

Brevini Gearmotors

Parallel shaft helical gearboxes

Operating Instructions

BREVINI POWER TRANSMISSION S.P.A.

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1 -How To Use This Manual

Take attention to the following safety and warning signs for proper understanding and quick reference.



Electric Hazard; Can cause severe or fatal injuries.



Mechanical Hazard; Can cause severe or fatal injuries.



Likely to be Hazardous; Can cause minor or fatal injuries.



Damage Risk; Can damage gearbox or environment.



Important Information.



EC Machinery Directive:

Within terms of the EC machinery directive 2006/42/EC, the gearboxes are considered as not autonomous machine, but as a component to install in machines.

Operation is prohibited within the area of validity of the EC directive, until it has been determined that the machine, in which this product is installed, corresponds to the regulations within this directive.

The operating instructions contain important information to ensure;

- Trouble-free operation
- Fulfilment of any rights to claim under guarantee

The operating instruction must be kept close to the gearbox and must be available in case it is needed.

This operating instruction is written for D series gear units and is applicable only for D series. If any different type of gearbox is used please ask BREVINI POWER TRANSMISSION S.P.A. for the operating instructions of that type.

This instruction can be used only for standard type geared units of BREVINI POWER TRANSMISSION S.P.A. For special application and modified gear units ask BREVINI POWER TRANSMISSION S.P.A. for validity.

This manual does not cover 94/9/EC compatible gearboxes. For 94/9/EC contact BREVINI POWER TRANSMISSION S.P.A.

Operating Instructions

D Series

Type Designation




2.2- Nameplate, unit designation



Nameplate unit designation is a short abbreviation from the detailed designation

A sample name plate for D Series

		MADE IN TURKEY
Type: DR473.03-3E71M/4C-L05		
Serial N.: 100524545		
Power: 3,8 kW	Ratio: 584,15	
Speed: 2,5 rpm.	M. Pos.: M1	
Oil: ISO VG320 (Mineral Oil)	Oil Qty : 6.4 lt.	

Abbreviations:

Serial N. : Serial Number

M.Pos. : Mounting Position

Type Designation;

DR473 - 3E71M/4C
 Type Motor Size

DR- With motor

DT- With input shaft

DV- With Motor and IEC Flange

DN- IEC Flange without Motor

Operating Instructions

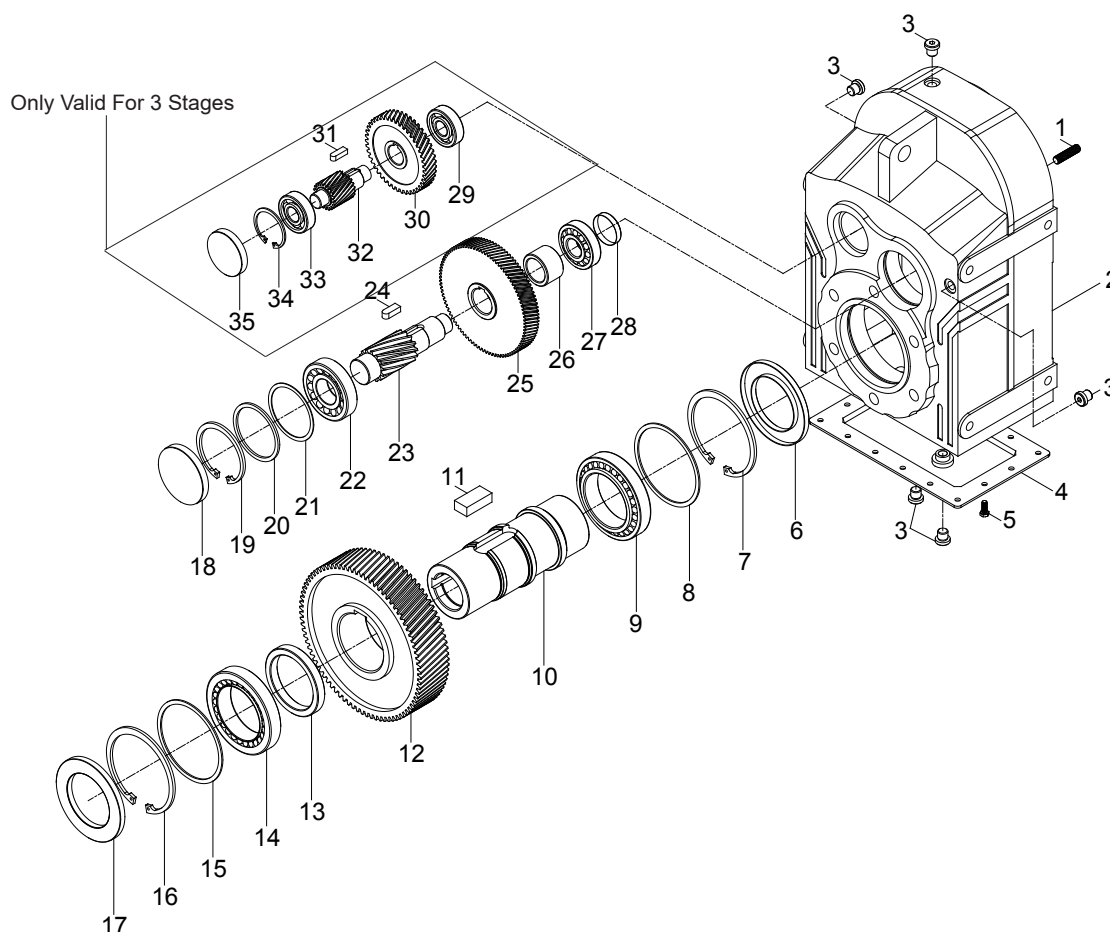
D Series

Part Designation



3- Part List of Standard Type Gear Units

3.1- D..00... Types for 2 and 3 Staged Gear Units



Standard D...00... type basic part diagram. Parts may differ for special applications.

Standard Part List

1- Pin Screw	9- Bearing	17- Seal	25- Gear	33- Bearing
2- Housing	10- Hollow Shaft	18- Closing Cap	26- Spacer	34- Circlip
3- Plug	11- Key	19- Circlip	27- Bearing	35- Closing Cap
4- Cover Plate	12- Gear	20- Spacer	28- Spacer	
5- Screw	13- Spacer	21- Spacer	29- Bearing	
6- Oil Seal	14- Bearing	22- Bearing	30- Gear	
7- Circlip	15- Spacer	23- Shaft Gear	31- Key	
8- Spacer	16- Circlip	24- Key	32- Gear	

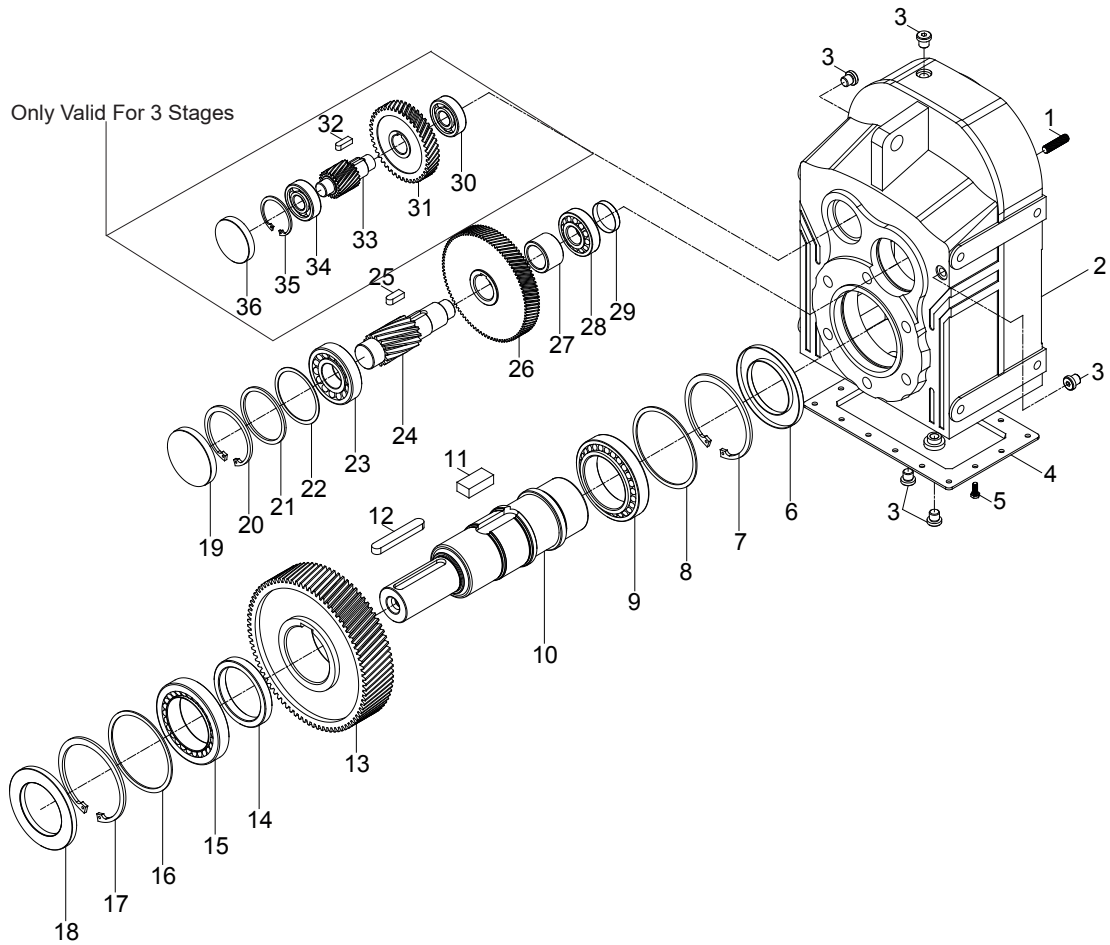
Operating Instructions

D Series

Part Designation



3.2- D..01... Types for 2 and 3 Staged Gear Units



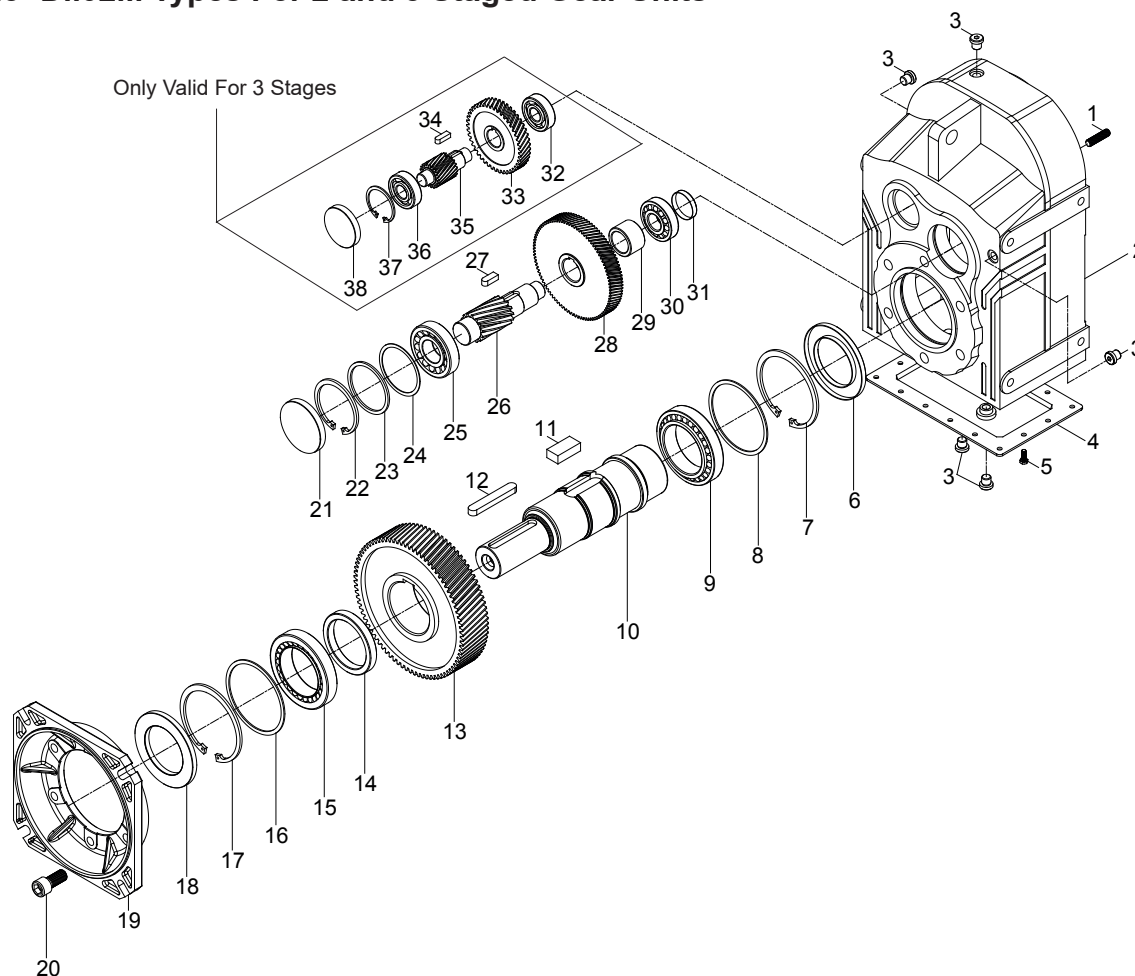
Standard D...01... type basic part diagram. Parts may differ for special applications.

Standard Part List

1- Pin Screw	9- Bearing	17- Circlip	25- Key	33- Shaft Gear
2- Housing	10- Output Shaft	18- Oil Seal	26- Gear	34- Bearing
3- Plug	11- Key	19- Closing Cap	27- Spacer	35- Circlip
4- Cover Plate	12- Key	20- Circlip	28- Bearing	36- Closing Cap
5- Bolt	13- Gear	21- Spacer	29- Spacer	
6- Oil Seal	14- Spacer	22- Spacer	30- Bearing	
7- Circlip	15- Bearing	23- Bearing	31- Gear	
8- Bearing	16- Spacer	24- Shaft Gear	32- Key	



3.3- D..02... Types For 2 and 3 Staged Gear Units



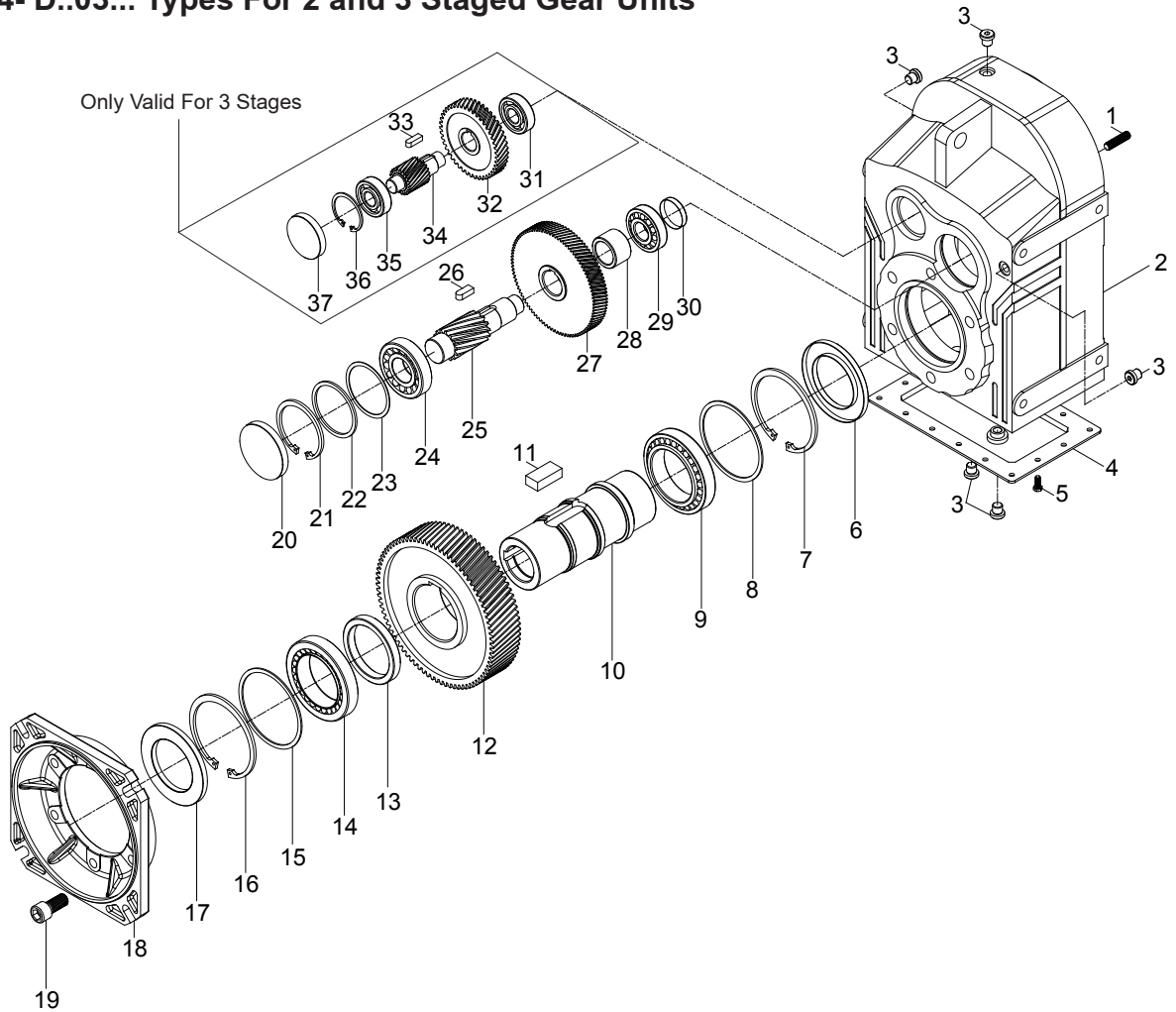
Standard D...02... type basic part diagram. Parts may differ for special applications.

