



MAINTENANCE BOOKLET

(GEARBOXES RX)

Notice :
Please check the revision in your possession as well as the table reporting
all the updates in the new revision.

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| 8 | 5.5 | 1.0 | <i>Assembly anti-run back device</i> |



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LEGENDA - SIMBOLOGIA

| SIMBOLO | DESCRIZIONE | SIMBOLO | DESCRIZIONE |
|---|-------------------|---|------------------|
|  | DANGER |  | N.B. |
|  | FIRE DANGER |  | READ THE BOOKLET |
|  | ACCIDENT COVERAGE |  | HOT SURFACE |



0. GENERAL INFORMATIONS

These operating instructions contain all information for trouble-free handling, use and maintenance and the observance of it is necessary condition to secure correct operation. We recommend to read carefully the contents of this manual and kept a copy handy near the gear units. The main general information is effective either for standard parallel and right angle shaft units as well as for special ones.

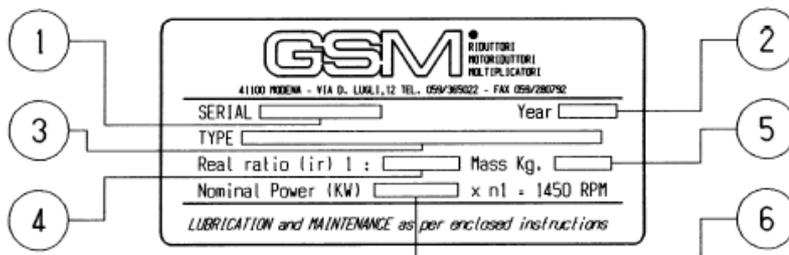
1. SAFETY NOTES

Our gear units are designed, manufactured and distributed following the technological and scientific knowledge available. In the light of future development of knowledge we reserve the right to introduce modifications to the components in order to further improve efficiency and safety.

Unauthorized modifications which may decrease its reliability by changing the applicability conditions specified in the contract, must not be carried out. **The gears must not be put into operation until the machine in which they are to be embodied has been declared to be in conformity with the EEC Machine Directive 89/392 and subs. rev.** The machine constructor has to complete the information concerning his machine with that contained in this manual. Before any intervention, the gear unit should be stopped and all necessary precautions should be taken to prevent the accidental start up. **A protection for moving parts (eg.: couplings), should be provided in order to avoid any possible accidental contact.** If anomalous changes in the temperature e/o noise are detected while running the gear and are not due to application variations, the gear should be stopped and checked to prevent more serious damage. **All regulations in force concerning environment pollution, caution and safety must be respected.**

2. TECHNICAL DATA

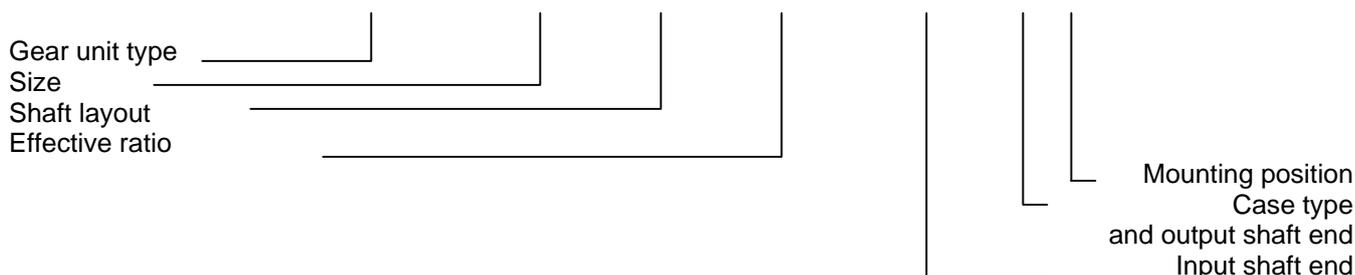
The name plate contains the main technical information regarding the operating and constructional features of the gear-box and defines its contractual application limits; it should therefore be kept intact and visible.



- 1: serial number
- 2: year of fabrication
- 3: gear unit type
- 4: effective ratio
- 5: mass (kg)
- 6: nominal power (kW)

