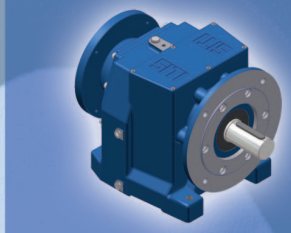
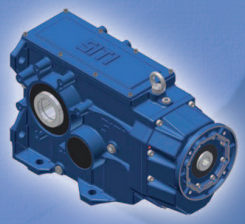
SPA
SOCIETÀ ITALIANA TRASMISSIONI INDUSTRIALI



NHL - MNHL



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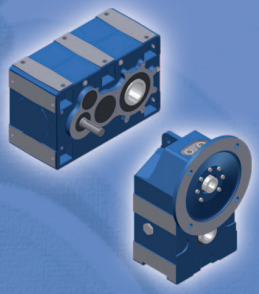

PL - PD

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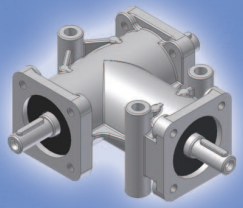

R

EN GEARBOXES INSTRUCTION AND SPARE PARTS MANUAL

01.2025

Abstract

1. Introduction

1.1. Foreword

SITI S.p.A. thanks you for the trust granted and reminds you that your product is the result of a work of improvement our engineers are continuously pursuing, due to a constant research in the section.
Reading and understanding the present publication is an essential condition for a correct set up and following installation.
The Assistance network is anyway at your disposal in order to help you to settle all possible doubts that might arise.

1.2. Manufacturer's identification data

SOCIETÀ ITALIANA TRASMISSIONI INDUSTRIALI®

GEARBOXES
GEARED MOTORS
MECHANICAL VARIATORS
ELECTRIC MOTORS A.C./D.C.

HEADQUARTER and FACTORY

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40053 VALSAMOGGIA Loc. Monteveglio (Bo) - Italy
Tel. +39/051/6714811
Fax. +39/051/6714858
E-mail: info@sitiriduttori.it
WebSite: www.sitiriduttori.it

1.3. Communications with the technical assistance

For whatever communication with the Technical Assistance Center, please always mention the gearbox technical data appearing on the name plate, located on the unit. These data will allow a whole identification of the unit (⇒ Identification name plate, 7).

1.4. List of contents of the manual

The present manual provides the installation, use and maintenance instructions of the product and refers to its use in the conditions as it will be clearly described in the following sections (⇒ Expected use, 6).
The present manual has been written in Italian as original language and thereafter translated into other languages. Therefore, the italian language constitutes the "ORIGINAL INSTRUCTIONS MANUAL", while the versions drawn up in other languages are to be considered "TRANSLATIONS OF THE ORIGINAL INSTRUCTIONS". Should you be convinced that the translation is wrong or missing a few parts, you are kindly requested to get in touch with the SITI S.p.A., who will provide to supply all the convenient clarifications and possibly to amend the translation where necessary.

1.5. Purpose and validity of the manual

Remark:
If not otherwise specified, what described in reference with gearboxes is to be intended to be applied even to bevel gearboxes of the series R.

The present manual offers the instructions for set up, use and maintenance related to geared gearboxes of the series NHL, BH, PL, PD, RP2 and to bevel gearboxes of the series R and complies with all the law dispositions, to the directives and to the rules which are in force at the time of the sale. The copy of the manual delivered along with the gearbox cannot be considered inadequate simply because it has been subsequently updated due to new experiences. Should any possible changes, adjustments etc.. be carried out to the marketed units in a following moment, they neither will force the manufacturer to come in action retrospectively on products previously supplied nor to consider the same products and the related manual as missing or unsuitable.

Possible further inclusions to the manual that the manufacturer will feel convenient to send to customers will have to be saved along with the manual, which they will represent integral part of.
The warranty related to the good running and performance and full compliance of the unit with the expected service is strictly dependent on the correct application of instructions held in the present manual.

1.6. Addressees of the manual

The present manual is addressed to:
- the manager of the plant;
- the personnel in charge of set ups;
- the personnel in charge of the maintenance.

The manual has to be guarded by a responsible person and kept, in the best status of preservation, in a place suitable to be always available for the consultation by the persons it is addressed to.
In case of loss or deterioration, the replacing documentation is to be requested to the manufacturer, indicating the reference data given on the identification plate (⇒ Identification name plate, 7).

1.7. Choice and qualification of the personnel

For the operations of handling, set up and maintenance, the user will have to commit the task to operators who have at their disposal the following features:
- Degree of education and training are adequate in view of the operation to be carried out.
- Knowledge of what is illustrated in the present manual in relation to the operation to be carried out.
- Knowledge of the accident prevention rules which are in force at the moment of use.
- Physical conditions suitable to the operation to be carried out.
- Equipment and use of certified individual protection devices.

1.8. Symbology used

Instructions are tied to symbols aimed at making the reading easier, by clarifying the kind of information supplied.

 Generalized danger for the safety of human beings.

 Important remarks in view of a correct usage without causing damages to the equipments.

 Instructions related to units expected for set up in environments having a potentially explosive atmosphere, complying with the directive 2014/34/UE (ATEX).

1.9. Glossary

P.P.E.
Acronym of Personal Protective Equipment.

1.10. Warranty

- Our warranty has a validity of one year, starting from the date of invoice of the product. It is limited exclusively to the free of charge repair or to the free replacement of the parts we recognize defective; checks intended to ascertain whether warranty can apply will be always carried out in the plant of the Seller or by one of the authorized branches. The claim can neither give rise to the cancellation of orders and not even to a high reduction of deliveries nor to the suspension of payments by the Buyer; not even the payment of a compensation in money of any kind effected by the Seller can be acceptable.
  Our warranty will expire if the pieces sent back as defective ones will prove to have been in any way altered or repaired without our previous written authorization; moreover, it will expire in case the Buyer fails in anyone of his contractual obligations, especially in reference to the payment conditions.
- Our warranty does not cover any damage or failure due to external factors, a missing maintenance, overloads, unsuitable lubrication, wrong choice of the type of unit, assembling error, caused by external components and by components subject to wear and deterioration as well as damages arising as a consequence of the transport carried out on account of the customer or through a transporter designed by the customer, considering that the shipment is always carried out on account and at risk afforded by the Buyer.

- Expenses (like for instance disassembling, labour, re-assembling, transport, board and lodging), which are undertaken due to the outer service of personnel of the Seller, even after acknowledgment of the warranty, are always on charge of the Buyer. On charge of the Seller, there are to be considered the components acknowledged under warranty and the time necessary for the replacement of the same.
- Any sort of compensation is not included and not even direct or indirect damages can be claimed (even towards thirds).
- The requests for repair under warranty and/or out of warranty are to be communicated by written through the suitable module to SITI S.p.A. in view of the acceptance of the repair.
  Material to be repaired either under warranty or anyway subject to troubles, will be withdrawn by our Company only if it is sent back at free port following up a written request, and it will be sent back with transport freights covered by the customer.

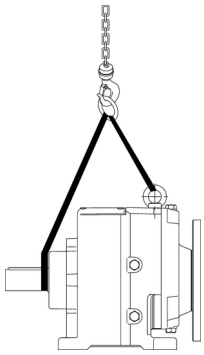
2. Accident prevention advices

2.1. General warnings

- It is prohibited to bring any kind of modification to the gearbox, without a previous authorization granted by the manufacturer.
- It is prohibited to use the gearbox in a potentially explosive atmosphere, unless the unit has been purposely pre-arranged for the use in such kind of atmosphere.
- The surface of a gearbox while operating might reach high ranges of temperature, such to cause skin burns. It is strictly recommended to check the temperature value of the outer surfaces of the gearbox, prior to enforcing any kind of service on the unit (⇒ Measure of the running temperature, 17).
- Whenever one is operating near the gearbox, it is recommended to wear a protection equipment, suitable for the operation to be carried out. All clothes worn while operating near a unit are to be close-fitting to the body. It is strongly recommendable to refrain from wearing ties, necklaces or belts, which might get caught by or squeeze in the rotating parts of the unit. It is necessary to always wear individual own protection devices, as called for by the manual in view of carrying out some kinds of service on the units.

2.2. Residual risks

In the stage of design and calculation of the gearboxes, an accurate analysis has been carried out about the risks, which the operators in charge of maintenance might be subject to, while they effect the manoeuvres and other kinds of maintenance and, due to this, all possible precautions have been taken, in order to make the gearbox safer and more reliable.
There are anyway a few conditions of risk depending on the installation type and on the operating conditions, which may be removed just by using simple precautions, as indicated on the manual in the related paragraphs.

Risk: crushing **Eventuality / risk location** Fall / crash of the gearbox during transport / set up stages. **Protections / precautions** Wear all P.P.E. called for. Comply with the instructions given in the manual (⇒ Handling and transport, 8).	

Risk: burns **Eventuality / risk location** By touching the gearbox during the use and maintenance. **Protections / precautions** Wear all the P.P.E. called for. Comply with the instructions given in the manual (⇒ Measure of the running temperature, 17) and (⇒ Oil replacement, 23).	

Risk: irritation of skin / eyes **Eventuality / risk location** Replacing / re-filling oil during the maintenance. **Protections / precautions** Wear all the P.P.E. called for. Comply with the instructions given in the manual (⇒ Oil replacement, 23).	

2.3. Advices for the use in a potentially explosive atmosphere

	Danger! **Mixtures of explosive gases or high powder concentrations may cause serious damages especially when they get in touch with hot rotating parts of the gearbox.** Set up, connection, start up, maintenance or repair works on gearboxes are to be accomplished only by specialized and qualified technicians, who have to comply with the following prescriptions: • Follow all manufacturer's instructions. • Take care and comply with all notice marks and information signs applied on the units. • Strictly follow the specific rules related to the installation on which the unit is operating. • Strictly follow all rules which are in force in the country of manufacture (protection against explosions, safety, risk prevention).

2.4. Installation of parts on account of the customer

Caution!
Prior to being set in motion, the gearbox must be provided with a few parts, essential in view of a full safety in the use and operations.

After set up, the user is requested to equip the gearbox with adapted repairs, suitable to protect rotating parts connecting input shafts and output shafts. On the protections, the following pictographs are to be applied:

 Do not remove the protections.

 Obligation to keep protections effective.

Caution!
The SITI S.p.A. declines any responsibility in case of damages occurring to things or persons, caused by the use of the gearbox without taking all the due protections as mentioned here above.

3. General information

3.1. Expected use

The unit has been designed and manufactured in order to directly transmit the rotational motion, operating a revolution speed reduction between input and output shafts.
Performance and limitation of use are clearly specified in the technical/commercial catalogue, which is available upon request or may be downloaded from the site www.sitiriduttori.it

	 Only in case ATEX mounting is purposely requested, the gearbox can be used for operating in environments meeting the following requirements: Group: **II** Category **2 G / 2 D** Protection mode (not electrical): **Ex h** Modes of protection used: **"c" constructive safety - "k" immersion in liquid** Gas / Dust Group: **IIC / IIIC** Zone: **1 / 21** EPL: **Gb / Db** Maximum surface temperature: **T4 / T135 °C** **II 2G Ex h IIC T4 Gb** **II 2D E xh IIIC T135 °C Db** **-20 °C ≤ Ta ≤ + 60 °C** Ambient temperature: - 20°C min., +60°C max. Different ambient temperatures from the mentioned ones are to be evalualed along with our Engineering Dept. Marking according to rules IEC EN 80079-36, IEC EN-80079-37.

3.2. Prohibited uses

The gearbox cannot be used for purposes different from the expected ones.
The standard gearbox cannot be used in environments characterized by a potentially explosive atmosphere. For such a use, it is necessary to require the special version fulfilling the directive 2014/34/UE (ATEX).

3.3. Declaration of incorporation

In compliance with the Machinery Directory 2006/42/CE, the gearbox, being intended to be built in and/or fitted on other machines or machine components, is considered a "component", therefore it cannot be put in service as long as the machine, on which it will be built in, has not been declared in conformance with the Machinery Directory 2006/42/CE.

 **Remark:**
The subject product complies with the above mentioned features and with the ones given on the catalogue which is in force at the production date. SITI S.p.A. reserves the right to change them, in order to adapt them to the technology or material variations occurred.

3.4. Gearbox identification data

3.4.1. Identification name plate

The units are equipped with an identification name plate, showing the following pieces of information:

• Gearbox code • Type of gearbox - Transmission ratio - PAM - Version • Additional description • Serial number • Bar code and or QR Code for internal traceability	

	In case of units fulfilling the directive 2014/34/EU (ATEX), the specific name plate ATEX is applied, on which the following information is given: • Gearbox code • Type of gearbox - Transmission ratio - PAM - Version • Additional description • Serial number • Bar code and/or QR Code for internal traceability • Compliance with ATEX classification	

 **Remark:**

The name plate must be always preserved in a way to be readable in relation to all data shown on it, providing periodically to its cleaning.

Should a name plate deteriorate and/or result to be not readable any longer, even in one only of the data appearing on it, it is recommended to require a new name plate to the manufacturer, mentioning the data which are still readable, and then provide to replace the name plate.

3.5. Technical specifications

Dimensions and performance

Features, dimensions and performance of gearboxes are given in the related technical/commercial catalogue available on request or they can be downloaded from the website www.sitiriduttori.it.

Noise

The level of noise emitted by a gearbox during a running period at full load in the worst operating conditions is always remarkably below the value of 70 dB (A).

3.6. Stocking

If, prior to set up, a period of stocking is expected, it is necessary to adhere to the following rules:

- Avoid to stock outdoor, in areas exposed to the bad weather and with excessive humidity.
- Always avoid the direct contact with the floor; for instance, use pallets or materials of another nature which anyway are such to insulate the product.
- For times of stocking longer than 60 days, it is recommended to coat with anti-oxidation products shafts, flanges and anyway all not painted surfaces.
- For times of stocking longer than 6 months, it is necessary to coat with grease all non machined parts, in order to prevent oxidation. Completely fill in the gearboxes with oil, keeping attention that the fill-in/breather plug is placed in the upper zone; of course, at the time of setting the unit up, it will be necessary to recover the proper oil amounts (⇒ Oil amount, 21).

