

Hydro Multi-E

Booster systems with 2 to 3 CRE pumps
60 Hz



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1. Product introduction

Introduction

The Hydro Multi-E booster systems consist of two and three Grundfos CRE pumps connected in parallel and mounted on a common base frame with all necessary fittings.

As standard, Hydro Multi-E is supplied with the following components:

- base frame
- pumps
- inlet and outlet manifolds
- pressure switch as dry-running protection
- one or two outlet-pressure sensors, depending on pump size
- check valves, one per pump
- isolating valves, two per pump
- pressure gauge
- breaker box.

Hydro Multi-E is factory-tested and ready for operation on delivery.

Hydro Multi-E, 0.5 to 10 hp (0.37 to 7.5 kW)

The pumps incorporated in this Hydro Multi-E system are fitted with the new-generation MLE motors which are permanent-magnet motors with a high-efficiency frequency converter. The motors ensure an even higher efficiency than the previous version of the booster system. The MLE motors have a total efficiency which exceeds the NEMA Premium Efficiency level defined for fixed-speed motors.

Hydro Multi-E with pumps in this range offers additional functions:

- multimaster function
- pipe-filling function
- predefined setpoint
- external setpoint influence
- limit-exceeded function.

Applications

The Grundfos Hydro Multi-E booster systems are designed for the transfer and pressure boosting of clean water in places such as

- apartment buildings
- hotels
- industry
- hospitals
- schools.

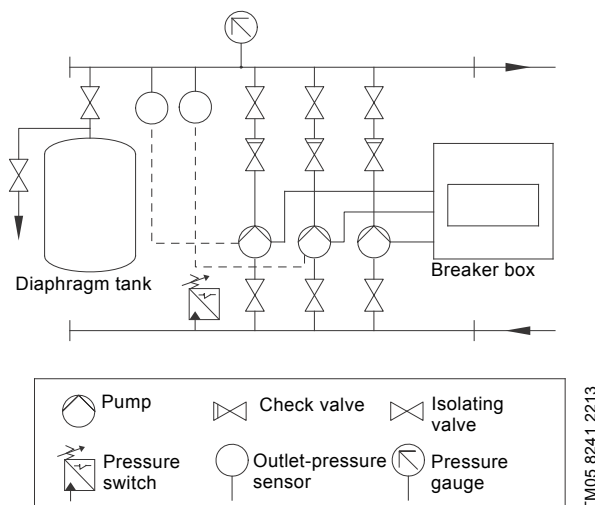


Fig. 1 Schematic drawing of Hydro Multi-E with three single-phase pumps

Benefits

Plug-and-pump solution

Hydro Multi-E is supplied as a complete preassembled system mounted on a base frame. The only task left is to connect the pipes and the power supply.

User-friendliness

Hydro Multi-E is a highly intelligent booster system which is capable of controlling two to three speed-controlled pumps in cascade. Hydro Multi-E is simple and easy to set up and control with one pump on the booster system equipped with an advanced control panel. The advanced control panel allows you to start-up, set up and control the system without a Grundfos GO Remote. Alternatively, you can use Grundfos GO Remote for setup and control.

Perfect constant-pressure control

The speed-controlled pumps are perfectly controlled and adjusted by the PI controller of Hydro Multi-E to deliver the correct pressure at the required flow.

Reliability

Grundfos CRE pumps are known for their reliability and long life. The PI controller is protected inside the pump and this has proven to be a very reliable solution.

Multimaster function (0.5 to 10 hp (0.37 to 7.5 kW))

All pumps that have an outlet-pressure sensor connected are capable of taking control of the entire booster system. This means that the system will continue to operate as a booster system even if one or more of the pumps or sensors are unavailable.

Redundant sensor (0.5 to 10 hp (0.37 to 7.5 kW))

No system is more reliable than the weakest component. In connection with booster systems, it is common to rely on only one pressure measurement. However, that makes the operation extremely dependent on one single sensor. On Hydro Multi-E, we do not depend on one sensor (single point of failure) as the booster system is supplied with two outlet-pressure sensors as standard.

Tested and ready to use

Before delivery, all Hydro Multi-E systems are carefully tested to Grundfos standard, i.e. pressure-tested and tested for full functionality.

Low energy consumption

Hydro Multi-E ensures low energy consumption through speed-controlled pumps, automatic cascade control of the pumps and highly efficient low-flow operation. The highly efficient motors and pumps also contribute to the overall high efficiency of Hydro Multi-E system.

2. Product data

Performance range

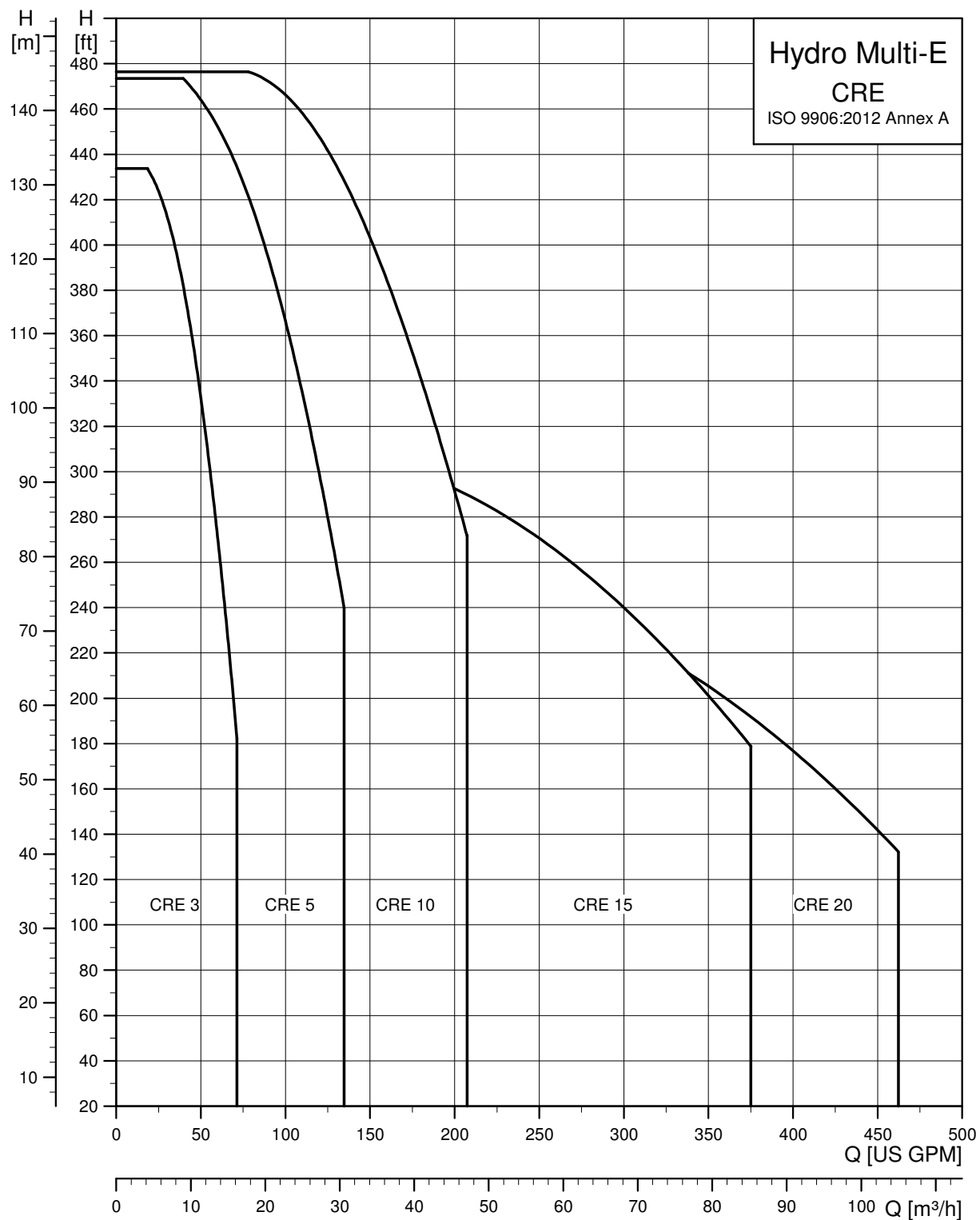


Fig. 2 Performance range, Hydro Multi-E CRE

TM07 0027 3917

Type key

Code	Example	Hydro Multi	-E	2 CRE 15-02	3 x 460 V, 60 Hz
Type range					
System type					
E	All pumps, E-motor				
Number of pumps with integrated frequency drive and pump type					
Supply voltage, frequency					

Product Range

1 x 230 V

Number of pumps	Pump type	[hp]	Diaphragm tank [gal]	Description	Part number
2	CRE3-6	1	4.4	Hydro Multi-E 2CRE3-6 1HP 1 x 230 V	99334059
	CRE3-9	1.5	4.4	Hydro Multi-E 2CRE3-9 1.5HP 1 x 230 V	99334060
	CRE3-12	2	4.4	Hydro Multi-E 2CRE3-12 2HP 1 x 230 V	99334061
	CRE5-4	1.5	4.4	Hydro Multi-E 2CRE5-4 1.5HP 1 x 230 V	99334062
	CRE5-6	2	4.4	Hydro Multi-E 2CRE5-6 2HP 1 x 230 V	99334063
	CRE10-02	1.5	10.3	Hydro Multi-E 2CRE10-02 1.5HP 1 x 230 V	99334064
	CRE15-01	2	34	Hydro Multi-E 2CRE15-01 2HP 1 x 230 V	99334065
3	CRE3-6	1	4.4	Hydro Multi-E 3CRE3-6 1HP 1 x 230 V	99334684
	CRE3-9	1.5	4.4	Hydro Multi-E 3CRE3-9 1.5HP 1 x 230 V	99334685
	CRE3-12	2	4.4	Hydro Multi-E 3CRE3-12 2HP 1 x 230 V	99334686
	CRE5-4	1.5	4.4	Hydro Multi-E 3CRE5-4 1.5HP 1 x 230 V	99334687
	CRE5-6	2	4.4	Hydro Multi-E 3CRE5-6 2HP 1 x 230 V	99334688
	CRE10-02	1.5	10.3	Hydro Multi-E 3CRE10-02 1.5HP 1 x 230 V	99334689
	CRE15-01	2	34	Hydro Multi-E 3CRE15-01 2HP 1 x 230 V	99334690

