

7 Design and Operating Data

7.1 Tolerances

Shaft heights The following tolerances apply to the indicated dimensions:

h	≤ 9.84 in	→ -0.02 in
h	> 9.84 in	→ -0.04 in

Foot-mounted gear units: Check the motor diameter because it may project below the mounting feet and require shimming below feet.

Shaft ends

Diameter tolerance:

inch		mm	
∅	> 0.500...1.500	→ +0 / -0.0005	≤ 50 mm → ISO k6
∅	> 1.500...7.500	→ +0 / -0.0010	> 50 mm → ISO m6

Center bores according to DIN 332, shape D [in], shape DR [mm]:

inch		mm	
∅	0.625...0.750	→ 1/4 - 20 x 0.63	= 7...10 mm → M3
∅	1.000	→ 3/8 - 16 x 0.87	> 10...13 mm → M4
∅	1.250...1.375	→ 1/2 - 13 x 1.12	> 13...16 mm → M5
∅	1.625...1.750	→ 5/8 - 11 x 1.38	> 16...21 mm → M6
∅	2.000...2.875	→ 3/4 - 10 x 1.61	> 21...24 mm → M8
∅	3.625...4.750	→ 1 - 8 x 2.13	> 24...30 mm → M10
∅	6.250...7.500	→ 1-1/8 - 7 x 2.13	> 30...38 mm → M12
∅			> 38...50 mm → M16
∅			> 50...85 mm → M20
∅			> 85...130 mm → M24
∅			> 130 mm → M30

Keys: according to DIN 6885.

Hollow shafts

Diameter tolerance:

inch		mm	
→ ANSI H7		→ ISO H7	
∅	0.625	→ +0.0007 / -0	
∅	0.750...1.000	→ +0.0008 / -0	
∅	1.250...1.9375	→ +0.0010 / -0	
∅	2.000...2.9375	→ +0.0012 / -0	
∅	3.250...4.500	→ +0.0014 / -0	

Spline shafts

Dm = Measuring roller diameter
Me = Check size


Flange

Centering shoulder tolerance:

≤ 230 mm (flange sizes A120...A300)	→ ISO j6
> 230 mm (flange sizes A350...A660)	→ ISO h6

Up to two different flange dimensions are available for each size of helical gear unit and Spiroplan® gear unit. The dimension drawings will show the flanges for each size.

7.2 Foot or flange mounting

INFORMATION	
	<p>Alignment is critical when installing gear units with a flange or with feet. Installation recommendations are available online within the Technical Notes section at www.seweurodrive.com.</p> <p>For gear units with a flange, review Technical Note GM-020.</p> <p>For gear units with hollow shaft and feet, review Technical Note GM-019.</p>

7.3 Torque arm mounting


Part Numbers

Gear unit	Size					
	27	37	47	57	67	77
KA, KH, KV, KT	-	643 425 8	643 428 2	643 431 2	643 431 2	643 434 7
SA, SH, ST	-	126 994 1	644 237 4	644 240 4	644 243 9	644 246 3
FA, FH, FV, FT Rubber buffer (2 pieces)	013 348 5	013 348 5	013 348 5	013 348 5	013 348 5	013 349 3

Gear unit	Size				
	87	97	107	127	157
KA, KH, KV, KT	643 437 1	643 440 1	643 443 6	643 294 8	-
SA, SH, ST	644 249 8	644 252 8	-	-	-
FA, FH, FV, FT Rubber buffer (2 pieces)	013 349 3	013 350 7	013 350 7	013 351 5	013 347 7

Gear unit	Size				
	10	20	30	37	47
WA	1 061 021 9	1 68 073 0	1 68 011 0	1 061 129 0	1 061 187 8

As standard, torque arms are not available for gear unit sizes KH167.. and KH187... Consult SEW-EURODRIVE for design proposals if you require torque arms for these gear units.

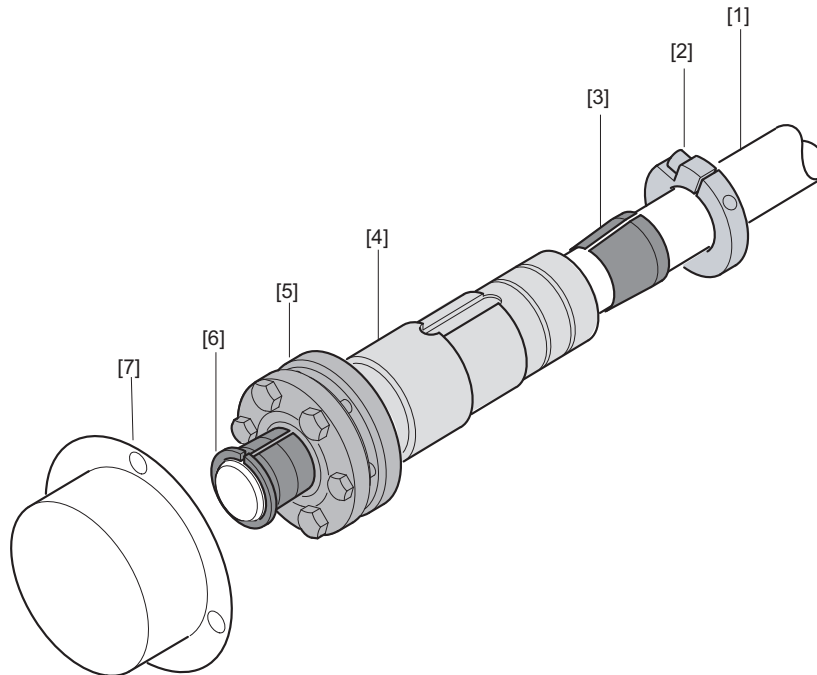
INFORMATION	
	<p>For proper design and mounting of torque arms, please see Technical Note GM-021 available at www.seweurodrive.com</p>

7.4 TorqLOC® mounting system

Description

The TorqLOC® hollow shaft mounting system is a premier design used for achieving a keyless connection between a customer solid shaft and the hollow shaft of the gear unit. TorqLOC® is the preferred alternative to a hollow shaft with shrink disk, a hollow shaft with key, or a hollow shaft with spline.

TorqLOC® consists of the following components:



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[1]	Customer shaft	[5]	Shrink disk
[2]	Clamping ring	[6]	Tapered bushing (steel or stainless steel)
[3]	Tapered bronze bushing	[7]	Fixed cover
[4]	Hollow shaft inside gear unit		

Advantages

TorqLOC® offers the following advantages:

- Cost savings because the customer shaft can be made from turned shaft stock or cold rolled stock without additional machining.
- Cost savings because there is no keyway to machine.
- A variety of tapered bushings [item 6] are available for each hollow shaft, providing flexibility and various shaft diameter options within the same gear unit.
- Simple installation since there is no key.
- Simple removal even after many hours of operation because there is no contact corrosion. High clamping forces on one end and dissimilar metals on the other end deter corrosion.
- Ease of disassembly - the same screws that are used for tightening during installation can be used for future disassembly.

Technical data

TorqLOC® is approved for output torques of 814 lb-in to 159,300 lb-in and is available on the following gear units:

- FT37 .. FT157 ^{the}Snuggler® helical-parallel shaft
- KT37 .. KT157 Helical-bevel, KT39 - KT49 hypoid
- ST37 .. ST97 Helical-worm
- WT37 .. WT47 SPIROPLAN®

Options

The following options are available for gear units with TorqLOC®:

- (/T) torque arm option is available on KT.., ST.., WT37, WT47 gear units
- (/G) rubber buffer option is available for the built-in torque arm of FT gear units

Bore sizes

The following charts shows the metric and inch bores available with TorqLOC®.

Model	inch				
ST37	0.625	0.6875	0.75	-	-
FT37, KT37, ST47	1.00	1.1875	1.25	-	-
FT47, KT39, KT47, ST57	1.1875	1.25	1.375	1.4375	-
FT57, KT57	1.375	1.4375	1.50	1.625	-
FT67, KT49, KT67, ST67	1.375	1.4375	1.50	1.625	1.688
FT77, KT77, ST77	1.625	1.75	1.9375	2.00	-
FT87, KT87, ST87	1.9375	2.00	2.375	2.4375	-
FT97, KT97, ST97	2.4375	2.75	2.9375	-	-
FT107, KT107	3.250	3.4375	3.625	3.750	-
FT127, KT127	3.4375	3.750	3.937	4.00	4.1875
FT157, KT157	4.4375	4.50	4.9375	5.00	-

Model	mm		
ST37	16	19	20
FT37, KT37, ST47	25	30	-
FT47, KT39, KT47, ST57	30	35	-
KT49	35	40	-
FT57, KT57	35	38	40
FT67, KT67, ST67	35	38	40
FT77, KT77, ST77	50	-	-
FT87, KT87, ST87	51	62	65
FT97, KT97, ST97	62	70	75
FT107, KT107	80	90	95
FT127, KT127	95	100	105
FT157, KT157	110	125	-

INFORMATION



For additional information on TorqLOC®, see Technical Notes **GM-033**, **GM-034**, and **GM-035** available at www.seweurodrive.com.