4. Handling and transport

4.1. Handling and transport

Caution!
Read carefully and comply with the following instructions prior to handling the gearbox.

P.P.E. Helmet, safety shoes and protection gloves

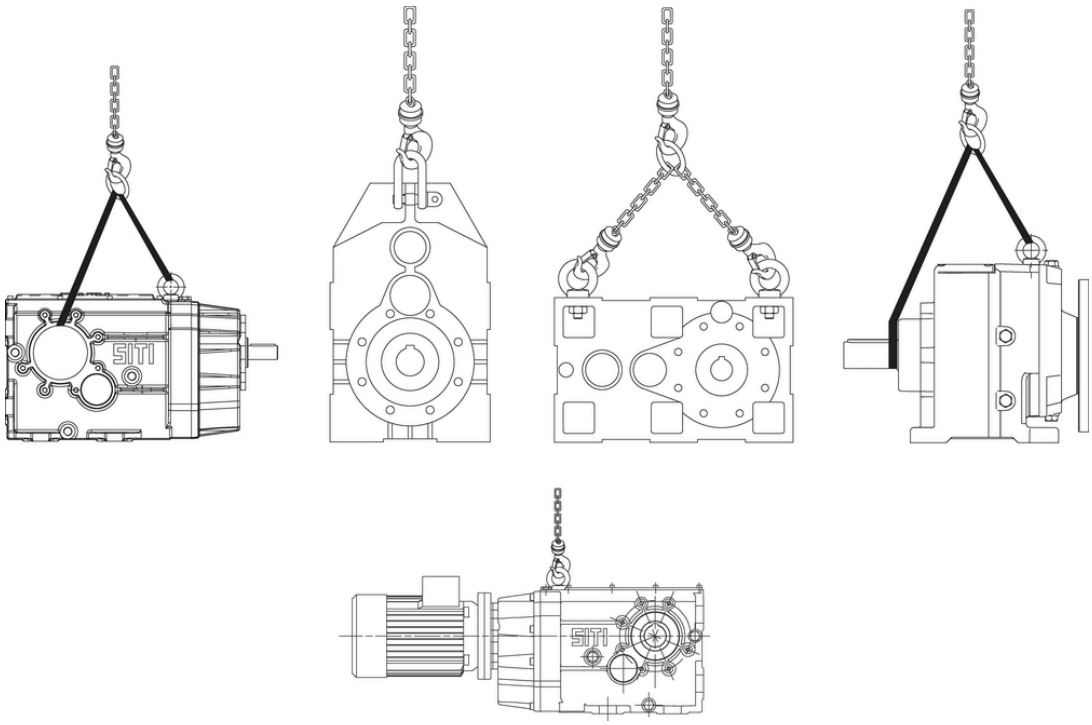
- Usually the gearbox is delivered in the condition of assembled and packed unit. Should the product be delivered packed in cardboard containers, handle the packed product with suitable means of weight-lifting in compliance with the law rules.
- Do not stop or move below suspended loads during lifting and transport operations.

The packages which include more gearboxes are to be lifted and handled with appropriate and suitable means, adequate to the dimensions and weights involved, like transpallets, lift trucks, overhead travelling cranes using ropes, cables, belts or suspension chains.

Single gearboxes or geared motors packed or deprived of the package must be lifted with the following operational modes:

- if their weight is equal to or lower than 15 kg they can be moved by hand;
- in case their weight is more than 15 kg, they are to be moved using proper lifting and transport means, as above mentioned. In particular, the unpacked units are to be hooked up and harnessed as it is shown, as an example, by arranging ropes, belts or chains in function of the configuration of the product.

On the gearboxes of the series NHL-MNHL, BH-MBH, PL-MPL there are on the units eyebolts, while on the gearboxes PD-MPD there are some crickets, by means of which it is possible a safe hook. Should the load prove to be unbalanced, a second belt has to be arranged, in order to correctly distribute the weight.



Caution!
- **Make sure that the grip of the load is steady and safe, even in case of oscillations.**
- **The eyebolt is suitable for lifting a single gearbox or a geared motor and not for lifting the whole complex of components which it will be fitted on.**

5. Set up

5.1. Set up

Caution!

All actions of set up, assembling and setting on account and on behalf of the buyer must be accomplished by qualified personnel. A wrong set up might lead to dangerous situations for the safety of the personnel and could give rise to serious or even irreparable damages to the product itself and to the connected machine.

Gearboxes are supplied already assembled in their main parts. Therefore, set up consists in placing and then fixing the unit in the place where it will operate, connecting input and output shafts to their matching parts, and carrying out the electric connections of the electric motor, whenever needed.
While setting a gearbox up, it is requested to adhere to a few strictly severe prescriptions:

- Make sure that the environment, where the unit will operate, does not highlight any unexpected conditions, like:
  - potentially explosive atmosphere;
  - immersion in water or corrosive solution;
  - vapours, radiations.
  For applications in peculiar environmental conditions, please consult the SITI S.p.A.
- It is necessary to avoid, or at least to reduce as much as possible narrowing and throttling in the air passages and especially the presence of heat sources located nearby gearboxes and such to be able to remarkably affect the temperature of the refrigerating air. Furthermore, it is necessary to prevent from an insufficient air circulation, which might compromise the regular heat removal from hot gearbox parts.
- Prior to setting the gearbox up, make sure that fill-in, unloading and level inspection plugs have been placed in the correct location in relation to the requested mounting position of the unit (⇒ Mounting positions, 11) and that the recommended oil has been used for filling the unit (⇒ Lubrication, 18).
- It is essential to fit the gearbox in a way such to avoid that it is subject to vibrations while operating. In fact, vibrations, in addition to causing noise, give rise to other kinds of problems, like the possible progressive unscrewing of the connection screws as well as an increase of loads acting on the inner parts submitted to fatigue stresses.
- Fixing surfaces are to be clean and are to have a sufficient microfinish in order to arrange that a good friction coefficient is available. In the screws and in the connection plains it is strictly necessary to use self-locking stickers.
- It is recommended to avoid as much as possible the fact of assembling cantilever mounted pinions and to reduce to the highest possible extent the stress of chains and belts. Should outer loads be there, it is suggested to use pins and positive stops.
- Prior to going ahead with the assembling, it is necessary to take particular care to clean accurately and lubricate the mating surfaces, in order to avoid possible oxidations and seizures.
- All parts which are press-fitted on the gearbox hollow shaft (made in tolerance range H7) are to be carried out with their fitting diameter made in a tolerance range h6. Wherever the kind of application requires a slight interference fit, it is possible to provide a fitting with a tolerance range female-male of the matching parts in (H7 - j6).
- Never use the hammer for assembling and disassembling fitted parts, but use the tapped holes provided on the shaft heads for suitable removal implements.
- It is of prior importance, in view of a good performance of the unit in operating conditions, to take care with the greatest attention of a good alignment of the gearbox with respect to the motor and to the machine to be driven. Whenever it is possible, it is recommended to fit elastic or self-aligning couplings. It is even suggested to proceed with a particular accuracy whenever an outrigger bearing is fitted, because possible errors in the alignment of this component would unavoidably involve the rise-up of overloads which would consequently destroy a bearing or break the shaft.
- When three-phase asynchronous electric motors are used and their start-up occurs in no load conditions or anyway under very restricted loads, it is necessary to accomplish very smooth starting times, very limited starting currents, even very restricted stresses and, whenever necessary, use the star/delta starting system.
- Whenever the application involves overloads of long duration, frequent shocks and danger of lock off, it is imperative to fit a motor saving system, electronic torque limiters, hydraulic couplings, safety couplings or control units.
- In case of use with a service factor involving several starting under load, it is recommended to make use of a motor protection by means of thermal sensors, in order to prevent the rise-up of dangerous overloading conditions for the motor, which might lead motor windings to overheat and thus to melt and fail.
- During the possible painting of the machine on which the unit is fitted, it is strictly recommended to protect the outer edge of shaft seals, aiming at preventing paint to make rubber dry, thus compromising the sealing effect.

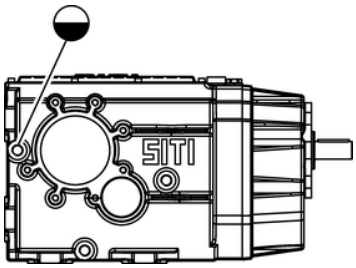
	It is advisable to use plastic inserts whenever there is a risk of electro-chemical corrosion between gearbox and actuator unit (due to the connection of different metals). Moreover, please provide all bolts with plastic washers! The plastic material used is to have an electric loss resistance < 10^9 W. Provide the outer structure with earth connection, furthermore use bolts with earth connection of the motor for the geared motors. Assure a convenient and sufficient cooling air flow and make sure that there is no return of heated air, coming from other devices.

5.2. Check and predisposition

Prior to proceeding with the gearbox mounting, the following checks are to be carried out:

- After unpacking the gearbox, it is recommended to carry out a visual check, intended to realize whether there is full compliance with the order, whether the product integrity is assured and whether there is absence of defects on all gearbox parts. Should it be found out that there is no compliance with the order and/or presence of failures or damages, this will have to be promptly communicated to the SITI S.p.A.
- Make sure that the product is suitable to the requested use.
- Check the appropriateness of the structures on which the unit will be mounted, in relation to the actions and reactions due to the load application.
- Check the conformance of the mounting position indicated in the order acknowledgment with the wished one (⇒ Mounting positions, 11). A possible change of the mounting position can be accomplished only after having consulted the SITI S.p.A. and after having received their authorization, otherwise warranty and the possible conformity with the directive 2014/34/UE (ATEX) will expire.
- Make sure that the spaces available for set up and mounting can comply with the need of providing an easy assembling, maintenance, access to the plugs (⇒ Mounting positions, 11), air circulation, etc.
- Check whether the unit has been supplied complete with lubricant.
  Units without plugs are filled in by SITI S.p.A. and are provided with lifetime lubrication.
  Units with plugs might be delivered with or without lubrication oil, depending on the type and size.

Therefore, it is strictly necessary to check whether there is actually lubricant inside the unit, by watching through the suitable inspection plug, firstly providing to directing the gearbox in conformance with the actual expected mounting position (⇒ Mounting positions, 11). In the opposite case, please proceed with oil filling in (⇒ First filling in of the gearbox, 14).



