has been estimated according to L10 (according to ISO 281:1990).

Please contact our Technical Department for other graphs relating to this product.



## WHEEL MOTORS WITH GEARBOX WR Series

**BD1 + WR20** (dual displacement)
**BV1 + WR20** (variable displacement)

## TECHNICAL SPECIFICATION

| | | 685 | 350 | 1100 | 300 | 1150 | 500 | 1600 | 400 | 1600 | 800 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Equivalent displacement (1) | [cc/rev] | 673 | 356 | 1135 | 283 | 1154 | 502 | 1603 | 402 | 1603 | 802 |
| Reduction ratio | | 6,6:1 | | | | | | | | | |
| Bore | [mm] | 37 | 37 | 37 | 37 | 44 | 44 | 44 | 44 | 44 | 44 |
| Stroke | [mm] | 19 | 10 | 32 | 8 | 23 | 10 | 32 | 8 | 32 | 16 |
| Specific torque | [Nm/bar] | 10,73 | 5,65 | 18,07 | 4,52 | 18,37 | 7,99 | 25,56 | 6,39 | 25,56 | 12,73 |
| Continuous pressure | [bar] | 250 | 250 | 250 | 250 | 250 | 250 | 250 | 250 | 250 | 250 |
| Peak pressure (2) | [bar] | 425 | 425 | 400 | 400 | 400 | 400 | 375 | 375 | 375 | 375 |
| Peak power (3) | [kW] | 55 | 42 | 55 | 42 | 55 | 42 | 55 | 42 | 55 | 42 |
| Continuous speed (4) | [rpm] | 75 | 150 | 75 | 150 | 75 | 150 | 75 | 150 | 75 | 150 |
| Maximum speed (4) | [rpm] | 150 | 150 | 150 | 150 | 150 | 150 | 125 | 150 | 125 | 150 |

| | | | | | |
|---|---|---|---|---|---|
| Approximative weight | [kg] | 125 unit | Type of brake | Negative disc brake | |
| Maximum casing pressure | [bar] | 1 continuous / 5 peak | Admissible temperatures | [°C] | -20 minimum / +80 maximum |
| Motor oil capacity | [l] | 1,5 | Static braking torque (5) | [Nm] | 10000 |
| Gearbox oil capacity | [l] | 1 | Minimum brake pilot pressure | [bar] | 15 |
| Brake pilot volume | [cm³] | 37,5 | Maximum brake pilot pressure | [bar] | 60 |
| Volume pilot change displacement | [cm³] | 2,12 | Pilot pressure change displacement | [bar] | 25 minimum / 35 maximum |
| Bolt torque setting | [Nm] | 767,0 / 958,0 coarse — 799,0 / 1008,0 fine | Suggested bolt type | M22 | 12.9 |

NOTES

(1) Equivalent displacement = motor displacement x reduction ratio of gearbox (6,6 :1)

(2) For higher peak pressure please contact our Tech. Dept.

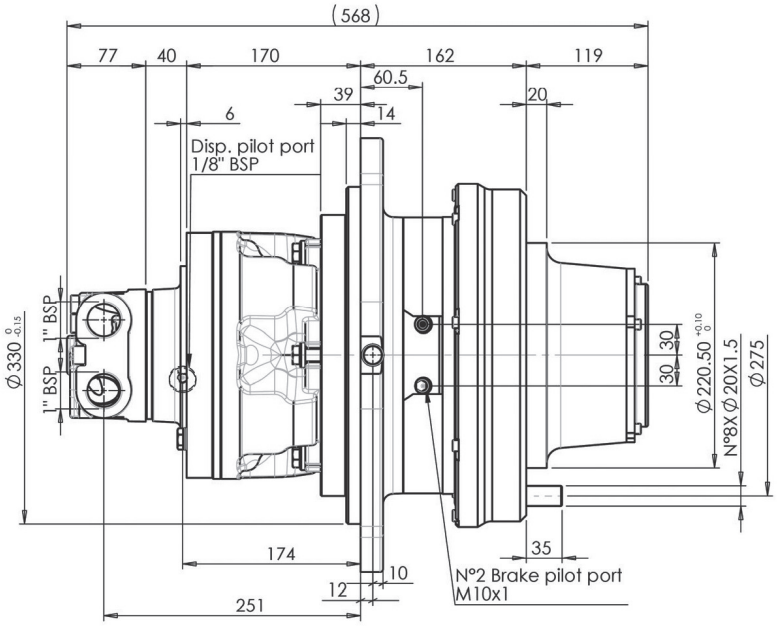
(3) For higher peak power please contact our Tech. Dept.

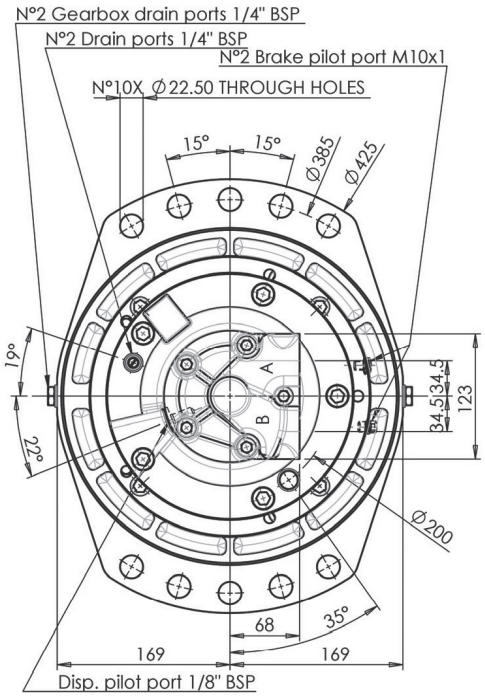
(4) For higher continuous and maximum speed please contact our Tech. Dept.

(5) If the brake is engaged for a long time, the braking torque could increase considerably.
The brake requires to be periodically engaged and disengaged to mantain the desired performance.

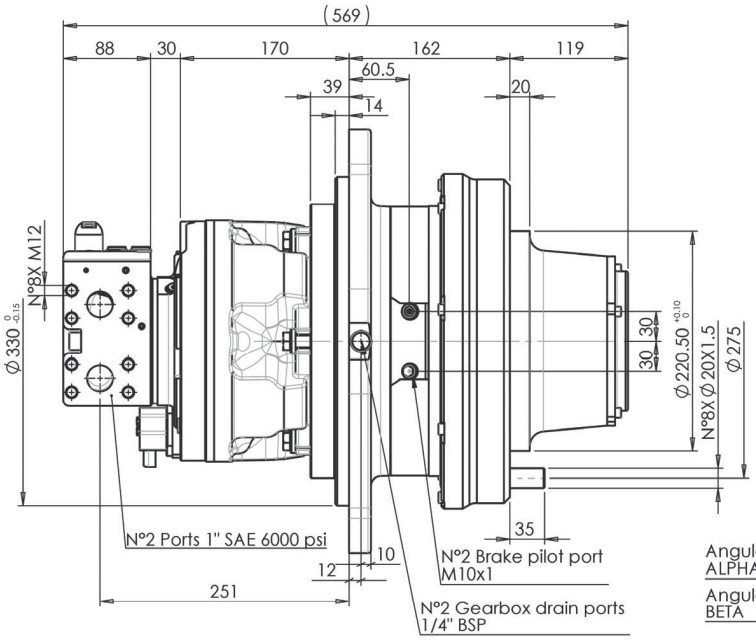
## WHEEL MOTORS WITH GEARBOX WR Series

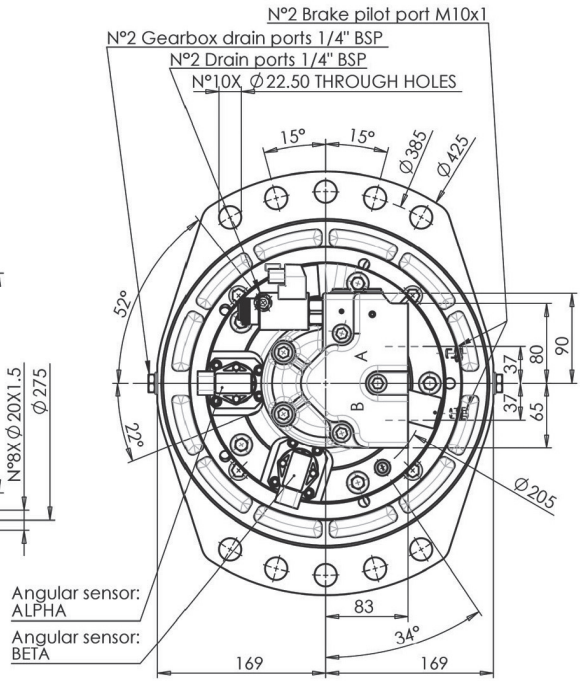
## BD1 + WR20 - INSTALLATION DRAWINGS




## BV1 + WR20 - INSTALLATION DRAWINGS



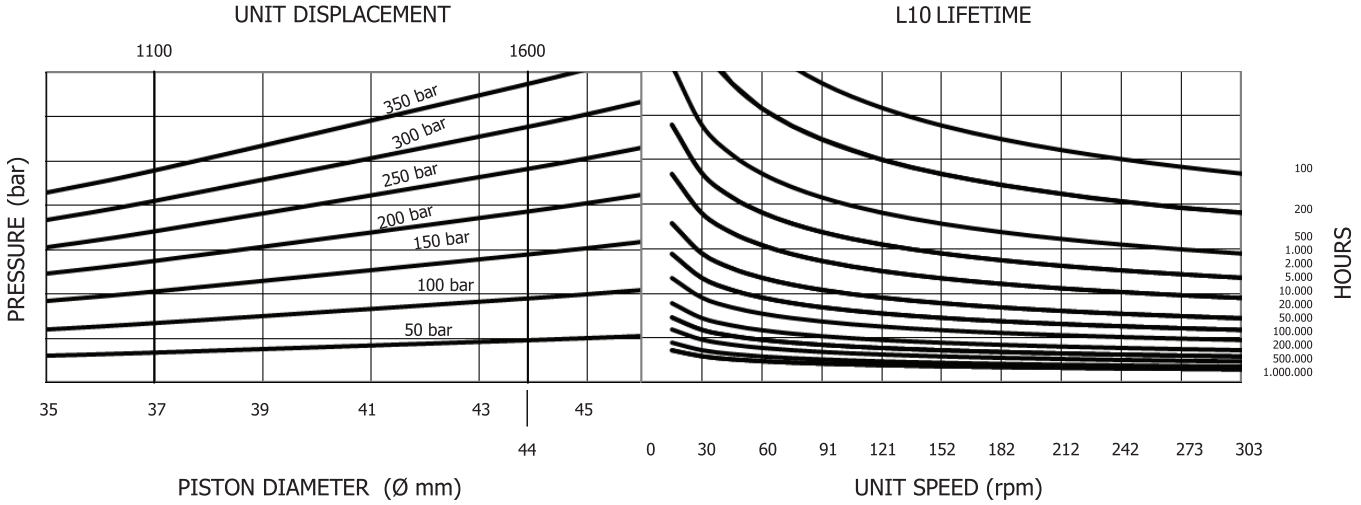



## WHEEL MOTORS WITH GEARBOX WR Series

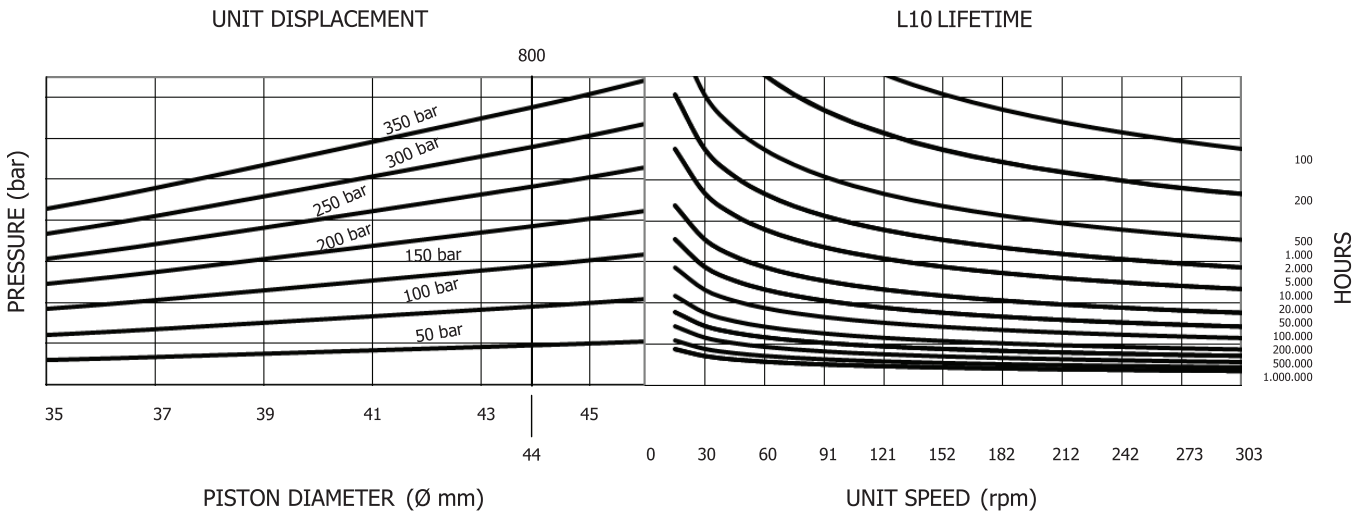
## BD1 + WR20
## BV1 + WR20

## BEARING LIFETIME GRAPHS

Bearing lifetime has been estimated according to L10 (according to ISO 281:1990).
The following graph has been plotted using the stroke of 32 mm.
Please contact our Technical Department for other graphs relating to this product.




Bearing lifetime has been estimated according to L10 (according to ISO 281:1990).
The following graph has been plotted using the stroke of 16 mm.
Please contact our Technical Department for other graphs relating to this product.



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## WHEEL MOTORS WITH GEARBOX WR Series

### GM2 + WR20 (fixed displacement)

### TECHNICAL SPECIFICATION

| | | 1250 | 1650 | 2000 | 2300 | 2800 | 3250 | 3750 | 4100 |
|---|---|---|---|---|---|---|---|---|---|
| Equivalent displacement (1) | [cc/rev] | 1267 | 1656 | 2006 | 2290 | 2805 | 3253 | 3729 | 4111 |
| Reduction ratio | | | | | 6,6:1 | | | | |
| Bore | [mm] | 35 | 40 | 44 | 47 | 52 | 56 | 60 | 63 |
| Stroke | [mm] | | | | 40 | | | | |
| Specific torque | [Nm/bar] | 20,21 | 26,40 | 31,94 | 36,45 | 44,65 | 51,74 | 53,40 | 65,49 |
| Continuous pressure | [bar] | 250 | 250 | 250 | 250 | 220 | 190 | 165 | 150 |
| Peak pressure (2) | [bar] | 425 | 425 | 400 | 375 | 325 | 280 | 245 | 220 |
| Peak power (3) | [kW] | | | | 59 | | | | |
| Continuous speed (4) | [rpm] | 80 | 80 | 80 | 80 | 70 | 70 | 65 | 60 |
| Maximum speed (4) | [rpm] | 150 | 150 | 150 | 135 | 120 | 105 | 105 | 95 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Approximative weight | [kg] | 117 unit | | Type of brake | | Negative disc brake | |
| Maximum casing pressure | [bar] | 1 continuous<br>5 peak | | Admissible temperatures | [°C] | -20 minimum<br>+80 maximum | |
| Motor oil capacity | [l] | 1 | | Static braking torque (5) | [Nm] | 10000 | |
| Gearbox oil capacity | [l] | 1 | | Minimum brake pilot pressure | [bar] | 15 | |
| Brake pilot volume | [cm³] | 37,5 | | Maximum brake pilot pressure | [bar] | 60 | |
| Bolt torque setting | [Nm] | 767,0 coarse 799,0 fine<br>958,0 1008,0 | | Suggested bolt type | | M22 12.9 | |

NOTES

(1) Equivalent displacement = motor displacement x reduction ratio of gearbox (6,6 :1)

(2) For higher peak pressure please contact our Tech. Dept.

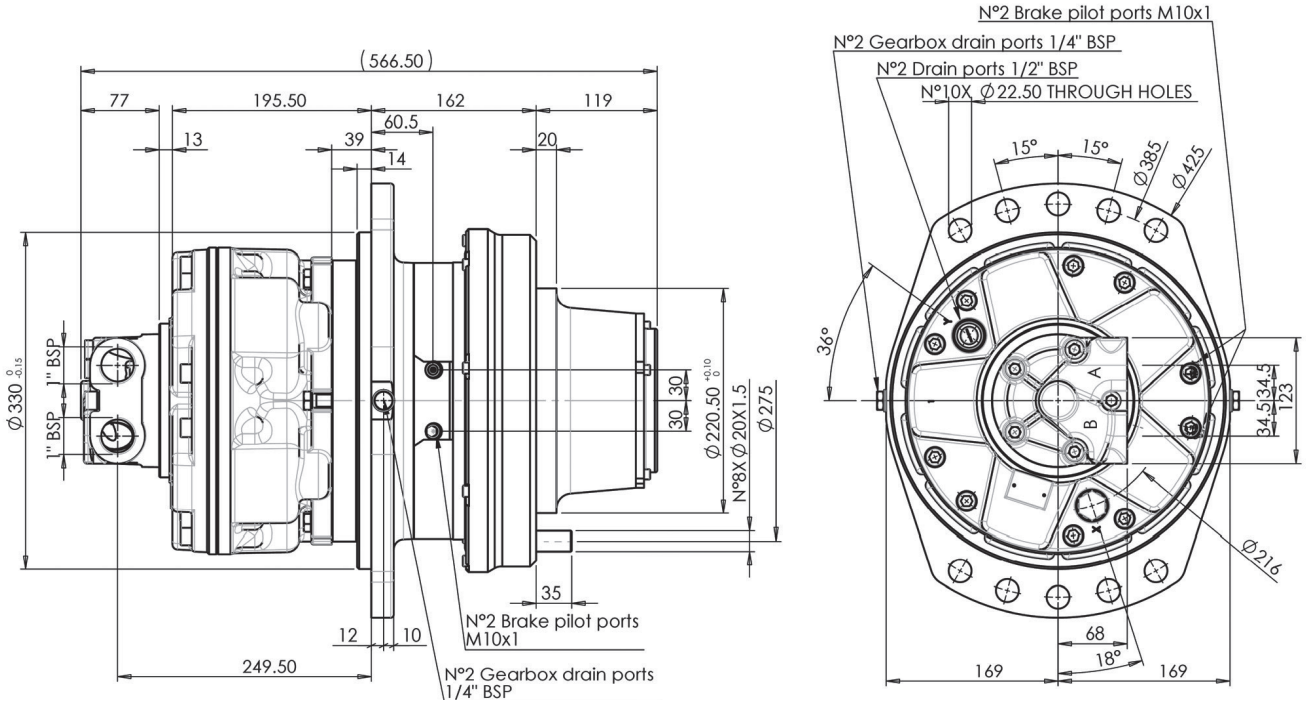
(3) For higher peak power please contact our Tech. Dept.

(4) For higher continuous and maximum speed please contact our Tech. Dept.

(5) If the brake is engaged for a long time, the braking torque could increase considerably.
The brake requires to be periodically engaged and disengaged to mantain the desired performance.

## WHEEL MOTORS WITH GEARBOX WR Series

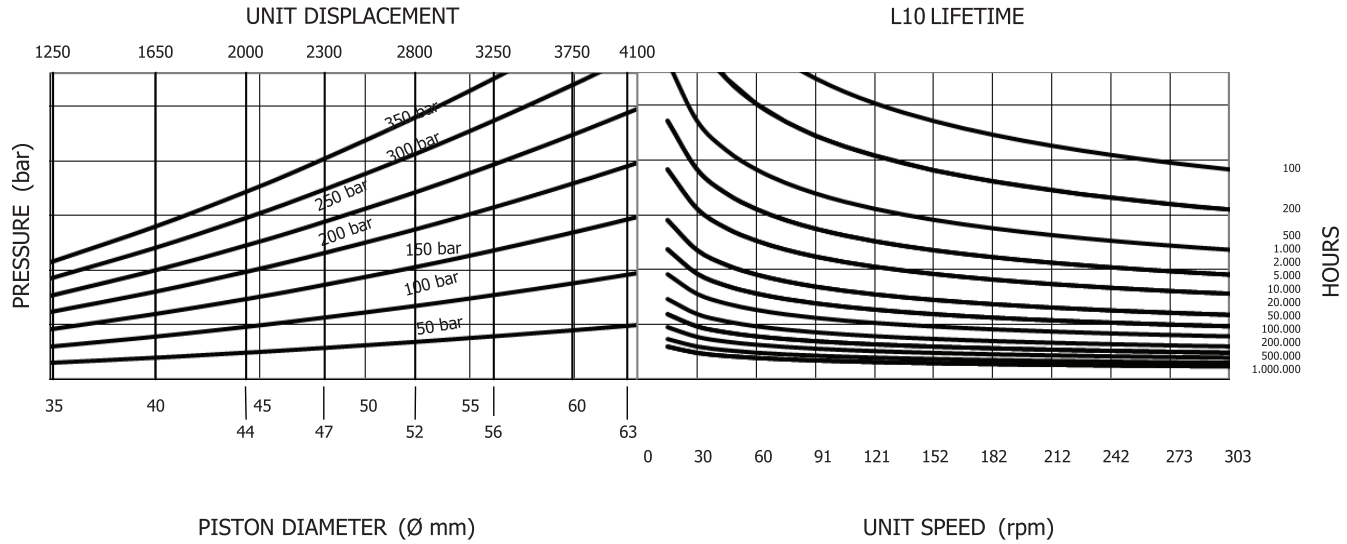
## GM2 + WR20 - INSTALLATION DRAWINGS




## BEARING LIFETIME GRAPHS

Bearing lifetime has been estimated according to L10 (according to ISO 281:1990).

Please contact our Technical Department for other graphs relating to this product.



## WHEEL MOTORS WITH GEARBOX WR Series

### BD2 + WR20 (dual displacement)
### BV2 + WR20 (variable displacement)

### TECHNICAL SPECIFICATION

| | | 1700 | 450 | 1700 | 800 | 2300 | 600 | 2300 | 1150 | 3300 | 800 | 3300 | 1600 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Equivalent displacement (1) | [cc/rev] | 1656 | 415 | 1656 | 831 | 2290 | 574 | 2290 | 1141 | 3253 | 811 | 3253 | 1623 |
| Reduction ratio | | 6,6:1 | | | | | | | | | | | |
| Bore | [mm] | 40 | | 40 | | 47 | | 47 | | 56 | | 56 | |
| Stroke | [mm] | 40 | 10 | 40 | 20 | 40 | 10 | 40 | 20 | 40 | 10 | 40 | 20 |
| Specific torque | [Nm/bar] | 26,40 | 6,60 | 26,40 | 13,20 | 36,30 | 9,24 | 36,30 | 18,48 | 51,48 | 13,20 | 51,48 | 25,74 |
| Continuous pressure | [bar] | 250 | 250 | 250 | 250 | 250 | 250 | 250 | 250 | 250 | 185 | 180 | 250 |
| Peak pressure (2) | [bar] | 425 | 425 | 425 | 425 | 375 | 375 | 375 | 375 | 280 | 350 | 280 | 375 |
| Peak power (3) | [kW] | 75 | 65 | 75 | 65 | 75 | 65 | 75 | 65 | 75 | 65 | 75 | 65 |
| Continuous speed (4) | [rpm] | 100 | 150 | 100 | 150 | 100 | 150 | 100 | 150 | 60 | 150 | 60 | 150 |
| Maximum speed (4) | [rpm] | 150 | 150 | 150 | 150 | 150 | 150 | 150 | 150 | 120 | 150 | 120 | 150 |

| | | | | | |
|---|---|---|---|---|---|
| Approximative weight | [kg] | 140 | unit | | |
| Maximum casing pressure | [bar] | 1 | continuous | | |
| | | 5 | peak | | |
| Motor oil capacity | [l] | 3 | | | |
| Gearbox oil capacity | [l] | 1 | | | |
| Brake pilot volume | [cm³] | 37,5 | | | |
| Volume pilot change displacement | [cm³] | 5,568 | | | |
| Bolt torque setting | [Nm] | 767,0 | coarse | 799,0 | fine |
| | | 958,0 | | 1008,0 | |

| | | | | |
|---|---|---|---|---|
| Type of brake | | Negative disc brake | | |
| Admissible temperatures | [°C] | -20 | minimum | |
| | | +80 | maximum | |
| Static braking torque (5) | [Nm] | 10000 | | |
| Minimum brake pilot pressure | [bar] | 15 | | |
| Maximum brake pilot pressure | [bar] | 60 | | |
| Pilot pressure change displacement | [bar] | 25 | minimum | |
| | | 35 | maximum | |
| Suggested bolt type | | M22 | 12.9 | |

NOTES

(1) Equivalent displacement = motor displacement x reduction ratio of gearbox (6,6 :1)

(2) For higher peak pressure please contact our Tech. Dept.

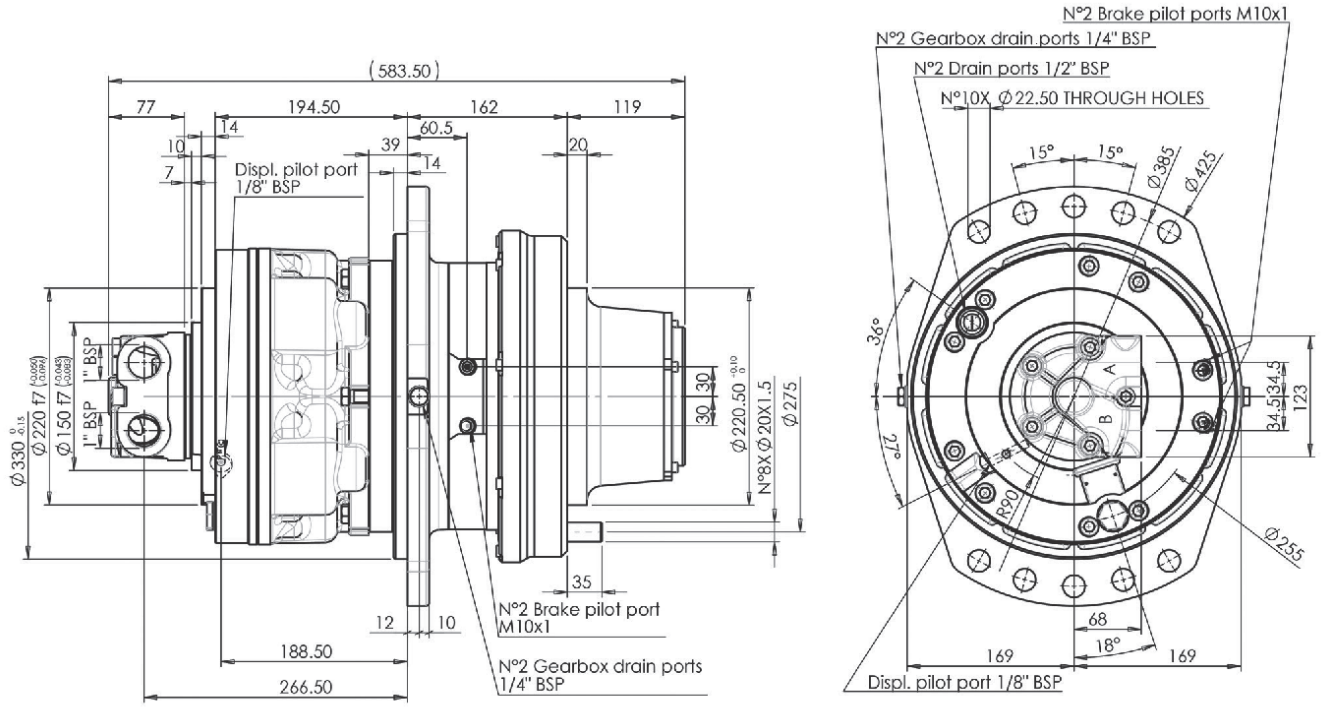
(3) For higher peak power please contact our Tech. Dept.

(4) For higher continuous and maximum speed please contact our Tech. Dept.

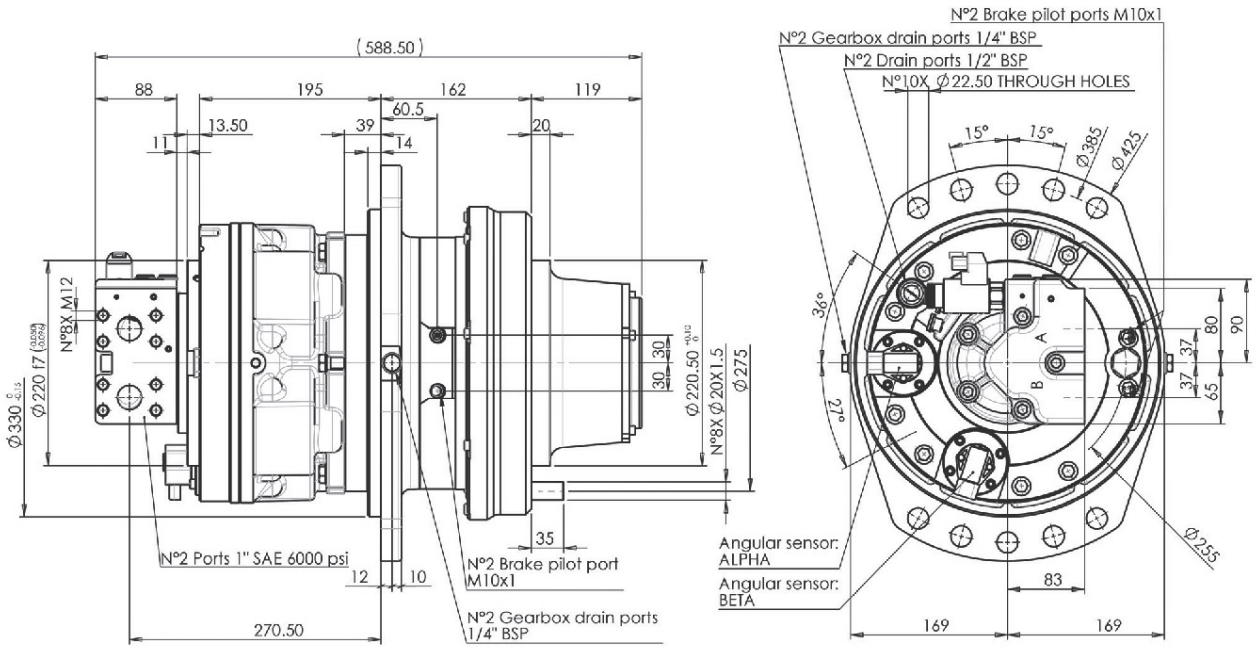
(5) If the brake is engaged for a long time, the braking torque could increase considerably.
The brake requires to be periodically engaged and disengaged to mantain the desired performance.

## WHEEL MOTORS WITH GEARBOX WR Series

## BD2 + WR20 - INSTALLATION DRAWINGS




## BV2 + WR20 - INSTALLATION DRAWINGS

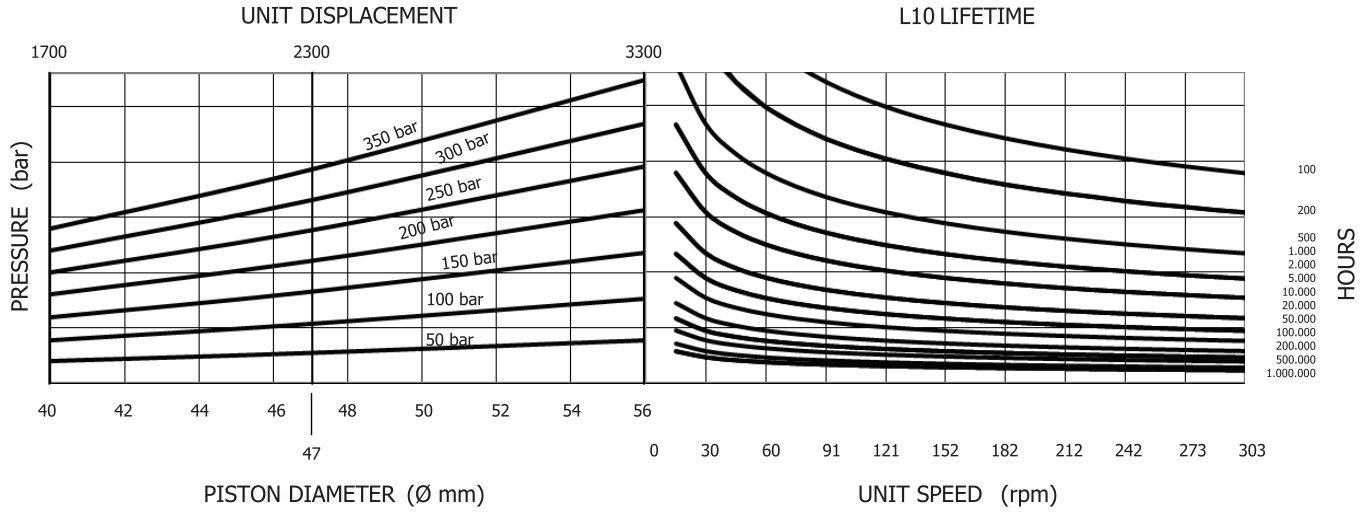


## WHEEL MOTORS WITH GEARBOX WR Series

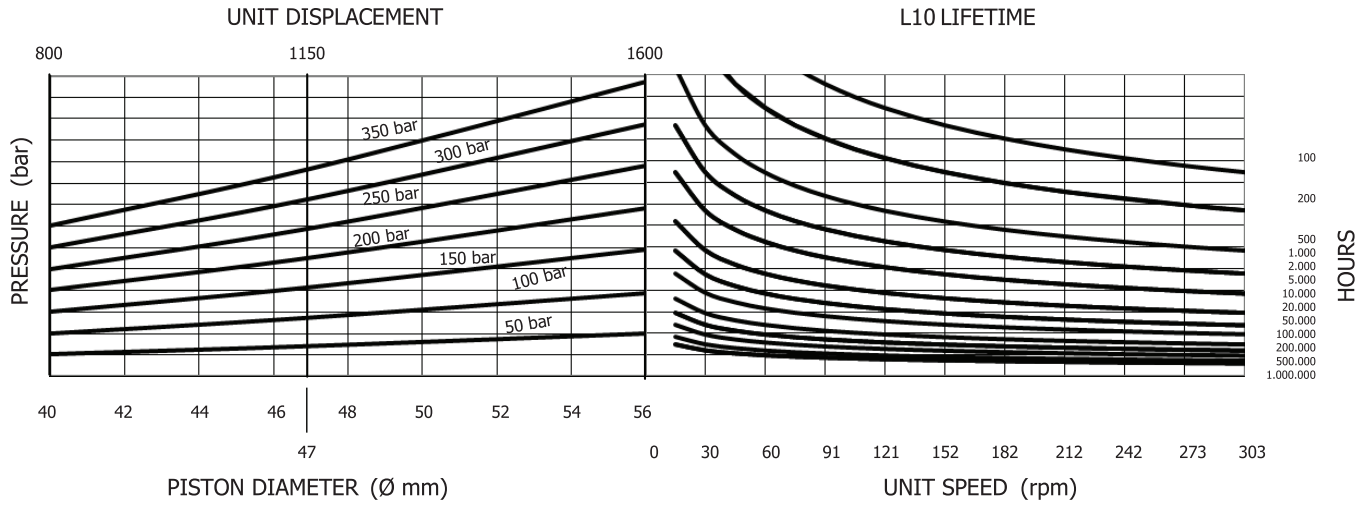
## BD2 + WR20
## BV2 + WR20

## BEARING LIFETIME GRAPHS

Bearing lifetime has been estimated according to L10 (according to ISO 281:1990).
The following graph has been plotted using the stroke of 40 mm.
Please contact our Technical Department for other graphs relating to this product.




