Submersible Motor Pump

Amarex KRT

INDIA
50 Hz

Type Series Booklet

Legal information/Copyright

Type Series Booklet Amarex KRT

Inhaltsverzeichnis

Waste Water

Submersible Motor Pump

Amarex KRT

Main applications

- Waste water management
- Service water supply systems
- Disposal
- Waste water treatment plants
- Sludge disposal

Fluids handled

- Waste water with faeces
- Activated sludge
- Digested sludge
- Raw sludge
- Gas-containing liquids
- Industrial waste water

Operating data

Table 1: Operating properties

Characteristic		Value
Flow rate	Q [m³/h]	≤ 3500
	Q [l/s]	≤ 972
Head	H [m]	≤ 100
Fluid temperature	T [°C]	≤ +40
Motor rating	P_2 [kW]	5,5 - 350

Design details

Design

- Fully floodable submersible motor pump
- Not self-priming
- Close-coupled design

Drive

- Three-phase asynchronous squirrel-cage motor
- Enclosure: IP68 to IEC 60034-5
- Voltage: 415 V (+ 10 %/- 15 %)
- Frequency 50 Hz (+/- 3 %)

Shaft seal

Depending on the motor design:

- Two bi-directional mechanical seals in tandem arrangement with liquid reservoir, with leakage chamber (internal flow switch) on some models

Impeller type

Various application-oriented impeller types (⇨ Page 5)

Bearings

Standard bearings:

- Grease-packed bearings sealed for life
- Maintenance-free

Drive end:

- Grease-packed bearings sealed for life (grooved ball bearing or cylindrical roller bearing)
- Maintenance-free

Pump-end:

- Grease-lubricated bearings (grooved ball bearing or angular contact bearing)
- Can be re-lubricated

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Designation

Example: Amarex KRT K 150-500/155 4 UN G-S_ _

Table 2: Designation key

Code	Description	
Amarex KRT	Type series (Commonly called as KRT)	
K	Impeller type	
	F	Free-flow impeller
	E	Closed single-channel impeller
	K/K-max	Closed multi-channel impeller
150	Nominal discharge nozzle diameter [mm]	
500	Maximum nominal impeller diameter [mm]	
155	Motor size	
4	Number of poles	
	2, 4, 6, 8	
UN	Motor version	
	U	Side entry , without explosion protection, for fluid temperatures of up to 40 °C[1)]
	UN	Top entry , without explosion protection, for fluid temperatures of up to 40 °C[1)]
G	Material variant (refer clause for "Materials")	
	G	Complete cast iron pump
	G1	Complete cast iron pump with stainless steel impeller
S	Installation type	
	K	Stationary wet installation (S1 duty with motor outside the fluid possible) with guide wire arrangement or dual guide rail[2)] arrangement
	S	Stationary wet installation (S1 duty with submerged motor) with guide wire arrangement or dual guide rail arrangement[2)]
	P	Transportable wet-installed model (S1 duty with submerged motor)
_ _	Motor efficiency classification	
	[3)]	No efficiency classification[4)]

Materials

Table 3: Overview of available materials

Part No.	Description	Material variant		
		G	G1	G1A[5)]
Pump set				
101	Pump casing	IS 210 FG260	NiCi (2%-3% Nickle)	
163	Discharge cover	IS 210 FG260		
210	Shaft	DKN motors: A 276 Type 410 K motors: 1.4021 QT800 (⇨ Page 12)		A 276 Type 431
230	Impeller	IS 210 FG260	A 743 Gr.CF8M	
350	Bearing housing	IS 210 FG260		
412	O-ring	Nitrile butadiene rubber (NBR)		
433.01	Mechanical seal Drive end (motor side)	Carbon/SiC		
433.02	Mechanical seal Non-drive end (pump side)	SiC/SiC		
502	Casing wear ring[6)]	IS 210 FG260		
66-2	Cooling jacket[7)]	1.4571 or SS 316		

1 Maximum fluid temperature and ambient temperature
2 Guide rail is also called as guide pipe.
3 Blank
4 IEC 60034-30 standard not binding for submersible motor pumps. Efficiencies calculated/determined according to the measurement method specified in IEC 60034-2. The marking is used for submersible motors that achieve efficiency levels similar to those of standardised motors acc. to the IEC 60034-30 standard.
5 G1A is only for differentiation in Easy select for Amarex KRT India. The material variant to be selected should be G1. Then an option for selecting the shaft material will be available.
6 Only for E impeller and K impeller, except F 40-250
7 Only K motors

Part No.	Description	Material variant		
		G	G1	G1A[5]
811	Motor housing	IS 210 FG260		
824	Power cable	rubber-sheated cable		
900	Bolts/screws	A4 or equivalent		
Installation parts				
144	Discharge elbow[8]	DN 40/80: IS 210 GR FG260 DN 100/150/200/250: MS		
572	Guide wire suspension bracket[9]	1.4571 up to DN 200; IS 210 FG260 from size K200-502		
59-17	Shackle	MS or SS 304[10]		
59-24	Guide wire (wire rope)[9]	SS 304		
710	Guide pipe (guide rail)	MS or SS 304[10]		
72-1	Flanged bend (duckfoot bend)	IS 210 FG260		
732	Claw	DN 40/80: IS 210 FG260 DN 100 - 400: A216 Gr WCB		
885	Lifting chain	MS or SS 304[10]		
892	Foot plate / feet[11]	MS		
894	Mounting bracket[12]	A240 Type 316		

Table 4: Codes used

Code	Material type	Equivalent material grad
IS 210 FG260	Cast iron	EN-GJL-250/ A48 CL35 B
A 743 Gr.CF8M	Stainless steel	1.4408
NiCl (2%-3% Ni)	Cast iron with nickle content	-
A 276 Type 410	Stainless steel	-
1.4021 QT800	Stainless steel	A276 Type 420
A 276 Type 431	Stainless steel	-
A216 Gr WCB	Carbon steel	GS-C25N (1.0619)
1.4571	Duplex stainless steel	A276 Type 316 Ti
MS	Mild steel	-

Description of materials

Grey cast iron IS 210 FG260 (lamellar graphite cast iron)
Lamellar graphite cast iron to IS standard is the most widely used cast material for handling municipal sewage, waste water and sludges as well as stormwater and surface water. It is suitable for neutral fluids which are only slightly aggressive and cause little wear. The pH should be ≥ 6.5, the sand content ≤ 0.5 g/l.

Stainless steel (A 743 Gr.CF8M or technically equivalent material)

A 743 Gr.CF8M is a cast austenitic material for pressure containing parts confirming to ASTM standard. A 743 Gr. CF8M is a molybdenum(2-3 %) bearing modification of CF8 alloy and is the cast equivalent of wrought AISI 316 stainless steel. The presence of molybdenum increases the general corrosion resistance and the resistance to pitting by chlorides. Its tensile strength is 485 MPa.

Product benefits

- Absolutely water-tight resin-sealed cable entries prevent any water from entering the motor – even in the event of a damaged cable.
- Reliable operation ensured by leakage sensors signalling any ingress of moisture into the motor
- Reliable operation ensured by sensors monitoring the motor temperature and preventing overheating
- Non-clogging low-maintenance design with large free passages reduces clogging risk and, consequently, maintenance work.
- High-efficiency motors and variable hydraulic systems for optimum hydraulic efficiency and energy efficiency
- Optimum cooling under all operating conditions
- Top efficiencies
- Long motor life
- Highly reliable and easy to service

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/ .

8 Portable installation up to DN 250, except DN 200-500/502/503/632
9 Stationary installation with guide wire
10 Standard material to be offered is MS.
11 Portable installation up to DN 250
12 Stationary installation

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Acceptance tests and warranty

Functional test

- Every pump undergoes functional testing to KSB standard ZN 56525.
- Operating data is guaranteed to DIN EN ISO 9906 / HI / 2B.

Acceptance inspections/tests

- Acceptance test to ISO/DIN or comparable standards available against a surcharge.

Warranty

- Quality is assured by means of an audited and certified quality assurance system to DIN EN ISO 9001.

Selection information

- The indicated heads and performance data apply to material variant *G*, for fluids with a density ρ = 1 kg/dm³ and a kinematic viscosity v ≦ 20 mm²/s.
- For hydraulic acceptance tests of different material variants other than *G* , reduce the documented efficiencies by 2 percent.

Impeller type

- The impeller type (E, K/K-max and F), free passage and material variant have to be selected in accordance with the pumped medium.
- F and E impellers can only be supplied with the documented impeller diameters. In the purchase order, the impeller diameter must always be added to the designation of the pump set.
- K impellers are trimmed to the duty point. Indicate the H/Q data or the impeller diameter in the purchase order. In the hydraulic selection program, the impeller diameter is automatically computed based on the H/Q data and added to the designation of the pump set.

Pump input power

- Adjust the power input to the density of the fluid handled:
  P_2 (required) = ρ [kg/dm³] (fluid handled) × P_2 (documented)
- Select the operating point with the largest power input within an operating range. Select a motor size providing a power reserve to compensate the tolerances in the system characteristic / pump characteristic.

Losses

The performance curves do not include the flange bend losses for stationary execution which have to be calculated as per the following formula:

$Hv = [K \times (Q/A)^2] / (2 \times g)$

$A = (\pi \times d^2) / 4$

Table 5: Key

Symbol	Description	Unit
A	Cross sectional area at the outlet	m²
d	Flange bend diameter	m
g	Acceleration due to gravity	m/s²
Hv	Bend loss	m
K	Loss coefficient	-
Q	Flow	m³/s

The loss coefficient K is 0,53 for all DN sizes.

Example: Flange bend DN 200

Q	600 m³/h = 0,17 m³/s
d	200 mm = 0,2 m
g	9,81 m/s²
K	0,53
A	0,031 m²
Hv	= [K × (Q/A)²] / (2 × g) = [0,53 × (0,17/0,031)²] / (2 × 9,81) = 0,81 m

Recommended motor power reserve

To balance the inevitable tolerances of the characteristic curve of the plant, the pump, the motor etc., select a motor size with sufficient power reserve.

Table 6: Recommended motor power reserve[13)]

P_2	Reserve	
[kW]	Mains operation	With frequency inverter
≤ 30	10 %	15 %
> 30	5 %	10 %

For installation types K (with cooling jacket) a power reserve of 1.5 kW must always be added for the cooling circuit.

General information on operating submersible pumps in waste water

In the case of waste water, too low a flow velocity in the discharge line will lead to clogging and increased wear. A minimum flow velocity in the vertical riser of 2 m/s must be observed.

In the case of waste water, too low a circumferential speed of the impeller will lead to clogging of the hydraulic system (frequency inverter operation). A minimum circumferential speed (measured at the outside diameter of the impeller) of 12 m/s must be observed.[14)]

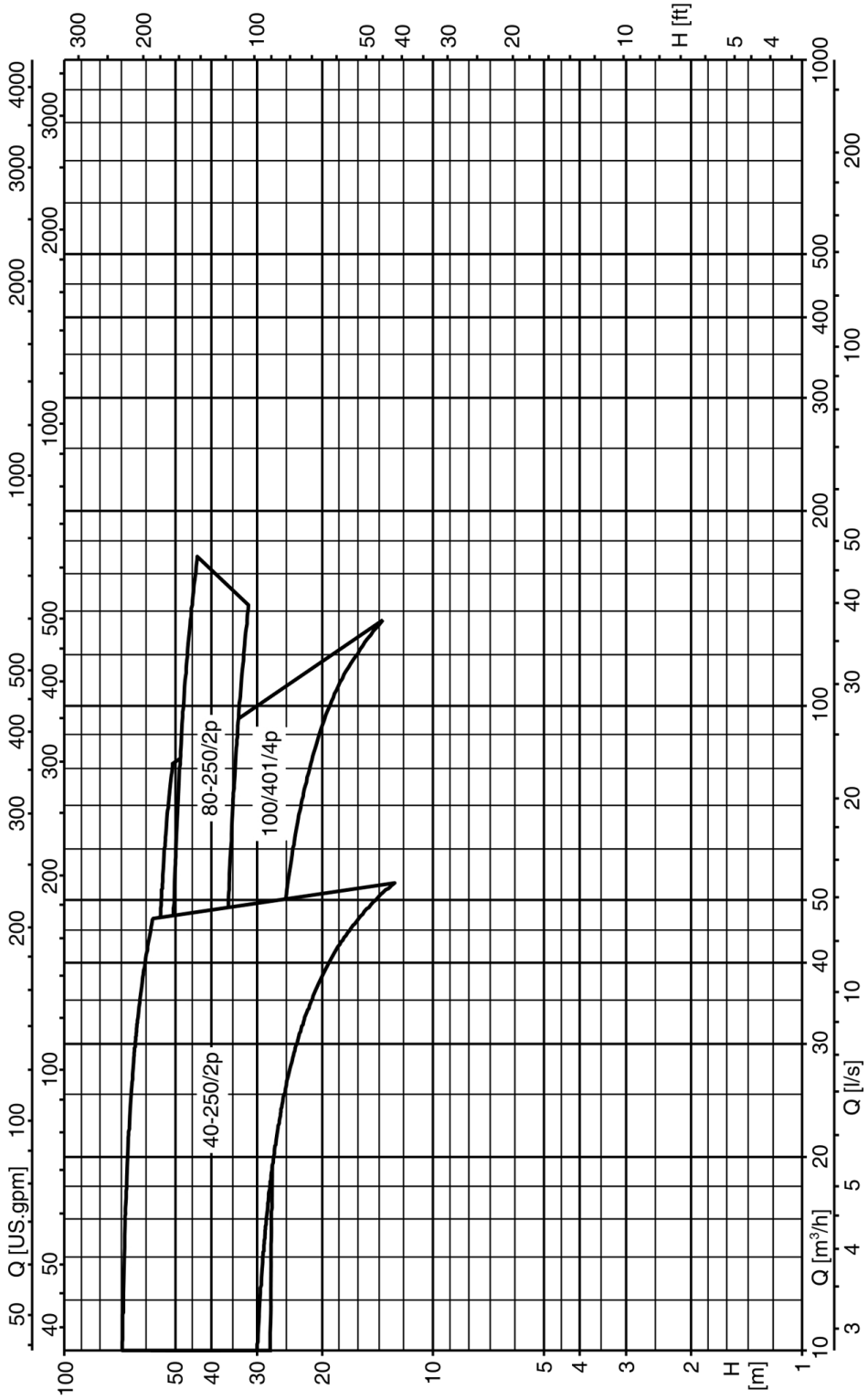
KRT motors are basically appropriate for an operation with VFD in frequency range 25 to 50 Hz. The given motor capacity can only be used up to 85% of it's normal rating. The current limit of the frequency inverter must be set to max. 1,2 times the rated current indicated on the name plate. Should local regulations or uncertainties regarding plant calculation demand higher reserves, then these will supersede the above values.

