



6 Design and operating notes

6.1 Lubricants

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 mounting position (M1 – M6, see chapter "Mounting positions") must be specified in the order. If you change the mounting position later, you will have to adapt the lubricant fill to the new mounting position, see chapter "Lubricant fill quantities"" (page 92).

6.1.1 Bearing greases

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

	Ambient temperature	Manufacturer	Type
Gear unit rolling bearings	-40 °C to +80 °C	Fuchs	Renolit CX-TOM 15
	-40 °C to +80 °C	Klüber	Petamo GHY 133 N
	-40 °C to +40 °C	Castrol	Oberen FS 2
	-20 °C to +40 °C	Fuchs	Plantogel 2S



INFORMATION

The following grease quantities are required:

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



6.1.2 Lubricant table

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

Key to the lubricant table

CLP PG	= Polyglycol (W gear units, conforms to USDA-H1)
CLP HC	= Synthetic hydrocarbons
E	= Ester oil (water hazard classification 1 (German regulation – "WKG"))
HCE	= Synthetic hydrocarbons + ester oil (USDA - H1 certification)
HLP	= Hydraulic oil
	= Synthetic lubricant (= synthetic-based bearing grease)
1)	Helical-worm gear units with PG oil: please consult SEW-EURODRIVE
2)	Special lubricant only for SPIROPLAN® gear units
3)	Use $SEW f_B \geq 1.2$
4)	Bear in mind the critical starting behavior at low temperatures.
5)	Low-viscosity grease
6)	Ambient temperature
7)	Grease
	Lubricant for the food industry (food grade oil)
	Biodegradable oil (lubricant for agriculture, forestry, and water management)



Lubricant table

01 751 09 04

	6)	DIN (ISO)	ISO, NLGI	Mobil®	Shell	bp	ELMAG	Castrol	FUCHS	TOTAL
R...	Standard -15	CLP (CC)	VG 220	Mobilgear 600 XP 220	Shell Omala S2 G 220	BP Energol GR-XP 220	Küblersynth GEM 1-220 N	Tribol 1100/220	Renolin CLP 220	Carter EP 220
K..37-187 (HK...)	+80	CLP PG	VG 220	Mobil Glycoyle 220	Shell Omala S4 WE 220	BP Energol SG-XP 220	Küblersynth GEM 6-220	Optiflex A 220	Renolin PG 220	Carter SY 220
F...	+60	CLP HC	VG 220	Mobil SHC 630	Shell Omala S4 GX 220		Küblersynth GEM 4-220 N	Optiflex A 220	Renolin Unisyn CLP 220	Carter SH 220
	+40	CLP HC	VG 150	Mobil SHC 629	Shell Omala S4 GX 150		Küblersynth GEM 4-150 N	Optiflex A 220	Renolin Unisyn CLP 150	Carter SH 150
	+25	CLP (CC)	VG 150	Mobilgear 600 XP 150	Shell Omala S2 G 150	BP Energol GR-XP 150	Küblersynth GEM 1-150 N	Optiflex A 220	Renolin Unisyn CLP 150	Carter EP 150
	+20	CLP HC	VG 68	Mobil SHC 626	Shell Omala S4 GX 68				Renolin Unisyn CLP 68	
	+0	CLP HC	VG 32	Mobil SHC 624			Küblersynth GEM 6-32	Optiflex A 220	Renolin Unisyn CLP 32	Dachis SH 32
	Standard	CLP PG	VG 460				Küblersynth GEM 6-460			
	+60	H1 PG	VG 460							
K..19 K..29	Standard	CLP PG	VG 460							
	+60	H1 PG	VG 460							
S...(HS...)	Standard	CLP (CC)	VG 680	Mobilgear 600 XP 680	Shell Omala S2 G 680	BP Energol GR-XP 680	Küblersynth GEM 1-680 N	Tribol 1100/680	Renolin SEW 680	Carter EP 680
	+40	CLP PG	VG 680	Mobil Glycoyle 680	Shell Omala S4 WE 680	BP Energol SG-XP 680	Küblersynth GEM 6-680	Optiflex A 680	Renolin PG 680	
	+60	CLP HC	VG 460	Mobil SHC 634	Shell Omala S4 GX 460		Küblersynth GEM 4-460 N	Optiflex A 680	Renolin Unisyn CLP 460	Carter SH 460
	+30	CLP HC	VG 150	Mobil SHC 629	Shell Omala S4 GX 150		Küblersynth GEM 4-150 N	Optiflex A 680	Renolin Unisyn CLP 150	Carter SH 150
	+10	CLP (CC)	VG 150	Mobilgear 600 XP 150	Shell Omala S2 G 150	BP Energol GR-XP 150	Küblersynth GEM 1-150 N	Optiflex A 680	Renolin CLP 150	Carter EP 150
	+40	CLP PG	VG 220	Mobil Glycoyle 220	Shell Omala S4 WE 220	BP Energol SG-XP 220	Küblersynth GEM 6-220	Optiflex A 220	Renolin PG 220	Carter SY 220
	+20	CLP HC	VG 68	Mobil SHC 626	Shell Omala S4 GX 68				Renolin Unisyn CLP 68	
	0	CLP HC	VG 32	Mobil SHC 624			Küblersynth GEM 6-32	Optiflex A 220	Renolin Unisyn CLP 32	Dachis SH 32
R.. K..37-187 / HK.. F.. S.. / HS..	-10	CLPHC NSF H1	VG 460				Küblersynth GEM 4-460 N			
	+40		VG 220				Küblersynth GEM 4-220 N			
	+30		VG 68				Küblersynth GEM 4-68 N			
	0		VG 460				Küblersynth GEM 4-460 N			
	+40		VG 460				Küblersynth GEM 4-460 N			
W...(HW...)	Standard	SEW PG	VG 460				Küblersynth GEM 4-460 N			
	+40		VG 460				Küblersynth GEM 4-460 N			
	+10	API GL5	SAE 75W90 (~VG 100)	Mobil Synth Gear Oil 75 W90			Küblersynth GEM 4-460 N			
	+60	H1 PG	VG 460				Küblersynth GEM 4-460 N			
PS.F.	Standard	CLP PG	VG 220				Küblersynth GEM 6-220			
	+60	H1 PG	VG 460				Küblersynth GEM 6-460			
	0	CLP HC	VG 32	Mobil SHC 624						
	Standard	CLP (CC)	VG 220	Mobilgear 600 XP 220						
PS.C..	+40	DIN 51 818	NLGI 00	Mobilux EP 004						
	+40	DIN 51 818	NLGI 1							
	+40	CLP HC	VG 32	Mobil SHC 624						
BS.F.	Standard	CLP PG	VG 220							
	+60	H1 PG	VG 460							
	+60		VG 460							

18014401354484107



6.1.3 Lubricant fill quantities

The specified fill quantities are **recommended values**. The exact values vary depending on the number of gear stages and reduction ratio. Check the **oil level plug for the exact oil quantity** when you fill in the oil.

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

Helical (R) gear units

R..., R..F

Gear unit	Fill quantity in liters					
	M1 ¹⁾	M2	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	2.40	2.80	2.90	1.80	2.00
R77	1.20/3.00	3.30	3.60	3.80	2.50	3.40
R87	2.30/6.0	6.4	7.2	7.2	6.3	6.5
R97	4.60/9.8	11.7	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	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	2.50	2.70	2.80	1.90	2.10
RF77	1.20/2.60	3.10	3.30	3.60	2.40	3.00
RF87	2.40/6.0	6.4	7.1	7.2	6.3	6.4
RF97	5.1/10.2	11.9	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.



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

6



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	79.5



Helical-bevel (K)
gear units



INFORMATION

All K..9 gear have a universal mounting position, which means that K..9 gear units of the same variant are filled with the same amount of oil independent of the mounting position. An exception to this is the M4 mounting position.

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

Gear unit	Fill quantity in liters					
	M1	M2	M3	M4	M5	M6
K..19	0.35	0.35	0.35	0.38	0.35	0.35
K..29	0.65	0.65	0.65	0.8	0.65	0.65
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	1.10	2.20	2.20	2.80	2.30	2.10
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
KF19	0.35	0.35	0.35	0.38	0.35	0.35
KF29	0.75	0.75	0.75	0.9	0.75	0.75
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	1.20	2.20	2.40	3.15	2.50	2.30
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..19	0.35	0.35	0.35	0.38	0.35	0.35
K..29	0.65	0.65	0.65	0.8	0.65	0.65
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	1.20	2.20	2.40	3.15	2.70	2.40
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.

6

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



INFORMATION

SPIROPLAN® gear units W..10 to W..30 have a universal mounting position, which means that gear units of the same variant are filled with the same amount of oil independent of the mounting position.

The oil fill quantity of SPIROPLAN® gear units W..37 and W..47 in mounting position M4 is different from that of the other mounting positions.

Gear unit	Fill quantity in liters					
	M1	M2	M3	M4	M5	M6
W..10	0.16					
W..20	0.24					
W..30	0.40					
W..37		0.50		0.70		0.50
W..47		0.90		1.40		0.90
WF47		0.90		1.55		0.90
WA47		0.80		1.40		0.80



6.2 Reduced backlash gear unit types

Helical, parallel-shaft helical and helical-bevel gear units with reduced backlash are available as of gear unit size 37. The rotational clearance of these gear units is considerably less than that of the standard versions so that positioning tasks can be solved with great precision. The rotational clearance is specified in angular minutes ['] in the technical data. The rotational clearance for the output shaft is specified without load (max. 1% of the rated output torque); 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 helical gear units (F), sizes 37 to 157
- Helical-bevel gear units (K), sizes 37 to 187

6

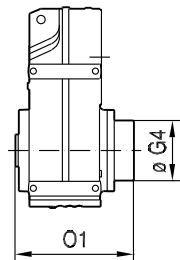
Multi-stage gear units are not available with reduced backlash.

The dimensions of the reduced backlash variants correspond to the dimensions of the standard designs, except for parallel-shaft gear units FH.87 and FH.97 with reduced backlash.

