

**Qty. Description**

1 CR 45-4-2 A-F-A-E-HQQE



Note! Product picture may differ from actual product

Product No.: [96122802](#)

Vertical, multistage centrifugal pump with inlet and outlet ports on same the level (inline). The pump head and base are in cast iron – all other wetted parts are in stainless steel. A cartridge shaft seal ensures high reliability, safe handling, and easy access and service. Power transmission is via a rigid split coupling. Pipe connection is via DIN flanges.

The pump is fitted with a 3-phase, fan-cooled asynchronous motor.

### Further product details

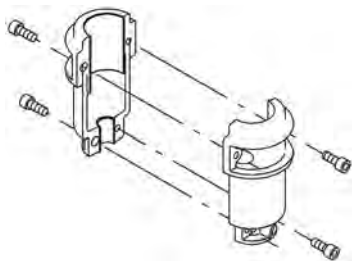
Steel, cast iron and aluminium components have an epoxy-based coating made in a cathodic electro-deposition (CED) process. CED is a high-quality dip-painting process where an electrical field around the products ensures deposition of paint particles as a thin, well-controlled layer on the surface. An integral part of the process is a pretreatment. The entire process consists of these elements:

- 1) Alkaline-based cleaning.
- 2) Zinc phosphating.
- 3) Cathodic electro-deposition.
- 4) Curing to a dry film thickness 18-22 my m.

The colour code for the finished product is NCS 9000/RAL 9005.

### Pump

A long split coupling connects the pump and motor shaft. It is enclosed in the motor stool by means of two coupling guards. The long coupling makes it possible to replace the shaft seal without removing the motor from the pump.



The motor stool connects the pump head and motor. The pump head has a combined 1/2" priming plug and vent screw.



The pump is fitted with a balanced O-ring seal unit with a rigid torque-transmission system. This seal type is assembled in a cartridge unit which makes replacement safe and easy. Due to the balancing, this seal type is suitable for high-pressure applications. The cartridge construction also protects the pump shaft from possible wear from a dynamic O-ring between pump shaft and shaft seal.

Primary seal:

- Rotating seal ring material: silicon carbide (SiC)
- Stationary seat material: silicon carbide (SiC)

This material pairing is used where higher corrosion resistance is required. The high hardness of this material pairing offers good resistance against abrasive particles.

Secondary seal material: EPDM (ethylene-propylene rubber)

EPDM has excellent resistance to hot water. EPDM is not suitable for mineral oils.



The shaft seal is retained in the pump head by a cover and screws. It can be replaced without removing the motor.

The chambers and impellers are made of stainless-steel sheet. The chambers are provided with a PTFE neck ring offering improved sealing and high efficiency. The impellers have smooth surfaces, and the shape of the blades ensure a high efficiency.

The base is made of cast iron. Both the inlet and the outlet side of the base have two pressure gauge tapings. The pump is secured to the foundation by four bolts through the base plate. The flanges are fastened to the base by means of locking rings.



## Motor

The motor is a totally enclosed, fan-cooled motor with principal dimensions to IEC and DIN standards. The motor is flange-mounted with free-hole flange (FF).

Motor-mounting designation in accordance with IEC 60034-7: IM B 5 (Code I) / IM 3001 (Code II).

Electrical tolerances comply with IEC 60034.

The motor efficiency is classified as IE3 in accordance with IEC 60034-30-1.

The motor has thermistors (PTC sensors) in the windings in accordance with DIN 44081/DIN 44082. The protection reacts to both slow- and quick-rising temperatures, e.g. constant overload and stalled conditions.

Thermal switches must be connected to an external control circuit in a way which ensures that the automatic reset cannot cause accidents. The motors must be connected to a motor-protective circuit breaker according to local regulations.

The motor can be connected to a variable speed drive for adjustment of pump performance to any duty point. Grundfos CUE offers a range of variable speed drives. Please find more information in Grundfos Product Center.

Qty.	Description
	<p><b>Technical data</b></p> <p><b>Controls:</b>                      Frequency converter: NONE</p> <p><b>Liquid:</b>                      Pumped liquid: Water                      Liquid temperature range: -30 .. 120 °C                      Liquid temperature during operation: 20 °C                      Density: 998.2 kg/m<sup>3</sup></p> <p><b>Technical:</b>                      Pump speed on which pump data are based: 2923 rpm                      Rated flow: 45 m<sup>3</sup>/h                      Rated head: 72.1 m                      Pump orientation: Vertical                      Shaft seal arrangement: Single                      Code for shaft seal: HQQE                      Approvals on nameplate: CE, EAC,ACS                      Curve tolerance: ISO9906:2012 3B</p> <p><b>Materials:</b>                      Base: Cast iron                                EN 1563 EN-GJS-500-7                                ASTM A536 80-55-06                      Impeller: Stainless steel                                EN 1.4301                                AISI 304                      Bearing: SIC                      Support bearing: Graflon</p> <p><b>Installation:</b>                      Maximum ambient temperature: 60 °C                      Maximum operating pressure: 16 bar                      Max pressure at stated temp: 16 bar / 120 °C                                                                16 bar / -30 °C                      Type of connection: DIN                      Size of inlet connection: DN 80                      Size of outlet connection: DN 80                      Pressure rating for pipe connection: PN 40                      Flange size for motor: FF300</p> <p><b>Electrical data:</b>                      Motor standard: IEC                      Motor type: 160MD                      IE Efficiency class: IE3                      Rated power - P2: 15 kW                      Power (P2) required by pump: 15 kW                      Mains frequency: 50 Hz                      Rated voltage: 3 x 380-415D/660-690Y V                      Rated current: 28,0-26,0/16,2-15,6 A                      Starting current: 660-780 %                      Cos phi - power factor: 0.89-0.87                      Rated speed: 2930-2950 rpm                      Efficiency: IE3 91,9%                      Motor efficiency at full load: 91.9-91.9 %                      Motor efficiency at 3/4 load: 92.4 %                      Motor efficiency at 1/2 load: 92.4 %                      Number of poles: 2</p>