2.1 Code description:

es. **RXP2 / 802 / ABU / 10 / ECE / N / M1**

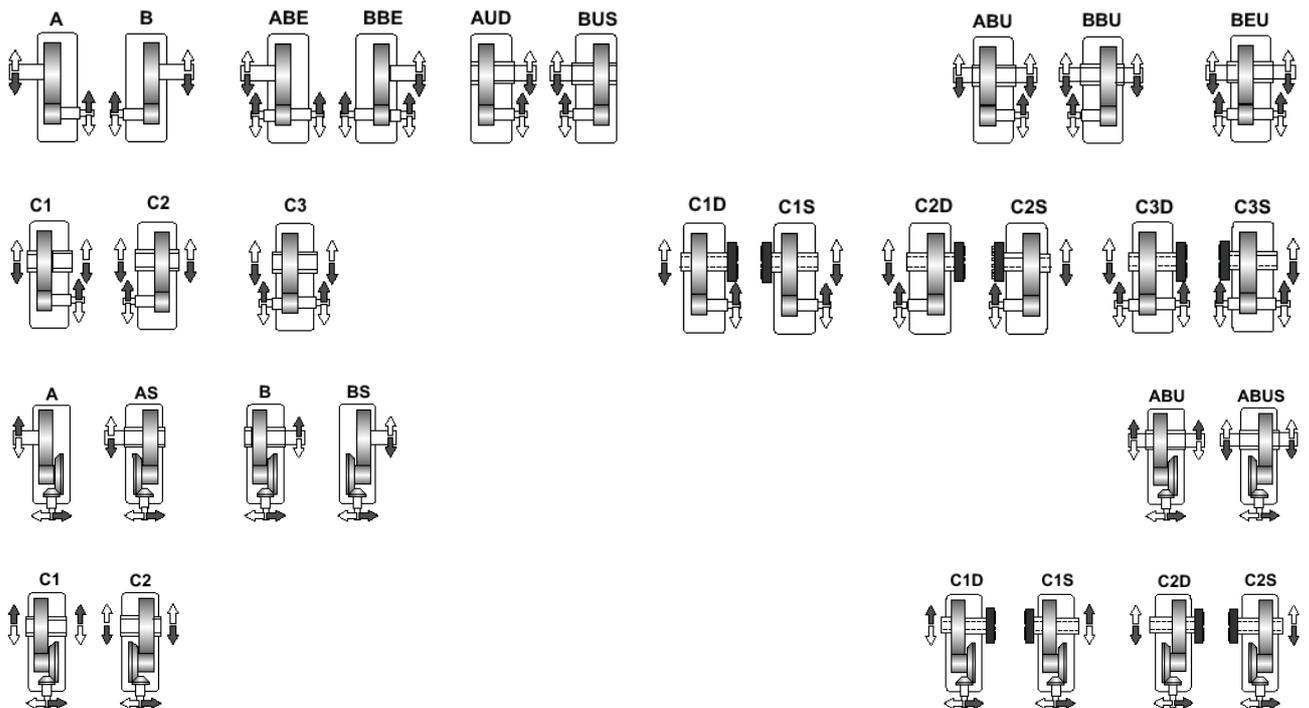




2.2 Mounting positions:

| | | |
|-----------|-----------|-----------|
| | | |
| <p>M1</p> | <p>M2</p> | <p>M3</p> |
| | | |
| <p>M4</p> | <p>M5</p> | <p>M6</p> |

2.3 Shaft layout:





2.4 Approximate weights of gearboxes without lubricant (kg):

|  | 802 | 804 | 806 | 808 | 810 | 812 | 814 | 816 | 818 | 820 | 822 | 824 | 826 | 828 | 830 | 832 |
|---|-----|-----|-----|-----|-----|-----|-----|------|------|------|------|------|------|------|------|-------|
| RXP1 | 71 | 103 | 145 | 200 | 281 | 376 | 550 | 771 | 1079 | 1511 | 2115 | | | | | |
| RXO/V1 | 80 | 111 | 157 | 218 | 307 | 429 | 600 | 840 | 1197 | 1647 | 2306 | | | | | |
| RXP2 | 87 | 120 | 172 | 236 | 341 | 466 | 648 | 906 | 1270 | 1778 | 2488 | 2961 | 4145 | 5766 | | |
| RXO/V2 | 94 | 131 | 183 | 250 | 359 | 502 | 703 | 984 | 1377 | 1929 | 2699 | 3213 | 4497 | 6296 | | |
| RXP3 | 99 | 138 | 243 | 273 | 382 | 534 | 758 | 1045 | 1464 | 2049 | 2346 | 3414 | 4780 | 6691 | 9368 | 13064 |
| RXO/V3 | 101 | 143 | 207 | 282 | 394 | 551 | 772 | 1080 | 1513 | 2118 | 2520 | 3527 | 4938 | 6912 | 9678 | 13558 |
| RXP4 | 102 | 143 | 259 | 289 | 403 | 555 | 779 | 1085 | 1524 | 2204 | 2520 | 3527 | 4938 | 6912 | 9678 | 13558 |
| RXP2_EST | 106 | 153 | 211 | 295 | 408 | 570 | 788 | 1083 | 1516 | 2112 | | | | | | |
| RXP3_EST | 118 | 168 | 233 | 332 | 453 | 632 | 874 | 1205 | 1686 | 2349 | | | | | | |

|  | 70 | 100 | 125 | 160 | 180 | 225 |
|---|----|-----|-----|-----|-----|-----|
| E | 14 | 43 | 65 | 110 | 215 | 330 |

|  | 71 | 90 | 112 | 125 | 140 | 160 | 180 | 200 |
|---|----|----|-----|-----|-----|-----|-----|-----|
| O | 24 | 57 | 88 | 130 | 182 | 234 | 351 | 442 |

3. CONDITION AS SUPPLIED

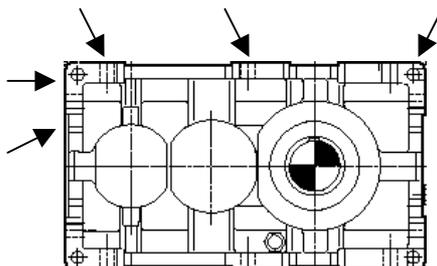
The gear units are externally painted with an epoxy primer and RAL 5017 blue synthetic enamel, unless different contractual instructions are given. The protection is suitable to stand normal industrial environments, also outside, and allows additional synthetic paint finishes. In case particularly aggressive environment conditions are expected, special paints will be needed. Shaft ends and hollow shafts are grease protected against oxidization. The internal part of the gear casing is painted with an epoxy layer, whereas machined parts are oil protected against oxidization. The gear units **are supplied with no lubricant**, unless different contractual instructions are given; a special plate specifies their condition. In the event a back-stop device is provided, an arrow near the slow shaft indicates its permitted sense of rotation.