13 If larger power reserves are stipulated by local regulations, these larger reserves must be provided.

14 For F impellers, a circumferential speed below 12 m/s is permissible.

Selection charts

Amarex KRT F, n = 2900 + 1450 rpm



Operating data is guaranteed to DIN EN ISO 9906 / HI / 2B

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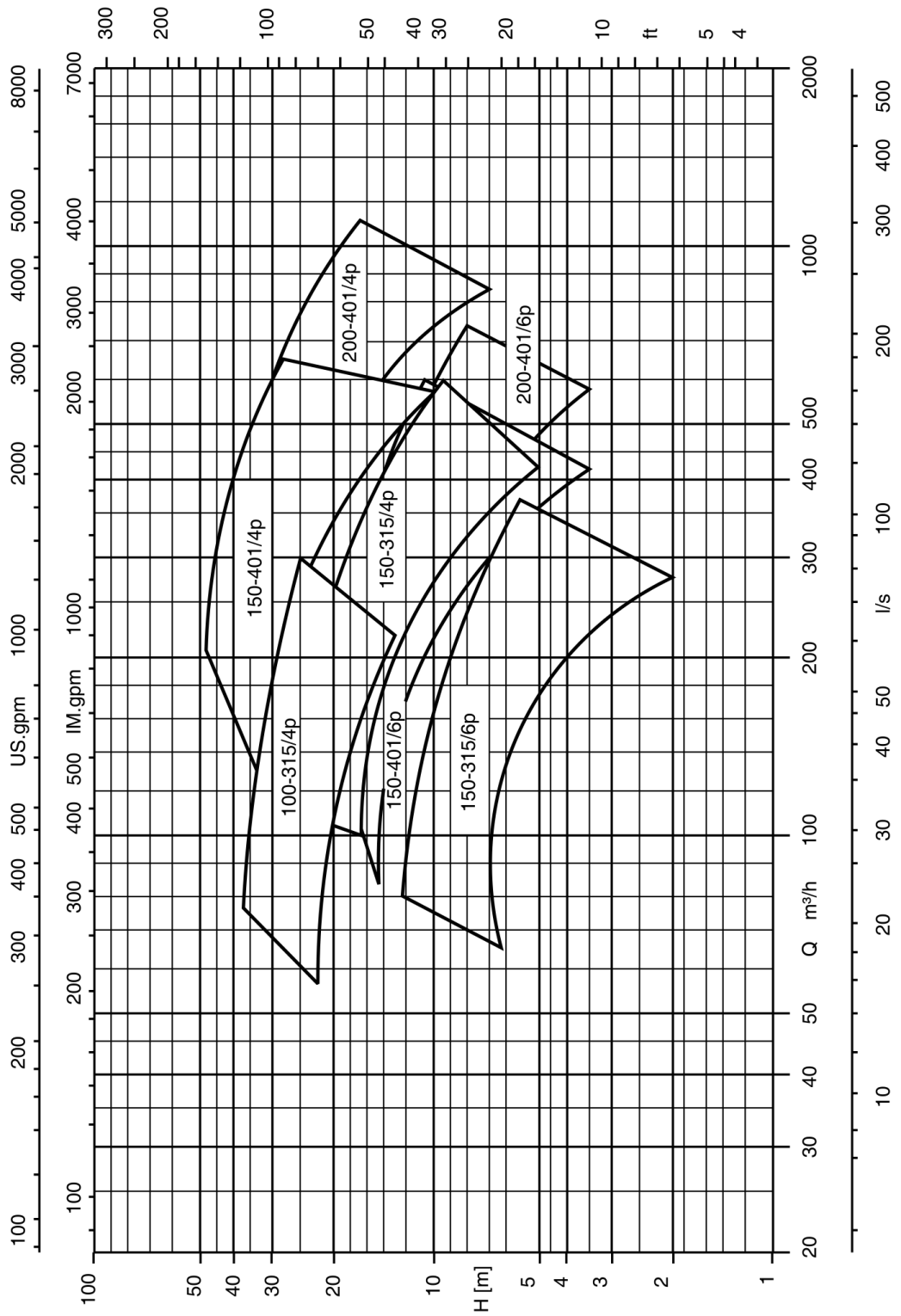
Amarex KRT E, n =1450 + 960 rpm



Operating data is guaranteed to DIN EN ISO 9906 / HI / 2B

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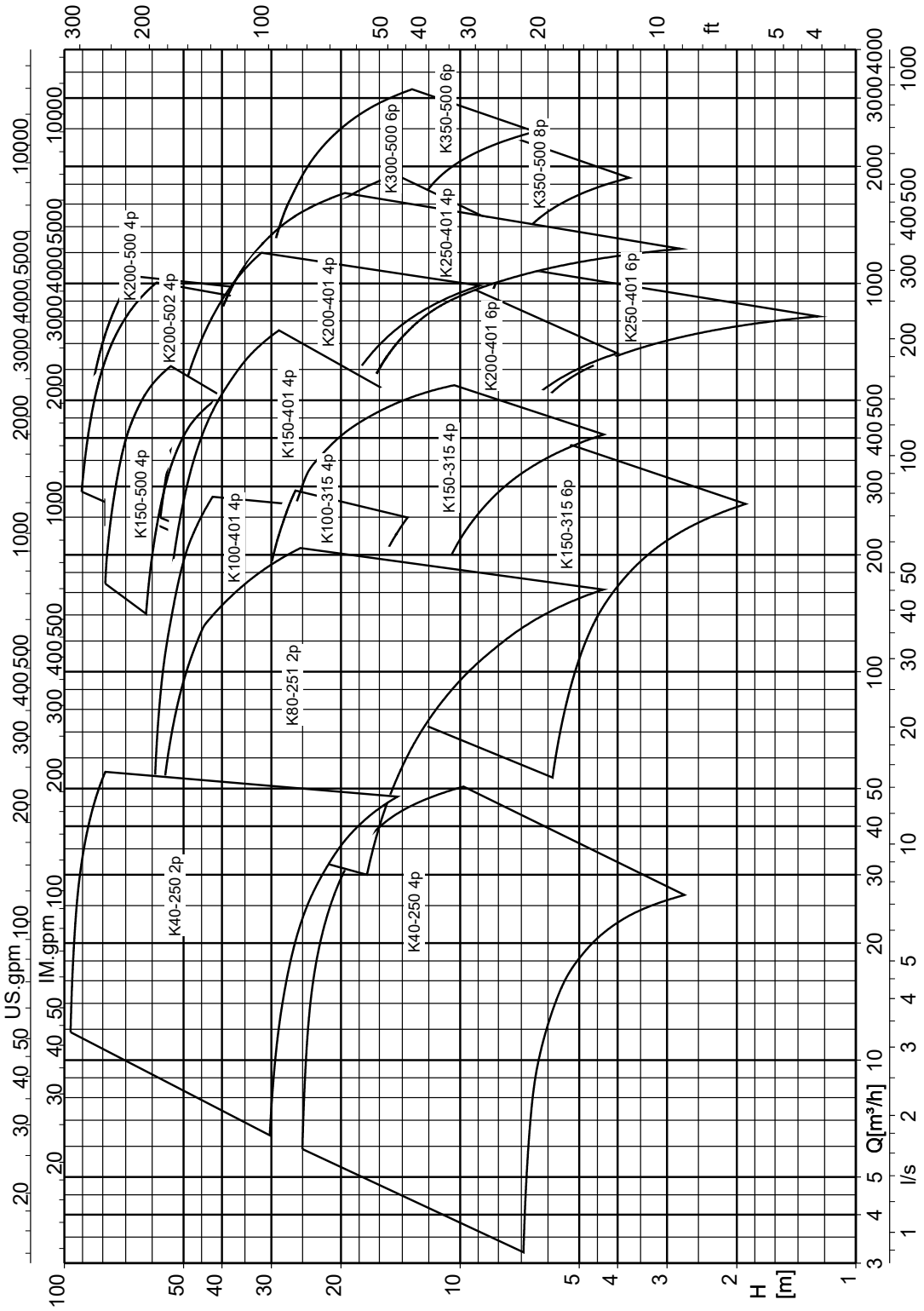
Amarex KRT K, n = 2900 + 1450 + 960 rpm



Operating data is guaranteed to DIN EN ISO 9906 / HI / 2B

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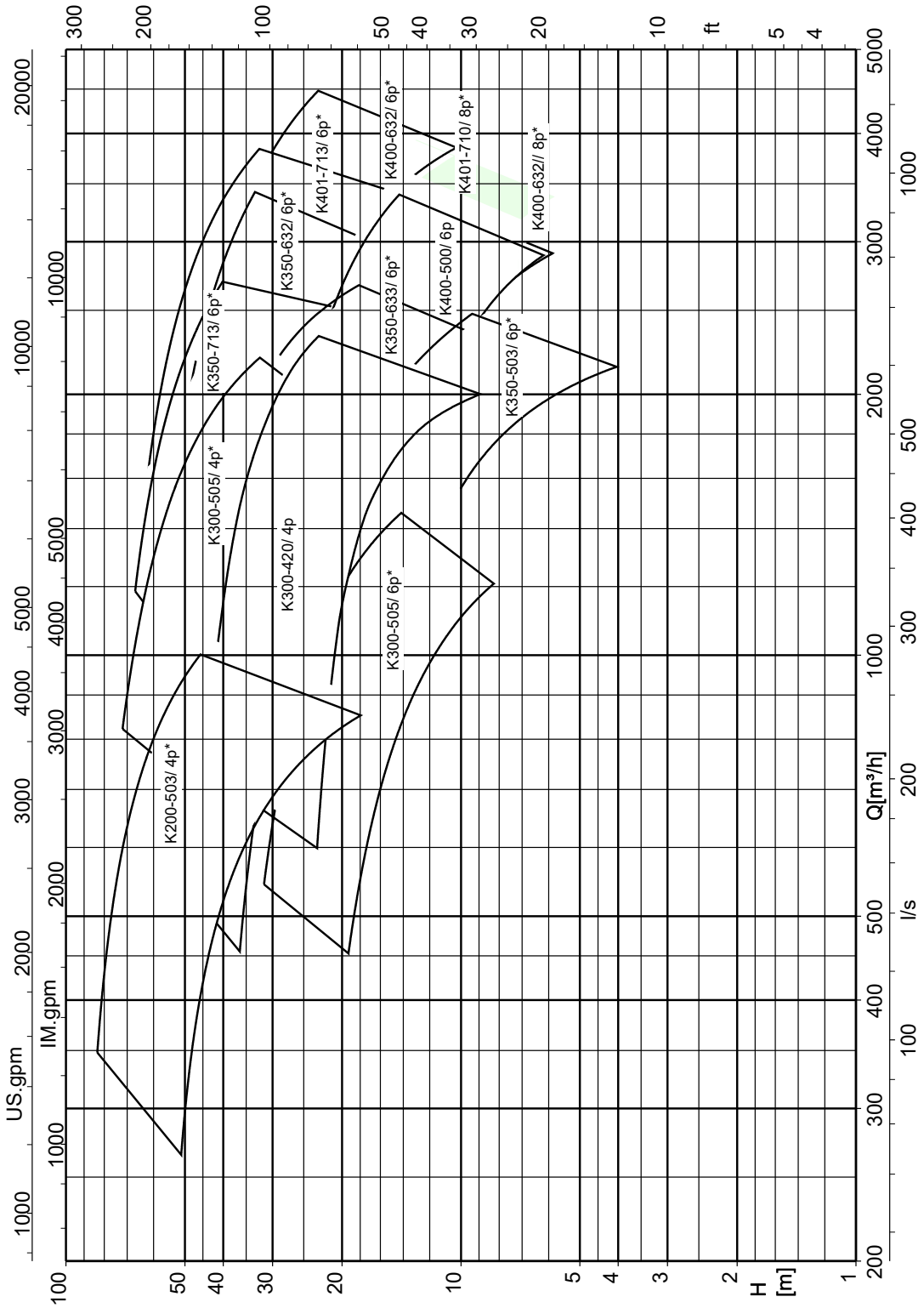
Amarex KRT K max, n = 1450 + 960 + 750 rpm



* Before offering these sizes, kindly contact head office.