Company name:

Created by:

Phone:

Date:

17/02/2019

Qty.	Description
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	Enclosure class (IEC 34-5): 55 Dust/Jetting
	Insulation class (IEC 85): F

**Others:**

Minimum efficiency index, MEI  $\hat{a}\%¥$ : 0.70

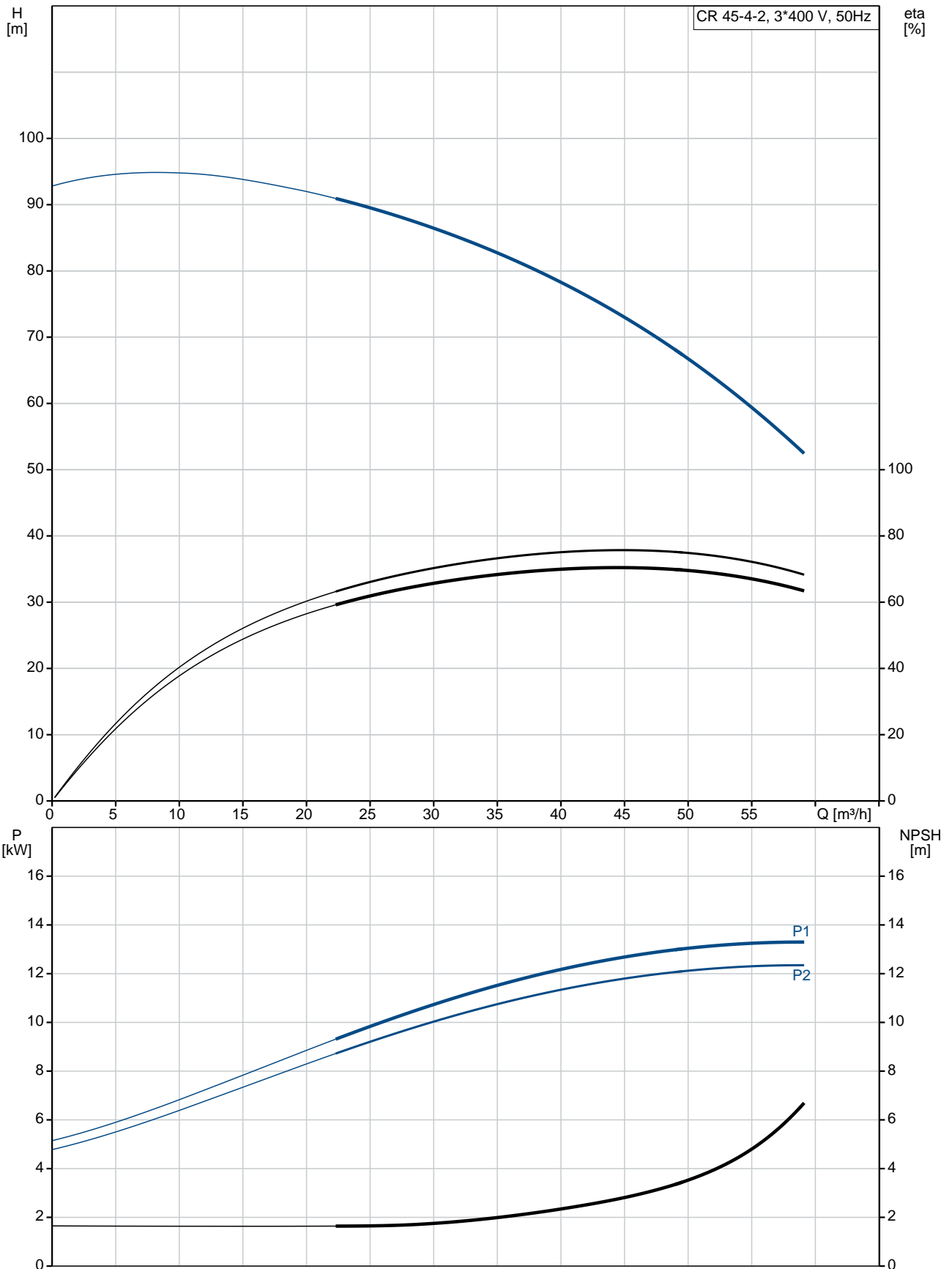
Net weight: 179 kg

Gross weight: 212 kg

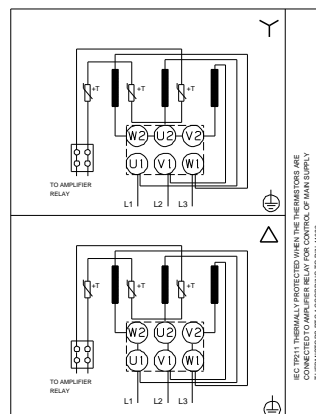
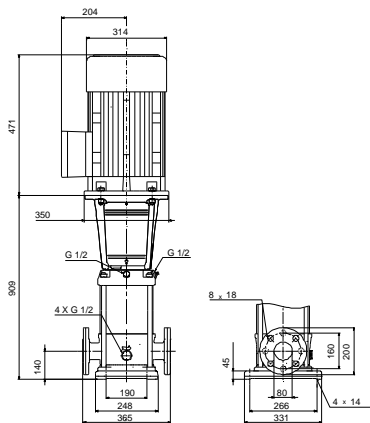
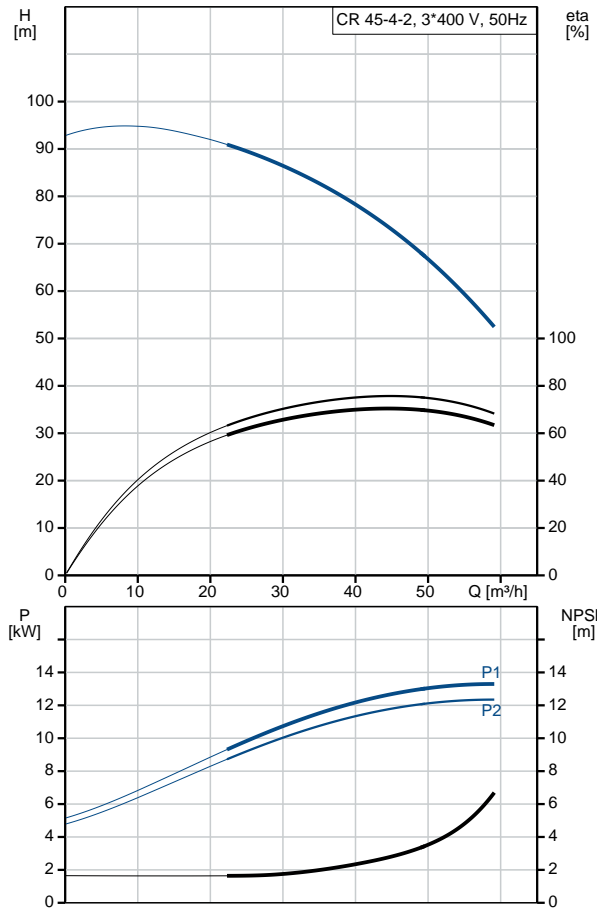
Shipping volume: 0.495 m<sup>3</sup>

Danish VVS No.: 385907042

## 96122802 CR 45-4-2 A-F-A-E-HQQE 50 Hz



Description	Value
<b>General information:</b>	
Product name:	CR 45-4-2 A-F-A-E-HQQE
Product No:	96122802
EAN number:	5700396688466
<b>Technical:</b>	
Pump speed on which pump data are based:	2923 rpm
Rated flow:	45 m <sup>3</sup> /h
Rated head:	72.1 m
Head max:	92.4 m
Stages:	4
Impellers:	4
Number of reduced-diameter impellers:	2
Low NPSH:	N
Pump orientation:	Vertical
Shaft seal arrangement:	Single
Code for shaft seal:	HQQE
