GRUNDFOS **DATA BOOKLET**

Hydro Multi-E

Grundfos Hydro Multi-E booster sets with 2 or 3 CRE pumps

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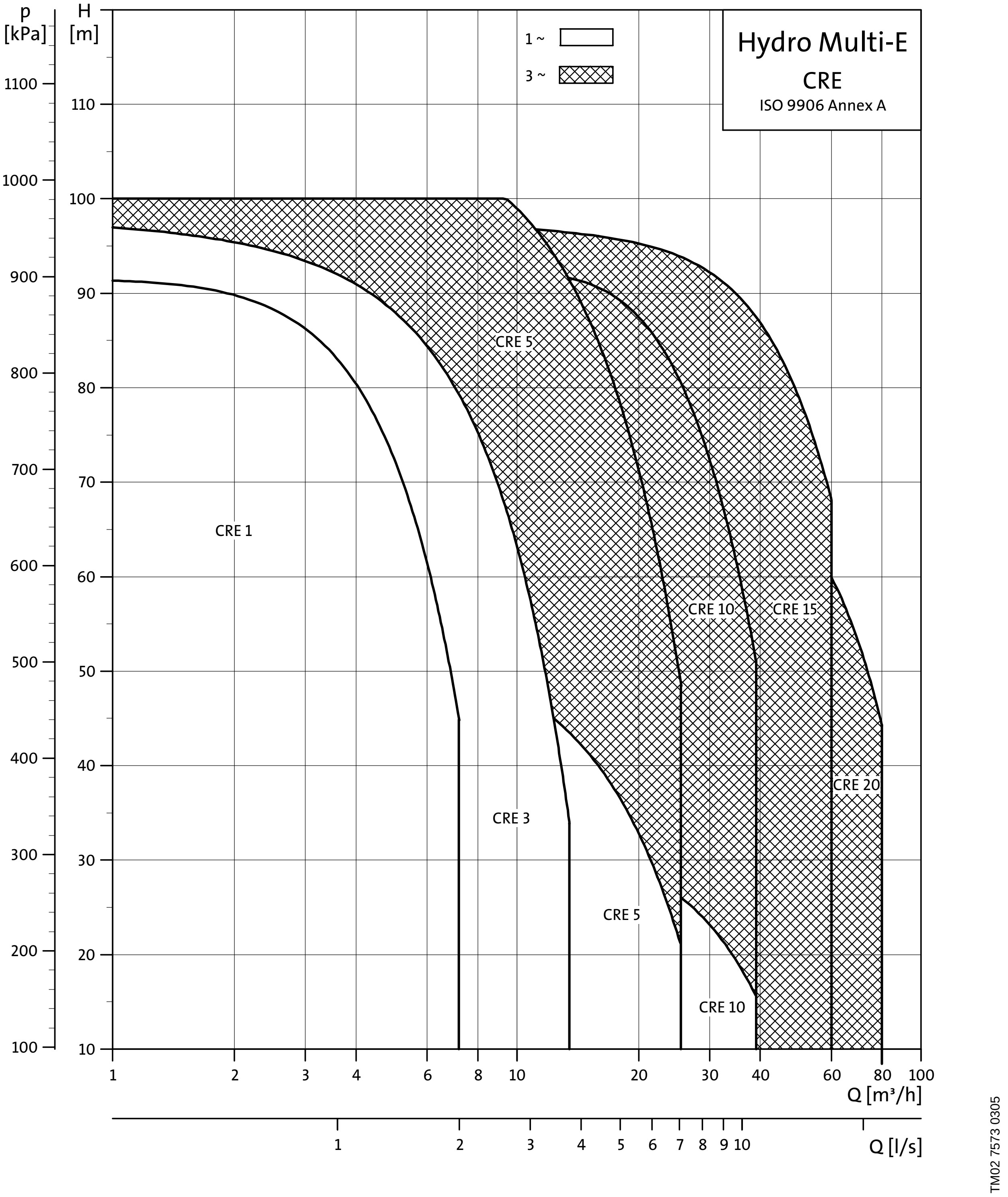


Hydro Multi-E

Grundfos Hydro Multi-E booster sets are designed for the transfer and pressure boosting of clean water in waterworks, blocks of flats, hotels, industry, hospitals, schools, etc.

A Grundfos Hydro Multi-E booster set consists of 2 or 3 CRE pumps coupled in parallel and mounted on a common base frame provided with all the necessary fittings.

The Hydro Multi-E booster set is supplied without dry-running protection. A dry-running protection device **must** be fitted prior to start-up.

When delivered, the Grundfos Hydro Multi-E booster set is factory-tested and ready for operation.

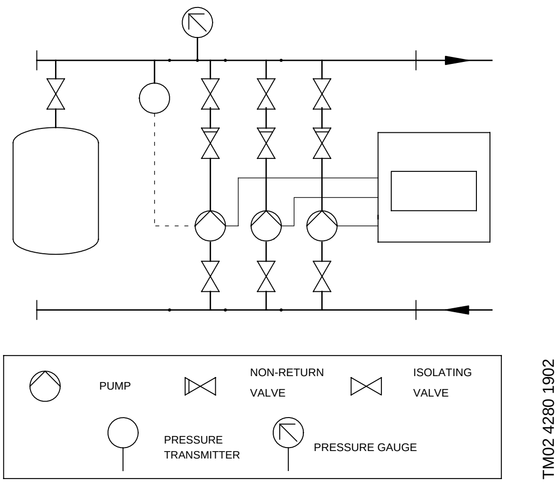


Fig. 1 Hydro Multi-E with three single-phase pumps

Operating conditions

Liquid temperature: 0 °C to +70 °C.

Ambient temperature: 0 °C to +40 °C.

System pressure: Max. 10 bar.

The total of inlet pressure and the pressure when the pump is running against a closed valve must not exceed the maximum system pressure.

Inlet pressure

Minimum inlet pressure

The minimum inlet pressure H in metres head required to avoid cavitation in the pump is calculated as follows:

H = p_b x 10.2 – NPSH – H_f – H_v – H_s

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

CRE 1	
1-7, 1-11, 1-15	10 bar
CRE 3	
3-5, 3-7, 3-10, 3-15	10 bar
CRE 5	
5-4, 5-5, 5-8, 5-10, 5-16	10 bar
CRE 10	
10-3, 10-4, 10-6 10-9	8 bar 10 bar
CRE 15	
15-2, 15-3 15-5, 15-7	8 bar 10 bar
CRE 20	
20-2, 20-3 20-5	8 bar 10 bar

Product range

No. of pumps	Pump type	Motor [kW]	Pressure transmitter [bar]	Size of diaphragm tank [l]	Shaft seal HQQE	Product numbers 3 x 400/230 V, PE, N	Product numbers 3 x 400 V, PE
2	CRE 1-7	0.37	0 - 10	8	●	96090371	-
	CRE 1-11	0.55	0 - 10		●	96090372	-
	CRE 1-15	0.75	0 - 10		●	96090373	-
3	CRE 1-7	0.37	0 - 10		●	96090382	-
	CRE 1-11	0.55	0 - 10		●	96090383	-
	CRE 1-15	0.75	0 - 10		●	96090384	-
2	CRE 3-5	0.37	0 - 10	8	●	96090375	-
	CRE 3-7	0.55	0 - 10		●	96090376	-
	CRE 3-10	0.75	0 - 10		●	96090377	-
	CRE 3-15	1.1	0 - 10		●	96090378	-
3	CRE 3-5	0.37	0 - 10		●	96090386	-
	CRE 3-7	0.55	0 - 10		●	96090387	-
	CRE 3-10	0.75	0 - 10		●	96090388	-
	CRE 3-15	1.1	0 - 10		●	96090389	-
2	CRE 5-4	0.55	0 - 10	18	●	96090379	-
	CRE 5-5	0.75	0 - 10		●	96495991	-
	CRE 5-8	1.1	0 - 10		●	96090380	-
	CRE 5-10	1.5	0 - 10		●	-	96090393
	CRE 5-16	2.2	0 - 10		●	-	96090394
3	CRE 5-4	0.55	0 - 10		●	96090390	-
	CRE 5-5	0.75	0 - 10		●	96495992	-
	CRE 5-8	1.1	0 - 10		●	96090391	-
	CRE 5-10	1.5	0 - 10		●	-	96090402
	CRE 5-16	2.2	0 - 10		●	-	96090403
2	CRE 10-3	1.1	0 - 10	24	●	96513914	-
	CRE 10-4	1.5	0 - 10		●	-	96513916
	CRE 10-6	2.2	0 - 10		●	-	96513917
	CRE 10-9	3.0	0 - 10		●	-	96513918
3	CRE 10-3	1.1	0 - 10		●	96513915	-
	CRE 10-4	1.5	0 - 10		●	-	96513919
	CRE 10-6	2.2	0 - 10		●	-	96513930
	CRE 10-9	3.0	0 - 10		●	-	96513931
2	CRE 15-2	2.2	0 - 10	33	●	-	96513934
	CRE 15-3	3.0	0 - 10		●	-	96513935
	CRE 15-5	4.0	0 - 10		●	-	96513936
	CRE 15-7	5.5	0 - 10		●	-	96513937
3	CRE 15-2	2.2	0 - 10		●	-	96513938
	CRE 15-3	3.0	0 - 10		●	-	96513939
	CRE 15-5	4.0	0 - 10		●	-	96513940
	CRE 15-7	5.5	0 - 10		●	-	96513941
2	CRE 20-2	2.2	0 - 10		●	-	96513942
	CRE 20-3	4.0	0 - 10		●	-	96513943
	CRE 20-5	5.5	0 - 10		●		96513944
3	CRE 20-2	2.2	0 - 10		●		96513945
	CRE 20-3	4.0	0 - 10		●	-	96513946
	CRE 20-5	5.5	0 - 10		●		96513946

Type key

Example	Hydro	Multi-E	2	CRE 1-7	3 x 400/230 V
Type range	●				
Subgroup		●			
Number of pumps: 2 or 3			●		
Pump type				●	
Supply voltage					●

Construction

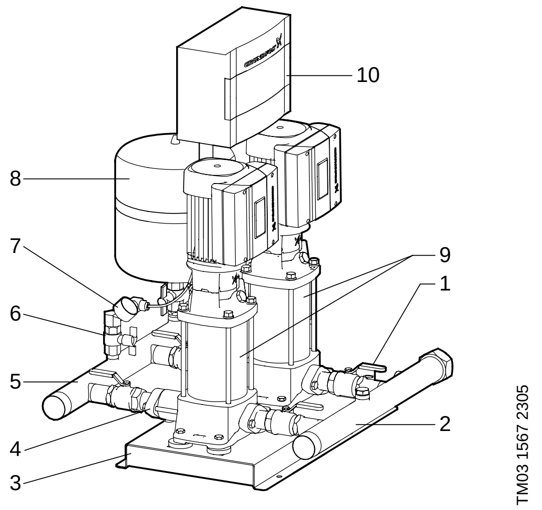


Fig. 2 Hydro Multi-E

Pos.	Description	Qty.
1	Isolating valve	2 per pump
2	Suction manifold (stainless steel)	1
3	Base frame (stainless steel)	1
4	Non-return valve	1 per pump
5	Discharge manifold (stainless steel)	1
6	Pressure transmitter	1
7	Pressure gauge	1
8	Diaphragm tank	1
9	CRE pump	2-3
10	Breaker cabinet	1

Hydro Multi-E is mounted on a common base frame made of stainless steel (EN/DIN 1.4301).

A suction manifold (EN/DIN 1.4401 or EN/DIN 1.4571) and an isolating valve are fitted on the suction side.

A non-return valve, an isolating valve, a pressure gauge, a pressure transmitter, a diaphragm tank and a stainless-steel discharge manifold (EN/DIN 1.4401 or EN/DIN 1.4571) are fitted on the discharge side.

The Hydro Multi-E is fitted with an on/off switch for the mains supply.

Diaphragm tank

The diaphragm tank is pre-charged to correct pressure. If the setpoint is altered, a new pre-charge pressure should be calculated to obtain optimum duty:

Calculation of pre-charge pressure:

Pre-charge pressure = 0.7 x setpoint

The diaphragm tank pre-charge pressure must be measured in a pressureless system.

It is recommended to refill the tank with nitrogen.

Environmental considerations

Grundfos manufactures its motors and other products with a high degree of consideration for the environment in respect of materials, production methods, energy-saving operation and recycling of as many materials as possible.

The Grundfos A/S manufacturing company is

- certified as environmentally friendly in accordance with ISO 14001.
- is approved in accordance with European certification standard EMAS.
- holds an ISO 9001 certificate.

Regulatory requirements

The Hydro Multi-E booster set complies with the following directives and standards:

MD (Machinery Directive: 98/37/EC)

EN ISO 12100:
Safety of machines. Basic terms, general principles for projecting, construction and design. Part 1: Basic terminology, methology.

LVD (Low Voltage Directive: 73/23/EEC)

EN 60 204-1:
Electrical equipment of machines. Part 1: General requirements.

PED (Pressure Equipment Directive: 97/23/EC)

According to standard EN 13 831.

EMC (EMC Directive: 89/336/EEC)

According to standard EN 61 800-3.

CE-marking

Hydro Multi-E booster sets on the European market are CE-marked.

TM02 1695 1901

Fig. 3 CE-marking

Installation

A Hydro Multi-E booster set must be installed in a well ventilated room to ensure sufficient cooling of the pumps. Hydro Multi-E is not suitable for outdoor installation.

