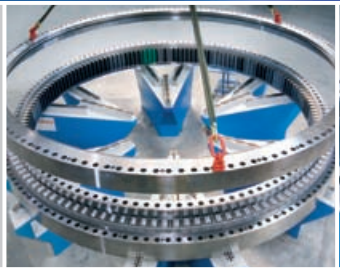
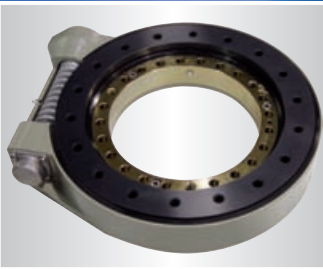


ST 211 E

Slew Drive
Product Catalog



IMO Anlagenbau develops and manufactures efficient tracking technology for photovoltaic systems. Our single and dual axis solar tracking systems consist of matching high quality components for optimum performance. IMO's expertise begins at component level offering support throughout the project and spans the entire field of solar applications, including turn-key implementation of large-scale 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.



Nomenclature

WD – L □ 0156 / 3 – 01234

Drawing reference number

Gearing heat treatment

- 1: Normalized
- 2: Quenched and tempered
- 3: Hardened

for WD-L and SP: Raceway diameter [mm]
for WD-H: Bolt PCD of worm wheel [mm]

Identification for custom configurations only, i.e.

- C: With or without hydraulic motor
- E: With or without electric motor

Series

- L: Light series
- I: Intermediate series
- M: Medium series
- H: Heavy series

Design types

- WD: Worm gear driven type
- SP: Spur gear driven type

Preface & Imprint

IMO has developed, manufactured and sold innovative Slew Drives to global customers for many years.

This catalog presents our comprehensive range of Slew Drives, covering a wide range of standard sizes and customization options that is unprecedented in the market.

The standard sizes listed in this publication cover common industry requirements. If your application has special needs our Engineering Department will support you to find the right Slew Drive - see the back cover for contact details. This catalog replaces all previous editions. It has a reference number on the front cover. Data of earlier catalogs that do not agree with the data of this version are therefore no longer valid.

This catalog includes an "Application Data Sheet" on page 100-102. Filling this in ensures that our application engineering receives all the information they need to recommend the optimum Slew Drive for your application and represents a record of your requirements. Slew Drives are high-tech products that are optimized to the specific demands and environmental conditions of your application. Thus it is important to fill in the form as exactly and as detailed as possible before returning it to us.

You will then receive our recommendation for the right IMO product for your application and benefit directly from our many years of experience.

IMO terms and conditions shall apply to all quotations and purchase orders. Also, please make sure that you follow our Installation and Maintenance Instructions exactly. Refer to our homepage for the latest version of this important document.

Following the Installation and Maintenance Instructions is important for the reliability and safety of our product and has considerable influence on its service-life.

The latest versions of all mentioned documents can be downloaded at www.imo.de. Please contact us to receive a paper copy.

Separate brochures about the IMO group and our comprehensive product portfolio of Slewing Rings, Slew Drives and Solar Tracking Technology can be downloaded from our website. If you need more information, please do not hesitate to contact us.

All information in this catalog has been carefully reviewed and checked. We cannot accept responsibility for omissions and errors in this publication.

Applications presented in this catalog show potential fields of application and demonstrate the capabilities of our products and are not intended to be understood as fundamental designs. All engineering design work is to be based on the technical data listed in this catalog. Please contact our Engineering Department for specific questions.

Our product ranges and designs are continuously updated and revised. Products and specifications contained in this publication are subject to change without notice.

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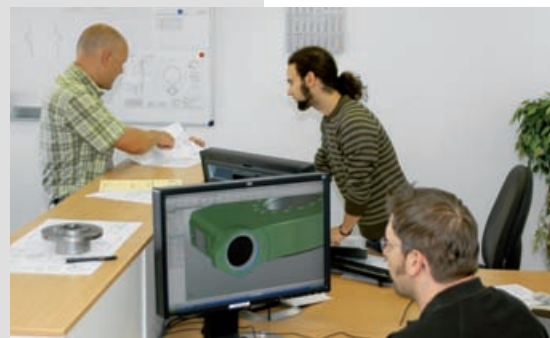
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The innovative business group IMO, headquartered in Gremsdorf, Germany, has been designing, manufacturing and supplying Slewing Rings and self-contained Slew Drives for more than 20 years.

IMO currently holds DIN EN ISO 9001, ISO 14001 and OHSAS 18001 approvals and has been certified since 1995.

IMO has earned several technical awards at international exhibitions for new and innovative product introductions and has repeatedly been honored for continued sustainable growth.

We are a recognized supplier in our industry and around the globe.



Strong Partner
Strong Partner

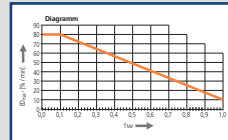
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www.imo.de

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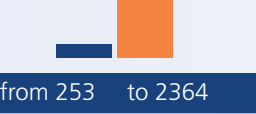










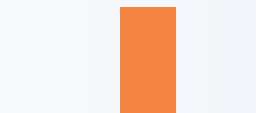




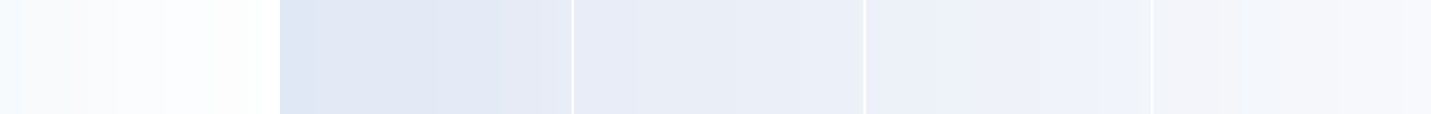
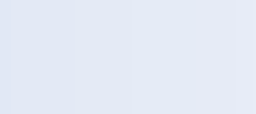
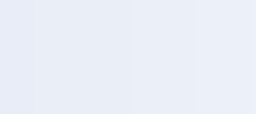
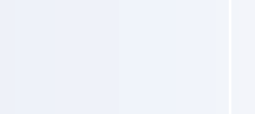





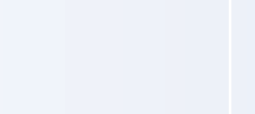


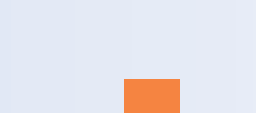
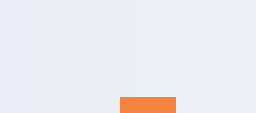

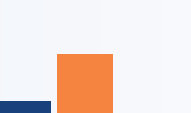
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Product Line Overview/Comparison

Design types	Series	Sizes	Raceway diameters	Maximum torque ¹⁾	Maximum tilting moment ^{1) 2)}	Load carrying capacity ¹⁾		Weight ¹⁾	Clearance
						Static axial load rating	Static radial load rating		
			DL [mm]	M _{d max} [Nm]	M _{k max} [kNm]	C _{0 ax} [kN]	C _{0 rad} [kN]	G [kg]	
Worm gear driven types 	 Series WD-L	0156	156	 from 3280 to 42824	 from 9 to 318	 from 253 to 2364	 from 94 to 883	 from 40 to 242	Preloaded raceway system
		0223	223						
	0343	343	 from 3280 to 42824	 from 9 to 318	 from 253 to 2364	 from 94 to 883	 from 40 to 242		
	0419	419							
	0478	478							
	0625	625							
 Series WD-H	0146	205	 from 4010 to 152610	 from 51 to 1052	 from 1208 to 7199	 from 451 to 3528	 from 73 to 516	Preloaded raceway system	
	0220	280							
	0300	370							
	0373	452							
	0490	569							
	0645	725							
Spur gear driven types 	 Series SP-I	0229	229	 from 3002 to 11172	 from 22 to 353	 from 426 to 1957	 from 159 to 731	 from 46 to 132	Radial clearance 0 - 0,05 mm Axial tilting clearance 0 - 0,08 mm
		0311	311						
		0411	411						
		0541	541						
		0641	641						
		0741	741						
	 Series SP-M	0841	841	 from 8622 to 25482	 from 31 to 299	 from 447 to 1570	 from 191 to 672	 from 80 to 200	Radial clearance 0 - 0,2 mm Axial tilting clearance 0 - 0,4 mm
		0941	941						
		1091	1091						
		0311	311						
		0411	411						
		0541	541						
 Series SP-H	0641	641	 from 27673 to 51888	 from 144 to 548	 from 1432 to 3006	 from 535 to 1123	 from 190 to 320	Radial clearance 0 - 0,25 mm Axial tilting clearance 0 - 0,4 mm	
	0741	741							
	0841	841							
	0941	941							
	0455	455							
	0555	555							
0655	655								
0755	755								
0855	855								
0955	955								

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.

Slew Drive – what is it? What does it do? Where is it used?

A complete system, ready to install, consists of

- A Ball or Roller Slewing Ring to handle simultaneously occurring radial, axial and moment loads
- Hydraulic or electric motor to pitch or rotate the Slewing Ring
- A totally enclosed housing

Bolt, connect, run... done!



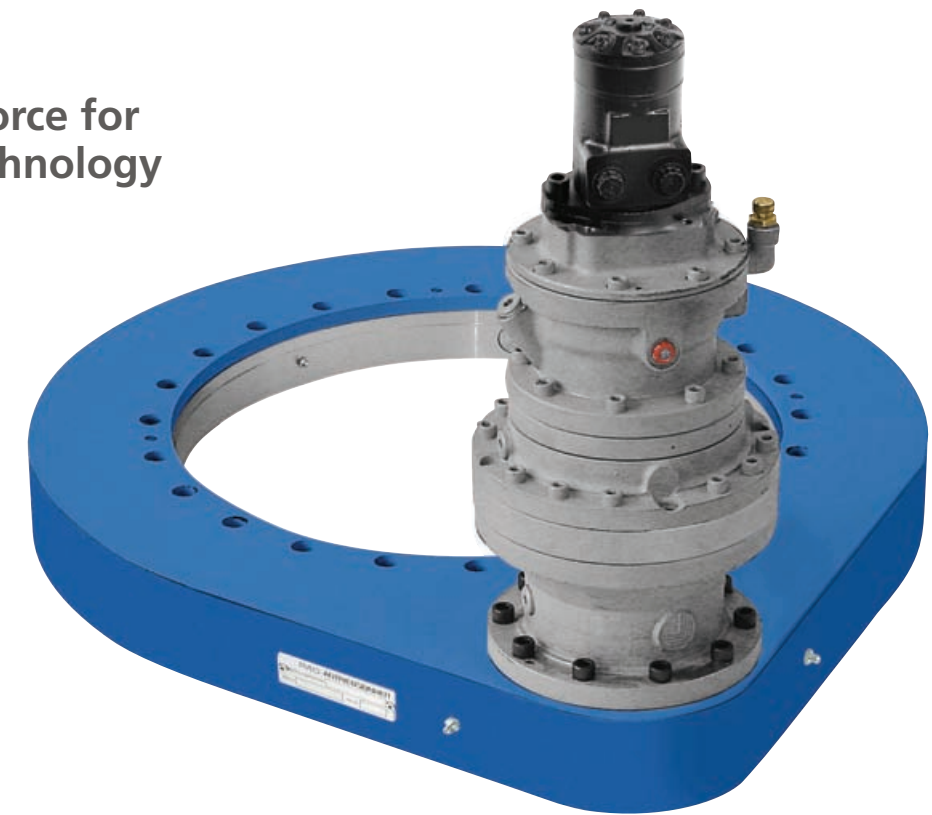
Advantages of IMO Slew Drives

- Compact packages for space saving installations
- Maximum load capacity in compact design
- Extended life
- Reduced maintenance costs
- Easy to integrate into existing applications
- Modularity enables rapid customization of the unit
- Custom designs available

Used by customers around the globe in:

- Vehicle and crane steering systems
- Manlift systems for boom and basket rotation
- Light crane systems
- Rotation of attachments such as excavators, grabs and fork lifts
- Handling equipment (automation systems)
- Loading and unloading devices
- Positioning systems / turntables e.g. for solar tracking systems

**IMO -
the driving force for
innovative technology**



Slew Drives
Introduction

A complete unit

- All components guaranteed to work together
- Easy to order - simple to install
- Eliminates component assembly
- One source - total system responsibility

Easy selection

- Complete line of various standard sizes
- Immediate, off-the-shelf availability
- Online sizing and selection programs available at www.imo.de
- Extensive technical support

IMO Slew Drive is an encapsulated unit

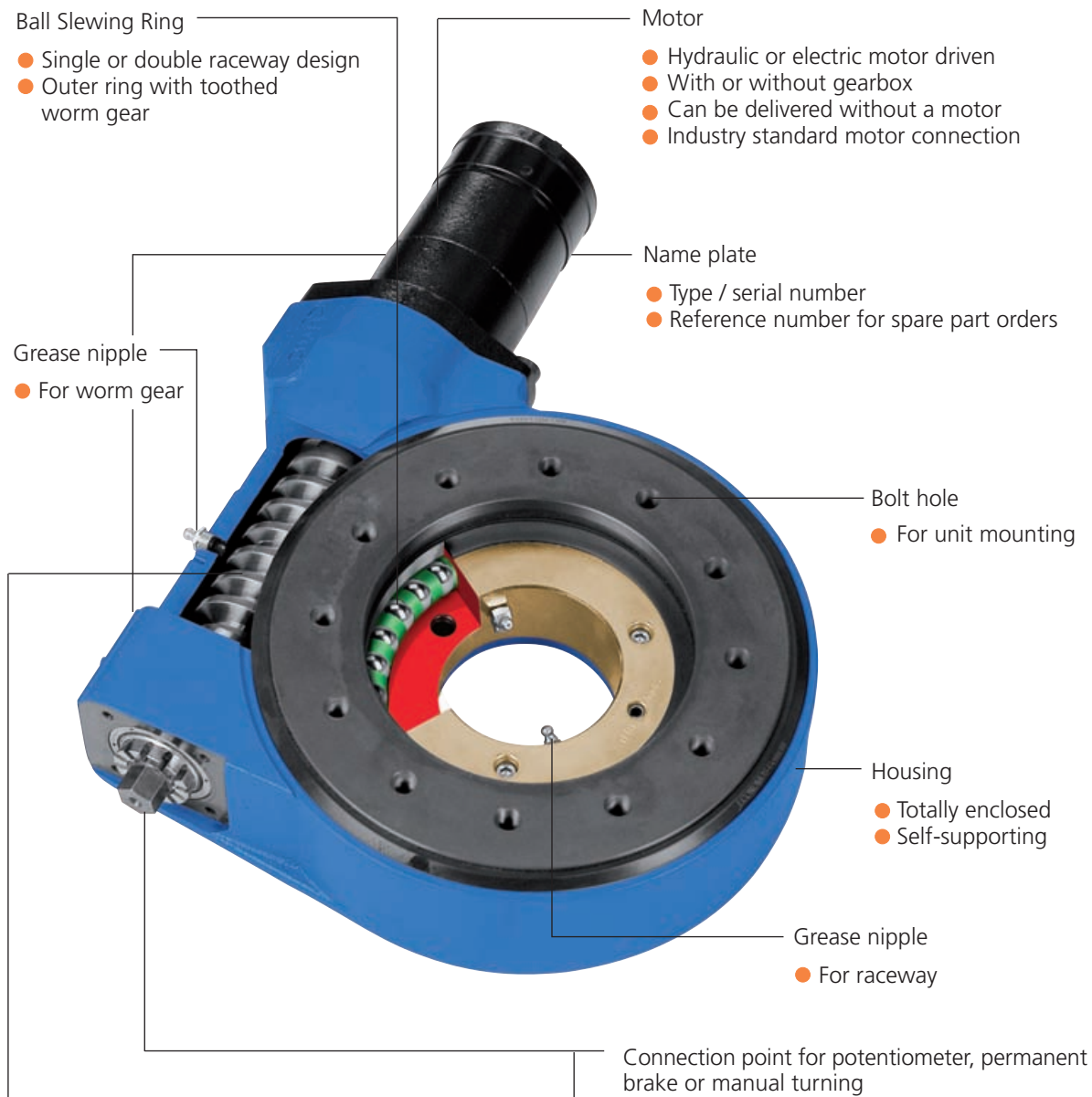
- Optimum protection against:
 - Contamination
 - Damage
 - Loss of lubrication
- Provides:
 - Extended life
 - Reduced maintenance costs
 - Enhanced operator safety
 - Sleek, clean appearance

Wide range of load capacities

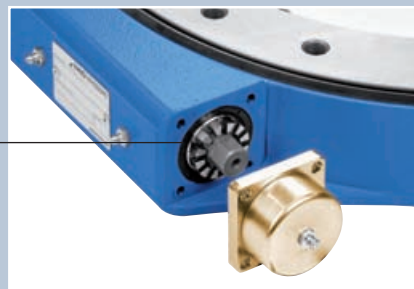
- Peak torque up to 152610 Nm
- Tilting moment load up to 1052 kNm
- Raceway diameters from 156 - 1091 mm
- Larger diameter variants available on request

WD-L Series

Product Description

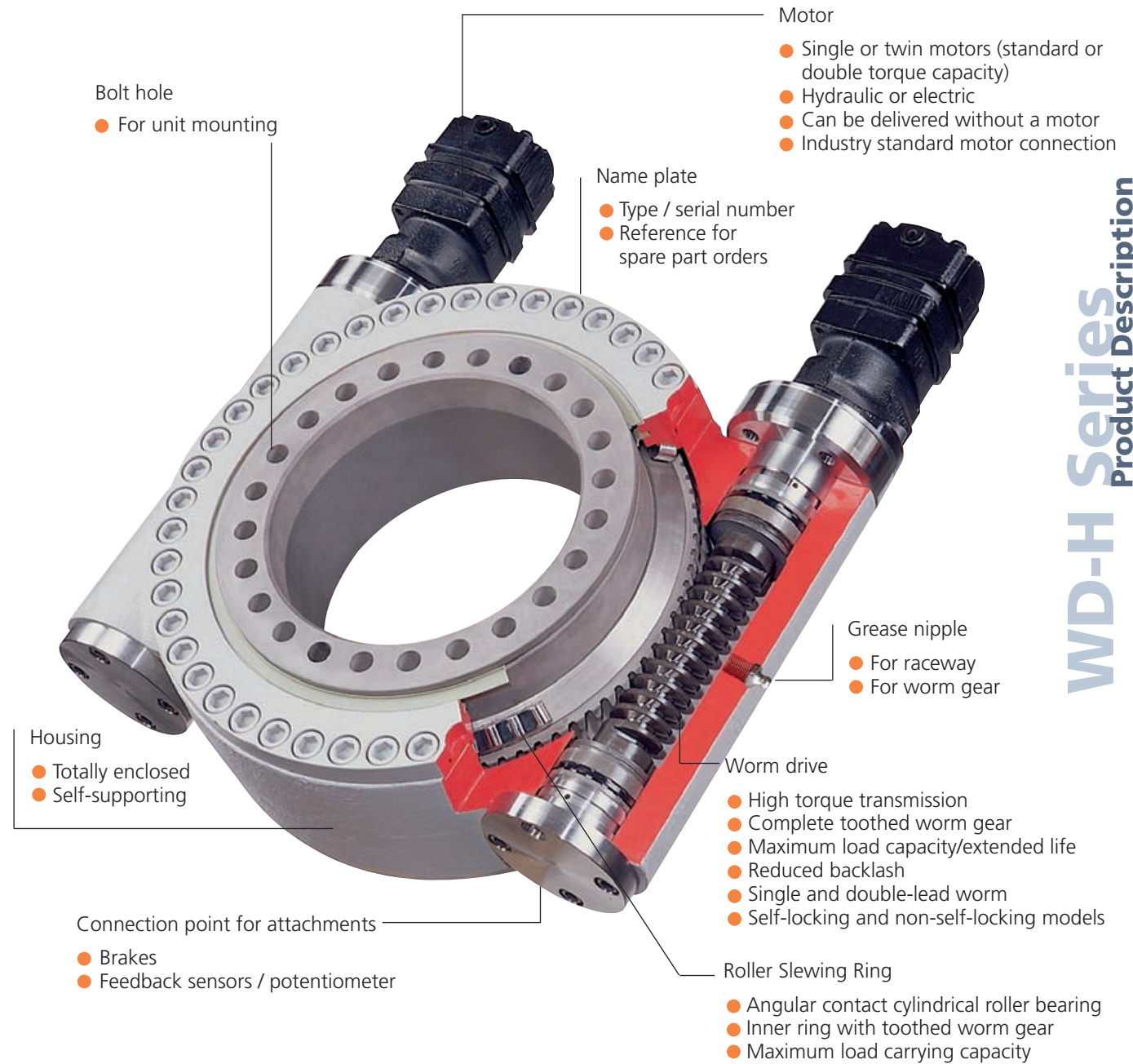


- Worm drive**
- High torque transmission
 - Complete toothed worm gear
 - Maximum load capacity and extended life
 - Reduced backlash
 - Self-locking and non-self-locking models

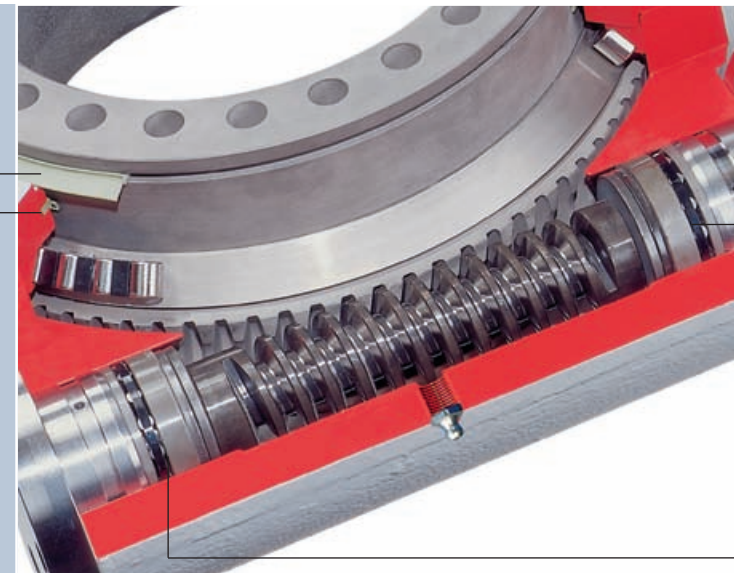


WD-H Series

Product Description

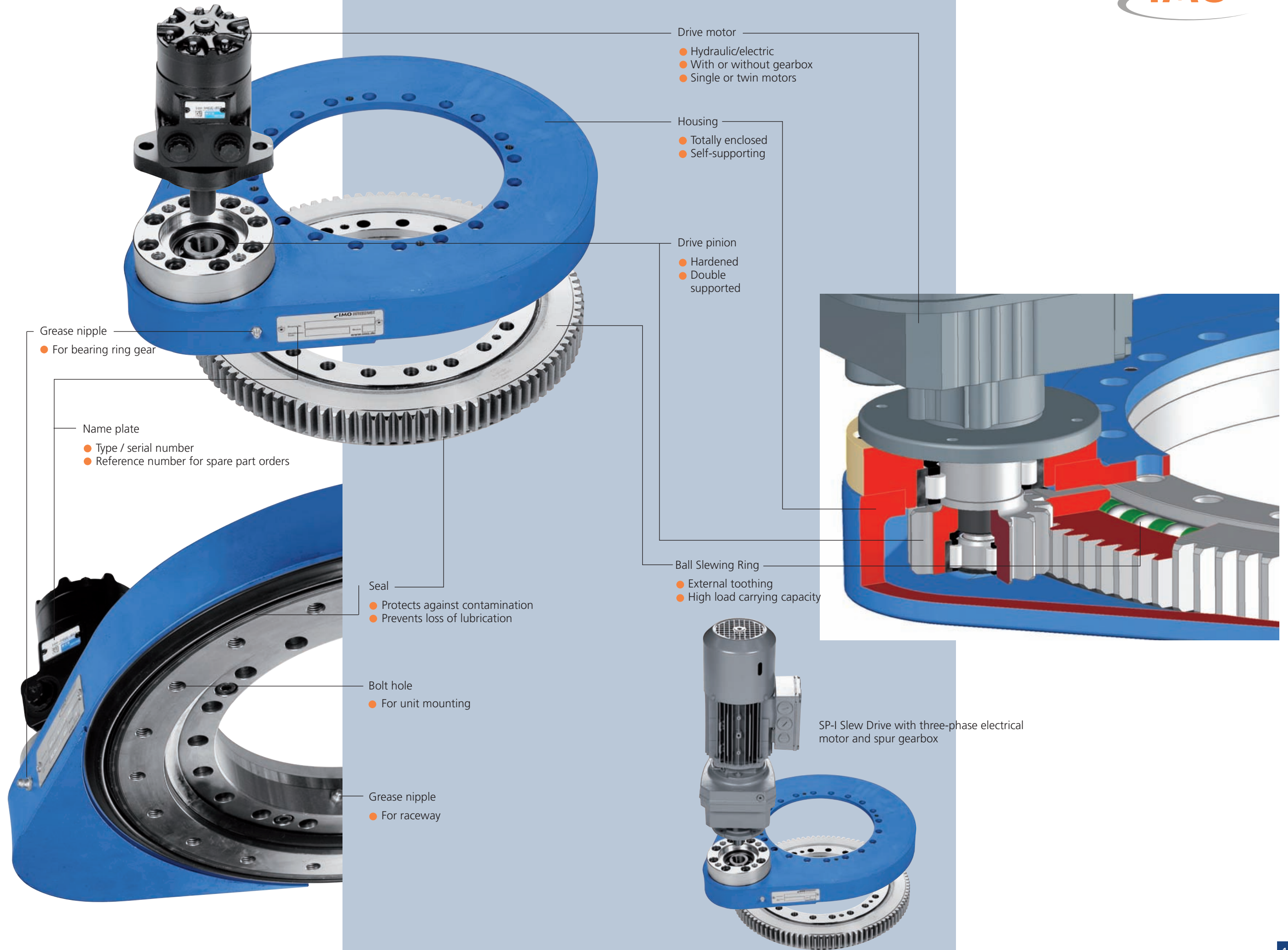


Seal



Axial bearing for the worm shaft

SP Series
Product Description



- Drive motor
- Hydraulic/electric
 - With or without gearbox
 - Single or twin motors

- Housing
- Totally enclosed
 - Self-supporting

- Drive pinion
- Hardened
 - Double supported

- Grease nipple
- For bearing ring gear

- Name plate
- Type / serial number
 - Reference number for spare part orders

- Seal
- Protects against contamination
 - Prevents loss of lubrication

- Bolt hole
- For unit mounting

- Grease nipple
- For raceway

- Ball Slewing Ring
- External tothing
 - High load carrying capacity

SP-I Slew Drive with three-phase electrical motor and spur gearbox

WD-L Slew Drives from IMO have an impressive combination of unique features.

WD-L series comprises **8 standard models**

WD-L Slew Drives Overview



WD-L 0156 Single Row Slewing Ring

WD-L 0223 Single Row Slewing Ring

WD-L 0223 Double Row Slewing Ring

WD-L 0343 Single Row Slewing Ring

WD-L 0419 Single Row Slewing Ring

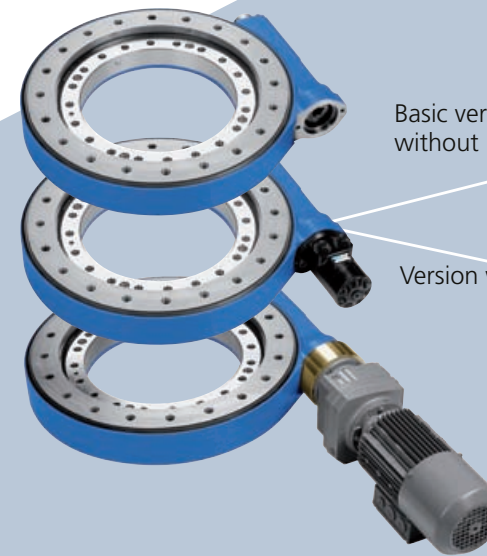
WD-L 0419 Double Row Slewing Ring

WD-L 0478 Single Row Slewing Ring

WD-L 0625 Single Row Slewing Ring

IMO Slew Drives, with a wide range of **industry standard sizes** and torque capacities offer fast, cost effective slewing solutions.

Modular system enables the utilization of various motors
(e.g. WD-L 0419)



Basic version WD-L 0419 without motor

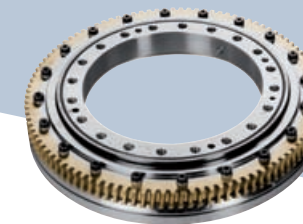
Version with hydraulic motor

Version with a three-phase electrical motor and spur gearbox

Drives are easily modified to meet special operating conditions.



Standard steel ring of a Double Row Slew Drive WD-L 0419, optimized for a high capacity, short cycle application



Modified worm gear of the WD-L 0419 made of bronze for applications with extended duty cycle



Worm shaft with appropriate worm gear (WD-L 0419)



WD-L 0419 with flanged spring energised multi-plate disk brake and motor, in a manlift system



The subsystem consists of a WD-L special design which is bolted to a base plate for a paver stone laying machine turning device



WD-L 0343 with the attached potentiometer, used in manlift systems



Frameless worm gear with integrated Slewing Ring suitable for extreme high temperatures for a forklift rotator (IMO is providing the worm gear and the customer is assembling them in its own housing)

Our WD-H family - which model do you need?

WD-H series comprises **6 standard sizes**

Standard units easily adaptable to meet specific applications (i.e: WD-H 0300)

WD-H Slew Drives Overview



WD-H 0146

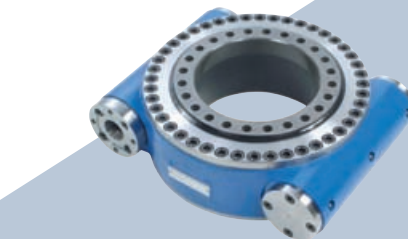
WD-H 0220

WD-H 0300

WD-H 0373

WD-H 0490

WD-H 0645



Basic version WD-H 0300 without motor



Version with single motor



Version with twin motors (double torque capacity) available from size WD-H 0300 and above

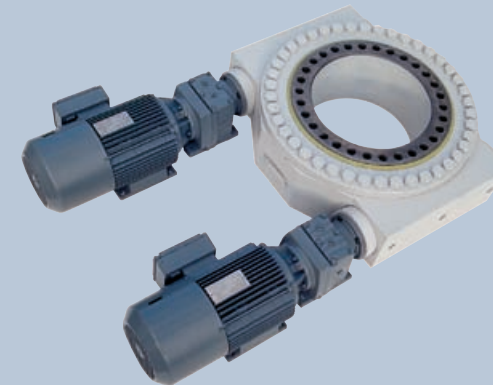


Version with twin motors and additional brakes (mounted between motors and housing)



Version with twin motors and flanged feedback sensors (gearing potentiometer)

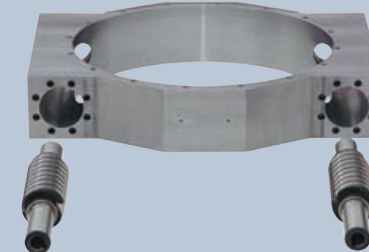
Best possible application solution to meet our customers **design requirements**



WD-HE 0373 with twin three phase electrical motors and spur gearboxes



WD-HC 0373 bronze worm gear for increased operating life expectancy (amusement park ride)



WD-HC 0220 with integral clutch to protect unit from overloading (for a rock drill rig)



WD-HC 0300 with special housing (seamless rolled, quenched and tempered steel) and a special designed worm gear pair for a higher capacity load

The WD-H series is unique on the market!

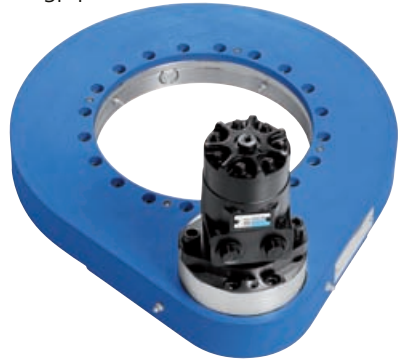
Our design solution is protected by international patents, allowing IMO to offer the unique combination of high torque and tilting moment capacities in the industries smallest footprints.

SP-Slew Drives with totally enclosed housing.

Standard Slew Ring mounting hole patterns provide full product interchangeability.

Overview

SP-I



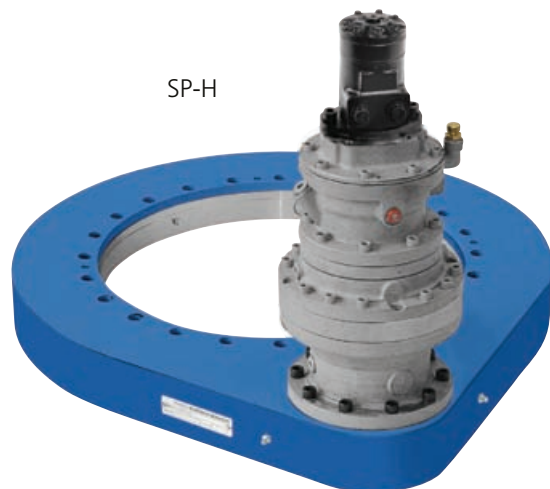
- SP-I, intermediate series
- mounting hole patterns and height identical to IMO Ball Slew Ring series 120
 - ball diameter 20 mm
 - module 4 mm
 - direct drive

SP-M



- SP-M, medium series
- mounting hole patterns identical to IMO Ball Slew Ring series 120
 - height increased by base plate thickness of 15 mm
 - ball diameter 20 mm
 - module 6 mm
 - one or multistage planetary gearbox

SP-H



- SP-H, heavy series
- mounting hole patterns identical to IMO Ball Slew Ring series 125
 - height increased by base plate thickness of 15 mm
 - ball diameter 25 mm
 - module 8 mm
 - one or multistage planetary gearbox

Examples of customer initiated special designs



SP-HE 0955

SP-H heavy series Slew Drive with four electric motors and planetary gearboxes for a stirring unit in a recycling plant.



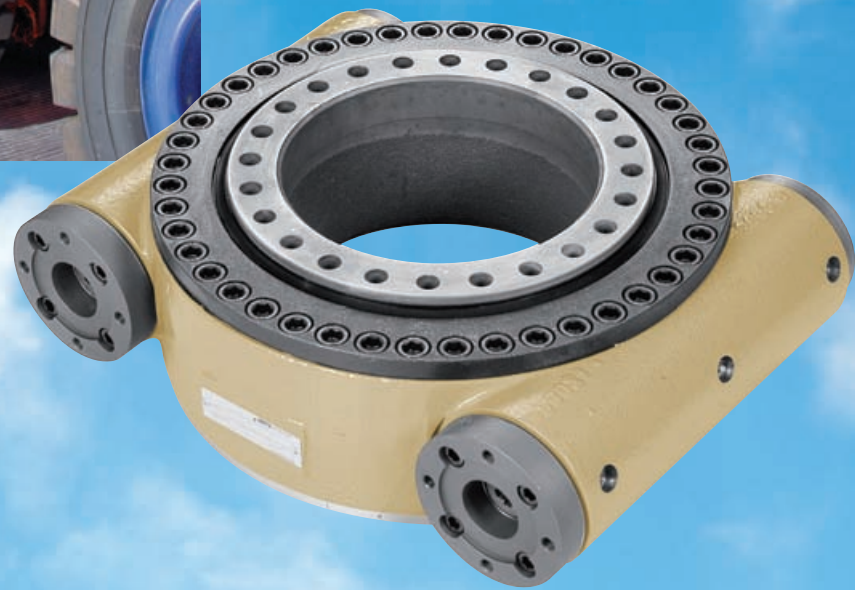
SP-HC 0755

SP-H series Slew Drive with two motor modules (hydraulic motor/planetary gearbox) for a ship rescue crane.

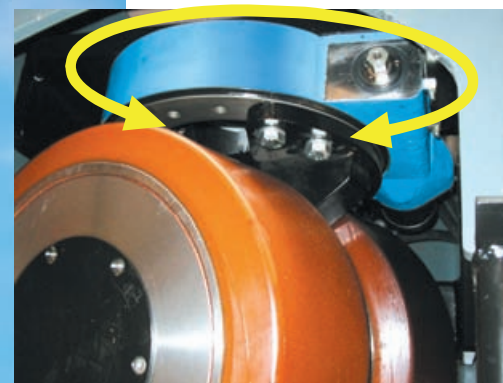


SP-HC 0655

Custom design with planetary gearbox and feedback potentiometer used to rotate a special excavator attachment.



◁ **Heavy load transporters** present big technical challenges. Each single axle is steered by an IMO Slew Drive requiring the maximum axial, radial and tilting moment capacity. The **WD-H 0300** with steering torques of 27000 Nm is an excellent solution.



△ **Side loader** with the steering gears of the **WD-L 0223** and **WD-L 0419** series; the high operating time requires the use of bronze worm gears.

Straddle carrier with eight independently steered axles.



The combination of IMO steering gears with additional hydraulic, electrical and electromechanical components and the system integration into the vehicle enables an effective solution, including "steering by wire".



Unlike typical hydraulic push rod actuated steering solutions IMO Slew Drives offer 360 degree steering capability.

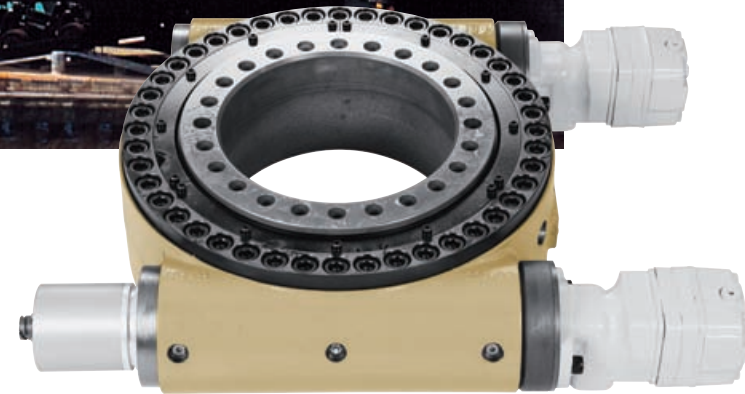


With the capacity to handle extreme tilting moments, high output torques, all in a compact design, the IMO **WD-H Slew Drives** are especially suited as **steering devices**.

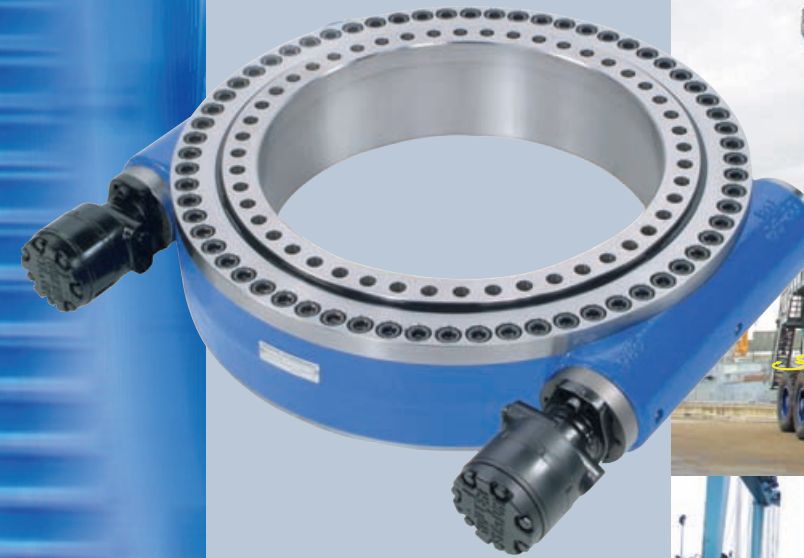
In addition, integrated position feedback sensors support computer controlled steering systems.

Using IMO Slew Drives, cranes and special vehicles achieve **unique maneuvering capabilities** including turning on the spot.

Applications Steering Gears For Undercarriages



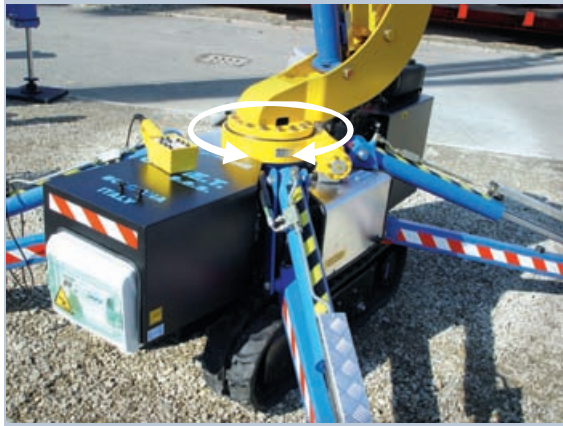
Undercarriage of a **harbor mobile crane** with **WD-HC 0300** steering gears; In combination with the hydraulic motor, the gear potentiometer indicates the position of the wheel.



In concrete factories, large **movable gantry cranes** displace heavy and bulky prefabricated concrete. With the Slew Drive **WD-HC 0645**, each axle can be turned individually. The steering torque required at the maximum load while turning on the spot is about 150000 Nm.



Ship lifting device to lift and place ships up to a weight of 650 tons. Eight Slew Drives of the **WD-HC** series carry this load capacity.



Small manlift on a crawler chassis with a **WD-L 0223** Slew Drive.



This bridge inspection equipment uses Slew Drive **WD-HC 0300** in the boom joint. The unit is able to accommodate the suspended loads and is fitted with a worm drive and multi-plate disk brake.



This working platform with a height of 35 m uses two IMO Slewing Rings on a synchronous rotating turntable which are driven by an IMO **WD-HC 0146** Slew Drive.



The high capacity and low profile of the **WD-L** series are perfectly suited for **manlift platforms**.

The wide variety of sizes in this series enables their use in many different kinds of platforms (heights ranging between 7 and 27 meters). Design standardisation "at its best"!



Telescopic working platform with a **WD-L 0419** Slew Drive.



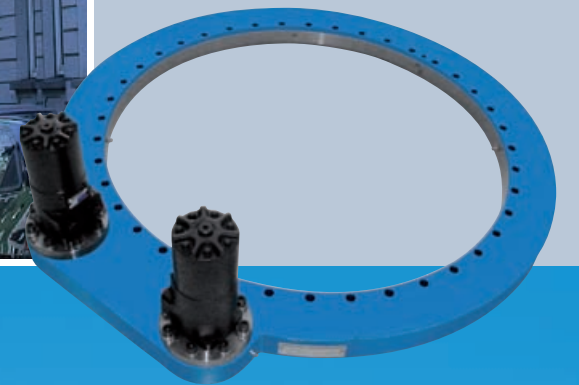
Combining low unit weight and high capacity, the Single and Double Row Slew Drives of the series **WD-L 0223** perfectly match **basket rotator requirements** of large manlift systems.



The IMO Slew Drive, model **WD-L 0478** is used for **railway slewing cranes** used to position track sections.



Applications
Cranes



This functional but elegant twin worm Slew Drive **WD-H 0645**, is ideally suited for the slewing gear of a **yacht crane**.



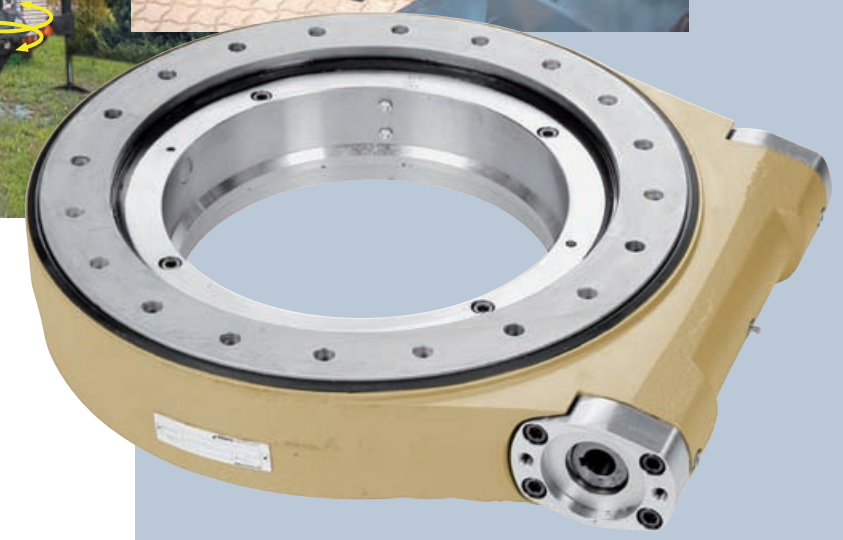
Light cranes - the standard equipment of **service trucks**, using the IMO **WD-L 0343** Slew Drive (also available with special flanges).



The special series **SP-IC 0841** with two direct hydraulic motors was developed for this **special crane**, used for roof top operations.



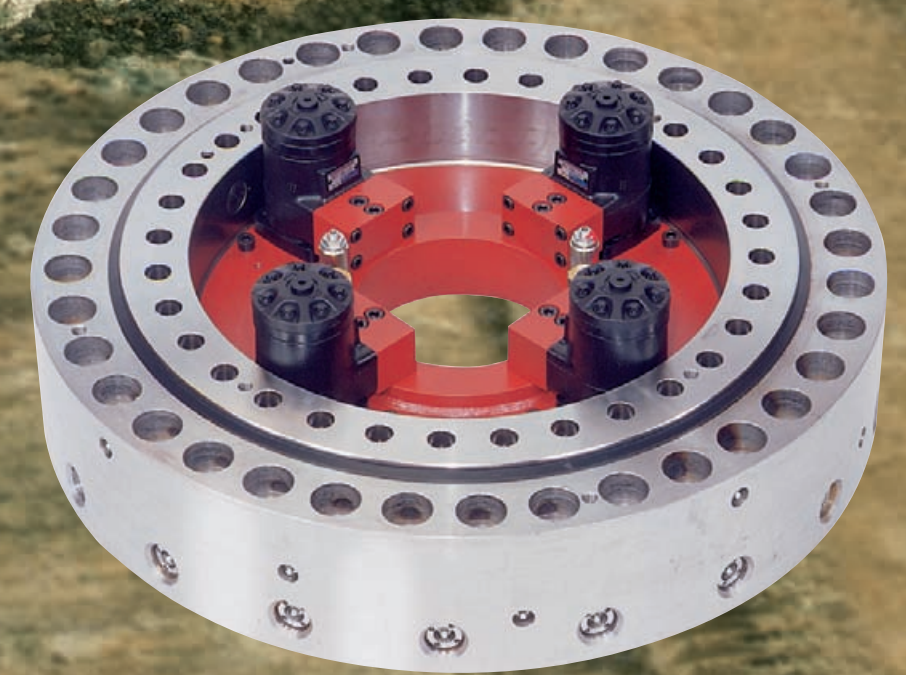
Cement mixer equipped with a conveyor belt with a length of 16.5 m, which is rotated with two **WD-LC 0419**; the considerable length of the belt leads to high tilting moments. Therefore a double row design with a reinforced housing is used.



This rotation and tilting device of a **front loader** uses an IMO Slew Drive, model **WD-LC 0419** with twin motors (double the torque).



