

Qty. Description

1 CR 3-21 A-A-A-E-HQQE



Note! Product picture may differ from actual product

Product No.: [96516604](#)

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 oval flanges with internal Rp threads.

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:

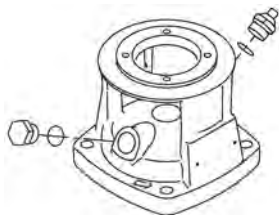
- 1) Alkaline-based cleaning.
 - 2) Zinc phosphating.
 - 3) Cathodic electro-deposition.
 - 4) Curing to a dry film thickness 18-22 my m.
- The colour code for the finished product is NCS 9000/RAL 9005.

Pump

A standard split coupling connects the pump and motor shaft. It is enclosed in the pump head/motor stool by means of two coupling guards.



The pump head, pump head cover and flange for motor mounting is made in one piece. 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:

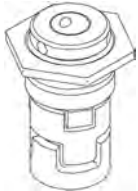
- Rotating seal ring material: silicon carbide (SiC)
- Stationary seat material: silicon carbide (SiC)

Qty. Description

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)

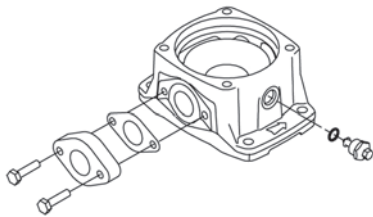
EPDM has excellent resistance to hot water. EPDM is not suitable for mineral oils.



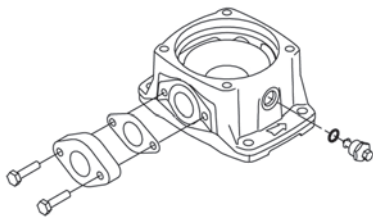
The shaft seal is screwed into the pump head.

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. The oval flanges are bolted to the base. The outlet side of the base has a combined drain plug and bypass valve. The pump is secured to the foundation by four bolts through the base plate.



The base is made of cast iron. The oval flanges are bolted to the base. The outlet side of the base has a combined drain plug and bypass valve. The pump is secured to the foundation by four bolts through the base plate.



Motor

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

Motor-mounting designation in accordance with IEC 60034-7: IM B 14 (Code I) / IM 3601 (Code II).

Electrical tolerances comply with IEC 60034.

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

The motor does not incorporate motor protection and must be connected to a motor-protective circuit breaker which can be manually reset. The motor-protective circuit breaker must be set according to the rated current of the motor (I₁/1).

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.

Technical data

Controls:

Frequency converter: NONE

| Qty. | Description |
|------|---|
| | <p>Liquid: Pumped liquid: Water Liquid temperature range: -20 .. 120 °C Liquid temperature during operation: 20 °C Density: 998.2 kg/m³</p> <p>Technical: Pump speed on which pump data are based: 2899 rpm Rated flow: 3 m³/h Rated head: 103.6 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>Materials: Base: Cast iron EN 1561 EN-GJL-200 ASTM A48-25B Impeller: Stainless steel EN 1.4301 AISI 304 Bearing: SIC</p> <p>Installation: Maximum ambient temperature: 60 °C Maximum operating pressure: 16 bar Max pressure at stated temp: 16 bar / 120 °C 16 bar / -20 °C Type of connection: Oval / Rp Size of inlet connection: 1 inch Size of outlet connection: 1 inch Pressure rating for pipe connection: PN 16 Flange size for motor: FT115</p> <p>Electrical data: Motor standard: IEC Motor type: 90LC IE Efficiency class: IE3 Rated power - P2: 2.2 kW Power (P2) required by pump: 2.2 kW Mains frequency: 50 Hz Rated voltage: 3 x 220-240D/380-415Y V Rated current: 7.70/4.45 A Starting current: 850-950 % Cos phi - power factor: 0.89-0.87 Rated speed: 2890-2910 rpm Efficiency: IE3 85,9% Motor efficiency at full load: 85.9 % Motor efficiency at 3/4 load: 86.8 % Motor efficiency at 1/2 load: 86.0 % Number of poles: 2 Enclosure class (IEC 34-5): 55 Dust/Jetting Insulation class (IEC 85): F</p> <p>Others: Minimum efficiency index, MEI $\hat{\alpha}\%$: 0.70 Net weight: 41.6 kg</p> |



Company name:

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Phone:

Date:

15/02/2019

| Qty. | Description |
|------|-------------|
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| | |
|--|--------------------------------------|
| | Gross weight: 44.5 kg |
| | Shipping volume: 0.13 m ³ |
| | Danish VVS No.: 385901021 |



Company name:

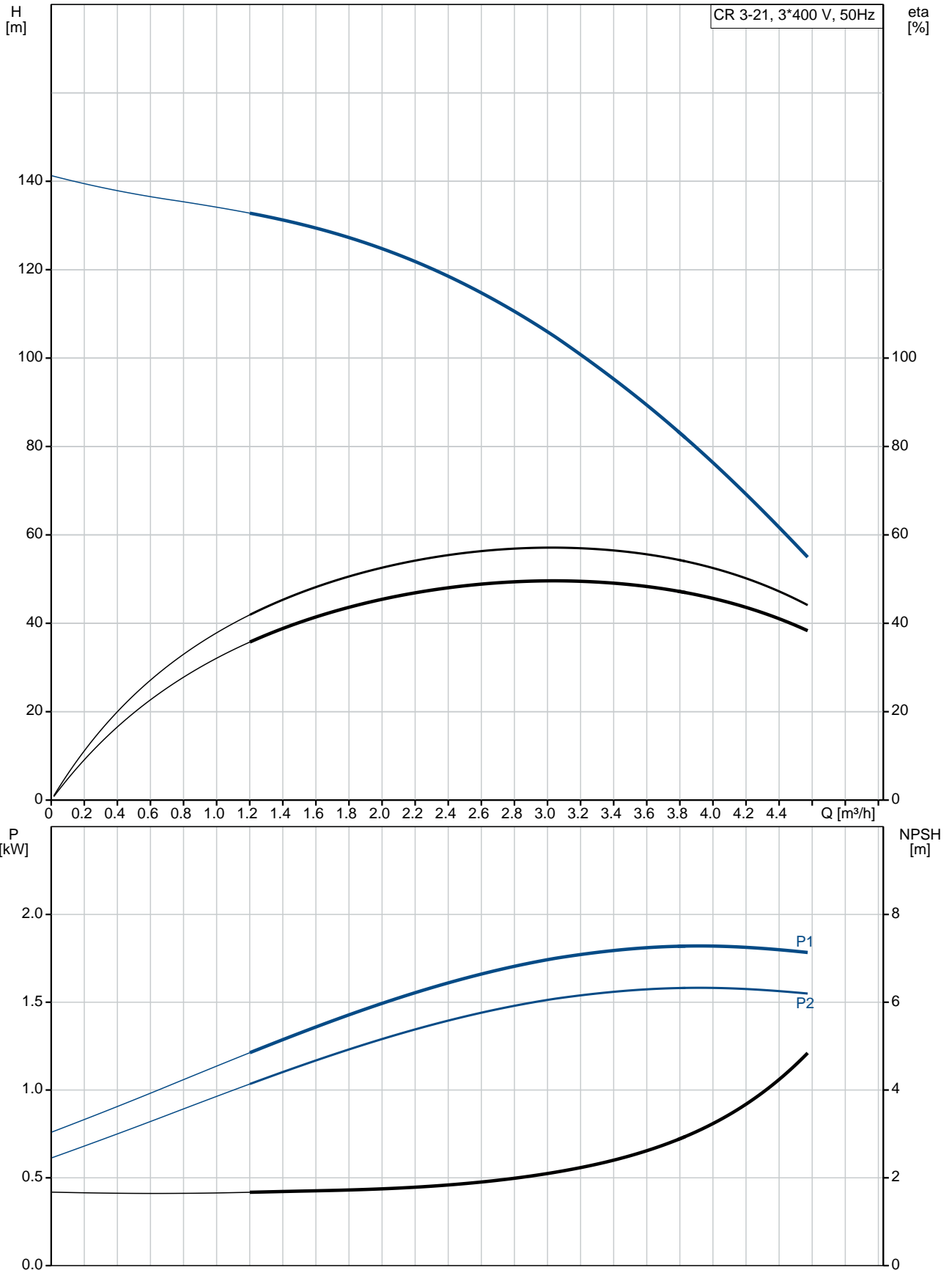
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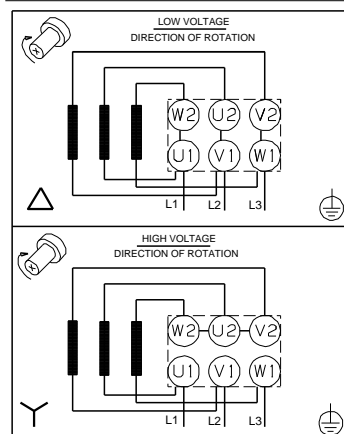
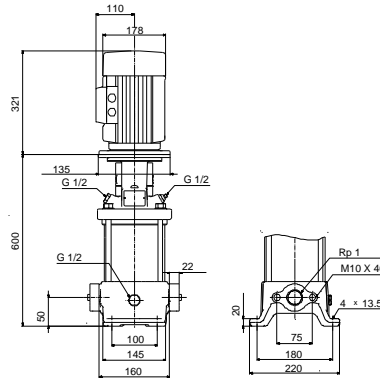
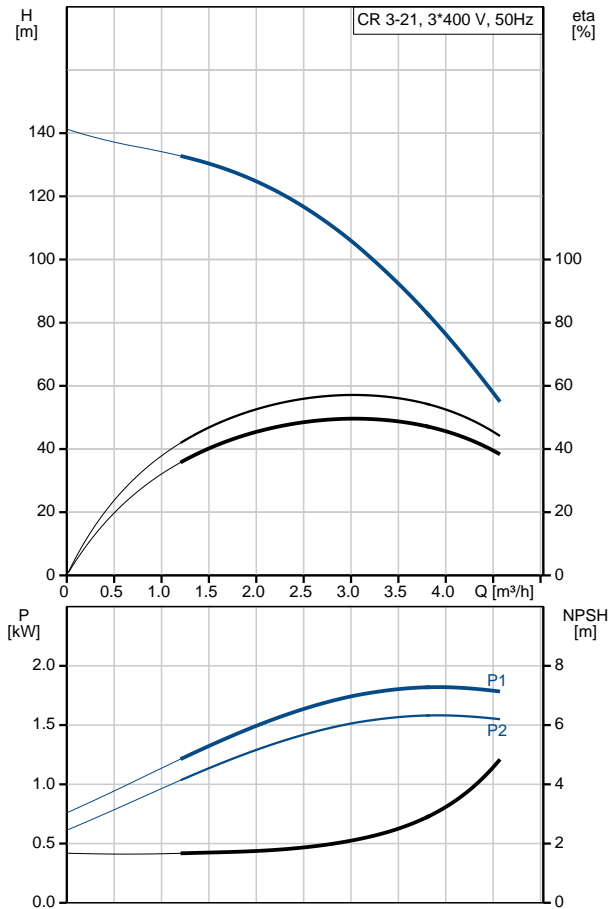
Date:

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96516604 CR 3-21 A-A-A-E-HQQE 50 Hz



| Description | Value |
|--|---|
| General information: | |
| Product name: | CR 3-21 A-A-A-E-HQQE |
| Product No: | 96516604 |
| EAN number: | 5700396746210 |
| Technical: | |
| Pump speed on which pump data are based: | 2899 rpm |
| Rated flow: | 3 m³/h |
| Rated head: | 103.6 m |
| Head max: | 139.9 m |
| Stages: | 21 |
| Impellers: | 21 |
| Number of reduced-diameter impellers: | 0 |
| 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: | A |
| Materials: | |
| Base: | Cast iron EN 1561 EN-GJL-200 ASTM A48-25B |
| Impeller: | Stainless steel EN 1.4301 AISI 304 |
| Material code: | A |
| Code for rubber: | E |
| Bearing: | SIC |
| Installation: | |
| Maximum ambient temperature: | 60 °C |
| Maximum operating pressure: | 16 bar |
| Max pressure at stated temp: | 16 bar / 120 °C 16 bar / -20 °C |
| Type of connection: | Oval / Rp |
| Size of inlet connection: | 1 inch |
| Size of outlet connection: | 1 inch |
| Pressure rating for pipe connection: | PN 16 |
| Flange size for motor: | FT115 |
| Connect code: | A |
| Liquid: | |
| Pumped liquid: | Water |
| Liquid temperature range: | -20 .. 120 °C |
| Liquid temperature during operation: | 20 °C |
| Density: | 998.2 kg/m³ |
| Electrical data: | |
| Motor standard: | IEC |
| Motor type: | 90LC |
| IE Efficiency class: | IE3 |
| Rated power - P2: | 2.2 kW |
| Power (P2) required by pump: | 2.2 kW |
| Mains frequency: | 50 Hz |
| Rated voltage: | 3 x 220-240D/380-415Y V |
| Rated current: | 7.70/4.45 A |
| Starting current: | 850-950 % |





Company name:

Created by:

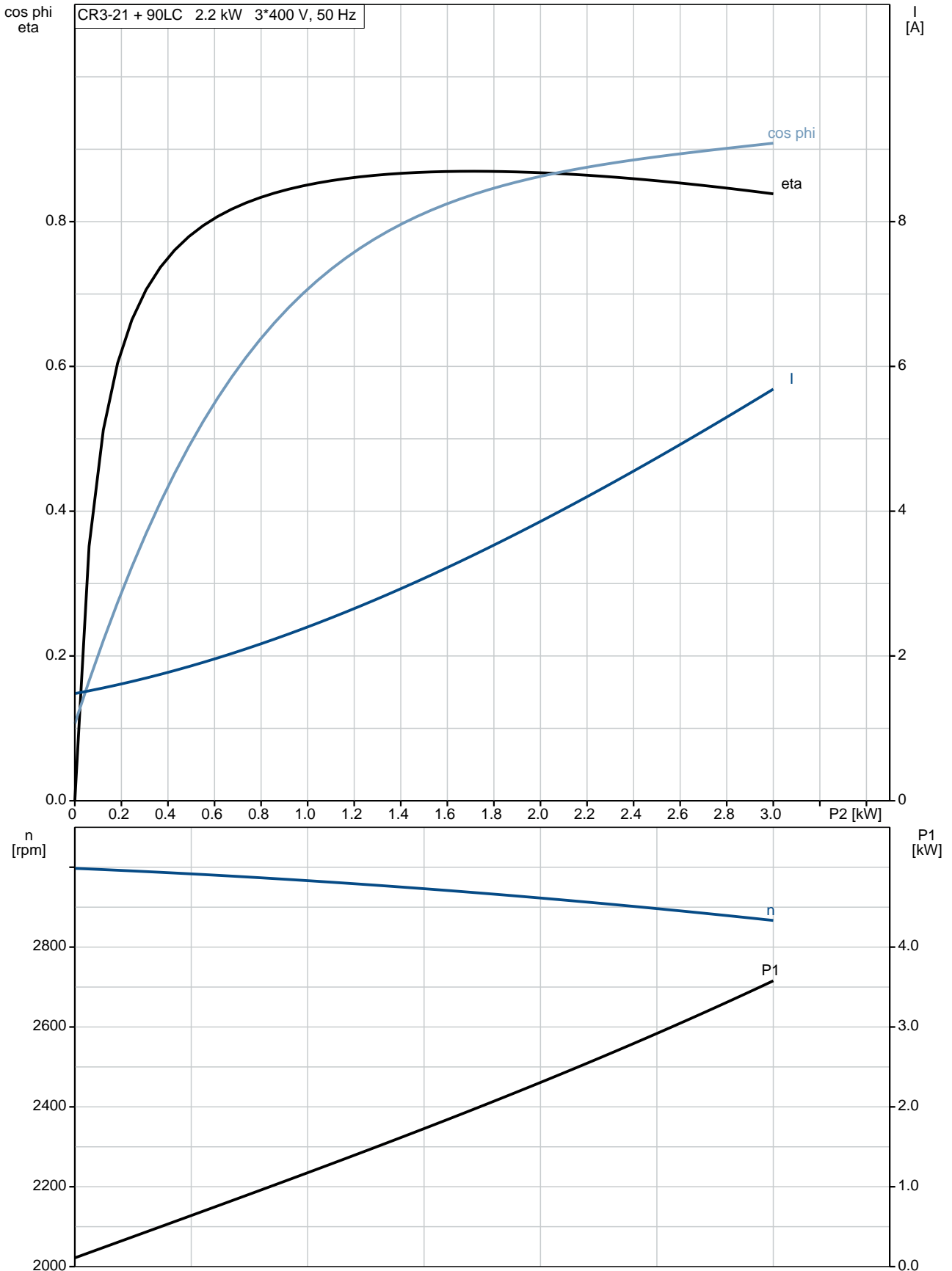
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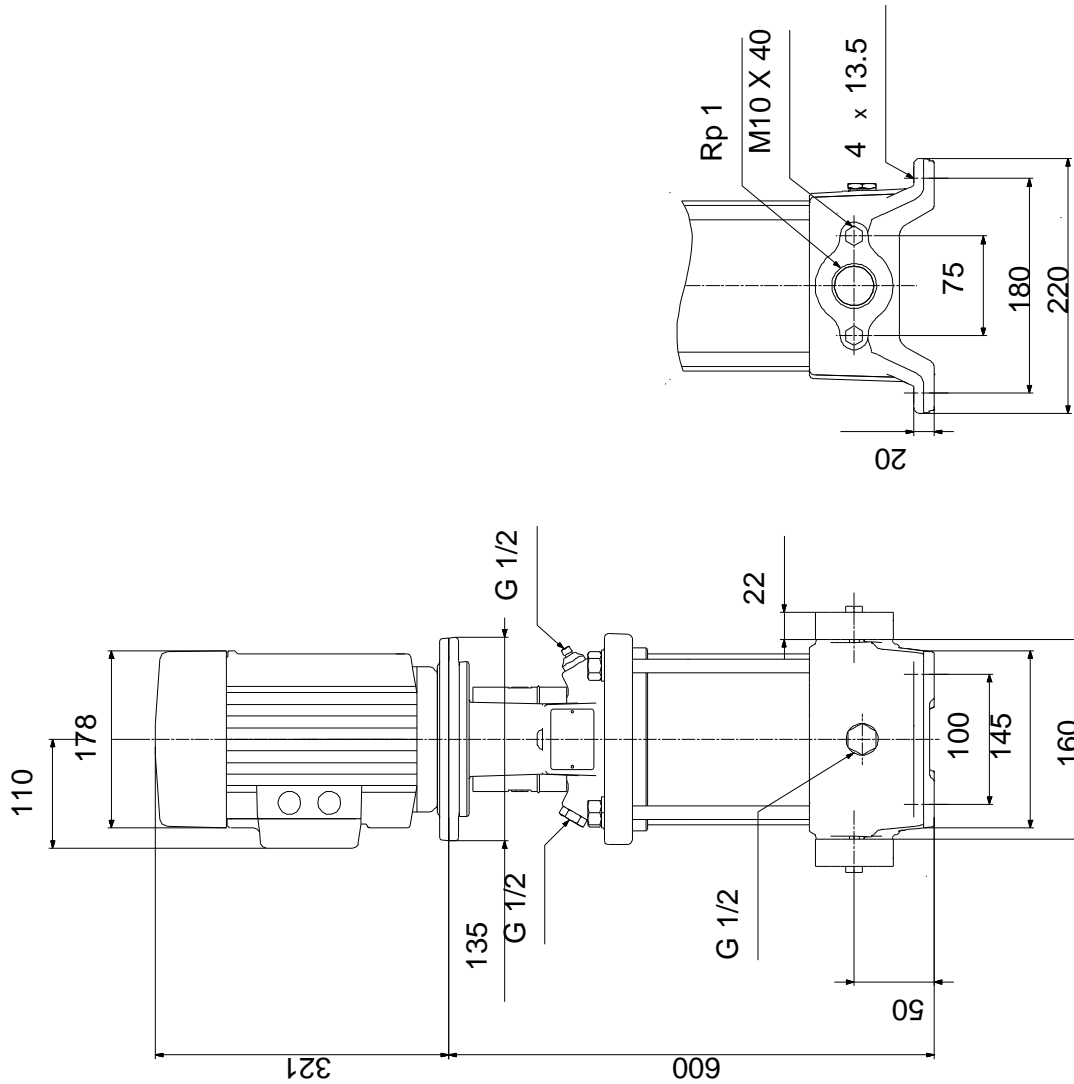
15/02/2019