3 x 460 V

Number of pumps	Pump type	[hp]	Diaphragm tank [gal]	Description	Part number
2	CRE3-6	1	4.4	Hydro Multi-E 2CRE3-6 1HP 3 x 460 V	99334001
	CRE3-9	1.5	4.4	Hydro Multi-E 2CRE3-9 1.5HP 3 x 460 V	99334002
	CRE3-12	2	4.4	Hydro Multi-E 2CRE3-12 2HP 3 x 460 V	99334013
	CRE3-15	3	4.4	Hydro Multi-E 2CRE3-15 3HP 3 x 460 V	99334014
	CRE5-4	1.5	4.4	Hydro Multi-E 2CRE5-4 1.5HP 3 x 460 V	99334015
	CRE5-6	2	4.4	Hydro Multi-E 2CRE5-6 2HP 3 x 460 V	99334016
	CRE5-9	3	4.4	Hydro Multi-E 2CRE5-9 3HP 3 x 460 V	99334017
	CRE5-16	5	4.4	Hydro Multi-E 2CRE5-16 5HP 3 x 460 V	99334018
	CRE10-02	1.5	10.3	Hydro Multi-E 2CRE10-02 1.5HP 3 x 460 V	99334019
	CRE10-03	3	10.3	Hydro Multi-E 2CRE10-03 3HP 3 x 460 V	99334020
	CRE10-04	3	10.3	Hydro Multi-E 2CRE10-04 3HP 3 x 460 V	99334021
	CRE10-05	5	10.3	Hydro Multi-E 2CRE10-05 5HP 3 x 460 V	99334022
	CRE10-06	5	10.3	Hydro Multi-E 2CRE10-06 5HP 3 x 460 V	99334023
	CRE10-08	7.5	10.3	Hydro Multi-E 2CRE10-08 7.5HP 3 x 460 V	99334024
	CRE10-10	7.5	10.3	Hydro Multi-E 2CRE10-10 7.5HP 3 x 460 V	99334025
	CRE15-01	2	34	Hydro Multi-E 2CRE15-01 2HP 3 x 460 V	99334026
	CRE15-02	5	34	Hydro Multi-E 2CRE15-02 5HP 3 x 460 V	99334027
	CRE15-03	7.5	34	Hydro Multi-E 2CRE15-03 7.5HP 3 x 460 V	99334028
	CRE15-04	7.5	34	Hydro Multi-E 2CRE15-04 7.5HP 3 x 460 V	99334029
	CRE15-05	10	34	Hydro Multi-E 2CRE15-05 10HP 3 x 460 V	99334030
3	CRE20-01	3	34	Hydro Multi-E 2CRE20-01 3HP 3 x 460 V	99334031
	CRE20-02	5	34	Hydro Multi-E 2CRE20-02 5HP 3 x 460 V	99334032
	CRE20-03	7.5	34	Hydro Multi-E 2CRE20-03 7.5HP 3 x 460 V	99334033
	CRE20-04	10	34	Hydro Multi-E 2CRE20-04 10HP 3 x 460 V	99334034
	CRE3-6	1	4.4	Hydro Multi-E 3CRE3-6 1HP 3 x 460 V	99334035
	CRE3-9	1.5	4.4	Hydro Multi-E 3CRE3-9 1.5HP 3 x 460 V	99334036
	CRE3-12	2	4.4	Hydro Multi-E 3CRE3-12 2HP 3 x 460 V	99334037
	CRE3-15	3	4.4	Hydro Multi-E 3CRE3-15 3HP 3 x 460 V	99334038
	CRE5-4	1.5	4.4	Hydro Multi-E 3CRE5-4 1.5HP 3 x 460 V	99334039
	CRE5-6	2	4.4	Hydro Multi-E 3CRE5-6 2HP 3 x 460 V	99334040
	CRE5-9	3	4.4	Hydro Multi-E 3CRE5-9 3HP 3 x 460 V	99334041
	CRE5-16	5	4.4	Hydro Multi-E 3CRE5-16 5HP 3 x 460 V	99334042
	CRE10-02	1.5	10.3	Hydro Multi-E 3CRE10-02 1.5HP 3 x 460 V	99334043
	CRE10-03	3	10.3	Hydro Multi-E 3CRE10-03 3HP 3 x 460 V	99334044
	CRE10-04	3	10.3	Hydro Multi-E 3CRE10-04 3HP 3 x 460 V	99334045
	CRE10-05	5	10.3	Hydro Multi-E 3CRE10-05 5HP 3 x 460 V	99334046
	CRE10-06	5	10.3	Hydro Multi-E 3CRE10-06 5HP 3 x 460 V	99334047
	CRE10-08	7.5	10.3	Hydro Multi-E 3CRE10-08 7.5HP 3 x 460 V	99334048
	CRE10-10	7.5	10.3	Hydro Multi-E 3CRE10-10 7.5HP 3 x 460 V	99334049
	CRE15-01	2	34	Hydro Multi-E 3CRE15-01 2HP 3 x 460 V	99334050
	CRE15-02	5	34	Hydro Multi-E 3CRE15-02 5HP 3 x 460 V	99334051
	CRE15-03	7.5	34	Hydro Multi-E 3CRE15-03 7.5HP 3 x 460 V	99334052
	CRE15-04	7.5	34	Hydro Multi-E 3CRE15-04 7.5HP 3 x 460 V	99334053
	CRE15-05	10	34	Hydro Multi-E 3CRE15-05 10HP 3 x 460 V	99334054
	CRE20-01	3	34	Hydro Multi-E 3CRE20-01 3HP 3 x 460 V	99334055
	CRE20-02	5	34	Hydro Multi-E 3CRE20-02 5HP 3 x 460 V	99334056
	CRE20-03	7.5	34	Hydro Multi-E 3CRE20-03 7.5HP 3 x 460 V	99334057
	CRE20-04	10	34	Hydro Multi-E 3CRE20-04 10HP 3 x 460 V	99334058

Operating conditions

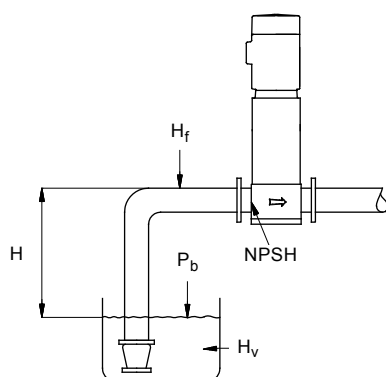
Liquid temperature: 32 to 140 °F (0 to +60 °C).

Ambient temperature:

Power range [hp (kW)]	Permissible ambient temperature [°F (°C)]
0.5 - 10 (0.37 - 7.5)	-4 to 104 (-20 to +40)

Minimum inlet pressure

Hydro Multi-E with CRE pumps



TM02 0118 3800

Fig. 3 Parameters for the calculation of minimum inlet pressure

To avoid cavitation, make sure that there is a minimum inlet pressure on the inlet side of the booster system. The minimum inlet pressure in bar can be calculated as follows:

Hydro Multi-E with CME pumps

$$H = P_b - \text{NPSH} - H_f - H_v - H_s$$

P_b = Barometric pressure in feet (33.9 feet at sea level). In closed systems, P_b indicates system pressure in feet.

NPSH = **N**et **P**ositive **S**uction **H**ead in feet.

NPSH can be read from the NPSH curve at the maximum capacity at which the pump will run.

(See the installation and operating instructions for CR, CRI, CRN).

H_f = Friction loss in suction piping in feet.
(At the highest flow the pump will be delivering).

H_v = Vapor pressure in feet.

H_s = Safety margin of minimum 2 ft head.

$$P \text{ (psi)} = H/2.31.$$



If "H" is calculated as positive, the pump can operate at a suction of maximum "H" feet. If "H" is calculated as negative, an inlet pressure (psia) of minimum "H" feet is required.

Example

$$P_b = 33.5 \text{ ft.}$$

$$\text{Pump type} = \text{CRE 15-3, 60 Hz.}$$

$$\text{Flow rate} = 90.3 \text{ GPM}$$

$$\text{NPSH} = 7.28 \text{ ft head.}$$

(from Grundfos Product Center)

$$H_f = 10 \text{ ft head.}$$

$$\text{Liquid temperature} = 140 \text{ °F.}$$

$$H_v = 6.7 \text{ ft head.}$$

$$H = P_b - \text{NPSH} - H_f - H_v - H_s.$$

$$H = (33.5 - 7.28 - 10 - 6.7 - 2) \text{ ft equal to } 7.52 \text{ ft head.}$$

This means that each pump can operate at a suction lift of maximum 7.52 ft head.

Pressure calculated in bar: 7.52×0.0299 equal to 0.22.

Pressure calculated in psi: 7.52×0.433 equal to 3.3.

Maximum inlet pressure

The following table shows the maximum permissible inlet pressure. However, the actual inlet pressure plus the pressure against a closed valve must always be lower than the maximum permissible operating pressure.

If the maximum permissible operating pressure is exceeded, the conical bearing in the motor may be damaged and the life of the shaft seal reduced.

Pump type	Maximum permissible inlet pressure [psi (bar)]		
	116 (8)	145 (10)	232 (16)
CRE 3-6, 3-9, 3-12, 3-15		•	
CRE 5-4, 5-6, 5-9		•	
CRE 5-16			•
CRE 10-02, 10-03, 10-04, 10-05	•		
CRE 10-06, 10-08, 10-10		•	
CRE 15-01, 15-02	•		
CRE 15-03, 15-04, 15-05		•	
CRE 20-01	•		
CRE 20-02, 20-03, 20-04		•	

Maximum operating pressure

Pump type	Maximum permissible operating pressure [psi (bar)]	
	145 (10)	232 (16)
CRE 3-6, 3-9, 3-12, 3-15		•
CRE 3-11		•
CRE 5-4, 5-6, 5-9		•
CRE 5-16		•
CRE 10-02, 10-03, 10-04, 10-05		•
CRE 10-06, 10-08, 10-10		•
CRE 15-01, 15-02		•
CRE 15-03, 15-04, 15-05		•
CRE 20-01		•
CRE 20-02, 20-30, 20-04		•

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

3. Construction

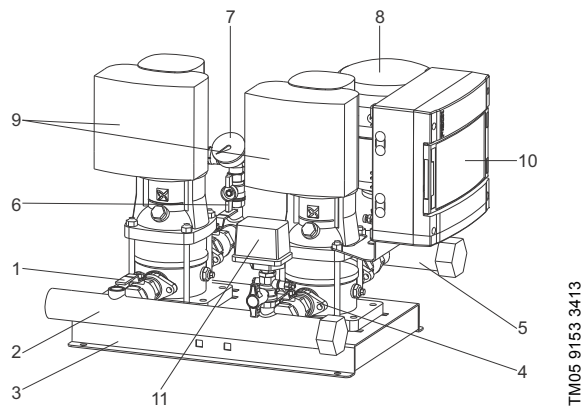


Fig. 4 Hydro Multi-E with two CRE pumps

Pos.	Description	Quantity
		Hydro Multi-E 0.5 - 10 hp (0.37 - 7.5 kW)
1	Isolating valve	2 per pump
2	Inlet manifold	1
3	Base frame	1
4	Check valve	1 per pump
5	Outlet manifold	1
6	Outlet-pressure sensor	2
7	Pressure gauge	1
8	Diaphragm tank*	Sold as accessory
9	Pump	2 to 3
10	Breaker box	1
11	Pressure switch as dry-running protection	1

* We recommend that you use a diaphragm tank.

System components

Hydro Multi-E has a base frame fitted with these components:

Components fitted on the inlet side

- an inlet manifold
- one isolating valve per pump
- a pressure gauge
- a pressure switch for dry-running protection.

Components fitted on the outlet side

- an outlet manifold
- one check valve per pump
- one isolating valve per pump
- a pressure gauge
- two outlet-pressure sensors.

Hydro Multi-E is fitted with a breaker box for switching the power supply on and off.

Materials

Hydro Multi-E incorporates the well-known high-quality Grundfos CRE pumps. However, the quality extends beyond the pumps. As standard, Hydro Multi-E is supplied with stainless-steel (AISI 304, 316)* manifolds manufactured using an extrusion method that creates a smooth surface from the connecting pipe to the manifold. This minimizes the risk of stagnant water and reduces noise and friction loss.

* Manifold constructed with AISI 316 and threaded fittings constructed with AISI 304.

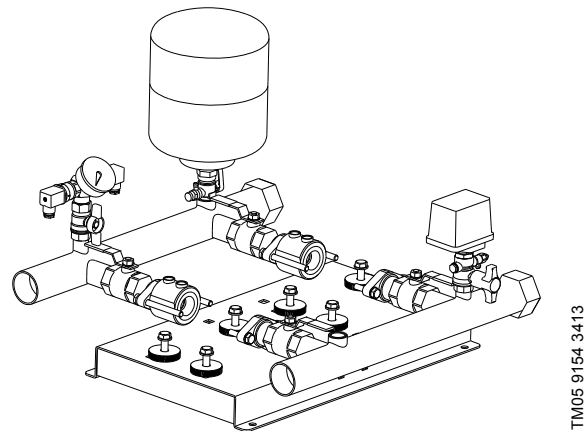


Fig. 5 Base frame, manifolds and valves

Pump type	Material specification for base frame and manifold	
	Stainless steel	AISI 316 TI (EN1.4571)
CRE		

Diaphragm tank

To ensure optimum operation, the tank must be precharged with pressure.

The precharge pressure = 0.7 x setpoint.

The diaphragm tank precharge pressure must be measured in a pressureless system.

We recommend that you refill the tank with nitrogen.

Environmental considerations

We manufacture our 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.

Grundfos is certified as environmentally friendly in accordance with ISO 14001.

Grundfos holds an ISO 9001 certificate.

4. Functions

Overview of functions

Functions	Hydro Multi-E	
	0.5 -10 hp (0.37 - 7.5 kW)	
	Standard	Accessory
Automatic cascade control	•	
Dry-running protection	•	
Pump alternation	•	
Limit exceeded 1 and 2	•	
Multimaster function	•	
Number of starts per hour	•	
Stop function	•	
Pipe-filling function	•	
External setpoint influence	•	
Predefined setpoint	•	
Communication*		
GENIbus		•
LonWorks		•
PROFIBUS DP		•
Modbus RTU		•
GSM/GPRS		•
Grundfos Remote Management		•
BACnet MS/TP		•
PROFIBUS I/O / Modbus TCP		•

* Communication interface module or unit required.

Description of functions

Automatic cascade control

Cascade control ensures that the performance of Hydro Multi-E is automatically adapted to the consumption by switching pumps on or off. The system thus runs as energy-efficiently as possible with a constant pressure and only the number of pumps required.

Dry-running protection

This function is very important as dry running may damage bearings and shaft seals.

The inlet pressure of the system or the water level in a possible tank on the inlet side is monitored. If the inlet pressure or the water level becomes too low, all pumps will be stopped.

Level switches, pressure switches or analog sensors signalling water shortage at a set level can be used.

Pump alternation

This function ensures that the operating hours are distributed evenly on the pumps over time.

