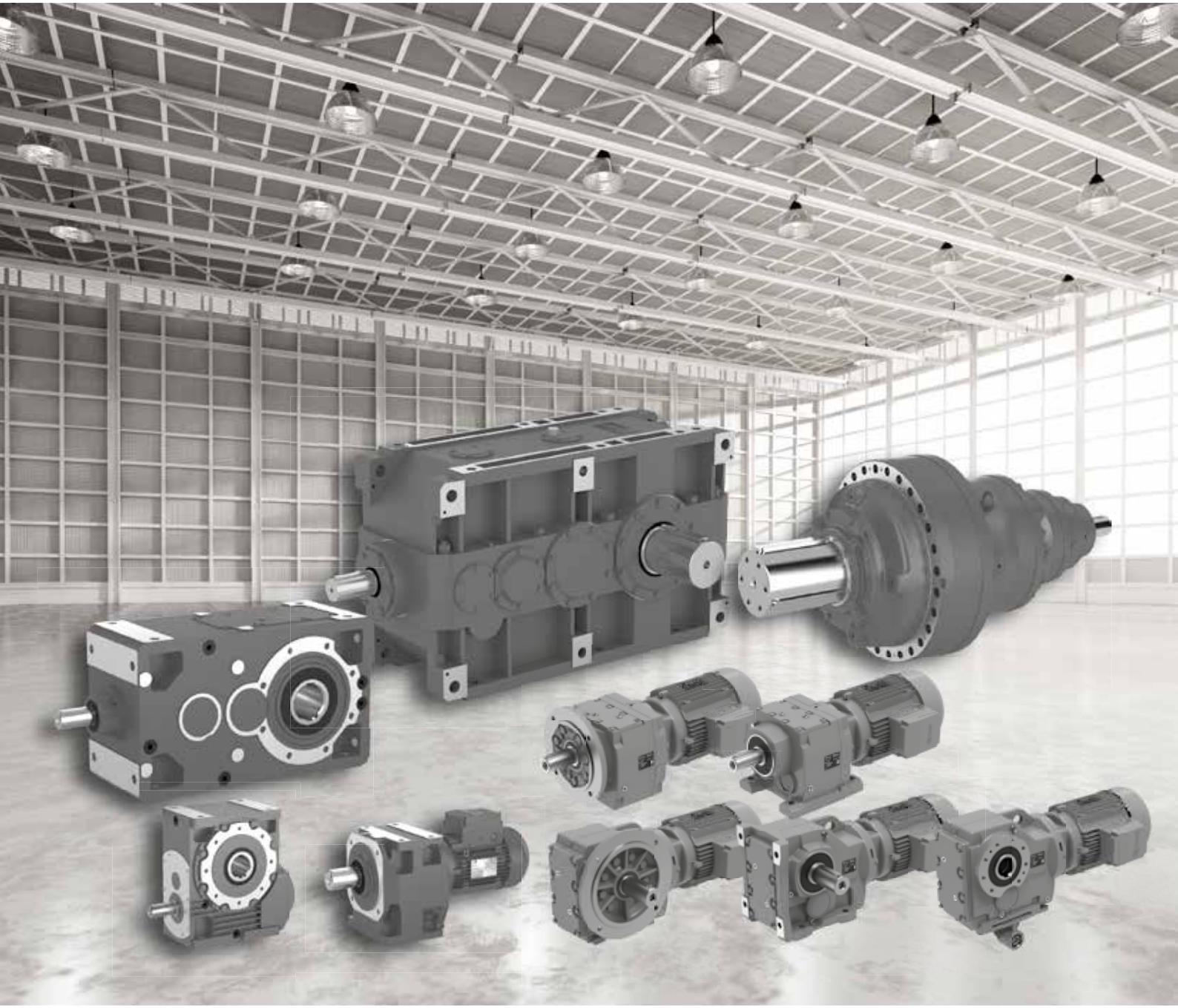
A, E, G, H, iFIT, EP series

Rossi



ATEX Operating Instructions

UTD.123.2024-05.00_EN

Content

Operating instructions gear reducers and gearmotors complying with ATEX 2014/34/EU

A series Worm gear reducers and gearmotors
E series Coaxial gear reducers and gearmotors
G series Helical and bevel helical gear reducers and gearmotors (sizes 40 ... 401)
H series Helical and bevel helical gear reducers (sizes 4000 ... 8001)
iFIT series Helical inline gearmotors (**iC**), Bevel helical gearmotors (**iO**)
EP series Planetary gear reducers and gearmotors

1 - General safety information

This chapter provides information about handling, installation and maintenance of the gear reducers and gearmotors applied in potentially explosive environments ATEX).

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

The information and the data contained in this document correspond to the technical level reached at the moment the handbook is printed. Rossi reserves the right to introduce, without notice, the necessary changes for the increase of product performances.

1.1 - Decommissioning, disposal and recycling

Before decommissioning the gearbox or gearmotor, it should be rendered inactive by disconnecting any electrical contacts and draining it of lubricant, keeping in mind that waste oil has a strong environmental impact and therefore should not be dispersed into soil or surface water.

Decommissioning must be carried out by trained and experienced operators in compliance with applicable occupational health and safety and environmental protection laws.

The gearbox or gearmotor parts must be disposed of at authorized collection centers for waste treatment, recycling and disposal, according to the regulations in force in the country where the disposal will take place

Component	Material
Cylindrical gears with external (pinions and sprockets) and internal (planetary gears) teeth Bevel gears Worm gears: worm gear Shafts Roller Bearings Keys Shrink discs and hub clamps	Case hardening or tempering steel
Drive Unit Bases	Structural steel
Fan cover	Steel sheet
Fans	Aluminum or technopolymers
Torque arm	Structural steel or cast iron
Housing, covers, flanges (inlet and outlet) of the gearbox - Gearbox holders (planetary gearboxes)	Gray or spheroidal cast iron
Worm gears: worm wheels	Bronze and spheroidal cast iron
Seal rings	
O-ring	
V-ring	
Protective caps	Elastomers and steel
Connecting joints	Elastomers and steel
Lubricants	EP additive mineral oil
PAG-based synthetic oil (factory supply)	
PAO-based synthetic oil	
Synthetic grease for bearings, gears and seals	
Cooling coil	Copper or aluminum
Forced lubrication circuit: pipes and fittings	Steel or copper

Motor components	Material
Housing - Shields - Flanges	Aluminum or cast iron
Stator	Steel and copper
Induced	Steel and aluminum
Roller Bearings	Steel
Seal rings	Elastomer and steel
Brake	Steel, copper, plastics, elastomers

Disposal of packaging materials

The materials that make up the packaging must be disposed of at authorized collection centers, giving preference to separate collection and recycling, in accordance with the legal provisions in force in the country where the disposal will take place; reference should also be made to the information contained on the environmental labeling, if any, on the packaging or available on digital channels (e.g., APPs, QR codes, websites);

Type of packaging	Material
Wooden crates, pallets, joists, ...	Wooden packaging
Cardboard packaging and boxes, sheets of cardboard and corrugated paper, curled paper, ...	Paper and cardboard packaging
Plastic packaging, barrier chess, bubble wrap, preformed ...	Plastic packaging

For information on the proper disposal of the gearbox or gearmotor, its components, and packing material, or on the nearest authorized collection centers for treatment, recycling, and disposal, contact your local Rossi branch.

1.2 - Residual risks

The equipment has been designed and manufactured according to state-of-the-art technology as per standards contained in "EU Declaration of conformity".

The application of such standards has allowed to reduce the intrinsic risks of the equipment type at an acceptable level.

Therefore, here following you will find the residual risks list the user will have to consider.

If the instructions and specific selection, installation, verification and maintenance instructions are not followed in zones with danger of explosion, the residual risk of causing an explosion would consequently increase.

The products supplied by Rossi have been designed and manufactured by the essential health and safety requirements of the Machinery Directive 2006/42/EC - Annex I.

The following table lists the residual hazards that the user is required to deal with by the instructions in this document and those that may be attached to the shipment.

Nature/Cause of Risk	Countermeasures
Installation and maintenance operations	**The component shall be handled, installed, commissioned, operated, inspected, maintained, and repaired only by qualified responsible personnel who shall carefully read and strictly apply all instructions contained herein, those that may be attached** to the shipment. He or she should also be **specifically trained and experienced in recognizing the risks and potential hazardous situations (electrical or mechanical) associated with these products**, such as, but not limited to: - Presence of electrical voltage; - Presence of temperature above 50 °C; - Presence of moving parts during operation; - Presence of suspended loads; - Presence of possible high sound level (> 85 dB (A). **He or she should be equipped with appropriate personal protective equipment (PPE) and be familiar with and observe all applicable regulations regarding proper installation and current safety regulations** to ensure the safety of people and avoid major damage to the machine or system.

Nature/Cause of Risk	Countermeasures
Falling or projecting objects	For gearboxes equipped with **backstop device** provide a protection system against the projection of objects resulting from the breakage of the device itself
	For gearboxes equipped with **connection with joint** (fast shaft and/or slow shaft) provide protections against the projection of objects resulting from the breakage of the joint itself.
	For gearboxes with **pendulum mounting** provide appropriate safeties against: - The loosening or breaking of fixing screws; - The rotation or slipping of the gearbox from the machine pivot resulting from accidental breakage of the reaction constraint; - The accidental breakage of the machine pin.
Moving elements	Provide any accident prevention guards for **unused shaft ends** and for possibly accessible fan cover passages (or others).
	Any operation on the gearbox or gearmotor must be done with the machine stopped and disconnected and the gearbox or gearmotor cold.
Temperature extremes	During operation, gearboxes may have **hot surfaces** (> 50 °C); before undertaking any operation, always wait until the gearbox or gearmotor has cooled down (wait about 1 to 3 hours depending on the size); if necessary, take a temperature survey on the surface of the gearbox or gearmotor near the high speed shaft. The same applies to the hydraulic coupling, if any. After a period of operation, the reducer is subject to a slight internal overpressure which can cause burning fluid to leak out. Therefore, wait until the gearbox has cooled down before loosening the plugs (of any kind); otherwise, use appropriate protection (PPE) against burns resulting from accidental contact with hot oil. In all cases, always proceed with great care.
Noise	Depending on the size, transmission ratio to the gearbox, type of service, and mounting system of the gearbox or gearmotor, the noise emission level may be more than 85 dB(A). Carry out field measures and, if necessary, equip the affected personnel with appropriate personal protective equipment (PPE).
Changes that may compromise the safety of the equipment	Do not make structural changes to products supplied by Rossi (gearboxes, gearmotors, drive assembly, etc.) without prior approval from Rossi
Use of substitute components with characteristics unsuitable for the application	Replacement parts must be those authorized by Rossi.

1.3 - Safety

The paragraphs marked with symbols ⚠ Ex shown below contain recommendations to be **strictly** respected in order to assure **personal safety** and to avoid any **heavy damages** to the machine or to the system (e.g.: works on live parts, on lifting machines, etc.).

⚠ Electric or mechanical **situations of danger**, e.g.:
– live parts;
– temperature higher than 50 °C;
– presence of rotating pieces during the running;
– suspended loads (lifting and handling);
– eventual high sound level (> 85 dB(A));

Ex **Safety instructions for the use in areas classified according to ATEX 2014/34/EC.**

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

- **Machinery directive 2006/42/EC and subsequent updatings; 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)» 2014/30/EC and subsequent updatings.**

Attention! It is recommended to pay attention to all instructions of present handbook, all existing safety laws and standards concerning correct installation.

Whenever personal injury or property damage may occur, foresee adequate supplementary protection devices against:

- **release or breakage of fastening screws;**
- **rotation or loosening of the gear reducer from shaft end of driven machine following to accidental breakage of the reaction arrangement;**
- **the 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 in 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 products must be moved, installed, commissioned, handled, controlled, serviced and repaired **exclusively by responsible qualified personnel**.

In the case of installation in places where there may be the formation of stray currents (eg: near electric railway networks, large welding plants, electrical installations with high currents and radio frequencies, etc.), it is appropriate to take adequate precautions to avoid consequences.

The skilled personnel must be **specifically instructed** and have the necessary experience to **recognize any risks** (see paragraph 1.2 - Residual Risks) connected with present products avoiding any possible emergencies.

In this regard, see the standard IEC / EN 60079-14 "Explosive atmospheres - Part 14: Design, selection and installation of electrical systems", in particular Annex F "knowledge, skills and competences of the responsible persons, of the operational and of the designers.

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! 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 of 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. If necessary, require it.

Safety during maintenance

When operating on gear reducer or on components connected to it the **machine must be at rest**: 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

ATEX requirements

For whatever operation (assembling, disassembling, cleanness, maintenance) use tools and procedures which will not cause explosion (e.g.: sparks). When using electric equipment (portable working lights, vacuum cleaner, etc.) be sure that they are cer tified according to ATEX directive and suitable to the area.

Whenever the gear reducer/gearmotor is disassembled, moved and mounted to another installation, or modified, e.g. with the application of a different motor (see table 7.1), **check whether it is compatible with the new installation and classification of the area, as well as its suitability for the envisaged service as indicated by the service specifications** (fs, radial loads, ch. 7.15), thermal power ***P***t (ch. 7.16), radial loads, etc.).

When a bearing lubrication pump is present in G gear reducers ("P" code stated on name plate, see DESIGN) it is necessary **to avoid** input speeds lower than n1= 355 min-1, consult us if need may be.

This handbook «ATEX operating instructions» and its enclosures, if any, must be kept close to the gear reducer or gearmotor in order to be easily consulted.

Further technical documentation (e.g. catalogs) can be downloaded from our website www.rossi.com or can be directly required to Rossi. For any clarification and/or additional information consult Rossi and specify all name plate data.

2 - Application conditions and use limits

2.1 - Use foreseen

The gearboxes and gearmotors of the A, E, G, H, iC, EP series are intended to be used, in accordance with the data on the plate, in environments where during normal activities it is possible or probable the formation of an explosive atmosphere consisting of a mixture of air and flammable substances in the form of gases, vapors, mists (G) or air and combustible dusts (D).

Their use in underground areas of mines and in areas of surface installations of mines subject to risks deriving from firedamp and / or flammable dust (group I) is not permitted.

The intended use is in industrial applications - in the absence of vibrations (see chap. 7.3), nuclear radiations and magnetic fields - with ambient temperature -20 ÷ +60 °C[1)], max relative humidity 80%, pressure 80 ÷ 110 [kPA] and oxygen percentage 21% (O_2) v/v and can be used in areas with explosion dangers classified as follows according to ATEX 2014/34/EU:

- for zone 1, 21, 2, 22 gear reducer and gearmotor without motor in **ATEX 2G, 2D design**
- for zone 2, 22 gear reducer and gearmotor without motor in **ATEX 3G, 3D design**

1) Temperatures outside the range 0 ÷ 40 °C require a technical evaluation of the specific case to be executed by Rossi.

In case of different ambient conditions, consult Rossi.

The specific mark relevant to explosion protection is to be completed with following data:
- **maximum surface temperature and temperature class** or
- **maximum surface temperature** or
- symbol “X” followed by the **identification code of technical document** to be referred to concerning running conditions.

2.2 - Special conditions for a safe use

- Before carrying out any operation, the user **must carefully read this document** (ATEX instructions for use) **and any other supplementary technical documents attached**;
- In the case of accessories, Rossi has the right to supply interchangeable probes such as functional technical specifi cations and connections, but with slightly modifi ed case dimens**ions.**
- **When present, the user must** connect the safety sensors of the protective liquid (temperature and / or lubricating oil level) **and the temperatures of the bearings** installed on the gearboxes and **gearmotors to his own monitoring system and set the intervention thresholds, as indicated in the ATEX Instructions** for Use (and any other supplementary technical documents attached). The signal deriving from the sensors must be used to interrupt the operation of the equipment automatically, making it safe. Operation cannot be restored automatically.
- When present, the user must **connect the complete monitoring pressure switch of the PB parking brake** to his control system for starting the machine. The intervention threshold must be set according to what is indicated in the ATEX instructions for use (and any other supplementary technical document attached).
- The user must **regularly clean the external surfaces** of the equipment to avoid dust deposits in layers with a thickness greater than 5 mm.

Running conditions must not exceed the limits stated on the name plate and those of the documentation enclosed, if any.

3 - Product identification

3.1 - A series - Worm gear reducers and gearmotors

R	**V**	**250**	**U**	**O**	**2**	**A**			**–**	**50**	**B3**	
MR	**V**	**80**	**U**	**O**	**3**	**A**	**-**	**24 × 200**	**–**	**25**	**V5**	

MOUNTING POSITION
(see page 15)

TRANSMISSION RATIO

IEC MOTOR MATING DIMENSIONS
Ød × Ø**P**

DESIGN
A standard
B reduced worm shaft end
C double extension worm with reduced shaft end
D double extension wormshaft

MODEL
3 sizes 32 ... 81
2 sizes 100 ... 250

SHAFT POSITION
O bevel helical

MOUNTING
U universal

SIZE
32 ... 250 final reduction center distance [mm]

TRAIN OF GEARS
V worm gear pair
IV 1 cylindrical and 1 worm gear pair
2IV 2 cylindrical and 1 worm gear pair

MACHINE
R gear reducer
MR gearmotor

3.2 - E series - Coaxial gear reducers and gearmotors

R	**2I**	**50**	**U**	**C**	**2**	**A**			**–**	**29.3**	**B3**		
MR	**3I**	**50**	**U**	**C**	**2**	**A**	**-**	**19 × 200**	**–**	**22.7**	**V5**		

MOUNTING POSITION

(see page 16)

TRANSMISSION RATIO

IEC MOTOR MATING DIMENSIONS

Ød × ØP

DESIGN

A standard

MODEL

1, 2 standard

SHAFT POSITION

C coaxial

MOUNTING

U universal (sizes 50 ... 180)
P with feet (sizes 32 ... 41)
F with flange (sizes 32 ... 41)

SIZE

32 ... 180 final reduction center distance [mm]

TRAIN OF GEARS

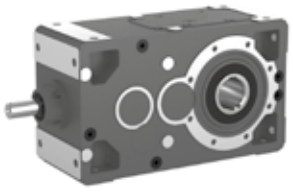
MACHINE

R gear reducer
MR gearmotor

3.3 - G series - Helical and bevel helical gear reducers and gearmotors

R 2I 320 U P 2 D - 10,3 B3

MR C2I 200 U O 2 V - 48 × 350 - 35,3 V5



MOUNTING POSITION

(see page 17)

TRANSMISSION RATIO

IEC MOTOR COUPLING DIMENSIONS

Ø**d** × Ø**P**

DESIGN

A standard

... others

MODEL

2, 3 standard

4 long

SHAFT POSITION

P helical

O bevel helical

MOUNTING

U universal

SIZE

40 ... 360 final reduction centre distance [mm]

TRAIN OF GEARS

Helical gear units:

I 1 helical gear pair

2I 2 helical gear pairs

3I 3 helical gear pairs

4I 4 helical gear pairs

Bevel helical:

CI 1 bevel and 1 helical gear pairs

ICI 1 helical, 1 bevel and 1 helical gear pairs

C2I 1 bevel and 2 helical gear pairs

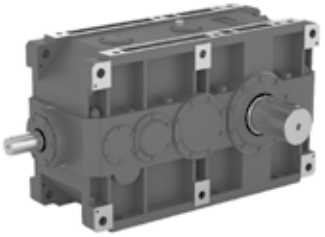
C3I 2 helical, 1 bevel and 1 helical gear pairs

MACHINE

R gear reducer

MR motoriduttore

3.4 - H series - Helical and bevel helical gear reducers



R C2I 5600 U O 1 A - 25.4 B3

MOUNTING POSITION
(see page 18)

TRANSMISSION RATIO

DESIGN
A standard
... others

MODEL
1

SHAFT POSITIONS
P helical
O bevel helical

MOUNTING
U universal

SIZE
4000 ... 8001

TRAIN OF GEARS
Parallel shaft
2I 2 cylindrical gear pairs
3I 3 cylindrical gear pairs
4I 4 cylindrical gear pairs

Right angle shafts
CI 1 bevel and 1 helical gear pair
C2I 1 bevel and 2 cylindrical gear pairs
C3I 1 bevel and 3 cylindrical gear pairs

MACHINE
R gear reducer

3.5 - iFIT iC series - Helical inline gearmotors

iC	4	7	3	F	E	-	34,73	-	B3	-	F416	-	B16D / AB16BI063

Series	Frame size gear reducer	Model	Train of gears	Gear reducer design	Low speed shaft design	-	Transmission ratio	-	Gear reducer mounting position	-	Output flange	-	Mounting position of compact motor / Motor adaptor code
					gear reducer								motor

iC i-FIT Helical inline

Frame size gear reducer: 2, 3, 4, 5, 6, 7, 8, 9

Model: 7

Train of gears: 2 stages; 3 stages

Gear reducer design: P foot mounted design; F foot mounted design; 56

Low speed shaft design: E metric

Transmission ratio: 3,37; 4,00; ...; ...; 75

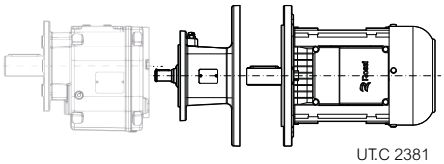
Gear reducer mounting position: B3, B6, B7, B8, V5, V6; 56

Output flange: F212, F214, ..., ...; 69

Mounting position of compact motor / Motor adaptor code:

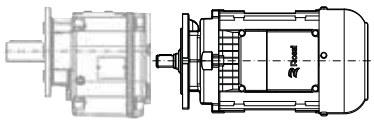
- IEC: AB12BI063, AB12BI071, ..., AB30MI200; 66
- NEMA: AB12BN056, AB12CN143, ..., AB30MN324; 67
- B12B, ..., B30M; 84

configuration with adapter and standard IEC motor



UT.C 2381

configuration with compact motor



UT.C 2382

3.6 iFIT iO series - Bevel helical gearmotors

iO	6	7	3	FE	- 7,28	- B3	- HD	B	- F625	B16D / AB16BI063

Series	Frame size gear reducer	Model	Train of gears	Gear reducer design	Transmission ratio	Gear reducer mounting position	Low speed shaft	Machine [1] size	Output flange	Mounting position of compact motor / Motor adapter code
					gear red.					motor

Series
- **iO** — Bevel helical gearmotors iFIT

Frame size gear reducer
- 3
- 4
- 5
- 6
- 7
- 8
- 9

Model
- 7

Train of gears
- 3 stages

Gear reducer design
- **PE** — metric foot mounting design
- **FE** — metric flange mounting design
- **SE** — metric shaft mounting design
- 61

Transmission ratio
- 5,36
- 6,37
- 7,28
- ...
- 153

Gear reducer mounting position
- B3
- B6
- B7
- B8
- V5
- V6
- 61

Low speed shaft
- **S** — solid
- **SS** — double extens.
- **H** — hollow with key
- **HB** — hollow with shrink disc
- **HD** — stepped hollow with shrink disc
- 39

Machine [1] size
- A
- B

Output flange
- F316
- F214
- ...
- ...
- 77 78

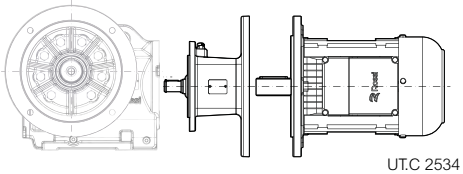
Mounting position of compact motor / Motor adapter code

IEC
- AB12BI063
- AB12BI071
- ...
- AB30MI200
- 74

NEMA
- AB12BN056
- AB12CN143
- ...
- AB30MN324
- 75

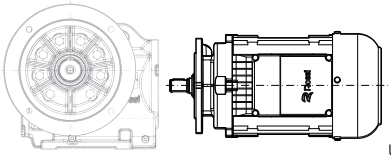
- B12B
- ...
- B30M
- 160

configuration with adapter and standard IEC motor



UT.C 2534

configuration with compact motor



UT.C 2535

[1] field not to be filled in for **"PE"** and **"SE"** designs with **"H"** or **"SS"** shafts

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3.7 - EP series - In-line and bevel gear reducers and gearmotors

Designation

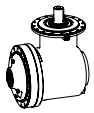
Gear red. size and transm. ratio

R	3EL	018	A	61,3	Y
Machine	PLANETARY EPICICLOIDALE	Size	Reduction stage description [1]	Transmission ratio [1]	Transmission ratio type

1EL 1 planet. stage

2EL 2 planet. stage

2EB 1 planet. stage and 1 bevel stage



3EL 3 planet. stage

3EB 2 planet. stages and 1 bevel stage

4EL 4 planet. stage

4EB 3 planet. stages and 1 bevel stage

Size

001
002
...
018
...
710

Reduction stage description [1]

A standard stage composition

X stage composition not to catalog

Transmission ratio [1]

3,52
4,17
...
61,3
...
3868

Transmission ratio type

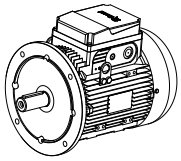
Y standard transm. ratio

Z transm. ratio not to catalog

Designation example:

R 2EL 002A 45,2Y C042M1 F10a C30x58 B5 ,...
R 2EL 009A 25,9Y S070M1 P10c I55x400 B3 ,...
R 3EB 030A 68,3Y H120M1 A10e J38x58 B53 ,...

1) More stage compositions and ratios are available on request. Use online selection software or consult Rossi S.p.A.



QWhen gearmotor is supplied with a Rossi standard motor, please state motor designation according to catalog TX. For terminal box position refer to ch. 6 of EP catalog.

Output — Brake — Input

C	100	M	1	F	10	d	PB10-	0340	I38	x	300	B5	,...
									UH		SA1		

Shaft end type	Output shaft dimensions			Mounting	Output model		Brake		Input	Shaft / Coupling dimensions	Mounting position	Accessories
	Shaft end	System units	Model		Model	Coupling dimens.	Brake model	Braking torque				

C cylindrical

S splined

H hollow for shaft mounting

M flanged

K hollow with keyway

Z splined hollow shaft

T output flange shaft

N hollow with keyway and axial loack

X non-standard design

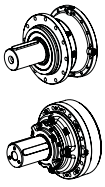
038 ... 100 ... 320

M Metric system units

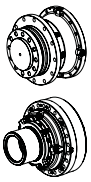
I Impe-rial system units

1 ... 9

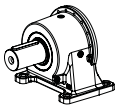
F flange mounting



A shaft mounting



P foot mounting



10 20 ... | a ... z

PB10 PB30 PB90

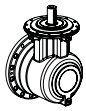
0075 ... 0340 ... 4250

I... IEC electric motor adapter

C... cylindrical shaft end

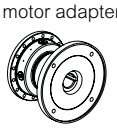
V... cylindrical with fan

J... bevel shaft end



U... universal adapter

UN... NEMA electric motor adapter



UH... hydraulic motor adapter

B5 B51 V1 ...

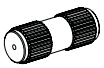
ch.6

,SW... stop washer

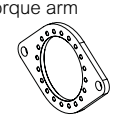
,SB... splined bush

,WF... wheel flange

,SC... splined bar

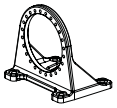


,TA... torque arm



,SD... shrink disc

,FB... foot bracket



,R... pinion gear

ch.4 ...

4 - General product description

4.1 - General

Every gear reducer is provided with a name plate in anodised aluminium containing main technical information relevant to operating and constructive specifications and defining, according to contractual agreements (see fig. ,below), the application limits; 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.

Attention! For the mass stated on name plate remind that:

– it does not consider the lubricant mass;

– it is the maximum one for the gear reducer size, therefore the actual one can be lower as it depends from train of gears and transmission ratio;

– for the gearmotors the mass is always the same of **gearmotor without motor**, therefore consider also the mass of motor stated on relevant name plate in order to know the total mass.

In view of above mentioned points, if it is necessary to know the exact mass, consult Rossi.

Gear reducers and gearmotors are mechanical devices including one or more gear pairs (with internal or external toothing) with several space positions (parallel, intersecting, orthogonal axis), with the aim to reduce motion and to increase torque of a rotating driving machine (e.g. electric, hydraulic motor, etc.) to drive a great number of machines (lifting, traverse movements, rotations, etc.).

They are made of a cast iron or stainless steel housing, including shafts equipped with toothed gear wheels and supported by taper roller bearings; the gear pairs and bearings are grease or oil lubricated with different lubrication solutions: bath, splash or ducts lubrication; gear reducers and gearmotors are equipped with at least one input (high speed) shaft and one output (low speed) shaft; the lubricant is kept inside the hoousing through elastomer-based sliding seals.

4.2- Materials

Gear reducer component	**Material**
Housing	Grey cast iron, nodular cast iron
Planet carrier	Cast iron, steel
Helical and bevel gear pairs	Case hardened steel
Worms	Case hardened steel
Worm gears	Nodular cast iron, bronze alloy
Internal toothing crowns	Case hardened or nitrided steel
Low speed shafts	Structural steel, tempered steel
Cooling coils	Copper, stainless steel
Seal rings	Steel with elastomers

4.3 - Nominal data

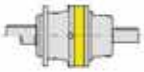
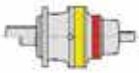
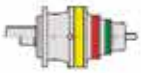
Low speed shaft rated torque M_{N2} - Low speed shaft radial load F_{r2}

Size gear reducer	A Series V, IV, 2IV		E Series 2I, 3I		G Series I, 2I, 3I, 4I, CI, ICI, C2I, C3I		H Series 2I, 3I, 4I, CI, C2I, C3I	
	M_{N2} [N m]	F_{r2} [N]	M_{N2} [N m]	F_{r2} [N]	M_{N2} [N m]	F_{r2} [N]	M_{N2} [N m]	F_{r2} [N]
32	40	1 800	37,5	1 250	–	–	–	–
40	71	2 500	75	2 000	100	2 240	–	–
41	–	–	95	2 500	–	–	–	–
50	128	3 550	160	3 550	206	3 150	–	–
51	–	–	224	4 250	–	–	–	–
63	219	5 300	335	5 300	387	5 000	–	–
64	261	5 300	450	6 700	487	5 000	–	–
80	422	8 000	670	8 000	825	8 000	–	–
81	500	8 000	900	10 000	975	8 000	–	–
100	830	12 500	1 320	12 500	1 700	12 500	–	–
101	–	–	1 800	16 000	–	–	–	–
125	1 330	18 000	2 650	20 000	3 450	20 000	–	–
126	1 580	18 000	3 550	25 000	–	–	–	–
140	–	–	5 000	31 500	5 150	28 000	–	–
160	2 450	26 500	7 100	40 000	7 750	35 500	–	–
161	2 910	30 000	–	–	–	–	–	–
180	–	–	–	–	10 900	45 000	–	–
200	4 620	45 000	10 000	50 000	15 500	56 000	–	–
225	–	–	–	–	21 800	71 000	–	–
250	8 020	63 000	–	–	31 500	90 000	–	–
280	–	–	–	–	43 700	112 000	–	–
320	–	–	–	–	54 500	140 000	–	–
321	–	–	–	–	69 000	140 000	–	–
360	–	–	–	–	87 500	180 000	–	–
400	–	–	–	–	90 000	200 000	–	–
401	–	–	–	–	103 000	200 000	–	–
4000	–	–	–	–	–	–	109 000	200 000
4001	–	–	–	–	–	–	122 000	200 000
4500	–	–	–	–	–	–	140 000	250 000
4501	–	–	–	–	–	–	160 000	250 000
5000	–	–	–	–	–	–	206 000	315 000
5001	–	–	–	–	–	–	250 000	315 000
5600	–	–	–	–	–	–	280 000	400 000
5601	–	–	–	–	–	–	315 000	400 000
6300	–	–	–	–	–	–	400 000	400 000
6301	–	–	–	–	–	–	450 000	400 000
7101	–	–	–	–	–	–	710 000	630 000
8001	–	–	–	–	–	–	1 000 000	900 000

iC Series		iC 27	iC 37	iC 47	iC 57	iC 67	iC 77	iC 87	iC 97
Maximum nominal torque	[N m]	145	224	335	500	670	925	1750	3350
Maximum nominal radial load	[N]	4230	4940	5420	7100	6980	9900	16900	19800

iO Series		iO 373	iO 473	iO 573	iO 673	iO 773	iO 873	iO 973
Maximum nominal torque	[N m]	224	450	670	925	1750	3000	4870
Maximum nominal radial load	[N]	5640	5920	7630	12300	16100	27300	40000

Nominal data and performance of EP series:

Size	Train of gears - Coaxial			
M_{N2} [N m], M_{2max} [N m] F_{r2}[1)] [N] (C ...), F_{r2}[1)] [N] (S ...)	i_N			
	1EL	**2EL**	**3EL**	**4EL**
	3,55 ... 7,1	**12,5 ... 50**	**50 ... 250**	**180 ... 3550**
001A **1 600, 1 900** 17 000, 20 000				
002A **2 240, 2 650** 20 000, 23 600				
003A **3 150, 3 750** 28 000, 33 500				
004A **4 500, 5 300** 35 500, 40 000				
006A **6 300, 7 500** 42 500, 47 500				
009A **9 000, 10 600** 56 000 ,63 000				
012A **12 500, 15 000** 71 000, 80 000				
015A **15 000, 18 000** 63 000, 80 000				
018A **18 000, 21 200** 85 000, 106 000				
021A **21 200, 28 000** 85 000, 106 000				
030A **31 500, 45 000** 100 000, 106 000				
042A **45 000, 67 000** 132 000, 140 000				
060A **63 000, 90 000** 140 000, 160 000				
085A **90 000, 140 000** 200 000, 224 000				

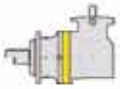
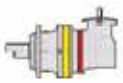
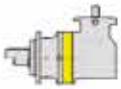
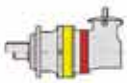
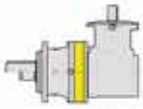
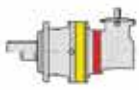
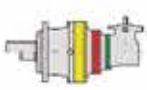
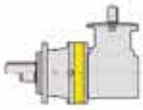
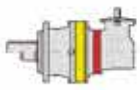
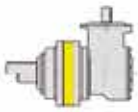
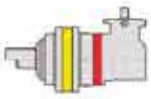
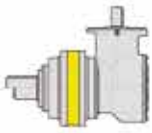
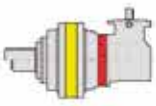
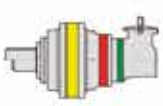
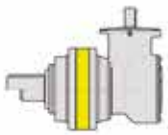
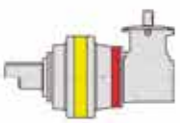
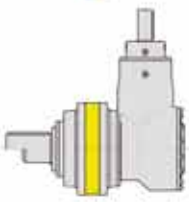
1) Radial loads valid for cylindrical shaft end (C ...) and splined shaft end (S ...), respectively.

Size

M_{N2} [N m], M_{2max} [N m]
F_{r2} [1)] [N] (C ...), F_{r2} [1)] [N] (S ...)

Trai of gears - Bevel helical

i_N

	2EB	3EB	4EB
	9 ... 31,5	31,5 ... 200	160 ... 2240
001A **1 600, 1 900** 17 000, 20 000			
002A **2 240, 2 650** 20 000, 23 600			
003A **3 150, 3 750** 28 000, 33 500			
004A **4 500, 5 300** 35 500, 40 000			
006A **6 300, 7 500** 42 500, 47 500			
009A **9 000, 10 600** 56 000 ,63 000			
012A **12 500, 15 000** 71 000, 80 000			
015A **15 000, 18 000** 63 000, 80 000			
018A **18 000, 21 200** 85 000, 106 000			
021A **21 200, 28 000** 85 000, 106 000			
030A **31 500, 45 000** 100 000, 106 000			
042A **45 000, 67 000** 132 000, 140 000			
060A **63 000, 90 000** 140 000, 160 000			
085A **90 000, 140 000** 200 000, 224 000			

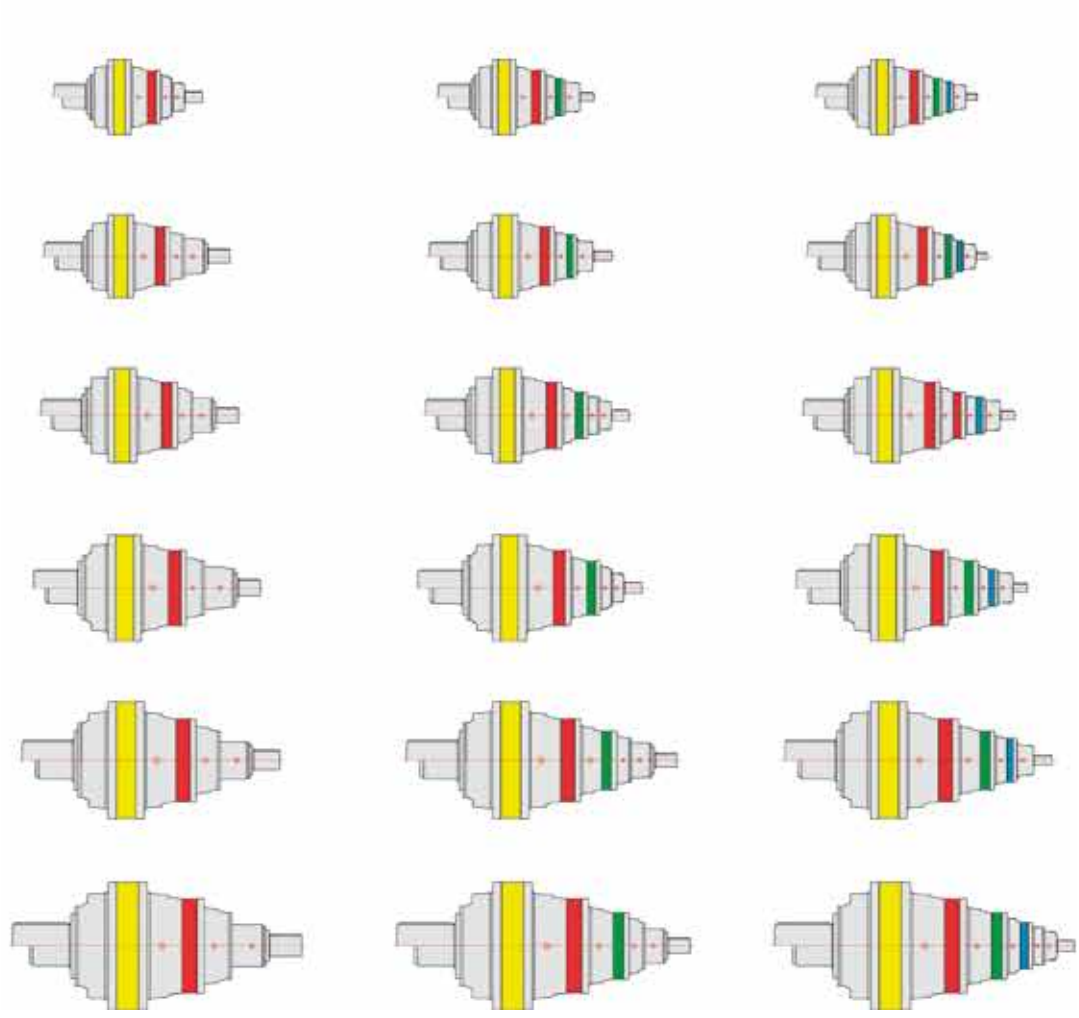
1) Radial loads valid for cylindrical shaft end (C ...) and splined shaft end (S ...), respectively.

Size

M_{N2} [N m], M_{2max} [N m]
F_{r2}[1)] [N] (C ...), F_{r2}[1)] [N] (S ...)

Train of gears - Coaxial

i_N

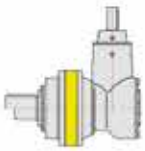
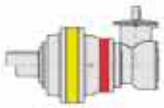
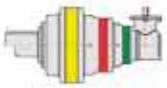
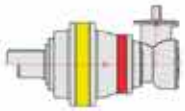
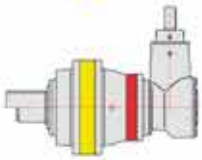
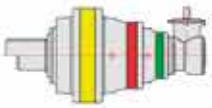
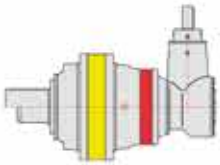
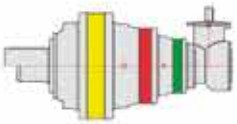
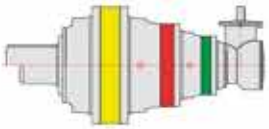
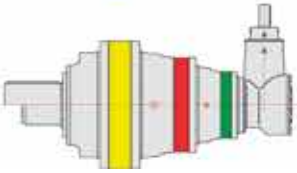
	2EL	3EL	4EL
	18 ... 31,5	**63 ... 250**	**250 ... 1 800**
125A **125 000, 200 000** 250 000, 280 000			
180A **180 000, 280 000** 355 000, 375 000			
250A **265 000, 400 000** 375 000, 425 000			
355A **375 000, 560 000** 530 000, 560 000			
500A **530 000, 800 000** 670 000, 710 000			
710A **710 000, 1 120 000** 800 000 ,850 000			

Size

M_{N2} [N m], M_{2max} [N m]
F_{r2}[1)] [N] (C ...), F_{r2}[1)] [N] (S ...)

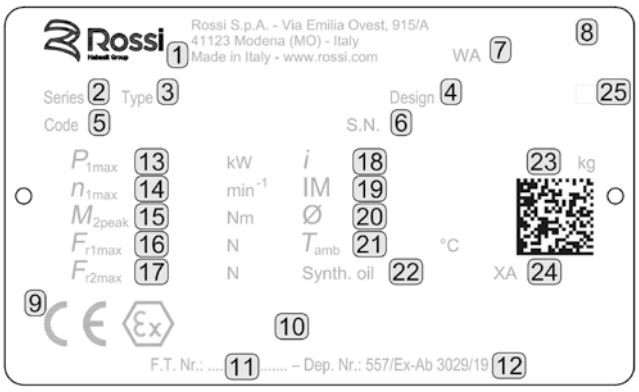
Trai of gears - Bevel helical

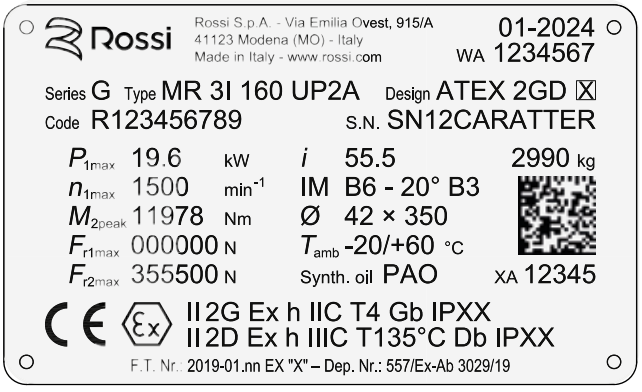
i_N

	2EB	3EB	4EB
	10 ... 25	**45 ... 160**	**160 ... 1 250**
125A **125 000, 200 000** 250 000, 280 000			
180A **180 000, 280 000** 355 000, 375 000			
250A **265 000, 400 000** 375 000, 425 000			
355A **375 000, 560 000** 530 000, 560 000			
500A **530 000, 800 000** 670 000, 710 000			
710A **710 000, 1 120 000** 800 000, 850 000			

4.4 - Nameplate

Every gear reducer is provided with a name plate in anodised aluminium containing main technical information relevant to operating and constructive specifications and defining, according to contractual agreements (see fig. ,below), the application limits; 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.





1 Mark, name and address of manufacturer

2 Gear reducer series

3 Gear reducer designation

4 ATEX design: 2G, 2D or 3G, 3D

5 Product code

6 Serial number

7 Production batch

8 Month and year of manufacturing

9 CE Markings: graphic symbol stating one or more EU Directives has/have been applied

10 **ATEX mark:**

EX: specific EU trademark specific for explosion protection

II: equipment group (suitable for installation in surface locations)

2G: equipment category (suitable for zone 1 and zone 2 - Gas)

2D: equipment category (suitable for zone 21 and zone 22 - Powders)

3G: equipment category (suitable for zone 2 - Gas)

3D: equipment category (suitable for zone 22 - Powders)

Ex: explosion protection

h: mode of protection applied to the non-electric construction intended to be used in an explosive atmosphere, through constructive safety

IIC: equipment suitable for installation in surface locations - gas group "C"; suitable for any combustible gas

IIIC: equipment suitable for installation in surface locations - "C" powder subgroup; suitable for any combustible dust

T*: temperature class - maximum temperature that can be reached by the device: **T4, T3** (G); **T135 ° C**, **T200 ° C** (D)

Gb, **Db**, **Gc**, **Dc**: protection level category 2G, 2D, 3G, 3D, respectively

IP54: IP degree of protection

11 Technical file number deposited

12 Identification of the Certification Body where the technical file was filed

13 Maximum permissible power at the high speed shaft, with working and efficacious cooling systems, if any: the real power to be applied is to be determined basing on the service (overloads, running time, etc.).

14 Maximum permissible input speed

15 Maximum permissible torque at the low speed shaft as overload (duration < 15 s).

16 Mximum radial load permissible at the center line of the high speed shaft taking into account the direction of rotation, the most unfavourable direction of the load and n_{1max}.

17 Maximum radial load permissible at the center line of the low speed shaft end taking into account the direction of rotation, the most unfavourable direction of the load and n_{2max} (= n_{1max} / i)

18 Transmission ratio

19 Mounting position; the eventual indication «spec.» means that it concerns a gear reducer with plugs for special (inclined) mounting position.

20 ∅ motor shaft ∅ flange (gearmotor)

21 Admitted ambient temperature range

22 Lubricant type: PAG (polyglycole) size ≤ 81 and for A series (all sizes); PAO (polyalfaolephines) for all remaining cases.

23 Gear reducer or gearmotor mass (if applicable).

24 Progressive alphanumeric code identifying the presence of additional technical documentaiton (e.g.: SPT scheme)

25 If marked with X install the necessary probes and/or thermostats: mounting position as per SPT scheme attached to these ATEX operating instructions; connections see ch. 9

5 - How supplied

5.1 - 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 courier.

Do not commission gear reducers and gearmotors that are even slightly damaged or not suitable for the intended use: in this case consult Rossi.

Report any non-compliance to Rossi

5.2 - Lubricant

For A, E, G series, if not otherwise stated, gear reducer sizes ≤ 81 are supplied **complete** of synthetic lubricant (PAG base), whereas sizes ≥ 100 are supplied **without** lubricant (see table 8.2).

For H series, if not otherwise stated, all gear reducer sizes are supplied **without** lubricant (see tab. 8.2).

For iC series, if not otherwise stated, all gear reducer sizes are supplied **complete** of synthetic lubricant (PAG base).

For EP series, if not otherwise stated, gear reducer sizes ≤ 021A are supplied **complete** of synthetic lubricant (PAO base) whereas sizes ≥ 022A are supplied **without** lubricant (see table 8.2). Every gear reducer is equipped with lubrication name plate.

5.3 - Painting

Gear reducers in ATEX design are externally protected with **electrically conductive enamel** with surface resistivity $< 10^8\ \Omega$; **grey** color RAL 7040.

In order not to affect the protection coat of external paint, avoid damages to it both from a mechanical (ex. scratch), chemical (ex. aggressive acids) a thermal point of view (ex. sparks).

For typology, specifications, resistance to paint chemical agents, see Tab. 5.3.1.

Tab 5.3.1 - Painting.

Series	Size	Internal painting	External painting		Notes
			Final color **grey RAL 7040**	Features	
A	**32 ... 81**	Epoxy powder (prepainted)	Epoxy powder (prepainted) + Water-soluble polyurethan dual-compound **conductive enamel** Total thickness **90 ÷ 120** µm	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 conductive enamel	Machined parts are painted with water-soluble polyurethan dual-compound conductive enamel Thickness **50 ÷ 80** µm Remove by a scraper or solvent the eventual paint of gear reducer coupling surfaces
G	**40 ... 81**				
A	**100 ... 250**	Single compound ester epoxy or phenolic resin basis primer (pre-painted)	Single compound ester epoxy or phenolic resin basis primer (pre-painted) + Water-soluble polyurethan dual-compound **conductive enamel** Total thickness **90 ÷ 120** µm	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 conductive enamel	
E	**50 ... 180**				
G	**100 ... 401**				
H	**4000 ... 8001**				
iC, iO	**272 ... 972** **273 ... 973**				
EP	**001 ... 710**				

Before adding further coats of paint, properly protect the seal rings and carefully degrease and sand the gear reducer surfaces (as alternative to sandblasting it is possible to apply a water soluble primer coat). In the event of overcoating, use **only conductive paint with surface resistivity values** $< 10^8$ **Ω**.

5.4 - Protections and packing

Overhanging free shaft ends and hollow shafts are treated with protective anti-rust long life oil and protected with a plastic (polyethyl ene) cap (for A, E, G series only up to D ⩽ 48 mm for overhanging shafts, D ⩽ 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 as follows: on pallets, protected with a polyethylene film, wound with adhesive tape and strap (bigger sizes); in carton pallets, wound with adhesive tape and strap (smaller sizes); in carton boxes wound with tape (for small dimensions and quantities). If necessary, motors are conveniently separated by means of anti-shock foam cells or of filling cardboard.

Generally the packing is suitable for the normal road/rail transport. For sea transport it is necessary to foresee a special packing, when ordering.

Do not stock packed products on top of each other.

6 – Lifting, handling and storage

6.1 - Lifting and handling

Make sure that the lifting equipment (e.g.: crane, hook, eye bolt, straps, etc.) is suitable for the dimensions and total weight of gear reducer or gearmotor (gear reducer, motor, oil, etc.); refer to Rossi technical catalog, if need be.

For the lifting and handling of gear reducer (or gearmotor) use exclusively clearance or threaded holes present in the gear reducer housing feet, as **purely** shown in the figures below.

Avoid unbalanced liftings during the handling (max inclination ±15° compared with mounting position during the transport) and, if necessary, use addition belts in order to balance the load.

Do not use shaft ends.

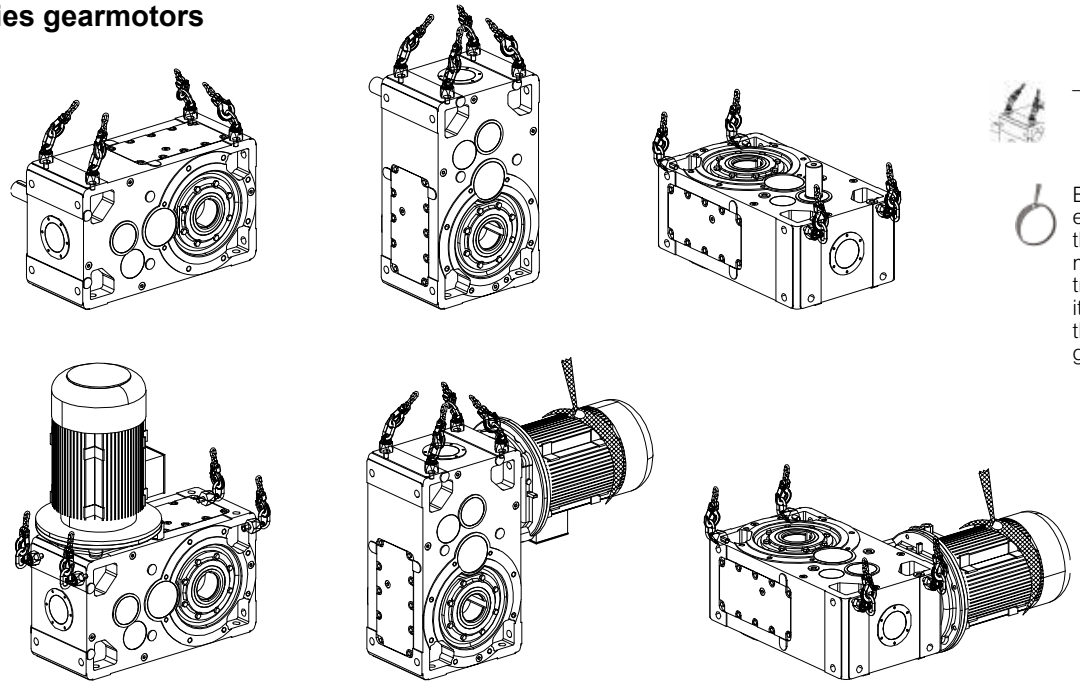
Do not use motor eyebolts, if any.

Do not use front threads of shaft ends or any 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 reducer filled with oil in the mounting position foreseen in the order.

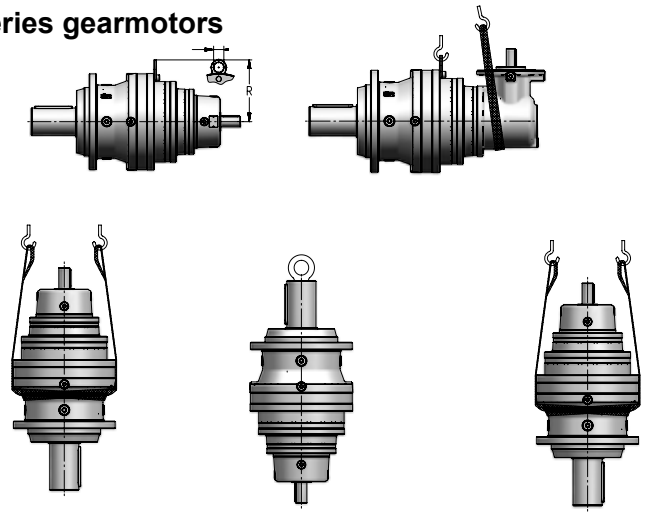
G series gearmotors



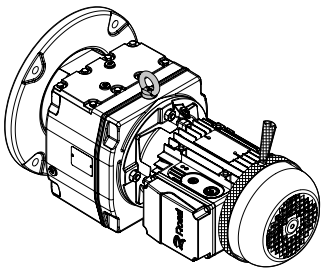
– Lifting point

Belt to be used exclusively to assure the motor, when mounted against transport oscillations; it is not to be used for the lifting of the entire gearmotor group.

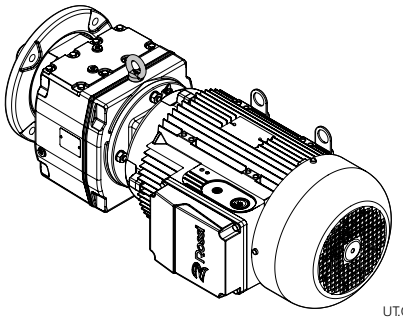
EP series gearmotors



iC gearmotors

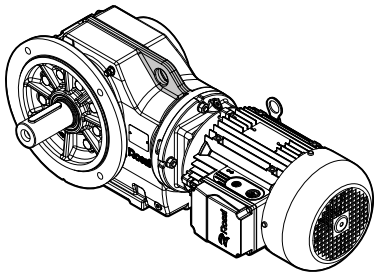


UT.C 2433

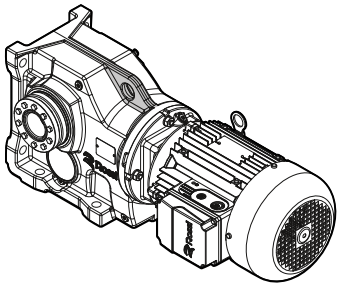


UT.C 2434

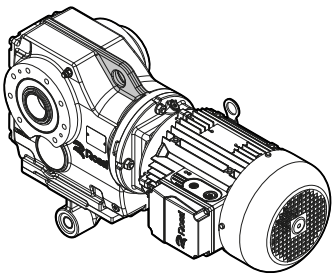
iO gearmotors



UT.C 2567



UT.C 2568



UT.C 2569

6.2 - Storing

The ambient must be sufficiently clean, dry (relative humidity < 50%), free from excessive vibrations (v_{eff} < 0,2 mm/s) to avoid damage to bearings (excessive vibrations should als guarded during transmt, even if within wider range) and at a temperature of 0 ÷ +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 order and on name plate during 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 environment or up to 1 year in environment with high humidity and temperature and/or environment with high changes in temperature 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;

– for gear reducers and gearmotors supplied without oil: completely fill the gear reducers with lubrication oil and verify the specified level before commissioning.

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

7 – Installation

7.1 - Maintenance and cleaning

General safety precautions

Maintenance on gear reducers and gearmotors series A, E, G, H, iFIT, EP, must be performed only by expert personnel, whose training has included all the necessary instructions on the equipment protection methods, on the installation methods, on the relevant laws and regulations and on the general principles of classification of places with danger of explosions (see IEC/EN 60079-17 "Explosive atmospheres - Part 17: verification and maintenance of electrical installations" - Annex B: "knowledge, skills and competences of the responsible personnel, technical personnel with executive functions and operating personnel").

Troubleshooting, diagnosis and repairs

The repair of gear reducers and gearmotors of A, E, G, H, iFIT, EP series must be executed by skilled personnel only (see IEC/EN 60079-19 "Explosive atmospheres - Part 19: repair, revision and restoration of equipment" - Annex B "knowledge, skills and competences of responsible and operational personnel").

7.2 - General

Before the installation, **verify that**:

- there is **no potential explosive atmosphere all around**;
- **the category of the machine is suitable to the area where it will be used and the design is suitable to the environmental conditions** (temperature, atmosphere, etc.); for gearmotors it is necessary to do verification both regarding gear reducer and motor on the basis of the data of the respective name plates because their limits of application may be different. **Attention!** Nameplate data refer to gear reducer only; when it is assembled together with a motor, the application limits derive from the combination of the two nameplates considering the most restrictive ones;

– Basing on the name plate data and additional literature, if any, the size of the unit has been chosen **to meet the requirements of the application**, that is service factor fs = PN1/P1 is greater than or equal to fs requested determined basing on instructions given in par. 7.15.

- in each case, ***f*s is always ⩾ 1** (⩾ **0,85** for worm gear reducers and gearmotors series A);
- input power P_1 **is to be lower than thermal power** determined basing on instructions given in par. 7.16; for further instructions consult Rossi;

– Verify the radial and axial loads are to be according to the max admissible value stated in our technical catalogues. In doubtful cases consult Rossi;

– There were no damages during transport or storage.

– The motor shaft has not been displaced axially in such a way as to result in the fan blades touching the fan cover or shield causing possible damage to one or more bearings.

