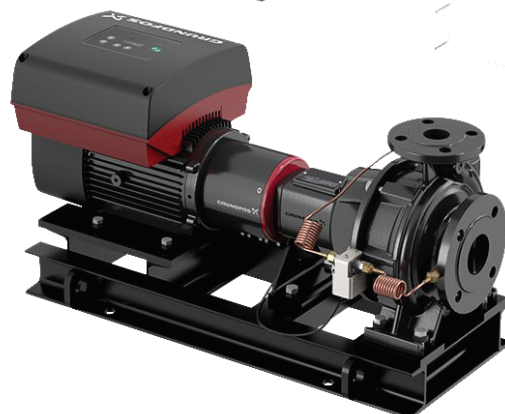
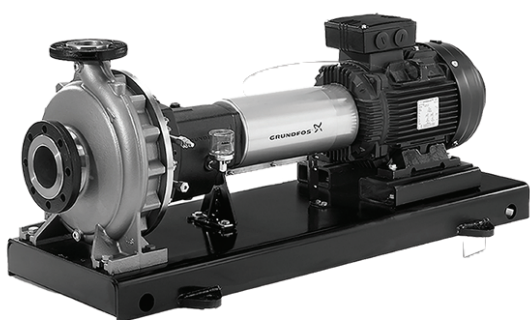


NK, NKE, NKG, NKGE



Service instructions



NK, NKE, NKG, NKGE

English (GB)

Service instructions	4
Appendix A	36

English (GB) Service instructions

Original service instructions

Table of contents

1. General information	4
1.1 Hazard statements	4
1.2 Notes	4
1.3 Target group	4
2. Identification	5
2.1 Products covered by this Service instruction	5
2.2 Nameplate	5
2.3 Type key - NK, NKE, NKG, NKGE	7
3. Standard tools	14
4. Special tools	15
5. Disassembly and assembly	15
5.1 Disassembling the pump	15
5.2 Checking the gap between the impeller and the pump housing/cover (wear rings)	20
5.3 Assembling the pump	21
6. Reference information	27
6.1 Torque table	27
6.2 Recommended lubricants	27
6.3 Gap between impeller and pump housing/cover (wear rings)	27
6.4 Related documents	29
6.5 Service videos	29
7. Fault finding the product	30
8. Exploded drawings	32

1. General information



Read this document before you start service work on the product. Service work must comply with local regulations and accepted codes of good practice.

Observe the safety instructions in the installation and operating instructions for the product.

1.1 Hazard statements

The symbols and hazard statements below may appear in Grundfos installation and operating instructions, safety instructions and service instructions.

**DANGER**

Indicates a hazardous situation which, if not avoided, will result in death or serious personal injury.

**WARNING**

Indicates a hazardous situation which, if not avoided, could result in death or serious personal injury.

**CAUTION**

Indicates a hazardous situation which, if not avoided, could result in minor or moderate personal injury.

The hazard statements are structured in the following way:

**SIGNAL WORD****Description of the hazard**

Consequence of ignoring the warning

- Action to avoid the hazard.

1.2 Notes

The symbols and notes below may appear in Grundfos installation and operating instructions, safety instructions and service instructions.



Observe these instructions for explosion-proof products.



A blue or grey circle with a white graphical symbol indicates that an action must be taken.



A red or grey circle with a diagonal bar, possibly with a black graphical symbol, indicates that an action must not be taken or must be stopped.



If these instructions are not observed, it may result in malfunction or damage to the equipment.



Tips and advice that make the work easier.

1.3 Target group

These service instructions are intended for professional installers, operators and service technicians of the product.

We recommend that service and maintenance be carried out by skilled persons with technical qualifications required by the specific legislation in force.

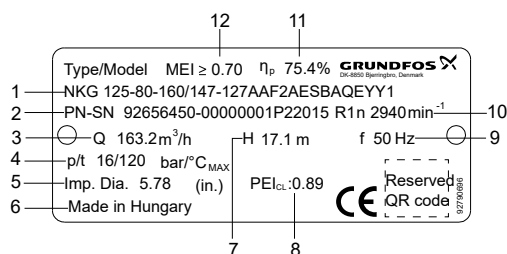
2. Identification

2.1 Products covered by this Service instruction

	Range		
	IEC motor ¹⁾		NEMA motor ²⁾
	1	2	6
NB(E)	X		X
NBG(E)	X		
NBS(E)			X
NK(E)	X	X	X
NKG(E)	X		

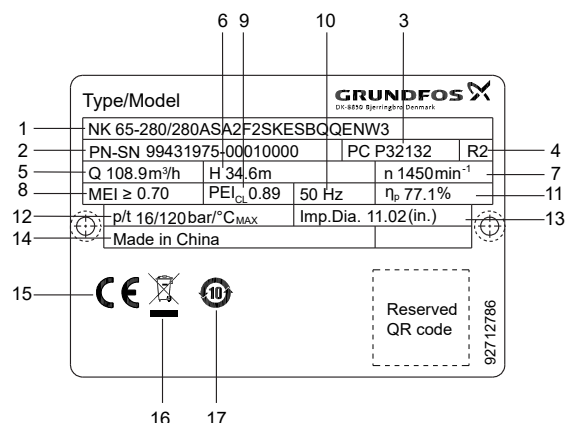
- 1) The motors fitted with the pumps are according to the IEC standard (International Electrotechnical Commission) for frame size, dimensions and connecting interfaces (flange and shaft).
- 2) The motors fitted with the pumps are according to the NEMA standard (National Electrical Manufacturers Association - USA) for frame size, dimensions and connecting interfaces (flange and shaft).

2.2 Nameplate



Example of NKG nameplate

Pos.	Description
1	Type designation
2	Identification code
	92656450 Product number
	00000001 Serial number
	P22015 Production code - production site, year and week
	R1 Service range
3	Nominal flow rate
4	Pressure rating and maximum temperature
5	Actual impeller diameter
6	Country of origin
7	Nominal pump head
	Drinking water approval
	Or Pump Energy Index (PEI)
8	PEI _{CL} : constant load
	PEI _{VL} : variable load
9	Frequency
10	Rated pump speed
11	Hydraulic efficiency at best efficiency point
12	Minimum efficiency index



Example of NK nameplate

Pos.	Description
1	Type designation
2	Identification code
	99431975 Product number
	00010000 Serial number
3	Production code - production site, year and week
4	Range identification (service range code)
5	Nominal flow rate
6	Nominal pump head
7	Rated pump speed
8	Minimum efficiency index (MEI)
9	Pump Energy Index (PEI), constant load
10	Frequency
11	Hydraulic pump efficiency
12	Pressure rating and maximum temperature
13	Actual impeller diameter
14	Country of origin
15	CE mark
16	EU/WEEE mark
17	China RoHS mark

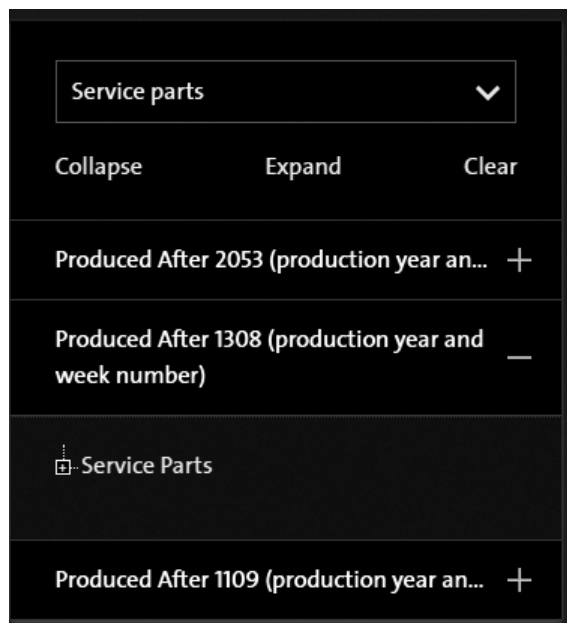
TM1040533

TM084201

2.2.1 Looking up service parts in Grundfos Product Center

- Check the production code (PC code) on the nameplate before looking up service parts in Grundfos Product Center.
- The production code contains a year and week code which is used to ensure that correct service parts are selected.
 - Example 1: Pump has a year-week code 1748. This means that the pump is "produced after 1308" (and before 2053) The service parts list "produced after 1308" must be used.
 - Example 2: Pump has a year-week code 2142. This means that the pump is "Produced after 2053" and that this service parts list must be used.

This is used when new service part/s cannot be used on previous models.



TM080702

Find your Grundfos Product Center here:



2.2.2 Looking up service parts in Service Kit Catalogue

Extra service information can be found in the Service Kit Catalogue compared to the service information in Grundfos Product Center - such as:

- Full overview of service architecture including material variants.
- Small kit exploded view drawings with position numbers explain the bill of material of the service parts in details.
- If service is not available when searching product PN in Grundfos Product Center, the service parts can be found by looking into the type designation.
- No need for internet access with physical catalogue. PDF file can be downloaded to smart devices.

Service Kit Catalogues can be found in Grundfos Product Center.