Standard Part List

1- Pin Screw	10- Solid Shaft	19- Flange	28- Gear	37- Circlips
2- Housing	11- Key	20- Bolt	29- Spacer	38- Closing Cap
3- Plug	12- Key	21- Closing Cap	30- Bearing	
4- Cover Plate	13- Gear	22- Circlip	31- Spacer	
5- Bolt	14- Spacer	23- Spacer	32- Bearing	
6- Oil Seal	15- Bearing	24- Spacer	33- Gear	
7- Circlip	16- Spacer	25- Bearing	34- Key	
8- Spacer	17- Circlip	26- Shaft Gear	35- Shaft Gear	
9- Bearing	18- Seal	27- Key	36- Bearing	



3.4- D..03... Types For 2 and 3 Staged Gear Units



Standard D...03... type basic part diagram. Parts may differ for special applications.

Standard Part List

1- Pin Screw	9- Bearing	17- Oil Seal	25- Shaft Gear	33- Key
2- Housing	10- Hollow Output Shaft	18- Flange	26- Key	34- Gear
3- Plug	11- Key	19- Bolt	27- Gear	35- Bearing
4- Cover Plate	12- Gear	20- Closing Cap	28- Spacer	36- Circlip
5- Bolt	13- Spacer	21- Circlip	29- Bearing	37- Closing Cap
6- Oil Seal	14- Bearing	22- Spacer	30- Spacer	
7- Circlip	15- Spacer	23- Spacer	31- Bearing	
8- Spacer	16- Circlip	24- Bearing	32- Gear	

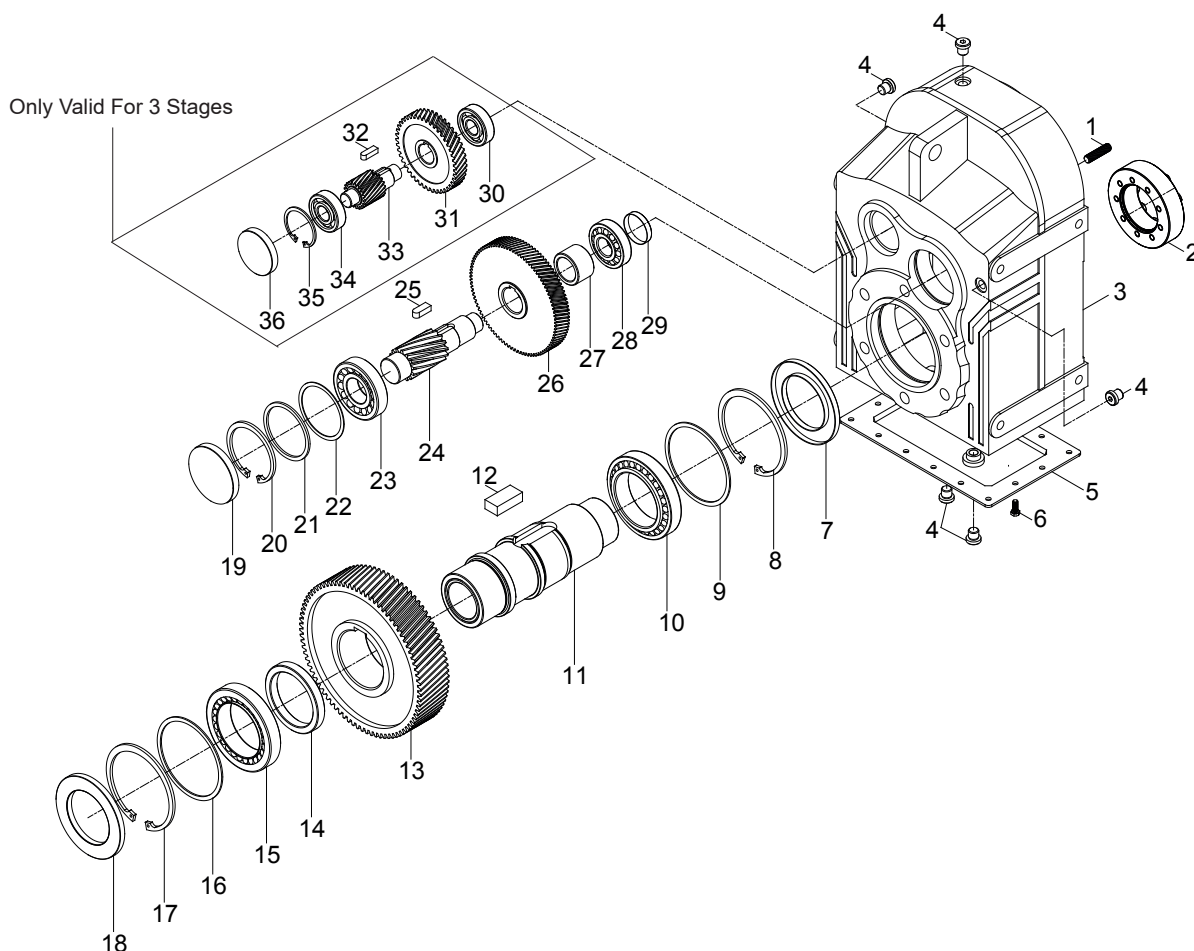
Operating Instructions

D Series

Part Designation



3.5- D...0S... Types For 2 and 3 Staged Gear Units



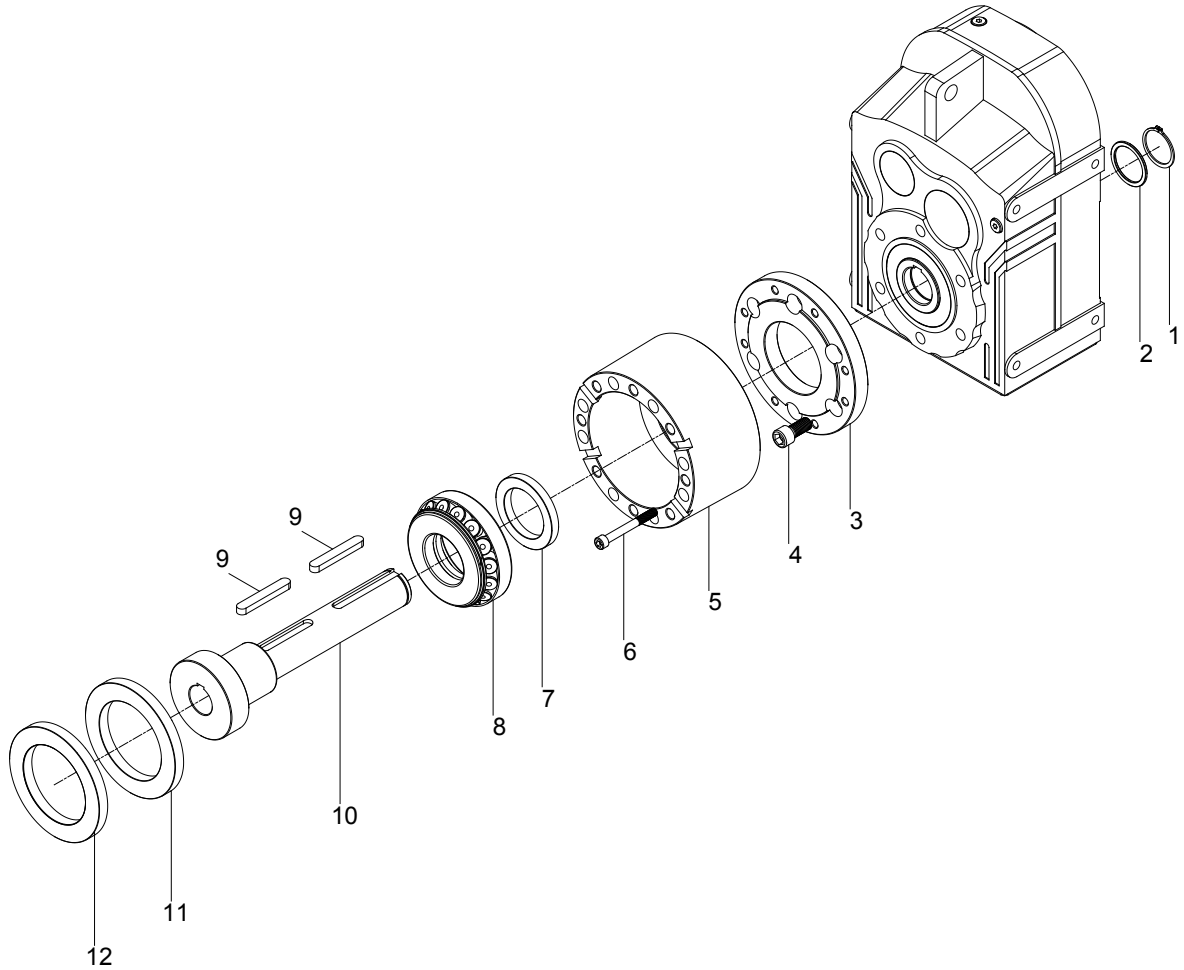
Standard D...0S... type basic part diagram. Parts may differ for special applications.

Standard Part List

1- Pin Screw	9- Spacer	17- Circlip	25- Key	33- Shaft Gear
2- Shrink Disk	10- Bearing	18- Oil Seal	26- Gear	34- Bearing
3- Housing	11- Output shaft	19- Closing Cap	27- Spacer	35- Circlip
4- Plug	12- Key	20- Circlip	28- Bearing	36- Closing Cap
5- Cover Plate	13- Gear	21- Spacer	29- Spacer	
6- Bolt	14- Spacer	22- Spacer	30- Bearing	
7- Oil Seal	15- Bearing	23- Bearing	31- Gear	
8- Circlip	16- Spacer	24- Shaft Gear	32- Key	



3.6- D...0E... Types For 3 Staged Gear Units



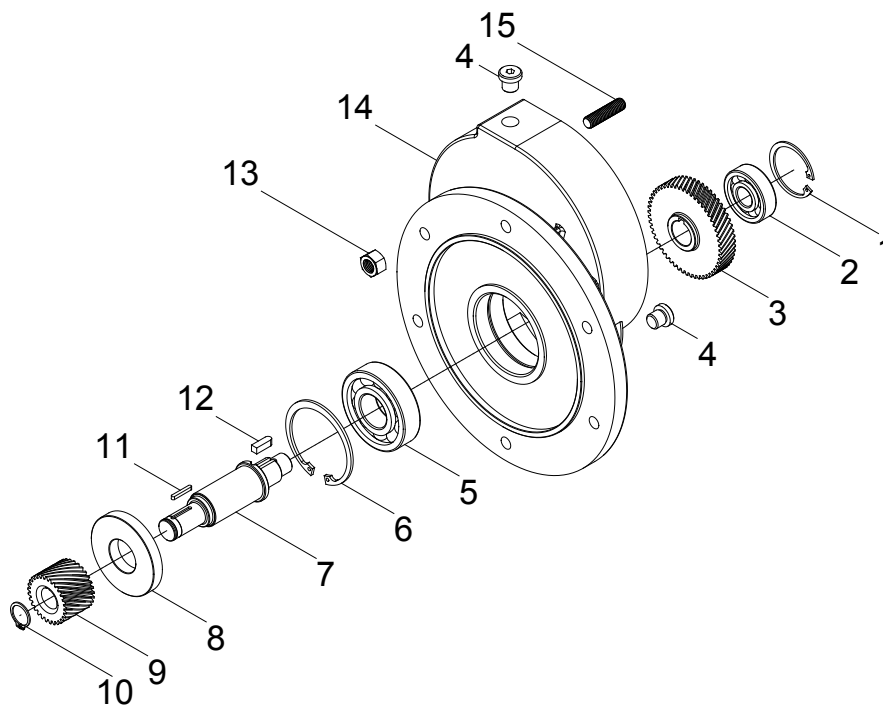
Standard D...0E... type basic part diagram. Parts may differ for special applications.

Standard Part List

1- Circlip	5- Extruder Neck	9- Key
2- Spacer	6- Bolt	10- Hollow Shaft Output
3- Flange	7- Seal	11- Spacer
4- Bolt	8- Bearing	12- Seal



3.7- D..4 Series Additional Stage for 4 Stage Types



Standard D..4 type additional stage basic part diagram. Parts may differ for special applications.

Parts List

1- Circlips	6- Circlips	11- Key
2- Bearing	7- Shaft	12- Key
3- Gear	8- Seal	13- Bolt
4- Oil plug	9- Gear	14- Additional Housing
5- Bearing	10- Circlips	15- Screw Pin

Operating Instructions

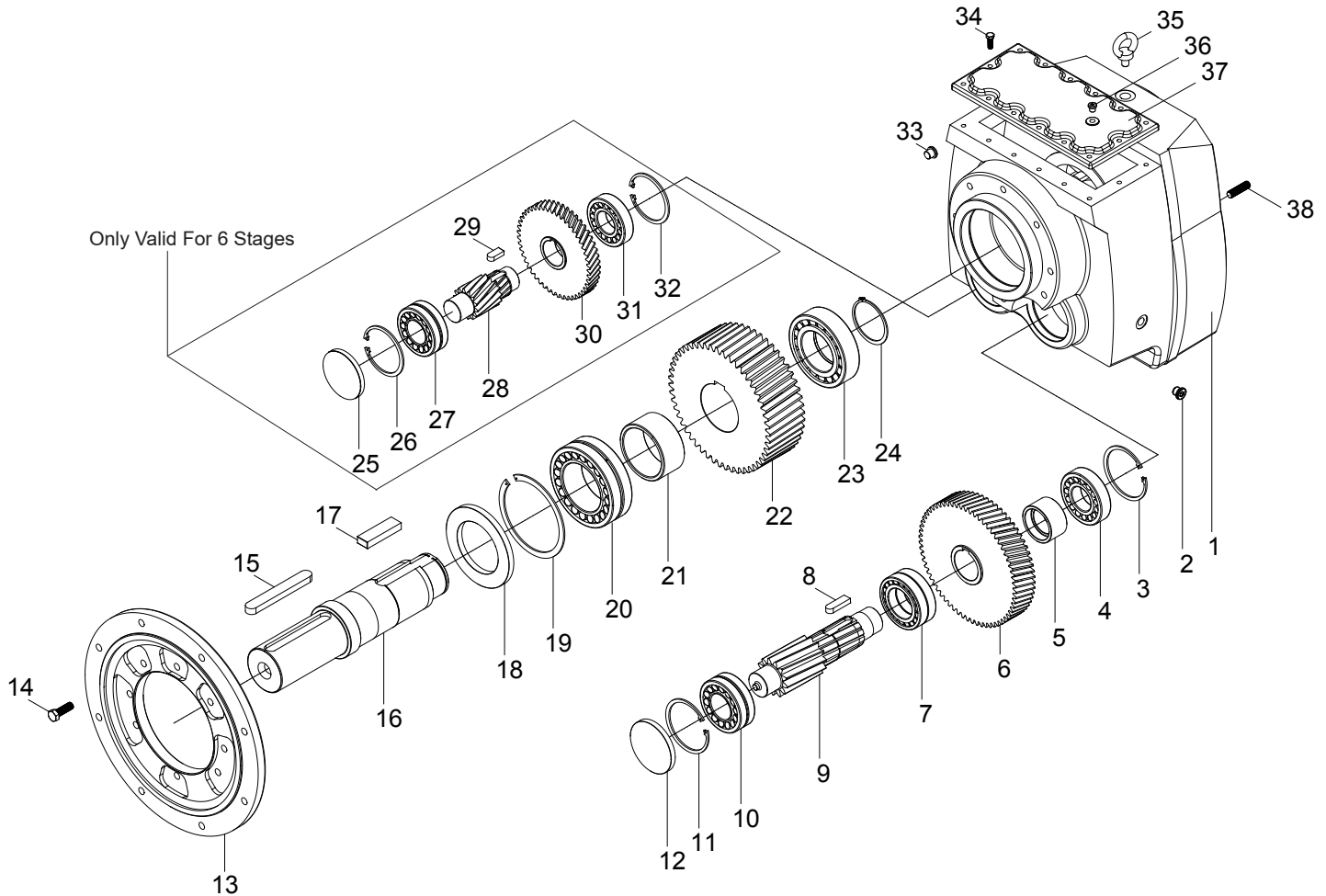
D Series

Part Designation



3.8- D Series 5-6 Stages Types

N Type 2 and 3 stages are additional housing of D series 5 stages and 6 stages of gear units.



Standard N type 3 stages basic part diagram. Parts may differ for special applications.