– Gear reducers supplied complete with oil contain the correct quantity of oil for the mounting position specified on the nameplate (see ch. 15 ... 19); and there is a filler plug with filter and valve (see ch. 13.6);

– Unpainted surfaces not used for assembly are protected with paint suitable for the installation; the paint should be conductive);

– the structure on which gear reducer or gearmotor is fitted is plane, levelled and sufficiently dimensioned in order to assure fitting stability and vibration absence, (vibration speed $v_{eff} \leqslant 3{,}5$ mm/s for $P_1 \leqslant 15$ kW and $v_{eff} \leqslant 4{,}5$ mm/s for $P_1 > 15$ 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;

– Electrical connection (power supply, etc.) corresponds to motor name plate data.

The **probes** (e.g.: Pt 100) and the **thermostats**, when foreseen, **are separately supplied** and therefore it **is necessary to install them on the gear reducer**, in the position stated in the **SPT scheme** attached to present ATEX Operating Instructions and following the instructions in par. 11.2, 11.3, 11.4, 11.5, 11.6.

Connect to proper checking device such probes: see SPT scheme and ch. 11.2, 11.3, 11.4, 11.5, 11.6.

Connect the eventual coil (or internal heat exchanger) to the external water circuit.

For equipments suitable for speed variation, utilise a control system (e.g. encoder connected to a safety system) **in order not to exceed the maximum input speed stated on nameplate.**

The gear reducer or gearmotor can be installed only if in the environment there is no potentially explosive atmosphere during the installation.

When a motor is assembled to a gear reducer or gearmotor without motor verify that it satisfies the minimum safety requirements according to ATEX 2014/34/EC (see table 7.1) and that the relevant application limits (n_{1max}, P_{1max}, etc.) stated on the nameplate of gear reducer (or of gearmotor without motor).

Install the unit in such a way that the level plug is accessible for inspection (where applicable).

Attention! Bearing life and 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; for gear reducer size > 400 use level tapped holes), interposing adequate couplings if need be.

Tab. 7.1 - Requisiti minimi di sicurezza per motore ATEX

Zona	Motore[1)]	Sonde termiche	$T_{superficiale}$
1 (G)	Ex II 2G Ex e, Ex d, Ex de	Termistori o Pt100	Da definire in base alle caratteristiche della zona d'impiego
21 (D)	Ex II 2D IP65		
2 (G)	Ex II 3G Ex n	—	
22 (D)	Ex II 3D IP55 (II 2D IP65 per polveri conduttrici)		

1) Gli apparecchi idonei per zona 1 lo sono anche per zona 2; analogamente quelli idonei per zona 21 lo sono anche per zona 22.

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 the fan side of gear reducer and motor).

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. Do not intake heated air.

Mount the gear reducer so as not to receive vibrations.

Mating surfaces (of gear reducer and machine) must be clean and sufficiently rough to provide a good friction coefficient (aproximately Ra 3,2 ÷ 6,3 µm): 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.

For the dimensions of fixing bolts of gear reducer feet and flanges and the depth of tapped holes consult the Rossi technical catalogs: for bolt tightening torques see ch. 7.4.

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).

The bonding connection of gear reducer and eventually his base, must be carried out through one of the free casing holes:

– remove paint from mating surface;

– use conductors of adequate section according to the regulations in force, see table 3 of EN 50014 standard, considering as traverse section area of phase conductors of the installation the one of the motor power supply cables.

– point out the place used for the earth connection with adequate symbols.

Mating surfaces of connections must be clean and protected against corrosion and conductors must not be subjected to mechanical stresses.

The installer must make the connection on the cable using an eyelet that will then be fixed to the structure by means of a screw; a serrated steel washer as an anti-rotation device will be interposed between the terminal and the housing, while an elastic steel washer as an anti-loosening device will be interposed between the head and the terminal. The eyelet terminal must be suitable to accept a cable section referred to the table below.

Tab. 7.2

Section area of phase conductors, S mm²	Min section area of relevant PE, Sp conductor mm²
$S \leq 16$	S
$16 < S \leq 35$	16
$S > 35$	$0,5\ S$

7.3 - Initial inspection by qualified personnel

Before commissioning, the equipment must be subjected to the initial detailed inspection to ensure that the chosen protection and installation methods are suitable.

In this regard, see the standard IEC / EN 60079-17 "Explosive atmospheres - Part 17: verification and maintenance of electrical installations", in particular Annex B "knowledge, skills and competences of the responsible personnel, technical personnel with executive functions and operating staff".

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 of three phase asynchronous motor.

Y-Δ starting should be adopted for no-load starting (or with a very small load) and for controlled starts, low starting current and limited stresses, if requested.

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 use 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. Fuses do not prevent from voltage peaks.

With non-electric motors (i.e. hydraulic motors) install torque limiters (i.e. max pressure valves) and do not exceed n1 = 1 500 min-1.

Verify that the above mentioned accessories comply with application zone.

When gear reducer is equipped with a backstop device - whose presence is given by an arrow near the low speed shaft stating the free rotation direction - provide a protection system where a backstop device breaking could cause personal injury or property damage.

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

If the reducer or gearmotor is repainted, use conductive paint **with surface resistivity values < 10^8 Ω**.

Gear reducers and gearmotors should be protected by appropriate means from solar radiance and extremes of weather.

If it is necessary to run the gear reducer or gearmotor with ‘free’ shafts, securely fasten the key in the keyway.

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

7.4 - Tightening torques for fastening screws (feet, flange, accessories) and plugs

Unless otherwise specified, it is normally sufficient to adopt screws in strength class 8.8; exceptions are the cases listed below, for which it is necessary to adopt screws with strength class 10.9:

- iC 372 - iC 373 FE with flange F312 and flange F314
- iC 472 - iC 473 FE with flange F414
- iC 572 - iC 573 FE with flange F516

- Before tightening the bolt be sure that the eventual centering of flanges are inserted properly- 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.

Thoroughly degrease the screws before tightening. Especially under severe vibration, heavy-duty service, and/or frequent reversals of motion, it is always advisable to **use locking adhesives** (such as Loxeal 23-18 or equivalent) in the fastening screws and bonding planes.

Pay attention to 12.9 bolts tightening. Values higher than recommended values can damage the bolts.
Do not use lubricants altering the friction coefficient for they may overload the screw connection.
Always verify the tightening torque after the first hours of running.

A, E, G, H, iFIT series

Tab. 7.4.1 - Tightening torque for foot and flange fixing screws

Worm	M_S [N m] UNI 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	1 000	1 200
M27	1 000	1 400	1 700
M30	1 380	1 950	2 350
M33	2 000	2 800	3 400
M36	2 500	3 550	4 200
M39	2 950	4 200	5 000
M42	4 100	5 800	6 900
M45	5 000	7 100	8 400
M48	6 100	8 600	10 300
M56	9 800	13 800	16 500

Tab. 7.4.2 - Tightening torque for plugs

Size gear reducer	Thread size	M_S [N m]
40, 50	G 1/4''	7
63 ... 81	M16 × 1.5	14
100 ... 140	G 1/2''	14
160 ... 280	G 3/4''	14
320 ... 360	G 1''	25
400, 401	G 1''	25
4001... 6301	G 1''	25
7101	G 1''1/4	25
8001	G 1''1/2	25

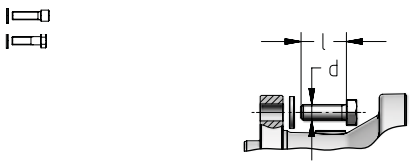
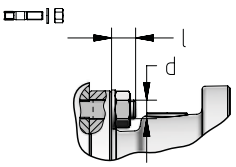
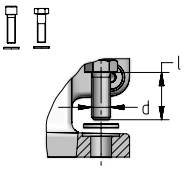
Size gear reducer iC, iO	Thread size	M_S [N m]
272 / 273	M10 x 1	8
372 / 373		
472 / 473		
572 / 573		
672 / 673		
772 / 773	M12 x 1.5	14
872 / 873		
972 / 973	M22 x 1.5	45

Tab. 7.4.3 - Tightening torque for accessories (probes and sensors)

Thread	M_S [N m]
1/2 NPT	50

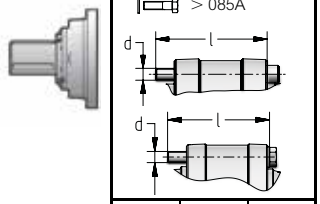
Size **001A ... 021A**

Tab. 7.4.3 - Tightening torque for fastening bolts, feet and flanges

Size	Design (e.g. C038M1 F10a)														
	C... F... S... F... H... A... M... A...				**K... F... Z... F...**				**K... F... Z... F...**				**C... P... S... P...**		
															
	n°	d Ø	l min	l max	n°	d Ø	l min	l max	n°	d Ø	l min	l max	n°	d Ø	l min
001A, 002A	8	M10	30	40	-	-	-	-	8	M10	10	13	4	M14	40
003A	10	M12	35	35	10	M12	35	35	-	-	-	-	4	M16	45
004A, 006A	10	M12	40	50	10	M12	35	35	-	-	-	-	4	M16	45
009A, 012A	12	M14	45	55	12	M14	45	50	-	-	-	-	4	M20	55
015A	16	M14	45	55	16	M14	45	50	-	-	-	-	4	M20	55
018A, 021A	12	M16	55	75	12	M16	50	50	-	-	-	-	4	M22	60

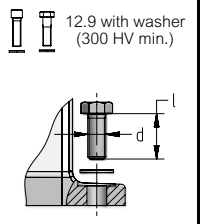
Size **030A ... 710A**

Tab. 7.4.5 Tightening torque

Size	Design (e.g. C100M1 F10e) C... F... S... F... H... A... Z... F...		
			
	n°	d Ø	l min
030A	24	M16	150
042A	28	M16	160
060A	24	M20	180
085A	28	M20	200
125A	28	M24	230
180A	32	M24	250
250A	28	M30	290
355A	32	M30	320
500A	28	M36	350
710A	32	M36	390

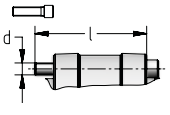
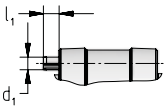
Size **030A ... 710A**

Tab. 7.4.6 Tightening torque

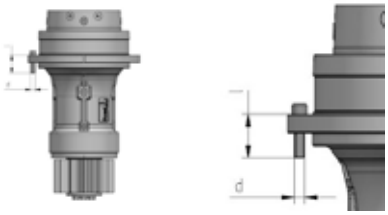
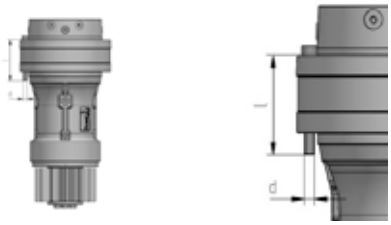
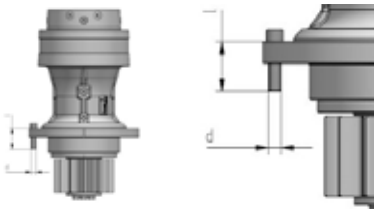
Size	**Accessories ,FB** 		
	n °	**d** Ø	**l** min
030A	4	M24	65
042A	4	M27	70
060A	4	M30	85
085A	4	M33	90
125A	4	M36	110
180A	4	M39	120
250A	4	M42	130
355A	4	M45	140
500A	4	M52	160
710A	4	M56	180

Size **022A, 031A, 043A**

Tab. 7.4.7 Tightening torque

Size	**Design** (e.g. **C**100M1 **F**10z) **C... F... S... F...**					
				 In case of plugs, please use them!		
	n °	**d** Ø	**l** min	**n °**	**d_1** Ø	**l_1** min
022A	12	M16	140	3	12	20
031A	15	M16	160	3	16	20
043A	24	M16	170	-	-	-

Tab. 7.4.7 - Tightening torque for fastening bolts

	R				S				H			
												
size	**output design**	**n**	**d**	**l min**	**output design**	**n**	**d**	**l min**	**output design**	**n**	**d**	**l min**
007	R30b	12	M12	50	S30b	16	M10	100	H30b	10	M16	60
015	R30c	10	M16	60	S30c	16	M12	130	H30c	12	M16	55
021	R30d	24	M16	65	S30d	16	M14	140	H30d	12	M20	70
030	R30e	24	M16	65	S30e	24	M16	160	H30e	24	M20	80
042	R30f	24	M20	70	S30f	28	M16	180	H30f	24	M20	70
060	R30g	24	M20	80	S30g	24	M20	220	H30g	24	M20	80
085	R30h	24	M20	80	S30h	28	M20	240	H30h	24	M30	110
125	R30i	24	M24	90	S30i	28	M24	240	H30i	28	M24	90
180	R30j	28	M24	90	S30j	32	M24	260	H30j	32	M24	90
250	R30k	28	M30	110	S30k	28	M30	300	H30k	28	M30	110

Tab. 7.4.8 -
Size **001A ... 021A**

Size 	**Performance** (e.g. **M... A...**) **Accessories** (e.g. ,**WF...**)		
	n°	**d** 10.9	**l** min
001A ... 002A	12	M10	30
003A ... 006A	12	M12*	40
009A ... 015A	12	M18	50
018A ... 021A	12	M20	60

*) Class 12.9.

Tab. 7.4.9 -
Size **030A ... 710A**

Size 	**Accessories** (e.g. ,**WF...** ,**WT...**)		
	n°	**d** 10.9	**l** min
030A	12	M24	70
042A	16	M24	70
060A	12	M30	90
085A	16	M30	90
125A	18	M30	100
180A	28	M30	100
250A	36	M30	110
355A	44	M30	110
500A	44	M33	130
710A	48	M36	140

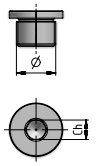
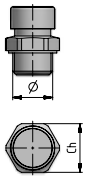
Tab. 7.4.10 - Tightening torque [N m] 

Ø	Class **8.8** $M_2 < 70\% M_{n2}$	**10.9**	**12.9** Washer must be always used (300 HV min.)
M10	50	70	85
M12	85	120	145
M14	135	190	230
M16	210	300	355
M20	400	560	675
M22	530	770	895
M24	690	1 000	1 165
M27	1 010	1 400	1 705
M30	1 380	1 950	2 330
M33	2 000	2 800	3 375
M36	2 500	3 550	4 220
M39	2 950	4 200	4 980
M42	4 100	5 800	6 920
M45	5 000	7 100	8 440
M52	7 600	10 700	12 800
M56	9 800	13 800	16 540

EP plugs

For the size of plugs and breather plug and the value of tightening torque see table below.

Table 7.4.11 Tightening torque

	Filler plugs				Plug with breather			
	Ø	**Ch**	Tightening torque [Nm]		**Ø**	**Ch**	Tightening torque (with aluminium washer) [Nm]
	G 1/8 "	5	**8**		G 1/4 "	17	**12**
	G 1/4"	6	**13**		G 3/8 "	20	**16**
	G 3/8 "	8	**20**		G 1/2 "	24	**23**
	G 1/2 "	10	**30**		G 3/4 "	32	**37**
	G 3/4"	12	**45**		G 1"	40	**58**
	G 1"	17	**65**		G 1" 1/4	50	**105**
	G 1" 1/4	22	**100**		G 1" 1/2	55	**126**
	G 1" 1/2	24	**125**				

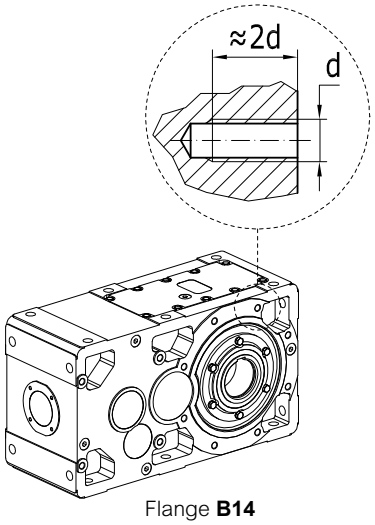
7.5 - Flange mounting

Carefully select the length of fixing screws when using tapped holes (B14) for gear reducer fitting, in order to assure a sufficient meshing thread length (minimum length 1,5 · D screw), for the correct gear reducer fitting to the machine without breaking down the threading seat.

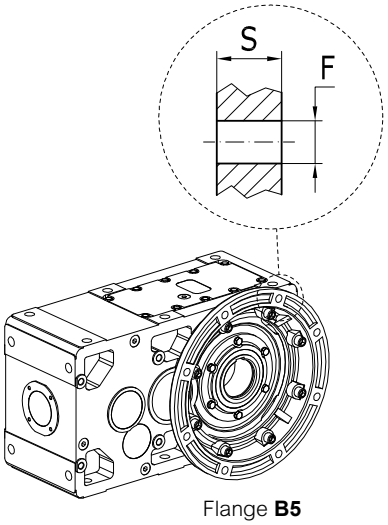
Locking adhesives are recommended both around threads and on mating surfaces.

For the dimensions of fixing screws and the depth of tapped holes consult Rossi technical catalogs.

A, E, G, H, iFIT series

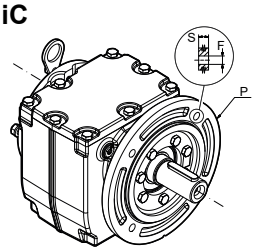


Flange **B14**

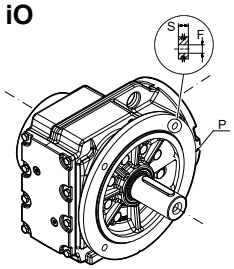


Flange **B5**

iC



iO



EP series

For splined couplings apply adequate lubricants.

To machine the driven shaft, please refer to the dimensions shown in ch. 4, catalog EP series.

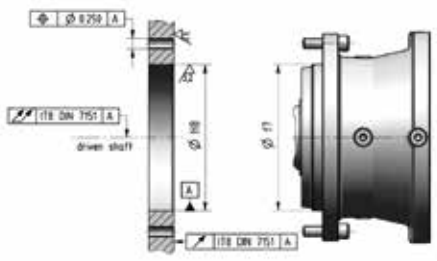
Before mounting pay attention to clean carefully mating surfaces.

In presence of external radial loads or torque required $M_2 \geq 0{,}7 \times M_{N2}$, apply locking adhesives.

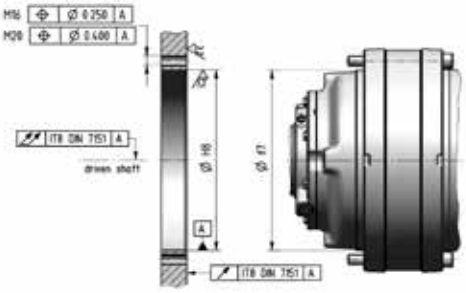
Tighten the screws according to the values given in the table on previous page.

To machine the matching frame, please refer to the drawings below.

Sizes **001A ... 021A**



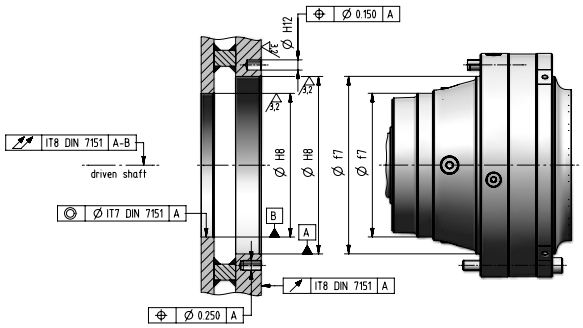
Sizes **030A ... 710A**



Sizes **022A, 031A, 043A**

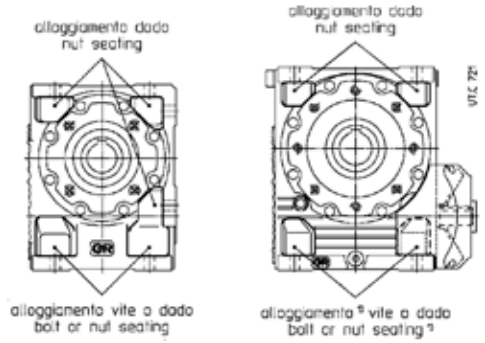
These gear reducer sizes have two spigots. If the output shaft is not subject to radial load or if radial load is below 60% maximum allowed, only the bigger spigot may be used.

If elastic pins are present on the gear reducer flange, they must be used in the matching with a machine frame by a length equivalent to their diameter.



7.6 - Foot mounting

A series

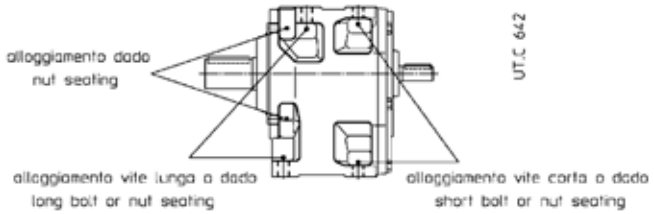


1) For the fastening of fan side screws (sizes 100 ... 250) disassemble the fan cover (which has to cover the seating for the best air flow) and therefore any walls must distance from this one at least half gear reducer center line.

Tab. 7.6.1

Gear red. size	Worm UNI 5737-88 × l_{max}
32 **40** **50**	M6 × 25 M8 × 35 M8 × 40
63, 64 **80, 81** **100**	M10 × 50 M12 × 60 M14 × 55
125, 126 **160, 161** **200**	M16 × 65 M20 × 80 M24 × 90
250	M30 × 120

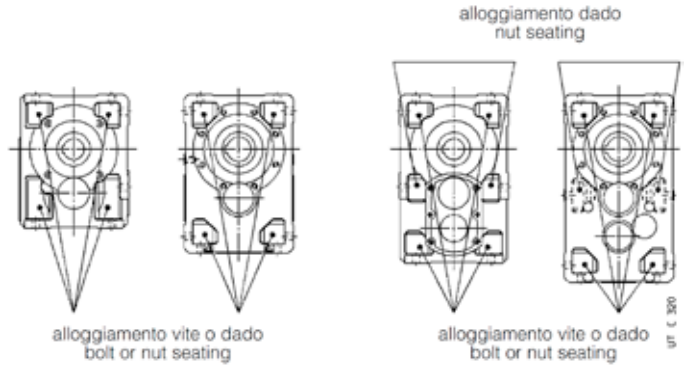
E series



Tab. 7.6.2

Gear red. size	Short bolt	Long bolt
	UNI 5737-88 × l_{max}	
50, 51 **63, 64** **80, 81**	M10 × 30 M12 × 35 M14 × 40	M10 × 35 M12 × 40 M14 × 50
100, 101 **125, 126, 140** **160, 180**	M16 × 50 M20 × 60 M24 × 70	M16 × 60 M20 × 70 M24 × 90

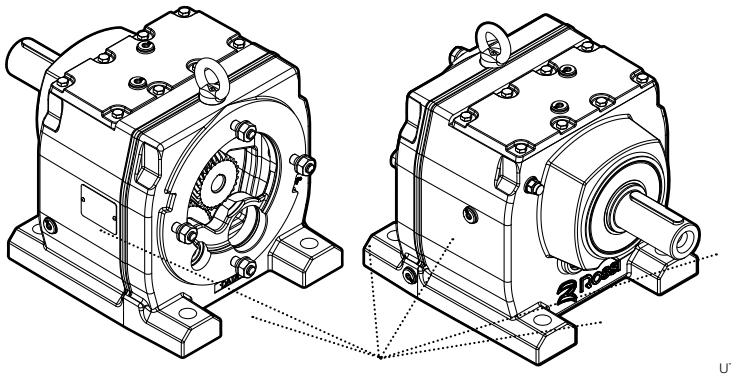
G series



Tab. 7.6.3

Gear red. size	Worm UNI 5737-88 × l_{max}
40 **50** **63, 64**	M6 × 22 M8 × 30 M10 × 35
80, 81 **100** **125, 140**	M12 × 40 M14 × 50 M16 × 55
160, 180 **200, 225** **250, 280**	M20 × 70 M24 × 90 M30 × 110
320 ... 360 **400, 401**	M36 × 130 M45 × 260

iC



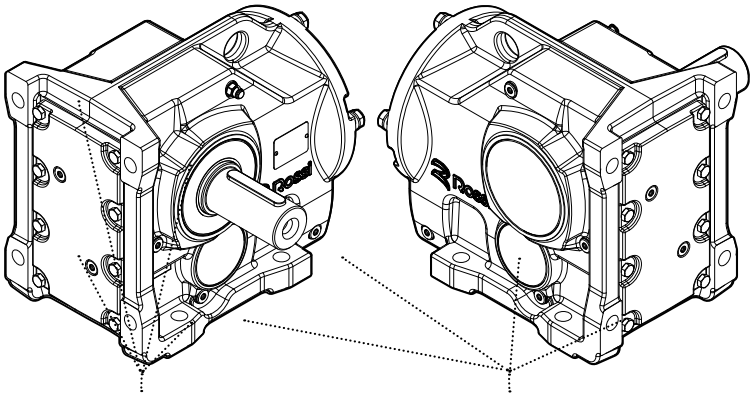
UT.C 2570

Housing no. 4 screws or nuts
(minimum length shown in table)

Tab. 7.6.4 Foot mounting screw dimensions - iC

Size gear reducer iC	**Foot fastening screw** 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



UT.C 2571

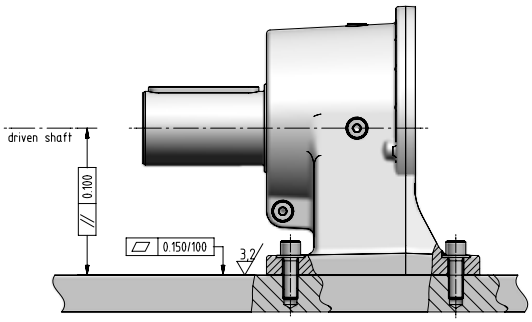
Housing no. 4+4 screws or nuts
(minimum length shown in table)

Tab. 7.6.5 Foot mounting screw dimensions - iO

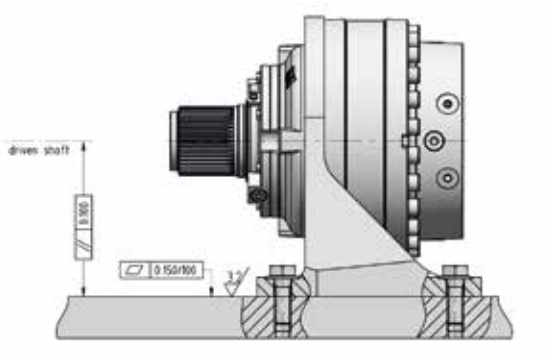
Size gear reducer iO	**Foot fastening screw** UNI5737 - ISO 4014 (minimum length in mm)
373 **473**	M10 x 40
573 **673**	M12 x 50
773	M16 x 60
873	M20 x 75
973	M24 x 85

EP series

Sizes **001A ... 021A**

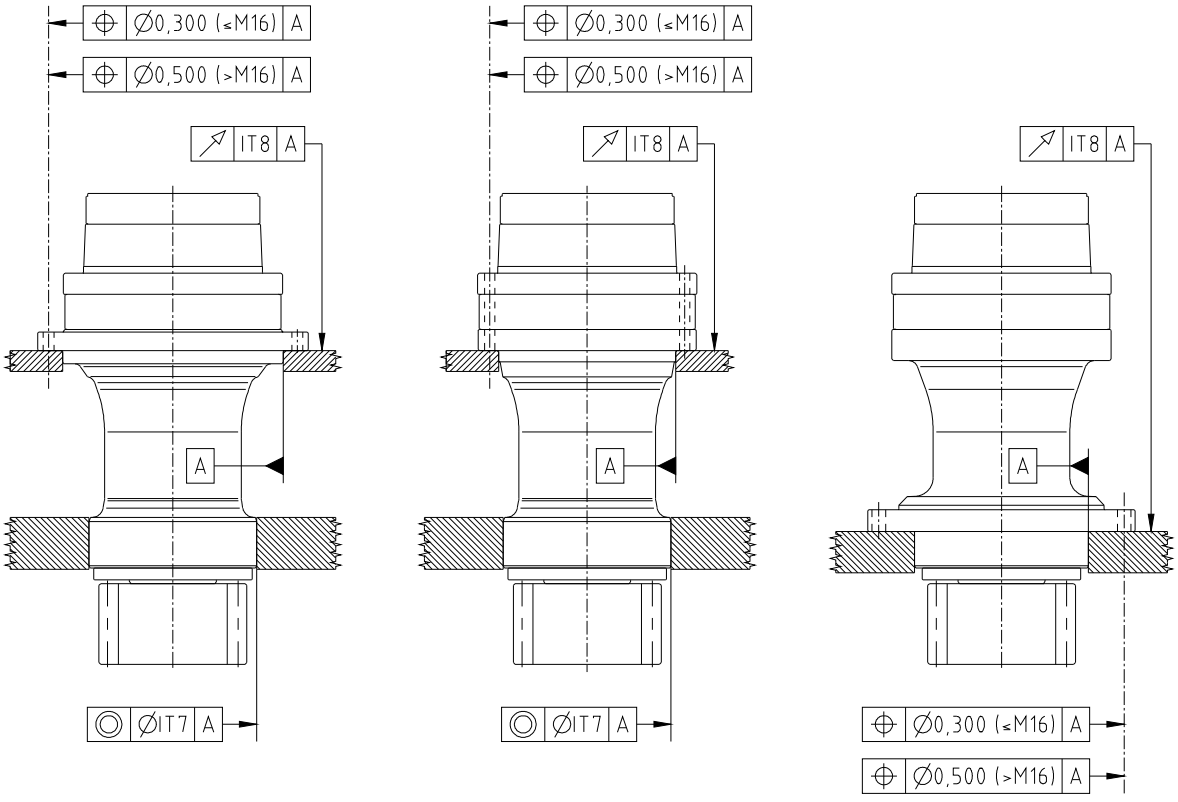


Sizes **030A ... 710A**



Gear reducer mounting for slewing drives

In the case of slewing drives (output design R-S-H), to ensure a correct operation and an excellent power transmission between gear reducer and machine, the gear reducer requires a rigid connection structure resistent to radial loads. The shape and position tolerances stated below must be followed.



7.7 - Shaft mounting

Important! When shaft mounted, the gear reducer must be supported both axially and radially (also for mounting positions B3 ... B8 in the case of A, E, G, H, iFIT series and mounting positions B5 and B53 for EP) 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**:

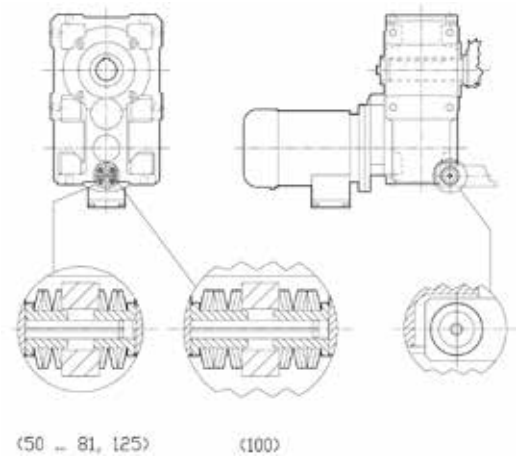
– **rotation** or **unthreading of the gear reducer from shaft end** of driven machine following to accidental breakage of the reaction arrangement;

– accidental breakage of shaft end of driven machine.

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.

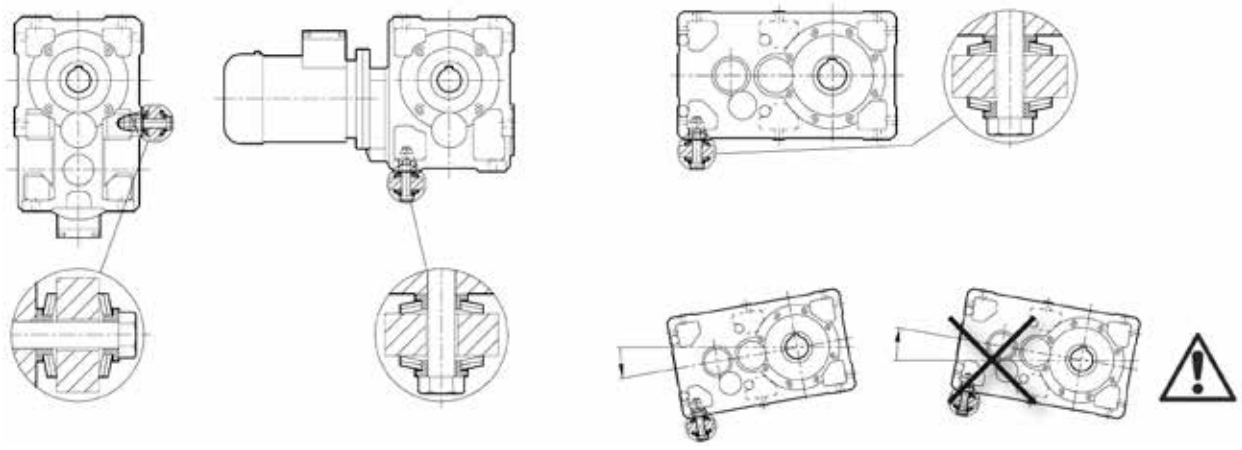
Kit using reaction disc springs (reaction recess), size < 125 helical.

For the kit mounting, 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.



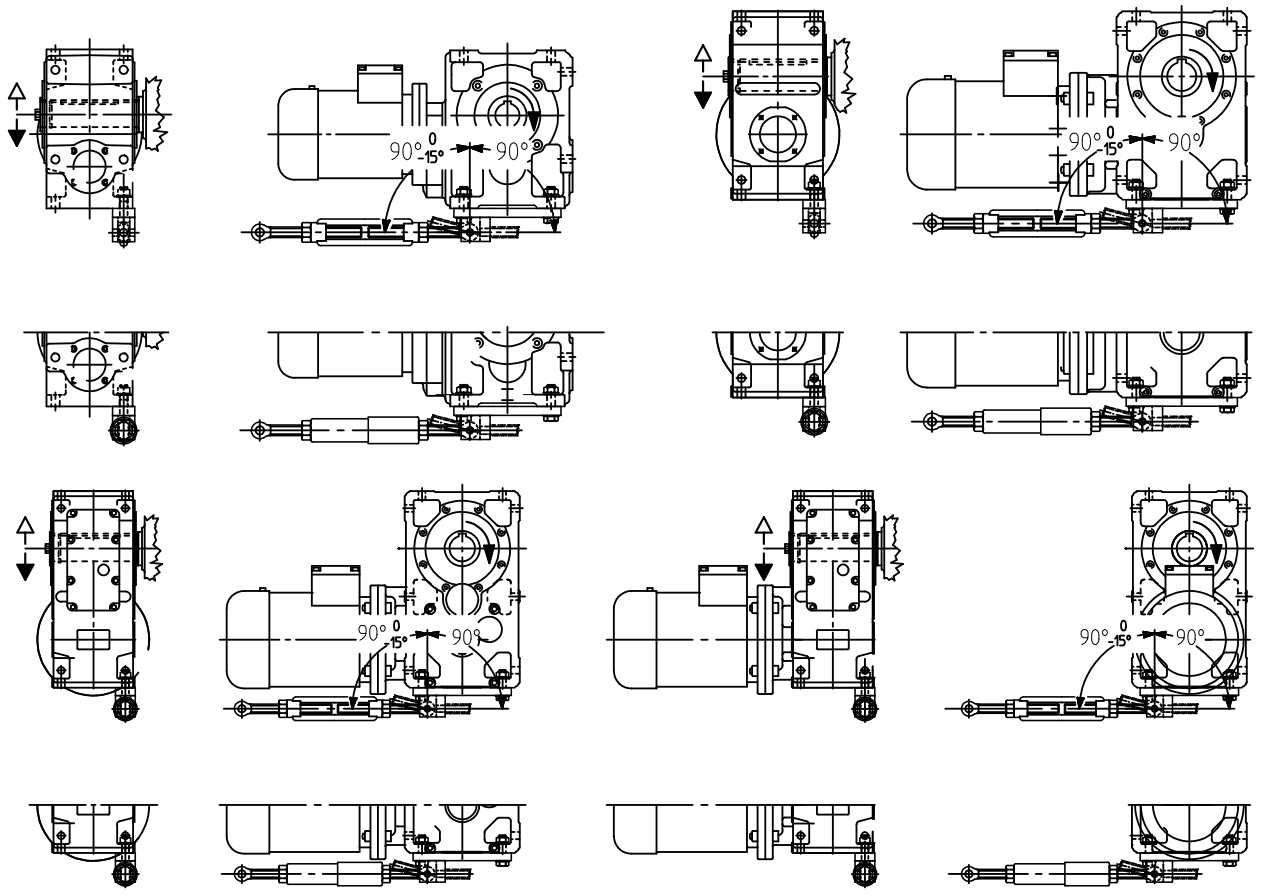
System with reaction bolt using disc spring

For helical and bevel helical gear reducers sizes 140 ... 360 C2I, 2I, 3I, mounting position B3 or B8, ensure that the **housing oscillation, during the running, does not overtake** – towards the top – **the horizontal position.**



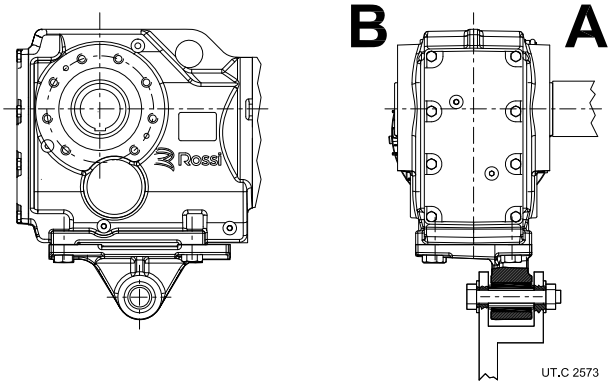
System with **rigid** or **flexible torque arm**

If the direction of rotation is opposite to that given in the fig. rotate the rigid torque arm by 180° (unnecessary operation in case of flexible torque arm).



System with **rigid torque armiFIT - iO**

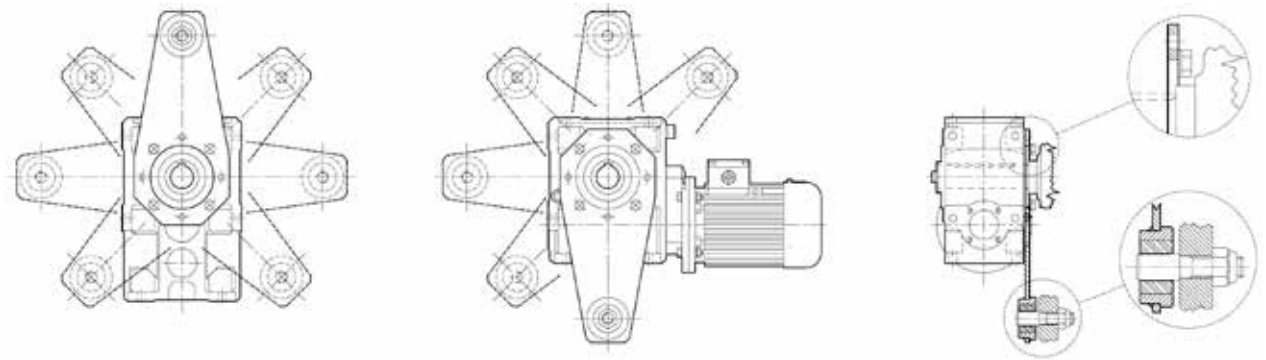
In case of machine pivot on the B side, mount the reaction arm in a mirror position to that shown in the figure.



System with **torque arm** (A, E, G, H series)

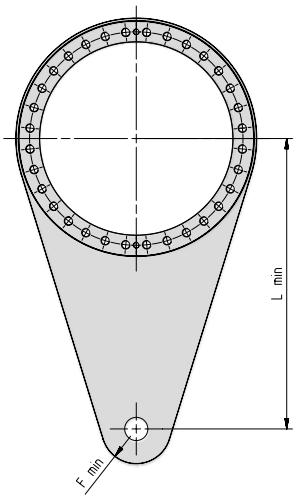
According to dimensions, some mounting positions of the motor flange torque arm could not be possible.

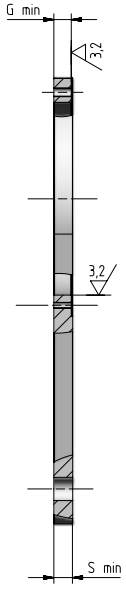
Before mounting the reaction arm, clean carefully the coupling surfaces and apply locking adhesives on the screws and on mating surfaces. Tighten the screws by a dynamometric wrench at values shown in the table 7.4.10.



System with **asymmetrical torque arm without ball bearing (EP series, sizes 001-021)**

The torque arm can be easily applied to all **H, M** and **N** designs.
Symmetrical torque arm is provided as standard option (,TA - up to size 085A); if you need a one sided torque arm, it must comply with the dimensions shown below.





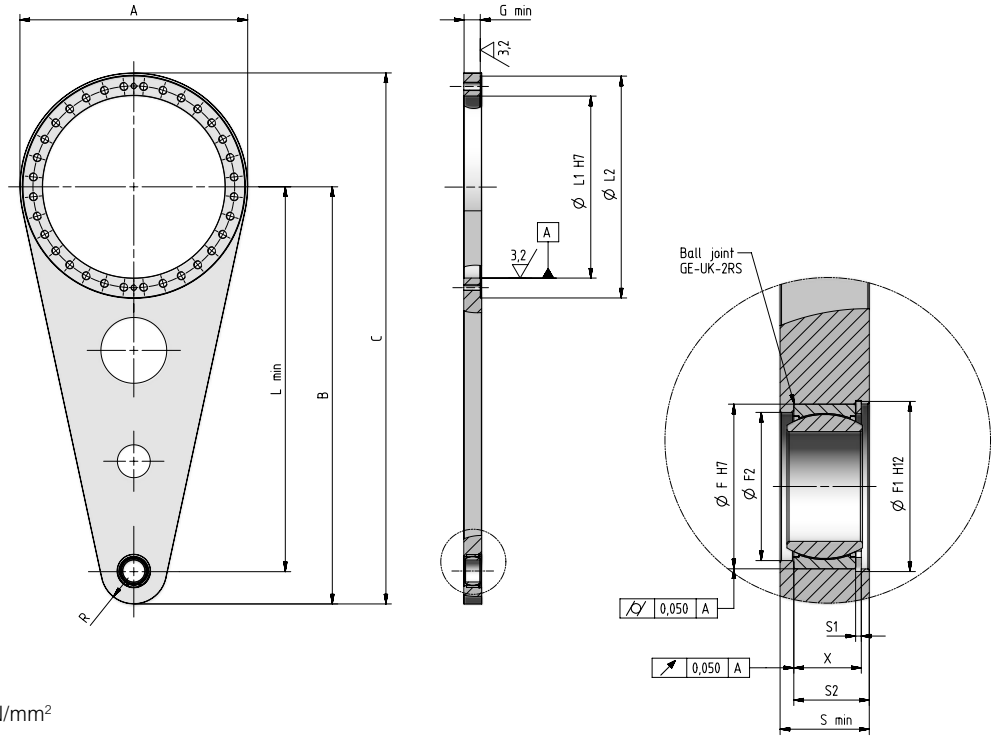
R_m min ≥ 500 N/mm²

Size	L_{min}	G_{min}	S_{min}	F_{min}	kg
001A	325	10	15	20	3
002A	325	10	15	20	3
003A	375	13	15	20	4
004A	375	13	15	20	4
006A	375	13	15	20	4
009A	450	18	20	30	8
012A	450	18	20	30	8
015A	450	18	20	30	8
018A	550	23	25	35	16
021A	550	23	25	35	16

System with **asymmetrical torque arm with ball bearing (EP series, sizes 030-710)**

Output designs **H** and **M** can be considered with rigid shaft fastening.
Output types **T** are considered less rigid thanks to its connetion with splined shaft and to fastening backlash.
Output types **H** and **M** are to be preferred only when occurring the following conditions:

- shaft mounting when gear reducer has to support overhaning parts, e.g. combined units EP+G+motor and eventual accessories on baseplate with high bending torque
- applications with minimum backlash values
- severe operating conditions, frequent reversals, dusty and particularly aggressive environments
- high reliability over the years+

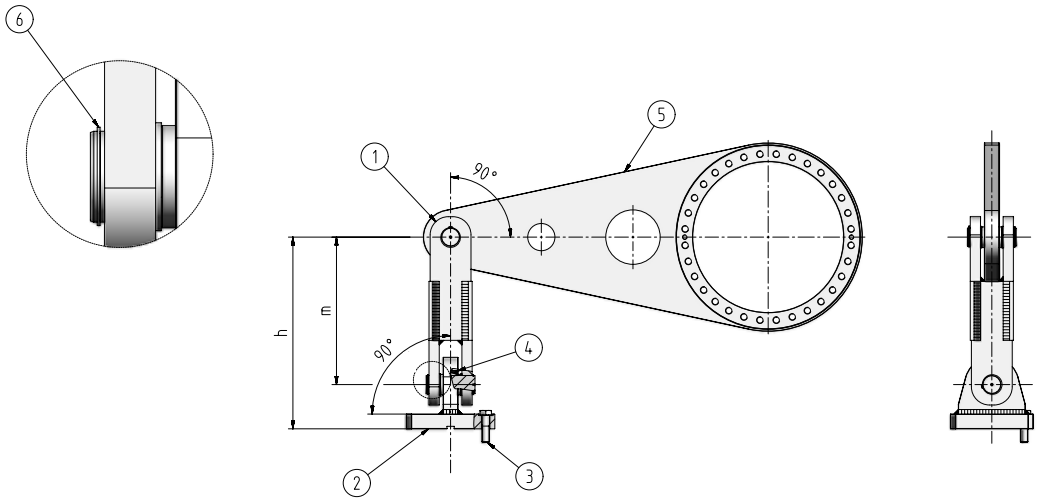


R_m min ≥ 500 N/mm²

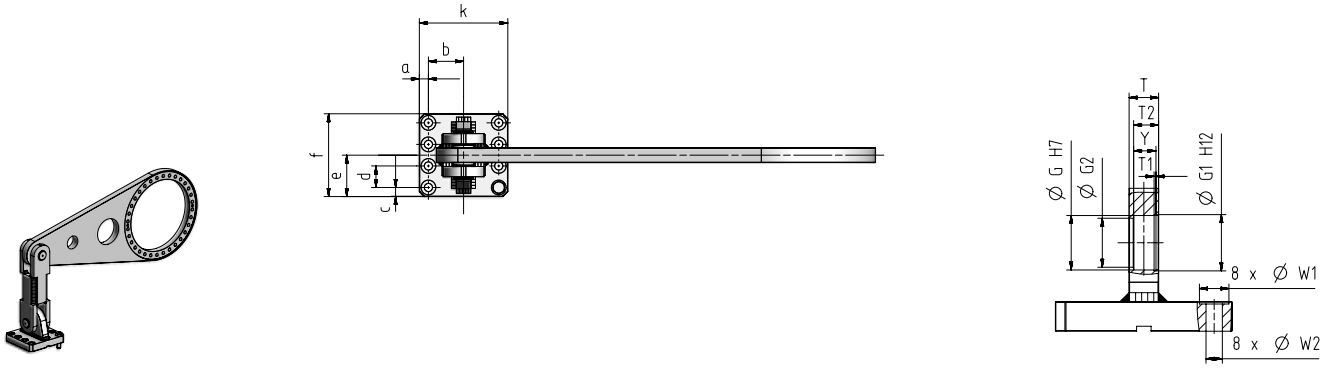
Size	L_{min}	B	A	C	R	G_{min}	S_{min}	S1	S2	X	F	F1	d mm	ball bearings Schaeffler	F2	L1	L2	kg
030	600	655	360	835	55	28	30	2,15	25	22,2	47	58	35	GE35-UK-2RS	54	285	354	28
042	700	762	420	972	62	33	35	2,15	28,5	24,2	62	65	40	GE40-UK-2RS	54	340	412	43
060	800	862	455	1 089,5	62	33	35	2,15	28,5	24,2	62	65	40	GE40-UK-2RS	54	365	447	56
085	900	968	520	1 228	68	38	40	2,65	32,5	27,7	68	71	45	GE45-UK-2RS	62	425	510	77
125	1 000	1 075	585	1 367,5	75	41	45	2,65	36,5	30,7	75	78	50	GE50-UK-2RS	67	470	572	113
180	1 100	1 190	645	1 512,5	90	45	50	3,15	39,2	43	90	93,5	60	GE60-UK-2RS	82	520	633	145
250	1 250	1 355	730	1 720	105	55	60	4,15	50	44,2	105	109	70	GE70-UK-2RS	95	585	718	235
355	1 400	1 520	830	1 935	120	60	65	4,15	55	49,2	120	124	80	GE80-UK-2RS	108	665	810	315
500	1 550	1 680	910	2 135	130	65	70	4,15	60	54,2	130	134	90	GE90-UK-2RS	120	730	890	410
710	1 700	1 850	1 000	2 350	150	75	80	4,15	67,5	59,2	150	155	100	GE100-UK-2RS	135	810	977	562

System with **asymmetrical foot of torque arm (EP series)**

Listed below are the recommended dimensions for the ground connection brackets of the torque arms.
Possibility of customization upon request.



R_m min ≥ 500 N/mm²

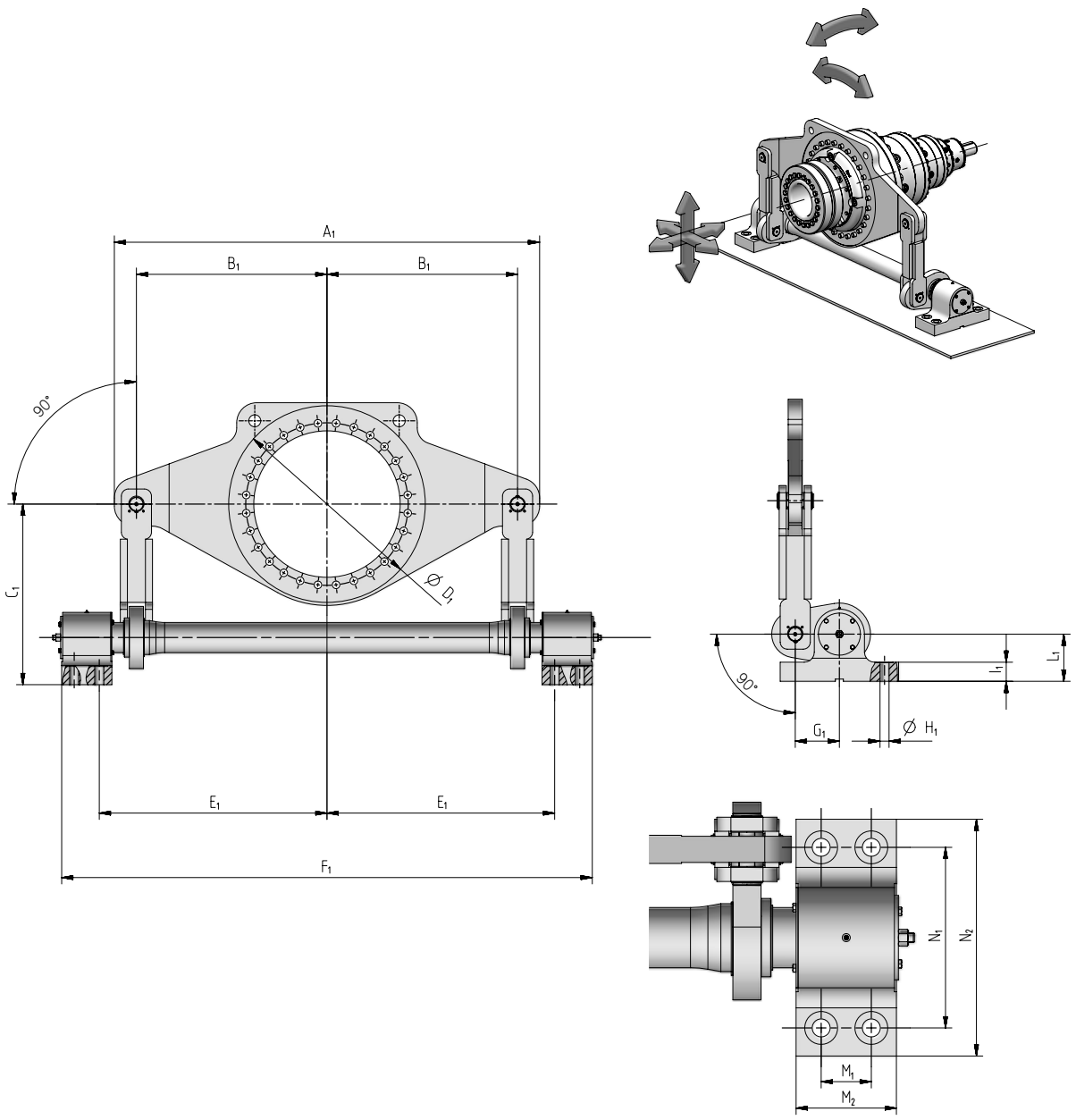


Item	Description
1	Connecting rod
2	Foot
3	Screw UNI 5739
4	Ball bearing GE-UK-2RS
5	Torque arm
6	Circlip DIN 7435

Size	m	h	c	d	e	f	a	b	k	G	G1	G2	W1	W2	Screw	T1	T2	T	Y
030	250	340	25	45	92,5	185	25	67,5	185	55	58	47	38	20	M18 10,9 - 8x	2,15	25	30	22,2
042	295	400	27,5	55	110	220	27,5	80	215	62	65	54	45	24	M22 10,9 - 8x	2,15	28,5	35	24,2
060	315	420	27,5	55	110	220	27,5	80	215	62	65	54	45	24	M22 10,9 - 8x	2,15	28,5	35	24,2
085	360	480	30	60	120	240	30	92,5	245	68	71	62	50	26	M24 10,9 - 8x	2,65	32,5	40	27,7
125	400	535	35	62,5	128,75	257,5	32,5	102,5	270	75	78	67	55	30	M27 10,9 - 8x	2,65	36,5	45	30,7
180	485	645	37,5	75	150	300	37,5	122,5	320	90	93,5	82	65	33	M30 10,9 - 8x	3,15	43	50	39,2
250	560	740	40	90	175	350	40	140	360	105	109	95	65	36	M33 10,9 - 8x	4,15	50	60	44,2
355	650	845	40	95	182,5	365	40	155	390	120	124	108	65	36	M33 10,9 - 8x	4,15	55	65	49,2
500	725	948,5	50	110	215	450	50	175	450	130	134	120	80	42	M39 10,9 - 8x	4,15	60	70	54,2
710	800	1050	52,5	125	240	480	55	195	500	150	155	135	85	45	M42 10,9 - 8x	4,15	67,5	80	59,2

Dynamic torque arm assembly and system flexibility

The torque arm with double fulcrum and the ground-fixed torsion bar enable the gearbox to follow the movements of the driven shaft during operation and provide an elastic reaction capable of absorbing torque torsion overloads.The allowable displacement values are shown in the figure, are a function of size, and should be checked when selecting accessories.



Size	A_1	B_1	C_1	D_1	E_1	F_1	G_1	H_1	I_1	L_1	M_1	M_2	N_1	N_2
250	1670	750	700	730	888.5	2041	165	39	55	170	84	180	157.5	157.5
355	1870	850	860	820	1000	2300	175	45	80	195	100	200	350	450
500	2120	950	900	880	1135	2645	220	45	70	229	125	250	450	590
710	2346	1063	1060	980	1248	2871	220	45	95	235	125	250	450	590

7.8 - Hollow low speed shaft mounting

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 (duty type, overloads, etc.).

Important! The shoulder diameter of the driven machine shaft end abutting with the gear reducer must be at least 1,18 ÷ 1,25 times the internal diameter of the hollow shaft. For other data on machine shaft end, in case of standard hollow low speed shaft, stepped shaft, with locking rings or bushing, with shrink disc see Rossi technical catalogs.

When assembling a hollow low speed shaft gear reducer verify that the hollow shaft is in line with the machine shaft end.

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

Warning! Even if hollow low speed shaft are completely machined in H7 tolerance, a check through bott could reveal two zones with **slightly lowered** diameter (see fig. 5.6.1): this lowering is intentional and not affecting the **keying quality** – which is **improved** in terms of **duration** and **precision** – and is nt hindering the mounting of machine shaft end executed as shown in fig. 7.8.1.

Warning! When **mounting** the gear reducer on the machine shaft end, D diameter (**, see fig. 7.8.2) at hollow shaft engagement (standard, stepped shaft, with shrink disc) it is slightly oversized compared with the rated dimensions: However this won't affect the connection reliability.

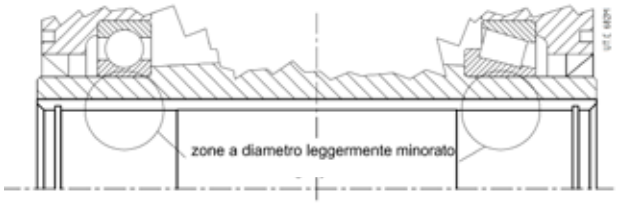


Fig. 7.8.1

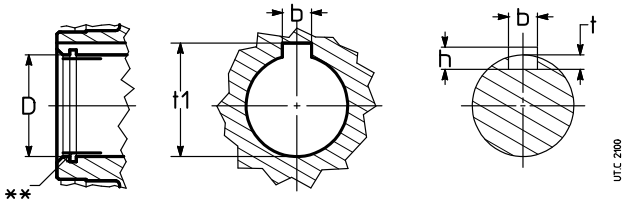


Fig. 7.8.2

Tab. 7.8.1 - Hollow low speed shaft (**A, G, H** series)

Hole	Parallel key					Keyway		
D Ø H7	**b** h9	×	**h** h11	×	**l***	b H9 hub N9 shaft	t shaft	t_1 hub
19	6	×	6	×	50[2]	6	3,5	21,8[3]
24	8	×	7	×	63[2]	8	4	27,3[3]
28	8	×	7	×	63	8	4	31,2
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][4]
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]
75	20	×	12	×	180	20	7,5	79,9
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
220	50	×	28	×	600	50	17	231,4
250	56	×	32	×	750	56	20	262,4
280	63	×	32	×	750	63	20	292,4
310	70	×	36	×	840	70	22	324,4

Tab. 7.8.2 - Hollow low speed shaft (**iFIT - iO** series)

Hole	Key					Keyway		
D Ø H7	**b** h9	×	**h** h11	×	**l***	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

* Recommended length
1) Non-unified values.
2) For worm gearboxes dimension l* = 36 and 45 respectively.
3) For worm gearboxes dimension t_1 = 21.7 and 27.2 respectively.
4) For worm gearboxes dimension t_1 = 41.3

7.9 - Gearbox assembly and disassembly (A, G, H series)

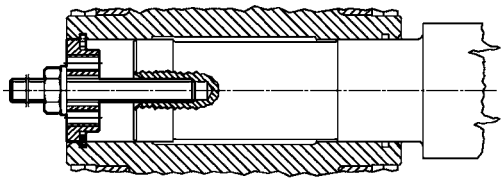


Fig. 7.9.1

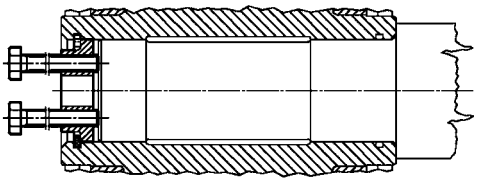


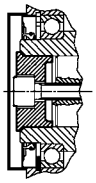
Fig. 7.9.2

When **assembling** and **disassembling** the gear reducers and gearmotors with hollow low speed shaft and groove for retaining ring – both with keyway and with shrink disc - proceed as per fig. 7.9.1 and 7.9.2, respectively (excluding helical gearmotors MR 3I 100 with motor size 112 and MR 3I 125 with motor size 132; consult us).

