

# Hydro Solo-S

Complete pressure boosting system  
50 Hz



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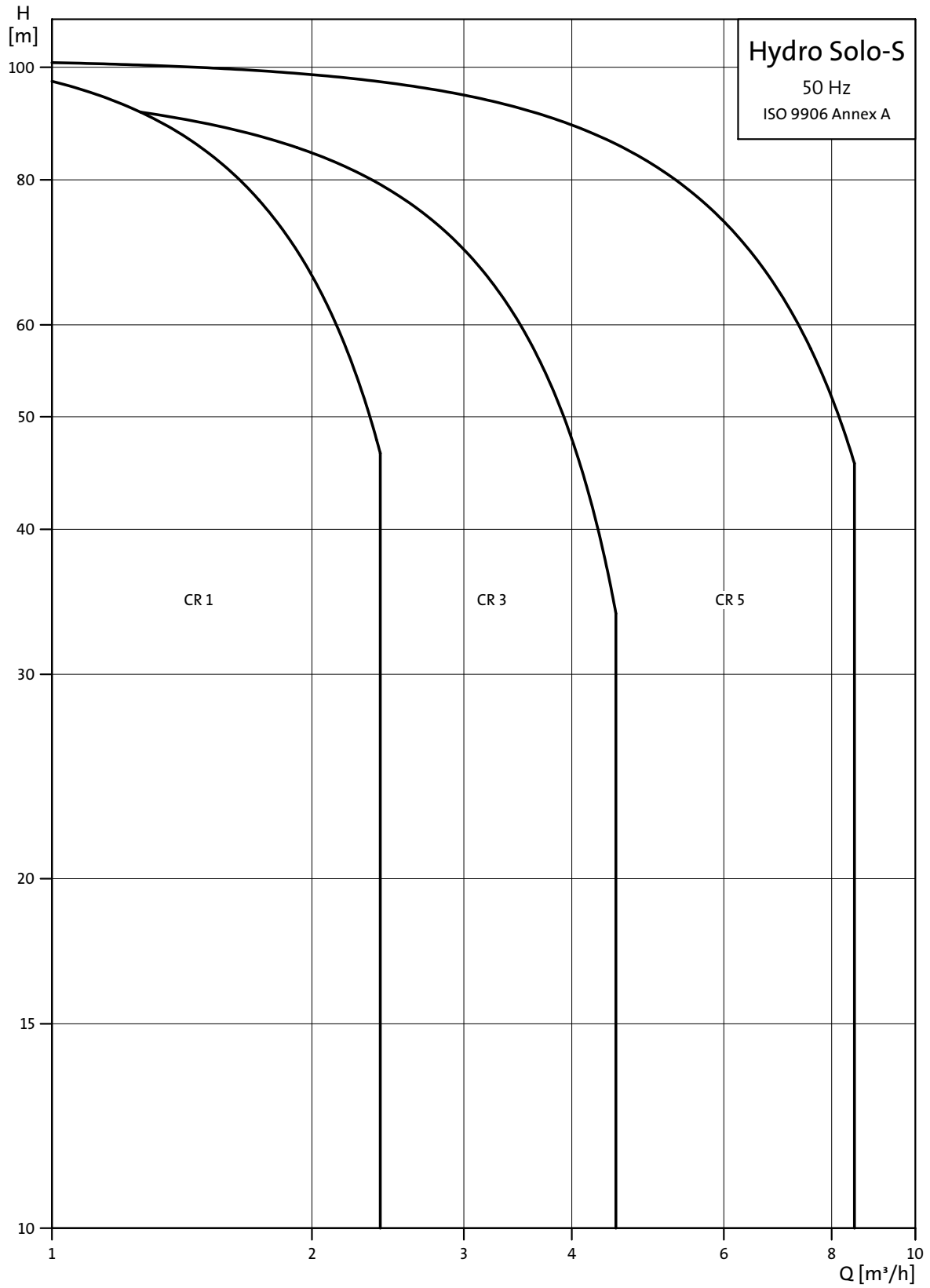
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## Performance range



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### Hydro Solo-S

Grundfos Hydro Solo-S booster sets are designed for the transfer and pressure boosting of clean water in single-family houses, cottages, farms or as pressure boosting in other systems e.g. process water systems and irrigation.