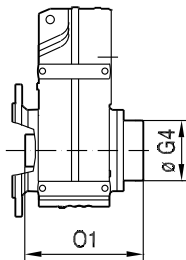
The following figure shows the dimensions of FH.87 and FH.97 gear units with reduced backlash:

42 020 00 09

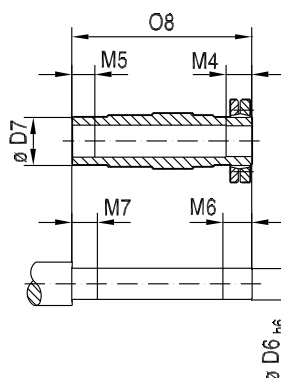
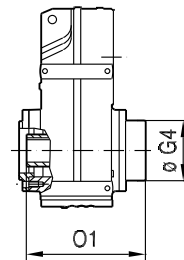
FH../R
FH..B/R



FHF../R



FHZ../R



6644506891

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

**6.3 Installation / removal of gear units with hollow shaft and key****INFORMATION**

- Always use the supplied NOCO[®] fluid for installation. The fluid facilitates removal as it prevents contact corrosion.
 - The key dimension X is specified by the customers, but $X > DK$ must apply, see following figure.
-

6.3.1 Installation

SEW-EURODRIVE recommends 2 ways of installing gear units with hollow shaft and key onto the input shaft of the driven machine (= customer shaft):

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

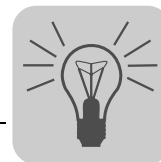
1. Supplied fastening parts

The following fastening parts are provided as standard:

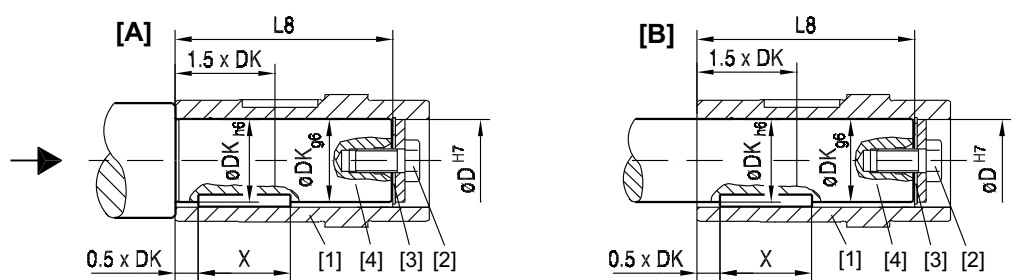
- Retaining screw with washer (2)
- Retaining ring (3)

Note the following information concerning the customer shaft:

- The installation length of the customer shaft with contact shoulder (A) must be $L8 - 1 \text{ mm}$.
- The installation length of the customer shaft without contact shoulder (B) must equal $L8$.



The following figure shows the customer shaft with contact shoulder (A) and without contact shoulder (B).



4308965131

- | | | | |
|-----|-----------------------------|-----|----------------|
| [1] | Hollow shaft | [3] | Retaining ring |
| [2] | Retaining screw with washer | [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} in mm	DK in mm	L8 in mm	MS in Nm
WA..10	16	16	69	8
WA..20	18	18	84	
WA..20	20	20	92	
KA..19	20	20	92	20
FA..27	25	25	88	
KA..29		30	107	
KA..29	20	20	105	8
WA..30, WA..37		20	104	
SA..37, BSAF202		20	105	
FA..37, KA..37, SA..47	30	30	105	20
BSAF302	25	25	118	
SA..47, WA..37		25	105	
SAF402	30	30	138	
FA..47, KA..47, SA..57	35	35	132	
WA..47	30	30	122	
SA..57		30	132	
FA..57, KA..57	40	40	142	40
BSAF502			158	
FA..67, KA..67			156	
SA..67			144	
SA..67	45	45	144	80
BSAF602	55	55	179	
FA..77, KA..77, SA..77	50	50	183	40
SA..77	60	60	180	
FA..87, KA..87			210	80
SA..87			220	
SA..87			220	
BSAF802	60	60	222	
FA..97, KA..97	70	70	270	
SA..97			260	
FA..107, KA..107	80	80	313	200
SA..97	90	90	255	
FA..107, KA..107	90	90	313	
FA..127, KA..127	100	100	373	
FA..157, KA..157	120	120	460	



Design and operating notes

Installation / removal of gear units with hollow shaft and key

2nd installation / removal kit

You can use the optional installation / removal kit for installation. You can 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)

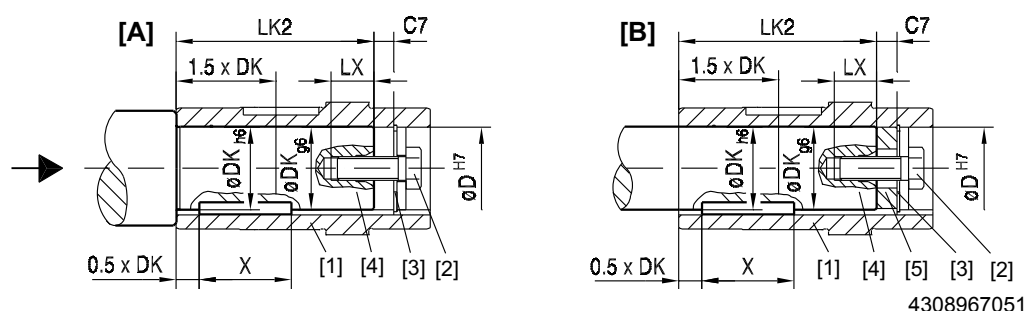
The short retaining screw delivered as standard is not required.

Note the following information 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 tube if the customer shaft **has no contact shoulder (B)**.



The following figure shows the customer shaft with contact shoulder (A) and without contact shoulder (B).



- [1] Hollow shaft
[2] Retaining screw with washer
[3] Retaining ring
[4] Customer shaft
[5] Spacer tube

4308967051

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		643 682 X		
WA..20, WA..30, WA..37	20	20	72, 93		8		643 683 8		
SA..37	20	20	92	16		12			
KA..19			80						
KA..29	25	25	95	22	16	20	643 684 6		
FA..27			72						
SA..47			89						
WA..47	30	30	106				643 685 4		
FA..37, KA..37			89						
SA..47			89						
SA..57			116						
KA..29			95						
FA..47, KA..47, SA..57	35	35	114	28	18	40	643 686 2		
FA..57, KA..57	40	40	124	36			643 687 0		
FA..67			138						
KA..67			138						
SA..67			126						
SA..67	45	45	126	50			26	200	643 688 9
FA..77, KA..77, SA..77	50	50	165						643 689 7
FA..87, KA..87	60	60	188	42	22	80	643 690 0		
SA..77			158						
SA..87			198						
FA..97, KA..97	70	70	248				643 691 9		
SA..87			198						
SA..97			238						
FA..107, KA..107	80	80	287	42	26	80	106 821 12		
FA..107, KA..107	90	90	287	50	26	200	643 692 7		
SA..97			229						
FA..127, KA..127	100	100	347				643 693 5		
FA..157, KA..157	120	120	434					643 694 3	



Design and operating notes

Installation / removal of gear units with hollow shaft and key

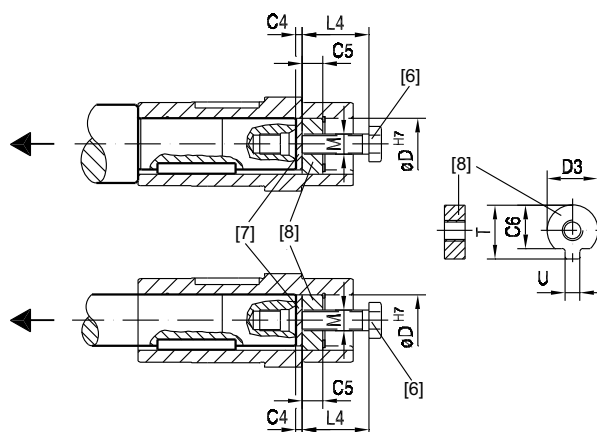
Removal

Applies only if the installation / removal kit was previously used for installation.

Proceed as follows for removal:

1. Loosen the retaining screw (6).
2. Remove the circlip (3) and, if used, the spacer tube (5).
3. Insert the forcing disk (7) and the fixed nut (8) between the customer's shaft (4) and circlip (3) as shown in the following figure.
4. Re-install the circlip (3).
5. Re-install the retaining screw (6). Now you can force the gear unit off the shaft.

The following figure shows the removal of a gear unit with hollow shaft and key.



9182672139

[6] Retaining screw

[8] Locked nut for removal

[7] Forcing washer

Dimensions and part numbers:

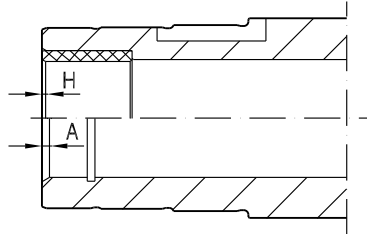
Type	D^H7 [mm]	M	C4 [mm]	C5 [mm]	C6 [mm]	$U^{-0.5}$ [mm]	$T^{-0.5}$ [mm]	$D3^{-0.5}$ [mm]	L4 [mm]	Part number of installation / removal kit
WA..10	16	M5	5	5	12	4.5	18	15.7	50	643 712 5
WA..20	18	M6	5	6	13.5	5.5	20.5	17.7	25	643 682 X
WA..20, WA..30, SA..37, WA..37, KA..19	20	M6	5	6	15.5	5.5	22.5	19.7	25	643 683 8
FA..27, SA..47, WA..47, KA..29	25	M10	5	10	20	7.5	28	24.7	35	643 684 6
FA..37, KA..37, SA..47, SA..57, WA..47, KA..29	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	80	M20	5	20	75.5	21.5	85	79.7	70	106 8211 2
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



6.4 Gear units with hollow shaft

6.4.1 Chamfers on hollow shafts

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



4309448843

6

Gear unit	Design	
	with hollow shaft (A)	with hollow shaft and shrink disk (H)
W..10	1.5 × 30°	-
W..20	2 × 30°	-
W..30	2 × 30°	-
F..27	2 × 30°	0.5 × 45°
K..19	2 × 30°	0.5 × 45°
K..29	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..57	2 × 30°	0.5 × 45°
F../K../S..67	2 × 30°	0.5 × 45°
F../K../S..77	2 × 30°	0.5 × 45°
F../K../S..87	3 × 30°	0.5 × 45°
F../K../S..97	3 × 30°	0.5 × 45°
F../K..107	3 × 30°	0.5 × 45°
F../K..127	5 × 30°	0.5 × 45°
F../K..157	5 × 30°	0.5 × 45°
KH167	-	0.5 × 45°
KH187	-	0.5 × 45°

**6.4.2 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.

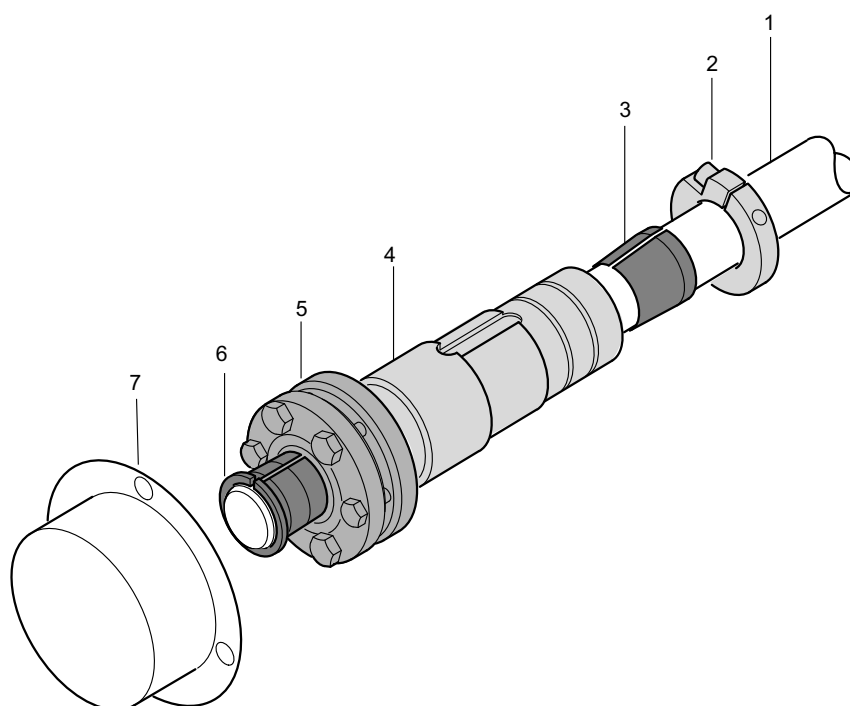


6.5 TorqLOC® mounting system for hollow shaft gear units

6.5.1 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:



4309625867

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

6.5.2 Advantages of TorqLOC®

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

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

**6.5.3 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)
- SPIROPLAN® gear unit sizes 37 and 47 (WT.7)

Available options

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

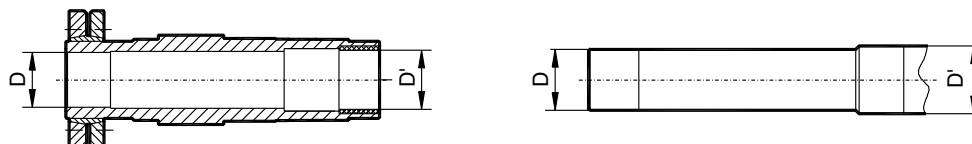
- Helical-bevel, helical-worm and SPIROPLAN® gear units with TorqLOC® (KT..., ST..., WT.7...): The "torque arm" (../T) option is available.
- Parallel-shaft helical gear units with TorqLOC® (FT...): The "rubber buffer" (../G) option is available.



6.6 Shouldered hollow shaft option with shrink disk

As an option, gear units with hollow shaft and shrink disk (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'.

D' = D as standard.



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').

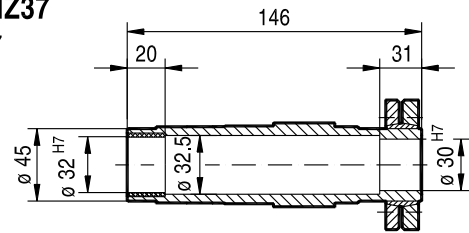
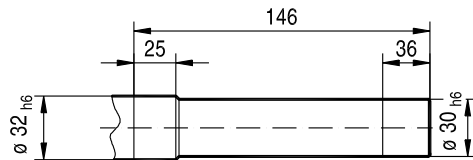
6.6.1 Sample order

FH37 DRS80M4 with hollow shaft 30/32 mm

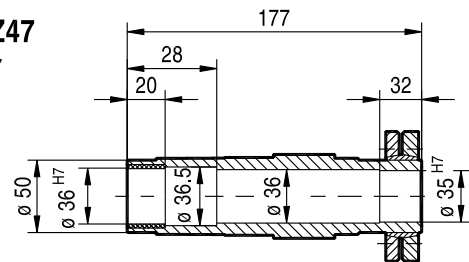
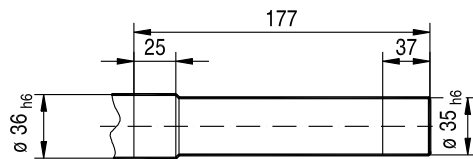


6.6.2 Parallel-shaft helical gear units with shouldered hollow shaft (dimensions in mm):

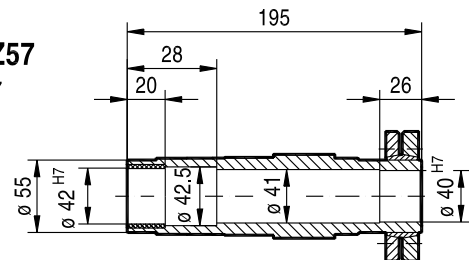
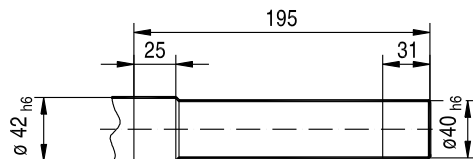
FH / FHF / FHZ37

 $\emptyset 30^{H7} / \emptyset 32^{H7}$ 

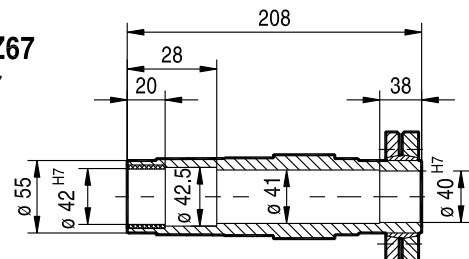
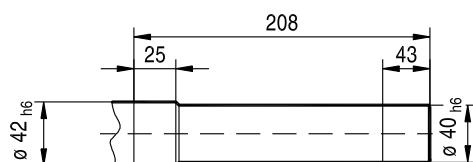
FH / FHF / FHZ47

 $\emptyset 35^{H7} / \emptyset 36^{H7}$ 

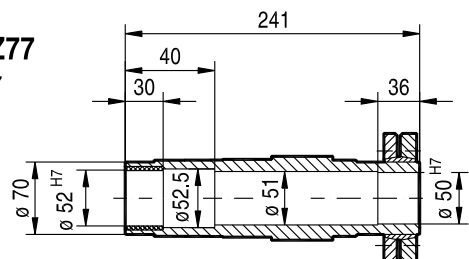
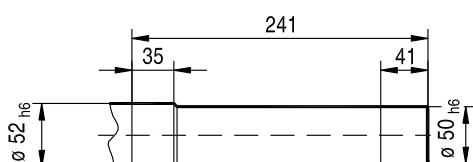
FH / FHF / FHZ57