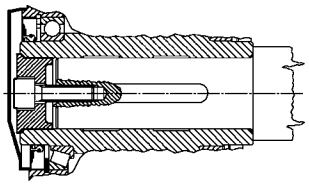
For helicalsha gearmotors MR 3I 64 ... 81, first insert the washer fitted with a screw and snap ring into the hollow shaft of the gearbox (on the opposite side of the motor), then mount the gearbox on the machine shaft end.

7.10a - Gear reducer axial fastening (A, G, H series)

Worm
32 ... 50



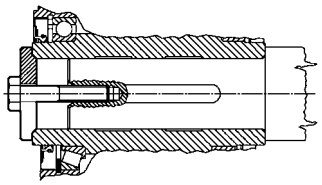
Helical and bevel helical
size 40, 50



Helical and bevel helical
size 63

Fig. 7.10.1a

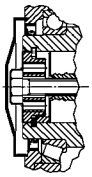
Helical
MR 3I 40, 50



Helical
MR 3I 63

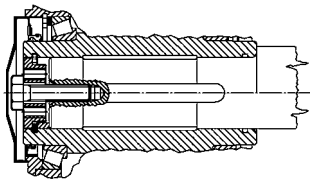
Fig. 7.10.1b

Worm
63 ... 161

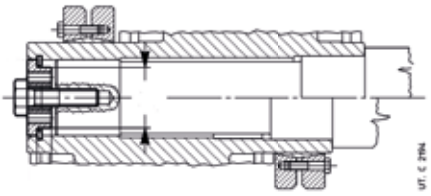


Worm
200, 250

Helical and bevel helical
size 64 ... 160



Helical and bevel helical
size 180 ... 360



Helical and bevel helical
size 400, 401
size 4000 ... 8001

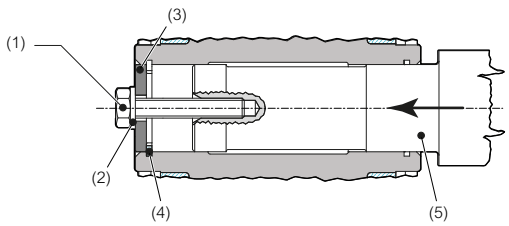
For the **axial fastening** it is possible to adopt the system per fig. 7.10.1 and 7.10.2.

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 itself (as in the lower half of the fig. 7.10.2).

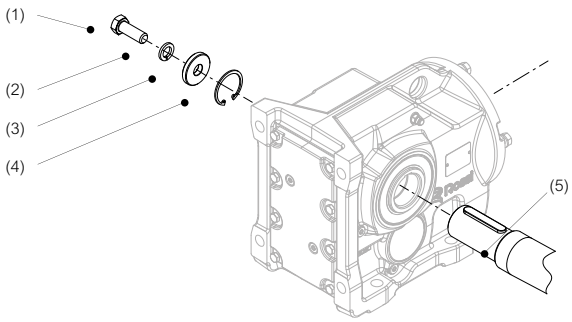
Parts in contact with the retaining ring must have sharp edges.

7.10b - Gear reducer mounting and axial fastening (iFIT - iO series)

To facilitate the **assembly** of hollow low speed shaft gearboxes and gearmotors, both with keyway and locking units, proceed as depicted in Figs. 5.7.1 respectively



Worm	Tightening torque M_s N m
M10/M12	20
M16	40
M20	80



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

7.11a - Gear reducer keying with key and locking rings or bush (A, G series)

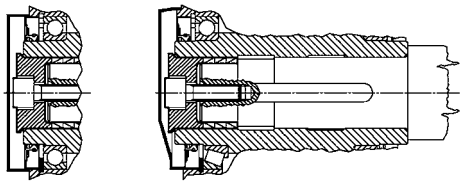


Fig. 7.11.1

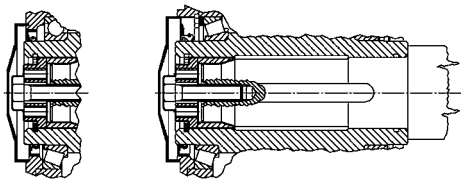


Fig 7.11.2

The use of **locking rings** (fig. 7.11.1) or of **locking bushing** (fig. 7.11.2) will permit easier and more accurate installing and removing and to eliminate backlash between key and keyway; friction system compatible with ATEX design.

The locking rings or the locking bushing are fitted after mounting (for MR 3I 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 a **locking adhesive** LOCTITE 601. 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 the table 7.11.1.

Attention! In applications with **travelling lifts**, the locking bush isn't sufficient anymore to grant a stable keying of the hollow low speed shaft with machine shaft end, even when the axial fastening bolt is fixed with locking adhesive. In these cases, it is necessary to key with hollow shaft and shrink disc. This is valid, in general, also when there is a high frequency of startings and brakings motion reversal and when the inertia ratio J/J_0 is very high (> 5).

Tab. 7.11.1 - Tightening torque for axial fastening bolts with rings or locking bush

		Gear reducer size																
Series	**A**	**32**	**40**	**50**	**63 64**	**—**	**80 81**	**—**	**125 126**	**160 161**	**—**	**200**	**—**	**250**	**—**	**—**	**—**	**—**
	G	**40**	**50**	**—**	**63 64**	**80**	**81**	**100**	**125**	**140**	**160**	**180**	**200**	**225**	**250**	**280**	**320 321**	**360**
Screw UNI 5737-88 cl 8.8		M8[1]	M8[1]	M10[1]	M10	M10	M10[2]	M12[2]	M14[2]	M16	M20	M20[2]	M24	M24[2]	M30	M30[2]	M36	M36[3]
Tightening torque M_s [N m]		29	35	43	43	51	53	92	17	21	34	43	66	83	135	166	257	315

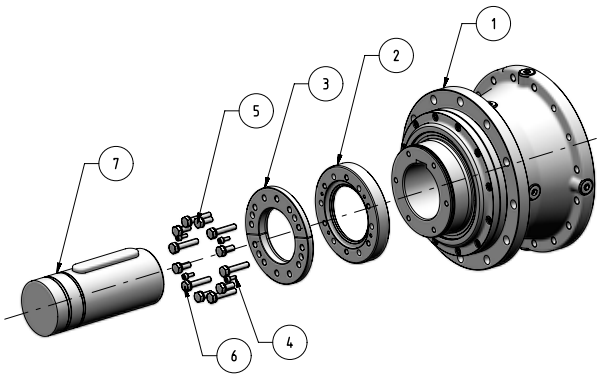
1) UNI 5931-84 cl. 8.8 (excluding MR 3I).
2) UNI 5737-88 cl. 10.9 (excluding worm gear reducer sizes 80, 81, 125, 126).
3) UNI 5931-84 cl. 10.9.

7.11b - Keying with locking rings (EP series)

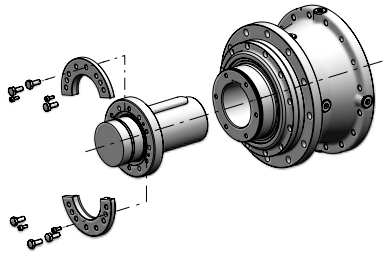
In case of N output, follow the instructions listed below:

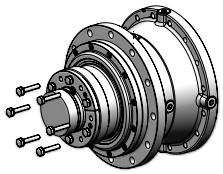
Installation

- Remove the tab from the machine shaft end (number 7).
- Place the o-ring in the ring (number 2) on the machine shaft between key seat and circular recess for axial locking. Place the o-ring in the seat of the ring.
- Install the key on the end of the machine shaft and apply Kluberpaste MR401(or similar) to the end of the machine shaft.
- insert the reducer (number 1) along the full length of the keyway making sure you have enough space to install the two retaining half-rings
- Place the securing half rings (number 3) on the machine shaft end. Assemble the ring (number 2) with short UNI 5931 screws (number 4) and medium length UNI 5739 screws. Lightly tighten a first set of three screws positioned at about 120°. Tighten gradually and evenly by means of torque wrench.
- Once the fasteners are installed, check that there is no axial movement; if not, you should check the dimensions of the components or contact Rossi S.p.A. before proceeding further.
- After an initial check of axial locking (see above), assemble the gearboxes with the locking system using UNI 5739 long screws according to the type and torque class of the screws. Lightly tighten a first set of three screws positioned at about 120°. Tighten the screws gradually and evenly by means of a torque wrench.
-



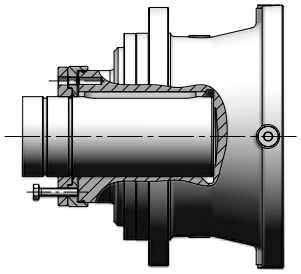
Pos.	Description
1	Gear reducer
2	Seal ring type o-ring
3	Half-ring
4	Screw UNI 5931
5	Short screw UNI 5739
6	Long screw UNI 5739
7	Machine shaft end





Disassembly

- Clean all oxidized areas.
- Remove all UNI 5739 fastening screws.
- Insert the long UNI 5739 screws into the holes previously occupied by medium length UNI 5739 screws and use them as a puller to remove the gearbox from the driven shaft.



7.12 - Mounting of hollow low speed shaft with shrink disc

Attention! Verify that machine shaft end has dimensions, tolerances and roughness as per fig. 7.12.1 ... 7.12.3 and table 7.12.1; the respect of these prescriptions guarantees the correct running of the shrink disc and is an integrating part of ATEX protection system.

Pre-arrange a proper protection of the shrink disc against the accidental contact and against the dust; when it is not possible (eg.: machine through shaft) foresee an adequate maintenance plan to guarantee that the thickness of the material is reduced and never exceeding 5 mm.

Fig. 7.12.4

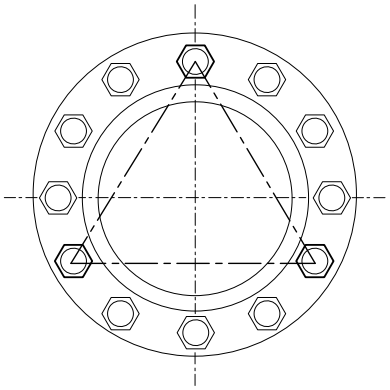
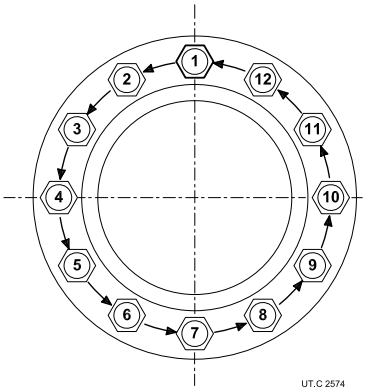


Fig. 7.12.5



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 gear reducer hollow shaft by lubricating first the external surface; position axially to dimension «Q» (see tab. 7.12.1) the shrink disc.
– slightly tighten a first group of three screws positioned at about 120° as shown in fig. 7.12.4;
– tighten the screws by a dynamometric wrench – set at a value approximately higher than 5% compared to the one foreseen in table 7.12.1 – the screws of shrink disc must be gradually and uniformly tightened, with continous sequence (not diagonally!) see fig. 7.12.5 and during several phases (approx. 1/4 rotation each time) until the 1/4 rotation is not possible anymore;
– tighten again 1 or 2 times with dynamometric wrench verifying that the tightening torque stated in table 7.12.1 has been realized;
– when having heavy duty cycles, with frequent reversals, verify again after some hours of running, the bolt tightening torque.
– verify the screw titightening torque at every maintenance interval (oil change) or in case of anomalous vibrations (see table 14.2).

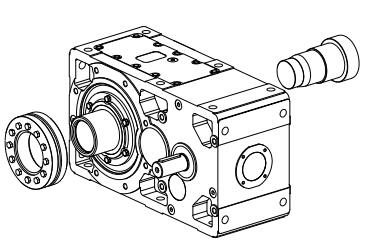
Removing

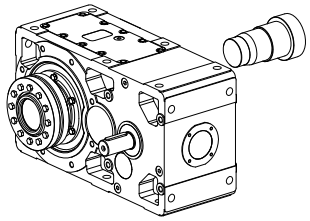
Before disassembling, ensure that no torque/load is applied on the shrink disc, on shaft or other connected elements.

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

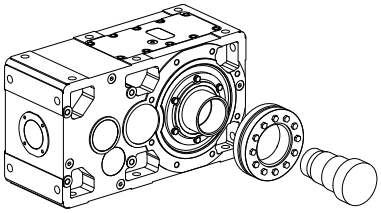
Clean off any rusty areas.
Loosen the fastening screws one after the other only by using approx. $\frac{1}{2}$ turn at a time and by a continuous sequence (not crossing), until shrink disc can be moved on hollow shaft.
Remove the gear reducer from machine shaft end.

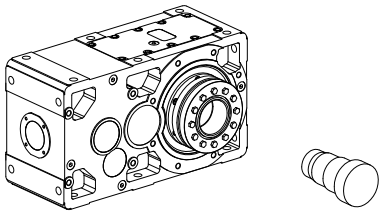
G, H series



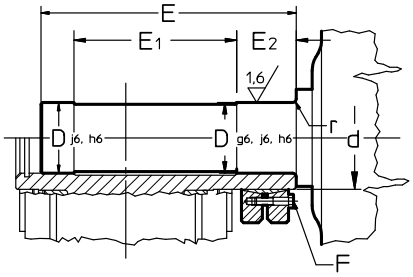


Shrink disc
machine opposite side

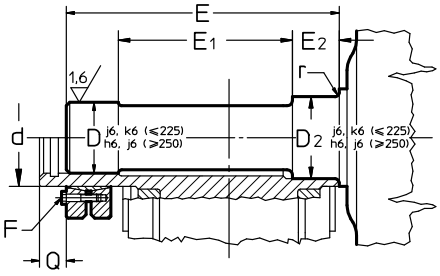




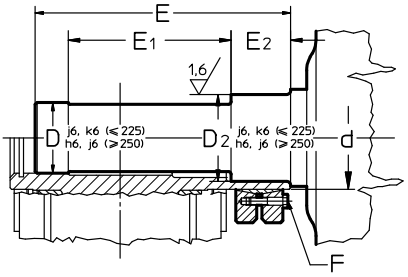
Shrink disc
machine side



Shrink disc
machine side
(sizes ≤ 125)
Fig. 7.12.1



Shrink disc
machine opposite side
(sizes ≥ 140)
Fig. 7.12.2



Shrink disc
machine side
(sizes ≥ 140)
Fig. 7.12.3

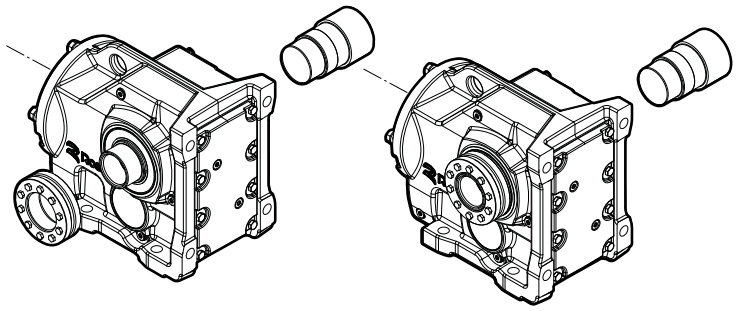
Tab. 7.12.1 - Hollow low speed shsaft and machine shaft end with shrink disc [4]

Gear reducer series G, H	D Ø H7	D_2 H7	d Ø	E		E_1		E_2		F UNI 5737-88 cl. 10.9	M_S N m 2)	Q
					1)		1)		1)			
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
4000, 4001*	210	220	260	754	788	446	480	165[5]	165[5]	M20 n. 14	490	47
4500, 4501	230	240	280	768	799	434	465	180[5]	180[5]	M20 n. 16[3]	490	44
5000, 5001	260	270	320	935	970	565	600	200[5]	200[5]	M20 n. 20[3]	490	53
5600, 5601	290	300	360	958	992	538	572	225[5]	225[5]	M20 n. 24[3]	490	55
6300, 6301	325	335	400	1063	1110	603	650	250[5]	250[5]	M24 n. 21[3]	840	74
7101	360	370	460	1335	1394	774	782	280	327	M27 n. 28	1250	96
8001	400	410	530	1548	1606	879	886	315	400	M27 n. 34	1250	107

* Values valid for sizes 400, 401.
1) Values valid for shrink disc on machine opposite side.
2) Screw tightening torque
3) In case of shrink disc on machine side n. screws 14 for size 4500 ... 4501 (450 ... 451); 16 for sizes 5000 ... 5601 (500 ... 561); 18 for sizes 6300 ... 6301 (630 ... 631), respectively.
4) For design with labyrinth seal on low speed shaft, the dimensions E, E1, E2 change: consult us.
5) For R 4I: 130 (4000 ... 4501); 165 (5000, 5001); 180 (5600, 5601); 200 (6300, 6301).

Fig. 7.12.6 Hollow low speed shaft with shrink disc - side A and side B

Side A



Side B

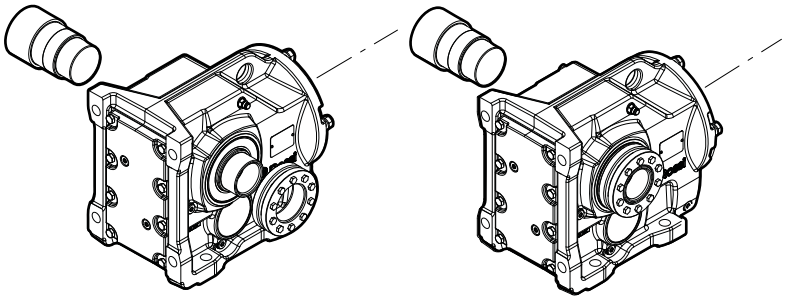
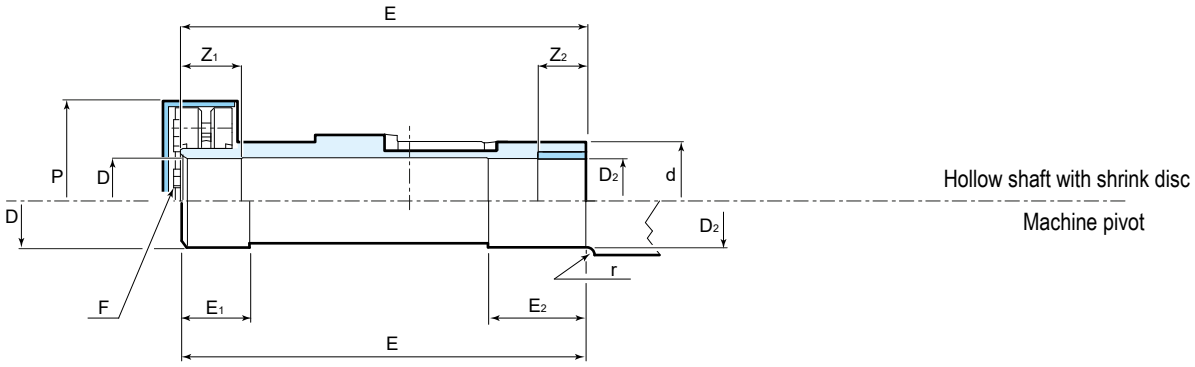


Fig. 7.12.7 Hollow low speed shaft and machine pivot with shrink disc



Tab. 7.12.2 Hollow low speed shaft and machine pivot with shrink disc

Gear red. size iO	Machine pivot							Hollow shaft									
	D	D2		E	E1	E2	r	D	D2		E	F		d	P	Z1	Z2
		...HB...	...HD...						...HB...	...HD...			Ms				
	h6	h6	h6					H7	H7	H7			[N m]				
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

For installation in case of hollow shaft and shrink disc, follow the statements of EP series - Operating instructions.

Attention! Verify that the shaft end have dimensions, tolerances and roughness as stated in the figure and in the table stated here following; the consideration of following prescriptions ensures the correct running of shrink disc, and is an integrating part of ATEX protection system.

For shaft ends type M,S + WF,T + WT use screws and tightening torques as shown on page 29 and 30.

Attention! Installing and removal operations should be carried out with pullers and jacking screws using the tapped holes at the shaft butt-end (see ch. «Fitting of components to shaft end») taking care to avoid impacts and shocks which may irremediably damage the bearings, the circlips or other parts.

Hollow shaft mounting with shrink disc

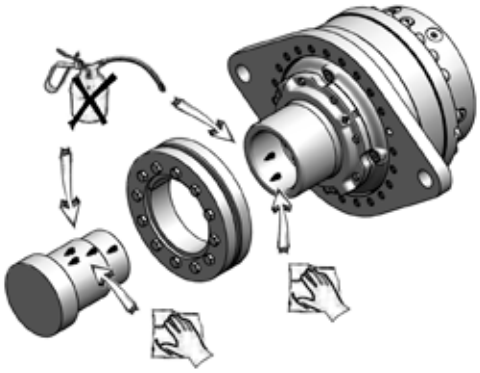
For the shaft end detail of machines where the hollow shaft of the gear reducer is to be keyed, follow the instructions see EP catalog.

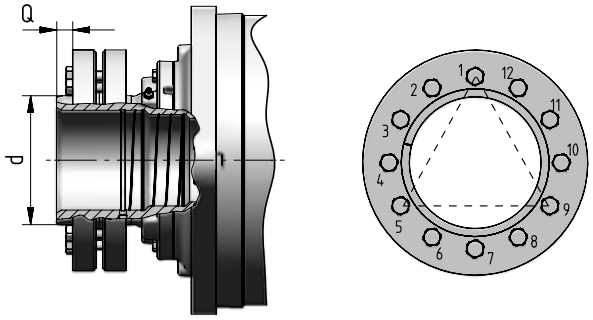
Installation

If the shrink disc is not supplied by Rossi, please carefully follow the manufacturer's instructions

When keying the shrink disc supplied by Rossi follow these instructions:

– carefully degrease the surfaces of hollow shaft and shaft end of driven machine to be fitted;
– mount the shrink disc on gear reducer hollow shaft by lubricating first only the external surface of hollow shaft; pay attention to locate axially the shrink disc at dimension «Q» shown in table below (values valid only for our shrink disc);
– slightly tighten a first group of three screws positioned at about 120° as shown for example in the figure;





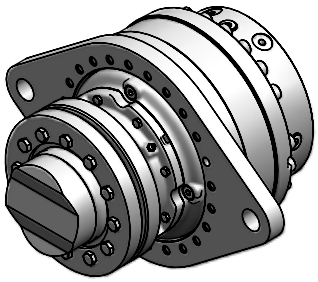
Tab. 7.12.3

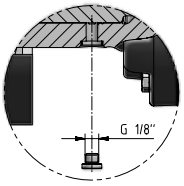
Size	d	Q
001A	55	8
002A	62	8
003A	68	10
004A	80	15
006A	90	8
009A	100	14
012A	115	13
015A	120	13
015A	125	18
018A	130	13
021A	130	13
030A	155	10
042A	165	10
060A	185	10
085A	200	10

Tab. 7.12.4

Size	d	Q
125A	240	13,5
180A	260	13
250A	300	16
355A	340	15
500A	360	15
710A	420	15

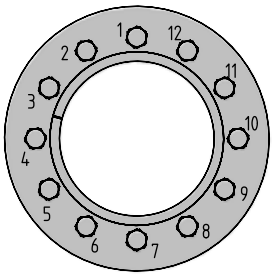
– mount the gear reducer on the machine shaft end; insert the shaft slowly to allow an air escape (from size 030A, open the plug located on the shaft, see below);





detail

– gradually and uniformly tighten, by means of dynamometric wrench, the screws of shrink disc at torque value shown in the fig. below, by a continuous sequence (not crossing) using approximately ¼ turns for several passes until ¼ turns can no longer be achieved;
– continue to apply overtorque for 1 or 2 more passes and at the end verify the bolt tightening torque;
– when having heavy duty cycles, with frequent reversals, verify again after some hours of running, the bolt tightening torque.



Tab. 7.12.5

Size	screws	Quantity	**T...** tightening [N m]
001A	M6	8	12
002A	M8	6	30
003A	M8	6	30
004A	M8	8	30
006A	M8	10	30
009A	M8	12	30
012A	M10	10	59
015A	M10	12	59
018A	M12	10	100
021A	M12	10	100
030A	M12	15	100
042A	M16	10	250
060A	M16	15	250
085A	M16	15	250

Tab. 7.12.6

Size	screws	Quantity	**T...** tightening [N m]
125A	M20	15	490
180A	M20	18	490
250A	M20	20	490
355A	M24	20	840
500A	M24	20	840
710A	M24	30	840

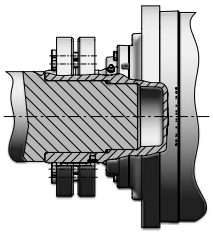
Removing

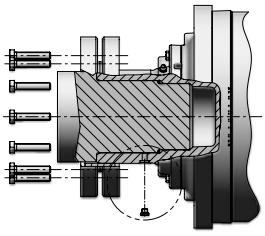
Do not completely remove fastening screws before locking rings are disengaged.
Risk of serious injury!!!

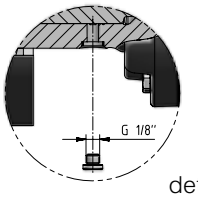
Clean off any rusty areas.

Loosen the fastening screws one after the other only by using approx. ½ turn at a time and by a continuous sequence (not crossing), until shrink disc can be moved on the hollow shaft.

Remove the customer shaft or the gear reducer. For sizes above 030A to make it easier is possible to inject low pressure oil through a threaded hole located on the hollow shaft (see below).

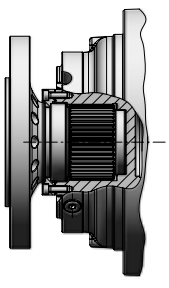


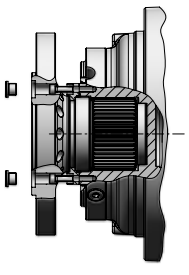


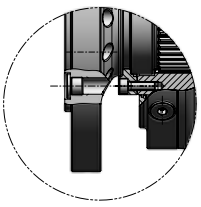


detail

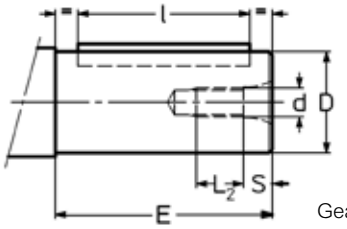
"T" outputs can be used for gear reducer shaft mounting on solid splined shaft end and on solid splined gear wheel flange.
For the assembly of "T" output to a solid splined gear flange consider the following instructions:
– disassemble the metal plugs on splined gear holes pre-arranged for the half-ring fastening screws.
– lubricate carefully the splined shaft surfaces with grease for industrial applications with heavy loads and long lasting
– insert the O-ring seal on the flange shaft
– in case of mounting with wheel flange: orientate the accessory before mounting; identify the tooth of splined shaft timing with the relevant recess positioned on gear reducer shaft. Timed tooth and recess are identified as per hole see sketch below.
– insert slowly the splined shaft so that air can flow out
– assemble radially the cover compressing the O-ring.
– screw with cross tightening the half-ring fastening screws taking care to tighten to relevant torque.
– close the splined gear flange using plugs



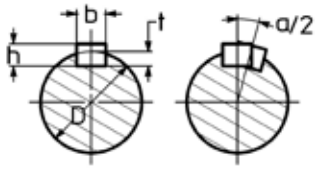


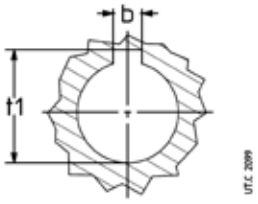


7.13 - Fitting of components to low and high speed shaft ends



Gear reducer shaft end



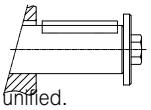


Machine shaft

Tab. 7.13.1 - Low and high speed shaft ends

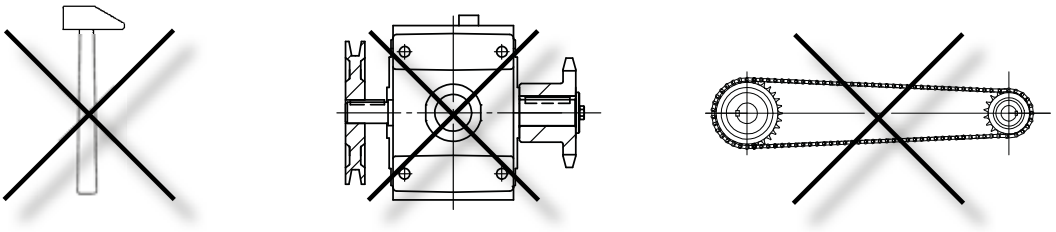
Shaft end											Parallel key							Keyway		
D Ø				E		d Ø	S	L2		α/2[4] arc min	b	×	h	×	l			b H9 hub N9 shaft	t shaft	t_1 hub
	1)	2)	3)	1)	2) 3)			1)	2) 3)		h9		h11		1)	2) 3)				
11	j 6	–	–	23	20	M5	3,6	9,4	–	–	4	×	4	×	18	12		4	2,5	12,8
14	j 6	–	–	30	25	M6	4,6	11,4	–	–	5	×	5	×	25	16		5	3	16,3
16	j 6	–	–	30	–	M6	4,6	11,4	–	–	5	×	5	×	25	–		5	3	18,3
19	j 6	h7	–	40	30	M6	4,6	11,4	13,4	5,43	6	×	6	×	36	25		6	3,5	21,8
24	j 6	h7	–	50	36[7]	M8	5,9	15,1	17,1	5,16	8	×	7	×	45	25		8	4	27,3
25	–	–	k6	–	50	M10	7,6	–	20,4	–	8	×	7	×	–	40		8	4	28,3
28	j 6	–	–	60	42	M8	5,9	15,1	–	–	8	×	7	×	45	36		8	4	31,3
30	–	h7	–	58	58[7]	M10	7,6	–	20,4	4,13	8	×	7	×	45	45		8	4	33,3
30	–	–	k6	–	60	M10	7,6	–	20,4	–	8	×	7	×	–	50		8	4	33,3
32	k 6	h7	–	80	58[7]	M10	7,6	18,4	20,4	3,87	10	×	8	×	70	50		10	5	35,3
35	k 6	–	–	–	70	M12	9,5	–	26,5	–	10	×	8	×	–	56		10	5	38,3
38	k 6	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
40	–	–	k6	–	80	M16	12,7	–	35,3	–	12	×	8	×	–	70		12	5	43,3
42	k 6	–	–	110	–	M12	9,5	22,5	–	–	12	×	8	×	90	–		12	5	45,3
45	k 6	–	–	110	82	M12	9,5	22,5	–	–	14	×	9	×	90	–		14	5,5	48,8
48	k 6	h7	k6	110	82	M12	9,5	22,5	26,5	3,08	14	×	9	×	90	70		14	5,5	51,8
50	–	–	k6	–	100	M16	12,7	–	35,3	–	14	×	9	×	–	80		14	5,5	53,8
55	m 6	–		110	82	M12	9,5	22,5	–	–	16	×	10	×	90	70		16	6	59,3
60	m 6	h7	k6	140	105[5]	M16	12,7	27,3	35,3	2,46	18	×	11	×	110	90		18	7	64,4
60	–	–	m6	–	120	M20	16	–	44	–	18	×	11	×	–	110		18	7	64,4
70	m 6	h7	k6	140	105	M16	12,7	27,3	35,3	2,55	20	×	12	×	–	125		20	7,5	74,9
70	–	–	m6	–	140	M20	16	–	44	–	20	×	12	×	–	125		20	7,5	74,9
75	m 6	–	–	140	105	M16	12,7	27,3	–	–	20	×	12	×	125	90		20	7,5	79,9
80	m 6	h7	k6	170	130	M20	16	–	44	2,23	22	×	14	×	140	110		22	9	85,4
90	m 6	h7	k6	170	130	M20	16	34	44	1,99	25	×	14	×	140	110		25	9	95,4
95	m 6	–	–	170	–	M20	16	34	–	–	25	×	14	×	140	–		25	9	100,4
100	–	j6	k6	–	165	M24	19	–	41	1,79	28	×	16	×	–	140		28	10	106,4
110	m 6	j6	k6	210	165	M24	19	41	41	1,63	28	×	16	×	180	140		28	10	116,4
125	–	j6	k6	210	200[6]	M30	22	–	45	1,71	32	×	18	×	180	180		32	11	132,4
140	–	j6	k6	–	200	M30	22	–	45	1,52	36	×	20	×	180	180		36	12	148,4
160	–	j6	k6	–	240	M36	27	–	54	1,33	40	×	22	×	220	220		40	13	169,4
180	–	j6	k6	–	240	M36	27	–	54	1,18	45	×	25	×	220	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
200	-	-	m6	-	350	M36	27	-	54	1,07	45	×	25	×	–	320		45	15	210,4
210	–	–	m6	–	300	M36	27	–	54	1,02	50	×	28	×	–	280		50	17	221,4
220	–	–	m6	–	300	M36	27	–	54	0,97	50	×	28	×	–	280		50	17	231,4
240	–	–	m6	–	330	M45	33	–	67	1,06	56	×	32	×	–	300		56	20	252,4
250	–	–	m6	–	330	M45	33	–	67	1,02	56	×	32	×	–	300		56	20	262,4
270	–	–	m6	–	380	M45	33	–	67	0,94	63	×	32	×	–	360		63	20	282,4
280	–	–	m6	–	380	M45	33	–	67	0,91	63	×	32	×	–	360		63	20	292,4
300	–	–	m6	–	430	M45	33	–	67	0,85	70	×	36	×	–	400		70	22	314,4
320	–	–	m6	–	430	M45	33	–	67	0,80	70	×	36	×	–	400		70	22	334,4
360	–	–	m6	–	590	M45	33	–	67	1,45	80	×	40	×	–	550		90	25	375,4
400	–	–	m6	–	660	M45	33	–	67	1,50	90	×	45	×	–	610		90	28	417,4

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 helical and bevel helical gear reducers, standard low speed shaft end E = 97 (E = 101 for double extensions shaft); value not unified.
6) Value not to standard.
7) For helical gear reducer MR 3I with standard low speed shaft end, dimension E increases by 1.
8) For worm gear reducer size 81 E = 80.

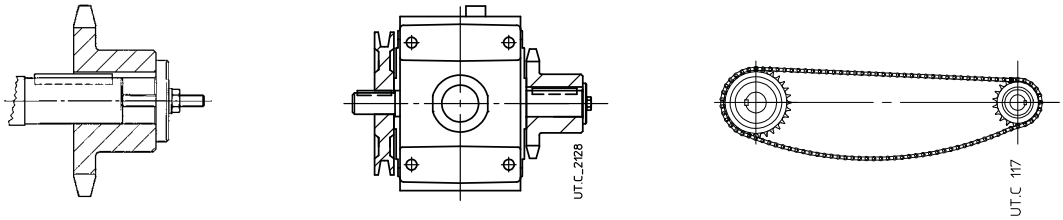


Standard low speed shaft end

Incorrect



Correct



Generally, it is recommended to machine the hole of parts keyed onto shaft end, tolerance **H7**. For high speed shaft end with D **>** 55mm tolerance can be **G7**, progided that load is uniform and light.

For low speed shaft with D **<** 180 tolerance must be **K7**, provided that load is not uniform and light.

Before mounting, thoroughly clean mating surfaces and lubricate against seizure and fretting corrosion.

Attention! Installation and removal operations should be carried out with the aid of **jacking screws** and **pullers** using the tapped hole at the shaft butt-end (see table in fig. 2) taking care to avoid impacts and shocks which **may irreparably damage the bearings**, the circlips or other parts or cause sparks; for H7/m6 and K7/j6 fits 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 catalogue values:

– loads do not rise above catalog values and values of application design;
– transmission overhang is kept to a minimum;

drive-chains should not be tensioned (if necessary – alternating loads and/or motion – foresee suitable chain tighteners); if the peripheral speed of the chain is greater than 1 m/s it is necessary to install proper malfunction markers such as aligning sensors, etc.

– in the gear transmission there is an adequate gear mesh (≈ 0,03 ÷ 0,04 · m) between pinion and rack (bushing).
– drive-belts should not be over-tensioned.

Use belts with electric bleeder resistance to mass **<** 10^9 Ω

For splined couplings apply adequate products against oxydation.

7.14 - Backstop device

A, E, G, H series

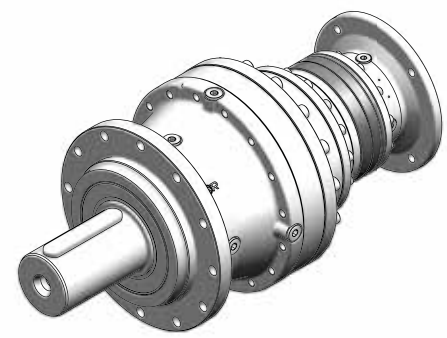
The presence on gear reducer of backstop device is stated by the arrow near the low speed shaft, **indicating the free rotation.**

Provide a protection system where a backstop device breaking could cause personal injury or property damage.

Before starting, **make sure that the direction of rotation in machine, gear reducer and motor all correspond correctly.**

Attention! One or more starting in the false direction, even if short, could irremediably damage the backstop device, the coupling seats and/or the electric motor; they could also cause the overheating of the backstop device over the temperature limit of 135 °C and the generation of mechanical sparks.

EP series



EP gear reducers, according to size, can be equipped with a backstop device. This system permits the rotation in one specific direction avoiding thus the counterrotation when the drive is disconnected. The exact direction of the free rotation is stated by a proper gear reducer nameplate.

Attention! Do not start the motor in the blocking direction!
Several damage can be occur!.

7.15 - Verification of service factor *f*s required by the application

Service factor fs takes into account the different running conditions (type of load, running time, frequency of starting, other considerations) which must be referred to when performing calculations of gear reducer selection and ATEX verification.

The **minimum service factor required** by the application is given by the following ratio:

$$\boldsymbol{fs}\ \text{required} \geqslant \boldsymbol{fs}_1 \cdot \boldsymbol{fs}_2 \cdot \boldsymbol{fs}_3 \cdot \boldsymbol{fs}_4 \cdot \boldsymbol{fs}_5 \cdot \boldsymbol{fs}_{ATEX}$$

or in case of selection $\boldsymbol{n}_2 \cdot \boldsymbol{L}_h$:

$$\boldsymbol{fs}\ \text{required} \geqslant \mathbf{1} \cdot \boldsymbol{fs}_2 \cdot \boldsymbol{fs}_3 \cdot \boldsymbol{fs}_4 \cdot \boldsymbol{fs}_{ATEX}$$

Where the values of $\boldsymbol{fs}_1$, …, $\boldsymbol{fs}_5$ are given in the tables 7.15.1 … 7.15.6, considering that:

– in case of selection $\boldsymbol{n}_2 \cdot \boldsymbol{L}_h$,: $\boldsymbol{fs}_1 = 1$; $\boldsymbol{fs}_5 = 1$

– in case of gearmotors of **iC series**: $\boldsymbol{fs}_1$ is given by **fig. 7.15.7**, according to nature of load of driven machine (mass acceleration factor m_j; for further details see catalog iFIT) and to number of starts/hour and $\boldsymbol{fs}_2 = \boldsymbol{fs}_3 = \boldsymbol{fs}_4 = \boldsymbol{fs}_5 = 1$.

The value of ***fs*** required thus determined **must not be lower than 1** (or **0,85** for A series).

Details and considerations about service factor.

The values of fs_1 ... fs_5 stated in the tables 7.15.1 ... 7.15.6 are valid for:

– maximum overload duration on starting, braking, running, 3s; longer time intervals are to be considered as load levels of work cycles;

– the overload frequency must not be multiple or submultiple in that output shaft rotation.

Motors having a starting torque not exceeding nominal values (stardelta starting, particular types of motor operating on direct current, and single-phase motors), and particular types of coupling between gear reducer and motor, and gear reducer and driven machine (flexible, centrifugal, fluid and safety couplings, clutches and belt drives) affect service factor favourably, allowing its reduction in certain heavy-duty applications; consult us if need be.

Tab. 7.15.1 - Service factor fs1 based on the **nature of load** [1] and **running time**

Nature of load of driven machine [1]		$\boldsymbol{fs}_1$ [2]				
Ref.	Description	Running time [h]				
A series		**3 150** h 2 h/d	**6 300** h 4 h/d	**12 500** h 8 h/d	**25 000** h 12 h/d	**50 000** h 24 h/d
a	**Uniform**	0.67	0.85	**1**	1.25	1.6
b	**Moderate overloads** (1,6 times the normal load)	0.85	1.06	1.25	1.6	2
c	**Heavy overloads** (2,5 times the normal load)	1	1.25	1.5	1.9	2.36
E series		**3 150** h ⩽2 h/d	**6 300** h 2÷4 h/d	**12 500** h 4÷8 h/d	**25 000** h 8÷16 h/d	**50 000** h 16÷24 h/d
a	**Uniform**	0.8	0.9	**1**	1.18	1.32
b	**Moderate overloads** (1,6 times the normal load)	1	1.12	1.25	1.5	1.7
c	**Heavy overloads** (2,5 times the normal load)	1.32	1.5	1.7	2	2.24
G[2] series		**2** h/d	**4** h/d	**8** h/d	**16** h/d	**24** h/d
a	**Uniform**	0,8[3]	0,9[3]	**1**	1.18	1.32
b	**Moderate overloads** (1,6 times the normal load)	1	1.12	1.25	1.5	1.7
c	**Heavy overloads** (2,5 times the normal load)	1.32	1.5	1.7	2	2.24
H series		**2** h/d	**4** h/d	**8** h/d	**16** h/d	**24** h/d
a	**Uniform**	1	1	**1**	1.18	1.32
b	**Moderate overloads** (1,6 times the normal load)	1.12	1.18	1.25	1.5	1.7
c	**Heavy overloads** (2,5 times the normal load)	1.4	1.5	1.7	2	2.24

EP series		**1250** h	**2500** h	**10 000** h	**25 000** h	**50 000** h	**80 000** h
a	**Uniform**	0,85	0,9	1	1,32	1,6	1,9
b	**Moderate overloads** (1,6 times the normal load)	1,06	1,12	1,25	1,7	2	2,36
c	**Heavy overloads** (2,5 times the normal load)	1,4	1,5	1,7	2,24	2,65	3,15

See notes at page 47.

Tab. 7.15.2 - Service factor fs_2 based on **nature of load** and of **frequency of starting**

Ref.	Nature of load of driven machine [1] / Description	fs_2 Frequency of starting z [starts/h]							
	A series	**4**	**8**	**16**	**32**	**63**	**125**	**250**	**500**
	E, **G** series	**2**	**4**	**8**	**16**	**32**	**63**	**125**	**250**
	H series	**1**	**2**	**4**	**8**	**16**	**32**	**–**	**–**
	EP series	**2**	**4**	**8**	**16**	**32**	**63**	**125**	**-**
a	**Uniform**	1	1,06	1,12	1,18	1,25	1,32	1,4	1,5
b	**Moderate overloads** (1,6 times the normal load)	1	1	1,06	1,12	1,18	1,25	1,32	1,4
c	**Heavy overloads** (2,5 times the normal load)	1	1	1	1,06	1,12	1,18	1,25	1,32

Tab. 7.15.3 - Service factor fs_3 based on **motor type**

Motor type **Description**		fs_3
Electric three-phase motor	$P_1 \leq 9{,}2$ kW	1
	$P_1 > 9{,}2$ kW	1,06[4]
Electric three-phase brake motor		1.06
Hydraulic		1
Internal combustion	multi-cylinder	1.25
	single-cylinder	1.5

Tab. 7.15.4 - Service factor fs_4 based on **reliability level**

Reliability level [5]	fs_4
Standard	1
Average	1.25
High	1.4

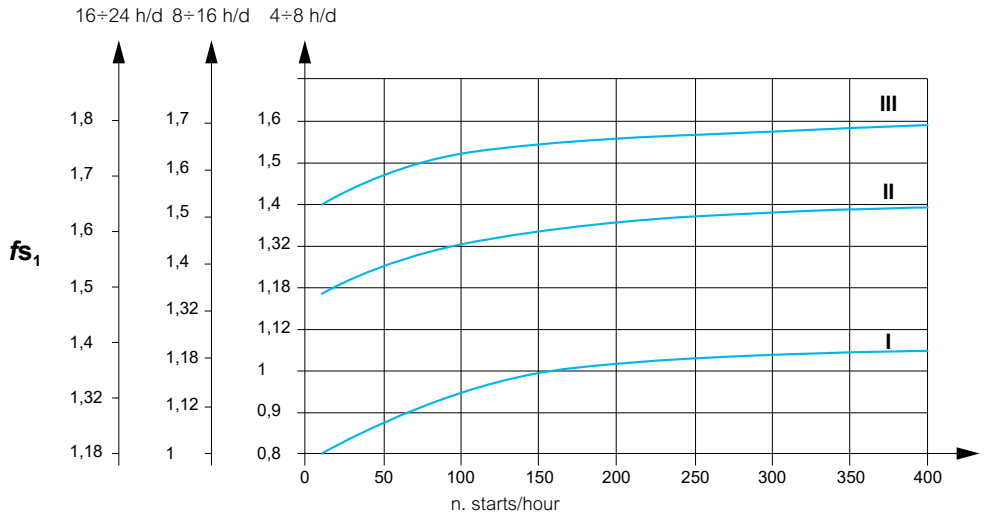
Tab. 7.15.5 - Service factor fs_5 based on **output angular speed** n_2

Output speed n_2 [min^{-1}]	fs_5 serie **G**	**H** series
560 ÷ 355	1,25	–
355 ÷ 224	1,18	–
224 ÷ 140	1,12	1,18
140 ÷ 90	1,06	1,12
90 ÷ 56	1	1,06
< 56	1	1

Tab. 7.15.6 - Service factor fs_{ATEX} according to **gear reducer ATEX design**

Gear reducer design	fs_{ATEX} **A**, **E**, **G**, **iFIT**, **EP** series	**H** series
2GD	**1,18**	**1,32**
3GD	**1,06**	**1,18**

Fig. 7.15.7 - iFIT Series - iC - iO - Service factor fs_1 depending on the nature of the driven machine load and the number of starts/hour



Class III - heavy overloads:
≈ 2.5 times the normal load
($3 < m_J \leq 10$)

Class II - moderate overloads:
≈ 1.6 times the normal load
($0.3 < m_J \leq 3$)

Class I - uniform load:
($m_J \leq 0.3$)

1) For indication on the type of load of the driven machine according to the application, see Rossi technical catalogs.
2) In case of selection with $n_2 \cdot L_h$ use $fs_1 = 1$.
3) Verify that the torque M_2 is lower than or equal to M_{N2} valid for $n_1 <$ 90 min^{-1} (s. Rossi technical catalogs); in presence of variable load, verify for each interval of load cycle.
4) For Y-Δ starting, running with inverter or with «soft start» devices, $fs_3 = 1$.
5) Reliability degrees higher than normal are required in presence of very difficult maintenance, great importance of gear reducer in the production cycle, safety,etc.

7.16 - Thermal power verification *P*t [kW] of gear reducer

The nominal thermal power $\boldsymbol{Pt}_N$ of gear reducer, stated in the following tables, is that which can be applied at the gear reducer input, without exceeding 95 °C[1] approximately oil temperature when operating in following running conditions:

- **input speed** $\boldsymbol{n}_1$ = **1 400** min^{-1};
- **mounting position B3**;
- **continuous duty S1**;
- **maximum ambient temperature 40** °C;
- **maximum altitude 1 000** above sea level;
- **air speed** ⩾ **1,25** m/s (typical value in presence of a gearmotor with self-cooled motor);
- **maximum relative humidity 80** %.

Always verify that the power applied $\boldsymbol{P}1$ is lower than or equal to gear reducer thermal power *P*t,: table 7.16.1a, table 7.16.1b) multiplied by corrective coefficients $\boldsymbol{ft}_1$, $\boldsymbol{ft}_2$, $\boldsymbol{ft}_3$, $\boldsymbol{ft}_4$, $\boldsymbol{ft}_5$,$\boldsymbol{ft}_{ATEX}$ (stated in the tables 7.16.2 ... 7.16.7) considering the different operating conditions:

$$\boldsymbol{P}_1 \leqslant \boldsymbol{Pt}_N \cdot \boldsymbol{ft}_1 \cdot \boldsymbol{ft}_2 \cdot \boldsymbol{ft}_3 \cdot \boldsymbol{ft}_4 \cdot \boldsymbol{ft}_5 \cdot \boldsymbol{ft}_{ATEX}$$

When thermal power is not stated in the tables, consider that the power has been already verified.

When the power applied is not constant and when the exact load cycle is given, it is possible, or advisable, to calculate the equivalent power applied, according to the formula:

$$\boldsymbol{P}_{1th} = \frac{1}{\eta} \cdot \sqrt[3]{\frac{P^3_{21} \cdot t_1 + P^3_{22} \cdot t_2 + \ldots + P^3_{2i} \cdot t_i + \ldots + P^3_{2n} \cdot t_n}{t_c}}$$

where:

η is the gear reducer efficiency (see ch. 6);

$\boldsymbol{P}_{2i}$ [kW] is the power, referred to the gear reducer output, required in the time interval t_i [s];

$t_c = t_1 + t_2 + \ldots + t_i + \ldots + t_n$ is the total duration of load cycle [s].

In these cases choose factor $\boldsymbol{ft}_2$ from the continuous duty column S1.

ATTENTION: in presence of at least a load level with power $\boldsymbol{P}_{2n} > \boldsymbol{P}$t, applied for a duration equal to or higher than $\boldsymbol{t}_i$ = 20 min, you have to consider this load level in the $\boldsymbol{P}_{th}$ dimensioning.

Tab. 7.16.1a - **Nominal thermal power** $\boldsymbol{Pt}_N$ for **E**, **G, H, iFIT (iC, iO)** series

$\boldsymbol{Pt}_N$ [kW] - T_{amb} = 40 °C																
E series							**iFIT (iC, iO)** series									
Train of gears	**80** **81**	**100** **101**	**125** **126**	**140**	**160**	**180**	Train of gears	**27**	**37**	**47**	**57**	**67**	**77**	**87**	**97**	
2I **3I**	15 11,2	22,4 17	33,5 25	35,5 26,5	53 40	56 42,5	**iC...2** **iC...3**	6 4,25	6,3 4,75	8,5 6,7	10 7,5	11,8 9	16 11,8	22,4 17	31,5 23,6	
							iO...3	–	4,5	6	7,1	8,5	11,8	20	26,5	
G series																
Train of gears	**40**	**50**	**63** **64**	**80** **81**	**100**	**125**	**140**	**160**	**180**	**200**	**225**	**250**	**280**	**320** **321**	**360**	**400** **401**
I	–	–	11,2	17	25	37,5	50	56	80	90	125	140	200	224	315	–
2I	3,35	5	7,5	11,2	17	25	28	37,5	42,5	60	67	95	106	150	170	236
3I	2,5	3,75	5,6	8,5	12,5	19	21,2	28	31,5	45	50	71	80	112	125	180
4I	–	–	4,25	6,3	9,5	14	–	–	–	–	–	–	–	–	–	132
CI[2]	3	4,75	7,1	10,6	16	23,6	31,5	35,5	50	56	80	90	125	140	200	–
ICI	2,12	3,15	4,75	7,1	10,6	16	18	23,6	26,5	37,5	–	–	–	–	–	–
C2I[2]	–	–	–	–	–	–	21,2	28	31,5	45	50	71	80	112	125	180
C3I	–	2,36	3,55	5,3	8	11,8	–	–	–	–	–	–	–	–	–	132
H series																
Train of gears	**4000, 4001**		**4500, 4501**		**5000, 5001**		**5600, 5601**		**6300, 6301**		**7101**		**8001**			
2I	236		265		375		425		530		630		900			
3I	180		200		280		315		400		475		670			
4I	132		150		212		236		300		365		500			
CI[2]	224		315		–		–		–		–		–			
C2I[2]	180		200		280		315		400		475		670			
C3I	132		150		212		236		300		355		500			

Notes of pages 54, 55.

1) Corresponding to an average temperature of the external housing surface of approximately 85 °C; locally housing temperature can achieve the oil temperature.
2) For sizes ⩽ 360 with double extension high speed shaft multiply the values of $\boldsymbol{Pt}_N$ by **0,85**; for sizes ⩾ 400 with double extension high speed shaft multiply $\boldsymbol{Pt}_N$ by **0,85** (CI) or **0,9** (C2I).
3) For speed $\boldsymbol{n}_x$ included between two stated values ($\boldsymbol{n}_{sup}$, $\boldsymbol{n}_{inf}$), select the nearest lower value or interpolate:
$\boldsymbol{Pt}_{N@nx} = (\boldsymbol{Pt}_{N@nsup} - \boldsymbol{Pt}_{N@ninf}) \cdot (\boldsymbol{n}_x - \boldsymbol{n}_{inf}) / (\boldsymbol{n}_{sup} - \boldsymbol{n}_{inf}) + \boldsymbol{Pt}_{N@ninf}$
4) For $\boldsymbol{n}_{worm}$ ⩽ 90 min^{-1}, consult us.