4. STORAGE

Gear unit have to be stored in adequately dry, clean and vibration free premises. We suggest to run the gears every six months to prevent bearings and seal rings damages. For storage periods higher than one year, you need to change the filler plug and the breather valve with a closed plug and fill completely the gearboxes with oil. Check and change grease in the seal ring and protective fluid on machined parts every six months. In case of aggressive environment, special paints are to be provided; in case of either damp environments or with great thermal excursions frequent inspections and hygrosopic plates will be needed. In case of long breaks after running, the above mentioned measures should be taken by restoring the supply protections as indicated at point 3; alternatively, the gear unit can be filled with the same type of oil used. In case of heat exchangers, drain all water possibly existing inside using compressed air; it is a good rule to check the tube system if the heat exchanger is of break-up type.

5. INSTALLATION

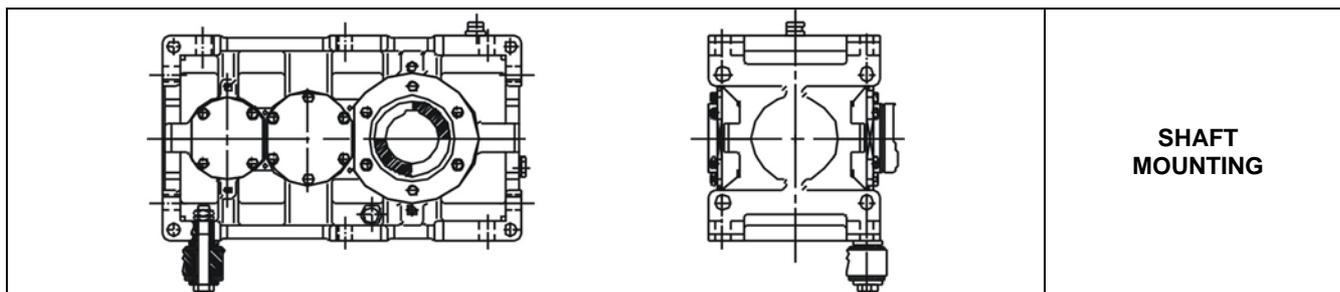
The place of installation has to foresee enough free area for periodical checking and maintenance and secure sufficient cooling air flow for heat dispersion. In case the external temperature range (0-40)°C is different than that considered in the contract, please consult us. When **handling the gear units** special attention should be paid not to cause any damage; **use only the lifting eyes indicated beside:**





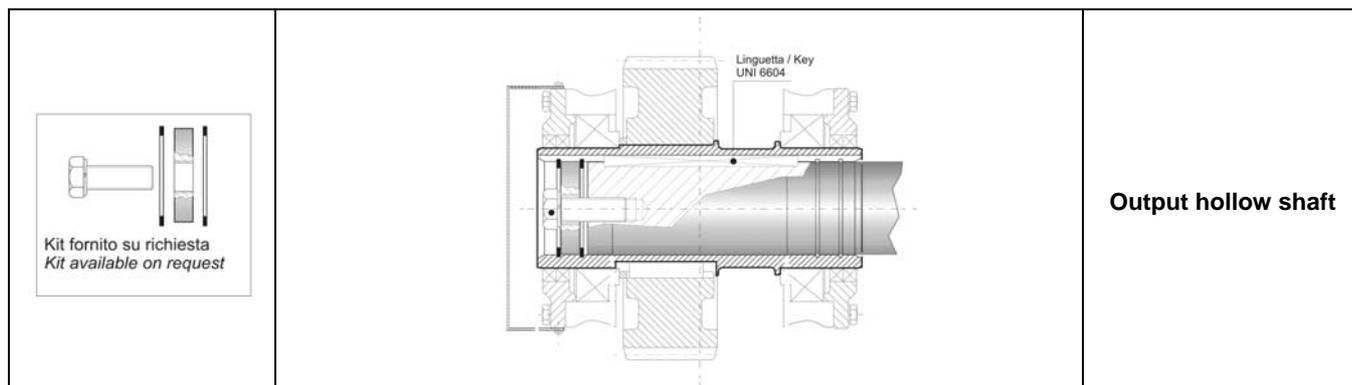
When geared motors are handled it is recommended connecting also the motor on the gear unit since the centre of gravity may very much vary according to the type.

Use diluent to remove protective coat on shafts in a well-aired environment, avoiding direct contact with skin. Refrain from smoking during this operation. The gear unit must be perfectly aligned with the driving and operating machine; the use of flexible couplings is recommended wherever possible. Machine the components to be fitted to the gear unit shafts within a tolerance of ISO H7; for diameters ≤ 55 heat assembling ($T = 90^{\circ}\text{C}$) is suggested. **Use the threaded shaft end holes when fitting pulleys, couplings, etc.** Avoid striking with a hammer when mounting which could damage bearings. In case of external drives reduce overhang at minimum and avoid radial load due to excessive tension of belt or chain pull and low clearance on teeth. Avoid vibrations; gear unit must be mounted on a sufficiently rough surface; use anti-loosening systems for locking screws. Verify torsional resonant speeds in case of fan drive gear units. Foresee intermittent operation S3 in case of speed reducers with differentials. Foresee torque limit-switch or similar safety devices in case of application with overload. Foresee caution and safety devices in case an accidental leakage of lubricant might cause major damage. Prevent lubricant from being polluted by the outside. Protect the outer edge of the oil seals from direct sunbeams or bad weather to prevent the rubber from drying out which would cause the rubber to crack resulting in possible oil leakage, by using hydrorepellent grease. In case of direct flange gear motor it's necessary to have motors with flanges machined acc. to exact class (UNEL 13501) and to apply lubricating products against fretting corrosion, because of the contact on motor shaft. It's advisable to use motor with oil sealing. In **shaft mounting execution**, the shaft is the constraint for radial and axial translation of the gear; rotational constraint must be realized by using the proper eyes on the casing thus obtaining a gap allowing minor swing and avoiding making the structure hyperstatic. These systems allow the installation of torque limit switch safety devices. In the drawing below an example of reaction tie with bucket springs is shown:



5.1 Output hollow shaft:

Mounting and dismounting of hollow low speed shaft reducers with key or locking assembly is effected by means of jacking screw and hub pullers using the tapped hole at the shaft butt-end.