Bearing lifetime has been estimated according to L10 (according to ISO 281:1990).
The following graph has been plotted using the stroke of 20 mm.
Please contact our Technical Department for other graphs relating to this product.



## WHEEL MOTORS WITH GEARBOX WR Series

## ORDER CODE

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
|---|---|---|---|---|---|---|---|---|
| | + | + | + | + | + | + | + | + |

| | | |
|---|---|---|
| 1 | **Motor type** | |
| 2 | **Displacement** | see table |
| 3 | **Additional options** | U = shared oil<br>O = separated oil |
| 4 | **Distributor** | see distributors section<br>D40 standard |
| 5 | **Direction of rotation**<br>(viewed from the output side)<br>with flow in port A, out in port B. | No code = clockwise rotation<br>L = anti-clockwise rotation |
| 6 | **Distributor cover orientation** | No code = position 1<br>DM2 = position 2<br>DM3 = position 3<br>DM4 = position 4<br>DM5 = position 5 |
| 7 | **WR series** | WR6B<br>WR10<br>WR20 |

Example

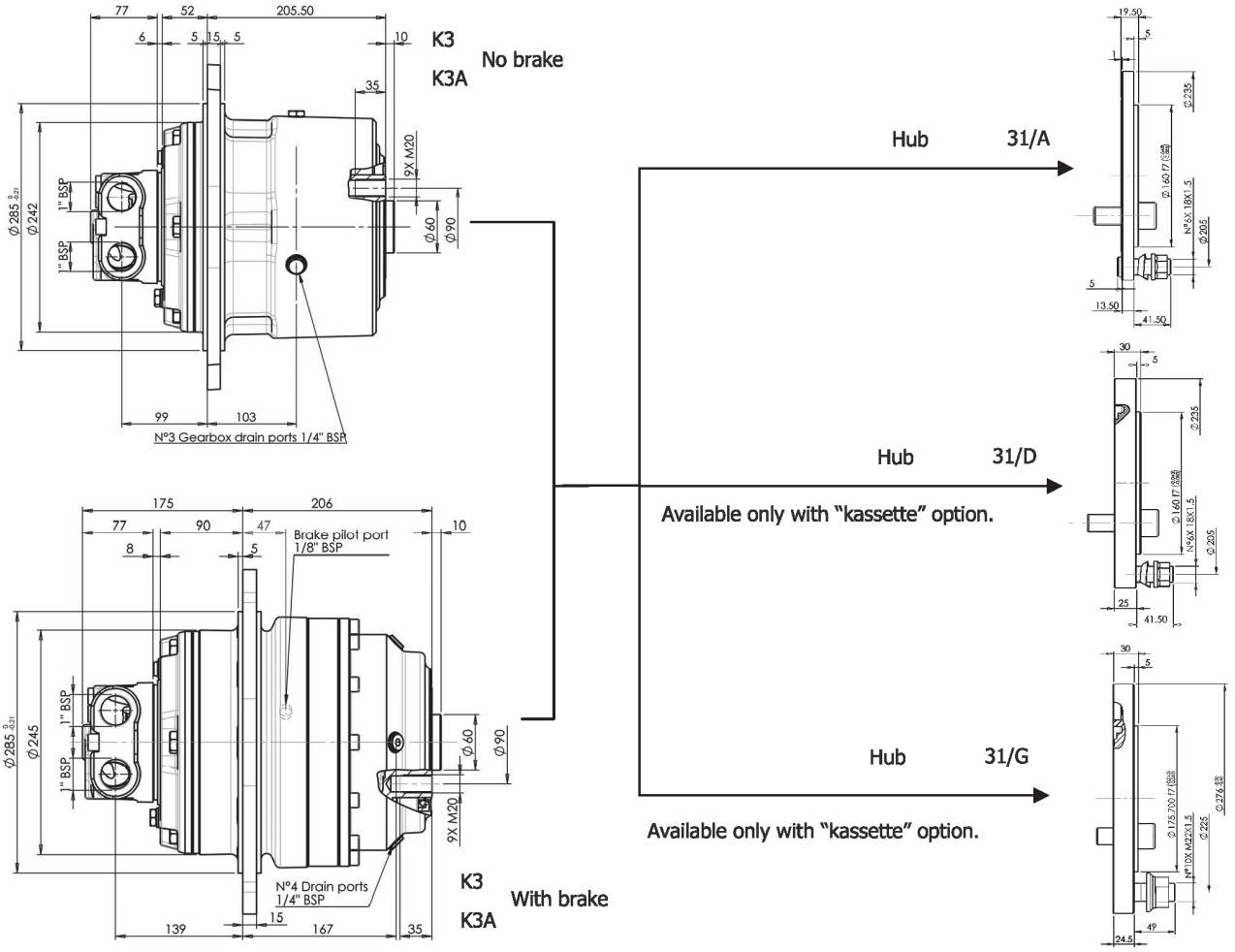
GM05 600 U D40 WR6B
(standard)

GM05 600 U D40LDM2 WR6B
(options: anti-clockwise sense of rotation)

# WHEEL MOTORS WITH GEARBOX K Series

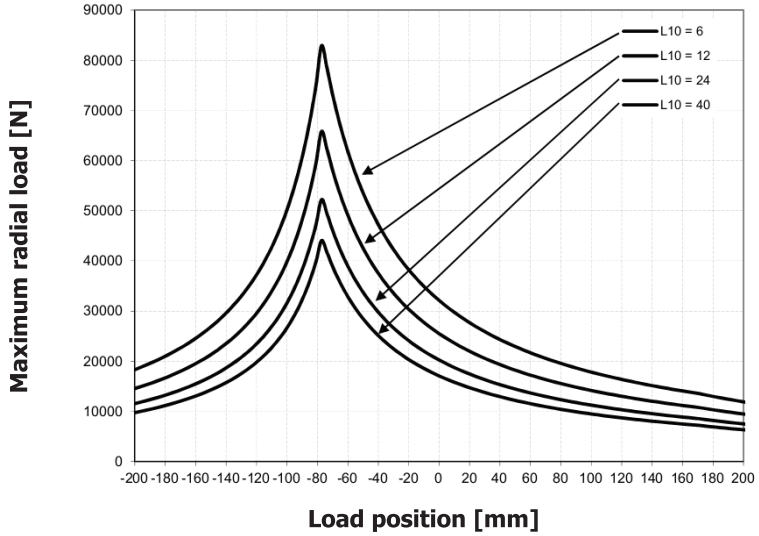
## PRODUCT OVERVIEW

| | | | K3 | K3A | K4 |
|---|---|---|---|---|---|
| Maximum continuous torque | [Nm] | | 3500 | 5000 | 14000 |
| Peak torque | [Nm] | | 7000 | 10000 | 19000 |
| Reduction ratio | | | 7:1 | 5:1 | 5,6:1 |
| Maximum braking torque | [Nm] | | 6500 | 8000 | 18000 |
| Brake pilot pressure | [bar] | minimum | 20 | 20 | 20 |
| | | maximum | 50 | 50 | 50 |
| Type of brake | | | Negative | Negative | Negative |
| Available combinations | | | GK3<br>GFK3R<br>BDK3<br>BDFK3R<br>BVK3<br>BVFK3R | GK3A<br>GFK3AR<br>BDK3A<br>BDFK3AR<br>BVK3A<br>BVFK3AR | GK4<br>GFK4<br>BDK4<br>BDFK4<br>BVK4<br>BVFK4 |

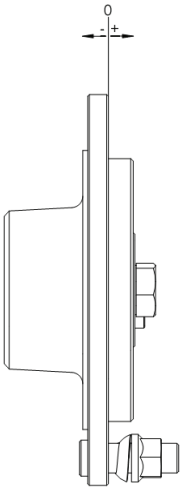


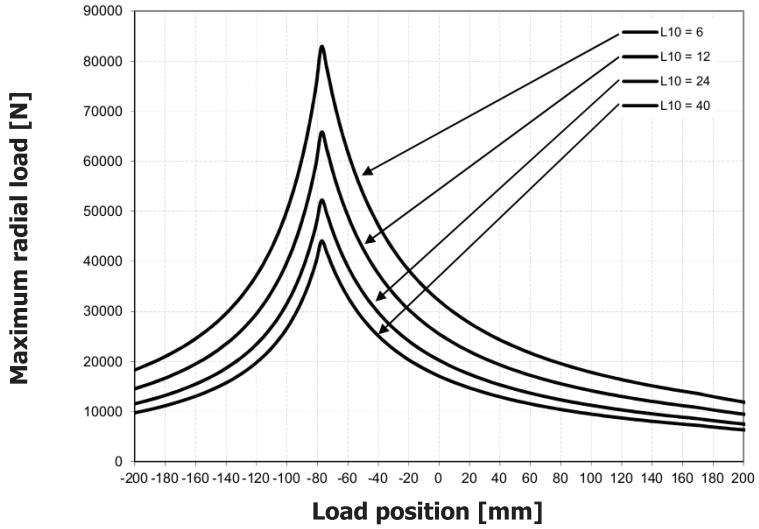
## WHEEL MOTORS WITH GEARBOX K Series

## LOAD POSITION GRAPH

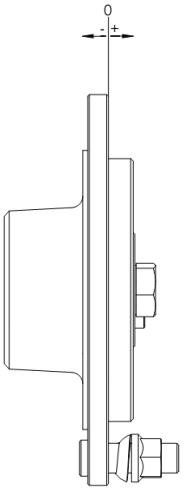


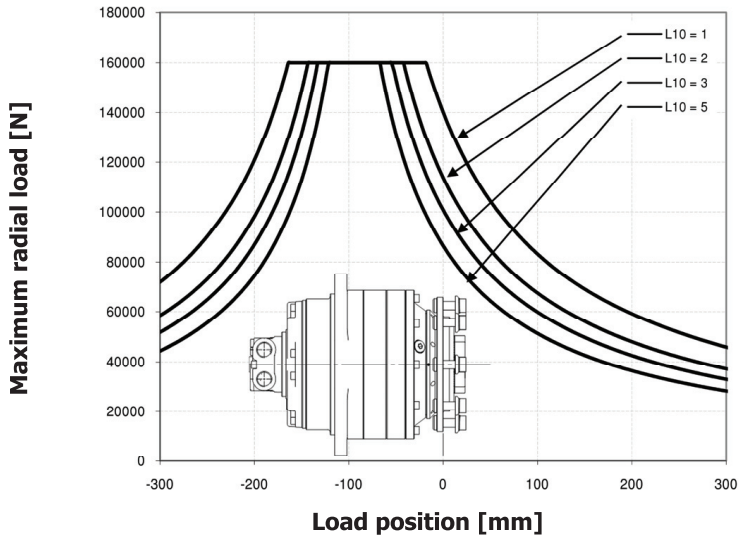

K3



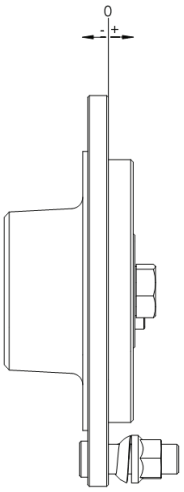




K3A




K4



## WHEEL MOTORS WITH GEARBOX K Series

**GK3** (fixed displacement without brake)

**GFK3R** (fixed displacement with brake)

## TECHNICAL SPECIFICATION

| | | 700 | 900 | 1000 | 1200 | 1400 | 1600 | 1700 | 2000 | 2200 |
|---|---|---|---|---|---|---|---|---|---|---|
| Equivalent displacement (1) | [cc/rev] | 690 | 901 | 1078 | 1204 | 1407 | 1552 | 1703 | 2027 | 2199 |
| Reduction ratio | | | | | | 7:1 | | | | |
| Bore | [mm] | 28 | 32 | 35 | 37 | 40 | 42 | 44 | 48 | 50 |
| Stroke | [mm] | | | | | 32 | | | | |
| Specific torque | [Nm/bar] | 10,98 | 14,34 | 17,15 | 19,17 | 22,40 | 24,70 | 27,10 | 32,26 | 35,00 |
| Continuous pressure | [bar] | 250 | 245 | 200 | 180 | 155 | 140 | 130 | 105 | 100 |
| Peak pressure (2) | [bar] | 425 | 400 | 400 | 365 | 310 | 280 | 255 | 215 | 200 |
| Peak power (3) | [kW] | | | | | 48 | | | | |
| Continuous speed (4) | [rpm] | 78 | 78 | 78 | 78 | 78 | 78 | 64 | 50 | 50 |
| Maximum speed (4) | [rpm] | 150 | 150 | 150 | 130 | 103 | 100 | 100 | 100 | 90 |

| | | | | | |
|---|---|---|---|---|---|
| Approximative weight | [kg] | 75 unit | Type of brake | Negative disc brake | |
| Maximum casing pressure | [bar] | 1 continuous<br>5 peak | Admissible temperatures | [°C] | -20 minimum<br>+80 maximum |
| Motor oil capacity | [l] | 1,5 | Static braking torque (5) | [Nm] | 6500 |
| Gearbox oil capacity | [l] | 1,7 | Minimum brake pilot pressure | [bar] | 20 |
| Brake pilot volume | [cm³] | 3,9 | Maximum brake pilot pressure | [bar] | 60 |
| Bolt torque setting | [Nm] | 767,0 coarse 799,0 fine<br>958,0 1008,0 | Suggested bolt type | M22 | 12.9 |

NOTES

(1) Equivalent displacement = motor displacement x reduction ratio of gearbox (7 :1)

(2) For higher peak pressure please contact our Tech. Dept.

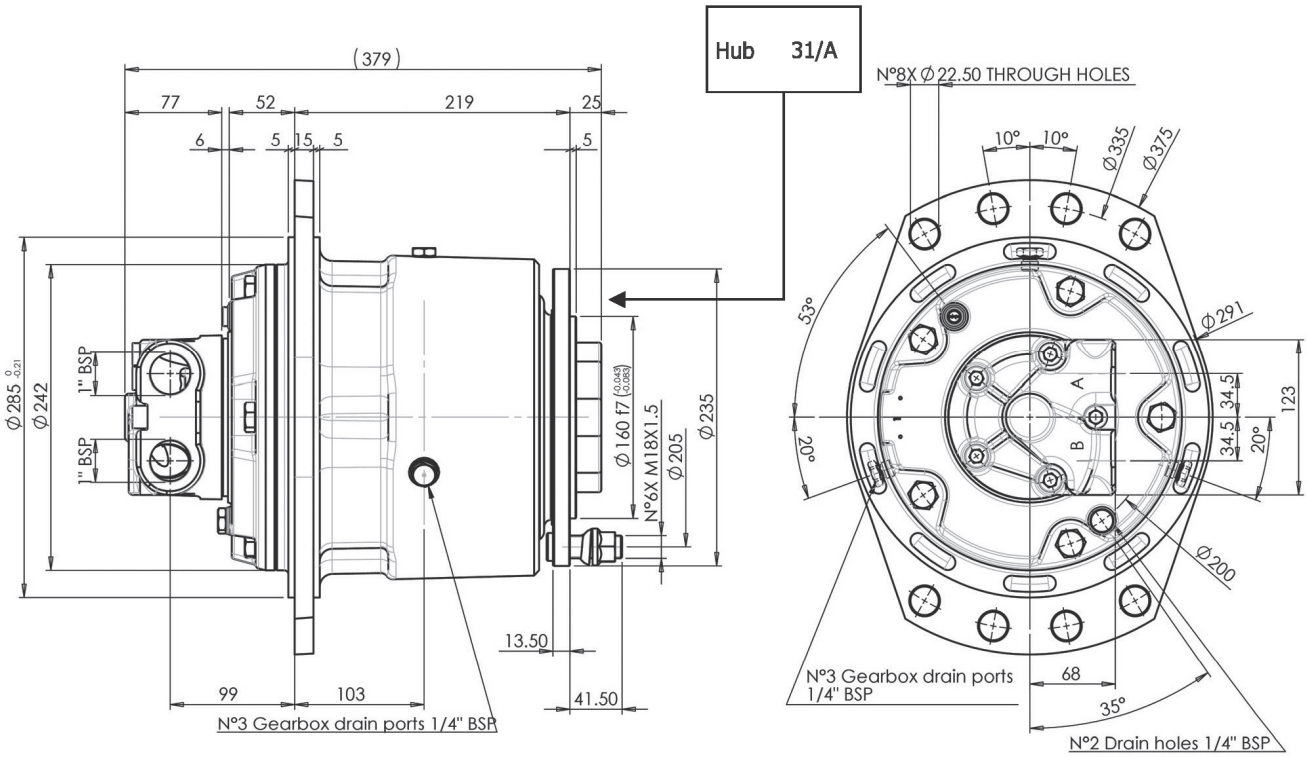
(3) For higher peak power please contact our Tech. Dept.

(4) For higher continuous and maximum speed please contact our Tech. Dept.

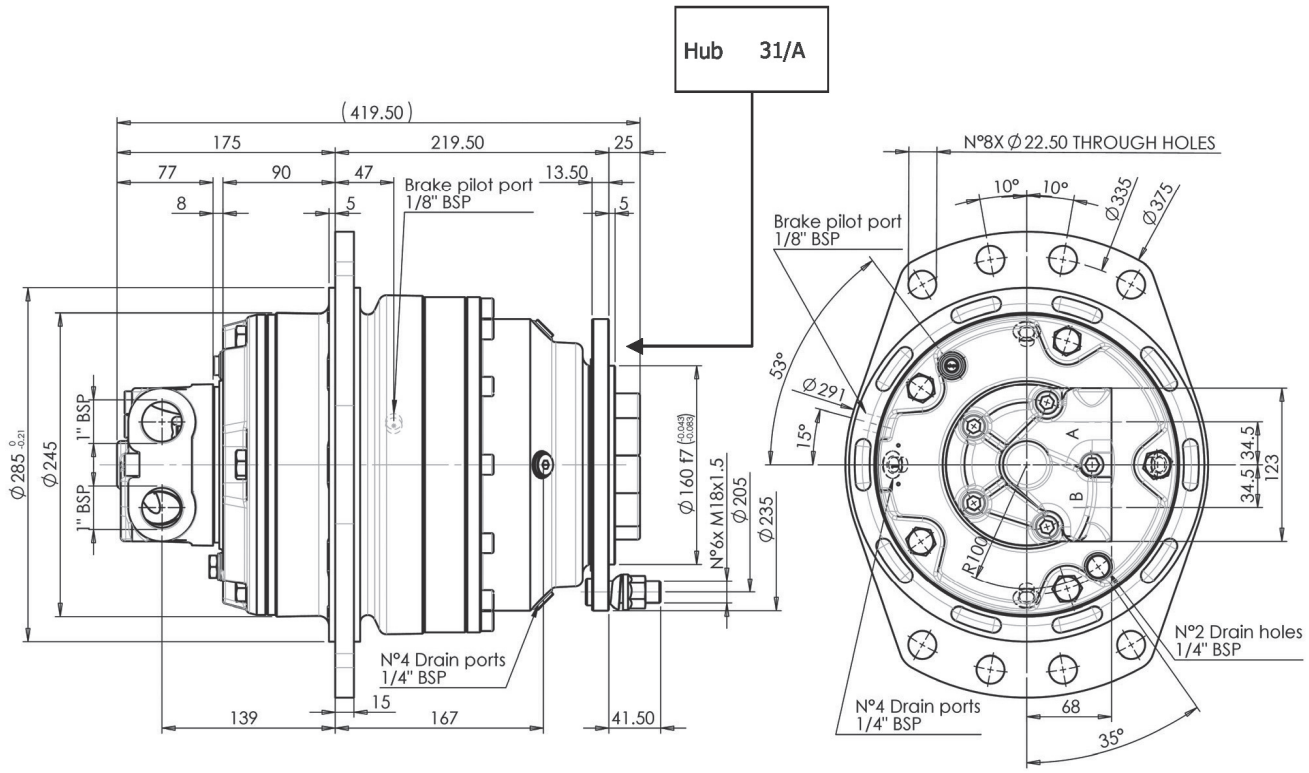
(5) If the brake is engaged for a long time, the braking torque could increase considerably.
The brake requires to be periodically engaged and disengaged to mantain the desired performance.

## WHEEL MOTORS WITH GEARBOX K Series

## GK3 - INSTALLATION DRAWINGS




## GFK3R - INSTALLATION DRAWINGS

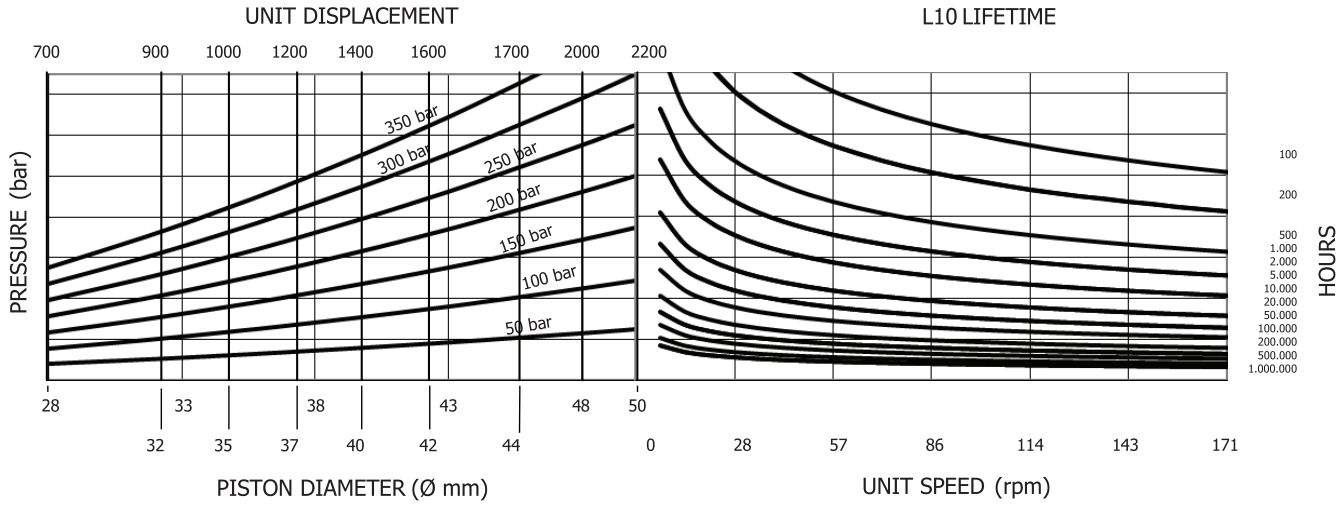


## WHEEL MOTORS WITH GEARBOX K Series

## GK3
## GFK3R

## BEARING LIFETIME GRAPHS

Bearing lifetime has been estimated according to L10 (according to ISO 281:1990).
Please contact our Technical Department for other graphs relating to this product.



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## WHEEL MOTORS WITH GEARBOX K Series

**BDK3** (dual displacement without brake)
**BDFK3R** (dual displacement with brake)

**BVK3** (variable displacement without brake)
**BVFK3R** (variable displacement with brake)

## TECHNICAL SPECIFICATION

| | | 700 | 375 | 1200 | 300 | 1200 | 550 | 1700 | 425 | 1700 | 850 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Equivalent displacement (1) | [cc/rev] | 714 | 378 | 1204 | 301 | 1232 | 532 | 1701 | 427 | 1701 | 851 |
| Reduction ratio | | 7:1 | | | | | | | | | |
| Bore | [mm] | 37 | 37 | 37 | 37 | 44 | 44 | 44 | 44 | 44 | 44 |
| Stroke | [mm] | 19 | 10 | 32 | 8 | 23 | 10 | 32 | 8 | 32 | 16 |
| Specific torque | [Nm/bar] | 11,38 | 5,99 | 19,17 | 4,79 | 19,48 | 8,47 | 27,10 | 6,78 | 27,10 | 13,55 |
| Continuous pressure | [bar] | 250 | 250 | 185 | 250 | 180 | 250 | 130 | 250 | 130 | 250 |
| Peak pressure (2) | [bar] | 425 | 425 | 370 | 400 | 355 | 400 | 250 | 375 | 250 | 375 |
| Peak power (3) | [kW] | 55 | 42 | 55 | 42 | 55 | 42 | 55 | 42 | 55 | 42 |
| Continuous speed (4) | [rpm] | 70 | 200 | 70 | 200 | 70 | 200 | 70 | 200 | 70 | 200 |
| Maximum speed (4) | [rpm] | 200 | 500 | 140 | 500 | 140 | 400 | 120 | 400 | 120 | 350 |

| | | | | | | |
|---|---|---|---|---|---|---|
| Approximative weight | [kg] | 75 | unit | Type of brake | | Negative disc brake |
| Maximum casing pressure | [bar] | 1 | continuous | Admissible temperatures | [°C] | -20 minimum |
| | | 5 | peak | | | +80 maximum |
| Motor oil capacity | [l] | 1,5 | | Static braking torque (5) | [Nm] | 6500 |
| Gearbox oil capacity | [l] | 1,7 | | Minimum brake pilot pressure | [bar] | 20 |
| Brake pilot volume | [cm³] | 3,9 | | Maximum brake pilot pressure | [bar] | 60 |
| Volume pilot change displacement | [cm³] | 2,12 | | Pilot pressure change displacement | [bar] | 25 minimum |
| | | | | | | 35 maximum |
| Bolt torque setting | [Nm] | 454,0<br>568,0 | coarse | 474,0<br>597,0 | fine | Suggested bolt type | M22 | 8,8 |

NOTES

(1) Equivalent displacement = motor displacement x reduction ratio of gearbox (7 :1)

(2) For higher peak pressure please contact our Tech. Dept.

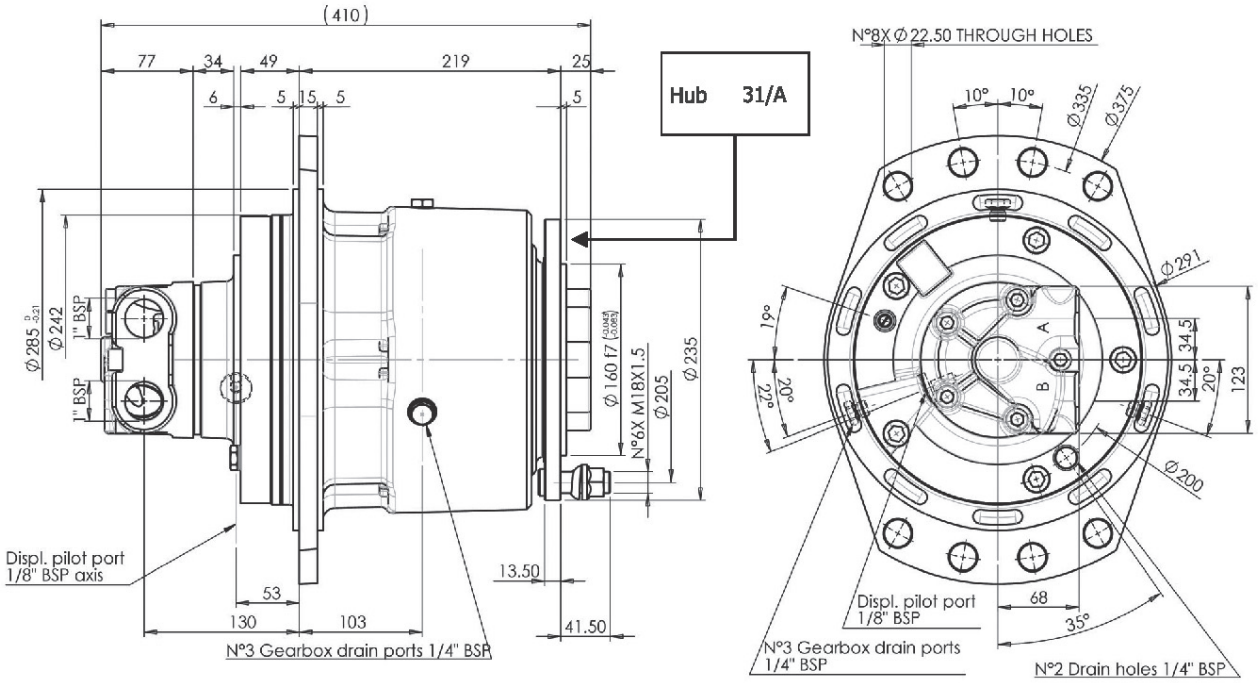
(3) For higher peak power please contact our Tech. Dept.

(4) For higher continuous and maximum speed please contact our Tech. Dept.

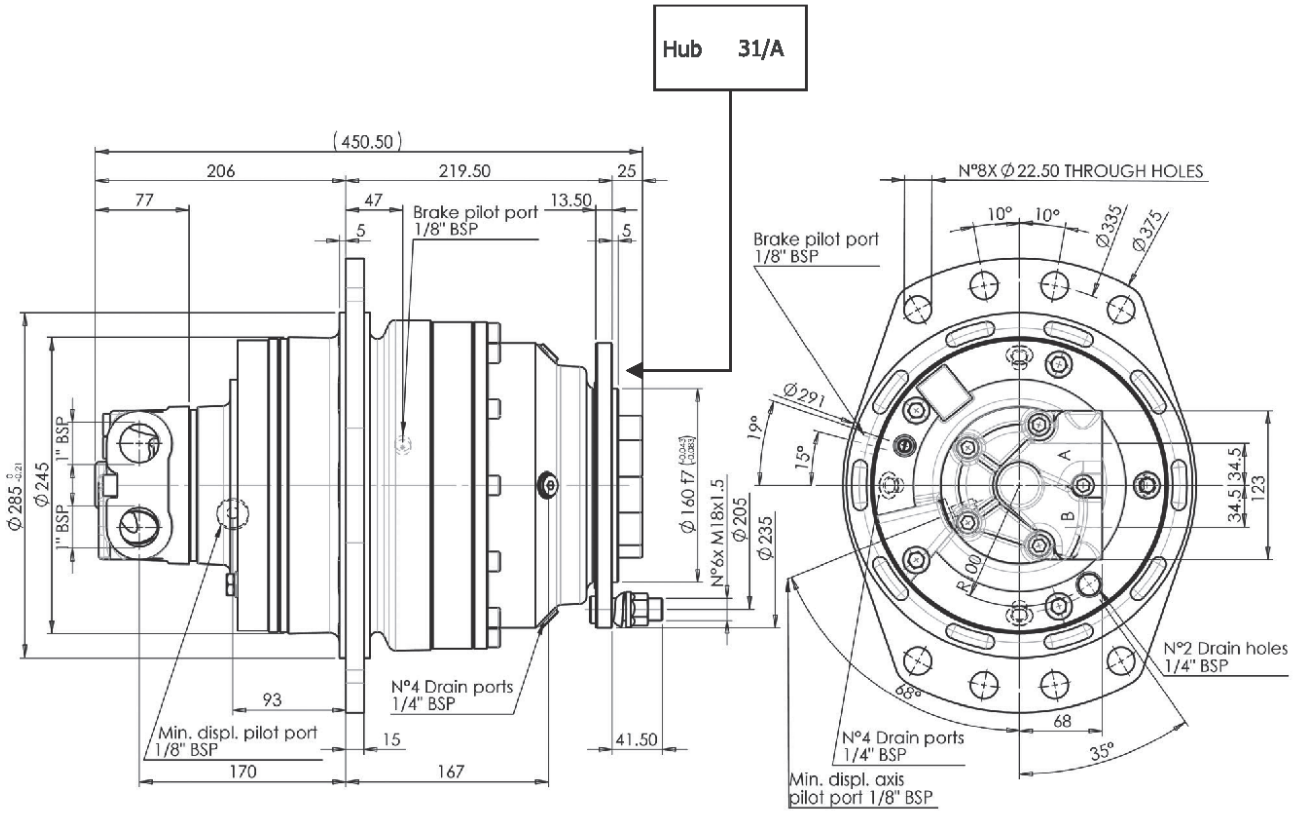
(5) If the brake is engaged for a long time, the braking torque could increase considerably.
The brake requires to be periodically engaged and disengaged to mantain the desired performance.

