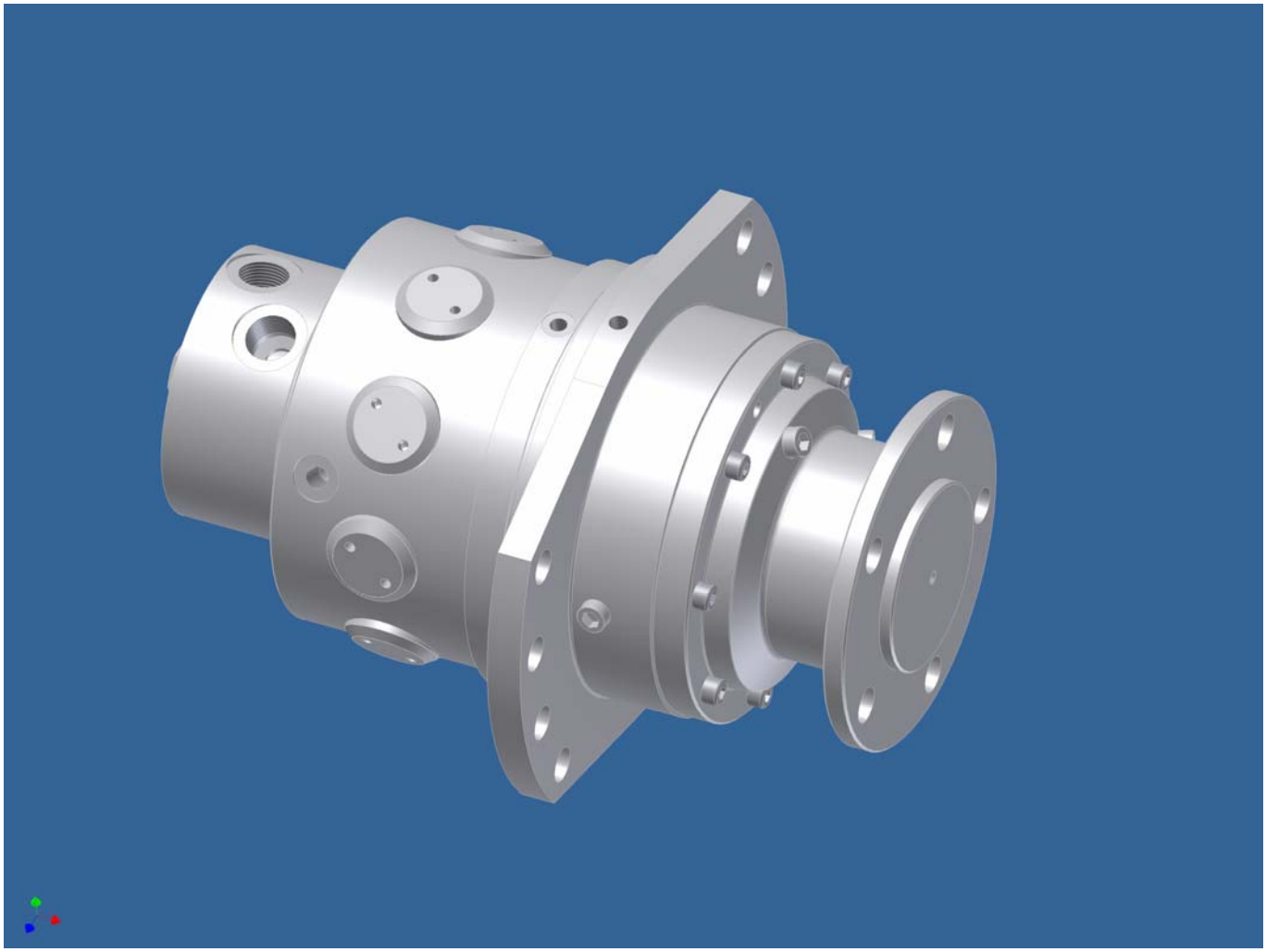
WHEEL MOTOR
W SERIES
TECHNICAL CATALOGUE

