

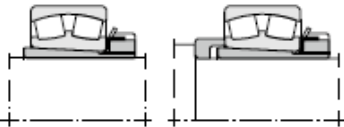
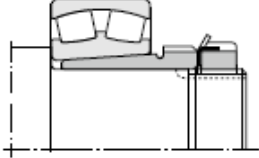
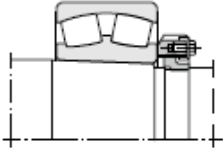
Ningbo Amol Machinery Co., Ltd.  
Jiangsu Amol Bearing Co., Ltd.  
Ningbo Amol Intl. Trade Co., Ltd.



Bearing accessories include adapter sleeve, with draw sleeve, locknuts, nuts, lockwashers, locking clips, snap rings and so on.

Some applications require frequent disassembly and reassembly to enable periodic inspections and repairs. For such applications, bearings with separable inner/outer rings, such as cylindrical roller bearings, needle roller bearings, and tapered roller bearings are most appropriate. Incorporation of adapter sleeves simplifies the installation and disassembly of self-aligning ball bearings and spherical roller bearings with tapered bores.

Table 14.2 Fixing methods—bearings with tapered bores

Adapter sleeve mounting	Withdrawal sleeve mounting	Split ring mounting
		
<p>When installing bearings on cylindrical shafts, adapter sleeves or withdrawal sleeves can be used to fix bearings in place axially. The adapter sleeve is fastened in place by frictional force between the shaft and inner diameter of the sleeve.</p>		<p>For installation of tapered bore bearings directly on tapered shafts, the bearing is held in place by a split ring inserted into a groove on the shaft, and is fixed in place with a split ring nut or screw.</p>

### Installation of tapered bore bearing

Small tapered bore bearings are installed by inserting a bearing a predetermined amount with locknuts and by using a tapered bore or an adapter sleeve/withdrawal sleeve. Locknuts are tightened by a hook spanner wrench (Fig. 15.20).

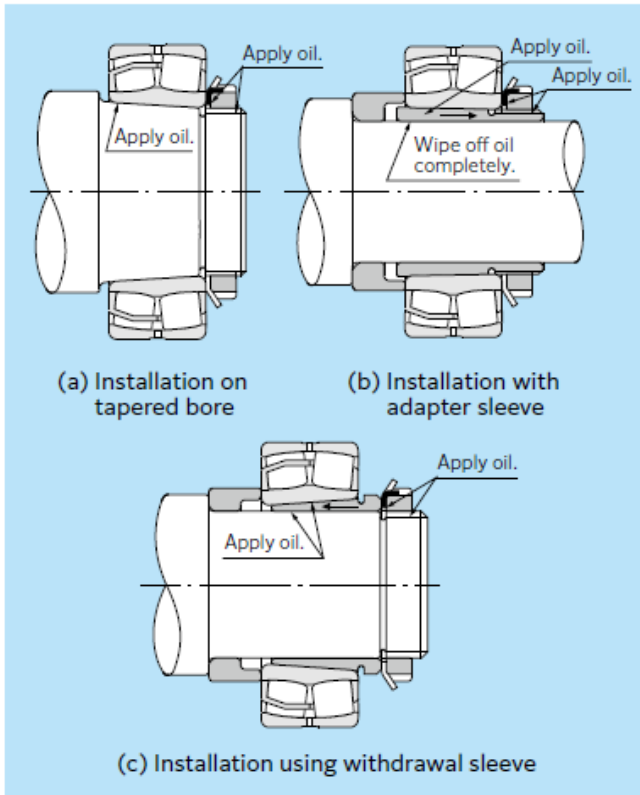


Fig. 15.20 Installation methods using locknuts

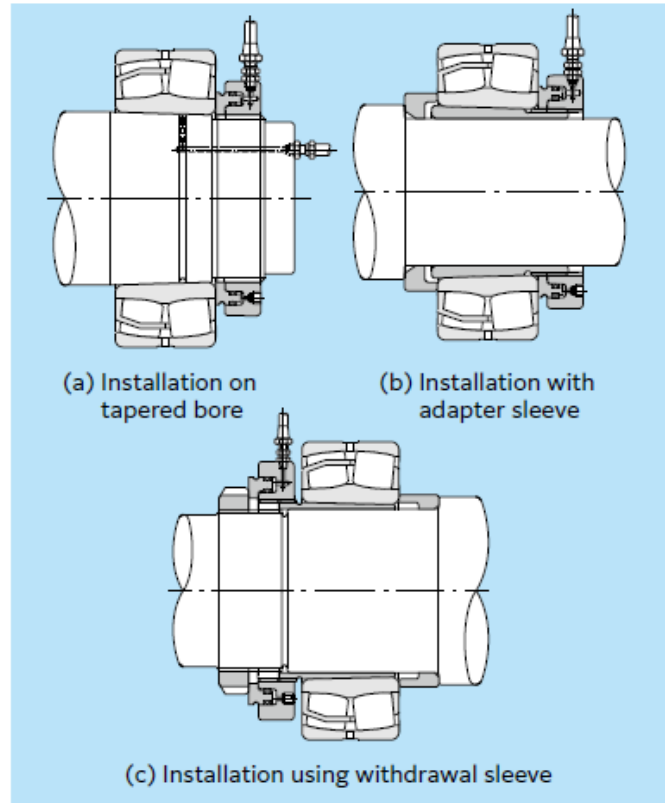


Fig. 15.22 Installation using hydraulic nut

#### Disassembly of bearings with tapered bores

Small bearings installed using an adapter are removed by loosening the locknut, placing a block on the edge of the inner ring as shown in Fig. 15.35 (a) or the edge of the lock nut as shown in Fig. 15.35 (b), and tapping it with a hammer. In such a case, use a resin or copper hammer instead of an iron one. Bearings which have been installed with withdrawal sleeves can be disassembled by tightening down the lock nut as shown in Fig. 15.36.

For large type bearings on tapered shafts, adapters, or withdrawal sleeves, disassembly is greatly facilitated by hydraulic methods. Fig. 15.37 shows the case where the bearing is Fig. 15.38 shows two methods of disassembling bearings with adapters or withdrawal sleeves using a hydraulic nut. Fig. 15.39 shows a disassembly method using a hydraulic withdrawal sleeve where high pressure oil is injected between fitting surfaces and a lock nut is then employed to remove the sleeve. removed by applying hydraulic pressure on the fitting surface of a bearing installed on a tapered shaft.

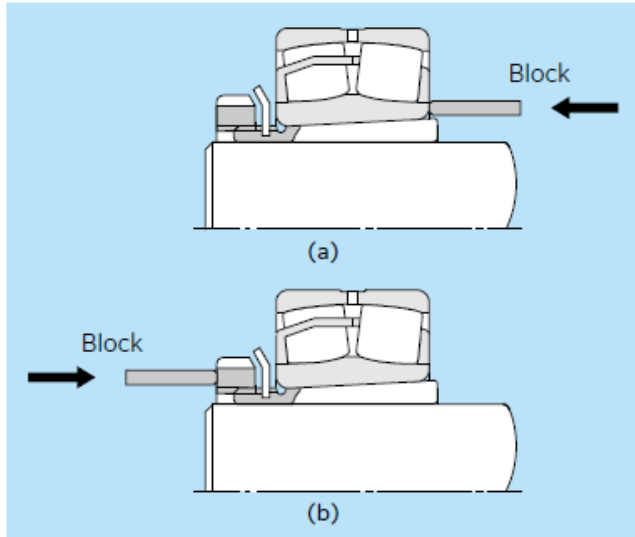


Fig. 15.35 Removal of bearing with adapter

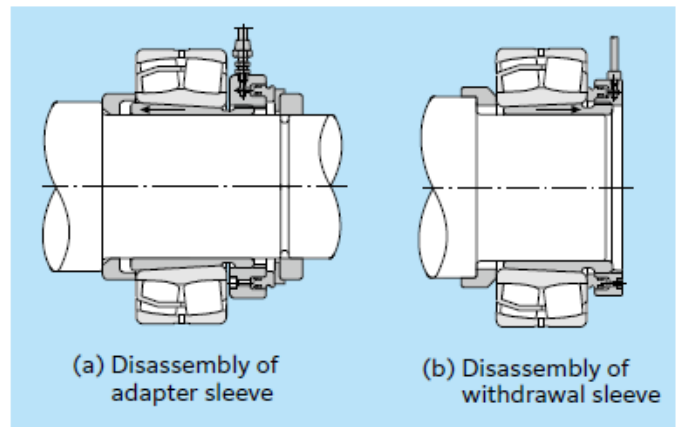


Fig. 15.38 Disassembly using hydraulic nut

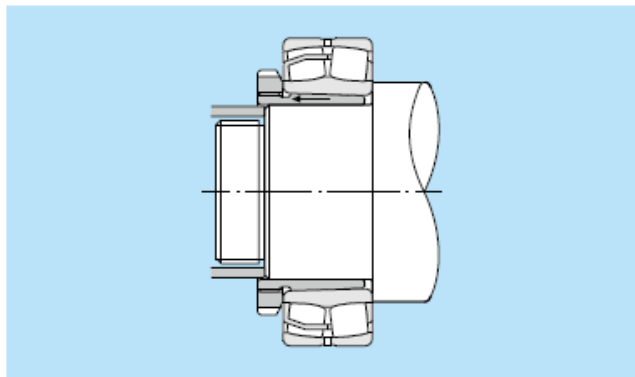


Fig. 15.36 Disassembly of bearing with withdrawal sleeve

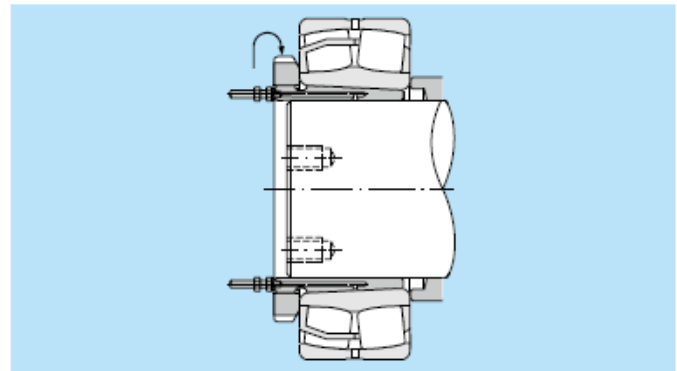
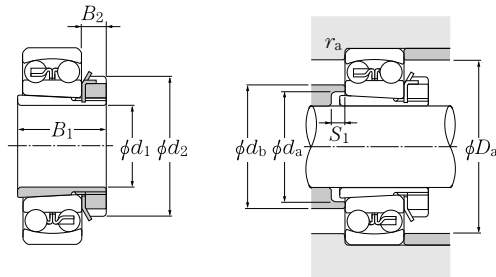


Fig. 15.39 Disassembly using hydraulic withdrawal sleeve

(For self-aligning ball bearings)



d 17 ~ 50mm

	Boundary dimensions				Numbers		Installation-related dimensions					Mass <sup>1)</sup>
	mm				Bearing	Adapter	$d_a$	$d_b$	mm $S_1$	$D_a$	$r_{as}$	kg
	$d_1$	$B_1$	$d_2$	$B_2$			Min.	Max.	Min.	Max.	Max.	(approx.)
17	24	32	7		1204SK;H 204		23	27	5	41	1	0.041
	28	32	7		2204SK;H 304		24	28	5	41	1	0.045
	28	32	7		1304SK;H 304		24	31	8	45	1	0.045
	31	32	7		2304SK;H2304		24	28	5	45	1	0.049
20	26	38	8		1205SK;H 205X		28	33	5	46	1	0.07
	29	38	8		2205SK;H 305X		29	33	5	46	1	0.075
	29	38	8		1305SK;H 305X		29	37	6	55	1	0.075
	35	38	8		2305SK;H2305X		29	34	5	55	1	0.087
25	27	45	8		1206SK;H 206X		33	39	5	56	1	0.099
	31	45	8		2206SK;H 306X		34	39	5	56	1	0.109
	31	45	8		1306SK;H 306X		34	44	6	65	1	0.109
	38	45	8		2306SK;H2306X		35	40	5	65	1	0.126
30	29	52	9		1207SK;H 207X		38	46	5	65	1	0.125
	35	52	9		2207SK;H 307X		39	45	5	65	1	0.142
	35	52	9		1307SK;H 307X		39	50	7	71.5	1.5	0.142
	43	52	9		2307SK;H2307X		40	46	5	71.5	1.5	0.165
35	31	58	10		1208SK;H 208X		44	52	5	73	1	0.174
	36	58	10		2208SK;H 308X		44	50	5	73	1	0.189
	36	58	10		1308SK;H 308X		44	56	5	81.5	1.5	0.189
	46	58	10		2308SK;H2308X		45	52	5	81.5	1.5	0.224
40	33	65	11		1209SK;H 209X		49	57	5	78	1	0.227
	39	65	11		2209SK;H 309X		49	57	8	78	1	0.248
	39	65	11		1309SK;H 309X		49	61	5	91.5	1.5	0.248
	50	65	11		2309SK;H2309X		50	58	5	91.5	1.5	0.28
45	35	70	12		1210SK;H 210X		53	62	5	83	1	0.274
	42	70	12		2210SK;H 310X		54	63	10	83	1	0.303
	42	70	12		1310SK;H 310X		54	67	5	100	2	0.303
	55	70	12		2310SK;H2310X		56	65	5	100	2	0.362
50	37	75	12		1211SK;H 211X		60	70	6	91.5	1.5	0.308

1) Indicates adapter mass.

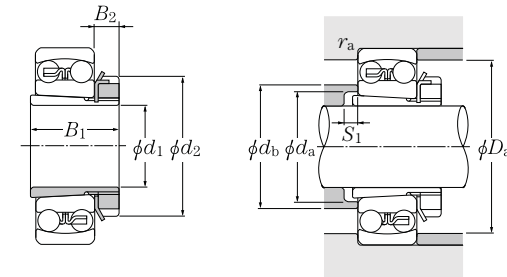
Note: 1. Refer to pages B-82 to B-85 for bearing dimensions, basic rated loads, and mass.

2. Adapters for series 12 bearings can also be used with H2 and H3 series bearings. Caution: the  $B_1$  dimension of H3 series bearings is longer than that of H2 series bearings.

3. Adapter numbers which are appended with the code "X" indicate narrow slit type adapters which use washers with straight inner tabs.