## WHEEL MOTORS WITH GEARBOX K Series

## BDK3 - INSTALLATION DRAWINGS

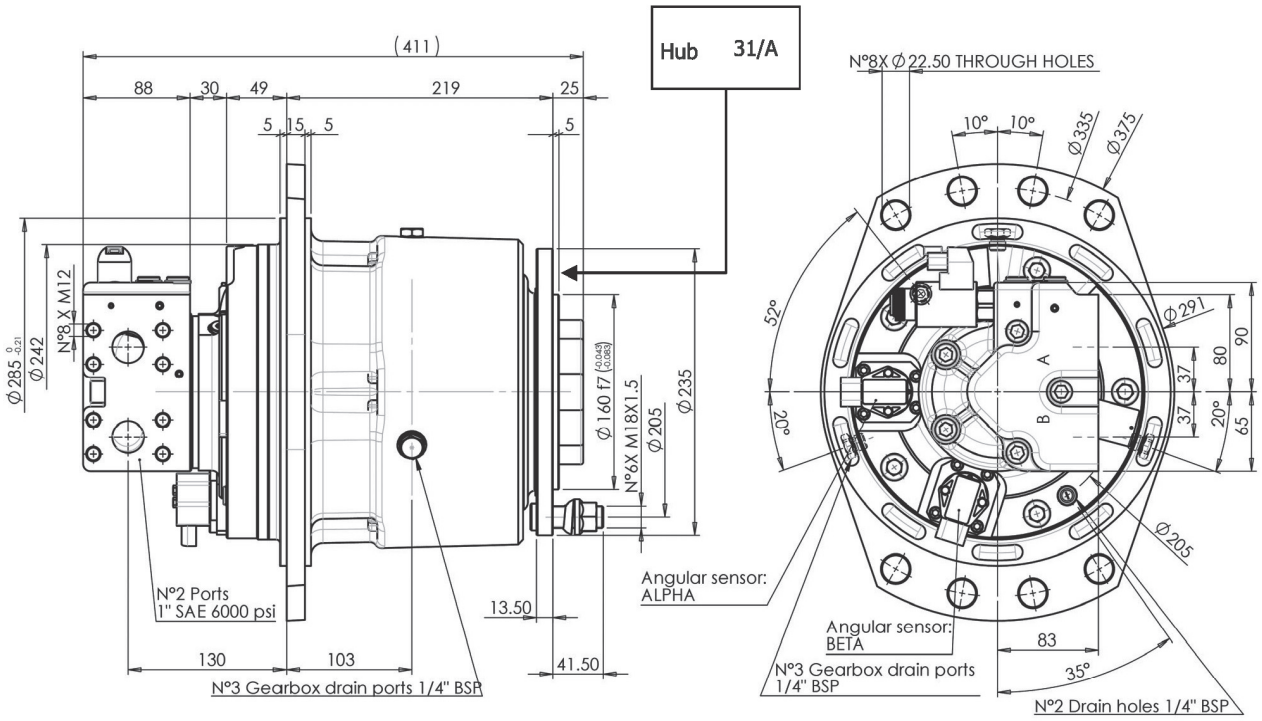



## BDFK3R - INSTALLATION DRAWINGS

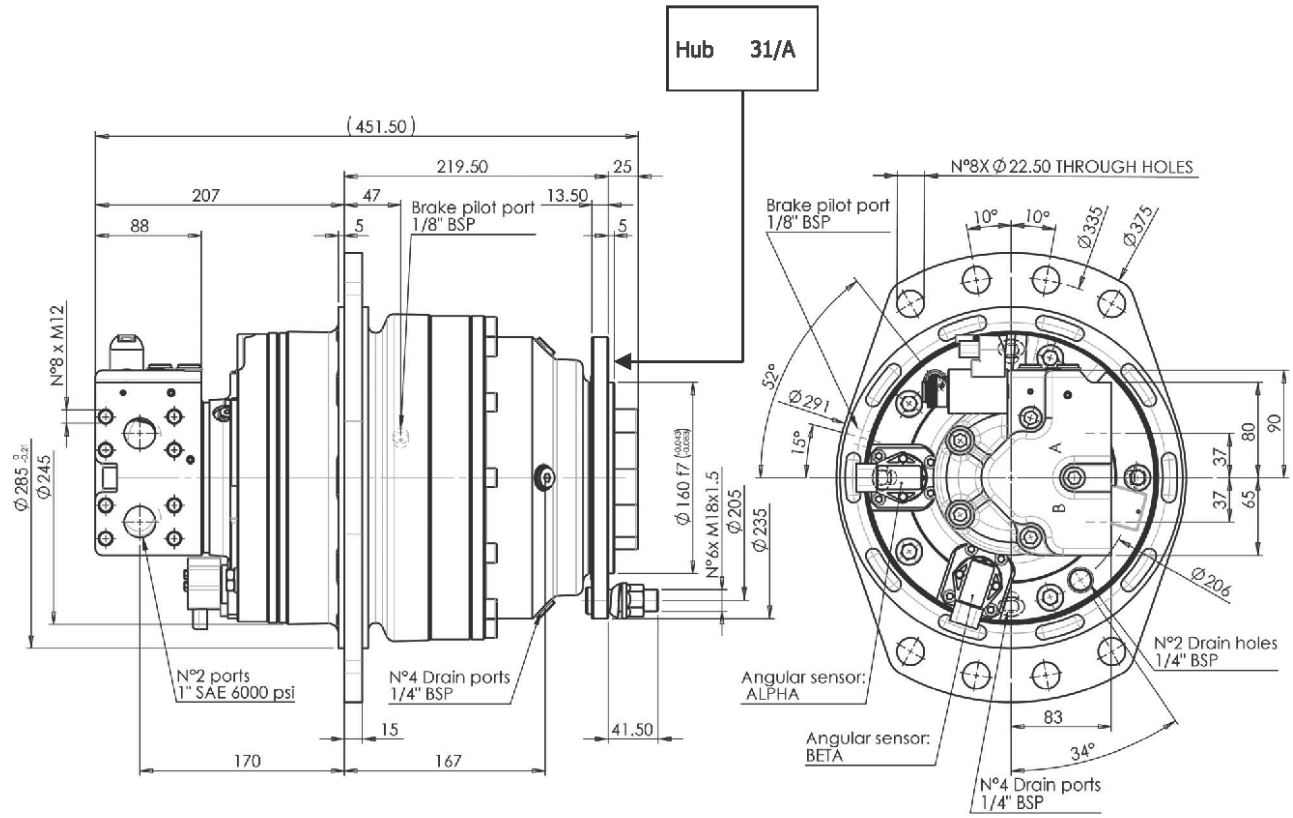


## WHEEL MOTORS WITH GEARBOX K Series

## BVK3 - INSTALLATION DRAWINGS




## BVFK3R - INSTALLATION DRAWINGS

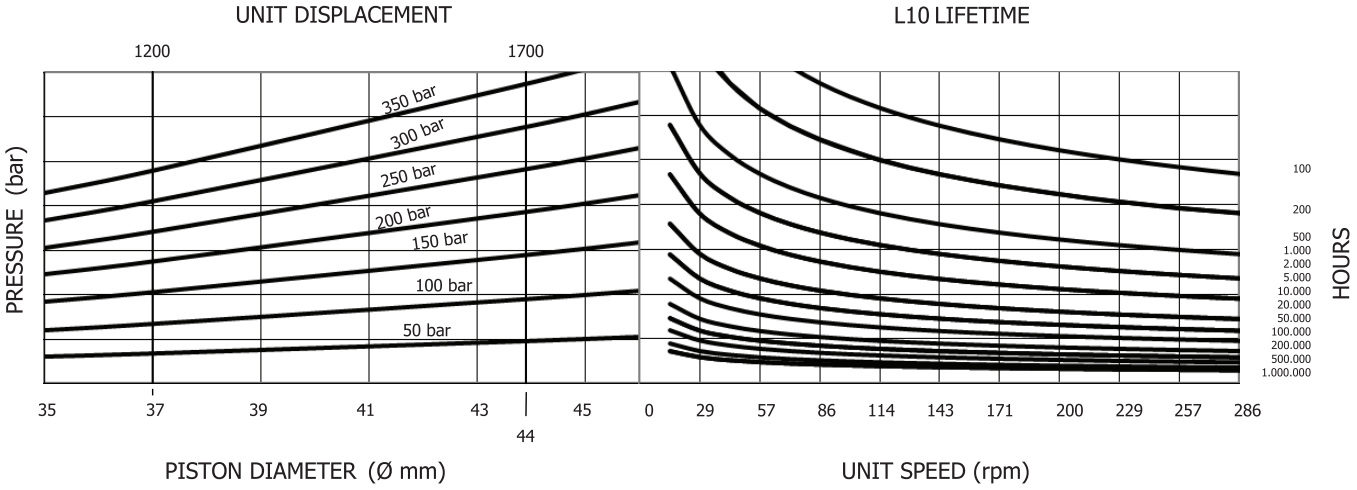


## WHEEL MOTORS WITH GEARBOX K Series

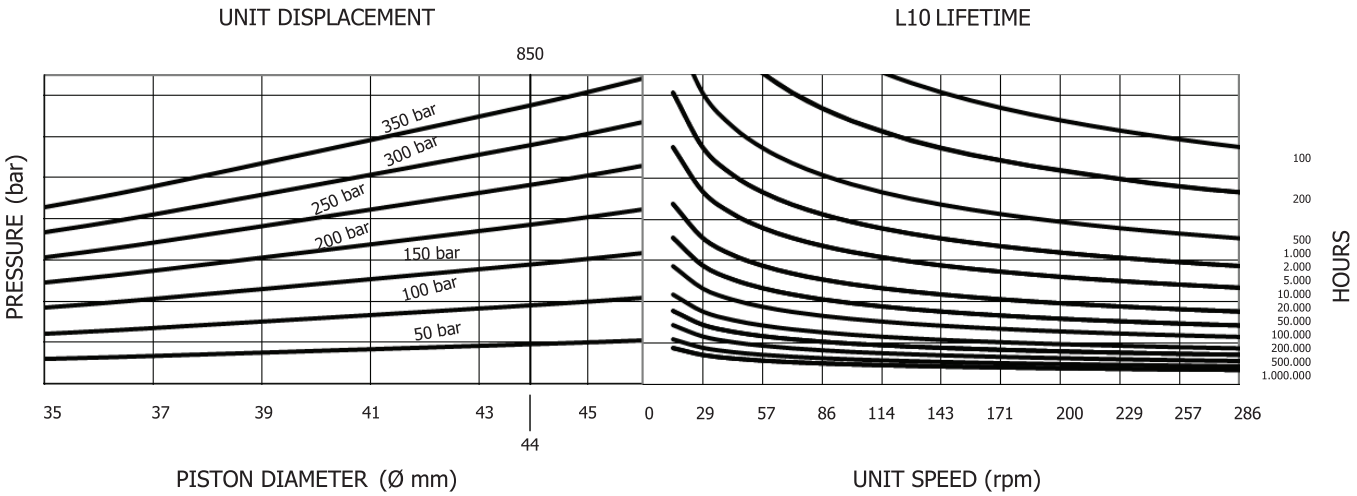
## BDK3 - BDFK3R
## BVK3 - BVFK3R

## BEARING LIFETIME GRAPHS

Bearing lifetime has been estimated according to L10 (according to ISO 281:1990).
The following graph has been plotted using the stroke of 32 mm.
Please contact our Technical Department for other graphs relating to this product.




Bearing lifetime has been estimated according to L10 (according to ISO 281:1990).
The following graph has been plotted using the stroke of 16 mm.
Please contact our Technical Department for other graphs relating to this product.



## WHEEL MOTORS WITH GEARBOX K Series

**GK3A** (fixed displacement without brake)
**GFK3AR** (fixed displacement with brake)

## TECHNICAL SPECIFICATION

| | | 500 | 650 | 750 | 850 | 1000 | 1150 | 1200 | 1450 | 1550 |
|---|---|---|---|---|---|---|---|---|---|---|
| Equivalent displacement (1) | [cc/rev] | 493 | 643 | 770 | 860 | 1005 | 1108 | 1216 | 1448 | 1571 |
| Reduction ratio | | | | | | 5:1 | | | | |
| Bore | [mm] | 28 | 32 | 35 | 37 | 40 | 42 | 44 | 48 | 50 |
| Stroke | [mm] | | | | | 32 | | | | |
| Specific torque | [Nm/bar] | 7,84 | 10,24 | 12,25 | 13,69 | 16,00 | 17,64 | 19,36 | 23,04 | 25,00 |
| Continuous pressure | [bar] | 250 | 250 | 250 | 250 | 250 | 250 | 250 | 220 | 205 |
| Peak pressure (2) | [bar] | 425 | 400 | 400 | 375 | 350 | 350 | 350 | 300 | 280 |
| Peak power (3) | [kW] | | | | | 48 | | | | |
| Continuous speed (4) | [rpm] | 110 | 110 | 110 | 110 | 110 | 110 | 90 | 70 | 70 |
| Maximum speed (4) | [rpm] | 200 | 200 | 200 | 180 | 160 | 140 | 140 | 130 | 130 |

| | | | | | |
|---|---|---|---|---|---|
| Approximative weight | [kg] | 75 unit | Type of brake | Negative disc brake | |
| Maximum casing pressure | [bar] | 1 continuous<br>5 peak | Admissible temperatures | [°C] | -20 minimum<br>+80 maximum |
| Motor oil capacity | [l] | 1,5 | Static braking torque (5) | [Nm] | 8200 |
| Gearbox oil capacity | [l] | 1,7 | Minimum brake pilot pressure | [bar] | 20 |
| Brake pilot volume | [cm³] | 3,9 | Maximum brake pilot pressure | [bar] | 50 |
| Bolt torque setting | [Nm] | 767,0 coarse 799,0 fine<br>958,0 1008,0 | Suggested bolt type | M22 | 12.9 |

NOTES

(1) Equivalent displacement = motor displacement x reduction ratio of gearbox (5 :1)

(2) For higher peak pressure please contact our Tech. Dept.

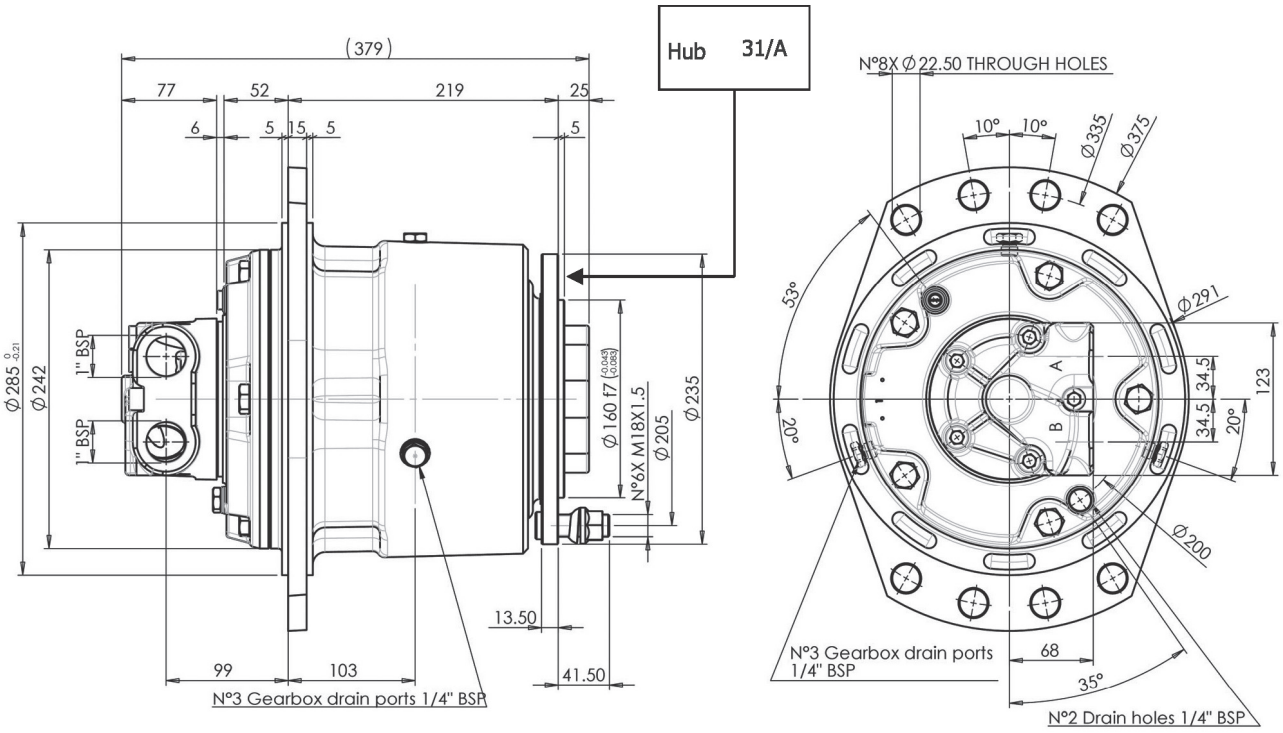
(3) For higher peak power please contact our Tech. Dept.

(4) For higher continuous and maximum speed please contact our Tech. Dept.

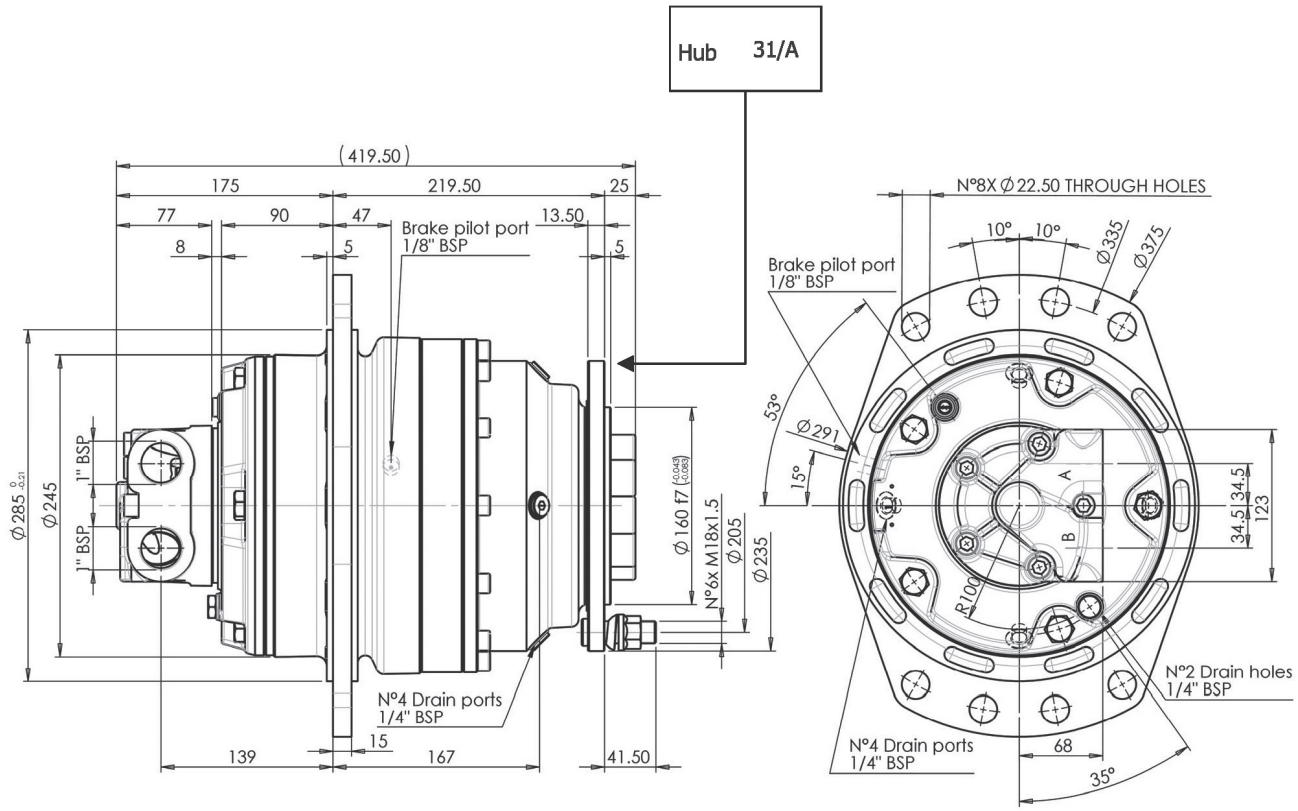
(5) If the brake is engaged for a long time, the braking torque could increase considerably.
The brake requires to be periodically engaged and disengaged to mantain the desired performance.

## WHEEL MOTORS WITH GEARBOX K Series

## GK3A - INSTALLATION DRAWINGS




## GFK3AR - INSTALLATION DRAWINGS



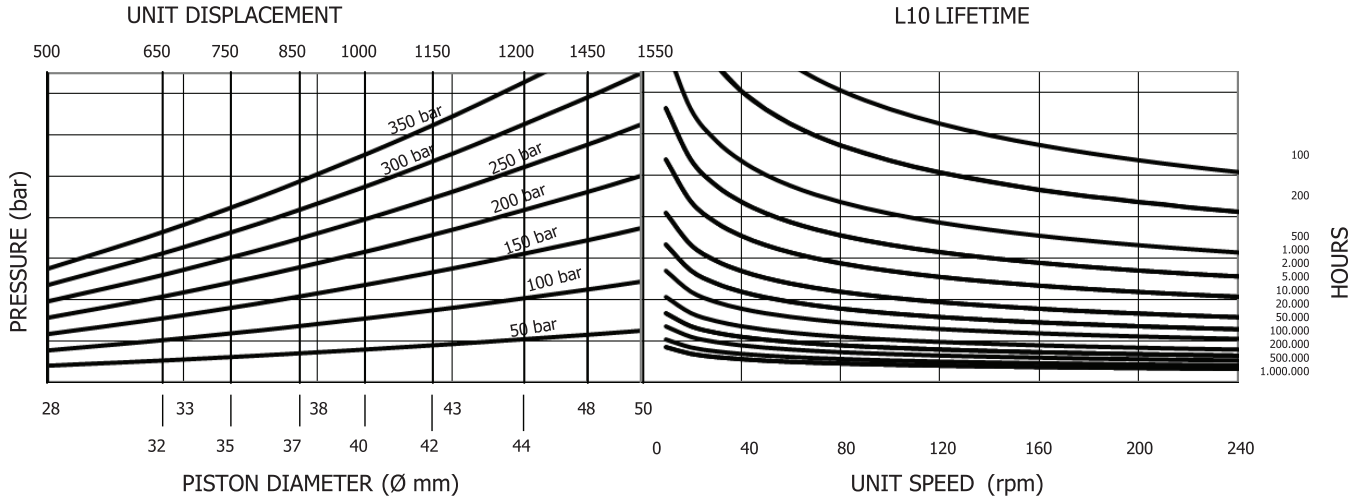
## WHEEL MOTORS WITH GEARBOX K Series

## GK3A
## GFK3AR

## BEARING LIFETIME GRAPHS

Bearing lifetime has been estimated according to L10 (according to ISO 281:1990).

Please contact our Technical Department for other graphs relating to this product.



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## WHEEL MOTORS WITH GEARBOX K Series

**BDK3A** (dual displacement without brake)
**BDFK3AR** (dual displacement with brake)

**BVK3A** (variable displacement without brake)
**BVFK3AR** (variable displacement with brake)

## TECHNICAL SPECIFICATION

| | | 500 | 250 | 850 | 215 | 875 | 400 | 1250 | 300 | 1250 | 625 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Equivalent displacement (1) | [cc/rev] | 510 | 270 | 874 | 215 | 880 | 380 | 1216 | 304 | 1216 | 608 |
| Reduction ratio | | 5:1 | | | | | | | | | |
| Bore | [mm] | 37 | 37 | 37 | 37 | 44 | 44 | 44 | 44 | 44 | 44 |
| Stroke | [mm] | 19 | 10 | 32 | 8 | 23 | 10 | 32 | 8 | 32 | 16 |
| Specific torque | [Nm/bar] | 8,12 | 4,28 | 13,50 | 3,42 | 13,90 | 6,04 | 19,36 | 4,84 | 19,36 | 9,68 |
| Continuous pressure | [bar] | 250 | 250 | 250 | 250 | 250 | 250 | 250 | 250 | 250 | 250 |
| Peak pressure (2) | [bar] | 425 | 425 | 400 | 400 | 400 | 400 | 350 | 350 | 350 | 350 |
| Peak power (3) | [kW] | 55 | 42 | 55 | 42 | 55 | 42 | 55 | 42 | 55 | 42 |
| Continuous speed (4) | [rpm] | 100 | 300 | 100 | 300 | 100 | 300 | 100 | 300 | 100 | 300 |
| Maximum speed (4) | [rpm] | 300 | 300 | 200 | 300 | 200 | 300 | 170 | 300 | 170 | 300 |

| | | | | | | |
|---|---|---|---|---|---|---|
| Approximative weight | [kg] | 75 | unit | Type of brake | | Negative disc brake |
| Maximum casing pressure | [bar] | 1 | continuous | Admissible temperatures | [°C] | -20 minimum |
| | | 5 | peak | | | +80 maximum |
| Motor oil capacity | [l] | 1,5 | | Static braking torque (5) | [Nm] | 8200 |
| Gearbox oil capacity | [l] | 1,7 | | Minimum brake pilot pressure | [bar] | 20 |
| Brake pilot volume | [cm³] | 3,9 | | Maximum brake pilot pressure | [bar] | 60 |
| Volume pilot change displacement | [cm³] | 2,12 | | Pilot pressure change displacement | [bar] | 25 minimum |
| | | | | | | 35 maximum |
| Bolt torque setting | [Nm] | 767,0 | coarse 799,0 fine | Suggested bolt type | | M22 12.9 |
| | | 958,0 | 1008,0 | | | |

NOTES

(1) Equivalent displacement = motor displacement x reduction ratio of gearbox (5 :1)

(2) For higher peak pressure please contact our Tech. Dept.

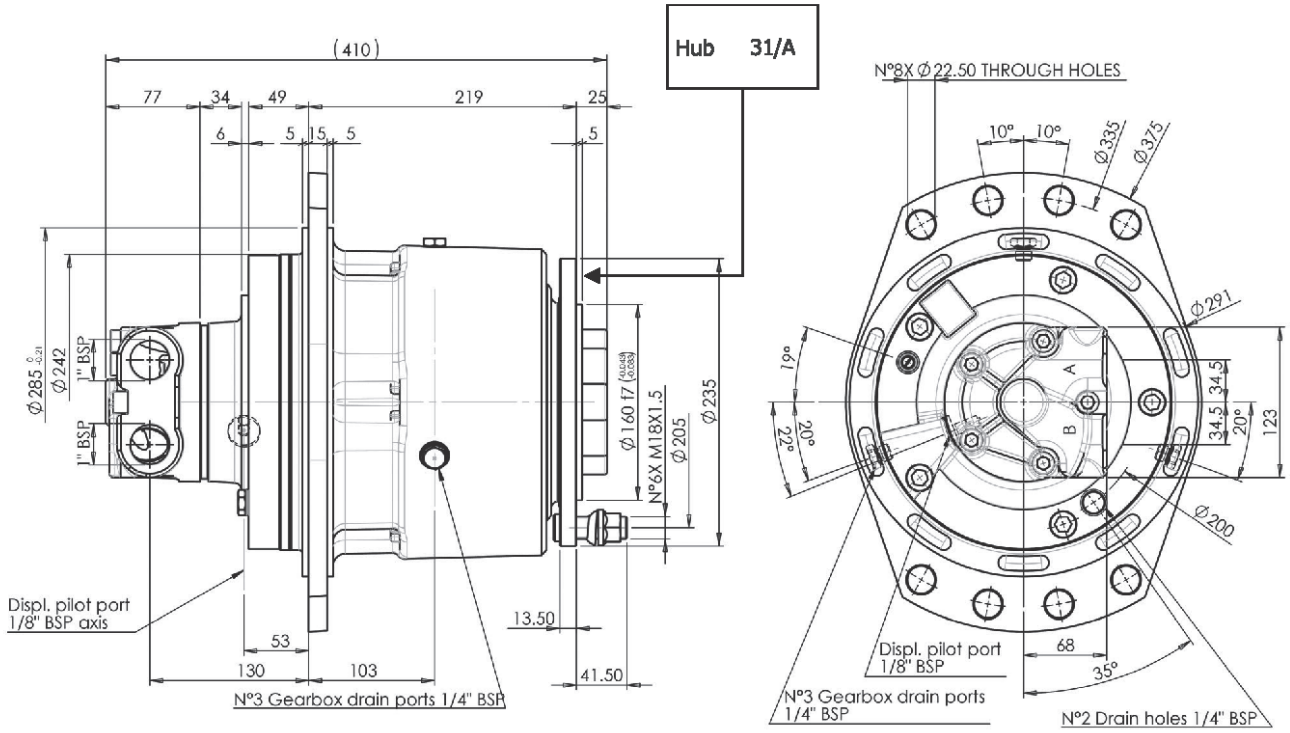
(3) For higher peak power please contact our Tech. Dept.

(4) For higher continuous and maximum speed please contact our Tech. Dept.

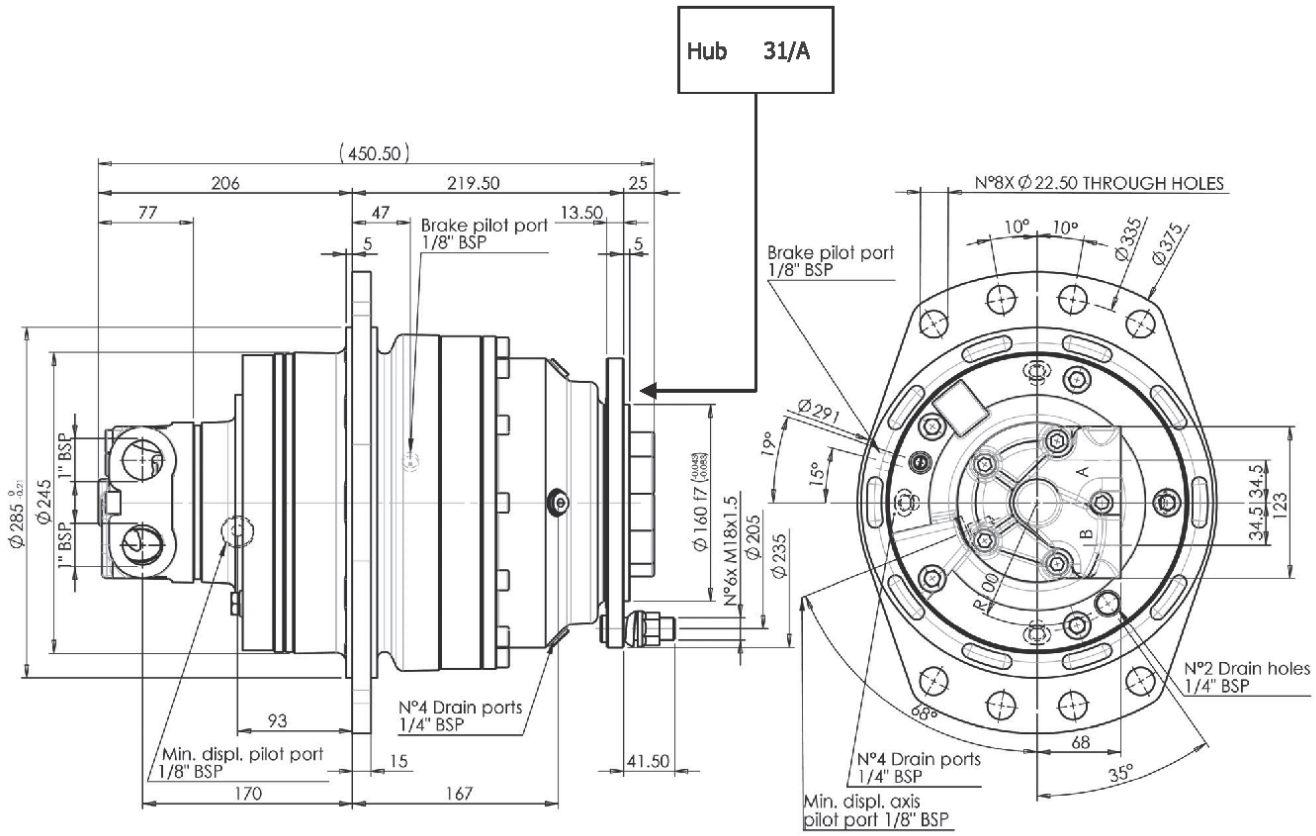
(5) If the brake is engaged for a long time, the braking torque could increase considerably.
The brake requires to be periodically engaged and disengaged to mantain the desired performance.