Tab. 7.16.1b - **Nominal thermal power Pt_N** of **A** series

n_{worm} [3]	u_{worm}																			
min^{-1}	7	10	13	16	20	25	32	40	50	63	7	10	13	16	20	25	32	40	50	63
	Size 32										**Size 40**									
1 400	0.82	0.67	-	-	0.44	-	-	-	-	-	1.14	0.93	0.84	0.77	0.6	0.55	0.49	-	-	-
1 120	-	0.61	-	-	0.4	-	-	-	-	-	1.04	0.84	0.76	0.69	0.55	0.49	0.45	-	-	-
900	-	-	-	-	-	-	-	-	-	-	0.94	0.76	0.7	0.64	0.5	0.46	-	-	-	-
710	-	-	-	-	-	-	-	-	-	-	0.87	0.7	0.63	0.58	0.45	0.41	-	-	-	-
560	-	-	-	-	-	-	-	-	-	-	0.8	0.64	-	-	0.41	-	-	-	-	-
450	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.38	-	-	-	-	-
	Size 50										**Size 63, 64**									
1 400	1.72	1.4	1.29	1.18	0.92	0.84	0.76	0.68	-	-	2.73	2.34	1.97	1.81	1.67	1.3	1.17	1.08	0.96	-
1 120	1.58	1.28	1.16	1.06	0.83	0.76	0.68	0.62	-	-	2.49	2.13	1.79	1.64	1.5	1.17	1.06	0.97	-	-
900	1.43	1.16	1.05	0.96	0.75	0.69	0.63	-	-	-	2.28	1.93	1.62	1.48	1.37	1.06	0.95	0.88	-	-
710	1.31	1.05	0.96	0.88	0.69	0.63	0.57	-	-	-	2.07	1.75	1.46	1.34	1.24	0.96	0.87	-	-	-
560	1.2	0.96	0.88	0.81	0.63	0.58	-	-	-	-	1.9	1.61	1.34	1.23	-	0.88	0.8	-	-	-
450	1.1	0.89	0.82	0.75	0.58	0.54	-	-	-	-	1.76	1.48	1.24	1.14	-	0.82	-	-	-	-
355	1.01	0.81	-	-	0.53	-	-	-	-	-	1.62	1.37	1.13	1.04	-	0.74	-	-	-	-
280	-	-	-	-	0.5	-	-	-	-	-	1.51	1.27	1.06	-	-	-	-	-	-	-
	Size 80, 81										**Size 100**									
1 400	4.15	3.59	3.04	2.82	2.58	2.1	1.83	1.66	1.49	1.32	-	9.8	8.5	7.8	7.2	5.7	5.1	-	-	-
1 120	3.82	3.28	2.76	2.54	2.34	1.82	1.65	1.5	1.35	-	-	8.5	7.3	6.6	6.2	4.84	4.32	-	-	-
900	3.51	2.99	2.51	2.31	2.11	1.65	1.49	1.36	1.23	-	-	7.2	6.2	5.6	5.3	4.12	3.67	3.4	-	-
710	3.17	2.7	2.27	2.09	1.91	1.49	1.35	1.23	1.11	-	-	6.2	5.3	4.8	4.45	3.5	3.11	2.87	-	-
560	2.89	2.46	2.06	1.89	1.75	1.36	1.22	1.13	-	-	-	5.3	4.49	4.08	3.79	2.97	2.64	2.44	-	-
450	2.67	2.28	1.9	1.75	1.61	1.24	1.13	1.05	-	-	-	4.59	3.9	3.54	3.3	2.56	2.3	-	-	-
355	2.47	2.09	1.73	1.6	1.49	1.14	1.04	-	-	-	-	4.02	3.41	3.09	2.89	2.24	2.01	-	-	-
280	2.31	1.94	1.61	1.49	-	1.06	0.96	-	-	-	-	3.55	3.01	2.76	2.57	1.99	1.79	-	-	-
224	2.11	1.8	1.5	-	-	0.99	-	-	-	-	-	3.18	2.69	2.44	-	1.78	1.59	-	-	-
180	1.98	1.69	1.4	-	-	-	-	-	-	-	-	2.88	2.42	2.21	-	1.6	-	-	-	-
140	1.8	-	-	-	-	-	-	-	-	-	-	2.52	2.12	-	-	1.4	-	-	-	-
112	-	-	-	-	-	-	-	-	-	-	-	2.25	1.9	-	-	-	-	-	-	-
	Size 125, 126										**Size 160, 161**									
1 400	-	15.2	14	12.2	11.2	10.4	8	7.1	6.6	5.9	-	23.4	21.8	18.9	17.4	16.1	12.5	11.4	10.3	9.3
1 120	-	13.1	11.9	10.3	9.5	8.8	6.7	6	5.6	-	-	20.2	18.9	16.3	14.9	13.8	10.8	9.7	8.7	7.8
900	-	11.3	10.2	8.9	8.1	7.5	5.8	5.1	4.76	-	-	17.4	16.1	13.9	12.7	11.8	9.1	8.3	7.5	6.7
710	-	9.6	8.7	7.5	6.9	6.4	4.89	4.36	4.03	-	-	15	13.8	11.8	10.8	10	7.7	7	6.3	5.7
560	-	8.3	7.4	6.4	5.8	5.4	4.17	3.7	3.44	-	-	12.8	11.8	10.1	9.2	8.5	6.6	6	5.4	4.82
450	-	7.2	6.4	5.6	5.1	4.7	3.6	3.21	2.99	-	-	11.1	10.2	8.7	8	7.4	5.7	5.1	4.67	4.17
355	-	6.2	5.6	4.81	4.4	4.11	3.12	2.81	-	-	-	9.6	8.8	7.5	6.9	6.4	4.81	4.44	4.05	3.65
280	-	5.5	4.99	4.27	3.92	3.64	2.77	2.49	-	-	-	8.5	7.8	6.7	6.1	5.6	4.32	3.94	3.6	-
224	-	4.91	4.46	3.81	3.49	3.24	2.48	2.23	-	-	-	7.6	7	5.9	5.4	5	3.86	3.51	3.23	-
180	-	4.42	3.98	3.4	3.11	-	2.21	2.01	-	-	-	6.9	6.3	5.4	4.86	4.49	3.48	3.16	2.89	-
140	-	3.9	3.51	3.01	2.75	-	1.97	-	-	-	-	6	5.5	4.63	4.26	-	3.02	2.78	2.32	-
112	-	3.48	3.14	2.68	-	-	1.75	-	-	-	-	5.4	4.92	4.16	3.81	-	2.71	2.5	-	-
90[4]	-	3.14	2.85	-	-	-	-	-	-	-	-	4.81	4.42	3.74	3.43	-	2.46	2.25	-	-
	Size 200										**Size 250**									
1 400	-	-	33.1	31.3	27	25.1	19.4	17.7	16.2	14.5	-	-	-	48.5	41.2	39.4	35.5	27.3	25.7	23.2
1 120	-	-	28.6	26.9	23.2	21.5	16.7	15	13.9	12.3	-	-	-	42.2	36	34	30.2	23.8	22.1	19.7
900	-	-	24.7	23.1	20	18.3	14.5	12.8	11.7	10.5	-	-	-	36.8	31	29.6	25.9	20.4	18.9	16.8
710	-	-	21.2	19.9	17	15.7	12.2	10.9	10	8.9	-	-	-	31.2	26.4	25	22.2	17.3	16	14.4
560	-	-	18.2	17	14.5	13.4	10.4	9.3	8.5	7.6	-	-	-	26.9	22.8	21.4	18.8	14.9	13.6	12.2
450	-	-	15.8	14.7	12.6	11.6	9	8	7.3	6.5	-	-	-	23.4	19.7	18.6	16.3	12.8	11.8	10.6
355	-	-	13.7	12.7	10.8	10	7.7	6.9	6.3	5.7	-	-	-	20.2	17	15.9	14	11	10.1	9.1
280	-	-	12	11.2	9.5	8.8	6.8	6.1	5.6	-	-	-	-	17.7	14.9	14	12.3	9.6	8.9	8
224	-	-	10.7	10	8.5	7.8	6	5.4	5	-	-	-	-	15.8	13.1	12.4	11	8.5	7.9	7.2
180	-	-	9.6	9	7.6	7	5.4	4.85	4.52	-	-	-	-	14.2	11.8	11.1	9.8	7.7	7.1	6.4
140	-	-	8.4	7.8	6.6	6.1	4.74	4.25	3.93	-	-	-	-	12.5	10.3	9.8	-	6.7	6.2	-
112	-	-	7.5	7.1	5.9	5.5	4.17	3.83	-	-	-	-	-	11	9.1	8.6	-	5.9	5.6	-
90[4]	-	-	6.8	6.3	5.3	4.93	3.79	3.46	-	-	-	-	-	9.9	8.3	7.8	-	5.4	5	-

See notes at page 49.

Tab. 7.16.1c - **Nominal thermal power Pt_N** of **EP** series

Gear reducer size	Train of gears Pt_N kW													
	1EL		**2EL**		**3EL**		**4EL**		**2EB**		**3EB**		**4EB**	
	20 °C	40 °C	20 °C	40 °C	20 °C	40 °C	20 °C	40 °C	20 °C	40 °C	20 °C	40 °C	20 °C	40 °C
001A	11,8	9	8,5	6,3	6,3	4,75	5,6	4,25	9	6,7	7,1	5,3	6	4,5
002A	11,8	9	8,5	6,3	6,3	4,75	5,6	4,25	9,5	7,1	7,5	5,6	6,3	4,75
003A	17	12,5	11,2	8,5	8,5	6,3	7,5	5,6	12,5	9,5	9	6,7	7,5	5,6
004A	18	14	12,5	9,5	9	6,7	8	6	13,2	10	9,5	7,1	8	6
006A	18	14	12,5	9,5	9,5	7,1	8	6	13,2	10	10	7,5	8,5	6,3
009A	28	21,2	18	14	14	10,6	11,8	9	20	15	14	10,6	11,2	8,5
012A	28	21,2	20	15	14	10,6	11,8	9	21,2	16	15	11,2	11,8	9
015A	28	21,2	20	15	14	10,6	11,8	9	21,2	16	15	11,2	11,8	9
018A	40	30	23,6	18	17	13,2	15	11,2	26,5	20	17	13,2	14	10,6
021A	40	30	23,6	18	17	13,2	15	11,2	26,5	20	17	13,2	14	10,6
022A	-	-	26,5	20	18	14	16	11,8	26,5	20	17	13,2	14	10,6
030A	42,5	31,5	31,5	23,6	21,2	16	17	12,5	28	21,2	20	15	16	11,8
031A	45	33,5	35,5	26,5	25	19	20	15	33,5	25	22,4	17	18	14
042A	56	42,5	40	30	26,5	20	21,2	16	33,5	25	25	19	20	15
043A	56	42,5	42,5	31,5	30	22,4	22,4	17	33,5	25	25	19	20	15
060A	-	-	50	37,5	33,5	25	23,6	18	37,5	28	28	21,2	22,4	17
061A	-	-	50	37,5	33,5	25	26,6	18	50	37,5	36,5	26,5	28	21,2
085A	-	-	60	45	42,5	31,5	30	22,4	50	37,5	35,5	26,5	28	21,2
125A	-	-	71	53	50	37,5	35,5	26,5	56	42,5	42,5	31,5	33,5	25
180A	-	-	85	63	60	45	42,5	31,5	-	-	50	37,5	40	30
250A	-	-	100	75	75	56	50	37,5	-	-	67	50	50	37,5
355A	-	-	125	95	90	67	60	45	-	-	80	60	60	45
500A	-	-	160	118	106	80	71	53	-	-	-	-	71	53
710A	-	-	200	150	125	95	80	60	-	-	-	-	90	67

Values referred to $n_1 = n_{1\,max}$.

Tab. 7.16.2 - **Thermal factor ft_1 (= ft_{1a} ft_{1b}) according to cooling system and input speed n_1**

Cooling system			ft_{1a}, ft_{1b} input speed n_1 [min^{-1}] ≥										
			≤ 355	**450**	**560**	**710**	**900**	**1120**	**1400**	**1800**	**2240**	**2800**	**3150**
ft_{1a} Natural convection	**A**, **E**, **G**, **H**, **iFIT** series	train of gears **V**, **I**	2	1,8	1,6	1,4	1,25	1,12	1	0,71	0,5	0,355	0,3
		train of gears **IV**,**2I**, **CI, ...72**	1,4	1,32	1,25	1,18	1,12	1,06	1	0,85	0,71	0,5	0,425
		tr. **2IV**, **3I**, **4I**, **ICI**, **C2I**, **C3I, ...73**	1,18	1,12	1,12	1,06	1,06	1,03	1	0,95	0,85	0,6	0,5
	EP series	**Horizontal** mounting position (B...)	2	1,8	1,6	1,4	1,25	1,12	1	0,71	0,56	0,4	0,355
		Vertical mounting position [2] (V...)	1,6	1,4	1,25	1,12	1	0,9	0,8	0,56	0,45	0,355	0,28
ft_{1b} Forced cooling [3] [4] [5]	**G**, **H** series	**1 radial fan** (helical)	1	1	1,06	1,12	1,18	1,25	1,32	1,4	1,6	1,8	2
		2 radial fans (helical)	1	1,06	1,12	1,25	1,4	1,6	1,8[6]	2	2,24	2,5	2,8
		1 radial fan (bevel helical)											
	EP series	**1 radial fan**	1	1	1	1,06	1,18	1,32	1,5	1,7	1,9	2,12	2,24
	with water coil		2										
	with internal exchanger (G)		see ch. 8.2										

Notes of pages 62, 63.

- Position of the reference groove

1) For MR 2I, $ft_3 = 1$.
2) Including B51, B52, B31, B32, B61, B62, B71, B72, B81, B82.
1) With simultaneous water cooling by **coil**, values are multiplied by **1,8**.
4) For positions, dimensions and design verification see ch. 17.
6) With axial fan, values are to be multiplied by 1,12. Consult us.
6) Value also valid for electric fan (installed by the Buyer).

For applications at these speed values, consult us.

Tab. 7.16.3 - Thermal factor ft_2 according to **ambient temperature** and **service**

Maximum ambient temperature °C	ft_2				
	Continuous duty	Intermittent load duty **S3 ... S6** Cyclic duration factor [%] for 60 min running [1]			
	S1	**60**	**40**	**25**	**15**
60	0.6	0.71	0.8	1	0.95
50	0.8	0.95	1.06	1.25	1.32
40	1	1.18	1.32	1.5	1.7
30	1.18	1.4	1.6	1.8	2
20	1.32	1.6	1.8	2	2.24
10	1.5	1.8	2	2.24	2.5

1) $\frac{\text{Duration of running on load [min]}}{60} \cdot 100\ [\%]$

Tab. 7.16.4 - Thermal factor ft_4 according to **altitude of installation**

Altitude a.s.l. m	ft_4
0 ÷ 1 000	1
1000 ÷ 2 000	0.95
2000 ÷ 3 000	0.9
3000 ÷ 4 000	0.85

Tab. 7.16.5 - Thermal factor ft_5 according to cooling **air speed** on gear reducer housing

Air speed m/s	Installation environment	ft_5
< 0.63	very small environment or without air movements or with protected gear reducer	consult us
0.63	small environment and with limited air movements	0.71
1	wide environment without air movements	0.9
1.25	wide environment with light air movements (e.g. gearmotor with self-cooled motor	1
2.5	open and colled	1.18
4	with heavy air movements	1.32

Tab. 7.16.6 - Thermal factor ft_{ATEX} according to **ATEX gear reducer design**

Series	**2G, 2D**	**3G, 3D**
A, **E**, **G**, **H**, **iFIT**, **EP**	**0.8** (**0,71** for train of gears **I** and **CI**) (**0,63** for **iFIT** with **Adapter**) (**0,6** for train of gears **2EB ... 6EB**)	**0.9** (**0,8** for train of gears **I** and **CI**) (**0,63** for **iFIT** with **Adapter**) (**0,6** for train of gears **2EB ... 6EB**)

Tab. 7.16.7 - **Thermal factor ft_3** according to **mounting position where ft_3 = 1 is not specified**

A series			**Size**
			32 ... 250
R, MR	**V**	**B6, B7**	0,9

iFIT iC series	**Size**	
	272 ... 972	**273 ... 973**
V5	0,8	0,9
V6	0,71	0,8

E series				**Size**	
				50 ... 140	**160, 180**
R MR	**2I**	**V5**	$i_N \leq 10$	1	0,85
MR MR	**2I, 3I**	**V6**		0,85	

iFIT iO series	**Size**
	273 ... 973
B6, V5	0,9
B7, B8, V6	0,8

G series			**Size**							
			140	**160**	**180**	**200**	**225**	**250**	**280**	**320, 321**	**360**
R I	**B6**		1	0,71	0,71	0,71	0,71	0,71	0,71	0,71	0,71
	B7		0,85	0,85	0,85	0,85	0,85	0,85	0,85	0,85	0,85
	B8		0,85	1	0,85	1	0,85	1	0,85	1	0,85
R 2I MR 2I	**B6**	$i_N \leq 14$	1	1	1	0,85	0,85	0,85	0,85	0,85	0,85
		$i_N \geq 16$	1	1	1	1	1	1	1	0,85	0,85
	B7	$i_N \leq 14$	1	0,71	0,71	0,71	0,71	0,71	0,71	0,71	0,71
		$i_N \geq 16$	1	1	1	1	1	0,71	0,71	0,71	0,71
	V5	$i_N \leq 14$	1	1	1	0,71	0,71	0,71	0,71	0,71	0,71
		$i_N \geq 16$	1	1	1	1	1	1	1	0,71	0,71
	V6	$i_N \leq 14$	1	1	1	1	1	1	1	0,85[1)]	0,85[1)]
R 3I MR 3I	**B6**	$i_N \leq 63$	1	1	1	1	1	0,85	0,85	0,85	0,85
	B7	$i_N \leq 63$	1	1	1	0,71	0,71	0,71	0,71	0,71	0,71
		$i_N \geq 71$	1	1	1	1	1	1	1	0,71	0,71
	V5	$i_N \leq 63$	1	1	1	1	1	1	1	0,71	0,71
	V6	$i_N \leq 63$	1	1	1	1	1	0,85	0,85	0,85	0,85
R CI	**B6**	$i_N \leq 8$	1	1	1	1	1	0,85	0,85	0,85	0,85
	B7		1	0,71	0,71	0,71	0,71	0,71	0,71	0,71	0,71
	B8		0,85	1	0,85	1	0,85	1	0,85	1	0,85
	V5, V6	• below $i_N \leq 8$	1	1	1	1	1	0,85	0,85	0,85	0,85
		• above	1	0,71	0,71	0,71	0,71	0,71	0,71	0,71	0,71
MR CI	**B7**		1	1	1	1	1	0,85	0,85	-	-
	B8		0,85	1	0,85	1	0,85	1	0,85	-	-
	V5, V6	• above	1	1	1	1	1	0,85	0,85	-	-
R C2I	**B6**	$i_N \leq 28$	1	1	1	1	1	1	1	0,85	0,85
	B7		1	1	1	0,71	0,71	0,71	0,71	0,71	0,71
	V5, V6	• below	1	1	1	0,71	0,71	0,71	0,71	0,71	0,71
		• above	1	1	1	1	1	1	1	0,85	0,85
MR C2I	**B7**		1	1	1	1	1	1	1	0,85	0,85

G series (400 , 401) **H** series			**Size**							
			400, 401	**4000, 4001**	**4500, 4501**	**5000, 5001**	**5600, 5601**	**6300, 6301**	**7101**	**8001**
R 2I R 3I R 4I	**B6, V6**		0,9	0,9	0,9	0,9	0,9	0,9	0,9	0,9
	B7, V5		0,8	0,8	0,8	0,8	0,8	0,8	0,8	0,8
R CI	**B6**		–	0,85	0,85	–	–	–	–	–
	B7		–	0,71	0,71	–	–	–	–	–
	V5, V6	low speed shaft **below**	–	0,85	0,85	–	–	–	–	–
		upper low speed shaft		0,71	0,71					
R C2I R C3I	**B6**		0,9	0,9	0,9	0,9	0,9	0,9	0,9	0,9
	B7		0,8	0,8	0,8	0,8	0,8	0,8	0,8	0,8
	V5, V6	**upper** low speed shaft **(C2I), below (C3I)**	0,9	0,9	0,9	0,9	0,9	0,9	0,9	0,9
		low speed shaft **below (C2I), upper (C3I)**	0,8	0,8	0,8	0,8	0,8	0,8	0,8	0,8

1) See notes at page 61.

8 - Lubrication

8.1 - 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. 8.2). The gear pairs are oil-bath lubricated, the bearings are either oil bathed or splashed or lubricated «for life» with grease. For some mounting positions with continuous duty at high speed, an expansion tank is foreseen: consult us. **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**; usually the level is stated by means of transparent level plug (see ch. 15 ... 20 or eventual SPT scheme 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 table 8.2.

⚠ **Make sure that for gear reducers and gearmotors size ⩾ 100, the filler plug is metallic and equipped with filter and valve** (symbol -◇-; see fig. 8.1.1). When these gear reducers are required filled with oil (non-standard design) the **filler plug** is not mounted but **supplied separately**; the responsible for installation will take care of the right assembly (see ch. 15 ... 20 or eventual scheme SPT attached) replacing a closed plug.

When the gear reducer or gearmotor is supplied with **transparent level plug** (size ⩾ 100), the lubricant quantity to be filled is the one that allows **to reach the level** specified **by the proper transparent plug at gear reducer rest** and not the one stated on the catalog.

When gear reducer or gearmotor is provided with a **level plug with rod** (see fig. 8.1.2), 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. 8.1.3) fill after unscrewing a.m. plug in order to check the obtained level by oil outlet.

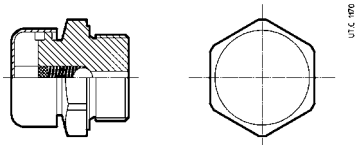


Fig. 8.1.1
Filler plug with filter and valve

2I, 3I, 4I (100, 125), m.p. **V6**
3I (125), m.p. **V5**[1)]

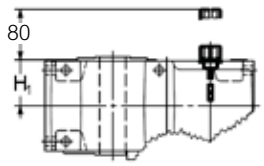
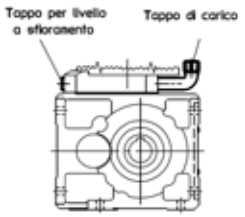


Fig. 8.1.2
Level plug with dip stick

ICI (100, 200), m.p. **B6**[1)]



C3I (100, 125), m.p. **B6**[1)]

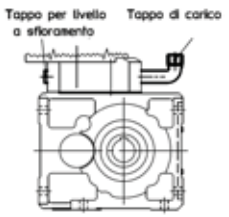
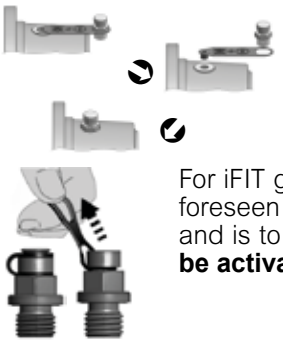


Fig. 8.1.3
Plug for flowing over level

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



⚠ For EP gear reducers, the filler plug with breather is supplied disassembled, positioned closed to its seating. Before commissioning, after positioning the gear reducer in the mounting position stated in the name plate, replace the closed plug with the filler plug with breather (see fig. on the left).

For iFIT gear units, the filler plug with breather is supplied assembled in the correct position foreseen by the mounting position required; for mounting position BX it is supplied separately and is to be assembled in the specific mounting position required. **The breather plug is to be activated before commissioning after removing the proper tab** (see fig. 8.1.4).

Fig. 8.1.4

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 V1, V3, V5, V6, and bevel helical gear reducers in horizontal positions B3, B6, B51, B52 (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.

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. 4.4). In case of **pivoted mounting positions** the gear reducers are equipped with an supplementary nameplate stating the mounting position, the oil filling and level check during maintenance operations.

For gear reducers of EP series, when n_2 output speed is lower than 0,3 min^{-1}, for all mounting positions refer to approx oil quantities stated for position V1. **For mounting positions, oil quantity and plug position see ch. 19, 20**.

8.2 - Lubrication tables

Table 8.2a - **How supplied and plugs** (identification through specific lubrication nameplate)

A series sizes ≤ **81**	**E**, **G** series sizes ≤ **81** **iFIT** series all sizes	**EP** series sizes ≤ **021A**	**A** series sizes ≥ **100**	**E**, **G**, **H** series sizes ≥ **100**	**EP** series sizes ≥ **022A**
FILLED WITH SYNTHETIC OIL			**WITHOUT OIL** (except different statement on lubrication name plate) Before commissioning, fill to specified level with synthetic oil having the following ISO viscosity degree and features stated in table 8.2b		
PAG		**PAO**			
ISO VG **320** with worm speed ≤ 280 min^{-1} ISO VG **680**	ISO VG **220** **	ISO VG **320**			
1 filler plug for size ≤ 64 **2 filler/drain plugs for sizes 80, 81**		**all filler/drain plugs ***	**Filler plug with filter, valve, drain and level plug**		**all filler/drain plugs ***

* For mounting positions V3 for outputs Z, C , M, H the level plugs are for flowing over level, for remaining mounting positions sight level plugs.
** For iC series, a filler plug with breather for size ≥ 37 (for size 27 only with mounting position V5 or V6).

Use only lubricants with EP (extreme pressure) additives.

Tab. 8.2b - **Filling instructions**

Before commissioning and at every oil change, **fill to specified level with synthetic oil having the following ISO viscosity degree and features:** Use only lubricants with EP (extreme pressure) additives, see tab. 8.2d.
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).

A series — **Polyglycol based synthetic oil (PAG)**

ISO viscosity grade [cSt]

Worm speed min^{-1}	Ambient temperature 0 ÷ 40 °C[1] Gear reducer size **100**	**125 ... 161** **B3**, **V5**, **V6**	**125 ... 161** **B6**, **B7**, **B8**	**200, 250** **B3**, **V5**, **V6**	**200, 250** **B6**, **B7**, **B8**
1 500 ÷ 710[2]	320	320		320	220
710 ÷ 355[2]	460	460		460	320
355 ÷ 180[2]	680	680	460	460	
< 180	680	680		680	

1) Peaks of 10 °C below (20 °C for ≤ 460 cSt) the ambient temperature range are acceptable.
2) For this speed we advise to replace oil after running-in.

E, **G, H** series — **Polyalphaolephine based synthetic oil (PAO)**

ISO viscosity grade [cSt]

Speed n_2 min^{-1}	Ambient temperature -20 ÷ 0 °C[2]	Ambient temperature 0 ÷ 40 °C[1]
> 224	150	150
224 ÷ 22.4	150	220
22.4 ÷ 5.6	220	320
< 5.6	320	460

Peaks of 20 °C below and 10 °C above the ambient temperature range are acceptable.
2) Temperature range admitted, without heaters, only for H series.

EP series

ISO viscosity grade [cSt]

Speed n_2 min^{-1}	Ambient temperature -10 ÷ 20 °C	Ambient temperature 10 ÷ 40 °C[1]
> 224	150	220
140 ÷ 2.0	220	320
< 2.0	320	460

Peaks of 20 °C below and 10 °C above the ambient temperature range are acceptable.

Oil change intervals

Sizes ≤ 81 (A, E, G series) and ≤ 021A (EP series), and all sizes of iFIT series are **lubricated for life**, assuming external pollution-free environment. 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 years.

Tab. 8.2d - **Lubricants**

Manufacturer	**Synthetic oil PAO**	Synthetic oil PAG
ADDINOL	Eco Gear S	Eco Gear M
AGIP	Blasia SX	Blasia S
ARAL	Degol PAS	Degol GS
BP	Enersyn EPX	Enersyn SG-XP
CASTROL	Alphasyn EP	Optiflex A
FUCHS	Renolin Unisys	Renolin PG
KLÜBER	Klübersynth GEM4	Klübersynth GH6
MOBIL	Mobil SHC Gear	Mobil Glygoyle
SHELL	Omala S4 GX / S4 GXV	Omala S4 WE
TEXACO	Pinnacle	Synlube CLP
TOTAL	Carter SH	Carter SY

Tab. 8.2e - **Lubrication intervals**

Oil temperature °C	Lubrication interval h **A**	**E**, **G**, **H**	**iFIT**	**EP**
≤ 65	9 000	12 500	25 000	12 500
65 ÷ 80	6 300	9 000	18 000	10 000
80 ÷ 95	4 500	6 300	12 500	6 300

Grease-lubricated bearings:

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

Attention! for bearings requiring greasing refero to ch. 15 ... 20 and consult Rossi in case of doubt.

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

Output bearings for slewing drives (**EP series Slewing drives**)

In the case of slewing drives (output designs R-S-H), regardless of the mounting position, the output bearing has an independent grease lubrication.

The re-lubrication of the bearing has to be carried out at each oil change. For maintenance intervals and grease quantity, refer to relevant table 8.2e

It is recommended to re-lubricate bearings and seals with the same grease the gear reducer was supplied; as alternative, it is possible to use similar grease types.

ATTENTION: the re-lubrication procedure may cause a grease leakage from bearing seat to oil chamber. This does not affact gear reducer operation. However it is recommended to re-lubricate before replacing gear reducer oil, in order to remove any grease leaked into oil chamber. For grease quantities follow the data contained in table 19.1 on page 93.

8.3 - Lubrication of extruder support (helical and bevel helical, sizes 100 ... 4501)

The lubrication of extruder support, supplied **WITHOUT OIL** like the gear reducer, is oil bathed and can be joint or separate compared with the gear reducer's one.

Separate lubrication[1)]

The gear reducer must be filled with lubricant with ISO viscosity degree stated in table 8.2b, whereas the **extruder support** – equipped with metallic plug with filter and valve, drain and level – must be filled with **polyalfaolefines basis synthetic oil** with viscosity degree ISO **320 cSt** (see tab. 8.2.d, AGIP Blasia SX, MOBIL SHC Gear, KLÜBER Klübersynth GEM4, ARAL Degol PAS, BP Enersyn EPX, SHELL Omala S4 WE; approx quantities see table 8.3.1) and up to level stated on **extruder support**.

Common/Joint lubrication[2)]

The **gear reducer** and the **support** must be filled with the same **polialfaolefines basis synthetic oil**, with iSO viscosity degree stated in table 8.2b and up to **level** stated on the **gear reducer**. For mounting position B6, during the filling, remove the upper plug positioned on the extruder support in order to facilitate the air flow from inside. In this circumstance, cause of the elimination of potential residual air, an oil filling up to level could be necessary before commissioning.

Table 8.3.1

Gear red. size	Approximate oil quantity extruder support l
140, 160	0.8
180	1.1
200	1.5
225	2.5
250, 280	4
320 ... 360	9.1
4000, 4001	20
4500, 4501	16

1) The inner part of gear reducer is separated from the extruder support through a seal ring.
2) The inner part of gear reducer is connected with the extruder support; the common lubrication is present on gear reducer and gearmotors 2l sizes 100 ... 360 or in presence of independent cooling unit when it is used both for gear reducer and extruder support.

9 - Motor assembly and disassembly

9.1 - General

Attention. Verify that motor:

- **respects the application limits (P_{1max}, n_{1max}, etc.) stated on nameplate of gear reducer on which it is mounted** (gearmotor without motor),
- **it has ATEX protection specifications equal to or higher than the gear reducer ones on which it is mounted** (gearmotor without motor)
- **it is complying with the minimum safety requirements of the use area** (see table 7.1).

As all gearmotors (excluding iFIT series gearmotors) are fitted with **standardized** motor, the mounting or replacement of motor is user-friendly. Simply observe the following instructions (after having observed the safety instructions relevant to machine, see maintenance procedure of ch. 13.1:

– be sure that the matin surfaces are machined under accuracy rating (IEC 60072-1);
– clean surfaces to be fitted, thoroughly. If painted, remove paint;
– in the event of a lowered keyway, replace the motor key with the one supplied with the gear reducer; if necessary, 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; iin 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 fastening screws from motor to flange is enough to have 2 × pitch over the nut;
– consider the tightening torque stated at ch. 7.4:

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

Worm gearmotors MR V (A series)
Helical gearmotors MR 2I, MR 3I sizes 40 ... 360 (G series)
Bevel gearmotors MR CI, MR C2I (G series)

– check that the fit-tolerance (push-fit) between hole and shaft end is G7/j6 for D < 28 mm, F7/k6 for D ⩾ 38 mm;
– apply a thread-braking seal type LOXEAL 23-18 the coupling surfaces 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 **hub clamp** (helical gearmotors 2I, 3I with motor size ⩾ 200) proceed as follows, for the **mounting**:

– 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;
– push the motor up to shoulder;
– tighten the motor fastening screws or nuts to gear reducer motor flange;
– tighten the hub clamp by dynamometric key up to the tightening torque specified in tab. 9.2.1; 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;

Tab. 9.2.1 - Tightening torque for hub clamp

Gear reducer size		Screw	*M*s
2I	**3I**	UNI 5931	N m
160 ... 225	**200 ... 280**	M12 × 45 cl. 12.9	143
250... 360	**320 ... 360**	M12 × 45 cl. 12.9 Ød ⩽ 75 M14 × 50 cl. 8.8 Ød = 80	143 135

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.

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

Worm gearmotors MR IV, MR 2IV (A series)
Coaxial gearmotors MR 2I, MR 3I (E series)
Helical gearmotors MR 3I 40 ... 125, MR 4I (G series)
Bevel helical gearmotors MR ICI, MR C3I (G series)

– check that the fit-tolerance between hole and shaft end is K6/j6 for D ⩽ 28 mm, J6/k6 for D ⩾ 38 mm;
– make sure that the motors have bearing location and overhang (dimension S see fig. 7.3.1) as shown in table 7.3.1;
– assemble on motor shaft, as follows:
  a) 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;
  b) 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**;
  d) 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. 9.3.1 - Minimum mechanical requirements for IEC motors

Motor size	Min dynamic load capacity N		Max dimension S[1] mm
	Drive end	Non-drive end	
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
250	125 000	90 000	53
280	160 000	112 000	56

1) Values advised in order to minimize sound levels. These values refer to the maximum power of motor size; proportionally they increase when the applied power decreases.
They can double accepting higher sound levels (3÷5 dB(A)). **These values do not affect the gearmotor compliance with ATEX directive.**

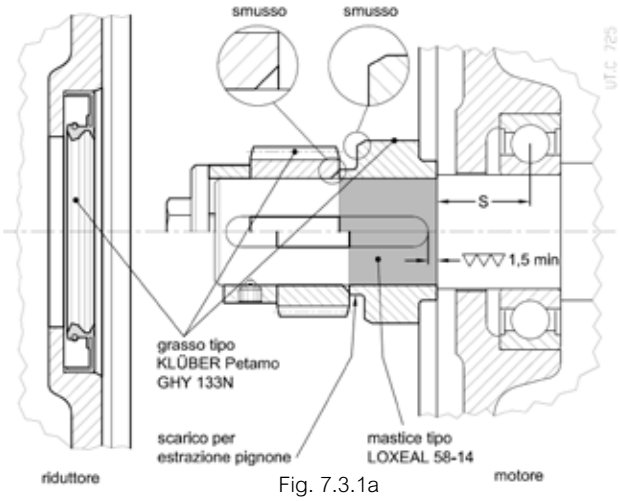


Fig. 7.3.1a

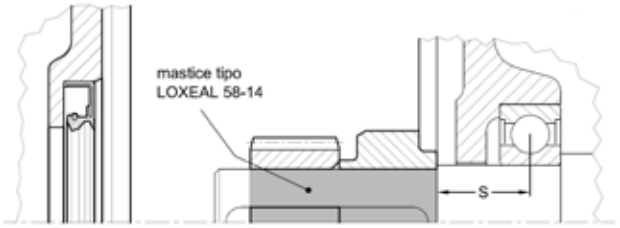


Fig. 7.3.1b

9.4 - Gearmotors with iFIT compact motor (cylindrical pinion keyed directly on compact motor shaft end)

Helical inline gearmotors iC, bevel helical iO gearmotors (iFIT series)

Make the following assemblies on the motor shaft:

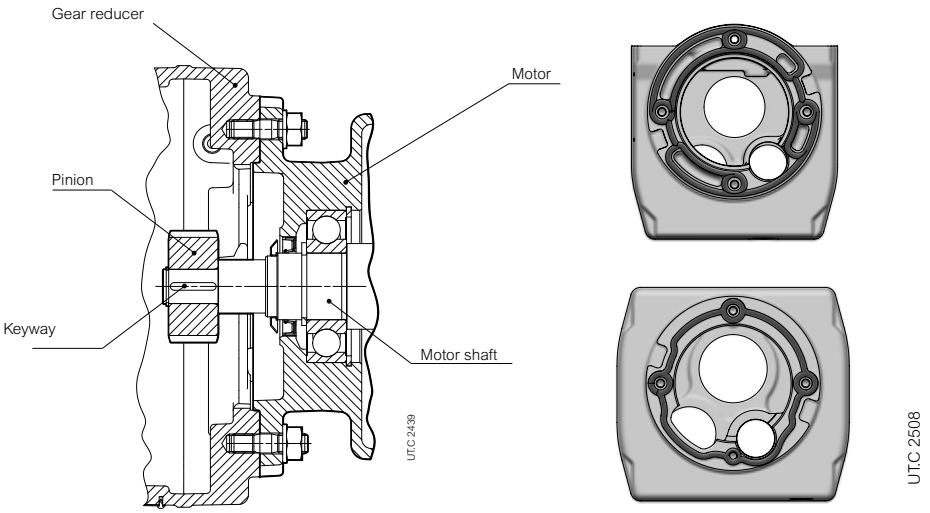
1) assemble the key provided in the proper keyway;

2) sprinkle the motor shaft end with adhesive (e.g. LOXEAL 23-18);

3) key the pinion preheated at approx. 100 °C onto the motor shaft sull'albero motore il pignone preriscaldato a circa 100 °C taking care not to beat the motor shaft with the mallet or other tools;

4) check that the circlip is in its seat;

5) Mount the motor on the gearbox by applying a thin, continuous bead of LOXEAL 58-14 sealant in the flange union planes and on the gearbox housing, contouring the motor mounting studs and staying in the center position of the machined surface, away from the bearing seats as much as possible (see figure below)



9.5 - IEC or NEMA motor mounting on the adapter

Check mating dimensions according to IEC 72-1 standards, and make sure contact surfaces are machined to precise class (IEC 60072-1, UNEL 13501-69; DIN 42955)-for NEMA standards refer to NEMA C-FACE diagram.

To mount the motor on the adapter, proceed as follows:

- Thoroughly clean the mating surfaces (motor shaft, motor flange surface and adapter);
- Check and, if necessary, lower the key to obtain a clearance of 0.1 ÷ 0.2 mm between the top and bottom of the borehole slot. If shaft keyway is without shoulder, lock the key with a pin.
- Lubricate the mating surfaces against contact oxidation (Klüberpaste 46 MR 401 is recommended);
- Insert the motor into the adapter.
  Do not force the motor shaft into the adapter coupling. Danger of serious damage.
- Tighten the provided fastening screws of the motor to the adapter flange until a tightening torque is obtained as shown in the table below:

Tab. 9.5.1 Tightening torque of motor adapter fixing screws

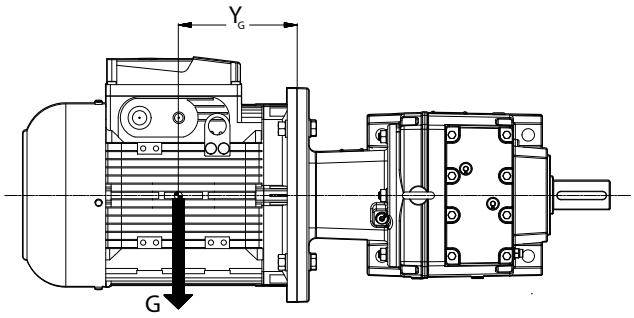
Worm Ød	**Tightening torque M_s** IEC motors N m cl. 8.8
M8	25
M10	50
M12	85
M16	205

Worm Ød	**Tightening torque M_s** NEMA Motors	
[in]	ft lb	N m
3/8" - 16	32,9	44,6
1/2" - 13	80,3	109
5/8" - 11	157	213

To prevent harmful infiltration of moisture or dirt (e.g., dust) inside the adapter, it is advisable to isolate any discontinuities or openings in the mating surfaces between the motor and adapter flange by applying a continuous bead of sealant (e.g., LOXEAL 58-14).

Before assembling the motor, check that the static bending moment M_b generated by the weight of the motor on the adapter counter flange is less than the allowable value M_{bmax}, shown in Table 7.4.2:

$$M_b < M_{bmax}$$



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where:

$M_b = (G - Y_G) / 1000$ [N m]

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

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

Motors that are too long and slender, even where the bending moment is less than the prescribed table limits, may generate abnormal vibrations during operation.

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

Loads higher than permissible loads may be present in dynamical applications where the gearmotor is subjected to translations, rotations, or oscillations: consult us for the study of every specific case.

Tab. 9.5.2a Maximum bending moment M_{bmax} related to IEC motor adapter

IEC Adapter Code	**Maximum bending moment M_{bmax}** [N m]				
	iC 27, iC 37 iO 37	**iC 47 ... iC 67 iO 47 ... iO 67**	**iC 77 iO 77**	**iC 87 iO 87**	**iC 97 iO97**
AB12BI063, AB12BI071, AB16BI063, AB16BI07, AB20BI063, AB20BI071	55				
AB12CI080, AB12DI090, AB16CI080, AB16DI090, AB20CI080, AB20DI090 AB25CI080, AB25DI090, AB30CI080, AB30DI090	90	265			
AB12EI0100, AB16EI0100, AB16FI0112, AB20EI0100, AB20FI0112 AB25EI0100,AB25FI0112, AB30EI0100, AB30FI0112	200				
AB16GI13S, AB20GI13S, AB25GI13S, AB30GI13S		290	870		
AB20HI13L, AB25HI13L, AB30HI13L					
AB20HI160, AB25HI160, AB30HI160			935	1155	
AB25LI180, AB30LI180					
AB30MI200					1645

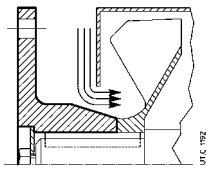
Tab. 9.5.2b Maximum bending moment M_{bmax} related to NEMA motor adapter

NEMA Adapter Code	**Maximum bending moment M_{bmax}** [N m]				
	iC 27, iC 37 iO 37	**iC 47 ... iC 67 iO 47 ... iO 67**	**iC 77 iO 77**	**iC 87 iO 87**	**iC 97 iO97**
AB12BN056, AB16BN056, AB20BN056	45				
AB12CN143, AB12DN145, AB16CN143, AB16DN145, AB20CN143 AB20DN145, AB25CN143, AB25DN145, AB30CN143, AB30DN145	72	246			
AB12EN182, AB16EN182, AB16FN184, AB20EN182, AB20FN184, AB25EN182, AB25FN184, AB30EN182, AB30FN184	161				
AB16GN213, AB20GN213, AB25GN213, AB30GN213		251	656		
AB20HN254, AB25HN254, AB30HN254		740	1003		
AB25LN284, AB30LN284					
AB30MN324					1430

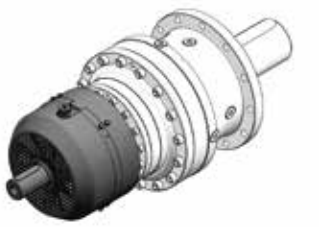
10 - Cooling systems

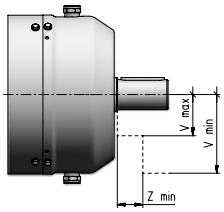
10.1 - Fan cooling

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.



10.2 - Integrated fan cooling unit (EP series)



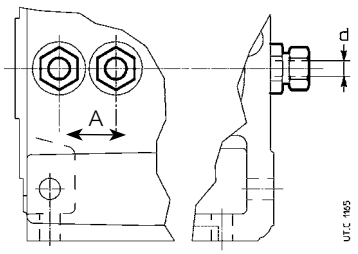


Tab. 10.2.1

1EL	2EL	3EL	4EL	2EB	3EB	4EB	V_{max} Ø	V_{min} Ø	Z_{min}	Code
001A, 002A 003A ... 006A 009A ... 015A	001A ... 006A 009A ... 022A 030A ... 043A	001A ... 022A 030A ... 060A 085A ... 125A	001A ... 060A 085A ... 180A 250A ... 355A	001A ... 006A 009A ... 015A , 022A 018A, 021A, 030A	001A ... 022A 030A ... 043A 060A ... 085A	001A ... 060A 085A ... 125A 180A ... 250A	70 85 110	195 230 280	27 30 35	V38x58 V48x82 V60x105

10.3 - Cooling by coil (G, H series) or with internal exchanger (G series)

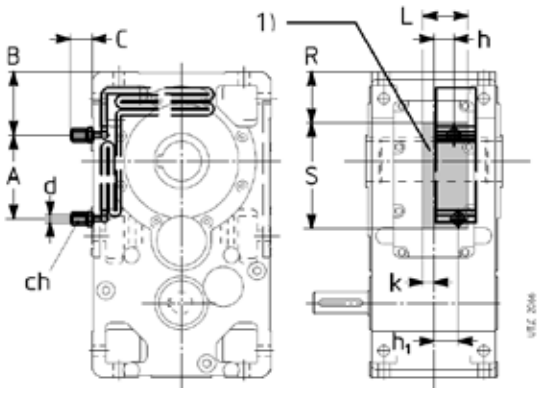
The presence of coil or internal exchanger is given by water **inlets** (pipes DIN 2353) protruding from the housing or from the inspection cover as shown in the following figures.



Tab. 10.3.1 - Coil

Gear reducer size	**d** Ø	**A**[1] ≈	**B**[1] ≈	**h**[1] ≈	**O**[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	255		
4000 ... 4501	16	180	–	250	472	30
5000 ... 5601	16	225	–	310	577	30
6300, 6301	16	280	–	320	647	30

1) Values valid and referred to mounting position B3; consult us.



Tab. 10.3.2 - Internal heat exchanger

Gear red. size	ft_{1b} B3	ft_{1b} B6, B7	ft_{1b} B8	A ≈	B ≈	C	ch	d Ø	h	h_1	K	L	R	S
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	2	2,24	2,12	2)	2)	34	30	16	2)	2)	2)	2)	2)	2)

1) Free area for pipe fastening and coil fastening devices.
2) Consult us.

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 ≤ 12 °F (French degrees);
– be at max temperature +20 °C;
– capacity 10 ÷ 20 dm^3/min;
– pressure 0,2 ÷ 0,4 MPa (2 ÷ 4 bar); the load loss of coil according to water capacity and pressure is 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 (see ch. 13.3).

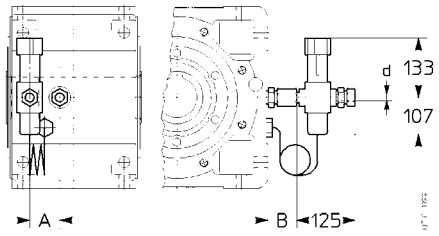
The direction of flow of the cooling water is discretionary.

The user must install a flow indicator or other device on the water delivery to ensure the gear reducer/ gearmotor stops when the flow drops below the required rate; if the delivery water pressure is too high or there is a risk of this occurring, install a safety valve properly set.

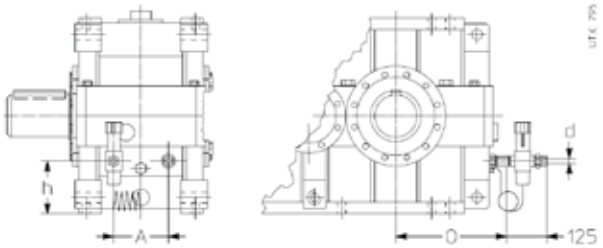
The instruments must be according to ATEX depending on the area of application and installed as close as possible to the gear reducer/ gearmotor.

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.



Valvola termostatica (serie G)



Valvola termostatica (serie H)

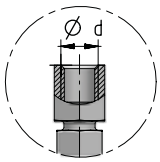
The **thermostatic valve** permits to have water circulation automatically and without auxiliary supply need, when gear reducer oil reaches the set temperature. The valve sensor is equipped with immerson bulb. Mounting and setting, adjustable within +50 ÷ +90 °C, must be mounted during the assembly. 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! Be sure that all operations foreseen for the installation have been executed, by using tables 14.1 and 14.2. It is necessary to protect the thermostatic valve from any shock or stroke.

10.4 - Integrated water cooling unit (EP series)



Ensure that all connections are free of leaks.

Tab. 10.4.1

1EL	2EL	3EL	4EL	2EB	3EB	4EB	d Ø	Code
001A … 002A 003A … 006A 009A … 015A	001A … 006A 009A … 022A 030A … 043A	001A … 022A 030A … 061A 085A … 125A	001A … 061A 085A … 180A 250A … 355A	001A … 006A 009A … 015A , 022 018A ... 021A , 030A	001A … 022A 030A … 043A 061A … 085A	001A … 061A 085A … 125A 180A … 250A	G1/4” G1/4” G1/4”	RS1a RS1b RS1c

11 - Accessories

IMPORTANT. Rossi has the right to supply interchangeable probes such as functional technical specifi cations and connections, but with slightly modifi ed case dimensions.

The probes (temperature probe, level probe) are an integrating part of safety system and must be connected to control devices of category to ISO 13849-1.

Control devices must work independently from electric power devices, needed for the operation. Follow the "fail+safe principle" for above mentioned devices.

Control device and/or connection logics must be realized with a locking system avoiding the accidental restart of operation, in case of stop.

IMPORTANT: Accessories that are supplied unassembled for transportation reasons must be installed on the gearbox before it is put into service by means of the threaded holes appropriately provided and indicated in the technical documentation accompanying the product. Tighten to the tightening torque indicated in Section 7.4 and use threadlocking adhesives type LOXEAL 23-18.

11.1 - Heater

Oil heater for starting the gear reducer at low temperature, **design ATEX II 2G EExd IIC T4**. **When the gear reducer is supplied in 2G and 2D design is equipped with ATEX oil temperature probe as standard** (see ch. 11.2) for piloting of the heater and the check of gear reducer; for gear reducer design 3GD the oil temperature probe is Buyer's responsibility.

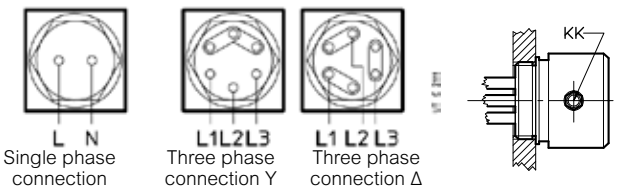
The heater is piloted through proper control device releasing when achieving the pre-set oil temperature.

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

Features:

- specific power 2W/cm^2;
- single-phase supply 230 V 50-60 Hz or three-phase Δ 230 Y 400 V 50-60 Hz (see table 11.1.1);
- metallic terminal box; cable gland protection IP 65;
- Horizontal mounting with oil bath lubrication;
- thermal safety sensor with manual reset.

Set the operating threshold of heater at 50 °C and the reset threshold at 30 °C. In case of running at T_{amb} < 0 °C, consult us.

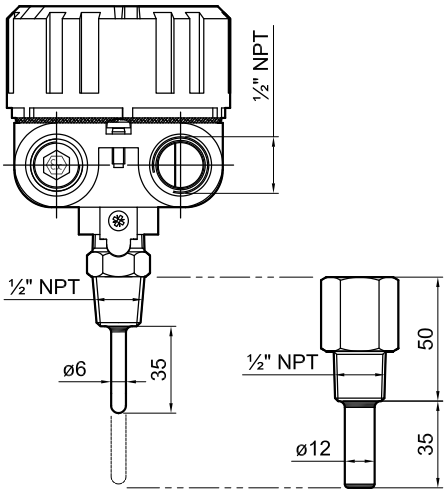
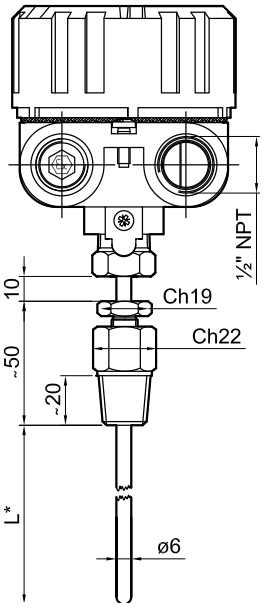
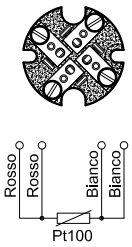
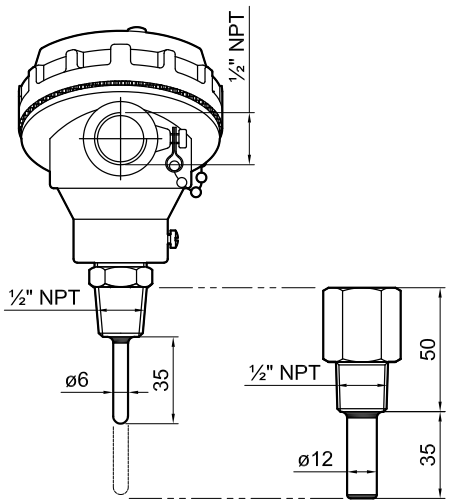
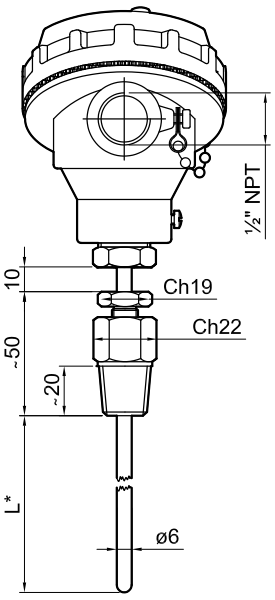
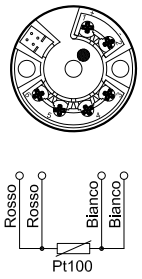


Tab. 11.1.1 - Heaters for standard configuration.

The values may differ, according to the application; refer always to the specific documentation attached.

Gear reducer size	**F**	M_S N m ≈	**P** W	**KK**	Supply
125, 140	G 1"	118	200	Pg 11	1~ 230 V 50-60 Hz
160, 180	G 1" 1/4	180	400		
200, 225	G 1" 1/2	224	600	Pg 13,5	3~ Δ 230 Y 400 V 50-60 Hz
250, 280	G 2"	300	1000		
320 … 360			1400		
400, 401	G 2" 1/2	375	2100		
4000 … 4501			n.2 × 1500		
5000 … 5601			n.2 × 3000		
6300 … 6301			n.2 × 3500		
7101			n.2 × 7500		
8001			n.2 × 9000		

11.2 - Oil or bearing resistance thermometers

Resistance type	Oil Fixed connection without bulb / bulb (optional)	Bearing Sliding connection bulb not possible	Connection 4 threads
Ex_d **ATEX II 2G, 2D** **Ex_d IIC T6**			 4 terminal ceramic base see specific documentation
Ex_ia **ATEX II 2G, 2D** **Ex_ia IIC T6**			 TMT82 transmitter see specific documentation

The temperature gauge is realized with a thermo-resistor Pt100 having following features:
– platinum wire with 100 Ω at 0 °C according to EN 60751;
– single element;
– 4 wire connection according to IEC 751;
– precision class A according to CEI EN 60751;
– alluminium body supplied without cable gland; cover screwed with pin chain and earth screw; IP66;
– range of measurement -40 °C < T < +160 °C
– functional safety SIL 2

For the electric specifications and the connection schemes refer to the specific instructions attached.

Installation and maintenance

Fit the coupling with sliding probe into the appropriate threaded hole of the gear reducer (for the position refer to SPT scheme attached to present operating instructions) by using a spanner key 24, loosen the hexagon using a 19 mm spanner and slide the probe of the thermometer in (up to the point of contact when the temperature of a bearing is to be measured) so that the head of the thermometer is closer to gear reducer.

The electrical connections must be made with copper shielded “twisted” wires separated from power cables. Internal and external earth connection to be made.

The body of the thermometer must be protected against all risks of damage.

Connect the sensor to a temperature control device with 2 operating threshold or similar device.

Periodically verify that:

– there is no erosion/corrosion of the gaiter

– the whole equipment is working efficiently by inserting into the circuit a resistance of a known value and simulating a known temperature.

Attention! Assemble and **disassemble the sensor with gear reducer without oil.**

Setting

2 operating thresholds are foreseen:

– **Alarm**: anormal temperature increase; consult the table 14.1 and identify the possible over-heating causes; when no operation is possible, start the procedure of machine block.

– **Block**: achieving the maximum temperature allowed; start immediately the procedures of machine block, exclude the gearmotor from supply; consult table 14.1 and execute the controls of table 14.3.

Unless otherwise stated in the eventual supplementary documentation attached to present operating instructions, proceed as follows:

Setting of **oil temperature probe**

At the end of commissioning (see ch. 12) when gear reducers or gearmotors reach a steady thermal condition measure the oil temperature $\boldsymbol{T}_{oil}$ and ambient temperature $\boldsymbol{T}_{amb}$ and set the operating temperature (alert) of the device connected with the oil probe at the lowest temperature between the following two:

– $\boldsymbol{T}_{calculation} = \boldsymbol{T}_{oil\ [°C]} - \boldsymbol{T}_{amb\ [°C]} + \mathbf{45}$ [°C]

– $\boldsymbol{T}_{alert} = \mathbf{85}$ [°C]

The **machine block** temperature cannot exceed $\boldsymbol{T}_{stop} = \mathbf{100}$ [°C].

Setting of **bearing temperature probe**

Set the operating temperature (alert and block) of the device connected to bearing probe as follows:

– $\boldsymbol{T}_{alert} = \mathbf{100}$ [°C]

– $\boldsymbol{T}_{stop} = \mathbf{110}$ [°C]

11.3 - Oil thermostat

Thermostat TRI120

Ⓔx II 2 G Ex d IIB T6 IP65
Ⓔx II 2 D Ex d IIB T85 °C IP65

Features
It is a thermostat for oil with following features:
- Internal temperature regulator, manually set by operator
- Body: aluminium alloy
- Liquid dilatation probe in cylindrical sump made of tropicalized brass
- Cable entry Ø 3/4" UNI 6125 (ISO 7/1)
- Setting range 0÷120 °C
- Maximum bulb temperature 150 °C
- Differential XT = 3 K
- Maximum current: 10 A
- Maximum voltage: 400 V (a.c.)/250 V (d.c.)
- SPDT contact
- Functional safety SIL2

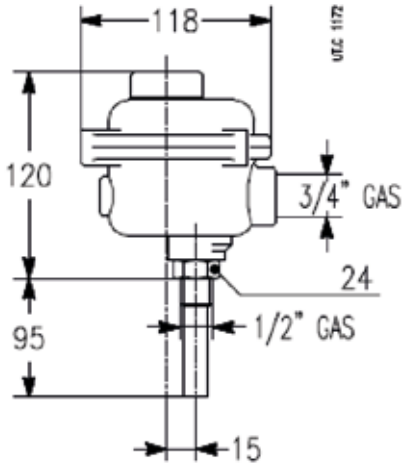


Fig. 11.3.1

Thermostat B121-120

Ⓔx II 2 G Ex d IIC T6 IP65
Ⓔx II 2 D Ex d IIC T85 °C IP65

Features
It is a thermostat for oil with following features:
- Incremental (5 K steps) internal temperature regulator, manually set by operator
- Body: aluminium alloy
- Liquid dilatation probe in cylindrical sump made of nickel-plated brass
- Cable entry Ø 3/4" NPT-F
- Thread Ø 3/4" NPT-M
- Setting range -18÷105 °C
- Maximum bulb temperature 135° C
- Current carrying capacity 15 A at 125/250 V (a.c.); 2 A at 30 V (d.c.)
- SPDT contact
- Functional safety SIL2

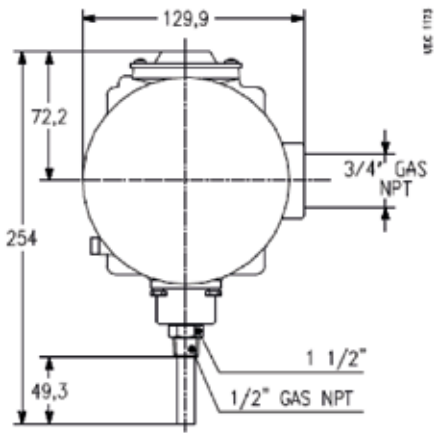


Fig. 11.3.2

TCA 2BA Thermostat

II 2 G Ex d IIC T6 IP65
II 2 D Ex d IIC T85 °C IP65

It is a thermostat for oil with following features:
- Scale: the instrument is fitted as standard with an approximate scale of the set point indication;
- Body: alluminium alloy, copper and copper alloy free;
- Vapor tension sensor;
- Cable entry Ø 1/2”-14 NPT-F
- Cable entry Ø 1/2"-14 NPT-M;
- Setting range -40 ÷ +170 °C;
- Maximum bulb temperature +180° C
- Current carrying capacity 15 A at 220 V (a.c.); 2 A at 24 V (d.c.)
- SPDT contact.

Installation and maintenance

Assemble thermostat in the proper hole of gear reducer (see position indicated in the enclosed SPT sketch). Carry out electrical connections according to the current standards. Protect the body of the thermostat if there may be a risk of being damaged by foreign particles. The connection of the thermostat shall be made by cable entries or a stopping box of a flameproof type, certified EExd IIC (for B121-120) or EExd IIB (for TRI120) .

The thermostat must not be altered or modified: if modification is necessary consult Rossi.

When the thermostat has an external and an internal grounding terminal, the internal grounding terminal shall be used as **primary** equipment grounding means whereas the external grounding terminal is only for a supplementary (secondary) grounding connection where local authorities permit or require such a connection.