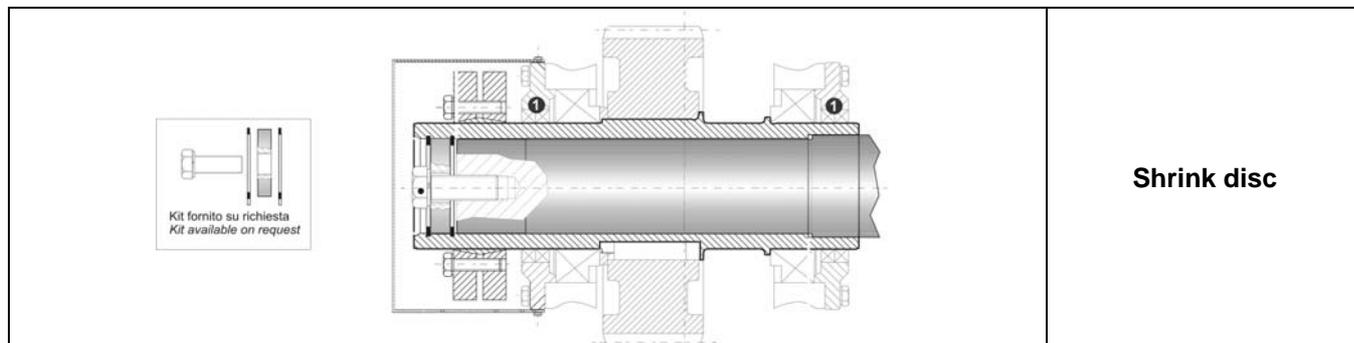


Before assembly clean and lubricate all mating surface to avoid the risk of seizure and limit contact oxidation. Parts in contact with the seeger ring must have well defined edges. Diameter of the shoulder on the machine shaft should be at least 1,15 times the diameter of shoulder on hollow shaft.



5.2 Shrink disc:

Apply grease to the threads and screw head and to the surface of the hub on which the shrink rings seats. Do not apply grease to the hub bore or the shaft. Do not begin tightening the screws before the shaft is in place in the hub bore, otherwise permanent deformation will result. Make sure shrink discs is alligned. Gradually and uniformity tighten the clamping screws. This operation must be done thightening diagonally opposite screws in stage.



Go round several times before all screws are torqued down to the below recommended value.

| | | 802 | 804 | 806 | 808 | 810 | 812 | 814 | 816 | 818 | 820 | 822 | 824 | 826 | 828 | 830 | 832 |
|--------------------|--------------|------|-------|-------|--------|--------|--------|--------|-------|--------|--------|--------|--------|--------|--------|-----|-----|
| Tight. torque (Nm) | DIN 931 10.9 | 30 | 30 | 30 | 59 | 59 | 100 | 100 | 250 | 250 | 490 | 490 | 490 | 490 | 490 | / | / |
| | DIN 931 12.9 | 42 | 42 | 42 | 79 | 79 | 141 | 141 | 352 | 352 | 691 | 691 | 691 | 691 | 691 | / | / |
| Tight. screw | N° x M... | 7xM8 | 10xM8 | 12xM8 | 12xM10 | 12xM10 | 10xM12 | 12xM12 | 8xM16 | 12xM16 | 12xM20 | 14xM20 | 16xM20 | 20xM20 | 24xM20 | / | / |

5.3 Splined end and/or with splined flange or coupling:

It's very important to take care of the alignment in stiff connection with splined flange to support drum. As much as the charge condition is hard and the work is intensive. In this case it's necessary to check time by time the wear and tear of connection teeth between shaft and flange. The upper surface of gearbox case and the flange surface opposite to the connected to drum, can be used as references to verify the alignment. Flange splined coupling: maximum dynamic angular misalignment 0° 10'. Flanges have side millings to grant shoulders welding on drum to avoid rotation. Leave clearance between drum-flange group and the shoulder of the opposite gearbox shaft-support in order to allow axial espansions under load.

5.4 Elastic coupling:

Couplings with elastic components are suitable to operate in acid, alkaline, oxidizing ambients, in the presence of greases, oils, petrols, benzol, chloride hydrocarbons, ozone, salinity and within -30°C =T =120°C temperature range. For the installation, the following procedure should be complied with:

- a) Fasten each single half- coupling on its relevant shaft (holes tolerance H7) and lock it by using radial grains;
- b) Approach the half-couplings until the pins (or the dowels) enter their own seats, taking care of "H" dimensions:

| Coupling | E120P – E160P | E180P – E225P | E250P – E300P |
|----------|---------------|---------------|---------------|
| H | 3 | 4 | 5 |

- c) Ascertain that both faces be parallel, and that the half-couplings be perfectly coaxial as shown in the figure.