| Description | Value |
|----------------------------------|---------------------|
| Cos phi - power factor: | 0.89-0.87 |
| Rated speed: | 2890-2910 rpm |
| Efficiency: | IE3 85,9% |
| Motor efficiency at full load: | 85.9 % |
| Motor efficiency at 3/4 load: | 86.8 % |
| Motor efficiency at 1/2 load: | 86.0 % |
| Number of poles: | 2 |
| Enclosure class (IEC 34-5): | 55 Dust/Jetting |
| Insulation class (IEC 85): | F |
| Motor protec: | NONE |
| Motor No: | 85U05908 |
| Controls: | |
| Frequency converter: | NONE |
| Others: | |
| Minimum efficiency index, MEI %: | 0.70 |
| Net weight: | 41.6 kg |
| Gross weight: | 44.5 kg |
| Shipping volume: | 0.13 m ³ |
| Danish VVS No.: | 385901021 |

96516604 CR 3-21 A-A-A-E-HQQE 50 Hz

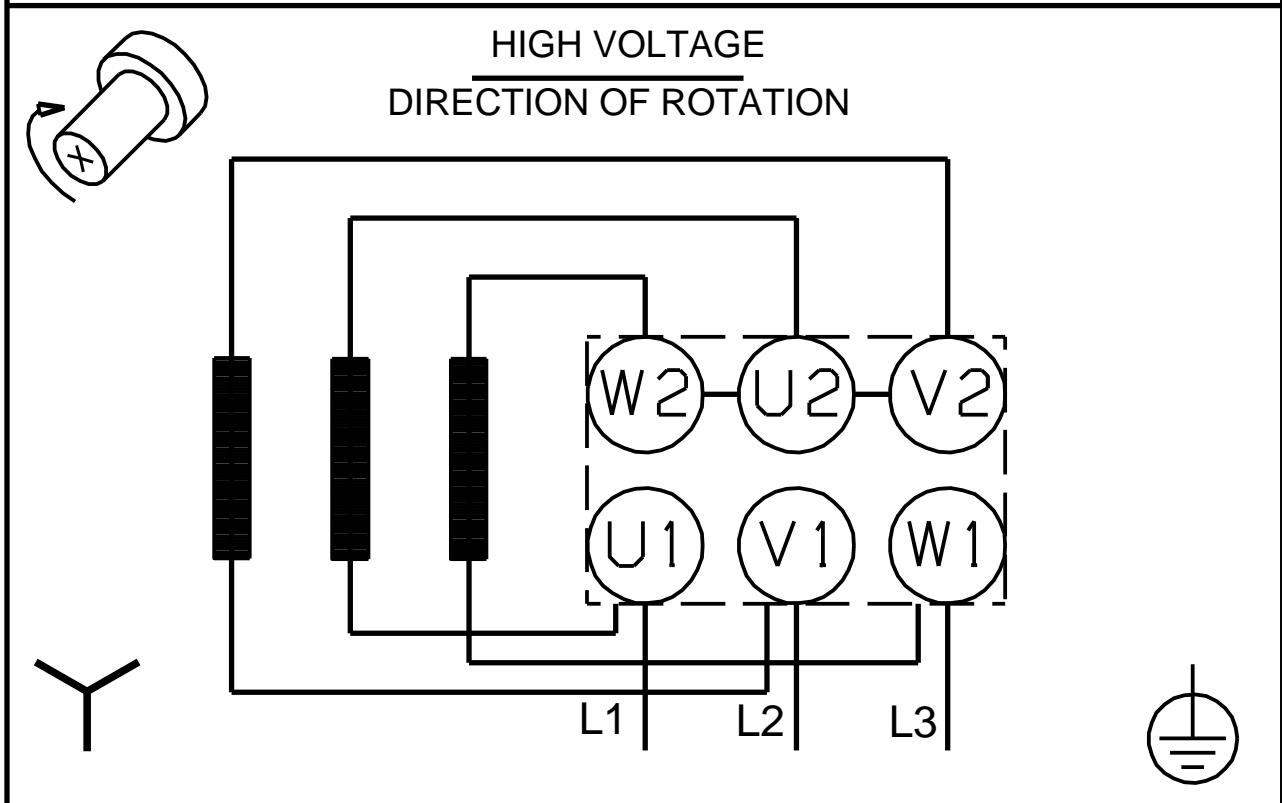
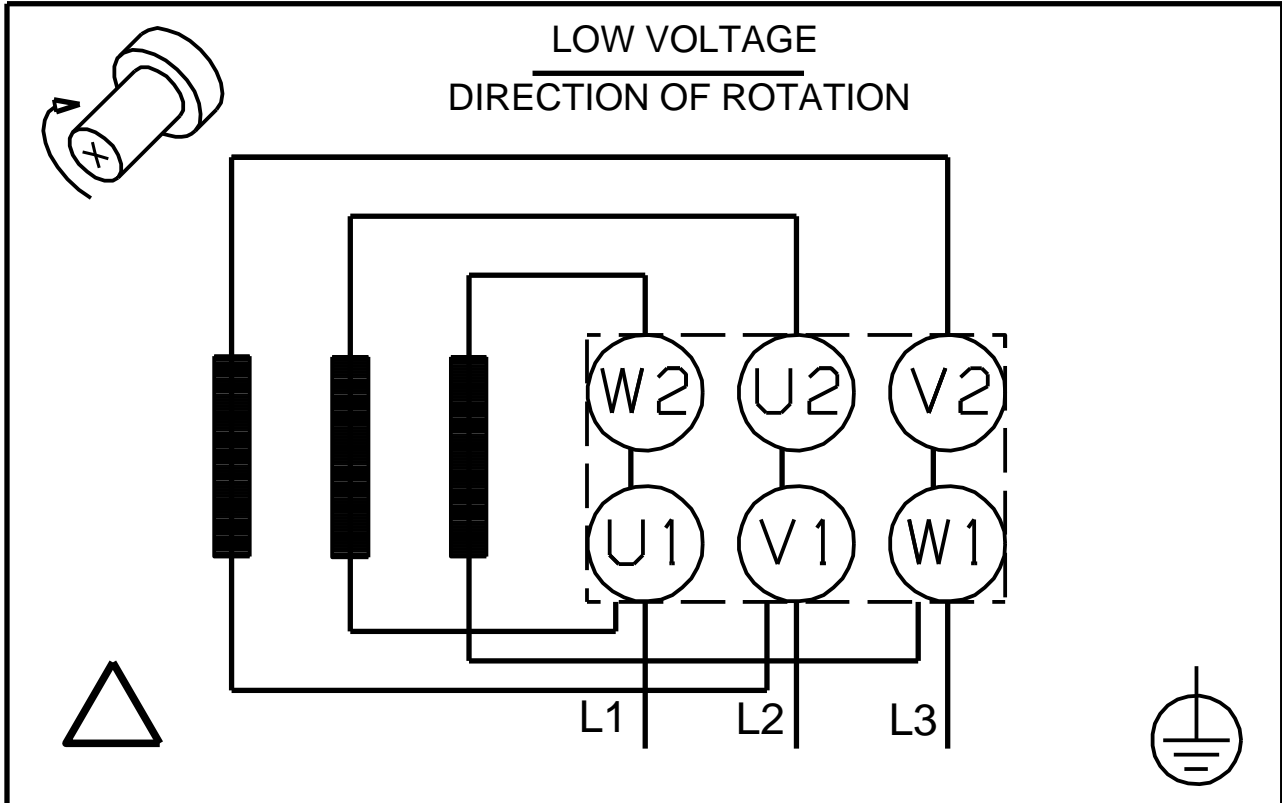


