

10 Design and Operating Notes

10.1 Lubricants

General information

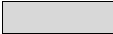
Unless a special arrangement is made, SEW-EURODRIVE supplies the drives with a lubricant fill adapted for the specific gear unit and mounting position. The decisive factor is the mounting position (M1 – M6, → Sec. "Mounting positions and important order information" in the Gearmotor catalog) specified 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 refer to the following legend for the lubricant table.

Legend for the lubricant table

Abbreviations, meaning of shading and notes:

- CLP = Mineral oil
- CLP PG = Polyglycol (W gear units, conforms to USDA-H1)
- CLP HC = Synthetic hydrocarbons
- E = Ester oil (water hazard class 1 (German regulation))
- HCE = Synthetic hydrocarbons + ester oil (USDA - H1 certification)
- HLP = Hydraulic oil
-  = Synthetic lubricant (= synthetic-based anti-friction bearing grease)
-  = Mineral lubricant (= mineral-based anti-friction bearing grease)
- 1) Helical-worm gear units with PG oil: please contact SEW-EURODRIVE.
- 2) Special lubricant for Spiroplan® gear units only
- 3) SEW-f_B ≥ 1.2 required
- 4) Pay attention to critical starting behavior at low temperatures!
- 5) Low-viscosity grease
- 6) Ambient temperature
-  Lubricant for the food industry (food grade oil)
-  Biodegradable oil (lubricant for agriculture, forestry, and fisheries)

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 or replacing the anti-friction bearings.

	Ambient temperature	Manufacturer	Type
Gear unit anti-friction bearings	-40 °C ... +80 °C	Fuchs	Renolit CX-TOM15 ¹⁾
Motor anti-friction bearings²⁾	-20 °C ... +80 °C	Esso	Polyrex EM
	+20 °C ... +100 °C	Klüber	Barrierta L55/2
	-40 °C ... +60 °C	Kyodo Yushi	Multemp SRL ³⁾
Special greases for gear unit anti-friction bearings:			
	-30 °C ... +40 °C	Aral	Aral Eural Grease EP 2
	-20 °C ... +40 °C	Aral	Aral Aralube BAB EP2

- 1) Anti-friction bearing grease based on partly synthetic base oil.
- 2) The motor anti-friction bearings are covered on both sides and cannot be regreased.
- 3) 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 (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.

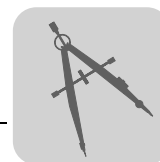




Lubricant table

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			ISO/NGI	Mobil®	Shell	ALBION	ARAL	bp	Tribol	TEACO	Optimal	FUCHS	TOTAL
R...			VG 220	Mobilgear 630	Shell Omala 220	Klüberoil GEM 1-220 N	Aral Degol BG 220	BP Energol GR-XP 220	Tribol 1100/220	Meropa 220	Optigear BM 220	Renolin CLP 220	Carter EP 220
K... (HK...)			VG 220	Mobil Glygoyle 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		Carter SY 220
F...			VG 150	Mobil SHC 630	Shell Omala HD 220	Klüberoil GEM 4-220 N	Aral Degol PAS 220		Tribol 1510/220	Pinnacle EP 220	Optigear Synthetic A 220	Renolin Unisyn CLP 220	
			VG 150	Mobil SHC 629	Shell Omala HD 150	Klüberoil GEM 4-150 N				Pinnacle EP 150			Carter SH 150
			VG 150	Mobilgear 627	Shell Omala 100	Klüberoil GEM 1-150 N	Aral Degol BG 100	BP Energol GR-XP 100	Tribol 1100/100	Meropa 150	Optigear BM 100	Renolin CLP 150	Carter EP 100
			VG 68-46	Mobil D.T.E. 13M	Shell Tellus T 32	Klüberoil GEM 1-68 N	Aral Degol BG 46		Tribol 1100/68	Rando EP	Optigear 32	Renolin B 46 HVI	Equivalents 46
			VG 32	Mobil SHC 624		Klüber-Summit HySyn FG-32				Cetus PAO 46			Dacnis SH 32
			VG 22	Mobil D.T.E. 11M	Shell Tellus T 15	Isosol MT 30 ROT		BP Energol HLP-HM 15		Rando HDZ 15			Equivalents 15
			VG 15	Mobilgear 636	Shell Omala 680	Klüberoil GEM 1-680 N	Aral Degol BG 680	BP Energol GR-XP 680	Tribol 1100/680	Meropa 680	Optigear BM 680	Renolin CLP 680	Carter EP 680
S... (HS...)			VG 680		Shell Tivela S 680	Klüberoil GH 6-680		BP Energol SG-XP 680	Tribol 800/680	Synlube CLP 680			
			VG 460	Mobil SHC 634	Shell Omala HD 460	Klüberoil GEM 4-460 N				Pinnacle EP 460			
			VG 150	Mobil SHC 629	Shell Omala HD 150	Klüberoil GEM 4-150 N				Pinnacle EP 150			Carter SH 150
			VG 150	Mobilgear 627	Shell Omala 100	Klüberoil GEM 1-150 N	Aral Degol BG 100	BP Energol GR-XP 100	Tribol 1100/100	Meropa 150	Optigear BM 100	Renolin CLP 150	Carter EP 100
			VG 220	Mobil Glygoyle 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		Carter SY 220
			VG 32	Mobil SHC 624	Shell Cassida Fluid GL 460	Klüber-Summit HySyn FG-32				Cetus PAO 46			Dacnis SH 32
R..., K... (HK...), F..., S... (HS...)			VG 460		Shell Cassida Fluid GL 460	Klüberoil 4UH1-460 N	Aral Eural Gear 460				Optileb GT 460		
			VG 460			Klüberbio CA2-460	Aral Degol BAB 460				Optisynth BS 460		
W... (HW...)			VG 460 ²⁾			Klüber SEW HT-460-5							
			SAE 75W90 (~VG 100)	Mobilube SHC 75 W90-LS									
			VG 460 ³⁾			Klüberoil UH1 6-460							
			00	Glygoyle Grease 00	Shell Tivela GL 00	Klüberoil GE 46-1200				Multifak 6833 EP 00			Marson SY 00
R32 R302			000 - 0	Mobilux EP 004	Shell Alvania GL 00		Aralub MFL 00	BP Energol LS-EP 00		Multifak EP 000	Longtime PD 00	Renolin SF 7 - 041	Multis EP 00



Lubricant fill quantities

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

RX..

Gear unit	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 unit	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 unit	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	0.40
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 unit	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	0.40
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 unit	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 unit	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 unit	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

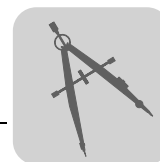
Gear unit	Fill quantity in liters					
	M1	M2	M3	M4	M5	M6
K..37	0.50	1.00	1.00	1.25	0.95	0.95
K..47	0.80	1.30	1.50	2.00	1.60	1.60
K..57	1.20	2.30	2.50	2.80	2.60	2.40
K..67	1.10	2.40	2.60	3.45	2.60	2.60
K..77	2.20	4.10	4.40	5.8	4.20	4.40
K..87	3.70	8.0	8.7	10.9	8.0	8.0
K..97	7.0	14.0	15.7	20.0	15.7	15.5
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 unit	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 unit	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
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



Helical-worm (S) gear units

S

Gear unit	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 unit	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 unit	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.

Spiroplan® (W) gear units

The fill quantity of Spiroplan® gear units does not vary, irrespective of their mounting position.

Gear unit	Fill quantity in liters					
	M1	M2	M3	M4	M5	M6
W..10			0.16			
W..20			0.24			
W..30			0.40			



10.2 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 keyway dimension X is specified by the customers, but X must > DK.

Installation

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 fastening parts supplied 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)

Note the following points concerning the 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.

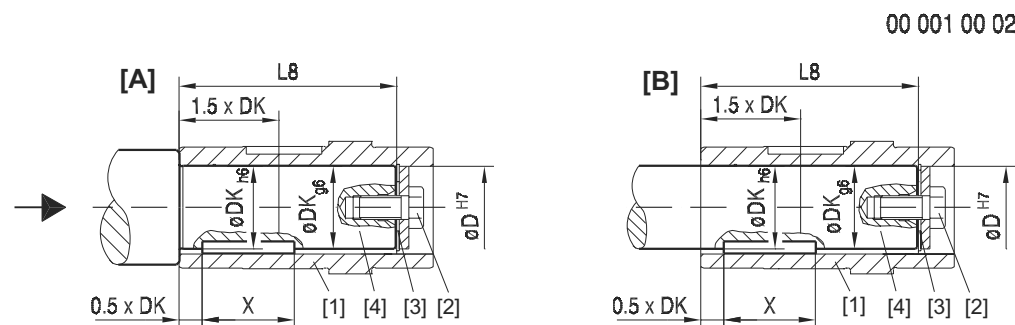


Figure 103: Customer shaft with contact shoulder (A) and without contact shoulder (B)

- (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]
WA..10	16	16	69	8
WA..20	18	18	84	8
WA..20, WA..30, 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	105 132	20
FA..47, KA..47, SA..57	35	35	132	20
FA..57, KA..57 FA..67, KA..67 SA..67	40	40	142 156 144	40
SA..67	45	45	144	40
FA..77, KA..77, SA..77	50	50	183	40
FA..87, KA..87 SA..77, SA..87	60	60	210 180, 220	80
FA..97, KA..97 SA..87, SA..97	70	70	270 220, 260	80
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



Design and Operating Notes

Installation/removal of gear units with hollow shafts and keys

2) Installation /removal 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 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 delivered as standard is not required.

