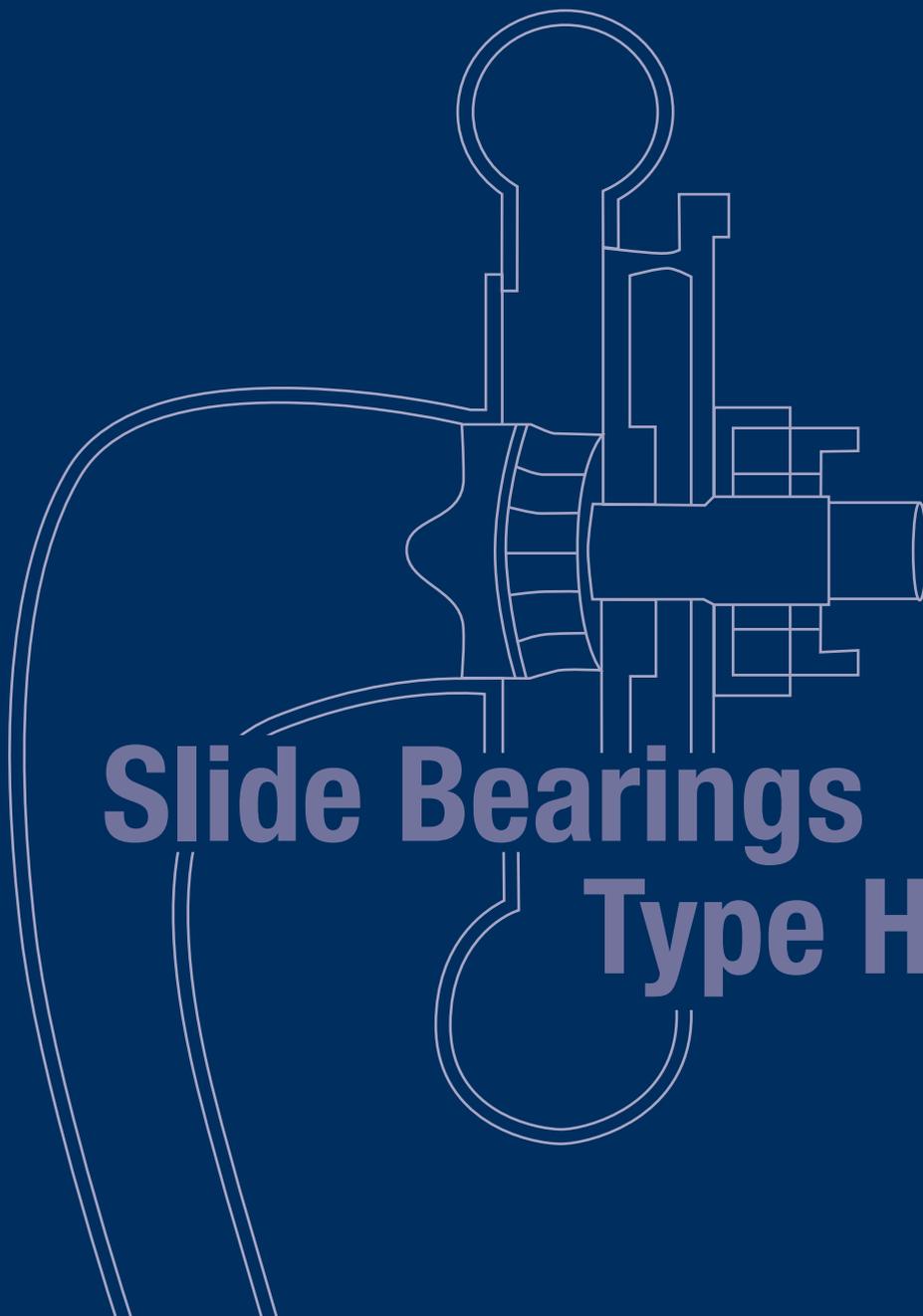




Innovative Power Transmission



Slide Bearings Type HG

Type HG

Slide Bearings

Slide Bearings Type HG

Locating bearings for horizontal hydro turbines operate under high axial loads, high speeds, overloads and overspeed conditions and therefore there is a need for strong bearings.

RENK slide bearings type HG have been specifically designed for this kind of application. Furthermore, it is possible to combine a high axial load capacity with the customer requirement for a self-lubricated and water cooled operation.

HG bearings are fully self-contained slide bearings. In order to compensate a limited misalignment of the shaft the bearing shell is spherically seated inside of the rigid housing.

Without any electrical power supply, the internal viscosity pump starts supplying the oil simultaneously with the rotation of the shaft. For this reason, the HG bearings are most suitable for „black starts“.