Limit exceeded 1 and 2

Hydro Multi-E, 0.5 to 10 hp (0.37 to 7.5 kW)

The limit-exceeded function is used for monitoring one or two values/inputs. The function enables different inputs to activate various outputs and alarms/warnings when the signal input has exceeded predetermined limits. The purpose of this function is to monitor parameters which are central for the application. This will enable the pumps to react to possible abnormal operating conditions.

The function can for instance be used for monitoring the following:

- the inlet pressure if an inlet pressure sensor is connected
- the drinking water temperature if a temperature sensor is connected.

Multimaster function

Hydro Multi-E, 0.5 to 10 hp (0.37 to 7.5 kW)

All pumps that have an outlet-pressure sensor connected can function as master pump and control the system. As standard, Hydro Multi-E is supplied with two outlet-pressure sensors, one connected to pump 1 and the other to pump 2.

As standard, the pump with the lowest number will be the master pump. From factory, the master pump is marked with number 1.

If the master pump is switched off or stopped due to an alarm, one of the other pumps will automatically take over the control of the system. Thereby, the reliability is increased and stop of operation is prevented.

As an option, the system can be supplied with only one outlet-pressure sensor. In that case, the system will stop if the pump or sensor fails.

The system can also be fitted with sensors on all pumps for maximum reliability.

Number of starts per hour

This function limits the number of pump starts and stops per hour.

Each time a pump starts or stops, the system will calculate when the next pump is allowed to start or stop in order not to exceed the permissible number of starts per hour.

This function always allows pumps to be started to meet the requirement, but pump stops will be delayed, if necessary, in order not to exceed the permissible number of starts/stops per hour.

Stop function

The stop function 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 + $0.5 \times \Delta H$) is reached, and the pump stops. When the pressure has fallen to the start pressure (actual setpoint - $0.5 \times \Delta H$), the pump will restart.

ΔH indicates the difference between start and stop pressures.

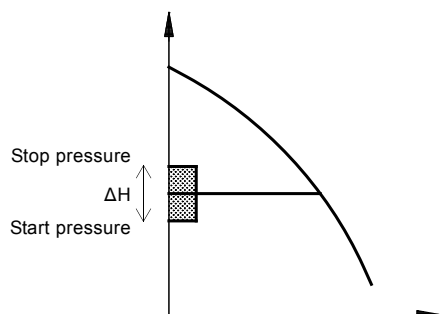


Fig. 6 Start and stop pressures

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

We recommend that you fit a Hydro Multi-E with a diaphragm tank of an appropriate size to accommodate the operation in low flow. The precharge pressure must be 0.7 times the actual setpoint.

Pipe-filling function

Hydro Multi-E, 0.5 to 10 hp (0.37 to 7.5 kW)

This function ensures a soft start of systems with empty pipework.

The function has two phases:

1. The pipework is slowly filled with water.
2. When the pressure sensor of the system detects that the pipework has been filled with water, the pressure is increased until it reaches the setpoint. See fig. 7.

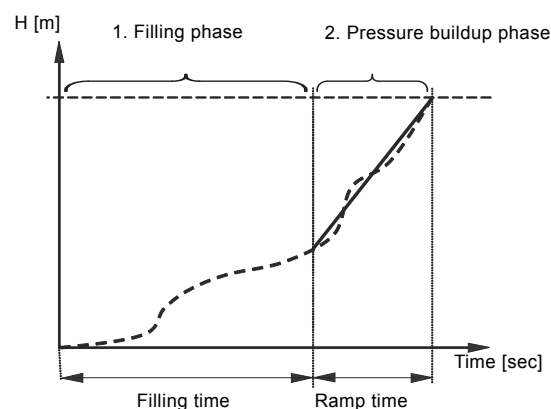


Fig. 7 Filling and pressure buildup phases

The function can be used to prevent water hammer in high-rise buildings with unstable power supply or in irrigation systems.

External setpoint influence

Hydro Multi-E, 0.5 to 10 hp (0.37 to 7.5 kW)

This function is used for influencing the setpoint via an external setpoint signal. The value of the external setpoint signal is used in a formula calculating a "new" setpoint, the actual setpoint. The function is often used for adjusting the setpoint depending on an external input from a Grundfos VSF flowmeter.

Predefined setpoint

Hydro Multi-E, 0.5 to 10 hp (0.37 to 7.5 kW)

This function is used for changing between predefined setpoints via digital input signals. This means that the operator can easily change setpoint by pressing a button. Due to the combination of digital inputs, up to three predefined setpoints can be configured.

Overview of inputs and outputs

Terminals	Hydro Multi-E
	0.5 - 10 hp (0.37 - 7.5 kW)
Digital inputs	2 inputs
Analog inputs	3 inputs
Digital outputs	2 outputs
Digital input/output	2 inputs or 2 outputs

Using the inputs and outputs

Hydro Multi-E, 0.5 to 10 hp (0.37 to 7.5 kW)

- Two digital inputs
The digital inputs can be used for remote control of the following functions:
 - external stop
 - setting the pumps to operation on the maximum curve
 - setting the pumps to operation on the minimum curve
 - dry-running protection, pulse flow, flow switch.
- Two analog inputs
The analog inputs can be used for feedback sensors, setting of setpoint influence or monitoring of analog values with the limit-exceeded function.
- Two digital outputs
The digital outputs can be used for sending a signal regarding pump operating status:
 - ready
 - fault
 - operating
 - running
 - limit exceeded.

5. Installation

Mechanical installation

Location

Install the booster system in a well ventilated room to ensure sufficient cooling of the pumps.

Note: The booster system is not designed for outdoor installation and must not be exposed to direct sunlight.

Allow sufficient clearance around the booster system to enable the operator to work freely.

Enclosure class: IP54.

Insulation class: F.

Motor cooling

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

- Place Hydro Multi-E in a well ventilated room.
- The temperature of the cooling air must not exceed 104 °F (40 °C).
- Keep motor cooling fins, holes in fan cover and fan blades clean.

Pipework

The pipes connected to the booster system must be of adequate size. Fit expansion joints in the inlet and outlet manifolds to avoid resonance.

Connect the pipes to the manifolds of the booster system.

Tighten the booster system before startup.

We recommend that you fit pipe supports for the inlet and outlet pipes.

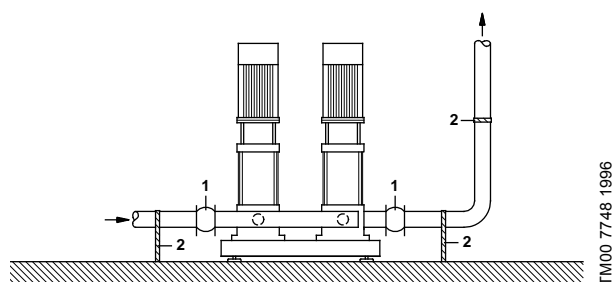


Fig. 8 Pipework

Pos.	Description
1	Expansion joint (and good location for isolating valves)
2	Pipe support

Note: The expansion joints and pipe supports shown in fig. 8 are not included in a standard booster system.

Foundation

Position the booster system on an even and solid surface, such as a concrete floor or foundation. If the booster system is not fitted with vibration dampers, bolt it to the floor or foundation.

Electrical installation

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

- Hydro Multi-E must be correctly earthed.
Note: 5 to 7.5 hp (4.0 to 5.5 kW) motors must be connected to especially reliable or sturdy earth connections due to an earth leakage current above 3.5 mA.
- The pumps require no external motor protection. The motors incorporate thermal protection against slow overloading and blocking (IEC 34-11: TP 211).
- When the pumps are switched on via the power supply, they start after approximately 5 seconds.

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

If the system is supplied with a breaker box for wall mounting, the cabinet must be mounted in accordance with local regulations.

6. Control of Hydro Multi-E

Control options

Communication with Hydro Multi-E is possible by means of the following:

- the control panel on the pumps
- Grundfos GO Remote
- a building management system.

Control panels

The control panel on the pump terminal box enables the operator to change the setpoint and speed and to reset alarms.

The design and functionality of the control panel depend on pump size.

Hydro Multi-E, 0.5 to 10 hp (0.37 to 7.5 kW)

The pump control panel enables infrared and radio communication.

Light fields indicate the setpoint and the buttons can be used for setpoint setting.

Grundfos Eye is an indicator light that shows the operating status of the pump.

The indicator light will flash in different sequences and provide information about the following:

- power on/off
- pump warnings
- pump alarms
- remote control.

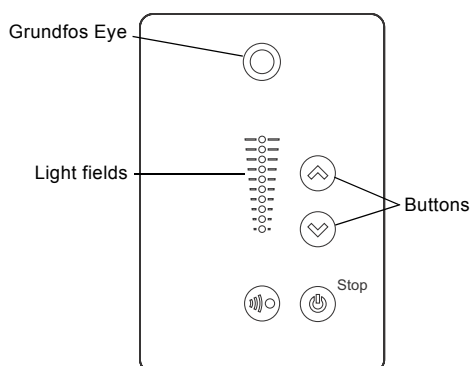


Fig. 9 Standard control panel, 0.5 to 10 hp (0.37 to 7.5 kW) pumps

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Advanced control panel

One pump on the Hydro Multi-E is equipped with the advanced control panel. The advanced control panel is used to start up, set and control the booster system without requiring Grundfos GO Remote.

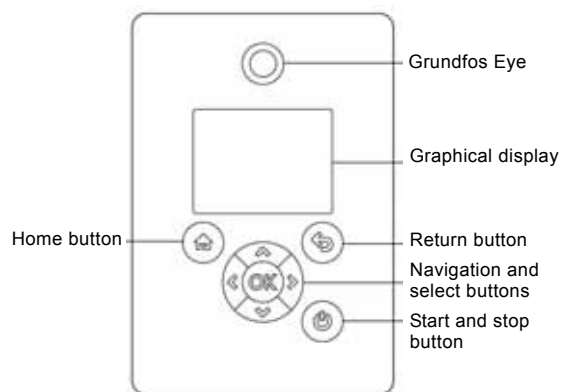


Fig. 10 Advanced control panel

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Grundfos GO Remote



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Fig. 11 Grundfos GO Remote

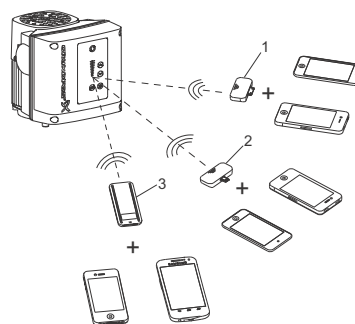
With Grundfos GO Remote, the operator can remotely monitor and change settings of Hydro Multi-E. Grundfos GO Remote communicates with the pump via wireless infrared or radio communication, depending on pump size.

Communication interface	Hydro Multi-E 0.5 - 10 hp (0.37 - 7.5 kW)
Infrared	•
Radio	•

Grundfos GO Remote can be used for the following functions:

- reading of operating data
- reading of warning and alarm indications
- setting of control mode
- setting of setpoint
- selection of external setpoint signal
- allocation of pump number making it possible to distinguish between pumps that are connected via Grundfos GENIbus
- selection of function for digital input
- generation of reports (PDF)
- multipump setup
- displaying relevant documentation
- adjusting stop function
- pipe filling
- PI controller
- analog inputs
- setting of function of relays
- adjusting limits.

Grundfos GO Remote offers three different mobile interfaces (MI). See fig. 12.



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Fig. 12 Grundfos GO Remote

Pos.	Description
1	Grundfos MI 202: Add-on module. You can use MI 202 in conjunction with an Apple iPhone or iPod with 30-pin connector and iOS 5.0 or later, such as fourth-generation iPhone or iPod.
2	Grundfos MI 204: Add-on module. You can use MI 204 in conjunction with an Apple iPhone or iPod with lightning connector, such as fifth generation iPhone or iPod. MI 204 is also available together with an Apple iPod touch and a cover.
3	Grundfos MI 301: Separate module enabling radio or infrared communication. You can use MI 301 in conjunction with an Android or iOS-based smart device with Bluetooth connection.

Grundfos GO Remote is available as an accessory. See page 36.

Building management system (BMS)

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

The communication interface between Hydro Multi-E system and a central building management system varies, depending on pump size.

Hydro Multi-E, 0.5 - 10 hp (0.37 to 7.5 kW)

These booster systems can communicate with external systems via a Grundfos communication interface module (CIM) that can be fitted in the pumps. This means that no external communication interface is required.

