IMO Anlagenbau offers future-oriented products and solutions in the machine and plant manufacturing sector as well as environmental technology. In addition to standard machines and special machines, the company’s activities include development and implementation of solar tracking systems, as well as solar home systems. The IMO Anlagenbau experts also offer consulting support and take charge of turn-key projects.

IMO Antriebseinheit is specialized in developing and manufacturing pinion or worm driven Slew Drives. These patented component systems are used for example in manlift platforms, steering gears, construction machinery and solar trackers.

IMO Energy is one of the leading suppliers of yaw and blade bearings for onshore and offshore wind turbines. Slewing Rings manufactured by IMO Energy are also used as single main bearing for gear- and shaftless wind turbines and as blade bearing for tidal stream systems.

IMO Momentenlager is developing, manufacturing and supplying Ball and Roller Slewing Rings up to a diameter of 5,200 mm / 204.724 in in a wide range of products. They are used for instance in the following applications: special purpose machinery, construction machinery, cranes and manlift platforms, tunnel boring machines, ship building, medical technology and bulk handling.

IMO Holding acts as service provider for the other companies of the IMO Group. IMO Holding comprises the central departments of the Group such as quality assurance, finance, human resource, IT and marketing.
### Slewing Ring Design

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Single Row Ball Slewing Ring</td>
</tr>
<tr>
<td>2</td>
<td>Cross Roller Slewing Ring</td>
</tr>
<tr>
<td>3</td>
<td>Triple Row Roller Slewing Ring</td>
</tr>
<tr>
<td>4</td>
<td>Double Row Ball Slewing Ring</td>
</tr>
<tr>
<td>5</td>
<td>Roller / Ball Combination Slewing Ring</td>
</tr>
<tr>
<td>6</td>
<td>Gear rim / pinion / ring</td>
</tr>
<tr>
<td>7</td>
<td>Wire race bearing / fitting element</td>
</tr>
<tr>
<td>8</td>
<td>Double Axial Slewing Ring</td>
</tr>
<tr>
<td>9</td>
<td>Ball Slewing Ring with flange ring</td>
</tr>
<tr>
<td>0</td>
<td>Special Slewing Ring</td>
</tr>
</tbody>
</table>

### Gear Type

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>External toothed</td>
</tr>
<tr>
<td>2</td>
<td>Internal toothed</td>
</tr>
<tr>
<td>3-9</td>
<td>Identification for special designs</td>
</tr>
<tr>
<td>0</td>
<td>Untoothed</td>
</tr>
</tbody>
</table>

### Gear Rim and Pinions

- Pitch circle diameter [inches]
- Identification for special designs
- Module [inches]

### Gearing Heat Treatment

- Normalized
- Quenched and tempered
- Tooth flanks surface hardened
- Tooth flanks and roots surface hardened
- Identification for special designs
- Untoothed

### Drawing Reference Number

- 12 - 60 5012 / 2 - 01234

### Slewing Ring Nomenclature

- Raceway diameter [inches]
- Outside diameter [inches]
- Rolling element diameter [inches]
IMO has developed, designed, manufactured and sold large diameter anti-friction bearings globally for many years. Our current range of products up to a diameter of 5,200 mm (204 in) is presented in this catalog. Special designs are also available, please contact our Engineering Department for assistance (the contact details are on the back of the catalog).

In this catalog we provide you with comprehensive information about our standard range of Ball and Roller Slewing Rings. The catalog has a reference number on the front cover. Please always check this is the latest edition before using the information contained within it.

You will find the “Application Data Sheet” on pages 60/61 in this catalog. If you require assistance with any Slewing Ring application, please fill in this form. This gives us an overview of the application and represents a record of your requirements.

Slewing Rings are safety critical products. They have to meet your requirements exactly and perform in the environmental conditions of your application. Therefore, it is important to fill in the form completely, with as much details as possible and send it to us. You will then receive our recommendation for the right IMO product for your application and gain the benefit of years of experience meeting challenging customer requirements and operating conditions! If the application data sheet has already been removed we will be pleased to send you another one. The application data sheet can also be downloaded from our homepage www.goimo.com.

You can find information on our Slew Drive product line in the Slew Drive catalog ST105E and ST205US, which we will send you on request. Further details of our company, products, their application and utilization can be found in our detailed company brochure IM104E.

IMO terms and conditions shall apply to all quotations and purchase orders. Further we would like to ask you to follow closely our Installation and Operating Manuals which contain important data. You can find these on our homepage.

The observance of our Installation and Operating Manuals is important for the reliability and safety of our product and has a great influence on the service life. The Installation and Operating Manuals contain practical information to help you with the design of your mounting structure.

All the information in this catalog has been carefully evaluated and checked. We cannot accept responsibility for omissions and errors in this publication.
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Single Row Ball Slewing Rings  Series 116, 120, 125, 150  P. 52 - 59

Application Data Sheet - Slewing Rings  P. 60 - 61
### Product Line Overview / Comparison

<table>
<thead>
<tr>
<th>Design types</th>
<th>Series</th>
<th>Raceway diameters</th>
<th>Maximum tangential tooth force</th>
<th>Maximum tilting moment</th>
<th>Load carrying capacity</th>
<th>Weight</th>
<th>Clearance</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>$D_h$ [inch]</td>
<td>$F_{z \text{ max}}$ [lbs x 1000]</td>
<td>$M_{k \text{ max}}$ [lbs x 1000]</td>
<td>$C_{0 \text{ ax}}$ [lbs x 1000]</td>
<td>$C_{0 \text{ rad}}$ [lbs x 1000]</td>
<td>$G$ [lbs]</td>
</tr>
<tr>
<td>Ball Slewing Rings with flange rings</td>
<td>Series 920</td>
<td>from 12.24 to 42.95</td>
<td>from 6 to 9</td>
<td>from 12 to 111</td>
<td>from 47 to 164</td>
<td>from 20 to 70</td>
<td>from 42 to 192</td>
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<tr>
<td></td>
<td>Series 932*</td>
<td>from 37.60 to 57.28</td>
<td>from 15 to 19</td>
<td>from 325 to 764</td>
<td>from 619 to 943</td>
<td>from 231 to 353</td>
<td>from 289 to 551</td>
</tr>
<tr>
<td>Single Row Ball Slewing Rings</td>
<td>Series 116</td>
<td>from 3.94 to 19.69</td>
<td>from 3.6 to 4.2</td>
<td>from 2 to 37</td>
<td>from 23 to 116</td>
<td>from 11 to 57</td>
<td>from 11 to 53</td>
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<tr>
<td></td>
<td>Series 120</td>
<td>from 12.24 to 42.95</td>
<td>from 6 to 9</td>
<td>from 26 to 229</td>
<td>from 101 to 353</td>
<td>from 43 to 151</td>
<td>from 46 to 201</td>
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<tr>
<td></td>
<td>Series 125</td>
<td>from 17.91 to 57.28</td>
<td>from 12 to 19</td>
<td>from 89 to 851</td>
<td>from 273 to 872</td>
<td>from 102 to 326</td>
<td>from 117 to 514</td>
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<tr>
<td></td>
<td>Series 150</td>
<td>from 70.87 to 110.24</td>
<td>from 51 to 65</td>
<td>from 2110 to 5169</td>
<td>from 1894 to 2945</td>
<td>from 708 to 1101</td>
<td>from 1680 to 2657</td>
</tr>
</tbody>
</table>

*Typical applications: Simple turntables, slewing mechanisms, bogies, light cranes and construction machinery.*

*Typical applications: Turntables, slewing mechanisms, bogies, light to medium-sized cranes and construction machinery, wind energy turbines, handling equipment.*

---

1) The data refers to the minimum and maximum diameter per series

2) The tilting moment capacity for each unit should be confirmed by referring to the limiting load diagram for each individual model.

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(*) This series is not part of the catalog. For details about this series please have a look at www.goimo.com or contact our US office.