4. Refer to pages D-2 to D-7 and D-12 to D-14 for adapter locknut and washer dimensions.

(For self-aligning ball bearings)



d 50 ~ 85mm

	Boundary dimensions				Numbers		Installation-related dimensions					Mass <sup>1)</sup>
	mm				Bearing	Adapter	$d_a$	$d_b$	mm $S_1$	$D_a$	$r_{as}$	kg
	$d_1$	$B_1$	$d_2$	$B_2$			Min.	Max.	Min.	Max.	Max.	(approx.)
50	45	75	12		2211SK;H 311X		60	69	11	91.5	1.5	0.345
	45	75	12		1311SK;H 311X		60	73	6	110	2	0.345
	59	75	12		2311SK;H2311X		61	71	6	110	2	0.42
55	38	80	13		1212SK;H 212X		64	76	5	101.5	1.5	0.346
	47	80	13		2212SK;H 312X		65	75	9	101.5	1.5	0.394
	47	80	13		1312SK;H 312X		65	79	5	118	2	0.394
	62	80	13		2312SK;H2312X		66	77	5	118	2	0.481
60	40	85	14		1213SK;H 213X		70	83	5	111.5	1.5	0.401
	50	85	14		2213SK;H 313X		70	81	8	111.5	1.5	0.458
	50	85	14		1313SK;H 313X		70	85	5	128	2	0.458
	65	85	14		2313SK;H2313X		72	84	5	128	2	0.557
65	43	98	15		1215SK;H 215X		80	93	5	121.5	1.5	0.707
	55	98	15		2215SK;H 315X		80	93	12	121.5	1.5	0.831
	55	98	15		1315SK;H 315X		80	97	5	148	2	0.831
	73	98	15		2315SK;H2315X		82	96	5	148	2	1.05
70	46	105	17		1216SK;H 216X		85	100	5	130	2	0.882
	59	105	17		2216SK;H 316X		86	98	12	130	2	1.03
	59	105	17		1316SK;H 316X		86	103	5	158	2	1.03
	78	105	17		2316SK;H2316X		87	103	5	158	2	1.28
75	50	110	18		1217SK;H 217X		90	106	6	140	2	1.02
	63	110	18		2217SK;H 317X		91	104	12	140	2	1.18
	63	110	18		1317SK;H 317X		91	110	6	166	2.5	1.18
	82	110	18		2317SK;H2317X		94	110	6	166	2.5	1.45
80	52	120	18		1218SK;H 218X		95	111	6	150	2	1.19
	65	120	18		2218SK;H 318X		96	112	10	150	2	1.37
	65	120	18		1318SK;H 318X		96	116	6	176	2.5	1.37
	86	120	18		2318SK;H2318X		99	117	6	176	2.5	1.69
85	55	125	19		1219SK;H 219X		101	118	7	158	2	1.37
	68	125	19		2219SK;H 319X		102	117	9	158	2	1.56

1) Indicates adapter mass.

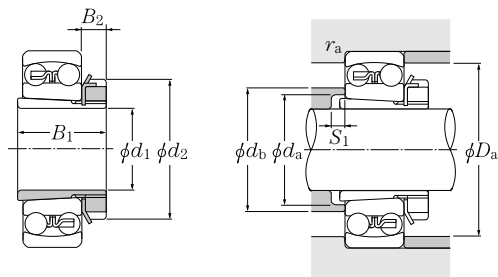
Note: 1. Refer to pages B-84 to B-87 for bearing dimensions, basic rated loads, and mass.

2. Adapters for series 12 bearings can also be used with H2 and H3 series bearings. Caution: the  $B_1$  dimension of H3 series bearings is longer than that of H2 series bearings.

3. Adapter numbers which are appended with the code "X" indicate narrow slit type adapters which use washers with straight inner tabs.

4. Refer to pages D-2 to D-7 and D-12 to D-14 for adapter locknut and washer dimensions.

(For self-aligning ball bearings)



a 85 ~ 100mm

	Boundary dimensions			Numbers		Installation-related dimensions					Mass <sup>1)</sup>
	mm			Bearing	Adapter	$d_a$ Min.	$d_b$ Max.	$S_1$ mm Min.	$D_a$ Max.	$r_{as}$ Max.	kg (approx.)
<b>85</b>	68	125	19	1319SK; <b>H 319X</b>		102	123	7	186	2.5	1.56
	90	125	19	2319SK; <b>H2319X</b>		105	123	7	186	2.5	1.92
<b>90</b>	58	130	20	1220SK; <b>H 220X</b>		106	125	7	168	2	1.49
	71	130	20	2220SK; <b>H 320X</b>		107	123	8	168	2	1.69
	71	130	20	1320SK; <b>H 320X</b>		107	130	7	201	2.5	1.69
	97	130	20	2320SK; <b>H2320X</b>		110	129	7	201	2.5	2.15
<b>100</b>	63	145	21	1222SK; <b>H 222X</b>		116	138	7	188	2	1.93
	77	145	21	2222SK; <b>H 322X</b>		117	137	6	188	2	2.18
	77	145	21	1322SK; <b>H 322X</b>		117	150	9	226	2.5	2.18
	105	145	21	2322SK; <b>H2322X</b>		121	142	7	226	2.5	2.74

1) Indicates adapter mass.

Note: 1. Refer to pages B-86 to B-87 for bearing dimensions, basic rated loads, and mass.

2. Adapters for series 12 bearings can also be used with H2 and H3 series bearings. Caution: the  $B_1$  dimension of H3 series bearings is longer than that of H2 series bearings.

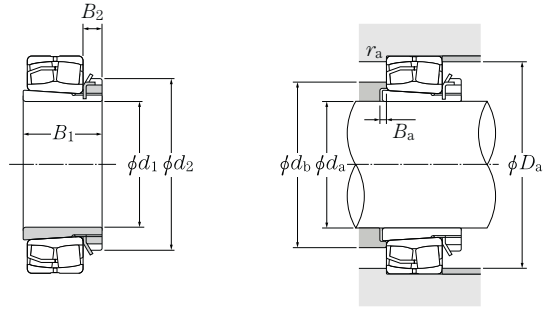
3. Adapter numbers which are appended with the code "X" indicate narrow slit type adapters which use washers with straight inner tabs.

4. Refer to pages D-2 to D-9 and D-12 to D-14 for adapter locknut and washer dimensions.

## Adapters

WBW

(For spherical roller bearings)



$d_1$  35 ~ 70mm

	Boundary dimensions				Numbers <sup>1)</sup>		Installation-related dimensions					Mass <sup>2)</sup>
	mm				Bearing	Adapter	$d_a$	$d_b$	$B_a$	mm		kg
$d_1$	$B_1$	$d_2$	$B_2$			Min.	Max.	Min.	Min.	Max.	$r_{as}$	(approx.)
35	36	58	10	* 22208EAKD1;H 308X		44	50	5	71	73	1.1	0.189
	36	58	10	21308CK;H 308X		44	52	5	76	81.5	1.5	0.189
	46	58	10	* 22308EAKD1;H2308X		45	52	5	78	81	1.5	0.224
40	39	65	11	* 22209EAKD1;H 309X		49	54	8	76	78	1.1	0.248
	39	65	11	21309CK;H 309X		49	57	5	85	91.5	1.5	0.248
	50	65	11	* 22309EAKD1;H2309X		50	58	5	87	91	1.5	0.280
45	42	70	12	* 22210EAKD1;H 310X		54	59	10	81	83	1.1	0.303
	42	70	12	21310CK;H 310X		54	65	5	93	100	2	0.303
	55	70	12	* 22310EAKD1;H2310X		56	63	5	95	99	2	0.362
50	45	75	12	* 22211EAKD1;H 311X		60	66	11	90	91	1.5	0.345
	45	75	12	21311K;H 311X		60	73	6	102	110	2	0.345
	59	75	12	* 22311EAKD1;H2311X		61	68	6	104	109	2	0.420
55	47	80	13	* 22212EAKD1;H 312X		65	71	9	99	101	1.5	0.394
	47	80	13	21312K;H 312X		65	78	5	109	118	2	0.394
	62	80	13	* 22312EAKD1;H2312X		66	75	5	113	118	2.1	0.481
60	50	85	14	* 22213EAKD1;H 313X		70	78	8	107	111	1.5	0.458
	50	85	14	21313K;H 313X		70	85	5	119	128	2	0.458
	65	85	14	* 22313EAKD1;H2313X		72	81	5	122	128	2.1	0.557
65	55	98	15	* 22215EAKD1;H 315X		80	88	12	118	121	1.5	0.831
	55	98	15	21315K;H 315X		80	99	5	136	148	2	0.831
	73	98	15	* 22315EAKD1;H2315X		82	91	5	139	148	2.1	1.05
70	59	105	17	* 22216EAKD1;H 316X		86	94	12	127	129	2	1.03
	59	105	17	21316K;H 316X		86	105	5	144	158	2	1.03
	78	105	17	* 22316EAKD1;H2316X		87	98	5	148	158	2.1	1.28

1) Bearing numbers marked "\*" designate ULTAGE Series. 2) Indicates the adapter mass.

Note: 1. Refer to pages B-218 to B-221 for bearing dimensions, rated loads, and mass.

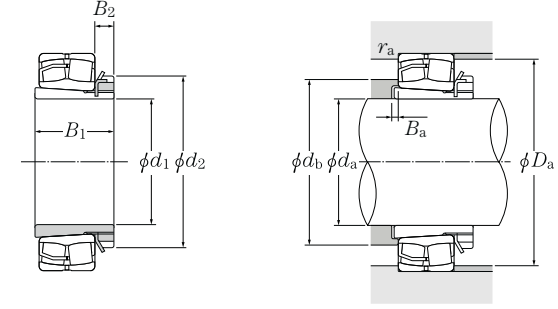
2. Refer to pages D-2 to D-10 and D-12 to D-14 for adapter locknut and washer dimensions.

3. Adapter numbers which are appended with the code "X" indicate narrow slit type adapters which use washers with straight inner tabs.

## Adapters

WBW

(For spherical roller bearings)



$d_1$  75 ~ 115mm

	Boundary dimensions				Numbers <sup>1)</sup>		Installation-related dimensions					Mass <sup>2)</sup>
	mm				Bearing	Adapter	$d_a$	$d_b$	$B_a$	mm		kg
$d_1$	$B_1$	$d_2$	$B_2$			Min.	Max.	Min.	Min.	Max.	$r_{as}$	(approx.)
75	63	110	18	* 22217EAKD1;H 317X		91	100	12	137	139	2	1.18
	63	110	18	21317K;H 317X		91	111	6	152	166	2.5	1.18
	82	110	18	* 22317EAKD1;H2317X		94	107	6	157	166	3	1.45
80	65	120	18	* 22218EAKD1;H 318X		96	105	10	144	149	2	1.37
	86	120	18	* 23218EMKD1;H2318X		99	104	18	141	149	2	1.69
	65	120	18	21318K;H 318X		96	119	6	162	176	2.5	1.37
	86	120	18	* 22318EAKD1;H2318X		99	110	6	166	176	3	1.69
85	68	125	19	* 22219EAKD1;H 319X		102	110	9	153	158	2.1	1.56
	68	125	19	21319K;H 319X		102	127	7	171	186	2.5	1.56
	90	125	19	* 22319EAKD1;H2319X		105	120	7	174	186	3	1.92
90	71	130	20	* 22220EAKD1;H 320X		107	118	8	161	168	2.1	1.69
	97	130	20	* 23220EMKD1;H2320X		110	118	19	159	168	2.1	2.15
	71	130	20	21320K;H 320X		107	133	7	179	201	2.5	1.69
	97	130	20	* 22320EAKD1;H2320X		110	127	7	187	201	3	2.15
100	81	145	21	* 23122EAKD1;H3122X		117	125	7	161	169	2	2.25
	77	145	21	* 22222EAKD1;H 322X		117	130	6	179	188	2.1	2.18
	105	145	21	* 23222EMKD1;H2322X		121	130	17	176	188	2.1	2.74
	77	145	21	21322K;H 322X		117	146	9	203	226	2.5	2.18
	105	145	21	* 22322EAKD1;H2322X		121	139	7	209	226	3	2.74
110	72	145	22	* 23024EAKD1;H3024X		127	134	7	165	171	2	1.93
	88	155	22	* 23124EAKD1;H3124X		128	138	7	179	189	2	2.64
	88	155	22	* 22224EAKD1;H2324X		128	141	11	193	203	2.1	2.64
	112	155	22	* 23224EMKD1;H2324X		131	139	17	190	203	2.1	3.19
	112	155	22	* 22324EAKD1;H2324X		131	156	7	225	246	3	3.19
115	80	155	23	* 23026EAKD1;H3026		137	145	8	183	191	2	2.85
	92	165	23	* 23126EAKD1;H3126		138	148	8	189	199	2	3.66
	92	165	23	* 22226EAKD1;H2326		138	151	8	206	216	3	3.66
	121	165	23	* 23226EMKD1;H2326		142	150	21	203	216	3	4.6
	121	165	23	* 22326EAKD1;H2326		142	164	8	243	263	4	4.6

1) Bearing numbers marked "\*" designate ULTAGE Series. 2) Indicates the adapter mass.

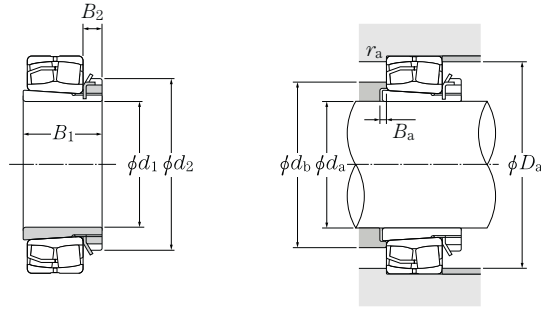
Note: 1. Refer to pages B-220 to B-225 for bearing dimensions, rated loads, and mass.

2. Refer to pages D-2 to D-10 and D-12 to D-14 for adapter locknut and washer dimensions.

3. Adapter numbers which are appended with the code "X" indicate narrow slit type adapters which use washers with straight inner tabs.

