

Hydro Multi-E

Booster systems with 2 to 3 CRE pumps
60 Hz, North America



Drinking Water System Component
NSF / ANSI 61
NSF / ANSI 372

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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.

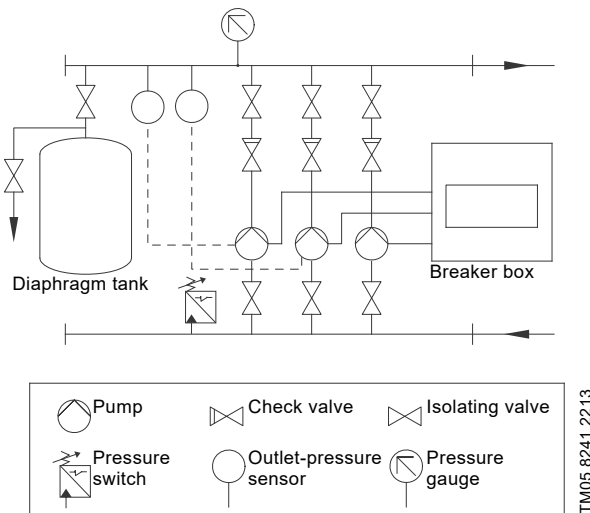


Fig. 1 Schematic drawing of Hydro Multi-E with three single-phase pumps

Pump Energy Index

Pump Energy Index (PEI) was established by the U.S. Department of Energy (DOE) and adopted by Canada as the standard metric used to evaluate pump efficiency. The value is the ratio of the pump efficiency rating (PER) divided by the calculated minimally complaint PER (PER_{STD}) for the pump type. This provides a representation of a pump's actual performance compared to the minimal standard performance required by regulation. The lower the PEI value, the more efficient a pump is at the tested operating points.

PER is determined by defined testing parameters required by the DOE. This includes testing a particular pump model at its best efficiency point (BEP).

For PEI values there are two different versions:

- PEI_{CL} (constant load): Applies to a bare-shaft pump, and a pump sold with a motor
- PEI_{VL} (variable load): Applies to pumps sold with a motor and controller (such as VFD, VSD)

The DOE has set the maximum PEI value as 1.00. Any pump, pump and motor, or pump, motor and controller that exceeds a PEI value of 1.00 can no longer be manufactured after January 26, 2020.

PEI is a generalized efficiency value. PEI cannot be used to determine the efficiency of a pump in a specific application.

Even though packaged systems with advanced control logic can deliver greater savings, the skid packaged system will not have a PEI value, the individual pumps in the system will have a PEI value.

Product type	hp (kW)	Voltage	PEI_{VL}	Impeller diameter [in (mm)]	
CRE 10	1 (0.75)	1x200-240	0.42	3.66 (92.9)	
		3x440-480	0.41		
	1.5-2 (1.1-1.5)	1x200-240	0.41		
		3x200-240	0.43		
	3-15 (2.2-11)	3x200-240	0.41		
		3x440-480	0.40		
CRE 15	1.5-2 (1.1-1.5)	1x200-240	0.45	4.13 (104.8)	
		3x200-240	0.44		
	3-15 (2.2-11)	3x200-240	0.42		
		3x440-480	0.40		
	CRE 20	1.5-2 (1.1-1.5)	1x200-240		0.51
			3x200-240		0.50
3-15 (2.2-11)		3x440-480	0.48		
		3x200-240	0.42		
		3x440-480	0.41		

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
- proportional pressure 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.

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 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

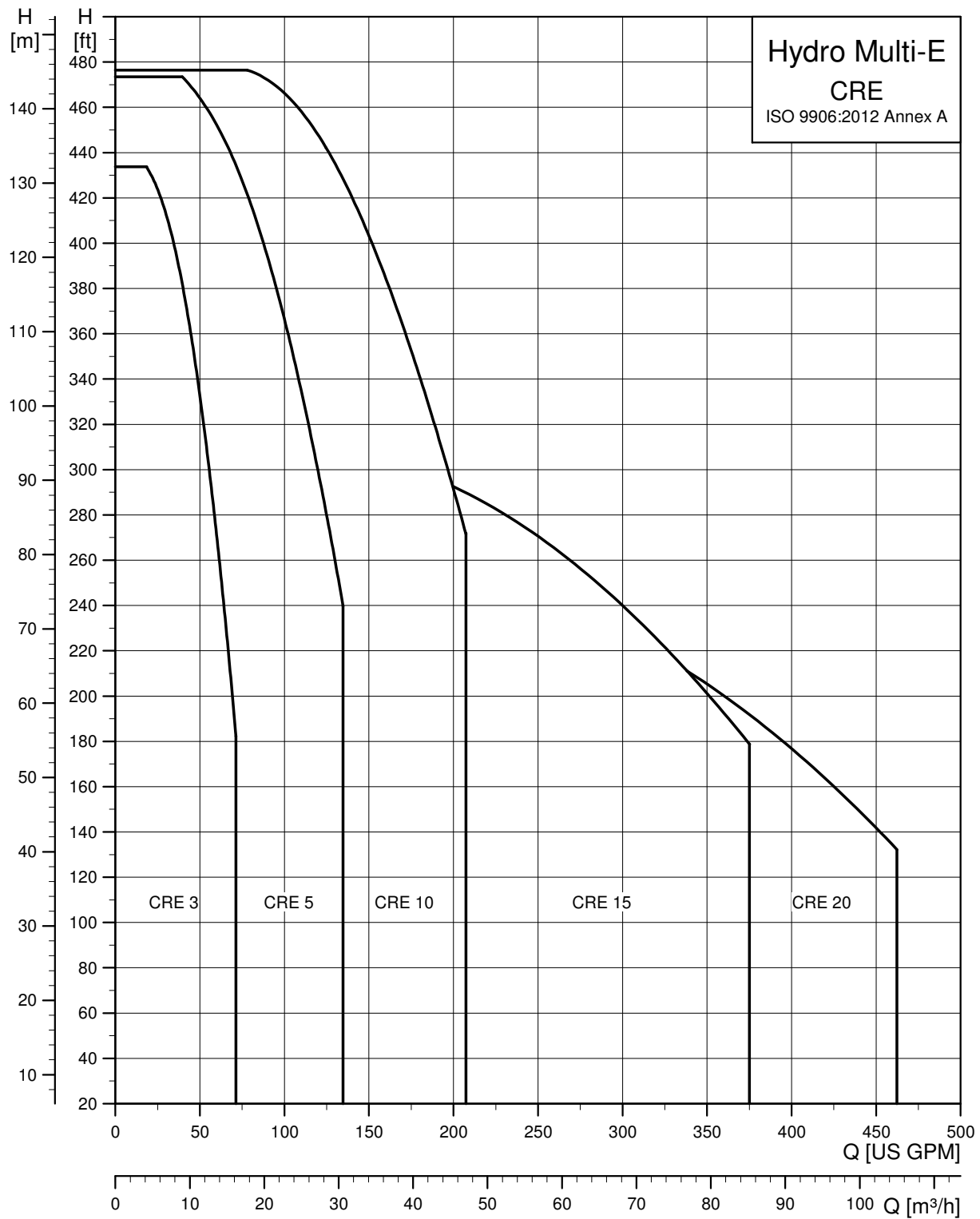


Fig. 2 Performance range, Hydro Multi-E CRE

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 200-240 V

Number of pumps	Pump type	[hp (kW)]	Diaphragm tank [gal (L)]	Full load current [A]	Part number, pressure switch on inlet	Part number, pressure sensor on inlet
2	CRE 3-6	1 (0.74)	4.4 (16.65)	9.4	99334059	99761496
	CRE 3-9	1.5 (1.11)	4.4 (16.65)	13.4	99334060	99761497
	CRE 3-12	2 (1.49)	4.4 (16.65)	18.2	99334061	99761498
	CRE 5-4	1.5 (1.11)	4.4 (16.65)	13.4	99334062	99761499
	CRE 5-6	2 (1.49)	4.4 (16.65)	18.2	99334063	99761500
	CRE 10-02	1.5 (1.11)	10.3 (38.98)	13.4	99334064	99761501
	CRE 15-01	2 (1.49)	34 (128.70)	27.3	99334065	99761502
3	CRE 3-6	1 (0.74)	4.4 (16.65)	14.1	99334684	99761503
	CRE 3-9	1.5 (1.11)	4.4 (16.65)	20.1	99334685	99761504
	CRE 3-12	2 (1.49)	4.4 (16.65)	27.3	99334686	99761505
	CRE 5-4	1.5 (1.11)	4.4 (16.65)	20.1	99334687	99761506
	CRE 5-6	2 (1.49)	4.4 (16.65)	27.3	99334688	99761507
	CRE 10-02	1.5 (1.11)	10.3 (38.98)	20.1	99334689	99761508
	CRE 15-01	2 (1.49)	34 (128.70)	18.2	99334690	99761509