Note: in normal conditions, only misalignments lower than or equal to 0.3° and axle parallel (or radial) misalignments depening upon coupling dimensions should be as follows:

$$\text{Misalignment} < \frac{F}{1000}$$

Foresee a protection in order to avoid any possible accidental contact

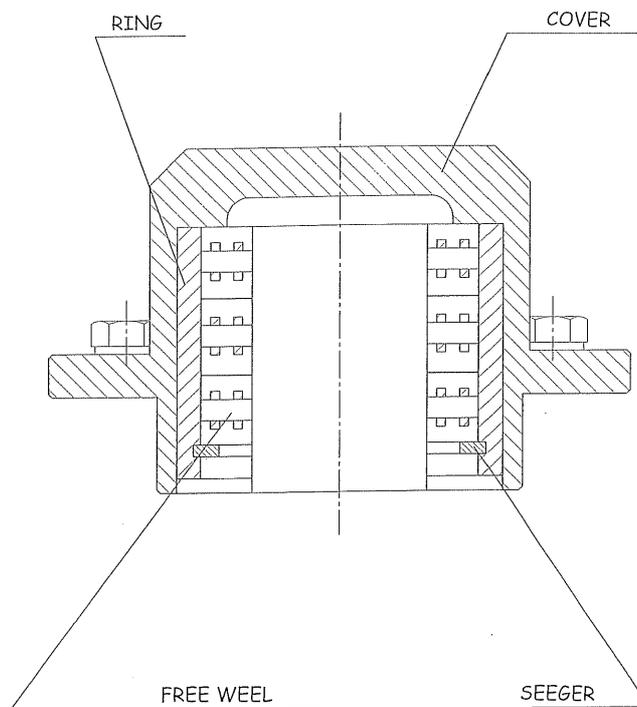


5. Anti-run back device

In order to reverse the free gearbox direction of rotation (that is equipped with an anti-run back device), it is necessary to carry out the following operations:

- 1) Reduce the oil level of the gearbox.
- 2) Remove the anti-run cover using a screwdriver and hit the gearbox on the axial side with an hammer (this is to brake the sealing film on the joining surface).
- 3) Rotate of 180° the free wheel using rubber rings pliers for the extraction.
- 4) During the assembling phase, rotate the pinion/shaft to facilitate the right positioning; avoid pushes to do not damage the cage and cases.
- 5) Clean the cover/case joining surface.

Seal once again the surfaces with sealant, re-assemble the cover and tighten the screws. Respect the polymerization time of the sealant before adding oil once again.



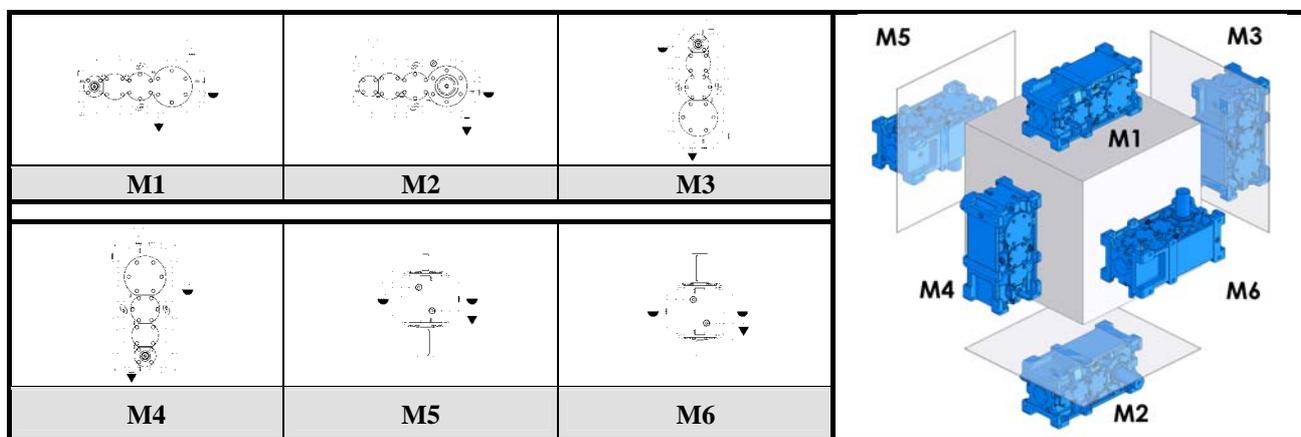


6. START UP

In case of long storage remove possible hygroscopic plates. Fill gear unit and possible artificial cooling system with oil lubricant up to level plug. **Do not mount the gear unit in a position different than as specified in the rating plate; different mounting positions require in general a modification of the level indicator e/o a different lubrication system.** In the event the gear unit is supplied with a backstop device and/or forced lubrication with unidirectional pump check before starting up that the direction matches the drive machine one. In case of gearboxes with a speed change lever, proceed in engaging the gears when the machine is at standstill, helping the engage by a rotation pulse of the motor shaft without any load. Gradually apply the load on the speed change lever, avoiding shocks during the engage and at limit stroke (maximum static load suggested on the lever is 800 N). Maintain the same setting of mechanical limit strokes as given after supplying; proceed with the release when the machine is at standstill braked.

7. LUBRICATION

Gear units are supplied without lubricant. Filling up is at the customer's care. Mounting positions B3 and B5 lubrication is normally by splash and foresee the following plug positions:



Gear units requiring bearings on vertical shafts at the top or are lubricated with difficulty on splash system, need forced lubrication or long life grease lubrication through nilos ring. The oil utilized should have "EP" additives; fail stage 12 must be reached in the FZG corrosion test according to DIN 51354.