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1) Load carrying capacity 0 - 11.81 Axial tilting clearance 0 - 19.69
2) Radial clearance 0 - 7.87 Axial tilting clearance 0 - 15.75
3) Radial clearance 0 - 9.84 Axial tilting clearance 0 - 15.75
4) Radial clearance 0 - 11.81 Axial tilting clearance 0 - 19.69
5) Radial clearance 0 - 7.87 Axial tilting clearance 0 - 15.75
<table>
<thead>
<tr>
<th>Design types</th>
<th>Series</th>
<th>Raceway diameters</th>
<th>Maximum tangential force (f_{t \text{ max}}) (\text{lbs x 1000})</th>
<th>Maximum tilting moment (M_{t \text{ max}}) (\text{ft-lbs x 1000})</th>
<th>Load carrying capacity (C_{0 \text{ rad}}) (\text{lbs x 1000})</th>
<th>Static axial load rating (C_{0 \text{ ax}}) (\text{lbs x 1000})</th>
<th>Weight (G) (\text{lbs})</th>
<th>Clearance (G) [\text{milli inch}]</th>
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</thead>
<tbody>
<tr>
<td>Double Axial Slewing Rings</td>
<td>Series 840(^*)</td>
<td>(D_{t}) [inch]</td>
<td>(f_{t \text{ max}}) (\text{lbs x 1000})</td>
<td>(M_{t \text{ max}}) (\text{ft-lbs x 1000})</td>
<td>(C_{0 \text{ rad}}) (\text{lbs x 1000})</td>
<td>(C_{0 \text{ ax}}) (\text{lbs x 1000})</td>
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<td>Radial clearance 0 - 15.75 Axial clearance 0 - 15.75</td>
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<tr>
<td></td>
<td></td>
<td>from 86.57 to 129.92</td>
<td>from 69 to 92</td>
<td>from 3233 to 6812</td>
<td>from 2335 to 3504</td>
<td>from 467 to 700</td>
<td>from 2729 to 4341</td>
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<td></td>
<td>Series 850(^*)</td>
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<td>Radial clearance 0 - 12.60 Axial clearance 0 - 12.60</td>
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<td></td>
<td>from 100.75 to 162.99</td>
<td>from 91 to 111</td>
<td>from 4913 to 11926</td>
<td>from 3278 to 5303</td>
<td>from 664 to 1068</td>
<td>from 4171 to 7236</td>
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<tr>
<td>Roller / Ball Combination Slewing Rings</td>
<td>Series 532(^*)</td>
<td>(D_{t}) [inch]</td>
<td>(f_{t \text{ max}}) (\text{lbs x 1000})</td>
<td>(M_{t \text{ max}}) (\text{ft-lbs x 1000})</td>
<td>(C_{0 \text{ rad}}) (\text{lbs x 1000})</td>
<td>(C_{0 \text{ ax}}) (\text{lbs x 1000})</td>
<td></td>
<td>Radial clearance 0 - 15.75 Axial clearance 0 - 15.75</td>
</tr>
<tr>
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<td></td>
<td>from 139.76 to 167.32</td>
<td>from 66 to 66</td>
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<td>Series 540(^*)</td>
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<td></td>
<td></td>
<td>Radial clearance 0 - 15.75 Axial clearance 0 - 15.75</td>
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<tr>
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<td></td>
<td>from 167.32 to 192.91</td>
<td>from 101 to 101</td>
<td>from 20395 to 27119</td>
<td>from 10055 to 11593</td>
<td>from 315 to 364</td>
<td>from 7648 to 8818</td>
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</tbody>
</table>

1) The data refers to the minimum and maximum diameter per series
2) This series is not part of the catalog. For details about this series please have a look at www.goimo.com or contact our US office.

Typical applications:
- Turntables, slewing mechanisms, bogies, winders, medium-sized to large cranes and construction machinery. Applications such as for Single Row Ball Slewing Rings with higher axial load.
- Reclaimers, stackers and other equipment for bulk materials handling, turntables.
## Product Line Overview / Comparison

### Triple Row Roller Slewing Rings

**Typical applications:** Heavy harbour cranes, shipboard cranes, ladle turrets and grab cranes, radar antennas, wind energy turbine main bearings, tunnel boring machines and loading buoys (oil, gas swivels), machine tools (in general where the application requires high duty cycles).

<table>
<thead>
<tr>
<th>Design types</th>
<th>Series</th>
<th>Raceway diameters</th>
<th>Maximum tangential tooth force</th>
<th>Maximum tilting moment</th>
<th>Load carrying capacity</th>
<th>Weight</th>
<th>Clearance</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>from 49.21 to 78.74</td>
<td>from 42 to 72</td>
<td>from 1280 to 3257</td>
<td>from 1660 to 2655</td>
<td>from 132 to 222</td>
<td>from 1188 to 2011</td>
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</tr>
</tbody>
</table>

**Typical applications:** Turntables, slewing mechanisms, bogies, light to medium-sized cranes, construction machinery, wind energy turbines and winders (applications such as double axial Slewing Rings with increased radial load).

<table>
<thead>
<tr>
<th>Design types</th>
<th>Series</th>
<th>Raceway diameters</th>
<th>Maximum tangential tooth force</th>
<th>Maximum tilting moment</th>
<th>Load carrying capacity</th>
<th>Weight</th>
<th>Clearance</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>from 70.87 to 110.24</td>
<td>from 69 to 101</td>
<td>from 3152 to 7775</td>
<td>from 2924 to 4548</td>
<td>from 303 to 403</td>
<td>from 2427 to 3935</td>
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</tr>
</tbody>
</table>

**Typical applications:** Heavy harbour cranes, shipboard cranes, ladle turrets and grab cranes, radar antennas, wind energy turbine main bearings, tunnel boring machines and loading buoys (oil, gas swivels), machine tools (in general where the application requires high duty cycles).

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<tr>
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<th>Load carrying capacity</th>
<th>Weight</th>
<th>Clearance</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>from 88.19 to 157.48</td>
<td>from 90 to 126</td>
<td>from 5980 to 19080</td>
<td>from 4351 to 7769</td>
<td>from 419 to 780</td>
<td>from 4354 to 8272</td>
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</tbody>
</table>

**Typical applications:** Turntables, slewing mechanisms, bogies, light to medium-sized cranes, construction machinery, wind energy turbines and winders (applications such as double axial Slewing Rings with increased radial load).

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<tr>
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<th>Load carrying capacity</th>
<th>Weight</th>
<th>Clearance</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>from 110.24 to 177.17</td>
<td>from 118 to 166</td>
<td>from 9957 to 27541</td>
<td>from 6289 to 10107</td>
<td>from 525 to 878</td>
<td>from 7083 to 11927</td>
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</tbody>
</table>

**Typical applications:** Turntables, slewing mechanisms, bogies, light to medium-sized cranes, construction machinery, wind energy turbines and winders (applications such as double axial Slewing Rings with increased radial load).

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<th>Weight</th>
<th>Clearance</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>from 124.02 to 187.01</td>
<td>from 171 to 184</td>
<td>from 15543 to 35662</td>
<td>from 8276 to 12480</td>
<td>from 875 to 1381</td>
<td>from 11305 to 17350</td>
<td></td>
</tr>
</tbody>
</table>

1) The data refers to the minimum and maximum diameter per series
2) The tilting moment capacity for each unit should be confirmed by referring to the limiting load diagram for each individual model
3) This series is not part of the catalog. For details about this series please have a look at www.goimo.com or contact our US office.
Product Line
Slewing Rings

- Replaces traditional systems using fixed and floating bearings as well as king pins
- Ball and Roller Type Slewing Ring configurations
- Available in diameters from 100 to 5,200 mm (3.937 to 204.724 in)
- Integrated mounting holes
- Available with integral internal or external gearing of bearing rings (module 1 to 30 mm / 25.4 to 0.846 in)
- Sealed raceway system with grease lubrication
- Standard series and special designs
- Certified to meet EN 10204 requirements for materials, dimensions and operating specifications

Large-diameter anti-friction Slewing Rings designed to handle simultaneously occurring axial, radial and moment loads.

A comparison of the Slewing Rings:
- On the left are the smallest (internal diameter 40 mm / 1.575 in) and the largest (outside diameter 5,200 mm / 204.724 in)
- IMO Slewing Rings.
- Below is the smallest raceway roller which we use (diameter 12 mm / 0.472 in) and the largest ball (diameter 70 mm / 2.756 in).

“Diameters up to 5,200 mm / 204.724 in - we supply XXL Slewing Rings!”

IMO cannot perform miracles, but we will do our utmost to meet what others describe as 'impossible' delivery requirements. IMO’s Express Service has already met the emergency needs of many customers. Try us!”

Services
Express Service

IMO is able to offer you a unique service on the market: Depending on the size and features of the Slewing Ring we are able to manufacture and deliver urgently needed spare parts or prototypes in only a few weeks whether standard or special designs.

“IMO cannot perform miracles, but we will do our utmost to meet what others describe as 'impossible' delivery requirements. IMO’s Express Service has already met the emergency needs of many customers. Try us!”
Ball Slewing Rings with flange rings

- Single row design with four-point raceway geometry
- Untoothed rings with flange thicknesses of 12 and 21 mm / 0.472 and 0.827 in
- Ball diameters 20 and 32 mm / 0.788 and 1.260 in
- Available ex stock or with a short delivery time as standard series in 14 sizes
- Raceway diameters of 311 to 1,091 mm or 1,023 to 42.953 in / 12.244 to 42.953 in or 37.598 to 57.283 in
- For applications with light loads
- Enables lightweight structures in spite of large bearing diameters
- Applications: Handling technology, manlift platforms, turntables

Roller / Ball Combination Slewing Rings

- Roller raceway to take up the axial loads
- Ball raceway provides support for radial loads. All parts are retained together as a unit during fitting
- Ball diameters 25 to 70 mm / 0.984 to 2.756 in, roller diameters up to 100 mm / 3.937 in
- Used in applications with a dominant axial force and low radial load / tilting moments
- Standard series with outside diameters up to 5,176 mm / 203.780 in
- Frequently produced as special designs according to customer requirements
- Typical applications: Bulk materials handling, stacker reclaimers, bucket wheel excavators, machine tools

Ball Slewing Rings

- Single row (picture above) and double row (picture below) designs
- Ball diameters 12 to 70 mm / 0.472 to 2.756 in
- Four-point raceway geometry
- Optional preloaded raceway system and centerings
- Enables robust designs for arduous application conditions
- High resistance to ‘false brinelling’ in heavy vibration conditions
- Reduced sensitivity to shape deformations in the mounting structure
- Higher static load capacity than similar design Cross Roller Slewing Rings
- Catalog series with outside diameters from 180 to 2,971 mm / 7.087 to 116.968 in
- Often designed as special versions according to customer requirements (outside diameters up to 5,200 mm / 204.724 in)
- Frequently used in wind energy turbines, cranes, construction machinery, mechanical engineering and special purpose machinery