## WHEEL MOTORS WITH GEARBOX K Series

## BDK3A - INSTALLATION DRAWINGS

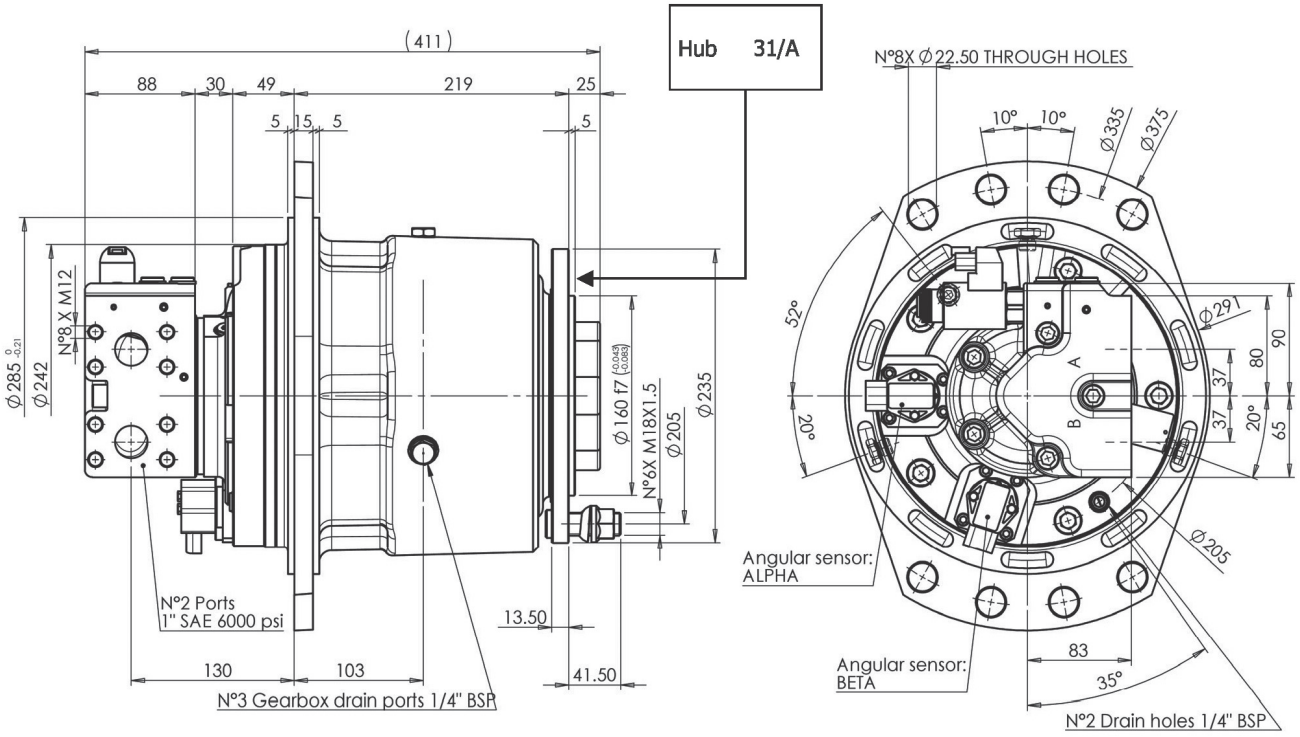



## BDFK3AR - INSTALLATION DRAWINGS

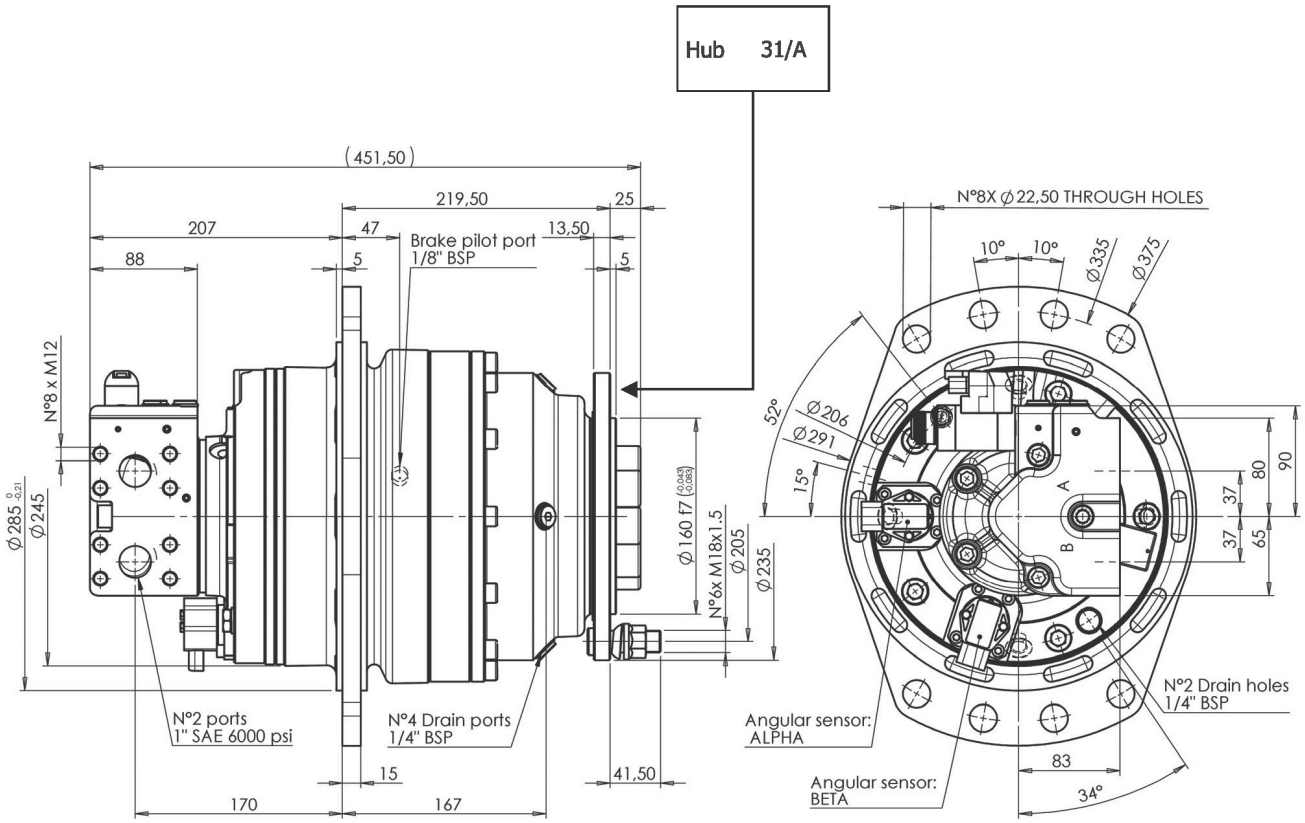


## WHEEL MOTORS WITH GEARBOX K Series

## BVK3A - INSTALLATION DRAWINGS




## BVFK3AR - INSTALLATION DRAWINGS



## WHEEL MOTORS WITH GEARBOX K Series

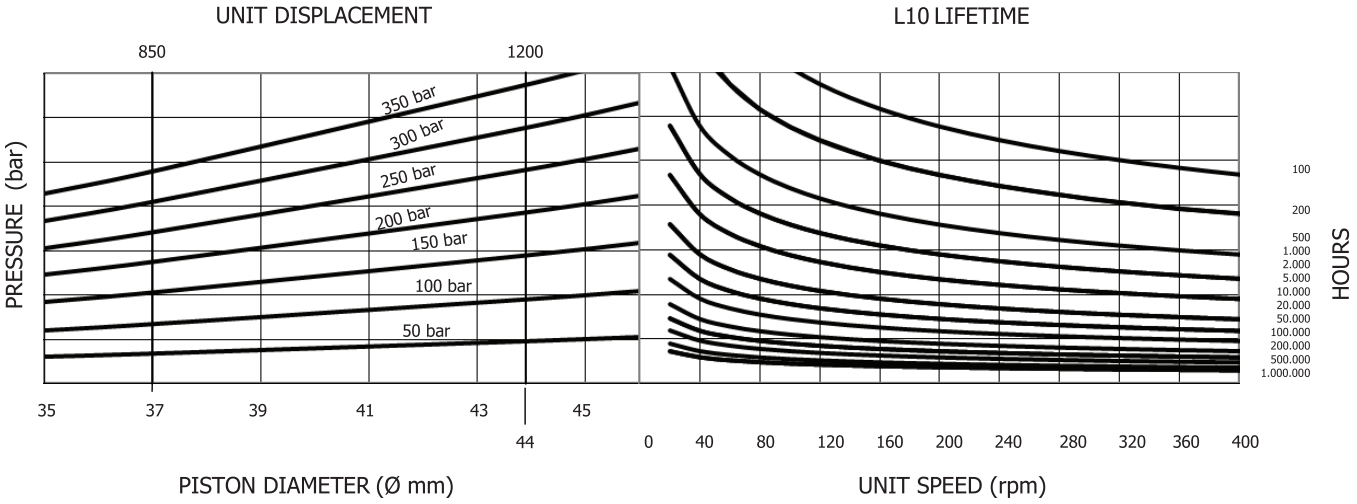
## BDK3A - BDFK3AR
## BVKA3 - BVFK3AR

## BEARING LIFETIME GRAPHS

Bearing lifetime has been estimated according to L10 (according to ISO 281:1990).

The following graph has been plotted using the stroke of 32 mm.

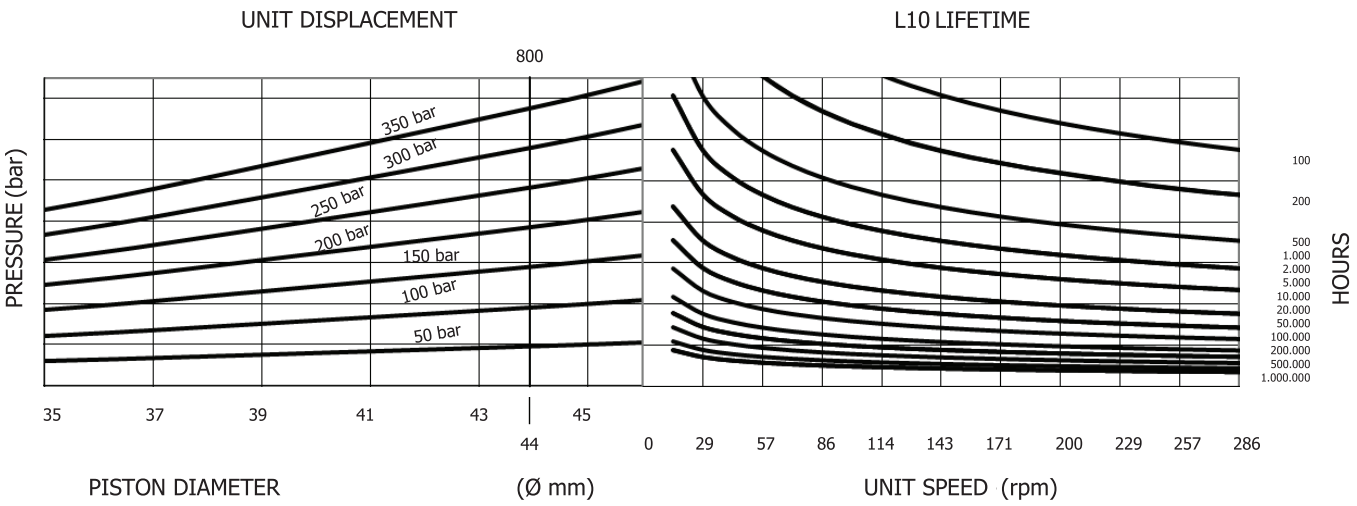
Please contact our Technical Department for other graphs relating to this product.




Bearing lifetime has been estimated according to L10 (according to ISO 281:1990).

The following graph has been plotted using the stroke of 16 mm.

Please contact our Technical Department for other graphs relating to this product.



## WHEEL MOTORS WITH GEARBOX K Series

**GK4** (fixed displacement without brake)
**GFK4** (fixed displacement with brake)

## TECHNICAL SPECIFICATION

| | | 1120 | 1400 | 1700 | 1950 | 2400 | 2800 | 3200 | 3500 |
|---|---|---|---|---|---|---|---|---|---|
| Equivalent displacement (1) | [cc/rev] | 1078 | 1407 | 1703 | 1943 | 2379 | 2759 | 3167 | 3491 |
| Reduction ratio | | 5,6:1 | | | | | | | |
| Bore | [mm] | 35 | 40 | 44 | 47 | 52 | 56 | 60 | 63 |
| Stroke | [mm] | 40 | | | | | | | |
| Specific torque | [Nm/bar] | 17,15 | 22,40 | 27,10 | 30,93 | 37,86 | 43,90 | 50,40 | 55,57 |
| Continuous pressure | [bar] | 250 | 250 | 250 | 250 | 250 | 250 | 250 | 250 |
| Peak pressure (5) | [bar] | 425 | 425 | 400 | 375 | 350 | 350 | 300 | 280 |
| Peak power (2) | [kW] | 59 | | | | | | | |
| Continuous speed (6) | [rpm] | 125 | 125 | 89 | 89 | 80 | 80 | 80 | 71 |
| Maximum speed (6) | [rpm] | 185 | 175 | 135 | 135 | 134 | 125 | 125 | 115 |

| | | | | | |
|---|---|---|---|---|---|
| Approximative weight | [kg] | 166 unit | Gearbox oil capacity | [l] | 3,5 |
| Maximum casing pressure | [bar] | 1 continuous<br>5 peak | Motor oil capacity (3) | [l] | 2 |
| Admissible temperatures | [°C] | -20 minimum<br>+80 maximum | Static braking torque (4) | [Nm] | 18000 |
| Type of brake | | Negative disc brake | Minimum brake pilot pressure | [bar] | 20 |
| Brake pilot volume | [cm³] | 37,5 | Maximum brake pilot pressure | [bar] | 50 |
| Bolt torque setting | [Nm] | 767,0 coarse 799,0 fine<br>958,0 1008,0 | Suggested bolt type | M22 | 12.9 |

NOTES

(1) Equivalent displacement = motor displacement x reduction ratio of gearbox (5,6 :1)

(2) For higher peak power please contact our Tech. Dept.

(3) The motor, the brake and the gearbox can either share the lubricating oil or be separated.
The standard is with separated oil and has a 0,3 bar safety valve.

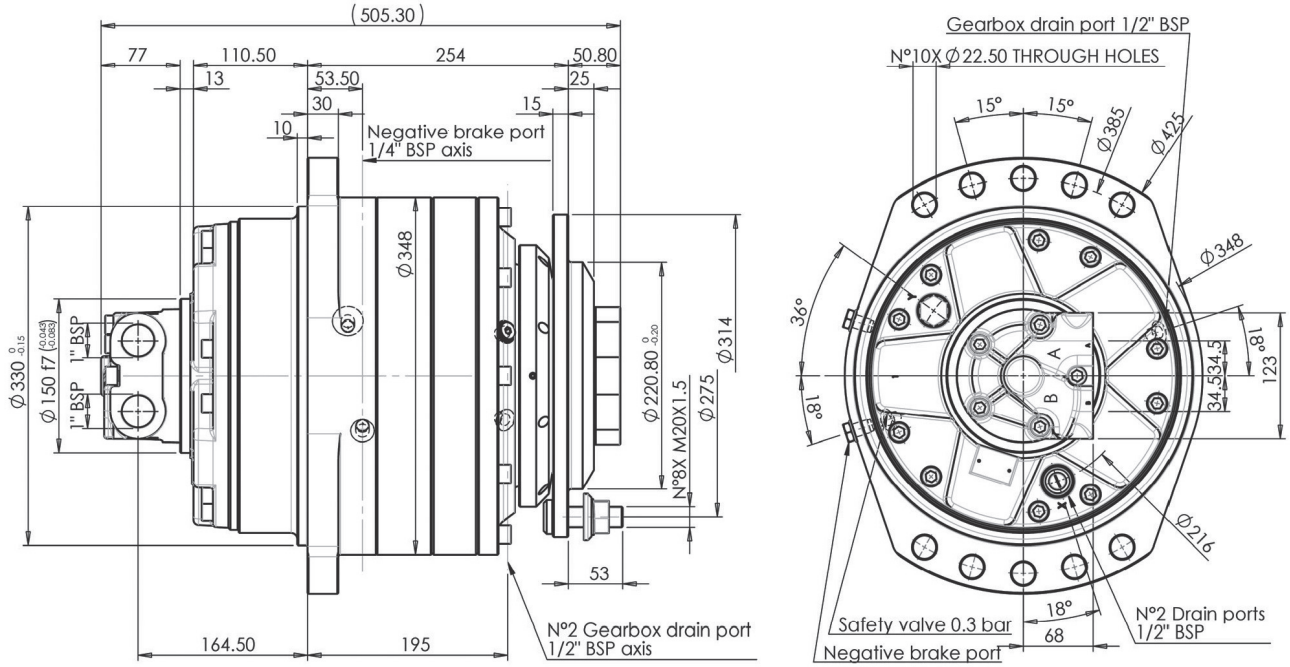
(4) If the brake is engaged for a long time, the braking torque could increase considerably.
The brake requires to be periodically engaged and disengaged to mantain the desired performance.

(5) For higher peak pressure please contact our Tech. Dept.

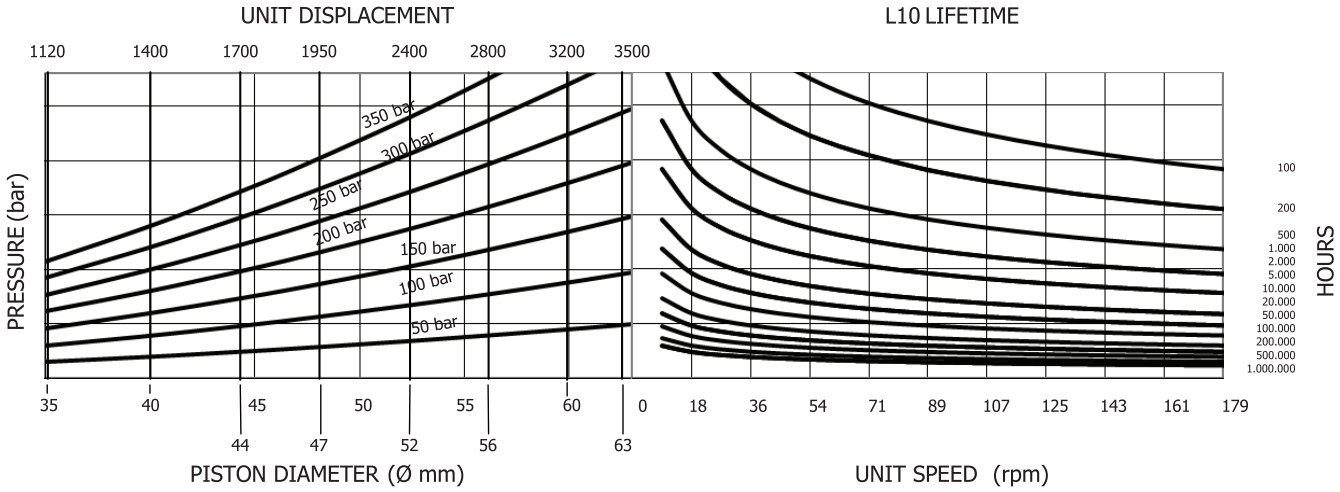
(6) For higher continuous and maximum speed please contact our Tech. Dept. Maximum speed can reach up to 250 rpm.

## WHEEL MOTORS WITH GEARBOX K Series

## GK4 - GFK4 - INSTALLATION DRAWINGS




## GK4 - GFK4 - BEARING LIFETIME GRAPHS



## WHEEL MOTORS WITH GEARBOX K Series

**BDK4** (dual displacement without brake)
**BDFK4** (dual displacement with brake)

**BVK4** (variable displacement without brake)
**BVFK4** (variable displacement with brake)

## TECHNICAL SPECIFICATION

| | | 1400 | 350 | 1400 | 700 | 1950 | 500 | 1950 | 1000 | 2800 | 700 | 2800 | 1400 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Equivalent displacement (1) | [cc/rev] | 1407 | 352 | 1407 | 705 | 1943 | 487 | 1943 | 972 | 2759 | 688 | 2759 | 1377 |
| Reduction ratio | | 5,6:1 | | | | | | | | | | | |
| Bore | [mm] | 40 | 40 | 40 | 40 | 47 | 47 | 47 | 47 | 56 | 56 | 56 | 56 |
| Stroke | [mm] | 40 | 10 | 40 | 20 | 40 | 10 | 40 | 20 | 40 | 10 | 40 | 20 |
| Specific torque | [Nm/bar] | 22,40 | 5,60 | 22,40 | 11,20 | 30,93 | 7,73 | 30,80 | 15,40 | 43,90 | 10,98 | 43,90 | 21,95 |
| Continuous pressure | [bar] | 250 | | | | | | | | | | | |
| Peak pressure (2) | [bar] | 425 | 425 | 425 | 425 | 375 | 375 | 375 | 375 | 350 | 350 | 350 | 350 |
| Peak power (3) | [kW] | 75 | 65 | 75 | 65 | 75 | 65 | 75 | 65 | 75 | 65 | 75 | 65 |
| Continuous speed (4) | [rpm] | 125 | 260 | 125 | 260 | 125 | 260 | 125 | 260 | 70 | 260 | 70 | 140 |
| Maximum speed (4) | [rpm] | 175 | 300 | 175 | 300 | 175 | 300 | 175 | 300 | 140 | 300 | 140 | 285 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Approximative weight | [kg] | 166 | unit | Gearbox oil capacity | [l] | 3,5 | |
| Maximum casing pressure | [bar] | 1 | continuous | Motor oil capacity (3) | [l] | 2 | |
| | | 5 | peak | | | | |
| Admissible temperatures | [°C] | -20 | minimum | Static braking torque (4) | [Nm] | 18000 | |
| | | +80 | maximum | | | | |
| Type of brake | | Negative disc brake | | Minimum brake pilot pressure | [bar] | 20 | |
| Brake pilot volume | [cm³] | 37,5 | | Maximum brake pilot pressure | [bar] | 50 | |
| Bolt torque setting | [Nm] | 767,0<br>958,0 | coarse | 799,0<br>1008,0 fine | Suggested bolt type | M22 | 12.9 |

NOTES

(1) Equivalent displacement = motor displacement x reduction ratio of gearbox (5,6 :1)

(2) For higher peak pressure please contact our Tech. Dept.

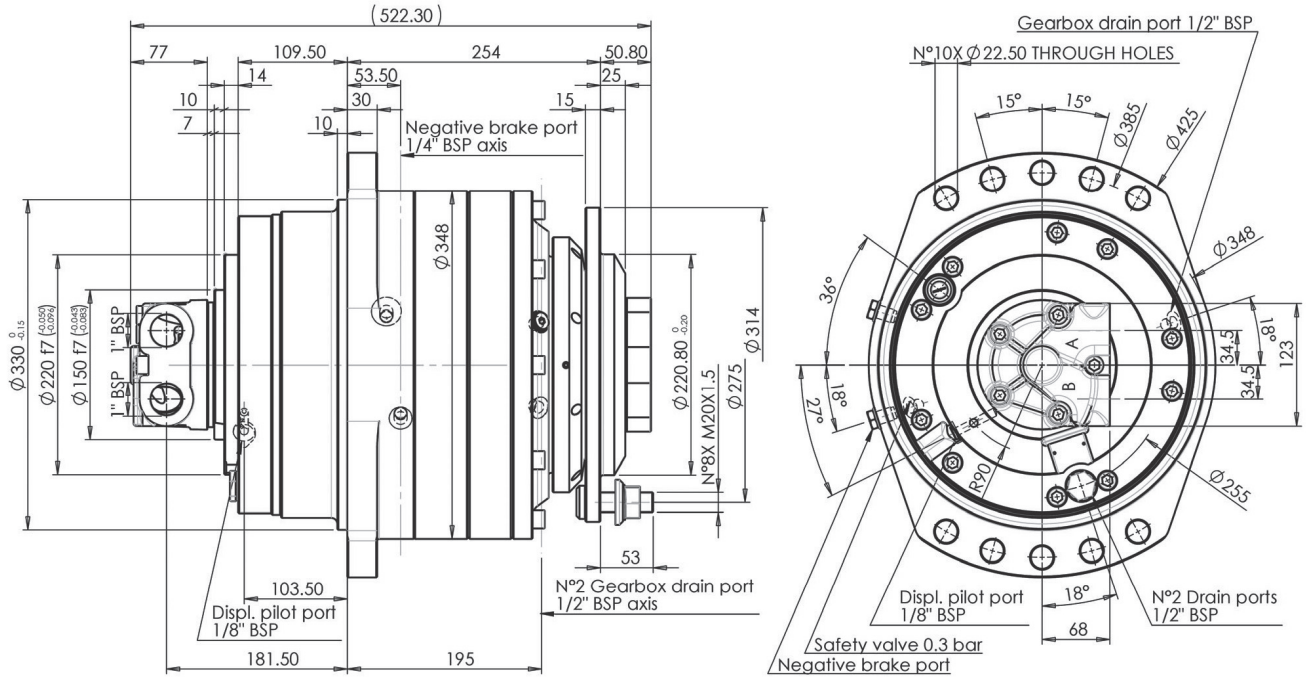
(3) For higher peak power please contact our Tech. Dept.

(4) For higher continuous and maximum speed please contact our Tech. Dept.

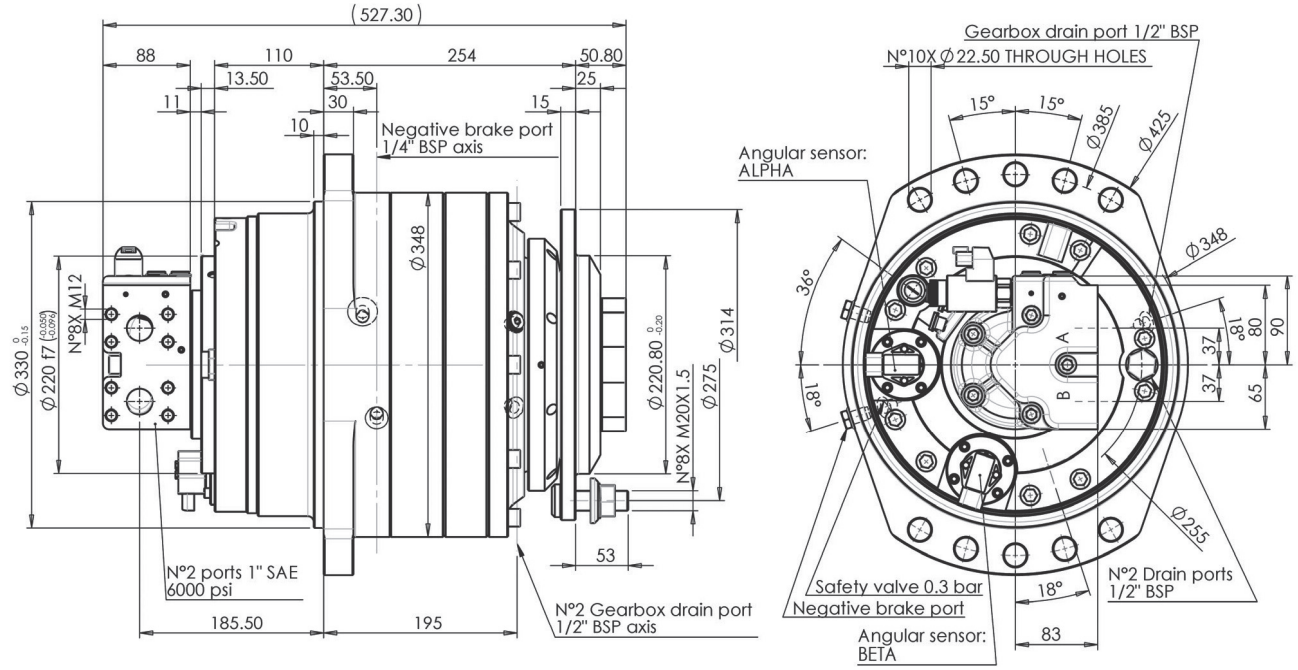
(5) If the brake is engaged for a long time, the braking torque could increase considerably.
The brake requires to be periodically engaged and disengaged to mantain the desired performance.

## WHEEL MOTORS WITH GEARBOX K Series

## BDK4 - BDFK4 - INSTALLATION DRAWINGS




## BVK4 - BVFK4 - INSTALLATION DRAWINGS

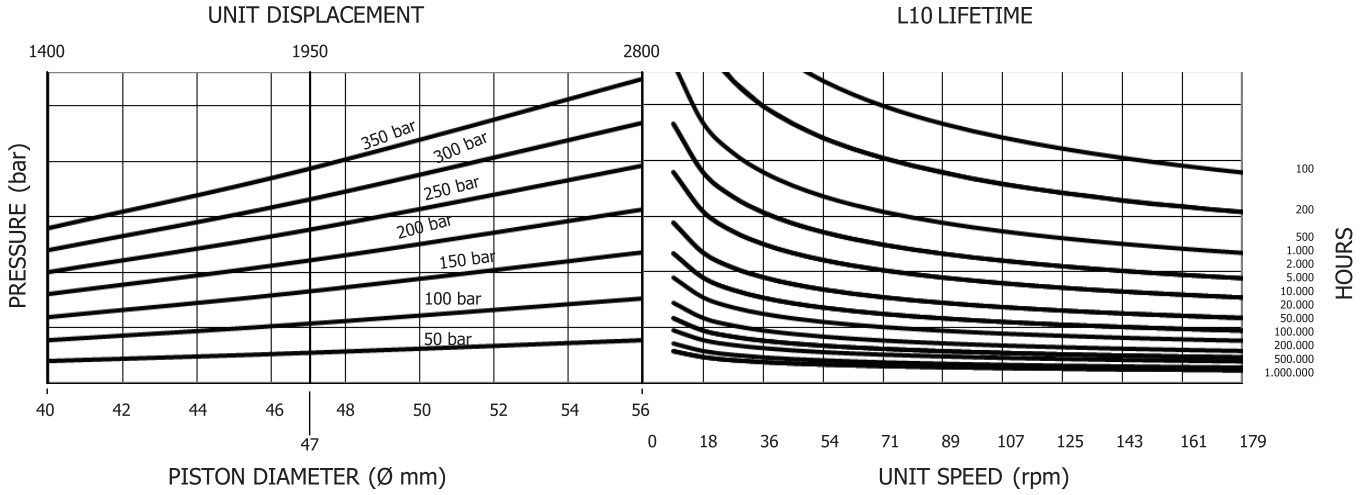


## WHEEL MOTORS WITH GEARBOX K Series

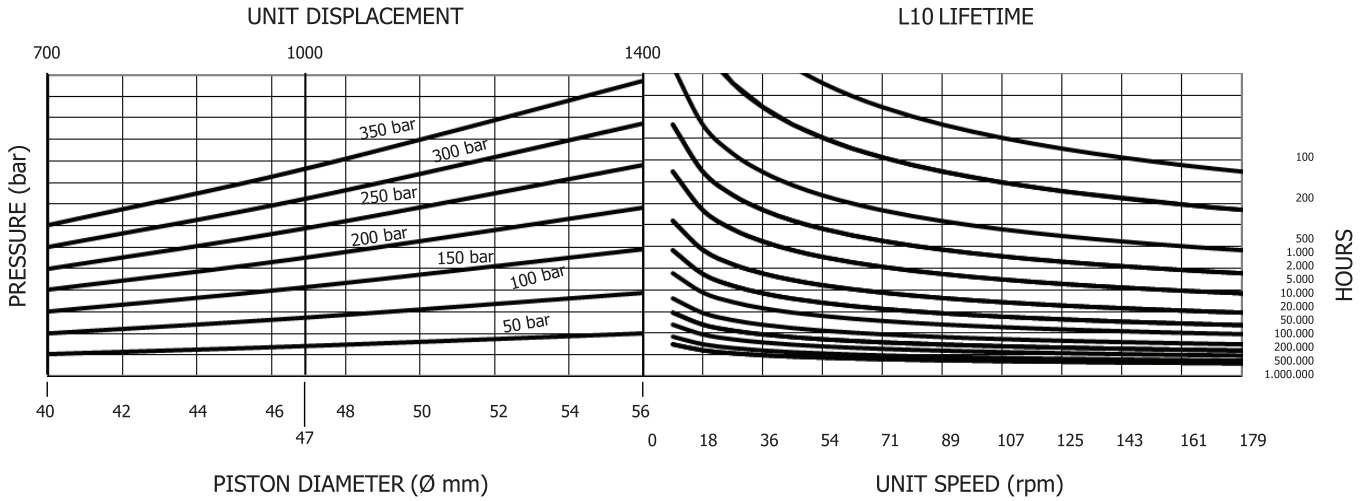
## BDK4 - BDFK4
## BVK4 - BVFK4

## BEARING LIFETIME GRAPHS

Bearing lifetime has been estimated according to L10 (according to ISO 281:1990).
The following graph has been plotted using the stroke of 40 mm.
Please contact our Technical Department for other graphs relating to this product.




Bearing lifetime has been estimated according to L10 (according to ISO 281:1990).
The following graph has been plotted using the stroke of 20 mm.
Please contact our Technical Department for other graphs relating to this product.



## WHEEL MOTORS WITH GEARBOX K Series

## ORDER CODE

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|---|
| G | + | + | K3R | + | + | + | + | D40 | + | + | + | + | + |

| | | | |
|---|---|---|---|
| 1 **Motor type** | G | = | Fixed displacement |
| | BD | = | Dual displacement |
| | BV | = | Variable displacement |
| 2 **Brake option** | No code | = | no brake |
| | F | = | brake |
| 3 **Gearbox series** | K3 | = | not available with brake option. Reduction ratio 7:1. Compact |
| | K3A | = | not available with brake option. Reduction ratio 7:1. Compact |
| | K3R | = | reduction ratio 7:1. possible interchangeability to MS11 |
| | K3AR | = | reduction ratio 5:1 possible interchangeability to MS11 |
| | K4 | = | interhangeable MS18. Reduction ratio 5,6:1 |
| 4 **Displacement** | see table | | |
| 5 **Hub options** | 31A | = | hub 31/A |
| | 31B | = | hub 31/B |
| | 31D | = | hub 31/D "kassette" |
| 6 **Options** | V | = | FKM seals |
| | I | = | breath valve |
| 7 **Lubrication options** | O | = | separated lubrication |
| | U | = | shared lubrication |
| 8 **Distributor** | see distributors section D40 standard | | |
| 9 **Direction of rotation** (viewed from the output side) with flow in port A, out in port B. | No code | = | clockwise rotation |
| | L | = | anti-clockwise rotation |
| 10 **Distributor cover orientation** | No code | = | position 1 |
| | DM2 | = | position 2 |
| | DM3 | = | position 3 |
| | DM4 | = | position 4 |
| | DM5 | = | position 5 |

Example

GFK3 700 31AU D40

(standard)

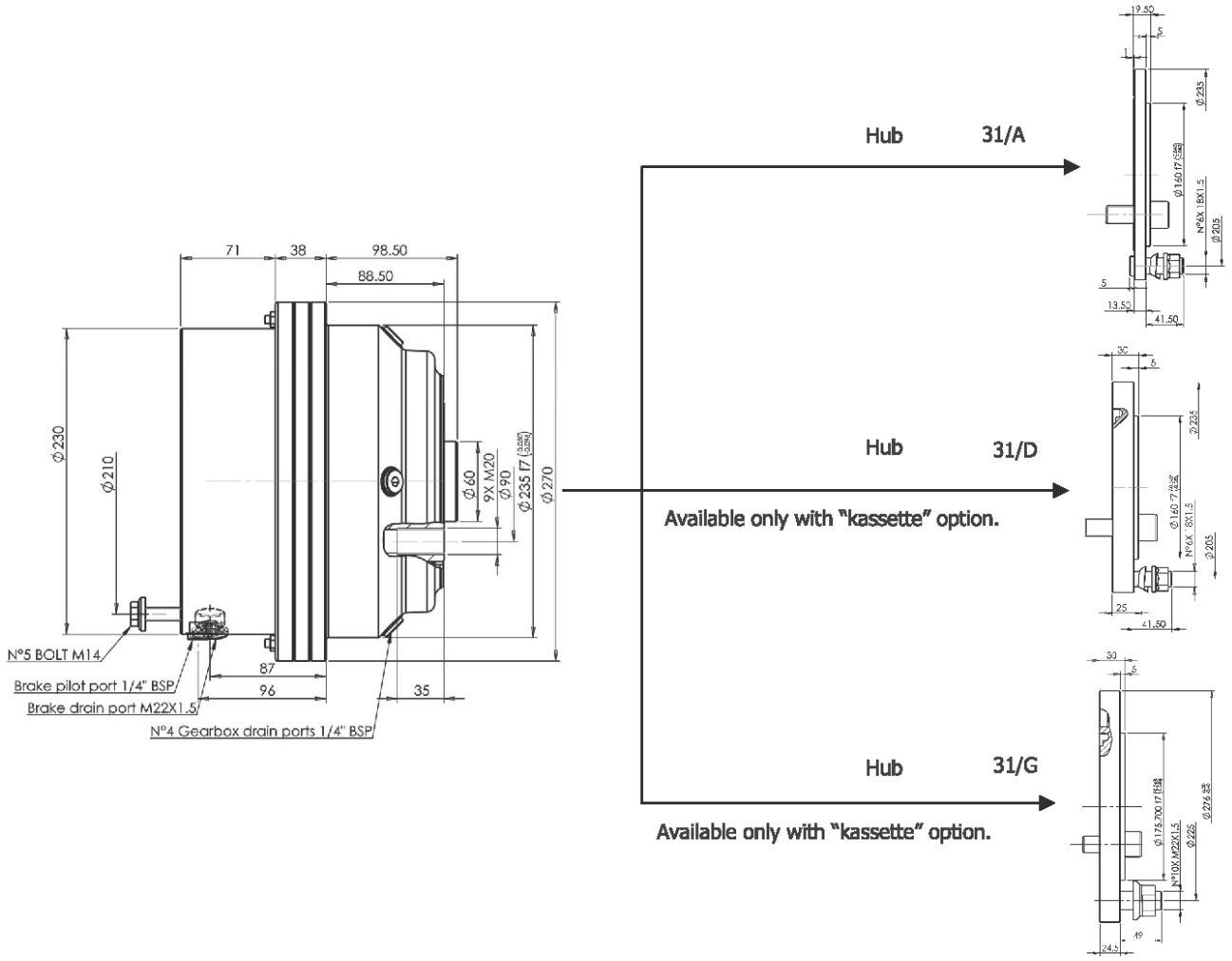
GFK3 700 31AVU D40L DM5

(options: FKM seals and anti-clockwise sense of rotation)