7.1 Oil quantity standard gear units (litres):

| | | 802 | 804 | 806 | 808 | 810 | 812 | 814 | 816 | 818 | 820 | 822 | 824 | 826 | 828 | 830 | 832 |
|---------|---------|-----|------|------|------|------|------|------|-----|-----|-----|-----|-----|-----|-----|-----|------|
| RX1 | M1 - M2 | 2.5 | 3.5 | 4.9 | 6.9 | 9.6 | 13 | 19 | 26 | 37 | 52 | 72 | | | | | |
| | M3 | 3.8 | 5.3 | 7.5 | 11 | 15 | 21 | 30 | 42 | 61 | 85 | 115 | | | | | |
| | M4 | 3.5 | 4.9 | 7.0 | 9.8 | 14 | 22 | 28 | 40 | 56 | 78 | 111 | | | | | |
| | M5 - M6 | 3.6 | 5.0 | 7.1 | 10 | 14 | 20 | 29 | 40 | 57 | 79 | 110 | | | | | |
| RX2 | M1 - M2 | 3.3 | 4.7 | 6.5 | 9.0 | 13 | 18 | 25 | 35 | 49 | 69 | 96 | 135 | 189 | 264 | | |
| | M3 | 6.1 | 8.6 | 12 | 17 | 24 | 34 | 48 | 68 | 95 | 133 | 187 | 263 | 370 | 518 | | |
| | M4 | 5.1 | 7.2 | 10 | 15 | 20 | 29 | 40 | 56 | 80 | 114 | 164 | 228 | 320 | 448 | | |
| | M5 - M6 | 4.6 | 6.5 | 9.4 | 13 | 18 | 25 | 35 | 50 | 70 | 99 | 139 | 196 | 275 | 390 | | |
| RX3 | M1 - M2 | 3.9 | 5.5 | 7.6 | 11 | 15 | 21 | 29 | 41 | 58 | 81 | 113 | 158 | 221 | 310 | 433 | 605 |
| | M3 | 8.1 | 11 | 15 | 22 | 32 | 44 | 62 | 87 | 125 | 175 | 246 | 345 | 485 | 682 | 950 | 1300 |
| | M4 | 6.6 | 9.2 | 13 | 18 | 26 | 36 | 50 | 71 | 102 | 144 | 201 | 285 | 400 | 561 | 789 | 1100 |
| | M5 - M6 | 5.1 | 7.3 | 10 | 14 | 20 | 28 | 40 | 56 | 79 | 111 | 156 | 218 | 306 | 430 | 604 | 845 |
| RX4 | M1 - M2 | 4.2 | 5.8 | 8.3 | 11.8 | 16.5 | 22.5 | 30.5 | 44 | 67 | 97 | 113 | 158 | 221 | 310 | 433 | 605 |
| | M3 | 8.4 | 11.3 | 15.8 | 22.8 | 33.5 | 45.5 | 63.5 | 90 | 134 | 191 | 246 | 345 | 485 | 682 | 950 | 1300 |
| | M4 | 6.9 | 9.5 | 13.8 | 18.8 | 27.5 | 37.5 | 51.5 | 74 | 111 | 160 | 201 | 285 | 400 | 561 | 789 | 1100 |
| | M5 - M6 | 5.4 | 7.6 | 10.8 | 14.8 | 21.5 | 29.5 | 41.5 | 59 | 88 | 127 | 156 | 218 | 306 | 430 | 604 | 845 |
| RX2_EST | M1 | 3.7 | 5.2 | 7.2 | 10 | 14 | 20 | 27 | 39 | 54 | 77 | | | | | | |
| RX3_EST | M1 | 4.3 | 6.0 | 8.3 | 12 | 16 | 23 | 32 | 45 | 63 | 89 | | | | | | |

| | | 70 | 100 | 125 | 160 | 180 | 225 |
|---|----|-----|-----|-----|-----|-----|------|
| E | M1 | 0.5 | 1.3 | 2.3 | 4 | 7.8 | 11.5 |

| | | 71 | 90 | 112 | 125 | 140 | 160 | 180 | 200 |
|---|----|-----|-----|-----|-----|-----|-----|-----|-----|
| O | M1 | 1.3 | 2.4 | 4.9 | 3 | 5 | 7 | 11 | 15 |
| | M3 | 1.9 | 3.3 | 6.7 | 6 | 10 | 14 | 22 | 30 |

Oil quantities are approximate; for correct lubrication refer to the level indicator.



7.2 Recommended ISO VG

| Input speed n_1 (min ⁻¹) | Absorbed power (kW) | Lubrication system | Viscosity ISO VG at 40°C (cSt) | |
|---|------------------------|----------------------------|--------------------------------|-----|
| | | | ≤10 | >10 |
| 2000 < n_1 ≤ 5000 | P < 7.5 | Forced or Oil splash | 68 | 68 |
| | 7.5 ≤ P ≤ 22 | | 68 | 150 |
| | P > 22 | | 150 | 220 |
| 1000 < n_1 ≤ 2000 | P < 7.5 | Forced or Oil splash | 68 | 150 |
| | 7.5 ≤ P ≤ 37 | | 150 | 220 |
| | P > 37 | | 220 | 320 |
| 300 < n_1 ≤ 1000 | P < 15 | Forced | 68 | 150 |
| | | Oil splash | 150 | 220 |
| | 15 ≤ P ≤ 55 | Forced | 150 | 220 |
| | | Oil splash | 220 | 320 |
| | P > 55 | Forced | 220 | 320 |
| Oil splash | 320 | 460 | | |
| 50 < n_1 ≤ 300 | P < 22 | Forced | 150 | 220 |
| | | Oil splash | 220 | 320 |
| | 22 ≤ P ≤ 75 | Forced | 220 | 320 |
| | | Oil splash | 320 | 460 |
| | P > 75 | Forced | 320 | 460 |
| Oil splash | 460 | 680 | | |

In case of forced lubrication by pump, when ISO VG > 220 and/or temperatures < 10°C, are requested, it's advisable to consult us. The table is valid for normal peripheral speeds; in case of speed > 13 m/s, consult us.