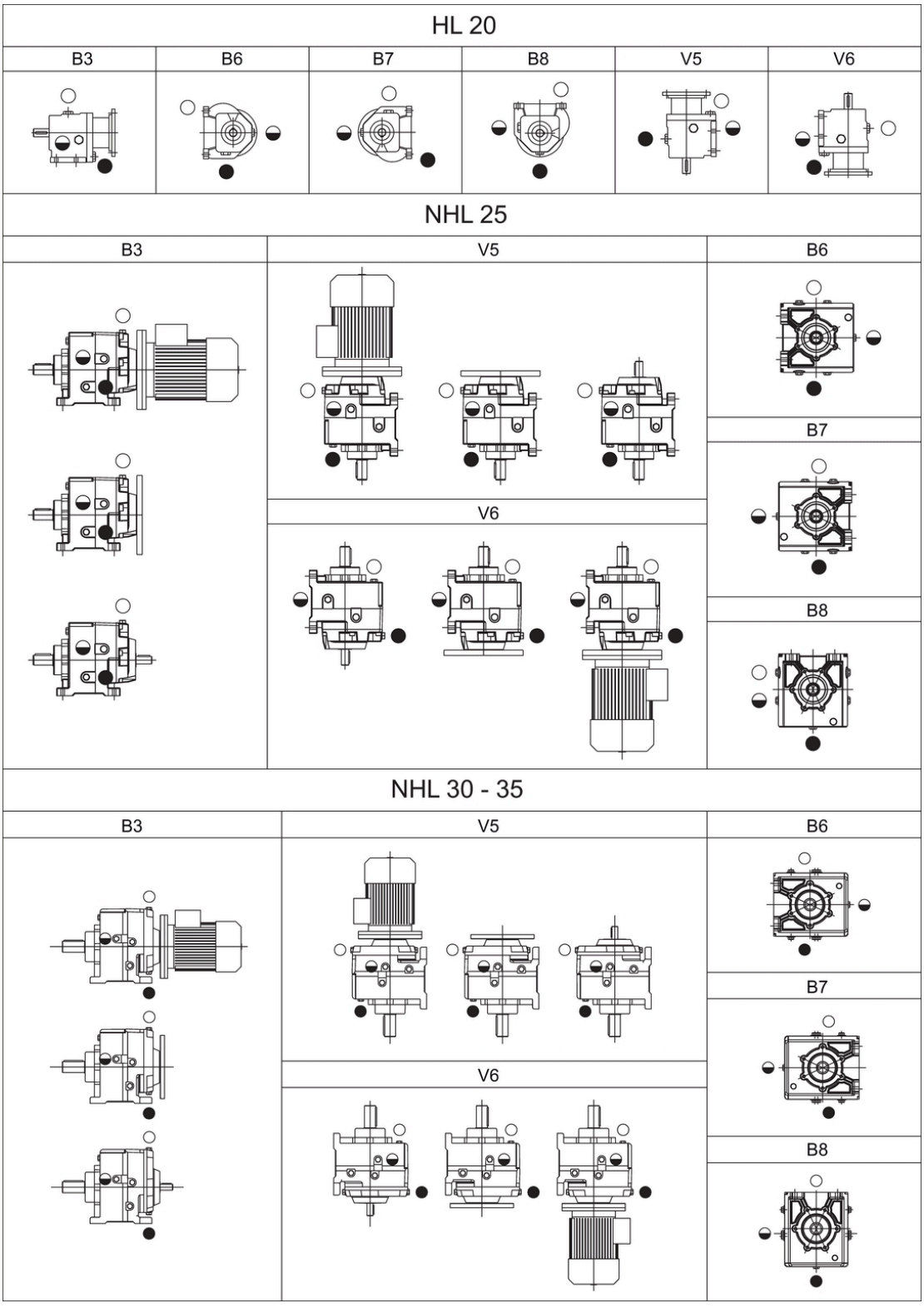
5.3. Mounting positions

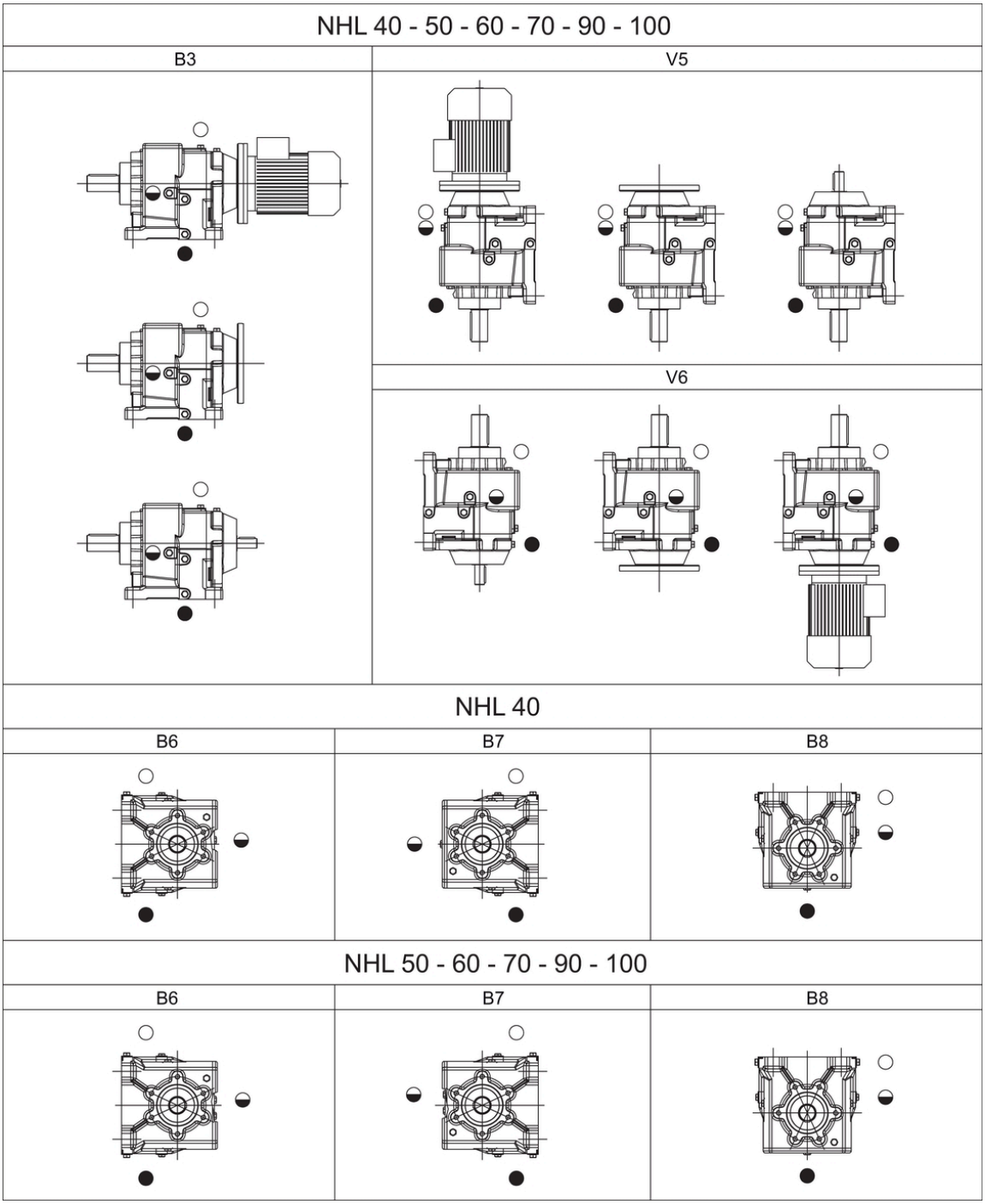
The following schematic drawings show the typical mounting positions of an unit with the correspondant identification marks. On a side of the gearboxes, they are even given, with circular-shaped symbols, the positions of the fill-in plug, breather plug, level indication plug and unloading plug, if they are actually present on the unit.

○ Fill-in and breather plug

◒ Level plug

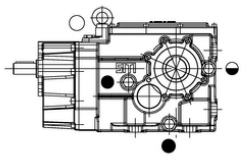
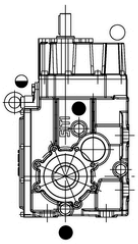
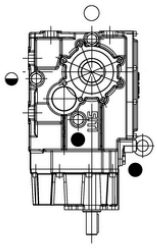
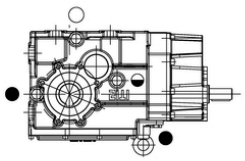
● Unloading plug

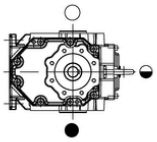
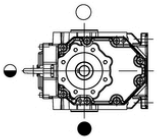




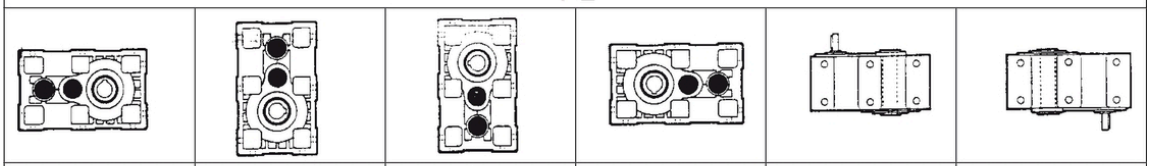
Remark:
On the units NHL 90 and 100, in the mounting positions V5 and V6, if the input RPM (n_1) exceeds the value 1750 RPM, please get in touch with our Technical Assistance Dept.

BH

B3	B6	B7	B8
			

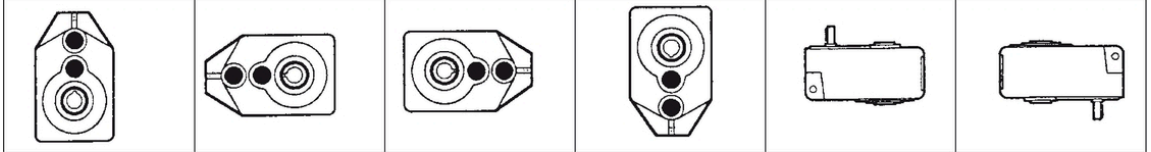
V5	V6
	

PL



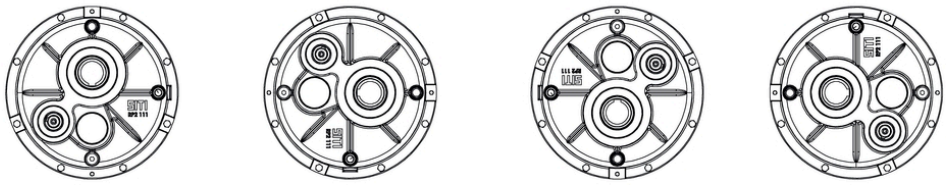
B3	B6	B7	B8	V5	V6

PD



B3	B6	B7	B8	V5	V6

RP2



U STANDARD R D L

VU VD

5.4. First filling in of the gearbox

P.P.E. Protection gloves and mask glasses

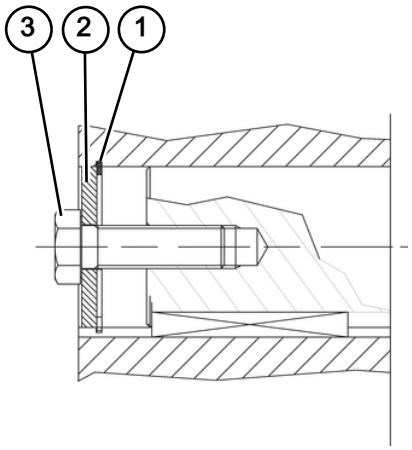
- Check that the unloading plug, located in the lowest position, and the level plug have been correctly fastened.
- For filling oil in, use the fill-in/breather plug, located in the upper gearbox portion. Oil amount to be filled in is given in the table (⇒ Oil amount, 21), but we point out that said amounts have a merely indicative value; the user will have in any case to fill oil in, until the oil level visible at sight on the level plug has been reached, once the unit has been already mounted in the correct mounting position (⇒ Mounting positions, 11).

5.5. Assembling-disassembling of the gearboxes with hollow output shaft of the series BH

The correct assembling of the gearboxes with hollow output shaft of the series BH has to be carried out as it is described in the following sections. It is recommended to use the suitable optional kit for assembling/disassembling, which includes all the necessary pieces.

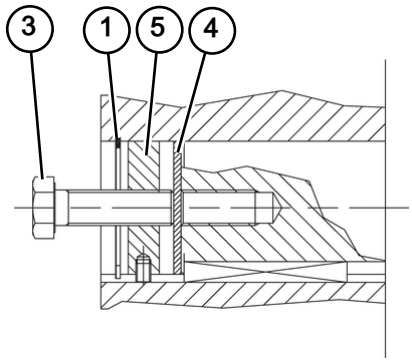
5.5.1. Assembling

- Clean the shaft and lubricate it slightly using Klüber 46MR401 compound (or equivalent).
- Fit the gearbox on the shaft.
- Place the elastic ring **1**.
- Place the washer **2**.
- Screw up the screw **3** up to completely locking it.



5.5.2. Disassembling

- Remove the locking pieces (screw **3**, washer **2** and elastic ring **1**).
- Fit the washer **4**.
- Fit the nut **5**.
- Fit the elastic ring **1**.
- Screw theextraction screw **3**.



6. Instructions for the use of the gearbox

6.1. Preliminary checks

Prior to the start up, a few very important checks are to be carried out:

- Make sure that the set up has been accomplished in a correct way, complying with all the prescriptions given on the chapter devoted to set up.
- Find out the temperature of the environment where the unit is mounted and pre-arrange a thermometer suitable to register the surface temperature (⇒ Measure of the running temperature, 17).

	Prior to starting a gearbox mounted in an environment with potentially explosive atmosphere, according to the ATEX 100a directive, the following checks are to be carried out.	✓
Inspect the packing, in order to check the status of goods at the moment of delivery.		
The following pieces of information given on the gearbox name plate correspond to the kind of explosive atmosphere approved: group, category, anti-deflagration zone, class of maximum allowed surface temperature.		
Do you feel sure that we are not in presence of a potentially explosive atmosphere, consisting of oils, gases, acids, vapours, radiations active during the gearbox set up?		
Does the ambient temperature meet the values given on paragraph (⇒ Check of running temperature, 16)?		
Make sure that gearboxes are sufficiently ventilated and that there are no outer sources of heat inlet (e.g. through connectors).		
Does mounting position correspond to the expected one? (⇒ Mounting positions, 11). **Caution!** **Any change of the mounting position can be carried out only if authorized by the manufacturer. ATEX compliance will expire in case of a missing consultation with the manufacturer.**		
Is oil level correct? (with the unit located exactly in the requested mounting position) (⇒ Check of oil level, 22)		
Are unloading and inspection plugs (whenever expected), as well as breather valves all easily accessible?		
Have input and output parts been mounted according to the ATEX rules?		
In case of motors driven by a frequency converter: make sure that the motor is regularly certified in view of its usage in combination with a frequency converter.		
The calibration and scaling of the technical parameters of the frequency converter are to be such to prevent the overloading of the gearbox.		

6.2. Running in

All gearboxes are to be submitted to a running in time of about 300-400 hours.
It is recommended to increase progressively during the running in time the transmitted power up to a limit of the 50-70 % of the maximum allowed power (in the first running hours).
During this time, values of temperature higher than the standard ones might occur.
Made exception for the units already supplied as lubricated by SITI S.p.A. with a lifetime lubricant, on which no oil replacement is requested, on all the units supplied by the SITI S.p.A. without oil it is recommended an oil change after running in, in order to assure higher reliability and a longer gearbox time of life (⇒ Oil replacement, 23).

6.3. Checks during running

6.3.1. Check of running temperature

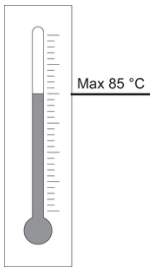
P.P.E. Heat insulated gloves
During the gearbox running time, it is necessary to keep the inner temperature controlled.
Temperature reached inside a unit depends on several factors:

- the kind of kinematism used for the transmission;
- type and amount of lubricant;
- main features and structure of the gearbox;
- input and output speed;
- mounting position;
- applied power;
- ambient temperature.

Temperature check may be effected by measuring its value on the gearbox outer surface. The max. surface temperature is achieved after about three running hours of continuous running and has not to overcome, in any operating condition, the differential value of 50 °C, compared with the ambient temperature, this being achieved with the max. allowable load applied. If this occurs in the period of time subsequent to running in and in standard operating conditions, the unit has to be stopped immediately and it is necessary to consult the SITI S.p.A.

Remark:
Please keep in mind that this value, like many other values of the max. admissible temperature mentioned in this manual, refers to environmental conditions characterized by an ambient temperature of 20 °C, poor conditions of ventilation (air speed ≤0.5m/s) and applies when running in time has been completed.
Moreover, it refers to a correct selection and usage of the units, i.e. to a use with an effective service factor higher or equal to the minimum service factor requested by the heaviness of the application.
Even slight variations in comparison with these conditions, both environmental and operating ones, might remarkably adversely affect the temperature of the gearbox. During the stage of running in (first 300-400 operating hours), the values of temperature increase ΔT might be even 25% higher.

Standard shaft seals are made in nitrile rubber compounds NBR and are suitable to operate in the range of standard operating temperatures included between about -15 °C and +85 °C. Should temperature inside the unit reach and keep for meaningful time intervals some values out of this range, it is necessary to require a special version of the gearbox, which is to be equipped with shaft seals made in fluorinated compounds FKM (trademark: Viton) for temperatures higher than +85 °C or in silicon rubber compound called VMQ, for temperatures lower than -15 °C.



