



CESTARI
REDUTORES

Worm Gearbox line | Instruction Manual



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1 General Considerations

The purpose of this manual is to provide important information that must be observed when transporting, storing, installing, operating and maintaining WEG-CESTARI products (gear units, gear motors, parts, and parts) and we, therefore, recommend that you carefully read the instructions contained herein. Failure to observe the instructions in this manual, in the motor manual (if supplied), voids the product warranty and may result in serious personal injury and property damage.

In the case of geared motors supplied with a WEG motor, the Motor Installation, Operation and Maintenance Manual is attached to this manual and must also carefully observe.

The gearboxes supplied with a nameplate (Fig.1) and the geared motors supplied with two nameplates, one from the gearbox (Fig..1) and one from the motor (according to the manufacturer's standard). The nameplates contain symbols and values that determine the characteristics of the gearbox and the motor. They fixed in an easily visible place; they made of weather-resistant material.

The data on the gearbox nameplate are:

- **Code:** Gearbox or geared motor code.
- **Serial:** Serial number.
- **P1:** Motor or gearbox power (kW).
- **rpm:** Gearbox output speed.
- **M2:** Output torque (Nm).
- **sf:** Service factor.
- **i:** Total reduction.
- **Weight:** Weight of the gearbox without motor (kg).
- **Oil:** Type and viscosity of the oil at 40°C.
- **P:** Working position and Year of manufacture.
- **TAG:** Information Space

WEG CESTARI REDUTORES		www.wegcestari.com (55) 16 3244 1000	MADE IN BRAZIL
CÓDIGO/TYPE		SÉRIE SERIAL NUMBER	
P1	<input type="text"/> kW	rpm	<input type="text"/>
M2	<input type="text"/> Nm	fs / sf	<input type="text"/>
i	<input type="text"/>	Peso / Weight (Redutor / Gear)	<input type="text"/> kg
Óleo Oil	<input type="text"/>	P	Ano Year <input type="text"/>
TAG <input type="text"/>			

Figura 1

The geared motors and gearboxes supplied painted with WEG-CESTARI standard synthetic enamel or according to specific customer requirements.

1.1 Safety instructions and information

All safety and warning instructions must be followed without exception!

ⓘ WARNING!

Warning of electrical or mechanical danger.

ⓘ ATTENTION!

Important instructions for safe and trouble-free operation.

1.2 General information

This documentation is an integral part of the product and must be read carefully. The information is intended for all people involved in the assembly, installation, operation, and maintenance of the product and must be followed.

We do not accept any liability for damage or interruptions of operation resulting from non-compliance with this documentation.

In the interest of future development, we reserve the right to make modifications and adjustments to this document without prior notice.

If you have any questions or would like further information, please contact WEG-CESTARI Redutores e Motor reduutores S.A.

Intended use:

Geared motors are exclusively designed to generate a defined rotary motion in machines and equipment. Any use other than this is considered unintended use.

The user/operator of the machine or equipment is solely responsible for damage resulting from this. The details of this manual, the nameplate, and other technical documentation must be considered and observed.

Intended use for motors:

The motors are designed for operation with power and also in combination with frequency inverters.

Standard motors are designed for use in:

- Ambient temperatures from -20°C to +40°C
- Altitudes ≤ 1000 m above sea level.

This information can also be found on the motor nameplate

1.3 Exclusion of liability

The information contained in this Instruction Manual must be followed to ensure the safe and flawless operation of the Geared motor and to achieve the specified product characteristics and performance requirements.

WEG-CESTARI assume no responsibility for damage to persons, equipment or property resulting from non-compliance with this instruction manual. In these cases, any liability for defects is excluded.

1.4 Copyright and protection rights

Todos os documentos técnicos são protegidos de acordo com a lei de direitos autorais. O processamento, reprodução e divulgação deles, mesmo que em partes, assim como outra utilização não é permitida, salvo com concessão expressa por escrito.

2 General safety

The customer is responsible for installing the unit following good engineering practice.

The instructions in these Operating Instructions must be followed to achieve the characteristics of the drive units and to ensure approval in case of warranty claims.

Make sure that no damaged products are put into operation!

Read these Operating Instructions carefully before starting any adjustment, installation or maintenance.

Installation, commissioning, maintenance, and repair of the Geared motor and electrical accessories may only be carried out by qualified personnel under the following items:

- Operating Instructions
- Information labels/labels on the Geared motor
- All other project documents, installation manuals, and operation manuals
- Geared motor specifications and requirements belonging to the Geared motor
- The applicable regional and national safety and accident prevention regulations..

WARNING!

Work is only allowed:

- With the drive stopped,
- When disconnected and prevented from being turned on again.

The protection around rotating parts must be observed in the installation project of the equipment to be actuated to protect people and prevent accidents.

The operation of the drive unit by means of a frequency inverter may only take place if the specifications shown on the motor nameplate are observed.

3 Transport

We recommend that when you receive our product (gearbox, geared motor and/or parts and accessories), you check that it is in good condition and that it corresponds to your specifications.

If any damage has been found to the product, we request immediate formal communication of the fact to the shipping company and WEG-CESTARI.

No installation work should be started before the problem encountered is resolved.

3.1 Movement

Use appropriate ropes, cables, belts and suspension equipment when moving the gearboxes/geared motors so as not to endanger human lives and the equipment itself..

The gearboxes must be moved using the suspension screw (Fig.2A) and, when it is a geared motor, it must be moved together with the motor eyebolt (Fig.2B) respecting the maximum angle of 60° between the cables.

Never suspend the equipment only through the motor.

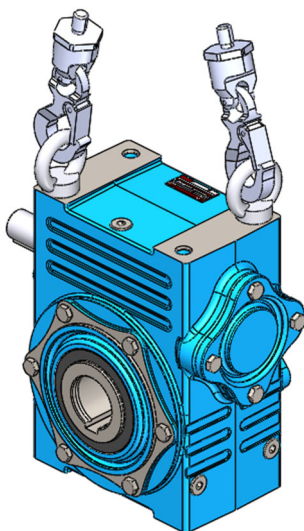


Figure 2A

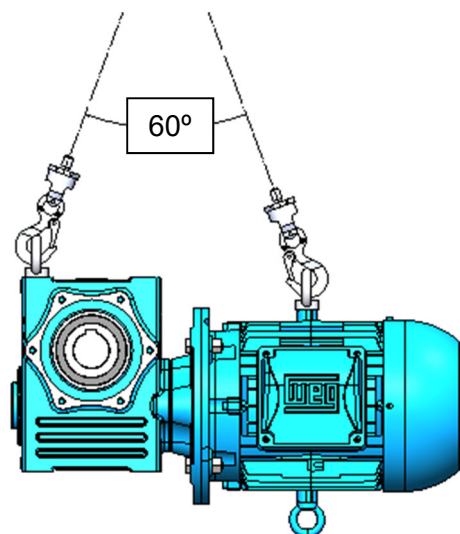


Figure 2B

Before fully lifting the gearboxes/geared motor make sure that the load is properly balanced. All handling of the gearbox/geared motor must be carried out in a gentle manner to avoid impacts and damage especially to the shaft ends.

4 Storage

WEG-CESTARI products (gearboxes, geared motors, parts, and parts) must be stored in their original packaging in a closed environment (not directly exposed to sunlight or UV rays), dry, protected against insects, free of dust, air humidity below 60%, free of gases, fungi, corrosive agents (contaminated air, ozone, gases, solvents, acids, alkaline, salts, radioactivity, etc) and ambient temperature between -5°C to +40°C.

WEG-CESTARI gearboxes must be stored in the specified and supplied working position, on a flat surface on platforms or appropriate shelves (not in direct contact with the floor) and not in a place with vibration and oscillations.

4.1 No operation period

WEG-CESTARI gearboxes/motors leave the factory and must be put into operation within a maximum period of 6 months.

For periods of 6 months to 9 months without operation, it is recommended to fill the entire interior of the gear unit with appropriate lubricants (see chapter Lubricants). Fill the reducer with oil up to the top (just below the vent), thus ensuring that all its gears and bearings are immersed in oil. The input shaft of the reducer must be rotated at least two complete turns and this procedure must be repeated at least once every 2 months.

NOTE:

For the appropriate lubricant volume, refer to chapter "Lubrication".

Protect the retainers externally with grease and apply a thin layer of grease to the external surface to prevent drying out. The grease should be removed before starting operation (recommended grease NLGI#2EP Texaco Multifak EP2 or similar).

4.2 Long-term Storage

The following are guidelines for cases of long-term storage or shutdown, i.e., more than 9 months without operation. These guidelines are recommended for the storage of up to 2 years. If the relative humidity of the air is less than 50%, the WEG-CESTARI product can be stored for up to 3 years.

Since there may be influences on the gearbox depending on local conditions, the time indications may vary from those mentioned above.

If in doubt, contact WEG-CESTARI.

4.1 Preparation for Storage:

- a) Remove all moisture from the gearbox;
- b) Check the oil level and complete if necessary with the lubricant recommended in the product manuals;
- c) On gearboxes supplied with lubricating oil, add VCI (Volatile Corrosion Inhibitor) anticorrosive agent to the lubricant to the extent of 2% of the lubricating capacity.

