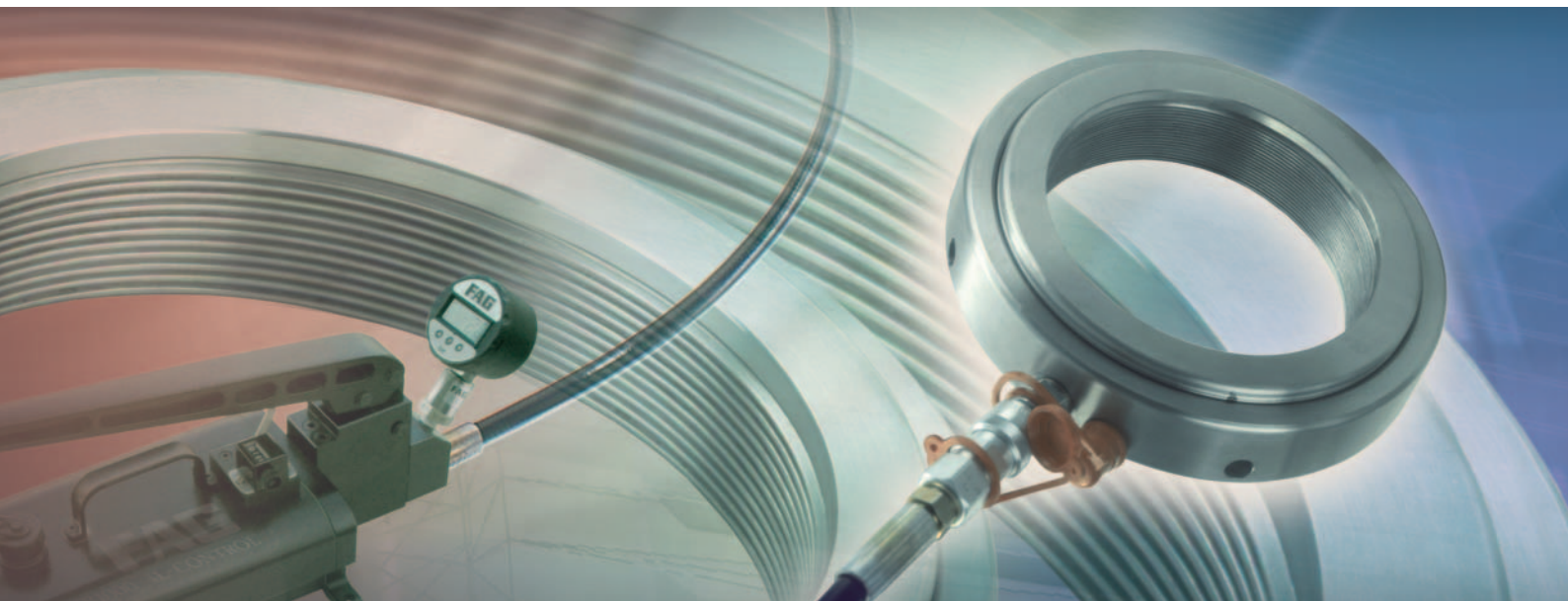


FAG



FAG Hydraulic Nuts

SCHAEFFLER GROUP
INDUSTRIAL

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This catalogue contains the current ordering designations of Schaeffler Group Industrial. In some countries, other ordering designations are still in use (please see the comparison on page 24).

Application · Design

Application

FAG hydraulic nuts HYDNUT are used to drive up parts with a tapered bore onto their tapered seats. Presses are mainly used if the drive-up forces required cannot be applied using other accessories, e.g. shaft nuts or pressure screws.

They are mainly used for:

- mounting of rolling bearings with a tapered bore. The rolling bearings can be seated directly on a tapered shaft, on an adapter sleeve or a withdrawal sleeve. If the bearing is located using a withdrawal sleeve or an adapter sleeve, the hydraulic nut can also be used for dismounting.
- mounting of couplings, gears, impellers, ships' propellers etc.

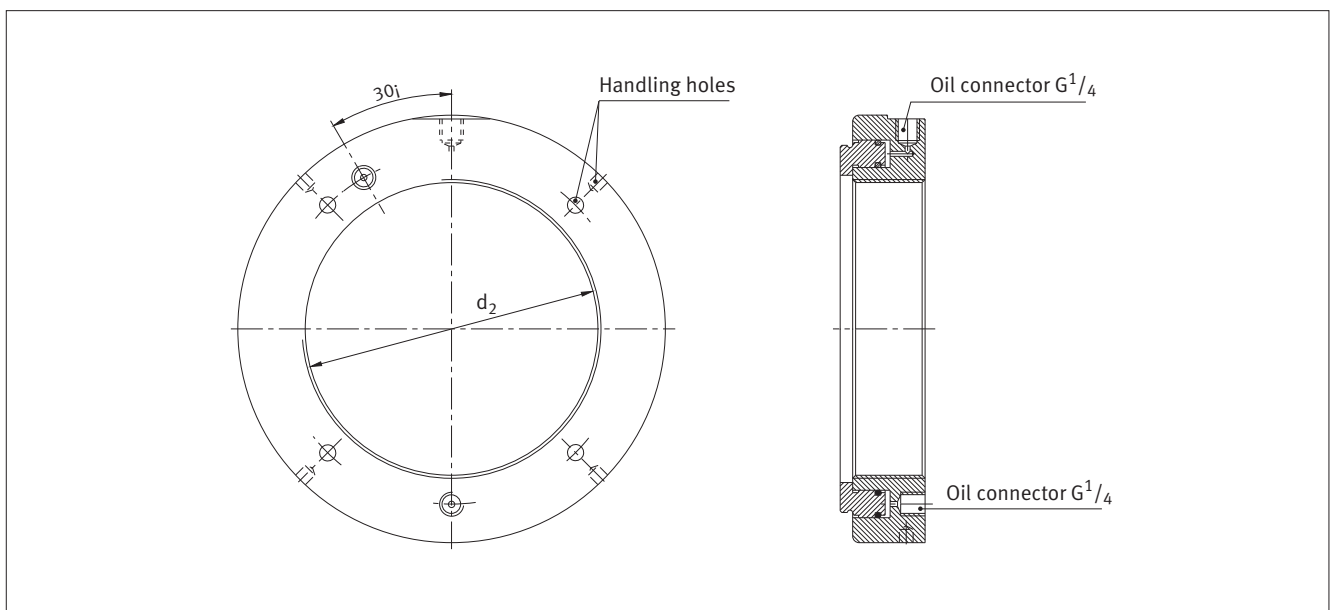
Design

FAG hydraulic nuts comprise a press ring and an annular piston, Figure 1. The piston is hydraulically operated. The pressure chamber is sealed by two soft PVC sealing cords mounted on rings.

Hydraulic nuts are designed for a maximum oil pressure of 800 bar. The stroke is designed such that the rolling bearings or other components with a tapered bore can be mounted in a single operation.

The bore d_2 of the press ring is available with a metric fine thread, a trapezoidal thread or an inch size thread. A suitable FAG hydraulic nut is thus available for all common sleeve and shaft threads.

For higher drive-up forces, we also supply hydraulic nuts with a smooth bore (heavy duty design). FAG hydraulic nuts have oil connectors with a $G^{1/4}$ thread. In designs with a thread, there are two connectors on the end face and one on the circumferential face. In the heavy duty design, both connectors are on the circumferential face. Hydraulic nuts with a thread have holes to make handling easier. As the size increases, so does the number of these holes, as per the table in Figure 2. Larger hydraulic nuts also have threaded holes for eye bolts to allow easier transport.



1: FAG hydraulic nut (threaded design)

Design • Design variants

2: Holes in the press ring for easier handling of FAG hydraulic nuts

Thread d ₂		Handling holes Quantity	Circumferential face	Diameter
mm	inch	End face		mm
50...200	3,527...7,847	2	2	10
205...345	8,628...13,339	4	4	12
350...395	14,170...14,957	4	4	14
≥ 400	≥ 15,745	6	6	16

Design variants

FAG hydraulic nuts are available in different variants:

- with a metric fine pitch thread or trapezoidal thread

This design fits all standardised adapter and withdrawal sleeves with metric dimensions.

Ordering designations:

HYDNUT50 to HYDNUT200

(metric fine pitch thread to DIN 13) and

HYDNUT205 to HYDNUT1180

(trapezoidal thread to DIN 103)

- with an inch size thread

These hydraulic nuts comply with ABMA Standards for Bearing Mounting Accessories, Section 8, Locknuts Series N-00.

Ordering designations:

HYDNUT90-INCH to

HYDNUT530-INCH.

- in a heavy duty design

These hydraulic nuts have a smooth bore machined to H7.

They were primarily developed for shipbuilding, where higher mounting forces are required and hydraulic nuts are generally mounted on a nut with a centring spigot.

Ordering designations:

HYDNUT100-HEAVY to

HYDNUT900-HEAVY

Special design variants are available by agreement.

Replacement seals

Seals are subject to wear.

We supply replacement seals for all hydraulic nuts (1 set is supplied with the original delivery of each HYDNUT).