W 05

INDEX

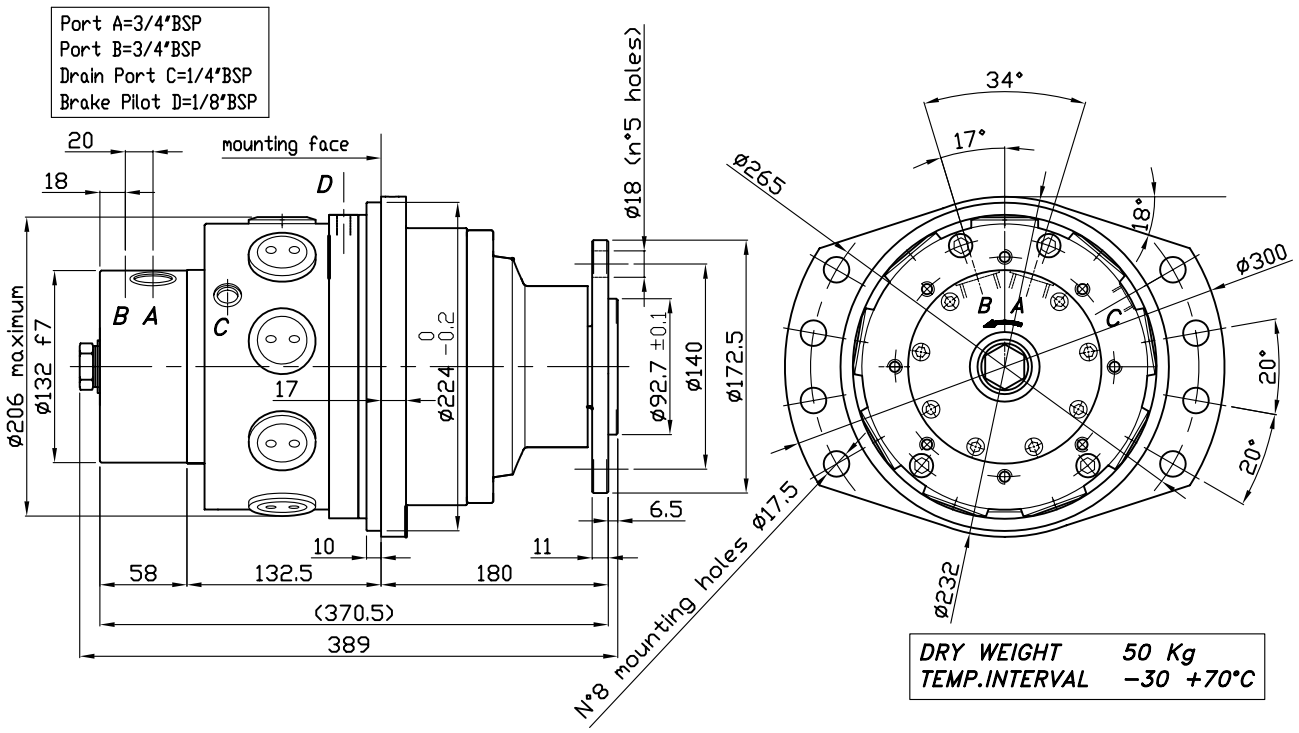
GENERAL INFORMATION

INTERMOT produces RADIAL PISTON HYDRAULIC MOTORS since 1985: our yearly production is more than 13.000 units which we sell all over the world through our agents and authorized sellers. Our motor range varies from 20cc to 8500cc displacement and it is completed by two-speed motors and special motors created in cooperation with our clients for different applications such as : underwater, high & low speed and wheel motors and with the possibility to assemble valves, brakes or gear reductions. You can directly contact our Technical Department which will give you all the necessary support to find the right solutions to your problems.
INTERMOT is a flexible work reality and manages deliveries also within the same day of order; we produce motors exactly interchangeable with our competitors, always ready on stock which our clients particularly appreciate.



SIZE

W 05 – G100 (Fixed displacement) STANDARD SERIES



TECHNICAL DATA

W 05 – G100 (Fixed displacement)

Gear code	Gear ratio	Output torque		Working pressure		Total displacement	Max output speed	Max freewheeling speed (*)	Max power	
				continuos	maximum					
		Nm (cont)	Nm (max)	bar	bar	cc/Rev	Rpm	Rpm	kW	HP
1	1:3.55	1400	1970	250	350	361	620	560	60	82
2	1:4.28	1680	2350	250	350	432	520	470	60	82
3	1:5.6	2250	3100	250	350	565	390	360	60	82
4	1:6.75	2700	3800	250	350	681	325	300	60	82

Brake technical data

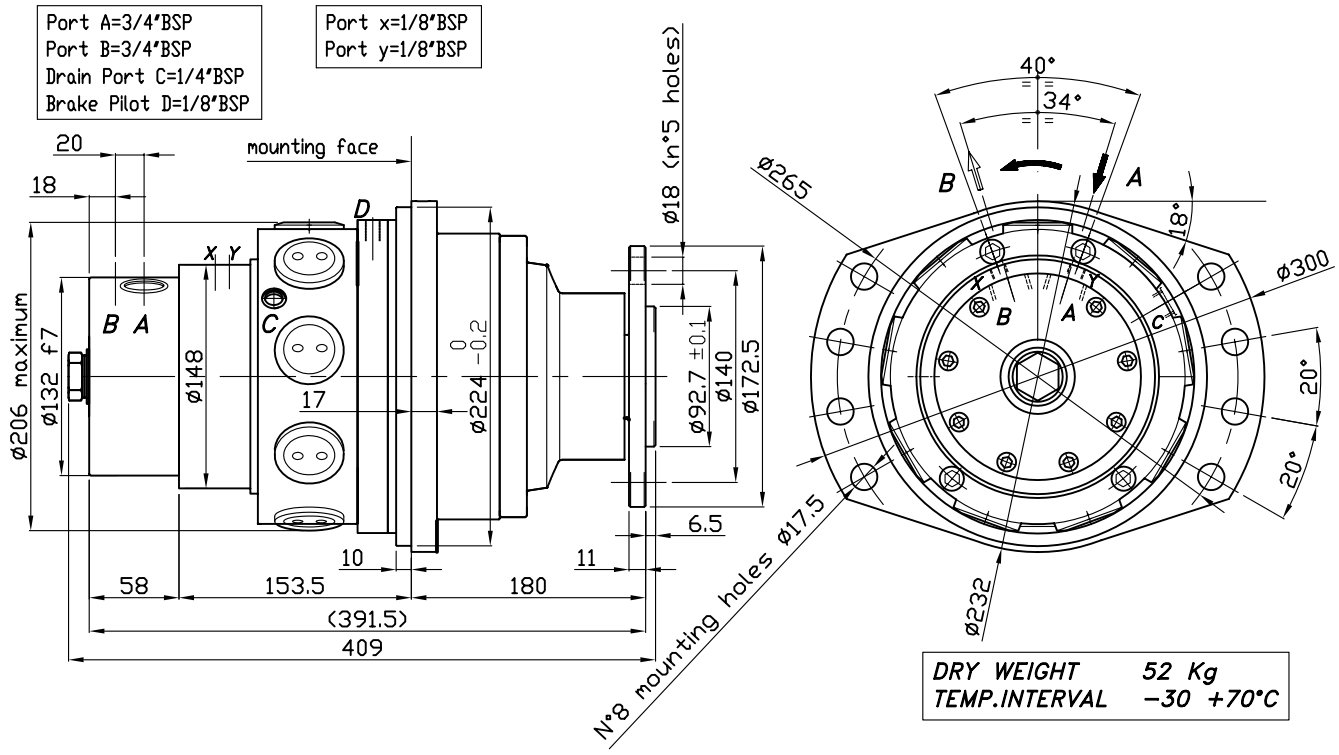
Oil quantity gear unit	[l]
Horizontal	0.6
Vertical	1.8