Approvals on nameplate:	CE, EAC, ACS
Curve tolerance:	ISO9906:2012 3B
Pump version:	A
Model:	B
<b>Materials:</b>	
Base:	Cast iron EN 1563 EN-GJS-500-7
Impeller:	ASTM A536 80-55-06 Stainless steel EN 1.4301 AISI 304
Material code:	A
Code for rubber:	E
Bearing:	SIC
Support bearing:	Graflon
<b>Installation:</b>	
Maximum ambient temperature:	60 °C
Maximum operating pressure:	16 bar
Max pressure at stated temp:	16 bar / 120 °C 16 bar / -30 °C
Type of connection:	DIN
Size of inlet connection:	DN 80
Size of outlet connection:	DN 80
Pressure rating for pipe connection:	PN 40
Flange size for motor:	FF300
Connect code:	F
<b>Liquid:</b>	
Pumped liquid:	Water
Liquid temperature range:	-30 .. 120 °C
Liquid temperature during operation:	20 °C
Density:	998.2 kg/m <sup>3</sup>
<b>Electrical data:</b>	
Motor standard:	IEC
Motor type:	160MD
IE Efficiency class:	IE3
Rated power - P2:	15 kW
Power (P2) required by pump:	15 kW
Mains frequency:	50 Hz
Rated voltage:	3 x 380-415D/660-690Y V





Company name:

Created by:

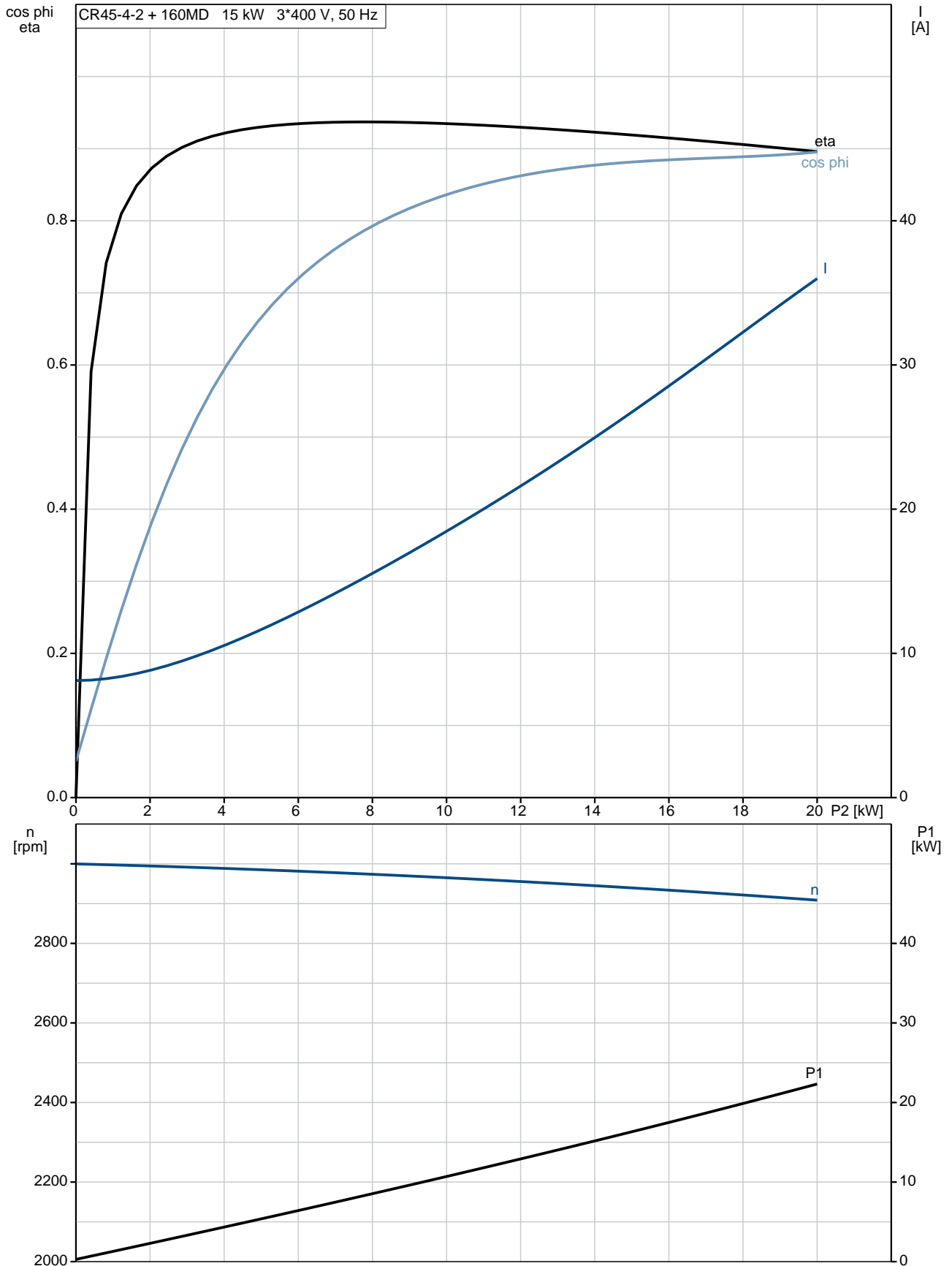
Phone:

Date:

17/02/2019

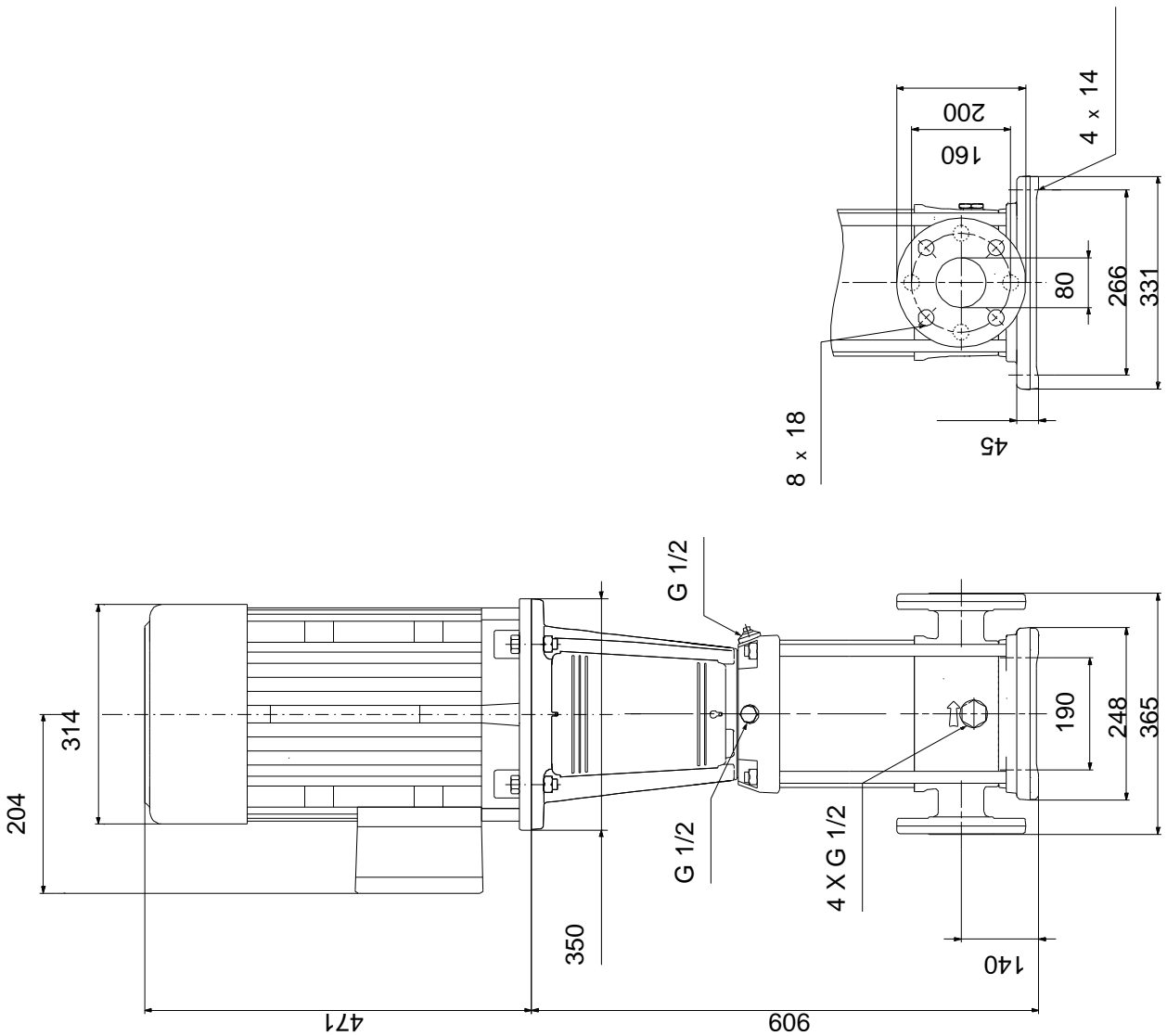
Description	Value
Rated current:	28,0-26,0/16,2-15,6 A
Starting current:	660-780 %
Cos phi - power factor:	0.89-0.87
Rated speed:	2930-2950 rpm
Efficiency:	IE3 91,9%
Motor efficiency at full load:	91.9-91.9 %
Motor efficiency at 3/4 load:	92.4 %
Motor efficiency at 1/2 load:	92.4 %
Number of poles:	2
Enclosure class (IEC 34-5):	55 Dust/Jetting
Insulation class (IEC 85):	F
Motor protec:	PTC
Motor No:	85U17526
<b>Controls:</b>	
Frequency converter:	NONE
<b>Others:</b>	
Minimum efficiency index, MEI $\eta_{min}$ :	0.70
Net weight:	179 kg
Gross weight:	212 kg
Shipping volume:	0.495 m <sup>3</sup>
Danish VVS No.:	385907042

