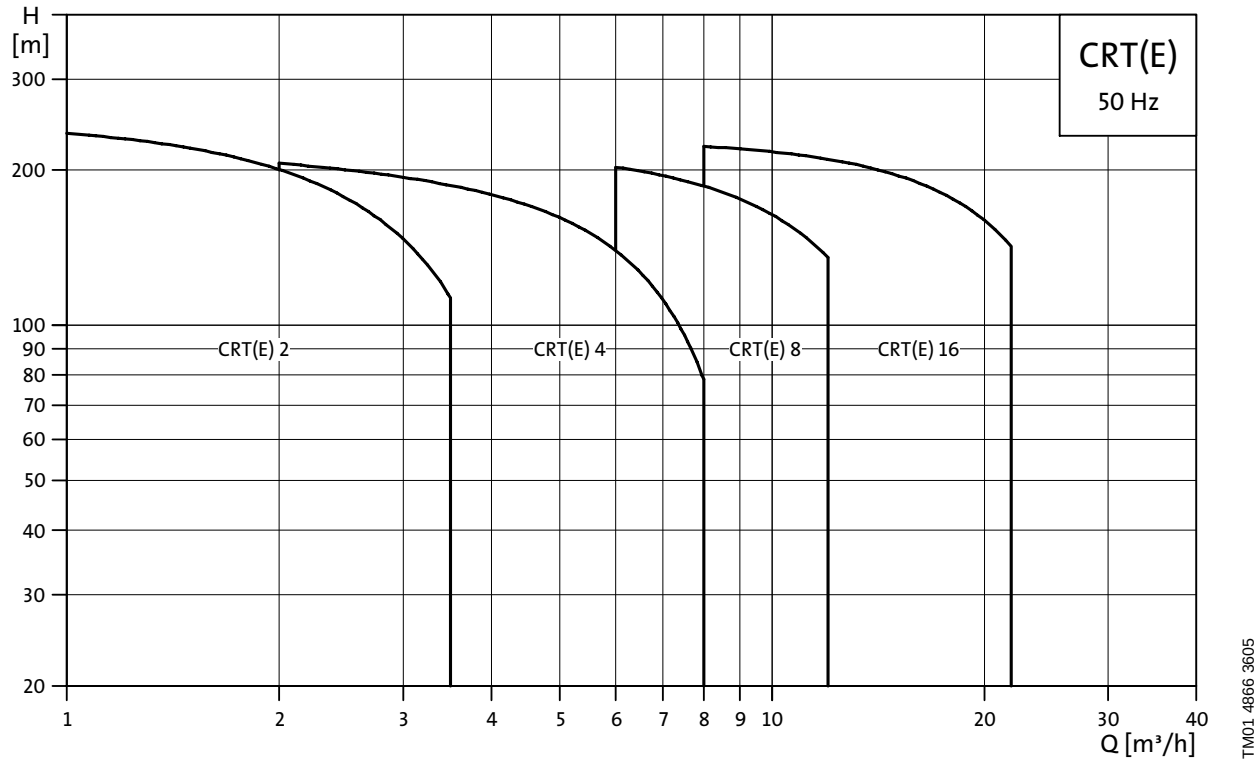
# CRT, CRTE

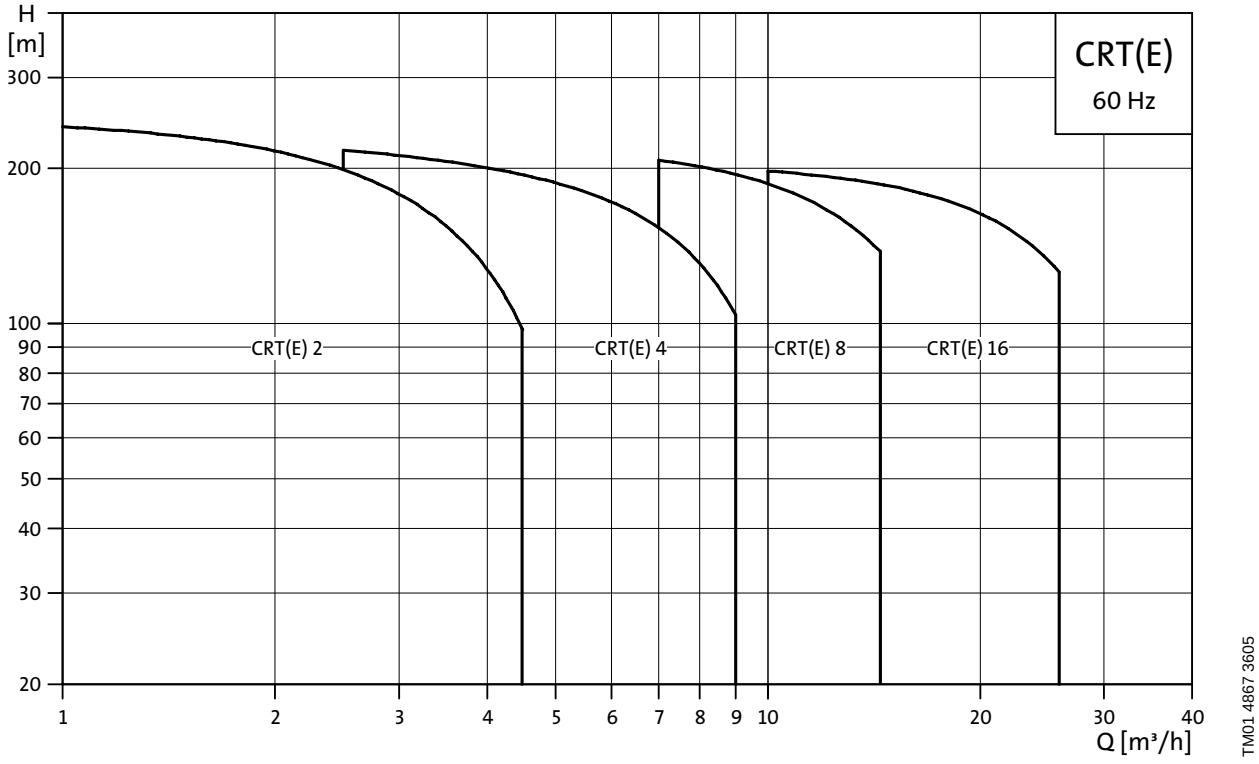
Vertical multistage centrifugal titanium pumps
50/60 Hz

# Contents

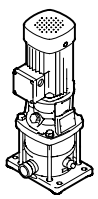
## Performance range, 50 Hz




## Performance range, 60 Hz



## Product range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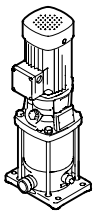
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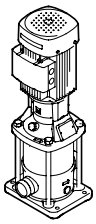
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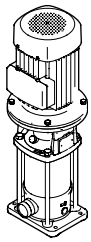
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| Description | CRT(E) 2 | CRT(E) 4 | CRT(E) 8 | CRT(E) 16 |
|---|---|---|---|---|
| **Range** | | | | |
| Nominal flow rate [$m^3$/h] | 2 | 4 | 8 | 16 |
| Maximum pressure [bar] | 25 | 25 | 25 | 25 |
| Temperature range [°C] | –20 to +120 | –20 to +120 | –20 to +120 | –20 to +120 |
| Maximum efficiency [%] | 48 | 59 | 64 | 70 |
| **50 Hz** | | | | |
| Flow range [$m^3$/h] | 1 - 3.5 | 2 - 8 | 6 -12 | 8 - 22 |
| Motor power [kW] | 0.37 - 3.0 | 0.37 - 4.0 | 0.37 - 7.5 | 2.2 - 18.5 |
| **60 Hz** | | | | |
| Flow range [$m^3$/h] | 1 - 4.5 | 2 - 9 | 6 - 14.5 | 8 - 26 |
| Motor power [kW] | 0.37 - 4.0 | 0.37 - 5.5 | 0.37 - 11 | 2.2 - 15 |
| **Pipework connection** | | | | |
| PJE coupling with socket for welding/threaded socket | Rp 1¼ | Rp 1¼ | R 2 | R 2 |
| DIN flange - on request | DN 32 | DN 32 | DN 50 | DN 50 |

## Applications

Reliable and cost-efficient, CRT pumps handle a variety of liquids from seawater to sodium hypochlorite.

**Excellent corrosion resistance**

Titanium is widely used for many industrial applications due to its high resistance to corrosion.

Totally unaffected by corrosive attacks by salt water or marine atmospheres, titanium also has an exceptional resistance to a wide range of acids, alkalis, natural water and industrial chemicals.

The fine corrosion resistance of titanium is due to a stable, protective and strongly adherent oxide film, formed instantly on the metal when a fresh surface is exposed to air or moisture.

## Fields of application

**Marine environment**

- Ballast pumps
- Washing/cleaning.

**Pulp and paper industries**

- Bleaching solutions.

**Offshore industries and refineries**

- Fire fighting
- Cooling.

**Metal-finishing industries (electroplating)**

- Copper chloride etching
- Ammonium chloride etching.

**Power generation plants**

- FGD (Flue Gas Desulphurisation).

**Food processing, brewing and pharmaceutical industries**

- CIP (Cleaning In Place)
- Disinfection.

**Desalination industries**

- Reverse osmosis
- Distillation.

**Chemical processing industries**

- Chlorine and chlorates
- Organic acids
- Oxidising acids (nitric acid, chromic acid)
- Chloride-containing salts (ferric chloride)
- Inhibited reducing acids.

**Other**

- Fish farming
- Aquaria
- Fun water parks.

GR7369

**Fig. 1** CRT pumps

## Pump

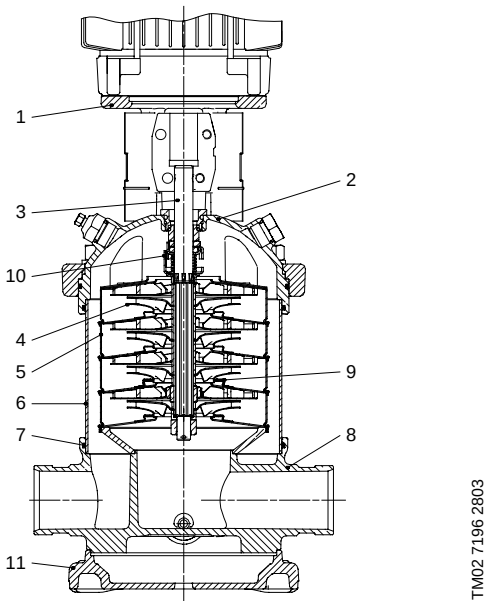
The CRT(E) 2, 4, 8 and 16 pump is a non self-priming, vertical multistage centrifugal pump fitted with a Grundfos standard motor.

The pump consists of a base and a pump head. The pump body and the outer sleeve are fixed between the base and the pump head by means of staybolts. The base has in-line suction and discharge ports. The pump has a maintenance-free mechanical shaft seal with dimensions to DIN 24960.

## Operating conditions

| Description | Operating conditions |
|---|---|
| **Liquid temperature** | EPDM: –20°C to +120°C<br>FKM: –20°C to +90°C |
| **Ambient temperature** | Maximum +40°C |
| **Minimum inlet pressure** | According to the NPSH curve + a safety margin of minimum 0.5 metres head |

## Sectional drawing




## Materials

| Pos. | Description | Materials | EN/DIN | AISI/ASTM |
|---|---|---|---|---|
| 1 | Pump head | Stainless steel | 1.4308 | ASTM 25B |
| 2 | Pump head cover | Titanium | | ASTM B 265/ 1993 |
| 3 | Shaft | Titanium | | ASTM B 348/ 1993 |
| 4 | Impeller | Titanium | | ASTM B 265 |
| 5 | Chamber | Titanium | | ASTM B 265 |
| 6 | Outer sleeve | Titanium | | ASTM B 265 |
| 7 | O-ring for outer sleeve | EPDM or FKM | | |
| 8 | Base | Titanium | | ASTM B 265 |
| 9 | Neck ring | PTFE | | |
| 10 | Shaft seal | AUUE/AUUV | | |
| 11 | Base plate | Stainless steel | 1.4408 | CF8M (equal to AISI 316) |
| | Rubber parts in pump | Same as in shaft seal EPDM/FKM | | |

## Pumped liquids

Thin, non-explosive liquids, not containing solid particles or fibres. The liquid must not attack the pump materials chemically.

When pumping liquids with a density and/or viscosity higher than that of water, motors with correspondingly higher outputs must be used, if required.

CRT(E) pumps can be used for liquid transfer, circulation and pressure boosting.

## Motor

The motor is a totally enclosed, fan-cooled, 2-pole Grundfos standard motor with principal dimensions in accordance with the IEC and DIN standards.

Electrical tolerances according to IEC 34/EN 60034.

## Electrical data

### CRT pumps

| | MG motor |
|---|---|
| **Mounting designation** | Up to 4 kW: V 18<br>From 5.5 kW: V 1 |
| **Insulation class** | F |
| **Efficiency class** | EFF 1 |
| **Enclosure class** | IP 55 [1] |
| **50 Hz<br>Supply voltage<br>(tolerance: ±10%)** | $P_2$: 0.37-1.5 kW<br>3 x 220-240/380-415 V, 50 Hz<br>$P_2$: 2.2-18.5 kW<br>3 x 380-415 V, 50 Hz |
| **60 Hz<br>Supply voltage<br>(tolerance: ±10%)** | $P_2$: 0.37-1.1 kW<br>3 x 220-255/380-440 V, 60 Hz<br>$P_2$: 1.5-15 kW<br>3 x 220-277/380-480 V, 60 Hz |

1) IP 44, IP 54 and IP 65 - on request.

### CRTE pumps

| | MGE motor ($P_2 \leq$ 7.5 kW) | MGE motor ($P_2 \geq$ 11-22 kW) |
|---|---|---|
| **Mounting designation** | Up to 4 kW: V 18<br>From 5.5 kW: V 1 | |
| **Insulation class** | F | |
| **Efficiency class** | EFF 1 [2] | EFF 2 |
| **Enclosure class** | IP 54 | |
| **Supply voltage (tolerance: ±10%)** | $P_2$: 0.37-1.1 kW<br>1 x 200-240 V, 50/60 Hz<br>$P_2$: 0.75-7.5 kW<br>3 x 380-415 V, 50/60 Hz | $P_2$: 11-22 kW<br>3 x 380-415 V, 50/60 Hz |

2) Single-phase MGE motors are EFF 2.