Gear code	max braking torque [Nm]	release pressure [bar]	max pressure [bar]
1	1850	13	350
2	2250	13	350
3	2900	13	350
4	3500	13	350

(*) for the hydraulic circuit, please refer to page 6 (Freewheeling operation).

SIZE

W 05 – GD100 (Dual displacement) STANDARD SERIES



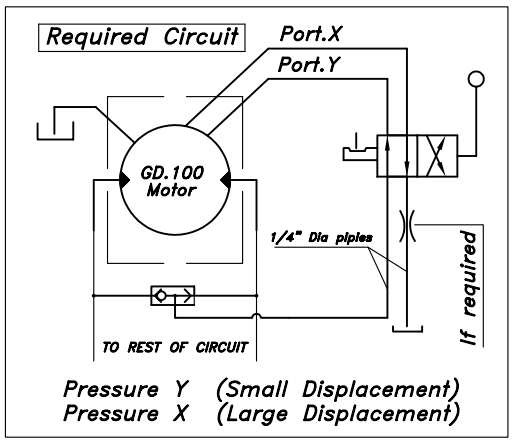
W 05 – GD100 (Dual displacement)

NOTES

Displacement change sistem is realized HYDRAULICALLY & requires system pressure for operation

One port must be presurised continuously to maintain given capacity,other port is connected to drain

Displacement change required Circuit



W05 – GD 100 TECHNICAL DATA

The W05 – GD100 it is a dual displacement wheel motor. The user can choose between two displacements. In the bottom of the page the technical wheel motor technical characteristics are shown, both for the maximum and minumum motor displacement. For closed loop circuit applications please contact Intermot technical departement.

DISPLACEMENT CHANGE DURING THE MOTOR FUNCTIONING

The user can choose between two displacements, acting on the hydraulic circuit. When the X port is at high pressure (system pressure) and the Y port is at low pressure (drain pressure), the motor functions at the maximum displacement, otherwise, when the Y port is at high pressure (system pressure) and the X port is at low pressure (drain pressure), the motor functions at the minimum displacement. When the X and Y ports are at low pressure the motor automatically switch in the maximum displacement.

Maximum displacement technical data

Gear code	Gear ratio	Output torque		Working pressure		Total displacement	Max output speed	Max freewheeling speed (*)	Max power	
				continuos	maximum					
		Nm (cont)	Nm (max)	bar	bar	cc/Rev	Rpm	Rpm	kW	HP
1	1:3.55	1400	1970	250	350	361	620	560	60	82
2	1:4.28	1680	2350	250	350	432	520	470	60	82
3	1:5.6	2250	3100	250	350	565	390	360	60	82
4	1:6.75	2700	3800	250	350	681	325	300	60	82

Minimum displacement technical data

Gear code	Gear ratio	Output torque		Working pressure		Total displacement	Max output speed	Max freewheeling speed (*)	Max power	
				continuos	maximum					
		Nm (cont)	Nm (max)	bar	bar	cc/Rev	Rpm	Rpm	kW	HP
1	1:3.55	700	985	250	350	180	670	560	23	32
2	1:4.28	840	1175	250	350	216	560	470	23	32
3	1:5.6	970	1410	220	320	283	430	360	23	32
4	1:6.75	1060	1700	200	320	341	355	300	23	32

(*) for the hydraulic circuit, please refer to page 6 (Freewheeling operation).