 $\emptyset 40^{H7} / \emptyset 42^{H7}$ 

FH / FHF / FHZ67

 $\emptyset 40^{H7} / \emptyset 42^{H7}$ 

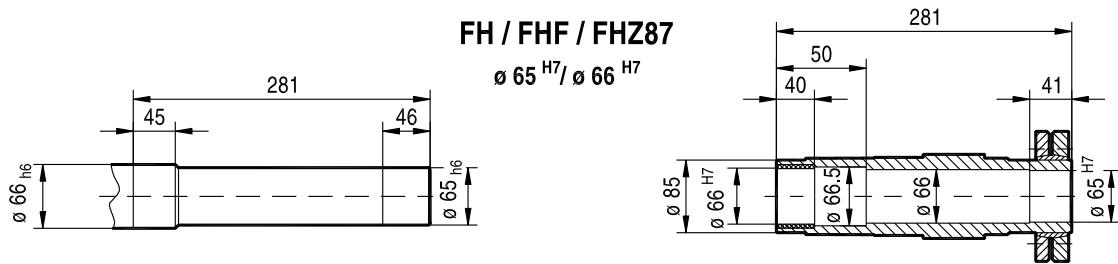
FH / FHF / FHZ77

 $\emptyset 50^{H7} / \emptyset 52^{H7}$ 



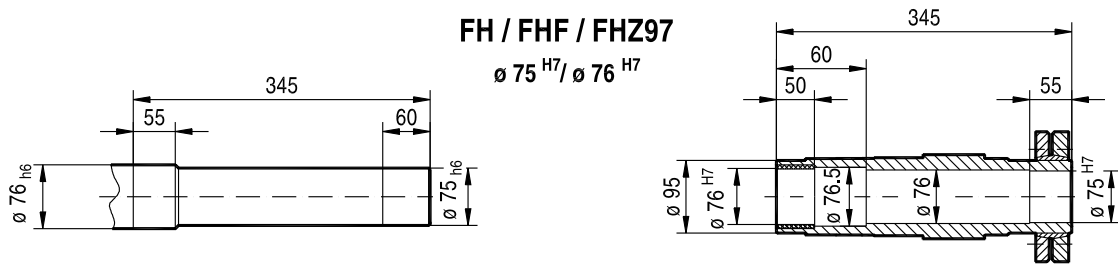
FH / FHF / FHZ87

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



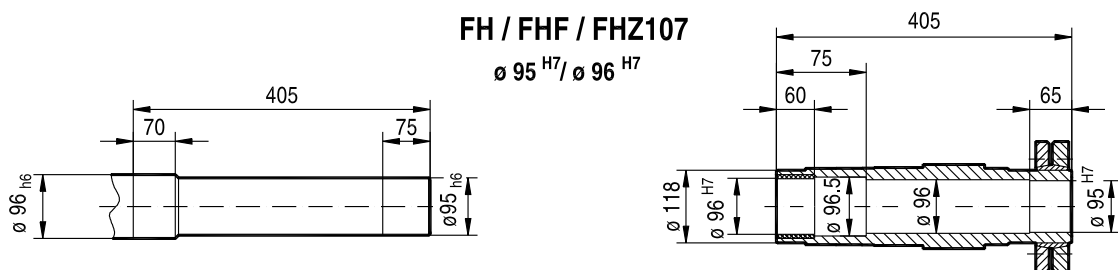
FH / FHF / FHZ97

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



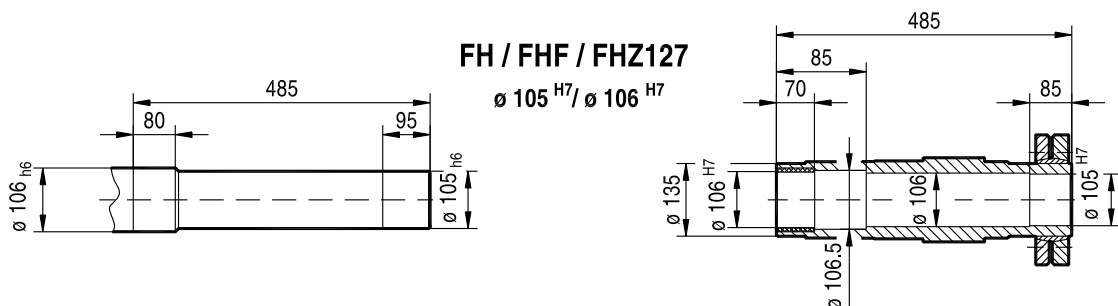
FH / FHF / FHZ107

$\varnothing 95^{H7} / \varnothing 96^{H7}$



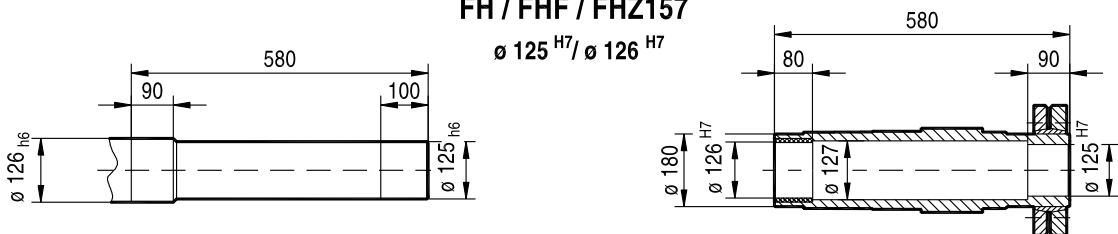
FH / FHF / FHZ127

$\varnothing 105^{H7} / \varnothing 106^{H7}$



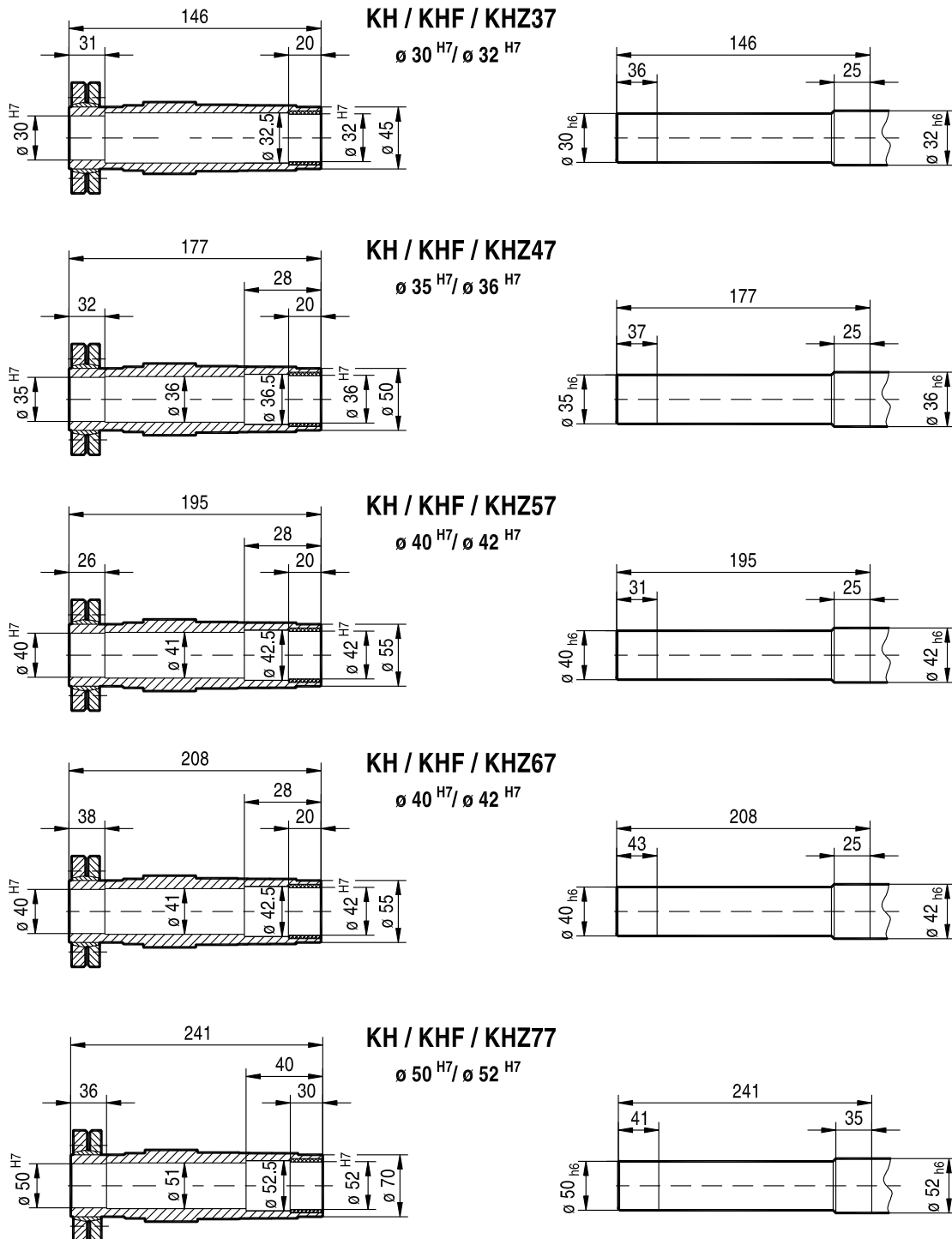
FH / FHF / FHZ157

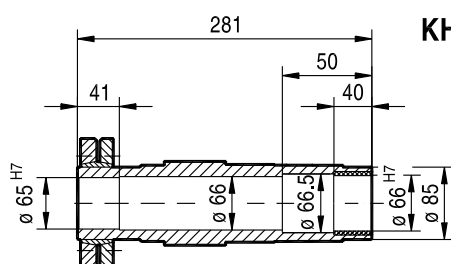
$\varnothing 125^{H7} / \varnothing 126^{H7}$





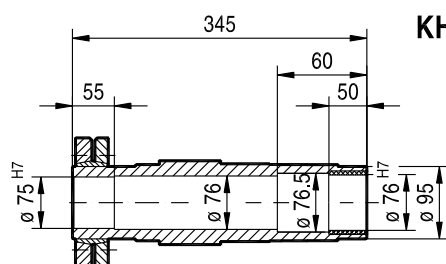
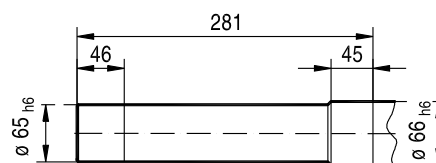
6.6.3 Helical-bevel gear units with shouldered hollow shaft (dimensions in mm):





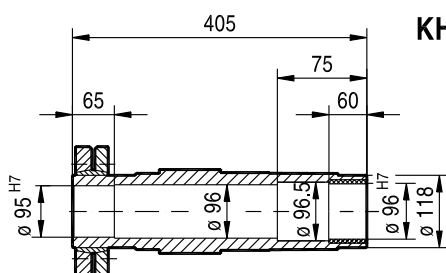
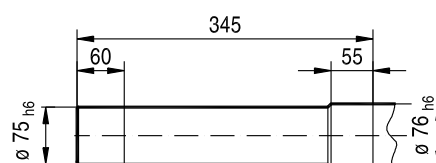
KH / KHF / KHZ87

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



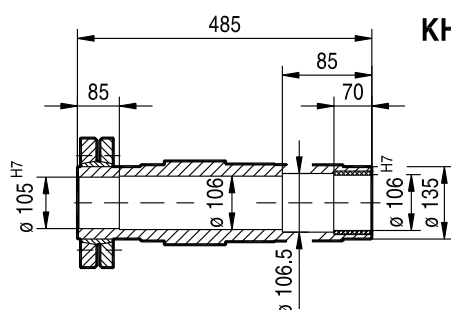
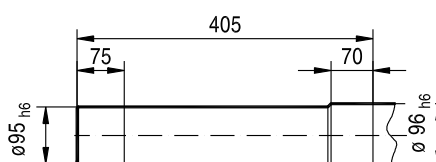
KH / KHF / KHZ97

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



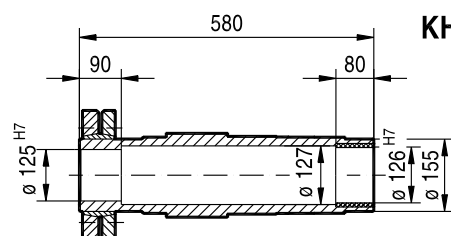
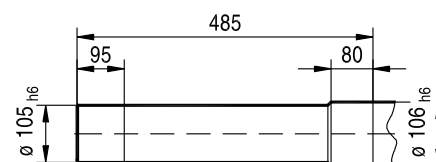
KH / KHF / KHZ107

