Standardised Pump

Etanorm-R

Type Series Booklet

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Type Series Booklet Etanorm-R

Contents

Centrifugal Pumps with Shaft Seal

Standardised Pump

Etanorm-R

Main applications

- Water supply systems
- Spray irrigation systems
- Drainage systems
- Air-conditioning systems
- Fire-fighting systems
- General irrigation systems
- Heating systems

Fluids handled

- Seawater
- Brackish water
- Drinking water
- Hot water
- Service water
- Fire-fighting water
- Brine
- Cleaning agents
- Condensate
- Oils

Operating data

Operating properties

Characteristic		Value	
		50 Hz	60 Hz
Flow rate	Q m^3/h]	≤ 1900	≤ 2285
Head	H [m]	≤ 101	≤ 88
Fluid temperature	T [°C]	-30 to +140	
Operating pressure	p [bar]	≤ 16 (⇨ Page 12)	

Designation

Example: Etanorm-R G C1 300-400 X

Designation key

Code	Description	
Etanorm-R	Type series	
G	Casing material	
	G	Grey cast iron
	S	Nodular cast iron
C1	Impeller material	
	C1	Stainless steel
	G	Grey cast iron
	M	Bronze
300	Nominal discharge nozzle diameter [mm]	
400	Nominal impeller diameter [mm]	
X	Additional code	
	-[1)]	Single-stage
	.1	Single-stage, modified
	/2	Two-stage
	X	Fire-fighting pump

Design details

Design

- Volute casing pump
- Radially split volute casing
- Volute casing with integrally cast pump feet
- Baseframe made of welded channel sections
- Back pull-out design
- Axial thrust balanced by discharge-side casing wear ring and balancing holes
- Replaceable casing wear rings
- Single-stage

Size 125-500/2:

- 2 stages

≤ DN 200:

- Dimensions and ratings to EN 733

Installation type

- Horizontal installation

Shaft seal

- KSB cartridge seal
- Standardised mechanical seal to EN 12756
- Gland packing

Impeller type

- Closed radial impeller with multiply curved vanes

1) Blank

Sizes 200-250, 250-300, 300-340:

- Mixed flow impeller

Bearings

- Grease-packed deep groove ball bearing
- Oil-lubricated deep groove ball bearing

Direction of rotation

- Clockwise, viewed from the drive end.

Automation

Automation options:

- PumpDrive (wall-mounted model)
- PumpDrive (motor-mounted model)[2)]

Materials

Overview of materials depending on material variant

Part No.	Description	Material variant					
		GG	GM	GC1	SG	SM	SC1
102	Volute casing	Grey cast iron EN-GJL-250 / A 48 CL 35B			Nodular cast iron EN-GJS-400 / A536 GR 60-40-18		
230	Impeller	Grey cast iron EN-GJL-250 / A 48 CL 35B	Bronze CC480K-GS/B30 C90700	Stainless steel 1.4408 / A743 Gr CF8 M	Grey cast iron EN-GJL-250 / A 48 CL 35B	Bronze CC480K-GS/B30 C90700	Stainless steel 1.4408 / A743 Gr CF8 M
161	Casing cover	Grey cast iron JL1040 / grey cast iron A 48 CL 35B			Nodular cast iron JS1030/A536 GR 60-40-18		
171	Diffuser[3)]	Grey cast iron EN-GJL-250 / A 48 CL 35B	Bronze CC480K-GS/B30 C90700	Grey cast iron EN-GJL-250 / A 48 CL 35B	Grey cast iron JL1040 / grey cast iron A 48 CL 35B	Bronze CC480K-GS/B30 C90700	Grey cast iron EN-GJL-250 / A 48 CL 35B
183	Support foot	Grey cast iron EN-GJL-250 / A 48 CL 35B					
210	Shaft	Tempered steel C45+N[4)]					
502.01	Casing wear ring, suction side	Grey cast iron EN-GJL-250/ Cl[5)]					
502.02	Casing wear ring, discharge side	Grey cast iron EN-GJL-250/ Cl[5)]					
523	Shaft sleeve	Chrome nickel molybdenum steel 1.4571	-				
524	Shaft protecting sleeve	-	Chrome molybdenum steel 1.4122				
330	Bearing bracket	Grey cast iron EN-GJL-250 / A 48 CL 35B					
360.1/.2	Bearing cover	Grey cast iron EN-GJL-250 / A 48 CL 35B					
400.1/.9	Gasket	DPAF					
412	O-ring	EPDM80					

2) For fluid temperatures ≤ 140°C only
3) For size 125-500/2 only
4) Optional: chrome steel 1.4057+QT800
5) Optional: bronze CC495K-GS

Coating and preservation

- Coating and preservation to KSB standard
- Special coatings on request

Product benefits

- Improved efficiency and $NPSH_{req}$ by experimentally verified hydraulic design of impellers (vanes)
- Low energy costs through compliance with Commission Regulation 547/2012 (minimum efficiency index MEI ≥ 0.4)
- Operating costs reduced by trimming the 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
- Casing sealed reliably – even in varying operating conditions – by confined casing gasket
- Large variety of materials for perfectly matching the pump to the fluid handled. Large range of materials for many applications available as standard.
- Extended selection chart with additional pump sizes for small flow rates
- Easy to dismantle using forcing screws at the interface of casing cover and bearing bracket lantern

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- Operating costs reduced by trimming the 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
- Pioneering energy efficiency by variable speed operation in combination with PumpDrive. When used in combination with the KSB SuPremE motor , the pump achieves efficiency level IE4 to IEC/CD 60034-30 Ed. 2 already today.
- Easy to dismantle due to back pull-out design; no need to remove the pump casing from the piping

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 ≥ 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 identificator: 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
- 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

Certifications

Overview

Label	Effective in:	Note
International Organization for Standardization ISO 9001	All countries	Certified quality management to ISO 9001

Standards

Applicable standards

Standard	Title
DIN EN 733	End-suction centrifugal pumps, rating 10 bar, with bearing bracket - Nominal duty point, main dimensions, designation system
DIN EN 809	Pumps and pump sets for liquids – Common safety requirements
DIN EN 12756	Mechanical seals – Main dimensions, designation and material codes
DIN EN ISO 12100	Safety of machinery - General principles for design - Risk assessment and risk reduction

FluidFuture energy efficiency concept developed by KSB

http://www.ksb.com/fluidfuture

Acceptance tests and warranty

Acceptance inspections/tests

- Hydraulic test
  - To ISO 9906 Cl. 2A
  - Non-witnessed
  - Scope of testing: Q, H, P, η, H_0
- Hydraulic test
  - To ISO 9906 Cl. 2A
  - Non-witnessed
  - Scope of testing: Q, H, P, η, H_0, NPSH at duty point
- Hydraulic test
  - To ISO 9906 Cl. 2A
  - Witnessed
  - Scope of testing: Q, H, P, η, H_0
- Hydraulic test
  - To ISO 9906 Cl. 2A
  - Witnessed
  - Scope of testing: Q, H, P, η, H_0, NPSH at duty point
- Final inspection
  - Incl. inspection certificate 3.1. B to EN 10204 for pressure test of complete pump
- Materials inspection and testing
  - Incl. certificate of compliance with the order 2.1 to EN 10204
- Materials inspection and testing
  - Incl. certificate of compliance with the order 2.2 to EN 10204

Warranty

- Warranty
  - In accordance with the valid terms and conditions of sales and delivery

Selection information

Duty point

Pump operation is possible at any point on the individual performance curve, provided $NPSH_A > NPSH_P$. The max. permissible pump performance or the max. permissible pump discharge pressure must not be exceeded. Short-term operation near the shut-off head is permitted.

Flow rate

If the plant configuration is such that the pump might be operated against a closed discharge-side shut-off valve, a minimum flow of roughly 25 % of Q_{opt} is required during this time (max. 2 minutes).

$Q_{min} = 0.25 \times Q_{opt}$

The following requirement must be met for continuous operation at low flow:
$Q_{Low\text{-}flow} = 0.45 \times Q_{opt}$

Head

The head developed by the individual sizes depends on the following characteristics:

- Impeller speed
- Impeller trimming
- Permissible pump discharge pressure when handling higher-density fluids

NPSH

The NPSH values given in the individual performance curves are minimum values which correspond to the cavitation limit. They apply to degassed water. For safety reasons, the curve values shall therefore be increased by at least 0.5 m for the application.

General rule:
$NPSH_{available} - NPSH_{pump} \geq 0.5$ m

Size of suction pipe

The nominal diameter of the suction nozzle is immaterial for the selection of the nominal diameter of the suction strainer with foot valve and of the suction pipe. The suction pipe diameter shall be selected so that flow velocity does not exceed 1.5 m/s. If the nominal diameter of the suction flange is smaller than that of the suction pipe, an eccentric adapter must be fitted, to prevent the formation of air pockets.

Permissible circumferential speed of the impeller

Permissible circumferential speed of the impeller [m/s] depending on material variant

Material variant	Permissible circumferential speed of the impeller
	[m/s]
GG	50
GM	50
GC1	60
SG	50
SM	50
SC1	60

Programme overview / selection tables

Range overview

Range overview

Size	Material variant					
	GG	GM	GC1	SG	SM	SC1
125-500/2	✗	✗	✗	✗	✗	✗
150-500.1	✗	✗	✗	✗	✗	✗
200-250	✗	✗	✗	✗	✗	✗
200-260	✗	✗	✗	✗	✗	✗
200-330	✗	✗	✗	✗	✗	✗
200-400	✗	✗	✗	✗	✗	✗
200-500	✗	✗	✗	✗	✗	✗
250-300	✗	✗	✗	✗	✗	✗
250-330	✗	✗	✗	✗	✗	✗
250-400	✗	✗	✗	✗	✗	✗
250-500	✗	✗	✗	✗	✗	✗
300-340	✗	✗	✗	✗	✗	✗
300-360	✗	✗	✗	✗	✗	✗
300-400	✗	✗	✗	✗	✗	✗
300-500	✗	✗	✗	✗	✗	✗