Roller Slewing Rings

- Catalog series with outside diameters from 180 to 2,971 mm / 7.087 to 116.968 in
- Often designed as special versions according to customer requirements (outside diameters up to 5,200 mm / 204.724 in)
- Frequently used in wind energy turbines, cranes, construction machinery, mechanical engineering and special purpose machinery

IMO
Cross Roller Slewing Rings
- Single row roller raceway under 45 degrees
- Roller diameters 12 to 60 mm / 0.472 to 2.362 in
- Alternately arranged rolling elements
- Constant friction torque with different loads
- Higher dynamic service life than similar Ball Slewing Ring designs
- Higher demands on the rigidity and precision of the mounting structure in comparison with Ball Slewing Rings

Applications: Robots, antennas, medical technology, positioning devices, machine tools

Can be supplied to special customer requirements

Double Axial Slewing Rings
- Double row design with large supporting balls and smaller retaining balls
- Ball diameters 20 to 70 mm / 0.787 to 2.756 in
- Both raceways in two point geometry
- Frequently replaced by double row Ball Slewing Rings in new designs
- Standard series with outside diameters up to 5,200 mm / 204.724 in
- Used in cranes and as replacement parts for existing equipment
- Special designs can be supplied

Ball diameters 20 to 70 mm / 0.787 to 2.756 in
Both raceways in two point geometry
Frequently replaced by double row Ball Slewing Rings in new designs
Standard series with outside diameters up to 5,200 mm / 204.724 in
Used in cranes and as replacement parts for existing equipment
Special designs can be supplied

Roller Slewing Rings
- Triple Row Roller Slewing Rings
- Roller diameters 10 to 100 mm / 0.393 to 3.937 in
- Plastic, steel or brass cage segments according to loads (can also be supplied with closed cage)
- Designed to provide the combination of the highest capacity in the smallest configuration
- Greater static and dynamic load capacity, higher rigidity and constant friction torque compared with all other Slewing Ring designs (with the same raceway diameter)
- High requirements on the rigidity and precision of the mounting structure
- Standard series with outside diameters from 1,462 to 5,179 mm / 57.559 to 203.897 in
- Mostly supplied as customer specific designs

Roller Slewing Rings
- Triple Row Roller Slewing Rings
- Roller diameters 10 to 100 mm / 0.393 to 3.937 in
- Plastic, steel or brass cage segments according to loads (can also be supplied with closed cage)
- Designed to provide the combination of the highest capacity in the smallest configuration
- Greater static and dynamic load capacity, higher rigidity and constant friction torque compared with all other Slewing Ring designs (with the same raceway diameter)
- High requirements on the rigidity and precision of the mounting structure
- Standard series with outside diameters from 1,462 to 5,179 mm / 57.559 to 203.897 in
- Mostly supplied as customer specific designs
Surface coating
Depending on the requirements of the application, the surfaces of our Slewing Rings can be provided with metallic and non-metallic coatings, which ensure effective corrosion protection.

ZnFeCo coating, dark-coloured, according to MIL specification
ZnFe coating
Priming and multi-coat painting
Zinc-coated surface (flame-sprayed)

Gearing
We supply Slewing Rings with internal, external, straight and helical gears, (in various heat treated conditions) as well as untoothed Slewing Rings. The point of maximum runout of the gearing at which the circumferential backlash of the pinion should be adjusted, is marked in green.

External straight gear, quenched and tempered
External helical gear, normalized
We supply modules from 1 to 30 mm / Pd from 25.4 to 0.846 1/in (pictured: Modules 3 mm and 20 mm / Pd 8.47 and 1.27 1/in)
Quenched and tempered ring, induction hardened wear resistant tooth flanks
Hardened tooth flanks and roots

External toothed Slewing Ring, quenched and tempered rings, raceway 3,000 mm, module 20 mm / 118.11 in, Pd 1.27 1/in
Teeth in only one segment
Special Slewing Rings with ceramic balls (dry running), stainless steel rings, square-sectioned raceway (low friction torque) and labyrinth seal.

Ceramic and steel balls

Series 920 Slewing Rings, but with stainless steel rings and rollers

Seals

NBR70 seal fixed with stainless steel wire

Steel plate as primary seal

Rolling element separation

Steel cage segments for a crane Slewing Ring

Brass cage for Ball Slewing Ring with longer service life and higher rotational speed requirements

Plastic cage for high circumferential speeds

Plastic spacers for low circumferential speeds

Rolling element guided brass roller cage made for horizontal axis rotation
Eccentric bearing unit from a machine tool used for diesel engine crankshaft machining. The bearing unit contains two high precision Cross Roller raceways and one slide bearing. The integrated toothing makes it possible to adjust the eccentricity allowing machining of all crankshaft bearing surfaces in just one operation. The unit has an external diameter of around 1,200 mm / 47.244 in. Completely manufactured by IMO!

Other special designs
- Slewing Rings matched to customer requirements, e.g. custom mounting hole patterns or prototype designs
- Geometry of the Slewing Ring adapted to the installation conditions
- Suitable for extreme temperatures and vacuums
- Special cages for high circumferential speeds
- Special sealing systems for specific applications
- Special lubrication according to customer requirements
- Rings made of special materials

Imagine you require a special Slewing Ring that does not show any linear expansion with temperature increase and no shrinkage as it cools. Do you think this is impossible? Are you sure?

Customer specific wire race bearing with rings manufactured from a high nickel rich material with a thermal expansion coefficient of practically zero. Such a bearing was developed and manufactured by IMO!

Split Slewing Rings are ideal for situations where a bearing has to be fitted around an existing structure, or where complete dismantling of a machine would be uneconomic. Typical applications are stone compactors, tool magazines and yaw bearings of clarification plants.

“We show what is possible!”

IMO: “Engineering at its best!”
We manufacture gear rims up to outside diameters of 5,250 mm / 206.692 in and module 30 mm / $P_d = 0.846 \text{ in}$.

Double Row Angular Contact Cylindrical Roller Slewing Ring for the chain wheel of a tracklaying vehicle. These separable rings are not self-supporting but integrated into the housing as individual parts by the customer.

We supply customer specific pinions from 12 mm module / $P_d = 2.12 \text{ in}$.

We also supply complete solutions!

Our pinion and worm driven Slew Drives are ready to install system modules consisting of:
- A Ball or Roller Slewing Ring
- Hydraulic or electric motors (direct drive or with gearbox)
- A totally enclosed housing
- Attachments on request (brakes, position feedback sensors)

Bolt on the Slew Drive, connect the motor and start slewing - as simple as that!

IMO’s innovative Slew Drives have a lot to offer:
- No adjusting of components
- Complete system instead of many single parts
- Compact design
- High output torques thanks to the high gear ratio
- and are used in many applications such as steering gear in special vehicles, hinges in manlift platforms, in cranes and in attachments for stackers and excavators.

You can find our complete standard lines in our Product Catalog ST 305 US. We also supply customized designs. Request a copy of the catalog straight away by e-mail: slew.drives@goimo.com.
IMO Slewing Rings - approved for use in arctic conditions (operation down to -22°F, proof of structural integrity under load at -40°F)

Offshore - the future!

The nacelle with Yaw Bearing already attached, is lowered onto the turbine tower.

Single Row Ball Slewing Ring, with internal teeth, zinc coated surface (flame-sprayed) and painted. Used on top of the turbine tower as a Yaw Bearing to allow the nacelle and rotor to orientate into wind.

Double Row untoothed Ball Slewing Ring, with cage and special seals, zinc coated surfaces (flame-sprayed) and painted. Such Slewing Rings are used to adjust the rotor blades (three per wind turbine).

Slewing Ring in delivery condition, unpacked: Raceway soft spots marked with “S”, nameplate in the vicinity of the filling plug (here with customer specific barcode).

Tidal Energy

IMO blade bearings are used in tidal stream systems in a water depth of 20 m / 65.616 ft.

Wind Energy Turbines

A wind energy turbine with a rotor diameter of 82 m / 269 ft and a power of 1.65 MW. This turbine can provide electric power for 1,200 homes. IMO develops Slewing Rings for such wind energy turbines with the latest equipment according to recognized procedures. The calculation is carried out according to the relevant regulations from Germanischer Lloyd, the DNV and other well-known certifying authorities.
Shipboard cranes

Harbour cranes, mobile harbour cranes

Railway slewing cranes

Specifications:
- Outside diameter 5,000 mm / 196.85 in
- Support roller diameter 50 mm / 1.968 in
- Maximum permissible tilting moment 65,000 kNm / 47941400 ft-lbs
- Module 24 mm / 0.945 in
- Weight 8,500 kg / 18739.1 lbs

Triple Row Roller Slewing Ring with an outside diameter of about 5,000 mm / 196.85 in and root and flank hardened internal toothing. This Slewing Ring for an Indonesian harbour pontoon crane was manufactured and shipped by IMO in only 8 weeks.
Special Slewing Rings (wire race bearing) with stainless steel rings for a slip ring assembly on an FPSO. A highly accurate and very narrow bearing gap ensures the necessary EExd - explosion pressure protection. In the case of an explosion on the upper side of the wire race bearing there must be no possibility of ignition sparks penetrating through the bearing and causing a secondary detonation on the lower side.