- d) In the case of gear geraboxes supplied without oil, mix 10% of the total volume of the lubricant recommended in the manuals with 2% of this total volume of VCI and fill the reducer. VCI additive reference MV OIL 1061 ([http:// www.vcibrasil.com.br](http://www.vcibrasil.com.br)).
Mineral oil already with VCI (Castrol Alpha SP 150 S or Castrol Alpha SP 220 S);
- e) Seal the gerabox completely by hermetically closing the air holes (vents) and the area around the level dipstick with an adhesive tape (if level dipstick is present);
- f) Place grease around the shafts near the retainers and then wrap the shaft areas near the retainers with an adhesive tape leaving the shaft flush with the retainers;
- g) For external fastening surfaces (shafts and flange faces) they are Factory protected; inspect and protect these surfaces if necessary (in case of film loss) with appropriate corrosion protection (Castrol Safecoat DW 801 Corrosion Protection Oil or similar layer of approximately 50 µm). Any damage caused by transport must be corrected.
- h) If the gearbox is stored outdoors, place it on blocks. Make a frame around it (if possible) and cover it with tarpaulin (cotton wax is recommended). Leave the bottom open to receive ventilation.

4.2 Operation after Storage:

If the storage or stop time exceeds 2 years or the ambient temperature deviates from the normal range during storage, the gear unit lubricant must be replaced before commissioning.

Since they have been properly lubricated, the retainers must be replaced after 2 (two) years.

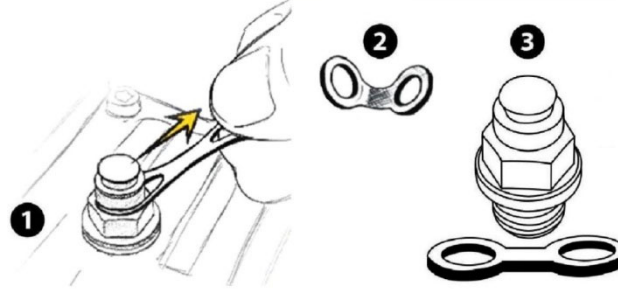
- a) Remove any tape used in preparation for storage;
- b) Remove any moisture that may have accumulated in the gearbox, clean the gearbox and inspect for damage;
- c) The VCI corrosion protection agent is soluble in recommended lubricating oils and does not need to be removed from the gearbox;
- d) Check this manual for recommended lubricants and installation, maintenance and operating instructions;
- e) In case the gear reducer is filled with oil, the amount of oil must be reduced to the recommended amount before commissioning. See chapter "Mounting positions and lubricant quantities".

If required, gearbox prepared for "long-term storage" can be supplied. In this case, WEG-CESTARI must be informed during the quotation and purchase process.

For storage periods longer than 9 months, the gearboxes/geared motors may only be put into operation if the above procedures have been followed.

5 Installation

For geared motors supplied with a rubber-sealed vent valve for transportation, before operating the geared motor/gearbox, completely remove the protective rubber installed in the valve (as shown below):



After this procedure the vent valve is ready to operate.

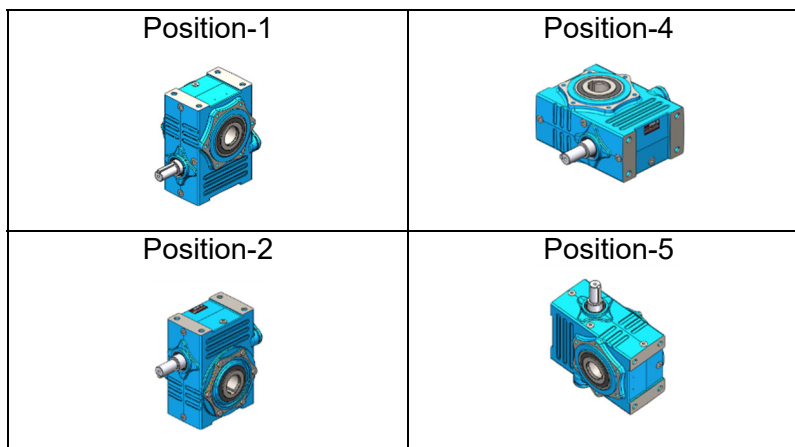
The shaft ends are protected with a thin layer of anti-corrosion oil. This oil should be removed before installation using normal solvents (varsol, turpentine or similar).

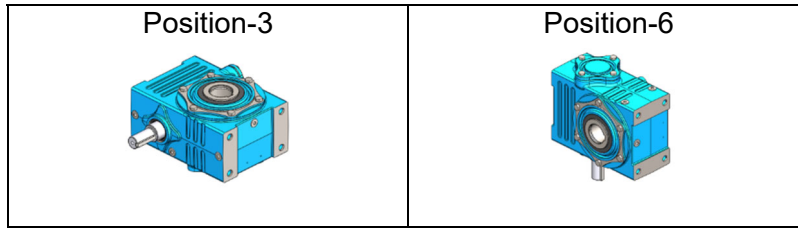
ⓘ Attention !

The solvent must not reach the retainers and never use sandpaper to remove the varnish.

Geared motors / gearboxes must be installed in the correct working position (as stated in the Commercial Proposal) on a flat, rigid base (to avoid additional stresses and strains), allowing easy access to the lubrication devices.

5.1 Example of Working Position





5.2 Minimum permissible diameter for the drive element mounted on the shaft

$$F = \frac{P_c \times 19.100.000}{D_p \times n_2} K$$

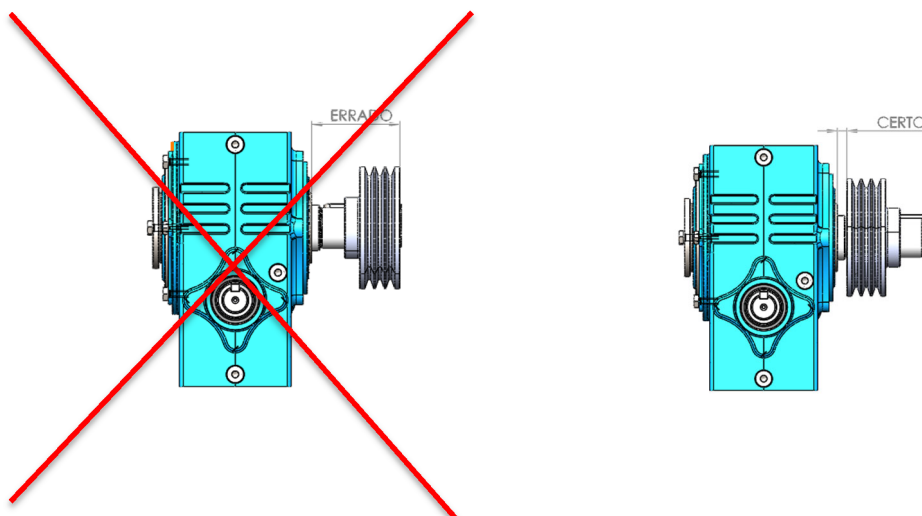
- Where:
- F = Effective radial load (N).
 - P_c = Effective power required by the machine (KW).
 - D_p = Primitive diameter of the element (mm).
 - n₂ = Rotation on the output shaft (rpm).
 - K = Correction factor.

Values for the k-factor:

- Cogwheels.....: 1,0
- Pinion and Gear: 1.25
- Belt V.....: 1,50
- Flat Belt.....: 2.5

*For correct calculation, please refer to the catalog.

The elements to be mounted on the shafts, such as: couplings, pulleys, cogwheels, etc., must have the holes machined with H7 tolerance, their weights and dimensions compatible with the gearbox and assembled with slight interference, and must be as close as possible to the shaft backrest, as shown below:



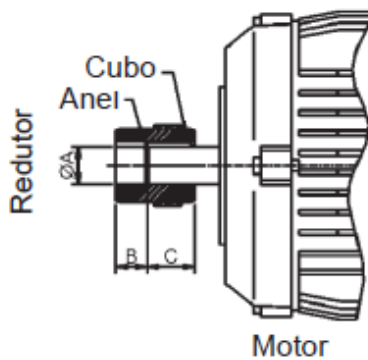
The use of a hammer in the assembly of these elements can damage the bearings and teeth of the gear gearbox's worm.

The elements mounted on the shafts must be carefully aligned (even if it is an elastic coupling) to avoid vibrations and additional forces. It is convenient to heat the part to be assembled up to about 100°C; it can be used the hole of threaded center in the end of the gearbox shaft in the assembly aid, making then the necessary locking to avoid axial displacements of the transmission element.

ATTENTION! In accordance with the accident prevention regulations, protect all rotating parts by means of protections installed against unwanted contact and against falling objects on the transmission element, complying at least with the protection requirements (in Brazil according to NR12 standard and/or according to work safety standard applied to the country where the product will be installed and used).

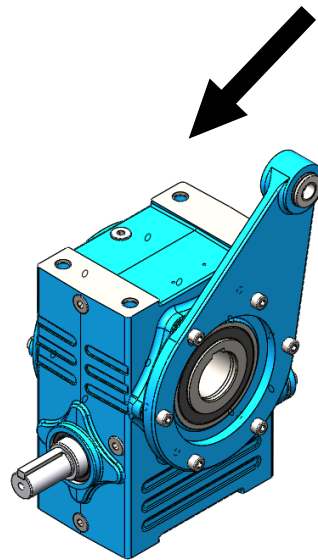
In the case of gearboxes/geared motors with a hollow shaft, do not mount the gearbox/geared motor to the device by means of blows. To avoid contact oxidation and assembly difficulties, it is recommended to apply and spread antioxidant greases (such as Dow Corning Molykote G-Rapid Plus or similar) on the shaft, housing and keyway.