## 96122802 CR 45-4-2 A-F-A-E-HQQE 50 Hz





**96122802 CR 45-4-2 A-F-A-E-HQQE 50 Hz**



Note! All units are in [mm] unless others are stated.  
 Disclaimer: This simplified dimensional drawing does not show all details.

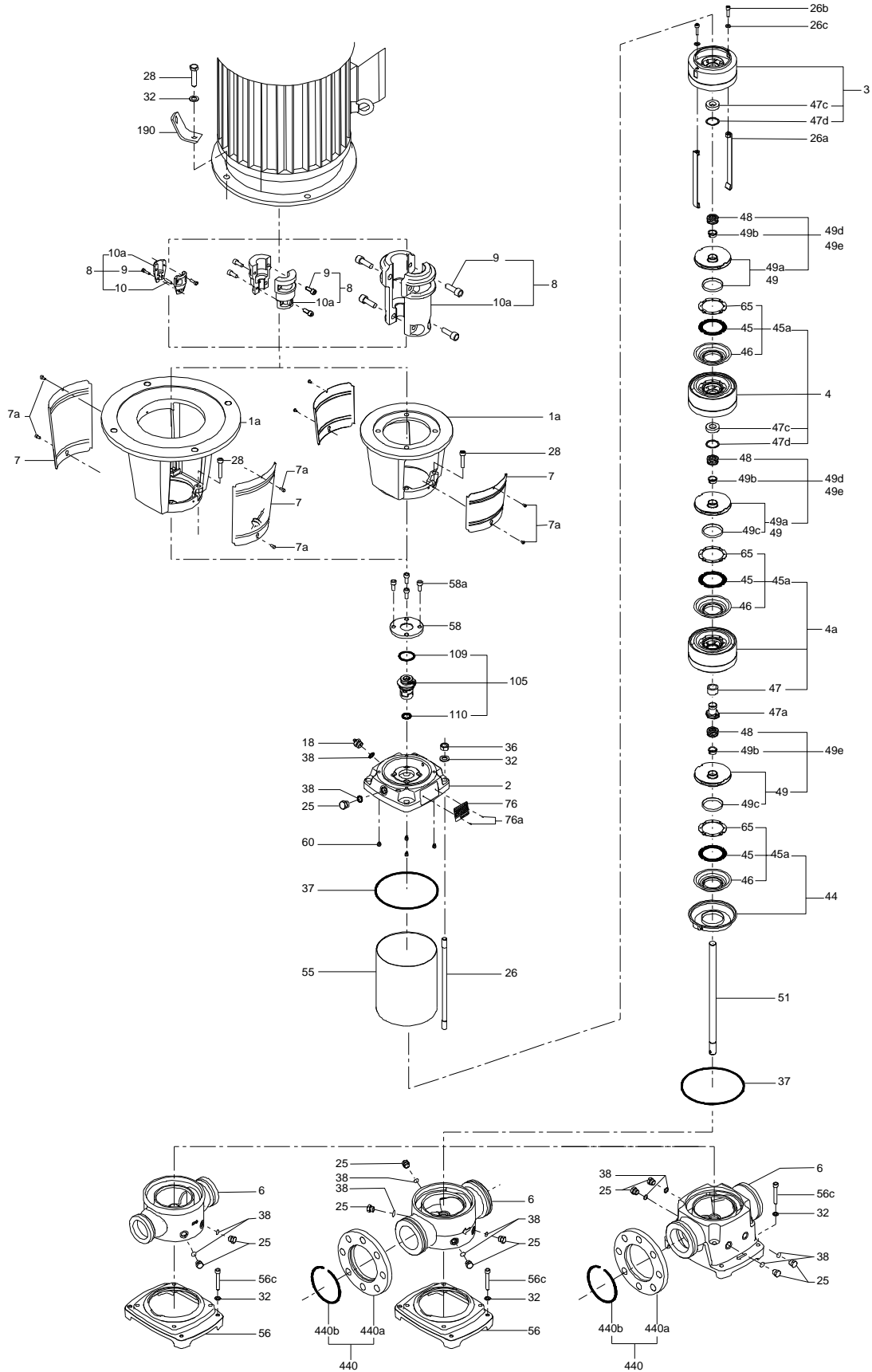
## 96122802 CR 45-4-2 A-F-A-E-HQQE 50 Hz