Operating data is guaranteed to DIN EN ISO 9906 / HI / 2B

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Drives

Standard voltage rating: 415 V (+10%, -15%) ; 50 Hz (+/- 3%)

Table 7: Drives

Motor pole	Motor frame size	Motor type	Efficiency classification	Motor version	Installation Type		Allowable motor version U	Allowable insulation class		Installation type	Allowable motor version U	Allowable insulation class		Moment of inertia	GD2
					S	P	[kW]	F	H	K	[kW]	F	H	[kg m²]	[kg m²]
2	DKN 132	52	-	U	✗	✗	5	✗	-	-	-	-	-	0,01	0,04
		62	-	U	✗	✗	6,5	✗	-	-	-	-	-	0,01	0,04
		82	-	U	✗	✗	8,5	✗	-	-	-	-	-	0,01	0,04
	DKN 160	122	-	U	✗	✗	12	✗	-	-	-	-	-	0,02	0,08
		172	-	U	✗	✗	17	✗	-	-	-	-	-	0,03	0,12
	DKN 160L	222	-	U	✗	✗	22	✗	-	-	-	-	-	0,04	0,16
		252	-	U	✗	✗	25	✗	-	-	-	-	-	0,04	0,16
4	DKN 160	114	-	U	✗	✗	11,8	✗	-	-	-	-	-	0,04	0,16
		164	-	U	✗	✗	16	✗	-	-	-	-	-	0,05	0,2
	DKN 161	234	-	U	✗	✗	21	✗	-	-	-	-	-	0,07	0,28
	DKN 181	294	-	U	✗	✗	27	✗	-	-	-	-	-	0,11	0,44
	DKN 226	354	-	U	✗	✗	38	✗	-	-	-	-	-	0,22	0,88
		504	-	U	✗	✗	48	✗	-	-	-	-	-	0,25	1
		654	-	U	✗	✗	62	✗	-	-	-	-	-	0,30	1,2
	K22K	354	-	UN	-	-	-	-	-	✗	32	-	✗	0,25	1
		504	-	UN	-	-	-	-	-	✗	42	-	✗	0,28	1,12
		654	-	UN	-	-	-	-	-	✗	55	-	✗	0,33	1,32
		804	-	UN	✗	✗	80	-	✗	✗	75	-	✗	0,46	1,84
	K22L	954	-	UN	✗	✗	95	-	✗	✗	90	-	✗	0,55	2,2
		1104	-	UN	✗	✗	110	-	✗	✗	100	-	✗	0,63	2,52
	K28	1304	-	UN	✗	-	130	-	✗	✗	125	-	✗	1,26	5,04
		1554	-	UN	✗	-	155	-	✗	✗	145	-	✗	1,43	5,72
		1754	-	UN	✗	-	175	-	✗	✗	165	-	✗	1,57	6,28
	K31	2004	-	UN	✗	-	200	-	✗	✗	180	-	✗	3,78	15,12
		2504	-	UN	✗	-	250	-	✗	✗	210	-	✗	4,13	16,52
		3004	-	UN	✗	-	300	-	✗	✗	240	-	✗	4,82	19,28
		3504	-	UN	✗	-	350	-	✗	✗	300	-	✗	5,51	22,04
6	DKN 160	96	-	U	✗	✗	9	✗	-	-	-	-	-	0,07	0,28
		126	-	U	✗	✗	12,5	✗	-	-	-	-	-	0,10	0,4
	DKN 161	206	-	U	✗	✗	18	✗	-	-	-	-	-	0,13	0,52
	DKN 181	266	-	U	✗	✗	24	✗	-	-	-	-	-	0,34	1,36
	DKN 226	326	-	U	✗	✗	30	✗	-	-	-	-	-	0,42	1,68
		406	-	U	✗	✗	40	✗	-	-	-	-	-	0,51	2,04
		506	-	U	✗	✗	48	✗	-	-	-	-	-	0,80	3,2
	K22 K	326	-	UN	-	-	-	-	-	✗	24	-	✗	0,37	1,48
		406	-	UN	-	-	-	-	-	✗	32	-	✗	0,45	1,8
		506	-	UN	-	-	-	-	-	✗	40	-	✗	0,54	2,16
		606	-	UN	✗	✗	60	-	✗	✗	60	-	✗	0,66	2,64
	K22 L	806	-	UN	✗	-	80	-	✗	✗	75	-	✗	0,80	3,2
		1006	-	UN	✗	-	100	-	✗	✗	90	-	✗	0,94	3,76
	K28	1206	-	UN	✗	-	120	-	✗	✗	120	-	✗	1,98	7,92
		1406	-	UN	✗	-	140	-	✗	✗	140	-	✗	2,25	9
		1656	-	UN	✗	-	165	-	✗	✗	160	-	✗	2,55	10,2
	K 31	1906	-	UN	✗	-	190	-	✗	✗	170	-	✗	7,3	29,2
		2256	-	UN	✗	-	224	-	✗	✗	200	-	✗	8,57	34,28
		2606	-	UN	✗	-	260	-	✗	✗	235	-	✗	9,84	39,36
8	K22K	508	-	UN	✗	-	50	-	✗	✗	50	-	✗	0,66	2,64
	K22L	758	-	UN	✗	-	75	-	✗	✗	75	-	✗	0,94	3,76
	K28	908	-	UN	✗	-	90	-	✗	✗	90	-	✗	1,98	7,92
		1108	-	UN	✗	-	110	-	✗	✗	110	-	✗	2,25	9

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Motor pole	Motor frame size	Motor type	Efficiency classification	Motor version	Installation Type		Allowable motor version U	Allowable insulation class		Installation type	Allowable motor version U	Allowable insulation class		Moment of inertia	GD2
					S	P	[kW]	F	H	K	[kW]	F	H	[kg m²]	[kg m²]
8	K28	1308	-	UN	✗	-	130	-	✗	✗	130	-	✗	2,55	10,2
	K 31	1508	-	UN	✗	-	150	-	✗	✗	150	-	✗	7,3	29,2
		1808	-	UN	✗	-	185	-	✗	✗	175	-	✗	8,57	34,28
		2208	-	UN	✗	-	220	-	✗	✗	200	-	✗	9,84	39,36

Pump sets of installation type K are suitable for continuous duty with the motor outside the fluid. Cooling is effected by means of air convection. Versions with a cooling jacket have an additional internal cooling circuit.

Pump sets of installation types P and S are designed for continuously submerged operation. The motor is cooled by the fluid handled on the motor surface. Operation with the motor outside the fluid handled is possible for short periods.

Notes:

From above table, motor frame sizes designated with prefix as DKN will be termed as DKN motors and frame sizes designated with prefix as K will be called as K motors.

- Many K motors are coupled with hydraulics (i.e DN 150 and above) having nominal impeller diameter as 401,500,630 Etc. These motors in particular which are coupled with either DN size ≥300 and/or impeller diameter ≥500 cannot be offered for portable execution (i.e transportable installation).
- K motors which are offered with cooling jackets (i.e K type installation) cannot be offered for portable execution.
- Kindly refer to installation varieties (⇨ Page 22) for more details related to motor and hydraulic combinations that can be offered.

✗	available
-	not available

Hydraulic list

Table 8: Key

✗	available
-	not available

2900 rpm

Table 9: Available motor sizes 2900 rpm

Size	Impeller type	Material variant	Motor frame size						
			DKN 132			DKN 160		DKN 160L	
			Motor size						
			52	62	82	122	172	222	252
			_U	_U	_U	_U	_U	_U	_U
40-250	K	G/G1	✗	✗	✗	✗	✗	-	-
80-251	K	G/G1	-	-	-	✗	✗	✗	✗
40-250	F	G/G1	✗	✗	✗	✗	✗	-	-
80-250	F	G/G1	-	-	-	✗	✗	✗	✗

1450 rpm

Table 10: Available motor sizes 1450 rpm

Size	Impeller type	Material variant	Motor frame size																	
			DKN 160		DKN 161	DKN 181	DKN 226			K 22K				K 22L		K28			K 31		
			Motor size																		
			114	164	234	294	354	504	654	354	504	654	804	954	1104	1304	1554	1754	2004	2504	3004	3504
			_U	_U	_U	_U	_U	_U	_U	_UN	_UN	_UN	_UN	_UN	_UN	_UN	_UN	_UN	_UN	_UN	_UN	_UN
100-315	K	G/G1	✗	✗	✗	✗	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
100-401	K	G/G1	-	-	✗	✗	✗	✗	✗	-	-	-	-	-	-	-	-	-	-	-	-	-
150-315	K	G/G1	✗	✗	✗	✗	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
150-401	K	G/G1	-	-	-	-	✗	✗	✗	-	✗	✗	✗	✗	-	-	-	-	-	-	-	-
150-500	K	G/G1	-	-	-	-	-	-	-	-	-	-	✗	✗	✗	✗	✗	-	-	-	-	-
200-401	K	G/G1	-	-	-	-	✗	✗	✗	-	✗	✗	✗	✗	✗	✗	✗	-	-	-	-	-
200-502	K	G/G1	-	-	-	-	-	-	-	-	-	-	-	-	✗	✗	✗	✗	✗	✗	✗	-
250-401	K	G/G1	-	-	-	-	-	✗	✗	-	-	✗	✗	✗	✗	✗	✗	-	-	-	-	-
200-503	K	G/G1	-	-	-	-	-	-	-	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗
300-420	K	G/G1	-	-	-	-	-	-	-	-	-	-	-	-	✗	✗	✗	✗	✗	✗	✗	-
300-505	K	G/G1	-	-	-	-	-	-	-	-	-	-	-	✗	✗	✗	✗	✗	✗	✗	✗	✗
100-315	E	G1	✗	✗	✗	✗	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
150-315	E	G1	✗	✗	✗	✗	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Size	Impeller type	Material variant	Motor frame size																		
			DKN 160		DKN 161	DKN 181	DKN 226			K 22K				K 22L		K28			K 31		
			Motor size																		
			114	164	234	294	354	504	654	354	504	654	804	954	1104	1304	1554	1754	2004	2504	3004	3504
			_U	_U	_U	_U	_U	_U	_U	_UN	_UN	_UN	_UN	_UN	_UN	_UN	_UN	_UN	_UN	_UN	_UN	_UN
150-401	E	G1	-	-	-	-	✗	✗	✗	✗	✗	✗	✗	-	-	-	-	-	-	-	-	-
200-401	E	G1	-	-	-	-	✗	✗	✗	✗	✗	✗	-	-	-	-	-	-	-	-	-	-
100-401	F	G/G1	-	-	✗	✗	✗	✗	-	-	-	-	-	-	-	-	-	-	-	-	-	-

960 rpm

Table 11: Available motor sizes 960 rpm

Size	Impeller type	Material variant	Motor frame size																		
			DKN 160	DKN 161	DKN 181	DKN 226				K22K				K 22L		K28			K 31		
			Motor size																		
			96	126	206	266	326	406	506	326	406	506	606	806	1006	1206	1406	1656	1906	2256	2606
			_U	_U	_U	_U	_U	_U	_U	_UN	_UN	_UN	_UN	_UN	_UN	_UN	_UN	_UN	_UN	_UN	_UN
150-315	E	G1	✗	✗	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
150-401	E	G1	-	-	✗	✗	-	-	-	✗	✗	-	-	-	-	-	-	-	-	-	-
200-401	E	G1	-	-	✗	✗	-	-	-	✗	✗	-	-	-	-	-	-	-	-	-	-
150-315	K	G/G1	✗	✗	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
150-401	K	G/G1	-	-	✗	✗	-	-	-	✗	✗	-	-	-	-	-	-	-	-	-	-
200-401	K	G/G1	-	-	✗	✗	✗	✗	✗	✗	✗	✗	✗	-	-	-	-	-	-	-	-
250-401	K	G/G1	-	-	✗	✗	✗	✗	✗	✗	✗	✗	✗	-	-	-	-	-	-	-	-
300-500	K	G/G1	-	-	-	-	-	-	-	-	-	-	✗	✗	✗	✗	✗	-	-	-	-
350-500	K	G/G1	-	-	-	-	-	-	-	-	-	-	-	✗	✗	✗	✗	✗	✗	✗	-
250-632	K	G/G1	-	-	-	-	-	-	-	-	-	-	-	-	-	✗	✗	✗	✗	✗	✗
300-505	K	G/G1	-	-	-	-	-	-	-	✗	✗	✗	-	✗	✗	✗	✗	✗	✗	✗	✗
350-503	K	G/G1	-	-	-	-	-	-	-	✗	✗	✗	-	✗	✗	✗	✗	✗	✗	✗	✗
350-632	K	G/G1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✗	✗	✗
350-633	K	G/G1	-	-	-	-	-	-	-	-	-	-	-	-	-	✗	✗	✗	✗	✗	✗
350-713	K	G/G1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✗	✗	✗
400-500	K	G/G1	-	-	-	-	-	-	-	-	-	-	-	✗	✗	✗	✗	✗	✗	✗	✗
400-632	K	G/G1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✗	✗
401-713	K	G/G1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✗	✗	✗