7.3 Recommended mineral oil:

| Viscosity ISO VG at 40°C (cSt) | BP Energol | ESSO Spartan | MOBIL Mobilgear | SHELL Omala oil | TEXACO Meropa | IP Mellana | AGIP Blasias |
|--------------------------------|------------|--------------|-----------------|-----------------|---------------|------------|--------------|
| VG 680 | GR-XP 680 | EP 680 | 636 | 680 | 680 | 680 | 680 |
| VG 460 | GR-XP 460 | EP 460 | 634 | 460 | 460 | 460 | 460 |
| VG 320 | GR-XP 320 | EP 320 | 632 | 320 | 320 | 320 | 320 |
| VG 220 | GR-XP 220 | EP 220 | 630 | 220 | 220 | 220 | 220 |
| VG 150 | GR-XP 150 | EP 150 | 629 | 150 | 150 | 150 | 150 |
| VG 100 | GR-XP 100 | EP 100 | - | 100 | 100 | 100 | 100 |
| VG 68 | GR-XP 68 | EP 68 | 626 | 68 | 68 | 68 | 68 |

7.4 Recommended synthetic oil:

If the environment temperature $T < 0^\circ\text{C}$, decrease viscosity class by one, vice versa increase by one if $T > 40^\circ\text{C}$.

Permissible temperatures for mineral oil are:

(-10 = $T = 90$)°C, briefly up to 100°C.

Permissible temperatures for synthetic oil are:

(-20 = $T = 110$)°C, briefly up to 120°C.

If the temperature is not permissible for mineral oil and for decreasing frequency of oil change, adopt synthetic oil with polyalphaolefins (PAOs). Table for oil suggested and oil-change interval indicatively valid in absence of pollution and overload, is reported below. More precise information can be obtained by the company's lubricant supplier for example through periodical analysis of the oil.

| Viscosity ISO VG at 40°C (cSt) | BP Enersyn | Tribol | Mobil SHC | Castrol AlphasynEP |
|--------------------------------|------------|----------|-----------|--------------------|
| VG 680 | | 1510/680 | 636 | |
| VG 460 | HTX 460 | 1510/460 | 634 | 460 |
| VG 320 | EPX 320 | 1510/320 | 632 | 320 |
| VG 220 | EPX 220 | 1510/220 | 630 | 220 |
| VG 150 | HTX 150 | 1510/150 | 629 | 150 |
| VG 68 | | | 626 | |



7.4 Frequency oil changes (h):

| base \ oil temp. | 65°C | 80°C | 90°C |
|------------------|-------|-------|------|
| mineral | 8000 | 3000 | 1000 |
| synthetic | 20000 | 15000 | 9000 |

8. MAINTENANCE

All works should be carried out by adequately prepared operators and in observance of the safety rules in force. Our assistance service is at your disposal for any eventual need. Check monthly the oil level; make first oil change after 500h of running in. Mixing of different oils is not recommended. Change the oil when gear unit is still in temperature paying due attention before filling the gear unit with the new oil to remove particles remained inside the casing. Make sure the new oil is introduced when no impurities are present. Check often for anomalous variations of temperature e/o noise. Check monthly for lubricant leakages. Life of seals depends on various factors such as speed, temperature and environment, and could vary between 4000 and 20000 hours. Where it is foreseen, substitute the original cartridge of the filter after 500 hours, the every 2000 h; cleaning of the exchanger must be made every 3 months. Clean the oil filter and the exchanger every three months. Inspect the gear unit every two years. Check the screws tightening at the end of the running in period and then every 20000h. In case of the gearbox is fitted with a coupling, we suggest to periodically check the wearing condition of the elastic components, verifying that installation conditions haven't been modified as well.

The **shaft ends** with drum support flanges are supplied with lubricant grease based on PTFE (NLGI 2 ASTM D-217 a 25°C 260-290); it has to be compensate: in case of removal by handling or prolonged storage after first 1000 working hours and afterwards every 3000 working hours. Flanged splined couplings are supplied without lubricant: suggested greases are AGIP Rocol MTS 2000, MOBIL TEMP 76 or equivalent with NLGI added with MoS₂. Lubricant substitution has same rules as advised for splined flange.



During normal operations surfaces are hot: take care in avoiding burns.

8.1 Recommended screws tightening (Nm) according UNI 5739 mat.8.8:

| M6 | M8 | M10 | M12 | M14 | M16 | M18 | M20 | M22 | M24 | M27 | M30 |
|------|------|------|------|-----|-----|-----|-----|-----|-----|------|------|
| 10.4 | 24.6 | 50.1 | 84.8 | 135 | 205 | 283 | 400 | 532 | 691 | 1010 | 1370 |

9. ARTIFICIAL COOLING:

9.1 Fan system:

To provide an adequate cooling, avoid obstacles in the normal air flow allowing heat dispersion; do not remove fan cover, maintain temperatures of air $T < 40^{\circ}\text{C}$ and keep fan and fan cover cleaned

9.2 Water-oil cooler:

Water should not be allowed to stand still in the exchanger within a range of temperature $0 = T > 50^{\circ}\text{C}$; it is recommended to decalcify the water should it be very hard; **take care in avoiding burns**, both during normal operations and maintenance (temperature of oil entry is about 65°C); in presence of brackish water use special exchangers; in the event the system is made by the customer, check that the suggested oil flow is, in numerical value, higher than the gear capacity in order to foresee an auxiliary tank; in case of low temperatures foresee preheat systems.

Water flow rates have to be the following: 85 l/h for each kW to be dispersed with water temperatures $= 20^{\circ}\text{C}$; 170 l/h for each kW to be dispersed with water temperature $T > 20^{\circ}\text{C}$. The maximum permitted line pressure on the oil and water circuits is 12 bar.

9.2.1 Mounting:

The oil and water connections must be executed in such a way as to ensure that the air can be easily expelled by the normal circulation of the fluids. This means that if the exchanger is installed in a horizontal position, the water must enter from the coupling located in the bottom position and the oil couplings must face upwards. If they are installed in a vertical position, the water outlet connection must be on the top side and the oil must enter through the lowest coupling.

