Hydro Multi-B

Booster systems with 2 or 3 pumps

60 Hz

CLASSIFIED
C UL US
WATER QUALITY
Drinking Water System Component
NSF / ANSI 61
NSF / ANSI 372

be
think
innovate

GRUNDFOS

Table of contents

1. Introduction

The Grundfos Hydro Multi-B is a booster system designed to maintain a constant pressure, regardless of flow fluctuations.

The system can be installed in buildings where the water supply does not deliver a sufficient pressure or is unstable.

The system is ideal for any clean-water pressure-boosting application where adaptability and user comfort are in focus.

Examples:

- Office buildings
- apartment buildings
- hotels
- shopping centers
- hospitals
- schools.

As standard, Hydro Multi-B booster systems consist of two or three CM(E) pumps coupled in parallel and mounted on a common base frame with all the necessary fittings and a control panel.

The pumps are controlled in automatic cascade via the control panel. The CU 323 controller controls the speed of the CM(E) pumps and starts and stops the required number of CM(E) pump in order to adapt perfectly to the water demand of the application.

Benefits

Pressure boosting made simple

The Hydro Multi-B is developed with focus on user-friendliness and ease of operation.

The pumps are controlled via the CU 323 controller which features a simple interface that makes it easy to control and monitor the system.

When the system has been set up, the controller takes care of the daily operation.

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Fig. 1 CU 323 controller

Compact and designed to last

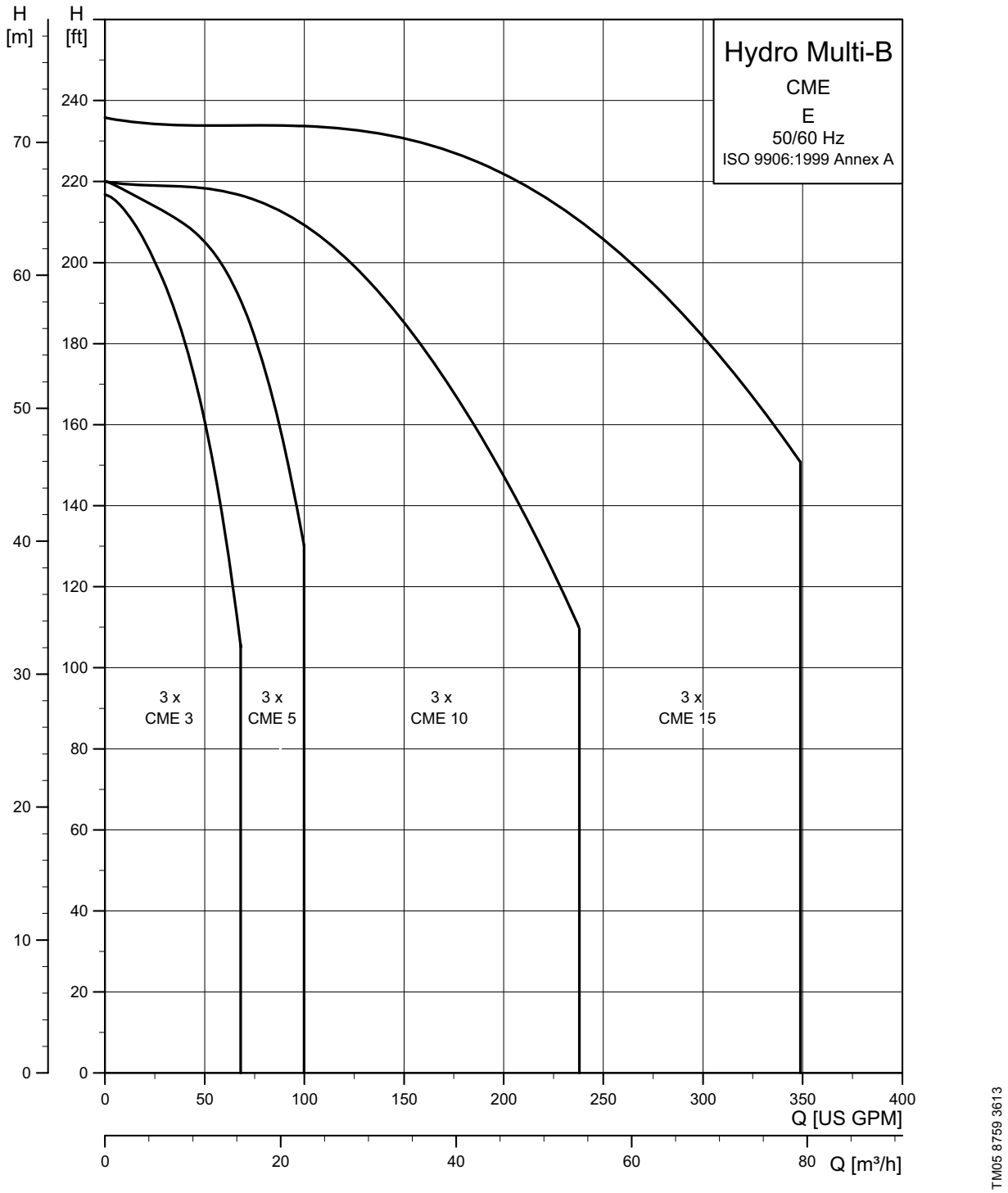
The components and design of the Hydro Multi-B have been chosen with focus on robustness and compactness. The booster system offers the user all the benefits of a complete solution with a single supplier who takes the responsibility for the complete system.

