

iFit series



**Operating instructions
Helical Inline and Bevel Helical gearmotors**

rossi.com

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

All the people handling with these activities must carefully read all the following instructions and apply them rigorously.

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

Recycling

Observe the established legislation concerning waste treatment and recycling of exhaust material:



- the elements of housing, gear pairs, shafts and bearings of gear reducer must be transformed into steel scraps as well as cast iron elements, subject to other specific requirements;
- for other non-metallic components (seal rings, covers, etc.) comply with applicable regulations;
- waste oils must be recovered and treated in accordance with applicable legal requirements.

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 S.p.A. are "**partly completed machinery**" and as such they **must be** incorporated in finished appliances or systems and **should not be commissioned before the machinery in which the component has been incorporated conforms to:**

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

Attention!



All instructions in this manual, all applicable installation regulations, as well as all applicable safety regulations must be duly followed.

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:

- 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.

Safety during 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 repaired **exclusively by responsible qualified personnel**. Qualified personnel must be **specifically trained** and have the necessary experience to **recognize** any **risks** (see section Residual risks) related to these products, avoiding possible emergency situations.

Gear reducers and gearmotors in this manual are normally intended for installations in **industrial areas** : additional protection measures that may be necessary must be adopted and ensured by the personnel responsible for the installation.



Attention!

Motors in non-standard design 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 the possible motor-variator and/or the electric supply device (frequency converter, soft-start, etc.), and/or any optional electric devices (e.g.: independent cooling unit, etc.), consult the specific attached documentation. Request it if necessary.

Maintenance safety

When operating on a gear reducer or components connected to it, the machine must be **at rest, disconnected from the power supply, and cold** : disconnect the motor (including auxiliary equipment) from the power supply, gear reducer from the 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.

Further technical documentation (e.g. catalogs) can be downloaded from our website **www.rossi.com** or can be directly required to Rossi S.p.A. For any clarification and/or information, please contact Rossi S.p.A. specifying all data found on the name plate.

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 Machine Directive 2006/42/EC - Annex I.

The following table lists the residual risks that the user is required to handle in accordance with the instructions contained in this document and in those, if any, enclosed with the shipment.

Table 1.2.1. Residual risks

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 equipped with a coupling (high or low speed shaft), provide protections 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 others).</p> <p>Any operation on the gear reducer or gearmotor must be carried out with the machine stopped and disconnected from the power supply, after the gear reducer or gearmotor have cooled down.</p>
Extreme temperatures	<p>During operation, the gear reducers 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 high speed shaft. The same applies to the hydraulic coupling, if present.</p> <p>After a period of operation, the gear reducer will undergo a slight internal overpressure that can result in the leakage of burning fluid.</p> <p>Therefore, wait until the gear reducer has cooled down before loosening the caps (of any kind); alternatively, use appropriate protections (PPE) against burns resulting from accidental contact with hot oil.</p> <p>In all cases, always proceed with great care.</p>
Noise	<p>Depending on the size, gear ratio, transmission ratio, duty cycle type, and mounting system of the gear reducer 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 replacement components with characteristics unsuitable for the application	<p>Spare parts must be those authorized by Rossi S.p.A.</p>

Gear reducers are designed for industrial applications according to catalog data, ambient temperature 0 ÷ +40 °C (with peaks at -20 °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.

How supplied and product designation

3

3.1

Receipt


Upon receipt **check** that the goods correspond to the order specifications and that **they have not suffered damage during transport**; in this event, immediately contest such damage 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

Each gear reducer is provided with a name plate in anodized aluminium containing main informations necessary for a correct identification of the product (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.



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Made in Italy - www.rossi.com

Type

☐ i

Date

☐ M.P.

Code

S.N.

WA

ITEM

- (1) Gear reducer type
- (2) Transmission ratio
- (3) Production date
- (4) Gear reducer mounting position
- (5) Product code
- (6) Serial number
- (7) Production batch
- (8) Customer code ⁽¹⁾

⁽¹⁾ On request

Unless otherwise stated, the gear reducers are supplied **complete** with synthetic oil for long-life lubrication. Some bearings are lubricated with grease and metal shield, also referring to the mounting position. In detail, see ch. 6.

Standard paint unless otherwise indicated.

Tab. 3.4.1 Standard painting

Painting Internal	External painting		Note
	Final color Blue RAL 5010	Features	
Epoxy powder (pre-painted)	Two-component, water-based acrylic-polyurethane resin enamel.	Resistant to normal indoor industrial environments (corrosivity class C3 according to ISO 12944-2). Overpaintable only with dual-compound products ¹⁾ . Machined parts painted with two-component, water-based acrylic-polyurethane resin enamel.	Use a scraper or solvent to remove any paint on the mating surfaces of the gearbox.

For special paintings, please request additional information.

⁽¹⁾ Before overpainting, suitably protect the seal rings and degrease and sand the gear reducer surfaces (as an alternative to sanding, a coat of solvent-based primer can be applied).

Overhanging free shaft ends and hollow shafts are treated with protective anti-rust long-life oil and protected with a plastic (polyethylene) cap. 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

3.6.1 Helical inline gearmotor designation - iC

iC

4

7

3

FE

-

34,73

-

B3

-

F416

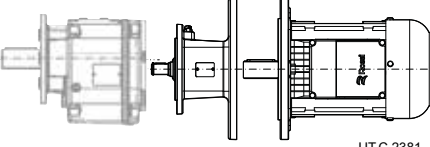
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B16D

AB16BI063

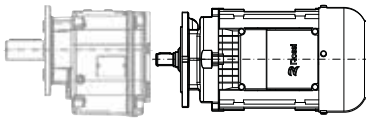
Series	Gear reducer size	Model	Train of gears	Design	Transmission ratio	Gear reducer mounting position	Output flange	Mounting position compact motor
iC				gear reducer				Motor adapter code
iFIT								motor
helical inline gearmotors	2							
	3	7						AB12BI063
	4		2 Stages					AB12BI071
	5		3 Stages					...
	6			P foot mounted				AB30MI200
	7			F flange mounted				
	8				3,37			AB12BI056
	9				4,00	B3		AB12CNI43
					...	B6		...
					...	B7		AB30MNI324
						B8		
						V5	F212	
						V6	F214	
							...	B12B
						
								B30M

configuration with adapter and standard IEC motor



UT.C 2381

configuration with compact motor



UT.C 2382

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3.6.2 Bevel helical gearmotor designation - iO

iO

6

7

3

FE

7,28

B3

HD

B

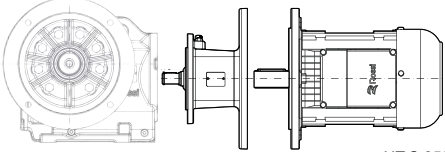
F625

B16D

AB16BI063

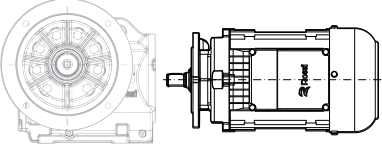
Series	Gear reducer size	Model	Train of gears	Design	Transmission ratio	Gear reducer mounting position	Low speed shaft design	User ¹⁾	Output flange	Mounting position compact motor	Motor adapter code		
iO iFIT bevel helical gearmotors	3	7	3 Stages	PE foot mounted	5,36 6,37 7,28 ...	B3 B6 B7 B8 V5 V6	S solid SS double extension H hollow with keyway HB hollow with shrink disc HD stepped hollow with shrink disc	A B					
	4												
	5												
	6												
	7												
	8	FE flange mounted	B3 B6 B7 B8 V5 V6	S solid SS double extension H hollow with keyway HB hollow with shrink disc HD stepped hollow with shrink disc									
	9												
	SE shaft mounted	B3 B6 B7 B8 V5 V6							S solid SS double extension H hollow with keyway HB hollow with shrink disc HD stepped hollow with shrink disc				
	...												
	...												
...													
...													

configuration with adapter and standard IEC motor



UT.C 2534

configuration with compact motor



UT.C 2535

gear reducer

motor

IEC

NEMA

AB12BI063

AB12BI071

...

AB30MI200

AB12BN056

AB12CN143

...

AB30MN324

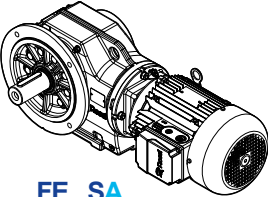
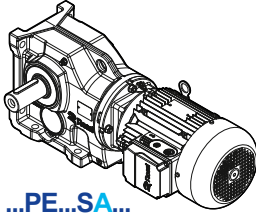
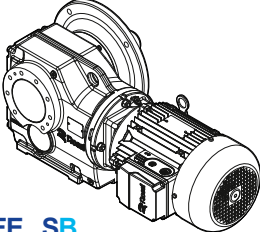
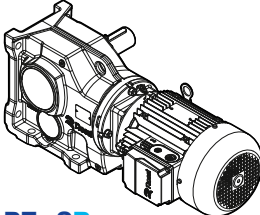
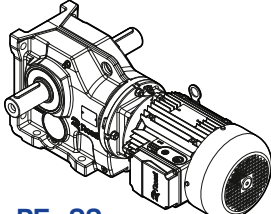
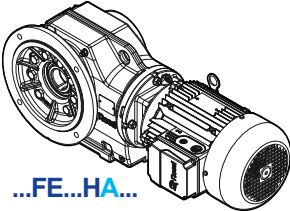
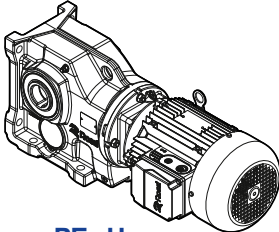
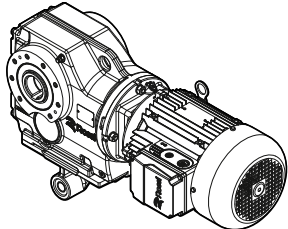
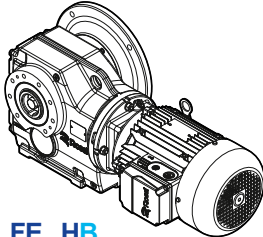
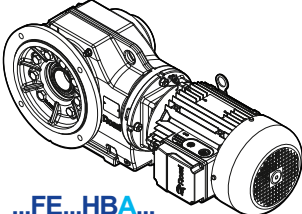
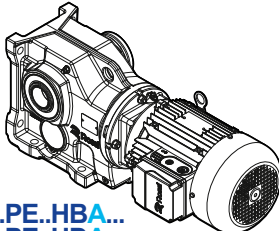
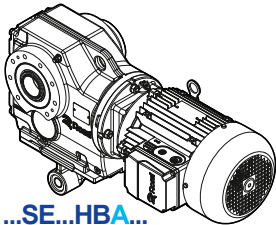
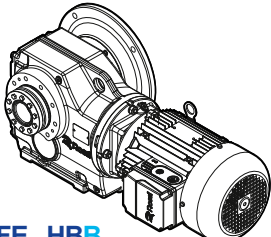
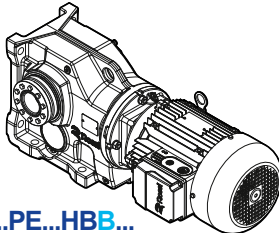
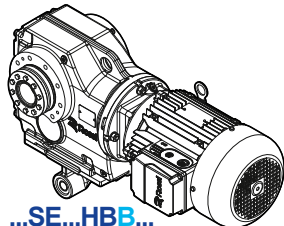
B12B

...

B30M

¹⁾ field not to be filled in for “PE” and “SE” designs with “H” or “SS” shafts



3.6.3 Design and machine side iO

	Flange mounted design	Foot mounted design	Shaft mounted design
Solid shaft	 ...FE...SA...	 ...PE...SA...	—
	 ...FE...SB...	 ...PE...SB...	—
Double extension shaft	—	 ...PE...SS...	—
Hollow shaft	 ...FE...HA...	 ...PE...H...	 ...SE...H...
	 ...FE...HB...		
Hollow shaft with shrink disc	 ...FE...HBA... ...FE...HDA...	 ...PE...HBA... ...PE...HDA...	 ...SE...HBA... ...SE...HDA...
	 ...FE...HBB... ...FE...HDB...	 ...PE...HBB... ...PE...HDB...	 ...SE...HBB... ...SE...HDB...

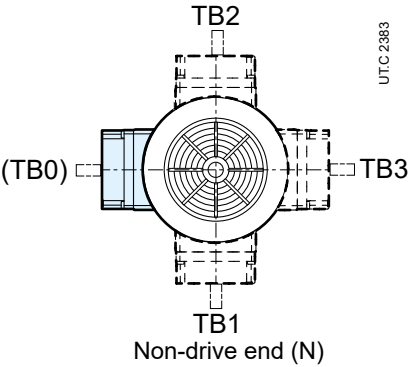
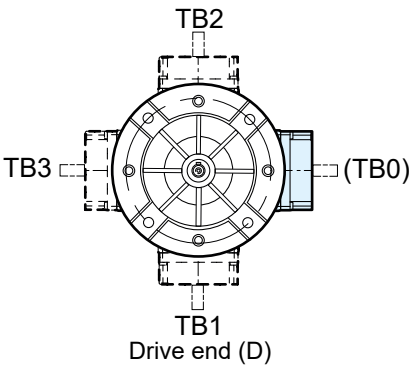
UT.C 2536

3.6.4 Motor designation

HB	3	Z	90S	-	4	230.400	50	-	B16D	-	TB2 ⁽¹⁾
----	---	---	-----	---	---	---------	----	---	------	---	--------------------

Series	Class energy	Brake Integrated	Motor size	N. poles	Voltage supply	Frequency supply	Motor mounting position		Position terminal block
							 compact	 IEC	
HB	2 efficiency IE2	-	63A	2	230.400	50	B12B	B5	TB1
	3 efficiency IE3	Z	63B	4	400	60	...		TB2
			71B	6	...		B30C		TB3
			...						