Parts List

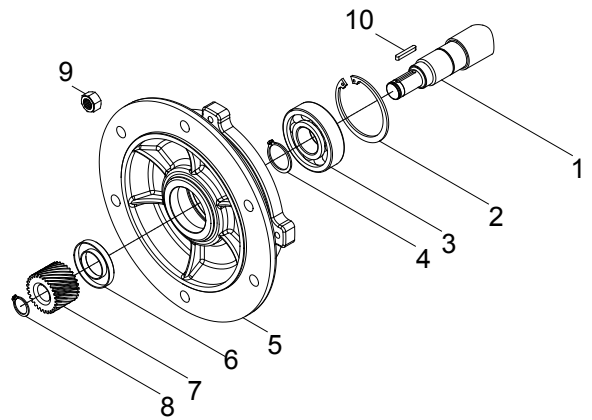
1- Housing	9- Gear	17- Key	25- Cover	33- Oil plug
2- Oil plug	10- Bearing	18- Seal	26- Circlips	34- Bolt
3- Circlips	11- Circlips	19- Circlips	27- Bearing	35- Eye bolt
4- Bearing	12- Cover	20- Bearing	28- Gear	36- Oil plug
5- Spacer	13- Output Flange	21- Spacer	29- Key	37- Top side cover
6- Gear	14- Bolt	22- Gear	30- Gear	38- Screw Pin
7- Bearing	15- Key	23- Bearing	31- Bearing	
8- Key	16- Output Shaft	24- Circlips	32- Circlips	



3.9- D Series Motor Flange for Direct Coupled Types

Parts List

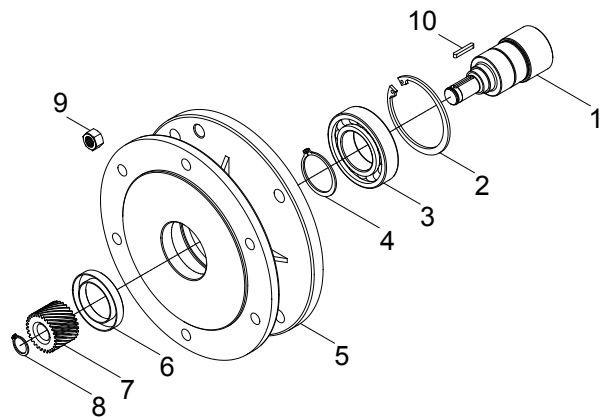
1- Shaft	6- Key
2- Circlips	7- Gear
3- Bearing	8- Circlips
4- Circlips	9- Nut
5- Flange	10- Key



3.10- DN..., DV...Types B5, B14 Motor Flange

Parts List

1- Shaft	6- Seal
2- Circlips	7- Gear
3- Bearing	8- Circlips
4- Circlips	9- Nut
5- B5 / B14 Flange	10- Key

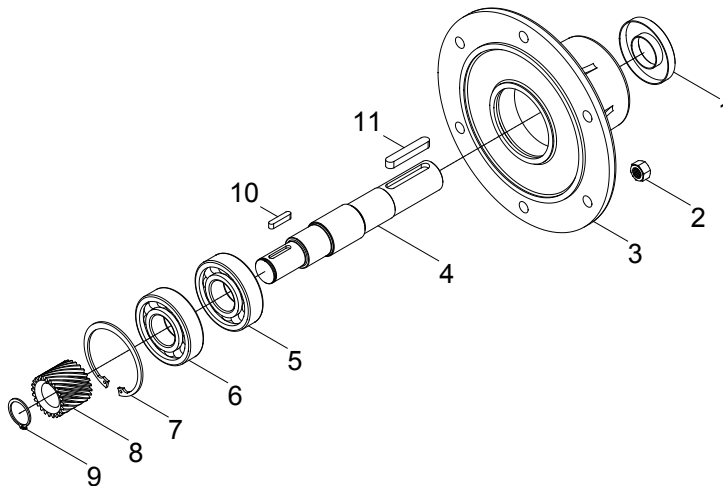




3.11- DT... Types Input Bearing Housing with Solid Input Shaft

Parts List

1- Seal	7- Circlips
2- Nut	8- Gear
3- Flange	9- Circlips
4- Shaft	10- Key
5- Bearing	11- Key
6- Bearing	





4- Safety

4.1- Intended Use

The gear reducer is designed for use in industrial machines. Please refer to our catalogue or our web page for the maximum permitted torques and speeds. The most important maximum permitted values are indicated on the nameplate of the product. But the whole data can be found on our product catalogues. Using the product out of the product catalogue / nameplate's permitted ranges will cancel the warranty/manufacturer declaration and BREVINI POWER TRANSMISSION S.P.A. will not take any responsibility.

The gear units are intended for industrial machines and may only be used in accordance with the information provided in this manual the product catalogue and the nameplate of the gearbox. They comply with the applicable standards and regulations and meet the requirements of the directive 2006/42/EC. The gearbox must be started up, maintained and operated according this manual. The gearbox must be incorporated with 2006/42/EC confirming parts/machines.



A motor connected to the gear unit is only allowed to be operated in the frequency entries so that the data provided on nameplate/catalogue of the gear unit is not exceeded and in accordance with the nameplate/catalogue. The speed range will be provided on the nameplate if BREVINI POWER TRANSMISSION S.P.A. is informed that the gear unit will be used with frequency inverter. If not informed the nameplate will have a single fixed speed and only this speed is allowed.

The electric motor and frequency inverter must be in accordance with 2006/42/EC.



If the gear units input is used with variable speed gear unit, this must be informed to BREVINI POWER TRANSMISSION S.P.A. before ordering and on the nameplate the allowed maximum and minimum speeds (speed range) will be provided. If not mentioned by ordering the gear units speed will be a fixed single input speed and only this speed is allowed.



If the gear unit will be driven by belt / coupling / chain drive etc. the gear unit is only allowed to be used according the nameplate/catalogue entries. Different speed, higher motor power, higher radial/axial loads etc. than nameplate/catalogue is not allowed.



The ambient temperature must be between +5 - +40 °C and no abrasive media must attack the paint and seals. If different working conditions this must be informed to BREVINI POWER TRANSMISSION S.P.A. before ordering.

The gearbox maintenance (oil change / check) must be done according this manual.

4.2- Improper Use



Every usage which exceeds the limits stated above, the nameplate and catalogue of the product (especially higher torques and speeds) is not compliant with the regulations, and thus prohibited.

The operation of the gear reducer is prohibited if;

- It was not mounted/installed according to regulations and this manual
- The gear reducer is very soiled
- It is operated without lubricant
- It is operated out of the permitted values provided on catalogues and/or nameplate.



4.3- Safety Instructions

4.3.1- General Safety Instructions

4.3.1.1- Working on the gear reducer



- Inappropriately executed work can lead to injury or damage.

Make sure that the gear reducer is only installed, maintained and dismantled by trained technicians.



- Foreign bodies spinning through the air can cause grave injury.

Before putting the gear reducer into operation, check that there are no foreign bodies or tools near the gear reducer

4.3.1.2- Operation



- Touching hot surfaces can lead to burns.

Do not touch the gear reducer if their operation temperatures are too high, or use suitable safety equipment like gloves.



-Rotating machinery can lead to injuries. There is danger of being trapped or pulled in!

Keep a sufficient distance and make safeguarding to rotating machinery. See relevant norms EN349+A1, EN13857.

4.3.1.3- Maintenance



-An unintentional start of the machine during maintenance work can lead to serious accidents.

Make sure no one can start the machine while you are working on it.



- Even a brief running of the machine during maintenance work can lead to accidents if the safety devices are not operating.

Make sure that all safety devices are mounted and active.

4.3.1.4- Lubricant



- Extended, intensive contact with oils can lead to skin irritations.

Avoid extended contact with oil, and clean oil off skin thoroughly.



- Hot oil can cause scalding.

When changing oil, protect yourself against contacting hot oil.

4.3.1.5- Ambient Conditions



- Standard gearboxes are allowed to work in ambient temperatures between +5 to +40 °C unless differently specified on the nameplate. Using the gear unit out of this range can cause damage to the gear unit or environment. Over +40 °C ambient conditions the gear unit surface temp could be so high causing burns when touched.



-If the gear unit will be used in outdoor applications the gear unit must be prevented from rain snow and dust. Entering substances inside the gear unit from seals can damage the gear unit. Observe the safety instructions for outdoor use EN12100:2010



4.4- Tightening Torques

All screwed connections for which a tightening torque is specified, must on principle be tightened with a calibrated torque wrench and checked. Use the following torques for the threaded bores over the gear unit housing. For connecting elements refer to the mechanical installation part.

Bolt Size	Class	Tightening Torque [Nm]
M8	8.8	23
M10	8.8	43
M12	8.8	77
M16	8.8	190
M20	8.8	370
M24	8.8	640

4.5- Case of Fire

The gear reducer itself is not combustible. However, it usually contains a synthetic or mineral gear oil.

Please observe the following if the gear reducer is situated in a burning environment

4.5.1- Suitable extinguishing agents, Protective equipment

Always keep suitable extinguishing, protective equipment like carbon dioxide, powder, foam, fog easily accessible around the gear unit.



-High temperature produce irritating steam.

Use a protective breathing apparatuses.



4.5.2- Unsuitable extinguishing agents

Do not spray with water!



5 -Thinks to Check Before the Gear Unit or Geared Motor is Installed



If geared motors are used, please also refer to the manual of the motor manufacturer.

Before you install the gearbox you have to be sure that the gearbox is arrived with the all necessary equipment and without damage. Points to take into consideration before you start to install the unit;

- You have received the correct operation manual of the your product.
- The gearbox and all its parts are transported without damage.
- The gearbox is stored correctly according the instructions in this manual
- You have the latest product catalogue or you have access to our web page

5.1- Transportation

When the goods arrive, first check for any damage. If some damage observed, immediately contact the transport company and inform about the damage. Contact BREVINI POWER TRANSMISSION S.P.A. for the damage and do not start to install the unit until it is agreed that the damage has no affect of operation.



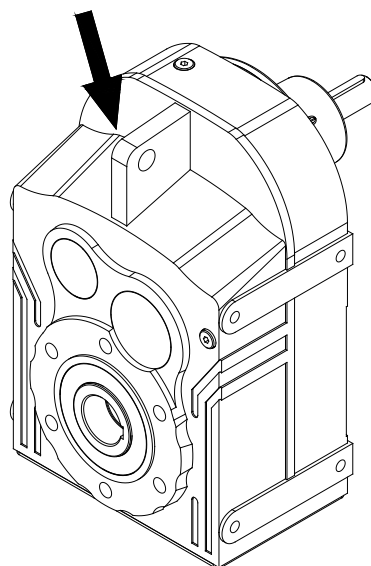
Use the supplied eyebolts or lifting holes for lifting up the gear unit. The eyebolts are capable to carry the weight of gearboxes only. Do not hang additional loads. Use suitable hoisting equipment which is capable to hold the gear units weight. Refer to the catalogue for various types weights. See drawing bellow for hoisting point.



Do not stay beneath / under the lifting/hoisting equipment which may cause serious injuries by falling down objects, accidental movements, unexpected accidents.



Falling or hard placement can damage the gear unit.
Only use hoisting and securing equipment which is permitted for the size / weight of your gear unit.
Ensure that the load is slowly and carefully handled and placed.





5.2- Storage

If the geared unit or geared motor will be stored up to 3 years refer to the following instructions;

With Packing;

-Use corrosion protection oil for the output shaft and connection surfaces like flange surface or foot assembling surface. Seal the unit in a plastic wrap and pack it in container. A moisture indicator should be placed around the container to observe the moisture. Relative atmospheric humidity should not exceed 50%. The container should be kept under roof which protects from snow and rain. Under this condition the gear unit can be stored up to 3 year with regular check. The ambient temperature should be between -5 to 60 °C.

Without Packing;

-Use protection oil for the output shaft and connection surfaces like flange surface or foot assembling surface. If no packing is used and the gearbox is stored without packing, the ambient temperature should be between 5 to 60 °C. The gearbox must be kept under enclosed roof with constant temperature and constant humidity not exceeding 50%. The storage should be free of dust and dirt and ventilated with filter. If the gearbox is stored without packing it is recommended not to store more than 2 years and regular check during this time is recommended.

If stored in open protect against insect damage.



6- Installing The Gear Unit

6.1- Before you start;

- Observe the gear unit for damages of storage or transportation. If any damage please contact BREVINI POWER TRANSMISSION S.P.A.
- Be sure that you have all the equipment necessary for installing like; Spanners, torque wrench, shims and distance rings, fixing devices for input and output elements, lubricant, bolt adhesive etc.



- This manual is not for 94/9/EC (ATEX) conforming gear units. For 94/9/EC conforming gear units refer to the ATEX range manual. ATEX conforming gear units have name plates indicating the zone and the temperature class and are different from standard type geared units. Therefore Standard units can not be installed on Potentially explosive atmospheres.

6.2- Check the shaft dimensions to fit;

Type	Hollow Shaft Diameter	Hollow Shaft Tolerance (H8)	Output Shaft Diameter	Output Shaft Tolerance (DIN748) Up to 50mm k6 Over 50mm m6	Flange Centering Shoulder Diameter	Centering Shoulder Tolerance (g6)
D...172/173...	30	+0.02 0	30	+0.02 0	80	-0,01 -0,03
D...272/273...	35	+0.03 0	35	+0.02 0	86	-0,02 -0,04
D...282/283...	40	+0.03 0	40	+0.02 0	110	-0,02 -0,04
D...372/373...	45	+0.03 0	40	+0.02 0	110	-0,02 -0,04
D...472/473...	50	+0.03 0	50	+0.02 0	130	-0,02 -0,04
D...572/573...	60	+0.03 0	60	+0.03 +0.01	180	-0,02 -0,05
D...672/673...	70	+0.03 0	70	+0.03 +0.01	180	-0,02 -0,05
D...772/773...	90	+0.04 0	90	+0.04 +0.02	230	-0,02 -0,05
D...872/873...	110	+0.04 0	110	+0.04 +0.02	250	-0,02 -0,05
D...972/973...	120	+0.04 0	120	+0.04 +0.02	300	-0,02 -0,05

6.3- Check the ambient temperature;

The ambient temperature must be between +5 °C to +40 °C for standard type gear units. If different contact BREVINI POWER TRANSMISSION S.P.A. for special solutions.

6.4- Check the voltage supply;

The standard geared motors are supplied with 230/400 V 50/60 Hz up to 3 kW including 3 kW and 400/690 V 50/60 Hz over 3 kW and is indicated on the motors name plate unless it is differently ordered.



In case of only gear unit is supplied from BREVINI POWER TRANSMISSION S.P.A. please observe the name plate of the electric motor and the instructions of the supplier. Check the basic electric connection diagrams below. Use experienced electric technician.



Using wrong connection or voltage can damage the electric motor or environment.

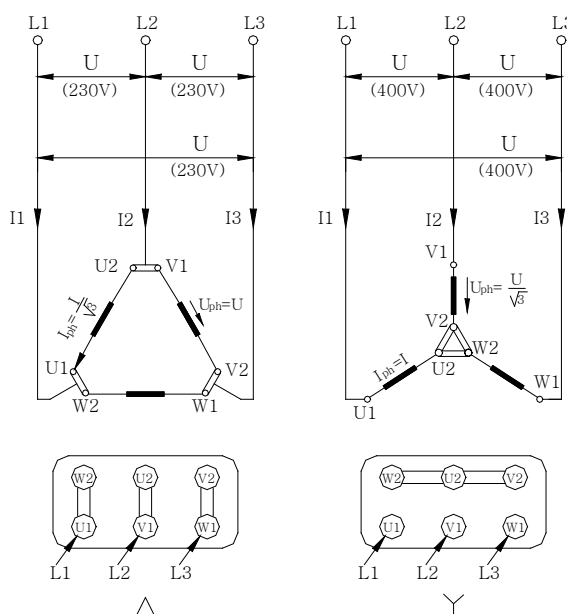
The following wiring diagram is for standard 230/400 V 50 Hz AC electric motors. For different voltages please contact BREVINI POWER TRANSMISSION S.P.A. For gear units supplied without motor, refer to the motor manufacturers user manual.

The electric connection must be done by experienced electric technician.

The gearbox, the motor and the brake must be grounded to prevent potential differences of earth and gearbox/motor.

Pole Number	Nominal Powers at 400V, 50Hz	
	230V (D) / 400 V (Y)	400V (D)
2 or 4	≤ 3 kW	≥ 4 kW
6	≤ 2,2 kW	≥ 3 kW
8	≤ 1,5 kW	≥ 2,2 kW
Starting Principle	Direct	Direct or Y/D

Basic motor connection wiring diagram



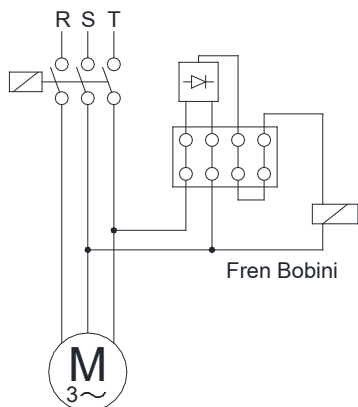


Standard type brakes basic wiring diagram

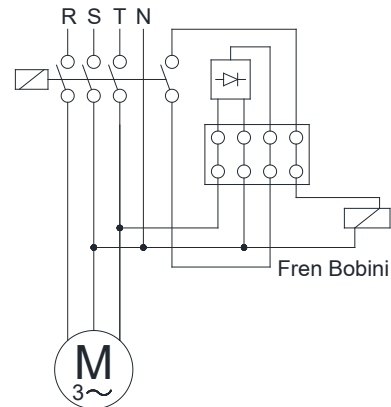


The electric connection must be done by experienced electric technician.
The gearbox and the motor must be grounded to prevent potential differences of earth and gearbox/motor.