725 rpm

Table 12: Available motor sizes 725 rpm

Size	Impeller type	Material variant	Motor frame size						
			K 22K	K 22L	K28		K31		
			Motor size						
			508	758	908	1108	1508	1808	2208
			_UN	_UN	_UN	_UN	_UN	_UN	_UN
350-500	K	G/G1	✗	✗	✗	✗	-	-	-
400-632	K	G/G1	-	-	✗	✗	✗	✗	✗
401-710	K	G/G1	-	-	-	-	✗	✗	✗

Overview of product features / selection tables

Overview of product features

Table 13: Material variants G, G1

Feature	Motor frame size			
Motor size	**DKN 132/160/161/181**	**DKN 226**	**K22 (K + L)**	**K28/ K31**
	Motor frame size			
	52 - 252	**354 - 654**	**354 - 804**	**954 - 3504**
	114 - 294	**326 - 506**	**326 - 606**	**806 - 2606**
	96 - 226		**508 - 758**	**908 - 2208**
Shaft material	A276 type 410		1.4021 QT 800	
	G1A (⇨ Page 5) : A276 Type 431			
Bearing assembly	Grease-packed rolling element bearings sealed for life		Regreasable rolling element bearings (pump end), grease-packed rolling element bearings sealed for life (drive end)	
Motor				
Motor version	U -Non-explosion-proof		UN -Non-explosion-proof	
Starting method	DOL / star-delta			
Voltage, frequency	415 V (+10%/-15%), 50 Hz (+/- 3%)			
Cooling	Cooled by surrounding fluid / air cooling		Cooled by surrounding fluid or air/ jacked cooled[15)]	
Immersion depth	≤ 30 m			
Power cable				
Type	Standard rubber-sheathed cable			
Rated voltage	1000 V			
Insulation material	Ethylene propylene rubber EPR			
Max. continuous temperature of insulation	90 °C			
For permanent immersion in waste water to DIN VDE 0282-16	✓			
Length	min. 10 m (standard) to 40 m[16)]			
Cable entry	Absolutely water-tight			
Sealing elements				
Elastomers	Nitrile butadiene rubber NBR			
Shaft seal	Double mechanical seal with elastomer bellow type in tandem arrangement[17)]			
Monitoring equipment				
Winding temperature	Temperature switches (bimetal) in motor winding (150 °C), 2 in series in between 3 phases			
		Thermistors PTC 170 in motor winding (3 in series, 1 in each phase)		
Coolant temperature; installation types K	-		Thermistor PTC 90 (1 Qty)	
Bearing temperature	-		Pt 100 resistance thermometer (pump end, 1 Qty) Pt 100 resistance thermometer (drive end, 1 Qty)	
Motor leakage	Moisture sensor near bottom side (pump side), bearing housing		Moisture sensor near bottom side (pump side), bearing housing and top side bearing bracket (motor side)	
Mechanical seal leakage	-	Internal float switch (1 Qty)		
Coating	H: Environmentally friendly KSB standard coating (colour RAL 5002)			
Maximum fluid temperature				
Motor version U	40 °C			
Motor version UN	40 °C, but limited to 30 ° C for 1554 motor with cooling jacket			
Tests/inspections				
Hydraulic system	KSB standard (ZN 56525) / E impeller, F impeller (ISO 9906/A) / K impeller (ISO 9906//1/2/A)			
General	KSB standard (ZN 56525)			
Installation type				

15 Except motor sizes 354/504/654/326/406/506 in K22 frame size are only jacket cooled motors.
16 Other lengths on request
17 Other seal types on request

Feature	Motor frame size			
Motor size	DKN 132/160/161/181	DKN 226	K22 (K + L)	K28/ K31
	Motor frame size			
	52 - 252	354 - 654	354 - 804	954 - 3504
	114 - 294	326 - 506	326 - 606	806 - 2606
	96 - 226		508 - 758	908 - 2208
Stationary, with guide wire	Installation depths 4,5 m /15 m[18] / ≤ 30 m			
Transportable	only up to size 250-401 (except sizes 200-502/503, 200-632)			
Stationary, with guide rail arrangement	Installation depths 4,5 m / ≤ 30 m			

Impellers

Single vane impeller (impeller type E)

Suitable for the following fluids:

sewage containing solids and fibrous admixtures

- Raw sludge
- Mixed water
- Raw and digested sludge
- Activated sludge
- Circulated and heated sludge

Free-flow impeller (impeller type F)

Suitable for the following fluids:

fluids containing solids and stringy material as well as fluids with entrapped air or entrapped gas

- Activated sludge
- Digested sludge
- Heating sludge
- Mixed water
- Raw waste water
- Raw sludge
- Recirculated sludge

Closed multi-channel impeller (impeller type K)

Suitable for the following fluids:

contaminated liquids, containing sludges and solids, non-gaseous and not containing fibrous admixtures liable to twist or bunch

- Screened sewage
- Mechanically screened sewage
- Water from waste disposal sites
- Stormwater
- Activated sludge
- Industrial effluent

F and E impellers can only be supplied with the documented impeller diameters. Duty point must be on the performance curve.
K impellers are trimmed to the duty point.

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18 For size DN 200-503

Overview of fluids handled

The table below for your guidance is based on KSB's long-standing experience. The data are standard values and are not to be considered as generally binding recommendations. More detailed advice is available from KSB. Make use of our laboratory's expertise when selecting materials.

Table 14: Selection aid for materials and hydraulic systems per fluid

Fluid handled[19)]	Recommended material	Recommended impeller type[20)]	Comments, further recommendations
Grey water	Grey cast iron	K/K-max, E, F	Free passage > fluid possibly pre-screened to remove solids
River water	Grey cast iron	K/K-max, E, F	Free passage > fluid possibly pre-screened to remove solids
Stormwater	Grey cast iron	K/K-max, E, F	Free passage > fluid possibly pre-screened to remove solids
Waste water:			
▪ Untreated municipal waste water	Grey cast iron	F, E, K/K max	Free passage of 100mm, min. free passage: 76mm
▪ Containing air and gas	Grey cast iron	F	Up to 8 %
Sludges			
▪ Raw sludge	Grey cast iron	F, E	Pumpable up to a dry substance content of 8 % (F), 6 % (E), 5 % (K)
▪ Digested sludge	Grey cast iron	F, E	Pumpable up to a dry substance content of 8 % (F), 6 % (E)
▪ Activated sludge	Grey cast iron	K/K-max	Pumpable up to a dry substance content of: 5 % (K)
Industrial waste water containing:			
▪ Paint suspensions	Grey cast iron	K/K-max	Solvent-free, observe the operator's instructions.
▪ Lacquer/paint/varnish suspensions	Grey cast iron	F, E	Solvent-free
▪ Fibres/pulp	Grey cast iron	F	-
Non-corrosive waste water			
▪ Ammonia water	Grey cast iron	K/K-max	-
▪ Ammonium hydroxide 5 % NH_4OH	Grey cast iron	K/K-max	-
▪ Urea 25 % $(NH_2)_2$-CO	Grey cast iron	K/K-max	-
▪ Potassium hydroxide 10 % KOH	Grey cast iron	K/K-max	-
▪ Calcium hydroxide 5 % $Ca(OH)_2$	Grey cast iron	K/K-max	-
▪ Sodium hydroxide 5 % NaOH	Grey cast iron	K/K-max	-
▪ Sodium carbonate 30 % Na_2CO_3	Grey cast iron	K/K-max	-
Non-corrosive waste water containing:			
▪ Aliphatic hydrocarbons, e.g. oils, petrol, butane, methane	Grey cast iron	K/K-max	-

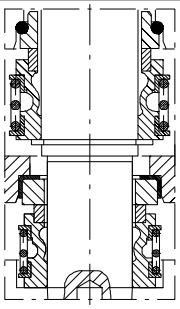
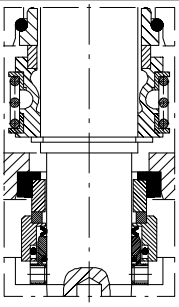
Severe hydroabrasive wear occurs if solids contents of approx. 0.5 g/l or higher are combined with circumferential speeds exceeding 20 m/s or low-flow conditions to the left of the duty point.

19 For any fluids which are not listed in this table contact KSB.

20 The first impeller type listed should be given preference.

Shaft seal

Table 15: Available shaft seal types per bearing bracket

Mechanical seal with elastomer bellows For all types of waste water, standard	Pump-end mechanical seal with covered spring For very abrasive fluids or fluids containing metallic particles (e.g. shavings from drilling), optional on request
	

Technical data

Table 16: Grey cast iron (G, G1)

Size	Impeller type	No. of Poles	Material variant	Impeller				Wet well installation S,K,P		Moment of inertia J[22]
				Impeller channels	Free passage	Max. impeller diameter	Min. impeller diameter	Max. operating pressure[21]	Max. test pressure	
				No. of vanes	[mm]	[mm]	[mm]	[bar]	[bar]	[kg m²]
100-315	E	4	G1	1	100	330	262	4,3	5,6	0,26
150-315		4/6			110	320	254	3,1	4,1	0,31
150-401					115/115-140	407	348	6,3	8,2	0,68
200-401					120/121-143	400	319	5,7	7,4	0,86
40-250	F	2	G/G1	-	25	210	150	7,6	9,8	0,03
80-250		2		-	76	265	150	6,3	8,2	0,14
100-401		4		-	100	390	325	7,6	9,8	0,248
40-250	K	2	G/G1	3	15	260	150	10,0	13	0,047
80-251		2		2	33	220	140	6,6	8,6	0,15
100-315		4		2	80	312	254	4,0	5,2	0,15
100-401		4		2	50	404	310	9,3	12,1	0,504
150-315		4/6		2	76	310	235	3,5	4,6	0,18
150-401				2	76	404	310	8,9	11,6	0,916
150-500		4		3	60	160	420	8,6	11,2	0,71
200-401		4/6		3	80	408	300	7,1	9,2	0,52
200-500		4		3	76	504	400	9,7	12,6	0,83
200-502		4		3	76	504	400	9,7	12,6	0,83
200-503		4		2	90	504	400	9,8	12,8	1,636
250-401		4/6		2	105	400	310	6,0	7,8	0,55
250-632		6		3	102	638	500	10,6	13,8	5,684
300-420		4		3	100	408	370	5,6	7,3	0,950
300-500		6		3	90	504	430	6,2	8	1,48
300-505		4/6		3	102	508	400	8	10,4	2,919
350-500		6/8		3	110	508	426/410[23]	5,7	7,4	3,12
350-503		6		2	140	508	400	4,6	6	4,073
350-632		6		3	140	638	500	6,5	8,4	6,451
350-633		6		2	135	638	500	9,4	12,2	6,979
350-713		6		2	125	738	580	12,2	16	14,557
400-500		6		3	130	508	443	3,4	4,5	3,370
400-632		6/8		3	142	638	527	5,7	7,41	9,074
401-710		8		3	165	739	587	8,8	11,5	16,000

21 Data applies to maximum impeller diameter and impeller with water fill.
22 Permissible operating pressure = inlet pressure + pressure at Q = 0
23 Impeller trimming as per IN 10034 D

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Size	Impeller type	No. of Poles	Material variant	Impeller				Wet well installation S,K,P		Moment of inertia J[21]
				Impeller channels	Free passage	Max. impeller diameter	Min. impeller diameter	Max. operating pressure[22]	Max. test pressure	
				No. of vanes	[mm]	[mm]	[mm]	[bar]	[bar]	[kg m²]
401-713	K	6	G/G1	2	143	738	580	7	9,1	15,894

Installation types

Types of installation

Installation type K

Pump sets of installation type K are suitable for continuous duty with the motor outside the fluid. Cooling is effected by means of air convection. Versions with a cooling jacket have an additional internal cooling circuit.

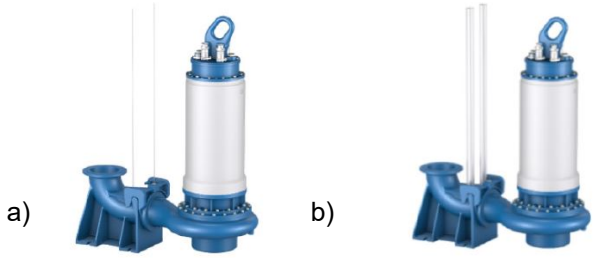

Fig. 1: Installation type K a) guide wire arrangement b) guide rail (pipe) arrangement

Installation type P and S

Pump sets of installation types P and S are designed for continuously submerged operation. The motor is cooled by the fluid handled on the motor surface. Operation with the motor outside the fluid handled is possible for short periods.