5.3 Mounting position of the notched hub



Redutor	ØA	B	C
04	Ø11	07	13
	Ø14	03	22
05 06	Ø11	16	14
	Ø14	16	14
	Ø19	07	23
07 08	Ø24	03	35
	Ø14	25	15
	Ø19	16	24
10 12	Ø24	11	29
	Ø28	04	45
	Ø19	19,9	20,1
	Ø24	10	30
	Ø28	04	36

Gearboxes and Geared motors supplied with a torque arm must be guided axially and radially along the shaft of the equipment and fixed by the torque arm; anti-vibration dampers compensate for oscillations in the radial direction of the gearbox (see figure below):



If the gearbox/geared motor is repainted for any reason, the retainers must be insulated to prevent the paint from drying out, which causes the retainers to leak.

The fan and motor fans must be kept clean and free to allow perfect cooling; the distance between the air inlet and the wall must be at least 30 mm.

The equipment where the geared motor or gearbox is being fixed must provide a correct positioning of the fixing holes, observing that all the flange holes or gearbox feet must be used, so that there is no concentration of efforts.

The keyway of the geared motor or gearbox is in accordance with DIN 6885 (Flat keys - DIN 6885 standard sheet 1) and the metric thread of the tip in accordance with DIN 332 (centre 60° holes with metric thread - DIN 332 standard sheet 2 form D).

Check that the gearbox's working position and mounting are correct. Check that all fixing screws are correctly tightened. When the gearboxes are put into operation, they must work without load for some hours; if there is no abnormality, the load is gradually placed until reaching its total.

NOTE: The items listed above are valid only for the proper functioning of the gearbox, leaving the specifications for general operation to the equipment manufacturer

5.4 Axial clearance for bearing mounting

size	Simple reduction gearboxes			Double reduction gearboxes			
	Input	Output		Input		Output	
		Normal Shaft	Hollow Shaft	1° Stage	2° Stage	Normal Shaft	Hollow Shaft
14	0,16 - 0,18	0,01 - 0,03	0,01 - 0,03	0,08 - 0,09	0,03 - 0,04	0 - 0,02	0 - 0,02
17	0,18 - 0,20	0,01 - 0,03	0,01 - 0,03	0,10 - 0,12	0,04 - 0,05	0 - 0,02	0 - 0,02
20	0,14 - 0,16	0,02 - 0,04	0,02 - 0,04	0,12 - 0,14	0,03 - 0,04	0 - 0,02	0 - 0,02

24	0,16 - 0,18	0,02 - 0,04	0,02 - 0,04	0,14 - 0,16	0,03 - 0,04	0 - 0,02	0 - 0,02
28	0,18 - 0,20	0,02 - 0,04	0,02 - 0,04	0,16 - 0,18	0,04 - 0,05	0 - 0,02	0 - 0,02
34	0,20 - 0,22	0,02 - 0,04	0,02 - 0,04	0,18 - 0,20	0,04 - 0,05	0 - 0,02	0 - 0,02

6 Lubrication

Proper lubrication is responsible for the performance and service life of the gearbox/geared motor. The gearboxes are lubricated by oil bath and equipped with a level indicator plug, which can be a level gauge or a hexagonal plug model HN10-WD (similar to DIN 510), differing from the other plugs in the gearbox/geared motor.

The correct oil level is in the center of the sight glass (when of the "level glass" type) or in the plug level (when of the hexagonal plug type) with the gearbox stationary and in the required working position.

Before starting operation, check that the gearbox is filled with oil and that the lubricant level is adequate as recommended.

The operating temperature is the temperature of the lubricating oil after the temperature stabilization period at full load (period after approx. 3 hours of continuous operation).

The minimum ambient temperature for the start of operation of gearboxes and geared motors depends on the viscosity and type of lubricating oil.

The table below shows the minimum ambient temperature for the start-up of gearboxes and geared motors:

Oil		MINIMUM TEMPERATURE	
Type	Viscosity	Lubrication	Lubrication
Mineral CLP	ISO VG 220	+2°C	+8°C
	ISO VG 320	+7°C	+14°C
Synthetic CLP HC (PAO)	ISO VG 220	-5°C	+2°C
	ISO VG 320	0°C	+8°C
	ISO VG 460	+6°C	--- ---

Contact WEG-CESTARI for other temperatures.

The external temperature of the housing is approximately 15°C lower than the operating temperature (oil temperature).

When changing gears, the oil must be drained while still "warm" because the viscosity of the oil is lower, facilitating the draining and cleaning.

NOTE: The lubricant used must be disposed of in accordance with current legislation and the guidelines contained in the Environmental Guidelines chapter of this manual.

When changing gears, use the same oil as indicated on the gearbox nameplate and specified in this manual. It is not recommended to mix oils of different types and manufacturers.

The oil must be changed every 3500 hours or annually.

6.1 Operating temperature and Oil temperature

The operating temperature is the temperature of the lubricating oil after the temperature stabilization period at full load. (period after approximately 3 hours of continuous operation)

The external temperature of the housing is approximately 15 °C lower than the operating temperature (oil temperature).

The operating temperature for WEG-CESTARI gearboxes is a minimum of 18°C and a maximum of 90°C (under normal operating conditions).

In the first 500 hours it is recommended to observe the quality of the oil, if it is contaminated or with particles must be replaced.

When changing, the oil must be drained while still hot in order to facilitate draining and cleaning. In case of unfavorable environmental conditions (high humidity, aggressiveness, dust), the change time can be reduced, in this case under consultation.

When changing gearboxes, the same oil must be used as indicated on the gearbox nameplate and specified in this manual.

Do not mix oils of different types and manufacturers. The oil change time is defined as a function of the operating temperature - see table below

Operating temperature	Mineral Oil CLP	Synthetic Oil CLP HC Hydrocarbons	Synthetic Oil CLP PG Polyglycol
80 °C	5.000 hours	15.000 hours	25.000 hours
85 °C	3.500 hours	10.000 hours	18.000 hours
90 °C	2.500 hours	7.500 hours	13.000 hours
95 °C	--- ---	6.000 hours	8.500 hours
100 °C	--- ---	3.800 hours	6.000 hours
105 °C	--- ---	2.500 hours	4.000 hours
110 °C	--- ---	2.000 hours	3.000 hours

NOTE: The nameplate informs the type of oil recommended for the gear unit (CLP=Mineral; CLP HC=Synthetic; CLP PG= Synthetic).

6.2 Quantity of lubricant Magma M line

SIMPLE	Size	03	04	05	06	07	08	10	12
	Volume	0,3	0,27	0,65	0,87	1,2	1,68	2,74	3,9
DUPLEX	Size	05(04)	06(04)	07(04)	08(05)	10(05)	12(06)	----	----
	Volume	0,65/0,27	0,87/0,27	1,2/0,27	1,68/0,65	2,74/0,65	3,9/0,87	----	----

* The quantities of oil (liters) specified in the table above include all working positions..

6.3 Quantidade de lubrificante Linha Lubricant quantity Alumag line

SIMPLE	Size	L03	L04	L05
	Volume	30 ML	50 ML	70 ML
DUPLEX	Size	L04/L03	L04/L05	L05/L03
	Volume	50 ml / 30 ml	50 ml / 70 ml	70 ml / 30 ml

6.4 Quantity of lubricant Magma K line

Size	Posição	Working position Normal double shaft				Working position Hollow shaft			
		1	2	3 e 4	5 e 6	1	2	3 e 4	5 e 6
14		3,6	8,0	5,6	6,3	3,6	7,0	5,0	5,7
17		5,2	12,0	8,2	9,5	5,2	10,5	7,4	8,8
20		12,0	20,0	15,5	16,0	12,0	20,0	16,0	17,0
24		18,0	26,0	21,5	22,0	18,0	26,0	22,0	23,0
28		30,0	40,0	36,0	38,0	30,0	40,0	38,0	38,0
34		50,0	70,0	60,0	62,0	50,0	70,0	62,0	62,0

* Magma K series gearboxes are supplied without lubricant as standard. For cases where the customer requests the gearbox with oil, this must be described in the sales order and must follow the quantity indicated above.

For the Magma K line (only fill the oil up to the level plug).

6.5 Quantity of lubricant 1st stage of the duplex gearboxes Magma K line

Size	K14					K17					K20	K24	K28	K34
Position	1	2	4	5	6	1	2	4	5	6	--	--	--	--
Volume	3,6	7,0	5,0	5,7	5,2	10,5	7,4	5,7	--	--	--	--	--	

6.6 Recommended synthetic lubricants

Manufacturer	Viscosity mm ² /s	Lubricant Type
	(C St) a 40°C	Maximum oil time
	ISO - NLGI	90°C
ExxonMobil	VG 460	SHC 634
Shell	VG 460	OMALA S4GX 460
Klüber	VG 460	KLUBER SYNTH - EG4-460
Klüber	VG 460	Syntheso D460 EP
Petrobrás	VG 460	Lubrax Syntesis Gear 0 - 460

6.7 Recommended mineral lubricants

Manufacturer	Viscosity and Lubricant Type		Greases for bearings
	AGMA 7 EP -10°C a 10°C	AGMA 8 EP 10°C a 50°C	
Petrobrás	Lubrax Industrial EGF 460	PSLubrax Industrial EGF 0 PS	Lubrax GMA - 2
Ipiranga	Ipiranga SP 460	Ipiranga SP 680	Ipiflex 2
Esso	Spartan EP 460	Spartan EP 680	Beacon 2
Texaco	Meropa 460	Meropa 680	Multifak
Atlantic	Pennant 460	Pennant 680	Litholine 2
Shell	Omala 460	Omala 680	Alvania 2
Mobiloil	Mobilgear 634	Mobilgear 636	Mobil Grease MP
PROMAX	G.O. 140	G.O. 250	Bardahl Purpose Grease
CHEMLUB	-	Gear 680	UD-90 Especial

6.8 Check list – Installation and assembly of gearboxes

Receipt	Checked
Paint Verification Check for scratches, peeling and other imperfections.	
Oxidation Verification Check for the presence of oxidised points or areas on the gearbox and/or accessories.	
Leakage Verification Check for the presence of oil in seals, caps and joints.	
Machined Parts Protection Verification Check that machined parts are protected with protective oil.	
Component Verification Check if components used in the assembly are present.	
Seals Verification Check that the vent valve is sealed.	
Verification of storage conditions Check that the gearbox has been conditioned according to the instructions in the product manual.	