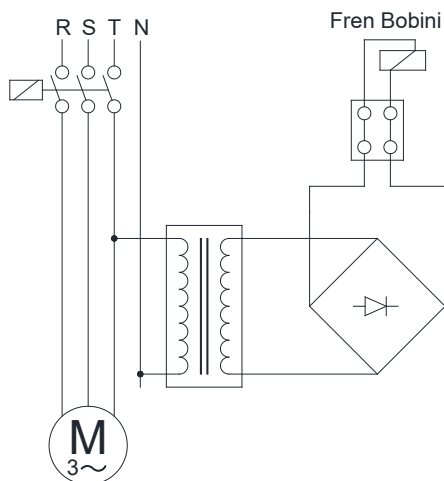
Gecikmeli Frenleme / Delayed Running Brake / Verspätete Bremsung
 (220 V)



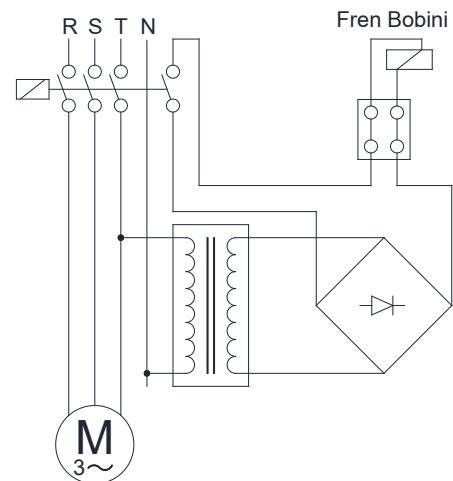
Ani Frenleme / Sudden Brake / Plötzliche Bremsung
 (220 V)



Gecikmeli Frenleme / Delayed Running Brake / Verspätete Bremsung
 (24 V)



Ani Frenleme / Sudden Brake / Plötzliche Bremsung
 (24 V)





6.5- Check the mounting position;

The mounting position must be in accordance with the mounting position mentioned on the name plate. If different please contact BREVINI POWER TRANSMISSION S.P.A. for possibilities of using in a different mounting position. Refer to the mounting positions and oil quantities on this manual and adjust the oil level accordingly with the recommended oil types given on this manual.



Do not mix synthetic oils with mineral oils which can cause serious damage on the gear unit.

6.6- Use of breather plug;

Breather plugs are not needed for D series under normal ambient and working conditions (Up to 30 °C ambient temperature and up to 8 hours per day) . If heavy ambient conditions and long time working hours then breather plug are recommended by BREVINI POWER TRANSMISSION S.P.A. and delivered with the gearbox together. Replace the breather plug with the most top plug according to your mounting position.



Some plug positions are not machined according mounting position. If no mounting position is mentioned by ordering, the standard M1 position plugs are machined.

6.7- Check the oil level ;

On the mounting position tables the oil level plug is shown. Please refer to those tables and be sure that the oil level is correct according the mounting position by screwing half way out the level plug and see if oil comes out from that plug. If oil comes out tighten the plug again. If no oil comes out take out the filling plug and add oil until oil comes out from the level plug and tighten both plugs after finish. Be sure you are using the correct oil mentioned on the oil tables on this manual.



Do not mix synthetic oils with mineral which can cause serious damage on the gear unit.

6.8- Check shaft ends and mounting faces;

Before you start to installing be sure that all the connection elements are free of oil and dust. The output shaft may be protected by anti-corrosion oil. Please remove this using available solvents on your market. By using this do not touch sealing lips or painting of the housing.

6.9- Cover abrasive ambient;

If the gear unit will be placed on a abrasive ambient be sure that the output seals are covered so that no abrasive material, chemicals or water touches the seals. Any pressure coming from outside over the seals can cause that the out staying substances to enter the gearbox and cause serious damage to the gear unit. If pressure or abrasive material can not be prevented from coming over the sealing, contact BREVINI POWER TRANSMISSION S.P.A. for solutions.



Abrasive material, chemicals, water, positive or negative pressure exceeding 0,2 bar can affect or damage the sealing lip or output shaft. Inside entering substances from the seals can cause serious damage to the gear unit.



6.10- Check accessibility to filling, breather and drain plugs;

The filling, breather and drain plugs must be freely accessible for further checking and service.

7- Mechanical Installation

The gear unit can only be installed using the supplied connection points like foot and flange assembling points.



To install the gear unit without the supplied connection points can cause serious injuries by loosening or braking the gear unit. Even the gear unit is installed totally correctly according this manual, be sure that no one will be harmed by accidentally brake downs or loosening.

The mounting plate must be rigid enough not allowing torsions, flat enough to prevent strains by tightening the bolts and stable enough not allowing vibrations. By using chain drives this becomes much more important because of the polygon effect on chain drives. According to your connection elements the maximal permitted radial and axial load of the gear unit must be in accordance with your application. Check the product catalogue for permitted radial loads and calculation.



If the output or input shaft is overloaded by radial or axial loads it can cause serious damage to the gear unit.

Secure the gear unit using 8.8 or higher quality bolts.



Cover all the turning parts from human entering or touching. Turning parts can cause severe or fatal injuries.

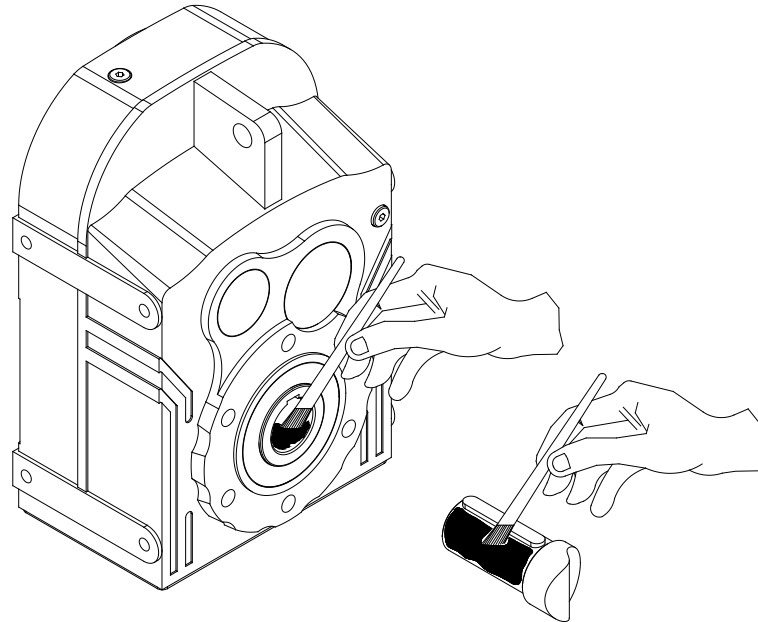


For different kind of basic installations refer to the following illustrations.

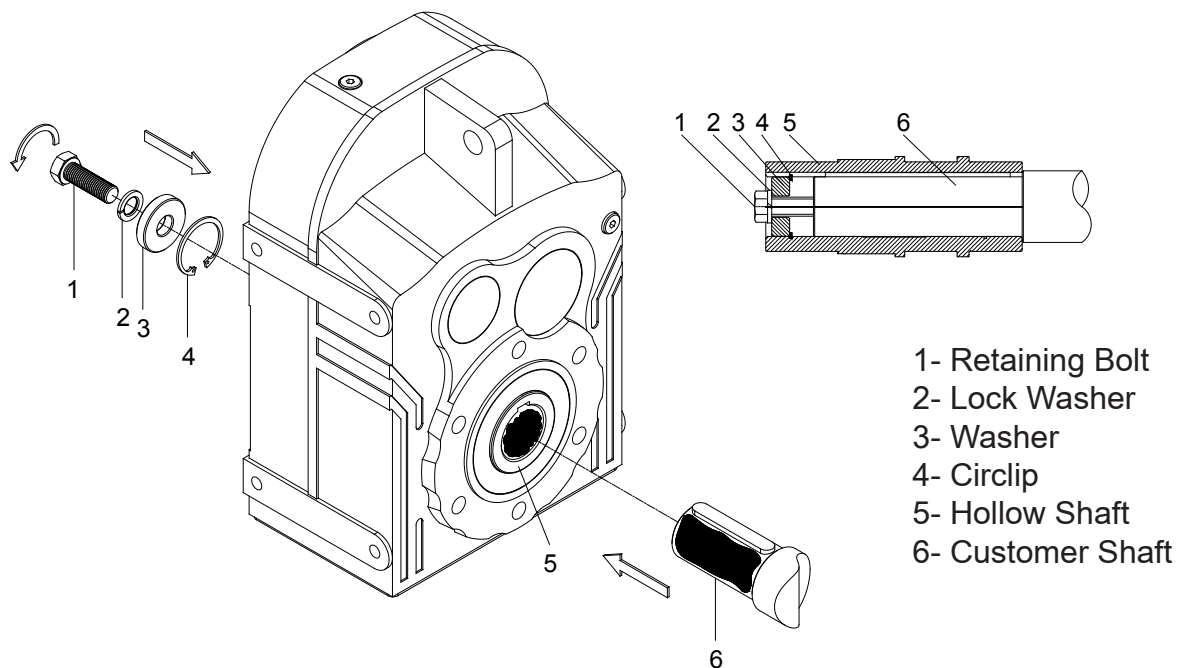


7.1- Installing customer shaft with shoulder

7.1.1- Use anti-seize assembling paste available on your market. Use a brush to apply the paste.



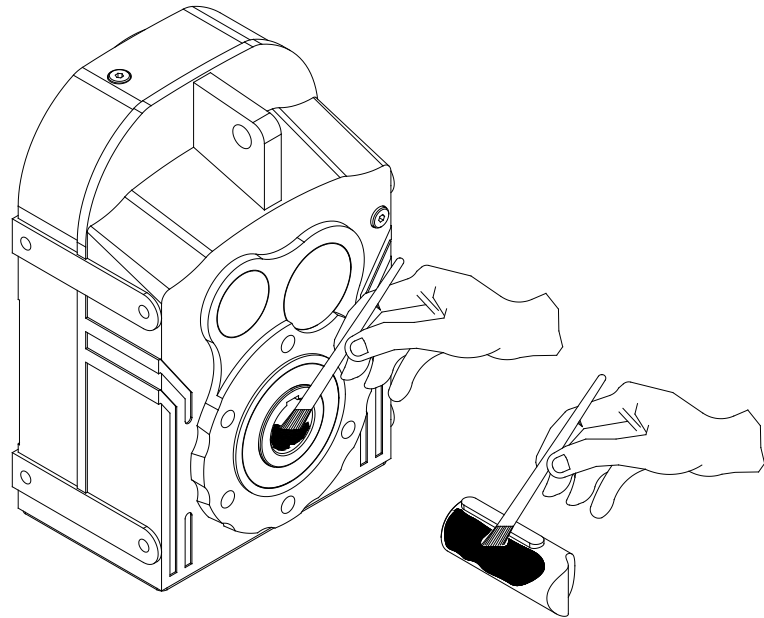
7.1.2 -Fasten the bolt as shown below.



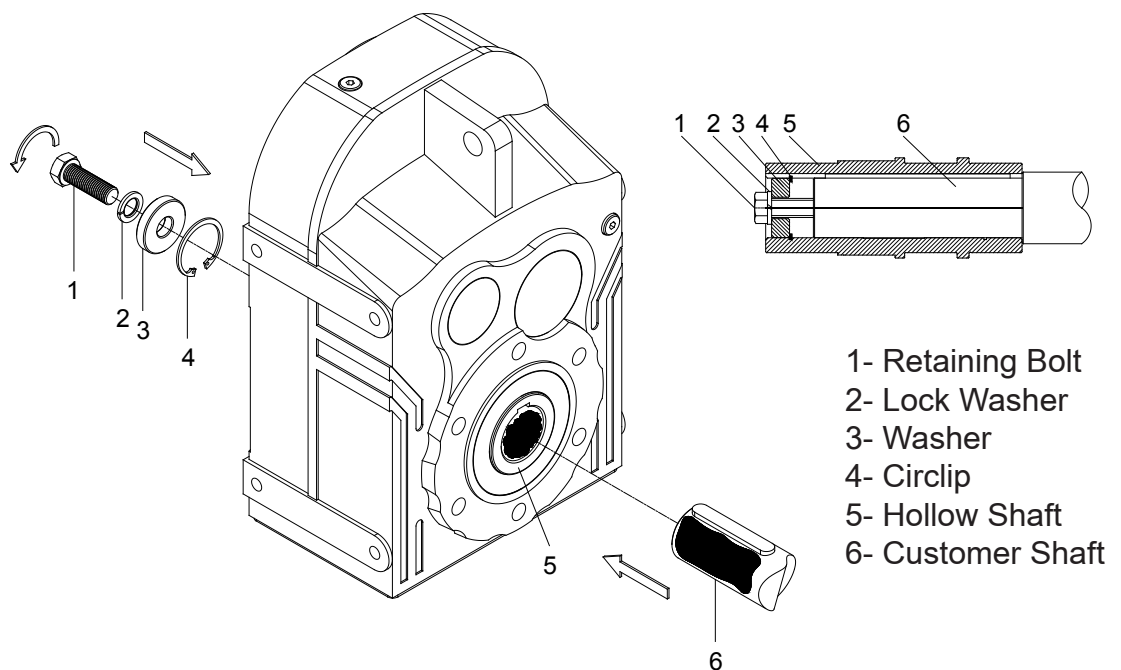


7.2- Installing customer shaft without shoulder

7.2.1- Use anti-seize mounting paste available on your market. Use a brush to apply the paste.



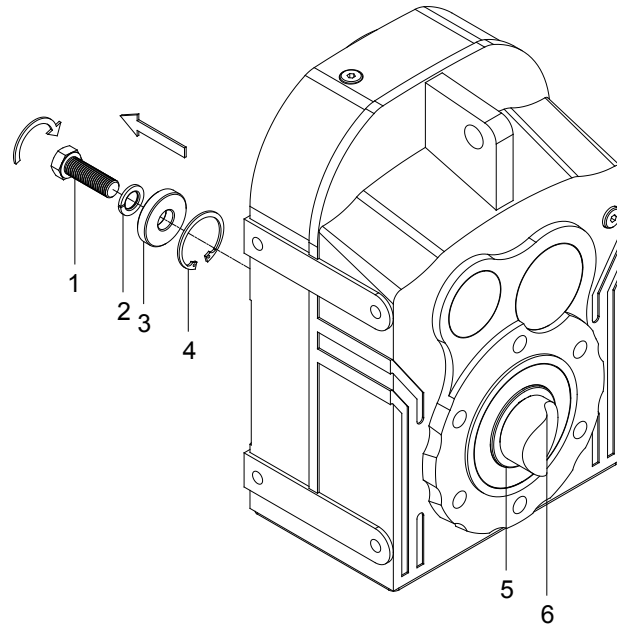
7.2.2 -Fasten the bold as shown below.



