



6 Design and Operating Notes

6.1 Lubricants

General information

Unless a special arrangement is made, SEW supplies the drives with a lubricant fill adapted for the specific gear unit and mounting position. The decisive factor is the mounting position (M1...M6, → Sec. "Mounting Positions and Important Order Information") specified when ordering the drive. You must adapt the lubricant fill in case of any subsequent changes made to the mounting position (→ Lubricant fill quantities).

Lubricant table

The lubricant table on the following page shows the permitted lubricants for SEW-EURODRIVE gear units. Please note the following key to the lubricant table.

Key to the lubricant table

Abbreviations used, meaning of shading and notes:

CLP	= Mineral oil
CLP PG	= Polyglycol (W gear units, conforms to USDA-H)
CLP HC	= Synthetic hydrocarbons
E	= Ester oil (water pollution danger category WGK 1)
HCE	= Synthetic hydrocarbons + ester oil (USDA - H1 certification)
HLP	= Hydraulic oil
	= Synthetic lubricant (= synthetic anti-friction bearing grease)
	= Mineral lubricant (= mineral-based anti-friction bearing grease)

- 1) Helical-worm gear units with PG oil: Please contact SEW
- 2) Special lubricant for Spiroplan® gear units only
- 3) Recommendation: Select SEW $f_B \geq 1.2$
- 4) Pay attention to critical starting behavior at low temperatures!
- 5) Low-viscosity grease
- 6) Ambient temperature



Lubricant for the food industry



Biodegradable oil (lubricant for use in agriculture, forestry and water resources)

Anti-friction bearing greases

The anti-friction bearings in gear units and motors are given a factory-fill with the greases listed below. SEW-EURODRIVE recommends regreasing anti-friction bearings with a grease fill at the same time as changing the oil.

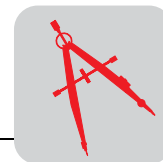
	Ambient temperature	Manufacturer	Type
Anti-friction bearing in gear unit	-20 °C ... +60 °C	Mobil	Mobilux EP 2
	-40 °C ... +80 °C	Mobil	Mobiltemp SHC 100
Anti-friction bearing in motor	-20 °C ... +80 °C	Esso	Unirex EQ3
	-20 °C ... +60 °C	Shell	Alvania RL3
	+80 °C ... +100 °C	Klüber	Barrierta L55/2
	-45 °C ... -25 °C	Shell	Aero Shell Grease 16 ¹⁾
Special greases for anti-friction bearings in gear units:			
	-30 °C ... +40 °C	Aral	Aral Eural Grease EP 2
	-20 °C ... +40 °C	Aral	Aral Aralube BAB EP2

1) Recommended for continuous operation at ambient temperatures below 0 °C, for example in a cold storage.



The following grease quantities are required:

- For fast-running bearings (motor and gear unit input end): Fill the cavities between the rolling elements one third full with grease.
- For slow-running bearings (in gear units and at gear unit output end): Fill the cavities between the rolling elements two thirds full with grease.



6.2 Lubricant table for standard variable speed gearmotors

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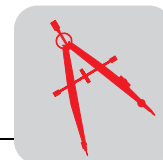
	6) °C -50 0 +50 +100 Standard -10 +40	DIN (ISO) CLP(CC) CLP PG CLP HC CLP (CC) HLP (HM) CLP HC HLP (HM)	ISO, NLGI	Mobil®	Shell	KLÜBER LUBRICATION	ARAL	bp	Tribol	TEXACO	Optimol	FUCHS
R...		CLP(CC)	VG 220	Mobilgear 630	Shell Omala 220	Klüberoil GEM 1-220	Aral Degol BG 220	BP Energol GR-XP 220	Tribol 1100/220	Meropa 220	Optigear BM 220	Renolin CLP 220
K...(HK...)	+80	CLP PG	VG 220	Mobil Glycoyle 30	Shell Tivela S 220	Klüberoil GH 6-220	Aral Degol GS 220	BP Energol SG-XP 220	Tribol 800/220	Synlube CLP 220	Optiflex A 220	
F...	+80	CLP HC	VG 220	Mobil SHC 630	Shell Omala HD 220	Klüberoil EG 4-220	Aral Degol PAS 220		Tribol 1510/220	Pinnacle EP 220	Optigear Synthetic A 220	Renolin Unisyn CLP 220
	+40		VG 150	Mobil SHC 629	Shell Omala HD 150	Klüberoil EG 4-150				Pinnacle EP 150		
	+25	CLP (CC)	VG 150	Mobilgear 627	Shell Omala 100	Klüberoil GEM 1-150	Aral Degol BG 100	BP Energol GR-XP 100	Tribol 1100/100	Meropa 150	Optigear BM 100	Renolin CLP 150
	+10	HLP (HM)	VG 68-46	Mobil D.T.E. 13M	Shell Tellus T 32	Klüberoil GEM 1-68	Aral Degol BG 46		Tribol 1100/68	Rando EP 32	Optigear 32	Renolin B 46 HVI
	+10	CLP HC	VG 32	Mobil SHC 624		Klüber-Summit HySyn FG-32				Cetus PAO 46		
	-20	HLP (HM)	VG 22	Mobil D.T.E. 11M	Shell Tellus T 15	Isoflex MT 30 ROT		BP Energol HLP-HM 15		Rando HDZ 15		
	-40		VG 680	Mobilgear 636	Shell Omala 680	Klüberoil GEM 1-680	Aral Degol BG 680	BP Energol GR-XP 680	Tribol 1100/680	Meropa 680	Optigear BM 680	Renolin CLP 680
S...(HS...)	+60	CLP PG	VG 680 ¹⁾		Shell Tivela S 680	Klüberoil GH 6-680		BP Energol SG-XP 680	Tribol 800/680	Synlube CLP 680		
	+80	CLP HC	VG 460	Mobil SHC 634	Shell Omala HD 460	Klüberoil EG 4-460				Pinnacle EP 460		
	+10		VG 150	Mobil SHC 629	Shell Omala HD 150	Klüberoil EG 4-150				Pinnacle EP 150		
	+10	CLP (CC)	VG 150	Mobilgear 627	Shell Omala 100	Klüberoil GEM 1-150	Aral Degol BG 100	BP Energol GR-XP 100	Tribol 1100/100	Meropa 100	Optigear BM 100	Renolin CLP 150
	+20	CLP PG	VG 220 ¹⁾	Mobil Glycoyle 30	Shell Tivela S 220	Klüberoil GH 6-220			Tribol 800/220	Synlube CLP 220	Optiflex A 220	
	0	CLP HC	VG 32	Mobil SHC 624		Klüber-Summit HySyn FG-32				Cetus PAO 46		
R..., K...(HK...), F..., S...(HS...)	+40	HCE	VG 460		Shell Cassida Fluid GL 460	Klüberoil 4UH1-460 N	Aral Eural Gear 460				Optileb GT 460	
	+40	E	VG 460			Klüberoil CA2-460	Aral Degol BAB 460				Optisynth BS 460	
W...(HW...)	Standard -20 +40	SEW PG	VG 460 ²⁾			Klüber SEW HT-460-5						
	+10	API GL5	SAE 75W90 (-VG 100)	Mobilube SHC 75 W90-LS		Klüberoil UH1 6-460						
	+40	CLP PG	VG 460 ³⁾			Klüberoil GE 46-1200						
R32 R302	+60	DIN 51 818 ⁵⁾	00	Glycoyle Grease 00	Shell Tivela GL 00	Klüberoil GE 46-1200				Multifak 6833 EP 00	Longtime PD 00	Renolin SF 7 - 041
	Standard -15 +40		000 - 0	Mobilux EP 004	Shell Alvania GL 00		Aralub MFL 00	BP Energol LS-EP 00		Multifak EP 000		