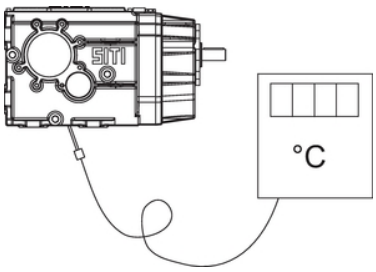
Ex	**During the running of a unit mounted in a potentially explosive atmosphere, according to the directive ATEX 100a, the following check operations are to be carried out.**	✓
Measure the surface temperature after about 3 hours of continuous service. The temperature differential in comparison with the ambient temperature has not to overcome a value of 50 °C.		
Should said temperature differential ΔT be higher, stop the gearbox immediately and consult the manufacturer.		

6.3.2. Measure of the running temperature

P.P.E. Heat insulated gloves

Caution!
Do not touch the gearbox prior to providing to the detection of the actual temperature with a thermometer.

For measuring the outer temperature of the housing, it is necessary to equip oneself with a thermometer provided with a temperature detection sensor. Any evaluation effected by touching the gearbox with a hand might be dangerous and additionally not reliable at all. In optimal conditions of use, the temperature of the housing rises up of at least 15-20 °C compared with the environment and the values of temperature usually reached by the housing during the running conditions are mostly too high to be born by the human skin. The fact of believing that a gearbox warms up too much because it is not possible to keep the hand on its housing is a statement missing any rational foundation. In fact, as soon as the temperature is even slightly above the value of 50 °C, the most of people are unable to keep their hand over the gearbox housing, although this is still a completely acceptable running temperature of an unit.
It is important to make sure that the running temperature at which a gearbox stabilizes in rated operating conditions, when there are the same modes of use, is more or less a constant value, considering that this a signal that the unit is operating without the possible rise up of adverse effects.
The gearbox surface temperature must be detected in the area of transition from gearbox to motor, where the location of the electric motor clamp hinders a correct ventilation.



7. Lubrication

7.1. Lubrication

The unit BH/MBH 56 and the bevel gearboxes of the series R are supplied completely lubricated using a synthetic lifetime oil, which does not require any replacement during the entire operating life of the unit.
The gearboxes of the series NHL/MNHL from the size 20 up to the size 35 included are supplied already lubricated with a mineral oil.
On the contrary, all other units of the series BH/MBH, the gearboxes of the series NHL/MNHL from the size 40 included upwards and the gearboxes of the series PL/MPL, PD/MPD, RP2 are supplied without oil, therefore the relevant oil filling in is committed to the customer.
For the lifetime lubrication, the Company SITI S.p.A. is currently using the synthetic oil type Shell Omala S4 WE 320.
For the non lifetime lubrication, the Company SITI S.p.A. is currently using the mineral oil type Shell Omala S2 G 220.
For all those cases when the filling in of oil is committed to the customer, this one can use either one of the synthetic-base lubricants for lifetime lubrication or one of mineral-base lubricants for non lifetime lubrication recommended (⇒ Oil grade, 20). In the choice of the oil to use, the customer has even to take care of the ambient temperature.
In the following tables, we show the oils, both synthetic and mineral ones, that we suggest and we recommend to strictly comply with these indications, even when there is the occasional need of adding oil for recovering the correct level.

 **Remark:**
It is recommended never to mix mineral oils with synthetic oils.

NHL-MNHL range	Lubricant
20	MINERAL OIL CLP ISO VG 220
25	
30	
35	
40	Supplied without any lubricant
50	
60	
70	
90	
110	

BH-MBH range	Lubricant
56	SYNT OIL ISO VG 320 PAG (suitable for all mounting positions)
63	Supplied without any lubricant
80	
100	
125	
140	
160	
180	
200	

R range	Lubricant
09	SYNT OIL ISO VG 320 PAG (suitable for all mounting positions)
14	
19	
24	

RP2 range	Lubricant
71	Supplied without any lubricant
91	
111	
131	
151	
181	
221	

PL/MPL - PD/MPD range	Lubricant
63	Supplied without any lubricant
80	
100	
125	
160	

7.2. Oil grade

		Ambient operating temperature																		
		-40	-35	-30	-25	-20	-10	-5	0	5	10	15	20	25	30	35	40	45	50	60
		(2)					(1)												(2)	
Mineral oil	150 VG	(3)																		
	220 VG																			
	320 VG																			
	460 VG																			
Synthetic oil (PAO)	150 VG	(3)																	(2)	
	220 VG																			
	320 VG																			
Synthetic oil (PAG)	150 VG	(3)																	(2)	
	220 VG																			
	320 VG																			

(1) Standard catalogue shaft seals
(2) Special out-of-catalogue shaft seals
(3) Get in touch with SITI Engineering

7.3. Comparison table

TYPE	Mineral oil				Synthetic oil (PAO)			Synthetic oil (PAG)		
ISO VG	**150**	**220**	**320**	**460**	**150**	**220**	**320**	**150**	**220**	**320**
ARAL	Degol BG				Degol PAS			Degol GS		
CASTROL	Alpha SP				Alphasyn EP			Alphasyn PG		
KLÜBER	Kluberoil GEM 1				KluberSynt GEM 4			KluberSynt GH 6		
MOBIL	Mobil Gear XMP				Mobil Gear SHC XMP			Mobil Glygoyle		
SHELL	Omala S2 G				Omala S4 GX			Omala S4 WE		
TOTAL	Carter EP				Carter SH			Carter SY		
FUCHS	Renolin CKC				Renolin Unisyn CLP			Renolin PG		

7.4. Oil amount

In the following tables, the oil amounts for each gearbox series are given, even in reference to those cases on which a lifetime lubrication is provided. The amounts are intended to be given in liters, except for bevel gearboxes, for which they are given in grams.

	Mounting position					
	B3	B6	B7	B8	V5	V6
NHL 20/2	0.26	0.26	0.26	0.26	0.26	0.26
NHL 25/2	0.9	1.1	1.1	1.3	1.3	1.4
NHL 30/2	1.6	1.7	1.7	2.3	2.1	1.8
NHL 35/2	1.7	1.7	1.7	2.2	2.4	1.6
NHL 40/2	2.1	2.6	2.6	3.6	2.8	3.2
NHL 50/2	5	6.5	6.5	7.2	7	7
NHL 60/2	7.5	9	9	10.5	13	12
NHL 70/2	11.5	15	15	17	21	17
NHL 90/2	16.5	18.5	18.5	25	30	28
NHL 100/2	25	33	33	38	45	
NHL 25/3	1	1.25	1.25	1.3	1.3	1.4
NHL 30/3	1.7	2	1.9	2.2	2	1.7
NHL 35/3	1.7	2	2	2.2	2.2	1.7
NHL 40/3	1.7	2.75	2.75	3.5	2.8	
NHL 50/3	4	4.8	5	8.2	5.5	5.5
NHL 60/3	6	7.8	8.7	7.5	13.3	
NHL 70/3	10	11.9	12.9	11.3	21	
NHL 90/3	16.5				30	20
NHL 100/3	25					

Mounting position	BH 56	BH 63	BH 80	BH 100	BH 125	BH 140	BH 160	BH 180	BH 200
B3	1.35	1.8	3.6	7.1	11.0	20.4	31.0	31.0	45
B6		3.0	5.16	9.3	15.0	25	40.0	52.0	68.0
B7		3.0	4.1	8.5	13.0	23.0	32.0	46.0	65.0
B8		2.0	3.6	5.9	8.5	15.0	15.5	34.0	46.0
V5		1.8	2.7	5.0	7.8	15.0	23.0	34.0	46.0
V6		1.9	2.9	5.7	9.0	16.2	24.0	34.0	53.0

Main housing											
Mounting position	PD					Mounting position	PL				
	63	80	100	125	160		63	80	100	125	160
B3	1.1	1.6	2.8	5.5	10	B3 - B8	0.9	1.5	2.8	5.6	10
B6 - B7	0.8	1.4	2.6	5.3	9.8	B6	1.4	2.1	4.0	7.6	12.5
B8	1.0	1.7	3.5	6.6	11.2	B7	1.1	1.8	3.6	7.0	11.7
V5 - V6	1.1	1.8	3.6	6.8	11.6	V5 -V6	1.2	1.9	3.8	7.2	12.0

Pre-lubricated primary reduction unit									
PD					PL				
63/3	80/3	100/3	125/3	160/3	63/3	80/3	100/3	125/3	160/3
0.2	0.3	0.4	0.6	0.8	0.2	0.3	0.4	0.6	0.8

Mounting position	RP2						
	71/2	91/2	111/2	131/2	151/2	181/2	221/2
U	0.85	1.6	2.3	3.9	4.6	7.3	12.5

R	Pre-lubricated with oil ISO VG 320			
Size	R 9	R 14	R 19	R 24
Oil amount (g)	30	110	200	200

8. Maintenance

8.1. Maintenance

The program of maintenance includes the service actions of ordinary type, providing inspections, checks and audits effected directly by the operator and/or by qualified personnel committed to the usual maintenance and service actions of periodical type, including replacement of parts or recording, developed by personnel, who has been purposely trained on behalf of the manufacturer through specific courses or special issues.

8.2. Ordinary maintenance

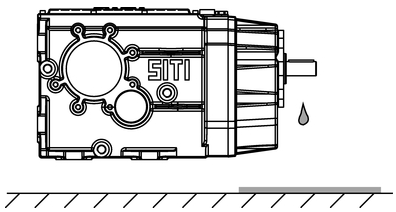
8.2.1. Cleaning

Carry out periodically the cleaning of the outer surface of the gearbox and of the air channels for the ventilation, in order to assure a satisfactory thermal exchange coefficient towards outside.

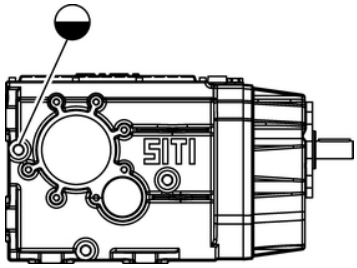
8.2.2. Check of oil level

For the units supplied by SITI S.p.A. without oil plugs and filled in with synthetic oil, the fact of checking oil level is neither requested nor possible, due to the missing level plug.
Should the user, however, detect oil leakages or should he make sure that some running malfunction events take place, which induce him to assume that the oil level might have been meaningfully reduced, we recommend to apply to the Technical Assistance Dept. SITI S.p.A., in order to ask for an advice about the way to behave.

Caution!
The damages a gearbox might be subject to, should it operate with a poor oil amount, are extremely serious and quick, and many times are fully irreparable!



A poor amount of lubricant, in addition to the fact of not allowing the proper lubrication of all inner parts, might adversely affect the thermal exchange conditions and, due to the highly reduced refrigerating and heat removal power, gives rise to the inner running temperature increase, especially on the mating surfaces of teeth flanks.
It is suggested to often make sure, through quick visual checks, that no oil leakages are occurring through shaft seals, gaskets, connecting flanges, attaching hardware of covers, end caps etc....



A more careful check of oil level has to be carried out at sufficiently frequent time intervals. This check is to be effected through the level plug when the unit is standing still and is sufficiently cool.
Should it be ascertained, through the same level plug, that an inner dirt sedimentation has occurred, it is strictly necessary to make sure that no foreign material, such as powder, sand, water or anything else has penetrated into the gearbox housing and anyway replace oil (⇒ Oil replacement, 23).
Should oil level have sunk down and shallowed below the recommended values, it is necessary to fill oil in, up to restoring the correct level.

8.3. Periodical maintenance operations

8.3.1. Oil replacement

For the oil replacement after the running in time, comply with the instructions given on the paragraph (⇒ Running in, 16) and (⇒ Lubrication, 18).

The interval of periodical oil replacement depends on the conditions of use, briefly summarized in the following prospect.

Oil temperature (°C)	Service	Time interval of oil replacement (hours)
< 60	Continuous Intermittent	5000 8000
> 60	Continuous Intermittent	2500 5000

Remark:
Data given in the prospect refer to a lubrication with use of mineral oils.

Synthetic oils, if used in the range of standard temperatures from -15 °C up to +85 °C, can be used even for a lifetime lubrication.
This occurs in the case of all units already supplied by the SITI S.p.A. with a synthetic base lubrication.
In the case of large and expensive gearboxes, on which all possible maintenance actions are very costly, it is recommended for safety reasons to carry out an oil change, even if synthetic, whenever any maintenance repair service has been effected, provided that a period of operating time of 8000 thru 10000 service hours has occurred.

Remark:
Unloading of oil is to be carried out in hot conditions, with the gearbox at a temperature of about 40-45 °C, but not beyond this range, in order to prevent from possible burnings.

Caution!
Please be very careful in order to avoid to spill oil on the ground and pay attention to behave in full conformance with the environmental rules in force in the country of usage.

P.P.E. Protection gloves and mask glasses

- Unscrew the fill-in/breather plug.
- Unscrew the unloading plug located down and let oil completely flow out (this is particularly important in case of changing lubricant from a mineral to a synthetic oil or the opposite).
- Check whether the level plug is clean and transparent. In case it is not, unscrew and clean it.
- Screw again the unloading plug.
- Fill in the units from the upper hole. The oil amount to be filled in is indicated in the table (⇒ Oil amount, 21), but we point out that the mentioned amounts do have a simply indicative value; the user has to fill oil in, until the oil level visible at sight through the transparent level plug has been achieved (having already mounted the unit in the expected mounting position).
- Screw again the fill-in breather plug located above.