Ordering examples:

HYDNUT160.SEAL

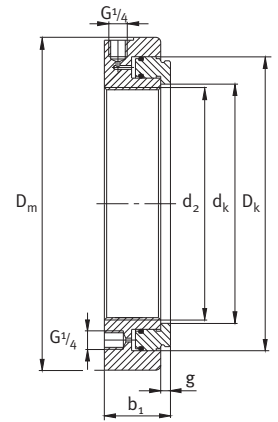
(for HYDNUT160 or HYDNUT160-INCH)

HYDNUT600-HEAVY.SEAL

(for HYDNUT600-HEAVY)

FAG hydraulic nuts

Threads in metric sizes



FAG hydraulic nuts, threads in metric sizes

Hydraulic nut	Thread	Dimensions							Mass ≈	Drive-up force
Ordering designation	d ₂ mm	D _m	b ₁	D _k	d _k	g	Stroke	Piston surface cm ²	kg	at 800 bar kN
HYDNUT50	M50×1,5	110	40	88	51	2	4	30,6	2,3	245
HYDNUT55	M55×2	118	40	92	56	2	4	31,2	2,6	250
HYDNUT60	M60×2	125	40	96	61	2	4	31,6	2,8	253
HYDNUT65	M65×2	132	40	103	66	3	4	35,5	3,1	284
HYDNUT70	M70×2	140	40	110	71	3	4	41	3,4	328
HYDNUT75	M75×2	145	40	116	76	3	4	44,8	3,6	359
HYDNUT80	M80×2	150	40	122	81	3	4	49	3,8	392
HYDNUT85	M85×2	155	40	126	86	3	4	49,3	3,9	394
HYDNUT90	M90×2	160	40	130	91	3	5	50	4,2	395
HYDNUT95	M95×2	165	40	136	96	3	5	52	4,3	416
HYDNUT100	M100×2	170	42	142	101	3	5	54,5	4,7	435
HYDNUT105	M105×2	175	42	147	106	6	5	56,6	4,7	453
HYDNUT110	M110×2	180	43	152	111	6	5	59	5	470
HYDNUT115	M115×2	185	43	157	116	6	5	60,8	5,2	487
HYDNUT120	M120×2	190	43	162	121	6	5	63	5,4	504
HYDNUT125	M125×2	195	44	167	126	7	5	65	5,6	520
HYDNUT130	M130×2	200	44	171	131	7	5	65	5,8	520
HYDNUT135	M135×2	205	45	176	136	7	5	66,6	6	533
HYDNUT140	M140×2	210	45	182	141	7	5	69	6,3	552
HYDNUT145	M145×2	215	46	186	146	7	5	70,6	6,6	565

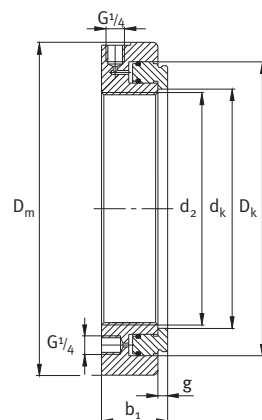
Hydraulic nuts can be secured in a manner similar to conventional nuts, see page 14.

We also supply replacement seals for hydraulic nuts (suffix .SEAL).

Ordering example (for HYDNUT115): HYDNUT115.SEAL. Each hydraulic nut is supplied with 1 set of seals in the original delivery.

FAG hydraulic nuts

Threads in metric sizes



FAG hydraulic nuts, threads in metric sizes

Hydraulic nut	Thread	Dimensions						Mass	Drive-up force
Ordering designation	d ₂ mm	D _m	b ₁	D _k	d _k	g	Stroke	Piston surface cm ²	at 800 bar kN
HYDNUT150	M150×2	220	46	191	151	7	5	75,3	602
HYDNUT155	M155×3	225	46	200	156	7	5	81,8	654
HYDNUT160	M160×3	235	47	206	161	7	6	87,2	698
HYDNUT165	M165×3	240	47	211	166	7	6	92,3	739
HYDNUT170	M170×3	245	48	216	171	7	6	94,7	758
HYDNUT180	M180×3	255	48	227	181	7	6	103	824
HYDNUT190	M190×3	270	50	240	191	8	8	116	928
HYDNUT200	M200×3	280	50	251	201	8	8	125	1 000
HYDNUT205	Tr205×4	290	51	258	207	8	8	132,2	1 058
HYDNUT210	Tr210×4	295	52	263	212	9	9	135	1 080
HYDNUT215	Tr215×4	300	53	268	217	9	9	137,7	1 102
HYDNUT220	Tr220×4	305	53	273	222	9	9	144,2	1 154
HYDNUT225	Tr225×4	315	54	282	227	9	10	153	1 224
HYDNUT230	Tr230×4	320	54	287	232	9	10	160	1 280
HYDNUT235	Tr235×4	325	54	290	237	9	10	161,7	1 294
HYDNUT240	Tr240×4	330	55	296	242	9	10	165,3	1 323
HYDNUT250	Tr250×4	345	56	310	252	10	10	182,2	1 458
HYDNUT260	Tr260×4	355	57	319	262	10	11	188	1 504
HYDNUT270	Tr270×4	370	58	332	272	10	12	196	1 568
HYDNUT275	Tr275×4	375	58	337	277	10	12	204	1 632
HYDNUT280	Tr280×4	380	59	342	282	10	12	211,7	1 694
HYDNUT290	Tr290×4	390	60	352	292	10	13	218,3	1 747
HYDNUT295	Tr295×4	400	60	362	297	10	13	230	1 840

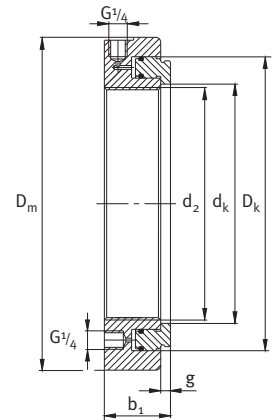
Hydraulic nuts can be secured in a manner similar to conventional nuts, see page 14.

We also supply replacement seals for hydraulic nuts (suffix .SEAL).

Ordering example (for HYDNUT260): HYDNUT260.SEAL. Each hydraulic nut is supplied with 1 set of seals in the original delivery.

FAG hydraulic nuts

Threads in metric sizes



FAG hydraulic nuts, threads in metric sizes

Hydraulic nut	Thread	Dimensions							Mass ≈	Drive-up force
Ordering designation	d ₂ mm	D _m	b ₁	D _k	d _k	g	Stroke	Piston surface cm ²	kg	at 800 bar kN
HYDNUT300	Tr300×4	405	61	365	302	10	13	237	25,8	1 896
HYDNUT310	Tr310×5	415	62	375	312	10	13	249	27	1 992
HYDNUT315	Tr315×5	420	62	380	317	10	13	252,5	27,5	2 020
HYDNUT320	Tr320×5	430	63	389	322	10	14	264	29,9	2 112
HYDNUT330	Tr330×5	440	64	398	332	11	14	270,8	31	2 166
HYDNUT335	Tr335×5	445	65	403	337	11	14	275	32	2 200
HYDNUT340	Tr340×5	450	65	408	342	11	14	284	32,5	2 272
HYDNUT345	Tr345×5	455	66	413	347	11	14	288	33,5	2 304
HYDNUT350	Tr350×5	465	66	422	352	11	14	306	35	2 448
HYDNUT355	Tr355×5	470	67	427	357	11	15	304	36,5	2 432
HYDNUT360	Tr360×5	475	67	431	362	11	15	313	37	2 504
HYDNUT365	Tr365×5	482	67	436	367	11	15	317	38	2 536
HYDNUT370	Tr370×5	490	68	444	372	11	16	323	40	2 584
HYDNUT375	Tr375×5	495	68	450	377	11	16	334	41	2 672
HYDNUT380	Tr380×5	500	69	454	382	11	16	337	41,5	2 696
HYDNUT385	Tr385×5	505	69	460	387	11	16	348	42	2 784
HYDNUT395	Tr395×5	512	69	470	397	11	16	356	43	2 848
HYDNUT400	Tr400×5	525	71	477	402	11	17	368	47	2 944
HYDNUT410	Tr410×5	535	71	485	412	11	17	382	48	3 056
HYDNUT415	Tr415×5	540	71	490	417	11	17	386	49	3 088

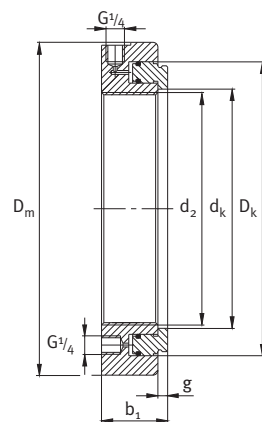
Hydraulic nuts can be secured in a manner similar to conventional nuts, see page 14.

We also supply replacement seals for hydraulic nuts (suffix .SEAL).

Ordering example (for HYDNUT330): HYDNUT330.SEAL. Each hydraulic nut is supplied with 1 set of seals in the original delivery.

FAG hydraulic nuts

Threads in metric sizes



FAG hydraulic nuts, threads in metric sizes

Hydraulic nut	Thread	Dimensions						Mass	Drive-up force
Ordering designation	d ₂ mm	D _m	b ₁	D _K	d _K	g	Stroke	Piston surface cm ²	at 800 bar kN
HYDNUT420	Tr420×5	545	72	495	422	12	17	390	3 120
HYDNUT430	Tr430×5	555	74	505	432	12	17	398	3 184
HYDNUT435	Tr435×5	560	74	510	437	12	17	403	3 224
HYDNUT440	Tr440×5	565	74	519	442	12	17	425	3 400
HYDNUT450	Tr450×5	580	76	530	452	12	17	442	3 536
HYDNUT460	Tr460×5	590	76	540	462	12	18	450	3 600
HYDNUT470	Tr470×5	600	76	550	472	12	18	459	3 672
HYDNUT480	Tr480×5	612	76	560	482	12	18	460	3 680
HYDNUT490	Tr490×5	625	80	575	492	13	19	506	4 048
HYDNUT500	Tr500×5	635	80	585	502	13	20	523	4 185
HYDNUT510	Tr510×6	645	80	595	512	13	20	533	4 264
HYDNUT520	Tr520×6	657	80	605	522	13	21	542	4 336
HYDNUT530	Tr530×6	670	83	617	532	13	22	562	4 496
HYDNUT540	Tr540×6	680	83	628	542	13	22	581	4 648
HYDNUT550	Tr550×6	692	83	639	552	13	22	592	4 736
HYDNUT560	Tr560×6	705	83	650	562	13	22	612	4 896
HYDNUT570	Tr570×6	715	85	660	572	13	23	631	5 048
HYDNUT580	Tr580×6	725	85	670	582	13	23	641	5 128
HYDNUT590	Tr590×6	740	85	685	592	13	23	666	5 328
HYDNUT600	Tr600×6	750	85	695	603	13	23	677	5 416

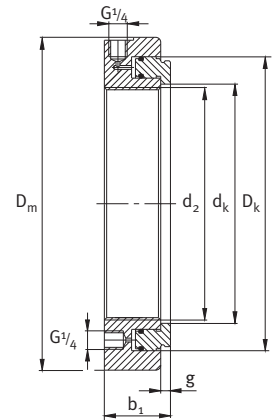
Hydraulic nuts can be secured in a manner similar to conventional nuts, see page 14.