6.3 Lubricant table for explosion-proof variable speed gearmotors

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			ISO, NLGI	Mobil®	Shell	KLÜBER	ARAL	Tribol	TEXACO	Optimal	FUCHS
R... 	3) -40 Standard +80	CLP HC	VG 220	Mobil SHC630	Shell Omala 220 HD	Klübersynth EG 4-220	Aral Degol PAS 220	Tribol 1510/220	Pinnacle EP 220	Optigear Synthetic A 220	Renolin Unisyn CLP 220
K... 	3) -40 +40	CLP HC	VG 150	Mobil SHC629		Klübersynth EG 4-150			Pinnacle EP 150		
F... 	3) -40 +10	CLP HC	VG 32	Mobil SHC 624		Klüber-Summit HySyn FG-32			Cetus PAO 46		
S.. 	3) -30 Standard +80	CLP HC	VG 460	Mobil SHC 634	Shell Omala 460 HD	Klübersynth EG 4-460			Pinnacle EP 460		
	3) -40 +10	CLP HC	VG 150	Mobil SHC 629		Klübersynth EG 4-150			Pinnacle EP 150		
	3) -40 0	CLP HC	VG 32	Mobil SHC 624		Klüber-Summit HySyn FG-32			Cetus PAO 46		
R...K... F...S... 	3) -30 +40	HCE	VG 460		Shell Cassida Fluid GL 460	Klüberoil 4UH1-460	4) Aral Eural Gear 460			Optileb GT 460	
	-20 +40		VG 460			Klüberbio CA2-460	Aral Degol BAB 460			Optisynth BS 460	
W... 	Standard -20 +40	SEW PG	1) VG 460			Klüber SEW HT-460-5					
	-20 +40	CLP PG	2) VG 460			Klübersynth UH1 6-460					



6.4 Lubricant fill quantities for variable speed gearmotors

The specified fill quantities are **recommended values**. The precise values vary depending on the number of stages and gear ratio. When filling, it is essential to check the **oil level plug since it indicates the precise oil capacity**.

The following tables show guide values for lubricant fill quantities in relation to the mounting position M1 ... M6.



Helical (R) gear units

Standard and explosion-proof variable speed gearmotors have the same lubricant full quantity.

RX..

Gear units	Fill quantity in liters					
	M1	M2	M3	M4	M5	M6
RX57	0.60	0.80	1.30	1.30	0.90	0.90
RX67	0.80	0.80	1.70	1.90	1.10	1.10
RX77	1.10	1.50	2.60	2.70	1.60	1.60
RX87	1.70	2.50	4.80	4.80	2.90	2.90
RX97	2.10	3.40	7.4	7.0	4.80	4.80
RX107	3.90	5.6	11.6	11.9	7.7	7.7

RXF..

Gear units	Fill quantity in liters					
	M1	M2	M3	M4	M5	M6
RXF57	0.50	0.80	1.10	1.10	0.70	0.70
RXF67	0.70	0.80	1.50	1.40	1.00	1.00
RXF77	0.90	1.30	2.40	2.00	1.60	1.60
RXF87	1.60	1.95	4.90	3.95	2.90	2.90
RXF97	2.10	3.70	7.1	6.3	4.80	4.80
RXF107	3.10	5.7	11.2	9.3	7.2	7.2

R..., R..F

Gear units	Fill quantity in liters					
	M1 ¹⁾	M2 ¹⁾	M3	M4	M5	M6
R07	0.12	0.20	0.20	0.20	0.20	0.20
R17	0.25	0.55	0.35	0.55	0.35	0.35
R27	0.25/0.40	0.70	0.50	0.70	0.50	0.50
R37	0.30/0.95	0.85	0.95	1.05	0.75	0.95
R47	0.70/1.50	1.60	1.50	1.65	1.50	1.50
R57	0.80/1.70	1.90	1.70	2.10	1.70	1.70
R67	1.10/2.30	2.60/3.50	2.80	3.20	1.80	2.00
R77	1.20/3.00	3.80/4.10	3.60	4.10	2.50	3.40
R87	2.30/6.0	6.7/8.2	7.2	7.7	6.3	6.5
R97	4.60/9.8	11.7/14.0	11.7	13.4	11.3	11.7
R107	6.0/13.7	16.3	16.9	19.2	13.2	15.9
R137	10.0/25.0	28.0	29.5	31.5	25.0	25.0
R147	15.4/40.0	46.5	48.0	52.0	39.5	41.0
R167	27.0/70.0	82.0	78.0	88.0	66.0	69.0

1) The larger gear unit of multi-stage gear units must be filled with the larger oil volume.



RF..

Gear units	Fill quantity in liters					
	M1 ¹⁾	M2 ¹⁾	M3	M4	M5	M6
RF07	0.12	0.20	0.20	0.20	0.20	0.20
RF17	0.25	0.55	0.35	0.55	0.35	0.35
RF27	0.25/0.40	0.70	0.50	0.70	0.50	0.50
RF37	0.35/0.95	0.90	0.95	1.05	0.75	0.95
RF47	0.65/1.50	1.60	1.50	1.65	1.50	1.50
RF57	0.80/1.70	1.80	1.70	2.00	1.70	1.70
RF67	1.20/2.50	2.70/3.60	2.70	2.60	1.90	2.10
RF77	1.20/2.60	3.80/4.10	3.30	4.10	2.40	3.00
RF87	2.40/6.0	6.8/7.9	7.1	7.7	6.3	6.4
RF97	5.1/10.2	11.9/14.0	11.2	14.0	11.2	11.8
RF107	6.3/14.9	15.9	17.0	19.2	13.1	15.9
RF137	9.5/25.0	27.0	29.0	32.5	25.0	25.0
RF147	16.4/42.0	47.0	48.0	52.0	42.0	42.0
RF167	26.0/70.0	82.0	78.0	88.0	65.0	71.0

1) The larger gear unit of multi-stage gear units must be filled with the larger oil volume.

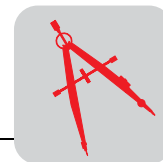
Parallel shaft
helical (F) gear
units

F.., FA..B, FH..B, FV..B

Gear units	Fill quantity in liters					
	M1	M2	M3	M4	M5	M6
F..27	0.60	0.80	0.65	0.70	0.60	0.60
F..37	0.95	1.25	0.70	1.25	1.00	1.10
F..47	1.50	1.80	1.10	1.90	1.50	1.70
F..57	2.60	3.50	2.10	3.50	2.80	2.90
F..67	2.70	3.80	1.90	3.80	2.90	3.20
F..77	5.9	7.3	4.30	8.0	6.0	6.3
F..87	10.8	13.0	7.7	13.8	10.8	11.0
F..97	18.5	22.5	12.6	25.2	18.5	20.0
F..107	24.5	32.0	19.5	37.5	27.0	27.0
F..127	40.5	54.5	34.0	61.0	46.3	47.0
F..157	69.0	104.0	63.0	105.0	86.0	78.0

FF..

Gear units	Fill quantity in liters					
	M1	M2	M3	M4	M5	M6
FF27	0.60	0.80	0.65	0.70	0.60	0.60
FF37	1.00	1.25	0.70	1.30	1.00	1.10
FF47	1.60	1.85	1.10	1.90	1.50	1.70
FF57	2.80	3.50	2.10	3.70	2.90	3.00
FF67	2.70	3.80	1.90	3.80	2.90	3.20
FF77	5.9	7.3	4.30	8.1	6.0	6.3
FF87	10.8	13.2	7.8	14.1	11.0	11.2
FF97	19.0	22.5	12.6	25.6	18.9	20.5
FF107	25.5	32.0	19.5	38.5	27.5	28.0
FF127	41.5	55.5	34.0	63.0	46.3	49.0
FF157	72.0	105.0	64.0	106.0	87.0	79.0



FA.., FH.., FV.., FAF.., FAZ.., FHF.., FHZ.., FVF.., FVZ.., FT..

Gear units	Fill quantity in liters					
	M1	M2	M3	M4	M5	M6
F..27	0.60	0.80	0.65	0.70	0.60	0.60
F..37	0.95	1.25	0.70	1.25	1.00	1.10
F..47	1.50	1.80	1.10	1.90	1.50	1.70
F..57	2.70	3.50	2.10	3.40	2.90	3.00
F..67	2.70	3.80	1.90	3.80	2.90	3.20
F..77	5.9	7.3	4.30	8.0	6.0	6.3
F..87	10.8	13.0	7.7	13.8	10.8	11.0
F..97	18.5	22.5	12.6	25.2	18.5	20.0
F..107	24.5	32.0	19.5	37.5	27.0	27.0
F..127	39.0	54.5	34.0	61.0	45.0	46.5
F..157	68.0	103.0	62.0	104.0	85.0	77.0

Helical-bevel (K)
gear units

K.., KA..B, KH..B, KV..B

Gear units	Fill quantity in liters					
	M1	M2	M3	M4	M5	M6
K..37	0.50	1.00	1.00	1.25	0.95	0.95
K..47	0.80	1.30	1.50	2.00	1.60	1.60
K..57	1.20	2.30	2.50	2.80	2.60	2.40
K..67	1.10	2.40	2.60	3.45	2.60	2.60
K..77	2.20	4.10	4.40	5.8	4.20	4.40
K..87	3.70	8.0	8.7	10.9	8.0	8.0
K..97	7.0	14.0	15.7	20.0	15.7	15.5
K..107	10.0	21.0	25.5	33.5	24.0	24.0
K..127	21.0	41.5	44.0	54.0	40.0	41.0
K..157	31.0	62.0	65.0	90.0	58.0	62.0
K..167	33.0	95.0	105.0	123.0	85.0	84.0
K..187	53.0	152.0	167.0	200	143.0	143.0

KF..