9.2.2 Maintenance:

- **Cleaning oil side:** the exchanger must be dismantled. Dirt can be removed by circulating perchloroethylene through the exchanger. This operation takes from 10 to 30 minutes. Traces of the product remain inside the exchanger after this operation and must be washed out with hot water.

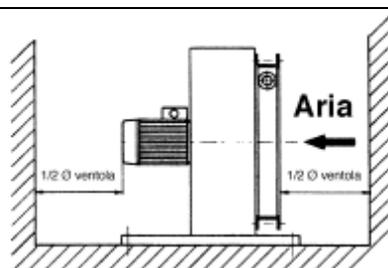


- **Cleaning water side:** it is a good rule to check the exchanger every 2 or 3 months, to make sure that the heat does not obstruct completely the tubes inside which the water circulates; in this case the exchanger must be replaced. If the tubes become slightly furled up, 10% solution of water and hydrochloric acid or other similar fluids readily available on the market should be circulated through the water circuit, in the direction opposite to the normal water flow. Once the operation has been completed, all traces of this corrosive solution must be eliminated. Normally, the circulation of hot water for several minutes is sufficient to eliminate these traces. In case of **exchangers with inspectable circuit**, if the inspection shows that the exchanger is not clogged up with calcium sediment but with mud or other solid particles contained in the water, swab out the tubes and then rinse out with a jet of water. Before remounting the heads, always check the zinc anode to make sure that it is clean and not worn, since, otherwise it will not be able to perform its anticorrosive function and will have to be replaced. If the anode becomes worn in a very short time, check the earthing of the machine on which the exchanger is installed, since it is obvious that stray currents could be producing rapid corrosion. In case of exchangers for sea use, please contact us.

9.3 Air-oil cooler:

9.3.1 Mounting:

Place the cooler so that there is an unrestricted air flow to and from the cooler. The distance from the nearest wall should not be less than half the diameter of the fan (see the picture beside). Use hydraulic hoses both to and from the cooler.



9.3.2 Maintenance:

The most easy way to clean the air fins is by using compressed air or rinsing with water. Fouling can be dealt with using a degreasing agent and a high pressure washing system. When using a high-pressure washing system point the jet carefully parallel to the air fins. To clean the inside of oil cooling pipes connect the cooler to a closed circuit and flush the inside with perchlorethylene. After cleaning the radiator should be flushed with oil before reconnected to the hydraulic system.



Surface are hot during normal operations: take care in avoiding burns.

10. MEAN SOUND PRESSURE LEVEL

Standard production mean sound pressure level assuming input speed of 1450 r/min (tolerance +3 dB (A)). Mean value of measurement at 1 m from external surface and obtained on the base of tests it experiences them. In case of artificial cooling with fan shaft mounted add to the value in the table 2dB (A) for each fan. In case of different input speed modify tabulated value as follows:

| | RXP1 | | RXO/V1 | | RXP2 | | RXO/V2 | | RXP3 | | RXO/V3 | | RXP4 | |
|-----|-------|-------|--------|------|------|------|--------|-------|------|------|--------|-------|-------|-------|
| | I<2.5 | I>2.5 | I<14 | I>14 | I<14 | I>14 | I<250 | I>250 | I<50 | I>50 | I<125 | I>125 | I<250 | I>250 |
| 802 | 80 | 76 | 78 | 73 | 75 | 72 | 73 | 68 | 70 | 67 | 69 | 64 | 68 | 63 |
| 804 | 81 | 77 | 79 | 74 | 76 | 73 | 74 | 69 | 71 | 68 | 70 | 65 | 69 | 64 |
| 806 | 83 | 79 | 81 | 76 | 77 | 74 | 76 | 71 | 72 | 69 | 72 | 67 | 71 | 66 |
| 808 | 84 | 80 | 82 | 77 | 78 | 75 | 77 | 72 | 73 | 70 | 73 | 68 | 72 | 67 |
| 810 | 86 | 82 | 84 | 79 | 80 | 77 | 79 | 74 | 75 | 72 | 75 | 70 | 74 | 69 |
| 812 | 87 | 83 | 85 | 80 | 81 | 78 | 80 | 75 | 76 | 73 | 76 | 71 | 75 | 70 |
| 814 | 89 | 85 | 87 | 82 | 83 | 80 | 82 | 77 | 78 | 75 | 78 | 73 | 77 | 72 |
| 816 | 91 | 87 | 89 | 84 | 85 | 82 | 84 | 79 | 80 | 77 | 80 | 75 | 79 | 74 |
| 818 | 93 | 89 | 91 | 86 | 87 | 84 | 86 | 81 | 82 | 79 | 82 | 78 | 81 | 77 |
| 820 | 95 | 91 | 93 | 88 | 89 | 86 | 88 | 83 | 84 | 81 | 84 | 80 | 83 | 79 |
| 822 | 97 | 93 | 95 | 90 | 91 | 88 | 90 | 85 | 86 | 83 | 86 | 82 | 85 | 81 |
| 824 | | | | | 93 | 90 | 92 | 87 | 88 | 85 | 88 | 84 | 87 | 83 |
| 826 | | | | | 95 | 92 | 94 | 89 | 90 | 87 | 90 | 86 | 89 | 85 |
| 828 | | | | | 97 | 94 | 96 | 91 | 91 | 89 | 92 | 88 | 91 | 87 |
| 830 | | | | | | | | | 94 | 91 | 94 | 90 | 93 | 89 |
| 832 | | | | | | | | | 96 | 93 | 96 | 92 | 95 | 91 |