

G series



**Operating instructions
Helical and bevel helical
gear reducers and gearmotors**

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1 - General safety information

This document provides information about handling, installation and maintenance of helical and bevel helical gear reducers and gearmotors (G series).

All the people involved in these activities will carefully read and follow all present instructions.

Information and data contained in this document correspond to the technical level reached at the moment the catalog is printed. Rossi reserves the right to introduce, without notice, the necessary changes to improve efficiency and safety of its products.

1.1 - Disposal and recycling



Keep in mind the instructions in force concerning exhaust disposal and recycling:

- elements of gear reducer housing, gear pairs, shafts and bearings must be transformed into steel scraps along with all other cast iron components, excluding specific cases;
- for all other non-metallic components (seal rings, caps, etc.) follow the instructions in force;
- all exhaust oils must be recycled and treated as per regulations in force.

1.2 - Safety

The paragraphs marked with symbols shown below contain dispositions to be strictly respected in order to assure personal **safety** and to avoid any heavy **damages** to the machine or to the system.



(Electric or mechanical) danger, such as:

- live parts;
- temperature higher than 50 °C;
- components rotating during operation;
- suspended loads (lifting and transport);
- eventual high sound level (> 85 dB(A)).



Lifting instructions.

IMPORTANT: gear reducers and gearmotors supplied by Rossi are **partly completed machinery** to be incorporated into machinery and **should not be commissioned before the machinery in which the components have been incorporated conforms to:**

- **Machinery directive 2006/42/EC and subsequent updates; in particular, possible safety guards for shaft ends not being used for eventually accessible fan cover passages (or other) are the Buyer's responsibility;**
- **«Electromagnetic compatibility (EMC)» 2004/108/EC and subsequent updates.**



Attention! It is recommended to pay attention to all instructions of present handbook, all standards concerning correct installation and all existing safety laws. Whenever personal injury or property damage may occur, foresee adequate supplementary protection devices against:

- **release or breakage of fastening screws;**
- **rotation or unthreading of the gear reducer from shaft end of driven machine following to accidental breakage of the reaction arrangement;**
- **accidental breakage of shaft end of driven machine.**

If deviations from normal operation occur (temperature increase, unusual noise, etc.) immediately switch off the machine.

Installation

An incorrect installation, an improper use, the removing or disconnection of protection devices, the lack of inspections and maintenance, improper connections may cause severe personal injury or property damage. Therefore the component must be moved, installed, commissioned, handled, controlled, serviced and re-paired **exclusively by responsible qualified personnel.**

The qualified personnel must be **specifically instructed** and have the experience necessary to **recognize** and prevent **dangers** (see table 1.2.1 - Residual dangers) connected to present products avoiding all possible emergencies.

Gear reducers and gearmotors of present handbook are normally suitable for installations in **industrial areas:** additional protection measures, if necessary, must be adopted and assured by the personnel responsible for the installation.

Attention! Components in non-standard design or with special executions or with constructive variations may differ in the details from the ones described here following and may require additional information.

Attention! For the installation, use and maintenance of the **electric motor** (standard, brake or non-standard motor) or of the eventual motor variator and/or electric supply device (frequency converter, soft-start etc.), and/or optional electric devices (e.g.: independent cooling unit, etc.), consult the attached specific documentation. If necessary, require it.

Maintenance

When operating on gear reducer or on components connected to it the **machine** must be **at rest and cold:** disconnect motor (including auxiliary equipments) from power supply, gear reducer from load, be sure that safety systems are on against any accidental starting and, if necessary, pre-arrange mechanical locking devices (to be removed before commissioning).



Attention! During the running the gear reducers could have **hot surfaces;** always wait that the gear reducer or the gearmotor to cool before carrying out any operations.

Please download further technical documentation (e.g.: catalogs) from our website www.rossi-group.com or contact Rossi. For any clarification and/or additional information consult Rossi and specify all name plate data.

Tab. 1.2.1 - Residual risks

The products supplied by Rossi S.p.A. have been designed and manufactured according to the essential health and safety requirements provided for by the Machine Directive 2006/42/EC - Annex I. The following table lists the residual risks that the user must deal with in compliance with the instructions contained in this document and in those eventually attached to the shipment.

Nature/Cause of Risk	Countermeasures
Installation and maintenance operations	<p>The component must be handled, installed, commissioned, operated, inspected, maintained, and repaired only by qualified, responsible personnel who must carefully read and strictly follow all instructions in this document, including any instructions enclosed with the shipment. They shall also be specifically instructed and have the necessary experience to recognize the hazards and potential hazards (electrical or mechanical) associated with these products, such as, but not limited to:</p> <ul style="list-style-type: none"> - presence of electrical voltage; - presence of temperature higher than 50 °C; - presence of moving parts during operation; - presence of suspended loads; - presence of possible high sound level (> 85 dB (A)). <p>It must be equipped with appropriate personal protective equipment (PPE) and be familiar with and comply with all applicable regulations regarding proper installation and current safety laws in order to ensure the safety of persons and avoid significant damage to the machine or system.</p>
Falling or projecting objects	<p>For gearboxes equipped with a backstop, provide a protection system against the projection of objects resulting from the breaking of the backstop.</p> <p>For gearboxes fitted with a coupling (fast and/or slow shaft), provide protection against the projection of objects resulting from breakage of the coupling itself.</p> <p>For shaft-mounted gear units, provide appropriate safety devices against</p> <ul style="list-style-type: none"> - Loosening or breaking of the mounting screws; - Rotation or loosening of the gear unit from the machine pin due to accidental breakage of the reaction constraint; - accidental breakage of the machine pin.
Movable elements	<p>Provide safety guards for unused shaft ends and accessible fan cover passages (or other).</p> <p>Any work on the gearbox or gearmotor must be carried out with the machine stopped and disconnected from the power supply and the gearbox or gearmotor cold.</p>
Extreme Temperatures	<p>During operation, the gearboxes may have hot surfaces (> 50 °C); before starting any operation, always wait for the gearbox or gearmotor to cool down (wait about 1 to 3 hours depending on the size); if necessary, carry out a temperature measurement on the surface of the gearbox or gearmotor near the fast shaft. The same applies to the hydraulic coupling, if present.</p> <p>After a period of operation, the gearbox is subjected to a slight internal overpressure that can result in the leakage of burning fluid.</p> <p>Therefore, before loosening the caps (of any kind) wait for the gearbox to cool down; otherwise, use appropriate protection (PPE) against burns resulting from accidental contact with hot oil.</p> <p>In any case, always proceed with the utmost caution.</p>
Noise	<p>Depending on the size, gear ratio, gearbox, type of service, and mounting system of the gearbox or gearmotor, the noise emission level may exceed 85 dB(A). Perform field measurements and, if necessary, equip the personnel concerned with appropriate personal protective equipment (PPE).</p>
Changes that may affect the safety of the equipment	<p>Do not make any structural modification to the products supplied by Rossi (reducers, gearmotors, control group, etc.) without prior approval by Rossi S.p.A.</p>
Use of substitute components with characteristics not suitable for the application	<p>Spare parts must be those authorized by Rossi S.p.A.</p>

2 – Application conditions and limits

Gear reducers are designed for industrial applications according to catalog data, ambient temperature $0 \div +40$ °C (with peaks at -10 °C and $+50$ °C), maximum altitude 1 000 m.

Not allowed running conditions: application in aggressive environments having explosion danger, etc. Ambient conditions must comply with specifications stated on name plate.

3 – How supplied

3.1 - Receipt

At receipt **verify** that the unit corresponds to the one ordered and **has not been damaged during the transport**, in case of damages, report them immediately to the carrier.

Do not commission gear reducers and gearmotors that are even slightly damaged.

Report any non-compliance to Rossi.

3.2 - Name plate

Every gear reducer is provided with a name plate in anodized aluminium containing main technical information relevant to identification (see ch. 3.6); the name plate must not be removed and must be kept integral and readable. All name plate data must be specified on eventual spare part orders.

Product assembled by Rossi Italy

Labels for Rossi Italy name plate:

- Gear reducer type
- Transmission ratio
- Product code
- Serial number
- Work Assembly
- Date
- Mounting position
- QR code

Product assembled by Rossi ACs

Labels for Rossi ACs name plate:

- Subsidiary name
- Date
- Mounting position
- QR code

3.3 - Lubricant

Unless otherwise stated, the gear reducers sizes 40 ... 81 are supplied **complete** with synthetic oil whereas for sizes 100 ... 401 gear reducers are supplied **without** lubricant.

3.4 - Painting

Size gear reducer	Internal painting	External painting		Notes
		Final color blue RAL 5010	Features	
40 ... 81	Epoxy powder (pre-painted)	Epoxy powder (pre-painted)	Resistant to atmospheric and aggressive agents. (corrosivity class C3 according to ISO 12944-2) Suitable for further coats of dual-compound paints ¹⁾	Machined parts remain unpainted and are protected with an easily removable antitrust oil (before painting remove the protective oil).
100 ... 401	Single compound ester epoxy or phenolic resin basis primer (pre-painted)	Single compound exter epoxy or phenolic resin basis primer (pre-painted) + Water-soluble polyurethan dual-compound enamel	Resistant to atmospheric and aggressive agents. (corrosivity class C3 according to ISO 12944-2) Suitable for further coats of dual-compound paints only 1). Machined parts are painted with water-soluble polyurethan dual-compound enamel	The internal painting does not resist polyglycol synthetic oils (polyalphaolefines synthetic oils are suitable). Remove by a scraper or solvent, if present, the eventual paint of gear reducer coupling surfaces

1) Before adding further coats of paint, properly protect the seal rings and carefully degrease and sand the gear reducer surfaces (instead of sanding, it is possible to apply a coat of water-soluble primer).

3.5 - Protections and packing

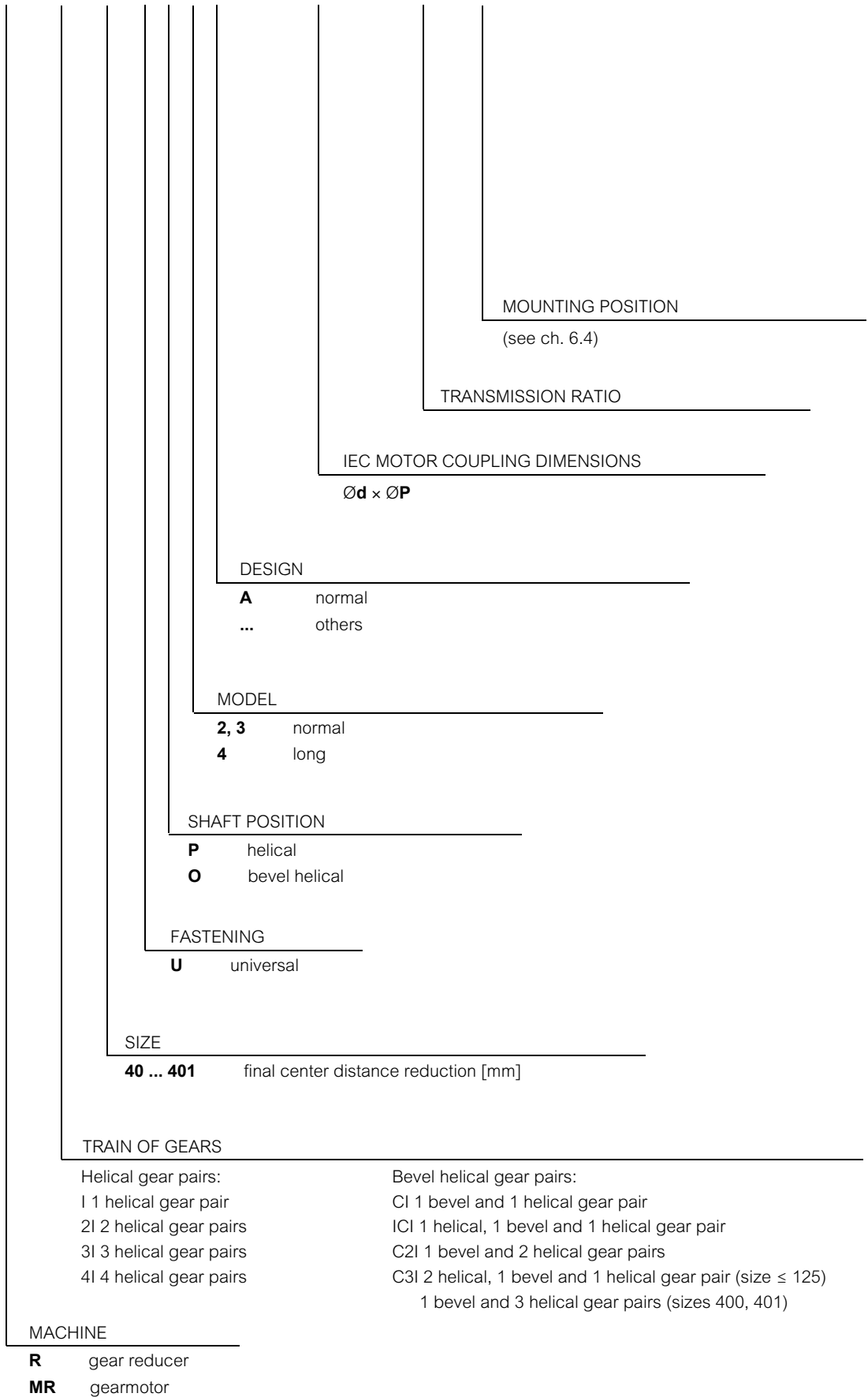
Overhanging free shaft ends and hollow shafts are treated with protective anti-rust long life oil and protected with a plastic (polyethylene) cap (only up to $D \leq 48$ mm for overhanging shafts, $D \leq 110$ mm for hollow shafts). All internal parts are protected with protective anti-rust oil.

Unless otherwise agreed in the order, products are adequately packed: on pallet, protected with a polyethylene film, wound with adhesive tape and strap (bigger sizes); in carton pallet, wound with adhesive tape and strap (smaller sizes); in carton boxes wound with tape (for small dimensions and quantities). If necessary, gear reducers are conveniently separated by means of anti-shock foam cells or of filling cardboard.

Do not stock packed products on top of each other.

3.6 - Designation

R 2I 320 U P 2 D - 10,3 B3
MR C2I 200 U O 2 V - 48 x 350 - 35,3 V5



4 – Lifting, handling and storing

4.1 - Lifting and handling

Make sure that the lifting equipment (e.g.: crane, hook, eye bolt, straps, etc.) are suitable for the weight and size of the gear reducer (consult Rossi technical catalog for dimensions and weight).

For the lifting and transport of gear reducer (or gearmotor) use through holes or threads on the gear reducer housing feet as stated in the figures below.

Avoid unbalanced lifting (during the movement, inclination must not exceed max $\pm 15^\circ$ as to mounting position) and, if necessary, use additional belts to balance the weight.

Do not use any shaft ends.

Do not use motor eyebolts.

Do not use front threads of shaft ends or eventual external pipes.

Do not add supplementary loads to the gear reducer or gearmotor mass.



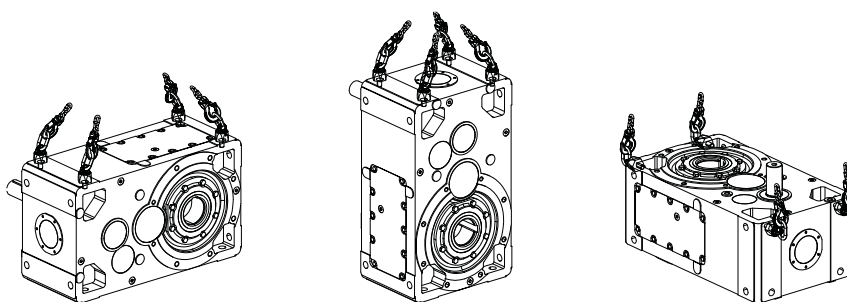
Attention! During the lifting and handling:

- do not stand under the suspended loads;
- do not damage the gear reducer with an inadequate transport;
- keep the gear reducers filled with oil in the mounting position foreseen in the order.

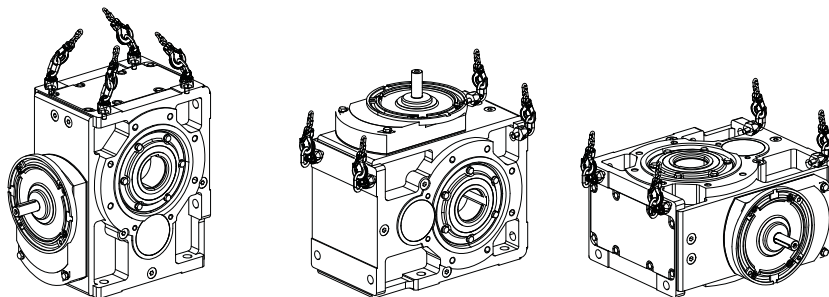
Gear reducers

R I, R 2I, R 3I

R CI, R C2I

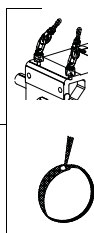
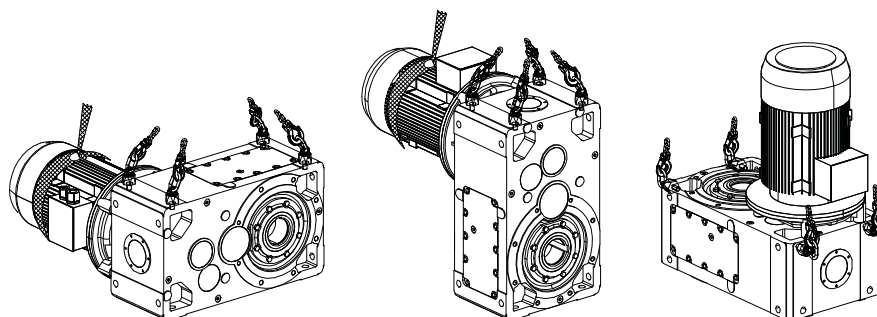


R ICI



Gearmotors

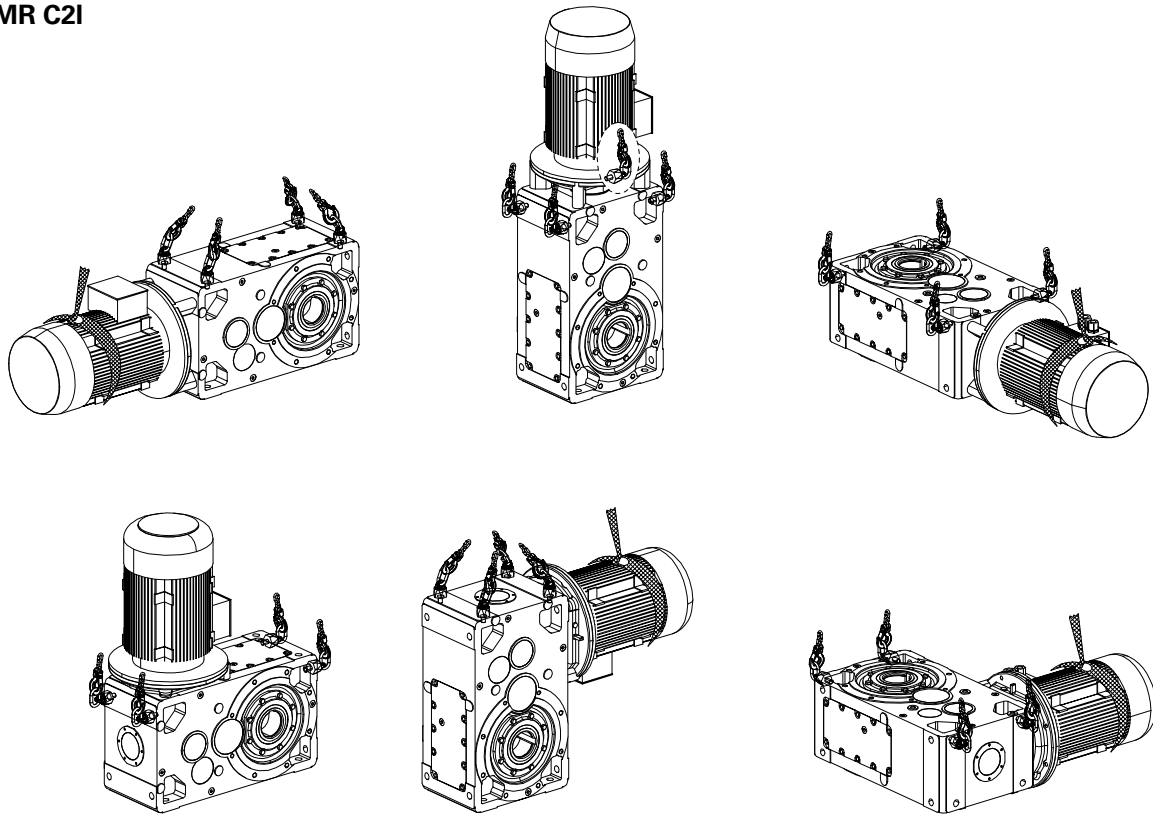
MR 2I, MR 3I, MR 4I



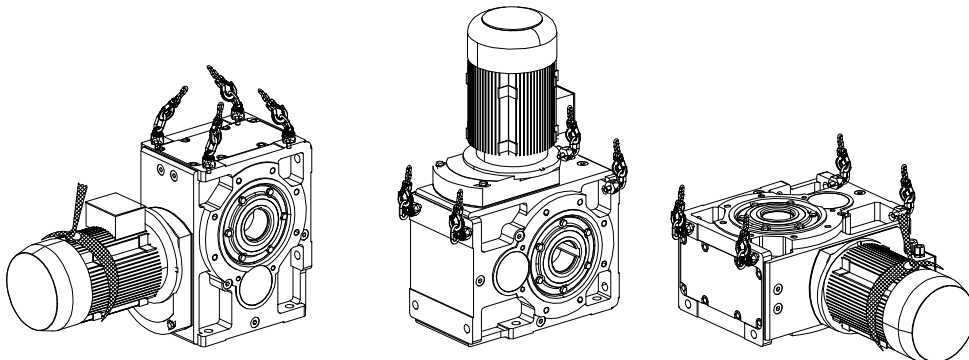
Lifting point

Belt to be used **exclusively** to ensure the motor, when directly mounted, against oscillations due to transport; **not to be used for the lifting of entire gearmotor group.**

MR CI, MR C2I



MR ICI



4.2 - Storing

Surroundings should be sufficiently clean, dry (relative humidity < 50%), free from excessive vibrations ($v_{\text{eff}} \leq 0,2$ mm/s) not to damage the bearings (excessive vibration should also be guarded during transit, even if within wider range) and at a temperature of $0 \div +40$ °C: peaks of 10 °C above and below are acceptable.

The gear reducers filled with oil must be positioned according to the mounting position stated on name plate during transport and storage.

Every six months rotate the shafts (some revolutions are sufficient) to prevent damage to bearings and seal rings.

Assuming normal surroundings and the provision of adequate protection during transit, the unit is protected for storage up to 1 year.

For a 2 year storing period in normal surroundings it is necessary to pay attention also to following instructions:

- generously grease the seal rings, the shafts and the unpainted machined surfaces, if any, and periodically check the conservation state of the protective anti-rust oil;
- completely fill the gear reducers with lubrication oil and the specified level before commissioning.