Gear units	Fill quantity in liters					
	M1	M2	M3	M4	M5	M6
KF37	0.50	1.10	1.10	1.50	1.00	1.00
KF47	0.80	1.30	1.70	2.20	1.60	1.60
KF57	1.30	2.30	2.70	3.15	2.90	2.70
KF67	1.10	2.40	2.80	3.70	2.70	2.70
KF77	2.10	4.10	4.40	5.9	4.50	4.50
KF87	3.70	8.2	9.0	11.9	8.4	8.4
KF97	7.0	14.7	17.3	21.5	15.7	16.5
KF107	10.0	21.8	25.8	35.1	25.2	25.2
KF127	21.0	41.5	46.0	55.0	41.0	41.0
KF157	31.0	66.0	69.0	92.0	62.0	62.0

KA.., KH.., KV.., KAF.., KHF.., KVF.., KAZ.., KHZ.., KVZ.., KT..

Gear units	Fill quantity in liters					
	M1	M2	M3	M4	M5	M6
K..37	0.50	1.00	1.00	1.40	1.00	1.00
K..47	0.80	1.30	1.60	2.15	1.60	1.60
K..57	1.30	2.30	2.70	3.15	2.90	2.70
K..67	1.10	2.40	2.70	3.70	2.60	2.60



Helical-worm (S)
gear units

Gear units	Fill quantity in liters					
	M1	M2	M3	M4	M5	M6
K..77	2.10	4.10	4.60	5.9	4.40	4.40
K..87	3.70	8.2	8.8	11.1	8.0	8.0
K..97	7.0	14.7	15.7	20.0	15.7	15.7
K..107	10.0	20.5	24.0	32.4	24.0	24.0
K..127	21.0	41.5	43.0	52.0	40.0	40.0
K..157	31.0	66.0	67.0	87.0	62.0	62.0
K..167	33.0	95.0	105.0	123.0	85.0	84.0
K..187	53.0	152.0	167.0	200	143.0	143.0

S..

Gear units	Fill quantity in liters					
	M1	M2	M3 ¹⁾	M4	M5	M6
S..37	0.25	0.40	0.50	0.55	0.40	0.40
S..47	0.35	0.80	0.70/0.90	1.00	0.80	0.80
S..57	0.50	1.20	1.00/1.20	1.45	1.30	1.30
S..67	1.00	2.00	2.20/3.10	3.10	2.60	2.60
S..77	1.90	4.20	3.70/5.4	5.9	4.40	4.40
S..87	3.30	8.1	6.9/10.4	11.3	8.4	8.4
S..97	6.8	15.0	13.4/18.0	21.8	17.0	17.0

1) The larger gear unit of multi-stage gear units must be filled with the larger oil volume.

SF..

Gear units	Fill quantity in liters					
	M1	M2	M3 ¹⁾	M4	M5	M6
SF37	0.25	0.40	0.50	0.55	0.40	0.40
SF47	0.40	0.90	0.90/1.05	1.05	1.00	1.00
SF57	0.50	1.20	1.00/1.50	1.55	1.40	1.40
SF67	1.00	2.20	2.30/3.00	3.20	2.70	2.70
SF77	1.90	4.10	3.90/5.8	6.5	4.90	4.90
SF87	3.80	8.0	7.1/10.1	12.0	9.1	9.1
SF97	7.4	15.0	13.8/18.8	22.6	18.0	18.0

1) The larger gear unit of multi-stage gear units must be filled with the larger oil volume.

SA.., SH.., SAF.., SHZ.., SAZ.., SHF.., ST..

Gear units	Fill quantity in liters					
	M1	M2	M3 ¹⁾	M4	M5	M6
S..37	0.25	0.40	0.50	0.50	0.40	0.40
S..47	0.40	0.80	0.70/0.90	1.00	0.80	0.80
S..57	0.50	1.10	1.00/1.50	1.50	1.20	1.20
S..67	1.00	2.00	1.80/2.60	2.90	2.50	2.50
S..77	1.80	3.90	3.60/5.0	5.8	4.50	4.50
S..87	3.80	7.4	6.0/8.7	10.8	8.0	8.0
S..97	7.0	14.0	11.4/16.0	20.5	15.7	15.7

1) The larger gear unit of multi-stage gear units must be filled with the larger oil volume.



6.5 Installation/removal of gear units with hollow shafts and keys

- Always use the supplied NOCO® fluid for installation. The fluid prevents contact corrosion and facilitates subsequent removal.
- The key dimension X is defined by the customer, however X must be > DK.

Assembly

SEW-EURODRIVE recommends two variants for installation of gear units with hollow shaft and key onto the input shaft of the driven machine (= customer shaft):

1. Use the supplied fastening parts for installation.
2. Use the optional installation/removal kit for installation.

1. Supplied fastening parts

The following fastening parts are supplied as standard:

- Retaining screw with washer [2]
- Circlip [3]

Customer shaft

- The installation length of the customer shaft with contact shoulder [A] must be $L8 - 1$ mm.
- The installation length of the customer shaft without contact shoulder [B] must equal L8.

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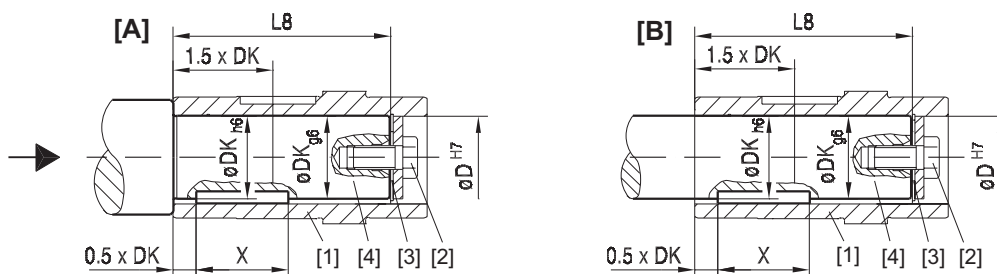


Figure 10: Customer shaft with contact shoulder [A] and without contact shoulder [B]

[1] Hollow shaft

[2] Retaining screw with washer

[3] Circlip

[4] Customer shaft

Dimensions and tightening torque

The retaining screw [2] must be tightened to the tightening torque MS given in the following table.

Gear unit type	D^{H7} [mm]	DK [mm]	L8 [mm]	MS [Nm]
SA..37	20	20	84, 106, 104	8
FA..27, SA..47	25	25	88, 105	20
FA..37, KA..37, SA..47	30	30	105	20
SA..57			132	
FA..47, KA..47, SA..57	35	35	132	20
FA..57, KA..57	40	40	142	40
FA..67, KA..67			156	
SA..67			144	
SA..67	45	45	144	40
FA..77, KA..77, SA..77	50	50	183	40
FA..87, KA..87	60	60	210	80
SA..77, SA..87			180, 220	
FA..97, KA..97	70	70	270	80
SA..87, SA..97			220, 260	
FA..107, KA..107, SA..97	90	90	313, 313, 255	200
FA..127, KA..127	100	100	373	200
FA..157, KA..157	120	120	460	200



2. Assembly/ disassembly kit

You can also use the optional installation/removal kit for installation. You order the kit for the specific gear unit type(s) by quoting the part numbers in the table below. The scope of delivery includes:

- Spacer tube for installation without contact shoulder [5]
- Retaining screw for installation [2]
- Forcing washer for removal [7]
- Locked nut for removal [8]

The short retaining screw supplied as standard is not used.

