

# Standardised Water Pump

## Etanorm

Fixed Speed / Variable Speed  
50 Hz / 60 Hz  
Europe (EU)  
Middle East (ME)  
North Africa (NA)

## Type Series Booklet



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Type Series Booklet Etanorm

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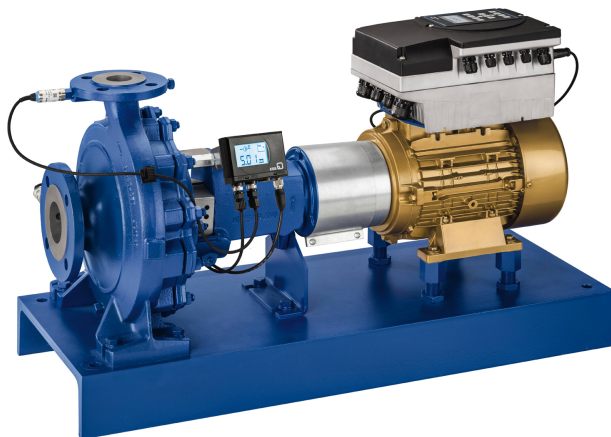
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## Centrifugal Pumps with Shaft Seal

### Standardised Water Pumps

## Etanorm (EU / ME / NA)



**i** The product illustrated as an example may include options incurring a surcharge.

#### Main applications

- Handling clean or aggressive fluids not chemically and mechanically aggressive to the pump materials.
- Water supply systems
- Cooling circuits
- Swimming pools
- Fire-fighting systems
- General irrigation systems
- Drainage systems
- Heating systems
- Air-conditioning systems
- Spray irrigation systems

#### Fluids handled

- Seawater
- Brackish water
- Drinking water
- High-temperature hot water
- Service water
- Fire-fighting water
- Brine
- Cleaning agents
- Condensate
- Oils

#### Further information on fluids handled

Overview of fluids handled (⇒ Page 16)

### Operating data

Table 1: Operating properties

Characteristic		Value	
		50 Hz	60 Hz
Flow rate	Q m³/h	≤ 1930	≤ 2321
Head	H [m]	≤ 160	≤ 160
Fluid temperature	T [°C]	≥ -30	≥ -30
		≤ +140	≤ +140
Operating pressure	p [bar]	≤ 16	≤ 16

### Design details

#### Design

- Volute casing pump
- Horizontal installation
- Back pull-out design
- Single-stage
- Dimensions and ratings to EN 733
- Requirements to 2009/125/EC Directive
- Fixed speed version (without PumpDrive 2 / PumpDrive 2 Eco / PumpDrive R) / variable speed version (with PumpDrive 2 / PumpDrive 2 Eco / PumpDrive R)

#### Pump casing

- Radially split volute casing
- Volute casing with integrally cast pump feet
- Replaceable casing wear rings (optional for pump casing material C)

#### Drive (fixed speed version)

Standard design:

- KSB/Siemens surface-cooled IEC frame three-phase squirrel-cage motor
- Efficiency class IE1 (size 71/80) / IE3 (from size 90) to IEC 60034-30
- Rated voltage (50 Hz) 230 V / 400 V ≤ 2.20 kW
- Rated voltage (50 Hz) 400 V / 690 V ≥ 3.00 kW
- Rated voltage (60 Hz) - / 460 V ≤ 2.20 kW
- Rated voltage (60 Hz) 460 V / - ≥ 3.00 kW
- Type of construction IM B3
- Enclosure IP55
- Duty type: continuous duty S1
- Thermal class F with temperature sensor, 1 PTC thermistor (size 80/90) / 3 PTC thermistors (from size 100)

Explosion-proof design:

- KSB surface-cooled IEC three-phase current squirrel-cage motor
- Efficiency class IE2 / IE3 to IEC 60034-30
- Rated voltage (50 Hz) 230 V / 400 V ≤ 2.50 kW
- Rated voltage (50 Hz) 400 V / 690 V ≥ 3.30 kW
- Rated voltage (60 Hz) - / 460 V ≤ 2.50 kW
- Rated voltage (60 Hz) 460 V / - ≥ 3.30 kW
- Type of construction IM B3
- Enclosure IP55
- Duty type: continuous duty S1

- II 3G Ex ec IIC T3 Gc
- II 2G Ex eb IIC T3 Gb
- II 2G Ex db (eb) IIB T4 Gb
- II 2G Ex db (eb) IIC T4 Gb

### Drive (variable speed version)

KSB SuPremE motor:

- Surface-cooled KSB SuPremE motor, IEC-compatible, magnetless synchronous reluctance motor<sup>1)</sup> (PumpDrive required)
- Efficiency class IE4/IE5 to IEC TS 60034-30-2:2016
- Mounting points to EN 50347:2001
- Envelope dimensions to DIN VDE 42673-4:2011-07
- Type of construction IM B3
- Enclosure IP55
- Duty type: continuous duty S1
- Thermal class F with temperature sensor, 3 PTC thermistors
- Shaft centreline height 71 to 225 mm
- Rated power 0.55 kW to 45 kW
- Rated speed 1500 rpm or 3000 rpm
- Frequency 50 Hz / 60 Hz (PumpDrive input)
- Voltage 380 V to 480 V (PumpDrive input)

KSB SuPremE X1:

- With terminal box for connecting to PumpDrive 2 or PumpDrive R for mounting on walls and in control cabinets

KSB SuPremE X2:

- Equipped for being fitted with a motor-mounted PumpDrive 2

PumpDrive 2 / PumpDrive 2 Eco:

- Self-cooling frequency inverter of modular design for the continuously variable speed control of asynchronous motors and synchronous reluctance motors by means of analog standard signals, a field bus or the control panel
- Identical design of frequency inverter for motor mounting, wall mounting and cabinet mounting
- Mains voltage 3~ 380 V AC -10 % to 480 V AC +10 %
- Mains frequency 50 Hz to 60 Hz  $\pm$  2 %

PumpDrive R:

- Self-cooling frequency inverter of modular design for the continuously variable speed control of asynchronous motors and synchronous reluctance motors, such as KSB SuPremE motors or permanent magnet synchronous motors, by means of analog standard signals, a field bus or the control panel
- Identical design of frequency inverter for the mounting types wall mounting and cabinet mounting
- Mains voltage 3~ 380 V AC -10 % to 480 V AC +10 %
- Extended mains voltage range (on request)
- Mains frequency 50 Hz to 60 Hz  $\pm$  2 %
- Extended power range with a nominal power of 110 kW (standard) or 1400 kW (on request)

PumpMeter:

- Intelligent pressure transmitter for pumps, with on-site display of measured values and operating data
- For recording the load profile of the pump
- Supplied completely assembled and parameterised for the individual pump

KSB Guard

- System for monitoring the pump's condition by means of temperature and vibration sensors
- Measured values and operating data may be retrieved via the KSB Guard app and the web portal at any time.

### Shaft seal

- Gland packing
- KSB single mechanical seal
- KSB cartridge seal
- Single mechanical seals and double mechanical seals to EN 12756
- Shaft equipped with replaceable shaft sleeve in the shaft seal area

### Impeller type

- Closed radial impeller with multiply curved vanes

### Bearings

Standard:

- Deep groove ball bearing (floating bearing assembly)

Reinforced:

- Deep groove ball bearing (floating bearing assembly)

### Further information on bearings

(⇒ Page 20)

<sup>1</sup> Motor sizes 0.55 kW / 0.75 kW with 1500 rpm are designed with permanent magnets.

## Designation

**i** To correctly interpret the designation refer to position 26. If a number is specified go to (⇒ Table 3) . If a letter is specified go to (⇒ Table 5) .

**Table 2:** Designation example, KSB EasySelect

Position																																				
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37
E	T	N		0	5	0	-	0	3	2	-	1	2	5		G	G	S	A	S	1	1	G	B	2	1	3	2	0	2	B	P	D	2	E	M
See name plate and data sheet																											See data sheet									

**Table 3:** Designation key KSB EasySelect

Position	Code	Description
1-4	Pump type	
	ETN	Etanorm
	ETNF	Etanorm fire-fighting pump
5-16	Size [mm], e.g.	
	050	Nominal suction nozzle diameter
	032	Nominal discharge nozzle diameter
	125	Nominal impeller diameter
17	Pump casing material	
	B	Bronze CC480K-GS / B30 C90700
	C	Stainless steel 1.4408 / A743CF8M
	G	Cast iron EN-GJL-250 / A48 Cl. 35
	S	Nodular cast iron EN-GJS-400-15 / A536 Gr. 60-40-18
18	Impeller material	
	B	Bronze CC480K-GS / B30 C90700
	C	Stainless steel 1.4408 / A743CF8M
	G	Cast iron EN-GJL-250 / A48 Cl. 35
	O	Cast steel 1.4008 / A743CF8M
	S	Nodular cast iron EN-GJS-400-15 / A536 Gr. 60-40-18
19	Design	
	A	Fire-fighting variant to APSAD
	H	Approved for drinking water to ACS
	K	Approved for drinking water to KSB standard
	M	Fire-fighting variant to FM or UL
	N	Fire-fighting variant, non-listed
	S	Standard
	U	Approved for drinking water to UBA
	V	Fire-fighting variant to VDS
	W	Approved for drinking water to WRAS
	X	Non-standard (BT3D, BT3)
20	Casing cover	
	A	Conical casing cover for version with single mechanical seal
	C	Cylindrical casing cover for version with gland packing or double mechanical seal
21	Shaft seal type	
	A	Single mechanical seal, conical casing cover without internal circulation
	D	Double mechanical seal in back-to-back arrangement
	E	Single mechanical seal, external circulation
	F	Single mechanical seal, external flushing
	I	Single mechanical seal, internal circulation (only for version with conical casing cover)
	P	Gland packing
	S	Single mechanical seal, internal circulation with anti-swirl baffles (only for version with conical casing cover)
	T	Double mechanical seal in tandem arrangement with internal circulation
22-23	Seal code of gland packing	
	1A	P1, with internal barrier fluid (Na), material RT/P (for hot water of up to 120 °C)
	1B	P2, without barrier fluid (Nb), material RT/P (for hot water of up to 120 °C)

Position	Code	Description
22-23	1C	P3, with external barrier fluid (Nc), material RT/P (for hot water of up to 110 °C)
	1D	P4, with external flushing liquid (VSH), material RT/P (for hot water of up to 110 °C)
	3B	P2, without barrier fluid (Nb), material BUP901/B5 (for hot water of up to 140 °C)
	4A	P1, with internal barrier fluid (Na), material BU5426 (for drinking water to ACS, for example)
	4B	P2, without barrier fluid (Nb), material BU5426 (for drinking water to ACS, for example)
	5A	P1, with internal barrier fluid (Na), material HE1727 (surface treatment technology)
	5B	P2, without barrier fluid (Nb), material HE1727 (surface treatment technology)
	Seal code, single mechanical seal	
	01	Q1Q1VGG 1 (ZN1181) $\geq -20 - \leq +110$ [°C]
	06	U3BEGG RMG13G606 $\geq -30 - \leq +140$ [°C]
	07	Q1Q1EGG 1A (ZN1181) $\geq -30 - \leq +110$ [°C]
	08	AQ1VGG M32N69 $\geq -30 - \leq +110$ [°C]
	09	U3U3VGG MG13G60 $\geq -20 - \leq +110$ [°C]
	10	Q1Q1X4GG 1 (ZN1181) $\geq -20 - \leq +110$ [°C]
	11	BQ1EGG-WA 1 (ZN1181) $\geq -30 - \leq +110$ [°C]
	12	Q12Q1M1GG1 M37GN83 $\geq -20 - \leq +100$ [°C]
	13	BQ1VGG 1 (ZN1181) $\geq -20 - \leq +110$ [°C]
	14	Q1Q1KY7G KMB13S2G9 $\geq -20 - \leq +120$ [°C]
	15	Q1Q1KGG M7G49 $\geq -20 - \leq +110$ [°C]
	16	BVPGG MG1S20 $\geq -20 - \leq +110$ [°C]
	17	Q1BVGG M7N / 5A $\geq -20 - \leq +110$ [°C]
	22	AQ1EGG M32N69 $\geq -30 - \leq +140$ [°C]
	66	Q7Q7EGG MG13G6 $\geq -30 - \leq +120$ [°C]
	67	Q6Q6X4GG MG13G60 / MG1G61S6 $\geq -20 - \leq +110$ [°C]
	Seal code, double mechanical seal in tandem arrangement	
	18	Q1Q1EGG/G MG12G6-E1 $\geq -30 - \leq +110$ [°C]
		Q1Q1EGG-G MG12G6-E1 $\geq -30 - \leq +110$ [°C]
	20	Q12Q1M1GG1 M37GN85 $\geq -20 - \leq +110$ [°C]
		Q1Q1EGG-G MG12G6-E1 $\geq -20 - \leq +110$ [°C]
	23	Q12Q1M1GG1 M37GN92 $\geq -20 - \leq +110$ [°C]
		Q1Q1EGG-G MG12G6-E1 $\geq -20 - \leq +110$ [°C]
	Seal code, double mechanical seal in back-to-back arrangement	
	21	Q1Q1KGG M7G49 $\geq -20 - \leq +110$ [°C]
		Q1Q1KGG M7G49 $\geq -20 - \leq +110$ [°C]
	24	Q1Q1KGG M7G49 $\geq -20 - \leq +110$ [°C]
		Q1BVGG M7N $\geq -20 - \leq +110$ [°C]
24	Bearing bracket	
	G	Grease lubrication
	O	Oil lubrication
25	Scope of supply	
	A	Pump only
	B	Pump, baseplate
	C	Pump, baseplate, coupling, coupling guard
	D	Pump, baseplate, coupling, coupling guard, motor
	E	Back pull-out unit
26	Shaft unit	
	2	Shaft unit 25
	3	Shaft unit 35
	4	Shaft unit 50
	5	Shaft unit 55
	6	Shaft unit 60
	7	Shaft unit 60.1
27-30	Motor rating P <sub>N</sub> [kW]	
	0007	0,75

Position	Code	Description
	...	...
	1320	132,00
31	Number of motor poles	
32	Product generation	
	B	Etanorm 2013
33-36	Version	
	-	Fixed speed version
	PD2	Variable speed version, with PumpDrive 2
	PD2E	Variable speed version, with PumpDrive 2 Eco
	IFS	MyFlow Drive
37	PumpMeter	
	M	PumpMeter

Table 4: Designation example, KSBase

Position																															
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
E	T	N		0	5	0	-	0	3	2	-	1	2	5		G	G	S	A	S	1	1	G	S	E	J	V	2	E	L	B
See name plate and data sheet																										See data sheet					

Table 5: Designation key KSBase

Position	Code	Description
1-4	Pump type	
	ETN	Etanorm
	ETNE	Etanorm complementary sizes
	ETNF	Etanorm fire-fighting pump
5-16	Size [mm], e.g.	
	050	Nominal suction nozzle diameter
	032	Nominal discharge nozzle diameter
	125	Nominal impeller diameter
17	Pump casing material	
	B	Bronze CC480K-GS / B30 C90700
	C	Stainless steel 1.4408 / A743CF8M
	G	Cast iron EN-GJL-250 / A48 Cl. 35
	S	Nodular cast iron EN-GJS-400-15 / A536 Gr. 60-40-18
	P	Cast iron without protective coating EN-GJL-250 without protective coating
18	Impeller material	
	B	Bronze CC480K-GS / B30 C90700
	C	Stainless steel 1.4408 / A743CF8M
	G	Cast iron EN-GJL-250 / A48 Cl. 35
	O	Cast steel 1.4008 / A743 Gr. CA15
	P	Cast iron without protective coating EN-GJL-250 without protective coating
19	Version	
	A	Fire-fighting variant to APSAD
	E	Design as per European Regulation (EC) No. 1935/2004
	H	Approved for drinking water to ACS
	K	Approved for drinking water to KSB standard
	L	Fire-fighting variant UL
	M	Fire-fighting variant to FM
	N	Fire-fighting variant, non-listed
	S	Standard
	U	Approved for drinking water to UBA
	V	Fire-fighting variant to VDS
	W	Approved for drinking water to WRAS
20	Casing cover connections	
	A	Conical casing cover without connection
	D	Conical casing cover with connection for external flushing
	E	Conical casing cover with connection for external flushing from discharge nozzle

Position	Code	Description
20	F	Cylindrical casing cover for version with gland packing without connection
	G	Cylindrical casing cover for version with gland packing with external barrier fluid or external flushing
	H	Cylindrical casing cover for version with double mechanical seal in tandem arrangement with connection for quench system
	I	Cylindrical casing cover for version with double mechanical seal in back-to-back arrangement with connection for barrier fluid system
	L	Cylindrical casing cover for version with gland packing or single mechanical seal, prepared for internal circulation
21	Shaft seal type	
	A	Single mechanical seal, conical casing cover
	C	Internal circulation with cylindrical casing cover
	D	Double mechanical seal in back-to-back arrangement
	E	Single mechanical seal, external circulation, conical casing cover
	F	Single mechanical seal, external flushing, conical casing cover
	G	Internal circulation with cylindrical casing cover for cartridge seal
	I	Single mechanical seal, internal circulation, conical casing cover
	T	Double mechanical seal in tandem arrangement with internal circulation
	1	Gland packing with internal barrier fluid (Na)
	2	Gland packing without barrier fluid (Nb)
	3	Gland packing with external barrier fluid (Nc)
	4	Gland packing with external flushing liquid (VSH)
22-23	Seal code of gland packing	
	1	A P1, with internal barrier fluid (Na), material RT/P (for hot water of up to 120 °C)
	1	B P2, without barrier fluid (Nb), material RT/P (for hot water of up to 120 °C)
	1	C P3, with external barrier fluid (Nc), material RT/P (for hot water of up to 110 °C)
	1	D P4, with external flushing liquid (VSH), material RT/P (for hot water of up to 110 °C)
	3	B P2, without barrier fluid (Nb), material BUP901/B5 (for hot water of up to 140 °C)
	4	A P1, with internal barrier fluid (Na), material BU5426 (for drinking water to ACS, for example)
	4	B P2, without barrier fluid (Nb), material BU5426 (for drinking water to ACS, for example)
	5	A P1, with internal barrier fluid (Na), material HE1727 (surface treatment technology)
	5	B P2, without barrier fluid (Nb), material HE1727 (surface treatment technology)
	Seal code, single mechanical seal	
	0	1 Q1Q1VGG 1 (ZN1181) $\geq -20 - \leq +110$ [°C]
	0	6 U3BEGG RMG13G606 $\geq -30 - \leq +140$ [°C]
	0	7 Q1Q1EGG 1A (ZN1181) $\geq -30 - \leq +110$ [°C]
	0	8 AQ1VGG M32N69 $\geq -30 - \leq +110$ [°C]
	0	9 U3U3VGG MG13G60 $\geq -20 - \leq +110$ [°C]
	1	0 Q1Q1X4GG 1 (ZN1181) $\geq -20 - \leq +110$ [°C]
	1	1 BQ1EGG-WA 1 (ZN1181) $\geq -30 - \leq +110$ [°C]
	1	2 Q12Q1M1GG1 M37GN83 $\geq -20 - \leq +100$ [°C]
	1	3 BQ1VGG 1 (ZN1181) $\geq -20 - \leq +110$ [°C]
	1	4 Q1Q1KY7G KMB13S2G9 $\geq -20 - \leq +120$ [°C]
	1	5 Q1Q1KGG M7G49 $\geq -20 - \leq +110$ [°C]
	1	6 BVPGG MG1S20 $\geq -20 - \leq +110$ [°C]
	1	7 Q1BVGG M7N / 5A $\geq -20 - \leq +110$ [°C]
	2	2 AQ1EGG M32N69 $\geq -30 - \leq +140$ [°C]
	3	1 BQ7EGG/Y10-WA EMG12G6 $\geq -30 - \leq +120$ [°C]
	3	2 Q7Q7EGG/Y10-WA EMG12G6 $\geq -30 - \leq +80$ [°C]
	4	0 U2U2VGG 4M $\geq -5 - \leq +150$ [°C]
	4	1 Q1Q1U2GG 5A $\geq -20 - \leq +150$ [°C]
	4	2 A2Q1TGG 59U $\geq -20 - \leq +180$ [°C]
	4	3 Q1Q1TGG 59U $\geq -20 - \leq +180$ [°C]
	4	4 BQ1E4GG 4M $\geq -35 - \leq +120$ [°C]
	4	5 BQ7E1/Y10GG EMG13G6 $\geq -30 - \leq +110$ [°C]
	4	6 Q7Q7E1/Y10GG EMG13G6 $\geq -30 - \leq +110$ [°C]
	4	7 BQ1U1MG 5KSCB2S $\geq -5 - \leq +120$ [°C]
	4	8 Q1Q1U1MG 5KSCB2S $\geq -5 - \leq +180$ [°C]
	5	0 Q7Q7VGG/Y10 EMG12G6 $\geq -30 - \leq +85$ [°C]