Installation	Verificado
Checking the Working Position Check that the gearbox is mounted in the position for which it was supplied.	
Lube Oil Level Check Check the lubricating oil level according to the product manual.	
Vent Valve Seal Removal Check Check that the vent valve seal has been completely removed before putting the gearbox into operation.	
Verification of Sealing Elements Check seals, caps and other sealing elements for leaks and/or deformities of these elements.	
Checking the gearbox installation Check that the gearbox has been placed on the driven machine in accordance with the recommendations of the product manual.	
Application of Protective Oil in Machined Parts Check whether protective oil has been applied to the machined parts after installing the gearbox in the machine.	

7 Operation

Before starting operation, check that the gearbox is filled with oil and that the lubricant level is adequate as recommended.

Make sure that the geared motor/gearbox rotates freely. Make sure that the connection diagram is as shown on the motor nameplate for the required voltage.

ⓘ Attention!

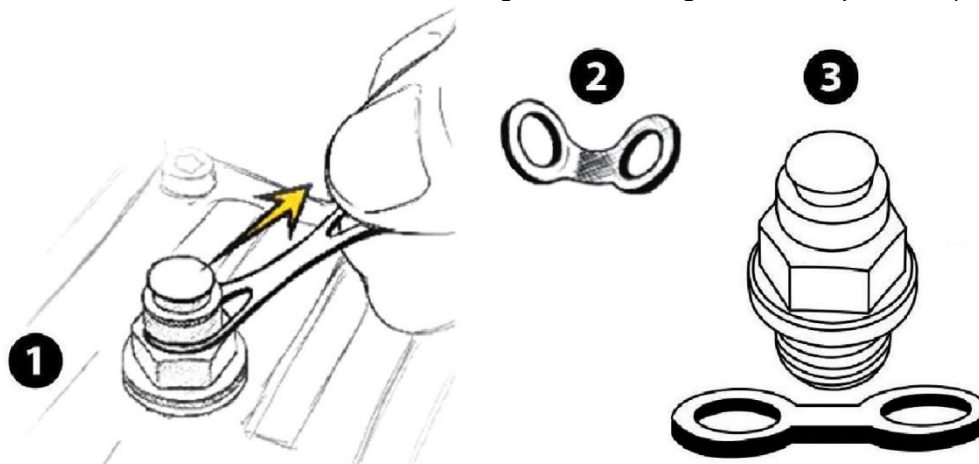
Standard motors are suitable for clockwise and counterclockwise rotation. Connecting the power cables in phase sequence L1, L2, L3 to U1, V1, W1 results in clockwise rotation (looking at the shaft end on the drive side).

If the two connections are changed the rotation will be counterclockwise (e.g. L1, L2, L3 to V1, U1, W1).

Identify the desired direction of rotation by activating the geared motor uncoupled from the equipment if reversal of the direction of rotation is necessary must reverse any two phases.

Check that the screws, nuts and connections of the motor terminals and the gearbox fixing screws and nuts are properly tightened.

For geared motors/gearbox supplied with a rubber-sealed vent valve for transportation, completely remove the protective rubber installed in the valve before the geared motor/gearbox is operated (as shown below):



After this procedure, the vent valve is ready to operate.

When the gearbox starts operating, the oil temperature gradually rises until it stabilizes after approximately 3 hours, reaching the operating temperature.

8 Maintenance

The main purpose of periodic preventive maintenance is to check the operating conditions of the geared motor/gearbox. It must be performed by qualified people.

There are no strict rules to be followed when addressing inspection programs. The periods and types of examinations to be carried out can be extended or reduced according to the working conditions and location where the gearbox/geared motor is installed.

It is recommended that each geared motor/gearbox has some type of note of its own, such as plug, cards or label. To register all the maintenance performed, the parts exchanged and the dates on which they were performed.

In the following topic is presented a basic program for inspection containing the items to be inspected and the suggested time intervals; such intervals are flexible, in the following topic is according to the conditions of the place where the geared motor/gearbox is installed:

8.1 Maintenance Task List

Roteiro de Manutenção

Itens a verificar	Procedimentos	Periodicidade
Condições mecânicas	Examinar a presença de ruídos ou vibrações anormais, vazamento de óleo, inspecionar também as condições do sistema de transmissão verificando lubrificação e alinhamento	Semanal
Local onde está instalado o motorreductor	Identificar a existência de água ou vapores junto ao motorreductor, excesso de poeiras, aparas ou resíduos, verificar o respiro do reductor, desentupindo-o se for o caso, verificar as condições de ventilação do motor elétrico.	Semanal
Nível de óleo	Verifique o nível de óleo e, se necessário complete-o.	Semanal
Parafusos de fixação do motorreductor	Verificar se por vibração não houve afrouxamento dos parafusos de fixação do motorreductor.	Mensal
Terminais e parafusos	Observar se, por vibração não houve o afrouxamento dos parafusos e pontes de ligação, tornando deficiente o contato e prejudicando o fornecimento de energia.	Mensal
Condições mecânicas	Examinar as condições, dos elementos de transmissão, substituindo-os se necessário, limpando a carcaça e tampas do motorreductor. Verificar se há falta de alinhamento ou algo atritando.	Semestral

8.2 Gearbox faults

DEFEITOS EM REDUTORES

SINTOMAS		CAUSAS		MEDIDAS CORRETIVAS
Aquecimento excessivo	Sobrecarga	Carga excede a capacidade do redutor.		Verifique a capacidade indicada na plaqueta do redutor, substitua por uma unidade de capacidade suficiente, ou reduza a carga.
	Lubrificação imprópria	Volume de óleo insuficiente. Óleo em demasia no redutor provoca excessiva agitação, geração de calor e gases no interior da caixa. Óleo fora de especificação.		Verifique o nível de óleo, ajuste o nível para a posição correta. Drene e encha novamente para o nível de óleo adequado, com o óleo indicado na plaqueta do redutor ou similar.
Perda de óleo	Retentores gastos ou defeituosos	Quantidade excessiva de óleo. Respirador para entrada de ar e saída de gases obstruído. Camadas de vedação entre as superfícies das caixas insuficientes.		Cheque o nível e drene para o nível indicado. Limpe ou substitua o respirador, use um solvente não inflamável para limpeza. Substitua os retentores gastos por novos. Aplique nova camada de vedação, permatex ou equivalente, monte o conjunto. Monte sempre os retentores com graxa nos lábios de vedação.
	Irregularidades nos parafusos de fixação	Instalação invertida		Verifique o aperto dos parafusos e se os chumbadores estão firmes em suas fundações ou estruturas. Cheque o alinhamento da unidade e as folhas distanciadoras ou calços.
Barulho excessivo e vibração	Falha nos rolamentos	Fadiga dos rolamentos, verifique desgaste nas esferas, rolos ou pistas. Desgaste pode ser por sujeira no óleo Pistas dos rolamentos com descascamentos, marcadas ou com flancos machucados geralmente indicam sobrecarga. Falha nas gaiolas dos rolamentos também indicam sobrecarga.		Substitua os rolamentos gastos, limpe todo o interior do redutor e recoloque óleo novo, conforme o especificado. Substitua os rolamento gastos, cheque e repare folgas nos rolamentos, alinhamento dos acoplamentos e cargas sobre os eixos dos redutores.
	Excessivo desgaste das engrenagens	Sobrecarga causa Pitting dos dentes (escovação, pequenos furos).		Cheque as cargas, troque as engrenagens ou substitua por redutor de capacidade adequada.
	Quantidade de óleo insuficiente	Óleo abaixo do nível normal pode causar barulho.		Cheque o nível de óleo complete para o nível indicado
	Perdas de partes	Choques excessivos ou conexão imperfeita com outros elementos.		Inspeção o redutor contra partes quebradas, perda de parafusos, porcas ou rosca danificadas. Verifique o alinhamento com a máquina acionada. Cheque as chavetas e tolerâncias.
	Alta velocidade dos eixos	Tensão excessiva nas correias ou correntes de acionamentos.		Cheque velocidades indicadas na plaqueta. Verifique as tensões.
Folga excessivas de eixos	Rolamento expostos a elementos abrasivos causam desgaste nas esferas, rolos e pistas.		Substitua rolamentos gastos. Limpe todo o interior da caixa, alimente a unidade com óleo recomendado.	
Folga excessivas nas engrenagens	Engrenagens e chavetas gastas ou perda dos parafusos causam backlash (folga no engrenamento); backlash aumenta com o número de jogos de engrenagem.		Substitua engrenagens e chavetas gastas. Aperte todos os parafusos da unidade.	