# Adapters

(For spherical roller bearings)



d<sub>1</sub> 125 ~ 170mm

	Boundary dimensions				Numbers <sup>1)</sup>	Installation-related dimensions							Mass <sup>2)</sup>
	mm					d <sub>a</sub> Min.	d <sub>b</sub> Max.	mm			r <sub>as</sub> Max.	kg (approx.)	
d <sub>1</sub>	B <sub>1</sub>	d <sub>2</sub>	B <sub>2</sub>	Bearing	Adapter			d <sub>a</sub>	d <sub>b</sub>	B <sub>a</sub>			D <sub>a</sub>
125	82	165	24		* 23028EAKD1;H3028	147	155	8	193	201	2	3.16	
	97	180	24		* 23128EAKD1;H3128	149	159	8	203	213	2.1	4.34	
	97	180	24		* 22228EAKD1;H3128	149	163	8	224	236	3	4.34	
	131	180	24		* 23228EMKD1;H2328	152	162	22	220	236	3	5.55	
	131	180	24		* 22328EAKD1;H2328	152	181	8	261	283	4	5.55	
135	87	180	26		* 23030EAKD1;H3030	158	167	8	207	214	2.1	3.89	
	111	195	26		* 23130EAKD1;H3130	160	171	8	223	238	2.1	5.52	
	111	195	26		* 22230EAKD1;H3130	160	177	15	242	256	3	5.52	
	139	195	26		* 23230EMKD1;H2330	163	174	20	237	256	3	6.63	
	139	195	26		* 22330EMKD1;H2330	163	188	8	279	303	4	6.63	
140	93	190	28		* 23032EAKD1;H3032	168	177	8	221	229	2.1	5.21	
	119	210	28		* 23132EAKD1;H3132	170	185	8	240	258	2.1	7.67	
	119	210	28		* 22232EAKD1;H3132	170	190	14	260	276	3	7.67	
	147	210	28		* 23232EMKD1;H2332	174	187	18	254	276	3	9.14	
	147	210	28		* 22332EMKD1;H2332	174	205	8	296	323	4	9.14	
150	101	200	29		* 23034EAKD1;H3034	179	190	8	238	249	2.1	5.99	
	122	220	29		* 23134EAKD1;H3134	180	195	8	250	268	2.1	8.38	
	122	220	29		* 22234EAKD1;H3134	180	201	10	277	293	4	8.38	
	154	220	29		* 23234EMKD1;H2334	185	199	18	272	293	4	10.2	
	154	220	29		* 22334EMKD1;H2334	185	223	8	313	343	4	10.2	
160	109	210	30		* 23036EAKD1;H3036	189	201	8	255	269	2.1	6.83	
	131	230	30		* 23136EAKD1;H3136	191	205	8	267	286	3	9.5	
	131	230	30		* 22236EMKD1;H3136	191	209	18	287	303	4	9.5	
	161	230	30		* 23236EMKD1;H2336	195	210	22	282	303	4	11.3	
	161	230	30		* 22336EMKD1;H2336	195	229	8	329	363	4	11.3	
170	112	220	31		* 23038EAKD1;H3038	199	213	9	266	279	2.1	7.45	
	141	240	31		* 23138EMKD1;H3138	202	221	9	284	306	3	10.8	
	141	240	31		* 22238EMKD1;H3138	202	222	21	305	323	4	10.8	
	169	240	31		* 23238EMKD1;H2338	206	220	21	299	323	4	12.6	
	169	240	31		* 22338EMKD1;H2338	206	247	9	346	380	5	12.6	

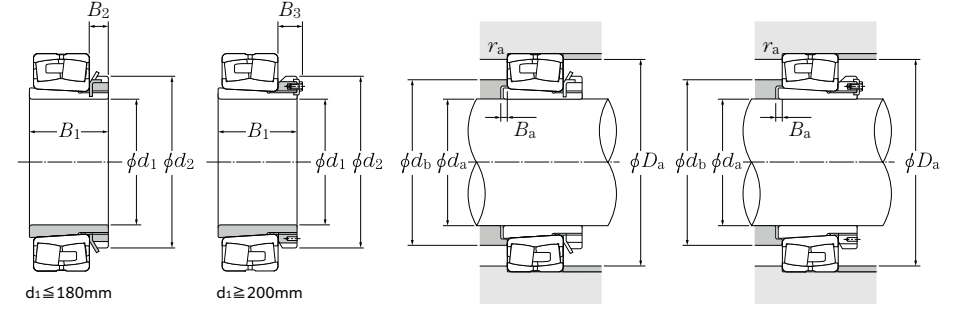
1) Bearing numbers marked "\*" designate ULTAGE Series. 2) Indicates the adapter mass.

Note: 1. Refer to pages B-224 to B-227 for bearing dimensions, rated loads, and mass.

2. Refer to pages D-2 to D-10 and D-12 to D-14 for adapter locknut and washer dimensions.

# Adapters

(For spherical roller bearings)



d<sub>1</sub> 180 ~ 300mm

	Boundary dimensions				Numbers <sup>1)</sup>	Installation-related dimensions							Mass <sup>2)</sup>
	mm					d <sub>a</sub> Min.	d <sub>b</sub> Max.	mm			r <sub>as</sub> Max.	kg (approx.)	
d <sub>1</sub>	B <sub>1</sub>	d <sub>2</sub>	B <sub>2</sub>	Bearing	Adapter			d <sub>a</sub>	d <sub>b</sub>	B <sub>a</sub>			D <sub>a</sub>
180	120	240	32	-	* 23040EMKD1;H3040	210	223	10	283	299	2.1	9.19	
	150	250	32	-	* 23140EMKD1;H3140	212	231	10	301	326	3	12.1	
	150	250	32	-	* 22240EMKD1;H3140	212	234	24	323	343	4	12.1	
	176	250	32	-	* 23240EMKD1;H2340	216	232	20	315	343	4	13.9	
	176	250	32	-	* 22340EMKD1;H2340	216	265	10	364	400	5	13.9	
200	126	260	-	41	* 23044EMKD1;H3044	231	246	12	310	327	3	10.3	
	158	280	-	44	* 23144EMKD1;H3144	233	252	10	328	353	4	14.7	
	158	280	-	44	* 22244EMKD1;H3144	233	264	22	358	383	4	14.7	
	183	280	-	44	* 23244EMKD1;H2344	236	261	11	349	383	4	16.7	
	183	280	-	44	* 22344EMKD1;H2344	236	277	10	388	440	5	16.7	
220	133	290	-	46	* 23048EMKD1;H3048	251	267	11	329	347	3	13.2	
	169	300	-	46	* 23148EMKD1;H3148	254	276	11	356	383	4	17.3	
	169	300	-	46	* 22248EMKD1;H3148	254	288	19	383	423	4	17.3	
	196	300	-	46	* 23248EMKD1;H2348	257	284	6	372	423	4	19.7	
	196	300	-	46	* 22348EMKD1;H2348	257	299	11	421	480	5	19.7	
240	145	310	-	46	* 23052EMKD1;H3052	272	291	13	366	385	4	15.3	
	187	330	-	49	* 23152EMKD1;H3152	276	302	11	380	423	4	22	
	187	330	-	49	* 22252EMKD1;H3152	276	312	25	415	460	5	22	
	208	330	-	49	* 23252EMKD1;H2352	278	310	2	405	460	5	24.2	
	208	330	-	49	* 22352EMKD1;H2352	278	324	11	456	514	6	24.2	
260	152	330	-	50	* 23056EMKD1;H3056	292	310	12	386	405	4	17.7	
	192	350	-	51	* 23156EMKD1;H3156	296	322	12	403	440	5	24.5	
	192	350	-	51	* 22256EMKD1;H3156	296	333	28	437	480	5	24.5	
	221	350	-	51	* 23256EMKD1;H2356	299	331	11	426	480	5	27.8	
	221	350	-	51	* 22356EMKD1;H2356	299	349	12	489	554	6	27.8	
280	168	360	-	54	* 23060EMKD1;H3060	313	338	12	413	445	4	22.8	
	208	380	-	53	* 23160EMKD1;H3160	317	345	12	436	480	5	30.2	
	208	380	-	53	* 22260EMKD1;H3160	317	358	32	469	520	5	30.2	
	240	380	-	53	* 23260EMKD1;H3260	321	352	12	461	520	5	34.1	
300	171	380	-	55	* 23064EMKD1;H3064	334	360	13	433	465	4	24.6	
	226	400	-	56	* 23164EMKD1;H3164	339	373	13	468	520	5	34.9	
	226	400	-	56	* 22264EMKD1;H3164	339	383	39	510	560	5	34.9	

1) Bearing numbers marked "\*" designate ULTAGE Series. 2) Indicates the adapter mass.

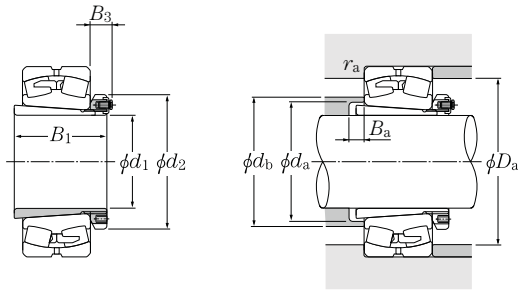
Note: 1. Refer to pages B-228 to B-231 for bearing dimensions, rated loads, and mass.

2. Refer to pages D-2 to D-10 and D-12 to D-14 for adapter locknut, washer, and lockplate dimensions.



## Adapters

(For spherical roller bearings)



$d_1$  300 ~ 470mm

$d_1$	Boundary dimensions			Numbers <sup>1)</sup>		Installation-related dimensions					Mass <sup>2)</sup> kg (approx.)	
	mm			Bearing	Adapter	$d_a$	$d_b$	$B_a$	mm			$r_{as}$
	$B_1$	$d_2$	$B_2$			Min.	Max.	Min.	Min.	Max.	Max.	
<b>300</b>	258	400	56	*	23264EMKD1;H3264	343	376	13	493	560	5	39.3
<b>320</b>	187	400	58	*	23068EMKD1;H3068	355	384	14	466	502	5	28.7
	254	440	72	*	23168EMKD1;H3168	360	393	14	500	560	5	49.5
	288	440	72		23268BK;H3268	364	410	14	524	592	5	54.6
<b>340</b>	188	420	58	*	23072EMKD1;H3072	375	405	14	488	522	5	30.5
	259	460	75		23172BK;H3172	380	417	14	520	578	4	54.2
	299	460	75		23272BK;H3272	385	429	14	551	622	5	60.2
<b>360</b>	193	450	62	*	23076EMKD1;H3076	396	425	15	509	542	5	35.8
	264	490	77		23176BK;H3176	401	436	15	540	598	4	61.7
	310	490	77		23276BK;H3276	405	453	15	575	652	5	69.6
<b>380</b>	210	470	66		23080BK;H3080	417	451	15	542	578	4	41.3
	272	520	82		23180BK;H3180	421	458	15	568	622	5	70.6
	328	520	82		23280BK;H3280	427	473	15	612	692	5	81
<b>400</b>	212	490	66		23084BK;H3084	437	471	16	562	598	4	43.7
	304	540	90		23184BK;H3184	443	488	16	611	672	5	84.2
<b>410</b>	228	520	77		23088BK;H3088	458	490	17	585	622	5	65.2
	307	560	90		23188BK;H3188	464	504	17	627	692	5	104
<b>430</b>	234	540	77		23092BK;H3092	478	512	17	613	652	5	69.5
	326	580	95		23192BK;H3192	485	534	17	660	724	6	116
<b>450</b>	237	560	77		23096BK;H3096	499	532	18	633	672	5	73.3
	335	620	95		23196BK;H3196	505	554	18	687	754	6	133
<b>470</b>	247	580	85		230/500BK;H30/500	519	552	18	653	692	5	81.8
	356	630	100		231/500BK;H31/500	527	580	18	724	794	6	143

1) Bearing numbers marked "\*" designate ULTAGE Series. 2) Indicates the adapter mass.

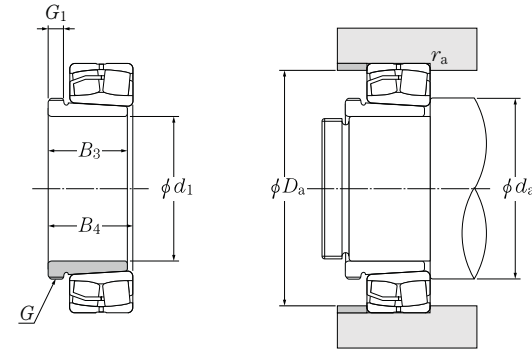
Note: 1. Refer to pages B-230 to B-235 for bearing dimensions, rated loads, and mass.

2. Refer to pages D-2 to D-10 and D-12 to D-14 for adapter locknut and lockplate dimensions.

B-244

## Withdrawal Sleeves

(For spherical roller bearings)



$d_1$  35 ~ 70 mm

$d_1$	Boundary dimensions				Numbers <sup>3)</sup>		Installation-related dimensions					Mass <sup>4)</sup> kg (approx.)	Applied nut number Bearing number <sup>5)</sup>
	mm				Bearing	Withdrawal sleeve	mm			$r_{as}$			
	Thread nominal dimension <sup>1)</sup>	$B_3$	$G_1$	$B_4$ <sup>2)</sup>			Min.	Max.	Min.	Max.	Max.		
<b>35</b>	M45x1.5	29	6	32	*	22208EAKD1 ;AH 308	47	50	71	73	1.1	0.09	AN09
	M45x1.5	29	6	32		21308CK ;AH 308	48.5	52	76	81.5	1.5	0.09	AN09
	M45x1.5	40	7	43	*	22308EAKD1 ;AH 2308	49	52	78	81	1.5	0.128	AN09
<b>40</b>	M50x1.5	31	6	34	*	22209EAKD1 ;AH 309	52	54	76	78	1.1	0.109	AN10
	M50x1.5	31	6	34		21309CK ;AH 309	53.5	57	85	91.5	1.5	0.109	AN10
	M50x1.5	44	7	47	*	22309EAKD1 ;AH 2309	54	58	87	91	1.5	0.164	AN10
<b>45</b>	M55x2	35	7	38	*	22210EAKD1 ;AHX 310	57	59	81	83	1.1	0.137	AN11
	M55x2	35	7	38		21310CK ;AHX 310	60	65	93	100	2	0.137	AN11
	M55x2	50	9	53	*	22310EAKD1 ;AHX 2310	61	63	95	99	2	0.209	AN11
<b>50</b>	M60x2	37	7	40	*	22211EAKD1 ;AHX 311	64	66	90	91	1.5	0.161	AN12
	M60x2	37	7	40		21311K ;AHX 311	65	73	102	110	2	0.161	AN12
	M60x2	54	10	57	*	22311EAKD1 ;AHX 2311	66	68	104	109	2	0.253	AN12
<b>55</b>	M65x2	40	8	43	*	22212EAKD1 ;AHX 312	69	71	99	101	1.5	0.189	AN13
	M65x2	40	8	43		21312K ;AHX 312	72	78	109	118	2.1	0.189	AN13
	M65x2	58	11	61	*	22312EAKD1 ;AHX 2312	72	75	113	118	2.1	0.297	AN13
<b>60</b>	M75x2	42	8	45	*	22213EAKD1 ;AH 313	74	78	107	111	1.5	0.253	AN15
	M75x2	42	8	45		21313K ;AH 313	77	85	119	128	2.1	0.253	AN15
	M75x2	61	12	64	*	22313EAKD1 ;AH 2313	77	81	122	128	2.1	0.395	AN15
<b>65</b>	M80x2	43	8	47	*	22214EAKD1 ;AH 314	79	84	113	116	1.5	0.28	AN16
	M80x2	43	8	47		21314K ;AH 314	82	91	126	138	2.1	0.28	AN16
	M80x2	64	12	68	*	22314EAKD1 ;AHX 2314	82	85	131	138	2.1	0.466	AN16
<b>70</b>	M85x2	45	8	49	*	22215EAKD1 ;AH 315	84	88	118	121	1.5	0.313	AN17
	M85x2	45	8	49		21315K ;AH 315	87	99	136	148	2.1	0.313	AN17
	M85x2	68	12	72	*	22315EAKD1 ;AHX 2315	87	91	139	148	2.1	0.534	AN17

1) Standard thread shapes and dimensions are as per JIS B 0205-1 and JIS B 0205-4 (general metric thread).

2) Indicates reference dimensions before withdrawal sleeves are attached.

3) Bearing numbers marked "\*" designate ULTAGE Series.

4) Indicates withdrawal sleeve mass.

5) Indicates the number of nuts to be used at the time of disassembly. Refer to pages D-2 to D-10 for nut dimensions.

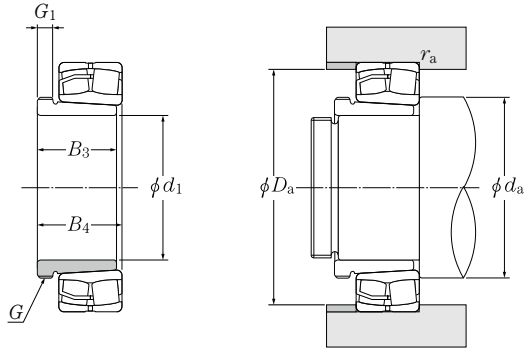
Note: Refer to pages B-218 to B-221 for bearing dimensions, rated loads, and mass.