2.3 Type key - NK, NKE, NKG, NKGE

Example 1: NK 32-180/166AAEF2S3ESBQQEGX4

Example 2: NK 150-350/328-324AAEF2TBESBQQEWX4

Example 3: NKE 65-225/242ASA2F2SKESBQQENWA

Example 4: NKG 125-100-250/275VACXEF1AESBQQELY1

Example 5: NKGE 125-100-160/160-140BSA1F2AESBAQERW1

Pos.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Example 1	NK		32	-180	/166		A		AE	F	2	S3	E	S	BQQE	G	X	4
Example 2	NK		150	-350	/328-324		A		AE	F	2	TB	E	S	BQQE	W	X	4
Example 3	NKE		65	-225	/242		A	S	A2	F	2	SK	E	S	BQQE	N	W	A
Example 4	NKGE	125	-100	-250	/275	V	A	C	XE	F	1	A	E	S	BQQE	L	Y	1
Example 5	NKGE	125	-100	-160	/160-140		B	S	A1	F	2	A	E	S	BAQE	R	W	1

Pos.	Explanation
1	Type range
2	Nominal diameter of inlet port (DN)
3	Nominal diameter of outlet port (DN)
4	Nominal impeller diameter [mm]
5	Actual impeller diameter [mm]
Impeller type	
	'blank': Closed impeller, cylindrical trim. If one dimension is shown, the impeller has a cylindrical trim, for example 219
6	'blank': Closed impeller, conical trim. If two dimensions are shown, the impeller has a conical trim, for example 160-140
	S: Special open impeller
	V: Super vortex impeller
Hydraulic version	
	A: 1st version
7	B: 2nd version
	C: 3rd version
	D: 4th version
Sensor/motor version	
	'blank': Pump without sensor
	C: Without built-in sensor, one cable and one pressure sensor are supplied with the pump.
8	S: Pump with built-in differential-pressure sensor, Series 2000
	G: Non -E pump/ -E pump with semi-integrated VFD/CUE: Motor with Grounding ring: Non drive-end
	H: Non -E pump/ -E pump with semi-integrated VFD/CUE: Motor with hybrid bearing (HYB): Non drive-end
	I: Non -E pump/ -E pump with semi-integrated VFD/CUE: Motor with insulated bearing: Non drive-end
Code for pump version; the codes may be combined	
	A1: Basic version, grease-lubricated standard bearing design, standard coupling
	A2: Basic version, grease-lubricated standard bearing design, spacer coupling
	B: Oversize motor
	(+E): With ATEX approval, certificate or test report, the second character of the pump version code is an E
	G1: Grease-lubricated heavy-duty bearing design, standard coupling
	G2: Grease-lubricated heavy-duty bearing design, spacer coupling
	H1: Oil-lubricated heavy-duty bearing design, standard coupling
	H2: Oil-lubricated heavy-duty bearing design, spacer coupling
9	I1: Pump without motor, grease-lubricated standard bearing design, standard coupling
	I2: Pump without motor, grease-lubricated standard bearing design, spacer coupling
	J1: Pump without motor, grease-lubricated heavy-duty bearing design, standard coupling
	J2: Pump without motor, grease-lubricated heavy-duty bearing design, spacer coupling
	K1: Pump without motor, oil-lubricated heavy-duty bearing design, standard coupling
	K2: Pump without motor, oil-lubricated heavy-duty bearing design, spacer coupling
	Y1: Bare shaft pump, grease-lubricated standard bearing design
	W1: Bare shaft pump, grease-lubricated heavy-duty bearing design
	Z1: Bare shaft pump, oil-lubricated heavy-duty bearing design
	X: Special version; used in case of further customisation than already listed
Pipe connection	
	E: Table E flange
10	F: DIN flange
	G: ANSI flange
	J: JIS flange

Pos.	Explanation
11	Flange pressure rating (PN - rated pressure)
	1: 10 bar
	2: 16 bar
	3: 25 bar
	4: 40 bar
	5: Other pressure rating

Pos.	Explanation
Code for materials	
Code	Pump housing Impeller Wear ring Shaft
A	EN-GJL-250 EN-GJL-200 Bronze/brass 1.4021/1.4034
B	EN-GJL-250 Bronze CuSn10 Bronze/brass 1.4021/1.4034
C	EN-GJL-250 EN-GJL-200 Bronze/brass 1.4401
D	EN-GJL-250 Bronze CuSn10 Bronze/brass 1.4401
E	EN-GJL-250 EN-GJL-200 EN-GJL-250 1.4021/1.4034
F	EN-GJL-250 Bronze CuSn10 EN-GJL-250 1.4021/1.4034
G	EN-GJL-250 EN-GJL-200 EN-GJL-250 1.4401
H	EN-GJL-250 Bronze CuSn10 EN-GJL-250 1.4401
I	1.4408 1.4408 1.4517 1.4462
J	1.4408 1.4408 Carbon-graphite-filled PTFE (Graflon®) 1.4462
K	1.4408 1.4408 1.4517 1.4401
L	1.4517 1.4517 1.4517 1.4462
M	1.4408 1.4517 1.4517 1.4401
N	1.4408 1.4408 Carbon-graphite-filled PTFE (Graflon®) 1.4401
P	1.4408 1.4517 Carbon-graphite-filled PTFE (Graflon®) 1.4401
R	1.4517 1.4517 Carbon-graphite-filled PTFE (Graflon®) 1.4462
S	EN-GJL-250 1.4408 Bronze/brass 1.4401
T	EN-GJL-250 1.4517 Bronze/brass 1.4462
U	1.4408 1.4517 1.4517 1.4462
W	1.4408 1.4517 Carbon-graphite-filled PTFE (Graflon®) 1.4462
Z	1.4469 1.4469 1.4410 1.4410
QA	EN-GJL-250 Bronze CuSn10 No wear ring 1.4301 + 1.0503
QB	EN-GJL-250 Bronze CuSn10 No wear ring 1.4401
QC	EN-GJL-250 Bronze CuSn10 No wear ring 1.4462
QD	EN-GJL-250 Bronze CuSn10 No wear ring 1.4410
QE	EN-GJS-500-7 ductile Bronze CuSn10 No wear ring 1.4301 + 1.0503
QF	EN-GJS-500-7 ductile Bronze CuSn10 No wear ring 1.4401
QG	EN-GJS-500-7 ductile Bronze CuSn10 No wear ring 1.4462
QH	EN-GJS-500-7 ductile Bronze CuSn10 No wear ring 1.4410
S3	EN-GJL-250 1.4308 No wear ring 1.4301 + 1.0503
S4	EN-GJL-250 1.4308 No wear ring 1.4401
S5	EN-GJL-250 1.4308 No wear ring 1.4462
S8	EN-GJL-250 1.4408 No wear ring 1.4401
S9	EN-GJL-250 1.4408 No wear ring 1.4462
SB	EN-GJS-500-7 ductile 1.4308 No wear ring 1.4301 + 1.0503
SC	EN-GJS-500-7 ductile 1.4308 No wear ring 1.4401
SD	EN-GJS-500-7 ductile 1.4308 No wear ring 1.4462
SG	EN-GJS-500-7 ductile 1.4408 No wear ring 1.4401
SH	EN-GJS-500-7 ductile 1.4408 No wear ring 1.4462
SI	EN-GJS-500-7 ductile 1.4308 No wear ring 1.4410
SJ	EN-GJS-500-7 ductile 1.4408 No wear ring 1.4410
SK	EN-GJL-250 1.4308 No wear ring 1.4410
SL	EN-GJL-250 1.4408 No wear ring 1.4410
T2	EN-GJL-250 1.4517 No wear ring 1.4462
T3	EN-GJL-250 1.4517 No wear ring 1.4410
TA	EN-GJS-500-7 ductile 1.4517 No wear ring 1.4462
TB	EN-GJS-500-7 ductile 1.4517 No wear ring 1.4410
X	Special version

Pos.	Explanation														
	Rubber parts in pump E: EE F: FF G: FE H: KE I: KM J: KV K: KK M: MN N: ME O: OO V: VV														
13	- The first letter indicates material of elastomer between pump housing and cover, and elastomer between cover and split cover. - The second letter indicates material of elastomer between split cover and seal housing. See the material description in the table below. <table> <tr> <th>Code</th><th>Material description</th></tr> <tr> <td>E</td><td>EPDM</td></tr> <tr> <td>F</td><td>FXM (Fluoraz®)</td></tr> <tr> <td>K</td><td>FFKM (Kalrez®)</td></tr> <tr> <td>M</td><td>FEPS (PTFE-sheathed silicone O-ring)</td></tr> <tr> <td>O</td><td>HNBR</td></tr> <tr> <td>V</td><td>FKM (Viton®)</td></tr> </table>	Code	Material description	E	EPDM	F	FXM (Fluoraz®)	K	FFKM (Kalrez®)	M	FEPS (PTFE-sheathed silicone O-ring)	O	HNBR	V	FKM (Viton®)
Code	Material description														
E	EPDM														
F	FXM (Fluoraz®)														
K	FFKM (Kalrez®)														
M	FEPS (PTFE-sheathed silicone O-ring)														
O	HNBR														
V	FKM (Viton®)														
	Shaft seal arrangement B: Stuffing box C: Cartridge seal, single D: Cartridge seal, double O: Back-to-back, double seal P: Tandem, double seal S: Single seal														
	Shaft seal(s) in pump Letter or digit code for mechanical shaft seal and shaft seal rubber parts 4 letters: Single mechanical shaft seal, such as BQQE, or single cartridge seal, such as HBQV														
15	4 digits: - double seal solution; example 2716, where 27 is DQQV, primary seal, and 16 is BQQV, secondary seal; - double cartridge seal; example 5150, where 51 is HQQU, primary seal, and 50 is HBQV, secondary seal The relation between letters and digits of the shaft seals is described in Codes for shaft seals.														
16	Code for rated motor power [kW]. See Codes for rated motor power.														
17	Code for phase and voltage [V] or other information. See Codes for phase and voltage or other information.														
18	Code for speed variant [rpm]. See Codes for speed variant.														

Example 1: NK 32-180/166AAEF2S3ESBQQEGX4 shows an NK 32-180 pump with these characteristics:

- 166 mm closed impeller, cylindrical trim
- hydraulic version A
- pump without sensor
- grease-lubricated standard bearing design
- with certificate/report (with standard coupling)
- DIN flange to EN1092-2
- 16 bar flange pressure rating
- cast iron pump housing, EN-GJL-250
- stainless steel impeller, 1.4308
- no wear ring
- stainless steel shaft, 1.4301
- EPDM O-rings for pump cover and seal cover
- single shaft seal arrangement
- BQQE shaft seal
- 1.1 kW motor, no motor or US DOE Regulated Motor (CC marked motor), 4-pole, 60 Hz.

Example 2: NK 150-350/328-324AAEF2TBESBQQEWX2 shows an NK 150-350 pump with these characteristics:

- 328-324 mm closed impeller, conical trim
- hydraulic version A
- pump without sensor
- grease-lubricated standard bearing design
- with certificate/report (with standard coupling)
- DIN flange to EN1092-2
- 16 bar flange pressure rating
- ductile iron pump housing, EN-GJS-500-7
- duplex stainless steel impeller, 1.4517
- no wear ring
- super duplex stainless steel shaft, 1.4410
- EPDM O-rings for pump cover and seal cover
- single shaft seal arrangement
- BQQE shaft seal
- 90 kW motor, no motor or US DOE Regulated Motor (CC marked motor), 2-pole, 60 Hz.

Example 3: NKE 65-225/242ASA2F2SKESBQQENWA shows an NKE 65-225 pump with these characteristics:

- 242 mm closed impeller, cylindrical trim
- hydraulic version A
- Built-in differential-pressure sensor, Series 2000
- grease-lubricated standard bearing design
- spacer coupling
- DIN flange to EN1092-2
- 16 bar flange pressure rating
- cast iron pump housing, EN-GJL-250
- stainless steel impeller, 1.4308
- no wear ring
- super duplex stainless steel shaft, 1.4410
- EPDM O-rings for pump cover and seal cover
- single shaft seal arrangement
- BQQE shaft seal
- 11 kW motor, not for sale in North American, 1450-2200 rpm.