96516604 CR 3-21 A-A-A-E-HQQE 50 Hz



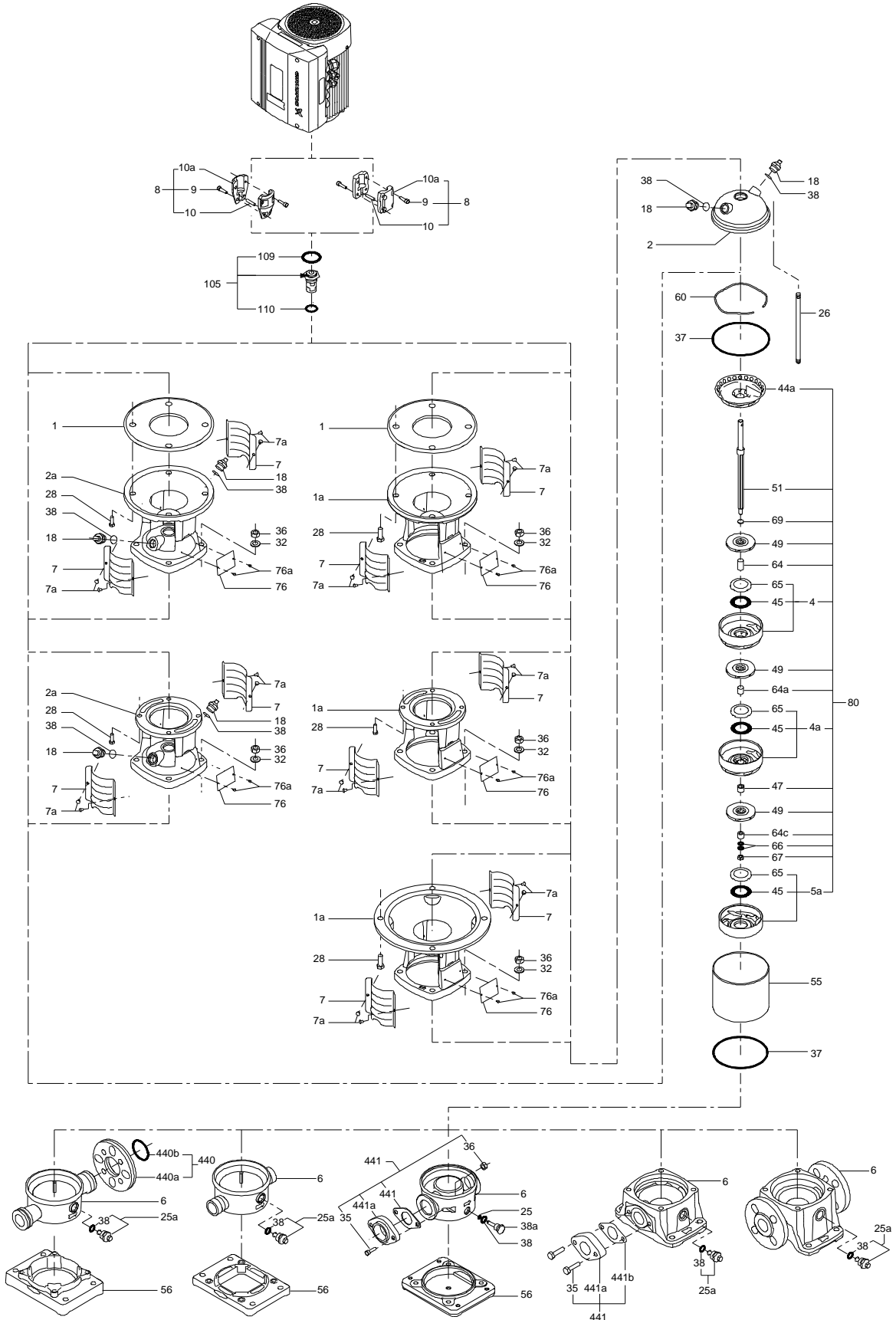
Note! All units are in [mm] unless others are stated.
Disclaimer: This simplified dimensional drawing does not show all details.