Hydro Solo-S is compact, maintenance-free and easy to install. The booster set is ready for operation when the piping system and the electricity supply have been connected.

Grundfos Hydro Solo-S booster set with one pump is a combined unit consisting of one pump (CR) fitted with isolating valve, discharge pipe, pressure switch, pressure gauge and diaphragm tank.

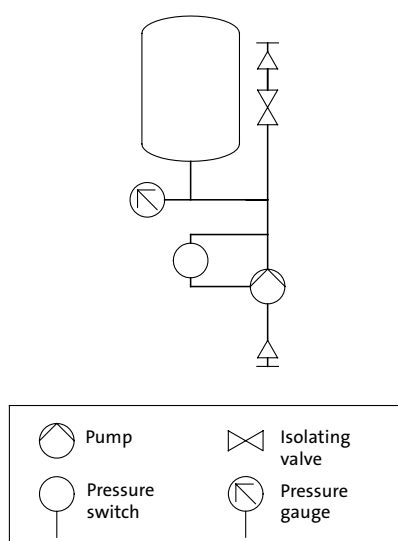


Fig. 1 Principal sketch of Hydro Solo-S

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### Operating conditions

- Capacity:** 0.7 - 8.5 m<sup>3</sup>/h
- Liquid temperature:** 0°C to +70°C
- Ambient temperature:** 0°C to +40°C
- System pressure:** The maximum system pressure is 10 bar.

The total of inlet pressure and head must not exceed the maximum system pressure.

### Inlet pressure

#### 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:

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

$p_b$  = Barometric pressure in bar.  
Barometric pressure can be set to 1, if required.

**NPSH** = Net Positive Suction Head in metres head.  
NPSH can be read from the NPSH curve at the maximum capacity at which the pump will run.

$H_f$  = Friction loss in suction pipe in metres head.

$H_v$  = Vapour pressure in metres head.

$H_s$  = Safety margin of min. 0.5 metres head.

### Maximum inlet pressure

Pump type	Phases		Max. inlet pressure
	1~	3~	
CR 1-4	●	●	7 [bar]
CR 1-7	●	●	7 [bar]
CR 1-10	●	●	7 [bar]
CR 1-13	-	●	10 [bar]
CR 1-17	-	●	10 [bar]
CR 3-4	●	●	7 [bar]
CR 3-7	●	●	7 [bar]
CR 3-10	●	●	7 [bar]
CR 3-12	-	●	10 [bar]
CR 3-15	-	●	10 [bar]
CR 5-3	-	●	7 [bar]
CR 5-4	●	-	7 [bar]
CR 5-5	-	●	7 [bar]
CR 5-8	-	●	7 [bar]
CR 5-10	-	●	10 [bar]
CR 5-15	-	●	10 [bar]

### Example of operating and inlet pressures

The values for operating and inlet pressures must not be considered individually but must always be compared, see the following example:

#### Example:

The following pump type has been selected:  
CR 5-3 A-A-A

- Max. operating pressure: **10 bar**
- Max. inlet pressure: **7 bar**
- Discharge pressure against a closed valve: **1.4 bar**.

The system is allowed to start at an inlet pressure of 7 bar as the discharge pressure is only 1.4 bar which results in an operating pressure of 7 + 1.4 = **8.4 bar**.

### Type key

#### Single-phase:

Example	Hydro	Solo-S	CR 5-4	1 x 200 - 240 V, 50 Hz
Type range				
Subgroup				
Pump type				
Supply voltage, frequency				

#### Three-phase:

Example	Hydro	Solo-S	CR 3-12	3 x 380 - 415 V, 50 Hz
Type range				
Subgroup				
Pump type				
Supply voltage, frequency				