The advantage is obvious. No additional lubrication units are necessary and consequently there are no follow-up costs for energy and maintenance. HG bearings offer highest operational availability.

Strong arguments for a strong bearing.

1 Type
H

2 Housing
G smooth housing

3 Heat dissipation
N natural cooling
W water cooling
T circulating pump and water cooling

4 Shape of bore and type of lubrication
F plain cylindrical bore, with viscosity pump

5 Thrust parts
Q without thrust parts (non locating bearing)
A elastically supported circular tilting pads (locating bearing)



Example for designation:

Slide bearing type HG, smooth housing, water cooling with cooling tubes in oil sump, plain cylindrical bore with viscosity pump, elastically supported circular tilting pads as locating bearing, size 35, shaft diameter 355 mm:

1 2 3 4 5

Slide Bearings Type HG H G W F A 35 - 355

Technical Information

Slide Bearings Type HG



This brochure contains the data required for incorporating HG slide bearings into machine designs. It also explains the unique design features incorporated in the HG bearing.

Technical Information

The **RENK** horizontal **slide bearing type HG** is a state of the art design, specifically developed in its combined thrust and journal form to meet the requirements of the horizontal shaft hydro turbine generator application, when self-lubrication is the preferred option.

The **HG bearing** is fully self contained, water cooled, with its lubricating oil positively circulated by an internal viscosity pump powered by a rotating shaft collar.

When the water powers the turbine, and the machine shaft rotates, the **HG bearings** start to operate all on their own (independent of any external pumps etc.). They continue to operate safely under normal operation conditions and in case of over-speed until the shaft runs down to stand still.

Bearing Housing

The top and bottom half housings are cast iron, but can be nodular cast iron if specified. The bearing housing bottom provides space for one or two large water tube coolers of maximum oil cooling efficiency.

Bearing Shells

The shells are manufactured from steel and have a spherical seating. They are lined with **RENK** metal therm89 and have a plain cylindrical bore. Shells with two lobe bore are also available.

For high thrust (axial) loads, elastically supported circular tilting pads (RD thrust pads) are fitted to the ends of the shell (type ...A). The cup springs supporting the RD thrust pads have damping properties which can elastically absorb axial impact loads from the water turbine, without detriment to the white metal working surfaces or the equally important tilting action of the pads.

The displacement of the unique cup spring mounting can be utilized to calculate the magnitude of the axial load imposed on the RD thrust bearing.

Also, the displacement of the cup springs (the support of each RD thrust pad) ensures that the thrust load is safely carried by the full surface of the thrust bearing at all times.

The RD thrust pads at both ends of the bearing shell are identical. If one is accidentally damaged on site, it can be easily replaced by another one from stock. Spare pads are safely packed for ease of storage.

The journal shell itself is spherically seated, bolted together and located in the bearing housing in the same well proven manner used by **RENK** in their well known E-type bearings. This feature along with a very high quality of dimensional and geometrical finish guarantees that every shell gives the very best performance and is fully interchangeable.

Technical Information

Slide Bearings Type HG

Oil Supply

Optionally cooled by one or two large and highly efficient water coolers, the **HG bearing** is fully self-contained with its own large oil sump.

A viscosity pump, powered by the shaft rotation lifts an excessive amount of oil from the oil sump direct to all the working surfaces of the bearing. In fact there is so much oil available from the viscosity pump that the excess is directed to move as much oil of the oil sump as possible over and between the water cooler tubes, while at the same time taking away an extra amount of heat from the bearing shell.

A specially designed oil distribution system in the top half shell (at the point of oil entry from the viscosity pump) ensures that both thrust surfaces, as well as the journal, get an immediate delivery of oil at startup phase.

Heat Dissipation

Frictional heat generated by the HG bearing is dissipated by one or two large U-shape water tube coolers. These tube coolers are fully submerged in the oil sump, at each end of the bottom half casing. The internal design of the bearing controls the flow of the oil in circulation to ensure that these water coolers operate with maximum efficiency.



Seals

Baffles and rigid seals (type 20) combine to give an effective oil sealing arrangement for the **HG bearing**. These rigid seals are made of corrosion resistant aluminum alloy and they correspond to protection grade IP 44. Standard seals of higher protection grades are available upon request.

Temperature Control

Provision is made for measuring the temperature of the radial bearing shell through a standard drilling and tapping on the side of the bottom half housing. Thermocouple access to selected RD axial thrust pads at each end of the bearing shell is provided in the top half housing.