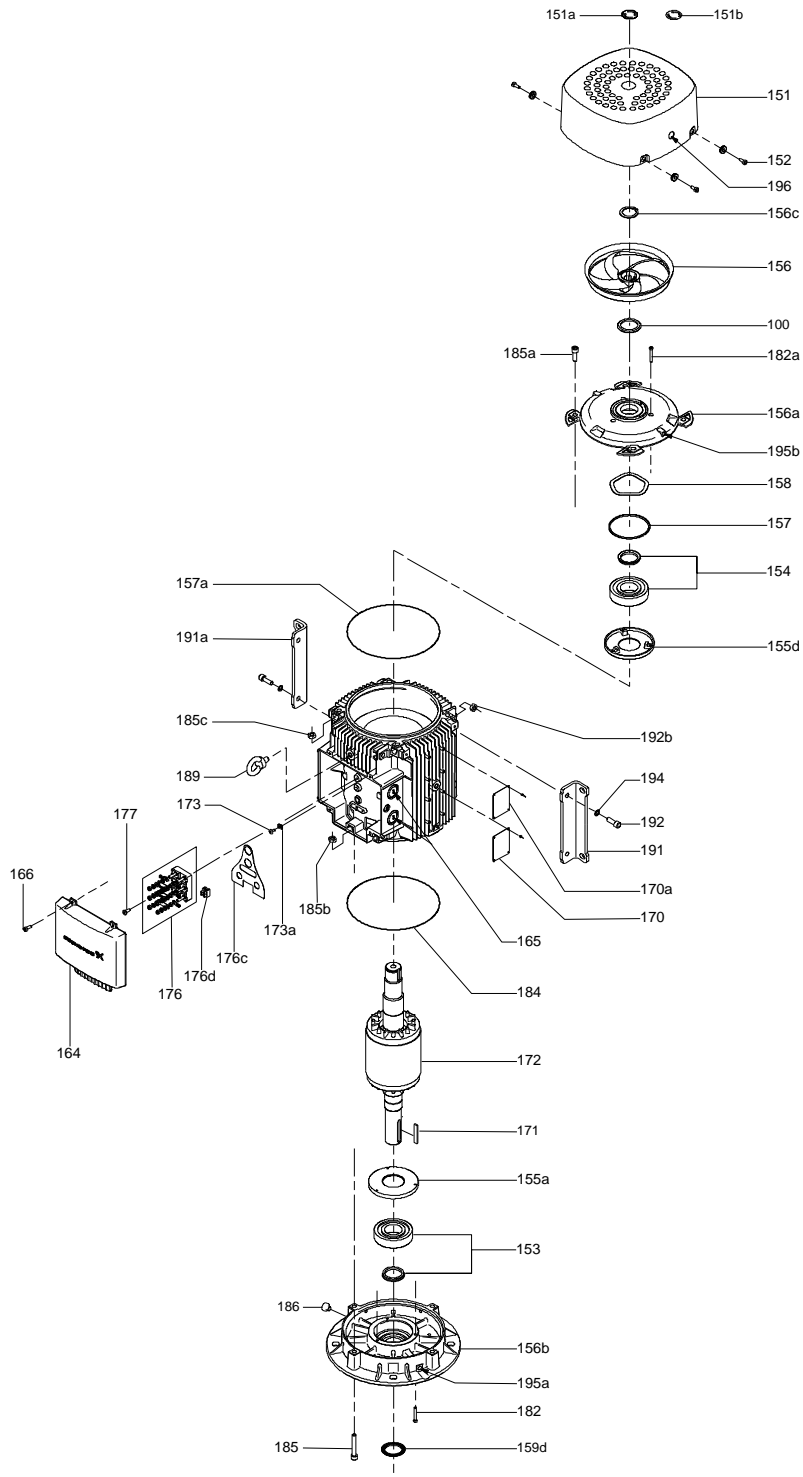
IEC TP211 THERMALLY PROTECTED WHEN THE THERMISTORS ARE  
CONNECTED TO AMPLIFIER RELAY FOR CONTROL OF MAIN SUPPLY  
THERMISTORS PTC ACCORDING TO DIN 44082

Note! All units are in [mm] unless others are stated.