9 Repairs

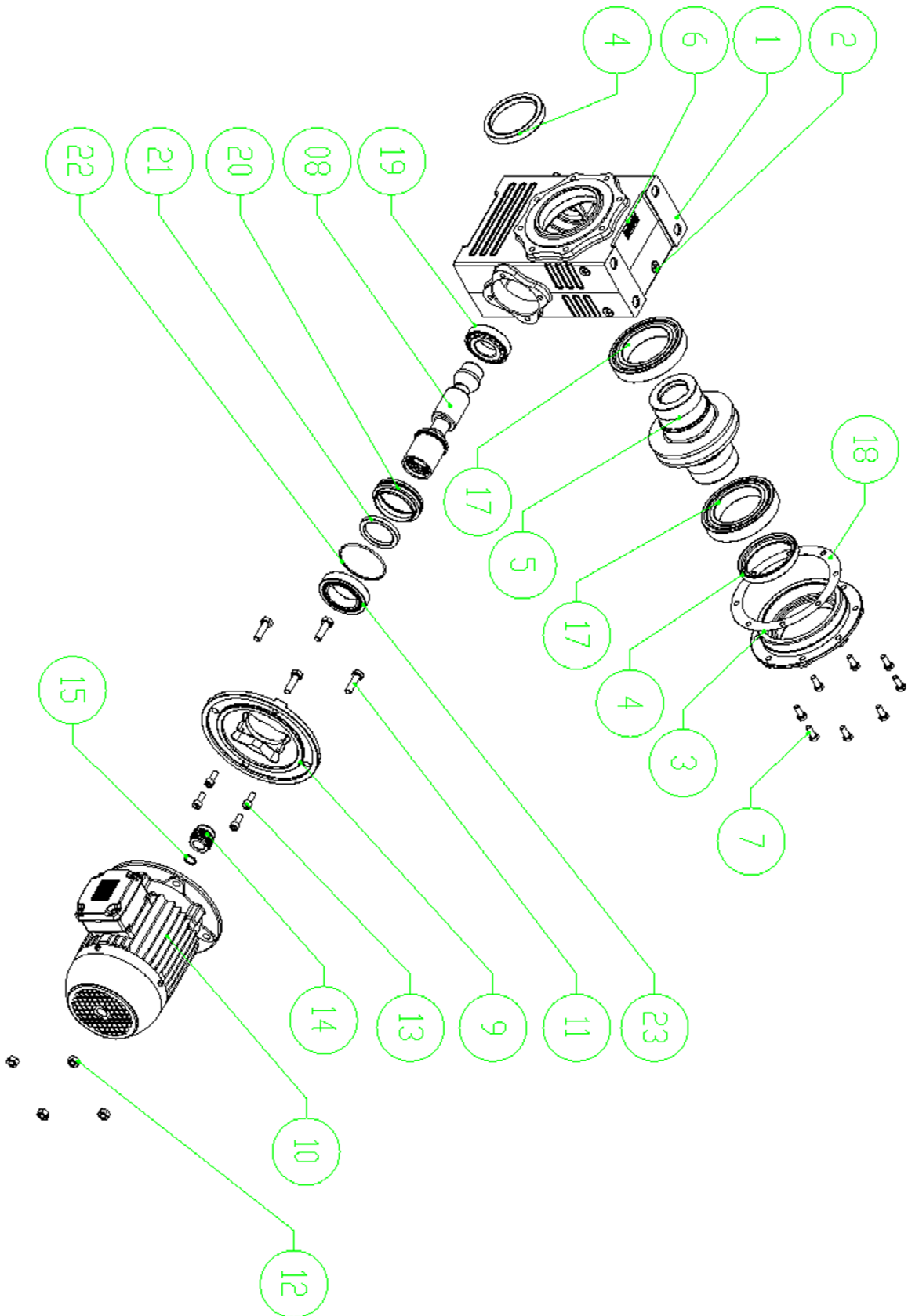
Repairs must be performed by an Authorized WEG-CESTARI Technical Assistant.

The list of Authorized Technical Assistants and their contact details are available on the website: www.wegcestari.com in the "Relationship" section, "Sales Channels". To perform the filter, select "Type", "Technical Assistance".

When component replacement is required, the customer should contact WEG-CESTARI or an Authorized Technical Assistant by providing the geared motor/gearbox serial number on the geared motor/gearbox nameplate from which we can identify the desired component.

NOTE: Replaced components must be intended for use in accordance with current legislation and the guidelines contained in the Environmental Guidelines chapter of this manual.

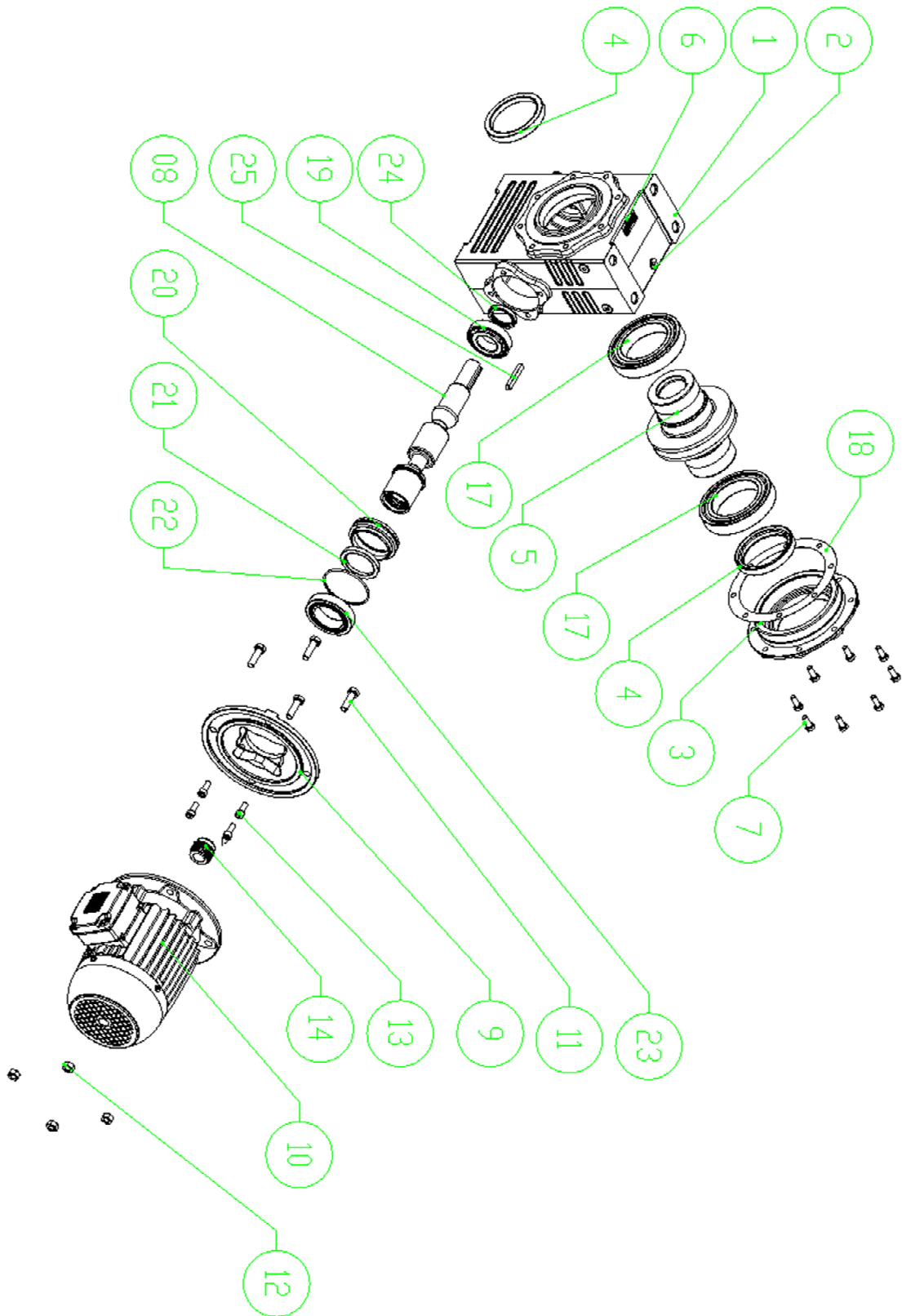
9.1 Compact Single Inlet assembly



9.2 Compact single input list

Nº DO ITEM	DENOMINACAO	QTD.
1	CARCACA USINADA	1
2	BUJAO DIN0908	7
3	TAMPA SAÍDA VAZADA	1
4	RETENTOR	2
5	EIXO VAZADO C/ COROA M08	1
6	PLAQUETA	1
7	PARAFUSO DIN933	8
8	SEM FIM COMPACTO_COMPACTA_60	1
9	FLANGE P/ MOTOR TIPO-FF FLANGE P/ MOTOR TIPO-C-DIN	1
10	MOTOR	1
11	PARAFUSO DIN933	4
12	PORCA SEXTAVADA DIN0934	4
13	PARAFUSO DIN912	4
14	CUBO ENTALHADO	1
15	ANEL RETENÇÃO DIN0472	1
16	TAMPA DE EXPANSAO	1
17	ROLAMENTO	2
18	JUNTA	1
19	ROLAMENTO	1
20	ANEL DE AJUSTE	1
21	RETENTOR	1
22	ANEL ORING	1
23	ROLAMENTO	1