Commercially available thermo sensors can be used for monitoring temperatures. We recommend the use of **RENK** resistance thermometers, alternatively, **RENK** angle thermometers for direct visual reading.

Oil Selection

The correct viscosity grade for each operating condition will be determined by EDP calculation. Such calculations are always carried out at the design stage. A computer printout of the results can be provided on request.

Good suitable for use with RENK slide bearings are following lubricants:

- **Industrial oil – CKB, ISO 6743-6**
- **Hydraulic oil – HL, ISO 6743-4**
- **Turbine oil – TSA, ISO 6743-5**

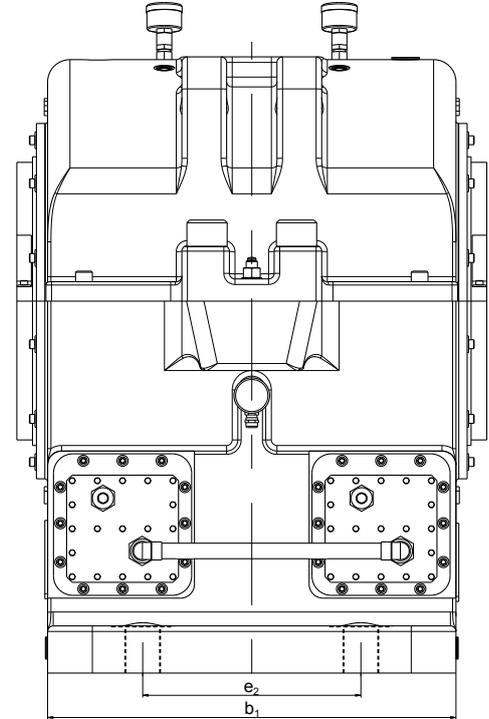
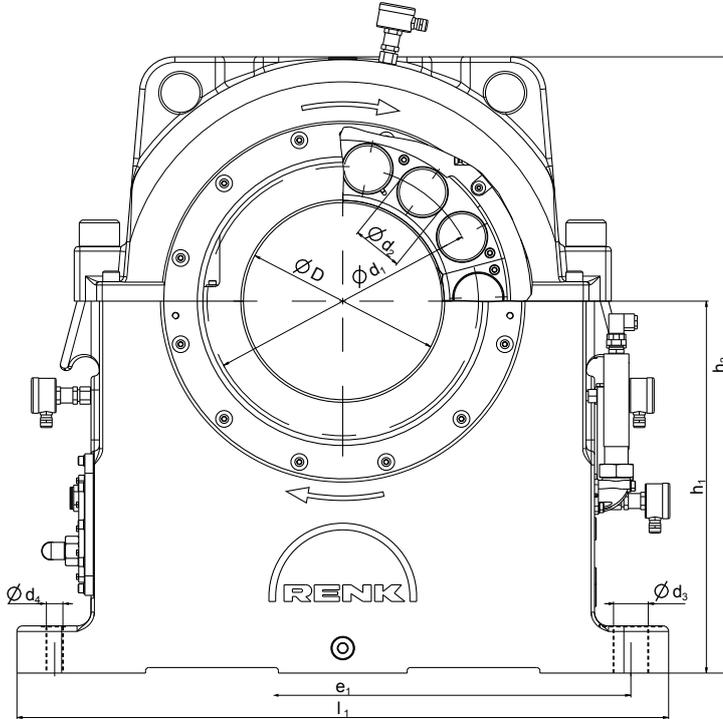
One Direction of Rotation

Because of the design of the oil supply components the **HG bearing** can operate in one direction of rotation only.

To ensure that the bearing is supplied with correct water connections, oil level gauge and instrumentation, it is important to have a key plan of the site layout. This key plan should also show the sense of shaft rotation.



Dimensions of Bearings



Size	Shaft	effective bearing width		d1	d2	d3	d4	e1	e2	h1	h2	l1
		B1	b1									
28	250			400	80	55 for M 42	20	990	300	560	960	1120
	280											
	300 ¹⁾	220	562									
	315 ¹⁾											
	335 ¹⁾											
	355 ¹⁾											
35	300			485	90	62 for M 48	20	1030	390	670	1110	1165
	315											
	335											
	355	250	730									
	375 ¹⁾											
	400 ¹⁾											
	425 ¹⁾											
450 ¹⁾												
45	375			615	112	70 for M 56	25	1330	620	750	1295	1480
	400											
	425											
	450	320	780									
	475 ¹⁾											
	500 ¹⁾											
	530 ¹⁾											
	560 ¹⁾											

1) Nonlocating bearing

For further technical information please contact our sales office.

Distribution



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Subject to changes due to technical progress.