7.5 Hollow shaft with key


There are two ways to design the customer's solid shaft for use with a gear unit containing a keyed hollow shaft. While both designs are acceptable, the second is more advantageous to the end user because it allows for easier disassembly later, especially if corrosion exists between the two shafts.

Standard Design:

Uses the fastening parts supplied with the gear unit. This design requires a longer customer shaft that extends to the snapping. While this design is very common, it does not permit the use of a removal kit to aid with future removal of the customer's shaft.

Recommended Design:

Uses the optional installation/removal kit. This design requires a shorter customer shaft than the standard design. The shaft does **not** extend to the snapping. The area between the end of the shaft and the snapping contains a gap or a spacer tube, depending if the customer shaft contains a shoulder. During future disassembly, the gap or spacer tube is replaced with a locking nut that allows the user to push out the shaft by turning a wrench. This is especially beneficial in a humid or wet environment where corrosion between the shafts is probable.

INFORMATION	
	Always use the supplied NOCO® fluid for assembly. The fluid minimizes contact corrosion and facilitates future disassembly.

7.6 Hollow shaft with key - standard design

The standard design uses the parts that are normally supplied with every hollow shaft, as shown in Figure 4. Note the following points concerning the customer's solid shaft:

- See dimension sheets or page 117 for dimension, L8.
- If there is a contact shoulder [A] on the customer shaft, the installation length should be (L8 - 1 mm) or (L8 - 0.04 in).
- If there is no contact shoulder [B] on the customer shaft, the installation length should equal L8.
- Observe the tolerances for dimension, D, in various areas along the shaft.
- Refer to the dimension pages for the diameter and length of retaining screw [2].
- X must be > D. But the key does **not** have to extend the length of shaft.

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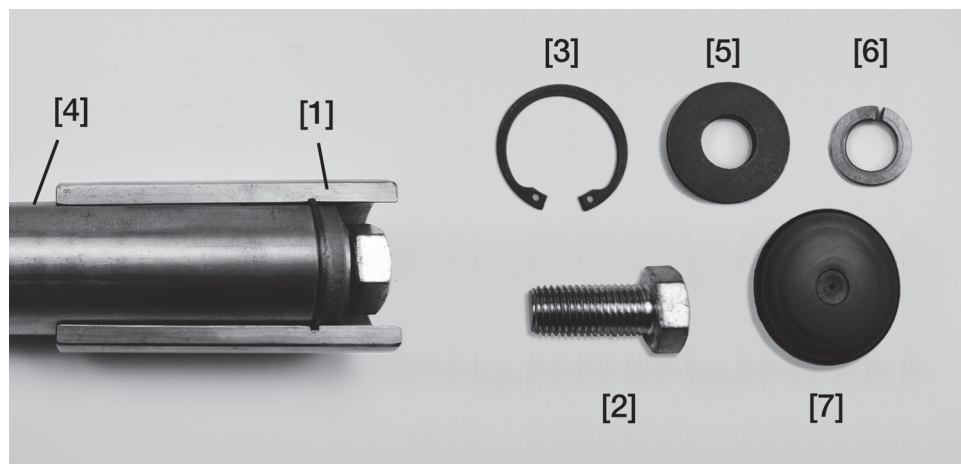
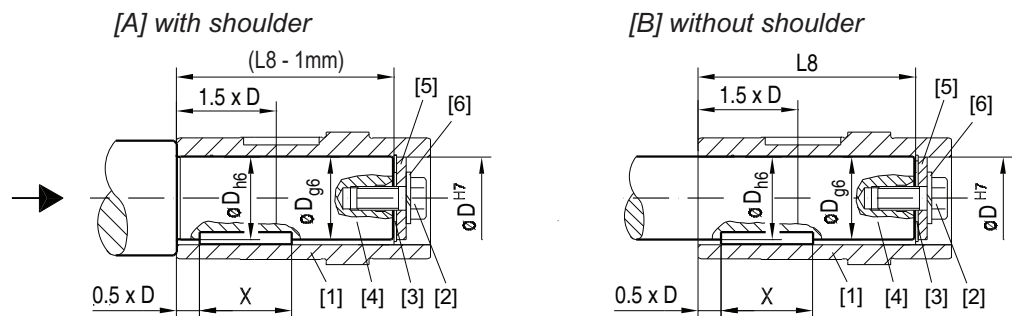


Figure 4: Customer shaft with contact shoulder [A] and without contact shoulder [B]

- | | | | |
|-----|----------------------|-----|------------------------|
| [1] | Hollow shaft | [5] | Flat washer |
| [2] | Retaining screw | [6] | Lock washer |
| [3] | Retaining snapping | [7] | Plastic protection cap |
| [4] | Customer solid shaft | | |

Customer shaft:

The following table lists the dimensions that are needed to design the customer shaft.

Gear Unit	[inch]			[mm]		
	D	STD Screw	L8 ¹⁾	D	STD Screw	L8 ¹⁾
WA..10	0.625	1/4-20 x 5/8	2.72	14	M5 x 16	69
				16		
KA..19	0.750	1/4-20 x 5/8	3.62	20	M6 x 16	92
WA..20	0.750	1/4-20 x 5/8	3.31	18	M6 x 16	84
				20		
FA..27	1.000	3/8-16 x 1	3.47	25	M10 x 25	88
KA..29	1.000	3/8-16 x 1	4.21	25	M10 x 25	107
WA..30, WA..37	0.750	1/4-20 x 5/8	4.13	20	M6 x 16	105
SA..37	0.750	1/4-20 x 5/8	4.09	20	M6 x 16	104
FA..37, KA..37	1.250	7/16-14 x 1	4.13	30	M10 x 25	105
KA..39	1.250	7/16-14 x 1	5.39	30	M10 x 25	137
	1.375	1/2-13 x 1		35	M12 x 30	
WA..47	1.000	3/8-16 x 1	4.80	30	M10 x 25	122
	1.250	7/16-14 x 1				
SA..47	1.250	7/16-14 x 1	4.13	25	M10 x 25	105
				30		
FA..47, KA..47, SA..57	1.250	7/16-14 x 1	5.20	30	M10 x 25	132
	1.375	1/2-13 x 1		35	M12 x 30	
	1.4375	5/8-11 x 1-3/4				
KA..49	1.375	1/2-13 x 1	6.30	35	M12 x 30	160
	1.500	5/8-11 x 1-3/4		40	M16 x 40	
FA..57, KA..57	1.4375	5/8-11 x 1-3/4	5.59	40	M16 x 40	142
	1.500					
FA..67, KA..67	1.4375	5/8-11 x 1-3/4	6.14	40	M16 x 40	156
	1.500					
SA..67	1.250	7/16-14 x 1	5.67	40	M16 x 40	144
	1.500	5/8-11 x 1-3/4		45		
FA..77, KA..77	1.9375	5/8-11 x 1-3/4	7.21	50	M16 x 45	183
	2.000					
SA..77	2.000	5/8-11 x 1-3/4	7.21	50	M16 x 45	183
				7.09	60	M20 x 50
FA..87, KA..87	2.375	3/4-10 x 2	8.27	60	M20 x 50	210
	2.4375					
SA..87	2.375	3/4-10 x 2	8.66	60	M20 x 50	220
				70		
FA..97, KA..97	2.750	3/4-10 x 2	10.63	70	M20 x 50	270
	2.9375					
SA..97	2.750	3/4-10 x 2	10.24	70	M20 x 50	260
				10.04	90	M24 x 60
FA..107, KA..107	3.250	3/4-10 x 2	12.32	90	M24 x 60	313
	3.4375			80	M20 x 50	
	3.625					
FA..127, KA..127	4.000	1-8 x 2-1/4	14.69	100	M24 x 60	373
FA..157, KA..157	4.500		18.11			120