Ready, Set, Pump

Grundfos does not compromise when it comes to quality. Therefore, every system is thoroughly tested before is leaves the factory. The system is completely assembled, tested and after commissioning, is ready to pump as soon as it is connected to the water and power supplies.

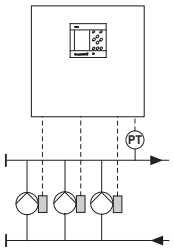
2. Product data

Performance range, 60 Hz



Note: The performance range is based on the standard range of the CME pumps.

Product range



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Control variant	Hydro Multi-B E
Hydraulic data	
Maximum head ft [m]	231 [70]
Flow rate gpm [m^3/h]	0 to 330 [0 to 75]
Liquid temperature °F [°C]	0 to 140 [0 to +60]
Maximum operating pressure psi [bar]	232 [16]
Pump and motor data	
Number of pumps	2 or 3
Motor power hp	1.5 to 7.5
Shaft seal	
AQQE (SiC/SiC/EPDM)	•
Materials	
CM(E) 3 to CM(E) 15: Stainless steel (EN/DIN 1.4301/AISI 304)	•
Manifold: Stainless steel	•
Pipework connection	
NPT	1.5" to 3"
ANSI flange	4"
Approvals	
UL Listed - Packaged pumping systems	Category QCZJ
NSF 61 - NSF 372	Drinking water system component approved
Functions	
Constant-pressure control	•
Pump cascade control	•
Automatic pump changeover	•
Stop function	•
Integrated frequency converter	•
Water shortage protection	•
CIM (Communication Interface Module)	❍
Redundant primary sensor	❍
Standby pumps	❍

• Available as standard.
❍ can be configured with PC Tools / available as accessory

Type key

Code	Example	Hydro Multi-B	E	2 CME 10-3 I	3 x 460 V, 60 Hz
	Type range				
	System variants				
E	Two or three pumps with integrated frequency converter				
	Number of pumps with integrated frequency converter, pump type and pump material				
A	Cast iron (EN-GJL-200)				
I	Stainless steel (EN 1.4301/AISI 304)				
G	Stainless steel (EN 1.4401/AISI 316)				
	Supply voltage, frequency				

Operating conditions

Maximum operating pressure

As standard, the maximum operating pressure is 232 psi [16 bar].

Temperatures

Liquid temperature: 0 °F to 140 °F [0 °C to +60 °C].