8.3.2. Possible replacement of shaft seals

The running time and thus the endurance time of a shaft seal is affected in a conclusive way by the operating temperature in the mating area, by the possible chemical reactions which might occur between rubber compound and lubrication fluid and by the status of preservation of the shaft seal.
Replacement of the shaft seal is necessary if:

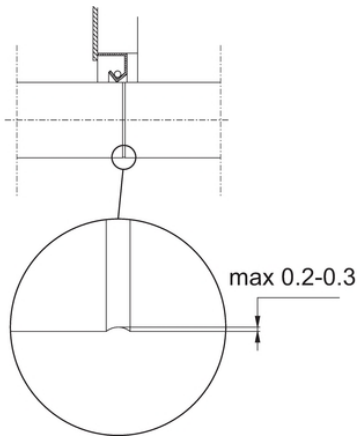
- a good serviceability of the sealing function is missing, and due to this an oil leakage towards outside of the unit is occurring;
- it is being effected a revision of the machine or of the installation.

Whenever a shaft seal is not developing its sealing function any longer, it is necessary to provide as soon as possible to its replacement, in order to prevent a leakage extending along the time, as well as a damage possibly extended to other components.

At the time of fitting a new shaft seal, it is needed:

- to take a particular care while handling the shaft seal and make sure of the intactness of the product (possibly avoid too long times of storage, which might give rise to a premature aging, especially if there is an excessive level of humidity);
- always check that the shaft seal seat is in a perfect status, in other words it is free of longitudinal or oriented scores, fingerprints, engravings, cuttings, marks or surface failures;
- take care to prevent that the shaft seal lip of the new seal operates exactly over the same trace left clearly by the previous one;

- whenever it is made sure that a deterioration of the shaft seal mating area has occurred, involving a depth greater than 0.2-0.3 mm, we strongly advise not to fit the new shaft seal and to get in touch with a workshop of our Assistance, which will provide to check whether there is any chance of recovering the shaft, and in any case will issue a diagnosis about the possible reasons of the damage occurred;



- fit the shaft seal in a way to be perpendicular to the axis and with the lip completely free and not overturned or pinched;
- position the shaft seal in a way that the sealing lip is oriented towards the fluid which is to be sealed, or on the side where a higher pressure is exerted;
- on shaft seals without a dust lip, spread grease in the outer area of the lip;
- fill in with grease the interspace between sealing and dust lip;
- coat with grease the shaft seal seat on the shaft;
- never use sealants, otherwise shaft seal lip or shaft surface would get smirched and thus would quickly deteriorate;
- exert the fitting force as close as possible to the shaft seal outer diameter;
- neither lock axially the seal nor submit it to a strong force;
- always use suitable toolings, in order to prevent possible damages to the shaft seal lip, due to the presence of threads, outlet chamfers, sharp edges, keyways;
- always protect the lip and its seat on the shaft, whenever one provides to repaint the unit or the machine on which it is fitted.

All above mentioned precautions do have the objective to avoid that a shaft seal might operate in dry conditions, especially during the first shaft turns, because otherwise too high temperatures might be achieved in the contact areas, which would immediately cause a deterioration of the materials shaft seal is made of: shaft seal getting harder, scorings, change of colourfulness.

8.3.3. Check of bearings

In every gearbox there are bearings even of different kind, subject to loading and lubrication conditions which might change as a function of the transmission ratio and of the type of application.
For this reason, considering the variability of the parameters involved, it is not defined a planned replacement interval, but it is requested a series of checks on bearings, allowing to understand when to proceed with the replacement.
Therefore, it is necessary to plan periodical checks of noise level and vibrations of bearings, using suitable instruments, according the the Table frequency of checks.
In case a deterioration of the measured values is detected, it is necessary to stop the machine and carry out an inner inspection of the gearbox, involving, whenever necessary, our Technical Dept.
Should the possible failure of a bearing and the following machine stop mean a danger for people, carry out a monitoring of vibrations and noise with continuity.

Table frequency of checks

Code	Subject of the check	Frequency
A	Sound level (noise)	On three-month basis
B	Vibrations	On three-month basis
C	Temperature	On three-month basis

8.4. Table of tightening torques of attaching hardware

For all gearboxes and possible accessories, please strictly adhere to the following values of the tightening torques.

Screw threads Class 8.8	Tightening torque for steel and cast iron (Nm)	Tightening torque for aluminium (Nm)
M4	2.9	2.3
M5	6	4.8
M6	10	8
M8	25	20
M10	49	39
M12	86	69
M14	135	108
M16	210	168
M18	290	232
M20	410	328

8.5. Troubles, causes, corrective actions

The conditions of malfunctioning, which might be reasonably expected, related to the single operating conditions of the unit, are reported; in the columns of the following table, the kind of trouble, the operating function and the component which might be the reason of the failure are accurately described.

TROUBLE	POSSIBLE CAUSES	CORRECTIVE ACTIONS
Motor does not start.	Faulty electric motor connection.	Check the connection.
	Faulty motor.	Replace the motor.
	Wrong motor sizing.	Replace the motor.
Motor and gearbox reach a too high temperature.	Mechanical overloading.	Check the mechanical parts driven by the motor-gearbox.
	Sizing of the motor-gearbox group wrong.	Replace the motor-gearbox group.
Motor current absorption and/ or motor temperature are too high.	Faulty motor.	Replace the motor.
	Wrong motor sizing.	Replace the motor.
Gearbox reaches a too high temperature.	Faulty gearbox.	Repair or replace the gearbox.
	Wrong sizing of the gearbox.	Replace the gearbox.
	Mounting position not complying with the one for which the gearbox has been arranged.	Make sure that the gearbox is in compliance with the order.
	Insufficient amount of lubricant.	Re-fill new lubricant in, until the oil level corresponding to the level plug has been reached.
Oil leakages through the shafts.	Worn or faulty shaft seals.	Replace shaft seals.
	Worn shaft seal seat on shafts.	Replace shaft seals and fit the new ones in a slightly shifted position or otherwise replace shafts.
Oil leakages through the mating surfaces between flanges/covers and housing.	Flanges not sufficiently tightened.	Tighten flanges.
	Faulty gaskets between mating plains.	Replace gaskets, making sure that the sealing surfaces are perfectly machined.
The gearbox emits a noise similar to a beat.	Faulty gear teeth.	Apply to the Technical Assistance Service.
The gearbox emits a noise similar to a whistle.	Insufficient amount of lubricant.	Re-fill new lubricant in, until the oil level corresponding to the level plug has been reached.
	Faulty or worn gears.	Apply to the Technical Assistance Service.
	Faulty or uncorrectly fitted bearings.	Apply to the Technical Assistance Service.

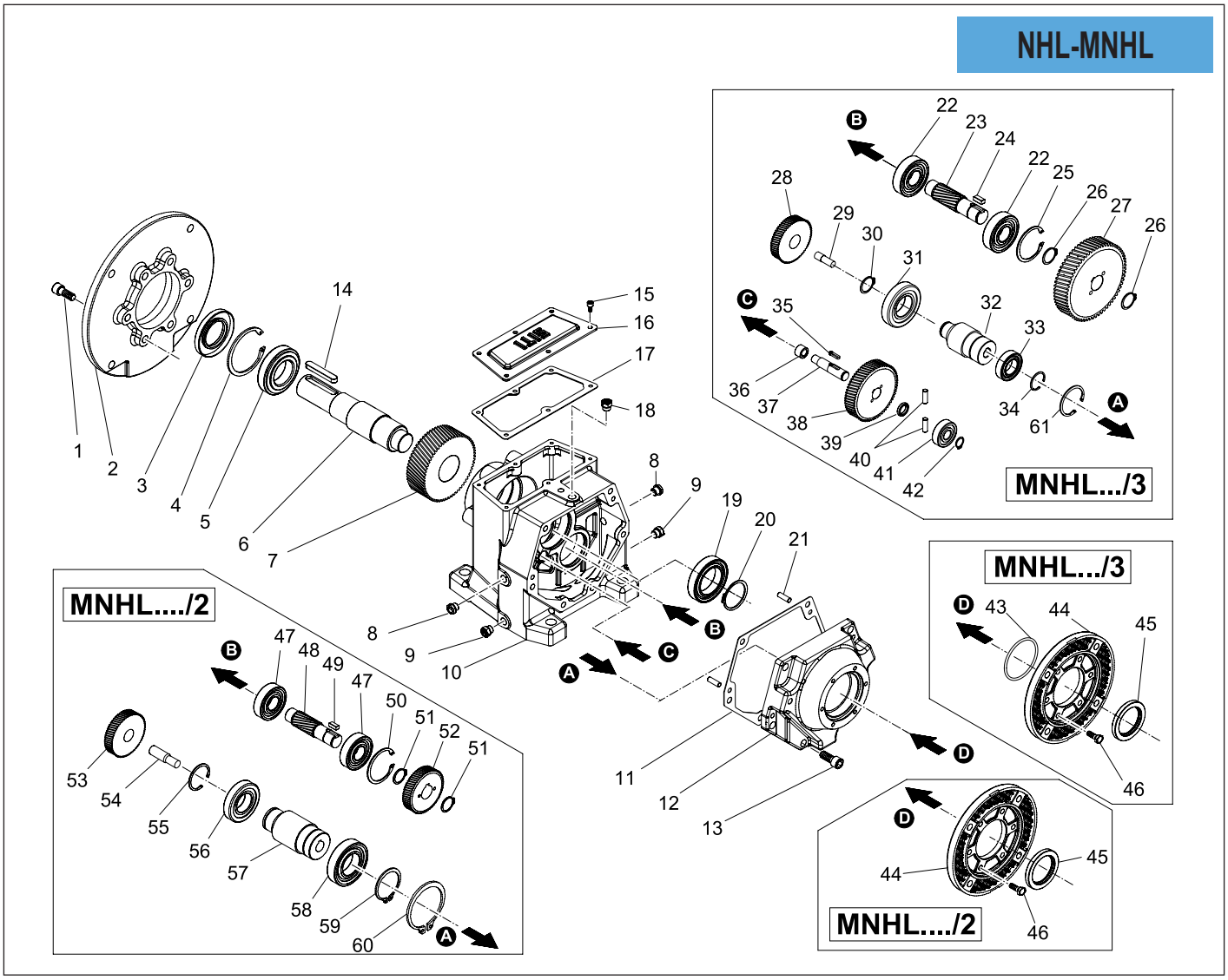
9. Scrapping and material disposal

9.1. Scrapping and material disposal

As soon as the gearbox has achieved its maximum limit of usage, it will have to be dismantled and scrapped.
Remove all oil from the gearbox, keeping in mind that exhausted oil has a strong adverse effect on the environment.
After scrapping, the operation of getting rid of the materials and of the lubricant will have to be accomplished in full compliance with all rules and law dispositions which are in force at the moment in the country of usage.
All operations related to getting rid of materials will have to be effected by qualified and authorized Companies; it is a task of the Company that is in charge of getting rid of materials to make sure that said Companies are complying with the requested National and International Directives.

10. Spare parts

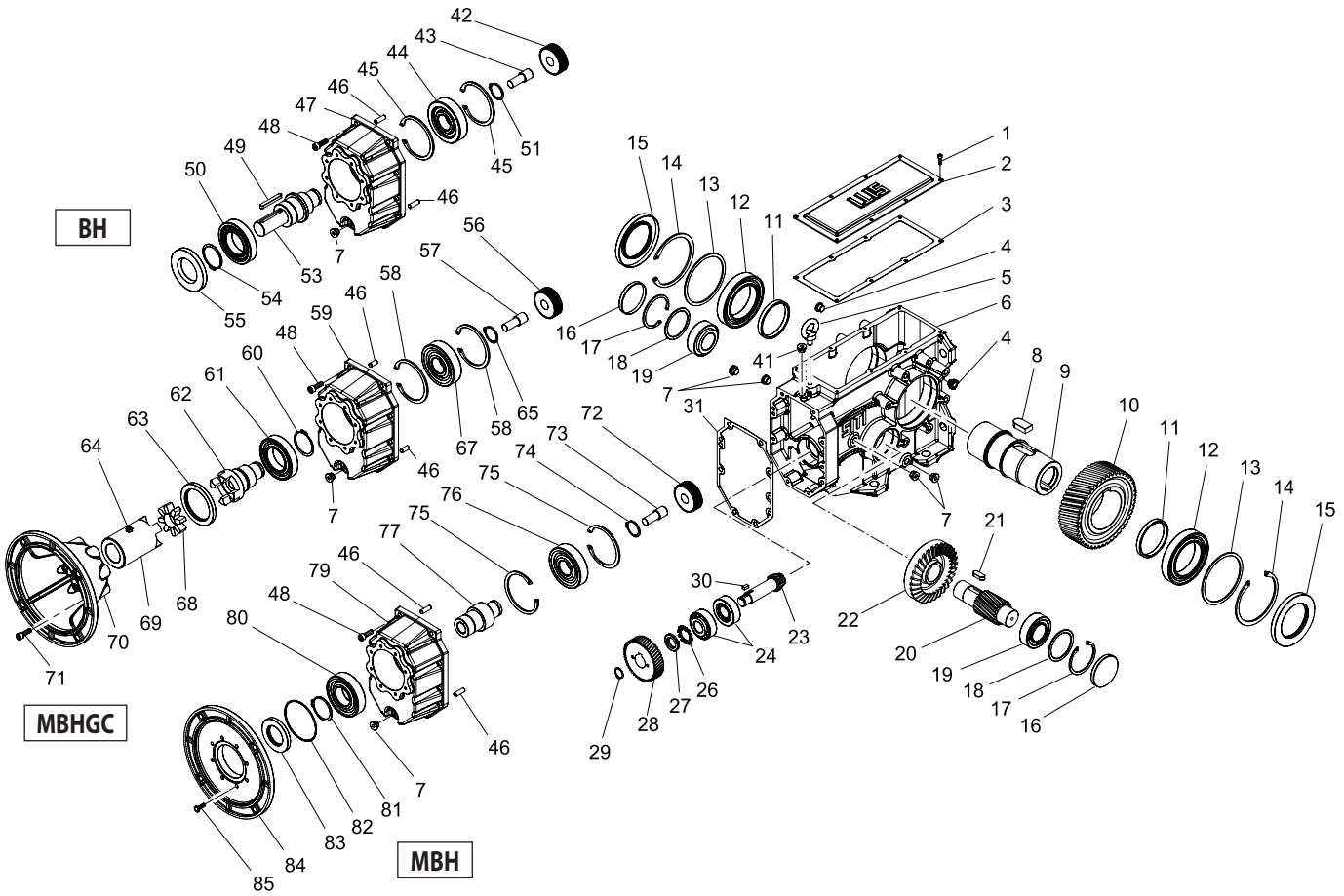
To check the spare parts catalogue, contact the SITI S.p.A. Technical Service Department and require a hard copy of the documentation or the interactive CD-ROM (when available).