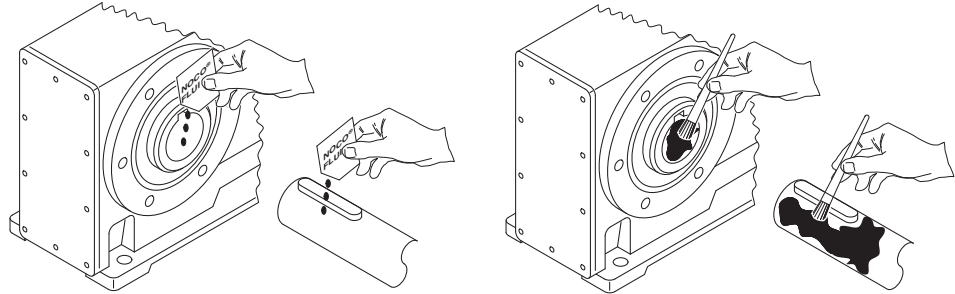
1) If customer shaft does not contain a shoulder, then the installation length of customer shaft = L8.
If customer shaft contains a shoulder, the installation length = (L8 - 1mm) or (L8 - 0.04")

7 Design and Operating Data

Hollow shaft with key - standard design

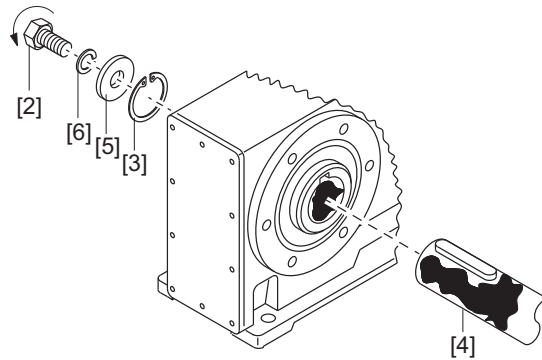
Installation procedure:

1. Apply and thoroughly spread NOCO fluid (normally supplied with unit).



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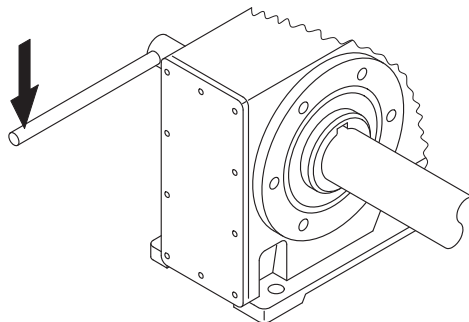
2. Install the shaft and secure it axially with the hardware supplied.



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- [2] Shorter retaining screw (normally supplied)
- [3] Retaining snapping
- [4] Customer shaft
- [5] Flat washer
- [6] Lock washer

3. Tighten the retaining screw to the appropriate torque shown in table below.



Screw		Tightening torque Nm / lb-in
Metric	SAE	
M5		5 / 44
M6	1/4-20	8 / 71
M10	7/16-14	20 / 177
M12	1/2-13	
M16	5/8-11	40 / 355
M20	3/4-10	80 / 710
M24	1-8	200 / 1770

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7.7 Hollow shaft with key - recommended design

The recommended design uses the standard hardware along with a removal kit, as shown dotted in Figure 5. Since the normal retaining screw is too short, the removal kit includes a longer screw [2]. The customer may make his own kit or purchase it from SEW-EURODRIVE. Kit part numbers and dimensions are shown on page 121.

Please observe the following:

- Items 3, 5, 6, and 7 are normally supplied with the hollowshaft, so they are not included in the kit.
- The longer retaining screw [2] can be used for both assembly and removal.
- The installation length of the customer shaft must be LK2, regardless if the shaft has a contact shoulder or not. See page 120 for LK2 dimension. Observe that the customer shaft does not extend to the snapping.
- The spacer tube [8] is not needed if the customer shaft has a shoulder.
- X must be > D. But the key does **not** have to extend the length of shaft.

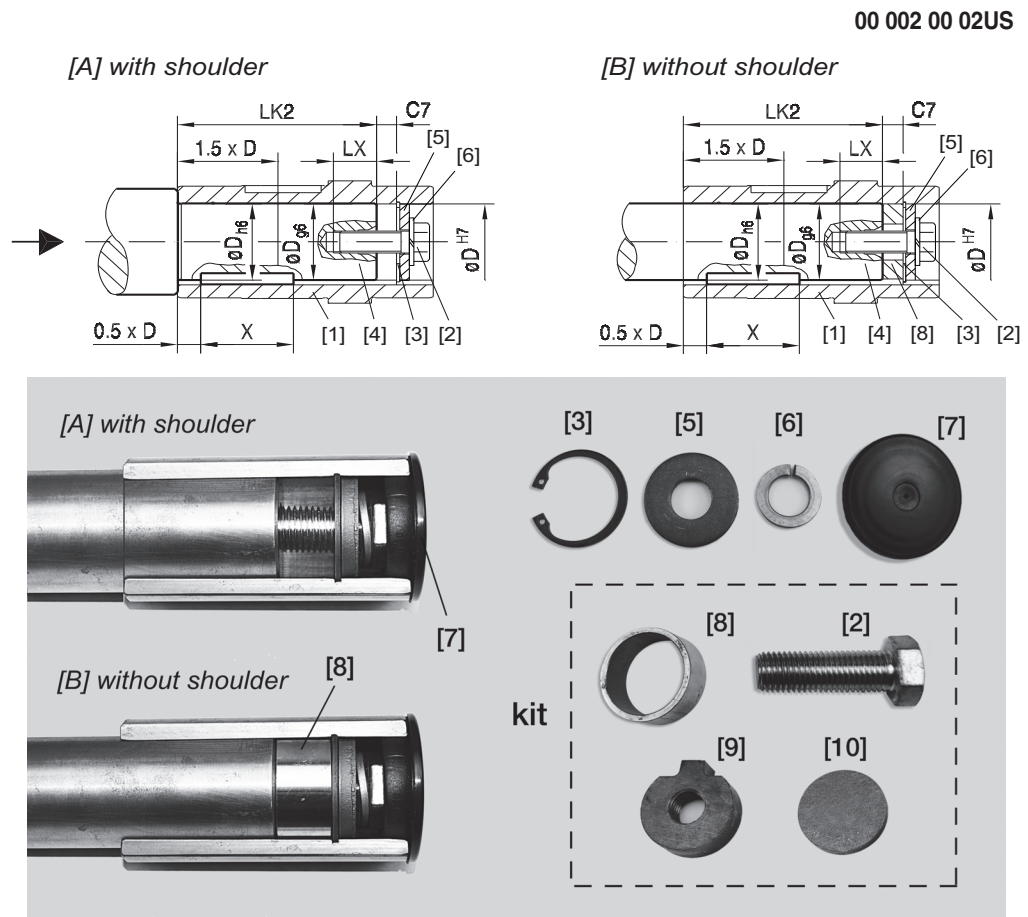


Figure 5: Customer shaft with contact shoulder (A) and without contact shoulder (B)

- | | | | |
|-----|--|------|-------------------------------------|
| [1] | Hollow shaft | [6] | Lock washer |
| [2] | Retaining screw (for assembly & removal) | [7] | Protection cap |
| [3] | Snapping | [8] | Spacer tube (not needed w/shoulder) |
| [4] | Customer shaft | [9] | Locking nut (for removal only) |
| [5] | Flat washer | [10] | Forcing washer (for removal only) |

7 Design and Operating Data

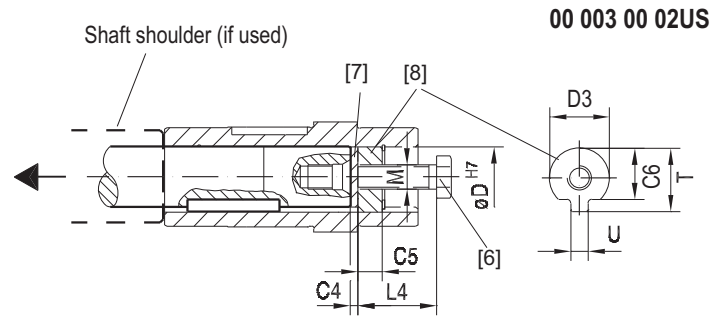
Hollow shaft with key - recommended design

Customer shaft:

The following table lists the recommended dimensions for the shaft length and depth of tap to enable the use of a shaft removal kit.