3 x 200-240 V

Number of pumps	Pump type	[hp (kW)]	Diaphragm tank [gal (L)]	Full load current [A]	Part number, pressure switch on inlet	Part number, pressure sensor on inlet
2	CRE 3-6	1 (0.74)	4.4 (16.65)	8	99445611	99761452
	CRE 3-9	1.5 (1.11)	4.4 (16.65)	8	99445612	99761453
	CRE 3-12	2 (1.49)	4.4 (16.65)	10.8	99445623	99761454
	CRE 3-15	3 (2.23)	4.4 (16.65)	15.8	99445624	99761455
	CRE 5-4	1.5 (1.11)	4.4 (16.65)	8	99445625	99761456
	CRE 5-6	2 (1.49)	10.3 (38.98)	10.8	99445626	99761457
	CRE 5-9	3 (2.23)	34 (128.70)	15.8	99445627	99761458
	CRE 5-16	5 (3.72)	4.4 (16.65)	26.4	99445628	99761459
	CRE 10-2	1.5 (1.11)	4.4 (16.65)	8	99445629	99761460
	CRE 10-3	3 (2.23)	4.4 (16.65)	15.8	99445630	99761461
	CRE 10-4	3 (2.23)	4.4 (16.65)	15.8	99445631	99761462
	CRE 10-5	5 (3.72)	4.4 (16.65)	26.4	99445632	99761463
	CRE 10-06	5 (3.72)	10.3 (38.98)	26.4	99445633	99761464
	CRE 10-08	7.5 (5.59)	34 (128.70)	40	99445634	99761465
	CRE 10-10	7.5 (5.59)	10.3 (38.98)	40	99445635	99761466
	CRE 15-01	2 (1.49)	18.2 (68.89)	10.8	99445636	99761467
	CRE 15-02	5 (3.72)	12.2 (46.18)	26.4	99445637	99761468
	CRE 15-03	7.5 (5.59)	17.8 (67.38)	40	99445638	99761469
	CRE 15-04	7.5 (5.59)	17.8 (67.38)	40	99445639	99761470
	CRE 20-01	3 (2.23)	11.4 (43.15)	15.8	99445640	99761471
CRE 20-02	5 (3.72)	18.3 (69.27)	26.4	99445641	99761472	
CRE 20-03	7.5 (5.59)	26.7 (101.07)	40	99445642	99761473	
3	CRE 3-6	1 (0.74)	4.4 (16.65)	12	99445643	99761474
	CRE 3-9	1.5 (1.11)	4.4 (16.65)	12	99445645	99761475
	CRE 3-12	2 (1.49)	4.4 (16.65)	16.2	99445646	99761476
	CRE 3-15	3 (2.23)	7,6 (28.76)	23.7	99445647	99761477
	CRE 5-4	1.5 (1.11)	4,4 (16.65)	12	99445648	99761478
	CRE 5-6	2 (1.49)	18.2 (68.89)	16.2	99445649	99761479
	CRE 5-9	3 (2.23)	4.4 (16.65)	23.7	99445650	99761480
	CRE 5-16	5 (3.72)	12.2 (46.18)	39.6	99445651	99761481
	CRE 10-02	1.5 (1.11)	10.3 (38.98)	12	99445652	99761482
	CRE 10-03	3 (2.23)	10.3 (38.98)	23.7	99445653	99761483
	CRE 10-04	3 (2.23)	10.3 (38.98)	23.7	99445654	99761484
	CRE 10-05	5 (3.72)	10.3 (38.98)	39.6	99445655	99761485
	CRE 10-06	5 (3.72)	10.3 (38.98)	39.6	99445656	99761486
	CRE 10-08	7.5 (5.59)	10.3 (38.98)	60	99445657	99761487
	CRE 10-10	7.5 (5.59)	10.3 (38.98)	60	99449909	99761488
	CRE 15-01	2 (1.49)	34 (128.70)	16.2	99445658	99761489
	CRE 15-02	5 (3.72)	34 (128.70)	39.6	99445659	99761490
	CRE 15-03	7.5 (5.59)	34 (128.70)	60	99445660	99761491
	CRE 15-04	7.5 (5.59)	34 (128.70)	60	99445661	99761492
	CRE 20-01	3 (2.23)	34 (128.70)	23.7	99445662	99761493
CRE 20-02	5 (3.72)	34 (128.70)	39.6	99445663	99761494	
CRE 20-03	7.5 (5.59)	34 (128.70)	60	99445664	99761495	

3 x 440-480 V

Number of pumps	Pump type	[hp (kW)]	Diaphragm tank [gal (L)]	Full load current [A]	Part number, pressure switch on inlet	Part number, pressure sensor on inlet
2	CRE 3-6	1 (0.74)	4.4 (16.65)	3,3	99334001	99761393
	CRE 3-9	1.5 (1.11)	4.4 (16.65)	4,1	99334002	99761395
	CRE 3-12	2 (1.49)	4.4 (16.65)	5,3	99334013	99761396
	CRE 3-15	3 (2.23)	4.4 (16.65)	7,6	99334014	99761397
	CRE 5-4	1.5 (1.11)	4.4 (16.65)	4.1	99334015	99761398
	CRE 5-6	2 (1.49)	4.4 (16.65)	5.3	99334016	99761399
	CRE 5-9	3 (2.23)	4.4 (16.65)	7.6	99334017	99761400
	CRE 5-16	5 (3.72)	4.4 (16.65)	12.2	99334018	99761401
	CRE 10-02	1.5 (1.11)	10.3 (38.98)	4,1	99334019	99761402
	CRE 10-03	3 (2.23)	10.3 (38.98)	7,6	99334020	99761413
	CRE 10-04	3 (2.23)	10.3 (38.98)	7,6	99334021	99761414
	CRE 10-05	5 (3.72)	10.3 (38.98)	12,2	99334022	99761415
	CRE 10-06	5 (3.72)	10.3 (38.98)	12,2	99334023	99761416
	CRE 10-08	7.5 (5.59)	10.3 (38.98)	17,8	99334024	99761417
	CRE 10-10	7.5 (5.59)	10.3 (38.98)	17,8	99334025	99761418
	CRE 15-01	2 (1.49)	34 (128.70)	5,3	99334026	99761419
	CRE 15-02	5 (3.72)	34 (128.70)	12,2	99334027	99761420
	CRE 15-03	7.5 (5.59)	34 (128.70)	17,8	99334028	99761421
	CRE 15-04	7.5 (5.59)	34 (128.70)	17,8	99334029	99761422
	CRE 15-05	10 (7.45)	34 (128.70)	23,2	99334030	99761423
	CRE 20-01	3 (2.23)	34 (128.70)	7.6	99334031	99761424
	CRE 20-02	5 (3.72)	34 (128.70)	12.2	99334032	99761425
	CRE 20-03	7.5 (5.59)	34 (128.70)	17.8	99334033	99761426
	CRE 20-04	10 (7.45)	34 (128.70)	23.2	99334034	99761427
3	CRE 3-6	1 (0.74)	4.4 (16.65)	4,95	99334035	99761428
	CRE 3-9	1.5 (1.11)	4.4 (16.65)	6,15	99334036	99761429
	CRE 3-12	2 (1.49)	4.4 (16.65)	7,95	99334037	99761430
	CRE 3-15	3 (2.23)	4.4 (16.65)	11,4	99334038	99761431
	CRE 5-4	1.5 (1.11)	4.4 (16.65)	6,15	99334039	99761432
	CRE 5-6	2 (1.49)	4.4 (16.65)	7,95	99334040	99761433
	CRE 5-9	3 (2.23)	4.4 (16.65)	11,4	99334041	99761434
	CRE 5-16	5 (3.72)	4.4 (16.65)	18,3	99334042	99761435
	CRE 10-02	1.5 (1.11)	10.3 (38.98)	6,15	99334043	99761436
	CRE 10-03	3 (2.23)	10.3 (38.98)	11,4	99334044	99761437
	CRE 10-04	3 (2.23)	10.3 (38.98)	11,4	99334045	99761438
	CRE 10-05	5 (3.72)	10.3 (38.98)	18,3	99334046	99761439
	CRE 10-06	5 (3.72)	10.3 (38.98)	18,3	99334047	99761440
	CRE 10-08	7.5 (5.59)	10.3 (38.98)	26,7	99334048	99761441
	CRE 10-10	7.5 (5.59)	10.3 (38.98)	26,7	99334049	99761442
	CRE 15-01	2 (1.49)	34 (128.70)	7,95	99334050	99761443
	CRE 15-02	5 (3.72)	34 (128.70)	18,3	99334051	99761444
	CRE 15-03	7.5 (5.59)	34 (128.70)	26,7	99334052	99761445
	CRE 15-04	7.5 (5.59)	34 (128.70)	26,7	99334053	99761446
	CRE 15-05	10 (7.45)	34 (128.70)	34,8	99334054	99761447
	CRE 20-01	3 (2.23)	34 (128.70)	11,4	99334055	99761448
	CRE 20-02	5 (3.72)	34 (128.70)	18,3	99334056	99761449
	CRE 20-03	7.5 (5.59)	34 (128.70)	26,7	99334057	99761450
	CRE 20-04	10 (7.45)	34 (128.70)	34,8	99334058	99761451

Operating conditions

Liquid temperature: 32 to 185 °F (0 to +85 °C).

For CRE 3, CRE 5:

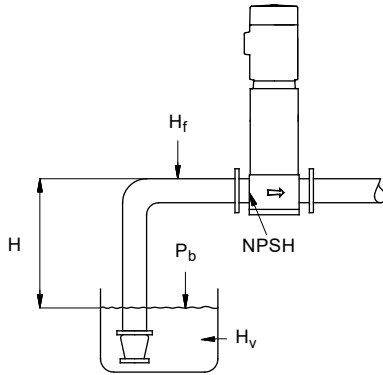
Liquid temperature: 32 to 140 °F (0 to 60 °C)

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



TMO2 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 CRE 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 = **Net Positive Suction Head** 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 ft.
Pump type	= CRE 15-3, 60 Hz.
Flow rate	= 90.3 GPM
NPSH	= 7.28 ft head.

(from Grundfos Product Center)

H_f	= 10 ft head.
Liquid temperature	= 140 °F.
H_v	= 6.7 ft head.
H	= $P_b - \text{NPSH} - H_f - H_v - H_s$.
H	= (33.5 - 7.28 - 10 - 6.7 - 2) ft equal to 7.52 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 x 0.0299 equal to 0.22.

Pressure calculated in psi: 7.52 x 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

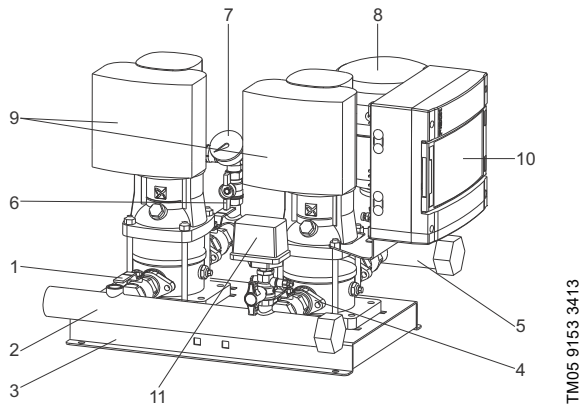


Fig. 4 Hydro Multi-E with two CRE pumps

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
	Pressure sensors as dry-running protection**	2

* We recommend that you use a diaphragm tank.