Motors for other voltages are available on request.

#### MG motors

Single-phase motors incorporate a thermal overload switch.

Three-phase motors must be connected to a motor starter in accordance with local regulations.

Three-phase Grundfos motors from 3 kW incorporate a thermistor (PTC) according to DIN 44082.

From 0.37 kW to 2.2 kW, Grundfos offers CRT pumps fitted with single-phase MG motors (1 x 220-230 V/ 240 V).

#### MGE motors

CRTE pumps require no external motor protection. The MGE motor incorporates thermal protection against slow overloading and blocking (IEC 34-11: TP 211).

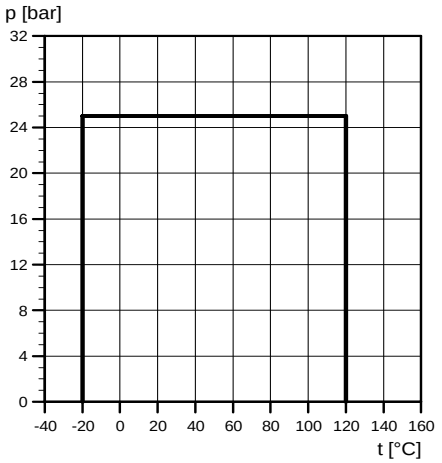
From 0.37 kW to 1.1 kW, Grundfos offers CRTE pumps fitted with single-phase MGE motors (1 x 200-240 V).

## Type key

| Example | CR | T | E | 16 | - | 3 | A | - | P | - | A | - | E | AUUE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|

- Pump range
- Version with vital parts in titanium
- Pump with integrated frequency converter
- Nominal flow rate [$m^3$/h]
- Number of impellers
- Code for pump version
- Code for pipework connection
- Code for materials, excl. plastic and rubber parts (A = basic version)
- Code for neck ring material
- Code for shaft seal and plastic/rubber parts, excl. neck ring

## Maximum operating pressure and temperature limits




p = Maximum operating pressure

**Fig. 2** Operating pressure and temperature limits

**Note:** Liquid temperatures above 90°C may involve the risk of periodic noise from the shaft seal.

## Maximum inlet pressure

The following tables show the maximum permissible inlet pressure. However, the actual inlet pressure + pressure against a closed valve must always be lower than the maximum permissible operating pressure.

| 50 Hz | | 60 Hz | |
|---|---|---|---|
| CRT(E) 2-2 → 2-11 | 10 bar | CRT(E) 2-2 → 2-6 | 10 bar |
| CRT(E) 2-13 → 2-26 | 15 bar | CRT(E) 2-7 → 2-18 | 15 bar |
| CRT(E) 4-1 → 4-12 | 10 bar | CRT(E) 4-1 → 4-7 | 10 bar |
| CRT(E) 4-14 → 4-22 | 15 bar | CRT(E) 4-8 → 4-16 | 15 bar |
| CRT(E) 8-1 → 8-20 | 10 bar | CRT(E) 8-1 → 8-14 | 10 bar |
| CRT(E) 16-2 → 16-17 | 10 bar | CRT(E) 16-2 → 16-10 | 10 bar |

## Corrosion resistance

| Media | Conc. [%] | Temp. [°C] | Seal face | | Bearing |
|---|---|---|---|---|---|
| | | | Binderless tungsten carbide | Silicon carbide | Silicon carbide |
| Demineralised water | | 120 | ● | | ● |
| Groundwater | | 120 | ● | | ● |
| Brackish water | | 120 | ● | | ● |
| Seawater | | 80 | ● | | ● |
| Sulfuric acid | 3 | 60 | | ● 1) | ● |
| Phosphoric acid | 30<br>10 | 35<br>60 | ● | | ● |
| Formic acid | 50 | 80 | | ● 1) | ● |
| Citric acid | 50 | 100 | ● | | ● |
| Oxalic acid | 5 | 20 | ● | | ● |
| Inorganic salts (including $FeCl_3$) | | | | ● 1) | ● |
| Sodium hydroxide | 10<br>50 | 100<br>60 | ● | | ● |
| Potassium hydroxide | 50 | 20 | ● | | ● |
| Calcium hydroxide | saturated | 100 | ● | | ● |
| Ammonium hydroxide | 28 | 100 | ● | | ● |
| Alcohols **(except for methanol** 2)**)**, aldehydes, ketones | | | ● | | ● |

1) Available on request.

2) Titanium is susceptible to stress corosion cracking (SSC) in methanol and should not be used with methanol.

## Selection of pumps

Selection of pumps should be based on

- the duty point of the pump (see section 1)
- dimensional data such as pressure loss as a result of height differences, friction loss in the pipework, pump efficiency, etc. (see section 2)
- pump materials (see section 3)
- pump connections (see section 4)
- shaft seal (see section 5).

### 1. Duty point of the pump

From a duty point it is possible to select a pump on the basis of the curve charts shown in the chapter "Performance curves/Technical data", page 12.

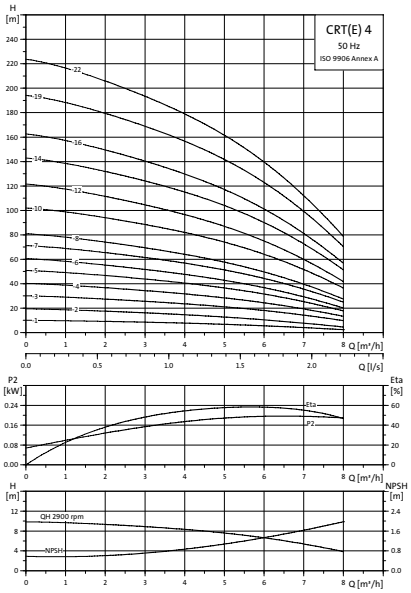



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**Fig. 3** Example of a curve chart

### 2. Dimensional data

When sizing a pump, the following must be taken into account:

- Required flow and pressure at the draw-off point.
- Pressure loss as a result of height differences ($H_{geo}$).
- Friction loss in the pipework ($H_f$).
  It may be necessary to account for pressure loss in connection with long pipes, bends, valves, etc.
- Best efficiency at the estimated duty point.
- NPSH value.
  For calculation of the NPSH value, see "Minimum inlet pressure - NPSH", page 11.

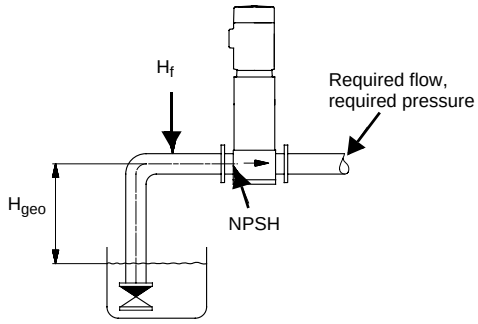


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**Fig. 4** Dimensional data

**Efficiency**

Before determining the point of best efficiency, the operation pattern of the pump needs to be identified.

Is the pump expected to operate at the **same** duty point, then select a CRT(E) pump which is operating at a duty point corresponding with the best efficiency of the pump.

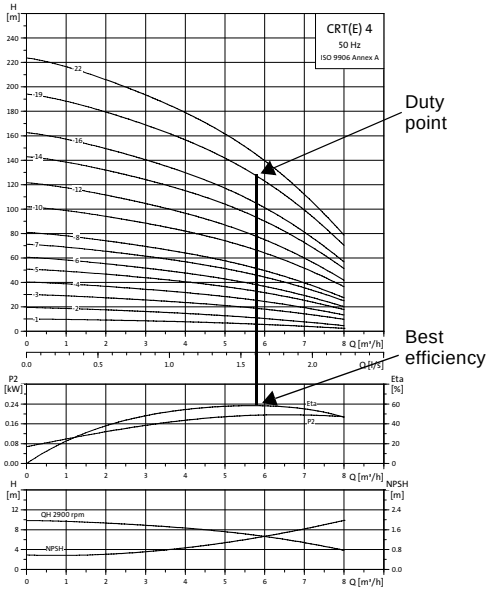


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**Fig. 5** Example of the duty point of a CRT(E) pump

As the pump is sized on the basis of the highest possible flow, it is urgent always to have the duty point to the right on the efficiency curve (eta) in order to keep efficiency high when the flow drops.

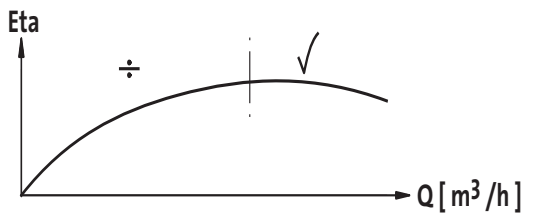


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**Fig. 6** Best efficiency

Normally, CRTE pumps are used in applications characterised by a **variable** flow. Consequently, it is not possible to select a pump that is constantly operating at optimum efficiency.

In order to achieve optimum operating economy, the pump should be selected on the basis of the following criteria:

- The max. required duty point should be as close as possible to the QH curve of the pump.
- The required duty point should be positioned so that $P_2$ is close to the max. point of the QH curve.

Between the min. and max. performance curve E-pumps have an infinite number of performance curves each representing a specific speed. Therefore it may not be possible to select a duty point close to the 100% curve.

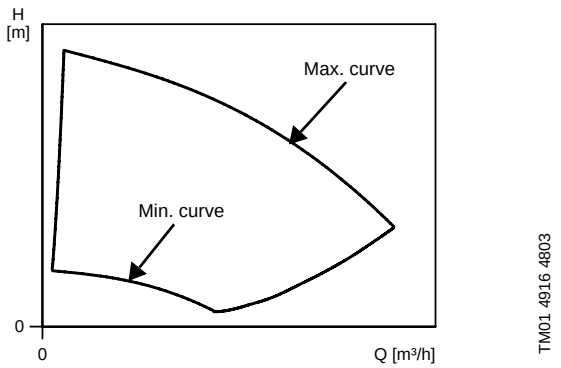


**Fig. 7** Min. and max. performance curves

In situations where it is not possible to select a duty point close to the 100% curve, the affinity equations in fig. 8 can be used. The head (H), the flow (Q) and the input power (P) are all the appropriate variables for the motor speed (n).

**Note:**

The approximated formulas apply on condition that the system characteristic remains unchanged for $n_n$ and $n_x$ and that it is based on the formula $H = k \times Q^2$, where k is a constant.

The power equation implies that the pump efficiency is unchanged at the two speeds. In practice this is **not** quite correct.

Finally, it is worth noting that the efficiencies of the frequency converter and the motor **must** be taken into account if a precise calculation of the power saving resulting from a reduction of the pump speed is wanted.

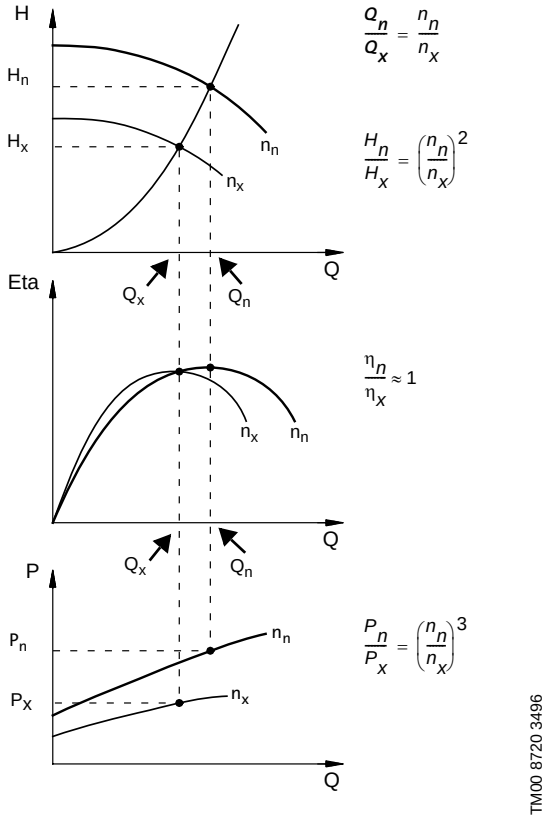


**Fig. 8** Affinity equations

**Legend**

| | |
|---|---|
| $H_n$ | Rated head in metres |
| $H_x$ | Current head in metres |
| $Q_n$ | Rated flow in $m^3/h$ |
| $Q_x$ | Current flow in $m^3/h$ |
| $n_n$ | Rated motor speed in $min^{-1}$ ($n_n$ = 2900 $min^{-1}$) |
| $n_x$ | Current motor speed in $min^{-1}$ |
| $\eta_n$ | Rated efficiency in % |
| $\eta_x$ | Current efficiency in %. |

**WinCAPS and WebCAPS**

WinCAPS and WebCAPS are selection programs offered by Grundfos.

The two programs make it possible to calculate the specific duty point and energy consumption of a CRTE pump.

On the basis of the dimensional data of the pump, WinCAPS and WebCAPS can calculate the exact duty point and energy comsumption.


For further information, see pages 32 and 33.

### 3. Pump materials

The material variant should be selected on the basis of the liquid to be pumped.

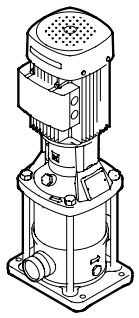

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**Fig. 9** CRT pump

### 4. Pump connections

Selection of pump connection depends on the rated pressure and pipework. To meet any requirement, Grundfos offers flexible connections such as:

- DIN flange - on request
- PJE coupling.