Note the following points concerning the 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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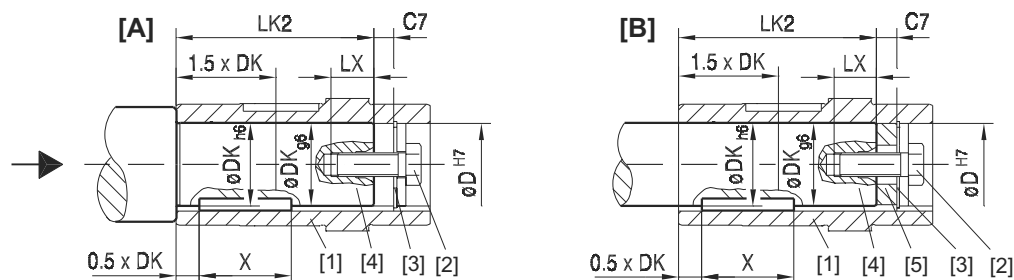
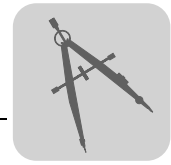


Figure 104: Customer shaft with contact shoulder (A) and without contact shoulder (B)

- (1) Hollow shaft
- (2) Retaining screw with washer
- (3) Circlip
- (4) Customer shaft
- (5) Spacer



Dimensions, tightening torques and part numbers:

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

Type	D ^{H7} [mm]	DK [mm]	LK2 [mm]	LX ⁺² [mm]	C7 [mm]	MS [Nm]	Part number of installation- removal kit
WA..10	16	16	57	12.5	11	8	643 712 5
WA..20	18	18	72	16	12	8	643 682 X
WA..20, WA..30 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



Design and Operating Notes

Installation/removal of gear units with hollow shafts and keys

Removal

Applies only if installation/removal kit was previously used for installation (→ Figure 104).

Proceed as follows for removal:

1. Loosen the retaining screw (6).
2. Remove the circlip (3) and, if used, the spacer tube (5).
3. According to Figure 105 place the forcing washer (7) and the locked nut (8) between the customer shaft (4) and circlip (3).
4. Re-install the circlip (3).
5. Re-install the retaining screw (6). Now you can force the gear unit off the shaft.

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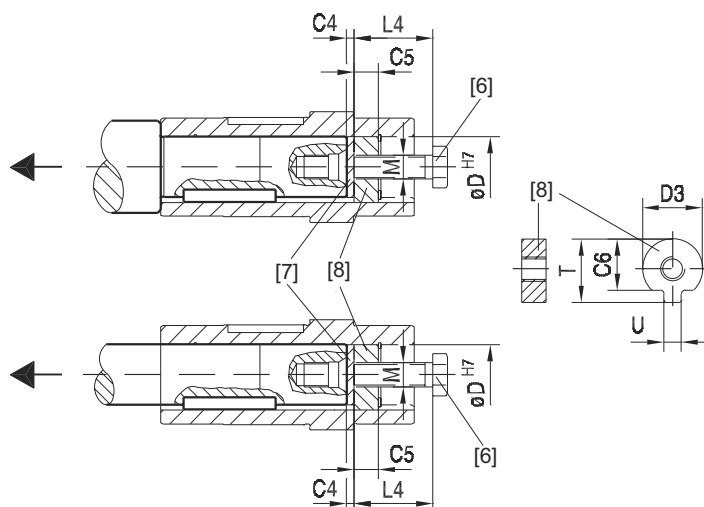
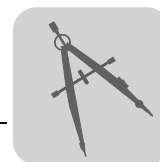


Figure 105: Removal

- (6) Retaining bolt
- (7) Forcing washer
- (8) Locked nut for removal

Dimensions and part numbers:

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 of installa- tion/removal kit
WA..10	16	M5	5	5	12	4.5	18	15.7	50	643 712 5
WA..20	18	M6	5	6	13.5	5.5	20.5	17.7	25	643,682 X
WA..20, WA..30, 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

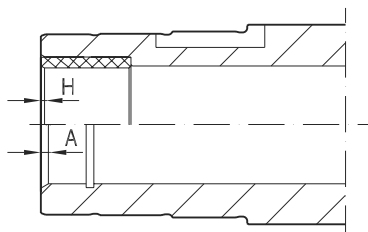


10.3 Gear units with hollow shaft

Chamfers on hollow shafts

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

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Figure 106: Chamfers on hollow shafts

Gear unit	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../S..37	$2 \times 30^\circ$	$0.5 \times 45^\circ$
F../K../S..47	$2 \times 30^\circ$	$0.5 \times 45^\circ$
S..57	$2 \times 30^\circ$	$0.5 \times 45^\circ$
F../K../S..57	$2 \times 30^\circ$	$3 \times 2^\circ$
F../K../S..67	$2 \times 30^\circ$	$3 \times 2^\circ$
F../K../S..77	$2 \times 30^\circ$	$3 \times 2^\circ$
F../K../S..87	$3 \times 30^\circ$	$3 \times 2^\circ$
F../K../S..97	$3 \times 30^\circ$	$3 \times 2^\circ$
F../K../S..107	$3 \times 30^\circ$	$3 \times 2^\circ$
F../K../S..127	$5 \times 30^\circ$	$1.5 \times 30^\circ$
F../K../S..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 AC to decide whether there will be a collision with a pushed-through customer shaft.

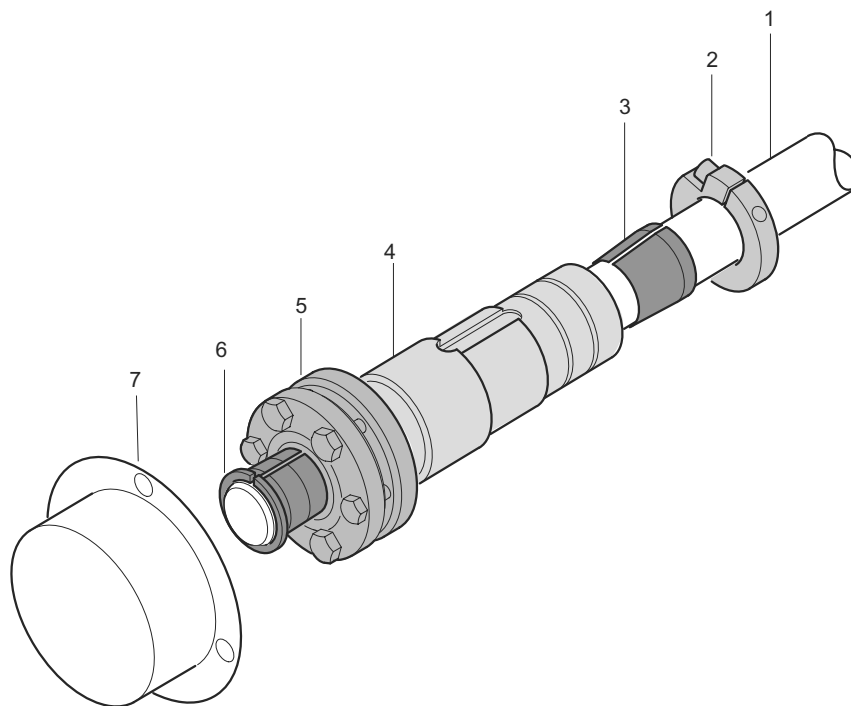


10.4 TorqLOC® mounting system for gear units with hollow shaft

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 disc, 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:



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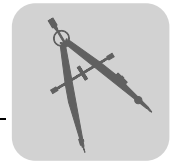
Figure 107: Components of the TorqLOC® hollow shaft mounting system

1. Customer shaft
2. Locking collar
3. Conical bronze bushing
4. Hollow shaft in gear unit
5. Shrink disc
6. Conical steel bushing
7. Fixed cover

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.
- Simple removal 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 18000 Nm.

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

- Parallel shaft helical gear units in gear unit sizes 37 to 157 (FT37 ... FT157)
- Helical-bevel gear units in gear unit sizes 37 to 157 (KT37 ... KT157)
- Helical-worm gear units in gear unit sizes 37 to 97 (ST37 ... ST97)

Available options

The following options are available for gear units with 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.



10.5 Shouldered hollow shaft with shrink disc option

As an option, gear units with 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, $D' = D$.