We also supply replacement seals for hydraulic nuts (suffix .SEAL).

Ordering example (for HYDNUT500): HYDNUT500.SEAL. Each hydraulic nut is supplied with 1 set of seals in the original delivery.

FAG hydraulic nuts

Threads in metric sizes



FAG hydraulic nuts, threads in metric sizes

Hydraulic nut	Thread	Dimensions							Mass ≈	Drive-up force at 800 bar
Ordering designation	d ₂ mm	D _m	b ₁	D _k	d _k	g	Stroke	Piston surface cm ²	kg	kN
HYDNUT610	Tr610×6	760	88	705	613	14	24	687	104	5 496
HYDNUT625	Tr625×6	775	88	720	628	14	24	702	107	5 516
HYDNUT630	Tr630×6	780	88	725	633	14	24	728	109	5 824
HYDNUT650	Tr650×6	805	88	748	653	14	24	763	115	6 104
HYDNUT655	Tr655×6	810	88	753	658	14	24	768	116	6 144
HYDNUT670	Tr670×6	825	90	768	673	14	24	795	121	6 360
HYDNUT680	Tr680×6	837	90	780	683	14	24	819	124	6 552
HYDNUT690	Tr690×6	850	90	792	693	14	25	844	128	6 752
HYDNUT695	Tr695×6	855	93	798	698	14	25	862	133	6 896
HYDNUT710	Tr710×7	870	93	812	713	14	25	877	136	7 020
HYDNUT720	Tr720×7	883	95	825	723	15	25	928	144	7 424
HYDNUT740	Tr740×7	910	95	848	743	15	25	991	154	7 928
HYDNUT750	Tr750×7	922	96	862	753	15	26	1 033	160	8 265
HYDNUT760	Tr760×7	935	96	872	763	15	26	1 045	165	8 360
HYDNUT780	Tr780×7	955	98	890	783	15	28	1 068	172	8 544
HYDNUT800	Tr800×7	970	98	909	803	16	28	1 079	170	8 632
HYDNUT830	Tr830×7	1 000	98	938	833	16	29	1 101	176	8 808
HYDNUT850	Tr850×7	1 020	98	960	853	16	29	1 156	180	9 248
HYDNUT880	Tr880×7	1 050	98	988	883	16	29	1 148	185	9 184
HYDNUT900	Tr900×7	1 070	100	1 012	903	16	29	1 251	194	10 008

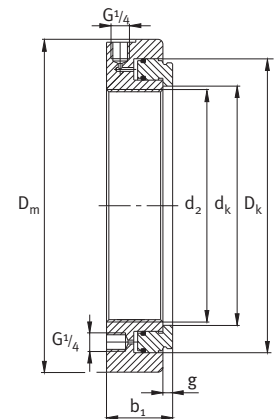
Hydraulic nuts can be secured in a manner similar to conventional nuts, see page 14.

We also supply replacement seals for hydraulic nuts (suffix .SEAL).

Ordering example (for HYDNUT610): HYDNUT610.SEAL. Each hydraulic nut is supplied with 1 set of seals in the original delivery.

FAG hydraulic nuts

Threads in metric sizes



FAG hydraulic nuts, threads in metric sizes

Hydraulic nut	Thread	Dimensions						Mass ≈ kg	Drive-up force at 800 bar kN
		d ₂ mm	D _m	b ₁	D _k	d _k	g		
Ordering designation							Stroke	Piston surface cm ²	
HYDNUT930	Tr930×8	1 100	100	1 042	933	16	30	1 290	200
HYDNUT950	Tr950×8	1 120	100	1 065	953	16	30	1 365	210
HYDNUT1000	Tr1000×8	1 170	100	1 123	1 003	16	30	1 490	228
HYDNUT1060	Tr1060×8	1 255	115	1 185	1 063	18	32	1 610	300
HYDNUT1080	Tr1080×8	1 280	118	1 207	1 083	18	33	1 680	322
HYDNUT1120	Tr1120×8	1 340	125	1 260	1 123	19	36	1 900	392
HYDNUT1180	Tr1180×8	1 430	135	1 315	1 183	22	39	2 100	503

Hydraulic nuts can be secured in a manner similar to conventional nuts, see page 14.

We also supply replacement seals for hydraulic nuts (suffix .SEAL).

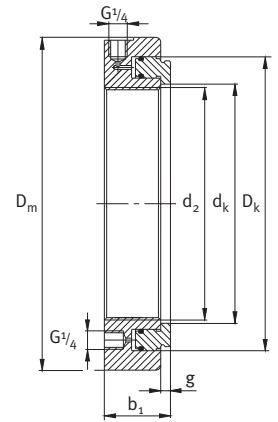
Ordering example (for HYDNUT1080): HYDNUT1080.SEAL. Each hydraulic nut is supplied with 1 set of seals in the original delivery.

FAG hydraulic nuts

Threads in inch sizes



Thread from HYDNUT90-INCH to HYDNUT320-INCH:
American National Form Threads Class 3
Thread from HYDNUT340-INCH to HYDNUT530-INCH:
Acme General Purpose Threads Class 3G



FAG hydraulic nuts, threads in inch sizes

Hydraulic nut	Thread		Dimensions										Mass	Drive-up force
	d ₂		Flank diameter		Number of turns	D _m	b ₁	D _k	d _k	g	Stroke	Piston surface	≈	at 800 bar
Ordering designation	mm	inch	mm	inch	per inch	mm						cm ²	kg	kN
HYDNUT90-INCH	89,586	3,527	88,212	3,4729	12	160	40	130	91	3	5	50	4,2	395
HYDNUT95-INCH	94,742	3,730	93,368	3,6759	12	165	40	136	96	3	5	52	4,3	416
HYDNUT100-INCH	99,517	3,918	98,143	3,8639	12	170	42	142	101	3	5	54	4,7	435
HYDNUT105-INCH	104,699	4,122	103,325	4,0679	12	175	42	147	106	5	5	57	4,7	455
HYDNUT110-INCH	109,855	4,325	108,481	4,2709	12	180	43	152	111	6	5	59	5	470
HYDNUT120-INCH	119,786	4,716	118,412	4,6619	12	190	43	162	121	6	5	63	5,4	504
HYDNUT130-INCH	129,692	5,106	128,318	5,0519	12	200	44	171	131	7	5	65	5,8	520
HYDNUT140-INCH	139,624	5,497	138,25	5,4429	12	210	45	182	141	7	5	69	6,3	552
HYDNUT150-INCH	149,555	5,888	148,181	5,8339	12	220	46	191	151	7	5	75,3	6,8	602
HYDNUT160-INCH	159,614	6,284	157,551	6,2028	8	235	47	206	161	7	6	87,2	8	698
HYDNUT170-INCH	169,139	6,659	167,067	6,5778	8	245	48	216	171	7	6	94,7	8,6	758
HYDNUT180-INCH	179,476	7,066	177,414	6,9848	8	255	48	227	181	7	6	103	8,1	824
HYDNUT190-INCH	189,789	7,472	187,726	7,3908	8	270	50	240	191	8	8	116	10,5	928
HYDNUT200-INCH	199,314	7,847	197,251	7,7658	8	280	50	251	201	8	8	125	11,5	1 000
HYDNUT220-INCH	219,151	8,628	217,089	8,5468	8	305	53	273	222	9	9	144,2	13,5	1 154
HYDNUT240-INCH	239,827	9,442	237,076	9,3337	6	330	55	296	242	9	10	165,3	16,1	1 323
HYDNUT260-INCH	258,877	10,192	256,126	10,0837	6	355	57	319	262	10	11	188	19	1 504
HYDNUT280-INCH	279,502	11,004	276,751	10,8975	6	380	59	342	282	10	12	211,7	22,3	1 694

Hydraulic nuts can be secured in a manner similar to conventional nuts, see page 14.

We also supply replacement seals for hydraulic nuts (suffix .SEAL).

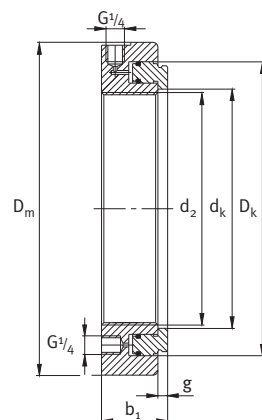
Ordering example (for HYDNUT160-INCH): HYDNUT160.SEAL. Each hydraulic nut is supplied with 1 set of seals in the original delivery.