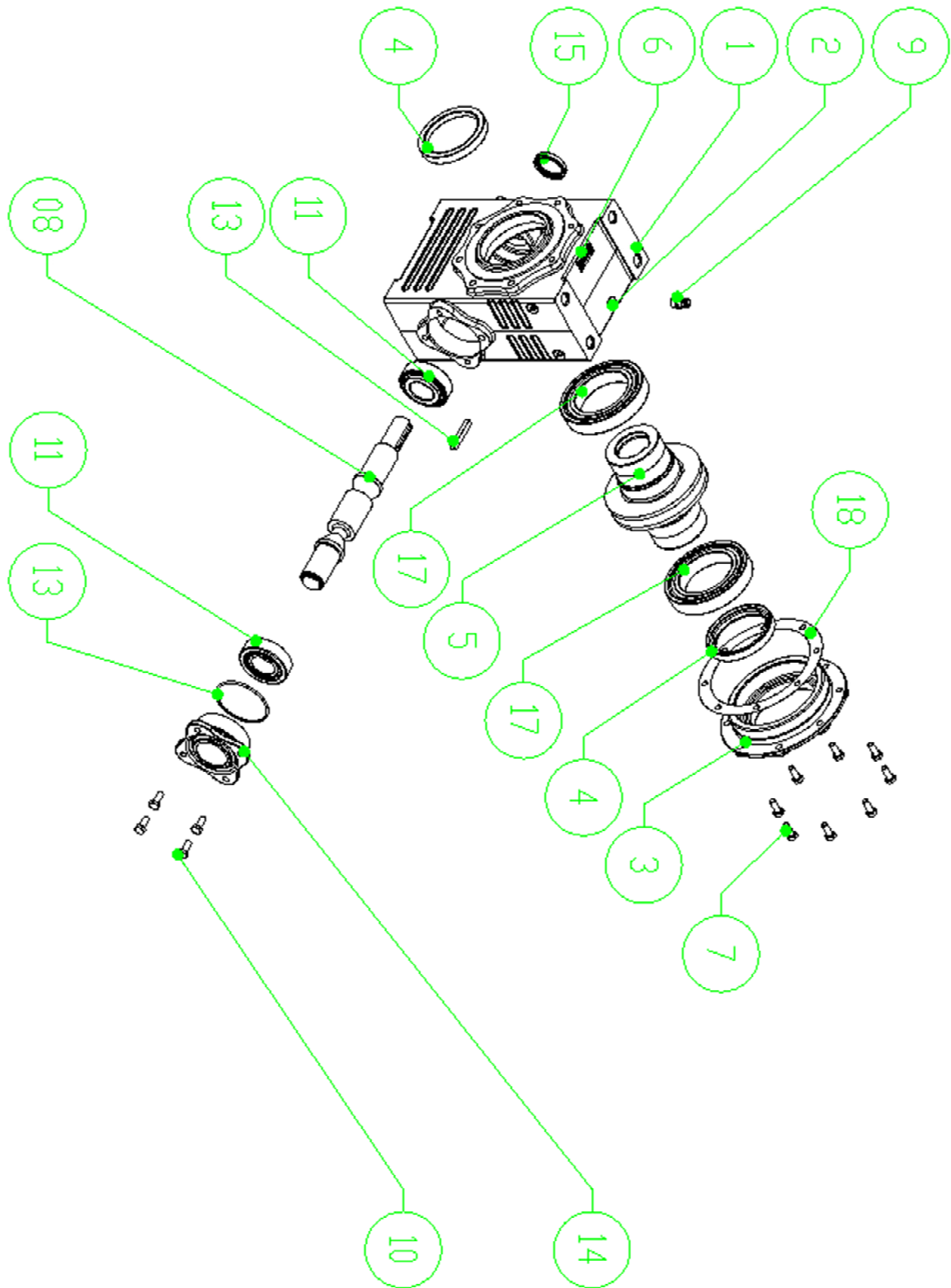
9.3 Compact Dual Input Assembly



9.4 Compact Dual Input List

Nº DO ITEM	DENOMINACAO	QTD.
1	CARCACA USINADA	1
2	BUJAO DIN0908	7
3	TAMPA SAIDA VAZADA	1
4	RETENTOR	2
5	EIXO VAZADO C/ CORDA M08	1
6	PLAQUETA	1
7	PARAFUSO DIN933	8
8	SEM FIM COMPACTO_ DUPLA COMPACTA_63	1
9	FLANGE P/ MOTOR TIPO-FF FLANGE P/ MOTOR TIPO-C-DIN	1
10	MOTOR	1
11	PARAFUSO DIN933	4
12	PORCA SEXTAVADA DIN0934	4
13	PARAFUSO DIN912	4
14	CUBO ENTALHADO	1
15	ANEL RETENÇÃO DIN0472	1
16	TAMPA DE EXPANSAO	1
17	ROLAMENTO	2
18	JUNTA	1
19	ROLAMENTO	1
20	ANEL DE AJUSTE	1
21	RETENTOR	1
22	ANEL ORING	1
23	ROLAMENTO	1
24	RETENTOR	1
25	CHAVETA	1

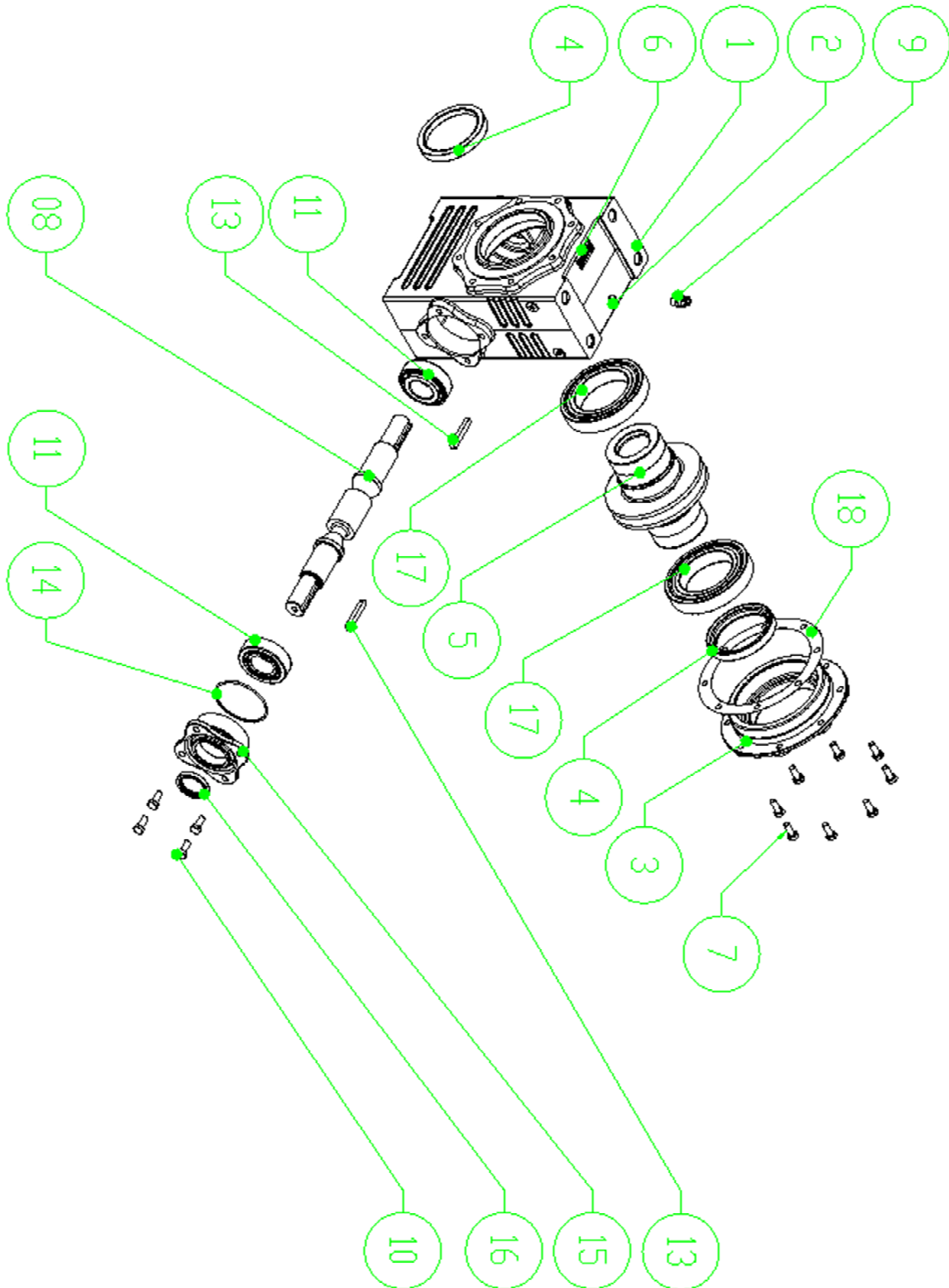
9.5 Assembly Single input



9.6 Simple Input List

Nº DO ITEM	DENOMINACAO	QTD.
1	CARCACA USINADA	1
2	BUJAO DIN0908	7
3	TAMPA SAÍDA VAZADA	1
4	RETENTOR	2
5	EIXO VAZADO C/ COROA M08	1
6	PLAQUETA	1
7	PARAFUSO DIN933 (M04/M05/M06/M07/M08/M10/M12)	M04-M07=6 M08-M12=8
8	SEM FIM PONTA_ SIMPLES NORMAL _60	1
9	RESPIRO	1
10	PARAFUSO DIN933	4
11	ROLAMENTO	2
12	JUNTA	1
13	ANEL ORING	1
14	TAMPA DE ENTRADA FECHADA	1
15	RETENTOR	1