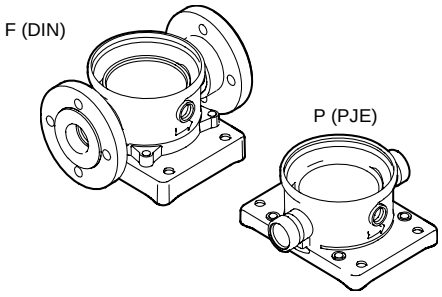


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**Fig. 10** Pump connections

### 5. Shaft seal

As standard, the CRT(E) range is fitted with a Grundfos type A shaft seal suitable for the most common applications.

In service situations, Grundfos type A shaft seals can be replaced without removing the pump head.

The following three key parameters **must** be taken into account, when selecting the shaft seal:

- type of pumped liquid
- liquid temperature
- maximum pressure.

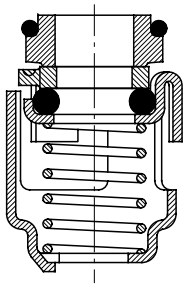

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**Fig. 11** Shaft seal

**Inlet pressure and operating pressure**

The limit values stated on page 7 must **not** be exceeded as regards

- maximum inlet pressure
- maximum operating pressure.

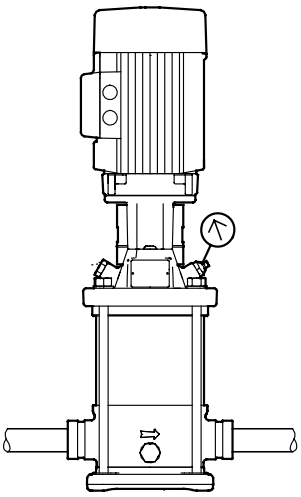

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**Fig. 12** Inlet and operating pressures

**Minimum inlet pressure - NPSH**

Calculation of the inlet pressure "H" is recommended when

- the liquid temperature is high
- the flow is significantly higher than the rated flow
- water is drawn from depths
- water is drawn through long pipes
- inlet conditions are poor.

To avoid cavitation, make sure that there is a minimum pressure on the suction side of the pump. The maximum suction lift "H" in metres head can be calculated as follows:

$H = p_b \times 10.2 - NPSH - H_f - H_v - H_s$

| | | |
|---|---|---|
| $p_b$ | = | Barometric pressure in bar.<br>Barometric pressure can be set to 1 bar.)<br>In closed systems, $p_b$ indicates the system pressure in bar. |
| NPSH | = | Net Positive Suction Head in metres head.<br>(To be read from the NPSH curve at the highest flow the pump will be delivering.) |
| $H_f$ | = | Friction loss in suction pipe in metres head.<br>(At the highest flow the pump will be delivering.) |
| $H_v$ | = | Vapour pressure in metres head.<br>(To be read from the vapour pressure scale.<br>"$H_v$" depends on the liquid temperature "$t_m$".) |
| $H_s$ | = | Safety margin = minimum 0.5 metres head. |

If the "H" calculated is positive, the pump can operate at a suction lift of maximum "H" metres head.

If the "H" calculated is negative, an inlet pressure of minimum "H" metres head is required.

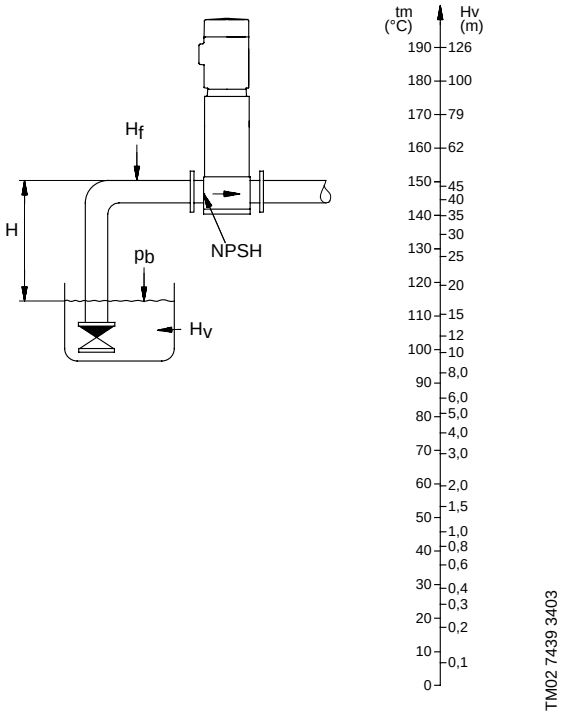
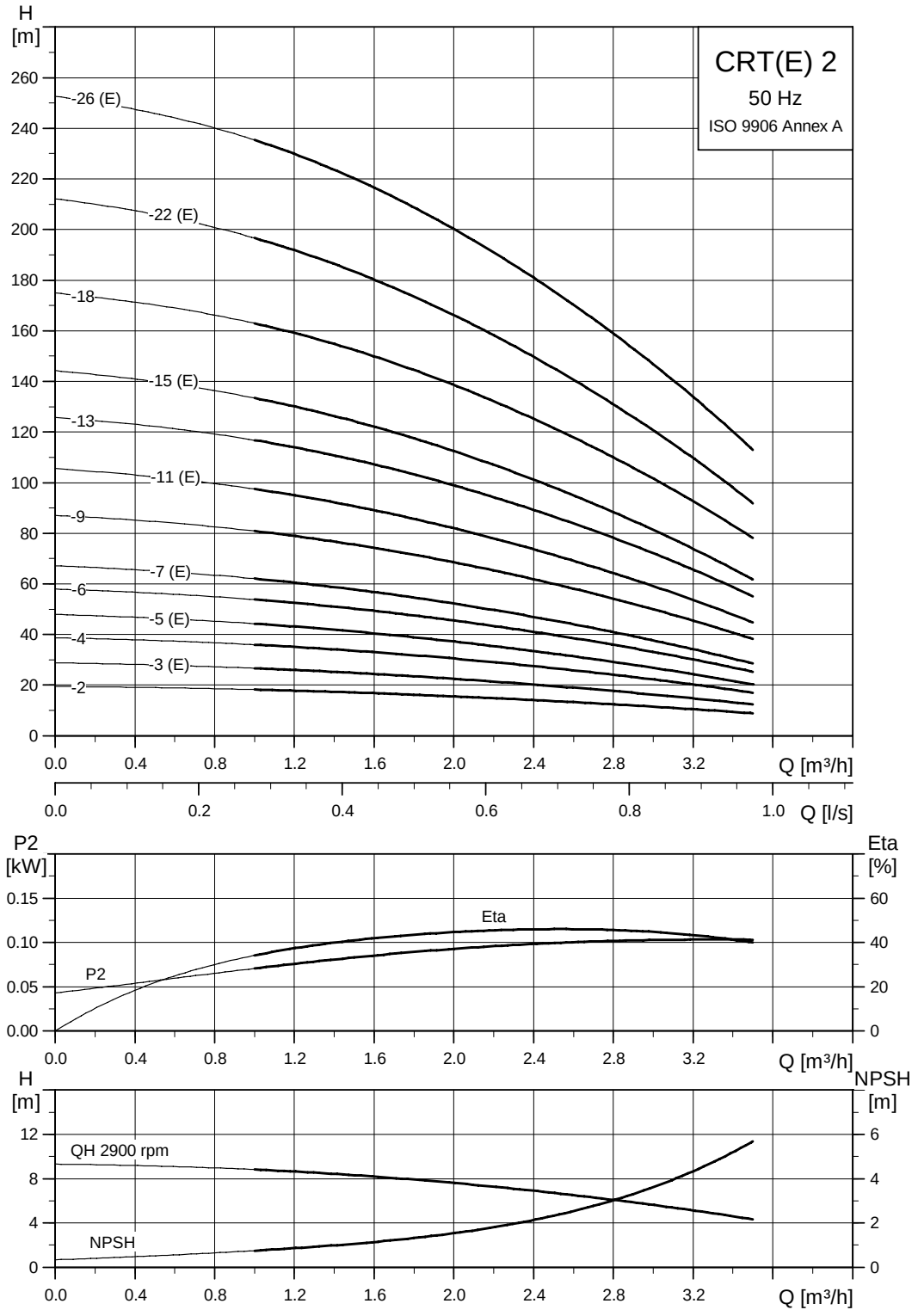



**Fig. 13** Minimum inlet pressure - NPSH

**Note:** In order to avoid cavitation, **never** select a pump whose duty point lies too far to the right on the NPSH curve.

Always check the NPSH value of the pump at the highest possible flow.

## CRT, CRTE 2 - 50 Hz

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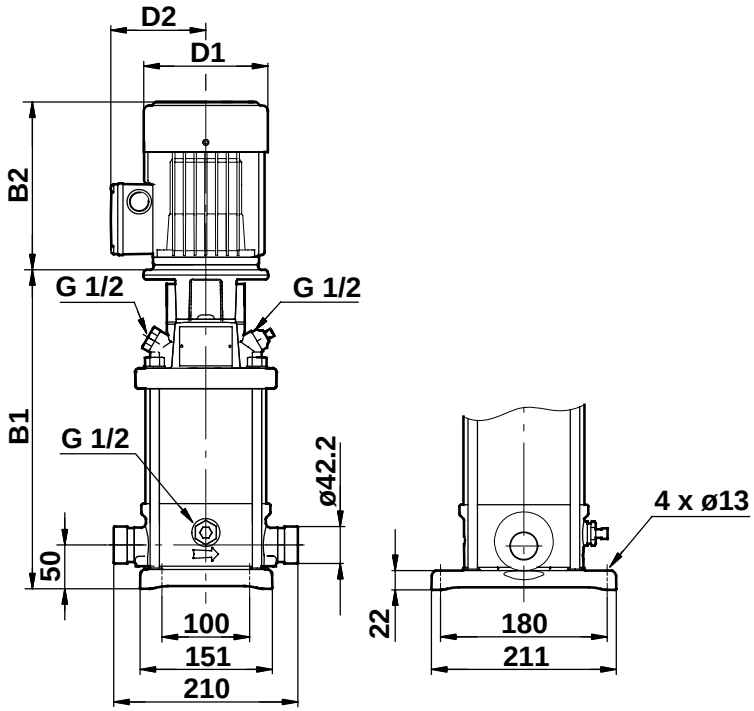
# Technical data

## Dimensional sketch

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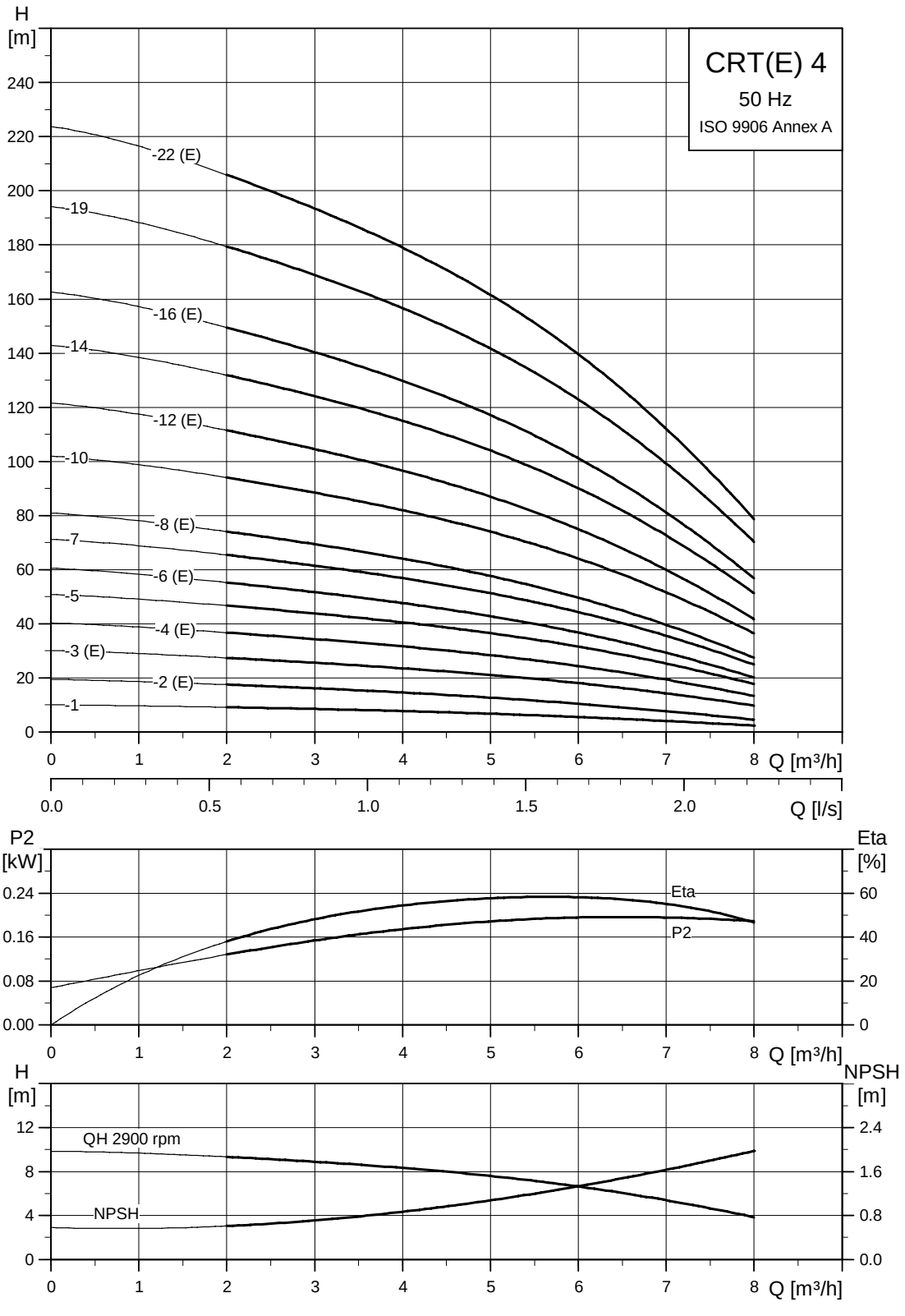
## Dimensions and weights

| Pump type | Motor $P_2$ [kW] | CRT | | | | | CRTE | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Dimension [mm] | | | | Net weight [kg] | Dimension [mm] | | | | Net weight [kg] |
| | | B1 | B1+B2 | D1 | D2 | | B1 | B1+B2 | D1 | D2 | |
| CRT 2-2 | 0.37 | 253 | 444 | 141 | 109 | 14 | - | - | - | - | - |
| CRT(E) 2-3 | 0.37 | 253 | 444 | 141 | 109 | 15 | 253 | 444 | 141 | 140 | 18.3 |
| CRT 2-4 | 0.55 | 289 | 480 | 141 | 109 | 15 | - | - | - | - | - |
| CRT(E) 2-5 | 0.55 | 289 | 480 | 141 | 109 | 16 | 289 | 480 | 141 | 140 | 18.6 |
| CRT 2-6 | 0.75 | 331 | 562 | 141 | 109 | 17 | - | - | - | - | - |
| CRT(E) 2-7 | 0.75 | 331 | 562 | 141 | 109 | 18 | 331 | 562 | 178 | 167 | 30.1 |
| CRT 2-9 | 1.1 | 403 | 634 | 141 | 109 | 20 | - | - | - | - | - |
| CRT(E) 2-11 | 1.1 | 403 | 634 | 141 | 109 | 21 | 403 | 634 | 178 | 167 | 27 |
| CRT 2-13 | 1.5 | 491 | 772 | 178 | 110 | 28 | - | - | - | - | - |
| CRT(E) 2-15 | 1.5 | 491 | 772 | 178 | 110 | 29 | 491 | 772 | 178 | 167 | 37.5 |
| CRT 2-18 | 2.2 | 545 | 866 | 178 | 110 | 32 | - | - | - | - | - |
| CRT(E) 2-22 | 2.2 | 617 | 938 | 178 | 110 | 34 | 617 | 938 | 178 | 167 | 44.5 |
| CRT(E) 2-26 | 3 | 694 | 1029 | 198 | 120 | 42 | 694 | 1029 | 198 | 177 | 51 |