96516604 CR 3-21 A-A-A-E-HQQE 50 Hz

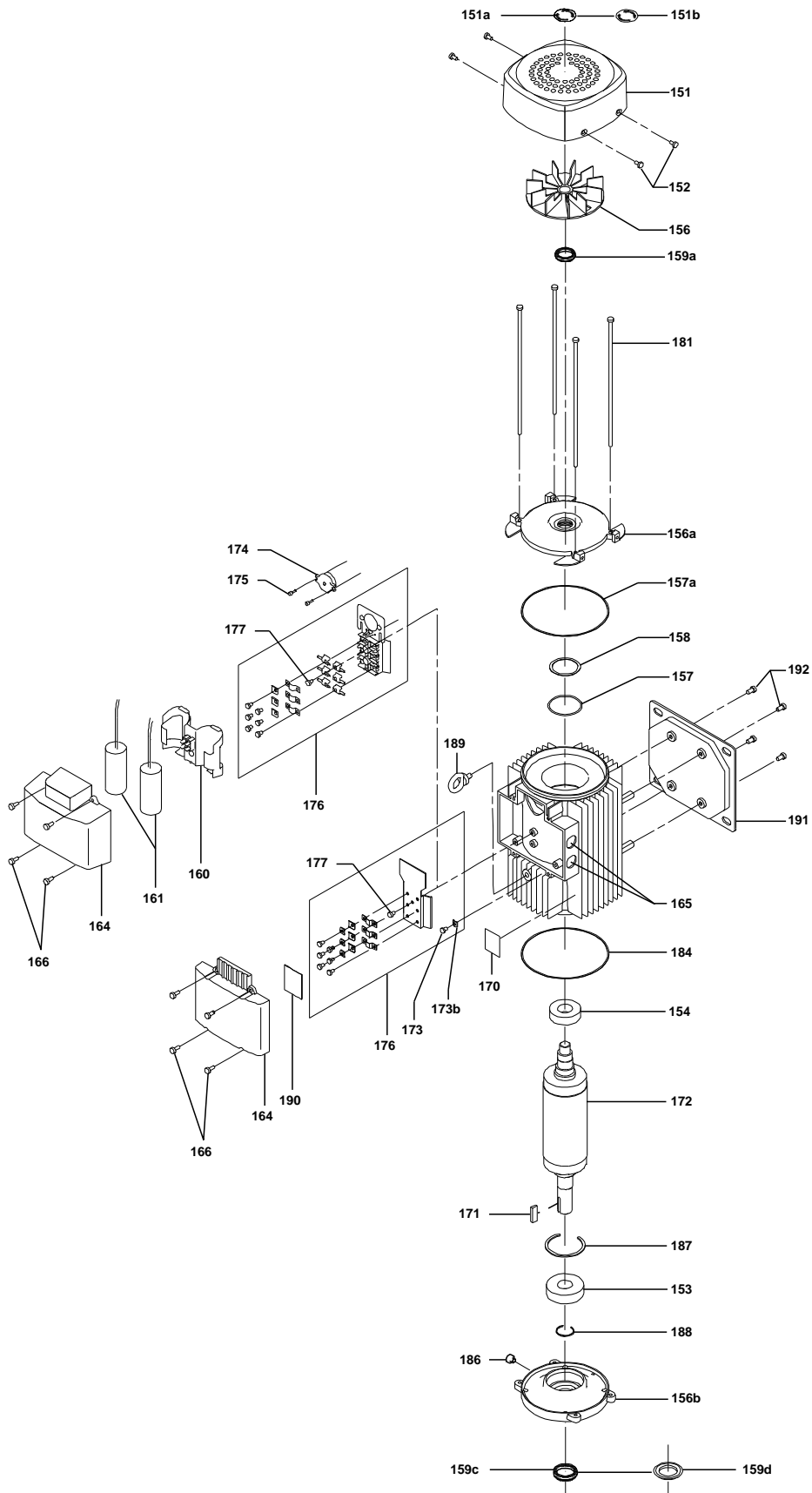


Note! All units are in [mm] unless others are stated.

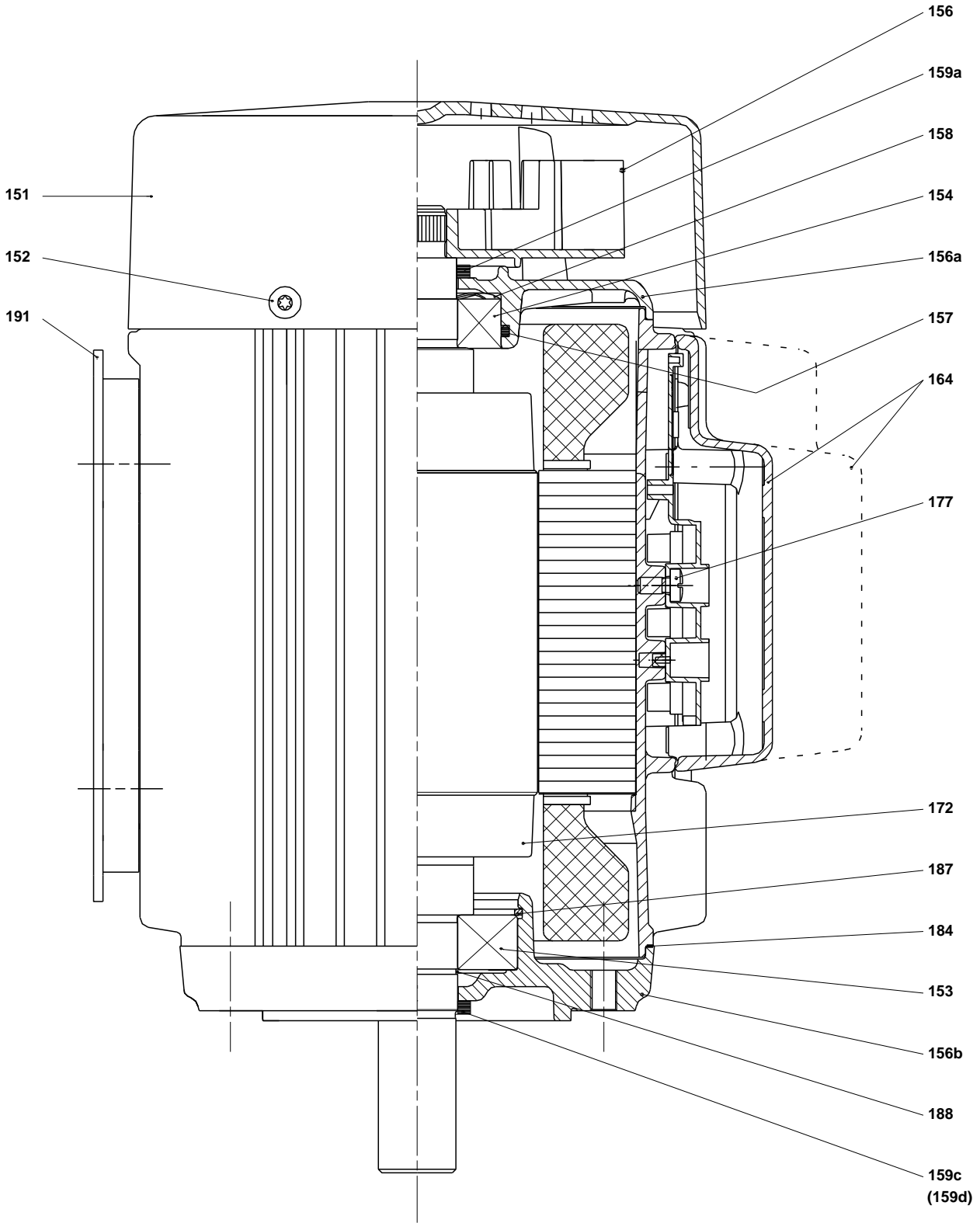
(TM069451 for SMCR standard)