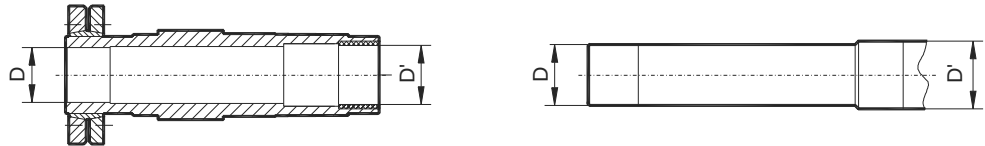


Figure 108: Optional bore diameter D'

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Gear unit	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

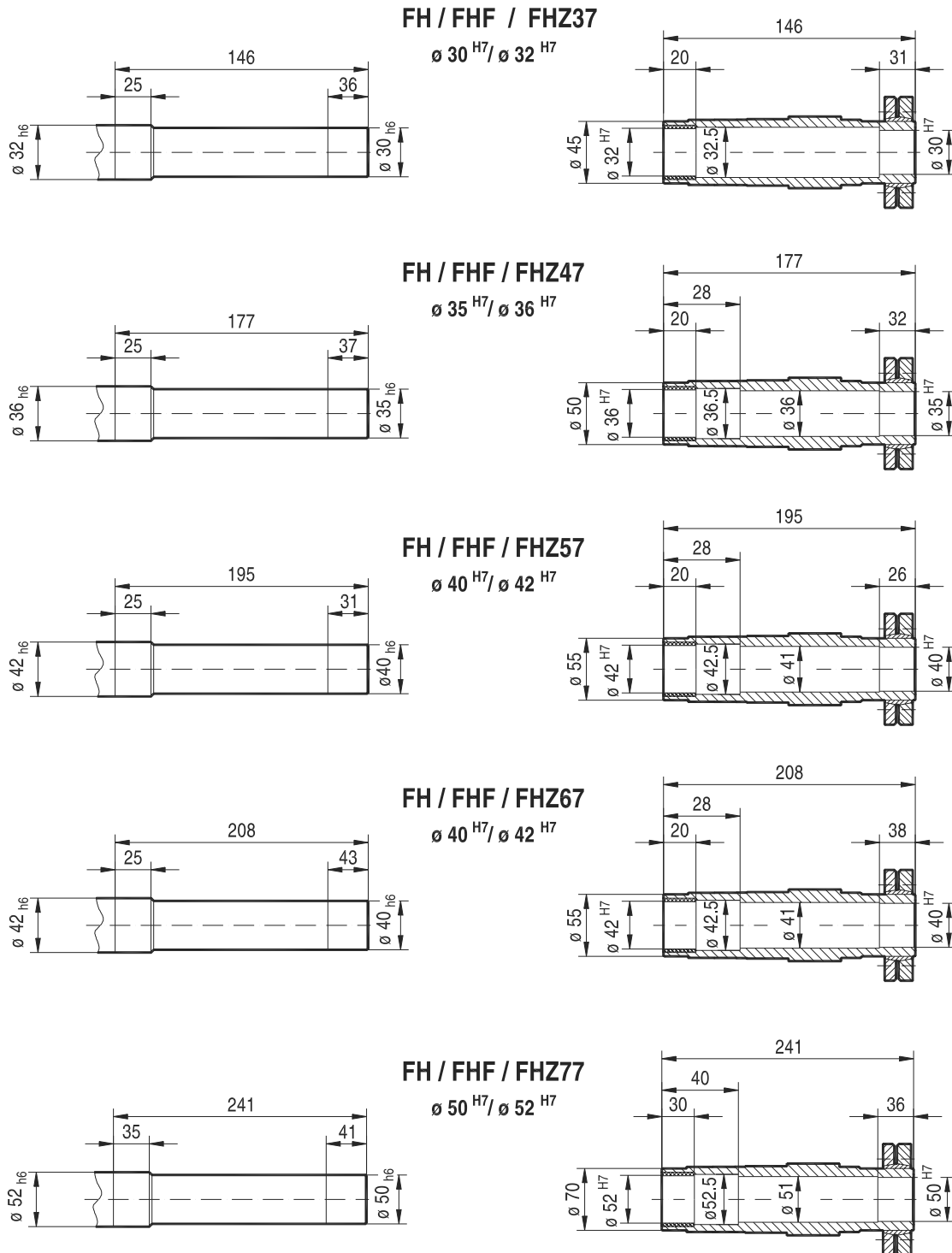
Diameter D / D' must be specified when ordering gear units with a shouldered hollow shaft (optional bore diameter D').

Sample order

FH37 DT80N4 with hollow shaft 30/32 mm

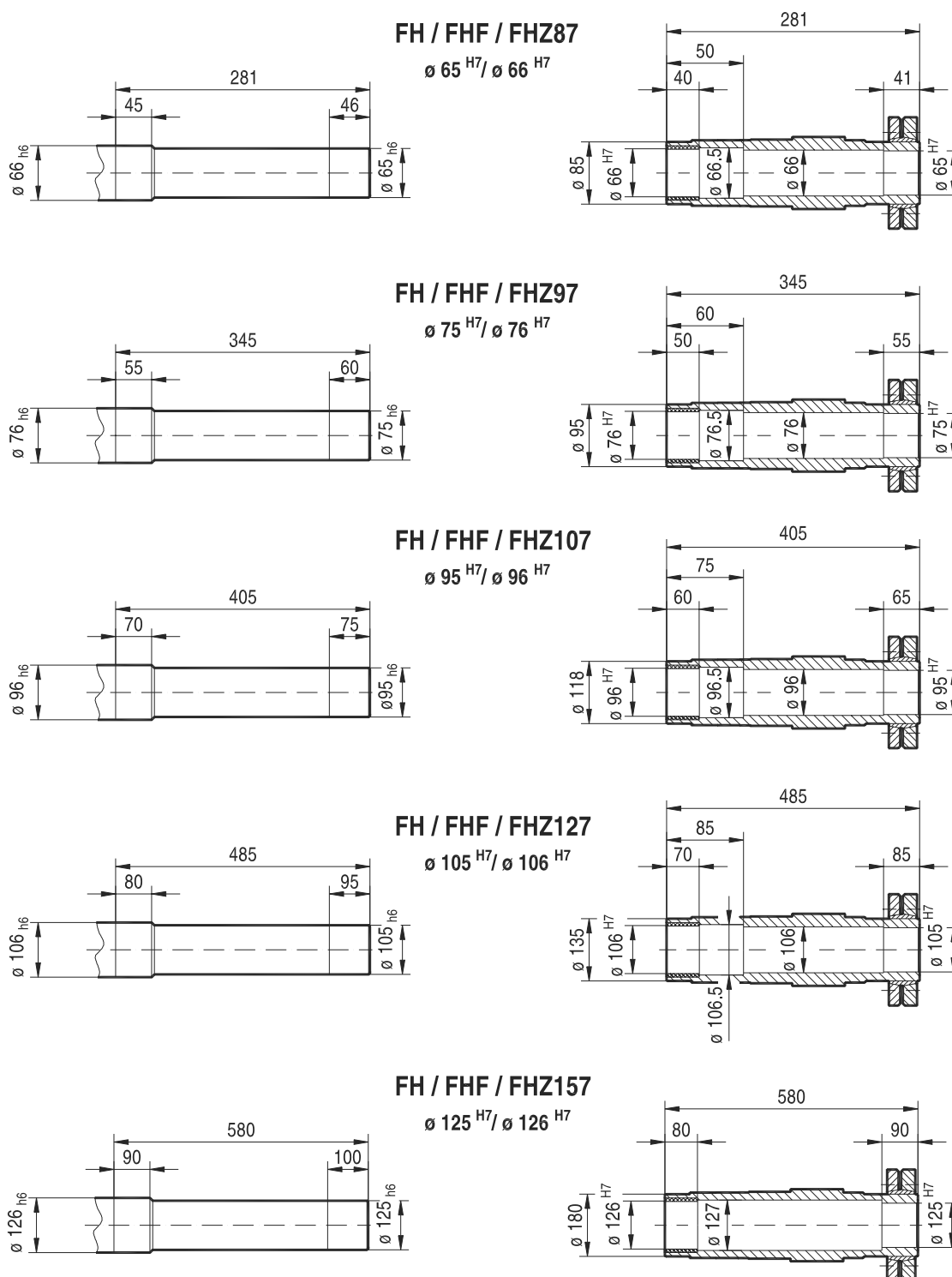


Parallel shaft helical gear units with shouldered hollow shaft (dimensions in mm):



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Figure 109: Shouldered hollow shaft FH/FHF/FHZ37...77