### Product range

Pump type	Motor [kW]	Pressure switch [bar]	Product numbers	
			1 x 200 - 240 V 50 Hz, PE	3 x 380 - 415 V 50 Hz, N, PE
CR 1-4	0.37	0 - 6	96471823	96471831
CR 1-7	0.37	0 - 6	96471824	96471832
CR 1-10	0.55	0 - 6	96471825	96471833
CR 1-13	0.75	0 - 10	-	96471834
CR 1-17	1.1	0 - 10	-	96471835
CR 3-4	0.37	0 - 6	96471826	96471836
CR 3-7	0.55	0 - 6	96471827	96471837
CR 3-10	0.75	0 - 6	96471828	96471838
CR 3-12	1.1	0 - 10	-	96471839
CR 3-15	1.1	0 - 10	-	96471840
CR 5-3	0.55	0 - 6	-	96471841
CR 5-4	0.55	0 - 6	96471829	-
CR 5-5	0.75	0 - 6	-	96471842
CR 5-8	1.1	0 - 6	-	96471843
CR 5-10	1.5	0 - 10	-	96471844
CR 5-15	2.2	0 - 10	-	96471845

### Construction

Pos.	Designation	Qty.
1	CR pump	1
2	Diaphragm tank	1
3	Pressure switch	1
4	Pressure gauge	1
5	Discharge pipe (brass)	1
6	Isolating valve	1

On the discharge side of the pump is fitted a discharge pipe made of brass.

On the discharge pipe are fitted a pressure switch.

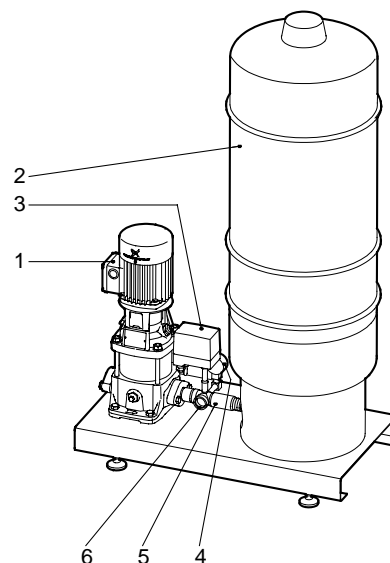


Fig. 2 Construction of Hydro Solo-S

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### Installation

A Hydro Solo-S booster set **must** be installed in a well ventilated room to ensure sufficient cooling for the pump. Hydro Solo-S is **not** suitable for outdoor installation.

The booster set should be placed with sufficient clearance around it.

### Mechanical installation

The pipes connected to the booster set must be of adequate size. To avoid resonance, expansion joints should be fitted both in the discharge and suction pipes.

The pipes are to be connected to the discharge pipe and the pump suction port.

The booster set should be tightened up prior to start-up.

It is always advisable to fit pipe hangers both on the suction and discharge side.

The system should be positioned on an even and solid surface, e.g. a concrete floor or foundation.

## Curve conditions

The following curves are subject to the following guidelines:

Performance measurement is made at a water temperature of +20°C. Test liquid: Pure water.

The curves describe the pump mean values.

**The curves should not be used as guarantee curves.**

Curve tolerance: ISO 9906, Annex A.

The conversion between head  $H(m)$  and pressure  $p$  (kPa) has been made for water with a density of  $\rho = 1000 \text{ kg/m}^3$ .

The curves apply to a kinematic viscosity of  $1 \text{ mm}^2/\text{s}$  (1 cSt).

## Motor

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

Electrical tolerances according to EN 60034.

### Electrical data

<b>Mounting designation</b>	Up to 4 kW: V 18
<b>Insulation class</b>	F
<b>Efficiency class</b>	Eff.2 Eff.1 – on request
<b>Enclosure class</b>	IP 55 IP 44 and IP 54 – on request
<b>50 Hz Standard voltages</b>	3 x 200-220/346-380V, -10%/+10% 3 x 220-240/380-415V 3 x 380-415Δ V 1 x 220-230/240 V

### Motor protection

Single-phase motors have a built-in thermal overload switch.

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

To protect the motor against overload, it **must** be connected to an external thermal-magnetic motor circuit breaker GV2-ME.