(tm029184 0505)



(tm029178 2004)



**Spare parts CR 3-21, Product No. 96516604
Valid from 1.1.2011 (1152)**

| Pos | Description | Annotation | Classification Data | Part no. | Qty. | Unit |
|-------|---------------------------|------------|--|----------|------|------|
| - 80 | Kit, chamber stack | | Bearing type: SILICON CARBIDE | 96453544 | 1 | pcs |
| - 4a | Chamber w. bearing cpl. | | | | 3 | |
| | Vane | | | | | |
| | Intermediate chamber | | | | | |
| | Retainer for bearing | | | | | |
| | Guide vane | | | | | |
| 45 | Neck ring | | | | | |
| 47 | Bearing bush | | | | | |
| 65 | Retainer | | | | | |
| 65 | Retainer | | | | | |
| - 4 | Chamber cpl. | | | | 17 | |
| | Vane | | | | | |
| | Intermediate chamber | | | | | |
| | Plate | | | | | |
| | Guide vane | | | | | |
| 45 | Neck ring | | | | | |
| 65 | Retainer | | | | | |
| 65 | Retainer | | | | | |
| - 5a | Chamber cpl. | | | | 1 | |
| | Vane | | | | | |
| | Intermediate chamber | | | | | |
| 45 | Neck ring | | | | | |
| 65 | Retainer | | | | | |
| 65 | Retainer | | | | | |
| - 44a | Guide vane cpl. | | | | 1 | |
| | Plate | | | | | |
| | Guide vane | | | | | |
| 50 | Top plate | | | | | |
| 47 | Bearing ring, rotating | | | | 3 | |
| 49 | Impeller cpl. | | | | 21 | |
| 51 | Shaft, spline, cpl. | | | | 1 | |
| 64d | Spacing pipe | | Internal diameter: 12,85 Outer diameter: 15,85 Length (mm): 4,50 | | 3 | |
| 64c | Clamp, splined | | Internal diameter: 8,5 Outer diameter: 15 | | 1 | |
| 64a | Spacing pipe | | | | 17 | |
| 66 | Wedge lock washer | | | | 1 | |
| 67 | Lock nut | | Thread: M8 | | 1 | |
| - | Kit, coupling | | | 00415062 | 1 | pcs |
| 9 | Hex socket head cap screw | | Designation: DIN 912 Length (mm): 25 Thread: M8 | | 4 | |
| 10a | Coupling half | | | | 2 | |
| 10 | Shaft pin | | Diameter: 5 Length (mm): 26 | | 1 | |
| - | Kit, coupling guard | | | 96505131 | 1 | pcs |
| 7.a | Combi Slot Torx screw | | | | 4 | |
| 7 | Coupling guard | | | | 2 | |
| - | Kit, gaskets | | | 96455090 | 1 | pcs |
| 37 | O-ring | | | | 2 | |
| 38 | O-ring | | Diameter: 16,3 Material type: EPDM | | 1 | |

| Pos | Description | Annotation | Classification Data | Part no. | Qty. | Unit |
|-------|-------------------------|------------|--------------------------------|----------|------|------|
| | | | Thickness: 2,4 | | | |
| 38 | O-ring | | Diameter: 16,3 | | 2 | |
| | | | Material type: EPDM | | | |
| | | | Thickness: 2,4 | | | |
| 109 | O-ring | | Diameter: 22,00 | | 1 | |
| | | | Material type: EPDM | | | |
| | | | Thickness: 2,75 | | | |
| - | Kit, plug | | | 96505133 | 1 | pcs |
| - 18 | Air vent screw | | | | | 1 |
| | Spindle | | | | | |
| | Plug | | | | | |
| 23b | Spindle | | | | | 1 |
| 25 | Plug | | | | | 1 |
| 25 | Plug | | | | | 1 |
| 38 | O-ring | | Diameter: 16,3 | | | 1 |
| | | | Material type: FKM | | | |
| | | | Thickness: 2,4 | | | |
| 38 | O-ring | | Diameter: 16,3 | | | 2 |
| | | | Material type: FKM | | | |
| | | | Thickness: 2,4 | | | |
| 38 | O-ring | | Diameter: 16,3 | | | 1 |
| | | | Material type: EPDM | | | |
| | | | Thickness: 2,4 | | | |
| 38 | O-ring | | Diameter: 16,3 | | | 2 |
| | | | Material type: EPDM | | | |
| | | | Thickness: 2,4 | | | |
| - | Kit, shaft seal HQQE | | | 96455086 | 1 | pcs |
| + 105 | Shaft seal | | Material type: HQQE | | | 1 |
| - | Kit, wear parts | | Material type: SILICON CARBIDE | 96455093 | 1 | pcs |
| - 4a | Chamber w. bearing cpl. | | | | | 3 |
| 4a | Intermediate chamber | | | | | |
| 45 | Neck ring | | | | | |
| 65 | Neck ring retainer | | | | | |
| 45 | Neck ring | | | | | 24 |
| 47 | Bearing ring, rotating | | | | | 3 |
| 64d | Spacing pipe | | Internal diameter: 12,85 | | | 3 |
| | | | Outer diameter: 15,85 | | | |
| | | | Length (mm): 4,50 | | | |
| 64c | Clamp, splined | | Internal diameter: 8,5 | | | 1 |
| | | | Outer diameter: 15 | | | |
| 65 | Neck ring retainer | | | | | 24 |
| 66 | Wedge lock washer | | | | | 1 |
| 67 | Lock nut | | Thread: M8 | | | 1 |
| 441b | Gasket | | | | | 2 |
| - | Motor | | | 85903722 | 1 | pcs |
| - | Kit, bearing cpl. | | | 96279794 | 1 | |
| 111 | Ball bearing | | | | | |
| 111 | Ball bearing | | | | | |
| 157 | O-ring | | Diameter: 52 | | | |
| | | | Material type: NBR | | | |
| | | | Thickness: 3 | | | |
| 158 | Waved washer | | | | | |
| 187 | Retaining ring | | | | | |
| 188 | Retaining ring | | | | | |
| - | Kit, end shield | | | 96279789 | 1 | |
| 156a | End shield | | | | | |
| 157a | Gasket | | Internal diameter: 141,2 | | | |
| | | | Outer diameter: 145,5 | | | |
| | | | Thickness: 0,2 | | | |