Overview of fluids handled

Table of fluids handled

Fluid handled	T		Material variant						Shaft seal						
	Min. [°C]	Max. [°C]	GG	GM	GC1	SG	SM	SC1	Q1BVGG	Q1Q1VGG	Q1Q1EGG	Q1AEGG	Q1BEGG	RT/P NA	RT/P NB
Fire-fighting water	0	60	✗	✗	✗	✗	✗	✗	-	-	-	✗	✗	-	-
Heating water ≤ 100 °C, to VDI 2035	0	100	✗	✗	✗	✗	✗	✗	-	-	-	✗	✗	-	-
Hot water, to VdTüV 1466	0	140	✗	✗	✗	✗	✗	✗	-	-	-	✗	✗[6)]	-	-
Condensate, to VdTüV 1466	0	140	✗	✗	✗	✗	✗	✗	-	-	-	✗	✗[6)]	-	-
Condensate, AF composition	0	140	✗	✗	✗	✗	✗	✗	-	-	-	✗	✗[6)]	-	-
Vapour condensate	0	140	✗	✗	✗	✗	✗	✗	-	-	-	✗	✗[6)]	-	-
Cooling water, closed circuit	0	70	-	✗	✗	-	✗	✗	-	✗	-	-	-	-	-
Cooling water, open circuit	0	70	-	✗	✗	-	✗	✗	-	✗	-	-	-	-	-
River water	0	60	✗	✗	✗	✗	✗	✗	-	✗	-	-	-	-	-
Surface water	0	60	✗	✗	✗	✗	✗	✗	-	✗	-	-	-	-	-
Lake water	0	60	✗	✗	✗	✗	✗	✗	-	✗	-	-	-	-	-
Dam water	0	60	✗	✗	✗	✗	✗	✗	-	✗	-	-	-	-	-
Raw water	0	60	✗	✗	✗	✗	✗	✗	-	✗	-	-	-	-	-
Grey water	0	60	✗	✗	✗	✗	✗	✗	-	✗	-	-	-	-	-
Swimming pool water	0	60	✗	✗	✗	✗	✗	✗	-	-	-	-	✗	-	-
Brewing water	0	60	✗	✗	✗	✗	✗	✗	-	-	-	-	✗	-	-
Ice water (brewery)	0	60	✗	✗	✗	✗	✗	✗	-	-	-	-	✗	-	-
Tap water	0	60	✗	✗	✗	✗	✗	✗	-	-	-	-	✗	-	-
Drinking water	0	60	✗	✗	✗	✗	✗	✗	-	-	-	-	✗	-	-
Hot water (brewery)	0	60	✗	✗	✗	✗	✗	✗	✗	✗	-	-	-	-	-
Clean water (brewery)	0	60	✗	✗	✗	✗	✗	✗	-	✗	-	-	✗	✗	✗
Ethylene glycol base anti-freeze (concentration: 50 %)	0	110	✗	✗	✗	✗	✗	✗	-	-	✗	-	-	✗	✗
Propylene glycol base anti-freeze (concentration: 50 %)	0	110	✗	✗	✗	✗	✗	✗	-	-	✗	-	-	✗	✗
Calcium chloride base cooling brine (concentration: ≤ 25.7 %)	0	25	✗	✗	-	✗	✗	-	-	-	✗	-	-	✗	✗
Ethylene glycol	0	80	✗	✗	✗	✗	✗	✗	-	-	-	-	✗	✗	✗
Condenser water (sugar production)	0	60	✗	-	✗	✗	-	✗	-	-	-	-	✗	✗	✗
Olive oil	10	90	✗	-	✗	✗	-	✗	✗	-	-	-	-	✗	✗

6) Fluid temperature ≤ 110 °C

Fluid handled	T		Material variant						Shaft seal						
	Min. [°C]	Max. [°C]	GG	GM	GC1	SG	SM	SC1	Q1BVGG	Q1Q1VGG	Q1Q1EGG	Q1AEGG	Q1BEGG	RT/P NA	RT/P NB
Petrol	0	30	✗	✗	✗	✗	✗	✗	✗	-	-	-	-	-	-
Fuel oil	0	60	✗	✗	✗	✗	✗	✗	✗	-	-	-	-	-	-
Methanol	0	60	✗	✗	✗	✗	✗	✗	-	-	-	-	✗	-	-

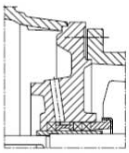
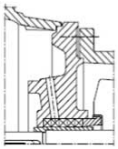
Drive

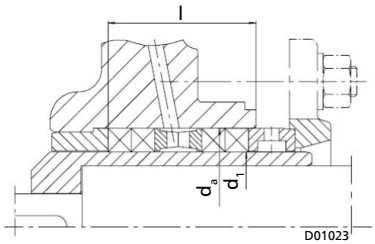
Selection table: drive[7)]

Feature	KSB	SIEMENS
Motor enclosure	IP55	IP55
Thermal class	F to IEC 34-1	F to IEC 34-1
Rated voltage	400 V / 690 V	400 V / 690 V
Motor material	Grey cast iron	Grey cast iron
Efficiency class	IE3 to IEC 60034-30	IE3 to IEC 60034-30
Terminal box position	360°	360° / 45°
Frequency of starts ≤ 12 kW	15 start-ups/h	15 start-ups/h
Frequency of starts ≤ 100 kW	12 start-ups/h	12 start-ups/h
Frequency of starts > 100 kW	5 start-ups/h	5 start-ups/h

Shaft seal

Overview of gland packings

Feature	Gland packing design	
	Na	Nb
Illustration	 1211:57/2	 1211:4/3
Application	For pure fluids handled in suction lift operation, or with an inlet pressure ≤ 0.5 bar in suction head operation	For suction head operation with an inlet pressure > 0.5 bar; also for malodorous fluids (e.g. ammonia water; for petrol, benzene and lubricating oils, if the pump is installed outdoors)
Fluid temperature	-30 °C to +140 °C	-30 °C to +140 °C
Barrier fluid	Internal barrier fluid	No barrier fluid



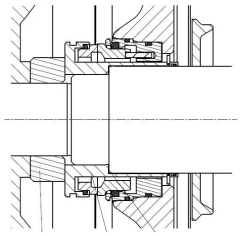
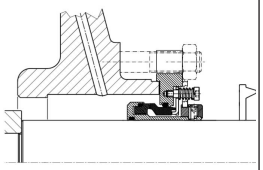
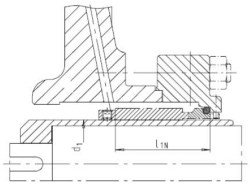
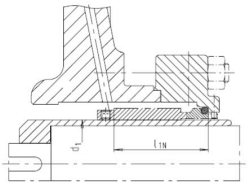
Dimensions of the gland packing chamber

Dimensions of the gland packing chamber

Shaft unit	Gland packing chamber			Number of packing rings / lantern ring
	d_1	d_a	l	
	[mm]	[mm]	[mm]	
65	80	105	80	4/1

7) The cooling air of the electric motor used to drive the pump must flow in axial direction towards the pump end. Air velocity ≥ 3 m/s, measured in the area of the drive-side bearing end plate.

Overview of mechanical seals

Feature	KSB 4EB	KSB 4ES	Burgmann M32 N-75 R	Crane 59U
Illustration				
Application	Cartridge seal, without shaft protecting sleeve, without seal cover	Cartridge seal, without shaft protecting sleeve, without seal cover		
Fluid temperature	-30 °C to +140 °C	-30 °C to +140 °C	-20 °C to +110 °C	-20 °C to +110 °C
Operating pressure	Dynamic: 16 bar	Dynamic: 16 bar	16 bar	16 bar
Approval	WRAS, ACS	WRAS, ACS		
Code	Q1BVGG: -20 °C to+110 °C	Q1BVGG: -20 °C to+110 °C	BSVGG: -20 °C to +110 °C	Q1Q1TGG/BP: -20 °C to +110 °C
	Q1BEGG: -20 °C to +110 °C	Q1BEGG: -20 °C to +110 °C		BQ1TGG/BP: -20 °C to +110 °C
	Q1Q1VGG: -20 °C to +110 °C	Q1Q1VGG: -20 °C to +110 °C		
	Q1Q1EGG: -20 °C to +110 °C	Q1Q1EGG: -20 °C to +110 °C		
	Q1AEGG: -30 °C to +140 °C	Q1AEGG: -30 °C to +140 °C		
Operating mode	Without circulation	Internal circulation	Internal circulation	Internal circulation
Direction of rotation	Bi-rotational	Bi-rotational	Clockwise	Clockwise
Mechanical seal	Balanced	Balanced	Unbalanced	Unbalanced

Bearings

Selection table: bearings

Feature	Standard		Optional	
	Pump end	Drive end	Pump end	Drive end
Design	Deep groove ball bearing		Deep groove ball bearing	
Material	6413 C3 with Nilos ring JV[8)]		6413 C3	
Lubrication type	Grease-lubricated		Oil-lubricated	
Lubricant	High-quality lithium-soap grease		Mineral oil	
Lubricant change intervals	Every 15,000 operating hours; at least once within two years[9)]		Every 3000 operating hours; at least once a year[10)]	
Bearing temperature (measured on the outside of the bearing bracket)	≤ 90 °C[11)]		≤ 90 °C[11)]	
Bearing bracket	WE 65		WE 65	

Key to designation of bearing bracket

Code	Description
WE	Bearing bracket: version for heat transfer fluids
65	Size code (based on dimensions of seal chamber and shaft end)

8) To DIN 625

9) Under unfavourable operating conditions (e.g. high room temperature, high atmospheric humidity, dust-laden air, aggressive industrial atmosphere etc.) check the bearings earlier and clean and re-lubricate them, if required.

10) The first oil change should be carried out after 300 operating hours.

11) Bearing temperature may exceed room temperature by up to 50 °C but must never rise above 90 °C.

Coupling / coupling guard

Selection table: coupling

Feature	N coupling	NH coupling	Rotex ZS-DKM-H
Design	Flexible coupling		
Spacer sleeve	-	✗	✗

Selection table: coupling guard

Feature	Standard	Optional
Design	Coupling guard	Coupling guard
Description	Lightweight	
	Not designed to support a person's weight	
	Without support piece	
	Guard/Ring made of galvanised solid unperforated sheet metal	Non-sparking, made of brass
	-	Not designed to support a person's weight
	-	Mounted on bearing bracket

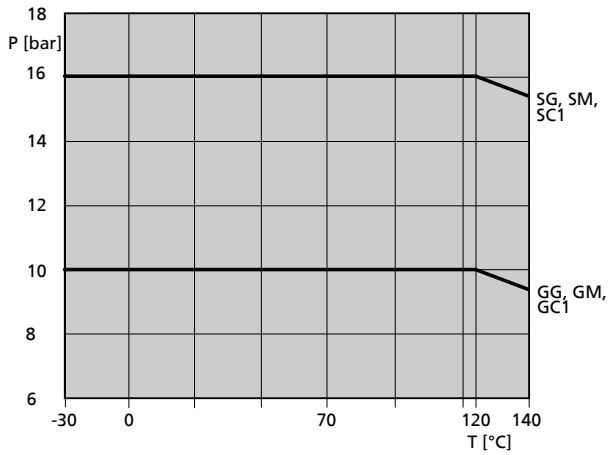
Pressure limits and temperature limits

Test pressure limits and temperature limits

Pressure limits and temperature limits

Material variant	Fluid temperature	Test pressure[12)]
	[°C]	[bar]
GG, GM, GC1	-30 to +140	≤ 15
SG, SM, SC1	≤ 140	≤ 24

In-service pressure limits and temperature limits



In-service pressure limits and temperature limits as a function of material variant[13)]

Inlet pressure

The maximum inlet pressure is limited by the permissible pump discharge pressure p2.

Test pressure

1.5 x nominal pressure

12) The casing components are checked for leakage by means of internal pressure tests to AN 1897/75-03D00 with water.
13) The sum of inlet pressure and shut-off head must not exceed the values indicated in the diagram.