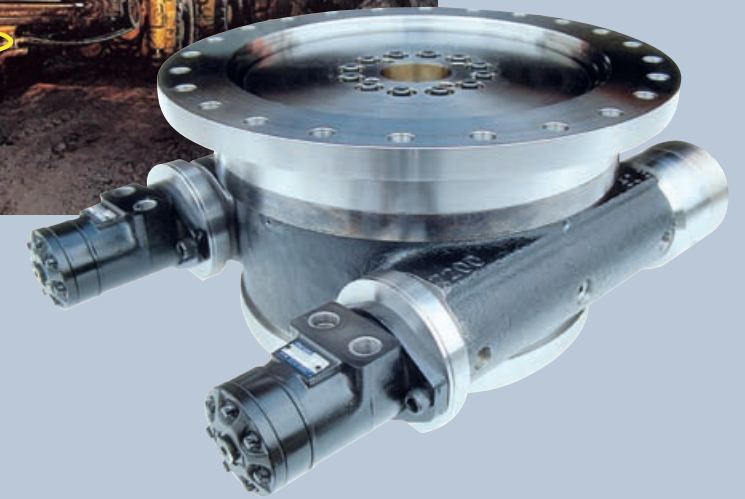
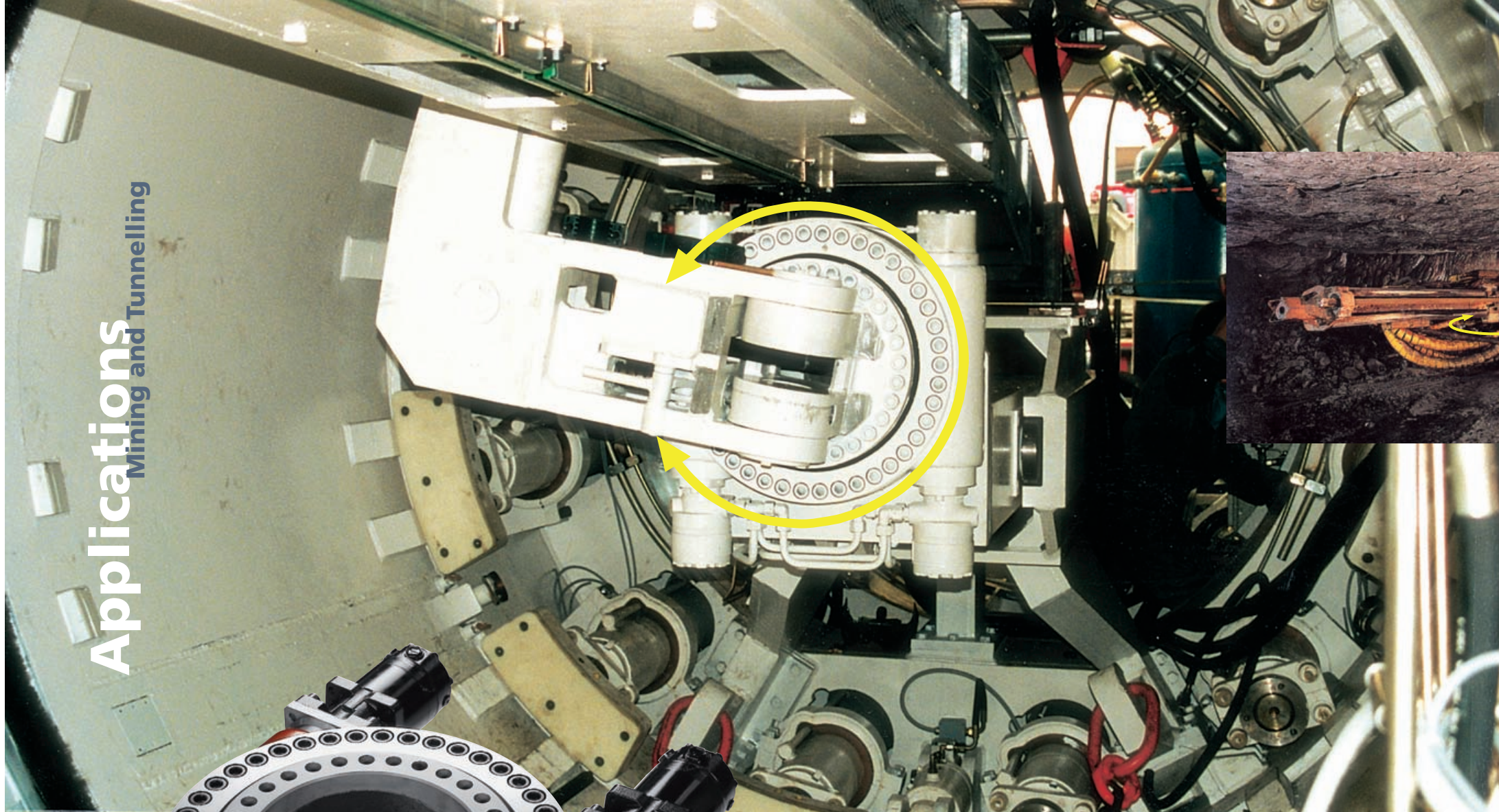
Cemetery excavator with the IMO Slew Drive **WD-L 0343**.



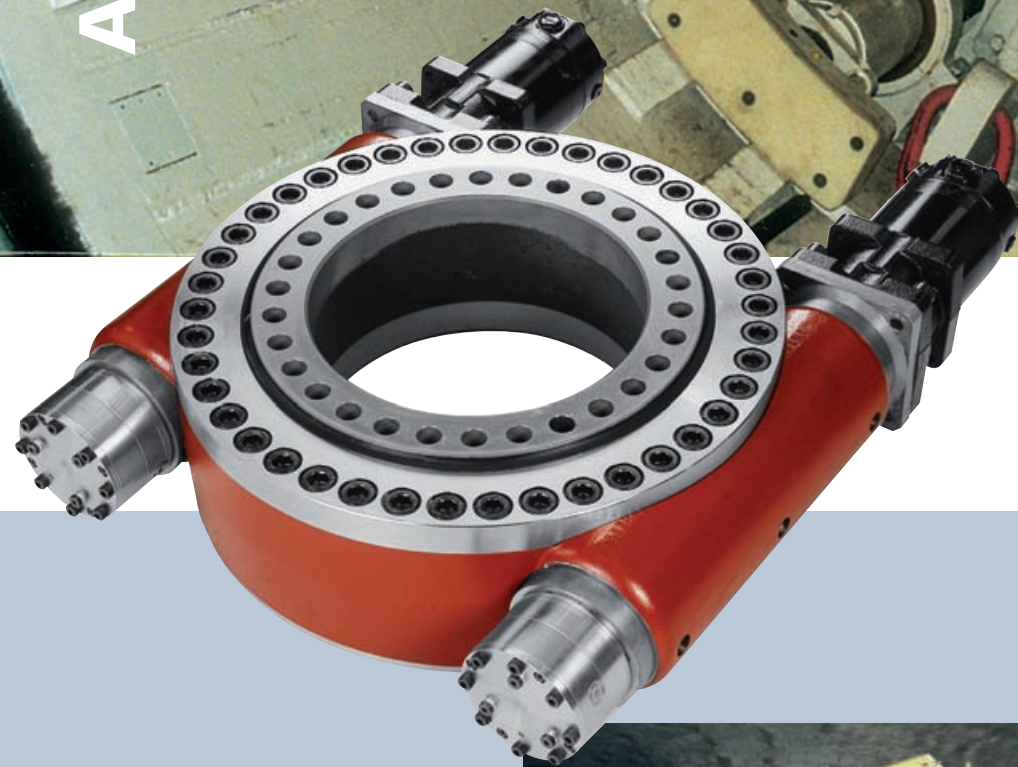
To protect the teeth of this **demolition equipment** from overload damages, a friction coupling is integrated in the spur gear driven Slew Drive **SP-OP 0580** (OP= "overload protected").

Applications

Mining and Tunnelling



To ensure that the **blasthole boring tool** remains locked in place during the boring process, the **WD-HC 0220** shown has an integrated locking system with a position holding device.



Instead of a traditional large diameter toothed Slewing Ring, this **manipulator** uses a compact Slewing Drive **WD-HC 0373** with twin worm and locking brakes..

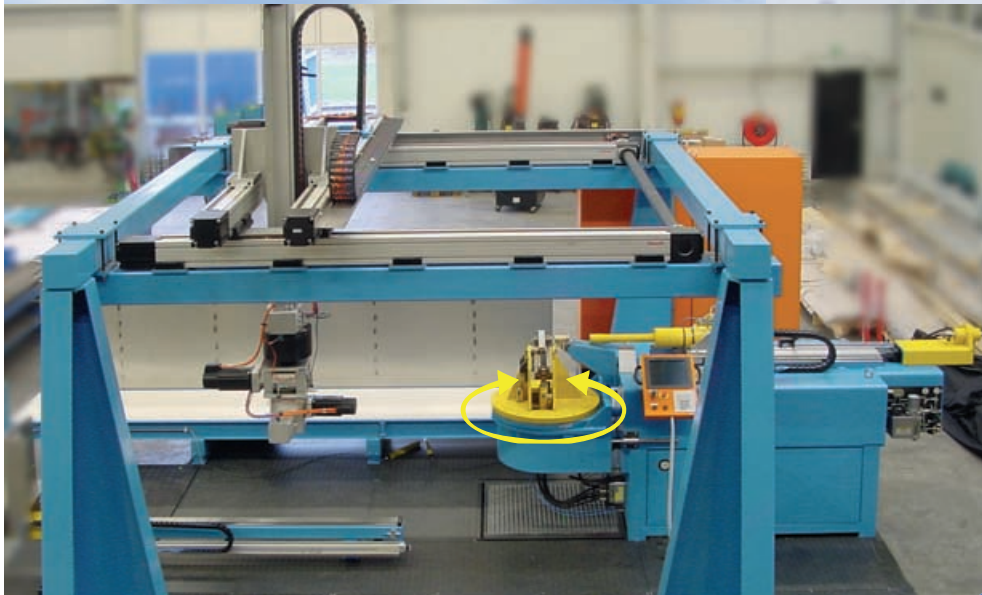


Working in aggressive environmental conditions, the Slewing Drive **WD-HC 0373** is adapted for the use by a **crane in a salt mine**. Brakes ensure position holding at extreme crane decline.

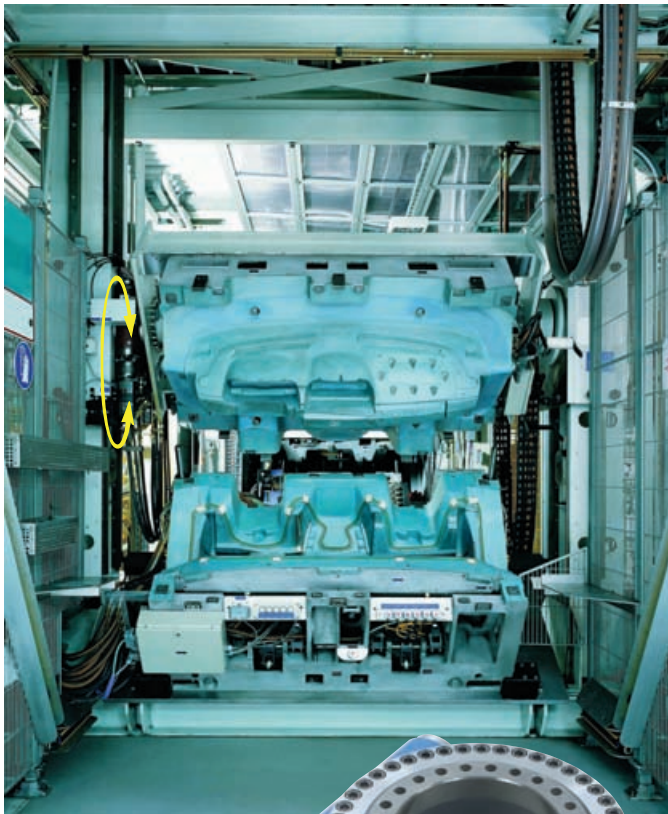


Slewing Drive **SP-HC 0698** with hydraulic motors and gear boxes for turning an **excavator boom**, part of a cutter bar of a tunnel boring machine.





SP-Slew Drives are used in automation systems. Picture: Slew Drive **SP-IE 0411** with three-phase electrical motor and spur gearbox.



▽ **Manipulator** for turning concrete parts with Slew Drive **WD-HE 0373**.



Applications
Positioning / Automation



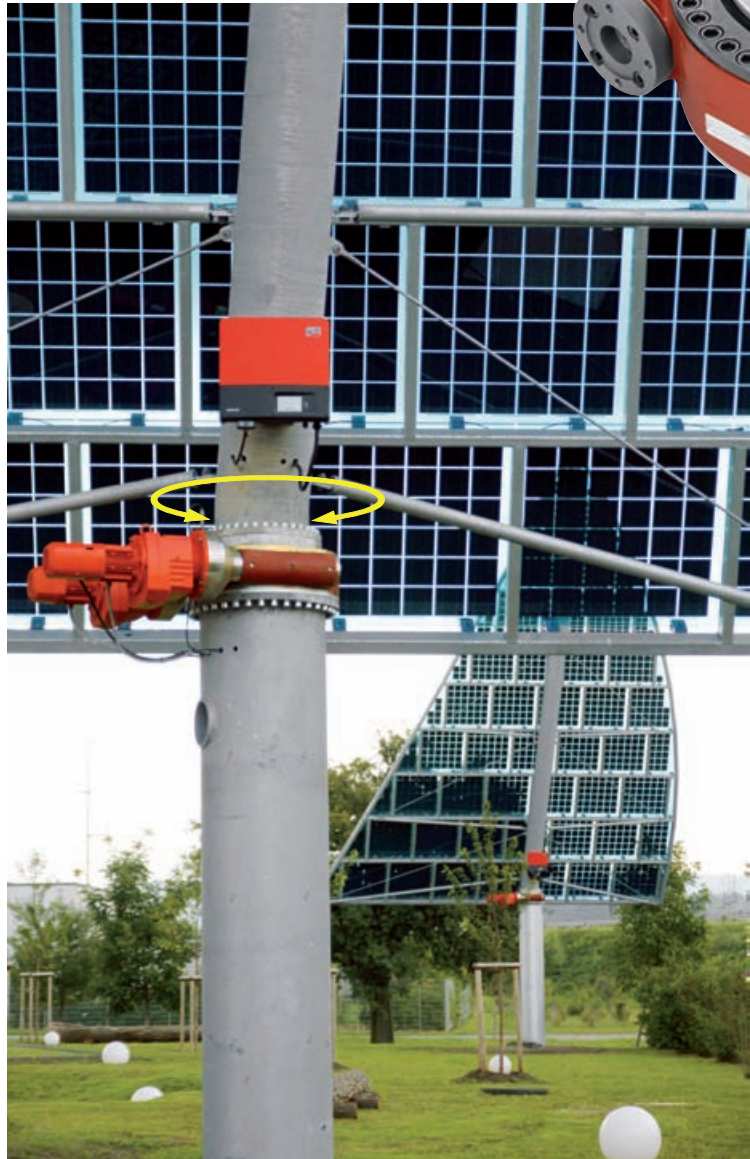
Bank mower with Slew Drive **WD-L 0419**, double row series.



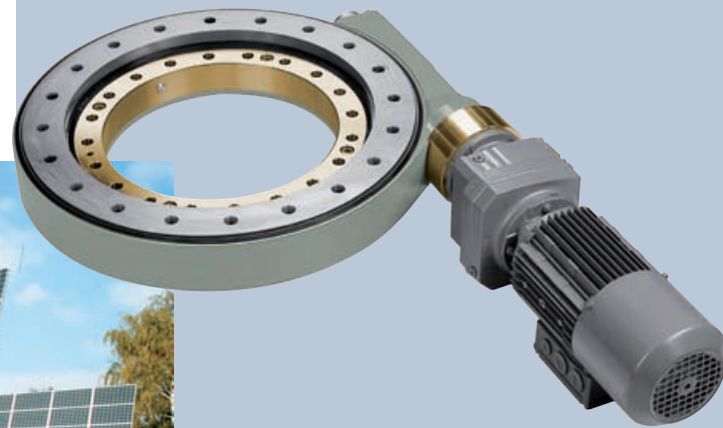
△ This is a **facility** to cover car fascia panels with leather. It contains Slew Drive **WD-HC 0300**. Because of its operating condition, it is fitted with a spring energised multi-plate disk brake.



Slew Drives of **WD-series** fitted with electric motors used for the yaw and pitch controls of this **solar table**.



WD-L and WD-H series Sleew Drive applications in solar tracking systems.

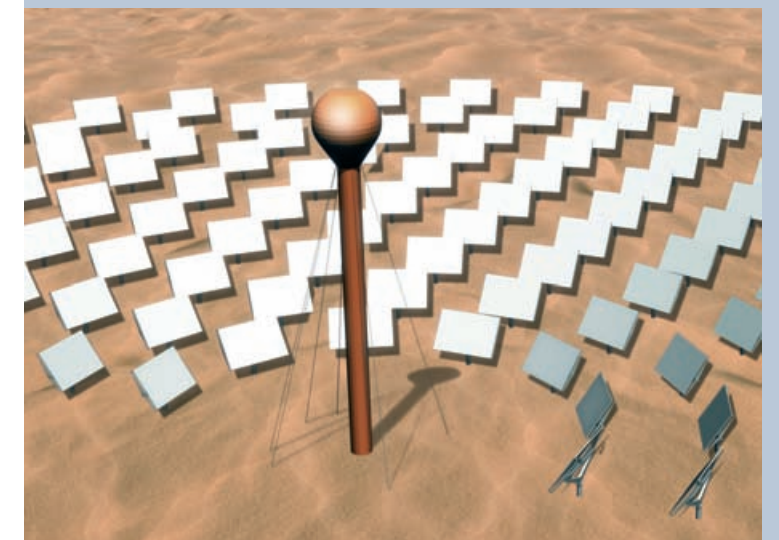
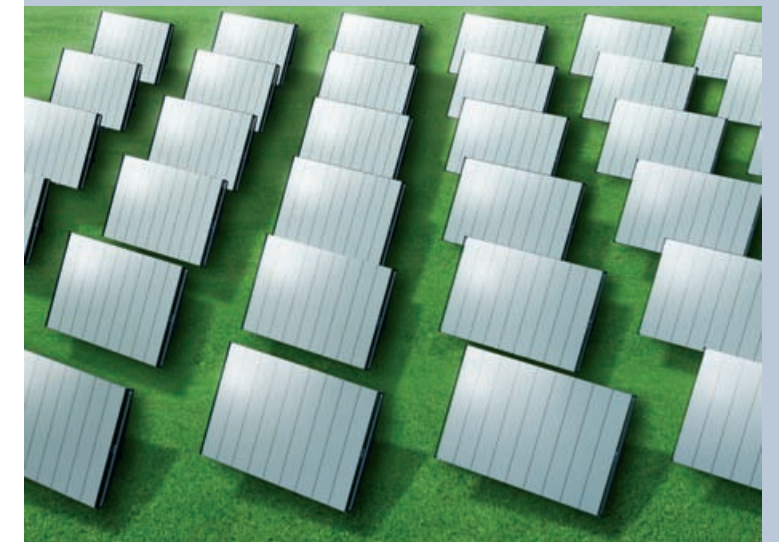
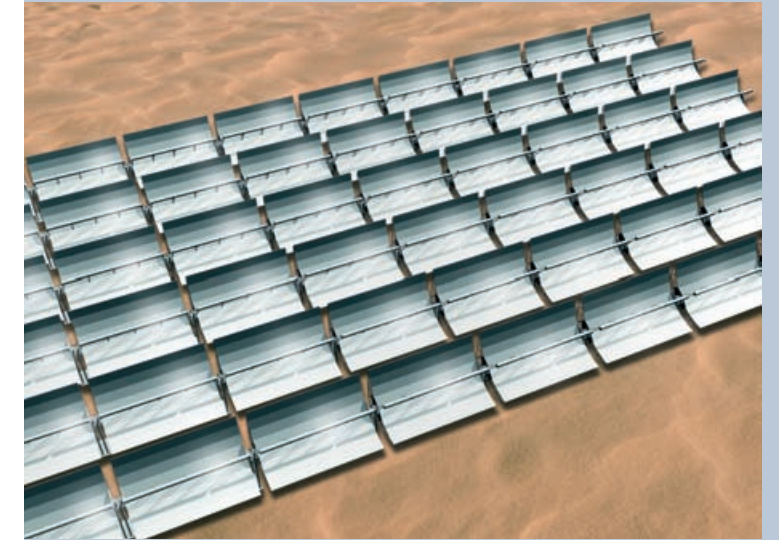


Applications

Photovoltaic and Solar-Thermal Systems



Designed for high accuracy positioning: WD-LC (top) and WD-LB (bottom) Sleew Drives.



Technical Information

Symbols and units

B_h	h	Basic rating life in operating hours
C_{ax}	kN	Basic axial dynamic load rating
C_{rad}	kN	Basic radial dynamic load rating
$C_{0 ax}$	kN	Basic axial static load rating
$C_{0 rad}$	kN	Basic radial static load rating
D_L	mm	Raceway diameter (see Product Overview P. 4/5)
ED_B	%	Duty
$ED_B \cdot$	%/min	Duty per minute
$ED_{max} \cdot$	%/min	Maximum permissible duty of rotation per minute (see diagram series description)
f_a	—	Application service factor
f_{Md}	—	Ratio of operating torque to maximum torque
F_{ax}	kN	Equivalent axial load including all occurring shock loads and required safety factors, calculated from all axial forces
F_{axD}	kN	Equivalent axial load including application service factor for determining the load point in the limiting load diagram
F_{rad}	kN	Equivalent radial load including all occurring shock loads and required safety factors, calculated from all radial forces; the effective gearing circumferential force has to be considered
$F_{rad max}$	kN	Limit value for checking frictional contact
F_{sp}	kN	Initial preload on bolt
G_w	h	Limit value
i	—	Gear ratio
m	mm	Module
M_A	Nm	Tightening torque for mounting bolts
M_{dB}	Nm	Operating torque
$M_{d nom}$	Nm	Nominal torque
$M_{d max}$	Nm	Maximum torque
M_h	Nm	Maximum holding torque

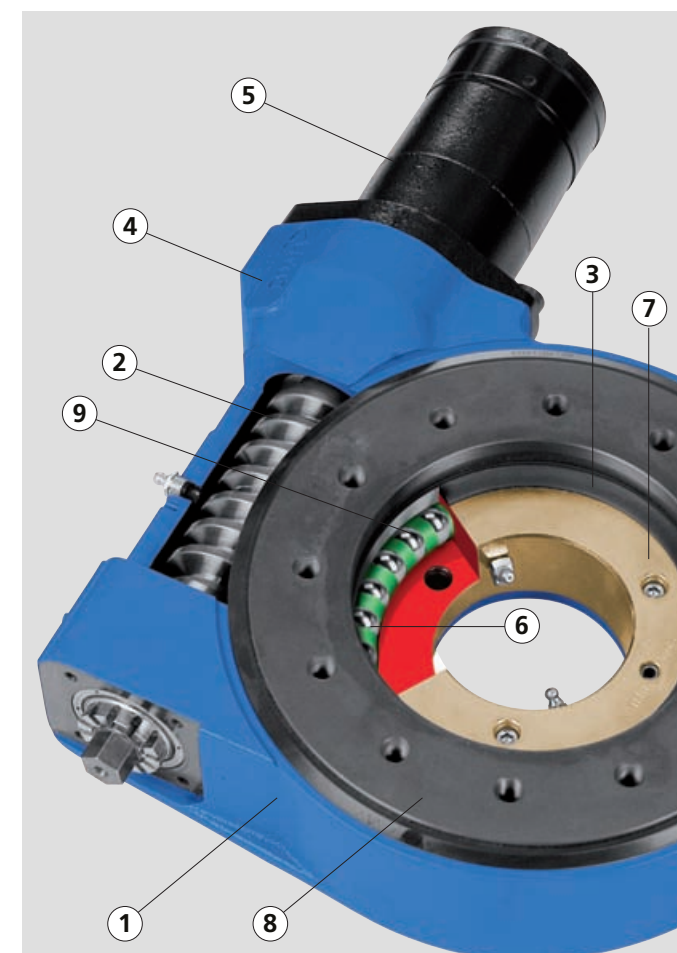
M_k	kNm	Equivalent tilting moment including all occurring impact loads and required safety factors, calculated from all axial and radial forces that cause the tilting effect
M_{kD}	kNm	Equivalent tilting moment including radial load and application service factor for determining the load point in the limiting load diagram
M_W	Nm	Friction torque of the Slew Drive under operating load in the installed state
M_{WA}	Nm	Friction torque of the Slew Drive, unloaded
n	rpm	Operating speed of Slewing Ring
n_{perm}	rpm	Permissible operating speed of Slewing Ring
n_b	—	Number of fastening holes per bearing ring
SF1	—	Series SP: Safety factor against tooth base fatigue Series WD: Safety factor against tooth wear
SFS 1	—	Series WD: Safety factor against tooth fracture
SFS 1.75	—	Series SP: Safety factor against static tooth base fracture
S_w	—	Calculation safety factor 1.3 for wear diagram
Q	l/min	Oil flow
z_1	—	Number of teeth, pinion
z_2	—	Number of teeth, Slewing Ring
α_A	—	Bolt tightening factor
Δp	bar	Pressure differential
δ_k	mm	Tilting clearance increase
$\delta_{k perm}$	mm	Maximum permissible tilting clearance increase
δ_p	mm	Maximum permissible flatness deviation
δ_v	mm	Maximum permissible deformation of mounting structure
δ_w	mm	Maximum permissible perpendicularity deviation

General

Function of Slew Drive

Slew drives comprise a highly robust Slewing Ring provided with gear teeth (1), one or several toothed drive elements (2), a worm gear in this case, seal (3), housing (4) and a hydraulic or an electric drive (5). Slew Drives are designed for grease lubrication.

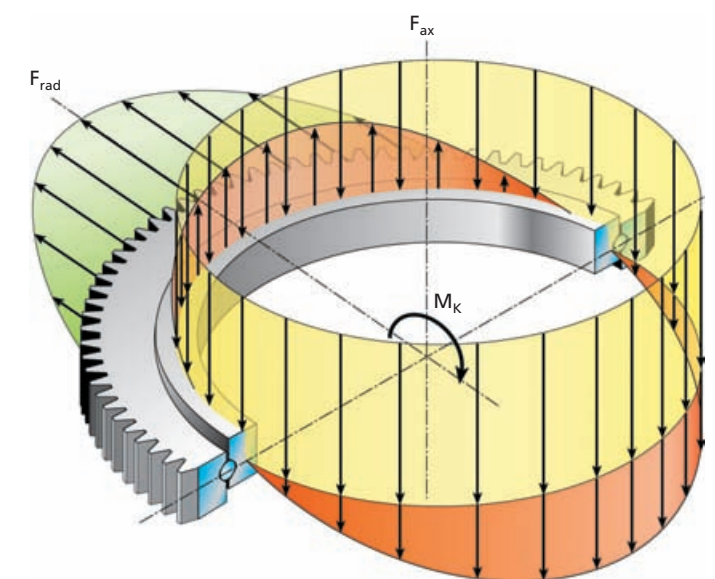
In a Slew Drive the rolling elements (6) carry the load between the inner ring (7) and outer ring (8). The raceway system's capacity is determined predominantly by Slewing Ring design, the depth of hardening and the number and size of the rolling elements. Spacers (9) separate the rolling elements and minimise friction and wear.



Load distribution

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

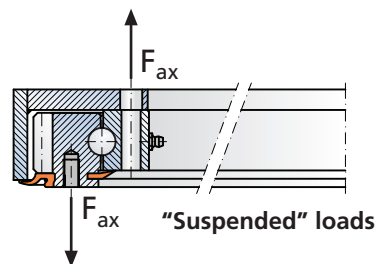
- In the case of axial load, all rolling elements are loaded in the same direction.
- In the case of radial load, a segment of the rolling elements carries the load.
- In the case of tilting moment load, a segment on one side and a segment on the opposite side carry the load.
- Mostly, a combination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



Technical Information

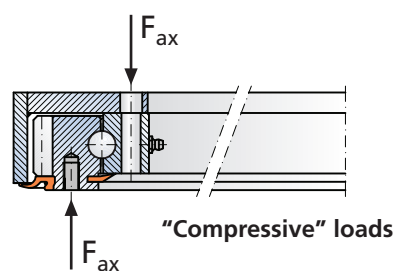
- Axial loads can be “compressive” or “suspended”.
- A “suspended” axial load and the load on a rising segment in tilting moments must be adequately resisted by mounting bolts.

Caution: Catalog bolt data is not valid in this case!



- Radial loads must be transmitted by means of frictional contact between Slew Drive and the attached structure.
- A good bolt connection is vital for satisfactory function of the Slew Drive. Bolt connection and tilting clearance of a Slew Drive must be checked regularly.

All catalog bolt data is valid only for “compressive” loads!



Gear

Slew Drives of series WD are designed with worm gear. Slew Drives of series SP are designed with spur gear. Permissible torque is specified in the Technical Information section.

Drive

Drive is provided by either an attached hydraulic or electric motor. Both motor mountings as well as the shaft/hub connection conform to industrial standards, hence hydraulic motors available on the market can be mounted without difficulty. For electric motors, corresponding adapter pieces are necessary. The design specification for drive motors is undertaken by IMO, based upon rotational speed and torque information provided by the customer.

Housing

Housing is designed as a welded or cast component and adapted to the size of the Slew Drive. As a standard feature, housings are supplied with a priming paint.

Sealing

Polymer seals protect the Slew Drive from normal dirt penetration, dust and light sprayed water. For very dirty and wet environments, the seals shall be protected with pre-mounted labyrinth seals on the mounting structure. Performance and reliability of a Slew Drive depend strongly on avoiding ingress of contaminants to the interior of the unit.

Pressure washing must not be used to clean Slew Drives.

Operating temperature

Standard version IMO Slew Drives can be used in ambient temperatures from -20°C up to $+70^{\circ}\text{C}$.

Selection criteria

The following criteria must be considered for the correct selection of a Slew Drive.

Position of the output shaft

Vertical: Slew Drives of all series can be used (even with a self-locking gear).

Horizontal: All Slew Drives can be used with the exception of the WD-H series and WD-L series sizes 0478 and 0625. Here, it is necessary to use a Slew Drive with a 2-start gear, since using gear with self-locking and external driving force does not ensure smooth (jerk free) operation.

Alternating: Slew Drives provided with self-locking gear cannot be used. Using a Slew Drive of series WD-H with 1-start gear without self-locking is possible only up to 5° inclination angle to the vertical, otherwise smooth operation cannot be guaranteed.

Slew Drives that are not self-locking can, as an option, be equipped with a locking brake, if required.

Loads

External forces such as axial load, radial load 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 different applications, the shock factors for gears should be considered. Slew Drives of the series WD are not suitable for applications under permanent vibration.

Back load

Keep in mind that in the case of series WD Slew Drives, due to the high gear ratio, that in the case of back load (e.g. caused by boom impacting on obstacle), there is danger of irreparable damage to the worm gearbox, so long as the driving torque exceeds the maximum permissible table values $M_{d\ max}$.

Torque

The operating torque may not exceed the maximum torque specified in the Technical Data section, calculated with application service factor 1. Explanations of different torque specifications are as follows:

Series SP:

Maximum torque $M_{d\ max}$:

Slew Drive series SP-H, SP-M: Maximum torque is limited by maximum radial load of the planetary gear-set used.

Slew Drive series SP-L:

The maximum torque is limited by the input torque of the attached hydraulic motor and the strength of the parallel key connection for a 25 mm shaft.

Nominal torque $M_{d\ nom}$:

The nominal torque is calculated with a safety factor against tooth base fatigue SF1, at the rotational output speed specified in the Technical Data section, under one-way varying load.

Series WD:

Maximum torque $M_{d\ max}$:

The calculation of the maximum torque with a safety factor against tooth fracture SFS 1 is done according to G. Niemann / H. Winter, Machine Elements, Band III, 1986, for worm gears and is influenced by:

- Limiting value of tooth base stress
- Module
- Gearing width

Nominal torque $M_{d\ nom}$:

The nominal torque is calculated with a safety factor against tooth wear of SF1,

- at the output speed specified in the table
- for a calculated service life of 10000 h
- at a duty of 5%

For Slew Drives with two motors, the specified values are valid for a slewing angle of $\leq 170^{\circ}$.

Series SP and WD:

Maximum holding torque M_h :

The maximum holding torque determines which retroactive torque can be transmitted or held without damage being caused to the gearing. In general, the value of the maximum torque is assumed.

Rotational speed

Slew Drive series SP:

The maximum permissible speed is $n_{perm} = \frac{40000}{D_L}$

Slew Drive series WD:

The maximum permissible speed is specified in the Technical Data section. For higher speeds, our Engineering Department should be consulted.

Duty

Slew Drive series WDs are designed for intermittent duty. Application with continuous running or with higher rate of duty and simultaneously high output torque are not permissible. This would lead to unacceptable temperature increase in the gearing and thus to premature failure of the Slew Drive. Transmission of the maximum torque is to be limited to 10% of each minute. Please check the diagram for the maximum permissible duty per minute of the respective series on P. 49 and P. 59.

Static capacity of raceway

Static capacity of the Slew Drive is determined by:

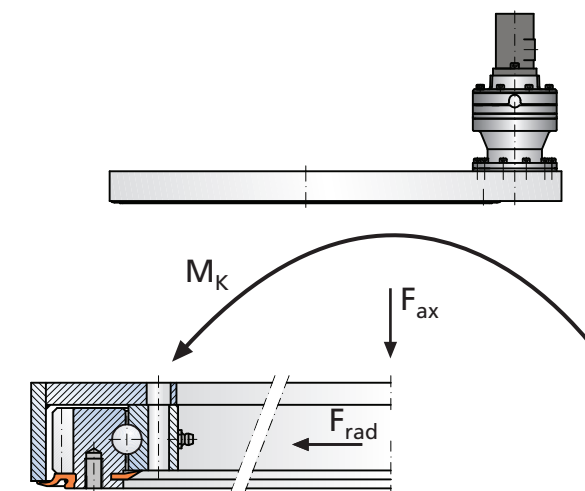
- Hardening depth of the raceway
- Number and size of the rolling elements
- Slewing Ring design
- Raceway geometry

The limiting load diagram shows permissible axial and tilting moment loads for a respective size unit.

Every loading case including the required or recommended safety must lie below the limiting load line.

Limiting load diagrams are valid under the following condition:

- Static loading
- Limiting load line with safety 1
- Clamping length of bolts, minimum 5-times, maximum 10-times the bolt diameter
- Continuous threads up to the bolt head is not permissible
- Bolts of quality class 10.9
- All mounting holes used
- “Compressive” load
- Adequately stiff and level mounting structure (see chapter
- Minimum strength of the mounting structure $500\ \text{N/mm}^2$
- Radial loading considered as specified
- Compliance with “Installation and Maintenance Instructions”



Technical Information

To address the peculiarities of different applications, the following application service factors are to be considered in the prevailing loads:

Application	Application service factor f_a	Remark
Construction machinery	1.25	Normal operation
Forestry machinery	1.50	Rough operation
Foundries	1.75	Rough operation
Manlift platforms	1.30	Normal operation
Mech. engineering, general	1.25	Normal operation
Mech. engineering, general	1.50	Heavy operation
Measuring technique	2.00	Accuracy
Robot / mech. handling sys.	1.50	Accuracy
Rail vehicles	1.50	Rough operation
Special vehicles	1.50	Rough operation
Deep mining	1.75	Rough operation
Machine tools	1.50	Accuracy

Application service factors are to be considered in the following equations for the prevailing loads:

$$F_{axD} = F_{ax} \cdot f_a$$

$$M_{kD} = (M_k + 1.73 \cdot F_{rad} \cdot \frac{D_L}{1000}) \cdot f_a$$

To account for the prevailing radial load, the tilting moment is increased accordingly.

This equation applies only if:

$$F_{rad} \leq 220 \cdot \frac{M_k}{1000} + 0.5 \cdot F_{ax}$$

Should the value be exceeded, the limiting load diagram no longer applies.

Please contact our Engineering Department.

Calculation example:

Application: Slewing equipment for a construction machine under normal operation

Load:	Axial load	55 kN
	Radial load	6 kN
	Tilting moment load	86 kNm

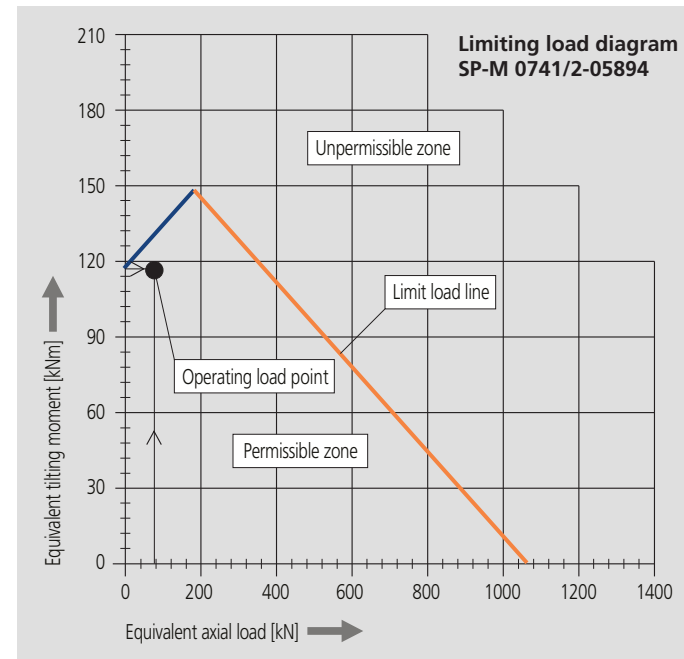
Slew Drive: pre-selected SP-M 0741/2-05894

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

$$F_{axD} = 55 \cdot 1.25 = 68.75 \text{ kN}$$

$$M_{kD} = (86 + 1.73 \cdot 6 \cdot \frac{741}{1000}) \cdot 1.25 = 117.11 \text{ kNm}$$

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



If the operating load point lies below the limiting load line then the Slew Drive is statically adequately dimensioned. If loads frequently occur during the slewing process, the selected type should be reevaluated dynamically for lifespan. For this, please contact our Engineering Department.

Mounting bolts

Prevailing 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 Slew Drive capacity of the raceway.
- Bolts are appropriately tightened with a torque wrench (bolt tightening factor $\alpha_A = 1.6$). For tightening torques.
- For Slew Drives with through holes, use the largest possible metric bolts with regular threads.

Caution: In the case of "suspended" loads, the bolts are subject to additional tensional forces. Please contact our Engineering Department.

Static load carrying capacity of mounting bolts

Determining 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 bolt connection is statically adequately dimensioned.

Dynamic load Slew Drive capacity of mounting bolts

Mostly, static dimensioning of a mounting bolt is sufficient. In cases where very high numbers of stress reversals act on the Slew Drive, dynamic verification is necessary. For this, please contact our Engineering Department.

Pressure lock of mounting bolts

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

$$F_{rad \max} = \frac{n_b \cdot F_{sp}}{18.8}$$

n_b = number of fixing holes per ring
 F_{sp} = pre-stressing force on a mounting bolt

If the prevailing radial load exceeds the limit value, we request that you contact our Engineering Department.

For Slew Drives with a different number or size of 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. Frictional contact prevails if $F_{rad \max}$ is greater than the prevailing radial load.

Slew Drives, series WD-H, are basically to be centralized.

Securing the mounting bolts

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

Loctite®

Application of Loctite 270 is suitable for the highest level of connections. This prevents loosening and the threads are also sealed.

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.

Other bolt securing systems are not recommended.

Friction torque

The friction torque in Slew Drives depends upon many influence factors, e.g.:

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

The friction torque of an unloaded Slew Drive can be determined approximately with the following equations:

Slew Drive series SP, with minimum Slew Drive clearance greater than zero

$$M_{wA} = 0.2 \cdot \frac{D_L^2}{2000}$$

Slew Drive series WD-L, with preloaded Slew Drive

$$M_{wA} = 2.0 \cdot \frac{D_L^2}{2000}$$

Slew Drive series WD-H, with preloaded Slew Drive

$$M_{wA} = 4.0 \cdot \frac{D_L^2}{2000}$$

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

$$M_w = 0.005 \cdot (4400 \cdot M_k + 4 \cdot D_L \cdot F_{rad} + D_L \cdot F_{ax}) + M_{wA}$$

Gear

Slew Drive series SP

Type of gear

Slew Drives series SP are provided with spur gear according to DIN 3960, DIN 3962 and DIN 3967.

If higher torque is necessary or longer operating lifespan is required, it is possible to manufacture the gear in tempered or hardened form.

Permissible torque

Corresponding data is available in the Technical Information section.

Drive pinion

The pinions used in different sizes are provided with hardened gear. In the Technical Data section you will find data about transmission ratios and numbers of teeth.

The drive pinion in direct drive units is supported by two radial bearings integrated into the housing and the drive mount.

Technical Information

Tooth backlash

Tooth backlash is factory-set at the highest point of the gear. It depends on the module of the gear and is calculated according to the following formula:

Tooth backlash to be set = 0.03 to 0.04 • module

Slew Drive series WD

Design of the gear

Slew Drive series WD is designed with a hardened worm gear according to DIN 3960, DIN 3962 and DIN 3967,

Permissible torque

Corresponding data is provided in the published Technical Information section.

Worm shaft

Worm shafts are made of hardened steel, with ground tooth flanks.

Tooth backlash

The tooth backlash is set at approx. 0.3 mm for Slew Drive series WD.

Self-locking

Series SP Slew Drives

Series SP Slew Drives are not self-locking.

Series WD Slew Drives

Self-locking only exists in the case of series WD Slew Drives if it cannot be driven from the output side. Self-locking is directly related to the efficiency of the Slew Drive, which depends on very many factors, e.g.

- Lead angle
- Angle of friction
- Rotation speed
- Lubrication
- Material matching
- Surface finish, etc.

Theory indicates self-locking occurs if the gear efficiency is < 50%. Data in the Technical Data section conforms to this statement. However, it is vital to determine the actual existence of the self-locking characteristics in the supplied Slew Drive individually during actual usage.

We take no responsibility for conformity of the theoretical data in the Technical Data section with the practically prevailing self-locking or non-self-locking characteristics.

Shock coefficient

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

Lifespan

The expected lifespan of the gear depends on the operating conditions. The following factors are key:

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

Lubrication

To ensure flawless operation and 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 the grease "collar"

For the gears:

- Smooth running
- Less wear
- Reduced operation noise
- Longer operating life
- Less heat development

Initial greasing

IMO Slew Drives 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 lubrication.

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 Maintenance Instructions" chapter.

Beside regular regreasing during operation, it is also necessary to grease the Slew Drive after long standstill periods. Equally important is to grease the equipment in which the Slew Drive is integrated after cleaning.

ATTENTION:

Slew Drives must not be cleaned with pressure washing equipment. During pressure washing, large amounts of pressurized water can penetrate into the Slew Drive through the sealing gap and cannot be removed, even by massive re-greasing. This will strongly reduce the usable lifespan of a Slew Drive.

Mixing greases

Grease with different thickener and base oil 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 3 years grease is not yet used, it should be replaced.

Design of mounting structure

Safe transmission of application loads and reliable operation of Slew Drives is achieved, along with other factors, through using adequately designed mounting structures.

To ensure safe operation of Slew Drives, there are certain minimum requirements to the mounting structure.

- Sufficient rigidity (see "Installation and Maintenance Instructions")
- Maintain flatness according to "Installation and Maintenance Instructions"
- No hard points (e.g. through cross beams)
- Surfaces for bolts must be machined plane
- Hollow mounting structure is preferred
- Use all mounting bolts
- Bolts of recommended strength should be used
- Minimum strength of attached structure 500 N/mm²

Very different mounting structure solutions can be used, depending upon maximum load and application.

If hollow mounting structure is designated for attached structure, flange thickness should be at least 50 % of Slew Drive's overall height. The thickness of the hollow mounting structure should be about 30% of flange thickness. For weight-critical applications, flange thickness can only be reduced if appropriate stiffening ribs are provided and the specifications on permissible flatness and perpendicularity deviations and deformation under load are upheld. Values on this are specified in the "Installation and Maintenance Instructions".

Please follow the Installation and Maintenance Instructions.

Following the Installation and Maintenance Instructions is important for the reliability and safety of our product and has considerable influence on its service-life. The latest revision of the Installation and Maintenance Instructions can be downloaded at www.imo.de. Contact us to receive a paper copy.

A few simple steps for selecting a Slew Drive

You will find a detailed procedure on the following pages!

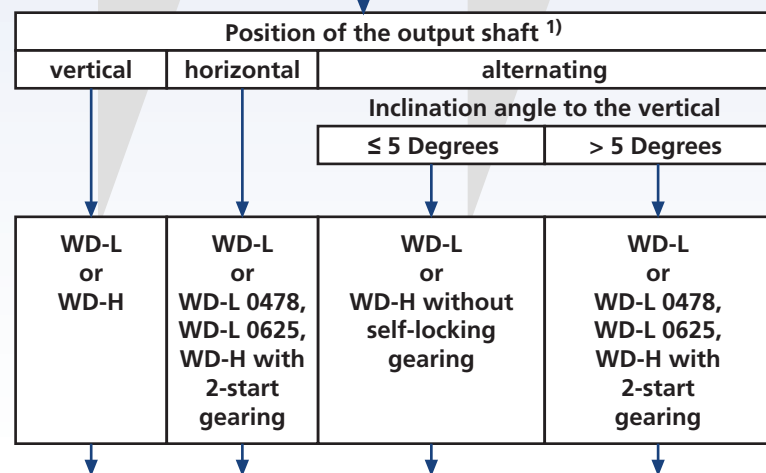
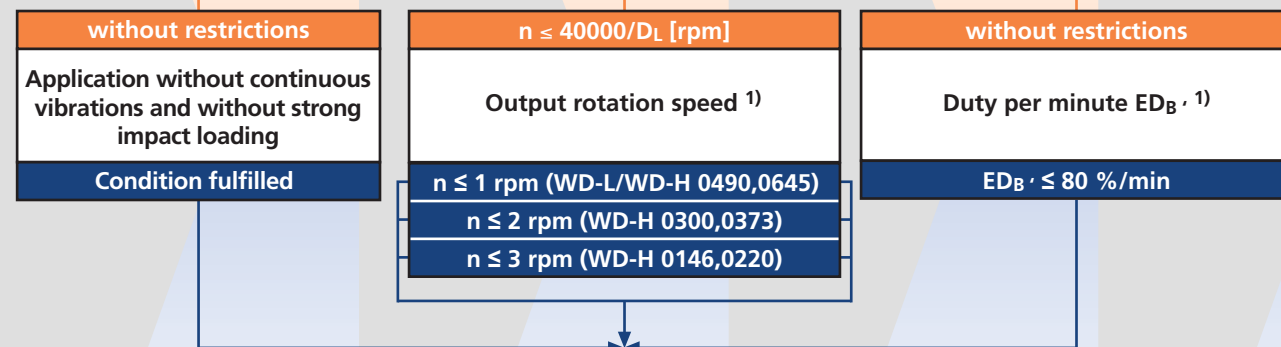


Spur gear driven type SP Series

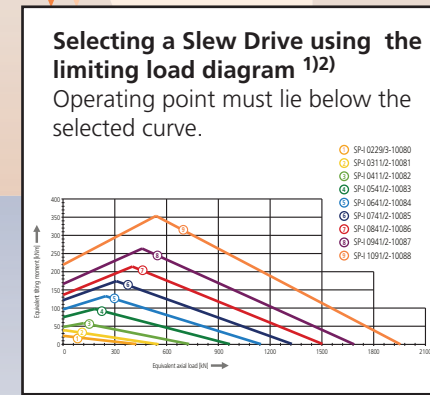


START

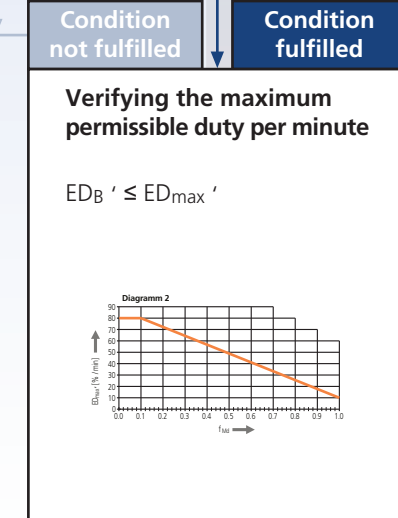
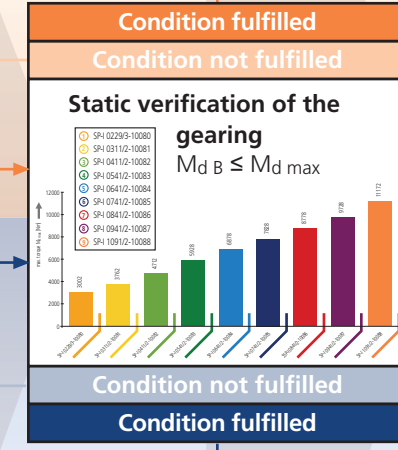
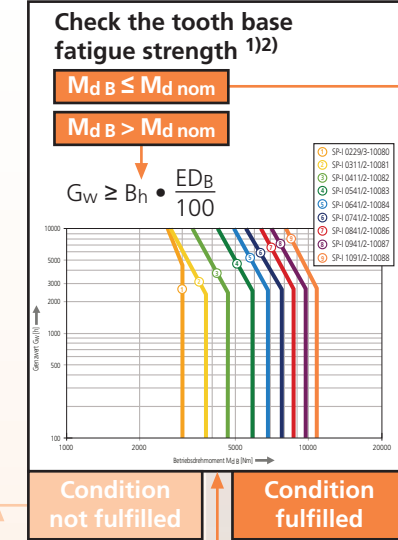
Worm gear driven type WD Series



Selecting Slew Drive with larger maximum torque M_d max

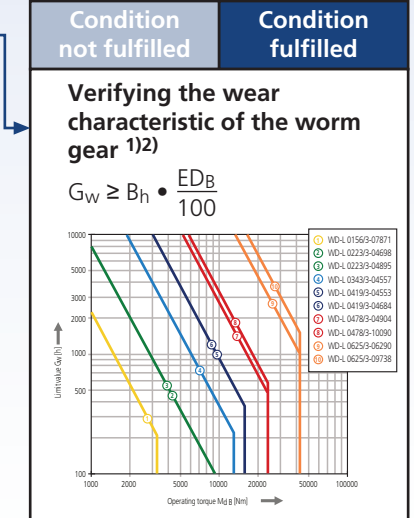


Selecting Slew Drive with a larger maximum torque M_d max



Verifying the selected Slew Drive by IMO Engineering Department

Please fill out an Application Data Sheet and supply a sketch of the application.