** Depending on the configuration, the system will have either one pressure switch or two pressure sensors.

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 or two pressure sensors 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.

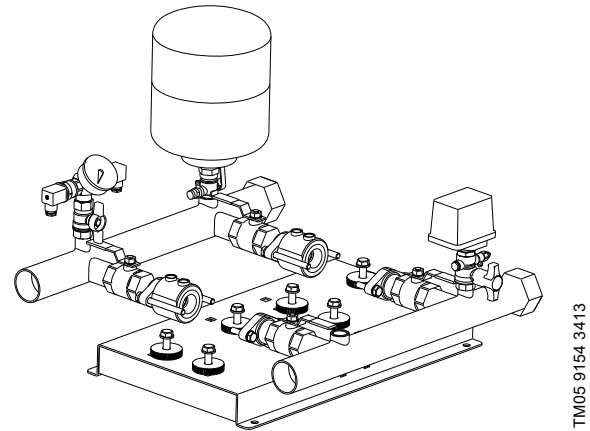


Fig. 5 Base frame, manifolds and valves

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

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	•	
Proportional pressure	•	
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.



Multi-E systems configured with two inlet pressure sensors use the limit exceed 1 for dry-run protection.

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 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.

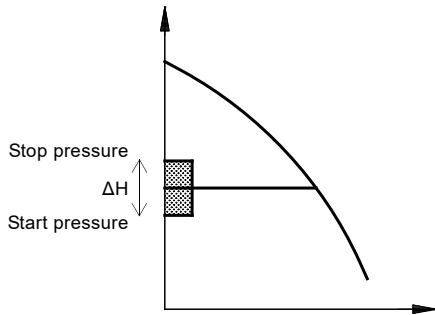


Fig. 6 Start and stop pressures

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.

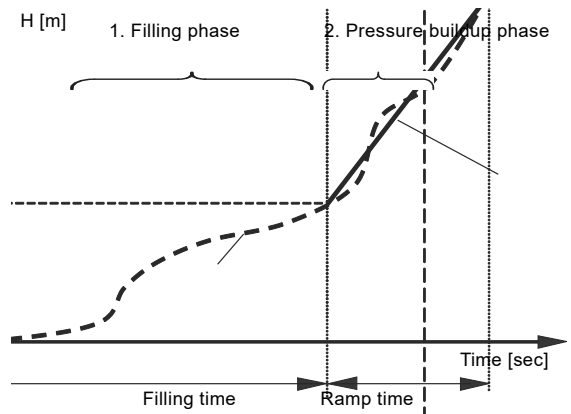


Fig. 7 Filling and pressure buildup phases

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.

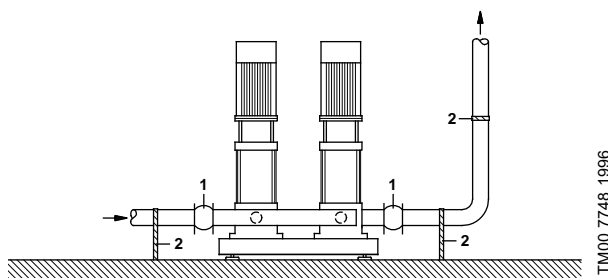


Fig. 8 Pipework

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.

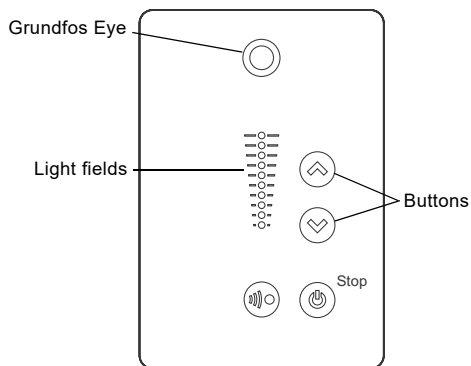


Fig. 9 Standard control panel, 0.5 to 10 hp (0.37 to 7.5 kW) pumps

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Advanced control panel

Two pumps on the Hydro Multi-E are 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.

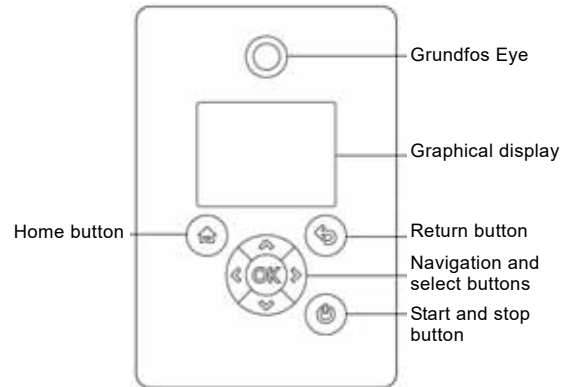


Fig. 10 Advanced control panel

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Grundfos GO Remote



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.

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

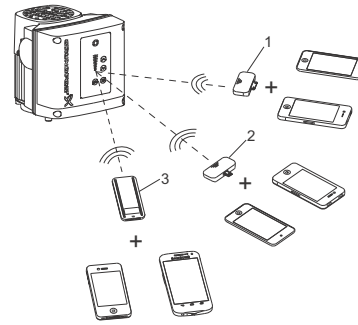


Fig. 12 Grundfos GO Remote

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 38.

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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.

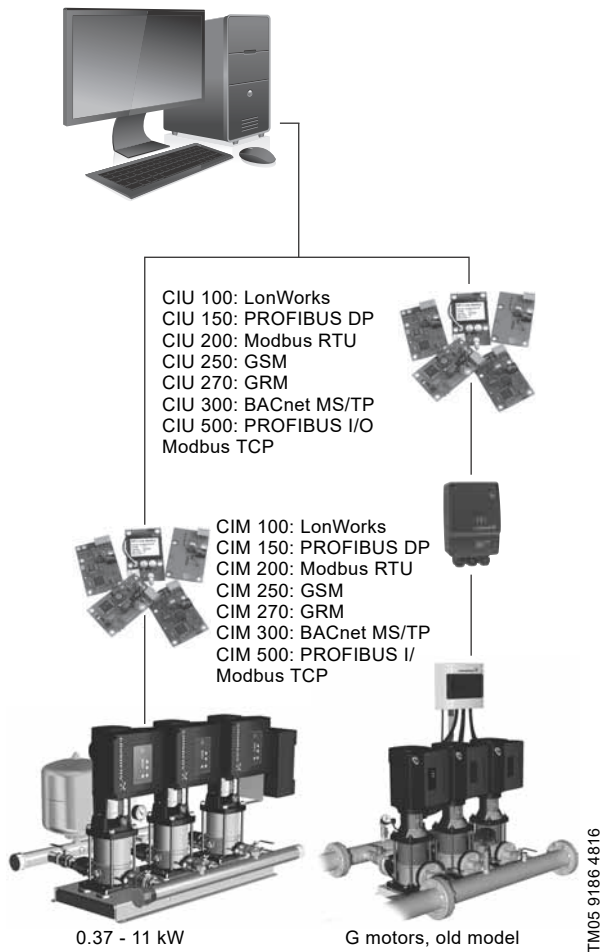


Fig. 13 Structure of a building management system

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.

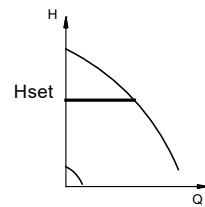


Fig. 14 Constant-pressure mode

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

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Proportional pressure mode

It is possible to control the system in proportional pressure control. With this function, the system automatically adjusts the setpoint to the actual flow rate to compensate for flow dependent dynamic losses. This will also gain considerable energy savings and increase the comfort for the users.

To use this function, the system needs to calculate the flow in the system and the head of the system must be known (outlet - inlet pressure)

The outlet pressure is always known as the system is always fitted with an outlet pressure sensor. The inlet pressure is known when the system is fitted with an inlet pressure sensor, all systems have the option to have one installed. When the system is fitted with a pressure switch and not a inlet pressure sensor the inlet pressure can be set to a fixed value in the [Advanced control panel](#) or [Grundfos GO Remote](#).

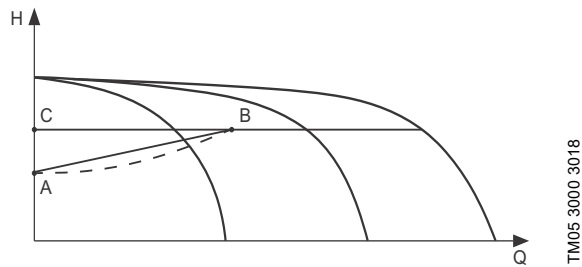


Fig. 15 Proportional pressure

- A: The zero head
- B: Qmax in cascade
- C: The maximum pressure (standard setpoint).

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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 39.

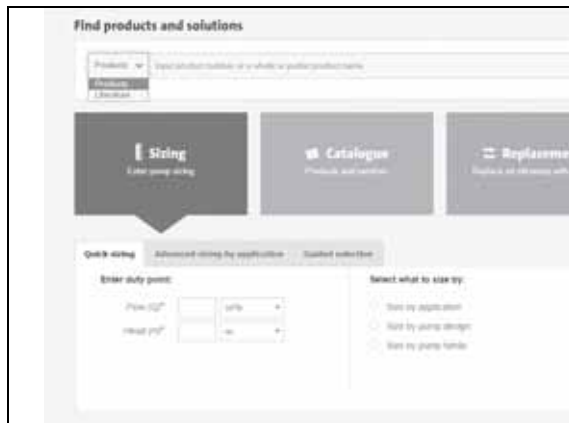


Fig. 16 Sizing in Grundfos Product Center

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

- pset = Required outlet pressure in bar
- ptap(min) = Required minimum pressure at the highest tapping point in bar
- pf = Total pipe friction loss in feet
- hmax = Height from booster outlet port to highest tapping point in feet
- pin(min) = Minimum inlet pressure in psi
- pboost = Required boost in psi.