Motor terminal block position



The designation is to be completed with the statement of motor terminal box position if differing from the standard one TB0. The release lever (for brake motor) follows the position of the terminal box.

The cable entry is the responsibility of the Buyer: the terminal box is integral with housing with knockout cable openings on both sides (one for power cable and one for auxiliary equipment).

⁽¹⁾ For standard terminal box position TB0, no indication in motor designation is necessary.

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 $\pm 15^\circ$ 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.

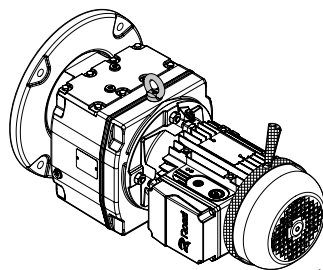


Attention!

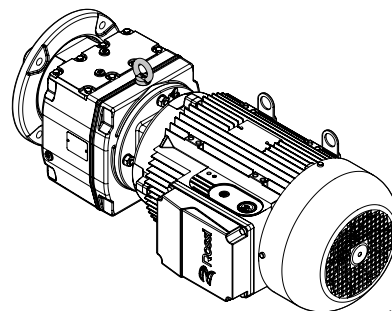
During the lifting and handling:

- 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.

Helical inline gearmotors - iC

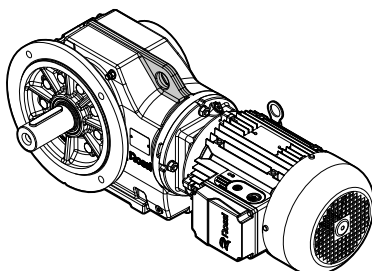


UTC 2433

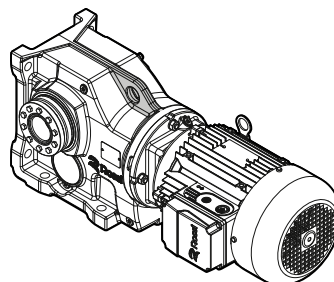


UTC 2434

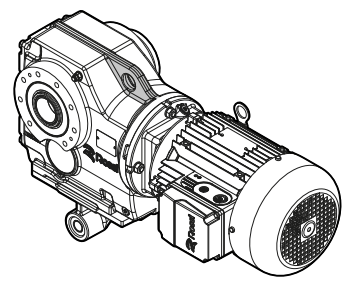
Bevel helical gearmotors - iO



UTC 2567

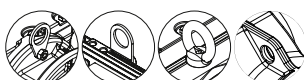


UTC 2568



UTC 2569

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.**

4.2

Storage

Surroundings should be sufficiently clean, dry (relative humidity < 50%), free from excessive vibrations ($v_{eff} \leq 0,2$ mm/s) not to damage the bearings (vibrations must be limited, although within a wider range, also during transport) and must have a temperature of $0 \div +40$ °C: peaks of 10 °C above or below this temperature range are allowed.

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

Do not stack units.

very 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.

Do not, under any circumstances, loosen the closed plugs or activate the drain plug before commissioning.

In the event of "**Long germ storage**" option, for a storage period from 12 to 24 months in normal environments, the following is envisaged:

- gear reducer delivered without oil filling;
- internal volume of the gear reducer protected by VCI lubricant coating;
- application of a layer of special anti-corrosive oil to all unpainted external parts (shafts, feet, flanges), including galvanized components (screws, nuts, washers, eyebolts, etc.);
- application of an adhesive label indicating the type of protection used;
- single packaging with sealed VCI bag.
- washing the reducer with the same oil as the filling oil, before final filling.

For longer periods please contact Rossi S.p.A.

Before installing, **check that:**

- the shafts and contact surfaces are not damaged;
- gear reducer specifications are suitable for ambient conditions (temperature, atmosphere, etc.);
- the structure on which the gear reducer is secured is flat, levelled and sufficiently dimensioned to ensure installation stability and absence of vibrations, (vibration speed $v_{eff} \leq 3,5$ mm/s for $P_N < 15$ kW and $v_{eff} < 4,5$ mm/s for $P_N > 15$ kW are acceptable), taking into account all transmitted forces due to masses, torque, radial and axial loads;
- the mounting position intended use corresponds to that indicated 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 so as to allow a free passage of air for cooling both gear reducer and motor (especially at their fan side); 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 gearbox in a position visible to personnel involved in the operation and maintenance of the machine.

Mating surfaces (of gear reducer and machine) must be clean and sufficiently rough to provide a good friction coefficient (indicatively $Ra\ 3,2 \div 6,3\ \mu m$).

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 as LOCTITE 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. 5.10), 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 installations or aggressive environments, paint the gear reducer or gearmotor with a suitable anti-corrosive paint (see ch. 3.4), protecting it with water-repellent grease (especially in position with the rotating seats of the seal rings and the access areas on the shaft ends).

Gearmotors should be protected wherever possible, and by whatever appropriate means, from solar radiation and extremes of weather; weather protection **becomes essential for V5 and V6 mounting positions.**

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

5.2

Tightening torques for fastening bolts (feet, flange, accessories) and for plugs

Unless otherwise specified, it is normally sufficient to use class 8.8 screws; the following cases are an exception, for which screws with strength class 10.9 must be used:

- iC 372 - iC 373 FE with flange F312
- iC 472 - iC 473 FE with flange F414
- iC 572 - iC 573 FE with flange F516

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 for fastening bolts

Fastening bolts	Tightening torque <i>Ms</i> for bolts for foot and flange fastening N m	
	cl. 8.8	cl. 10.9
M4	2,9	4
M5	6	8,5
M6	11	15
M8	25	35
M10	50	70
M12	85	120
M14	135	190
M16	205	290
M18	280	400
M20	400	560
M22	550	770
M24	710	1000

Tab. 5.2.2 Tightening torques for oil drain and filler plugs

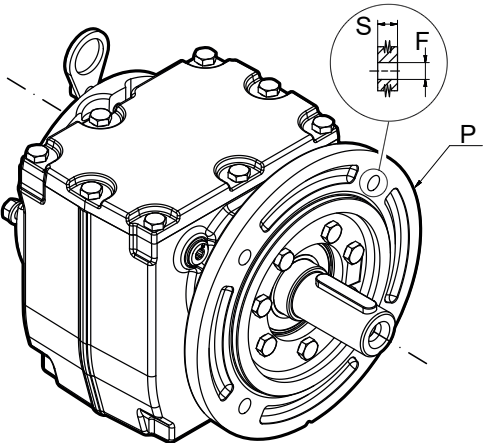
Frame size gear reducer iC, iO	Tightening torque <i>Ms</i> for oil drain and breather plugs	
	Plug threading dimension	<i>Ms</i> N m
272 / 273	M10 x 1	8
372 / 373		
472 / 473		
572 / 573		
672 / 673		
772 / 773	M12 x 1,5	14
872 / 873		
972 / 973	M22 x 1,5	45

Flange mounting

If through-holes (flange B5) are used for fastening, carefully select the length of the fastening screws, which must be long enough to ensure a sufficiently extended clamping section to ensure correct fastening of the gearbox to the machine.
Before tightening the bolt be sure that the eventual centering of flanges is inserted properly

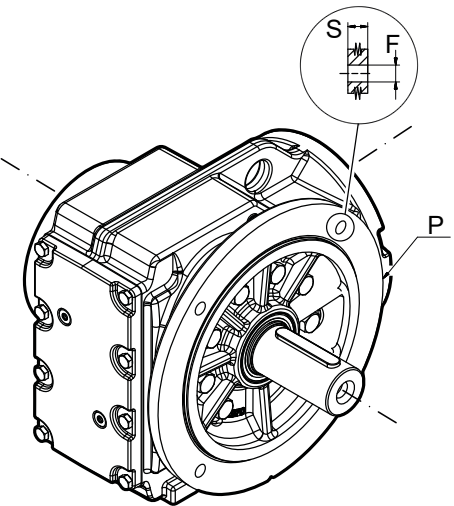
Screws must be tightened diagonally with the maximum torque indicated in Table 5.3.1.
In the fastening screws and in the flange mating surfaces use **locking adhesives**.

iC



UT.C. 2435

iO



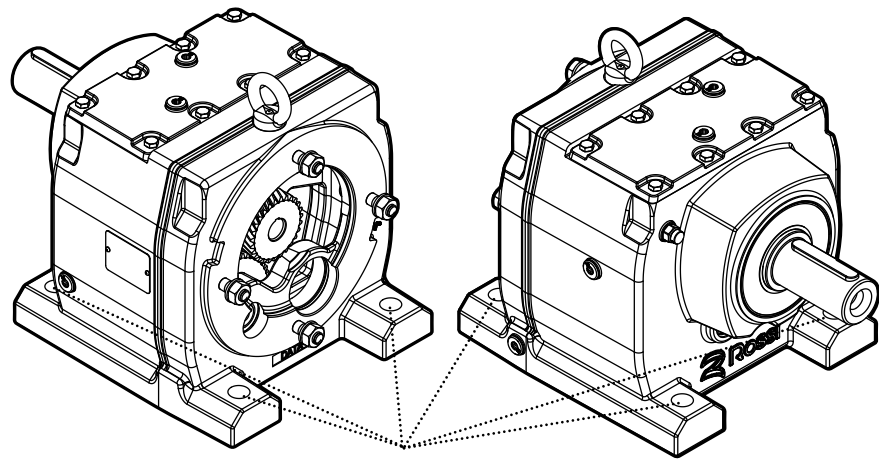
Tab. 5.3.1 B5 flange hole dimensions

Dimensions B5 flange			Ms tightening torque for B5 flange screws N m		
Code	Ø P mm	S mm	Screws mm	Class mm	Ms ± 10%
F212	120	8	M6	8.8	11
F214	140	9	M8	8.8	25
F216	160	10	M8	8.8	35
F312	120	8	M6	10.9	15
F314	140	10	M8	10.9	35
F316	160	10	M8	8.8	25
F320	200	12	M10	8.8	50
F414	140	10	M8	10.9	35
F416	160	10	M8	8.8	25
F420	200	12	M10	8.8	50
F516	160	10	M8	10.9	35
F520	200	12	M10	8.8	50
F525	250	15	M12	8.8	85
F620	200	12	M10	8.8	50
F625	250	15	M12	8.8	85
F725	250	15	M12	8.8	85
F730	300	16	M12	8.8	85
F830	300	16	M12	8.8	85
F835	350	18	M16	8.8	205
F935	350	18	M16	8.8	205
F945	450	22	M16	8.8	205

5.4

Foot mounting

iC



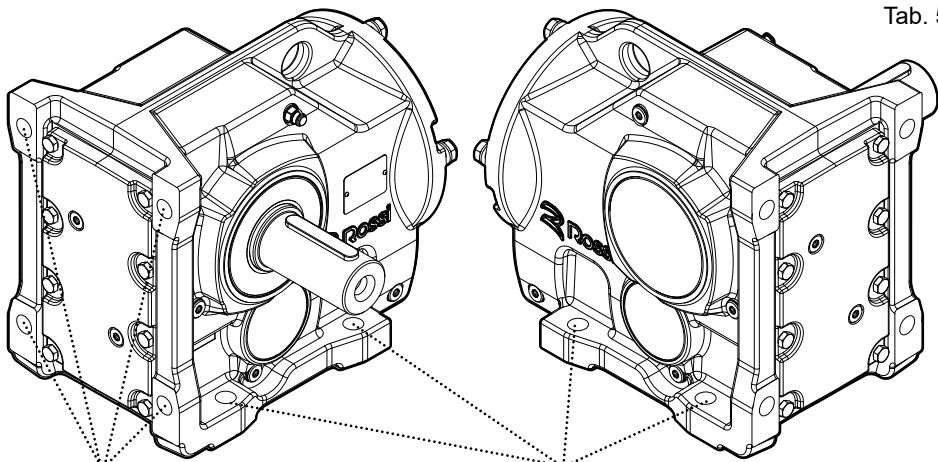
Housing for 4 screws or nuts
(minimum length indicated in the table)

UT.C 2570

Tab. 5.4.1 Foot mounting screw dimensions - iC

Gear reducer size iC	Foot mounting screws UNI5737 - ISO 4014 (minimum length in mm)
27... 37...	M8 x 40
47... 57... 67...	M12 x 50
77...	M16 x 60
87...	M16 x 80
97...	M20 x 100

iO



Housing for 4+4 screws or nuts
(minimum length indicated in the table)

UT.C 2571

Tab. 5.4.2 Foot mounting screw dimensions - iO

Gear reducer size iO	Foot mounting screws UNI5737 - ISO 4014 (minimum length in mm)
373 473	M10 x 40
573 673	M12 x 50
773	M16 x 60
873	M20 x 75
973	M24 x 85

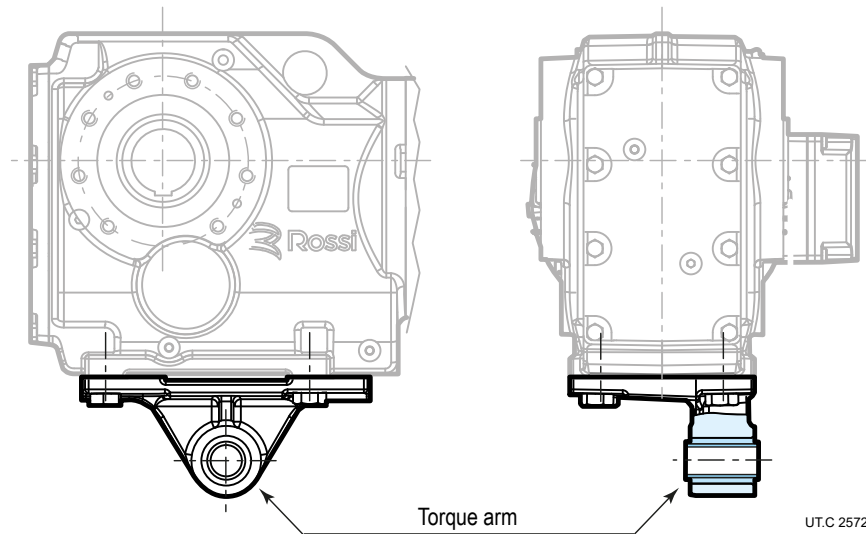


Attention!