SOLUTION

1) Selection criteria can be used only as rough typical values; if limit value is exceeded, please contact IMO.
 2) Please accurately consider operating conditions.

Technical Information

Procedure for selecting a Slew Drive in only 5 steps:

Pre-selecting a suitable Slew Drive is described using the following example:

Example:

Application: Steering gears for an in-house transport vehicle; rough operation; limited assembly space; "compressive" load.

Load data:

Axial load:	$F_{ax} = 100 \text{ kN}$
Radial load:	$F_{rad} = 35 \text{ kN}$
Tilting moment:	$M_k = 75 \text{ kNm}$
Operating torque:	$M_{dB} = 13200 \text{ Nm}$
Output speed:	$n = 1.0 \text{ rpm}$
Operating time:	$B_h = 14000 \text{ h}$
Duty:	$ED_B = 5 \%$

Rotation cycle description under operating torque:
 60° rotation in 10 seconds in clockwise direction
 60° rotation in 10 seconds in counter-clockwise direction
 Pause for 40 seconds
 Operation of Slew Drive per minute:
 20 seconds rotating – 40 seconds standing still
 → 0,333 minute, rotating per minute
 → Duty per minute:

$$ED_B = \frac{0.333}{\text{min.}} \cdot 100\% = \frac{33.3\%}{\text{min.}}$$

1. Step: Selecting a suitable design (WD or SP)

Comparing product characteristics

WD design:

- Exhibits high torque at low output speeds and transmits high tilting moments, axial and radial loads
- Attains highest capacity with smallest diameter configuration
- Flat design, due to tangentially located drives
- Provides high torque transmission (however, the duty must be taken into consideration)
- Self-locking and non-self-locking Slew Drives are available
- Non-self-locking Slew Drives can be equipped with locking brakes
- Consider the position of the output shaft when selecting the Slew Drive
- Not recommended in case of continuous vibrations and heavy impact loading

Typical application:

Manlift platforms, steering gears for undercarriages of cranes and heavy-duty vehicles, loading cranes, turntables, forklift rotators, mining equipment, etc.

SP design:

- Enables higher output rotary speeds
- Very narrow in size around the Slewing Ring, but the drive is broad in axial direction
- Offers a large, open internal diameter
- Very suitable for upper structures with larger radial diameters
- Basically not self-locking in design
- Can be equipped with locking brakes
- The position of output shaft is insignificant
- Preferred design for vibration and impact loading applications

Typical applications:

Handling and automation equipment, packaging machines, tool changers, grippers, construction machines, land and forestry machines, etc.

Typical selection:

Worm gear driven types have proven themselves as steering gears. Features such as high torque, low output rotary speed with smaller assembly height and diameter clearly speak for the application of WD design. The smallest assembly height of a worm gear driven Slew Drive is provided by the WD-L series.

2. Step: Selecting a suitable design size in the limiting load diagram for "compressive" load:

A suitable Slew Drive is selected iteratively. For a pre-selected Slew Drive, (e.g. WD-L 0478/3-04904), an operation load point is calculated depending on external loading, the application service factor and the raceway diameter D_L .

Loading is permissible for raceway and bolt connection, provided that the operating point lies below the limiting load line of a pre-selected Slew Drive.

If the operation load point lies above the corresponding limiting load line, a Slew Drive with higher power rating must be selected, for which the limiting load line lies above the current operation load point. For the newly selected size, the operation load point must be calculated again and the permissibility of the new operation load point must be verified against the limiting load line.

On the contrary, if the operating load point also lies below the limiting load line of a smaller size, then, for this size, permissibility of the newly calculated operating point can be verified within the limiting load diagram.

This iterative approach is repeated until an optimally suitable size is determined, by which the operation load point lies below the corresponding limiting load line.

The following conditions must be fulfilled:

- Preconditions for limiting load diagram apply.
- Equation $F_{rad} \leq 220 \cdot \frac{M_k}{1000} + 0.5 \cdot F_{ax}$ fulfilled

Example:

- Preconditions for the limiting load diagram apply
- Verifying the operating parameters:

$$F_{rad} \leq 220 \cdot \frac{M_k}{1000} + 0.5 \cdot F_{ax}$$

$$35 \leq 220 \cdot \frac{75}{1000} + 0.5 \cdot 100 = 66.5 \quad (\text{condition fulfilled})$$

Calculation of the operation load point:

Application service factor $f_a = 1.5$ (special vehicles)

Raceway diameter for WD-L 0478/3-04904: $D_L = 478 \text{ mm}$ (see product program overview / compare P. 4 and P. 5)

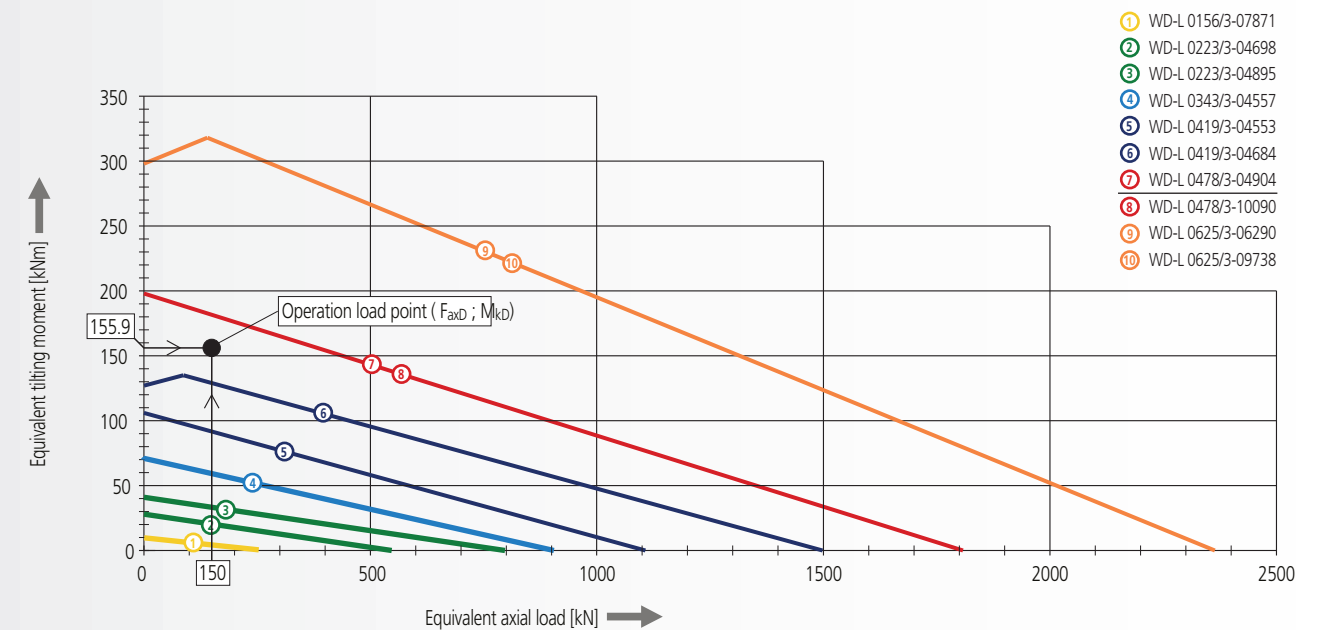
$$F_{axD} = F_{ax} \cdot f_a$$

$$F_{axD} = 100 \text{ kN} \cdot 1.5 = 150 \text{ kN}$$

$$M_{kD} = (M_k + 1.73 \cdot F_{rad} \cdot \frac{D_L}{1000}) \cdot f_a$$

$$M_{kD} = (75 + 1.73 \cdot 35 \cdot \frac{478}{1000}) \cdot 1.5 = 155.9 \text{ kNm}$$

The operation load point lies below the limiting load line of the selected Slew Drive WD-L 0478/3-04904 and is permissible. The operation load point of the selected Slew Drive lies above the limiting load line of the smaller size, which would not be permissible. A Slew Drive that is larger than the selected Slew Drive WD-L 0478/3-04904 would not be the best solution from the economic point of view.



Technische Grundlagen

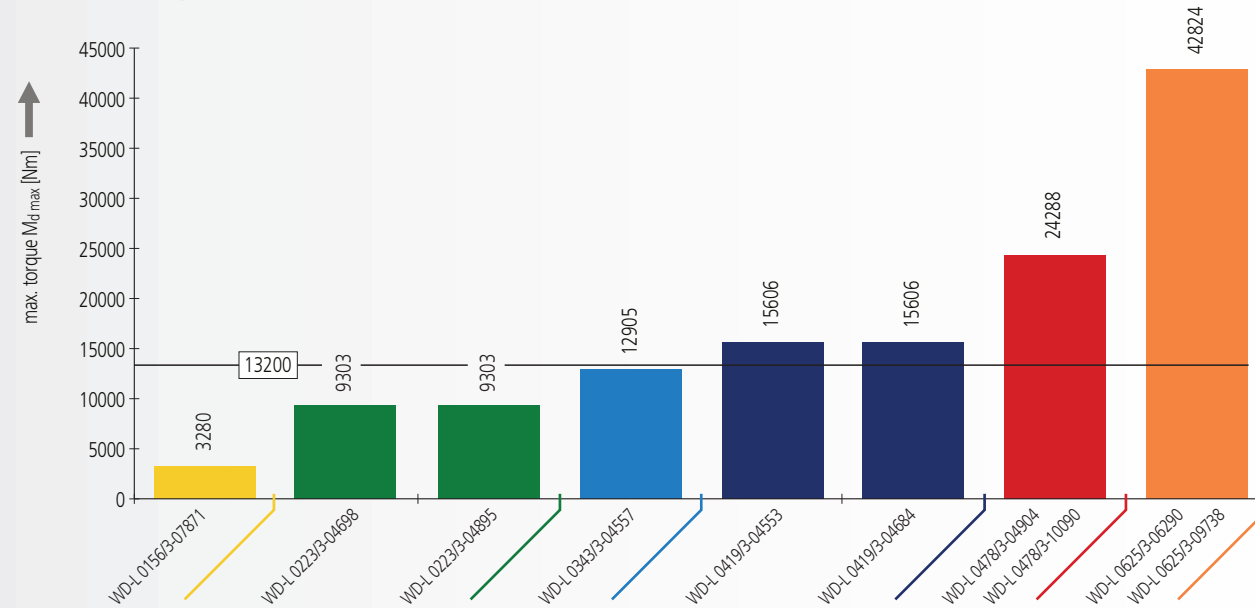
Step 3: Static reliability verification of operation torque M_{dB} :

The following condition must be fulfilled:
Operating torque $M_{dB} \leq$ maximum torque $M_{d\max}$
(see series overview WD-L P. 48)

Example: $13200 \text{ Nm} \leq 24288 \text{ Nm}$ (condition fulfilled)

Slew Drives WD-L 0419/3-04553, WD-L 0419/3-04684, WD-L 0478/3-04904 and WD-L 0625/3-06290 can statically transmit the operating torque M_{dB} .
Since the operation load points of series WD-L 0419/3-04553 and WD-L 0419/3-04684 lie above their limiting load lines (cf. Step 2), the size WD-L 0478/3-04904 selected in Step 2 has to be selected. If the operating torque M_{dB} is greater than 24288 Nm, then WD-L 0625/3-06290 must be selected; in this example, however, WD-L 0625/3-06290 is not an economical solution.

Maximum torque $M_{d\max}$ of individual sizes



Step 4: Verifying the maximum permissible duty per minute ED_{\max} :

The following condition must be fulfilled:

- Preconditions for the diagram of maximum permissible duty per minute ED_{\max} apply (see series overview WD-L P. 49)

Duty per minute $ED_B \leq$ maximal permissible duty per minute ED_{\max}
(see series overview WD-L P. 49)

Example:

- Pre-conditions for the diagram of maximum permissible duty per minute ED_{\max} apply.

Verifying the condition: $ED_B \leq ED_{\max}$

Duty per minute $ED_B = 33.3 \text{ \% / min}$

Determining the maximum permissible duty per minute (see series overview WD-L P. 49)

$$\text{Factor } f_{Md} = \frac{M_{dB}}{M_{d\max}} = \frac{13200 \text{ Nm}}{24288 \text{ Nm}} = 0.543$$

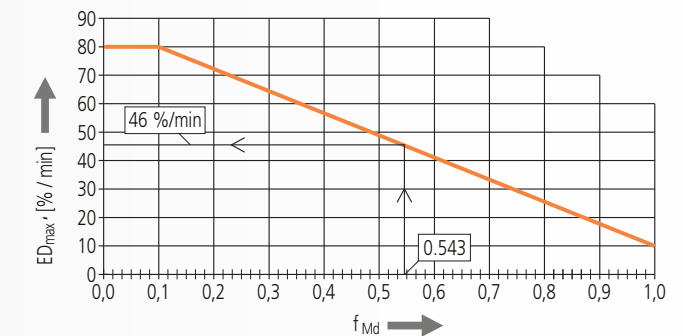
Maximum permissible duty per minute

$ED_{\max} = 46 \text{ \% / min}$

Verifying the condition: $ED_B \leq ED_{\max}$

$33.3 \text{ \% / min} \leq 46 \text{ \% / min} \rightarrow$ condition fulfilled

Duty per minute is permissible.



Step 5: Verifying wear characteristics of worm gear

The following condition must be fulfilled:

- Preconditions for wear diagram apply (see series overview WD-L P. 49)

$$\text{Limit value } G_w \geq \text{operation time } B_h \cdot \frac{\text{duty } ED_B}{100}$$

Example:

- Preconditions for wear diagram apply

Verifying the condition: $G_w \geq B_h \cdot \frac{ED_B}{100}$

Determining the limit value G_w at the operating torque M_{dB} from the diagram for the selected Slew Drive WD-L 0478/3-04904 (see series overview WD-L S. 49)

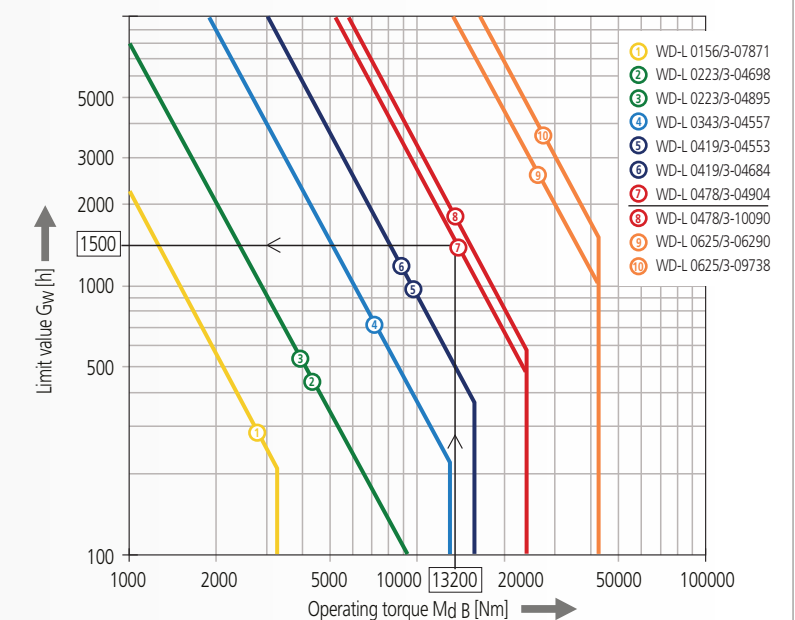
Verifying the condition: $G_w \geq B_h \cdot \frac{ED_B}{100}$

Limit value $G_w = 1500$ hours (from diagram)

$$B_h \cdot \frac{ED_B}{100} = 14000 \text{ Stunden} \cdot \frac{5\%}{100} = 700 \text{ Stunden}$$

$1500 \text{ hours} \geq 700 \text{ hours} \rightarrow$ condition fulfilled

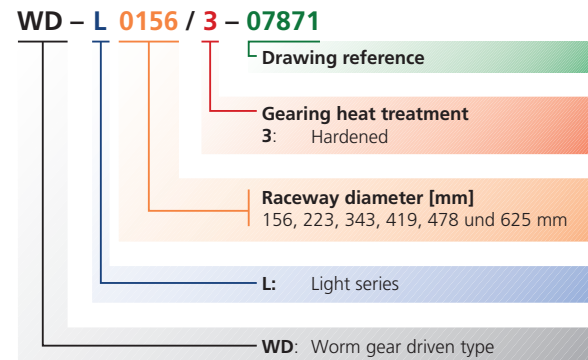
Operation is permissible as regards wear characteristics.



- Verification as regards:
- Suitability of design
 - Load carrying capacity of raceway and bolt connection in the limiting load diagram
 - Permissibility of the operating torque
 - Maximum permissible duty per minute
 - Wear characteristic of worm gearing was considered and the Slew Drive WD-L 0478/3-04904 evaluated as applicable in all aspects.

Verification of the selected Slew Drive by IMO is recommended.
Please enclose Application Data Sheet and a sketch of the application (see P. 100 and P. 102).

Series Overview



Due to the high gear ratio and the large surface contact between worm and worm gear, very high torque values can be transmitted using very small sized Slew Drives (highest power density). Worm gear driven Slew Drives of the light series WD-L are short-cycle drives for rotation and swiveling applications. Use in continuous rotation applications is not permissible due to higher duty. The duty should be selected so that over-heating around the gearing contact cannot occur. Diagram 2 exhibits the maximum permissible duty per minute, depending upon operation torque. When this maximum permissible duty per minute ED_{max} is exceeded, the permissibility must be checked by the IMO Engineering Department.

The following conditions apply when determining the maximum permissible duty per minute and when verifying the wear characteristic of worm gearing:

- Output speed: $n = 1.0$ rpm
- Wear safety factor of worm gearing: $S_W = 1.3$
- Observance of the maximum permissible duty ED_{max} (see diagram 2)
- Ambient temperature $20^\circ C$

Determining the maximum permissible duty per minute ED_{max} :

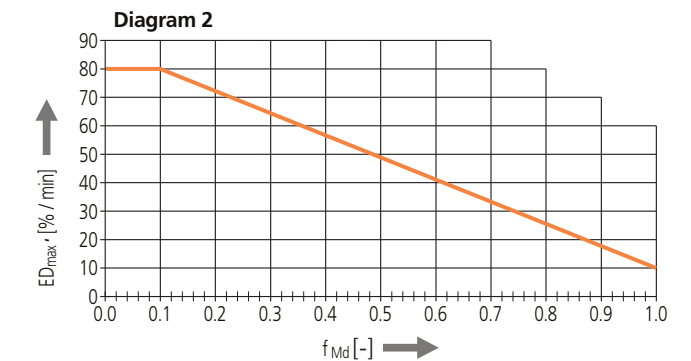
The maximum permissible duty per minute should never be exceeded

ED_{max} : Ratio of operating torque to maximum torque [-]

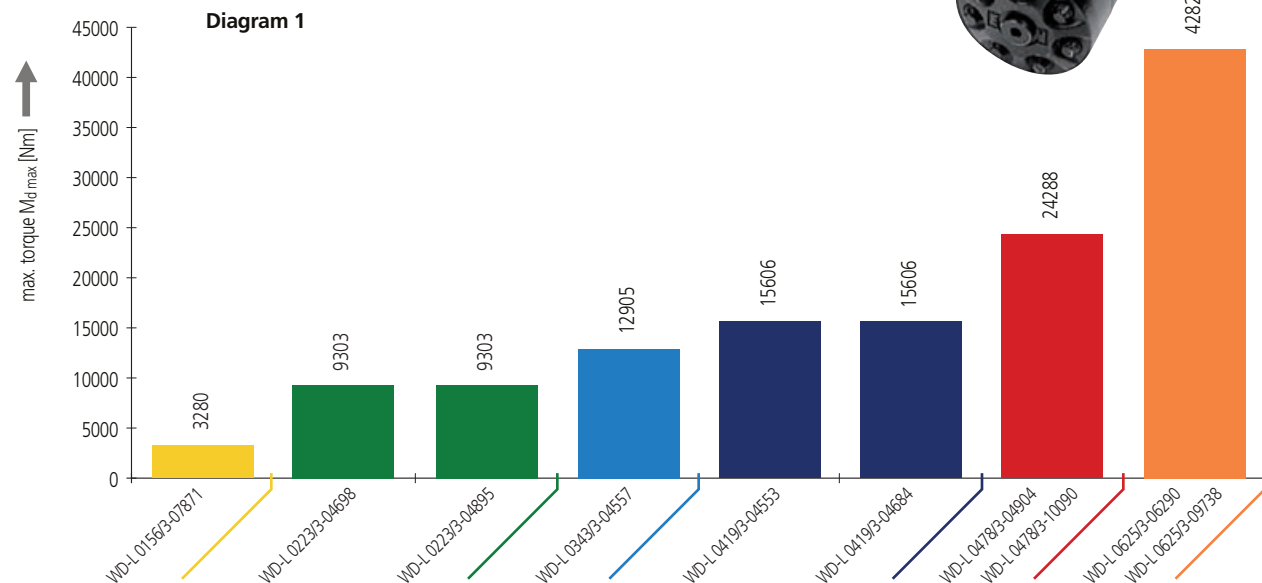
$$f_{Md} = M_{dB} / M_{dmax}$$

f_{Md} : Ratio of operating torque to maximum torque [-]

M_{dB} : Operating torque [Nm]
 M_{dmax} : Maximum torque [Nm] (see diagram 1)

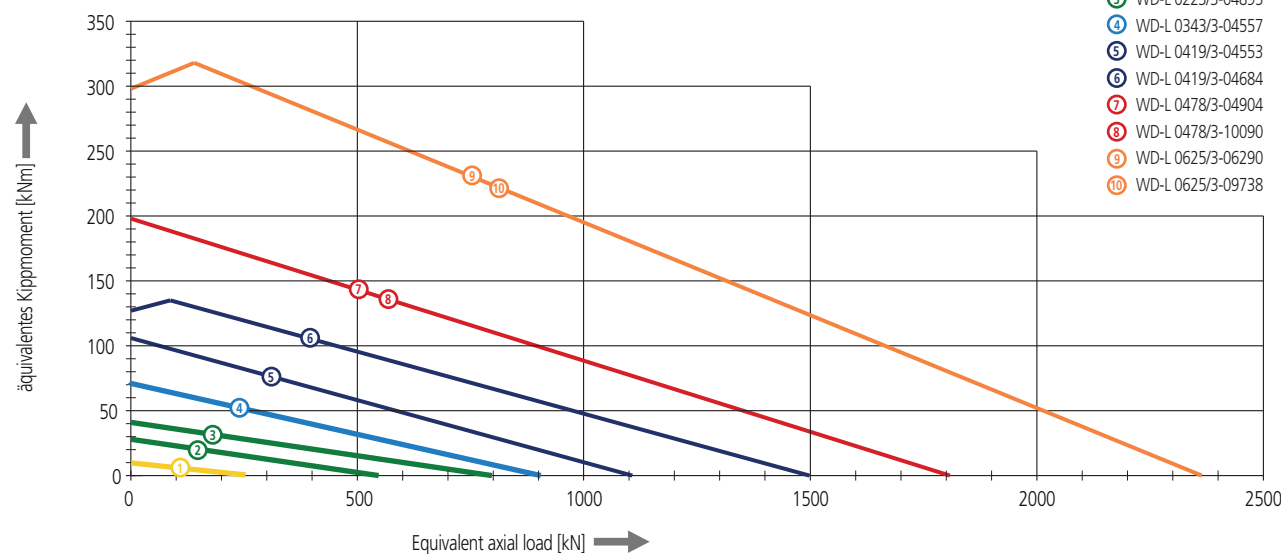


Maximum torque M_{dmax} of individual sizes



Limiting load diagrams of individual sizes for "compressive" load

Please refer to the explanations in the Technical Information section of the catalog



Wear characteristics of the worm gearing:

G_w : Limit value [h] (see diagram 3)
 B_h : Operation time [h]

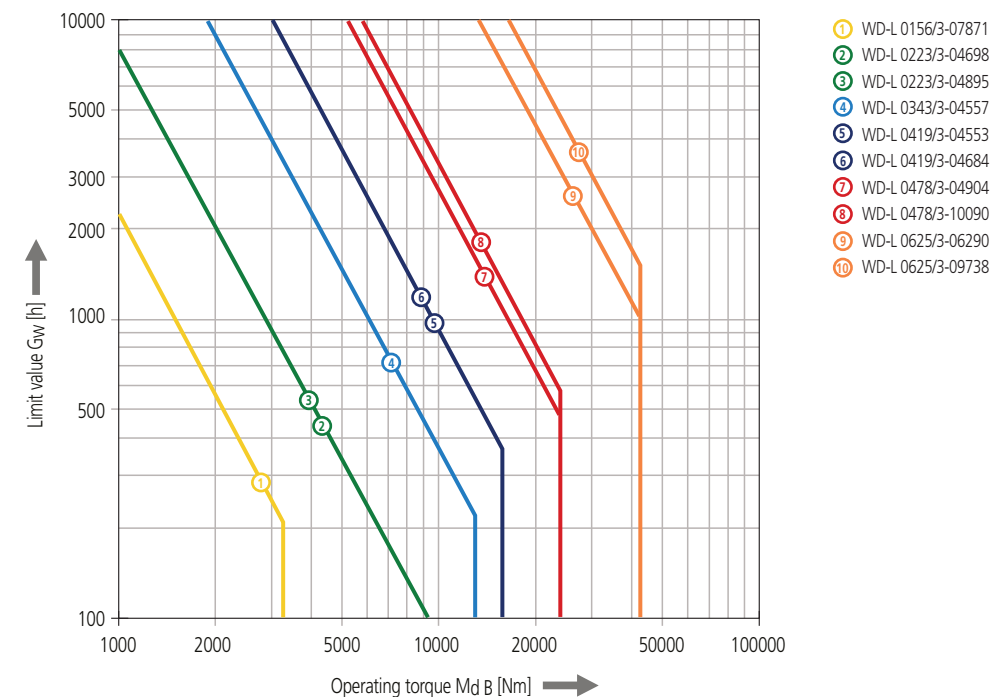
The operation is permissible as regards wear characteristics, if the following relationship prevails:

ED_B : Duty in operation [%]
 M_{dB} : Operating torque [Nm]

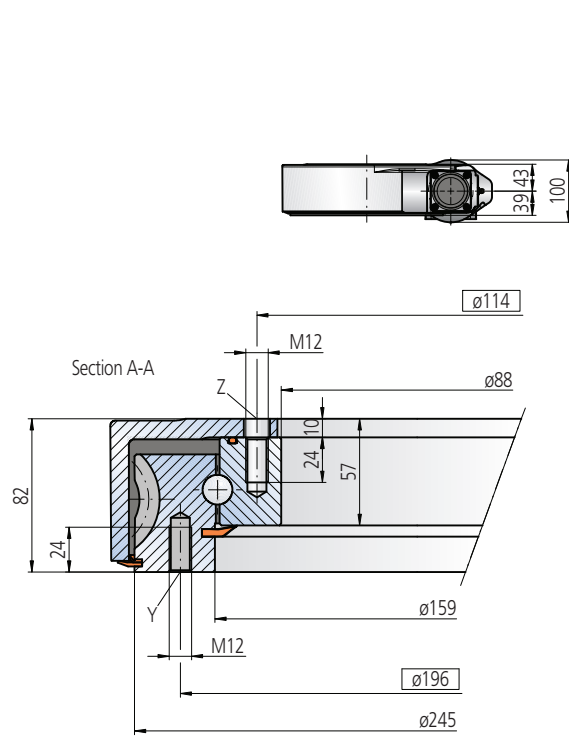
$$G_w \geq B_h \cdot \frac{ED_B}{100}$$

If this relationship is not fulfilled, a high rate of wear must be expected.

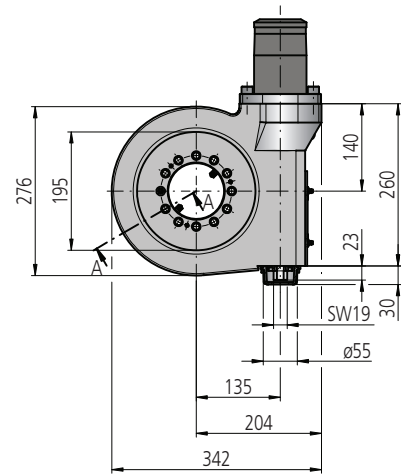
Diagram 3



Size 0156 / single row



Note, mounting face against upper surface shall be within the limits of $\phi 156$ and $\phi 225$



Mounting holes

Y = 12 Holes M12-24 deep, equally spaced
Z = 11 Holes $\phi 14$ -10 deep / M12-24 deep, equally spaced over 12 pitch

Lubrication ports

2 Taper type grease nipples on the internal diameter
2 Taper type grease nipples on the outside of the housing

Slew Drive supplied pre-lubricated

Drawing reference number WD-L 0156/3-07871			
Module	m [mm]	5	
Number of starts of the worm	[-]	1	
Gear ratio	i [-]	46	
Self-locking gears		nein**	
Maximum torque $s_{FS} = 1$	M_{d max} [Nm]	3280	
Nom. torque $s_{FS} = 1$ at $n = 1$ rpm	M_{d nom} [Nm]	2520	
Maximum holding torque*	M_h [Nm]	3280	
Static load rating, radial	C_{o rad} [kN]	94	
Static load rating, axial	C_{o ax} [kN]	253	
Dynamic load rating, radial	C_{rad} [kN]	83	
Dynamic load rating, axial	C_{ax} [kN]	97	
Weight, incl. 6 kg for hydraulic motor H-159	[kg]	40	

*Optional with brake

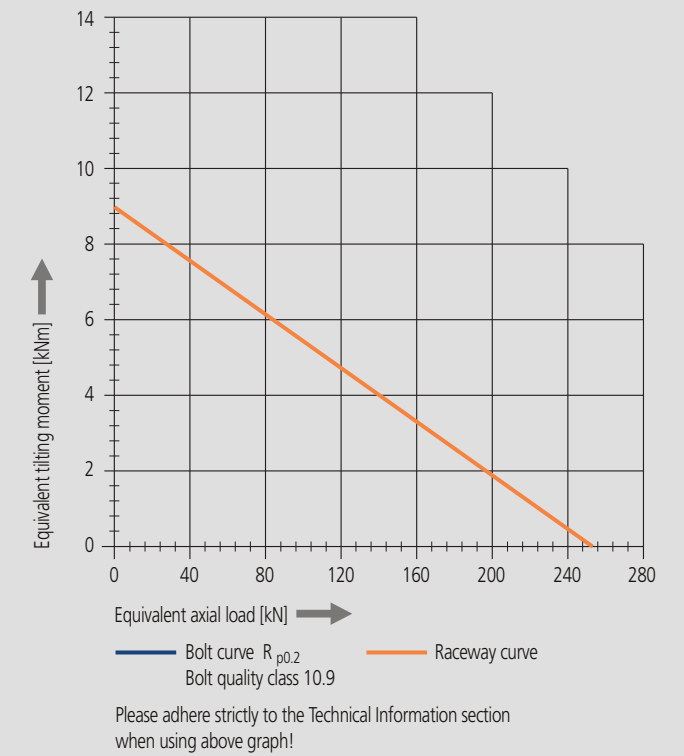
**Self-locking with mounted permanent brake or with mounted hydraulic motor and oil return stop

The selection of the hydraulic / electric motor depends on actual customer requirements and specifications.

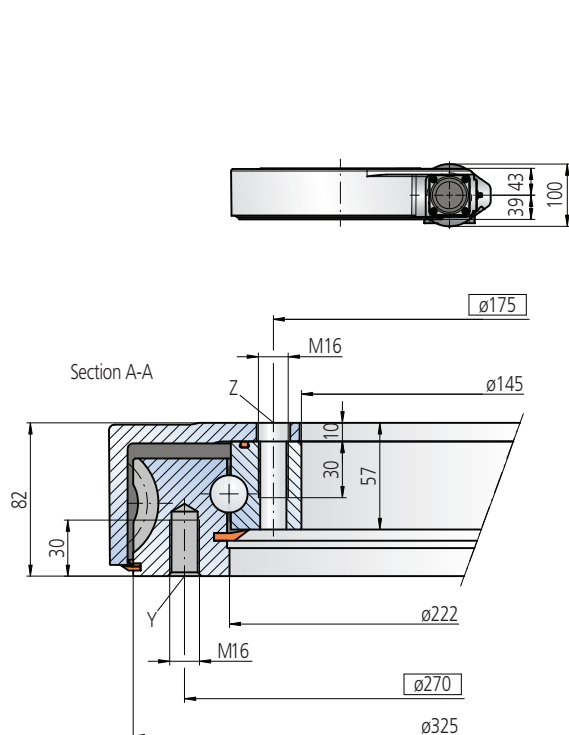
Selection example: performance data with hydraulic motor H-159

Pressure differential	Δp [bar]	75
Oil flow	Q [l/min]	8
Output speed	n [min ⁻¹]	1
Maximum achievable torque	M_d [Nm]	3280

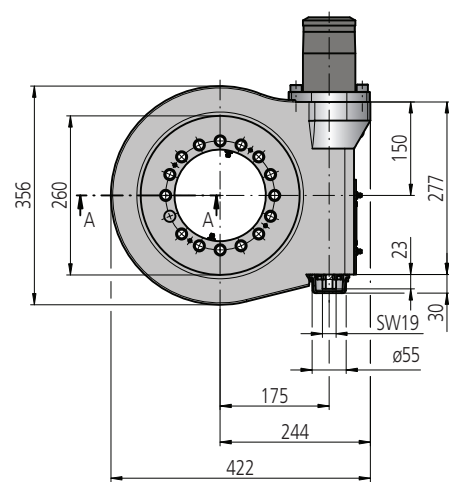
Limiting load diagram for 'compressive' load



Size 0223 / single row



Note, mounting face against upper surface shall be within the limits of $\phi 223$ and $\phi 329$



Mounting holes

Y = 16 Holes M16-30 deep, equally spaced
Z = 15 Holes $\phi 18$ -10 deep / M16-30 deep, equally spaced over 16 pitch

Lubrication ports

2 Taper type grease nipples on the internal diameter
2 Taper type grease nipples on the outside of the housing

Slew Drive supplied pre-lubricated

Drawing reference number WD-L 0223/3-04698			
Module	m [mm]	5	
Number of starts of the worm	[-]	1	
Gear ratio	i [-]	62	
Self-locking gears		nein**	
Maximum torque $s_{FS} = 1$	M_{d max} [Nm]	9303	
Nom. torque $s_{FS} = 1$ at $n = 1$ rpm	M_{d nom} [Nm]	4795	
Maximum holding torque*	M_h [Nm]	9303	
Static load rating, radial	C_{o rad} [kN]	204	
Static load rating, axial	C_{o ax} [kN]	547	
Dynamic load rating, radial	C_{rad} [kN]	132	
Dynamic load rating, axial	C_{ax} [kN]	154	
Weight, incl. 6 kg for hydraulic motor H-159	[kg]	50	

*Optional with brake

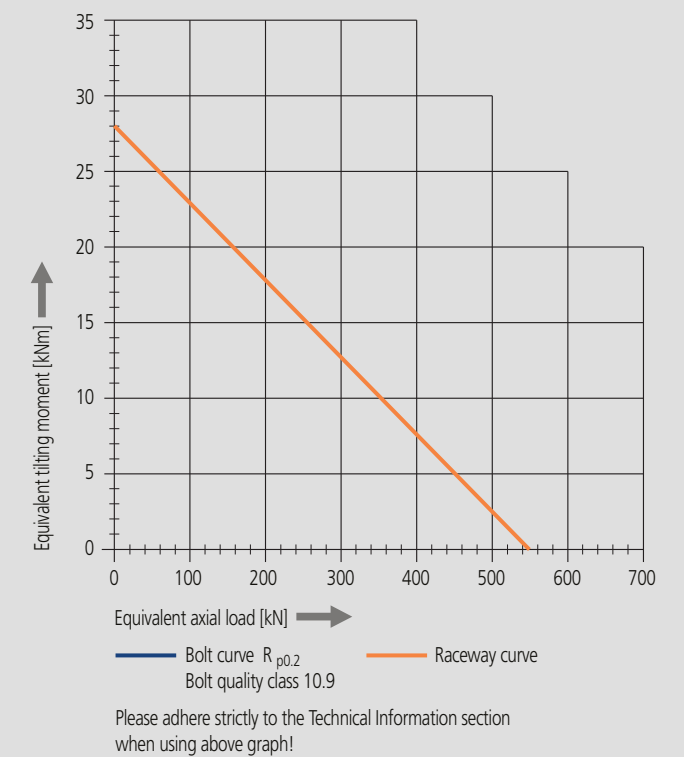
**Self-locking with mounted permanent brake or with mounted hydraulic motor and oil return stop

The selection of the hydraulic / electric motor depends on actual customer requirements and specifications.

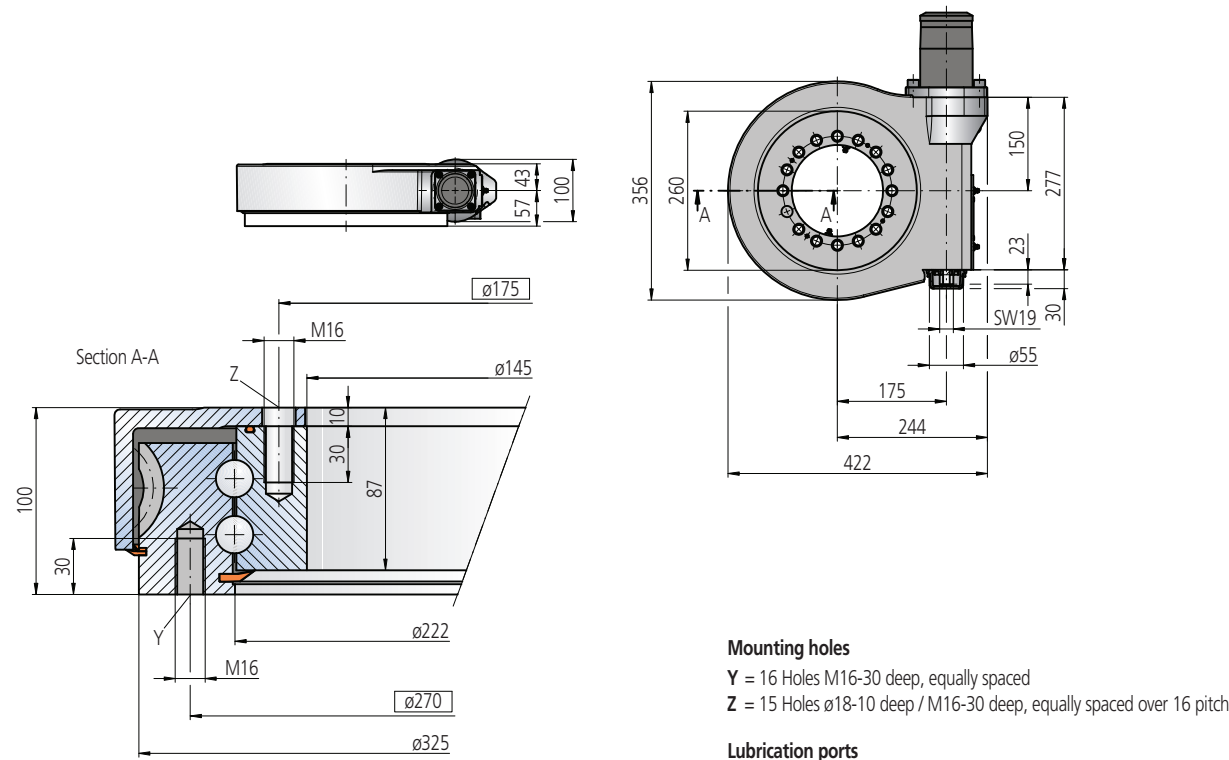
Selection example: performance data with hydraulic motor H-159

Pressure differential	Δp [bar]	150
Oil flow	Q [l/min]	13
Output speed	n [min ⁻¹]	1
Maximum achievable torque	M_d [Nm]	9303

Limiting load diagram for 'compressive' load



Size 0223 / double row



Note, mounting face against upper surface shall be within the limits of $\phi 223$ and $\phi 329$

Mounting holes
 Y = 16 Holes M16-30 deep, equally spaced
 Z = 15 Holes $\phi 18-10$ deep / M16-30 deep, equally spaced over 16 pitch

Lubrication ports
 4 Taper type grease nipples on the internal diameter
 2 Taper type grease nipples on the outside of the housing
 Slew Drive supplied pre-lubricated

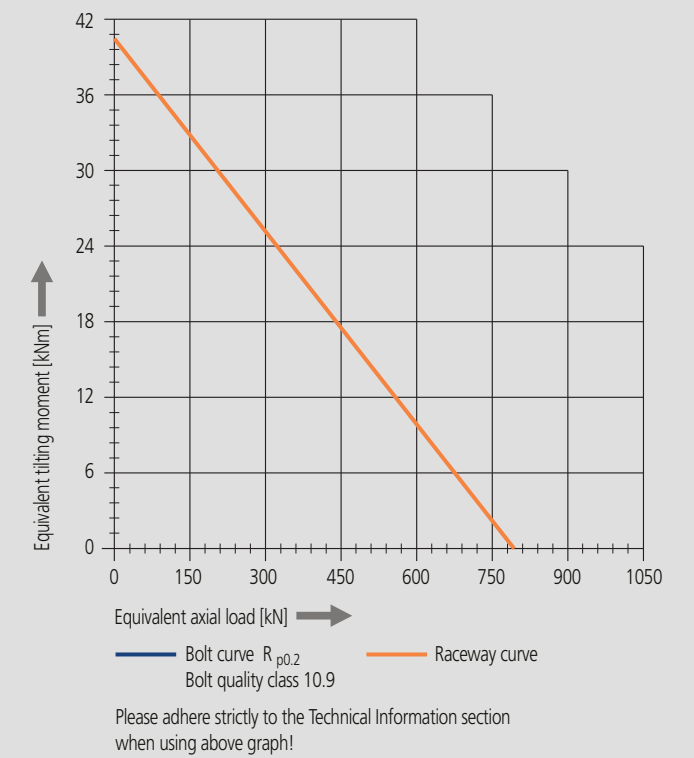
Drawing reference number WD-L 0223/3-04895

Module	m [mm]	5
Number of starts of the worm	[-]	1
Gear ratio	i [-]	62
Self-locking gears		nein**
Maximum torque $s_{FS} = 1$	M_{d max} [Nm]	9303
Nom. torque $s_{FS} = 1$ at $n = 1$ rpm	M_{d nom} [Nm]	4795
Maximum holding torque*	M_h [Nm]	9303
Static load rating, radial	C_{o rad} [kN]	297
Static load rating, axial	C_{o ax} [kN]	797
Dynamic load rating, radial	C_{rad} [kN]	215
Dynamic load rating, axial	C_{ax} [kN]	250
Weight, incl. 6 kg for hydraulic motor H-159	[kg]	60

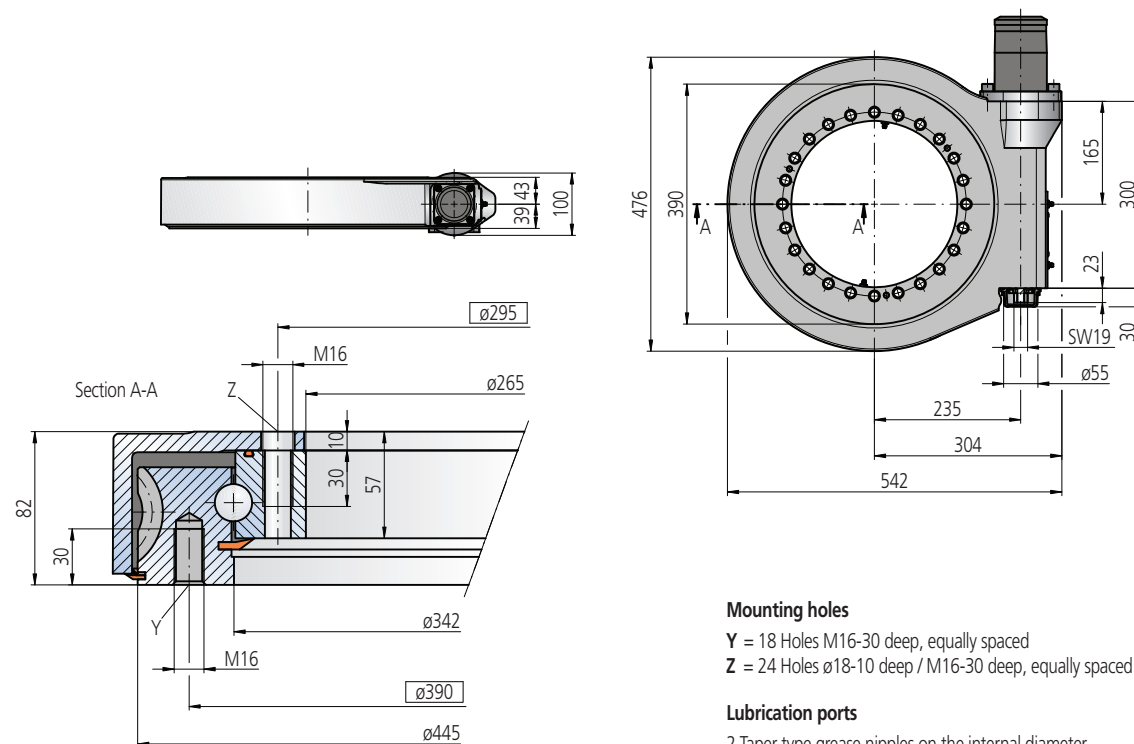
*Optional with brake
 **Self-locking with mounted permanent brake or with mounted hydraulic motor and oil return stop
 The selection of the hydraulic / electric motor depends on actual customer requirements and specifications.
 Selection example: performance data with hydraulic motor H-159

Pressure differential	Δp [bar]	150
Oil flow	Q [l/min]	13
Output speed	n [min ⁻¹]	1
Maximum achievable torque	M_d [Nm]	9303

Limiting load diagram for 'compressive' load



Size 0343 / single row



Note, mounting face against upper surface shall be within the limits of $\phi 343$ and $\phi 449$

Mounting holes
 Y = 18 Holes M16-30 deep, equally spaced
 Z = 24 Holes $\phi 18-10$ deep / M16-30 deep, equally spaced

Lubrication ports
 2 Taper type grease nipples on the internal diameter
 2 Taper type grease nipples on the outside of the housing
 Slew Drive supplied pre-lubricated

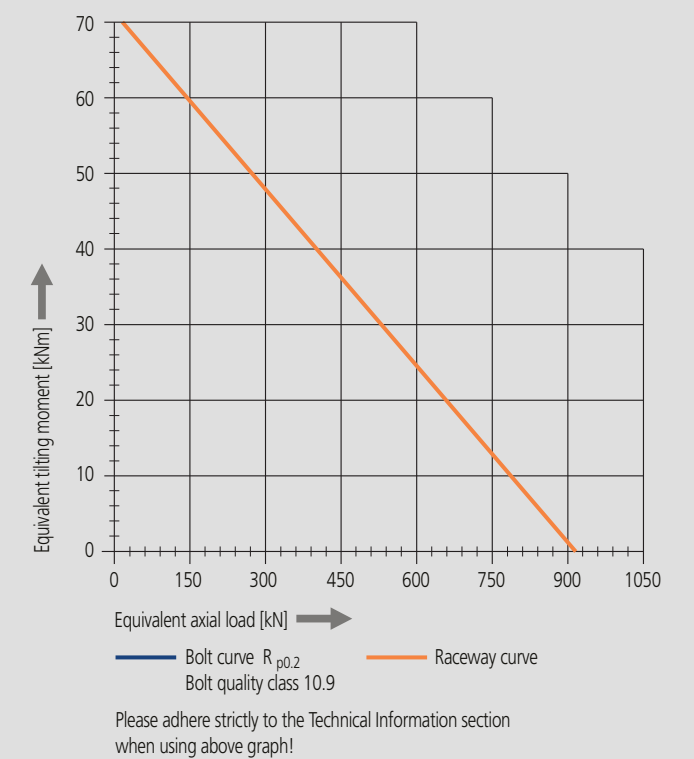
Drawing reference number WD-L 0343/3-04557

Module	m [mm]	5
Number of starts of the worm	[-]	1
Gear ratio	i [-]	86
Self-locking gears		nein**
Maximum torque $s_{FS} = 1$	M_{d max} [Nm]	12905
Nom. torque $s_{FS} = 1$ at $n = 1$ rpm	M_{d nom} [Nm]	10150
Maximum holding torque*	M_h [Nm]	12905
Static load rating, radial	C_{o rad} [kN]	338
Static load rating, axial	C_{o ax} [kN]	905
Dynamic load rating, radial	C_{rad} [kN]	157
Dynamic load rating, axial	C_{ax} [kN]	183
Weight, incl. 6 kg for hydraulic motor H-159	[kg]	68

