

HMZ Locknuts – simple and reliable locking devices

Technical Product Information

HMZ Locknuts

Application · Characteristics

Application

The new HMZ locknuts are easy to handle, permitting accurate and secure axial locking of bearings and other machine parts on shafts. They are already being successfully used in paper machines and wind turbines.

FAG locknuts of series 30^{*)} (HMZ30) can, as a rule, be used for the same applications as grooved nuts or locknuts (KM, HM) with lock washers or locking clamps (MB, MS) and are reliable locking devices that provide a frictional connection. They are used to fasten and lock bearings on cylindrical and tapered shafts or on adapter sleeves.

*) HMZ locknuts of series 31 on request.

Characteristics

Design characteristics

Characteristics of HMZ locknuts:

- No retention grooves in the OD.
- The locknuts' internal thread is axially split by an annular groove (slot).
- 4(8) threaded countersunk holes in the side face for the clamping screws.
- 4(8) threaded holes (offset in the OD circumference relative to the countersunk holes) for the threaded rod which is used to screw the locknut onto the shaft thread.

Dimensions

The main dimensions and the material of HMZ locknuts are identical with those of conventional grooved nuts and comply with the standard specifications for series KM30, HM30 (DIN 981, ISO 2982-2).

Material

HMZ locknuts are made of steel with a minimum tensile strength of 350 MPa.

Threads

Locknuts with a thread diameter of up to 200 mm have a metric finepitch thread to DIN 13 and quality grade 6H. Larger HMZ locknuts have a trapezoid thread to DIN 103/ISO 2903 and quality grade 7H.

The corresponding shaft threads must be made to quality grade 7e.

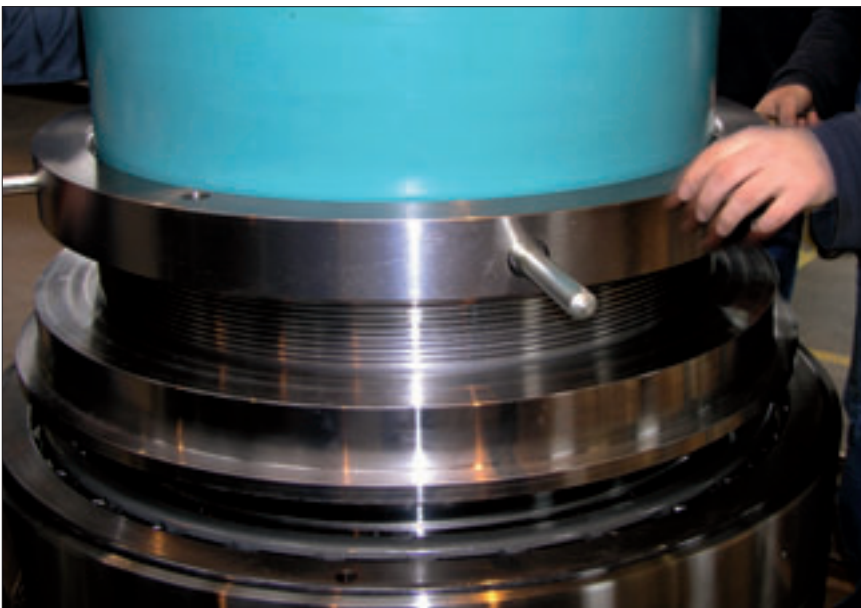
Scope of delivery

The scope of delivery includes the HMZ locknut, one threaded rod and the clamping screws.

On delivery, the HMZ locknuts are protected from corrosion by oil.

On request, they will be delivered in a long-term packaging.

On request, the locknuts can additionally be provided with a protective surface coating: zinc phosphated, Corrotect, electroplated, etc.



HMZ Locknuts

Advantages · Mounting · Dismounting

Advantages

- No retention groove in the shaft required (no notch effect, higher strength, lower cost due to simplified production process).
- No grooves in the locknut OD, no lock washers or locking clamps (cost savings, simplified design).
- Simplified mounting (no fitting of lock washers or locking clamps).
- Easy to screw onto shafts thanks to shaft thread without retention groove.
- Secure grip is provided by axial clamping screws that permit uniform locking/clamping over the locknut OD (preventing damage to the shaft thread and sleeve thread).
- Bearings can be locked in any axial position (the locknut does not have to be turned back).
- No replacement of damaged lock washers or locking clamps required when bearings are replaced.
- Full interchangeability with conventional locknuts.
- Frictional connection prevents the locknuts from working loose.