Gear Unit	D		LK2 [mm]	LX ⁺² [mm]	C7 [mm]	
	[inch]	[mm]				
WA..10	0.625	14	58	12.5	11	
		16				
KA..19	0.750	20	80	16	12	
WA..20	0.750	18	72	16	12	
		20				
FA..27	1.000	25	72	22	16	
KA..29	1.000	25	91	22	16	
WA..30, WA..37	0.750	20	93	16	12	
SA..37	0.750	20	92	16	12	
FA..37, KA..37	1.250	30	89	22	16	
KA..39	1.250	30	121	22	16	
	1.375	35				
WA..47	1.000	30	106	22	16	
	1.250					
SA..47	1.250	25	89	22	16	
		30				
FA..47, KA..47, SA..57	1.250	30	116	22	16	
		1.375				
		1.4375				
KA..49	1.375	35	142	28	18	
	1.500	40				
FA..57, KA..57	1.4375	40	124	26	18	
	1.500					
FA..67, KA..67	1.4375	40	138	36	18	
	1.500					
SA..67	1.250	40	126	36	18	
	1.500	45				
FA..77, KA..77	1.9375	50	165	36	18	
	2.000					
SA..77	2.000	50	165	36	18	
		60	158	42	22	
FA..87, KA..87	2.375	60	188	42	22	
	2.4375					
SA..87	2.375	60	198	42	22	
		70				
FA..97, KA..97	2.750	70	248	42	22	
	2.9375					
SA..97	2.750	70	238	42	22	
		90	229	52	26	
FA..107, KA..107	3.250		289	52	24	
		3.4375	80	287	52	26
		3.625	90			
FA..127, KA..127	4.000	100	347	62	26	
FA..157, KA..157	4.500	120	434	62	26	

Kit dimensions and part numbers:



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- [6] Longer retaining screw
- [7] Forcing washer
- [8] Locking nut

Metric Bores:

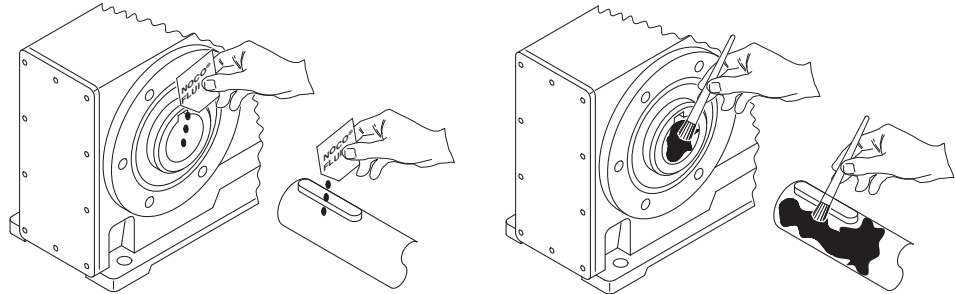
D [mm]	M	C4 [mm]	C5 [mm]	C6 [mm]	U ^{-0.5} [mm]	T ^{-0.5} [mm]	D3 ^{-0.5} [mm]	L4 [mm]	Kit Part Number
16	M5	5	5	12	4.5	18	15.7	50	643 712 5
18	M6		6	13.5	5.5	20.5	17.7	25	643 682 X
20				15.5	5.5	22.5	19.7		643 683 8
25	M10		10	20	7.5	28	24.7	35	643 684 6
30				25	7.5	33	29.7		643 685 4
35	M12		12	29	9.5	38	34.7	45	643 686 2
40	M16			34	11.5	41.9	39.7	50	643 687 0
45				38.5	13.5	48.5	44.7		643 688 9
50				43.5	13.5	53.5	49.7		643 689 7
60	M20		16	56	17.5	64	59.7	60	643 690 0
70				65.5	19.5	74.5	69.7		643 691 9
90	M24		20	80	24.5	95	89.7	70	643 692 7
100				89	27.5	106	99.7		643 693 5
120				107	31	127	119.7		643 694 3

Inch Bores:

D [inch]	M	C4 [mm]	C5 [mm]	C6 [inch]	U ^{-0.02} [inch]	T ^{-0.02} [inch]	D3 ^{-0.02} [inch]	L4 [inch]	Kit Part Number
0.625	1/4-20	5	5	0.500	0.168	0.701	0.6130	2.0	250 546 00
0.750	1/4-20		6	0.625		0.835	0.738	1.0	250 546 19
1.000	7/16-14		10	0.863	0.230	1.110	0.988	1.5	250 546 27
1.250	7/16-14			1.113		1.362	1.238		250 546 35
1.375	1/2-13		12	1.142	0.293	1.509	1.363	1.75	250 546 43
1.4375	5/8-11			1.205		0.356	1.602		1.4255
1.500	5/8-11			1.267	1.657		1.4880	250 546 78	
1.9375	5/8-11			1.682	0.480	2.148	1.9255	250 546 86	
2.00	5/8-11		1.744	2.224		1.9880	250 546 94		
2.375	3/4-10		16	2.119	0.606	2.650	2.3630	2.5	250 247 08
2.4375	3/4-10			2.182		2.605	2.4255		250 547 16
2.750	3/4-10			2.488	3.031	2.7380	250 547 24		
2.9375	3/4-10		18	2.676	0.730	3.128	2.9255	3.0	250 547 32
3.250	3/4-10			2.938		3.587	3.2380		250 547 40
3.4375	3/4-10		20	3.126	0.856	3.685	3.4255	3.5	250 547 59
3.6250	1-8			3.263		3.873	3.6130		250 547 67
4.000	1-8	3.588		0.980	4.441	3.9880	250 547 75		
4.500	1-8	4.088			4.933	4.4880	250 547 83		

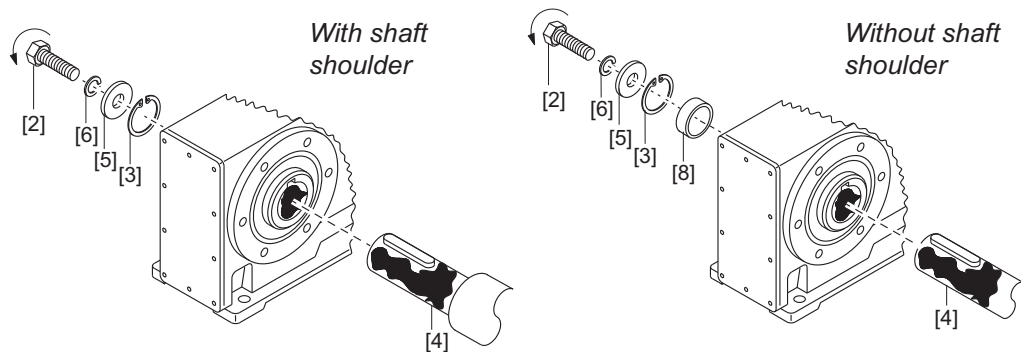
Installation procedure:

1. Apply and thoroughly spread NOCO fluid (normally supplied with unit).



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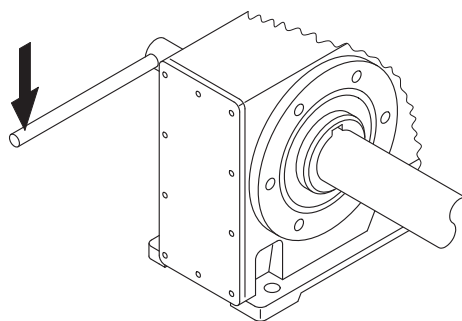
2. Install the shaft and secure it axially with the hardware supplied.



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- [2] Longer retaining screw
- [3] Snapping
- [4] Customer shaft
- [5] Flat washer
- [6] Lock washer
- [8] Spacer tube

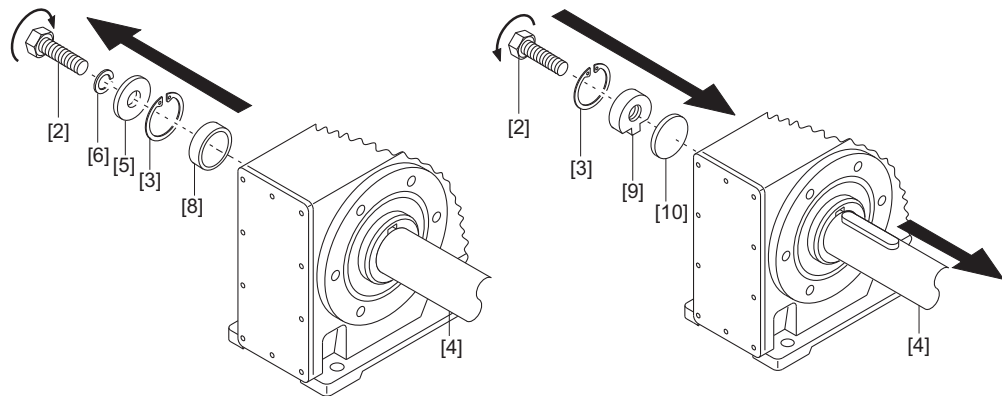
3. Tighten the retaining screw to the appropriate torque shown in table below.



