



## GALPERTI TECH

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A division of

**GALPERTI ENGINEERING and Flow Control S.p.A.**

Capitale Sociale € 2.000.000,00 interamente versato

Sede legale e Amministrativa:

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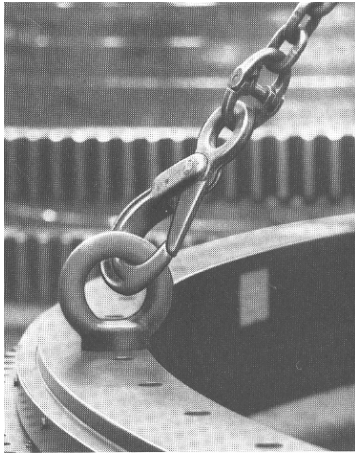
## Maintenance and Instruction Manual

### 1. Transport

Large-diameter bearings are machine parts requiring careful handling. Their transport should always be carried out in horizontal position. Shocks, particularly in horizontal direction, must be avoided.

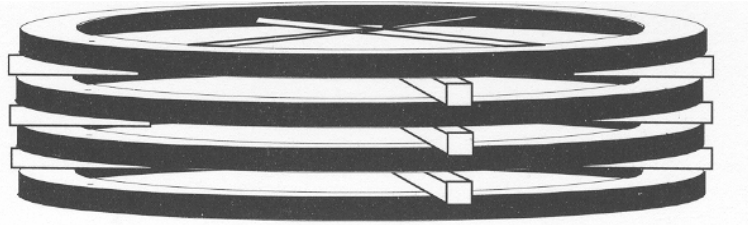
When the bearings, due to their big diameter, require transportation in inclined position, an internal cross-made stiffening device is necessary. The transport cross has to be removed after installation. For transportation use eyebolts only.

Lifting and handling using the cross is not allowed.



### 2. Storage

Store bearings horizontally in original package and in a dry area until installation. Galperti Tech bearings are protected at the factory by internal grease and external surface protection. Use an adequate number of spacers when you pile the bearings.





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After a long storage, the seal's lips should be detached from the contact surfaces. Lift up the lips carefully with a blunt tool around the whole circumference. This will restore the torque to normal values.

### 3. Companion Structures

The cross section of a large diameter bearing is generally relatively small compared to its diameter.

The bearings therefore need a stiff structure with low distortions under the operating loads in order to ensure a good load distribution in the bearing race and the bolt connection.

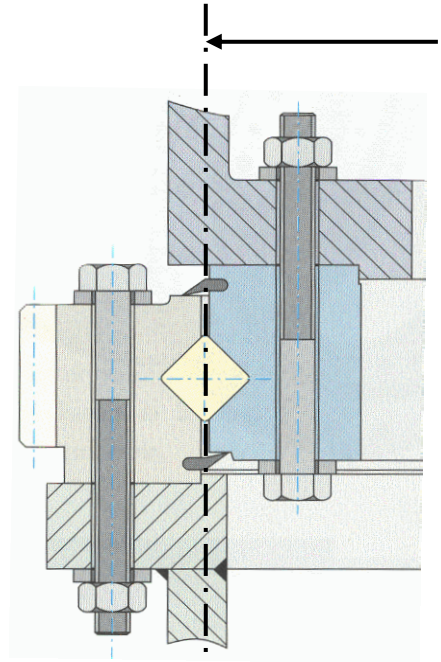
That means that the deviation curve must rise and fall equally in a sector of 0°- 90°-180°. Peaks in smaller sectors have to be avoided, otherwise tight spots may cause local overloads in the raceway and bolts.

In order to minimise the deflections of the supporting structures under maximum loads, the vertical line of the force in the companion structures must be as near as possible to the race diameter.

Space for the bolts tightening tools has to be considered. Accurate machining of the contact surfaces is required and the surfaces must be flat and clean to prevent the bearing from becoming distorted when it is bolted down.

A final mechanical machining is necessary after welding.

We **DO NOT** recommend to use stiffening ribs welded to the flanges.