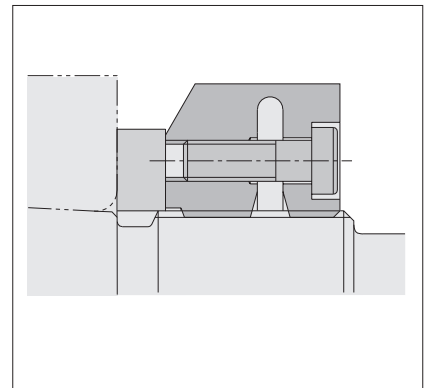
The technical and economic advantages are particularly attractive to machine manufacturers, but machine users can also benefit from them when a machine has to be repaired and/or bearings need to be replaced.

Mounting

For bearings with HMZ locknuts, FAG generally recommends to use the hydraulic method. Mounting is effected in a similar manner as HM locknuts:

- Prior to mounting, check the shaft thread and contact surfaces for cleanliness and screw the threaded rod into one of the radial threaded holes.
- Place HMZ locknut onto the shaft thread with the chamfer facing the contact surface and screw it on as far as possible. The locknut can be screwed on more easily if the thread is thinly coated with lubricant and the locknut is slightly lifted (instead of pulled) while being turned.
- After the locknut has been screwed on, clamp and lock it by means of the 4 (8) clamping screws with the tightening torque specified in the table. As the screws are tightened, the locknut's thread flanks are pressed against the shaft thread, (see sketch), providing a frictional connection that prevents the HMZ locknut from working loose.
- If bearings with a cylindrical bore have to be heated prior to mounting, they must be locked immediately after mounting by means of the HMZ locknut in order to prevent creeping of the inner ring as it cools down. If a gap has formed between locknut and contact surface and between bearing and shaft shoulder after the ring has cooled down, the locknut must be readjusted.
- After the mounting process, remove the threaded rod and keep it for the dismounting process.

Please note: After mounting the bearing, check if there is sufficient thread contact between locknut and shaft. If necessary, insert a shim.



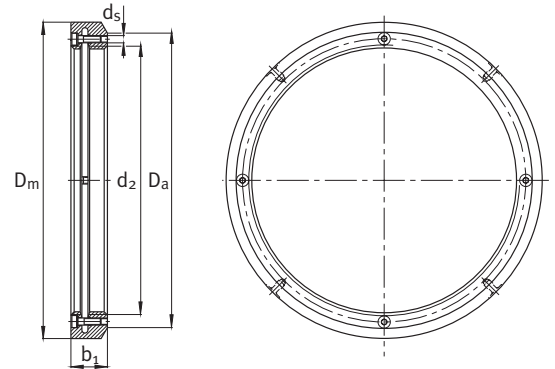
Sketch

Dismounting

- Unscrew the axial clamping screws.
- Unscrew the HMZ locknut by means of the threaded rod. Caution! The bearing fit on the tapered seat may be released abruptly. This axial movement must be limited by the locknut. For this reason, the locknut should be turned back slightly farther than the normal drive-up distance but not completely.

Important maintenance information: If, during operation, a gap forms between HMZ locknut and contact area as a result of the loads acting on them, the locknut must be readjusted during regular maintenance activities.