Technical data

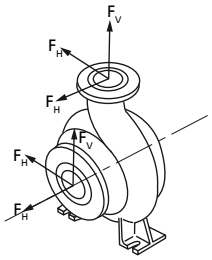
Technical data

Size	Impeller					n		J	Volumetric pump content (approx.)	Weight		
	Diameter		Free passage	Impeller outlet	Number of vanes	Min.	Max.			Material variant		
	Min.	Max.								GG, SG	GM, SM	GC1, SC1
	[mm]	[mm]	[mm]	[mm]		[rpm]	[rpm]	[kg m²]	[l]	[kg]	[kg]	[kg]
125-500/2	260	405	14	16	7	500	1500	0,68	41,8	300	303	303
150-500.1	410	500	19	21	7	500	1500	0,85	62,7	370	375	375
200-250	200	240	48	57	4	500	1800	0,15	81,8	350	352	352
200-260	240	2600	33	62	6	500	1800	0,17	46,4	355	358	358
200-330	270	330	48	54	5	500	1800	0,25	47,7	390	393	393
200-400	340	405	32	38	7	500	1800	0,52	49,5	385	389	389
200-500	420	510	33	36	7	500	1500	1,10	52,6	560	566	566
250-300	245	285	60	66,5	4	500	1800	0,35	122,8	405	408	408
250-330	290	330	37	72	6	500	1800	0,42	70,3	458	463	463
250-400	340	405	36	58	6	500	1800	0,75	78,8	460	464	464
250-500	440	520	40	44	7	500	1500	1,35	84,3	635	642	642
300-340	270	320	68	74,5	4	500	1800	0,47	175,6	547	551	551
300-360	320	360	44	78	6	500	1800	0,55	125,1	590	595	595
300-400	360	430	33	65	8	500	1800	0,94	120,7	705	711	711
300-500	450	520	40	56	7	500	1500	1,67	120,1	720	728	728

P/n values as a function of material variant, temperature and shaft material

Size	Material variant											
	GG, SG				GM, SM				GC1, SC1			
	20 °C		140 °C		20 °C		140 °C		20 °C		140 °C	
	Shaft											
	C45N	1.4057	C45N	1.4057	C45N	1.4057	C45N	1.4057	C45N	1.4057	C45N	1.4057
125-500/2	0,0696	0,088	0,0587	0,088	0,0677	0,0677	0,0479	0,0479	0,0696	0,0835	0,0587	0,0591
150-500.1	0,2385	0,2836	0,2013	0,2836	0,2182	0,2182	0,1542	0,1542	0,2385	0,2691	0,1905	0,1905
200-250	0,1203	0,2067	0,1015	0,1765	0,1203	0,159	0,1015	0,1124	0,1203	0,1961	0,1015	0,1389
200-260	0,2385	0,2836	0,2013	0,2836	0,2182	0,2182	0,1542	0,1542	0,2385	0,2691	0,1905	0,1905
200-330	0,2385	0,2836	0,2013	0,2836	0,2182	0,2182	0,1542	0,1542	0,2385	0,2691	0,1905	0,1905
200-400	0,2385	0,2836	0,2013	0,2836	0,2182	0,2182	0,1542	0,1542	0,2385	0,2691	0,1905	0,1905
200-500	0,2385	0,2836	0,2013	0,2836	0,2182	0,2182	0,1542	0,1542	0,2385	0,2691	0,1905	0,1905
250-300	0,1203	0,2067	0,1015	0,1765	0,1203	0,159	0,1015	0,1765	0,1203	0,1961	0,1015	0,1765
250-330	0,2385	0,2836	0,2013	0,2836	0,2182	0,2182	0,1542	0,1542	0,2385	0,2691	0,1905	0,1905
250-400	0,2385	0,2836	0,2013	0,2836	0,2182	0,2182	0,1542	0,1542	0,2385	0,2691	0,1905	0,1905
250-500	0,2385	0,2836	0,2013	0,2836	0,2182	0,2182	0,1542	0,1542	0,2385	0,2691	0,1905	0,1905
300-340	0,1203	0,2067	0,1015	0,1765	0,1203	0,159	0,1015	0,1765	0,1203	0,1961	0,1015	0,1765
300-360	0,2385	0,2836	0,2013	0,2836	0,2182	0,2182	0,1542	0,1542	0,2385	0,2691	0,1905	0,1905
300-400	0,2385	0,2836	0,2013	0,2836	0,2182	0,2182	0,1542	0,1542	0,2385	0,2691	0,1905	0,1905
300-500	0,2385	0,2836	0,2013	0,2836	0,2182	0,2182	0,1542	0,1542	0,2385	0,2691	0,1905	0,1905

Permissible forces and moments at the pump nozzles



$$\left[\frac{\Sigma\,|F_V|}{|F_{Vmax}|}\right]^2 + \left[\frac{\Sigma\,|F_H|}{|F_{Hmax}|}\right]^2 + \left[\frac{\Sigma\,|M_t|}{|M_{tmax}|}\right]^2 \leq 1$$

Forces and moments at the pump nozzles

The following condition must be met:

$\sum|F_V|$, $\sum|F_H|$, and $\sum|M_t|$ are the sums of the absolute values of the respective loads acting on the nozzles. Neither the load direction nor the load distribution among the nozzles are taken into account in these sums.

The values indicated also apply to pumps on non-grouted baseplates.

Forces and moments at the pump nozzles

DN	Material variant					
	GG, GM, GC1			SG, SM, SC1		
	F_{Vmax}	F_{Hmax}	M_{tmax}	F_{Vmax}	F_{Hmax}	M_{tmax}
	[kN]	[kN]	[kNm]	[kN]	[kN]	[kNm]
125	2,5	3,5	0,95	3,8	5,3	1,45
150	2,75	3,9	1,45	4,2	5,9	2,2
200	4,0	5,6	2,4	6,0	8,4	3,6
250	5,0	7,0	3,8	7,5	10,5	5,7
300	5,0	7,0	6,2	7,5	10,5	9,3
350	5,0	7,0	8,60	7,5	10,5	12,9

Noise characteristics

Surface sound pressure level L_{pA} [14)15)]

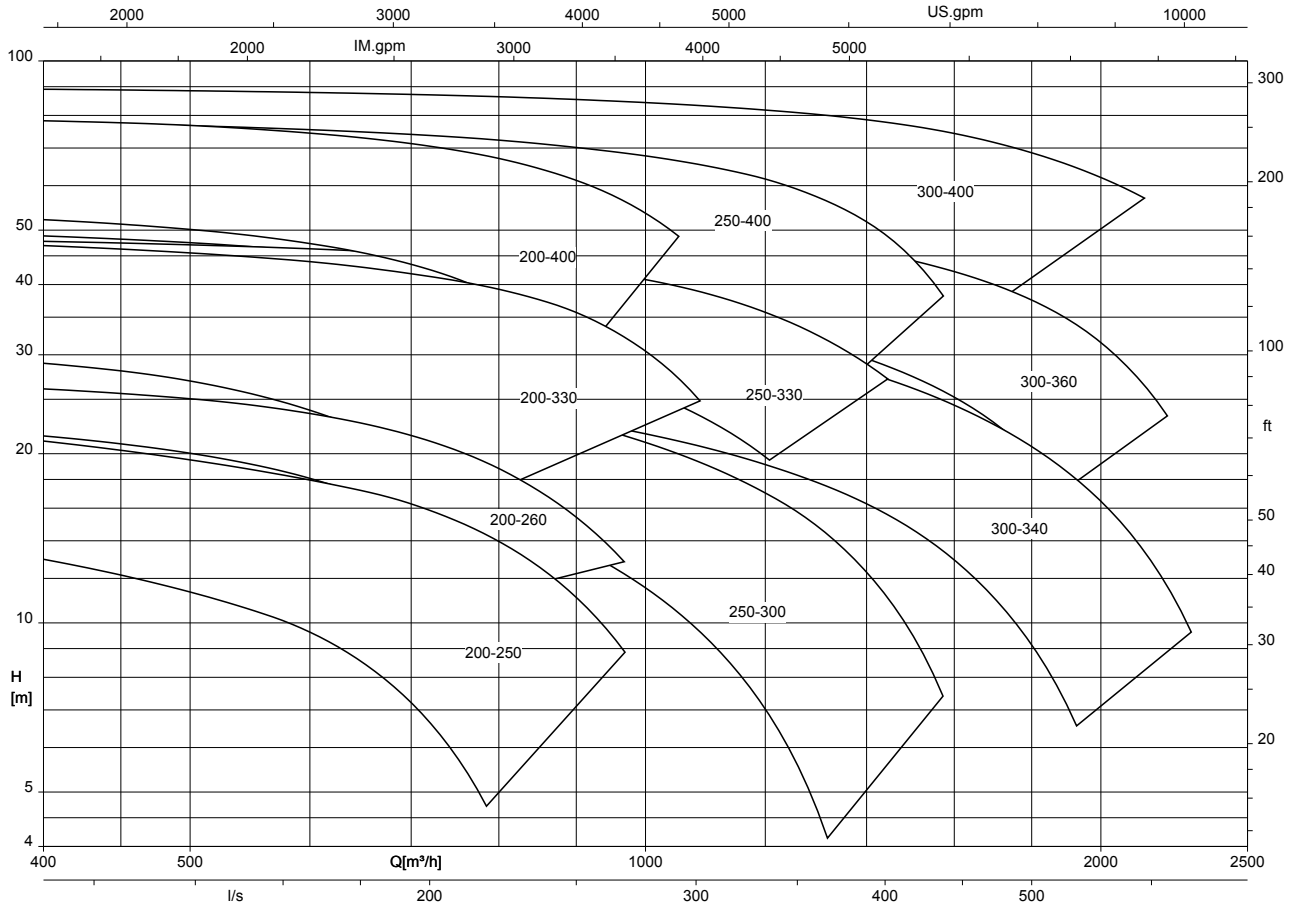
P_N	Pump	Pump set
	1450 rpm	1450 rpm
[kW]	[dB]	[dB]
15	64	69
19	65	69
22	66	70
30	67	71
37	69	72
45	70	73
55	71	74
75	72	75
90	73	76
110	74	76
132	76	79
160	76	79
200	77	80
250	78	81
315	79	82
400	79	82

14) The surface sound pressure level as spatial average as per ISO 3744 and EN 12639 is valid for pump operation in the Q/Qopt = 0.8 - 1.1 range and for non-cavitating operation.