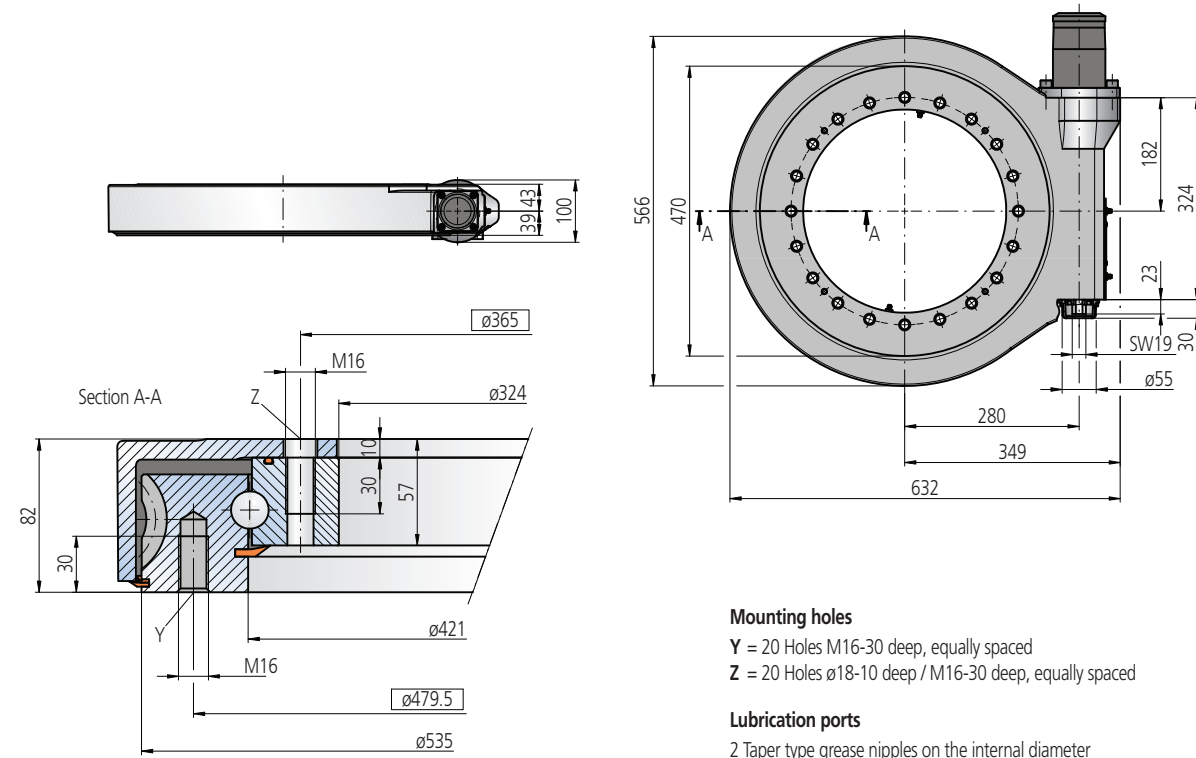
*Optional with brake
 **Self-locking with mounted permanent brake or with mounted hydraulic motor and oil return stop
 The selection of the hydraulic / electric motor depends on actual customer requirements and specifications.
 Selection example: performance data with hydraulic motor H-159

Pressure differential	Δp [bar]	150
Oil flow	Q [l/min]	15
Output speed	n [min ⁻¹]	1
Maximum achievable torque	M_d [Nm]	12905

Limiting load diagram for 'compressive' load



Size 0419 / single row



Note, mounting face against upper surface shall be within the limits of $\varnothing 419$ and $\varnothing 439$

Mounting holes
Y = 20 Holes M16-30 deep, equally spaced
Z = 20 Holes $\varnothing 18-10$ deep / M16-30 deep, equally spaced

Lubrication ports
 2 Taper type grease nipples on the internal diameter
 2 Taper type grease nipples on the outside of the housing
 Slew Drive supplied pre-lubricated

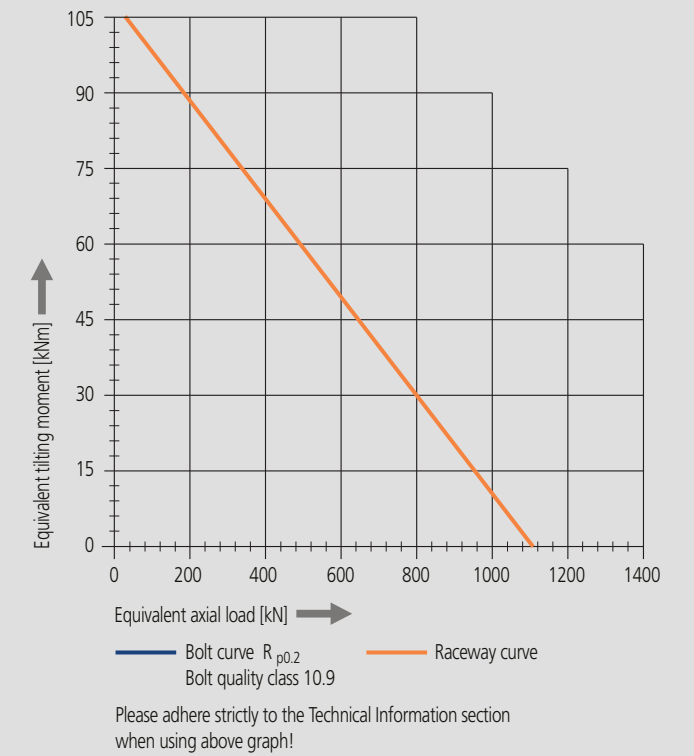
Drawing reference number WD-L 0419/3-04553

Module	m [mm]	5
Number of starts of the worm	[-]	1
Gear ratio	i [-]	104
Self-locking gears		nein**
Maximum torque $s_{FS} = 1$	M_{d max} [Nm]	15606
Nom. torque $s_{FS} = 1$ at $n = 1$ rpm	M_{d nom} [Nm]	15606
Maximum holding torque*	M_h [Nm]	15606
Static load rating, radial	C_{o rad} [kN]	413
Static load rating, axial	C_{o ax} [kN]	1107
Dynamic load rating, radial	C_{rad} [kN]	170
Dynamic load rating, axial	C_{ax} [kN]	198
Weight, incl. 6 kg for hydraulic motor H-159	[kg]	92

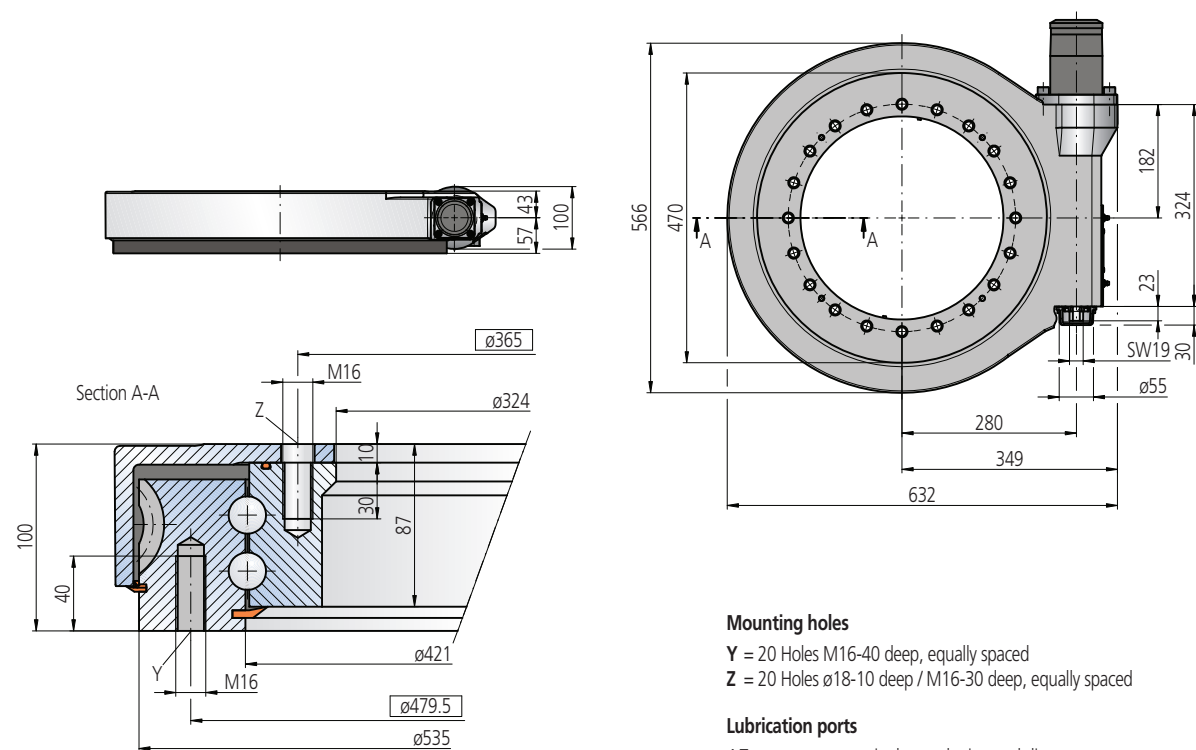
*Optional with brake
 **Self-locking with mounted permanent brake or with mounted hydraulic motor and oil return stop
 The selection of the hydraulic / electric motor depends on actual customer requirements and specifications.
 Selection example: performance data with hydraulic motor H-159

Pressure differential	Δp [bar]	150
Oil flow	Q [l/min]	20
Output speed	n [min ⁻¹]	1
Maximum achievable torque	M_d [Nm]	15606

Limiting load diagram for 'compressive' load



Size 0419 / double row



Note, mounting face against upper surface shall be within the limits of $\varnothing 419$ and $\varnothing 439$

Mounting holes
Y = 20 Holes M16-40 deep, equally spaced
Z = 20 Holes $\varnothing 18-10$ deep / M16-30 deep, equally spaced

Lubrication ports
 4 Taper type grease nipples on the internal diameter
 2 Taper type grease nipples on the outside of the housing
 Slew Drive supplied pre-lubricated

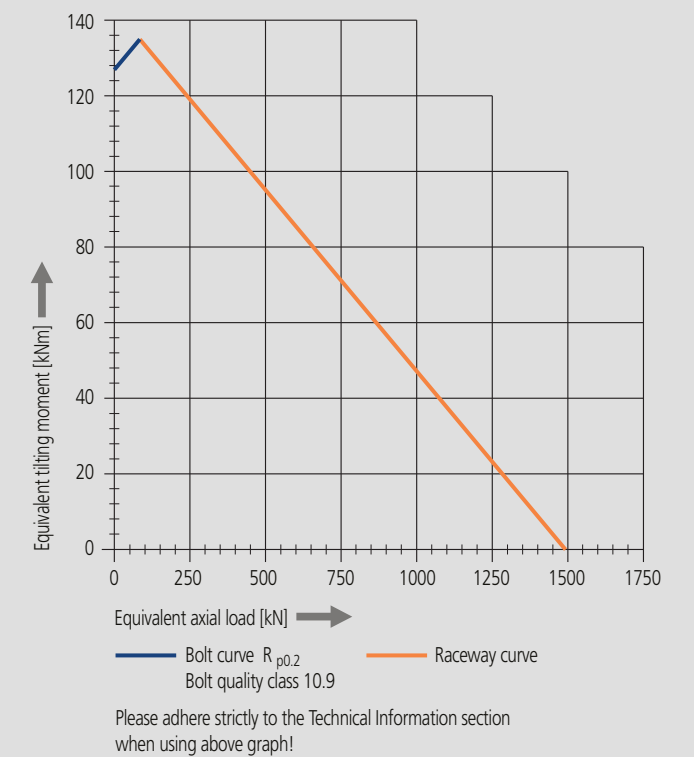
Drawing reference number WD-L 0419/3-04684

Module	m [mm]	5
Number of starts of the worm	[-]	1
Gear ratio	i [-]	104
Self-locking gears		nein**
Maximum torque $s_{FS} = 1$	M_{d max} [Nm]	15606
Nom. torque $s_{FS} = 1$ at $n = 1$ rpm	M_{d nom} [Nm]	15606
Maximum holding torque*	M_h [Nm]	15606
Static load rating, radial	C_{o rad} [kN]	559
Static load rating, axial	C_{o ax} [kN]	1498
Dynamic load rating, radial	C_{rad} [kN]	277
Dynamic load rating, axial	C_{ax} [kN]	323
Weight, incl. 6 kg for hydraulic motor H-159	[kg]	112

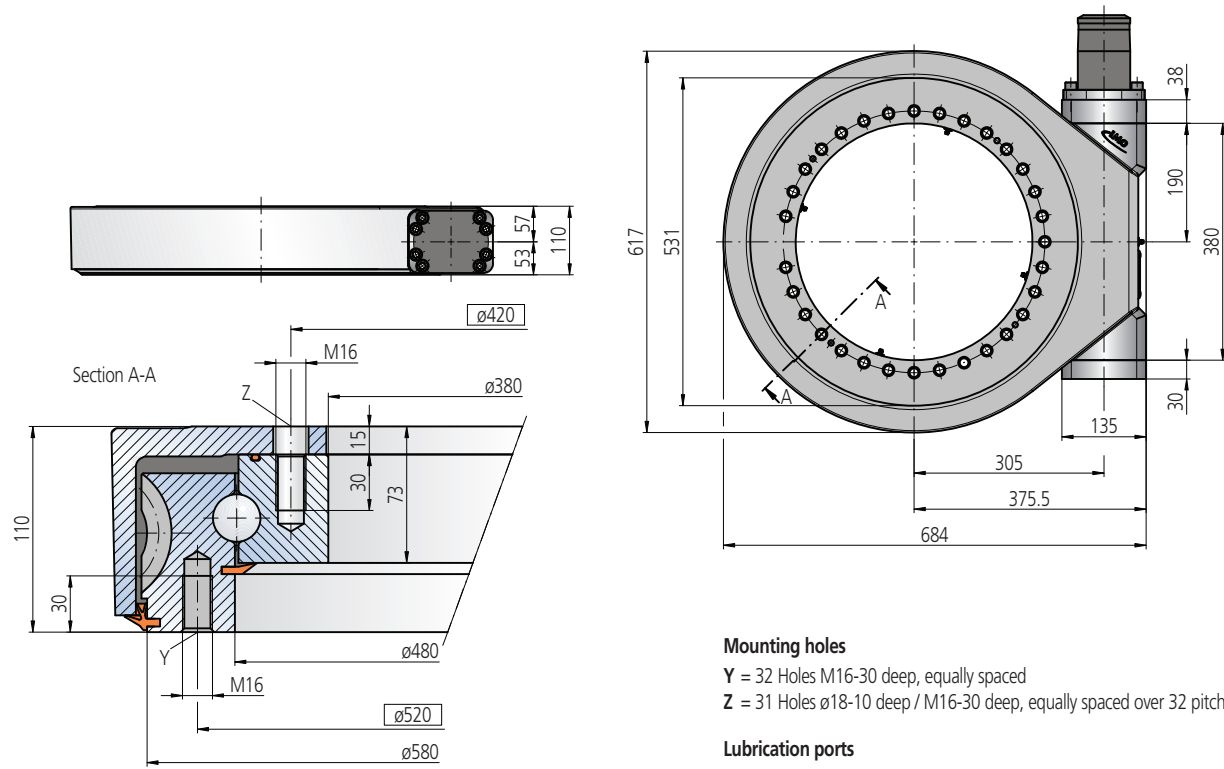
*Optional with brake
 **Self-locking with mounted permanent brake or with mounted hydraulic motor and oil return stop
 The selection of the hydraulic / electric motor depends on actual customer requirements and specifications.
 Selection example: performance data with hydraulic motor H-159

Pressure differential	Δp [bar]	150
Oil flow	Q [l/min]	20
Output speed	n [min ⁻¹]	1
Maximum achievable torque	M_d [Nm]	15606

Limiting load diagram for 'compressive' load



Size 0478 / single row



Note, mounting face against upper surface shall be within the limits of $\phi 478$

Mounting holes
Y = 32 Holes M16-30 deep, equally spaced
Z = 31 Holes $\phi 18$ -10 deep / M16-30 deep, equally spaced over 32 pitch

Lubrication ports
 4 Taper type grease nipples on the internal diameter
 2 Taper type grease nipples on the outside of the housing
 Slew Drive supplied pre-lubricated

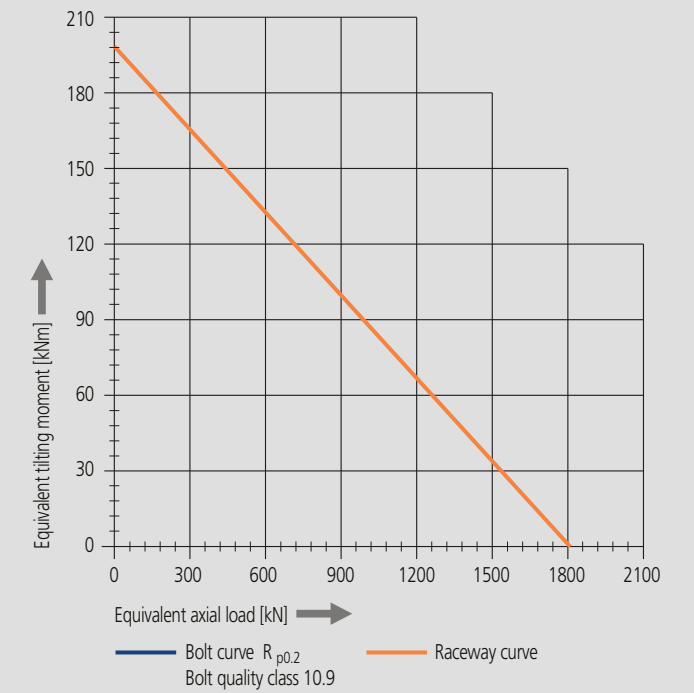
Drawing reference number WD-L 0478/3-10090			
Drawing reference number WD-L 0478/3-04904			
Module	m [mm]	6	6
Number of starts of the worm	[-]	1	2
Gear ratio	i [-]	93	47
Self-locking gears		nein**	nein**
Maximum torque $s_f s = 1$	M_{d max} [Nm]	24288	24288
Nom. torque $s_f = 1$ at $n = 1$ rpm	M_{d nom} [Nm]	24288	24288
Maximum holding torque*	M_h [Nm]	24288	24288
Static load rating, radial	C_{o rad} [kN]	675	675
Static load rating, axial	C_{o ax} [kN]	1808	1808
Dynamic load rating, radial	C_{rad} [kN]	251	251
Dynamic load rating, axial	C_{ax} [kN]	293	293
Weight, incl. 12 kg for hydraulic motor 2-300	[kg]	144	144

*Optional with brake
 **Self-locking with mounted spring loaded disc brake

The selection of the hydraulic / electric motor depends on actual customer requirements and specifications.
 Selection example: performance data with hydraulic motor 2-300

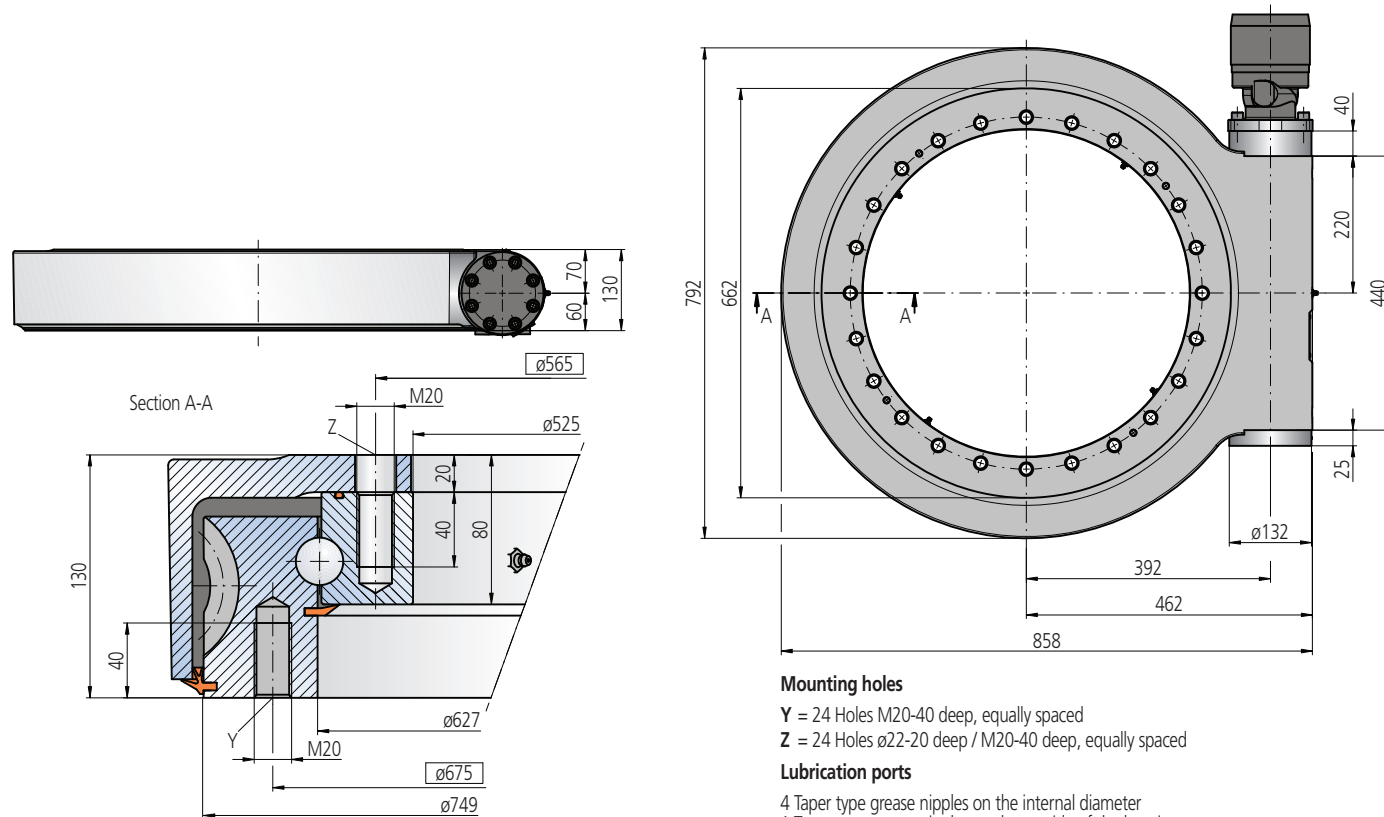
Pressure differential	Δp [bar]	125	195
Oil flow	Q [l/min]	32	22
Output speed	n [min ⁻¹]	1	1
Maximum achievable torque	M_d [Nm]	24288	24288

Limiting load diagram for 'compressive' load



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

Size 0625 / single row



Note, mounting face against upper surface shall be within the limits of $\phi 625$

Mounting holes
Y = 24 Holes M20-40 deep, equally spaced
Z = 24 Holes $\phi 22$ -20 deep / M20-40 deep, equally spaced

Lubrication ports
 4 Taper type grease nipples on the internal diameter
 1 Taper type grease nipples on the outside of the housing
 Slew Drive supplied pre-lubricated

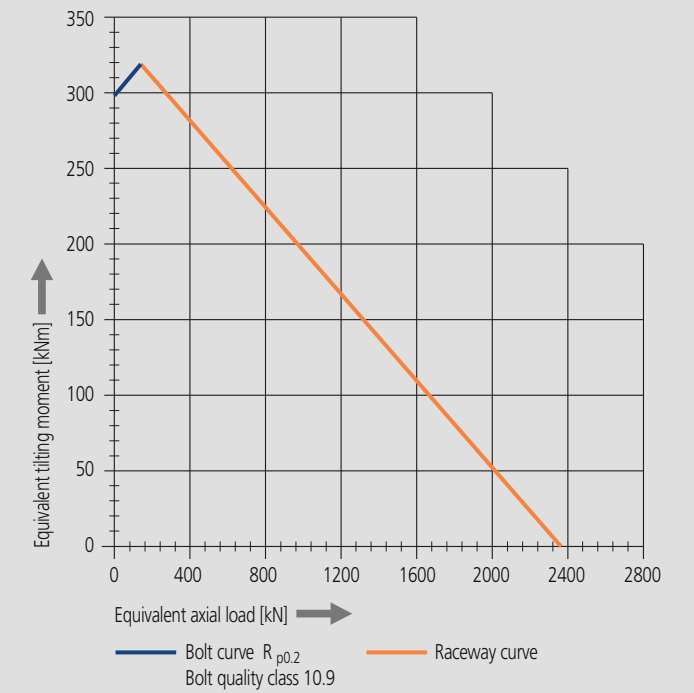
Drawing reference number WD-L 0625/3-09738			
Drawing reference number WD-L 0625/3-06290			
Module	m [mm]	7	7
Number of starts of the worm	[-]	1	2
Gear ratio	i [-]	104	51.5
Self-locking gears		nein**	nein**
Maximum torque $s_f s = 1$	M_{d max} [Nm]	42824	42824
Nom. torque $s_f = 1$ at $n = 1$ rpm	M_{d nom} [Nm]	42824	42824
Maximum holding torque*	M_h [Nm]	42824	42824
Static load rating, radial	C_{o rad} [kN]	883	883
Static load rating, axial	C_{o ax} [kN]	2364	2364
Dynamic load rating, radial	C_{rad} [kN]	280	280
Dynamic load rating, axial	C_{ax} [kN]	327	327
Weight, incl. 24 kg for hydraulic motor DT750	[kg]	242	242

*Optional with brake
 **Self-locking with mounted spring loaded disc brake

The selection of the hydraulic / electric motor depends on actual customer requirements and specifications.
 Selection example: performance data with hydraulic motor DT750

Pressure differential	Δp [bar]	105	130
Oil flow	Q [l/min]	80	46
Output speed	n [min ⁻¹]	1	1
Maximum achievable torque	M_d [Nm]	42824	42824

Limiting load diagram for 'compressive' load



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

Series Overview

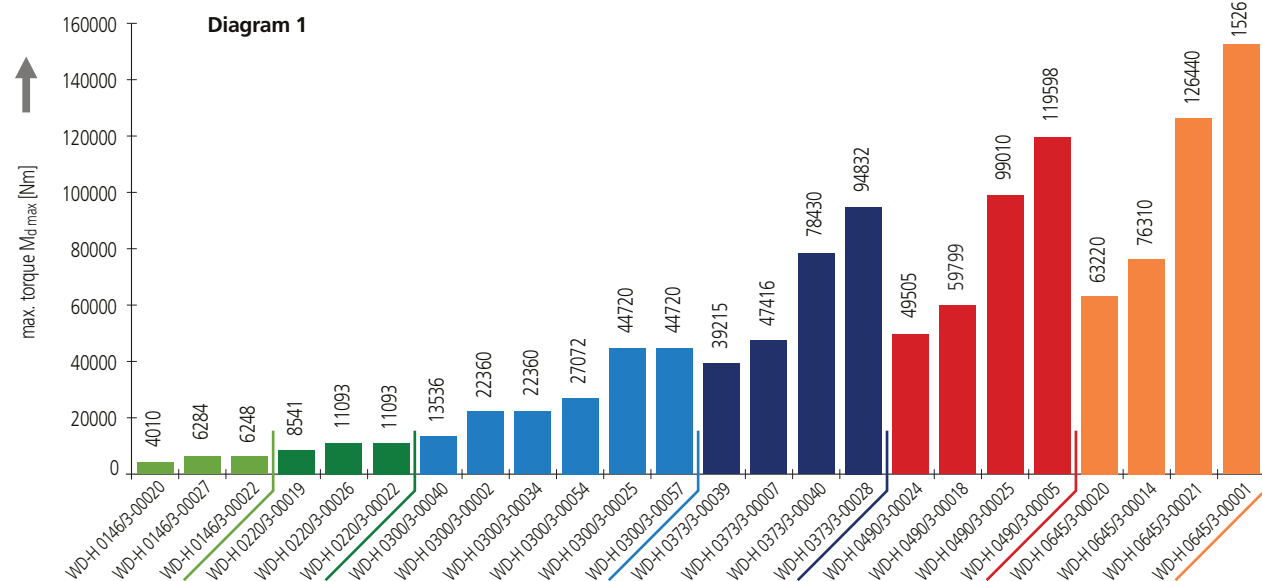


Due to the high gear ratio and the large surface contact between worm and worm gear, very high torque values can be transmitted using very small sized Slew Drives (highest power density). Worm gear driven Slew Drives of the heavy series, WD-H, are short-cycle units for rotation and swiveling applications. Use in applications with continuous rotation is not permissible, due to the higher duty. The duty is to be selected so that over-heating around the gearing contact cannot occur. Diagram 2 exhibits maximum permissible duty per minute, depending upon operation torque. When this maximum permissible duty per minute ED_{max} is exceeded, the permissibility must be checked by the IMO Engineering Department.

The following conditions apply when determining the maximum permissible duty per minute and when verifying the wear characteristic of worm gearing:

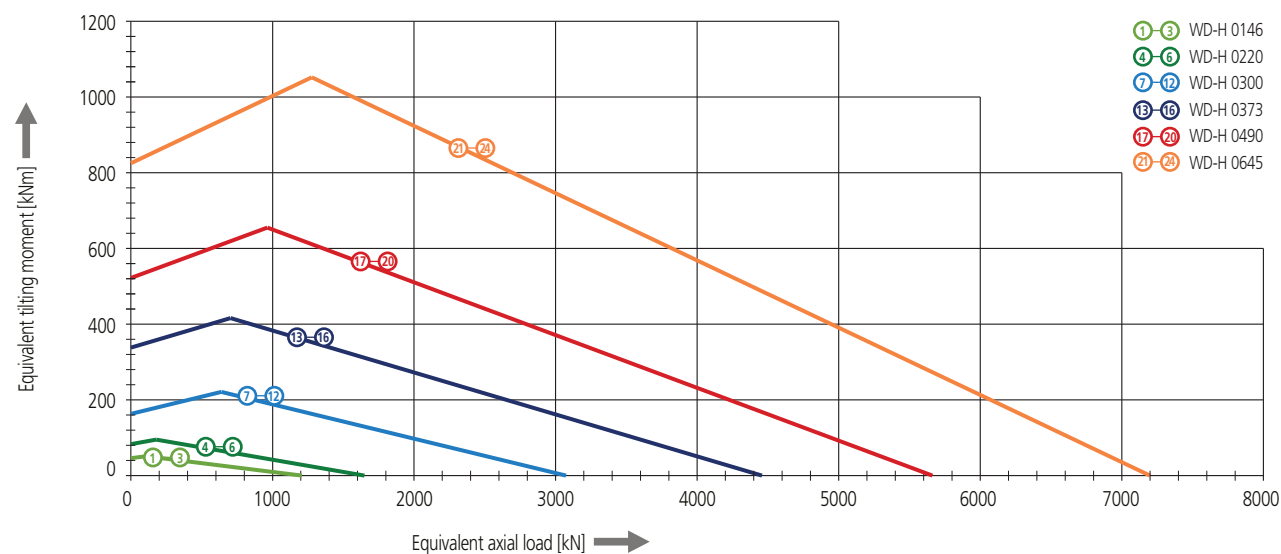
- Output speed: $n = 1.0$ rpm
- Wear safety factor of worm gearing: $S_w = 1.3$
- Observance of the maximum permissible duty per minute ED_{max} (see diagram 2)
- Ambient temperature 20°C

Maximum torque $M_{d max}$ of individual sizes



Limiting load diagrams of individual sizes for "compressive" load

Please refer to the explanations in the Technical Information section of the catalog



Determining the maximum permissible duty per minute ED_{max}

The maximum permissible duty per minute may never be exceeded

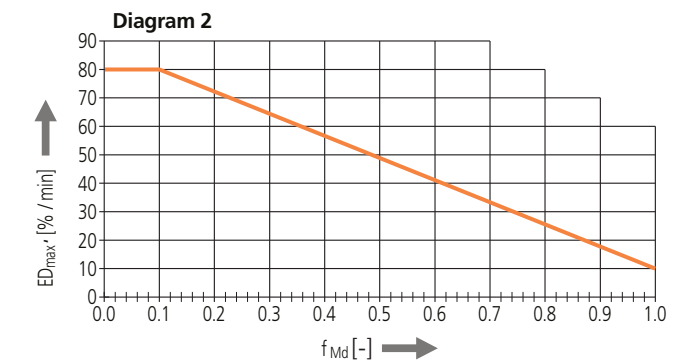
ED_{max} : Maximum permissible duty per minute in percent per minute [% / min] (see diagram 2)

$$f_{Md} = M_{dB} / M_{d max}$$

f_{Md} : Ratio of operating torque to maximum torque [-]

M_{dB} : Operating torque [Nm]

$M_{d max}$: Maximum torque [Nm] (see diagram 1)



Wear characteristics of the worm gear:

G_w : Limit value [h] (see diagram 3)

B_h : Operation time [h]

ED_B : Duty [%]

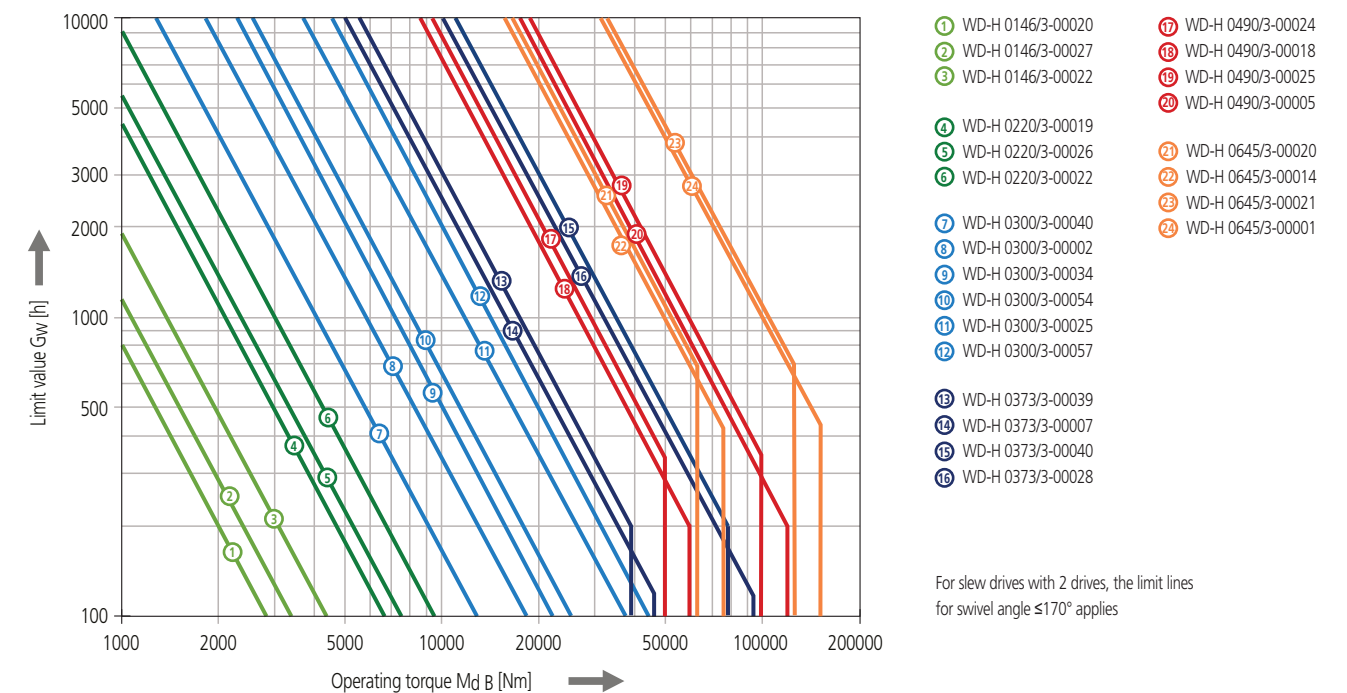
M_{dB} : Operating torque [Nm]

The application is permissible as regards wear characteristics, if the following relationship prevails:

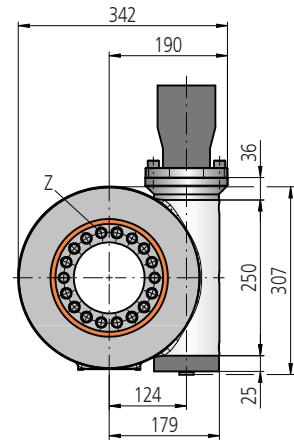
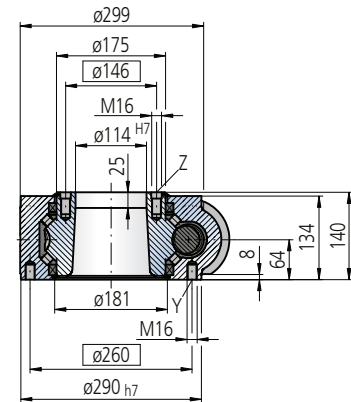
$$G_w \geq B_h \cdot \frac{ED_B}{100}$$

If this relationship is not fulfilled, a high rate of wear must be expected.

Diagram 3



Size 0146



Mounting holes

Y = 20 Holes M16-24 deep, equally spaced
Z = 18 Holes \varnothing 17-10 deep / M16-25 deep, equally spaced

Lubrication ports

1 Taper type grease nipple on the outside of the housing
Slew Drive supplied pre-lubricated

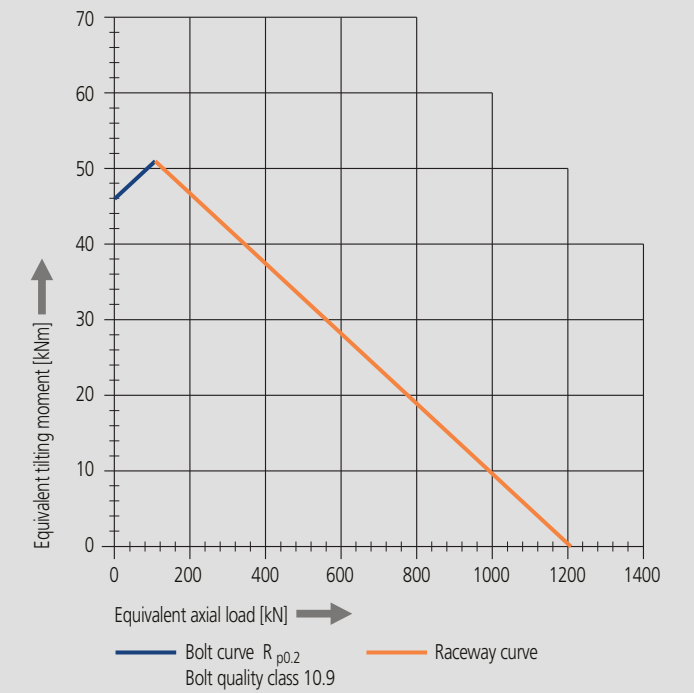
Drawing reference number WD-H 0146/3-00022					
Drawing reference number WD-H 0146/3-00027					
Drawing reference number WD-H 0146/3-00020					
Module	m	[mm]	3	4	4
Number of starts of the worm	-		1	1	2
Gear ratio	i	-	68	51	25.5
Self-locking gears**			ja	ja	nein
Maximum torque $s_{FS} = 1$	$M_{d\ max}$	[Nm]	4010	6284	6284
Nom. torque $s_{FS} = 1$ at $n = 3$ rpm	$M_{d\ nom}$	[Nm]	1950	2100	2300
Maximum holding torque*	M_h	[Nm]	4010	6284	6284
Static load rating, radial	$C_{o\ rad}$	[kN]	451	451	451
Static load rating, axial	$C_{o\ ax}$	[kN]	1208	1208	1208
Dynamic load rating, radial	C_{rad}	[kN]	172	172	172
Dynamic load rating, axial	C_{ax}	[kN]	199	199	199
Weight, incl. 8 kg for hydraulic motor H-293		[kg]	73	73	73

*Optional with brake
**See technical data

The selection of the hydraulic / electric motor depends on actual customer requirements and specifications.
Selection example: performance data with hydraulic motor H-293

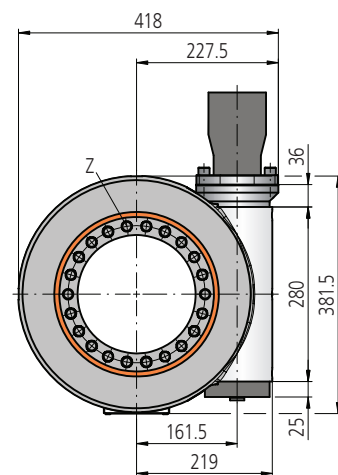
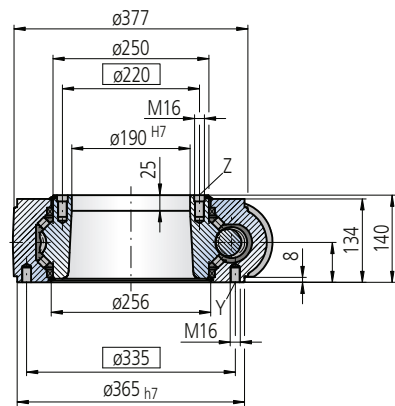
Pressure differential	Δp	[bar]	55	80	110
Oil flow	Q	[l/min]	61	46	27
Output speed	n	[min ⁻¹]	3	3	3
Maximum achievable torque	M_d	[Nm]	4010	6284	6284

Limiting load diagram for 'compressive' load



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

Size 0220



Mounting holes

Y = 24 Holes M16-24 deep, equally spaced
Z = 22 Holes \varnothing 17-10 deep / M16-25 deep, equally spaced

Lubrication ports

1 Taper type grease nipple on the outside of the housing
Slew Drive supplied pre-lubricated

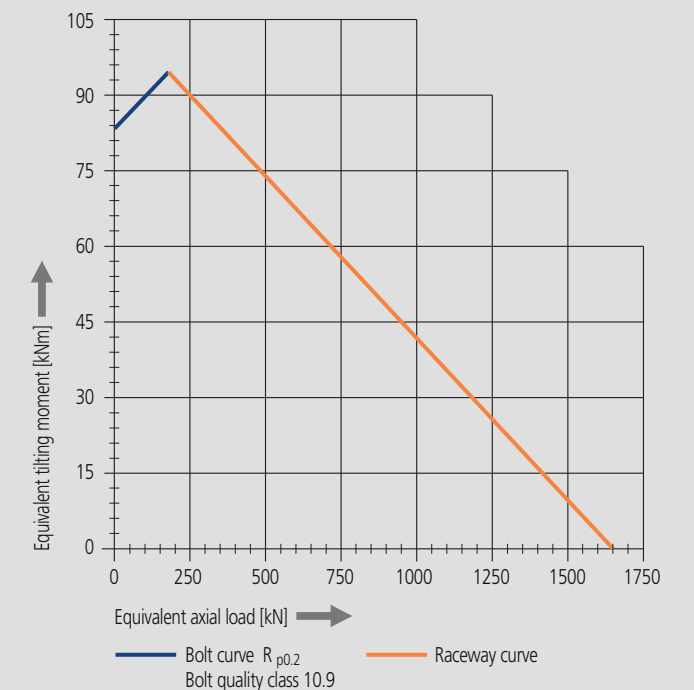
Drawing reference number WD-H 0220/3-00022					
Drawing reference number WD-H 0220/3-00026					
Drawing reference number WD-H 0220/3-00019					
Module	m	[mm]	4	5	5
Number of starts of the worm	-		1	1	2
Gear ratio	i	-	70	56	28
Self-locking gears**			ja	nein	nein
Maximum torque $s_{FS} = 1$	$M_{d\ max}$	[Nm]	8541	11093	11093
Nom. torque $s_{FS} = 1$ at $n = 3$ rpm	$M_{d\ nom}$	[Nm]	4550	4800	5150
Maximum holding torque*	M_h	[Nm]	8541	11093	11093
Static load rating, radial	$C_{o\ rad}$	[kN]	616	616	616
Static load rating, axial	$C_{o\ ax}$	[kN]	1650	1650	1650
Dynamic load rating, radial	C_{rad}	[kN]	193	193	193
Dynamic load rating, axial	C_{ax}	[kN]	224	224	224
Weight, incl. 11 kg for hydraulic motor RE200		[kg]	89	89	89

*Optional with brake
**See technical data

The selection of the hydraulic / electric motor depends on actual customer requirements and specifications.
Selection example: performance data with hydraulic motor RE200

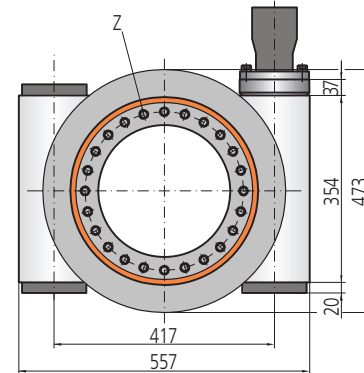
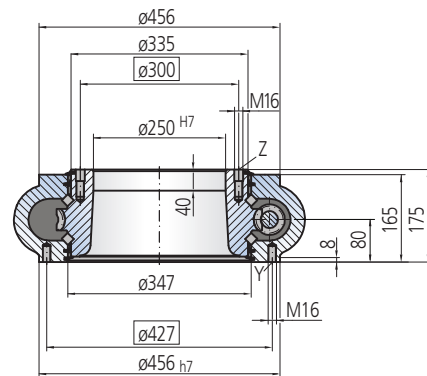
Pressure differential	Δp	[bar]	105	145	230
Oil flow	Q	[l/min]	45	38	22
Output speed	n	[min ⁻¹]	3	3	3
Maximum achievable torque	M_d	[Nm]	8541	11093	11093

Limiting load diagram for 'compressive' load



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

Size 0300 / single drive



Mounting holes

Y = 24 Holes M16-30 deep, equally spaced
Z = 24 Holes ø17-22 deep / M16-30 deep, equally spaced

Lubrication ports

1 Taper type grease nipple on the outside of the housing on the right side
3 Taper type grease nipples on the outside of the housing on the left side

Slew Drive supplied pre-lubricated

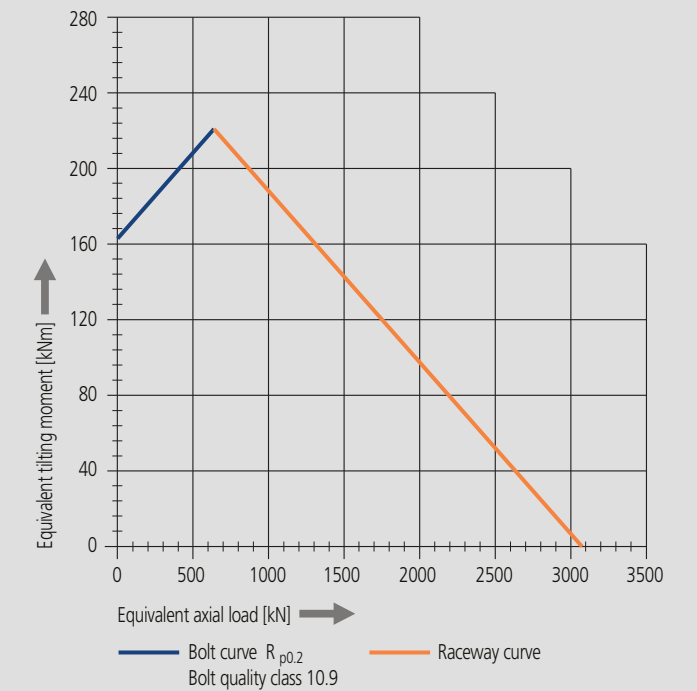
Drawing reference number WD-H 0300/3-00034				
Drawing reference number WD-H 0300/3-00002				
Drawing reference number WD-H 0300/3-00040				
Module	m [mm]	4.5	6	6
Number of starts of the worm	[-]	1	1	2
Gear ratio	i [-]	84	61	30.5
Self-locking gears**		ja	nein	nein
Maximum torque $s_{FS} = 1$	$M_{d\ max}$ [Nm]	13536	22360	22360
Nom. torque $s_{FS} = 1$ at $n = 2$ rpm	$M_{d\ nom}$ [Nm]	9000	12600	14000
Maximum holding torque*	M_h [Nm]	13536	22360	22360
Static load rating, radial	$C_{o\ rad}$ [kN]	1506	1506	1506
Static load rating, axial	$C_{o\ ax}$ [kN]	3074	3074	3074
Dynamic load rating, radial	C_{rad} [kN]	316	316	316
Dynamic load rating, axial	C_{ax} [kN]	445	445	445
Weight, incl. 13 kg for hydraulic motor RE470	[kg]	167	167	167

*Optional with brake
**See technical data

The selection of the hydraulic / electric motor depends on actual customer requirements and specifications.
Selection example: performance data with hydraulic motor RE470