FAG hydraulic nuts

Threads in inch sizes



Thread from HYDNUT90-INCH to HYDNUT320-INCH:
American National Form Threads Class 3
Thread from HYDNUT340-INCH to HYDNUT530-INCH:
Acme General Purpose Threads Class 3G



FAG hydraulic nuts, threads in inch sizes

Hydraulic nut	Thread		Dimensions										Mass	Drive-up force
	d ₂		Flank diameter		Number of turns	D _m	b ₁	D _k	d _k	g	Stroke	Piston surface	≈	at 800 bar
Ordering designation	mm	inch	mm	inch	per inch	mm						cm ²	kg	kN
HYDNUT300-INCH	299,339	11,785	296,588	11,6767	6	405	61	365	302	10	13	237	25,8	1 896
HYDNUT320-INCH	319,075	12,562	316,324	12,4537	6	430	63	389	322	10	14	264	29,9	2 112
HYDNUT340-INCH	338,811	13,339	335,763	13,2190	5	450	65	408	342	11	14	284	32,5	2 272
HYDNUT360-INCH	359,918	14,170	356,87	14,0500	5	475	67	431	362	11	15	313	37	2 504
HYDNUT380-INCH	379,908	14,957	376,86	14,8370	5	500	69	454	382	11	16	337	41,5	2 696
HYDNUT400-INCH	399,923	15,745	396,875	15,6250	5	525	71	477	402	11	17	368	47	2 944
HYDNUT420-INCH	419,913	16,532	416,865	16,4120	5	545	72	495	422	11	17	390	50	3 120
HYDNUT440-INCH	439,903	17,319	436,855	17,1990	5	565	74	519	442	12	17	425	54	3 400
HYDNUT460-INCH	459,918	18,107	456,87	17,9870	5	590	76	540	462	12	18	450	59,5	3 600
HYDNUT480-INCH	479,908	18,894	476,86	18,7740	5	612	76	560	482	12	18	460	63	3 680
HYDNUT500-INCH	499,923	19,682	496,875	19,5620	5	635	80	585	502	13	20	523	70	4 185
HYDNUT530-INCH	530,022	20,867	526,339	20,7220	4	670	83	617	542	13	22	562	80	4 496

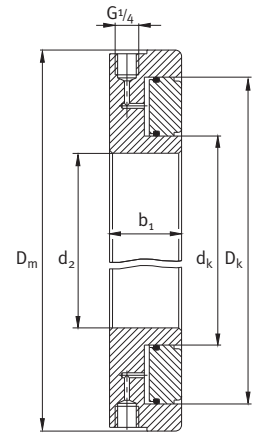
Hydraulic nuts can be secured in a manner similar to conventional nuts, see page 14.

We also supply replacement seals for hydraulic nuts (suffix .SEAL).

Ordering example (for HYDNUT360-INCH): HYDNUT360.SEAL. Each hydraulic nut is supplied with 1 set of seals in the original delivery.

FAG hydraulic nuts

Heavy duty design



FAG hydraulic nuts, heavy duty design

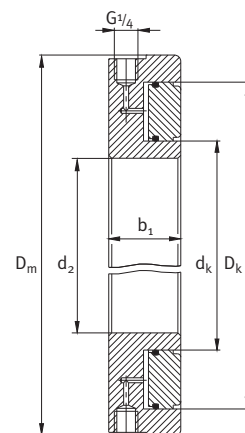
Hydraulic nut	Dimensions							Mass	Drive-up force
	d_2^{H7}	D_m	b_1	D_k	d_k	Stroke	Piston surface	$\approx$	at 800 bar
Ordering designation	mm						cm ²	kg	kN
HYDNUT100-HEAVY	100	220	40	180	125	10	132	9,5	1 060
HYDNUT125-HEAVY	125	245	40	200	150	10	137	9,8	1 100
HYDNUT150-HEAVY	150	270	40	226	180	10	147	12,5	1 170
HYDNUT175-HEAVY	175	305	45	250	205	11	161	17	1 280
HYDNUT200-HEAVY	200	330	50	280	230	12	200	21	1 600
HYDNUT225-HEAVY	225	365	50	313	255	12	259	23	2 070
HYDNUT250-HEAVY	250	390	50	345	280	12	319	28	2 550
HYDNUT275-HEAVY	275	430	50	380	305	12	403	34	3 220
HYDNUT300-HEAVY	300	470	55	410	335	13	439	44	3 510
HYDNUT325-HEAVY	325	500	55	440	360	13	503	49	4 020
HYDNUT350-HEAVY	350	540	55	475	385	13	608	57	4 860
HYDNUT375-HEAVY	375	575	55	510	410	13	723	65	5 780
HYDNUT400-HEAVY	400	620	60	545	440	15	812	83	6 500
HYDNUT425-HEAVY	425	650	60	575	465	15	899	90	7 190
HYDNUT450-HEAVY	450	690	65	610	490	17	1 037	100	8 290
HYDNUT475-HEAVY	475	725	65	642	515	17	1 154	120	9 230
HYDNUT500-HEAVY	500	760	70	675	540	20	1 288	142	10 300
HYDNUT525-HEAVY	525	800	70	710	565	20	1 452	158	11 620
HYDNUT550-HEAVY	550	835	75	742	590	22	1 590	183	12 720
HYDNUT575-HEAVY	575	870	75	775	615	22	1 747	197	13 980

We also supply replacement seals for hydraulic nuts (suffix .SEAL).

Ordering example (for HYDNUT100-HEAVY): HYDNUT100-HEAVY.SEAL. Each hydraulic nut is supplied with 1 set of seals in the original delivery.

FAG hydraulic nuts

Heavy duty design



FAG hydraulic nuts, heavy duty design

Hydraulic nut	Dimensions							Mass	Drive-up force
	d ₂ ^{H7}	D _m	b ₁	D _K	d _K	Stroke	Piston surface	≈	at 800 bar
Ordering designation	mm						cm ²	kg	kN
HYDNUT600-HEAVY	600	910	80	808	645	25	1 860	230	14 880
HYDNUT625-HEAVY	625	945	80	840	670	25	2 016	248	16 130
HYDNUT650-HEAVY	650	980	85	875	695	28	2 220	282	17 760
HYDNUT675-HEAVY	675	1 020	85	906	720	28	2 375	307	19 000
HYDNUT700-HEAVY	700	1 060	90	940	750	30	2 522	351	20 180
HYDNUT750-HEAVY	750	1 130	95	1 007	800	32	2 938	431	23 500
HYDNUT800-HEAVY	800	1 205	100	1 070	855	35	3 250	500	26 000
HYDNUT850-HEAVY	850	1 275	105	1 135	905	38	3 685	583	29 480
HYDNUT900-HEAVY	900	1 350	110	1 200	960	40	4 072	688	32 580

We also supply replacement seals for hydraulic nuts (suffix .SEAL).

Ordering example (for HYDNUT600-HEAVY): HYDNUT600-HEAVY.SEAL. Each hydraulic nut is supplied with 1 set of seals in the original delivery.

FAG hydraulic nuts

Securing against rotation

FAG anti-rotation locking devices

In some applications, hydraulic nuts remain on the shaft or the adapter sleeve.

For these cases, we supply three designs of anti-rotation locking devices, Figure 3.

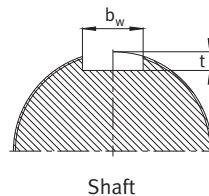
Locking devices of designs SA and SC comprise clamps and hexagon head cap screws. A slot is required in the shaft to the dimensions in Figure 4. Adapter sleeves have this slot as standard. The threaded holes for the hexagon head cap screws are drilled in the press ring before mounting.

The anti-rotation locking device SB is secured by means of a grub screw and a copper pin.

Ordering example:

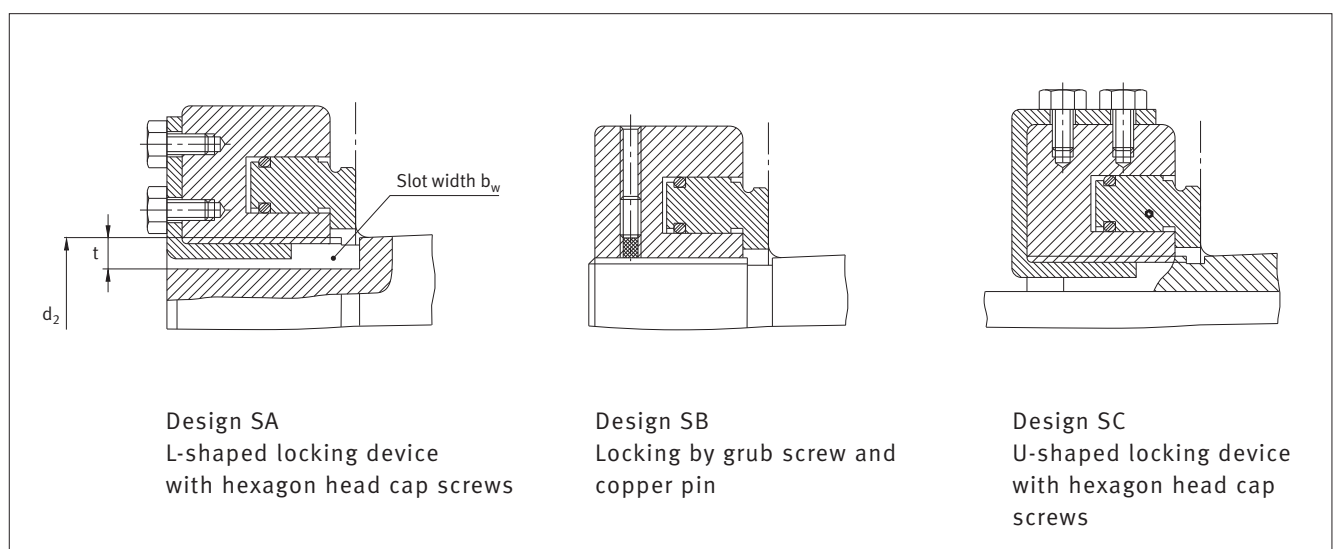
Hydraulic nut with trapezoidal thread 400×5, U-shaped locking device with hexagon head cap screws:

HYDNUT400-SC



4: Dimensions of shaft slot for FAG anti-rotation locking devices SA and SC

Hydraulic nut		Shaft slot	
Press ring with thread from	to	b_w mm	t
HYDNUT100	HYDNUT150	14	7
HYDNUT155	HYDNUT200	16	8
HYDNUT205	HYDNUT260	22	9
HYDNUT270	HYDNUT300	26	9
HYDNUT310	HYDNUT400	30	10
HYDNUT420	HYDNUT460	34	10
HYDNUT480	HYDNUT500	38	12
HYDNUT530	HYDNUT600	42	14
HYDNUT630	HYDNUT670	48	14
HYDNUT710	HYDNUT900	55	15
HYDNUT930	HYDNUT1120	65	16



3: FAG anti-rotation locking devices for FAG hydraulic nuts

Pressure generation devices, Connectors

Pressure generation devices, connectors

Hydraulic nuts are operated by oil pressure. We supply a comprehensive, matched range of accessories

including pressure generation devices and connectors. The FAG pressure generation device required to operate the hydraulic nuts is shown in the scheme in Figure 5.