NHL/2-MNHL/2 20-100		Cuscinetto / Bearing / Lager Roulement / Cojinete / Rolamento					Anello di tenuta / Shaft seals Wellendichtung / Joints d'étanchéité Anillos de retención / Retentor	
		5	19	47	56	58	3	45
NHL 20		6204 2RS	6204	6201	6004	6007	24-47-7 BASL	35-62-7 BASL
MNHL 20		6204 2RS	6204	6201	6004	6007	24-47-7 BASL	35-55-10 BASL
NHL 25/2		6206	6205	6302	6005	6207 2RS	30-62-7 BASL	35-72-10 BASL
MNHL 25/2		6206	6205	6302	6005	6008 2RS	30-62-7 BASL	40-60-10 BASL
NHL 30/2		6208	6206	6304	6205	6207 2RS	40-80-10 BASL	35-72-10 BASL
MNHL 30/2		6208	6206	6304	6205	6008 2RS	40-80-10 BASL	40-60-10 BASL
NHL 35/2		6208	6206	30304	6205	6207 2RS	40-80-10 BASL	35-72-10 BASL
MNHL 35/2		6208	6206	30304	6205	6008 2RS	40-80-10 BASL	40-60-10 BASL
NHL 40/2		30209	30207	6305	6208	6208 2RS	45-85-10 BASL	40-80-10 BASL
MNHL 40/2		30209	30207	6305	6208	6010 2RS	45-85-10 BASL	50-72-8 BASL
NHL 50/2		30211	30210	6307	NJ 208 E	6208 2RS	55-100-10 BASL	40-80-10 BASL
MNHL 50/2	PAM 80 90 100 112 132	30211	30210	6307	NJ 208 E	6010 2RS	55-100-10 BASL	50-72-8 BASL
MNHL 50/2	PAM 160	30211	30210	6307	NJ 208 E	6011 2RS	55-100-10 BASL	55-80-8 BASL
NHL 60/2		30213	32212	32208	NJ 209 EC	6310 2RS	65-120-13 BASL	50-72-8 BASL
MNHL 60/2		30213	32212	32208	NJ 209 EC	6015 2RS	65-120-13 BASL	75-100-10 BASL
NHL 70/2		30215	30215	32210	NJ 2210 E	6312 2RS	75-130-10 BASL	60-85-8 BASL
MNHL 70/2	PAM 132 160 180 200	30215	30215	32210	NJ 210 E	6015 2RS	75-130-10 BASL	75-100-10 BASL
MNHL 70/2	PAM 225	30211	30210	6307	NJ 2210 E	6016 2RS	75-130-10 BASL	80-110-10 BASL
NHL 90/2		32219	32216	32212	NJ 313 EC	6319	95-170-13 BASL	95-110-10 BASL
MNHL 90/2	PAM 132 160 180 200	32219	32216	32212	NJ 2210 E	6015 2RS	95-170-13 BASL	75-100-10 BASL
MNHL 90/2	PAM 225 250	32219	32216	32212	NJ 313 EC	6026 2RS	95-170-13 BASL	130-170-12
NHL100/2 Usc. D.100		32222	32221	32214	NJ 313 EC	6319	100-200-13 BASL	95-110-10 BASL
MNHL100/2 Usc. D.100	PAM 132 160 180 200	32222	32221	32214	NJ 2210 E	6015 2RS	100-200-13 BASL	75-100-10 BASL
MNHL100/2 Usc. D.100	PAM 225 250 280	32222	32221	32214	NJ 313 EC	6026 2RS	100-200-13 BASL	130-170-12
NHL100/2 Usc. D.110		32026X	32221	32214	NJ 313 EC	6319	130-200-15 BASL	95-110-10 BASL
MNHL100/2 Usc. D.110	PAM 132 160 180 200	32026X	32221	32214	NJ 2210 E	6015 2RS	130-200-15 BASL	75-100-10 BASL
MNHL100/2 Usc. D.110	PAM 225 250 280	32026X	32221	32214	NJ 313 EC	6026 2RS	130-200-15 BASL	130-170-12

NHL/3-MNHL/3 25-100		Cuscinetto / Bearing / Lager Roulement / Cojinete / Rolamento							Anello di tenuta / Shaft seals Wellendichtung / Joints d'étanchéité Anillos de retención / Retentor	
		5	19	22	31	33	36	41	3	45
NHL 25/3		6206	6205	6302	6004	6007 2RS	HK 1010	6201	30-62-7 BASL	35-72-10 BASL
MNHL 25/3		6206	6205	6302	6004	6007 2RS	HK 1010	6201	30-62-7 BASL	40-60-10 BASL
NHL 30/3		6208	6206	6304	6004	6007 2RS	HK 1015	6301	40-80-10 BASL	35-72-10 BASL
MNHL 30/3		6208	6206	6304	6004	6007 2RS	HK 1015	6301	40-80-10 BASL	40-60-10 BASL
NHL 35/3		6208	6206	30304	6004	6007 2RS	HK 1015	6301	40-80-10 BASL	35-72-10 BASL
MNHL 35/3		6208	6206	30304	6004	6007 2RS	HK 1015	6301	40-80-10 BASL	40-60-10 BASL
NHL 40/3		30209	30207	6305	6005	6008 2RS	HK 1212	6302	45-85-10 BASL	40-80-10 BASL
MNHL 40/3		30209	30207	6305	6005	6008 2RS	HK 1212	6302	45-85-10 BASL	50-72-8 BASL
NHL 50/3		30211	30210	6307	6205	6207 2RS	HK 1512	6304	55-100-10 BASL	40-80-10 BASL
MNHL 50/3	PAM 80 90 100 112 132	30211	30210	6307	6205	6008 2RS	HK 1512	6304	55-100-10 BASL	50-72-8 BASL
MNHL 50/3	PAM 160	30211	30210	6307	6205	6008 2RS	HK 1512	6304	55-100-10 BASL	55-80-8 BASL
NHL 60/3		30213	32212	32208	6208	6208 2RS	HK 2216	6305 2RS	65-120-13 BASL	40-80-10 BASL
MNHL 60/3		30213	32212	32208	6208	6010 2RS	HK 2216	6305 2RS	65-120-13 BASL	50-72-8 BASL
NHL 70/3		30215	30215	32210	NJ 208 E	6208 2RS	HK 2820	6307	75-130-10 BASL	40-80-10 BASL
MNHL 70/3	PAM 90 100 112 132	30215	30215	32210	NJ 208 E	6010 2RS	HK 2820	6307	75-130-10 BASL	50-72-8 BASL
MNHL 70/3	PAM 160	30211	30210	6307	NJ 208 E	6011 2RS	HK 2820	6307	75-130-10 BASL	55-80-8 BASL
NHL 90/3		32219	32216	32212	NJ 209 EC	6310 2RS	33208	33208	95-170-13 BASL	50-72-8 BASL
MNHL 90/3	PAM 100 112 132 160 180	32219	32216	32212	NJ 209 EC	6015 2RS	33208	33208	95-170-13 BASL	75-100-10 BASL
NHL100/3 Usc.D.100		32222	32221	32214	NJ 2210 E	6312 2RS	33210	32310	100-200-13 BASL	60-85-8 BASL
MNHL100/3 Usc. D.100	PAM 132 160 180 200	32222	32221	32214	NJ 210 E	6015 2RS	33210	32310	100-200-13 BASL	75-100-10 BASL
MNHL100/3 Usc. D.100	PAM 225	32222	32221	32214	NJ 2210 E	6016 2RS	33210	32310	100-200-13 BASL	80-110-10 BASL
NHL100/3 Usc.D.110		32026X	32221	32214	NJ 2210 E	6312 2RS	33210	32310	130-200-15 BASL	60-85-8 BASL
MNHL100/3 Usc. D.110	PAM 132 160 180 200	32026X	32221	32214	NJ 210 E	6015 2RS	33210	32310	130-200-15 BASL	75-100-10 BASL
MNHL100/3 Usc. D.110	PAM 225	32026X	32221	32214	NJ 2210 E	6016 2RS	33210	32310	130-200-15 BASL	80-110-10 BASL