B-245

## Withdrawal Sleeves

WBW

(For spherical roller bearings)



d<sub>1</sub> 75 ~ 115mm

d <sub>1</sub>	Boundary dimensions mm				Numbers <sup>3)</sup>	Installation-related dimensions mm					Mass <sup>4)</sup> kg	Applied nut number Bearing number <sup>5)</sup>	
	Thread nominal dimension <sup>1)</sup> G	B <sub>3</sub>	G <sub>1</sub>	B <sub>4</sub> <sup>2)</sup>		Bearing	Withdrawal sleeve	d <sub>a</sub> Min.	d <sub>a</sub> Max.	D <sub>a</sub> Min.			D <sub>a</sub> Max.
75	M90×2	48	8	52	* 22216EAKD1	;AH 316	91	94	127	129	2	0.365	AN18
	M90×2	48	8	52	21316K	;AH 316	92	105	144	158	2	0.365	AN18
	M90×2	71	12	75	* 22316EAKD1	;AHX 2316	92	98	148	158	2.1	0.597	AN18
80	M95×2	52	9	56	* 22217EAKD1	;AHX 317	96	100	137	139	2	0.429	AN19
	M95×2	52	9	56	21317K	;AHX 317	99	111	152	166	2.5	0.429	AN19
	M95×2	74	13	78	* 22317EAKD1	;AHX 2317	99	107	157	166	3.0	0.67	AN19
85	M100×2	53	9	57	* 22218EAKD1	;AHX 318	101	105	144	149	2	0.461	AN20
	M100×2	63	10	67	* 23218EMKD1	;AHX 3218	101	104	141	149	2	0.576	AN20
	M100×2	53	9	57	21318K	;AHX 318	104	119	162	176	2.5	0.461	AN20
	M100×2	79	14	83	* 22318EAKD1	;AHX 2318	104	110	166	176	3	0.779	AN20
90	M105×2	57	10	61	* 22219EAKD1	;AHX 319	107	110	153	158	2.1	0.532	AN21
	M105×2	57	10	61	21319K	;AHX 319	109	127	171	186	2.5	0.532	AN21
	M105×2	85	16	89	* 22319EAKD1	;AHX 2319	109	120	174	186	3	0.886	AN21
95	M110×2	59	10	63	* 22220EAKD1	;AHX 320	112	118	161	168	2.1	0.582	AN22
	M110×2	73	11	77	* 23220EMKD1	;AHX 3220	112	118	159	168	2.1	0.767	AN22
	M110×2	59	10	63	21320K	;AHX 320	114	133	179	201	2.5	0.582	AN22
	M110×2	90	16	94	* 22320EAKD1	;AHX 2320	114	127	187	201	3	0.998	AN22
105	M120×2	68	11	72	* 23122EAKD1	;AHX 3122	121	125	161	169	2	0.76	AN24
	M115×2	82	13	91	* 24122EMK30D1	;AH 24122	121	121	158	169	2	0.73	AN23
	M120×2	68	11	72	* 22222EAKD1	;AHX 3122	122	130	179	188	2.1	0.76	AN24
	M125×2	82	11	86	* 23222EMKD1	;AHX 3222	122	130	176	188	2.1	1.04	AN25
	M120×2	63	12	67	21322K	;AHX 322	124	146	203	226	2.5	0.663	AN24
	M125×2	98	16	102	* 22322EAKD1	;AHX 2322	124	139	209	226	3	1.35	AN25
115	M130×2	60	13	64	* 23024EAKD1	;AHX 3024	129	134	165	171	2	0.75	AN26
	M125×2	73	13	82	* 24024EMK30D1	;AH 24024	129	132	161	171	2	0.65	AN25
	M130×2	75	12	79	* 23124EAKD1	;AHX 3124	131	138	179	189	2	0.95	AN26
	M130×2	93	13	102	* 24124EMK30D1	;AH 24124	131	136	173	189	2	1	AN26

1) Standard thread shapes and dimensions are as per JIS B 0205-1 and JIS B 0205-4 (general metric thread).

2) Indicates reference dimensions before withdrawal sleeves are attached.

3) Bearing numbers marked "\*" designate ULTAGE Series.

4) Indicates withdrawal sleeve mass.

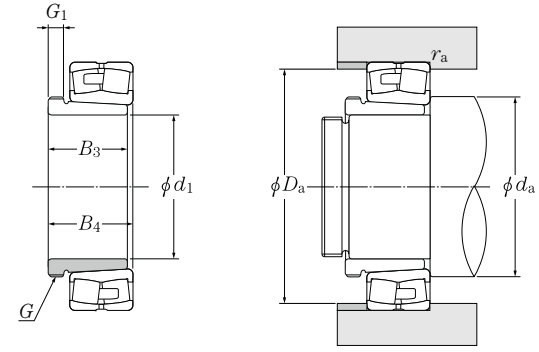
5) Indicates the number of nuts to be used at the time of disassembly. Refer to pages D-2 to D-10 for nut dimensions.

Note: Refer to pages B-220 to B-223 for bearing dimensions, rated loads, and mass.

## Withdrawal Sleeves

WBW

(For spherical roller bearings)



d<sub>1</sub> 115 ~ 150mm

d <sub>1</sub>	Boundary dimensions mm				Numbers <sup>3)</sup>	Installation-related dimensions mm					Mass <sup>4)</sup> kg	Applied nut number Bearing number <sup>5)</sup>		
	Thread nominal dimension <sup>1)</sup> G	B <sub>3</sub>	G <sub>1</sub>	B <sub>4</sub> <sup>2)</sup>		Bearing	Withdrawal sleeve	d <sub>a</sub> Min.	d <sub>a</sub> Max.	D <sub>a</sub> Min.			D <sub>a</sub> Max.	r <sub>as</sub> Max. (approx.)
115	M130×2	75	12	79	* 22224EAKD1	;AHX 3124	132	141	193	203	2.1	0.95	AN26	
	M135×2	90	13	94	* 23224EMKD1	;AHX 3224	132	139	190	203	2.1	1.3	AN27	
	M135×2	105	17	109	* 22324EAKD1	;AHX 2324	134	156	225	246	3	1.6	AN27	
125	M140×2	67	14	71	* 23026EAKD1	;AHX 3026	139	145	183	191	2	0.93	AN28	
	M135×2	83	14	93	* 24026EMK30D1	;AH 24026	139	143	178	191	2	0.84	AN27	
	M140×2	78	12	82	* 23126EAKD1	;AHX 3126	141	148	189	199	2	1.08	AN28	
	M140×2	94	14	104	* 24126EMK30D1	;AH 24126	141	146	183	199	2	1.11	AN28	
135	M140×2	78	12	82	* 22226EAKD1	;AHX 3126	144	151	206	216	3	1.08	AN28	
	M145×2	98	15	102	* 23226EMKD1	;AHX 3226	144	150	203	216	3	1.58	AN29	
	M145×2	115	19	119	* 22326EAKD1	;AHX 2326	147	164	243	263	4	1.97	AN29	
	135	M150×2	68	14	73	* 23028EAKD1	;AHX 3028	149	155	193	201	2	1.01	AN30
M145×2		83	14	93	* 24028EMK30D1	;AH 24028	149	153	188	201	2	0.91	AN29	
M150×2		83	14	88	* 23128EAKD1	;AHX 3128	152	159	203	213	2.1	1.28	AN30	
M150×2		99	14	109	* 24128EMK30D1	;AH 24128	152	156	198	213	2.1	1.25	AN30	
M150×2		83	14	88	* 22228EAKD1	;AHX 3128	154	163	224	236	3	1.28	AN30	
145	M155×3	104	15	109	* 23228EMKD1	;AHX 3228	154	162	220	236	3	1.84	AN31	
	M155×3	125	20	130	* 22328EAKD1	;AHX 2328	157	181	261	283	4	2.33	AN31	
	145	M160×3	72	15	77	* 23030EAKD1	;AHX 3030	161	167	207	214	2.1	1.15	AN32
M155×3		90	15	101	* 24030EMK30D1	;AH 24030	161	165	202	214	2.1	1.04	AN31	
M165×3		96	15	101	* 23130EAKD1	;AHX 3130	162	171	223	238	2.1	1.79	AN33	
M160×3		115	15	126	* 24130EMK30D1	;AH 24130	162	168	216	238	2.1	1.56	AN32	
M165×3		96	15	101	* 22230EAKD1	;AHX 3130	164	177	242	256	3	1.79	AN33	
M165×3		114	17	119	* 23230EMKD1	;AHX 3230	164	174	237	256	3	2.22	AN33	
150	M165×3	135	24	140	* 22330EMKD1	;AHX 2330	167	188	279	303	4	2.82	AN33	
	150	M170×3	77	16	82	* 23032EAKD1	;AH 3032	171	177	221	229	2.1	2.06	AN34
		M170×3	95	15	106	* 24032EMK30D1	;AH 24032	171	175	215	229	2.1	2.33	AN34
		M180×3	103	16	108	* 23132EAKD1	;AH 3132	172	185	240	258	2.1	3.21	AN36
M170×3		124	15	135	* 24132EMK30D1	;AH 24132	172	181	232	258	2.1	3	AN34	
M180×3	103	16	108	* 22232EAKD1	;AH 3132	174	190	260	276	3	3.21	AN36		

1) Standard thread shapes and dimensions are as per JIS B 0205-1 and JIS B 0205-4 (metric trapezoidal screw thread).

2) Indicates reference dimensions before withdrawal sleeves are attached.

3) Bearing numbers marked "\*" designate ULTAGE Series.

4) Indicates withdrawal sleeve mass.

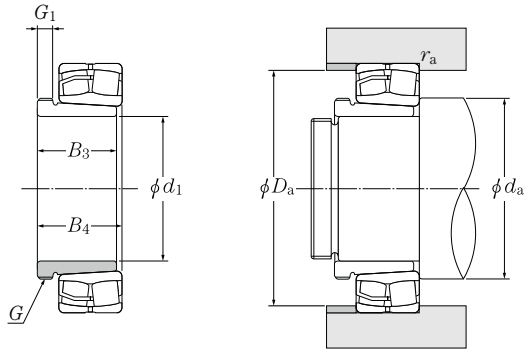
5) Indicates the number of nuts to be used at the time of disassembly. Refer to pages D-2 to D-10 for nut dimensions.

Note: Refer to pages B-222 to B-227 for bearing dimensions, rated loads, and mass.

# Withdrawal Sleeves

WBW

(For spherical roller bearings)



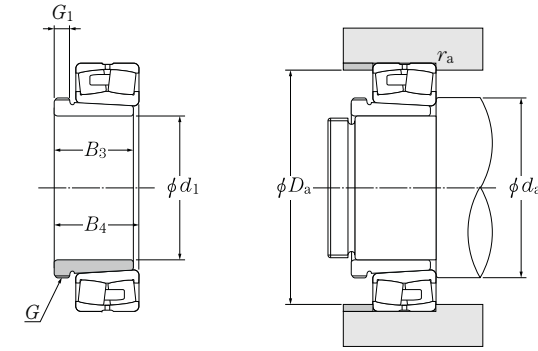
d1 150 ~ 190mm

d1	Boundary dimensions mm				Numbers <sup>3)</sup>	Installation-related dimensions mm					Mass <sup>4)</sup> kg	Applied nut number Bearing number <sup>5)</sup>	
	Thread nominal dimension <sup>1)</sup> G	B <sub>3</sub>	G <sub>1</sub>	B <sub>4</sub> <sup>2)</sup>		Bearing	Withdrawal sleeve	d <sub>a</sub>	D <sub>a</sub>	r <sub>as</sub>			
150	M180×3	124	20	130	* 23232EMKD1	;AH 3232	174	187	254	276	3	4.08	AN36
	M180×3	140	24	146	* 22332EMKD1	;AH 2332	177	205	296	323	4	4.72	AN36
160	M180×3	85	17	90	* 23034EAKD1	;AH 3034	181	190	238	249	2.1	2.43	AN36
	M180×3	106	16	117	* 24034EMK30D1	;AH 24034	181	186	231	249	2.1	2.8	AN36
	M190×3	104	16	109	* 23134EAKD1	;AH 3134	182	195	250	268	2.1	3.4	AN38
	M180×3	125	16	136	* 24134EMK30D1	;AH 24134	182	193	243	268	2.1	3.21	AN36
	M190×3	104	16	109	* 22234EMKD1	;AH 3134	187	201	277	293	4	3.4	AN38
	M190×3	134	24	140	* 23234EMKD1	;AH 3234	187	199	272	293	4	4.8	AN38
170	M190×3	146	24	152	* 22334EMKD1	;AH 2334	187	223	313	343	4	5.25	AN38
	M190×3	92	17	98	* 23036EAKD1	;AH 3036	191	201	255	269	2.1	2.81	AN38
	M190×3	116	16	127	* 24036EMK30D1	;AH 24036	191	199	248	269	2.1	3.1	AN38
	M200×3	116	19	122	* 23136EAKD1	;AH 3136	194	205	267	286	3	4.22	AN40
	M190×3	134	16	145	* 24136EMK30D1	;AH 24136	194	202	254	286	3	3.68	AN38
	M200×3	105	17	110	* 22236EMKD1	;AH 2236	197	209	287	303	4	3.73	AN40
180	M200×3	140	24	146	* 23236EMKD1	;AH 3236	197	210	282	303	4	5.32	AN40
	M200×3	154	26	160	* 22336EMKD1	;AH 2336	197	229	324	363	4	5.83	AN40
	Tr205×4	96	18	102	* 23038EAKD1	;AH 3038	201	213	266	279	2.1	3.32	HNL41
	M200×3	118	18	131	* 24038EMK30D1	;AH 24038	201	209	258	279	2.1	3.5	AN40
	Tr210×4	125	20	131	* 23138EMKD1	;AH 3138	204	221	284	306	3	4.89	HN42
	M200×3	146	18	159	* 24138EMK30D1	;AH 24138	204	216	275	306	3	4.28	AN40
190	Tr210×4	112	18	117	* 22238EMKD1	;AH 2238	207	222	305	323	4	4.25	HN42
	Tr210×4	145	25	152	* 23238EMKD1	;AH 3238	207	220	299	323	4	5.9	HN42
	Tr210×4	160	26	167	* 22338EMKD1	;AH 2338	210	247	346	380	5	6.63	HN42
	Tr215×4	102	19	108	* 23040EMKD1	;AH 3040	211	223	283	299	2.1	3.8	HNL43
190	Tr210×4	127	18	140	* 24040EMK30D1	;AH 24040	211	221	275	299	2.1	3.93	HN42
	Tr220×4	134	21	140	* 23140EMKD1	;AH 3140	214	231	301	326	3	5.49	HN44
	Tr210×4	158	18	171	* 24140EMK30D1	;AH 24140	214	224	291	326	3	5.1	HN42