Example 4: NKGE

125-100-250/275VACXEF1AESBQQELY1 shows an NKGE 125-100-160 pump with these characteristics:

- 275 mm Super Vortex impeller
- hydraulic version A
- without built-in sensor, one cable and one pressure sensor are supplied with the pump.
- special version with certificate/report (with standard coupling)
- DIN flange to EN 1092-2 pipe connection
- 10 bar flange pressure rating
- cast iron pump housing, EN-GJL-250
- cast iron impeller, EN-GJL-200
- bronze/brass wear ring
- stainless steel shaft, EN 1.4021/1.4034
- EPDM O-rings for pump cover and seal cover
- single shaft seal arrangement
- BAQE shaft seal
- 5.5 kW motor, out of DOE scope, 2-pole, 50 Hz.

Example 5: NKGE

125-100-160/160-140BSA1F2AESBAQERW1 shows an NKGE 125-100-160 pump with these characteristics:

- 160-140 mm closed impeller, conical trim
- hydraulic version B
- with built-in differential-pressure sensor
- grease-lubricated standard bearing design
- standard coupling
- DIN flange to EN 1092-2 pipe connection
- 16 bar flange pressure rating
- cast iron pump housing, EN-GJL-250
- cast iron impeller, EN-GJL-200
- bronze/brass wear ring
- stainless steel shaft, EN 1.4021/1.4034
- EPDM O-rings for pump cover and seal cover
- single shaft seal arrangement
- BAQE shaft seal
- 30 kW motor, not for sale in North America, 2-pole, 50 Hz.

2.3.1 Codes for shaft seals

The digits are only used for double shaft seal solutions.

Digits	Letters	Description
10	BAQE	Single mechanical shaft seal
11	BAQV	Single mechanical shaft seal
12	BBQE	Single mechanical shaft seal
13	BBQV	Single mechanical shaft seal
15	BQQE	Single mechanical shaft seal
16	BQQV	Single mechanical shaft seal
19	AQAE	Single mechanical shaft seal
20	AQAV	Single mechanical shaft seal
21	AQQE	Single mechanical shaft seal
22	AQQV	Single mechanical shaft seal
23	AQQX	Single mechanical shaft seal
24	AQQK	Single mechanical shaft seal
25	DAQF	Single mechanical shaft seal
26	DQQE	Single mechanical shaft seal
27	DQQV	Single mechanical shaft seal
28	DQQX	Single mechanical shaft seal
29	DQQK	Single mechanical shaft seal
50	HBQV	Cartridge seal
51	HQQV	Cartridge seal
52	HAQK	Cartridge seal
	SNEA	Stuffing box
	SNEB	Stuffing box
	SNEC	Stuffing box
	SNED	Stuffing box
	SNOA	Stuffing box
	SNOB	Stuffing box
	SNOC	Stuffing box
	SNOD	Stuffing box
	SNFA	Stuffing box
	SNFB	Stuffing box
	SNFC	Stuffing box
	SNFD	Stuffing box

2.3.2 Letter codes for shaft seals

Pos. 14 in NK, NKE, NKG, NKGE type key example.

Code	Description	Explanation
B	Shaft seal type	A: O-ring seal with fixed driver
		B: Rubber bellows seal
		D: O-ring seal, balanced
		H: Cartridge seal, balanced
Q	Material of rotating seal face	A: Carbon, metal-impregnated with antimony which is not approved for potable water
		B: Carbon, resin-impregnated
		Q: Silicon carbide
Q	Material of stationary seal	A: Carbon, metal-impregnated with antimony which is not approved for potable water
		Q: Silicon carbide
E	Material of secondary seal and other rubber and composite parts, except the wear ring	E: EPDM
		V: FKM (Viton®)
		F: FXM (Fluoraz®)
		K: FFKM (Kalrez®)
		X: HNBR
		U: Dynamic O-rings in FFKM and static O-rings in PTFE

For a thorough description of shaft seal types and materials, see the data booklet "NB, NBG, NK, NKG, NBE, NBGE, NKE, NKGE - Custom-built pumps according to EN 733 and ISO 2858".

2.3.3 Codes for rated motor power

Pos. 15 in NK_NKE_NKG_NKGE type key example.

Code	Description	
	[hp]	[kW]
A	0.16	0.12
B	0.25	0.18
C	0.33	0.25
D	0.5	0.37
E	0.75	0.55
F	1	0.75
G	1.5	1.1
H	2	1.5
I	3	2.2
J	4	3
K	5 (5.5 ³⁾)	3.7 (4 ³⁾)
L	7.5	5.5
M	10	7.5
N	15	11
O	20	15
P	25	18.5
Q	30	22
R	40	30
S	50	37
T	60	45
U	75	55
V	100	75
W	125	90
X	Bare shaft pump	
Y	> 200 ⁴⁾	> 150 ⁴⁾
1	150	110
2	175	132
3	200	150
4	215 ⁵⁾	160 ⁵⁾
5	250 ⁵⁾	185 ⁵⁾

3) Value in bracket is for the standard IEC motor size. Value outside bracket is for the motor size according to NEMA standards.

4) Used for pumps where the pump shaft input power exceeds 200 hp (150 kW) and is not regulated under the DOE pump rule.

5) Special cases with power sizes above 200 hp (150 kW) which are still regulated under the DOE pump rule. For example: Pump has a P2 value of 198 hp (147.6 kW) in its duty point (in DOE scope) but customer wants the 215 hp (160 kW) motor instead of the 200 hp (150 kW). The pump is in scope of the DOE regulation and requires a PEI value and a motor code.

2.3.4 Codes for phase and voltage or other information

Pos. 16 in NK_NKE_NKG_NKGE type key example.

Code	Description
A	E-motor (ECM ⁶⁾), 1 x 200-240 V
B	E-motor (ECM ⁶⁾), 3 x 200-240 V
C	E-motor (ECM ⁶⁾), 3 x 440-480 V
D	E-motor (ECM ⁶⁾), 3 x 380-500 V
W	Not for sale in North America
X	No motor or US DOE regulated motor (CC marked motor)
Y	Out of DOE scope
Z	E-motor, asynchronous motor

6) ECM: Electronically Commutated Motor.

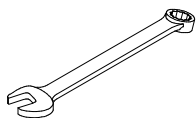
2.3.5 Codes for speed variant

Pos. 17 in NK_NKE_NKG_NKGE type key example.

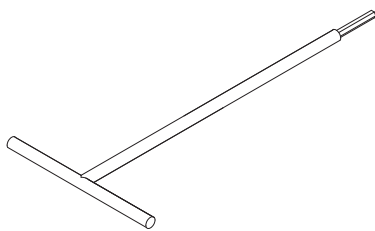
Code	Description
A	1450-2200 RPM, E-motor (ECM ⁷⁾)
B	2900-4000 RPM, E-motor (ECM ⁷⁾)
C	4000-5900 RPM, E-motor (ECM ⁷⁾)
1	2-pole, 50 Hz (Asynchronous motor)
2	2-pole, 60 Hz (Asynchronous motor)
3	4-pole, 50 Hz (Asynchronous motor)
4	4-pole, 60 Hz (Asynchronous motor)
5	6-pole, 50 Hz (Asynchronous motor)
6	6-pole, 60 Hz (Asynchronous motor)
7	8-pole, 50 Hz (Asynchronous motor)
8	8-pole, 60 Hz (Asynchronous motor)

7) ECM: Electronically Commutated Motor.

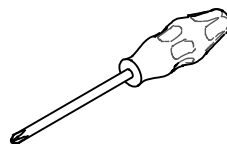
3. Standard tools



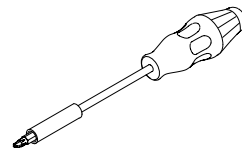
Ring/open-end spanner



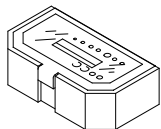
Hexagon T-key



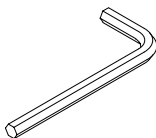
Cross-recess screwdriver



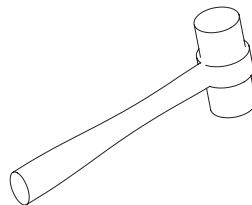
Reversible-bit screwdriver



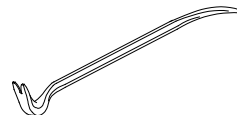
Bits kit



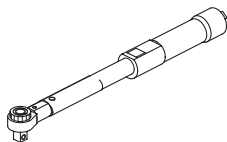
Hexagon key



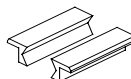
Plastic hammer



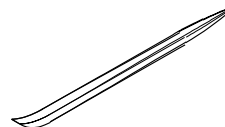
Pry bar



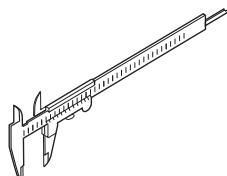
Torque wrench

Gauge for inner diameter
measurement of wear ring

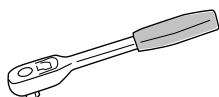
Soft jaws



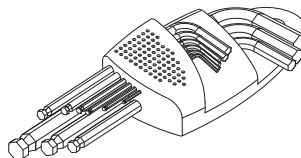
Pinch bar



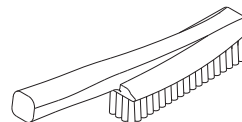
Sliding gauge



Ratchet spanner with socket



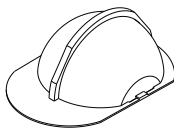
Hexagon key set



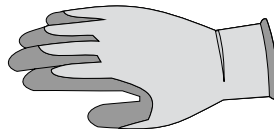
Steel brush



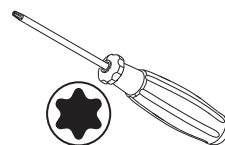
Safety shoes



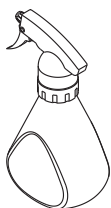
Safety helmet



Safety gloves



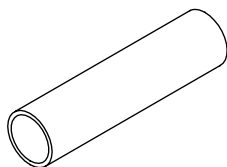
Screwdriver, Torx



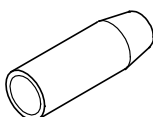
Sprayer

4. Special tools

You can manufacture your own special tools. See descriptions in Appendix A or follow the links with the illustrations.



Punch for shaft seal



Protective tool



Positioning tool

5. Disassembly and assembly

WARNING

Overhead load

Death or serious personal injury



- Pay attention to the pump weight and take precautions to prevent personal injury if the pump topples or falls by accident.