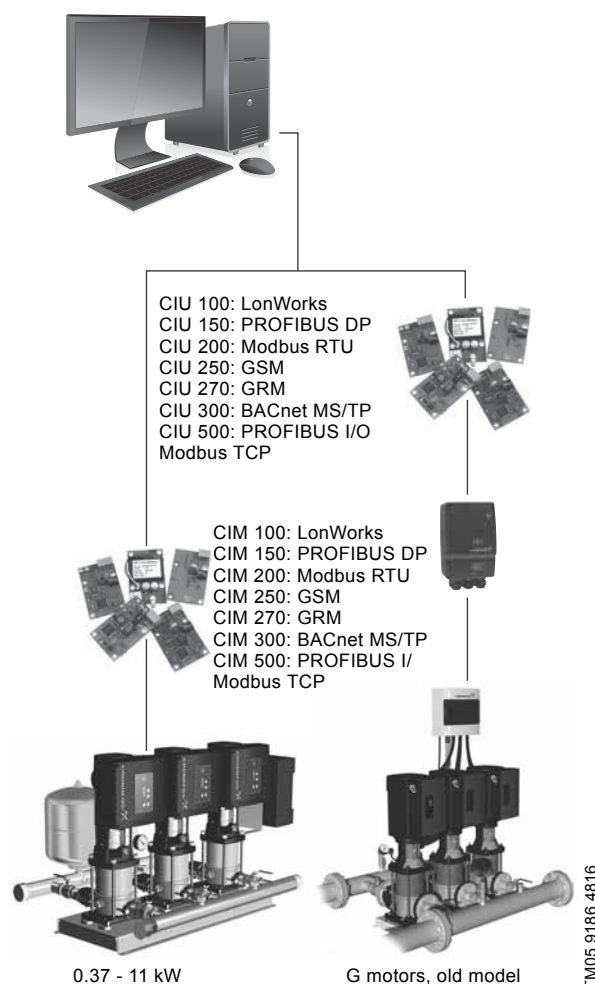


Fig. 13 Structure of a building management system

Control modes

Constant-pressure mode

Hydro Multi-E is suitable for applications where you want to control the pressure on the outlet side of the booster system, irrespective of the flow.

Signals of pressure changes in the piping system are transmitted continuously from the sensor to Hydro Multi-E. 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.

In constant-pressure mode, Hydro Multi-E maintains a preset pressure on the outlet side of the booster system, irrespective of the flow.

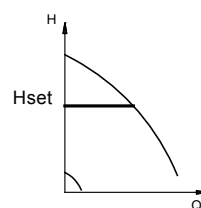


Fig. 14 Constant-pressure mode

To meet the flow requirements of the system, Hydro Multi-E continuously adjusts the number of running pumps.

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7. Sizing

When sizing a booster system, take these parameters into account:

- The performance of the booster system must meet the highest possible demand both in terms of flow rate and pressure.
- The booster system must not be oversized. This is important in relation to installation and operating costs.

You can size the Grundfos Hydro Multi-E booster systems via Grundfos Product Center or this data booklet.

Sizing in Grundfos Product Center (recommended)

We recommend that you size your Hydro Multi-E booster system in Grundfos Product Center, which is a selection program offered by Grundfos. For further information, see page 37.



Fig. 15 Sizing in Grundfos Product Center

Sizing via this data booklet

There are seven steps:

1. Maximum flow requirement
2. Required outlet pressure
3. System layout
4. Consumption profile and load profile
5. Inlet pressure
6. Selection of booster system
7. Accessories.

1. Maximum flow requirement

The total consumption and the required maximum flow rate depend on the application in question. The maximum flow requirement can be calculated by means of the table below which is based on statistical data.

Consumer	Unit	Qyear	Consumption period d	Qday	fd	Q(m)day	ft	Maximum flow rate
		gal/year	days/year	gal/day		gal/day		gpm
Residence building	Residence (2.5 persons)	48,343.5	365	132.4	1.3	172.1	1.7	0.203
Office building	Employee	6,604.3	250	26.4	1.2	31.7	3.6	0.8
Shopping center	Employee	6,604.3	300	22.0	1.2	26.4	4.3	0.078
Supermarket	Employee	21,133.8	300	70.4	1.5	105.6	3.0	0.22
Hotel	Bed	47,551	365	130.3	1.5	195.5	4.0	0.54
Hospital	Bed	79,251.6	365	217.1	1.2	260.5	3.0	0.54
School	Pupil	2,113.4	200	10.6	1.3	13.8	2.5	0.023

fd: Maximum consumption factor, day

ft: Maximum consumption factor, hour

Example: Hotel with 540 beds

Number of beds: n.

Total annual consumption: Qyear x n.

Consumption period: d.

Average consumption per day: (Qyear x n)/d.

Maximum consumption per day: Q(m)day = fd x Qday.

Maximum flow requirement per hour: Qmax = maximum flow rate/hour x the number of beds.

Calculation

n = 540 beds.

Qyear x n = 47,551 x 540 = 25,677,540 gal/year.

d = 365 days/year.

(Qyear x n)/d = 25,677,540/365 = 70,349.4 gal/day.

Q(m)day = fd x Qday = 1.5 x 70,349.4 = 105,524.1 gal/day.

Qmax = Maximum flow rate/min x number of beds = 0.54 x 540 = 292 gpm.

2. Required outlet pressure

The required outlet pressure of Hydro Multi-E can be calculated with the following equation:

$$p_{set} = p_{tap(min)} + pf + (h_{max}/10.2)$$

$$p_{boost} = p_{set} - p_{in(min)}$$

Key

p_{set}	= Required outlet pressure in bar
$p_{tap(min)}$	= Required minimum pressure at the highest tapping point in bar
pf	= Total pipe friction loss in feet
h_{max}	= Height from booster outlet port to highest tapping point in feet
$p_{in(min)}$	= Minimum inlet pressure in psi
p_{boost}	= Required boost in psi.

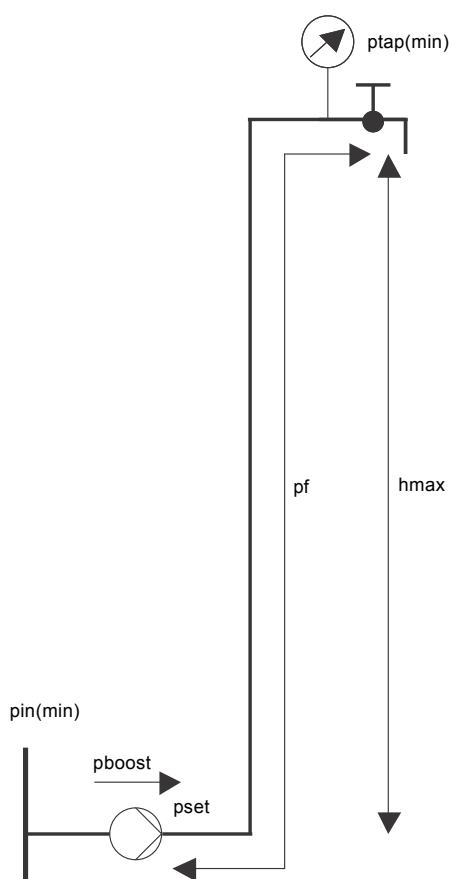


Fig. 16 Calculation of required outlet pressure

Calculation

$p_{tap(min)}$	= 29 psi
pf	= 17.4 psi
h_{max}	= 136 ft
$p_{in(min)}$	= 29 psi
p_{set}	= $29 + 17.4 + (136/2.31) = 105.3$ psi
p_{boost}	= $105.3 - 29 = 76.3$ psi

3. System layout

What is the system layout?

- Direct boosting
Example: Hydro Multi-E connected to water mains designed to distribute water from one place to another.
- Break tank
Example: Hydro Multi-E connected to a break tank installed before the booster system.
- Pressure boosting in zones
Example: High-rise building or hilly landscape where the water supply system is divided into zones.
- Roof tank
Example: Hydro Multi-E distributes water to a roof tank on top of a high-rise building.

4. Consumption profile and load profile

The consumption pattern of the installation can be illustrated as a 24-hour consumption profile and a load profile.

24-hour consumption profile

The 24-hour consumption profile is the relation between the time of the day and the flow rate.

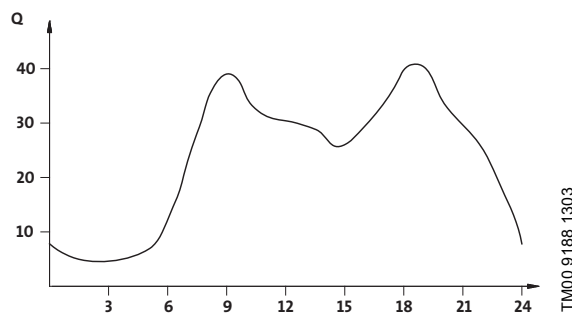


Fig. 17 Example of 24-hour consumption profile

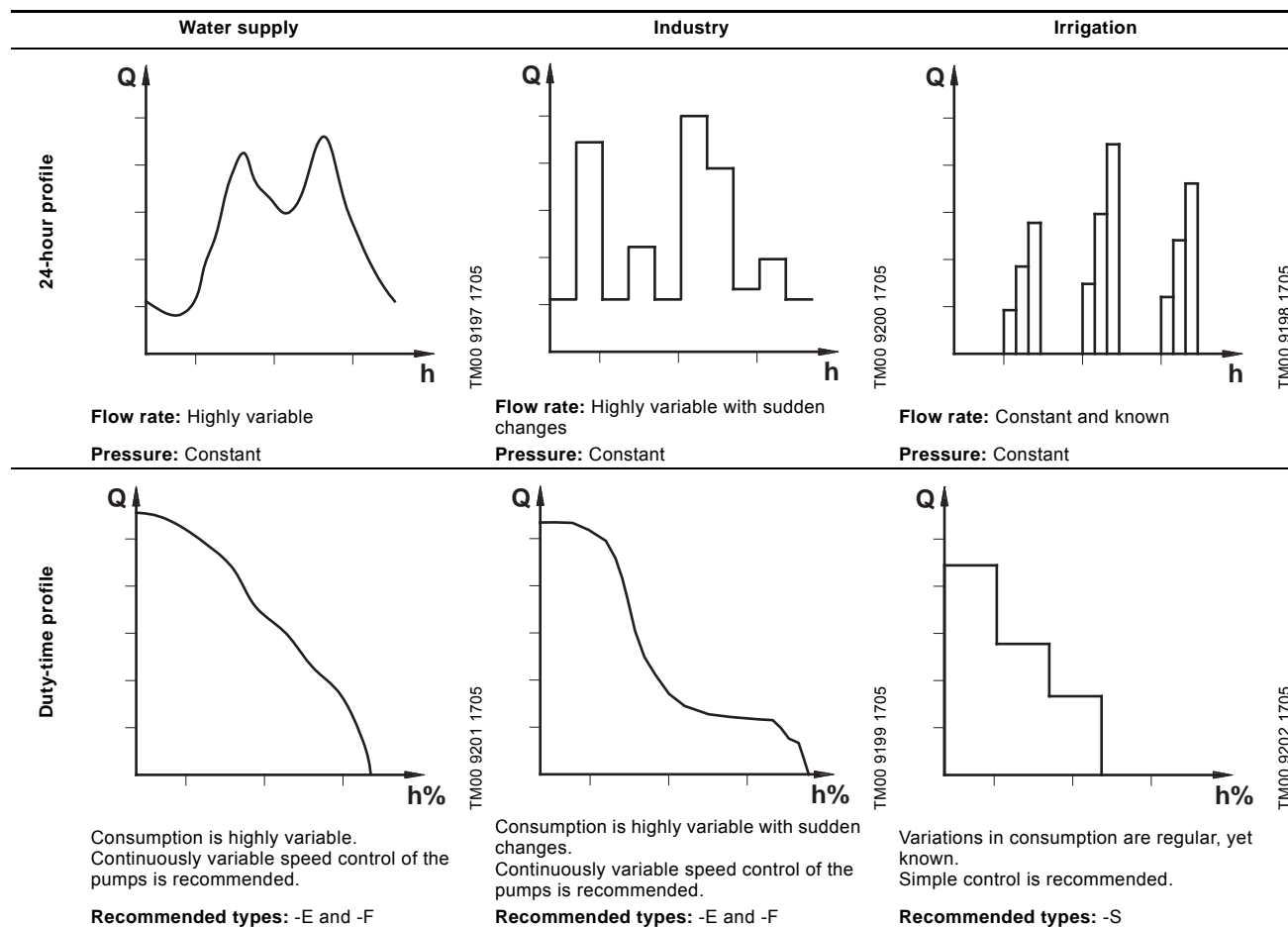
Note: If the consumption is variable and optimum comfort is required, use pumps with continuously variable speed.

Load profile

When the 24-hour consumption profile has been determined, the load profile can be made.

The load profile gives an overview of how many per cent per day the booster system operates at a specific flow rate.

Examples of typical 24-hour consumption profiles and their load profiles:



5. Inlet pressure

Is there a positive inlet pressure? If so, take the inlet pressure into consideration to ensure safe operation.

If there is a positive inlet pressure, this has to be added to the outlet pressure supplied by the booster system in order to evaluate the resulting maximum outlet pressure.