Position	Code		Description		
22-23	5	1	BQ7V16GG/Y10	EMG13G6	≥ -14 - ≤ +120 [°C]
	5	2	Q7Q7V16GG/Y10	EMG13G6	≥ -14 - ≤ +120 [°C]
	6	6	Q7Q7EGG	MG13G6	≥ -30 - ≤ +120 [°C]
	6	7	Q6Q6X4GG	MG13G60 / MG1G61S6	≥ -20 - ≤ +110 [°C]
	Seal code, double mechanical seal in tandem arrangement				
	1	8	Q1Q1EGG/G	MG12G6-E1	≥ -30 - ≤ +110 [°C]
			Q1Q1EGG-G	MG12G6-E1	≥ -30 - ≤ +110 [°C]
	2	0	Q12Q1M1GG1	M37GN85	≥ -20 - ≤ +110 [°C]
			Q1Q1EGG-G	MG12G6-E1	≥ -20 - ≤ +110 [°C]
	2	3	Q12Q1M1GG1	M37GN92	≥ -20 - ≤ +110 [°C]
			Q1Q1EGG-G	MG12G6-E1	≥ -20 - ≤ +110 [°C]
	Seal code, double mechanical seal in back-to-back arrangement				
	2	1	Q1Q1KGG	M7G49	≥ -20 - ≤ +110 [°C]
			Q1Q1KGG	M7G49	≥ -20 - ≤ +110 [°C]
	2	4	Q1Q1KGG	M7G49	≥ -20 - ≤ +110 [°C]
			Q1BVGG	M7N	≥ -20 - ≤ +110 [°C]
24	Bearing bracket				
	G	Grease lubrication			
	O	Oil lubrication			
25	Order type				
	S	KSB standard			
	C	Extended standard			
	X	Special design			
26	Bearing bracket / Shaft unit				
	E	Shaft unit 25			
	F	Shaft unit 35			
	G	Shaft unit 50			
	H	Shaft unit 55			
	I	Shaft unit 60			
	J	Shaft unit 60.1			
	K	Shaft unit 65			
	L	Shaft unit 65.1			
	M	Shaft unit 65.2			
	N	Shaft unit 85			
	O	Shaft unit 85.1			
	P	Shaft unit 85.2			
27-28	Motor rating P <sub>N</sub> [kW]				
	A...J	0,37 kW			
	...	...			
	OU	725 kW			
29	Number of motor poles				
	2	2 poles			
	4	4 poles			
	6	6 poles			
30	Scope of supply				
	A	Bare-shaft pump			
	B	Bare-shaft pump, baseplate			
	C	Pump, baseplate			
	D	Pump, baseplate, coupling, coupling guard			
	E	Pump, baseplate, coupling, coupling guard, motor			
	F	Pump, baseplate, coupling			
	G	Back pull-out unit			
31	Accessories / Automation				
	A	KSB PumpDrive 2			
	B	KSB PumpMeter			
	C	KSB PumpDrive 2 & KSB PumpMeter			
	D	IFS			
	E	KSB Guard			
	F	Han-Drive 10E			

Position	Code	Description
31	G	Han-Drive 10E & KSB PumpMeter
	H	None
	I	ATEX
	J	KSB PumpDrive 2 & KSB Guard
	K	KSB PumpMeter 2 & KSB Guard
	L	KSB PumpDrive 2 & KSB PumpMeter & KSB Guard
32	Product generation	
	B	Generation B

## Materials

**Table 6:** Symbols key

Symbol	Description
<b>X</b>	Standard
<b>o</b>	Optional
-	Version not available / not feasible

**Table 7:** Overview of available materials

Part No. (⇒ Page 38)	Description	Material	Material variant <sup>2)</sup>							
			GG	GB	GC	BB	SG	SB	SC	CC
102	Volute casing	Grey cast iron EN-GJL-250 / A 48 Cl. 35B	<b>X</b>	<b>X</b>	<b>X</b>	-	-	-	-	-
		Bronze CC480K-GS/ B30 C90700	-	-	-	<b>X</b>	-	-	-	-
		Nodular cast iron EN-GJS-400-15 / A536 Gr. 60-40-18	-	-	-	-	<b>X</b>	<b>X</b>	<b>X</b>	-
		Stainless steel 1.4408 / A743 Gr. CF8 M	-	-	-	-	-	-	-	<b>X</b>
161	Conical casing cover	Grey cast iron EN-GJL-250/ A 48 Cl. 35B	<b>X</b>	<b>X</b>	<b>X</b>	-	-	-	-	-
		Bronze CC480K-GS/ B30 C90700	-	-	-	<b>X</b>	-	-	-	-
		Nodular cast iron EN-GJS-400-15 / A536 Gr. 60-40-18	-	-	-	-	<b>X</b>	<b>X</b>	<b>X</b>	-
		Stainless steel 1.4408 / A743 Gr. CF8 M	-	-	-	-	-	-	-	<b>X</b>
161	Cylindrical casing cover	Grey cast iron EN-GJL-250/ A 48 Cl. 35B	<b>o</b>	<b>o</b>	<b>o</b>	-	-	-	-	-
		Stainless steel 1.4408 / A743 Gr. CF8 M	-	-	-	-	-	-	-	<b>o</b>
		Bronze CC480K-GS/ B30 C90700	-	-	-	<b>o</b>	-	-	-	-
210	Shaft	Tempered steel C45+N	<b>X</b>	<b>X</b>	<b>X</b>	-	<b>X</b>	<b>X</b>	<b>X</b>	-
		Chrome steel 1.4057+QT800	<b>o</b>	<b>o</b>	<b>o</b>	-	<b>o</b>	<b>o</b>	<b>o</b>	-
		Duplex stainless steel 1.4462 / UNS S31803	<b>o</b>	<b>o</b>	<b>o</b>	<b>X</b>	<b>o</b>	<b>o</b>	<b>o</b>	<b>X</b>
230	Impeller	Grey cast iron EN-GJL-250 / A 48 Cl. 35B	<b>X</b>	-	-	-	<b>X</b>	-	-	-
		Bronze CC480K-DW	-	<b>X</b>	-	<b>X</b>	-	<b>X</b>	-	-
		Stainless steel 1.4408 / A743 Gr. CF8 M	-	-	<b>X</b>	-	-	-	<b>X</b>	<b>X</b>
330	Bearing bracket	Grey cast iron EN-GJL-250/ A48 Cl. 35B <sup>3)</sup>	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>
		Nodular cast iron EN-GJS-400-18-LT <sup>4)</sup>	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>
400	Gaskets	DPAF, asbestos-free	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>
502.01	Casing wear ring, suction side	JL / lamellar graphite cast iron	<b>X</b>	<b>X</b>	<b>X</b>	-	<b>X</b>	<b>X</b>	<b>X</b>	-
		Stainless steel (CrNiMoST) <sup>5)</sup>	<b>o</b>	-	<b>o</b>	-	-	-	-	<b>o</b>
		Bronze CC495K-GS	-	<b>o</b>	-	<b>X</b>	-	<b>o</b>	-	-
502.02	Casing wear ring, discharge side	JL / lamellar graphite cast iron	<b>X</b>	<b>X</b>	<b>X</b>	-	<b>X</b>	<b>X</b>	<b>X</b>	-
		Stainless steel (CrNiMoST) <sup>5)</sup>	<b>o</b>	-	<b>o</b>	-	-	-	-	<b>o</b>
		Bronze CC495K-GS	-	<b>o</b>	-	<b>X</b>	-	<b>o</b>	-	-
523	Shaft sleeve <sup>6)</sup>	Stainless steel (CrNiMoST) <sup>5)</sup>	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>
524	Shaft protecting sleeve <sup>7)</sup>	Stainless steel (CrNiMoST) <sup>5)</sup>	-	-	-	<b>X</b>	-	-	-	<b>X</b>
		Chrome steel 1.4122+QT750	<b>X</b>	<b>X</b>	<b>X</b>	-	-	-	-	-
902	Studs	Steel 8.8	<b>X</b>	<b>X</b>	<b>X</b>	-	<b>X</b>	<b>X</b>	<b>X</b>	-
		A4-70/ A193 Gr. B8M Cl. 2	<b>o</b>	<b>o</b>	<b>o</b>	<b>X</b>	<b>o</b>	<b>o</b>	<b>o</b>	<b>X</b>
903	Screw plugs	Steel	<b>X</b>	<b>X</b>	<b>X</b>	-	<b>X</b>	<b>X</b>	<b>X</b>	-
		A4/ AISI 316	<b>o</b>	<b>o</b>	<b>o</b>	<b>X</b>	<b>o</b>	<b>o</b>	<b>o</b>	<b>X</b>
920	Nut	8+A2A/ 8+B633 SC1 TP3	<b>X</b>	<b>X</b>	<b>X</b>	-	<b>X</b>	<b>X</b>	<b>X</b>	-
		A4/ AISI 316	<b>o</b>	<b>o</b>	<b>o</b>	<b>X</b>	<b>o</b>	<b>o</b>	<b>o</b>	<b>X</b>
920.95	Impeller nut	A4/ AISI 316	<b>o</b>	<b>X</b>	<b>X</b>	<b>X</b>	<b>o</b>	<b>X</b>	<b>X</b>	<b>X</b>
		Steel 8	<b>X</b>	-	-	-	<b>X</b>	-	-	-

<sup>2)</sup> Material variant P: cast iron without protective coating for drinking water

<sup>3)</sup> Valid for shaft units WS25, WS35, WS55 - bearing bracket LS (standard)

<sup>4)</sup> Valid for shaft units WS50, WS60 - bearing bracket LR (reinforced)

<sup>5)</sup> Possible materials for material group CrNiMo steel INT (material identification code 7605): 1.4401, 1.4404, 1.4408, 1.4571, AISI 316, AISI 316Ti, A743 Gr. CF8M, A479 TYPE 316L.

<sup>6)</sup> For versions with mechanical seal

<sup>7)</sup> For versions with gland packing

## Coating and preservation

- Coating and preservation to KSB standard

## Product benefits

- Improved efficiency and NPSHreq by experimentally verified hydraulic design of impellers (vanes)
- Operating costs reduced by trimming the nominal impeller diameter to match the specified duty point
- Little wear, low vibration levels and excellent smooth running characteristics thanks to good suction performance and virtually cavitation-free operation across a wide operating range
- Large variety of materials as standard for perfectly matching the pump to the fluid handled
- PumpDrive perfectly matched to pump and motor by default factory parameter settings
- Motor-mounted variable speed system up to 45 kW saves space
- Pump operation made fully transparent with PumpMeter
- The efficiency of the motor also exceeds 95 % of the nominal efficiency when the motor runs at 25 % of its nominal power on a quadratic torque-speed curve.
- Sustainable and environmentally friendly because no magnets based on "rare earth elements" such as NdFeB are used

- Information on benchmark efficiency or benchmark efficiency graph for MEI = 0.70 (0.40) for the pump based on the model shown in the Figure are available at: <http://www.europump.org/efficiencycharts>

## Acceptance tests and warranty

Materials inspection and testing:

- Test report 2.2 on request

Final inspection:

- Inspection certificate 3.1 to EN 10204 on request

Hydraulic test against surcharge

- Duty point to ISO 9906/2B
- NPSH test

 Other inspections/tests on request

Warranty:

- Warranties are given within the scope of the valid terms and conditions of sale and delivery.

## Product information

### Product information as per Regulation No. 1907/2006 (REACH)

For information as per chemicals Regulation (EC) No. 1907/2006 (REACH), see <https://www.ksb.com/ksb-en/About-KSB/Corporate-responsibility/reach/>.

### Product information as per Regulation No. 547/2012 (for water pumps with a maximum shaft power of 150 kW) implementing "Ecodesign" Directive 2009/125/EC

- Minimum efficiency index: see data sheet
- The benchmark for the most efficient water pumps is MEI  $\geq 0.70$ .
- Year of construction: see data sheet
- Manufacturer's name or trade mark, commercial registration number and place of manufacture: see data sheet or order documentation
- Product's type and size identifier: see data sheet
- Hydraulic pump efficiency (%) with trimmed impeller: see data sheet
- Pump performance curves, including efficiency characteristics: see documented characteristic curve
- The efficiency of a pump with a trimmed impeller is usually lower than that of a pump with full impeller diameter. Trimming of the impeller will adapt the pump to a fixed duty point, leading to reduced energy consumption. The minimum efficiency index (MEI) is based on the full impeller diameter.
- Operation of this water pump with variable duty points may be more efficient and economic when controlled, for example, by the use of a variable speed drive that matches the pump duty to the system.
- Information relevant for disassembly, recycling or disposal at end of life: see installation/operating manual

## Overview of product features / selection tables

### Overview of material variants

 Other designs on request

**Table 8:** Symbols key

Symbol	Description
X	Standard
-	Version not available / not feasible

**Table 9:** Overview of Etanorm variants

Variant	102 / Volute casing	230 / Impeller	Gland packing / mechanical seal	T [°C]	Main applications									
					Handling clean or aggressive fluids not chemically and mechanically aggressive to the pump materials	Water supply systems	Cooling circuits	Swimming pool applications	Fire-fighting systems	General irrigations systems	Drainage systems	Heating systems	Air-conditioning systems	Spray irrigation systems
GG01	Grey cast iron EN-GJL-250 / A 48 Cl. 35 B	Grey cast iron EN-GJL-250 / A 48 Cl. 35 B	Gland packing RT/P	≥ -20 - ≤ +110	-	-	X	-	-	-	-	X	X	-
GG06	Grey cast iron EN-GJL-250 / A 48 Cl. 35 B	Grey cast iron EN-GJL-250 / A 48 Cl. 35 B	SU 25, 35: mech. seal U3BEGG SU 55: mech. seal AQ1EGG	≥ -30 - ≤ +140	-	-	-	-	-	-	-	X	-	-
GG10	Grey cast iron EN-GJL-250 / A 48 Cl. 35 B	Grey cast iron EN-GJL-250 / A 48 Cl. 35 B	Mech. seal Q1Q1X4GG	≥ -20 - ≤ +110	-	X	-	X <sup>8)</sup>	X	X	X	-	-	X
GG11	Grey cast iron EN-GJL-250 / A 48 Cl. 35 B	Grey cast iron EN-GJL-250 / A 48 Cl. 35 B	Mech. seal BQ1EGG	≥ -30 - ≤ +110	X	X	X <sup>9)</sup>	-	X	-	-	-	X <sup>9)</sup>	-
GB01	Grey cast iron EN-GJL-250 / A 48 Cl. 35 B	Bronze CC480K-GS/ B30 C90700	Gland packing RT/P	≥ -20 - ≤ +110	-	-	X	-	-	-	-	X	X	-
GB06	Grey cast iron EN-GJL-250 / A 48 Cl. 35 B	Bronze CC480K-GS/ B30 C90700	SU 25, 35: mech. seal U3BEGG SU 55: mech. seal AQ1EGG	≥ -30 - ≤ +140	-	-	-	-	-	-	-	X	-	-
GB10	Grey cast iron EN-GJL-250 / A 48 Cl. 35 B	Bronze CC480K-GS/ B30 C90700	Mech. seal Q1Q1X4GG	≥ -20 - ≤ +110	-	X	-	X <sup>8)</sup>	X	X	X	-	-	X
GB11	Grey cast iron EN-GJL-250 / A 48 Cl. 35 B	Bronze CC480K-GS/ B30 C90700	Mech. seal BQ1EGG	≥ -30 - ≤ +110	X	X	X <sup>9)</sup>	-	X	-	-	-	X <sup>9)</sup>	-
SG10	Nodular cast iron EN-GJS-400-15 / A536 Gr. 60-40-18	Grey cast iron EN-GJL-250 / A 48 Cl. 35 B	Mech. seal Q1Q1X4GG	≥ -20 - ≤ +110	-	X	-	X <sup>8)</sup>	X	X	X	-	-	X
SG11	Nodular cast iron EN-GJS-400-15 / A536 Gr. 60-40-18	Grey cast iron EN-GJL-250 / A 48 Cl. 35 B	Mech. seal BQ1EGG	≥ -30 - ≤ +110	X	X	X <sup>9)</sup>	-	X	-	-	-	X <sup>9)</sup>	-
BB01	Bronze CC480K-GS / B30 C90700	Bronze CC480K-GS/ B30 C90700	Gland packing RT/P	≥ -20 - ≤ +110	-	-	X	-	-	-	-	X	X	-
BB10	Bronze CC480K-GS / B30 C90700	Bronze CC480K-GS/ B30 C90700	Mech. seal Q1Q1X4GG	≥ -20 - ≤ +110	-	X	-	X <sup>8)</sup>	X	X	X	-	-	X
BB11	Bronze CC480K-GS / B30 C90700	Bronze CC480K-GS/ B30 C90700	Mech. seal BQ1EGG	≥ -30 - ≤ +110	X	X	X <sup>9)</sup>	-	X	-	-	-	X <sup>9)</sup>	-

<sup>8</sup> Q1Q1VGG

<sup>9</sup> Q1Q1EGG / Q7Q7EGG, fluid handled: water, glycol with inhibitors

Variant	102 / Volute casing	230 / Impeller	Gland packing / mechanical seal	T [°C]	Main applications									
					Handling clean or aggressive fluids not chemically and mechanically aggressive to the pump materials	Water supply systems	Cooling circuits	Swimming pool applications	Fire-fighting systems	General irrigations systems	Drainage systems	Heating systems	Air-conditioning systems	Spray irrigation systems
CC01	Stainless steel 1.4408 / A743 Gr. CF8 M	Stainless steel 1.4408 / A743 Gr. CF8 M	Gland packing RT/P	$\geq -20 - \leq +110$	-	-	✗	-	-	-	-	✗	✗	-
CC10	Stainless steel 1.4408 / A743 Gr. CF8 M	Stainless steel 1.4408 / A743 Gr. CF8 M	Mech. seal Q1Q1X4GG	$\geq -20 - \leq +110$	-	✗	-	✗ <sub>8)</sub>	✗	✗	✗	-	-	✗
CC11	Stainless steel 1.4408 / A743 Gr. CF8 M	Stainless steel 1.4408 / A743 Gr. CF8 M	Mech. seal BQ1EGG	$\geq -30 - \leq +110$	✗	✗	✗ <sub>9)</sub>	-	✗	-	-	-	✗ <sub>9)</sub>	-

**Overview of fluids handled**
**Table 10:** Symbols key

Symbol	Description
X	Standard
-	Version not available / not feasible

**Table 11:** Excerpt from the overview of fluids handled with associated material variants

Fluid handled	T <sup>10)</sup>		Materials					Shaft seal								Comments	
			Casing/impeller					Gland packing RT/P	Gland packing, pure graphite	Mechanical seal							
	Minimum	Maximum	Grey cast iron / grey cast iron	Grey cast iron / tin bronze	Nodular cast iron / grey cast iron	Tin bronze / tin bronze	CrNiMo cast steel / CrNiMo cast steel			U3BEGG	Q1Q1EGG	U3U3VGG	Q1Q1X4GG	BQ1EGG	Q12Q1M1GG1		
																	[°C]
Water																	
Brackish water <sup>11)</sup>	-	≤ 25	-	-	-	✗	-	✗	-	-	-	-	✗	-	-	-	CrNiMo cast steel can be used.
Fire-fighting water <sup>12)</sup>	-	≤ 60	-	✗	-	-	-	✗	-	-	-	-	✗	-	-	-	Contact KSB for supply to VdS guideline.
Heating water <sup>13)</sup>	-	≤ 110	✗	-	-	-	-	✗	-	-	-	-	-	✗	-	-	If used as circulating pump to DIN 4752: p ≤ 10 bar. If ductile material has been specified: "S"
Heating water	-	≤ 140	✗	-	-	-	-	-	✗	✗	-	-	-	-	-	-	
Heating water	-	≥ 110	✗	-	-	-	-	✗	-	-	-	-	✗	-	-	-	
Condensate	-	≤ 110	✗	-	-	-	-	✗	-	-	-	-	-	✗	-	-	-
Condensate, not conditioned	-	≤ 110	-	-	-	-	✗	✗	-	-	-	-	-	✗	-	-	-
Cooling water without antifreeze	-	≤ 60	✗	-	-	-	-	✗	-	-	-	-	✗	-	-	-	Open circuit: GB 1 / GB 10 required.
Cooling water with antifreeze <sup>14)</sup> , pH ≥ 7.5	≥ 30	≤ 60	✗	-	-	-	-	✗	-	-	-	-	-	✗	-	-	Open circuit: GB required
Cooling water with antifreeze <sup>14)</sup> , pH ≥ 7.5	≥ 60	≤ 110	✗	-	-	-	-	✗	-	-	✗	-	-	-	-	-	Open circuit: GB required
Slightly contaminated water	-	≤ 60	✗	-	-	-	-	✗	-	-	-	-	✗	-	-	-	-
Seawater	-	≤ 25	-	-	-	✗	-	✗	-	-	-	-	✗	-	-	-	CrNiMo cast steel can be used.
Pure water <sup>15)</sup>	-	≤ 60	✗	-	-	-	-	✗	-	-	-	-	-	✗	-	-	-
Raw water	-	≤ 60	✗	-	-	-	-	✗	-	-	-	-	✗	-	-	-	-
Swimming pool water (fresh water)	-	≤ 60	✗	-	-	-	-	✗	-	-	-	-	✗	-	-	-	Also applies to requirements as per DIN 19643
Swimming pool water <sup>16)</sup> : filtration	-	≤ 40	-	✗	-	-	-	-	-	-	-	-	✗	-	-	-	Variant GB; shaft C45+N, shaft sleeve CrNiMo steel, nut A4/ AISI 316, key A2, casing wear ring (suction side and discharge side) JL / lamellar graphite cast iron
Swimming pool water <sup>16)</sup> : water features; without turbulences and/or air content	-	≤ 40	-	✗	-	-	-	-	-	-	-	-	✗	-	-	-	Variant GB; shaft C45+N, shaft sleeve CrNiMo steel, nut A4/ AISI 316, key A2, casing wear ring (suction side and discharge side) CC495K-GS

<sup>10)</sup> T = fluid temperature

<sup>11)</sup> For components made of bronze: ammonia (NH<sub>3</sub>) ≤ 5 mg/kg, free from hydrogen sulphide (H<sub>2</sub>S); no limitation of Cl content required in this case. Please contact KSB if limits are exceeded.

<sup>12)</sup> General evaluation criteria for results of water analysis: pH ≥ 7, chlorides content (Cl) ≤ 250 mg/kg, chlorine (Cl<sub>2</sub>) ≤ 0.6 mg/kg.

<sup>13)</sup> Treatment to VdTÜV 1466, additional requirement: O<sub>2</sub> t ≤ 0.02 mg/l

<sup>14)</sup> Antifreeze on ethylene glycol basis with inhibitors, content > 20 % to 50 % (e.g. Antifrogen N)

<sup>15)</sup> No pure water, electrical conductivity at 25 °C: ≤ 800 µS/cm, neutral with regard to chemical corrosion

<sup>16)</sup> France: Observe the rules as per ministerial order dated 18 January 2002.