CAUTION

Crushing of feet

Minor or moderate personal injury



- Do not drop pump components when servicing the product.

Check also the following service videos in association with this task:

Related information

[3. Standard tools](#)

[4. Special tools](#)

5.1 Disassembling the pump

1. Find the service tools listed in section Service tools.



TM083822

2. Use the nameplate to search out correct service parts.



TM083821

3. Remove the coupling guard to gain access.



TM083823

4. Measure outside coupling diameter.



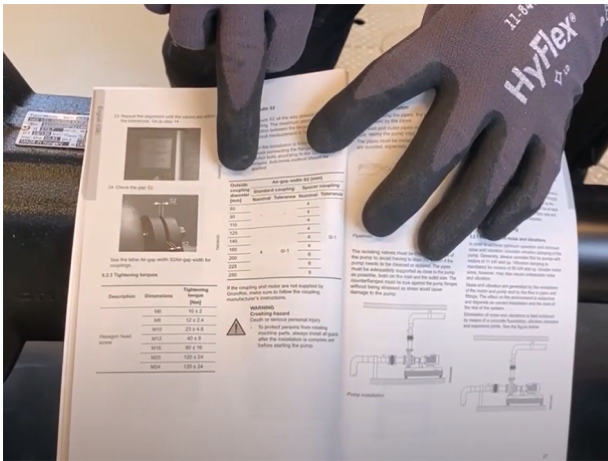
TM083824

5. Measure the air gap between the pump hub and the driver.



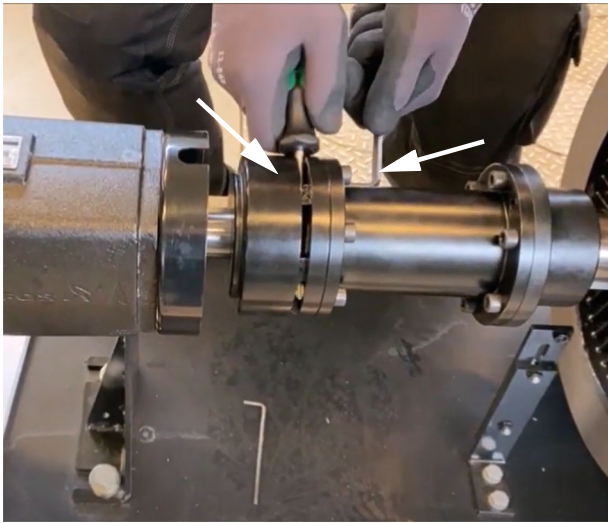
TM083825

6. Check in Installation and operating instructions (I/O) if the gap is correct.



TM083826

7. Loosen the spacer from the hubs.

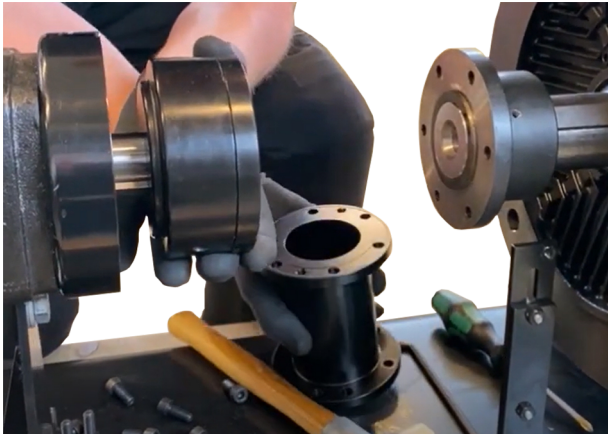


TM083827



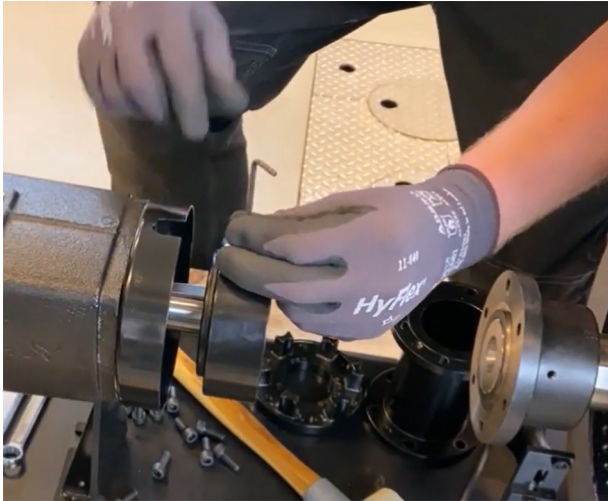
Use a screwdriver to hold the coupling.

8. Remove the spacer ring and the spacer.



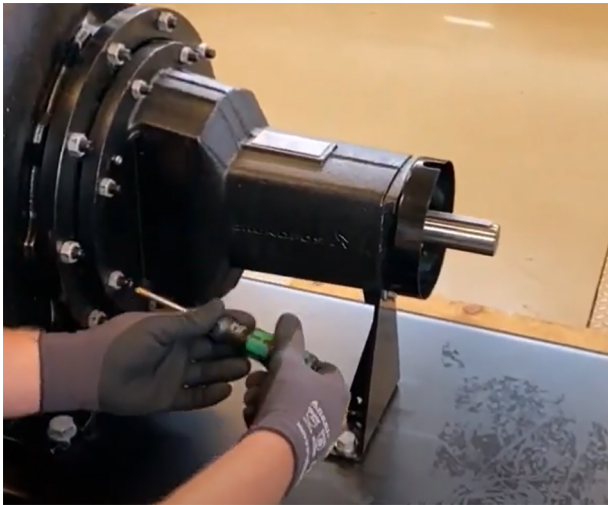
TM083828

9. Loosen the set screw and remove the pump hub.



TM083829

10. Loosen and remove the shaft guard.



TM083830

11. Loosen the bearing bracket foot.



TM083831

12. Loosen the cover from pump housing.



TM083832

13. Use pinch bars to loosen the bearing bracket and the cover from the pump housing.

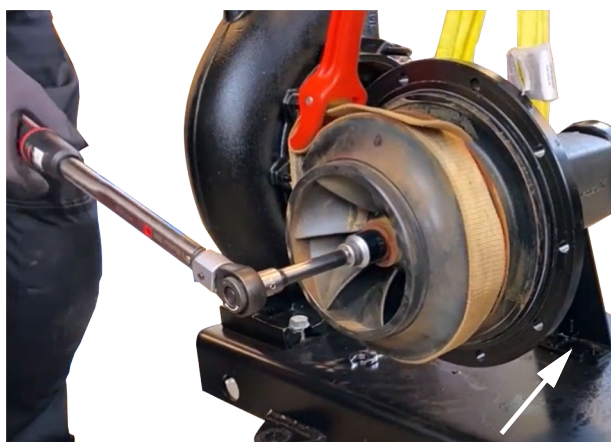


TM083833



Make support for the bearing bracket with a suitable lifting device.

14. Use a strap wrench to secure the impeller and loosen the impeller.

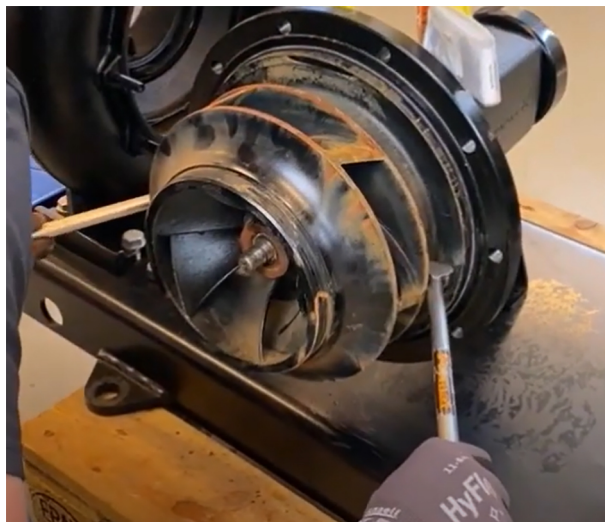


TM083834



Fixate the bearing bracket foot to ease dismantling of the impeller.

15. Use pinch bars to loosen the impeller.



TM083835

16. Remove the shaft key and the spacer.



TM083836

17. Use pinch bars to remove the rotating part of the shaft seal.



TM083837

18. Check conditions of the spring, and seal face.

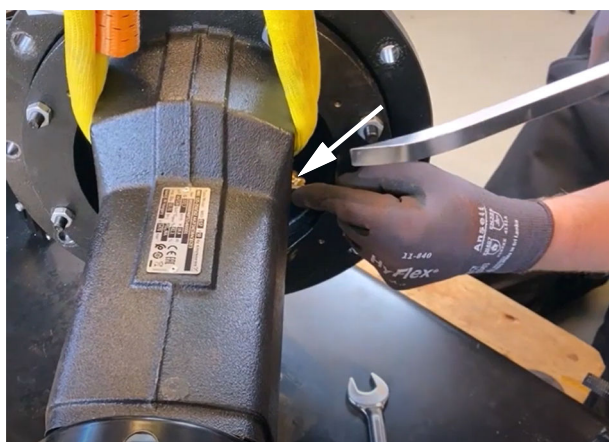


TM083838



Make sure that you do not touch the seal surface.

19. Push out the stationary part of the shaft seal.



TM083839



TM083946



Use an allen key and a pinch bar to loosen the stationary part of the shaft seal from outer side of the cover.