Thoroughly degrease the screws before tightening.

In the event of strong vibrations, heavy-duty cycles, frequent motion reversals, it is always advisable to apply a suitable threadlocker adhesive such as LOXAEI 23-18 or equivalent on the thread.

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**

5.6

Mounting of hollow low speed shaft

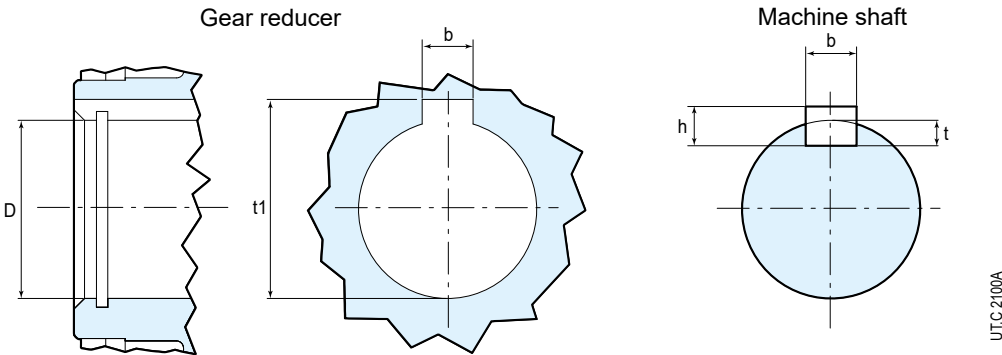
For machine shaft ends onto which the hollow shafts of gear reducers are to be keyed, h6, j6, and k6 tolerances are recommended, according to requirements.



Important!
the shoulder diameter of the driven machine shaft end abutting with the gear reducer must be at least 1,18 ±1,25 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.



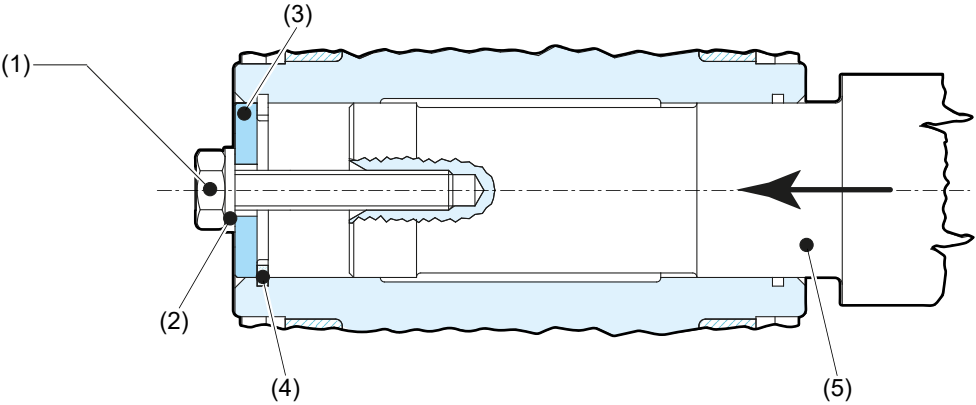
Tab. 5.6.1 Hollow low speed shaft

Hole Ø D H7	Parallel key			Parallel key		
	b h9	x h11	l ⁽¹⁾	b H9 hub N9 shaft	t shaft	t ₁ hub
30	8	7	50	8	4	33,3
35	10	8	56	10	5	38,3
40	12	8	70	12	5	43,3
50	14	9	80	14	5,5	53,5
60	18	11	110	18	7	64,4
70	20	12	125	20	7,5	74,9

¹⁾ Recommended length

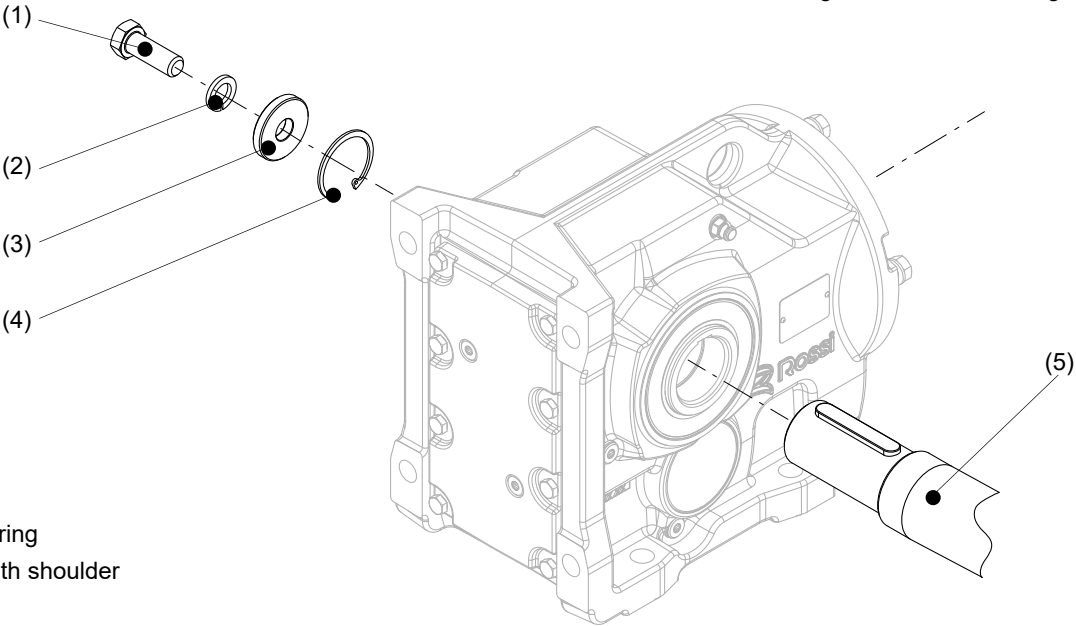
Gear reducer installing and axial fastening

Fig. 5.7.1 Mounting hollow low speed shaft



In order to have an easier **installing** of gear reducers and gearmotors with hollow low speed shaft, both with keyway and shrink disc, proceed as shown at fig. 5.7.1 and 5.7.2.

Fig. 5.7.2 Axial fastening screw



- (1) Fastening screw
- (2) Stop washer
- (3) Thrust bush
- (4) Elastic retaining ring
- (5) Machine shaft with shoulder

Tighten the axial fastening screw up to the torque stated in the table.

Screw	M _s tightening torque N m
M5	5
M6	8
M10/M12	20
M16	40
M20	80
M24	200

5.8

Mounting of Hollow low speed shaft with shrink disc

Fig. 5.8.1 Hollow low speed shaft with shrink disc - A side and B side

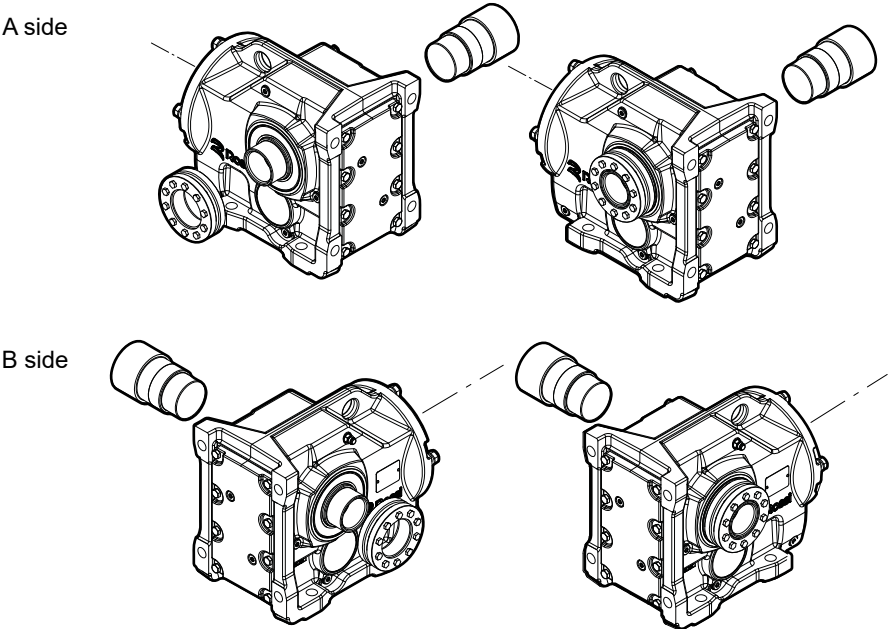
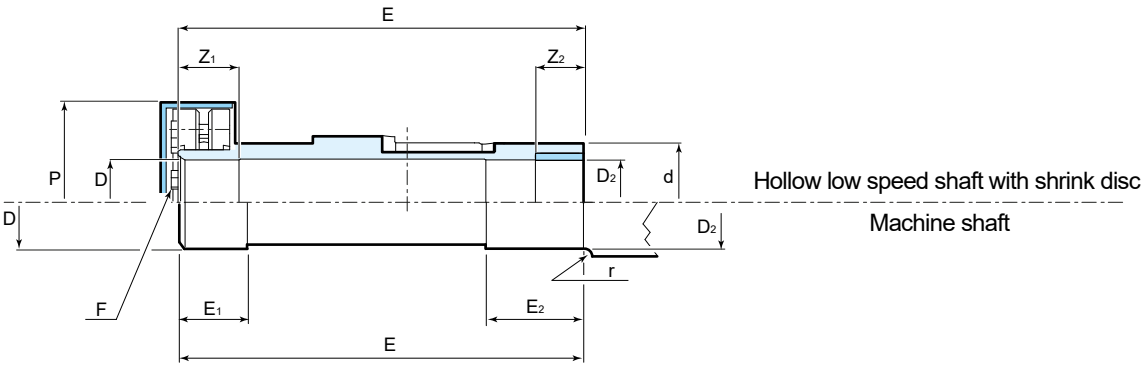


Fig. 5.8.2 Hollow low speed shaft and machine shaft end with shrink disc



Tab. 5.8.1 - Hollow low speed shaft and machine shaft end with shrink disc

Gear reduction size iO	Machine shaft							Hollow low speed shaft									
	D	D ₂		E	E ₁	E ₂	r	D	D ₂		E	F		d	P	Z ₁	Z ₂
		...HB...	...HD...						M _s [N m]								
		h6	h6							h6		H7	H7				
373	30	30	32	146	36	25	0,4	30	30	32	146	5 x M8	41	45	77	31	20
473	35	35	36	177	32	20	0,4	35	35	36	177	7 x M8	41	50	83	37	25
573	40	40	42	195	31	25	0,4	40	40	42	195	7 x M8	41	55	83	26	20
673	40	40	42	208	43	25	0,4	40	40	42	208	8 x M8	41	55	93	38	20
773	50	50	52	241	41	35	0,4	50	50	52	241	10 x M8	41	70	114	36	30
873	65	65	66	281	46	45	0,4	65	65	66	281	11 x M8	41	85	159	41	40
973	75	75	76	345	60	55	0,4	75	75	76	345	12 x M8	41	95	174	55	50



Attention!

Verify that the machine shaft end has dimensions, tolerances and roughness as stated in fig. 5.8.1, 5.8.2 and tab. 5.8.1; following these instructions the correct running of shrink disc will be granted.

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

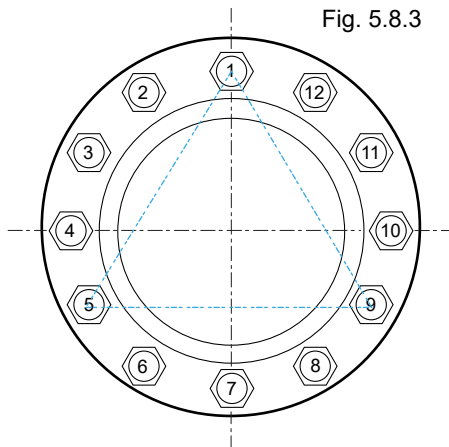


Fig. 5.8.3

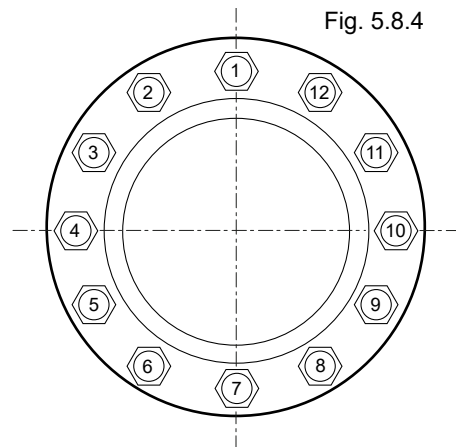


Fig. 5.8.4

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;
- position the shrink disc axially by aligning the outer surface with the end of the hollow low speed shaft as shown in figure 5.8.2;
- slightly tighten a first group of three screws positioned at about 120° as shown for example in the figure 5.8.3;
- tighten through dynamometric wrench – balanced to a value approximately higher than 5% compared to the one foreseen in tab. 5.8.1, the bolts of the shrink disc, by a continuous sequence (not crossing) see fig. 5.8.4 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. 5.8.1 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



Attention!