## WHEEL MOTORS WITH GEARBOX G3 - G3A Series

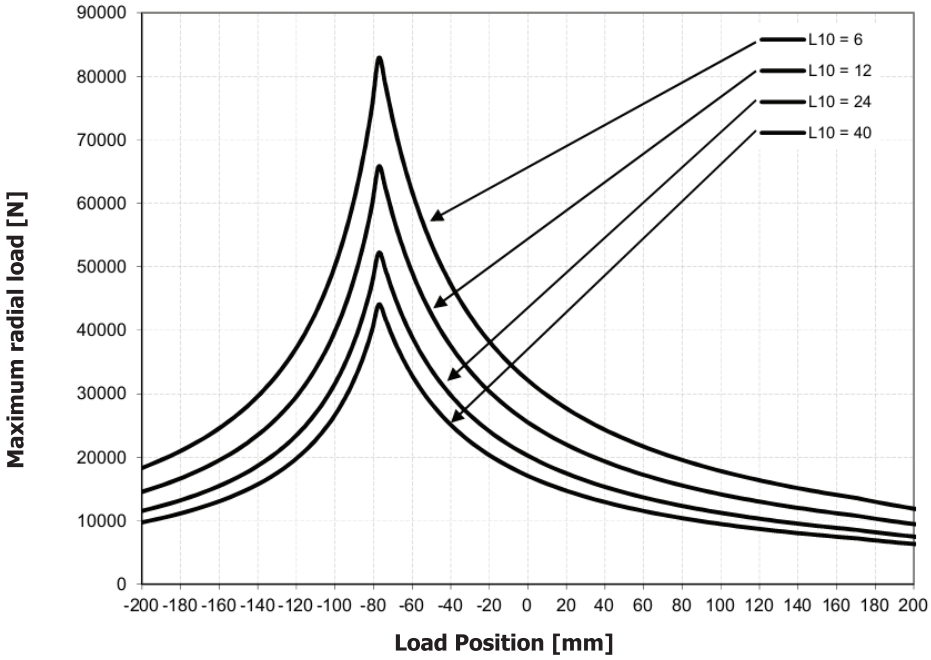
## PRODUCT OVERVIEW

| | | | G3 | G3A |
|---|---|---|---|---|
| Maximum continuous torque | [Nm] | | 3500 | 5000 |
| Peak torque | [Nm] | | 7000 | 10000 |
| Reduction ratio | | | 7:1 | 5:1 |
| Maximum braking torque | [Nm] | | 6500 | 8750 |
| Brake pilot pressure | [bar] | minimum | 18 | 15 |
| | | maximum | 60 | 60 |
| Gearbox weight | [kg] | | 47 | 75 |
| Applicable motors | | | GM05<br>GM1<br>BD1<br>BV1 | GM05<br>GM1<br>BD1<br>BV1 |

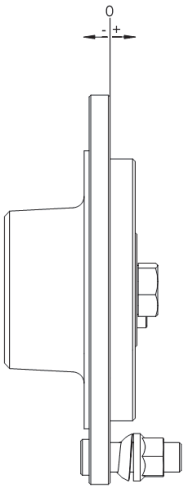


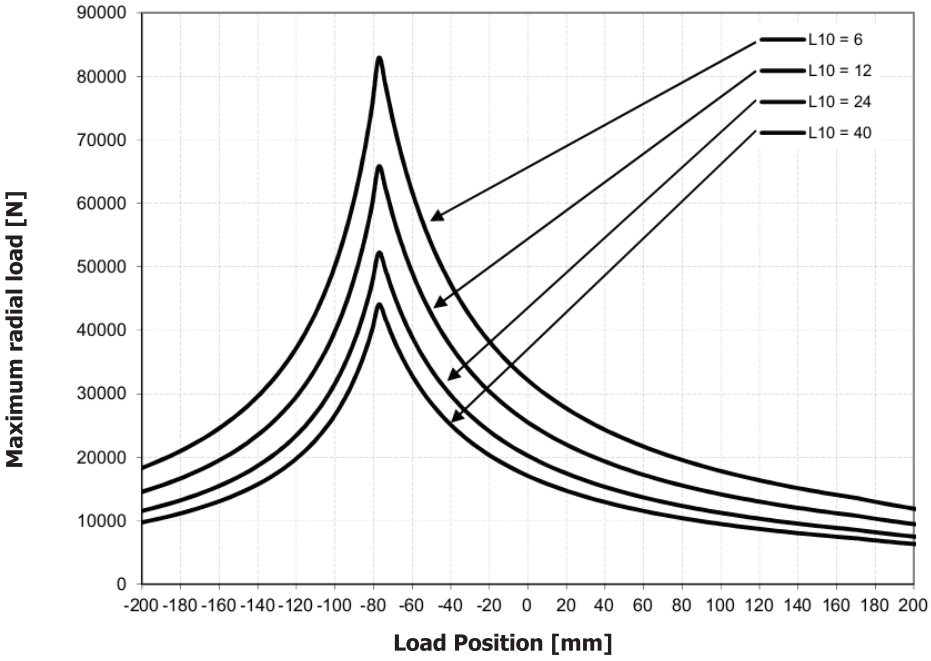
## WHEEL MOTORS WITH GEARBOX G3 - G3A Series

## LOAD POSITION GRAPH

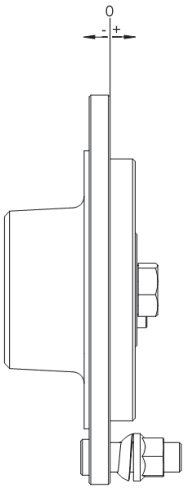



Bearing lifetime has been estimated according to $L_{10}$ (according to ISO 281:1990).




Bearing lifetime has been estimated according to $L_{10}$ (according to ISO 281:1990).



## WHEEL MOTORS WITH GEARBOX G3 - G3A Series

### GM05 + G3 (fixed displacement without brake)
### GM05 + F10L + G3 (fixed displacement with brake)

## TECHNICAL SPECIFICATION

| | | 275 | 400 | 520 | 600 | 800 | 900 | 1050 | 1150 | 1350 |
|---|---|---|---|---|---|---|---|---|---|---|
| Equivalent displacement (1) | [cc/rev] | 275 | 412 | 517 | 602 | 808 | 903 | 1056 | 1164 | 1336 |
| Reduction ratio | | | | | | 7:1 | | | | |
| Bore | [mm] | 25 | 25 | 28 | 37 | 35 | 37 | 40 | 42 | 45 |
| Stroke | [mm] | 16 | 24 | 24 | 16 | 24 | 24 | 24 | 24 | 24 |
| Specific torque | [Nm/bar] | 4,38 | 6,56 | 8,24 | 9,58 | 12,86 | 14,37 | 16,82 | 18,49 | 21,26 |
| Continuous pressure | [bar] | 250 | 250 | 250 | 250 | 250 | 250 | 210 | 190 | 165 |
| Peak pressure (2) | [bar] | 450 | 450 | 425 | 375 | 400 | 375 | 325 | 325 | 280 |
| Peak power (3) | [kW] | 20 | 20 | 33 | 33 | 33 | 33 | 33 | 33 | 33 |
| Continuous speed (4) | [rpm] | 100 | 100 | 100 | 100 | 90 | 90 | 90 | 85 | 85 |
| Maximum speed (4) | [rpm] | 140 | 140 | 140 | 140 | 125 | 125 | 125 | 110 | 110 |

| | | | | | |
|---|---|---|---|---|---|
| Approximative weight no brake | [kg] | 42 unit | Approximative weight with brake | [kg] | 56 unit |
| Maximum casing pressure | [bar] | 1 continuous<br>5 peak | Admissible temperatures | [°C] | -20 minimum<br>+80 maximum |
| Motor oil capacity | [l] | 0,8 | Type of brake | | Negative disc brake |
| Gearbox oil capacity | [l] | 1,7 | Static braking torque (5) | [Nm] | 6500 |
| Brake oil capacity | [l] | 0,45 | Minimum brake pilot pressure | [bar] | 35 |
| Brake pilot volume | [cm³] | 65,1 | Maximum brake pilot pressure | [bar] | 60 |
| Bolt torque setting | [Nm] | 68,0 coarse 71,0 fine<br>84,0 89,0 | Suggested bolt type | | M10 12.9 |

NOTES

(1) Equivalent displacement = motor displacement x reduction ratio of gearbox (7 :1)

(2) For higher peak pressure please contact our Tech. Dept.

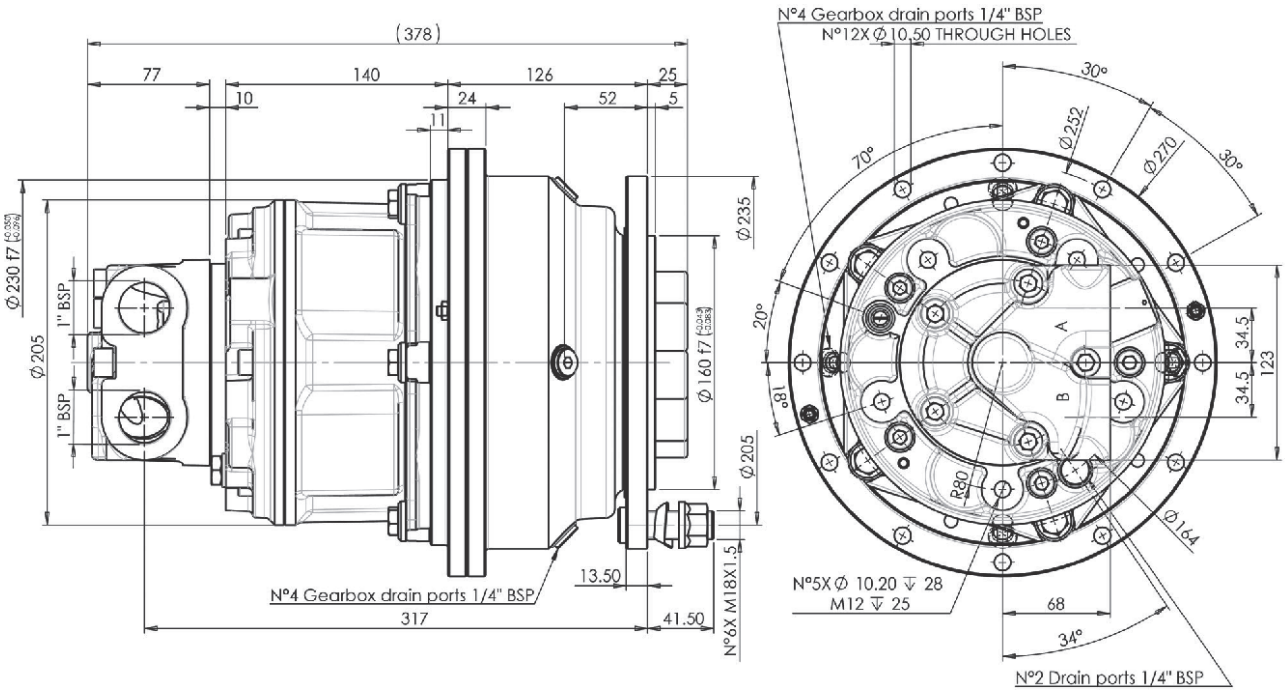
(3) For higher peak power please contact our Tech. Dept.

(4) For higher continuous and maximum speed please contact our Tech. Dept.

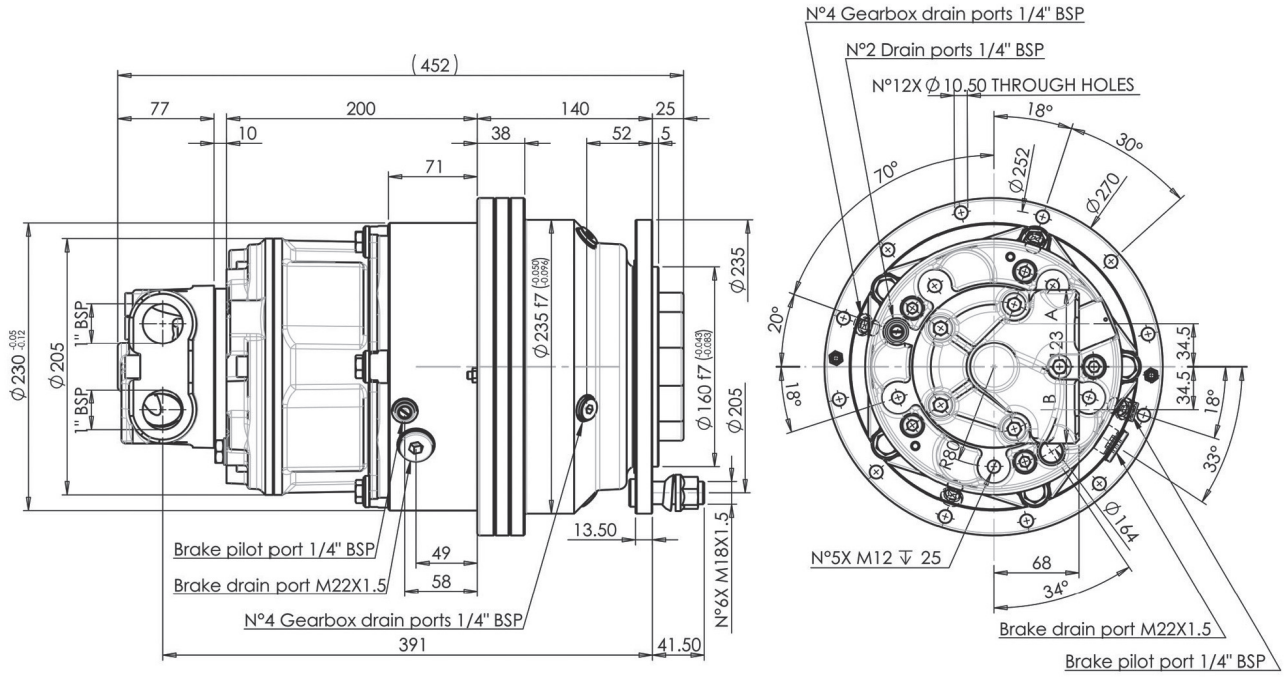
(5) If the brake is engaged for a long time, the braking torque could increase considerably.
The brake requires to be periodically engaged and disengaged to mantain the desired performance.

## WHEEL MOTORS WITH GEARBOX G3 - G3A Series

## GM05 + G3 - INSTALLATION DRAWINGS




## GM05 + F10L + G3 - INSTALLATION DRAWINGS

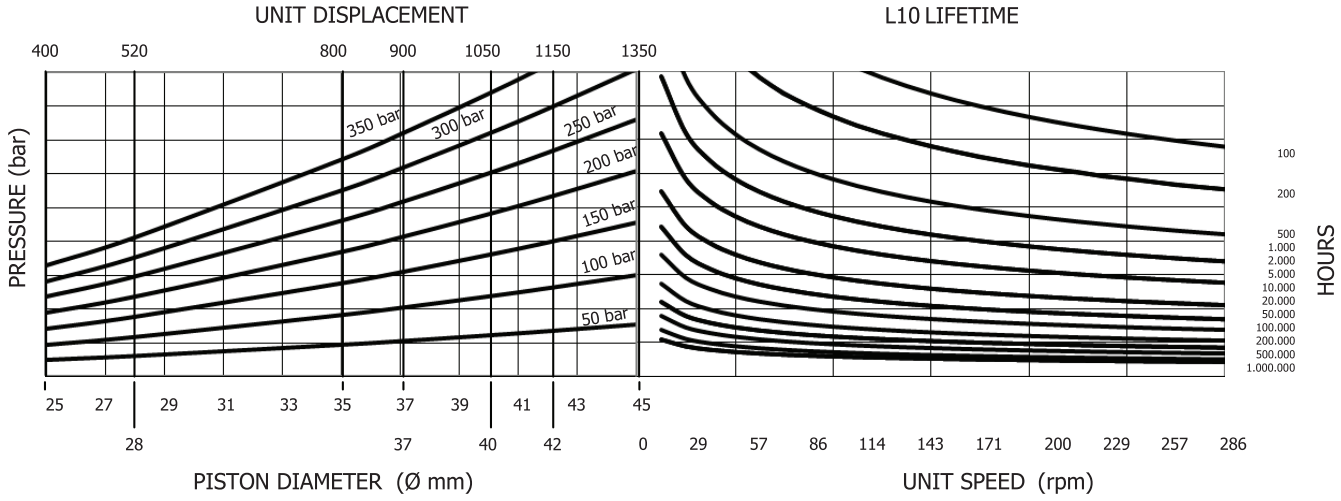


## WHEEL MOTORS WITH GEARBOX G3 - G3A Series

## GM05 + G3
## GM05 + F10L + G3

## BEARING LIFETIME GRAPHS

Bearing lifetime has been estimated according to L10 (according to ISO 281:1990).
Please contact our Technical Department for other graphs relating to this product.



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## WHEEL MOTORS WITH GEARBOX G3 - G3A Series

### GM1 + G3 (fixed displacement without brake)
### GM1 + F10L + G3 (fixed displacement with brake)

## TECHNICAL SPECIFICATION

| | | 700 | 900 | 1000 | 1200 | 1400 | 1600 | 1700 | 2000 | 2200 |
|---|---|---|---|---|---|---|---|---|---|---|
| Equivalent displacement (1) | [cc/rev] | 690 | 901 | 1078 | 1204 | 1407 | 1552 | 1703 | 2027 | 2199 |
| Reduction ratio | | | | | | 7:1 | | | | |
| Bore | [mm] | 28 | 32 | 35 | 37 | 40 | 42 | 44 | 48 | 50 |
| Stroke | [mm] | | | | | 32 | | | | |
| Specific torque | [Nm/bar] | 10,98 | 14,34 | 17,15 | 19,17 | 22,40 | 24,70 | 27,10 | 32,26 | 35,00 |
| Continuous pressure | [bar] | 250 | 245 | 200 | 180 | 155 | 140 | 130 | 105 | 100 |
| Peak pressure (2) | [bar] | 425 | 400 | 400 | 365 | 310 | 280 | 255 | 215 | 200 |
| Peak power (3) | [kW] | | | | | 48 | | | | |
| Continuous speed (4) | [rpm] | 78 | 78 | 78 | 78 | 78 | 78 | 64 | 50 | 50 |
| Maximum speed (4) | [rpm] | 150 | 150 | 150 | 130 | 103 | 100 | 100 | 100 | 90 |

| | | | | | |
|---|---|---|---|---|---|
| Approximative weight no brake | [kg] | 70 unit | Approximative weight with brake | [kg] | 95 unit |
| Maximum casing pressure | [bar] | 1 continuous<br>5 peak | Admissible temperatures | [°C] | -20 minimum<br>+80 maximum |
| Motor oil capacity | [l] | 1 | Type of brake | | Negative disc brake |
| Gearbox oil capacity | [l] | 1,7 | Static braking torque (5) | [Nm] | 6500 |
| Brake oil capacity | [l] | 0,45 | Minimum brake pilot pressure | [bar] | 20 |
| Brake pilot volume | [cm³] | 65,1 | Maximum brake pilot pressure | [bar] | 60 |
| Bolt torque setting | [Nm] | 68,0 coarse 84,0 / 71,0 fine 89,0 | Suggested bolt type | | M10 12.9 |

NOTES

(1) Equivalent displacement = motor displacement x reduction ratio of gearbox (7 :1)

(2) For higher peak pressure please contact our Tech. Dept.

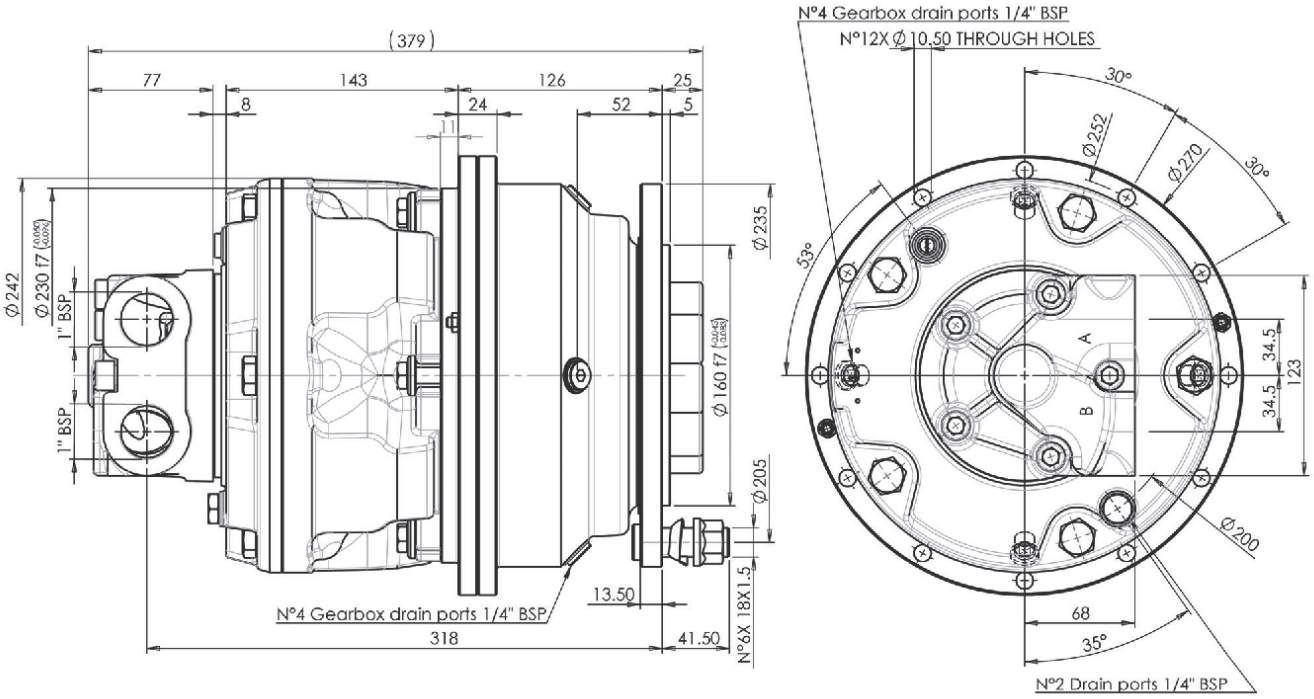
(3) For higher peak power please contact our Tech. Dept.

(4) For higher continuous and maximum speed please contact our Tech. Dept.

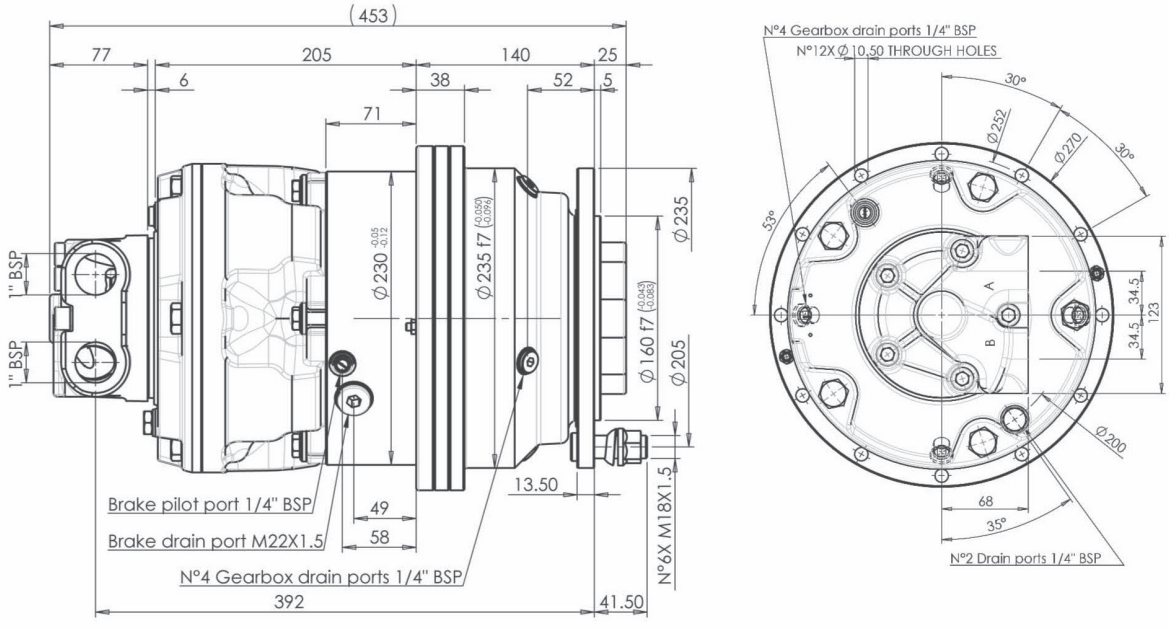
(5) If the brake is engaged for a long time, the braking torque could increase considerably.
The brake requires to be periodically engaged and disengaged to mantain the desired performance.

## WHEEL MOTORS WITH GEARBOX G3 - G3A Series

## GM1 + G3 - INSTALLATION DRAWINGS




## GM1 + F10L + G3 - INSTALLATION DRAWINGS

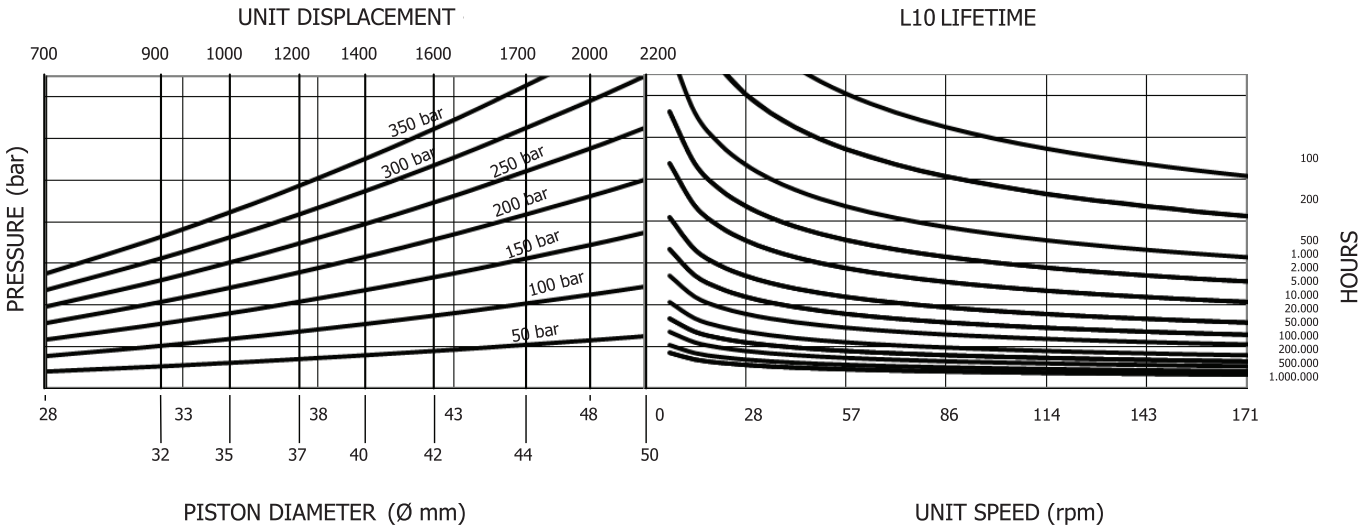


## WHEEL MOTORS WITH GEARBOX G3 - G3A Series

## GM1 + G3
## GM1 + F10L + G3

## BEARING LIFETIME GRAPHS

Bearing lifetime has been estimated according to L10 (according to ISO 281:1990).
Please contact our Technical Department for other graphs relating to this product.



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## WHEEL MOTORS WITH GEARBOX G3 - G3A Series

**BD1 + G3** (dual displacement without brake)
**BD1 + F10L + G3** (dual displacement with brake)

**BV1 + G3** (variable displacement without brake)
**BV1 + F10L + G3** (variable displacement with brake)

## TECHNICAL SPECIFICATION

| | | 700 | 375 | 1200 | 300 | 1200 | 550 | 1700 | 425 | 1700 | 850 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Equivalent displacement (1) | [cc/rev] | 714 | 378 | 1204 | 301 | 1232 | 532 | 1701 | 427 | 1701 | 851 |
| Reduction ratio | | 7:1 | | | | | | | | | |
| Bore | [mm] | 37 | 37 | 37 | 37 | 44 | 44 | 44 | 44 | 44 | 44 |
| Stroke | [mm] | 19 | 10 | 32 | 8 | 23 | 10 | 32 | 8 | 32 | 16 |
| Specific torque | [Nm/bar] | 11,40 | 6,30 | 19,20 | 4,80 | 19,55 | 8,45 | 27,07 | 6,79 | 27,30 | 13,51 |
| Continuous pressure | [bar] | 300 | 300 | 185 | 300 | 180 | 300 | 125 | 300 | 125 | 250 |
| Peak pressure (2) | [bar] | 425 | 425 | 370 | 400 | 355 | 400 | 250 | 375 | 250 | 375 |
| Peak power (3) | [kW] | 50 | 42 | 50 | 42 | 50 | 42 | 50 | 42 | 50 | 42 |
| Continuous speed (4) | [rpm] | 70 | 200 | 70 | 200 | 70 | 200 | 70 | 200 | 70 | 200 |
| Maximum speed (4) | [rpm] | 200 | 200 | 140 | 200 | 140 | 200 | 120 | 200 | 120 | 200 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Approximative weight no brake | [kg] | 70 | unit | Approximative weight with brake | [kg] | 95 | unit |
| Maximum casing pressure | [bar] | 1 continuous / 5 peak | | Admissible temperatures | [°C] | -20 minimum / +80 maximum | |
| Motor oil capacity | [l] | 1,5 | | Type of brake | | Negative disc brake | |
| Gearbox oil capacity | [l] | 1,7 | | Static braking torque (5) | [Nm] | 6500 | |
| Brake oil capacity | [l] | 0,45 | | Minimum brake pilot pressure | [bar] | 20 | |
| Brake pilot volume | [cm³] | 65,1 | | Maximum brake pilot pressure | [bar] | 60 | |
| Bolt torque setting | [Nm] | 68,0 / 84,0 coarse | 71,0 / 89,0 fine | Suggested bolt type | | M10 | 12.9 |

NOTES

(1) Equivalent displacement = motor displacement x reduction ratio of gearbox (7 :1)

(2) For higher peak pressure please contact our Tech. Dept.

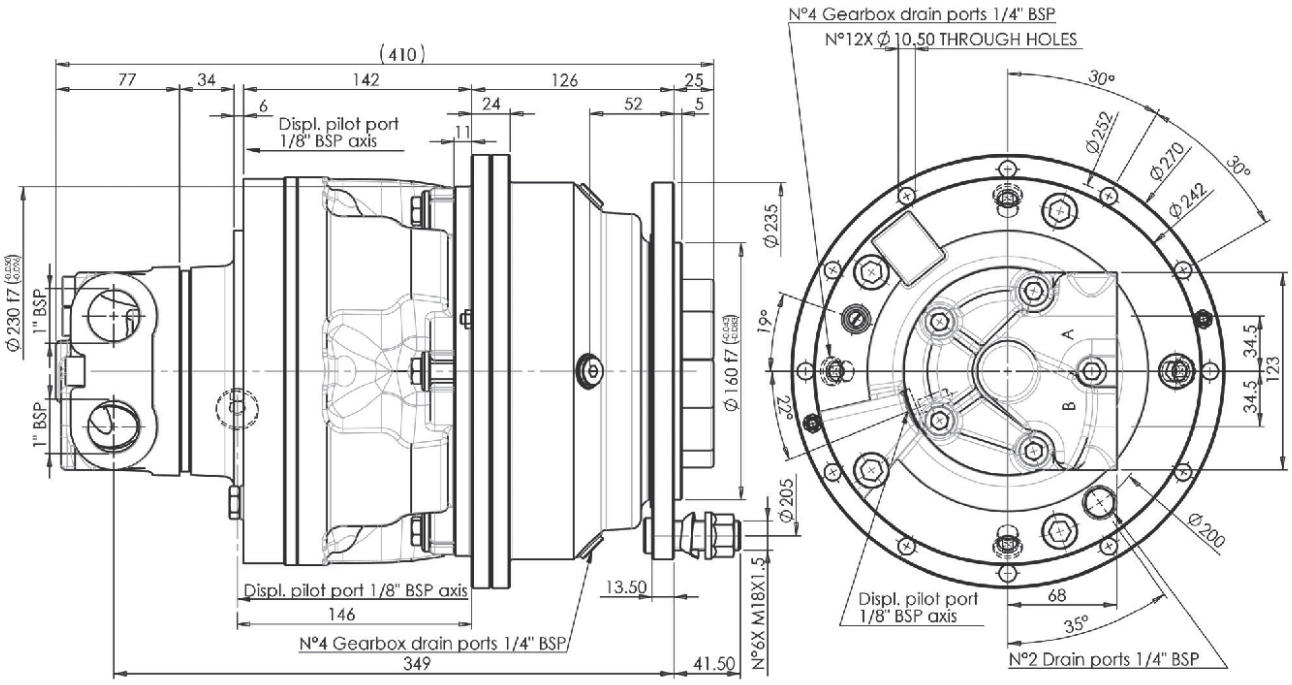
(3) For higher peak power please contact our Tech. Dept.

(4) For higher continuous and maximum speed please contact our Tech. Dept.

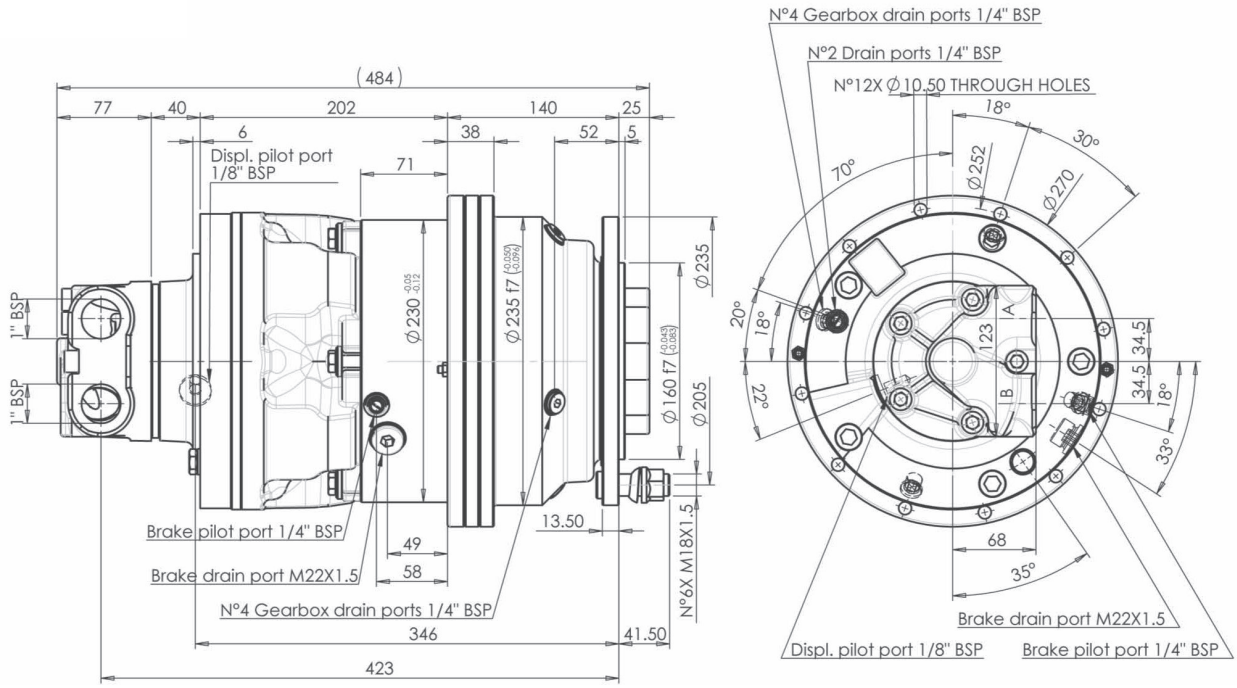
(5) If the brake is engaged for a long time, the braking torque could increase considerably.
The brake requires to be periodically engaged and disengaged to mantain the desired performance.