Customer shaft

- The installation length of the customer shaft must be LK2. Do not use the spacer if the customer shaft **has a contact shoulder [A]**.
- The installation length of the customer shaft must be LK2. Use the spacer if the customer shaft **has a contact shoulder [B]**.

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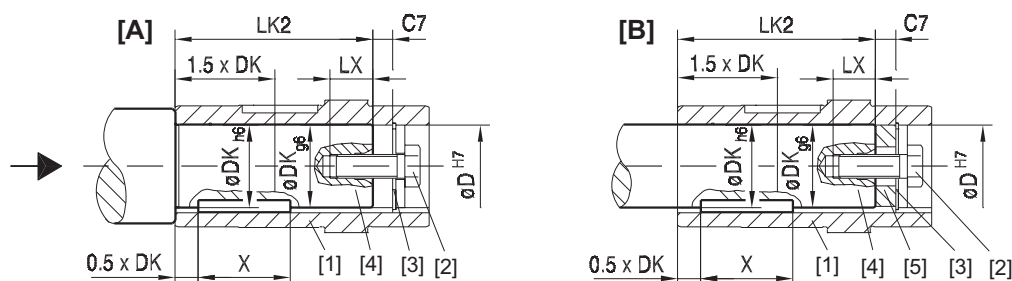


Figure 11: Customer shaft with contact shoulder [A] and without contact shoulder [B]

- [1] Hollow shaft
[2] Retaining screw with washer
[3] Circlip

- [4] Customer shaft
[5] Distance piece

Dimensions, tightening torques and part numbers

The retaining screw [2] must be tightened to the tightening torque MS given in the following table.

Type	DH7 [mm]	DK [mm]	LK2 [mm]	LX+2 [mm]	C7 [mm]	MS [Nm]	Part number installation/ removal kit
SA..37	20	20	72, 93 92	16	12	8	643 683 8
FA..27, SA..47	25	25	72, 89	22	16	20	643 684 6
FA..37, KA..37 SA..47, SA..57	30	30	89 89, 116	22	16	20	643 685 4
FA..47, KA..47, SA..57	35	35	114	28	18	20	643 686 2
FA..57, KA..57 FA..67, KA..67, SA..67	40	40	124 138, 138, 126	36	18	40	643 687 0
SA..67	45	45	126	36	18	40	643 688 9
FA..77, KA..77, SA..77	50	50	165	36	18	40	643 689 7
FA..87, KA..87 SA..77, SA..87	60	60	188 158, 198	42	22	80	643 690 0
FA..97, KA..97 SA..87, SA..97	70	70	248 198, 238	42	22	80	643 691 9
FA..107, KA..107 SA..97	90	90	287 229	50	26	200	643 692 7
FA..127, KA..127	100	100	347	50	26	200	643 693 5
FA..157, KA..157	120	120	434	50	26	200	643 694 3



Removal

Applies only if installation/removal kit was previously used for assembly (→ Fig. 11).

Proceed as follows for removal:

1. Loosen the retaining screw [6].
2. Remove the circlip [3] and, if used, the spacer tube [5].
3. Place the forcing washer [7] and the locked nut [8] between the customer shaft [4] and circlip [3] according to figure 11.
4. Re-install the circlip [3].
5. Re-install the retaining screw [6]. You can now push the gear unit off the shaft.

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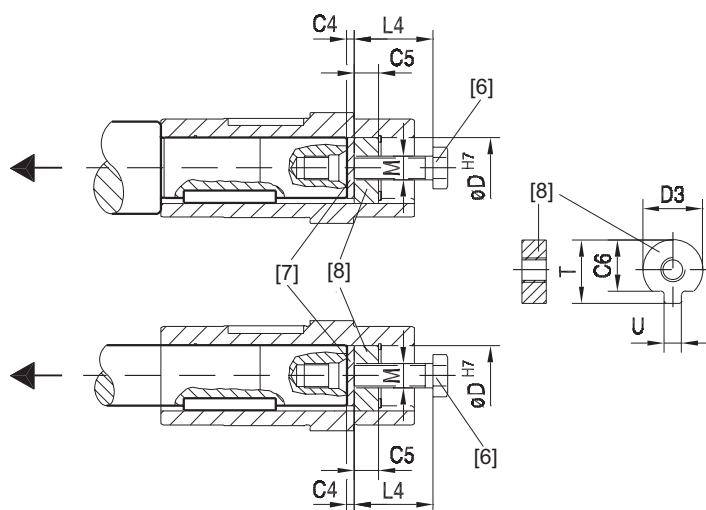


Figure 12: Removal

- [6] Retaining bolt
- [7] Forcing washer
- [8] Locked nut for removal

Type	D ^{H7} [mm]	M	C4 [mm]	C5 [mm]	C6 [mm]	U ^{-0.5} [mm]	T ^{-0.5} [mm]	D3 ^{-0.5} [mm]	L4 [mm]	Part number installation/removal kit
SA..37	20	M6	5	6	15.5	5.5	22.5	19.7	25	643 683 8
FA27.., SA..47	25	M10	5	10	20	7.5	28	24.7	35	643 684 6
FA..37, KA..37, SA..47, SA..57	30	M10	5	10	25	7.5	33	29.7	35	643 685 4
FA..47, KA..47, SA..57	35	M12	5	12	29	9.5	38	34.7	45	643 686 2
FA..57, KA..57, FA..67, KA..67, SA..67	40	M16	5	12	34	11.5	41.9	39.7	50	643 687 0
SA..67	45	M16	5	12	38.5	13.5	48.5	44.7	50	643 688 9
FA..77, KA..77, SA..77	50	M16	5	12	43.5	13.5	53.5	49.7	50	643 689 7
FA..87, KA..87, SA..77, SA..87	60	M20	5	16	56	17.5	64	59.7	60	643 690 0
FA..97, KA..97, SA..87, SA..97	70	M20	5	16	65.5	19.5	74.5	69.7	60	643 691 9
FA..107, KA..107, SA..97	90	M24	5	20	80	24.5	95	89.7	70	643 692 7
FA..127, KA..127	100	M24	5	20	89	27.5	106	99.7	70	643 693 5
FA..157, KA..157	120	M24	5	20	107	31	127	119.7	70	643 694 3



6.6 Gear units with hollow shaft

Chamfers on hollow shafts

The following illustration shows the chamfers on parallel shaft helical and helical-bevel gear units with hollow shaft:

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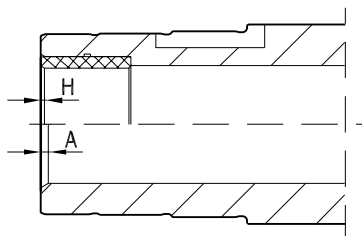


Figure 13: Chamfers on hollow shafts

Gear units	Version	
	with hollow shaft (A)	with hollow shaft and shrink disc (H)
F..27	$2 \times 30^\circ$	$0.5 \times 45^\circ$
F../K..37	$2 \times 30^\circ$	$0.5 \times 45^\circ$
F../K..47	$2 \times 30^\circ$	$0.5 \times 45^\circ$
F../K..57	$2 \times 30^\circ$	$0.5 \times 45^\circ$
F../K..67	$2 \times 30^\circ$	$0.5 \times 45^\circ$
F../K..77	$2 \times 30^\circ$	$0.5 \times 45^\circ$
F../K..87	$3 \times 30^\circ$	$0.5 \times 45^\circ$
F../K..97	$3 \times 30^\circ$	$0.5 \times 45^\circ$
F../K..107	$3 \times 30^\circ$	$3 \times 2^\circ$
F../K..127	$5 \times 30^\circ$	$1.5 \times 30^\circ$
F../K..157	$5 \times 30^\circ$	$1.5 \times 30^\circ$
KH167	-	$1.5 \times 30^\circ$
KH187	-	$1.5 \times 30^\circ$

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 you are using a customer shaft pushed through on the motor end, there may be a collision when a "small gear unit" is used in combination with a "large motor."
- Check the motor dimension G (see dimension sheets) to decide whether there will be a collision with a pushed-through customer shaft.



6.7 TorqLOC® mounting system for units with hollow shaft

Description of TorqLOC®

The TorqLOC® hollow shaft mounting system is used for achieving a non-positive connection between customer shaft and the hollow shaft in the gear unit. As a result, the TorqLOC® hollow shaft mounting system is an alternative to the hollow shaft with shrink disk, the hollow shaft with key and the splined hollow shaft that have been used so far.