Fluid handled	T <sup>(10)</sup>		Materials					Shaft seal								Comments
			Casing/impeller					Gland packing RT/P	Gland packing, pure graphite	Mechanical seal						
	Minimum	Maximum	Grey cast iron / grey cast iron	Grey cast iron / tin bronze	Nodular cast iron / grey cast iron	Tin bronze / tin bronze	CrNiMo cast steel / CrNiMo cast steel			U3BEGG	Q1Q1EGG	U3U3VGG	Q1Q1X4GG	BQ1EGG	Q12Q1M1GG1	
[°C]	GG	GB	SG	BB	CC	1	3B	6	7	9	10	11	12			
Swimming pool water <sup>16)</sup> : water features; with turbulences and/or air content	-	≤ 40	-	-	-	✗	-	-	-	-	-	✗	-	-	Variant B; shaft 1.4571, shaft sleeve CrNiMo steel, nut A4/ AISI 316, key A2, casing wear ring (suction side and discharge side) CC495K-GS	
Swimming pool water (seawater)	-	≤ 40	-	-	-	✗	-	✗	-	-	-	✗	-	-	CrNiMo cast steel for t ≤ 25 °C	
Dam water	-	≤ 60	-	✗	-	-	-	✗	-	-	-	✗	-	-	If solids are contained, contact KSB.	
Drinking water <sup>17)</sup>	-	≤ 60	-	✗	-	-	-	✗	-	-	-	-	✗	-	Select material variant PB or PP (without protective coating) for drinking water.	
Partly desalinated water	-	≤ 110	✗	-	-	-	-	✗	-	-	-	-	✗	-	-	
Fully desalinated water	-	≤ 110	-	-	-	-	✗	✗	-	-	-	-	✗	-	Purity requirements cannot be met.	
Fully desalinated water as boiler feed water	-	≤ 110	✗	-	-	-	-	✗	-	-	-	-	✗	-	-	
Refrigerants, cooling brines																
Cooling brine; inorganic, pH > 7.5, inhibited	≥ 30	≤ 25	✗	-	-	-	-	✗	-	-	-	-	-	✗	-	-
Water with antifreeze, pH ≥ 7.5	≥ 30	≤ 60	✗	-	-	-	-	✗	-	-	-	-	-	✗	-	-
Water with antifreeze, pH ≥ 7.5	≥ 60	≤ 110	✗	-	-	-	-	✗	-	-	✗	-	-	-	-	-
Oils/emulsions																
Diesel oil, extra light fuel oil	-	≤ 60	-	-	✗	-	-	-	-	-	-	-	✗	-	-	GG possible, unless specific standards have to be observed
Lubricating oil, turbine oil, does not apply to SF-D oils (hardly flammable)	-	≤ 80	-	-	✗	-	-	-	-	-	-	-	✗	-	-	If specified without internal primer contact KSB. GG possible, unless specific standards have to be observed
Drilling emulsion, grinding emulsion	-	≤ 60	✗	-	-	-	-	-	-	-	-	✗	-	-	-	-
Oil-water emulsion	-	≤ 60	✗	-	-	-	-	-	-	-	-	✗	-	-	-	-
Brewery applications																
Beer mash	-	≤ 100	✗	-	-	-	-	-	-	-	-	-	-	-	✗	If there is a risk of the pump running dry due to excessive emptying of the tank, use an Etanorm with double mechanical seal in tandem arrangement.
Beer wort	-	≤ 100	✗	-	-	-	-	-	-	-	-	-	-	-	✗	

<sup>17)</sup> For France, ACS approval is required.

## Overview of material variants

Table 12: Symbols key

Symbol	Description
X	Standard
-	Version not available / not feasible

Table 13: Material variants available

Etanorm	Material variants							
	GG	GB	GC	BB	SG	SB	SC	CC
040-025-160	X	X	X	-	X	X	X	X
040-025-200	X	X	X	-	X	X	X	X
050-032-125.1	X	X	X	X	X	X	X	X
050-032-160.1	X	X	X	X	X	X	X	X
050-032-200.1	X	X	X	X	X	X	X	X
050-032-250.1	X	X	X	-	-	-	-	X
050-032-125	X	X	X	X	-	-	-	X
050-032-160	X	X	X	X	X	X	X	X
050-032-200	X	X	X	X	X	X	X	X
050-032-250	X	X	X	-	X	X	X	X
065-040-125	X	X	X	X	-	-	-	X
065-040-160	X	X	X	X	X	X	X	X
065-040-200	X	X	X	X	X	X	X	X
065-040-250	X	X	X	X	X	X	X	X
065-040-315	X	X	X	-	X	X	X	X
065-050-125	X	X	X	X	-	-	-	X
065-050-160	X	X	X	X	X	X	X	X
065-050-200	X	X	X	X	X	X	X	X
065-050-250	X	X	X	X	X	X	X	X
065-050-315	X	X	X	-	X	X	X	X
080-065-125	X	X	X	X	-	-	-	X
080-065-160	X	X	X	X	X	X	X	X
080-065-200	X	X	X	X	X	X	X	X
080-065-250	X	X	X	X	X	X	X	X
080-065-315	X	X	X	X	X	X	X	X
100-080-160	X	X	X	X	X	X	X	X
100-080-200	X	X	X	X	X	X	X	X
100-080-250	X	X	X	X	X	X	X	X
100-080-315	X	X	X	-	X	X	X	X
100-080-400	X	X	X	-	-	-	-	X
125-100-160	X	X	X	X	X	X	X	X
125-100-200	X	X	X	X	X	X	X	X
125-100-250	X	X	X	X	X	X	X	X
125-100-315	X	X	X	X	X	X	X	X
125-100-400	X	X	X	-	-	-	-	X
150-125-200	X	X	X	X	X	X	X	X
150-125-250	X	X	X	X	X	X	X	X
150-125-315	X	X	X	X	X	X	X	X
150-125-400	X	X	X	-	X	X	X	X
150-125-510	X	X	X	-	X	X	X	-
200-150-200	X	X	X	-	-	-	-	X
200-150-250	X	X	X	X	-	-	-	X
200-150-315	X	X	X	X	X	X	X	X
200-150-400	X	X	X	X	X	X	X	X
200-150-510	X	X	X	-	X	X	X	-
200-200-250	X	X	X	-	X	X	X	-
250-200-275	X	X	X	-	X	X	X	-
250-200-320	X	X	X	-	X	X	X	-
250-200-375	X	X	X	-	X	X	X	-
250-200-435	X	X	X	-	X	X	X	-

Etanorm	Material variants							
	GG	GB	GC	BB	SG	SB	SC	CC
250-200-510	X	X	X	-	X	X	X	-
300-250-295	X	X	X	-	X	X	X	-
300-250-295.1	X	X	X	-	X	X	X	-
300-250-320	X	X	X	-	X	X	X	-
300-250-375	X	X	X	-	X	X	X	-
300-250-435	X	X	X	-	X	X	X	-
300-250-510	X	X	X	-	X	X	X	-
350-300-350	X	X	X	-	X	X	X	-
350-300-350.1	X	X	X	-	X	X	X	-
350-300-375	X	X	X	-	X	X	X	-
350-300-435	X	X	X	-	X	X	X	-
350-300-510	X	X	X	-	X	X	X	-

## Bearings

Standard:

- Deep groove ball bearing (floating bearing assembly)

Reinforced:

- Deep groove ball bearing (floating bearing assembly)

### Example: WS\_25\_LS

**Table 14:** Bearing bracket designation

Designation	Description
WS	Bearing bracket, standardised water pump
25	Size code <sup>18)</sup>
LS	Standard
LR	Reinforced

## Bearings used

**Table 15:** Standard bearings: grease-lubricated deep groove ball bearings

Bearing bracket	Pump end	Drive end
WS_25_LS	6305 2Z C3	6305 2Z C3
WS_35_LS	6307 2Z C3	6307 2Z C3
WS_55_LS	6311 2Z C3	6311 2Z C3
WS_65_LS	6313 2Z C3	6313 2Z C3
WS_85_LS	6317 2Z C3	6317 2Z C3

**Table 16:** Standard bearings: oil-lubricated deep groove ball bearings

Bearing bracket	Pump end	Drive end
WS_25_LS	6305 C3	6305 C3
WS_35_LS	6307 C3	6307 C3
WS_55_LS	6311 C3	6311 C3
WS_65_LS	6313 C3	6313 C3
WS_85_LS	6317 C3	6317 C3

**Table 17:** Reinforced bearings: grease-lubricated deep groove ball bearings

Bearing bracket	Pump end	Drive end
WS_50_LR	6310 2Z C3	6310 2Z C3
WS_60_LR	6312 2Z C3	6312 2Z C3

**Table 18:** Reinforced bearings: oil-lubricated deep groove ball bearings

Bearing bracket	Pump end	Drive end
WS_50_LR	6310 C3	6310 C3
WS_60_LR	6312 C3	6312 C3

<sup>18)</sup> Referring to the dimensions of seal chamber and shaft end

## Overview of functions for variable speed version

Table 19: Overview of functions

Functions / firmware	PumpDrive 2	PumpDrive 2 Eco
<b>Protective functions</b>		
Thermal motor protection	X	X
Mains voltage monitoring	X	X
Phase failure, motor side	X	X
Short-circuit monitoring, motor side (phase to phase and phase to earth)	X	X
Dynamic overload protection by speed limitation (i <sup>2</sup> t control)	X	X
Resonant frequency suppression	X	X
Broken wire detection (live zero)	X	X
Protection against dry running and hydraulic blockage (sensorless due to learning function)	X	X
Dry running protection (external control signal)	X	X
Operating point estimation and characteristic curve control	X	X
<b>Open-loop control</b>		
Open-loop control mode	X	X
<b>Closed-loop control</b>		
Closed-loop control mode via integrated PID controller	X	X
Pressure control / differential pressure control ( $\Delta p$ const)	X	X
Pressure control / differential pressure control with dynamic pressure compensation ( $\Delta p$ var)	X	X
Flow rate control	X	X
Sensorless differential pressure control ( $\Delta p$ const) in a single-pump configuration	X	X
Sensorless differential pressure control with dynamic pressure compensation ( $\Delta p$ var) in a single-pump configuration	X	X
Sensorless flow rate control	X	X
Level control	X	X
Temperature control	X	X
Alternative setpoint	X	-
<b>Operation and monitoring (display)</b>		
Measured value display (pressure, head, speed, electric power, motor voltage, motor current, torque)	X	X
Fault history	X	X
Operating hours counter	X	X
Fault reporting via relay	X	X
<b>Frequency inverter functions</b>		
Programmable start ramps and stop ramps	X	X
Field-oriented control (vector control), V/f control	X	X
Configurable motor control method (asynchronous motor, KSB SuPremE)	X	X
Automatic motor adaptation (AMA)	X	X
Motor standstill heater	X	X
Manual-0-automatic mode	X	X
External OFF	X	X
External minimum speed	X	X
Sleep mode (stand-by mode)	X	X
Energy savings meter	X	-
<b>Pump functions</b>		
Flow rate estimation	X	X
M12 module with PumpMeter bus connection	X	X
M12 module for dual-pump configuration	X	X
M12 module for multiple pump configuration with up to 6 pumps	X	X
Functional check run	X	X
Deragging	X	X
Integrated dual-pump configuration (1×100 % with redundant pump or 2×50 % without redundant pump)	X	X
Multiple pump configuration with up to 6 pumps	X	X
Waste water function: start-up at maximum speed	X	-
Waste water function: rinsing function	X	-
<b>Operation</b>		

Functions / firmware	PumpDrive 2	PumpDrive 2 Eco
Control panel	✗	✗ <sup>19)</sup>
Commissioning wizard	✗	✗ <sup>20)</sup>
Favourites list	✗	-
Service interface	✗	✗

## Pressure limits and temperature limits

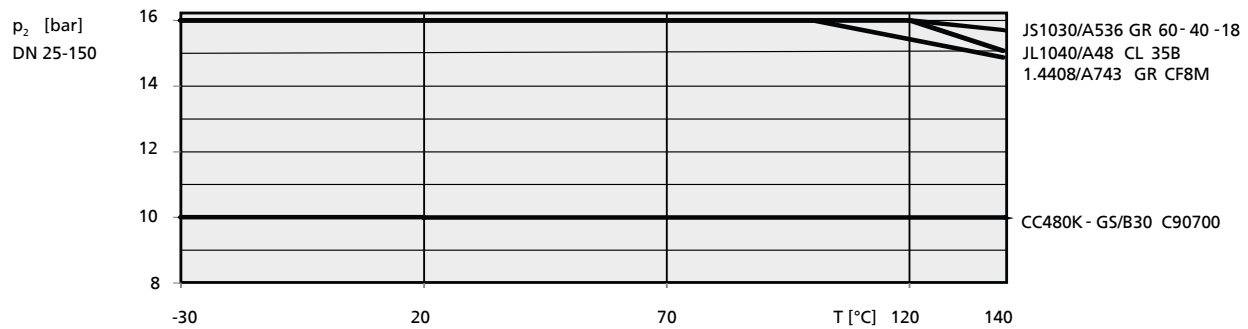
### Test pressure limits and temperature limits

**Table 20:** Pressure limits and temperature limits as a function of material variant

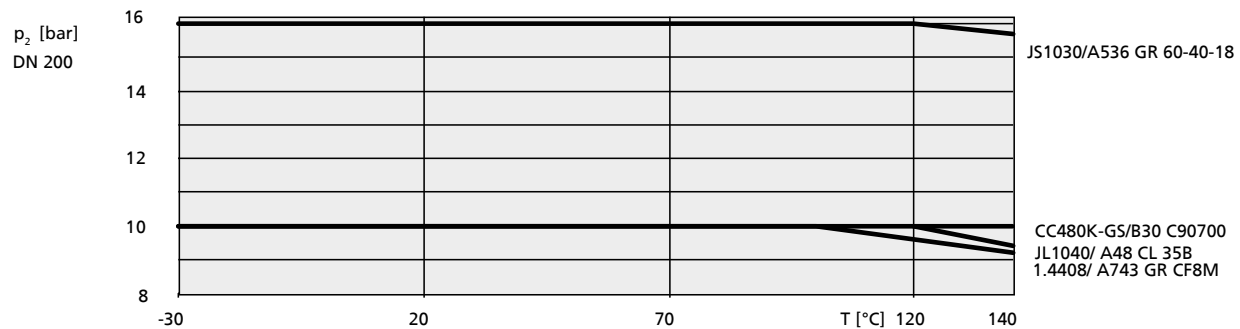
Material variant	Fluid temperature <sup>21)22)</sup>	Discharge pressure $p_2$	Test pressure <sup>23)</sup>
	[°C]	[bar]	[bar]
GG, GB, GC	-30 to +140	16/10 <sup>24)</sup>	21/15 <sup>24)</sup>
SG, SB, SC	-30 to +140	16	25
BB	-30 to +140	10	15
CC	-30 to +140	16	21

### In-service pressure limits and temperature limits

With flange to EN 1092-1, 1092-2 and 1092-3



**Fig. 1:** Pump pressure limits and temperature limits DN 25 - DN 150 for ETN<sup>25)</sup>



**Fig. 2:** Pump pressure limits and temperature limits DN 200 for ETN<sup>25)</sup>

<sup>19)</sup> Some functions can only be parameterised and/or displayed using the KSB ServiceTool (see operating manual).

<sup>20)</sup> Only available via KSB ServiceTool or app

<sup>21)</sup> For hot water heating systems to DIN 4752, Section 4.5, application limits must be observed.

<sup>22)</sup> For fluid temperatures >140 °C use Etanorm SYT.

<sup>23)</sup> The casing components have been checked for leakage by means of internal pressure tests to ZN 1650 with water.

<sup>24)</sup> For pump type ETNE (⇒ Page 24)

<sup>25)</sup> For pump type ETN (⇒ Page 24)

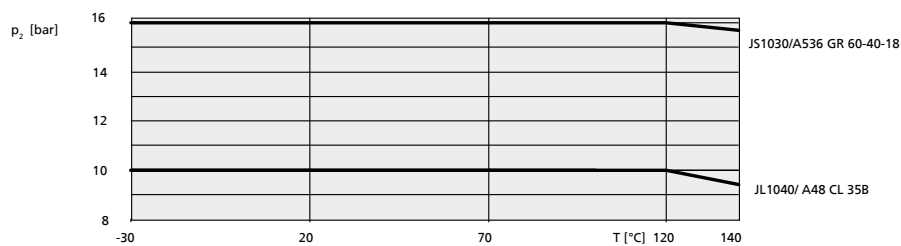


Fig. 3: Pump pressure limits and temperature limits<sup>26)</sup> ETNE<sup>24)</sup>

<sup>26)</sup> The sum of inlet pressure and shut-off head must not exceed the values indicated in the diagram.

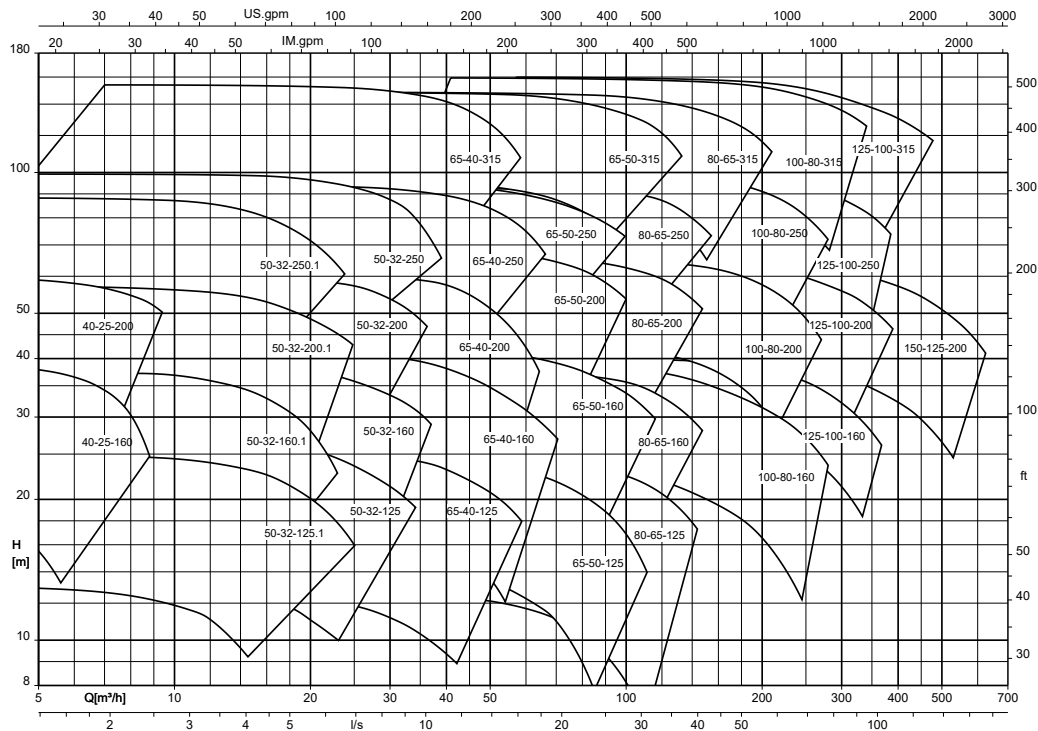
**Technical data**
**Etanorm**
**Table 21: Technical data**

Etanorm	Pump type		Shaft unit		Impeller					Speed limit	
	ETN	ETNE	Bearing bracket LS (standard)	Bearing bracket LR (reinforced)	Impeller outlet width	Free passage diameter	Impeller inlet diameter	Nominal impeller diameter		Maximum	Minimum
								Maximum	Minimum		
040-025-160	✗	-	WS_25_LS	-	6,0	5,7	45,2	169	135	3600	500
040-025-200	✗	-	WS_25_LS	-	6,0	5,7	45,2	209	165	3600	500
050-032-125.1	✗	-	WS_25_LS	-	6,8	6,0	52,4	139	104	3600	500
050-032-160.1	✗	-	WS_25_LS	-	5,7	5,4	52,7	170	135	4400	500
050-032-200.1	✗	-	WS_25_LS	-	5,6	5,3	54,0	204	168	3800	500
050-032-250.1	✗	-	WS_25_LS	-	5,5	5,2	58,3	254	200	3600	500
050-032-125	✗	-	WS_25_LS	-	9,8	5,7	63,4	139	104	3600	500
050-032-160	✗	-	WS_25_LS	-	8,5	5,8	60,6	174	132	3600	500
050-032-200	✗	-	WS_25_LS	-	7,0	6,7	62,9	209	170	3700	500
050-032-250	✗	-	WS_25_LS	-	7,5	7,1	62,6	261	205	3600	500
065-040-125	✗	-	WS_25_LS	-	14,0	9,6	73,9	139	104	3600	500
065-040-160	✗	-	WS_25_LS	-	13,0	11,5	70,0	174	128	4400	500
065-040-200	✗	-	WS_25_LS	-	9,4	8,9	69,4	209	160	3700	500
065-040-250	✗	-	WS_25_LS	-	8,4	8,0	74,1	260	195	3600	500
065-040-315	✗	-	WS_35_LS	-	7,5	7,1	75,3	326	260	2300	500
065-040-315	✗	-	-	WS_50_LR	7,5	7,1	75,3	326	260	3000	500
065-050-125	✗	-	WS_25_LS	-	19,9	11,6	87,9	142	112	4500	500
065-050-160	✗	-	WS_25_LS	-	16,9	11,6	86,9	174	128	4400	500
065-050-200	✗	-	WS_25_LS	-	13,8	11,9	83,6	219	170	3600	500
065-050-250	✗	-	WS_25_LS	-	10,5	10,0	84,0	260	215	3600	500
065-050-315	✗	-	WS_35_LS	-	10,0	9,5	87,0	323	265	2400	500
065-050-315	✗	-	-	WS_50_LR	10,0	9,5	87,0	323	265	3000	500
080-065-125	✗	-	WS_25_LS	-	25,8	12,9	99,0	141	109	3900	500
080-065-160	✗	-	WS_25_LS	-	21,0	12,2	91,9	174	132	3900	500
080-065-200	✗	-	WS_25_LS	-	17,0	13,3	99,7	219	165	3600	500
080-065-250	✗	-	WS_35_LS	-	15,1	14,3	101,0	260	215	3600	500
080-065-315	✗	-	WS_35_LS	-	13,7	14,0	108,2	320	245	1900	500
080-065-315	✗	-	-	WS_60_LR	13,7	14,0	108,2	320	245	3000	500
100-080-160	✗	-	WS_25_LS	-	31,6	15,1	124,0	174	138	3600	500
100-080-200	✗	-	WS_35_LS	-	24,5	15,2	115,3	219	165	3600	500
100-080-250	✗	-	WS_35_LS	-	19,0	15,8	115,1	269	215	3600	500
100-080-315	✗	-	WS_35_LS	-	18,7	17,8	115,6	334	265	1900	500
100-080-315	✗	-	-	WS_60_LR	18,7	17,8	115,6	334	265	3000	500
100-080-400	✗	-	WS_55_LS	-	15,0	14,3	129,9	398	315	1900	500
125-100-160	✗	-	WS_35_LS	-	37,6	16,4	124,0	185	162	3600	500
125-100-200	✗	-	WS_35_LS	-	32,5	17,9	115,3	219	170	3600	500
125-100-250	✗	-	WS_35_LS	-	27,0	18,8	115,1	269	210	3600	500
125-100-315	✗	-	WS_35_LS	-	23,0	19,9	115,6	334	250	1900	500
125-100-315	✗	-	-	WS_60_LR	23,0	19,9	115,6	334	250	3000	500
125-100-400	✗	-	WS_55_LS	-	18,0	17,1	129,9	401	317	1900	500
150-125-200	✗	-	WS_35_LS	-	40,7	21,1	159,2	224	182	3600	500
150-125-250	✗	-	WS_35_LS	-	37,0	22,4	162,4	269	218	2000	500
150-125-315	✗	-	WS_55_LS	-	30,9	22,6	162,3	334	270	1900	500
150-125-400	✗	-	WS_55_LS	-	25,9	20,9	162,4	419	330	1800	500
150-125-510	-	✗	WS_65_LS	-	23,2	23	174,9	508	400	1800	500
200-150-200	✗	-	WS_35_LS	-	59,5	25,2	179,4	224	188	2100	500
200-150-250	✗	-	WS_35_LS	-	48,8	23,0	191,0	269	220	1800	500