FAG hand pump sets should preferably be used due to their ease of handling, large oil volume and suitability for universal use.

5: Allocation of FAG pressure generation devices to FAG hydraulic nuts

Pressure generation device required (see also TPI 195, FAG Pressure Generation Devices)	Hydraulic nut (standard)	Hydraulic nut of heavy duty design	Hydraulic nut with inch size thread
PUMP1000-0,7L	HYDNUT50	HYDNUT100-HEAVY	HYDNUT90-INCH
	HYDNUT395	HYDNUT300-HEAVY	HYDNUT380-INCH
PUMP1000-4L ¹⁾	HYDNUT400	HYDNUT325-HEAVY	HYDNUT400-INCH
	HYDNUT800	HYDNUT525-HEAVY	HYDNUT530-INCH
PUMP1000-8L	HYDNUT830	HYDNUT550-HEAVY	
	HYDNUT1120	HYDNUT675-HEAVY	
AGGREG-E700 (electrically operated)	HYDNUT1180	HYDNUT700-HEAVY	

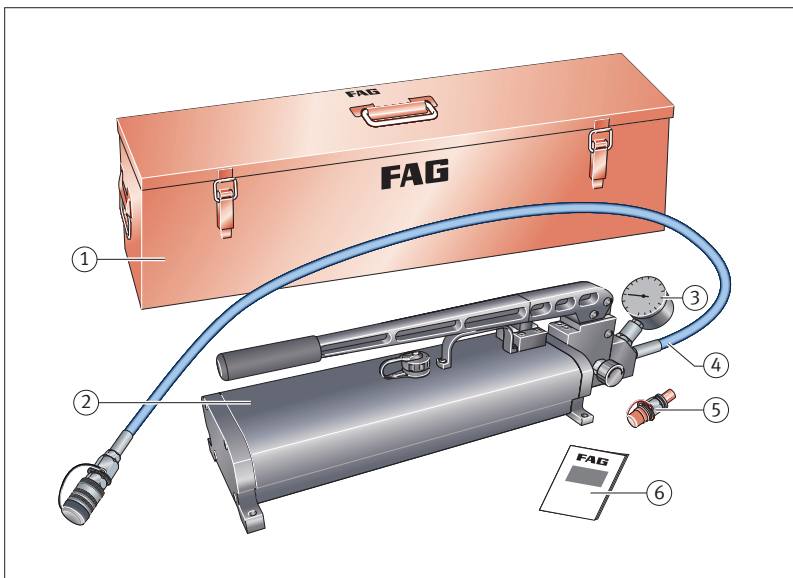
¹⁾ PUMP1000-4L-CONTROL is suitable for all standard hydraulic nuts in the mounting and dismounting of rolling bearings with a tapered bore, see page 18.



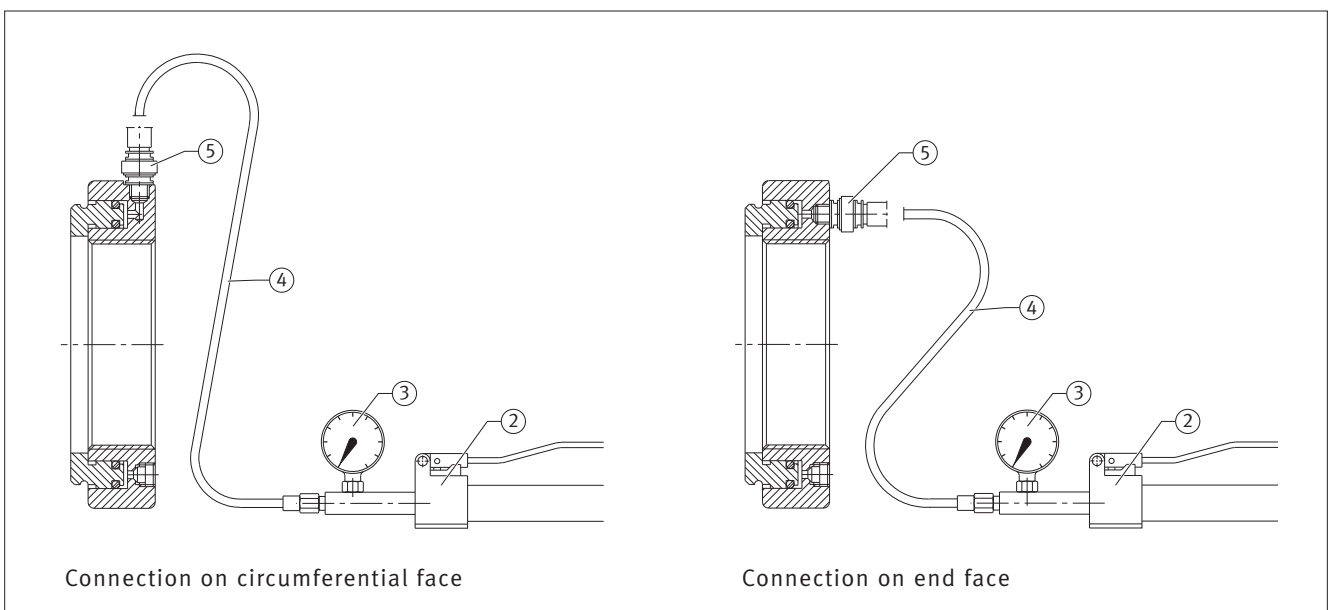
6: FAG hand pump set PUMP1000-4L-CONTROL for connection to standard hydraulic nuts (example)

Pressure generation devices, Connectors

- ① Metal case
- ② Hand pump with 4 l oil container/1000 bar
- ③ Manometer, 0 bar – 1000 bar
- ④ High pressure hose with coupling sleeve
- ⑤ Plug-in coupling nipple (connector G $\frac{1}{4}$)
- ⑥ User manual



7: Scope of delivery of an FAG hand pump set (example: PUMP1000-4L)



8: Connection of an FAG hand pump set to an FAG hydraulic nut up to HYDNUT800 (example)

Mounting of rolling bearings using hydraulic nuts

The hydraulic nut is used to mount rolling bearings with a tapered bore. Mounting is either carried out “dry” or by means of the hydraulic method. In the hydraulic method, oil is pressed between the mating surfaces to form an oil film so that the hydraulic nut only needs to apply a slight displacement.

Figure 9 shows a spherical roller bearing driven directly up a tapered shaft seat. The bearing is first located on the tapered seat and the hydraulic nut is then screwed onto the threaded portion of the shaft until the bearing is firmly seated. The bearing is pressed onto its seat by activating the hydraulic nut. The amount of axial displacement depends on the reduction required in the radial internal clearance of the bearing. During the drive-up process, the radial internal clearance must be continually measured using feeler gauges.

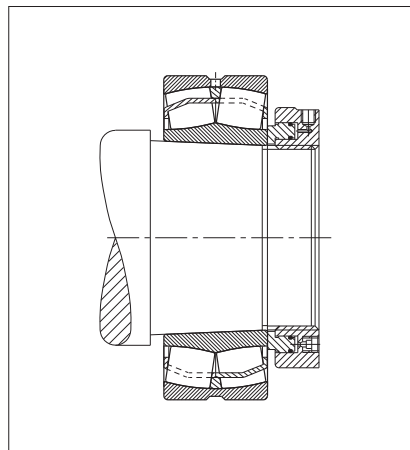
If the hydraulic method is used, the oil pressure at the seat must be relieved for measurement of radial internal clearance. If the reduction in radial internal clearance cannot be measured, for example if the housing shape does not permit this, the axial drive-up distance can be measured instead. The values for the required reduction in radial internal clearance and the corresponding drive-up distance are given on pages 19 and 20 for cylindrical roller bearings and spherical roller bearings.

After drive-up it takes about 10 to 30 minutes, depending on the bearing size, for the oil to escape completely from the joint. It is only at this point that the hydraulic nut is removed and the shaft or sleeve nut is screwed into place and secured.

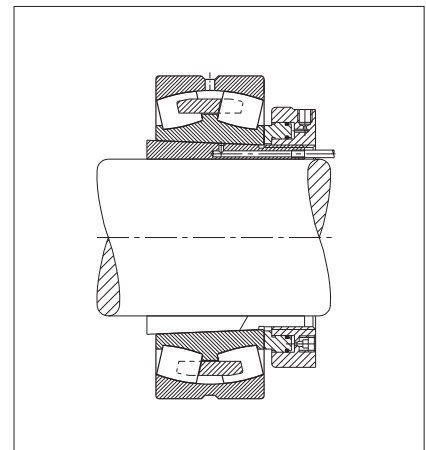
Rolling bearings with adapter or withdrawal sleeves can be mounted in the same way (Figures 10 and 11).