## WHEEL MOTORS WITH GEARBOX G3 - G3A Series

## BD1 + G3 - INSTALLATION DRAWINGS

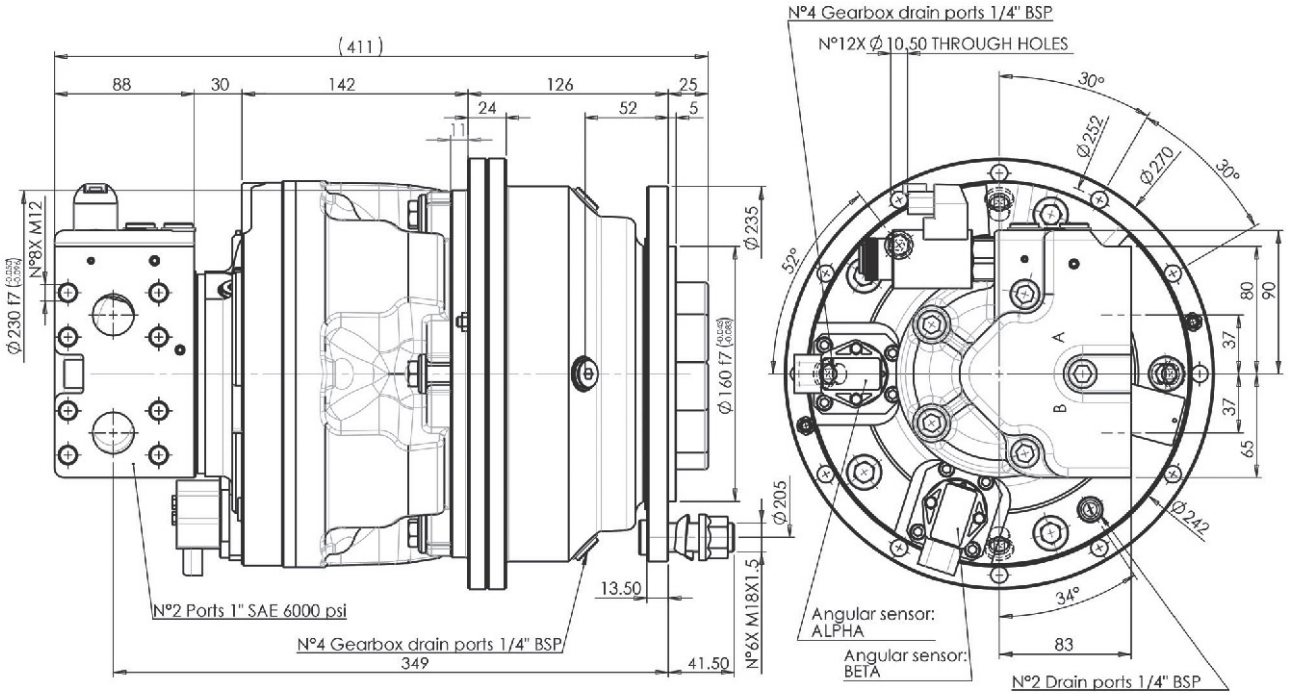



## BD1 + F10L + G3 - INSTALLATION DRAWINGS

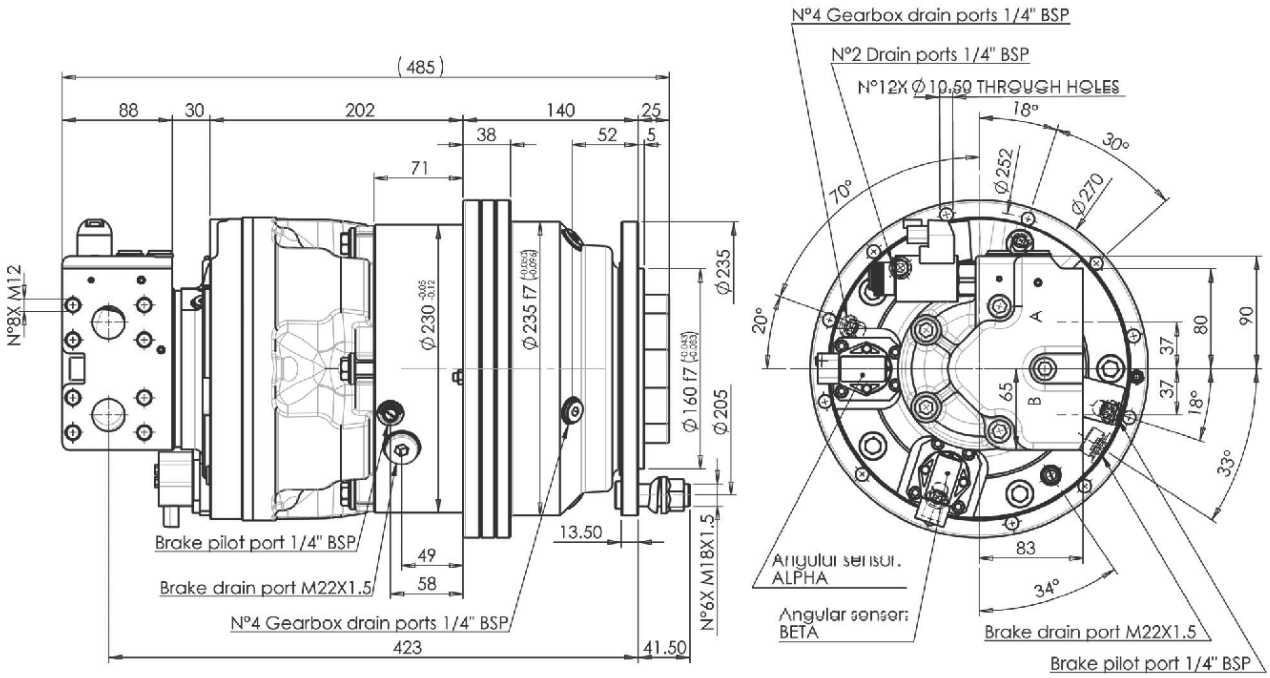


## WHEEL MOTORS WITH GEARBOX G3 - G3A Series

## BV1 + G3 - INSTALLATION DRAWINGS




## BV1 + F10L + G3 - INSTALLATION DRAWINGS

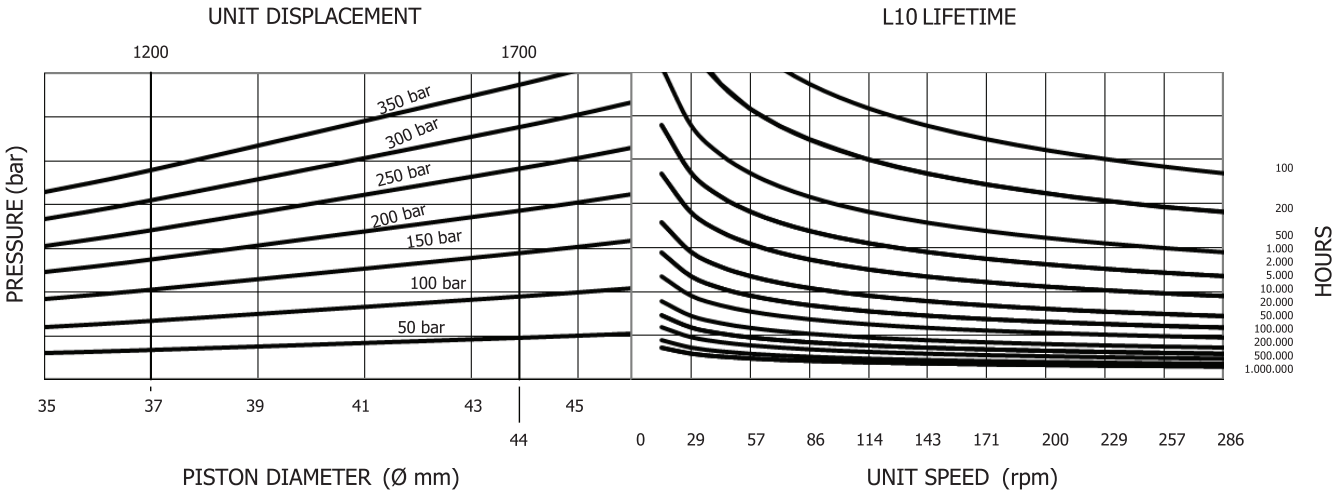


## WHEEL MOTORS WITH GEARBOX G3 - G3A Series

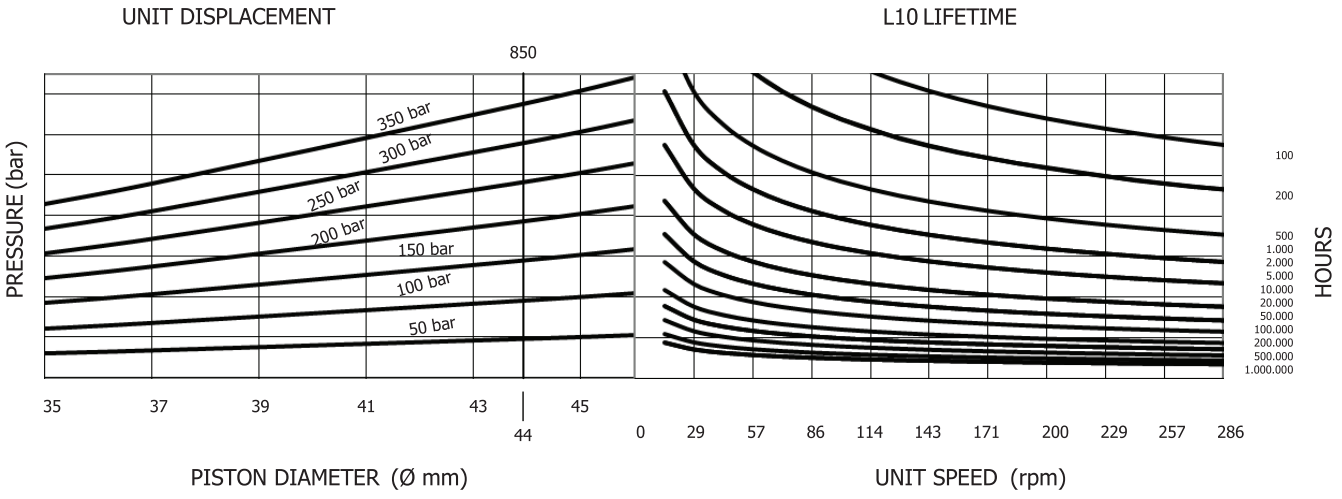
## BD1 + G3 - BD1 + F10L + G3
## BV1 + G3 - BV1 + F10L + G3

## BEARING LIFETIME GRAPHS

Bearing lifetime has been estimated according to L10 (according to ISO 281:1990).
The following graph has been plotted using the stroke of 32 mm.
Please contact our Technical Department for other graphs relating to this product.




Bearing lifetime has been estimated according to L10 (according to ISO 281:1990).
The following graph has been plotted using the stroke of 16 mm.
Please contact our Technical Department for other graphs relating to this product.



## WHEEL MOTORS WITH GEARBOX G3 - G3A Series

**GM05 + G3A** (fixed displacement without brake)
**GM05 + F10L + G3A** (fixed displacement with brake)

## TECHNICAL SPECIFICATION

| | | 200 | 300 | 400 | 450 | 600 | 650 | 750 | 800 | 950 |
|---|---|---|---|---|---|---|---|---|---|---|
| Equivalent displacement (1) | [cc/rev] | 195 | 295 | 370 | 430 | 575 | 645 | 755 | 805 | 955 |
| Reduction ratio | | | | | | 5:1 | | | | |
| Bore | [mm] | 25 | 25 | 28 | 37 | 35 | 37 | 40 | 42 | 45 |
| Stroke | [mm] | 16 | 24 | 24 | 16 | 24 | 24 | 24 | 24 | 24 |
| Specific torque | [Nm/bar] | 3,10 | 4,70 | 5,90 | 6,85 | 9,19 | 10,27 | 12,00 | 13,23 | 15,20 |
| Continuous pressure | [bar] | 250 | 250 | 250 | 250 | 250 | 250 | 250 | 250 | 250 |
| Peak pressure (2) | [bar] | 450 | 450 | 425 | 400 | 375 | 375 | 325 | 325 | 280 |
| Peak power (3) | [kW] | 20 | 20 | 33 | 33 | 33 | 33 | 33 | 33 | 33 |
| Continuous speed (4) | [rpm] | 140 | 140 | 140 | 140 | 130 | 130 | 130 | 120 | 120 |
| Maximum speed (4) | [rpm] | 200 | 200 | 200 | 200 | 180 | 180 | 180 | 160 | 160 |

| | | | | | |
|---|---|---|---|---|---|
| Approximative weight no brake | [kg] | 44 unit | Approximative weight with brake | [kg] | 55 unit |
| Maximum casing pressure | [bar] | 1 continuous<br>5 peak | Admissible temperatures | [°C] | -20 minimum<br>+80 maximum |
| Motor oil capacity | [l] | 0,8 | Type of brake | | Negative disc brake |
| Gearbox oil capacity | [l] | 1,7 | Static braking torque (5) | [Nm] | 8750 |
| Brake oil capacity | [l] | 0,45 | Minimum brake pilot pressure | [bar] | 20 |
| Brake pilot volume | [cm³] | 65,1 | Maximum brake pilot pressure | [bar] | 60 |
| Bolt torque setting | [Nm] | 68,0 coarse 71,0 fine<br>84,0 89,0 | Suggested bolt type | | M10 12.9 |

NOTES

(1) Equivalent displacement = motor displacement x reduction ratio of gearbox (5 :1)

(2) For higher peak pressure please contact our Tech. Dept.

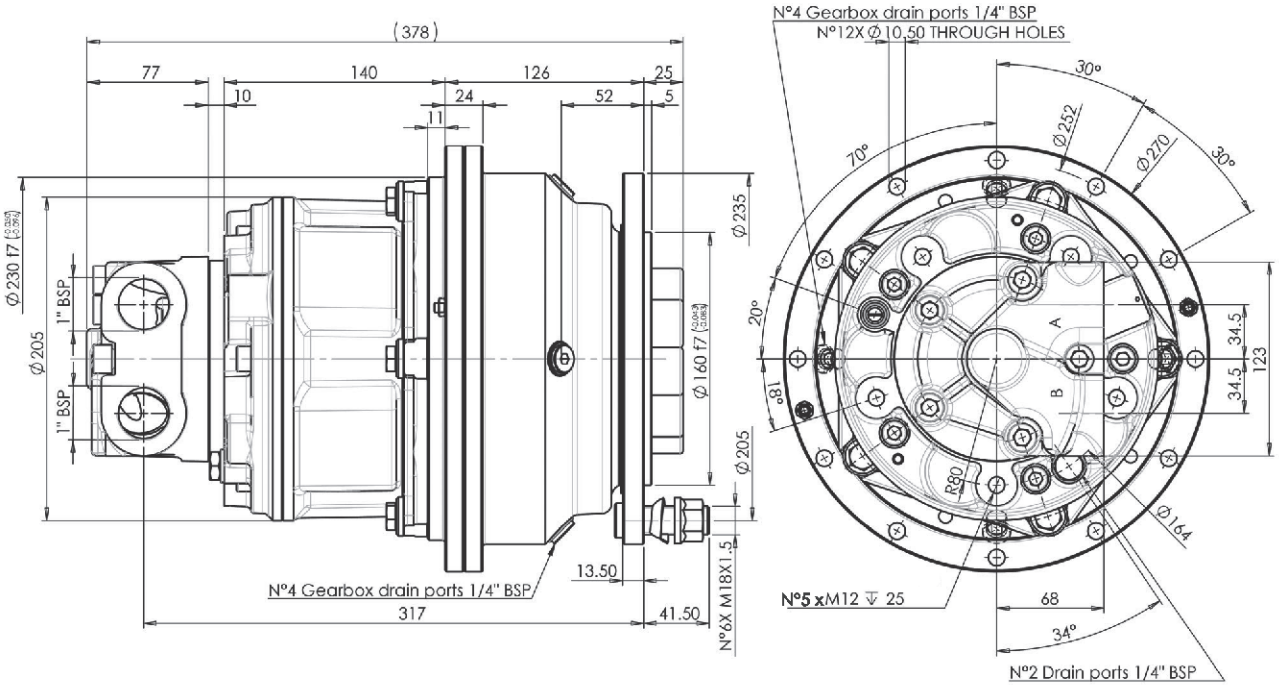
(3) For higher peak power please contact our Tech. Dept.

(4) For higher continuous and maximum speed please contact our Tech. Dept.

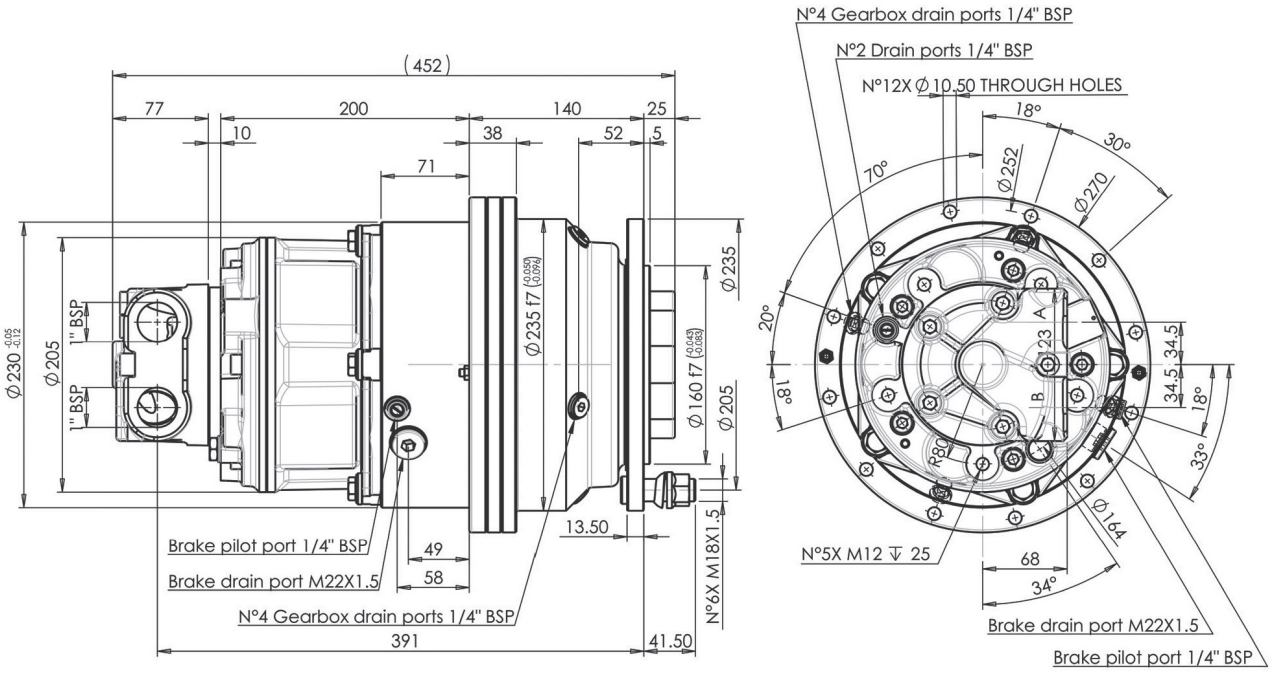
(5) If the brake is engaged for a long time, the braking torque could increase considerably.
The brake requires to be periodically engaged and disengaged to mantain the desired performance.

## WHEEL MOTORS WITH GEARBOX G3 - G3A Series

## GM05 + G3A - INSTALLATION DRAWINGS




## GM05 + F10L + G3A - INSTALLATION DRAWINGS

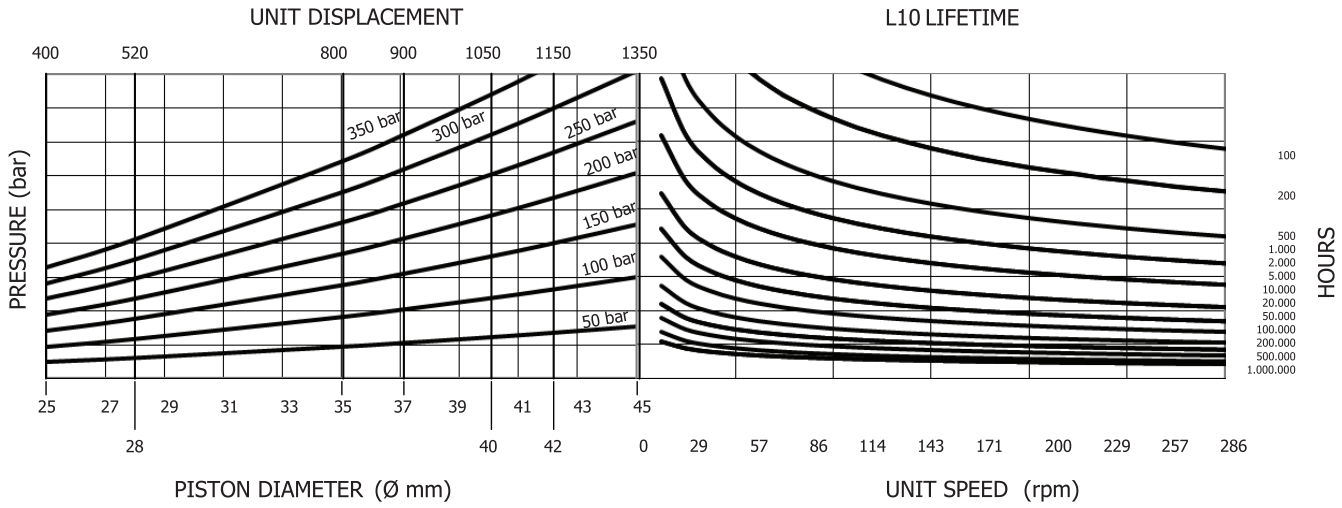


## WHEEL MOTORS WITH GEARBOX G3 - G3A Series

## GM05 + G3A
## GM05 + F10L + G3A

## BEARING LIFETIME GRAPHS

Bearing lifetime has been estimated according to L10 (according to ISO 281:1990).
Please contact our Technical Department for other graphs relating to this product.



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## WHEEL MOTORS WITH GEARBOX G3 - G3A Series

### GM1 + G3A (fixed displacement without brake)
### GM1 + F10L + G3A (fixed displacement with brake)

## TECHNICAL SPECIFICATION

| | | 500 | 650 | 750 | 850 | 1000 | 1150 | 1200 | 1450 | 1550 |
|---|---|---|---|---|---|---|---|---|---|---|
| Equivalent displacement (1) | [cc/rev] | 493 | 643 | 770 | 860 | 1005 | 1108 | 1216 | 1448 | 1571 |
| Reduction ratio | | | | | | 5:1 | | | | |
| Bore | [mm] | 28 | 32 | 35 | 37 | 40 | 42 | 44 | 48 | 50 |
| Stroke | [mm] | | | | | 32 | | | | |
| Specific torque | [Nm/bar] | 7,84 | 10,26 | 12,25 | 13,69 | 16,00 | 17,64 | 19,36 | 23,04 | 25,00 |
| Continuous pressure | [bar] | 250 | 250 | 250 | 250 | 250 | 250 | 250 | 220 | 205 |
| Peak pressure (2) | [bar] | 425 | 400 | 400 | 375 | 350 | 350 | 350 | 300 | 280 |
| Peak power (3) | [kW] | | | | | 48 | | | | |
| Continuous speed (4) | [rpm] | 110 | 110 | 110 | 110 | 110 | 110 | 90 | 70 | 70 |
| Maximum speed (4) | [rpm] | 200 | 200 | 200 | 180 | 160 | 140 | 140 | 130 | 120 |

| | | | | | |
|---|---|---|---|---|---|
| Approximative weight no brake | [kg] | 47 unit | Approximative weight with brake | [kg] | 59 unit |
| Maximum casing pressure | [bar] | 1 continuous<br>5 peak | Admissible temperatures | [°C] | -20 minimum<br>+80 maximum |
| Motor oil capacity | [l] | 1 | Type of brake | | Negative disc brake |
| Gearbox oil capacity | [l] | 1,7 | Static braking torque (5) | [Nm] | 8750 |
| Brake oil capacity | [l] | 0,45 | Minimum brake pilot pressure | [bar] | 35 |
| Brake pilot volume | [cm³] | 65,1 | Maximum brake pilot pressure | [bar] | 60 |
| Bolt torque setting | [Nm] | 68,0 coarse 71,0 fine<br>84,0 89,0 | Suggested bolt type | | M10 12.9 |

NOTES

(1) Equivalent displacement = motor displacement x reduction ratio of gearbox (5 :1)

(2) For higher peak pressure please contact our Tech. Dept.

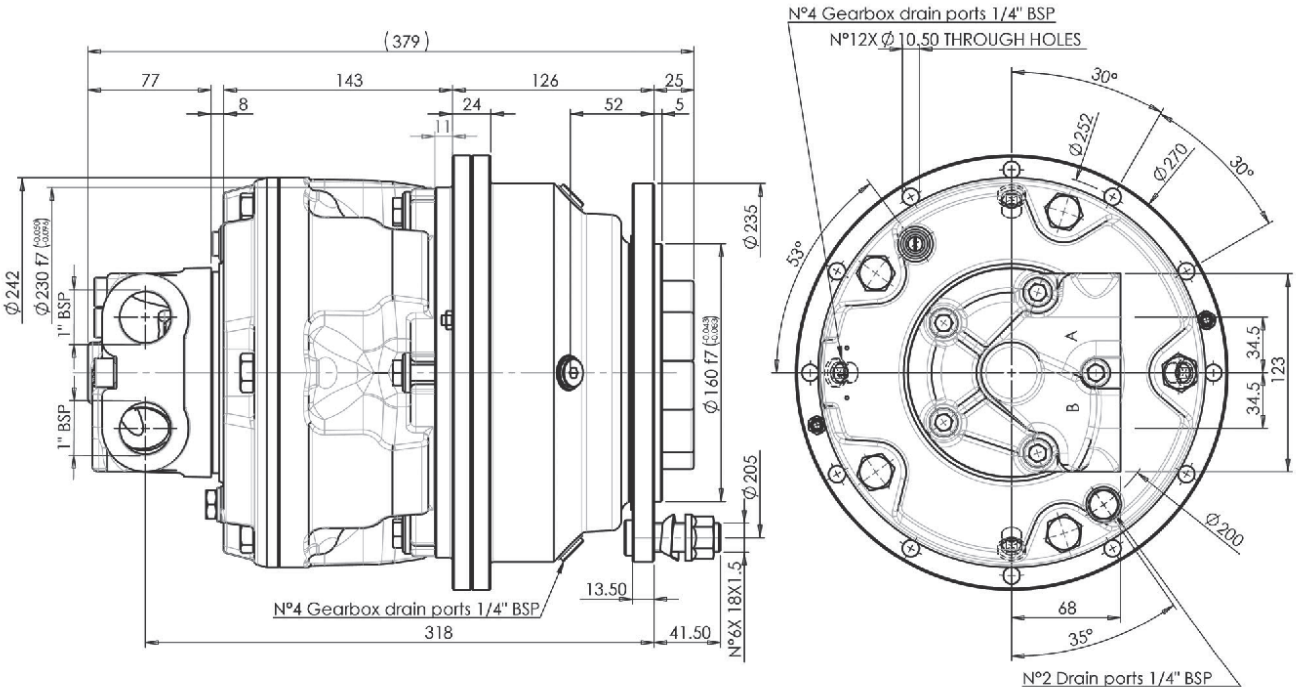
(3) For higher peak power please contact our Tech. Dept.

(4) For higher continuous and maximum speed please contact our Tech. Dept.

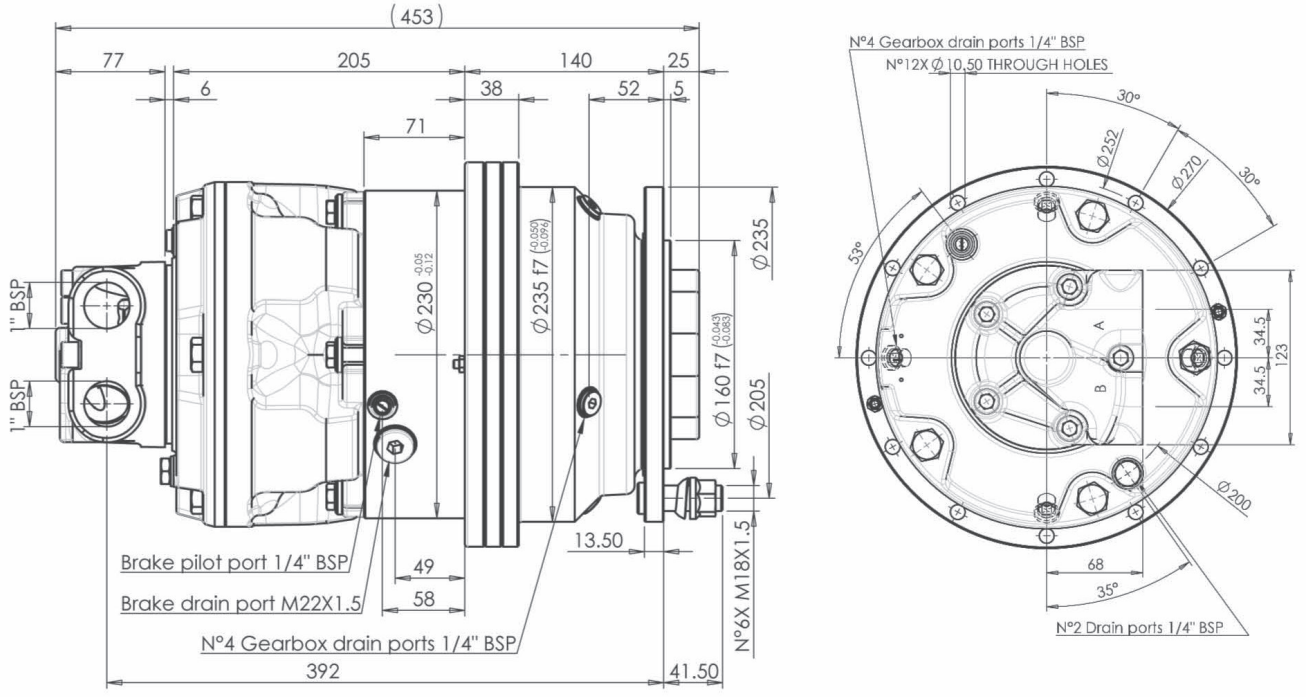
(5) If the brake is engaged for a long time, the braking torque could increase considerably.
The brake requires to be periodically engaged and disengaged to mantain the desired performance.

## WHEEL MOTORS WITH GEARBOX G3 - G3A Series

## GM1 + G3A - INSTALLATION DRAWINGS




## GM1 + F10L + G3A - INSTALLATION DRAWINGS

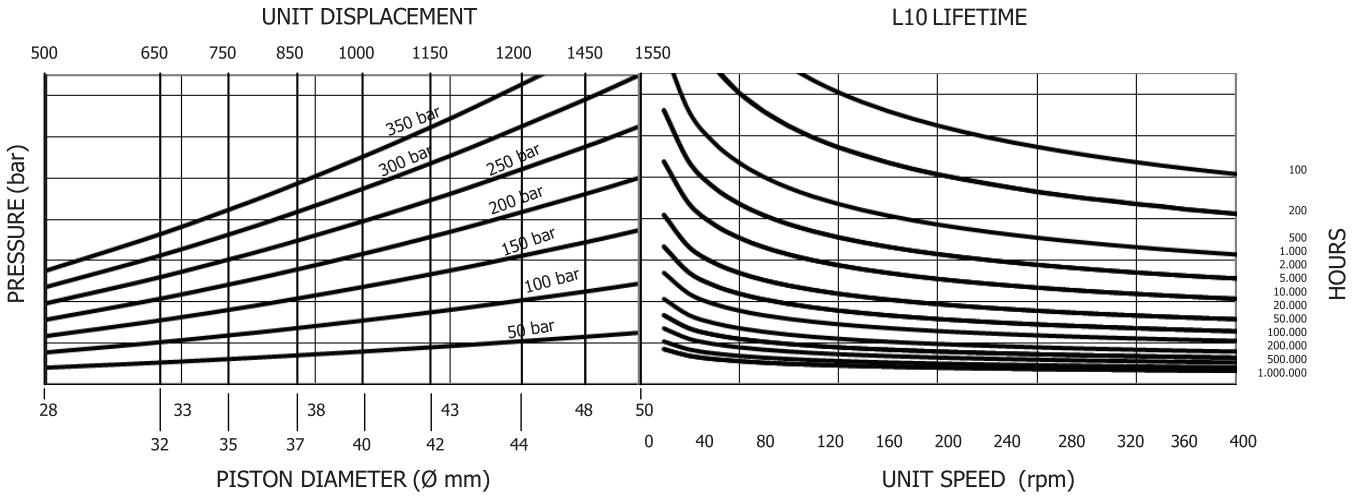


## WHEEL MOTORS WITH GEARBOX G3 - G3A Series

## GM1 + G3A
## GM1 + F10L + G3A

## BEARING LIFETIME GRAPHS

Bearing lifetime has been estimated according to L10 (according to ISO 281:1990).
Please contact our Technical Department for other graphs relating to this product.