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

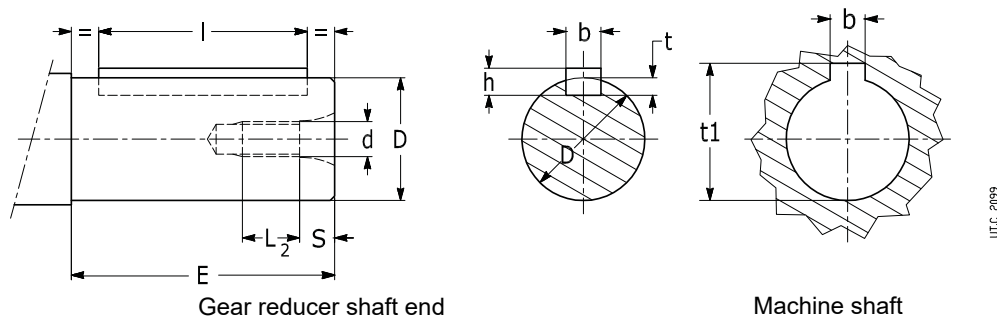
Do not completely remove fastening screws before locking rings are disengaged. Risk of serious injury!

To remove the shrink disc, proceed as follows:

- 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;

5.9

Fitting of components to shaft ends



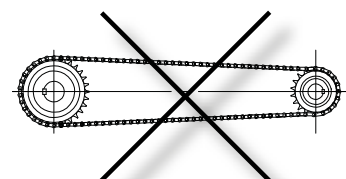
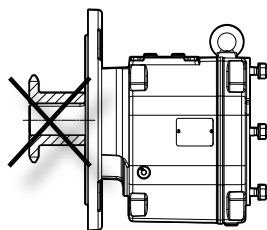
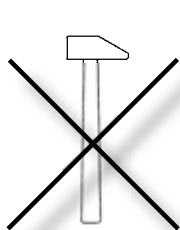
Tab. 5.9.1 Shafts in metres

Ø D k6	Shaft end mm				Parallel key mm	Parallel key mm		
	E	Ø d	S	L2	b x h x l h9 h11	b H9 hub N9 shaft	t shaft	t ₁ hub
25	50	M10	7,6	18,4	8 x 7 x 40	8	4	28,3
30	60	M10	7,6	18,4	8 x 7 x 50	8	4	33,3
35	70	M12	9,5	22,5	10 x 8 x 56	10	5	38,3
40	80	M16	12,7	27,3	12 x 8 x 70	12	5	43,3
50	100	M16	12,7	27,3	14 x 9 x 80	14	5,5	53,8
60 m6	120	M20	16	34	18 x 11 x 110	18	7	64,4
70 m6	140	M20	16	34	20 x 12 x 125	20	7,5	74,9

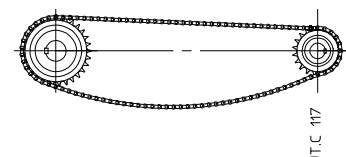
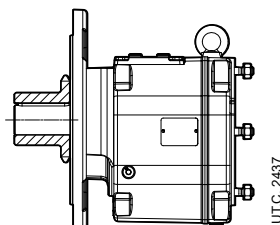
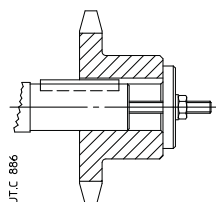
Tab. 5.9.2 Shaft in inches

Ø D	Shaft end in (mm)				Parallel key in (mm)			Parallel key in (mm)		
	E	Ø d	S (mm)	L2	b	h	l	b	t shaft	t ₁ hub
1 (25,4)	1,93 (50)	3/8-16 (7,9)	7,5	14,5 (22,9)	0,25 ^{+0,000} _{-0,002} (6,35)	0,25 ^{+0,000} _{-0,002} (6,35)	1,313 (33,34)	0,25 ^{+0,002} _{-0,000} (6,35)	0,141 (3,58)	1,114 (28,3)
1,25 (31,75)	2,36 (60)	1/2-13 (10,7)	10	18,5 (29,5)	0,25 ^{+0,000} _{-0,002} (6,35)	0,25 ^{+0,000} _{-0,002} (6,35)	1,688 (42,86)	0,25 ^{+0,002} _{-0,000} (6,35)	0,141 (3,58)	1,367 (34,72)
1,375 (34,93)	2,76 (70)	1/2-13 (10,7)	10	18,5 (29,5)	0,313 ^{+0,000} _{-0,002} (7,94)	0,313 ^{+0,000} _{-0,002} (7,94)	1,813 (46,04)	0,313 ^{+0,002} _{-0,000} (7,94)	0,174 (4,42)	1,518 (38,56)
1,625 (41,28)	3,15 (80)	5/8-11 (13,5)	50	23 (36,8)	0,375 ^{+0,000} _{-0,002} (9,52)	0,375 ^{+0,000} _{-0,002} (9,52)	2,25 (57,15)	0,375 ^{+0,002} _{-0,000} (9,52)	0,209 (5,31)	1,796 (45,62)
2,125 (53,93)	3,94 (100)	3/4-10 (16,5)	15	26 (42,2)	0,50 ^{+0,000} _{-0,002} (12,7)	0,50 ^{+0,000} _{-0,002} (12,7)	2,625 (66,68)	0,50 ^{+0,002} _{-0,000} (12,7)	0,28 (7,11)	2,35 (59,69)
2,375 (60,33)	4,72 (120)	3/4-10 (16,5)	15	26 (42,2)	0,625 ^{+0,000} _{-0,002} (15,88)	0,625 ^{+0,000} _{-0,002} (15,88)	3,625 (92,08)	0,625 ^{+0,002} _{-0,000} (15,88)	0,354 (8,99)	2,651 (67,34)
2,875 (73,00)	5,51 (140)	3/4-10 (16,5)	15	26 (42,2)	0,750 ^{+0,000} _{-0,002} (19,05)	0,750 ^{+0,000} _{-0,002} (19,05)	4,125 (104,78)	0,750 ^{+0,002} _{-0,000} (19,05)	0,375 (9,53)	3,050 (77,47)

Incorrect



Correct



In general, it is recommended to machine the hole of the parts keyed onto shaft end to **H7** tolerance.

Before mounting, thoroughly clean mating surfaces with proper antirust products, 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 **H7/k6** it is advisable that the part to be keyed is preheated to a temperature of 80 ± 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:

- 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.

5.10

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.

6.1

General

Gear pairs are bathed or splashed lubricated; bearings are splashed lubricated or lubricated with long life grease (with or without NILOS ring). **Gearmotors are supplied FILLED WITH POLYGLYCOLE BASED SYNTHETIC OIL** (KLÜBER Klübersynth GH 6-220, MOBIL Glygoyle 220, SHELL Omala S4 WE 220), for long life lubrication in the absence of external pollution.

Ambient temperature $0 \div 40$ °C with peaks down/up to -20 °C and $+50$ °C.



Important!

The **mounting position** specified in the order determines the quantity of lubricant the gear reducer is filled with at the time of delivery, as well as the presence of bearings with independent grease lubrication.

Be sure that the gearmotor is installed in the mounting position specified in the order – including inclined mounting positions (e.g.: B3 38° V5) – and stated on the nameplate.

If the gearmotor is installed in a **different mounting position**, check, based on the values in the table, that this does not lead to a change in the lubricant quantity; if so, adjust the lubricant quantity.

Furthermore, consider that the mounting positions **V5** and **V6** require the application of special grease in the upper bearings. Finally, it is also necessary to adapt the breather plug position to the new mounting position.

Mounting positions, oil quantities and plug positions are stated at ch. 6.4 and ch. 6.5.

The mounting position can only be changed with prior authorisation by Rossi S.p.A., otherwise the warranty may be invalidated



Attention!

Before commissioning be sure that the gear reducer is filled with oil and that the (metal) breather plug is mounted in the correct position according to the mounting position required; for mounting position BX the breather plug is supplied separately and is to be mounted in the correct position according to the mounting position required.

The breather plug is to be activated before commissioning by removing the proper tab (see fig. 6.1.1).

Care must be taken to keep the breather free of dirt that may impair its functionality. If this is not possible, contact Rossi S.p.A. to find a different solution.

Fig. 6.1.1 Activation of breather plug



Using synthetic oil is always recommended, especially if you want to increase the lubrication interval, ambient temperature range and/or reduce the oil temperature.

Important:

Inappropriate lubricants can cause damage to the gear reducer.

Viscosity and type of lubricating oil used for filling **are indicated on the gear reducer name plate**.

Rossi S.p.A. declines any responsibility for damages deriving from the use of other lubricants or from the use outside the expected ambient temperature range. The indications on lubricants do not bind Rossi S.p.A. on the quality of the lubricant supplied by each individual manufacturer. Do not mix different lubricating oils; do not mix synthetic oils with mineral oils.

Manufacturer	Oil synthetic PAO	Oil synthetic PAG	Oil mineral	Manufacturer	Oil synthetic PAO	Oil synthetic PAG	Oil mineral
AGIP	Blasia SX	Blasia S	Blasia	KLÜBER	Klübersynth GEM4	Klübersynth GH6	Klübersynth GEM1
ARAL	Degol PAS	Degol GS	Degol BG	MOBIL	Mobil SHC Gear	Mobil Glygoyle	Mobilgear 600 XP
BP	Energyn EPX	Energyn SG-XP	Energol GR-XP	SHELL	Omala S4 GX	Omala S4 WE	Omala S2 G
CASTROL	Alphasyn EP	Optiflex A	Alpha SP	TEXACO	Pinnacle	Synlube CLP	Meropa
FUCHS	Renolin Unisys	Renolin PG	Renolin CLP	TOTAL	Carter SH	Carter SY	Carter EP

ISO viscosity grade

Unless otherwise specified, the gearmotors are **supplied complete with synthetic oil** of viscosity grade ISO VG 220 suitable for most applications in normal industrial environments. For different application conditions or specific needs, please contact Rossi S.p.A.

The following table provides a general guideline for lubricant viscosity selection (average cSt value of kinematic viscosity at 40 °C).

Speed n_2 [min ⁻¹]	Ambient temperature T_{amb} [°C]		
	Mineral Oil		Synthetic oil
	0 ÷ 20	10 ÷ 40	0 ÷ 40
> 224	150	150	150
224 ÷ 22,4	150	220	220
22,4 ÷ 5,6	220	320	320
< 5,6	320	460	460

Ambient temperature peaks of ± 10 °C for mineral oils and ± 20 °C for synthetic oils are permissible with respect to the conditions given in the table.

6.3

Oil change interval

An overall guide to oil-change interval is given in the table, and assumes pollution-free surroundings. When heavy overloads are present, halve the values.

Oil temperature [°C]	Oil-change interval [h]	
	Mineral Oil	Synthetic oil
≤ 65	8000	25000
65 ÷ 80	4000	18000
80 ÷ 95	2000	12500

Seal rings:

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..

Grease-lubricated bearings:

Lubrication is «for life» assuming uniform load and pollution-free environment.

If these conditions are not met, replace the grease every year in the event of operation time up to 12 h/d and every 6 months if the operation time is 12 ÷ 24 h/d.

Ball bearings must be completely filled with SHELL Gadus S2 V100 bearing grease, roller bearings with KLÜBER STABURAGS NBU 8 EP.



Attention!

Refer to ch. 6.1 for bearings requiring greasing and contact Rossi in case of doubt.

6.4

Oil (quantity) levels



Important!

The oil quantities given in the table are to be understood as guidelines for procurement purposes.

The correct lubricant quantity the gear reducer is to be filled with is the one that which allows to reach the level when the gearbox is at rest and not running.

iC... PE; FE						
Frame size gear reducer	Oil quantity [l]					
	B3	B6	B7	B8	V5	V6
iC 27...	0,45	0,6	0,6	0,55	0,9	0,8
iC 37...	0,3	0,75	0,95	0,95	1,05	0,85
iC 47...	0,7	1,5	1,5	1,5	1,65	1,6
iC 57...	0,8	1,7	1,7	1,7	2,1	1,9
iC 67...	1,1	1,8	2,0	2,8	2,9	2,4
iC 77...	1,2	2,5	3,4	3,6	3,8	3,3
iC 87...	2,3	6,3	6,5	7,2	7,2	6,4
iC 97...	4,6	11,3	11,7	11,7	13,4	11,7

iO...PE						
Frame size gear reducer	Oil quantity [l]					
	B3	B6	B7	B8	V5	V6
iO 373	0,5	1,25	1,0	1,0	0,95	0,95
iO 473	0,8	2,0	1,3	1,5	1,6	1,6
iO 573	1,1	2,8	2,2	2,2	2,3	2,1
iO 673	1,1	3,45	2,4	2,6	2,6	2,6
iO 773	2,2	5,8	4,1	4,4	4,2	4,4
iO 873	3,7	10,9	8,0	8,7	8,0	8,0
iO 973	7,0	20,0	14,0	15,7	15,7	15,5