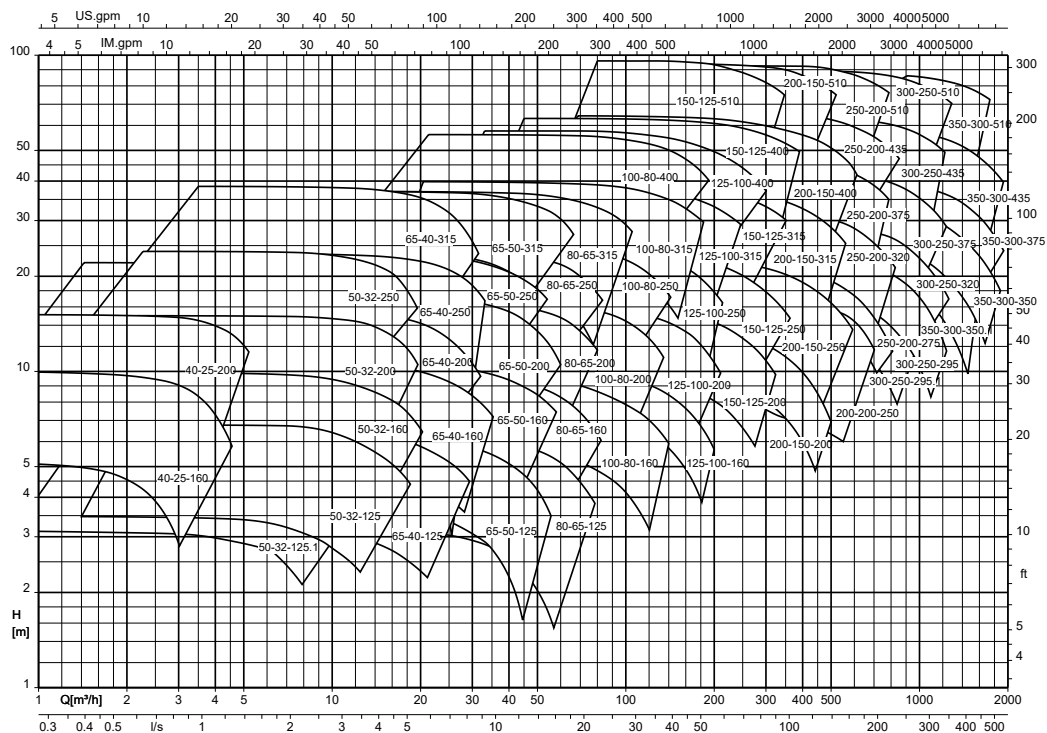
Etanorm	Pump type		Shaft unit		Impeller					Speed limit	
	ETN	ETNE	Bearing bracket LS (standard)	Bearing bracket LR (reinforced)	Impeller outlet width	Free passage diameter	Impeller inlet diameter	Nominal impeller diameter		Maximum	Minimum
								Maximum	Minimum		
200-150-315	✗	-	WS_55_LS	-	39,7	26,9	191,5	334	264	1800	500
200-150-400	✗	-	WS_55_LS	-	33,0	23,8	191,4	419	330	1800	500
200-150-510	-	✗	WS_65_LS	-	30,2	22	196	508	404	1800	500
200-200-250	-	✗	WS_65_LS	-	62	37	190,1	260	215	1800	500
250-200-275	-	✗	WS_65_LS	-	72	38	213,6	280	253	1800	500
250-200-320	-	✗	WS_65_LS	-	57,6	24	213,5	325	256	1800	500
250-200-375	-	✗	WS_65_LS	-	48	25	212,5	373	324	1800	500
250-200-435	-	✗	WS_65_LS	-	40,6	26	218,9	433	364	1800	500
250-200-510	-	✗	WS_65_LS	-	35	26	221,6	508	400	1800	500
300-250-295	-	✗	WS_65_LS	-	88,1	45	251,6	322	258	1800	500
300-250-295.1	-	✗	WS_65_LS	-	90,5	45	229,5	322	258	1800	500
300-250-320	-	✗	WS_65_LS	-	81	45	251	327	270	1800	500
300-250-375	-	✗	WS_65_LS	-	67,7	31	248,3	373	301	1800	500
300-250-435	-	✗	WS_85_LS	-	56,4	25	250,1	433	354	1800	500
300-250-510	-	✗	WS_85_LS	-	47	31	255	508	424	1800	500
350-300-350	-	✗	WS_85_LS	-	102,5	52	293,9	348	313	1800	500
350-300-350.1	-	✗	WS_85_LS	-	105,3	52	269,9	345	285	1800	500
350-300-375	-	✗	WS_85_LS	-	94	52	292,2	383	311	1800	500
350-300-435	-	✗	WS_85_LS	-	76,7	35	285	434	350	1800	500
350-300-510	-	✗	WS_85_LS	-	65	35	287	508	465	1800	500

## Selection charts

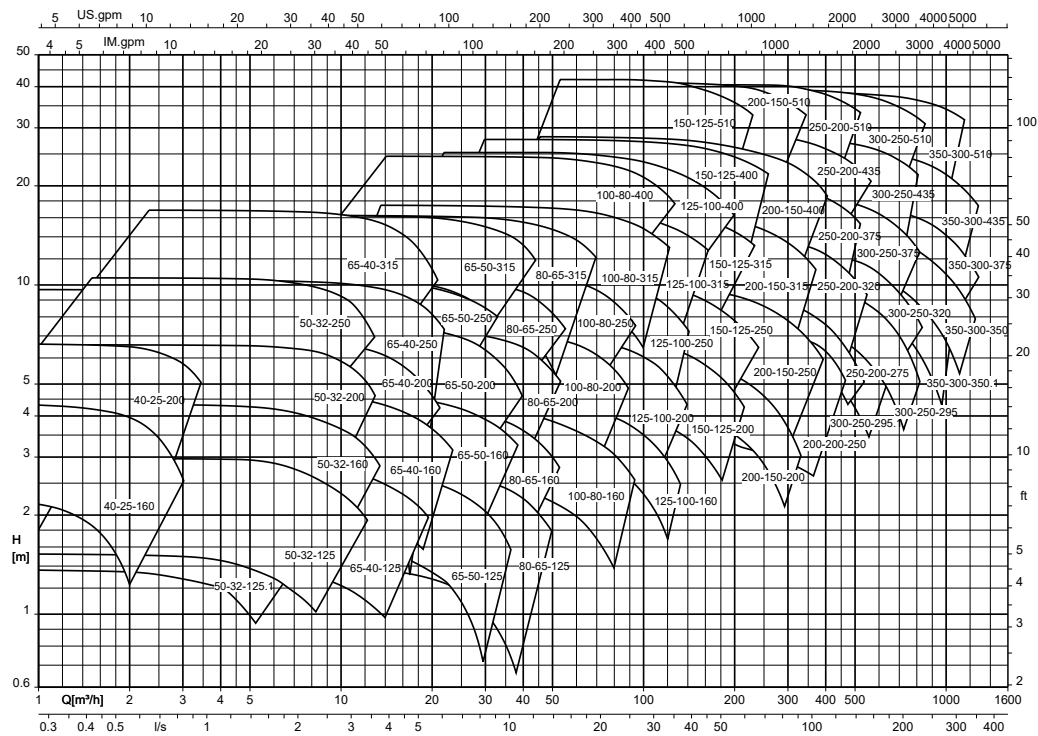
### Etanorm (fixed speed version), $n = 2900$ rpm



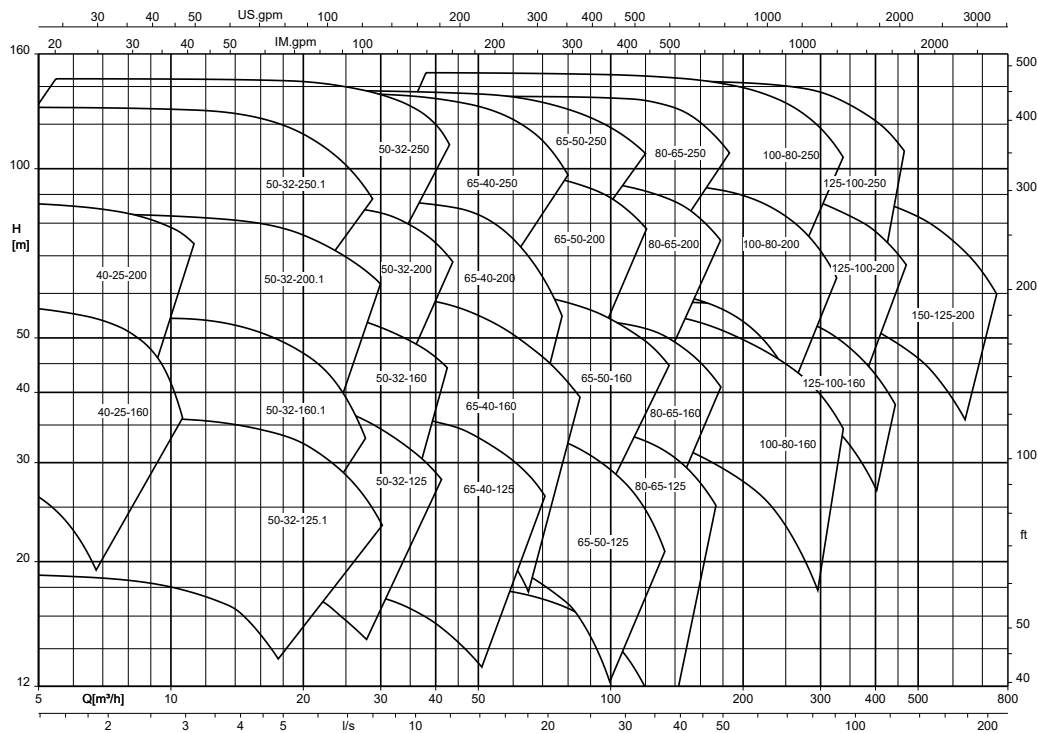
### Etanorm (fixed speed version), $n = 1450$ rpm



Etanorm (fixed speed version),  $n = 960$  rpm



Etanorm (fixed speed version),  $n = 3500$  rpm





## Connections

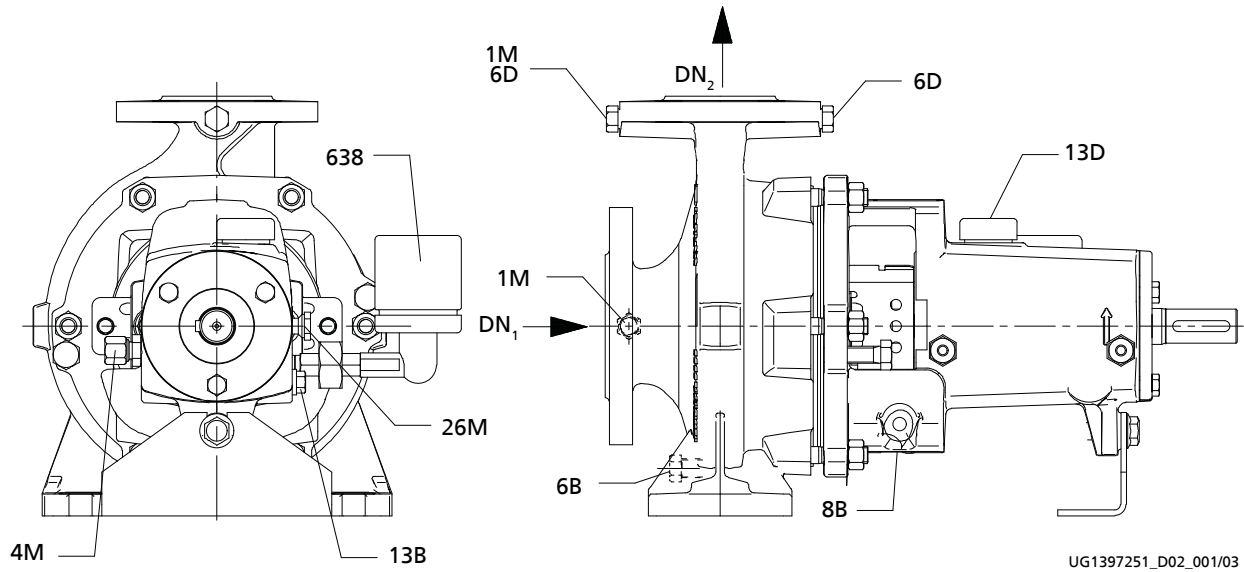


Fig. 4: Version with constant level oiler

P1	Na – Gland packing with internal barrier fluid
P2	Nb – Gland packing without barrier fluid
A	Single mechanical seal, A-type cover
IA	Single mechanical seal, A-type cover with internal circulation

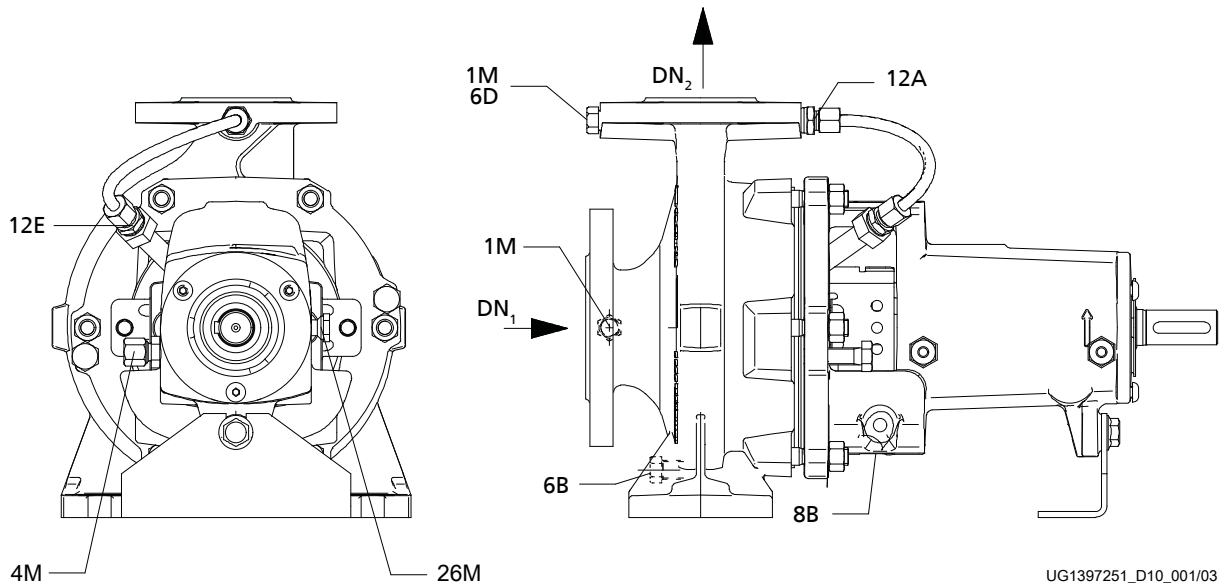


Fig. 5: Grease-lubricated version

EA	External circulation, A-type cover
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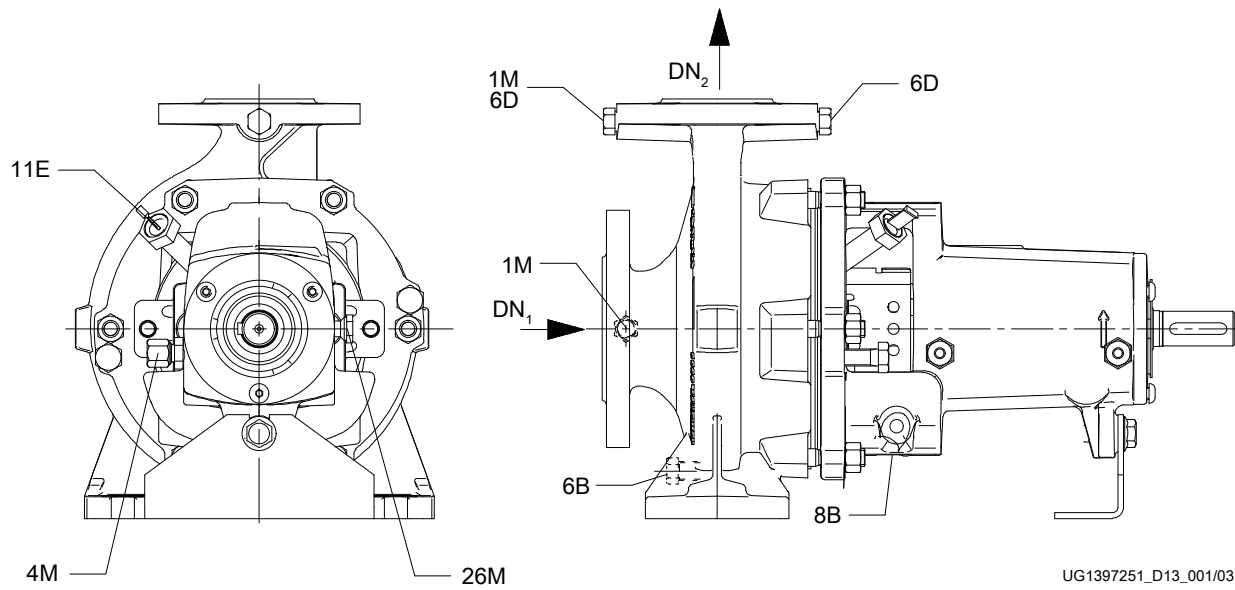


Fig. 6: Grease-lubricated version

FA	External flushing, A-type cover
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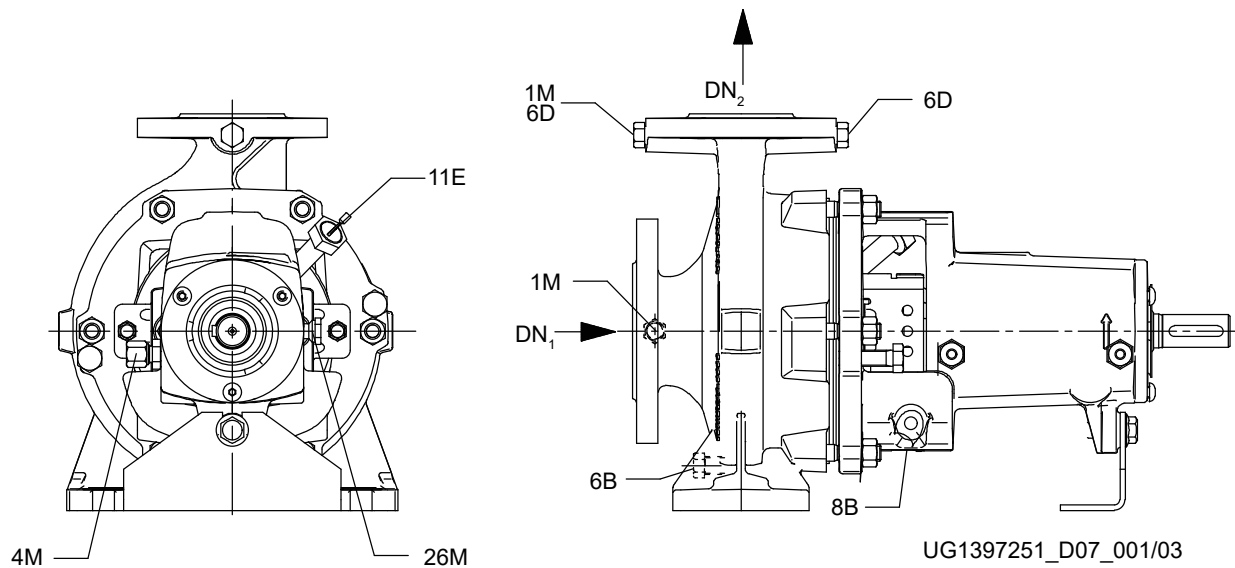