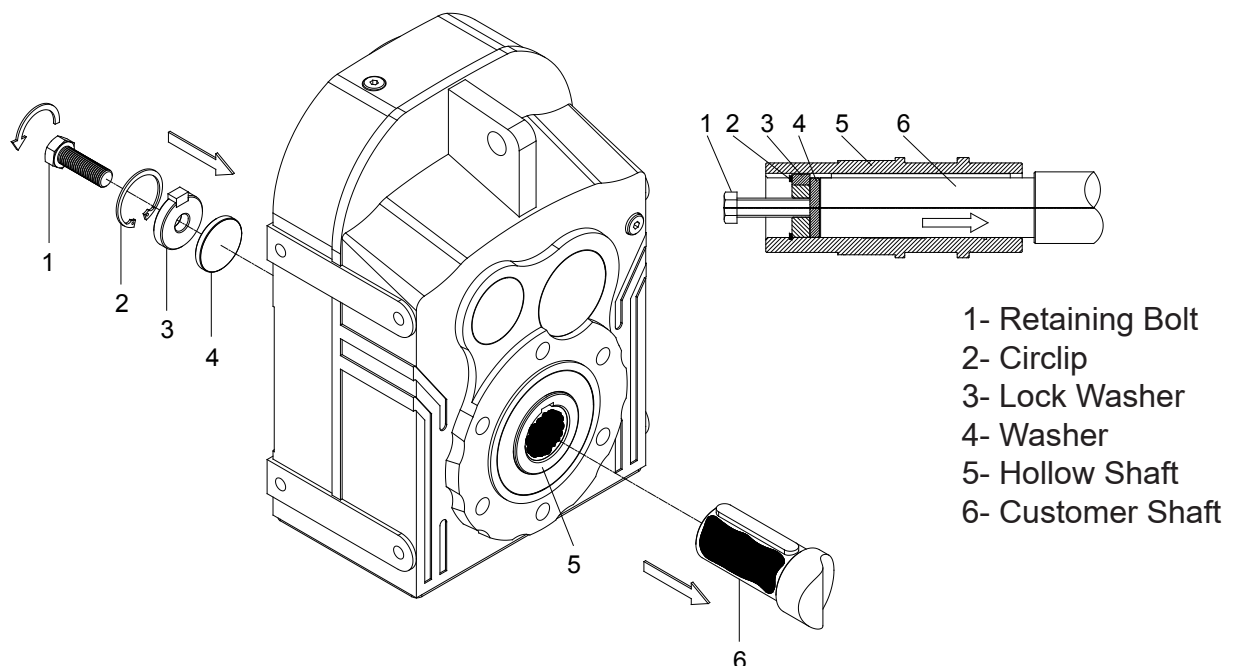


7.3- Disassembling customer shaft with shoulder

7.3.1- Disassemble the bolt and take out the parts as shown



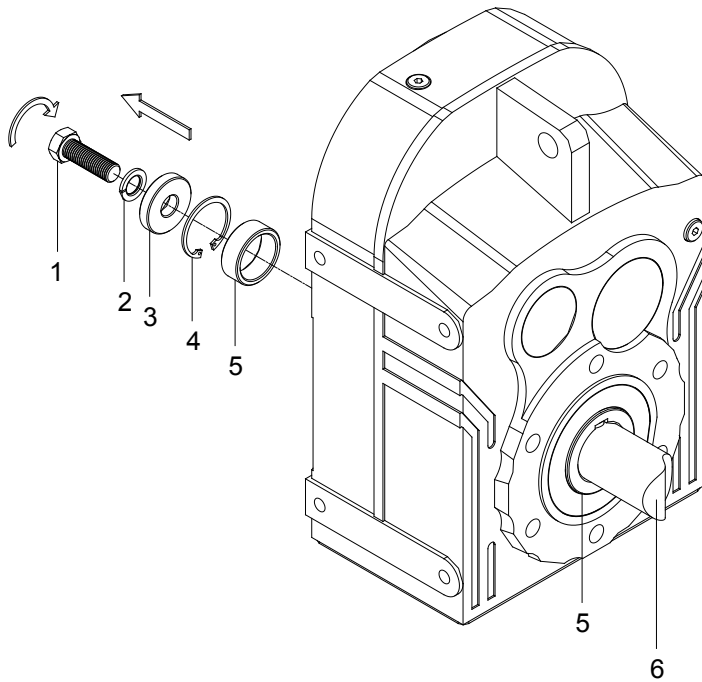
7.3.2 -Use the disassemble set from BREVINI POWER TRANSMISSION S.P.A. and fasten the bolt as shown bellow to take out the output shaft. For disassemble sets look the following pages.



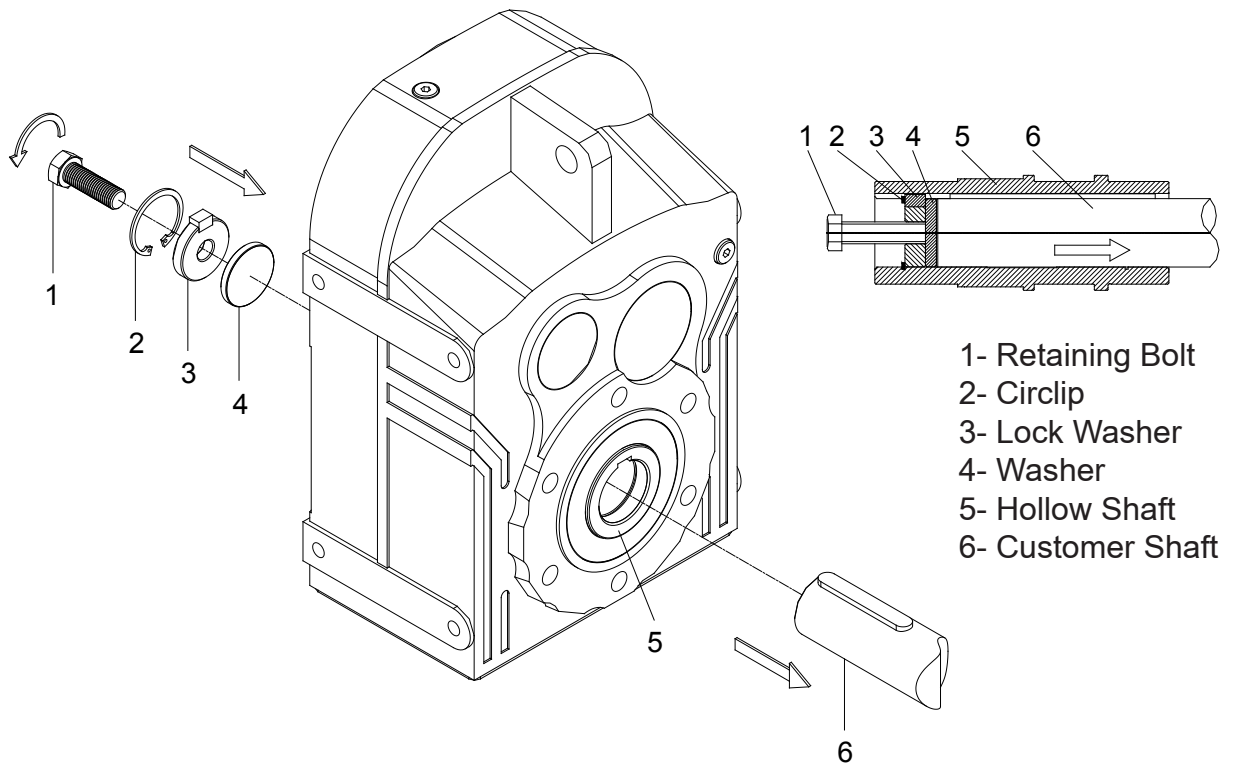


7.4- Disassembling customer shaft without shoulder

7.4.1- Disassembly the bolt and take out the parts as shown



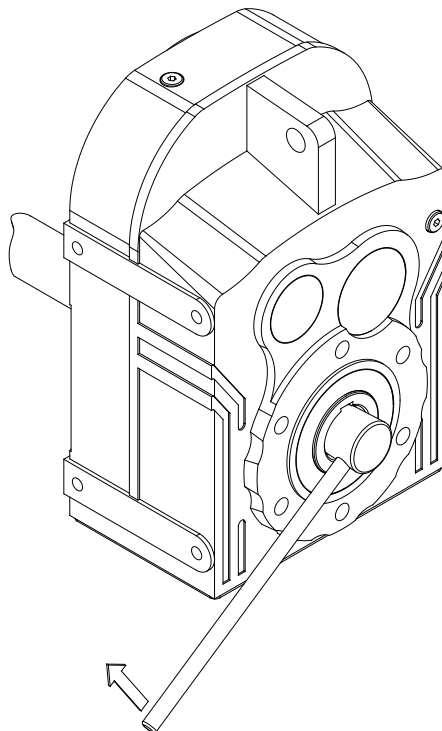
7.4.2 -Use the disassembly set from BREVINI POWER TRANSMISSION S.P.A. and fasten the bolt as shown below to take out the output shaft. For disassembly sets look the following pages.





7.5- Shaft tightening torques

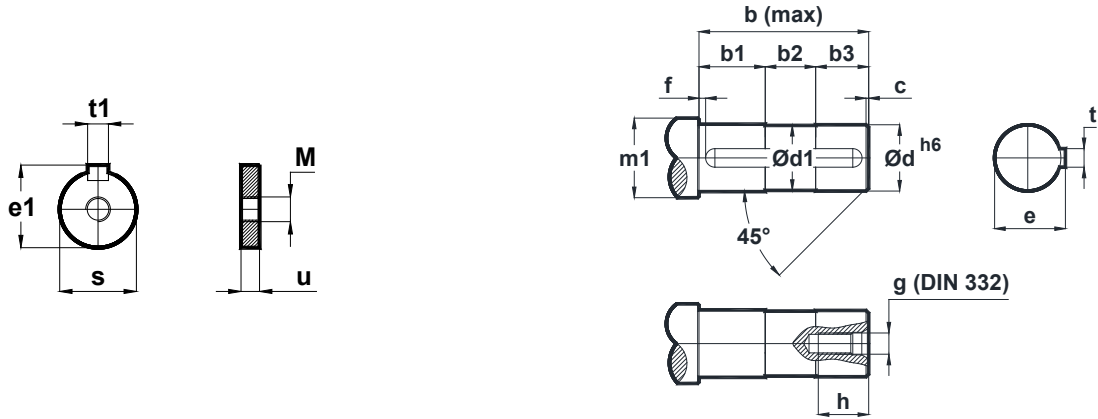
Use the following table for shaft tightening torques.



Type	Bolt	Tightening Torque [Nm]
D.172/173	M10	20
D.272/273	M12	20
D.282/283	M16	40
D.372/373	M16	40
D.472/473	M16	40
D.572/573	M20	80
D.672/673	M20	80
D.772/773	M24	200
D.872/873	M24	200
D.972/973	M24	200

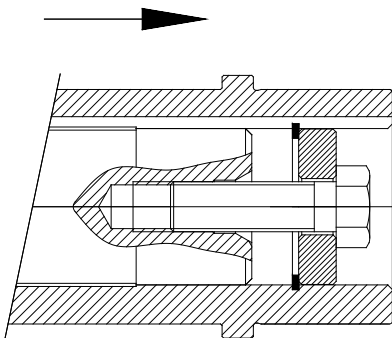


7-6 Advised Shaft Dimensions and Accessories

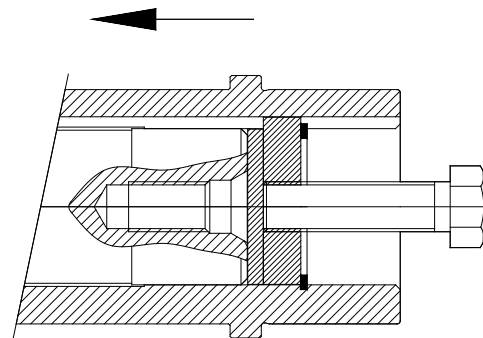


Type	s	u	e1	t1	M	d	d1	m1	f	b	b1	b2	b3	c	g	h	e	t
D.17..	29.7	10	33	7.5	M12	30	29	36	5	89	50	20	19	1	M10	24	33	8
D.27..	34.7	12	38	9.5	M16	35	34	43		114	65	27	22	1	M12	30	38	10
D.28..	39.7	12	43	11.5	M20	40	39	50		124	69	28	27	2	M16	38	43	12
D.37..	39.7	12	43	11.5	M20	40	39	50		138	75	35	28	2	M16	38	43	12
D.47..	49.7	12	53.5	13.5	M20	50	49	60		165	87	41	37	3	M16	38	53.5	14
D.57..	59.7	16	64	17.5	M24	60	59	75		188	101	44	43	3	M20	44	64	18
D.67..	69.7	16	74.5	19.5	M24	70	69	85		248	115	78	55	4	M20	44	74.5	20
D.77..	89.7	20	95	24.5	M30	90	89	110		287	140	83	64	4	M24	52	95	25
D.87..	109.7	20	116	27.5	M30	110	109	130		347	165	98	84	4	M24	52	116	28
D.97..	119.7	20	127	31	M30	120	119	140		434	185	130	119	4	M24	52	127	32

Dismounting



Mounting

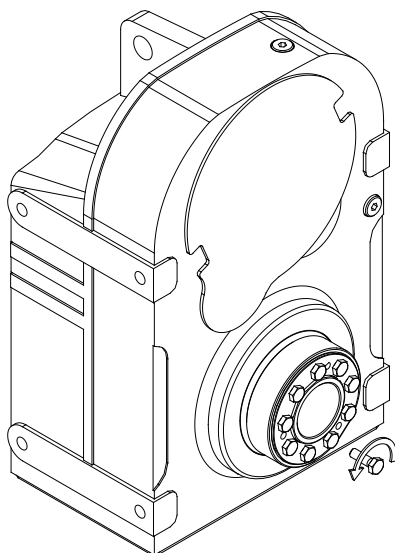


6 Contour Bolt
(DIN ISO 4014 . DIN ISO 4017)
(DIN ISO 8765)

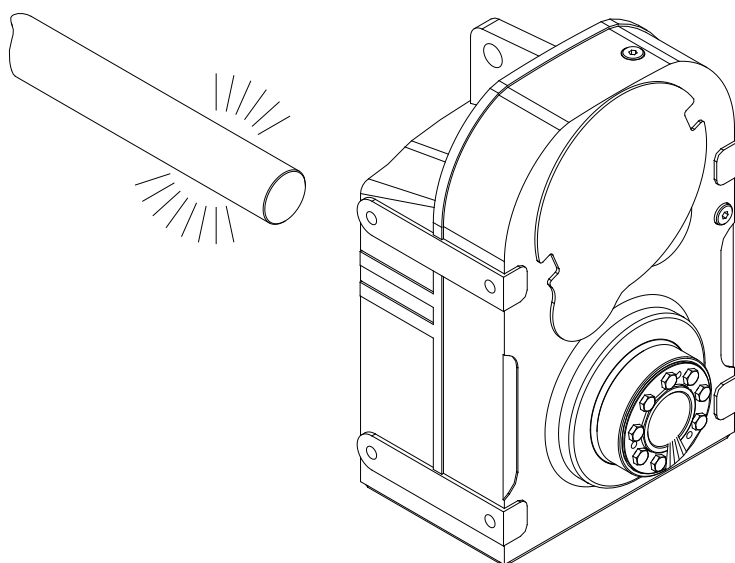


7.7- Assembling customer shaft with shrink disk

7.7.1- Loosen the bolts of the shrink disk

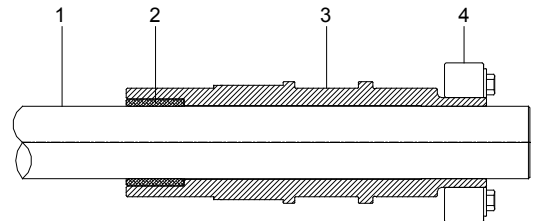
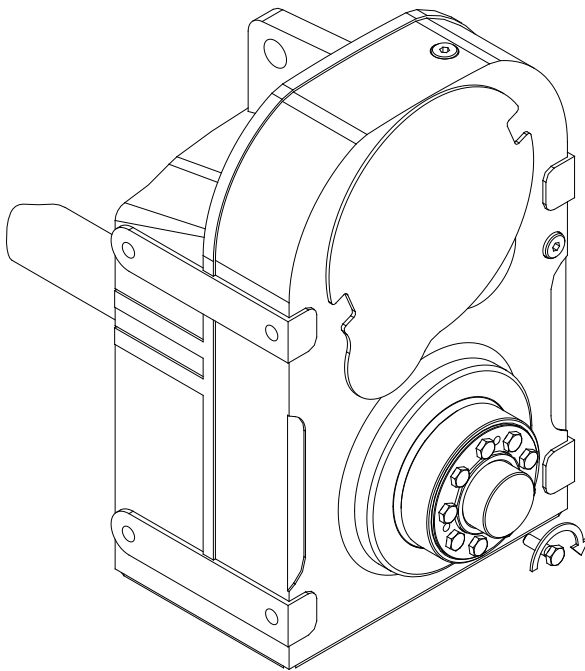


7.7.2- Use a solvent available in your market to clean all the dirt and oil from the shaft and shrink disk hollow. The surfaces must be free from oil or any dirt. The solvent must be removed from the surfaces as well.





7.7.3- Insert the shaft and tighten the bolts as shown. Be sure that there is a clearance between the shrink disk shoulder and the hollow shaft shoulder of the gearbox.