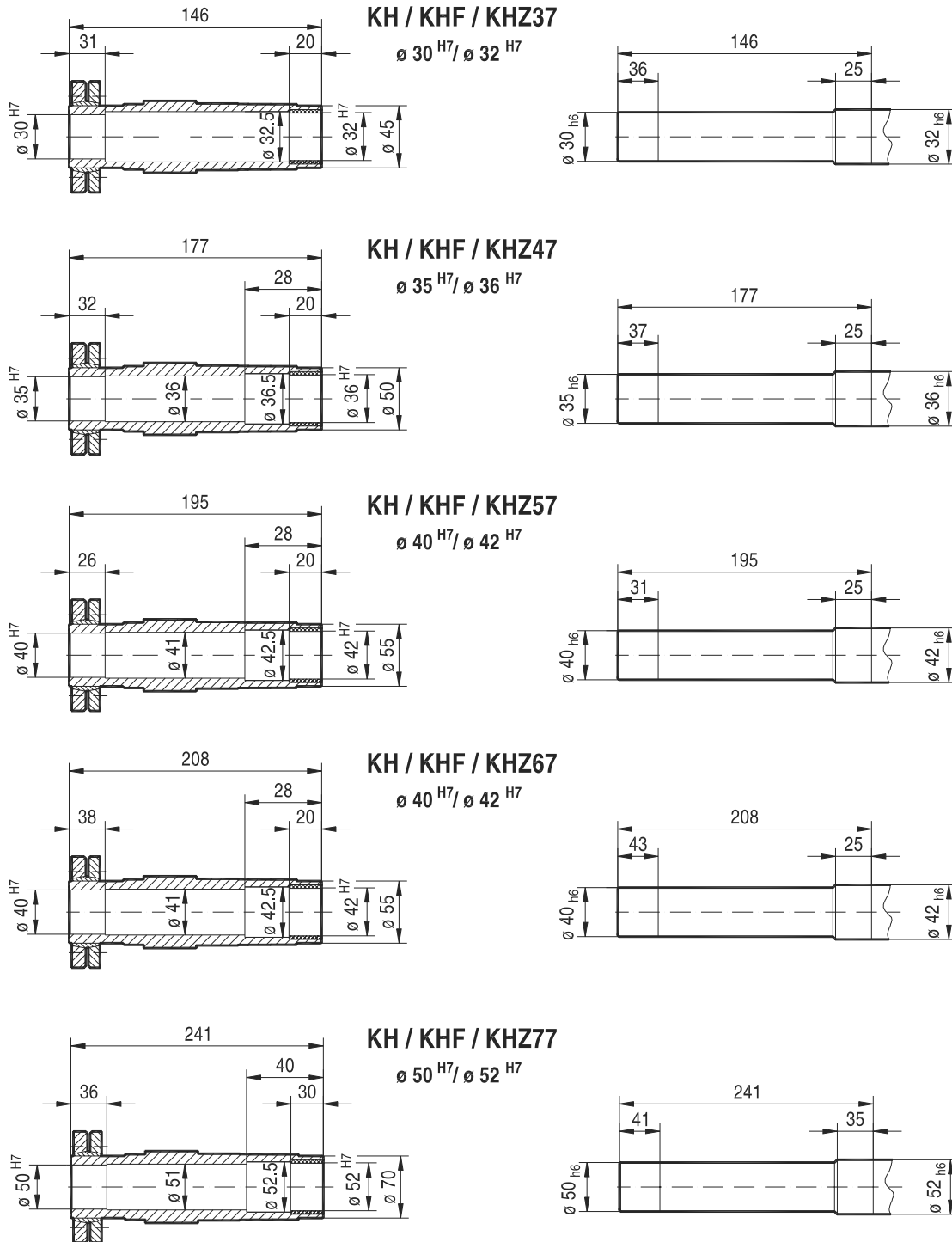


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Figure 110: Shouldered hollow shaft FH/FHF/FHZ87...157



Helical-bevel gear unit with shouldered hollow shaft (dimensions in mm):



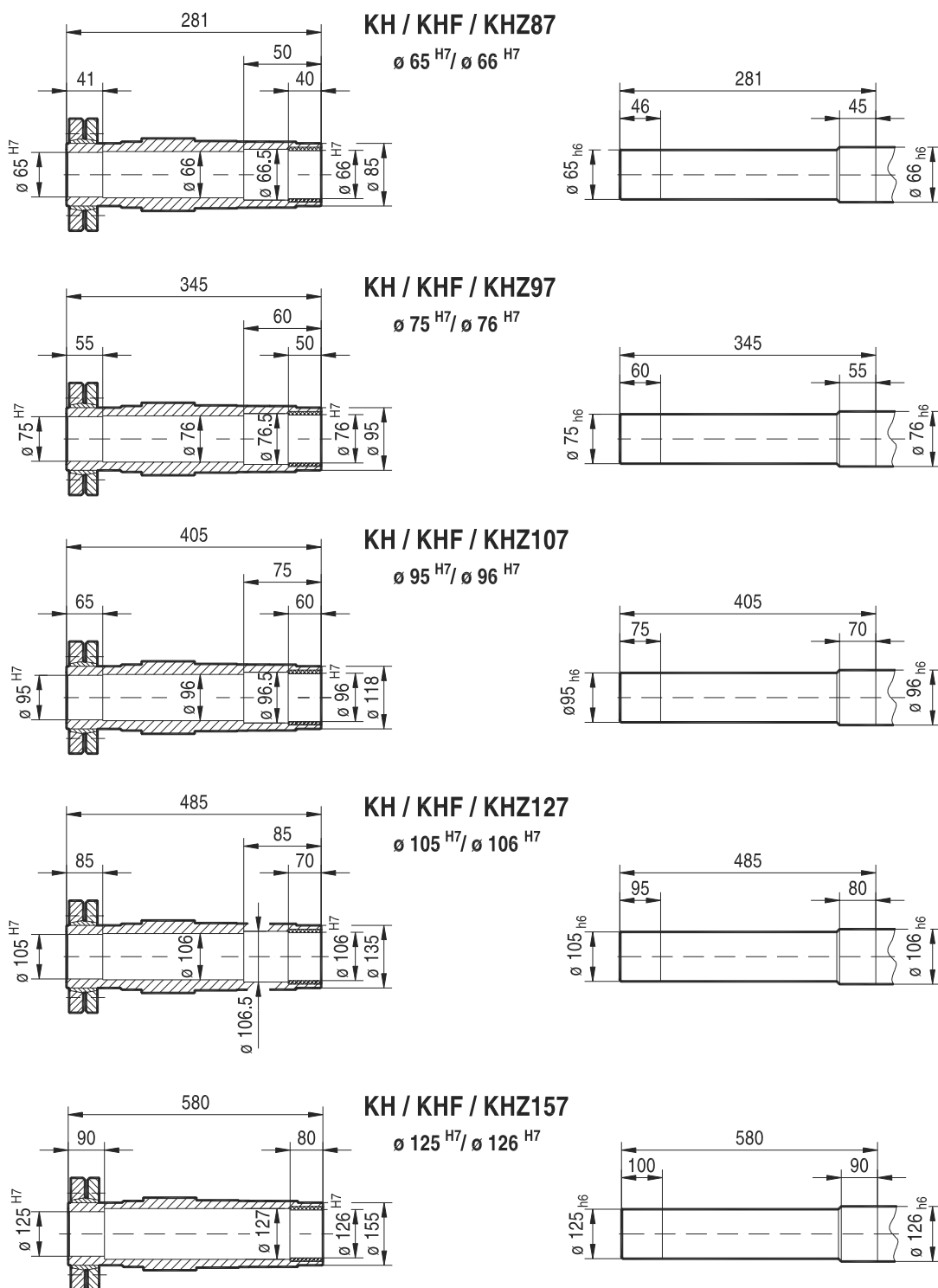
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Figure 111: Shouldered hollow shaft KH/KHF/KHZ37...77