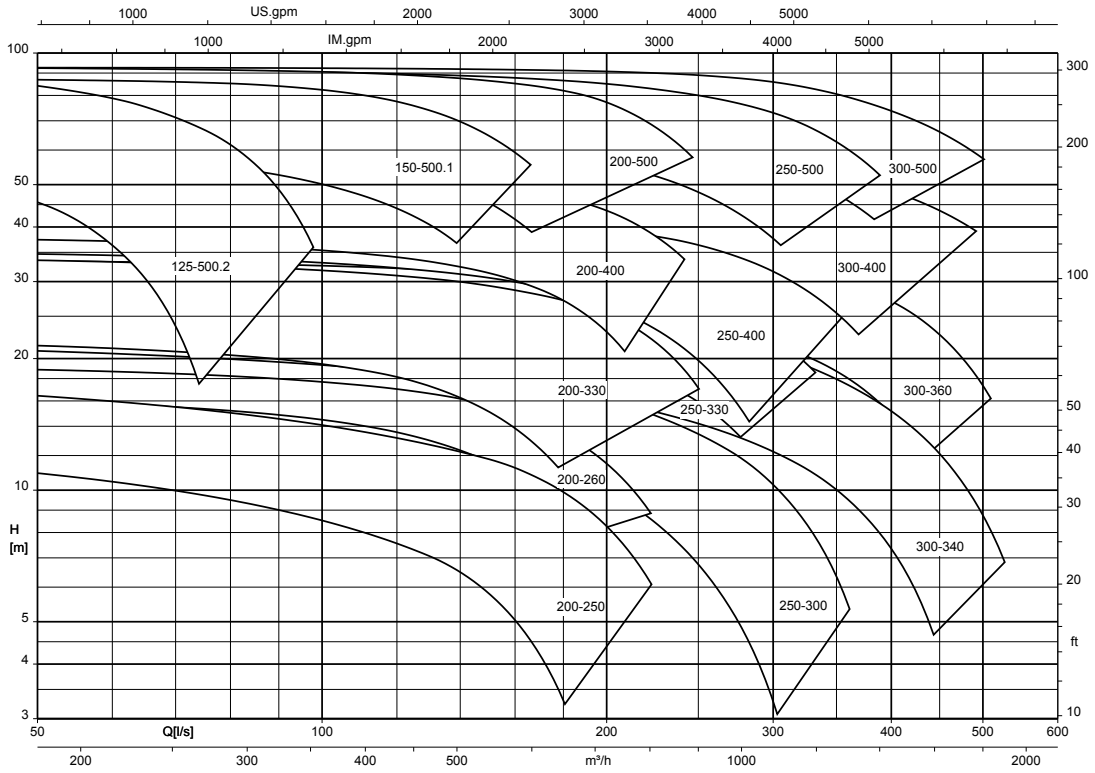
15) For measuring and constructional tolerance, add 1 dB for n ≤ 1750 rpm and 3 dB for n > 1750 rpm.