Ambient temperature: 0 °F to 104 °F [0 °C to +40 °C].

Relative air humidity

Maximum 95 %.

3. Construction

Pump

The Grundfos CME pumps are non-self- priming, horizontal, multistage, end-suction centrifugal pumps. The pumps are of the close-coupled type.

CME pumps have an integrated frequency converter. CME pumps have mechanical shaft seals.

CME

Fig. 2 Grundfos CME pumps

The compactness of the Hydro Multi-B is achievable due to the unique combination of size and performance offered by the Grundfos CM(E) pumps. CertainHdimensions of the CM(E) pumps are 30 % smaller than those of corresponding pumps with identical performance.

For further details on the pumps, see the following data booklets:

Title	Publication number
CM, CME	L-CM-PG-001 (98435269)
Grundfos E-pumps	L-ML-PG-001

Integrated VFD/motor (MLE)

The MLE motor (E-motor) fitted to the CME pumps used in the Hydro Multi-B systems incorporate an integrated variable frequency drive. The E-motor up to and including 2 hp in 1 x 230V power and up to and including 3 hp in 3 x 460V power are permanent magnet motors. These motors have a total efficiency (VFD and motor) which exceeds NEMA premium efficiency levels of motors alone.

Manifold

A 316 stainless-steel manifold is fitted on the suction and discharge side of the pumps.

An isolating valve and a non-return valve are fitted between the discharge manifold and the individual pumps.

The suction manifold is secured to the base frame by special supports that keep the manifold in the right position and ensure that no stress is transferred to the pumps.

Control panel and CU 323

The control panel contains all the necessary electrical components to control the pumps. The CU 323 is located in the front panel.

The CU 323 is the controller for the Hydro Multi-B and features two digital displays, two system indicator lights and three additional indicator lights per pump in the system. Furthermore, it has indicator lights for water shortage and sensor fault. The CU 323 has four buttons plus one button per pump in the system.

The controller enables manual setting and change of parameters such as setpoint, start/stop of system or individual pumps, resetting of alarms and monitoring of system performance.

The CU 323 comes with software for constant pressure boosting as standard.

Base frame

The Hydro Multi-B booster system has a common base frame. The pumps are secured to the base frame by bolts. The control panel is secured to the base frame by means of a stand.