Ball Slewing Ring with root and flank hardened external toothing for a ship’s thruster on a vessel. The stamp by Lloyd’s Register of Shipping can be clearly seen. With our partners we are able to fulfill the specifications of all leading certifying authorities.

FPSOs (Floating Production Storage Offloading) are oil processing ships which pump crude oil from the bottom of the sea by injecting high-pressure media. The ship ‘weather vaines’ around a swivel incorporating a Triple Row Roller Slewing Ring.

Applications
Offshore And FPSOs

Slewing Rings for offshore applications are always subject to special approval requirements from the respective certifying authority. The rolled rings must demonstrate a notched bar impact strength of an average of 42 J at -4°F.

The picture below shows the final assembly of an internal toothed Triple Row Roller Slewing Ring for a large offshore crane.
This stacker on board of a ship is swivelled by means of an internal toothed Triple Row Roller Slewing Ring.

Specification:
- Outside diameter 3,250 mm / 127.952 in
- Maximum tilting moment 13,000 kNm / 9588290 ft-lbs

Applications
Bulk Handling And Materials Handling

Bulk materials handling in the harbour is carried out by stackers and reclaimers, which are equipped with external toothed, Roller / Ball Combination Slewing Rings with raceways in a diameter range of 4 to 5 m / 13.123 to 16.404 ft.

Specification:
- Stack/ reclaimer with 80 m / 262.464 ft boom
- Outside diameter 4,300 mm / 169.291 in
- Roller diameter 40 mm / 1.575 in
- Ball diameter 32 mm / 1.260 in
- Maximum axial force 4,000 kN / 899236 lbs
- Maximum swivelling moment 6,000 kNm / 4425360 ft-lbs
The erector uses a Cross Roller Slewing Ring for lifting and positioning the concrete lining segments (Tubbing) which are used for strengthening the tunnel walls.

Tunnel boring machines use large and heavy Triple Row Roller Slewing Rings in cutting heads.

We manufacture Triple Row Roller Slewing Rings for cover swing gears of electric arc furnaces (so-called EAFs, picture above) as well as Triple Row Roller Slewing Rings for ladle turrets (picture below).

Specifications:
- Raceway diameter: 4,500 mm / 177.165 in
- Outside diameter: 4,700 mm / 185.039 in
- Roller diameter: 40 mm / 1.575 in
- Double lip seals with primary labyrinth

Tunnel boring machines use large and heavy Triple Row Roller Slewing Rings in cutting heads.

Triple Row Roller Slewing Ring for a micro tunnel boring machine.
The Ball Slewing Ring shown has special seals and compensates for the relative rotational movements of the split rollers (the actual rollers).

Tandem asphalt compaction rollers use untoothed Slewing Rings as steering bearings, which are coated to prevent corrosion.

Ball Slewing Rings with a horizontal rotating axis are used in the knuckle joint of the refuse compactor.

Precision Single Row Ball Slewing Rings with cages are used for the rotating carousels in fast running blow moulders for the production of polyethylene PET bottles. Such Slewing Rings run continuously and reliable service life is an essential design criterion.

Applications

Construction Machinery

Special Purpose Machinery
Linear accelerators are used in oncology for radiation therapies. The Ball Slewing Rings with horizontal rotational axes have to be highly precise with a minimum of running noise and friction torque.

Variable winding and unwinding systems in printing machines require high precision. Smooth running Cross Roller Slewing Rings fulfill all required criterion and are perfectly adaptable for this application. In this picture you can see a Cross Roller Slewing Ring, partly assembled with a raceway diameter of approximately 1,300 mm / 51.181 in.

In Cross Roller Slewing Rings, the rollers are arranged crosswise and run in a square sectioned raceway.

Linear accelerators are used in oncology for radiation therapies. The Ball Slewing Rings with horizontal rotational axes have to be highly precise with a minimum of running noise and friction torque.
## Technical Information

### Symbols and units

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>C_a</td>
<td>lbs</td>
</tr>
<tr>
<td>C_axf</td>
<td>lbs</td>
</tr>
<tr>
<td>C_axd</td>
<td>lbs</td>
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<tr>
<td>C_rad</td>
<td>lbs</td>
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<td>C_sp</td>
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<tr>
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<td>D_b</td>
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<tr>
<td>M_w</td>
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<td>S_Rad</td>
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<td>b_8</td>
<td>inch</td>
</tr>
<tr>
<td>b_9</td>
<td>inch</td>
</tr>
<tr>
<td>M_d</td>
<td>ft-lbs</td>
</tr>
</tbody>
</table>

### Function

#### Construction and function of a Slewing Ring

Slewing Rings consist of an internal (1) and external ring (2) and with an integrated raceway system and optional internal or external toothing (3). A functional seal (4) protects the raceway system on the upper and lower sides. Slewing Rings are designed for grease lubrication which is carried out via grease nipples (5).

In Slewing Rings, the rolling elements (6) carry the loads between the inner and outer ring. The load capacity of the raceway system is determined predominantly by the raceway design, the hardening depth, and the number and size of the rolling elements. Spacers (7) separate the rolling elements and minimise friction and wear. The rolling elements are inserted during manufacture through the filling plug hole (8), retained by the filling plug which is then secured by a pin (9). The force is transmitted to the mounting structure by bolts. Through holes or threaded holes (10) can be provided in the inner and outer rings for these bolts.

#### Load distribution

Depending on external load, the load distribution and the contact angle around the rolling elements will vary.

- In the case of axial load, all rolling elements are loaded in the same direction.
- In the case of radial load, a segment of the rolling elements carries the load.
- In the case of tilting moment load, a segment on one side and a segment on the opposite side of the raceway carry the load.

Mostly, a combination of axial, radial and tilting moment loads occur (Fig. 2).
Selection criteria
The following criteria must be considered for the correct selection of a Slewing Ring.

Direction of rotational axis
Vertical: Slewing Rings of all series can be used.
Horizontal: Slewing Rings of all series can be used. The permissible rotational speed has to be limited to half of the value of the vertical rotational speed.
Alternating: Here the same conditions apply as for a horizontal rotational axis.

Loads
External forces such as axial loads, radial loads and tilting moment must lie below the static limiting load curve, as regards their operating load point. For this, please refer to the chapters "Static capacity of raceway" and "Mounting bolts".

Shocks, vibrations
To account for the peculiarities of the different applications the shock factors for gears and the raceway system should be considered.

Torque / tooth forces
The required torque must not exceed the maximum permissible torques and tooth forces given in the Technical Information section. Explanations of the different torque specifications can be found in the gear section on page 43.

Rotational speed
The following is a list of the maximum permissible rotational speeds $n_{perm}$ for the different series:

- **Series 116 Slewing Rings:**
  \[
  n_{perm} = \frac{3200}{d_a}
  \]
- **Series 120, 125, 150 and 920 Slewing Rings:**
  \[
  n_{perm} = \frac{1600}{d_a}
  \]
- With horizontal axis of rotation:
  \[
  n_{perm} = \frac{500}{d_a}
  \]

Pressure washing must not be used to clean Slewing Rings.

Operating temperature
Standard IMO Slewing Rings can be used in ambient temperatures from -13°F up to 158°F. Please contact us in the case of higher or lower operating temperatures.

Duty
For continuous running or high duty applications it is essential to check the service life of the Slewing Ring and, if necessary, the gearing. Please contact our Engineering Department for assistance.

Static load capacity of raceway
Static load capacity of the Slewing Ring is determined by:

- Hardening depth of the raceway
- Number and size of the rolling elements
- Slewing Ring design
- Raceway geometry

The limiting load diagram shows the permissible axial and tilting moment loads for the respective size unit. Each loading case including the required or recommended safety must lie below the limiting load line for the selected Slewing Ring.

Limiting load diagrams are valid under the following condition:

- Static loading
- Limiting load line with safety 1
- Bolt clamping length between 5 and 10 times the bolt diameter
- Continuous threads up to bolt head are not permissible
- Strength of bolts according to grade B
- All mounting holes used
- "Compressive" axial load (load applied according to fig. 5)
- Adequately stiff and level mounting structure
- Minimum strength of mounting structure >72500 psi
- Radial leading considered as specified
- Compliance with "Installation and Operating Manual"

Equivalent Axial Force
\[
F_{ax,eq} = F_{ax} + f_a \cdot S_0
\]
To account for the prevailing radial load the tilting moment is increased correspondingly, at the same time the radial components from the gearing are also to be taken into account.

Equivalent Radial Force
\[
F_{rad,eq} = \frac{F_{rad,Z} + F_{rad,D}}{\cos \theta}
\]

Equivalent Tilting Moment
\[
M_{eq} = M_k \cdot f_a + 0.144 \cdot F_{ax,eq} \cdot d_a
\]

This equation applies only if:
\[
(F_{rad,Z} + F_{rad,D}) \leq 2.4 \times \frac{M_k}{d_a} + 0.046 \times F_{ax}
\]

Table 1: Application service factors
In the case of applications with higher duty factors or continuous running it is recommended that a calculation of service life is carried out. Please contact our Engineering Department for assistance.