Screw		Tightening torque Nm / lb-in
Metric	SAE	
M5		5 / 44
M6	1/4-20	8 / 71
M10	7/16-14	20 / 177
M12	1/2-13	
M16	5/8-11	40 / 355
M20	3/4-10	80 / 710
M24	1-8	200 / 1770

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Removal procedure:

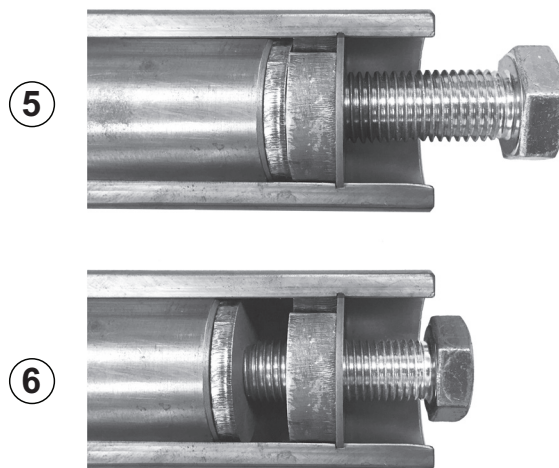


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- | | |
|----------------------------|---------------------|
| [2] Longer retaining screw | [6] Lock washer |
| [3] Snapping | [8] Spacer tube |
| [4] Customer shaft | [9] Locking nut |
| [5] Flat washer | [10] Forcing washer |

1. Loosen the retaining screw [2].
2. Remove parts [3], [5], and [6]. Also, remove the spacer tube, [8], if applicable.
3. Using the parts [9] and [10] from the removal kit, insert the forcing washer and the locking nut until they rest against the customer shaft [4].
4. Re-install the snapping [3].
5. Thread the retaining screw [2] into the locking nut, as shown in cutaway below.
6. Turn the screw with wrench to force the shaft out of the gear unit.



7.8 Bolts and eyebolts

Use bolts of quality 8.8 to fasten gear units.

Exception

Use bolts of quality 10.9 to fasten the following flange-mounted and foot/flange-mounted gear units in order to transmit the rated torques:

- RF37, R37F with flange Ø 120 mm
- RF47, R47F with flange Ø 140 mm
- RF57, R57F with flange Ø 160 mm
- RZ37 - RZ87

Eyebolts, lifting eyes

R07..R27 helical gear units, motors up to DR..100 and the Spiroplan® gearmotors W..10 to W..30 are delivered without additional hardware for ease of handling. All other gear units and motors are equipped with either cast-on suspension eye lugs, screw-on suspension eye lugs or screw-on lifting eyebolts, as noted below.

Gear Unit	Screw-on		Cast-on eyebolts
	lifting eyebolts	eyebolts	
R..37 - R..57		•	
R..67 - R..107	•		
RX57 - RX67		•	
RX77 - RX107	•		
F..27 - F..157			•
K..37 - K..157			•
K..167 - K..187	•		
S..37 - S..47		•	
S..57 - S..97			•
W37 - W47		•	

7.9 Reduced backlash

Helical, parallel shaft helical and helical-bevel gear units with reduced backlash are available from gear size 37. The circumferential backlash of these units is considerably less than that of the standard version to ensure higher precision when positioning. The circumferential backlash is specified in angular minutes ['] in the technical data. The circumferential backlash for the output shaft is specified with no load (max. 1% of the rated output torque) while the gear unit input end is blocked.

The reduced backlash variant is available for the following gear units:

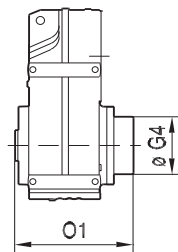
- Helical gear units (R), sizes 37 to 167
- Parallel-shaft gear units (F), sizes 37 to 157
- Helical-bevel gear units (K), sizes 37 to 187

Compound gear units (ex: F67R37..) are not available in the reduced backlash option.

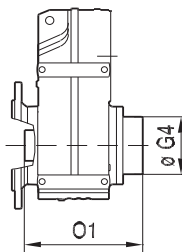
The dimensions for reduced backlash design are the same as the dimensions of the standard design, except for parallel-shaft sizes FH.87 and FH.97. The following figure shows the dimensions (mm) of the FH.87 and FH.97 with reduced backlash.

42 020 00 09

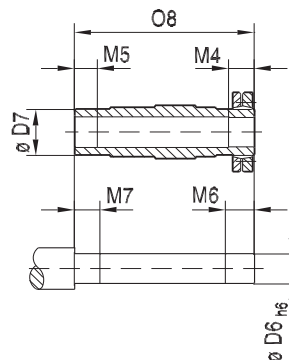
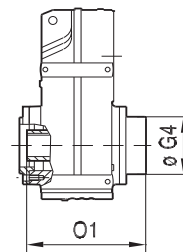
**FH../R
FH..B/R**



FHF../R



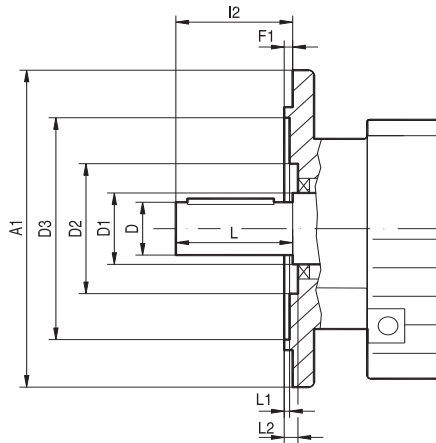
FHZ../R



Type	D6	D7	G4	M4	M5	M6	M7	O1	O8
FH.87/R	Ø 65 _{h6}	Ø 85	Ø 163	41	40	46	45	312.5	299.5
FH.97/R	Ø 75 _{h6}	Ø 95	Ø 184	55	50	60	55	382.5	367

7.10 Flange detail dimensions - RF.. and R..F

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Check dimensions L1 and L2 for selection and installation of output elements.

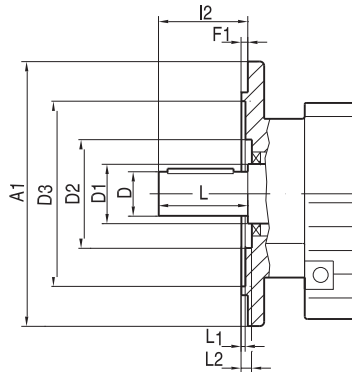
Type	Dimensions in mm											
	A1	D ¹⁾	D1	D2		D3	F1	I2	L	L1		L2
				RF	R..F					RF	R..F	
RF07, R07F	120	20	22	38	38	72	3	40	40	2	2	6
	140 ²⁾				-	85	3			2	-	6
	160 ²⁾				-	100	3.5			2.5	-	6.5
RF17, R17F	120	20	25	46	46	65	3	40	40	1	1	5
	140				-	78	3			1	-	5
	160 ²⁾				-	95	3.5			1	-	6
RF27, R27F	120	25	30	54	54	66	3	50	50	1	1	6
	140				-	79	3			3	-	7
	160				-	92	3.5			3	-	7
RF37, R37F	120	25	35	60	63	70	3	50	50	5	4	7
	160				-	96	3.5			1	-	7.5
	200 ²⁾				-	119	3.5			1	-	7.5
RF47, R47F	140	30	35	72	64	82	3	60	60	4	1	6
	160				-	96	3.5			0.5	-	6.5
	200				-	116	3.5			0.5	-	6.5
RF57, R57F	160	35	40	76	75	96	3.5	70	70	4	2.5	5
	200				-	116	3.5			0	-	5
	250 ²⁾				-	160	4			0.5	-	5.5
RF67, R67F	200	35	50	90	90	118	3.5	70	70	2	4	7
	250				-	160	4			1	-	7.5
RF77, R77F	250	40	52	112	100	160	4	80	80	0.5	2.5	7
	300 ²⁾				-	210	4			0.5	-	7
RF87, R87F	300	50	62	123	122	210	4	100	100	0	1.5	8
	350				-	226	5			1	-	9
RF97	350	60	72	136		236						
RF107	450	70	82	157		320	5	120	120	0		9
	450			186		232	5	140	140	0		11
RF137	450	90	108	180		316						
	550					416	5	170	170	0		10
RF147	450	110	125	210		316						
	550					416	5	210	210	0		10
RF167	550	120	145	290		416	5	210	210	1		10
	660					517	6			2		11

1) For dimension, D, for inch shafts see page 272.