$\varnothing 95^{H7} / \varnothing 96^{H7}$



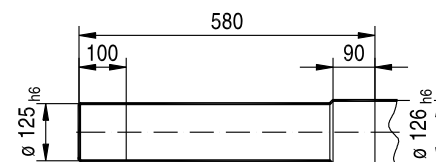
KH / KHF / KHZ127

$\varnothing 105^{H7} / \varnothing 106^{H7}$



KH / KHF / KHZ157

$\varnothing 125^{H7} / \varnothing 126^{H7}$

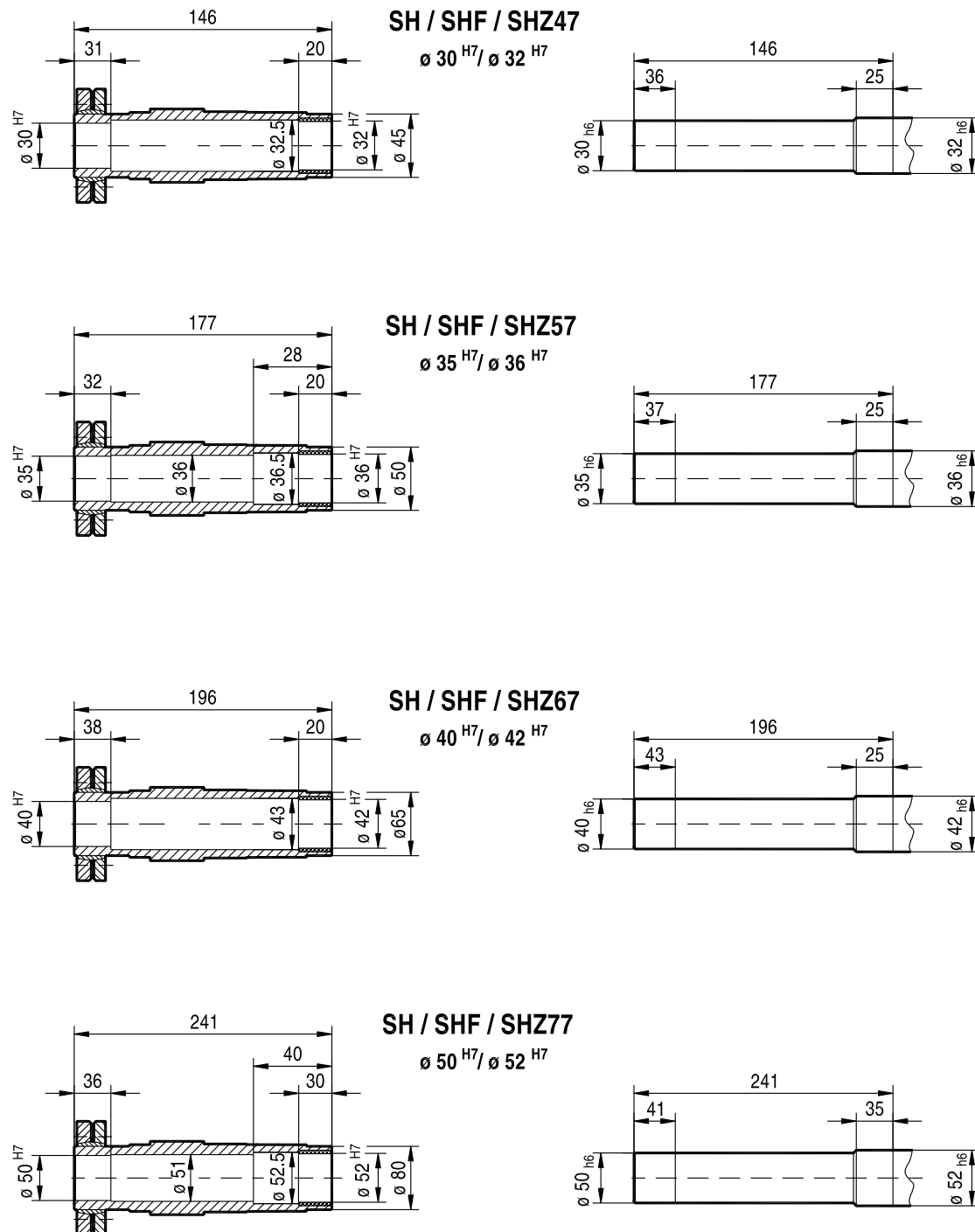


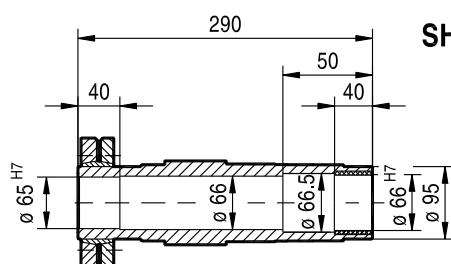


Design and operating notes

Shouldered hollow shaft option with shrink disk

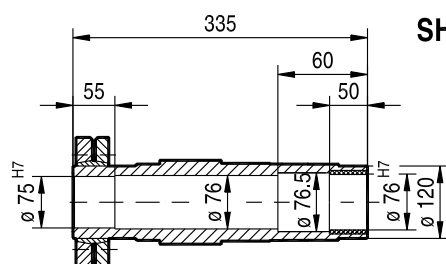
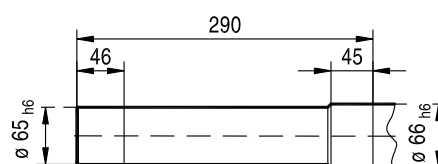
6.6.4 Helical-worm gear units with shouldered hollow shaft (dimensions in mm):





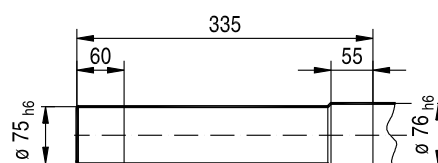
SH / SHF / SHZ87

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



SH / SHF / SHZ97

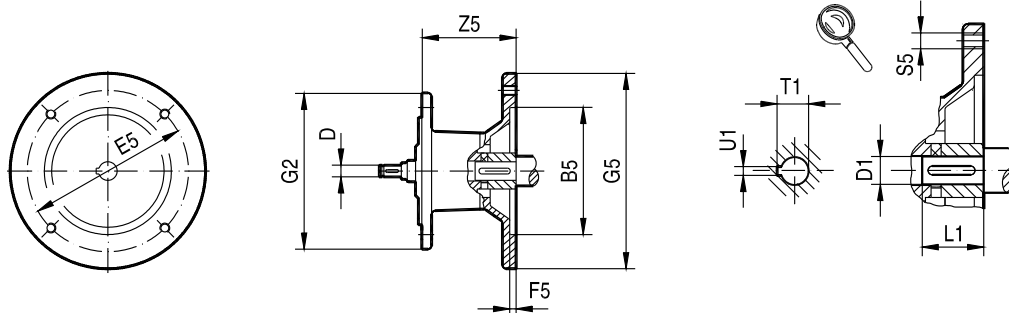
$\varnothing 75^{H7} / \varnothing 76^{H7}$





6.7 Adapters for mounting IEC motors

23 002 100



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..19, K..29, K..37 S..37, S..47, S..57 W..37	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 W..47	AM63	95	10	115		3.5	160	140	M8	66	11	23
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							28	60	31.3	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 1/2 G5 because component may protrude past foot-mounting surface if installed on R, K, S or W foot-mounted gear unit.

2) Not with AM112

3) Not with AM180



23 003 100

Fig.1

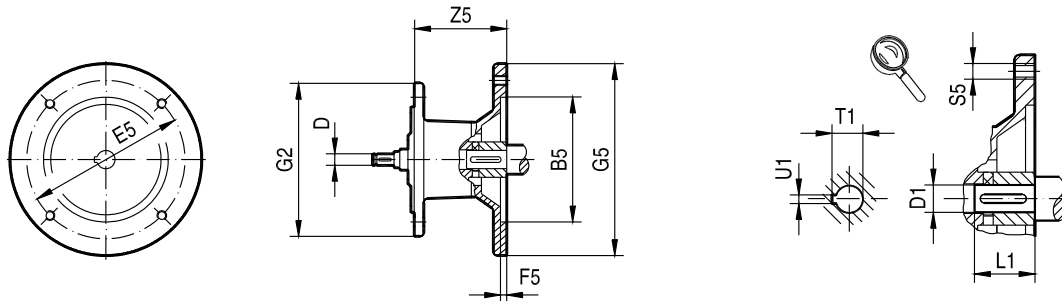
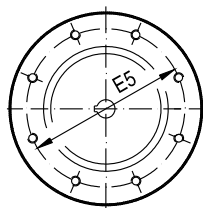


Fig.2

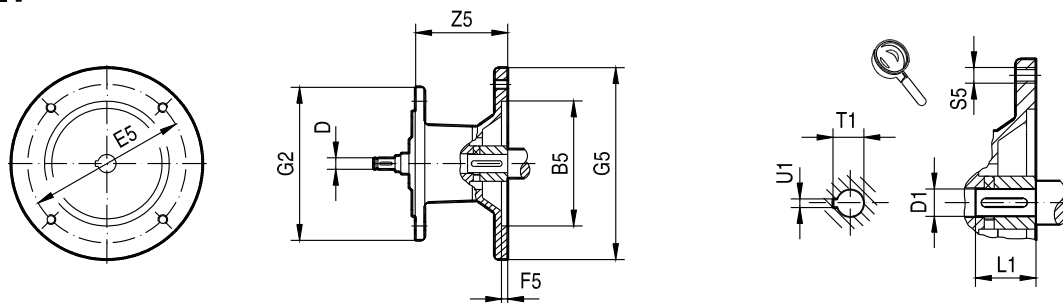
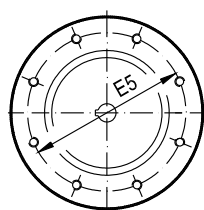


Gear unit type	Adapter type	Fig.	Dimensions in mm											
			B5	D	E5	F5	G2	G5	S5	Z5	D1	L1	T1	U1
R..97 F..97 K..97 S..97 ¹⁾	AM100	1	180	16	215	5	300	250	M12	116	28	60	31.3	8
	AM112			18				300		169	38	80	41.3	10
	AM132S/M		230	22	265									
	AM132ML			28				300	48	51.8	14			
	AM160		250	28	350	7						400	268	55
	AM180			32										
	AM200		300	38										
R..107 F..107 K..107	AM100	1	180	16	215	5	350	250	M12	110	28	60	31.3	8
	AM112			18				300		163	38	80	41.3	10
	AM132S/M		230	22	265									
	AM132ML			28				300	48	51.8	14			
	AM160		250	28	350	7						400	262	55
	AM180			32										
	AM200		300	38										
	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				350	M16	214	42	110	45.3	12
	AM160		250	28	300	6								
	AM180			32										
	AM200		300	38	350	7		450		270	60		140	64.4
	AM225	2	350	38	400									

1) Not with AM200



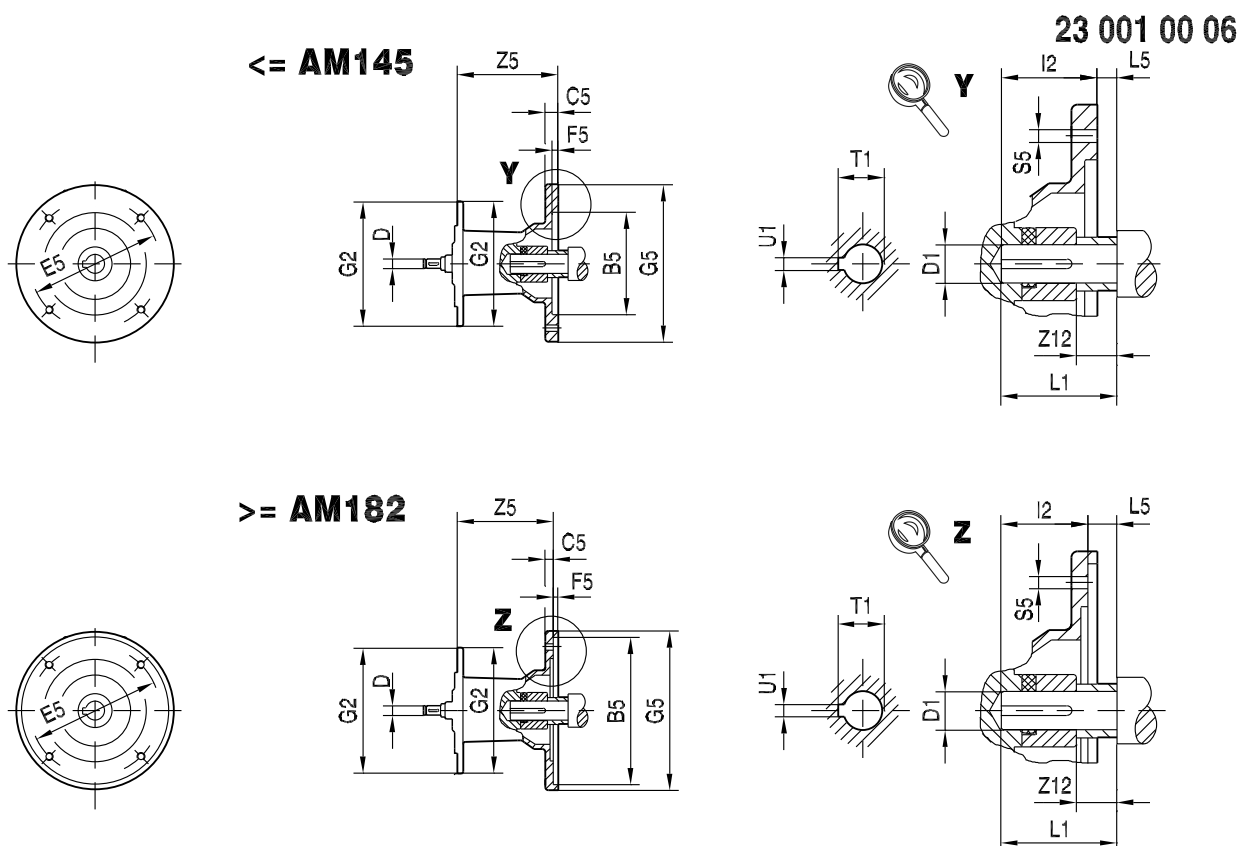
23 004 100

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	M16	206	42	110	45.3	12
	AM180			32							48		51.8	14
	AM200	300	38	350	7	400		247		55	59.3	16		
	AM225	2	350	38		400		450		262	60	140	64.4	18
	AM250		450	48		500		550		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		51.8	14
	AM200		300	38	350	7		400		239	55		59.3	16
	AM225	2	350	38	400			450		254	60	140	64.4	18
	AM250		450	48	500			550		328	65		69.4	
	AM280					75				79.9	20			