The application service factors and the required static safety $S_0$ for the existing loads are to be taken account of in the following equations:

<table>
<thead>
<tr>
<th>Application</th>
<th>Application service factor $f_a$</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Construction machinery</td>
<td>1.25</td>
<td>Normal operation</td>
</tr>
<tr>
<td>Ferrous machinery</td>
<td>1.50</td>
<td>Rough operation</td>
</tr>
<tr>
<td>Forgings</td>
<td>1.75</td>
<td>Rough operation</td>
</tr>
<tr>
<td>Rail vehicles</td>
<td>1.30</td>
<td>Normal operation</td>
</tr>
<tr>
<td>Shipyard cranes</td>
<td>1.25</td>
<td>Normal operation</td>
</tr>
<tr>
<td>Cranes</td>
<td>1.25</td>
<td>Average operation</td>
</tr>
<tr>
<td>Cranes</td>
<td>1.45</td>
<td>Heavy operation</td>
</tr>
<tr>
<td>Stacker &amp; attachments</td>
<td>1.10</td>
<td>Light shocks</td>
</tr>
<tr>
<td>Wind power turbines</td>
<td>2.00</td>
<td>Risk of fatigue</td>
</tr>
<tr>
<td>Machine tools</td>
<td>1.50</td>
<td>Precision required</td>
</tr>
</tbody>
</table>

Technical Information
- Axial loads can be either "compressive" or "suspended".
- "Suspended" axial loads and the load on a rising segment in tilting moments must be adequately resisted by mounting bolts (Fig. 3). (Note: Catalog bolt data is not valid in this case!)
- Radial loads must be transmitted by means of frictional contact between Slewing Ring and the attached mounting structure.
- A good bolt connection is vital for satisfactory function of the Slewing Ring.
- The bolt connection and tilting clearance of the Slewing Ring must be checked regularly.

All catalog bolt data is valid only for "compressive" loads as shown in Figure 4.

Gear
Our standard Slewing Rings are designed with spur gears. Permissible torques are specified in the Slewing Ring tables.

Sealing
Polymer seals protect the Slewing Rings from normal dirt penetration, dust and light sprayed water. For very dirty and wet environments, Polymer seals protect the Slewing Rings from normal dirt penetration, dust and light sprayed water. For very dirty and wet environments,

Duty
For continuous running or high duty applications it is essential to check the service life of the Slewing Ring and, if necessary, the gearing. Please contact our Engineering Department for assistance.

Static load capacity of raceway
Static load capacity of the Slewing Ring is determined by:

- Hardening depth of the raceway
- Number and size of the rolling elements
- Slewing Ring design
- Raceway geometry

The limiting load diagram shows the permissible axial and tilting moment loads for the respective size unit. Each loading case including the required or recommended safety must lie below the limiting load line for the selected Slewing Ring.

Limiting load diagrams are valid under the following condition:

- Static loading
- Limiting load line with safety 1
- Bolt clamping length between 5 and 10 times the bolt diameter
- Continuous threads up to bolt head are not permissible
- Strength of bolts according to grade B
- All mounting holes used
- "Compressive" axial load (load applied according to fig. 5)
- Adequately stiff and level mounting structure
- Minimum strength of mounting structure >72500 psi
- Radial leading considered as specified
- Compliance with "Installation and Operating Manual"

Equivalent Axial Force
\[
F_{ax,eq} = F_{ax} + f_a \cdot S_0
\]
To account for the prevailing radial load the tilting moment is increased correspondingly, at the same time the radial components from the gearing are also to be taken into account.

Equivalent Radial Force
\[
F_{rad,eq} = \frac{F_{rad,Z} + F_{rad,D}}{\cos \theta}
\]

Equivalent Tilting Moment
\[
M_{eq} = M_k \cdot f_a + 0.144 \cdot F_{ax,eq} \cdot d_a
\]

This equation applies only if:
\[
(F_{rad,Z} + F_{rad,D}) \leq 2.4 \times \frac{M_k}{d_a} + 0.046 \times F_{ax}
\]

Table 1: Application service factors
In the case of applications with higher duty factors or continuous running it is recommended that a calculation of service life is carried out. Please contact our Engineering Department for assistance.

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- Axial loads can be either "compressive" or "suspended".
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- A good bolt connection is vital for satisfactory function of the Slewing Ring.
- The bolt connection and tilting clearance of the Slewing Ring must be checked regularly.

All catalog bolt data is valid only for "compressive" loads as shown in Figure 4.

Gear
Our standard Slewing Rings are designed with spur gears. Permissible torques are specified in the Slewing Ring tables.

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Polymer seals protect the Slewing Rings from normal dirt penetration, dust and light sprayed water. For very dirty and wet environments, polymer seals protect the Slewing Rings from normal dirt penetration, dust and light sprayed water. For very dirty and wet environments,

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For continuous running or high duty applications it is essential to check the service life of the Slewing Ring and, if necessary, the gearing. Please contact our Engineering Department for assistance.

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Limiting load diagrams are valid under the following condition:

- Static loading
- Limiting load line with safety 1
- Bolt clamping length between 5 and 10 times the bolt diameter
- Continuous threads up to bolt head are not permissible
- Strength of bolts according to grade B
- All mounting holes used
- "Compressive" axial load (load applied according to fig. 5)
- Adequately stiff and level mounting structure
- Minimum strength of mounting structure >72500 psi
- Radial leading considered as specified
- Compliance with "Installation and Operating Manual"

Equivalent Axial Force
\[
F_{ax,eq} = F_{ax} + f_a \cdot S_0
\]
To account for the prevailing radial load the tilting moment is increased correspondingly, at the same time the radial components from the gearing are also to be taken into account.

Equivalent Radial Force
\[
F_{rad,eq} = \frac{F_{rad,Z} + F_{rad,D}}{\cos \theta}
\]

Equivalent Tilting Moment
\[
M_{eq} = M_k \cdot f_a + 0.144 \cdot F_{ax,eq} \cdot d_a
\]

This equation applies only if:
\[
(F_{rad,Z} + F_{rad,D}) \leq 2.4 \times \frac{M_k}{d_a} + 0.046 \times F_{ax}
\]
Should the value be exceeded, the limiting load diagram no longer applies. Please contact our Engineering Department for assistance.

Calculation example:

**Application:** Slewing equipment for a construction machine under normal operation, no additional safety factor Fc (Fc = 1) is required.

**Load:**
- Axial load: 36000 lbs
- Radial load: 1300 lbs
- Tilting moment load: 88500 ft-lbs

**Slewing Ring:** Pre-selected series 120

Type 10-20 0941 / 0-02062

The following values are achieved with an application service factor of 1.25:

**F_{Rad}** = 36000 lbs • 1.25 = 45000 lbs

**F_{Ax}** = 1300 lbs • 1.25 = 1630 lbs

**M_{L}** = 88500 • 1.25 + 0.144 • 1630 • 37.1 = 119333 ft-lbs

At this point it can be verified in the limiting load diagram, whether or not the pre-selected Slewing Ring is statically adequate.

### Mounting bolts

Prevaling loads must be safely transmitted. To ensure this, mounting bolts should be sized to handle the raceway loading. The bolt curve is depicted in the static limiting load diagram subject to the following conditions:

- Quote the fulfillment of the conditions in the case of considering the static load capacity of the raceway.
- The limiting load diagram is applicable for “compressive” loads (see Fig. 4).
- In the case of “suspended” loads, the bolts are subject to additional tensile forces. Please contact our Engineering Department for assistance.

The bolts of strength grade 8 are tightened according to specification with a torque wrench (nA = 1.6). You can find the tightening torques in our Installation and Operating Manual.

- The bolts above M30 should be tightened with an hydraulic tightening device to 85% of the yield point. Details on this can be found in our Installation and Operating Manual.

- For Slewing Rings with through holes, use the largest possible metric bolts with regular threads.

### Static load carrying capacity of the mounting bolts

Determine the operation load level, both with and without radial load, occurs along with the verification of the static load carrying capacity of the raceway.

If the prevailing load case lies below the limiting load line in the static limiting load diagram then the bolted connection is statically adequately dimensioned.

### Dynamic load carrying capacity of the mounting bolts

Mostly, static dimensioning of a mounting bolt is sufficient. In cases where very high numbers of stress reversals act on the Slewing Ring, dynamic verification is necessary. Please contact our Engineering Department for assistance.

### Frictional capability of bolt connection

When radial loads act on the Slewing Ring, it must be ensured that these loads can be transmitted without shearing forces occurring in the bolts. Therefore, it must be determined whether the radial load can be transmitted via frictional contact between the mounting structure and the Slewing Ring.

**F_{Rad max}** = \( \frac{n_b \cdot F_{Pd}}{18.8} \) in [lbs]

If the prevailing radial load exceeds the limit value, please contact our Engineering Department for assistance.

For Slewing Rings with a different number or size of the bolts in the inner and outer ring, the permissible radial load is to be determined for both rings. The smaller value is the limiting value.

### Friction contact prevalence

If \( F_{Rad max} > F_{Pd} \) is greater than the prevailing radial load.

### Securing the mounting bolts

When a customer desires that the mounting bolts shall be secured, we recommend the following products (manufacturer specification is valid): Lociote®

Application of Lociote 270 is suitable for the highest level of connections. This prevents loosening and provides thread sealing. Please observe the instructions and requirements of the manufacturer when using this product.

### Nord-Lock®

Nord-Lock®, self-locking washers, are recommended for cases of vibration or dynamic loading cycles. Due to a pair of square tapered washers with tapered surface gradients between both Nord-Lock securing washers greater than the gradient of the bolt threads, any loosening tendency of the bolt is immediately prevented.

Please observe the instructions and requirements of the manufacturer when using this product.

Other bolt securing systems are not approved.