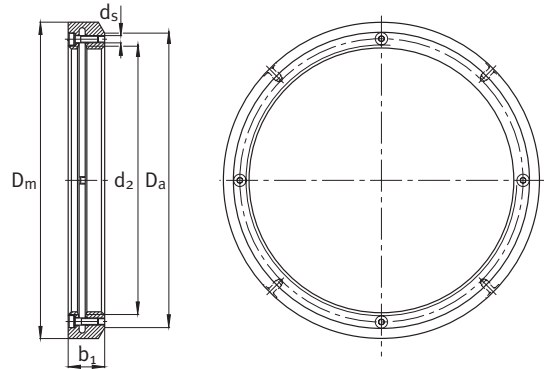
HMZ Locknuts



HMZ Locknuts M90x2 – Tr340x5

Thread	Dimensions				Clamping screws Number	Mass ≈ kg	Code FAG	Tightening torque per clamping screw M_{AL} Nm
	D_m	b_1	D_a	d_s				
M90x2	120	16	108	M5	4	0,6	HMZ18	6
M95x2	125	17	113	M5	4	0,7	HMZ19	6
M100x2	130	18	120	M6	4	0,8	HMZ20	11
M105x2	140	18	126	M6	4	0,9	HMZ21	11
M110x2	145	19	133	M6	4	1,0	HMZ22	11
M115x2	150	19	137	M6	4	1,1	HMZ23	11
M120x2	155	20	138	M6	4	1,1	HMZ24	11
M125x2	160	21	148	M6	4	1,3	HMZ25	11
M130x2	165	21	149	M6	4	1,3	HMZ26	11
M135x2	175	22	160	M6	4	1,6	HMZ27	11
M140x2	180	22	160	M6	4	1,6	HMZ28	11
M145x2	190	24	171	M6	4	2,2	HMZ29	11
M150x2	195	24	171	M6	4	2,2	HMZ30	11
M155x3	200	25	182	M6	4	2,4	HMZ31	11
M160x3	210	25	182	M6	4	2,6	HMZ32	11
M165x3	210	26	193	M8	4	2,8	HMZ33	27
M170x3	220	26	193	M8	4	2,9	HMZ34	27
M180x3	230	27	203	M8	4	3,2	HMZ36	27
M190x3	240	28	214	M8	4	3,5	HMZ38	27
M200x3	250	29	226	M8	4	3,9	HMZ40	27
Tr220x4	260	30	242	M8	4	3,4	HMZ3044	27
Tr240x4	290	34	270	M10	4	5,4	HMZ3048	54
Tr260x4	310	34	290	M10	4	5,8	HMZ3052	54
Tr280x4	330	38	310	M10	4	6,9	HMZ3056	54
Tr300x4	360	42	336	M10	4	10,0	HMZ3060	54
Tr320x5	380	42	356	M10	4	10,6	HMZ3064	54
Tr340x5	400	45	376	M12	4	12,1	HMZ3068	93

HMZ Locknuts



HMZ Locknuts Tr360×5 – Tr1500×8

Thread	Dimensions				Clamping screws Number	Mass ≈ kg	Code FAG	Tightening torque per clamping screw M _{AL} Nm
	D _m	b ₁	D _a	d _s				
Tr360×5	420	45	394	M12	4	12,5	HMZ3072	93
Tr380×5	450	48	422	M12	4	16,7	HMZ3076	93
Tr400×5	470	52	442	M16	4	19,1	HMZ3080	230
Tr420×5	490	52	462	M16	4	19,8	HMZ3084	230
Tr440×5	520	60	490	M16	4	27,8	HMZ3088	230
Tr460×5	540	60	510	M16	4	29,1	HMZ3092	230
Tr480×5	560	60	530	M16	4	30,1	HMZ3096	230
Tr500×5	580	68	550	M20	4	35,7	HMZ30/500	464
Tr530×6	630	68	590	M20	4	46,9	HMZ30/530	464
Tr560×6	650	75	610	M20	4	48,5	HMZ30/560	464
Tr600×6	700	75	660	M20	4	58,7	HMZ30/600	464
Tr630×6	730	75	690	M20	4	61,2	HMZ30/630	464
Tr670×6	780	80	740	M20	4	77,5	HMZ30/670	464
Tr710×7	830	90	780	M20	4	99,5	HMZ30/710	464
Tr750×7	870	90	820	M20	4	104,5	HMZ30/750	464
Tr800×7	920	90	870	M20	4	111,3	HMZ30/800	464
Tr850×7	980	90	925	M20	4	118,7	HMZ30/850	464
Tr900×7	1030	100	975	M24	8	141,8	HMZ30/900	798
Tr950×8	1080	100	1025	M24	8	150,2	HMZ30/950	798
Tr1000×8	1140	100	1085	M24	8	173,3	HMZ30/1000	798
Tr1060×8	1200	100	1145	M24	8	183,8	HMZ30/1060	798
Tr1120×8	1260	100	1205	M24	8	194,3	HMZ30/1120	798
Tr1180×8	1320	100	1265	M24	8	205,8	HMZ30/1180	798
Tr1250×8	1390	110	1335	M24	8	244,7	HMZ30/1250	798
Tr1320×8	1460	110	1405	M24	8	257,3	HMZ30/1320	798
Tr1400×8	1540	110	1485	M24	8	272,0	HMZ30/1400	798
Tr1500×8	1650	110	1595	M24	8	311,9	HMZ30/1500	798