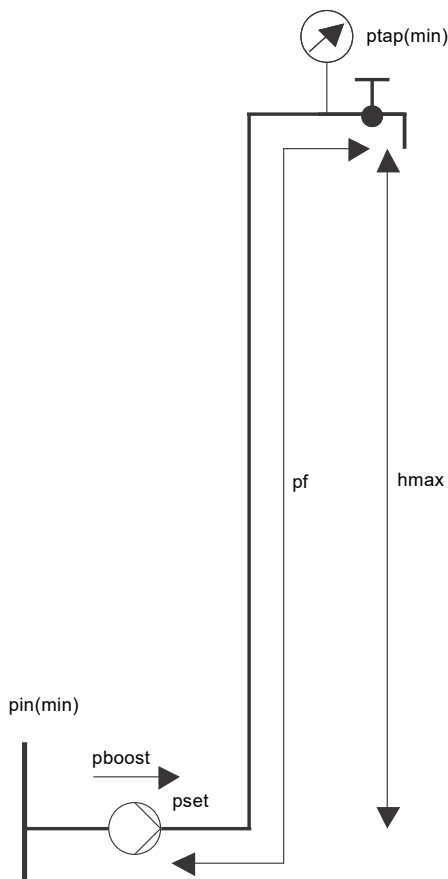


Fig. 17 Calculation of required outlet pressure

Calculation

$$p_{tap(min)} = 29 \text{ psi}$$

$$pf = 17.4 \text{ psi}$$

$$h_{max} = 136 \text{ ft}$$

$$p_{in(min)} = 29 \text{ psi}$$

$$p_{set} = 29 + 17.4 + (136/2.31) = 105.3 \text{ psi}$$

$$p_{boost} = 105.3 - 29 = 76.3 \text{ psi}$$

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.

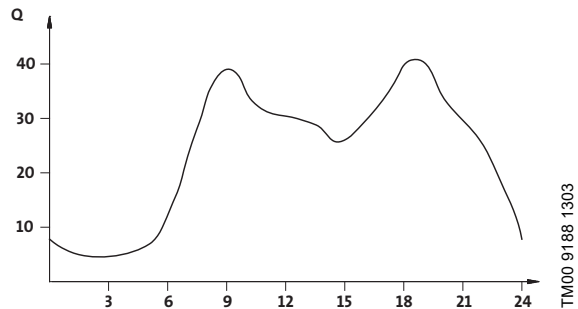


Fig. 18 Example of 24-hour consumption profile

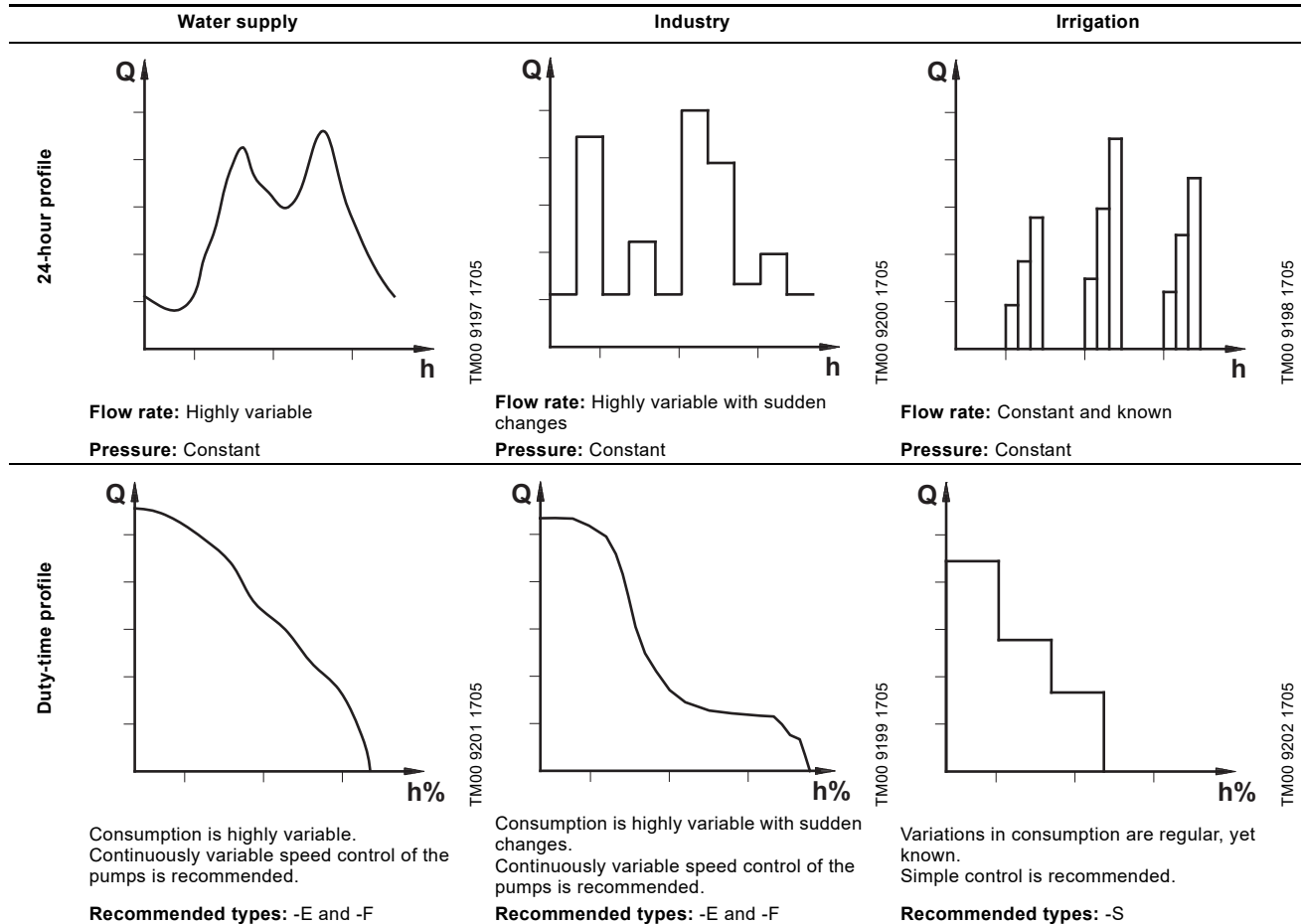
Note: If the consumption is variable and optimum comfort is required, use pumps with continuously variable speed.

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 36, and [Accessories](#), page 38, 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.

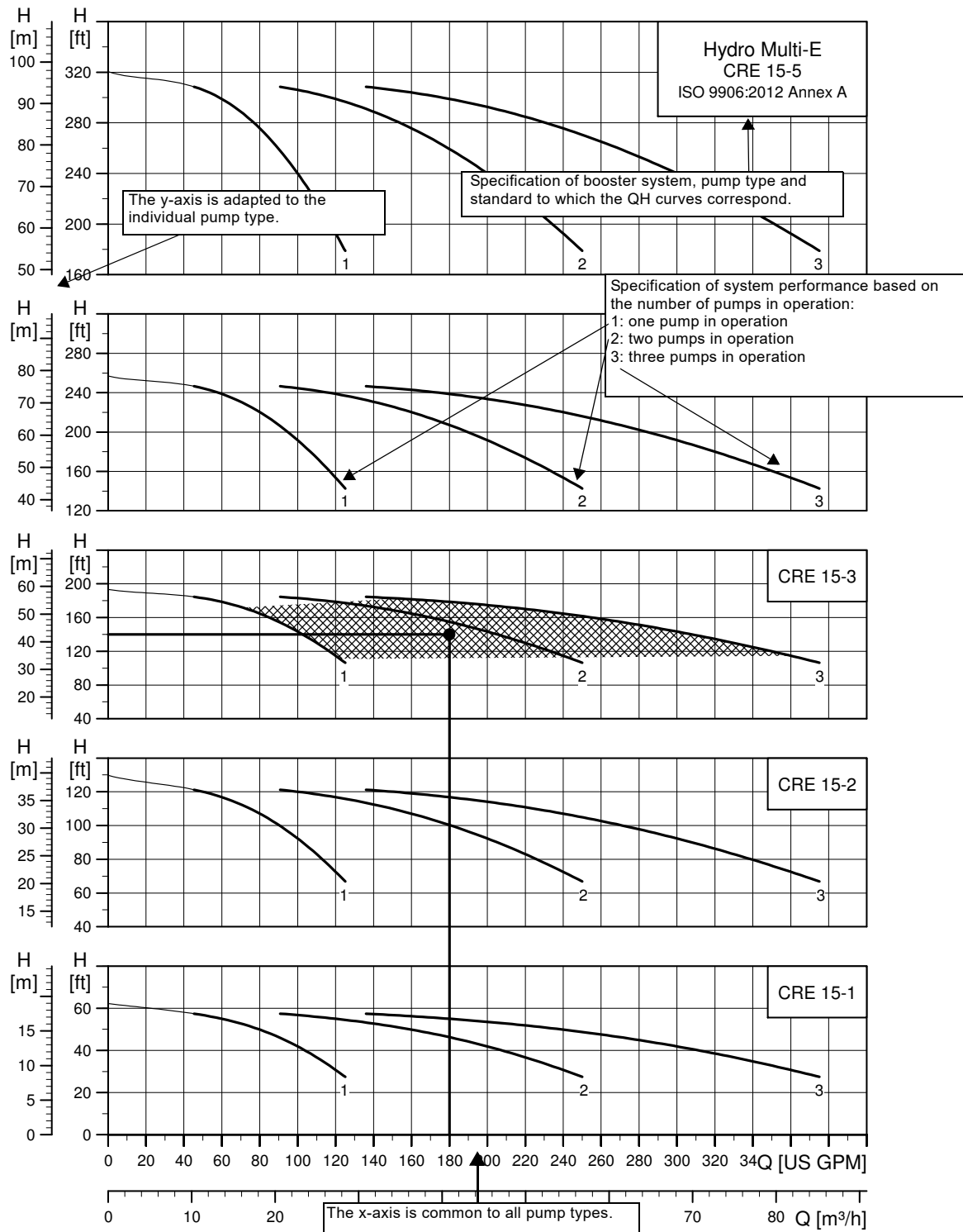


Fig. 19 Understanding the curve charts

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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.