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

Enclosure class:	IP 55 (IEC 34-5).
Insulation class:	F (IEC 85).

Motor cooling

To ensure adequate cooling of motor and electronics, the following must be observed:

- Place the Hydro Multi-E in such a way that sufficient cooling is ensured.
- The temperature of the cooling air must not exceed 40°C.

Motor cooling fins, holes in fan cover and fan blades must be kept clean.

Pipework

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

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

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

The booster set should be positioned on an even and solid surface, e.g. a concrete floor or foundation. If the booster set is not fitted with vibration dampers, it must be bolted to the floor or foundation.

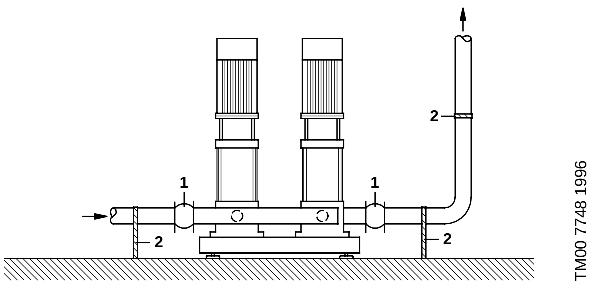


Fig. 4 Pipework

1. Expansion joints.
2. Pipe hangers.

Expansion joints and pipe hangers are not included in a standard booster set.

Electrical connection

The electrical connection and protection should be carried out in accordance with local regulations.

- The pump must be connected to an external mains switch.
- The pump must be correctly earthed.
  Note: The 4.0 - 5.5 kW motors must be connected to especially reliable/sturdy earth connections due to an earth leakage current above 3.5 mA.
- The pump requires no external motor protection. The motor incorporates thermal protection against slow overloading and blocking (IEC 34-11: TP 211).
- When the pump is switched on via the mains, the pump will start after approx. 5 seconds.

Note: The number of starts and stops via the mains supply must not exceed 4 times per hour.

The pump mains connection must be made as shown in the diagrams below.

3 x 400/230 V ±10%

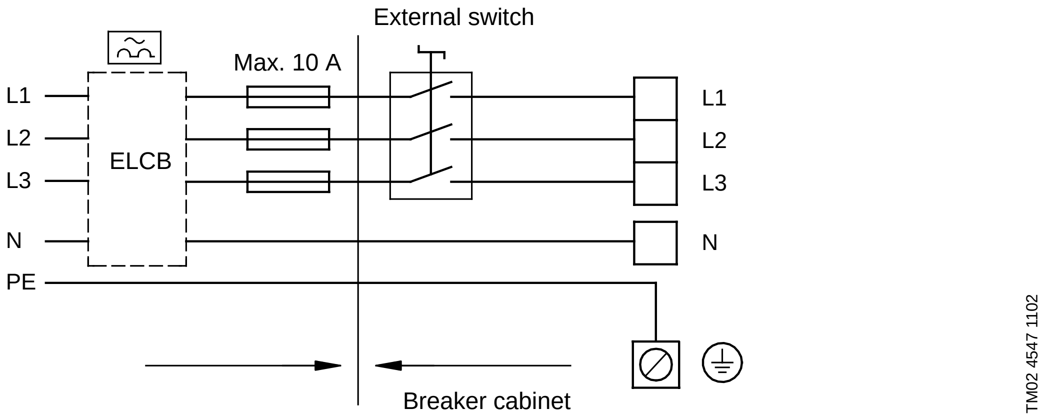


Fig. 5 Wiring diagram, single-phase

3 x 400 V ±10%

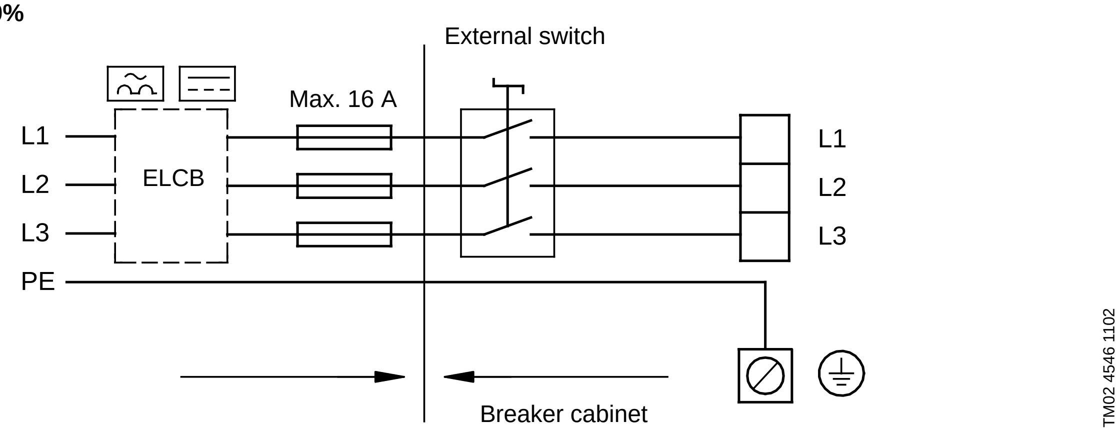
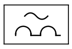


Fig. 6 Wiring diagram, three-phase

Additional protection

If the pump is connected to an electric installation where an earth leakage circuit breaker (ELCB) is used as an additional protection, the earth leakage circuit breaker must be marked with the following symbols.

- Single-phase:



  The earth leakage circuit breaker **must** trip out when earth fault currents with DC content (pulsating DC) occur.

- Three-phase:

  The earth leakage circuit breaker **must** trip out when earth fault currents with DC content (pulsating DC) and smooth DC earth fault currents occur.

Other connections

The connection of external potential-free contacts for start/stop and fault signal is shown in the wiring diagrams.

The wires can be connected to the following connection groups:

Group 1:	Inputs (external start/stop, digital function, setpoint and sensor signals, terminals 1-9, and bus connection, terminals A, Y, B and A1, Y, B1). All inputs are internally separated from the mains-conducting parts by reinforced insulation and galvanically separated from other circuits. Output (signal relay, terminals NC, C and NO).
Group 2:	The output is galvanically separated from other circuits. Therefore, the supply voltage or protective extra-low voltage can be connected to the output as desired.
Group 3:	Mains supply (terminals N, PE, L or L1, L2, L3, PE).

Note:

- As a precaution, the wires must be separated from each other by reinforced insulation in their entire lengths.
- Maintain the connection across terminals 2 and 3.

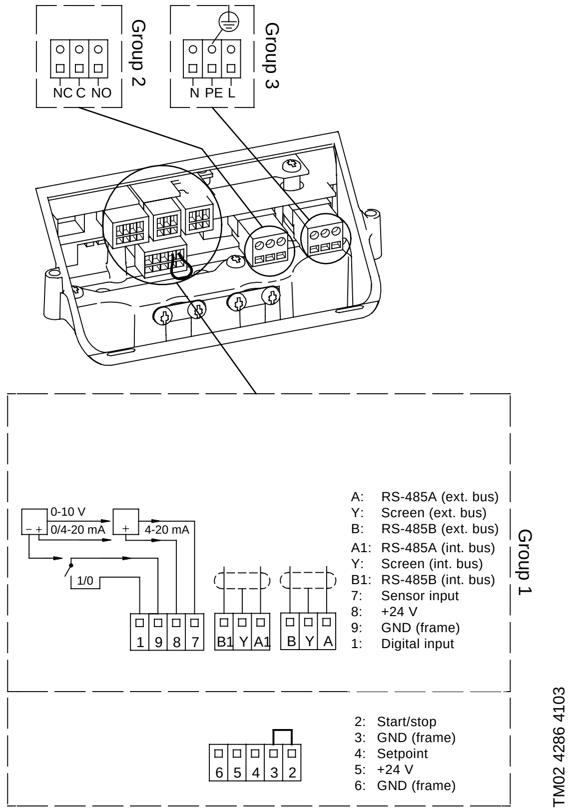


Fig. 7 Wiring diagram for pump no. 1, single-phase

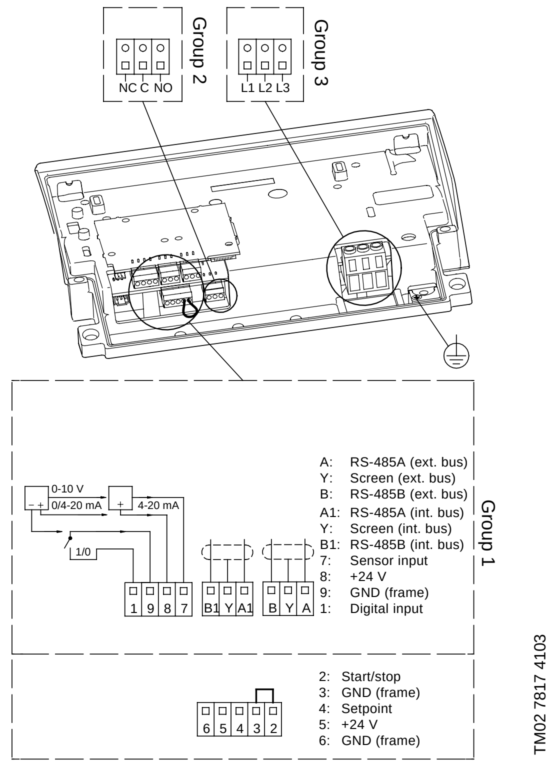


Fig. 8 Wiring diagram for pump no. 1, three-phase

Cables

Use screened cables (min. 0.5 mm^2) for external on/off switch, setpoint and sensor signals. The screens of the cables should be connected to frame at both ends.

The screen of the cable must have good frame connection and it must be as close as possible to the terminals.

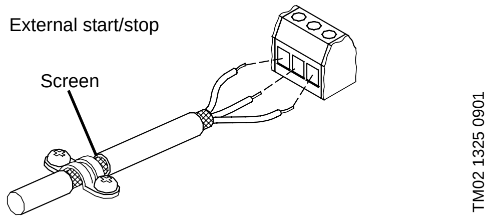


Fig. 9 Cable connection

For the bus connection a screened 2-core cable must be used. Connect the screen to terminal Y at both ends.

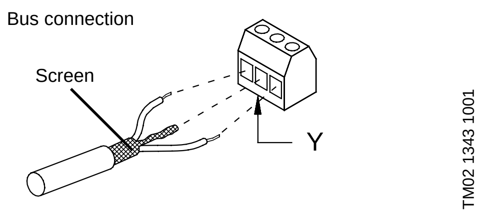


Fig. 10 Cables for bus connection

Control options

Communication with CRE pumps is possible by means of

- a building management system
- a remote control (Grundfos R100)
- a control panel.

The purpose of controlling a CRE pump is to monitor and control the pressure, temperature, flow and liquid level of the system.

Building management system

Communication with the CRE pump is possible even though the operator is not present near the CRE pump. Communication is enabled by having connected the CRE pump to a building management system allowing the operator to monitor and change control modes and setpoint settings of the CRE pump.

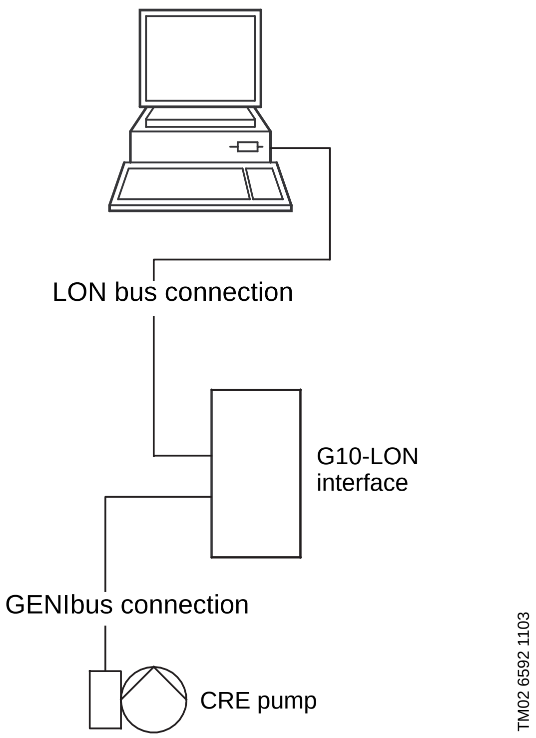


Fig. 11 Structure of a building management system

R100 remote control

The R100 remote control produced by Grundfos is available as an accessory.

The R100 communicates with the CRE pump via infrared light. During communication, the R100 must be pointed at the control panel on the CRE pump terminal box.

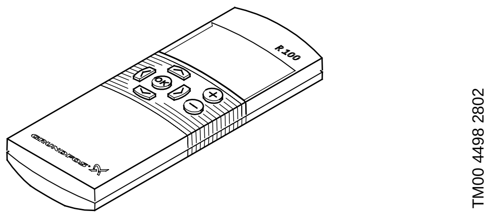


Fig. 12 R100 remote control

On the R100 control panel, it is possible to monitor and change control modes and settings of the CRE pump.

Control panel

The control panel on the CRE pump terminal box makes it possible to change the setpoint settings manually.