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## WHEEL MOTORS WITH GEARBOX G3 - G3A Series

**BD1 + G3A** (dual displacement without brake)
**BD1 + F10L + G3A** (dual displacement with brake)

**BV1 + G3A** (variable displacement without brake)
**BV1 + F10L + G3A** (variable displacement with brake)

## TECHNICAL SPECIFICATION

| | | 500 | 250 | 850 | 215 | 875 | 400 | 1250 | 300 | 1250 | 625 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Equivalent displacement (1) | [cc/rev] | 510 | 270 | 860 | 215 | 880 | 380 | 1215 | 305 | 1215 | 608 |
| Reduction ratio | | 5:1 | | | | | | | | | |
| Bore | [mm] | 37 | 37 | 37 | 37 | 44 | 44 | 44 | 44 | 44 | 44 |
| Stroke | [mm] | 19 | 10 | 32 | 8 | 23 | 10 | 32 | 8 | 32 | 16 |
| Specific torque | [Nm/bar] | 8,11 | 4,30 | 13,69 | 3,42 | 14,00 | 6,04 | 19,34 | 4,85 | 19,40 | 9,65 |
| Continuous pressure | [bar] | 250 | 250 | 250 | 250 | 250 | 250 | 250 | 250 | 250 | 250 |
| Peak pressure (2) | [bar] | 425 | 425 | 400 | 400 | 300 | 400 | 375 | 375 | 375 | 375 |
| Peak power (3) | [kW] | 55 | 42 | 55 | 42 | 55 | 42 | 55 | 42 | 55 | 42 |
| Continuous speed (4) | [rpm] | 100 | 300 | 100 | 300 | 100 | 300 | 100 | 300 | 100 | 300 |
| Maximum speed (4) | [rpm] | 300 | 300 | 200 | 300 | 200 | 300 | 170 | 300 | 170 | 300 |

| | | | | | | |
|---|---|---|---|---|---|---|
| Approximative weight no brake | [kg] | 55 | unit | Approximative weight with brake | [kg] | 67 unit |
| Maximum casing pressure | [bar] | 1 continuous<br>5 peak | | Admissible temperatures | [°C] | -20 minimum<br>+80 maximum |
| Motor oil capacity | [l] | 1,5 | | Type of brake | | Negative disc brake |
| Gearbox oil capacity | [l] | 1,7 | | Static braking torque (5) | [Nm] | 8750 |
| Brake oil capacity | [l] | 0,45 | | Minimum brake pilot pressure | [bar] | 20 |
| Brake pilot volume | [cm³] | 65,1 | | Maximum brake pilot pressure | [bar] | 60 |
| Bolt torque setting | [Nm] | 68,0 coarse 84,0 | 71,0 fine 89,0 | Suggested bolt type | | M10 12.9 |

NOTES

(1) Equivalent displacement = motor displacement x reduction ratio of gearbox (5 :1)

(2) For higher peak pressure please contact our Tech. Dept.

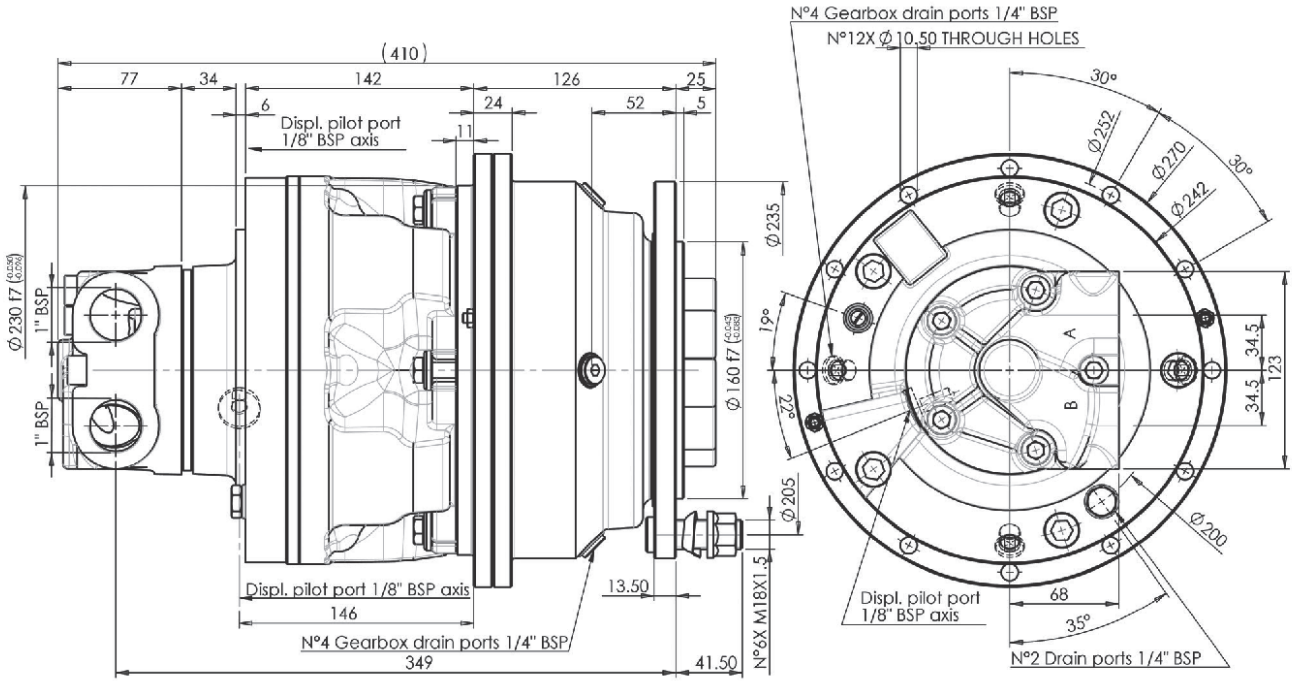
(3) For higher peak power please contact our Tech. Dept.

(4) For higher continuous and maximum speed please contact our Tech. Dept.

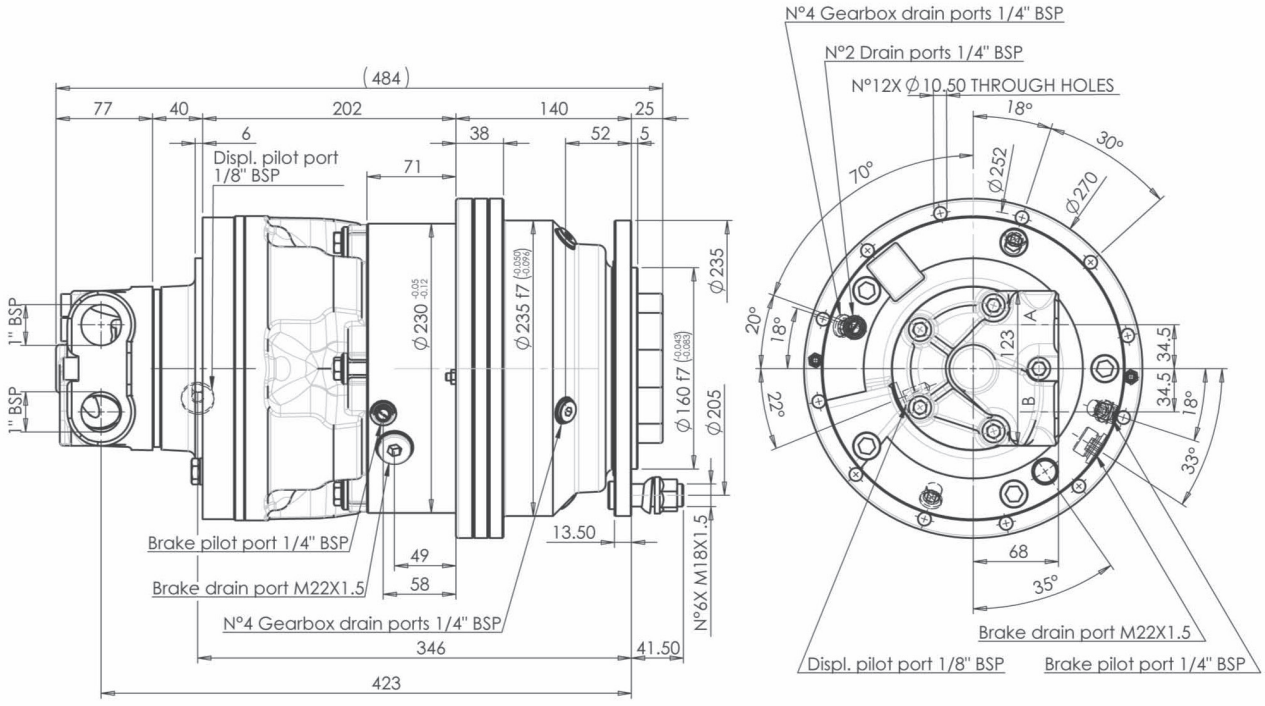
(5) If the brake is engaged for a long time, the braking torque could increase considerably.
The brake requires to be periodically engaged and disengaged to mantain the desired performance.

## WHEEL MOTORS WITH GEARBOX G3 - G3A Series

## BD1 + G3A - INSTALLATION DRAWINGS

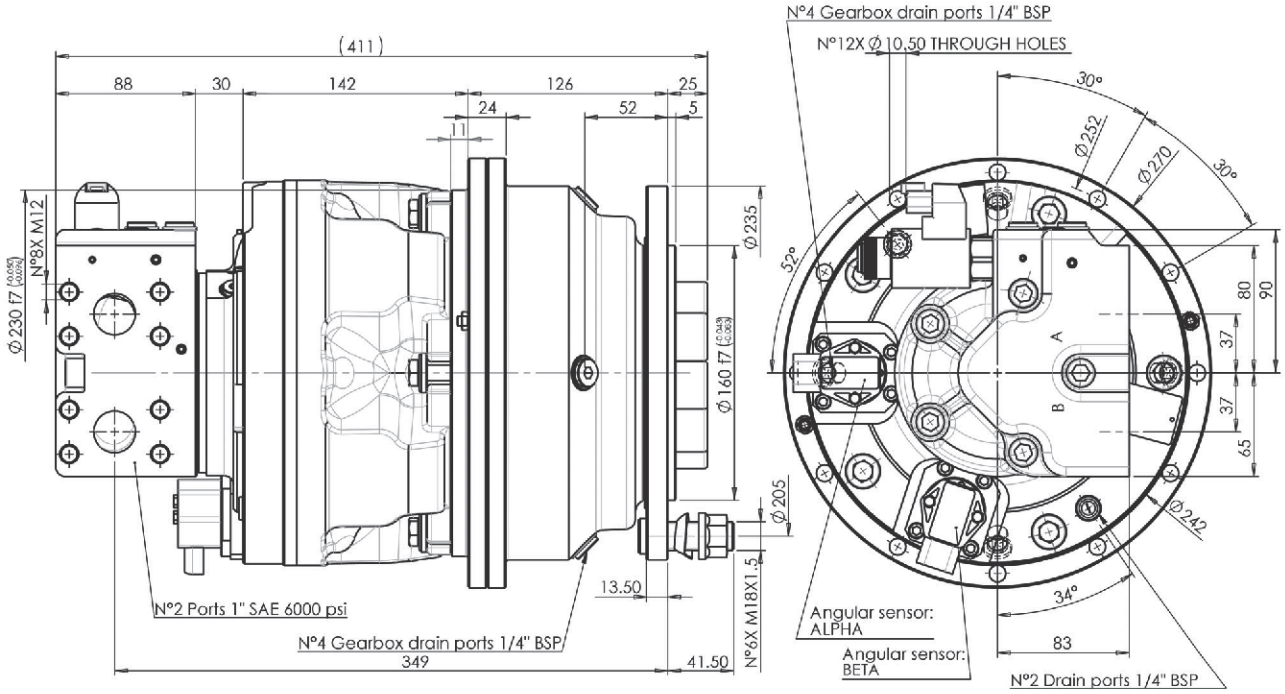



## BD1 + F10L + G3A - INSTALLATION DRAWINGS

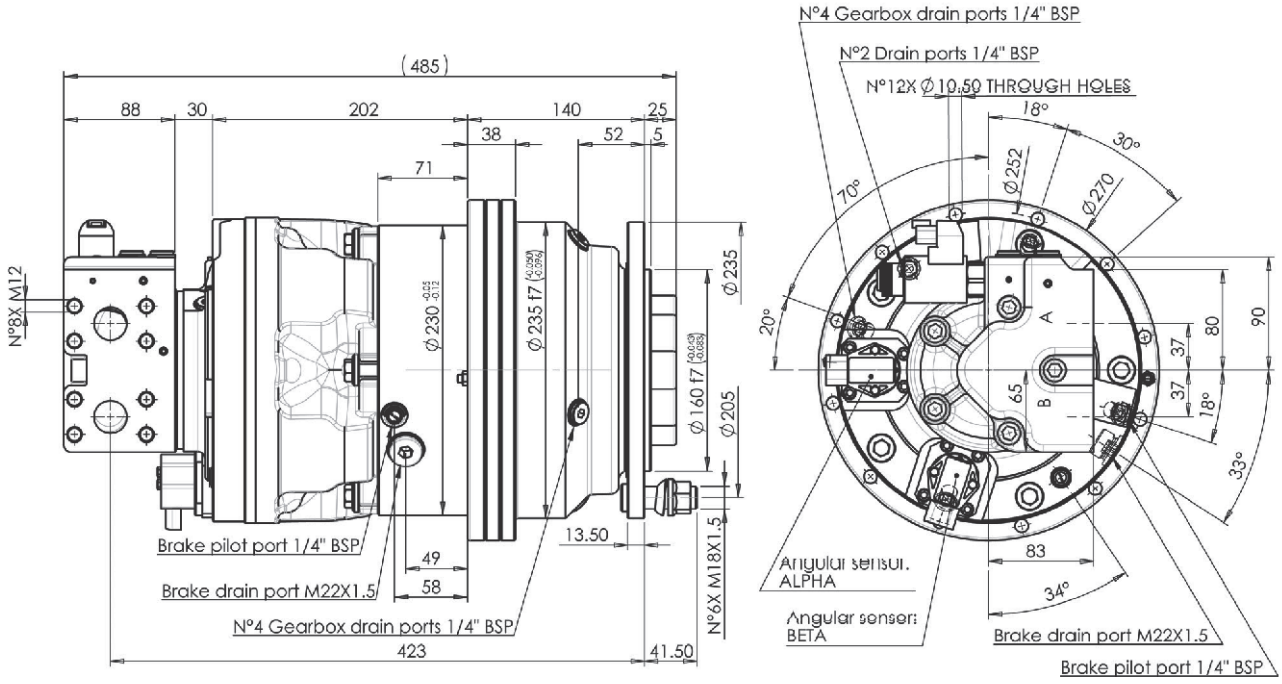


## WHEEL MOTORS WITH GEARBOX G3 - G3A Series

## BV1 + G3A - INSTALLATION DRAWINGS




## BV1 + F10L + G3A - INSTALLATION DRAWINGS

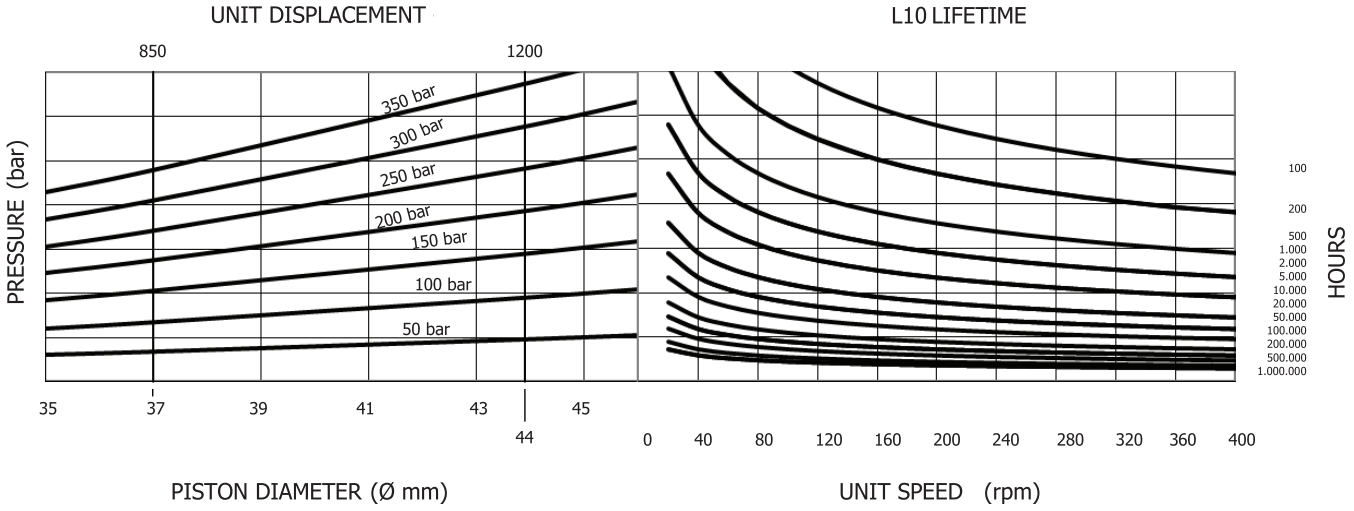


## WHEEL MOTORS WITH GEARBOX G3 - G3A Series

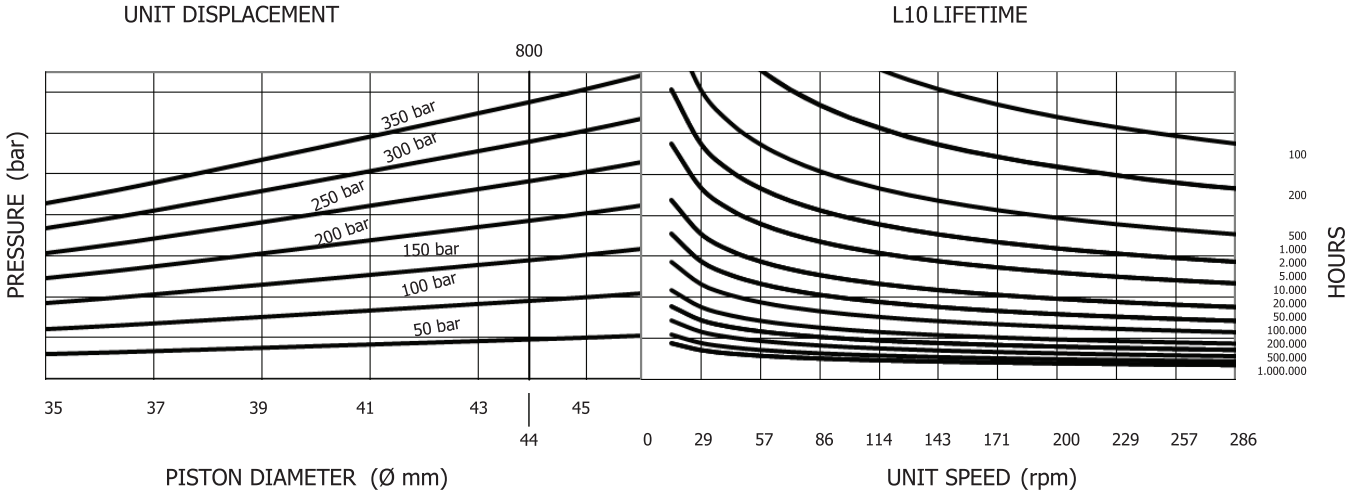
## BD1 + G3A - BD1 + F10L + G3A
## BV1 + G3A - BV1 + F10L + G3A

## BEARING LIFETIME GRAPHS

Bearing lifetime has been estimated according to L10 (according to ISO 281:1990).
The following graph has been plotted using the stroke of 32 mm.
Please contact our Technical Department for other graphs relating to this product.




Bearing lifetime has been estimated according to L10 (according to ISO 281:1990).
The following graph has been plotted using the stroke of 16 mm.
Please contact our Technical Department for other graphs relating to this product.



## WHEEL MOTORS WITH GEARBOX G3 - G3A Series

## ORDER CODE

| 1 | + | 2 | + | 3 | + | 4 | + | 5 | + | 6 | + | 7 | + | 8 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | + | | + | | + | | + | | + | | + | | + | |

| | | | | |
|---|---|---|---|---|
| 1 | **Motor type** | | | |
| 2 | **Displacement** | see table | | |
| 3 | **Additional options** | U | = | shared oil |
| | | O | = | separated oil |
| 4 | **Distributor** | see distributors section | | |
| | | D40 standard | | |
| 5 | **Direction of rotation** (viewed from the output side) with flow in port A, out in port B. | No code | = | clockwise rotation |
| | | L | = | anti-clockwise rotation |
| 6 | **Distributor cover orientation** | No code | = | position 1 |
| | | DM2 | = | position 2 |
| | | DM3 | = | position 3 |
| | | DM4 | = | position 4 |
| | | DM5 | = | position 5 |
| 7 | **G series** | G3 | = | reduction ratio 7:1 |
| | | G3A | = | reduction ratio 5:1 |
| 8 | **Hub option** | No code | = | no hub |
| | | 31/A | = | standard |
| | | 31/D | | |
| | | 31/G | | |

Example

GM05 600 U D40 G3
(standard)

GM05 600 U D40L G3A
(options: anti-clockwise sense of rotation)

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## WHEEL MOTORS WITH GEARBOX TS Series

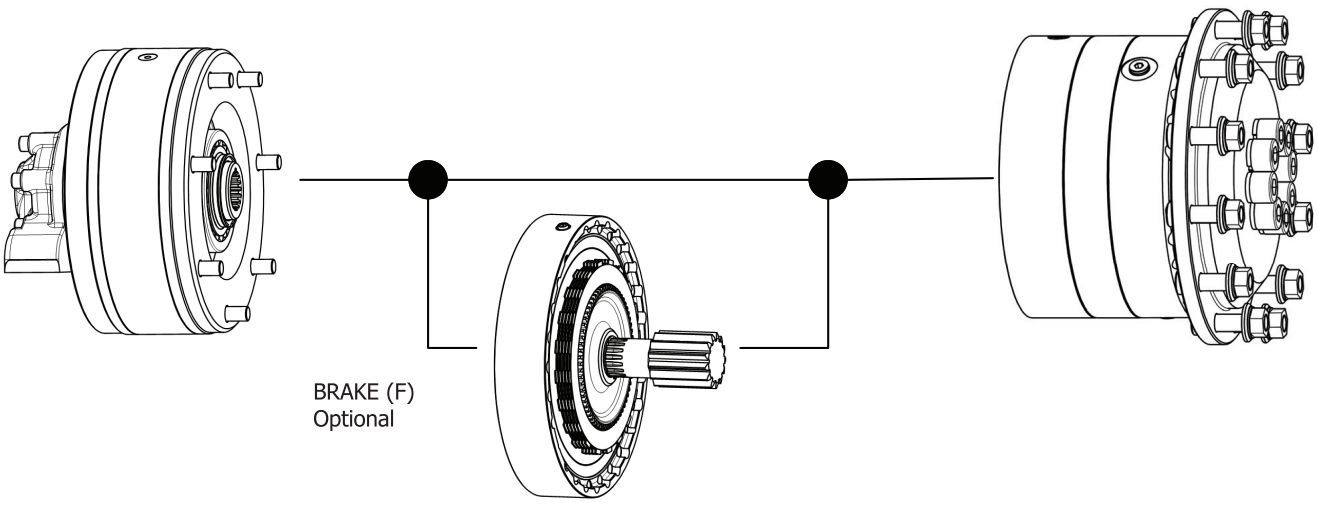
**HYDRAULIC INPUT**

FIXED DISPLACEMENT

TS8

**MECHANIC OUTPUT**

W OUTPUT



## WHEEL MOTORS WITH GEARBOX TS Series

Bearings lifetime calculation:
Permissible loads are calculated for different steps of lifetime $L_{10}$ according to ISO 281:1990.

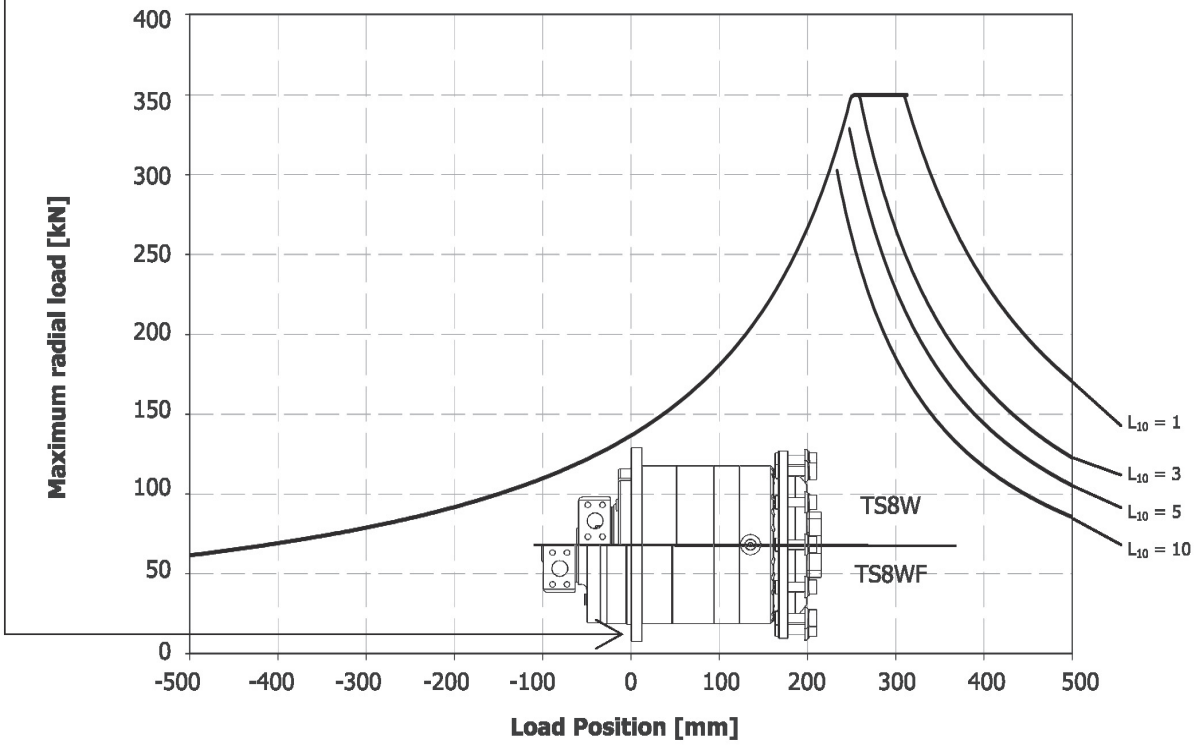
$L_{10}$: lifetime of the bearing system in millions of revolutions.
$L_{10}$ value can be converted in hours $L_{10h}$ using the formula*.
Permissible radial load in dynamic conditions and at maximum torque of 43000 Nm.

Notes: Diagrams are influenced by the shaft permissible radial loads.

The drawing in the graph is only intended to show the reference point "0" used to position the radial load of the application.

$$* \; L_{10h} = \frac{10^6}{60n} L_{10}$$

n: speed in rpm



## WHEEL MOTORS WITH GEARBOX TS Series

### TS8W (fixed displacement without brake)
### TS8WF (fixed displacement with brake)

## TECHNICAL SPECIFICATION

| | | 2700 | 3600 | 5000 | 6000 | 6700 | 7400 |
|---|---|---|---|---|---|---|---|
| Equivalent displacement (1) | [cc/rev] | 2667 | 3576 | 4995 | 5793 | 6650 | 7332 |
| Reduction ratio | | | | 6:1 | | | |
| Bore | [mm] | 38 | 44 | 52 | 56 | 60 | 63 |
| Stroke | [mm] | 56 | 56 | 56 | 56 | 56 | 56 |
| Specific torque | [Nm/bar] | 42,45 | 56,92 | 79,50 | 92,20 | 105,84 | 116,69 |
| Continuous pressure | [bar] | 400 | 400 | 400 | 380 | 330 | 300 |
| Peak pressure | [bar] | 450 | 450 | 450 | 450 | 400 | 370 |
| Peak power | [kW] | 220 | 220 | 220 | 220 | 220 | 220 |
| Minimum speed | [rpm] | 1 | 1 | 1 | 1 | 1 | 1 |
| Continuous speed | [rpm] | 185 | 138 | 100 | 90 | 80 | 80 |
| Maximum speed | [rpm] | 200 | 200 | 150 | 115 | 105 | 105 |

| | | | | | |
|---|---|---|---|---|---|
| Approximative weight | [kg] | 380 unit | Approximative weight with brake | [kg] | 410 unit |
| Maximum brake pilot pressure | [bar] | 50 50 | Static braking torque (4) | [Nm] | 40.000 |
| Minimum brake pilot pressure | [bar] | 25 25 | Brake pilot volume | [cm³] | 60 |
| Maximum casing pressure (hub version) | [bar] | 1 continuous<br>1,5 peak | Admissible temperatures | °C | -20 minimum<br>+80 maximum |
| Bolt torque setting | [Nm] | 767,0 coarse 799,0 fine<br>958,0 1008,0 | Suggested bolt type | | M22 12.9 |
| Unit oil capacity (3) | [l] | 5,5 | Available distributors | | D907 |

| | | | | | | |
|---|---|---|---|---|---|---|
| Constant of lifetime (5) | nxh | 10.000 | 25.000 | 50.000 | 100.000 | 500.000 |
| | T[Nm] | 35.000 | 30.000 | 27.000 | 24.000 | 21.500 |

NOTES

(1) Equivalent displacement = motor displacement x reduction ratio of gearbox (6 :1)

(2) For higher continuous and maximum speed please contact our Tech. Dept.

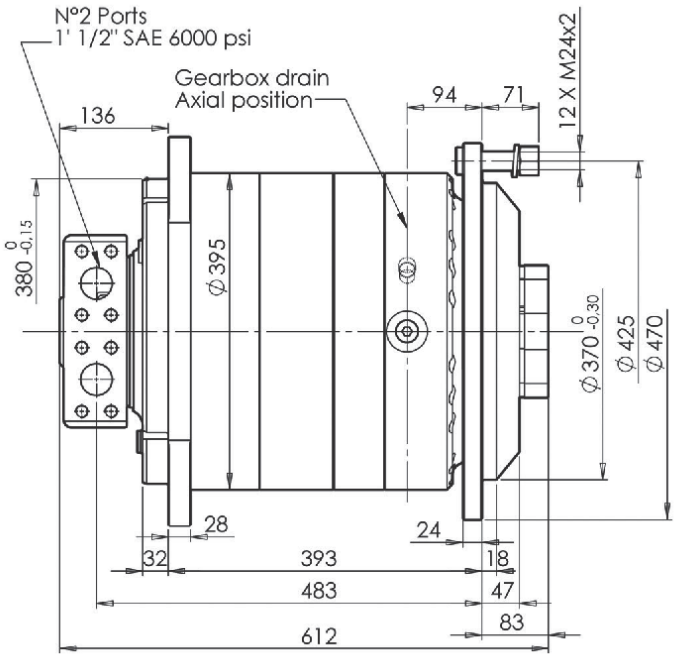
(3) The motor, the brake and the gearbox share the lubricating oil.

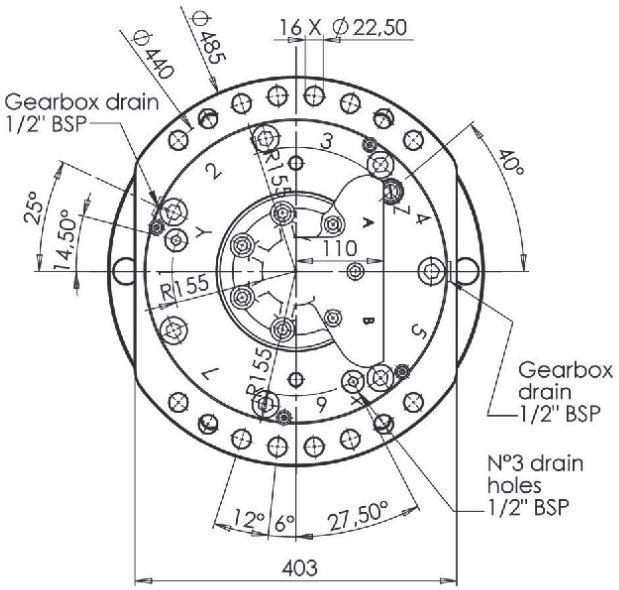
(4) If the brake is engaged for a long time, the braking torque could increase considerably.
The brake requires to be periodically engaged and disengaged to mantain the desired performance.

(5) Where n = gearbox output speed (rpm) and h = working time (hours)

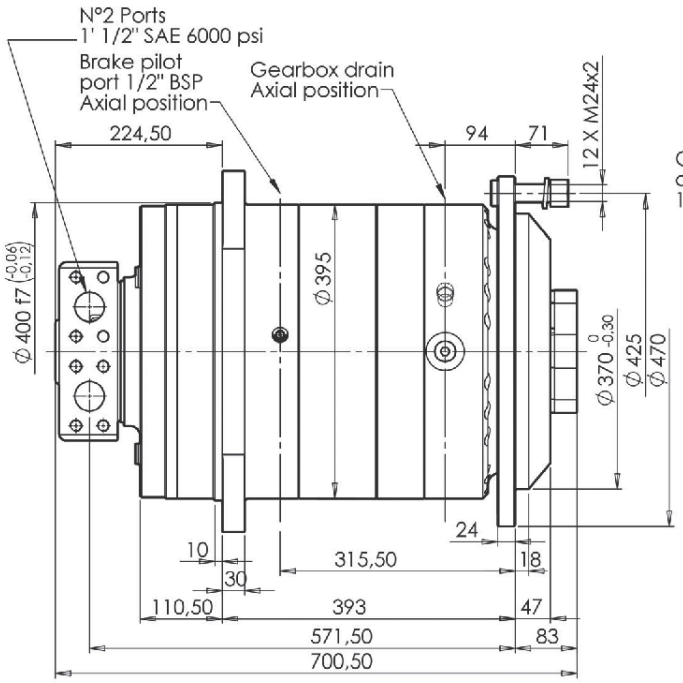
## WHEEL MOTORS WITH GEARBOX TS Series

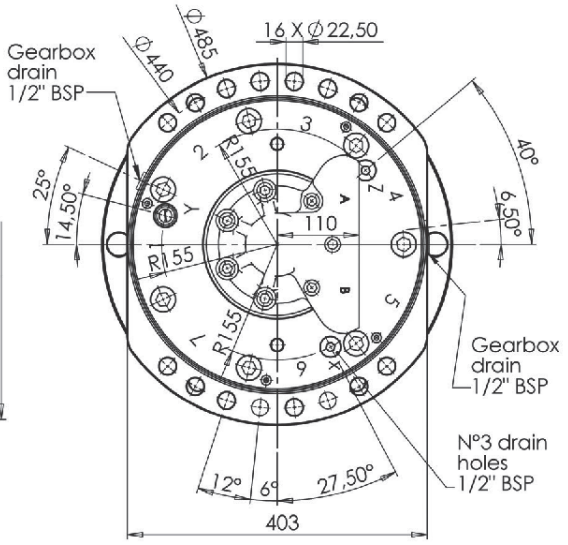
## TS8W - INSTALLATION DRAWINGS




## TS8WF - INSTALLATION DRAWINGS



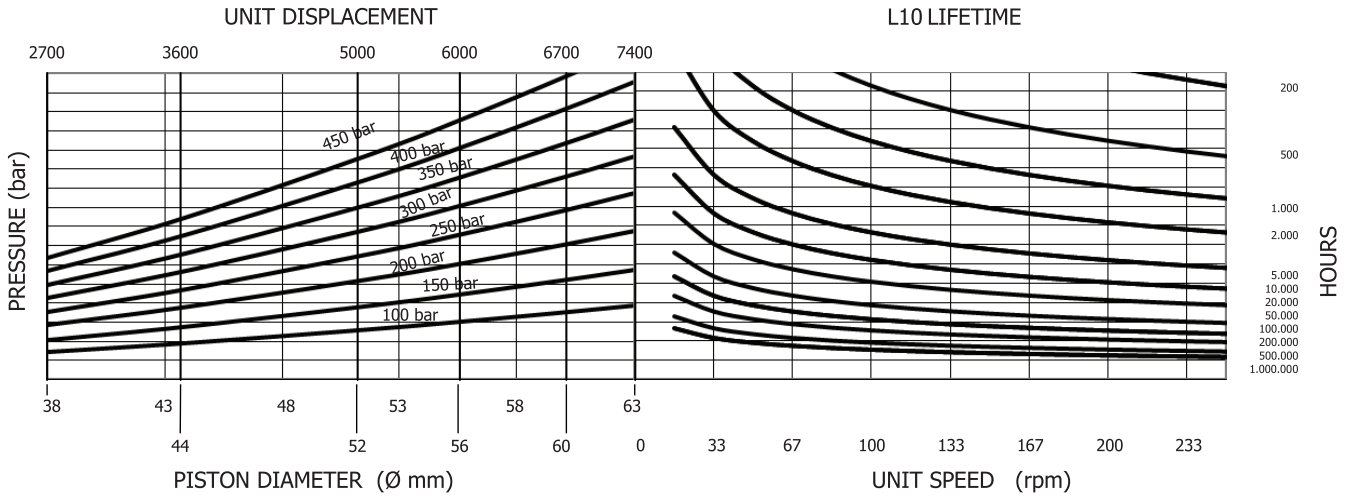
## WHEEL MOTORS WITH GEARBOX TS Series

## TS8W
## TS8WF

## BEARING LIFETIME GRAPHS

Bearing lifetime has been estimated according to L10 (according to ISO 281:1990).