Fig. 7: Grease-lubricated version

P4	VSH – Gland packing, external flushing liquid
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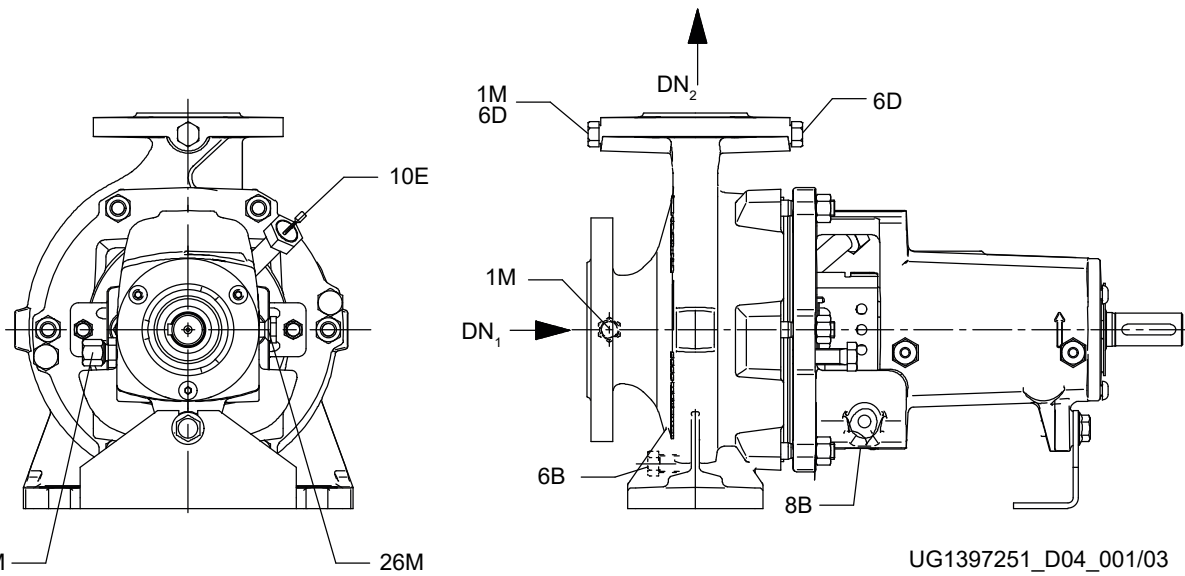


Fig. 8: Grease-lubricated version

P3	Nc – Gland packing, external barrier fluid
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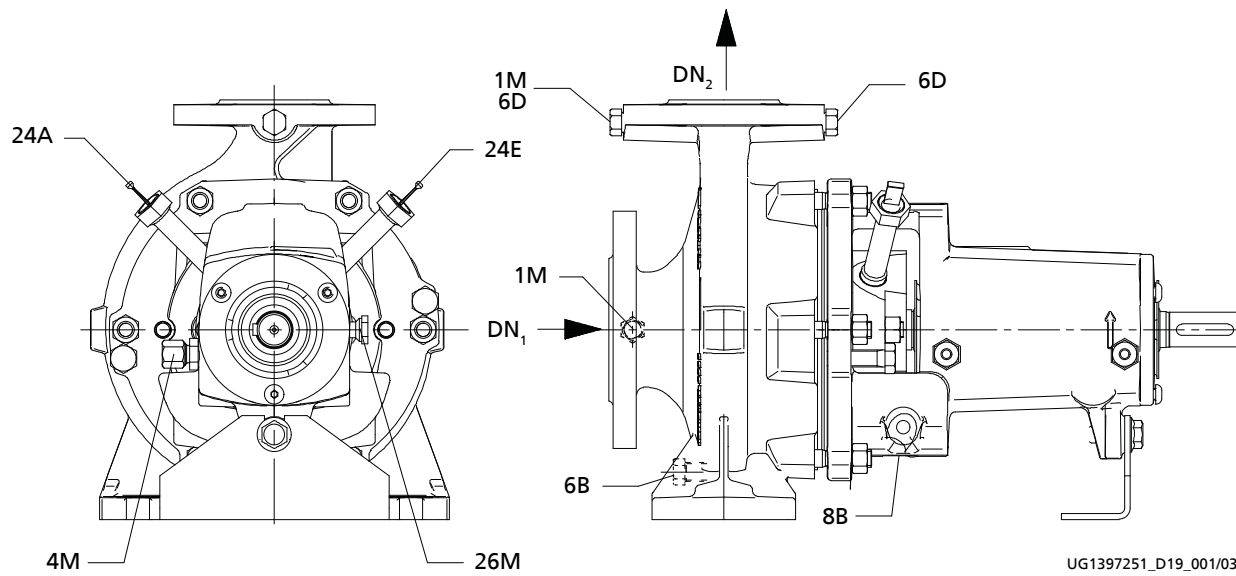
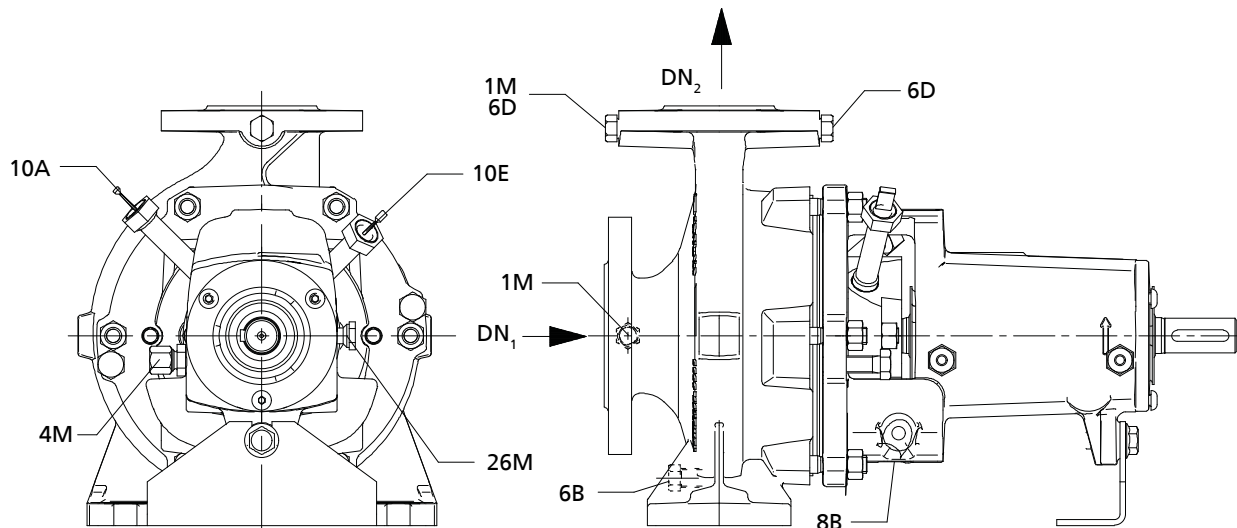


Fig. 9: Grease-lubricated version

TI	Double mechanical seal in tandem arrangement with internal circulation
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UG1397251\_D16\_001/03

Fig. 10: Grease-lubricated version

DB	Double mechanical seal in back-to-back arrangement
----	--

Table 22: Connections

Connection	Description	Configuration	Position
1M	Connection for pressure gauge	On pump set with pressure gauge	DN <sub>2</sub>
1M optional	Connection for pressure gauge	Drilled and closed or with pressure sensor	DN <sub>1</sub>
4M optional	Connection for temperature measuring instrument	Drilled and closed	-
6B	Fluid drain	Drilled and closed	-
6D	Fluid filling and venting	Drilled and closed	DN <sub>2</sub> , suction side
6D optional	Fluid filling and venting	Drilled and closed	DN <sub>2</sub> , drive end
8B	Leakage drain	Drilled and closed <sup>27)</sup>	-
10A optional	External barrier fluid outlet	Connection G 1/4 fitting, closed	-
10E optional	External barrier fluid inlet	Connection G 1/4 fitting, closed	-
11E optional	Flushing liquid inlet	Connection G 1/4 fitting, closed	-
12A optional	Circulation liquid outlet	Drilled and connected	-
12E optional	Circulation liquid inlet	Drilled and connected	-
13B optional	Oil drain	Drilled and closed	-
13D optional	Oil filling and venting	Drilled and closed	-
24A optional	Quench liquid outlet	Connection G 1/4 fitting, closed	-
24E optional	Quench liquid inlet	Connection G 1/4 fitting, closed	-
26M optional	Connection for vibration measurement	Drilled and closed	-

<sup>27)</sup> For bearing bracket LS only

**Table 23: Connections**

Size	Bearing bracket	Connection								
		1M.1/6D/ 1M.2/6B/6D	8B	10A/ 10E	11E	12A	12E	13B	13D	24A/ 24E
040-025-160	25	G 1/4	G 1/2	G 1/4	G 1/4	G 1/4	G 1/4	G 1/4	DN 20	G 1/4
040-025-200	25	G 1/4	G 1/2	G 1/4	G 1/4	G 1/4	G 1/4	G 1/4	DN 20	G 1/4
050-032-125.1	25	G 1/4	G 1/2	G 1/4	G 1/4	G 1/4	G 1/4	G 1/4	DN 20	G 1/4
050-032-160.1	25	G 1/4	G 1/2	G 1/4	G 1/4	G 1/4	G 1/4	G 1/4	DN 20	G 1/4
050-032-200.1	25	G 1/4	G 1/2	G 1/4	G 1/4	G 1/4	G 1/4	G 1/4	DN 20	G 1/4
050-032-250.1	25	G 1/4	G 1/2	G 1/4	G 1/4	G 1/4	G 1/4	G 1/4	DN 20	G 1/4
050-032-125	25	G 1/4	G 1/2	G 1/4	G 1/4	G 1/4	G 1/4	G 1/4	DN 20	G 1/4
050-032-160	25	G 1/4	G 1/2	G 1/4	G 1/4	G 1/4	G 1/4	G 1/4	DN 20	G 1/4
050-032-200	25	G 1/4	G 1/2	G 1/4	G 1/4	G 1/4	G 1/4	G 1/4	DN 20	G 1/4
050-032-250	25	G 1/4	G 1/2	G 1/4	G 1/4	G 1/4	G 1/4	G 1/4	DN 20	G 1/4
065-040-125	25	G 1/4	G 1/2	G 1/4	G 1/4	G 1/4	G 1/4	G 1/4	DN 20	G 1/4
065-040-160	25	G 1/4	G 1/2	G 1/4	G 1/4	G 1/4	G 1/4	G 1/4	DN 20	G 1/4
065-040-200	25	G 1/4	G 1/2	G 1/4	G 1/4	G 1/4	G 1/4	G 1/4	DN 20	G 1/4
065-040-250	25	G 1/4	G 1/2	G 1/4	G 1/4	G 1/4	G 1/4	G 1/4	DN 20	G 1/4
065-040-315	35	G 1/4	G 1/2	G 1/4	G 1/4	G 1/4	G 1/4	G 1/4	DN 20	G 1/4
065-040-315	50	G 1/4	-	G 1/4	G 1/4	G 1/4	G 1/4	G 3/8	DN 20	G 1/4
065-050-125	25	G 1/4	G 1/2	G 1/4	G 1/4	G 1/4	G 1/4	G 1/4	DN 20	G 1/4
065-050-160	25	G 1/4	G 1/2	G 1/4	G 1/4	G 1/4	G 1/4	G 1/4	DN 20	G 1/4
065-050-200	25	G 1/4	G 1/2	G 1/4	G 1/4	G 1/4	G 1/4	G 1/4	DN 20	G 1/4
065-050-250	25	G 1/4	G 1/2	G 1/4	G 1/4	G 1/4	G 1/4	G 1/4	DN 20	G 1/4
065-050-315	35	G 1/4	G 1/2	G 1/4	G 1/4	G 1/4	G 1/4	G 1/4	DN 20	G 1/4
065-050-315	50	G 1/4	-	G 1/4	G 1/4	G 1/4	G 1/4	G 3/8	DN 20	G 1/4
080-065-125	25	G 3/8	G 1/2	G 1/4	G 1/4	G 3/8	G 1/4	G 1/4	DN 20	G 1/4
080-065-160	25	G 3/8	G 1/2	G 1/4	G 1/4	G 3/8	G 1/4	G 1/4	DN 20	G 1/4
080-065-200	25	G 3/8	G 1/2	G 1/4	G 1/4	G 3/8	G 1/4	G 1/4	DN 20	G 1/4
080-065-250	35	G 3/8	G 1/2	G 1/4	G 1/4	G 3/8	G 1/4	G 1/4	DN 20	G 1/4
080-065-315	35	G 3/8	G 1/2	G 1/4	G 1/4	G 3/8	G 1/4	G 1/4	DN 20	G 1/4
080-065-315	60	G 3/8	-	G 1/4	G 1/4	G 3/8	G 1/4	G 3/8	DN 20	G 1/4
100-080-160	25	G 3/8	G 1/2	G 1/4	G 1/4	G 3/8	G 1/4	G 1/4	DN 20	G 1/4
100-080-200	35	G 3/8	G 1/2	G 1/4	G 1/4	G 3/8	G 1/4	G 1/4	DN 20	G 1/4
100-080-250	35	G 3/8	G 1/2	G 1/4	G 1/4	G 3/8	G 1/4	G 1/4	DN 20	G 1/4
100-080-315	35	G 3/8	G 1/2	G 1/4	G 1/4	G 3/8	G 1/4	G 1/4	DN 20	G 1/4
100-080-315	60	G 3/8	-	G 1/4	G 1/4	G 3/8	G 1/4	G 3/8	DN 20	G 1/4
100-080-400	55	G 3/8	G 1/2	G 1/4	G 1/4	G 3/8	G 1/4	G 1/4	DN 20	G 1/4
125-100-160	35	G 1/2	G 1/2	G 1/4	G 1/4	G 1/2	G 1/4	G 1/4	DN 20	G 1/4
125-100-200	35	G 1/2	G 1/2	G 1/4	G 1/4	G 1/2	G 1/4	G 1/4	DN 20	G 1/4
125-100-250	35	G 1/2	G 1/2	G 1/4	G 1/4	G 1/2	G 1/4	G 1/4	DN 20	G 1/4
125-100-315	35	G 1/2	G 1/2	G 1/4	G 1/4	G 1/2	G 1/4	G 1/4	DN 20	G 1/4
125-100-315	60	G 1/2	-	G 1/4	G 1/4	G 1/2	G 1/4	G 3/8	DN 20	G 1/4
125-100-400	55	G 1/2	G 1/2	G 1/4	G 1/4	G 1/2	G 1/4	G 1/4	DN 20	G 1/4
150-125-200	35	G 1/2	G 1/2	G 1/4	G 1/4	G 1/2	G 1/4	G 1/4	DN 20	G 1/4
150-125-250	35	G 1/2	G 1/2	G 1/4	G 1/4	G 1/2	G 1/4	G 1/4	DN 20	G 1/4
150-125-315	55	G 1/2	G 1/2	G 1/4	G 1/4	G 1/2	G 1/4	G 1/4	DN 20	G 1/4
150-125-400	55	G 1/2	G 1/2	G 1/4	G 1/4	G 1/2	G 1/4	G 1/4	DN 20	G 1/4
150-125-510	65	G 1/2	G 1/2	G 1/4	-	G 1/2	-	G 3/8	DN 20	G 1/4
200-150-200	35	G 1/2	G 1/2	G 1/4	G 1/4	G 1/2	G 1/4	G 1/4	DN 20	G 1/4
200-150-250	35	G 1/2	G 1/2	G 1/4	G 1/4	G 1/2	G 1/4	G 1/4	DN 20	G 1/4
200-150-315	55	G 1/2	G 1/2	G 1/4	G 1/4	G 1/2	G 1/4	G 1/4	DN 20	G 1/4
200-150-400	55	G 1/2	G 1/2	G 1/4	G 1/4	G 1/2	G 1/4	G 1/4	DN 20	G 1/4
200-150-510	65	G 1/2	G 1/2	G 1/4	-	G 1/2	-	G 3/8	DN 20	G 1/4
200-200-250	65	G 1/2	G 1/2	G 1/4	-	G 1/2	-	G 3/8	DN 20	G 1/4
250-200-275	65	G 1/2	G 1/2	G 1/4	-	G 1/2	-	G 3/8	DN 20	G 1/4
250-200-320	65	G 1/2	G 1/2	G 1/4	-	G 1/2	-	G 3/8	DN 20	G 1/4

Size	Bearing bracket	Connection								
		1M.1/6D/ 1M.2/6B/6D	8B	10A/ 10E	11E	12A	12E	13B	13D	24A/ 24E
250-200-375	65	G 1/2	G 1/2	G 1/4	-	G 1/2	-	G 3/8	DN 20	G 1/4
250-200-435	65	G 1/2	G 1/2	G 1/4	-	G 1/2	-	G 3/8	DN 20	G 1/4
250-200-510	65	G 1/2	G 1/2	G 1/4	-	G 1/2	-	G 3/8	DN 20	G 1/4
300-250-295	65	G 1/2	G 1/2	G 1/4	-	G 1/2	-	G 3/8	DN 20	G 1/4
300-250-295.1	65	G 1/2	G 1/2	G 1/4	-	G 1/2	-	G 3/8	DN 20	G 1/4
300-250-320	65	G 1/2	G 1/2	G 1/4	-	G 1/2	-	G 3/8	DN 20	G 1/4
300-250-375	65	G 1/2	G 1/2	G 1/4	-	G 1/2	-	G 3/8	DN 20	G 1/4
300-250-435	85	G 1/2	G 1/2	G 1/4	-	G 1/2	-	G 3/8	DN 20	G 1/4
300-250-510	85	G 1/2	G 1/2	G 1/4	-	G 1/2	-	G 3/8	DN 20	G 1/4
350-300-350	85	G 1/2	G 1/2	G 1/4	-	G 1/2	-	G 3/8	DN 20	G 1/4
350-300-350.1	85	G 1/2	G 1/2	G 1/4	-	G 1/2	-	G 3/8	DN 20	G 1/4
350-300-375	85	G 1/2	G 1/2	G 1/4	-	G 1/2	-	G 3/8	DN 20	G 1/4
350-300-435	85	G 1/2	G 1/2	G 1/4	-	G 1/2	-	G 3/8	DN 20	G 1/4
350-300-510	85	G 1/2	G 1/2	G 1/4	-	G 1/2	-	G 3/8	DN 20	G 1/4

## Flange design

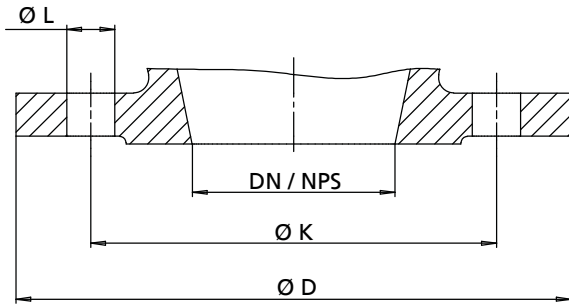


Fig. 11: Flange dimensions

## Flange dimensions to EN 1092-1, EN 1092-2, EN 1092-3

Table 24: Flange dimensions [mm]

Nominal size	Standard																	
	EN 1092-3			EN 1092-1						EN 1092-2								
	Material variant of volute casing																	
	B			C						G						S		
	PN 10			PN 10			PN 16			PN 10			PN 16			PN 16		
	Ø D	Ø K	Number x Ø L	Ø D	Ø K	Number x Ø L	Ø D	Ø K	Number x Ø L	Ø D	Ø K	Number x Ø L	Ø D	Ø K	Number x Ø L	Ø D	Ø K	Number x Ø L
25	115	85	4 x Ø 14	-	-	-	115	85	4 x Ø 14	-	-	-	115	85	4 x Ø 14	115	85	4 x Ø 14
32	140	100	4 x Ø 18	-	-	-	140	100	4 x Ø 18	-	-	-	140	100	4 x Ø 19	140	100	4 x Ø 19
40	150	110	4 x Ø 18	-	-	-	150	110	4 x Ø 18	-	-	-	150	110	4 x Ø 19	150	110	4 x Ø 19
50	165	125	4 x Ø 18	-	-	-	165	125	4 x Ø 18	-	-	-	165	125	4 x Ø 19	165	125	4 x Ø 19
65	185	145	4 x Ø 18	-	-	-	185	145	4 x Ø 18	-	-	-	185	145	4 x Ø 19	185	145	4 x Ø 19
80 (DN <sub>1</sub> <sup>28)</sup> )	229	160	8 x Ø 18	-	-	-	230	160	8 x Ø 18	-	-	-	229	160	8 x Ø 19	229	160	8 x Ø 19
80 (DN <sub>2</sub> <sup>29)</sup> )	200	160	8 x Ø 18	-	-	-	200	160	8 x Ø 18	-	-	-	200	160	8 x Ø 19	229	160	8 x Ø 19
100	229	180	8 x Ø 18	-	-	-	230	180	8 x Ø 18	-	-	-	229	180	8 x Ø 19	229	180	8 x Ø 19
125	254	210	8 x Ø 18	-	-	-	255	210	8 x Ø 18	-	-	-	254	210	8 x Ø 19	254	210	8 x Ø 19
150	285	240	8 x Ø 22	-	-	-	285	240	8 x Ø 22	-	-	-	285	240	8 x Ø 23	285	240	8 x Ø 23
200 <sup>30)</sup>	343	295	8 x Ø 22	345	295	8 x Ø 22	-	-	-	343	295	8 x Ø 23	-	-	-	343	295	12 x Ø 23
200 <sup>31)</sup>	-	-	-	-	-	-	-	-	-	345	295	8 x Ø 23	-	-	-	345	295	12 x Ø 23
250	-	-	-	-	-	-	-	-	-	405	350	12 x Ø 23	-	-	-	405	350	12 x Ø 28
300	-	-	-	-	-	-	-	-	-	485	400	12 x Ø 23	-	-	-	485	400	12 x Ø 28
350	-	-	-	-	-	-	-	-	-	535	460	16 x Ø 23	-	-	-	535	460	16 x Ø 28

## Flange drilled to: ASME B 16.1, Class 125, ASME B 16.5, Class 150

Table 25: Flange dimensions [mm]

Nominal size	Standard					
	ASME B 16.1, Class 125, ASME B 16.5, Class 150					
	Material variant of volute casing					
	B, G, S			C		
	Ø D	Ø K	Number x Ø L	Ø D	Ø K	Number x Ø L
25/ NPS 1	115	79,2	4 x Ø 15,7	115	79,2	4 x Ø 15,9
32/ NPS 1 1/4	140	88,9	4 x Ø 15,7	140	88,9	4 x Ø 15,9
40/ NPS 1 1/2	150	98,6	4 x Ø 15,7	150	98,6	4 x Ø 15,9

<sup>28</sup> Suction flange; suction line NPS 4 must be used.