For storages longer than 2 years or in aggressive surroundings or outdoors, consult Rossi.

5 Installation of gear reducer

5.1 - General

Before the installation, **verify that:**

- There are no damages on shafts and on mating surfaces;
- gear reducer specifications are adequate to ambient conditions (temperature, atmosphere, etc.);
- the structure on which gear reducer is fitted is plane, levelled and sufficiently dimensioned in order to assure fitting stability and vibration absence (vibration speed $v_{\text{eff}} < 3,5$ mm/s for $P_N < 15$ kW and $v_{\text{eff}} < 4,5$ mm/s for $P_N > 15$ kW are acceptable), keeping in mind all transmitted forces due to the masses, to the torque, to the radial and axial loads;
- Used mounting position corresponds to the one stated on name plate;



Attention! Bearing life, good shaft and coupling running depend on alignment precision between the shafts. Carefully align the gear reducer with the motor and the driven machine (with the aid of shims if need be).

Incorrect alignment may cause breakdown of shafts and/or bearings (which may cause overheatings) which may represent heavy danger for people.

Position the gear reducer or gearmotor so as to allow a free passage of air for cooling both gear reducer and motor (especially at motor fan sides).

- Avoid any obstruction to the air flow; heat sources near the gear reducer that might affect the temperature of cooling air and of gear reducer (for radiation); insufficient air recycle and applications hindering the steady dissipation of heat;

Verify that the gear reducer housing is dust-free in order to achieve an efficient heat dispersal.



Place the supplied adhesive pictogram identifying the risk associated with hot surfaces on the surface of the gear unit in a position visible to personnel involved in machine operation and maintenance.

Mating surfaces (of gear reducer and machine) must be clean and sufficiently rough to provide a good friction coefficient (indicatively $Ra\ 3,2 \div 6,3\ \mu\text{m}$). Remove by a scraper or solvent the eventual paint of gear reducer coupling surfaces

When external loads are present use pins or locking blocks, if necessary.

When fitting gear reducer and machine and/or gear reducer and eventual flange **B5** it is recommended to use **locking adhesives** such on the fastening screws (also on flange mating surfaces).

For accessories not supplied by Rossi, pay attention to their dimensioning; consult us, if need be.

Before wiring-up the gearmotor make sure that motor voltage corresponds to input voltage. If direction of rotation is not as desired, invert two phases at the terminals.

Y- Δ starting should be adopted for no-load starting (or with a very small load) and for smooth starts, low starting current or other similar devices should be fitted.

If overloads are imposed for long periods or if shocks or danger of jamming are envisaged, then motor-protection, electronic torque limiters, fluid couplings, safety couplings, control units or other similar devices should be fitted.

Usually protect the motor with a thermal cut-out however, where duty cycles involve a high number of on-load starts, it is necessary to utilise **thermal probes** for motor protection (fitted on the wiring); magnetothermic breaker is unsuitable since its threshold must be set higher than the motor nominal current of rating.

Connect thermal probes, if any, to auxiliary safety circuits.

Use varistors and/or RC filters to limit voltage peaks due to contactors.

For gear reducers equipped with **backstop device** (see ch. 5.12), foresee a protection system where a backstop device breaking could cause personal injury or property damage.

Whenever a leakage of lubricant could cause heavy damages, increase the frequency of inspections and/or envisage appropriate control devices (e.g.: remote level gauge, etc.).

In polluting surroundings, take suitable precautions against lubricant contamination through seal rings or other.

For outdoor installation or in a hostile environment (corrosivity class **C3** according to ISO 12944-2) protect the gear reducer or gearmotor with a proper anti-corrosion paint (see ch. 3.4), using water-repellent grease (especially around the rotary seating of seal rings and the accessible zones of shaft end).

Gear reducers and gearmotors should be protected whenever possible and by appropriate means from solar radiation and extremis of weather; weather protection **becomes essential** when high or low speed shafts are vertically disposed or when the motor is installed vertical with fan uppermost.

For ambient temperature greater than +40 °C or less than 0 °C, consult Rossi.

When gear reducer or gearmotor is supplied with water cooling by coil or independent cooling unit, see ch. 8.

5.2 - Tightening torques for fastening bolts (foot, flange, accessories) and for plugs

Unless otherwise stated, usually it is sufficient to use screws in class 8.8;

- Before tightening the bolt be sure that the eventual centering of flanges are inserted properly
- The bolts are to be diagonally tightened with the maximum tightening torque (see table 5.2.1).

Before tightening, carefully degrease the screws; in the event of heavy vibrations, heavy duties, frequent drive inversions apply a thread-braking seal type Loctite or similar.

Tab. 5.2.1. Tightening torque M_s for feet and flange fastening bolts

Screw	M_s [N m]		
	NI 5737-88, UNI 5931-84		
	cl. 8.8	cl. 10.9	cl. 12.9
M4	2.9	4	—
M5	6	8.5	10
M6	11	15	20
M8	25	35	40
M10	50	70	85
M12	85	120	145
M14	135	190	230
M16	205	290	350
M18	280	400	480
M20	400	560	680
M22	550	770	930
M24	710	1000	1200
M27	1000	1400	1700
M30	1380	1950	2350
M33	2000	2800	3400
M36	2500	3550	4200
M45	5000	7000	8400
M56	9800	13800	16500

Tab. 5.2.2. Tightening torques for plugs

Gear red. size	Dimension of threading	M_s [N m]
40, 50	G 1/4"	7
63 ... 81	M16 x 1,5	14
100 ... 140	G 1/2"	14
160 ... 280	G 3/4"	14
320 ... 401	G 1"	25

5.3 - Flange mounting

Carefully select the length of fixing screws when using tapped holes (B14 flange) for gear reducer fitting, in order to assure a sufficient meshing thread length for the correct gear reducer fitting to the machine without breaking down the threading seat.

For the mounting of sizes 140, 200 and 250 including B14 flange it is necessary that the tapped holes of counterflange (driven machine) are realized with the same diameter (equal to $\varnothing 15$, $\varnothing 21$ and $\varnothing 25$ respectively) as the 2 tapped holes of lower diameter are not exactly in position $22^\circ 30'$.

In the fastening screws and in the flange mating surfaces use **locking adhesives**.

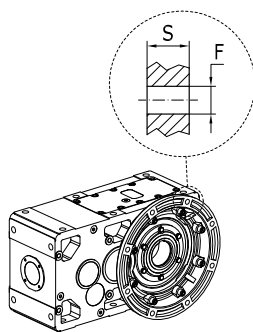


Fig. 5.3.1. **B5** Flange
B5 Flange (type B)

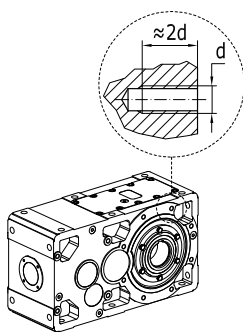


Fig. 5.3.2. **B14** Flange

Tab. 5.3.1. Dimension and flange hole numbers B5 and B14

Gear red. size	Flange B14		Flange B5		S
	d	d1	$\varnothing F$		
40	M5 n. 4	-	9,5	n. 4 (M8)	11
50	M6 n. 4	-	9,5	n. 4 (M8)	12
63, 64	M8 n. 4	-	11,5 ¹⁾	n. 4 ¹⁾ (M10 ¹⁾)	14
80,81	M10 n. 4	-	14	n. 4 (M12)	16
100	M12 n. 4	-	14	n. 4 (M12)	18
125	M14 n. 7	-	18	n. 4 (M16)	20
140	M14 n. 6	M12 n. 2	18	n. 4 (M16)	22
160, 180	M16 n. 8	-	18	n. 8 (M16)	22
200	M20 n. 6	M16 n. 2	18	n. 8 (M16)	25
225	M20 n. 8	-	22	n. 8 (M20)	25
250	M24 n. 6	M20 n. 2	27	n. 8 (M24)	30
280	M24 n. 8	-	27	n. 8 (M24)	30
320 ... 360	M30 n. 8	-	33	n. 8 (M30)	37
400, 401	M36 n. 8	-	39	n. 8 (M36)	45

1) With **B5** flange **type B**: 14 n.4 (M12).

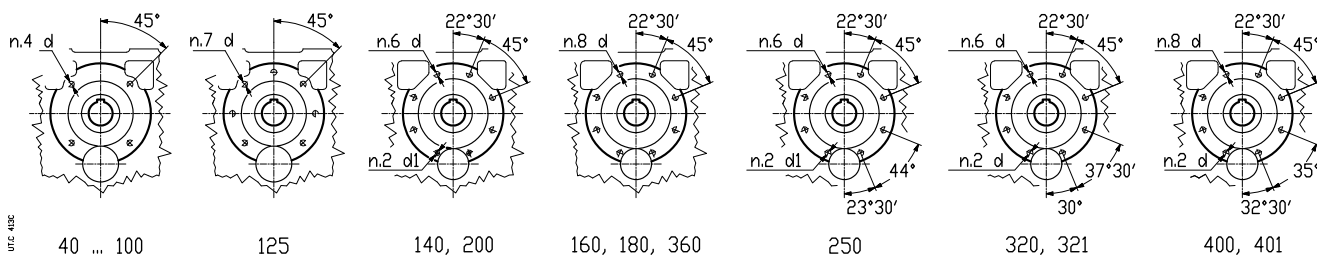


Fig. 5.3.3. Drilling B14 for sizes 140, 200 and 250.

5.4 - Foot mounting

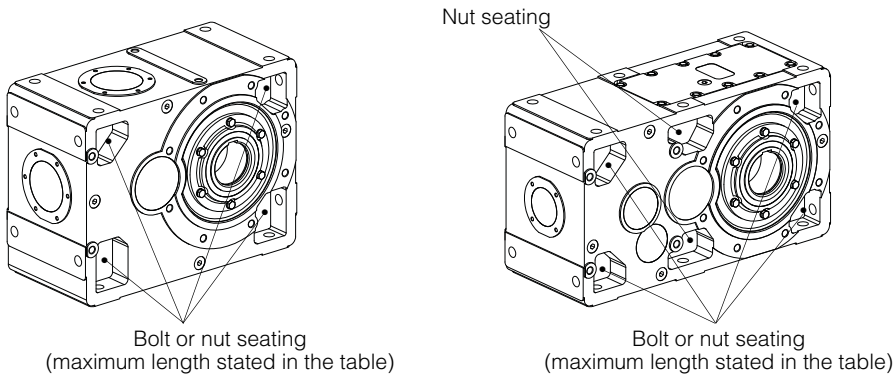
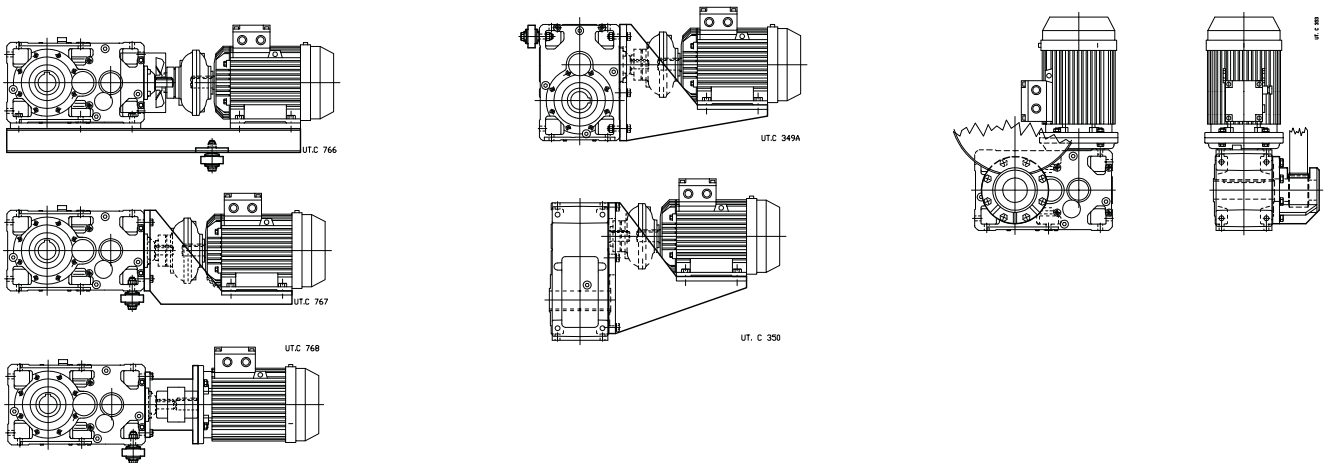


Fig. 5.4.1. Bolts for foot fastening

Gear red. size	Screw UNI 5737-88 (l max)
40	M6 × 22
50	M8 × 30
63, 64	M10 × 35
80, 81	M12 × 40
100	M14 × 50
125, 140	M16 × 55
160, 180	M20 × 70
200, 225	M24 × 90
250, 280	M30 × 110
320 ... 360	M36 × 130
400, 401	M45 × 155

5.5 - Shaft mounting



Important! When shaft mounted, the gear reducer must be supported both axially and radially (also for mounting position B3 ... B8) by the machine shaft end, as well as anchored against rotation only, by means of a reaction having **freedom of axial movement** and sufficient **clearance in its couplings** to permit minor oscillations always in evidence without provoking dangerous overloading on the gear reducer. Lubricate with proper products the hinges and the parts subject to sliding; when mounting the screws it is recommended to apply **locking adhesives**.

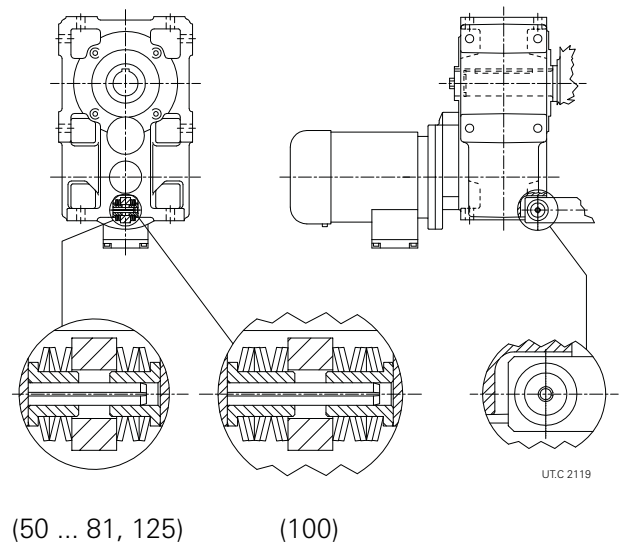


Important! Concerning the reaction system, follow the project indications stated in the technical catalogs Rossi. Whenever personal injury or property damage, due to falling or projecting parts of gear reducer or of its parts, may occur, **foresee adequate supplementary protection devices against:**

- **rotation or unthreading of the gear reducer from shaft end of driven machine** following to accidental breakage of the reaction arrangement;
- **accidental breakage of shaft end of driven machine.**

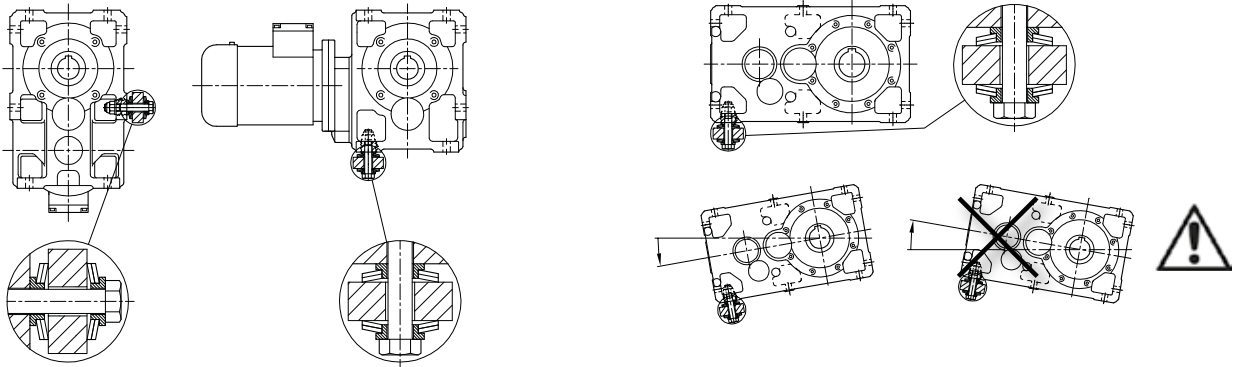
System **kit using reaction disc springs** (reaction recess).

For the mounting of the kit, use the tapped butt end hole on the shaft end of the driven machine and the flat machined chamfered surface for compressing and fitting the disc springs into the reaction recess.



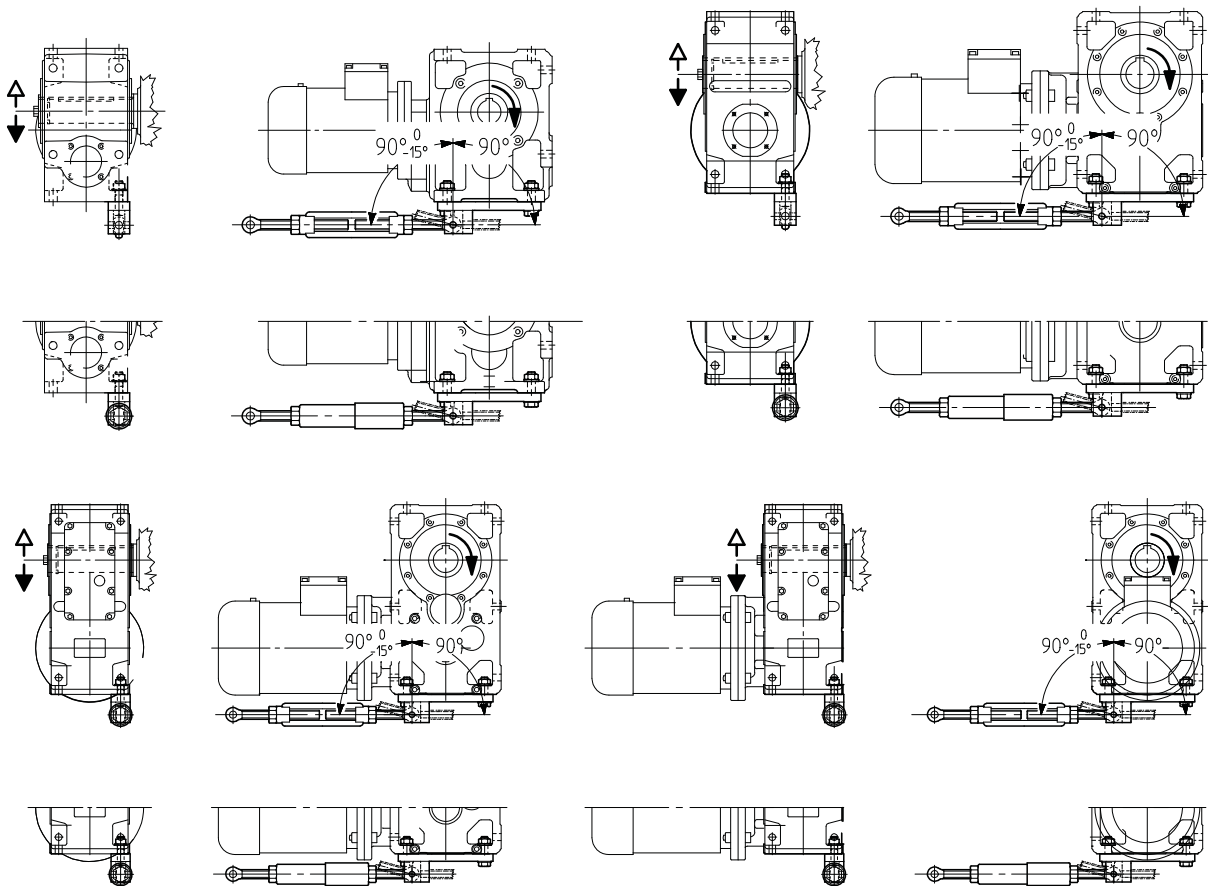
Reaction bolt using disc spring

For sizes 140 ... 401 C2I, 2I, 3I, in B3 or B8 mounting position, ensure that the **housing oscillation, during the running, does not overtake** – towards the top – **the horizontal position**.



Rigid or flexible torque arm using bracket

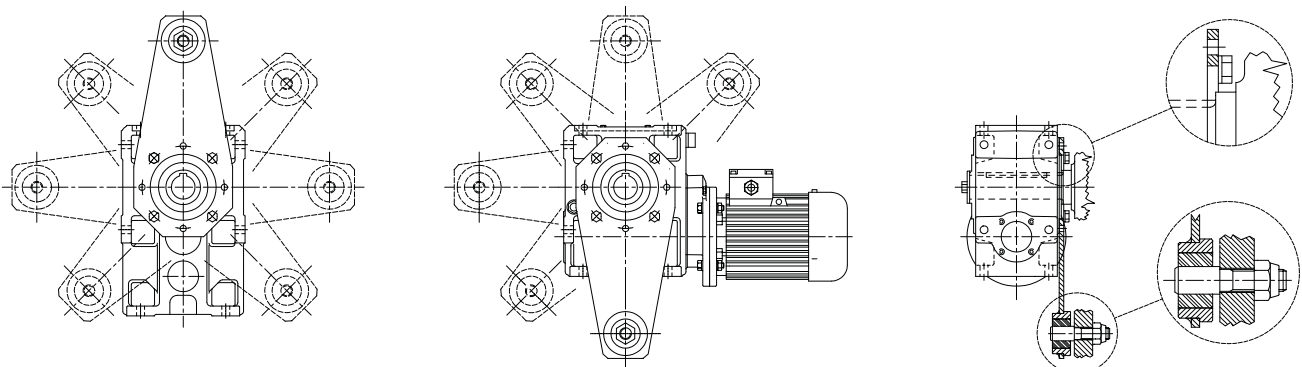
If the direction of rotation is opposite to that given in the fig. rotate the torque arm by 180° (operation not necessary in case of flexible torque arm).



System with torque arm

According to dimensions, some mounting positions of motor flange torque arm could not be possible.

Before mounting the torque arm, carefully clean the torque arm, all coupling surfaces and apply locking adhesives on the screws and on mating surfaces. Tighten the screws by a dynamometric wrench at values shown in the table 5.2.1 «Tightening torques».



5.6 - Mounting of hollow low speed shaft

For machine shaft ends onto which the hollow shafts of gear reducers are to be keyed, h6, j6, and k6 tolerances are recommended, according to requirements.

Important! the shoulder diameter of the driven machine shaft end abutting with the gear reducer must be at least $1,18 \div 1,25$ time the hollow shaft internal diameter. For other data on machine shaft end (in case of standard hollow low speed shaft, stepped shaft, with locking rings or bushings) see Rossi technical catalogs.



Attention! For **vertical ceiling-type** mounting and only for gear reducers equipped with locking rings or bushing, gear reducer support is due only to friction, for this reason it is advisable to provide it with a fastening system.