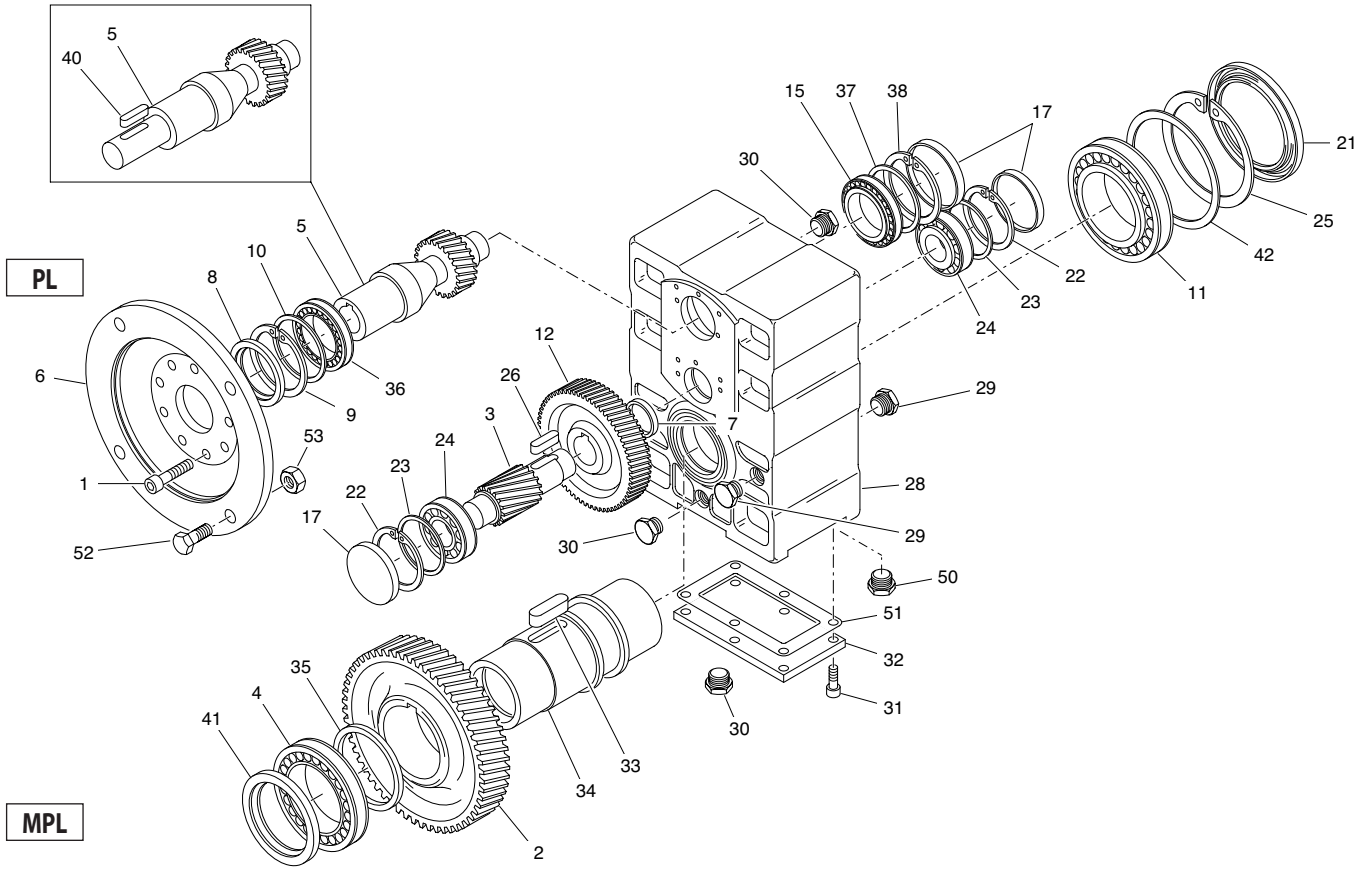
BH-MBH-MBHGC



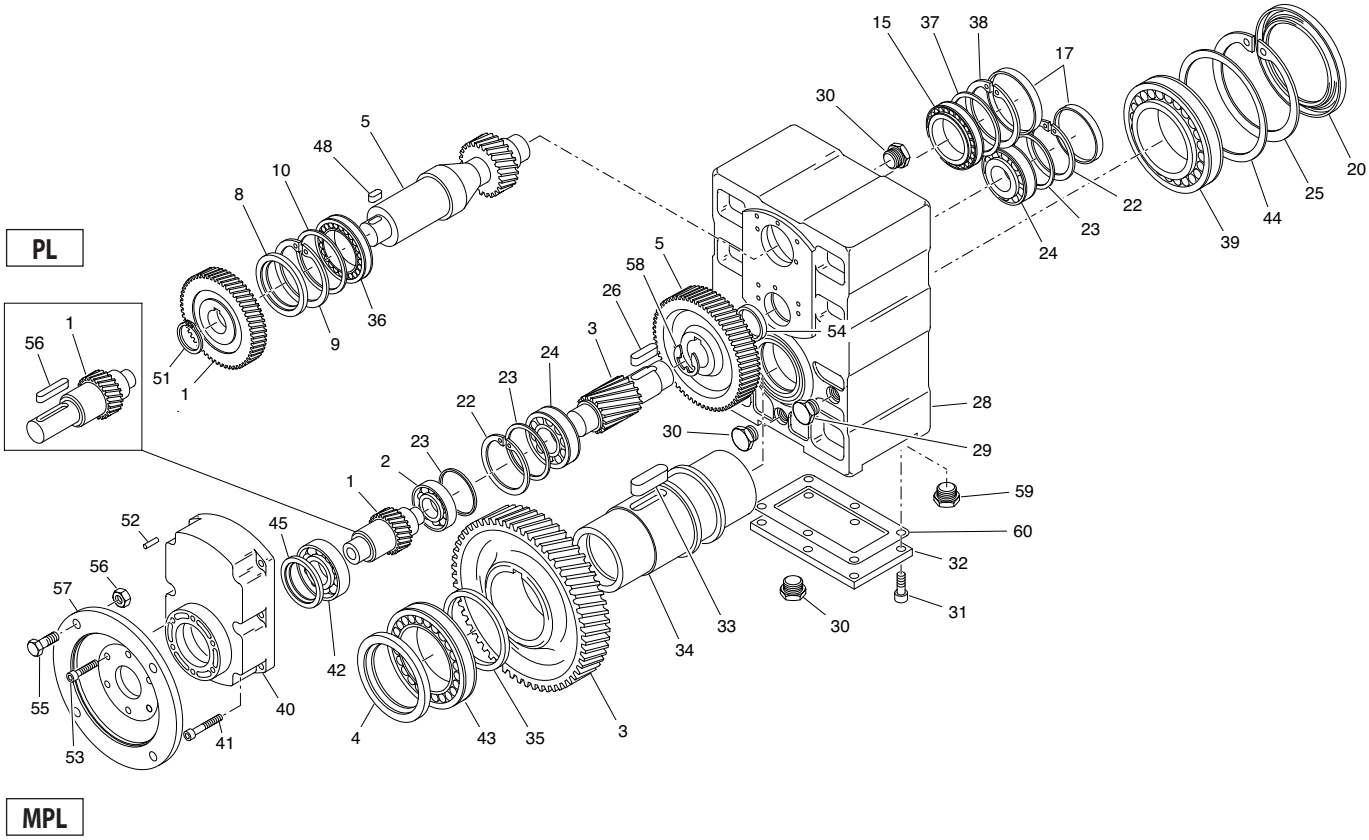
BH - MBH - MBHGC 56 -200		Cuscinetto / Bearing / Lager Roulement / Cojinete / Rolamento									
		12		19	24	44	50	67	61	76	80
		Standard	Optional								
BH 56		6008	32008X	30203	30203	6004	6007 2RS	-	-	-	-
MBH 56		6008	32008X	30203	30203	-	-	-	-	6004	6007 2RS
BH 63		6010	32010X	30204	33205	6208	6208 2RS	-	-	-	-
MBH 63	**PAM 71 80 90**	6010	32010X	30204	33205	-	-	6208	6010 2RS	6207	6010 2RS
MBH 63	**PAM 100 112**	6010	32010X	30204	33205	-	-	6208	6010 2RS	6208	6011 2RS
BH 80		6012	32012X	33205	32305	6208	6208 2RS	-	-	-	-
MBH 80	**PAM 71 80 90**	6012	32012X	33205	32305	-	-	6208	6010 2RS	6207	6010 2RS
MBH 80	**PAM 100 112 132**	6012	32012X	33205	32305	-	-	6208	6010 2RS	6208	6011 2RS
BH 100		6014	33014	33206	32306	NJ 408	NUP 212 EC	-	-	-	-
MBH 100	**PAM 80 90**	6014	33014	33206	32306	-	-	6408	6212 2RS	6208	6310 2RS
MBH 100	**PAM 100 112**	6014	33014	33206	32306	-	-	6408	6212 2RS	6408	6310 2RS
MBH 100	**PAM 132**	6014	33014	33206	32306	-	-	6408	6212 2RS	6408	6212 2RS
MBHGC 100	**PAM GC 160**	6014	33014	33206	32306	-	-	6408	6212 2RS	-	-
BH 125		6018	32018X	33209	32306	NJ 408	NUP 212 EC	-	-	-	-
MBH 125	**PAM 80 90**	6018	32018X	33209	32306	-	-	6408	6212 2RS	6208	6310 2RS
MBH 125	**PAM 100 112**	6018	32018X	33209	32306	-	-	6408	6212 2RS	6408	6310 2RS
MBH 125	**PAM 132**	6018	32018X	33209	32306	-	-	6408	6212 2RS	6408	6212 2RS
MBHGC 125	**PAM GC 160 180**	6018	32018X	33209	32306	-	-	6408	6212 2RS	-	-
BH 140		33021X	-	33212	33206	NJ 215 EC	6316 2Z	-	-	-	-
MBH 140	**PAM 100 112 132 160**	33021X	-	33212	33206	-	-	-	-	NJ 215 EC	6219 2Z
MBHGC 140	**PAM GC 100 112 132 160 180 200**	33021X	-	33212	33206	-	-	NJ 215 EC	6219 2Z	-	-
BH 160		33024	-	32312	32311	NJ 215 EC	6316 2Z	-	-	-	-
MBH 160	**PAM 100 112 132 160**	33024	-	32312	32311	-	-	-	-	NJ 215 EC	6219 2Z
MBHGC 160	**PAM GC 100 112 132 160 180 200**	33024	-	32312	32311	-	-	NJ 215 EC	6219 2Z	-	-
BH 180		32026X	-	32313	32312	NJ 2213 EC	NJ 316 EC			-	-
MBHGC 180	**PAM GC 100 112 132 160 180 200**	32026X	-	32313	32312			NJ 2213 EC	6219 2RS	-	-
BH 200		32030X	-	32314	33215	NJ 2213 EC	NJ 316 EC			-	-
MBHGC 200	**PAM GC 100 112 132 160 180 200**	32030X	-	32314	33215			NJ 2213 EC	6219 2RS	-	-

BH - MBH - MBHGC 56 -200		Anello di tenuta - Cappellotto / Shaft seals - Cover / Wellendichtung - Deckel Joints d'étanchéité - Chapeau / Anillos de retención - Capuchón / Retentor - Tampão					O-Ring
		15	16	55	63	83	82
BH 56		40-68-10 BASL	40-7	35-62-7 BASL	-	-	-
MBH 56		40-68-10 BASL	40-7	-	-	35-55-10 BASL	OR 2200
BH 63		50-80-8 BASL	47-7	40-80-10 BASL	-	-	-
MBH 63	**PAM 71 80 90**	50-80-8 BASL	47-7	-	65-80-8 BASL	50-65-8 BASL	OR 2300
MBH 63	**PAM 100 112**	50-80-8 BASL	47-7	-	65-80-8 BASL	50-65-8 BASL	OR 2300
BH 80		60-95-10 BASL	52-7	40-80-10 BASL	-	-	-
MBH 80	**PAM 71 80 90**	60-95-10 BASL	52-7	-	65-80-8 BASL	50-65-8 BASL	OR 2300
MBH 80	**PAM 100 112 132**	60-95-10 BASL	52-7	-	65-80-8 BASL	50-65-8 BASL	OR 2300
BH 100		70-110-8 BASL	62-10	60-110-13 BASL	-	-	-
MBH 100	**PAM 80 90**	70-110-8 BASL	62-10	-	80-110-10 BASL	50-90-10 BASL	OR 4400
MBH 100	**PAM 100 112**	70-110-8 BASL	62-10	-	80-110-10 BASL	50-90-10 BASL	OR 4400
MBH 100	**PAM 132**	70-110-8 BASL	62-10	-	80-110-10 BASL	60-90-8 BASL	OR 4400
MBHGC 100	**PAM GC 160**	70-110-8 BASL	62-10	-	80-110-10 BASL	-	-
BH 125		90-140-13 BASL	85-10	60-110-13 BASL	-	-	-
MBH 125	**PAM 80 90**	90-140-13 BASL	85-10	-	80-110-10 BASL	50-90-10 BASL	OR 4400
MBH 125	**PAM 100 112**	90-140-13 BASL	85-10	-	80-110-10 BASL	50-90-10 BASL	OR 4400
MBH 125	**PAM 132**	90-140-13 BASL	85-10	-	80-110-10 BASL	60-90-8 BASL	OR 4400
MBHGC 125	**PAM GC 160 180**	90-140-13 BASL	85-10	-	80-110-10 BASL	-	-
BH 140		105-160-12 BASL	110-10	80-125-10 BASL	-	-	-
MBH 140	**PAM 100 112 132 160**	105-160-12 BASL	110-10	-	-	80-125-10 BASL	-
MBHGC 140	**PAM GC 100 112 132 160 180 200**	105-160-12 BASL	110-10	-	80-125-10 BASL	-	-
BH 160		120-180-15	130-12	80-125-10 BASL	-	-	-
MBH 160	**PAM 100 112 132 160**	120-180-15	130-12	-	-	80-125-10 BASL	-
MBHGC 160	**PAM GC 100 112 132 160 180 200**	120-180-15	130-12	-	80-125-10 BASL	-	-
BH 180		130-200-15 BASL	140-15	108-170-15 BASL		-	-
MBHGC 180	**PAM GC 100 112 132 160 180 200**	130-200-15 BASL	140-15		108-170-15 BASL	-	-
BH 200		150-225-15 BASL	150-15	108-170-15 BASL		-	-
MBHGC 200	**PAM GC 100 112 132 160 180 200**	150-225-15 BASL	150-15		108-170-15 BASL	-	-