Selection charts

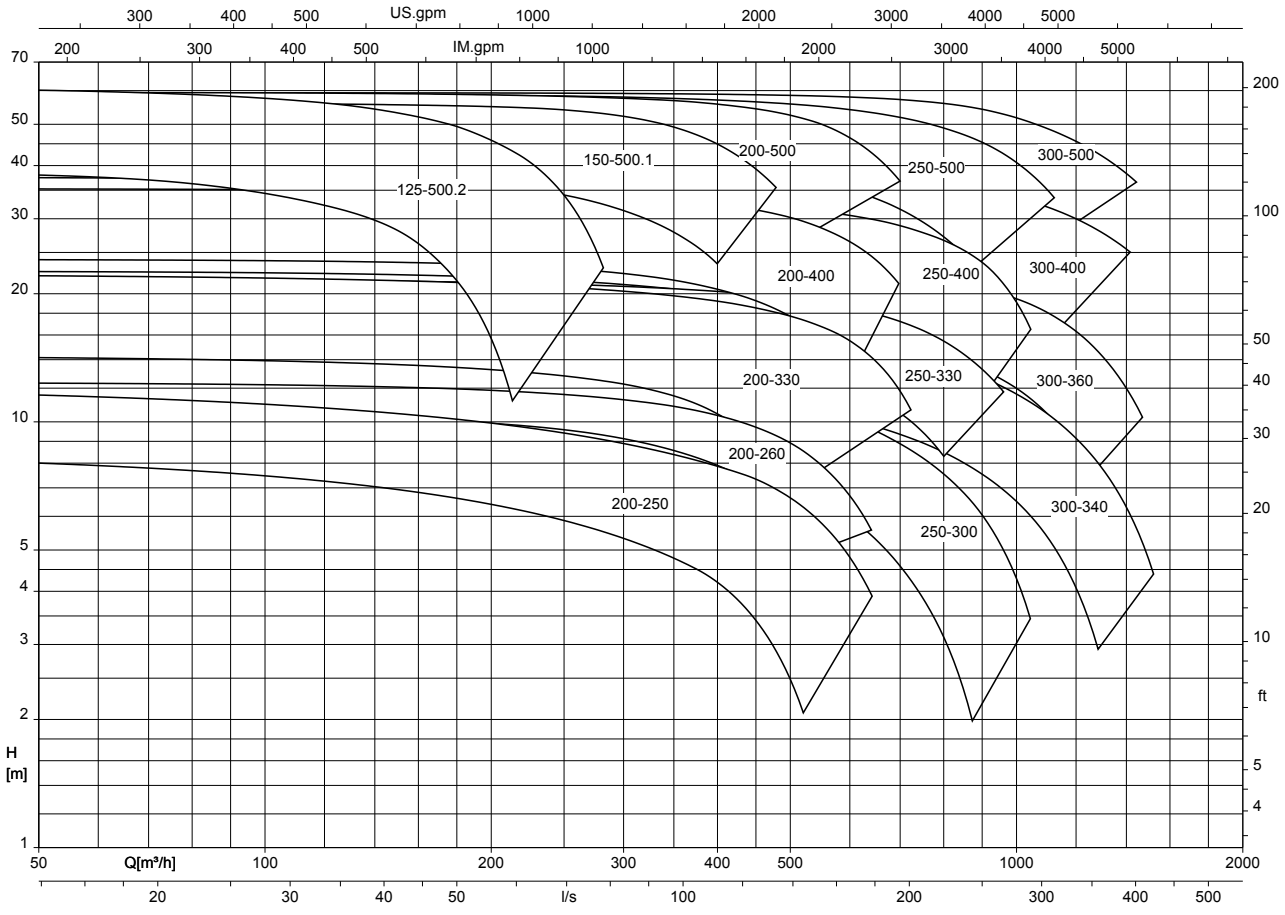
Etanorm-R, n = 1750 rpm



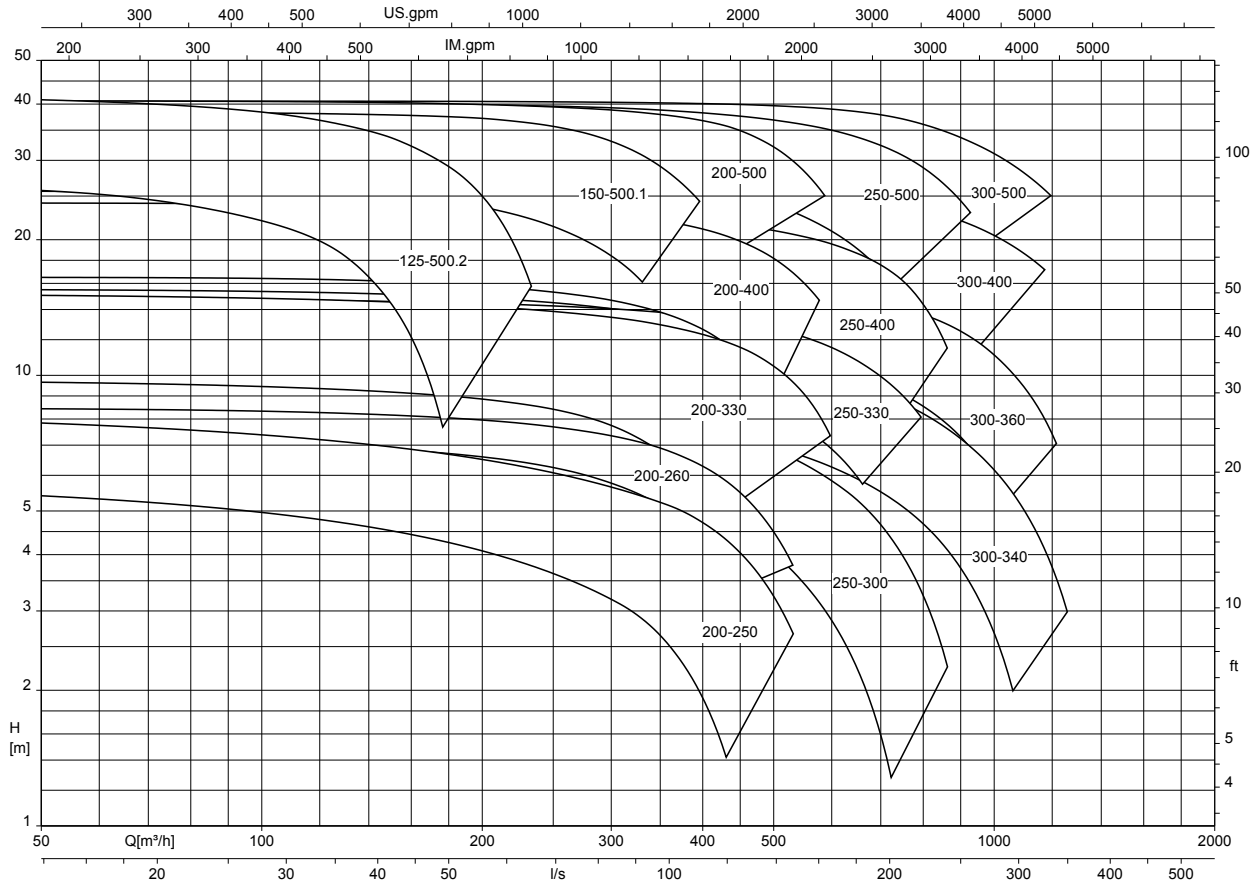
Etanorm-R, n = 1450 rpm



Etanorm-R, n = 1160 rpm



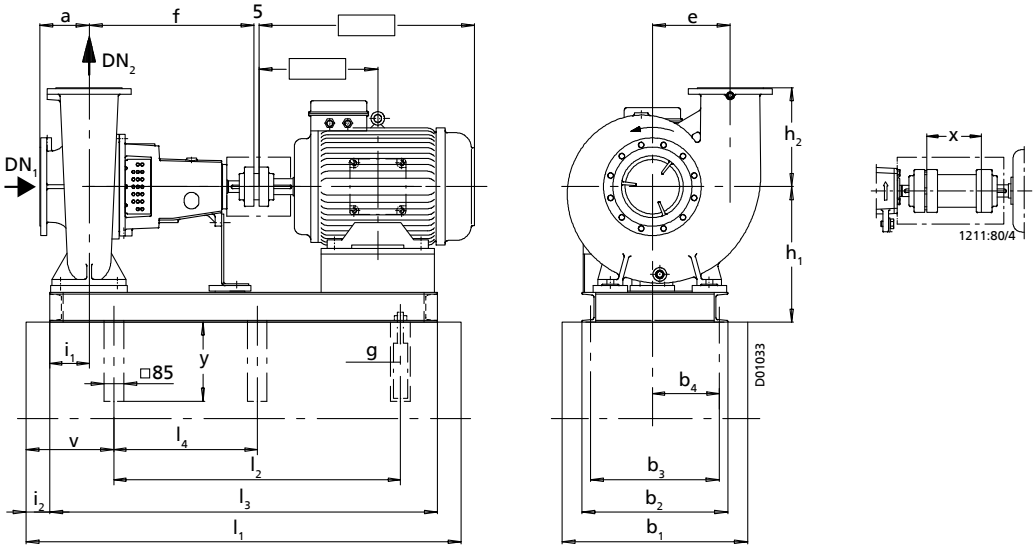
Etanorm-R, n = 960 rpm



Dimensions and connections

Dimensions

Pump set with foundation



Dimensions of the pump set with foundation

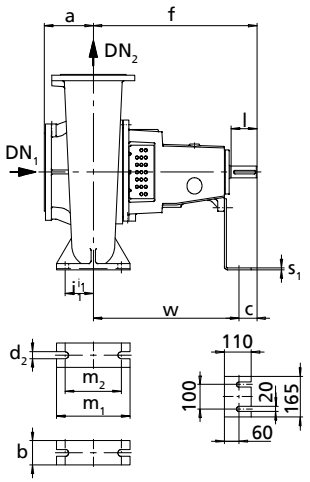
Dimensions

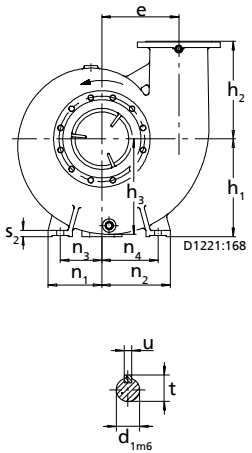
Size	Motor	P_2		DN_1	DN_2	a	e	f	g	h_2	i	y	Coupling										Spacer-type coupling											
		960, 1160 rpm	1450, 1750 rpm										b_1	b_2	b_3	b_4	h_1	i_2	l_1	l_2	l_3	v	b_1	b_2	b_3	b_4	h_1	i_2	l_1	l_2	l_3	l_4	v	x
		[kW]	[kW]			[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
125-500/2	160L	11,0	-	150	125	245	270	703	M20 × 400	300	145	450	1010	760	710	370	525	115	1920	1150	1695	310	1010	760	710	370	525	115	1920	1150	1695	-	310	200
125-500/2	180M	18,5	-	150	125	245	270	703	M20 × 400	300	145	450	1010	760	710	370	525	115	1920	1150	1695	310	1010	760	710	370	525	115	1920	1150	1695	-	310	200
125-500/2	180L	15,0	-	150	125	245	270	703	M20 × 400	300	145	450	1010	760	710	370	525	115	1920	1150	1695	310	900	650	805	318	505	110	2000	1250	1780	-	280	200
125-500/2	200L	18,5	-	150	125	245	270	703	M20 × 400	300	145	450	1010	760	710	370	525	115	1920	1150	1695	310	1010	760	710	370	525	110	2100	1300	1880	-	330	200
125-500/2	200L	22,0	-	150	125	245	270	703	M20 × 400	300	145	450	1010	760	710	370	525	115	1920	1150	1695	310	1010	760	710	370	525	110	2100	1300	1880	-	330	200
125-500/2	200L	-	30,0	150	125	245	270	703	M20 × 400	300	145	450	1010	760	710	370	525	115	1920	1150	1695	310	1010	760	710	370	525	110	2100	1300	1880	-	330	200
125-500/2	225S	-	37,0	150	125	245	270	703	M20 × 400	300	145	450	1010	760	710	370	525	115	1920	1150	1695	310	1010	760	710	370	525	110	2100	1300	1880	-	330	200
125-500/2	225M	30,0	45,0	150	125	245	270	703	M20 × 400	300	145	450	1010	760	710	370	525	115	1920	1150	1695	310	1010	760	710	370	525	110	2100	1300	1880	-	330	200
125-500/2	250M	37,0	55,0	150	125	245	270	703	M20 × 400	300	145	450	1010	760	710	370	525	115	1920	1150	1695	310	1010	760	710	370	525	110	2100	1300	1880	-	330	200
125-500/2	280S	45,0	75,0	150	125	245	270	703	M20 × 400	300	145	450	900	650	605	318	505	110	2000	1250	1780	280	1110	860	810	420	545	110	2260	1450	2040	-	330	200
125-500/2	280M	55,0	90,0	150	125	245	270	703	M20 × 400	300	145	450	900	650	605	318	505	110	2000	1250	1780	280	1110	860	810	420	545	110	2260	1450	2040	-	330	200
150-500.1	200L	18,5	-	200	150	150	315	715	M20 × 400	450	170	450	820	570	525	272	550	115	1920	1150	1695	285	1010	760	710	365	570	110	2100	1300	1880	-	330	200