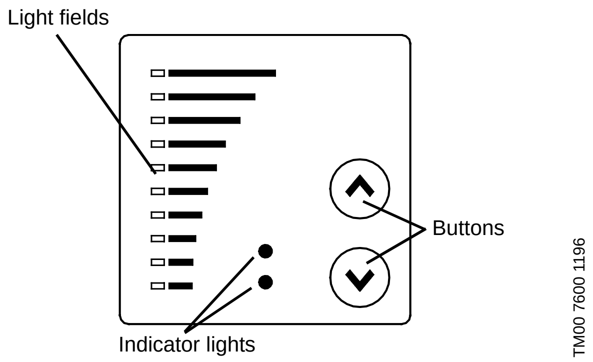


Fig. 13 Control panel on CRE pump

For further information about control options of CRE pumps, please see the "Grundfos E-pumps" data booklet.

Control modes

CRE pumps with integrated pressure sensor are suitable for applications where you want to control the pressure after the pump, irrespective of the flow.

For further information, see the "Grundfos E-pumps" data booklet.

Signals of pressure changes in the piping system are transmitted continuously from the sensor to the pump. The pump responds to the signals by adjusting its performance up or down to compensate for the pressure difference between the actual and the desired pressures. As this adjustment is a continuous process, a constant pressure is maintained in the piping system.

A CRE pump with integrated pressure sensor facilitates installation and commissioning.

In **constant-pressure** mode, the pump maintains a preset pressure after the pump, irrespective of the flow.

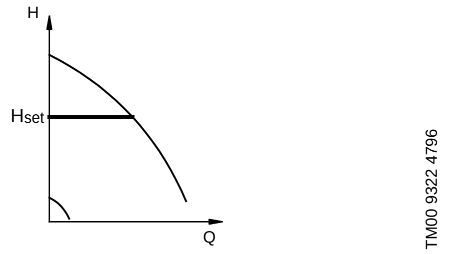
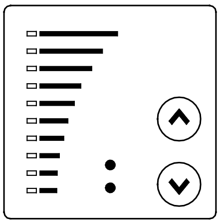
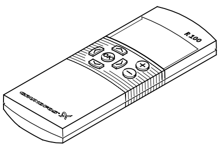
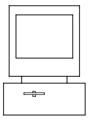
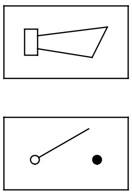


Fig. 14 Constant-pressure mode

Overview of functions

CRE pumps/functions		Hydro Multi-E
 TM00 7600 1596	**Setting via control panel:**	
	Setpoint	●
	Start/stop	●
	Max. curve	●
	Reading via control panel:	
	Setpoint	●
	Operating indication	●
	Fault indication	●
 TM00 4498 3494	**Setting via R100:**	
	Setpoint	●
	Start/stop	●
	Max. curve	●
	Control mode	●
	PI-controller	●
	Signal relay	
	Operating range	
	Stop function	●
	Reading via R100:	
	Setpoint	●
	Operating indication	●
	Pump status	●
 TM01 0929 2797	Connection to building management system	The pumps have inputs for bus communication. The pumps can be controlled and monitored via these inputs from a building management system or other external control systems.
 TM00 4533 3593	**External signals:**	
	Inputs:	
	Sensor	Fitted
	External fault	●
	Outputs:	
	Signal relay	●

Low-flow detection

The "low-flow detector" checks the flow regularly by reducing the speed for a short time, thus checking the change in pressure. If there is no or a small change in pressure, the pump will detect a low flow.

When the pump detects a low flow, the speed will be increased until the stop pressure (actual setpoint + 0.5 x ΔH) is reached and the pump stops. When the pressure has fallen to the start pressure (actual setpoint – 0.5 x ΔH), the pump will restart.

ΔH indicates the difference between start and stop pressures.

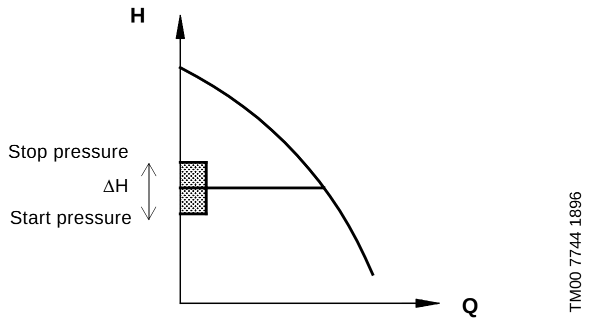


Fig. 15 Start and stop pressures

ΔH is factory-set to 10% of actual setpoint. ΔH can be set within the range from 5% to 30% of actual setpoint.

A diaphragm tank of a certain minimum size must be installed immediately after the pump and the precharge pressure must be 0.7 x actual setpoint.

Recommended diaphragm tank size when no flow switch is connected.

Pump type	Diaphragm tank size [litres]
CRE 1 and CRE 3	8
CRE 5	18
CRE 10	24
CRE 15	33
CRE 20	33

If a diaphragm tank of the above size is installed in the system, the factory setting of ΔH is the correct setting.

If the tank installed is too small, the pump will start and stop too often. This can be remedied by increasing ΔH.

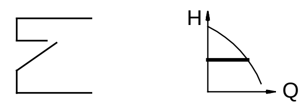
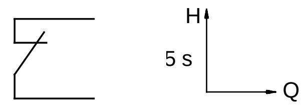
External fault signal

The pump has a digital input for external fault signals.

The digital input has been factory-set to external fault and will be **active** in closed condition.

The digital function is used for dry-running protection.

Functional diagram: Input for digital function:

Digital function (terminals 1 and 9)	
	Normal duty
	External fault

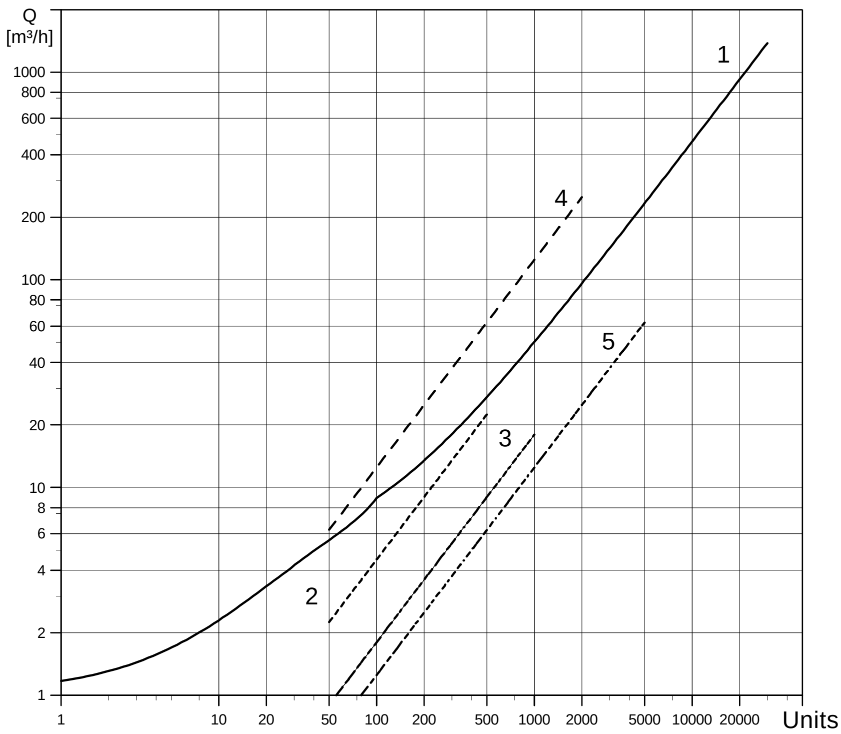
General information

When sizing a booster set, it is important to ensure

- that the performance of the booster set can meet the highest possible demand both in terms of flow and pressure.
- that the booster set is not oversized.
  This is important in relation to the installation and operating costs.

When sizing, the following should be considered:

- Flow rate, i.e. the flow of water which must be available at any draw-off point to ensure a sufficient water supply.
- Maximum pressure.
- System size, i.e. the number of pumps and pump performance. The selection of system size should be based on the following aspects:
  – efficiency
  – NPSH value
  – are standby pumps required.
- Dry-running protection.



TM02 4329 0602

How to read the curve chart for water demand

The y-axis shows the flow (Q) in m^3/h.

The x-axis shows the number of units, i.e. the number of

1. flats supplied with water from the Hydro Multi-E booster set
2. residents in a residential home
3. clerks in an office
4. beds at a hotel
5. pupils in a school.

Example: How to find the required flow (Q) in m^3/h.

1. Draw a vertical line from the actual number of units on the x-axis to its intersection with the application curve.
2. Draw a horizontal line from the intersection with the y-axis and read the value of the flow (Q) in m^3/h.

This flow rate can now be used in connection with the performance curves where the selection of system size is thus based on the required head. Efficiency and NPSH must of course be taken into consideration.

System size

Pump size

As mentioned before, the system should be capable of meeting the highest possible demand. But as the highest demand will often occur for a comparatively short part of the duty period only, it is important to select a type of pump which can meet the varying demand throughout the duty period.

It is not recommended to select a pump type whose performance is lower than the lowest possible consumption. Nor is it recommended to select a pump type whose performance is higher than the highest possible consumption.

Efficiency

In order to achieve the optimum operating economy, attempts should be made to select the pumps on the basis of optimum efficiency, i.e. the pumps should, as far as possible, operate within their nominal operating ranges.

As the system is always sized on the basis of the highest possible consumption, meaning that it will always be regulated down, it is important always to have the duty point of the pumps to the right on the efficiency curve (see the pump performance curve), in order to keep efficiency high when consumption drops.

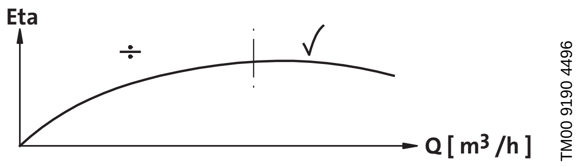


Fig. 16 Pump efficiency curve

The optimum efficiency is ensured by selecting a duty point within the hatched area.

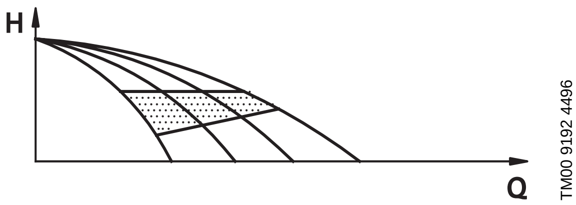


Fig. 17 Area of optimum efficiency

NPSH

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 values of the pumps at the highest possible consumption (see the pump performance curve).

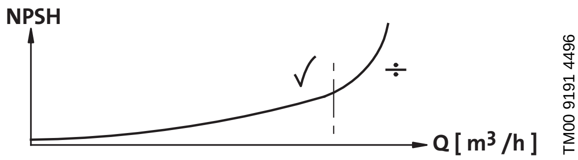


Fig. 18 NPSH curve

To most customers reliable supplies are a major factor. Often it is not acceptable if the system does not maintain its maximum flow even during pump repairs or breakdown. In order to prevent any disruption of the supply in such a situation, the system can be sized with a standby pump.

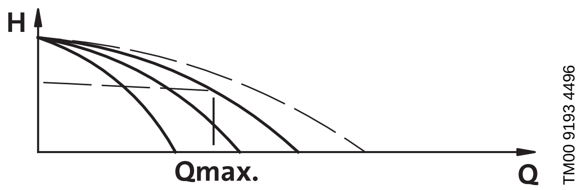
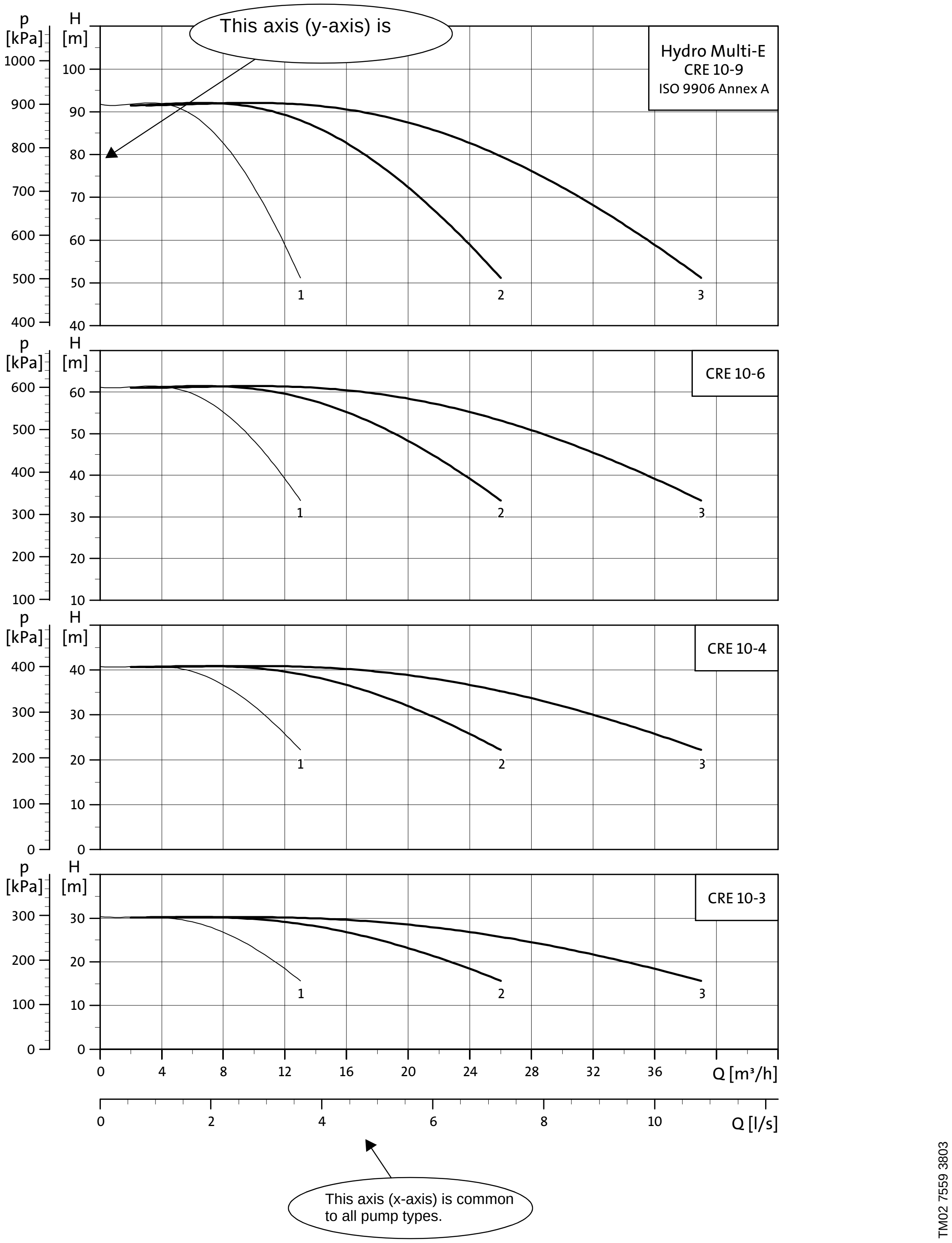