Design and Operating Notes

Shouldered hollow shaft with shrink disc option

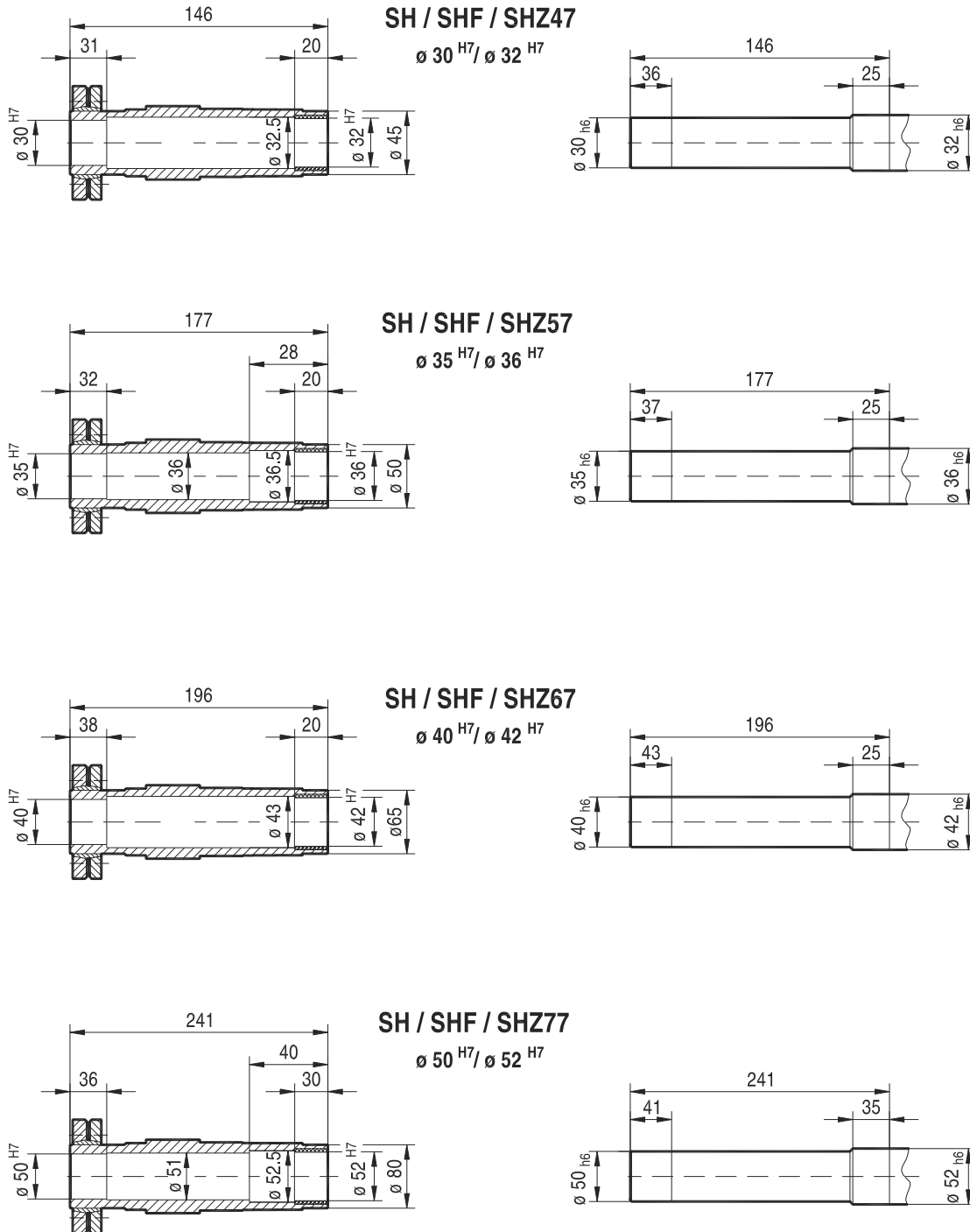


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Figure 112: Shouldered hollow shaft KH/KHF/KHZ87...157



Helical-worm gear units with shouldered hollow shaft (dimensions in mm):



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Figure 113: Shouldered hollow shaft SH/SHF/SHZ47...77

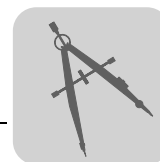


$\varnothing 65^{H7} / \varnothing 66^{H7}$

SH / SHF / SHZ97

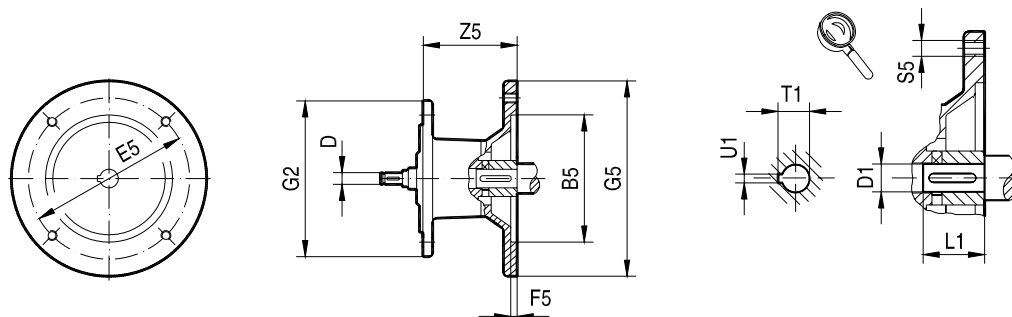
$\varnothing 75^{H7} / \varnothing 76^{H7}$

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10.6 Adapters for mounting IEC motors

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Gear unit type	Adapter type	Dimensions in mm											
		B5	D	E5	F5	G2	G5	S5	Z5	D1	L1	T1	U1
R..27, R..37 F..27, F..37, F..47 K..37 S..37, S..47, S..57	AM63	95	10	115	3.5	120	140	M8	72	11	23	12.8	4
	AM71 ¹⁾	110		130	4		160			14	30	16.3	5
	AM80 ¹⁾	130	12	165	4.5		200	M10	106	19	40	21.8	6
	AM90 ¹⁾		14							24	50	27.3	8
R..47 ²⁾ , R..57, R..67 F..57, F..67 K..47 ²⁾ , K..57, K..67 S..67	AM63	95	10	115	3.5	160	140	M8	66	11	23	12.8	4
	AM71	110		130	4		160			14	30	16.3	5
	AM80	130	12	165	4.5		200	M10	99	19	40	21.8	6
	AM90		14							24	50	27.3	8
	AM100 ¹⁾	180	16	215	5		250	M12	134	28	60	31.3	8
	AM112 ¹⁾		18							24	50	27.3	8
	AM132S/M ¹⁾	230	22	265	300		191	38	80	41.3	10		
R..77 F..77 K..77 S..77	AM63	95	10	115	3.5	200	140	M8	60	11	23	12.8	4
	AM71	110		130	4		160			14	30	16.3	5
	AM80	130	12	165	4.5		200	M10	92	19	40	21.8	6
	AM90		14							24	50	27.3	8
	AM100 ¹⁾	180	16	215	5		250	M12	126	28	60	31.3	8
	AM112 ¹⁾		18							24	50	27.3	8
	AM132S/M ¹⁾	230	22	265	300		M12	179	38	80	41.3	10	
	AM132ML ¹⁾		28						38	80	41.3	10	
R..87 F..87 K..87 S..87 ³⁾	AM80	130	12	165	4.5	250	200	M10	87	19	40	21.8	6
	AM90		14							24	50	27.3	8
	AM100	180	16	215	5		250	M12	121	28	60	31.3	8
	AM112		18							24	50	27.3	8
	AM132S/M	230	22	265	300		M12	174	38	80	41.3	10	
	AM132ML		28						38	80	41.3	10	
	AM160 ¹⁾	250	28	300	6		350	M16	232	42	110	45.3	12
	AM180 ¹⁾		32							48		51.8	14

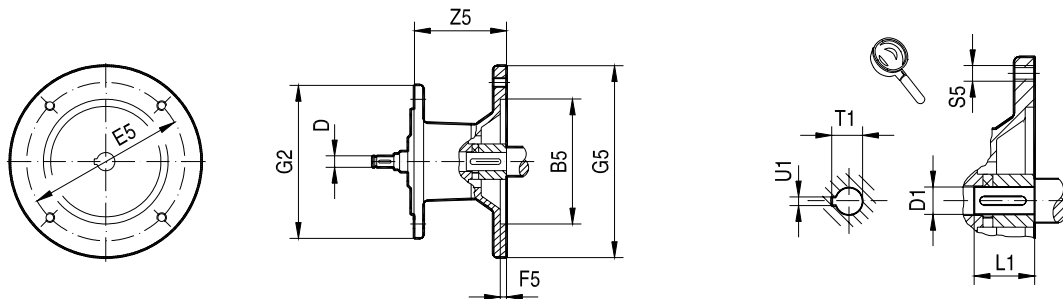
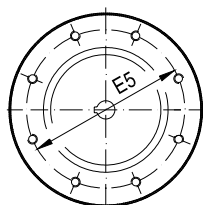
1) Check dimension 2 G5 because component may protrude past foot-mounting surface if installed on R, K or S foot-mounted gear unit.

2) not with AM112

3) not with AM180



23 003 100

Fig.1**Fig.2**

Gear unit type	Adapter type	Fig.	Dimensions in mm												
			B5	D	E5	F5	G2	G5	S5	Z5	D1	L1	T1	U1	
R..97 F..97 K..97 S..97 ¹⁾	AM100	1	180	16	215	5	300	250	M12	116	28	60	31.3	8	
	AM112			18											
	AM132S/M		230	22	265	300		M16	227	42	48	110	45.3	12	
	AM132ML			28		350									268
	AM160		250	28	300	6		400	268	55	110	45.3	12		
	AM180			32										51.8	14
	AM200		300	38	350	7		400	268	55	59.3	16			
R..107 F..107 K..107	AM100	1	180	16	215	5	350	250	M12	110	28	60	31.3	8	
	AM112			18											
	AM132S/M		230	22	265	300		M16	221	42	48	110	45.3	12	
	AM132ML			28		350									262
	AM160		250	28	300	6		400	262	55	110	45.3	12		
	AM180			32										51.8	14
	AM200		300	38	350	7		400	262	55	59.3	16			
	AM225	2	350	38	400			450	277	60	140	64.4	18		
R..137	AM132S/M	1	230	22	265	5	400	300	M12	156	38	80	41.3	10	
	AM132ML			28											
	AM160		250	28	300	6		350	M16	214	42	48	110	45.3	12
	AM180			32											
	AM200	300	38	350	7	400		255	55	59.3	16				
	AM225	2	350	38		400		450	270	60	140	64.4	18		