(tm069487 for LACR model B standard)



## Exploded view



## Sectional drawing



**Spare parts CR 45-4-2, Product No. 96122802**  
**Valid from 3.3.2014 (1410)**

Pos	Description	Annotation	Classification Data	Part no.	Qty.	Unit
-	Base			96587694	1	pcs
6	Base				1	
- 80	Kit, chamber stack			96416229	1	pcs
- 80	Chamber stack				1	
- 3	Upper chamber cpl.					
	Guide cup					
	Guide cup					
	Cone					
	Guide vane					
	Chamber					
	Chamber					
47d	Lock ring					
47c	Bush					
- 4a	Intermediate chamber cpl.					
	Guide cup					
	Guide cup					
	Cone					
	Guide vane					
	Chamber					
	Chamber					
45a	Neck ring cpl.					
47	Bearing					
- 4	Intermediate chamber cpl.					
	Guide cup					
	Guide cup					
	Cone					
	Guide vane					
	Chamber					
	Chamber					
45a	Neck ring cpl.					
47d	Lock ring					
47c	Bush					
26c	Washer		Designation: DIN 125A			
			Thickness: 1,6			
26b	Hex socket head cap screw					
26a	Strap cpl.		Length (mm): 329			
			Thread: M8			
- 44	Suction interconnector cpl.					
	Suction interconnector					
45	Seal ring					
46	Neck ring					
65	Top f/neck ring					
- 47a	Bearing cpl.					
	Driver					
	Holder					
	Disc spring					
	Bearing ring					
- 49e	Impeller cpl.					
48	Nut					
49b	Split cone					
- 49	Impeller					
	Impeller hub					
49c	Wear ring					

Pos	Description	Annotation	Classification Data	Part no.	Qty.	Unit
- 49d	Impeller cpl.					
48	Nut					
49b	Split cone					
- 49a	Impeller, reduced diameter					
	Impeller hub					
49c	Wear ring					
51	Shaft					
-	Kit, chambers			98497485	1	pcs
- 4a	Intermediate chamber cpl.					1
	Guide cup					
	Guide cup					
	Cone					
	Guide vane					
	Chamber					
	Chamber					
45a	Neck ring cpl.					
47	Bearing					
- 47a	Bearing cpl.					1
	Driver					
	Holder					
	Disc spring					
	Bearing ring					
-	Kit, coupling			96416592	1	pcs
	Adjusting fork					1
- 8	Coupling cpl.		Dimension: 22/42			1
9	Hex socket head cap screw		Designation: DIN 912			
			Length (mm): 25			
			Thread: M10			
10a	Coupling half					
-	Kit, coupling guard			96505135	1	pcs
7a	Socket button head screw					4
7	Coupling guard					2
-	Kit, cover			98832448	1	pcs
58a	Hex socket head cap screw		Designation: DIN 912			4
			Length (mm): 25			
			Thread: M10			
58	Cover					1
-	Kit, gaskets			96416599	1	pcs
	Adjusting fork					1
37	O-ring					2
38	O-ring		Diameter: 16,3			2
			Material type: EPDM			
			Thickness: 2,4			
38	O-ring		Diameter: 16,3			4
			Material type: EPDM			
			Thickness: 2,4			
60	Spring					4
109	O-ring					1
110	O-ring		Diameter: 21,2			1
			Material type: EPDM			
			Thickness: 3,55			
-	Kit, impeller			98497488	1	pcs
48	Nut					1
48	Nut					1
49b	Split cone					1
- 49	Impeller					1
	Impeller hub					
49c	Wear ring					
-	Kit, Impeller, reduced diamete			98634014	1	pcs

Pos	Description	Annotation	Classification Data	Part no.	Qty.	Unit
48	Nut				1	
48	Nut				1	
49b	Split cone				1	
- 49a	Impeller, reduced diameter				1	
	Impeller hub					
49c	Wear ring					
-	Kit, plug			96505136	1	pcs
- 18	Air vent screw				1	
	Spindle					
	Plug					
25	Plug				4	
25	Plug				1	
38	O-ring		Diameter: 16,3 Material type: FKM Thickness: 2,4		2	
38	O-ring		Diameter: 16,3 Material type: FKM Thickness: 2,4		4	
38	O-ring		Diameter: 16,3 Material type: FKM Thickness: 2,4		6	
38	O-ring		Diameter: 16,3 Material type: EPDM Thickness: 2,4		2	
38	O-ring		Diameter: 16,3 Material type: EPDM Thickness: 2,4		4	
-	Kit, shaft seal HQQE			96525458	1	pcs
	Grinding device				1	
- 105	Shaft seal		Material type: HQQE		1	
	Adjusting fork					
109	O-ring					
110	O-ring		Diameter: 21,5 Material type: EPDM Thickness: 4,25			
-	Kit, wear parts			98497474	1	pcs
45	Seal ring				7	
47d	Lock ring				7	
47c	Bush				5	
49c	Wear ring				7	
65	Top f/neck ring				7	
-	Motor			85904134	1	pcs
-	Kit, bearing cpl.			96796676	1	
32b	Waved washer					
153	Angular-contact bearing					
154	Ball bearing					
157	O-ring					
159	V-ring					
-	Kit, bearing plate			96796664	1	
155.a	Bearing cover					
208a	Gasket					
208	Hex socket head cap screw		Designation: DIN912 Length (mm): 40 Thread: M5			
-	Kit, eyebolt			96796712	1	
189	Eyebolt					
-	Kit, fan			96796654	1	
156.c	Retaining ring					
156	Fan					