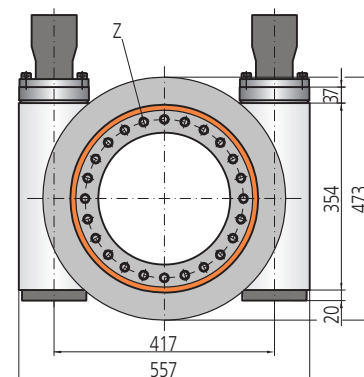
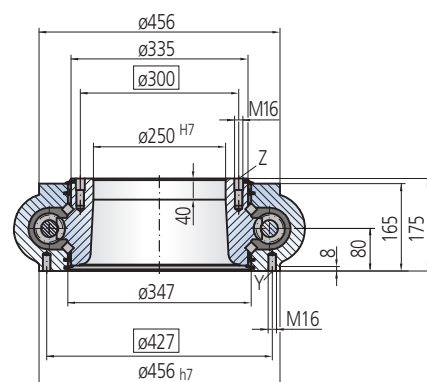
Pressure differential	Δp [bar]	85	125	180
Oil flow	Q [l/min]	80	61	38
Output speed	n [min ⁻¹]	2	2	2
Maximum achievable torque	M_d [Nm]	13565	22360	22360

Limiting load diagram for 'compressive' load



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

Size 0300 / twin drive



Mounting holes

Y = 24 Holes M16-30 deep, equally spaced
Z = 24 Holes ø17-22 deep / M16-30 deep, equally spaced

Lubrication ports

1 Taper type grease nipple on the outside of the housing on the right side and on the left side

Slew Drive supplied pre-lubricated

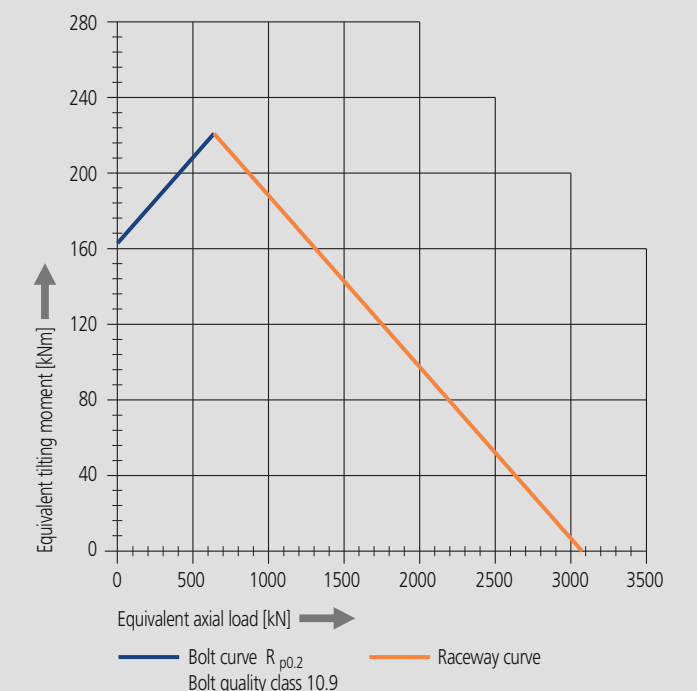
Drawing reference number WD-H 0300/3-00057				
Drawing reference number WD-H 0300/3-00025				
Drawing reference number WD-H 0300/3-00054				
Module	m [mm]	4.5	6	6
Number of starts of the worm	[-]	1	1	2
Gear ratio	i [-]	84	61	30.5
Self-locking gears**		ja	nein	nein
Maximum torque $s_{FS} = 1$	$M_{d\ max}$ [Nm]	27072	44720	44720
Nom. torque $s_{FS} = 1$ at $n = 2$ rpm	$M_{d\ nom}$ [Nm]	18000	25200	28000
Maximum holding torque*	M_h [Nm]	27072	44720	44720
Static load rating, radial	$C_{o\ rad}$ [kN]	1506	1506	1506
Static load rating, axial	$C_{o\ ax}$ [kN]	3074	3074	3074
Dynamic load rating, radial	C_{rad} [kN]	316	316	316
Dynamic load rating, axial	C_{ax} [kN]	445	445	445
Weight, incl. 26 kg for 2 hydraulic motors RE470	[kg]	186	186	186

*Optional with brake
**See technical data

The selection of the hydraulic / electric motor depends on actual customer requirements and specifications.
Selection example: performance data with hydraulic motor RE470

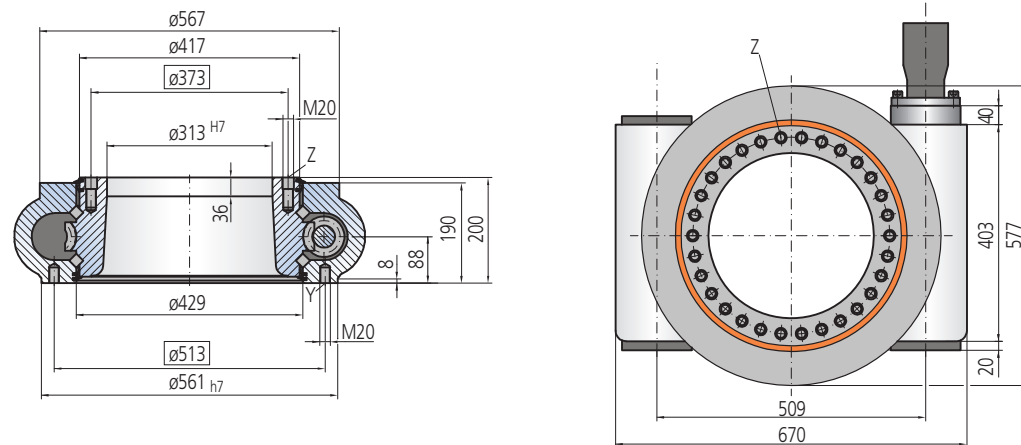
Pressure differential	Δp [bar]	85	125	180
Oil flow	Q [l/min]	160	122	72
Output speed	n [min ⁻¹]	2	2	2
Maximum achievable torque	M_d [Nm]	27072	44720	44720

Limiting load diagram for 'compressive' load



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

Size 0373 / single drive



Mounting holes

Y = 32 Holes M20-30 deep, equally spaced
Z = 30 Holes ø22-22 deep / M20-36 deep, equally spaced

Lubrication ports

1 Taper type grease nipple on the outside of the housing on the right side
3 Taper type grease nipples on the outside of the housing on the left side

Slew Drive supplied pre-lubricated

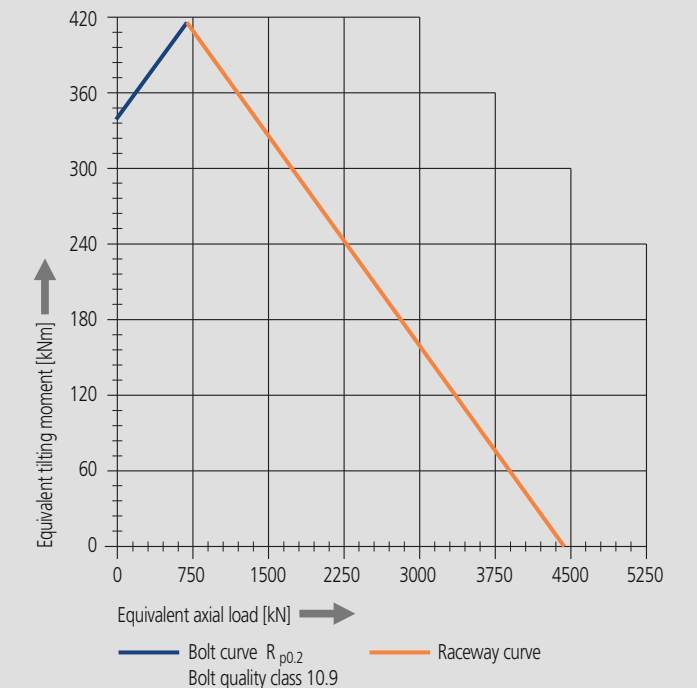
Drawing reference number WD-H 0373/3-00007			
Drawing reference number WD-H 0373/3-00039			
Module	m [mm]	7	8
Number of starts of the worm	[-]	2	1
Gear ratio	i [-]	31.5	56
Self-locking gears**		nein	nein
Maximum torque $s_{FS} = 1$	M_{d max} [Nm]	39215	47416
Nom. torque $s_F = 1$ at $n = 2$ rpm	M_{d nom} [Nm]	36000	35500
Maximum holding torque*	M_h [Nm]	39215	47416
Static load rating, radial	C_{o rad} [kN]	2185	2185
Static load rating, axial	C_{o ax} [kN]	4458	4458
Dynamic load rating, radial	C_{rad} [kN]	442	442
Dynamic load rating, axial	C_{ax} [kN]	622	622
Weight, incl. 25 kg for hydraulic motor DT930	[kg]	285	285

*Optional with brake
**See technical data

The selection of the hydraulic / electric motor depends on actual customer requirements and specifications.
Selection example: performance data with hydraulic motor DT930

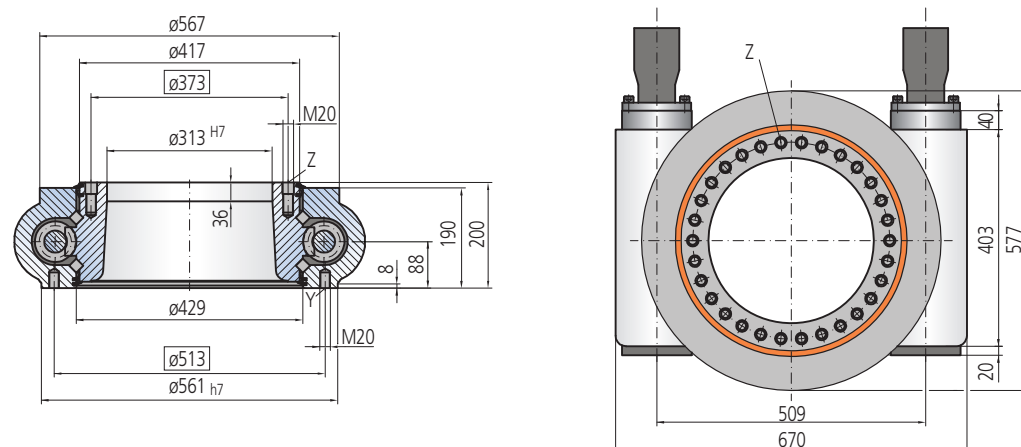
Pressure differential	Δp [bar]	165	160
Oil flow	Q [l/min]	76	114
Output speed	n [min ⁻¹]	2	2
Maximum achievable torque	M_d [Nm]	39215	47416

Limiting load diagram for 'compressive' load



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

Size 0373 / twin drive



Mounting holes

Y = 32 Holes M20-30 deep, equally spaced
Z = 30 Holes ø22-22 deep / M20-36 deep, equally spaced

Lubrication ports

1 Taper type grease nipple on the outside of the housing on the right side and on the left side

Slew Drive supplied pre-lubricated

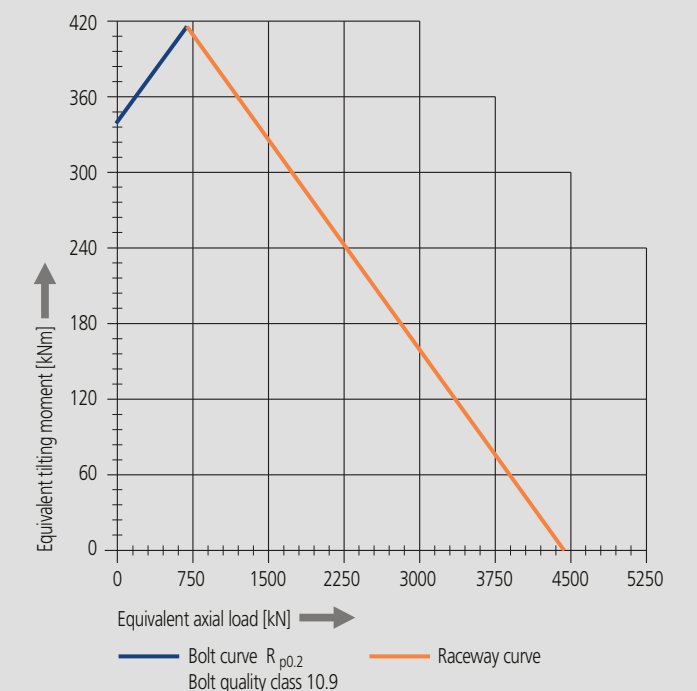
Drawing reference number WD-H 0373/3-00028			
Drawing reference number WD-H 0373/3-00040			
Module	m [mm]	7	8
Number of starts of the worm	[-]	2	1
Gear ratio	i [-]	31.5	56
Self-locking gears**		nein	nein
Maximum torque $s_{FS} = 1$	M_{d max} [Nm]	78430	94832
Nom. torque $s_F = 1$ at $n = 2$ rpm	M_{d nom} [Nm]	72000	71000
Maximum holding torque*	M_h [Nm]	78430	94832
Static load rating, radial	C_{o rad} [kN]	2185	2185
Static load rating, axial	C_{o ax} [kN]	4458	4458
Dynamic load rating, radial	C_{rad} [kN]	442	442
Dynamic load rating, axial	C_{ax} [kN]	622	622
Weight, incl. 50 kg for 2 hydraulic motors DT930	[kg]	330	330

*Optional with brake
**See technical data

The selection of the hydraulic / electric motor depends on actual customer requirements and specifications.
Selection example: performance data with hydraulic motor DT930

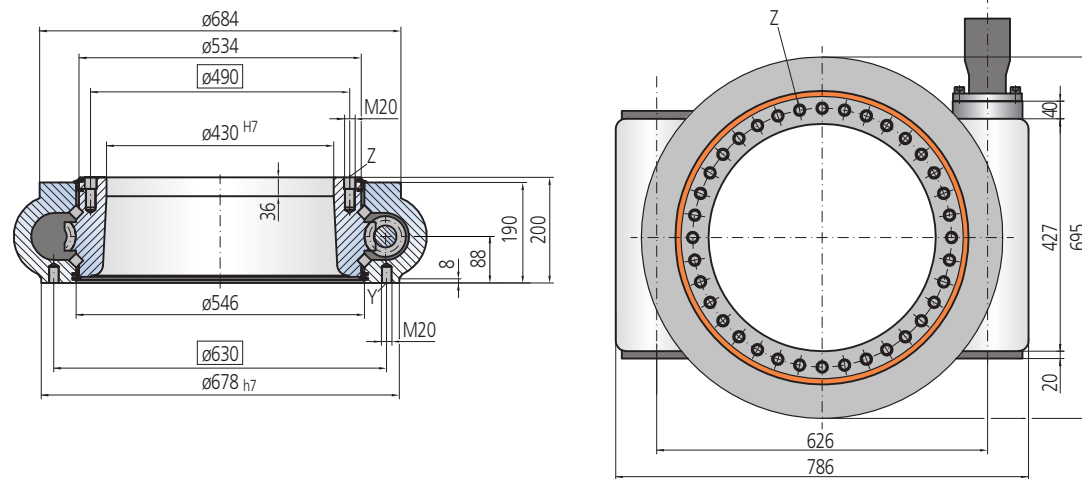
Pressure differential	Δp [bar]	165	160
Oil flow	Q [l/min]	150	228
Output speed	n [min ⁻¹]	2	2
Maximum achievable torque	M_d [Nm]	78430	94832

Limiting load diagram for 'compressive' load



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

Size 0490 / single drive



Mounting holes

Y = 36 Holes M20-30 deep, equally spaced
Z = 36 Holes ø22-22 deep / M20-36 deep, equally spaced

Lubrication ports

1 Taper type grease nipple on the outside of the housing on the right side
3 Taper type grease nipples on the outside of the housing on the left side

Slew Drive supplied pre-lubricated

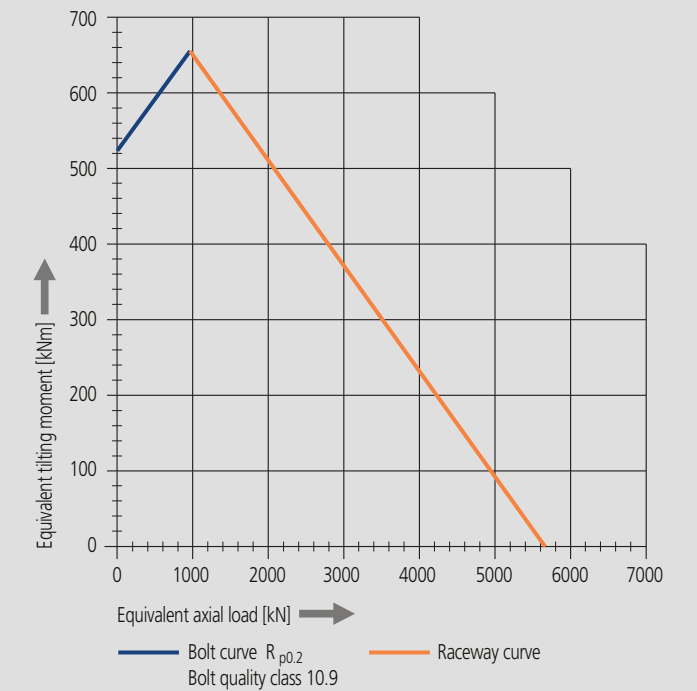
Drawing reference number WD-H 0490/3-00018			
Drawing reference number WD-H 0490/3-00024			
Module	m [mm]	7	8
Number of starts of the worm	[-]	2	1
Gear ratio	i [-]	40	70
Self-locking gears**		nein	nein
Maximum torque $s_{FS} = 1$	$M_{d max}$ [Nm]	49505	59799
Nom. torque $s_{FS} = 1$ at $n = 1$ rpm	$M_{d nom}$ [Nm]	49505	59799
Maximum holding torque*	M_h [Nm]	49505	59799
Static load rating, radial	$C_{o rad}$ [kN]	2775	2775
Static load rating, axial	$C_{o ax}$ [kN]	5662	5662
Dynamic load rating, radial	C_{rad} [kN]	502	502
Dynamic load rating, axial	C_{ax} [kN]	707	707
Weight, incl. 25 kg for hydraulic motor DT930	[kg]	347	347

*Optional with brake
**See technical data

The selection of the hydraulic / electric motor depends on actual customer requirements and specifications.
Selection example: performance data with hydraulic motor DT930

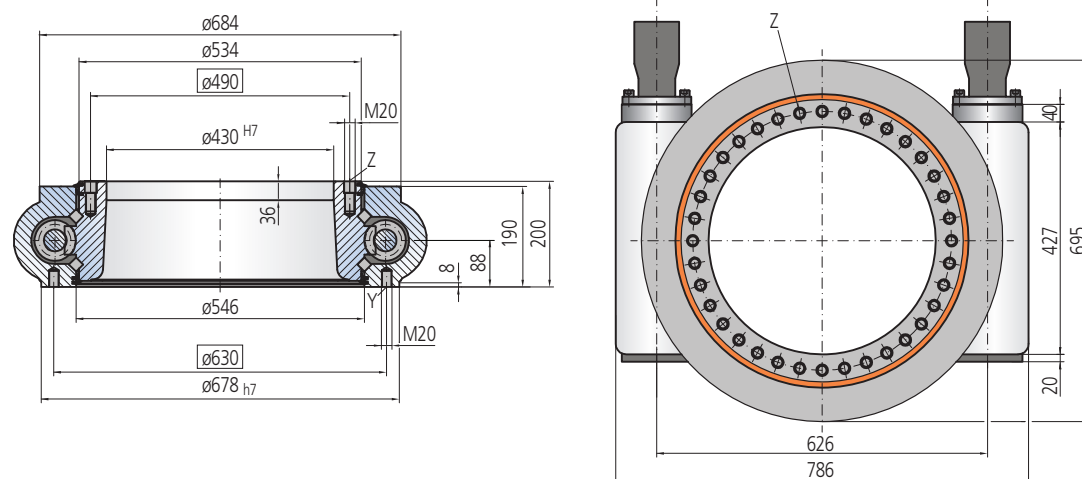
Pressure differential	Δp [bar]	155	145
Oil flow	Q [l/min]	50	74
Output speed	n [min ⁻¹]	1	1
Maximum achievable torque	M_d [Nm]	49505	59799

Limiting load diagram for 'compressive' load



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

Size 0490 / twin drive



Mounting holes

Y = 36 Holes M20-30 deep, equally spaced
Z = 36 Holes ø22-22 deep / M20-36 deep, equally spaced

Lubrication ports

1 Taper type grease nipple on the outside of the housing on the right side and on the left side

Slew Drive supplied pre-lubricated

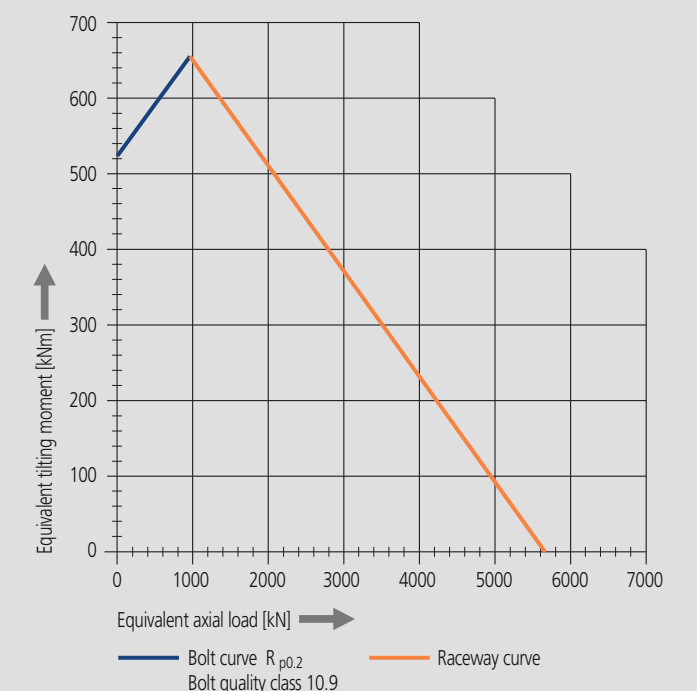
Drawing reference number WD-H 0490/3-00005			
Drawing reference number WD-H 0490/3-00025			
Module	m [mm]	7	8
Number of starts of the worm	[-]	2	1
Gear ratio	i [-]	40	70
Self-locking gears**		nein	nein
Maximum torque $s_{FS} = 1$	$M_{d max}$ [Nm]	99010	119598
Nom. torque $s_{FS} = 1$ at $n = 1$ rpm	$M_{d nom}$ [Nm]	99010	119598
Maximum holding torque*	M_h [Nm]	99010	119598
Static load rating, radial	$C_{o rad}$ [kN]	2775	2775
Static load rating, axial	$C_{o ax}$ [kN]	5662	5662
Dynamic load rating, radial	C_{rad} [kN]	502	502
Dynamic load rating, axial	C_{ax} [kN]	707	707
Weight, incl. 50 kg for 2 hydraulic motors DT930	[kg]	394	394

*Optional with brake
**See technical data

The selection of the hydraulic / electric motor depends on actual customer requirements and specifications.
Selection example: performance data with hydraulic motor DT930

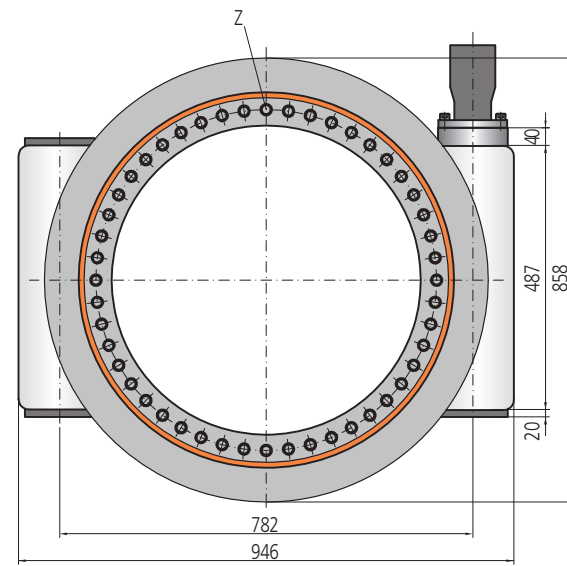
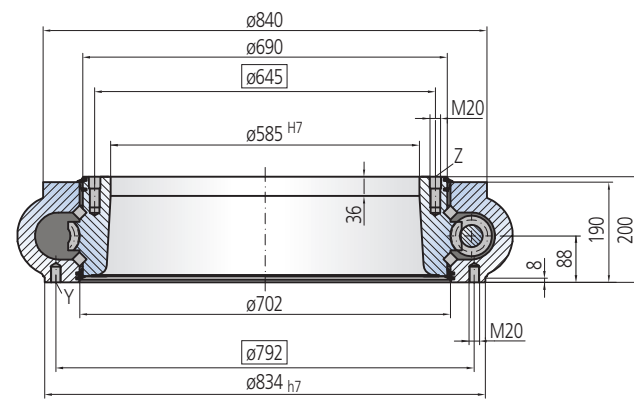
Pressure differential	Δp [bar]	155	145
Oil flow	Q [l/min]	100	74
Output speed	n [min ⁻¹]	1	1
Maximum achievable torque	M_d [Nm]	99010	119598

Limiting load diagram for 'compressive' load



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

Size 0645 / single drive



Mounting holes

Y = 48 Holes M20-30 deep, equally spaced

Z = 48 Holes $\phi 22$ -22 deep / M20-36 deep, equally spaced

Lubrication ports

1 Taper type grease nipple on the outside of the housing on the right side
3 Taper type grease nipples on the outside of the housing on the left side

Slew Drive supplied pre-lubricated

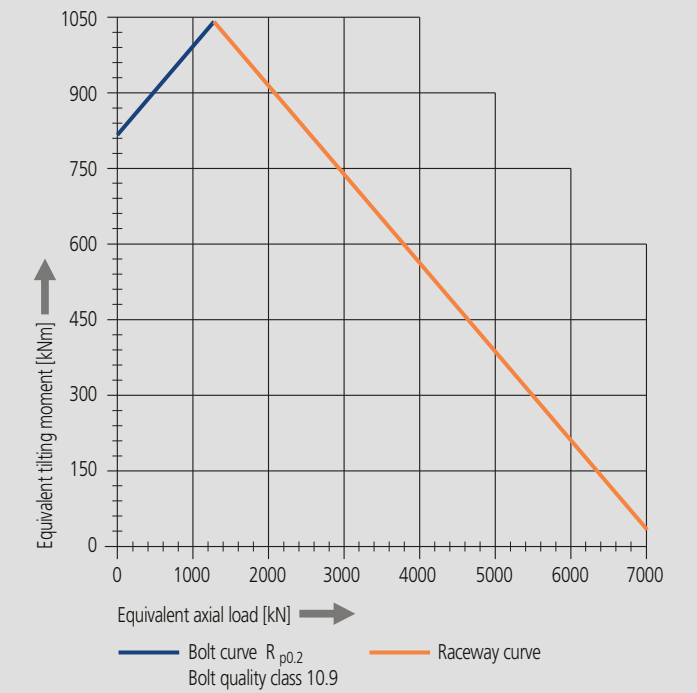
Drawing reference number WD-H 0645/3-00014			
Drawing reference number WD-H 0645/3-00020			
Module	m	[mm]	7 8
Number of starts of the worm	-		2 1
Gear ratio	i	-	51 90
Self-locking gears**			nein nein
Maximum torque $s_{FS} = 1$	$M_{d\ max}$	[Nm]	63220 76310
Nom. torque $s_{FS} = 1$ at $n = 1$ rpm	$M_{d\ nom}$	[Nm]	63220 76310
Maximum holding torque*	M_h	[Nm]	63220 76310
Static load rating, radial	$C_{o\ rad}$	[kN]	3528 3528
Static load rating, axial	$C_{o\ ax}$	[kN]	7199 7199
Dynamic load rating, radial	C_{rad}	[kN]	570 570
Dynamic load rating, axial	C_{ax}	[kN]	803 803
Weight, incl. 25 kg for hydraulic motor DT930		[kg]	430 430

*Optional with brake
**See technical data

The selection of the hydraulic / electric motor depends on actual customer requirements and specifications.
Selection example: performance data with hydraulic motor DT930

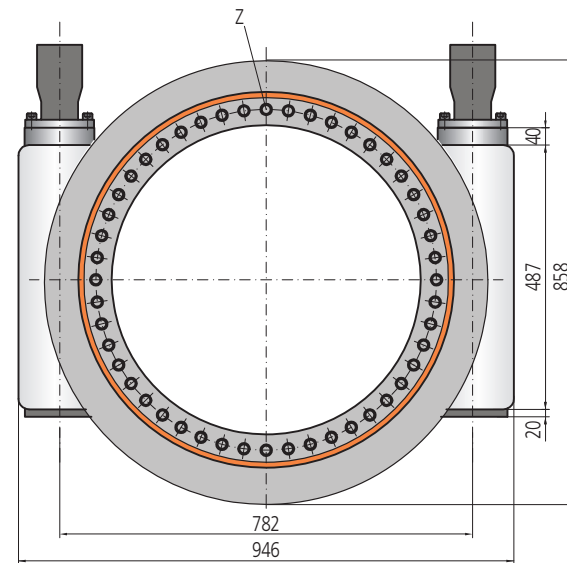
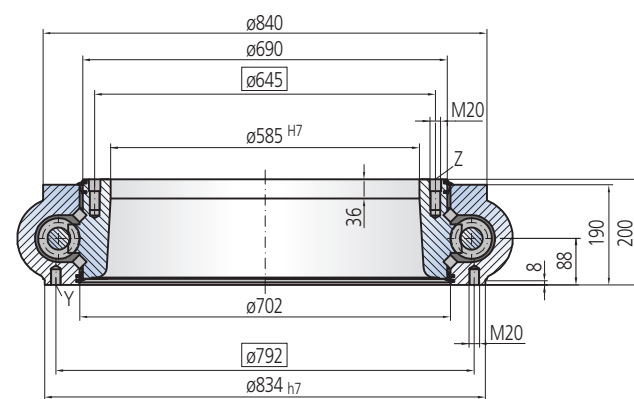
Pressure differential	Δp	[bar]	160 150
Oil flow	Q	[l/min]	63 95
Output speed	n	[min ⁻¹]	1 1
Maximum achievable torque	M_d	[Nm]	63220 76310

Limiting load diagram for 'compressive' load



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

Size 0645 / twin drive



Mounting holes

Y = 48 Holes M20-30 deep, equally spaced

Z = 48 Holes $\phi 22$ -22 deep / M20-36 deep, equally spaced

Lubrication ports

1 Taper type grease nipple on the outside of the housing on the right side and on the left side

Slew Drive supplied pre-lubricated

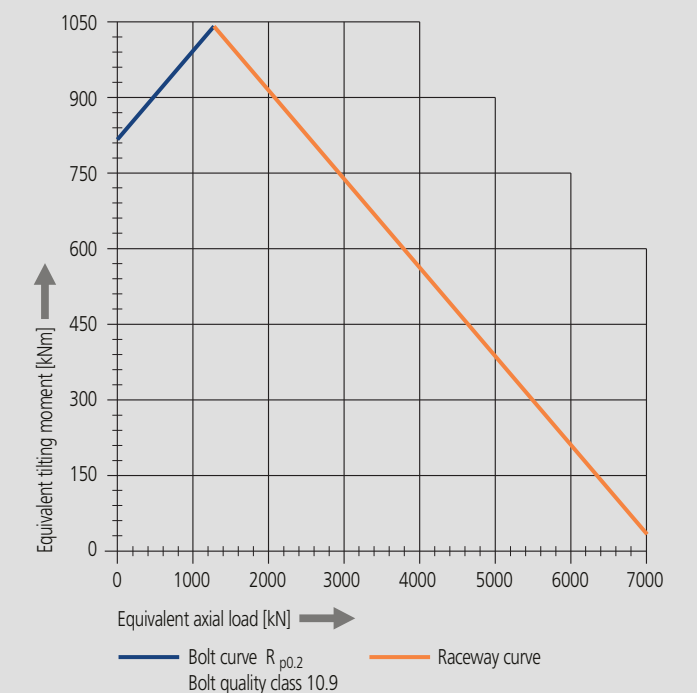
Drawing reference number WD-H 0645/3-00001			
Drawing reference number WD-H 0645/3-00021			
Module	m	[mm]	7 8
Number of starts of the worm	-		2 1
Gear ratio	i	-	51 90
Self-locking gears**			nein nein
Maximum torque $s_{FS} = 1$	$M_{d\ max}$	[Nm]	126440 152610
Nom. torque $s_{FS} = 1$ at $n = 1$ rpm	$M_{d\ nom}$	[Nm]	126440 152610
Maximum holding torque*	M_h	[Nm]	126440 152610
Static load rating, radial	$C_{o\ rad}$	[kN]	3528 3528
Static load rating, axial	$C_{o\ ax}$	[kN]	7199 7199
Dynamic load rating, radial	C_{rad}	[kN]	570 570
Dynamic load rating, axial	C_{ax}	[kN]	803 803
Weight, incl. 50 kg for 2 hydraulic motors DT930		[kg]	516 516

*Optional with brake
**See technical data

The selection of the hydraulic / electric motor depends on actual customer requirements and specifications.
Selection example: performance data with hydraulic motor DT930

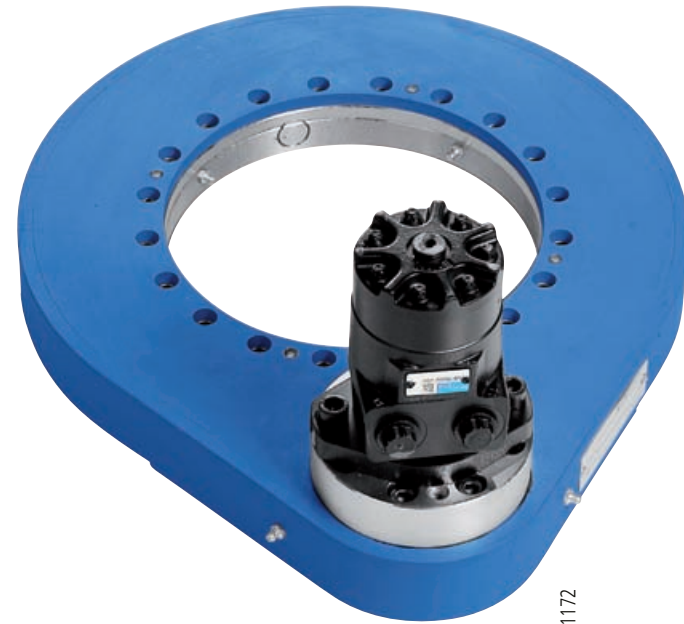
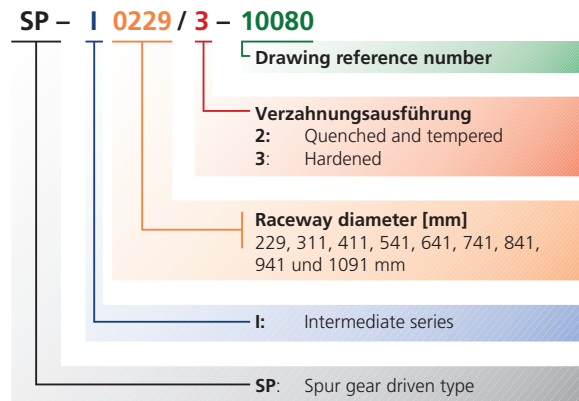
Pressure differential	Δp	[bar]	160 150
Oil flow	Q	[l/min]	126 190
Output speed	n	[min ⁻¹]	1 1
Maximum achievable torque	M_d	[Nm]	126440 152610

Limiting load diagram for 'compressive' load

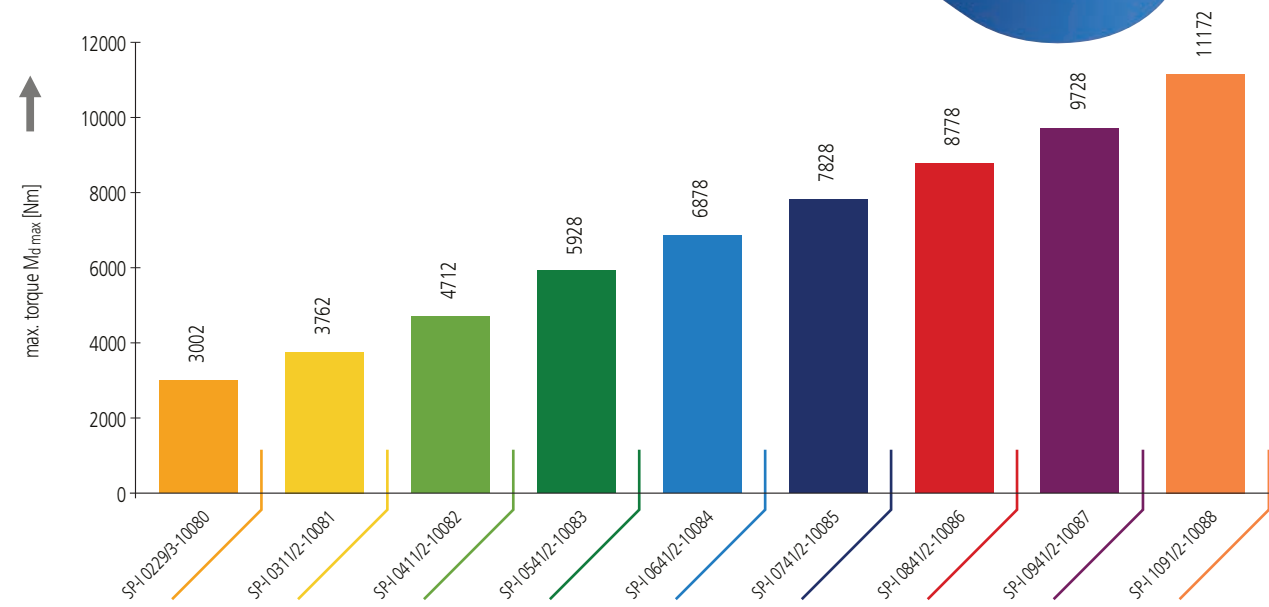


Please adhere strictly to the Technical Information section when using above graph!

Series Overview

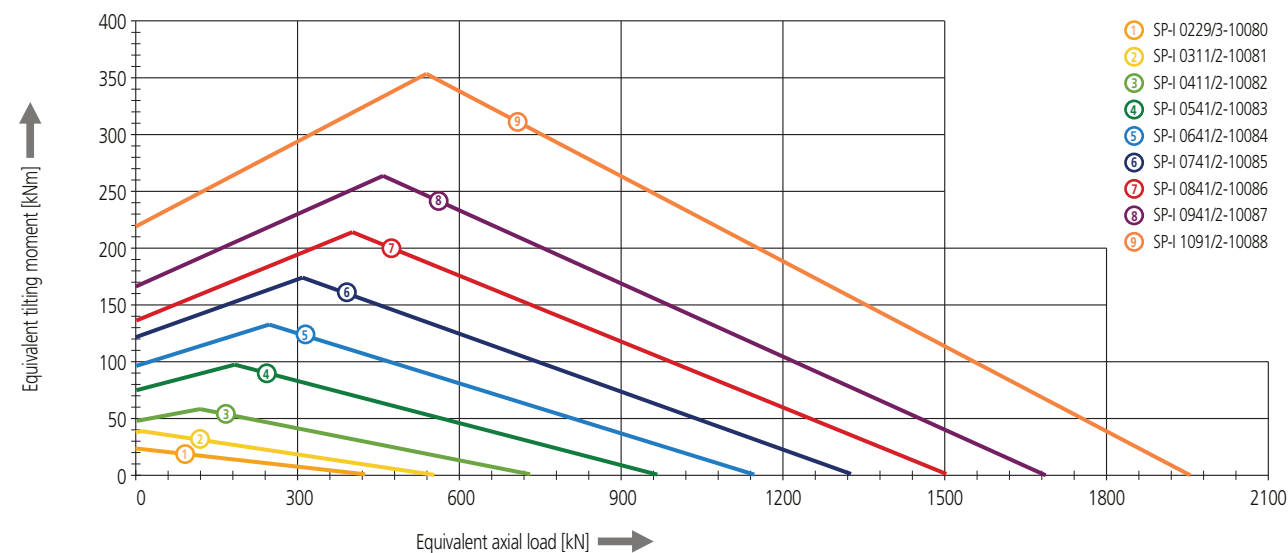


Maximum torque $M_{d\max}$ of individual sizes



Limiting load diagrams of individual sizes for "compressive" load

Please refer to the explanations in the Technical Information section of the catalog



Verifying tooth base fatigue strength:

Valid for the following conditions:

- Output speed: $n = 5.0$ rpm
- Repeated load
- Ambient temperature of 20°C

M_{dB} : Operation torque [Nm]

$M_{d\text{nom}}$: Nominal torque [Nm] for $SF = 1$ and $n = 5.0$ rpm (see dimensions table)

If the following equation is met, the stress level of tooth base is below the endurance limit and fatigue is infinite:

$$M_{dB} \leq M_{d\text{nom}}$$

Fatigue stress of tooth base needs to be considered however, if the following equation is met (if so, refer to below additional steps to verify life):

$$M_{dB} > M_{d\text{nom}}$$

The operation is permissible as regards the fatigue stress of tooth base, if the following equation is fulfilled.

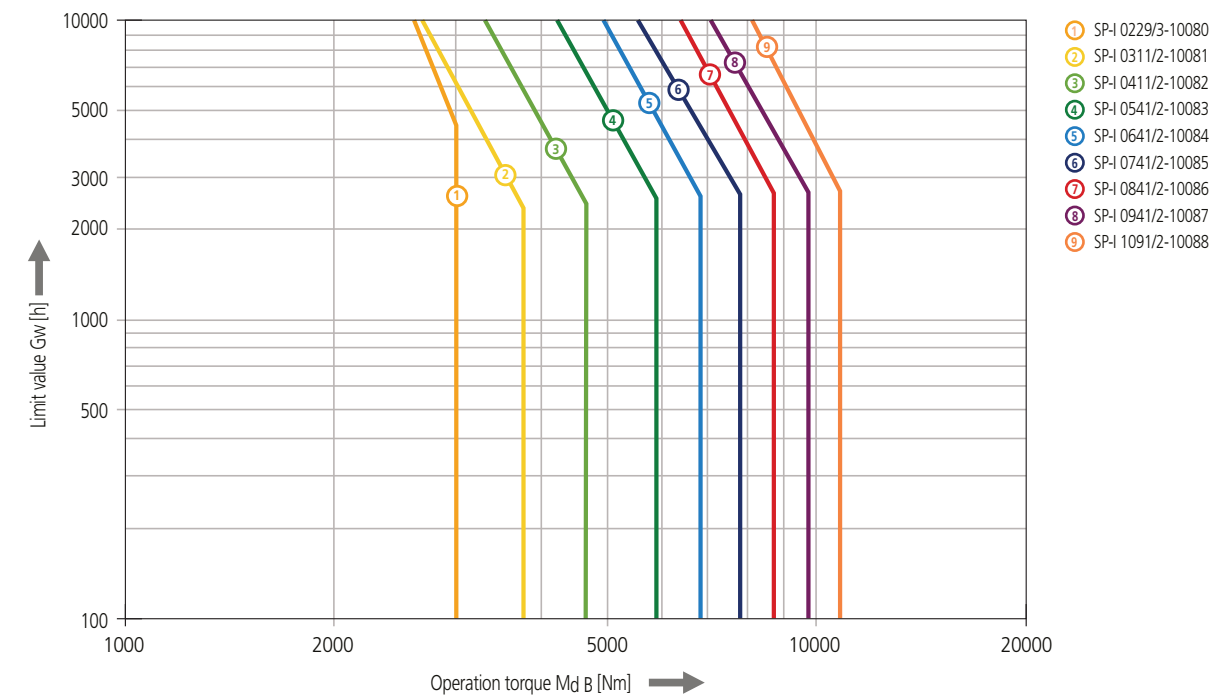
$$G_w \geq B_h \cdot \frac{ED_B}{100}$$

If this relationship is not fulfilled, then there is imminent danger of fatigue fracture of the tooth base.

G_w : Limit value from diagram [h]

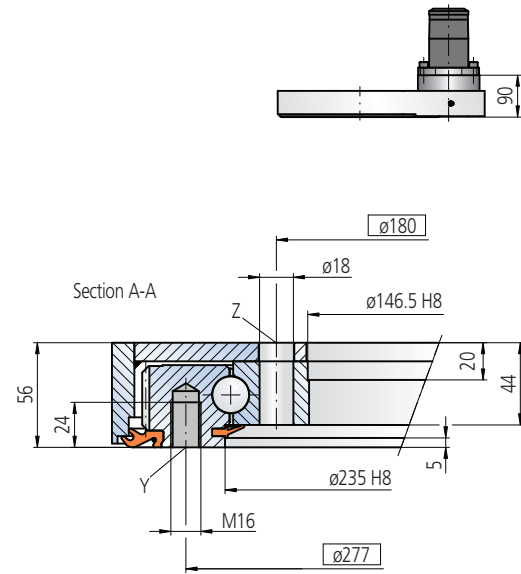
B_h : Operation time [h]

ED_B : Duty [%]

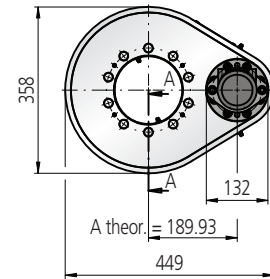


Verification of the pitting and wear safety of tooth flanks must be done by the IMO Engineering Department!