Example

A Hydro Multi-E-E booster system with 3 CRE 20-4 pumps has been selected.

Maximum operating pressure: 232 psi (16 bar).

Maximum inlet pressure: 145 psi (10 bar).

Outlet pressure against a closed valve: 145 psi (10 bar).

The selected system is allowed to start at an inlet pressure of maximum 84 psi (5.8 bar), as the maximum operating pressure is limited to 232 psi (16 bar). If the maximum inlet pressure exceeds 84 psi (5.8 bar), select a system rated 300 lb (PN 25).

6. Selection of Hydro Multi-E booster system

Select the booster system on the basis of these factors: maximum flow requirement, required outlet pressure, load profile, number of pumps required and possible standby pumps.

7. Accessories

When you have selected the optimum Hydro Multi-E booster system, consider whether you require any of the accessories mentioned below.

Dry-running protection

Every booster system must be protected against dry running.

The inlet conditions determine the type of dry-running protection:

- If the system draws water from a tank or a well, select a level switch or an electrode relay for dry-running protection.
- If the system has an inlet pressure, select a pressure transmitter or a pressure switch for dry-running protection.

Optional equipment and accessories

Hydro Multi-E can be fitted with equipment for communication, dry-running protection, emergency operation, etc.

See [Optional equipment](#), page 34, and [Accessories](#), page 36, for more details.

Understanding the curve charts

The x-axis showing the flow rate (Q) in gpm is common to all the curves; the y-axis showing the head (H) in feet has been adapted to the individual pump type.

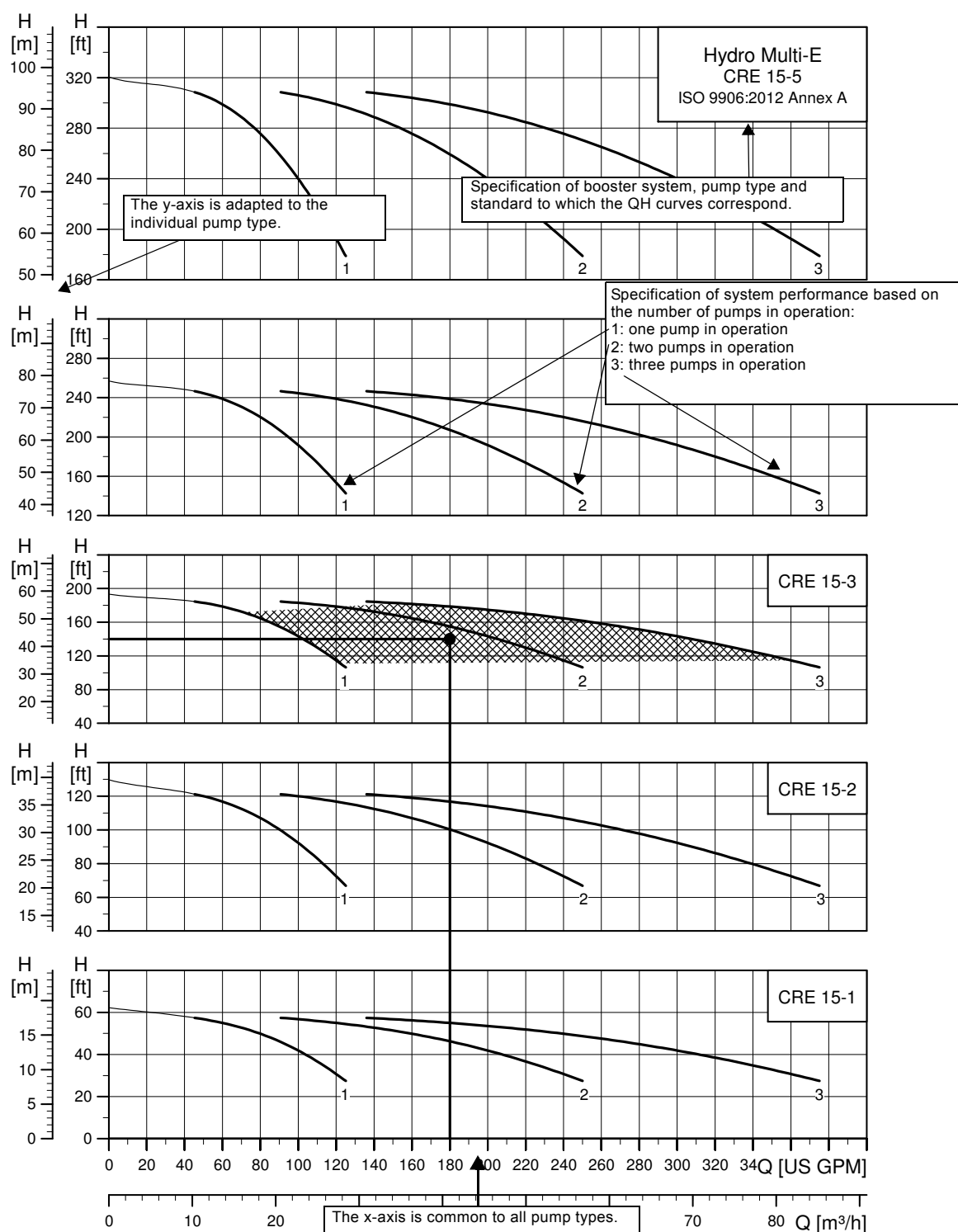


Fig. 18 Understanding the curve charts

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How to select a system, example

- A flow rate of 180 gpm is required.
- A head of 140 ft is required.

Draw a vertical line from the required flow rate

Draw a horizontal line from the required head.

The intersection of the two lines gives the number of pumps required for the system (two CRE 15-3).

The pump type best meeting this specification is found by means of the y-axis, for instance CRE 15-3).

Select only booster systems with performance ranges within the hatched area in the example.

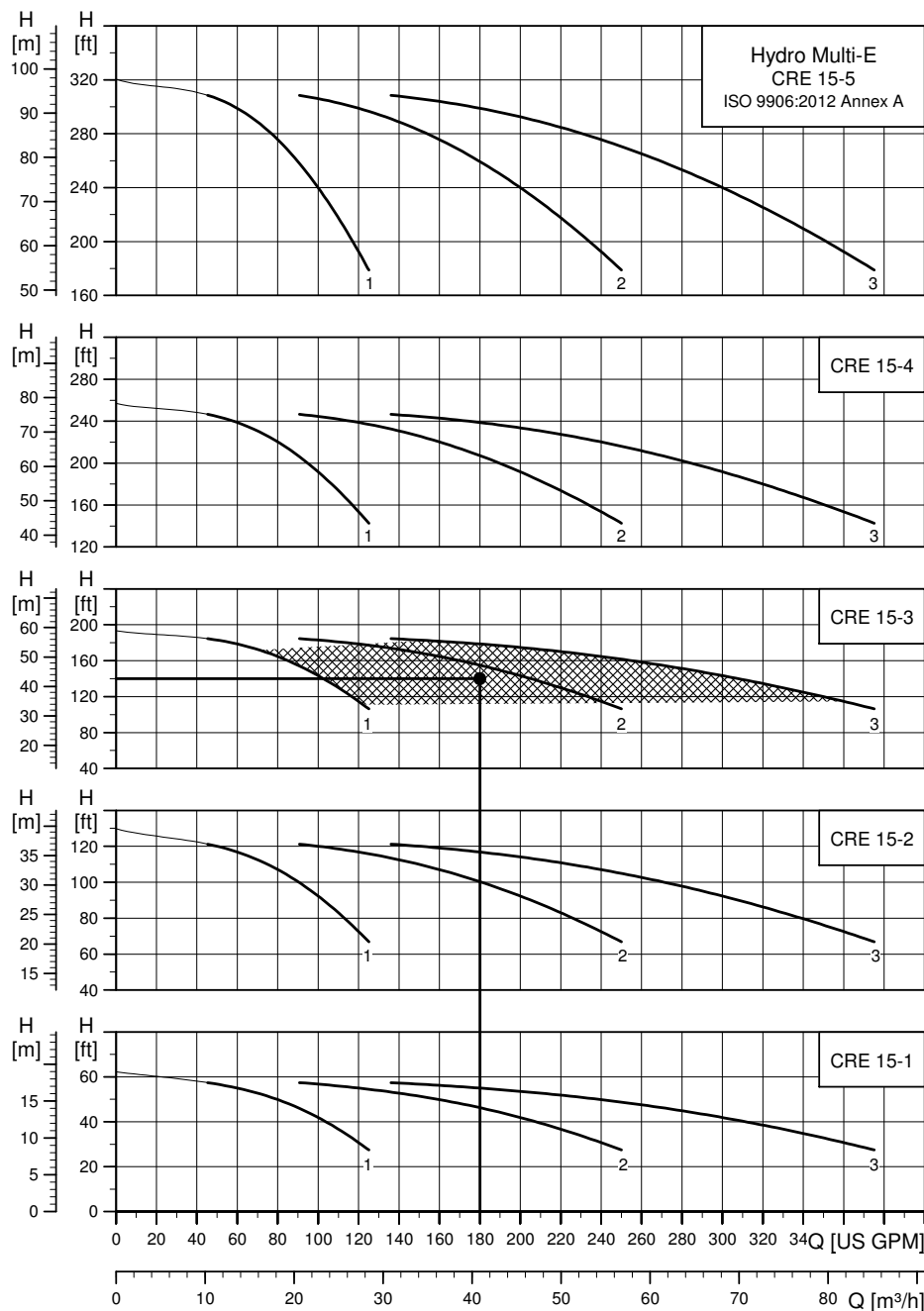


Fig. 19 Example of how to select a system

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8. Curve conditions

How to read the curve charts

The guidelines below apply to the curves on the following pages:

- Tolerances to ISO 9906:2012 Grade 3B, Annex A.
- Measurements have been made with airless water at a temperature of 68 °F (20 °C).
- The curves apply to a kinematic viscosity of ν equal to 1 mm²/s (1 cSt).
- The QH curves apply to fixed speeds of 3480 rpm at 60 Hz.

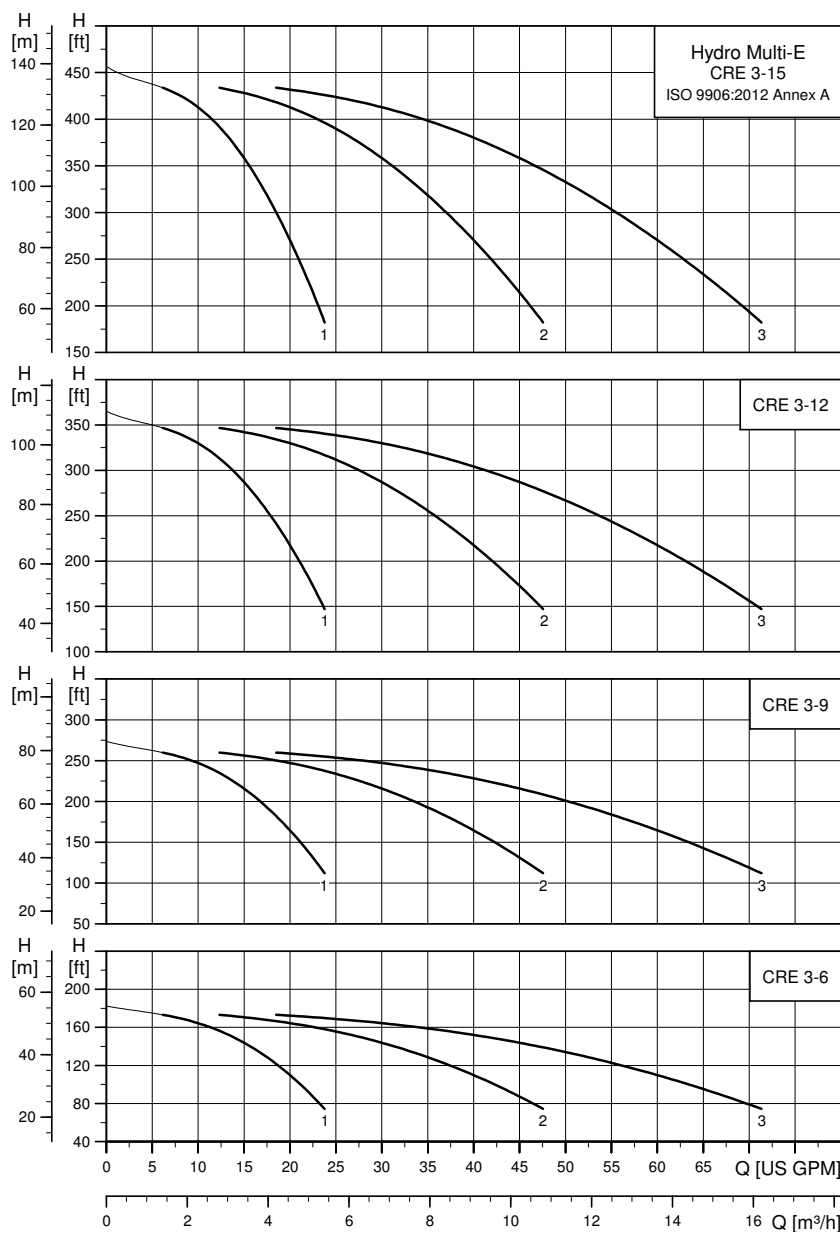
Note: In most cases, the actual speed deviates from the above-mentioned speeds. For realistic curves, please refer to Grundfos Product Center where the pump curves include the characteristics of the selected motor and therefore show curves at actual speeds.