Attention! Even if the hollow low speed shafts machined in tolerance H7, a check through bott could reveal two areas with a **slightly underdimensioned** diameter (see Fig. 1): this und underdimensioning is intentional and not affecting the **keying quality** – which is **improved** in terms of **duration** and **precision** – and is not hindering the assembly of machine shaft end according to usual methodes, such as the one shown at fig. a).

Attention! In order to **facilitate** the **mounting** of gear reducer onto machine shaft end, diameter D (**, see Fig. 2) is slightly overdimensioned as to nominal dimension, at hollow shaft input (standard, stepped, with shrink disc): this will not affect reliability.

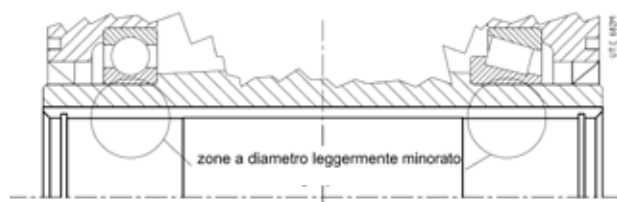


Fig. 5.6.1

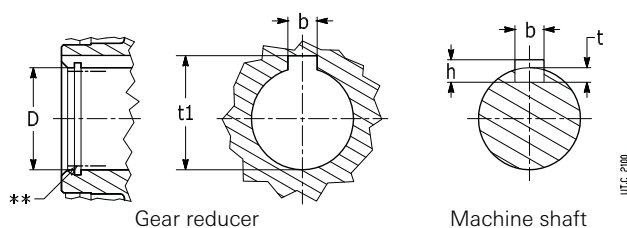


Fig. 5.6.2

Hollow low speed shaft

Hole D Ø H7	Parallel key b × h × l* h9 h11	Keyway		
		b H9 hub N9 shaft	t shaft	t ₁ hub
19	6 × 6 × 50	6	3,5	21,8
24	8 × 7 × 63	8	4	27,3
30	8 × 7 × 63	8	4,5 ¹⁾	32,7 ¹⁾
32	10 × 8 × 70	10	5	35,3
38	10 × 8 × 90	10	5,5 ¹⁾	40,7 ¹⁾
40	12 × 8 × 90	12	5 ¹⁾	43,3
48	14 × 9 × 110	14	5	51,8
60	18 × 11 × 140	18	7	64,4
70	20 × 12 × 180	20	8 ¹⁾	74,3 ¹⁾
80	22 × 14 × 200	22	9	85,4
90	25 × 14 × 200	25	9	95,4
100	28 × 16 × 250	28	10	106,4
110	28 × 16 × 250	28	10	116,4
125	32 × 18 × 320	32	11	132,4
140	36 × 20 × 320	36	12	148,4
160	40 × 22 × 400	40	14 ¹⁾	168,3 ¹⁾
180	45 × 25 × 400	45	15	190,4
200	45 × 25 × 600	45	15	210,4

* Recommended length.

1) Values not to standard.

5.7 - Gear reducer installing and removing

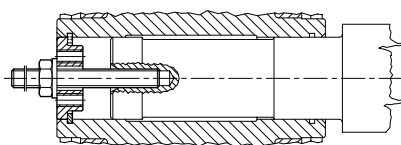


Fig. 5.7.1

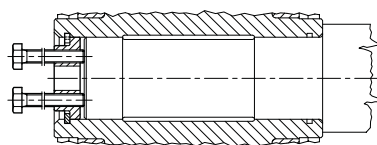
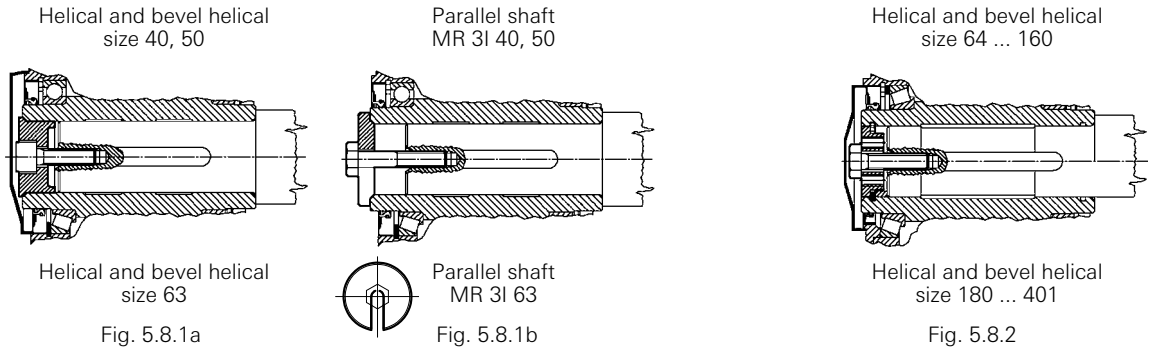


Fig. 5.7.2

In order to have an easier **installing** and **removing** of gear reducers and gearmotors with retaining ring groove (sizes 64 ... 401) – both with keyway and shrink disc – proceed as shown at fig. 5.7.1 and 5.7.2 (excluding MR 3I 100 with motor sizes 112 and 3I 125 with motor size 132; consult us).

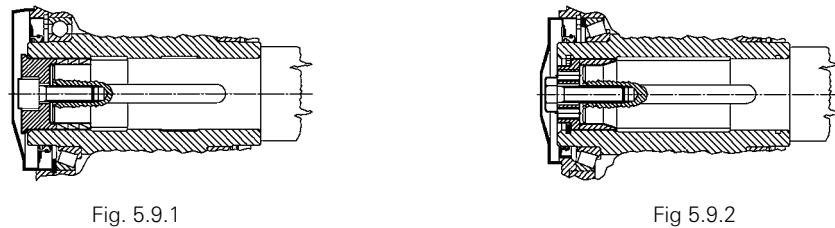
For MR 3I 64 ... 81, first insert the washer with screw and the retaining ring into the gear reducer hollow shaft (on motor opposite side); then mount on machine shaft end.

5.8 - Axial fastening of gear reducer



For the **axial fastening** it is possible to adopt the system as per fig. 5.8.1 and 5.8.2. For sizes 64 ... 360, when shaft end of driven machine has no shoulder, a spacer may be located between the retaining ring and the shaft end (as in the lower half on fig. 5.8.2). Parts in contact with the retaining ring must have sharp edges.

5.9 - Gear reducer fitting with key and locking rings or bushing



Using **locking rings** (sizes 40 ... 63, fig. 5.9.1) or **locking bushing** (sizes 64 ... 360, fig. 5.9.2) will allow to have easier and more accurate installing and removing and to eliminate backlash between key and keyway, friction system complying with ATEX.

The locking rings or the locking bushing are fitted after mounting (for MR 3l 64 ... 81 insert the bushing onto machine shaft end or into hollow shaft before mounting; pay attention when positioning the keyway). Do not use molybdenum bisulphide or equivalent lubricant for the lubrication of the parts in contact. When tightening the bolt, we recommend the use of **locking adhesives** type Loctite or equivalent. For vertical ceiling-type mounting, contact us.

In case of axial fastening with locking rings or bushing – especially when having heavy duty cycles, with frequent reversals – verify, after some hours of running, the bolt tightening torque and eventually apply the locking adhesive again.

Respect the tightening torques stated in table 5.9.1.

Attention! In applications with **travelling lifts**, the locking bushing is not sufficient to guarantee a stable fitting of hollow low speed shaft with the machine shaft end, also when the axial fastening bolt is fastened with locking adhesive. In these cases, it is necessary to fit with hollow shaft and shrink disc. This is valid, in general, also when there is a high frequency of starting and brakings with motion reversal and when the ratio of inertia J/J_0 is very high (≥ 5).

Tab. 5.9.1 Tightening torques for axial fastening bolts with locking rings or bushing

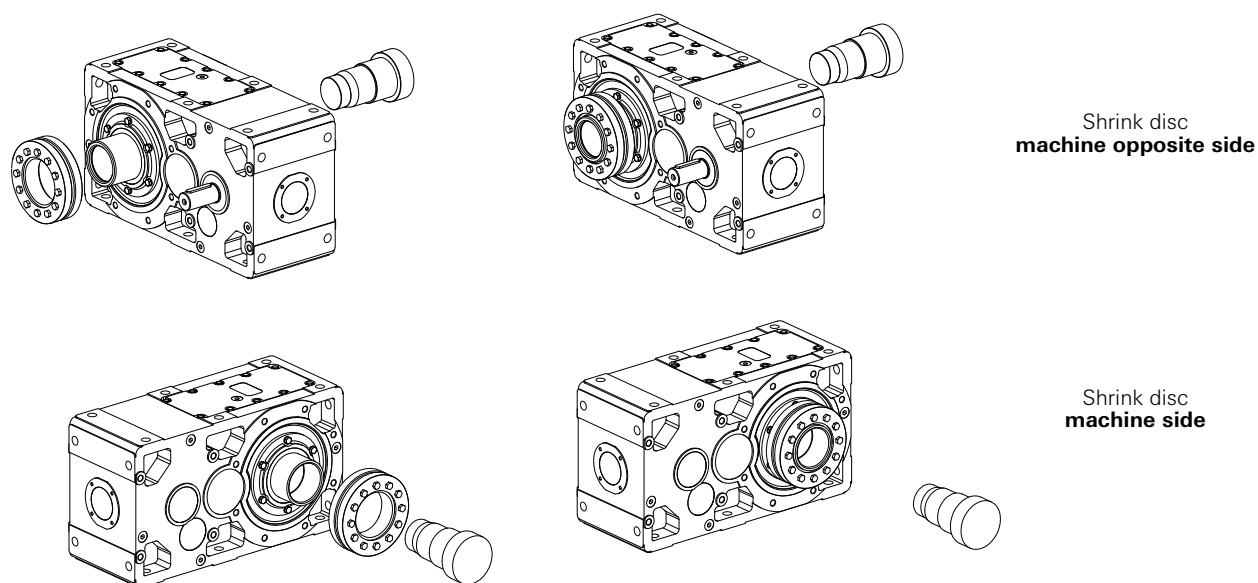
Gear red. size	40	50	63	64	80	81	100	125	140	160	180	200	225	250	280	320, 321	360	400, 401
Bolts for axial fastening UNI 5737-88 cl. 8.8	M8 ¹⁾	M8 ¹⁾	M10 ¹⁾	M10	M10 ²⁾	M10 ²⁾	M12 ²⁾	M14 ²⁾	M16	M20	M20 ²⁾	M24	M24 ²⁾	M30	M30 ²⁾	M36	M36 ³⁾	M30
M_s [N m] for rings or bushing	29	35	43	43	51	53	92	170	210	340	430	660	830	1350	1660	2570	3150	-

1) UNI 5931-84 cl. 8.8 (excluding MR 3l).

2) UNI 5737-88 cl. 10.9.

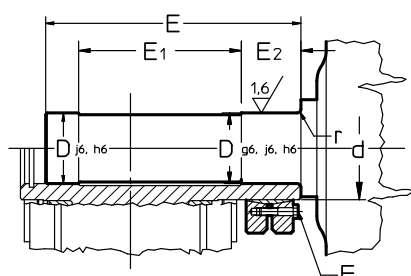
3) UNI 5931-84 cl. 10.9.

5.10 - Mounting of Hollow low speed shaft with shrink disc



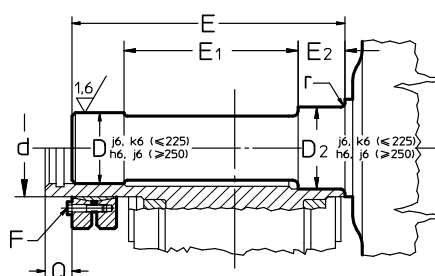
Shrink disc
machine opposite side

Shrink disc
machine side



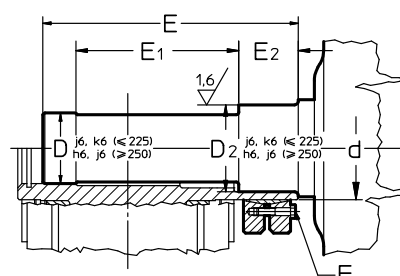
Shrink disc
machine side
(sizes 40 ... 125)

Fig. 5.10.1



Shrink disc
machine opposite side
(sizes 140 ... 401)

Fig. 5.10.2



Shrink disc
machine side
(sizes 140 ... 401)

Fig. 5.10.3

Tab. 5.10.1 - Hollow low speed shaft and machine shaft end with shrink disc ³⁾

Gear reducer size	D	D ₂	d	E		E ₁		E ₂		F		M _s	Q
	∅ H7	H7	∅	1)		1)				UNI 5737-88 cl. 10.9		N m 2)	
40	20	—	24	99,5	—	65	—	25	—	M5	n. 6	4	—
50	25	—	30	116,5	—	77	—	30	—	M5	n. 7	4	—
63	30	—	38	135,5	—	86	—	34	—	M6	n. 5	12	—
64	35	—	44	140	—	86	—	36	—	M6	n. 7	12	—
80, 81	40	—	50	166	—	103	—	39,5	—	M6	n. 8	12	—
100	50	—	62	197	—	122	—	46,5	—	M8	n. 6	30	—
125	65	—	80	239	—	148	—	55	—	M8	n. 8	30	—
140	70	75	90	273	294,5	180	192,5	52	52	M8	n. 10	30	27,5
160	80	85	105	307	329	199	208	62	57	M10	n. 9	60	29
180	90	100	120	335	363	221	228	65	63	M10	n. 12	60	35
200	100	110	130	377	402	251	260	72	66	M12	n. 10	100	33,5
225	110	120	140	404	428	265	277	78	75	M12	n. 12	100	32,5
250	125	135	160	461	493	307	318	86	84	M16	n. 8	250	45
280	140	150	180	506	543	324	337	104	94	M16	n. 10	250	47
320, 321	160	170	200	567	607	375	388	104	107	M16	n. 12	250	50
360	180	195	230	621	668	400	414	124	116	M16	n. 15	250	57
400, 401	210	220	260	754	788	446	480	165 ⁴⁾	165 ⁴⁾	M20	n. 14	490	47

1) Values valid for shrink disc on machine opposite side.

2) Bolt tightening torque.

3) For design with labyrinth seals at low speed shaft, the dimensions E, E₁, E₂ are changing: please consult us.

Attention! Verify that the machine shaft end has dimensions, tolerances and roughness as stated in fig. 5.10.1 ... 5.10.3 and tab. 5.10.1; following these instructions the correct running of shrink disc will be granted.

Pre-arrange a proper protection of the shrink disc against accidental contacts.

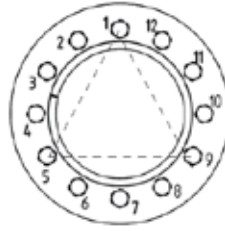


Fig. 5.10.4

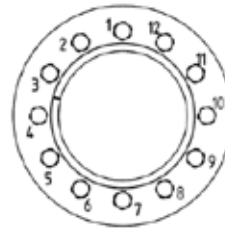


Fig. 5.10.5

Installing



Attention! Do not tighten the screws of shrink disc before mounting the gear reducer onto machine shaft in order not to deform the hollow shaft. When keying the shrink disc follow these instructions:

- carefully degrease the surfaces of hollow shaft and shaft end of driven machine to be fitted;
- mount the shrink disc on the gear reducer hollow shaft taking care to lubricate the only external surface, first; position the shrink disc axially to «Q» dimension (see tab. 5.10.1).
- slightly tighten a first group of three screws positioned at about 120° as shown for example in the figure 5.10.4;
- tighten through dynamometric wrench – balanced to a value approximately higher than 5% compared to the one foreseen in tab. 5.10.1 – the bolts of the shrink disc, by a continuous sequence (not crossing) see fig. 5.10.5 and during several phases (approx. 1/4 turn at a time) until no 1/4 turn is possible anymore;
- do again 1 or 2 passages with dynamometric wrench verifying that the tightening torque stated in tab. 5.10.1 has been realized;
- when having heavy duty cycles, with frequent reversals, verify again after some hours of running, the bolt tightening torque.
- verify the tightening torque of screws at every maintenance interval (oil exchange) or in case of anomalous vibrations.

Removing

Before starting the disassembling operation, be sure that no torque nor load is applied to shrink disc, shaft or other connected elements.



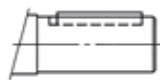
Attention! Do not completely remove fastening screws before locking rings are disengaged. Risk of serious injury!

Clean off any rusty areas.

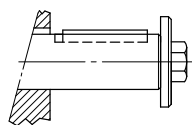
Loosen the fastening screws one after the other only by using approx. 1/2 turn at a time and by a continuous sequence (not crossing), until shrink disc can be moved on hollow shaft.

Remove the gear reducer from machine shaft end.

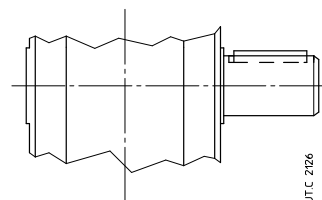
5.11 - Mounting of components on high and low speed shaft ends



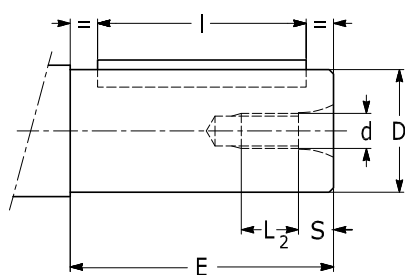
High speed shaft end



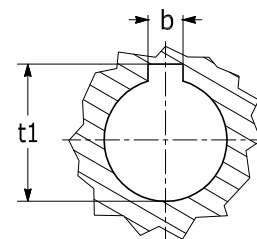
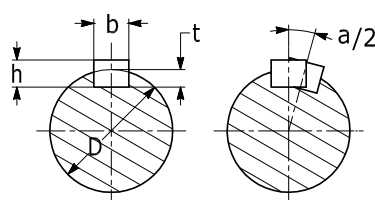
Low speed shaft end



Solid low speed shaft end



Gear reducer shaft end



Machine shaft

D Ø	Shaft end								Parallel key			Keyway		
	1) 2) 3)	E 1) 2) 3)	d Ø	S	L 1) 2) 3)	a/2 ⁴⁾ arc min	b × h × l h9 h11	b H9 hub N9 shaft	t shaft	t ₁ hub				
11	j6 - -	23 -	M5	3,6	9,4 -	-	4 × 4 × 18 -	4	2,5	12,7				
14	j6 - -	30 -	M6	4,6	11,4 -	-	5 × 5 × 25 -	5	3	16,2				
16	j6 - -	30 -	M6	4,6	11,4 -	-	5 × 5 × 25 -	5	3	18,2				
19	j6 h7 -	40 30	M6	4,6	11,4 13,4	5,43	6 × 6 × 36 25	6	3,5	21,7				
24	j6 h7 -	50 36 ⁷⁾	M8	5,9	15,1 17,1	5,16	8 × 7 × 45 25	8	4	27,2				
28	j6 - -	60 -	M8	5,9	15,1 -	-	8 × 7 × 45 -	8	4	31,2				
30	- h7 -	58 58 ⁷⁾	M0	7,6	- 20,4	4,13	8 × 7 × 45 45	8	4	33,2				
32	k6 h7 -	80 58 ⁷⁾	M10	7,6	18,4 20,4	3,87	10 × 8 × 70 50	10	5	35,3				
38	k6 h7 -	80 58	M10	7,6	18,4 20,4	3,27	10 × 8 × 70 50	10	5	41,3				
40	- h7 -	- 58	M10	7,6	- 20,4	3,7	12 × 8 × 50 50	12	5	43,3				
42	k6 - -	110 -	M12	9,5	22,5 -	-	12 × 8 × 90 -	12	5	45,3				
45	k6 - -	110 -	M12	9,5	22,5 -	-	14 × 9 × 90 -	14	5,5	48,8				
48	k6 h7 k6	110 82	M12	9,5	22,5 26,5	3,08	14 × 9 × 90 70	14	5,5	51,8				
55	m6 - -	110 -	M12	9,5	22,5 -	-	16 × 10 × 90 -	16	6	59,3				
60	m6 h7 k6	140 105 ⁵⁾	M16	12,7	27,3 35,3	2,46	18 × 11 × 110 90	18	7	64,4				
65	m6 - -	140 -	M16	12,7	27,3 -	2,33	18 × 11 × 110 -	18	7	69,4				
70	m6 h7 k6	140 105	M16	12,7	27,3 35,3	2,55	20 × 12 × 125 90	20	7,5	74,9				
75	m6 - -	140 -	M16	12,7	27,3 -	-	20 × 12 × 125 -	20	7,5	79,9				
80	m6 h7 k6	170 130	M20	16	34 44	2,23	22 × 14 × 140 110	22	9	85,4				
90	m6 h7 k6	170 130	M20	16	34 44	1,99	25 × 14 × 140 110	25	9	95,4				
95	m6 - -	170 -	M20	16	34 -	-	25 × 14 × 140 -	25	9	100,4				
100	- j6 k6	- 165	M24	19	- 41	1,79	28 × 16 × 180 140	28	10	106,4				
110	m6 j6 k6	210 165	M24	19	41 41	1,63	28 × 16 × 180 140	28	10	116,4				
125	- j6 k6	- 200 ⁶⁾	M30	22	- 45	1,71	32 × 18 × - 180	32	11	132,4				
140	- j6 k6	- 200	M30	22	- 45	1,52	36 × 20 × - 180	36	12	148,4				
160	- j6 k6	- 240	M36	27	- 54	1,33	40 × 22 × - 220	40	13	169,4				
180	- j6 k6	- 240	M36	27	- 54	1,18	45 × 25 × - 220	45	15	190,4				
190	m6 - -	280 -	M36	27	54 -	1,12	45 × 25 × 250 -	45	15	200,4				
200	m6 - -	280 -	M36	27	54 -	1,07	45 × 25 × 250 -	45	15	210,4				

1) Values valid for high speed shaft end.

2) Values valid for standard low speed shaft end.

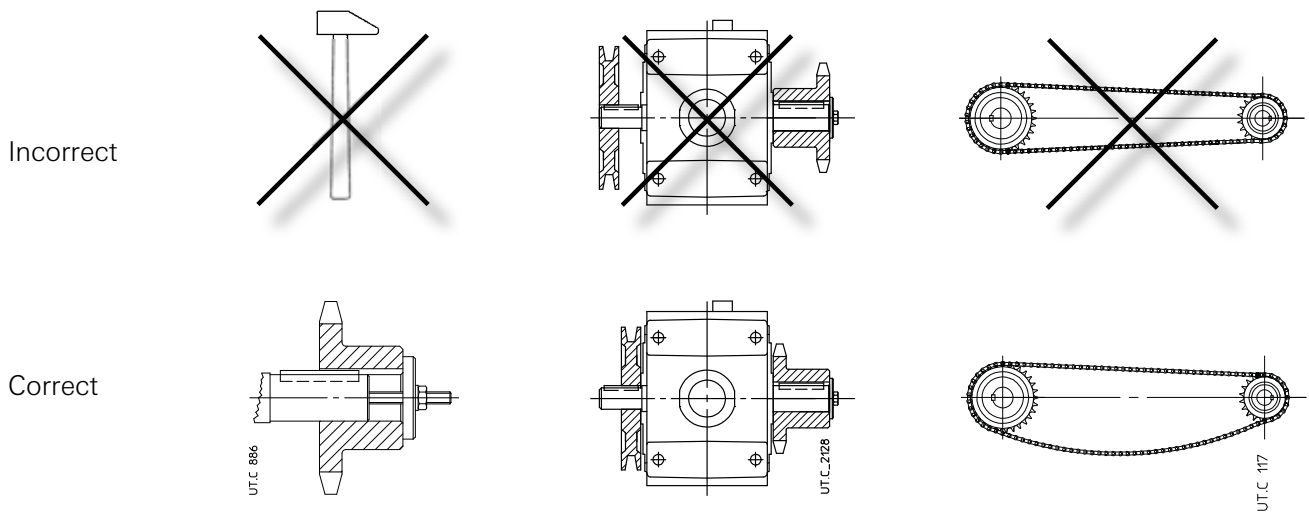
3) Values valid for solid low speed shaft end.