The TorqLOC® hollow shaft mounting system consists of the following components:

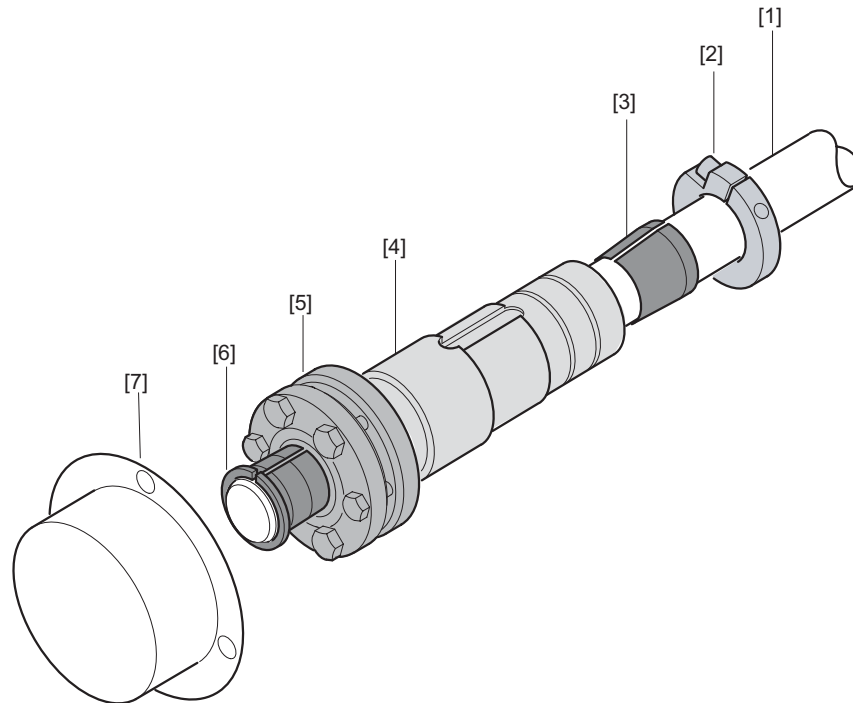


Figure 14: Components of the TorqLOC® hollow shaft mounting system

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- | | |
|-------------------------------|---------------------------|
| [1] Customer shaft | [5] Shrink disc |
| [2] Clamping ring | [6] Conical steel bushing |
| [3] Conical bronze bushing | [7] Fixed cover |
| [4] Hollow shaft in gear unit | |

Advantages of TorqLOC®

The TorqLOC® hollow shaft mounting system is characterized by the following advantages:

- Cost saving because the customer shaft can be made from drawn material up to quality h11.
- Cost saving because different customer shaft diameters can be covered by one hollow shaft diameter and different bushings.
- Simple installation since there is no need to accommodate any shaft connections.
- Removal is easy even after many hours of operation because the formation of contact corrosion has been reduced and the conical connections can easily be released.

**Technical data**

The TorqLOC® hollow shaft mounting system is approved for input torques of 92 Nm to 4300 Nm.

The following gear units are available with TorqLOC® hollow shaft mounting system:

- Parallel shaft helical gear units in gear unit sizes 37 to 97 (FT37 ... FT97)
- Helical-bevel gear units in gear unit sizes 37 to 97 (KT37 ... KT97)
- Helical-worm gear units in gear unit sizes 37 to 97 (ST37 ... ST97)

Available options

The following options are available for gear units with a TorqLOC® hollow shaft mounting system:

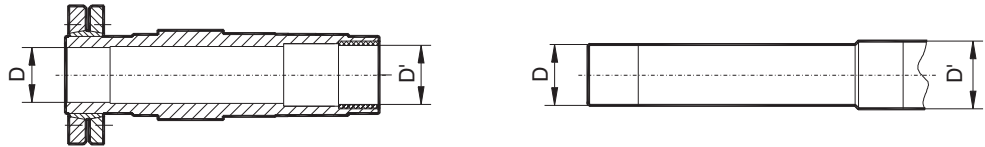
- Helical-bevel and helical-worm gear units with TorqLOC® (KT..., ST...): The "torque arm" (../T) option is available.
- Parallel shaft helical gear units with TorqLOC® (FT...): The "rubber buffer" (../G) option is available.



6.8 Option, offset hollow shaft with shrink disk

As an option, gear units with a hollow shaft and shrink disc (parallel shaft helical gear units FH/FHF/FHZ37-157, helical-bevel gear units KH/KHF/KHZ37-157 and helical-worm gear units SH/SHF/SHZ47-97) can be supplied with a larger bore diameter D' .

As standard, $D' = D$.



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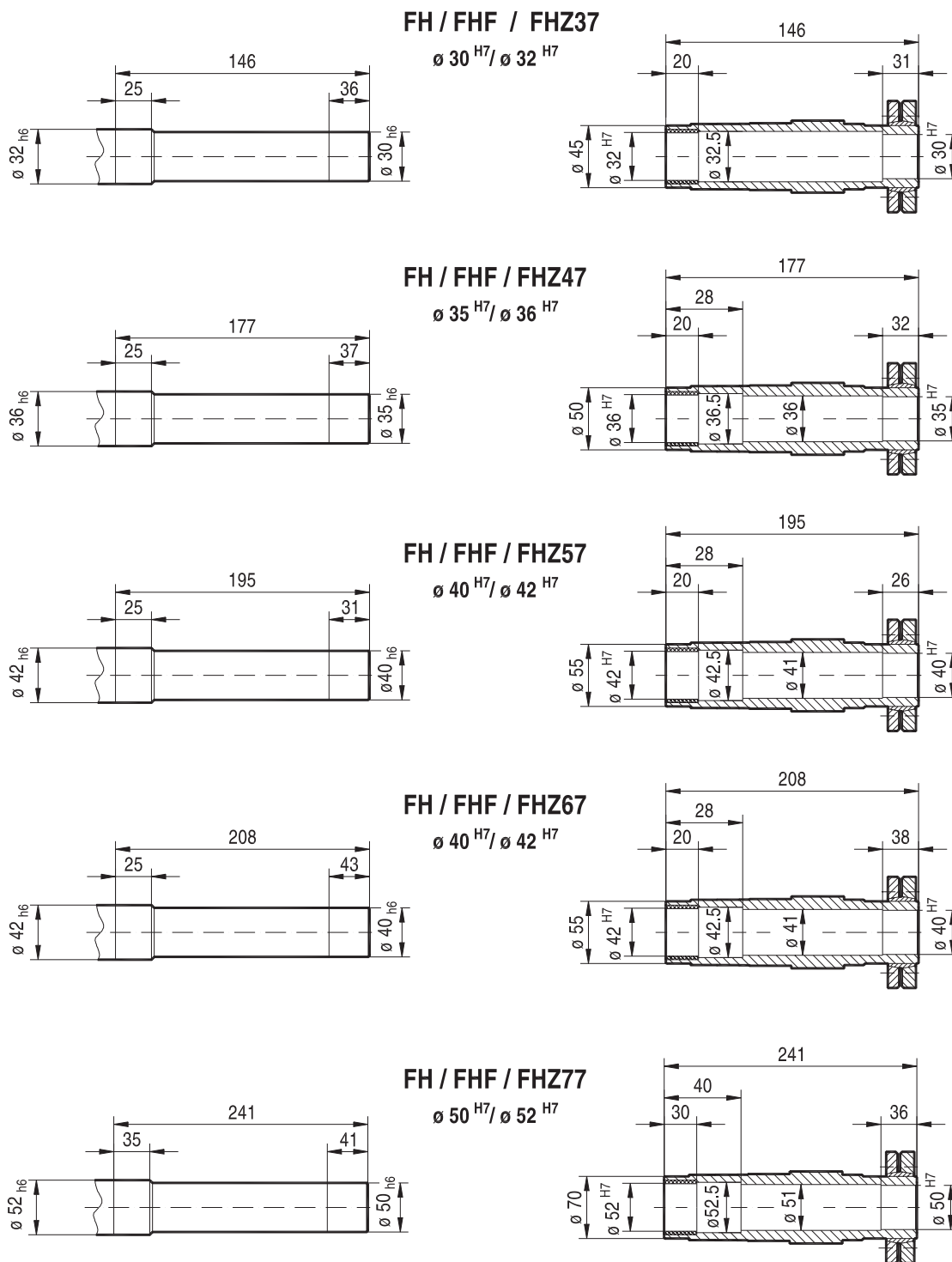
Figure 15: Optional bore diameter D'