Size	Motor	P_2		DN_1	DN_2	a	e	f	g	h_2	i	y	Coupling										Spacer-type coupling											
		960, 1160 rpm	1450, 1750 rpm										b_1	b_2	b_3	b_4	h_1	i_2	l_1	l_2	l_3	v	b_1	b_2	b_3	b_4	h_1	i_2	l_1	l_2	l_3	l_4	v	x
		[kW]	[kW]			[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
150-500.1	200L	22,0	-	200	150	150	315	715	M20 × 400	450	170	450	820	570	525	272	550	115	1920	1150	1695	285	1010	760	710	365	570	110	2100	1300	1880	-	330	200
150-500.1	225S	37,0	-	200	150	150	315	715	M20 × 400	450	170	450	820	570	525	272	550	115	1920	1150	1695	285	1010	760	710	365	570	110	2100	1300	1880	-	330	200
150-500.1	225M	30,0	-	200	150	150	315	715	M20 × 400	450	170	450	820	570	525	272	550	115	1920	1150	1695	285	1010	760	710	365	570	110	2100	1300	1880	-	330	200
150-500.1	250M	37,0	-	200	150	150	315	715	M20 × 400	450	170	450	900	650	605	313	550	110	2000	1250	1780	280	1110	860	810	415	590	110	2260	1450	2040	-	330	200
150-500.1	280S	45,0	-	200	150	150	315	715	M20 × 400	450	170	450	900	650	605	313	550	110	2000	1250	1780	280	1110	860	810	415	590	110	2260	1450	2040	-	330	200
150-500.1	280S	-	75,0	200	150	150	315	715	M20 × 400	450	170	450	900	650	605	313	550	110	2000	1250	1780	280	1110	860	810	415	590	110	2260	1450	2040	-	330	200
150-500.1	280M	55,0	90,0	200	150	150	315	715	M20 × 400	450	170	450	1010	760	710	365	570	110	2100	1300	1880	330	1110	860	810	415	590	110	2260	1450	2040	-	330	200
150-500.1	315S	75,0	110,0	200	150	150	315	715	M20 × 400	450	170	450	1010	760	710	365	570	110	2100	1300	1880	330	1110	860	800	410	610	110	2450	1650	2230	825	330	200
150-500.1	315M	-	132,0	200	150	150	315	715	M20 × 400	450	170	450	1110	860	810	415	590	110	2260	1450	2040	330	1110	860	800	410	610	110	2450	1650	2230	825	330	200
200-250	132M	4,0	-	200	200	220	250	815	M20 × 400	345	170	450	820	570	525	293	505	115	1920	1150	1695	285	900	650	605	333	505	110	2000	1250	1780	-	280	200
200-250	132M	5,5	-	200	200	220	250	815	M20 × 400	345	170	450	820	570	525	293	505	115	1920	1150	1695	285	900	650	605	333	505	110	2000	1250	1780	-	280	200
200-250	160M	7,5	-	200	200	220	250	815	M20 × 400	345	170	450	820	570	525	293	505	115	1920	1150	1695	285	1010	760	710	385	525	110	2100	1300	1880	-	330	200
200-250	160L	11,0	15,0	200	200	220	250	815	M20 × 400	345	170	450	820	570	525	293	505	115	1920	1150	1695	285	1010	760	710	385	525	110	2100	1300	1880	-	330	200
200-250	180M	-	18,5	200	200	220	250	815	M20 × 400	345	170	450	820	570	525	293	505	115	1920	1150	1695	285	1010	760	710	385	525	110	2100	1300	1880	-	330	200
200-250	180L	15,0	22,0	200	200	220	250	815	M20 × 400	345	170	450	820	570	525	293	505	115	1920	1150	1695	285	1010	760	710	385	525	110	2100	1300	1880	-	330	200
200-250	200L	-	30,0	200	200	220	250	815	M20 × 400	345	170	450	900	650	605	333	505	110	2000	1250	1780	280	1110	860	810	435	545	110	2260	1450	2040	-	330	200
200-250	225S	-	37,0	200	200	220	250	815	M20 × 400	345	170	450	900	650	605	333	505	110	2000	1250	1780	280	1110	860	810	435	545	110	2260	1450	2040	-	330	200
200-250	225M	-	45,0	200	200	220	250	815	M20 × 400	345	170	450	900	650	605	333	505	110	2000	1250	1780	280	1110	860	810	435	545	110	2260	1450	2040	-	330	200
200-260	160M	7,5	-	200	200	200	300	715	M20 × 400	350	170	450	820	570	525	293	550	115	1920	1150	1695	285	900	650	605	333	550	110	2000	1250	1780	-	280	200
200-260	160L	11,0	18,5	200	200	200	300	715	M20 × 400	350	170	450	820	570	525	293	550	115	1920	1150	1695	285	900	650	605	333	550	110	2000	1250	1780	-	280	200
200-260	180L	15,0	22,0	200	200	200	300	715	M20 × 400	350	170	450	820	570	525	293	550	115	1920	1150	1695	285	900	650	605	333	550	110	2000	1250	1780	-	280	200
200-260	180L	15,0	22,0	200	200	200	300	715	M20 × 400	350	170	450	820	570	525	293	550	115	1920	1150	1695	285	900	650	605	333	550	110	2000	1250	1780	-	280	200
200-260	200L	18,5	30,0	200	200	200	300	715	M20 × 400	350	170	450	820	570	525	293	550	115	1920	1150	1695	285	1010	760	710	385	570	110	2100	1300	1880	-	330	200
200-260	225S	-	37,0	200	200	200	300	715	M20 × 400	350	170	450	820	570	525	293	550	115	1920	1150	1695	285	1010	760	710	385	570	110	2100	1300	1880	-	330	200
200-260	225M	-	45,0	200	200	200	300	715	M20 × 400	350	170	450	820	570	525	293	550	115	1920	1150	1695	285	1010	760	710	385	570	110	2100	1300	1880	-	330	200
200-260	250M	-	55,0	200	200	200	300	715	M20 × 400	350	170	450	900	650	605	333	550	110	2000	1250	1780	280	1110	860	810	435	590	110	2260	1450	2040	-	330	200
200-330	160L	11,0	-	250	200	200	315	715	M20 × 400	400	170	450	820	570	525	293	550	115	1920	1150	1695	285	900	650	605	333	550	110	2000	1250	1780	-	280	200
200-330	180M	15,0	18,5	250	200	200	315	715	M20 × 400	400	170	450	820	570	525	293	550	115	1920	1150	1695	285	900	650	605	333	550	110	2000	1250	1780	-	280	200
200-330	180L	15,0	22,0	250	200	200	315	715	M20 × 400	400	170	450	820	570	525	293	550	115	1920	1150	1695	285	900	650	605	333	550	110	2000	1250	1780	-	280	200
200-330	200L	18,5	-	250	200	200	315	715	M20 × 400	400	170	450	820	570	525	293	550	115	1920	1150	1695	285	1010	760	710	385	570	110	2100	1300	1880	-	330	200
200-330	200L	22,0	30,0	250	200	200	315	715	M20 × 400	400	170	450	820	570	525	293	550	115	1920	1150	1695	285	1010	760	710	385	570	110	2100	1300	1880	-	330	200
200-330	225S	-	37,0	250	200	200	315	715	M20 × 400	400	170	450	820	570	525	293	550	115	1920	1150	1695	285	1010	760	710	385	570	110	2100	1300	1880	-	330	200
200-330	225M	30,0	45,0	250	200	200	315	715	M20 × 400	400	170	450	820	570	525	293	550	115	1920	1150	1695	285	1010	760	710	385	570	110	2100	1300	1880	-	330	200
200-330	250M	-	55,0	250	200	200	315	715	M20 × 400	400	170	450	900	650	605	333	550	110	2000	1250	1780	280	1110	860	810	435	590	110	2260	1450	2040	-	330	200
200-330	280S	-	75,0	250	200	200	315	715	M20 × 400	400	170	450	900	650	605	333	550	110	2000	1250	1780	280	1110	860	810	435	590	110	2260	1450	2040	-	330	200
200-330	280M	-	90,0	250	200	200	315	715	M20 × 400	400	170	450	1010	760	710	385	570	110	2100	1300	1880	330	1110	860	810	435	590	110	2260	1450	2040	-	330	200
200-330	315S	-	110,0	250	200	200	315	715	M20 × 400	400	170	450	1010	760	710	385	570	110	2100	1300	1880	330	1110	860	800	430	610	110	2450	1650	2230	825	330	200
200-400	200L	18,5	-	250	200	180	290	715	M20 × 400	400	170	450	820	570	525	293	550	115	1920	1150	1695	285	1010	760	710	385	570	110	2100	1300	1880	-	330	200
200-400	200L	22,0	-	250	200	180	290	715	M20 × 400	400	170	450	820	570	525	293	550	115	1920	1150	1695	285	1010	760	710	385	570	110	2100	1300	1880	-	330	200
200-400	225M	30,0	-	250	200	180	290	715	M20 × 400	400	170	450	820	570	525	293	550	115	1920	1150	1695	285	1010	760	710	385	570	110	2100	1300	1880	-	330	200
200-400	250M	37,0	-	250	200	180	290	715	M20 × 400	400	170	450	900	650	605	333	550	110	2000	1250	1780	280	1110	860	810	435	590	110	2260	1450	2040	-	330	200
200-400	280S	45,0	75,0	250	200	180	290	715	M20 × 400	400	170	450	900	650	605	333	550	110	2000	1250	1780	280	1110	860	810	435	590	110	2260	1450	2040	-	330	200
200-400	280M	55,0	90,0	250	200	180	290	715	M20 × 400	400	170	450	1010	760	710	385	570	110	2100	1300	1880	330	1110	860	810	435	590	110	2260	1450	2040	-	330	200
200-400	315S	75,0	110,0	250	200	180	290	715	M20 × 400	400	170	450	1010	760	710	385	570	110	2100	1300	1880	330	1110	860	800	430	610	110	2450	1650	2230	825	330	200
200-400	315M	-	132,0	250	200	180	290	715	M20 × 400	400	170	450	1110	860	810	435	590	110	2260	1450	2040	330	1110	860	800	430	610	110	2450	1650	2230	825	330	200
200-500	225M	30,0	-	250	200	200	387	715	M20 × 400	450	195	450	1010	760	710	385	670	110	2000	1200	1780	330	1010	760	710	385	670	110	2100	1300	1880	-	330	200
200-500	250M	37,0	-	250	200	200	387	715	M20 × 400	450	195	450	1010	760	710	385	670	110	2000	1200	1780	330	1110	860	810	435	690	110	2260	1450	2040	-	330	200
200-500	280S	45,0	-	250	200	200	387	715	M20 × 400	450	195	450	1010	760	710	385	670	110	2100	1300	1880	330	1110	860	810	435	690	110	2260	1450	2040	-	330	200
200-500	280M	55,0	-	250	200	200	387	715	M20 × 400	450	195	450	1010	760	710	385	670	110	2100	1300	1880	330	1110	860	810	435	690	110	2260	1450	2040	-	330	200
200-500	315S	75,0	-	250	200	200	387	715	M20 × 400	450	195	450	1110	860	810	435	690	110	2260	1450	2040	330	1110	860	800	430	710	110	2450	1650	2230	825	330	200
200-500	315S	-	110,0	250	200	200	387	715	M20 × 400	450	195	450	1110	860	810	435	690	110	2260	1450	2040	330	1110	860	800	430	710	110	2450	1650	2230	825	330	200
200-500	315M	90,0	132,0	250	200	200	387	715	M20 × 400	450	195	450	1110	860	810	435	690	110	2260	1450	2040	330	1110	860	800	430	710	110	2450	1650	2230	825	330	200
250-300	160L	11	-	250	250	225	300	830	M20 × 400	400	170	450	1010	760	710	385	570	115	1920	1150	1695	310	1010	760	710	385	570	110	2100	1300	1880	-	330	250
250-300	180M	-	18,5	250	250	225	300	830	M20 × 400	400	170	450	1010	760	710	385	570	115	1920	1150	1695	310	1010	760	710	385	570	110	2100	1300	1880	-	330	250
250-300	180L	15	-	250	250	225	300	830	M20 × 400	400	170	450	1010	760	710	385	570	115	1920	1150	1695	310	1110	860	810	445	590	110	2260	1450	2040	-	330	250
250-300	200L	18,5	30	250	250	225	300	830	M20 × 400	400	170	450	1010	760	710	385	570	110	2000	1200	1780	330	1110	860	810	445	590	110	2260	1450	2040	-	330	250
250-300	200L	22	-	250	250	225	300	830	M20 × 400	400	170	450	1010	760	710	385	570	110	2000	1200	1780	330	1110	860	810	445	590	110	2260	1450	2040	-	330	250