| Pos | Description | Annotation | Classification Data | Part no. | Qty. | Unit |
|-------|---------------------------------------|------------|-----------------------------|----------|------|------|
| 157 | O-ring | | Diameter: 52 | | | |
| | | | Material type: NBR | | | |
| | | | Thickness: 3 | | | |
| 158 | Waved washer | | | | | |
| 159a | Seal ring | | | | | |
| - | Kit, fan | | | 96279757 | 1 | |
| 156 | Fan | | | | | |
| 159a | Seal ring | | | | | |
| - | Kit, fan cover | | | 96279755 | 1 | |
| 151 | Fan cover | | | | | |
| 152 | Pan head thread forming screw | | | | | |
| - | Kit, flange | | | 96279777 | 1 | |
| 156b | Flange | | | | | |
| 159.c | Seal ring | | | | | |
| 184 | Gasket | | Internal diameter: 141,2 | | | |
| | | | Outer diameter: 145,5 | | | |
| | | | Thickness: 0,2 | | | |
| 186 | Drain plug | | | | | |
| - | Kit, retaining ring | | | 96279798 | 1 | |
| 187 | Retaining ring | | | | | |
| 188 | Retaining ring | | | | | |
| - | Kit, shaft seal | | | 96279761 | 1 | |
| 159c | Seal ring | | | | | |
| 159a | Seal ring | | | | | |
| - | Kit, staybolts | | | 96279792 | 1 | |
| 181 | Pan head staybolt | | | | | |
| - | Kit, terminal board | | | 96279769 | 1 | |
| 173a | Base | | | | | |
| 173 | Pan head thread forming screw | | Designation: COMBI TORX T25 | | | |
| 176 | Slot cheese head screw | | Designation: COMBI TORX T25 | | | |
| | | | Length (mm): 10 | | | |
| | | | Thread: M5 | | | |
| 176 | Terminal | | | | | |
| 176 | Connecting piece | | | | | |
| 176 | Wire clamp | | | | | |
| 176 | Terminal board | | | | | |
| 177 | Pan head screw | | | | | |
| - | Kit, terminal box | | | 96279771 | 1 | |
| 164 | Terminal box cover w/gasket | | | | | |
| 166 | Pan head thread forming screw | | | | | |
| + 4a | Bulk, Chamber w. bearing cpl. (3 pcs) | | | 98371208 | 3 | pcs |
| + 4a | Bulk, Chamber w. bearing cpl. (5 pcs) | | | 97690601 | 3 | pcs |
| + 4a | Bulk, Chamber w. bearing cpl. (5 pcs) | | | 97690590 | 3 | pcs |
| + 4a | Chamber w. bearing cpl. | | | 98371207 | 3 | pcs |
| - 4 | Bulk, Chamber cpl. (5 pcs) | | | 97690020 | 17 | pcs |
| 45 | Bulk, Neck ring (24 pcs) | | | 96536194 | 1 | |
| 65 | Bulk, Retainer (24 pcs) | | | 98270018 | 1 | |
| + 4 | Bulk, Chamber cpl. (10 pcs) | | | 96547662 | 17 | pcs |
| + 4 | Chamber cpl. | | | 98371206 | 17 | pcs |
| + 5a | Bulk, Chamber cpl. (10 pcs) | | | 98371205 | 1 | pcs |
| + 5a | Chamber cpl. | | | 96588148 | 1 | pcs |
| 6 | Base | | | 96588138 | 1 | pcs |
| 10 | Bulk, Shaft pin (10 pcs) | | Diameter: 5 | 96536473 | 1 | pcs |
| | | | Length (mm): 26 | | | |
| - 25a | Drain plug w/bypass valve | | | 96588242 | 1 | pcs |
| 38 | Bulk, O-ring (10 pcs) | | Diameter: 16,3 | 99198815 | 1 | |
| | | | Material type: EPDM | | | |
| | | | Thickness: 2,4 | | | |



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|--------|---------------------------------------|------------|---|----------|------|------|
| 38 | Bulk, O-ring (50 pcs) | | Diameter: 16,3 Material type: EPDM Thickness: 2,4 | 99412727 | 1 | |
| 26 | Staybolt | | Length (mm): 400 Thread: M12 | 98986331 | 4 | pcs |
| 36 | Bulk, Nut (20 pcs) | | Thread: M12 | 96620479 | 4 | pcs |
| 37 | Bulk, O-ring (24 pcs) | | | 96547656 | 2 | pcs |
| 38 | Bulk, O-ring (10 pcs) | | Diameter: 16,3 Material type: EPDM Thickness: 2,4 | 99198815 | 2 | pcs |
| 38 | Bulk, O-ring (50 pcs) | | Diameter: 16,3 Material type: EPDM Thickness: 2,4 | 99412727 | 2 | pcs |
| + 44a | Bulk, Guide vane cpl. (5 pcs) | | | 96547659 | 1 | pcs |
| 47 | Bulk, Bearing ring, rotating (10 pcs) | | | 97905743 | 3 | pcs |
| 47 | Bearing ring, rotating | | | 96547649 | 3 | pcs |
| 49 | Bulk, Impeller cpl. (5 pcs) | | | 98426771 | 21 | pcs |
| 49 | Bulk, Impeller cpl. (10 pcs) | | | 98394269 | 21 | pcs |
| 49 | Bulk, Impeller cpl. (24 pcs) | | | 96547599 | 21 | pcs |
| 49 | Impeller cpl. | | | 98394415 | 21 | pcs |
| 51 | Shaft, spline, cpl. | | | 96588236 | 1 | pcs |
| 64c | Bulk, Clamp, splined (5 pcs) | | Internal diameter: 8,5 Outer diameter: 15 | 98496968 | 1 | pcs |
| 64a | Bulk, Spacing pipe (24 pcs) | | | 96536198 | 17 | pcs |
| 66 | Bulk, Wedge lock washer (10 pcs) | | | 96536157 | 1 | pcs |
| 67 | Bulk, Lock nut (10 pcs) | | Thread: M8 | 98277008 | 1 | pcs |
| + 105 | Bulk, Shaft seal (15 pcs) | | Material type: HQQE | 96983415 | 1 | pcs |
| 441b | Bulk, Gasket (24 pcs) | | | 96536206 | 2 | pcs |
| + 441a | Flange | | Thread: RP 1 | 96547453 | 2 | pcs |