Fig. 19 System with standby pump

Understanding the curve charts

The curves should be read as follows:

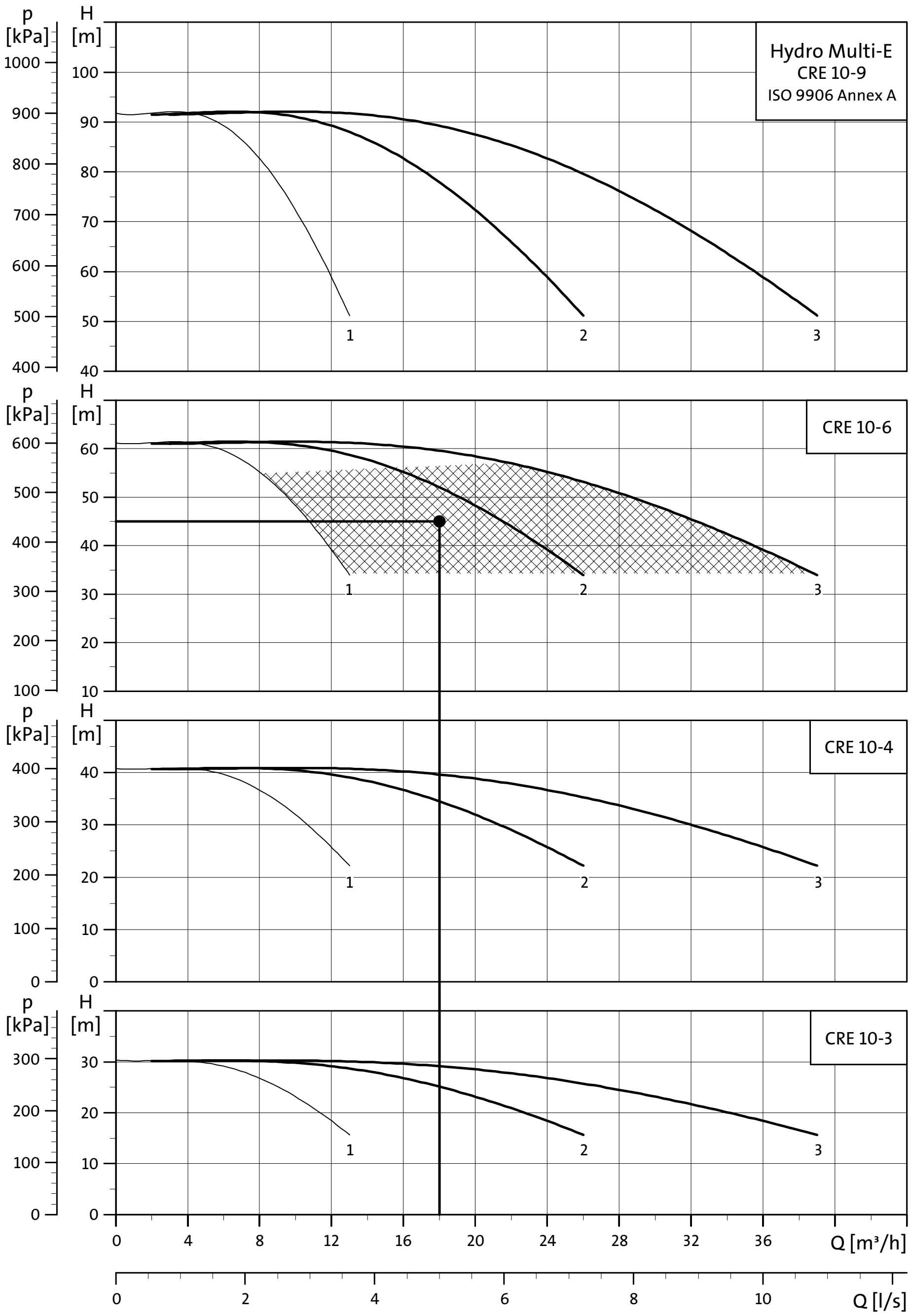
The x-axis, giving the flow (Q) in m^3/h, is common to all the curves, whereas the y-axis, giving the head (H) in m, has been adapted to the individual pump type.



Example: How to select a system

- A head of 45 m is required.
  The pump type best meeting this specification is found by means of the y-axis (e.g. CRE 10-6).
  Draw a rightward, horizontal line from the head required.
- A flow of 18 m^3/h is required.
  Now draw an upward, vertical line from the specified flow.
  The intersection of the two lines gives the number of pumps required for the system (2 CRE 10-6).

Only systems whose operating ranges lie within the hatched area of the example should be selected.

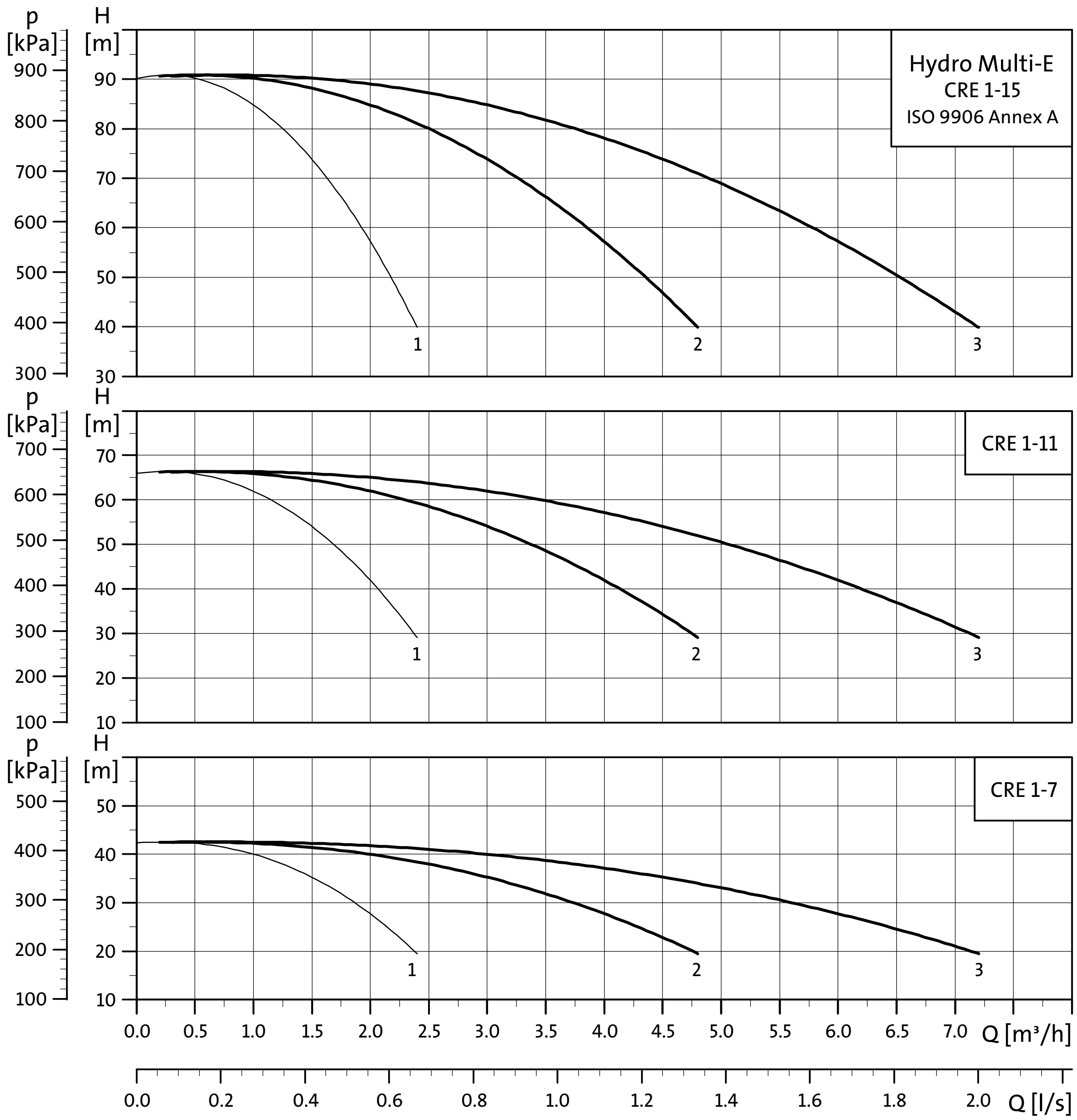


TM02 7575 3803

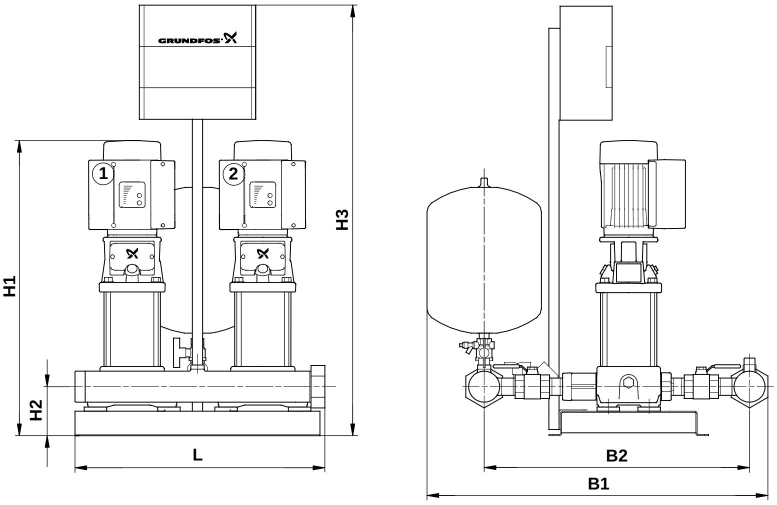
Curve conditions

The curves on pages 20-31 are subject to the following guidelines:

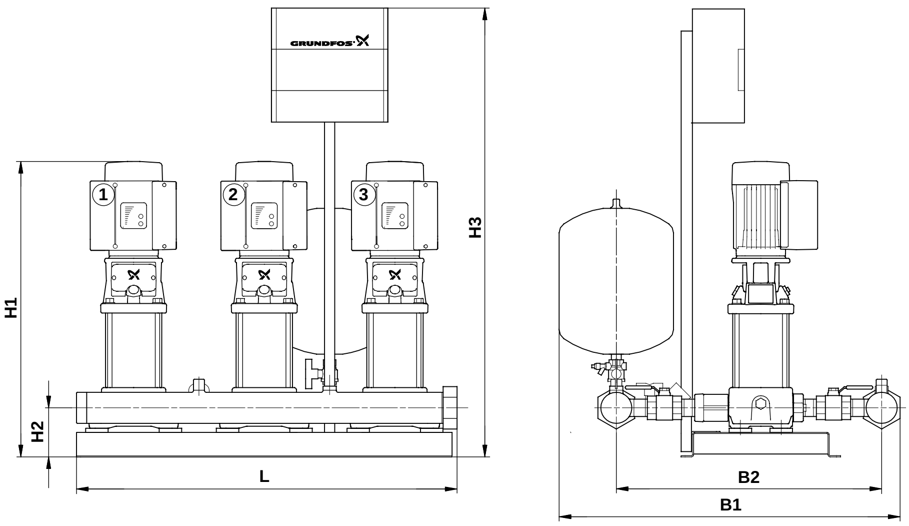
- Performance measurement is made at a water temperature of 20°C.
- Test liquid: Pure water.
- The curves describe the pump mean values.
- **The curves should not be used as guarantee curves.**
- Curve tolerance: ISO 9906, Annex A.
- The conversion between head H (m) and pressure p (kPa) has been made for water with a density of ò = 1000 kg/m^3.
- The curves apply to a kinematic viscosity of 1 mm^2/s (1 cSt).