Carry out periodical checks to verify that the whole equipment is efficient according to table 14.3. **To prevent ignition of hazardous atmospheres, disconnect circuits before opening the thermostat.**

Attention! Assemble and **disassemble the sensor with gear reducer without oil.**

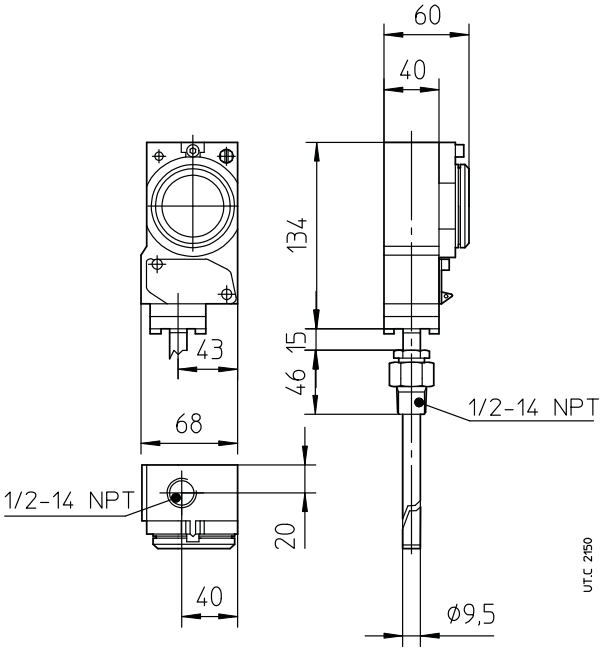


Fig. 11.3.3

Setting

The thermostat is to be set for a maximum threshold temperature of 85° C. If, after commissioning (when gear reducer or gearmotor reaches steady thermal conditions) the oil temperature *T*oil and ambient temperature Tamb can be measured, set the unit at the lower temperature between the following two:

- $\boldsymbol{T}_{\text{calculation}} = \boldsymbol{T}_{\text{oil [°C]}} - \boldsymbol{T}_{\text{amb [°C]}} + \mathbf{45}$ [°C]
- $\boldsymbol{T}_{\text{alert}} = \mathbf{85}$ [°C]

The **machine block** temperature cannot exceed $\boldsymbol{T}_{\text{stop}} = \mathbf{100}$ [°C].

11.4 - Oil level switch with float

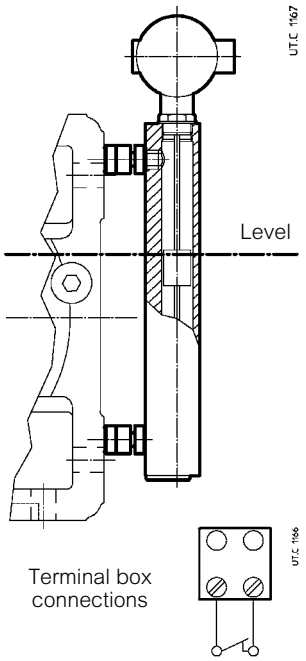
II 1 G Ex d IIC T6
II 2 G Ex d IIC T6

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.

The float and the supporting stem are included in a hollow column of not magnetic material connected to the gear reducer casing through communicating vessels.

Features:

- 2 wires connection;
- Max voltage: 350 V
- Maximum current: 1.5 A
- 1 cable input 1/2" UNI6125 – IP65
- G 1" brass joint.



Installation and maintenance

The accessories used for cable input and for covering unused holes must be certified according to EN 60079-0 and EN 60079-1 standards.

The level switch must be installed and maintained according to plant and maintenance standards for environments classified to explosion proof for the presence of gas (i.e.: EN 60079-14, EN 60079-17 or other national standards). The level switch box must be earth connected.

Only proper tools have to be used for installing and disassembling the level switches. Never use electrical connections for manual installation.

The level switch cables must be installed in mechanical protections such as conduit pipes with separating joints at the top and the end of the pipes. Minimum cable section has to be 0,22 mm^2. All active/passive safety barriers and connected devices (insulated amplifiers, relays) if any must be certified according to EN 60079-11 standards with [EEX ia] IIC protection and have to be installed in a safe area. The contacts are "REED" type and can carry up to ca. 100 000 000 operations during their life cycle. The switch power is relatively low (30-100 VA/W depending on application). For the safe use of the contacts it is recommended to drive inductive/capacitive power-loads through auxiliary relays or to use transient dampers/ Suppressors If used in accordance with its mechanical and electric specifications, this series of instruments does not need any specific maintenance. **Check every 6 months** the functionality of the level switch according to table 12.3. Protect the switch head if there may be a risk of hurts with foreign matters.

Setting

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 set.** If any problems occur during this operation contact Rossi.

11.5 - Pressure switch with flameproof enclosure Ex d

II 2G Ex db IIC T4 Gb
II 2D Ex tb IIIC T135 Db IP66

ATTENTION: In presence of brake PB series and application of ATEX 2G, 2D and 3G, 3D, the pressure switch is always necessary as a safety device. The equipment on which the brake is installed can be operated only when the detection of a pressure value higher than the set one confirms that the brake is released.

General technical specifications:

- Flameproof enclosure: alluminium alloy, copper free, polyurethan paint
- 1x SPDT, single pole double throw hermetically sealed, argon gas filling
- Electrical rating (resistive load):
  AC: 250 V, 15 A
  DC: 24 V, 2 A, 220 V, 0,5 A
- Process connection: 1/4-18 NPT-female
- Electrical connection: 1/2-14 NPT-female
- Permissible ambient temperature range: - 30°C ... +70°C
- Working pressure range: 0 - 350 bar
- Setting range: 20 - 220 bar (see note about pressure setting value)
- Protection degree: IP66
- SIL2 (Safety Integrity Level)

Pressure switch setting:

The pressure switch is supplied by Rossi already set to the nominal value, see below. This setting refers to the comprehensive range of PB brakes, however it is possible to obtain several setting values, if need be.

Nominal setting pressure value, rising pressure (operation pressure or set point) = **100 bar**
Actual Setting Pressure = from 98 to 102 bar
Resetting pressure, failing = min 92 bar

Electrical connection:

Follow the instructions stated in the installation and maintenance manual supplied by the manufacturer.

When commissioning the gear reducer

Check that pressure in brake supply circuit is suitable and sufficient to exceed the operating threshold (set pressure).

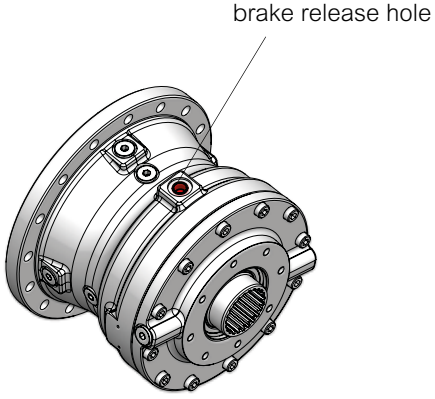
During the normal operation

If, during brake opening (gear reducer starting transient), a longer time should be necessary to achieve the operating pressure, it is allowed the running of brake for Max. 5 seconds assuming that supply pressure is higher than pressure of brake opening end ("p" pressure according to technical sheet).

Installation:

The pressure switch is supplied by Rossi and installed directly on a port of a T-connection fitted to the brake, the other port of the T-connection carries a 1/4" G thread for the brake release pipe.

The standard configuration foresees the supply of the switch in VERTICAL position (see fig. 11.5.1), but in presence of application overall dimensions, it is possible to have an HORIZONTAL mounting (see fig. 11.5.2).



Pressure switch mounting position

VERTICAL (standard)

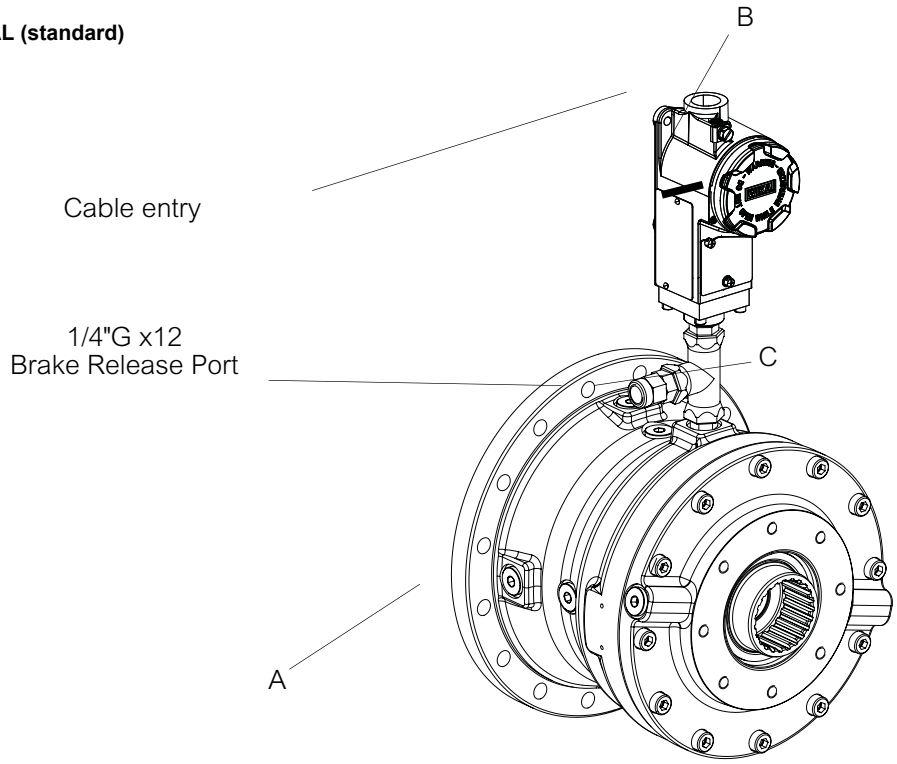


fig. 11.5.1

HORIZONTAL (optional)

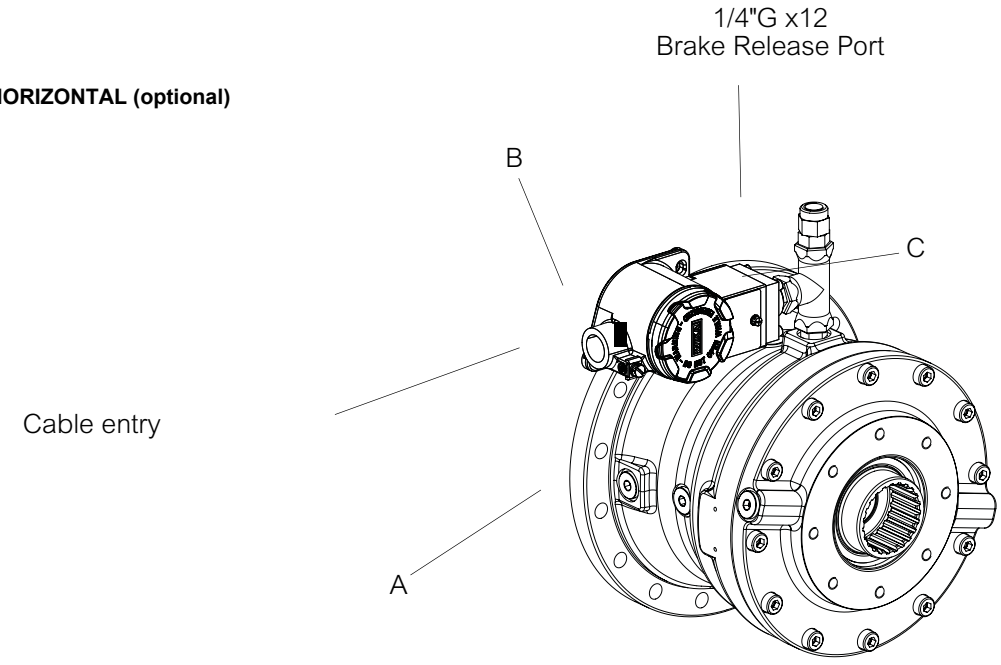


fig. 11.5.2

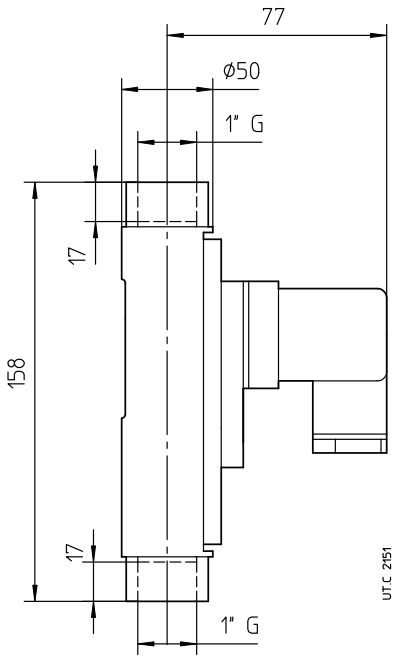
A. Brake of PB series
B. Pressure switch.
C. Connection KIT

11.6 - Flow gauge BFS-20

II 1 G Ex ia IIB T100°C IP6X
II 1 D Ex ia IIIB T100°C IP6X

It's a capacity control device.

The measurement is executed through a piston movement equipped with loaded spring, free to flow inside a cylindrical pipe. The piston movement depends from device calibrating and from its minimum and maximum setup capacity. This device is equipped with viscosity compensation system.



Running features:

– Circuit voltage ***U*** = 28 V;
– Circuit current ***i*** = 50 mA;
– Supply 45 V - 1 A;
– Electrical connection to DIN 43650;
– Maximum pressure ***P*** = 10 bar;
– Maximum temperature ***T*** = 120 °C;
– Viscosity compensation from 30 to 600 cSt;
– Capacity measurement range 2 - 90 l/min;
– IP 65 protection;
– Connection 3/4" G or 1" G.

Setting

The flow gauge must be set for a minimum level equivalent to 70 % of capacity. During the running it is necessary to verify the correct setting of the device. If any problems occur during this operation contact Rossi.

Installation and maintenance

The flow gauge must be installed and maintained according to installation and maintenance rules for environments classified against the risk of explosion for gas presence (example: EN 60079-14, EN 60079-17 etc.).

The instrument can be mounted in whatever position but in order to execute a careful measurement it is necessary to mount it in vertical direction and that the flow traverses it from the bottomo to the top.

ùThe oil must be pollution particles free, otherwise the instrument could not operate properly; install an oil filter or a magnetic filter, in order to avoid this problem.

The device must be installed far away from inductive or magnetic fields and at a minimum distance of the iron parts of 10 mm.

During the assembly of the device, avoid rotating the electrical connections inside the tabular hose in order to avoid any damage to the instrument.

Pre-arrange suitable protections against electrical overloads.

Adjust the switching point according to the measurement range so that the contact is open when the capacity achieves the minimum setup point.

The flow gauge, if used properly according to its mechanical and electrical features specified, does not need any careful maintenance, but it is recommended to do a specific check every 6 months in order to control the correct running as per table 14.3.

Protect the probe body from any external impact.

The probe body must be earth connected.

In any case, refer to the installation and maintenance instructions; consult us, if need be.

12 - Commissionning

12.1 - General

Carry out a general check, making particularly sure that **the gear reducer is filled with synthetic oil in the correct quantity** (up to level), **with the proper viscosity and one of the brands recommended in table 10.3**, and that it is installed in the mounting position stated on nameplate.

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 **safety and control devices assembled on the gear reducer** and requiring electric power supply at user's care **are active and running**.

Be sure that the independent cooling units (with coil with internal heat exchanger and independen cooling unit) are working during the gear reducer running (see ch. 10.3).

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.

Before running gear reducers fitted with **backstop device, make sure that the direction of rotation in machine, gear reducer and motor all correspond correctly.** 7.14).

12.2 - Running-in

For the first commissioning, before starting with a normal running cycle, it is advisable to run the gear reducer without load in order to verify if it correctly runs.

In this circumstance, cause of the elimination of potential residual air, an oil filling up to level could be necessary.

During the first running hours, it is important to check:

– noise level;

– vibrations;

– sealings;

If you notice any malfunctions, please refer to ch. 14.

A **running-in** period with gear reducer running at 50% of rated torque is suggested as follows:

– of approx. 400 ÷ 1 600 h for gear reducers with worm gear pairs in order to reach maximum efficiency;

– of approx. 200 ÷ 400 h for gear reducers with bevel and/or cylindrical gear pairs in order to reach the best possible running conditions.

The temperature of both gear reducer and lubricant may well rise beyond normal values during running-in, but lower than the maximum value stated on name plate. After the running-in period it may be necessary to verify the gear reducer fixing bolt tightness.

During the first running hours it is possible to have a slight seepage of grease from the seal rings, which will not affect the good running.

Note. Note: worm gear reducer efficiency is lower in the **first running hours** (about 50) and at every cold starting (efficiency will be better with oil temperature increasing).

At first commissioning do all checks listed in table 14.2. The controls, for the devices of category 2, must be repeated after 24 hours and after one week.

Check that the unit is not faulty (broken bearings, keys, shafts, etc.) or shows signs of incipient malfunction (e.g. increased running noise/vibration, etc.).

12.3 - Measurement of surface temperature

Measure by a thermometer the surface temperature of gear reducer close to the high speed shaft (gear reducer) or at the coupling surface between motor and gear reducer (gearmotors) in the position which is most protected from air circulation.

When commissioning this temperature is to be kept under control and the max value is to be noted; the values are to be periodically checked (according to table 14.3) and compared with those which were previously noted in order to verify if there is any increase; **if a significant increase (> ≈ 10%) occurs, something is not working properly and the machine must be stopped: consult Rossi.**

Attention! Measure the difference in temperature (ΔT) compared to ambient temperature at the same operating conditions.

Note. Note: the max surface temperature is reached after approx **1÷4** h running on full load (the heating time is proportional to gear reducer size). The difference in temperature shall not exceed ambient temperature by more than **45° C**.

13 - Maintenance

Safety precautions

Maintenance on speed reducers and gearmotors series A, E, G, H, iC, EP, must be performed only by expert personnel, whose training has included all the necessary instructions on the equipment protection methods, on the installation methods, on the relevant laws and regulations and on the general principles of classification of places with danger of explosions (see IEC/EN 60079-17 “Explosive atmospheres – Part 17: verification and maintenance of electrical plants”, in particular attachment B “knowledge, skills and competences of qualified personnel, technical personnel with executive functions and operational personnel").

Troubleshooting, diagnosis and repairs

The repair of gear reducers and gearmotors of A, E, G, H, iC, EP series must be executed only by skilled personnel.

For this purpose see standard IEC/EN 60079-19 “Explosive atmospheres – Part 19: repair, revision and resetting of tools”, in particular attachment B “Knowledge, skills and competences of responsible and operational personnel".

Do all checks and verifications according to table 14.3.

The **replacement of seal rings**, the **oil change** and in general all operations not requiring any gear reducer opening and any replacement of transmission elements (e.g. shafts, gears, bearings, etc.) are considered **standard maintenance** operations. All these operations can be executed by **responsible qualified staff and** without any direct involvement of Rossi personnel. The spare parts (excluding lubricant) must be ordered at Rossi, by stating the gear reducer identification code stated on nameplate

Occasional maintenance such as replacement of gear pairs, bearings, etc. must only be done by **qualified Rossi technicians**. Therefore, the request of bearing, gear, shaft spare parts **may not be taken in consideration without any direct intervention of Rossi field service network**. As alternative the gear reducer will have to be sent back to Rossi for all necessary maintenance operations.

Rossi undertakes and grants no responsibility or guarantee for any damages and/or malfunctions arising from the use of non-original Rossi spare parts and/or accessories.

13.1 - General

Before starting any maintenance operations (disassembling, oil change, seal ring change, etc.):

– ensure there is no potential explosive atmosphere all around.

– disconnect the motor (including the auxiliary equipments) **from the electrical supply, and the gear reducer from load;**

– **be sure that all safety systems have been activated against the accidental starting** and if necessary, utilize mechanical locking devices (to be removed before commissioning);

Maintenance procedures to be adopted:

- **LOTO** (Lockout/Tagout): it is necessary to adopt the machine disconnection procedure (electrical and mechanical segregation)..
- **HOT Works**: hot fitting of components (ex. to the shaft end) can absolutely only be made in certified safe areas.

Do not weld anything to the reducer/gearmotor as this can damage gear pairs, bearings, oil seals. Do not use the housing to ground welding equipment.

Maintenance technicians must wear appropriate work apparel (antistatic clothing, gloves, etc.).

Stop the machine and isolate the power supply to ensure there will be no accidental starts in the following circumstances:

a) when maintaining labyrinth seals and greaser;

b) when maintaining bearings with separate lubrication of the backstop device;

c) control of:

– cleaning of external surfaces and air passages of gear reducer or gearmotor;

– oil level;

– visible checks for oil deterioration (metal parts, water, sludge, etc.);

– correct tightening of fastening screws (feet, flange), shrink disc, hub clamp, if any (see 9.2) and of electrical bonding;

– cleanliness of filter and functionality of valve of filler plug;

d) lubricant leak;

e) critical threshold of eventual safety devices has been exceeded.

For gear reducers **with level plug or equivalent system** (plug for flowing over level, plug with dipstick) verify that oil level has not lowered.

For gear reducers without level plug, check for oil leaks (dripping, oil spots, etc.) **with the machine running and at rest.**

In case of lubricant leak, before commissioning again the gear reducer or gearmotor:

– collect the a.m. lubricant and dispose of it according to the law in force;

– identify the cause of leak (if necessary, consult Rossi).

– ripristinare il livello o la quantità richiesta.

In presence of dusty environment pre-arrange an adequate maintenance plan so that the thickness of dust laying on gear reducer or gearmotor surface is reduced to a minimum and never exceeding 5 mm.
For this operation use antistatic materials.

Be sure that the safety and control devices are effective.

Attention! After a running period, even if thermal range is not achieved, gear reducer is subject to a light internal overpressure which may cause burning liquid discharge. Therefore, before loosening whichever plug wait until gear reducer has become cold; 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 in lubrication table (see ch 8.2) do not represent a hindrance to the gear reducer regular running.

Qualora venga smontato il coperchio (per i riduttori che ne sono provvisti) o un cappellotto, ripristinare la tenuta con mastice dopo aver pulito e sgrassato accuratamente le superfici di accoppiamento.
All bolts which may be damaged during assembling and disassembling operations are to be replaced with new ones having equivalent specifications and resistance class.

Occasional maintenance such as replacement of gear pairs, bearings, etc. must **only be done by qualified Rossi technicians**. We recommend to purchase spare parts and accessories from Rossi.

Rossi undertakes and grants no responsibility or guarantee for any damages and/or malfunctions arising from the use of non-original Rossi spare parts and/or accessories.

In case of long rest periods, the gear reducer must be committed for a shor time every 3 weeks; for rest periods longer than 6 months the gear reducer must be treated adequately for the conservation: consult Rossi.

13.2 - Oil change

Execute the oil change with **machine at rest** and **cold gear reducer**.

Pre-arrange a proper tank system for the drain oil, unscrew the drain plug and the filler plug to facilitate the drain; make sure that all oil has been drained, inclining the gear reducer of removing any residual parts with a suction pump; dispose the drain 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;

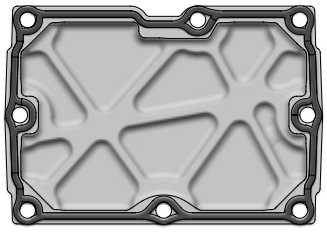
Fill the gear reducer with oil again **up to level**.

The exact quantity gear reducer is to be filled with is definitely **given by the level**, excluding some iC series gear reduvers for which the level is to be determined through graduated rod (see ch. 18.1). For EP series gear reducers, when output speed n_2 is lower than 0,3 min^{-1} , for all mounting positions refer to approximative oil quantities stated for position V1.

During the oil change, replace the seal rings.

In this case, the new ring must be positioned so that it does not work on the same point of sliding contact as the previous ring;

When dismounting the cap (whenever gear reducers are provided with), reset the sealing with liquid adhesive LOXEAL 58-14 on cleaned and degreased mating surfaces, without interruption and contouring the holes (see fig. below); when finished, replace the cover, apply the screws, and tighten to the tightening torque indicated in Section 7.4 .



For lubrication interval see table 8.2.

Indiependently from running hours: replace or regenerate synthetic oil at least 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 (see ch. 8), than give the gear reducer a through clean-out.

13.3 - Coil and internal heat exchanger

In case of long non-running periods at ambient temperatures lower than 0 °C, the coil 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 proceed with the cleaning of exchange surfaces taking care not to damage the finned surfaces.

13.4 - Seal rings

Seal rings duration depends on several factors such as dragging speed, temperature, ambient conditions, etc.; as a rough guide it can vary from 1 600 to 12 500 h; in any case replace them every 5 years.

In general, however, replace the seal rings in case of dismounting or of periodical check; in this case, during the assembly, you have to:

- lubricate the rotary seating of seal ring and the seal lip generously with grease (type KLÜBER Petamo GHY 133N);
- procede with mounting paying particular attention not to damage the seal lip due to accidental shocks or hurts or direct radiation deriving from eventual hot fitting of other components;
- position the seal lip **not in correspondence** of previous ring groove;
- position the seal ring in its seat on gear reducer housing **using locking adhesive** (type LOXEAL Istant 29); the application of locking adhesive is required even when replacing **protection caps**.

The new seal rings must be made of fluoro-rubber (Viton®).

In case of designs with **labyrinth seal and greaser** («Taconite»), re-grease at least every month.

In case of EP series, for sizes higher than 030A (excluding sizes 031A and 043A), refill the grease on output seals each 3000 operating hours or at least every 6 months.

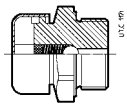
13.5 - Bearings

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.

It is therefore necessary **to undertake periodical checks (according to table 14.3) to verify noise level and vibrations with the help of appropriate diagnostic equipment and instruments**. If the measured values worsen even slightly it is necessary to stop gear reducer or gearmotor and after having inspected inside and consult Rossi, if need be.

If the failure of a bearing and the stopping of the machinery constitute a danger to people, execute a continuous monitoring of vibrations and noise level.

13.6 - Metal filler plug with filter and valve



For the cleaning of plug (see ch. 8.1) 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.

Do this operation at least once every 6 months: if the environment requires it, reduce the maintenance interval.

13.7 - Sound levels

Most of the Rossi product range is characterised by **sound pressure levels *L***pA (mean value of measurement, assuming nominal load and input speed n_1 = 1 400 min $^{-1}$, at 1 m from external profile of gear reducer standing in free field on a reflecting surface, according to draft proposal ISO/CD 8579) **lower or equal to 85 dB(A)**.

The table 11.8.1 shows the products which can exceed a.m. threshold. For further information about sound levels of every single product see Rossi technical catalogs.

Tab. 13.7.1 - Products that can exceed the threshold of 85 dB(A) of sound pressure levels.

	Helical gear units (G, H series)								**Bevel helical gear units** (G, H series)				
	R I		**R 2I**		**R 3I**		**R 4I**		**R CI**		**R C2I**		**R C3I**
i_N	⩽ 3.55	⩾ 4	⩽ 14	⩾ 16	⩽ 90	⩾ 100	⩽ 160	⩾ 200	⩽ 18	⩾ 20	⩽ 63	⩾ 71	all
Size	⩾160	⩾200	⩾ 250	⩾ 320	⩾ 320	⩾ 400 ⩾4000	⩾ 5000	⩾ 6300	⩾ 320	⩾ 400 ⩾ 4000	⩾ 400 ⩾ 4000	⩾ 5000	⩾ 6300

13.8 - Gear reducer troubles: causes and corrective actions

Trouble	Possible causes	Corrective actions
Excessive oil temperature	Inadequate lubrication: – excessive of insufficient oil quantity	Check: – oil level (gear reducer at rest) or quantity (see ch. 15 ... 20)
	– unsuitable lubricant (different type, too viscous, exhausted, etc.)	– lubricant type and/or state (see table 8.3) and eventually replace it
	– wrong mounting position	– change mounting position
	– too tightened taper roller bearings	Consult Rossi
	Worm gear reducer with ex cessive load durino running -in	Reduce the load
	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.)
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. 13.4)
	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 (see ch. 15 ... 20)
Oil leaking from filler plug	Too much oil	Check oil level or quantity (see ch. 15 ... 20)
	Incorrect mounting position	Check mounting position (see ch. 15 ... 20)
	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

Motor: see specific instructions.

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 occured;

– during the warranty period, in order not to loose validity, do not disassemble nor tamper the gear reducer or gearmotor without approval by Rossi.

14 - ATEX checks and verifications

Attention. Do all checks and verifications listed below, at first commissioning and during normal running. These checks are integrating parts of the device protection system and have to be carefully executed.

14.1 - Table of main installation checks and operations

Operation / Check	Reference
Has the consignment been damaged during shipping (dented shafts, strained oil seals, caps a/o plugs)?	5.1, 7.2
Has all packaging been removed?	5.4
Doe the nameplate data correspond to the order and fit the installation area?	4.4, 7.2
Beside the present operating instructions, is the eventual additional documentation available (SPT sketch, probes, thermostats, etc.)?	7.2
Is the mounting position of name plate correct for the actual installation?	5.1, 7.2, 15...20
Have all coupling surfaces been cleaned and greased?	7.2
Have you carefully aligned the gear reducer shafts with the motor and driven machine shafts?	7.2
Are the fan cage bolts fully tightened down?	7.2, 7.4
Are you sure that the installation is not to be done in a potentially explosive atmosphere?	7.2
Have all fastening bolts been correctly tightened (see table 7.4.1)?	7.2, 7.4
Has the shrink disc been correctly tightened?	7.12
Has the hub clamp correctly tightened?	9.2
Has the eventual cylindrical pinion been correctly mounted on the motor shaft?	9.3
Is there oil in the reducer (correct quantity/level)?	7.2, 8, 12.1,15 ... 20
Is the level plug accessible?	7.2, 8.1
Is the filler plug with filter and valve present (only size $\geq$ 100)?	8.1, 13.6
Is the filler plug accessible for maintenance?	8.1, 15 ... 20
Has the machine shaft for mounting with shrink disc got correct dimensions tolerances and roughness?	7.12
Has the locking assembly cover been pre-arranged?	7.12
Are the accessories (thermal probes, etc.) compliant with the ATEX specifications for the installation?	7.2, 11
Are you sure that the input speed cannot exceed 1 500 min^{-1}?	7.2
Have you hooked up all required monitoring/safety devices (resistance thermometer, oil level switch, etc.)?	7.2, 11
If a backstop device is mounted, do the direction of free rotation and drive direction of the service and the motor correspond?	7.2, 7.14
Are you sure that the environment is well ventilated and that the ambient temperature is and will be $\leq$ 40 °C?	2
Is there any oil leaks?	12.1
Have you done electrical bonding connection?	7.2
Have you aligned gear reducer and machine shafts?	7.2, 7.13
Have you connected the cooling coil, if any?	10.3
Have you connected the internal cooling exchanger, if any?	10.3
Have you foreseen a proper space for the suction of the cooling fan?	7.2

14.2 - Table of commissioning checks and operations[1)]

Cod.	Object	Check	On starting (category 2 and 3)	**After 24 h** and **after one week (category 2)**
A	Oil leaks (oil seals, joining surfaces, plugs, etc.)	Visual check	Keep under control for the first 4 h:	Temporary check
B	**External surface temperature**	Check by thermometer	Keep under control the surface temperature until it reaches a steady condition and verify that ΔT 45 K, keep the measured values to compare them in following measurements (see 12.3)	Measure and compare values with those previously measured see 12.3)
C	**Sound levels**	Sensory check or referably by noisemeter	Keep under control for the first 4 h. When checking by an instrument keep the measured values to compare them in following measurements	Check and compare values with those previously measured
D	**Vibrations**	Sensory check or preferably by accelerometer	Keep under control for the first 4 h. When checking by an instrument keep the measured values to compare them in following measurements	Check and compare values with those previously measured
E	**Gear reducer bearings (unit pre-assembled with vibration monitoring device)***	Check with proper instruments	Check on starting and after 4 h. Keep the measured values to compare them in following measurements	Measure and compare values with those previously measured
F	**Cooling coil**	Check by thermometer, chronometer, volume measurer (or other instruments)	Keep under control: water temperature 20°C, water flow rate 10 ÷ 20 dm3/min; absence of water drip	Measure and compare values with those previously measured
G	**Functionality of oil/air cooling unit**	Check air temperature by thermometer Visual check: – fan direction of rotation – oil circulation	Keep under control for the first 4 h: air temperature ⩽ 40 °C; gauge pressure > 0; absence of oil leaks	Measure and compare values with those previously measured
H	**Functionality of oil/ water cooling unit**	Check circulation of water and oil	Keep under control for the first 4 h: water temperature ⩽ 20 °C, water flow rate 15 ÷ 20 dm^3/min; gauge pressure > 0	Measure and compare values with those previously measured
I	**Resistance thermometers*** (oil, bearings)	Check: – connections to control devices – setting of devices – general functionality	Read value of temperature on the control device and verify that it is lower than the established values. Keep under control for the first 4 h:	Measure and compare values with those previously measured
J	**Oil level control switch***	Check: – connections to control devices – setting of devices – general functionality	Keep under control for the first 4 h:	Temporary check
K	**Thermostat* (oil)**	Check: – setting – electric connections to the safety switch (auxiliary circuits, etc.)	Keep under control for the first 4 h:	Temporary check
L	**Cleanliness of external surfaces**	Visual check	Dust thickness ⩽ 5 mm	Temporary check
M	**Cooling air passage**	Visual check	On starting and after 4 h	Temporary check
N	**Screws and tightening torque**	Check by dynamo-metric wrench of the fastening bolts (feet and flanges) and shrink disc	Check when excessive vibration is detected and after 4 h	Measure and compare values with those previously measured
O	**Motor absorption**	Check by Watt-meter or amp-meter	Check on starting and after 4 h. Keep the measured values to compare them in following measurements	Measure and compare values with those previously measured

The installation responsible has to verify that safety circuits using control switches and thermostats are on, run properly and switch on at once.

Repeat a.m. check procedures:
– at any oil change
– at any exceptional maintenance
– after a continuous stop of 2 or more weeks.

14.3 - Table of inspections[1)] to be made during the normal operation (to be made after checks listed on table 14.2)

Cod.	Object	Inspections in absence of oil temperature probe	Inspections in presence of oil temperature probe	Ref.
A	**Oil leaks** (oil seals, joining surfaces, plugs, etc.)	every six months for category 3G, 3D each month for category 2G, 2D	every three months	–
B	**External surface temperature**	every six months for category 3G, 3D each month for category 2G, 2D	every three months	12.3
C	**Sound levels**	every six months for category 3G, 3D each month for category 2G, 2D	every three months	13.7
D	**Vibrations**	every six months for category 3G, 3D each month for category 2G, 2D	every three months	13.7
E	**Gear reducer bearings (unit pre-assembled with vibration monitoring device)***	every six months		–
F	**Cooling coil and internal exchanger**	every two years		13.3
G	**Functionality of oil/air cooling unit**	every six months for category 3G, 3D each month for category 2G, 3D	every three months	doc. spec.
H	**Functionality of oil/water cooling unit**	every six months for category 3G, 3D each month for category 2G, 2D	every three months	doc. spec.
I	**Resistance thermometers (oil, bearings)**	every six months		–
J	**Oil level control switch***	every six months		–
K	**Thermostat* (oil)**	every six months		–
L	**Cleanliness of external surfaces**	when necessary, also every day (the dust thickness must not exceed a 5 mm thickness)		–
M	**Cooling air passage**	when necessary, also every day		–
N	**Screws and tightening torque**	at any oil change and when excessive vibration is detected		7.4
O	**Motor absorption**	every six months for category 3G, 3D each month for category 2G, 2D	every three months	–
P	**Electrical bonding**	every six months for category 3G, 3D each month for category 2G, 2D	every three months	–
Q	**Cleanliness of filler plug with filter and valve**	when necessary, at least every six months		13.6
R	**Labyrinth seals and greaser**	let in grease with pressure at least each month		doc. spec.
S	**Name plates**	yearly		–
T	**Gear reducer bearings with separate lubrication, backstop mounted on motor**	with uniform load and pollution free environment, lubrication is for life, otherwise replace grease at least every year for running < 12 h/d or every 6 months for running ⩾ 12 h/d		–
U	**Presence of water in oil**	yearly		–
V	**Restoration a/o preservation of surface protection**	when necessary to keep painting coat integral and retouching rusty spots, if any		7.2
W	**Oil seal replacement**	1 600 h ÷ 12 500 h and on gear reducer revision		13.4
X	**Oil change**	see table 8.3		13.2
Y	**Cleanliness of oil filter**	when detected by clogging device or there is an increase in oil pressure		–
Z	**Motor bearings**	see motor's specific documentation		–

The installation responsible has to verify that safety circuits using control switches and thermostats are on, run properly and switch on at once.

The control intervals stated in the table are the maximum values; for heavy duty or very severe ambient conditions it may be necessary to reduce these intervals.

15 - A series - Mounting positions, oil quantity and position of plugs

For inclined mounting positions, when "spec." is stated on nameplate in IM field, refer to the attached specific documentation.

15.1 - Oil (quantity) levels for worm GEAR REDUCERS and GEARMOTORS sizes 32 ... 81 (A series), supplied FILLED with OIL

Before commissioning, use a dipstick and check that the vertical distance X [mm] **between plug shoulder and oil level** corresponds to the value stated in the table 13.1.1.

Before checking ensure that there are no more gas pockets in the oil which is included in the gear reducer.

Measure as specified in fig. 13.1.1 with gear reducer in mounting position B7.

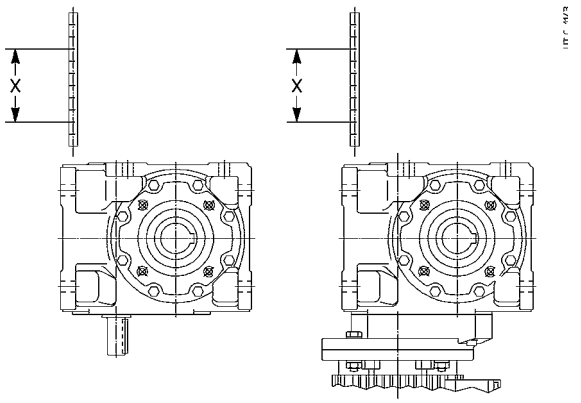


Fig. 13.1.1 - Position the gear reducer or gearmotor, mounting position B7 for the measurement of oil level (quantity).

Tab. 13.1.1 - Oil level (dimension x) and quantity for gear reducers and gearmotors A series sizes 32 ... 81

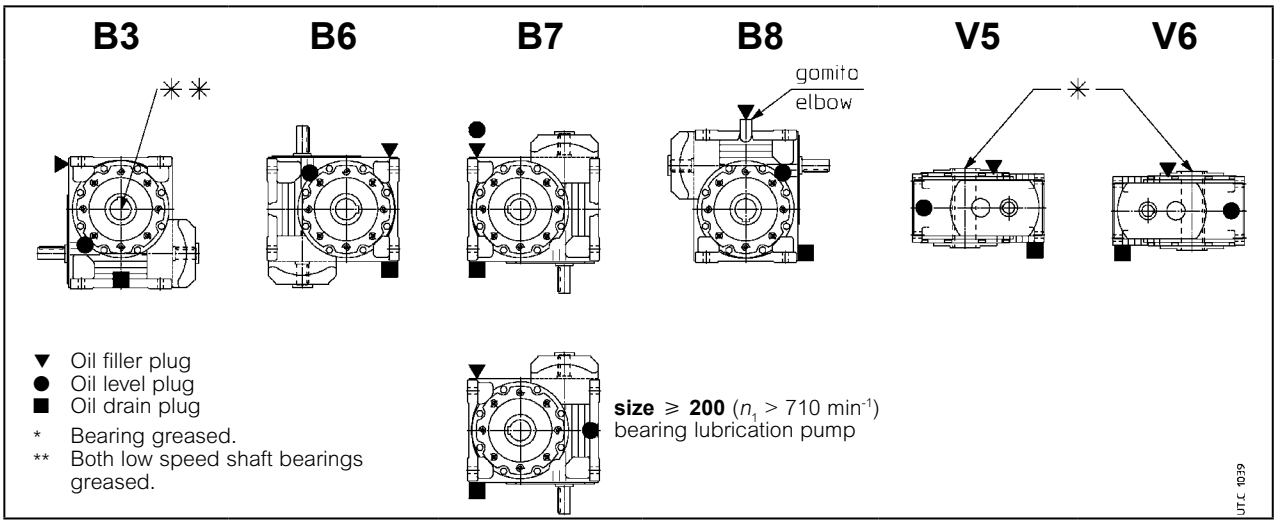
Size	Train of gears / Mounting position / Oil level (dimension x[1]) [mm] and quantity [l]																	
	V						IV						2IV					
	B3, V5, V6		B6, B7		B8		B3, V5, V6		B6, B7		B8		B3, V5, V6		B6, B7		B8	
	mm	l	mm	l	mm	l	mm	l	mm	l	mm	l	mm	l	mm	l	mm	l
32	34	0.15	25	0.2	34	0.16	42	0.2	25	0.25	42	0.2	–	–	–	–	–	–
40	34	0.26	24	0.35	34	0.26	43	0.32	24	0.4	43	0.32	43	0.42	24	0.5	43	0.42
50	52	0.4	26.5	0.6	52	0.4	48	0.5	22	0.7	48	0.5	48	0.6	22	0.8	48	0.6
63, 64	59	0.8	30	1.15	59	0.8	58	1	30	1.3	58	1	58	1.2	30	1.55	58	1.2
80, 81	89	1.3	37	2.2	63	1.7	96	1.5	37	2.5	50	2	**B3**: 96 **V5**: 89 **V6**: 89	1.7 1.8 1.8	37	2.8	50	2.3

1) Tolerance of dimension x: ± 2 mm.

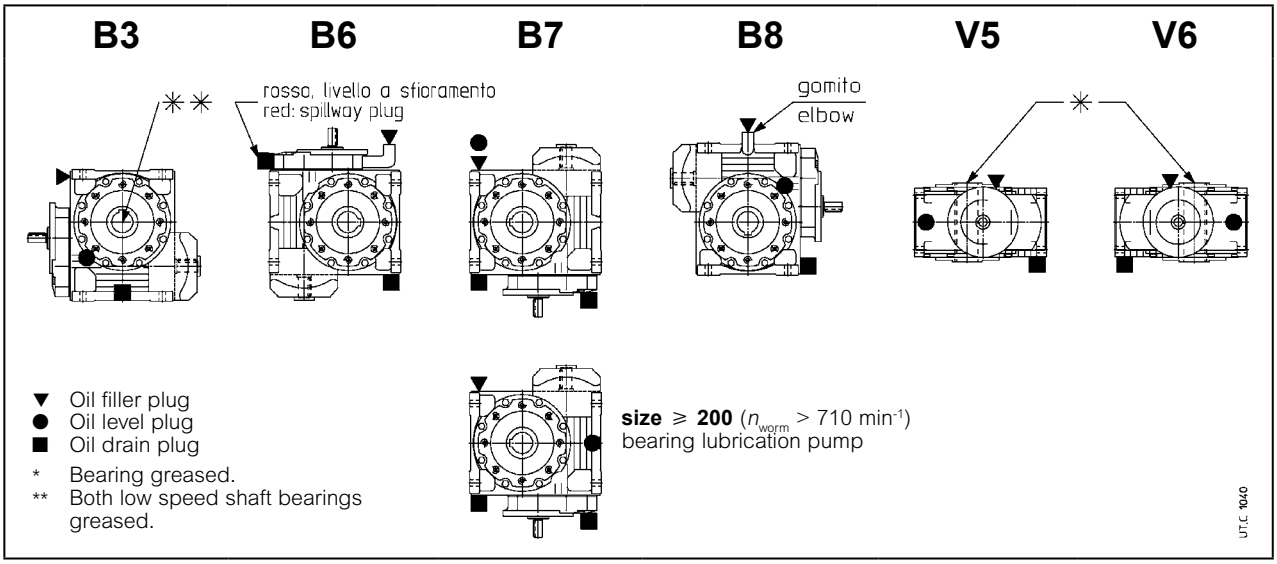
15.2 - Mounting positions and plug position for worm GEAR REDUCERS and GEARMOTORS sizes 100 ... 250 (A series), supplied WITHOUT OIL

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

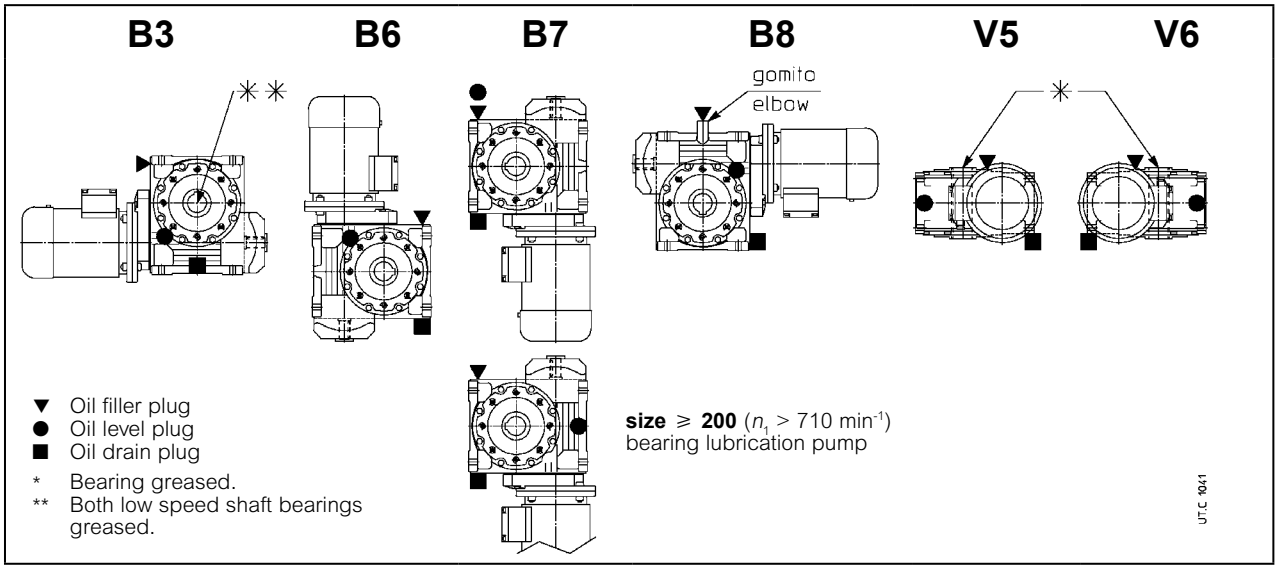
R V 100 ... 250



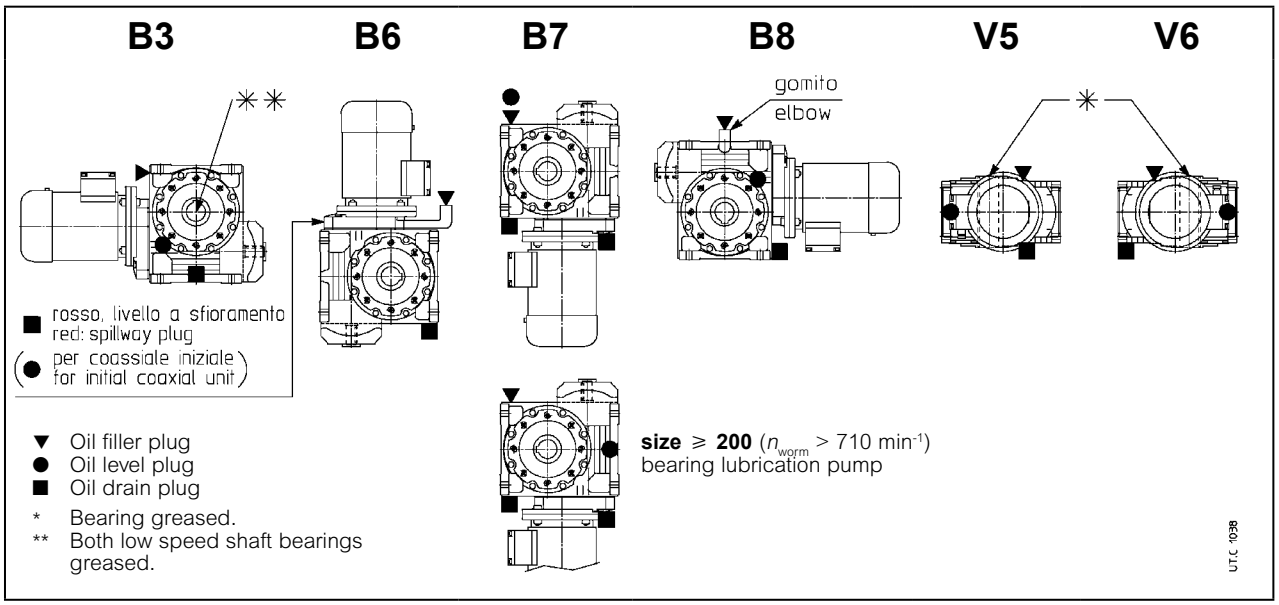
R IV 100 ... 250



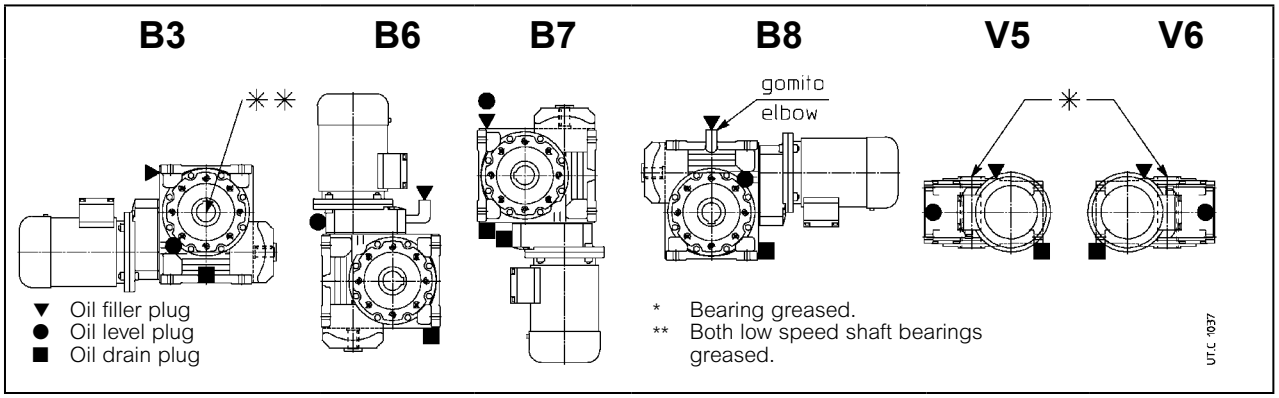
MR V 100 ... 250



MR IV 100 ... 250



MR 2IV 100 ... 126



16 - E series - Mounting positions, oil quantity and position of plugs

For inclined mounting positions, when "spec." is stated on nameplate in IM field, refer to the attached specific documentation.

16.1 - Oil level (quantity) for coaxial GEAR REDUCERS and GEARMOTORS sizes 50 ... 81 (E series) supplied FILLED WITH OIL

Before commissioning of the units verify that the dimensions X [mm] between the **plug shoulder and oil level** corresponds to the value stated in table 14.1, using a dipstick.

Before checking ensure that there are no more gas pockets in the oil which is included in the gear reducer.

Measure as specified in fig. 14.1.1 with gear reducer in mounting position B6.

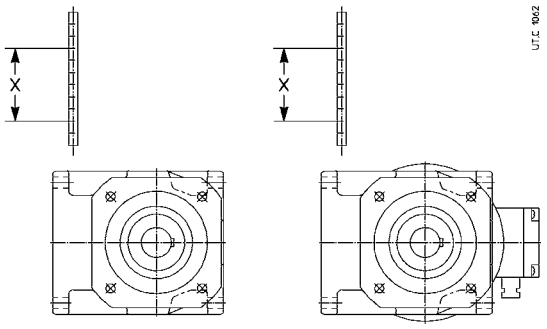


Fig. 14.1.1 - Position the gear reducer or gearmotor, mounting position B6 for the measurement of oil level (quantity).

Tab. 14.1.1 - Oil level (dimension x) and oil quantity gear reducers and gearmotors E series sizes 50 ... 81

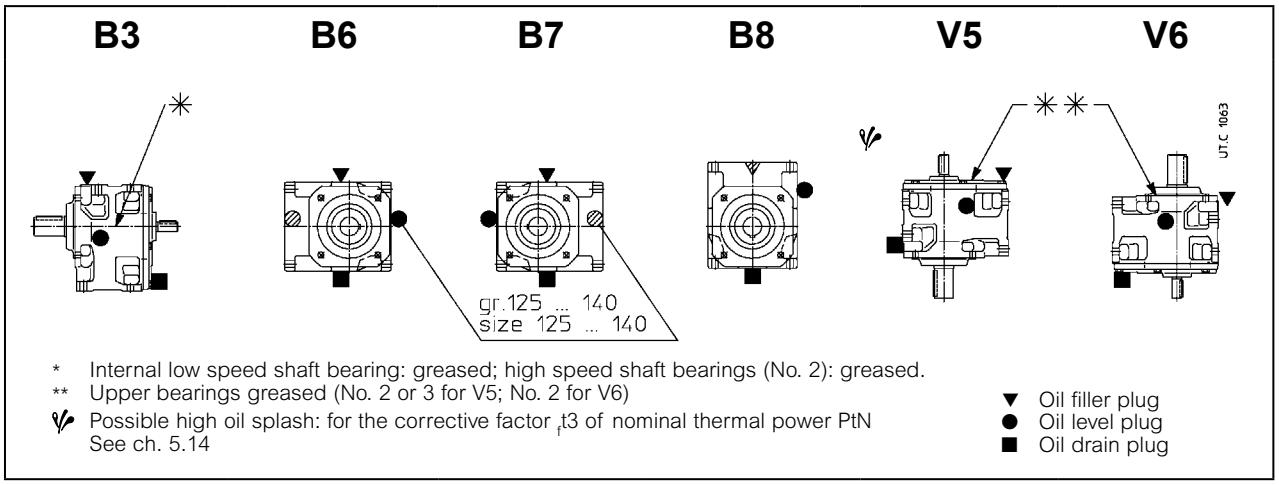
Size	Train of gears											
	Mounting position											
	Oil level (dimension x[1]) [mm] and quantity [l]											
	2l						3l					
	B3		B6, B7, B8, V6		V5		B3, V5, V6		B6, B7		B8	
	mm	l	mm	l	mm	l	mm	l	mm	l	mm	l
50, 51	65	0.8	50	1.1	35	1.4	60	0.8	45	1.1	30	1.4
63, 64	120	1.6	90	2.2	60	2.8	115	1.6	85	2.2	55	2.8
80, 81	110	3.1	75	4.3	45	5.5	105	3.1	70	4.3	40	5.5

1) Tolerance of dimension x: ± 5 mm.

16.2 - Mounting positions and plug positions for coaxial GEAR REDUCERS and GEARMOTORS sizes 100 ... 180 (E series), supplied WITHOUT OIL

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

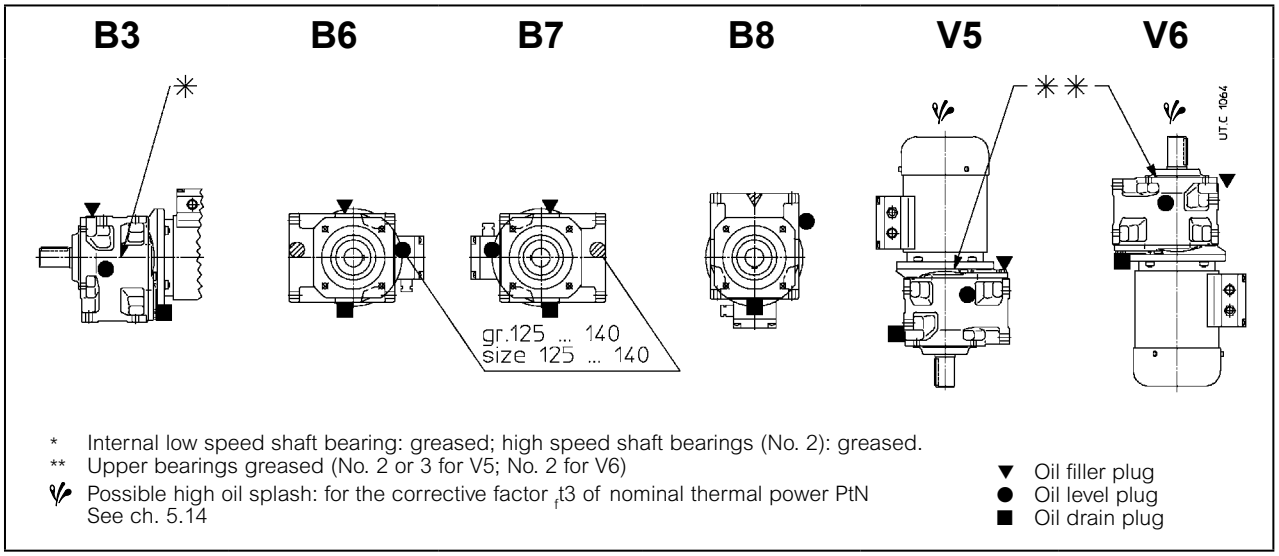
R 2I, 3I 100 ... 180



* Internal low speed shaft bearing: greased; high speed shaft bearings (No. 2): greased.
** Upper bearings greased (No. 2 or 3 for V5; No. 2 for V6)
Possible high oil splash: for the corrective factor f_{t3} of nominal thermal power PtN
See ch. 5.14

▼ Oil filler plug
● Oil level plug
■ Oil drain plug

MR 2I, 3I 100 ... 180



* Internal low speed shaft bearing: greased; high speed shaft bearings (No. 2): greased.
** Upper bearings greased (No. 2 or 3 for V5; No. 2 for V6)
Possible high oil splash: for the corrective factor f_{t3} of nominal thermal power PtN
See ch. 5.14

▼ Oil filler plug
● Oil level plug
■ Oil drain plug

17 - G series - Mounting positions, oil quantity and position of plugs

For inclined mounting positions, when "spec." is stated on nameplate in IM field, refer to the attached specific documentation.