# Withdrawal Sleeves

WBW

(For spherical roller bearings)



d1 190 ~ 260mm

d1	Boundary dimensions mm				Numbers <sup>3) 4)</sup>	Installation-related dimensions mm					Mass <sup>5)</sup> kg	Applied nut number Bearing number <sup>6)</sup>	
	Thread nominal dimension <sup>1)</sup> G	B <sub>3</sub>	G <sub>1</sub>	B <sub>4</sub> <sup>2)</sup>		Bearing	Withdrawal sleeve	d <sub>a</sub>	D <sub>a</sub>	r <sub>as</sub>			
190	Tr220×4	118	19	123	* 22240EMKD1	;AH 2240	217	234	323	343	4	4.68	HN44
	Tr220×4	153	25	160	* 23240EMKD1	;AH 3240	217	232	315	343	4	6.68	HN44
	Tr220×4	170	30	177	* 22340EMKD1	;AH 2340	220	265	364	400	5	7.54	HN44
200	Tr235×4	111	20	117	* 23044EMKD1	;AH 3044	233	246	310	327	3	7.4	HNL47
	Tr230×4	138	20	152	* 24044EMK30D1	;AH 24044H	233	243	302	327	3	8.25	HN46
	Tr240×4	145	23	151	* 23144EMKD1	;AH 3144	237	252	328	353	4	10.4	HN48
	Tr230×4	170	20	184	* 24144EMK30D1	;AH 24144H	237	247	317	353	4	10.2	HN46
	Tr240×4	130	20	136	* 22244EMKD1	;AH 2244	237	264	358	383	4	9.1	HN48
220	Tr240×4	181	30	189	* 23244EMKD1	;AH 2344	237	261	349	383	4	13.5	HN48
	Tr240×4	181	30	189	* 22344EMKD1	;AH 2344	240	277	388	440	5	13.5	HN48
	Tr260×4	116	21	123	* 23048EMKD1	;AH 3048	253	267	329	347	3	8.75	HNL52
	Tr250×4	138	20	153	* 24048EMK30D1	;AH 24048H	253	264	322	347	3	8.98	HN50
	Tr260×4	154	25	161	* 23148EMKD1	;AH 3148	257	276	356	383	4	12	HN52
	Tr260×4	180	20	195	* 24148EMK30D1	;AH 24148H	257	270	344	383	4	12.5	HN52
240	Tr260×4	144	21	150	* 22248EMKD1	;AH 2248	257	288	383	423	4	11.1	HN52
	Tr260×4	189	30	197	* 23248EMKD1	;AH 2348	257	284	372	423	4	15.5	HN52
	Tr260×4	189	30	197	* 22348EMKD1	;AH 2348	260	299	421	480	5	15.5	HN52
	Tr280×4	128	23	135	* 23052EMKD1	;AH 3052	275	291	366	385	4	10.7	HNL56
	Tr270×4	162	22	178	* 24052EMK30D1	;AH 24052	275	286	354	385	4	11.8	HN54
	Tr290×4	172	26	179	* 23152EMKD1	;AH 3152	277	302	380	423	4	16.2	HN58
240	Tr280×4	202	22	218	* 24152EMK30D1	;AH 24152H	277	295	371	423	4	15.4	HN56
	Tr290×4	155	23	161	* 22252EMKD1	;AH 2252	280	312	415	460	5	14	HN58
	Tr290×4	205	30	213	* 23252EMKD1	;AH 2352	280	310	405	460	5	19.6	HN58
	Tr290×4	205	30	213	* 22352EMKD1	;AH 2352	286	324	458	514	6	19.6	HN58
260	Tr300×4	131	24	139	* 23056EMKD1	;AH 3056	295	310	386	405	4	12	HNL60
	Tr290×4	162	22	179	* 24056EMK30D1	;AH 24056H	295	306	376	405	4	12.8	HN58
	Tr310×5	175	28	183	* 23156EMKD1	;AH 3156	300	322	403	440	5	17.5	HN62

1) Standard thread shapes and dimensions are as per JIS B 0205-1 and JIS B 0205-4 (general metric thread), and JIS B 0206 (metric trapezoidal screw thread).

2) Indicates reference dimensions before withdrawal sleeves are attached.

3) Bearing numbers marked "\*" designate ULTAGE Series.

4) Indicates withdrawal sleeve mass.

5) Indicates the number of nuts to be used at the time of disassembly. Refer to pages D-2 to D-10 for nut dimensions.

Note: Refer to pages B-226 to B-229 for bearing dimensions, rated loads, and mass.

1) Standard thread shapes and dimensions are as per JIS B 0206 (metric trapezoidal screw thread).

2) Indicates reference dimensions before withdrawal sleeves are attached.

3) Bearing numbers marked "\*" designate ULTAGE Series.

4) Withdrawal sleeve numbers appended with the suffix "H" signify the high pressure oil (hydraulic) design.

5) Indicates withdrawal sleeve mass.

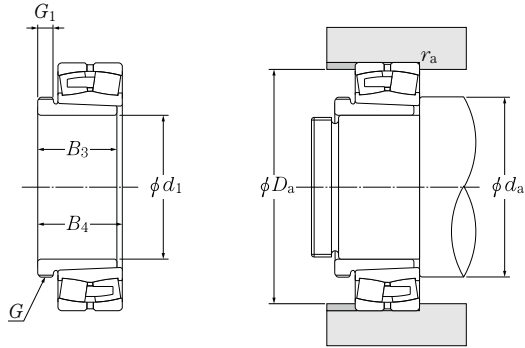
6) Indicates the number of nuts to be used at the time of disassembly. Refer to pages D-2 to D-10 for nut dimensions.

Note: Refer to pages B-228 to B-231 for bearing dimensions, rated loads, and mass.

## Withdrawal Sleeves

WBW

(For spherical roller bearings)



$d_1$  260 ~ 360mm

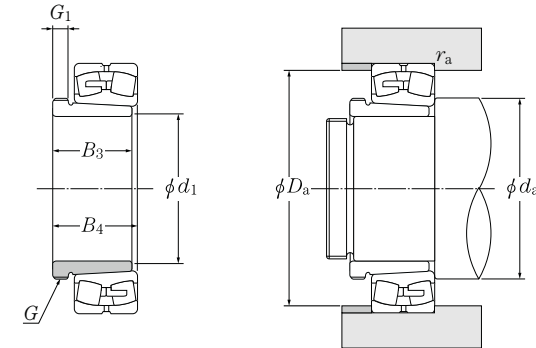
$d_1$	Boundary dimensions mm				Numbers <sup>3) 4)</sup> Bearing	Installation-related dimensions mm					Mass <sup>5)</sup> kg	Applied nut number Bearing number <sup>6)</sup>	
	Thread nominal dimension <sup>1)</sup> $G$	$B_3$	$G_1$	$B_4^{2)}$		Min.	Max.	$d_a$	$D_a$	$r_{as}$			Max. (approx.)
260	Tr300x4	202	22	219	* 24156EMKD1 ;AH	24156H	300	316	394	440	5	16.3	HN60
	Tr310x5	155	24	163	* 22256EMKD1 ;AH	2256	300	333	437	480	5	15.2	HN62
	Tr310x5	212	30	220	* 23256EMKD1 ;AH	2356	300	331	426	480	5	21.6	HN62
	Tr310x5	212	30	220	* 22356EMKD1 ;AH	2356	306	349	489	554	6	21.6	HN62
280	Tr320x5	145	26	153	* 23060EMKD1 ;AH	3060	315	338	413	445	4	14.4	HNL64
	Tr310x5	184	24	202	* 24060EMK30D1 ;AH	24060H	315	332	401	445	4	15.5	HN62
	Tr330x5	192	30	200	* 23160EMKD1 ;AH	3160	320	345	436	480	5	20.8	HN66
	Tr320x5	224	24	242	* 24160EMK30D1 ;AH	24160H	320	340	425	480	5	19.5	HN64
	Tr330x5	170	26	178	* 22260EMKD1 ;AH	2260	320	358	469	520	5	18.1	HN66
300	Tr330x5	228	34	236	* 23260EMKD1 ;AH	3260	320	352	461	520	5	26	HN66
	Tr345x5	149	27	157	* 23064EMKD1 ;AH	3064	335	360	433	465	4	16	HNL69
	Tr340x5	184	24	202	* 24064EMK30D1 ;AH	24064H	335	352	423	465	4	16.6	HN68
	Tr350x5	209	31	217	* 23164EMKD1 ;AH	3164	340	373	468	520	5	24.5	HN70
	Tr340x5	242	24	260	* 24164EMK30D1 ;AH	24164H	340	363	457	520	5	21.4	HN68
	Tr350x5	180	27	190	* 22264EMKD1 ;AH	2264	340	383	510	560	5	20.2	HN70
320	Tr350x5	246	36	254	* 23264EMKD1 ;AH	3264	340	376	493	560	5	30.6	HN70
	Tr365x5	162	28	171	* 23068EMKD1 ;AH	3068	358	384	466	502	5	19.5	HNL73
	Tr360x5	206	26	225	* 24068EMK30D1 ;AH	24068H	358	377	456	502	5	21.7	HNL72
	Tr370x5	225	33	234	* 23168EMKD1 ;AH	3168	360	393	500	560	5	29	HN74
340	Tr360x5	269	26	288	* 24168EMK30D1 ;AH	24168H	360	385	486	560	5	27.1	HNL72
	Tr385x5	167	30	176	* 23072EMKD1 ;AH	3072	378	405	488	522	5	21	HNL77
	Tr380x5	206	26	226	* 24072EMK30D1 ;AH	24072H	378	398	478	522	5	22.7	HNL76
	Tr400x5	229	35	238	23172BK ;AH	3172	382	417	520	578	5	33	HN80
360	Tr380x5	269	26	289	24172BK30 ;AH	24172H	382	414	507	578	5	29.6	HNL76
	Tr410x5	170	31	180	* 23076EMKD1 ;AH	3076	398	425	509	542	5	23.2	HNL82
	Tr400x5	208	28	228	* 24076EMK30D1 ;AH	24076H	398	420	499	542	5	23.7	HNL80
	Tr420x5	232	36	242	23176BK ;AH	3176	402	436	540	598	5	35.7	HN84
Tr400x5	271	28	291	24176BK30 ;AH	24176H	402	431	529	598	5	31.3	HNL80	

- 1) Standard thread shapes and dimensions are as per JIS B 0216 (metric trapezoidal screw thread).
- 2) Indicates reference dimensions before withdrawal sleeves are attached.
- 3) Bearing numbers marked "\*" designate ULTAGE Series.
- 4) Withdrawal sleeve numbers appended with the suffix "H" signify the high pressure oil (hydraulic) design.
- 5) Indicates withdrawal sleeve mass.
- 6) Indicates the number of nuts to be used at the time of disassembly. Refer to pages D-2 to D-10 for nut dimensions.  
Note: Refer to pages B-230 to B-233 for bearing dimensions, rated loads, and mass.

## Withdrawal Sleeves

WBW

(For spherical roller bearings)

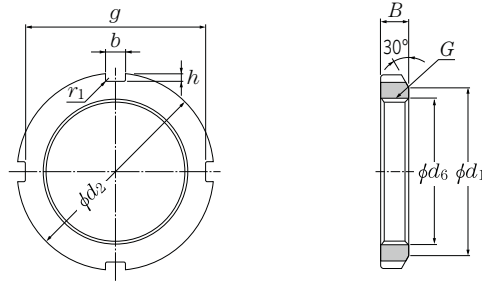


$d_1$  380 ~ 460mm

$d_1$	Boundary dimensions mm				Numbers <sup>3)</sup> Bearing	Installation-related dimensions mm					Mass <sup>4)</sup> kg	Applied nut number Bearing number <sup>5)</sup>	
	Thread nominal dimension <sup>1)</sup> $G$	$B_3$	$G_1$	$B_4^{2)}$		Min.	Max.	$d_a$	$D_a$	$r_{as}$			Max. (approx.)
380	Tr430x5	183	33	193	23080BK ;AH	3080	422	451	542	578	5	27.3	HNL86
	Tr420x5	228	28	248	24080BK30 ;AH	24080H	422	446	528	578	5	27.1	HNL84
	Tr440x5	240	38	250	23180BK ;AH	3180	428	458	568	622	6	39.5	HN88
400	Tr420x5	278	28	298	24180BK30 ;AH	24180H	428	452	552	622	6	34.4	HNL84
	Tr450x5	186	34	196	23084BK ;AH	3084	442	471	562	598	5	29	HNL90
	Tr440x5	230	30	252	24084BK30 ;AH	24084H	442	465	551	598	5	29	HNL88
	Tr460x5	266	40	276	23184BK ;AH	3184	448	488	611	672	6	46.5	HN92
420	Tr440x5	310	30	332	24184BK30 ;AH	24184H	448	477	592	672	6	40.3	HNL88
	Tr470x5	194	35	205	23088BK ;AHX	3088	468	490	585	622	6	32	HNL94
	Tr460x5	242	30	264	24088BK30 ;AH	24088H	468	485	576	622	6	31.9	HNL92
440	Tr480x5	270	42	281	23188BK ;AHX	3188	468	504	627	692	6	49.8	HN96
	Tr460x5	310	30	332	24188BK30 ;AH	24188H	468	498	614	692	6	42.3	HN92
	Tr490x5	202	37	213	23092BK ;AHX	3092	488	512	613	652	6	35.2	HNL98
460	Tr510x6	285	43	296	23192BK ;AHX	3192	496	534	660	724	7.5	57.9	HN102
	Tr480x5	332	32	355	24192BK30 ;AHX	24192H	496	523	645	724	7.5	47.4	HNL96
460	Tr520x6	205	38	217	23096BK ;AHX	3096	508	532	633	672	6	39.2	HNL104
	Tr530x6	295	45	307	23196BK ;AHX	3196	516	554	687	754	7.5	63.1	HN106

- 1) Standard thread shapes and dimensions are as per JIS B 0216 (metric trapezoidal screw thread).
- 2) Indicates reference dimensions before withdrawal sleeves are attached.
- 3) Withdrawal sleeve numbers appended with the suffix "H" signify the high pressure oil (hydraulic) design.
- 4) Indicates withdrawal sleeve mass.
- 5) Indicates the number of nuts to be used at the time of disassembly. Refer to pages D-2 to D-10 for nut dimensions.  
Note: Refer to pages B-232 to B-235 for bearing dimensions, rated loads, and mass.