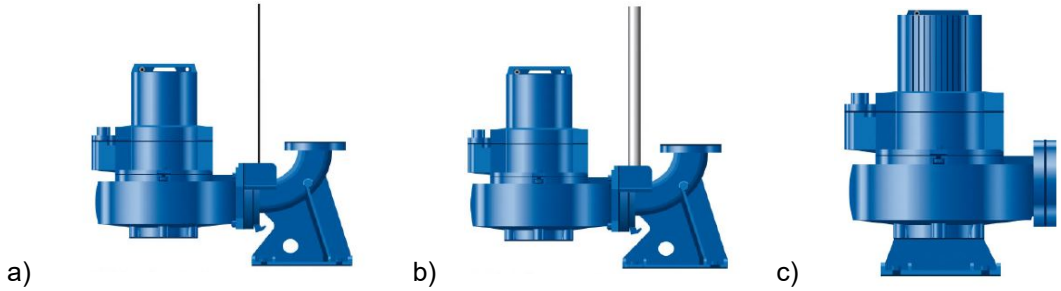

Fig. 2: Installation type P and S a) guide wire arrangement b) guide rail (pipe) arrangement c) portable

Scope of supply

Stationary wet installation (installation types K and S):

- Pump set complete with power cables and control cables
- Holder with sealing elements and fasteners
- Lifting chain (lifting equipment) and D-shackle
- Top mounting brackets with fasteners
- Duck foot bend (flanged bend) with fasteners
- Guide wire (wire rope)/ Dual guide rail (dual guide pipe)
- Guide wire spacer kit (only for installation depths > 4.5m)
- Guide pipe intermediate bracket (only for installation depths > 4.5m)

Transportable wet-installed model (installation type P):

- Pump set complete with power cables and control cables
- Discharge elbow (picture not shown)
- Support foot plate, support feet (3 nos.) or a single pump stool (as per design) along with the fasteners
- Lifting chain (lifting equipment) and D-shackle

Installation varieties

Table 17: Installation varieties

Sr. No.	DN	Motor Frame Size	Stationary				Transportable	
			Guide wire	Installation type	Dual Guide pipe	Installation type	Portable[24)]	Installation type
1	40-250	DKN 132/ 160	✗	S	✗	S	✗	P
2	80-250	DKN 160	✗	S	✗	S	✗	P
	80-251							
3	100-315	DKN 160/161/181	✗	S	✗	S	✗	P
4	100-401	DKN 161/181/226	✗	S	✗	S	✗	P
5	150-315	DKN 160/161/181	✗	S	✗	S	✗	P
6	150-401	DKN 161/181/226	✗	S	✗	S	✗	P
7	150-401	K22	✗	S/K	✗	S/K	✗	P
8	150-500	K 22/28	✗	S/K	✗	S/K	✗	P
9	200-401	DKN 161/181/226	✗	S	✗	S	✗	P
10	200-401	K22/28	✗	S/K	✗	S/K	✗	P
11	200-500	K 22/28/31	✗	S/K	✗	S/K	-	-
	200-502							
	200-503							
12	250-401	DKN 161/181/226	✗	S	✗	S	✗	P
13	250-401	K22/28	✗	S/K	✗	S/K	✗	P
14	300-420	K22/K28/K31	✗	S/K	✗	S/K	-	-
15	300-500	K 22/28/31	✗	S/K	✗	S/K	-	-
	300-505							
16	350-500	K 22/28/31	✗	S/K	✗	S/K	-	-
	350-503							
17	350-632	K31	✗	S/K	✗	S/K	-	-
18	350-633	K28/K31	✗	S/K	✗	S/K	-	-
19	350-713	K31	✗	S/K	✗	S/K	-	-
20	400-500	K 22/28/31	✗	S/K	✗	S/K	-	-
21	400-632	K 28/K31	✗	S/K	✗	S/K	-	-
22	401-710	K31	✗	S/K	✗	S/K	-	-
	401-713							

Pump sets of installation type K are suitable for continuous duty with the motor outside the fluid. Cooling is effected by means of air convection. Versions with a cooling jacket have an additional internal cooling circuit.

Pump sets of installation types P and S are designed for continuously submerged operation. The motor is cooled by the fluid handled on the motor surface. Operation with the motor outside the fluid handled is possible for short periods.

✗	available
-	not available

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24 Portable installation pumps will only be offered for pumps without cooling jacket. Any hydraulics which has either impeller diameter ≥500 and/or DN size ≥300 will not be offered for portable installation.

Minimum level of fluid handled

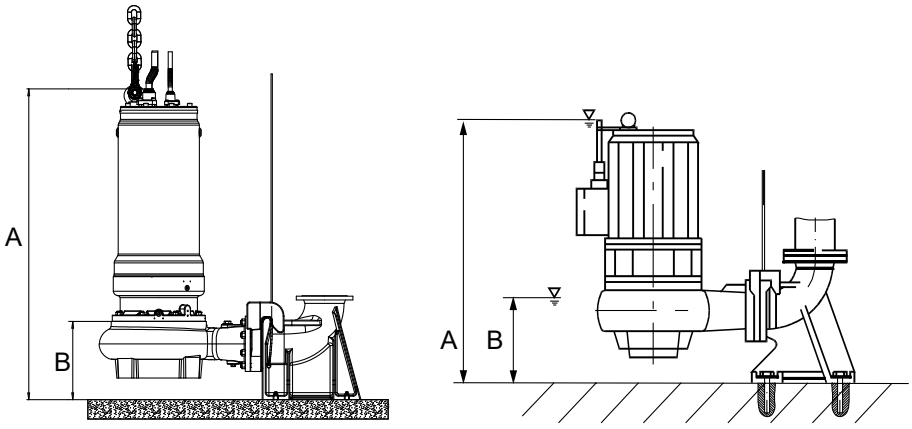

Fig. 3: Minimum level of fluid handled: Installation type K / P, S

Pump sets with cooling system (installation type K)

Pump sets of installation type K with cooling system are suitable for continuous operation with the motor outside the fluid.

The pump set is ready for operation when the minimum fluid level has been reached (dimension B). The fluid level must not drop below the specified minimum (dimension B). If the fluid level falls below this minimum, an internal temperature monitoring device will trip the pump set.
Exact dimensions see general arrangement drawing/outline drawing.

Pump sets without cooling system (installation types P and S)

Pump sets of installation type P and S without cooling system are designed for continuously **submerged** operation.

The pump set is ready for operation as soon as the motor is fully submerged (dimension A) the minimum fluid level has been reached (dimension B). The fluid level must not drop below the specified minimum (dimension B). If the fluid level falls below this minimum, an internal temperature monitoring device will trip the pump set.
Exact dimensions see general arrangement drawing/outline drawing.

Compliance with dimension B does not guarantee trouble-free operation of the pump set.
Depending on the pump's duty point, higher fluid levels may be required. Observe the NPSH values indicated in the characteristic curve (see hydraulic characteristic curves).

The pump can be operated at a lower fluid level for short periods. Internal temperature monitoring devices will switch off the pump and automatically restart it after it has cooled down.

Flanges

Table 18: Combination of material and standard for pump casing 101, flanged bend 72-1, suction elbow 139, flanged spacer 722

Material	Material description	EN 1092-1	EN 1092-2	ASME B 16.1-Class 125 ASME B 16.47A-Class 150	ASME B 16.5-Class 150 ASME B 16.47A-Class 150
IS 210 FG260 / EN GJL-250/ ASTM A48 CL35 B	Cast iron	-	✗	✗	-
EN-GJN-HB555/5.5610	Wear-resistant white cast iron	-	✗	✗	-
CD4MCuN/1.4517 SS2324/1.4460/AISI 329	Duplex stainless steel	✗	-	-	✗
A 743 Gr.CF8M/ 1.4408	Stainless steel	✗	-	-	-

Material grades which are not in standard scope of supply are only for recommendation and information.

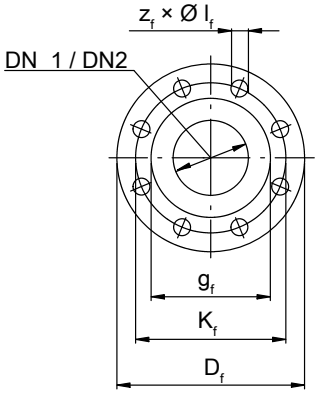

Fig. 4: Flanges

Table 19: Flange dimensions to EN 1092-1 / 1092-2 (Standard)

DN	PN 10[25]					PN 16[26]				
	gf	lf	zf	Df	Kf	gf	lf	zf	Df	Kf
	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
40	84	19	4	150	110	84	19	4	150	110
50	99	19	4	165	125	99	19	4	165	125
65	118	19	4	185	145	118	19	4	185	145
80	132	19	8	200	160	132	19	8	200	160
100	156	19	8	220	180	156	19	8	220	180
150	211	23	8	285	240	211	23	8	285	240
200	266	23	8	340	295	266	23	12	340	295
250	319	23	12	395	350	319	28	12	405	355
300	370	23	12	445	400	370	28	12	460	410
350	429	23	16	505	460	429	28	16	520	470
400	480	28	16	565	515	480	31	16	580	525
500	582	28	20	670	620	609	34	20	715	620
600	682	31	20	780	725	720	37	20	840	770
700	794	31	24	895	840	794	37	24	910	840

Table 20: Flange dimensions to ASME (optional, contact head office)

DN	ASME B 16.1-1998 Class 125, ASME B 16.47A-2011 Class 150 (DN 30″ / DN 750)				ASME B 16.5-2013 Class 150, ASME B 16.47A-2011 Class 150 (DN 30″ / DN 750)			
	lf	zf	Df	Kf	lf	zf	Df	Kf
	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
1 1/2	19,1	4	127	98,6	15,9	4	125	98,6
2	19,1	4	152,4	120,7	19,1	4	150	120,7
2 1/2	19,1	4	177,8	139,7	19,1	4	180	139,7
3	19,1	8	190,5	152,4	19,1	4	190	152,4
4	19,1	8	228,6	190,5	19,1	8	230	190,5
6	25,4	8	279,4	241,3	22,2	8	280	241,3
8	25,4	8	342,9	298,5	22,2	8	345	298,5
10	25,4	12	406,4	362	25,4	12	405	362
12	25,4	12	482,6	431,8	25,4	12	485	431,8
14	28,4	16	533,4	476,3	28,6	12	535	476,3
16	28,4	16	596,9	539,8	28,6	16	595	539,8
20	31,8	20	698,5	635	31,8	20	700	635
24	35,1	20	812,8	749,3	34,9	20	815	749,3
30	35,1	24	984,3	914,4	35,1	28	985	914,4

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25 All mating dimensions to EN 1092-1 / 1092-2, PN 10

26 Mating dimensions for hydraulic system size K350-713 optionally to EN 1092-1 / 1092-2, PN 16

Accessories

Guide pipe

Table 21: Guide pipe dimensions

DN	Outside pipe diameter		Thickness offered by KSB		Recommended wall thickness	
			MS Galvanized (Sch.40[27)])	SS 304 (Sch.10[27)])	Minimum	Maximum
	[mm]	[Inch]	[mm]	[mm]	[mm]	[mm]
40 to150	60	2	3,91	2,77	2	5
≥200	89	3	5,59	3,05	3	6

Standard:

MS Galvanized	ZN 2618
SS 304	ZN 1690

Guide wire (wire rope)

Table 22: Guide wire details

DN	Guide wire size	Material	Standard
40 to 200-401	5 6X 7 -IWRC1770 U SZ	SS 304	EN 12385-4
≥ 200-500	10 6X 19 -IWRC1770 U SZ	SS 304	EN 12385-4

Lifting chain

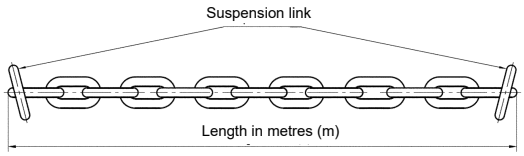

Fig. 5: Lifting chain

Table 23: Lifting chain details

Material	Length	Shakle
	[m]	[Qty.]
MS Galvanized	5 × K	K
SS 304	1 × K	K

K: multiply quantity as per requirement

27 Sch.: Schedule class

Foundation bolts

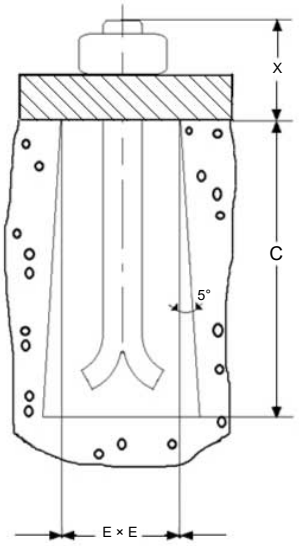

Fig. 6: Dimensions

Table 24: Foundation bolt dimensions

Size (M × L)	E × E	X	C
	[mm]		
CM16×200	70	70	150
CM20×250	85	90	200
CM24×320	100	90	250
CM24×250	100	90	200