17.1 - Oil levels (quantity) for helical and bevel helical GEAR REDUCERS AND GEARMOTORS sizes 40 ... 81 (G series) supplied FILLED with OIL

Before commissioning of the units verify that the dimensions X [mm] between the plug shoulder and oil level corresponds to the value stated in table 15.1, using a dipstick.

Before checking ensure that there are no more gas pockets in the oil which is included in the gear reducer.

Measure as specified in fig. 15.1.1 (helical) and 15.1.2 (helical bevel).

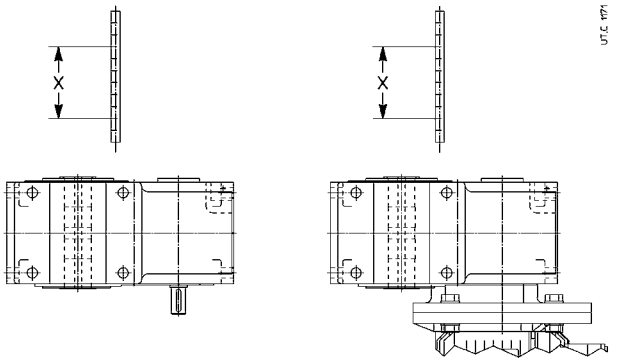


Fig. 15.1.1 - Position the helical gear reducer of gearmotor, mounting position V6 for oil level (quantity) measurement.

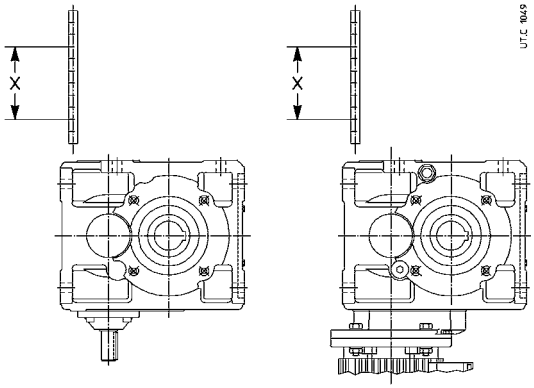


Fig. 15.1.2 - Position the bevel helical gear reducer or gearmotor, mounting position B7 for oil level (quantity) measurement.

Tab. 15.1.1 - Oil level (dimension X) and oil quantity for **HELICAL** gear reducers and gearmotors G series sizes 40 ... 81

Size	Train of gears / Mounting position / Oil level (dimension x[1]) [mm] and quantity [l]																					
	I						2I								3I						4I					
	B3, B8		B7		B6, V5, V6 2)		B3, B8		B6 R		B6 MR		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	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. 15.1.2 - Oil level (dimension X) and oil quantity for **BEVEL HELICAL** gear reducers and gearmotors G series 40 ... 81

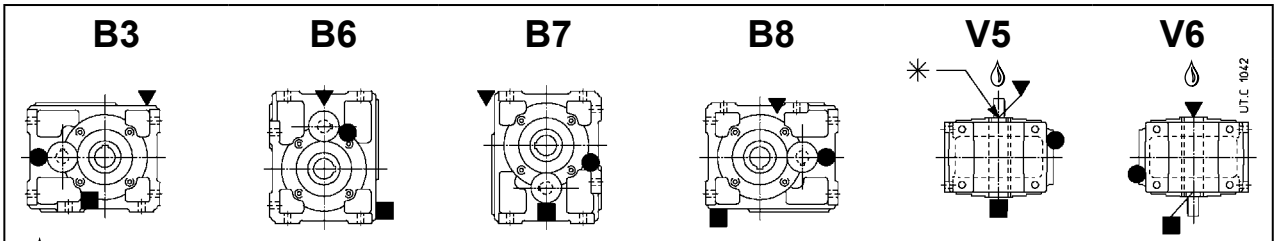
Size	Train of gears / Mounting position / Oil level (dimension x[1]) [mm] and quantity [l]																			
	CI						ICI								C3I					
	B3, B6, B7 4)		B8		V5, V6 2)		B3		B6, B7 4)		B8		V5, V6 2)		B3, B7 4)		B6 5)		B8		V5, V6 2)	
	mm	l	mm	l	mm	l	mm	l	mm	l	mm	l	mm	l	mm	l	mm	l	mm	l	mm	l
40	48	0.26	30	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 sizes ⩽ 50; ± 10 for size ⩾63.
2) For mounting positions V5 and V6 upper bearings are greased.
3) The first reduction stage (the first 2 stages for 4I), mounting position V5, is lubricated with grease for life.
4) For design UO3D, mounting positions B6 or B7 the bearings of upper bevel pinion are greased.
5) For C3I, mounting position B6, the bearing of the first gear pair (wheel side) is greased.

17.2 - Mounting position and plug positions for helical and bevel helical GEAR REDUCERS and GEARMOTORS sizes 100 ... 360 (G series), supplied WITHOUT OIL

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

R I 100

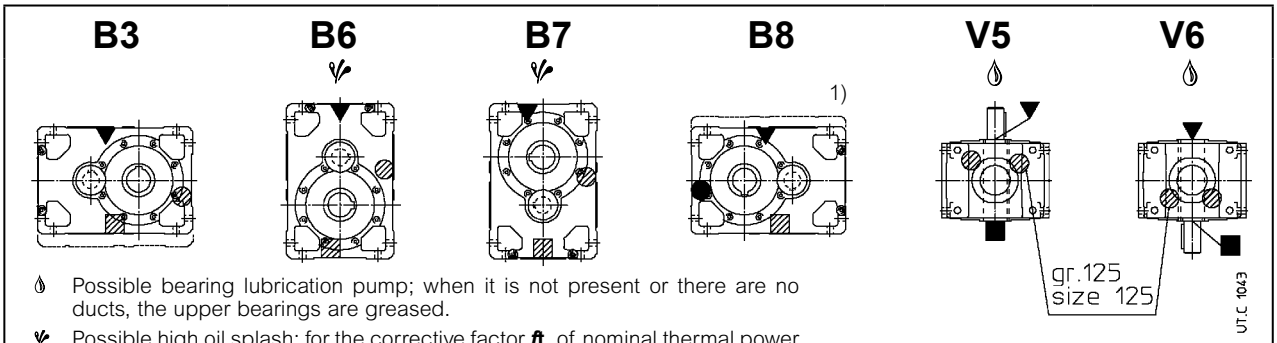


Possible bearing lubrication pump; when it is not present or there are no ducts, the upper bearings are greased.

* The 2 bearings are greased.

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

R I 125 ... 360



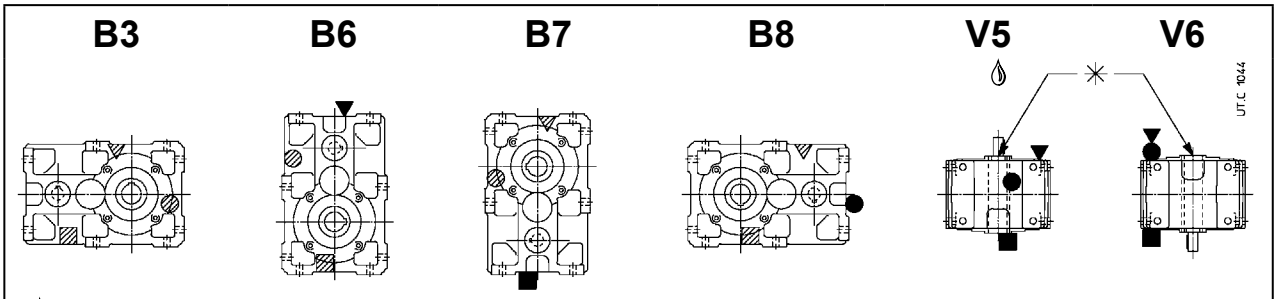
Possible bearing lubrication pump; when it is not present or there are no ducts, the upper bearings are greased.

Possible high oil splash: for the corrective factor f_{t_3} of nominal thermal power Pt_N see ch. 7.16.

1) For sizes 140, 180, 225, 280, 360 see corrective factor f_{t_3} of nominal thermal power Pt_N see ch. 7.16.

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

R 2I 100, 125

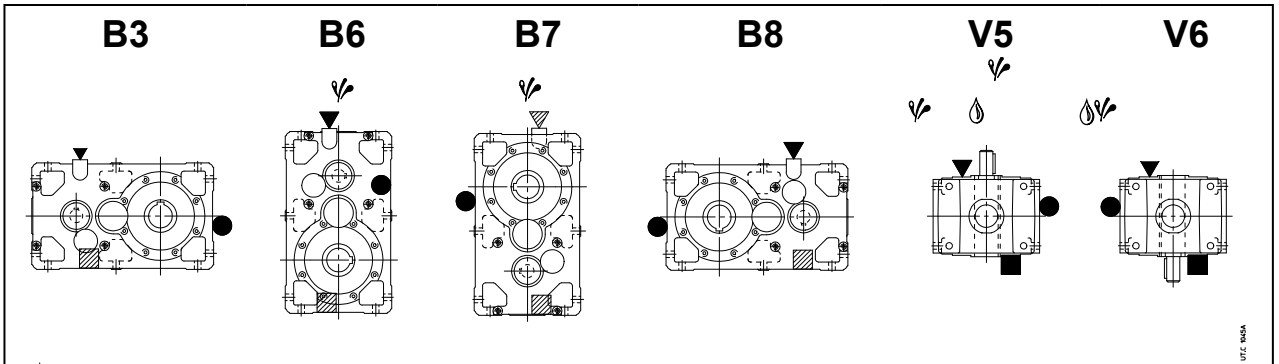


Possible high speed lubrication device; when it is not present or there are no ducts, grease the bearing.

* The upper bearings are greased.

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

R 2I 140 ... 401

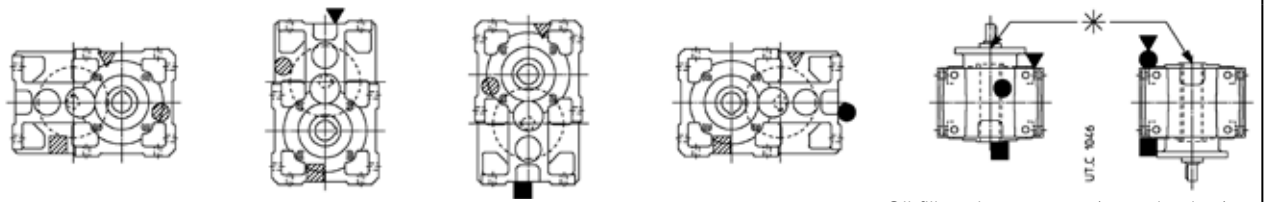


Possible high speed lubrication device (V5) or bearing lubrication pump (V6); when it is not present or there are no ducts, the upper bearings are greased.

Possible high oil splash: for the corrective factor f_{t_3} of nominal thermal power Pt_N see ch. 7.16.

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

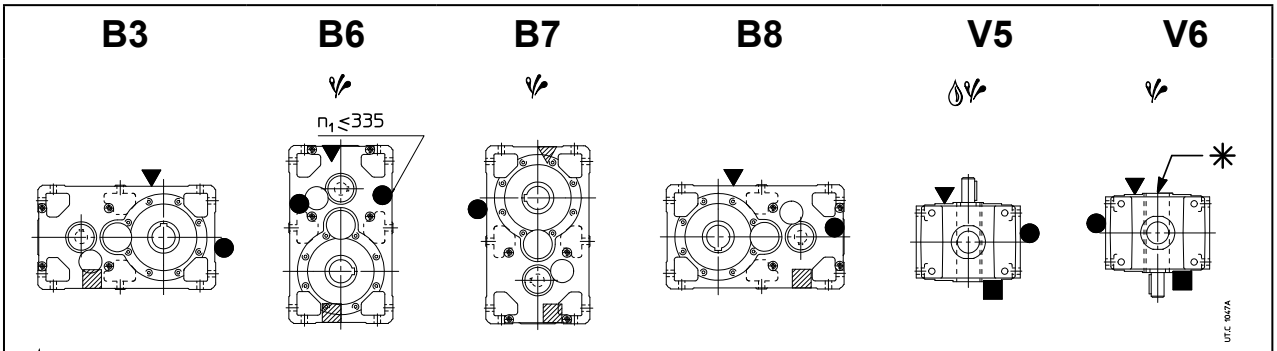
R 3I 100, 125



Upper bearings greased (in mounting position V5 also high speed shaft bearing is greased)

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

R 3I 140 ... 401



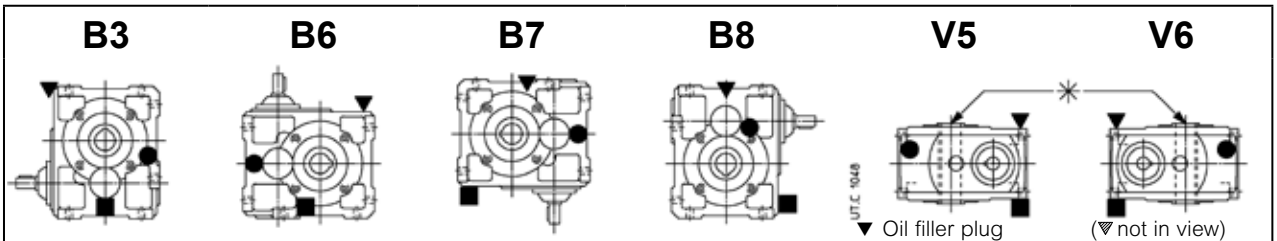
Possible bearing lubrication pump; when it is not present or there are no ducts, the upper bearings are greased.

Possible high oil splash: for the corrective factor f_3 of nominal thermal power Pt_N see ch. 7.16.

* The 2 bearings are greased.

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

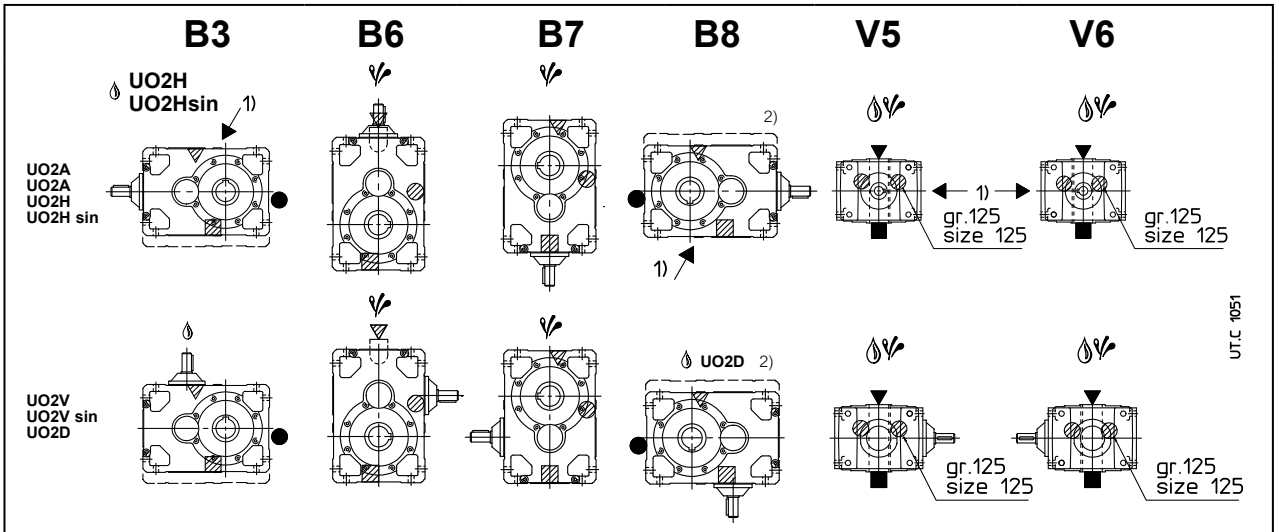
R CI 100



* The 2 upper bearings are greased.

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

R CI 125 ... 360



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

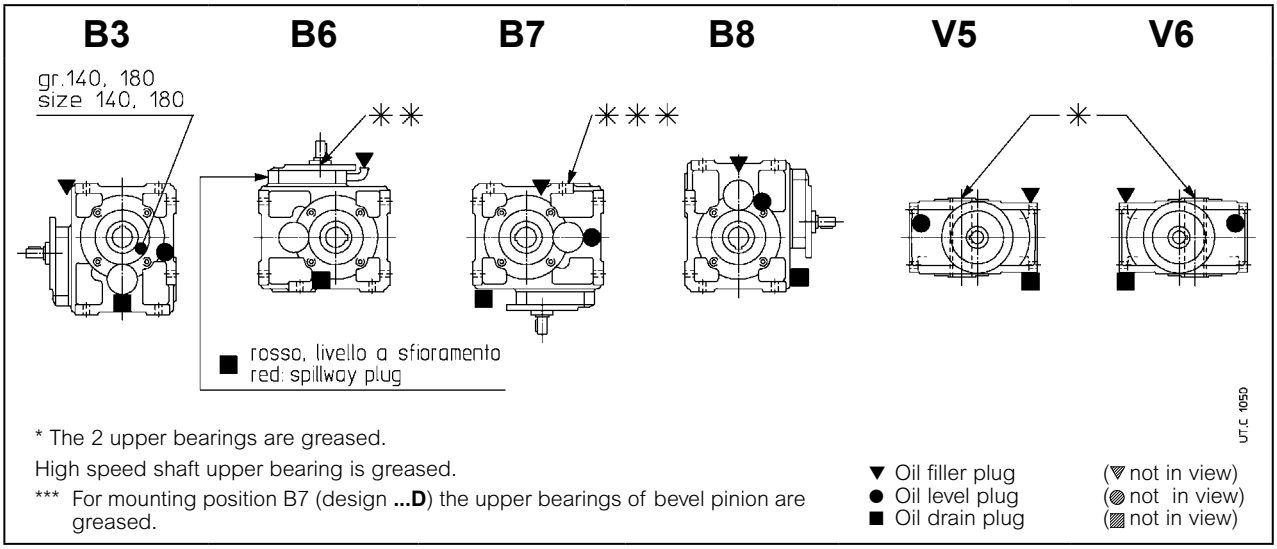
Possible high oil splash: for the corrective factor f_3 of nominal thermal power Pt_N see ch. 7.16.

1) Position of tapped holes for identification of mountig position.

2) For sizes 140, 180, 225, 280, 360 see corrective factor f_3 of nominal thermal power Pt_N see ch. 7.16.

▼ Tappo carico olio (▽ not in vista)
● Tappo livello olio (◍ not in vista)
■ Tappo scarico olio (▨ not in vista)

R ICI 100 ... 200



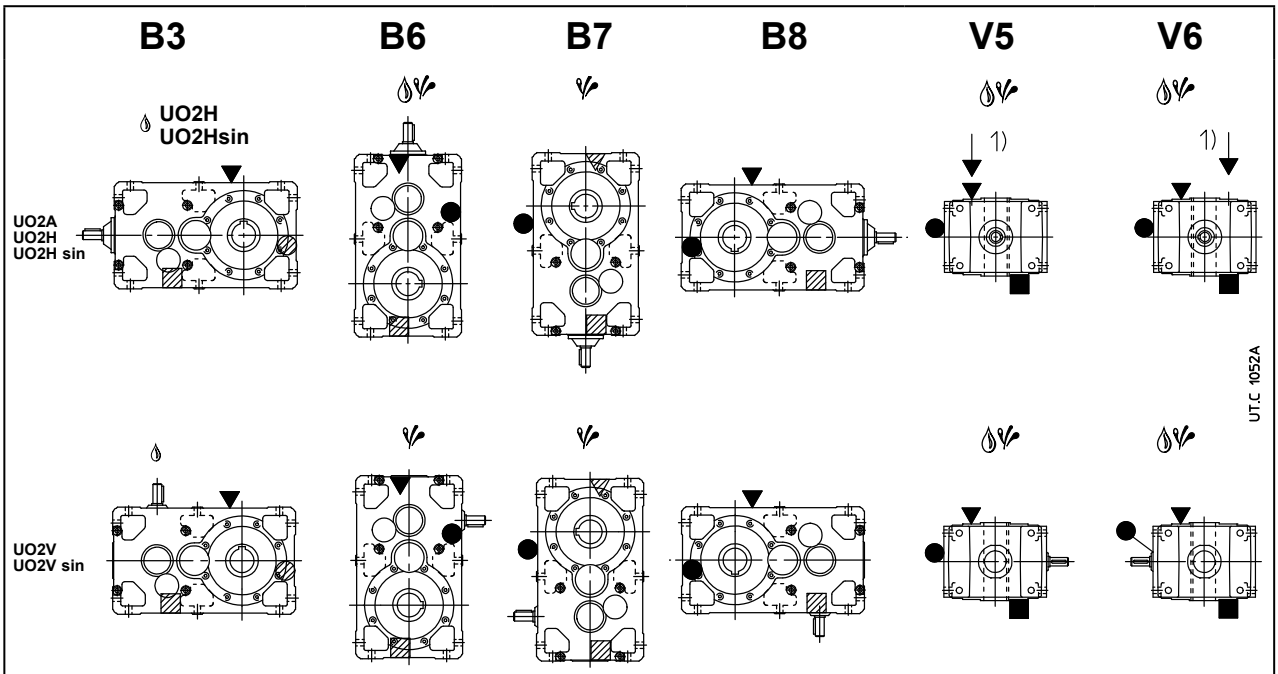
* The 2 upper bearings are greased.

High speed shaft upper bearing is greased.

*** For mounting position B7 (design **...D**) the upper bearings of bevel pinion are greased.

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

R C2I 140 ... 401



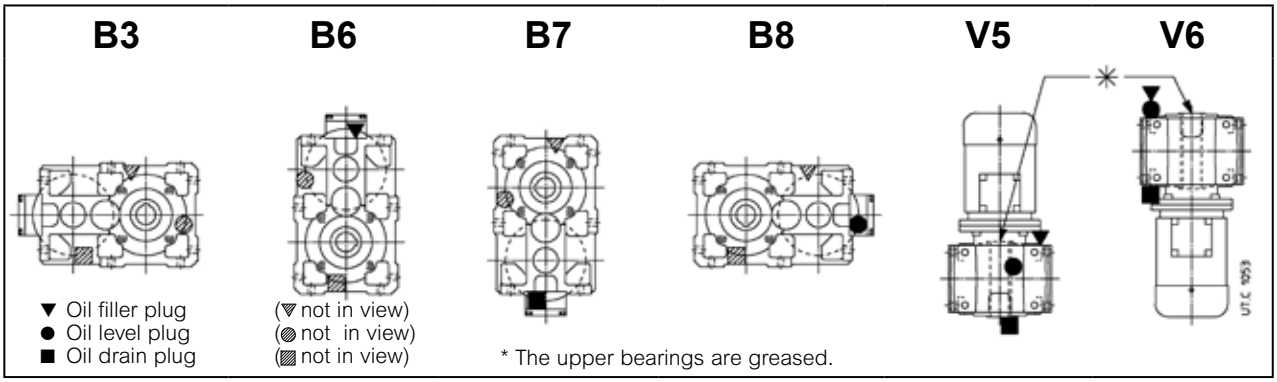
Possible bearing lubrication pump; when it is not present or there are no ducts, the upper bearings are greased.

Possible high oil splash: for the corrective factor ft_3 of nominal thermal power Pt_N see ch. 7.16.

1) Position of tapped holes for identification of mounting position.

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

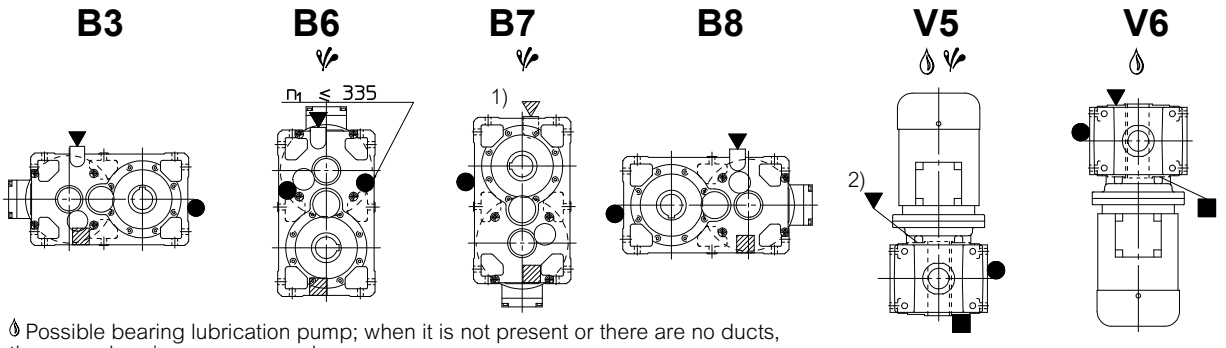
MR 2I 100, 125



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

* The upper bearings are greased.

MR 2I 140 ... 360



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

Possible high oil splash: for the corrective factor ft_3 of nominal thermal power Pt_N see ch. 7.16.

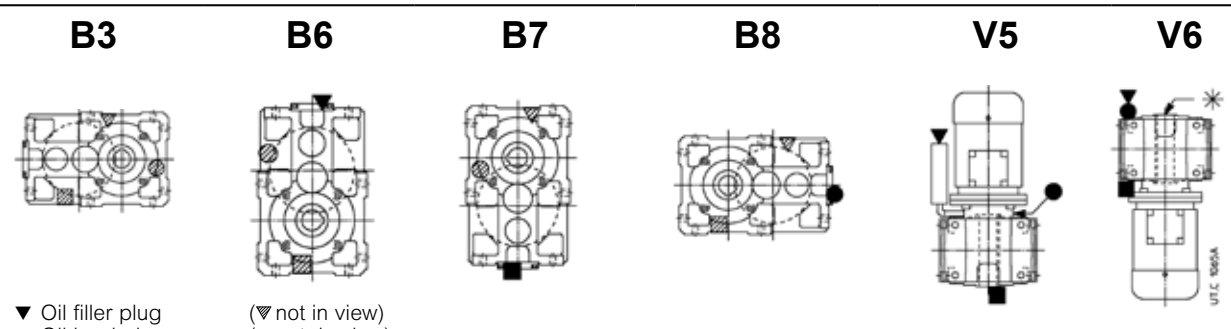
2) Oil filler plug possible also on opposite side.

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)

UT.C 1054A

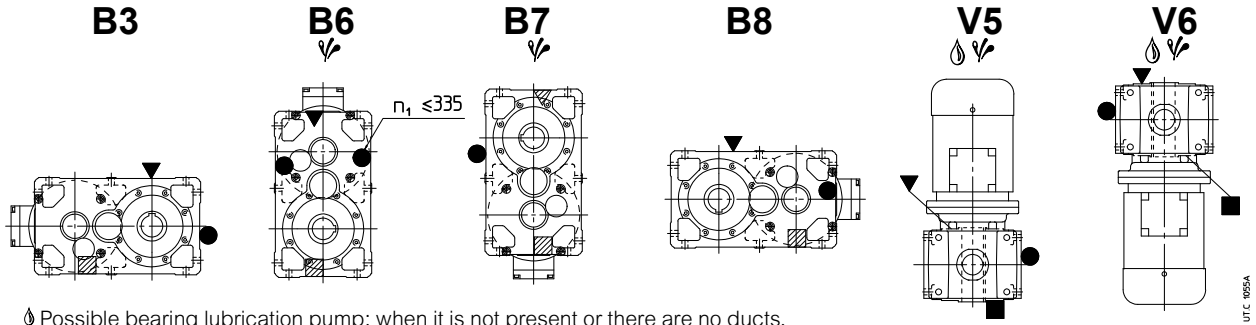
MR 3I 100, 125



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

* The 3 upper bearings are greased.

MR 3I 140 ... 360



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

Possible high oil splash: for the corrective factor ft_3 of nominal thermal power Pt_N see ch. 7.16.

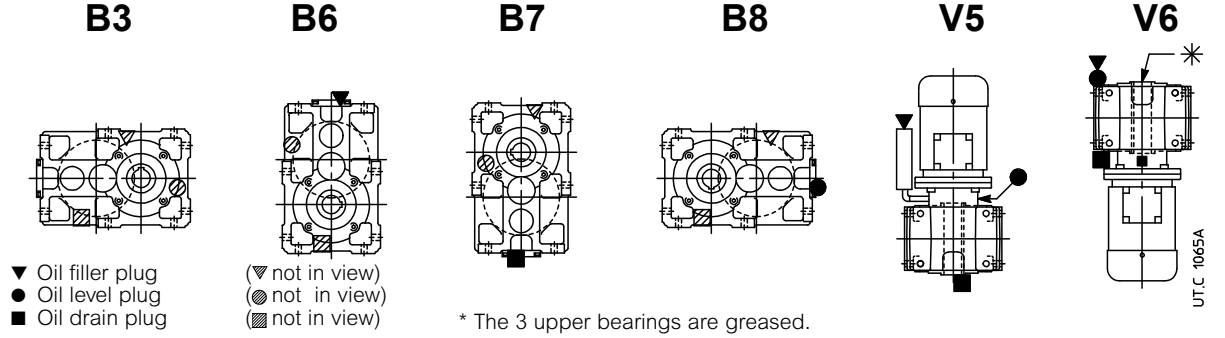
Design **UP2D**, mounting position B6, n1 > 335 min-1, the bearing of double extension high speed shaft end is greased.

2) 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)

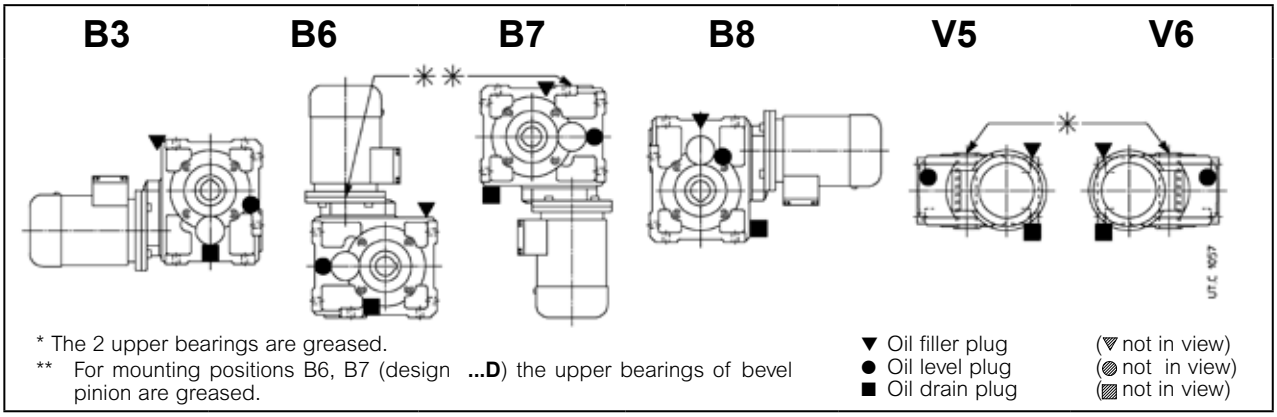
MR 4I 100, 125



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

* The 3 upper bearings are greased.

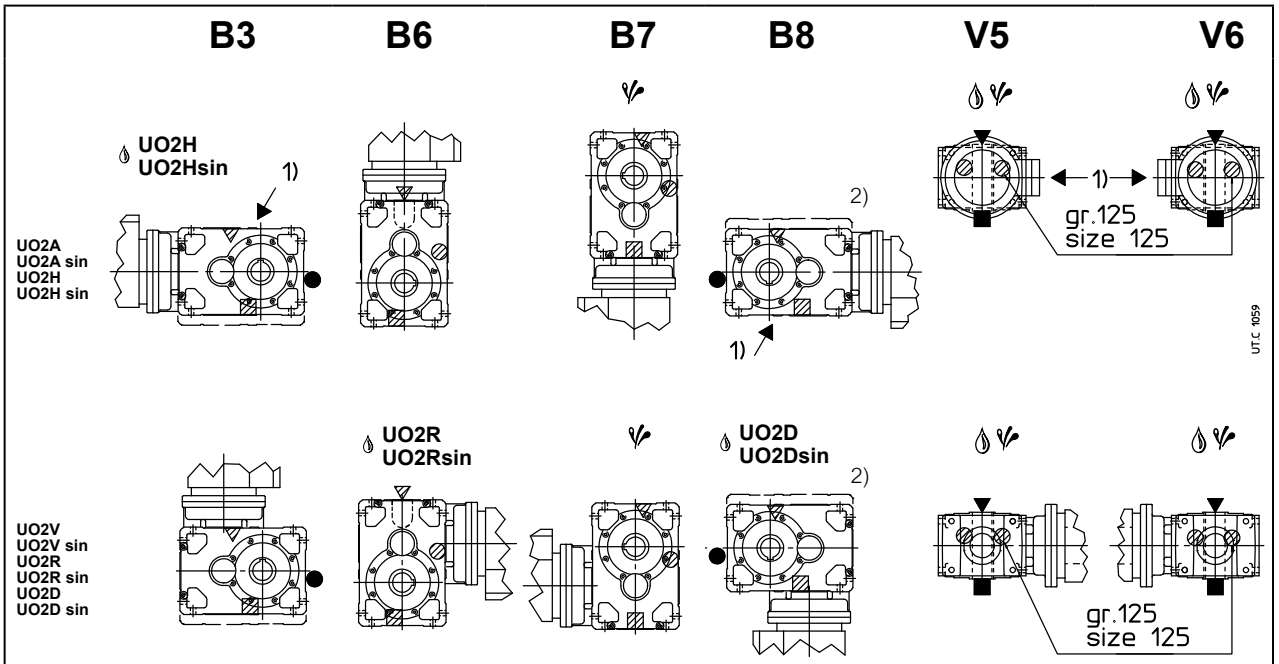
MR CI 100



* The 2 upper bearings are greased.
** For mounting positions B6, B7 (design **...D**) the upper bearings of bevel pinion are greased.

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

MR CI 125 ... 280



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

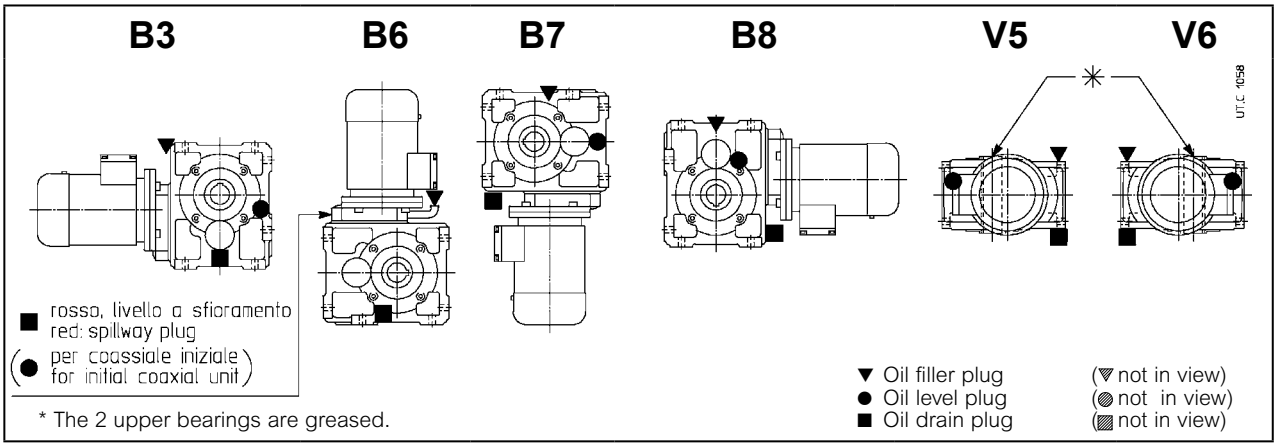
Possible high oil splash: for the corrective factor f_{t_3} of nominal thermal power Pt_N see ch. 7.16.

1) Position of tapped holes for identification of mountig position.

2) For sizes 140, 180, 225, 280, 360 see corrective factor f_{t_3} of the nominal thermal power Pt_N see ch. 7.16.

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

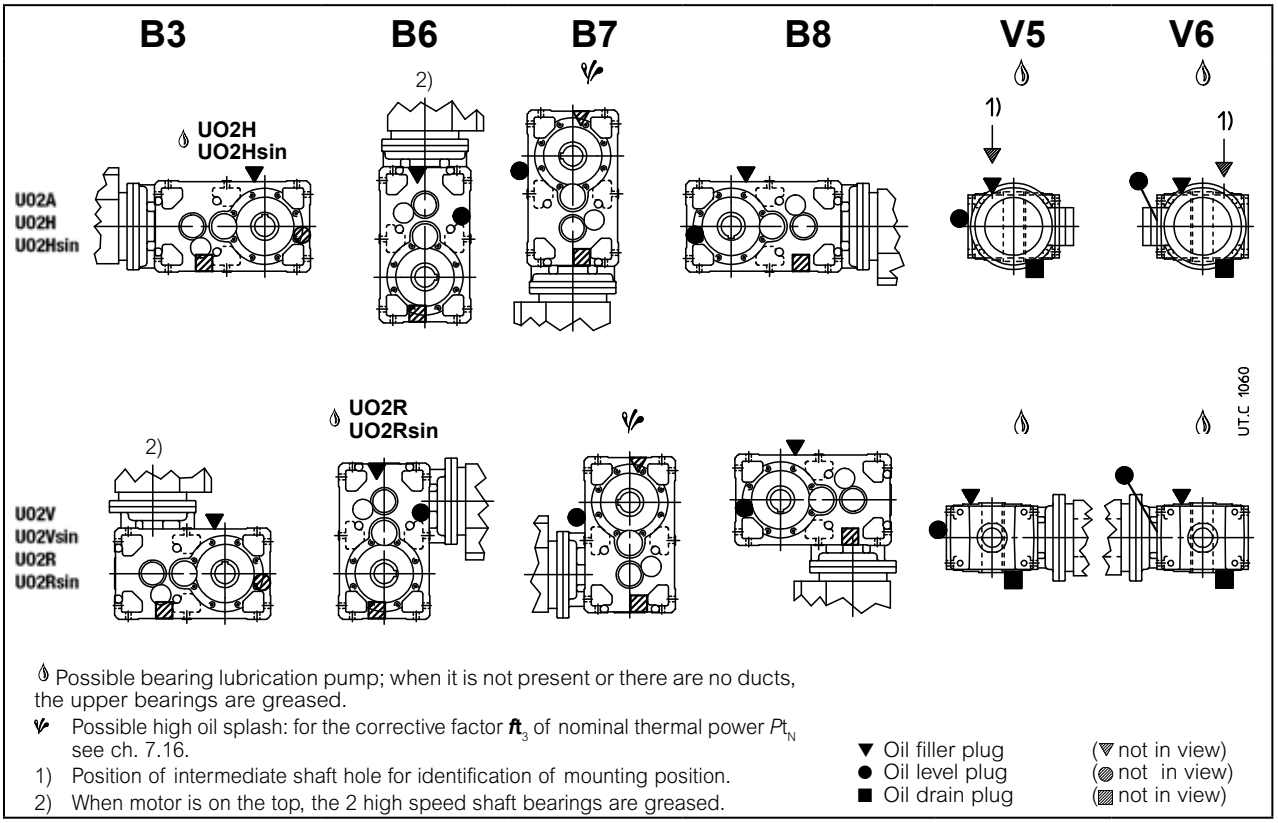
MR ICI 100 ... 200



* The 2 upper bearings are greased.

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

MR C2I 140 ... 360



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

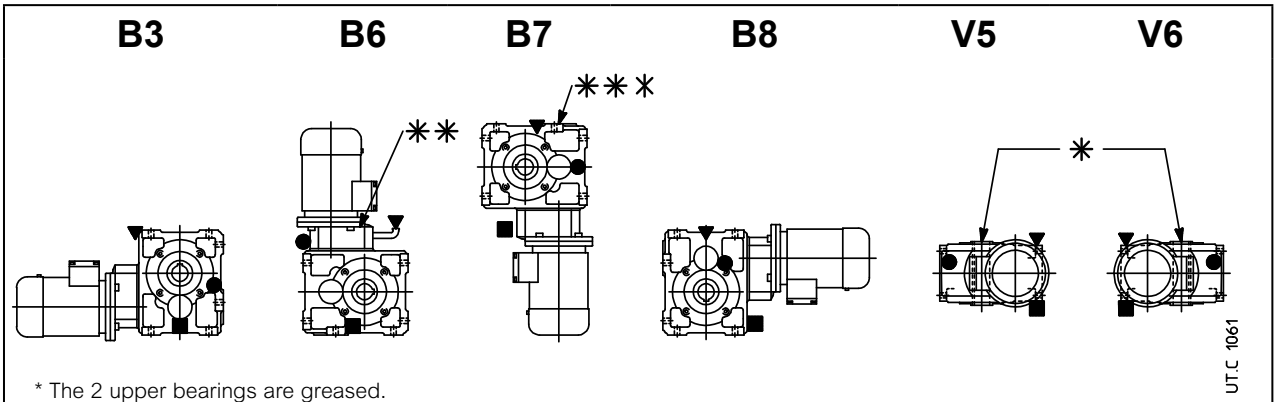
Possible high oil splash: for the corrective factor f_{t_3} of nominal thermal power Pt_N see ch. 7.16.

1) Position of intermediate shaft hole for identification of mounting position.

2) When motor is on the top, the 2 high speed shaft bearings are greased.

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

MR C3I 100, 125



* The 2 upper bearings are greased.

** Mounting position B6, the bearing of the first gear pair (wheel side) is greased.

*** For mounting position B7 (design **...D**) the upper bearings of bevel pinion are greased.

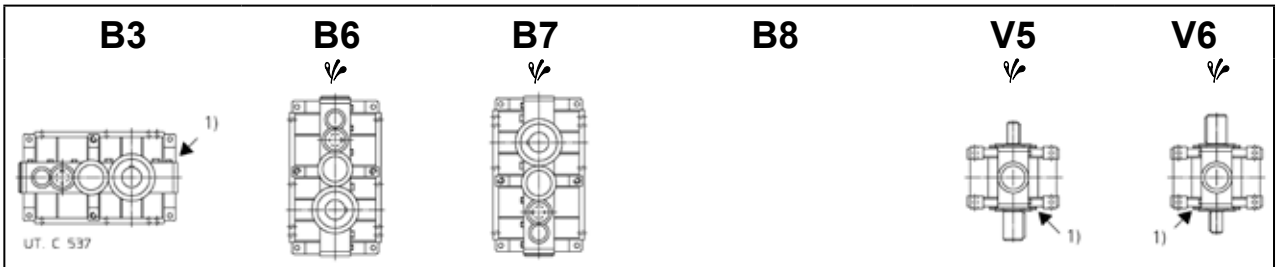
▼ Oil filler plug (▽ not in view)
● Oil level plug (◍ not in view)
■ Oil drain plug (▨ not in view)

18 - H series - Mounting positions, oil quantity and position of plugs

For oil levels and position of plugs see attached SPT sketch

Before commissioning, check lubricant level.

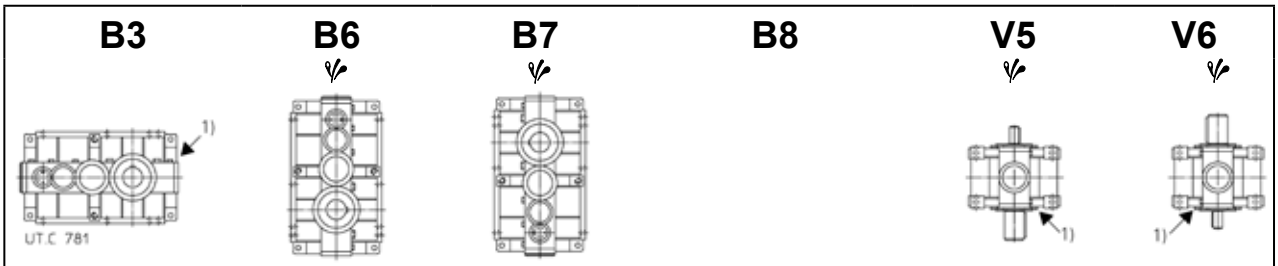
R 2I 4000 ... 8001



Possible high oil splash: for the corrective factor f_{t_3} of nominal thermal power Pt_N see ch. 7.16.

1) Mounting position **B3** may be identified from the position of the screw-heads as arrowed. The same applies for V5 and V6 with double extension or hollow low speed shaft.

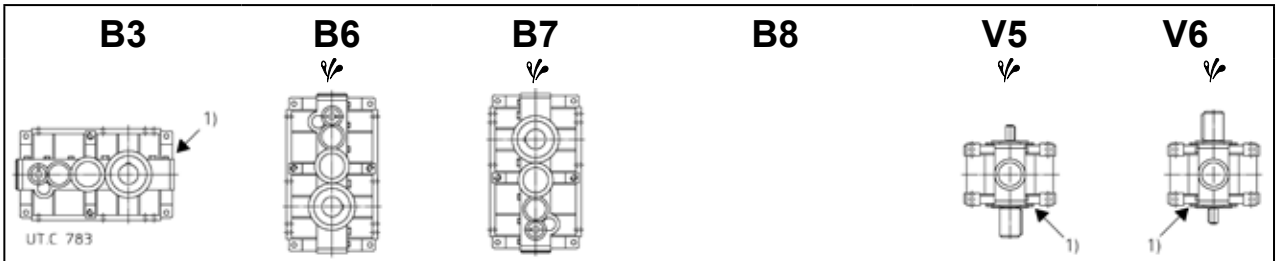
R 3I 4000 ... 8001



Possible high oil splash: for the corrective factor f_{t_3} of nominal thermal power Pt_N see ch. 7.16.

1) Mounting position **B3** may be identified from the position of the screw-heads as arrowed. The same applies for V5 and V6 with double extension or hollow low speed shaft.

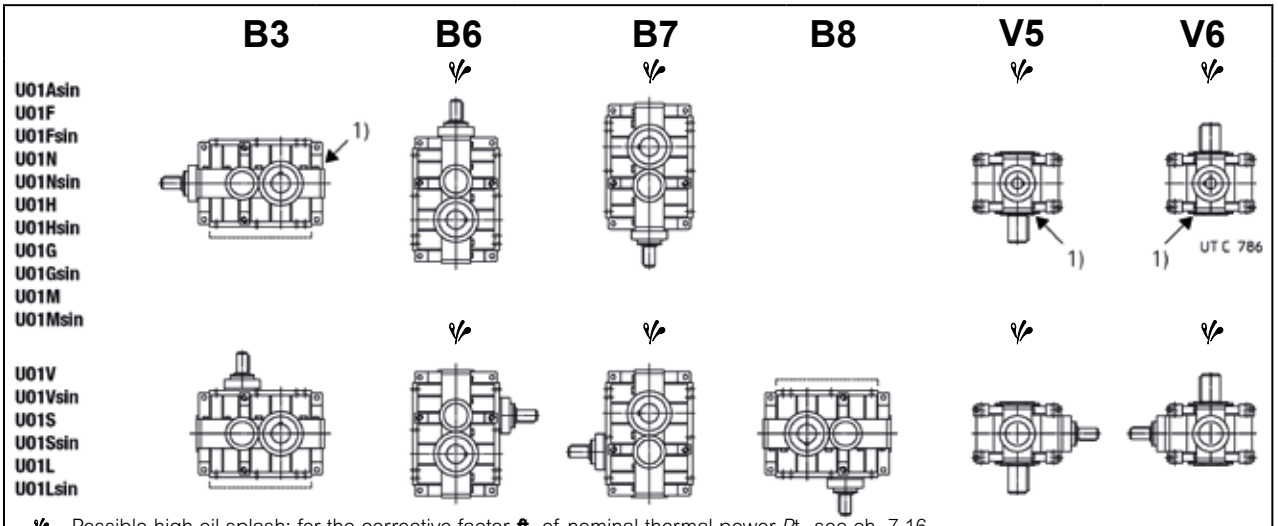
R 4I 4000 ... 8001



Possible high oil splash: for the corrective factor f_{t_3} of nominal thermal power Pt_N see ch. 7.16.

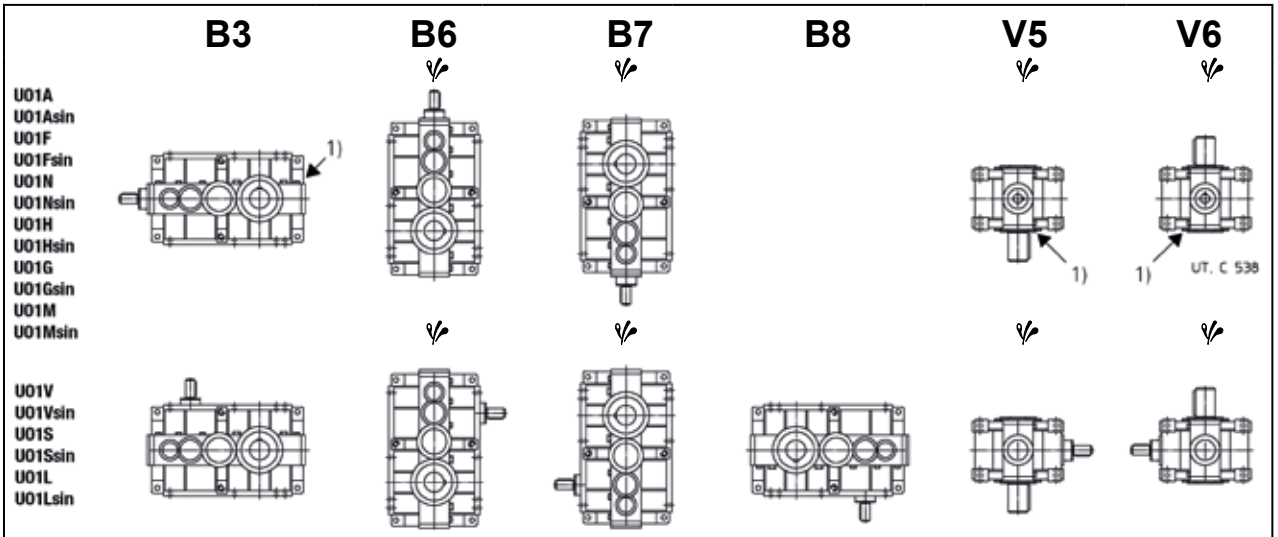
1) Mounting position **B3** may be identified from the position of the screw-heads as arrowed. The same applies for V5 and V6 with double extension or hollow low speed shaft.

R CI 4000 ... 8001



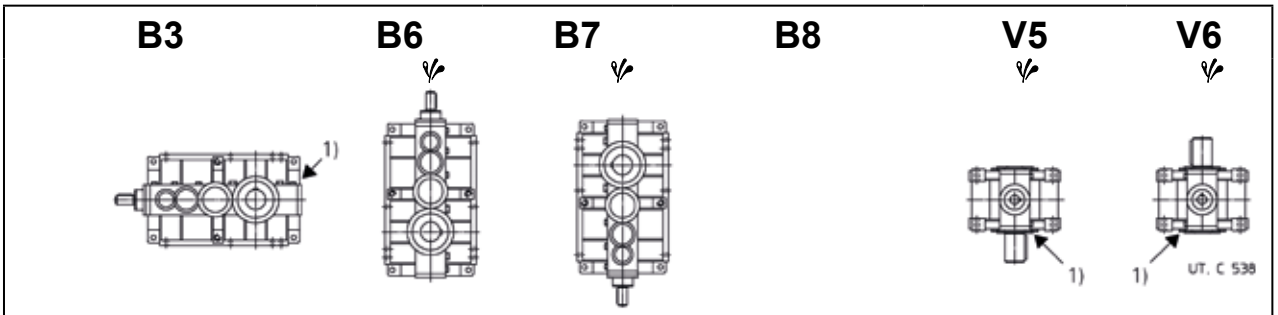
Possible high oil splash: for the corrective factor ft_3 of nominal thermal power Pt_N see ch. 7.16.
1) Mounting position **B3** may be identified from the position of the screw-heads as arrowed. The same applies for V5 and V6 with double extension or hollow low speed shaft.

R C2I 4000 ... 8001



Possible high oil splash: for the corrective factor ft_3 of nominal thermal power Pt_N see ch. 7.16.
1) Mounting position **B3** may be identified from the position of the screw-heads as arrowed. The same applies for V5 and V6 with double extension or hollow low speed shaft.

R C3I 4000 ... 8001



Possible high oil splash: for the corrective factor ft_3 of nominal thermal power Pt_N see ch. 7.16.
1) Mounting position **B3** may be identified from the position of the screw-heads as arrowed. The same applies for V5 and V6 with double extension or hollow low speed shaft.

19 - iFIT series - Mounting positions, oil quantity and position of plugs

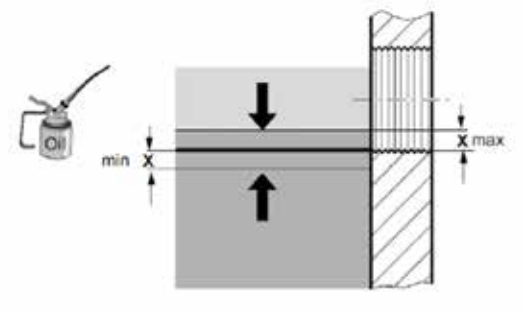
For inclined mounting positions, when "spec." appears in the "IM" field on the nameplate, the specific documentation attached to these Operating Instructions should be consulted.

19.1 - Oil quantity for helical inline iC, bevel helical iO GEARMOTORS (supplied FILLED WITH OIL)

Before commissioning, make sure oil is present, using the level plug (see chap. 18.2): position the gear reducer in the mounting position stated in the nameplate, identify the level plug, slowly loosen the cap, keeping in mind that a small amount of oil may leak out.

Check the oil level as per fig. belowì (dimension x in the table)

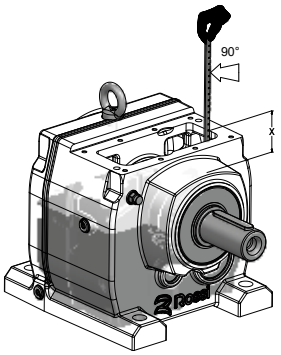
Size. iC, iO	x mm
372-373 472-473 572-573 672-673	1,5
772-773 872-873	2
972-973	3



For **size iC 27 and sizes iC 47 and 57**, **in mounting position B6**, the oil level check should be carried out by means of a dipstick by measuring the vertical distance between the oil level and the closing plane of the gearbox cover, with the gearbox itself positioned in B3 mounting position regardless of the mounting position shown on the nameplate.

The measured value must not exceed the value given in the table, with tolerance ± 1 mm.