Gear units	Bore diameter D / optionally D' [mm]
FH/FHF/FHZ37, KH/KHF/KHZ37, SH/SHF/SHZ47	30 / 32
FH/FHF/FHZ47, KH/KHF/KHZ47, SH/SHF/SHZ57	35 / 36
FH/FHF/FHZ57, KH/KHF/KHZ57	40 / 42
FH/FHF/FHZ67, KH/KHF/KHZ67, SH/SHF/SHZ67	40 / 42
FH/FHF/FHZ77, KH/KHF/KHZ77, SH/SHF/SHZ77	50 / 52
FH/FHF/FHZ87, KH/KHF/KHZ87, SH/SHF/SHZ87	65 / 66
FH/FHF/FHZ97, KH/KHF/KHZ97, SH/SHF/SHZ97	75 / 76
FH/FHF/FHZ107, KH/KHF/KHZ107	95 / 96
FH/FHF/FHZ127, KH/KHF/KHZ127	105 / 106
FH/FHF/FHZ157, KH/KHF/KHZ157	125 / 126

Diameter D / D' must be specified when ordering gear units with a shouldered hollow shaft (optional bore diameter D').

Sample order

FH37 DT80N4 with hollow shaft 30/32 mm


Parallel shaft helical gear unit with shouldered hollow shaft


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Figure 16: Shouldered hollow shaft FH/FHF/FHZ37...77

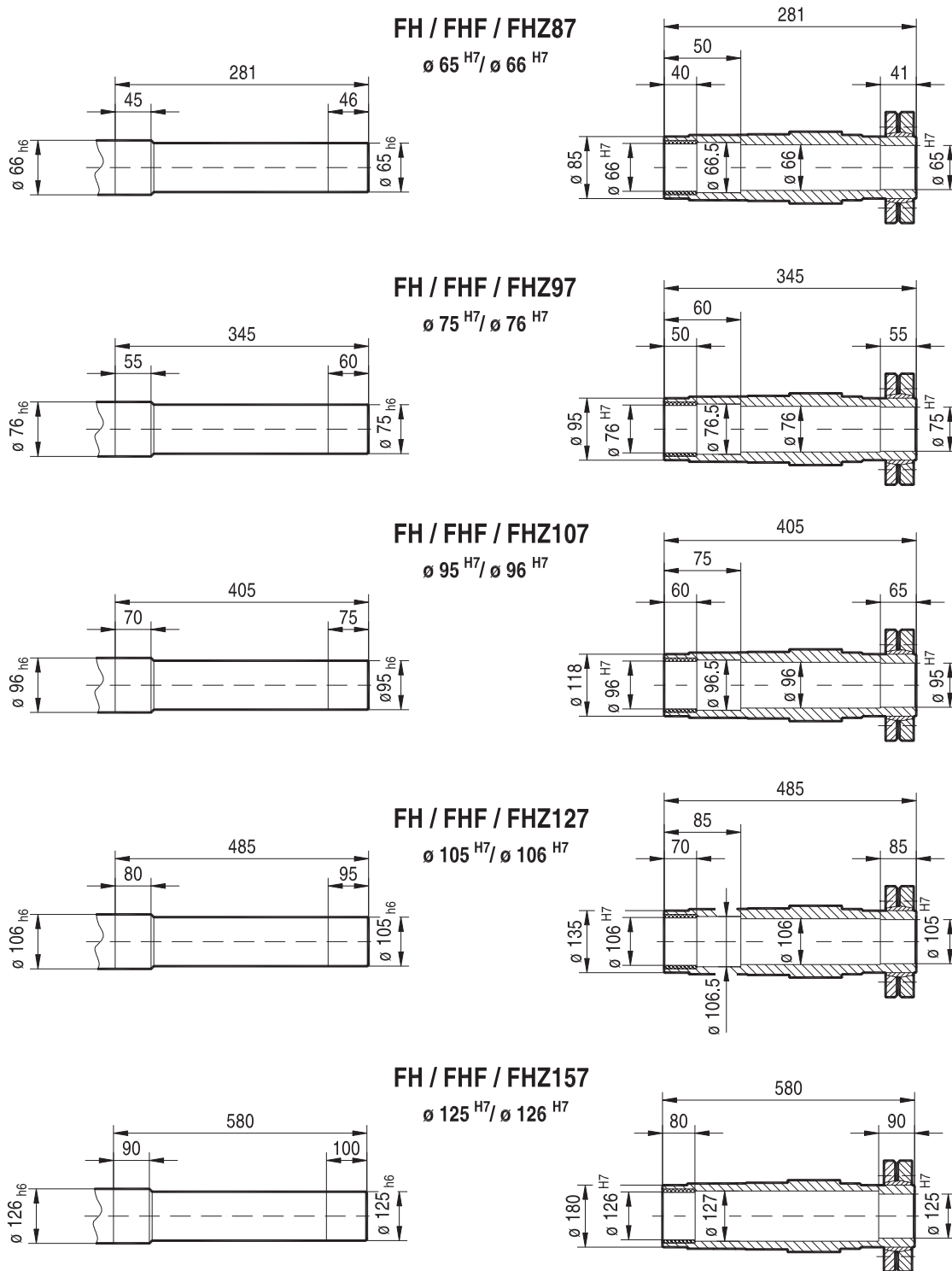


Figure 17: Shouldered hollow shaft FH/FHF/FHZ87...157

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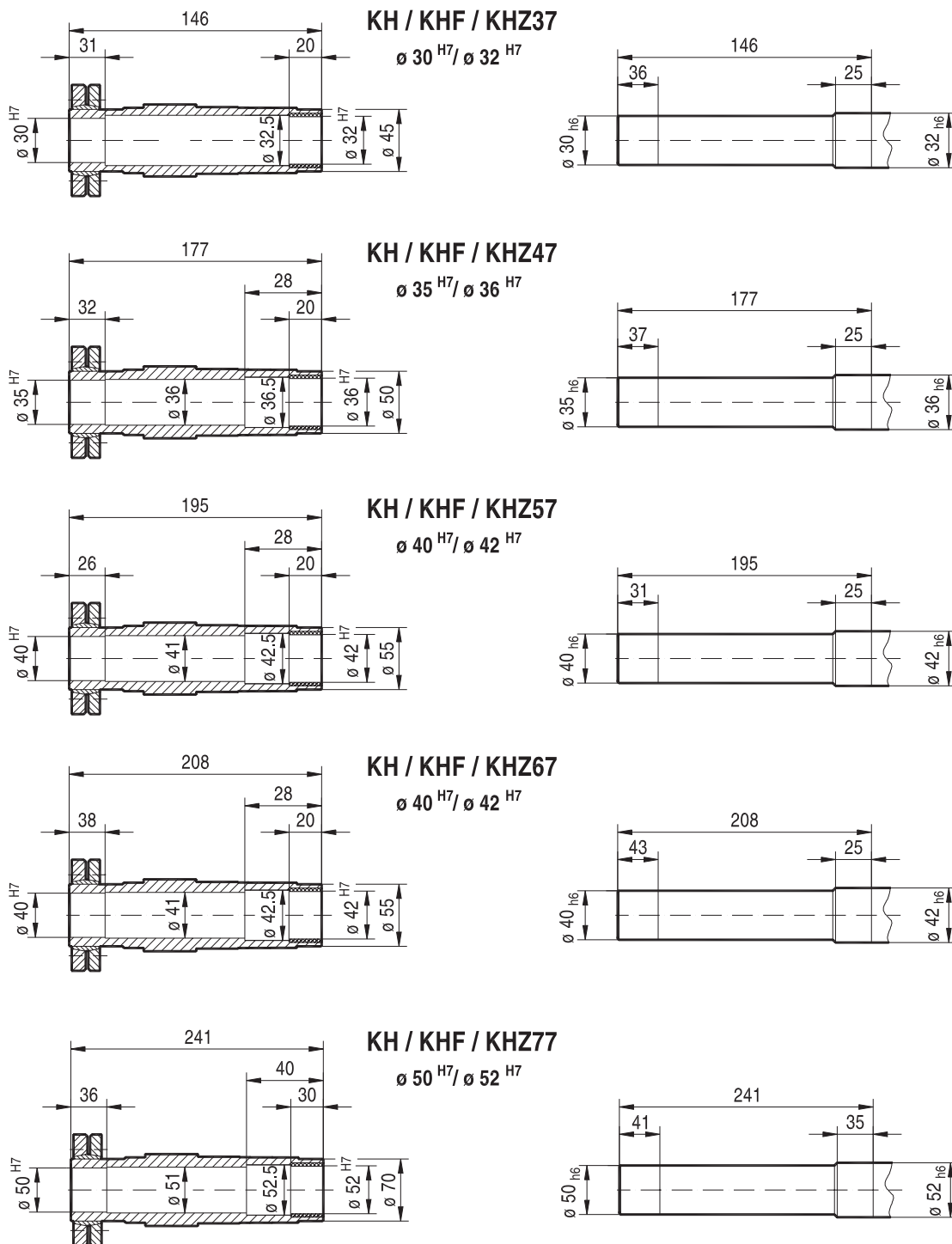
**Helical-bevel gear unit with shouldered hollow shaft**