20. Loosen and remove the coupling guard retainer.



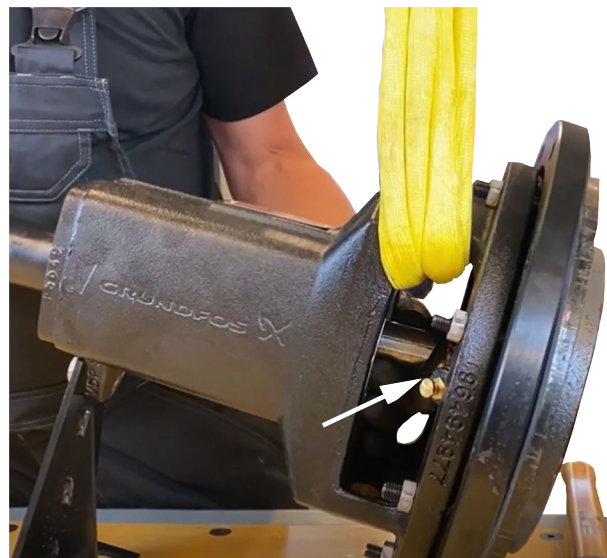
TM083840

21. Loosen the bearing cover and remove the V-ring and lock ring.



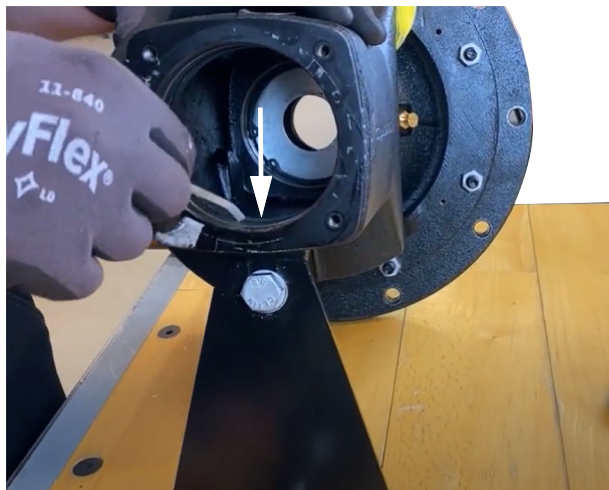
TM083841

22. Catch the V-ring when removing the shaft with bearings.



TM083842

23. Remove the O-rings.



TM083843



Bend a soft cable strip to catch the O-ring inside the bearing bracket.

24. Use a puller to extract the bearings from the shaft.



TM083844



Fit soft jaws to the vice to avoid damaging the shaft.

25. Before assembling new bearings, heat up the bearings to 100 °C with a bearing heater.



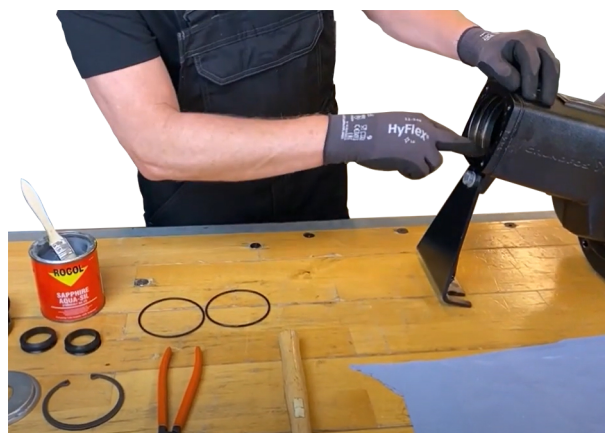
TM083845

26. Fit the preheated bearings to the shaft.



TM083846

27. Check condition and cleanliness of the recess for the cover and O-rings

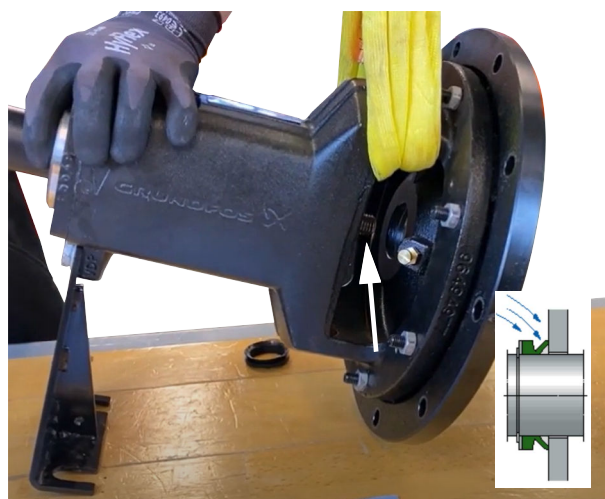


TM083847



Use locally approved lubricants (example: Rocol sapphire aqua SIL).

28. Fit the V-ring in the right position when assembling the shaft with bearings.



TM083848

29. Assemble the lock ring, cover and V-ring.



TM083849



Use locally approved lubricants (example: Rocol sapphire aqua SIL).

30. Assemble the coupling guard retainer.



TM083850

31. Tighten coupling guard retaining screws. See section [6.1 Torque table](#).

5.2 Checking the gap between the impeller and the pump housing/cover (wear rings)

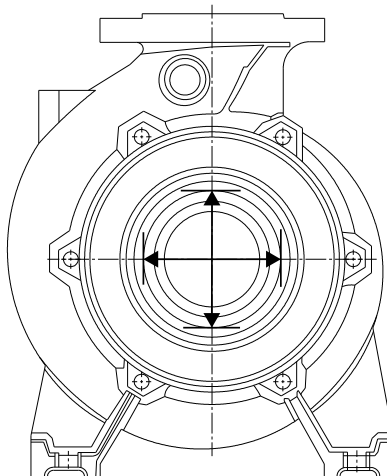
1. Measure and note the diameter of the impeller and cover interfaces.



TM083552

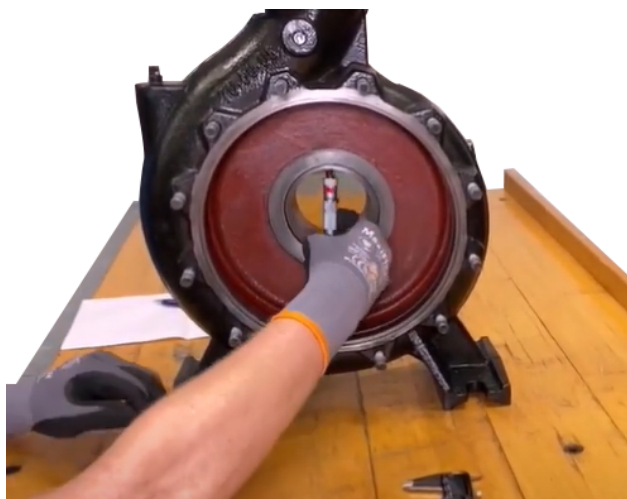


Two measurements must be made (positions 12-6 and 3-9). The wear ring may be worn oval due to different directions of radial forces.



TM080471

2. Measure and note the diameter of the pump housing interface to the impeller.



TM083553

3. Measure and note the impeller interface to the pump housing.



For maximum gap values, check the illustrated service instruction.



TM083513

Related information

[6.3 Gap between impeller and pump housing/cover \(wear rings\)](#)

5.3 Assembling the pump

1. Check condition and cleanliness of the shaft and the cover.



TM083851

2. Assemble the stationary seal part.



TM083852



Use locally approved thread lubricants (example: Rocol sapphire aqua SIL).



Make sure that you do not touch the seal surface.

3. Use a soft tool to position the stationary seal part.



TM083853

4. Lubricate the seal face with soapy water.



TM083854



Shaft seal face combination xQQx (siliconcarbide-siliconcarbide) must never run dry.

5. Lubricate the rotating seal part with soapy water and assemble the rotating seal part by using a soft punch tool.



TM083855



Make sure that you do not touch the seal surface.

6. Use the spacer (if installed) to secure the position of the rotating seal part.



TM083856

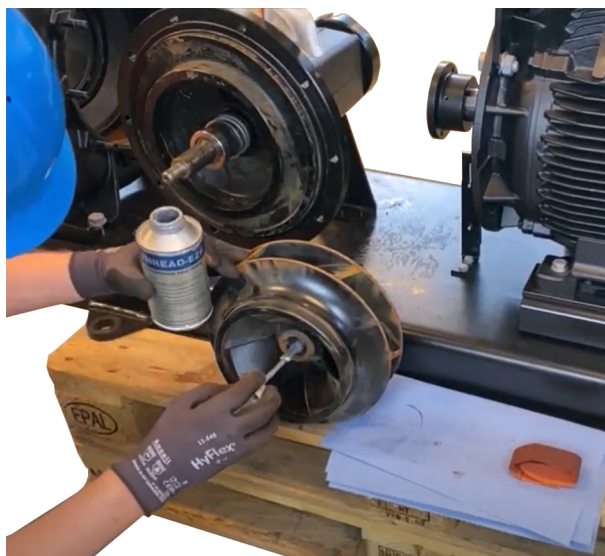
7. Check condition and cleanliness of the shaft and impeller interfaces. Polish rusted surfaces using an emery cloth or steel brush.



TM083857



Use locally approved lubricants (example: Never Seez).



TM083858

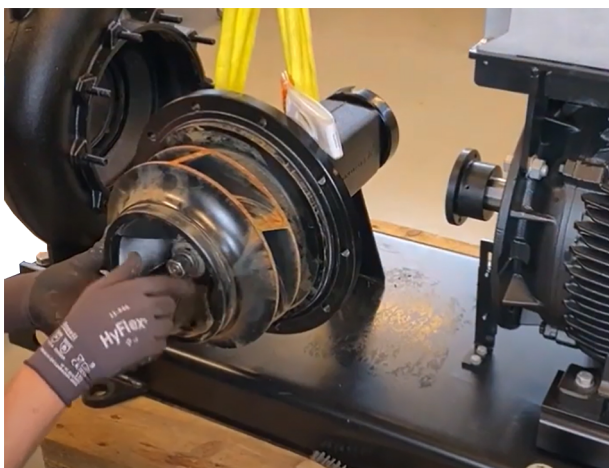
8. Assemble the shaft key and the impeller without using excess force.



TM083859



Assembly sequence - washer, spring washer and nut.



TM083860

9. Use a strap wrench to secure the impeller. Tighten the impeller nut. See section [6.1 Torque table](#).



TM083870

10. Polish rusted surfaces using an emery cloth or steel brush.



TM083871

11. Check condition and cleanliness of the O-ring before assembly.

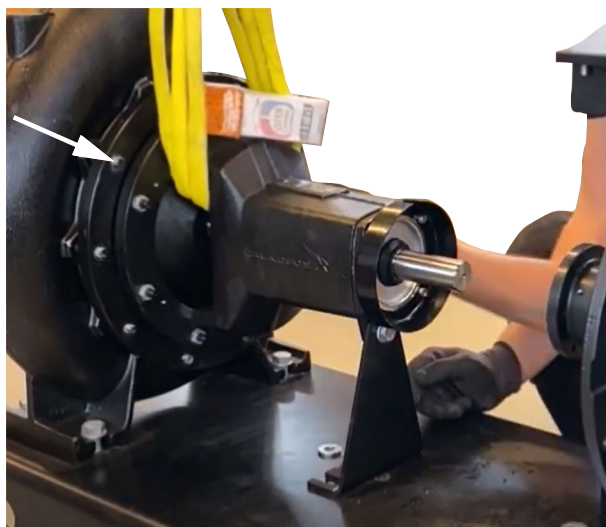


TM083872



Use locally approved lubricants (example: Rocol sapphire aqua SIL).