2) The flange contour protrudes below the base surface.

7.11 Flange detail dimensions - FF., KF., SF. and WF..

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Check dimensions L1 and L2 for selection and installation of output elements.

7

Type	Dimensions in mm									
	A1	D ¹⁾	D1	D2	D3	F1	I2	L	L1	L2
FF27	160	25	40	66	96	3.5	50	50	3	18.5
FF37	160	25	30	70	94	3.5	50	50	2	6
FF47	200	30	40	72	115	3.5	60	60	3.5	7.5
FF57	250	35	40	84	155	4	70	70	4	9
FF67	250	40	50	84	155	4	80	80	4	9
FF77	300	50	55	82	205	4	100	100	5	9
FF87	350	60	65	115	220	5	120	120	5	9
FF97	450	70	75	112	320	5	140	140	8	10
FF107	450	90	100	159	318	5	170	170	16	9
FF127	550	110	118	-	420	5	210	210	10	-
FF157	660	120	135	190	520	6	210	210	8	14
KF37	160	25	30	70	94	3.5	50	50	2	6
KF47	200	30	40	72	115	3.5	60	60	3.5	7.5
KF57	250	35	40	84	155	4	70	70	4	9
KF67	250	40	50	84	155	4	80	80	4	9
KF77	300	50	55	82	205	4	100	100	5	9
KF87	350	60	65	115	220	5	120	120	5	9
KF97	450	70	75	112	320	5	140	140	8	10
KF107	450	90	100	159	318	5	170	170	16	9
KF127	550	110	118	-	420	5	210	210	10	-
KF157	660	120	135	190	520	6	210	210	8	14
SF37	120	20	25	-	68	3	40	40	6	-
	160	20	25	-	96	3.5	40	40	5.5	-
SF47	160	25	30	70	94	3.5	50	50	2	6
SF57	200	30	40	72	115	3.5	60	60	3.5	7.5
SF67	200	35	45	-	115	3.5	70	70	8.5	-
SF77	250	45	55	108	160	4	90	90	8	9
SF87	350	60	65	130	220	5	120	120	6	10
SF97	450	70	75	150	320	5	140	140	8.5	10
WF10	80	16	25	-	39	2.5	40	40	30	-
	120	16	25	39	74	3	40	40	5	30
WF20	110	20	30	44	53	-4	40	40	27	35
	120	20	30	-	45	2.5	40	40	37.5	-
WF30	120	20	30	48	63	2.5	40	40	18	27
	160	20	30	48	63	2.5	40	40	33	42
WF37	120	20	30	-	70	2.5	40	40	-	10.5
	160	20	30	-	70	2.5	40	40	-	25.5
WF47	160	30	35	-	92	3.5	10	60	6	-

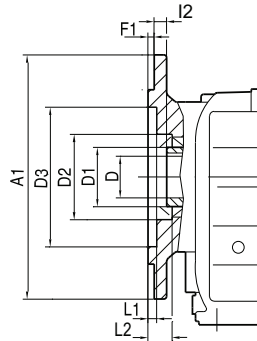
1) For dimension, D, for inch shafts see page 407 (FF), 571 (KF), 680 (SF), or 706 (WF).

7 Design and Operating Data

Flange detail dimensions - FAF., KAF., SAF. and WAF..

7.12 Flange detail dimensions - FAF., KAF., SAF. and WAF..

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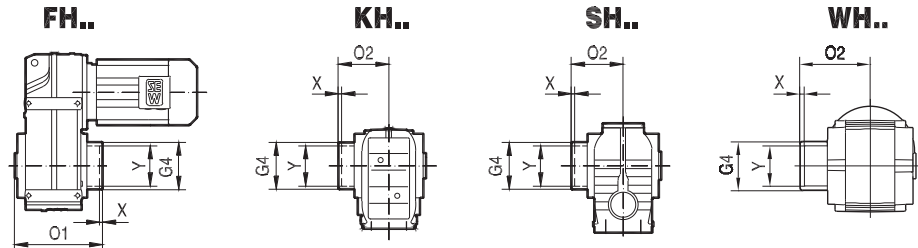
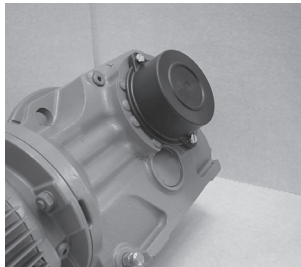
Check dimensions L1 and L2 for selection and installation of output elements.

Type	Dimensions in mm								
	A1	D ¹⁾	D1	D2	D3	F1	I2	L1	L2
FAF27	160	25	40	66	96	3.5	20	3	18.5
FAF37	160	30	45	62	94	3.5	24	2	30
FAF47	200	35	50	70	115	3.5	25	3.5	31.5
FAF57	250	40	55	76	155	4	23.5	4	31
FAF67	250	40	55	76	155	4	23	4	31
FAF77	300	50	70	95	205	4	37	5	45
FAF87	350	60	85	120	220	5	30	5	39
FAF97	450	70	95	135	320	5	41.5	5.5	51
FAF107	450	90	118	224	320	5	41	16	52
FAF127	550	100	135	185	420	5	51	6	63
FAF157	660	120	155	200	520	6	60	10	74
KAF37	160	30	45	62	94	3.5	24	2	30
KAF47	200	35	50	70	115	3.5	25	3.5	8.5
KAF57	250	40	55	76	155	4	23.5	4	31
KAF67	250	40	55	76	155	4	23	4	31
KAF77	300	50	70	95	205	4	37	5	45
KAF87	350	60	85	120	220	5	30	5	39
KAF97	450	70	95	135	320	5	41.5	5.5	51
KAF107	450	90	118	224	320	5	41	16	52
KAF127	550	100	135	185	420	5	51	6	63
KAF157	660	120	155	200	520	6	60	10	74
SAF37	120	20	35	-	68	3	15	6	-
	160	20	35	-	96	3.5	15	5.5	-
SAF47	160	30 / 25	45	62	94	3.5	24	2	30
SAF57	200	35 / 30	50	70	115	3.5	25	3.5	31.5
SAF67	200	45 / 40	65	91	115	3.5	42.5	4	48.5
SAF77	250	60 / 50	80	112	164	4	45.5	5	53.5
SAF87	350	70 / 60	95	131	220	5	52.5	6	62.5
SAF97	450	90 / 70	120	160	320	5	60	6.5	69
WAF10	80	16	25	-	39	2.5	23	30	-
	120	16	25	39	74	3	23	5	30
WAF20	110	18 / 20	30	44	53	-4	30	27	35
	120	18 / 20	30	-	45	2.5	30	37.5	-
WAF30	120	20	30	48	63	2.5	19.5	18	27
	160	20	30	48	63	2.5	34.5	33	42
WAF37	120	20 / 25	35	54	70	2.5	19.5	10.5	27
	160	20 / 25	35	54	70	2.5	34.5	25.5	42
WAF47	160	25 / 30	45	72	92	3.5	10	6	45

1) For dimension, D, for inch shafts see page 409 (FAF), 573 (KAF), 682 (SAF), or 708 (WAF).

7.13 Hollow shaft covers

Gear units with shrink discs (ex: FH, SH, KH) sizes 37 - 97 are supplied with a fixed cover, as shown below. These covers are available as an option for gear units with a hollow shaft and key (ex: FA, KA, SA).