# Performance curves

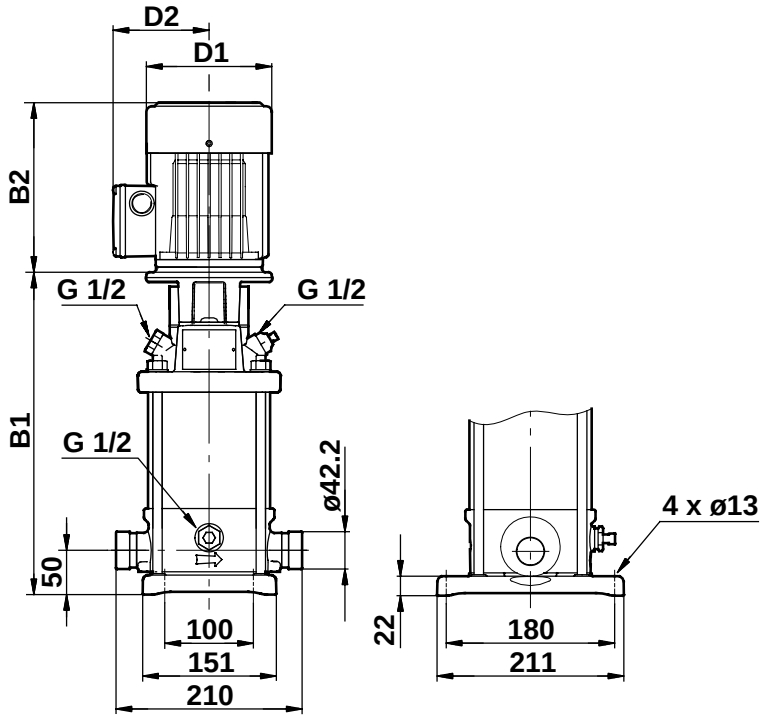
## CRT, CRTE 4 - 50 Hz




TM01 4872 3605

# Technical data

## Dimensional sketch

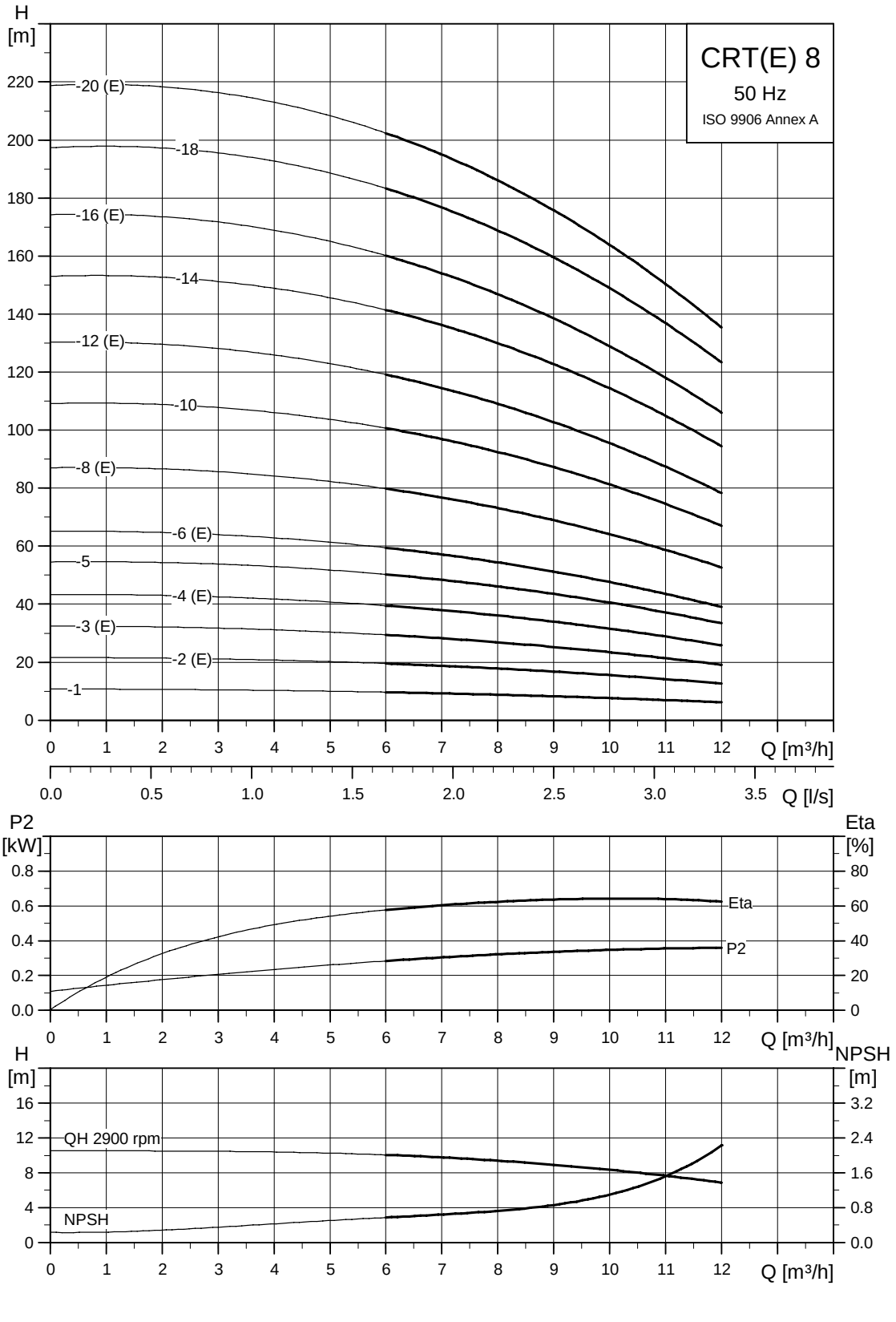



TM02 7181 2703

## Dimensions and weights

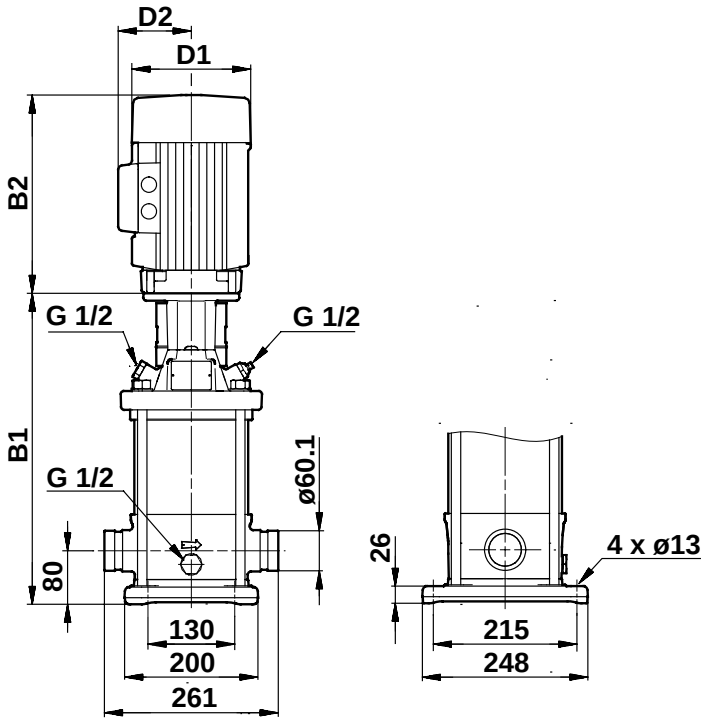
| Pump type | Motor $P_2$ [kW] | CRT | | | | | CRTE | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Dimension [mm] | | | | Net weight [kg] | Dimension [mm] | | | | Net weight [kg] |
| | | B1 | B1+B2 | D1 | D2 | | B1 | B1+B2 | D1 | D2 | |
| CRT 4-1 | 0.37 | 253 | 444 | 141 | 109 | 14 | - | - | - | - | - |
| CRT(E) 4-2 | 0.37 | 253 | 444 | 141 | 109 | 14 | 253 | 444 | 141 | 140 | 17.3 |
| CRT(E) 4-3 | 0.55 | 280 | 471 | 141 | 109 | 15 | 280 | 471 | 141 | 140 | 17.6 |
| CRT(E) 4-4 | 0.75 | 313 | 544 | 141 | 109 | 17 | 313 | 544 | 178 | 167 | 29.1 |
| CRT 4-5 | 1.1 | 367 | 598 | 141 | 109 | 19 | - | - | - | - | - |
| CRT(E) 4-6 | 1.1 | 367 | 598 | 141 | 109 | 20 | 367 | 598 | 178 | 167 | 26 |
| CRT 4-7 | 1.5 | 437 | 718 | 178 | 110 | 27 | - | - | - | - | - |
| CRT(E) 4-8 | 1.5 | 437 | 718 | 178 | 110 | 27 | 437 | 718 | 178 | 167 | 35.5 |
| CRT 4-10 | 2.2 | 545 | 866 | 178 | 110 | 30 | - | - | - | - | - |
| CRT(E) 4-12 | 2.2 | 545 | 866 | 178 | 110 | 31 | 544 | 865 | 178 | 167 | 41.5 |
| CRT 4-14 | 3 | 658 | 993 | 198 | 120 | 38 | - | - | - | - | - |
| CRT(E) 4-16 | 3 | 658 | 993 | 198 | 120 | 38 | 658 | 993 | 198 | 177 | 47 |
| CRT 4-19 | 4 | 739 | 1111 | 220 | 134 | 49 | - | - | - | - | - |
| CRT(E) 4-22 | 4 | 820 | 1192 | 220 | 134 | 51 | 820 | 1192 | 220 | 188 | 62.3 |