### Friction torque

The friction torque of a Slewing Ring depends upon many influence factors, such as:

- Rigidity and flatness of the mounting structure
- Load and loading combination
- Rotational speed and operating temperature
- Design of raceway system
- Number and frictional torque of seals
- Lubrication grease and filling level
- Manufacturing tolerances
- Other factors

The friction torque of an unloaded Slewing Ring can be determined approximately with the following equations:

**Slewing Rings in the Series 116, 120, 125, 150 and 920 with minimum clearance greater than zero**

**M_{Wa} = 0.048 \cdot d_a^2**

**M_{Wa} = 0.476 \cdot d_a^2**

If the prevailing radial load exceeds the limit value, please contact our Engineering Department for assistance.

The friction torque for a Slewing Ring under load can be determined with the following equation, approximately:

**M_w = 103 \cdot \frac{M_b \cdot F_{Pd} + 0.42 \cdot d_a \cdot F_{Rad} + M_{wa}}{d_a \cdot M}**

**M** in [ft-lbs]

**F** in [lbs]

### Gear

**Gearing design**

Slewing Rings can optionally be selected with spur gears conforming with DIN 3960, DIN 3962 and AGMA. The toothing is either normalized or quenched and tempered according to the Slewing Ring series. If higher torques or longer service life are required, toothing is available in the quenched and tempered or hardened condition.

### Permissible tooth forces \( f_{z norm} \) and \( f_{z max} \)

The data is available in the Technical Information section and defined as the gearing circumferential force and refer to the tooth base. The values for \( f_{z norm} \) are calculated with a safety factor against fracture of 2, the values for \( f_{z max} \) are calculated with SF=1 with respect to the tooth base fatigue. The pinion is thereby taken into account as hardened and grounded with x2=1.7 and x2=0.5.

In the series 120 and 920 the safety factor against fracture is 1.5 and the values for \( f_{z max} \) are determined with SF=0.85 and are therefore in the fatigue strength range.

In the case of standard single-sided pinion bearings the static safety factor should not be less than 1.5. If a pinion with fewer teeth and with addendum modification coefficient is used, please contact our Engineering Department for assistance.

The required gearing circumferential force can be determined from the existing or the required torque:

**F_z = 24 \cdot \frac{M}{Z}**

**F_z** in [lbs]

**Z** in [1/in]

**M** in [ft-lbs]

**F** in [lbs]

According to whether \( F_z \) is calculated from the torque at the Slewing Ring or the pinion, the corresponding number of teeth and the corresponding friction torque must be used.

If more detailed calculations such as service life etc. are needed please contact our Engineering Department for assistance.
Technical Information

Drive pinion

The permissible tooth forces (gearing circumferential force) have been determined with a pinion with \( z_1 = 17 \) and \( x_1 = 0.5 \). If no special requirements exist with respect to the gear ratio the drive pinion can be designed with this gear data. The width of the pinion teeth should also be more than the teeth on the Slewing Ring. The difference between tooth widths should be approximately equal to the module.

If less than 17 teeth are used for the pinion, the gearing should be calculated by calculations. The recommended gear quality for the pinion is 8x6 or better. In the case of very high tooth forces we recommend a pinion tip relief and a wide crown design, please contact our Engineering Department for assistance.

Tooth backlash

The tooth backlash is set at the highest point of the gear. It depends on the module of the gear and is calculated according to the following equation:

\[
\delta = 0.03 \text{ to } 0.04 \times \frac{1}{m} \text{ in [in]}
\]

For setting the circumferential backlash, the tooth zone with the run-out ‘high point’ is marked with green. The backlash is to be set at this point.

Shock coefficient

As for the applications in which impact is expected, the appropriate impact coefficients must be considered when determining the Slewing Ring maximum torque rating.

Service life

The service life of the gear depends on the operating conditions. The following factors are key:

- Torque
- Output speed
- Duty factor
- Ambient temperature
- Lubrication etc.

Drive power

In principle the drive should be dimensioned conservatively. The friction torque of a Slewing Ring can have a wide spread due to the load combination and magnitude, the design of the mounting structure, the raceway clearance and many other factors.

If the required drive torque is determined from the friction torque of the Slewing Ring it is necessary to start with twice the calculated value for the design of the drive power. Similarly additions should be made for the accelerating and decelerating of the moved masses and for any further power requirements according to the application.

Lubrication

To ensure flawless operation and a long usable life, adequate and regular lubrication is necessary. The grease fulfills the following functions:

- For the raceway:
  - Reduction of friction and wear in the rolling contacts
  - Corrosion protection
  - Lubrication of seals
  - Additional sealing effect of grease collar
  - Low friction torque

- For the gears:
  - Smoother running
  - Lower wear
  - Reduced operating noise
  - Longer useful life
  - Lower heat development

Initial greasing

IMO Slewing Rings are supplied pre-lubricated. High-quality lithium-complex grease, based on mineral oil, with EP additives according to DIN 51825, KP2P-20 is the standard lubricant.

Regreasing intervals

Regreasing must be done at regular intervals, depending on frequency of use and ambient operating conditions. General attention must be paid to ensure that the grease used during the greasing is compatible with the sealing material. Special attention should be paid to ensure that lubricating grease types originally specified are used throughout the life of the unit.

Should you wish to use other types of grease, it must be verified whether the grease is compatible with that used for initial greasing. Please contact your grease manufacturer. Please observe also the data in the “Installation and Operating Manual” chapter.

Beside regular regreasing during operation, it is also necessary to grease the Slewing Rings before and after long inactive periods. Equally important is to regrease the equipment after cleaning.

Attention:

Slewing Rings must not be cleaned with pressure washing equipment. During pressure washing, large amounts of pressurized water can penetrate into the Slewing Ring through the sealing gap and cannot be removed, even by massive regreasing. This will strongly reduce the usable service life of a Slewing Ring.

Mixing greases

Greases with different thickeners and/or base oils should generally not be mixed. The manufacturer should always confirm if different grease types can be mixed.

Shelf life of lubricants

Lubricants are subject to ageing even if unused. If after about 3 years grease is not yet used, it should be replaced.

Design of mounting structure

Safe transmission of application loads and reliable operation of Slewing Rings is achieved, along with other factors, through using adequately designed mounting structures. To ensure safe operation of Slewing Rings, there are certain minimum requirements to the mounting structure:

- Minimum strength of attached structure > 72500 psi
- Bolts of recommended strength should be used
- A hollow mounting structure is preferred
- No hard points (e.g. through cross beams)
- Sufficient rigidity (see Installation and Operating Manual)
- Maintain flatness according to Installation and Operating Manual
- No hard points (e.g. through cross beams)
- Balking surfaces must be machined flat
- A hollow mounting structure is preferred
- Use all mounting bolts
- Bolts of recommended strength should be used
- Minimum strength of attached structure > 7250 psi

Very different mounting structure solutions can be used, depending upon maximum load and application. If a hollow mounting structure is intended flange thickness should be at least 50% of the overall Slewing Ring height. The thickness of the hollow mounting structure should be about 1/3 of the flange thickness. For weight critical applications, flange thickness can only be reduced if appropriate stiffening ribs are provided and specifications on permissible flatness, perpendicularity deviations and deformation under load are achieved. Values on this are specified in the “Installation and Operating Manual”.

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Mixing greases

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A few simple steps for selecting a Slewing Ring

You will find a detailed procedure on the following pages!

Start

- Load data determined
- Rotational speed known
- Tooth forces calculated
- Application factors selected

Selection completed

Are all values in the permissible range

No

Yes

We recommend that the Slewing Ring selection is checked at IMO. Please fill in the Application Data sheet on pages 60/61 and provide a sketch of the application.
The correct Slewing Ring in 5 steps

Step 1: Determining the load

The first step is to determine the loads and rotational speeds. Here it is necessary to consider both axial as well as radial loads and tilting moment loads. It is also important to take account of those loads which can result from extreme situations such as high wind loads, loads during assembly, possible tilting etc.

Furthermore shock factors and the necessary safety factors must also be taken into account.

Step 2: Determining the size

One or the other series is better suited according to the application. To make the optimum choice the following table shall be used to determine the suitable / adaptable size.

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Series</th>
<th>100</th>
<th>120</th>
<th>116</th>
<th>125</th>
<th>150</th>
</tr>
</thead>
<tbody>
<tr>
<td>Radial design</td>
<td>++</td>
<td>++</td>
<td>++</td>
<td>++</td>
<td>++</td>
<td>++</td>
</tr>
<tr>
<td>Radial mounting structure</td>
<td>++</td>
<td>++</td>
<td>++</td>
<td>++</td>
<td>++</td>
<td>++</td>
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<td>+</td>
<td>+</td>
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<td>+</td>
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<tr>
<td>High load capacity</td>
<td>-</td>
<td>-</td>
<td>+</td>
<td>++</td>
<td>++</td>
<td>++</td>
</tr>
<tr>
<td>High wear life</td>
<td>-</td>
<td>-</td>
<td>+</td>
<td>++</td>
<td>++</td>
<td>++</td>
</tr>
<tr>
<td>Relieved clearance</td>
<td>++</td>
<td>++</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Load friction torque under load</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Ball bearing friction torque under load</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>High rotational speed</td>
<td>++</td>
<td>++</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Load data</td>
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<td>++</td>
<td>++</td>
<td>++</td>
<td>++</td>
<td>++</td>
</tr>
</tbody>
</table>

Step 3: Static checking of raceway

Using the static limiting load diagram a check must be made on whether the existing forces including the safety factors to be used do not exceed the permissible loads for the raceway.