Size 0229



Note, mounting face against upper surface shall be $\varnothing 229$, minimum



Mounting holes

Y = 12 Holes M16-24 deep, equally spaced
Z = 10 Holes $\varnothing 18$, equally spaced

Lubrication ports

2 Taper type grease nipples on the internal diameter
2 Taper type grease nipples on the outside of the housing

Slew Drive supplied pre-lubricated

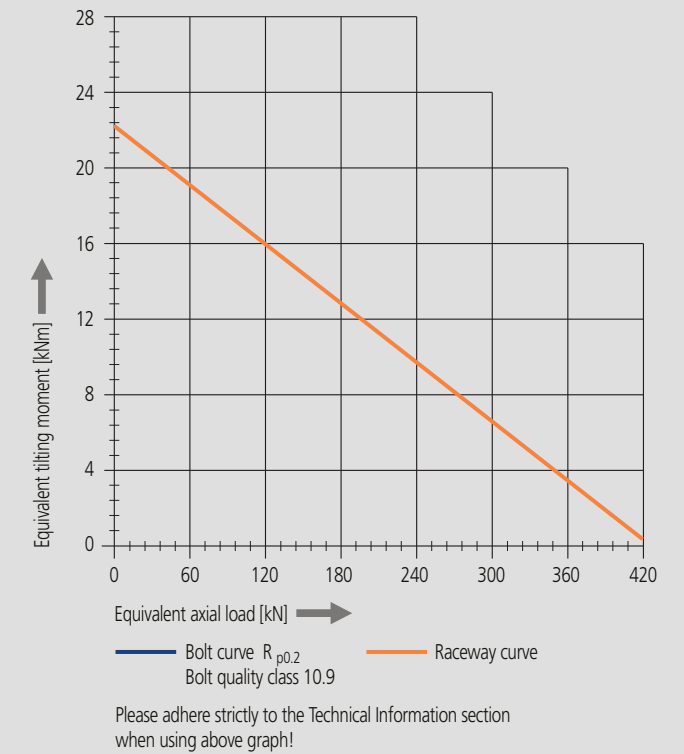
Drawing reference number SP-I 0229/3-10080			
Module	m [mm]	4	
Number of teeth, wheel	z₂ [-]	79	
Number of teeth, pinion	z₁ [-]	15	
Overall gear ration	i [-]	5.27	
Maximum torque	M_{d max} [Nm]	3002	
Nom. torque SF = 1 at n = 5 rpm	M_{d nom} [Nm]	2607	
Maximum holding torque*	M_h [Nm]	3002	
Static load rating, radial	C_{o rad} [kN]	159	
Static load rating, axial	C_{o ax} [kN]	462	
Dynamic load rating, radial	C_{rad} [kN]	151	
Dynamic load rating, axial	C_{ax} [kN]	177	
Weight, incl. 12 kg for hydraulic motor RE300	[kg]	46	

*Optional with brake

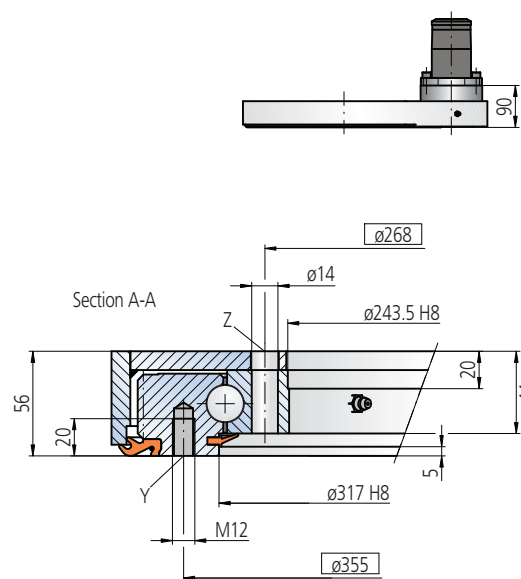
The selection of the hydraulic / electric motor depends on actual customer requirements and specifications.
Selection example: performance data with hydraulic motor RE300

Pressure differential	Δp [bar]	150
Oil flow	Q [l/min]	13
Output speed	n [min ⁻¹]	5
Maximum achievable torque	M_d [Nm]	3002

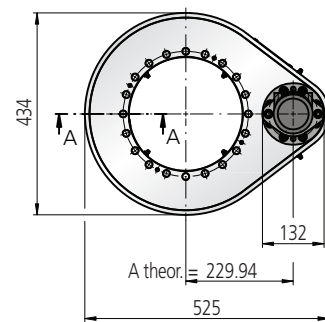
Limiting load diagram for 'compressive' load



Size 0311



Note, mounting face against upper surface shall be $\varnothing 311$, minimum



Mounting holes

Y = 20 Holes M12-20 deep, equally spaced
Z = 24 Holes $\varnothing 14$, equally spaced

Lubrication ports

4 Taper type grease nipples on the internal diameter
2 Taper type grease nipples on the outside of the housing

Slew Drive supplied pre-lubricated

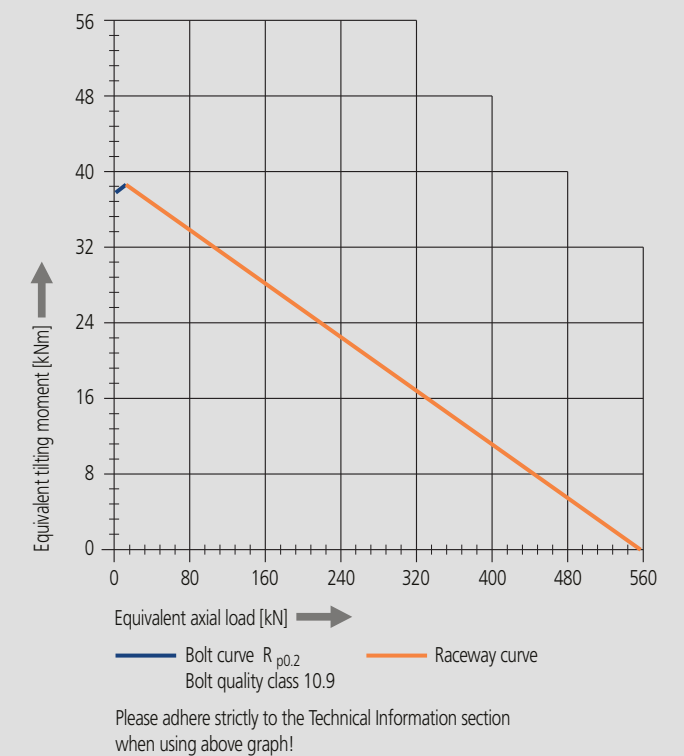
Drawing reference number SP-I 0311/2-10081			
Module	m [mm]	4	
Number of teeth, wheel	z₂ [-]	99	
Number of teeth, pinion	z₁ [-]	15	
Overall gear ration	i [-]	6.60	
Maximum torque SF = 1.75	M_{d max} [Nm]	3762	
Nom. torque SF = 1 at n = 5 rpm	M_{d nom} [Nm]	2653	
Maximum holding torque*	M_h [Nm]	3762	
Static load rating, radial	C_{o rad} [kN]	208	
Static load rating, axial	C_{o ax} [kN]	557	
Dynamic load rating, radial	C_{rad} [kN]	172	
Dynamic load rating, axial	C_{ax} [kN]	200	
Weight, incl. 12 kg for hydraulic motor RE300	[kg]	52	

*Optional with brake

The selection of the hydraulic / electric motor depends on actual customer requirements and specifications.
Selection example: performance data with hydraulic motor RE300

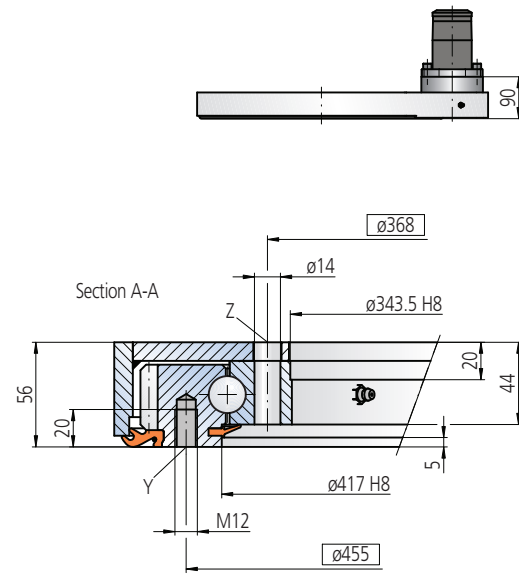
Pressure differential	Δp [bar]	150
Oil flow	Q [l/min]	15
Output speed	n [min ⁻¹]	5
Maximum achievable torque	M_d [Nm]	3762

Limiting load diagram for 'compressive' load

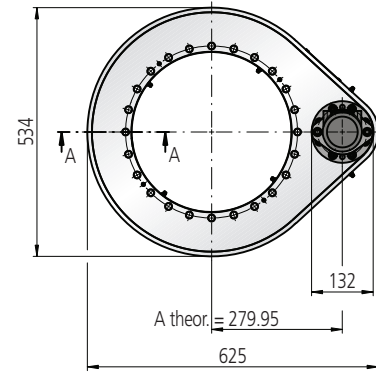


Size 0411

Limiting load diagram for 'compressive' load



Note, mounting face against upper surface shall be $\phi 411$, minimum



Mounting holes

Y = 20 Holes M12-20 deep, equally spaced
Z = 24 Holes $\phi 14$, equally spaced

Lubrication ports

4 Taper type grease nipples on the internal diameter
2 Taper type grease nipples on the outside of the housing

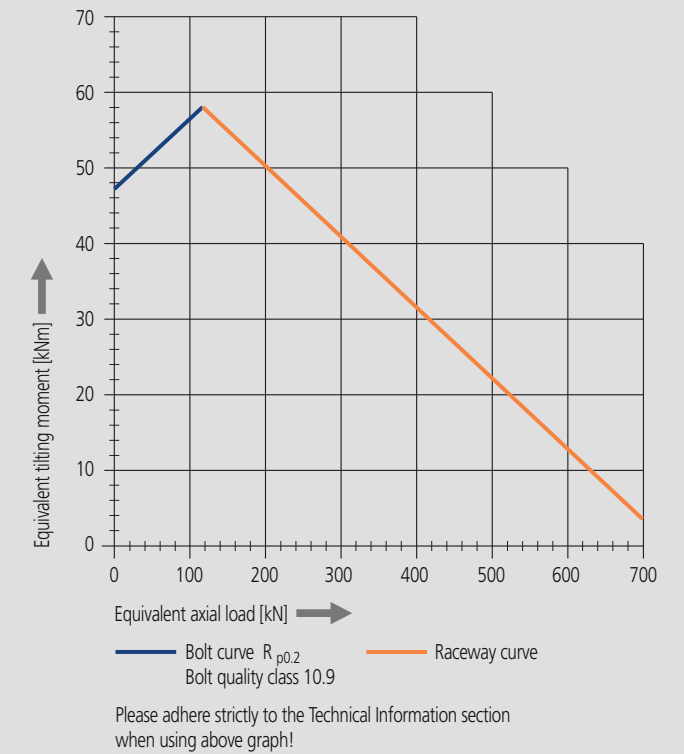
Slew Drive supplied pre-lubricated

Drawing reference number SP-I 0411/2-10082			
Module	m [mm]	4	
Number of teeth, wheel	z₂ [-]	124	
Number of teeth, pinion	z₁ [-]	15	
Overall gear ration	i [-]	8.27	
Maximum torque $s_{FS} = 1.75$	M_{d max} [Nm]	4712	
Nom. torque $s_F = 1$ at $n = 5$ rpm	M_{d nom} [Nm]	3348	
Maximum holding torque*	M_h [Nm]	4712	
Static load rating, radial	C_{o rad} [kN]	275	
Static load rating, axial	C_{o ax} [kN]	736	
Dynamic load rating, radial	C_{rad} [kN]	190	
Dynamic load rating, axial	C_{ax} [kN]	222	
Weight, incl. 12 kg for hydraulic motor RE300	[kg]	62	

*Optional with brake

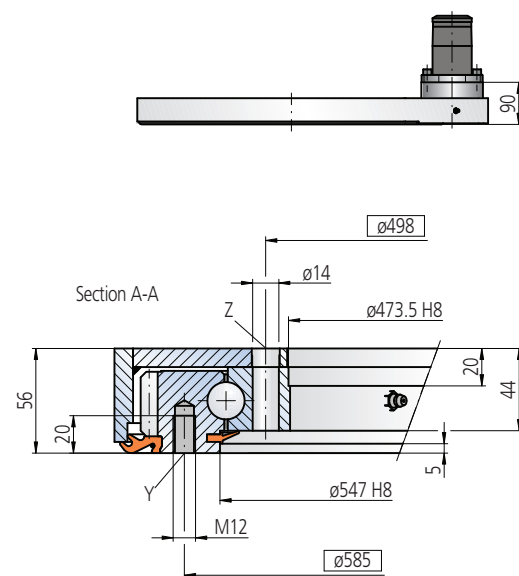
The selection of the hydraulic / electric motor depends on actual customer requirements and specifications.
Selection example: performance data with hydraulic motor RE300

Pressure differential	Δp [bar]	150
Oil flow	Q [l/min]	17
Output speed	n [min ⁻¹]	5
Maximum achievable torque	M_d [Nm]	4712

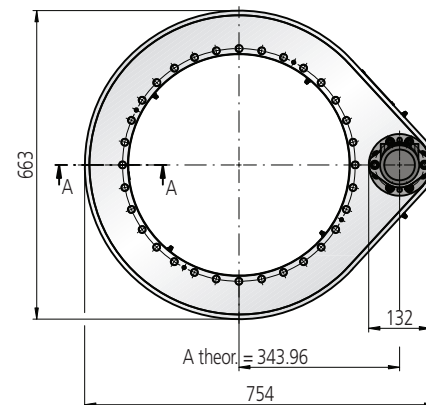


Size 0541

Limiting load diagram for 'compressive' load



Note, mounting face against upper surface shall be $\phi 541$, minimum



Mounting holes

Y = 28 Holes M12-20 deep, equally spaced
Z = 32 Holes $\phi 14$, equally spaced

Lubrication ports

4 Taper type grease nipples on the internal diameter
2 Taper type grease nipples on the outside of the housing

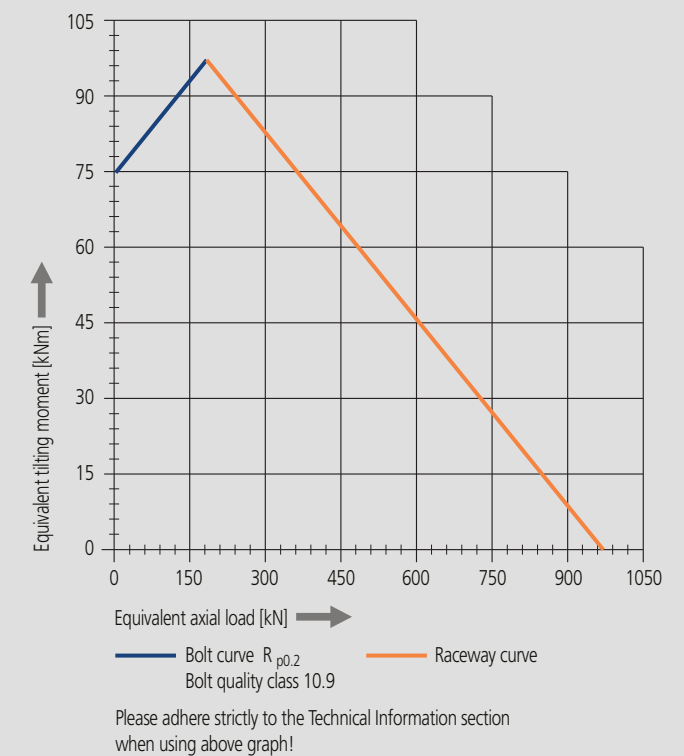
Slew Drive supplied pre-lubricated

Drawing reference number SP-I 0541/2-10083			
Module	m [mm]	4	
Number of teeth, wheel	z₂ [-]	156	
Number of teeth, pinion	z₁ [-]	15	
Overall gear ration	i [-]	10.4	
Maximum torque $s_{FS} = 1.75$	M_{d max} [Nm]	5928	
Nom. torque $s_F = 1$ at $n = 5$ rpm	M_{d nom} [Nm]	4243	
Maximum holding torque*	M_h [Nm]	5928	
Static load rating, radial	C_{o rad} [kN]	362	
Static load rating, axial	C_{o ax} [kN]	970	
Dynamic load rating, radial	C_{rad} [kN]	212	
Dynamic load rating, axial	C_{ax} [kN]	248	
Weight, incl. 12 kg for hydraulic motor RE300	[kg]	75	

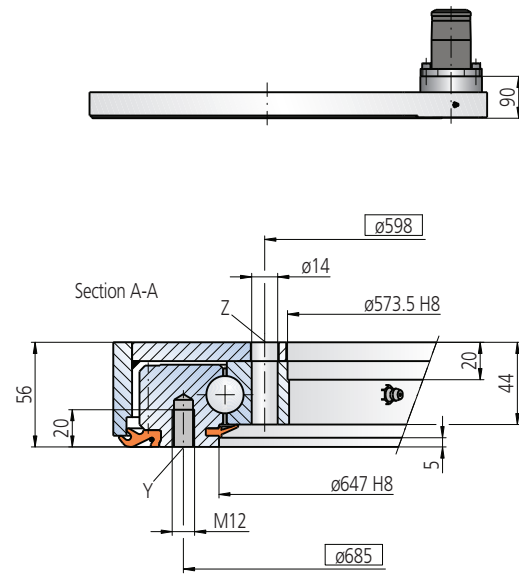
*Optional with brake

The selection of the hydraulic / electric motor depends on actual customer requirements and specifications.
Selection example: performance data with hydraulic motor RE300

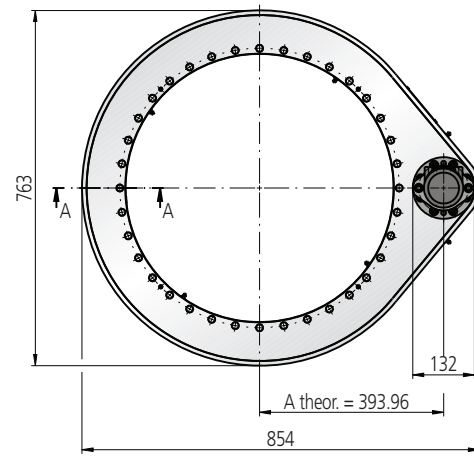
Pressure differential	Δp [bar]	150
Oil flow	Q [l/min]	21
Output speed	n [min ⁻¹]	5
Maximum achievable torque	M_d [Nm]	5928



Size 0641



Note, mounting face against upper surface shall be $\phi 641$, minimum



Mounting holes

Y = 32 Holes M12-20 deep, equally spaced
Z = 36 Holes $\phi 14$, equally spaced

Lubrication ports

4 Taper type grease nipples on the internal diameter
2 Taper type grease nipples on the outside of the housing

Slew Drive supplied pre-lubricated

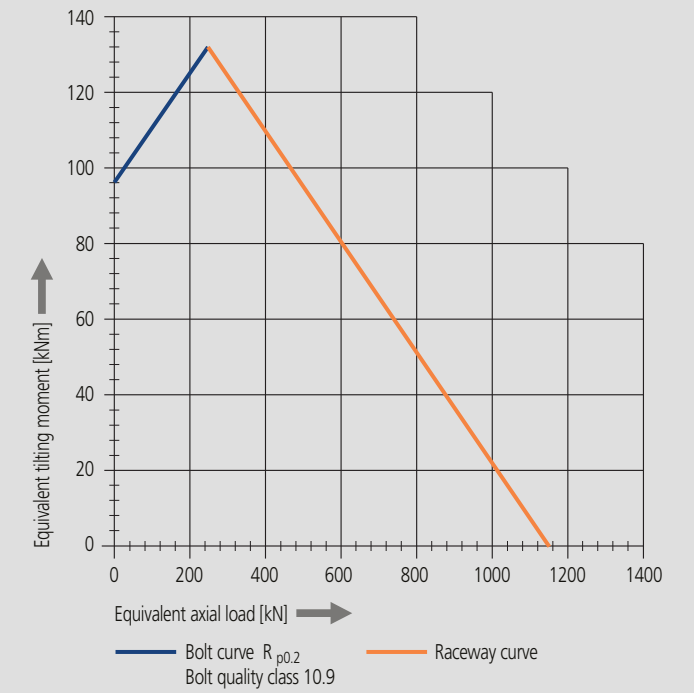
Drawing reference number SP-I 0641/2-10084			
Module	m [mm]	4	
Number of teeth, wheel	z₂ [-]	181	
Number of teeth, pinion	z₁ [-]	15	
Overall gear ration	i [-]	12.07	
Maximum torque $s_{FS} = 1.75$	M_{d max} [Nm]	6878	
Nom. torque $s_F = 1$ at $n = 5$ rpm	M_{d nom} [Nm]	4921	
Maximum holding torque*	M_h [Nm]	6878	
Static load rating, radial	C_{o rad} [kN]	429	
Static load rating, axial	C_{o ax} [kN]	1149	
Dynamic load rating, radial	C_{rad} [kN]	226	
Dynamic load rating, axial	C_{ax} [kN]	264	
Weight, incl. 12 kg for hydraulic motor RE300	[kg]	85	

*Optional with brake

The selection of the hydraulic / electric motor depends on actual customer requirements and specifications.
Selection example: performance data with hydraulic motor RE300

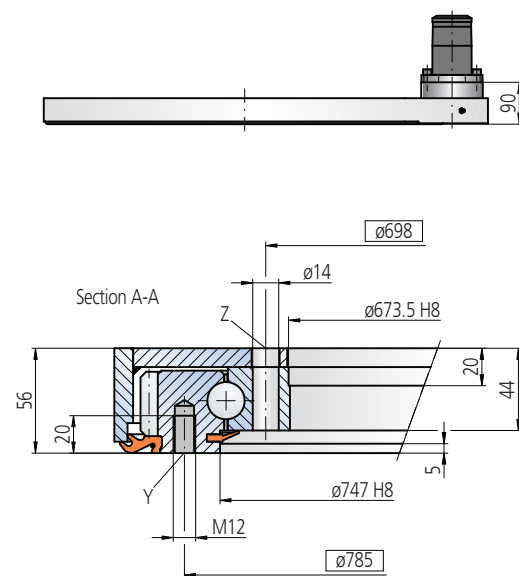
Pressure differential	Δp [bar]	155
Oil flow	Q [l/min]	23
Output speed	n [min ⁻¹]	5
Maximum achievable torque	M_d [Nm]	6878

Limiting load diagram for 'compressive' load

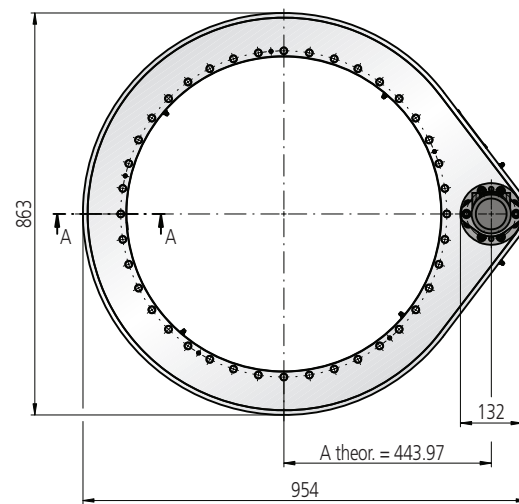


Please adhere strictly to the Technical Information section when using above graph!

Size 0741



Note, mounting face against upper surface shall be $\phi 741$, minimum



Mounting holes

Y = 36 Holes M12-20 deep, equally spaced
Z = 40 Holes $\phi 14$, equally spaced

Lubrication ports

4 Taper type grease nipples on the internal diameter
2 Taper type grease nipples on the outside of the housing

Slew Drive supplied pre-lubricated

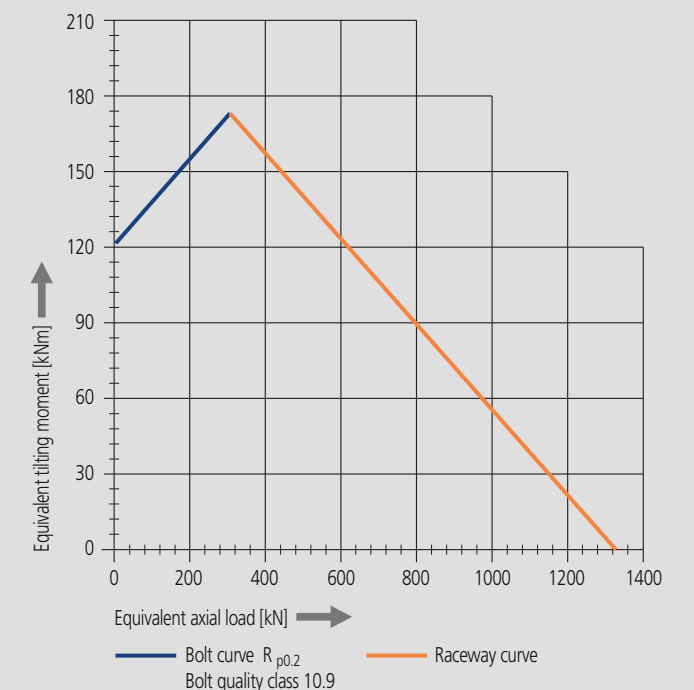
Drawing reference number SP-I 0741/2-10085			
Module	m [mm]	4	
Number of teeth, wheel	z₂ [-]	206	
Number of teeth, pinion	z₁ [-]	15	
Overall gear ration	i [-]	13.73	
Maximum torque $s_{FS} = 1.75$	M_{d max} [Nm]	7828	
Nom. torque $s_F = 1$ at $n = 5$ rpm	M_{d nom} [Nm]	5644	
Maximum holding torque*	M_h [Nm]	7828	
Static load rating, radial	C_{o rad} [kN]	496	
Static load rating, axial	C_{o ax} [kN]	1329	
Dynamic load rating, radial	C_{rad} [kN]	238	
Dynamic load rating, axial	C_{ax} [kN]	278	
Weight, incl. 12 kg for hydraulic motor RE300	[kg]	95	

*Optional with brake

The selection of the hydraulic / electric motor depends on actual customer requirements and specifications.
Selection example: performance data with hydraulic motor RE300

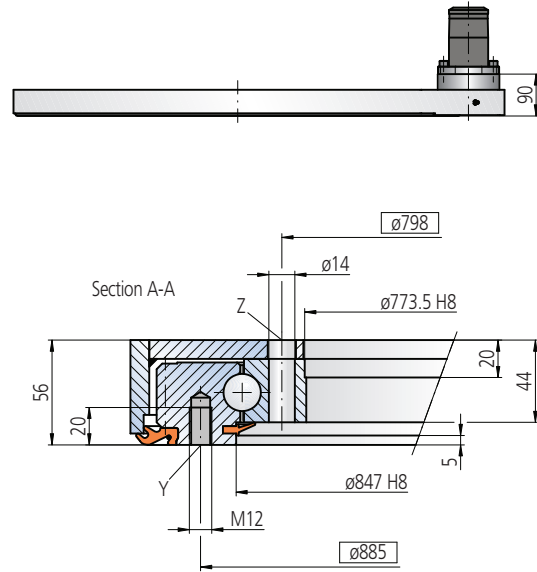
Pressure differential	Δp [bar]	155
Oil flow	Q [l/min]	25
Output speed	n [min ⁻¹]	5
Maximum achievable torque	M_d [Nm]	7828

Limiting load diagram for 'compressive' load

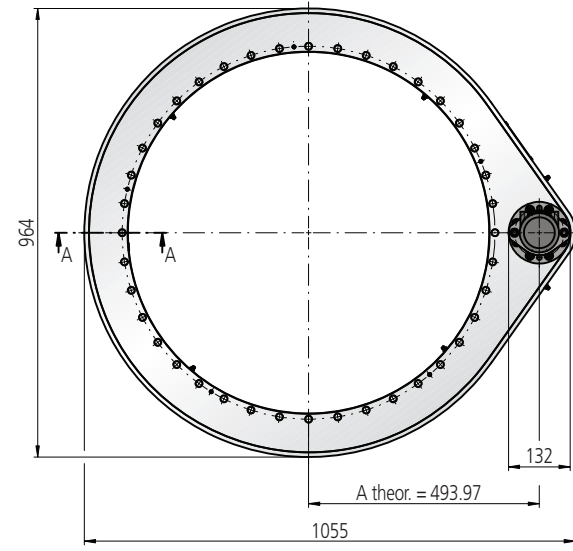


Please adhere strictly to the Technical Information section when using above graph!

Size 0841



Note, mounting face against upper surface shall be $\phi 841$, minimum



Mounting holes

Y = 36 Holes M12-20 deep, equally spaced
Z = 40 Holes $\phi 14$, equally spaced

Lubrication ports

4 Taper type grease nipples on the internal diameter
2 Taper type grease nipples on the outside of the housing

Slew Drive supplied pre-lubricated

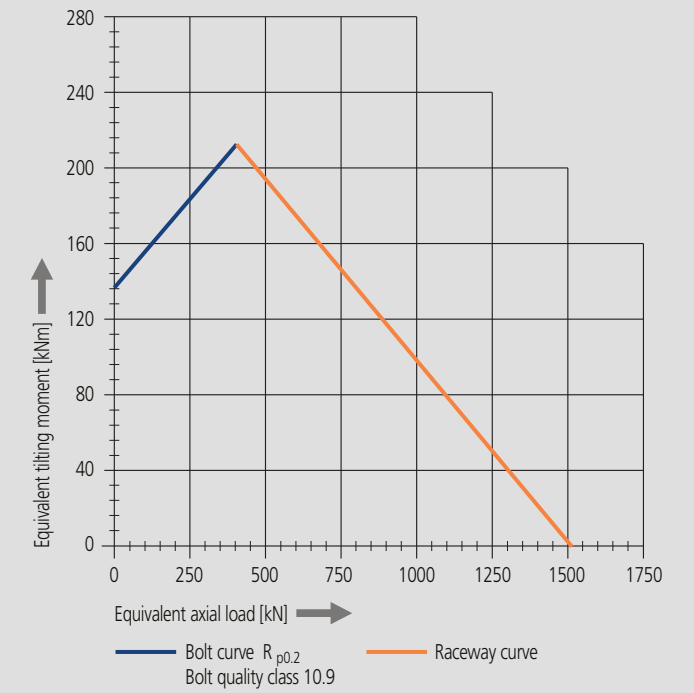
Drawing reference number SP-I 0841/2-10086			
Module	m [mm]	4	
Number of teeth, wheel	z₂ [-]	231	
Number of teeth, pinion	z₁ [-]	15	
Overall gear ration	i [-]	15.4	
Maximum torque $s_{FS} = 1.75$	M_{d max} [Nm]	8778	
Nom. torque $s_F = 1$ at $n = 5$ rpm	M_{d nom} [Nm]	6329	
Maximum holding torque*	M_h [Nm]	8778	
Static load rating, radial	C_{o rad} [kN]	563	
Static load rating, axial	C_{o ax} [kN]	1508	
Dynamic load rating, radial	C_{rad} [kN]	250	
Dynamic load rating, axial	C_{ax} [kN]	293	
Weight, incl. 12 kg for hydraulic motor RE300	[kg]	106	

*Optional with brake

The selection of the hydraulic / electric motor depends on actual customer requirements and specifications.
Selection example: performance data with hydraulic motor RE300

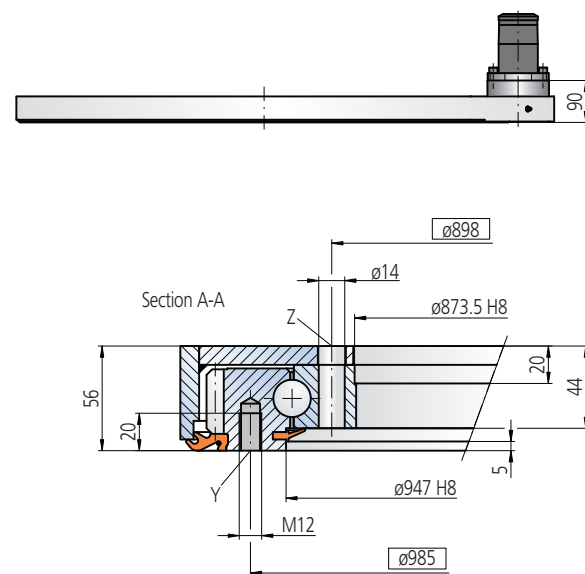
Pressure differential	Δp [bar]	155
Oil flow	Q [l/min]	28
Output speed	n [min ⁻¹]	5
Maximum achievable torque	M_d [Nm]	8778

Limiting load diagram for 'compressive' load

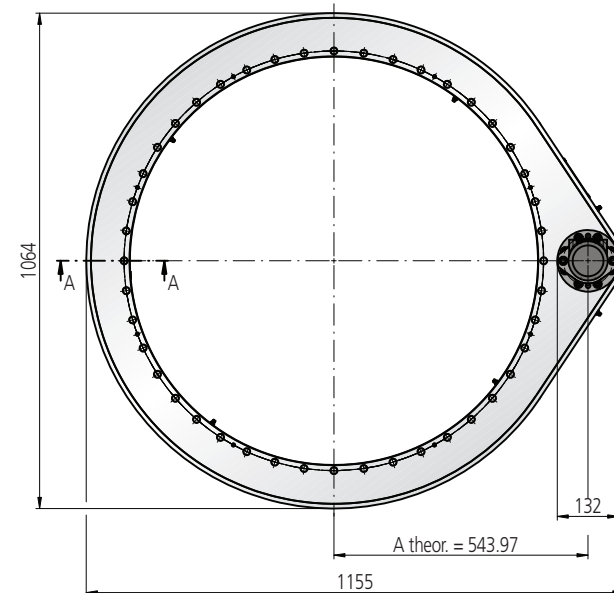


Please adhere strictly to the Technical Information section when using above graph!

Size 0941



Note, mounting face against upper surface shall be $\phi 941$, minimum



Mounting holes

Y = 40 Holes M12-20 deep, equally spaced
Z = 44 Holes $\phi 14$, equally spaced

Lubrication ports

4 Taper type grease nipples on the internal diameter
2 Taper type grease nipples on the outside of the housing

Slew Drive supplied pre-lubricated

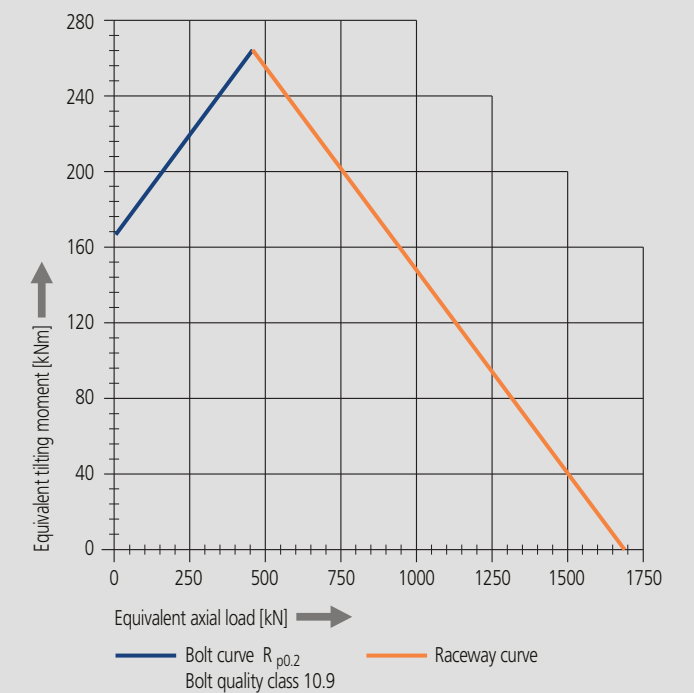
Drawing reference number SP-I 0941/2-10087			
Module	m [mm]	4	
Number of teeth, wheel	z₂ [-]	256	
Number of teeth, pinion	z₁ [-]	15	
Overall gear ration	i [-]	17.07	
Maximum torque $s_{FS} = 1.75$	M_{d max} [Nm]	9728	
Nom. torque $s_F = 1$ at $n = 5$ rpm	M_{d nom} [Nm]	7040	
Maximum holding torque*	M_h [Nm]	9728	
Static load rating, radial	C_{o rad} [kN]	630	
Static load rating, axial	C_{o ax} [kN]	1688	
Dynamic load rating, radial	C_{rad} [kN]	260	
Dynamic load rating, axial	C_{ax} [kN]	305	
Weight, incl. 12 kg for hydraulic motor RE300	[kg]	116	

*Optional with brake

The selection of the hydraulic / electric motor depends on actual customer requirements and specifications.
Selection example: performance data with hydraulic motor RE300

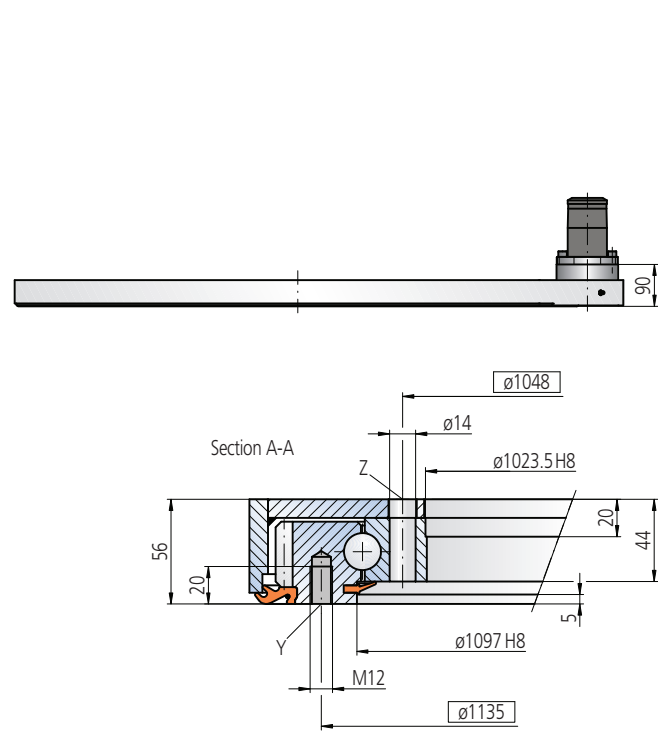
Pressure differential	Δp [bar]	155
Oil flow	Q [l/min]	30
Output speed	n [min ⁻¹]	5
Maximum achievable torque	M_d [Nm]	9728

Limiting load diagram for 'compressive' load

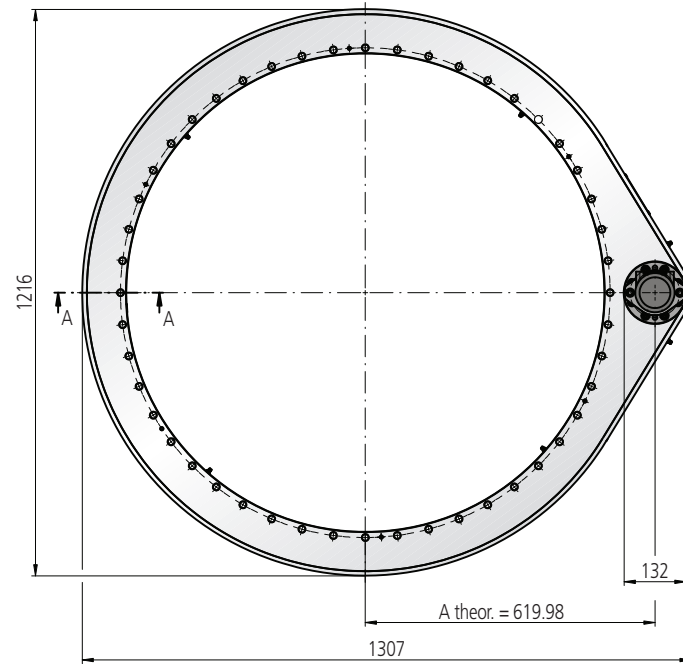


Please adhere strictly to the Technical Information section when using above graph!

Size 1091



Note, mounting face against upper surface shall be 1091, minimum



Mounting holes

Y = 44 Holes M12-20 deep, equally spaced
Z = 48 Holes $\phi 14$, equally spaced

Lubrication ports

4 Taper type grease nipples on the internal diameter
2 Taper type grease nipples on the outside of the housing

Slew Drive supplied pre-lubricated

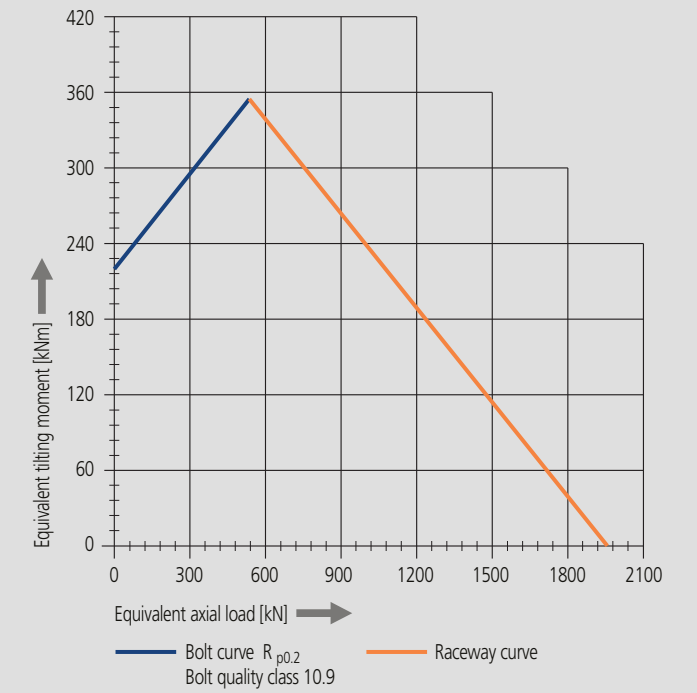
Drawing reference number SP-I 1091/2-10088			
Module	m	[mm]	4
Number of teeth, wheel	z₂	[-]	294
Number of teeth, pinion	z₁	[-]	15
Overall gear ration	i	[-]	19.6
Maximum torque $s_{FS} = 1.75$	M_{d max}	[Nm]	11172
Nom. torque $s_F = 1$ at $n = 5$ rpm	M_{d nom}	[Nm]	8085
Maximum holding torque*	M_h	[Nm]	11172
Static load rating, radial	C_{o rad}	[kN]	731
Static load rating, axial	C_{o ax}	[kN]	1957
Dynamic load rating, radial	C_{rad}	[kN]	275
Dynamic load rating, axial	C_{ax}	[kN]	321
Weight, incl. 12 kg for hydraulic motor RE300		[kg]	132

*Optional with brake

The selection of the hydraulic / electric motor depends on actual customer requirements and specifications.
Selection example: performance data with hydraulic motor RE300

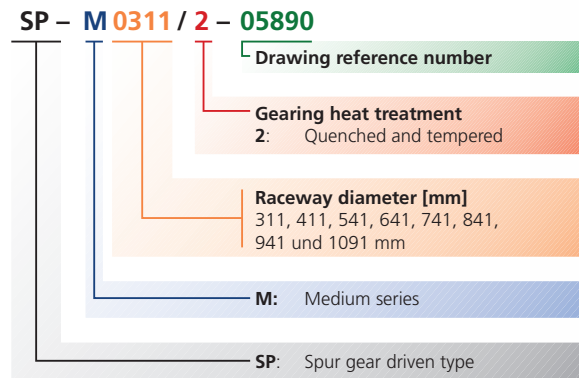
Pressure differential	Δp	[bar]	150
Oil flow	Q	[l/min]	35
Output speed	n	[min ⁻¹]	5
Maximum achievable torque	M_d	[Nm]	11172

Limiting load diagram for 'compressive' load



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

Series Overview



Verifying tooth base fatigue strength:

Valid for the following conditions:
 - Output speed: $n = 5.0$ rpm
 - Repeated load
 - Ambient temperature of 20°C

M_{dB} : Operation torque [Nm]
 M_{dnom} : Nominal torque [Nm] for $SF = 1$ and $n = 5.0$ rpm (see dimensions table)

If the following equation is met, the stress level of tooth base is below the endurance limit and fatigue is infinite:

$$M_{dB} \leq M_{dnom}$$

Fatigue stress of tooth base needs to be considered however, if the following equation is met (if so, refer to below additional steps to verify life):

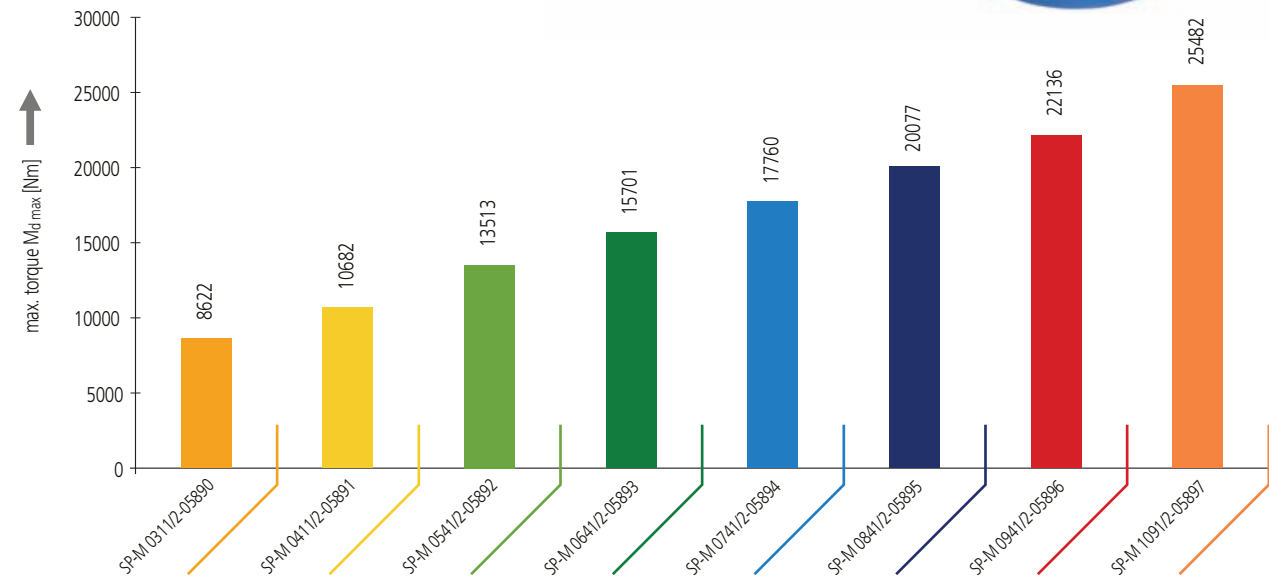
$$G_w \geq B_h \cdot \frac{ED_B}{100}$$

The operation is permissible as regards the fatigue stress of tooth base, if the following equation is fulfilled.

If this relationship is not fulfilled, then there is imminent danger of fatigue fracture of the tooth base.

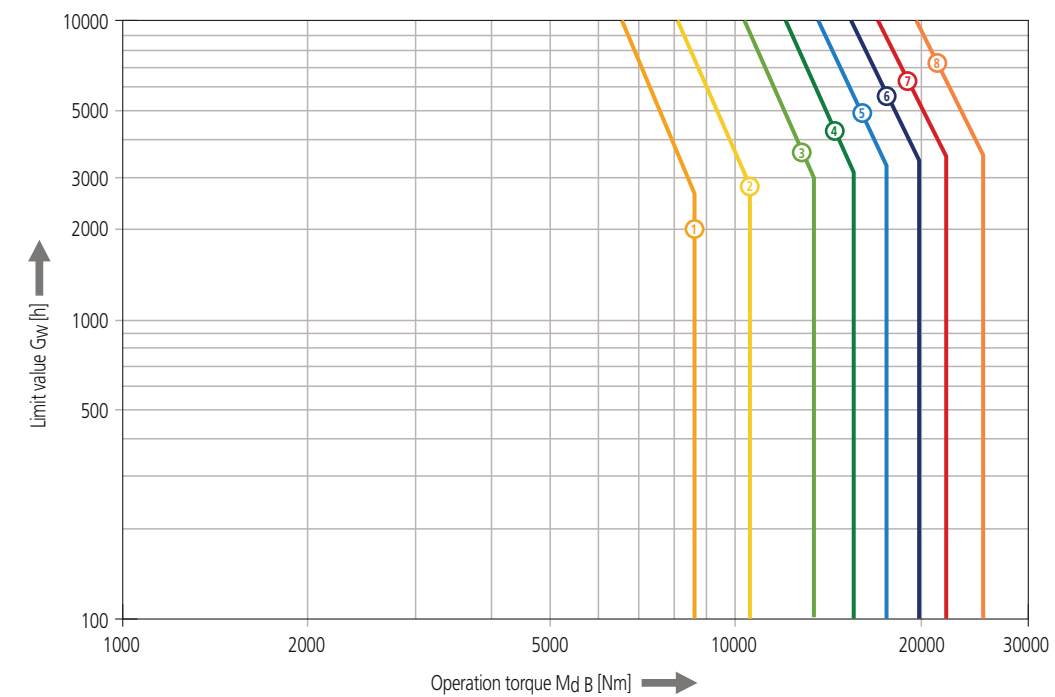
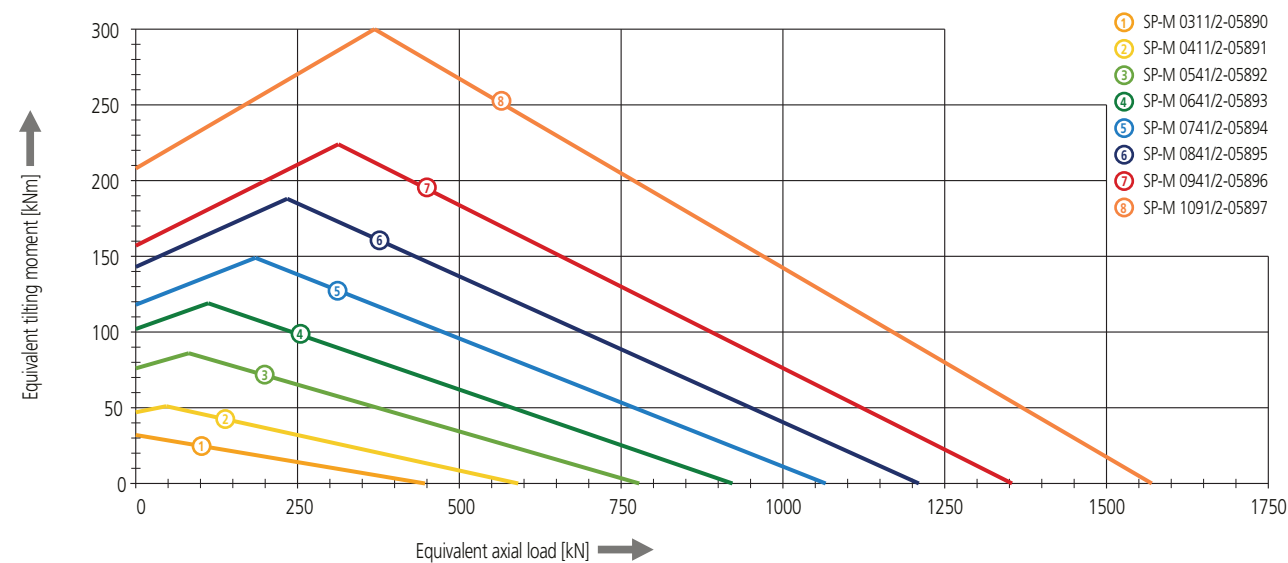
G_w : Limit value from diagram [h]
 B_h : Operation time [h]
 ED_B : Duty [%]

Maximum torque M_{dmax} of individual sizes



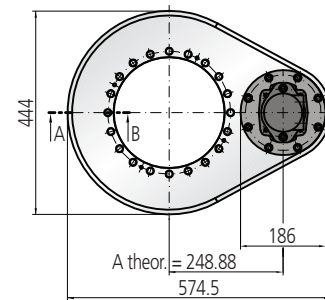
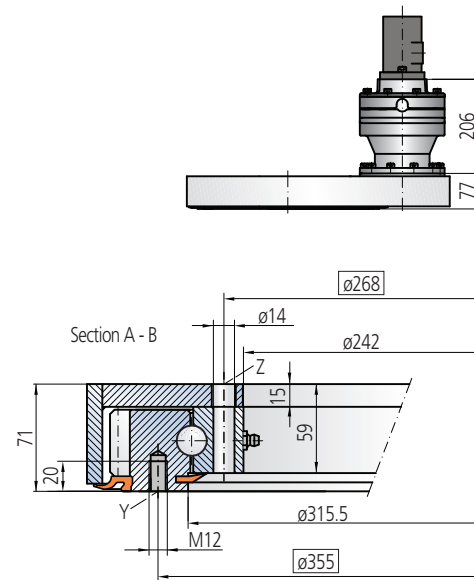
Limiting load diagrams of individual sizes for "compressive" load

Please refer to the explanations in the Technical Information section of the catalog



Verification of the pitting and wear safety of tooth flanks must be done by the IMO Engineering Department!