In Grundfos Product Center, you can also adjust the curves depending on the density and viscosity.

- The conversion between head H (ft (m)) and pressure p (psi (kPa)) applies to a specific weight equal to 8.3 lb/gal, water density of ρ equal to 1000 kg/m³.

9. Curve charts and technical data

Hydro Multi-E with CRE 3-xx

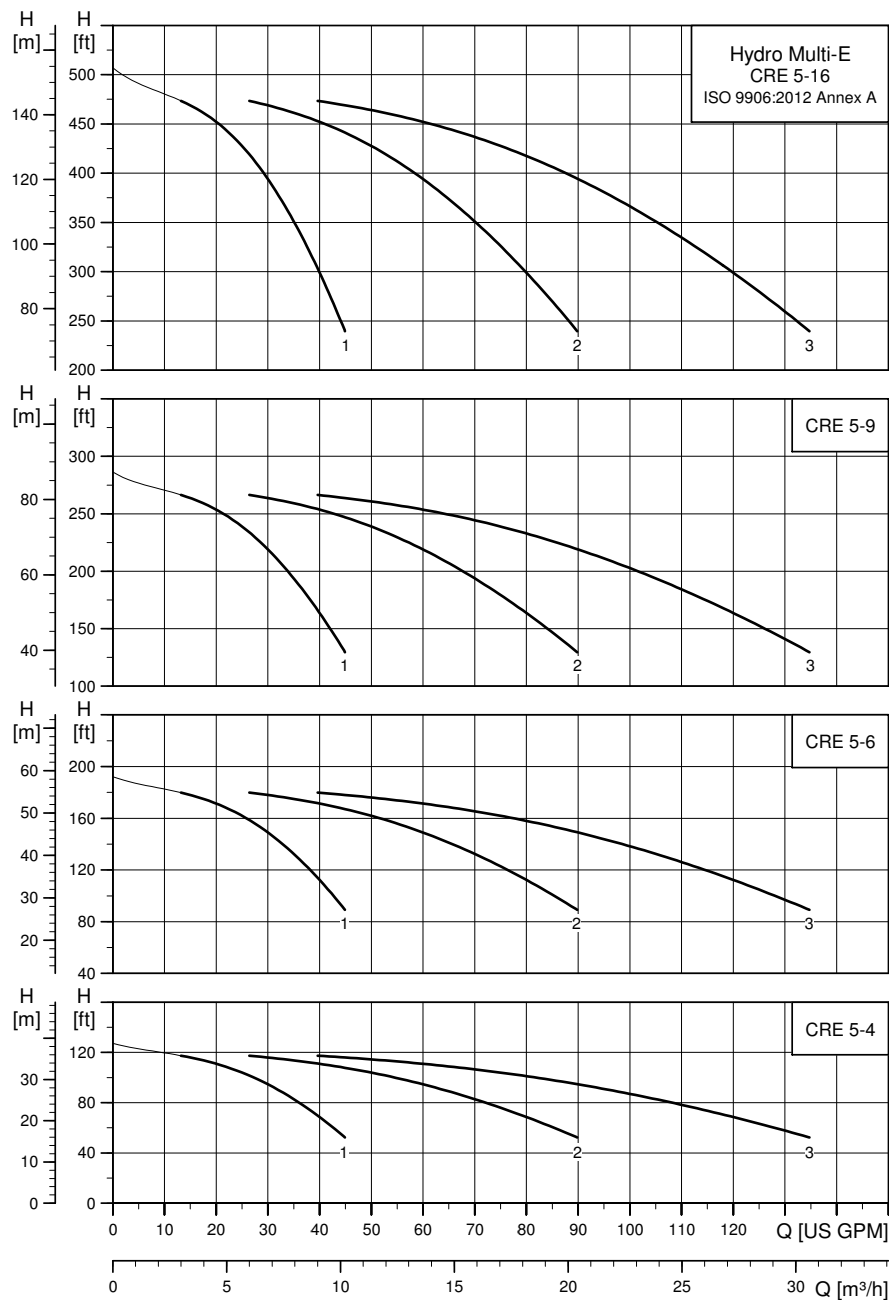


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No of pumps	Pump type	Motor [hp]	Supply voltage	Full load current [A]
2	CRE3-6	1	1 x 230 V	9.4
			3 x 460 V	3.3
	CRE3-9	1.5	1 x 230 V	13.4
			3 x 460 V	4.1
	CRE3-12	2	1 x 230 V	18.2
			3 x 460 V	5.3
	CRE3-15	3	3 x 460 V	7.6

No of pumps	Pump type	Motor [hp]	Supply voltage	Full load current [A]
3	CRE3-6	1	1 x 230 V	14.1
			3 x 460 V	4.95
	CRE3-9	1.5	1 x 230 V	20.1
			3 x 460 V	6.15
	CRE3-12	2	1 x 230 V	27.3
			3 x 460 V	7.95
	CRE3-15	3	3 x 460 V	11.4

Hydro Multi-E with CRE 5-xx

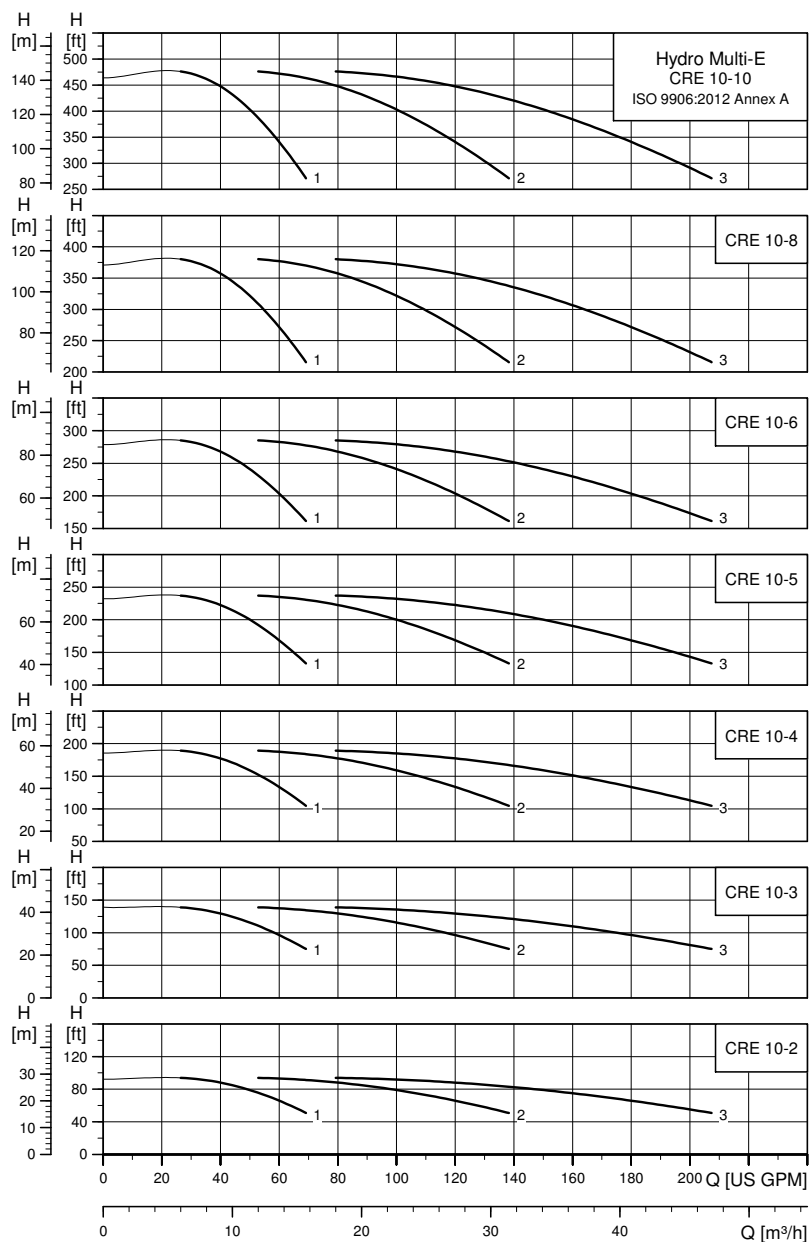


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No of pumps	Pump type	Motor [hp]	Supply voltage	Full load current [A]
2	CRE5-4	1.5	1 x 230 V	13.4
			3 x 460 V	4.1
	CRE5-6	2	1 x 230 V	18.2
			3 x 460 V	5.3
	CRE5-9	3	3 x 460 V	7.6
	CRE5-16	5	3 x 460 V	12.2

No of pumps	Pump type	Motor [hp]	Supply voltage	Full load current [A]
3	CRE5-4	1.5	1 x 230 V	20.1
			3 x 460 V	6.15
	CRE5-6	2	1 x 230 V	27.3
			3 x 460 V	7.95
	CRE5-9	3	3 x 460 V	11.4
	CRE5-16	5	3 x 460 V	18.3

Hydro Multi-E with CRE 10-xx

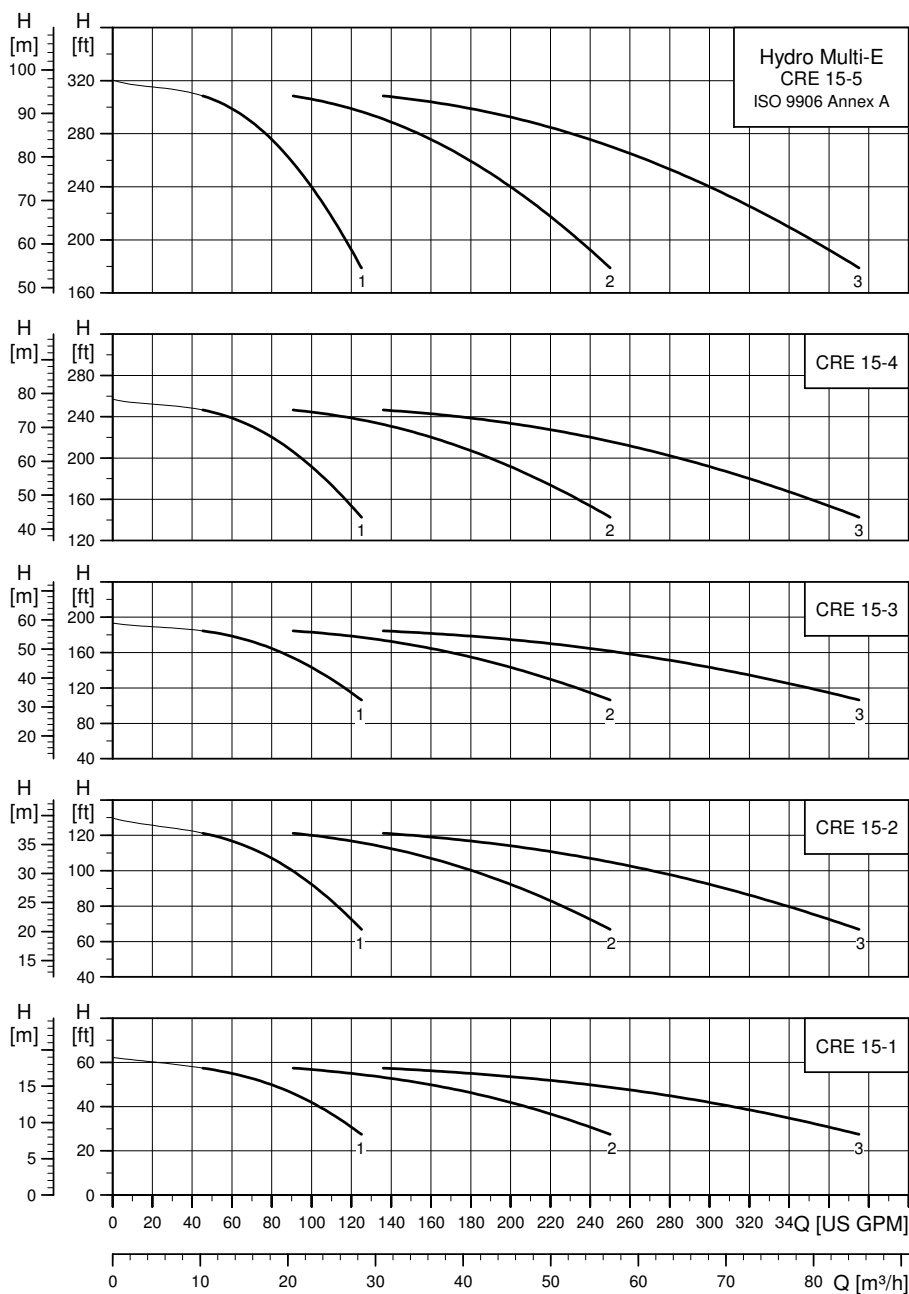


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No of pumps	Pump type	Motor [hp]	Supply voltage	Full load current [A]
2	CRE10-02	1.5	1 x 230 V	13.4
			3 x 460 V	4.1
	CRE10-03	3	3 x 460 V	7.6
	CRE10-04	3	3 x 460 V	7.6
	CRE10-05	5	3 x 460 V	12.2
	CRE10-06	5	3 x 460 V	12.2
	CRE10-08	7.5	3 x 460 V	17.8
	CRE10-10	7.5	3 x 460 V	17.8