## CRT, CRTE 8 - 50 Hz




TM01 4874 3605

## Dimensional sketch



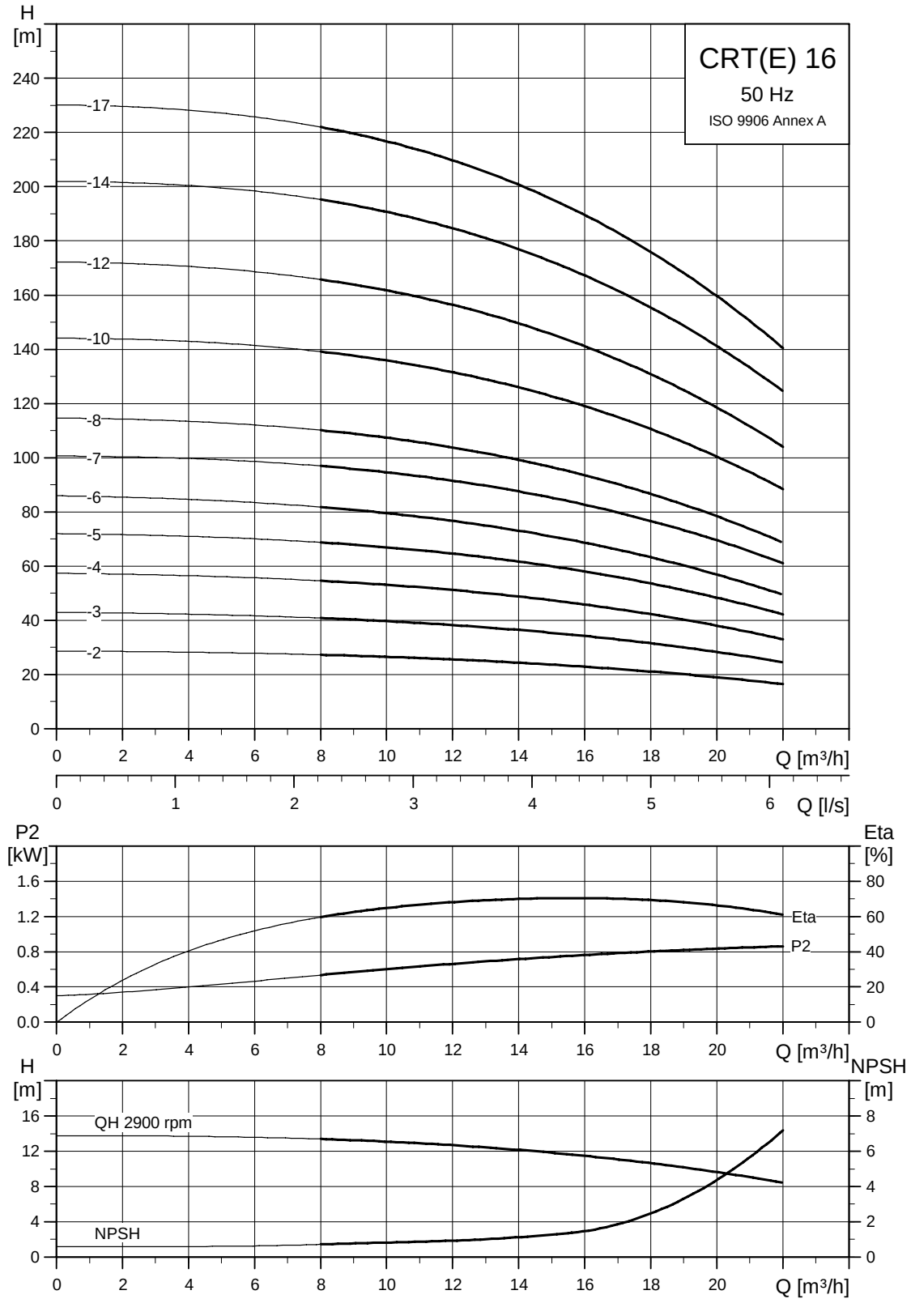

TM02 7183 2703

## Dimensions and weights

| Pump type | Motor $P_2$ [kW] | CRT | | | | | | CRTE | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Dimension [mm] | | | | | Net weight [kg] | Dimension [mm] | | | | | Net weight [kg] |
| | | B1 | B1+B2 | D1 | D2 | D3 | | B1 | B1+B2 | D1 | D2 | D3 | |
| CRT 8-1 | 0.37 | 353 | 544 | 141 | 109 | - | 24 | - | - | - | - | - | - |
| CRT(E) 8-2 | 0.75 | 357 | 588 | 141 | 109 | - | 25 | 357 | 588 | 178 | 167 | - | 37.1 |
| CRT(E) 8-3 | 1.1 | 417 | 648 | 141 | 109 | - | 27 | 417 | 648 | 178 | 167 | - | 33 |
| CRT(E) 8-4 | 1.5 | 433 | 714 | 178 | 110 | - | 33 | 433 | 714 | 178 | 167 | - | 41.5 |
| CRT 8-5 | 2.2 | 493 | 814 | 178 | 110 | - | 36 | - | - | - | - | - | - |
| CRT(E) 8-6 | 2.2 | 493 | 814 | 178 | 110 | - | 36 | 493 | 814 | 178 | 167 | - | 46.5 |
| CRT(E) 8-8 | 3 | 618 | 953 | 198 | 120 | - | 42 | 618 | 953 | 198 | 177 | - | 51 |
| CRT 8-10 | 4 | 618 | 990 | 220 | 134 | - | 53 | - | - | - | - | - | - |
| CRT(E) 8-12 | 4 | 738 | 1110 | 220 | 134 | - | 54 | 738 | 1110 | 220 | 188 | - | 65.3 |
| CRT 8-14 | 5.5 | 770 | 1161 | 220 | 134 | 300 | 62 | - | - | - | - | - | - |
| CRT(E) 8-16 | 5.5 | 890 | 1281 | 220 | 134 | 300 | 62 | 890 | 1281 | 220 | 188 | 300 | 74.9 |
| CRT(E) 8-18 | 7.5 | 890 | 1281 | 220 | 134 | 300 | 66 | 890 | 1281 | 220 | 188 | 300 | 89 |
| CRT(E) 8-20 | 11 | 980 | 1479 | 260 | 172 | 350 | 99 | 980 | 1429 | 258 | 344 | 350 | 110.7 |

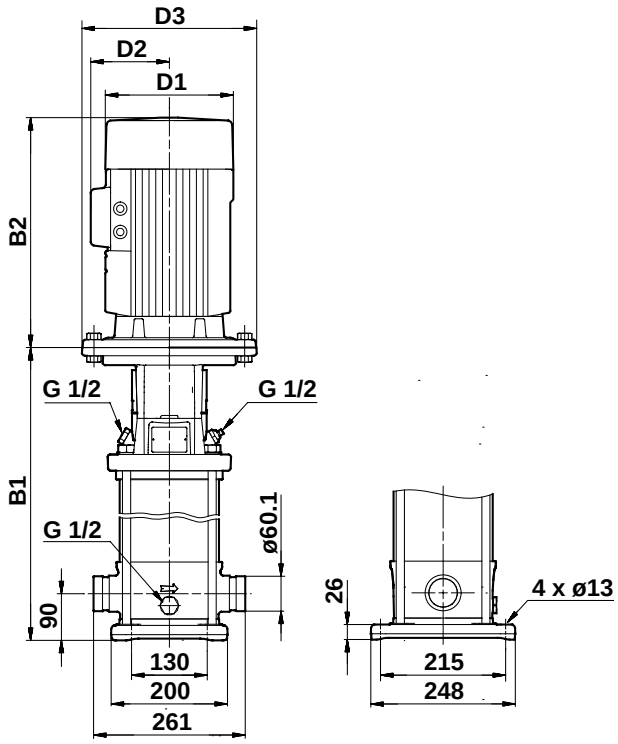
# Performance curves

## CRT, CRTE 16 - 50 Hz




TM01 4876 3605

## Dimensional sketch



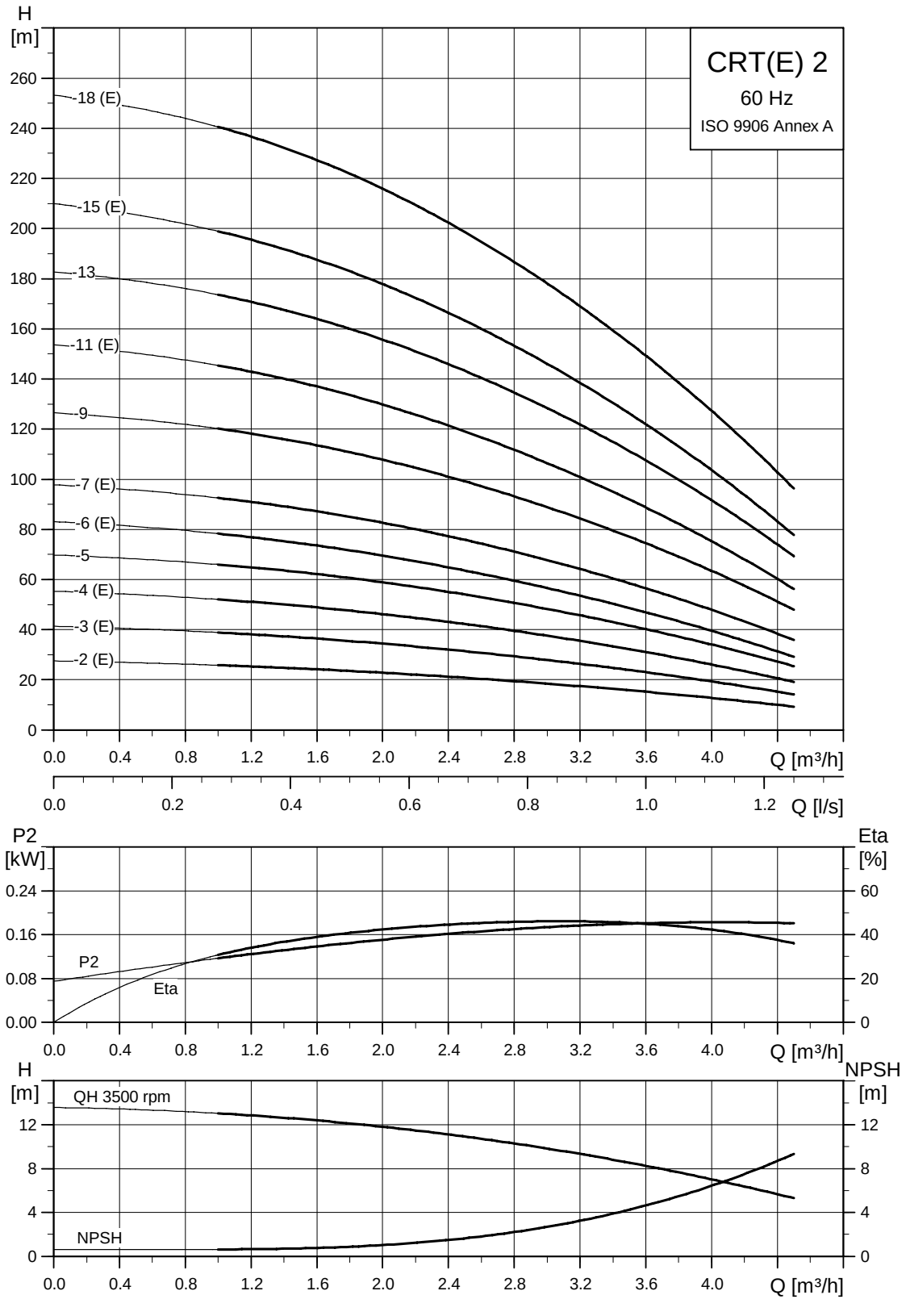

TM02 7182 4005

## Dimensions and weights

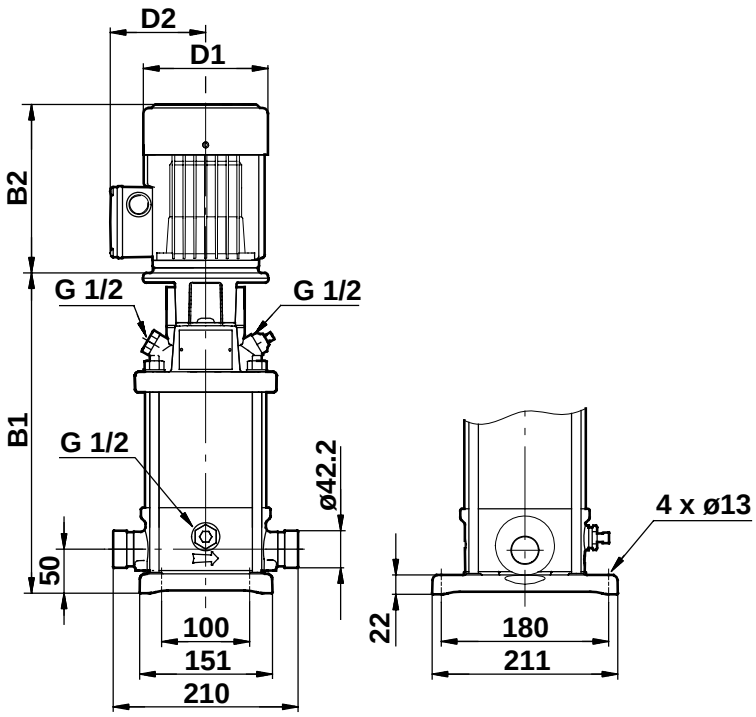
| Pump type | Motor $P_2$ [kW] | CRT | | | | | | CRTE | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Dimension [mm] | | | | | Net weight [kg] | Dimension [mm] | | | | | Net weight [kg] |
| | | B1 | B1+B2 | D1 | D2 | D3 | | B1 | B1+B2 | D1 | D2 | D3 | |
| CRT(E) 16-2 | 2.2 | 458 | 779 | 178 | 110 | - | 37 | 458 | 779 | 178 | 167 | - | 47.5 |
| CRT(E) 16-3 | 3 | 463 | 798 | 198 | 120 | - | 40 | 463 | 798 | 198 | 177 | - | 49 |
| CRT(E) 16-4 | 4 | 553 | 925 | 220 | 134 | - | 52 | 553 | 925 | 220 | 188 | - | 63.3 |
| CRT 16-5 | 5.5 | 585 | 976 | 220 | 134 | 300 | 60 | - | - | - | - | - | - |
| CRT(E) 16-6 | 5.5 | 675 | 1066 | 220 | 134 | 300 | 61 | 675 | 1066 | 220 | 188 | 298 | 73.9 |
| CRT 16-7 | 7.5 | 675 | 1066 | 220 | 134 | 300 | 64 | - | - | - | - | - | - |
| CRT(E) 16-8 | 7.5 | 810 | 1201 | 220 | 134 | 300 | 65 | 810 | 1201 | 220 | 188 | 298 | 76.7 |
| CRT 16-10 | 11 | 840 | 1339 | 260 | 172 | 350 | 97 | - | - | - | - | - | - |
| CRT(E) 16-12 | 11 | 1020 | 1519 | 260 | 172 | 350 | 98 | 1020 | 1469 | 258 | 344 | 350 | 150 |
| CRT(E) 16-14 | 15 | 1020 | 1498 | 320 | 197 | 350 | 103 | 1020 | 1481 | 313 | 372 | 350 | 150 |
| CRT(E) 16-17 | 18.5 | 1155 | 1673 | 320 | 197 | 350 | 115 | 1155 | 1654 | 313 | 372 | 350 | 150.5 |