TM02 4257 3803



TM03 0921 0805

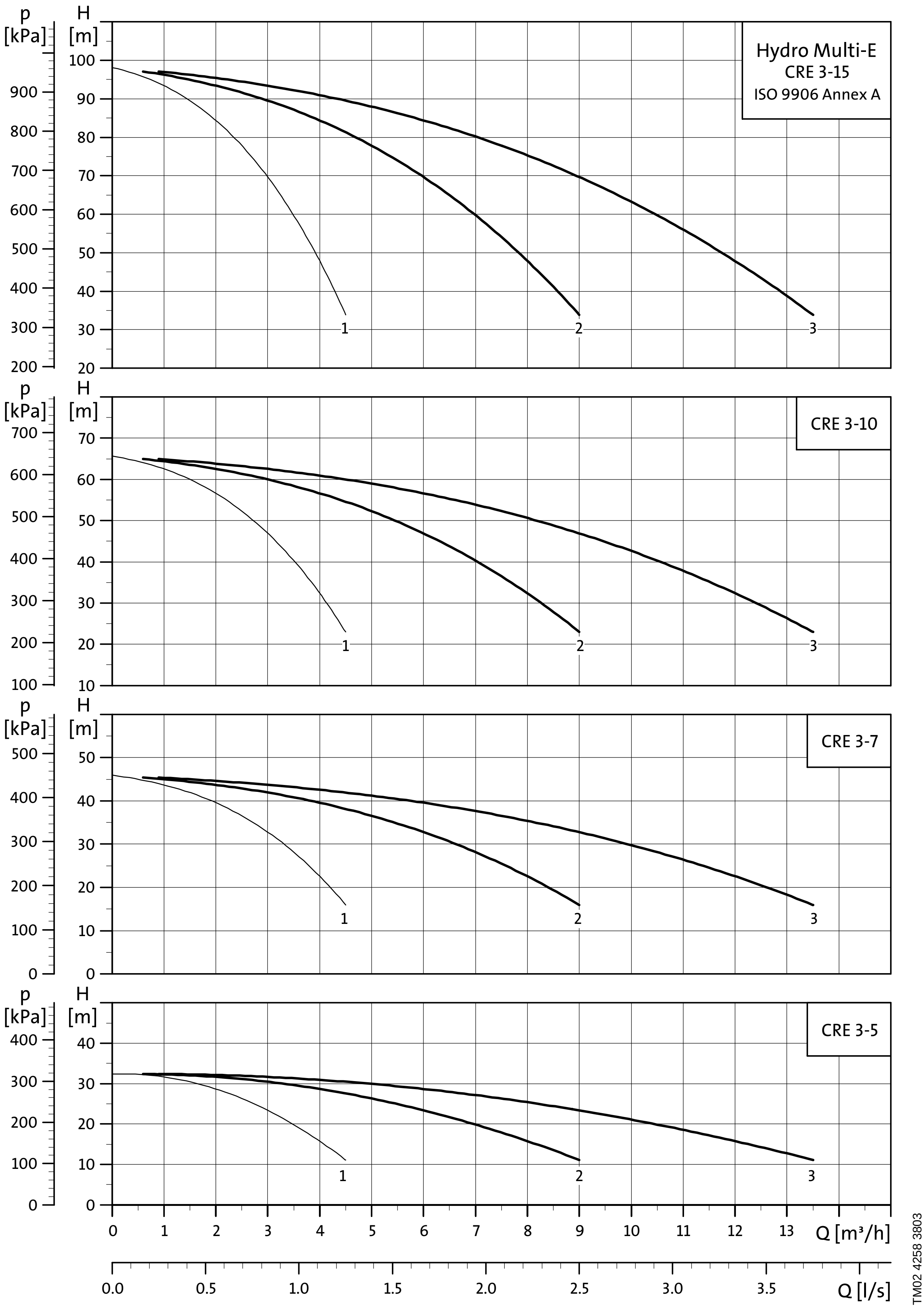


TM03 0922 0805

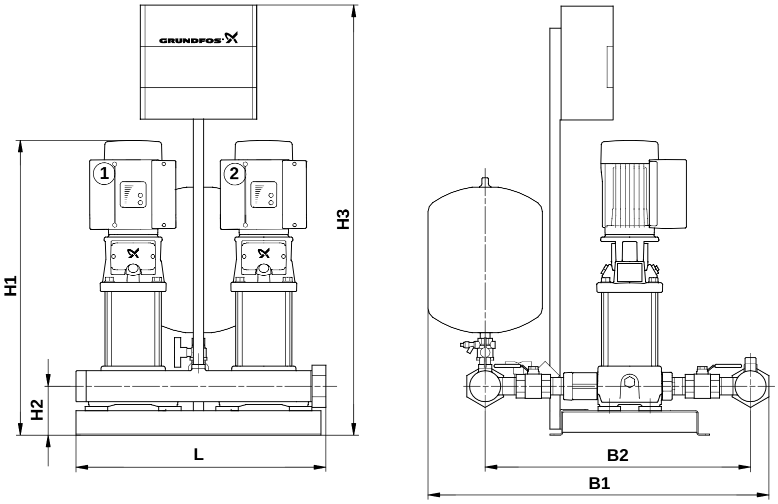
No. of pumps	Pump type	Motor [kW]	Max. I_N [A]	Max. I_0 [A] ★	Supply voltage: Single-phase 3 x 400/230 V, PE, N	Supply voltage: Three-phase 3 x 400 V, PE	Diaphragm tank [litres]	Shaft seal HQQE	Connection	B1 [mm]	B2 [mm]	L [mm]	H1 [mm]	H2 [mm]	H3 [mm]	Net weight [kg]	Ship. vol. [m^3]
2	CRE 1-7	0.37	3.0	3.0	●	-	8	●	2"	783	650	600	607	120	1165	76	0.36
	CRE 1-11	0.55	4.3	4.3	●	-		●					683			84	0.36
	CRE 1-15	0.75	5.1	5.1	●	-		●					777		1365	91	0.36
3	CRE 1-7	0.37	3.0	3.0	●	-	8	●	2"	783	650	920	607	120	1165	138	0.54
	CRE 1-11	0.55	4.3	4.3	●	-		●					683			149	0.54
	CRE 1-15	0.75	5.1	5.1	●	-		●					777		1365	159	0.56

★ Max. I_0 [A] applies to single-phase MGE motors. The value of max. I_0 [A] never exceeds the value of max. I_N [A].

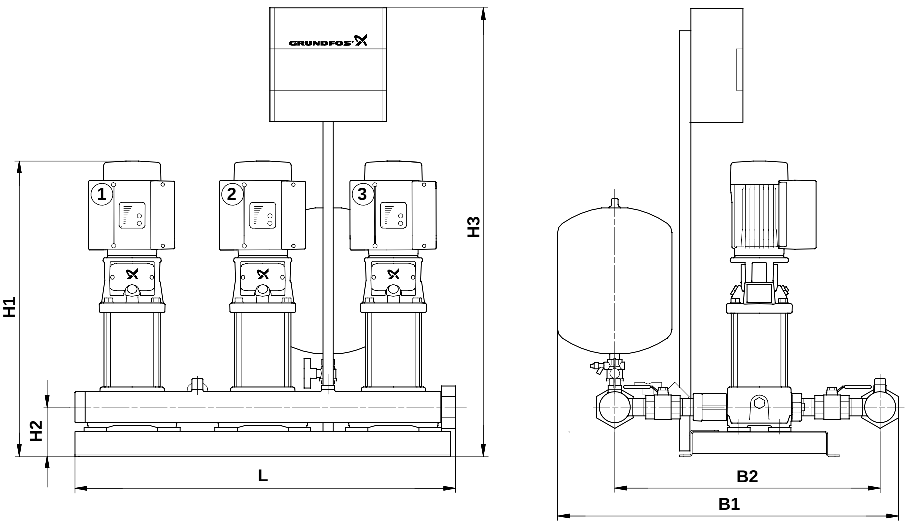
Performance curves



Technical data



TM03 0921 0805

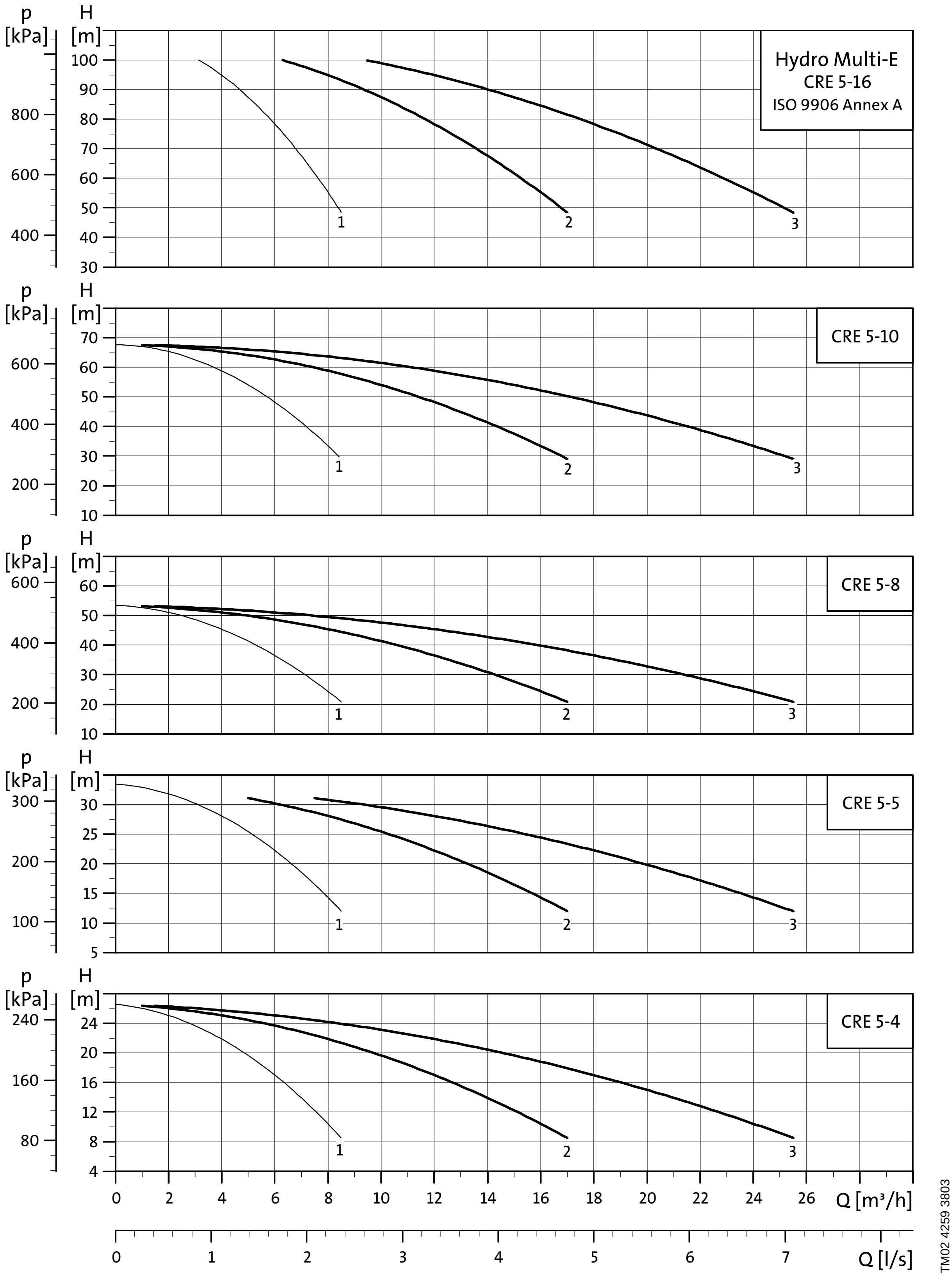


TM03 0922 0805

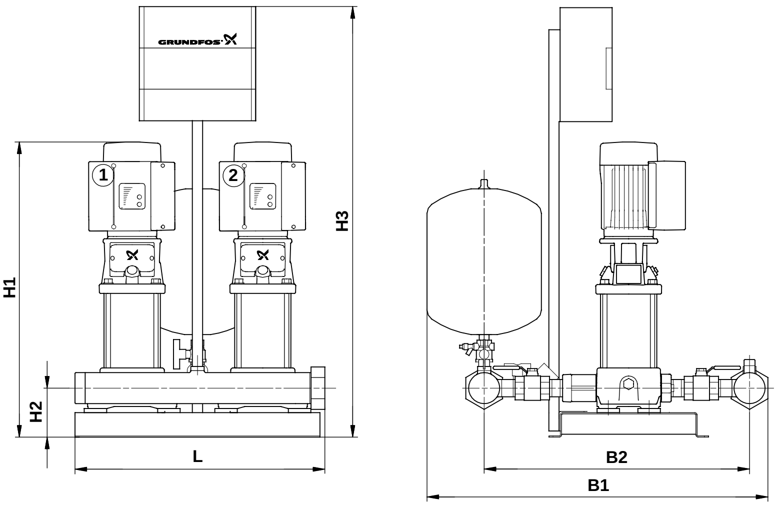
No. of pumps	Pump type	Motor [kW]	Max. I_N [A]	Max. I_0 [A] ★	Supply voltage Single-phase 3 x 400/230 V, PE, N	Three-phase 3 x 400 V, PE	Diaphragm tank [litres]	Shaft seal HQQE	Connection	B1 [mm]	B2 [mm]	L [mm]	H1 [mm]	H2 [mm]	H3 [mm]	Net weight [kg]	Ship. vol. [m^3]
2	CRE 3-5	0.37	3.0	3.0	●	-	8	●	2"	783	650	600	553	120	1165	75	0.36
	CRE 3-7	0.55	4.3	4.3	●	-		●					589			80	0.36
	CRE 3-10	0.75	5.1	5.1	●	-		●					687			87	0.36
	CRE 3-15	1.1	7.4	7.4	●	-		●					777		1365	103	0.36
3	CRE 3-5	0.37	3.0	3.0	●	-	8	●	2"	783	650	920	553	120	1165	136	0.54
	CRE 3-7	0.55	4.3	4.3	●	-		●					589			143	0.54
	CRE 3-10	0.75	5.1	5.1	●	-		●					687			154	0.54
	CRE 3-15	1.1	7.4	7.4	●	-		●					777		1365	178	0.56

★ Max. I_0 [A] applies to single-phase MGE motors. The value of max. I_0 [A] never exceeds the value of max. I_N [A].