Figure 18: Shouldered hollow shaft KH/KHF/KHZ37...77

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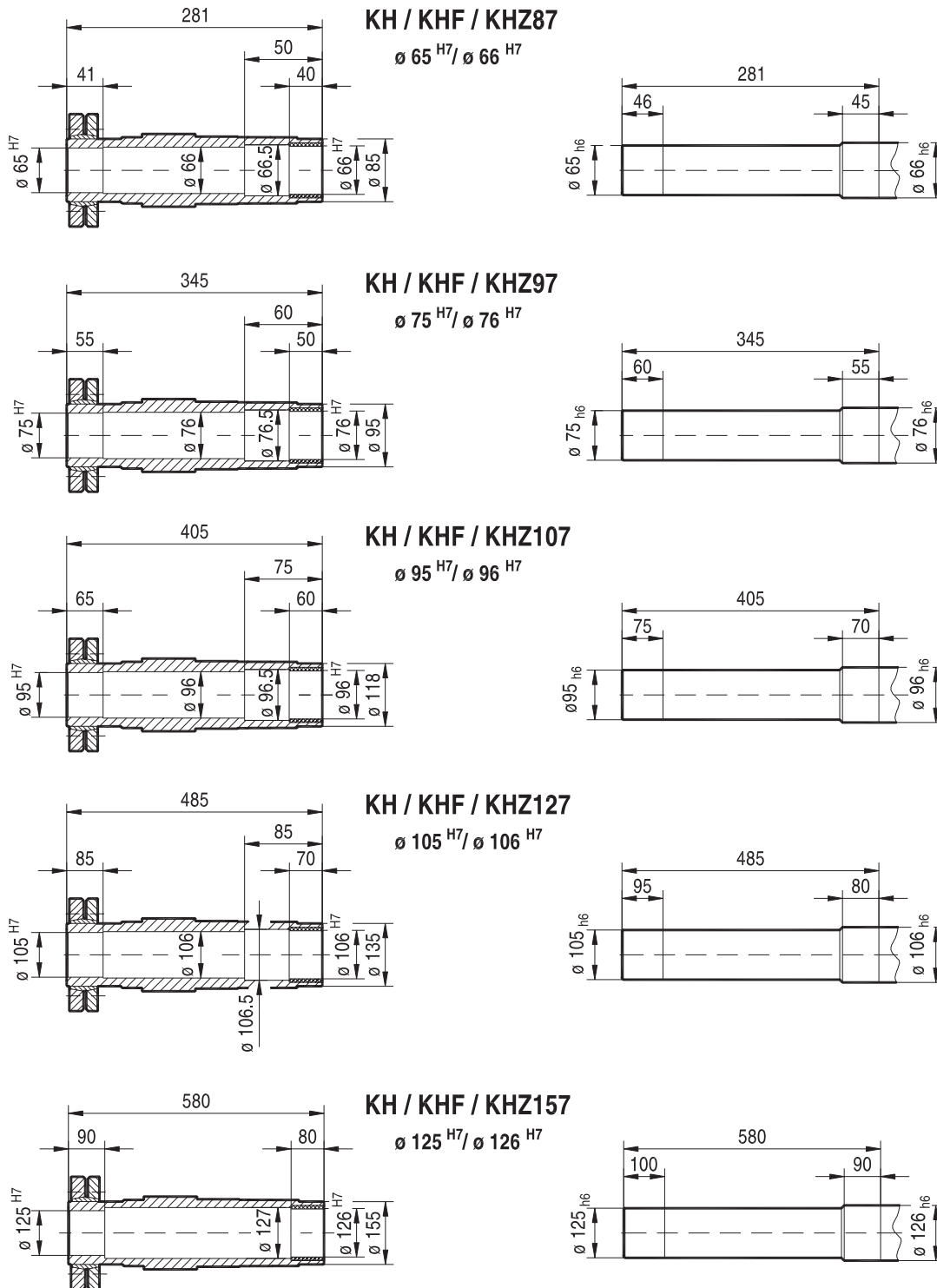
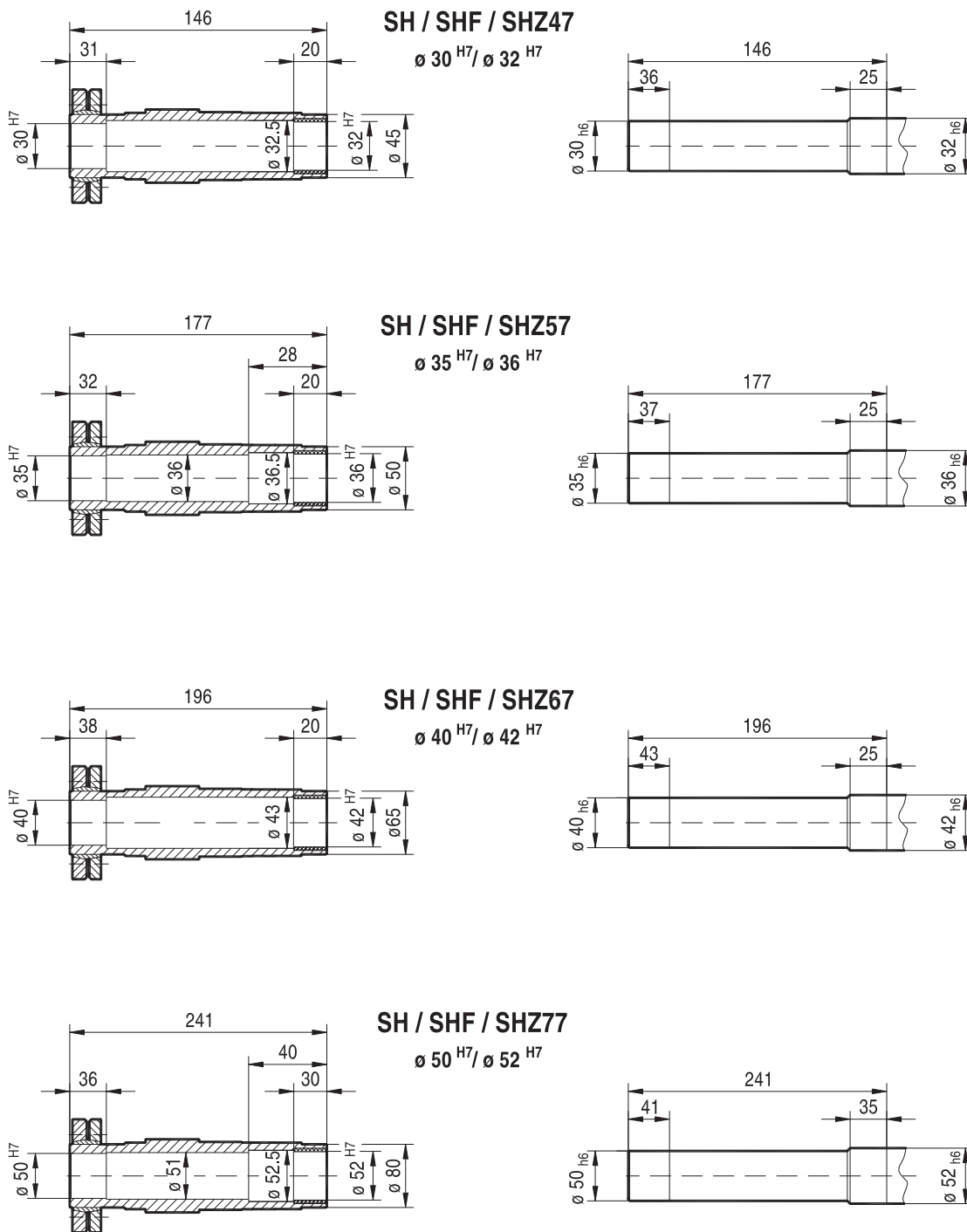