HMZ Locknuts

Mounting example: wind turbines

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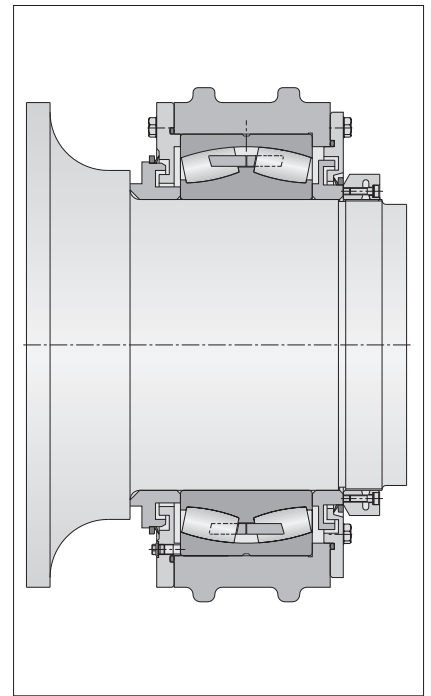
Our customers in the wind turbine sector are increasingly using HMZ locknuts to benefit from their significant advantages.

In the example shown on the right, the main bearing of a wind turbine is locked by an HMZ locknut. The robust spherical roller bearing of series 240 is installed in a housing that was designed especially for wind turbines.

Even in the gears and generators of wind turbines, there are many

applications for HMZ locknuts, e. g. locking bearings, gear wheels and other components that have to be locked securely.

They are equally suitable for locking bearings with a tapered bore on adapter sleeves. The bearings still have to be pushed onto the shaft hydraulically, and the bearing clearance must be adjusted hydraulically as well. In summary, HMZ locknuts are a preferred choice in the wind power sector thanks to the advantages they offer in the mounting process and their greater cost efficiency.