Brake technical data

Oil quantity gear unit	[l]
Horizontal	0.6
Vertical	1.8

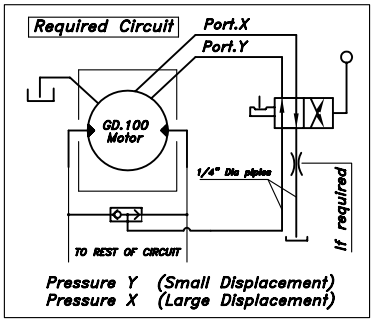
Gear code	max braking torque [Nm]	release pressure [bar]	max pressure [bar]
1	1850	13	350
2	2250	13	350
3	2900	13	350
4	3500	13	350

NOTES

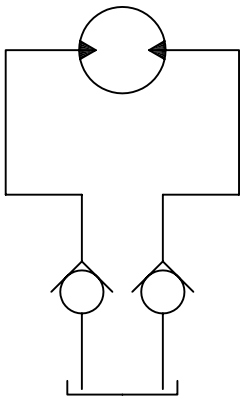
Displacement change sistem is realized HYDRAULICALLY & requires system pressure for operation

One port must be presurised continuously to maintain given capacity,other port is connected to drain

Displacement change required Circuit

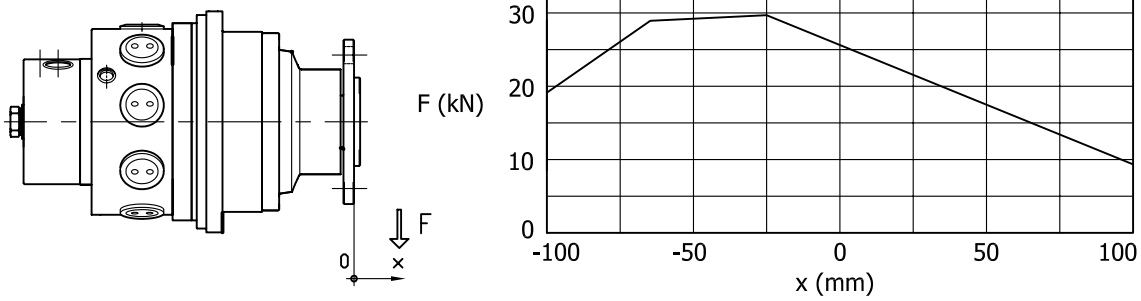


FREEWHEELING OPERATION



This is the most suitable circuit for high speed freewheeling. The motor operates under vacuum conditions, therefore it can work several hours without causing any damage and overheating.
The switch from normal to freewheeling operation (and viceversa) must be done at low speed and pressure.
For further informations please contact Intermot technical department.

RADIAL LOAD

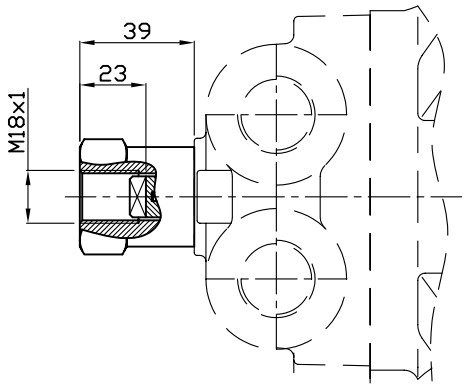


In the above diagram it is shown the maximum radial load to ensure a minimum life of 100000 revolutions.

For further information contact Intermot technical department.

TACHOMETER

TA



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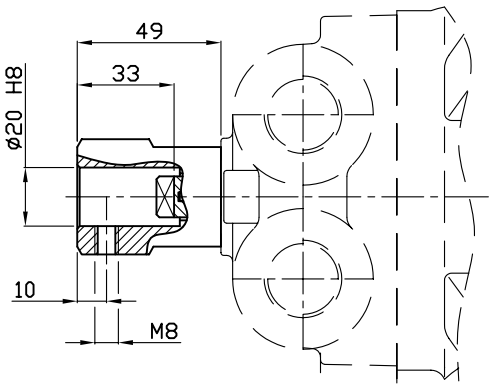
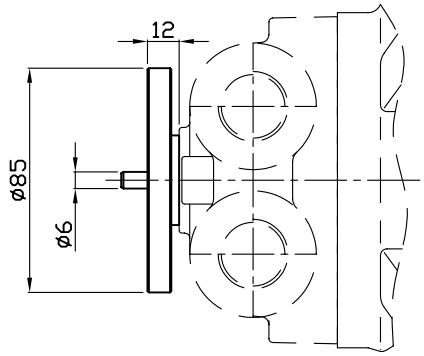
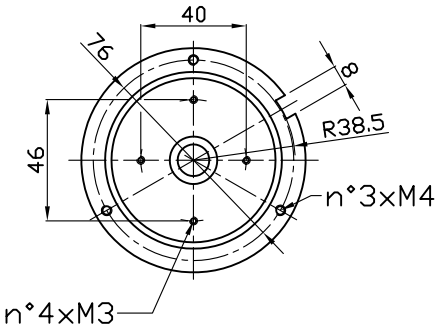
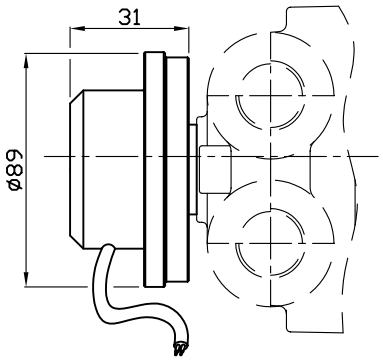