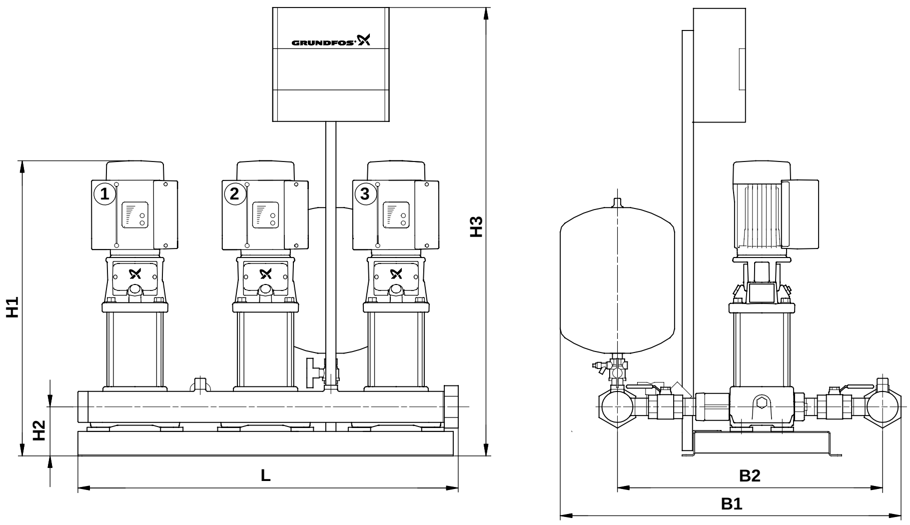
Performance curves



Technical data



TM03 0921 0805

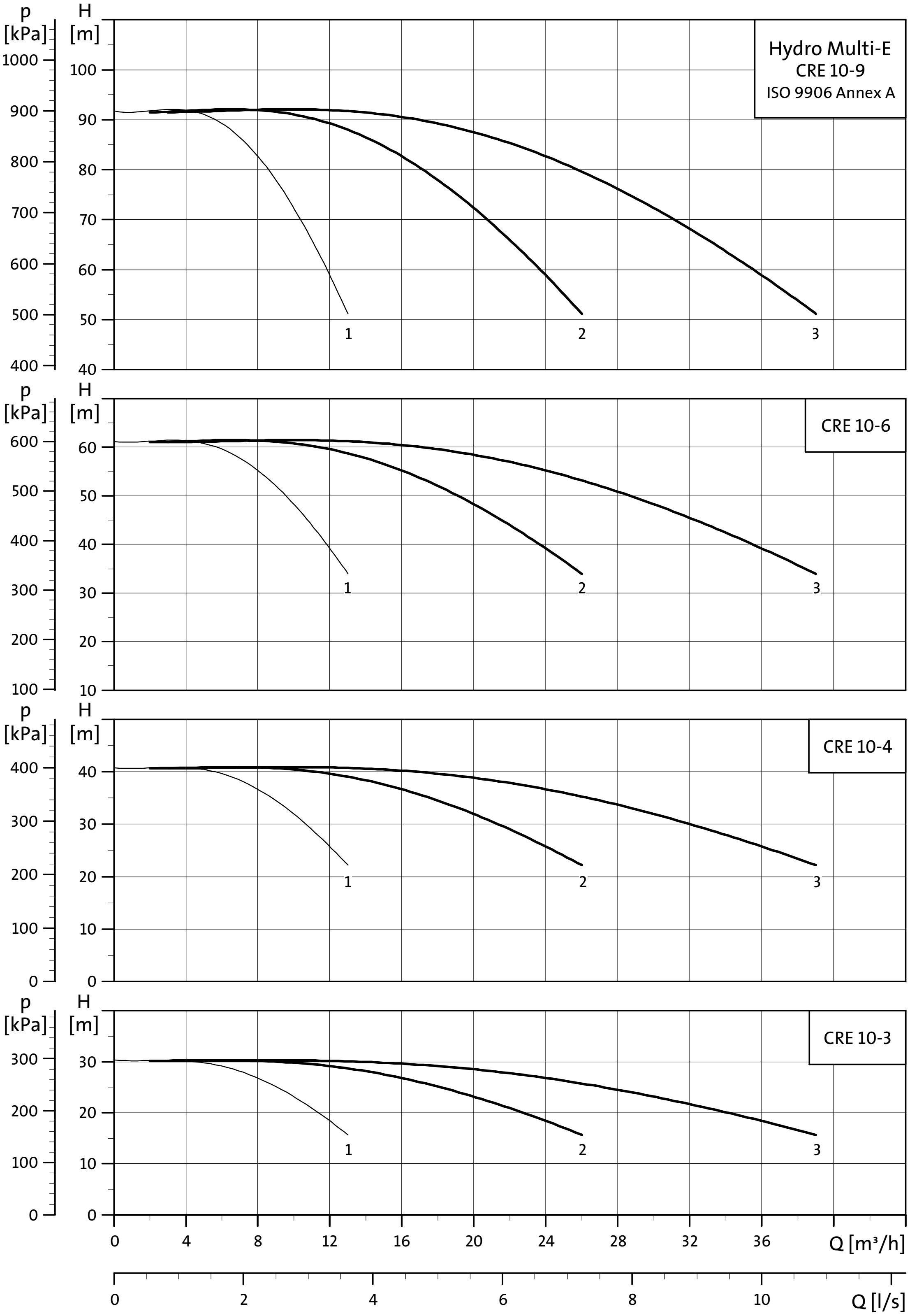


TM03 0922 0805

No. of pumps	Pump type	Motor [kW]	Max. I_N [A]	Max. I_0 [A] ★	Supply voltage: Single-phase 3 x 400/230 V, PE, N	Supply voltage: Three-phase 3 x 400 V, PE	Diaphragm tank [litres]	Shaft seal HQQE	Connection	B1 [mm]	B2 [mm]	L [mm]	H1 [mm]	H2 [mm]	H3 [mm]	Net weight [kg]	Ship. vol. [m^3]
2	CRE 5-4	0.55	4.3	4.3	●	-	18	●	2"	820	650	600	571	120	1165	79	0.37
	CRE 5-5	0.75	5.1	5.1	●	-		●					642			85	0.37
	CRE 5-8	1.1	7.4	7.4	●	-		●					723		1365	101	0.37
	CRE 5-10	1.5	6.6	-	-	●		●					517			114	0.54
	CRE 5-16	2.2	9.2	-	-	●		●					762		1565	124	0.88
3	CRE 5-4	0.55	4.3	4.3	●	-	18	●	2"	820	650	920	571	120	1165	142	0.57
	CRE 5-5	0.75	5.1	5.1	●	-		●					642			151	0.57
	CRE 5-8	1.1	7.4	7.4	●	-		●					723		1365	175	0.57
	CRE 5-10	1.5	9.9	-	-	●		●					517			185	0.83
	CRE 5-16	2.2	13.8	-	-	●		●					762		1565	201	1.35

★ Max. I_0 [A] applies to single-phase MGE motors. The value of max. I_0 [A] never exceeds the value of max. I_N [A].

Performance curves



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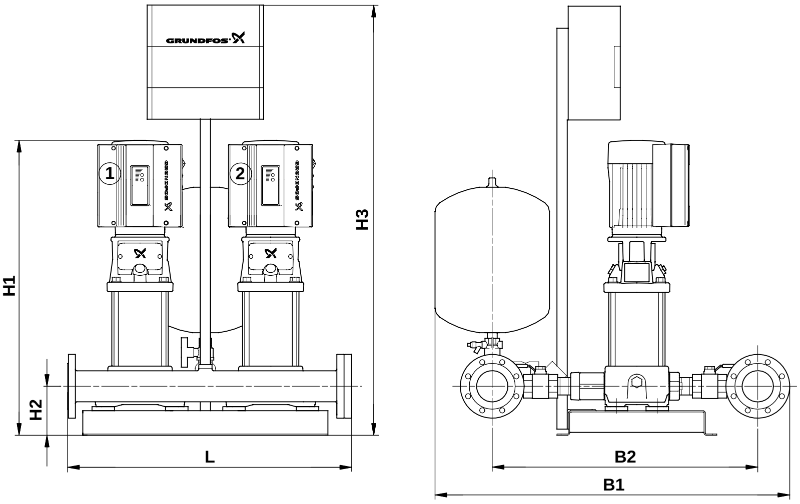
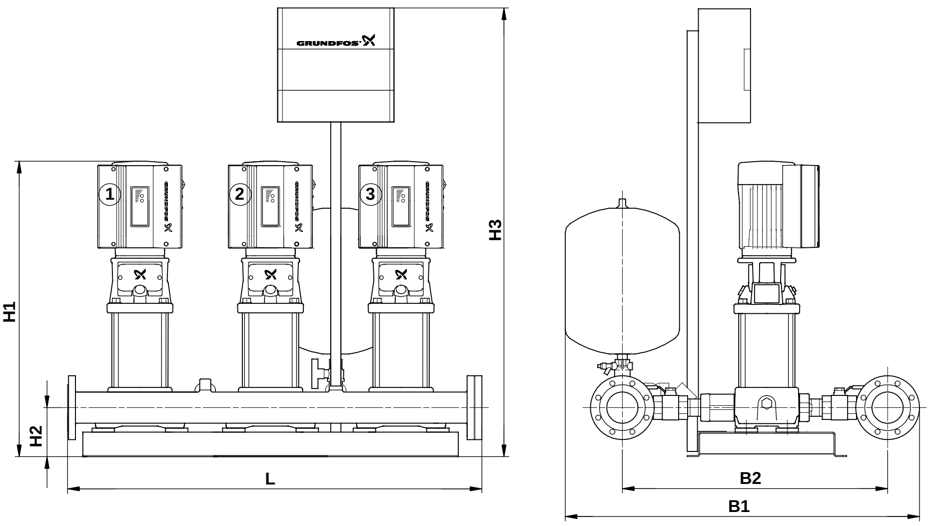