Rotor shaft bearings



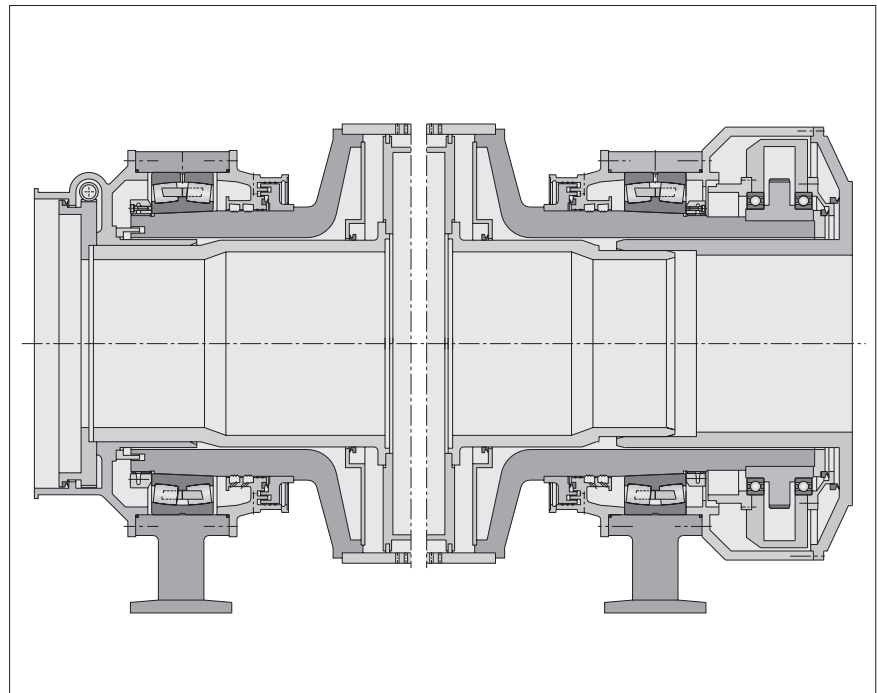
HMZ Locknuts

Mounting example: paper machines

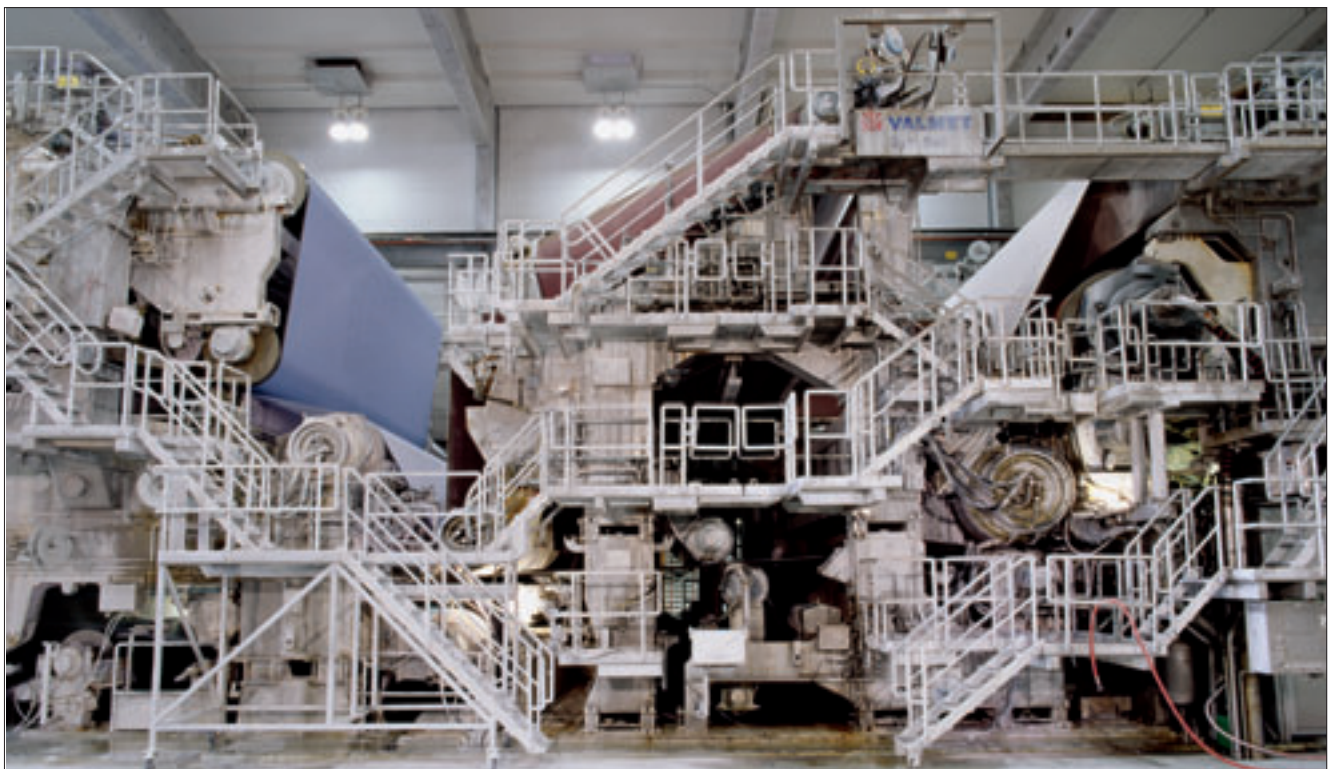
Mounting example: paper machines

In paper machines, a large number of rolls are supported in spherical roller bearings that are fitted directly on tapered shaft journals. HMZ locknuts offer the following main advantages where rolls of large diameters and lengths of up to 12 meters have to be supported:

- The shaft journal is not weakened by a retention groove for locking elements.
- Simplified production process, especially in the production of rotationally symmetric rolls and roll journals.
- No imbalance at high speeds caused by a retention groove.
- No special mounting tools (hook wrenches) required.



Suction roll bearings



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