The load, including the shock factors, the necessary safety factors and the calculated radial load must be in the permissible zone of the raceway curve and the expected rotational speeds must be below the limit. If the load is above the curve then the next size up or a stronger series must be selected. If the expected rotational speed is above the limit then the next smaller size or another series with higher limits must be selected.

Step 4: Checking of bolt connection

In the same limiting load diagram a check should also be made whether the load point is below the bolt curve. The load must include the shock factors, the necessary safety factors and the calculated radial load. If the load is above the curve then the next size up or a stronger series must be selected. In addition an examination should be carried out with the equation on Page 42 to check whether frictional contact is present.

Step 5: Static checking of gearing

A check should be made using the maximum expected tooth force to see whether the gearing has been adequately dimensioned. If the existing maximum tooth force has been determined from the friction torque under the maximum load, then this value must be doubled before comparison with the value in the table. If the corresponding masses are accelerated or decelerated the respective torques must also be taken into account.

If all the values for the selected Slewing Ring are in the permissible zone the Slewing Ring can be used. Finally, we would strongly recommend that your choice is confirmed by our Engineering Department.

In the case of high duty cycles or continuous running we recommend that a service life calculation is carried out by our Engineering Department.

Example:

Application: Crane operating in medium conditions

Load data:

- Axial load $F_{ax} = 73000$ lbs
- Radial load $F_{rad} = 10000$ lbs
- Tilting moment $M_k = 341000$ ft-lbs
- Tooth force $F_{z_{max}} = 14000$ lbs
- Max. rotational speed $n = 1.3$ rpm

Special requirements:

- Internal toothed design, no special precision required.
- Diameter range about 60 inch
- Additional safety factor $S_0 = 1.1$

From the table of $f_a$ values, $f_a = 1.25$ for medium duty cranes. From this you get:

- Pre-selection - Series 125,
- Item 12-25 1455/1-03270 $da = 57.205$ inch

Internal toothed design, no special precision required.

Evaluation code:

- Very good
- Good
- Medium
- Poor
- Not suitable

Selection list for optimum series

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Series</th>
<th>100</th>
<th>120</th>
<th>116</th>
<th>125</th>
<th>150</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tooth force</td>
<td>++</td>
<td>++</td>
<td>++</td>
<td>++</td>
<td>++</td>
<td>++</td>
</tr>
<tr>
<td>Radial load</td>
<td>++</td>
<td>++</td>
<td>++</td>
<td>++</td>
<td>++</td>
<td>++</td>
</tr>
<tr>
<td>Load data</td>
<td>++</td>
<td>++</td>
<td>++</td>
<td>++</td>
<td>++</td>
<td>++</td>
</tr>
</tbody>
</table>

New calculation:

- $d_a = 70.945$ inch
- $F_{ax} = F_{rad} = 73000$ lbs $\cdot 1.25 \cdot 1.1 = 100375$ lbs
- $F_{rad} = F_{rad} + F_{fr} + F_{z_{max}} + F_{z_{max}} = 14000$ lbs $\cdot 1.25 \cdot 1.1 = 34235$ lbs
- $M_{kD} = M_k + S_0 \cdot f_a = 0.144 \cdot FradD \cdot da$
- $F_{radD} = (FradD + Fz/cos20°) \cdot f_a \cdot S_0$
- $F_{radD} = 34235$ lbs
- $4500 \cdot 1.25 \cdot 1.1 + 0.144 \cdot 34235 \cdot 70.945 = 750882$ ft-lbs

Reading off the load point on the limiting load diagram.

<table>
<thead>
<tr>
<th>Equivalent axial load [lbs x 1000]</th>
<th>0</th>
<th>250</th>
<th>500</th>
<th>750</th>
</tr>
</thead>
<tbody>
<tr>
<td>Limiting load diagram, Series 125</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The selected Slewing Ring 12-50 1800/2-06500 is in the permissible zone.

The permissible tooth force $f_{z_{max}}$ is 57101 lbs and is therefore significantly above the existing tooth force $F_z$ of 14000 lbs.

The permissible rotational speed for this type is:

- $n_{perm} = 1600 \cdot 1600 = 22.6$ rpm

and is significantly over the existing rotational speed of 1.3 rpm.

This concludes the examination and the selection should be confirmed by IMO together with details of the loads.
### Unmounted

#### Dimensions and Weight

<table>
<thead>
<tr>
<th>Drawing number</th>
<th>Position</th>
<th>Outside diameter</th>
<th>Mounting holes</th>
<th>Gearing and tooth forces</th>
<th>Load ratings</th>
</tr>
</thead>
<tbody>
<tr>
<td>90-20 0641/0-37020</td>
<td>6</td>
<td>37.323</td>
<td>28.898</td>
<td>33.287</td>
<td>33.649</td>
</tr>
<tr>
<td>90-20 0641/0-37020</td>
<td>7</td>
<td>41.206</td>
<td>32.835</td>
<td>37.224</td>
<td>37.106</td>
</tr>
<tr>
<td>90-20 0641/0-37020</td>
<td>8</td>
<td>47.165</td>
<td>38.740</td>
<td>43.130</td>
<td>40.012</td>
</tr>
</tbody>
</table>

#### Mounting holes

- **D1** (inch): Outer diameter, inches
- **D2** (inch): Inside diameter, inches
- **D3** (inch): Outer diameter, inches
- **D4** (inch): Inside diameter, inches
- **L1** (inch): Hub length, inches
- **L2** (inch): Hub length, inches
- **P1** (inch): Hub pitch, inches
- **P2** (inch): Hub pitch, inches
- **Z** (inch): Number of teeth
- **f** (inch): Tooth profile, inches

#### Load ratings

- **Cra (lbs)**: Static load rating
- **Crl (lbs)**: Axial load rating
- **Cra (lbs)**: Radial load rating
- **Crl (lbs)**: Radial load rating

### Limiting load diagram for "compressive" loads - Series 920

#### Characteristics

- **Radial clearance**: 0 - 0.002 inch
- **Axial clearance**: 0 - 0.002 inch
- **Bearing ring material**: GCr9
- **Gear tooth form**: 20-degree double involute system
- **Necessary backlash**: at the pitch: 0 - 0.004 inch
- **Type**: 40, 50, 60, 70, 80, 90

#### Design variants

- **Standard design**:
  - **Reduction**: radial clearance, axial clearance
  - **Bearing rings with holes**: Double sequence
  - **Backlash-free bearing with preload**

- **Fitted**:
  - **Reduction**: radial clearance, axial clearance
  - **Bearing rings with holes**: Double sequence
  - **Backlash-free bearing with preload**
## Untoothed

**Series 116** standard design

### Dimensions and weight

<table>
<thead>
<tr>
<th>Drawing number</th>
<th>Drawing number</th>
<th>Dimensions and weight</th>
<th>Mounting holes</th>
<th>Load ratings</th>
</tr>
</thead>
<tbody>
<tr>
<td>11-16 0200/0-08001</td>
<td>11-16 0200/0-08001</td>
<td>1</td>
<td>7.887 1.575 4.955 3.304 11 5.512 6 2.86 6</td>
<td>11456 22535 18941 13713</td>
</tr>
</tbody>
</table>

### Characteristics

- Robust design
- Insensitive to vibrations
- Cost-optimized design
- Medium precision
- For Series 116 & 120 precision versions are available

## External toothed

### Dimensions and weight

<table>
<thead>
<tr>
<th>Drawing number</th>
<th>Drawing number</th>
<th>Dimensions and weight</th>
<th>Mounting holes</th>
<th>Load ratings</th>
</tr>
</thead>
<tbody>
<tr>
<td>11-16 0300/1-08010</td>
<td>11-16 0300/1-08010</td>
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<td>7.887 1.575 4.955 3.304 11 5.512 6 2.86 6</td>
<td>11456 22535 18941 13713</td>
</tr>
<tr>
<td>11-16 0300/1-08020</td>
<td>11-16 0300/1-08020</td>
<td>2</td>
<td>11.024 5.512 7.982 7.756 22 9.449 12 6.288 12</td>
<td>22706 46535 22256 19108</td>
</tr>
<tr>
<td>11-16 0300/1-08040</td>
<td>11-16 0300/1-08040</td>
<td>4</td>
<td>18.898 13.386 15.866 15.630 42 17.323 24 14.173 24</td>
<td>45636 83071 26225 25179</td>
</tr>
</tbody>
</table>

### Characteristics

- Robust design
- Insensitive to vibrations
- Cost-optimized design
- Medium precision
- For Series 116 & 120 precision versions are available

**Radial clearance:** 0 - 0.008 inch
**Axial clearance:** 0 - 0.016 inch
**Bearing ring material:** C45N
**1 Light type grease nipple, form C in filling plug
**Mounting holes equally spaced
**Raceway system supplied pre-lubricated
**Dimensions without tolerances DIN ISO 2768 coarse
### Unoothed