EST





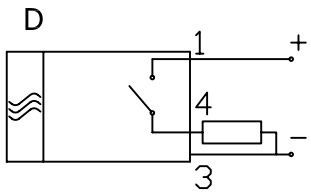
EST.30



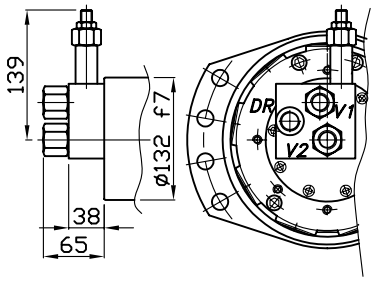
Operating parameters	E-...../3
Power supply (VDC)	10-30
Switching current (mA)	150
Frequency (Hz) 100rpm	50
Impulse/rpm	30
Operating temp. (°C)	-24/+70
Protection degree	IP67
Output	NPN
Motor type	All types

MODEL	Ø5
Torque	1 Nm

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

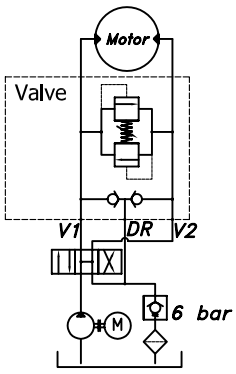


RELIEF AND ANTICAVITATION VALVE



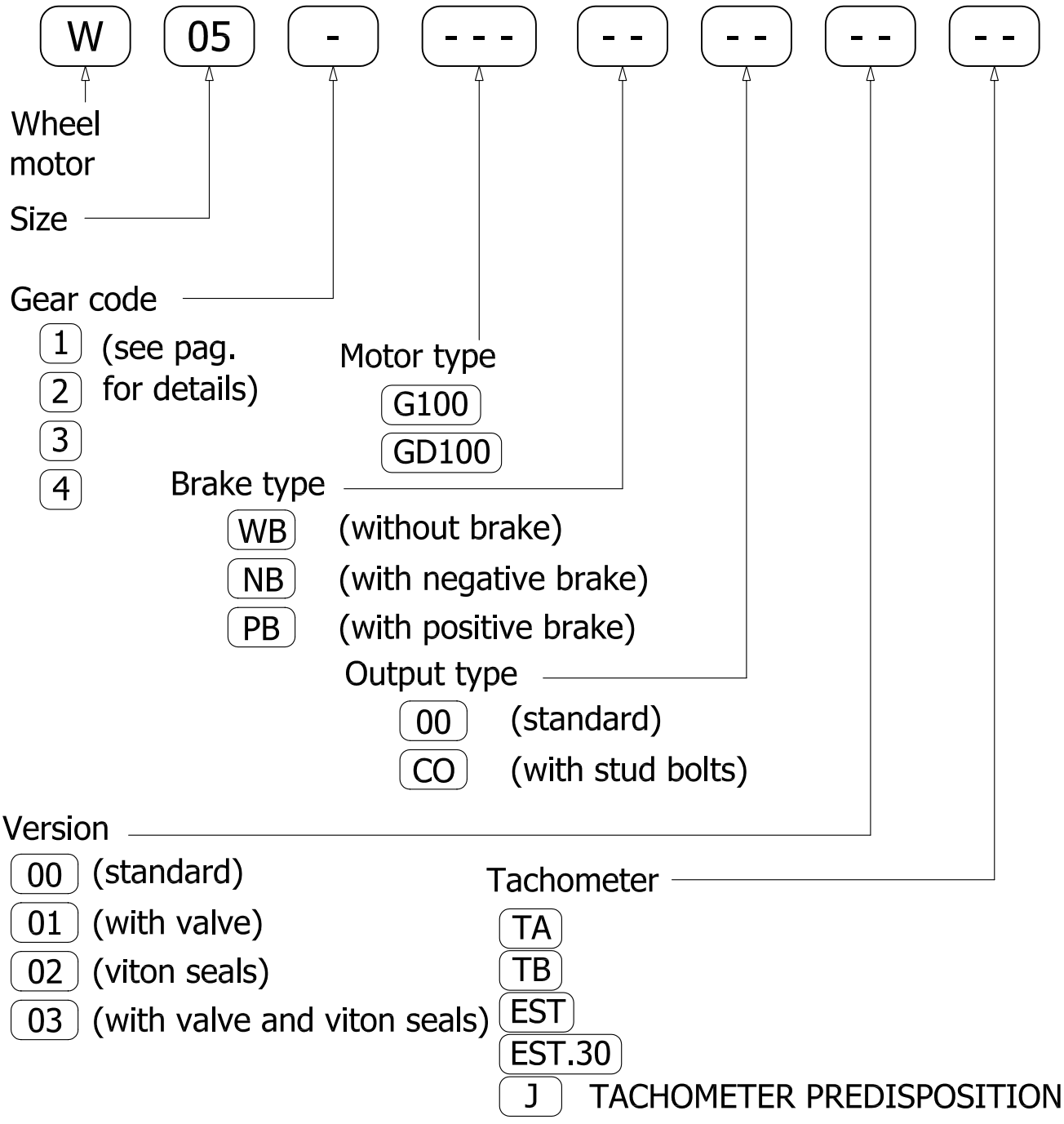
Valve dimensions

Valve technical data	
Max flow rate	45 l/min
Max pressure	350 bar
Max oil temperature	-30÷80 °C
Advised filtration	30÷50 micron