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Part numbers and dimensions

FH..	FH..37	FH..47	FH..57	FH..67	FH..77	FH..87	FH..97
Part number	643 513 0	643 514 9	643 515 7	643 515 7	643 516 5	643 517 3	643 518 1
G4	78	88	100	100	121	164	185
O1	157	188.5	207.5	221.5	255	295	363.5
X	2	4.5	7.5	6	6	4	6.5
Y	75	83	83	93	114	159	174

KH.. ¹⁾	KH..37	KH..47	KH..57	KH..67	KH..77	KH..87	KH..97
Part number	643 513 0	643 514 9	643 515 7	643 515 7	643 516 5	643 517 3	643 518 1
G4 [mm]	78	88	100	100	121	164	185
O2 [mm]	95	111.5	122.5	129	147	172	210.5
X [mm]	0	1.5	5.5	3	1	2	4.5
Y [mm]	75	83	83	93	114	159	174

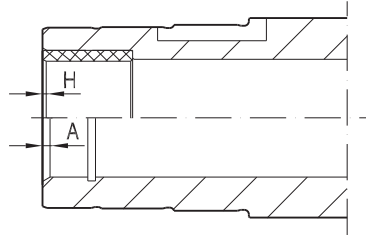
1) Not possible on foot-mounted helical-bevel gear units with hollow shaft and shrink disk (KH..B). There are no mouting holes.

SH..	SH..37	SH..47	SH..57	SH..67	SH..77	SH..87	SH..97
Part number	643 512 2	643 513 0	643 514 9	643 515 7	643 516 5	643 517 3	643 518 1
G4 [mm]	59	78	88	100	121	164	185
O2 [mm]	88	95	111.5	123	147	176	204.5
X [mm]	1	0	1.5	3	1	0	0.5
Y [mm]	53	75	83	93	114	159	174

WH..SPIROPLAN®	WH..37	WH..47
Part number	1 061 136 3	1 061 194 0
G4 [mm]	68	80.5
O2 [mm]	95.5	109.5
X [mm]	11	12.5
Y [mm]	50	72

7.14 Chamfers on hollow shafts

The following illustration shows the chamfers on gear units with hollow shaft:



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Gear unit	Type	
	with hollow shaft (A)	with hollow shaft and shrink disk (H)
W..10 - W..30	2 × 30°	-
F..27	2 × 30°	0.5 × 45°
F../K../S../W..37	2 × 30°	0.5 × 45°
F../K../S../W..47	2 × 30°	0.5 × 45°
S..57	2 × 30°	0.5 × 45°
F../K../S..67	2 × 30°	3 × 2°
F../K../S..77	2 × 30°	3 × 2°
F../K../S..87	3 × 30°	3 × 2°
F../K../S..97	3 × 30°	3 × 2°
F../K..107	3 × 30°	3 × 2°
F../K..127	5 × 30°	1.5 × 30°
F../K..157	5 × 30°	1.5 × 30°
KH167	-	1.5 × 30°
KH187	-	1.5 × 30°

Special motor/gear unit combinations

Please note for parallel shaft helical gearmotors with hollow shaft (FA..B, FV..B, FH..B, FAF, FVF, FHF, FA, FV, FH, FT, FAZ, FVZ, FHZ):

- If the customer shaft is pushed all the way through the hollow shaft to extend beneath the motor, there may be interference when a "small gear unit" is used in combination with a "large motor."
- Check the motor dimension AC to decide whether there will be interference when the customer shaft is pushed through.

7.15 General dimension notes

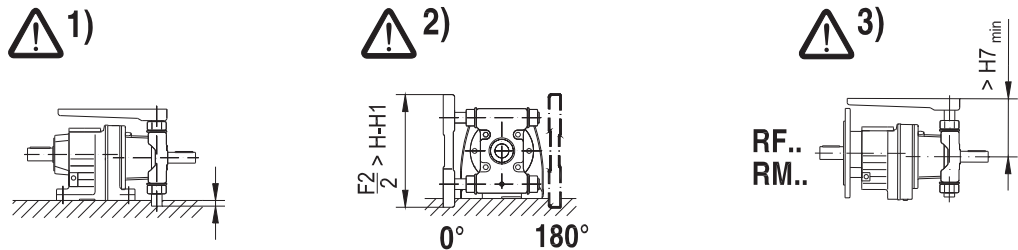
Breather valves The gear unit dimension drawings are shown with screw plugs. As standard, the corresponding screw plug is replaced with a breather valve depending on the mounting position M1...M6 specified on the order. Thus, dimensions might be slightly different.

Shrink disk connection For hollow shaft gear unit with shrink disk connection: If required, please request a detailed data sheet on shrink disks, data sheet no. 33 753 ..95.

Splined hollow shaft FV.. hollow shaft gear units in sizes 27 ... 107 and KV.. in sizes 37 ... 107 are delivered with a splined hollow shaft according to DIN 5480 (tooth space tolerance 9H).

Rubber buffer for FA/FH/FV/FT The value, mL, indicates the preloaded rubber buffer. The characteristic curve for the spring value of the rubber buffers is available at SEW-EURODRIVE upon request.

AD../P input shaft with motor platform The following cases can arise with gear units with input shaft assemblies and motor mounting platforms:



1. Depending on the setting, the column may protrude past the foot mounting surface
2. Motor mounting platform may protrude past the foot mounting surface
3. Motor mounting platform may collide with the gear unit flange, depending on the setting

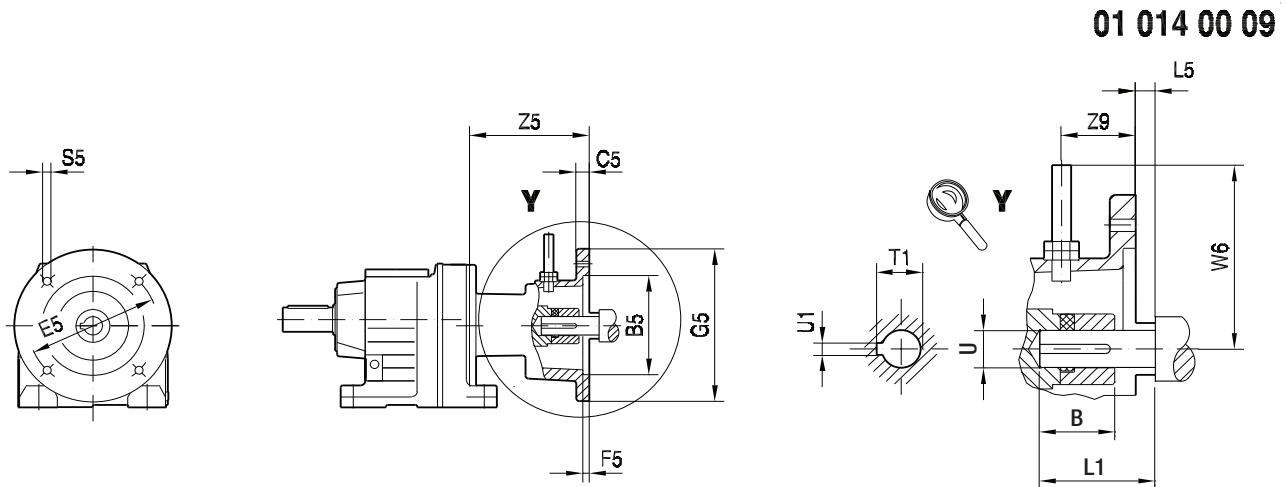
The corresponding cases are indicated in the dimension tables in the following column:

E2	F2	G2	H6	H7 min	H7 max	H11 min	H11 max	K2	Q4	D1	L1	L13	L14	T1	U1	 →118
----	----	----	----	--------	--------	---------	---------	----	----	----	----	-----	-----	----	----	---

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7.16 Explanation of dimensions

AR and AM..