Pos	Description	Annotation	Classification Data	Part no.	Qty.	Unit
-	Kit, fan cover			96796647	1	
151	Fan cover					
152.a	Rubber bush					
152	Hex head cap screw					
196	Diaphragm					
-	Kit, flange			96796662	1	
156.b	Flange					
159.b	Seal ring					
185.b	Nut					
185	Hex socket head cap screw					
186	Drain plug					
195.a	Grease nipple					
-	Kit, gaskets			96798508	1	
184	O-ring		Diameter: 235			
-	Kit, lubrication nipple			96796671	1	
195.b	Grease nipple					
195.a	Grease nipple					
-	Kit, ND-end shield cpl.			96796669	1	
32b	Waved washer					
156.a	End shield NDE					
157	O-ring					
159	V-ring					
185.c	Nut					
185.a	Hex socket head cap screw					
195.b	Grease nipple					
-	Kit, shaft seal			96843459	1	
159.b	V-ring					
159	V-ring					
-	Kit, terminal board			96796657	1	
	Terminal connection					
	Washer					
36	Hex nut					
173	Torx Screw					
176.d	Terminal board					
176	Terminal board					
177	Torx Screw					
-	Kit, terminal box cover			96796659	1	
164	Terminal box cover					
273a	Pan head thread forming screw					
1a	Motor stool			98993921	1	pcs
2	Pump head			96547433	1	pcs
-	3 Upper chamber cpl.			98634042	1	pcs
47c	Bulk, Bush (10 pcs)			99321194	1	
+ 4a	Bulk, Intermediate chamber cpl. (5 pcs)			99262867	1	pcs
+ 4a	Intermediate chamber cpl.			99139113	1	pcs
- 4	Bulk, Intermediate chamber cpl. (5 pcs)			99458546	2	pcs
45a	Bulk, Neck ring cpl. (4 pcs)			98763585	1	
45a	Bulk, Neck ring cpl. (10 pcs)			96547397	1	
7a	Bulk, Socket button head screw (10 pcs)			96549696	4	pcs
7	Bulk, Coupling guard (10 pcs)			96603279	2	pcs
+ 8	Coupling cpl.		Dimension: 22/42	96587704	1	pcs
+ 18	Bulk, Air vent screw (5 pcs)			96547461	1	pcs
+ 18	Air vent screw			95061351	1	pcs
25	Bulk, Plug (10 pcs)			96536013	1	pcs
26c	Bulk, Washer (4 pcs)		Designation: DIN 125A	99262704	2	pcs
			Thickness: 1,6			
26c	Washer		Designation: DIN 125A	96586880	2	pcs
			Thickness: 1,6			

Pos	Description	Annotation	Classification Data	Part no.	Qty.	Unit
26b	Bulk, Hex socket head cap screw (10 pcs)			98931380	2	pcs
26a	Strap cpl.		Length (mm): 329	98983870	2	pcs
			Thread: M8			
26	Staybolt		Length (mm): 487	98976713	4	pcs
			Thread: M16			
28.a	Bulk, Hex head screw (20 pcs)			96620478	4	pcs
28	Bulk, Hex socket head cap screw (10 pcs)		Designation: DIN 912	96536147	4	pcs
			Length (mm): 50			
			Thread: M10			
32	Bulk, Washer (100 pcs)		Designation: DIN 125 A	98923051	8	pcs
			Internal diameter: 17			
			Outer diameter: 30			
			Thickness: 3			
36	Bulk, Hex nut (20 pcs)		Thread: M16	96620480	4	pcs
38	Bulk, O-ring (10 pcs)		Diameter: 16,3	99198815	2	pcs
			Material type: EPDM			
			Thickness: 2,4			
38	Bulk, O-ring (50 pcs)		Diameter: 16,3	99412727	2	pcs
			Material type: EPDM			
			Thickness: 2,4			
- 44	Suction interconnector cpl.			98634054	1	pcs
45	Bulk, Seal ring (10 pcs)			97911448	1	
45	Bulk, Seal ring (10 pcs)			96535952	1	
65	Bulk, Top f/neck ring (10 pcs)			96547390	1	
+ 47a	Bulk, Bearing cpl. (5 pcs)			99270649	1	pcs
+ 47a	Bulk, Bearing cpl. (10 pcs)			96535951	1	pcs
48	Bulk, Nut (3 pcs)			99262680	1	pcs
48	Bulk, Nut (10 pcs)			99262683	1	pcs
48	Bulk, Nut (10 pcs)			96536016	1	pcs
- 49e	Impeller cpl.			98394328	2	pcs
48	Bulk, Nut (3 pcs)			99262680	1	
48	Bulk, Nut (10 pcs)			99262683	1	
48	Bulk, Nut (10 pcs)			96536016	1	
49b	Bulk, Split cone (10 pcs)			96536010	1	
- 49	Bulk, Impeller (10 pcs)			96535946	1	
49c	Bulk, Wear ring (10 pcs)			96535949		
49b	Bulk, Split cone (10 pcs)			96536010	1	pcs
- 49a	Bulk, Impeller, reduced diameter (5 pcs)			96535954	1	pcs
49c	Bulk, Wear ring (10 pcs)			96535949	1	
55	Outer sleeve		Outer diameter: 216,0	98820342	1	pcs
			Length (mm): 343,5			
58	Cover			98893158	1	pcs
60	Bulk, Spring (20 pcs)			96536032	4	pcs
- 105	Bulk, Shaft seal (12 pcs)		Material type: HQQE	96984086	1	pcs
	Adjusting fork			96587896	1	
109	Bulk, O-ring (10 pcs)			96547586	1	
+ 105	Bulk, Shaft seal (12 pcs)		Material type: HQQE	96984070	1	pcs
440b	Bulk, Lock ring (4 pcs)			96535943	1	pcs