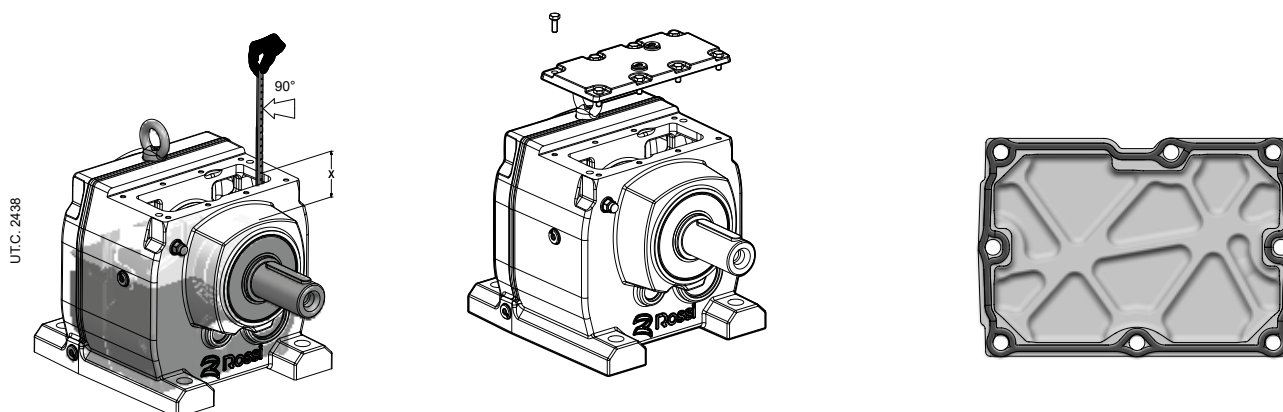
iO... FE...S						
Frame size gear reducer	Oil quantity [l]					
	B3	B6	B7	B8	V5	V6
iO 373	0,5	1,5	1,1	1,1	1,0	1,0
iO 473	0,8	2,2	1,3	1,7	1,6	1,6
iO 573	1,2	3,15	2,2	2,4	2,5	2,3
iO 673	1,1	3,7	2,4	2,8	2,7	2,7
iO 773	2,1	5,9	4,1	4,4	4,5	4,5
iO 873	3,7	11,9	8,2	9,0	8,4	8,4
iO 973	7,0	21,5	14,7	17,3	15,7	16,5

iO... FE...H; SE...H						
Frame size gear reducer	Oil quantity [l]					
	B3	B6	B7	B8	V5	V6
iO 373	0,5	1,4	1,0	1,0	1,0	1,0
iO 473	0,8	2,15	1,3	1,6	1,6	1,6
iO 573	1,2	3,15	2,2	2,4	2,7	2,4
iO 673	1,1	3,7	2,4	2,7	2,6	2,6
iO 773	2,1	5,9	4,1	4,6	4,4	4,4
iO 873	3,7	11,1	8,2	8,8	8,0	8,0
iO 973	7,0	20,0	14,7	15,7	15,7	15,7

For gearmotors **iC 27 (always) and iC 47, iC 57 in mounting position B6**, the oil level is determined by removing the cover (see fig. 6.4.1), positioning the gearbox in the mounting position B3 and measuring the distance "x" between oil level and cover surface, as per fig. 6.4.1, after eliminating potential residual air in the oil, inside the gear reducer.

After completion of the operation, clean the mating surfaces of the cover and gearbox housing from residual grease and polymerised sealant; restore the seal on the cover by applying a continuous bead of liquid gasket type LOXEAL 58-14 around the entire perimeter, without interruption and contouring the holes; then position the cover, apply the screws and tighten to the torque stated in ch. 5.2.

Fig. 6.4.1 Determination of oil quantity with "x" measure through graduated rod

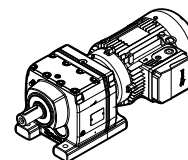


Tab. 6.4.1 Maximum distance "x" measurement

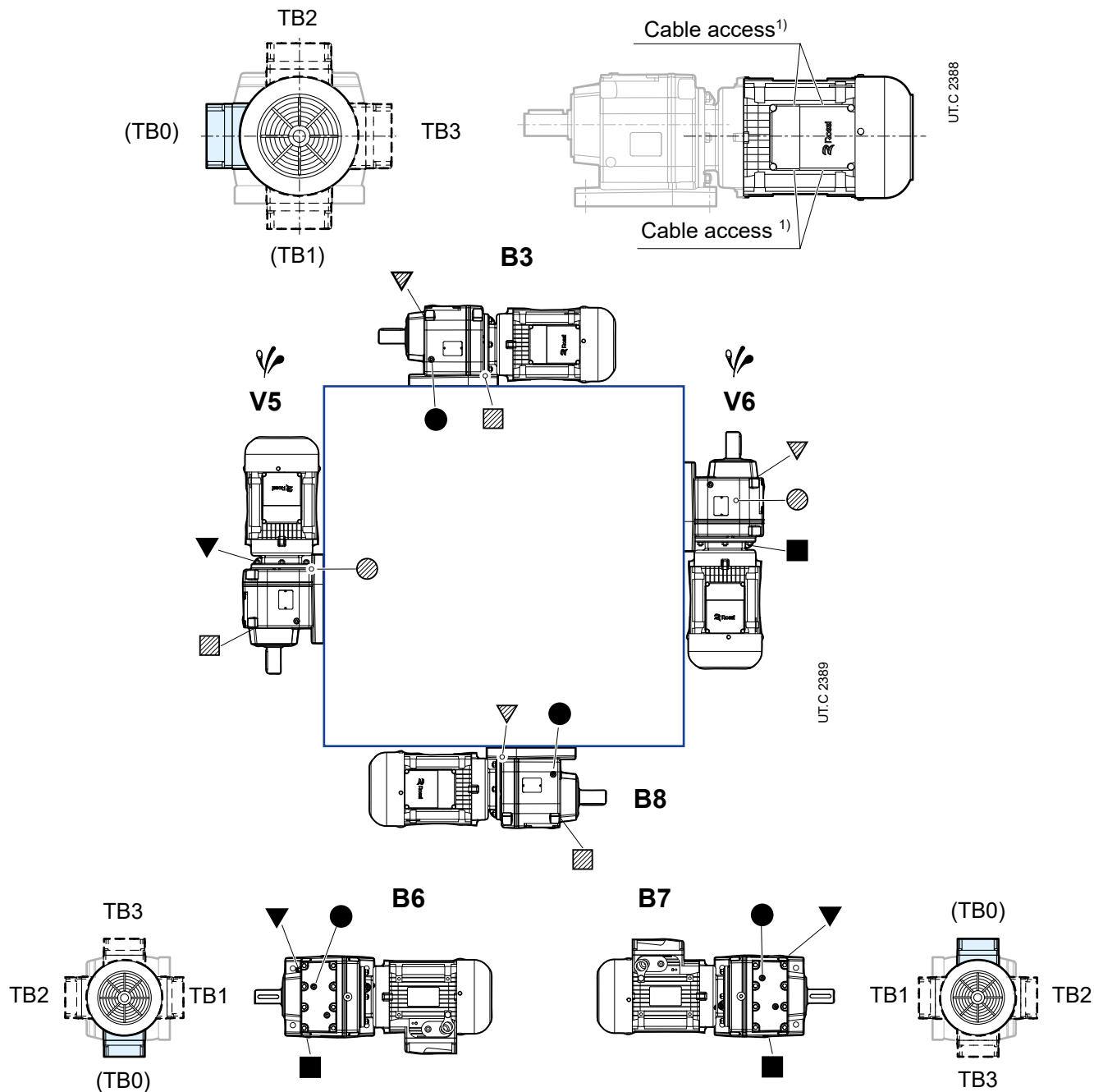
Gear reducer type	Maximum distance "x" [mm] between oil level and gear reducer cover resting surface					
Gear reducer size	B3	B6	B7	B8	V5	V6
iC 272	74 ± 1	45 ± 1	45 ± 1	45 ± 1	22 ± 1	22 ± 1
iC 273	76 ± 1	42 ± 1	42 ± 1	42 ± 1	19 ± 1	19 ± 1
iC 472	-	39 ± 1	-	-	-	-
iC 473	-	32 ± 1	-	-	-	-
iC 572	-	32 ± 1	-	-	-	-
iC 573	-	28 ± 1	-	-	-	-

6.5

Mounting positions and plug position



6.5.1 Helical inline - iC iC 272 / 273 PE ... iC 972 / 973 PE



iC 27... : breather plugs not present for B3, B8, B6, B7

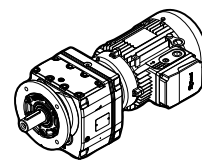
iC 27... : oil level and drain plugs not present

iC 47..., iC 57... : level plug not present for B6

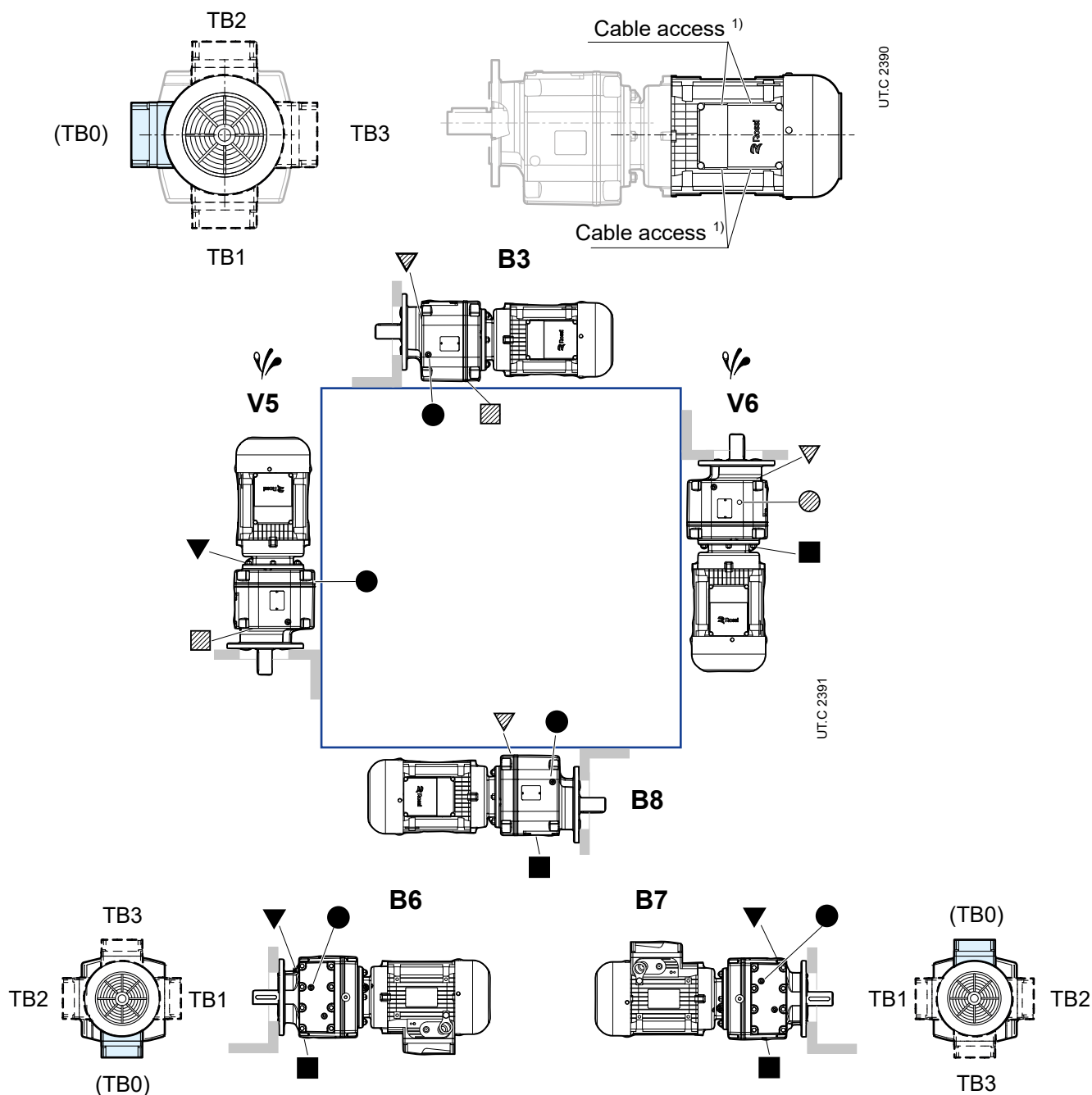
- | | |
|------------------|---|
| ▼ breather plug | ▼ breather plug on opposite side (not in view) |
| ● oil level plug | ● oil level plug on opposite side (not in view) |
| ■ oil drain plug | ■ oil drain plug on opposite side (not in view) |

Possible high oil splash: for the corrective factor f_{t3} of nominal thermal power P_{TN} .