<table>
<thead>
<tr>
<th>Drawing number</th>
<th>Position</th>
<th>Dimensions and weight</th>
<th>Mounting holes</th>
<th>Load ratings</th>
</tr>
</thead>
<tbody>
<tr>
<td>12-20 0311/1-32252</td>
<td>1</td>
<td>17.000 7.500 12.421 12.303 48</td>
<td>55.000 8 10.500 16</td>
<td>9.000 4 36 2830 6290</td>
</tr>
<tr>
<td>12-20 0311/1-32252</td>
<td>2</td>
<td>17.000 7.500 12.421 12.303 48</td>
<td>55.000 8 10.500 16</td>
<td>9.000 4 36 2830 6290</td>
</tr>
<tr>
<td>12-20 0311/1-32252</td>
<td>3</td>
<td>25.500 17.000 21.476 21.390 97</td>
<td>26.000 15 22.500 18</td>
<td>89800 107223 43685 43286</td>
</tr>
<tr>
<td>12-20 0311/1-32252</td>
<td>4</td>
<td>33.400 25.000 29.350 29.123 115</td>
<td>32.000 18 26.500 18</td>
<td>30378 245396 43613 43838</td>
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<tr>
<td>12-20 0311/1-32252</td>
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<td>37.400 28.80 32.387 31.106 130</td>
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<td>336672 274248 45661 46886</td>
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<tr>
<td>12-20 0311/1-32252</td>
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<td>41.250 32.830 37.224 37.106 146</td>
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<tr>
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### External toothed

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<thead>
<tr>
<th>Drawing number</th>
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<th>Mounting holes</th>
<th>Gearing and tooth forces</th>
<th>Load ratings</th>
</tr>
</thead>
<tbody>
<tr>
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<td>3</td>
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<tr>
<td>12-20 0311/1-32252</td>
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<td>32.900 25.000 29.350 29.123 128</td>
<td>31.000 24 26.500 18</td>
<td>32.500 4 130 2540 5800</td>
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<tr>
<td>12-20 0311/1-32252</td>
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<td>37.200 28.830 32.387 31.106 137</td>
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<td>36.687 3 110 3700 7960</td>
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<td>12-20 0311/1-32252</td>
<td>6</td>
<td>41.250 32.830 37.224 37.106 146</td>
<td>39.750 18 34.300 20</td>
<td>40.687 3 122 3700 7960</td>
<td>1303992 3048417 48784 48109</td>
</tr>
<tr>
<td>12-20 0311/1-32252</td>
<td>7</td>
<td>47.180 38.750 43.130 43.012 170</td>
<td>45.620 20 40.250 24</td>
<td>46.333 3 139 3700 7960</td>
<td>1512963 3534003 55357 50882</td>
</tr>
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</table>

### Internal toothed

<table>
<thead>
<tr>
<th>Drawing number</th>
<th>Position</th>
<th>Dimensions and weight</th>
<th>Mounting holes</th>
<th>Gearing and tooth forces</th>
<th>Load ratings</th>
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<tr>
<td>12-20 0311/1-32252</td>
<td>1</td>
<td>17.000 8.300 12.421 12.303 49</td>
<td>55.000 8 10.500 16</td>
<td>9.000 4 36 2830 6290</td>
<td>43263 100774 31473 34743</td>
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<tr>
<td>12-20 0311/1-32252</td>
<td>3</td>
<td>25.500 17.000 21.476 21.390 95</td>
<td>24.000 12 19.630 20</td>
<td>18.000 4 72 2830 6290</td>
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<tr>
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<td>4</td>
<td>29.500 21.000 25.413 25.295 110</td>
<td>28.000 15 23.630 24</td>
<td>22.800 4 88 2830 6290</td>
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<tr>
<td>12-20 0311/1-32252</td>
<td>5</td>
<td>33.400 25.000 29.350 29.123 126</td>
<td>32.000 18 26.500 18</td>
<td>26.600 4 104 2830 6290</td>
<td>103738 240403 43613 43838</td>
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<tr>
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<td>6</td>
<td>37.400 28.80 32.387 31.106 130</td>
<td>35.750 18 30.500 19</td>
<td>33.687 3 101 8080 8940</td>
<td>1303992 3048417 48784 48109</td>
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<tr>
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<td>7</td>
<td>41.250 33.133 37.174 37.106 146</td>
<td>39.750 18 35.000 20</td>
<td>33.687 3 101 8080 8940</td>
<td>1303992 3048417 48784 48109</td>
</tr>
</tbody>
</table>

### Limiting load diagram for "compressive" loads - Series 120

- Bolt cone: 1/2-13 UNC-2B
- Bolt grade II

Please adhere strictly to the rules given in the Technical Information section when using above graph!

**Characteristics**
- Robust design
- Insensitive to vibrations
- Cost-optimized design
- Medium precision
- For Series 116 & 120 precision versions are available
### Untoothed

<table>
<thead>
<tr>
<th>Drawing number</th>
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<th>Mounting holes</th>
<th>Load ratings</th>
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</thead>
<tbody>
<tr>
<td>10-25 400S/040120</td>
<td>1</td>
<td>131.150 139.79 18.632</td>
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<tbody>
<tr>
<td>11-99 3900/2-06400</td>
<td>1</td>
<td>58.220 60.671 74.724 74.822 1828 78.937 79.660 36</td>
<td>62.677 34 150 6.50 29675 53401 147483 1598776 155889 259624</td>
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<td>11-99 2130/2-06400</td>
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<td>59.732 77.136 83.780 83.952 2563 87.992 79.724 48</td>
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<td>102.551 85.583 92.768 92.936 2554 96.830 85.583 54</td>
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<td>11-99 2045/2-06400</td>
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<td>113.890 97.402 104.053 104.212 2534 108.268 100.000 60</td>
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</thead>
<tbody>
<tr>
<td>12-99 1800/2-06500</td>
<td>5</td>
<td>77.598 61.182 70.787 70.943 1683 75.000 66.732 36</td>
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<td>12-99 2090/2-06500</td>
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<td>85.472 69.449 78.661 78.839 1858 82.874 74.606 40</td>
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<td>94.921 78.110 88.110 88.288 2123 92.322 84.055 48</td>
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<td>12-99 2490/2-06500</td>
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<td>12-99 2020/2-06400</td>
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<td>113.890 100.157 110.157 110.312 2677 120.268 100.000 60</td>
<td>112.126 38 178 0.50 31098 57101 1200685 2948772 325416 428823</td>
<td></td>
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</tr>
</tbody>
</table>
2. Application description (please attach additional sketch):

New Application: 

Exchangeable with existing solution: 

Position of rotation axis: 

Type of load: 

Vertical 

Horizontal 

Loaded side of rotation axis: 

Degrees Middle position of rotation axis 

± β α 

Type of load: 

"Compressive" axial load

"Suspended" axial load

Ambient temperature: 

minimum °F normal °F maximum °F 

Do shocks or vibrations occur? 

No Yes 

Special tests required? 

No Yes 

Works Certificate? 

No Yes 

Test certificate from authority required? 

No Yes 

Special conditions or specifications to be considered? 

No Yes 

3. Gearing

which ring is with gear? 

internal external none (without gearing) 

Module m 

Diametral Pitch Pd 

Number of teeth z 

Width of teeth b 

Addendum modification coeff. x 

Slewing Ring mm mm 

Drive pinion mm 

Number of drive pinions 

4. Load parameters:

<table>
<thead>
<tr>
<th>Operating load</th>
<th>Test load</th>
<th>Extreme load</th>
</tr>
</thead>
<tbody>
<tr>
<td>Normal</td>
<td>Maximum</td>
<td></td>
</tr>
<tr>
<td>Axial load</td>
<td>fAx</td>
<td>fAx</td>
</tr>
<tr>
<td>Radial load</td>
<td>FRd</td>
<td>FRd</td>
</tr>
<tr>
<td>Tilting moment</td>
<td>Mk</td>
<td>ft-lbs</td>
</tr>
<tr>
<td>Circumferential force</td>
<td>fmax</td>
<td>lbs</td>
</tr>
<tr>
<td>Torque (Slewing Ring)</td>
<td>Mm</td>
<td>ft-lbs</td>
</tr>
<tr>
<td>Duty (% of rotation)</td>
<td>ED</td>
<td>%</td>
</tr>
</tbody>
</table>

- Continuous rotation without interruption 
- Rotational speed (Slewing Ring) | n | rpm |
- Rotational speed max (Slewing Ring) | nmax | rpm |
- Interrupted rotation 
- Cycle description 
  - Slewing angle | δS1 | degrees |
  - Slewing time | tS1 | s |
  - Interruption time | tI | s |
  - Angular acceleration | αa | rad/s² |

Slewing direction: 

One direction only 

Alternating directions 

Peculiarities:

Any additional application service factor? 

No Yes 

Which one: 

Equipment utilization time in years: 

Average operating hours per year: 

5. Offer data:

Yearly usage: 

pieces per year 

Average operating hours per year: 

Average operating hours per year: 

Proposal required by: 

Lot size: 

pieces per delivery lot 

Target price: 

price per unit 

6. Remarks:

Date: 

Processed by:
For custom configurations, we also supply material certificates. These certificates log the actual values of material characteristics such as tensile strength, apparent yielding point, notched bar impact work, extension and chemical analysis.
The delivery of a Roller Slewing Ring of over 5 m / 16.404 ft in diameter for an overseas crane (seaworthy packing). The wide-load transportation required police escort.
IMO Slewing Rings have to meet the highest quality requirements because they are often used as safety critical machine components.

Development, design, calculation, manufacturing and sales at our Headquarters in Germany are performed strictly according to DIN EN ISO 9001 certified procedures.

“We want you to be satisfied”
All contact details of our global partners are to be found at: www.goimo.com