Hydraulic nuts are also suitable for mounting hydraulic withdrawal sleeves, see Figure 12. The piston of the hydraulic nut is abutted against a plate connected to the shaft.

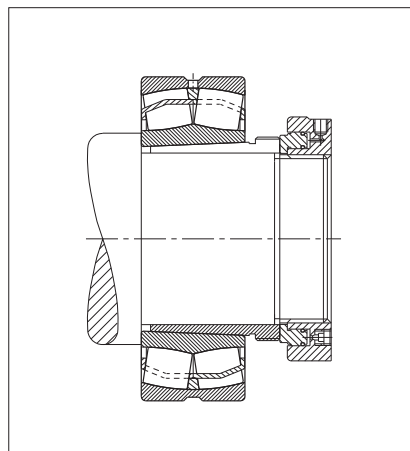
Such precautions are not necessary when mounting a hydraulic adapter sleeve, Figure 10.



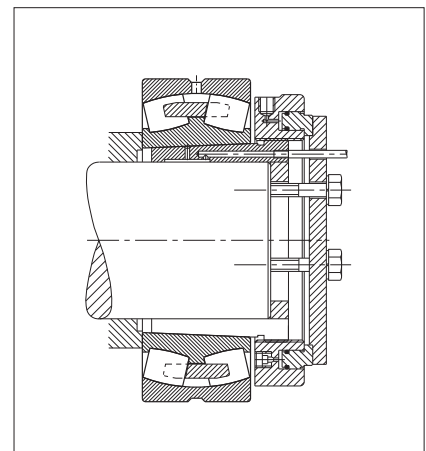
9: Drive-up of a spherical roller bearing onto a tapered shaft journal



10: Fitting of a spherical roller bearing with an adapter sleeve using the hydraulic method



11: Fitting of a spherical roller bearing with a withdrawal sleeve without using the hydraulic method



12: Mounting of a spherical roller bearing with a withdrawal sleeve using the hydraulic method

Mounting of rolling bearings using hydraulic nuts

Special features in the use of the FAG hand pump set PUMP1000-4L-CONTROL

Special features in the use of the FAG hand pump set PUMP1000-4L-CONTROL

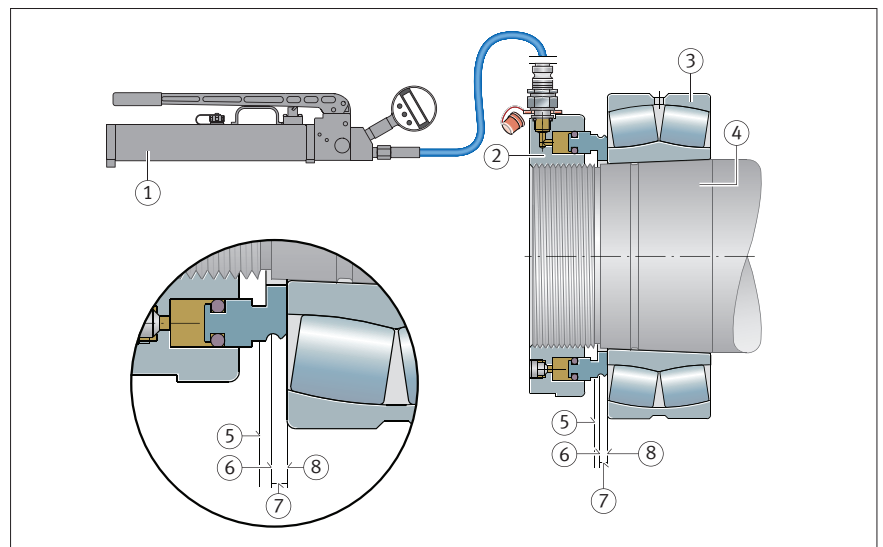
The FAG hand pump set PUMP1000-4L-CONTROL is particularly suitable as a pressure generation device where rolling bearings are to be driven onto their tapered seats using a hydraulic nut.

First, the bearing is pushed smoothly onto the tapered seat as far as the initial position. A suitable hydraulic nut is then screwed onto the shaft and the hand pump is connected. The hand pump is then operated until the pressure to reach the start position is achieved (see Mounting Manager, page 19).

By further operation of the pump, the bearing is driven up by the required distance and thus reaches the final position. The user manual for the pump PUMP1000-4L-CONTROL contains a table which shows the number of strokes required for the required drive-up distance of the bearing (see Mounting Manager).

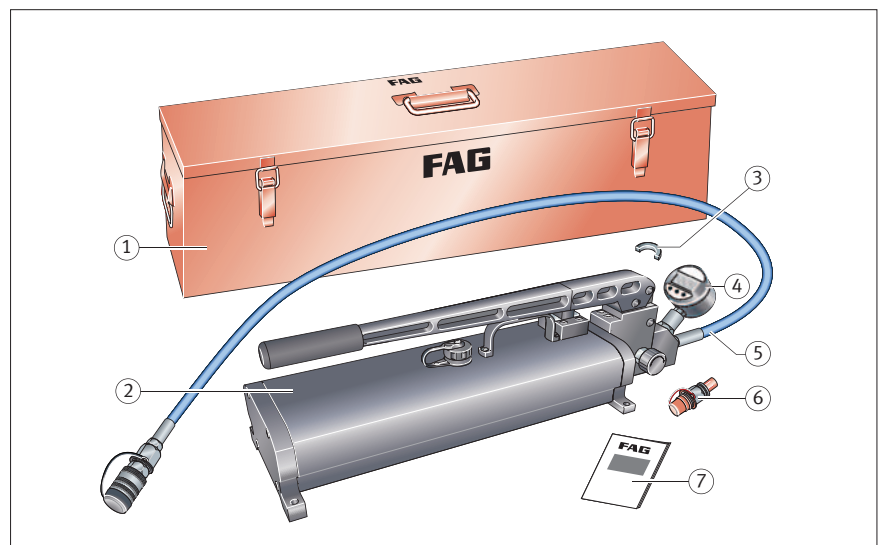
- ① Hand pump
- ② Hydraulic nut
- ③ Rolling bearing
- ④ Tapered seat
- ⑤ Initial position
- ⑥ Start position
- ⑦ Drive-up distance
- ⑧ Final position

13: Mounting of a rolling bearing using the FAG hand pump set PUMP1000-4L-CONTROL



- ① Metal case
- ② Hand pump
- ③ Spacer ring (HYDNUT 50 to 150)
- ④ Digital manometer
- ⑤ High pressure hose with coupling sleeve
- ⑥ Plug-in coupling nipple
- ⑦ Manual

14: Scope of delivery of the FAG hand pump set PUMP1000-4L-CONTROL



Mounting of rolling bearings using hydraulic nuts

Mounting Manager as an accessory in the mounting of bearings

FAG software Mounting Manager

The FAG software **MOUNTING MANAGER** is a user-friendly accessory for ensuring the correct mounting of bearings and offers the following options:

- It shows various mechanical and hydraulic mounting methods.
- It calculates the data required for mounting in relation to reduction in radial internal clearance, drive-up distance and start pressure.
- It gives useful mounting advice.
- It generates a list of the accessories and tools required.

Further information on mounting and dismounting of bearings is offered in the integrated library containing appropriate publications, Technical Product Information documents, etc.

Calculation possibilities for mounting methods:

Bearings with a tapered bore are mounted either directly on the tapered shaft or journal or by means of an adapter sleeve or withdrawal sleeve on the cylindrical shaft. The internal clearance is set either by conventional means using feeler gauges or by means of the axial drive-up distance.

a) Mounting of bearings with tapered bore by measurement of the axial drive-up distance

The bearing is placed in its start position on the tapered bearing seat with a hydraulic nut. The required starting pressure defined for each individual bearing is set in the hydraulic nut by means of the digital manometer. A certain quantity of oil is required in order to reach the specified drive-up distance. This is achieved by drive-up using a defined number of strokes, which can be monitored by means of a stroke counter on the pump PUMP1000-4L-CONTROL.

This mounting method:

- gives considerably shorter and simpler mounting
- offers very high security and accuracy
- allows the correct mounting of sealed bearings.

b) Mounting of bearings with tapered bore by measurement of the reduction in radial internal clearance

When the bearing is pushed onto the tapered seat, the inner ring is expanded and the radial internal clearance is thereby reduced. This reduction in radial internal clearance is valid as a measure of the tight fit of the bearing. It is measured by means of a feeler gauge.

The FAG Mounting Manager is available online at www.fis-services.com.