¹⁾ The customer is responsible for cable connection: the terminal box is incorporated with the motor housing and is equipped with bilateral cable access with pre-set cutting (one for the power cable and one for the auxiliary devices).



iC 272 / 273 FE ... iC 972 / 973 FE



iC 27... : breather plugs not present for B3, B8, B6, B7

iC 27... : oil level and drain plugs not present

iC 47..., iC 57... : level plug not present for B6

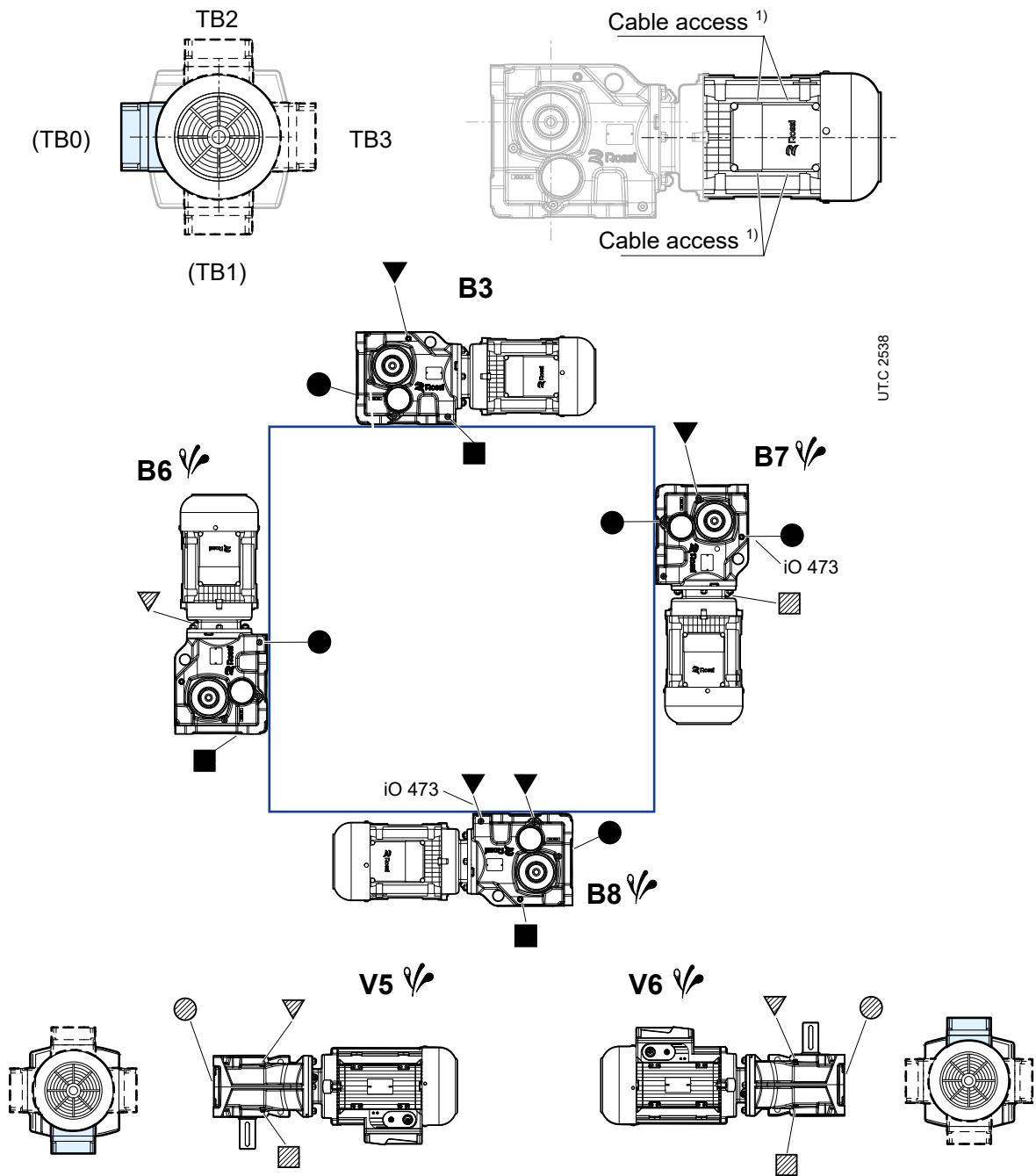
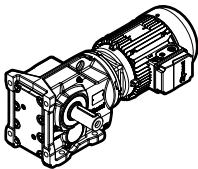
▼ breather plug
● oil level plug
■ oil drain plug

▼ breather 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)

Possible high oil splash: for the corrective factor f_{t3} of nominal thermal power P_{TN} .

¹⁾ The customer is responsible for cable connection: the terminal box is incorporated with the motor housing and is equipped with bilateral cable access with pre-set cutting (one for the power cable and one for the auxiliary devices).

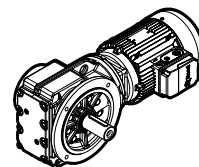
6.5.2 Bevel helical - iO iO 373 PE / iO 973 PE



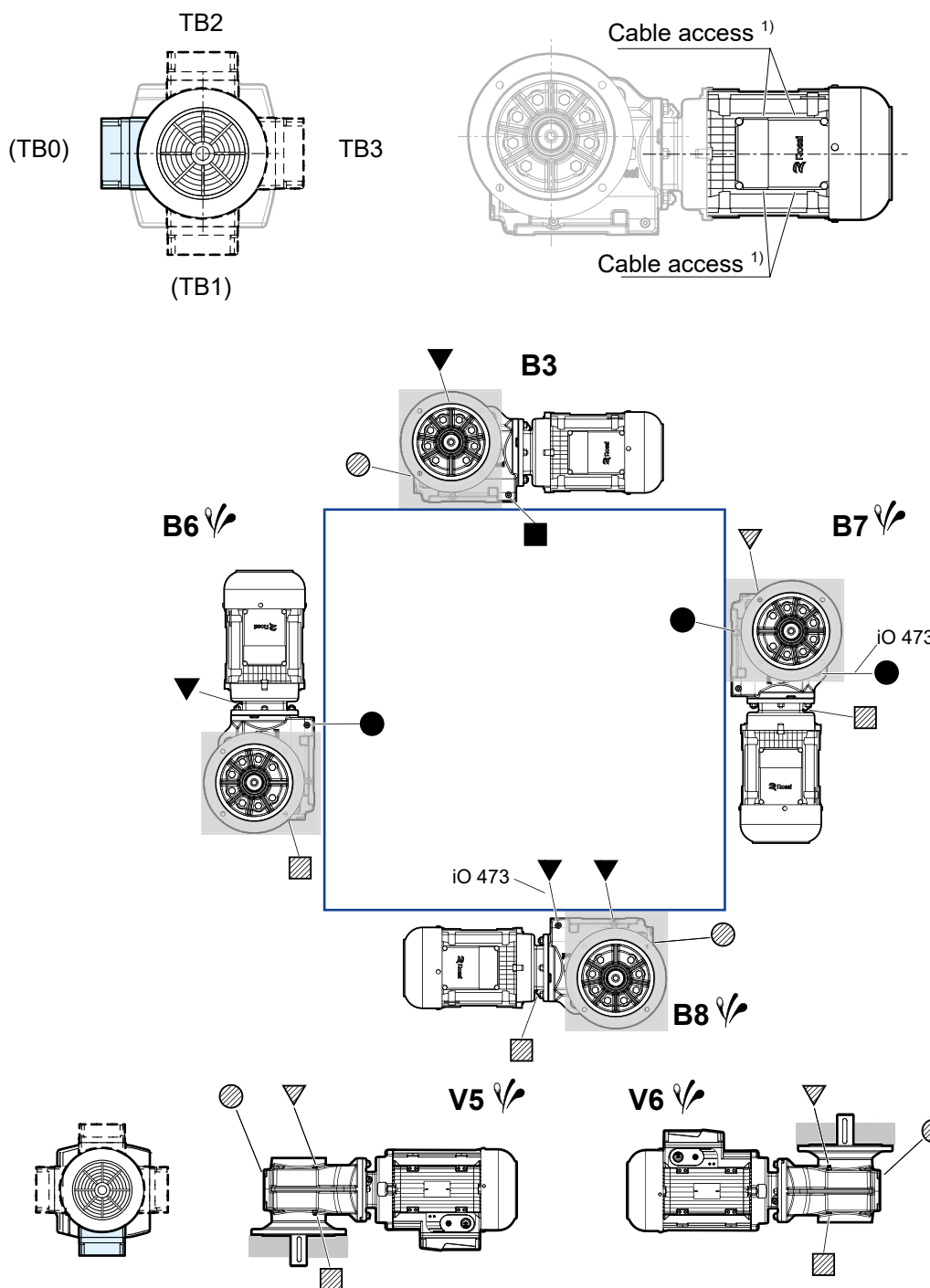
- ▼ breather plug
- oil level plug
- oil drain plug
- ▼ breather plug on opposite side (not in view)
- oil level plug on opposite side (not in view)
- oil drain plug on opposite side (not in view)

Possible high oil splash: for the corrective factor f_{i3} of nominal thermal power P_{TN} , see page 53

¹⁾ The customer is responsible for cable connection: the terminal box is incorporated with the motor housing and is equipped with bilateral cable access with pre-set cutting (one for the power cable and one for the auxiliary devices).



iO 373 FE / iO 973 FE



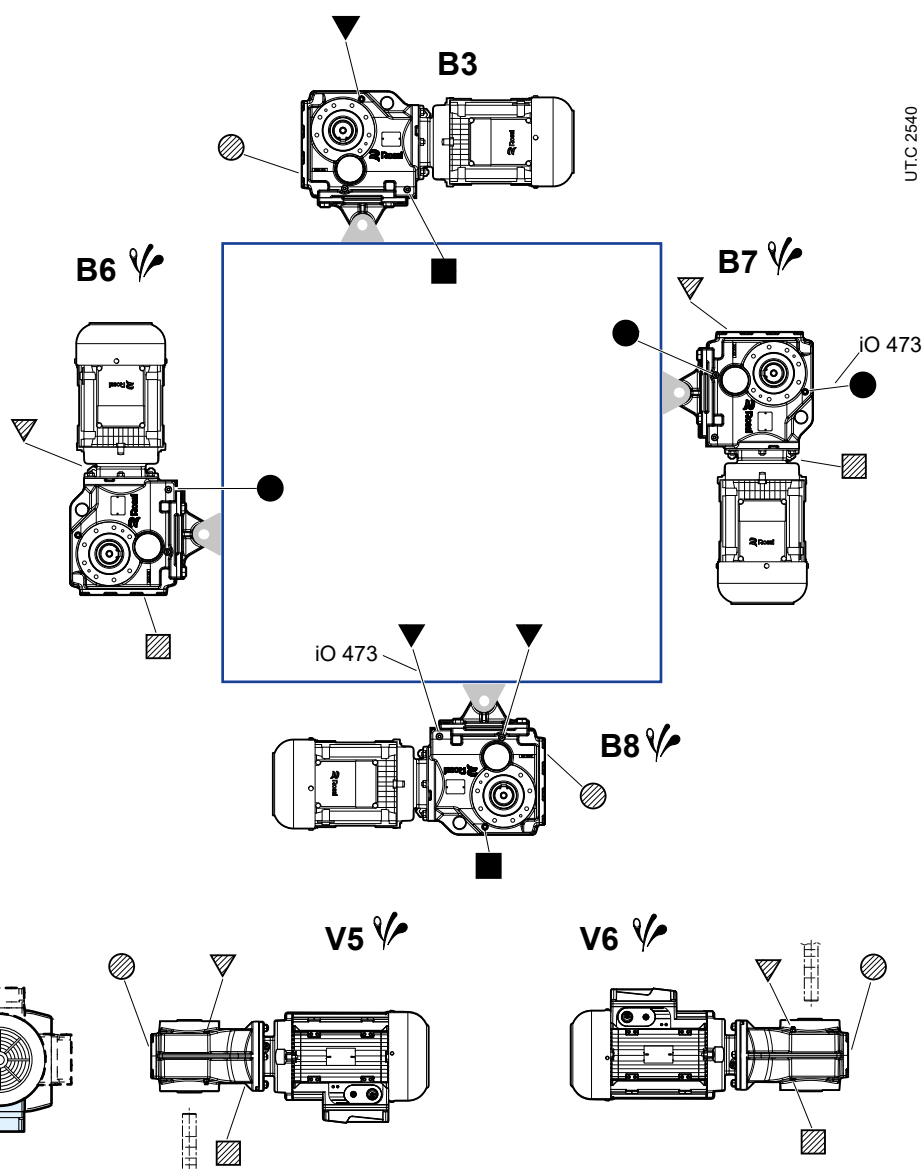
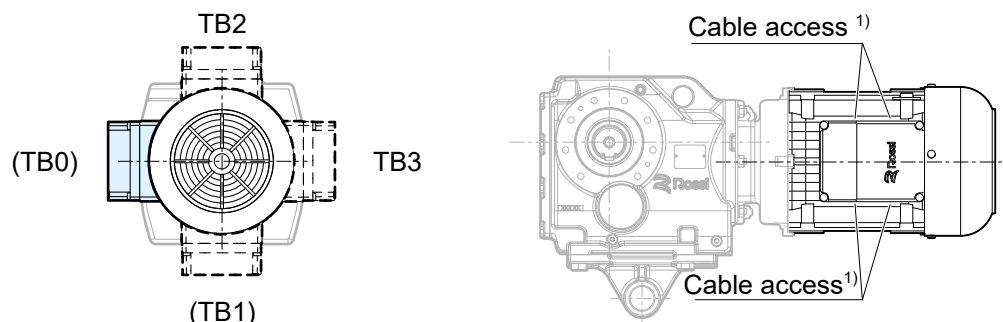
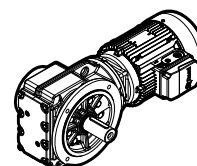
- ▼ breather plug
- oil level plug
- oil drain plug

- ▼ breather 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)

Possible high oil splash: for the corrective factor f_{t3} of nominal thermal power P_{TN} , see page 53

¹⁾ The customer is responsible for cable connection: the terminal box is incorporated with the motor housing and is equipped with bilateral cable access with pre-set cutting (one for the power cable and one for the auxiliary devices).

IO 373 SE / IO 973 SE



UTC 2540

- ▼ breather plug
- oil level plug
- oil drain plug
- ▽ breather 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)

Possible high oil splash: for the corrective factor f_{i3} of nominal thermal power P_{TN} , see page 53

¹⁾ The customer is responsible for cable connection: the terminal box is incorporated with the motor housing and is equipped with bilateral cable access with pre-set cutting (one for the power cable and one for the auxiliary devices).