12. Assemble the nuts for the bearing bracket (cover) and make a loose tightening.



TM083873

13. Assemble the screws for the bearing bracket foot and make a loose tightening.



TM083874



Use locally approved lubricants (example: Never Seez).

14. Tighten cover nuts. See section [6.1 Torque table](#).



TM083876

15. Tighten the bearing foot screws. See section [6.1 Torque table](#).



TM083877

16. Rotate the shaft to make sure that the shaft runs freely with no rub.



TM083875

17. Check condition of the coupling rubber. If it is hard and cracks when bended - replace it.



TM083878

18. Check that the spacer ring moves freely in the rubber parts.



TM083879

19. Prepare assembly of the spacer coupling. Lubricate screws.



TM083880



Use locally approved thread lubricants (example Never Seez).

20. Make sure that the set screw does not interfere with the shaft key.



TM083881

21. Make the pump hub flush with the shaft end.



TM083882

22. Assemble the spacer ring and the spacer.



TM083883



Prevent shaft rotation by securing the shaft with a screwdriver in the spacer ring.



If it is not possible to use a torque tool, tighten until resistance + 15 degrees.

23. Adjust the gap according to the specification in Installation and operating instructions (I/O).



TM083884



Use an allen key with the right thickness to adjust the gap.



TM083885

24. Tighten the set screw for the pump hub.



TM083886



If it is not possible to use a torque tool, tighten until resistance + 15 degrees.

25. Assemble coupling guards.



TM083887



Fixate the inner part of the coupling part with tape.

26. Tighten the coupling guard manually and make sure that the retainer and the coupling guard inner part are not deformed.



TM083888

27. Assemble the shaft guards.



TM083889

28. Tighten the shaft guard screws. See section [6.1 Torque table](#).

NOTE! Laser alignment – see video on Grundfos YouTube channel or find instructions/video on Grundfos Product Center.



6. Reference information

6.1 Torque table

Impeller nuts

Nut	Torque [Nm]
M12	41 +/- 4
M14	65 +/- 7
M18	120 +/- 10
M24	300 +/- 35
M27	300 +/- 35

Pump cover nuts

Nut	Torque [Nm]
M10	45 +/- 9
M12	80 +/- 16
M16	145 +/- 30

Motor stool/pump housing nuts

Nut	Torque [Nm]
M10	40 +/- 8
M1	70 +/- 15
M16	145 +/- 30

Motor stool/motor bolts

Bolt	Torque [Nm]
1/2"	70 +/- 10
5/8"	150 +/- 15

Seal cover screws

Screw	Torque [Nm]
M8	24 +/- 2.4
M10	45 +/- 9

Coupling screws

Screw	Torque [Nm]
M10	85 +/- 8.5
M12	90 +/- 9

Coupling key set screws

Screw	Torque [Nm]
M4	5 +/- 2
M	9 +/- 2
M8	12 +/- 2

Related information

[5.3 Assembling the pump](#)

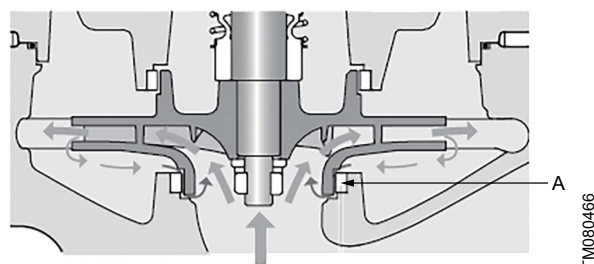
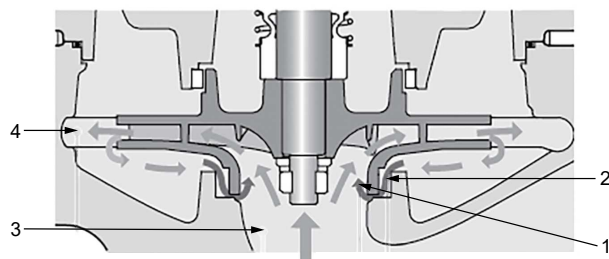
6.2 Recommended lubricants

- Elastomer Lubricant Vegetable Glycerin
- Anti-seize compound, food grade

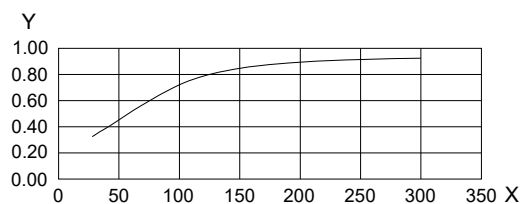
6.3 Gap between impeller and pump housing/cover (wear rings)

A leak flow (1) will occur in gap (2) between the rotating impeller and the stationary pump housing when the pump is operating. Leak flow (1) returns to impeller inlet (3) through gap (2).

Thus, the impeller must pump both leak flow (1) and the fluid through the pump from inlet (3) flange to outlet (4) flange. To minimize leak flow (1), an interchangeable wear ring (impeller seal) (A) is mounted.



We recommend that the seal gap never exceeds the maximum limit curve calculated according to an efficiency loss of maximum 2%.



X	Outlet DN
Y	Maximum seal gap [mm]

Tolerance table

If the difference exceeds the maximum seal gap according to the above limit curve, the below table informs whether the wear ring or the impeller is worn out.

GG pump housing + bronze wear ring + GG impeller

Wear ring inside			Impeller outside		
Nominal diameter	Max. tolerance	Min. tolerance	Nominal diameter	Max. tolerance	Min. tolerance
76	0.225	0.15	75.95	-0.2	-0.274
76	0.225	0.15	75.95	-0.2	-0.274
76	0.225	0.15	75.95	-0.2	-0.274
63	0.22	0.15	62.95	-0.19	-0.264
90	0.245	0.17	89.95	-0.22	-0.307
90	0.245	0.17	89.95	-0.22	-0.307
100	0.245	0.17	99.95	-0.22	-0.307
100	0.245	0.17	99.95	-0.22	-0.307
100	0.245	0.17	99.95	-0.22	-0.307
112	0.25	0.17	111.95	-0.24	-0.327
112	0.25	0.17	111.95	-0.24	-0.327
112	0.25	0.17	111.95	-0.24	-0.327
122	0.265	0.185	121.95	-0.26	-0.36
130	0.265	0.185	129.95	-0.26	-0.36
130	0.265	0.185	129.95	-0.26	-0.36
154	0.275	0.195	153.95	-0.28	-0.38
154	0.275	0.195	153.95	-0.28	-0.38
185	0.3	0.21	184.95	-0.34	-0.455
185	0.3	0.21	184.95	-0.34	-0.455
185	0.3	0.21	184.95	-0.34	-0.455
200	0.31	0.22	199.95	-0.34	-0.455
144	0.275	0.195	143.95	-0.28	-0.38
224	0.31	0.22	223.95	-0.38	-0.495
174	0.3	0.21	173.95	-0.31	-0.41
224	0.31	0.22	223.95	-0.38	-0.495
210	0.31	0.22	209.95	-0.38	-0.495
222	0.25	0.05	221.95	-0.38	-0.495
230	0.25	0.05	229.95	-0.42	-0.54
240	0.25	0.05	239.95	-0.42	-0.535
260	0.25	0.05	259.95	-0.48	-0.61
250	0.25	0.05	249.95	-0.42	-0.535

SS pump housing + SS wear ring + SS impeller

Wear ring inside			Impeller outside		
Nominal diameter	Max. tolerance	Min. tolerance	Nominal diameter	Max. tolerance	Min. tolerance
76.5	0.074	0	76	-0.2	-0.274
76.5	0.074	0	76	-0.2	-0.274
76.5	0.074	0	76	-0.2	-0.274
63.5	0.74	0	63	-0.19	-0.264
90.55	0.087	0	90	-0.22	-0.307
90.55	0.087	0	90	-0.22	-0.307
100.55	0.087	0	100	-0.22	-0.307
100.55	0.087	0	100	-0.22	-0.307
100.55	0.087	0	100	-0.22	-0.307
112.55	0.087	0	112	-0.24	-0.327
112.55	0.087	0	112	-0.24	-0.327
112.55	0.087	0	112	-0.24	-0.327
122.6	0.1	0	122	-0.26	-0.36
130.6	0.1	0	130	-0.26	-0.36
130.6	0.1	0	130	-0.26	-0.36
154.6	0.1	0	154	-0.28	-0.38
154.6	0.1	0	154	-0.28	-0.38
185.65	0.115	0	185	-0.34	-0.455
185.65	0.115	0	185	-0.34	-0.455
185.65	0.115	0	185	-0.34	-0.455
200.65	0.115	0	200	-0.34	-0.455
144.6	0.1	0	144	-0.28	-0.38
224.65	0.115	0	224	-0.38	-0.495
174.6	0.1	0	174	-0.31	-0.41
224.65	0.115	0	224	-0.38	-0.495
210.65	0.115	0	210	-0.38	-0.495

Related information

5.2 Checking the gap between the impeller and the pump housing/cover (wear rings)

6.4 Related documents

You can find further product information about NK, NKE, NKG, NKGE on grundfos.com:



6.5 Service videos

You can find video instructions for the service of NK, NKE, NKG, NKGE pumps by exploring the following QR codes/links:

Video	QR code
How to dismantle and assemble Grundfos NK, NKE, NKG, NKGE single-stage pump	

7. Fault finding the product



DANGER **Electric shock**

Death or serious personal injury

- Before removing the terminal box cover and before removing or dismantling the pump, make sure that the power supply has been switched off and that it cannot be accidentally switched on again.



WARNING **Escaping liquid**

Death or serious personal injury

- Pay attention to the orientation of the vent hole to ensure that the escaping liquid does not cause personal injury or damage to the motor or other components.
- In hot-liquid installations, pay special attention to the risk of personal injury caused by scalding hot liquid.
- In cold-liquid installations, pay special attention to the risk of personal injury caused by cold liquid.



CAUTION **Hot or cold surface**

Minor or moderate personal injury



- When pumping hot or cold liquids, make sure that persons cannot accidentally come into contact with hot or cold surfaces.