4) Maximum angular disalignment of keyways on double extension shafts.

5) For low speed shaft ends: E = 97 (E = 101 if double extension); value not to standard.

6) Value not to standard.

7) For MR 31 with low speed shaft end, E dimension increases by 1.



In general, it is recommended to machine the hole of the parts keyed onto shaft end to **H7** tolerance. For high speed shaft end with $D \geq 55$ mm, provided that load is uniform and light, tolerance can be **G7**. For low speed shaft ends, provided that load is not uniform and light, tolerance must be **K7**. Before mounting, thoroughly clean mating surfaces and lubricate against seizure and fretting corrosion. **Attention!** Assemble and disassemble with the aid of **jacking screws** and **pullers** using tapped holes at shaft butt-end, taking care to avoid impacts and shocks which may **irremediably damage** the **bearings**, the **circlips** or other parts. For couplings H7/m6 and K7/j6 it is advisable that the part to be keyed is preheated to a temperature of $80 \div 100$ °C. The couplings having a tip speed on external diameter up to 20 m/s must be statically balanced; for higher tip speeds they must be dynamically balanced. Where the transmission link between gear reducer and machine or motor generates shaft end loads, ensure that:

- loads do not rise above catalog values;
- transmission overhang is kept to a minimum;
- drive-chains should not be tensioned (if necessary – alternating loads and/or motion – foresee suitable chain tighteners);
- in the gear transmission systems there is a proper backlash ($\approx 0,03 \div 0,04$ mm) between pinion and rack;
- drive-belts should not be over-tensioned.

For splined couplings apply adequate antirust-products.

5.12 - Backstop device

The presence on gear reducer of backstop device is stated by the arrow near the low speed shaft, indicating the free rotation.

Provide a protection system where a backstop device breaking could cause personal injury or property damage. Make sure that the **direction of rotation in machine, gear reducer and motor all correspond correctly**.



Attention! One or more startings in the false direction, even if short, could irremediably damage the backstop device, the coupling seats and/or the electric motor.

6 - Lubrication

6.1 - General

Gear reducers and gearmotors must be lubricated with **polyglycol** or **polyalphaolephines based synthetic oil** depending on the series; they are supplied **FILLED WITH OIL** or **WITHOUT OIL** according to type and size (see ch. 6.2 and 6.3). **When supplying WITHOUT OIL, the filling up to specified level is Buyer's responsibility and has to be carried out with gear reducer at rest**; normally stated by means of transparent level plug (see ch. 6.4 or eventual SPT sketch attached to present instructions). Every gear reducer is equipped with **lubrication name plate**.

Concerning lubricant type, how supplied status of gear reducers, plugs, filling instructions, oil-change interval, etc. see lubrication table at ch. 6.2 and 6.3.



Be sure that, for gear reducers and gearmotors sizes ≥ 100 , the filler plug is equipped with filter and valve (symbol ; see fig. 6.1.1). When these gear reducers are required filled with oil (non-standard design) the **filler plug** is not mounted but **sent separately**; The installer will take care of the assembly in the right position (see ch. 6.4 or eventual SPT sketch attached) replacing the fitted plug.

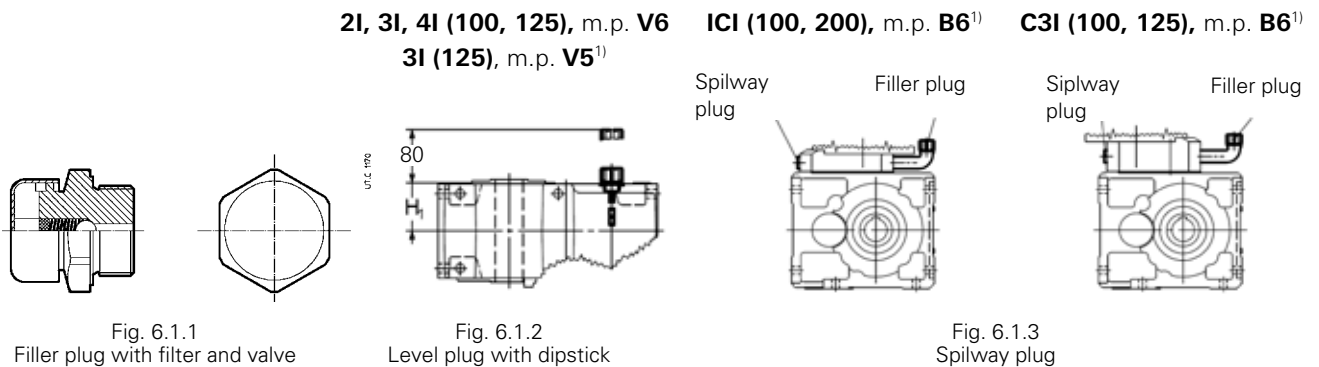
If gear reducer or gearmotor is supplied with **transparent oil level plug** (size ≥ 100), the necessary lubricant quantity is the one which **reaches a.m. level at gear reducer at rest, in center line**, and not the approximate quantity given on the catalog.

When gear reducer or gearmotor is provided with a **level plug with dipstick** (see fig. 6.1.2), fill with oil up to specified level on rod.

When gear reducer or gearmotor is provided with a **plug for flowing over level** (red colour, see fig. 6.1.3) fill after unscrewing a.m. plug in order to check the obtained level by oil outlet.

Usually bearings are automatically and continuously lubricated (bathed, splashed, through pipes or by a pump) utilising the main gear reducer lubricant. The same applies for backstop devices, when fitted to gear reducers.

In certain gear reducers in vertical mounting positions V5 and V6, and bevel helical gear reducers in horizontal positions B3, B6 (though not gearmotors in this case, for which the above indications hold good) upper bearings are independently lubricated with a special grease «for life», assuming pollution-free surroundings. The same applies for motor bearings (except some cases in which relubrication device is adopted) and backstop devices when fitted to motors.



1) For high speed continuous duty an expansion tank is envisaged: consult us.

Always be sure that the gear reducer is located as per the mounting position ordered - including the inclined mounting positions (e.g. B3 38° V5) - which appears on the name plate (see ch. 3.2).

In case of **oscillating mounting positions** the gear reducers are equipped with auxiliary name plate with statement of mounting position for the oil filling and the level check during maintenance.

For mounting positions, oil quantity and plug position see ch. 6.3 and 6.4.

Combined gear reducers. Lubrication remains independent, thus data relative to each single gear reducer hold good.

6.2 - Lubrication table

	Size ≤ 81	Size ≥ 100																									
How supplied and plugs (identification also through specific lubrication nameplate)	FILLED with SYNTHETIC OIL (polyglycol based synthetic oil) AGIP Blasia S 220 KLÜBER Klübersynth GH 6-220 MOBIL Glygoyle 220 SHELL Omala S4 WE 220 1 filler plug for size ≤ 64 2 filler/drain plugs for sizes 80, 81	WITHOUT OIL (except different statement on lubrication name plate) Filler plug with filter, valve, drain and level plug																									
Standards for eventual first filling	-	Before commissioning, fill to specified level, with synthetic oil type and ISO viscosity grade as follows: mineral oil: AGIP Blasia ARAL Degol BG BP Energol GR XP CASTROL Alpha SP FUCHS Renolin CLP KLÜBER Klüberoil GEM1 MOBIL Mobilgear 600 XP SHELL Omala S2 G TEXACO Meropa TOTAL Carter EP Polyalphaolephine based synthetic oil AGIP Blasia SX ARAL Degol PAS BP Enersys EPX CASTROL Alphasys EP FUCHS Renolin Unisys CLP KLÜBER Klübersynth GEM4 MOBIL SHC Gear SHELL Omala S4 GX TEXACO Pinnacle TOTAL Carter SH0																									
		ISO viscosity grade [cSt] <table border="1" style="display: inline-table; margin-right: 20px;"> <thead> <tr> <th>Speed n_2 min⁻¹</th> <th colspan="2">Ambient temperature 0 ÷ 20 °C¹⁾ 20 ÷ 40 °C¹⁾</th> </tr> </thead> <tbody> <tr> <td>> 224</td> <td>150</td> <td>150</td> </tr> <tr> <td>224 ÷ 22.4</td> <td>150</td> <td>220</td> </tr> <tr> <td>22.4 ÷ 5.6</td> <td>220</td> <td>320</td> </tr> <tr> <td>< 5.6</td> <td>320</td> <td>460</td> </tr> </tbody> </table> <table border="1" style="display: inline-table;"> <thead> <tr> <th>Speed n_2 min⁻¹</th> <th>Ambient temperature 0 ÷ 40 °C¹⁾</th> </tr> </thead> <tbody> <tr> <td>> 224</td> <td>150</td> </tr> <tr> <td>224 ÷ 22.4</td> <td>220</td> </tr> <tr> <td>22.4 ÷ 5.6</td> <td>320</td> </tr> <tr> <td>< 5.6</td> <td>460</td> </tr> </tbody> </table> <p><small>1) Peaks of 10 °C below and 10 °C above the ambient temperature range are acceptable.</small></p>	Speed n_2 min ⁻¹	Ambient temperature 0 ÷ 20 °C ¹⁾ 20 ÷ 40 °C ¹⁾		> 224	150	150	224 ÷ 22.4	150	220	22.4 ÷ 5.6	220	320	< 5.6	320	460	Speed n_2 min ⁻¹	Ambient temperature 0 ÷ 40 °C ¹⁾	> 224	150	224 ÷ 22.4	220	22.4 ÷ 5.6	320	< 5.6	460
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< 5.6	460																										
Lubrication interval and lubricant quantity	Lubrication «for life» (assuming external pollution-free environment).	<table border="1" style="display: inline-table; margin-right: 20px;"> <thead> <tr> <th>Oil temperature °C</th> <th>Lubrication interval h</th> </tr> </thead> <tbody> <tr> <td>≤ 65</td> <td>8 000</td> </tr> <tr> <td>65 ÷ 80</td> <td>4 000</td> </tr> <tr> <td>80 ÷ 95</td> <td>2 000</td> </tr> <tr> <td>95 ÷ 110¹⁾</td> <td>-</td> </tr> </tbody> </table> <table border="1" style="display: inline-table;"> <thead> <tr> <th>Oil temperature °C</th> <th>Lubrication interval h</th> </tr> </thead> <tbody> <tr> <td>≤ 65</td> <td>25 000</td> </tr> <tr> <td>65 ÷ 80</td> <td>18 000</td> </tr> <tr> <td>80 ÷ 95</td> <td>12 500</td> </tr> <tr> <td>95 ÷ 110¹⁾</td> <td>9 000</td> </tr> </tbody> </table> <p><small>1) Values valid for non continuous duties.</small></p> <p>An overall guide to oil-change interval is given in the table, and assumes pollution-free surroundings. Where heavy overloads are present, halve the values. Apart from running hours replace or regenerate synthetic oil at least each 5 ÷ 8 years according to gear reducer size and to operating and ambient conditions.</p> <p>The oil quantity is given by the level stated by the proper plug or an equivalent system (plug for flowing over level, plug with dipstick).</p>	Oil temperature °C	Lubrication interval h	≤ 65	8 000	65 ÷ 80	4 000	80 ÷ 95	2 000	95 ÷ 110 ¹⁾	-	Oil temperature °C	Lubrication interval h	≤ 65	25 000	65 ÷ 80	18 000	80 ÷ 95	12 500	95 ÷ 110 ¹⁾	9 000					
Oil temperature °C	Lubrication interval h																										
≤ 65	8 000																										
65 ÷ 80	4 000																										
80 ÷ 95	2 000																										
95 ÷ 110 ¹⁾	-																										
Oil temperature °C	Lubrication interval h																										
≤ 65	25 000																										
65 ÷ 80	18 000																										
80 ÷ 95	12 500																										
95 ÷ 110 ¹⁾	9 000																										

Grease-lubricated bearings:

lubrication is «for life» assuming uniform load and pollution-free environment. Otherwise replace the grease every year with running up to 12 h/d and every 6 months with running of 12 ÷ 24 h/d; in these occasions, re-lubricate the **backstop device** with grease SHELL Alvania RL2. Bearing should be filled with SHELL Gadus S2 V100 bearing-grease for ball bearings, KLÜBER STABURAGS NBU 8 EP for roller bearings.

In case of **labyrinth seal with greaser** apply, unless otherwise stated, KLÜBER STABURAGS NBU 8 EP (see ch. 11.4).

Attention! Refer to ch. 6.4 for bearings requiring greasing and contact Rossi in case of doubt.

6.3 - Oil level (quantity) for sizes 40 ... 81 supplied FILLED with OIL

Important! Verify mounting position keeping in mind that if gear reducer is installed in a mounting position which differs from the one indicated on the name plate, it could require the addition of the difference between the two quantities of lubricant corresponding to x dimension and stated in the following tables. Measure x dimension in fig. 6.2.1 (helical) and 6.2.2 (bevel helical), after eliminating potential residual air in the oil, inside the gear reducer.

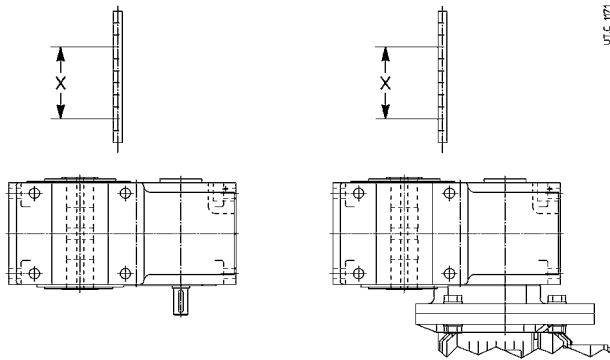


Fig. 6.2.1 - Position the helical gear reducer or gearmotor, mounting position V6 for oil level (quantity) measurement

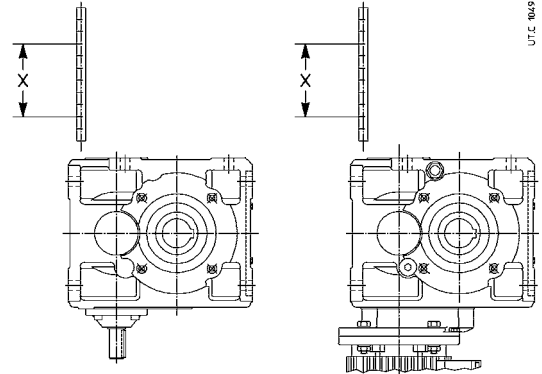


Fig. 6.2.2 - Position the bevel helical gear reducer or gearmotor, mounting position B7 for oil level (quantity) measurement

Tab. 6.1.1 - Oil level (X measurement) and quantity for HELICAL gear reducers and gearmotors sizes 40 ... 81

Size	Train of gears Mounting position																								
	Oil level (x ¹) measurement [mm] and quantity [l]																								
	I			2I				3I			4I														
	B3, B8	B7	B6, V5, V6 2)	B3, B8	B6		B7, V5, V6 2)	B3, B8	B6	B7, V5, V6 2) 3)	B3, B8	B6	B7, V5, V6 2) 3)												
mm	l	mm	l	mm	l	mm	l	mm	l	mm	l	mm	l	mm	l										
40	-	-	-	-	45	0,4	-	-	24	0,55	24	0,55	35	0,47	2	0,7	12	0,6	-	-	-	-			
50	-	-	-	-	60	0,6	25	0,9	30	0,8	30	0,8	45	0,7	5	1,05	15	1	-	-	-	-			
63, 64	80	0,7	65	0,8	46	1	60	0,9	42	1,4	48	1,2	48	1,2	58	1	40	1,5	B7: 50 1,3 V5: 50 1,4 V6: 50 1,3	58	1,1	40	1,8	50	1,4
80, 81	115	1,2	92	1,5	68	1,9	80	1,5	45	2,7	54	2,3	54	2,3	72	1,7	42	2,9	B7: 52 2,5 V5: 48 2,6 V6: 52 2,5	72	1,9	42	3,2	52	2,7

Tab. 6.1.2 - Oil level (X measurement) and quantity for BEVEL HELICAL gear reducers and gearmotors sizes 40 ... 81

Size	Train of gears Mounting position																					
	Oil level (x ¹) measurement [mm] and quantity [l]																					
	CI			ICI				C3I														
	B3, B6, B7 4)	B8	V5, V6 2)	B3	B6, B7 4)	B8	V5, V6 2)	B3, B7 4)	B6 5)	B8	V5, V6 2)											
mm	l	mm	l	mm	l	mm	l	mm	l	mm	l	mm	l	mm	l							
40	48	0,26	30	0,35	41	0,3	31	0,31	15	0,5	30	0,4	50	0,35	-	-	-	-	-	-	-	
50	48	0,4	30	0,6	50	0,45	50	0,45	15	0,8	30	0,65	54	0,5	50	0,5	15	0,9	30	0,7	54	0,55
63, 64	72	0,8	40	1	48	0,95	58	1	15	1,6	42	1,2	45	1,15	58	1,2	15	1,8	42	1,4	45	1,35
80, 81	90	1,3	50	2	56	1,8	90	1,6	25	2,7	48	2,2	56	2	90	1,9	25	3	48	2,5	56	2,3

1) Tolerance of dimension x: ± 5 mm for size ≤ 50; ± 10 for size ≥ 63.

2) For mounting positions V5 and V6 the upper bearings are greased.

3) The first reduction (the first 2 for 4I), mounting position V5, is lubricated with grease for life.

4) For design UO3D in mounting position B6 or B7 the bearings of upper bevel pinion are grease lubricated.

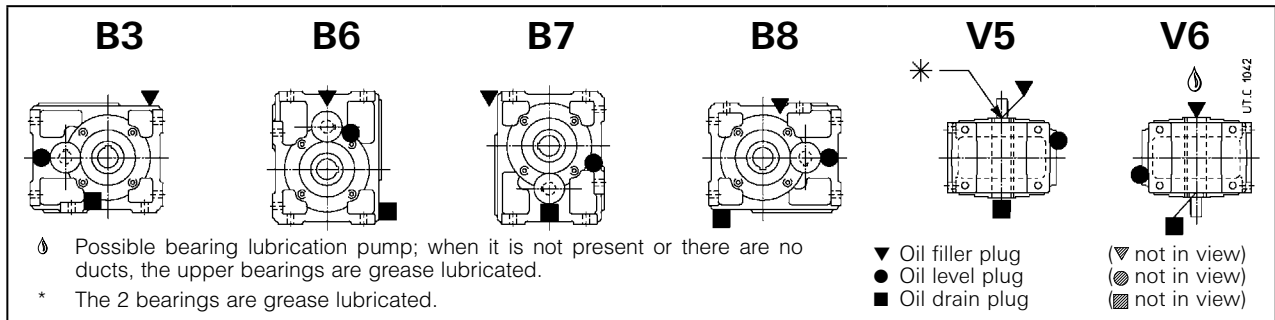
5) For C3I in mounting position B6, the bearing of the first gear pair (wheel side) is grease lubricated.

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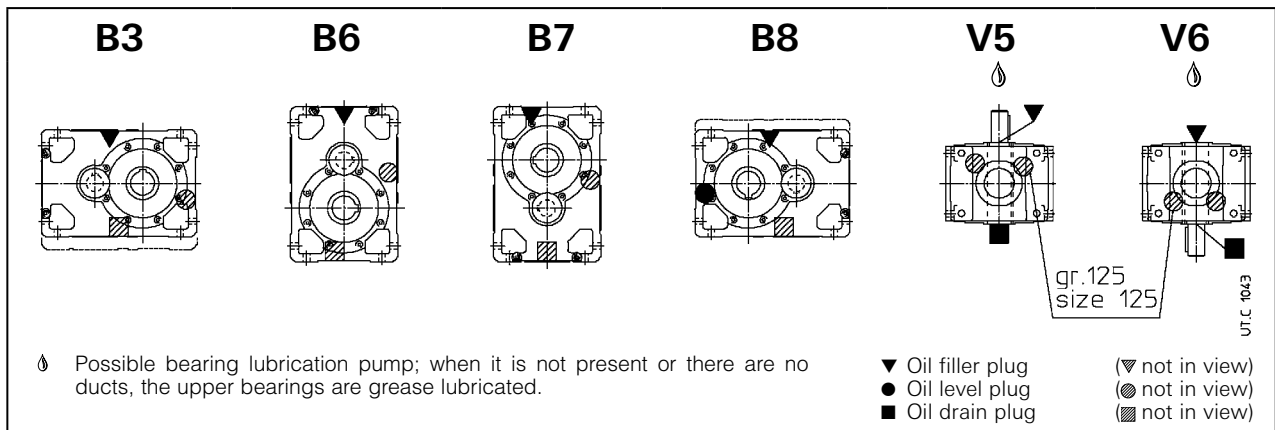
6.4 - Mounting positions and plug positions for sizes 100 ... 401 supplied WITHOUT OIL

Verify oil level through the level plug which is placed in the position indicated the following figures. For B7 mounting position the level is stated on the notched rod mounted on the filler plug.