Permissible out-of-flatness and deflections values in the companion structures are:

Raceway Diameter	Out- of-flatness per support surface			Maximum axial deflections at max. load	Min. Thickness of flange T
	4-point ball bearings light series	4-point and 8-point ball bearings	Roller bearings		
500	0,2	0,1	0,07	0,35	25
750	0,25	0,12	0,09	0,4	30
1000	0,3	0,15	0,11	0,5	35
1250		0,17	0,13	0,65	40
1500		0,2	0,15	0,8	50
2000		0,22	0,17	1	60
2500		0,25	0,19	1,3	70
3000		0,28	0,21	1,6	80
3500		0,3	0,23	2	90
4000		0,33	0,25	2,5	100
4500		0,35	0,28	3	110

All dimensions are in mm.  
For preloaded bearings above values must be reduced by 50%.



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### 4. Installation

Be sure that the mounting surfaces are free from welding pearls, paint residues, burring and other contaminations. Even mounting surfaces are essential for the installation. Examination of the contact surfaces by means of a levelling instrument or laser machine is recommended.

Do not exceed the values shown in the table at previous page (companion structures).

Prior to installation the bearing should be checked for running by rotating the unbolted bearing at least for two revolutions.

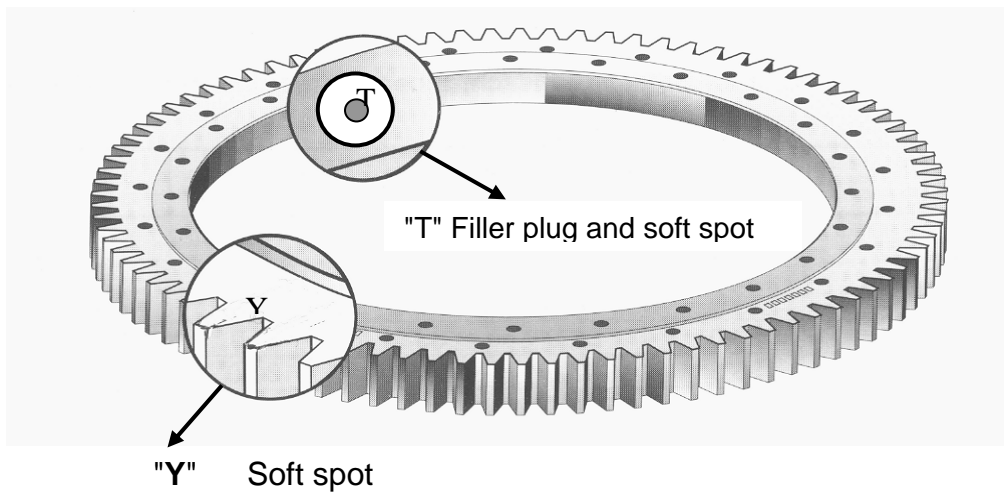
Remove the protective coating from the contact surfaces and from the gear. No solvent should come in contact with the seals or penetrate into the raceways.

Do not carry out welding on the bearing or in the vicinity of the bearing as the heat generated may cause distortions or destroy seals and plastic spacers.

Transit of current has to be absolutely avoided.

#### Hardness gap ( soft spot )

Most of the induction hardened bearings have a small unhardened zone between the beginning and the end of the hardened area. This spot is identified with a stamped letter "T" near the filler plug on the un-gearred ring and with a "Y" on the other ring.



The plug or the soft area should be positioned 90° from the load axis (outside the main load-carrying areas) when possible.

#### Gear ring

In case no fixed centre distance is existing the backlash has to be adjusted at the 3 teeth marked in blue ( narrowest point ). At this point the backlash should 0,03 • module.

After final tightening the backlash should be checked over the whole circumference.



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### 5. Fastening bolts

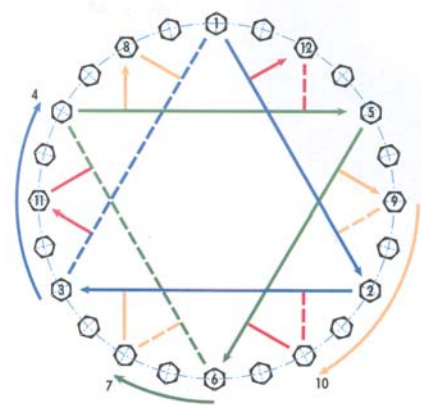
The fastening holes location of the structure must match that of the bearing or distortions will appear.