For assembly or replacement, simply follow the rules outlined below:

- make sure that the couplings of the motor, IEC or NEMA standard on Adapter, are machined based on a precise class (IEC 60072-1);
- thoroughly clean the coupling surfaces;
- check that the motor is centered in the corresponding gear reducer flange seat;
- Tighten the motor fastening screws to gear reducer flange in order to achieve a tightening torque as per ch. 5.2 and ch. 5.3.
- coat the coupling surfaces with a thread-braking seal type LOXEAL 58-14 to prevent contact oxydation;

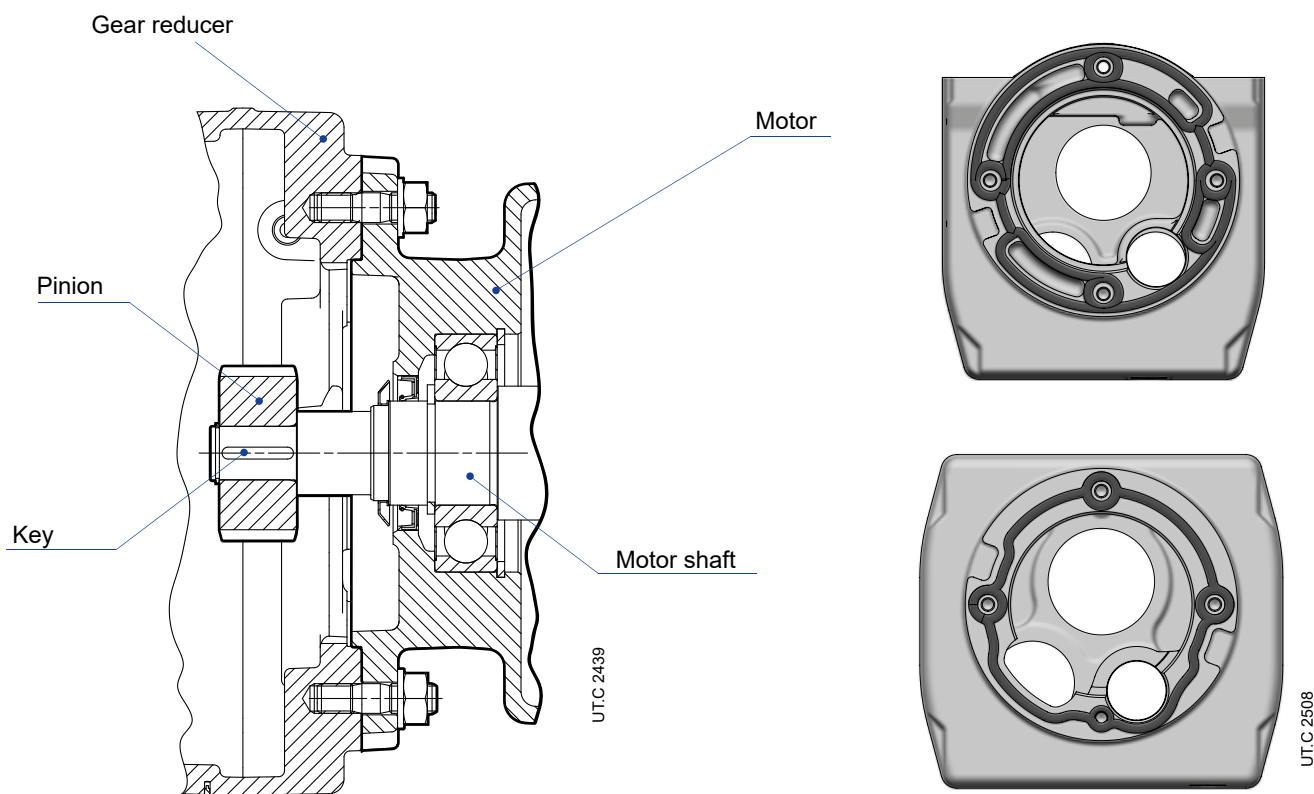


- insert the motor up to shoulder; **do not force the motor shaft during gear reducer coupling: danger of serious damages.**

Procedures of assembling the cylindrical pinion splined to the motor shaft

The following assembly procedures involving the drive shaft must be performed in the order shown:

- 1) mount the supplied key in the groove provided;
- 2) spline the preheated pinion onto the motor shaft at approx. **140 °C** taking care not to strike the motor shaft with a mallet or other tool;
- 3) coat with adhesive product (e.g.: LOXEAL 23-18) the portion of the motor shaft below the pinion;
- 4) check that the flexible ring is in place;
- 5) mount the motor on the gearbox by applying a thin, continuous bead of LOXEAL 58-14 sealant to the flange and gearbox housing, surrounding the motor mounting studs and staying in the central position of the machined surface, as far as possible from the bearing seats (see figure below).



7.3

Assembling the motor (IEC or NEMA) on adapter

Check the mating dimensions – for standards IEC 72-1 be sure that the mating surfaces are machined under accuracy rating (IEC 60072-1, UNEL 13501-69; DIN 42955) – for NEMA standards please refer to NEMA C-FACE chart;

Proceed as follows to assemble the motor on the adapter:

- thoroughly clean the coupling surfaces (motor shaft, motor flange and adapter);
- check and, if necessary, lower the key in order to obtain a backlash of $0,1 \div 0,2$ mm between the top and the bottom of the hole groove. If the shaft key is without shoulder, lock the key;
- lubricate the coupling surfaces to prevent contact oxidation (Klüberpaste 46 MR 401 is recommended);
- push the motor up to shoulder;
Do not force the motor shaft into the adapter coupling. Risk of serious damage.
- Tighten the supplied motor fastening screws to the adapter flange until reaching the tightening torque indicated in the table below:

Tab. 7.3.1 Tightening torques for motor adapter fastening screws

Worm Ød	Tightening torque M_s IEC motors N m cl. 8.8		Worm Ød [in]	Tightening torque M_s NEMA motors ft lb N m	
M8		25	3/8" - 16	32,9	44,6
M10		50	1/2" - 13	80,3	109
M12		85	5/8" - 11	157	213
M16		205			

In order to prevent harmful moisture or dirt (e.g.: dust) infiltrations inside the adapter, it is advisable to insulate any discontinuities or openings in the coupling surfaces between the motor and the adapter flange by applying a continuous bead of sealant (e.g.: LOXEAL 58-14).

Prior to fitting the customer-supplied motor, verify that the static bending torque M_b generated by the weight of the motor on the adapter counterflange is below the permitted value M_{bmax} , shown in table 7.3.2:

$$M_b < M_{bmax}$$

where:

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

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

Y_G [mm] distance of motor center of gravity from flange surface

Motors that are too long and too thin, even if the bending moment is below the prescribed table limits, can generate abnormal vibrations during operation.

In these cases, a suitable additional motor support must be provided (see specific motor documentation).

Loads above those permitted may be present in dynamic applications if the gearmotor is subject to translation, rotation or oscillation: contact Rossi to examine each individual case.

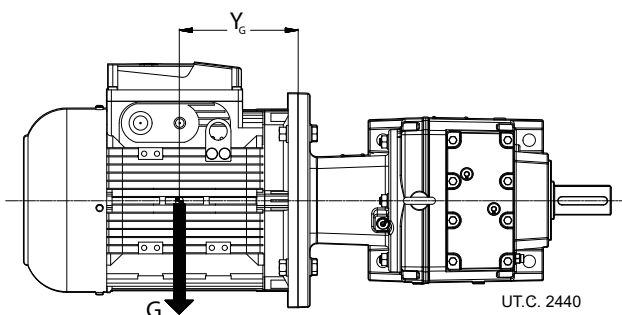


Table 7.3.2 Maximum bending torque M_{bmax} related to IEC and NEMA-C motor adapter

Gear reducer size iC, iO	Maximum bending torque M _{bmax} [N m] IEC motor size								Gear reducer size iC, iO	Maximum bending torque M _{bmax} [N m] NEMA-C motor size						
	63 71	80 90	100 112	132S 132M	132MB	160	180	200		56	143 145	182 184	213 215	254 256	284 286	324 326
272 / 273	55	90	200						272 / 273	45	72	160				
372 / 373									372 / 373							
472 / 473		265	265	290				472 / 473	245		245	250	740			
572 / 573																572 / 573
672 / 673																870
772 / 773				870		1155		1155				772 / 773	655	1000		
872 / 873	872 / 873															
972 / 973						1645	972 / 973							1430		

Commissioning

8

8.1

General

Carry out an overall check, making particularly sure that the **gear reducer is filled with lubricant**.
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 gearmotors equipped with backstop device, see ch 5.10

8.2

Running-in

It is advisable to execute a running-in of approximately 200 ÷ 400 h so that it is possible to achieve 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.

9.1

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;
- seals;
- etc.

Attention!



After a running period, the 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, if this is not possible, use appropriate protection against burns resulting from contact with hot oil.
In all cases, always proceed with great care.

The maximum oil temperatures indicated in the lubrication table (see ch. 6.2) will not impair proper functioning of the gear reducer.

9.2

Oil change

Execute the oil change with the **machine at 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 of the waste lubricant according to the laws in force.

wash the inside part of gear reducer housing using the same oil type suitable for the running; the oil used for this wash can be applied for further washings after proper filtering by 25 µm of filtration standard;

Fill the gear reducer with oil again up to level.

During the oil change, 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 interval see ch. 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 thorough clean-out.

For bearings lubricated with "lifetime" grease, it is not strictly necessary to replace the grease. However, during maintenance operations in which the bearings are accessible, it is always advisable to check and, if necessary, top up the grease.

9.3

Seal ring

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 12000 h.

9.4

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 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 the unit replace the bearings which are subject to breakdown.

9.5

Metal filler plug with filter and valve



To clean the filler plug, unscrew it from the gear reducer to remove any dust and foreign matter, clean it thoroughly, and refit it.

9.6

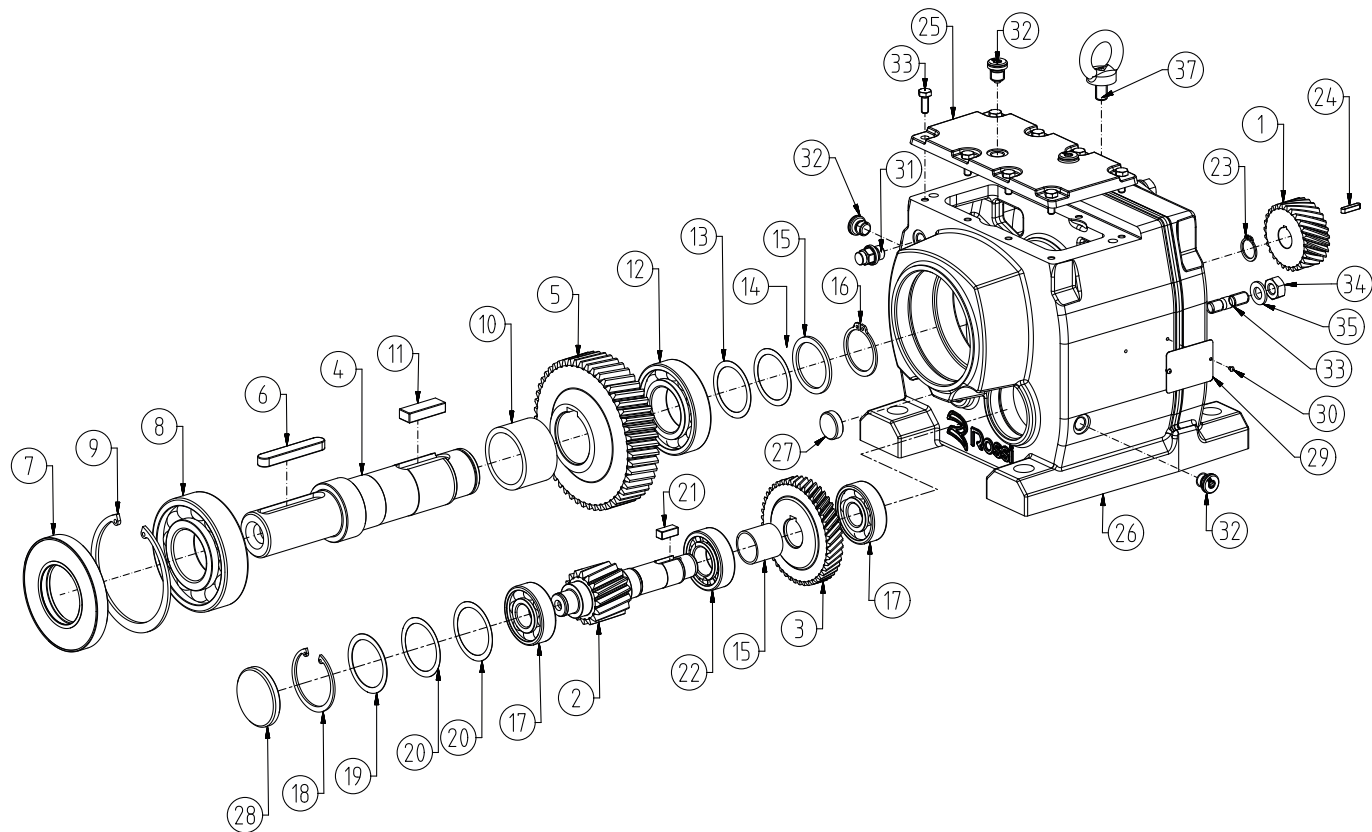
Sound levels L_{WA} and L_{pA}

The standard levels of sound power emission L_{WA} relevant to the gearmotors of this catalog, running at nominal load and speed, fulfill the limits settled by VDI 2159 for gear reducers and EN 60034 for motors.