System components

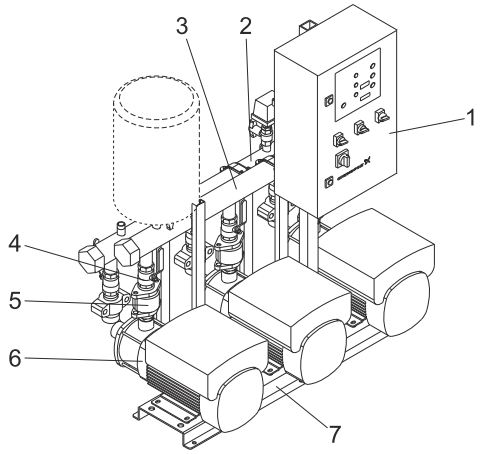


Fig. 3 Front view of Hydro Multi-B booster system

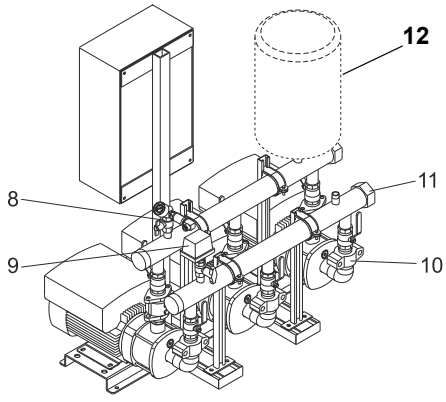


Fig. 4 Rear view of Hydro Multi-B booster system

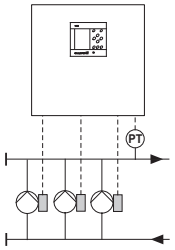
Pos.	Description	Quantity
1	Control cabinet	1
2	Suction manifold (316 SS)	1
3	Discharge manifold (316 SS)	1
4	Isolating valve (Nickel Plated Brass)	2 per pump
5	Non-return valve (Polyacetal (POM))	1 per pump
6	Pump (CME I-version 304 SS)	2-3
7	Base frame (304 SS)	1
8	Pressure transmitter and pressure gauge	1
9	Inlet pressure switch and pressure gauge	1
10	Oval flange connection (CME 3 - CME 10)	2 per pump
	Intermediate adapter connection (CME 15)	1 per pump
11	Screw cap or blanking flange	2
12	Optional diaphragm tank (available as accessory)	

4. Functions

Control variants

Control variant E

Two or three speed-controlled CME pumps



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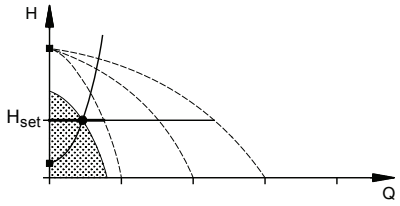
One CME pump in operation.



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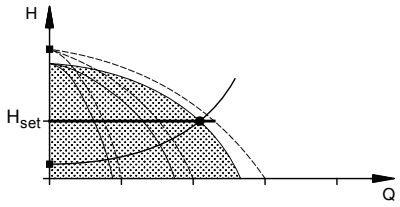
Three CME pumps in operation.



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- Control variant E for constant-pressure applications maintains a constant pressure through continuous adjustment of the speed of the pumps.
- The system performance is adjusted to the demand by cutting the required number of pumps in and out and through parallel speed control of the pumps in operation.
- Changeover among the pumps is automatic and depends on load, time and fault.

Overview of functions

	Constant-pressure boosting
Control variants	**E**
Functions via the CU 323 control panel	
Pump cascade control	•
Automatic pump changeover	•
Standby pumps	❍
Redundant primary sensor	❍
Digital input for external start/stop relay	•
Water shortage protection	•
Alarm and operation outputs	•
Motor protection	•
Maximum pressure protection	•
Protection in case of sensor fault	•
Button lock function	•
Communication	
CIM module (CIM = Communication Interface Module)	❍
External GENIbus connection (option)	❍

• Standard.
❍ Requires PC Tools/service engineer to configure.

Description of selected functions

Pump cascade control

The Hydro Multi-B automatically ensures that the required number of pumps are running so that the system demand is met in the most efficient way. Furthermore, the speed-controlled pumps in the system are ramped up and down according to the demand, thus offering perfect constant-pressure control.

Water shortage protection

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

The pressure or level can be monitored by one of the following:

- float switch
- analog sensor
- external electrode relay
- pressure transmitter
- pressure switch. (standard)

Furthermore, the system can be set to be reset and restarted manually or automatically after a water shortage situation.

Stop function and low-flow mode

The stop function makes it possible to stop the last pump in operation if there is no or a very small consumption. This function also prevents heating of the pumped liquid.

The operation of Hydro Multi-B is continuously monitored to detect a low flow rate. If the CU 323 detects no or a low flow rate ($Q < Q_{min}$), it will change from normal constant-pressure operation to on/off control of the last pump in operation. As long as the flow rate is lower than Q_{min}, the pump will run in on/off operation. If the flow rate is increased to more than Q_{min}, the system will return to normal constant-pressure operation.

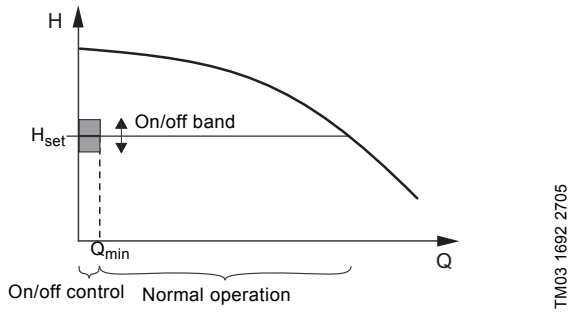

Fig. 5 On/off band

Automatic pump changeover

The CU 323 automatically ensures an equal number of operating hours of the pumps by always cutting in the pump with the lowest number of operating hours. This function also ensures that, if a running pump fails, the next available pump will be started.