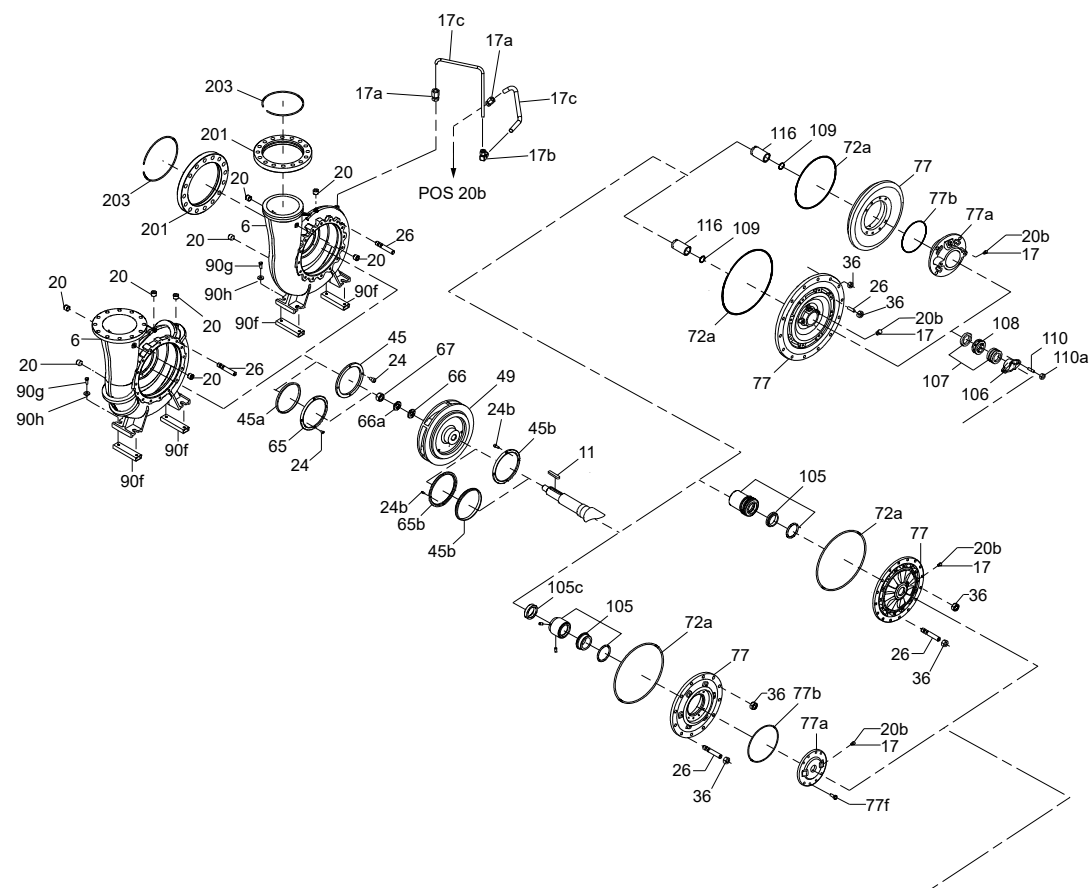
Fault	Cause	Remedy
1. The pump delivers no or too little liquid.	a) The electrical connection is wrong, for instance two phases.	1. Check the electrical connection. 2. Remedy, if necessary.
	b) The direction of rotation is wrong.	• Interchange two phases of the power supply.
	c) There is air in inlet pipe.	• Vent the inlet pipe or the pump.
	d) The counterpressure is too high.	1. Set the duty point according to the flow and head that the pump is selected for. 2. Check the system for debris. 3. Clean the system, if necessary.
	e) The inlet pressure is too low.	• Increase the liquid level on the inlet side. • Open the isolating valve in the inlet pipe. • Make sure that all the conditions in section Pipes and connections are complied with.
	f) The inlet pipe or impeller is blocked by debris.	• Clean the inlet pipe or pump.
	g) The pump draws in air due to a defective seal.	1. Check the pipeline seals, pump housing gaskets and shaft seals. 2. Replace gaskets and seals, if necessary.
	h) The pump draws in air due to low liquid level.	1. Increase the liquid level on the inlet side. 2. Keep the liquid level as constant as possible.
2. The motor-protective circuit breaker has tripped because the motor is overloaded.	a) The pump is blocked by debris.	• Clean the pump.
	b) The pump is running above rated duty point.	• Set the duty point according to the flow and head that the pump is selected for.
	c) The density or viscosity of the liquid is higher than specified upon order.	• If less flow is sufficient, reduce the flow on the outlet side. • If less flow is insufficient, fit a more powerful motor.
	d) The motor-protective circuit breaker overload setting is incorrect.	1. Check the setting of the motor-protective circuit breaker. 2. Adjust the setting if necessary.
	e) The motor runs on two phases.	1. Check the electrical connection. 2. Replace the fuse, if defective.
	f) The motor may be faulty	1. Check the motor. 2. Replace the motor if necessary.

Fault	Cause	Remedy
3. The pump makes too much noise. The pump runs unevenly and vibrates.	a) The inlet pressure is too low, resulting in cavitation in the pump.	• Increase the liquid level on the inlet side. • Open the isolating valve in the inlet pipe. • Make sure that all the conditions in section Pipes are complied with.
	b) There is air in the inlet pipe or pump.	• Vent the inlet pipe or the pump.
	c) The counterpressure is lower than specified.	• Set the duty point according to the flow and head that the pump is selected for.
	d) The pump draws in air due to low liquid level.	• Increase the liquid level on the inlet side and keep it as constant as possible.
	e) The impeller is out of balance or the impeller blades are clogged.	1. Clean the impeller. 2. Check the impeller blades, clean them if necessary.
	f) The split coupling is out of balance.	1. Check coupling gap and that set screws in split coupling are tightened. 2. Disassemble split coupling to inspect keys and keyways and their alignment with coupling pieces.
	g) The inner parts are worn.	• Replace the defective parts.
	h) The pump is stressed by the pipes thus causing starting noise.	• Mount the pump so that it is not stressed. • Support the pipes.
	i) The bearings are defective.	• Replace the bearings.
	j) The motor fan is defective.	• Replace the fan.
	k) There are foreign bodies in the pump.	• Clean the pump.
4. The pump, connections or mechanical shaft seal is leaking.	l) Frequency converter operation causes noise.	• Find the different remedies in Frequency converter operation section. See section Frequency converter operation.
	a) The pump is stressed by the pipes which causes leaks in the pump housing or at connections.	• Mount the pump so that it is not stressed. • Support the pipes.
	b) Pump housing gaskets and gaskets at connections are defective.	• Replace the pump housing gaskets or gaskets at connections.
	c) The mechanical shaft seal is dirty or stuck together.	• Check and clean the mechanical shaft seal.
	d) The mechanical shaft seal is defective.	• Replace the mechanical shaft seal.
5. The temperature in the pump or motor is too high.	e) The shaft surface is defective.	• Replace the shaft.
	a) There is air in the inlet pipe or pump.	1. Vent the inlet pipe or the pump. 2. Fill up the inlet pipe and the pump again.
	b) The inlet pressure is too low.	• Increase the liquid level on the inlet side. • Open the isolating valve in the inlet pipe. • Make sure that all the conditions in section Pipes are complied with.
	c) The bearings are lubricated with too little, too much or unsuitable lubricant.	• Replenish, reduce or replace the lubricant.
	d) The axial pressure is too high.	1. Check the relief holes of the impeller on the inlet side. 2. Clean the holes, if necessary
	e) The motor-protective circuit breaker is defective or the setting is incorrect.	1. Check the setting of the motor-protective circuit breaker. 2. Replace the circuit breaker if necessary.
6. Oil is leaking from the bearing bracket.	f) The motor is overloaded.	• Reduce the flow rate.
	a) The bearing bracket has been filled with too much oil through the filling hole, resulting in an oil level above the bottom of the shaft.	Drain off oil until the constant-level oiler starts to operate, that is when air bubbles can be seen in the reservoir.
7. Oil is leaking from the reservoir.	b) The oil seals are defective.	Replace the oil seals.
	The threads on the reservoir are damaged.	Replace the reservoir.

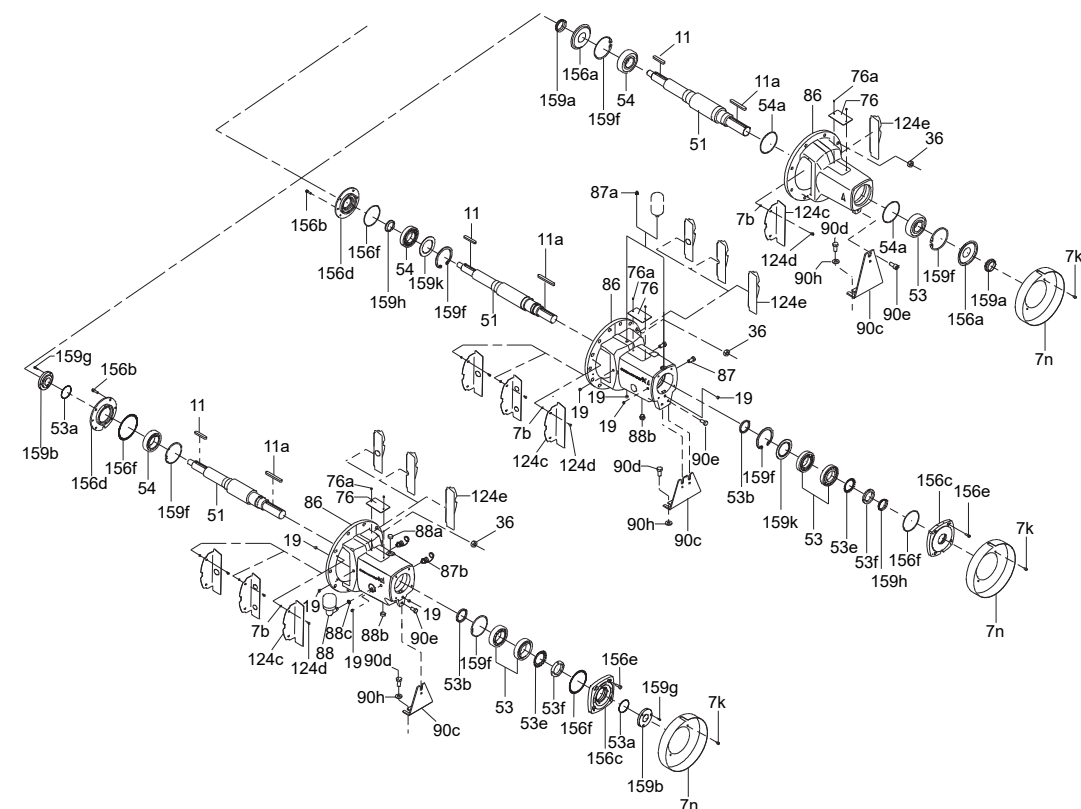
[illegible]