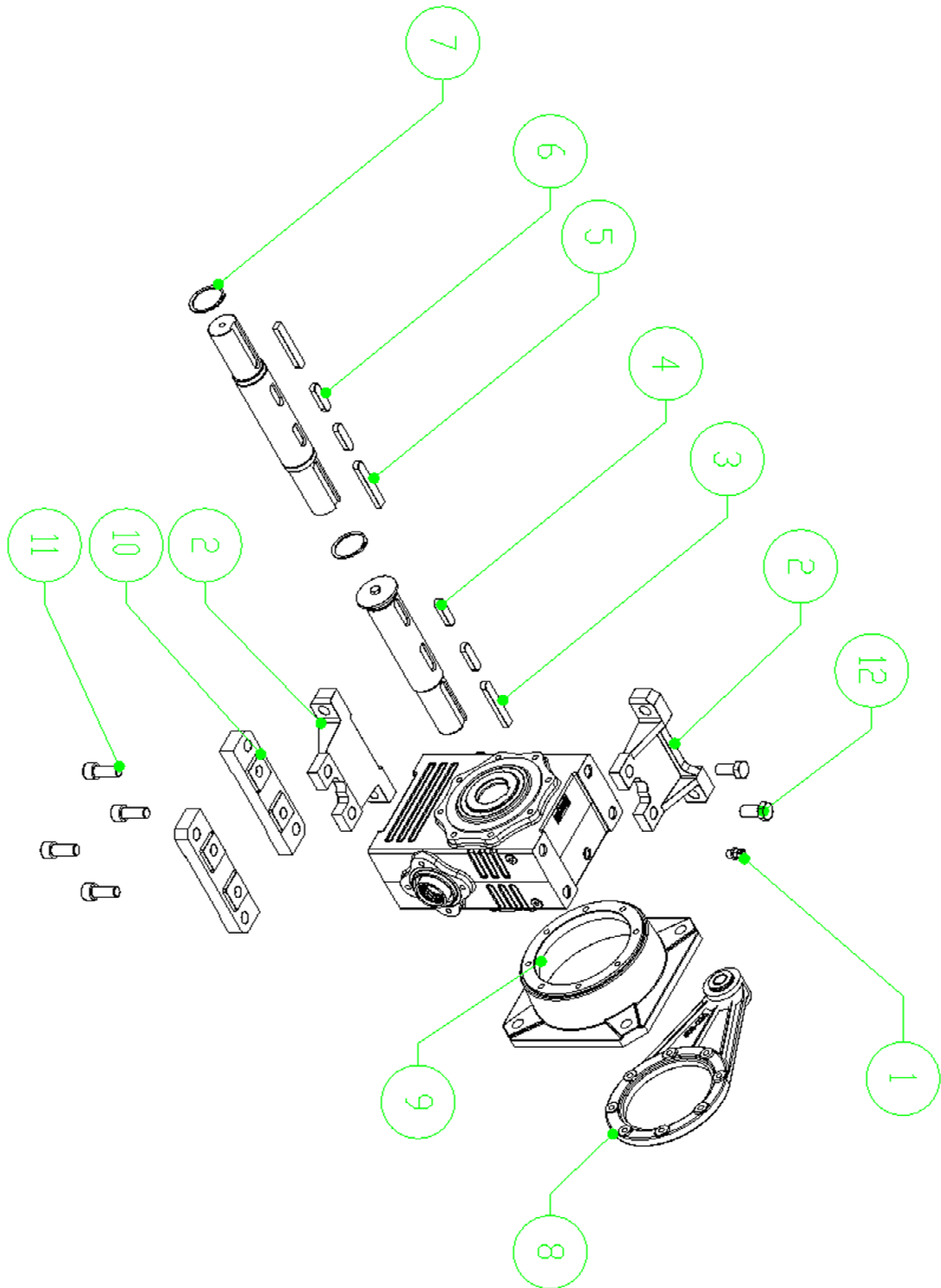
9.7 Dual Input Assembly



9.8 Dual input list

Nº DO ITEM	DENOMINACAO	QTD.
1	CARCACA USINADA	1
2	BUJAO DIN0908	7
3	TAMPA SAÍDA VAZADA	1
4	RETENTOR	2
5	EIXO VAZADO C/ CORDA M08	1
6	PLAQUETA	1
7	PARAFUSO DIN933 (M04/M05/M06/M07/M08/M10/M12)	M04-M07=6 M08-M12=8
8	SEM FIM PONTA_ DUPLA _61	1
9	RESPIRO	1
10	PARAFUSO DIN933	4
11	ROLAMENTO	2
12	JUNTA	1
13	CHAVETA DE ENTRADA	1
14	ANEL DRING	1
15	TAMPA DE ENTRADA	1
16	RETENTOR	1

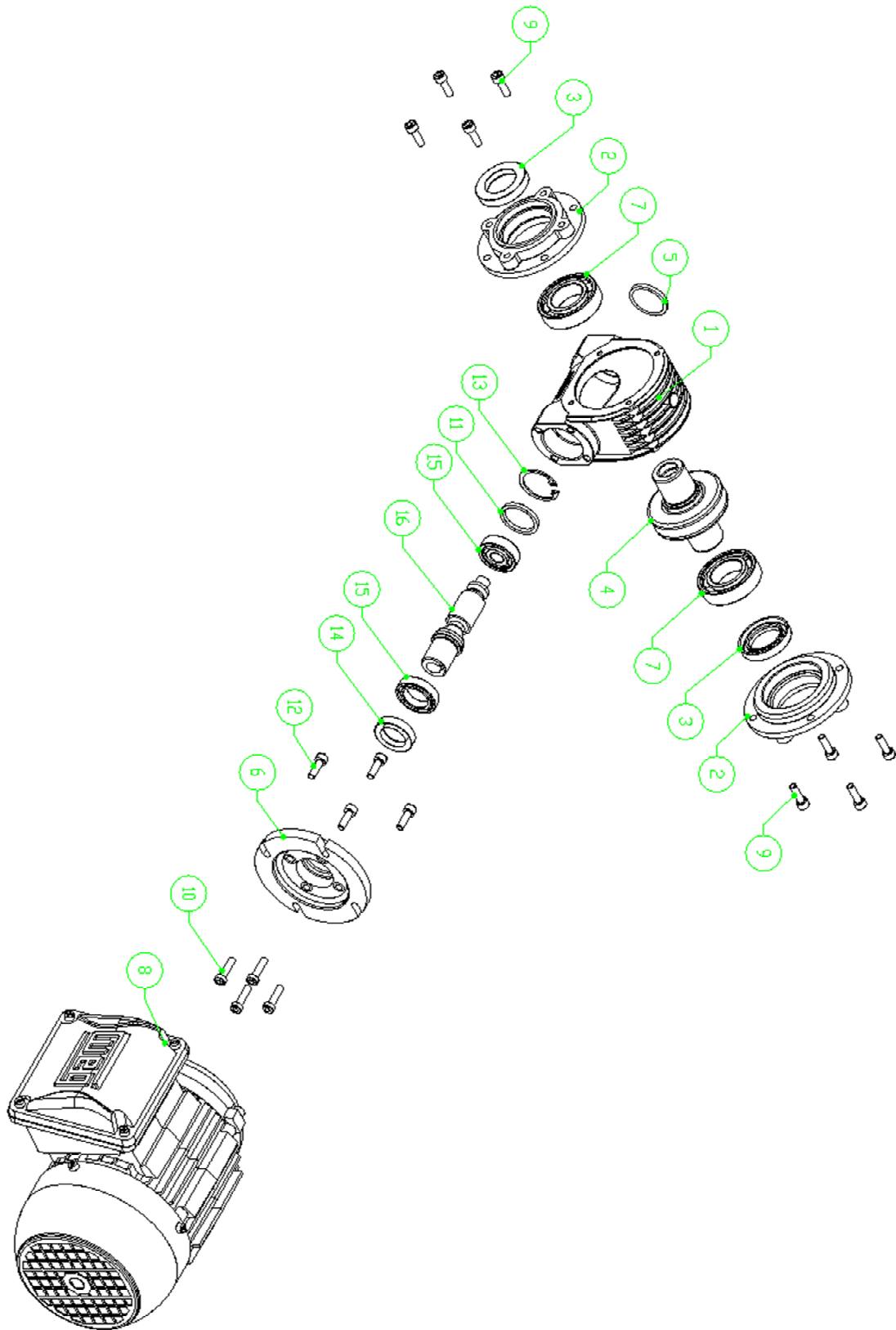
9.9 Adaptations Accessories



9.10 List Adaptations Accessories

Nº DO ITEM	DENOMINAÇÃO	QTD.
1	RESPIRO	1
2	PÉ LATERAL	7
3	CHAVETA EIXO NORMAL	1
4	CHAVETA EIXO NORMAL	2
5	CHAVETA EIXO PONTA DUPLA	1
6	CHAVETA EIXO PONTA DUPLA	1
7	ANEL TRAVA DIN 471	2
8	BRAÇO DE TORÇÃO (M04/M05/M06/M07/M08/M10/M12)	1
9	BASE DE SAIDA (M04/M05/M06/M07/M08/M10/M12)	1
10	PÉ NORMAL (M04/M05/M06/M07/M08/M10/M12)	2
11	PARAFUSO DIN912	4
12	PARAFUSO DIN933	4