1) Not with AM200



23 004 100

Fig.1

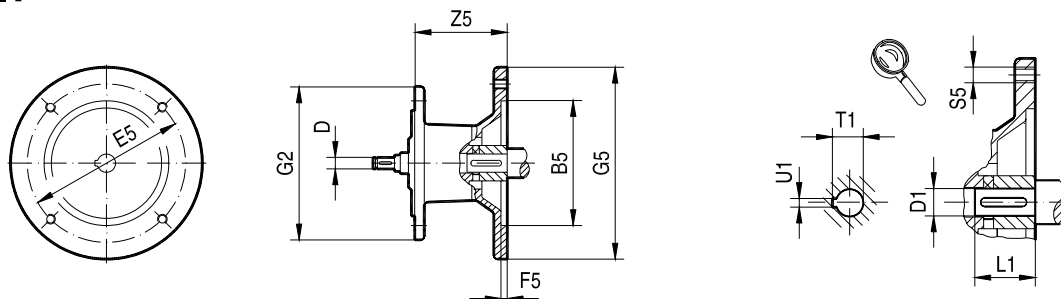
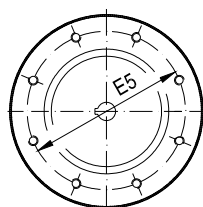


Fig.2

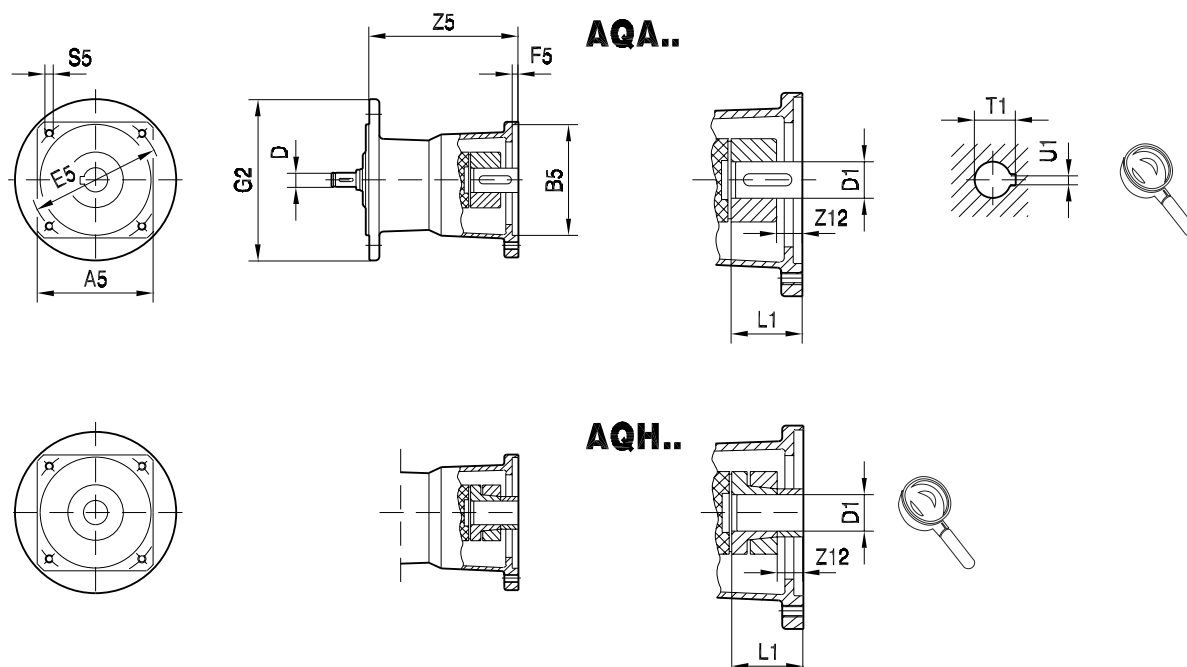


Gear unit type	Adapter type	Fig.	Dimensions in mm											
			B5	D	E5	F5	G2	G5	S5	Z5	D1	L1	T1	U1
R..147 F..127 K..127	AM132S/M	1	230	22	265	5	450	300	M12	148	38	80	41.3	10
	AM132ML			28							38			
	AM160		250	28	300	6		350	206	42	48	110	45.3	12
	AM180			32										
	AM200	300	38	350	7	400		247	55	140	59.3	16		
	AM225	350	38	400		450		262	60		64.4	18		
	AM250	450	48	500		550		M16	336		65		69.4	
	AM280								75		79.9	20		
R..167 F..157 K..157 K..167 K..187	AM160	1	250	28	300	6	550	350	M16	198	42	110	45.3	12
	AM180			32							48			
	AM200		300	38	350	7		400		239	55	59.3	16	
	AM225	350	38	400	450			254		60	64.4	18		
	AM250	450	48	500	550			328		65	69.4			
	AM280					75				79.9	20			



10.7 Adapters for mounting servomotors

23 005 01 00



Gear unit type	Adapter type	Dimensions in mm														
		A5	B5	D	E5	F5	G2	S5	Z5	Z12 ¹⁾	Z12 ²⁾	D1	L1	T1 ¹⁾	U1 ¹⁾	
R..27, R..37 F..27, F..37, F..47 K..37 S..37, S..47, S..57	AQ..80/1	82	60	10 12	75	3	120	M5	104.5	5.5	5.5	11	23	12.8	4	
	AQ..80/2		50		95			M6				14	30	16.3	5	
	AQ..80/3		80		100			M6				14	30	16.3	5	
	AQ..100/1	100	95	10 12 14 16	115	4		M8	129.5	-	-	14	30	16.3	5	
	AQ..100/2		80		100			M6	143.5	2	14	19	40	21.8	6	
	AQ..100/3		95		115			M8	152.5	11	23	19	40	21.8	6	
	AQ..100/4		95		130			16	16	24	50	27.3	8			
	AQ..115/1	115	110													
	AQ..115/2															
	AQ..115/3															
R..47, R..57, R..67 F..57, F..67 K..47 ³⁾ , K..57, K..67 S..67	AQ..80/1	82	60	10 12	75	3	160	M5	98	5.5	5.5	11	23	12.8	4	
	AQ..80/2		50		95			M6				14	30	16.3	5	
	AQ..80/3		80		100			M6				14	30	16.3	5	
	AQ..100/1	100	95	10 12 14 16	115	4		M8	122.5	-	-	14	30	16.3	5	
	AQ..100/2		80		100			M6	136.5	2	14	19	40	21.8	6	
	AQ..100/3		95		115			M8	145.5	11	23	19	40	21.8	6	
	AQ..100/4		95		130			16	16	24	50	27.3	8			
	AQ..115/1	115	110													
	AQ..115/2															
	AQ..115/3															
	AQ..140/1	140	110	16	165	5		M10	175	16	16	24	50	27.3	8	
	AQ..140/2		130	18					22	32	60	35.5	10			
	AQ..140/3		22													
	AQ..190/1	190	130	22 28	215			M12	237.5	24	24	32	60	35.3	10	
	AQ..190/2		180						261.5	34	34	38	80	41.3	10	
	AQ..190/3															

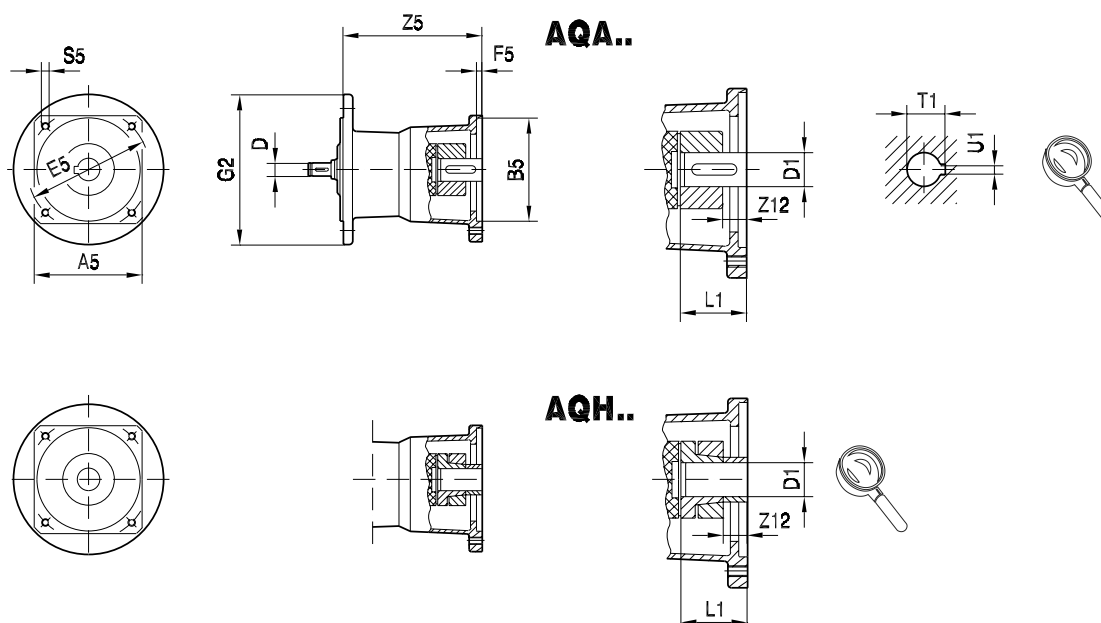
1) For versions with keyway (AQA..).

2) For version with clamping ring hub (AQH..).