Size. iC	x_{max} [mm] B3	B6	B7	B8	V5, BX	V6
272	74	45	45	45	22	22
273	76	42	42	42	19	19
472	–	39	–	–	–	–
473	–	32	–	–	–	–
572	–	32	–	–	–	–
573	–	28	–	–	–	–



iC... PE; FE

Gearmotor size	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

Gearmotor size	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

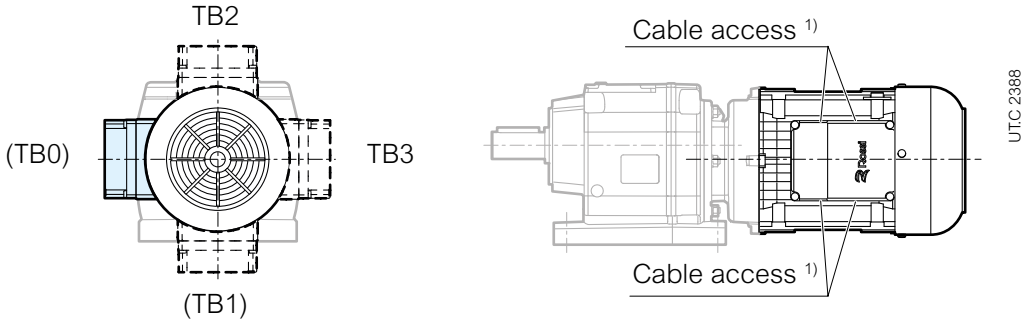
Gearmotor size	Oil quantity [l] B3	B6	B7	B8	V5	V6
iO 373	0,5	1,5	1,1	1,1	1,0	1,0
iO 473	0,8	2,2	1,3	1,7	1,6	1,6
iO 573	1,2	3,15	2,2	2,4	2,5	2,3
iO 673	1,1	3,7	2,4	2,8	2,7	2,7
iO 773	2,1	5,9	4,1	4,4	4,5	4,5
iO 873	3,7	11,9	8,2	9,0	8,4	8,4
iO 973	7,0	21,5	14,7	17,3	15,7	16,5

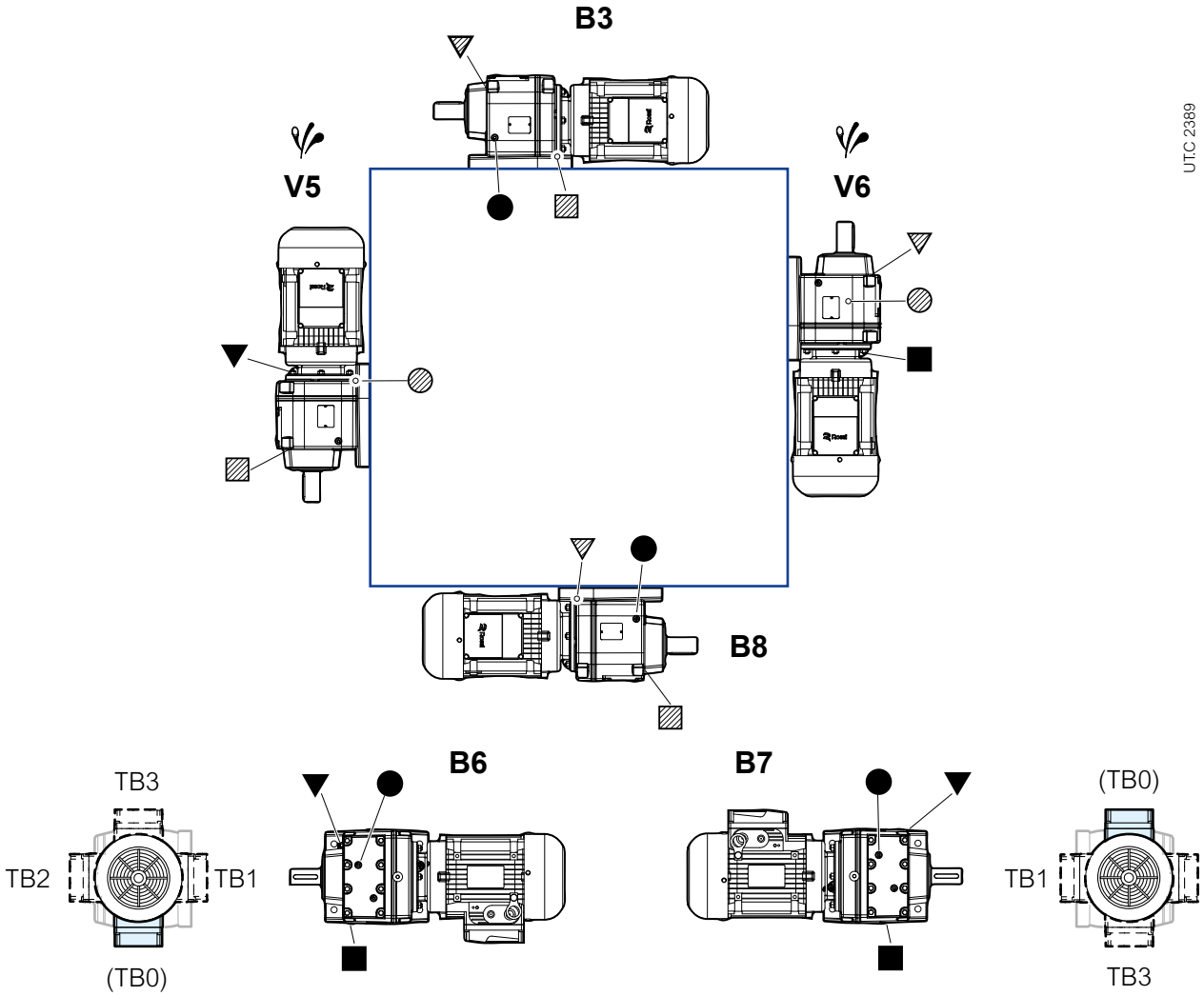
iO... FE...H; SE...H

Gearmotor size	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

19.2.a - Mounting positions and position of plugs for FOOT mounted helical inline GEARMOTORS 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**... : oil level plug not present for B6

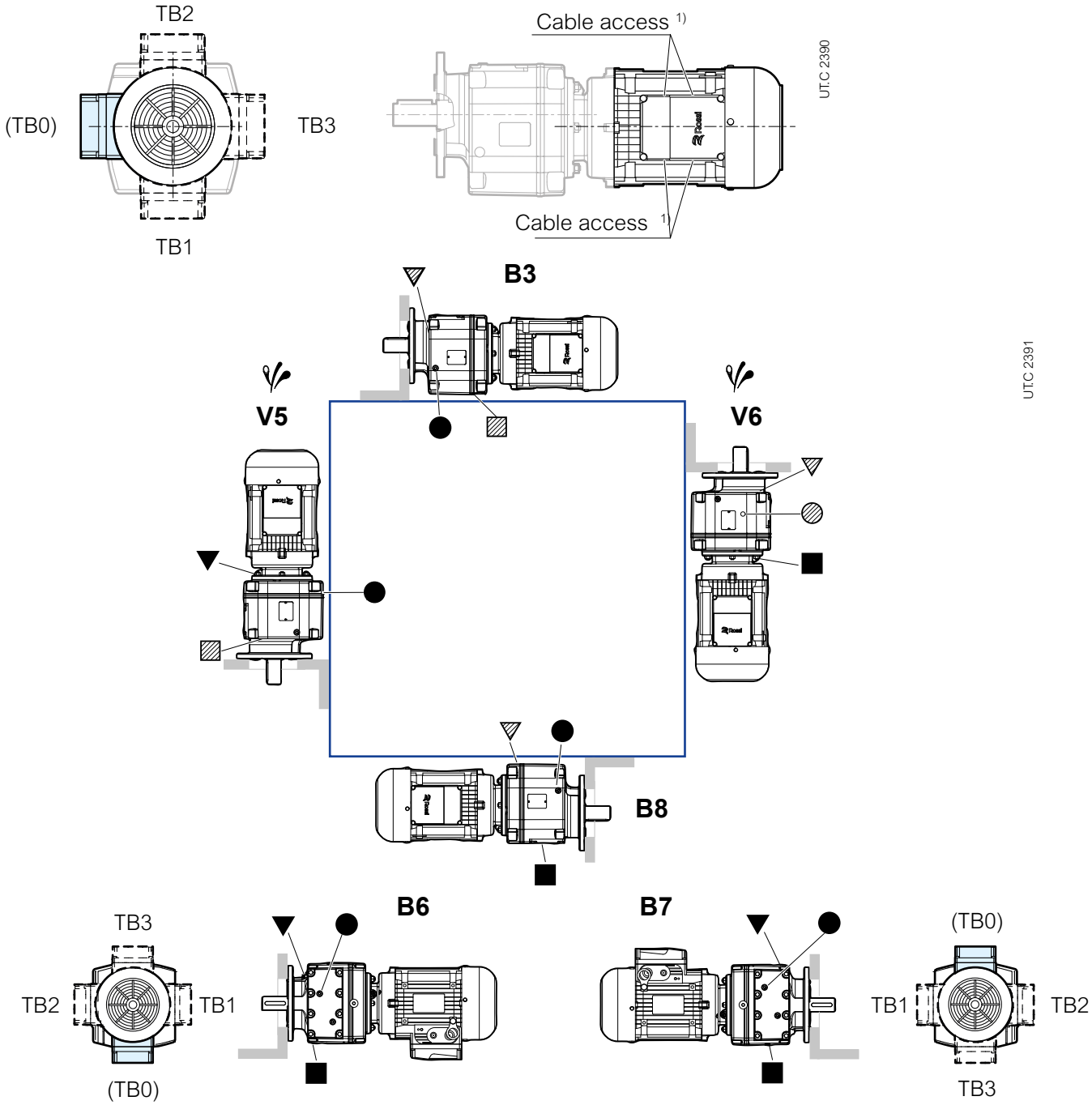
- ▼ breather plug
- ● oil level plug
- ■ oil drain plug
- ▽ breather plug on opposite side (not in view)
- ⊘ oil level plug on opposite side (not in view)
- ▨ oil drain plug on opposite side (not in view)

Possible high oil splash: for the corrective factor f_{i3} of nominal thermal power P_{TN} see page 49.

[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 able and one for the auxiliary devices).

19.2.b - Mounting positions and position of plugs for FLANGE mounted helical inline GEARMOTORS iC

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**... : oil level plug not present for B6

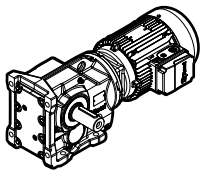
- ▼ breather plug
- ● oil level plug
- ■ oil drain plug
- ▽ breather plug on opposite side (not in view)
- ◍ oil level plug on opposite side (not in view)
- ▨ oil drain plug on opposite side (not in view)

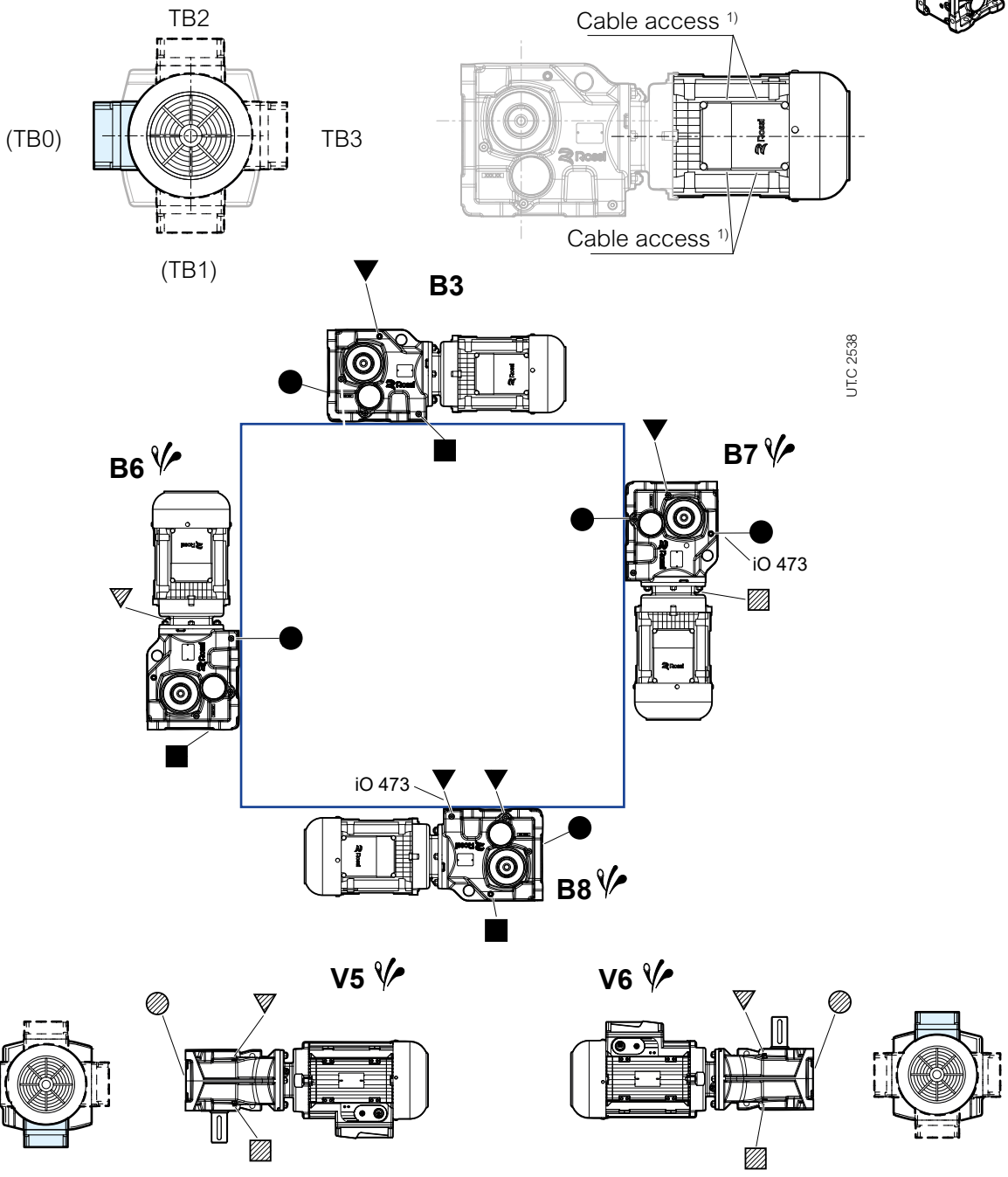
Possible high oil splash: for the corrective factor f_{t3} of nominal thermal power P_{TN} see page 49.

[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 able and one for the auxiliary devices).

19.2.c - Mounting positions and position of plugs for FOOT mounted bevel helical GEARMOTORS iO

iO 373 PE / iO 973 PE





▼ breather plug
● oil level plug
■ oil drain plug

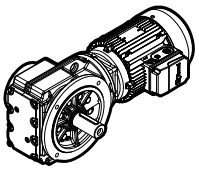
▽ breather plug on opposite side (not in view)
◍ oil level plug on opposite side (not in view)
▨ oil drain plug on opposite side (not in view)

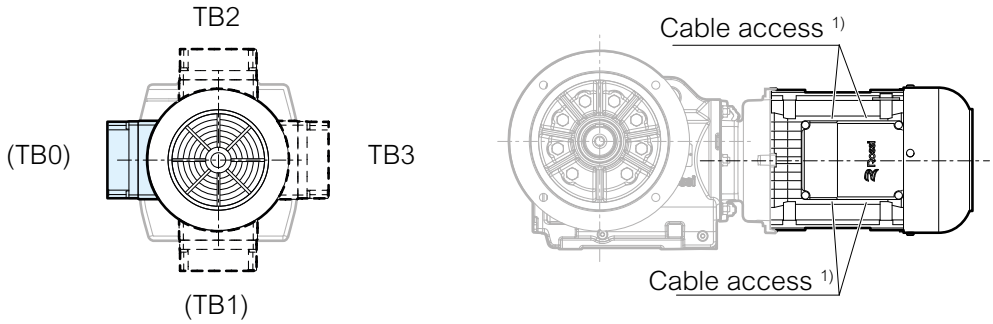
Possible high oil splash: for the corrective factor f_{i3} of nominal thermal power P_{TN} see page 53.

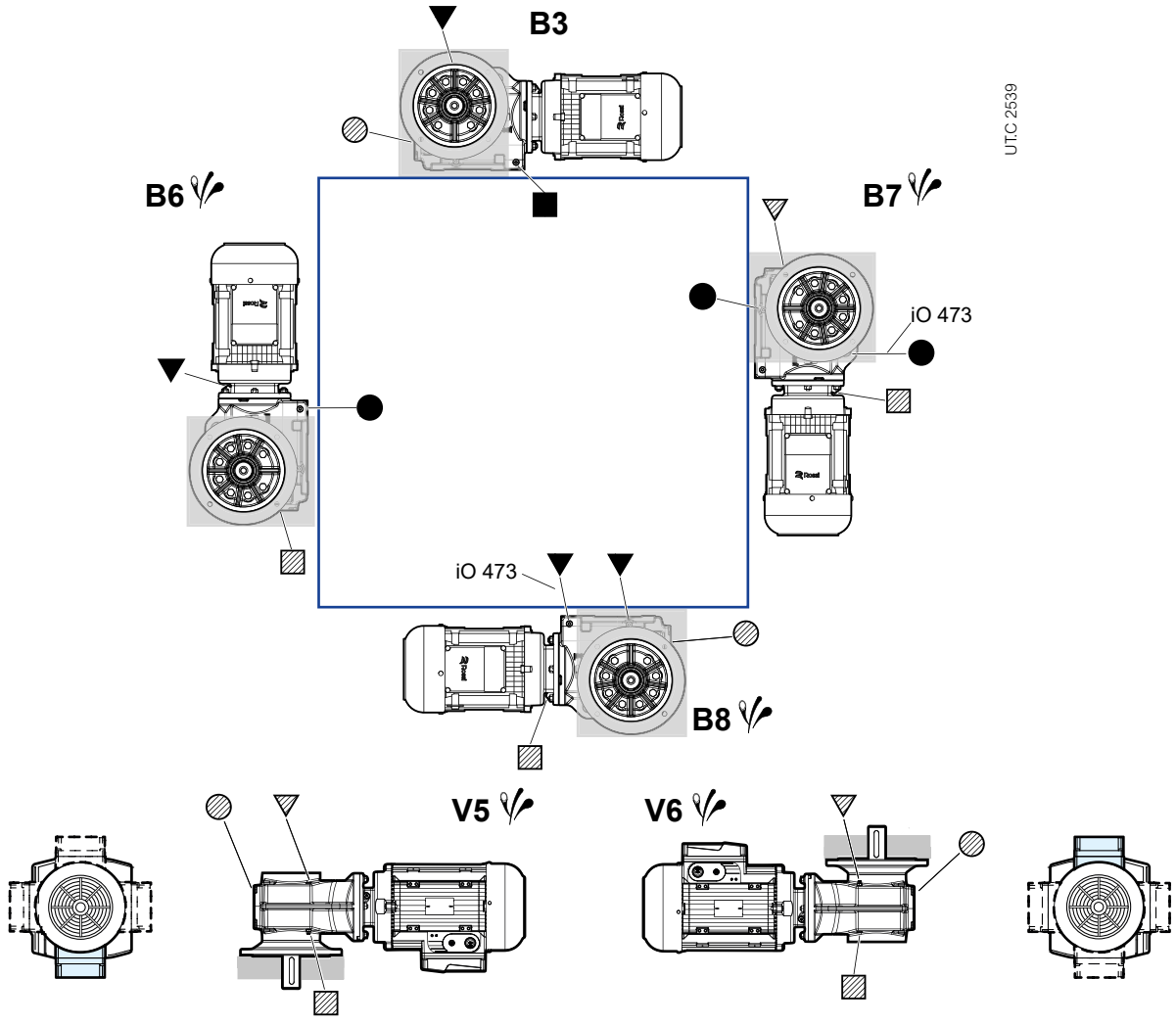
1) The customer is responsible for cable connection: the terminal box is incorporated with the motor housing and is equipped with bilateral cable access with pre-set cutting (one for the power able and one for the auxiliary devices).

19.2.d - Mounting positions and position of plugs for FLANGE mountedbevel helical GEARMOTORS iO

iO 373 FE / iO 973 FE





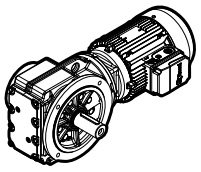


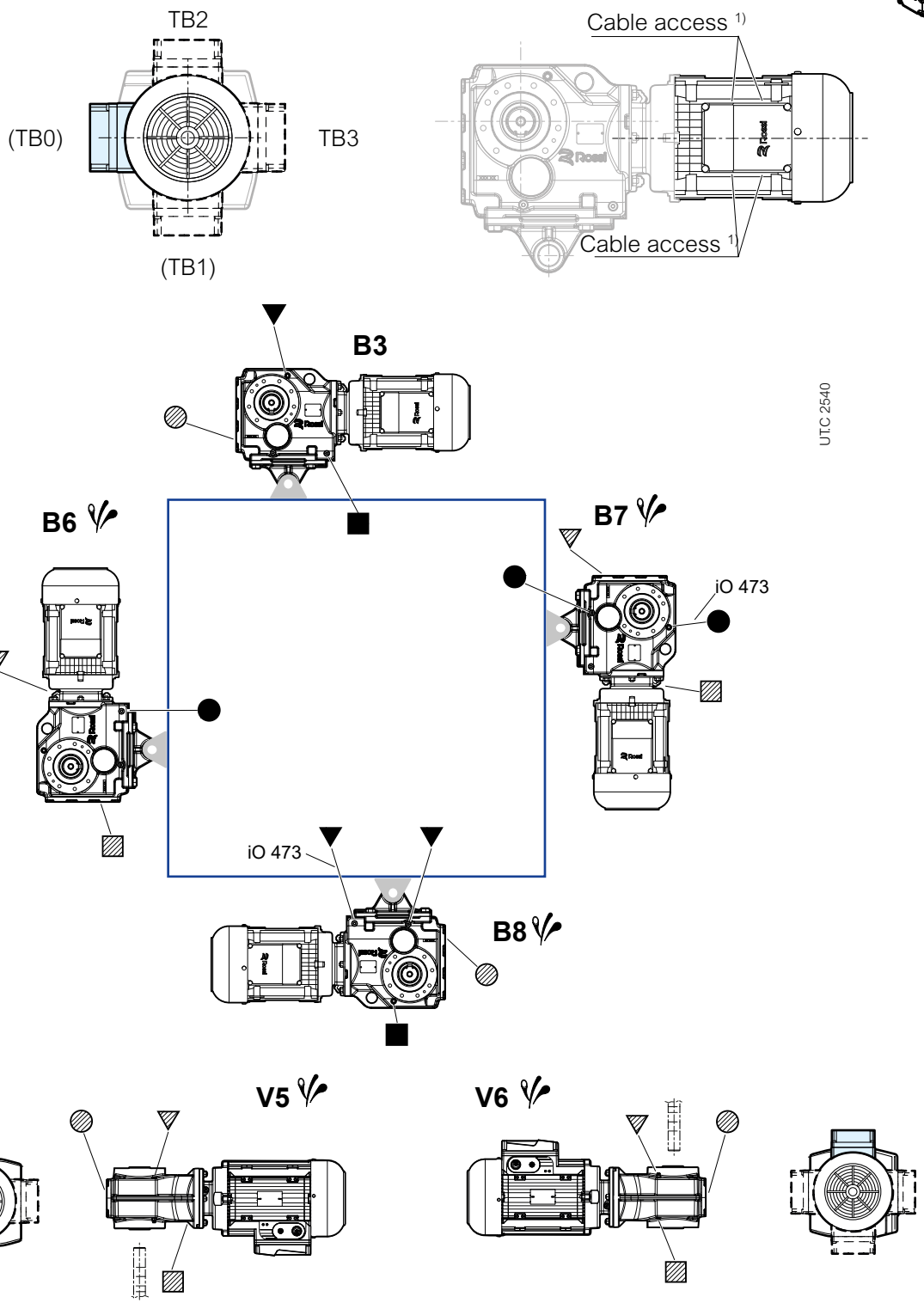
- ▼ breather plug
- ● oil level plug
- ■ oil drain plug
- ▽ breather plug on opposite side (not in view)
- ⊘ oil level plug on opposite side (not in view)
- ▨ oil drain plug on opposite side (not in view)

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 able and one for the auxiliary devices).

iO 373 SE / iO 973 SE





- ▼ 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 able and one for the auxiliary devices).

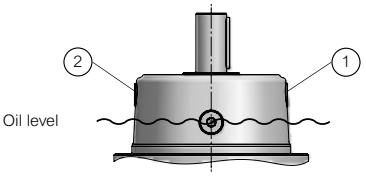
20 – EP series - Mounting positions, oil quantity and tanks

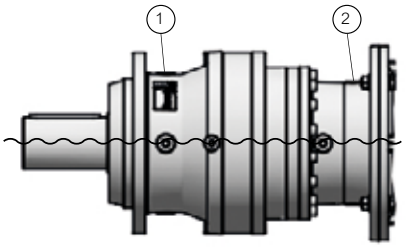
Oil filling

Pay attention to the correct position of the oil level plug (see cat. EP).

For mounting positions with input side in vertical position, during the oil filling it is very important to always open the plug located up to the level air to escape in order to reach the correct level.

When the output speed n_2 is lower than 0,3 min^{-1} and the mounting position is horizontal, the gear reducer must be completely filled with oil.





Oil filling:
a. Open plugs 1 and 2.
b. 2. Fill with oil by the plug 1 up to reach the correct level
c. Close plugs 1 and 2.

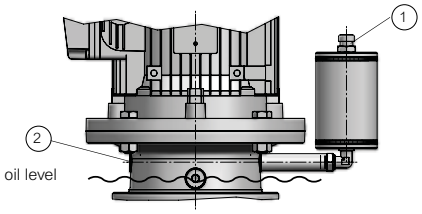
Notes

For oil quantities gear reducers for slewing drives are to be filled with (output designs R-S-H), refer to quantities stated in previous tables for gear reducers with output design F.

Stated oil quantities are approximate for provisioning.

The exact quantity gear reducer is to be filled with is definitely given by the level.

Expansion tanks



For some mounting positions, as foreseen in ch. 6, an expansion tank is needed in order to allow the correct oil level and the natural thermal expansion of lubricant.

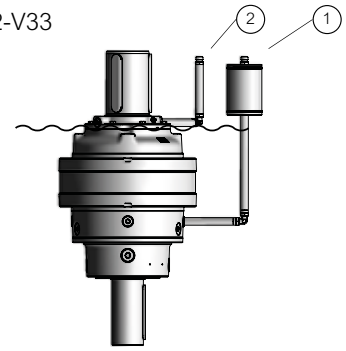
It is very important that it must always be placed above the oil level.

For the oil filling consider the instructions below:

a. Open plugs 1 and 2.
b. Fill with oil by the plug 1 up to reach the correct level
c. Close plugs 1 and 2.

For sizes from 030A with mounting positions V3-V31-V32-V33, when ordered, the expansion tank kit does not include the piping arrangement. In these cases, please refer to the instructions below:

Mounting positions
V3-V31-V32-V33



Oil filling:
a. Open plugs 1 and 2.
b. Fill with oil by the plug 1 up to reach the correct level
c. Close plugs 1 and 2.

Tab. 19.1 Grease quantity for slewing drives output bearings

Size	R		S		H	
	Output design	grease quantity g	Output design	grease quantity g	Output design	grease quantity g
007	R30b	50	S30b	50	H30b	50
015	R30c	100	S30c	100	H30c	70
021	R30d	120	S30d	120	H30d	120
030	R30e	150	S30e	150	H30e	150
042	R30f	170	S30f	170	H30f	170
060	R30g	200	S30g	200	H30g	200
085	R30h	220	S30h	220	H30h	220
125	R30i	250	S30i	250	H30i	250
180	R30j	300	S30j	300	H30j	300
250	R30k	350	S30k	350	H30k	350

001A ... 021A

Mounting positions[1] (Output design ... **F..., ... A...**)

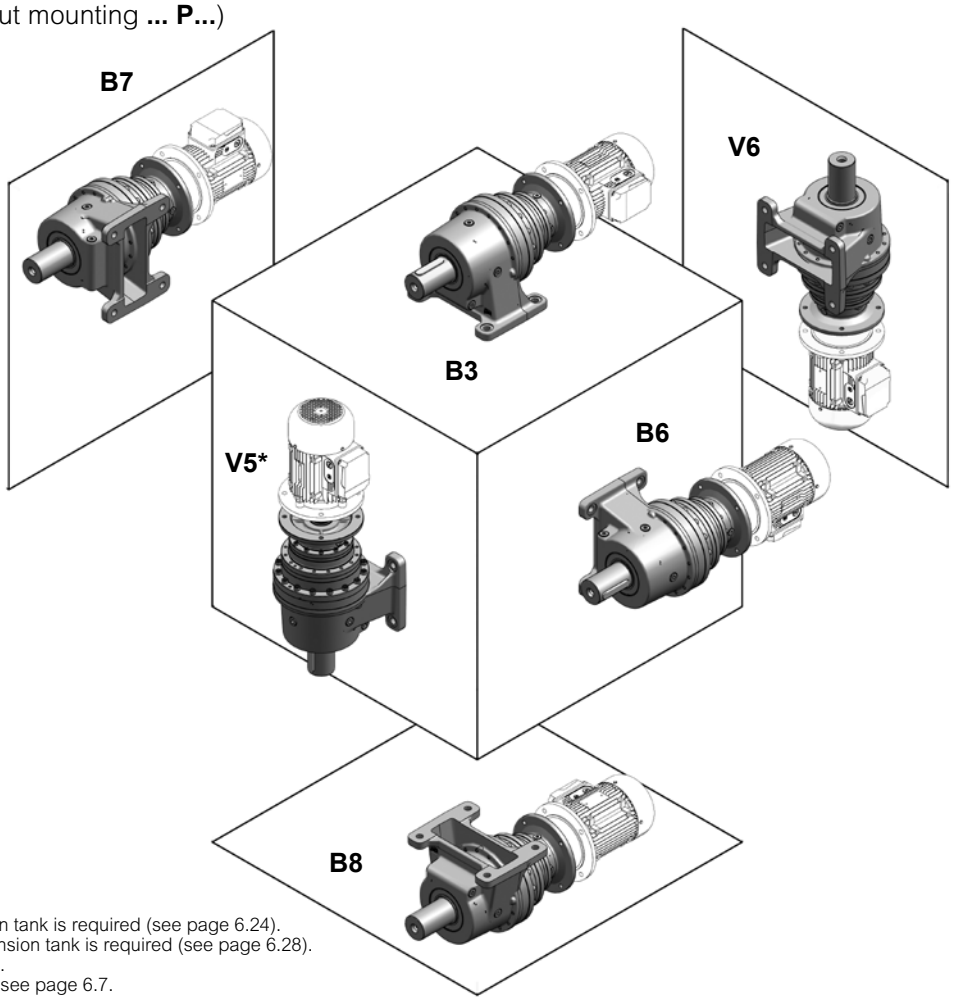
B5

V1*

V3**

* Based on the motor size, the expansion tank is required (see page 6.24).
** Based on the output design, the expansion tank is required (see page 6.28).
● Reference hole for the identification of the mounting position.
1) The drawings show the terminal box **0**. For different positions of terminal box, see page 6.7.

Moounting position[1] (Output mounting **... P...**)



* Based on the motor size, the expansion tank is required (see page 6.24).
** Based on the output design, the expansion tank is required (see page 6.28).
1) The drawings show the terminal box **0**.
For different positions of terminal box, see page 6.7.

Oil quantities [2] [l]

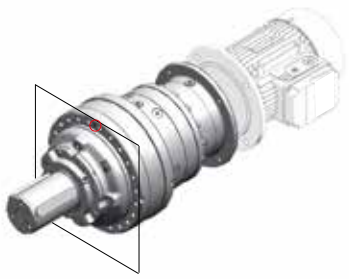
Q_R	1EL										2EL										3EL										4EL									
	001A	002A	003A	004A	006A	009A	012A	015A	018A	021A	001A	002A	003A	004A	006A	009A	012A	015A	018A	021A	001A	002A	003A	004A	006A	009A	012A	015A	018A	021A	001A	002A	003A	004A	006A	009A	012A	015A	018A	021A
B3 ... B8	0,7	0,7	1,2	1,3	1,3	2	1,9	1,9	3	3,4	0,8	0,8	1,3	1,4	1,4	2,7	2,6	2,6	3,2	3,2	1	1	1,4	1,5	1,4	2,5	2,6	2,6	3,3	3,3	1,1	1,1	1,5	1,6	1,5	2,6	2,6	2,6	3,2	3,2
V1, V5	0,8	0,8	1,5	1,6	1,4	2,5	2	2,1	3,9	4	1,1	1,2	2	2,2	2,1	3,9	3,9	3,9	5,1	5	1,5	1,5	2,3	2,5	2,3	4,5	4,4	4,4	5,8	5,8	1,8	1,8	2,6	2,8	2,6	4,8	4,8	4,8	6	6
V3, V6	1	1	1,9	2,1	2	2,9	2,8	2,9	4,3	5,2	1,3	1,3	2,1	2,3	2,3	4,1	4,3	4,3	4,8	4,7	1,6	1,7	2,2	2,4	2,2	3,9	4,1	4,1	4,8	4,8	1,8	1,9	2,5	2,7	2,5	4	4,3	4,3	4,8	4,8

2) Stated oil quantities are approximate for provisioning. The exact quantity gear reducer is to be filled with is definitely given by the level.

022A ... 710A

Mounting positions[1] (Output design ... **F..., ... A...**)

B5



V1*

V3**

* Based on the motor size, the expansion tank is required (see page 6.24).
** Based on the output design, the expansion tank is required (see page 6.28).
● Reference hole for the identification of the mounting position.
1) The drawings show the terminal box **0**. For different positions of terminal box, see page 6.7.

Oil quantities [2] [l]

Q_R	1EL					2EL							
	022A	030A	031A	042A	043A	022A	030A	031A	042A	043A	060A 061A	085A	125A
B5	2,9	3,2	4,5	4,4	5,6	2,7	4,4	5,9	5,3	6,7	6,7	7,7	14
V1	3,6	5,2	8,1	7,5	10,2	3,9	6,2	9,2	8	10,8	10,6	14,1	24
V3	3,3	6,5	5	8,8	6	2,9	8,9	7,8	10,7	8,3	13,5	15,4	27

Q_R	3EL											4EL												
	022A	030A	031A	042A	043A	060A 061A	085A	125A	180A	250A	355A	022A	030A	031A	042A	043A	060A 061A	085A	125A	180A	250A	355A	500A	710A
B5	3,1	3,6	5,1	4,9	6,3	6,3	7,9	15	22	32	45	3,1	3,6	5,1	5	6,4	6,2	8,1	15	22	33	46	59	89
V1	5,5	6	9	8,7	11,5	11,4	14,5	27	40	60	86	5,7	6,8	9,8	9,5	12,3	11,9	15,5	29	43	63	89	114	174
V3	3,8	7,1	6,1	9,8	7,5	12,5	15,8	29	43	63	89	3,8	7,3	6,2	10	7,6	12,4	16,2	30	44	65	91	117	177

2) Stated oil quantities are approximate for provisioning. The exact quantity gear reducer is to be filled with is definitely given by the level.

001A ... 021A

Mounting positions[1] (Output design ... **F..., ... A...**)

V3**

V31**

V32**

V33**

B5

B51*

B52

B53

V1

V11

V12

V13

* Based on the motor size, the expansion tank is required (see page 6.24).
** Based on the output design, the expansion tank is required (see page 6.28).
● Reference hole for the identification of the mounting position.
1) The drawings show the terminal box **0**. For different positions of terminal box, see page 6.7.

Oil quantities [2] [l]

Q_R	2EB										3EB										4EB									
	001A	002A	003A	004A	006A	009A	012A	015A	018A	021A	001A	002A	003A	004A	006A	009A	012A	015A	018A	021A	001A	002A	003A	004A	006A	009A	012A	015A	018A	021A
V3 ... V33	2,7	2,8	4,4	4,5	4,4	8,2	8,3	8,3	14,3	14,3	3	3,1	3,7	3,8	3,6	6,1	6,3	6,3	6,8	6,8	3,3	3,3	3,9	4,1	3,9	5,4	5,6	5,6	6,2	6,2
B5, B53	1,5	1,5	2,5	2,5	2,5	4,7	4,6	4,6	8	8	1,7	1,7	2,1	2,2	2,1	3,7	3,6	3,6	4,2	4,3	1,8	1,8	2,2	2,3	2,2	3,3	3,3	3,3	4	4
B51	2,6	2,6	4,2	4,3	4,2	8	7,8	7,8	13,3	13,3	2,9	2,9	3,7	3,9	3,7	6,6	6,5	6,5	7,7	7,7	3,2	3,2	4	4,2	4	6,2	6,1	6,1	7,4	7,4
B52	1,8	1,9	3	3	3	5,6	5,6	5,6	9,8	9,8	2	2	2,4	2,5	2,4	4,2	4,1	4,1	4,7	4,8	2,1	2,1	2,5	2,6	2,5	3,6	3,6	3,6	4,3	4,3
V1 ... V13	1,9	1,9	3	3,1	3	5,7	5,5	5,5	9,4	9,4	2,2	2,2	3	3,2	3	5,4	5,4	5,4	6,5	6,6	2,5	2,5	3,3	3,5	3,3	5,5	5,4	5,4	6,7	6,7

2) Stated oil quantities are approximate for provisioning. The exact quantity gear reducer is to be filled with is definitely given by the level.

022A ... 710A

Mounting positions[1] (Output design ... **F..., ... A...**)

** Based on the output design, the expansion tank is required (see page 6.28).
● Reference hole for the identification of the mounting position.
1) The drawings show the terminal box **0**. For different positions of terminal box, see page 6.7.

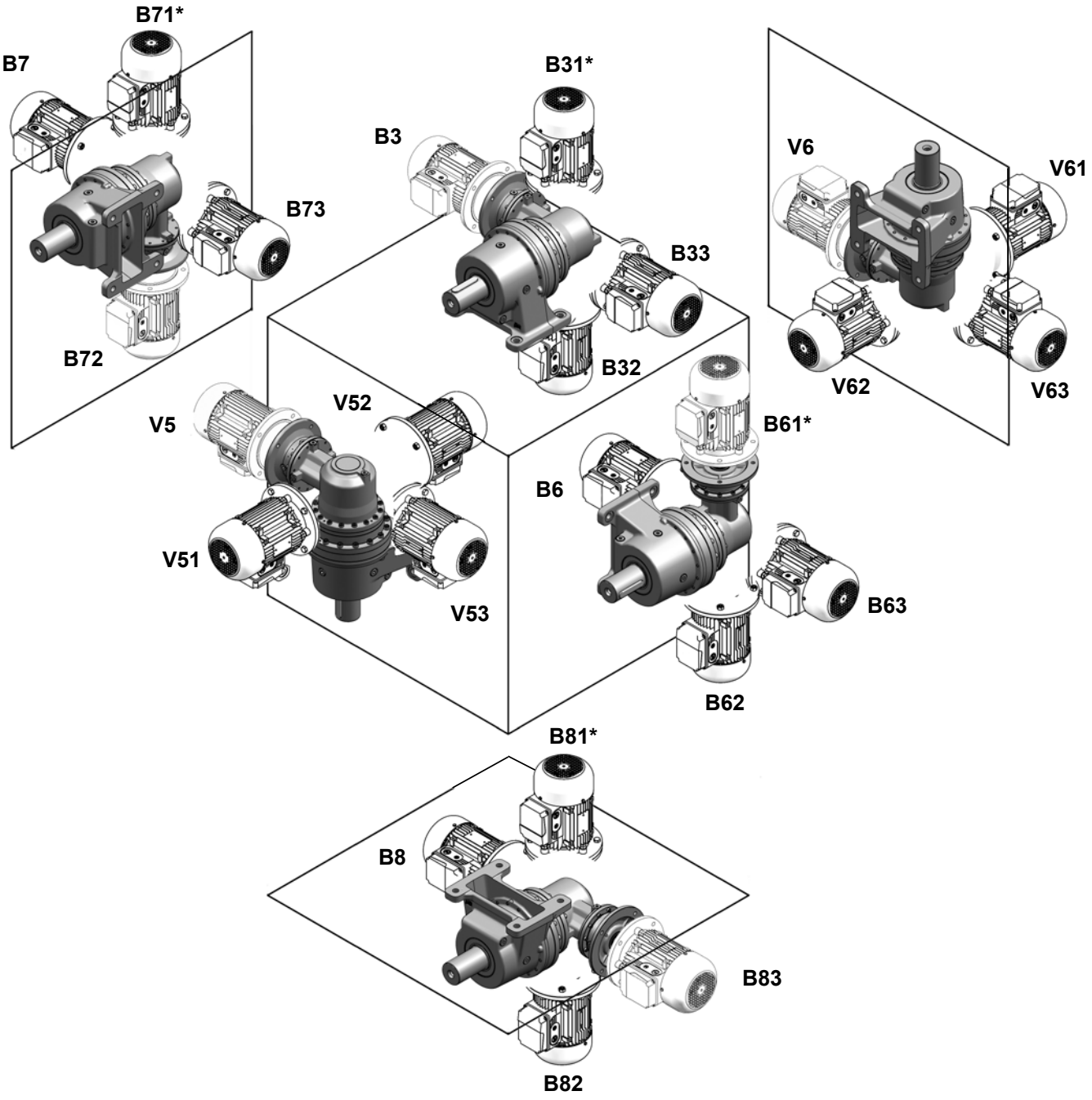
Oil quantities [2] [l]

Q_R	2EB								3EB										4EB											
	022A	030A	031A	042A	043A	060A 061A	085A	125A	022A	030A	031A	042A	043A	060A 061A	085A	125A	180A	250A	355A	022A	030A	031A	042A	043A	060A 061A	085A	125A	180A	250A	355A	500A	710A
V3 ... V33	11,2	12,5	12,4	18,8	15,7	20	33,5	45	6,5	11	10	14,5	11,9	20,5	20,6	42	56	84	106	4,9	10,3	8,1	11,9	9,6	14,6	23,6	36	52	68	101	125	196
B5, B53	6,8	6,3	8,2	9,4	10,4	10	16,8	23	4,4	5,5	7	7,3	8,5	10,2	10,3	21	28	42	53	3,6	5,1	6,1	6	7,4	7,3	11,8	18	26	34	51	63	98
B51	12,5	9,9	16,5	18,8	20,8	20	33,5	44	8,1	9,9	12,9	13,2	15,9	19,1	19,2	38	52	82	104	6,8	9,8	11,7	11,5	14,3	14,2	22,9	32	50	66	98	122	194
B52	7,6	8	8,2	9,4	10,4	10	16,8	27	4,9	6,3	7,8	8,2	9,3	11,1	11,2	21	44	46	57	4	5,4	6,4	6,3	7,7	7,6	12,2	18	26	34	51	63	102
V1 ... V13	10,1	7,8	10,6	13	15	14,2	20,5	31	6,9	7,5	10,5	10,8	13,5	14,8	16,7	34	52	70	92	6,1	8,5	10,4	10,2	13	12,9	20,3	32	46	64	93	118	182

2) Stated oil quantities are approximate for provisioning. The exact quantity gear reducer is to be filled with is definitely given by the level.

001A ... 021A

Mounting positions[1] (Output design **... P...**)



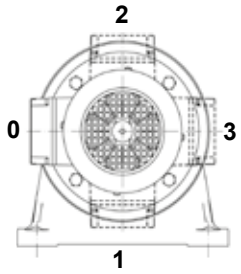
* Based on the motor size, the expansion tank is required (see page 6.24).
1) The drawings show the terminal box **0**. For different positions of terminal box, see page 6.7.

Oil quantities [2] [l]

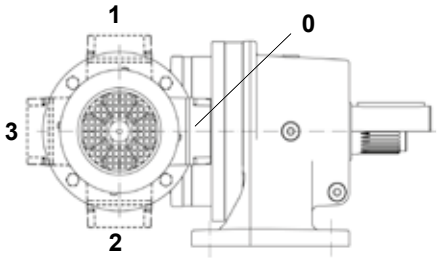
Q_R	2EB										3EB										4EB									
	001A	002A	003A	004A	006A	009A	012A	015A	018A	021A	001A	002A	003A	004A	006A	009A	012A	015A	018A	021A	001A	002A	003A	004A	006A	009A	012A	015A	018A	021A
B3 ... B8	1,5	1,5	2,5	2,5	2,5	4,7	4,6	4,6	8	8	1,7	1,7	2,1	2,2	2,1	3,7	3,6	3,6	4,2	4,3	1,8	1,8	2,2	2,3	2,2	3,3	3,3	3,3	4	4
B33 ... B83	1,5	1,5	2,5	2,5	2,5	4,7	4,6	4,6	8	8	1,7	1,7	2,1	2,2	2,1	3,7	3,6	3,6	4,2	4,3	1,8	1,8	2,2	2,3	2,2	3,3	3,3	3,3	4	4
B31 ... B81	2,6	2,6	4,2	4,3	4,2	8	7,8	7,8	13,3	13,3	2,9	2,9	3,7	3,9	3,7	6,6	6,5	6,5	7,7	7,7	3,2	3,2	4	4,2	4	6,2	6,1	6,1	7,4	7,4
B32 ... B82	1,8	1,9	3	3	3	5,6	5,6	5,6	9,8	9,8	2	2	2,4	2,5	2,4	4,2	4,1	4,1	4,7	4,8	2,1	2,1	2,5	2,6	2,5	3,6	3,6	3,6	4,3	4,3
V5 ... V53	1,9	1,9	3	3,1	3	5,7	5,5	5,5	9,4	9,4	2,2	2,2	3	3,2	3	5,4	5,4	5,4	6,5	6,6	2,5	2,5	3,3	3,5	3,3	5,5	5,4	5,4	6,7	6,7
V6 ... V63	2,7	2,8	4,4	4,5	4,4	8,2	8,3	8,3	14,3	14,3	3	3,1	3,7	3,8	3,6	6,1	6,3	6,3	6,8	6,8	3,3	3,3	3,9	4,1	3,9	5,4	5,6	5,6	6,2	6,2

001A ... 710A - Terminal box positions

Unless otherwise stated, the gearmotors are supplied with motor terminal box mounted in position **0** motor fan side (see figure).
On request, positions 1, 2 and 3 are available.
Code for the **designation**: **,TB0 (standard) ,TB1 ,TB2 ,TB3**.
The cable input is at Buyer's request.
In position 1 for inline and 2 for bevel helical, the terminal box may overhang from foot mounting base plane.
The following figures refer to mounting positions B3 - B5.



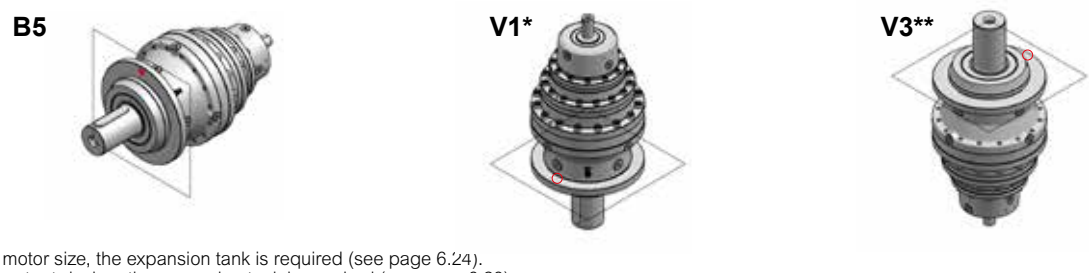
R 1EL ... 4EL



R 2EB ... 4EB

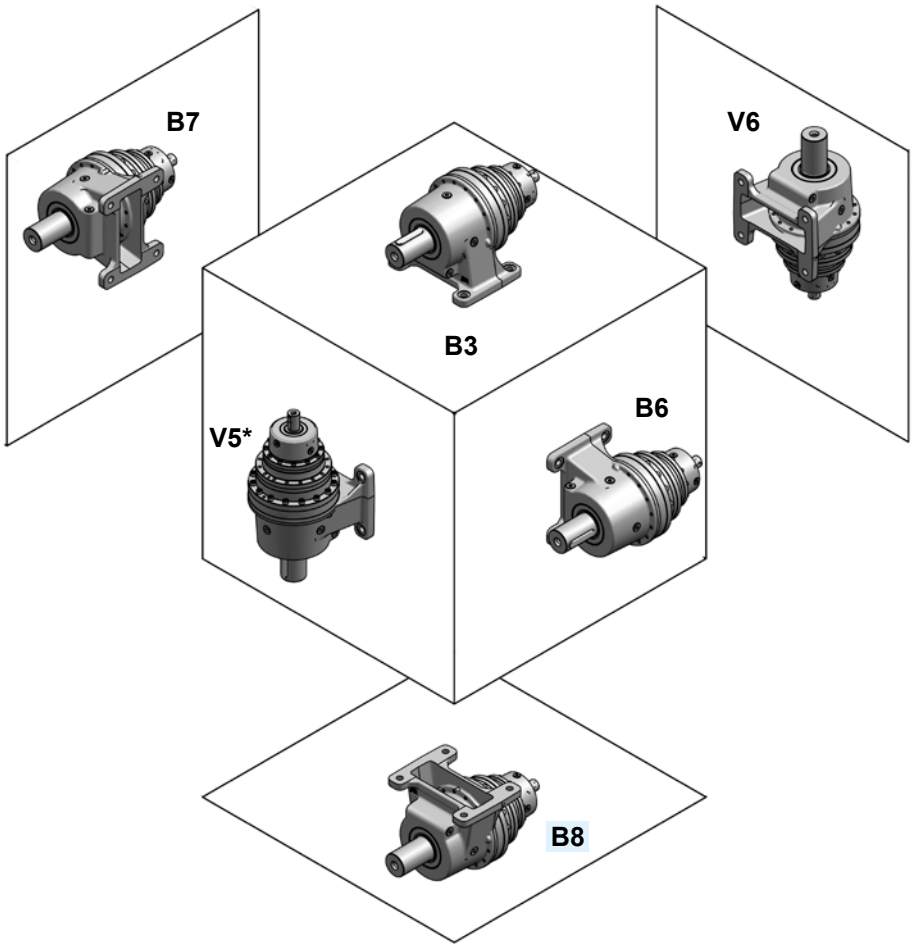
001A ... 021A

Mounting positions[1] (Output design ... F..., ... A...)



* Based on the motor size, the expansion tank is required (see page 6.24).
** Based on the output design, the expansion tank is required (see page 6.28).
● Reference hole for the identification of the mounting position.

Mounting positions[1] (Output design ... P...)



* Based on the gear reducer size and input type; the expansion tank is required (see page 6.24).

Oil quantities [1] [l]

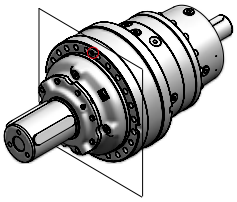
Q_R	1EL										2EL										3EL										4EL									
	001A	002A	003A	004A	006A	009A	012A	015A	018A	021A	001A	002A	003A	004A	006A	009A	012A	015A	018A	021A	001A	002A	003A	004A	006A	009A	012A	015A	018A	021A	001A	002A	003A	004A	006A	009A	012A	015A	018A	021A
B3 ... B8	0,7	0,7	1,4	1,4	1,2	2,2	2	2	3,1	3	0,8	0,8	1,3	1,3	1,2	2,5	2,5	2,5	3	3	1	1	1,4	1,5	1,4	2,5	2,5	2,5	3,1	3,1	1,2	1,2	1,6	1,7	1,6	2,6	2,6	2,6	3,3	3,3
V1, V5	1,4	1,4	2,7	2,7	2,5	4,4	3,9	4	6,2	6,1	1,7	1,7	2,5	2,7	2,5	5	4,9	4,9	6,1	6	2	2	2,8	3	2,8	5	4,9	4,9	6,2	6,2	2,3	2,3	3,2	3,3	3,2	5,3	5,3	5,3	6,5	6,5
V3, V6	1	1,1	2,2	2,1	1,9	3,2	2,9	3	4,5	4,4	1,3	1,4	2	2,1	1,9	3,8	3,9	3,9	4,4	4,3	1,6	1,7	2,3	2,4	2,3	3,8	3,9	3,9	4,5	4,5	2	2	2,6	2,8	2,6	4,1	4,3	4,3	4,8	4,8

1) Stated oil quantities are approximate for provisioning. The exact quantity gear reducer is to be filled with is definitely given by the level.

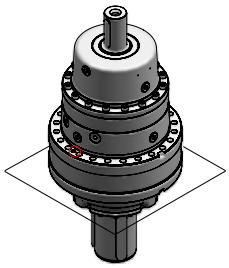
022A ... 710A

Mounting positions[1] (Output design **... F..., ... A...**)

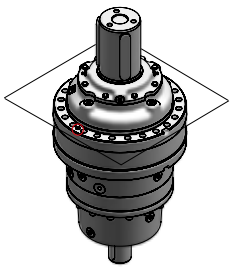
B5



V1*



V3**



⋆ Based on the motor size, the expansion tank is required (see page 6.24).
⋆⋆ Based on the output design, the expansion tank is required (see page 6.28).
● Reference hole for the identification of the mounting position.

Oil quantities [2] [l]

Q_R	1EL				2EL												
	030A	031A	042A	043A	022A	030A	031A	042A	043A	060A 061A	085A	125A	180A	250A	355A	500A	710A
B5	2,8	4,3	4	5,4	2,5	3,9	5,4	4,8	6,2	6,4	7,2	13	21	30	43	56	81
V1	5,6	8,6	7,9	10,7	4,9	7,8	10,8	9,6	12,4	12,7	14,5	26	42	60	86	112	162
V3	5,6	4,6	7,9	5,6	2,5	7,8	6,8	9,6	7,3	12,7	14,5	26	42	60	86	112	162

Q_R	3EL													4EL											
	022A	030A	031A	042A	043A	060A 061A	085A	125A	180A	250A	355A	500A	710A	022A	030A	031A	042A	043A	060A 061A	085A	125A	180A	250A	355A	500A	710A
B5	3	3,6	5	4,9	6,3	6,2	8,2	14	21	31	44	58	83	3,1	3,6	5,2	5	6,4	6,2	8,4	15	22	32	45	58	88
V1	5,9	7,1	10,1	9,8	12,6	12,5	16,5	28	42	62	88	116	166	6,2	7,3	10,3	10	12,8	12,4	16,8	30	44	64	90	116	176
V3	3,5	7,1	6	9,8	7,5	12,5	16,5	28	42	62	88	116	166	3,8	7,3	6,3	10	7,7	12,4	16,8	30	44	64	90	116	176

1) Stated oil quantities are approximate for provisioning. The exact quantity gear reducer is to be filled with is definitely given by the level.

001A ... 021A

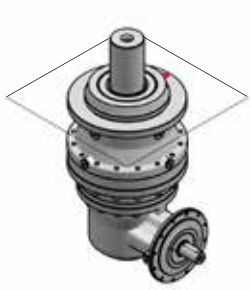
Mounting positions[1] (Output design **... F..., ... A...**)

V3**

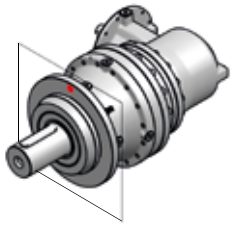
V31**

V32**

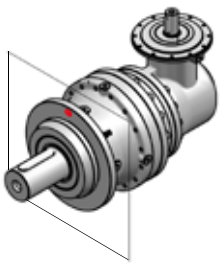
V33**



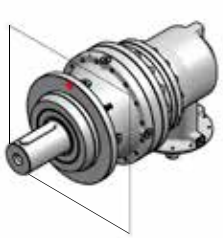
B5



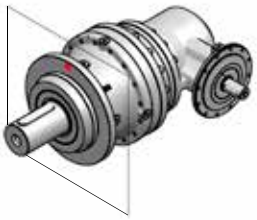
B51*



B52



B53

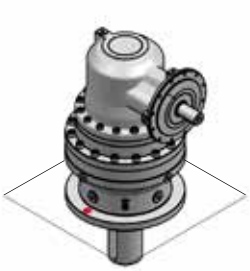


V1

V11

V12

V13



* Based on the motor size, the expansion tank is required (see page 6.24).
** Based on the output design, the expansion tank is required (see page 6.28).
● Reference hole for the identification of the mounting position.

Oil quantities [1] [l]

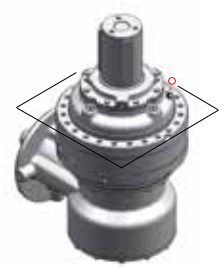
Q_R	2EB										3EB										4EB									
	001A	002A	003A	004A	006A	009A	012A	015A	018A	021A	001A	002A	003A	004A	006A	009A	012A	015A	018A	021A	001A	002A	003A	004A	006A	009A	012A	015A	018A	021A
V3 ... V33	2	2,1	3,4	3,5	3,3	6,4	6,4	6,4	10,7	10,7	2,4	2,4	3	3,2	3	5,1	5,3	5,3	5,8	5,8	2,7	2,8	3,4	3,5	3,3	4,8	5	5	5,6	5,6
B5, B53	1,2	1,2	2	2	2	3,8	3,7	3,7	6,2	6,2	1,4	1,4	1,8	1,9	1,8	3,2	3,1	3,1	3,7	3,7	1,5	1,5	2	2	1,9	3	3	3	3,6	3,6
B51	2,4	2,4	3,9	4,1	3,9	7,6	7,4	7,4	12,4	12,4	2,7	2,7	3,6	3,7	3,6	6,3	6,3	6,3	7,4	7,4	3,1	3,1	3,9	4,1	3,9	6	6	6	7,3	7,3
B52	1,2	1,2	2	2	2	3,8	3,7	3,7	6,2	6,2	1,4	1,4	1,8	1,9	1,8	3,2	3,1	3,1	3,7	3,7	1,5	1,5	2	2	1,9	3	3	3	3,6	3,6
V1 ... V13	1,5	1,5	2,5	2,6	2,5	4,8	4,6	4,6	7,6	7,6	1,9	1,9	2,7	2,9	2,7	4,9	4,9	4,9	6	6	2,2	2,2	3	3,2	3	5,1	5,1	5,1	6,4	6,4

1) Stated oil quantities are approximate for provisioning. The exact quantity gear reducer is to be filled with is definitely given by the level.

022A ... 710A

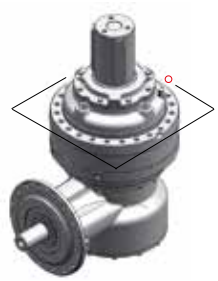
Mounting positions[1] (Output design **... F..., ... A...**)

V3**



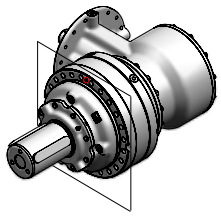
V31**

V32**

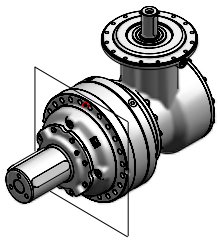


V33**

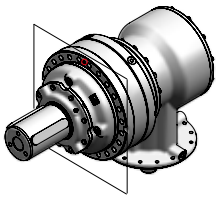
B5



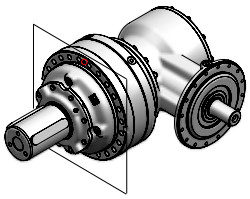
B51*



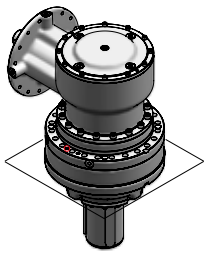
B52



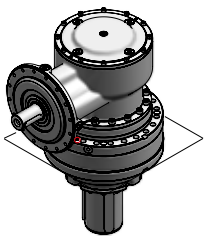
B53



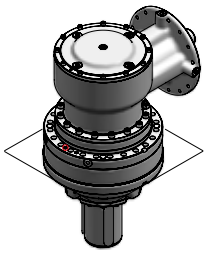
V1



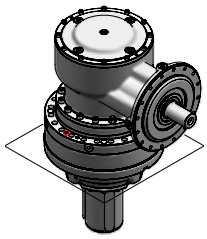
V11



V12



V13



* Based on the motor size, the expansion tank is required (see page 6.24).
** Based on the output design, the expansion tank is required (see page 6.28).
● Reference hole for the identification of the mounting position.