(For adapter sleeve, withdrawal sleeve and shaft)  
Series AN

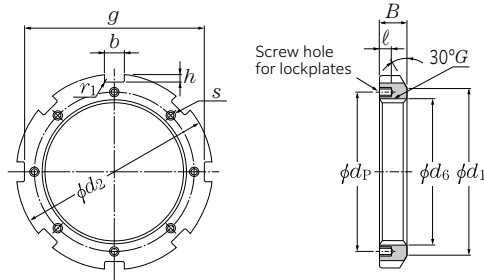


Number	Thread no.	Dimensions mm						Mass kg	(approx.)			
		$d_2$	$d_1$	$g$	$b$	$h$	$d_6$		$B$	$r_1$ Max.	Bore diameter no. of adapter <sup>2)</sup>	Lockwasher no. <sup>3)</sup>
AN00	M10 × 0.75	18	13.5	14	3	2	10.5	4	0.4	0.005	—	AW00
AN01	M12 × 1	22	17	18	3	2	12.5	4	0.4	0.007	—	AW01
AN02	M15 × 1	25	21	21	4	2	15.5	5	0.4	0.010	—	AW02
AN03	M17 × 1	28	24	24	4	2	17.5	5	0.4	0.013	—	AW03
AN04	M20 × 1	32	26	28	4	2	20.5	6	0.4	0.019	04	AW04
AN/22	M22 × 1	34	28	30	4	2	22.5	6	0.4	0.023	—	AW/22
AN05	M25 × 1.5	38	32	34	5	2	25.8	7	0.4	0.025	05	AW05
AN/28	M28 × 1.5	42	36	38	5	2	28.8	7	0.4	0.040	—	AW/28
AN06	M30 × 1.5	45	38	41	5	2	30.8	7	0.4	0.043	06	AW06
AN/32	M32 × 1.5	48	40	44	5	2	32.8	8	0.4	0.058	—	AW/32
AN07	M35 × 1.5	52	44	48	5	2	35.8	8	0.4	0.053	07	AW07
AN08	M40 × 1.5	58	50	53	6	2.5	40.8	9	0.5	0.085	08	AW08
AN09	M45 × 1.5	65	56	60	6	2.5	45.8	10	0.5	0.119	09	AW09
AN10	M50 × 1.5	70	61	65	6	2.5	50.8	11	0.5	0.148	10	AW10
AN11	M55 × 2	75	67	69	7	3	56	11	0.5	0.158	11	AW11
AN12	M60 × 2	80	73	74	7	3	61	11	0.5	0.174	12	AW12
AN13	M65 × 2	85	79	79	7	3	66	12	0.5	0.203	13	AW13
AN14	M70 × 2	92	85	85	8	3.5	71	12	0.5	0.242	14	AW14
AN15	M75 × 2	98	90	91	8	3.5	76	13	0.5	0.287	15	AW15
AN16	M80 × 2	105	95	98	8	3.5	81	15	0.6	0.397	16	AW16
AN17	M85 × 2	110	102	103	8	3.5	86	16	0.6	0.451	17	AW17
AN18	M90 × 2	120	108	112	10	4	91	16	0.6	0.556	18	AW18
AN19	M95 × 2	125	113	117	10	4	96	17	0.6	0.658	19	AW19
AN20	M100 × 2	130	120	122	10	4	101	18	0.6	0.698	20	AW20
AN21	M105 × 2	140	126	130	12	5	106	18	0.7	0.845	21	AW21
AN22	M110 × 2	145	133	135	12	5	111	19	0.7	0.965	22	AW22
AN23	M115 × 2	150	137	140	12	5	116	19	0.7	1.01	—	AW23
AN24	M120 × 2	155	138	145	12	5	121	20	0.7	1.08	24	AW24
AN25	M125 × 2	160	148	150	12	5	126	21	0.7	1.19	—	AW25
AN26	M130 × 2	165	149	155	12	5	131	21	0.7	1.25	26	AW26
AN27	M135 × 2	175	160	163	14	6	136	22	0.7	1.55	—	AW27
AN28	M140 × 2	180	160	168	14	6	141	22	0.7	1.56	28	AW28
AN29	M145 × 2	190	171	178	14	6	146	24	0.7	2.00	—	AW29
AN30	M150 × 2	195	171	183	14	6	151	24	0.7	2.03	30	AW30
AN31	M155 × 3	200	182	186	16	7	156.5	25	0.7	2.21	—	AW31
AN32	M160 × 3	210	182	196	16	7	161.5	25	0.7	2.59	32	AW32
AN33	M165 × 3	210	193	196	16	7	166.5	26	0.7	2.43	—	AW33
AN34	M170 × 3	220	193	206	16	7	171.5	26	0.7	2.80	34	AW34
AN36	M180 × 3	230	203	214	18	8	181.5	27	0.7	3.07	36	AW36
AN38	M190 × 3	240	214	224	18	8	191.5	28	0.7	3.39	38	AW38
AN40	M200 × 3	250	226	234	18	8	201.5	29	0.7	3.69	40	AW40

1) Thread shapes and dimensions are as per JIS B 0205-1 and JIS B 0205-4 (general metric threads).  
2) Used for adapter series H31, H2, H3, and H23.  
3) Washers with straight inner tabs that have code "X" after the number can also be used.

								(approx.)		Shaft dia. mm (for shaft)
AW30	AW240	AW31	Withdrawal sleeve no.		AW32	AW3	AW23			
—	—	—	—	—	—	—	—	—	—	10
—	—	—	—	—	—	—	—	—	—	12
—	—	—	—	—	—	—	—	—	—	15
—	—	—	—	—	—	—	—	—	—	17
—	—	—	—	—	—	—	—	—	—	20
—	—	—	—	—	—	—	—	—	—	22
—	—	—	—	—	—	—	—	—	—	25
—	—	—	—	—	—	—	—	—	—	28
—	—	—	—	—	—	—	—	—	—	30
—	—	—	—	—	—	—	—	—	—	32
—	—	—	—	—	—	—	—	—	—	35
—	—	—	—	—	—	—	—	—	—	40
—	—	—	—	—	AH208	—	AH 308	AH2308	—	45
—	—	—	—	—	AH209	—	AH 309	AH2309	—	50
—	—	—	—	—	AH210	—	AHX310	AHX2310	—	55
—	—	—	—	—	AH211	—	AHX311	AHX2311	—	60
—	—	—	—	—	AH212	—	AHX312	AHX2312	—	65
—	—	—	—	—	—	—	—	—	—	70
—	—	—	—	—	AH213	—	AH 313	AH2313	—	75
—	—	—	—	—	AH214	—	AH 314	AHX2314	—	80
—	—	—	—	—	AH215	—	AH 315	AHX2315	—	85
—	—	—	—	—	AH216	—	AH 316	AHX2316	—	90
—	—	—	—	—	AH217	—	AHX317	AHX2317	—	95
—	—	—	—	—	AH218	AHX3218	AHX318	AHX2318	—	100
—	—	—	—	—	AH219	—	AHX319	AHX2319	—	105
—	—	—	—	—	AH220	AHX3220	AHX320	AHX2320	—	110
—	—	—	—	—	AH221	—	AHX321	—	—	115
—	—	—	AH24122	—	AH222	—	AHX322	—	—	120
—	—	AHX3122	—	—	—	—	—	AHX2322	—	125
AHX3024	AH24024	—	—	—	AHX3224	—	—	AHX2324	—	130
—	AH24026	—	—	—	—	—	—	—	—	135
AHX3026	—	AHX3126	AH24126	AH226	—	AHX326	—	—	—	140
—	AH24028	—	—	—	AHX3226	—	—	AHX2326	—	145
AHX3028	—	AHX3128	AH24128	AH228	—	AHX328	—	—	—	150
—	AH24030	—	—	—	AHX3228	—	—	AHX2328	—	155
AHX3030	—	—	AH24130	AH230	—	—	—	—	—	160
—	—	AHX3130	—	—	AHX3230	AHX330	AHX2330	—	—	165
AH 3032	AH24032	—	AH24132	AH232	—	—	—	—	—	170
AH 3034	AH24034	AH3132	AH24134	AH234	AH3232	AH332	AH2332	—	—	180
AH 3036	AH24036	AH3134	AH24136	AH236	AH3234	AH334	AH2334	—	—	190
—	AH24038	AH 3136	AH24138	—	AH3236	—	AH2336	—	—	200

(For adapter sleeve and shaft)  
Series AN

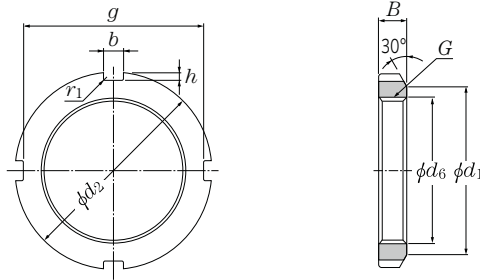


Number	Thread no.	Dimensions mm										Mass kg	
		$G^{1)}$	$d_2$	$d_1$	$g$	$b$	$h$	$d_6$	$B$	$r_1$ Max.	$l$		Screw hole for lockplates $s^{2)}$
AN44	Tr220 × 4	280	250	260	20	10	222	32	0.8	15	M8	238	5.20
AN48	Tr240 × 4	300	270	280	20	10	242	34	0.8	15	M8	258	5.95
AN52	Tr260 × 4	330	300	306	24	12	262	36	0.8	18	M10	281	8.05
AN56	Tr280 × 4	350	320	326	24	12	282	38	0.8	18	M10	301	9.05
AN60	Tr300 × 4	380	340	356	24	12	302	40	0.8	18	M10	326	11.8
AN64	Tr320 × 5	400	360	376	24	12	322.5	42	0.8	18	M10	345	13.1
AN68	Tr340 × 5	440	400	410	28	15	342.5	55	1	21	M12	372	23.1
AN72	Tr360 × 5	460	420	430	28	15	362.5	58	1	21	M12	392	25.1
AN76	Tr380 × 5	490	450	454	32	18	382.5	60	1	21	M12	414	30.9
AN80	Tr400 × 5	520	470	484	32	18	402.5	62	1	27	M16	439	36.9
AN84	Tr420 × 5	540	490	504	32	18	422.5	70	1	27	M16	459	43.5
AN88	Tr440 × 5	560	510	520	36	20	442.5	70	1	27	M16	477	45.3
AN92	Tr460 × 5	580	540	540	36	20	462.5	75	1	27	M16	497	50.4
AN96	Tr480 × 5	620	560	580	36	20	482.5	75	1	27	M16	527	62.2
AN100	Tr500 × 5	630	580	584	40	23	502.5	80	1	27	M16	539	63.3

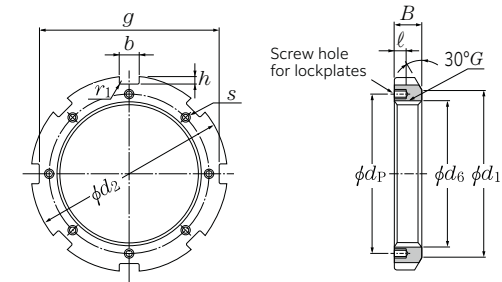
Bore diameter no. of adapter <sup>3)</sup>	(approx.)	
	Lockplate no.	Shaft dia. mm (for shaft)
44	AL44	220
48	AL44	240
52	AL52	260
56	AL52	280
60	AL60	300
64	AL64	320
68	AL68	340
72	AL68	360
76	AL76	380
80	AL80	400
84	AL80	420
88	AL88	440
92	AL88	460
96	AL96	480
/500	AL100	500

1) Thread shapes and dimensions are as per JIS B 0216 (metric trapezoidal screw threads).  
2) Thread shapes and dimensions of screw holes are as per JIS B 0205-1 and JIS B 0205-4 (general metric threads).  
3) Used for adapter series H31, H32, and H23.

(For adapter sleeve and shaft)  
Series ANL



Number	Thread no.	Dimensions mm							Mass kg	Bore diameter no. of adapter <sup>2)</sup>	(approx.) Lockwasher no. <sup>3)</sup>	Shaft dia. mm (for shaft)	
		$d_2$	$d_1$	$g$	$b$	$h$	$d_6$	$B$					
ANL24	M120 × 2	145	133	135	12	5	121	20	0.7	0.78	24	AWL24	120
ANL26	M130 × 2	155	143	145	12	5	131	21	0.7	0.88	26	AWL26	130
ANL28	M140 × 2	165	151	153	14	6	141	22	0.7	0.99	28	AWL28	140
ANL30	M150 × 2	180	164	168	14	6	151	24	0.7	1.38	30	AWL30	150
ANL32	M160 × 3	190	174	176	16	7	161.5	25	0.7	1.56	32	AWL32	160
ANL34	M170 × 3	200	184	186	16	7	171.5	26	0.7	1.72	34	AWL34	170
ANL36	M180 × 3	210	192	194	18	8	181.5	27	0.7	1.95	36	AWL36	180
ANL38	M190 × 3	220	202	204	18	8	191.5	28	0.7	2.08	38	AWL38	190
ANL40	M200 × 3	240	218	224	18	8	201.5	29	0.7	2.98	40	AWL40	200



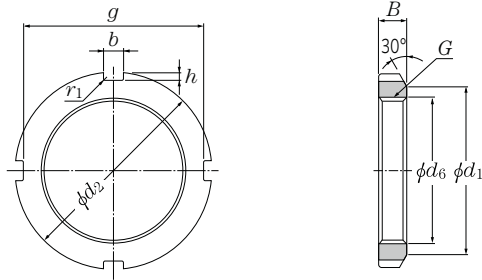
Number	Thread no.	Dimensions mm							$r_1$ Max.	Screw hole for lockplates <sup>2)</sup>	Mass kg (approx.)		
		$d_2$	$d_1$	$g$	$b$	$h$	$d_6$	$B$					
ANL44	Tr220 × 4	260	242	242	20	9	222	30	0.8	12	M6	229	3.09
ANL48	Tr240 × 4	290	270	270	20	10	242	34	0.8	15	M8	253	5.16
ANL52	Tr260 × 4	310	290	290	20	10	262	34	0.8	15	M8	273	5.67
ANL56	Tr280 × 4	330	310	310	24	10	282	38	0.8	15	M8	293	6.78
ANL60	Tr300 × 4	360	336	336	24	12	302	42	0.8	15	M8	316	9.62
ANL64	Tr320 × 5	380	356	356	24	12	322.5	42	0.8	15	M8	335	9.94
ANL68	Tr340 × 5	400	376	376	24	12	342.5	45	1	15	M8	355	11.7
ANL72	Tr360 × 5	420	394	394	28	13	362.5	45	1	15	M8	374	12.0
ANL76	Tr380 × 5	450	422	422	28	14	382.5	48	1	18	M10	398	14.9
ANL80	Tr400 × 5	470	442	442	28	14	402.5	52	1	18	M10	418	16.9
ANL84	Tr420 × 5	490	462	462	32	14	422.5	52	1	18	M10	438	17.4
ANL88	Tr440 × 5	520	490	490	32	15	442.5	60	1	21	M12	462	26.2
ANL92	Tr460 × 5	540	510	510	32	15	462.5	60	1	21	M12	482	29.6
ANL96	Tr480 × 5	560	530	530	36	15	482.5	60	1	21	M12	502	28.3
ANL100	Tr500 × 5	580	550	550	36	15	502.5	68	1	21	M12	522	33.6

- 1) Thread shapes and dimensions are as per JIS B 0216 (metric trapezoidal screw threads).
- 2) Thread shapes and dimensions of screw holes are as per JIS B 0205-1 and JIS B 0205-4 (general metric threads).
- 3) Applied to adapter series H30.

Bore diameter no. of adapter <sup>2)</sup>	(approx.) Lockplate no.	Shaft dia. mm (for shaft)	Number
			44
48	ALL48	240	ANL48
52	ALL48	260	ANL52
56	ALL56	280	ANL56
60	ALL60	300	ANL60
64	ALL64	320	ANL64
68	ALL64	340	ANL68
72	ALL72	360	ANL72
76	ALL76	380	ANL76
80	ALL76	400	ANL80
84	ALL84	420	ANL84
88	ALL88	440	ANL88
92	ALL88	460	ANL92
96	ALL96	480	ANL96
/500	ALL96	500	ANL100

- 1) Thread shapes and dimensions are as per JIS B 0205-1 and JIS B 0205-4 (general metric threads).
- 2) Applied to adapter series H30.
- 3) Washers with straight inner tabs that have code "X" after the number can also be used.