Size	Motor	P_2		DN_1	DN_2	a	e	f	g	h_2	i	y	Coupling										Spacer-type coupling											
		960, 1160 rpm	1450, 1750 rpm										b_1	b_2	b_3	b_4	h_1	i_2	l_1	l_2	l_3	v	b_1	b_2	b_3	b_4	h_1	i_2	l_1	l_2	l_3	l_4	v	x
		[kW]	[kW]			[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
250-300	225S	-	37	250	250	225	300	830	M20 × 400	400	170	450	1010	760	710	385	570	110	2000	1200	1780	330	1110	860	810	445	590	110	2260	1450	2040	-	330	250
250-300	225M	30	45	250	250	225	300	830	M20 × 400	400	170	450	1010	760	710	385	570	110	2000	1200	1780	330	1110	860	810	445	590	110	2260	1450	2040	-	330	250
250-300	250M	-	55	250	250	225	300	830	M20 × 400	400	170	450	1010	760	710	385	570	110	2100	1300	1880	330	1110	860	800	430	610	110	2450	1650	2230	825	330	250
250-300	280S	-	75	250	250	225	300	830	M20 × 400	400	170	450	1010	760	710	385	570	110	2100	1300	1880	330	1110	860	800	430	610	110	2450	1650	2230	825	330	250
250-300	280M	-	90	250	250	225	300	830	M20 × 400	400	170	450	1110	860	810	435	590	110	2260	1450	2040	330	1110	860	800	430	610	110	2450	1650	2230	825	330	250
250-330	180L	15	-	250	250	250	345	715	M20 × 400	400	195	450	1010	760	710	395	620	115	1920	1150	1695	310	1010	760	710	395	620	110	2100	1300	1880	-	330	200
250-330	200L	18,5	-	250	250	250	345	715	M20 × 400	400	195	450	1010	760	710	395	620	115	1920	1150	1695	310	1010	760	710	395	620	110	2100	1300	1880	-	330	200
250-330	200L	22	-	250	250	250	345	715	M20 × 400	400	195	450	1010	760	710	395	620	115	1920	1150	1695	310	1010	760	710	395	620	110	2100	1300	1880	-	330	200
250-330	225S	37	-	250	250	250	345	715	M20 × 400	400	195	450	1010	760	710	395	620	110	2000	1200	1780	330	1010	760	710	395	620	110	2100	1300	1880	-	330	200
250-330	225M	30	-	250	250	250	345	715	M20 × 400	400	195	450	1010	760	710	395	620	110	2000	1200	1780	330	1010	760	710	395	620	110	2100	1300	1880	-	330	200
250-330	250M	37	55	250	250	250	345	715	M20 × 400	400	195	450	1010	760	710	395	620	110	2000	1200	1780	330	1110	860	810	445	640	110	2240	1450	2040	-	330	200
250-330	280S	45	75	250	250	250	345	715	M20 × 400	400	195	450	1010	760	710	395	620	110	2100	1300	1880	330	1110	860	810	445	640	110	2240	1450	2040	-	330	200
250-330	280M	-	90	250	250	250	345	715	M20 × 400	400	195	450	1010	760	710	395	620	110	2100	1300	1880	330	1110	860	810	445	640	110	2240	1450	2040	-	330	200
250-330	315S	-	110	250	250	250	345	715	M20 × 400	400	195	450	1110	860	810	445	640	110	2260	1450	2040	330	1110	860	800	440	660	110	2450	1650	2230	825	330	200
250-330	315M	-	132	250	250	250	345	715	M20 × 400	400	195	450	1110	860	810	445	640	110	2260	1450	2040	330	1110	860	800	440	660	110	2450	1650	2230	825	330	200
250-400	200L	18,5	-	300	250	180	335	715	M20 × 400	480	195	450	1010	760	710	385	620	115	1920	1150	1695	310	1010	760	710	385	620	110	2100	1300	1880	-	330	200
250-400	200L	22	-	300	250	180	335	715	M20 × 400	480	195	450	1010	760	710	385	620	115	1920	1150	1695	310	1010	760	710	385	620	110	2100	1300	1880	-	330	200
250-400	225S	37	-	300	250	180	335	715	M20 × 400	480	195	450	1010	760	710	385	620	110	2000	1200	1780	330	1010	760	710	385	620	110	2100	1300	1880	-	330	200
250-400	225M	30	-	300	250	180	335	715	M20 × 400	480	195	450	1010	760	710	385	620	110	2000	1200	1780	330	1010	760	710	385	620	110	2100	1300	1880	-	330	200
250-400	250M	37	-	300	250	180	335	715	M20 × 400	480	195	450	1010	760	710	385	620	110	2000	1200	1780	330	1110	860	810	435	640	110	2260	1450	2040	-	330	200
250-400	280S	45	-	300	250	180	335	715	M20 × 400	480	195	450	1010	760	710	385	620	110	2100	1300	1880	330	1110	860	810	435	640	110	2260	1450	2040	-	330	200
250-400	280S	-	75	300	250	180	335	715	M20 × 400	480	195	450	1010	760	710	385	620	110	2100	1300	1880	330	1110	860	810	435	640	110	2260	1450	2040	-	330	200
250-400	280M	55	90	300	250	180	335	715	M20 × 400	480	195	450	1010	760	710	385	620	110	2100	1300	1880	330	1110	860	810	435	640	110	2260	1450	2040	-	330	200
250-400	315S	75	110	300	250	180	335	715	M20 × 400	480	195	450	1110	860	810	435	640	110	2260	1450	2040	330	1110	860	800	430	660	110	2450	1650	2230	825	330	200
250-400	315M	-	132	300	250	180	335	715	M20 × 400	480	195	450	1110	860	810	435	640	110	2260	1450	2040	330	1110	860	800	430	660	110	2450	1650	2230	825	330	200
250-500	280S	45	-	300	250	225	425	715	M20 × 400	500	220	450	1110	860	810	445	690	110	2260	1450	2040	330	1110	860	810	445	690	110	2260	1450	2040	-	330	200
250-500	280M	55	-	300	250	225	425	715	M20 × 400	500	220	450	1110	860	810	445	690	110	2260	1450	2040	330	1110	860	800	440	710	110	2450	1650	2230	825	330	200
250-500	315S	75	-	300	250	225	425	715	M20 × 400	500	220	450	1110	860	810	445	690	110	2260	1450	2040	330	1110	860	800	440	710	110	2450	1650	2230	825	330	200
250-500	315M	90	-	300	250	225	425	715	M20 × 400	500	220	450	1110	860	810	445	690	110	2260	1450	2040	330	1110	860	800	440	710	110	2450	1650	2230	825	330	200
300-340	180L	15,0	-	300	300	255	315	850	M20 × 400	450	195	450	1010	760	710	395	620	110	2000	1200	1780	330	1110	860	810	445	640	110	2260	1450	2040	-	330	250
300-340	200L	18,5	-	300	300	255	315	850	M20 × 401	450	195	450	1010	760	710	395	620	110	2000	1200	1780	330	1110	860	810	445	640	110	2260	1450	2040	-	330	250
300-340	200L	22,0	-	300	300	255	315	850	M20 × 402	450	195	450	1010	760	710	395	620	110	2000	1200	1780	330	1110	860	810	445	640	110	2260	1450	2040	-	330	250
300-340	225S	-	37,0	300	300	255	315	850	M20 × 403	450	195	450	1010	760	710	395	620	110	2000	1200	1780	330	1110	860	810	445	640	110	2260	1450	2040	-	330	250
300-340	225M	30,0	45,0	300	300	255	315	850	M20 × 404	450	195	450	1010	760	710	395	620	110	2000	1200	1780	330	1110	860	800	440	660	110	2450	1650	2230	-	330	250
300-340	250M	30,0	55,0	300	300	255	315	850	M20 × 405	450	195	450	1010	760	710	395	620	110	2000	1200	1780	330	1110	860	800	440	660	110	2450	1650	2230	825	330	250
300-340	250M	37,0	-	300	300	255	315	850	M20 × 406	450	195	450	1010	760	710	395	620	110	2100	1300	1880	330	1110	860	800	440	660	110	2450	1650	2230	825	330	250
300-340	280S	45,0	75,0	300	300	255	315	850	M20 × 407	450	195	450	1110	860	810	445	640	110	2260	1450	2040	330	1110	860	800	440	660	110	2450	1650	2230	825	330	250
300-340	280M	-	90,0	300	300	255	315	850	M20 × 408	450	195	450	1110	860	810	445	640	110	2260	1450	2040	330	1110	860	800	440	660	110	2450	1650	2230	825	330	250
300-340	315S	-	110,0	300	300	255	315	850	M20 × 409	450	195	450	1110	860	810	445	640	110	2260	1450	2040	330	1110	860	800	440	660	110	2590	1800	2370	900	330	250
300-340	315M	-	132,0	300	300	255	315	850	M20 × 410	450	195	450	1110	860	800	440	660	110	2450	1650	2230	330	1110	860	800	440	660	110	2590	1800	2370	900	330	250
300-360	225M	30,0	-	300	300	300	387	717	M20 × 411	450	220	450	1010	760	710	395	730	110	2000	1200	1780	330	1110	860	810	445	750	110	2260	1450	2040	-	330	250
300-360	250M	37,0	-	300	300	300	387	717	M20 × 412	450	220	450	1010	760	710	395	730	110	2100	1300	1880	330	1110	860	810	445	750	110	2250	1450	2040	-	330	250
300-360	280S	45,0	-	300	300	300	387	717	M20 × 413	450	220	450	1010	760	710	395	730	110	2100	1300	1880	330	1110	860	800	440	750	110	2450	1650	2230	825	330	250
300-360	280M	55,0	90,0	300	300	300	387	717	M20 × 414	450	220	450	1010	760	710	395	730	110	2100	1300	1880	330	1110	860	800	440	750	110	2450	1650	2230	825	330	250
300-360	315S	75,0	110,0	300	300	300	387	717	M20 × 415	450	220	450	1110	860	810	445	750	110	2260	1450	2040	330	1110	860	800	440	750	110	2450	1650	2230	825	330	250
300-360	315M	-	132,0	300	300	300	387	717	M20 × 416	450	220	450	1110	860	810	445	750	110	2260	1450	2040	330	1110	860	800	440	750	110	2450	1650	2230	825	330	250
300-400	250M	37,0	-	350	300	300	425	715	M20 × 417	500	220	450	1110	860	810	445	750	110	2260	1450	2040	330	1110	860	810	455	750	110	2260	1450	2040	-	330	250
300-400	280S	45,0	-	350	300	300	425	715	M20 × 418	500	220	450	1110	860	810	445	750	110	2260	1450	2040	330	1110	860	800	450	770	110	2450	1650	2230	825	330	250
300-400	280M	55,0	-	350	300	300	425	715	M20 × 419	500	220	450	1110	860	810	445	750	110	2260	1450	2040	330	1110	860	800	450	770	110	2450	1650	2230	825	330	250
300-400	315S	75,0	-	350	300	300	425	715	M20 × 420	500	220	450	1110	860	810	445	750	110	2260	1450	2040	330	1110	860	800	450	770	110	2450	1650	2230	825	330	250
300-400	315S	-	110,0	350	300	300	425	715	M20 × 421	500	220	450	1110	860	810	445	750	110	2260	1450	2040	330	1110	860	800	450	770	110	2450	1650	2230	825	330	250
300-400	315M	90,0	132,0	350	300	300	425	715	M20 × 422	500	220	450	1110	860	810	445	750	110	2260	1450	2040	330	1110	860	800	450	770	110	2450	1650	2230	825	330	250
300-500	315S	75,0	-	350	300	300	450	715	M20 × 423	500	220	450	1110	860	810	445	750	110	2260	1450	2040	330	1110	860	800	450	770	110	2450	1650	2230	825	330	250
300-500	315M	75,0	-	350	300	300	450	715	M20 × 424	500	220	450	1110	860	810	445	750	110	2260	1450	2040	330	1110	860	800	450	770	110	2450	1650	2230	825	330	250

Pump



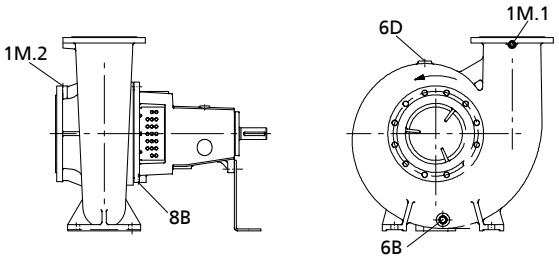


Pump dimensions

Dimensions

Size	DN_1	DN_2	a	b	c	d_{1m6}	d_2	e	f	h_1	h_2	h_3	i_1	l	m_1	m_2	n_1	n_2	n_3	n_4	s_1	s_2	t	u	w
			[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
125-500/2	150	125	245	120	121	60	24	270	703	355	300	297	95	140	250	190	270	300	220	250	6	22	64	18	582
150-500.1	200	150	150	100	115	60	28	315	715	400	450	359	115	140	300	230	240	260	190	210	6	25	64	18	600
200-250	200	200	220	100	119	60	28	250	815	355	345	329	109	140	300	230	220	280	170	230	6	25	64	18	690
200-260	200	200	200	100	120	60	28	300	715	400	350	369	115	140	300	230	220	280	170	230	8	25	64	18	595
200-330	250	200	200	100	120	60	28	315	715	400	400	390	115	140	300	230	220	280	170	230	8	25	64	18	595
200-400	250	200	180	130	120	60	28	290	715	400	400	358	115	140	300	230	220	280	155	215	8	25	64	18	595
200-500	250	200	200	130	115	60	28	387	715	500	450	497	140	140	350	280	320	380	255	315	20	25	64	18	600
250-300	250	250	225	130	115	60	28	300	830	400	400	384	95	140	300	230	270	330	205	265	8	25	64	18	695
250-330	250	250	250	130	120	60	34	345	715	450	400	445	140	140	350	280	310	390	245	325	10	25	64	18	595
250-400	300	250	180	130	120	60	34	335	715	450	480	400	140	140	350	280	320	380	255	315	10	25	64	18	595
250-500	300	250	225	130	115	60	34	425	715	500	500	514	162,5	140	400	325	360	440	295	375	20	32	64	18	600
300-340	300	300	255	160	115	60	34	315	850	450	450	427	120	140	350	280	310	390	230	310	10	25	64	18	715
300-360	300	300	300	160	122	60	34	387	717	560	450	505	162,5	140	400	325	310	390	230	310	20	32	64	18	595
300-400	350	300	300	160	120	60	34	425	715	560	500	540	162,5	140	400	325	350	450	270	370	20	32	64	18	595
300-500	350	300	300	160	115	60	34	450	715	560	500	581	162,5	140	400	325	350	450	270	370	20	32	64	18	600

Connections



Connections

1M.1	Pressure gauge	6D	Fluid priming and venting
6B	Fluid drain	8B	Leakage drain

Thread sizes of connections

Size	1M.1	6B	6D	8B
All	G 1/2	G 3/4[16)]	G 3/4[16)]	G 1/4

Flange design

Flange material variants

Material variant	Standard	Nominal diameter	Pressure class	Material
G, M, GC1	EN 1092-2	DN 125, DN 150	PN 16	Grey cast iron EN-GJL-250/A48 CL 35B
		DN 200, DN 250, DN 300, DN 350	PN 10	Grey cast iron EN-GJL-250/A48 CL 35B
SG, SM, SC1	EN 1092-2	DN 125, DN 150, DN 200, DN 250, DN 300, DN 350	PN 16	Nodular cast iron, EN-GJS-400-15 / A536 GR 60-40-18

Optional: flange design to ASME Class 125, drilled

Size	Suction nozzle	Discharge nozzle
125-500/2	✘	✘
125-500.1	✘	✘
200-250	✘	✘
200-260	✘	✘
200-330	✘	✘
200-400	✘	✘
200-500	✘	✘
250-300	✘	✘
250-330	✘	✘
250-400	-	✘
250-500	-	✘
300-340	-	-
300-360	-	-
300-400	✘	-
300-500	✘	-

16) Size 125-500/2: G 1/2

Interchangeability of pump components

Components featuring the same number in a column are interchangeable.