# Performance curves

## CRT, CRTE 2 - 60 Hz



## Dimensional sketch



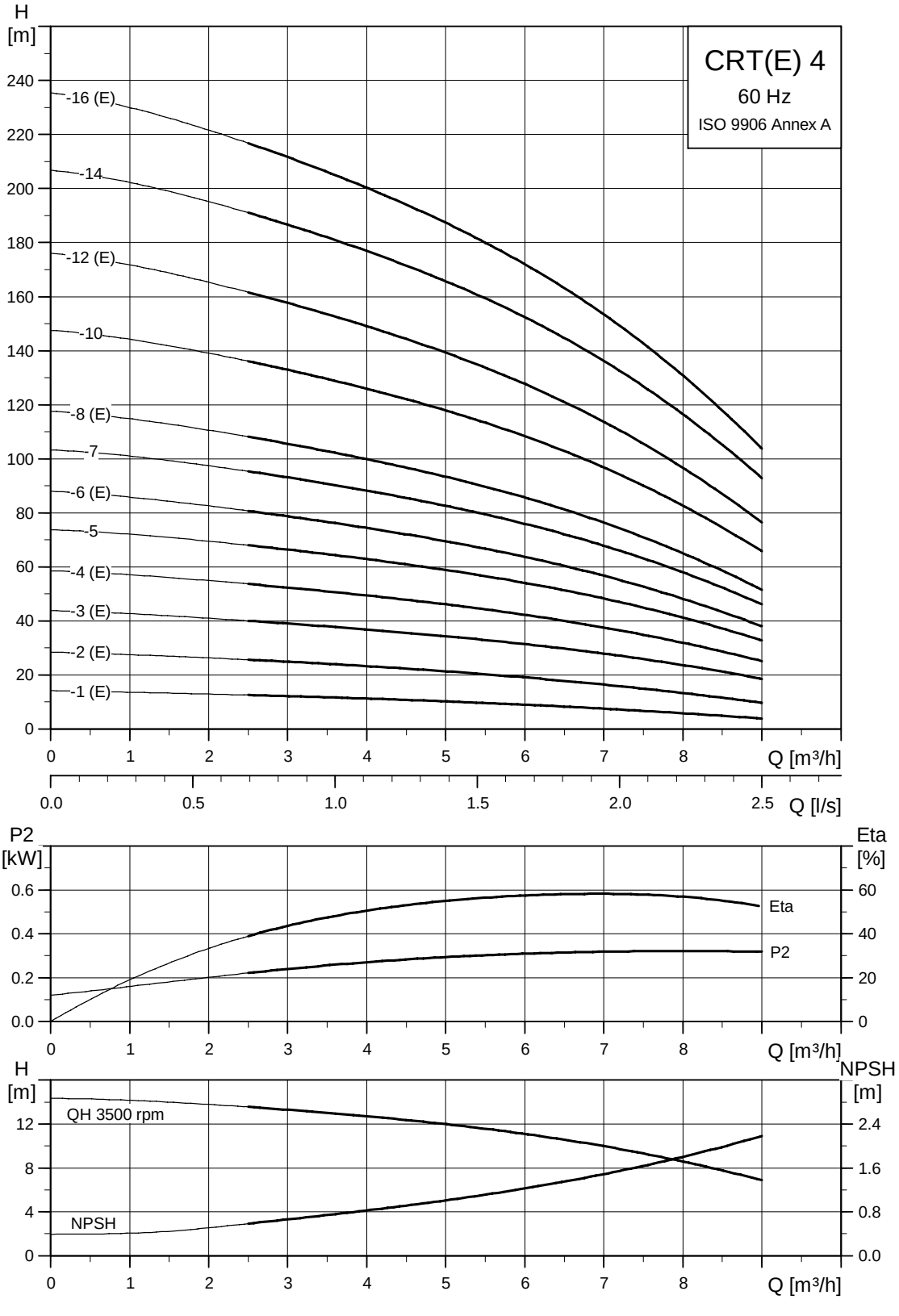

TM02 7181 2703

## Dimensions and weights

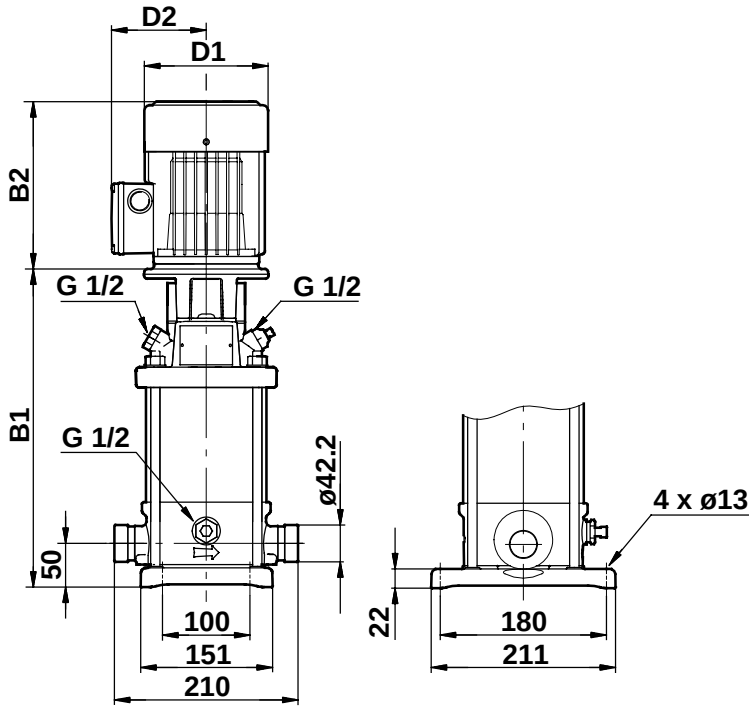
| Pump type | Motor $P_2$ [kW] | CRT | | | | | CRTE | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Dimension [mm] | | | | Net weight [kg] | Dimension [mm] | | | | Net weight [kg] |
| | | B1 | B1+B2 | D1 | D2 | | B1 | B1+B2 | D1 | D2 | |
| CRT(E) 2-2 | 0.37 | 253 | 444 | 141 | 109 | 14 | 253 | 444 | 141 | 140 | 17.3 |
| CRT(E) 2-3 | 0.55 | 253 | 444 | 141 | 109 | 15 | 253 | 444 | 141 | 140 | 17.6 |
| CRT(E) 2-4 | 0.75 | 295 | 526 | 141 | 109 | 17 | 295 | 526 | 178 | 167 | 29.1 |
| CRT 2-5 | 1.1 | 295 | 526 | 141 | 109 | 18 | - | - | - | - | - |
| CRT(E) 2-6 | 1.1 | 331 | 562 | 141 | 109 | 19 | 331 | 562 | 178 | 167 | 25 |
| CRT(E) 2-7 | 1.5 | 347 | 628 | 178 | 110 | 25 | 347 | 628 | 178 | 167 | 33.5 |
| CRT 2-9 | 2.2 | 419 | 740 | 178 | 110 | 28 | - | - | - | - | - |
| CRT(E) 2-11 | 2.2 | 419 | 740 | 178 | 110 | 29 | 419 | 740 | 178 | 167 | 39.5 |
| CRT 2-13 | 3 | 496 | 831 | 198 | 120 | 35 | - | - | - | - | - |
| CRT(E) 2-15 | 3 | 496 | 831 | 198 | 120 | 36 | 496 | 831 | 198 | 177 | 45 |
| CRT(E) 2-18 | 4 | 550 | 922 | 220 | 134 | 46 | 550 | 922 | 220 | 188 | 57.3 |

# Performance curves

## CRT, CRTE 4 - 60 Hz



## Dimensional sketch



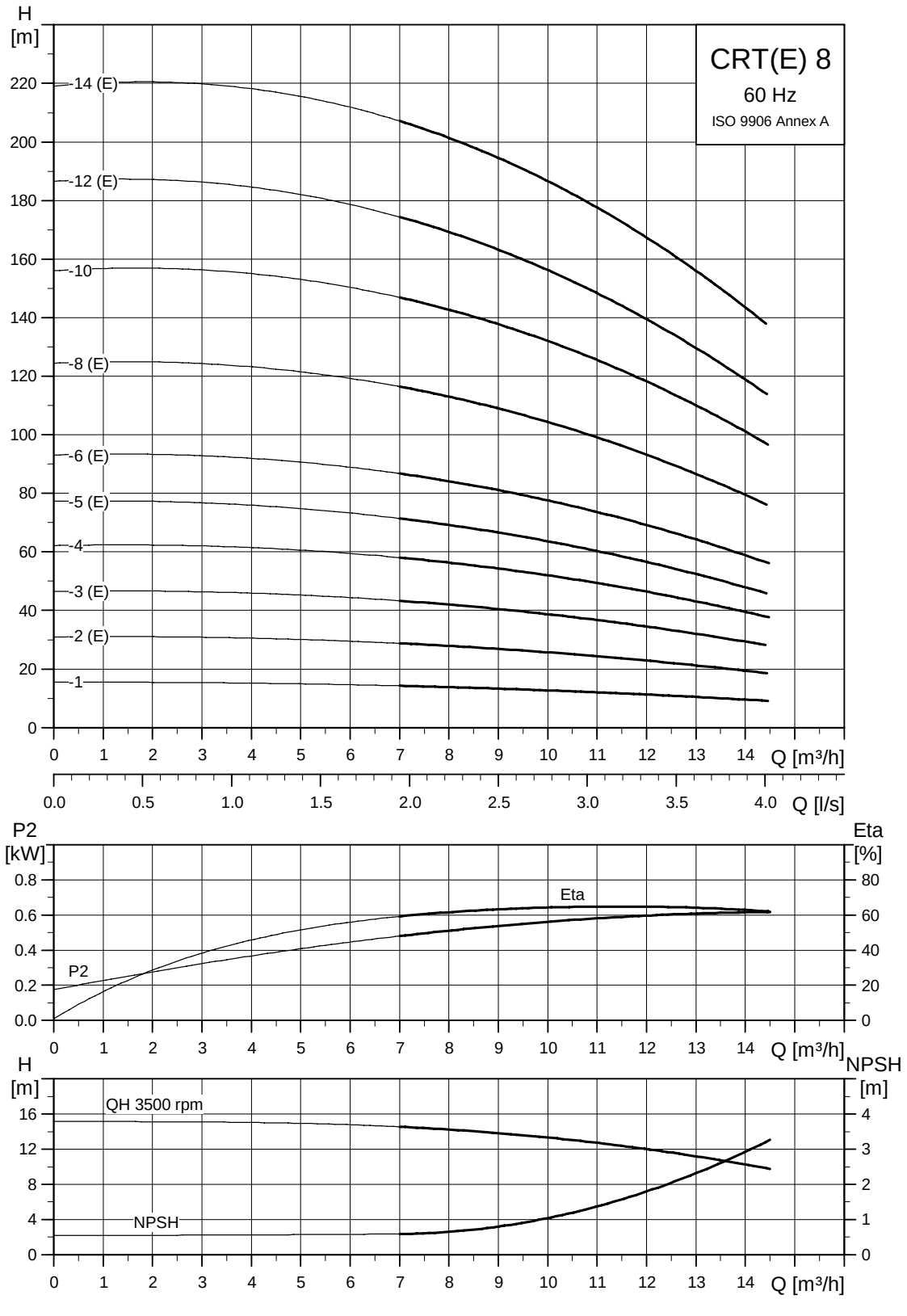

TM02 7181 2703

## Dimensions and weights

| Pump type | Motor $P_2$ [kW] | CRT | | | | | | CRTE | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Dimension [mm] | | | | | Net weight [kg] | Dimension [mm] | | | | | Net weight [kg] |
| | | B1 | B1+B2 | D1 | D2 | D3 | | B1 | B1+B2 | D1 | D2 | D3 | |
| CRT(E) 4-1 | 0.37 | 253 | 444 | 141 | 109 | - | 14 | 253 | 444 | 141 | 140 | - | 17.3 |
| CRT(E) 4-2 | 0.75 | 259 | 490 | 141 | 109 | - | 16 | 259 | 490 | 178 | 167 | - | 28.1 |
| CRT(E) 4-3 | 1.1 | 286 | 517 | 141 | 109 | - | 18 | 286 | 517 | 178 | 167 | - | 24 |
| CRT(E) 4-4 | 1.5 | 329 | 610 | 178 | 110 | - | 25 | 329 | 610 | 178 | 167 | - | 33.5 |
| CRT 4-5 | 2.2 | 383 | 704 | 178 | 110 | - | 27 | - | - | - | - | - | - |
| CRT(E) 4-6 | 2.2 | 383 | 704 | 178 | 110 | - | 28 | 383 | 704 | 178 | 167 | - | 38.5 |
| CRT 4-7 | 3 | 442 | 777 | 198 | 120 | - | 34 | - | - | - | - | - | - |
| CRT(E) 4-8 | 3 | 442 | 777 | 198 | 120 | - | 34 | 442 | 777 | 198 | 177 | - | 43 |
| CRT 4-10 | 4 | 550 | 922 | 220 | 134 | - | 44 | - | - | - | - | - | - |
| CRT(E) 4-12 | 4 | 550 | 922 | 220 | 134 | - | 45 | 550 | 922 | 220 | 188 | - | 56.3 |
| CRT 4-14 | 5.5 | 687 | 1078 | 220 | 134 | 300 | 57 | - | - | - | - | - | - |
| CRT(E) 4-16 | 5.5 | 687 | 1078 | 220 | 134 | 300 | 58 | 687 | 1078 | 220 | 188 | 298 | 66.5 |