Table 25: Foundation bolts details

DN	Motor Frame size	Motor size	Foundation bolt size
40-250	DKN 132/ 160	52/62/82/122/172	CM16X200
80-250	DKN 160	122/172/222/252	CM16X200
80-251	DKN 160	122/172/222/252	CM16X200
100-315	DKN 160/161/181	114/164/234/294	CM16X200
100-401	DKN 161/181/226	234/294/354/504/654	CM16X200
150-315	DKN 160/161/181	126/114/164/234/294	CM16X200
150-401	DKN 161/181/226	206/226/354/504/654	CM16X200
150-401	K22	804/954	CM16X200
150-500	K 22/28	804/954/1104/1304/1554	CM16X200
200-401	DKN 161/181/226	206/266/326/406/506/354/504/654	CM20X250
200-401	K22/K28	804/954/1104/1304/1554	CM20X250
200-500	K22/K28	1104/1304/1554/1754	CM20X250
200-502	K22/K28	1104/1304/1554/1754	CM20X250
200-502	K31	2004/2504/3004	CM20X250
250-401	DKN 161/181/226	206/266/326/406/506/504/654	CM20X250
250-401	K22/K28	804/954/1104/1304/1554	CM20X250
300-500	K22/K28	806/1006/1206/1406	CM30X320
350-500	K22/K28	1006/1206/1406/1656/508/758/908/1108	CM30X320
350-500	K31	1906/2256	CM30X320
200-503	K22/K28	354/504/654/804/954/1104/1304/1554/1754	CM24X320
200-503	K31	2004/2504/3004/3504	CM24X320
300-420	K22/K28	1104/1304/1554/1754	CM24X320
300-420	K31	2004/2504/3004/3504	CM24X320
300-505	K22/K28	954/1104/1304/1554/1754/326/406/506/606/806/1006/1206/1406/1656	CM24X320
300-505	K31	2004/2504/3004/3504/1906/2256/2606	CM24X320
250-632	K28	1206/1406/1656	CM24X320
250-632	K31	1906/2256/2606	CM24X320
350-503	K22/K28	326/406/506/606/806/1006/1206/1406/1656	CM24X320

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DN	Motor Frame size	Motor size	Foundation bolt size
350-503	K31	1906/2256/2606	CM24X320
350-632	K31	1906/2256/2606	CM24X320
350-633	K28	1206/1406/1656	CM24X320
350-633	K31	1906/2256/2606	CM24X320
350-713	K31	1906/2256/2606	CM24X320
400-500	K22/K28	806/1006/1206/1406/1656	CM24X320
400-500	K31	1906/2256	CM24X320
400-632	K28	908/1108/1308	CM24X320
400-632	K31	2256/2606/1508/1858/2208	CM24X320
401-713	K31	1906/2256/2606	CM24X320
401-710	K31	1508/1858/2208	CM24X320

Grease quantity for re-lubrication of bearings

The grease used must be high temperature grease LGH P2 of SKF made for working temperatures up to 150°C.

Table 26: Grease quantity for re-lubrification in [g]

Motor frame size								
DKN 132	**DKN 160**	**DKN 161**	**DKN 181**	**DKN 226**	**K22K**	**K22L**	**K28**	**K31**
Motor sizes								
5 2 **6 2** **8 2**	**12 2** **17 2** **22 2** **25 2** **11 4** **9 6** **16 4** **12 6** **9 6** **12 6**	**23 4** **20 6**	**29 4** **26 6**	**35 4** **50 4** **65 4** **32 6** **40 6** **50 6**	**35 4** **50 4** **65 4** **32 6** **40 6** **50 6** **60 6** **80 4**	**95 4** **110 4** **80 6** **100 6** **75 8**	**130 4** **155 4** **175 4** **120 6** **140 6** **165 6** **90 8** **110 8** **130 8**	**200 4** **250 4** **300 4** **350 4** **190 6** **225 6** **260 6** **150 8** **185 8** **220 8**
**	35	40	40	40	70	90	110	160

** rolling element with lifetime lubrification

Coolant quantity (pump sets with cooling jacket - installation type K)

Table 27: Coolant quantity in litres[28)]

Size	Impeller type	Motor sizes (applicable for K framed size motors)			
		35 4 **50 4** **65 4** **80 4** **32 6** **40 6** **50 6** **60 6** **26 8** **35 8** **50 8**	**95 4** **110 4** **80 6** **100 6** **75 8**	**130 4** **155 4** **175 4** **120 6** **140 6** **165 6** **90 8** **110 8** **130 8** **40 10** **60 10** **75 10** **90 10**	**200 4** **250 4** **300 4** **350 4** **190 6** **225 6** **260 6** **150 8** **185 8** **220 8** **110 10** **150 10** **190 10** **105 12** **135 12** **165 12**
100-400	K	28	30	60	-
100-401	F, K	28	30	60	-
150-400	K	28	30	60	-
150-401	E, F, K	28	30	60	-
150-403	K	28	30	60	-
150-500	K	40	42	75	-
150-503	K	40	42	75	80
151-401	K	28	30	60	-
151-403	K	28	30	60	-

28 Coolant quantities are applicable only for K motors, not DKN motors.

Size	Impeller type	Motor sizes (applicable for K framed size motors)			
		35 4 50 4 65 4 80 4 32 6 40 6 50 6 60 6 26 8 35 8 50 8	95 4 110 4 80 6 100 6 75 8	130 4 155 4 175 4 120 6 140 6 165 6 90 8 110 8 130 8 40 10 60 10 75 10 90 10	200 4 250 4 300 4 350 4 190 6 225 6 260 6 150 8 185 8 220 8 110 10 150 10 190 10 105 12 135 12 165 12
200-330	K	28	30	60	-
200-401	E, K	28	30	60	-
200-402	K	28	30	60	-
200-403	K	28	30	60	-
200-500	K	-	42	75	-
200-501	K	40	42	75	80
200-502	K	40	42	75	80
200-503	K	40	42	75	80
200-631	K	-	-	90	90
250-400	K	28	30	60	-
250-401	K	28	30	60	-
250-403	K	28	30	60	-
250-632	K	-	-	90	90
250-900	K	-	-	-	-
300-400	K	28	30	60	-
300-401	K	28	30	60	-
300-403	K	28	30	60	-
300-420	K	40	42	75	80
300-500	K	40	42	75	80
300-503	K	40	42	75	80
300-505	K	40	42	75	80
350-420	K	40	42	75	80
350-500	K	40	42	75	80
350-501	K	40	42	75	80
350-503	K	40	42	75	80
350-632	K	-	-	90	90
350-633	K	-	-	90	90
350-636	K	-	-	90	90
350-710	K	-	-	-	90
350-713	K	-	-	-	90
400-500	K	40	42	75	80
400-632	K	-	-	90	90
400-900	K	-	-	-	-
401-710	K	-	-	-	90
401-713	K	-	-	-	90

Notes:

- DN sizes which are not in the list are not applicable for the cooling jacket design and hence not mentioned.
- The pump set's cooling system is filled with a propylene glycol/water mixture with corrosion inhibitors for frost protection down to -20°C (e.g. glycol/water mixture, mixing ratio 38:62). The quantity of coolant in the table consists of the water and glycol mixture in above mentioned proportion.

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Oil quantity for mechanical seal (pump sets without cooling jacket - installation type S and P)

Table 28: Lubricant quantity [l] depending on the pump size and motor

Size	RPM	Motor frame size								
		DKN 132	DKN 160	DKN 161	DKN 181	DKN 226	K22K	K22L	K28	K31
		Motor size								
		5 2 6 2 8 2	12 2 17 2 22 2 25 2 11 4 16 4 9 6 12 6	23 4 20 6	29 4 26 6	35 4 50 4 65 4 80 4 32 6 40 6 50 6 80 6	35 4 50 4 65 4 80 4 32 6 40 6 50 6 60 6	95 4 110 4 80 6 100 6 75 8	130 4 155 4 175 4 120 6 140 6 165 6 90 8 110 8 130 8	200 4 250 4 300 4 350 4 190 6 225 6 260 6 150 8 185 8 220 8
40-250	2900	2,1	2,1	-	-	-	-	-	-	-
80-250	2900	2,1	2,1	-	-	-	-	-	-	-
80-251	2900	2,1	2,1	-	-	-	-	-	-	-
100-315	1450	-	4,6	4,6	4,6	-	-	-	-	-
100-401	1450	-	-	4,6	4,6	6,5	-	-	-	-
150-315	1450	-	4,6	4,6	4,6	-	-	-	-	-
150-401	1450/960	-	-	4,6	4,6	6,5	4,0	-	-	-
150-500	1450	-	-	-	-	-	4,7	4,7	7	-
200-401	1450/960	-	-	4,6	4,6	6,5	4,0	4,0	-	-
200-500	1450	-	-	-	-	-	-	4,7	7	-
200-502	1450	-	-	-	-	-	-	4,7	7	7,5
250-401	1450/960	-	-	-	-	6,5	4,0	4,0	5,5	-
300-420	1450	-	-	-	-	-	-	4,7	7	7,5
250-632	960	-	-	-	-	-	-	-	7	7,5
300-500	960	-	-	-	-	-	-	4,7	7	-
300-505	1450/960	-	-	-	-	-	4,7	4,7	7	7,5
350-500	960	-	-	-	-	-	-	4,7	7	7,5
350-503	960	-	-	-	-	-	4,7	4,7	7	7,5
350-632	960	-	-	-	-	-	-	-	-	7,5
350-633	960	-	-	-	-	-	-	-	7	7,5
350-713	960	-	-	-	-	-	-	-	-	7,5
400-500	960	-	-	-	-	-	-	4,7	7	7,5
401-713	960	-	-	-	-	-	-	-	-	7,5
400-632	960/725	-	-	-	-	-	-	-	7	7,5
401-710	725	-	-	-	-	-	-	-	-	7,5

Bearing details

Table 29: Bearing details

Motor frame size	Motor size	Angular contact bearing	Grooved ball bearing	Cylindrical roller bearing
DKN 132	52/62/82	-	6305-2RS C3 and 6308-2RS C3	-
DKN 160	122/172	-	6308-2RS C3	NU 206 ECJ C3
	222/252/114/ 164/126	-	6309-2RS C3	NU 206 ECJ C3
DKN 161	234/206	-	6314-2RS C3	NU 207 ECJ C3
DKN 181	294/266	-	6314-2RS C3	NU 207 ECJ C3
DKN 226	354/504/654/326/406/506	-	6316-2RS C3	NU 211 ECJ C3
K22	804	7220 BECBM		NU 2209 ECJ C3
	954/1104/806/1006	7318 BECBM	-	NU 2209 ECJ C3
K28	1304/1554/1754/1206/1406/1656	7320 BECBM	-	NU 211 ECPC3
K31	1906/2256/2606/ 1508/1808/2208/ 2004/ 2504/3004/3504	7324B-JP UA	-	NU 211 EMC3

Recommended spare parts stock for 2 years' operation (continuous operation)

Table 30: Quantity of spare parts for recommended spare parts stock

Part No.	Description	Number of pump sets (including stand-by pump sets)						
		2	3	4	5	6 and 7	8 and 9	10 and more
80-1[29)]	Motor unit	-	-	-	1	1	1	30 %
834	Cable gland	1	1	2	2	2	3	40 %
818	Rotor	-	-	-	1	1	2	30 %
230	Impeller	1	1	1	2	2	3	30 %
502	Casing wear ring	2	2	2	3	3	4	50 %
433.01	Mechanical seal, pump end	2	3	4	5	6	7	90 %
433.02	Mechanical seal, motor end	2	3	4	5	6	7	90 %
322	Cylindrical roller bearing	1	1	2	2	3	4	50 %
321	Radial ball bearing	1	1	2	2	3	4	50 %
320	Angular contact bearing	1	1	2	2	3	4	50 %
99-9	Set of sealing elements	4	6	8	8	9	10	100 %

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29 Motor unit consists of wound stator 81-59 pressed in motor housing 811.