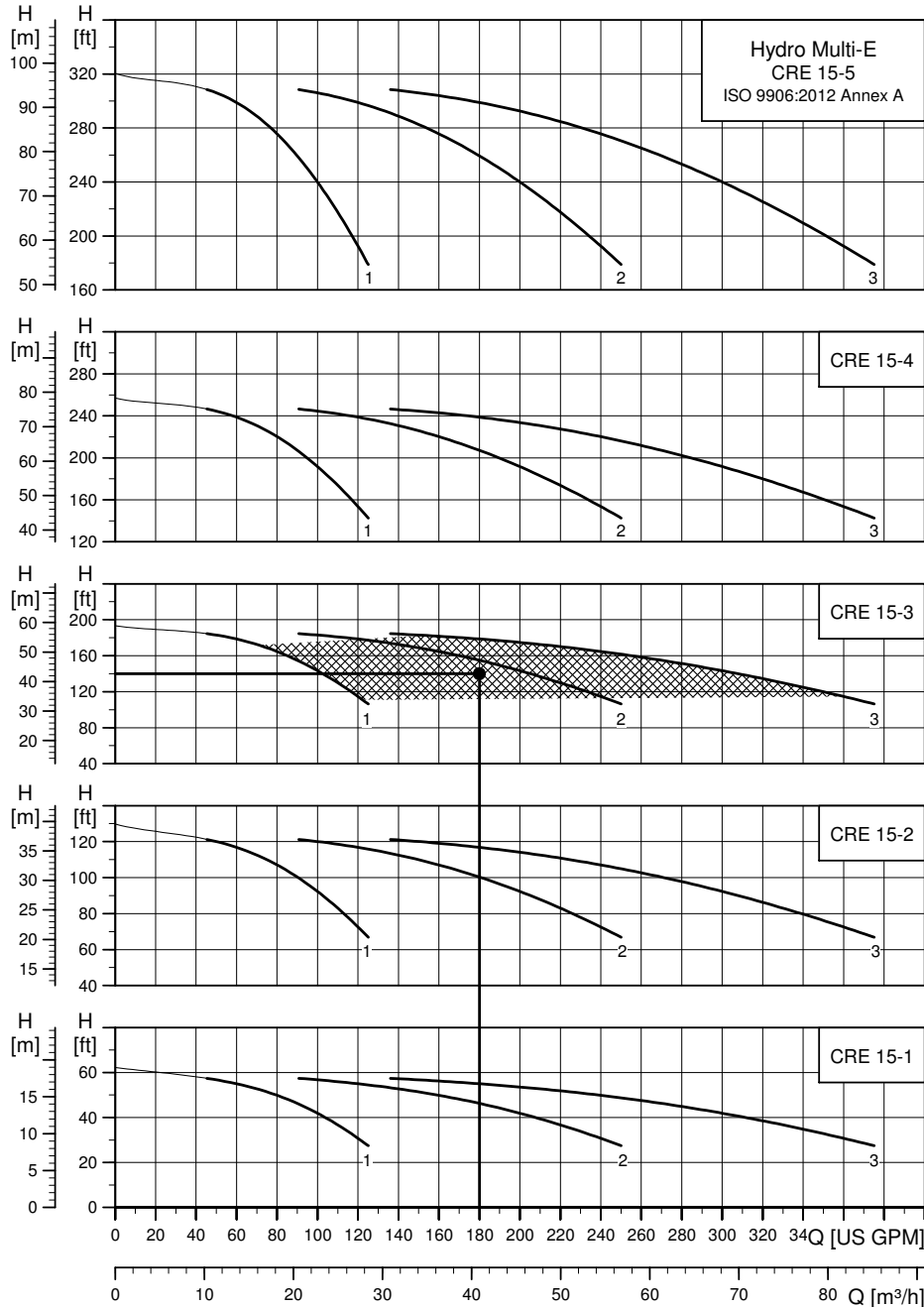


Fig. 20 Example of how to select a system

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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.

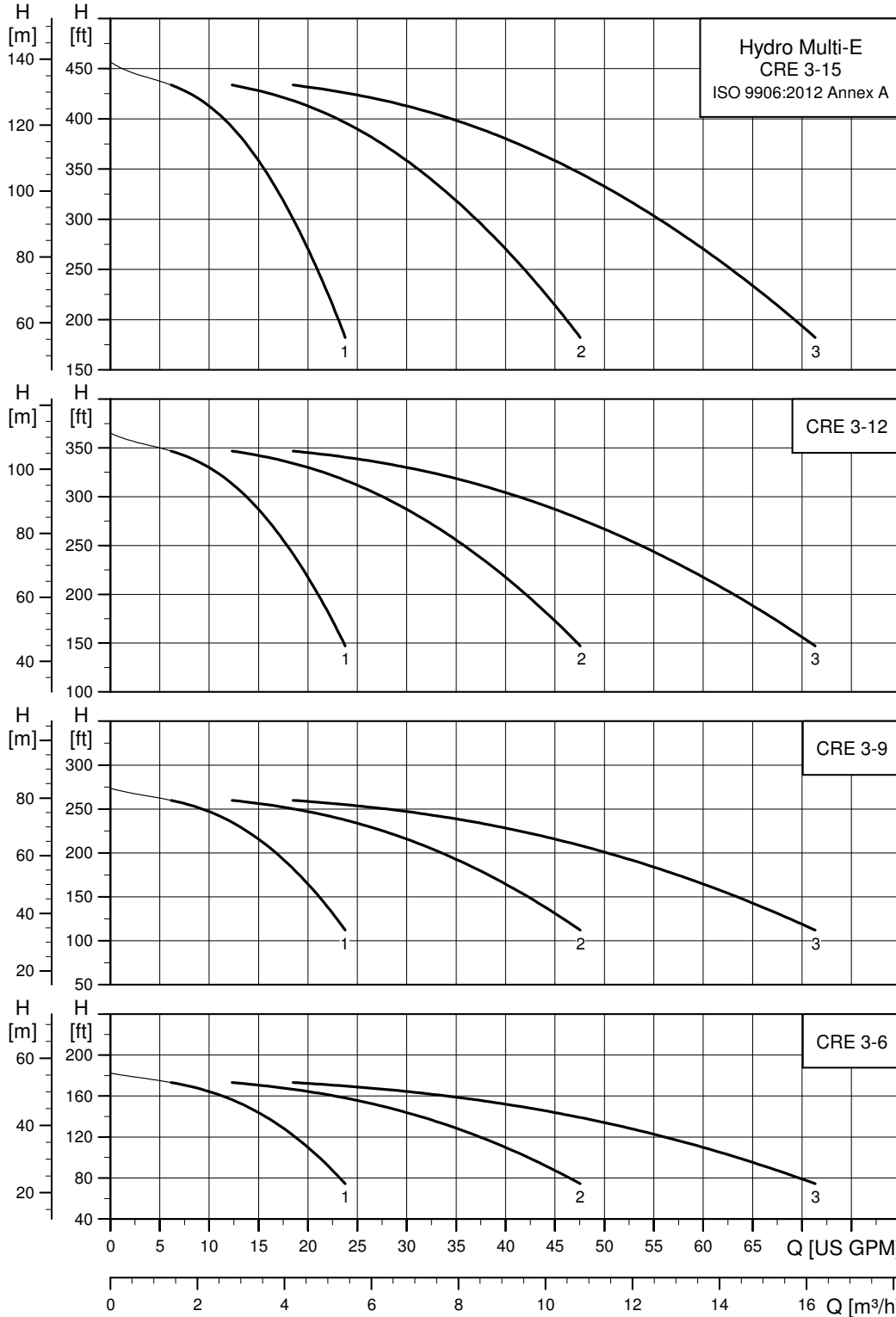
Note: In most cases, the actual speed deviates from the above-mentioned speeds. For realistic curves, please refer to Grundfos Product Center where the pump curves include the characteristics of the selected motor and therefore show curves at actual speeds.

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.