(For withdrawal sleeve)  
Series HN



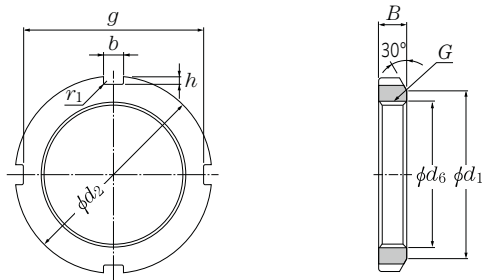
Number	Thread no.	Dimensions mm							Mass kg	(approx.)			
		$G^{1)}$	$d_2$	$d_1$	$g$	$b$	$h$	$d_6$		$B$	$r_1$ Max.(approx.)	Withdrawal sleeve no.	
											AH240	AH31	AH241
HN42	Tr210 × 4	270	238	250	20	10	212	30	0.8	4.75	AH24040	AH 3138	AH24140H
HN44	Tr220 × 4	280	250	260	20	10	222	32	0.8	5.35	—	AH 3140	—
HN46	Tr230 × 4	290	260	270	20	10	232	34	0.8	5.80	AH24044H	—	AH24144H
HN48	Tr240 × 4	300	270	280	20	10	242	34	0.8	6.20	—	AH 3144	—
HN50	Tr250 × 4	320	290	300	20	10	252	36	0.8	7.00	AH24048H	—	—
HN52	Tr260 × 4	330	300	306	24	12	262	36	0.8	8.55	—	AH 3148	AH24148H
HN54	Tr270 × 4	340	310	316	24	12	272	38	0.8	9.20	AH24052H	—	—
HN56	Tr280 × 4	350	320	326	24	12	282	38	0.8	10.0	—	—	AH24152H
HN58	Tr290 × 4	370	330	346	24	12	292	40	0.8	11.8	AH24056H	AH 3152	—
HN60	Tr300 × 4	380	340	356	24	12	302	40	0.8	12.0	—	—	AH24156H
HN62	Tr310 × 5	390	350	366	24	12	312.5	42	0.8	13.4	AH24060H	AH 3156	—
HN64	Tr320 × 5	400	360	376	24	12	322.5	42	0.8	13.5	—	—	AH24160H
HN66	Tr330 × 5	420	380	390	28	15	332.5	52	1	20.4	AH24064H	AH 3160	—
HN68	Tr340 × 5	440	400	410	28	15	342.5	55	1	24.5	—	—	AH24164H
HN70	Tr350 × 5	450	410	420	28	15	352.5	55	1	25.2	—	AH 3164	—
HN72	Tr360 × 5	460	420	430	28	15	362.5	58	1	27.5	—	—	AH24168H
HN74	Tr370 × 5	470	430	440	28	15	372.5	58	1	28.2	—	AH 3168	—
HN76	Tr380 × 5	490	450	454	32	18	382.5	60	1	33.5	—	—	AH24172H
HN80	Tr400 × 5	520	470	484	32	18	402.5	62	1	40.0	—	AH 3172	AH24176H
HN84	Tr420 × 5	540	490	504	32	18	422.5	70	1	46.9	—	AH 3176	AH24180H
HN88	Tr440 × 5	560	510	520	36	20	442.5	70	1	48.5	—	AH 3180	AH24184H
HN92	Tr460 × 5	580	540	540	36	20	462.5	75	1	55.0	—	AH 3184	AH24188H
HN96	Tr480 × 5	620	560	580	36	20	482.5	75	1	67.0	—	AHX3188	AH24192H
HN100	Tr500 × 5	630	580	584	40	23	502.5	80	1	69.0	—	—	—
HN102	Tr510 × 6	650	590	604	40	23	513	80	1	75.0	—	AHX3192	—
HN106	Tr530 × 6	670	610	624	40	23	533	80	1	78.0	—	AHX3196	—
HN110	Tr550 × 6	700	640	654	40	23	553	80	1	92.5	—	—	—

(approx.)		
Withdrawal sleeve no.		
AH22	AH32	AH23
AH2238	AH 3238	AH2338
AH2240	AH 3240	AH2340
—	—	—
AH2244	—	AH2344
—	—	—
AH2248	—	AH2348
—	—	—
—	—	—
AH2252	—	AH2352
—	—	—
AH2256	—	AH2356
—	—	—
AH2260	AH 3260	—
—	—	—
AH2264	AH 3264	—
—	—	—
—	AH 3268	—
—	—	—
—	—	—
—	AH 3272	—
—	AH 3276	—
—	AH 3280	—
—	AH 3284	—
—	AHX3288	—
—	—	—
—	AHX3292	—
—	AHX3296	—
—	—	—

1) Thread shapes and dimensions are as per JIS B 0216 (metric trapezoidal screw threads).  
Note: Number HN54 indicates dimensions that are not indicated in JIS B 1554.



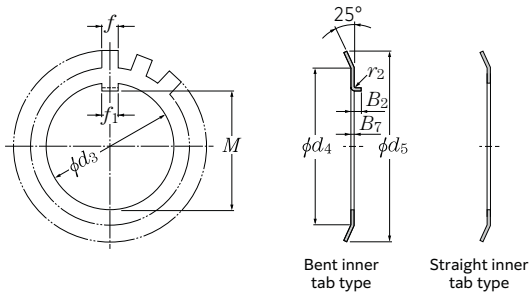
(For withdrawal sleeve)  
Series HNL



Number	Thread no.	Dimensions mm								Mass kg	(approx.) Withdrawal sleeve no.			
		G <sup>1)</sup>	d <sub>2</sub>	d <sub>1</sub>	g	b	h	d <sub>6</sub>	B		r <sub>1</sub> Max.(approx.)	AH30	AH240	AH2
HNL41	Tr205 × 4	250	232	234	18	8	207	30	0.8	3.43	AH 3038	—	AH238	
HNL43	Tr215 × 4	260	242	242	20	9	217	30	0.8	3.72	AH 3040	—	AH240	
HNL47	Tr235 × 4	280	262	262	20	9	237	34	0.8	4.60	AH 3044	—	AH244	
HNL52	Tr260 × 4	310	290	290	20	10	262	34	0.8	5.80	AH 3048	—	AH248	
HNL56	Tr280 × 4	330	310	310	24	10	282	38	0.8	6.72	AH 3052	—	AH252	
HNL60	Tr300 × 4	360	336	336	24	12	302	42	0.8	9.60	AH 3056	—	AH256	
HNL64	Tr320 × 5	380	356	356	24	12	322.5	42	1	10.3	AH 3060	—	—	
HNL69	Tr345 × 5	410	384	384	28	13	347.5	45	1	11.5	AH 3064	—	—	
HNL72	Tr360 × 5	420	394	394	28	13	362.5	45	1	12.1	—	AH24068H	—	
HNL73	Tr365 × 5	430	404	404	28	13	367.5	48	1	14.2	AH 3068	—	—	
HNL76	Tr380 × 5	450	422	422	28	14	382.5	48	1	16.0	—	AH24072H	—	
HNL77	Tr385 × 5	450	422	422	28	14	387.5	48	1	15.0	AH 3072	—	—	
HNL80	Tr400 × 5	470	442	442	28	14	402.5	52	1	18.5	—	AH24076H	—	
HNL82	Tr410 × 5	480	452	452	32	14	412.5	52	1	19.0	AH 3076	—	—	
HNL84	Tr420 × 5	490	462	462	32	14	422.5	52	1	19.4	—	AH24080H	—	
HNL86	Tr430 × 5	500	472	472	32	14	432.5	52	1	19.8	AH 3080	—	—	
HNL88	Tr440 × 5	520	490	490	32	15	442.5	60	1	27.0	—	AH24084H	—	
HNL90	Tr450 × 5	520	490	490	32	15	452.5	60	1	23.8	AH 3084	—	—	
HNL92	Tr460 × 5	540	510	510	32	15	462.5	60	1	28.0	—	AH24088H	—	
HNL94	Tr470 × 5	540	510	510	32	15	472.5	60	1	25.0	AHX3088	—	—	
HNL96	Tr480 × 5	560	530	530	36	15	482.5	60	1	29.5	—	—	—	
HNL98	Tr490 × 5	580	550	550	36	15	492.5	60	1	34.0	AHX3092	—	—	
HNL100	Tr500 × 5	580	550	550	36	15	502.5	68	1	35.0	—	—	—	
HNL104	Tr520 × 6	600	570	570	36	15	523	68	1	37.0	AHX3096	—	—	
HNL106	Tr530 × 6	630	590	590	40	20	533	68	1	47.0	—	—	—	
HNL108	Tr540 × 6	630	590	590	40	20	543	68	1	43.5	—	—	—	

1) Thread shapes and dimensions are as per JIS B 0216 (metric trapezoidal screw threads).

Series AW



Number		Dimensions mm							No. of tabs		Mass kg	
Bent inner tab type	Straight inner tab type	$d_3$	$M$	$f_1$	$B_7$	$f$	$d_4$	$d_5$	Bent inner tab type		100 pieces (approx.)	
									$r_2$	$B_2$		
AW00	AW00X	10	8.5	3	1	3	13.5	21	0.5	3	9	0.131
AW01	AW01X	12	10.5	3	1	3	17	25	0.5	3	11	0.192
AW02	AW02X	15	13.5	4	1	4	21	28	1	3.5	13	0.253
AW03	AW03X	17	15.5	4	1	4	24	32	1	3.5	13	0.313
AW04	AW04X	20	18.5	4	1	4	26	36	1	3.5	13	0.350
AW/22	AW/22X	22	20.5	4	1	4	28	38	1	3.5	13	0.394
AW05	AW05X	25	23	5	1.25	5	32	42	1	3.75	13	0.640
AW/28	AW/28X	28	26	5	1.25	5	36	46	1	3.75	13	0.723
AW06	AW06X	30	27.5	5	1.25	5	38	49	1	3.75	13	0.780
AW/32	AW/32X	32	29.5	5	1.25	5	40	52	1	3.75	13	0.839
AW07	AW07X	35	32.5	6	1.25	5	44	57	1	3.75	15	1.04
AW08	AW08X	40	37.5	6	1.25	6	50	62	1	3.75	15	1.23
AW09	AW09X	45	42.5	6	1.25	6	56	69	1	3.75	17	1.52
AW10	AW10X	50	47.5	6	1.25	6	61	74	1	3.75	17	1.60
AW11	AW11X	55	52.5	8	1.5	7	67	81	1	5.5	17	1.96
AW12	AW12X	60	57.5	8	1.5	7	73	86	1.2	5.5	17	2.53
AW13	AW13X	65	62.5	8	1.5	7	79	92	1.2	5.5	19	2.90
AW14	AW14X	70	66.5	8	1.5	8	85	98	1.2	5.5	19	3.34
AW15	AW15X	75	71.5	8	1.5	8	90	104	1.2	5.5	19	3.56
AW16	AW16X	80	76.5	10	1.8	8	95	112	1.2	5.8	19	4.64
AW17	AW17X	85	81.5	10	1.8	8	102	119	1.2	5.8	19	5.24
AW18	AW18X	90	86.5	10	1.8	10	108	126	1.2	5.8	19	6.23
AW19	AW19X	95	91.5	10	1.8	10	113	133	1.2	5.8	19	6.70
AW20	AW20X	100	96.5	12	1.8	10	120	142	1.2	7.8	19	7.65
AW21	AW21X	105	100.5	12	1.8	12	126	145	1.2	7.8	19	8.26
AW22	AW22X	110	105.5	12	1.8	12	133	154	1.2	7.8	19	9.40
AW23	AW23X	115	110.5	12	2	12	137	159	1.5	8	19	10.8
AW24	AW24X	120	115	14	2	12	138	164	1.5	8	19	10.5
AW25	AW25X	125	120	14	2	12	148	170	1.5	8	19	11.8
AW26	AW26X	130	125	14	2	12	149	175	1.5	8	19	11.3
AW27	AW27X	135	130	14	2	14	160	185	1.5	8	19	14.4
AW28	AW28X	140	135	16	2	14	160	192	1.5	10	19	14.2
AW29	AW29X	145	140	16	2	14	171	202	1.5	10	19	16.8
AW30	AW30X	150	145	16	2	14	171	205	1.5	10	19	15.5
AW31	AW31X	155	147.5	16	2.5	16	182	212	1.5	10.5	19	20.9
AW32	AW32X	160	154	18	2.5	16	182	217	1.5	10.5	19	22.2
AW33	AW33X	165	157.5	18	2.5	16	193	222	1.5	10.5	19	24.1
AW34	AW34X	170	164	18	2.5	16	193	232	1.5	10.5	19	24.7
AW36	AW36X	180	174	20	2.5	18	203	242	1.5	10.5	19	26.8
AW38	AW38X	190	184	20	2.5	18	214	252	1.5	10.5	19	27.8
AW40	AW40X	200	194	20	2.5	18	226	262	1.5	10.5	19	29.3

1) Used for adapter series H31, H2, H32, H3, and H23.  
 Note: Numbers AW00 and AW01 (bent inner tab type) indicate dimensions that are not indicated in JIS B 1554.  
 D-12

Bore diameter no. of adapter <sup>1)</sup>	(approx.) Nut no.	Shaft dia. mm (for shaft)
—	AN00	10
—	AN01	12
—	AN02	15
—	AN03	17
04	AN04	20
—	AN/22	22
05	AN05	25
—	AN/28	28
06	AN06	30
—	AN/32	32
07	AN07	35
08	AN08	40
09	AN09	45
10	AN10	50
11	AN11	55
12	AN12	60
13	AN13	65
14	AN14	70
15	AN15	75
16	AN16	80
17	AN17	85
18	AN18	90
19	AN19	95
20	AN20	100
21	AN21	105
22	AN22	110
—	AN23	115
24	AN24	120
—	AN25	125
26	AN26	130
—	AN27	135
28	AN28	140
—	AN29	145
30	AN30	150
—	AN31	155
32	AN32	160
—	AN33	165
34	AN34	170
36	AN36	180
38	AN38	190
40	AN40	200

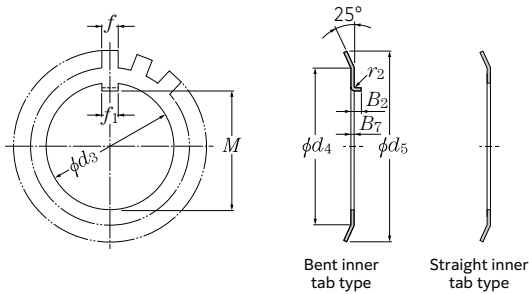
Note: For narrow slit type adapter sleeves that have code suffix "X" after the H2, H3, and H23 series number, use straight inner tab washers. In addition, for wide slit type adapter sleeves that have no suffix "X" after the adapter number, either straight or bent inner tab washers can be used.  
 D-13

Allowable washer dimensions(bent inner tab type) Unit: mm

Bore dia. of lockwasher $d_3$ mm	Dimensional tolerance of distance between lockwasher tab to bore diameter face $\Delta M_S$		Dimensional tolerance of lockwasher tab width $\Delta f_{is}$			
	Over	Incl.	Upper	Lower		
10 <sup>1)</sup>	50		+0.3	0	0	-0.4
50	80		+0.3	0	0	-1
80	120		+0.5	0	0	-1.4
120	200		+0.5	0	0	-2

1) 10 mm is included in this dimensional division.  
 Note: The dimensional tolerance in the table also applies to the AWL series bent inner tab type.