No of pumps	Pump type	Motor [hp]	Supply voltage	Full load current [A]
3	CRE10-02	1.5	1 x 230 V	20.1
			3 x 460 V	6.15
	CRE10-03	3	3 x 460 V	11.4
	CRE10-04	3	3 x 460 V	11.4
	CRE10-05	5	3 x 460 V	18.3
	CRE10-06	5	3 x 460 V	18.3
	CRE10-08	7.5	3 x 460 V	26.7
	CRE10-10	7.5	3 x 460 V	26.7

Hydro Multi-E with CRE 15-xx

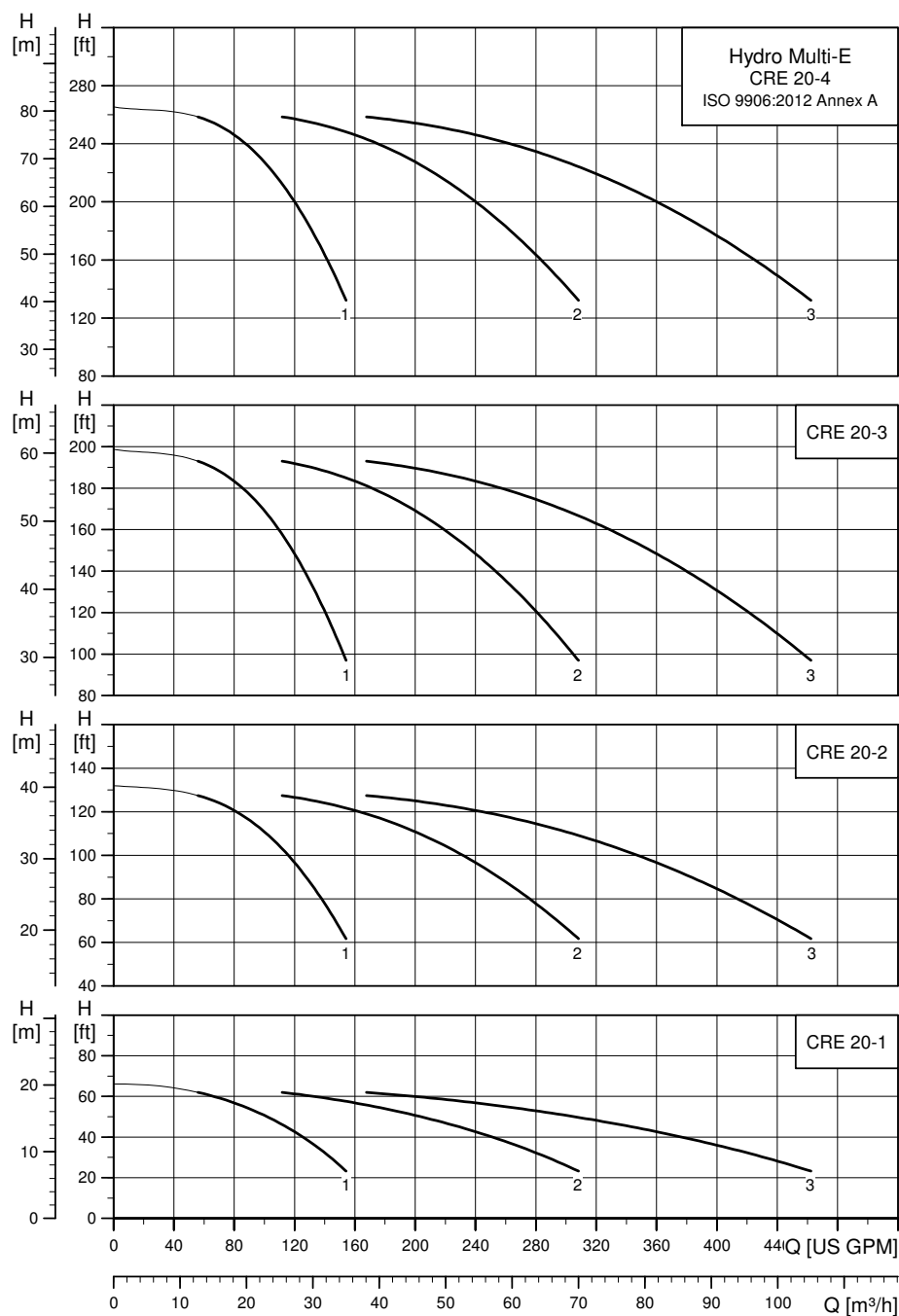


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No of pumps	Pump type	Motor [hp]	Supply voltage	Full load current [A]
2	CRE15-01	2	1 x 230 V	18.2
			3 x 460 V	5.3
	CRE15-02	5	3 x 460 V	12.2
	CRE15-03	7.5	3 x 460 V	17.8
	CRE15-04	7.5	3 x 460 V	17.8
	CRE15-05	10	3 x 460 V	23.2

No of pumps	Pump type	Motor [hp]	Supply voltage	Full load current [A]
3	CRE15-01	2	1 x 230 V	27.3
			3 x 460 V	7.95
	CRE15-02	5	3 x 460 V	18.3
	CRE15-03	7.5	3 x 460 V	26.7
	CRE15-04	7.5	3 x 460 V	26.7
	CRE15-05	10	3 x 460 V	34.8

Hydro Multi-E with CRE 20-xx



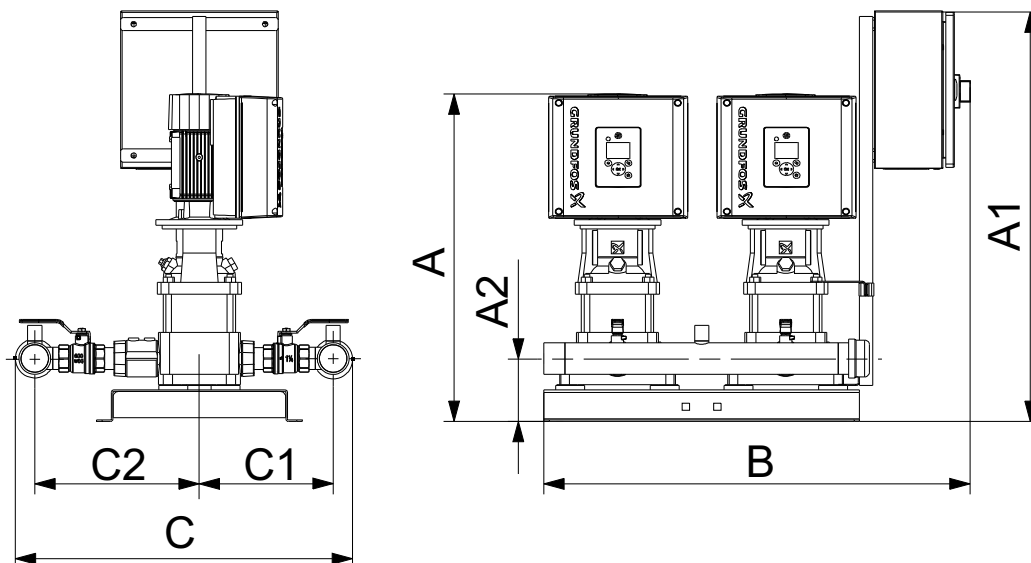
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No of pumps	Pump type	Motor [hp]	Supply voltage	Full load current [A]
2	CRE20-01	3	3 x 460 V	7.6
	CRE20-02	5	3 x 460 V	12.2
	CRE20-03	7.5	3 x 460 V	17.8
	CRE20-04	10	3 x 460 V	23.2

No of pumps	Pump type	Motor [hp]	Supply voltage	Full load current [A]
3	CRE20-01	3	3 x 460 V	11.4
	CRE20-02	5	3 x 460 V	18.3
	CRE20-03	7.5	3 x 460 V	26.7
	CRE20-04	10	3 x 460 V	34.8

10. Dimensions

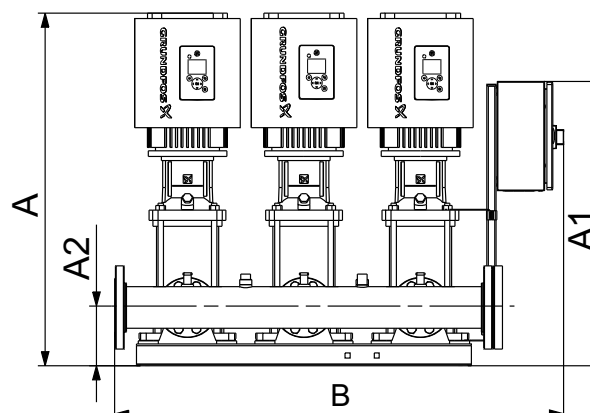
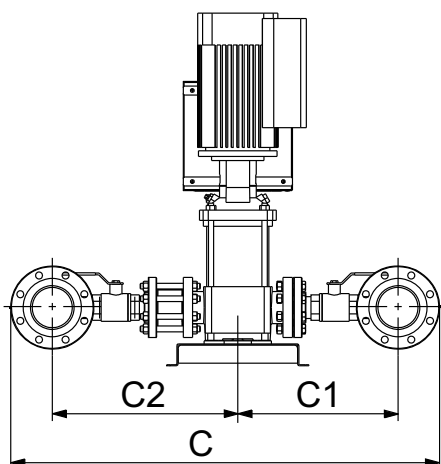
2 Pumps



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Pump type	HP	Connections	A [in (mm)]	A1 [in (mm)]	A2 [in (mm)]	B [in (mm)]	C [in (mm)]	C1 [in (mm)]	C2 [in (mm)]	net weight [lb (kg)]	Gross Weight [lb (kg)]	Shipping Volume [ft ³ (m ³)]
CRE3-6	1		24.5 (622)							207.9 (94.3)	300.5 (136.3)	
CRE3-9	1.5	2"	29.9 (759)	30.7 (780)	4.7 (119)	31.9 (810)	25.3 (643)	10 (254)	12.3 (312)	218.9 (99.3)	311.5 (141.3)	33.9 (0.96)
CRE3-12	2	NPT	31.9 (810)							220.5 (100)	313.1 (142)	
CRE3-15	3		35.6 (904)		5.7 (145)		26.8 (681)	11.8 (300)	12.1 (307)	284.6 (129.1)	400.4 (181.6)	54.7 (1.55)
CRE5-4	1.5		25.7 (653)							197.3 (89.5)	289.9 (131.5)	
CRE5-6	2	2"	29.8 (757)	30.7 (780)	4.7 (119)	31.9 (810)	25.3 (643)	10 (254)	12.3 (312)	210.3 (95.4)	302.9 (137.4)	33.9 (0.96)
CRE5-9	3	NPT	33.5 (851)							272.7 (123.7)	365.3 (165.7)	
CRE5-16	5		46.3 (1176)	35.7 (907)	5.7 (145)		26.8 (681)	11.8 (300)	12.1 (307)	317.5 (144)	433.2 (196.5)	54.7 (1.55)
CRE10-02	1.5		30.1 (765)							353.2 (160.2)	445.8 (202.2)	
CRE10-03	3		31.8 (808)							423.7 (192.2)	516.3 (234.2)	33.9 (0.96)
CRE10-04	3	2.5"	33 (838)	30.7 (780)						428.1 (194.2)	543.9 (246.7)	
CRE10-05	5	NPT	36.3 (922)		6.3 (160)	34.8 (884)	37.4 (950)	15.9 (404)	17.9 (455)	494.3 (224.2)	610 (276.7)	
CRE10-06	5		37.5 (953)							511.9 (232.2)	627.7 (284.7)	54.7 (1.55)
CRE10-08	7.5		40.5 (1029)							567.2 (257.3)	683 (309.8)	
CRE10-10	7.5		42.9 (1090)	35.7 (907)						576.1 (261.3)	691.8 (313.8)	
CRE15-01	2		31.3 (795)							377.9 (171.4)	600.5 (272.4)	
CRE15-02	5		35.5 (902)							479.1 (217.3)	701.7 (318.3)	
CRE15-03	7.5	4"	36.4 (925)	30.7 (780)	6.3 (160)	36 (914)	46.4 (1179)	17.3 (439)	20.1 (511)	512.6 (232.5)	735.2 (333.5)	89.7 (2.54)
CRE15-04	7.5	ANSI	38.1 (968)							530.2 (240.5)	752.9 (341.5)	
CRE15-05	10		39.3 (998)							571.9 (259.4)	794.5 (360.4)	
CRE20-01	3		31.8 (808)							420.9 (190.9)	643.5 (291.9)	
CRE20-02	5	4"	34 (864)	30.7 (780)	6.3 (160)	36 (914)	46.4 (1179)	17.3 (439)	20.1 (511)	482.6 (218.9)	705.3 (319.9)	89.7 (2.54)
CRE20-03	7.5	ANSI	36.4 (925)							584 (264.9)	806.7 (365.9)	
CRE20-04	10		37.6 (955)							593 (269)	815.7 (370)	