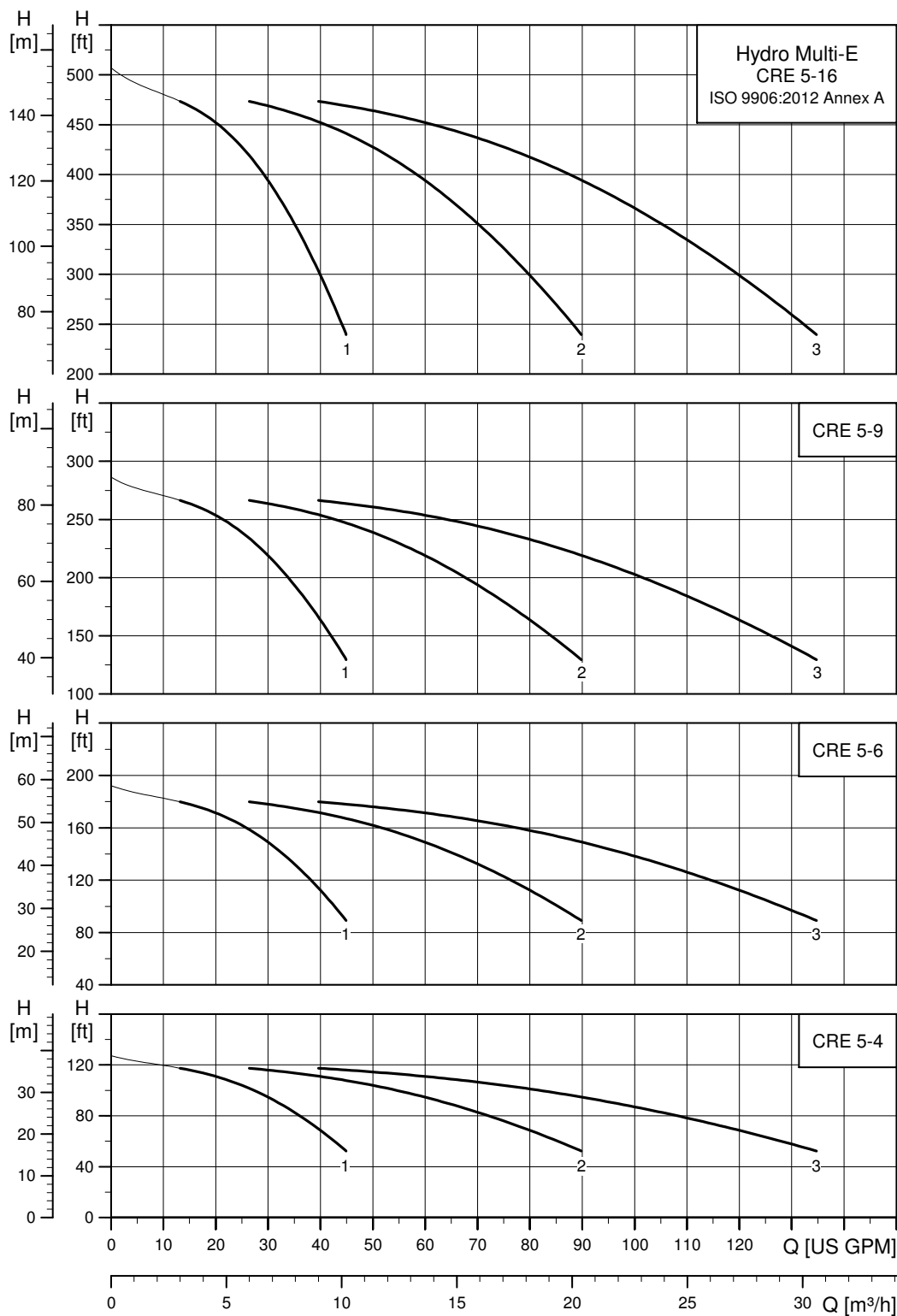
9. Curve charts and technical data

Hydro Multi-E with CRE 3-xx



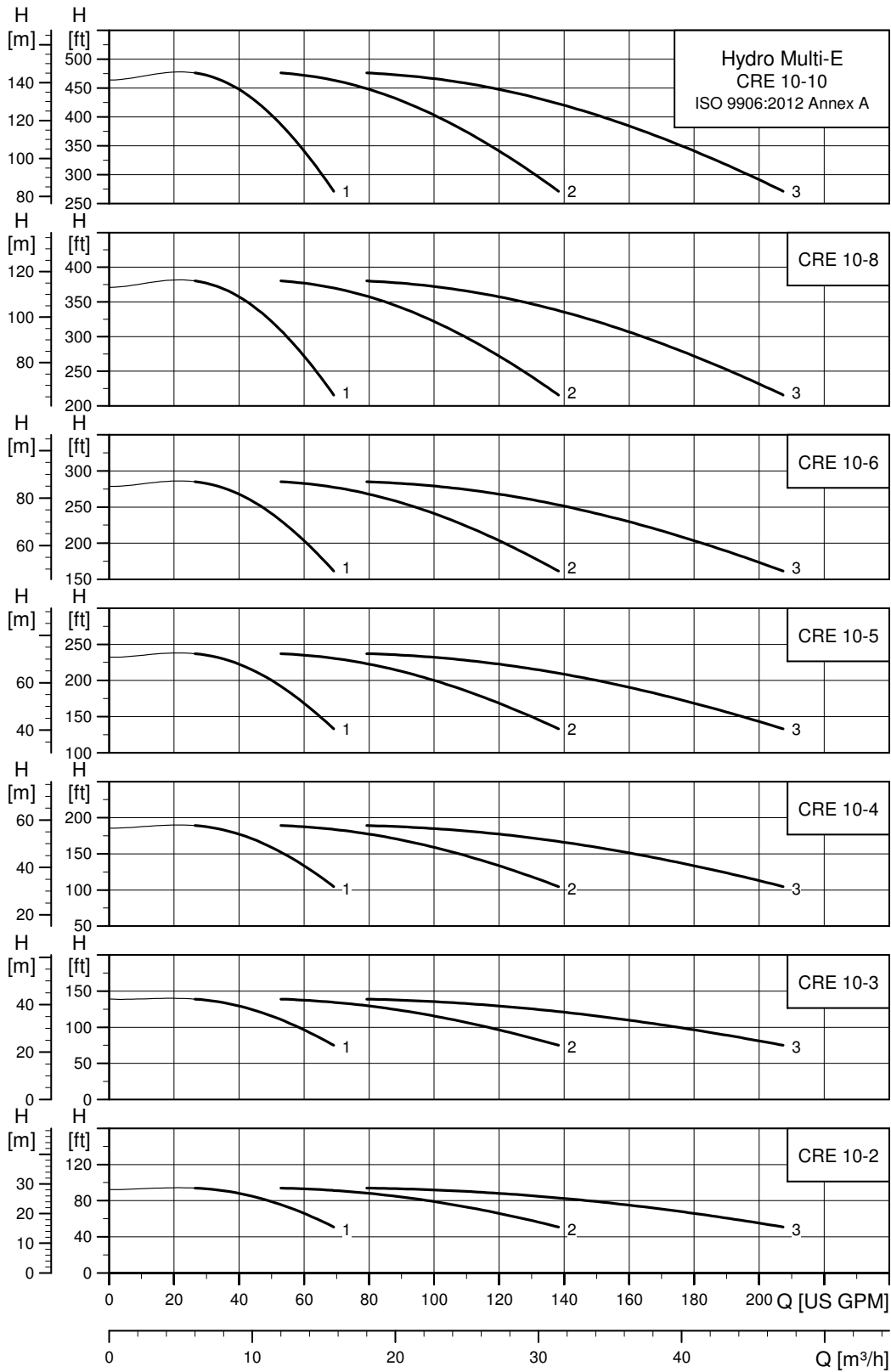
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Hydro Multi-E with CRE 5-xx



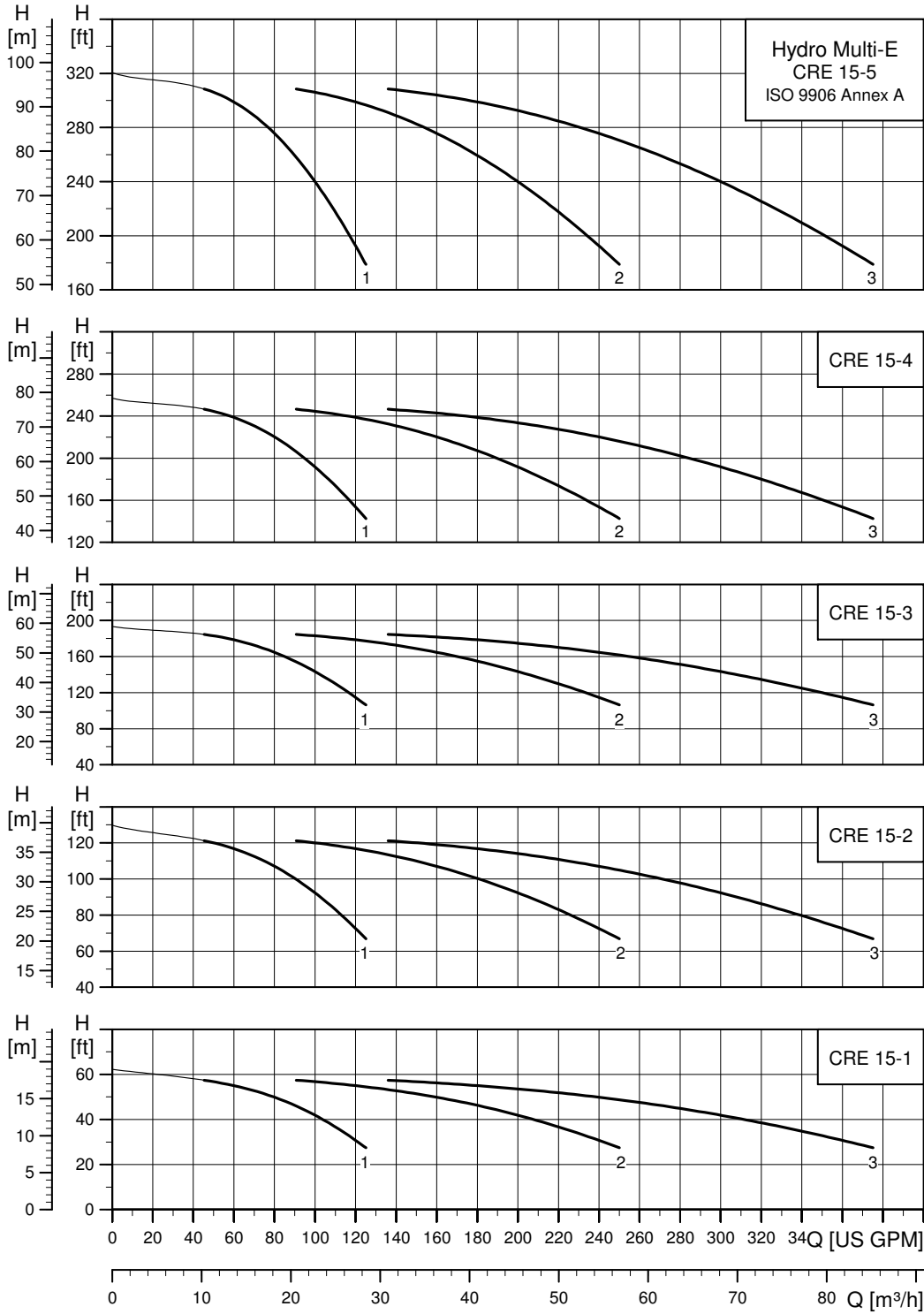
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Hydro Multi-E with CRE 10-xx