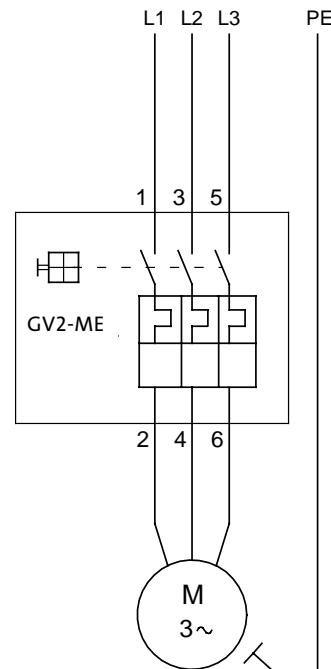
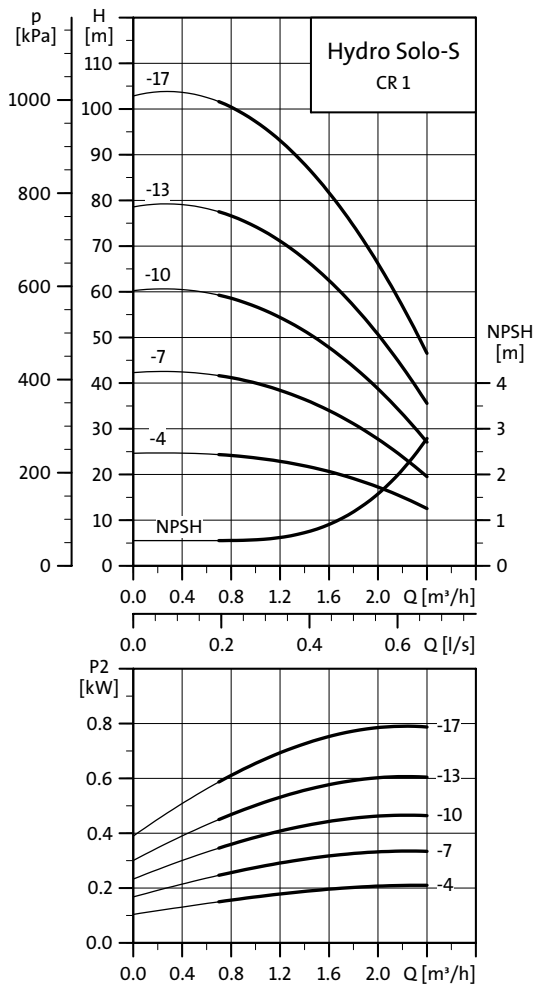


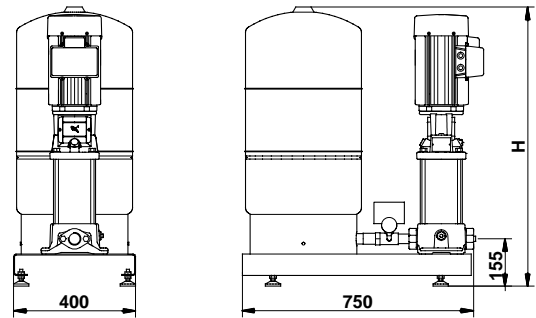
Fig. 3 Motor protection

Description	Mounting	Product number
Motor: 0.37 - 0.55 kW	On the pump	96 49 11 18
Motor: 0.75 kW	On the pump	96 49 11 19
Motor: 1.1 - 1.5 kW	On the pump	96 48 27 17
Motor: 2.2 kW	On the pump	96 48 49 69