<sup>29</sup> Discharge flange

<sup>30</sup> For pump type ETN (⇒ Page 24)

<sup>31</sup> For pump type ETNE (⇒ Page 24)

Nominal size	Standard					
	ASME B 16.1, Class 125, ASME B 16.5, Class 150					
	Material variant of volute casing					
	B, G, S			C		
	Ø D	Ø K	Number × Ø L	Ø D	Ø K	Number × Ø L
50/ NPS 2	165	120,7	4 × Ø 19,1	165	120,7	4 × Ø 19,1
65/ NPS 2 1/2	185	139,7	4 × Ø 19,1	185	139,7	4 × Ø 19,1
80/ NPS 3 (DN <sub>1</sub> <sup>28)</sup> )	229	190,5	8 × Ø 19,1	230	190,5	8 × Ø 19,1
80/ NPS 3 (DN <sub>2</sub> <sup>29)</sup> )	200	152,4	4 × Ø 19,1	200	152,4	4 × Ø 19,1
100/ NPS 4	229	190,5	8 × Ø 19,1	230	190,5	8 × Ø 19,1
125/ NPS 5	254	215,9	8 × Ø 22,4	255	215,9	8 × Ø 22,2
150/ NPS 6	285	241,3	8 × Ø 22,4	285	241,3	8 × Ø 22,2
200/ NPS 8	345	298,5	8 × Ø 22,4	345	298,5	8 × Ø 22,2
250/ NPS 10	405	362	12 × Ø 25,4	-	-	-
300/ NPS 12	485	431,8	12 × Ø 25,4	-	-	-
350/ NPS 14	535	476,3	12 × Ø 28,6	-	-	-

**Table 26:** Flange design by materials

Material variant	Standard	Nominal size	Pressure class
GG, GB, GC	EN 1092-2	DN 25 - DN 150	PN 16
GG, GB, GC	EN 1092-2	DN 200	PN 10
GG, GB, GC	Drilled to ASME B16.1 <sup>32)</sup>	DN 25 - DN 200	Class 125 <sup>33)</sup>
SG, SB, SC	EN 1092-2	DN 25 - DN 200	PN 16
SG, SB, SC	Drilled to ASME B16.1 <sup>32)</sup>	DN 25 - DN 200	Class 125 <sup>33)</sup>
SG, SB, SC <sup>31)</sup>	Drilled to ASME B16.5	DN125 - DN350	Class 150
BB	EN 1092-3	DN 25 - DN 200	PN 10
BB	Drilled to ASME B16.1 <sup>32)</sup>	DN 25 - DN 200	Class 125 <sup>34)</sup>
CC	EN 1092-1	DN 25 - DN 150	PN 16
CC	EN 1092-1	DN 200	PN 10
CC	Drilled to ASME B16.5 <sup>32)</sup>	DN 25 - DN 200	Class 150

### Scope of supply

Depending on the model, the following items are included in the scope of supply:

- Pump
- Baseplate
- Coupling
- Coupling guard
- Drive
- Supply system for double mechanical seal

### Recommended spare parts stock

**Table 27:** Quantity of spare parts for recommended spare parts stock for commissioning

Part No.	Description	Number of pumps									
		1	2	3	4	5	6	7	8	9	10 and more
433	Mechanical seal	1	1	1	2	2	2	2	3	3	25 %
433.01/.02 <sup>35)</sup>	Mechanical seal <sup>36)</sup>	1	1	1	2	2	2	2	3	3	25 %
400.10	Gasket	2	4	6	8	8	9	9	12	12	150 %
400.75	Gasket	2	4	6	8	8	9	9	12	12	150 %
400.15 <sup>35)</sup>	Gasket <sup>36)</sup>	2	4	6	8	8	9	9	12	12	150 %

<sup>32)</sup> Suction-side DN 80 machined like DN 100

<sup>33)</sup> Nozzle drilled to Class 125 with pressure class PN 16.

<sup>34)</sup> Nozzle drilled to Class 125 with pressure class PN 10.

<sup>35)</sup> For pump type ETN (⇒ Page 24)

<sup>36)</sup> For double mechanical seal

Part No.	Description	Number of pumps									
		1	2	3	4	5	6	7	8	9	10 and more
411.10 <sup>37)</sup>	Gasket	2	4	6	8	8	9	9	12	12	150 %
411.15 <sup>35)</sup>	Joint ring <sup>36)</sup>	2	4	6	8	8	9	9	12	12	150 %
412.15 <sup>35)</sup>	O-ring <sup>36)</sup>	2	4	6	8	8	9	9	12	12	150 %

**Table 28:** Quantity of spare parts for recommended spare parts stock for 2 years' operation to DIN 24296

Part No.	Description	Number of pumps									
		1	2	3	4	5	6	7	8	9	10 and more
210	Shaft	1	1	1	1	2	2	2	2	2	20 %
230	Impeller	1	1	1	1	2	2	2	2	2	20 %
321.01/.02	Rolling element bearing (set)	1	1	1	2	2	2	2	3	3	25 %
433	Mechanical seal	1	1	1	2	2	2	2	3	3	25 %
433.01/.02 <sup>35)</sup>	Mechanical seal <sup>36)</sup>	1	1	1	2	2	2	2	3	3	25 %
502.01/.02	Casing wear ring <sup>38)</sup> (set)	1	2	2	2	3	3	3	4	4	50 %
523	Shaft sleeve	1	2	2	2	3	3	3	4	4	50 %
524	Shaft protecting sleeve	1	2	2	2	3	3	3	4	4	50 %
461	Gland packing (set)	2	4	4	6	6	6	6	8	8	100 %
458	Lantern ring <sup>38)</sup>	2	4	4	6	6	6	8	8	8	100 %
400.10	Gasket	2	4	6	8	8	9	9	12	12	150 %
400.15 <sup>35)</sup>	Gasket <sup>36)</sup>	2	4	6	8	8	9	9	12	12	150 %
400.75	Gasket	2	4	6	8	8	9	9	12	12	150 %
411.10 <sup>37)</sup>	Gasket	2	4	6	8	8	9	9	12	12	150 %
411.15 <sup>35)</sup>	Joint ring <sup>36)</sup>	2	4	6	8	8	9	9	12	12	150 %
412.15 <sup>35)</sup>	O-ring <sup>36)</sup>	2	4	6	8	8	9	9	12	12	150 %

<sup>37)</sup> For pump type ETNE (⇒ Page 24)

<sup>38)</sup> If any

General assembly drawings

Version with standardised mechanical seal and bolted casing cover

Table 29: This illustration applies to the following pump sizes:

040-025-200	050-032-200.1	050-032-200	065-040-200	065-050-200	080-065-200	100-80-250	125-100-250	150-125-250	200-150-250
	050-032-250.1	050-032-250	065-040-250	065-050-250	080-065-250	100-80-315	125-100-315	150-125-315	200-150-315
			065-040-315	065-050-315	080-065-315	100-80-400	125-100-400	150-125-400	200-150-400

[ Supplied in packaging units only

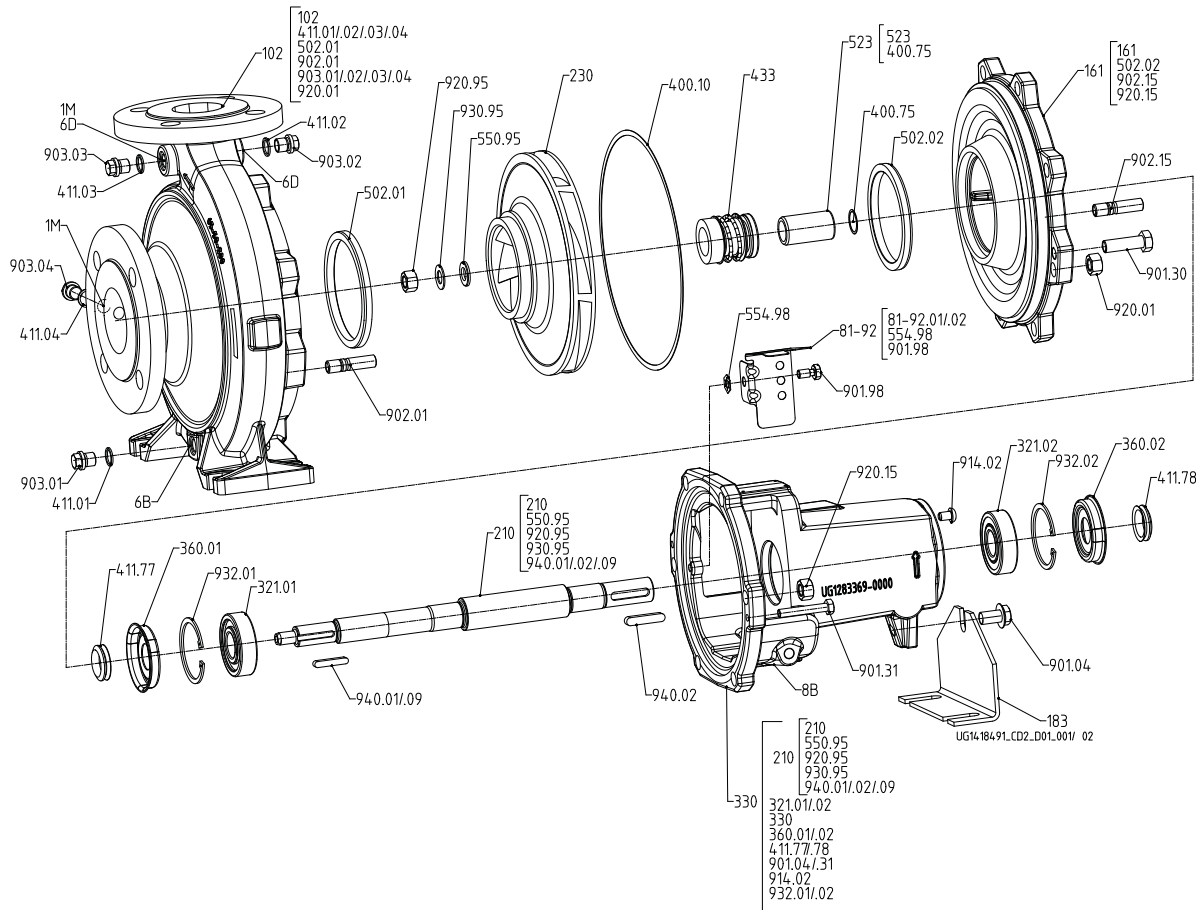


Fig. 12: Version with standardised mechanical seal and bolted casing cover

Table 30: List of components

Part No.	Description	Part No.	Description
102	Volute casing	523	Shaft sleeve
161	Casing cover	550.95 <sup>39)</sup>	Disc
183	Support foot	554.98	Lock washer
210	Shaft	81-92.01/.02	Cover plate
230	Impeller	901.04/.30/.31/.98	Hexagon head bolt
321.01/.02	Deep groove ball bearing	902.01/.15	Stud
330	Bearing bracket	903.01/.02/.03/.04	Screw plug
360.01/.02	Bearing cover	914.02	Round-head screw
400.10/.75	Gasket	920.01/.15/.95	Hexagon nut
411.01/.02/.03/.04	Joint ring	930.95	Spring washer
411.77/.78	Axial seal ring	932.01/.02	Circlip
433	Mechanical seal	940.01/.02/.09 <sup>40)</sup>	Key
502.01/.02	Casing wear ring <sup>41)</sup>		

<sup>39</sup> For shaft unit 25 only

<sup>40</sup> For shaft units 55 and 60 only

<sup>41</sup> Optional for casing material C

Table 31: Connections

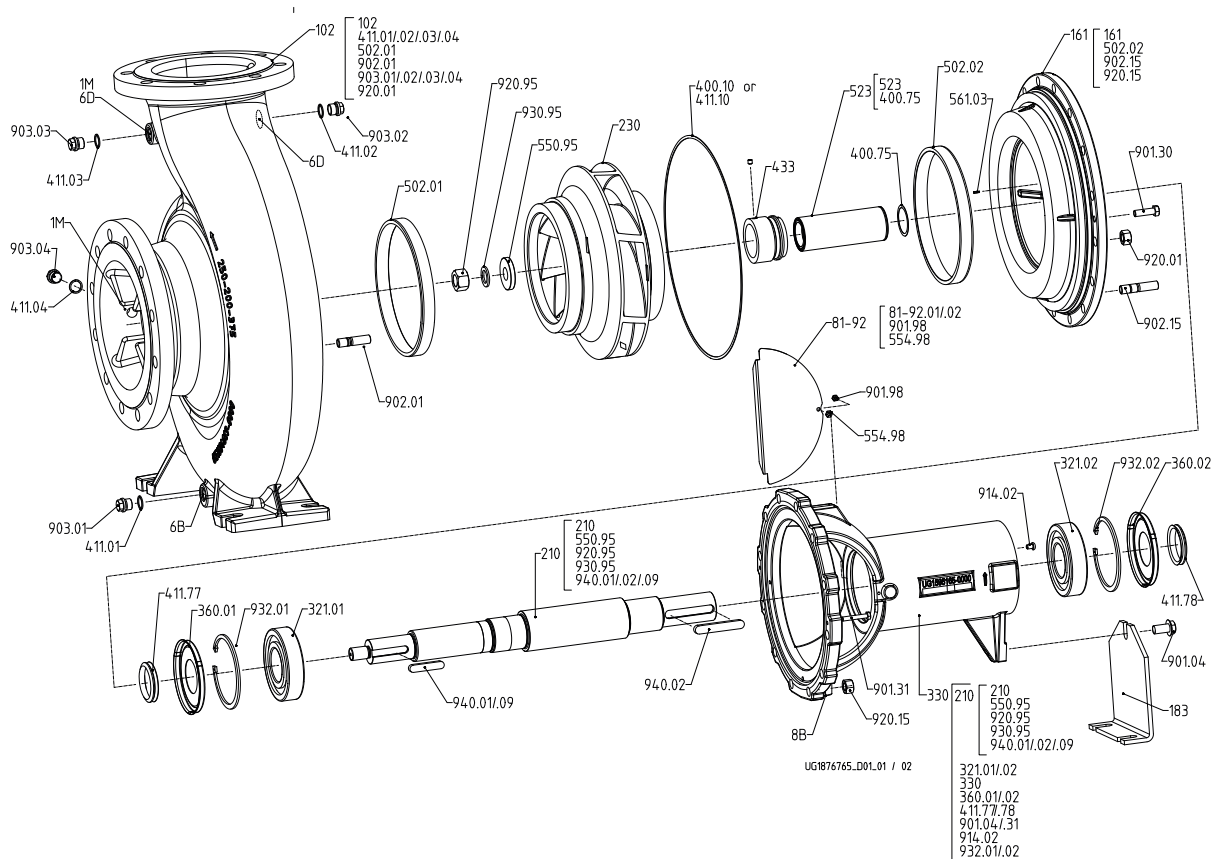
Part No.	Description	Part No.	Description
1M	Pressure gauge with connection	6D	Fluid priming and venting
6B	Fluid drain	8B	Leakage drain

**Version with standardised mechanical seal and bolted casing cover**

This illustration applies to the following pump sizes:

150-125-510	200-150-510	250-200-375	300-250-375	350-300-350
		250-200-435	300-250-435	350-300-350.1
		250-200-510	300-350-510	350-300-375
				350-300-435
				350-300-510

[ Supplied in packaging units only



**Fig. 13:** Version with standardised mechanical seal and bolted casing cover

**Table 32:** List of components

Part No.	Description	Part No.	Description
102	Volute casing	523	Shaft sleeve
161	Casing cover	550.95	Disc
183	Support foot	554.98	Lock washer
210	Shaft	561.03	Grooved pin
230	Impeller	81-92.01/02	Cover plate
321.01/02	Deep groove ball bearing	901.04/30/31/98	Hexagon head bolt
330	Bearing bracket	902.01/15	Stud
360.01/02	Bearing cover	903.01/02/03/04	Screw plug
400.10/75	Gasket	914.02	Round-head screw
411.01/02/03/04/10	Joint ring	920.01/15/95	Hexagon nut
411.77/78	Axial seal ring	930.95	Spring washer
433	Mechanical seal	932.01/02	Circlip
502.01/02	Casing wear ring	940.01/02/09	Key

**Table 33:** Connections

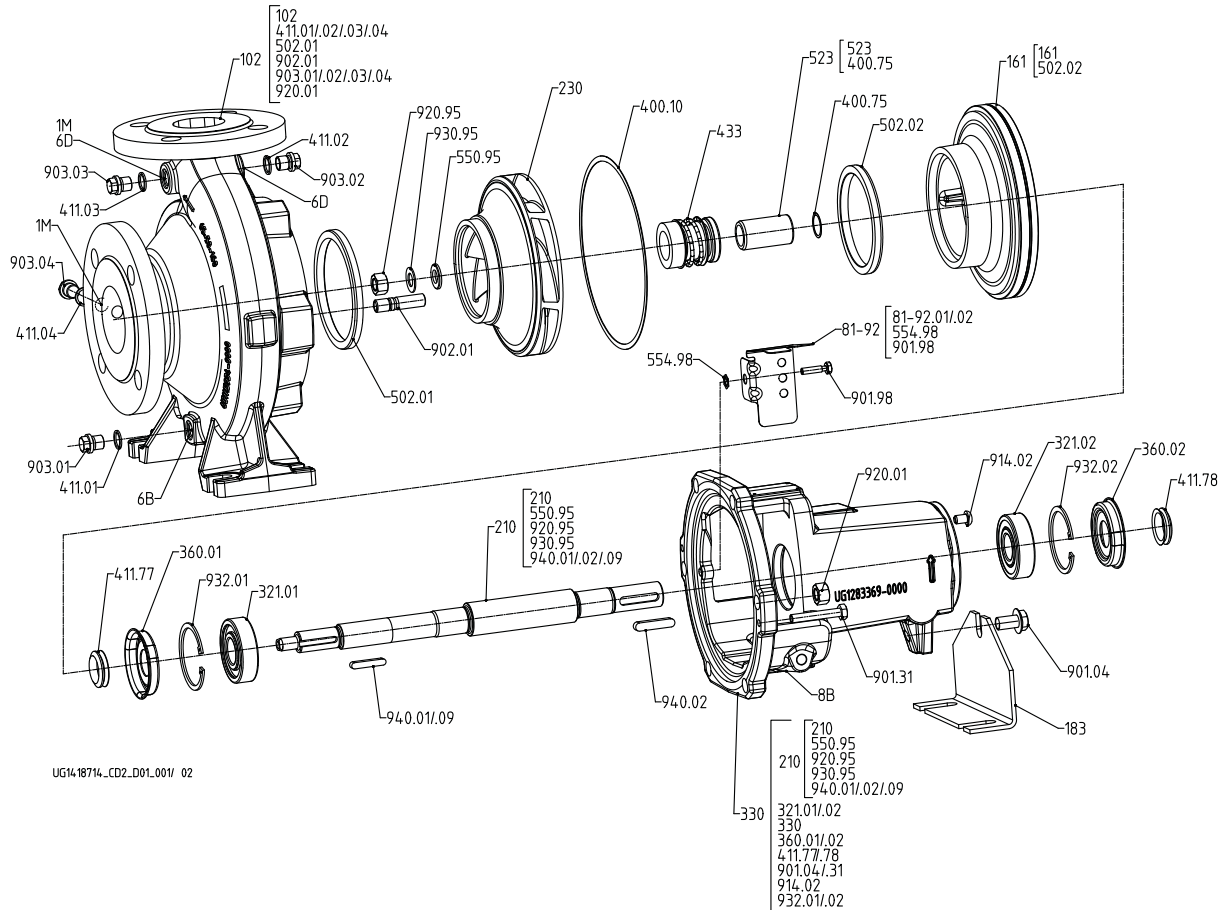
Part No.	Description	Part No.	Description
1M	Pressure gauge with connection	6D	Fluid priming and venting
6B	Fluid drain	8B	Leakage drain

### Version with standardised mechanical seal and clamped casing cover

**Table 34:** This illustration applies to the following pump sizes:

040-025-160	050-032-125.1	050-032-125	065-040-125	065-050-125	080-065-125	100-80-160	125-100-160	150-125-200	200-150-200
	050-032-160.1	050-032-160	065-040-160	065-050-160	080-065-160	100-80-200	125-100-200		

[ Supplied in packaging units only



**Fig. 14:** Version with standardised mechanical seal and clamped casing cover

**Table 35:** List of components

Part No.	Description	Part No.	Description
102	Volute casing	523	Shaft sleeve
161	Casing cover	550.95 <sup>42)</sup>	Disc
183	Support foot	554.98	Lock washer
210	Shaft	81-92.01/.02	Cover plate
230	Impeller	901.04/.31/.98	Hexagon head bolt
321.01/.02	Deep groove ball bearing	902.01	Stud
330	Bearing bracket	903.01/.02/.03/.04	Screw plug
360.01/.02	Bearing cover	914.02	Round-head screw
400.10/.75	Gasket	920.01/.95	Hexagon nut
411.01/.02/.03/.04	Joint ring	930.95	Spring washer
411.77/.78	Axial seal ring	932.01/.02	Circlip
433	Mechanical seal	940.01/.02/.09 <sup>43)</sup>	Key
502.01/.02 <sup>44)</sup>	Casing wear ring <sup>45)</sup>		

<sup>42</sup> For shaft unit 25 only

<sup>43</sup> For shaft units 55 and 60 only

<sup>44</sup> Not on sizes 040-025-160, 050-32-125.1, 050-32-160.1, 050-32-125, 050-32-160, 065-040-125

<sup>45</sup> Optional for casing material C

Table 36: Connections

Part No.	Description	Part No.	Description
1M	Pressure gauge with connection	6D	Fluid priming and venting
6B	Fluid drain	8B	Leakage drain

Version with standardised mechanical seal and clamped casing cover

Table 37: This illustration applies to the following pump sizes:

200-200-250	250-200-275	300-250-295
	250-200-320	300-250-295. 1
		300-250-320

[ Supplied in packaging units only

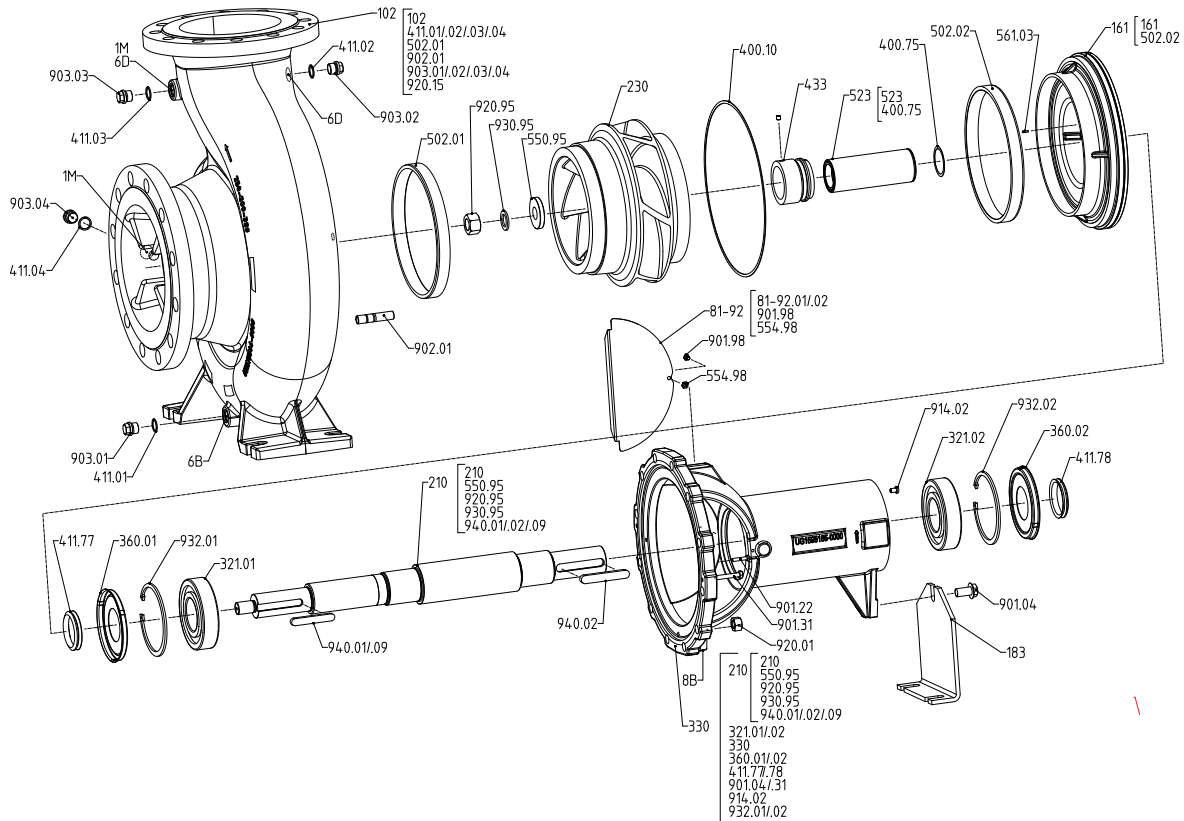


Fig. 15: Version with standardised mechanical seal and clamped casing cover

Table 38: List of components

Part No.	Description	Part No.	Description
102	Volute casing	523	Shaft sleeve
161	Casing cover	550.95	Disc
183	Support foot	554.98	Lock washer
210	Shaft	561.03	Grooved pin
230	Impeller	81-92.01/02	Cover plate
321.01/02	Deep groove ball bearing	901.04/22/31/98	Hexagon head bolt
330	Bearing bracket	902.01	Stud
360.01/02	Bearing cover	903.01/02/03/04	Screw plug
400.10/75	Gasket	914.02	Round-head screw
411.01/02/03/04	Joint ring	920.01/95	Hexagon nut
411.77/78	Axial seal ring	930.95	Spring washer
433	Mechanical seal	932.01/02	Circlip
502.01/02	Casing wear ring	940.01/02/09	Key

Table 39: Connections

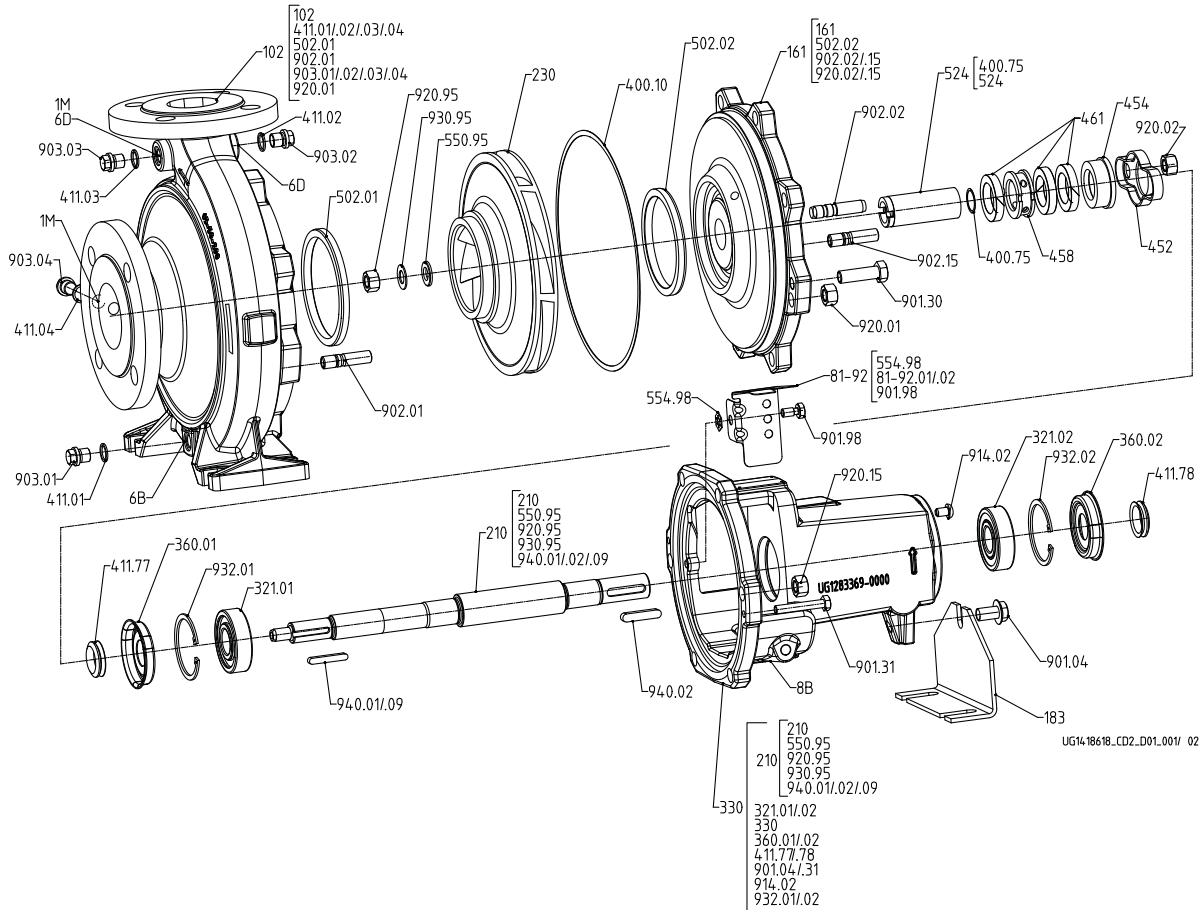
Part No.	Description	Part No.	Description
1M	Pressure gauge with connection	6D	Fluid priming and venting
6B	Fluid drain	8B	Leakage drain

### Version with gland packing and bolted casing cover

**Table 40:** This illustration applies to the following pump sizes:

040-025-200	050-032-200.1	050-032-200	065-040-200	065-050-200	080-065-200	100-80-250	125-100-250	150-125-250	200-150-250
	050-032-250.1	050-032-250	065-040-250	065-050-250	080-065-250	100-80-315	125-100-315	150-125-315	200-150-315
			065-040-315	065-050-315	080-065-315	100-80-400	125-100-400	150-125-400	200-150-400

[ Supplied in packaging units only



**Fig. 16:** Version with gland packing and bolted casing cover

**Table 41:** List of components

Part No.	Description	Part No.	Description
102	Volute casing	461	Gland packing
161	Casing cover	502.01/.02	Casing wear ring <sup>46)</sup>
183	Support foot	524	Shaft protecting sleeve
210	Shaft	550.95 <sup>47)</sup>	Disc
230	Impeller	554.98	Lock washer
321.01/.02	Deep groove ball bearing	81-92.01/.02	Cover plate
330	Bearing bracket	901.04/.30/.31/.98	Hexagon head bolt
360.01/.02	Bearing cover	902.01/.02/.15	Stud
400.10/.75	Gasket	903.01/.02/.03/.04	Screw plug
411.01/.02/.03/.04	Joint ring	914.02	Round-head screw
411.77/.78	Axial seal ring	920.01/.02/.15/.95	Hexagon nut
452	Gland follower	930.95	Spring washer
454	Stuffing box ring	932.01/.02	Circlip
458	Lantern ring	940.01/.02/.09 <sup>48)</sup>	Key

<sup>46</sup> Optional for casing material C

<sup>47</sup> For shaft unit 25 only

<sup>48</sup> For shaft units 55 and 60 only

Table 42: Connections

Part No.	Description	Part No.	Description
1M	Pressure gauge with connection	6D	Fluid priming and venting
6B	Fluid drain	8B	Leakage drain

Version with gland packing and bolted casing cover

Table 43: This illustration applies to the following pump sizes:

150-125-510	200-150-510	250-200-375	300-250-375	350-300-350
		250-200-435	300-250-435	350-300-350.1
		250-200-510	300-250-510	350-300-375
				350-300-435
				350-300-510

[ Supplied in packaging units only

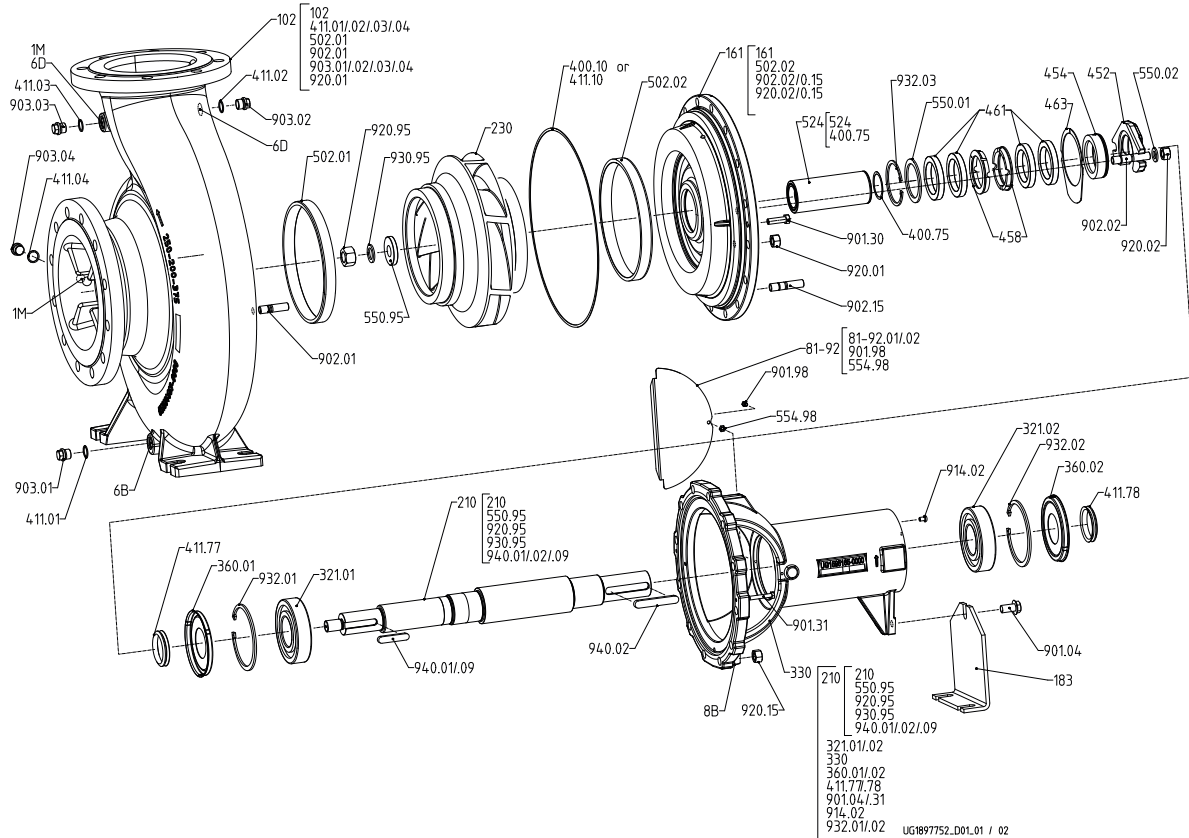


Fig. 17: Version with gland packing and bolted casing cover

Table 44: List of components

Part No.	Description	Part No.	Description
102	Volute casing	461	Gland packing
161	Casing cover	502.01/.02	Casing wear ring
183	Support foot	524	Shaft protecting sleeve
210	Shaft	550.95	Disc
230	Impeller	554.98	Lock washer
321.01/.02	Deep groove ball bearing	81-92.01/.02	Cover plate
330	Bearing bracket	901.04/.30/.31/.98	Hexagon head bolt
360.01/.02	Bearing cover	902.01/.02/.15	Stud
400.10/.75	Gasket	903.01/.02/.03/.04	Screw plug
411.01/.02/.03/.04/.10	Joint ring	914.02	Round-head screw
411.77/.78	Axial seal ring	920.01/.02/.15/.95	Hexagon nut
452	Gland follower	930.95	Spring washer
454	Stuffing box ring	932.01/.02	Circlip
458	Lantern ring	940.01/.02/.09	Key

Table 45: Connections

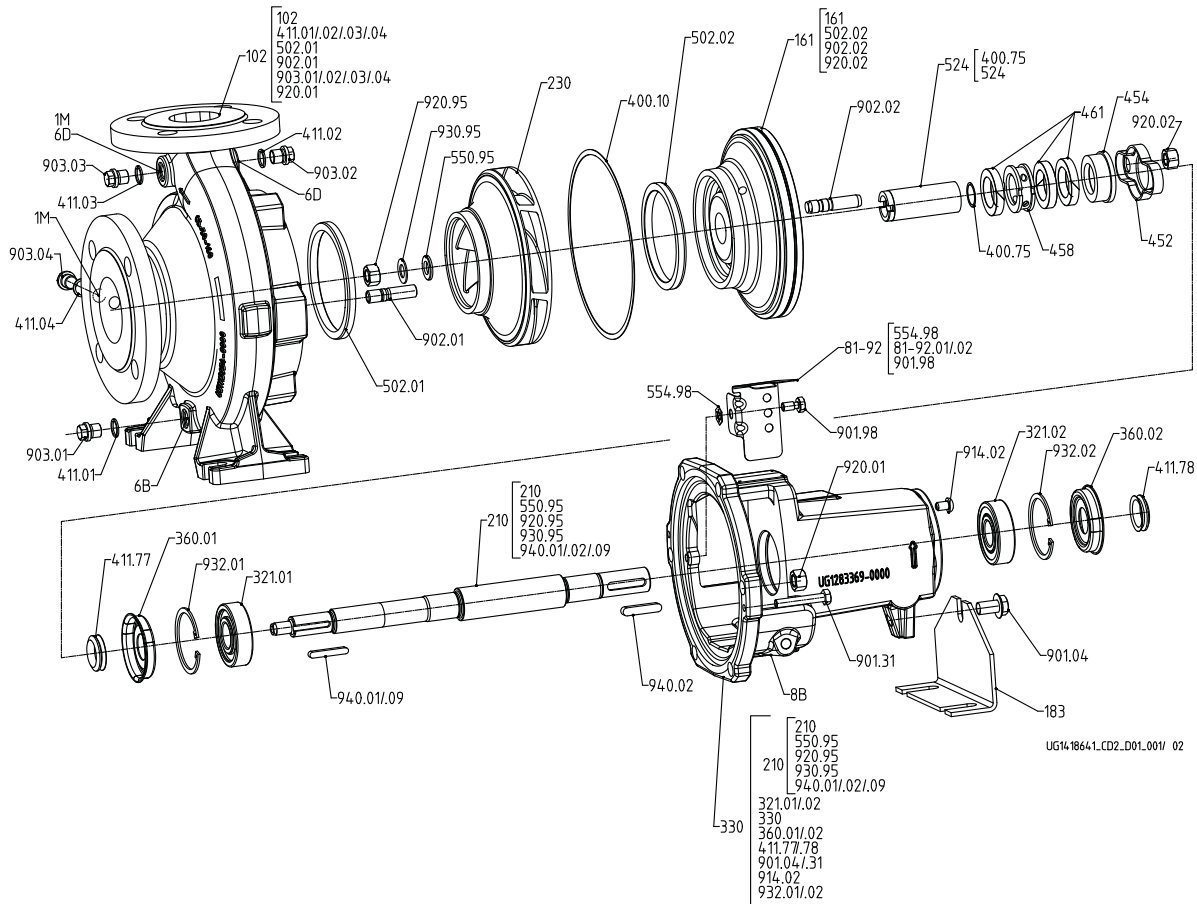
Part No.	Description	Part No.	Description
1M	Pressure gauge with connection	6D	Fluid priming and venting
6B	Fluid drain	8B	Leakage drain

## Version with gland packing and clamped casing cover

**Table 46:** This illustration applies to the following pump sizes:

040-025-160	050-032-125.1	050-032-125	065-040-125	065-050-125	080-065-125	100-80-160	125-100-160	150-125-200	200-150-200
	050-032-160.1	050-032-160	065-040-160	065-050-160	080-065-160	100-80-200	125-100-200		

[ Supplied in packaging units only



**Fig. 18:** Version with gland packing and clamped casing cover

**Table 47:** List of components

Part No.	Description	Part No.	Description
102	Volute casing	461	Gland packing
161	Casing cover	502.01/.02 <sup>49)</sup>	Casing wear ring <sup>50)</sup>
183	Support foot	524	Shaft protecting sleeve
210	Shaft	550.95 <sup>51)</sup>	Disc
230	Impeller	554.98	Lock washer
321.01/.02	Deep groove ball bearing	81-92.01/.02	Cover plate
330	Bearing bracket	901.04/.31/.98	Hexagon head bolt
360.01/.02	Bearing cover	902.01/.02	Stud
400.10/.75	Gasket	903.01/.02/.03/.04	Screw plug
411.01/.02/.03/.04	Joint ring	914.02	Round-head screw
411.77/.78	Axial seal ring	920.01/.02/.95	Hexagon nut
452	Gland follower	930.95	Spring washer
454	Stuffing box ring	932.01/.02	Circlip
458	Lantern ring	940.01/.02/.09 <sup>52)</sup>	Key

<sup>49</sup> Not on sizes 040-025-160, 050-32-125.1, 050-32-160.1, 050-32-125, 050-32-160, 065-040-125

<sup>50</sup> Optional for casing material C

<sup>51</sup> For shaft unit 25 only

<sup>52</sup> For shaft units 55 and 60 only

Table 48: Connections

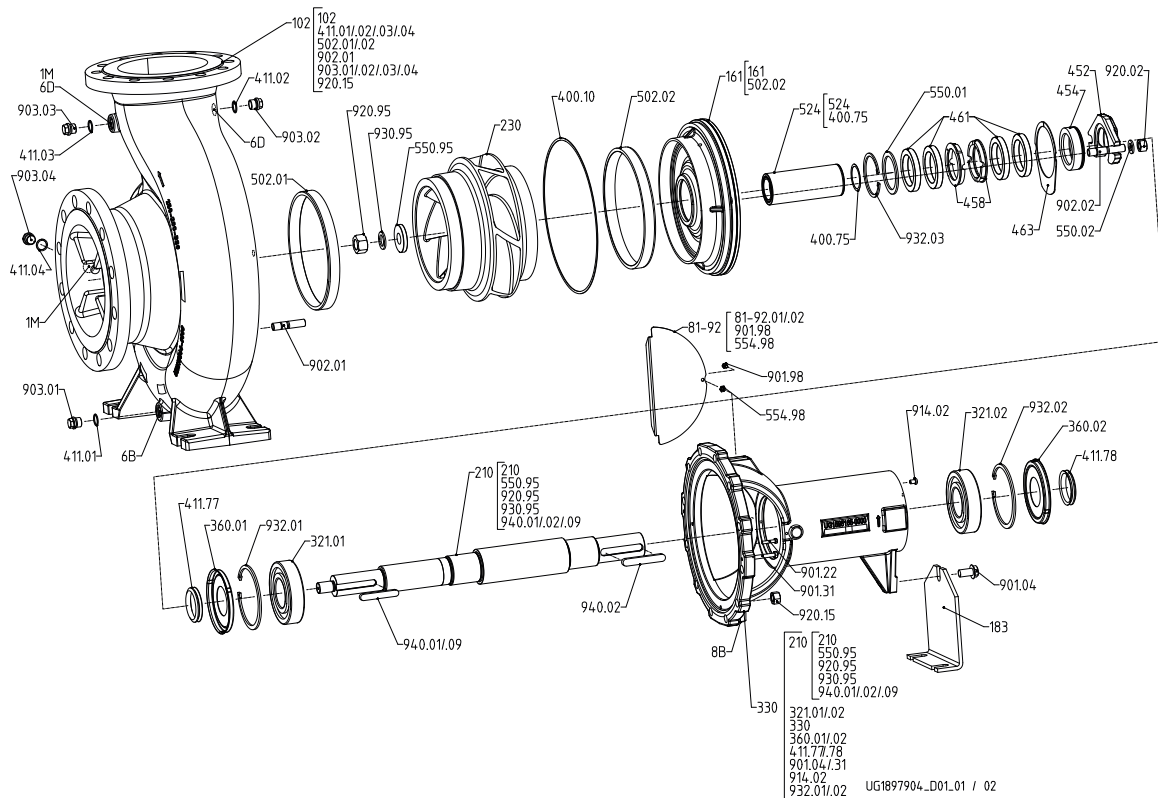
Part No.	Description	Part No.	Description
1M	Pressure gauge with connection	6D	Fluid priming and venting
6B	Fluid drain	8B	Leakage drain