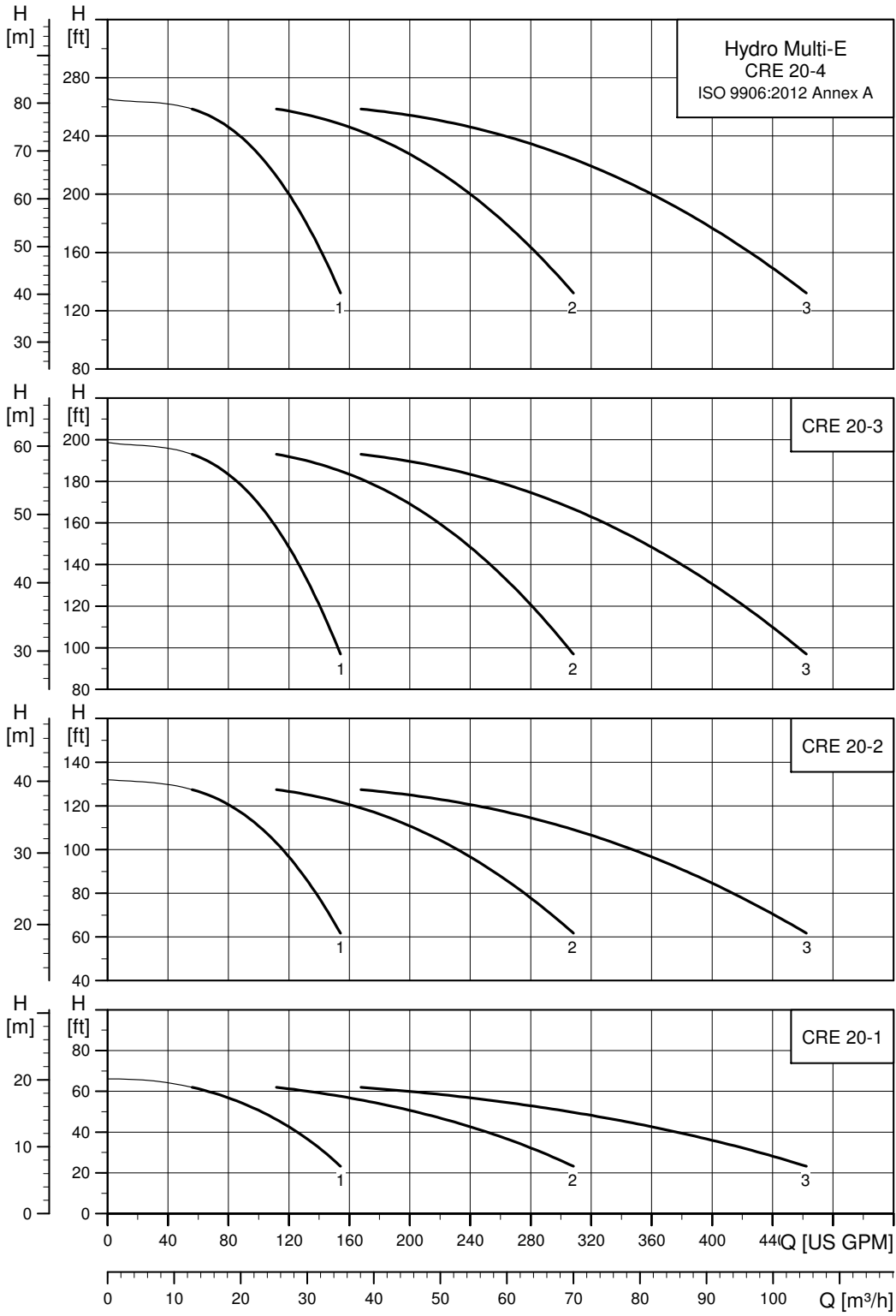
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Hydro Multi-E with CRE 15-xx



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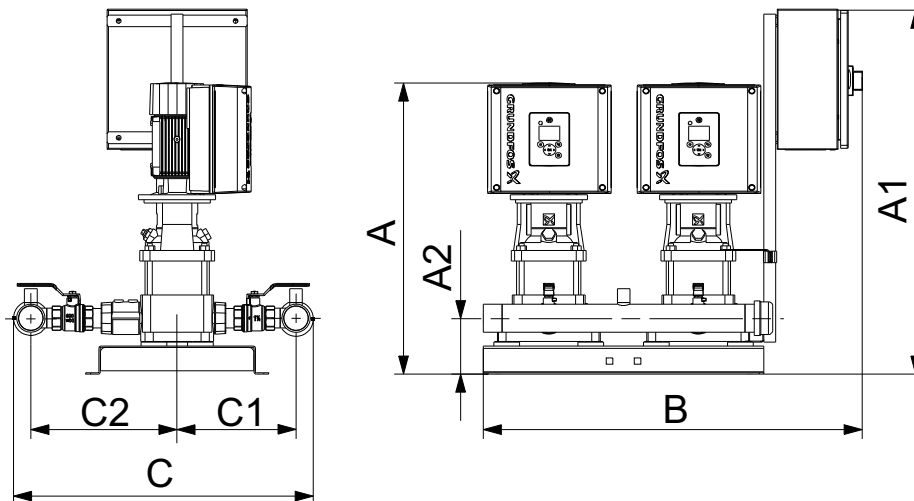
Hydro Multi-E with CRE 20-xx



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10. Dimensions

Two pumps

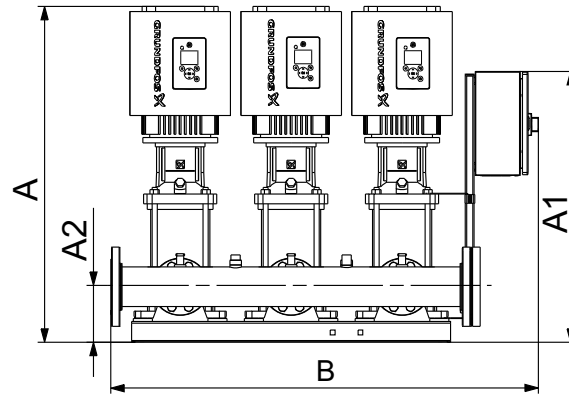
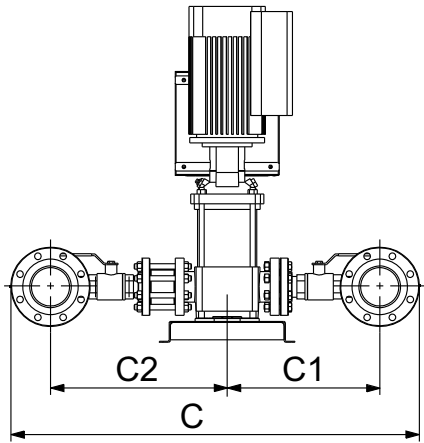


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Pump type	[hp (kW)]	Connections	A [in (mm)]	A1 [in (mm)]	A2 [in (mm)]	B [in (mm)]	C [in (mm)]	C1 [in (mm)]	C2 [in (mm)]	Net weight [lb (kg)]	Gross weight [lb (kg)]	Shipping volume [ft ³ (m ³)]
CRE 3-6	1 (0.7)	2" NPT	27.8 (706)	30.7 (780)	4.7 (120)	31.8 (808)	24.1 (612)	9.8 (249)	12 (305)	208 (94)	300 (136)	33.9 (0.96)
CRE 3-9	1.5 (1.1)		28 (711)							219 (99)	312 (141)	
CRE 3-12	2 (1.4)		33.1 (841)							220 (100)	313 (142)	
CRE 3-15	3 (2.2)		35.1 (892)							285 (129)	400 (182)	
CRE 5-4	1.5 (1.1)	2" NPT	25.9 (658)	30.7 (780)	4.7 (120)	31.8 (808)	24.1 (612)	9.8 (249)	12 (305)	197 (89.5)	290 (132)	33.9 (0.96)
CRE 5-6	2 (1.4)		30.9 (784.86)							210 (95.4)	303 (137)	
CRE 5-9	3 (2.2)		33.1 (841)							273 (124)	365 (166)	
CRE 5-16	5 (3.7)		46.1 (1171)							317 (144)	433 (197)	
CRE 10-02	1.5 (1.1)	2.5" NPT	28.1 (714)	30.7 (780)	6.3 (160)	34.6 (879)	37.2 (945)	15.7 (399)	18.5 (470)	353 (160)	576 (261)	89.7 (2.54)
CRE 10-03	3 (2.2)		30.7 (780)							424 (192)	646 (293)	
CRE 10-04	3 (2.2)		31.9 (810)							428 (194)	651 (296)	
CRE 10-05	5 (3.7)		37.8 (960)							494 (224)	718 (326)	
CRE 10-06	5 (3.7)		38.9 (988)							512 (232)	735 (334)	
*CRE 10-08	7.5 (5.5)		41.6 (1057)							567 (257)	791 (359)	
*CRE 10-10	7.5 (5.5)		44 (1118)							573 (261)	799 (363)	
CRE 10-08	7.5 (5.5)		41.6 (1057)							567 (257)	791 (359)	
CRE 10-10	7.5 (5.5)		44 (1118)							573 (261)	799 (363)	
CRE 15-01	2 (1.4)		4" ANSI							32.2 (818)	30.7 (780)	
CRE 15-02	5 (3.7)	35.4 (899)		479 (217)	702 (318)							
*CRE 15-03	7.5 (5.5)	37.5 (953)		513 (233)	735 (334)							
*CRE 15-04	7.5 (5.5)	39.2 (996)		530 (241)	753 (342)							
CRE 15-03	7.5 (5.5)	37.5 (953)		513 (233)	735 (334)							
CRE 15-04	7.5 (5.5)	39.2 (996)		530 (241)	753 (342)							
CRE 15-05	10 (7.4)	40.5 (1029)		612 (278)	897 (407)							
CRE 20-01	3 (2.2)	30.7 (780)		421 (191)	644 (292)							
CRE 20-02	5 (3.7)	35.4 (899)		483 (219)	705 (320)							
*CRE 20-03	7.5 (5.5)	37.5 (953)		584 (265)	807 (366)							
CRE 20-03	7.5 (5.5)	37.5 (953)	584 (265)	807 (366)								
CRE 20-04	10 (7.4)	38.7 (983)	633 (287)	917 (416)								