3) Not with AQ190



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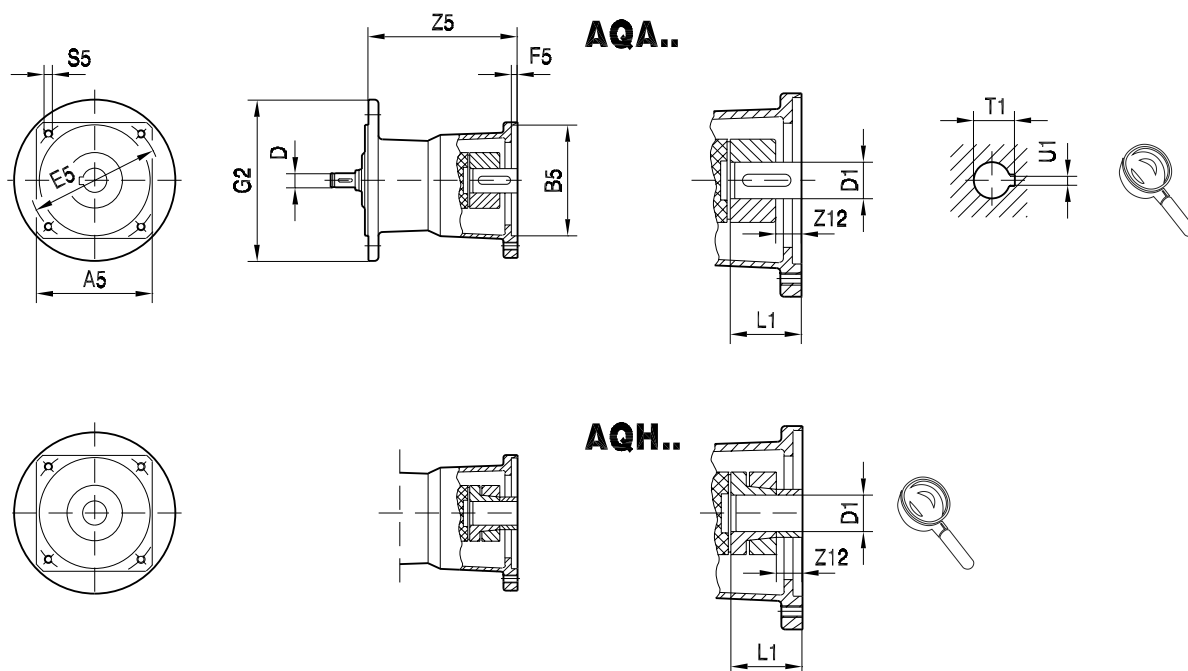
Gear unit type	Adapter type	Dimensions in mm													
		A5	B5	D	E5	F5	G2	S5	Z5	Z12 ¹⁾	Z12 ²⁾	D1	L1	T1 ¹⁾	U1 ¹⁾
R..77 F..77 K..77 S..77	AQ..80/1	82	60	10 12	75	3	200	M5	92	5.5	5.5	11	23	12.8	4
	AQ..80/2				75							14	30	16.3	5
	AQ..80/3				50			95				M6			
	AQ..100/1	100	80	10 12 14 16	100	4		M6	115.5	-	-	14	30	16.3	5
	AQ..100/2		95		115			M8							
	AQ..100/3		80		100			M6	129.5	2	14	19	40	21.8	6
	AQ..100/4		95		115			M8							
	AQ..115/1	115	95		130	5		M8	138.5	11	23	19	40	21.8	6
	AQ..115/2		110							16	16	24	50	27.3	8
	AQ..115/3														
	AQ..140/1	140	110	16 18 22	165	5		M10	167	16	16	24	50	27.3	8
	AQ..140/2		130						180	22	22	32	60	35.3	10
	AQ..140/3														
	AQ..190/1	190	130	22 28	215	5		M12	225.5	24	24	32	60	35.3	10
	AQ..190/2		180						249.5	34	34	38	80	41.3	10
	AQ..190/3														
R..87 F..87 K..87 S..87	AQ..100/1	100	80	12 14 16	100	4	250	M6	110.5	-	-	14	30	16.3	5
	AQ..100/2		95		115			M8							
	AQ..100/3		80		100			M6	124.5	2	14	19	40	21.8	6
	AQ..100/4		95		115			M8							
	AQ..115/1	115	95	130	5	M8		133.5	11	23	19	40	21.8	6	
	AQ..115/2		110						16	16	24	50	27.3	8	
	AQ..115/3														
	AQ..140/1	140	110	16 18 22	165	5		M10	162	16	16	24	50	27.3	8
	AQ..140/2		130						175	22	22	32	60	35.3	10
	AQ..140/3														
	AQ..190/1	190	130	22 28	215	5		M12	220.5	24	24	32	60	35.3	10
	AQ..190/2		180						244.5	34	34	38	80	41.3	10
AQ..190/3															

1) For versions with keyway (AQA..).

2) For version with clamping ring hub (AQH..).



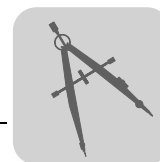
23 007 01 00



Gear unit type	Adapter type	Dimensions in mm															
		A5	B5	D	E5	F5	G2	S5	Z5	Z12 ¹⁾	Z12 ²⁾	D1	L1	T1 ¹⁾	U1 ¹⁾		
R..97 F..97 K..97 S..97	AQ..140/1	140	110	16	165	5	300	M10	157	16	16	24	50	27.3	8		
	AQ..140/2		130	18					M12	170	22	22	32	60	35.3	10	
	AQ..140/3			22						24	32	60	35.3	10			
	AQ..190/1	190	130	22	215			215.5		24	24	32	60		35.3		
	AQ..190/2		180	28	239.5			34	34	38	80	41.3					
	AQ..190/3																
R..107 F..107 K..107	AQ..140/1	140	110	16	165	5	350	M10	151	16	16	24	50	27.3	8		
	AQ..140/2		130	18					M12	164	22	22	32	60	35.3	10	
	AQ..140/3			22						24	32	60	35.3	10			
	AQ..190/1	190	130	22	215			209.5		24	24	32	60		35.3		
	AQ..190/2		180	28	233.5			34	34	38	80	41.3					
	AQ..190/3																
R..137	AQ..190/1	190	130	22	215	5	400	M12	202.5	24	24	32	60	35.3	10		
	AQ..190/2		180						28	226.5	34	34	38	80		41.3	
	AQ..190/3		130						22	194.5	24	24	32	60		35.3	
R..147 F..127 K..127	AQ..190/1		180	28			450			218.5	34	34	38	80		41.3	
	AQ..190/2																
	AQ..190/3																

1) For versions with keyway (AQA..).

2) For version with clamping ring hub (AQH..).



10.8 Fastening the gear unit

Use bolts of quality 8.8 to fasten gear units and gearmotors.

Exception

Use bolts of **quality 10.9** to fasten the customer flange to transmit the rated torques for the following flange-mounted helical gearmotors (RF ../RZ..) and foot/flange-mounted versions (R..F):

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

10.9 Torque arms

Available torque arms

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	
WA	1 061 021 9	168 073 0	168 011 0	

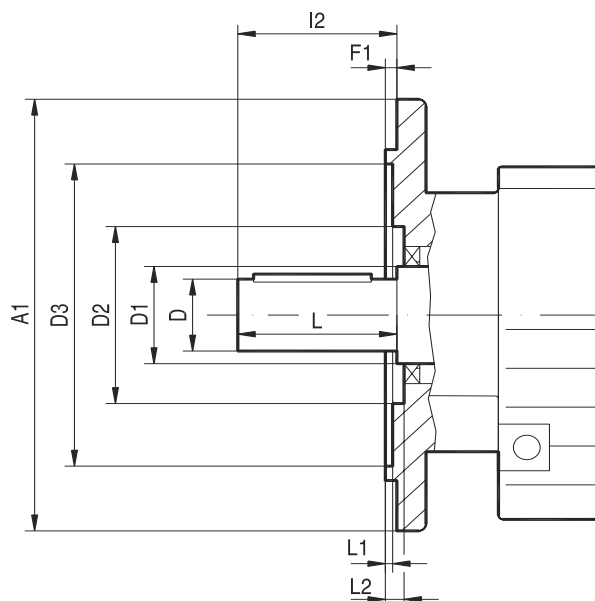
Torque arms for KH167.., KH187..

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.



10.10 Flange contours of RF.. and R..F gear units

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

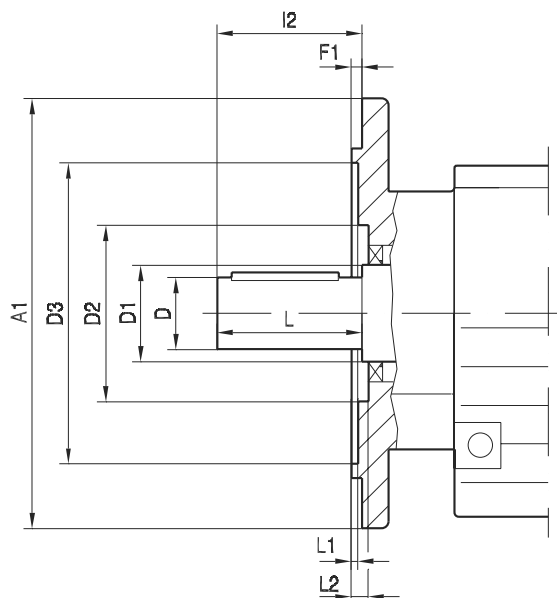
Type	Dimensions in mm											
	A1	D	D1	D2	RF	R..F	D3	F1	I2	L	L1	L2
RF07, R07F	120	20	22	38	38	72	3	40	40	2	2	6
	140 ¹⁾											
	160 ¹⁾											
RF17, R17F	120	20	25	46	46	65	3	40	40	1	1	5
	140											
	160 ¹⁾											
RF27, R27F	120	25	30	54	54	66	3	50	50	1	1	6
	140											
	160					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

1) The flange contour protrudes from under the base surface.