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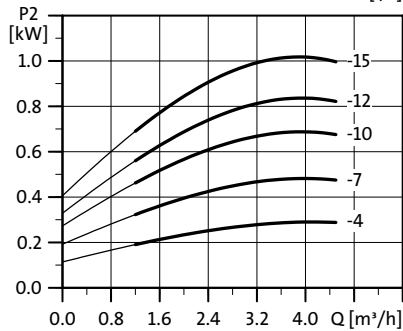
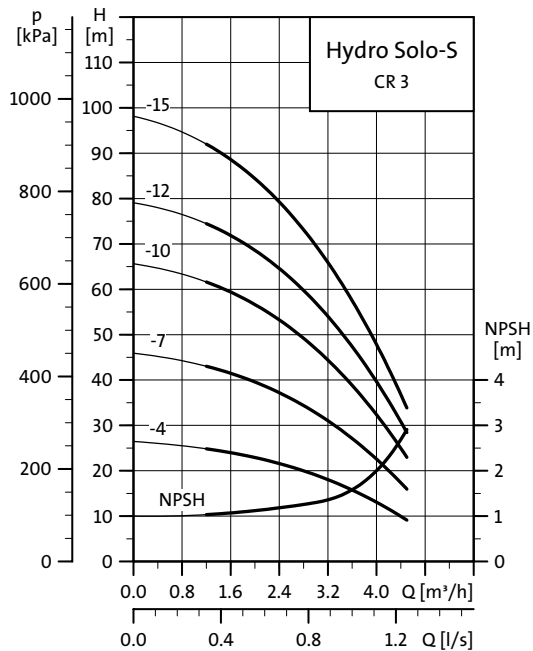
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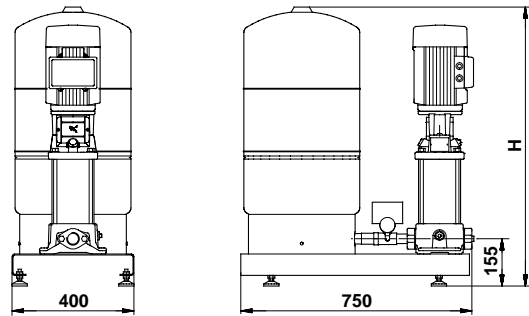
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### Electrical data, dimensions and weights

Pump type	Motor [kW]	Full load current 1/1 [A]		Supply voltage		Diaphragm tank [litres]	Connection		H [mm]	Weights [kg]		Packing [m³]
		1~	3~	1 x 220-240 V, PE	3 x 380-415 V, PE		Inlet	Outlet		Net	Gross	
CR 1-4	0.37	3.0-2.7	1.0	●	●	80	Rp 1	Rp 1	924	50.0	53.0	0.30
CR 1-7	0.37	3.0-2.7	1.0	●	●	80	Rp 1	Rp 1	924	51.0	54.0	0.30
CR 1-10	0.55	4.0-3.7	1.44	●	●	80	Rp 1	Rp 1	924	53.0	56.0	0.30
CR 1-13	0.75	-	1.9	-	●	80	Rp 1	Rp 1	924	72.0	75.0	0.30
CR 1-17	1.1	-	2.65	-	●	80	Rp 1	Rp 1	924	74.0	77.0	0.30



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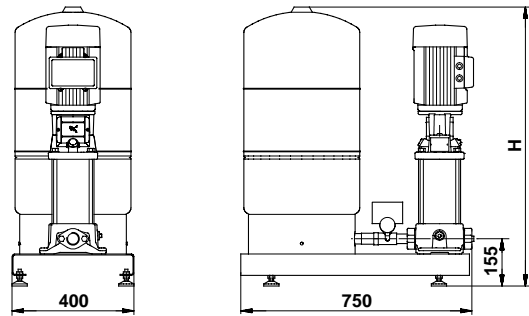
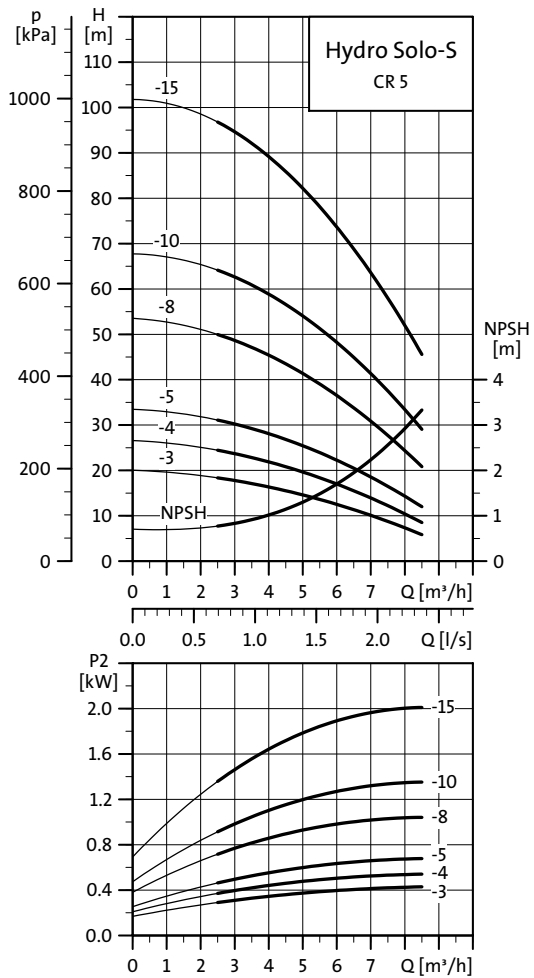