* 3 x 208-230 V dimension

Three pumps



TM07 0041 3917

Pump type	[hp (kW)]	Connections	A	A1	A2	B	C	C1	C2	Net weight [lb (kg)]	Gross weight [lb (kg)]	Shipping volume [ft ³ (m ³)]			
			[in (mm)]	[in (mm)]	[in (mm)]	[in (mm)]	[in (mm)]	[in (mm)]	[in (mm)]				[in (mm)]		
CRE 3-6	1 (0.7)	2" NPT	27.8 (706)	30.7 (780)	4.7 (120)	44.4 (1128)	24.1 (612)	9.8 (249)	12 (305)	300 (136)	522 (237)	89.7 (2.54)			
CRE 3-9	1.5 (1.1)		28 (711)							316 (144)	539 (245)				
CRE 3-12	2 (1.4)		33.1 (841)							319 (145)	541 (246)				
CRE 3-15	3 (2.2)	35.1 (892)	30.7 (780)	5.7 (145)	47.2 (1199)	27.9 (709)	11.6 (295)	13.9 (353)	416 (189)	639 (290)	89.7 (2.54)				
CRE 5-4	1.5 (1.1)	25.9 (658)		289 (131)		512 (232)									
CRE 5-6	2 (1.4)	30.9 (784.86)		309 (140)		532 (241)									
CRE 5-9	3 (2.2)	2.5" NPT	33.1 (841)	30.7 (780)	4.7 (120)	44.4 (1128)	27 (686)	10.9 (277)	13.1 (333)	403 (183)	625 (284)	89.7 (2.54)			
CRE 5-16	5 (3.7)		46.1 (1171)							30.7 (780)	12.7 (323)		15 (381)	473 (214)	695 (315)
CRE 10-02	1.5 (1.1)		28.1 (714)							590 (231)	732 (332)				
CRE 10-03	3 (2.2)	30.7 (780)	30.7 (780)	6.3 (160)	47.2 (1199)	37.8 (960)	15.8 (401)	18.5 (470)	615 (279)	838 (380)	89.7 (2.54)				
CRE 10-04	3 (2.2)	31.9 (810)							622 (282)	845 (383)					
CRE 10-05	5 (3.7)	37.8 (960)							721 (327)	945 (428)					
CRE 10-06	5 (3.7)	3" NPT	38.9 (988)	30.7 (780)	6.3 (160)	37.8 (960)	15.8 (401)	18.5 (470)	748 (339)	970 (440)	89.7 (2.54)				
*CRE 10-08	7.5 (5.5)		41.6 (1057)						832 (377)	1054 (478)					
*CRE 10-10	7.5 (5.5)		44 (1118)						845 (383)	1068 (484)					
CRE 10-08	7.5 (5.5)	41.6 (1057)	30.7 (780)	6.3 (160)	47.2 (1199)	37.8 (960)	15.8 (401)	18.5 (470)	832 (377)	1054 (478)	89.7 (2.54)				
CRE 10-10	7.5 (5.5)	44 (1118)							845 (383)	1068 (484)					
CRE 15-01	2 (1.4)	32.2 (818)							550 (249)	834 (378)					
CRE 15-02	5 (3.7)	35.4 (899)	30.7 (780)	6.3 (160)	48.4 (1229)	45.8 (1163)	17 (432)	19.8 (503)	701 (318)	985 (447)	157.9 (4.47)				
*CRE 15-03	7.5 (5.5)	37.5 (953)							756 (343)	1040 (472)					
*CRE 15-04	7.5 (5.5)	39.2 (996)							782 (355)	1066 (484)					
CRE 15-03	7.5 (5.5)	4" ANSI	37.5 (953)	30.7 (780)	6.3 (160)	48.4 (1229)	45.8 (1163)	17 (432)	19.8 (503)	756 (343)	1040 (472)	157.9 (4.47)			
CRE 15-04	7.5 (5.5)		39.2 (996)							782 (355)	1066 (484)				
CRE 15-05	10 (7.4)		40.5 (1029)							878 (398)	1162 (527)				
CRE 20-01	3 (2.2)	30.7 (780)	30.6 (777)	6.3 (160)	48.4 (1229)	45.8 (1163)	17 (432)	19.8 (503)	615 (279)	900 (408)	157.9 (4.47)				
CRE 20-02	5 (3.7)	35.4 (899)							712 (323)	997 (452)					
*CRE 20-03	7.5 (5.5)	37.5 (953)							860 (390)	1144 (519)					
CRE 20-03	7.5 (5.5)	4" ANSI	37.5 (953)	30.6 (777)	6.3 (160)	48.4 (1229)	45.8 (1163)	17 (432)	19.8 (503)	860 (390)	1144 (519)	157.9 (4.47)			
CRE 20-04	10 (7.4)		38.7 (983)							906 (411)	1191 (540)				

* 3 x 208-230 V dimension

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)

Depending on the configuration, the Multi-E is fitted with either a pressure switch or two inlet pressure sensors on the inlet manifold.

The sensors are available from 0 to 145 psi (0 to 10 bar) and from 0 to 232 psi (0 to 16 bar).

Note: If a sensor is used for dry-running protection, it requires setting the trigger level of the sensor in the [Advanced control panel](#) or [Grundfos GO Remote](#).

If a pressure switch is used for dry-run protection, the switch is a normally open switch that will trigger dry-run at 3 psi and reset when the pressure is above 5 psi.

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.

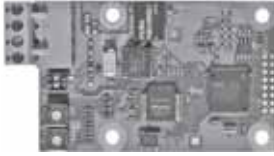
When more than two outlet-pressure sensors are connected, the sensors are fitted in a special connecting piece with a built-in vent in the top. The connecting piece is fitted to a drain valve.

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. 21 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 authorized 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. 22 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. 23 MI 301

These parts are 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 [39](#).

13. Grundfos Product Center

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

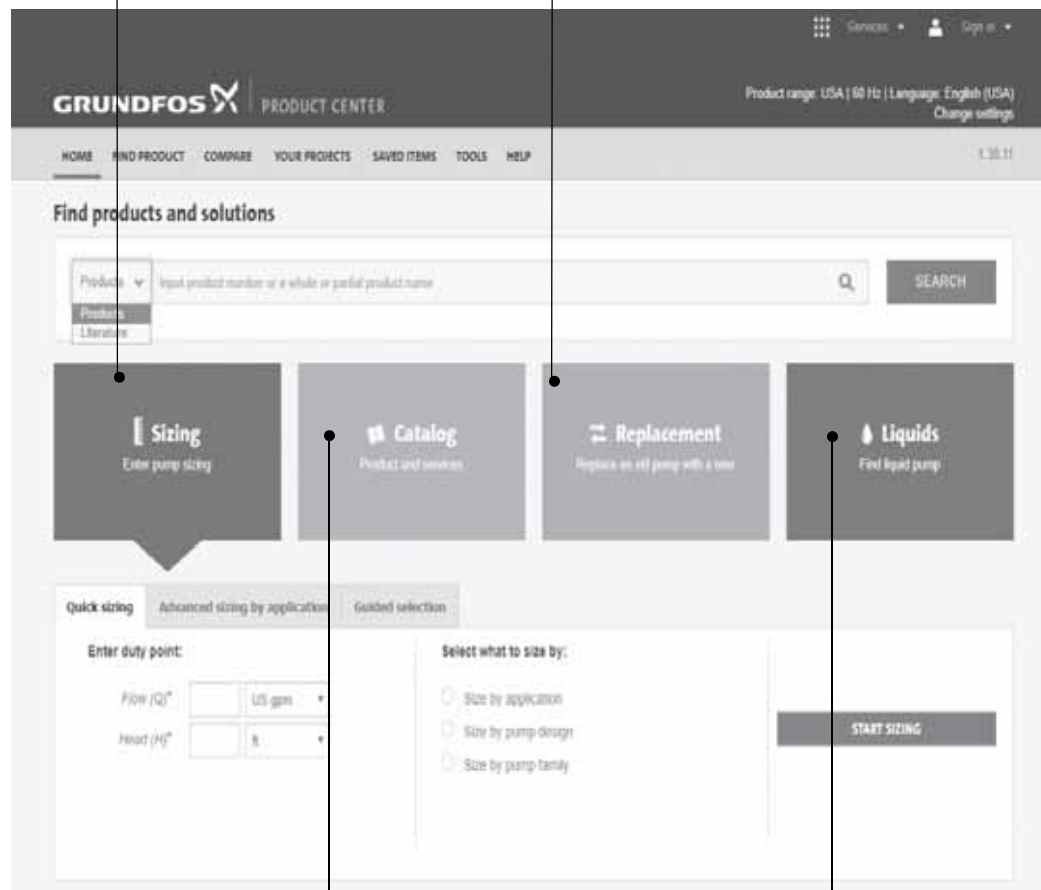
<http://product-selection.grundfos.com>



"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.



"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.

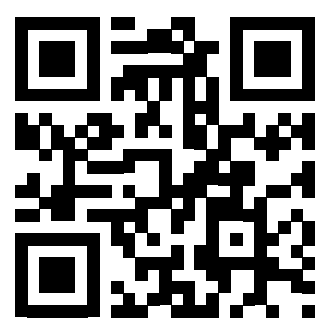
Downloads

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.



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