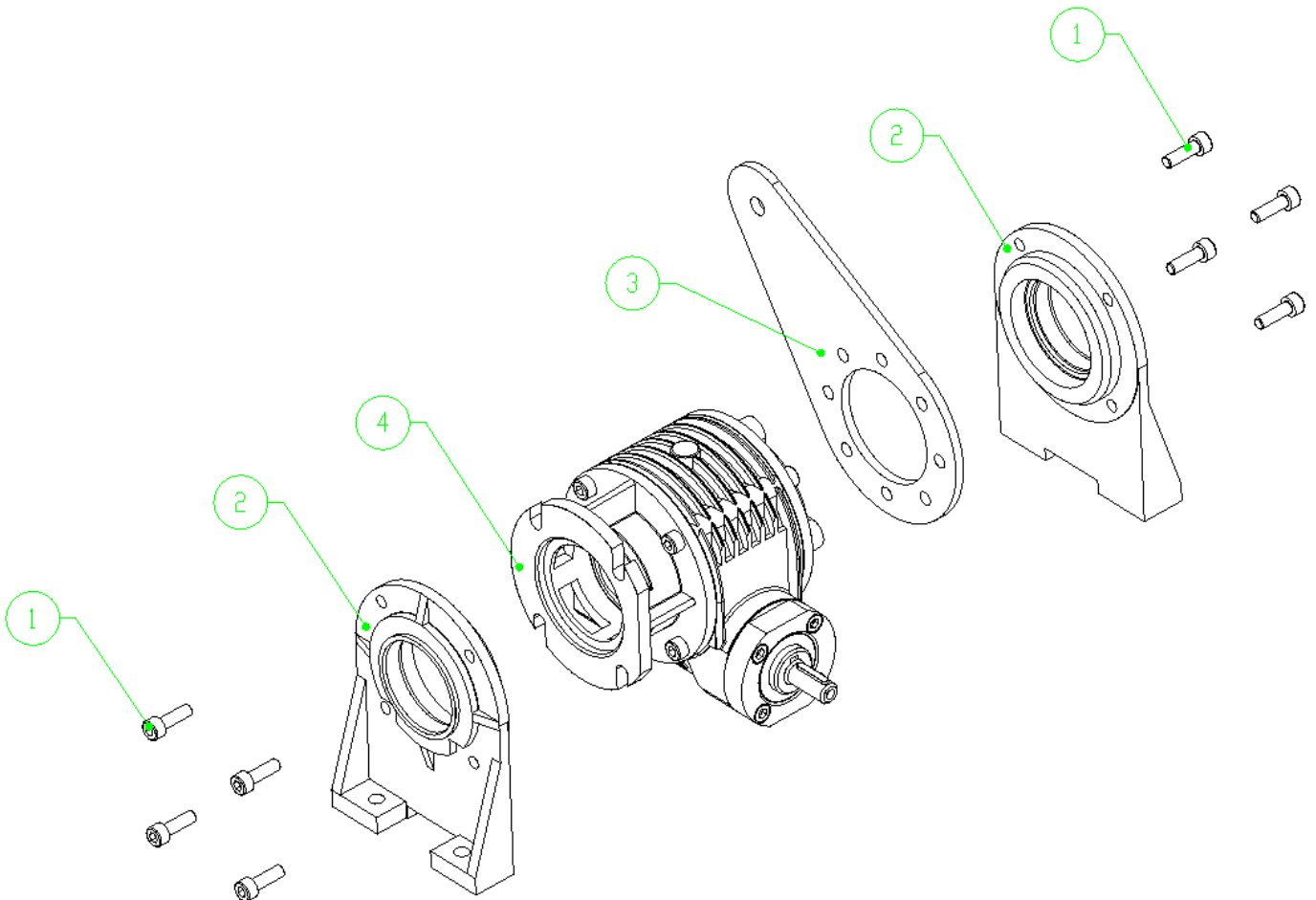
9.11 Compact input assembly



9.12 Compact Input List

Nº DO ITEM	DENOMINACAO	QTD.
1	CARCACA USINADA	1
2	TAMPA SAÍDA VAZADA	2
3	RETENTOR DE SAIDA	2
4	EIXO VAZADO C/ COROA	1
5	TAMPA DE EXPANSAO	1
6	FLANGE MOTOR C-DIN	1
7	ROLAMENTO DE SAIDA	2
8	MOTOR	1
9	PARAFUSO DIN0912	4
10	PARAFUSO DIN6912	4
11	ANEL DE AJUSTE	1
12	PARAFUSO DIN912	4
13	ANEL RETENÇÃO DIN0472	1
14	RETENTOR DE ENTRADA	1
15	ROLAMENTO DE ENTRADA	2
16	SEM FIM COMPACTO	1

9.13 Adaptations Alumag accessories



9.14 List Adaptations Alumag Accessories

Nº DO ITEM	DENOMINACAO	QTD.
1	PARAFUSO DIN912	1
2	PÉ LATERAL	2
3	BRAÇO DE TORÇÃO	1
4	BASE DE SAIDA	1

10 Warranty term

The warranty against manufacturing and material defect offered by WEG-CESTARI is:

Products: standard period of 12 months from the date of issue of the Invoice.

Services: standard term of 6 months from the date of issue of the Invoice.

NOTES:

1) When the warranty period is over, but within the current month, the service will be provided as a guarantee (e.g.: warranty expiration date: 04/01/2017) + service: 4/21/2017 = guarantee accepted).

2) If a differentiated warranty period is defined in the technical-commercial proposal for a given supply, it shall prevail over the above period;

3) The periods established above do not depend on the date of installation of the product and its entry into operation.

WEG-CESTARI products that present defects due to faults of: dimensioning and specification (when performed by WEG-CESTARI), design, material and manufacture are eligible for warranty, provided that the technical analysis performed by WEG-CESTARI has revealed the existence of items with defects that may be framed under these terms and within the above warranty period.

In the event of a deviation from the normal operation of the product, the customer shall immediately notify WEG-CESTARI of the defects and make the product available to WEG-CESTARI or its Authorized Technical Assistance for the period necessary to identify the cause of the deviation, verification of warranty coverage, and the proper repair shall only be performed after analysis of the RNC (Non Conformity Report).

The WEG-CESTARI reserves the right to submit to testing the products returned under warranty for verification of defect / manufacturing defect, as well as disassemble the products to verify the actual cause of the failure presented.

To be entitled to the warranty, the customer must meet the specifications of the technical documents of WEG-CESTARI, especially those provided for in the Installation, Operation and Maintenance Manual of the products. The warranty conditions offered by WEG-CESTARI will always be respected, respecting all the precepts of civil law that govern the commercial relationship.

Warranty will not be granted for the cases below:

If the customer or end user opens, repairs and/or modifies the gear unit or geared motor without prior authorization from WEG-CESTARI;

Oil leakage by the retainers due to drying caused by paints or paints made by the end customer or suppliers of machinery and equipment;

Incorrect installation of the equipment (working position different from that requested, out of alignment, unstable base, shocks or blows to the axles, etc.), in total disregard of the instructions made in the respective items of the Installation, Operation and Maintenance Manual of the products;

Inadequate, inefficient or non-existent lubrication in cases that are supplied without lubricant;

Lack of preventive maintenance, according to the Installation, Operation and Maintenance Manual of the products;

Incorrect specification or bad dimensioning of the equipment, when done by the customer;

Shocks or falls in the transport of responsibility of the customer or third parties hired by the same;

Oil leakage caused by obstructed vent;

Contamination of the oil by external agents (dust, water, etc.), when the gearbox has not been ordered with an air filter;

Wrong connection or mains failure in the case of motors;

Repair and/or adjustment carried out by an unqualified/authorized person;
Negligence, imprudence or inexperience in the installation and operation of the products;
Natural wear and tear of the product due to the use and/or wear of the product due to the action of agents of nature (such as actions of time, corrosion, etc.);
Gearboxes/goeared motor without identification platelets;
Absence or adulteration of the serial number.

The warranty does not cover expenses arising from the uninstallation and/or disassembly or installation and/or assembly of the product at the customer's premises.

The warranty does not cover damages caused by manufacturing equipment and/or commercialization of third parties coupled with products supplied by WEG-CESTARI. It also does not cover defects and/or problems resulting from force majeure or other causes that cannot be attributed to WEG-CESTARI, such as, but not limited to: incorrect or incomplete customer specifications or data, transportation, storage, handling, installation, operation and maintenance in disagreement with the instructions provided, accidents, deficiencies in civil works, use in applications and/or environments for which the product has not been designed and/or dimensioned, equipment and/or components not included in the scope of supply of WEG-CESTARI.

Warranty services may be provided at the WEG-CESTARI factory and/or in the Technical Assistance authorized by WEG-CESTARI. Under no circumstances will these warranty services extend the warranty periods of the equipment. Except for this rule, the warranty cases where it is necessary to change the project to suit the customer's application.

The civil liability of WEG-CESTARI is limited to the supplied product, not being responsible for indirect or emerging damages, such as lost profits, loss of revenue and the like, resulting from the impossibility of using the product while it is damaged and/or submitted to the warranty process.

11 Environmental guidelines

The products manufactured by WEG-CESTARI comply with the legal and environmental requirements defined by the company and as an integral part of our Environmental Management System, the information regarding the recycling of our products is provided in this Manual:

Housings, Couplings, Covers, etc. (Cast Iron, Steel or Aluminum):

They are 100% recyclable and must be destined to foundries.

Shafts, Gears, Pinion, etc. (Steel):

They are 100% recyclable and must be sent to steel mills.

Crowns (Bronze):

They are 100% recyclable and must be sent to foundries.

Oils:

They must be destined for refining in duly authorized companies.

Seals (Rubber):

Must be destined to companies duly licensed by the responsible environmental agency (landfill class II).

Elastic Elements:

They are 100% recyclable and must be sent to recycling companies

Packaging:

Wood: They are manufactured with reforestation wood and can be reused or used as fuel in boilers when not contaminated (with oil, grease, paint).

Cardboard: They are 100% recyclable when not contaminated (with oil, grease, paint) and must be sent to recycling companies.

NOTE: If any material is contaminated with oil, grease or paint, it must be destined to companies duly licensed by the responsible environmental agency.



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