Valve hydraulic circuit

ORDERING INSTRUCTIONS W



EXAMPLE:
W.05.2.G100.WB.00.00
W.05.1.G100.NB.00.01.J
W.05.1.GD100.NB.CO.00.TA

HYDRAULIC MOTOR FLUIDS RECOMMENDATIONS

HYDRAULIC FLUIDS

We recommend the use of hydraulic oils with anti-wear additives (ISO HM or HV) and minimum viscosity index of 95.
Once normal working temperature is reached, oil viscosity must be at least 12 cSt, preferably in the range from 20 to 60 cSt.
Hydraulic oils meeting Denison MF-O, Vickers M-2952-S I - 286-S performance requirements and DIN 51524 specifications, are preferred.

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

HM type

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

HV type

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

OIL VISCOSITY RECOMMENDATION

Room temperature HM type ISO-VG

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

Our motors have been designed to work also with:

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

During cold start-up, avoid high-speed operation until the system is warmed up to provide adequate lubrication.
Continuous working temperature must not exceed 70°C.

FIRE RESISTANT OIL LIMITATIONS

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

FILTRATION

Hydraulic systems oil must always be filtered.
The choice of filtration grade derives from needs of service life and money spent. In order to obtain stated service life it is important to follow our recommendations concerning filtration grade.
When choosing the filter it is important to consider the amount of dirt particles that filter can absorb and still operate satisfactorily. For that reason we recommend filters showing when you need to substitute filtering cartridge.

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

OXIDATION

Hydraulic oil oxidizes with time of use and temperature. Oxidation causes changes in colour and smell, acidity increase or sludge formation in the tank. Oxidation rate increases rapidly at surface temperatures above 60°C, in these situations oil should be checked more often.
The oxidation process increases the acidity of the fluid; the acidity is stated in terms of the "neutralization number". Oxidation is usually slow at the beginning and then it increases rapidly.
A sharp increase (by a factor of 2 to 3) in neutralization number between inspections shows that oil has oxidized too much and should be replaced immediately.

WATER CONTENT

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

DEGREE OF CONTAMINATION

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

ANALYSIS

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

HYDRAULIC MOTOR INSTRUCTIONS AND ADVICES

INSTALLATION

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

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

Splined adaptors (sleeves) are available upon request.

INSTALLATION CIRCUIT

The choice of open or closed loop circuit will be determined by the application.
Open loop circuits are cheaper and simpler to install.
Closed loop circuit is a superior circuit and usually takes up less space. It also offers better control features.

START UP

Motor case and pistons must be completely filled with oil before starting.
Do not load motor to maximum working pressure. Increase load gradually at start-up.

CASE DRAIN – CASE PRESSURE

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

IMPORTANT

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

TEMPERATURE

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

VISCOSITY

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

BACK PRESSURE

Don't exceed 70 bar back pressure.

HIGH PEAKS APPLICATIONS

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

CONTINUOUS HIGH SPEED DUTY

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

MINIMUM SPEED

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

FLUSHING

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

COOLING FLOW

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

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

GEAR UNIT INSTRUCTIONS AND ADVICES

The gear unit maintenance requires the periodic change of the oil and the lubrificant level monitoring. We advice to change the oil before 100 hours (during the gear unit running-in), and every 800 hours, and at least one time par year.
The recommended gear unit mineral oils are the following:
AGIP BLASIA 220
SHELL OMALA EP 220
BP ENERGOL GR-HP 220
ESSO SPARTAN EP 220
ELF REDULTELF SP 220
MOBIL MOBILGEAR 630

To fill the gear unit with lubrificant it is necessary rotate the group to let the two plugs to be in the correct position (see fig.1). After this the two plugs must be removed and the gear unit must be filled with mineral oil until the oil will flows out from the upper plug hole.

To remove the gear unit lubrificant it is necessary rotate the group to be in the correct position (see fig. 2). After this the two plugs must be removed; this will let the mineral oil flows out easily. To do this operation in the most easy way the oil must be warm.
A frequent oil level checking it is recommended. It is a good rule do this check every 80 working hours.
Assure that the system it is clean before start the unit it is compulsory.

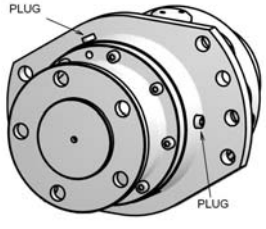


Fig.1

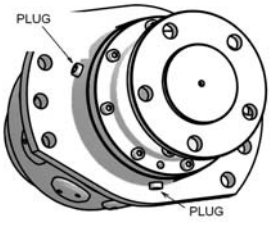


Fig.2

HYDRAULIC MOTOR SHAFT SEAL FEATURES

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

1. Features

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

2. Material

Sealing lip and O.D.:
- Acrylonitrile-butadiene rubber with 72 Shore A hardness (designation: SIMRIT® 72 NBR 902)
- Fluoro rubber with 75 Shore A hardness (designation: SIMRIT®75 FKM 595)

Metal insert:
- Plain steel DIN 1624

Spring:
- Spring steel DIN 17223

3. Application

For sealing pressurised media without additional backup ring, e. g. for rotational pressure sealing in hydraulic pumps, hydraulic motors, hydrodynamic clutches. Rubber covered O.D. assures sealing in the housing bore even in case of considerable surface roughness, thermal expansion or split housing.
Particularly suitable for sealing low viscosity and gaseous media.
Where high thermal stability and chemical resistance are required, SIMRIT® 75 FKM 595 material should be used.
Additional dust lip to avoid the entry of light and medium dust and dirt.