General drawings with list of components

Amarex KRT, motor type 1, DKN 132, impeller type K

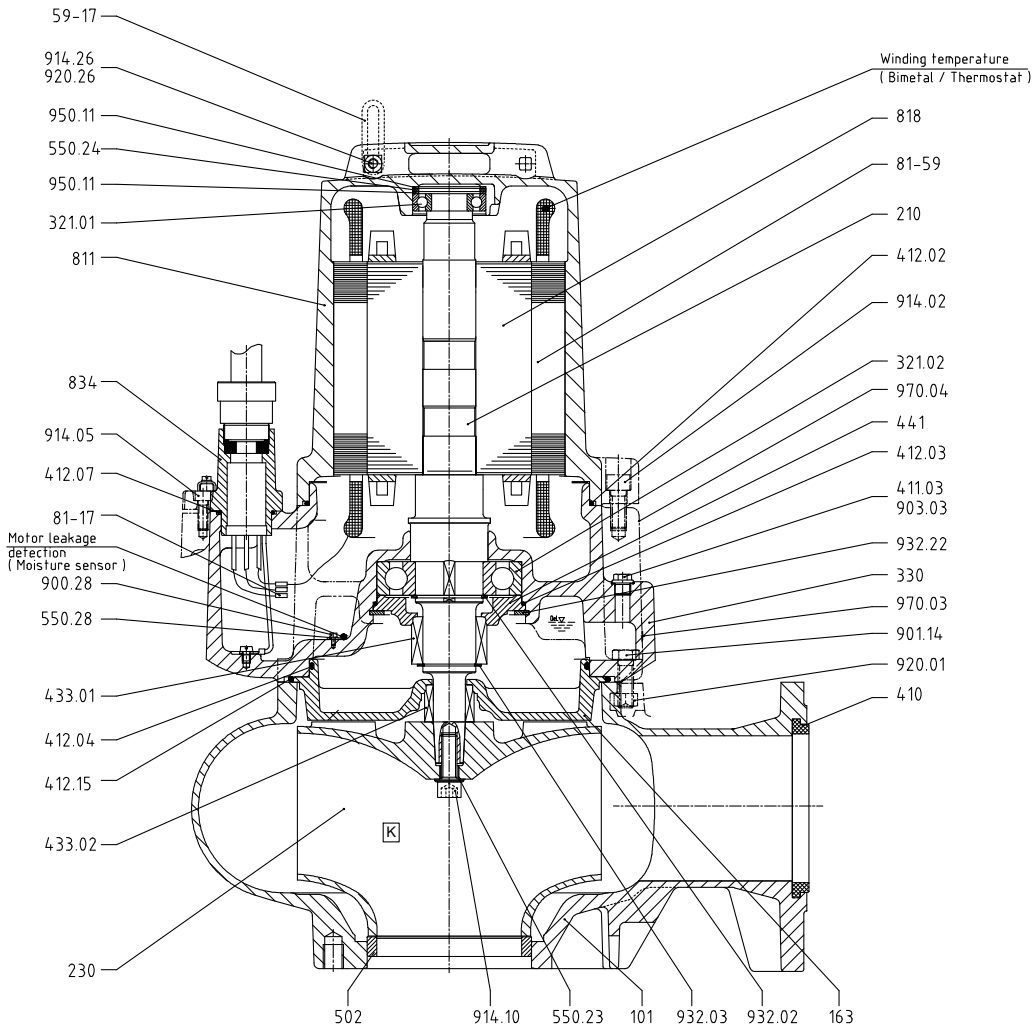

Fig. 7: General assembly drawing, motor type 1, DKN 132

Part No.	Description	Part No.	Description
59-17	Shackle	502	Casing wear ring
81-17	Butt joint	550.23/.24/.28	Disc
81-59	Stator	811	Motor housing
101	Pump casing	818	Rotor
163	Discharge cover	834	Cable gland
210	Shaft	900.28	Screw
230	Impeller	901.14	Hexagon head bolt
321.01/.02	Radial ball bearing	903.03	Screw plug
330	Bearing bracket	914.02/.05/.10/.26	Hexagon socket head cap screw
410	Profile joint	920.01/.26	Nut
411.03	Joint ring	932.02/.03/.22	Circlip
412.02/.03/.04/.07/.15	O-ring	950.11	Spring
433.01/.02	Mechanical seal	970.03/.04	Plate
441	Shaft seal housing		

Amarex KRT, motor type 2, DKN 160, impeller type K

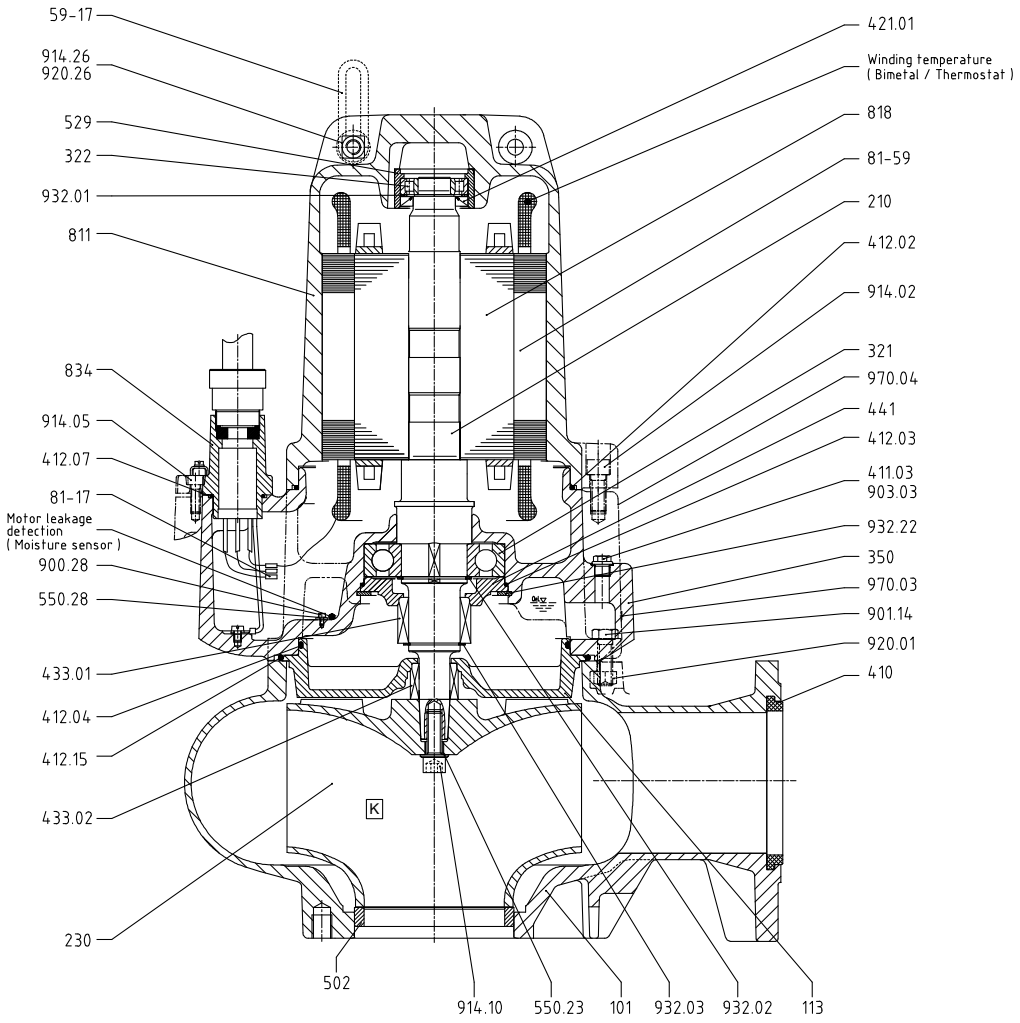

Fig. 8: General assembly drawing, motor type 2, DKN 160

Part No.	Description	Part No.	Description
59-17	Shackle	441	Shaft seal housing
81-17	Butt joint	502	Casing wear ring
81-59	Stator	529	Bearing sleeve
101	Pump casing	550.23/.28	Disc
113	Interstage casing	811	Motor housing
210	Shaft	818	Rotor
230	Impeller	834	Cable gland
321	Radial ball bearing	900.28	Screw
322	Cylindrical roller bearing	901.14	Hexagon head bolt
350	Bearing housing	903.03	Screw plug
410	Profile joint	914.02/.05/.10/.26	Hexagon socket head cap screw
411.03	Joint ring	920.01/.26	Nut
412.02/.03/.04/.07/.15	O-ring	932.01/.02/.03/.22	Circlip
421.01	Shaft seal ring	970.03/.04	Plate
433.01/.02	Mechanical seal		

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Amarex KRT, motor type 3, DKN 161/181, impeller type K

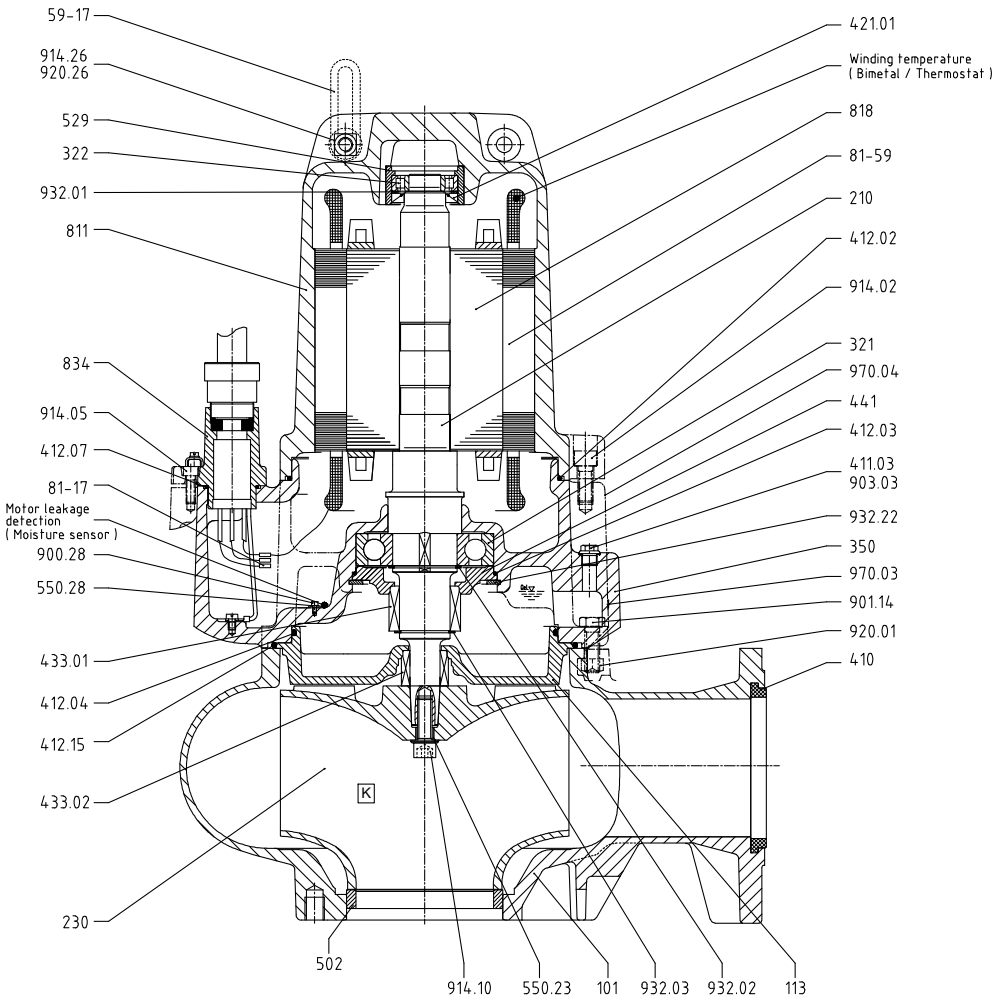

Fig. 9: General assembly drawing, motor type 3, DKN 161/181

Part No.	Description	Part No.	Description
59-17	Shackle	441	Shaft seal housing
81-17	Butt joint	502	Casing wear ring
81-59	Stator	529	Bearing sleeve
101	Pump casing	550.23/.28	Disc
113	Interstage casing	811	Motor housing
210	Shaft	818	Rotor
230	Impeller	834	Cable gland
321	Radial ball bearing	900.28	Screw
322	Cylindrical roller bearing	901.14	Hexagon head bolt
350	Bearing housing	903.03	Screw plug
410	Profile joint	914.02/.05/.10/.26	Hexagon socket head cap screw
411.03	Joint ring	920.01/.26	Nut
412.02/.03/.04/.07/.15	O-ring	932.01/.02/.03/.22	Circlip
421.01	Shaft seal ring	970.03/.04	Plate
433.01/.02	Mechanical seal		