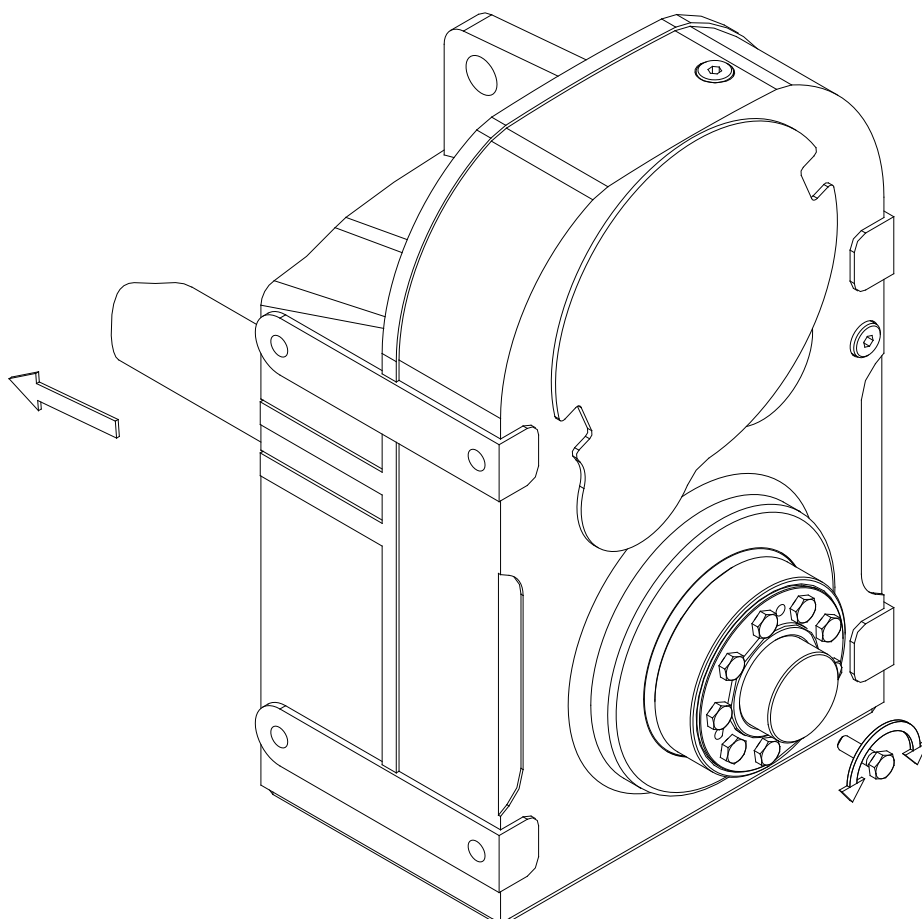
- 1- Customer Shaft
- 2- Bronze Ring
- 3- Hollow Shaft
- 4- Shrink Disk

Type	Bolt	Tightening Torque [Nm]
D.1...	M8	30
D.2...	M8	30
D.3...	M8	30
D.4...	M8	30
D.5...	M10	59
D.6...	M10	59
D.7...	M12	100
D.8...	M14	160
D.9...	M14	160



7.8- Disassembling customer shaft with shrink disk

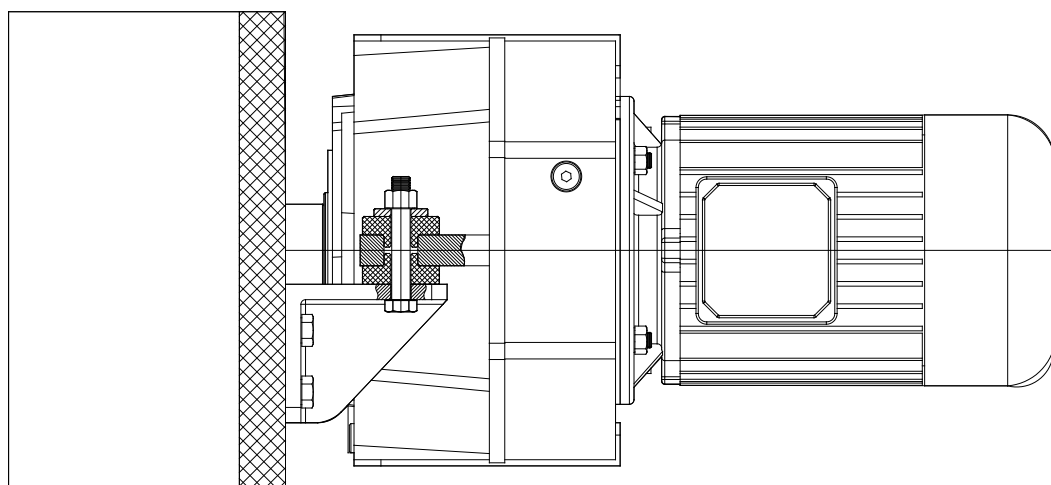
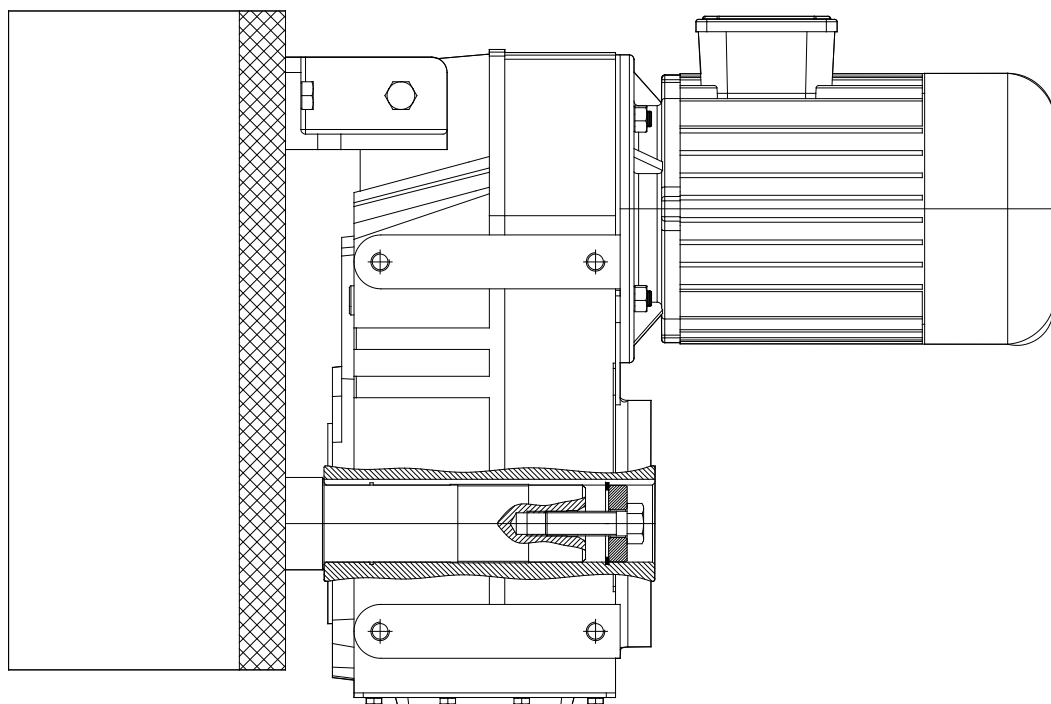
7.8.1- Loosen the bolts of the shrink disk and take out the shaft.





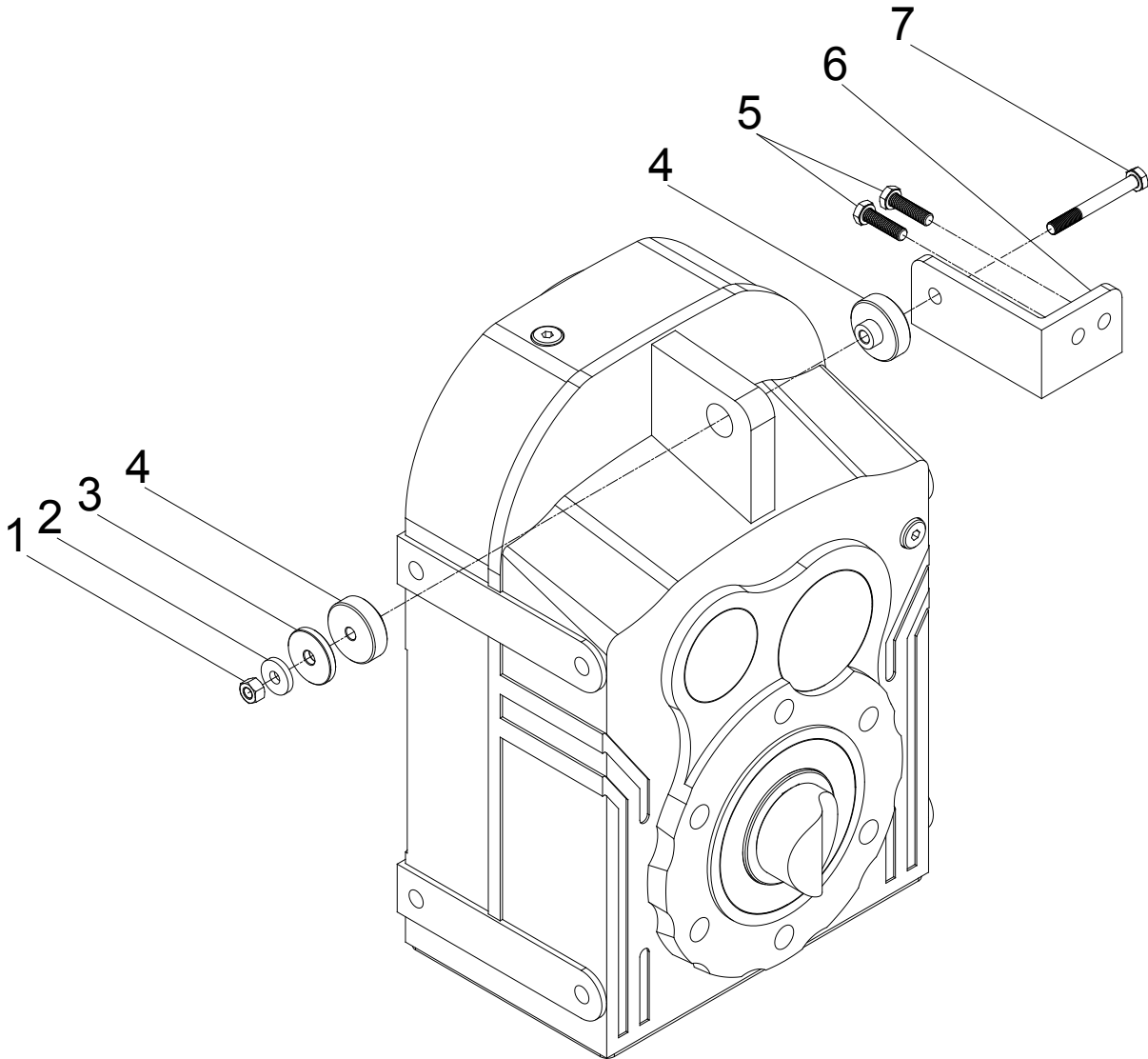
7.9- Assembling Gear Unit with Torque Arm

7.9.1- Use the torque arm connection according the following drawing.





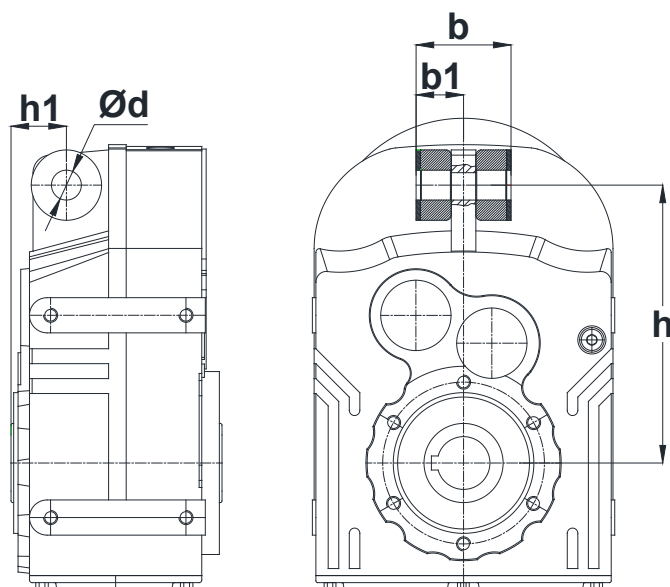
7.9.2- Assemble the parts as shown bellow



1- Bolt	4- Rubber Buffer	7- Bolt
2- Washer	5- Bolt	
3- Washer Ring	6- Fixing Plate	



7.9.3- For the fixing bold position refer to the following dimensions

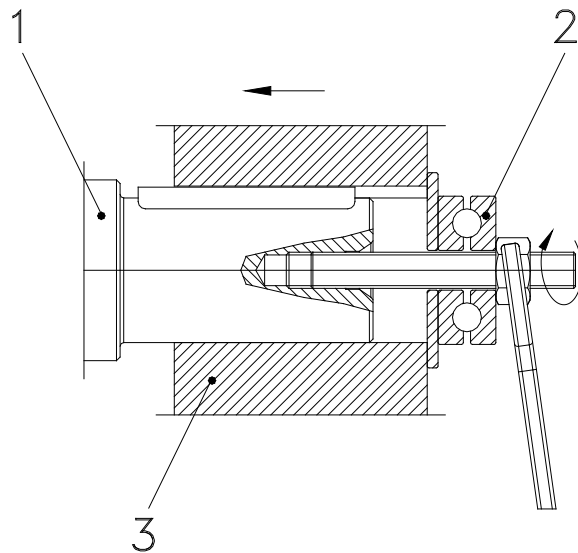


Type	d	b	b1	h	h1
D.17.	17	54	27	158	31.5
D.27.	17	54	27	170	32
D.28.	17	54	27	198	40.5
D.37.	17	56	28	218	41
D.47.	22	80	40	278	50
D.57.	22	86	43	346	62
D.67.	26	110	55	395	70
D.77.	26	116	58	485	88
D.87.	32	160	80	550	110
D.97.	32	165	82.5	660	150



7.10- Fitting outputshaft elements

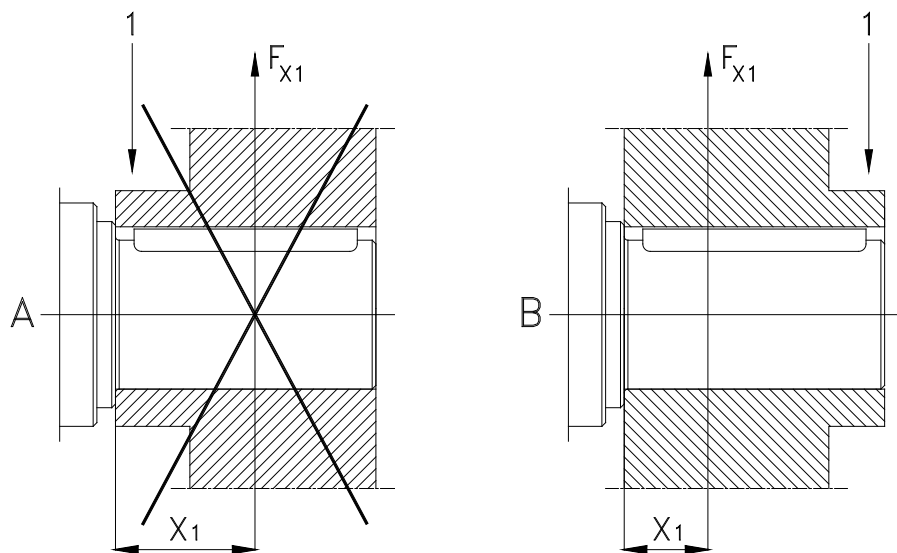
Use the following illustration to assemble output shaft units



- 1) Gear shaft end
- 2) Thrust bearing
- 3) Coupling hub

7.11- Correct position of output shaft elements

The Output Shaft unit (transmission elements) must be placed as close as possible to the gear unit so that the radial load is as closest as possible to the gear unit.

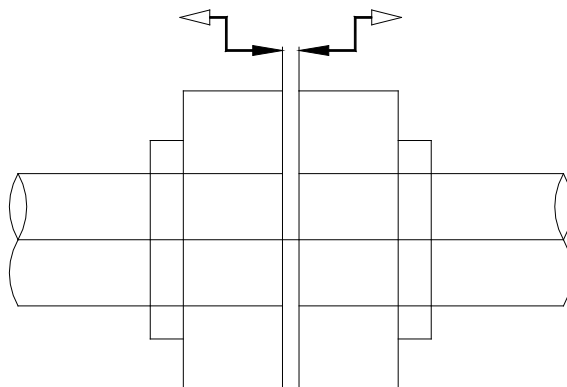


- 1) Hub

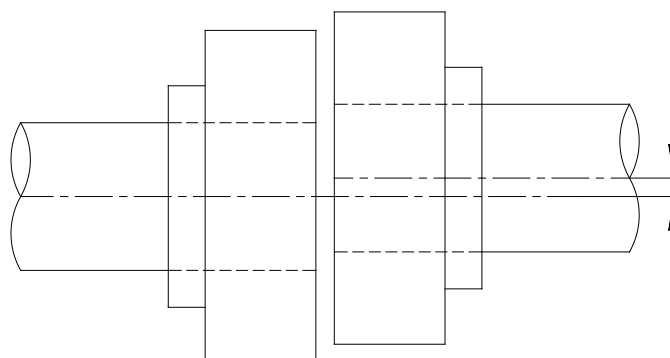


7.12- Fitting Couplings

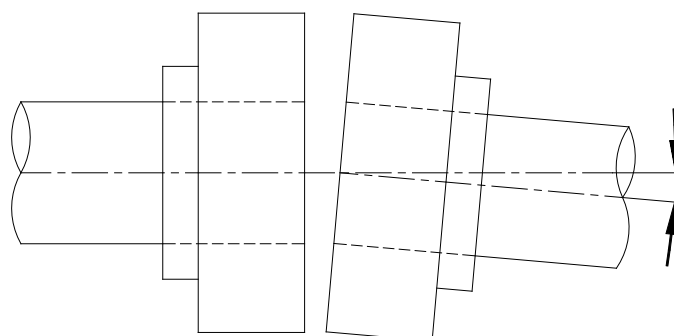
7.12.1-By fitting couplings be sure that there is some clearance between the two elements



7.12.2-By fitting couplings be sure that there is no eccentric between the two shafts.



7.12.3-By fitting couplings be sure that the two shafts are not angular miss-aligned.