Please contact our Technical Department for other graphs relating to this product.



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## WHEEL MOTORS WITH GEARBOX TS Series

**TS8DW** (dual displacement without brake)
**TS8VW** (variable displacement without brake)
**TS8DWF** (dual displacement with brake)
**TS8VWF** (variable displacement with brake )

## TECHNICAL SPECIFICATION

| | | 2700 | 700 | 3600 | 900 | 5000 | 1250 | 6000 | 1450 | 6700 | 1700 | 7400 | 1850 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Equivalent displacement (1) | [cc/rev] | 2667 | 666 | 3576 | 894 | 4995 | 1248 | 5793 | 1446 | 6650 | 1662 | 7332 | 1830 |
| Reduction ratio | | 6:1 | | | | | | | | | | | |
| Bore | [mm] | 38 | | 44 | | 52 | | 56 | | 60 | | 63 | |
| Stroke | [mm] | 56 | 14 | 56 | 14 | 56 | 14 | 56 | 14 | 56 | 14 | 56 | 14 |
| Specific torque | [Nm/bar] | 42,45 | 10,57 | 56,92 | 14,19 | 79,50 | 19,81 | 92,20 | 22,95 | 105,84 | 26,38 | 116,69 | 29,05 |
| Continuous pressure | [bar] | 400 | | 400 | | 400 | | 380 | 400 | 330 | 350 | 300 | 350 |
| Peak pressure | [bar] | 450 | | 450 | | 450 | | 450 | | 400 | | 370 | 400 |
| Peak power | [kW] | 220 | 200 | 220 | 200 | 220 | 200 | 220 | 200 | 220 | 200 | 220 | 200 |
| Minimum speed (2) | [rpm] | 1 | | 1 | | 1 | | 1 | | 1 | | 1 | |
| Continuous speed (2) | [rpm] | 185 | 200 | 138 | 200 | 100 | 200 | 90 | 200 | 80 | 200 | 80 | 200 |
| Maximum speed (2) | [rpm] | 200 | 250 | 200 | 250 | 150 | 250 | 115 | 250 | 105 | 250 | 105 | 250 |

| | | | | | |
|---|---|---|---|---|---|
| Approximative weight | [kg] | 380 unit | Approximative weight with brake | [kg] | 410 unit |
| Unit oil capacity (3) | [l] | 5,5 | Maximum casing pressure (hub version) | [bar] | 1 continuous<br>1,5 peak |
| Static braking torque (4) | [Nm] | 40.000 | Brake pilot volume | [$cm^3$] | 60 |
| Maximum brake pilot pressure | [bar] | 50 | Minimum brake pilot pressure | [bar] | 25 |
| Admissible temperatures | °C | -20 minimum<br>+80 maximum | Available distributors | | D907D D907V |
| Bolt torque setting | [Nm] | 767,0 / 958,0 coarse — 799,0 / 1008,0 fine | Suggested bolt type | | M22 12.9 |

| | | | | | | |
|---|---|---|---|---|---|---|
| Constant of lifetime (5) | nxh | 10.000 | 25.000 | 50.000 | 100.000 | 500.000 |
| | T[Nm] | 35.000 | 30.000 | 27.000 | 24.000 | 21.500 |

NOTES

(1) Equivalent displacement = motor displacement x reduction ratio of gearbox (6 :1)

(2) For higher continuous and maximum speed please contact our Tech. Dept.

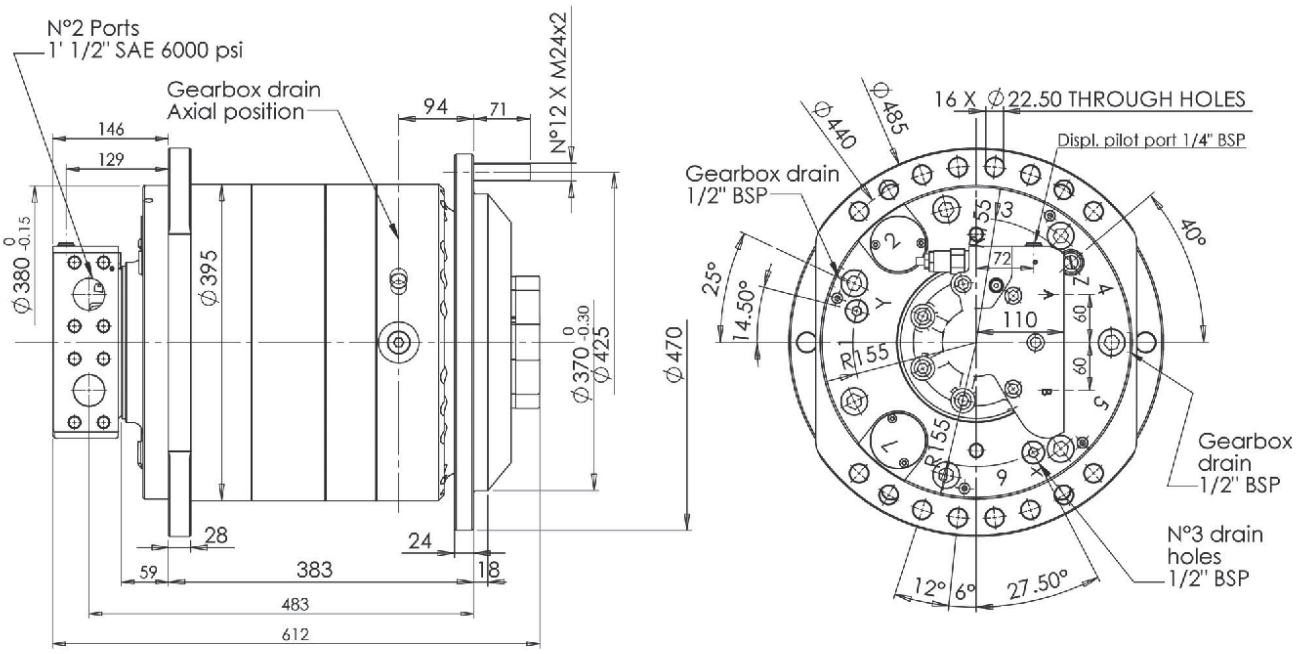
(3) The motor, the brake and the gearbox share the lubricating oil.

(4) If the brake is engaged for a long time, the braking torque could increase considerably.
The brake requires to be periodically engaged and disengaged to mantain the desired performance.

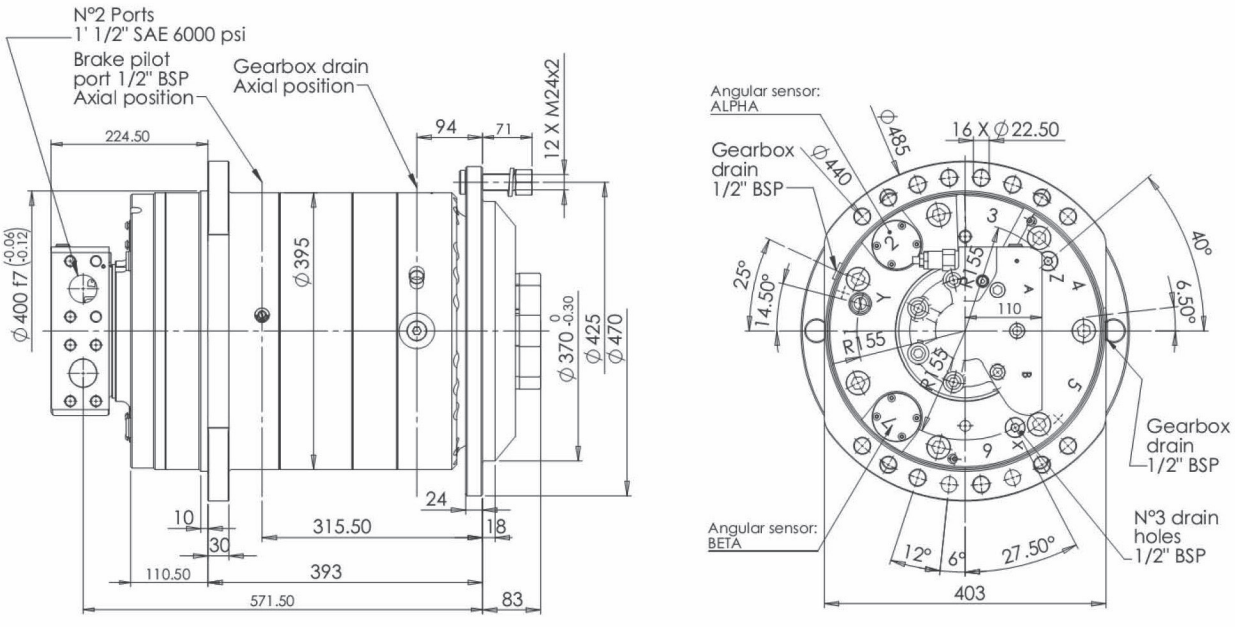
(5) Where n = gearbox output speed (rpm) and h = working time (hours)

## WHEEL MOTORS WITH GEARBOX TS Series

## TS8DW - INSTALLATION DRAWINGS

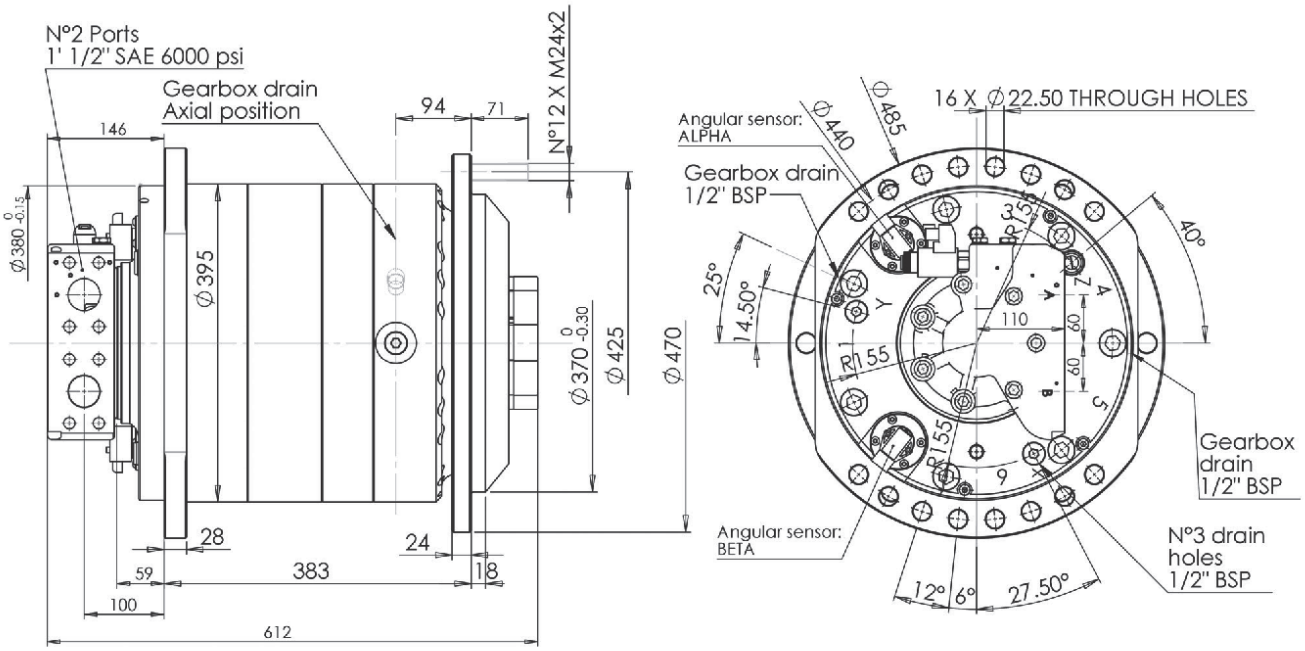



## TS8DWF - INSTALLATION DRAWINGS

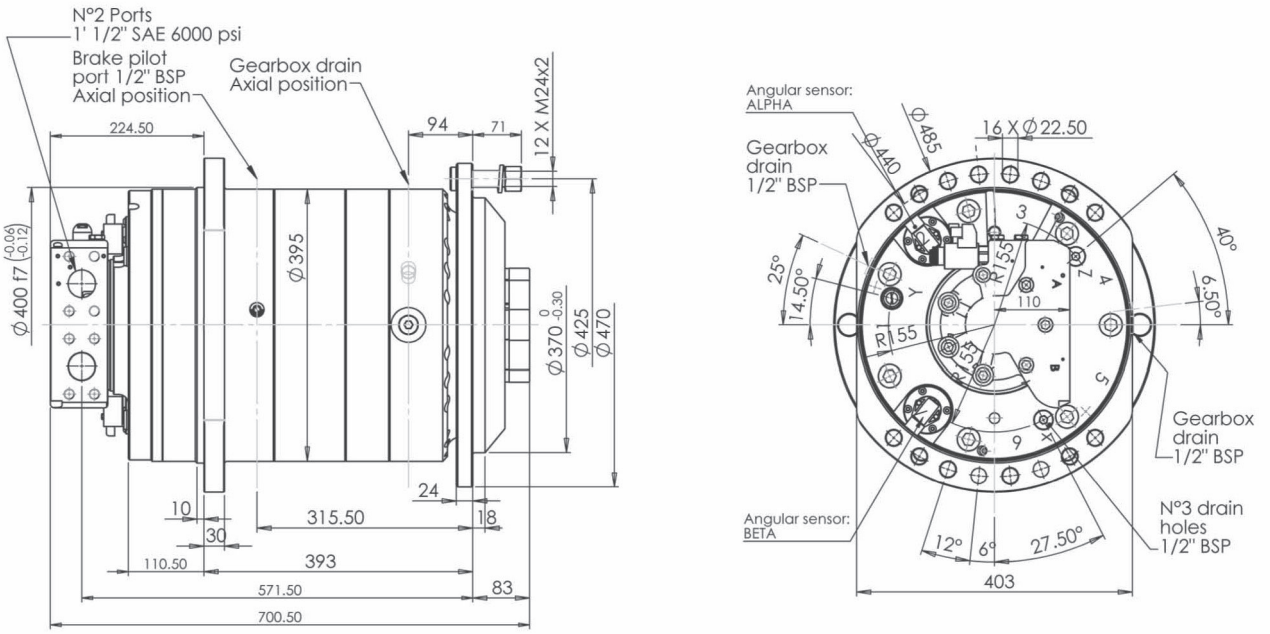


## WHEEL MOTORS WITH GEARBOX TS Series

## TS8VW - INSTALLATION DRAWINGS




## TS8VWF - INSTALLATION DRAWINGS



## WHEEL MOTORS WITH GEARBOX TS Series

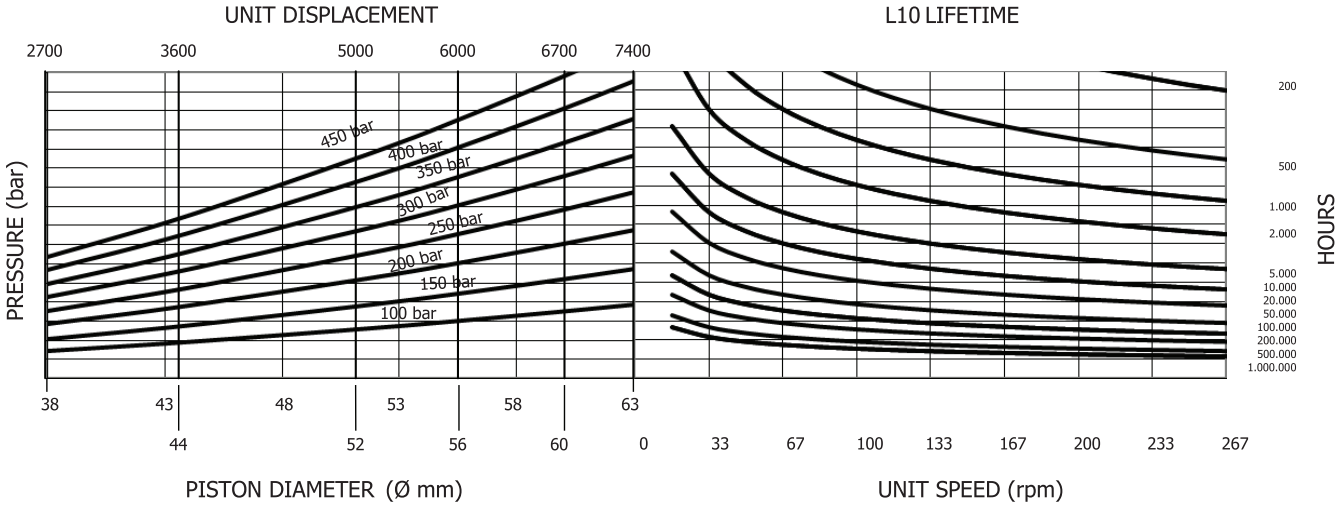
## TS8DW - TS8DWF
## TS8VW - TS8VWF

## BEARING LIFETIME GRAPHS

Bearing lifetime has been estimated according to L10 (according to ISO 281:1990).

The following graph has been plotted using the stroke of 56 mm.

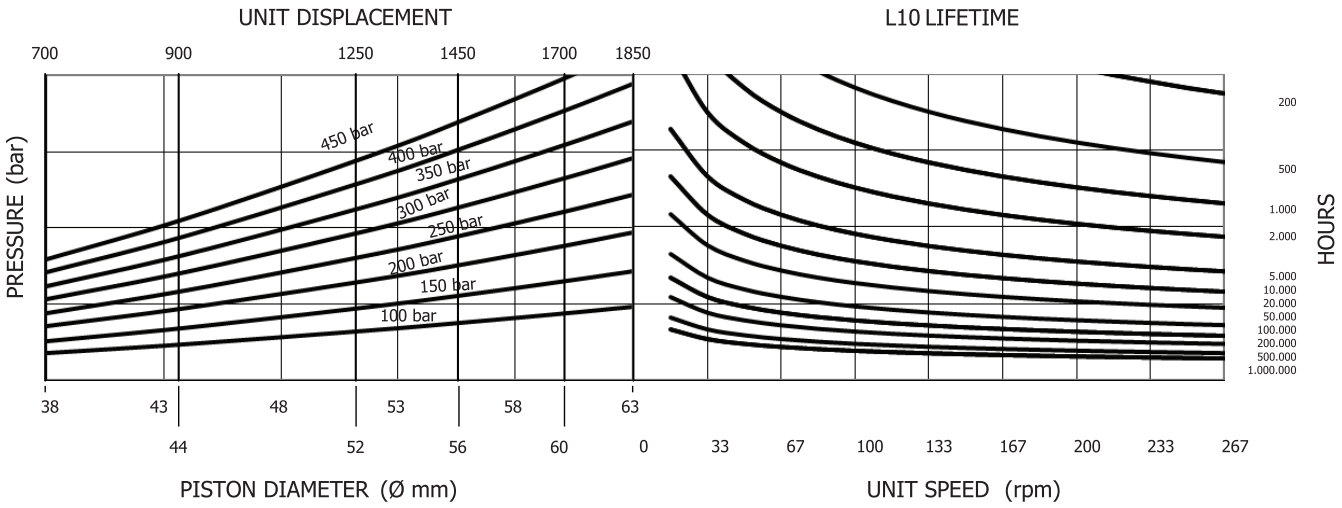
Please contact our Technical Department for other graphs relating to this product.




Bearing lifetime has been estimated according to L10 (according to ISO 281:1990).

The following graph has been plotted using the stroke of 14 mm.

Please contact our Technical Department for other graphs relating to this product.



## WHEEL MOTORS WITH GEARBOX TS8 Series

## ORDER CODE

| TS8 | + | | + | W | + | | + | | + | D907 | + | | + | | + | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|

| | | | | |
|---|---|---|---|---|
| 1 | **Type of displacement** | No code | = | fixed displacement |
| | | D | = | dual displacement |
| | | V | = | variable displacement |
| 2 | **Brake option** | F | = | brake |
| 3 | **Displacement** | see table | | |
| 4 | **Distributor** | D907 | = | For TS8W and TS8WF |
| | | D907D | = | For TS8DW and TS8DWF |
| | | D907V | = | For TS8VW and TS8VWF |
| 5 | **Options** | V | = | FKM seals |
| | | I | = | breath valve |
| | | RS | = | rotative sensor |
| 6 | **Direction of the output rotation** (viewed from the output side) with flow in port A, out port B. | No code | = | clockwise rotation |
| | | L | = | anti-clockwise rotation |
| 7 | **Distributor cover orientation** | No code | = | position 1 |
| | | DM2 | = | position 2 |
| | | DM3 | = | position 3 |

Example

TS8W 6000 D907

(standard)

TS8VWF 6000 D907V VL

(Options: FKM seals and direction anti-clockwise of the rotation)

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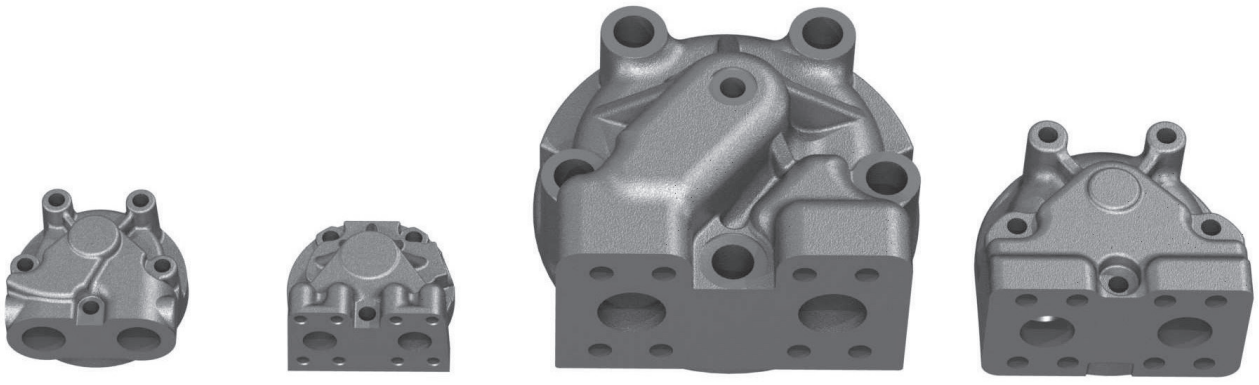
## DISTRIBUTORS



Please note that this page is to be considered an introduction to the Distributors Catalogue.
For further information please consult the mentioned catalogue.

| Distributor series | | | D3.. | D4.. | D5.. | D9.. |
|---|---|---|---|---|---|---|
| Speed | [rpm] | continuous | 300 | 1600 | 1600 | 700 |
| | | maximum | 500 | 2400 | 2400 | 1200 |
| Pressure | [bar] | continuous | 250 | 250 | 250 | 250 |
| | | maximum | 500 | 500 | 500 | 500 |
| Flow | [l/min] | continuous | 200 | 200 | 200 | 500 |
| | | maximum | 400 | 400 | 400 | 1000 |

Low speed distributors such as D31, D37 can be supplied mounted with a bronze disc.
With this option (called DBM) the distributors reach the same maximum speed as the high speed distributors.

| | D3.. | D4.. | D5.. | D9.. |
|---|---|---|---|---|
| P05R / P05R + F25 | O | X | O | - |
| P1G / P1G + F30D | O | X | O | - |
| P2G / P2G + F32 | O | X | O | - |
| BD2 / BD2 + F32 | O | X | O | - |
| GM05 + WR6B / WR10 | O | X | O | - |
| GM1 + WR6B / WR10 / WR20 | O | X | O | - |
| BD1 + WR6B / WR10 / WR20 | O | X | O | - |
| BV1 + WR6B / WR10 / WR20 | O | X | O | - |
| GM05 + G3 / F10L + G3 / G3A / F10L + G3A | O | X | O | - |
| GM1 + G3 / F10L + G3 / G3A / F10L + G3A | O | X | O | - |
| BD1 + G3 / F10L + G3 / G3A / F10L + G3A | O | X | O | - |
| BV1 + G3 / F10L + G3 / G3A / F10L + G3A | O | X | O | - |
| GK3 / GFK3R / GK3A / GFK3A | O | X | O | - |
| BDK3 / BDFK3R / BDK3A / BDFK3AR | O | X | O | - |
| BVK3 / BVFK3R / BVK3A / BVFK3AR | O | X | O | - |
| GK4 / GFK4 / BDK4 / BDFK4 / BVK4 / BVFK4 | O | X | O | - |
| TS8W | - | - | - | X |
| TS8DW | - | - | - | X |
| TS8VW | - | - | - | X |

| | |
|---|---|
| ALWAYS POSSIBLE | X |
| POSSIBLE ON REQUEST | O |
| NOT POSSIBLE | - |

## DISTRIBUTORS

| Distributor | Ports | Description |
|---|---|---|
| D31 | 3/4" BSP | |
| D310 | 1" BSP | |
| D311 | 1" BSP | |
| D312 | 3/4" BSP | |
| D313 | 1" BSP | |
| D314 | 1" BSP | |
| D322 | 3/4" BSP | Distributor with anti-cavitation valve |
| D37 | 1" SAE 3000psi | |
| D40 | 1" BSP | Standard for all motors unless otherwise described |
| D47 | 1" SAE 3000psi | |
| D47R | 1" SAE 6000psi | |
| D47D | 1" SAE 6000psi | |
| D47PV | 1" SAE 6000psi | |
| D48 | 1" BSP | With double pressure relief valves, 240 bar, 150 l/min |
| D481 | 1" BSP | With double pressure relief valves, 240 bar, 150 l/min. With purge valve 20 l/min at 20 bar |
| D49 | 1" BSP | With double pressure relief valves, 210 bar, 80 l/min |
| D491 | 1" BSP | With double pressure relief valves, 210 bar, 80 l/min. With purge valve 20 l/min at 20 bar |
| D504 | 1" BSP | With double overcentre valve 10:1, 120 l/min, 270 bar and shuttle valve |
| D508 | 1" BSP | |
| D508/A | 1" BSP | |
| D51 | 1" BSP | With double pressure relief valves, 240 bar, 150 l/min |
| D510 | 1" BSP | Short circuit freewheeling |
| D907 | 1 1/2" SAE 6000psi | |
| D907D | 1 1/2" SAE 6000psi | |
| D907V | 1 1/2" SAE 6000psi | |

# APPLICATION DATA SHEET

| General information | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Vehicle model | | | | Reference name | | | | | |
| Vehicle type (mark with an X) | | | | | | | | | |
| ☐ | Agricultural vehicle | ☐ | Forklift | ☐ | Dumper | ☐ | Motorized trailer | ☐ | Off-road vehicle |
| ☐ | Road roller | ☐ | Skid steer loader | ☐ | Harvesting vehicle | ☐ | Other. Please specify below | | |

| Vehicle specifications | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| No. of wheels | | | | No. of motors | | | | | |
| External tyre diameter of driving wheels | | | | Front wheels (m) | | Rear wheels (m) | | | |
| Vehicle weight | Unladen (kg) | | | Fully laden (kg) | | | | | |
| Weight distribution on vehicle axles (in kg) | | | | | | | | | |
| Unladen | Front axle | | Laden | Front axle | | Max slope to overcome (in %) | | | |
| | Rear axle | | | Rear axle | | | | | |
| Max vehicle working speed (km/h) | | | | Max vehicle working speed (km/h) | | | | | |
| Steering system | | | | Primary engine | | | | | |
| ☐ | 1 wheel steering | ☐ | 2 wheel steering | ☐ | 4 wheel steering | Maximum power (kW) | | | |
| ☐ | Skid steering | ☐ | Tracks | ☐ | Motorized trailer | Maximum speed (rpm) | | | |

| Hydraulic pump | | | | | | | |
|---|---|---|---|---|---|---|---|
| If a pump has already been selected please specify | | | | | | | |
| Quantity | | Type | | Displacement | | Max pressure | |

| Vehicle operating conditions | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Please specify the type of terrain | ☐ | Tarmac/Concrete | ☐ | Dry off-road | ☐ | Wet off-road | ☐ | Sand | |
| | ☐ | Rails | ☐ | Snow | ☐ | Other (please specify) | | | |
| Max number of hours of work | Per day | | Per year | | | | | | |

| Required options | | | | | | | |
|---|---|---|---|---|---|---|---|
| Will the motor be operating in freewheeling? | ☐ | Yes | ☐ | No | | | |
| If brakes are required please specify | No. of brakes per vehicle | | On which wheels | | | | |
| Brake actuation | ☐ | Mechanical | ☐ | Hydraulic negative (for static brake) | ☐ | Hydraulic positive (for dynamic brake) | |

| Company information | | | | | |
|---|---|---|---|---|---|
| Company name | | | | Date | |
| Country of origin | | | | | |
| Select type of company | ☐ | Distributor | ☐ | Manufacturer | |
| Contact name | | | Contact email address | | |
| Contact phone number | | | Contact fax number | | |

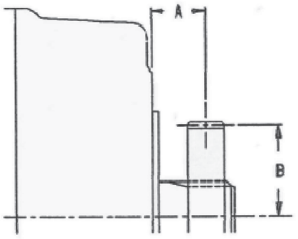
| Signature & stamp | |
|---|---|

# APPLICATION DATA SHEET

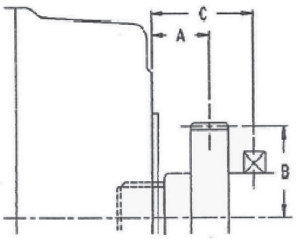
| General information | | | | |
|---|---|---|---|---|
| Name or reference of the machine | | | | |
| | | | | |
| Select type of machine | | | | |
| ☐ | Winch | ☐ | Concrete mixer | |
| ☐ | Auger | ☐ | Pinion drive | |
| ☐ | Conveyor | ☐ | Mixer | |
| ☐ | Plastic injection moulding machine | | | |
| ☐ | Other | Please specify below | | |
| | | | | |
| Annual production | | | Qty | |
| If machine in production please specify motors used below | | | | |
| | | | | |
| Maximum number of hours of work | | | | |
| per day | | per year | | |

| Hydraulic technical specifications | | | |
|---|---|---|---|
| Pump | Model name | | |
| | Displacement | | cc |
| | Power rating | | kW |
| | Flow | | l/min |
| | Maximum pressure | | bar |
| Motor | Maximum torque | | Nm |
| | Maximum speed | | rpm |
| | System pressure setting | | bar |
| | Maximum power | | kW |
| | Inertia values (if known) | | |
| If the motor has to work in freewheeling please specify | | | |
| Maximum speed | | | rpm |
| If brakes are required please specify whether they have | | | |
| ☐ | Mechanical actuation | ☐ | Hydraulic (negative) actuation |
| Hydraulic fluid used | | | |
| ☐ | Mineral oil | ☐ | Water glycol |
| ☐ | Phosphate-ester | ☐ | Water emulsion |
| ☐ | Biological oil | | |
| Viscosity | | | cSt |

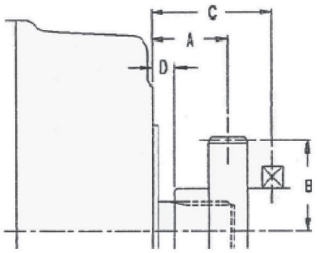
| Duty cycle | | | | |
|---|---|---|---|---|
| | Duration | Pressure | Speed | Radial load |
| | sec | bar | rpm | kN |
| 1 | | | | |
| 2 | | | | |
| 3 | | | | |
| 4 | | | | |




| | mm |
|---|---|
| A | |
| B | |




| | mm |
|---|---|
| A | |
| B | |
| C | |




| | mm |
|---|---|
| A | |
| B | |
| C | |
| D | |

| Other useful information |
|---|
| |
| |
| |
| |
| |

| Company information | | | |
|---|---|---|---|
| Company name | | Date | |
| Country of origin | | | |
| Select type of company | ☐ Distributor | ☐ Manufacturer | |
| Contact name | | Contact email address | |
| Contact phone number | | Contact fax number | |

| Signature & stamp | |
|---|---|

As HANSA-TMP has a very extensive range of products and some products have a variety of applications, the information supplied may often only apply to specific situations.

If the catalogue does not supply all the information required, please contact HANSA-TMP.
In order to provide a comprehensive reply to queries we may require specific data regarding the proposed application.

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HANSA-TMP reserves the right to amend specifications at their discretion.

HANSA-TMP
MANUFACTURING YOUR SUCCESS

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ISO 9001:2015 – ISO 14001:2015

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