Excessive distortion results in high friction and reduced bearing life. If friction increases by tightening the bolts, the bearing should be removed and the contact surfaces checked for flatness.

The recommendations on specified diameters, strength class, quantities and degree of preload, must be followed.

We recommend a minimum clamping length of 5 times the bolt diameter.

Cross-tightening technique: the bolts must be carefully tightened crosswise to the specified preload, see picture.



The following table gives some recommended values for the tightening torques.

The values are based on lightly oiled threads and contact surfaces. ( $\mu_{total} = 0.14$ )

Thread diameter mm	Tightening Torques in Nm			
	Hydraulic torque wrench	Mechanical torque wrench	Hydraulic torque wrench	Mechanical torque wrench
	<b>8.8</b>	<b>8.8</b>	<b>10.9</b>	<b>10.9</b>
M12	87	78	130	117
M16	215	193	310	279
M20	430	387	620	558
M24	740	666	1060	954
M27	1100	990	1550	1395
M30	1500	1350	2100	1890

Dry threads require higher tightening torques.

Heavily oiled threads require lower tightening torques.

The variation, particularly on bolts equal to or bigger than M27 is considerable.

We therefore recommend to use hydraulic tensioning cylinders for this sizes.



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## 6. Lubrication

All grease nipples must be easily accessible.

Lithium-based mineral grease of NLGI grade 2 with EP additives have to be used.

The table on the following page shows a list of lubricants for raceway and gear.

Lubricants for the raceway can be mixed together.

MANUFACTURER	RACEWAY	GEAR
AGIP	EP 2 GRMU -20°C to +110°C	
ARAL	Aralub HLP 2 -30°C to +130°C	Aralub MKA-Z 1 -25°C to +130°C
BP	Energrease LS-EP 2 -20°C to +120°C	Energrease LC 2 -25°C to +160°C
CASTROL	Spheerol EPL 2 -20°C to +110°C	Castrol LZV-EP -30°C to +150°C
ESSO	Beacon EP 2 -25°C to +135°C	Esso Multi-Purpose Grease (Molly) -25°C to +150°C
MOBIL	Mobilux EP 2 -25°C to +120°C	Mobil Gear OGL 461 -20°C to +120°C
SHELL	Shell Alvania EP 2 -20°C to +130°C	Shell Malleus OGH -20°C to +150°C
TOTAL	Total Multis EP 2 -30°C to +120°C	Total Gardrexa GR 1-AL -20°C to +200°C

Other grease of the same quality from other manufacturers may also be used, but compatibility with the existing grease and the material of spacers and seals has to be confirmed. ( Please call our design department )

The raceway system of our bearings is usually filled with AGIP EP 2 grease.

Applications operating in low temperatures require special lubricants.

When an automatic lubricating device is installed, the lubricant manufacturer must confirm the pump ability over the whole range of temperature.

For continuous rotation at high speeds, oil lubrication may be required to minimize internal friction and oil circulation may be necessary to reduce the operating temperature.



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## **7. Re-greasing**

The required frequency of lubrication varies with the application.

Re-greasing not only replaces old grease in order to reduce friction, it also seals the bearing, flushes out contaminants and wear particles and protects against corrosion.

Therefore, as a general rule, the bearing should always be re-greased in such a way that there is always a collar of fresh grease around the whole circumference.

The bearings must be rotated during re-greasing, when that is not possible the number of fittings have to be increased in order to distribute the grease around the whole circumference.

We recommend to start with a frequency of lubrication of every 100 operating hours on slewing applications ( operating hours refers to the time the machine is in use, not to the bearing rotation )

If the existing grease coming out the bearing is in good condition the interval may be extended.

Continuous rotation motions, high moisture-, dust-, dirt- and temperature effects may require shorter periods.

Other applications require long-term lubrication, for special regulations please ask our engineers.

At the beginning and end of standstill times, re-greasing is absolutely necessary.