Mounting of rolling bearings using hydraulic nuts

Reduction in radial internal clearance of FAG spherical roller bearings with tapered bore

Reduction in radial internal clearance of FAG spherical roller bearings with tapered bore																				
Nominal bore diameter		Radial internal clearance before fitting						Reduction in radial internal clearance ¹⁾		Drive-up distance on taper 1:12 ¹⁾				Drive-up distance on taper 1:30 ¹⁾				Control value for radial internal clearance after fitting		
d over mm	incl. mm	Internal clearance group						min mm	max mm	min mm	max mm	min mm	max mm	min mm	max mm	min mm	max mm	min mm	min mm	min mm
		CN (normal) min mm	max mm	C3 min mm	max mm	C4 min mm	max mm													
24	30	0,03	0,04	0,04	0,055	0,055	0,075	0,015	0,02	0,3	0,35	0,3	0,4	–	–	–	–	0,015	0,02	0,035
30	40	0,035	0,05	0,05	0,065	0,065	0,085	0,02	0,025	0,35	0,4	0,35	0,45	–	–	–	–	0,015	0,025	0,04
40	50	0,045	0,06	0,06	0,08	0,08	0,1	0,025	0,03	0,4	0,45	0,45	0,5	–	–	–	–	0,02	0,03	0,05
50	65	0,055	0,075	0,075	0,095	0,095	0,12	0,03	0,04	0,45	0,6	0,5	0,7	–	–	–	–	0,025	0,035	0,055
65	80	0,07	0,095	0,095	0,12	0,12	0,15	0,04	0,05	0,6	0,75	0,7	0,85	–	–	–	–	0,025	0,04	0,07
80	100	0,08	0,11	0,11	0,14	0,14	0,18	0,045	0,06	0,7	0,9	0,75	1	1,7	2,2	1,8	2,4	0,035	0,05	0,08
100	120	0,1	0,135	0,135	0,17	0,17	0,22	0,05	0,07	0,7	1,1	0,8	1,2	1,9	2,7	2	2,8	0,05	0,065	0,1
120	140	0,12	0,16	0,16	0,2	0,2	0,26	0,065	0,09	1,1	1,4	1,2	1,5	2,7	3,5	2,8	3,6	0,055	0,08	0,11
140	160	0,13	0,18	0,18	0,23	0,23	0,3	0,075	0,1	1,2	1,6	1,3	1,7	3	4	3,1	4,2	0,055	0,09	0,13
160	180	0,14	0,2	0,2	0,26	0,26	0,34	0,08	0,11	1,3	1,7	1,4	1,9	3,2	4,2	3,3	4,6	0,06	0,1	0,15
180	200	0,16	0,22	0,22	0,29	0,29	0,37	0,09	0,13	1,4	2	1,5	2,2	3,5	4,5	3,6	5	0,07	0,1	0,16
200	225	0,18	0,25	0,25	0,32	0,32	0,41	0,1	0,14	1,6	2,2	1,7	2,4	4	5,5	4,2	5,7	0,08	0,12	0,18
225	250	0,2	0,27	0,27	0,35	0,35	0,45	0,11	0,15	1,7	2,4	1,8	2,6	4,2	6	4,6	6,2	0,09	0,13	0,2
250	280	0,22	0,3	0,3	0,39	0,39	0,49	0,12	0,17	1,9	2,6	2	2,9	4,7	6,7	4,8	6,9	0,1	0,14	0,22
280	315	0,24	0,33	0,33	0,43	0,43	0,54	0,13	0,19	2	3	2,2	3,2	5	7,5	5,2	7,7	0,11	0,15	0,24
315	355	0,27	0,36	0,36	0,47	0,47	0,59	0,15	0,21	2,4	3,4	2,6	3,6	6	8,2	6,2	8,4	0,12	0,17	0,26
355	400	0,3	0,4	0,4	0,52	0,52	0,65	0,17	0,23	2,6	3,6	2,9	3,9	6,5	9	5,8	9,2	0,13	0,19	0,29
400	450	0,33	0,44	0,44	0,57	0,57	0,72	0,2	0,26	3,1	4,1	3,4	4,4	7,7	10	8	10,4	0,13	0,2	0,31
450	500	0,37	0,49	0,49	0,63	0,63	0,79	0,21	0,28	3,3	4,4	3,6	4,8	8,2	11	8,4	11,2	0,16	0,23	0,35
500	560	0,41	0,54	0,54	0,68	0,68	0,87	0,24	0,32	3,7	5	4,1	5,4	9,2	12,5	9,6	12,8	0,17	0,25	0,36
560	630	0,46	0,6	0,6	0,76	0,76	0,98	0,26	0,35	4	5,4	4,4	5,9	10	13,5	10,4	14	0,2	0,29	0,41
630	710	0,51	0,67	0,67	0,85	0,85	1,09	0,3	0,4	4,6	6,2	5,1	6,8	11,5	15,5	12	16	0,21	0,31	0,45
710	800	0,57	0,75	0,75	0,96	0,96	1,22	0,34	0,45	5,3	7	5,8	7,6	13,3	17,5	13,6	18	0,23	0,35	0,51
800	900	0,64	0,84	0,84	1,07	1,07	1,37	0,37	0,5	5,7	7,8	6,3	8,5	14,3	19,5	14,8	20	0,27	0,39	0,57
900	1000	0,71	0,93	0,93	1,19	1,19	1,52	0,41	0,55	6,3	8,5	7	9,4	15,8	21	16,4	22	0,3	0,43	0,64
1000	1120	0,78	1,02	1,02	1,3	1,3	1,65	0,45	0,6	6,8	9	7,6	10,2	17	23	18	24	0,32	0,48	0,7
1120	1250	0,86	1,12	1,12	1,42	1,42	1,8	0,49	0,65	7,4	9,8	8,3	11	18,5	25	19,6	26	0,34	0,54	0,77
1250	1400	0,94	1,22	1,22	1,55	1,55	1,96	0,55	0,72	8,3	10,8	9,3	12,1	21	27	22,2	28,3	0,36	0,59	0,84
1400	1600	1,06	1,38	1,38	1,75	1,75	2,2	0,62	0,81	9,3	12,2	10,6	13,8	23,6	30,8	24,8	32,4	0,44	0,66	0,94
1600	1800	1,18	1,54	1,54	1,95	1,95	2,5	0,69	0,93	10,4	14	11,7	15,8	26,2	35,3	27,6	37,2	0,48	0,73	1,02
1800	2000	1,31	1,71	1,71	2,15	2,15	2,75	0,77	1,04	11,6	15,6	13,1	17,7	29,3	39,5	30,8	41,6	0,54	0,81	1,11
2000	2250	1,45	1,9	1,9	2,4	2,4	3,05	0,85	1,15	12,7	17,2	14,5	19,5	32,4	43,9	34	46	0,6	0,95	1,55
2250	2500	1,6	2,1	2,1	2,65	2,65	3,35	0,95	1,28	14,3	19,2	16,2	21,8	36,2	48,8	38	51,2	0,65	1,15	1,7

¹⁾ Valid only for solid steel shafts and hollow shafts with a bore no larger than half the shaft diameter.

The following applies: Bearings with a radial internal clearance before mounting in the upper half of the tolerance range are mounted using the larger value for reduction in radial internal clearance or axial drive-up distance, bearings in the lower half of the tolerance range are mounted using the smaller value for reduction in radial internal clearance or axial drive-up distance.

Mounting of rolling bearings using hydraulic nuts

Reduction in radial internal clearance of FAG cylindrical roller bearings with tapered bore

Reduction in radial internal clearance of FAG cylindrical roller bearings with tapered bore																
Nominal bore diameter		Radial internal clearance before fitting						Reduction in radial internal clearance ¹⁾		Drive-up distance on taper 1:12 ¹⁾				Control value for radial internal clearance after fitting		
d over mm	incl. mm	Internal clearance group						min mm	max mm	Shaft min mm	max mm	Sleeve min mm	max mm	CN min mm	C3 min mm	C4 min mm
24	30	0,035	0,06	0,045	0,07	0,055	0,08	0,015	0,02	0,3	0,35	0,3	0,4	0,02	0,025	0,035
30	40	0,04	0,065	0,055	0,08	0,07	0,095	0,02	0,025	0,35	0,4	0,35	0,45	0,02	0,025	0,04
40	50	0,045	0,075	0,06	0,09	0,075	0,105	0,025	0,03	0,4	0,45	0,45	0,5	0,02	0,03	0,045
50	65	0,05	0,08	0,07	0,1	0,09	0,12	0,03	0,035	0,45	0,55	0,5	0,65	0,02	0,035	0,05
65	80	0,06	0,095	0,085	0,12	0,11	0,145	0,035	0,04	0,55	0,6	0,65	0,7	0,025	0,04	0,07
80	100	0,07	0,105	0,095	0,13	0,12	0,155	0,04	0,045	0,6	0,7	0,65	0,8	0,03	0,05	0,075
100	120	0,09	0,13	0,115	0,155	0,14	0,18	0,045	0,055	0,7	0,85	0,8	0,95	0,045	0,065	0,085
120	140	0,1	0,145	0,13	0,175	0,16	0,205	0,055	0,065	0,85	1	0,95	1,1	0,045	0,07	0,095
140	160	0,11	0,16	0,145	0,195	0,18	0,23	0,06	0,075	0,9	1,2	1	1,3	0,05	0,075	0,105
160	180	0,125	0,175	0,16	0,21	0,195	0,245	0,065	0,085	1	1,3	1,1	1,5	0,06	0,08	0,11
180	200	0,14	0,195	0,18	0,235	0,22	0,275	0,075	0,095	1,2	1,5	1,3	1,7	0,065	0,09	0,125
200	225	0,155	0,215	0,2	0,26	0,245	0,305	0,085	0,105	1,3	1,6	1,4	1,8	0,07	0,1	0,14
225	250	0,17	0,235	0,22	0,285	0,27	0,335	0,095	0,115	1,5	1,8	1,6	2	0,075	0,105	0,155
250	280	0,185	0,255	0,24	0,31	0,295	0,365	0,105	0,125	1,6	2	1,7	2,3	0,08	0,125	0,17
280	315	0,205	0,28	0,265	0,34	0,325	0,4	0,115	0,14	1,8	2,2	1,9	2,4	0,09	0,13	0,185
315	355	0,225	0,305	0,29	0,37	0,355	0,435	0,13	0,16	2	2,5	2,2	2,7	0,095	0,14	0,195
355	400	0,255	0,345	0,33	0,42	0,405	0,495	0,14	0,17	2,2	2,6	2,5	2,9	0,115	0,165	0,235
400	450	0,285	0,385	0,37	0,47	0,455	0,555	0,15	0,185	2,3	2,8	2,6	3,1	0,135	0,19	0,27
450	500	0,315	0,425	0,41	0,52	0,505	0,615	0,16	0,195	2,5	3	2,8	3,4	0,155	0,215	0,31
500	560	0,35	0,47	0,455	0,575	0,56	0,68	0,17	0,215	2,7	3,4	3,1	3,8	0,18	0,24	0,345
560	630	0,38	0,5	0,5	0,62	0,62	0,74	0,185	0,24	2,9	3,7	3,5	4,2	0,195	0,26	0,38
630	710	0,435	0,575	0,565	0,705	0,695	0,835	0,2	0,26	3,1	4,1	3,6	4,7	0,235	0,305	0,435
710	800	0,485	0,645	0,63	0,79	0,775	0,935	0,22	0,28	3,4	4,4	3,9	5,3	0,26	0,35	0,495
800	900	0,54	0,71	0,7	0,87	0,86	1,03	0,24	0,31	3,7	4,8	4,3	5,5	0,3	0,39	0,55
900	1000	0,6	0,79	0,78	0,97	0,96	1,15	0,26	0,34	4,1	5,3	4,8	6,2	0,34	0,44	0,62
1000	1120	0,665	0,875	0,865	1,075	1,065	1,275	0,28	0,37	4,4	5,8	5,2	7	0,385	0,5	0,7
1120	1250	0,73	0,97	0,96	1,2	1,2	1,44	0,31	0,41	4,8	6,4	5,7	7,6	0,42	0,55	0,79
1250	1400	0,81	1,07	1,07	1,33	1,33	1,59	0,34	0,45	5,3	7	6,3	8,3	0,47	0,62	0,85