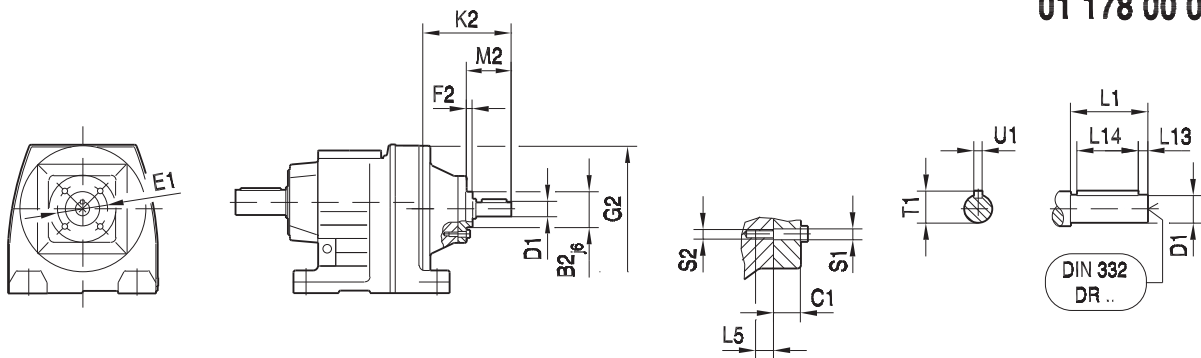


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B	Shaft end to coupling end (indicates where to place coupling onto motor when assembling motor to adapter)	L5	Shaft collar length to flange surface
B5	Center bore diameter	S5	Threaded hole diameter
C5	Flange thickness	T1	Height to top of keyway
E5	Hole circle diameter	U	Coupling bore diameter
F5	Centering depth	U1	Keyway width
G5	Adapter flange diameter	W6	Encoder height
L1	Length from shaft collar to shaft end	Z5	Adapter length
		Z9	Encoder position

AD../ZR

01 178 00 09



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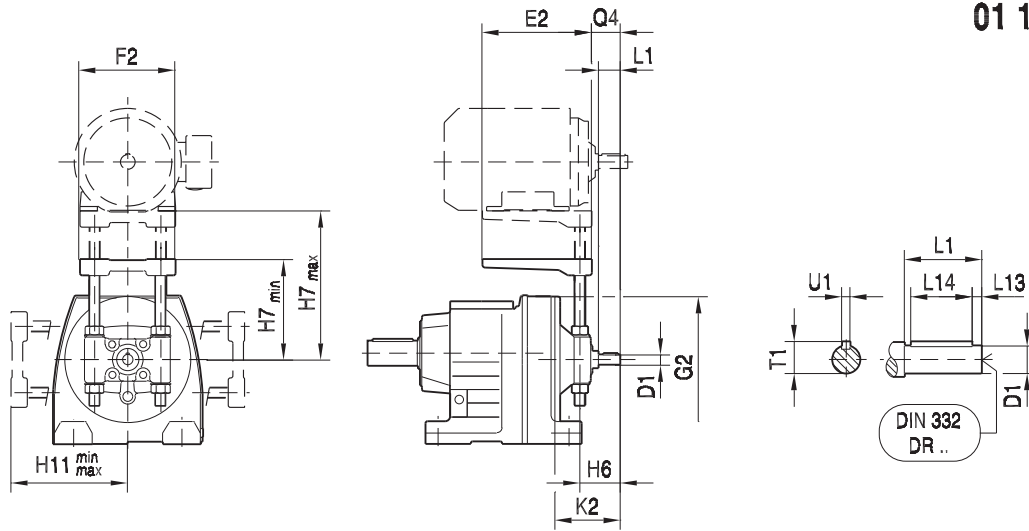
B2	Center bore diameter	L13	Position of key
C1	Flange thickness	L14	Key length
D1	Shaft diameter	L5	Thread depth
E1	Hole circle diameter	M2	Contact surface position
F2	Center bore height	S1	Through bore
G2	Flange diameter on input side of gear unit	S2	Thread diameter
K2	Input shaft assembly length	T1	Height to top of key
L1	Length from shaft collar to shaft end	U1	Key width

7 Design and Operating Data

Explanation of dimensions

AD../P

01 179 00 09




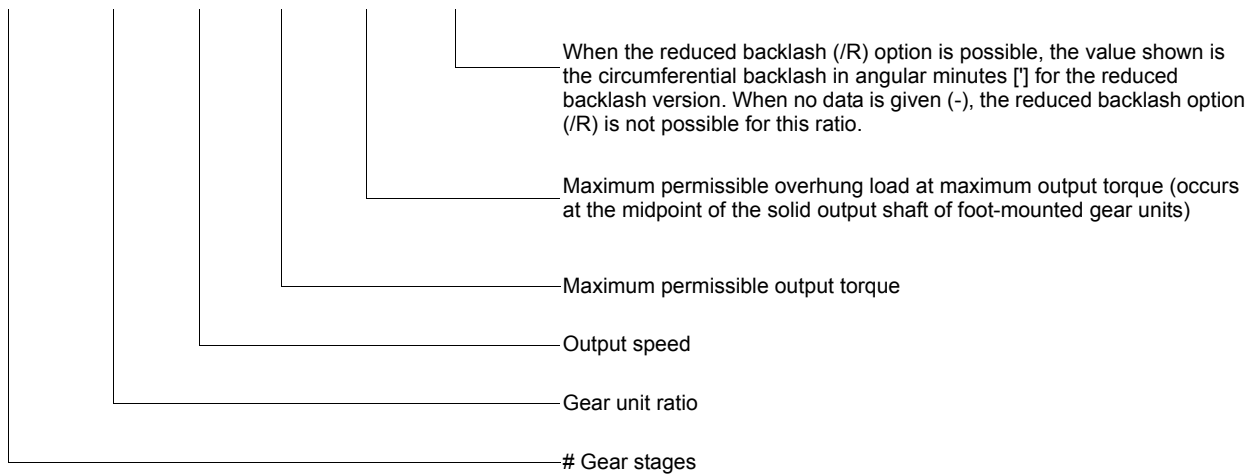
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D1	Shaft diameter	K2	Input shaft assembly length
E2	Length of motor mounting platform	L1	Length of shaft end
F2	Width of motor mounting platform	L13	Position of key
G2	Flange diameter on input side of gear unit	L14	Key length
H11	Adjusting height (0°, 180°)	Q4	Distance of shaft end and base plate
H6	Distance of shaft end to middle of column	T1	Key height in shaft
H7	Adjusting height	U1	Key width

7.17 Overview of selection tables

AM example

R77, n _e = 1700 rpm						7260 lb-in					
Stages	i [ratio]	n _a [rpm]	T _{a max} [lb-in]	F _{Ra} [lb]	φ (/R) [']	AM					
						56	143	145	182	184	213/215
R77  2	5.31	320	4510	710	8						
	5.99	284	4770	700	8						
	6.79	250	5130	660	8						
	7.74	220	5390	675	8						
	8.59	198	5570	705	7						
	9.64	176	5570	1190	7						
	10.88	156	5830	1220	6						



Key

	Combination is possible .
	Combination is not possible .

Weights

The weights of the gear units are shown at the bottom of the selection table for each gear unit, as shown below.



Weight [lbs]		Stages	AM						
			143	145	182	184	213/215	254/256	284/286
R87	NEMA	2	135	135	145	145	160	190	195
		3	140	140	150	150	160	190	195
	IEC		80	90	100	112	132S/M	160	180
		2	135	135	145	145	165	200	200
		3	140	140	150	150	165	200	205

RF87: + 16 lbs / RM87: +81 lbs

7 Design and Operating Data

Overview of selection tables

AD example

R107 AD.. , $n_e = 1700$ rpm										38060 lb-in	
i [ratio]	n_a [rpm]	$T_{a\ max}$ [lb-in]	P_e [HP]	$F_{Ra}^{1)}$ [lb]	F_{Re} [lb]	Stages		ϕ (/R) [']			
						Lg	Sm			[10]	[11]
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]

- [1] Output speed
- [2] Maximum permissible output torque
- [3] Calculated maximum input power rating of the gear unit
- [4] Maximum permissible overhung load at the midpoint of a solid output shaft assuming maximum output torque
- [5] Maximum permissible overhung load at the midpoint of the input shaft
- [6] Number of gear stages within a single gear unit or within the larger gear unit of a compound
- [7] Number of gear stages within the smaller gear unit of a compound (R..)
- [8] When the reduced backlash (/R) option is possible, the value shown is the circumferential backlash in angular minutes ['] for the reduced backlash version. When no data is given (-), the reduced backlash option (/R) is not possible for this ratio.
- [9] Some mounting positions invoke additional heat due to oil churning losses. The mounting position that may limit the input power rating will be shown. For additional information, see section, "Thermal limitations with AD input" on page 63.
- [10] Gear unit size
- [11] Cover size

Weights

The weights of the gear units with AD input are shown at the bottom of the selection table for each gear unit, as shown below.

Weight [lbs]	Stages		AD2	AD3	AD4	AD5
	Large	Small				
R87	2	-	132	141	154	187
	3	-	135	144	157	190
RF87: +15 lbs / RM87: +80 lbs						