TM03 0923 0805

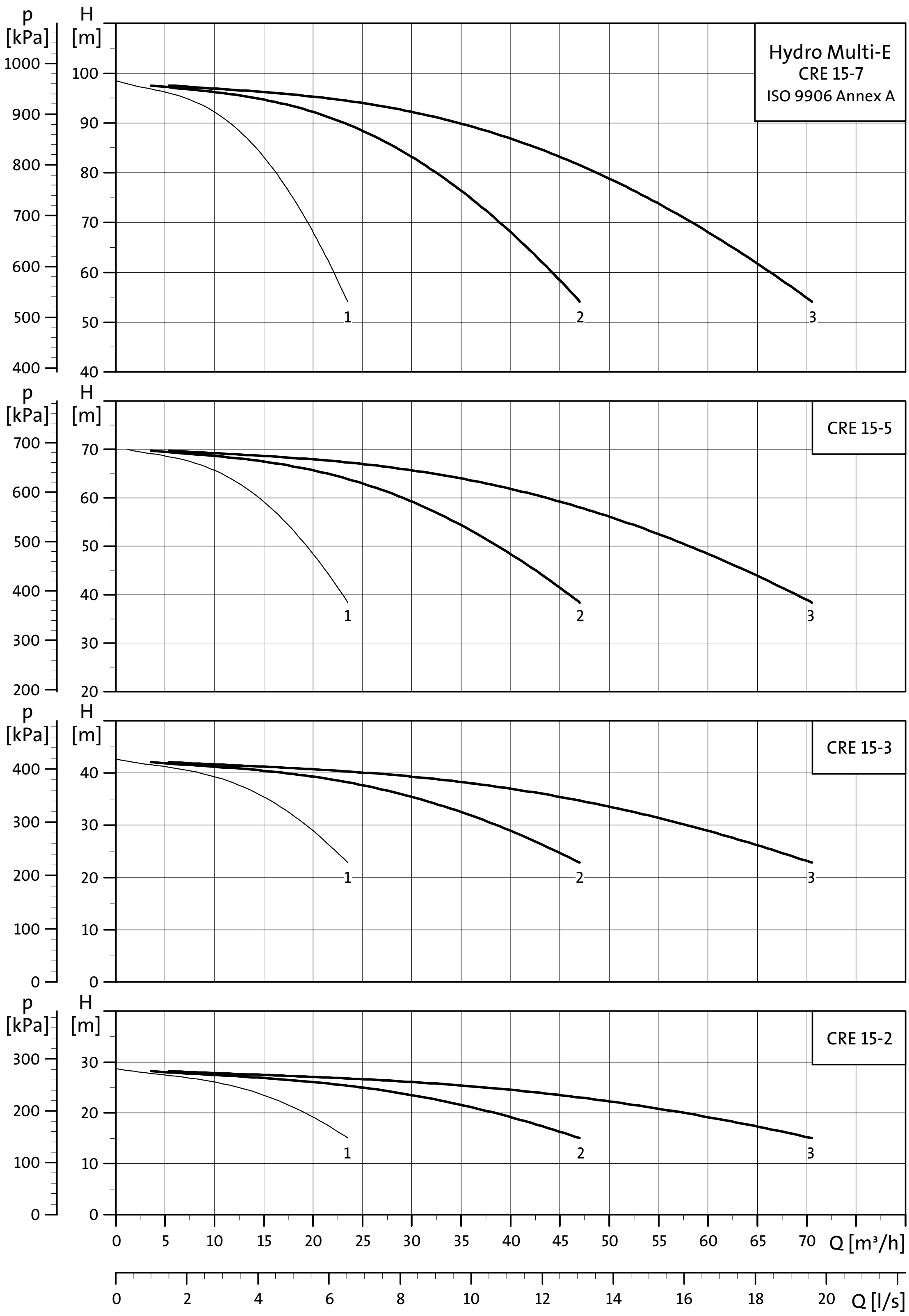


TM03 0924 0805

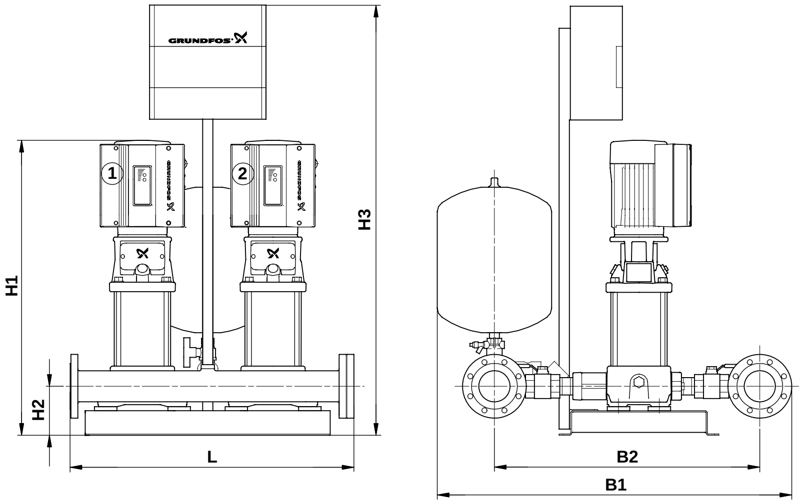
No. of pumps	Pump type	Motor [kW]	Max. I_N [A]	Max. I_0 [A] ★	Supply voltage: Single-phase 3 x 400/230 V, PE, N	Supply voltage: Three-phase 3 x 400 V, PE	Diaphragm tank [litres]	Shaft seal HQQE	Connection	B1 [mm]	B2 [mm]	L [mm]	H1 [mm]	H2 [mm]	H3 [mm]	Net weight [kg]	Ship. vol. [m^3]
2	CRE 10-3	1.1	7.4	7.4	●	-	24	●	2½"	979	800	660	678	150	1165	109	0.56
	CRE 10-4	1.5	6.6	-	-	●		●					774		1365	125	0.82
	CRE 10-6	2.2	9.2	-	-	●		●					874			143	0.82
	CRE 10-9	3.0	12.8	-	-	●		●					983		1565	157	0.82
3	CRE 10-3	1.1	7.4	7.4	●	-	24	●	2½"	979	800	980	678	150	1165	185	0.84
	CRE 10-4	1.5	9.9	-	-	●		●					774		1365	200	1.22
	CRE 10-6	2.2	13.8	-	-	●		●					874			227	1.22
	CRE 10-9	3.0	19.2	-	-	●		●					983		1565	248	1.22

★ Max. I_0 [A] applies to single-phase MGE motors. The value of max. I_0 [A] never exceeds the value of max. I_N [A].

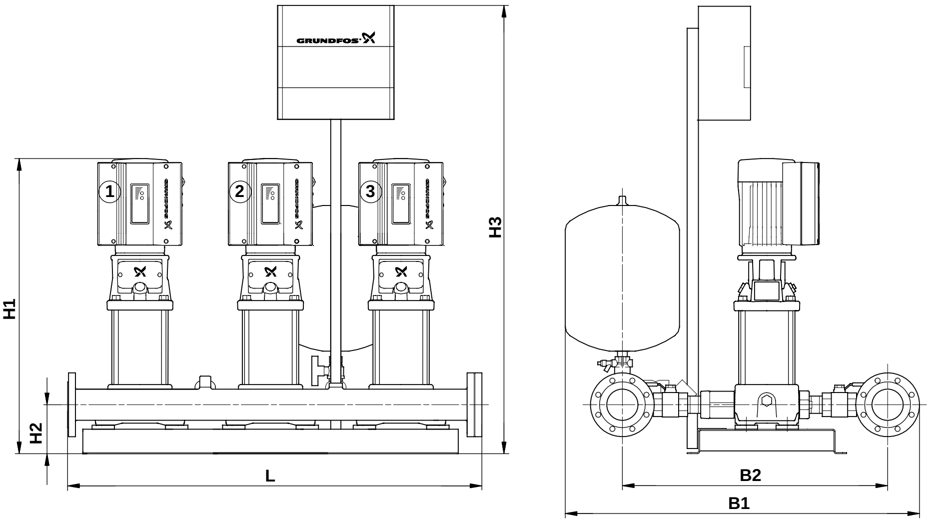
Performance curves



TM02 7560 3803



TM03 0923 0805

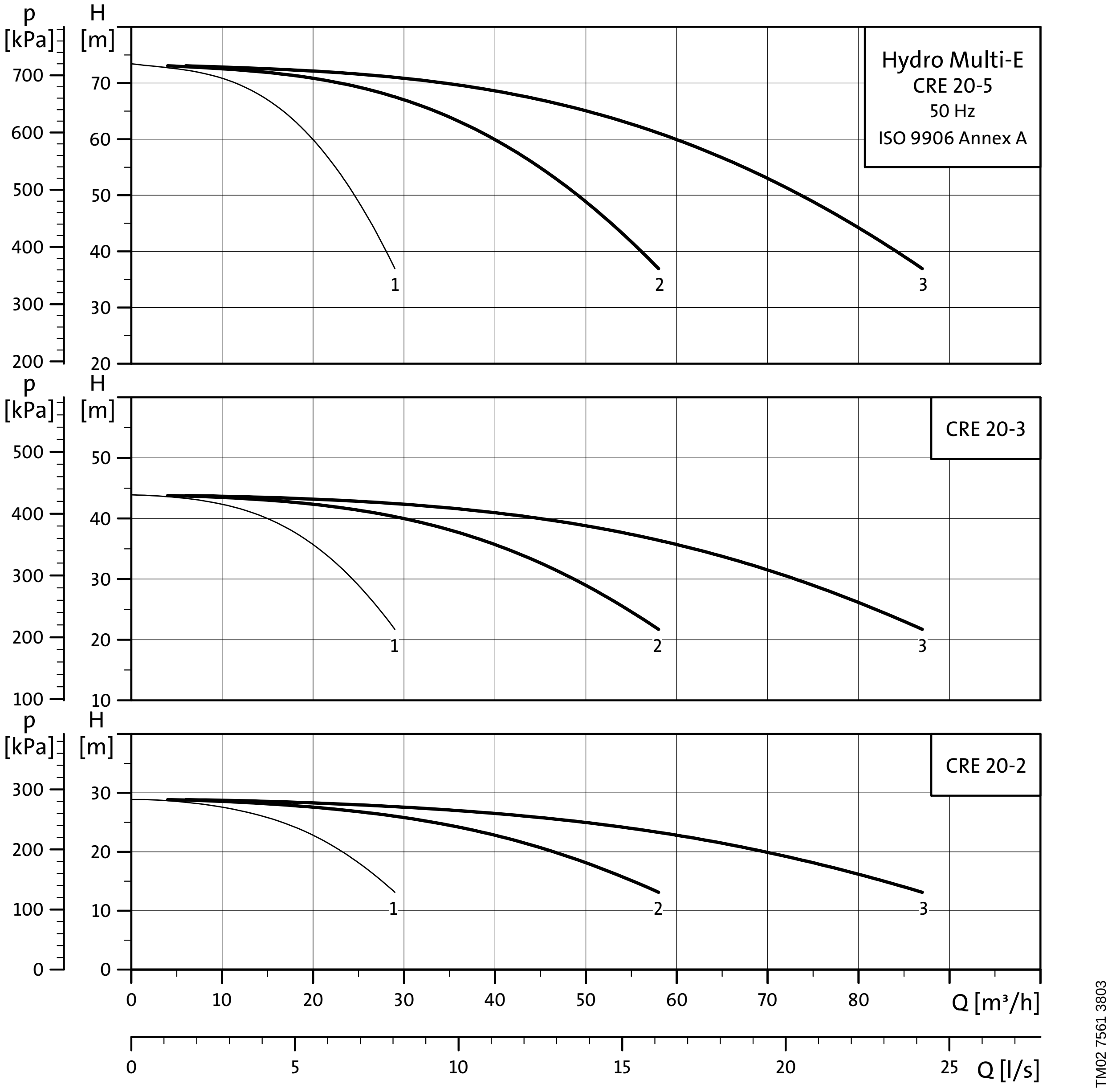


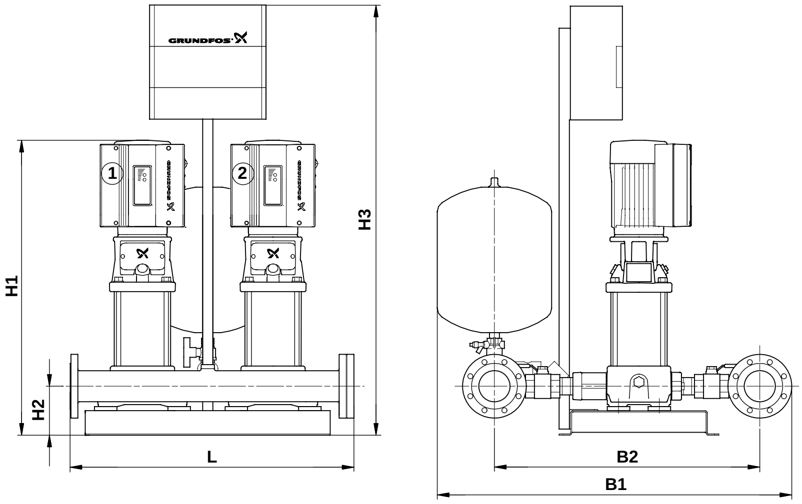
TM03 0924 0805

No. of pumps	Pump type	Motor [kW]	Max. I_N [A]	Max. I_0 [A] ★	Supply voltage: Single-phase 3 x 400/230 V, PE, N	Supply voltage: Three-phase 3 x 400 V, PE	Diaphragm tank [litres]	Shaft seal HQQE	Connection	B1 [mm]	B2 [mm]	L [mm]	H1 [mm]	H2 [mm]	H3 [mm]	Net weight [kg]	Ship. vol. [m^3]
2	CRE 15-2	2.2	9.2	-	-	●	33	●	DN 80	1135	950	700	806	160	1365	187	0.88
	CRE 15-3	3.0	12.8	-	-	●		●					870			208	0.88
	CRE 15-5	4.0	16.2	-	-	●		●					997		1565	263	0.98
	CRE 15-7	5.5	22	-	-	●		●					1138			272	1.06
3	CRE 15-2	2.2	13.8	-	-	●	33	●	DN 100	1148	950	1040	806	160	1365	300	1.31
	CRE 15-3	3.0	19.2	-	-	●		●					870			331	1.31
	CRE 15-5	4.0	24.3	-	-	●		●					997		1565	433	1.46
	CRE 15-7	5.5	33	-	-	●		●					1138			448	1.57

★ Max. I_0 [A] applies to single-phase MGE motors. The value of max. I_0 [A] never exceeds the value of max. I_N [A].