9.7

Spare part tables

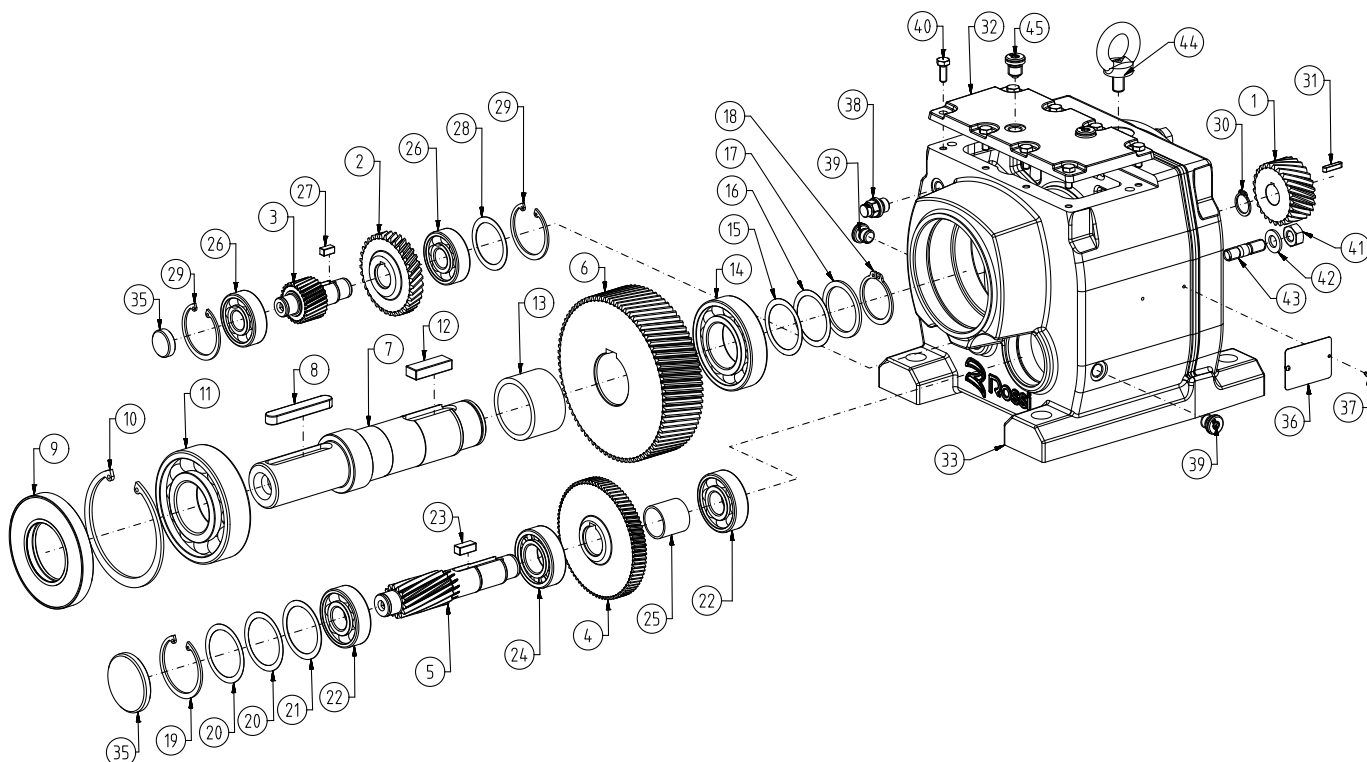
Gear reducer structure base iC272...972



Pos.	Description
1	Wheel
2	Pinion
3	Wheel
4	Output shaft
5	Wheel
6	Key
7	Seal ring
8	Ball bearing
9	Flexible ring
10	Spacer
11	Key
12	Ball bearing
13	Shim
14	Shim
15	Spacer
16	Flexible ring
17	Ball bearing
18	Flexible ring

Pos.	Description
19	Shim
20	Shim
21	Key
22	Roller bearing
23	Flexible ring
24	Key
25	Cover
26	Housing
27	Cap
28	Cap
29	Name plate
30	Rivet
31	Filler plug
32	Drain plug
33	Worm
34	Nut
35	Washer
36	Worm
37	Eyebolt

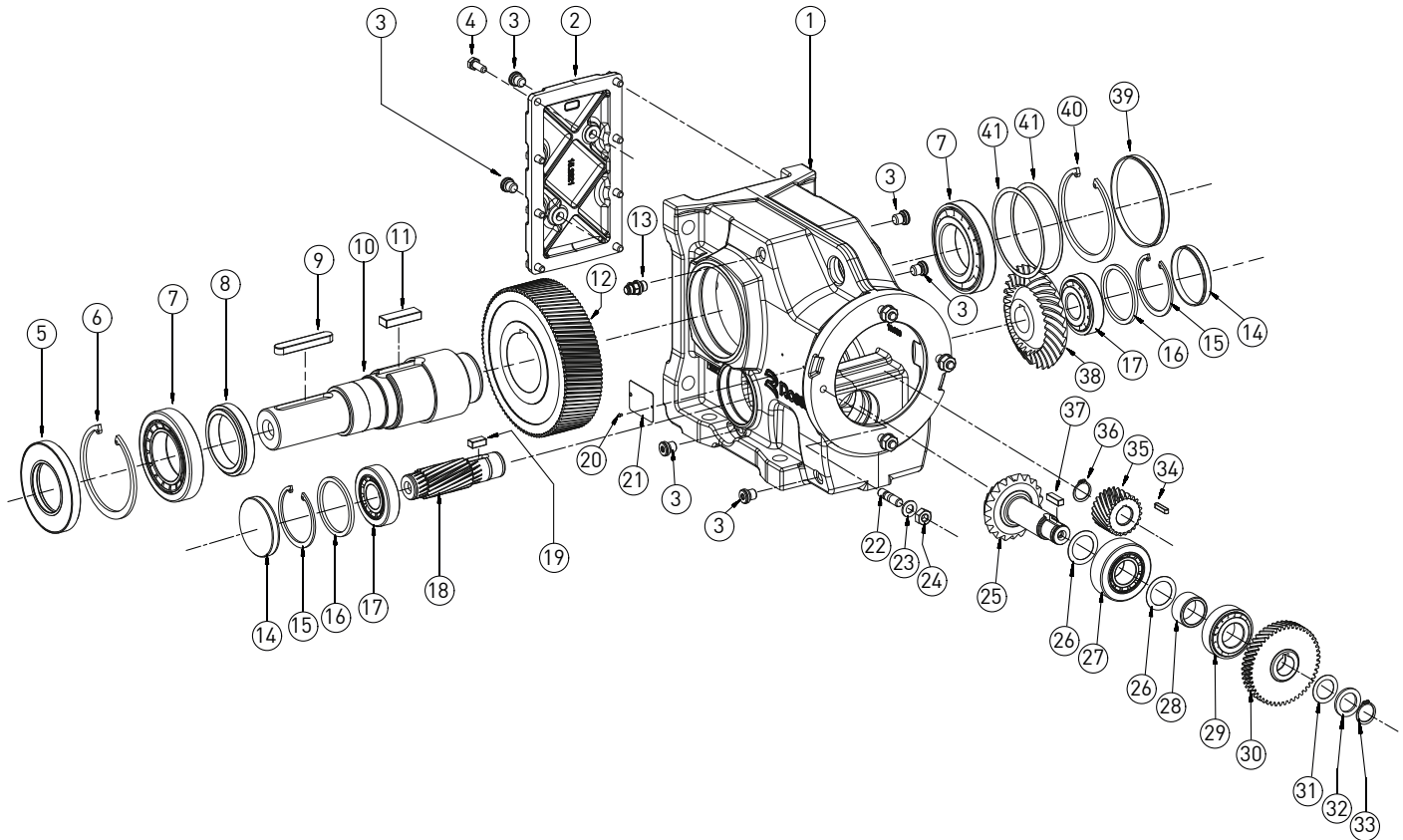
Gear reducer structure base iC273...973



Pos.	Description
1	Wheel
2	Wheel
3	Pinion
4	Wheel
5	Pinion
6	Wheel
7	Output shaft
8	Key
9	Seal ring
10	Flexible ring
11	Ball bearing
12	Key
13	Spacer
14	Ball bearing
15	Shim
16	Shim
17	Spacer
18	Flexible ring
19	Flexible ring
20	Shim
21	Shim
22	Ball bearing
23	Key
24	Roller bearing
25	Spacer
26	Ball bearing

Pos.	Description
27	Key
28	Shim
29	Flexible ring
30	Flexible ring
31	Key
32	Cover
33	Housing
34	Cap
35	Cap
36	Name plate
37	Rivet
38	Filler plug
39	Drain plug
40	Worm
41	Nut
42	Washer
43	Worm
44	Eyebolt

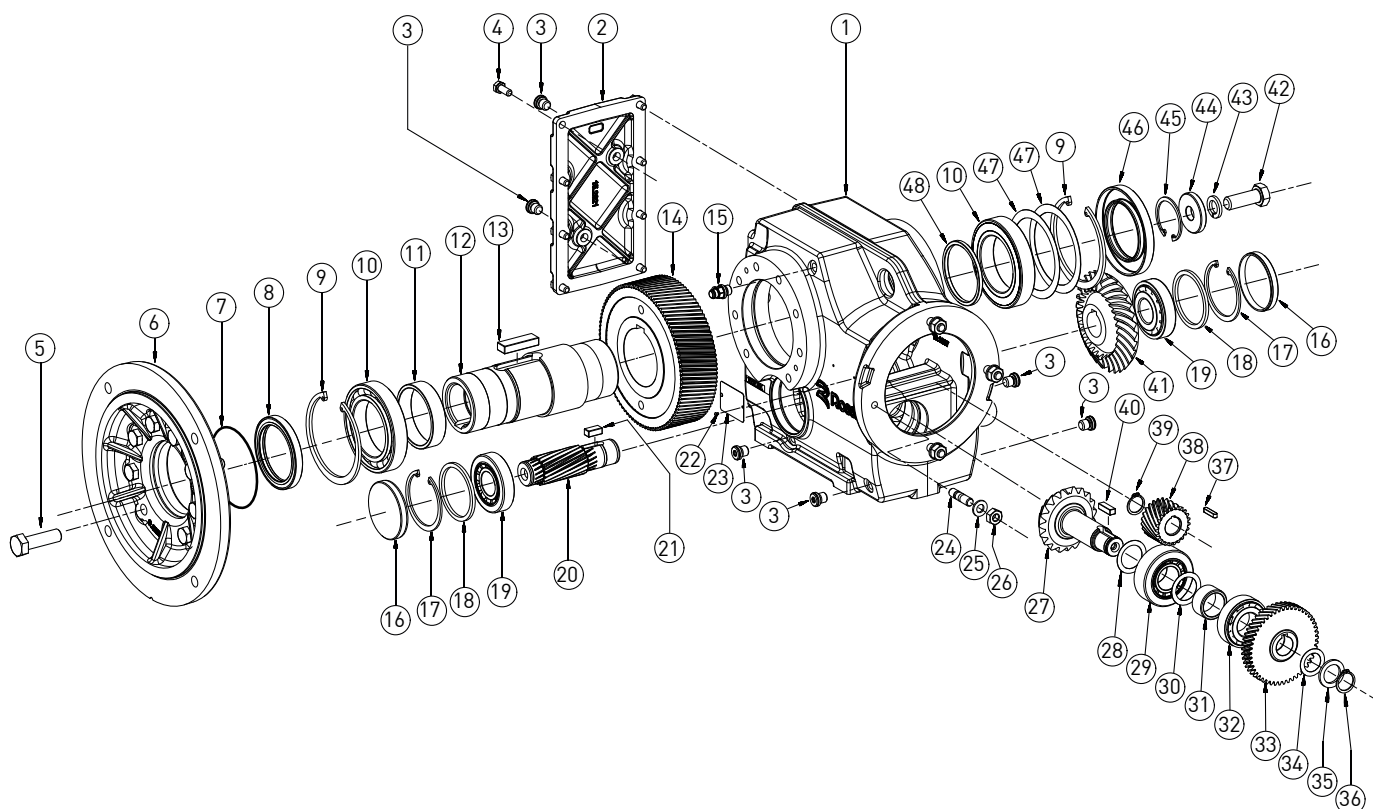
Gear reducer structure base iO373PE...973PE



Pos.	Description
1	Housing
2	Cover
3	Drain plug
4	Screw
5	Seal ring
6	Spring ring
7	Ball bearing
8	Spacer
9	Keyway
10	Output shaft
11	Keyway
12	Wheel
13	Filling plug
14	Cap
15	Spring ring
16	Spacer
17	Roller bearing
18	Pinion
19	Keyway
20	Rivet
21	Name plate
22	Screw
23	Washer
24	Nut
25	Tapered pinion
26	Shim
27	Roller bearing

Pos.	Description
28	Spacer
29	Roller bearing
30	Wheel
31	Shim
32	Spacer
33	Spring ring
34	Keyway
35	Sprocket wheel
36	Spring ring
37	Keyway
38	Bevel wheel
39	Cap
40	Spring ring
41	Spacer

Gear reducer structure base iO373FE...973FE



Pos.	Description
1	Housing
2	Cover
3	Drain plug
4	Screw
5	Screw
6	Flange
7	O Ring
8	Seal ring
9	Spring ring
10	Ball bearing
11	Spacer
12	Output shaft
13	Keyway
14	Wheel
15	Filling plug
16	Cap
17	Spring ring
18	Spacer
19	Roller bearing
20	Pinion
21	Keyway
22	Rivet
23	Name plate
24	Screw
25	Washer
26	Nut
27	Bevel pinion

Pos.	Description
28	Shim
29	Roller bearing
30	Shim
31	Spacer
32	Roller bearing
33	Wheel
34	Shim
35	Shim
36	Spring ring
37	Keyway
38	Sprocket wheel
39	Spring ring
40	Keyway
41	Bevel wheel
42	Screw
43	Washer
44	Bush
45	Spring ring
46	Seal ring
47	Shim
48	Spacer

Gear reducer troubles: causes and corrective actions 10

Trouble	Possible causes	Corrective actions
Excessive temperature of oil	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	Check the pump, the pipes, the oil filter and safety devices efficiency (manostats, thermostats, etc.)
Abnormal 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
	Damaged raceway surface (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 with high speed shaft/ motor running	Broken key	Consult Rossi
	Completely worn gear pair	Consult Rossi
Lubricant leaking from joints (covers or half-casing joints)	Defective oil seals	Consult Rossi
Water in the oil	Defective cooling coil or heat exchanger	Consult Rossi

See specific motor documentation.

NOTE

When contacting Rossi S.p.A. please indicate:

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

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