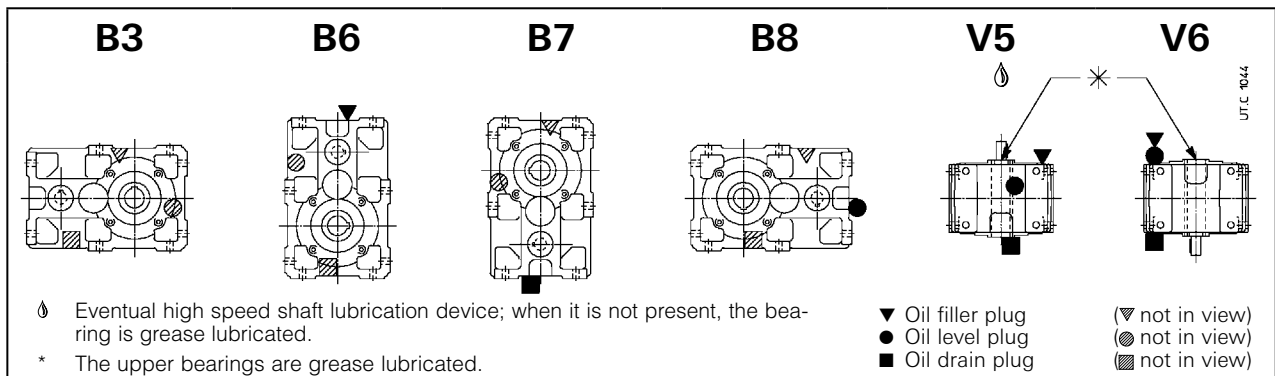
R I 100



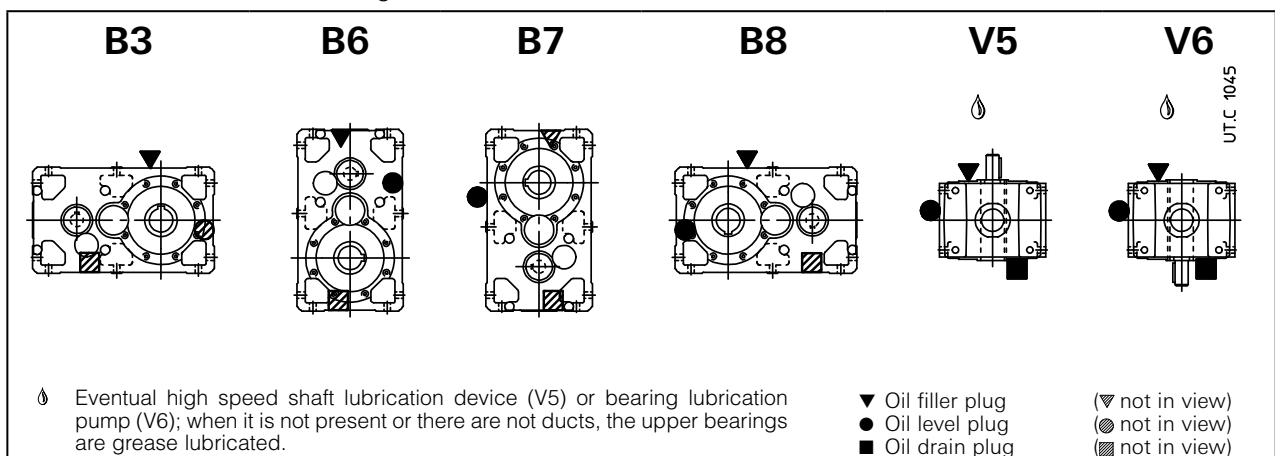
R I 125 ... 360



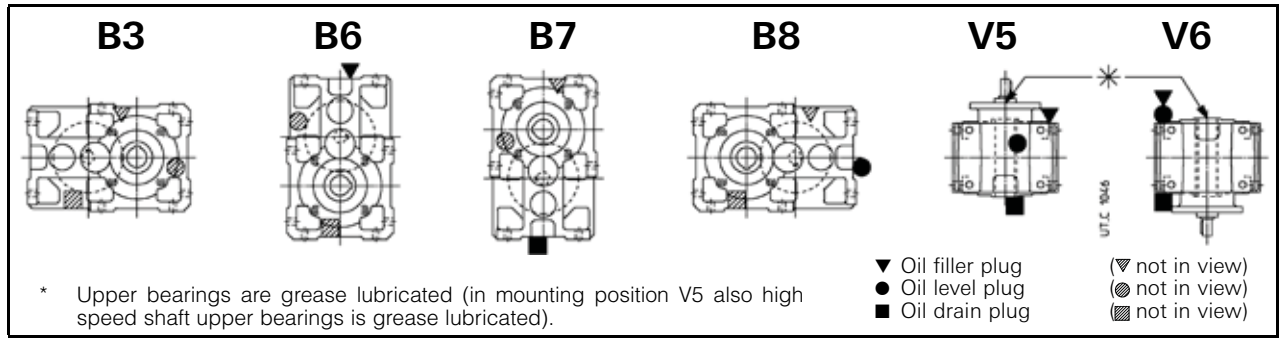
R 2I 100, 125 (valid for long model as well)



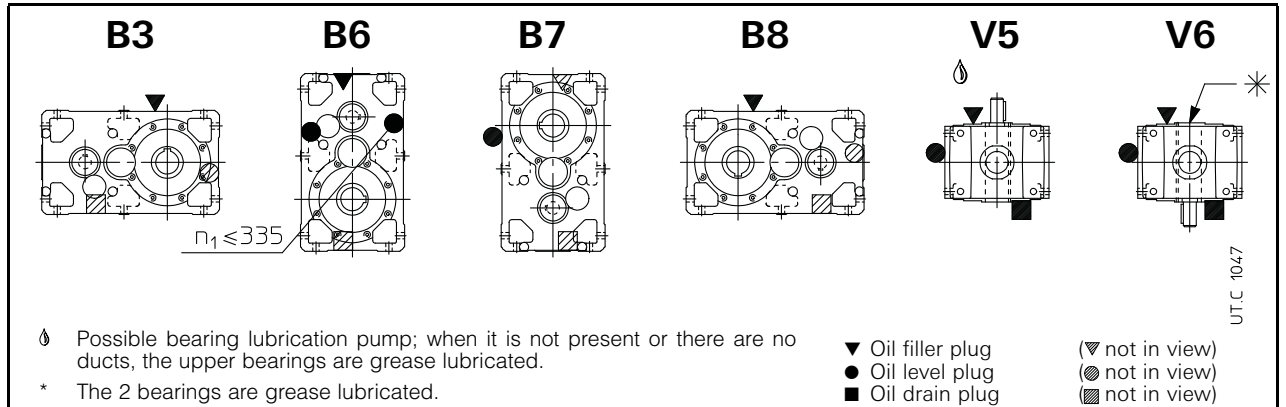
R 2I 140 ... 360 (valid for long model as well)



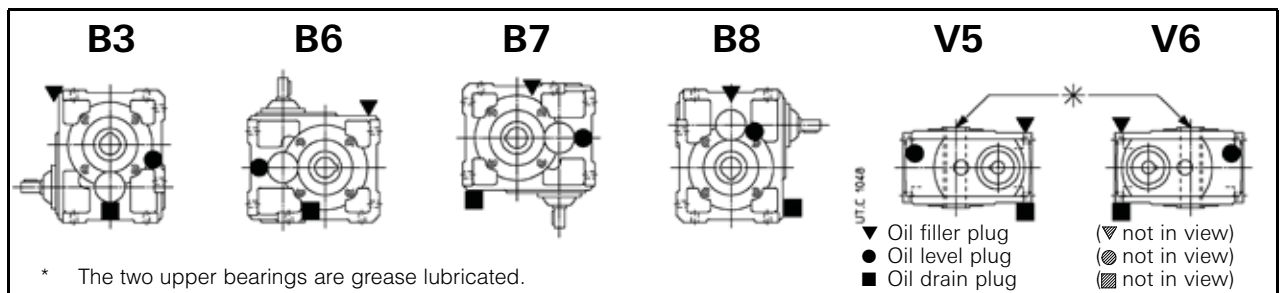
R 3I 100, 125



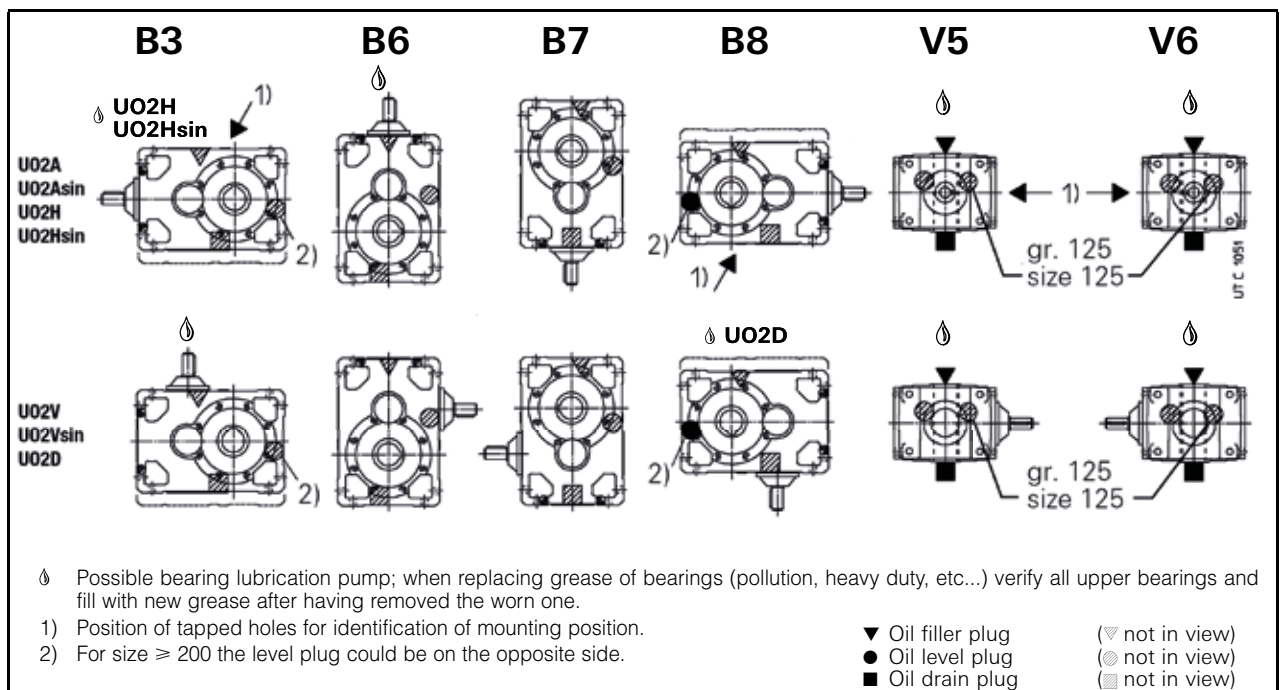
R 3I 140 ... 360 (valid for long model as well)



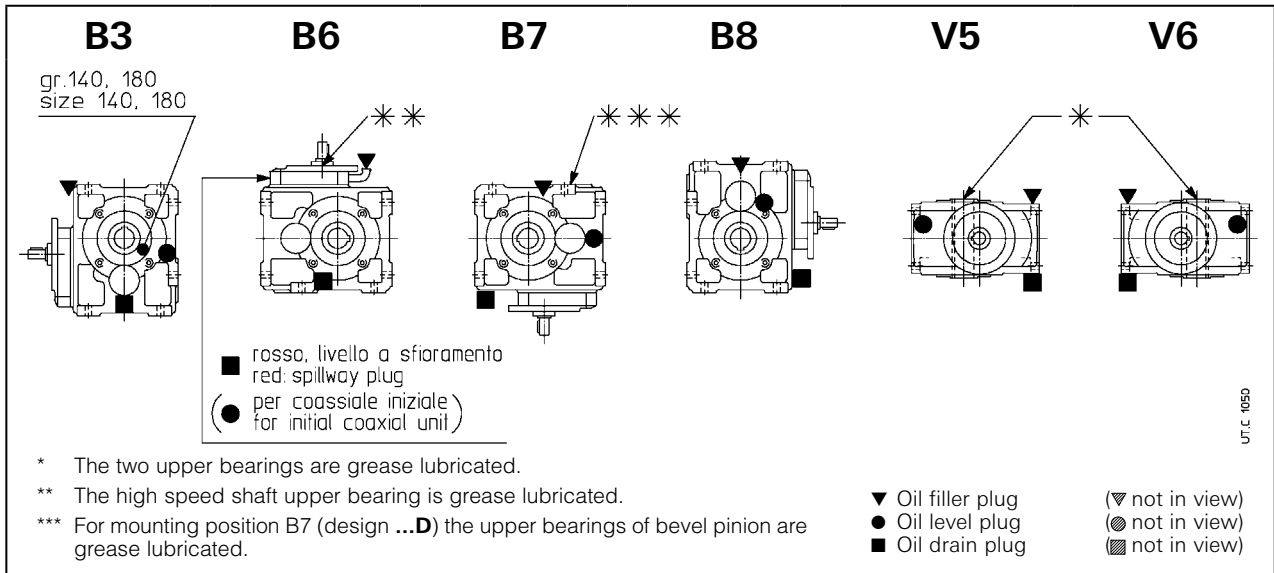
R CI 100



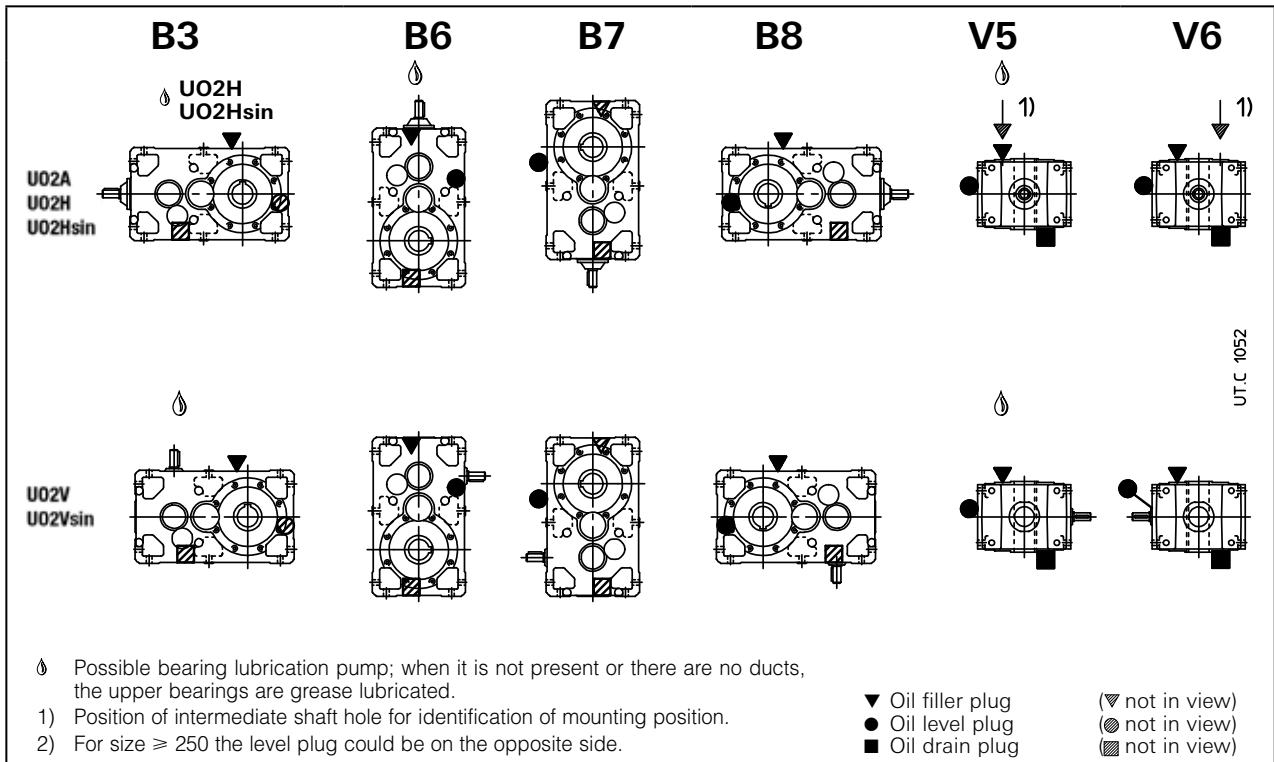
R CI 125 ... 360



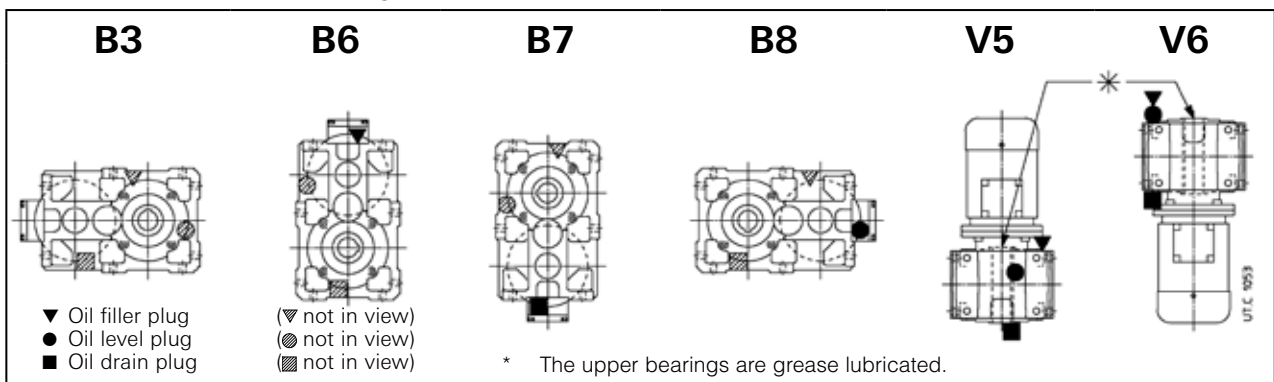
R ICI 100 ... 200



R C2I 140 ... 360



MR 2I 100, 125 (valid for long model as well)



MR 2I 140 ... 360 (valid for long model as well)

B3 **B6** **B7** **B8** **V5** **V6**

$n_1 \leq 335$

▽ Possible bearing lubrication pump; when it is not present or there are no ducts, the upper bearings are grease lubricated.

1) Oil filler plug possible also on opposite side.
2) Oil filler plug possible also on low speed shaft side.

▽ Oil filler plug (▽ not in view)
● Oil level plug (● not in view)
■ Oil drain plug (■ not in view)

U.T.C. 1054

MR 3I 100, 125 (valid for long model as well)

B3 **B6** **B7** **B8** **V5** **V6**

▽ Oil filler plug (▽ not in view)
● Oil level plug (● not in view)
■ Oil drain plug (■ not in view)

* The upper bearing are grease lubricated.

U.T.C. 1065A

MR 3I 140 ... 360 (valid for long model as well)

B3 **B6** **B7** **B8** **V5** **V6**

$n_1 \leq 335$

▽ Possible bearing lubrication pump; when it is not present or there are no ducts, the upper bearings are grease lubricated.

** For design **UP2D**, mounting position B6, $n_1 > 355 \text{ min}^{-1}$, the bearing of double extension high speed shaft end is grease lubricated.

1) Oil filler plug possible also on opposite side.
2) Oil filler plug possible also on low speed shaft side.

▽ Oil filler plug (▽ not in view)
● Oil level plug (● not in view)
■ Oil drain plug (■ not in view)

U.T.C. 1065

MR 4I 100, 125

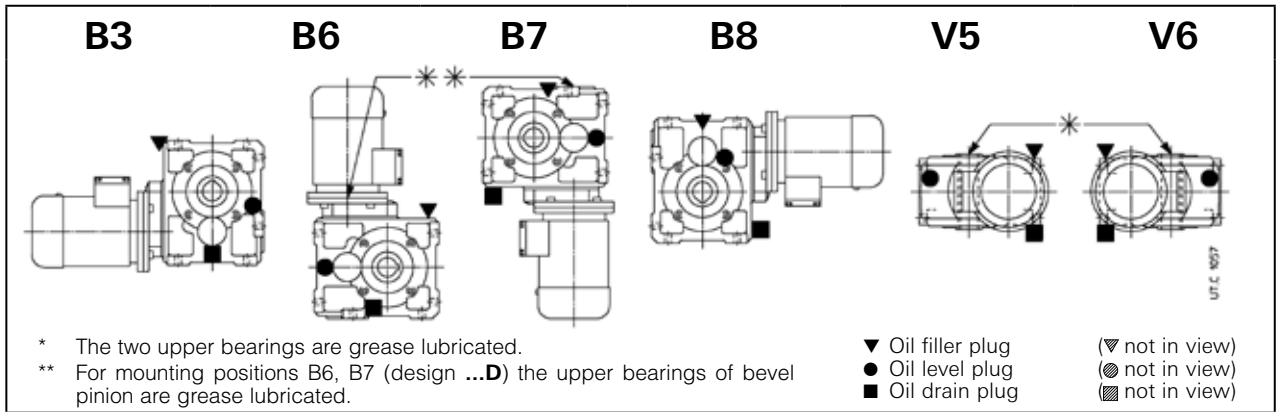
B3 **B6** **B7** **B8** **V5** **V6**

▽ Oil filler plug (▽ not in view)
● Oil level plug (● not in view)
■ Oil drain plug (■ not in view)

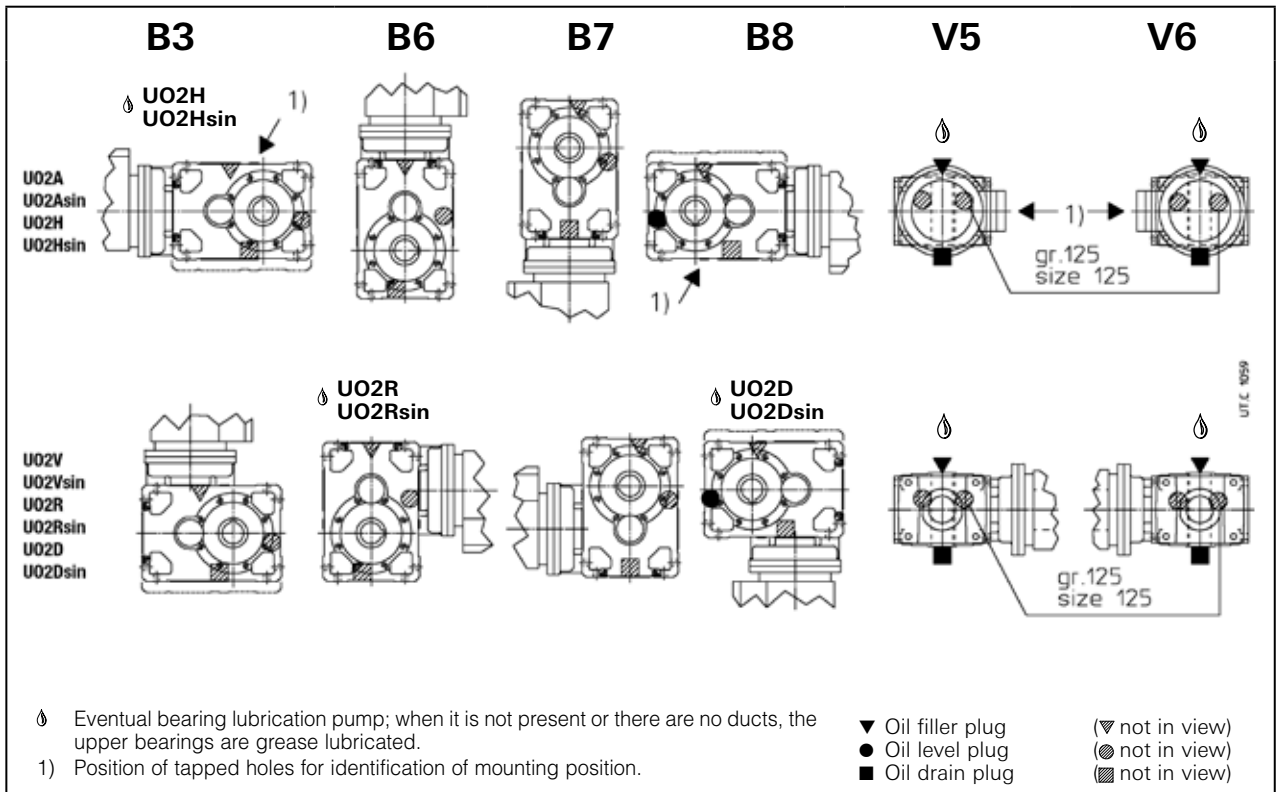
* The three upper bearings are greased.