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## Electrical data, dimensions and weights

Pump type	Motor [kW]	Full load current 1/1 [A]		Supply voltage		Diaphragm tank [litres]	Connection		H [mm]	Weights [kg]		Packing [m³]
		1~	3~	1 x 220-240 V, PE	3 x 380-415 V, PE		Inlet	Outlet		Net	Gross	
CR 3-4	0.37	3.0-2.7	1.0	●	●	120	Rp 1	Rp 1	1269	56.0	59.0	0.42
CR 3-7	0.55	4.0-3.7	1.44	●	●	120	Rp 1	Rp 1	1269	58.0	61.0	0.42
CR 3-10	0.75	5.1-4.8	1.9	●	●	120	Rp 1	Rp 1	1269	61.0	64.0	0.42
CR 3-12	1.1	-	2.65	-	●	120	Rp 1	Rp 1	1269	85.0	88.0	0.42
CR 3-15	1.1	-	2.65	-	●	120	Rp 1	Rp 1	1269	86.0	89.0	0.42





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## Electrical data, dimensions and weights

Pump type	Motor [kW]	Full load current 1/1 [A]		Supply voltage		Diaphragm tank [litres]	Connection		H [mm]	Weights [kg]		Packing [m³]
		1~	3~	1 x 220-240 V, PE	3 x 380-415 V, PE		Inlet	Outlet		Net	Gross	
CR 5-3	0.55	-	1.44	-	●	120	Rp 1¼	Rp 1	1269	56.0	59.0	0.42
CR 5-4	0.55	4.0-3.7	-	●	-	120	Rp 1¼	Rp 1	1269	60.0	63.0	0.42
CR 5-5	0.75	-	1.9	-	●	120	Rp 1¼	Rp 1	1269	60.0	63.0	0.42
CR 5-8	1.1	-	2.65	-	●	120	Rp 1¼	Rp 1	1269	63.0	66.0	0.42
CR 5-10	1.5	-	3.4	-	●	120	Rp 1¼	Rp 1	1269	92.0	95.0	0.42
CR 5-15	2.2	-	4.75	-	●	120	Rp 1¼	Rp 1	1269	96.0	99.0	0.42

# Further product documentation

In addition to the printed data booklet, Grundfos offers the following sources of product documentation.

- WinCAPS
- WebCAPS.

## WinCAPS

WinCAPS is a **Windows-based Computer-Aided Product Selection** program containing information on more than 90,000 Grundfos products.

Available on CD-ROM in more than 15 languages, WinCAPS offers

- detailed technical information
- selection of the optimum pump solution
- dimensional drawings of each pump
- detailed service documentation
- installation and operating instructions
- wiring diagrams of each pump.



Fig. 4 WinCAPS CD-ROM

cd-wincaps

Click on **Catalogue** and select a product from the extensive product catalogue.

Click on **Sizing** and select the most suitable pump for your application.