10.11 Flange contours of FF., KF., SF. and WF. gear units

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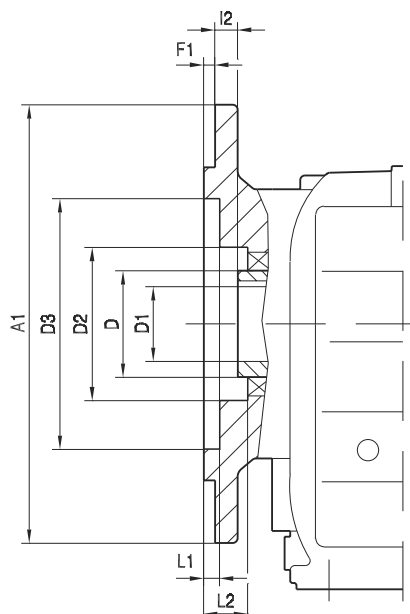
Check dimensions L1 and L2 for selection and installation of output elements.

Type	Dimensions in mm								
	A1	D	D1	D2	D3	F1	I2	L1	L2
FF27	160	25	40	-	96	3.5	20	10.5	18.5
FF37	160	30	45	-	94	3.5	24	2	10
FF47	200	35	50	70	115	3.5	25	8.5	3.5
FF57	250	40	55	76	155	4	23.5	4.5	12
FF67	250	40	55	76	155	4	23	4	4
FF77	300	50	70	95	205	4	37	18	5
FF87	350	60	85	120	220	5	30	9	5
FF97	450	70	95	192	320	5	41.5	15.5	5
FF107	450	90	118	224	320	5	41	29	16
FF127	550	100	135	185	420	5	51	48	6
FF157	660	120	155	200	520	6	60	65	10
KF37	160	30	45	62	94	3.5	24	2	10
KF47	200	35	50	70	115	3.5	25	8.5	3.5
KF57	250	40	55	76	155	4	23.5	4.5	12
KF67	250	40	55	76	155	4	23.5	4.5	12
KF77	300	50	70	95	205	4	37	18	5
KF87	350	60	85	120	220	5	30	9	5
KF97	450	70	95	192	320	5	41.5	15.5	5
KF107	450	90	118	224	320	5	41	29	16
KF127	550	100	135	185	420	5	51	48	6
KF157	660	120	155	200	520	6	60	65	10
SF37	120	20	35	-	68	3	15	6	6
SF37	160	20	35	-	98	3.5	15	6.5	6.5
SF47	160	30	45	-	94	3.5	24	2	10
SF57	200	35	50	75	115	3.5	25	8.5	3.5
SF67	200	40	65	95	115	3.5	42.5	11.5	4
SF77	250	50	80	115	164	4	45.5	21.5	5
SF87	350	60	95	140	220	5	52.5	27.5	6
SF97	450	70	120	175	355	5	60	34	6.5
WF10	80	16	25	40	40	2.5	23	30	30
WF10	120	16	25	49	74	3	23	5	24
WF20	110	18	30	55	104	3	30	23	23
WF20	110	20	30	55	104	4	30	23	23
WF20	120	18	30	46	46	2.5	30	32	32
WF20	120	20	30	46	46	2.5	30	32	32
WF30	120	20	30	64	64	2.5	19.5	14	22
WF30	136	20	30	64	64	2.5	19.5	25.5	31.5



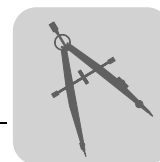
10.12 Flange contours of FAF.., KAF.., SAF.. and WAF.. gear units

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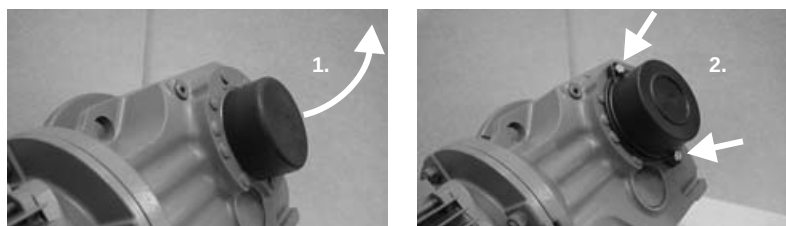
Check dimensions L1 and L2 for selection and installation of output elements.

Type	Dimensions in mm								
	A1	D	D1	D2	D3	F1	I2	L1	L2
FAF27	160	40	25	-	96	3.5	20	10.5	18.5
FAF37	160	45	30	-	94	3.5	24	2	10
FAF47	200	50	35	70	115	3.5	25	8.5	3.5
FAF57	250	55	40	76	155	4	23.5	4.5	12
FAF67	250	55	40	76	155	4	23	4	4
FAF77	300	70	50	95	205	4	37	18	5
FAF87	350	85	60	120	220	5	30	9	5
FAF97	450	95	70	192	320	5	41.5	15.5	5
FAF107	450	118	90	224	320	5	41	29	16
FAF127	550	135	100	185	420	5	51	48	6
FAF157	660	155	120	200	520	6	60	65	10
KAF37	160	45	30	62	94	3.5	24	2	10
KAF47	200	50	35	70	115	3.5	25	8.5	3.5
KAF57	250	55	40	76	155	4	23.5	4.5	12
KAF67	250	55	40	76	155	4	23.5	4.5	12
KAF77	300	70	50	95	205	4	37	18	5
KAF87	350	85	60	120	220	5	30	9	5
KAF97	450	95	70	192	320	5	41.5	15.5	5
KAF107	450	118	90	224	320	5	41	29	16
KAF127	550	135	100	185	420	5	51	48	6
KAF157	660	155	120	200	520	6	60	65	10
SAF37	120	35	20	-	68	3	15	6	6
SAF37	160	35	20	-	98	3.5	15	6.5	6.5
SAF47	160	45	30	-	94	3.5	24	2	10
SAF57	200	50	35	75	115	3.5	25	8.5	3.5
SAF67	200	65	40	95	115	3.5	42.5	11.5	4
SAF77	250	80	50	115	164	4	45.5	21.5	5
SAF87	350	95	60	140	220	5	52.5	27.5	6
SAF97	450	120	70	175	355	5	60	34	6.5
WAF10	80	25	16	40	40	2.5	23	30	30
WAF10	120	25	16	49	74	3	23	5	24
WAF20	110	30	18	55	104	3	30	23	23
WAF20	110	30	20	55	104	4	30	23	23
WAF20	120	30	18	46	46	2.5	30	32	32
WAF20	120	30	20	46	46	2.5	30	32	32
WAF30	120	30	20	64	64	2.5	19.5	14	22
WAF30	136	30	20	64	64	2.5	19.5	25.5	31.5



10.13 Fixed covers

Parallel shaft helical gear units, helical-bevel gear units and helical-worm gear units with hollow shafts and shrink discs of size 37 up to size 97 come equipped with a rotating cover as standard. 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. Parallel shaft helical gear units and helical-bevel gear units with hollow shafts and shrink disks of size 107 and higher as well as parallel shaft helical gear units of size 27 come equipped with a fixed cover as standard.

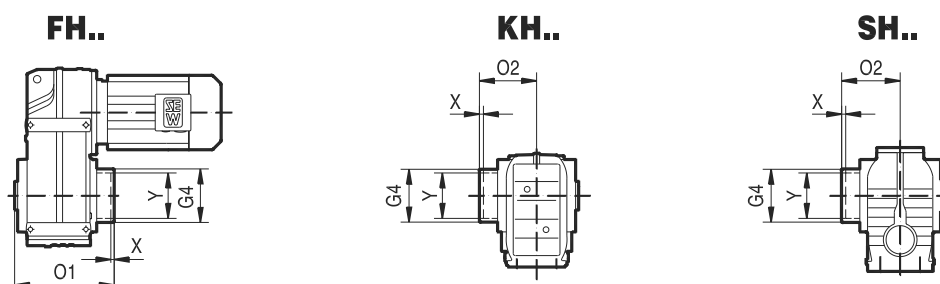


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Figure 115: Replacing a rotating cover with a fixed cover

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

Part numbers and dimensions



04356AXX

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 [mm]	78	88	100	100	121	164	185
O1 [mm]	157	188.5	207.5	221.5	255	295	363.5
X [mm]	2	4.5	7.5	6	6	4	6.5
Y [mm]	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 [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 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 [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