Series AWL

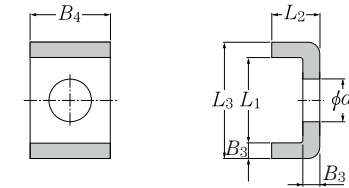


Number		Dimensions mm							No. of tabs		Mass kg	(approx.)			
Bent inner tab type	Straight inner tab type	$d_3$	$M$	$f_1$	$B_7$	$f$	$d_4$	$d_5$	Bent inner tab type	$r_2$	$B_2$	100 pieces (approx.)	Bore diameter no. of adapter <sup>1)</sup>	Nut no.	Shaft dia. mm (for shaft)
<b>AWL24</b>	<b>AWL24X</b>	120	115	14	2	12	133	155	1.5	8	19	7.70	24	<b>ANL24</b>	120
<b>AWL26</b>	<b>AWL26X</b>	130	125	14	2	12	143	165	1.5	8	19	8.70	26	<b>ANL26</b>	130
<b>AWL28</b>	<b>AWL28X</b>	140	135	16	2	14	151	175	1.5	10	19	10.9	28	<b>ANL28</b>	140
<b>AWL30</b>	<b>AWL30X</b>	150	145	16	2	14	164	190	1.5	10	19	11.3	30	<b>ANL30</b>	150
<b>AWL32</b>	<b>AWL32X</b>	160	154	18	2.5	16	174	200	1.5	10.5	19	16.2	32	<b>ANL32</b>	160
<b>AWL34</b>	<b>AWL34X</b>	170	164	18	2.5	16	184	210	1.5	10.5	19	19.0	34	<b>ANL34</b>	170
<b>AWL36</b>	<b>AWL36X</b>	180	174	20	2.5	18	192	220	1.5	10.5	19	18.0	36	<b>ANL36</b>	180
<b>AWL38</b>	<b>AWL38X</b>	190	184	20	2.5	18	202	230	1.5	10.5	19	20.5	38	<b>ANL38</b>	190
<b>AWL40</b>	<b>AWL40X</b>	200	194	20	2.5	18	218	250	1.5	10.5	19	21.4	40	<b>ANL40</b>	200

1) Used for adapter series H31, H32, and H23.

Note: For wide slit type adapter sleeves that have no suffix "X" after the adapter number, either straight or bent inner tab washers can be used.

Series AL, ALL



Number	Dimensions mm						Mass kg	(approx.)
	$B_3$	$B_4$	$L_2$	$d_7$	$L_1$	$L_3$	100 pieces (approx.)	Nut no.
<b>AL44</b>	4	20	12	9	22.5	30.5	2.60	<b>AN44, AN48</b>
<b>AL52</b>	4	24	12	12	25.5	33.5	3.39	<b>AN52, AN56</b>
<b>AL60</b>	4	24	12	12	30.5	38.5	3.79	<b>AN60</b>
<b>AL64</b>	5	24	15	12	31	41	5.35	<b>AN64</b>
<b>AL68</b>	5	28	15	14	38	48	6.65	<b>AN68, AN72</b>
<b>AL76</b>	5	32	15	14	40	50	7.96	<b>AN76</b>
<b>AL80</b>	5	32	15	18	45	55	8.20	<b>AN80, AN84</b>
<b>AL88</b>	5	36	15	18	43	53	9.00	<b>AN88, AN92</b>
<b>AL96</b>	5	36	15	18	53	63	10.4	<b>AN96</b>
<b>AL100</b>	5	40	15	18	45	55	10.5	<b>AN100</b>

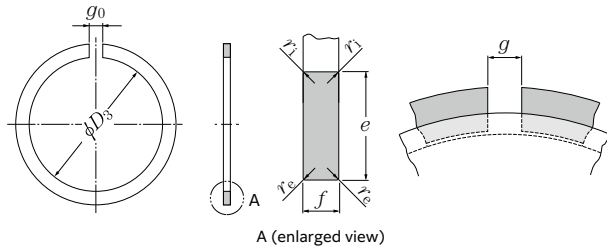
Note: This series uses series H31, H32, and H23 adapters.

Number	Dimensions mm						Mass kg	(approx.)
	$B_3$	$B_4$	$L_2$	$d_7$	$L_1$	$L_3$	100 pieces (approx.)	Nut no.
<b>ALL44</b>	4	20	12	7	13.5	21.5	2.12	<b>ANL44</b>
<b>ALL48</b>	4	20	12	9	17.5	25.5	2.29	<b>ANL48, ANL52</b>
<b>ALL56</b>	4	24	12	9	17.5	25.5	2.92	<b>ANL56</b>
<b>ALL60</b>	4	24	12	9	20.5	28.5	3.16	<b>ANL60</b>
<b>ALL64</b>	5	24	15	9	21	31	4.56	<b>ANL64, ANL68</b>
<b>ALL72</b>	5	28	15	9	20	30	5.03	<b>ANL72</b>
<b>ALL76</b>	5	28	15	12	24	34	5.28	<b>ANL76, ANL80</b>
<b>ALL84</b>	5	32	15	12	24	34	6.11	<b>ANL84</b>
<b>ALL88</b>	5	32	15	14	28	38	6.45	<b>ANL88, ANL92</b>
<b>ALL96</b>	5	36	15	14	28	38	7.29	<b>ANL96, ANL100</b>

Note: This series uses H30 adapters.

# Snap Rings and Grooves for Rolling Bearings

Snap rings  
For dimension series 18 and 19 bearings



A (enlarged view)

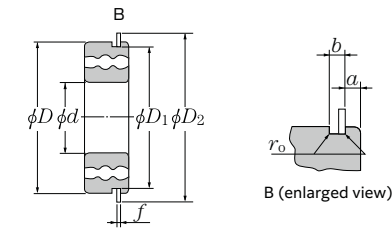
Unit: mm

Number	Bearing outside diameter		Snap rings				Snap ring fitted inside groove <sup>1)</sup>		(approx.)				Bearing bore diameter series					
	D	D <sub>3</sub>	Bore diameter of D <sub>3</sub>		e	f	D <sub>2</sub>	g	g <sub>0</sub>	r <sub>i</sub>	r <sub>e</sub>	V <sub>f</sub>	18		19			
			Δ	D <sub>BS</sub>									Max.	Min.	Max.	Min.	Max.	Min.
NR1022	22	20.5	0	-0.3	2.00	1.85	0.7	0.6	24.8	2	1	0.2	0.1	0.06	—	10		
NR1024	24	22.5	0	-0.3	2.00	1.85	0.7	0.6	26.8	2	1	0.2	0.1	0.06	—	12		
NR1028	28	26.4	0	-0.3	2.05	1.90	0.85	0.75	30.8	3	2	0.25	0.15	0.06	—	15		
NR1030	30	28.3	0	-0.3	2.05	1.90	0.85	0.75	32.8	3	2	0.25	0.15	0.06	—	17		
NR1032	32	30.3	0	-0.3	2.05	1.90	0.85	0.75	34.8	3	2	0.25	0.15	0.06	20	—		
NR1034	34	32.3	0	-0.3	2.05	1.90	0.85	0.75	36.8	3	2	0.25	0.15	0.06	22	—		
NR1037	37	35.3	0	-0.3	2.05	1.90	0.85	0.75	39.8	3	2	0.25	0.15	0.06	25	20		
NR1039	39	37.3	0	-0.3	2.05	1.90	0.85	0.75	41.8	3	2	0.25	0.15	0.06	—	22		
NR1040	40	38.3	0	-0.3	2.05	1.90	0.85	0.75	42.8	3	2	0.25	0.15	0.06	28	—		
NR1042	42	40.3	0	-0.4	2.05	1.90	0.85	0.75	44.8	3	2	0.25	0.15	0.06	30	25		
NR1044	44	42.3	0	-0.4	2.05	1.90	0.85	0.75	46.8	4	2.5	0.25	0.15	0.06	32	—		
NR1045	45	43.3	0	-0.4	2.05	1.90	0.85	0.75	47.8	4	2.5	0.25	0.15	0.06	—	28		
NR1047	47	45.3	0	-0.4	2.05	1.90	0.85	0.75	49.8	4	2.5	0.25	0.15	0.06	35	30		
NR1052	52	50.3	0	-0.4	2.05	1.90	0.85	0.75	54.8	4	2.5	0.25	0.15	0.06	40	32		
NR1055	55	53.3	0	-0.4	2.05	1.90	0.85	0.75	57.8	4	2.5	0.25	0.15	0.06	—	35		
NR1058	58	56.3	0	-0.6	2.05	1.90	0.85	0.75	60.8	4	2.5	0.25	0.15	0.06	45	—		
NR1062	62	60.2	0	-0.6	2.05	1.90	0.85	0.75	64.8	4	2.5	0.25	0.15	0.06	—	40		
NR1065	65	63.2	0	-0.6	2.05	1.90	0.85	0.75	67.8	4	2.5	0.25	0.15	0.06	50	—		
NR1068	68	66.2	0	-0.6	2.05	1.90	0.85	0.75	70.8	5	3	0.25	0.15	0.06	—	45		
NR1072	72	70.2	0	-0.6	2.05	1.90	0.85	0.75	74.8	5	3	0.25	0.15	0.06	55	50		
NR1078	78	75.7	0	-0.6	3.25	3.10	1.12	1.02	82.7	5	3	0.4	0.3	0.06	60	—		
NR1080	80	77.4	0	-0.6	3.25	3.10	1.12	1.02	84.4	5	3	0.4	0.3	0.06	—	55		
NR1085	85	82.4	0	-0.6	3.25	3.10	1.12	1.02	89.4	5	3	0.4	0.3	0.06	65	60		
NR1090	90	87.4	0	-0.6	3.25	3.10	1.12	1.02	94.4	5	3	0.4	0.3	0.06	70	65		
NR1095	95	92.4	0	-0.6	3.25	3.10	1.12	1.02	99.4	5	3	0.4	0.3	0.06	75	—		
NR1100	100	97.4	0	-0.6	3.25	3.10	1.12	1.02	104.4	5	3	0.4	0.3	0.06	80	70		
NR1105	105	101.9	0	-0.8	4.04	3.89	1.12	1.02	110.7	5	3	0.4	0.3	0.06	—	75		
NR1110	110	106.9	0	-0.8	4.04	3.89	1.12	1.02	115.7	5	3	0.4	0.3	0.06	85	80		
NR1115	115	111.9	0	-0.8	4.04	3.89	1.12	1.02	120.7	5	3	0.4	0.3	0.06	90	—		
NR1120	120	116.9	0	-0.8	4.04	3.89	1.12	1.02	125.7	7	4	0.4	0.3	0.06	95	85		
NR1125	125	121.8	0	-0.8	4.04	3.89	1.12	1.02	130.7	7	4	0.4	0.3	0.06	100	90		
NR1130	130	126.8	0	-0.8	4.04	3.89	1.12	1.02	135.7	7	4	0.4	0.3	0.06	105	95		
NR1140	140	136.8	0	-1.0	4.04	3.89	1.7	1.6	145.7	7	4	0.6	0.5	0.06	110	100		
NR1145	145	141.8	0	-1.0	4.04	3.89	1.7	1.6	150.7	7	4	0.6	0.5	0.06	—	105		
NR1150	150	146.8	0	-1.2	4.04	3.89	1.7	1.6	155.7	7	4	0.6	0.5	0.06	120	110		
NR1165	165	161	0	-1.2	4.85	4.70	1.7	1.6	171.5	7	4	0.6	0.5	0.06	130	120		
NR1175	175	171	0	-1.2	4.85	4.70	1.7	1.6	181.5	10	6	0.6	0.5	0.06	140	—		
NR1180	180	176	0	-1.2	4.85	4.70	1.7	1.6	186.5	10	6	0.6	0.5	0.06	—	130		
NR1190	190	186	0	-1.4	4.85	4.70	1.7	1.6	196.5	10	6	0.6	0.5	0.06	150	140		
NR1200	200	196	0	-1.4	4.85	4.70	1.7	1.6	206.5	10	6	0.6	0.5	0.06	160	—		

1) The snap ring must be fitted inside the groove in the radius direction free from looseness.

# Snap Rings and Grooves for Rolling Bearings

Groove



B (enlarged view)

Unit: mm

Bearing outside diameter	Groove diameter	Dimension series				Groove width		Fillet radius of groove bottom	
		18		19		b			
		Max.	Min.	Max.	Min.	Max.	Min.		
22	20.8	20.5	—	—	1.05	0.90	1.05	0.8	0.2
24	22.8	22.5	—	—	1.05	0.90	1.05	0.8	0.2
28	26.7	26.4	—	—	1.30	1.15	1.20	0.95	0.25
30	28.7	28.4	—	—	1.30	1.15	1.20	0.95	0.25
32	30.7	30.4	1.30	1.15	—	—	1.20	0.95	0.25
34	32.7	32.4	1.30	1.15	—	—	1.20	0.95	0.25
37	35.7	35.4	1.30	1.15	1.70	1.55	1.20	0.95	0.25
39	37.7	37.4	—	—	1.70	1.55	1.20	0.95	0.25
40	38.7	38.4	1.30	1.15	—	—	1.20	0.95	0.25
42	40.7	40.4	1.30	1.15	1.70	1.55	1.20	0.95	0.25
44	42.7	42.4	1.30	1.15	—	—	1.20	0.95	0.25
45	43.7	43.4	—	—	1.70	1.55	1.20	0.95	0.25
47	45.7	45.4	1.30	1.15	1.70	1.55	1.20	0.95	0.25
52	50.7	50.4	1.30	1.15	1.70	1.55	1.20	0.95	0.25
55	53.7	53.4	—	—	1.70	1.55	1.20	0.95	0.25
58	56.7	56.4	1.30	1.15	—	—	1.20	0.95	0.25
62	60.7	60.3	—	—	1.70	1.55	1.20	0.95	0.25
65	63.7	63.3	1.30	1.15	—	—	1.20	0.95	0.25
68	66.7	66.3	—	—	1.70	1.55	1.20	0.95	0.25
72	70.7	70.3	1.70	1.55	1.70	1.55	1.20	0.95	0.25
78	76.2	75.8	1.70	1.55	—	—	1.6	1.3	0.4
80	77.9	77.5	—	—	2.1	1.9	1.6	1.3	0.4
85	82.9	82.5	1.70	1.55	2.1	1.9	1.6	1.3	0.4
90	87.9	87.5	1.70	1.55	2.1	1.9	1.6	1.3	0.4
95	92.9	92.5	1.70	1.55	—	—	1.6	1.3	0.4
100	97.9	97.5	1.70	1.55	2.5	2.3	1.6	1.3	0.4
105	102.6	102.1	—	—	2.5	2.3	1.6	1.3	0.4
110	107.6	107.1	2.1	1.9	2.5	2.3	1.6	1.3	0.4
115	112.6	112.1	2.1	1.9	—	—	1.6	1.3	0.4
120	117.6	117.1	2.1	1.9	3.3	3.1	1.6	1.3	0.4
125	122.6	122.1	2.1	1.9	3.3	3.1	1.6	1.3	0.4
130	127.6	127.1	2.1	1.9	3.3	3.1	1.6	1.3	0.4
140	137.6	137.1	2.5	2.3	3.3	3.1	2.2	1.9	0.6
145	142.6	142.1	—	—	3.3	3.1	2.2	1.9	0.6
150	147.6	147.1	2.5	2.3	3.3	3.1	2.2	1.9	0.6
165	161.8	161.3	3.3	3.1	3.7	3.5	2.2	1.9	0.6
175	171.8	171.3	3.3	3.1	—	—	2.2	1.9	0.6
180	176.8	176.3	—	—	3.7	3.5	2.2	1.9	0.6
190	186.8	186.3	3.3	3.1	3.7	3.5	2.2	1.9	0.6
200	196.8	196.3	3.3	3.1	—	—	2.2	1.9	0.6