U.T.C. 1065A

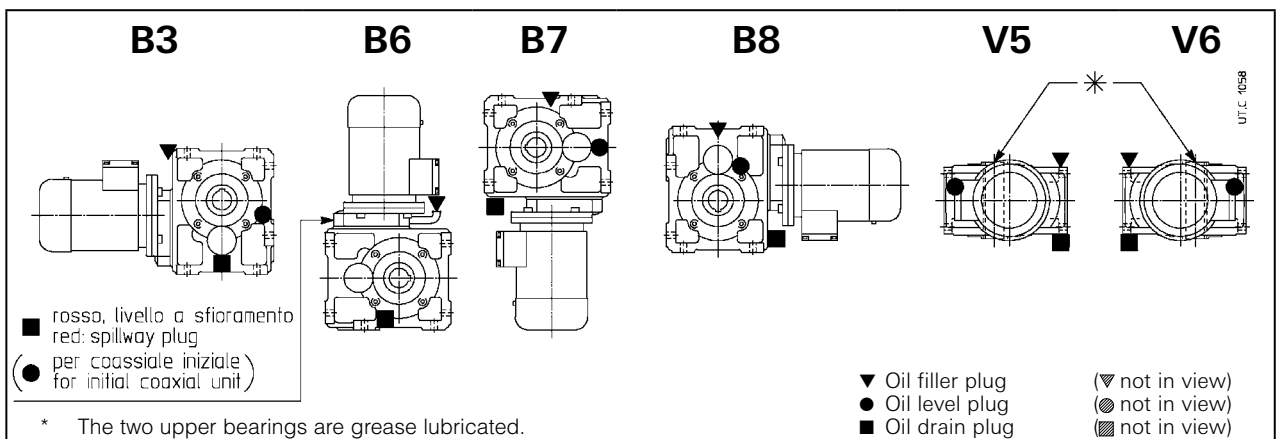
MR CI 100



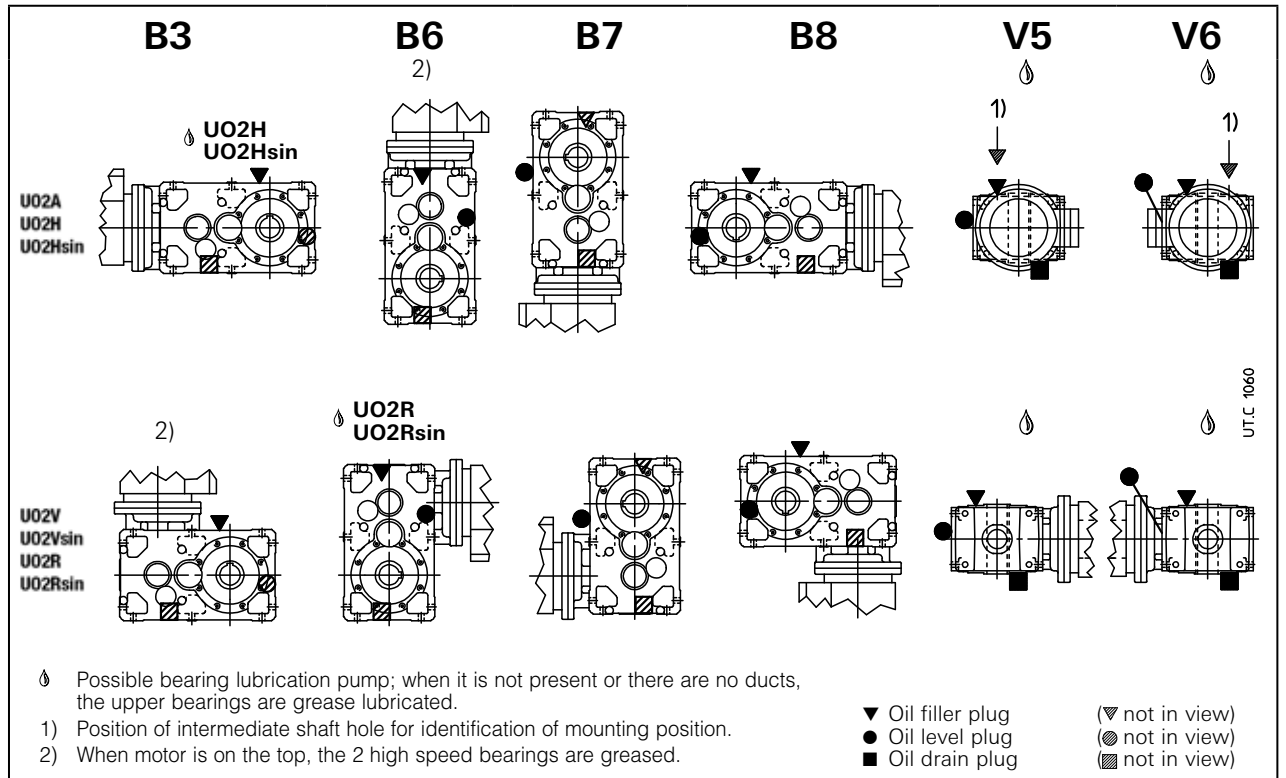
MR CI 125 ... 360



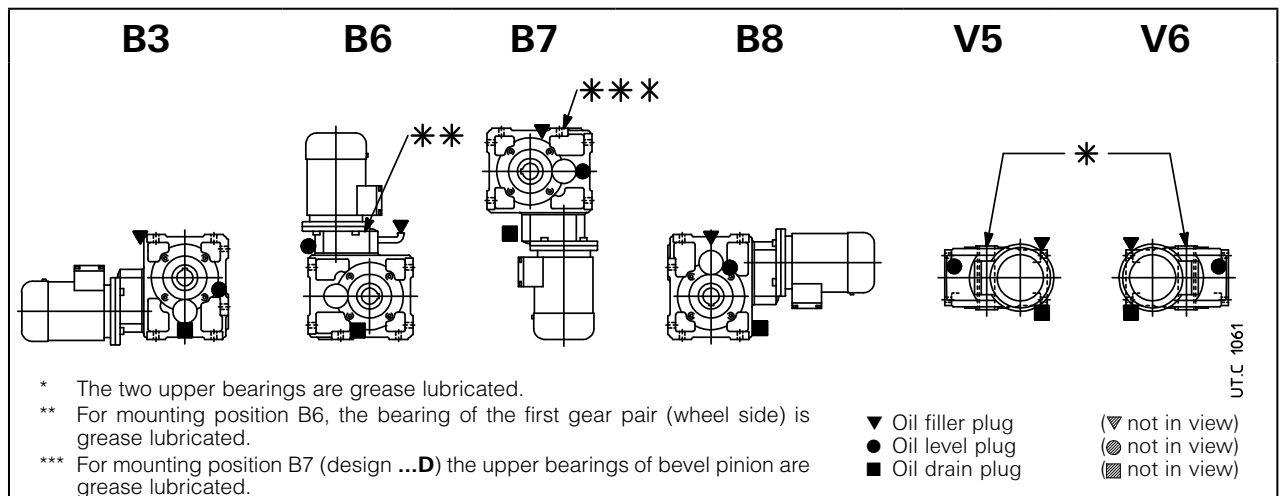
MR ICI 100 ... 200



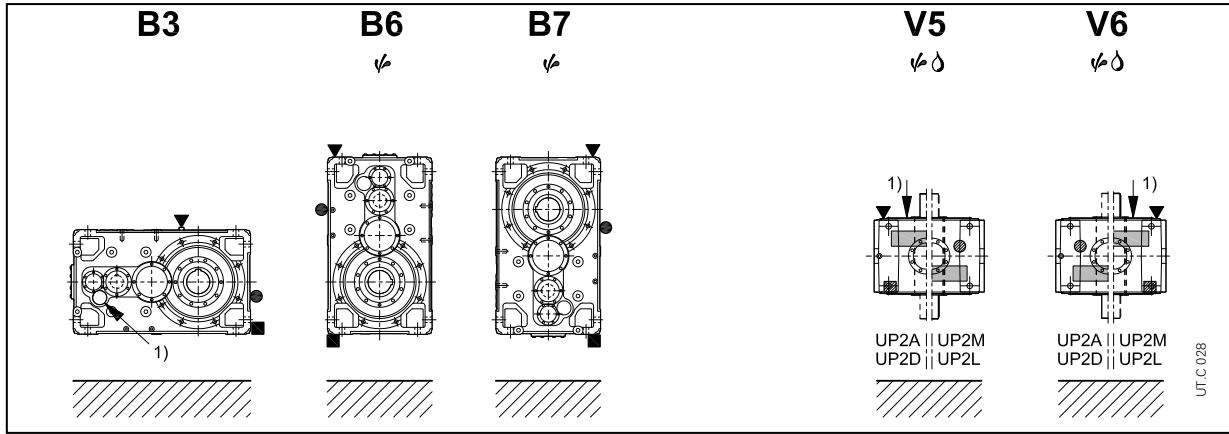
MR C2I 140 ... 360



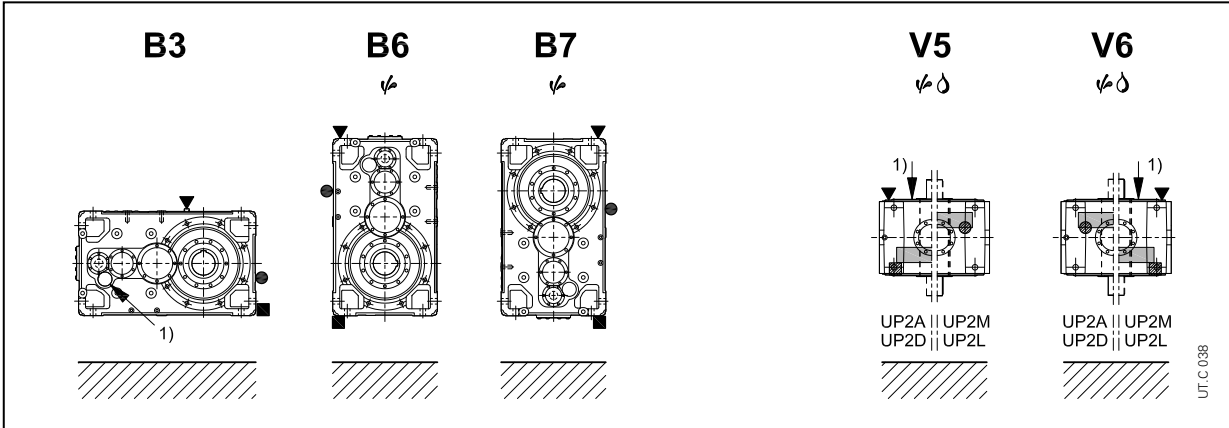
MR C3I 100, 125



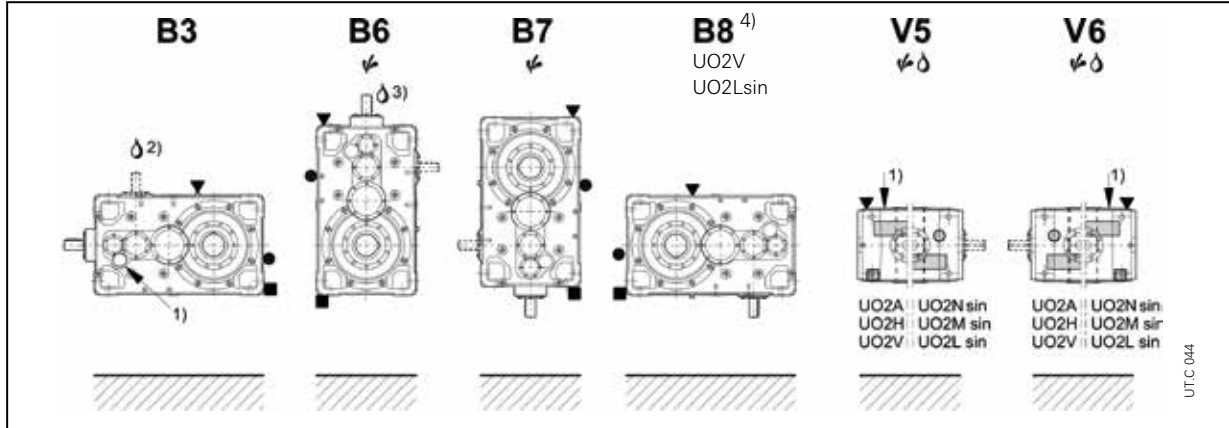
R 2I, 3I 400, 401



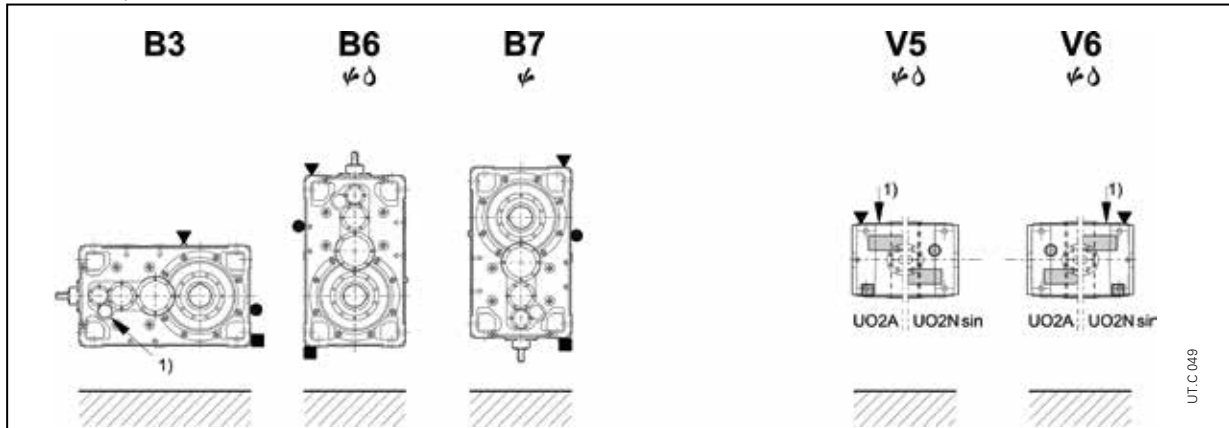
R 4I 400, 401



R C2I 400, 401



R C3I 400, 401



- ↙ Possible high oil splash: for the corrective factor ft_3 of nominal thermal power P_{tn} see ch. 22.
- ⚙ Possible bearing lubrication pump: consult us if need be.
- 1) Position of intermediate shaft for the mounting position identification; for mounting positions V5 and V6 it is possible to use the **position of low speed wheel** (s. also «Designs» on previous page).
- 2) ⚙ for designs UO2H, UO2M sin, UO2V, UO2L sin.
- 3) ⚙ for designs UO2A, UO2N sin, UO2H, UO2M sin.
- 4) Mounting position B8 available only for designs UO2V, UO2Lsin.

- ▼ Oil filler plug
- Oil level plug
- Oil drain plug
- ▼ Oil filler plug on opposite side (not in view)
- Oil level plug on opposite side (not in view)
- Oil drain plug on opposite side (not in view)

7 – Motor assembly and disassembly

7.1 - General

As all gearmotors are fitted with standardized motor, refer to following instructions, when mounting or replacing:

- be sure that the mating surfaces are machined under accuracy rating (IEC 60072-1);
- clean surfaces to be fitted thoroughly;
- in the event of a lowered keyway, replace the motor key with the one supplied with the gear reducer; if necessary, adjust its length to the motor shaft keyway; check the key so that between its top and the bottom of the hole keyway there is a backlash of 0,1 0,2 mm; in case of output shaft keyway, lock the key by pins;
- check that motor centering is in the relevant gear reducer flange seat;
- check that the length of the screws is enough to have 2 threads overhanging from the nut;
- tighten the motor fastening screws to gear reducer flange in order to achieve a tightening torque as per ch. 5.2.

7.2 - Gearmotors with motor keyed onto hollow high speed shaft of gear reducer

Helical gearmotors MR 2I, MR 3I 140 ... 360

Bevel helical gearmotors MR CI, MR C2I

- check that the fit-tolerance between hole and shaft end is G7/j6 for $D \leq 28$ mm, F7/k6 for $D \geq 38$ mm;
- apply a thread-braking seal type LOXEAL 23-18 the coupling surfaces in order to prevent contact oxydation;
- push the motor up to shoulder; **do not force the motor shaft inside the gear reducer: danger of severe injury;**
- tighten the motor fastening screws or nuts to gear reducer motor flange.



In presence of the **hub clamp** (helical gearmotors 2I, 3I with motor size ≥ 200) for the mounting proceed as follows:

- Turn the hub clamp until the fastening screw head is aligned with one of the access holes on gear reducers flange, after having removed the relevant closure plugs;
- do not modify the axial position of the hub clamp supplied from workshop, as this position is the excellent one in order to achieve the maximum tightening effect;
- tighten the motor fastening screws or nuts to gear reducer motor flange;
- complete the tightening of hub clamp with dynamometric wrench up to the tightening torque stated in the table; during this operation pay attention not to modify the axial position of hub clamp;
- screw again the closure plugs of access holes to gear reducer flange;

For the **disassembly** proceed as follows:

- acting on motor shaft rear end, whenever possible, or disconnecting the gear reducer from machine and acting on gear reducer low speed shaft (with brake motor the brake must be released), align the wrench hole with the tightening screw of hub clamp;
- loosen the tightening screw and consequently the hub clamp (taking care not to modify the axial position of hub clamp);
- unscrew the motor fastening screws of nuts to gear reducer flange;
- disassemble the motor.

Gear reducer size		Screw UNI 5931	<i>M_s</i> N m
2I	3I		
160 ... 225	200 ... 280	M12× 45 cl. 12.9	143
250... 360	320 ... 360	M12× 45 cl. 12.9 $\varnothing d \leq 75$ M14× 50 cl. 8.8 $\varnothing d = 80$	143 135

7.3 - Gearmotors with helical pinion keyed directly on motor shaft end

Helical gearmotors MR 3I 40 ... 125, MR 4I

Bevel helical gearmotors MR ICI, MR C3I

Coaxial gearmotors, coupled with helical and bevel helical gear reducers (combined units).

- check that the fit-tolerance between hole and shaft end is K6/j6 for $D \leq 28$ mm, J6/k6 for $D \geq 38$ mm;
- make sure that the motors have bearing location and overhang (dimension S see fig. 7.3.1) as stated in table 7.3.1.
- assemble on motor shaft, as follows:
 - the **spacer** pre-heated at **65 °C** sealing the motor shaft part with **locking adhesive type LOXEAL 58-14** and ensuring that keyway and motor shaft shoulder there is a ground helical section of at least 1,5 mm; pay attention **not to damage the external surface** of spacer;
 - the **key** in the keyway, taking care that a brief segment of at least 0,9 times the pinion width;
 - c) the pinion pre-heated at **80 – 100 °C**;
- the **axial fastening system** where foreseen (head self-locking screw with base, spacer, or hub clamp with one or more dowels, fig. 7.3.1a; for the cases foreseen **without axial fastening** (fig. 7.3.1b), seal with **locking adhesive type LOXEAL 58-14** also the motor shaft section below the **pinion**;
- in the event of axial fastening system with hub clamp and dowels, be sure that these ones do not overhang from spacer external surface: screw the dowel and matrix the motor shaft with a tip;
- grease the pinion teeth, the sealing ring rotary seat and the seal ring (with KLÜBER Petamo GHY 133N), and assemble carefully, **paying attention not to damage the seal ring lip due to accidental shock with the pinion toothing**.

Tab. 7.3.1 - Min mech. requirements for IEC motors

Size motor	Min dynamic load capacity N		Max dimension S mm
	Front	Rear	
63	4 500	3 350	16
71	6 300	4 750	18
80	9 000	6 700	20
90	13 200	10 000	22.5
100	20 000	15 000	25
112	25 000	19 000	28
132	35 500	26 500	33.5
160	47 500	33 500	37.5
180	63 000	45 000	40
200	80 000	56 000	45
225	100 000	71 000	47.5

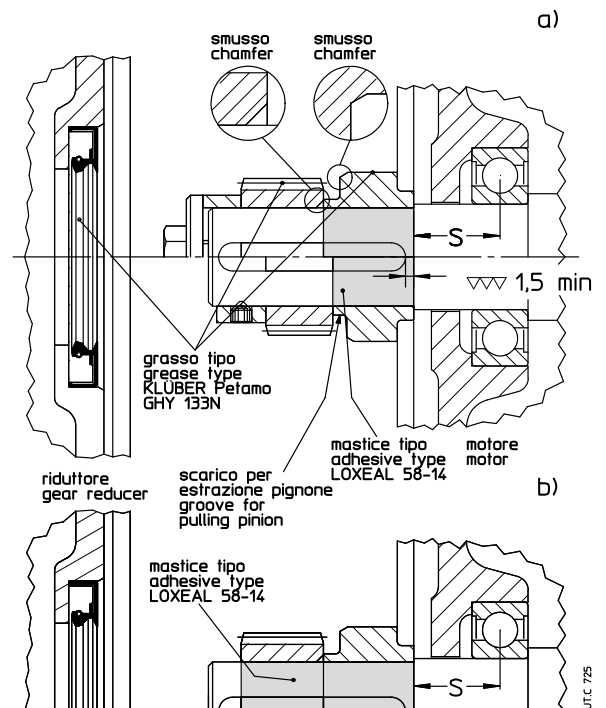


Fig. 7.3.1

7.4 - Maximum bending moment of flange MR

In case of assembly of motors supplied by the customer, verify that the static bending moment M_b generated by motor weight on the counter flange of gear reducer is lower than the value allowed M_{bmax} , stated in the table.

$$M_b \leq M_{bmax}$$

where:

$$M_b = G \cdot (X + HF) / 1000 \text{ [N m]}$$

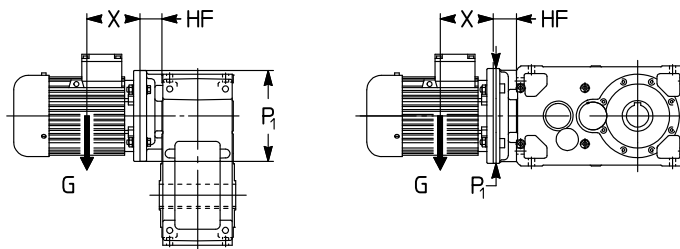
G [N] motor weight; almost equal numerically to motor mass, stated in kg, multiplied by 10.

X [mm] distance from motor center of gravity from flange surface.

HF [mm] supplied in table according to gear reducer size and flange diameter P_1 .

Very long and thin motors, though with bending moments lower than prescribed limits, may generate anomalous vibrations during the operation. In these cases it is necessary to foresee a proper additional motor support (see motor specific documentation).

In the dynamic applications where the garmotor is subject to translations, rotations or oscillations, some stresses exceeding the usually admissible ones can be generated (e.g. shaft mounting): consult us for the verification of specific case.