Size 0311



Mounting holes

Y = 20 Holes M12-20 deep, equally spaced
Z = 20 Holes $\varnothing 14$, equally spaced

Lubrication ports

4 Taper type grease nipples on the internal diameter
2 Taper type grease nipples on the outside of the housing

Slew Drive supplied pre-lubricated

Note, mounting face against upper surface shall be $\varnothing 308$, minimum

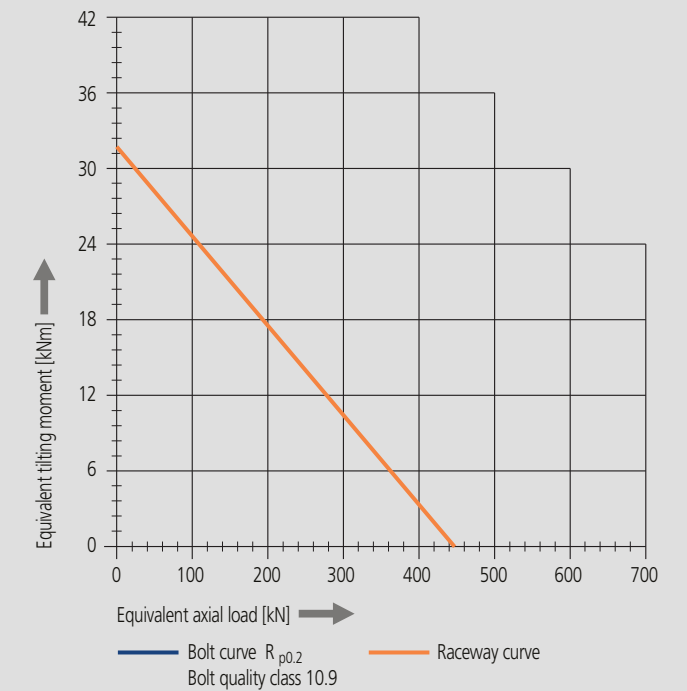
Drawing reference number SP-M 0311/2-05890			
Module	m [mm]	6	
Number of teeth, wheel	z₂ [-]	67	
Number of teeth, pinion	z₁ [-]	15	
Overall gear ration	i [-]	19.02	
Maximum torque	M_{d max} [Nm]	8622	
Nom. torque SF = 1 at n = 5 rpm	M_{d nom} [Nm]	6462	
Maximum holding torque*	M_h [Nm]	8622	
Static load rating, radial	C_{o rad} [kN]	191	
Static load rating, axial	C_{o ax} [kN]	447	
Dynamic load rating, radial	C_{rad} [kN]	140	
Dynamic load rating, axial	C_{ax} [kN]	140	
Weight, incl. 8 kg for hydraulic motor T-306	[kg]	80	

*Optional with brake

The selection of the hydraulic / electric motor depends on actual customer requirements and specifications.
Selection example: performance data with hydraulic motor T-306

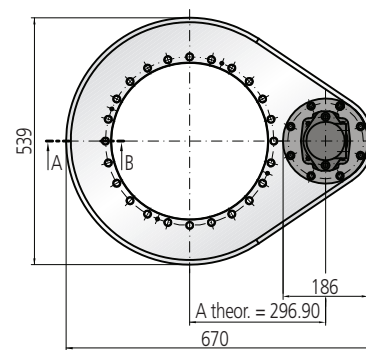
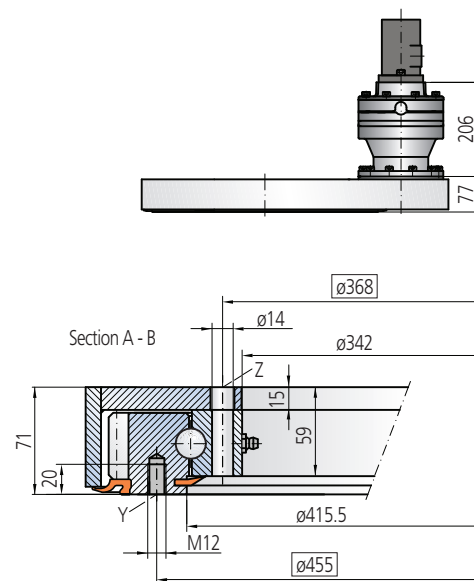
Pressure differential	Δp [bar]	124
Oil flow	Q [l/min]	39
Output speed	n [min ⁻¹]	5
Maximum achievable torque	M_d [Nm]	8622

Limiting load diagram for 'compressive' load



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

Size 0411



Mounting holes

Y = 20 Holes M12-20 deep, equally spaced
Z = 24 Holes $\varnothing 14$, equally spaced

Lubrication ports

4 Taper type grease nipples on the internal diameter
2 Taper type grease nipples on the outside of the housing

Slew Drive supplied pre-lubricated

Note, mounting face against upper surface shall be $\varnothing 405$, minimum

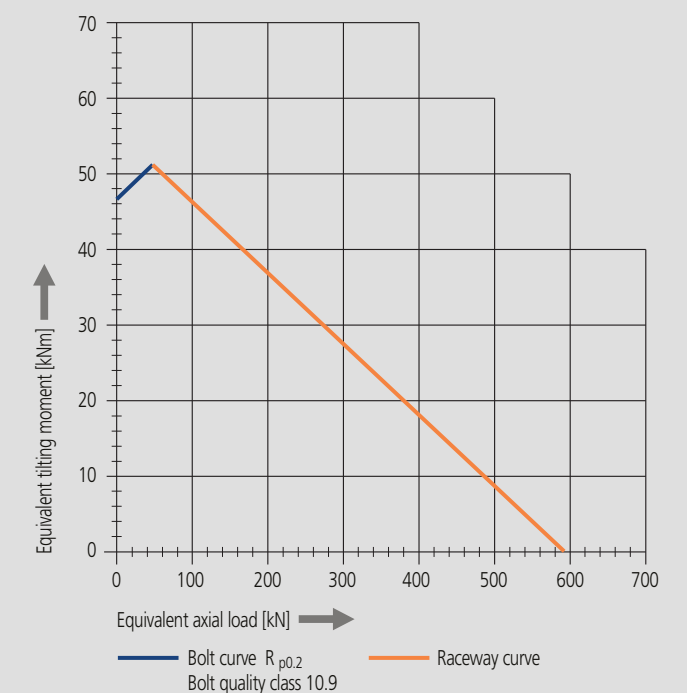
Drawing reference number SP-M 0411/2-05891			
Module	m [mm]	6	
Number of teeth, wheel	z₂ [-]	83	
Number of teeth, pinion	z₁ [-]	15	
Overall gear ration	i [-]	23.57	
Maximum torque	M_{d max} [Nm]	10682	
Nom. torque SF = 1 at n = 5 rpm	M_{d nom} [Nm]	8092	
Maximum holding torque*	M_h [Nm]	10682	
Static load rating, radial	C_{o rad} [kN]	253	
Static load rating, axial	C_{o ax} [kN]	591	
Dynamic load rating, radial	C_{rad} [kN]	155	
Dynamic load rating, axial	C_{ax} [kN]	156	
Weight, incl. 10 kg for hydraulic motor 2-200	[kg]	95	

*Optional with brake

The selection of the hydraulic / electric motor depends on actual customer requirements and specifications.
Selection example: performance data with hydraulic motor 2-200

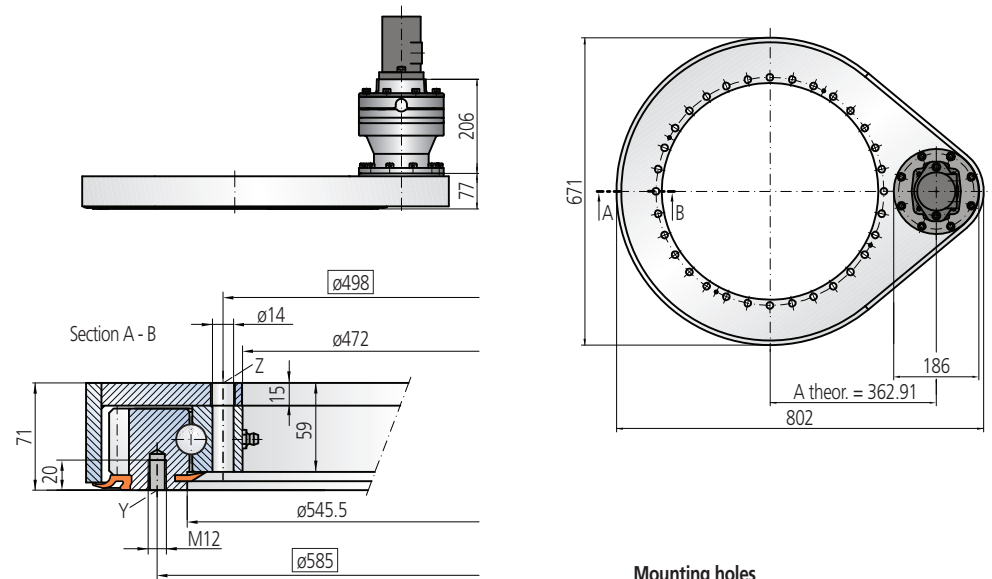
Pressure differential	Δp [bar]	190
Oil flow	Q [l/min]	28
Output speed	n [min ⁻¹]	5
Maximum achievable torque	M_d [Nm]	10682

Limiting load diagram for 'compressive' load



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

Size 0541



Mounting holes

Y = 28 Holes M12-20 deep, equally spaced
Z = 32 Holes $\phi 14$, equally spaced

Lubrication ports

4 Taper type grease nipples on the internal diameter
2 Taper type grease nipples on the outside of the housing

Slew Drive supplied pre-lubricated

Note, mounting face against upper surface shall be $\phi 537$, minimum

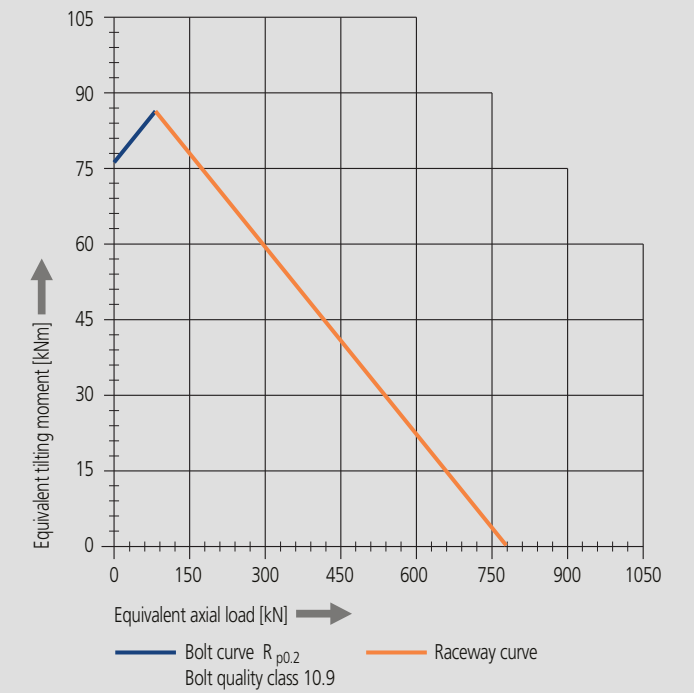
Drawing reference number SP-M 0541/2-05892			
Module	m [mm]	6	
Number of teeth, wheel	z₂ [-]	105	
Number of teeth, pinion	z₁ [-]	15	
Overall gear ration	i [-]	29.82	
Maximum torque	M_{d max} [Nm]	13513	
Nom. torque SF = 1 at n = 5 rpm	M_{d nom} [Nm]	10363	
Maximum holding torque*	M_h [Nm]	13513	
Static load rating, radial	C_{o rad} [kN]	333	
Static load rating, axial	C_{o ax} [kN]	778	
Dynamic load rating, radial	C_{rad} [kN]	173	
Dynamic load rating, axial	C_{ax} [kN]	174	
Weight, incl. 10 kg for hydraulic motor 2-200	[kg]	110	

*Optional with brake

The selection of the hydraulic / electric motor depends on actual customer requirements and specifications.
Selection example: performance data with hydraulic motor 2-200

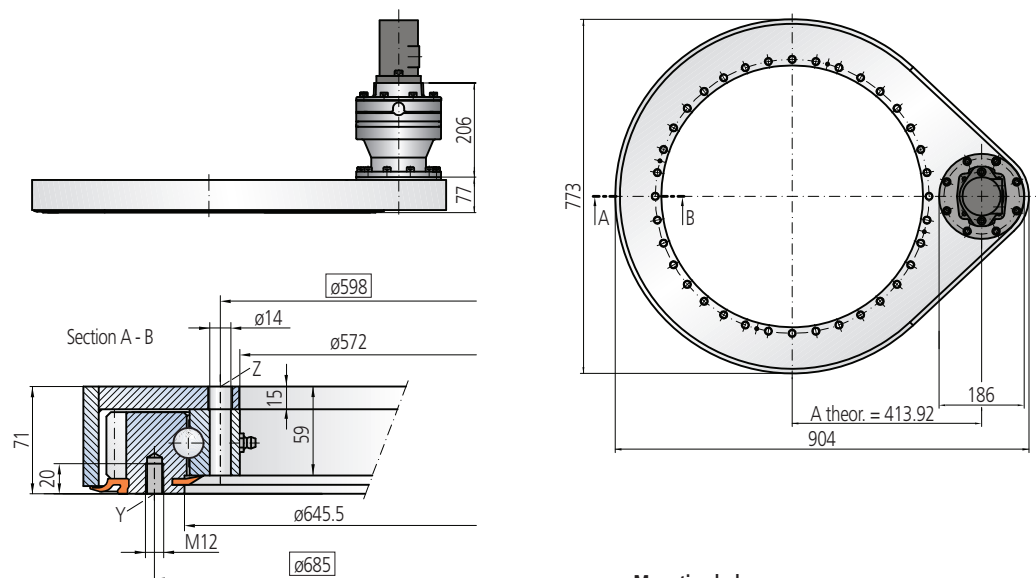
Pressure differential	Δp [bar]	190
Oil flow	Q [l/min]	34
Output speed	n [min ⁻¹]	5
Maximum achievable torque	M_d [Nm]	13513

Limiting load diagram for 'compressive' load



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

Size 0641



Mounting holes

Y = 32 Holes M12-20 deep, equally spaced
Z = 36 Holes $\phi 14$, equally spaced

Lubrication ports

4 Taper type grease nipples on the internal diameter
2 Taper type grease nipples on the outside of the housing

Slew Drive supplied pre-lubricated

Note, mounting face against upper surface shall be $\phi 639$, minimum

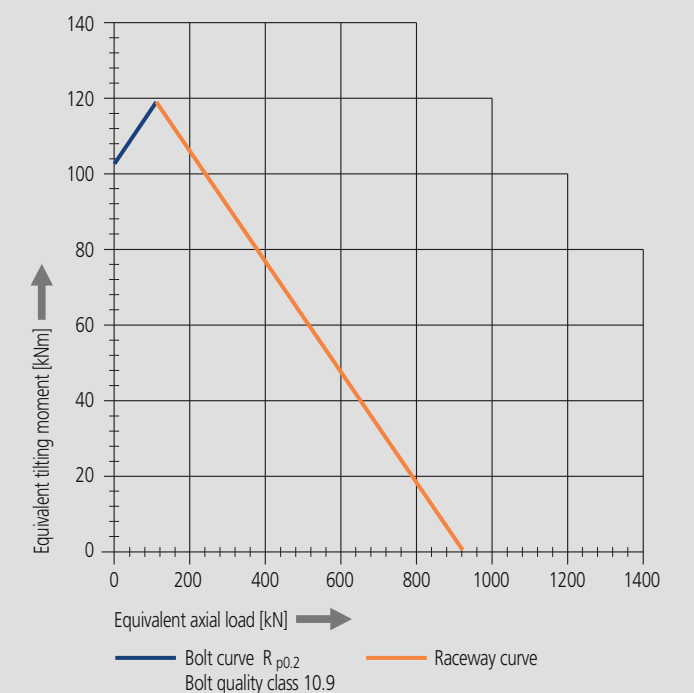
Drawing reference number SP-M 0641/2-05893			
Module	m [mm]	6	
Number of teeth, wheel	z₂ [-]	122	
Number of teeth, pinion	z₁ [-]	15	
Overall gear ration	i [-]	34.64	
Maximum torque	M_{d max} [Nm]	15701	
Nom. torque SF = 1 at n = 5 rpm	M_{d nom} [Nm]	12114	
Maximum holding torque*	M_h [Nm]	15701	
Static load rating, radial	C_{o rad} [kN]	394	
Static load rating, axial	C_{o ax} [kN]	922	
Dynamic load rating, radial	C_{rad} [kN]	184	
Dynamic load rating, axial	C_{ax} [kN]	185	
Weight, incl. 10 kg for hydraulic motor 2-200	[kg]	125	

*Optional with brake

The selection of the hydraulic / electric motor depends on actual customer requirements and specifications.
Selection example: performance data with hydraulic motor 2-200

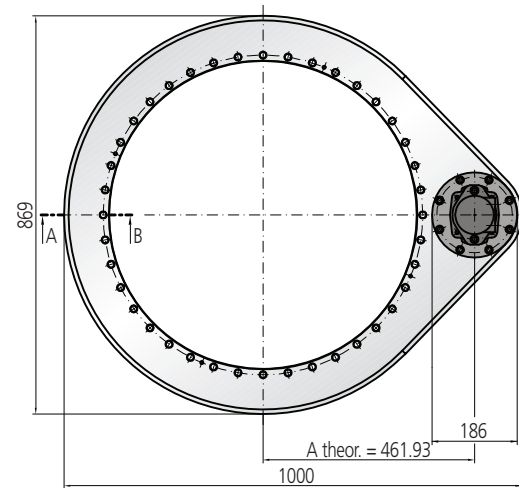
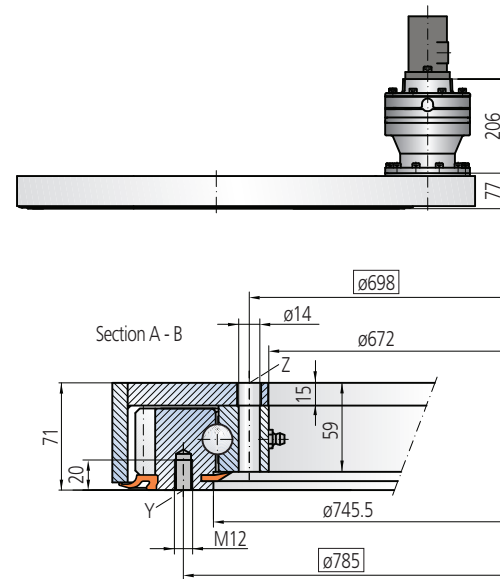
Pressure differential	Δp [bar]	190
Oil flow	Q [l/min]	38
Output speed	n [min ⁻¹]	5
Maximum achievable torque	M_d [Nm]	15701

Limiting load diagram for 'compressive' load



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

Size 0741



Mounting holes

Y = 36 Holes M12-20 deep, equally spaced
Z = 40 Holes $\phi 14$, equally spaced

Lubrication ports

4 Taper type grease nipples on the internal diameter
2 Taper type grease nipples on the outside of the housing

Slew Drive supplied pre-lubricated

Note, mounting face against upper surface shall be $\phi 739$, minimum

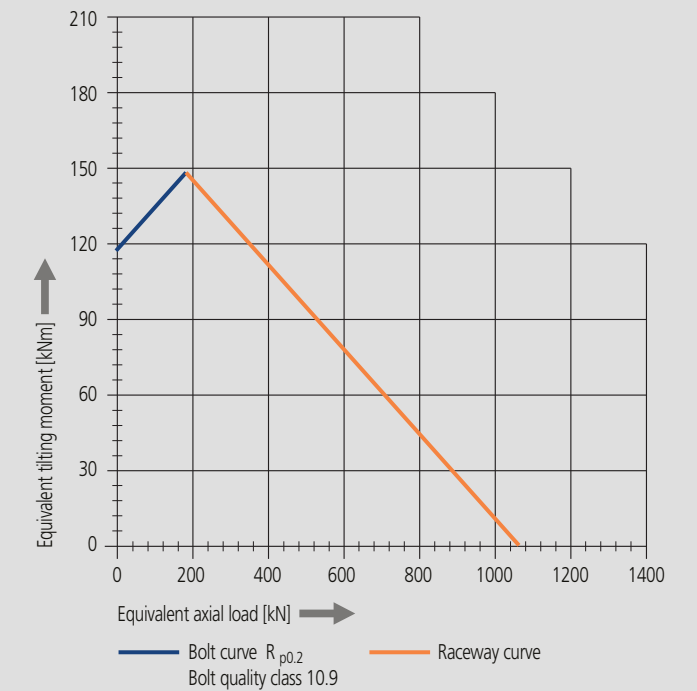
Drawing reference number SP-M 0741/2-05894			
Module	m [mm]	6	
Number of teeth, wheel	z₂ [-]	138	
Number of teeth, pinion	z₁ [-]	15	
Overall gear ration	i [-]	39.19	
Maximum torque	M_{d max} [Nm]	17760	
Nom. torque SF = 1 at n = 5 rpm	M_{d nom} [Nm]	13744	
Maximum holding torque*	M_h [Nm]	17760	
Static load rating, radial	C_{o rad} [kN]	456	
Static load rating, axial	C_{o ax} [kN]	1066	
Dynamic load rating, radial	C_{rad} [kN]	194	
Dynamic load rating, axial	C_{ax} [kN]	195	
Weight, incl. 10 kg for hydraulic motor 2-200	[kg]	140	

*Optional with brake

The selection of the hydraulic / electric motor depends on actual customer requirements and specifications.
Selection example: performance data with hydraulic motor 2-200

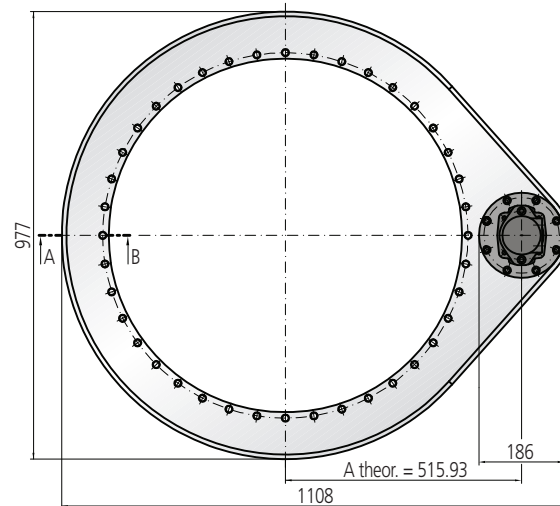
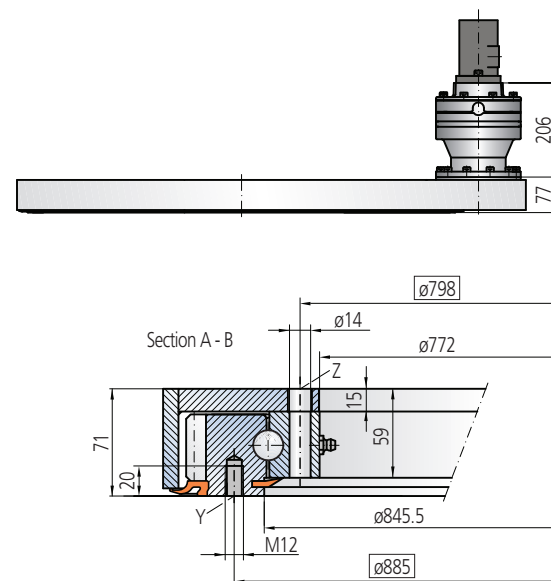
Pressure differential	Δp [bar]	190
Oil flow	Q [l/min]	43
Output speed	n [min ⁻¹]	5
Maximum achievable torque	M_d [Nm]	17760

Limiting load diagram for 'compressive' load



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

Size 0841



Mounting holes

Y = 36 Holes M12-20 deep, equally spaced
Z = 40 Holes $\phi 14$, equally spaced

Lubrication ports

4 Taper type grease nipples on the internal diameter
2 Taper type grease nipples on the outside of the housing

Slew Drive supplied pre-lubricated

Note, mounting face against upper surface shall be $\phi 841$, minimum

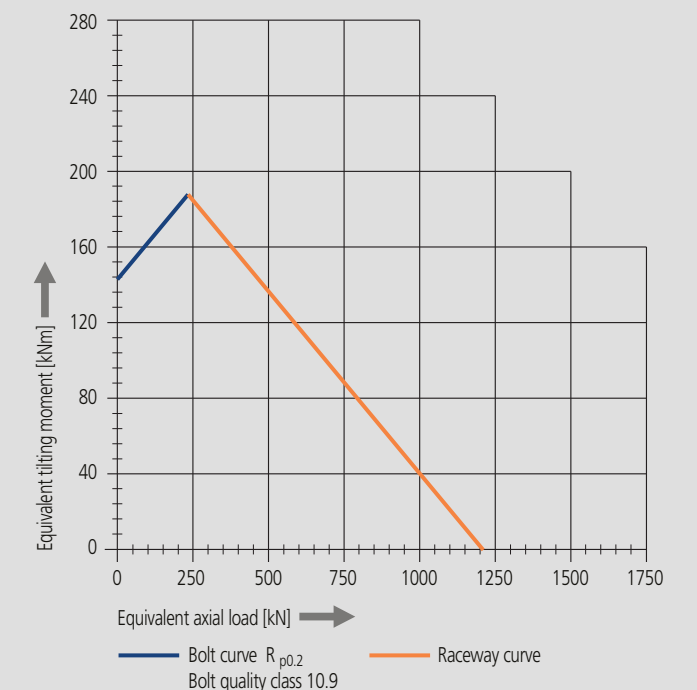
Drawing reference number SP-M 0841/2-05895			
Module	m [mm]	6	
Number of teeth, wheel	z₂ [-]	156	
Number of teeth, pinion	z₁ [-]	15	
Overall gear ration	i [-]	44.30	
Maximum torque	M_{d max} [Nm]	20077	
Nom. torque SF = 1 at n = 5 rpm	M_{d nom} [Nm]	15584	
Maximum holding torque*	M_h [Nm]	20077	
Static load rating, radial	C_{o rad} [kN]	518	
Static load rating, axial	C_{o ax} [kN]	1210	
Dynamic load rating, radial	C_{rad} [kN]	204	
Dynamic load rating, axial	C_{ax} [kN]	206	
Weight, incl. 10 kg for hydraulic motor 2-200	[kg]	155	

*Optional with brake

The selection of the hydraulic / electric motor depends on actual customer requirements and specifications.
Selection example: performance data with hydraulic motor 2-200

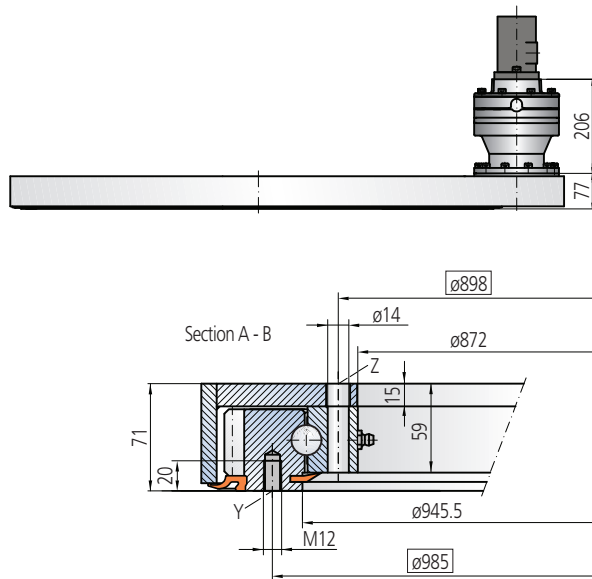
Pressure differential	Δp [bar]	190
Oil flow	Q [l/min]	48
Output speed	n [min ⁻¹]	5
Maximum achievable torque	M_d [Nm]	20077

Limiting load diagram for 'compressive' load

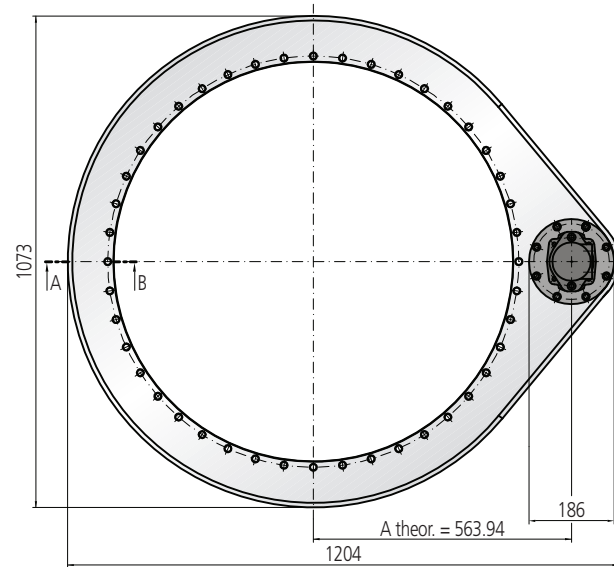


Please adhere strictly to the Technical Information section when using above graph!

Size 0941



Note, mounting face against upper surface shall be 0941, minimum



Mounting holes

Y = 40 Holes M12-20 deep, equally spaced
Z = 44 Holes $\phi 14$, equally spaced

Lubrication ports

4 Taper type grease nipples on the internal diameter
2 Taper type grease nipples on the outside of the housing

Slew Drive supplied pre-lubricated

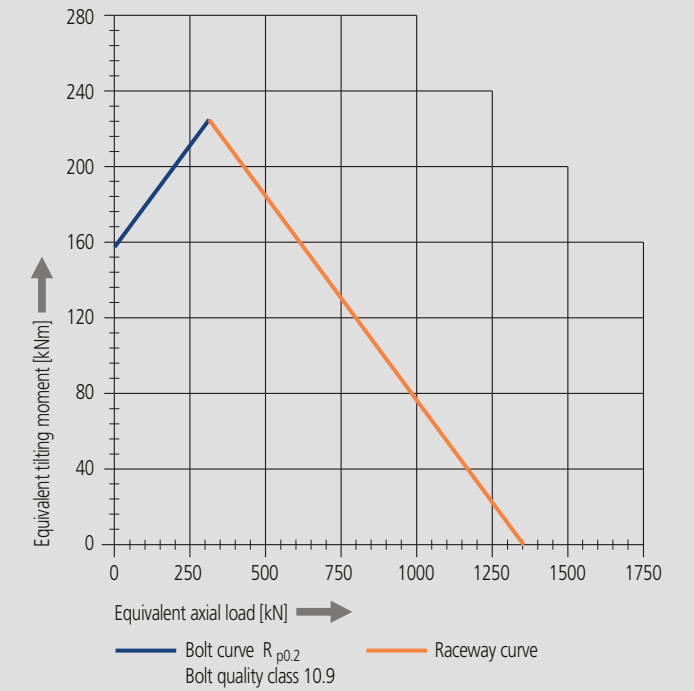
Drawing reference number SP-M 0941/2-05896			
Module	m	[mm]	6
Number of teeth, wheel	z_2	[-]	172
Number of teeth, pinion	z_1	[-]	15
Overall gear ration	i	[-]	48.84
Maximum torque	$M_{d\ max}$	[Nm]	22136
Nom. torque $SF = 1$ at $n = 5$ rpm	$M_{d\ nom}$	[Nm]	17182
Maximum holding torque*	M_h	[Nm]	22136
Static load rating, radial	$C_{o\ rad}$	[kN]	579
Static load rating, axial	$C_{o\ ax}$	[kN]	1354
Dynamic load rating, radial	C_{rad}	[kN]	212
Dynamic load rating, axial	C_{ax}	[kN]	214
Weight, incl. 10 kg for hydraulic motor 2-200	[kg]		170

*Optional with brake

The selection of the hydraulic / electric motor depends on actual customer requirements and specifications.
Selection example: performance data with hydraulic motor 2-200

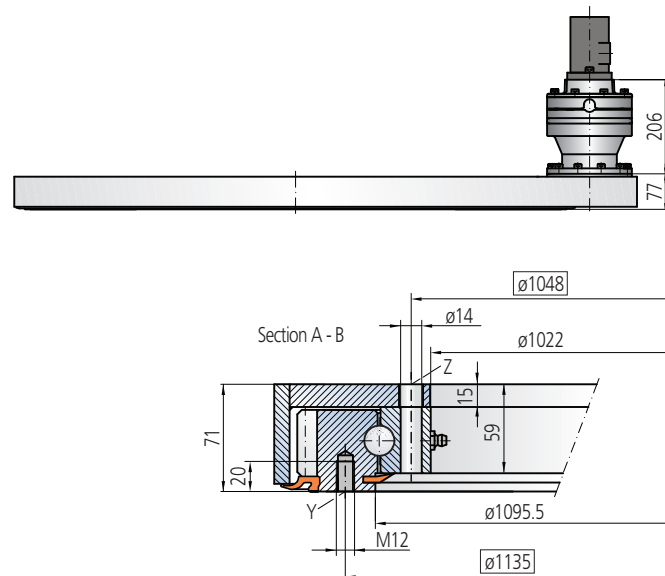
Pressure differential	Δp	[bar]	190
Oil flow	Q	[l/min]	51
Output speed	n	[min ⁻¹]	5
Maximum achievable torque	M_d	[Nm]	22136

Limiting load diagram for 'compressive' load

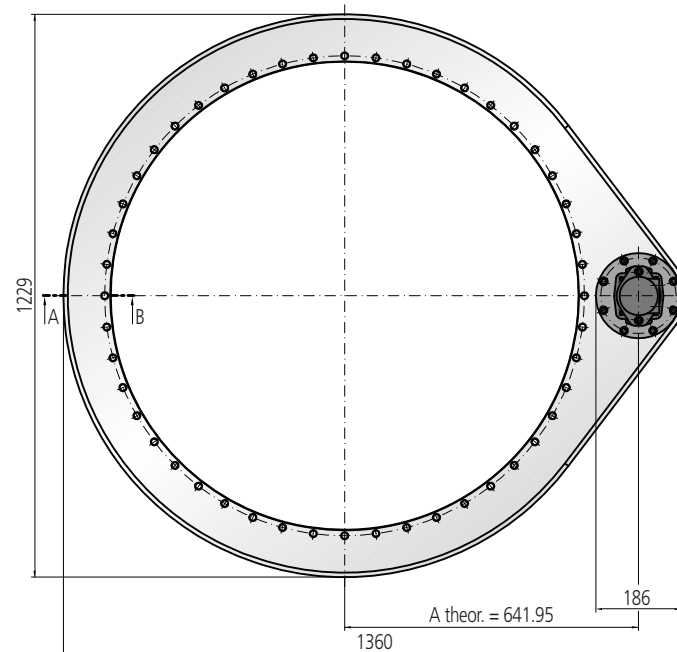


Please adhere strictly to the Technical Information section when using above graph!

Size 1091



Note, mounting face against upper surface shall be 1091, minimum



Mounting holes

Y = 44 Holes M12-20 deep, equally spaced
Z = 48 Holes $\phi 14$, equally spaced

Lubrication ports

4 Taper type grease nipples on the internal diameter
2 Taper type grease nipples on the outside of the housing

Slew Drive supplied pre-lubricated

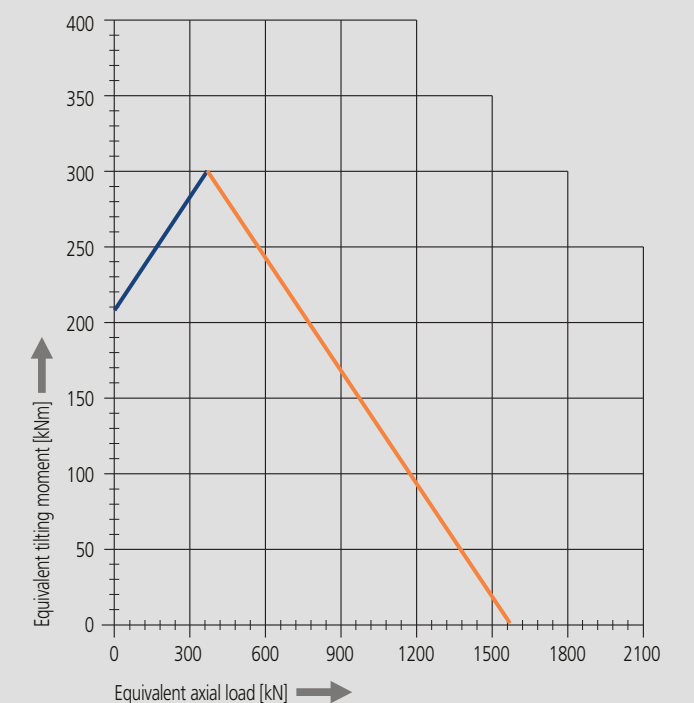
Drawing reference number SP-M 1091/2-05897			
Module	m	[mm]	6
Number of teeth, wheel	z_2	[-]	198
Number of teeth, pinion	z_1	[-]	15
Overall gear ration	i	[-]	56.23
Maximum torque	$M_{d\ max}$	[Nm]	25482
Nom. torque $SF = 1$ at $n = 5$ rpm	$M_{d\ nom}$	[Nm]	19839
Maximum holding torque*	M_h	[Nm]	25482
Static load rating, radial	$C_{o\ rad}$	[kN]	672
Static load rating, axial	$C_{o\ ax}$	[kN]	1570
Dynamic load rating, radial	C_{rad}	[kN]	224
Dynamic load rating, axial	C_{ax}	[kN]	226
Weight, incl. 10 kg for hydraulic motor 2-200	[kg]		200

*Optional with brake

The selection of the hydraulic / electric motor depends on actual customer requirements and specifications.
Selection example: performance data with hydraulic motor 2-200

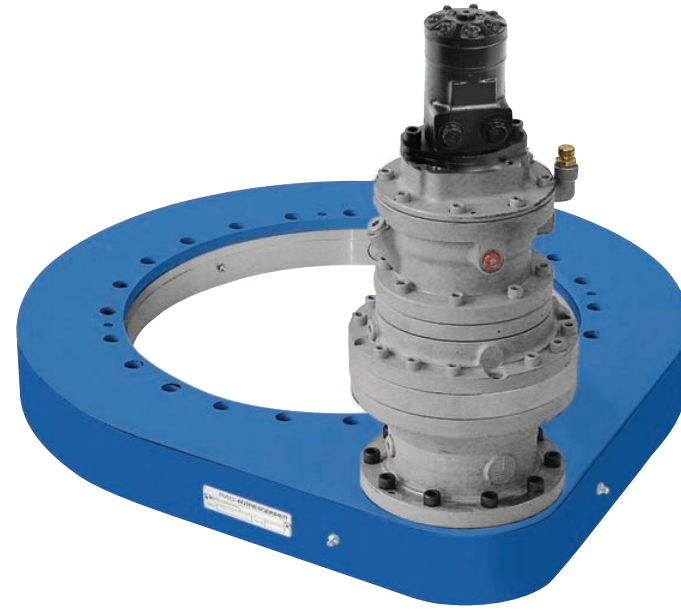
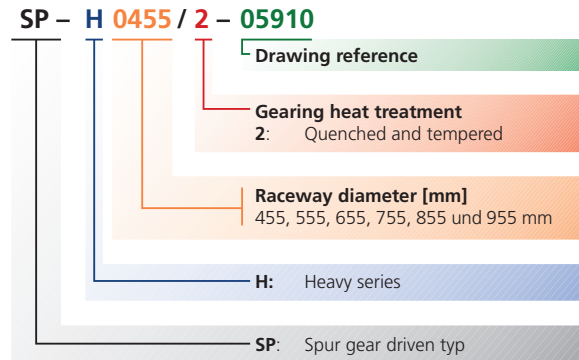
Pressure differential	Δp	[bar]	190
Oil flow	Q	[l/min]	62
Output speed	n	[min ⁻¹]	5
Maximum achievable torque	M_d	[Nm]	25482

Limiting load diagram for 'compressive' load

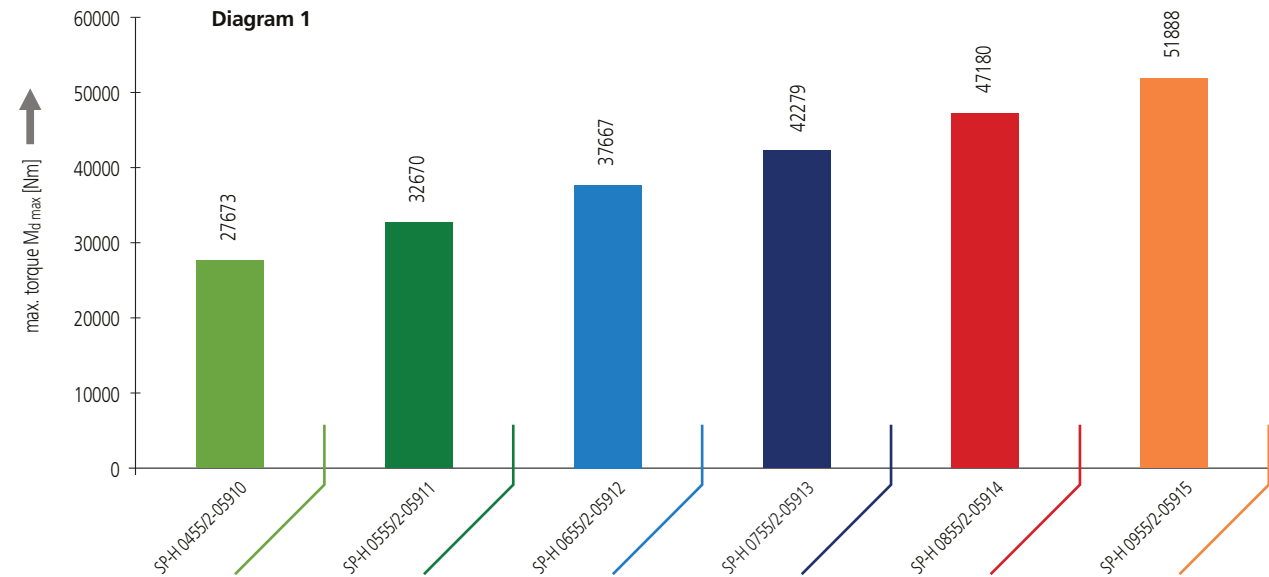


Please adhere strictly to the Technical Information section when using above graph!

Series Overview

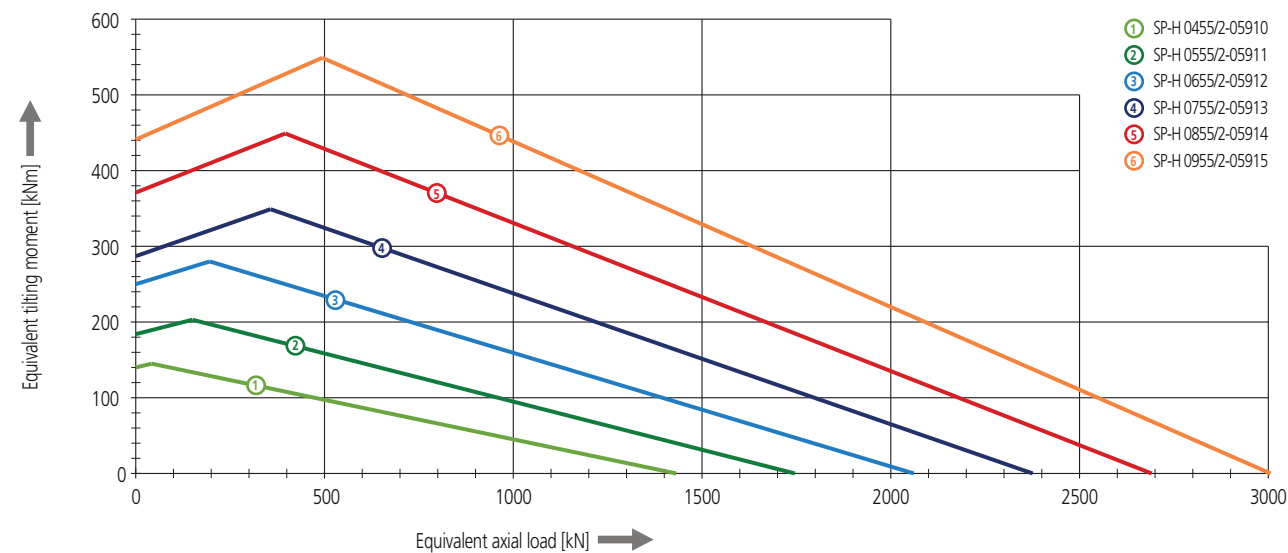


Maximum torque $M_{d\max}$ of individual sizes



Limiting load diagrams of individual sizes for "compressive" load

Please refer to the explanations in the Technical Information section of the catalog



Verifying tooth base fatigue strength:

Valid for the following conditions:
 - Output speed: $n = 3.0$ rpm
 - Repeated load
 - Ambient temperature of 20°C

M_{dB} : Operation torque [Nm]
 $M_{d\text{nom}}$: Nominal torque [Nm] for $SF = 1$ and $n = 3.0$ rpm (see dimensions table)

If the following equation is met, the stress level of tooth base is below the endurance limit and fatigue is infinite:

$$M_{dB} \leq M_{d\text{nom}}$$

Fatigue stress of tooth base needs to be considered however, if the following equation is met (if so, refer to below additional steps to verify life):

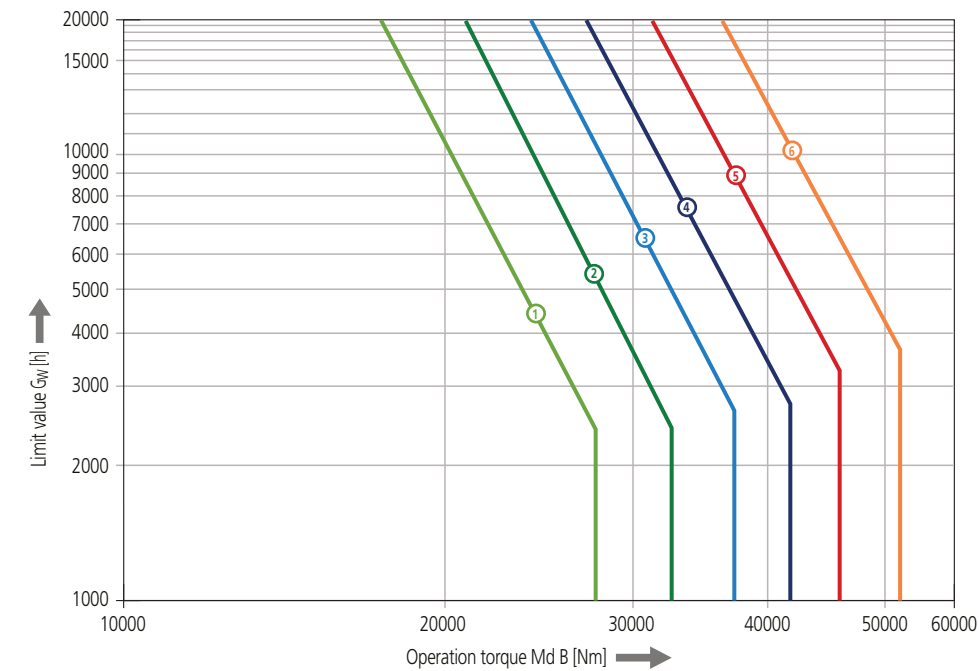
$$M_{dB} > M_{d\text{nom}}$$

The operation is permissible as regards the fatigue stress of tooth base, if the following equation is fulfilled.

$$G_w \geq B_h \cdot \frac{ED_B}{100}$$

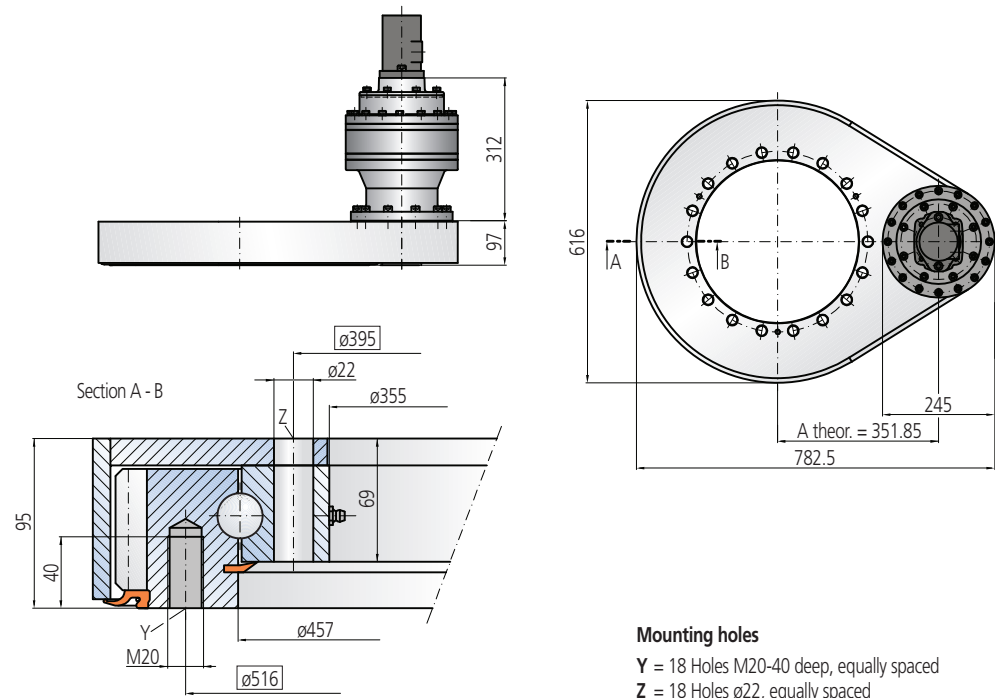
If this relationship is not fulfilled, then there is imminent danger of fatigue fracture of the tooth base.