Performance curves





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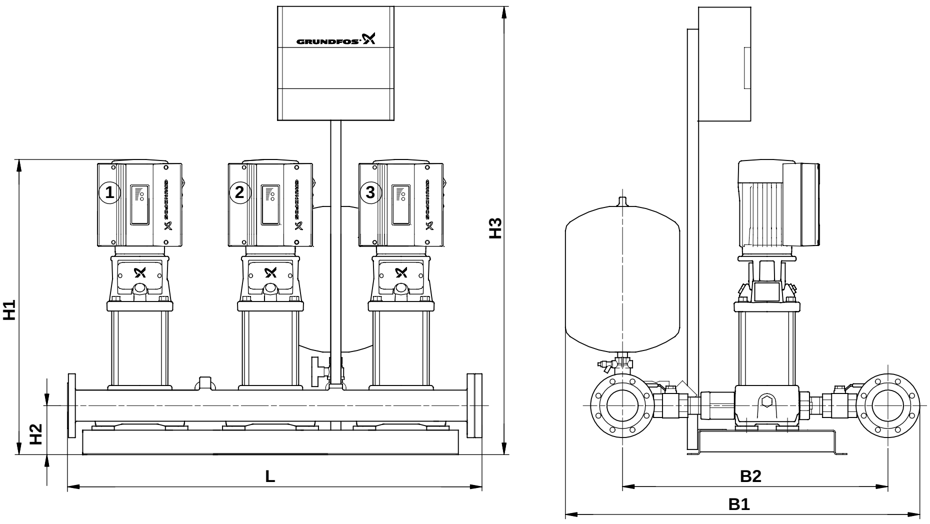


TM03 0924 0805

No. of pumps	Pump type	Motor [kW]	Max. I_N [A]	Max. I_0 [A] ★	Supply voltage: Single-phase 3 x 400/230 V, PE, N	Supply voltage: Three-phase 3 x 400 V, PE	Diaphragm tank [litres]	Shaft seal HQQE	Connection	B1 [mm]	B2 [mm]	L [mm]	H1 [mm]	H2 [mm]	H3 [mm]	Net weight [kg]	Ship. vol. [m^3]
2	CRE 20-2	2.2	9.2	-	-	●	33	●	DN 80	1135	950	700	806	160	1365	187	0.88
	CRE 20-3	4.0	16.2	-	-	●		●					907			220	0.88
	CRE 20-5	5.5	22	-	-	●		●					1048		1565	245	0.98
3	CRE 20-2	2.2	13.8	-	-	●	33	●	DN 100	1148	950	1040	806	160	1365	300	0.88
	CRE 20-3	4.0	24.3	-	-	●		●					907			349	0.88
	CRE 20-5	5.5	33	-	-	●		●					1048		1565	406	0.98

★ Max. I_0 [A] applies to single-phase MGE motors. The value of max. I_0 [A] never exceeds the value of max. I_N [A].

Dry-running protection

Dry-running protection **must** be installed.

The type of dry-running protection to choose is determined by the inlet conditions:

- If the system has an inlet pressure, a pressure switch should be used.
- If the system draws water from a tank, a level switch should be used.

As standard, Hydro Multi-E is fitted with a pressure switch as dry-running protection.

Example of installation:

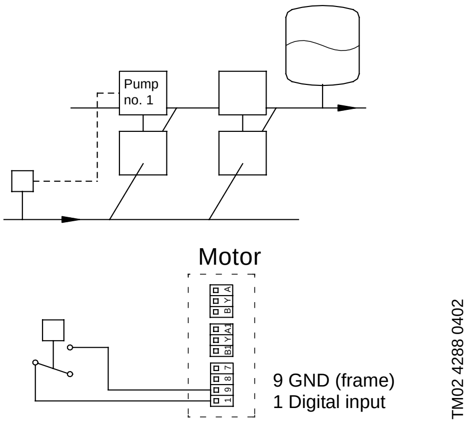


Fig. 20 System with pressure switch

If instead, a level switch is preferred as dry-running protection, this must be stated when ordering. Then the level switch will be supplied with the booster set.

Level switch

Product	Product number
Level switch incl. 5 m cable	010749

Example of installation:

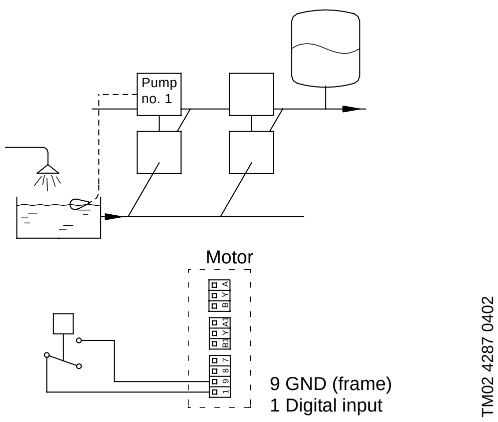


Fig. 21 System with level switch

Emergency operation

The emergency operation feature ensures the supply of water in case of

- sensor fault
- controller fault (pump 1).

If emergency operation is required, this must be stated when ordering.

Then two or three pressure switches will be fitted to the discharge manifold prior to delivery.

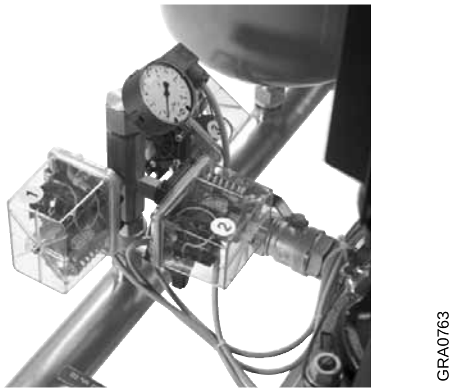


Fig. 22 Pressure switches fitted to the manifold

Emergency operation for	Product number
Hydro Multi-E with 2 pumps	96551259
Hydro Multi-E with 3 pumps	96551260

Accessories

The following accessories can be ordered separately and (retro)fitted/replaced at any time.

Level switch

Product	Product number
Level switch incl. 5 m cable	010184

R100 remote control

R100 is used for wireless communication. The communication takes place via infrared light.

Product	Product number
R100	625333

G10-LON interface

The G10-LON interface is used in connection with data transmission between a Locally Operating Network (LON) and electronically controlled Grundfos pumps applying the Grundfos bus protocol GENIbus.

Product	Product number
G10-LON interface	605726

G100 gateway

The G100 is a gateway enabling communication between pumps connected to a Grundfos GENIbus and a main network.

Besides functioning as a gateway, the G100 Basic Version and the Radio/Modem/PLC version provide data logging facilities.

The data logging function is configured by means of the program PC Tool G100 Data Log (Windows 95/ Windows NT).

Data logging enables continual storage of measured values in the G100, with a resolution down to 4 sec. Subsequently, stored data may be transmitted to a PC.

Product	Product number
G100 with Radio/Modem/PLC expansion board, incl. floppy disks with G100 support files	96411136
G100 Basic Version, incl. floppy disks with G100 support files	96411137
PC Tool G100 package	96415783

Further product documentation

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

- WinCAPS
- WebCAPS.

WinCAPS

WinCAPS is a **Win**dows-based **C**omputer **A**ided **P**roduct **S**election 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. 23 WinCAPS CD-ROM

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

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

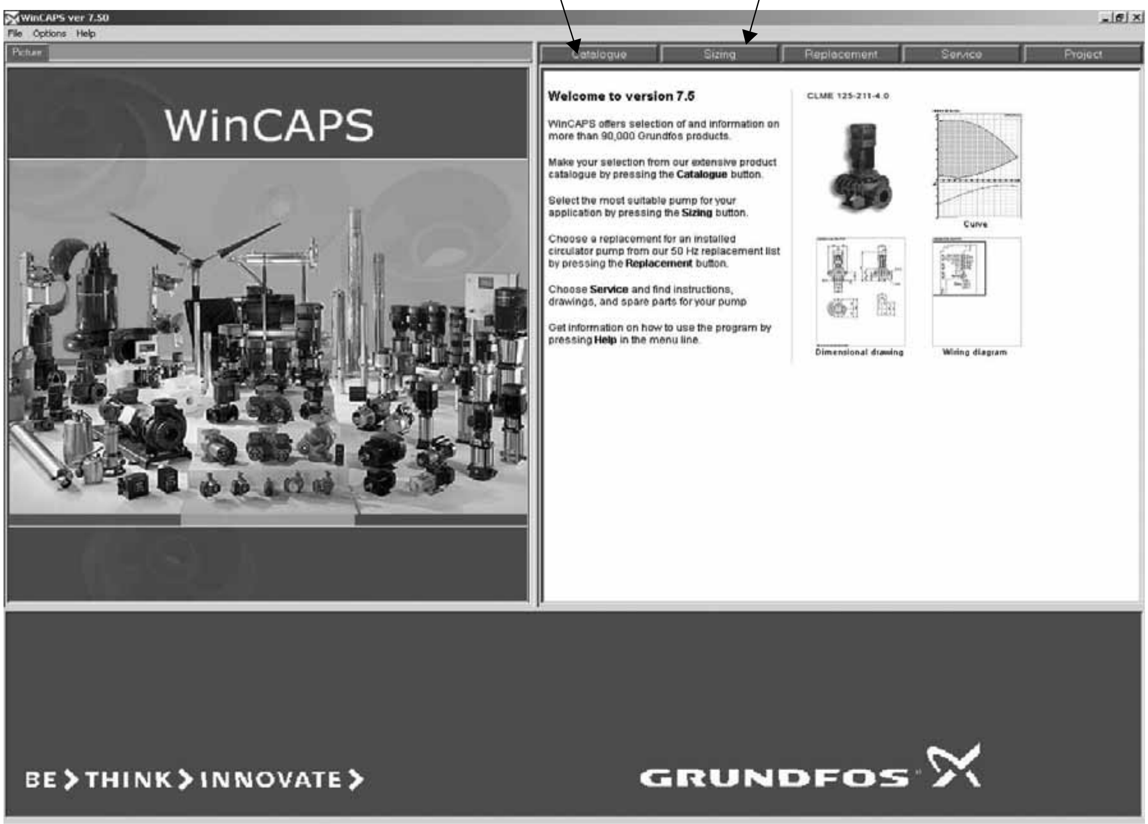


Fig. 24 WinCAPS

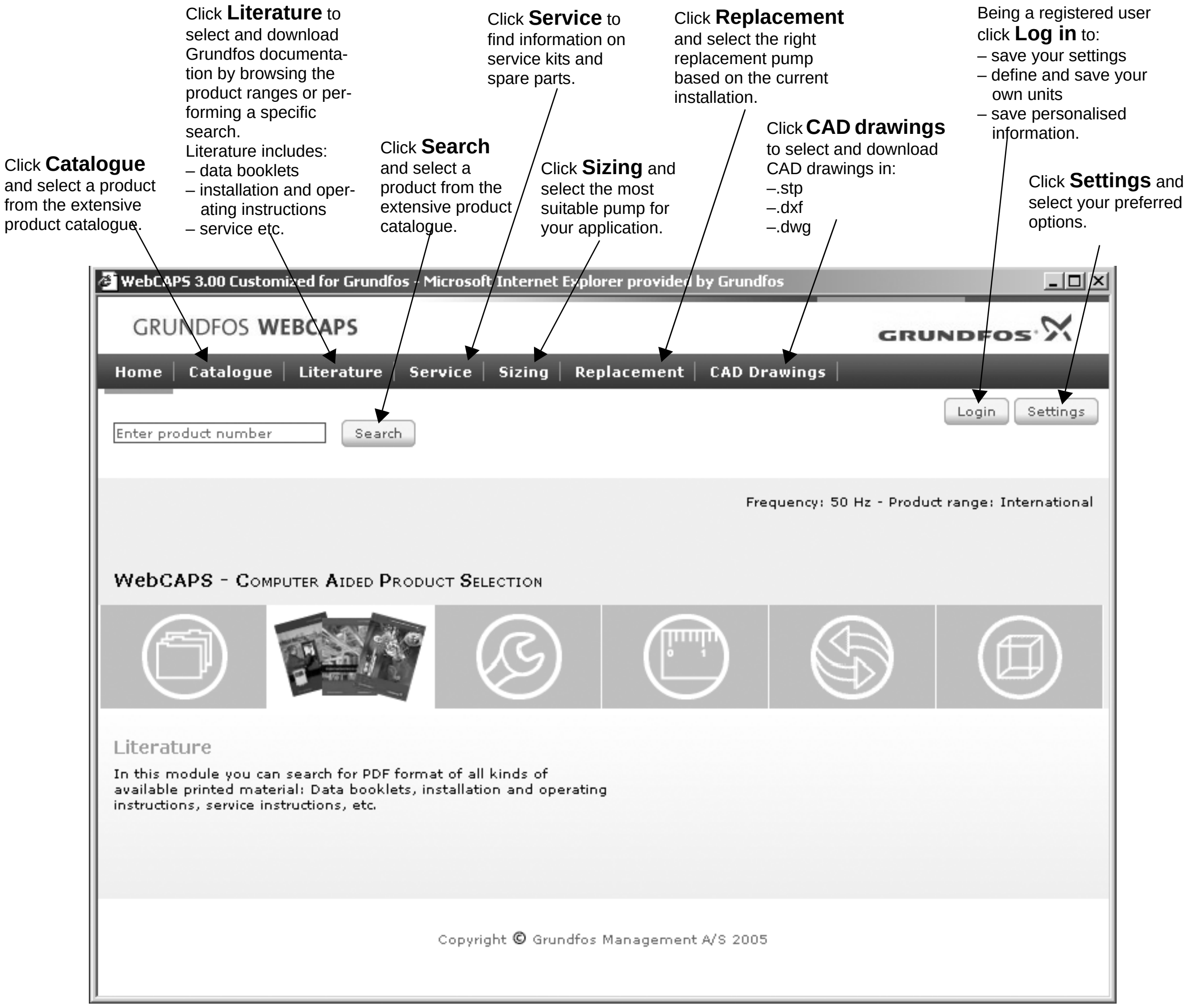
Further product documentation

WebCAPS

WebCAPS is a **Web**-based **C**ompute **A**ided **P**roduct **S**election program and a web-version of WinCAPS.

WebCAPS is accessible on Grundfos' homepage, **www.grundfos.com,** and offers

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



WebCAPS_English

Fig. 25 WebCAPS

96488673 0605	**GB**
Repl. **96488673** 0804	

Subject to alterations.

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