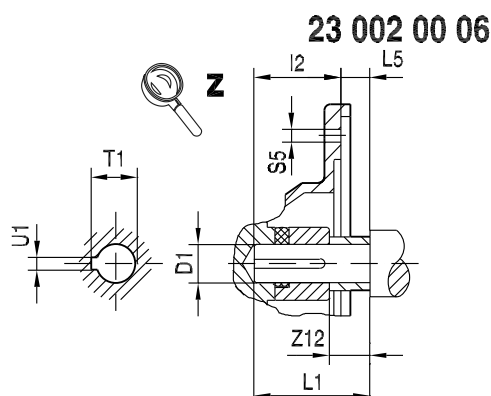
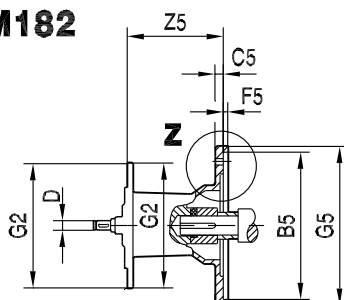
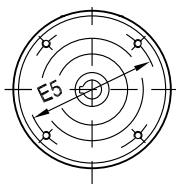
6.8 Adapters for mounting NEMA motors



Gear unit type	Adapter type	Dimensions in mm															
		B5	C5	D	E5	F5	G2	G5	I2	L5	S5	Z5	Z12	D1	L1	T1	U1
R..27, R..37 F..27, F..37, F..47 K..19, K..29, K..37 S..37, S..47, S..57 W..37	AM56	114.3	11	10	149.2	4.5	120	170	52.55	-4.8	10.5	93.5	16.5	15.875	47	18.1	4.76
	AM143		12	12					54.1	3		117	14.5	22.225	57	24.7	
	AM145		12	14					54.1	3		117	14.5	22.225	57	24.7	
R..47, R..57, R..67 F..57, F..67 K..47, K..57, K..67 S..67 W..47	AM56	114.3	11	10	149.2	4.5	160	170	52.55	-4.8	10.5	87	16.5	15.875	47	18.1	4.76
	AM143		12	12					54.1	3		110.5	14.5	22.225	57	24.7	
	AM145		12	14					54.1	3		110.5	14.5	22.225	57	24.7	
	AM182	215.9	10	16	184	5		228	66.85	3	15	147.5	16.5	28.575	69	31.7	6.35
	AM184		18	79.55					6.3	200.5		15.8	34.925	85	38.7	7.94	
	AM213/215		11	22					79.55	6.3		200.5	15.8	34.925	85	38.7	7.94
R..77 F..77 K..77 S..77	AM56	114.3	11	10	149.2	4.5	200	170	52.55	-4.8	10.5	81	16.5	15.875	47	18.1	4.76
	AM143		12	12					54.1	3		103.5	14.5	22.225	57	24.7	
	AM145		12	14					54.1	3		103.5	14.5	22.225	57	24.7	
	AM182	215.9	10	16	184	5		228	66.85	3	15	139.5	16.5	28.575	69	31.7	6.35
	AM184		18	79.55					6.3	188.5		15.8	34.925	85	38.7	7.94	
	AM213/215		11	22					79.55	6.3		188.5	15.8	34.925	85	38.7	7.94
R..87 F..87 K..87 S..87	AM143	114.3	12	12	149.2	4.5	250	170	54.1	3	10.5	98.5	14.5	22.225	57	24.7	4.76
	AM145		12	14					54.1	3		98.5	14.5	22.225	57	24.7	4.76
	AM182	215.9	10	16	184	5		228	66.85	3	15	134.5	16.5	28.575	69	31.7	6.35
	AM184		18	79.55					6.3	183.5		15.8	34.925	85	38.7	7.94	
	AM213/215		11	22					79.55	6.3		183.5	15.8	34.925	85	38.7	7.94
	AM254/256		12	28					95.3	6.3		234	8.8	41.275	101	45.8	9.53
	AM284/286	266.7	15	32	228.6	5		286	111.05	6.3	15	241	15.8	47.625	117	53.4	12.7



>= AM182

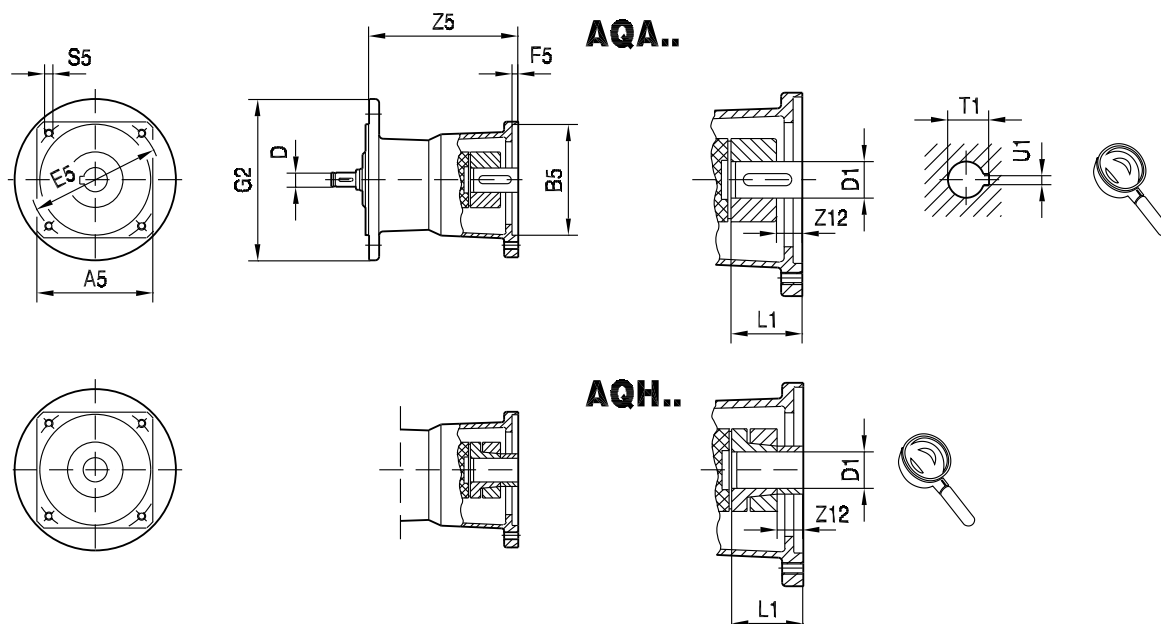


Gear unit type	Adapter type	Dimensions in mm																				
		B5	C5	D	E5	F5	G2	G5	I2	L5	S5	Z5	Z12	D1	L1	T1	U1					
R..97 F..97 K..97 S..97	AM182	215.9	10	16	184	5	300	228	66.85	3	15	129.5	16.5	28.575	69	31.7	6.35					
	AM184		18																			
	AM213/215		11	22					79.55	6.3		178.5	15.8	34.925	85	38.7	7.94					
	AM254/256		12	28					95.3	6.3		229	8.8	41.275	101	45.8	9.53					
	AM284/286	266.7	20	32	228.6	5		286	111.05	6.3	15	236	15.8	47.625	117	53.4	12.7					
	AM324/326	317.5	17	38	279.4	5		356	127.05	6.3	17.5	296	34.8	53.975	133	60	12.7					
	AM364/365			38					60.325					149	67.6	15.875						
R..107 F..107 K..107	AM182	215.9	10	16	184	5	350	228	66.85	3	15	123.5	16.5	28.575	69.85	31.7	6.35					
	AM184		18																			
	AM213/215		11	22					79.55	6.3		172.5	15.8	34.925	85.85	38.7	7.94					
	AM254/256		12	28					95.3	6.3		223	8.8	41.275	101.6	45.8	9.53					
	AM284/286	266.7	15	32	228.6	5		286	111.05	6.3	15	230	15.8	47.625	117.35	53.4	12.7					
	AM324/326	317.5	17	38	279.4	5		356	127.05	6.3	17.5	290	34.8	53.975	133.35	60	12.7					
	AM364/365			38					60.325					149.35	67.6	15.875						
R..137	AM213/215	215.9	11	22	184	5	400	228	79.55	6.3	15	165.5	15.8	34.925	85.85	38.7	7.94					
	AM254/256		12	28					95.3	6.3		216	8.8	41.275	101.6	45.8	9.53					
	AM284/286	266.7	15	32	228.6	5		286	111.05	6.3	15	223	15.8	47.625	117.35	53.4	12.7					
	AM324/326	317.5	17	38	279.4	5		356	127.05	6.3	17.5	283	34.8	53.975	133.35	60	12.7					
	AM364/365			38					60.325					149.35	67.6	15.875						
R..147 F..127 K..127	AM213/215	215.9	11	22	184	5	450	228	79.55	6.3	15	157.5	15.8	34.925	85.85	38.7	7.94					
	AM254/256		12	28					95.3	6.3		208	8.8	41.275	101.6	45.8	9.53					
	AM284/286	266.7	15	32	228.6	5		286	111.05	6.3	15	215	15.8	47.625	117.35	53.4	12.7					
	AM324/326	317.5	17	38	279.4	5		356	127.05	6.3	17.5	275	34.8	53.975	133.35	60	12.7					
	AM364/365			38					60.325					149.35	67.6	15.875						
R..167 F..157 K..157 K..167 K..187	AM254/256	215.9	12	28	184	5	550	228	95.3	6.3	15	200	8.8	41.275	101.6	45.8	9.53					
	AM284/286	266.7	15	32	228.6	5		286	111.05	6.3	15	207	15.8	47.625	117.35	53.4	12.7					
	AM324/326	317.5	17	38	279.4	5		356	127.05	6.3	17.5	267	34.8	53.975	133.35	60	12.7					
	AM364/365			38																		



6.9 Adapters for mounting servomotors

23 005 01 00



6

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..19, K..29, K..37 S..37, S..47, S..57 W..37	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							M6														
	AQ..100/1	100		80		10 12 14 16		100	4	M6	129.5					-	-	14	30	16.3	5	
	AQ..100/2		95	115	M8																	
	AQ..100/3		80	100	M6			143.5		2		14	19	40	21.8							6
	AQ..100/4		95	115	M8																	
	AQ..115/1	115	95	130	M8	152.5		11	23	19	40	21.8	6									
	AQ..115/2		110											24	50	27.3	8					
	AQ..115/3																					
R..47, R..57, R..67 F..57, F..67 K..47 ³⁾ , K..57, K..67 S..67 W..47	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							M6														
	AQ..100/1	100		80		10 12 14 16		100	4	M6	122.5					-	-	14	30	16.3	5	
	AQ..100/2		95	115	M8																	
	AQ..100/3		80	100	M6			136.5		2		14	19	40	21.8							6
	AQ..100/4		95	115	M8																	
	AQ..115/1	115	95	130	M8	145.5		11	23	19	40	21.8	6									
	AQ..115/2		110											24	50	27.3	8					
	AQ..115/3																					
	AQ..140/1	140	110	16 18 22	165	5		M10	175	16	16	24	50	27.3	8							
	AQ..140/2		130													32	60	35.5	10			
	AQ..140/3																			28	31.3	8
	AQ..140/4																					
	AQ..160/1	162	155	22 28	215	M12		237.5	24	24	32	60	35.3	10								
	AQ..190/1	190	130																			
	AQ..190/2		180																			
	AQ..190/3																					