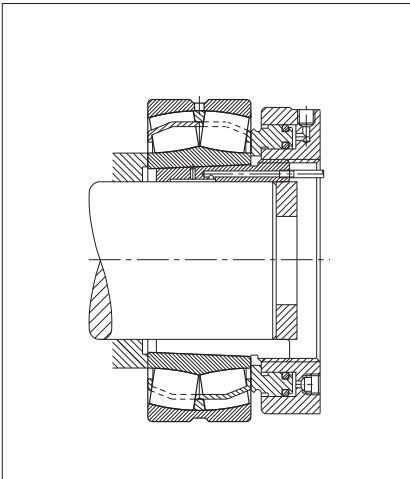
¹⁾ Valid only for solid steel shafts and hollow shafts with a bore no larger than half the shaft diameter.

The following applies: Bearings with a radial internal clearance before mounting in the upper half of the tolerance range are mounted using the larger value for reduction in radial internal clearance or axial drive-up distance, bearings in the lower half of the tolerance range are mounted using the smaller value for reduction in radial internal clearance or axial drive-up distance.

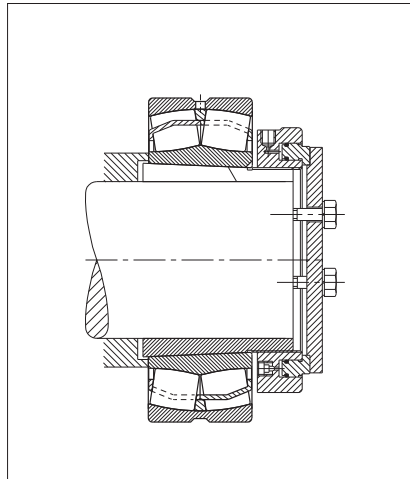
Dismounting of rolling bearings using hydraulic nuts

Dismantling of a withdrawal sleeve is shown in Figure 15. If the shaft is not long enough to prevent constriction of the threaded section, the withdrawal sleeve must be supported by a thick-walled auxiliary ring.

An adapter sleeve can be dismantled if the bearing inner ring is located axially and the piston of the hydraulic nut is abutted, for example against a mounting plate, Figure 16.



15: Dismounting of a withdrawal sleeve using the hydraulic method



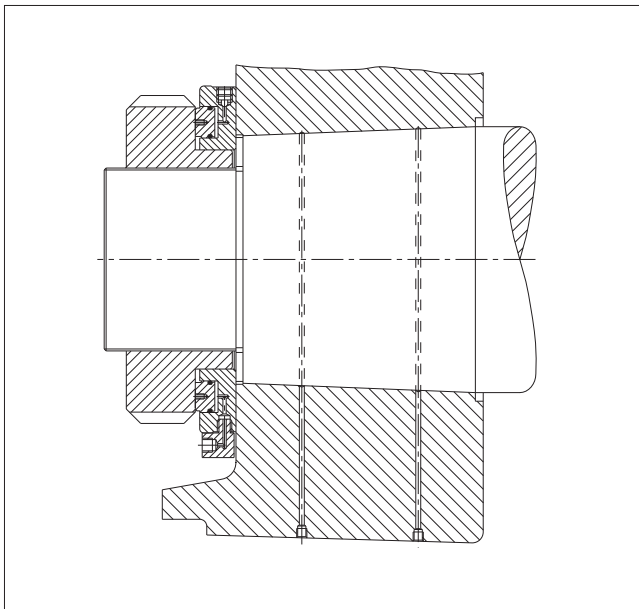
16: Dismounting of an adapter sleeve

Other applications of hydraulic nuts

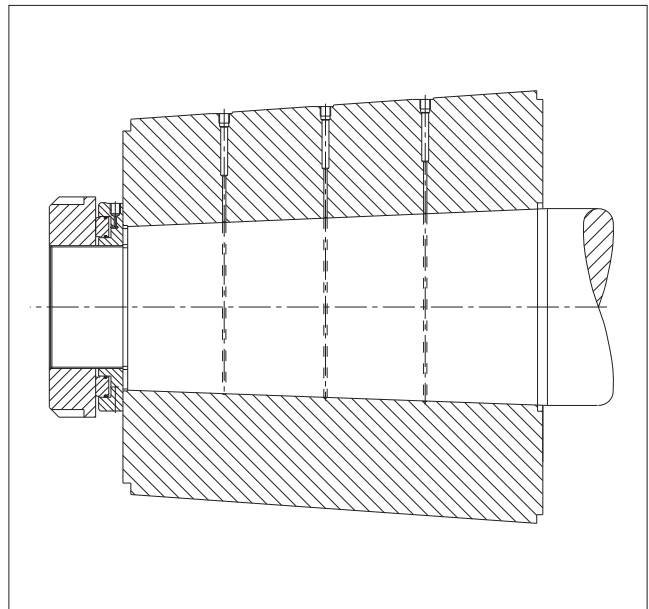
The use of FAG hydraulic nuts is not restricted to the mounting of rolling bearings. Other press fits (e.g. in the mounting of gears, drive wheels and couplings) can

also be realised by means of the hydraulic method using hydraulic nuts. Considerable pressing forces are often required in general machine building and especially

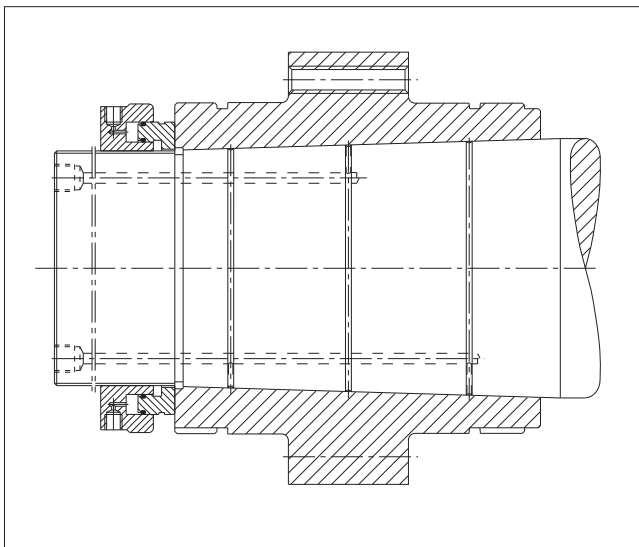
in shipbuilding. Such forces can be applied cost-effectively using hydraulic nuts. Figures 17 to 20 show examples of mounting.



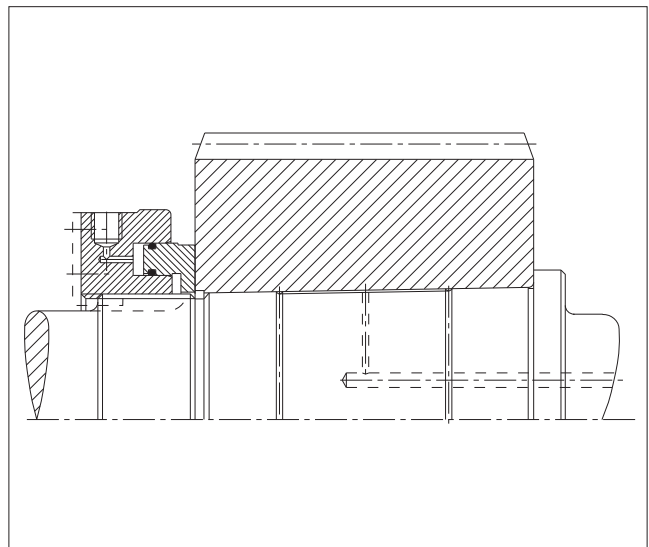
17: Mounting of a press fit between a rudder and rudder spindle



18: A hydraulic nut is used to realise the press fit between a propeller hub and ship driveshaft.



19: Mounting of a coupling



20: Gear mounting using a hydraulic nut

Comparison of ordering designations

Comparison of ordering designations	
Ordering designation, current (EP1)	Ordering designation, old (Pxx)
HYDNUT...	HYD.NUT...
HYDNUT...SEAL	HYD.NUT...SEAL
HYDNUT...-HEAVY	HYD.NUT...HEAVY
HYDNUT...-HEAVY.SEAL	HYD.NUT...HEAVY.SEAL
HYDNUT...-INCH	HYD.NUT...INCH
HYDNUT...-SA	HYD.NUT...SA
HYDNUT...-SB	HYD.NUT...SB
HYDNUT...-SC	HYD.NUT...SC

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