Interchangeability of pump components

Size	Shaft units	Description													
		Shaft	Radial ball bearing	Lip seal[17]	Mechanical seal	Casing cover[18]	Gland packing	Ring	Ring	Casing wear ring Suction side	Casing wear ring Discharge side	Thrower	Shaft sleeve	Shaft protecting sleeve	Spacer sleeve
		Part No.													
		210	321	421	433	161	461	500.1	500.3	502.1	502.2	507	523	524	525
125-500/2	65	-	1	1	1	-	1	1	1	-	-	1	-	-	-
150-500.1	65	1	1	1	1	1	1	1	1	1	1	1	1	1	-
200-250	65	2	1	1	1	-	1	1	1	-	3	1	2	2	-
200-260	65	1	1	1	1	-	1	1	1	1	3	1	1	1	-
200-330	65	1	1	1	1	4	1	1	1	-	4	1	1	1	-
200-400	65	1	1	1	1	-	1	1	1	2	2	1	1	1	-
200-500	65	1	1	1	1	1	1	1	1	-	1	1	1	1	-
250-300	65	2	1	1	1	4	1	1	1	-	4	1	2	2	-
250-330	65	1	1	1	1	-	1	1	1	2	4	1	1	1	-
250-400	65	1	1	1	1	-	1	1	1	-	1	1	1	1	-
250-500	65	1	1	1	1	2	1	1	1	-	1	1	1	1	-
300-340	65	2	1	1	1	-	1	1	1	-	2	1	2	2	-
300-360	65	1	1	1	1	3	1	1	1	-	1	1	1	1	-
300-400	65	1	1	1	1	3	1	1	1	3	1	1	1	1	-
300-500	65	1	1	1	1	2	1	1	1	3	1	1	1	1	-

Recommended spare parts stock for 2 years' operation to DIN 24296

Quantity of spare parts for recommended spare parts stock

Part No.	Description	Number of pumps (including stand-by pumps)						
		2	3	4	5	6 and 7	8 and 9	10 and more
171	Diffuser[19]	1	1	1	2	2	2	20 %
210	Shaft	1	1	1	2	2	2	20 %
230	Impeller	1	1	1	2	2	2	20 %
230.01/.02	Impeller[19]	1	1	1	2	2	2	20 %
321	Radial ball bearing	2	2	4	4	4	6	50 %
330	Bearing bracket	-	-	-	-	-	1	2
400./...	Gaskets (set)	4	6	8	8	9	12	150 %
412	O-ring[19]	4	6	8	8	9	12	150 %
-	Torque-transmitting coupling elements (set)	1	1	2	2	3	4	30 %
502.01/02.	Casing wear ring	2	2	2	3	3	4	50 %
502.03/.04	Casing wear ring[19]	2	2	2	3	3	4	50 %
525.01	Spacer sleeve[19]	1	1	1	2	2	2	20 %
For variants with mechanical seal:								
433	Mechanical seal	1	1	2	2	2	3	25 %
500.03	Ring	1	1	2	2	2	3	25 %
523	Shaft sleeve	2	2	2	3	3	4	50 %
For variants with gland packing								

17) For oil lubrication only
18) For gland packing or mechanical seal
19) For Etanorm-R 125-500/2 only

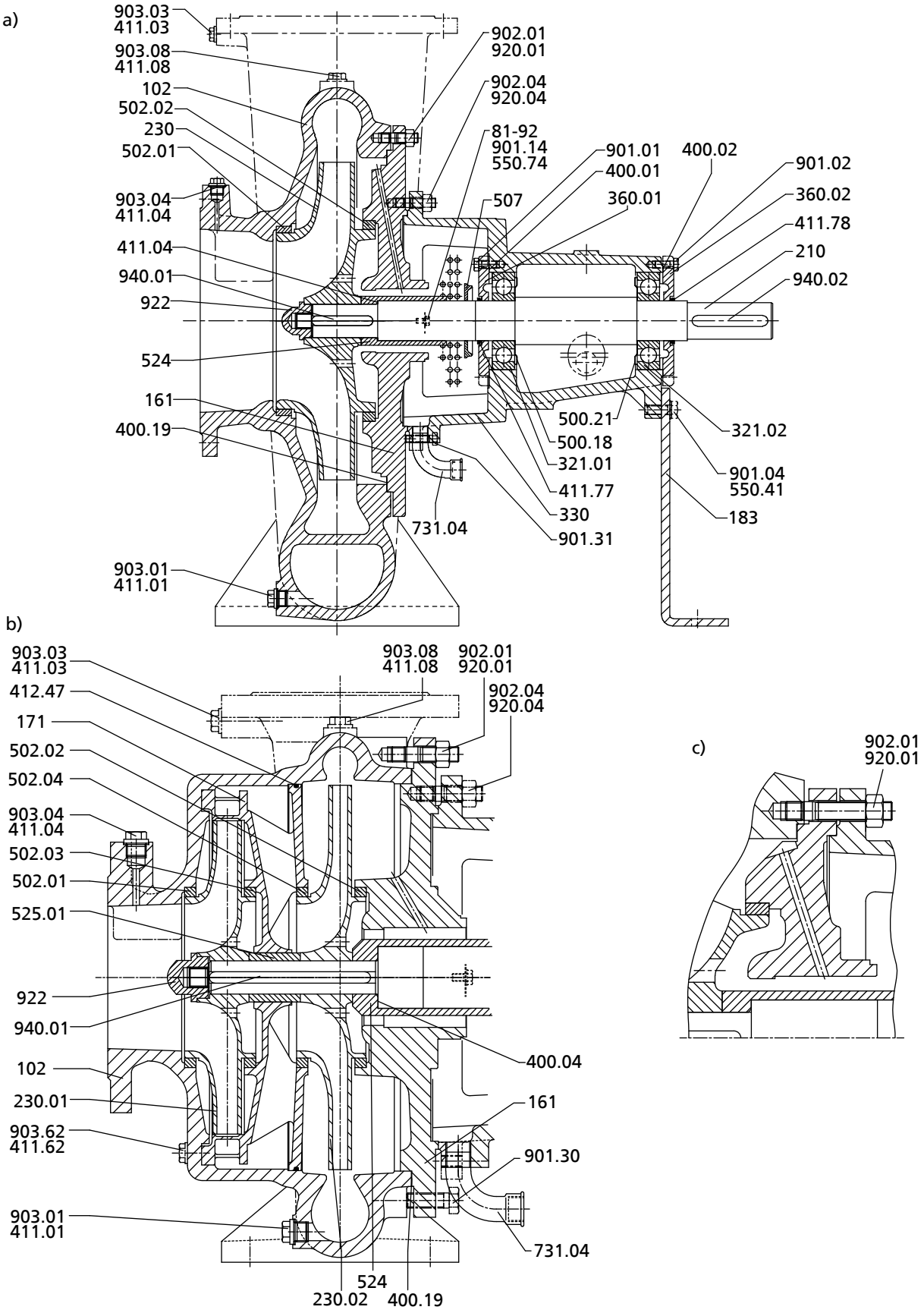
Part No.	Description	Number of pumps (including stand-by pumps)						
		2	3	4	5	6 and 7	8 and 9	10 and more
456.01	Neck bush	1	1	2	2	2	3	30 %
461	Gland packing (set)	4	4	6	6	6	8	100 %
524	Shaft protecting sleeve	2	2	2	3	3	4	50 %

Scope of supply

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

- Pump
- Drive
- Baseplate
- Coupling and coupling guard

General assembly drawing with list of components



a) Etanorm-R (single-entry) b) Etanorm-R (double-entry) c) clamped casing cover[20)]

List of components

Part No.	Comprising	Description
102	102	Volute casing
	411.01/.03/.04/.08	Joint ring
	502.01	Casing wear ring
	902.01	Stud
	903.01/.03/.04/.08	Screw plug
	920.01	Nut
161	161	Casing cover
	400.19	Gasket
	502.02	Casing wear ring
	901.30	Hexagon head bolt
	902.04	Stud
	920.01	Hexagon nut
	920.04	Hexagon nut
171[21)]	171	With diffuser
183	183	Support foot
	901.04	Hexagon head bolt
	550.41	Disc
210	210	Shaft
	940.01/.02	Key
230	230	Impeller
230.01/.02	230.01/.02	Impeller
321.01/.02	321.01/.02	Deep groove ball bearing
330	330	Bearing bracket
330	330	Bearing bracket
	210	Shaft
	312.01/.02	Deep groove ball bearing
	360.01/.02	Bearing cover
	400.01/.02	Gasket
	411.77/.78	V-ring
	500.18/.21	Ring
	507	Thrower
	550.74	Disc
	731.04[22)]	Pipe union
	901.01/.02/.14/.31	Hexagon head bolt
	81-92	Cover plate
	922	Impeller nut
	940.01/.02	Key
360.01/.02	360.01/.02	Bearing cover
	400.01/.02	Gasket
	901.01/.02	Hexagon head bolt
400.01/.02/.04/.19	400.01/.02/.04/.19	Gasket
411.01/.03/.04/.08	411.01/.03/.04/.08	Joint ring
411.62[21)]	411.62	Joint ring
411.77/.78	411.77/.78	V-ring
412.47[21)]	412.47	O-ring
452.01[23)]	452.01	Gland follower
454.01[23)]	454.01	Stuffing box ring
456.01[23)]	456.01	Neck bush
458.01[23)]	458.01	Lantern ring, split
461	461	Gland packing
502.01/.02/.03[21)]/.04[21)]	502.01/.02/.03/.04	Casing wear ring
507	507	Thrower
524	524	Shaft protecting sleeve
	400.04	Joint ring
525.01[21)]	525.01	Spacer sleeve
731.04[22)]	731.04	Pipe union

20) On sizes 200-250, 200-260, 200-330, 250-300, 250-330 only
21) On size 125-500/2 only
22) For oil lubrication only
23) Not shown

Part No.	Comprising	Description
81-92	81-92	Cover plate
	550.74	Disc
	901.14	Hexagon head bolt
901.01/.02/.04/.14/.30/.31	901.01/.02/.04/.14/.30/.31	Hexagon head bolt
902.01/.04	902.01/.04	Stud
903.01/.03/.04/.08	903.01/.03/.04/.08	Screw plug
903.62	903.62	Screw plug
920.01/.04	920.01/.04	Hexagon nut
922	922	Impeller nut
940.01/.02	940.01/.02	Key

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