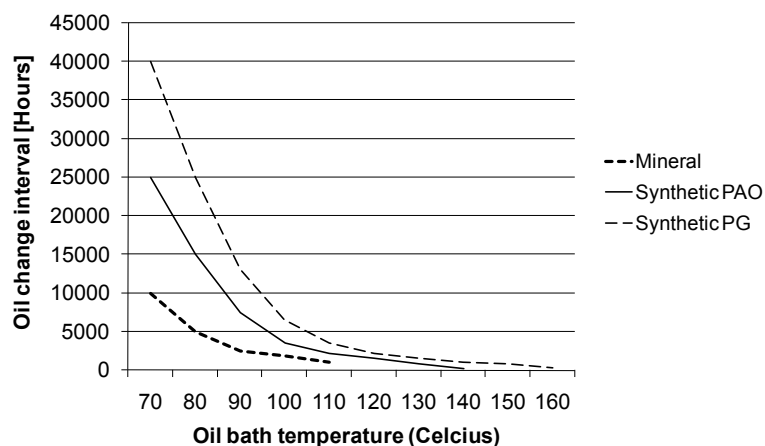




8- Maintenance and Inspections

Under normal ambient and working conditions the gear unit should be checked according the following intervals. (For definition of normal working conditions refer to the product catalogue: "Selecting Gearbox" section);

Item to check /replace	Every 3.000 working hours or every 6 months	Every 4.000 working hours	Every 10.000 working hours or every 3 years	Every 25.000 working hours
Check for oil leakage	x			
Check for oil level	x			
Check oil leakage from seal	x			
Check Rubber buffer	x (Change if necessary)			
Check Bearings Noise		x (Change if necessary)		
Change Mineral Oil			x (See Below for details)	
Change Synthetic-PAO Oil				x (See Below for details)
Change Sealing				x
Change Bearing Grease				x
Change Bearings				x
Check for noise Changes				x



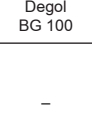
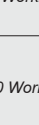
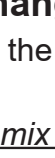

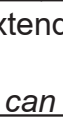
For normal ambient conditions 70 °C oil bath temperature should be taken as reference

* For D series mineral oil is used unless it is differently ordered. For oil type and quantities refer to the following table.



9- Lubrication

9.1- Oil Types

Lubricant	DIN 51517-3	Ambient Temp. [°C]	ISO VG	Aral	Beyond Petroleum	Castrol	Klüber Lubrication	Mobil	Shell	Total
		Dip Lubrication								
Mineral Oil	CLP	0 ... +50	680	Degol BG 680	Energol GR-XP 680	Alpha SP 680	Klüberoil GEM 1-680 N	Mobilgear 600 XMP 680	Omala 680	Carter EP 680
		-5 ... +45	460	Degol BG 460	Energol GR-XP 460	Alpha SP 460	Klüberoil GEM 1-460 N	Mobilgear 600 XMP 460	Omala F460	Carter EP 460
		-10 ... +40	320	Degol BG 320	Energol GR-XP 320	Alpha SP 320	Klüberoil GEM 1-320 N	Mobilgear 600 XMP 320	Omala F320	Carter EP 320
		-15 ... +30	220	Degol BG 220	Energol GR-XP 220	Alpha SP 220	Klüberoil GEM 1-220 N	Mobilgear 600 XMP 220	Omala F220	Carter EP 220
		-20 ... +20	150	Degol BG 150	Energol GR-XP 150	Alpha SP 150	Klüberoil GEM 1-150 N	Mobilgear 600 XMP 150	Omala 150	Carter EP 150
		-25... +10	100	Degol BG 100	Energol GR-XP 100	Alpha SP 100	Klüberoil GEM 1-100 N	Mobilgear 600 XMP 100	Omala 100	Carter EP 100
Food Grade Oil	CLP NSF H1	-15 ... +25	320	-	-	Optileb GT 320	Klüberoil 4 UH1-320 N	Mobil SHC Cibus 320	Cassida Fluid GL-320	Nevastane SL 320
Biodegradable Oil	CLP E	-25 ... +40	320	-	-	Tribol BioTop 1418-320	Klübersynth GEM 2-320	-	-	Carter Bio 320
Mineral Grease [-20 +120 Working Temperature °C]				Aralub HL3	Energrease LS 3	Spheerol AP3	Centplex 2 EP	Mobilux EP 3	Alvania RL3	Multis Complex EP 2
Synthetic Grease [-30 +100 Working Temperature °C]				-	Energrease SY 2202	-	Petamo GHY 133 N	Mobiltemp SHC 100	Cassida RLS 2	Multis Complex SHD 220

9.2- Changing the oil

Refer to the nameplate to find out the correct oil filled inside the gearbox.



-Do not mix synthetic oils with mineral oils which will cause serious damage to the gear unit. The oil change must be done by using the filling, draining and level plugs according the mounting position illustrated in section 9.4.



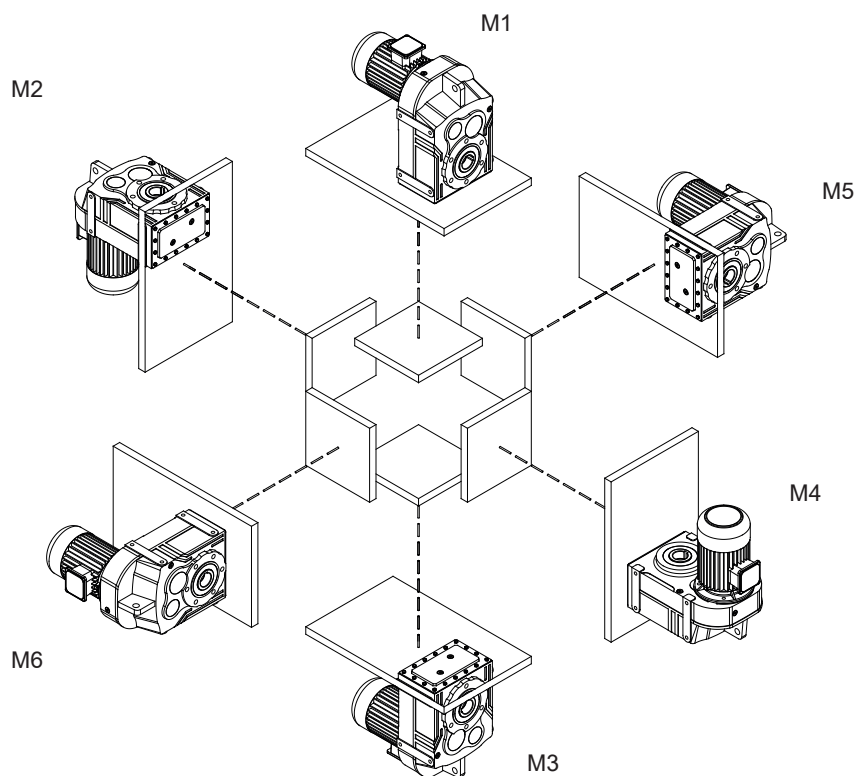
- Extended, intensive contact with oils can lead to skin irritations.
Avoid extended contact with oil, and clean oil off skin thorough.



- Hot oil can cause scalding.
When changing oil, protect yourself against contacting hot oil.

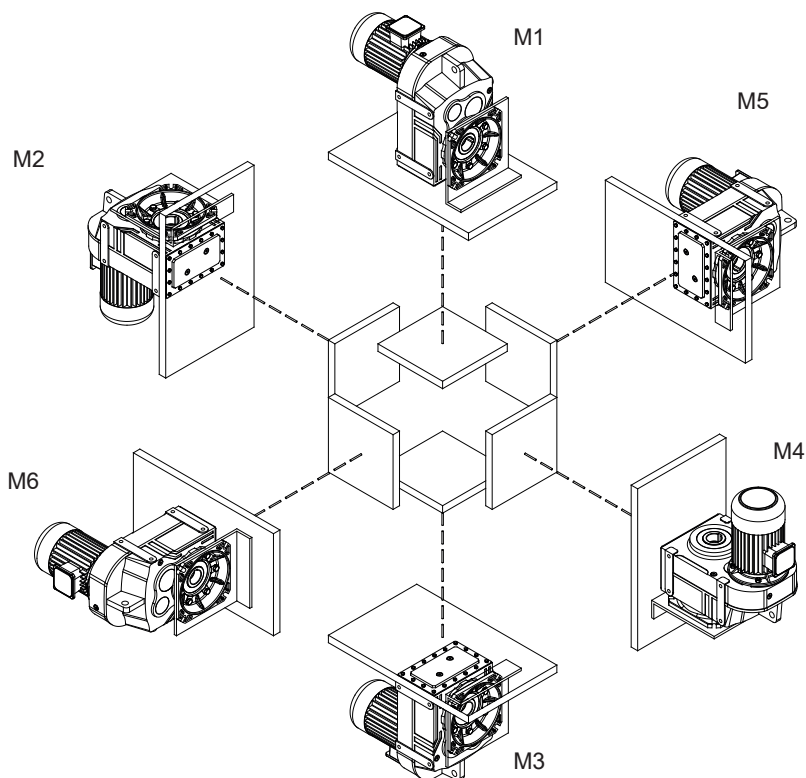


9.3 Mounting Positions



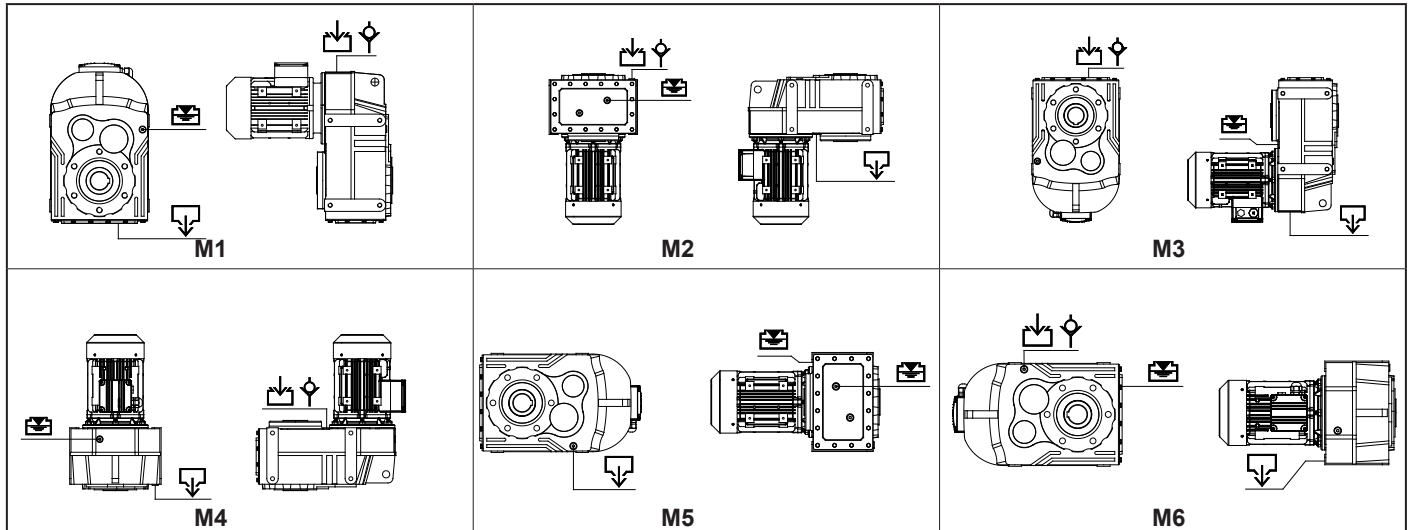
Figured mounting positions of M1 to M6 are determined as reference of directional position of the gearbox. Mounting surfaces are not binding.

Figured mounting positions of M1 to M6 are determined as reference of directional position of the gearbox. Mounting surfaces are not binding.





9.4 Oil Plugs and Oil Quantities: D Series 2-3 Stage Oil Level Plugs:



Oil Quantities (lt)

Type	M1	M2	M3	M4	M5	M6
DR172	1.3	1.5	1.0	1.4	1.3	1.4
DR173	1.0	1.3	0.8	1.1	1.2	1.1
DR272	1.9	2.2	1.4	1.8	2.0	2.1
DR273	1.8	2.0	1.2	1.6	1.6	1.9
DR282	2.4	3.2	2.0	2.7	2.8	3.0
DR283	2.0	2.8	1.8	2.1	2.2	2.4
DR372	3.0	4.2	2.4	2.6	3.8	3.9
DR373	3.2	3.7	2.0	3.5	3.3	3.5
DR472	6.8	7.0	4.6	6.0	6.0	6.2
DR473	6.4	8.4	5.5	5.0	7.2	7.3
DR572	11.4	12.7	8.6	11.4	10.0	11.0
DR573	11.2	12.4	7.4	9.6	11.5	11.35
DR672	19.0	20.0	15.1	16.0	19.5	19.5
DR673	18.0	18.0	14.0	15.0	15.0	16
DR772	29.0	30.0	22.0	24.0	25.0	27.0
DR773	27.2	28.0	20.0	22.5	22.0	24.0
DR872	46.0	48.0	39.0	38.0	42.0	44.0
DR873	43.0	45.0	32.0	36.0	40.0	42.0
DR972	78.0	81.0	59.0	64.0	75.0	78.0
DR973	73.0	76.0	54.0	61.0	70.0	73.0

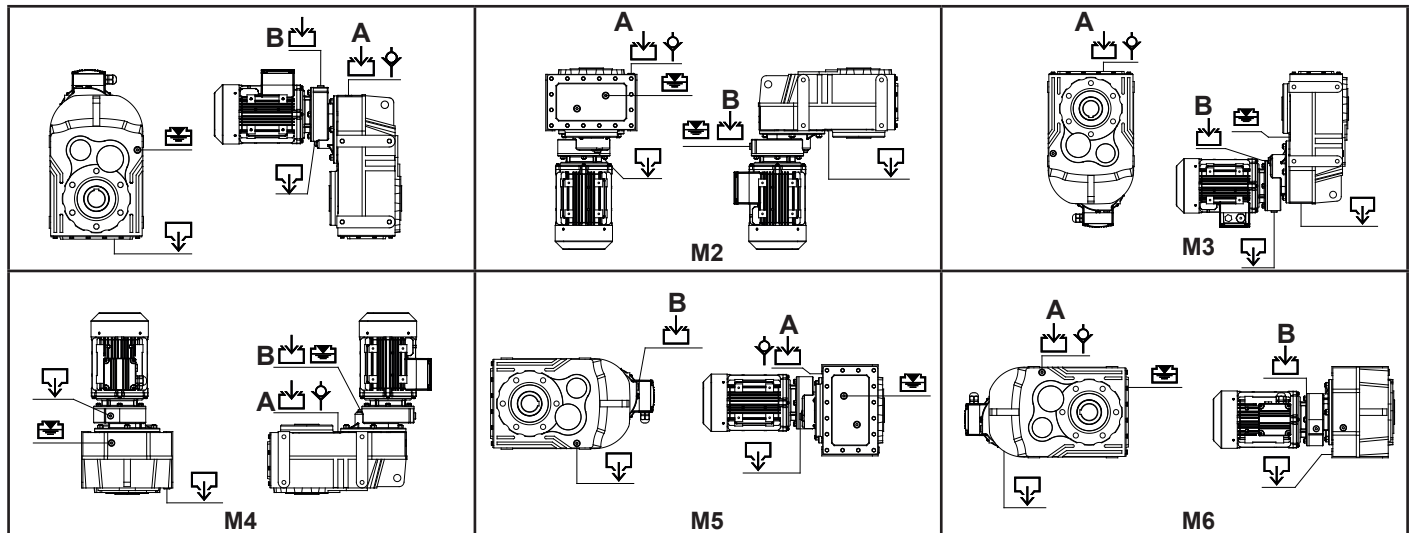
Simboli :  : **Tappo di riempimento**  : **Tappo di scarico**  : **Livello olio**  : **Tappo sfiato**
Symbols :  : **Oil Filling**  : **Drain plug**  : **Oil level**  : **Vent plug**
Symbole :  : **Ölfüllung**  : **Ölauslass**  : **Ölstand**  : **Entlüftungsschraube**

Operating Instructions

D Series



Oil Plugs and Oil Quantities: D Series 4 Stages Oil Level Plugs:



Oil Quantities (lt)

Type	M1 A / B	M2 A / B	M3 A / B	M4 A / B	M5 A / B	M6 A / B
DR474	6.4 / 0.7	6.5 / 0.7	4.3 / 0.7	5.0 / 0.7	7.0 / 0.7	7.0 / 0.7
DR574	11.2 / 1.5	12.4 / 1.5	7.4 / 1.5	9.6 / 1.5	11.5 / 1.5	11.5 / 1.5
DR674	18.0 / 4.0	18.0 / 4.0	14.0 / 4.0	15.0 / 4.0	16.5 / 4.0	17.0 / 4.0
DR774	27.2 / 4.0	28.0 / 4.0	20.0 / 4.0	22.5 / 4.0	27.0 / 4.0	27.0 / 4.0
DR874	43.0 / 6.0	45.0 / 6.0	32.0 / 6.0	36.0 / 6.0	43.0 / 6.0	43.0 / 6.0
DR974	73.0 / 4.0	76.5 / 4.0	54.0 / 4.0	61.0 / 4.0	73.0 / 4.0	73.0 / 4.0