Amarex KRT, motor type 4, DKN 226, impeller type K

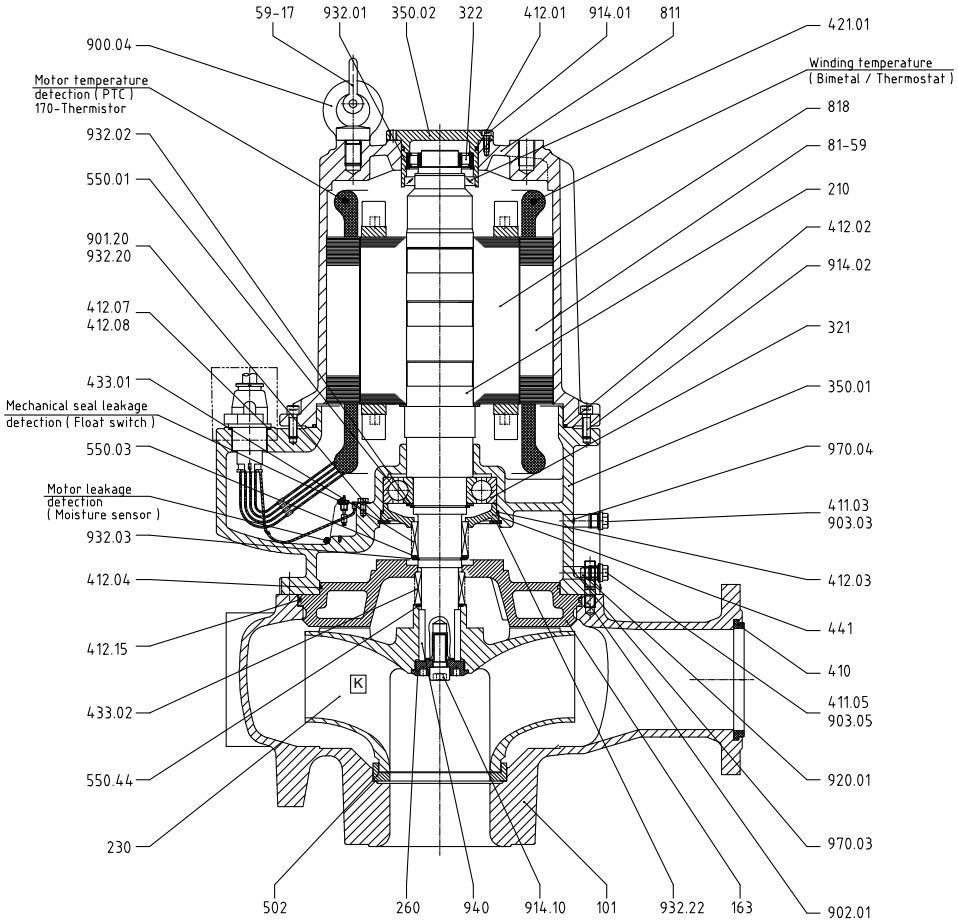

Fig. 10: General assembly drawing, motor type 4, DKN 226

Part No.	Description	Part No.	Description
59-17	Shackle	441	Shaft seal housing
81-59	Stator	502	Casing wear ring
101	Pump casing	550.01/.03/.44	Disc
163	Discharge cover	811	Motor housing
210	Shaft	818	Rotor
230	Impeller	900.04	Screw
260	Impeller hub cap	901.20	Hexagon head bolt
321	Radial ball bearing	902.1	Stud
322	Cylindrical roller bearing	903.03/.05	Screw plug
350.1/.2	Bearing housing	914.01/.02/.10	Hexagon socket head cap screw
410	Profile joint	920.01	Nut
411.03/.05	Joint ring	932.01/.02/.03/.20/.22	Circlip
412.01/.02/.03/.04/.07/.08/.15	O-ring	940	Key
421.01	Shaft seal ring	970.03/.04	Plate
433.01/.02	Mechanical seal		

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Amarex KRT, motor type 5, K22/K28/K31 with cooling jacket, impeller type K

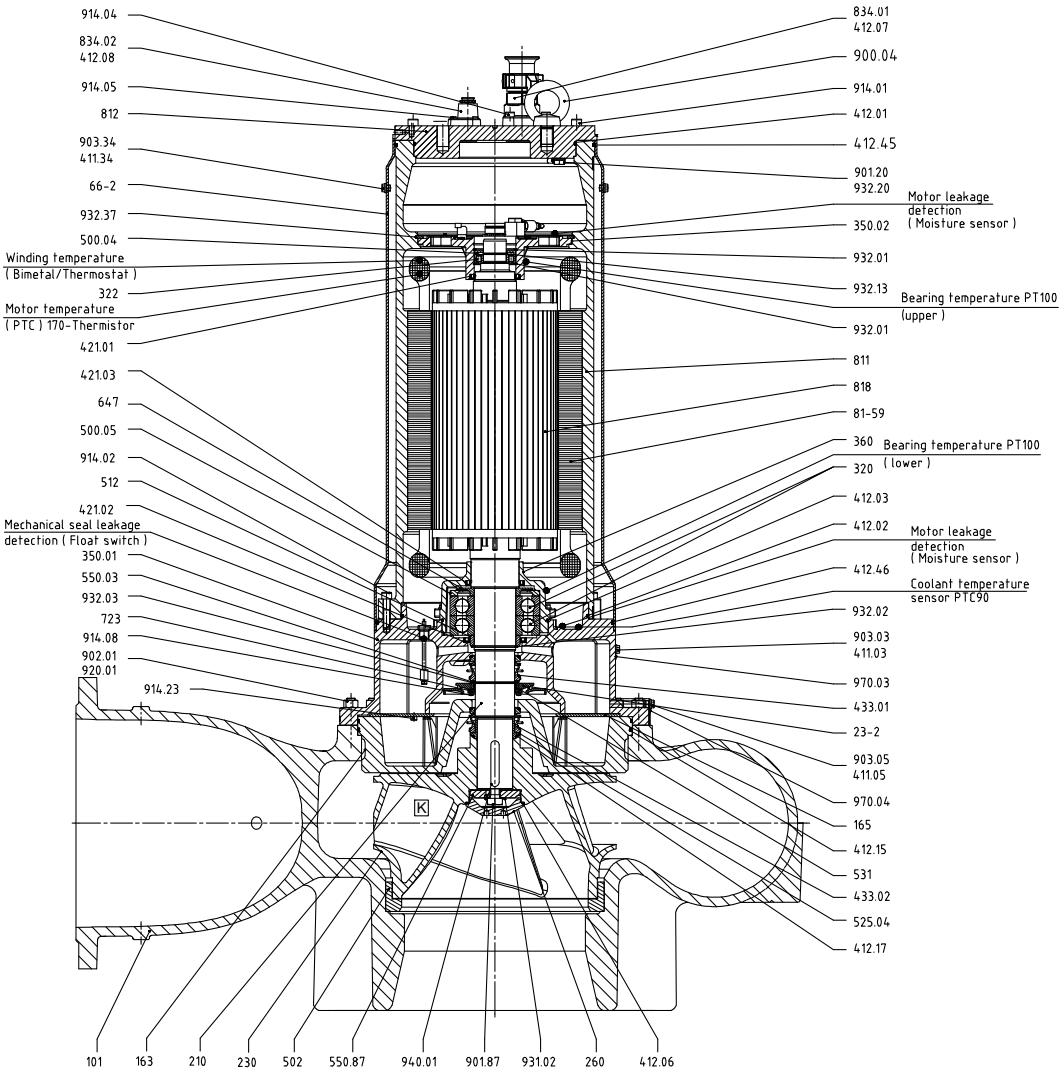

Fig. 11: General assembly drawing, motor type 5, K 22/28/31

Part No.	Description	Part No.	Description
23-2	Auxiliary impeller	525.04	Spacer sleeve
66-2	Cooling jacket	531	Locking sleeve
81-59	Stator	550.03/.87	Disc
101	Pump casing	647	Grease regulator
163	Discharge cover	723	Flange
165	Cooling chamber cover	811	Motor housing
210	Shaft	812	Motor housing cover
230	Impeller	818	Rotor
260	Impeller hub cap	834.01/.02	Cable gland
320	Angular contact bearing	900.04	Screw
322	Cylindrical roller bearing	901.20/.87	Hexagon head bolt
350.1/.2	Bearing housing	902.1	Stud
360	Bearing cover	903.03/.05/.34	Screw plug
411.03/.05/.34	Joint ring	914.01/.02/.04/.05/.08/.23	Hexagon socket head cap screw
412.01/.02/.03/.06/.07/.08/.15/.17/ .45/.46	O-ring	920.01	Nut
421.01/.02/.03	Shaft seal ring	931.02	Lock washer
433.01/.02	Mechanical seal	932.01/.02/.03/.13/.20/.37	Circlip
500.04/.05	Ring	940.01	Key
502	Casing wear ring	970.03/.04	Plate
512	Wear ring		

Amarex KRT, motor type 6, K22/K28/K31 with cooling jacket, impeller type K

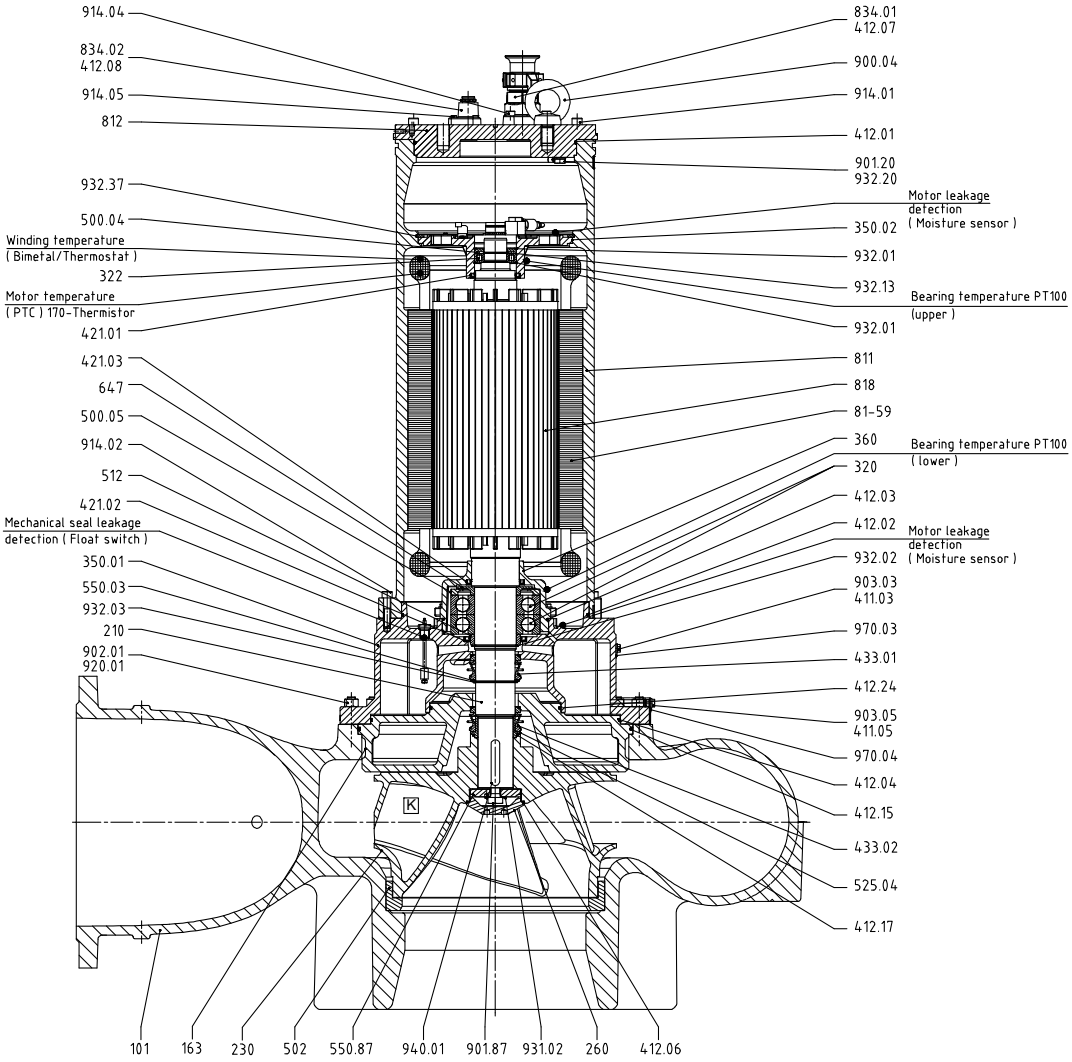

Fig. 12: General assembly drawing, motor type 6, K 22/28/31

Part No.	Description	Part No.	Description
81-59	Stator	525.04	Spacer sleeve
101	Pump casing	550.03/.87	Disc
163	Discharge cover	647	Grease regulator
210	Shaft	811	Motor housing
230	Impeller	812	Motor housing cover
260	Impeller hub cap	818	Rotor
320	Angular contact bearing	834.01/.02	Cable gland
322	Cylindrical roller bearing	900.04	Screw
350.1/.2	Bearing housing	901.20/.87	Hexagon head bolt
360	Bearing cover	902.1	Stud
411.03/.05	Joint ring	903.03/.05	Screw plug
412.01/.02/.03/.04/.06/.07/.08/.15/ .17/.24	O-ring	914.01/.02/.04/.05	Hexagon socket head cap screw
421.01/.02/.03	Shaft seal ring	920.01	Nut
433.01/.02	Mechanical seal	931.02	Lock washer
500.04/.05	Ring	932.01/.02/.03/.13/.20/.37	Circlip
502	Casing wear ring	940.01	Key
512	Wear ring	970.03/.04	Plate

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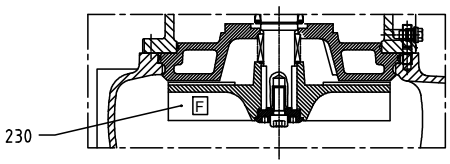
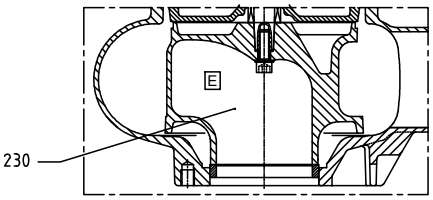
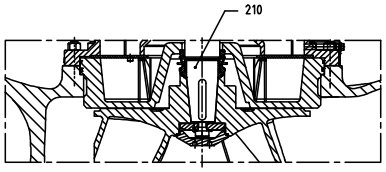
Detailed views of general assembly drawing

Table 31: Detailed views of general assembly drawings of Amarex KRT

Description	Detailed view
Impeller type F	
Impeller type E	
Taper shaft	 For hydraulic sizes DN 150-401, 200-401, 250-401 For K22 frame size motor combinations only

30/04/2021

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