32

Tangential outlet, single seal, closed impeller



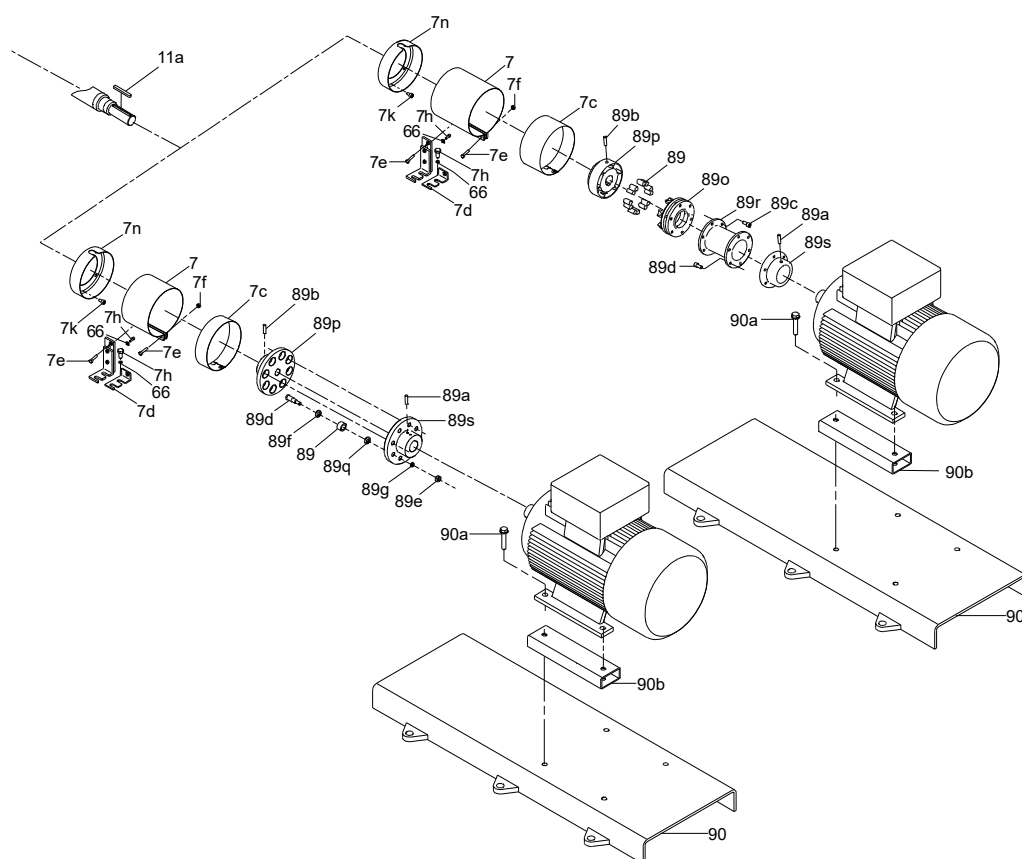
Bearing bracket



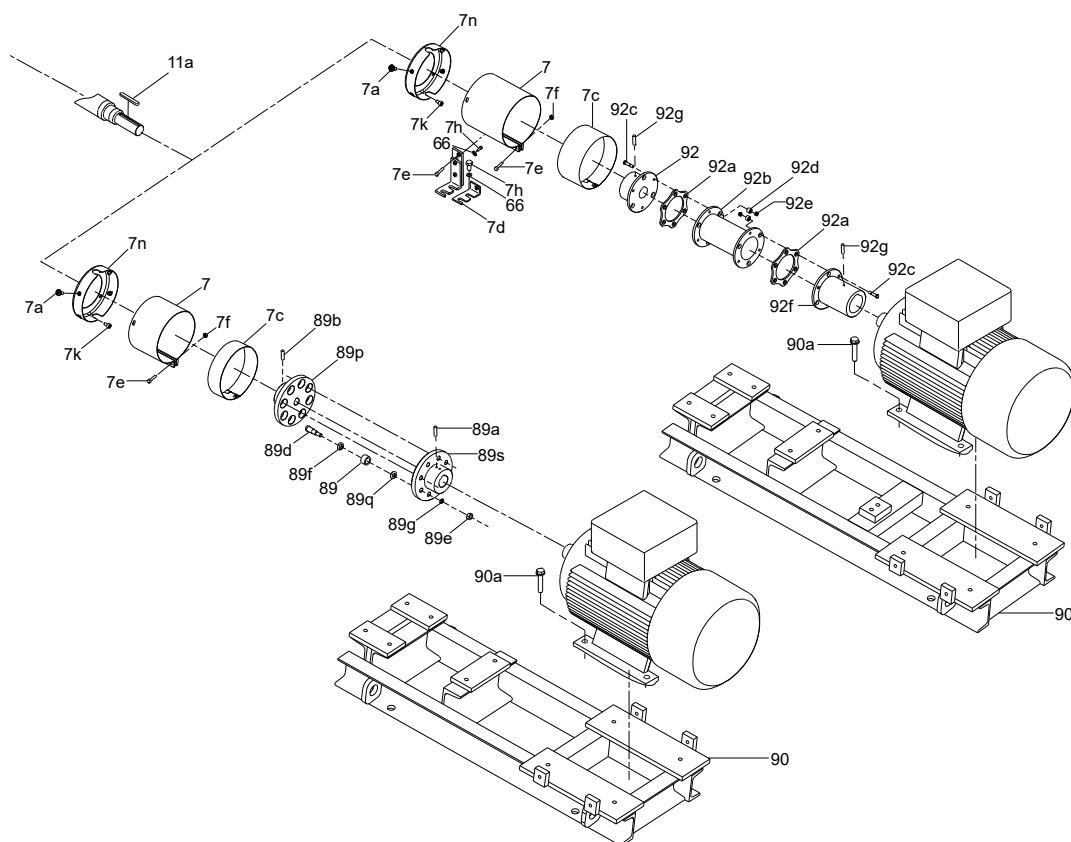
TM082148

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Coupling and base frame, Service range - R1

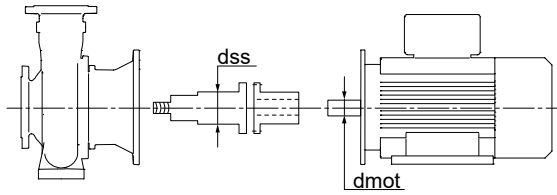


Coupling and base frame, Service range - R2

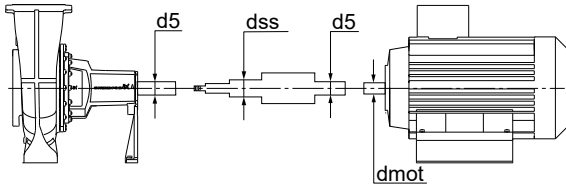


Appendix A

A.1. Drawings for special tools



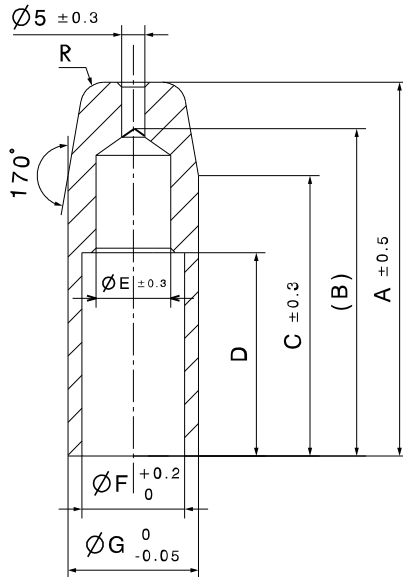
NB dss, dmot dimensions



NK dss, d5, dmot dimensions

Protective tool

This dimensional drawing can be used to manufacture needed protective tool. The tools can be manufactured in steel or nylon.

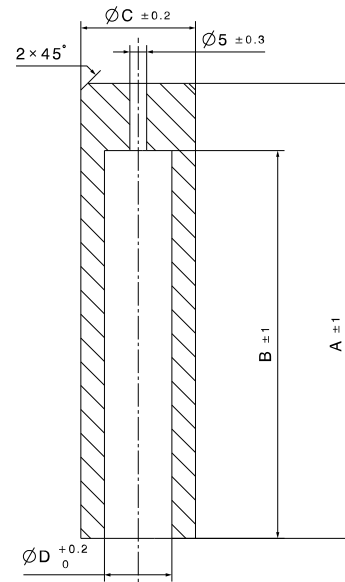


TM083954

Shaft seal diameter - dss [mm]	A	B	C	D	E	F	G	R
20	80	70	65	43.5	14	15	20	3
28	80	70	60	43.5	16	22	28	5
38	114	100	84	66	22	30	38	5
48	140	125	110	86	27	38	48	5
55	160	145	130	96.5	31	44	55	5
60	165	150	135	106	37	50	60	5

Punch for shaft seal

This dimensional drawing can be used to manufacture needed punch tool. The tools can be manufactured in steel or nylon.

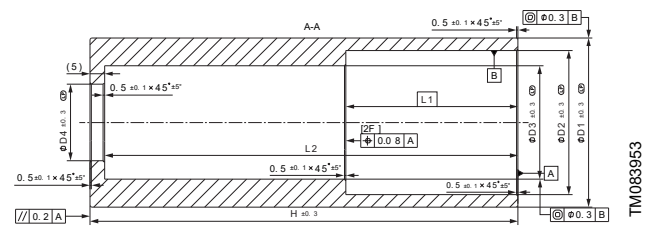
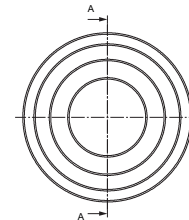


TM083952

Shaft seal diameter - dss [mm]	A	B	C	D
20	135	115	34	20
28	147	127	43	28
38	202	182	54	38
48	253.5	233.5	64	48
55	308.5	288.5	73	55
60	331.5	311.5	78	60
100	232	212	124	100

Positioning tool

This dimensional drawing can be used to manufacture needed positioning tool. The tools can be manufactured in steel or nylon.



TM083953

Shaft seal	d5/dss	H	ØD1	ØD2	ØD3	ØD4	L1	L2	Weight [kg]
Single	D16/Ø20	44.5	24	-	15.5	13	-	39.5	0.094
Single	D24/Ø28	44.5	34	-	22.5	16	-	39.5	0.185
Single	D32/Ø38	67	44	-	30.5	20	-	62	0.429
Single	D42/Ø48	87	54	-	38.5	26	-	82	0.788
Single	D48/Ø55	97.5	61	-	44.5	29	-	92.5	1.074
Single	D60/Ø60	107	66	-	50.5	35	-	102	1.224
Single	D100/Ø100	153	110	-	85.5	18	-	148	0.683

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