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

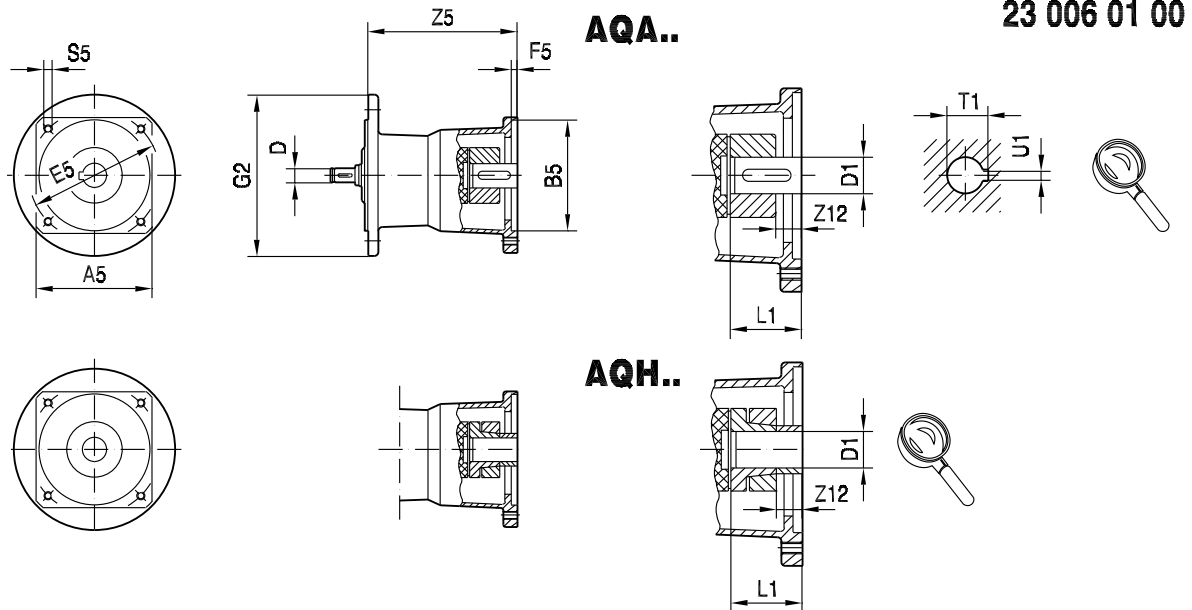
2) For variants with clamping ring hub (AQH..).

3) Not with AQ190



Design and operating notes

Adapters for mounting servomotors



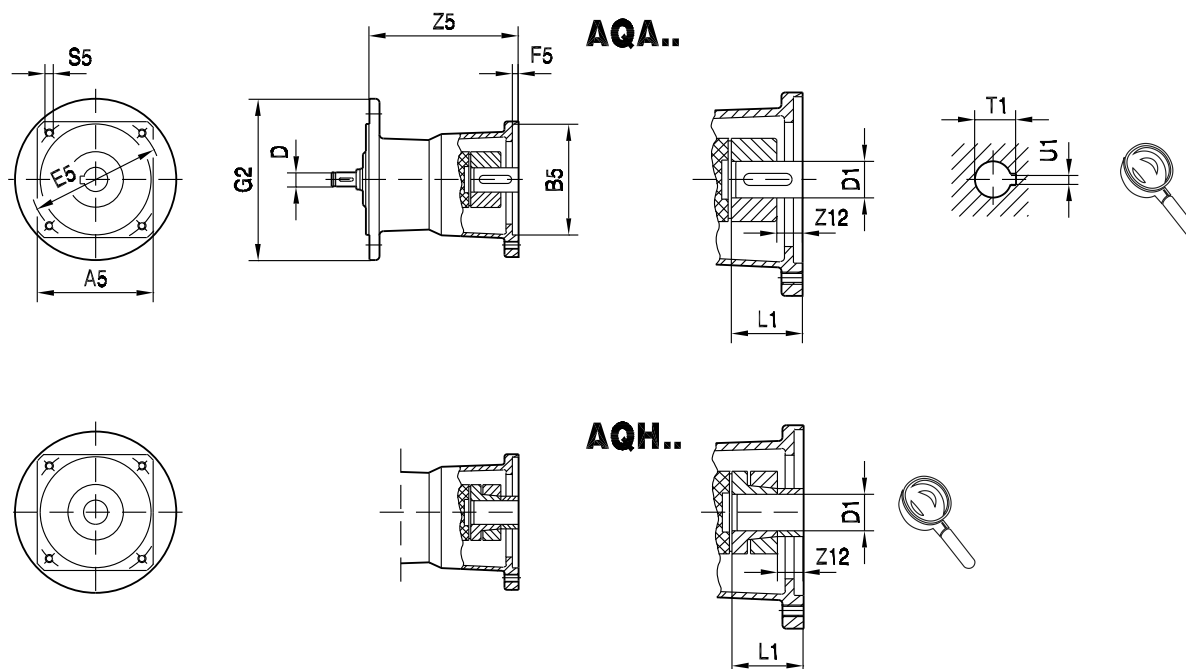
Gear unit type	Adapter type	Dimensions in mm																
		A5	B5	D	E5	F5	G2	S5	Z5	Z12 ¹⁾	Z12 ²⁾	D1	L1	T1 ¹⁾	U1 ¹⁾			
R..77 F..77 K..77 S..77	AQ..80/1	82	60	10 12	75	3	200	M5	92	5.5	5.5	11	23	12.8	4			
	AQ..80/2		75		M6			14				30	16.3	5				
	AQ..80/3		50		95			M6				14	30	16.3	5			
	AQ..100/1	100	80	10 12 14 16	100	4		M6	115.5	-	-	14	30	16.3	5			
	AQ..100/2		95		115			M8				129.5	2	14	19	40	21.8	6
	AQ..100/3		80		100			M6				129.5	2	14	19	40	21.8	6
	AQ..100/4		95		115			M8	129.5	2	14	19	40	21.8	6			
	AQ..115/1		115		95			130	M8	138.5	11	23	19	40	21.8	6		
	AQ..115/2				16						16	24	50	27.3	8			
	AQ..115/3	110	130	16	16	24		50	27.3	8								
	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											28		31.3	8			
	AQ..140/4											32		35.3	10			
	AQ..160/1	162	155	22 28	215	5		M12	225.5	24	24	32	60	35.3	10			
	AQ..190/1	190	130						249.5	34	34	38	80	41.3	10			
	AQ..190/2		180						249.5	34	34	38	80	41.3	10			
	AQ..190/3		180						249.5	34	34	38	80	41.3	10			
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				110.5	-	-	14	30	16.3	5
	AQ..100/3		80		100			M6				124.5	2	14	19	40	21.8	6
	AQ..100/4		95		115			M8				124.5	2	14	19	40	21.8	6
	AQ..115/1	115	95	130	M8	133.5		11	23	19	40	21.8	6					
	AQ..115/2		110					16	16	24	50	27.3	8					
	AQ..115/3													16	16	24	50	27.3
	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											28		31.3	8			
	AQ..140/4											32		35.3	10			
	AQ..160/1	162	155	22 28	215	5		M12	220.5	24	24	32	60	35.3	10			
	AQ..190/1	190	130						244.5	34	34	38	80	41.3	10			
	AQ..190/2		180						244.5	34	34	38	80	41.3	10			
	AQ..190/3		180						244.5	34	34	38	80	41.3	10			

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

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



23 007 01 00



6

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 18 22	165	5	300	M10	157	16	16	24	50	27.3	8
	AQ..140/2		130						170	22	22	32	60	35.3	10
	AQ..140/3											28		31.3	8
	AQ..140/4											32		35.3	10
	AQ..160/1	162	155	22 28	215			M12	215.5	24	24	32	60	35.3	10
	AQ..190/1	190	130						239.5	34	34	38	80	41.3	
	AQ..190/2		180												
	AQ..190/3														
R..107 F..107 K..107	AQ..140/1	140	110	16 18 22	165		350	M10	151	16	16	24	50	27.3	8
	AQ..140/2		130						164	22	22	32	60	35.3	10
	AQ..140/3											28		31.3	8
	AQ..140/4											32		35.3	10
	AQ..160/1	162	155	22 28	215			M12	209.5	24	24	32	60	35.3	10
	AQ..190/1	190	130						233.5	34	34	38	80	41.3	
	AQ..190/2		180												
	AQ..190/3														
R..137	AQ..190/1	190	130	22 28	215		400	M12	202.5	24	24	32	60	35.3	10
	AQ..190/2		180						226.5	34	34	38	80	41.3	
	AQ..190/3														
R..147 F..127 K..127	AQ..190/1	190	130	22 28	215		450	M12	194.5	24	24	32	60	35.3	10
	AQ..190/2		180												
	AQ..190/3														

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

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



6.10 Torque arms

6.10.1 Available torque arms



CAUTION

Danger due to static overdetermination if gear units with foot (e.g. KA19/29B, KA127/157B or FA127/157B) are mounted both via the torque arm and via the foot plate.

Risk of injuries and damage to property.

- Especially with KAx9B/T variants, concurrent use of the foot plates and the torque arm is not permitted.
- KAx9B/T variants may only be mounted via torque arms.
- Kx9 and KAx9B variants may only be mounted via the foot plate.
- If you want to use foot plates and torque arms for mounting, consult SEW-EURODRIVE.

Gear unit	Size	
	19	29
KA, KH, KV, KT	1068 411 5	1068 410 7

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

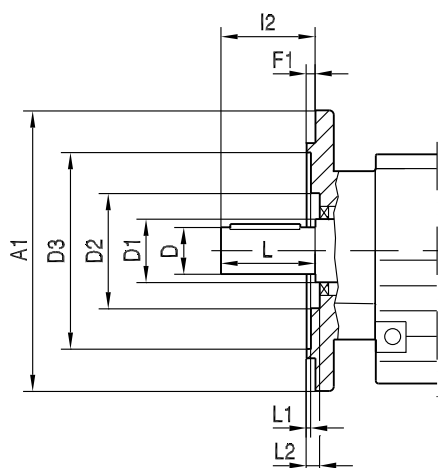
Gear unit	Size				
	10	20	30	37	47
WA	1 061 021 9	1 68 073 0	1 68 011 0	1 061 129 0	1 061 187 8

6.10.2 Torque arms for KH167..., KH187..

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



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



9007203564912395

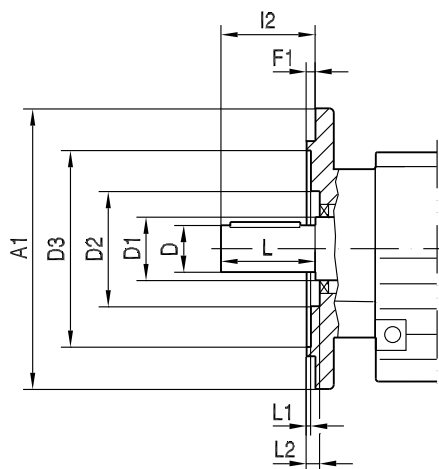
Check dimensions L1 and L2 for selection and installation of output elements.