4. Operating conditions

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

Media:	mineral oils, synthetic oils	
Temperature:	-40°C to +100°C	(SIMRIT® 72 NBR 902)
	-40°C to +160°C	(SIMRIT® 75 FKM 595)
Surface speed:	up to 5 m/s	
Working pressure:	see diagram 1	

Maximum permitted values, depending on other operating conditions.

5. Housing and Machining Criteria

See Part B/ SIMMERRING®, sections 2.

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

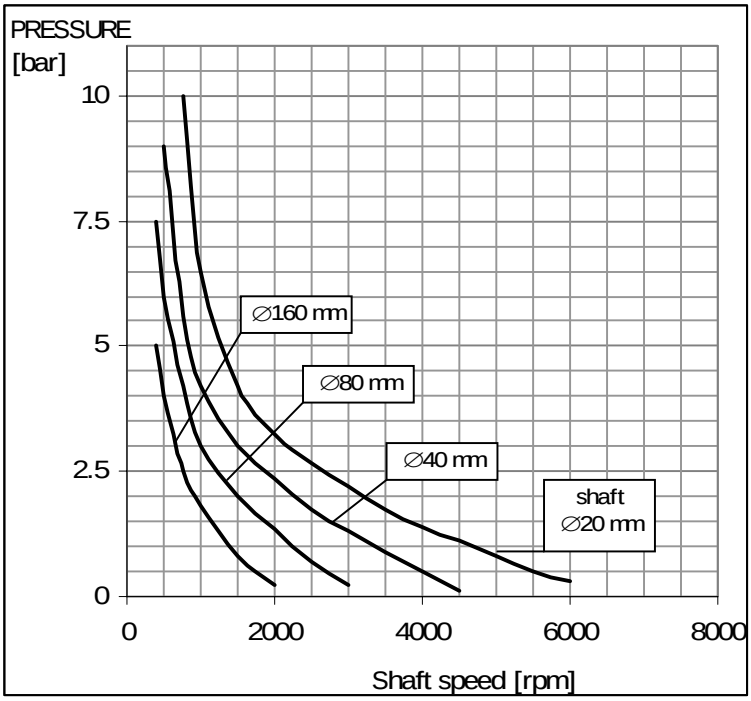


Diagram 1: Pressure Loading Limits

For more details please contact our Technical Department.

GEAR UNIT SHAFT SEAL FEATURES

Type: BASL
Form: AS DIN 3760
Material: SIMRIT® 72 NBR 902

1. Features

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

2. Material

Sealing lip and O.D.:
- Acrylonitrile-butadiene rubber with 72 Shore A hardness (designation: SIMRIT® 72 NBR 902)

Metal insert:
- Plain steel DIN 1624

Spring:
- Spring steel DIN 17223

3. Application

For sealing pressurised media without additional backup ring, e. g. for rotational pressure sealing in hydraulic pumps, hydraulic motors, hydrodynamic clutches. Rubber covered O.D. assures sealing in the housing bore even in case of considerable surface roughness, thermal expansion or split housing.
Particularly suitable for sealing low viscosity and gaseous media.
Where high thermal stability and chemical resistance are required, SIMRIT® 75 FKM 595 material should be used (see BAUMSLX7, in the bottom of this page).
Additional dust lip to avoid the entry of light and medium dust and dirt.

4. Operating conditions

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

Media:	mineral oils, synthetic oils, grease	
Temperature:	-40°C to +100°C	(SIMRIT® 72 NBR 902)
Surface speed:	up to 13 m/s (see Part B/SIMMERRING®, section 1, fig. 1.3)	
Working pressure:	up to 0.05 MPa/0,5 bar	

Maximum permitted values, depending on other operating conditions.

5. Housing and Machining Criteria

See Part B/ SIMMERRING®, sections 2.

Shaft:	Tolerance:	ISO h11
	Concentricity:	IT 8
	Roughness:	Ra=0.2-0.8 µm Rz=1÷5 µm Rmax<6,3 µm
	Hardness:	45-60 HRc
	Roughness: preferably by	non oriented; plunge grinding
Housing:	Tolerance:	ISO H8
	Roughness:	Rz=10÷25 µm

Type: BAUMSLX7
Form: AS DIN 3760
Material: SIMRIT® 75 FKM 585

1. Features

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

2. Material

Sealing lip and O.D.:
- Fluoro rubber with 75 Shore A hardness (designation: SIMRIT®75 FKM 595)

Metal insert:
- Plain steel DIN 1624

Spring:
- Spring steel DIN 17223

3. Application

For sealing pressurised media without additional backup ring, e. g. for rotational pressure sealing in hydraulic pumps, hydraulic motors, hydrodynamic clutches. Rubber covered O.D. assures sealing in the housing bore even in case of considerable surface roughness, thermal expansion or split housing. Particularly suitable for sealing low viscosity and gaseous media. Particulary suitable for high thermal stability and chemical resistance.
Additional dust lip to avoid the entry of light and medium dust and dirt.