## Version with gland packing and clamped casing cover

**Table 49:** This illustration applies to the following pump sizes:

200-200-250	250-200-275	300-250-295
	250-200-320	300-250-295.1
		300-250-320

[ Supplied in packaging units only



**Fig. 19:** Version with gland packing and clamped casing cover

**Table 50:** List of components

Part No.	Description	Part No.	Description
102	Volute casing	461	Gland packing
161	Casing cover	502.01/.02	Casing wear ring
183	Support foot	524	Shaft protecting sleeve
210	Shaft	550.95	Disc
230	Impeller	554.98	Lock washer
321.01/.02	Deep groove ball bearing	81-92.01/.02	Cover plate
330	Bearing bracket	901.04/.22/.31/.98	Hexagon head bolt
360.01/.02	Bearing cover	902.01/.02	Stud
400.10/.75	Gasket	903.01/.02/.03/.04	Screw plug
411.01/.02/.03/.04	Joint ring	914.02	Round-head screw
411.77/.78	Axial seal ring	920.01/.02/.95	Hexagon nut
452	Gland follower	930.95	Spring washer
454	Stuffing box ring	932.01/.02	Circlip
458	Lantern ring	940.01/.02/.09	Key

**Table 51:** Connections

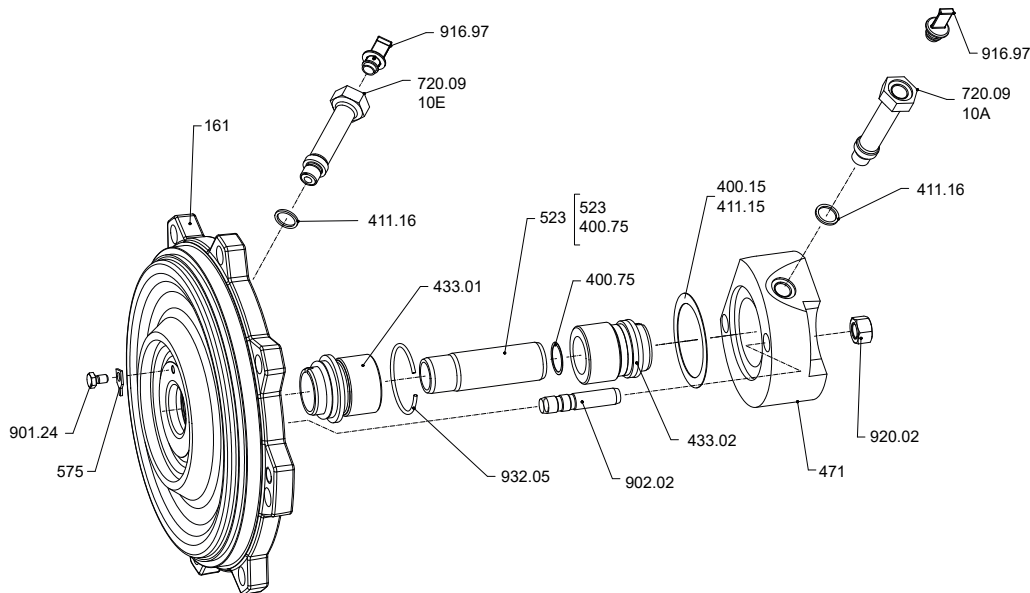
Part No.	Description	Part No.	Description
1M	Pressure gauge with connection	6D	Fluid priming and venting
6B	Fluid drain	8B	Leakage drain

## Version with double mechanical seal in back-to-back arrangement

**Table 52:** This illustration applies to the following pump sizes:

040-025-200	050-032-200.1	050-032-200	065-040-200	065-050-200	080-065-200	100-80-250	125-100-250	150-125-250	200-150-250
	050-032-250.1	050-032-250	065-040-250	065-050-250	080-065-250	100-80-315	125-100-315	150-125-315	200-150-315
			065-040-315	065-050-315	080-065-315	100-80-400	125-100-400	150-125-400	200-150-400

[ Supplied in packaging units only



UG1790188\_D02\_101/01

**Fig. 20:** Version with double mechanical seal in back-to-back arrangement

**Table 53:** List of components<sup>53)</sup>

Part No.	Description	Part No.	Description
161	Casing cover	720.09	Fitting
400.15/.75	Gasket	901.24	Hexagon head bolt
411.15/.16	Joint ring	916.97	Plug
433.01/.02	Mechanical seal	902.02	Stud
471	Seal cover	920.02	Hexagon nut
523	Shaft sleeve	932.05	Circlip
575	Strip		

**Table 54:** Auxiliary connections

Part No.	Description	Part No.	Description
10A	External barrier water outlet	10E	External barrier water inlet

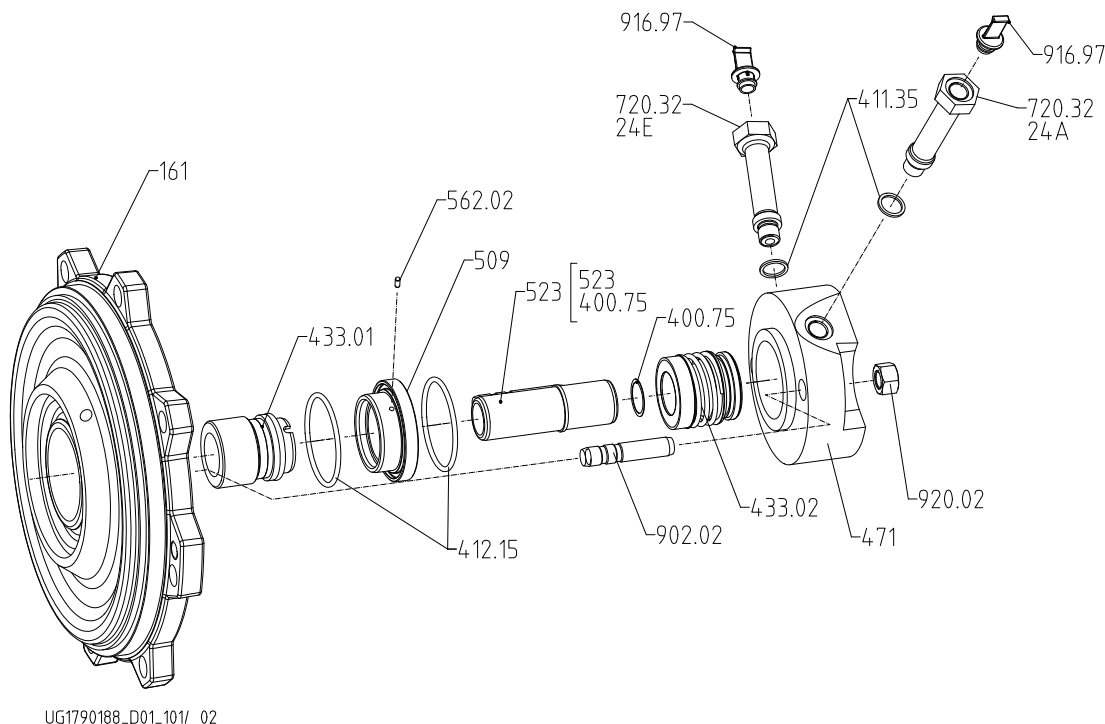
<sup>53)</sup> Some individual components might not be applicable, depending on the pump size and material.

## Version with double mechanical seal in tandem arrangement

**Table 55:** This illustration applies to the following pump sizes:

040-025-160	050-032-125.1	050-032-125	065-040-125	065-050-125	080-065-125	100-80-160	125-100-160	150-125-200	200-150-200
040-025-200	050-032-160.1	050-032-160	065-040-160	065-050-160	080-065-160	100-80-200	125-100-200	150-125-250	200-150-250
	050-032-200.1	050-032-200	065-040-200	065-050-200	080-065-200	100-80-250	125-100-250	150-125-315	200-150-315
	050-032-250.1	050-032-250	065-040-250	065-050-250	080-065-250	100-80-315	125-100-315	150-125-400	200-150-400
			065-040-315	065-050-315	080-065-315	100-80-400	125-100-400		

[ Supplied in packaging units only



**Fig. 21:** Version with double mechanical seal in tandem arrangement

**Table 56:** List of components<sup>54)</sup>

Part No.	Description	Part No.	Description
161	Casing cover	523	Shaft sleeve
400.75	Gasket	562.02	Parallel pin
411.35	Joint ring	720.32	Fitting
412.15	O-ring	902.02	Stud
433.01/02	Mechanical seal	916.97	Plug
471	Seal cover	920.02	Hexagon nut
509	Intermediate ring		

**Table 57:** Auxiliary connections

Part No.	Description	Part No.	Description
24A	Quench liquid outlet	24E	Quench liquid inlet

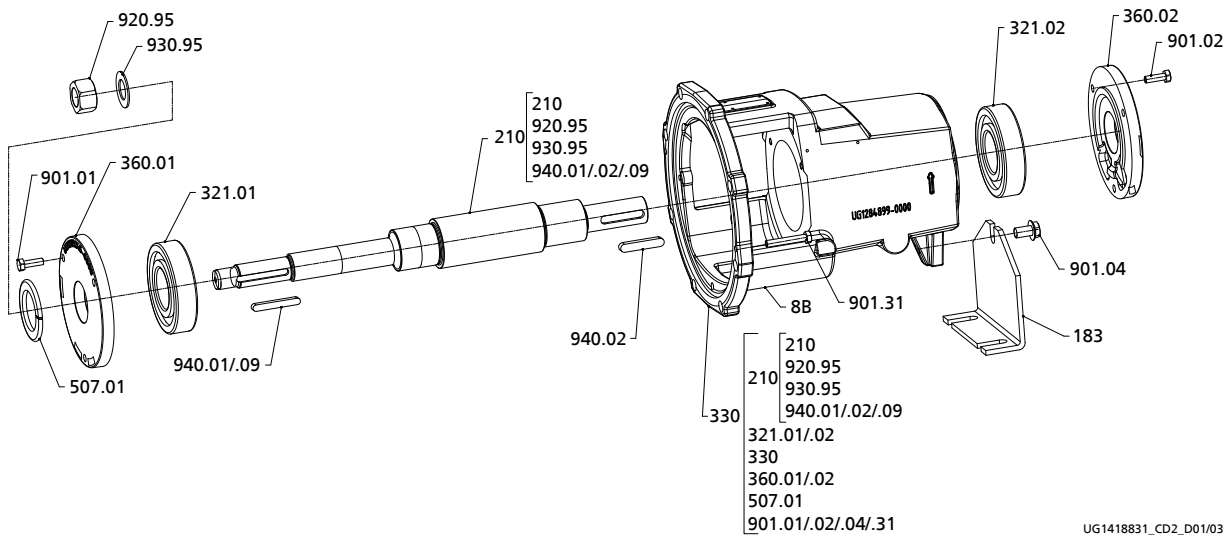
<sup>54</sup> Some individual components might not be applicable, depending on the pump size and material.

## Version with reinforced bearings

**Table 58:** This illustration applies to the following pump sizes:

040-025-160	050-032-125.1	050-032-125	065-040-125	065-050-125	080-065-125	100-80-160	125-100-160	150-125-200	200-150-200
040-025-200	050-032-160.1	050-032-160	065-040-160	065-050-160	080-065-160	100-80-200	125-100-200	150-125-250	200-150-250
	050-032-200.1	050-032-200	065-040-200	065-050-200	080-065-200	100-80-250	125-100-250	150-125-315	200-150-315
	050-032-250.1	050-032-250	065-040-250	065-050-250	080-065-250	100-80-315	125-100-315	150-125-400	200-150-400
			065-040-315	065-050-315	080-065-315	100-80-400	125-100-400		

[ Supplied in packaging units only



**Fig. 22:** Version with reinforced bearings (shaft units 50 and 60)

**Table 59:** List of components<sup>55)</sup>

Part No.	Description	Part No.	Description
183	Support foot	507.01	Thrower
210	Shaft	901.01/02/04/31	Hexagon head bolt
330	Bearing bracket	920.95	Hexagon nut
321.01/02	Deep groove ball bearing	930.95	Spring washer
360.01/02	Bearing cover	940.01/02/09 <sup>56)</sup>	Key

**Table 60:** Connections

Part No.	Description	Part No.	Description
8B	Leakage drain		

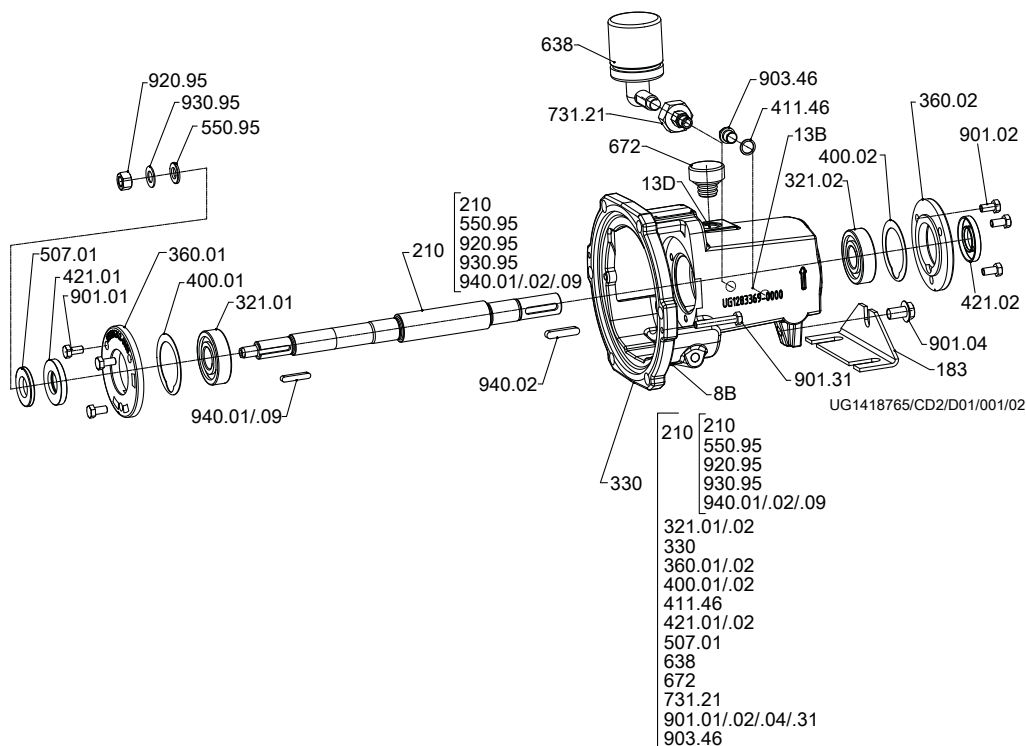
<sup>55)</sup> Some individual components might not be applicable, depending on the pump size and material.

<sup>56)</sup> For shaft unit 60 only

**Version with oil lubrication and constant level oiler**
**Table 61:** This illustration applies to the following pump sizes:

040-025-160	050-032-125.1	050-032-125	065-040-125	065-050-125	080-065-125	100-80-160	125-100-160	150-125-200	200-150-200
040-025-200	050-032-160.1	050-032-160	065-040-160	065-050-160	080-065-160	100-80-200	125-100-200	150-125-250	200-150-250
	050-032-200.1	050-032-200	065-040-200	065-050-200	080-065-200	100-80-250	125-100-250	150-125-315	200-150-315
	050-032-250.1	050-032-250	065-040-250	065-050-250	080-065-250	100-80-315	125-100-315	150-125-400	200-150-400
			065-040-315	065-050-315	080-065-315	100-80-400	125-100-400		

[ Supplied in packaging units only


**Fig. 23:** Version with oil lubrication and constant level oiler

**Table 62:** List of components<sup>57)</sup>

Part No.	Description	Part No.	Description
183	Support foot	550.95 <sup>58)</sup>	Disc
210	Shaft	638	Constant level oiler
330	Bearing bracket	672	Vent
321.01/.02	Deep groove ball bearing	731.21	Pipe union
360.01/.02	Bearing cover	901.01/.02/.04/.31	Hexagon head bolt
400.01/.02	Gasket	903.46	Screw plug
411.46	Joint ring	920.95	Hexagon nut
421.01/.02	Lip seal	930.95	Spring washer
507.01	Thrower	940.01/.02/.09 <sup>59)</sup>	Key

**Table 63:** Connections

Part No.	Description	Part No.	Description
8B	Leakage drain	13D	Oil filling and venting
13B	Oil drain		

<sup>57</sup> Some individual components might not be applicable, depending on the pump size and material.

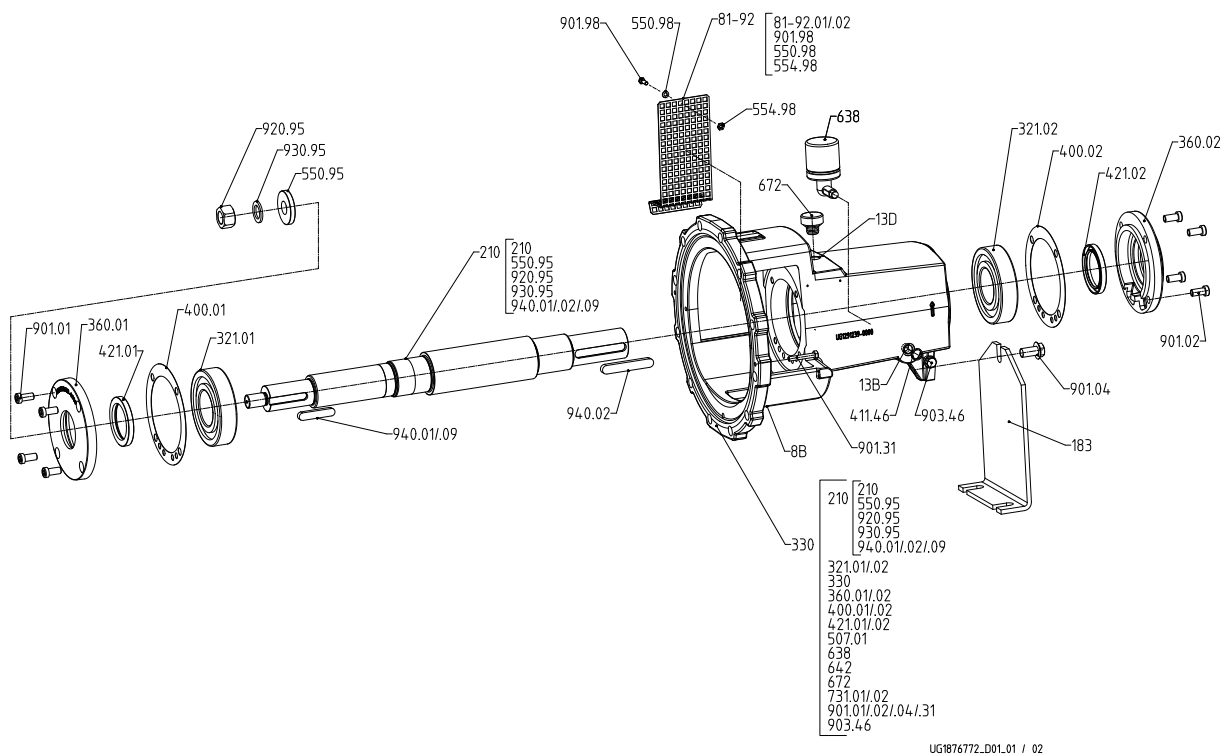
<sup>58</sup> For shaft unit 25 only

<sup>59</sup> For shaft units 55 and 60 only

**Version with oil lubrication and constant level oiler**
**Table 64:** This illustration applies to the following pump sizes:

150-125-510	200-150-510	250-200-275	300-250-295	350-300-350
	200-200-250	250-200-320	300-250-295.1	350-300-350.1
		250-200-375	300-250-320	350-300-375
		250-200-435	300-250-375	350-300-435
		250-200-510	300-250-435	350-300-510
			300-250-510	

[ Supplied in packaging units only


**Fig. 24:** Version with oil lubrication and constant level oiler

**Table 65:** List of components<sup>60)</sup>

Part No.	Description	Part No.	Description
183	Support foot	554.98	Lock washer
210	Shaft	638	Constant level oiler
330	Bearing bracket	672	Vent
321.01/.02	Deep groove ball bearing	81-92.1/.2	Cover plate
360.01/.02	Bearing cover	901.01/.02/.04/.31/.98	Hexagon head bolt
400.01/.02	Gasket	903.46	Screw plug
411.46	Joint ring	920.95	Hexagon nut
421.01/.02	Lip seal	930.95	Spring washer
507.01	Thrower	940.01/.02/.09	Key
550.95/.98	Disc		

**Table 66:** Connections

Part No.	Description	Part No.	Description
8B	Leakage drain	13D	Oil filling and venting
13B	Oil drain		

<sup>60)</sup> Some individual components might not be applicable, depending on the pump size and material.

## Glossary

### ACS

French drinking water regulations (ACS = Attestation de Conformité Sanitaire)

### Back pull-out design

The complete back pull-out unit can be pulled out without having to remove the pump casing from the piping.

### FM

Certification by FM Global (FM = Factory Mutual) regarding property insurance in industry and risk management; FM Approved products

### IE1

Efficiency class to IEC 60034-30: 1 = Standard Efficiency (IE = International Efficiency)

### IE2

Efficiency class to IEC 60034-30: 2 = High Efficiency (IE = International Efficiency)

### IE3

Efficiency class to IEC 60034-30: 3 = Premium Efficiency (IE = International Efficiency)

### Mech. seal

Mechanical seal

### SU

Shaft unit

### UBA

German drinking water regulations to German Environment Agency

### UL

Certification of materials, components and end products regarding product safety (UL = Underwriters Laboratories)

### VdS

Certification for fire protection and safety by VdS

### WRAS

Approved by all water suppliers in the UK (WRAS = Water Regulations Advisory Scheme)







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