Figure 19: Shouldered hollow shaft KH/KHF/KHZ87...157

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**Helical-worm gear unit with shouldered hollow shaft**

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Figure 20: Shouldered hollow shaft SH/SHF/SHZ47...77

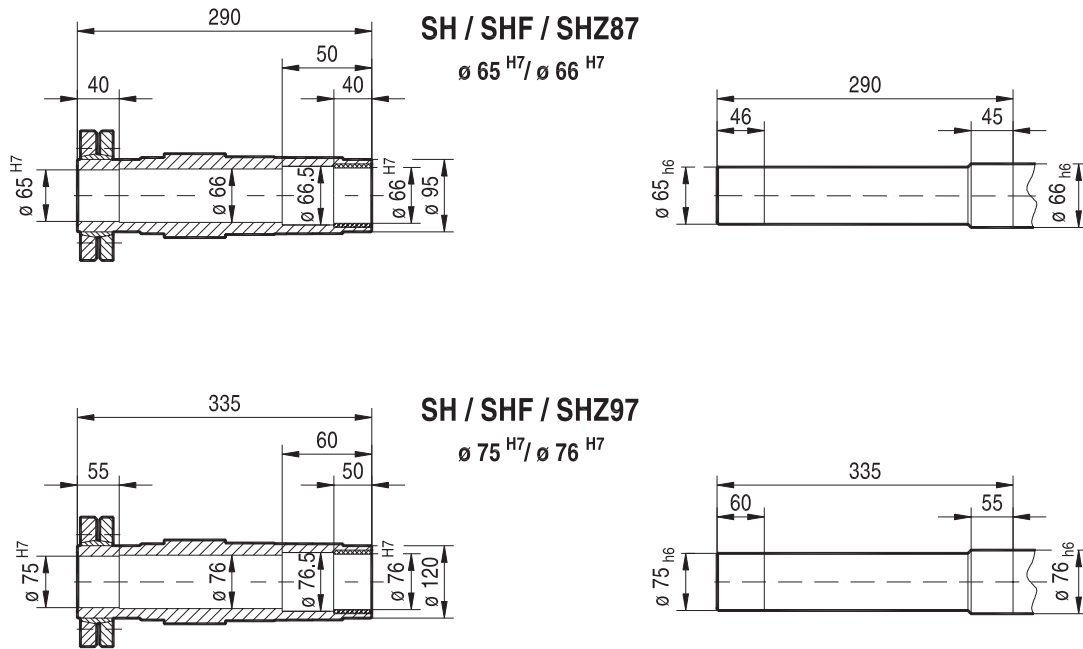
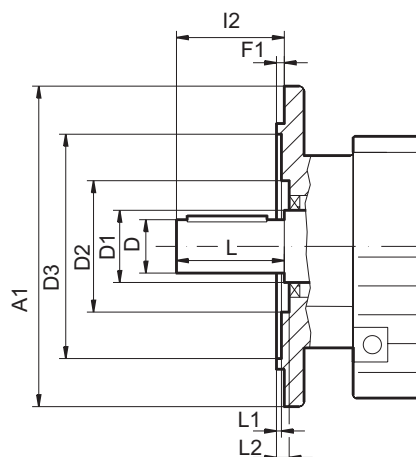


Figure 21: Shouldered hollow shaft SH/SHF/SHZ87...97

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6.9 Flange contours of the RF.. and R..F gear units



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Figure 22: Flange contours

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

Type	A1	D	D1	D2		D3	F1	I2	S	L1		L2
				RF	R..F					RF	R..F	
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				-	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				-	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				-	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	5	120	120	0		9
	450					320						
RF107	350	70	82	157		232	5	140	140	0		11
	450			186		316						
RF137	450	90	108	180		316	5	170	170	0		10
	550					416						
RF147	450	110	125	210		316	5	210	210	0		10
	550					416						
RF167	550	120	145	290		416	5	210	210	1		10
	660					517				2		11



6.10 Fastening of gear units

Use bolts of quality 8.8 to fasten gear units.

Exception

In case of the following flange-mounted helical gear units (RF..) and foot/flange-mounted helical gear units (R..F), use bolts of **quality 10.9** to fasten the customer flange to transmit the rated torque:

- RF37, R37F with flange $\varnothing$ 120 mm
- RF47, R47F with flange $\varnothing$ 140 mm
- RF57, R57F with flange $\varnothing$ 160 mm

6.11 Torque arms

Available torque arms

Gear units	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 buffers (2 pcs.)	013 348 5	013 348 5	013 348 5	013 348 5	013 348 5	013 349 3

Gear units	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 buffers (2 pcs.)	013 349 3	013 350 7	013 350 7	013 351 5	013 347 7

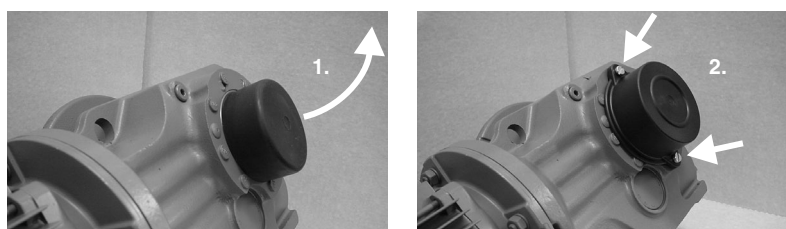
Torque arms for KH167.., KH187..

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



6.12 Fixed covers

As standard, parallel shaft helical gear units, helical-bevel gear units and helical-worm gear units with hollow shafts and shrink disks from size 37 up to and including size 97 have a cover that turns with the unit. If for safety reasons fixed covers are required for these gear units, you can order them for the respective gear unit types by quoting the part numbers in the following tables. As standard, parallel shaft helical gear units and helical-bevel gear units with hollow shafts and shrink discs of size 107 and parallel shaft helical gear units of size 27 come equipped with a fixed cover.

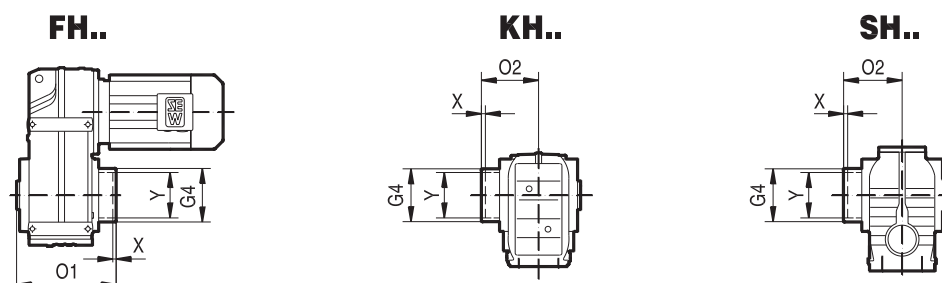


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Figure 23: Replacing a rotating cover with a fixed cover

1. Pull off the rotating cover.
2. Install and fasten fixed cover.

Part numbers and dimensions



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Parallel shaft helical gearmotors	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
Max. size of motor that can be mounted	DT80..	DT80..	DT80..	DV132S	DV160M	DV180..	DV180..
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

Helical-bevel gearmotors 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	78	88	100	100	121	164	185
O2	95	111.5	122.5	129	147	172	210.5
X	0	1.5	5.5	3	1	2	4.5
Y	75	83	83	93	114	159	174

1) Not possible in foot-mounted helical-bevel gear units with hollow shafts and shrink discs (KH..B).

Helical-worm gearmotors	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	59	78	88	100	121	164	185
O2	88	95	111.5	123	147	176	204.5
X	1	0	1.5	3	1	0	0.5
Y	53	75	83	93	114	159	174