4. Operating conditions

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

Media:	mineral oils, synthetic oils, grease	
Temperature:	-25°C to +160°C	(SIMRIT® 75 FKM 585)
Surface speed:	up to 13 m/s (see Part B/SIMMERRING®, section 1, fig. 1.3)	
Working pressure:	up to 0.05 MPa/0,5 bar	

Maximum permitted values, depending on other operating conditions.

5. Housing and Machining Criteria

See Part B/ SIMMERRING®, sections 2.

Shaft:	Tolerance:	ISO h11
	Concentricity:	IT 8
	Roughness:	Ra=0.2-0.8 µm Rz=1÷5 µm Rmax<6,3 µm
	Hardness:	45-60 HRc
	Roughness: preferably by	non oriented; plunge grinding
Housing:	Tolerance:	ISO H8
	Roughness:	Rz=10÷25 µm

CONVERSIONS

LENGTH	1	m	=	39.3701 in
			=	3.2808 ft
			=	1.0936 yd
			=	1000 mm
	1	in	=	0.0833 ft
			=	25.4 mm
	1	ft	=	0.3048 m
			=	0.3333 yd
			=	12 in
	1	yd	=	0.9144 m
			=	3 ft
			=	36 in
	1	km	=	1000 m
			=	1093.6 yd
			=	0.6214 mile
	1	mile	=	1.609 km
			=	1760 yd

MASS	1	kg	=	2.2046 lb
	1	lb	=	0.4536 kg

SPEED	1	m/s	=	3.6 km/h
			=	2.237 mph
			=	3.2808 ft/s
	1	km/h	=	0.2778 m/s
			=	0.6214 mph
			=	0.9113 ft/s
	1	mph	=	1.609 km/h
			=	0.447 m/s
			=	1.467 ft/s
	1	ft/s	=	0.3048 m/s
			=	1.0973 km/h
			=	0.6818 mph

FORCE	1	N	=	0.102 kgf
			=	0.2248 lbf
	1	kgf	=	2.205 lbf
			=	9.806 N
	1	lbf	=	0.4536 kgf
			=	4.448 N

PRESSURE	1	bar	=	14.223 psi
			=	0.99 atm
			=	1.02 ata
			=	100000 Pa
			=	100 kPa
			=	0.1 MPa
	1	psi	=	0.0703 bar

FLOW	1	l/min	=	0.264 gpm
			=	1000 cc/min
	1	gpm	=	3.785 l/min
			=	3785 cc/min
	1	m3/s	=	60000 l/min
			=	15852 gpm

POWER	1	kW	=	1.341 HP
			=	1.3596 CV
	1	HP	=	0.7457 Kw
			=	1.0139 CV

TORQUE	1	Nm	=	0.102 kgm
			=	0.7376 lbf ft
	1	kgm	=	9.806 Nm
			=	7.2325 lbf ft
	1	lbf ft	=	0.1383 kgm
			=	1.3558 Nm

APPLICATION DATA SHEET

To ensure that the most suitable motor is selected for your application please fill out and send us a copy of the data sheet below.

- **GENERAL INFORMATION**

Vehicle model/reference name: .....

Type of vehicle: ☐ Agricultural vehicle ☐ Road roller ☐ Skid steer loader ☐ Dumper

☐ Harvesting vehicle ☐ Fork lift ☐ Off-road vehicle ☐ Motorised trailer

Other: .....

Production Volume: .....

If the vehicle is already in production, please write down hydraulic motors used: .....
.....

- **VEHICLE SPECIFICATIONS**

N° of wheels ..... N° of motors ..... Max speed (km/h) .....

Ext. tyre diameter of drive-wheels front (m) ..... rear (m) .....

Vehiche weight: unloaded (kg) ..... loaded (kg) .....

Weight distribution on vehicle axes: ..... unloaded/front (kg) ..... unloaded/rear (kg) .....

loaded/front (kg) ..... loaded/read (kg) .....

Steering system: ☐ 1-wheel steering ☐ 2-wheel steering ☐ 4-wheel steering ☐ Skid steering ☐ Tracks ☐ Motorised trailer

- **PRIMARY ENGINE**

Max power (kW) ..... max speed (rpm) .....

- ..... **HYDRAULIC PUMP**

Type of pump ..... Quantity: .....
Displacement (cm^3) ..... max pressure (bar) .....

- ..... **VEHICLE OPERATING CONDITIONS**

Specify type of terrain

☐ Tarmac/concrete ☐ Off-road, dry ☐ Off-road, wet ☐ Rails Max angle slope: ……°

Working hours: Per day (h) ..... Per year (h) .....

- **OPTIONS REQUIRED**

Will the motor operate in free-wheeling (Y/N)? .....
If brakes are required, indicate: Quantity per vehicle ..... on which wheels .....

Brake actuation: ☐ mechanical ☐ hydraulic positive ☐ hydraulic negative