G_w : Limit value from diagram [h]
 B_h : Operation time [h]
 ED_B : Duty [%]



Verification of the pitting and wear safety of tooth flanks must be done by the IMO Engineering Department!

Size 0455



Mounting holes

Y = 18 Holes M20-40 deep, equally spaced
Z = 18 Holes $\phi 22$, equally spaced

Lubrication ports

4 Taper type grease nipples on the internal diameter
2 Taper type grease nipples on the outside of the housing
Slew Drive supplied pre-lubricated

Note, mounting face against upper surface shall be $\phi 455$, minimum

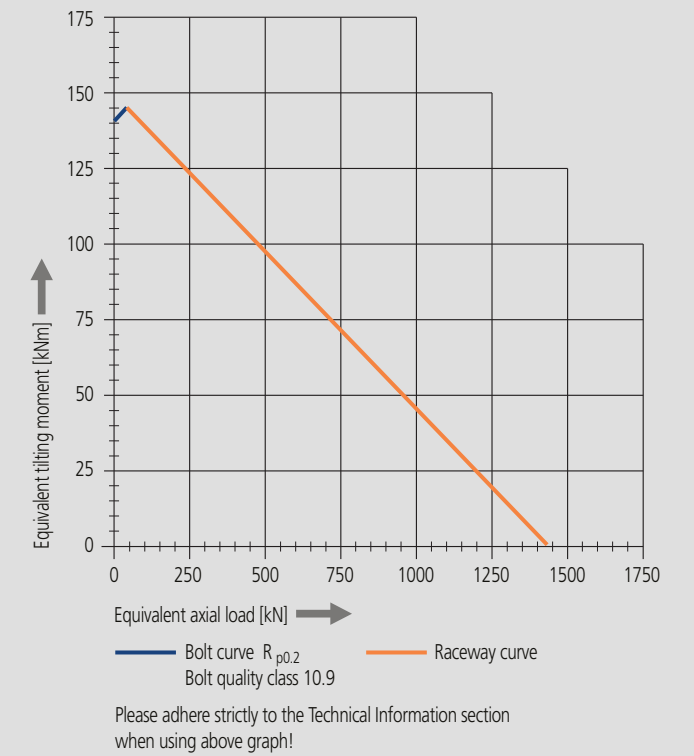
Drawing reference number SP-H 0455/2-05910			
Module	m [mm]	8	
Number of teeth, wheel	z₂ [-]	72	
Number of teeth, pinion	z₁ [-]	15	
Overall gear ration	i [-]	86.88	
Maximum torque	M_{d max} [Nm]	27673	
Nom. torque SF = 1 at n = 3 rpm	M_{d nom} [Nm]	18115	
Maximum holding torque*	M_h [Nm]	27673	
Static load rating, radial	C_{o rad} [kN]	535	
Static load rating, axial	C_{o ax} [kN]	1432	
Dynamic load rating, radial	C_{rad} [kN]	249	
Dynamic load rating, axial	C_{ax} [kN]	290	
Weight, incl. 10 kg for hydraulic motor 2-132	[kg]	190	

*Optional with brake

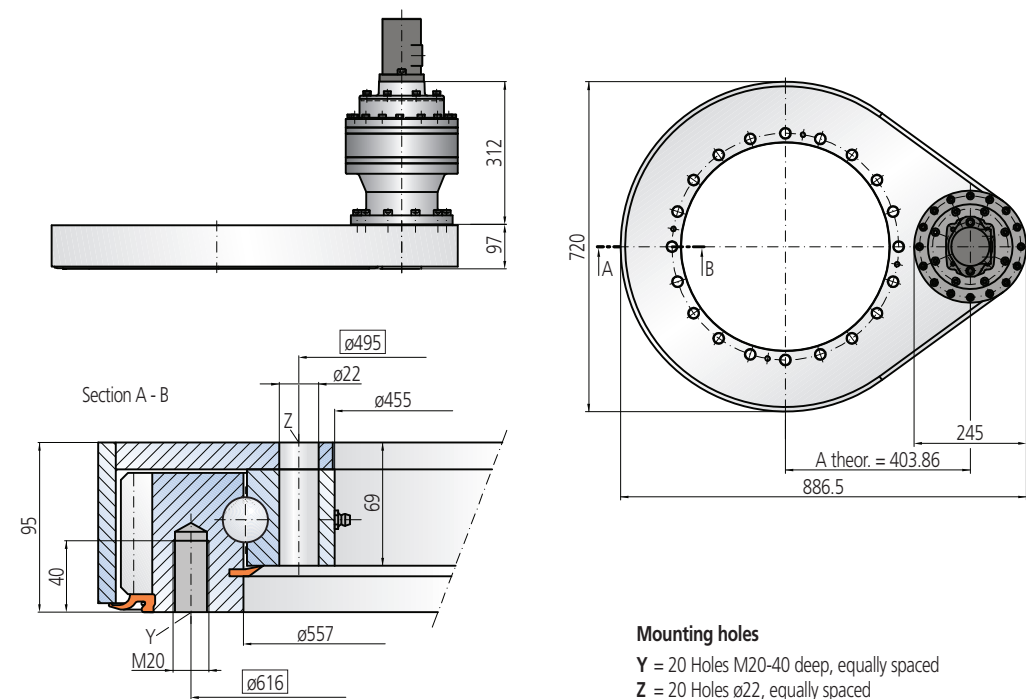
The selection of the hydraulic / electric motor depends on actual customer requirements and specifications.
Selection example: performance data with hydraulic motor 2-132

Pressure differential	Δp [bar]	195
Oil flow	Q [l/min]	38
Output speed	n [min ⁻¹]	3
Maximum achievable torque	M_d [Nm]	27673

Limiting load diagram for 'compressive' load



Size 0555



Mounting holes

Y = 20 Holes M20-40 deep, equally spaced
Z = 20 Holes $\phi 22$, equally spaced

Lubrication ports

4 Taper type grease nipples on the internal diameter
2 Taper type grease nipples on the outside of the housing
Slew Drive supplied pre-lubricated

Note, mounting face against upper surface shall be $\phi 555$, minimum

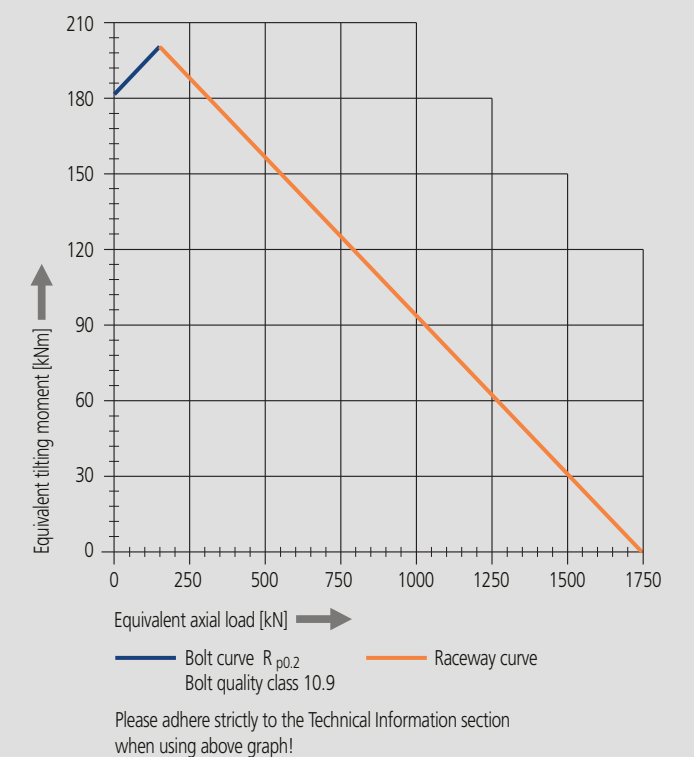
Drawing reference number SP-H 0555/2-05911			
Module	m [mm]	8	
Number of teeth, wheel	z₂ [-]	85	
Number of teeth, pinion	z₁ [-]	15	
Overall gear ration	i [-]	102.56	
Maximum torque	M_{d max} [Nm]	32670	
Nom. torque SF = 1 at n = 3 rpm	M_{d nom} [Nm]	21590	
Maximum holding torque*	M_h [Nm]	32670	
Static load rating, radial	C_{o rad} [kN]	652	
Static load rating, axial	C_{o ax} [kN]	1746	
Dynamic load rating, radial	C_{rad} [kN]	267	
Dynamic load rating, axial	C_{ax} [kN]	312	
Weight, incl. 10 kg for hydraulic motor 2-132	[kg]	215	

*Optional with brake

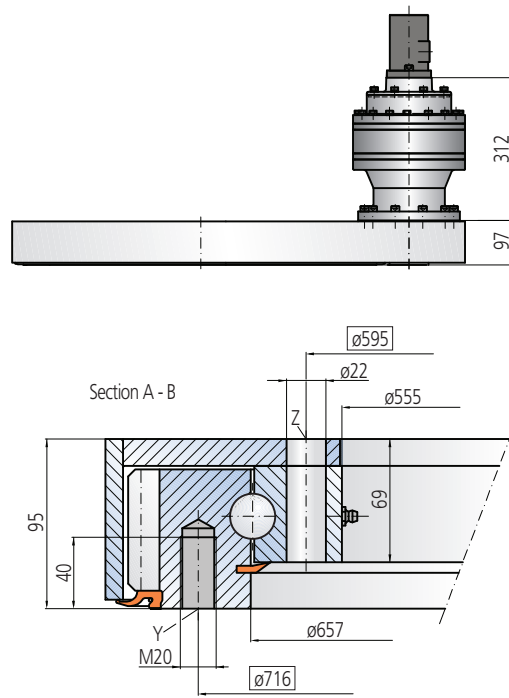
The selection of the hydraulic / electric motor depends on actual customer requirements and specifications.
Selection example: performance data with hydraulic motor 2-132

Pressure differential	Δp [bar]	195
Oil flow	Q [l/min]	45
Output speed	n [min ⁻¹]	3
Maximum achievable torque	M_d [Nm]	32670

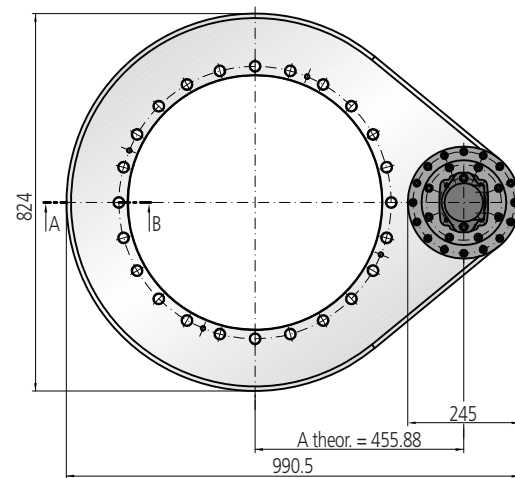
Limiting load diagram for 'compressive' load



Size 0655



Note, mounting face against upper surface shall be $\phi 655$, minimum



Mounting holes

Y = 24 Holes M20-40 deep, equally spaced
Z = 24 Holes $\phi 22$, equally spaced

Lubrication ports

4 Taper type grease nipples on the internal diameter
2 Taper type grease nipples on the outside of the housing
Slew Drive supplied pre-lubricated

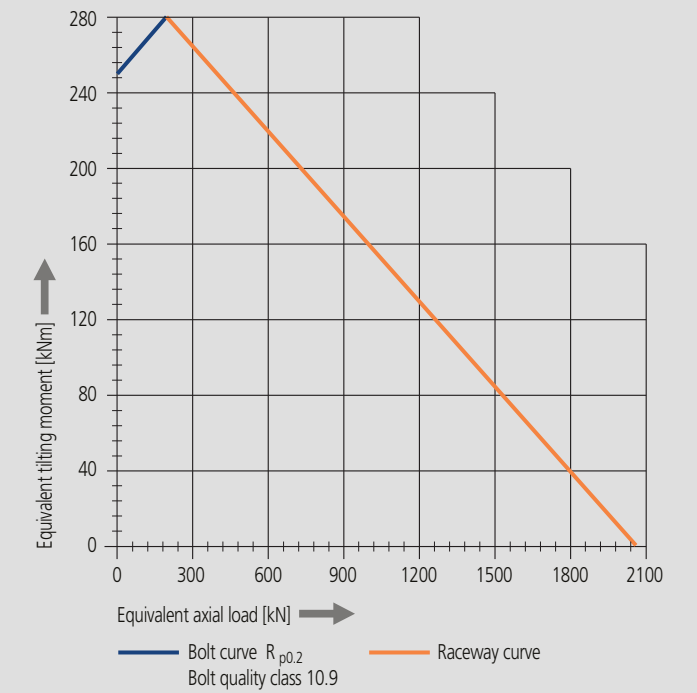
Drawing reference number SP-H 0655/2-05912			
Module	m	[mm]	8
Number of teeth, wheel	z₂	[-]	98
Number of teeth, pinion	z₁	[-]	15
Overall gear ration	i	[-]	118.25
Maximum torque	M_{d max}	[Nm]	37667
Nom. torque SF = 1 at n = 3 rpm	M_{d nom}	[Nm]	25048
Maximum holding torque*	M_h	[Nm]	37667
Static load rating, radial	C_{o rad}	[kN]	770
Static load rating, axial	C_{o ax}	[kN]	2061
Dynamic load rating, radial	C_{rad}	[kN]	284
Dynamic load rating, axial	C_{ax}	[kN]	331
Weight, incl. 10 kg for hydraulic motor 2-132		[kg]	245

*Optional with brake

The selection of the hydraulic / electric motor depends on actual customer requirements and specifications.
Selection example: performance data with hydraulic motor 2-132

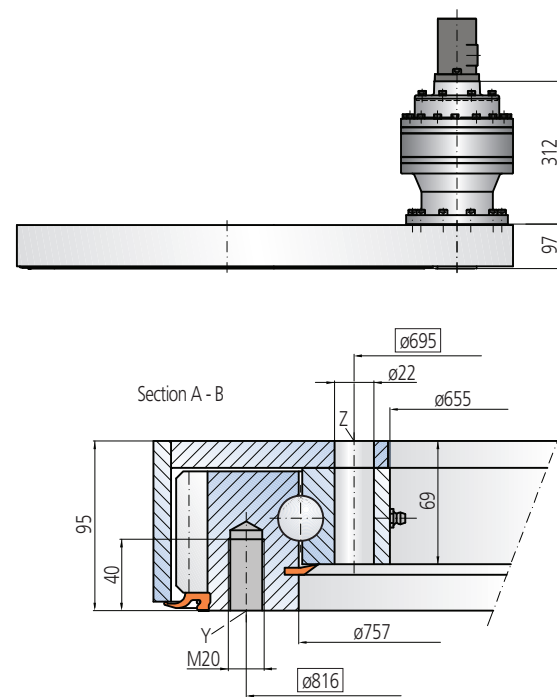
Pressure differential	Δp	[bar]	195
Oil flow	Q	[l/min]	52
Output speed	n	[min ⁻¹]	3
Maximum achievable torque	M_d	[Nm]	37667

Limiting load diagram for 'compressive' load

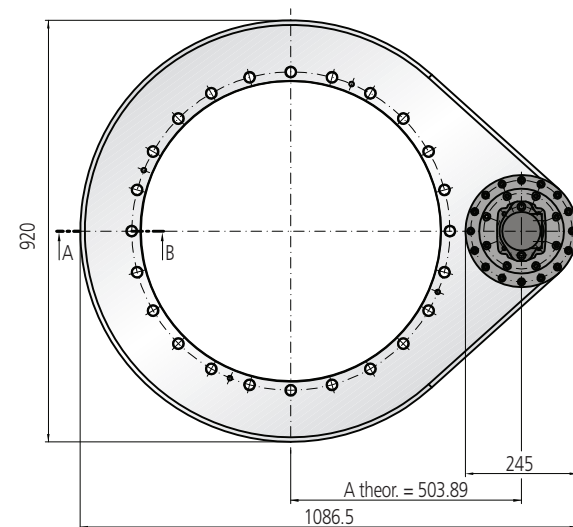


Please adhere strictly to the Technical Information section when using above graph!

Size 0755



Note, mounting face against upper surface shall be $\phi 755$, minimum



Mounting holes

Y = 24 Holes M20-40 deep, equally spaced
Z = 24 Holes $\phi 22$, equally spaced

Lubrication ports

4 Taper type grease nipples on the internal diameter
2 Taper type grease nipples on the outside of the housing
Slew Drive supplied pre-lubricated

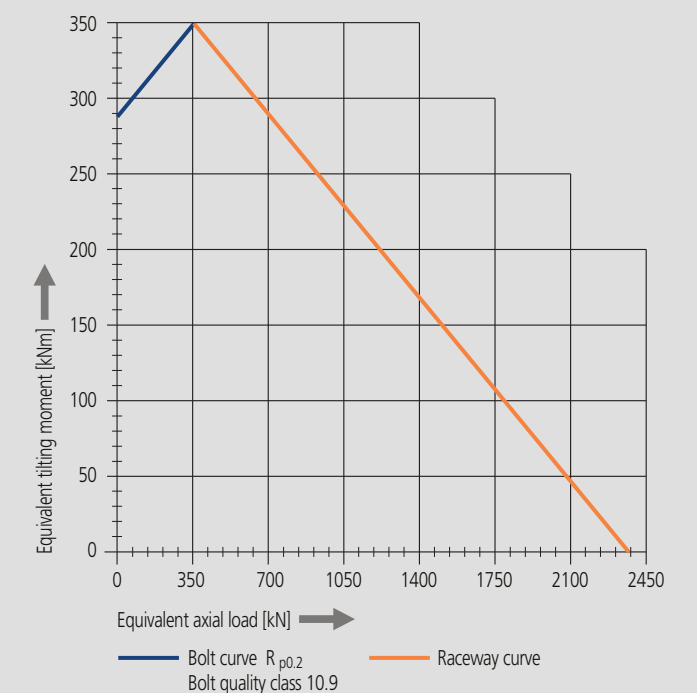
Drawing reference number SP-H 0755/2-05913			
Module	m	[mm]	8
Number of teeth, wheel	z₂	[-]	110
Number of teeth, pinion	z₁	[-]	15
Overall gear ration	i	[-]	132.73
Maximum torque	M_{d max}	[Nm]	42279
Nom. torque SF = 1 at n = 3 rpm	M_{d nom}	[Nm]	28204
Maximum holding torque*	M_h	[Nm]	42279
Static load rating, radial	C_{o rad}	[kN]	888
Static load rating, axial	C_{o ax}	[kN]	2376
Dynamic load rating, radial	C_{rad}	[kN]	299
Dynamic load rating, axial	C_{ax}	[kN]	349
Weight, incl. 10 kg for hydraulic motor 2-132		[kg]	265

*Optional with brake

The selection of the hydraulic / electric motor depends on actual customer requirements and specifications.
Selection example: performance data with hydraulic motor 2-132

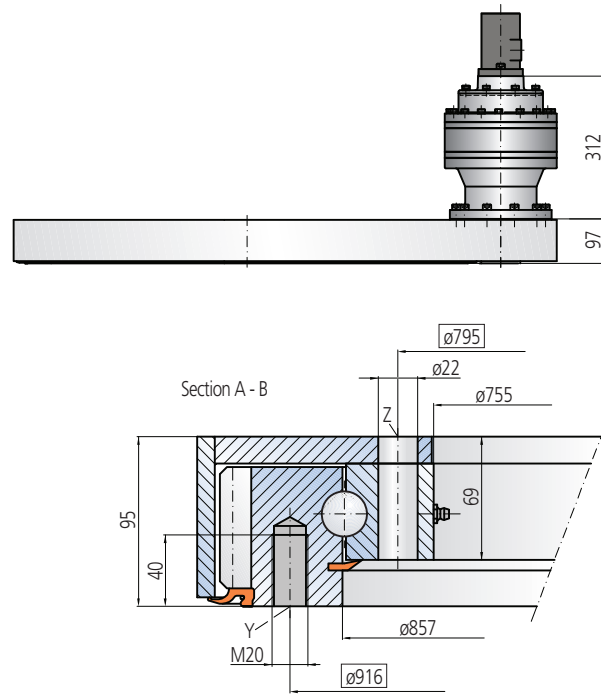
Pressure differential	Δp	[bar]	195
Oil flow	Q	[l/min]	57
Output speed	n	[min ⁻¹]	3
Maximum achievable torque	M_d	[Nm]	42279

Limiting load diagram for 'compressive' load

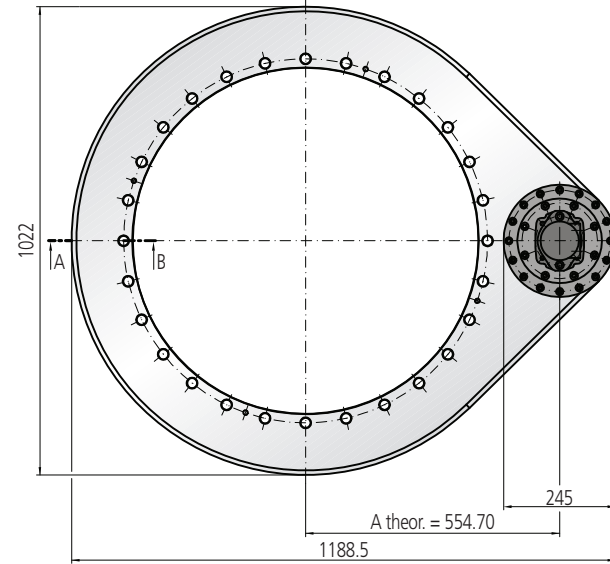


Please adhere strictly to the Technical Information section when using above graph!

Size 0855



Note, mounting face against upper surface shall be $\phi 855$, minimum



Mounting holes

Y = 28 Holes M20-40 deep, equally spaced
Z = 28 Holes $\phi 22$, equally spaced

Lubrication ports

4 Taper type grease nipples on the internal diameter
2 Taper type grease nipples on the outside of the housing

Slew Drive supplied pre-lubricated

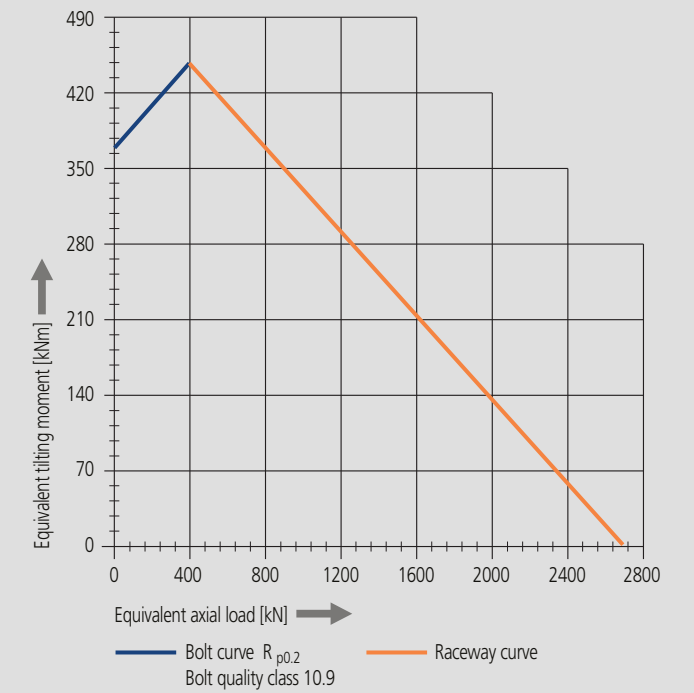
Drawing reference number SP-H 0855/2-05914			
Module	m	[mm]	8
Number of teeth, wheel	z₂	[-]	122
Number of teeth, pinion	z₁	[-]	15
Overall gear ration	i	[-]	147.21
Maximum torque	M_{d max}	[Nm]	47180
Nom. torque SF = 1 at n = 3 rpm	M_{d nom}	[Nm]	32749
Maximum holding torque*	M_h	[Nm]	47180
Static load rating, radial	C_{o rad}	[kN]	1005
Static load rating, axial	C_{o ax}	[kN]	2691
Dynamic load rating, radial	C_{rad}	[kN]	315
Dynamic load rating, axial	C_{ax}	[kN]	368
Weight, incl. 10 kg for hydraulic motor 2-132		[kg]	295

*Optional with brake

The selection of the hydraulic / electric motor depends on actual customer requirements and specifications.
Selection example: performance data with hydraulic motor 2-132

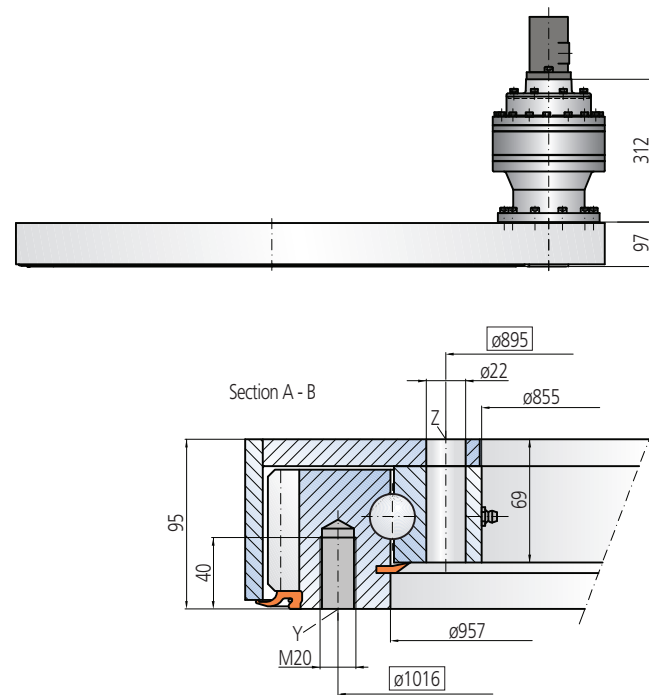
Pressure differential	Δp	[bar]	195
Oil flow	Q	[l/min]	64
Output speed	n	[min ⁻¹]	3
Maximum achievable torque	M_d	[Nm]	47180

Limiting load diagram for 'compressive' load

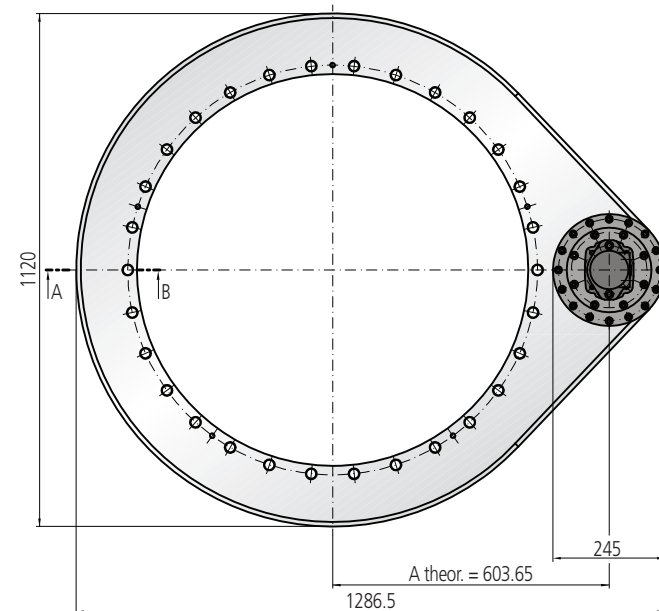


Please adhere strictly to the Technical Information section when using above graph!

Size 0955



Note, mounting face against upper surface shall be $\phi 955$, minimum



Mounting holes

Y = 30 Holes M20-40 deep, equally spaced
Z = 30 Holes $\phi 22$, equally spaced

Lubrication ports

4 Taper type grease nipples on the internal diameter
2 Taper type grease nipples on the outside of the housing

Slew Drive supplied pre-lubricated

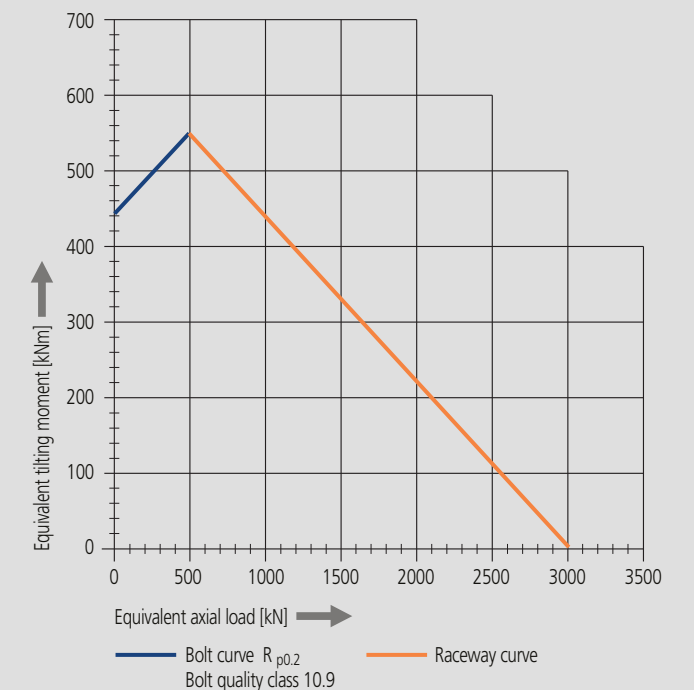
Drawing reference number SP-H 0955/2-05915			
Module	m	[mm]	8
Number of teeth, wheel	z₂	[-]	134
Number of teeth, pinion	z₁	[-]	15
Overall gear ration	i	[-]	161.69
Maximum torque	M_{d max}	[Nm]	51888
Nom. torque SF = 1 at n = 3 rpm	M_{d nom}	[Nm]	36342
Maximum holding torque*	M_h	[Nm]	51888
Static load rating, radial	C_{o rad}	[kN]	1123
Static load rating, axial	C_{o ax}	[kN]	3006
Dynamic load rating, radial	C_{rad}	[kN]	328
Dynamic load rating, axial	C_{ax}	[kN]	383
Weight, incl. 10 kg for hydraulic motor 2-132		[kg]	320

*Optional with brake

The selection of the hydraulic / electric motor depends on actual customer requirements and specifications.
Selection example: performance data with hydraulic motor 2-132

Pressure differential	Δp	[bar]	195
Oil flow	Q	[l/min]	70
Output speed	n	[min ⁻¹]	3
Maximum achievable torque	M_d	[Nm]	51888

Limiting load diagram for 'compressive' load



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

Application Data Sheet - Slew Drives

Please fill in the form and send to:
 IMO Antriebseinheit GmbH & Co. KG - Gewerbepark 16 - 91350 Gremsdorf, Germany - Fax: +49 9193 6395-2140

1. Contact **File number:** _____

Customer: _____
 Company: _____ Homepage: _____
 Contact person: Email: _____ Email: _____
 Street: Tel.: _____ Tel.: _____
 Country: Fax: _____ Fax: _____
 ZIP code/city: _____

IMO Antriebseinheit:
 Contact person: _____
 Tel.: _____
 Email: _____

Customer data
IMO data

An application data sheet which is filled in completely is the basis for the best design solution.

Military application: No Yes

2. Application
 Application description (sketch, if required): _____

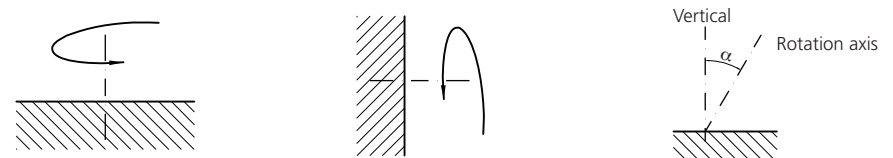
Does a solution already exist? No Yes

If yes, which one: _____

Should limited sizes and interface dimensions be considered? No Yes

If yes, what should be considered: _____

Position of rotation axis:
 Vertical Horizontal Changing α Degrees



Load direction:
 compressive load suspended load

Operating/ambient temperature: Minimum °C Normal °C Maximum °C

Do shocks or vibrations occur? No Yes

Self-locking/brake required? No Yes

Special seals required? No Yes which: _____

Application Data Sheet - Slew Drives

3. Load

	Load case nr.						Customer data	IMO data
	1	2	3	4	5	6		
a) Axial load F_{ax} N							<input type="checkbox"/>	<input type="checkbox"/>
b) Radial load F_{rad} N							<input type="checkbox"/>	<input type="checkbox"/>
c) Tilting moment M_k Nm							<input type="checkbox"/>	<input type="checkbox"/>
d) Operating torque M_{dB} Nm							<input type="checkbox"/>	<input type="checkbox"/>
e) Holding torque M_h Nm							<input type="checkbox"/>	<input type="checkbox"/>
f) Additional accelerating torque M_b Nm							<input type="checkbox"/>	<input type="checkbox"/>
Operating speed n min ⁻¹							<input type="checkbox"/>	<input type="checkbox"/>
Slewing angle δ_s Grad							<input type="checkbox"/>	<input type="checkbox"/>
Duration of load case (Total=100%) %							<input type="checkbox"/>	<input type="checkbox"/>
Max. slewing time per minute ED_B %/min							<input type="checkbox"/>	<input type="checkbox"/>

Are safety factors included in the load calculations a) to f)? No Yes which: _____

Should additional load increasing factors be included in the load calculations a) to f)? No Yes which: _____

Continuous operation No Yes

Slewing direction one direction only alternating directions

Description of load case:

Load case 1: _____

Load case 2: _____

Load case 3: _____

Load case 4: _____

Load case 5: _____

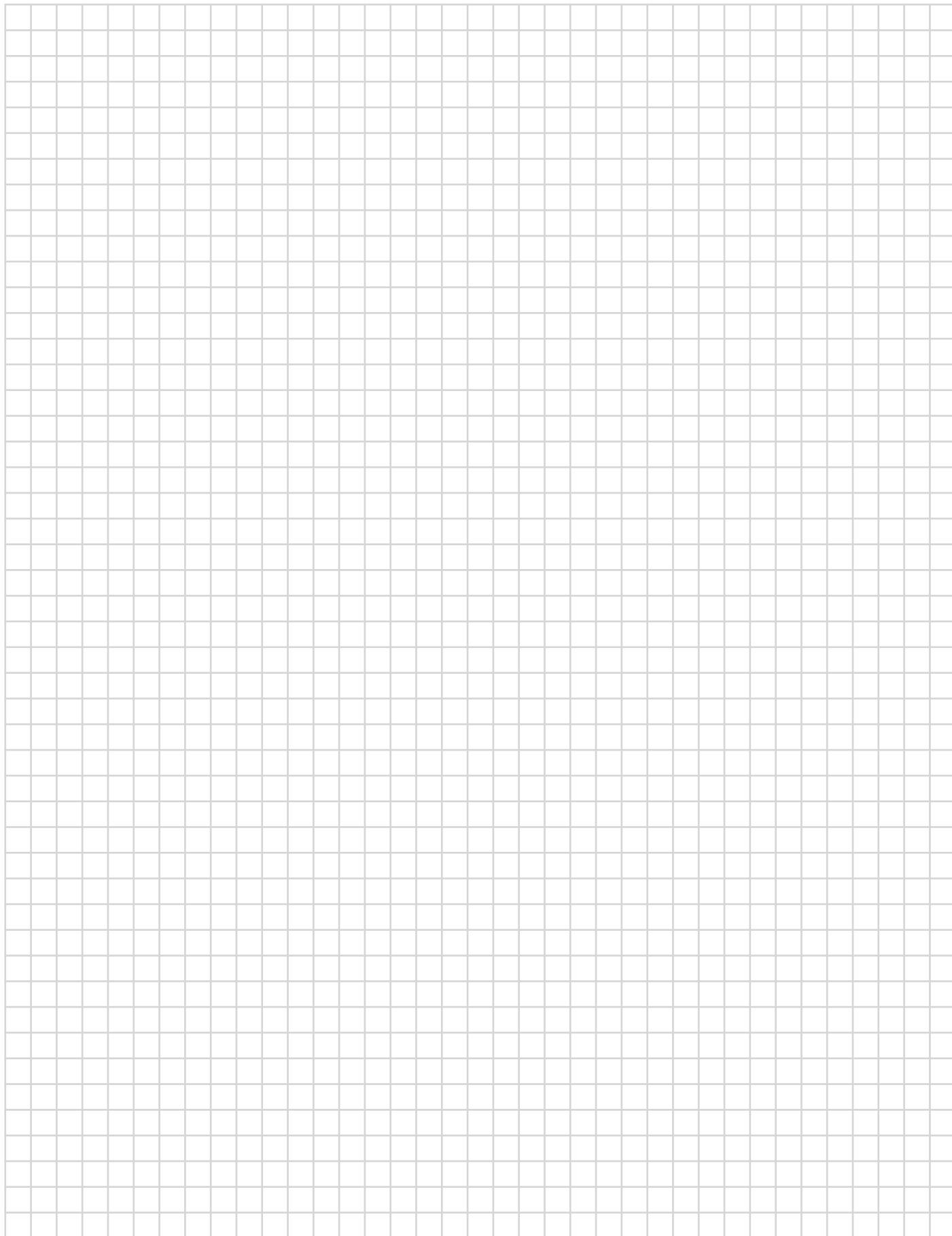
Load case 6: _____

Operating time of plant in years a

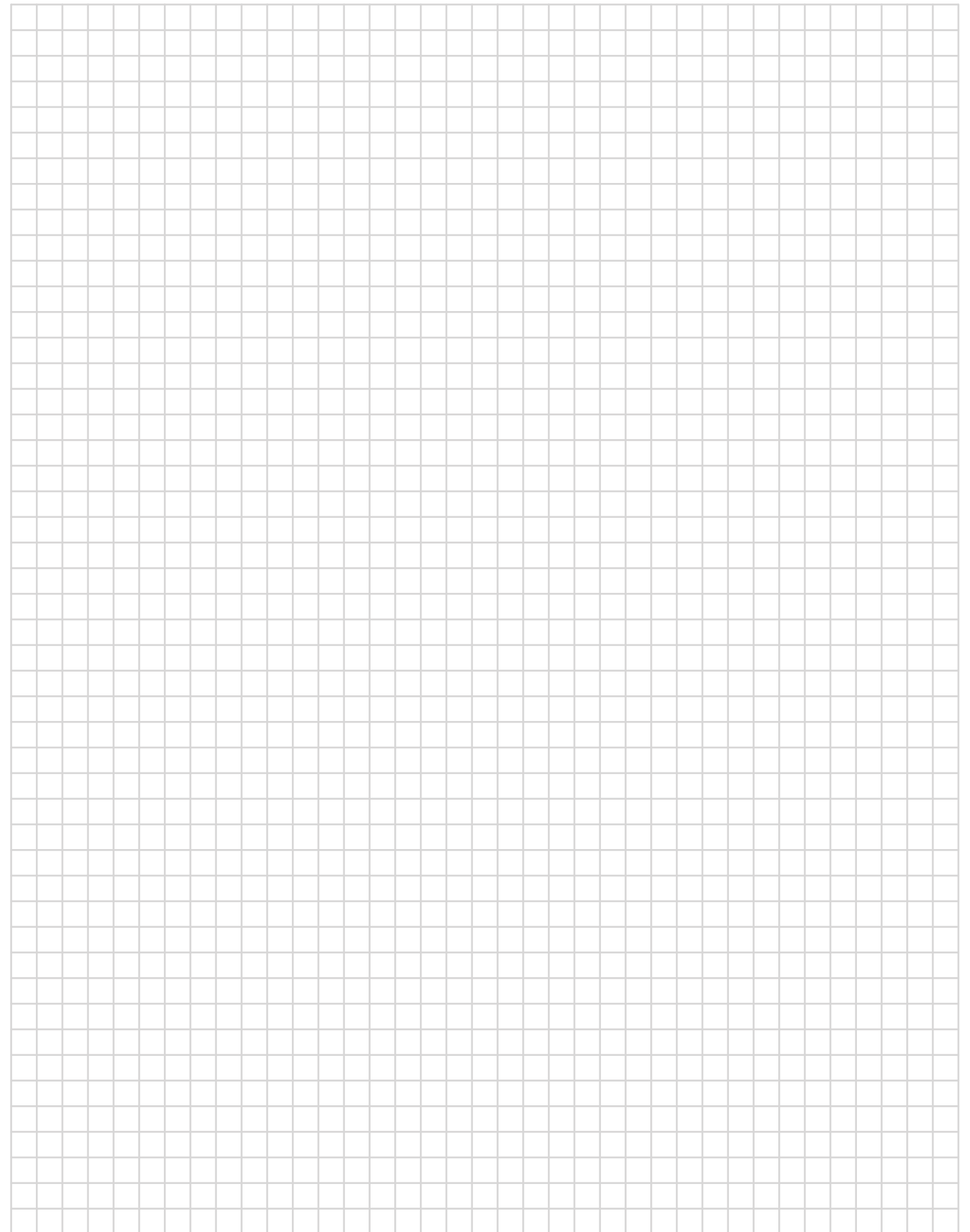
Operating hours of plant per year h

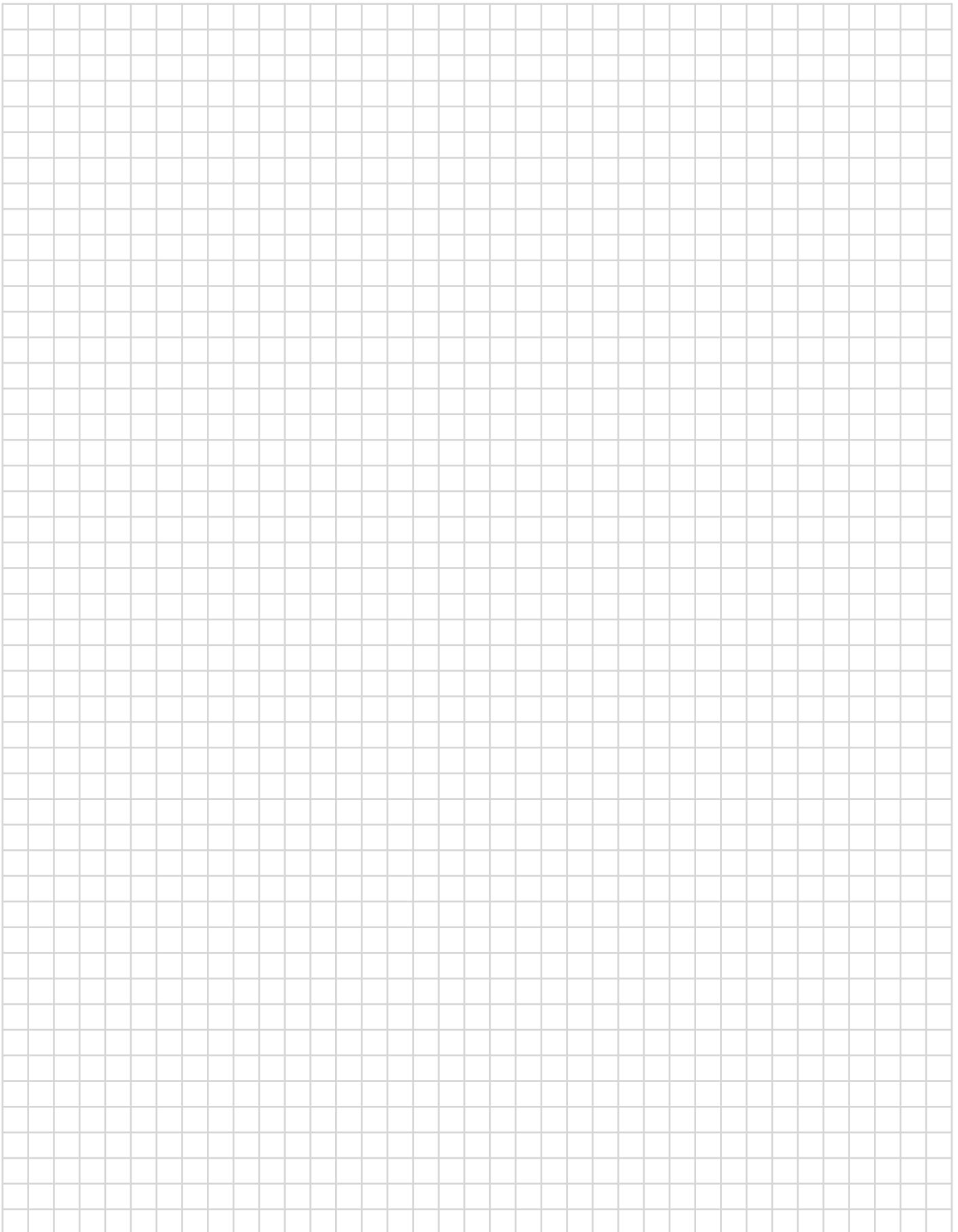
Slewing time of Slew Drive/year h

Notes

A large, empty grid of small squares, typical of graph paper, intended for taking notes. The grid consists of approximately 30 columns and 40 rows of squares.

Notes

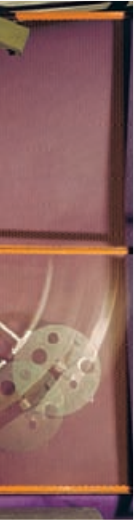
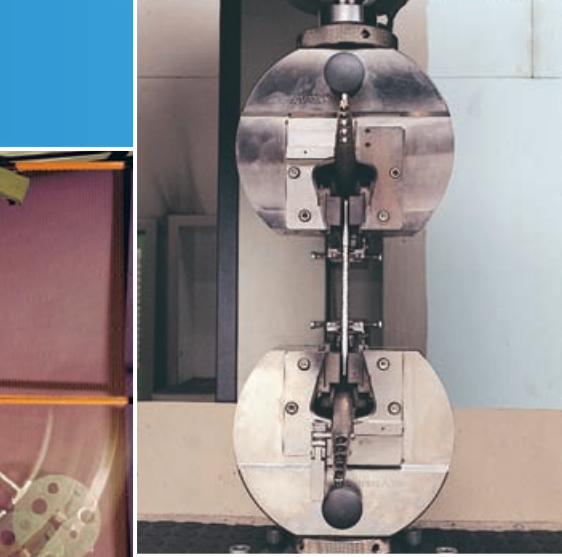
A large, empty grid of small squares, typical of graph paper, intended for taking notes. The grid consists of approximately 30 columns and 40 rows of squares.



For custom configurations, we also supply material certificates according to DIN EN 10204. This certificate logs the actual values of material characteristics such as tensile strength, apparent yielding point, notched bar impact work, extension and chemical analysis.



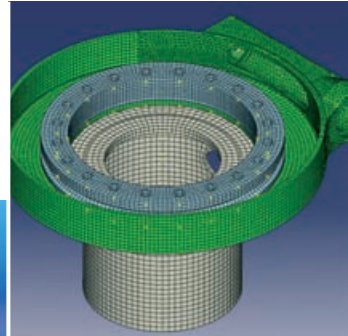
Material tests are performed according to the latest industry recognized methods (i.e. ultrasonic testing-developed by the Fraunhofer Institute).



Quality Assurance
DIN EN ISO 9001 certified

We want you to be satisfied

IMO Slew Drives have to meet the highest quality requirements because they are often used as safety critical components. Development, design, calculation and sales are performed strictly according to DIN EN ISO 9001 certified procedures.



Quality Assurance
DIN EN ISO 9001 certified



The quality chain starts with the choice of the raw material (i.e. for the production of seamless rolled rings of the SP series) and is continuous, including the ongoing testing of the current production series.



Plant I, Gremsdorf, Germany



Plant II, Gremsdorf, Germany



Plant III, Summerville, SC, USA

Slew Drives

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Fax +49 9193 6395-5140
anlagenbau@imo.de

Slewing Rings for Renewable Energy

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energy@imo.de

Slewing Rings

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americas@goimo.com

All contact details of our global partners
are to be found at: www.imo.de