PL - MPL.../2



PL - MPL.../3



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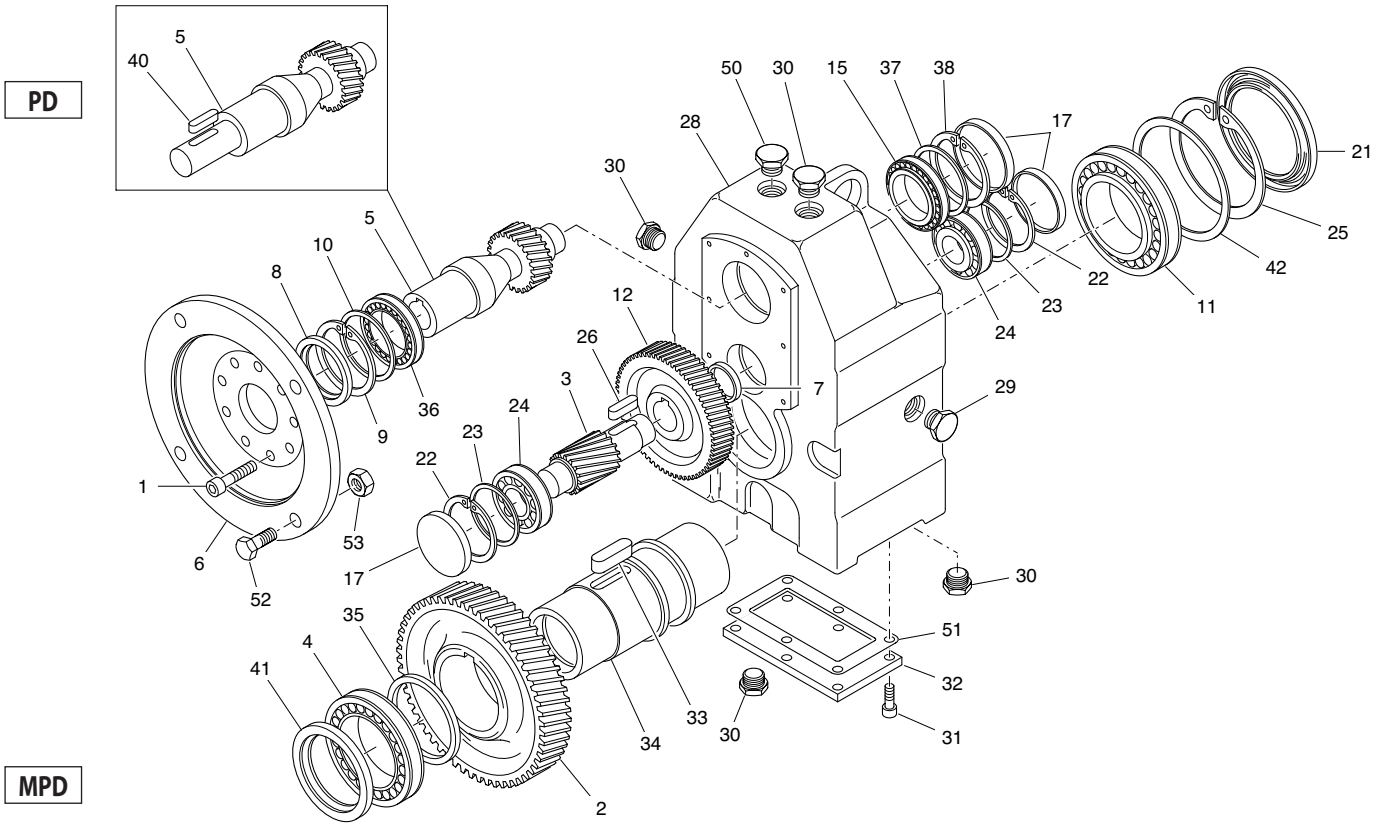
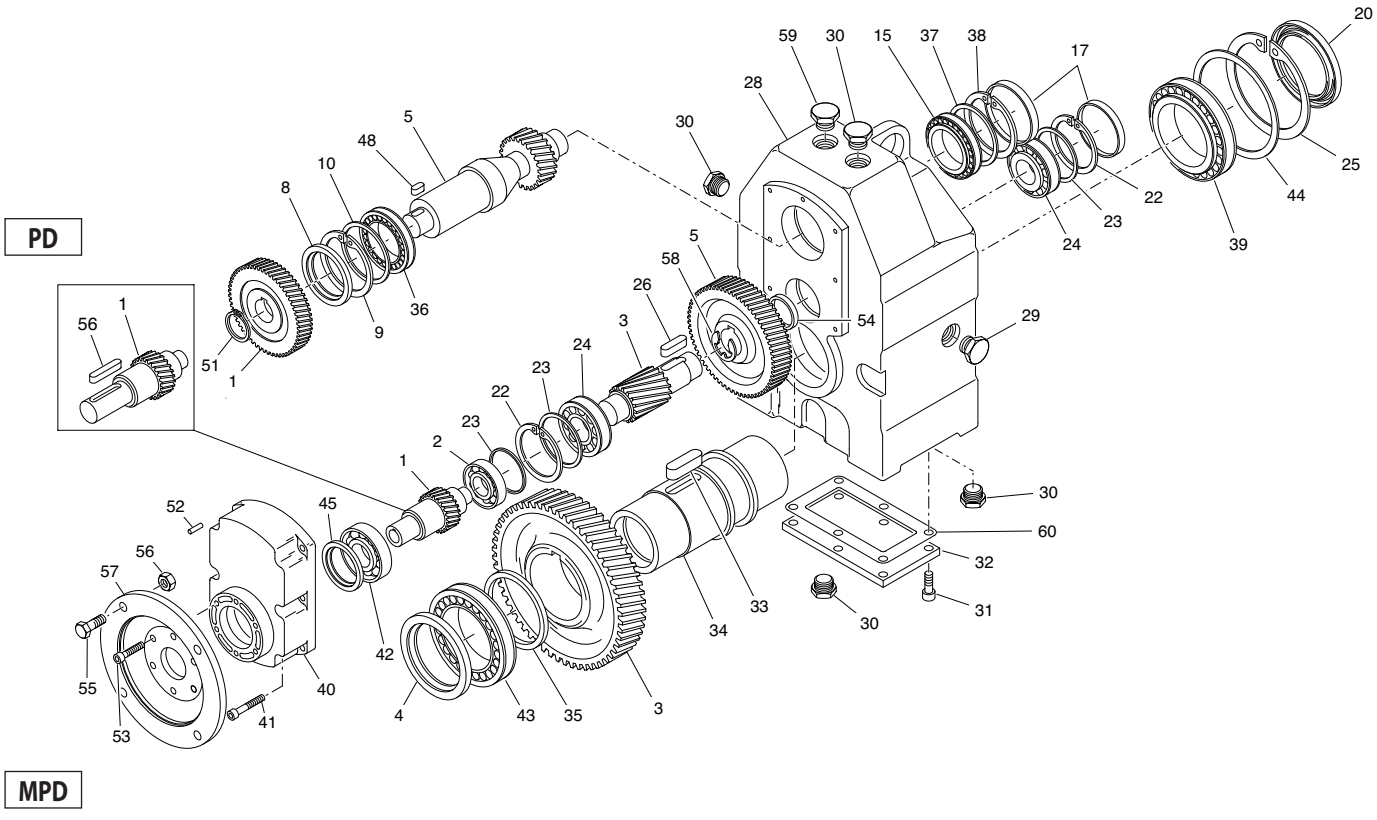
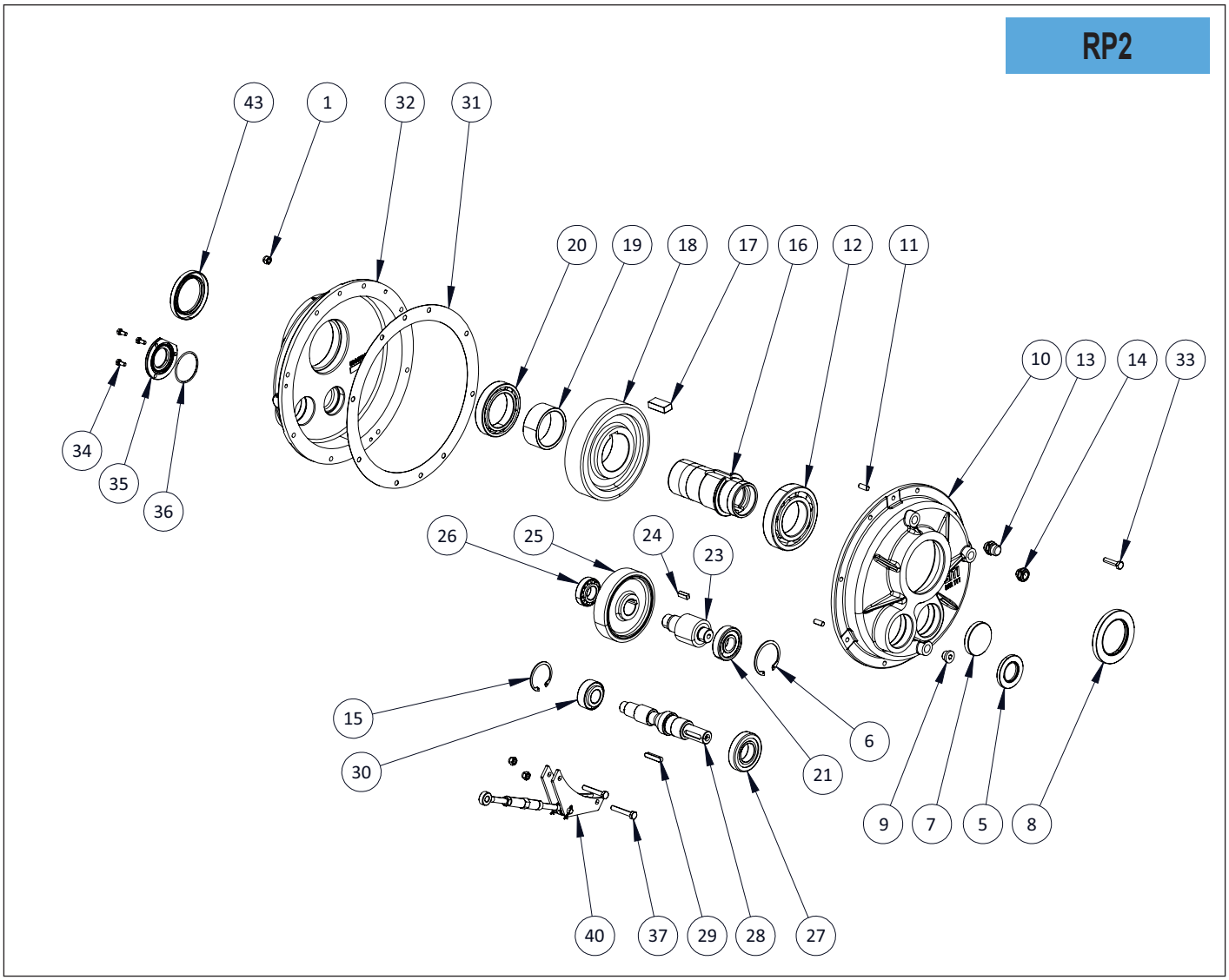
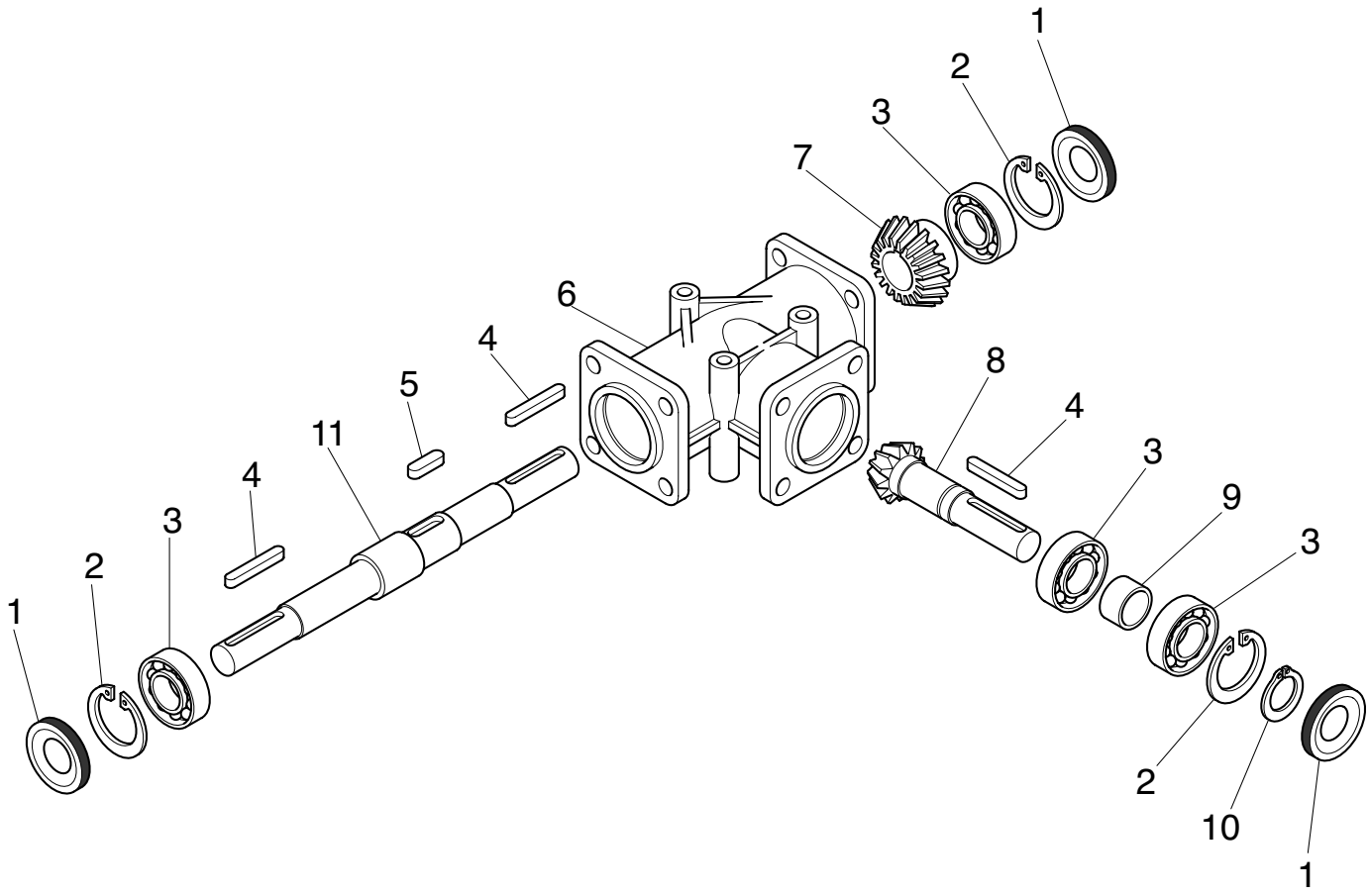


PD - MPD.../3





RP2 71÷221	Cuscinetto Bearing Lager Roulement Cojinete Rolamento						Anello di tenuta Shaft seals Wellendichtung Joints d'étanchéité Anillos de retención Retentor			Cappellotto Cover Deckel Chapeau Capuchón Tampão	O-Ring
	27	**30**	**21**	**26**	**12**	**20**	**5**	**8**	**43**	**7**	**36**
RP2 71/2	30204	30203	30204	30204	6210	6010	20-40-7 BASL	50-80-8 BASL	50-72-8 BASL	47-7	OR 3181
RP2 91/2	30206	30204	32304	30204	6211	6011	30-47-7 BASL	55-85-8 BASL	55-80-8 BASL	52-7	OR 3212
RP2 91/2 uscita F.45 - F.50	30206	30204	32304	30204	6013	6012	30-47-7 BASL	65-85-10 BASL	60-85-8 BASL	52-7	OR 3212
RP2 111/2	30207	33205	30305	30205	6213	6013	35-62-7 BASL	65-100-10 BASL	65-90-10 BASL	62-10	OR 3212
RP2 111/2 uscita F.55	30207	33205	30305	30205	6214	6014	35-62-7 BASL	70-100-10 BASL	70-90-10 BASL	62-10	OR 3212
RP2 131/2	32208	30306	32206	30206	6215	6015	40-62-8 BASL	75-100-10 BASL	75-100-10 BASL	62-10	-
RP2 151/2	32209	30306	33207	30305	6018	16018	45-65-10 BASL	90-120-12 BASL	90-120-12 BASL	72-10	-
RP2 181/2 i=1/15 - 1/20 entrata d.42	30210	30208	32307	30307	6022	16022	50-90-10 BASL	110-150-13 BASL	110-150-13 BASL	80-10	-
RP2 181/2 i=1/25 - 1/30 entrata d.42	30210	30307	32307	30307	6022	16022	50-90-10 BASL	110-150-13 BASL	110-150-13 BASL	80-10	-
RP2 181/2 i=1/15 - 1/20 entrata d.48	32011X	30208	32307	30307	6022	16022	55-90-10 BASL	110-150-13 BASL	110-150-13 BASL	80-10	-
RP2 181/2 i=1/25 - 1/30 entrata d.48	32011X	30307	32307	30307	6022	16022	55-90-10 BASL	110-150-13 BASL	110-150-13 BASL	80-10	-
RP2 221/2 i=1/15	32211	32011X	32308	30308	6026	16026	55-90-10 BASL	130-170-12 BASL	130-170-12 BASL	90-10	OR 4325
RP2 221/2 i=1/20 - 1/25 - 1/30	32211	30308	32308	30308	6026	16026	55-90-10 BASL	130-170-12 BASL	130-170-12 BASL	90-10	OR 4325



R 9÷24	Cuscinetto / Bearing / Lager Roulement / Cojinete / Rolamento	Anello di tenuta / Shaft seal / Wellendichtung Joint d'étanchéité / Anillo de retención / Retentor	Cappellotto Cover Deckel Chapeau Capuchón Tampão
	3	1	12
R9 1C - 2A	16101	12-30-7	30-7
R9 3C	16101	12-30-7	-
R14 1C - 2A	6303	17-47-8 BASL	47-7
R14 3C	6303	17-47-8 BASL	-
R19 1C - 2A	6305	25-62-10	62-10
R19 3C	6305	25-62-10	-
R24 1C - 2A	6305	25-62-10	62-10
R24 3C	6305	25-62-10	-

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40053 VALSAMOGGIA Loc. Monteveglio (Bo) - Italy
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commitalia@sitiriduttori.it
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37 Ayer Rd, Littleton, MA 01460
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E-mail: sales@sitipowertransmission.com
WebSite: www.sitipowertransmission.com

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