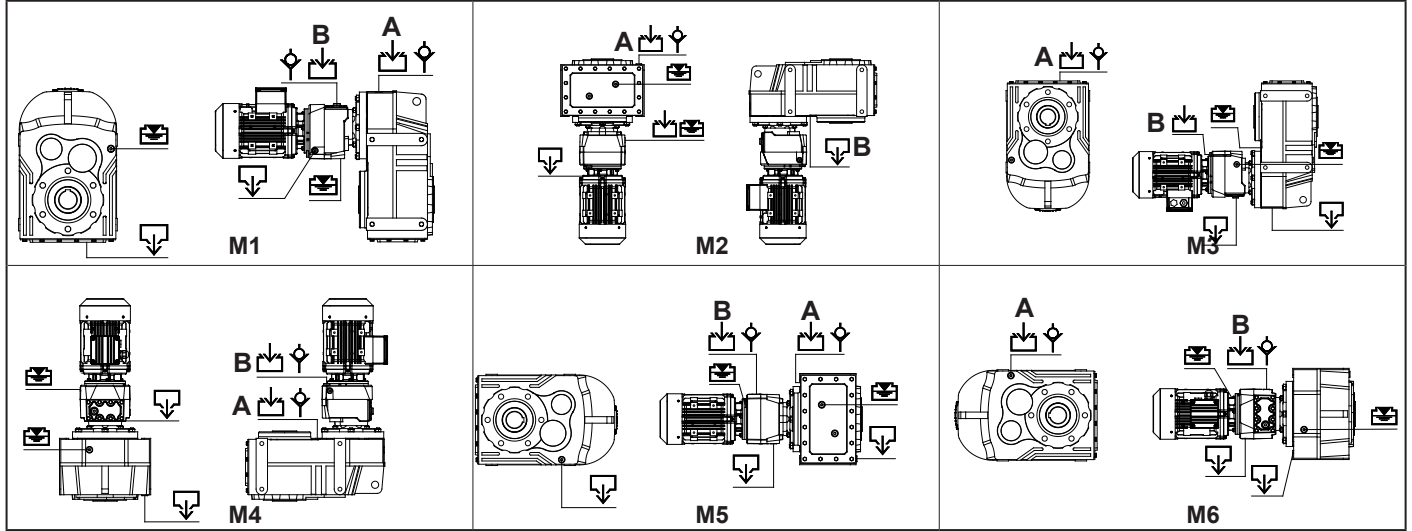
Simboli :  : Tappo di riempimento
  : Tappo di scarico
  : Livello olio
Symbols :  : Oil Filling
  : Drain plug
  : Oil level
Symbole :  : Öfüllung
  : Ölauslass
  : Ölstand
  : Tappo sfiato
 : Entlüftungsschraube

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Oil Plugs and Oil Quantities: D Series 5-6 Stages Oil Level Plugs:



Oil Quantities. (lt)

Type	M1 A / B	M2 A / B	M3 A / B	M4 A / B	M5 A / B	M6 A / B
DR275	1.8 / 0.4	2.0 / 0.6	1.2 / 0.5	1.6 / 0.6	1.9 / 0.5	1.6 / 0.5
DR276	1.8 / 0.35	2.0 / 0.5	1.2 / 0.5	1.6 / 0.55	1.9 / 0.4	1.6 / 0.4
DR285	2.0 / 0.4	2.8 / 0.6	1.8 / 0.5	2.1 / 0.6	2.4 / 0.5	2.2 / 0.5
DR286	2.0 / 0.35	2.8 / 0.5	1.8 / 0.5	2.1 / 0.5	2.4 / 0.4	2.2 / 0.4
DR375	3.2 / 0.4	3.7 / 0.6	2.0 / 0.5	3.5 / 0.6	3.5 / 0.5	3.3 / 0.5
DR376	3.2 / 0.35	3.7 / 0.5	2.0 / 0.5	3.5 / 0.5	3.5 / 0.4	3.3 / 0.4
DR475	6.4 / 0.65	8.4 / 0.95	5.5 / 0.7	5.0 / 0.95	7.3 / 0.7	7.2 / 0.7
DR476	6.4 / 0.6	8.4 / 0.8	5.5 / 0.7	5.0 / 0.8	7.3 / 0.65	7.2 / 0.65
DR575	11.2 / 1.2	12.4 / 2.1	7.4 / 2	9.6 / 2.1	11.35 / 1.4	11.5 / 1.4
DR576	11.2 / 1.1	12.4 / 2	7.4 / 1.9	9.6 / 2	11.35 / 1.3	11.5 / 1.3
DR675	18.0 / 1.2	18.0 / 2.1	14.0 / 2	15.0 / 2.1	16 / 1.4	15.0 / 1.4
DR676	18.0 / 1.1	18.0 / 2	14.0 / 1.9	15.0 / 2	16 / 1.3	15.0 / 1.3
DR775	27.2 / 2	28.0 / 3.4	20.0 / 3.1	22.5 / 3.4	24.0 / 2.8	22.0 / 2.8
DR776	27.2 / 1.9	28.0 / 3.3	20.0 / 3	22.5 / 3.3	24.0 / 2.6	22.0 / 2.6
DR875	43.0 / 2	45.0 / 3.4	32.0 / 3.1	36.0 / 3.4	42.0 / 2.8	40.0 / 2.8
DR876	43.0 / 1.9	45.0 / 3.3	32.0 / 3.0	36.0 / 3.3	42.0 / 2.6	40.0 / 2.6
DR975	73.0 / 4.5	76.0 / 8.0	54.0 / 7.5	61.0 / 8.0	73.0 / 5.5	70.0 / 5.5
DR976	73.0 / 4.0	76.0 / 7.6	54.0 / 7.0	61.0 / 7.6	73.0 / 5.0	70.0 / 5.0

Simboli :  : **Tappo di riempimento**  : **Tappo di scarico**  : **Livello olio**  : **Tappo sfiato**
Symbols :  : **Oil Filling**  : **Drain plug**  : **Oil level**  : **Vent plug**
Symbole :  : **Ölfüllung**  : **Ölauslass**  : **Ölstand**  : **Entlüftungsschraube**



10- Troubleshooting Guide



All the operations bellow must be done by authorized and skilled mechanician/electrician.

Inform BREVINI POWER TRANSMISSION S.P.A. before making any change to the gearbox. Only oil change is allowed to change without information. Do not make any think if you are not sure what you are doing and contact BREVINI POWER TRANSMISSION S.P.A.. Any change or operation done without the information of BREVINI POWER TRANSMISSION S.P.A. is in your own risk and responsibility and BREVINI POWER TRANSMISSION S.P.A. does not take any responsibility.

ID	Problem	Observation	Remedy
001	Gearbox Does Not Start Up	You hear no noise and shaft is not turning. You are not using any driver or frequency inverter.	Please Check the voltage supply and frequency of your electric connection. They must be in accordance with the nameplate of the motor. Observe motor manufacturers start up manual. Still does not work go to ID 100
002	Gearbox Does Not Start Up	You hear no noise and shaft is not turning. You are using frequency inverter or driver.	Please observe the frequency inverter/driver manual. Check the motor by supplying direct voltage to see if the problem is on your driver/frequency inverter. Still does not work go to ID 001.
003	Gearbox Does Not Start Up	You hear some noise but both motor shaft and gearbox shaft is not turning. You are not using any driver /frequency inverter or braked motor.	Please Check the voltage supply and frequency of your electric connection. They must be in accordance with the nameplate of the motor. Observe motor manufacturers start up manual. Still same problem, the load may be too high for the choosen motor. Loosen the gearbox from the load/torque. If it works than the starting torque is insufficient and higher motor power is needed. For monophaze motors, check the starting up condansator and running condansator as well. If notting helps go to ID 100
004	Gearbox Does Not Start Up	You hear some noise but both motor shaft and gearbox shaft is not turning. You are using driver or frequency inverter.	Please observe the frequency inverters or drivers manual. To see if the problem is on your driver or frequency inverter take out the driver/frequency inverter and make direct voltage supply to the motor according the motors nameplate. Still does not work go to ID 100
005	Gearbox Does Not Start Up	You hear some noise but both motor shaft and gearbox shaft is not turning. You are using braked motor	Please Check the voltage supply and frequency of your electric connection. They must be in accordance with the nameplate of the motor. Observe motor manufacturers start up manual. Be sure that the brake is working. Observe the brake manufacturers manuel. If brake is supplied from BREVINI observe this manuel for correct brake wiring diagram. If still not work supply the brake with voltage according its nameplate directly. For example 198V DC. You will hear a clicking noise explaining that the brake is opening. If you hear no noise the brake or rectifier is defect. If you hear the clicking noise the brake is working. You should this clicking noise by your normal electric connection as well. By supplying direct supply to the brake you hear the clicking noise and at same time you supply the motor with direct voltage according to its name plate and still same problem, the load may be too high for the choosen motor. Goto ID 003.

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ID	Problem	Observation	Remedy
006	Gearbox Does Not Work in Low Speeds/ frequencies.	You are using frequency inverter.	For very low speeds the frequency inverters frequency is lowering down. For very low frequencies the inverter parameter and motor parameter must be optimized. Also for low speeds the efficiency of the gearbox may vary too much. Specially for worm-gearboxes. The recommended frequency range is 20-70 Hz for worm-gearboxes and 10-70 Hz for Helical Gear Boxes. Use Higher motor power and Frequency inverter or change ratio of gearbox to work inside the recommended range.
007	Gearbox Does Not Start Mornings or After Long Time Stop.	Ambient Temperature is below +5 Celsius	The oil is not in accordance with your working conditions. Change to lower viscosity oils. Observe this manual for using the correct oil. Working in higher ambient temperatures is another solution if possible. If still same problem you need higher motor power.
008	Gearbox is Heating Up too Much	You are using Worm Gear Box and ambient temp is lower than +40 Celsius	Measure the surface temp. using a temperature measuring device under full load. If the temp is under +80 Celsius this will make no harm to the gearbox and is normal. All ATEX conforming gearboxes and standard worm gearboxes are designed to work under max. +120 Celsius. <u>If higher than +120 Celsius and using ATEX conforming gear box immediately stop the system and contact BREVINI POWER TRANSMISSION S.P.A.</u> Go to ID 100. If not ATEX conforming check the oil type and oil quantity/level according your mounting position and check the nameplate mounting position. If nameplate mounting position does not fit the actual position goto ID 100.
009	Gearbox is Heating Up too Much	You are using Helical Gear Box. Ambient temp is lower than +40 Celsius	Measure the surface temp. using a temperature measuring device under full load. If the temp is under +80 Celsius this will make no harm to the gearbox and is normal. All ATEX conforming gearboxes are designed to work under max. +120 Celsius. <u>If higher than +120 Celsius and using ATEX conforming gear box immediately stop the system and contact BREVINI POWER TRANSMISSION S.P.A.</u> If not ATEX gear box the gearbox is designed to work under max. +80 Celsius. If higher than +80 Celsius check the oil type and oil quantity/level according your mounting position and check the nameplate mounting position. If nameplate mounting position does not fit the actual position goto ID 100
010	Gearbox is Heating Up too Much	Ambient Temp is over +40 Celsius	Standard Gearboxes are designed to work under +40 Celsius. ambient temperature. If ambient temp is higher than +40 Celsius special solutions/gearboxes are required. Please contact BREVINI POWER TRANSMISSION S.P.A.
011	Gearbox is noisy	Noise is regular continuous	Check Your moving parts for noise. Disassemble the gearbox and run without load. If you still hear the noise motor bearings or gearbox bearings are defect. Change bearings. Goto ID 100
012	Gearbox is noisy	Noise is random	Check Your moving parts for noise. Disassemble the gearbox and run without load. If you hear still the noise the oil may have some particles inside. Change the oil and look for small particles. If metal particles are found the gearbox may have some damage. Goto ID 100

Operating Instructions

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ID	Problem	Observation	Remedy
013	Gearbox is noisy	Regular knocking noise	Check Your moving parts for noise. Disassemble the gearbox and run without load. If you still hear the noise one of the gears inside is defect. Goto ID 100
014	Gearbox is noisy	Regular up and down noise	Check the output-shaft connection elements for runout. Take out the output shaft element and run without load. If you still hear the noise one of the gears has runout problem. Goto ID 100
015	Gearbox is noisy	Gearbox is with braked motor and noise is coming from the brake side randomly.	Low randomly clicking noise may come from the brake disk which is normal. If noise level is disturbing the brake may be defect or brake clearance is not adjusted. Goto ID 100
016	Gearbox is noisy	You are using frequency inverter and the noise level is changing according your speed.	The frequency inverter parameters are not optimized for the frequency range or motor you are using. Observe the frequency inverters manual. If still same problem change the ratio of gearbox. Goto ID 100
017	Oil is Leaking	Oil Leakage from Seal	If ambient Temp is over +40 Celsius or none stop work over 16 hours please change the top plug with a breather plug. Observe this manual for using breather plug. If this is not your case the seal could be damaged. Goto ID 100
018	Oil is Leaking	Oil Leakage from Plug	If you are using breather plug be sure it is in the correct place. This is the most top plug position according your mounting position. The plug may be not tight enough. There are some particles under the plug rubber surface. Clean and tighten the plug. If still same problem goto ID 100
019	Oil is Leaking	Oil Leakage from Housing	Observe exactly where the oil is coming out. It could be seal or plug point where it comes out and leaks over the housing. If this is your case goto ID 018/019. If you are sure oil comes out from housing than housing has some micro split / crack. Goto ID 100
020	Oil is Leaking	Oil Leakage from Cover	The sealing liquid under cover is split/defect. Disassemble the cover and put new sealing liquid. Assemble the cover and tighten the bolts. If still same problem goto ID 100
021	Gearbox is moving regularly on its mounting point	You are using Torque Arm	The movement of gear box is because of the runout of the shaft which you assemble the gearbox. This has no bad affect or harm to the gearbox and is normal unless you are using torque arm.
022	Gearbox is moving randomly on its mounting point	You are using Torque Arm	The movement of gear box is because of the runout and clearance of the shaft which you assemble the gearbox. Check the clearance of the assembling shaft and the clearances on your machine. This has no bad affect or harm to the gearbox unless you are using torque arm.
023	Motor is heating up	Motor is running over its nominal current	The motor power is not enough or some overload to the motor is possible. The motor may be defect. Goto ID 100
023	Motor is heating up	Ambient is dusty	Check the motor Fan Hub and ribs. They must be free of dust. If you are using forced external fan, check if it is working. If you are using frequency inverter in low speeds and you do not have forced external fan, you may need forced external fan. Goto ID 100

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ID	Problem	Observation	Remedy
024	Motor is running but Gearbox shaft does not turn	Scratchinh noise comes out	Some part (key, gear) may be defect inside gearbox. Goto ID 10
025	Gearbox Housing is Defect	You are using chain drive or pinion gear	The radial load or poligon effect of the chain may have caused the damage. Check also if the assembly bolts are loosened or the plate you assemble the gearbox is rigit enough. Check if you are using the correct diameter of chain drive and you are not exceeding max. allowed radial load. Check the position of your output element and re-calculate your radyal load and check if this fit to the maximum allowed radial load. Goto ID 100
026	Output Shaft is Defect	You are using chain drive or pinion gear	The radial load or poligon effect of the chain may have caused the damage. Check also if the assembly bolts are loosened or the plate you assemble the gearbox is rigit enough. Check if you are using the correct diameter of chain drive and you are not exceeding max. allowed radial load. Check the position of your output element and re-calculate your radyal load and check if this fit to the maximum allowed radial load. Goto ID 100
027	Gearbox is stopping too late	You are using braked motor	Please check the wiring diagram of the brake. There are two different kind of brake wiring diagram. The standart gearbox delivered from our factory is set to delayed braking. For sudden braking check the wiring diagram.
028	Gearbox is starting too late	You are using braked motor	For fast opening of big brakes (over 100Nm), you may need shock transformators which is supplied by BREVINI POWER TRANSMISSION S.P.A. Goto ID 100
100	Service Required	No self solution found	Please contact BREVINI POWER TRANSMISSION S.P.A. Ser-vice point. See on the back side of this manual. Changing mechanical parts of gearbox can only be done by BREVINI POWER TRANSMISSION S.P.A. or with information of BREVINI POWER TRANSMISSION S.P.A.. Any change without informing BREVINI POWER TRANSMISSION S.P.A. will cancel the waranty, manufacturer decleration and BREVINI POWER TRANSMISSION S.P.A. will take no responsibility.

11- Disposal

If your product is no longer of use and you wish to dispose of it, refer to the instructions here. If you have any questions regarding ecological disposal methods, please consult our service points given on the backside of this manuel.

11.1- Disposal of Oil

-Lubricants (oil and greases) are hazardous substances, which can contaminate soil and water. Collect drained lubricant into suitable receptacles and dispose of it according to the valid national guidelines.

11.2- Disposal of Sealings

Remove the sealing rings from the gear reducer, and clean them of oil and grease resudies. Dispose of the sealings as composite material (metal/plastic)

11.3-Disposal of Metal

Divide up the remainder of the gear reducer into iron, aluminium, non-ferrous havy metal if possible Dispose of it according to the valid national guidelines.

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