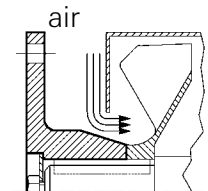
Bending torque M_{bmax} and dimension HF

Size	P_1 Ø	2I, 3I		4I		CI		ICI		C3I		C2I	
		HF mm	N m	HF mm	N m	HF mm	N m	HF mm	N m	HF mm	N m	mm	N m
40	140	28	28	-	-	31	63	31	63	-	-	-	-
	160	-	-	-	-	31	63	31	63	-	-	-	-
50	140	38	56	-	-	31	63	31	63	50	63	-	-
	160	30	56	-	-	31	63	31	63	50	63	-	-
	200	-	-	-	-	31	63	31	63	-	-	-	-
63, 64	140	31	63	51	63	-	-	-	-	-	-	-	-
	160	31	63	51	63	38	112	38	112	65	112	-	-
	200	31	112	-	-	38	112	38	112	65	112	-	-
80, 81	160	38	112	66	112	-	-	38	112	65	112	-	-
	200	38	200	66	112	38	200	38	112	65	112	-	-
	250	38	200	-	-	50	200	-	-	-	-	-	-
100	200	45	280	79	280	45	280	45	280	78	280	-	-
	250	45	-	-	-	45	450	45	280	-	-	-	-
	300	65	450	-	-	65	450	-	-	-	-	-	-
125	200	55	500	100	500	-	-	55	500	99	500	-	-
	250	55	500	100	500	-	-	55	500	99	500	-	-
	300	61	1 400	-	-	70	560	56	900	-	-	-	-
	350	75	1 400	-	-	100	900	-	-	-	-	-	-
140	200	-	-	-	-	-	-	55	500	-	-	-	-
	250	30	560	-	-	-	-	55	500	-	-	45 (30)	560
	300	55	560	-	-	70	560	56	900	-	-	70 (55)	-
	350	75	900	-	-	100	900	-	-	-	-	-	-
160, 180	250	50	1 250	-	-	-	-	67	710	-	-	55	180
	300	50	1 250	-	-	-	-	67	710	-	-	70 (50)	1 250
	350	75	1 250	-	-	102	1 250	80	1 120	-	-	100 (75)	1 250
	400	65	1 250	-	-	102	1 250	-	-	-	-	-	-
	450	95	2 000	-	-	132	1 250	-	-	-	-	-	-
200, 225	300	67	2 500	-	-	-	-	80	1 800	-	-	72	630
	350	67	2 500	-	-	100	2 500	80	1 800	-	-	102 (67)	2 500
	400	67	2 500	-	-	100	2 500	80	1 800	-	-	102 (67)	2 500
	450	97	2 500	-	-	130	2 500	90	1 800	-	-	132 (97)	2 500
	550	97	4 000	-	-	130	4 000	-	-	-	-	-	-
250, 280	350	65	4 500	-	-	-	-	-	-	-	-	100	1 400
	400	65	4 500	-	-	-	-	-	-	-	-	100 (45)	4 500
	450	95	4 500	-	-	130	4 500	-	-	-	-	130 (75)	4 500
	550	95	4 500	-	-	130	4 500	-	-	-	-	130 (75)	4 500
	660	115	4 750	-	-	160	4 750	-	-	-	-	-	-
320 ... 360	400	85	9 000	-	-	-	-	-	-	-	-	100	1 600
	450	85	9 000	-	-	-	-	-	-	-	-	130	2 800
	550	95	9 000	-	-	-	-	-	-	-	-	130 (65)	9 000
	660	115	9 000	-	-	-	-	-	-	-	-	160 (85)	9 000

8 - Cooling system

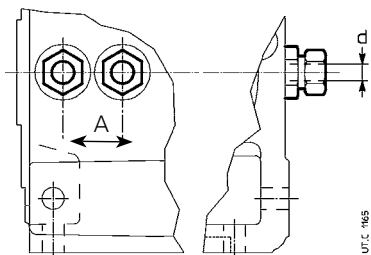
8.1 - Fan cooling

If there is fan on the gear reducer verify that there is sufficient space allowing for adequate circulation of cooling air also after fitting coupling protection. If a coupling protection is fitted (drilled case or wire netting), smooth, the coupling hub, if necessary.



8.2 - Cooling by coil or by internal heat exchanger

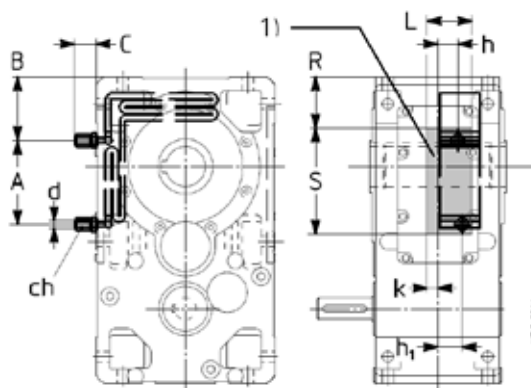
The presence of coil is given by water inlets (pipes DIN 2353) protruding from the housing or from the inspection cover as shown in the following figures.



Tab. 8.2.1 - Coil

Size gear reducer	d Ø	A ¹⁾ ≈	B ¹⁾ ≈	spanner
125 ... 180	12	40	40	22
200 ... 280	12	50	40	22
320 ... 360	16	60	45	30
400, 401	16	140	45	30

1) Values valid for B3 mounting position; consult us.



Tab. 8.2.2 - Internal heat exchanger

Size gear reducer	ft _{1b}			A ≈	B ≈	C	ch	d Ø	h	h ₁	K	L	R	S
	B3		B8											
140	1.7	1.9	1.8	30	81.5	54	22	12	32	19	16	68	60	130
160	2.12	2.36	2.24	0	102	54	22	12	20	46	16	86	77	177
180	2	2.24	2.12	0	102	54	22	12	21	47	15	86	77	177
200	2.24	2.5	2.36	190	152	25	22	12	41	41	14	75	105	263
225	2.12	2.36	2.12	190	152	25	22	12	41	41	14	75	105	263
250	2.36	2.65	2.5	180.5	170.5	25	22	12	50.5	50.5	18	100	125	311
280	2.24	2.5	2.36	180.5	170.5	25	22	12	54	54	15	100	125	311
320, 321	2.12	2.36	2.24	60	255	34	30	16	66	66	2	129	177	302
360	2	2.24	2.12	60	255	34	30	16	66	66	2	129	177	302
400, 401	contact Rossi S.p.A.													

1) Free area for pipe fastening and coil fastening devices.

Attention! Do not tamper with the eventual stop plate in order to keep the pipes locked; in particular keep the pipe locked while tightening the nut of connection pipe.

Unless specific indications given on the documentation attached to present instructions, **water** fed into the system must:

- be not too hard;
- be at max temperature +20 °C;
- capacity 10 ÷ 20 dm³/min;
- pressure 0,2 ÷ 0,4 MPa (2 ÷ 4 bar); the load loss of the coil, according to capacity and water pressure, is of 0,6 ÷ 0,8 bar for diameter d = 16 and 0,8 ÷ 1 for diameter d = 12.

Where ambient temperature may be less than 0 °C, make provision for water drain and compressed air inlet, so as to be able to empty out the coil completely and avoid freezing up.

The direction of flow of the cooling water is discretionary.

In case of too high water input pressure, install a safety valve balanced at a proper operating threshold.

The ends of the cooling coil protruding from the gear reducer must not be damaged (bent, dented, obstructed) as this can prejudice the correct flow of water for cooling or result in leaks. Before connecting the coil to the pipe fittings used for feeding and draining of the cooling water, first rinse to clear out any possible obstructions.

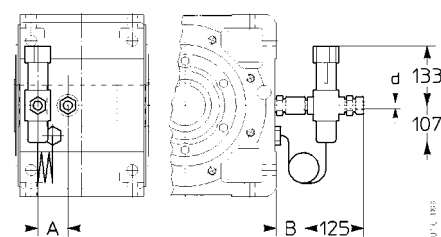
For the connection it is sufficient to use a smooth metallic tube having a d external diameter as per table.

The **thermostatic valve** permits to have water circulation automatically and without auxiliary supply need, when gear reducer oil reaches the set temperature. The valve sensor is equipped with immersion bulb. Mounting and setting, adjustable within +50 ÷ +90 °C, must be mounted during the assembly. For the setting use the control knob on valve head.

For ambient temperature lower than 0 °C consult us.

Setting values advised for operating temperature: +50 ÷ +65 °C.

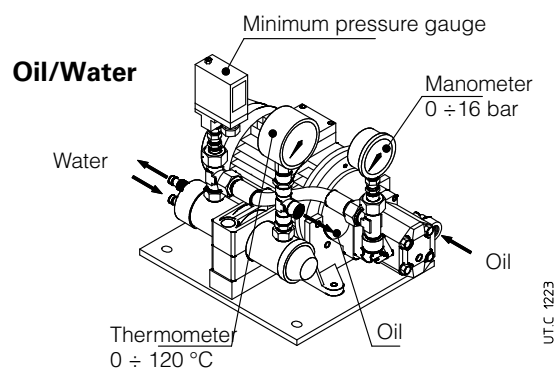
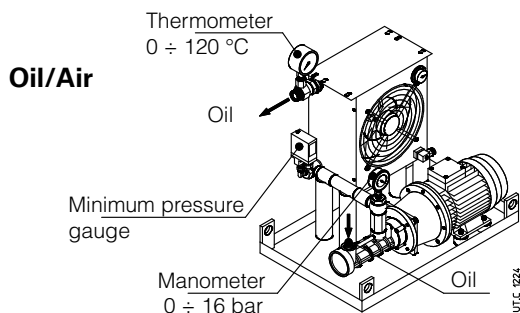
Attention! It is necessary to protect the thermostatic valve from any shock or stroke.



Thermostatic valve

8.3 - Independent cooling unit

Additional cooling device in the event that the other forced cooling systems are not sufficient anymore for the dissipation of thermal power produced by gear reducer during operation.



Including:

- a **oil/air heat exchanger** (O/A; with thermostat and adjustable control knob 0 ÷ 90 °C) or **oil/water heat exchanger** (O/W),
- one **motor pump**: screw pump with fluoro rubber seals (gear pump for UR O/W4 ÷ UR O/W 21); 4 pole motor B3/B5 (three-phase Δ230 Y400 V 50 Hz); motor-pump connection with coupling;
- one **motor fan** (O/A) (three-phase supply Δ230 Y400 V 50 Hz or single phase supply 230 V 50, 60 Hz, see table on following page); 2 poles motor (UR O/A 5 and 7) and 4 poles motor (UR O/A 10 ... 46);
- one **analog manometer** (0 ÷ 16 bar) mounted between pump and exchanger;
- one **analog thermometer** (0 ÷ 120 °C) mounted at exchanger output;
- one **minimum pressure gauge** (with exchange contacts) mounted between pump and exchanger;
- one **supporting frame** with nameplate.

On request, several accessories are at disposal (supplied separately, assembly is Customer's responsibility) in order to satisfy all functionality and safety needs.

- **oil temperature probe Pt100**;
- **2-threshold signalling device CT03** (necessary also the oil temperature probe Pt100) for the mounting on rail to DIN EN 50022;
- **3-threshold signalling device CT10** (necessary also the oil temperature probe Pt100) for the mounting on rail to DIN EN 50022;
- **bi-metal type thermostat**;
- **flow gauge**;
- «**filter**» (with optical-electric blockage warning and one or two filters)

Connections realized by flexible pipes (type SAE 100 R1, maximum length 2 m) between gear reducer and cooling unit and the assembly of accessories and signalling devices are Buyer's responsibility.

Operating features - UR O/A ...

Designation	Ps kW	Exchanger	Oil motor pump		Motor fan		Oil connections		Exch. capacity dm ³	Mass kg
			motor 3~ kW	load dm ³ /min	motor kW	load m ³ /h	Intake	Delivery		
UR O/A 5	5	AP 300E	1,5	30	0,12	1~	900	1" (1"1/4) ²⁾	2	60
UR O/A 7	7	AP 300/2E	1,5	30	0,12	1~	1300		3,6	65
UR O/A 10	10	AP 430E	1,5	30	0,21	3~	2750		3,6	70
UR O/A 13	13	AP 430/2E	1,5	30	0,18	3~	2700		5,5	75
UR O/A 16	16	AP 580 EB	2,2	56	0,18	3~	3500		15	96
UR O/A 21	21	AP 680 EB	2,2	56	0,69	3~	6300	1" 1/4	16	118
UR O/A 26	26	AP 730 EB	2,2	56	0,69	3~	7450		16	127
UR O/A 30	30	AP 730 EB	3	80	0,69	3~	7450		16	127
UR O/A 40	40	AP 830 EB	2,2	56	0,81	3~	9500		20	140
UR O/A 46	46	AP 830 EB	3	80	0,81	3~	9500		20	140

Designation	Ps kW	Exchanger	Oil motor pump		Water		Oil connections		Exch. capacity dm ³	Mass kg
			motor 3~ kW	load dm ³ /min	load dm ³ /min	connect.	Intake	Delivery		
UR O/W 4	4	T60CB1	0,37	16	≥ 8 (≤ 30)	Ø 12	G 1/2"	G 1/2"	0,4	13
UR O/W 6	6	T60CB2	0,37	16	≥ 10 (≤ 30)	Ø 12	G 1/2"	G 1/2"	0,6	15
UR O/W 9	9	T80CB2	0,55	16	≥ 16 (≤ 30)	Ø 12	G 1/2"	G 1/2"	1	18
UR O/W 13	13	MS84P2	1,1	30	≥ 25 (≤ 45)	G 1/2"	G 3/4"	G 3/4"	1	31
UR O/W 21	21	MS134P1	1,5	30	≥ 40 (≤ 110)	G 1"	G 3/4"	G 3/4"	3	44
UR O/W 31	31	MS134P1	2,2	56	≥ 50 (≤ 110)	G 1"	G 1"1/4	G 1"1/4	3	55
UR O/W 50	50	MS134P2	3	80	≥ 80 (≤ 110)	G 1"	G 1"1/4	G 1"1/4	4,5	70

1) Connection for delivery of UR O/A 16.

2) Connection for the delivery in presence of filter.

Starting mode and necessary accessories

Ref.	Gear reducer lubrication system	Types of gear reducer starting	T_{amb} °C	Necessary accessories	Type of requested oil	Description and notes
A1	Oil splash lubrication	Without oil pre-heating	0 ÷ 25	Pt100 + CT10	Mineral oil or synthetic oil (preferable)	Gear reducer starting and following hot oil motor pump starting The motor pump is piloted by a three threshold oil temperature signalling system (Pt100 + CT10). Balance the three threshold device CT10 with: – switching threshold at 60 °C (motor pump starting); – reset threshold at 40 °C; – safety threshold at 90 °C.
A2	Oil splash lubrication	Without oil pre-heating	> 25	–	Polyalphaolephine based synthetic oil	Simultaneous starting of gear reducer and motor pump Oil filter not possible ²⁾ .
B1	Forced lubrication (bearings and/or gears)	With oil pre-heating	0 ÷ 25	Pt100 + CT03 Pt100 + CT10 heater	Mineral oil or synthetic oil (preferable)	Simultaneous starting of gear reducer and motor pump after oil pre-heating¹⁾ The heater is piloted by the two threshold oil temperature signalling system (Pt100 + CT03). The gear reducer motor pump and motor are piloted by a further three threshold oil temperature signalling system (Pt100 + CT10). Balance the two threshold device CT03 with: – switching threshold at 50 °C (heater power supply shut off); – reset threshold at 30 °C. Balance the three threshold device CT10 with: – switching threshold at 30 °C (motor pump and gear reducer starting); – reset threshold at 10 °C; – safety threshold at 90 °C.
B2	Forced lubrication (bearings and/or gears)	Without oil pre-heating	> 25	–	Polyalphaolephine based synthetic oil	Simultaneous starting of gear reducer and motor pump¹⁾ Oil filter not possible ²⁾ .

1) It is advisable to delay the starting of gear reducer compared with the motor pump starting by approx. 1 min.

2) The presence of oil filter requires that the cooling unit starting is given with hot oil: refer to cases A1 or B1.

9 - Accessories

9.1 - Heater

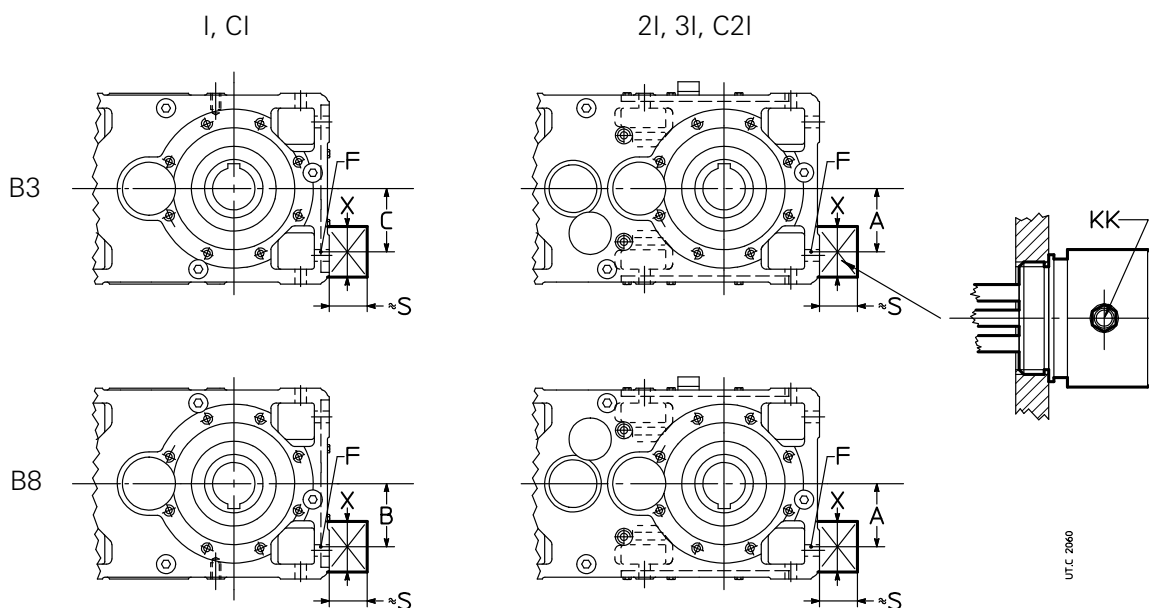
Oil heater for gear reducer starting at low ambient temperature.

The heater is piloted through proper control device releasing when achieving the pre-set oil temperature.

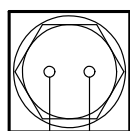
IMPORTANT. The data stated in the table refer to **mounting positions B3** and **B8** only; for other mounting positions, consult us.

Features:

- specific power $2W/cm^2$;
- single phase supply 230 V 50-60 Hz or three-phase $\Delta 230 Y400 V$ 50-60 Hz (see table);
- stainless steel resistors AISI 321;
- metallic terminal box; cable gland protection IP 65;
- Horizontal mounting with oil bath lubrication;
- max oil temperature $90\text{ }^\circ\text{C}$;
- threaded brass joint.

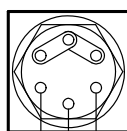


Gear reducer size	A	B	C	F	S ≈	X ≈	P W	KK	Supply
125	85	85	85	G 1"	85	85	300	Pg 11	1~ 230 V 50-60 Hz
140	100	85	100				600		
160	150	114	114	G 1" 1/4	90		900	Pg 13	3~ $\Delta 230 Y400 V$ 50-60 Hz
180		100	125				1500		
200	200	146	146	G 2"			2100		
225		140	155						
250	250	170	170						
280		170	235						
320, 321	340	235	235						
360		222	318						
400, 401		-	-						



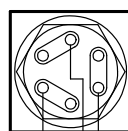
L N

Single-phase connection



L1 L2 L3

Three-phase connection Y



L1 L2 L3

Three-phase connection Δ

UTD.C.2111

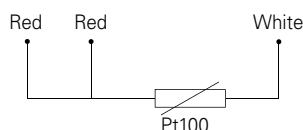
9.2 - Oil temperature probe

Remote oil temperature gauge; installation instead of drain plug, or into a hole properly pre-arranged by the Buyer. The temperature probe is realized with a thermo-resistor Pt100.

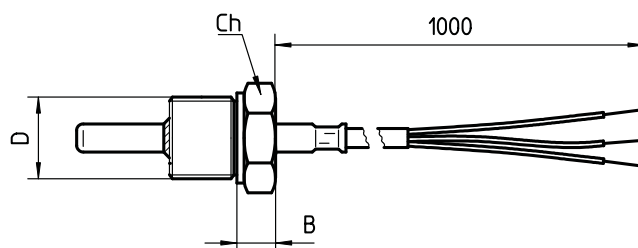
Features:

- platinum wire with 100Ω at $0 \text{ }^\circ\text{C}$ according to EN 60751;
- precision class B according to EN 60751;
- operation temperature field $-40 \text{ }^\circ\text{C} \div 200 \text{ }^\circ\text{C}$;
- max current 3 mA
- 3 wire connection according to IEC 751 (see Fig. below);
- stainless steel probe AISI 316; diameter 6 mm;
- cable 1 m long with free end.

For the connection of probe to relevant controlling device use a protected section cable $\geq 1,5 \text{ mm}^2$ positioned separately from power cables.



Gear reducer size	B	Ch (key)	D
125, 140	8	22	G 1/2"
160 ... 280	10	32	G 3/4"
320 ... 401	15	36	G 1"



UTC 2003

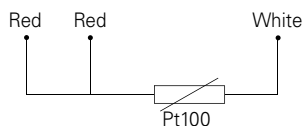
9.3 - Oil temperature probe with terminal box and amperometric transducer

Remote oil temperature gauge, with terminal box and amperometric transducer; installation instead of drain plug, at Buyer's responsibility. The temperature gauge is realized with a thermo-resistor Pt100.

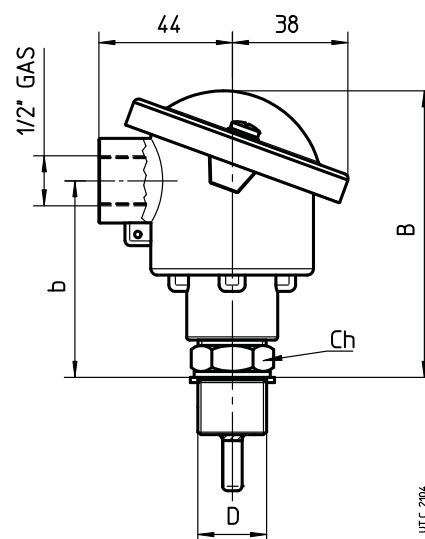
Features:

- platinum wire with 100Ω at $0 \text{ }^\circ\text{C}$ according to EN 60751;
- precision class B according to EN 60751;
- operation temperature field $-40 \text{ }^\circ\text{C} \div 200 \text{ }^\circ\text{C}$;
- 3 wire connection according to IEC 751 (see fig. below);
- stainless steel probe AISI 316; diameter 6 mm;
- amperometric transducer with output signal $4 \div 20 \text{ mA}$;
- aluminium terminal block (supplied without cable gland);
- protection IP65;
- input cables G 1/2";

For the connection of probe to relevant signalling device, use a protected section cable $\geq 1,5 \text{ mm}^2$ positioned separately from power cables.