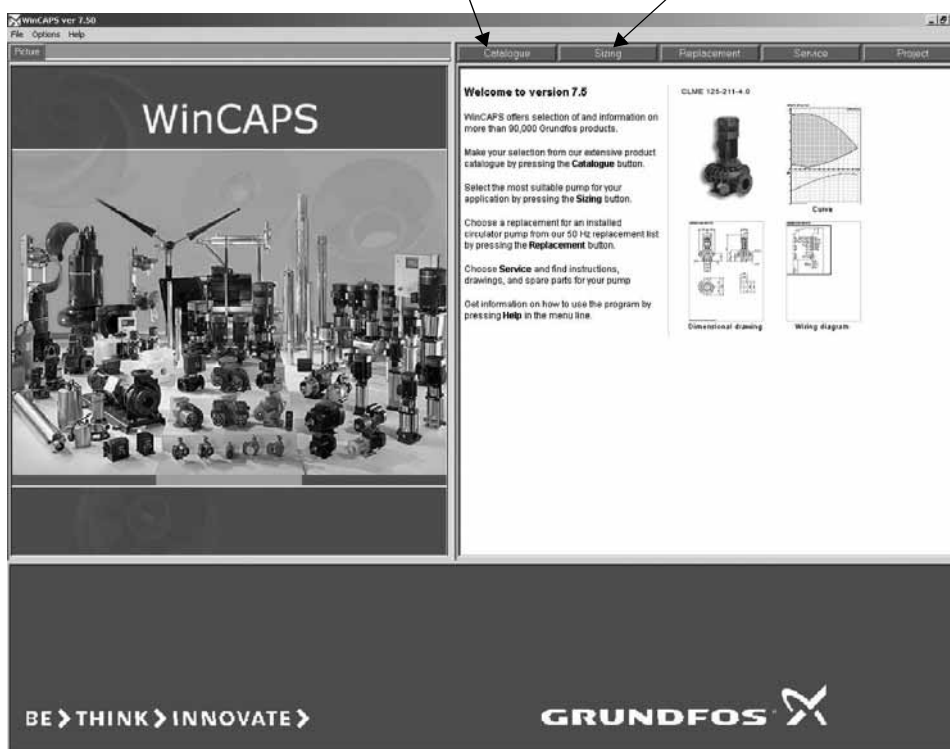


Fig. 5 WinCAPS

WinCAPS

# Further product documentation

## WebCAPS

WebCAPS is a **Web**-based Computer Aided-Product Selection program and a web-version of WinCAPS.

Available on Grundfos' homepage, [www.grundfos.com](http://www.grundfos.com), WebCAPS offers

- detailed technical information
- dimensional drawings of each pump
- wiring diagrams of each pump.

The screenshot shows the WebCAPS 2.21 interface in a Microsoft Internet Explorer browser window. The browser title is "WebCAPS 2.21 Customized for Grundfos - Microsoft Internet Explorer, provided by Grundfos". The page header includes the "WebCAPS" logo and the "GRUNDFOS" logo. Below the header is a navigation bar with tabs for "Product selection", "Literature", and "CAD Drawings". A secondary navigation bar contains buttons for "Catalogue", "Replacement", "Product search", and "Service". On the right side of the header, there are links for "Login", "Unit", and "Language". A "Product range" dropdown menu is set to "General" and a frequency dropdown menu is set to "50 Hz".

The main content area features a large "WebCAPS" heading and a sub-heading "Computer Aided Product Selection". Below this, a text block states: "WebCAPS offers selection of and information on more than 90,000 Grundfos products". A large image shows a collection of various Grundfos pumps. To the right, a specific product is highlighted: "ALPHA 25-40 130". Below the product name are three preview images: "Curve", "Dimensional Drawing", and "Wiring Diagram".

At the bottom of the main content area, there is a list of bullet points:

- make your selection from our extensive product catalogue
- choose a replacement for an installed circulator pump from our 50 Hz replacement list
- Choose service and find instructions, drawings, and spare parts for your pump

Annotations with arrows point to various elements:

- Click Replacement** and select the right replacement pump based on the current installation.
- Click Literature** to select and download Grundfos documentation by browsing the product ranges or performing a specific search. The literature includes:
  - Data booklets
  - Installation and operating instructions
  - Service instructions.
- Click CAD drawings** to select and download CAD drawings in:
  - .stp
  - .dxf
  - .dwg
- Click Product search** and select a product from the extensive product catalogue.
- Click Service** to find information on service kits and spare parts.
- Click Units** and select your preferred units of measurement:
  - Default units
  - SI units
  - US units.
- Click Language** and select your preferred language.
- Click the drop-down list** to select the frequency.
- If you are a registered user click Log in to:**
  - save your settings
  - define and save your own units
  - save personalised information.
- Click Catalogue** and select a product from the extensive product catalogue.

Fig. 6 WebCAPS

WebCAPS

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Subject to alterations.