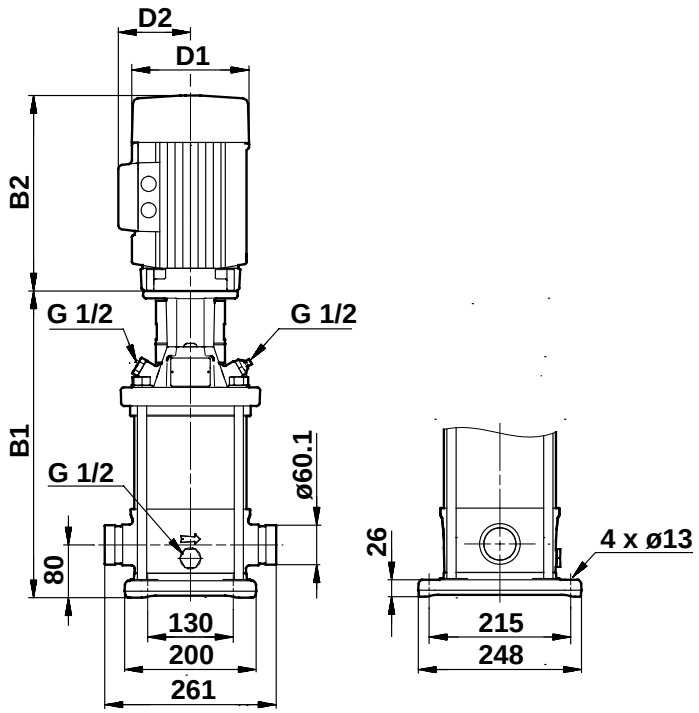
# Performance curves

## CRT, CRTE 8 - 60 Hz




TM01 4875 3605

## Dimensional sketch



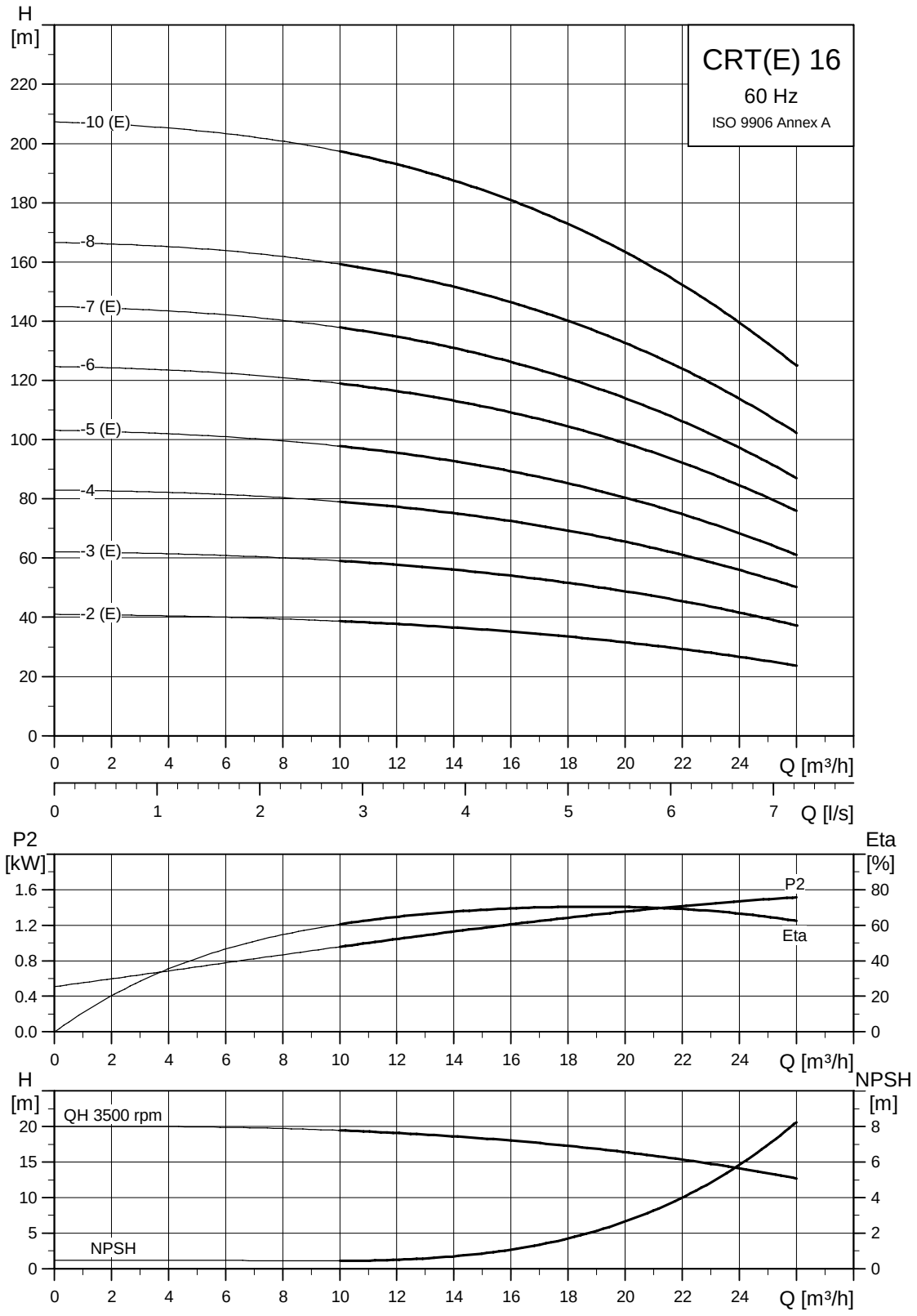

TM02 7183 2703

## Dimensions and weights

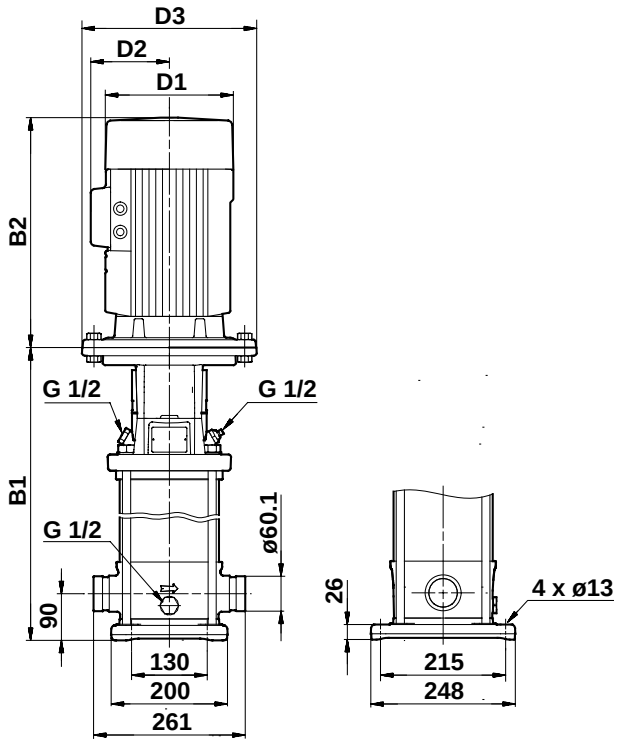
| Pump type | Motor $P_2$ [kW] | CRT | | | | | | CRTE | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Dimension [mm] | | | | | Net weight [kg] | Dimension [mm] | | | | | Net weight [kg] |
| | | B1 | B1+B2 | D1 | D2 | D3 | | B1 | B1+B2 | D1 | D2 | D3 | |
| CRT 8-1 | 0.75 | 357 | 588 | 141 | 109 | - | 25 | - | - | - | - | - | - |
| CRT(E) 8-2 | 1.5 | 373 | 654 | 178 | 110 | - | 33 | 373 | 654 | 178 | 167 | - | 41.5 |
| CRT(E) 8-3 | 2.2 | 433 | 754 | 178 | 110 | - | 35 | 433 | 754 | 178 | 167 | - | 45.5 |
| CRT 8-4 | 3 | 438 | 773 | 198 | 120 | - | 40 | - | - | - | - | - | - |
| CRT(E) 8-5 | 3 | 498 | 833 | 198 | 120 | - | 41 | 498 | 833 | 198 | 177 | - | 50 |
| CRT(E) 8-6 | 4 | 498 | 870 | 220 | 134 | - | 52 | 498 | 870 | 220 | 188 | - | 63.3 |
| CRT(E) 8-8 | 5.5 | 650 | 1041 | 220 | 134 | 300 | 61 | 650 | 1041 | 220 | 188 | 298 | 73.9 |
| CRT 8-10 | 7.5 | 650 | 1041 | 220 | 134 | 300 | 65 | - | - | - | - | - | - |
| CRT(E) 8-12 | 7.5 | 770 | 1161 | 220 | 134 | 300 | 65 | 770 | 1161 | 220 | 188 | 298 | 76.7 |
| CRT(E) 8-14 | 11 | 800 | 1299 | 260 | 172 | 350 | 97 | 800 | 1249 | 258 | 344 | 350 | 149 |

# Performance curves

## CRT, CRTE 16 - 60 Hz



## Dimensional sketch




TM02 7182 4005

## Dimensions and weights

| Pump type | Motor $P_2$ [kW] | CRT | | | | | | CRTE | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Dimension [mm] | | | | | Net weight [kg] | Dimension [mm] | | | | | Net weight [kg] |
| | | B1 | B1+B2 | D1 | D2 | D3 | | B1 | B1+B2 | D1 | D2 | D3 | |
| CRT(E) 16-2 | 3 | 463 | 798 | 198 | 120 | - | 40 | 463 | 798 | 198 | 177 | - | 49 |
| CRT(E) 16-3 | 5.5 | 495 | 886 | 220 | 134 | 300 | 60 | 495 | 886 | 220 | 188 | 298 | 72.9 |
| CRT 16-4 | 7.5 | 585 | 976 | 220 | 134 | 300 | 64 | - | - | - | - | - | - |
| CRT(E) 16-5 | 7.5 | 585 | 976 | 220 | 134 | 300 | 64 | 585 | 976 | 220 | 188 | 298 | 75.7 |
| CRT 16-6 | 11 | 705 | 1204 | 260 | 172 | 350 | 96 | - | - | - | - | - | - |
| CRT(E) 16-7 | 11 | 705 | 1204 | 260 | 172 | 350 | 96 | 705 | 1154 | 258 | 359 | 350 | 148 |
| CRT 16-8 | 15 | 840 | 1318 | 320 | 197 | 350 | 101 | - | - | - | - | - | - |
| CRT(E) 16-10 | 15 | 840 | 1318 | 320 | 197 | 350 | 101 | 840 | 1301 | 313 | 377 | 350 | 136.5 |

# Motor data

## 50 HZ

### Standard motors for CRT

| Motor $P_2$ [kW] | Frame size | Standard voltage [V] | $I_{1/1}$ [A] | Cos $\varphi_{1/1}$ | $\eta$ [%] | $I_{start}$ |
|---|---|---|---|---|---|---|
| 0.37 | 71 | 220-240Δ/380-415Y | 1.7/1 | 0.8-0.7 | 78.5 | 8.5-9.2/4.9-5.3 |
| 0.55 | 71 | 220-240Δ/380-415Y | 2.5/1.4 | 0.8-0.7 | 80 | 12-13/6.9-7.5 |
| 0.75 | 80 | 220-240Δ/380-415Y | 3.3/1.9 | 0.81-0.71 | 81 | 19.1-20.5/11.0-11.8 |
| 1.1 | 80 | 220-240Δ/380-415Y | 4.5/2.6 | 0.84-0.76 | 82.8 | 28.5-31.5/16.3-17.9 |
| 1.5 | 90 | 220-240Δ/380-415Y | 5.5/3.2 | 0.87-0.82 | 85.5 | 46.3-50.7/26.8-29.3 |
| 2.2 | 90 | 380-415Δ | 4.5-4.5 | 0.89-0.87 | 87.5 | 37.8-42.3 |
| 3.0 | 100 | 220-240Δ/380-415Y | 11/6.4 | 0.87-0.8 | 85 | 88-96.8/50.8-55.7 |
| 4.0 | 112 | 380-415Δ | 8.0-8.0 | 0.88-0.84 | 89 | 89.6-98.4 |
| 5.5 | 132 | 380-415Δ | 11.2-11.2 | 0.88-0.84 | 90 | 119.8-131.0 |
| 7.5 | 132 | 380-415Δ | 15.2-15.2 | 0.87-0.8 | 89.5 | 152-168.7 |
| 11 | 160 | 380-415Δ | 21.4-21.4 | 0.9-0.9 | 91.4 | 156.2-171.2 |

**MG**

TM03 1711 2805

| | | | | | | |
|---|---|---|---|---|---|---|
| 15 | 160 | 380-415Δ/660-690Y | 26.5/15.2 | 0.9-0.9 | 91.5 | 185.5/106.4 |
| 18.5 | 160 | 380-415Δ/660-690Y | 31.5/18.4 | 0.92-0.92 | 92.5 | 220.5/128.8 |

**Siemens**

TM03 1710 2805

### E-motors for CRTE

| Motor $P_2$ [kW] | Frame size | Phases | Standard voltage [V] | $I_{1/1}$ [A] | Cos $\varphi_{1/1}$ | $\eta$ [%] |
|---|---|---|---|---|---|---|
| 0.37 | 71 | 1 | 200-240 | 2.7-2.5 | 0.96 | 68 |
| 0.55 | 71 | 1 | 200-240 | 3.9-3.6 | 0.96 | 70 |
| 0.75 | 80 | 1 | 200-240 | 5.1-4.7 | 0.97 | 72 |
| 1.1 | 80 | 1 | 200-240 | 7.4-6.8 | 0.97 | 73 |
| 1.5 | 90 | 3 | 380-415 | 4.0 | 0.74 | 78 |
| 2.2 | 90 | 3 | 380-415 | 5.35 | 0.77 | 80 |
| 3.0 | 100 | 3 | 380-415 | 6.8 | 0.83 | 81 |
| 4.0 | 112 | 3 | 380-415 | 9.0 | 0.84 | 82 |
| 5.5 | 132 | 3 | 380-415 | 12.0 | 0.86 | 82 |
| 7.5 | 132 | 3 | 380-415 | 16.0 | 0.86 | 84.5 |

**MGE**

TM03 1712 2805

| | | | | | | |
|---|---|---|---|---|---|---|
| 11 | 160 | 3 | 380-415 | 21.4 | 0.93 | 84 |
| 15 | 160 | 3 | 380-415 | 28 | 0.94 | 85.5 |
| 18.5 | 160 | 3 | 380-415 | 34 | 0.95 | 85.5 |