Gear reducer size	B	Ch (key)	b	D
125, 140	90	24	60	G 1/2"
160 ... 280	92	32	62	G 3/4"
320 ... 401	97	36	67	G 1"



UTC 2004

9.4 - Bearing temperature probe

Probe for the remote bearing temperature measurement; installation into a threaded hole, properly pre-arranged by the Buyer next to a bearing to be monitored.

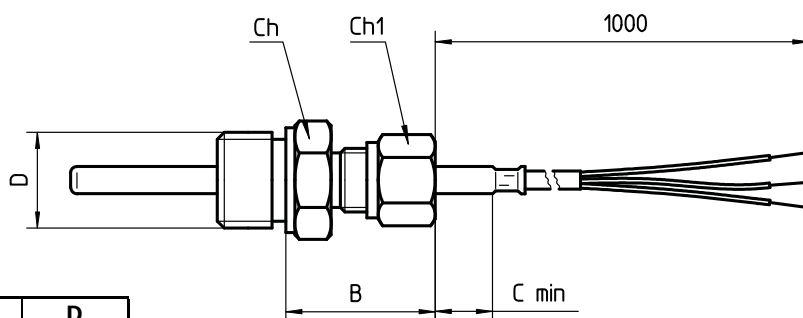
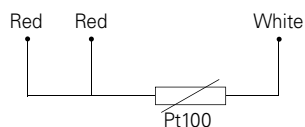
Using the sliding file, set the position so that the contact between probe and bearing external surface is guaranteed.

The temperature gauge is realized with a thermo-resistor Pt100.

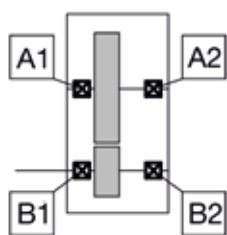
Features:

- platinum wire with 100 Ω at 0 °C according to EN 60751;
- precision class B according to EN 60751;
- operation temperature field -40 °C ÷ 200 °C;
- max current 40 mA
- 3 wire connection according to IEC 751 (see Fig. below);
- stainless steel AISI 316 **flat** probe; diameter 6 mm;

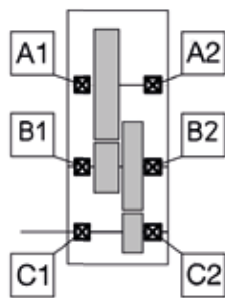
For the connection of probe to relevant signalling device use a protected section cable $\geq 1,5 \text{ mm}^2$ positioned separately from power cables.



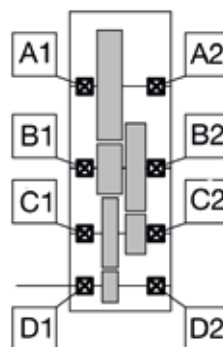
Gear reducer size	C _{min}	B	Ch (key)	Ch1 (key)	D
125 ... 401	5	32	24	17	G 1/2"



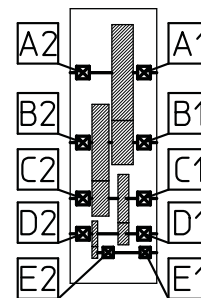
I ... UP2A



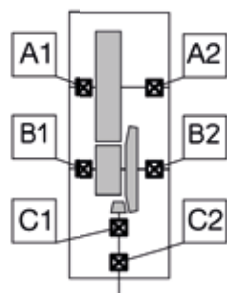
2I ... UP2A



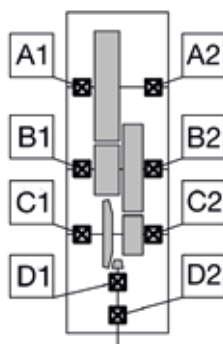
3I ... UP2A



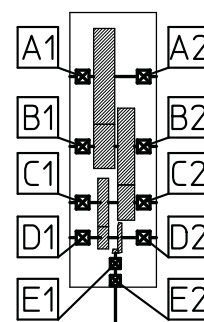
4I ... UP2A



CI ... UO2A (UO2V)



C2I ... UO2A (UO2V)



C3I ... UO2A

9.5 - Bearing temperature probe with terminal box and amperometric transducer

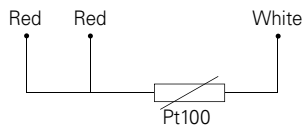
Probe for remote bearing temperature monitoring, with terminal box and amperometric transducer, installation (at Buyer's responsibility) in a threaded hole properly pre-arranged next to a bearing to be monitored. Using the sliding file, set the position so that the contact between probe and bearing external surface is guaranteed.

The temperature gauge is realized with a thermo-resistor Pt100.

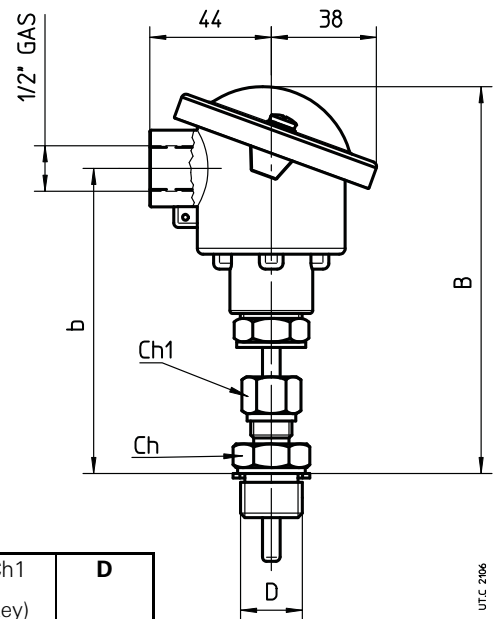
Features:

- platinum wire with 100Ω at 0°C according to EN 60751;
- precision class B according to EN 60751;
- operation temperature field $-40^\circ\text{C} \div 200^\circ\text{C}$;
- 3 wire connection according to IEC 751 (see Fig. below);
- amperometric transducer with output signal $4 \div 20 \text{ mA}$;
- alluminium terminal block (supplied without cable gland);
- IP65 protection;
- input cables G $1/2''$;
- stainless steel AISI 316 flat probe; diameter 6 mm;
- **sliding** stainless steel .

For the connection of probe to relevant signalling device use a protected section cable $\geq 1,5 \text{ mm}^2$ positioned separately from power cables.



Gear reducer size	B	b	Ch (key)	Ch1 (key)	D
125 ... 401	134	104	24	17	G $1/2''$



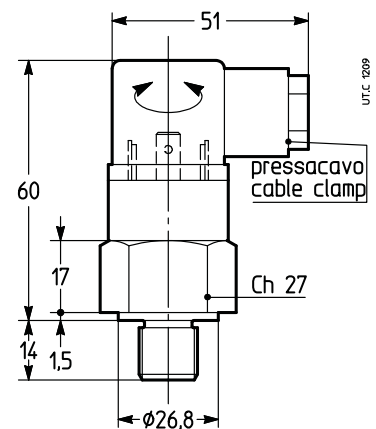
9.6 - Bi-metal type thermostat

Bi-metal type thermostat for the control of the maximum admissible oil temperature.

Features:

- NC contact with maximum alternate current 10 A 240 V a.c. (5 A - 24 V d.c.);
- G $1/2''$ thread connection;
- Pg 09 DIN 43650 cable gland;
- IP65 protection;
- Setting temperature $90^\circ\text{C} \pm 5^\circ\text{C}$ (other setting temperatures are possible, on request);
- differential temperature 15°C .

Mounting into a threaded plug with oil-bath lubrication prearranged according to mounting position and fastening, at Buyer's responsibility.



9.7 - Oil level switch with float

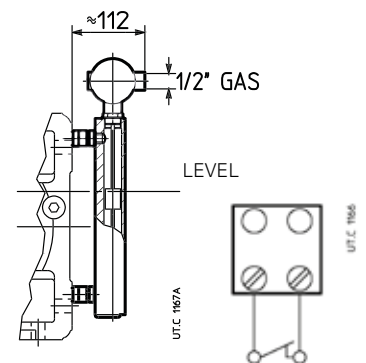
It is a level control device with reed contacts in a supporting stem moved by the magnetic field activated by the magnets included in the float.

Connecting features:

- 2 wires connection;
- maximum voltage: 350 V;
- maximum current: 1,5 A;
- 1 cable input $1/2''$ UNI 6125 - IP65;
- G $1''$ brass joint.

The switch is supplied ready for use; when level goes down approx 5 mm, the switch goes on and contact opens.

When filling oil in the gear reducer it is necessary to verify that device is properly calibrated. If any problems occur during this operation contact Rossi.

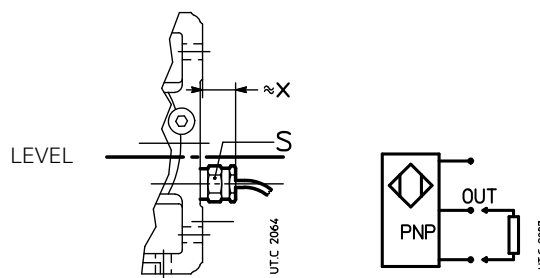


9.8 - Oil optical probe

Optical scanner, without mobile parts, for the constant control of oil level, inside the gear reducer at rest (e.g. control before starting the machine or the plant).

Features:

- Stainless steel probe.
- operation temperature field $-40\text{ °C} \div 125\text{ °C}$;
- d.c. supply $12 \div 28\text{ V}$ (other types on request; consult us);
- PNP output (other types on request, consult us), max 100 mA;
- male coupling G 3/8", G 1/2", G 3/4", G 1" according to gear reducer size.



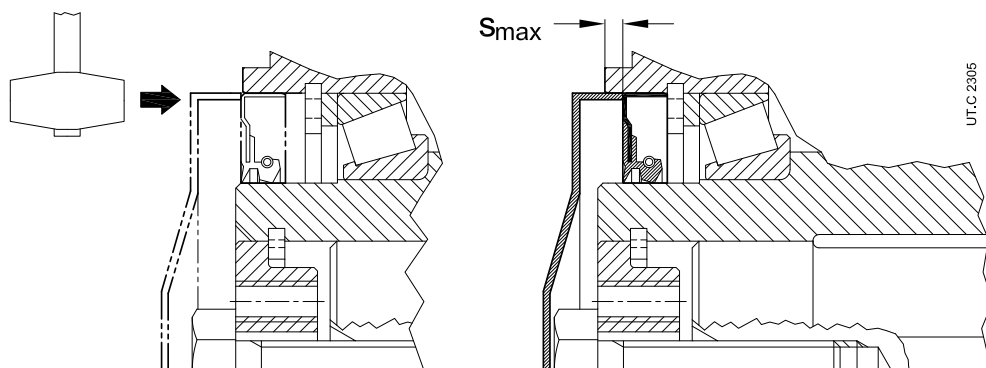
9.9 - Hollow low speed shaft protection cap

Size	63	64	80	81	100	125	140	160
s_{max}	2	3	6	6	7	9	9	11

For sizes 63 ... 160, the hollow low speed shaft protection cap has to be keyed into seal ring seat that, for this reason, must be pushed towards gear reducer inside for the maximum depth stated in the table.

For this operation use the protection cap as a tool, hammering it carefully along the periphery (see fig. above).

For ATEX design gear reducers, this accessory is not available.



10 - Commissioning

10.1 - General

Carry out an overall check, making particularly sure that the **gear reducer is filled with lubricant**.

If an external lubricating system is present (forced lubrication, cooling unit) oil is to be filled to the correct level with the external system full of oil.

Be sure that the **cooling unit with coil**, if present, **is working during the gear reducer running** (see ch. 5.5).

Where Y- Δ starting is being used, input voltage must match the motor lower voltage (Δ connection).

For asynchronous three-phase motor, if the direction of rotation is not as desired, invert two phases at the terminals.

For gear reducers equipped with **backstop device**, see ch. 5:12.

10.2 - Running-in

It is advisable to execute a running-in of approximately $200 \div 400\text{ h}$ so that it is possible to achieve the maximum functionality.

The temperature of both gear reducer and lubricant may well rise beyond normal values during running-in. After the running-in period it may be necessary to verify the gear reducer fixing bolt tightness.

11 - Maintenance

11.1 - General

At machine rest, verify at regular intervals (more or less frequently according to environment and use):

- all external surfaces are clean and air passages to the gear reducer or gearmotor are free, in order that cooling remains fully effective;
- oil level and deterioration degree (check with cold gear reducer at rest);
- correct fastening screws tightening.

During the operation check:

- noise level;
- vibrations;
- sealings;
- etc.



Attention! After a running period, gear reducer is subject to a light internal overpressure which may cause burning liquid discharge.

Therefore, before loosening whichever plug (filler plug included) wait until gear reducer has become cold and open it carefully; if not possible, take the necessary protection measures against burning due to warm oil contact. In all cases, always proceed with great care.

Maximum oil temperatures indicated on lubrication table do not represent a hindrance to the gear reducer regular running.

11.2 - Oil change

Execute the operation at **machine rest** and **cold gear reducer**.

Pre-arrange a proper waste oil collection system, unscrew the drain plug and the filler plug in order to facilitate the draining; dispose the waste lubricant according to the laws in force.

Wash internally the gear reducer's housing using the same oil type applied during the running; the oil used for this washing can be re-used for further washings after filtering with 25 µm of filtration standard.

Fill the gear reducer again up to level.

During the oil change, it is necessary to replace the seal rings.

When dismantling the cap (whenever gear reducers are provided with), reset the sealing with adhesive on cleaned and degreased mating surfaces.

For lubrication intervals see table 6.2.

Apart from running hours:

- replace mineral oil at least each 3 years;
- replace or regenerate synthetic oil each 5 - 8 years according to gear reducer size, running and environmental conditions.

Never mix different makes of synthetic oil; if oil-change involves switching to a type different from that used hitherto, then give the gear reducer a through clean-out.

11.3 - Coil and internal heat exchanger

In case of long non-running periods at ambient temperatures lower than 0 °C, the coil or the internal heat exchanger on the inspection cover should be emptied out using compressed air to blast out all the coolant, so as to avoid freezing-up which would cause the coil to break.

Verify that there are no deposits inside the coil which may obstruct water circulation or affect cooling. If any, wash the coil with suitable chemical cleaning products or consult Rossi.

Check the internal heat exchanger periodically and, if necessary, clean the exchange surfaces taking care not to damage the finned surfaces.

11.4 - Seal rings

It is always recommended that the seal rings are replaced with new ones when they are removed or during periodic checks of gear reducer; in this case, the new ring should be generously greased and positioned so that the seal line does not work on the same point of sliding contact as the previous ring.

Oil seals must be protected against heat radiation, also during the shrink fitting of parts, if applicable.

Duration depends on several factors such as dragging speed, temperature, ambient conditions, etc.; as a rough guide it can vary from 3150 to 25000 h.

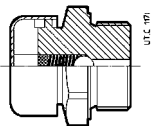
In case of designs with **labyrinth seal and greaser** («Taconite»), re-grease every 3 000 h of running or every 6 months with grease KLÜBER STABURAGS NBU 8 EP (unless otherwise stated).

11.5 - Bearings

Since there are many different types of bearings in a gear reducer (roller, tapered roller, straight roller, etc.) and each bearing works with different loads and speeds depending on the input speed, the nature of the load of the driven machine, the transmission ratio, etc., and with different lubricants (oil bath, oil splash, grease, oil circulation, etc.), it is not possible to define any periodical maintenance and replacement of bearings in advance.

If a precautionally maintenance is required, **undertake periodical checks to verify noise level and vibration with the help of appropriate diagnostic equipment and instruments**. If the measured values worsen even slightly it is necessary to stop gear reducer or gear motor and after having inspected inside the unit replace the bearings which are subject to breakdown.

11.6 - Metal filler plug with filter and valve

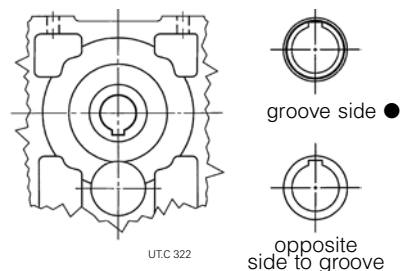


When the gear reducer or gearmotor (size ≥ 100) is equipped with metal filler plug and valve (see fig. in order to clean it, it is necessary to unscrew it from the gear reducer (preventing any debris or other foreign items from entering the reducer, disassemble the cover, wash it with solvent, dry with compressed air and reassemble it).

This operation is to be made according to environment conditions.

11.7 - Hollow low speed shaft

In order to remove the hollow low speed shaft of the helical and bevel helical gear reducers (this is the first operation to perform when disassembling the gear reducer) turn the shaft until the keyway is facing the intermediate shaft as indicated in fig. 5 and push the shaft from the reference groove side (circumferential keyway on shaft shoulder).



11.8 - Sound levels L_{WA} and \bar{L}_{pA}

Standard production sound power level L_{WA} [dB(A)]¹⁾ and mean sound pressure level \bar{L}_{pA} [dB(A)]²⁾ assuming nominal load, and input speed $n_1 = 1\,400$ ³⁾ min⁻¹. Tolerance +3 dB(A).

Gear reducer size	I		2I				3I, 4I				CI				ICI, C2I, C3I					
	$i_N \leq 3,55$		$i_N \geq 4$		$i_N \leq 14$		$i_N \geq 16$		$i_N \leq 90$		$i_N \geq 100$		$i_N \leq 18$		$i_N \geq 20$		$i_N \leq 80$ (ICI) $i_N \leq 71$ ⁵⁾ (C2I)		$i_N \geq 100$ (ICI, C3I) $i_N \geq 80$ ⁵⁾ (C2I)	
	L_{WA}	\bar{L}_{pA}	L_{WA}	\bar{L}_{pA}	L_{WA}	\bar{L}_{pA}	L_{WA}	\bar{L}_{pA}	L_{WA}	\bar{L}_{pA}	L_{WA}	\bar{L}_{pA}	L_{WA}	\bar{L}_{pA}	L_{WA}	\bar{L}_{pA}	L_{WA}	\bar{L}_{pA}	L_{WA}	\bar{L}_{pA}
40, 50	-	-	-	-	75	66	72	63	71	64	-	-	73	64	71	62	71	62	71	62
63, 64	83	74	79	70	78	69	75	66	74	64	72	62	76	67	73	64	73	64	73	64
80, 81	86	77	82	73	81	72	78	69	77	67	75	65	79	70	75	66	75	66	75	66
100	89	80	85	76	84	75	81	72	80	70	78	68	82	73	78	69	78	69	76	67
125, 140	92	83	88	79	87	77	84	74	83	73	80	70	85	76	80	71	82	72	79	69
160, 180	95	86	91	82	90	79	87	76	86	75	83	72	88	79	83	74	84	74	82	71
200, 225	99 ⁴⁾	89 ⁴⁾	95 ⁴⁾	85 ⁴⁾	93	82	90	79	89	78	86	75	92	82	87	77	87	76	84	73
250, 280	102 ⁴⁾	92 ⁴⁾	98 ⁴⁾	88 ⁴⁾	96	85	93	82	92	81	89	78	94	84	89	79	90	79	88	76
320 ... 360	106 ⁴⁾	96 ⁴⁾	102 ⁴⁾	92 ⁴⁾	100	89	97	86	96	85	93	82	98	88	93	83	93	82	91	80
400, 401	-	-	-	-	105	93	102	90	101	89	98	86	-	-	-	-	98	86	96 ⁶⁾	84 ⁶⁾

1) To ISO/CD 8579.

2) Mean value of measurement at 1 m from external profile of gear reducer standing in free field on a reflecting surface.

3) For n_1 710 ÷ 1 800 min⁻¹, modify tabulated values thus: $n_1 = 710$ min⁻¹, -3 dB(A); $n_1 = 900$ min⁻¹, -2 dB(A); $n_1 = 1\,120$ min⁻¹, -1 dB(A); $n_1 = 1\,800$ min⁻¹, +2 dB(A).

4) For sizes R I 225, 280 and 360, increase values of 1 dB(A).

5) For R C2I 400 and 401 $i_N \leq 63$ and $i_N \geq 71$, respectively.

6) For R C3I 400 and 401: $L_{WA} = 92$ and $L_{pA} = 80$.

In case of gearmotor (motor supplied by Rossi) add 1 dB(A) to the values in the table for 4 poles 50 Hz motors, and add 2 dB(A) for 4 poles 60 Hz motors.

In case of gear reducers with fan cooling, add to the values in the table 3 dB(A) for 1 fan and 5 dB(A) for 2 fans.

12 - Gear reducer troubles: causes and corrective actions

Trouble	Possible causes	Corrective actions
Excessive oil temperature	Inadequate lubrication: – excessive of insufficient oil quantity – unsuitable lubricant (different type, too viscous, exhausted, etc.)	Check – oil level (gear reducer at rest) or quantity – lubricant type and/or state (see ch. 6.2, lubrication table) and replace if necessary
	Incorrect mounting position	Change the mounting position
	Too tightened taper roller bearings	Consult Rossi
	Excessive ambient temperature	Increase the cooling or correct the ambient temperature
	Obstructed passage of air	Eliminate obstructive material
	Slow or missing air recycle	Arrange auxiliary ventilation
	Radiance	Screen gear reducer and motor properly
	Inefficiency of auxiliary bearing lubrication system	Check the pump and the pipes
	Bearings failure, defect or bad lubrication	Consult Rossi
	Inefficient or out of service oil cooling system: obstructed filter, insufficient oil (exchanger) or water (coil) flow rate, pump out of service, water temperature > 20 °C, etc.	Check the pump, the pipes, the oil filter and safety devices efficiency (manostats, thermostats, etc.)
Anomalous noise	One or more teeth with – dents or spallings – excessive flanks roughness	Consult Rossi
	Bearings failure, defect or bad lubrication	Consult Rossi
	Taper roller bearings with excessive clearance	Consult Rossi
	Vibrations	Check the fastening and the bearings
Lubricant leaking from seal ring	Seal ring with worm, bakelized, damaged or false mounted seal lip	Replace seal ring (see ch. 11.4)
	Damaged rotating seating (scoring, rust, dent, etc.)	Restore the seating
	Mounting position differs from the one stated on the name plate	Correctly position the gear reducer
Oil leaking from filler plug	Too much oil	Check oil level/quantity
	Incorrect mounting position	Check mounting position
	Inefficient vent valve	Clean/replace filler plug with vent valve
Low speed shaft not rotating even if high speed shaft or motor are running	Broken key	Consult Rossi
	Completely worn gear pair	
Lubricant leaking from joints (covers or half-housing joints)	Defective oil seals	Consult Rossi
Water in the oil	Defective cooling coil or heat exchanger	Consult Rossi

See specific motor documentation.

NOTE

When consulting Rossi state:

- all data on gear reducer or gearmotor name plate;
- failure nature and duration;
- when and under which conditions the failure occurred;
- during the warranty period, in order not to lose validity, do not disassemble nor tamper the gear reducer or gearmotor without approval by Rossi.

Index of revisions



Rossi

Solutions for
an evolving
industry

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