Type	Dimensions in mm											
	A1	D	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 ¹⁾				-	85	3			2	-	6
	160 ¹⁾				-	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 ¹⁾				-	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 ¹⁾				-	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 ¹⁾				-	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 ¹⁾				-	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	6			2		11

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



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



9007203564915467

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

Type	Dimensions in mm									
	A1	D	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
KF19	120	20	25	-	70	2.5	40	40	-	11.5
KF19	160	20	25	-	100	2.5	40	40	-	11.5
KF29	160	25	30	-	109	3.5	50	50	-	6.5
KF29	200	25	30	-	115	3.5	50	50	-	6.5
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	-
SF37	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	-
WF10	120	16	25	39	74	3	40	40	5	30
WF20	110	20	30	44	53	-4	40	40	27	35

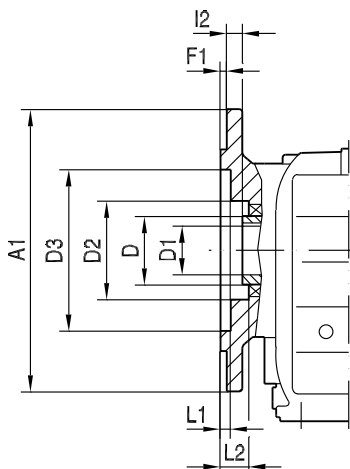
Table continued on next page.



Type	Dimensions in mm									
	A1	D	D1	D2	D3	F1	I2	L	L1	L2
WF20	120	20	30	-	45	2.5	40	40	37.5	-
WF30	120	20	30	48	63	2.5	40	40	18	27
WF30	160	20	30	48	63	2.5	40	40	33	42
WF37	120	20	30	-	70	2.5	40	40	-	10.5
WF37	160	20	30	-	70	2.5	40	40	-	25.5
WF47	160	30	35	-	92	3.5	10	60	6	-



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



18014402819885835

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	66	96	3.5	20	3	18.5
FAF37	160	45	30	62	94	3.5	24	2	30
FAF47	200	50	35	70	115	3.5	25	3.5	31.5
FAF57	250	55	40	76	155	4	23.5	4	31
FAF67	250	55	40	76	155	4	23	4	31
FAF77	300	70	50	95	205	4	37	5	45
FAF87	350	85	60	120	220	5	30	5	39
FAF97	450	95	70	135	320	5	41.5	5.5	51
FAF107	450	118	90	224	320	5	41	16	52
FAF127	550	135	100	185	420	5	51	6	63
FAF157	660	155	120	200	520	6	60	10	74
KAF19	120	30	20	60	70	2.5	25	9	25.5
KAF19	160	30	20	60	100	2.5	25	9	25.5
KAF29	160	40	25 / 30	-	105	3.5	33.5	-	6.5
KAF29	200	40	25 / 30	-	118	3.5	33.5	-	6.5
KAF37	160	45	30	62	94	3.5	24	2	30
KAF47	200	50	35	70	115	3.5	25	3.5	8.5
KAF57	250	55	40	76	155	4	23.5	4	31
KAF67	250	55	40	76	155	4	23	4	31
KAF77	300	70	50	95	205	4	37	5	45
KAF87	350	85	60	120	220	5	30	5	39
KAF97	450	95	70	135	320	5	41.5	5.5	51
KAF107	450	118	90	224	320	5	41	16	52
KAF127	550	135	100	185	420	5	51	6	63
KAF157	660	155	120	200	520	6	60	10	74
SAF37	120	35	20	-	68	3	15	6	-
SAF37	160	35	20	-	96	3.5	15	5.5	-
SAF47	160	45	30 / 25	62	94	3.5	24	2	30
SAF57	200	50	35 / 30	70	115	3.5	25	3.5	31.5
SAF67	200	65	45 / 40	91	115	3.5	42.5	4	48.5
SAF77	250	80	60 / 50	112	164	4	45.5	5	53.5
SAF87	350	95	70 / 60	131	220	5	52.5	6	62.5
SAF97	450	120	90 / 70	160	320	5	60	6.5	69
WAF10	80	25	16	-	39	2.5	23	30	-
WAF10	120	25	16	39	74	3	23	5	30
WAF20	110	30	18 / 20	44	53	-4	30	27	35

Table continued on next page.



Type	Dimensions in mm								
	A1	D	D1	D2	D3	F1	I2	L1	L2
WAF20	120	30	18 / 20	-	45	2.5	30	37.5	-
WAF30	120	30	20	48	63	2.5	19.5	18	27
WAF30	160	30	20	48	63	2.5	34.5	33	42
WAF37	120	35	20 / 25	54	70	2.5	19.5	10.5	27
WAF37	160	35	20 / 25	54	70	2.5	34.5	25.5	42
WAF47	160	45	25 / 30	72	92	3.5	10	6	45

6.14 Fixed covers

Parallel-shaft helical gear units, helical-bevel gear units, helical-worm and SPIROPLAN® gear units with hollow shafts and shrink disks of size 37 up to size 97 come equipped with a rotating cover as standard. If fixed covers are required for these gear units for safety reasons, you can order them for the respective gear unit types by quoting the part numbers in the following tables.

The following gear unit types with hollow shaft and shrink disk come equipped with a fixed cover with gasket as standard.

- Explosion-proof parallel-shaft, helical-bevel, helical-worm and SPIROPLAN® gear units
- Parallel-shaft helical gear units size 27
- Parallel-shaft and helical-bevel gear units size 107 and greater

The following figure shows how to replace the rotating cover with a fixed cover.



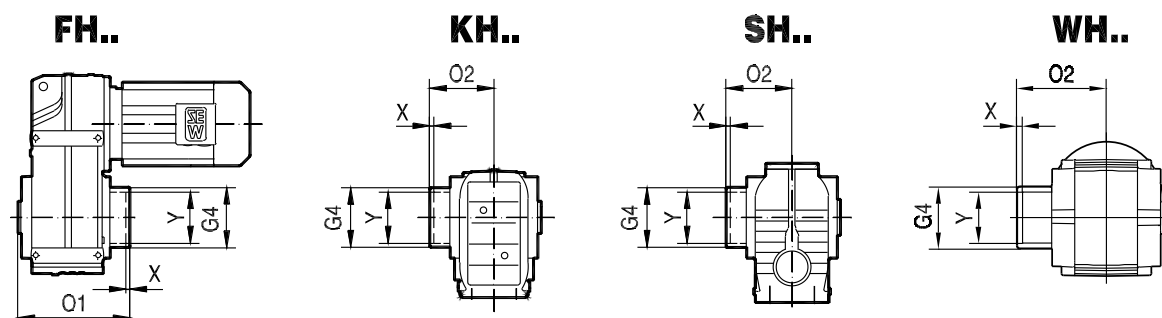
4310406923

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



6.14.1 Part numbers and dimensions

The following figure shows the different gear unit variants:



9187085195

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
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..19	KH..29
Part number	1068 415 8	1068 416 6
G4 in mm	62	68
O2 in mm	83	90
X in mm	2	4
Y in mm	50	60

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

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

1) Not possible in foot-mounted helical-bevel gear units with hollow shafts and shrink disk (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 in mm	59	78	88	100	121	164	185
O2 in mm	88	95	111.5	123	147	176	204.5
X in mm	1	0	1.5	3	1	0	0.5
Y in mm	53	75	83	93	114	159	174

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



6.15 Condition monitoring: Oil aging sensor

6.15.1 Technical data of oil aging sensor

DUO10A diagnos-
tic unit

DUO10A	Technical data
Preset oil grades	OIL1 CLP mineral oil $T_{\max} = 100^{\circ}\text{C}$
	Bio oil $T_{\max} = 100^{\circ}\text{C}$
	OIL2 CLP HC synthetic oil $T_{\max} = 130^{\circ}\text{C}$
	CLP PAO oil $T_{\max} = 130^{\circ}\text{C}$
	OIL3 CLP PG polyglycol $T_{\max} = 130^{\circ}\text{C}$
	OIL4 Food grade oil $T_{\max} = 100^{\circ}\text{C}$
Switch outputs	1: Early warning (time to next oil change can be set to between 2 and 100 days) 2: Main alarm (time to oil change 0 days) 3: Temperature $T_{\max}$ exceeded 4: DUO10A is ready for operation
Permitted oil temperature	-40 °C to +130 °C
Permitted temperature sensor	PT1000
EMC	IEC1000-4-2/3/4/6
Ambient temperature	-25 °C to +70 °C
Operating voltage	DC 18 – 28 V
Current consumption for DC 24 V	< 90 mA
Protection class	III
Degree of protection	IP67 (optionally IP69K)
Housing materials	Evaluation unit: V2A, EPDM/X, PBT, FPM Temperature sensor: V4A
Electrical connection	Evaluation unit: M12 plug connector PT1000 temperature sensor: M12 plug connector

Designations and
part numbers

Designation	Description	Part number
DUO10A	Evaluation unit (basic unit)	1 343 875 1
		
DUO10A-PUR-M12-5m	5 m PUR cable with 1 connector	1 343 877 8
DUO10A-PVC-M12-5m	5 m PVC cable with 1 connector	1 343 878 6
DUO10A	Angle bracket	1 343 880 8
DUO10A D = 34	Mounting clamp	1 343 879 4



Design and operating notes

Condition monitoring: Oil aging sensor

Designation	Description	Part number
W4843 PT1000 	PT1000 temperature sensor	1 343 881 6
W4843_4x0.34-2m-PUR	2 m PUR cable for PT1000 ¹⁾	1 343 882 4
W4843_4x0.34-2m-PVC	2 m PVC cable for PT1000 ²⁾	1 343 883 2
DUO10A 	Protection cap (for aseptic design, IP69K)	1 343 902 2

1) PUR cables are particularly suited for use in oil-contaminated environments.

2) PVC cables are particularly suited for use in moist environments.

Mounting to standard gear units (R, F, K, S)

Adapter for mounting the PT1000 temperature sensor in screw plug holes:

Complete adapter for PT1000 sensor	Part number
M10 × 1	1 343 903 0
M12 × 1.5	1 343 904 9
M22 × 1.5	1 343 905 7
M33 × 2	1 343 906 5
M42 × 2	1 343 907 3

Mounting base for installing the diagnostic unit at the gear unit with an angle bracket:

Mounting base with sealing ring	Part number
M10 × 1	1 343 441 1
M12 × 1.5	1 343 827 1
M22 × 1.5	1 343 829 8
M33 × 2	1 343 830 1
M42 × 2	1 343 832 8