3 Pumps



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Pump type	HP	Connections	A [in (mm)]	A1 [in (mm)]	A2 [in (mm)]	B [in (mm)]	C [in (mm)]	C1 [in (mm)]	C2 [in (mm)]	net weight [lb (kg)]	Gross Weight [lb (kg)]	Shipping Volume [ft³ (m³)]
CRE3-6	1		24.5 (622)							299.8 (136)	522.5 (237)	
CRE3-9	1.5	2"	29.9 (759)	30.7 (780)	4.7 (119)	44.6 (1133)	25.3 (643)	10 (254)	12.3 (312)	316.4 (143.5)	539 (244.5)	89.7 (2.54)
CRE3-12	2	NPT	31.9 (810)							318.8 (144.6)	541.5 (245.6)	
CRE3-15	3		35.6 (904)		5.7 (145)		26.8 (681)	11.8 (300)	12.1 (307)	416 (188.7)	638.7 (289.7)	
CRE5-4	1.5		25.7 (653)							289.2 (131.2)	511.9 (232.2)	
CRE5-6	2	2.5"	29.8 (757)	30.7 (780)	4.7 (119)	44.6 (1133)	28.1 (714)	11.1 (282)	13.4 (340)	308.9 (140.1)	531.5 (241.1)	89.7 (2.54)
CRE5-9	3	NPT	33.5 (851)							402.6 (182.6)	625.2 (283.6)	
CRE5-16	5		46.3 (1176)	35.7 (907)	5.7 (145)		29.6 (752)	12.9 (328)	13.2 (335)	472.7 (214.4)	695.3 (315.4)	
CRE10-02	1.5		30.1 (765)							509.5 (231.1)	732.2 (332.1)	
CRE10-03	3		31.8 (808)							615.3 (279.1)	838 (380.1)	
CRE10-04	3		33 (838)	30.7 (780)						621.9 (282.1)	844.6 (383.1)	
CRE10-05	5	3"	36.3 (922)		6.3 (160)	47.4 (1204)	39 (991)	16 (406)	18.7 (475)	721.1 (327.1)	943.8 (428.1)	89.7 (2.54)
CRE10-06	5	NPT	37.5 (953)							747.6 (339.1)	970.3 (440.1)	
CRE10-08	7.5		40.5 (1029)							831.8 (377.3)	1054.5 (478.3)	
CRE10-10	7.5		42.9 (1090)	35.7 (907)						845 (383.3)	1067.7 (484.3)	
CRE15-01	2		31.3 (795)							549.6 (249.3)	834 (378.3)	
CRE15-02	5		35.5 (902)							701.1 (318)	985.5 (447)	
CRE15-03	7.5	4"	36.4 (925)	30.7 (780)	6.3 (160)	48.6 (1234)	46.4 (1179)	17.3 (439)	20.1 (511)	755.5 (342.7)	1039.9 (471.7)	157.9 (4.47)
CRE15-04	7.5	ANSI	38.1 (968)							782 (354.7)	1066.4 (483.7)	
CRE15-05	10		39.3 (998)							844.8 (383.2)	1129.2 (512.2)	
CRE20-01	3		31.8 (808)							615.3 (279.1)	899.7 (408.1)	
CRE20-02	5	4"	34 (864)	30.7 (780)	6.3 (160)	48.6 (1234)	46.4 (1179)	17.3 (439)	20.1 (511)	712.5 (323.2)	996.9 (452.2)	157.9 (4.47)
CRE20-03	7.5	ANSI	36.4 (925)							860 (390.1)	1144.4 (519.1)	
CRE20-04	10		37.6 (955)							873.2 (396.1)	1157.6 (525.1)	

11. Optional equipment

All optional equipment, if required, must be specified when ordering the booster system, as it must be fitted from factory prior to delivery.

Dry-running protection

Hydro Multi-E, 0.5 to 10 hp (0.37 to 7.5 kW)

As standard, Hydro Multi-E is fitted with a pressure switch as dry-running protection. The switch is fitted to the inlet manifold.

Optionally, the system can be supplied with a level switch instead of the pressure switch. This is common if the booster system is supplied from a break tank.

As an alternative, the system can be factory-fitted with inlet-pressure sensors for dry-running protection.

The benefit of this option is that it is easier to adjust the trigger level of a sensor and that the inlet pressure can be monitored with Grundfos GO Remote and via a connected BMS system (CIM module required).

To ensure that the system is properly protected against dry running, an inlet-pressure sensor must be connected to the pumps that can potentially act as master. This means that every pump that has an outlet-pressure sensor connected must also have an inlet-pressure sensor connected.

The sensors are available from 0 to 145 psi (0 to 10 bar) and from 0 to 87 psi (0 to 6 bar).

Note: If a sensor is used for dry-running protection, it requires a Grundfos GO Remote to adjust the trigger level of the sensor.

If the system is fitted with two outlet-pressure sensors (standard), the two inlet-pressure sensors are fitted in the inlet manifold with a drain valve and a T-piece. The drain valve allows for test of the dry-running function.

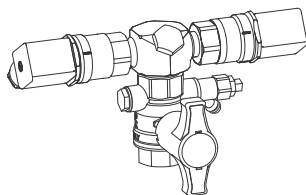


Fig. 20 Two inlet-pressure sensors fitted to T-piece

TM05 9127 3413

If the system is configured with more than two outlet-pressure sensors, a special connecting piece with a built-in vent is used. The connecting piece is fitted to a drain valve.

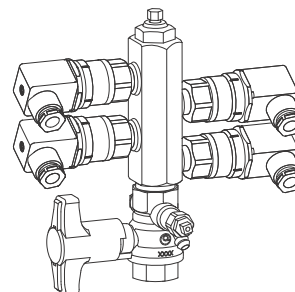


Fig. 21 Installation of more than two sensors

TM05 9128 3413

Note: The standard pressure switch normally supplied with the system is removed when the system is fitted with inlet-pressure sensors for dry-running protection.

Check valve on the inlet side

For suction-lift operation, the check valve can be moved to the inlet side. This is often used in combination with a foot valve if the system is drawing water from a tank.

Outlet pressure sensor on each pump

Hydro Multi-E, 0.5 to 10 hp (0.37 to 7.5 kW)

As standard, Hydro Multi-E is fitted with two outlet-pressure sensors. If required, the system can be fitted with a sensor on each pump. The benefit is that all pumps in the system can act as master pump and control the system.

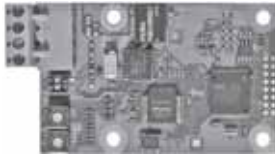
When more than two outlet-pressure sensors are connected, the sensors are fitted in a special connecting piece with a built-in vent in the top. The connecting piece is fitted to a drain valve.

Left-side breaker box

As standard, the breaker box is mounted on the right side of the system. As an alternative, the system can be supplied with the breaker box mounted on the left side.

CIM communication interface modules

Hydro Multi-E, 0.5 to 10 hp (0.37 to 7.5 kW)



GrA6121

Fig. 22 Grundfos CIM communication interface module

The CIM modules enable communication of operating data, such as measured values and setpoints, between Hydro Multi-E and a building management system.

Note: CIM modules must be fitted by authorised personnel.

The CIM module enables transfer of data such as:

- operating mode
- setpoint
- control mode
- warnings and alarms
- power/energy consumption.

We offer the following CIM modules:

Module	Fieldbus protocol
CIM 050	GENIbus
CIM 110	LonWorks
CIM 150	PROFIBUS DP
CIM 200	Modbus RTU
CIM 250	GSM
CIM 270	Grundfos Remote Management
CIM 300	BACnet MS/TP
CIM 500	PROFIBUS I/O / Modbus TCP

Aerials for CIM 250

Description
Aerial for roof
Aerial for desk

12. Accessories

Grundfos GO Remote

Grundfos GO Remote is used for wireless infrared or radio communication with the pumps. Various Grundfos GO Remote variants are available. The variants are described in the following.

MI 202 and MI 204

The MI 202 and MI 204 are add-on modules with built-in infrared and radio communication.

- The MI 202 is used in conjunction with Apple iPod Touch 4G, iPhone 4 or iPhone 4S
- The MI 204 is used in conjunction with Apple iPod Touch 5G, iPhone 5 or later.



TM05 3887 1712 - TM05 7704 1513

Fig. 23 MI 202 and MI 204

MI 301

The MI 301 is a module with built-in infrared and radio communication. The MI 301 must be used in conjunction with an Android or iOS-based Smartphone with a Bluetooth connection. The MI 301 has rechargeable Li-ion battery and must be charged separately.



TM05 3890 1712

Fig. 24 MI 301

Supplied with the product:

- battery charger
- quick guide.

Additional documentation

The documents and publication numbers below refer to all Hydro Multi-E documentation available.

Document	Publication number
Installation and operating instructions	
Hydro Multi-E 0.5 to 10 hp(0.37 - 7.5 kW)	98419766

In addition to the printed documentation, Grundfos offers product information in Grundfos Product Center on www.grundfos.com. See also page [37](#).

13. Grundfos Product Center

Online search and sizing tool to help you make the right choice.

<http://product-selection.grundfos.com>



"SIZING" enables you to size a pump based on entered data and selection choices.

"REPLACEMENT" enables you to find a replacement product. Search results will include information on

- the lowest purchase price
- the lowest energy consumption
- the lowest total life cycle cost.

The screenshot shows the Grundfos Product Center website. At the top, there's a navigation bar with the Grundfos logo and 'PRODUCT CENTER'. Below this is a search bar with a 'SEARCH' button. The main content area has four large buttons: 'SIZING' (with a pump icon), 'CATALOG' (with a book icon), 'REPLACEMENT' (with a double arrow icon), and 'LIQUIDS' (with a drop icon). Below these is a 'QUICK SIZING' section with input fields for 'Flow (Q)*' and 'Head (H)*', dropdown menus for units ('US gpm' and 'ft'), and radio buttons for 'Select what to size by:'. A 'START SIZING' button is to the right. At the bottom, there's an 'ADVANCED SIZING' section with links for 'Advanced sizing by application' and 'Guided selection'.

"CATALOG" gives you access to the Grundfos product catalog.

"LIQUIDS" enables you to find pumps designed for aggressive, flammable or other special liquids.

All the information you need in one place

Performance curves, technical specifications, pictures, dimensional drawings, motor curves, wiring diagrams, spare parts, service kits, 3D drawings, documents, system parts. The Product Center displays any recent and saved items — including complete projects — right on the main page.

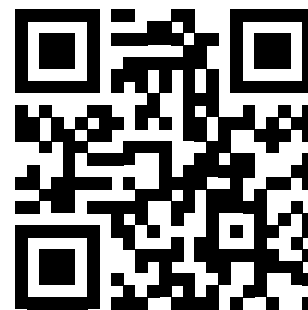
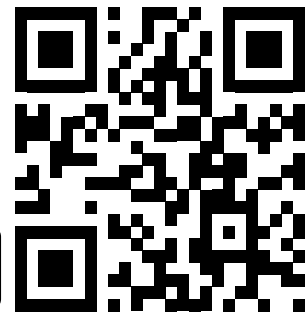
Downloads

On the product pages, you can download Installation and Operating Instructions, Data Booklets, Service Instructions, etc. in PDF format.

Grundfos GO

Mobile solution for professionals on the GO!

Grundfos GO is the mobile tool box for professional users on the go. It is the most comprehensive platform for mobile pump control and pump selection including sizing, replacement and documentation. It offers intuitive, handheld assistance and access to Grundfos online tools, and it saves valuable time for reporting and data collection.



Subject to alterations.

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ECM: 1220793

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