**MMGE**

TM03 1713 2805

# Motor data

## 60 Hz

### Standard motors for CRT

| Motor $P_2$ [kW] | Frame size | Standard voltage [V] | $I_{1/1}$ [A] | Cos $\varphi_{1/1}$ | $\eta$ [%] | $I_{start}$ |
|---|---|---|---|---|---|---|
| 0.37 | 71 | 220-255Δ/380-440Y | 1.5-1.4/0.9-0.8 | 0.85-0.76 | 79-80 | 8.3-9.4/4.8-4.9 |
| 0.55 | 71 | 220-255Δ/380-440Y | 2.2-2.1/1.3-1.2 | 0.85-0.76 | 81.5-83 | 10.8-12.3/6.3-7.2 |
| 0.75 | 80 | 220-255Δ/380-440Y | 2.9-2.7/1.7-1.6 | 0.86-0.78 | 83-85 | 17.1-20.0/9.9-11.5 |
| 1.1 | 80 | 220-255Δ/380-440Y | 4.2-3.9/2.5-2.2 | 0.88-0.82 | 82-84.5 | 25.6-30.4/14.9-17.5 |
| 1.5 | 90 | 220-277Δ/380-480Y | 5.4-4.7/3.1-2.7 | 0.9-0.81 | 84-85 | 41.7-49.4/24.2-28.4 |
| 2.2 | 90 | 380-480Δ | 4.5-3.7 | 0.91-0.85 | 84-87 | 34.7-40.7 |
| 3.0 | 100 | 220-277Δ/380-480Y | 10.8-9.5/6.3-5.5 | 0.9-0.79 | 83-85 | 81-104/46.9-60 |
| 4.0 | 112 | 380-480Δ | 7.8-6.8 | 0.9-0.82 | 88-89.5 | 79.6-102 |
| 5.5 | 132 | 380-480Δ | 10.8-9.5 | 0.9-0.82 | 89-89 | 108-138 |
| 7.5 | 132 | 380-480Δ | 14.8-13.4 | 0.9-0.79 | 89-89.5 | 137.6-174.2 |
| 11 | 160 | 380-480Δ | 21.4-17.2 | 0.92-0.88 | 90-93 | 132.7-166.8 |

**MG**

TM03 1711 2805

| | | | | | | |
|---|---|---|---|---|---|---|
| 15 | 160 | 380-480Δ/660-690Y | 27.5-22/15.8-15.8 | 0.92-0.9 | 89.5-91 | 165-200.2/94.8-94.8 |

**Siemens**

TM03 1710 2805

### E-motors for CRTE

| Motor $P_2$ [kW] | Frame size | Phases | Standard voltage [V] | $I_{1/1}$ [A] | Cos $\varphi_{1/1}$ | $\eta$ [%] |
|---|---|---|---|---|---|---|
| 0.37 | 71 | 1 | 200-240 | 2.7-2.5 | 0.96 | 68 |
| 0.55 | 71 | 1 | 200-240 | 3.9-3.6 | 0.96 | 70 |
| 0.75 | 80 | 1 | 200-240 | 5.1-4.7 | 0.97 | 72 |
| 1.1 | 80 | 1 | 200-240 | 7.4-6.8 | 0.97 | 73 |
| 1.5 | 90 | 3 | 380-415 | 4.0 | 0.74 | 78 |
| 2.2 | 90 | 3 | 380-415 | 5.35 | 0.77 | 80 |
| 3.0 | 100 | 3 | 380-415 | 6.8 | 0.83 | 81 |
| 4.0 | 112 | 3 | 380-415 | 9.0 | 0.84 | 82 |
| 5.5 | 132 | 3 | 380-415 | 12.0 | 0.86 | 82 |
| 7.5 | 132 | 3 | 380-415 | 16.0 | 0.86 | 84.5 |

**MGE**

TM03 1712 2805

| | | | | | | |
|---|---|---|---|---|---|---|
| 11 | 160 | 3 | 380-415 | 21.4 | 0.93 | 84 |
| 15 | 160 | 3 | 380-415 | 28.0 | 0.94 | 85.5 |

**MMGE**

TM03 1713 2805

## Pipework connection

### PJE couplings

A set includes 1 coupling, 1 gasket, 1 pipe stub and bolts and nuts.

| Pump type | Socket | PN | Pipework connection | Number of coupling sets needed | Part number | |
|---|---|---|---|---|---|---|
| | | | | | EPDM | FKM |
| CRT(E) 2 and CRT(E) 4 | Threaded | 80 bar | R 1¼ | 2 | 415520 | 415538 |
| | For welding | 80 bar | DN 32 | 2 | 415521 | 415539 |
| CRT(E) 8 and CRT(E) 16 | Threaded | 70 bar | R 2 | 2 | 425935 | 425951 |
| | For welding | 70 bar | DN 50 | 2 | 425934 | 425952 |

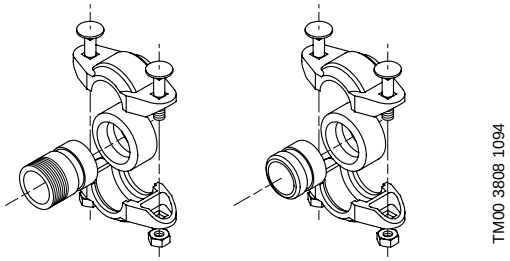



**Fig. 14** PJE couplings

### DIN flanges

For pipework connection, Grundfos offers the following sets of DIN flanges.

| Pump type | Pipework connection | Flange type | EPDM | FKM |
|---|---|---|---|---|
| CRT(E) 2 | DN 32 | DIN/JIS | 96521134 | 96521135 |
| CRT(E) 2 | DN 32 | ANSI | 96521136 | 96521137 |
| CRT(E) 4 | DN 32 | DIN/JIS | 96521134 | 96521135 |
| CRT(E) 4 | DN 32 | ANSI | 96521136 | 96521137 |
| CRT(E) 8 | DN 40 | DIN/JIS | 96546697 | 96546699 |
| CRT(E) 8 | DN 40 | ANSI | 96546700 | 96546701 |
| CRT(E) 16 | DN 50 | DIN/JIS | 96533932 | 96533934 |
| CRT(E) 16 | DN 50 | ANSI | 96533937 | 96533938 |

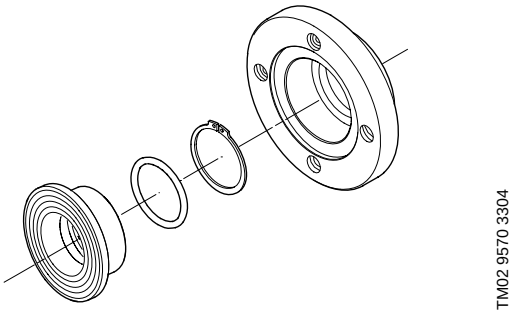



**Fig. 15** Optional DIN flange

## Lists of variants - on request

Although the Grundfos CRT(E) product range offers a number of pumps for different applications, customers require specific pump solutions to satisfy their needs.

Below please find the range of options available for customising the CRT(E) pumps to meet the customers' demands.

Contact Grundfos for further information or for requests other than the ones mentioned below.

## Motors

| Variant | Description |
|---|---|
| **ATEX-approved motors** | For operation in hazardous atmospheres, explosion-proof or dust-ignition-proof motors may be required. |
| **Motors with anti-condensation heating unit** | For operation in humid environments, motors with built-in anti-condensation heating unit may be required. |
| **Motors with thermal protection** | Grundfos offers motors with built-in bimetallic thermal switches or temperature-controlled PTC sensors (thermistors) incorporated in the motor windings. |
| **Oversized motor** | Ambient temperatures above 40°C or installation at altitudes of more than 1000 metres above sea level require the use of an oversized motor (i.e. derating). |
| **4-pole motors** | Grundfos offers standard motors with 4 poles. |

## Shaft seals

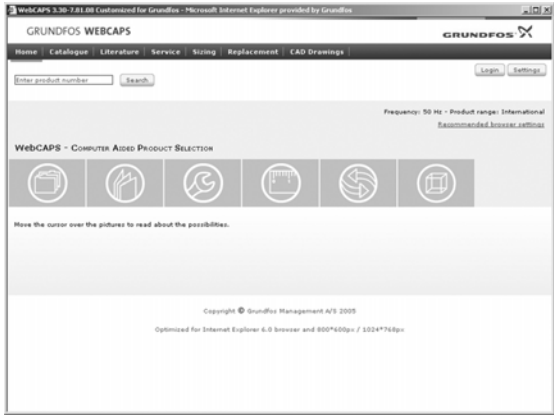
| Variant | Description |
|---|---|
| **Shaft seal with FFKM O-ring** | Shaft seals with FFKM O-ring are recommended for applications where the pumped liquid may damage the standard O-ring material. |
| **Shaft seal with SiC/SiC** | Grundfos offers shaft seals with silicon carbide/silicon carbide (SiC/SiC). |

## Pumps

| Variant | Description |
|---|---|
| **Horizontally mounted pump** | For safety or height reasons, certain applications, for instance on ships, require the pump to be mounted in the horizontal position.<br>For easy installation the pump is equipped with brackets that support motor and pump. |
| **Pump with bearing flange** | The bearing flange is suitable for applications where the inlet pressure is higher than the maximum pressure recommended.<br>The bearing flange increases the life of motor bearings.<br>(Recommended for standard motors.) |
| **Belt-driven pumps** | Belt-driven pumps designed to operate in places with limited space or where no electrical power is available. |

# Further product documentation

## WebCAPS




WebCAPS is a **Web**-based **C**omputer **A**ided **P**roduct **S**election program available on www.grundfos.com.

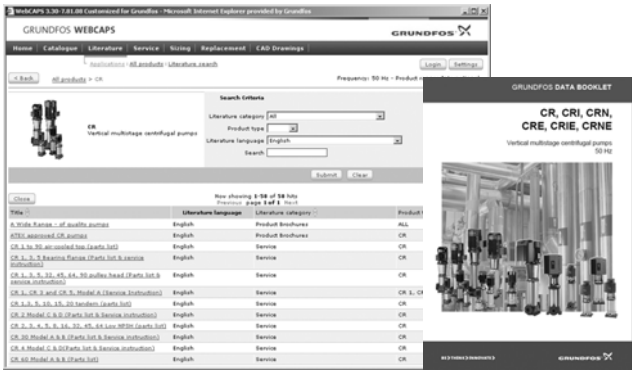
WebCAPS contains detailed information on more than 185,000 Grundfos products in more than 22 languages.

In WebCAPS, all information is divided into 6 sections:

- Catalogue
- Literature
- Service
- Sizing
- Replacement
- CAD drawings.

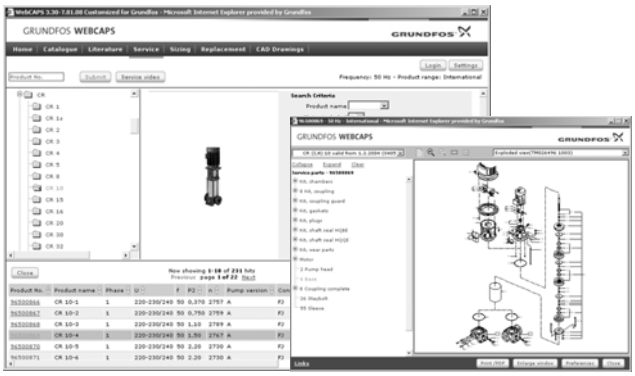

**Catalogue**

This section is based on fields of application and pump types, and contains
- technical data
- curves (QH, Eta, P1, P2, etc) which can be adapted to the density and viscosity of the pumped liquid and show the number of pumps in operation
- product photos
- dimensional drawings
- wiring diagrams
- quotation texts, etc.




**Literature**

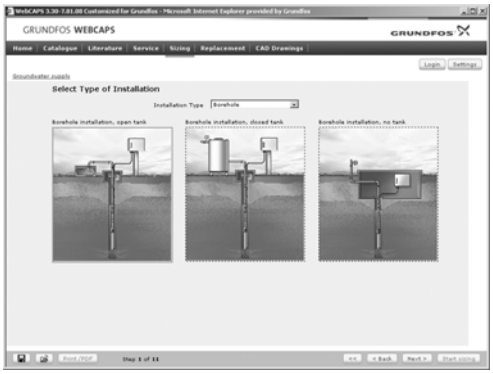
In this section you can access all the latest documents of a given pump, such as
- data booklets
- installation and operating instructions
- service documentation, such as Service kit catalogue and Service kit instructions
- quick guides
- product brochures, etc.




**Service**

This section contains an easy-to-use interactive service catalogue. Here you can find and identify service parts of both existing and discontinued Grundfos pumps.
Furthermore, this section contains service videos showing you how to replace service parts.

# Further product documentation



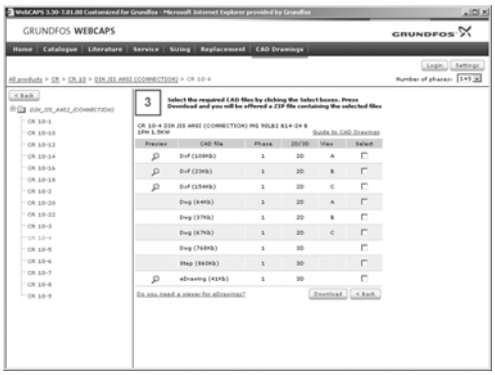

**Sizing**

This section is based on different fields of application and installation examples, and gives easy step-by-step instructions in how to
- select the most suitable and efficient pump for your installation
- carry out advanced calculations based on energy consumption, payback periods, load profiles, life cycle costs, etc.
- analyse your selected pump via the built-in life cycle cost tool
- determine the flow velocity in wastewater applications, etc.


**Replacement**

In this section you find a guide to selecting and comparing replacement data of an installed pump in order to replace the pump with a more efficient Grundfos pump.
The section contains replacement data of a wide range of pumps produced by other manufacturers than Grundfos.

Based on an easy step-by-step guide, you can compare Grundfos pumps with the one you have installed on your site. When you have specified the installed pump, the guide will suggest a number of Grundfos pumps which can improve both comfort and efficiency.




**CAD drawings**

In this section it is possible to download 2-dimensional (2D) and 3-dimensional (3D) CAD drawings of most Grundfos pumps.

These formats are available in WebCAPS:

2-dimensional drawings:
- .dxf, wireframe drawings
- .dwg, wireframe drawings.

3-dimensional drawings:
- .dwg, wireframe drawings (without surfaces)
- .stp, solid drawings (with surfaces)
- .eprt, E-drawings.

## WinCAPS


**Fig. 16** WinCAPS CD-ROM

WinCAPS is a **Win**dows-based **C**omputer **A**ided **P**roduct **S**election program containing detailed information on more than 185,000 Grundfos products in more than 22 languages.

The program contains the same features and functions as WebCAPS, but is an ideal solution if no Internet connection is available.

WinCAPS is available on CD-ROM and updated once a year.

| V7149894 0606 | GB |
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| Repl. V7149894 1205 | |

Subject to alterations.

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