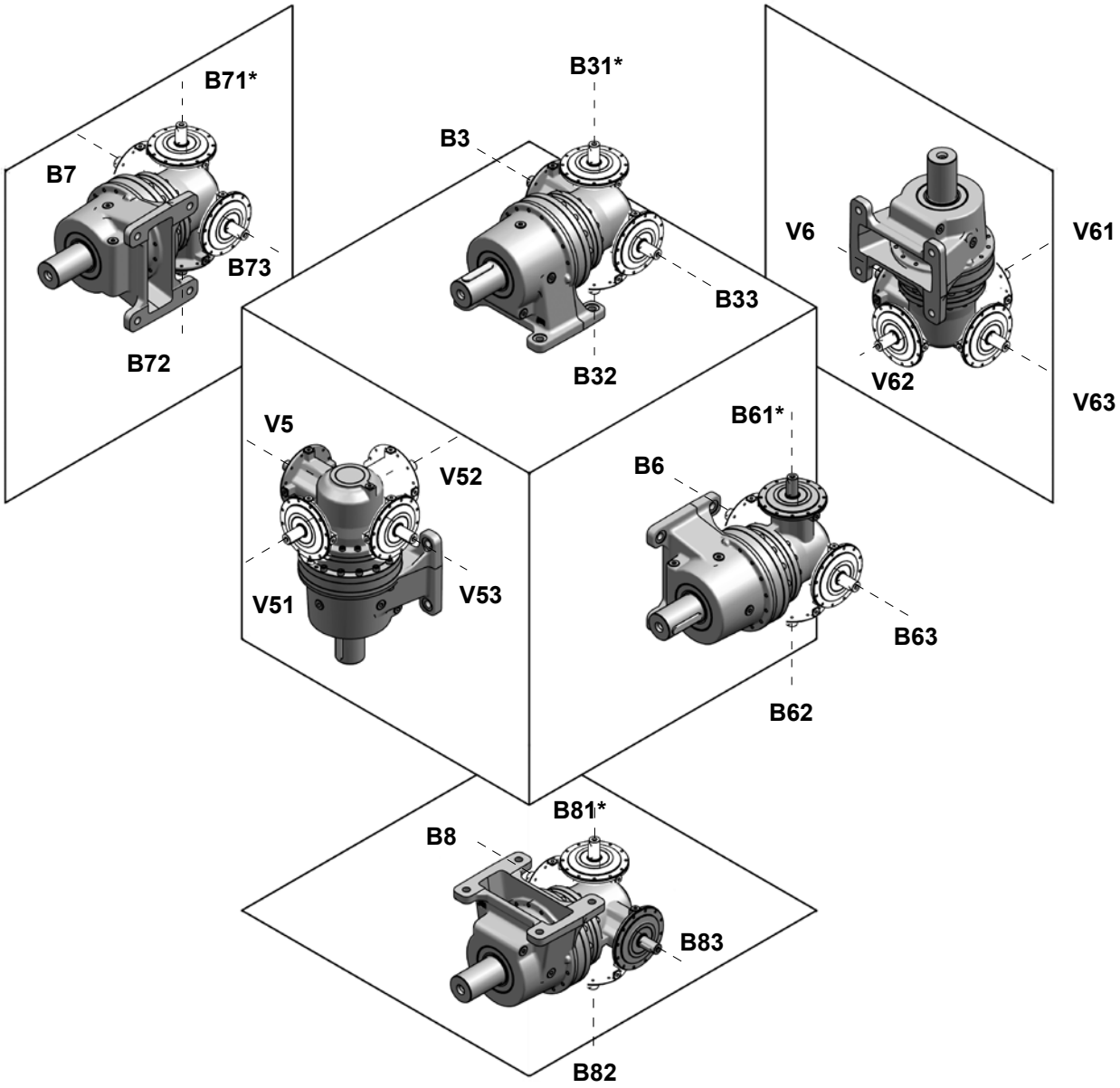
Oil quantities [1] [l]

Q_R	2EB								3EB											4EB													
	022A	030A	031A	042A	043A	060A 061A	085A	125A	022A	030A	031A	042A	043A	060A 061A	085A	125A	180A	250A	355A	022A	030A	031A	042A	043A	060A 061A	085A	125A	180A	250A	355A	500A	710A
V3 ... V33	9,7	9	12,4	18,8	15,7	20	33,5	44	5,4	9,5	8,4	12,7	10,4	18,7	18,8	38	52	82	104	4,2	9,6	7,4	11,3	9	14	22,7	32	50	66	98	122	194
B5, B53	6	4,5	8,2	9,4	10,4	10	16,8	22	3,9	4,8	6,2	6,4	7,8	9,4	9,4	19	26	41	52	3,3	4,8	5,8	5,6	7	7	11,4	16	25	33	49	61	97
B51	12,1	9	16,5	18,8	20,8	20	33,5	44	7,9	9,5	12,5	12,7	15,5	18,7	18,8	38	52	82	104	6,6	9,6	11,5	11,3	14,1	14	22,7	32	50	66	98	122	194
B52	6	4,5	8,2	9,4	10,4	10	16,8	26	3,9	4,8	6,2	6,4	7,8	9,4	9,4	19	26	45	56	3,3	4,8	5,8	5,6	7	7	11,4	16	25	33	49	61	101
V1 ... V13	9,7	9	12,4	18,8	15,7	20	33,5	31	6,4	6,7	9,7	9,9	12,7	14	15,8	32	46	69	91	5,8	8,2	10,1	9,9	12,7	12,6	19,9	29	45	63	92	116	181

1) Stated oil quantities are approximate for provisioning. The exact quantity gear reducer is to be filled with is definitely given by the level.

001A ... 021A

Mounting positions[1] (Output design **... P...**)



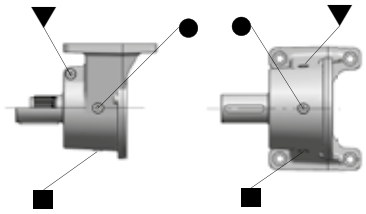
* Based on the gear reducer size and input type; the expansion tank is required (see page 6.24).

Oil quantities [1] [l]

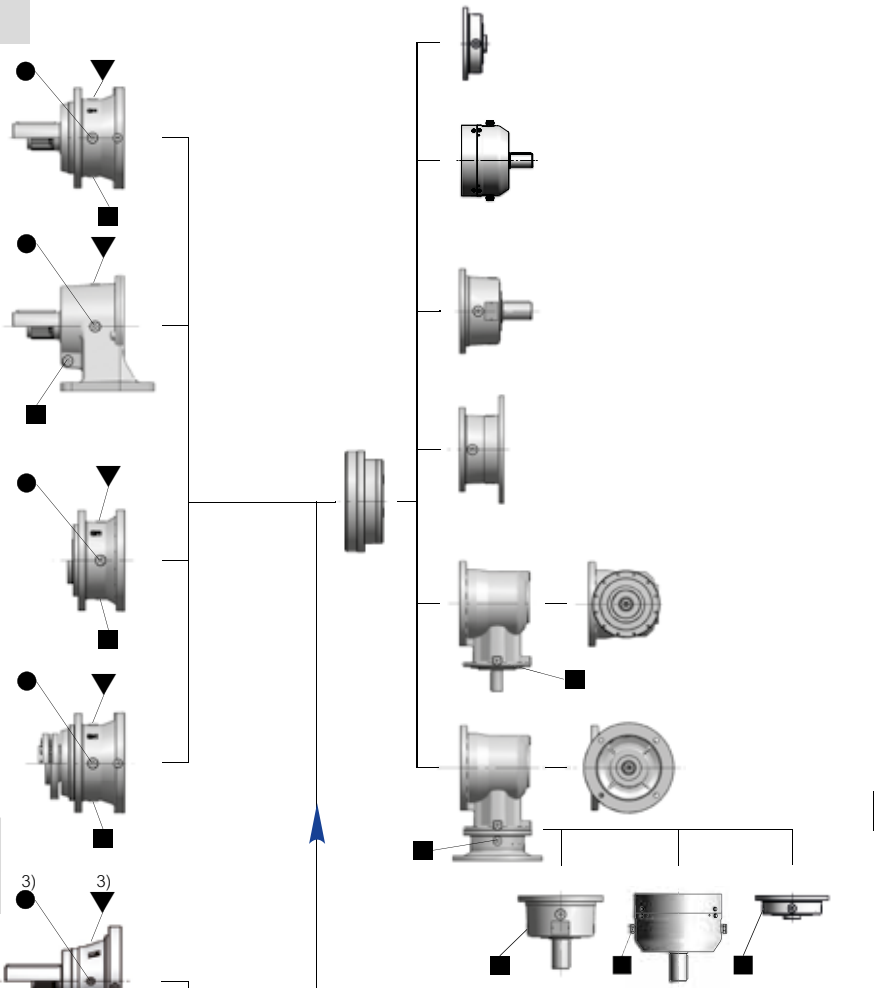
Q_R	2EB										3EB										4EB									
	001A	002A	003A	004A	006A	009A	012A	015A	018A	021A	001A	002A	003A	004A	006A	009A	012A	015A	018A	021A	001A	002A	003A	004A	006A	009A	012A	015A	018A	021A
B3 ... B8	1,2	1,2	2	2	2	3,8	3,7	3,7	6,2	6,2	1,4	1,4	1,8	1,9	1,8	3,2	3,1	3,1	3,7	3,7	1,5	1,5	2	2	1,9	3	3	3	3,6	3,6
B33 ... B83	1,2	1,2	2	2	2	3,8	3,7	3,7	6,2	6,2	1,4	1,4	1,8	1,9	1,8	3,2	3,1	3,1	3,7	3,7	1,5	1,5	2	2	1,9	3	3	3	3,6	3,6
B31 ... B81	2,4	2,4	3,9	4,1	3,9	7,6	7,4	7,4	12,4	12,4	2,7	2,7	3,6	3,7	3,6	6,3	6,3	6,3	7,4	7,4	3,1	3,1	3,9	4,1	3,9	6	6	6	7,3	7,3
B32 ... B82	1,2	1,2	2	2	2	3,8	3,7	3,7	6,2	6,2	1,4	1,4	1,8	1,9	1,8	3,2	3,1	3,1	3,7	3,7	1,5	1,5	2	2	1,9	3	3	3	3,6	3,6
V5 ... V53	1,5	1,5	2,5	2,6	2,5	4,8	4,6	4,6	7,6	7,6	1,9	1,9	2,7	2,9	2,7	4,9	4,9	4,9	6	6	2,2	2,2	3	3,2	3	5,1	5,1	5,1	6,4	6,4
V6 ... V63	2	2	3,4	3,5	3,3	6,4	6,4	6,4	10,7	10,7	2,4	2,4	3	3,2	3	5,1	5,3	5,3	5,8	5,8	2,7	2,8	3,4	3,5	3,3	4,8	5	5	5,6	5,6

1) Stated oil quantities are approximate for provisioning. The exact quantity gear reducer is to be filled with is definitely given by the level.

001A ... 021A
Plug positions and types

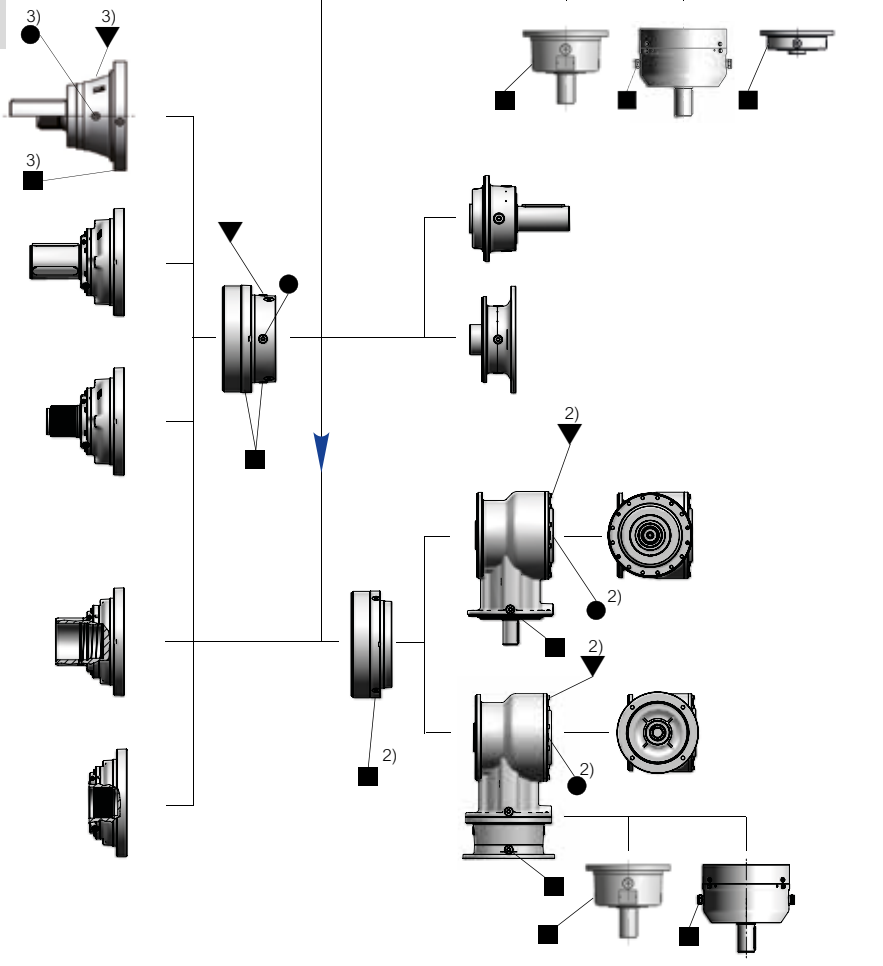


Mounting positions
B3, B5, B6, B7, B8
B32, B52, B62, B72, B82
B33, B53, B63, B73, B83



022A ... 710A
Plug positions and types

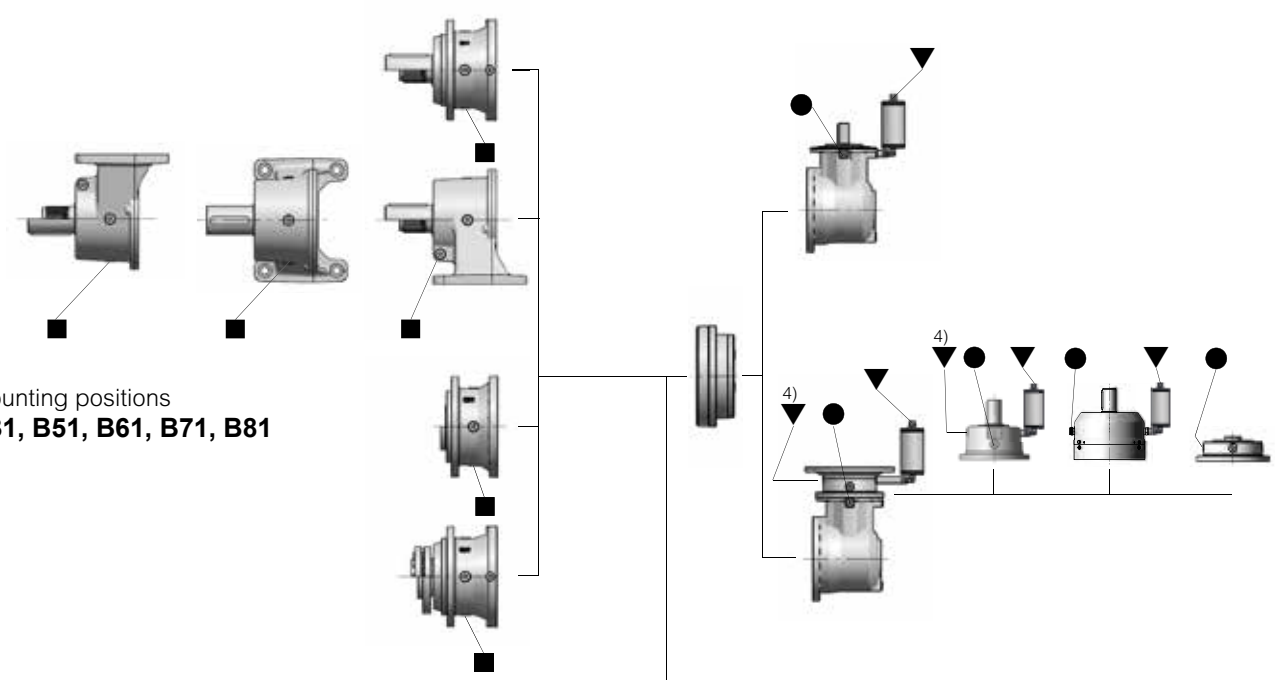
Mounting positions
B5, B52, B53



- Filler plug with breather
- Transparent level plug
- Spillway plug
- Drain plug
- Expansion tank[1)]
- Elbow

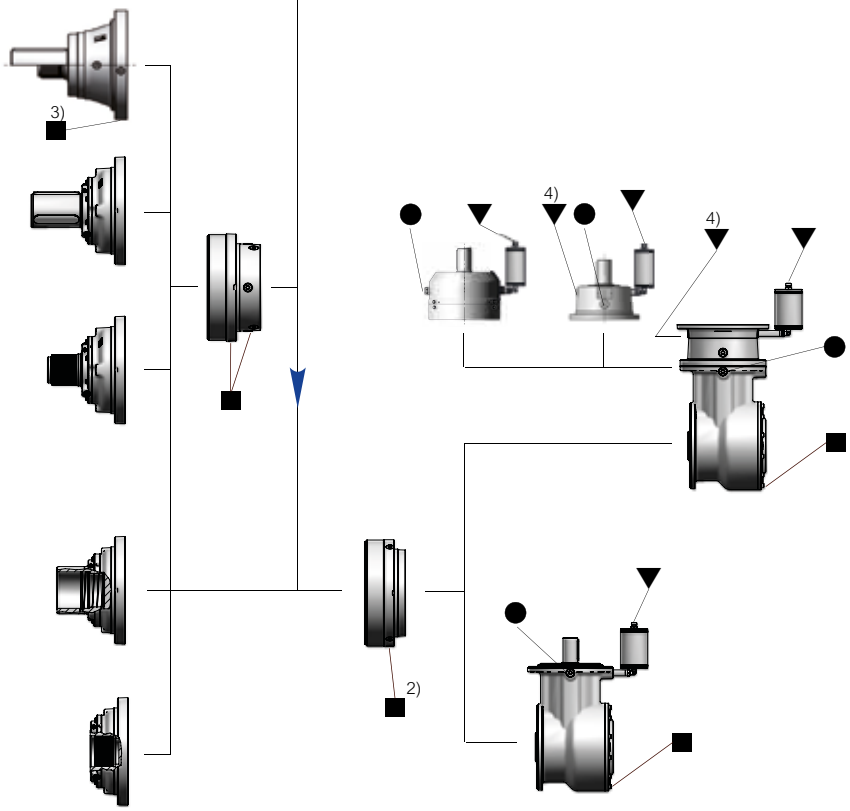
1) See page 6.24.
2) Only for 2EB train of gears.
3) Only for size 022A.

001A ... 021A
Plug positions and types



Mounting positions
B31, B51, B61, B71, B81

022A ... 710A
Plug positions and types

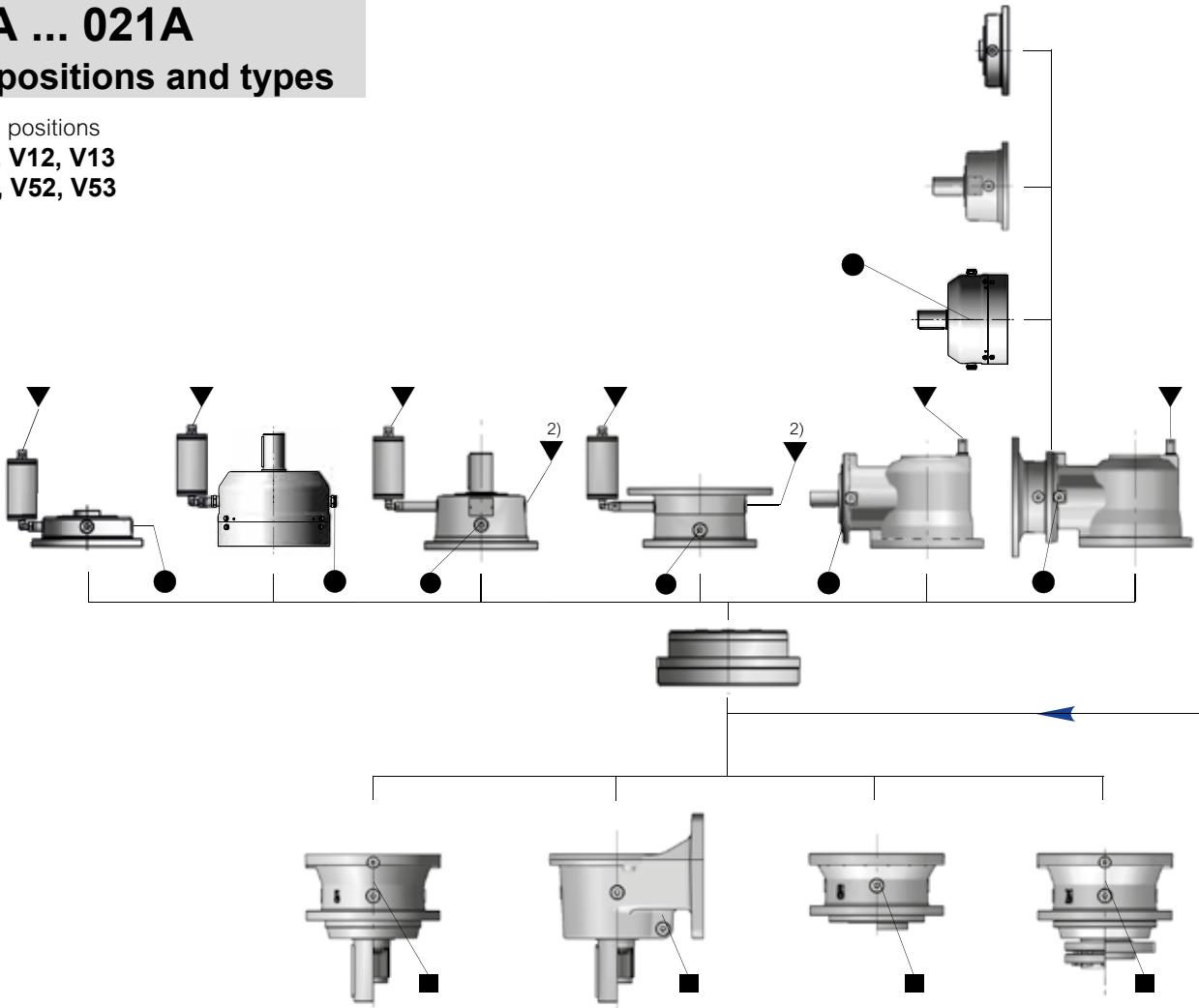


Mounting positions
B51

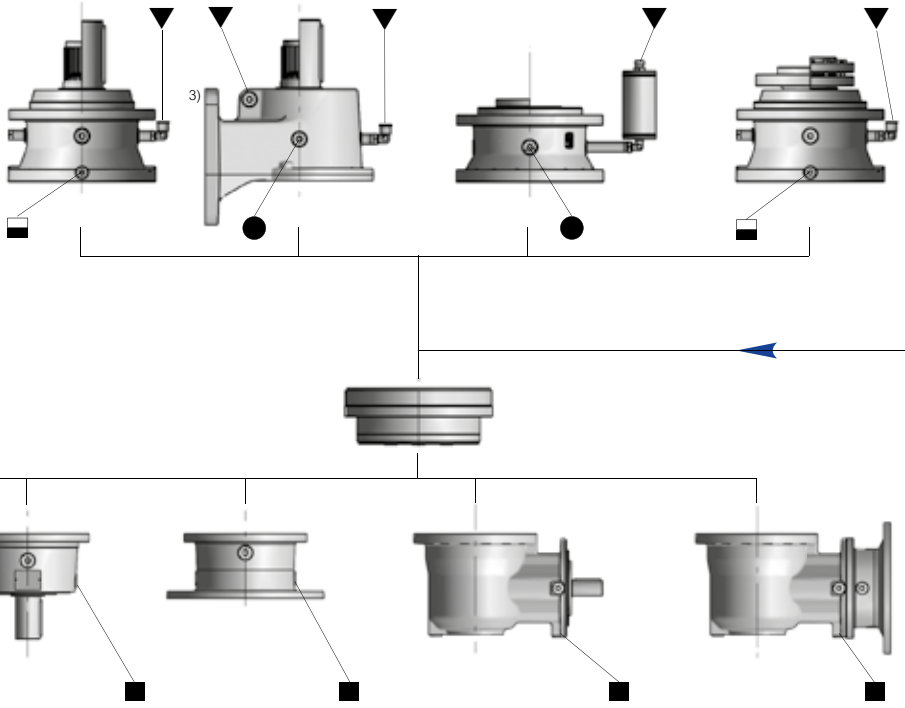
1) See page 6.24.
2) Only for 2EB train of gears.
3) Only for size 022A.
4) When expansion tank is not necessary.

001A ... 021A
Plug positions and types

Mounting positions
V1, V11, V12, V13
V5, V51, V52, V53



Mounting positions
V3, V31, V32, V33
V6, V61, V62, V63

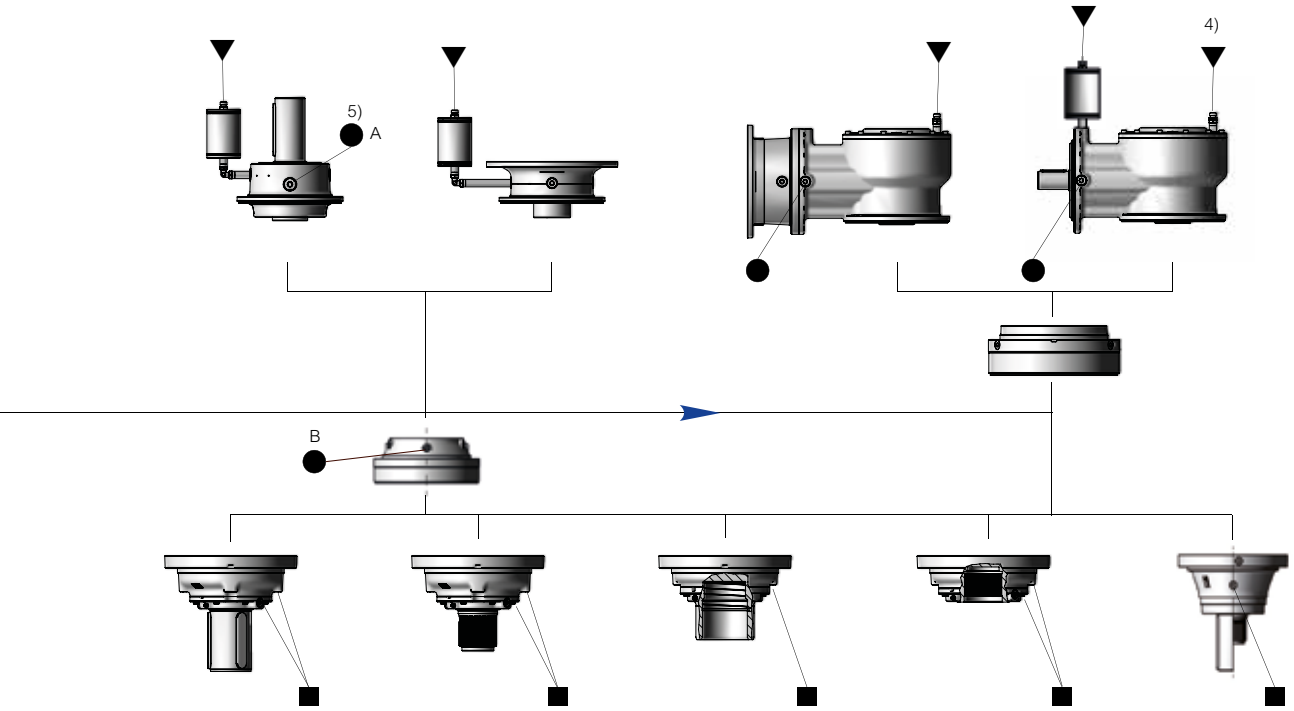


- Filler plug with breather
- Transparent level plug
- Spillway plug
- Drain plug
- Expansion tank[1)]
- Elbow

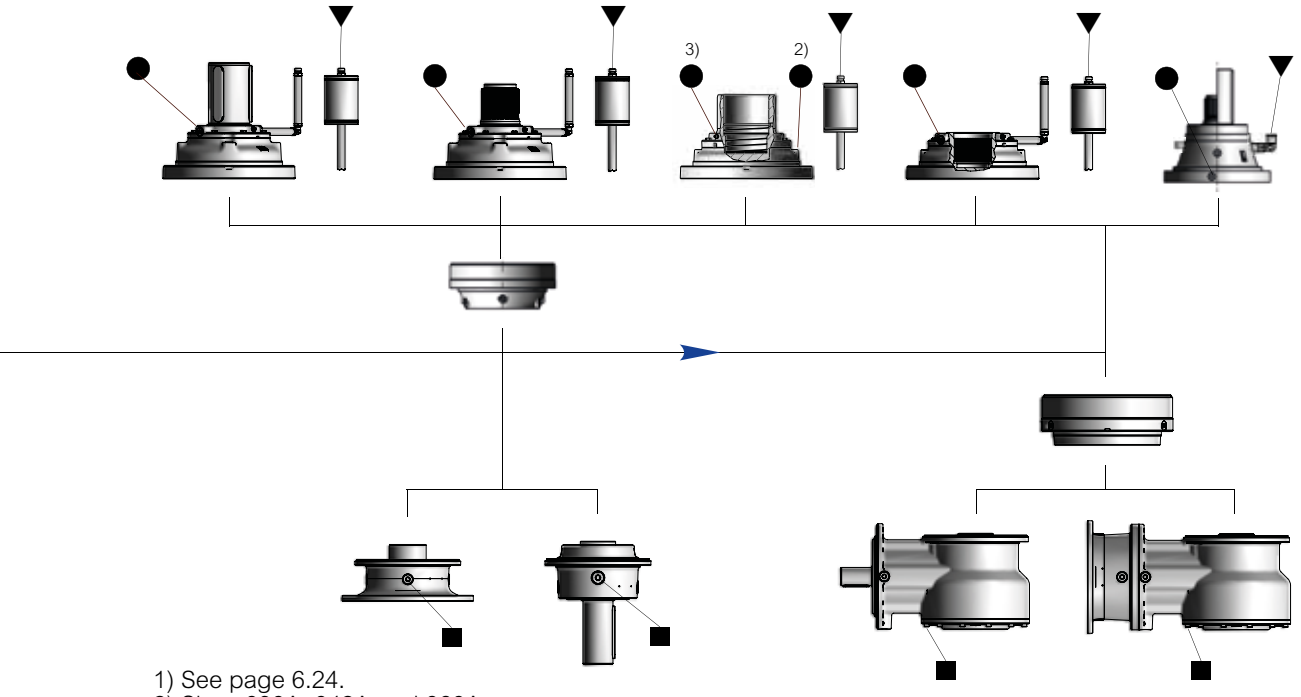
1) See page 6.24.
2) Only for 2EB train of gears.
3) Only for size 022A.

022A ... 710A
Plug positions and types

Mounting positions
V1, V11, V12, V13



Mounting positions
V3, V31, V32, V33



1) See page 6.24.
2) Sizes 030A, 042A and 060A.
3) Sizes ≥ 085A.
4) When expansion tank is not necessary.
5) In presence of level plug marked with A, B not present.

Appendix

Parking brake PB series

General specifications

The parking brakes of PB series are spring applied and hydraulic released multi-disci brakes (steel discs alternating with discs with sintered bronze coating), to be used in combination with planetary gear reducers of EP series.

They are not service brakes and cannot be used in dynamic conditions.

They are used to hold the load from application or to stop the machine in case of emergency.

The values of static braking torque M_{Rstat} given in the following table should be considered as nominal valus and are valid for a brand new brake with correct lubrication.

The tollerance on M_{Rstat} values is equal to +/- 10%. After some braking cycles, values of static braking torque could reduce by 5% and 10% due to the adjustment of discs.

Maximum counter-pressure admitted in brake supply pipe 0,5 bar.

Speed limit

The presence of a SAHR brake does not limit the values of n_{1max} and n_{1peak} of the gear reducer stated in EP catalog.

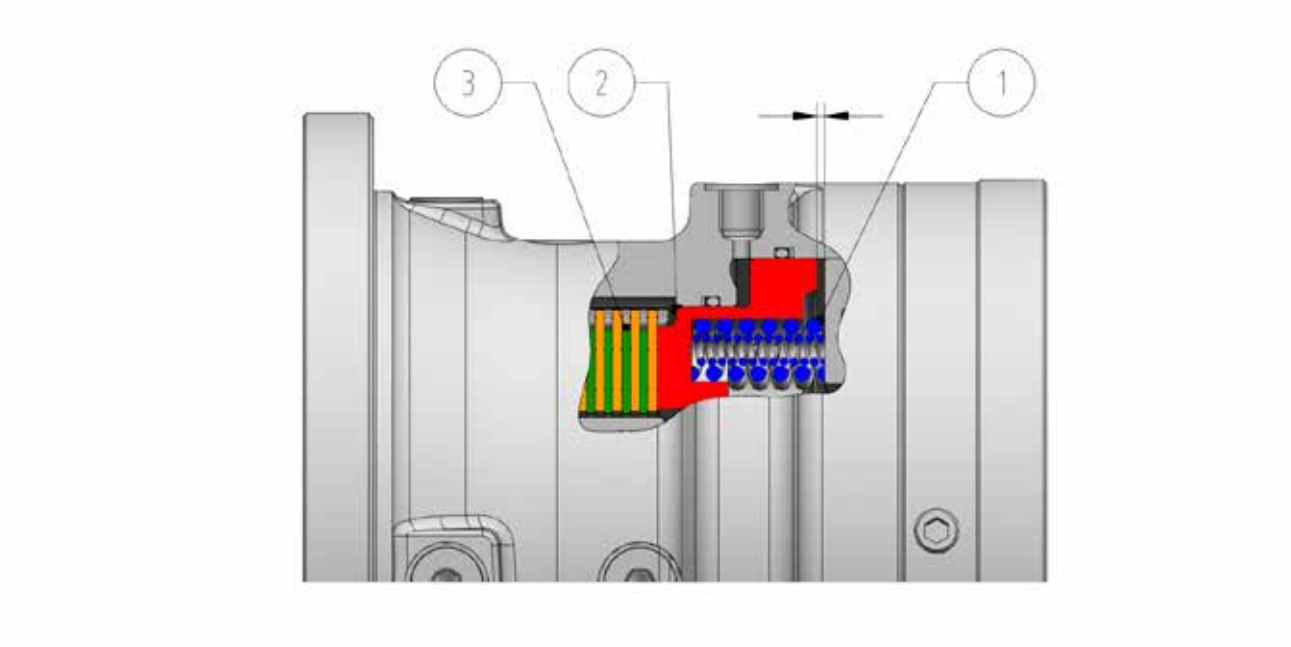
ATTENTION: a continuous of frequent duty at high speed may generate an overheating of the group (previous paragraph).

Operating conditions

Brakes are designed for industrial applications, at ambient temperature from -20 °C to +50 °C, maximum altitude 1000 m For operation at temperatures from -20 °C to 0 °C limit *p*max to 200 bar.

Brake closed

When no pressure is applied to the brake (0 bar) springs (1) apply a force to the piston (2) which lock the discs (3) and produce a nominal braking torque equivalent to $\boldsymbol{M}_{Bstat}$.

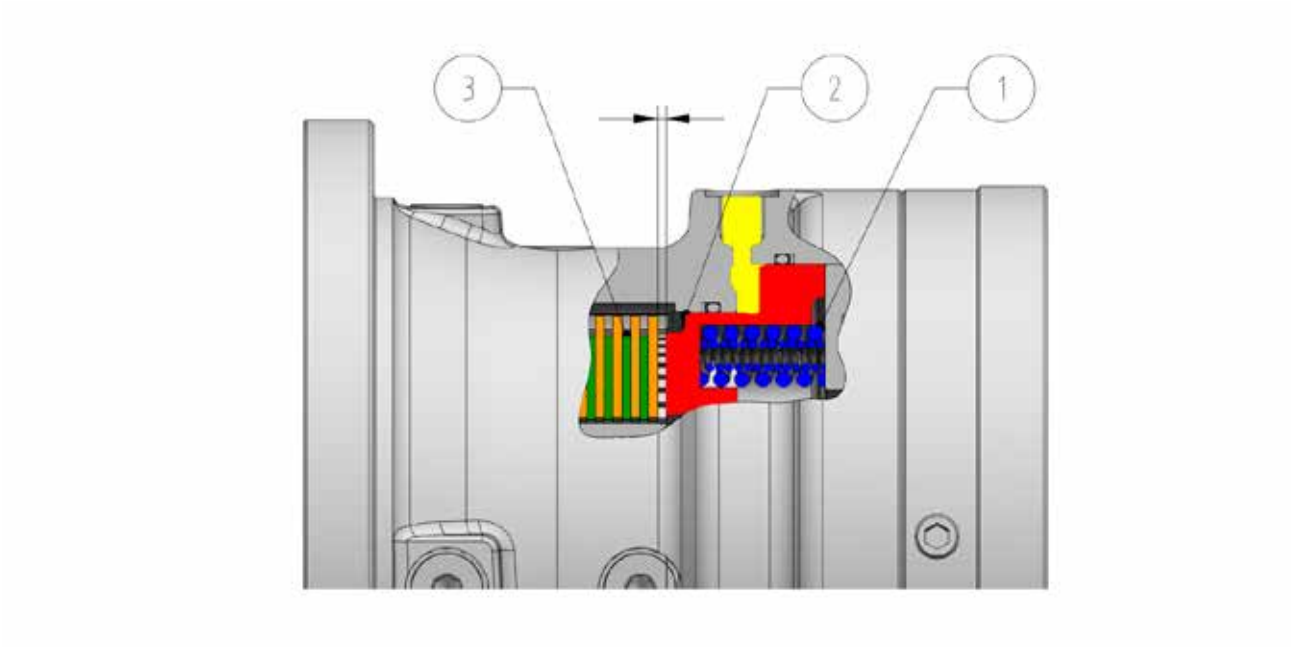


Brake opened

Above the pressure of 0 bar, the piston begins to compress the springs and the brake progressively reduces the braking torque.

When the release pressure exceeds the value of $\boldsymbol{p}_{min}$ the brake begins to open; once reached the value $\boldsymbol{p}$ the brake is fully opened, the piston ends its displacement and the discs can rotate freely.

To ensure a long life of the brake, it is suggested to use a release pressure 50% above the value of $\boldsymbol{p}$ and in any case not higher than $\boldsymbol{p}_{max}$.



Technical data of PB parking brakes

PB10-…			0075	0150	0225	0340	0420	0525	0650	0815	
Static braking torque	M_{Bstat}	[N m]	72	156	224	345	421	531	660	818	
Min opening pressure	p_{min}	[bar]	4.4	9.5	10.2	15.7	15.4	19.4	20.1	24.9	
Opening pressure	p	[bar]	6.9	14.9	16.1	24.7	24.2	30.4	31.6	39.1	
Max opening pressure	p_{max}	[bar]	300								
Max speed	n_{1max}	[min^{-1}]	according to n_{1max} and n_{1peak} values of gear reducer								
Oil volume for opening	V	[l]	0.10								

PB30-…			0250	0400	0500	0630	0800	1000	1250	1500	1700
Static braking torque	M_{Bstat}	[N m]	265	407	509	637	809	1010	1281	1529	1741
Min opening pressure	p_{min}	[bar]	7.6	11.8	11.8	14.7	15.6	19.4	24.7	25.2	28.7
Opening pressure	p	[bar]	12.0	18.5	18.5	23.1	24.5	30.5	38.7	39.6	45.1
Max opening pressure	p_{max}	[bar]	300								
Max speed	n_{1max}	[min^{-1}]	according to n_{1max} and n_{1peak} values of gear reducer								
Oil volume for opening	V	[l]	0.12								

PB90-…			0850	1250	1500	1800	2100	2600	3000	3550	4250
Static braking torque	M_{Bstat}	[N m]	869	1304	1552	1811	2173	2680	3063	3560	4305
Min opening pressure	p_{min}	[bar]	10.2	15.3	18.2	18.2	21.9	27.0	27.0	31.4	37.9
Opening pressure	p	[bar]	15.3	23.0	27.4	27.4	32.8	40.5	40.5	47.1	56.9
Max opening pressure	p_{max}	[bar]	300								
Max speed	n_{1max}	[min^{-1}]	according to n_{1max} and n_{1peak} values of gear reducer								
Oil volume for opening	V	[l]	0.25								

Other braking torque values on request.

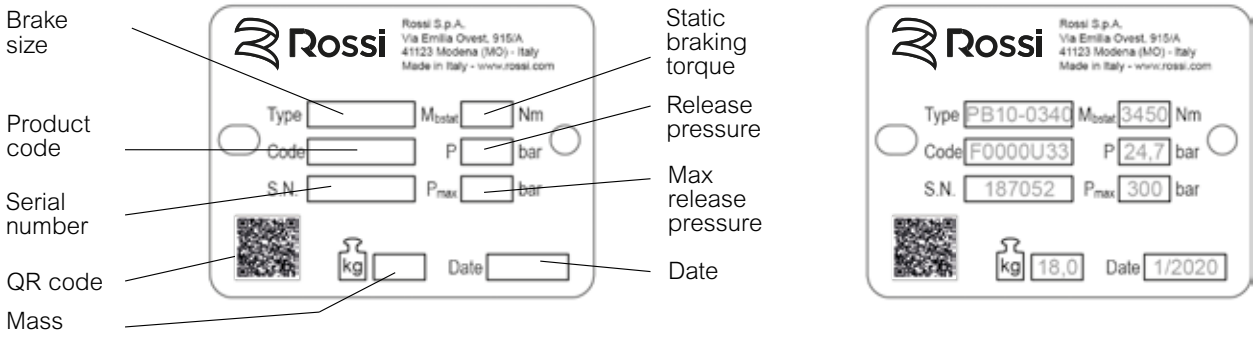
Max counter-pressure admitted 0,5 bar.

The above performance is given with return pressure equal to 0 bar, any back pressure should be considered when sizing the system.

How supplied

Nameplate of PB parking brakes

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

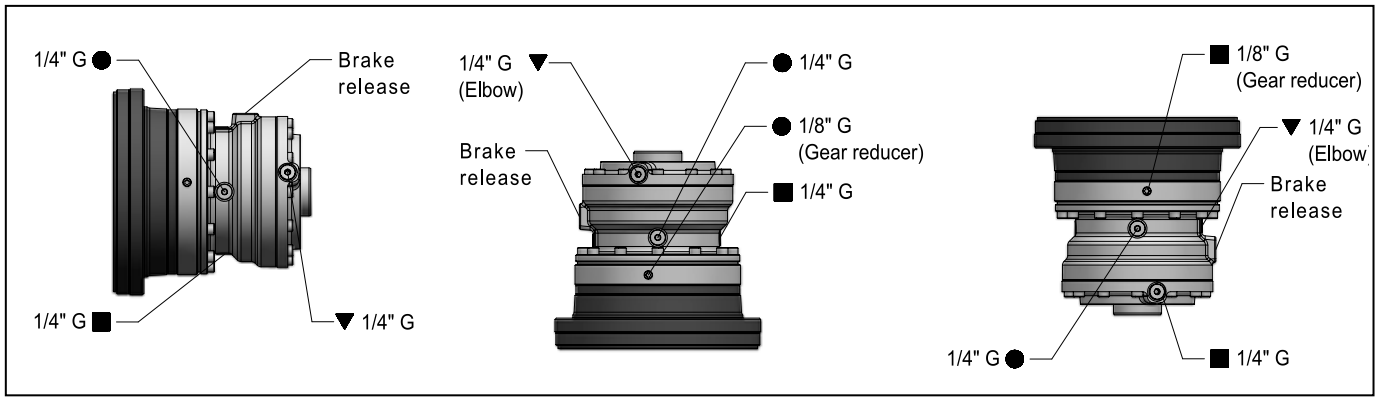


Lubrication of PB parking brakes

PB series parking brakes require lubrication , and **are supplied without oil**, as specified on proper adhesive label.
Before putting the brakes into service fill them with mineral oil ISO VG 32, unless otherwise prescribed by specific documentation. Hydraulic oils are generally suitable.
The separate lubrication prevents premature lubricant contamination in the gear reducer, increasing gears and bearings life.

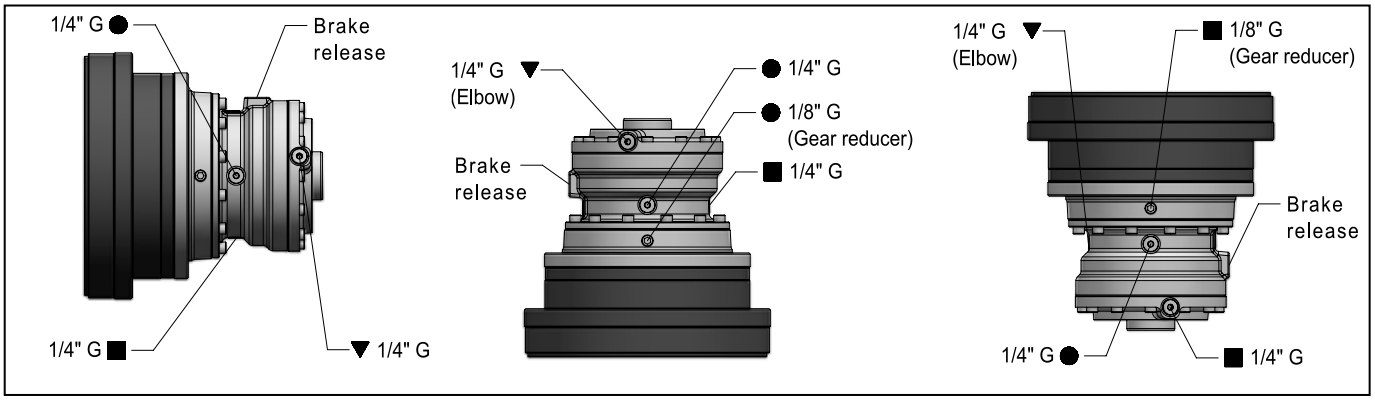
Mounting position and oil quantities

PB10 (001/002/C125/C160)



							Oil quantity		
1EL	**2EL**	**3EL**	**4EL**	**2EB**	**3EB**	**4EB**	**B5**	**V1**	**V3**
001A, 002A	001A…006A	001A…022A	001A…061A	001A…006A	001A…022A	001A…061A	0.09	0.06	0.16

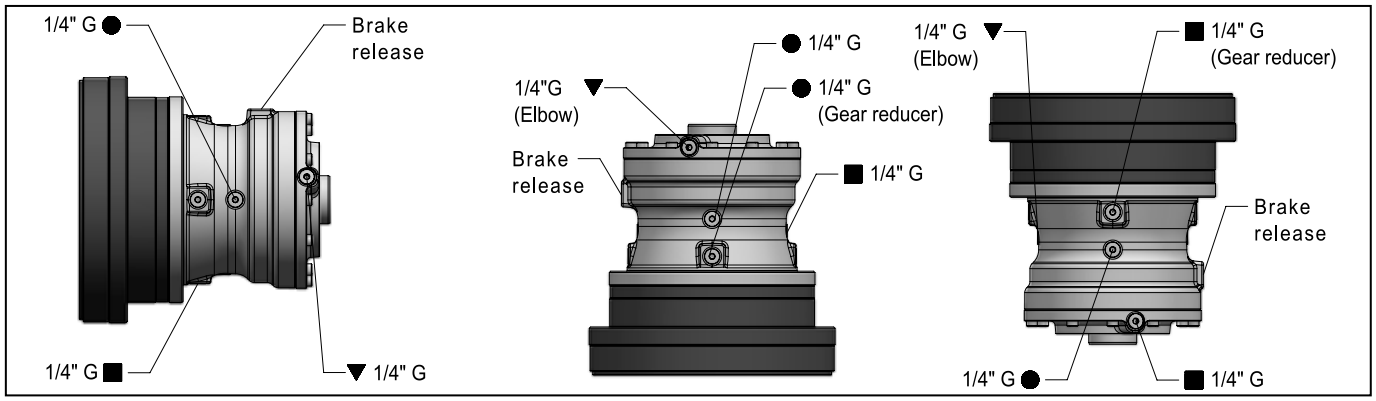
PB10 (003/004/006/C200)



							Oil quantity		
1EL	**2EL**	**3EL**	**4EL**	**2EB**	**3EB**	**4EB**	**B5**	**V1**	**V3**
003A…006A	009A…022A	030A…061A	085A…180A	009A…015A, 022A	030A…043A	085A…125A	0.09	0.06	0.16

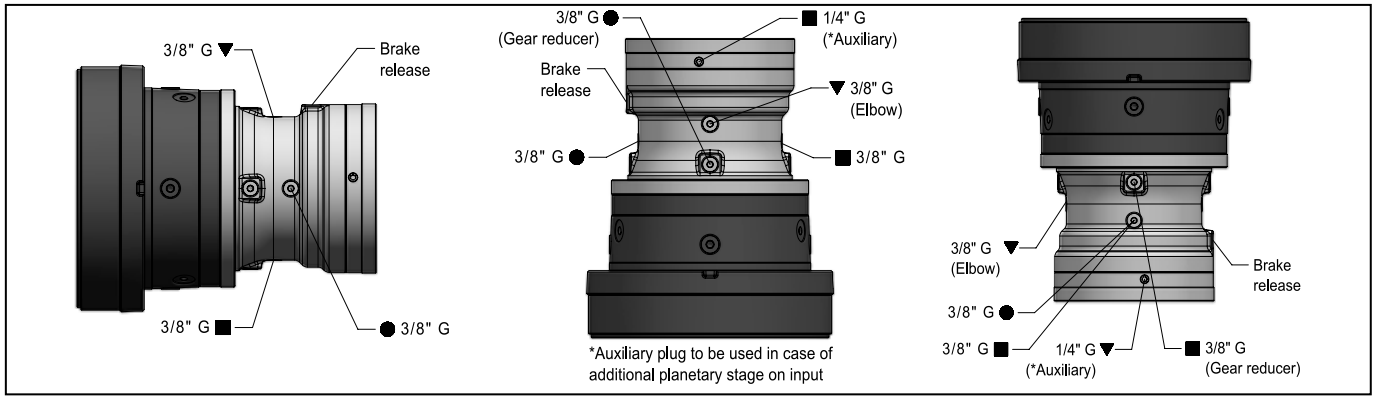
Mounting position and oil quantities

PB30 (003/004/006/C200)



							Oil quantity		
1EL	**2EL**	**3EL**	**4EL**	**2EB**	**3EB**	**4EB**	**B5**	**V1**	**V3**
003A…006A	009A…022A	030A…061A	085A…180A	009A…015A, 022A	030A…043A	085A…125A	0.36	0.18	0.67

PB90 (009/012/015/C250)



							Oil quantity		
1EL	**2EL**	**3EL**	**4EL**	**2EB**	**3EB**	**4EB**	**B5**	**V1**	**V3**
009A…015A	030A…043A	085A…125A	250A, 355A	018A, 021A, 030A	060A…085A	180A, 250A	0.48	0.24	0.90

Oil quantities [l]

For mounting position B5 the exact oil quantity ghe gear reducer is to be filled with is definitely given by the level.

For mounting positions V1, V3 consider the oil quantities stated in the tables.

Commissioning

An inadequate commissioning can damage the gear reducer, the brake and compromise the correct operation of the application.

Do not disassemble and do not modify any brake component in order not to compromise the correct operation of gear reducer / brake.

Before commissioning verify that:

- gear reducer has been correctly installed and fixed to the machine
- gear reducer and brake are correctly lubricated. (oil level and grease quantity, if foreseen).
- lubricants are suitable.
- there is no lubricant leakage from plugs / seals
- oil level, drain plugs and their relevant vent valves are easily accessible
- during operation, max temperature of brake and/or gear reducer housing never exceeds admitted temperature (95°C for products on catalog)
- brake starts when machine shaft is stopped (static conditions)
- supply tube (opening and closing) is correctly connected to brake and no oil leakage is present.

  For the supply of brake use mineral basis hydraulic oil; synthetic oils could damage and compromise the regular operation of brake.

  Connect the hydraulic circuit to drive hole present on brake, after removing the protection plug.

  Before using it, purge the air. Unscrew slightly the connector on drive hole, maintaining the pressure up to complete air leakage, then screw the connector again.
- supply pressure is sufficient to open completely the brake (higher than “opening pressure [p]” differing due to braking torque and brake type)
- during brake closure phase, the supply pressure is equal to 0 bar. **Attention, eventual residual pressure in the supply tube helps to reduce the static braking torque M_{Bstat}.**
- the drive and the possible drive valve are correctlz installed and connected to brake

Maintenance

All maintenance activities must be executed in safe conditions.

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

a) all external surfaces are clean and air passages to gear reducer and brake are free, in order that cooling remains fully effective. An accumulation of dust impedes efficient heat disposal

– oil level and deterioration degree

c) correct fastening screws tightening.

During operation, check periodically:

– vibration and noise level

– possible oil leakages

– possible pressure losses from brake supply area (possible losses from internal brake seals).

Attention. After a running period, gear reducer is subject to a light internal overpressure which may cause potentially burning liquid discharge. Therefore, before loosening whichever plug (filler plug included) wait until gear reducer has become cold. In all cases, always proceed with great care.

Oil change

Oil change of brake must be done according to the same gear reducer intervals.

Except specific cases, brake lubrication is separated from the gear reducer one, therefore it is necessary to act on the proper plugs present on brake.

Use only oil of the same type and viscosity and do not mix different oils.

It is adviced to change lubricating oil with warm brake, to avoid any deposits and to facilitate the output.

For the operations of oil drain and filling, use the specific plugs properly.

Seal change

Change the seals when disassembling or periodically checking.

ATTENTION: in case of a high increase of levels when checking lubricating oils, it could be caused by an oil leakage due to brake seal wear.

In this case it is necessary to stop gear reducer / brake and contact Rossi after sale service for repair.

Troubles: causes and corrective actions

If deviations from normal operation occur, refer to the following table. If deviations persist, consult Rossi.

Trouble	Possible cause	Corrective action
Oil leakage from seals	Seal stiffening due to long lasting storage	Clean the area and check the leakage after some hours of running
	Seal damage or wear	Consult Rossi
Multiple disc brake does not block	Residual pressure in the circuit	Verify the hydraulic circuit
	Worn discs	Consult Rossi
With running motor, gear reducer does not operate	Possible brake blocked	Verify hydraulic braking circuit
Excessive overheating	No lubricating oil	Add lubricating oil
	Disc brake does not open correctly	Verify pressure when brake opening
Multiple disc brake does not release	No pressure at brake	Verify brake connection
	Defect brake seals	Consult Rossi
Excessive vibrations	Internal trouble	Consult Rossi
Excessive noise level	Internal trouble	Consult Rossi

Dichiariazione UE di Conformità
EU Declaration of Conformity

Rossi S.p.A.
Via Emilia Ovest, 915/A
41123 Modena – ITALY
www.rossi.com

Rossi S.p.A., in qualità di fabbricante del prodotto stabilito nella Comunità (produttore), dichiaa sotto la nostra esclusiva responsabilità che l'apparecchiatura:

***Rossi S.p.A.**, as the manufacturer of the product established in the Community (producer), declares under its exclusive responsibility that the equipment:*

Riduttori e Motoridutori
Serie A, E, G, H, iFIT, EP

Gear reducers and Gearmotors
Series A, E, G, H, iFIT, EP

avente numero di matricola: **xxxxx**
costruito nell'anno: **xxxx**

*having serial number: **xxxxx***
*manufactured in the year: **xxxx***

ai quali questa dichiarazione si riferisce, soddisfa i Requisiti Essenziali di Sicurezza e Salute (RESS) ad esso applicabili definiti dalle seguenti Direttive e successive integrazioni e/o modifiche:

to which this declaration refers, satisfies Essential Health and Safety Requirements (EHSR) applicable to itself, defined by following Directives and successive integrations and/or modifications:

Direttiva 2014/34/UE: allegato II

Directive 2014/34/EU: annex II

Il soddisfacimento dei sopracitati Requisiti (RESS) è stato assicurato applicando le seguenti norme:

The satisfaction of above mentioned Requirements (EHSR) has been assured applying the following standards:

Direttiva 2014/34/UE – Apparecchiature o sistemi di protezione destinati ad essere utilizzati in atmosfere potenzialmente esplosive

- EN 1127-1: 2019 "atmosfere esplosive – parte 1: prevenzione dell'esplosione e protezione contro l'esplosione – concetti fondamentale e metodologia";
- EN ISO 80079-36: 2016 "atmosfere esplosive – parte 36: apparecchi non elettrici destinati alle atmosfere esplosive –metodo e requisiti di base";
- EN ISO 80079-37: 2016 "atmosfere esplosive – parte 37: apparecchi non elettrici destinati alle atmosfere esplosive – tipo di protezione non elettrica per sicurezza costruttiva "c", per controllo della sorgente di accensione "b", per immersione in liquido "k"".

Directive 2014/34/EU – Equipment or protective system intended for use in potentially explosive atmospheres

- *EN 1127-1: 2019 "explosive atmospheres – part 1: explosion protection and protection - basic concepts and methodology";*
- *EN ISO 80079-36: 2016 "explosive atmospheres – part 36: non-electrical equipment for explosive atmospheres - basic method and requirements";*
- *EN ISO 80079-37: 2016 "explosive atmospheres – part 37: non-electrical equipment for explosive atmospheres – non-electrical type of protection constructional safety "c", control of ignition sources "b", liquid immersion "k"".*

Ai sensi della Direttiva 2014/34/UE, l'apparecchiatura sopra menzionata riporta la seguente marcatura:

According to the Directive 2014/34/UE, above mentioned equipment reports the following marking:

II 2G Ex h IIB T3 Gb IPxx
II 2D Ex h IIIC T135°C Db IPxx **Tamb. -20/+60 °C**

Ai sensi della Direttiva 2014/34/UE, l'apparecchiatura sopra menzionata è oggetto, per gli aspetti relativi sia alla progettazione sia alla fabbricazione, del *controllo interno di fabbricazione* (Allegato VIII - Modulo A):

According to the Directive 2014/34/UE, above mentioned equipment is subject, relating to both of them design and production aspects, of internal control production (Annex VIII - Module A):

F.T. n° 2019/01.02-EX "X"

T.F. n° 2019/01.02-EX "X"

e depositato presso l'Organismo Notificato n° 0035
TÜV Rheinland Industrie Service GmbH
Am Grauen Stein - 51105 Köln – Germany

con numero di deposito: **557/Ex-Ab 3029/19.**

and deposited at the Notified Body n° 0035
TÜV Rheinland Industrie Service GmbH
Am Grauen Stein - 51105 Köln - Germany

*with deposit number: **557/Ex-Ab 3029/19.***

Modena

Group Chief Technology Officer

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