Standby pumps (requires PC Tools to configure)

This function makes it possible to limit the maximum performance of the Hydro Multi-B by selecting one or more pumps as standby pumps.

If a three-pump system has one standby pump, maximum two pumps are allowed to operate at a time.

If one of the two pumps in operation has a fault and is stopped, the standby pump will be started. The performance of the booster system is thus not reduced.

The status as standby pump alternates between all pumps.

This function is optional and available on request.

Note: This function must be configured by a Grundfos service engineer.

Protection functions

- Maximum number of starts and stops per hour
- minimum time between start and stop
- water shortage protection
- protection in case of sensor fault
- maximum-pressure alarms
- motor protection.

Communication options

The Hydro Multi-B can be fitted with a communication module that enables it to communicate with a SCADA system or a mobile phone. The communication interface module (CIM) card is available as an accessory and can be installed in the CU 323 controller.

5. Installation

Mechanical installation

Location

The Hydro Multi-B must be installed in a well ventilated room to ensure sufficient cooling of the pumps and the control panel.

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

The booster system should have a 3 ft clearance on all sides for inspection and removal.

Pipework

Arrows on the pump base show the direction of flow of water through the pump.

Note: The pipework connected to the booster system must be of adequate size.

Connect the pipes to the manifolds of the booster system. Either end can be used. Apply sealing compound to the unused end of the manifold, and fit the screw cap. For manifolds with flanges, fit a blanking flange with gasket.

It is advisable to install pipe supports for the suction and discharge pipes. See fig. 6.

If booster systems are installed where the first consumer on the line is close to the booster system, it is advisable to fit expansion joints on the suction and discharge pipes to prevent vibration being transmitted through the pipework.

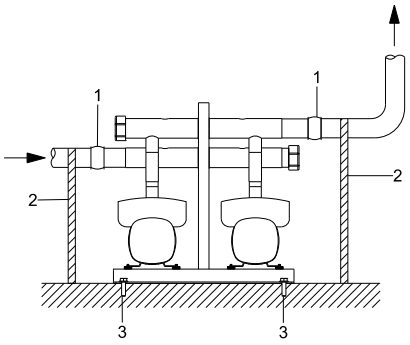

Fig. 6 Example showing the position of expansion joints, pipe supports and mounting bolts

Pos.	Description
1	Expansion joint
2	Pipe support (good location for system isolation valves)
3	Mounting bolts

Note: Expansion joints, pipe supports and mounting bolts shown in fig. 6 above are not supplied with a standard booster system.

The pipes must be fastened to parts of the building to ensure that they cannot move or be twisted.

Foundation

The booster system should be positioned on an even and solid surface, such as a concrete floor or foundation. The booster system must be bolted to the floor or foundation.

Note: As a rule of thumb, the weight of a concrete foundation should be 1.5 x the weight of the booster system.

Expansion joints

Expansion joints provide these advantages:

- absorption of thermal expansion and contraction of pipework caused by variations in liquid temperature.
- reduction of mechanical influences in connection with pressure surges in the pipework.
- isolation of structure-borne noise in the pipework (only rubber bellows expansion joints).

Note: Expansion joints must not be installed to compensate for inaccuracies in the pipework, such as center displacement of flanges.

Fit expansion joints at a distance of minimum 1 to 1.5 times the nominal flange diameter from the manifold on the suction as well as on the discharge side. This prevents the development of turbulence in the expansion joints, resulting in better suction conditions and a minimum pressure loss on the discharge side.

Fig. 7 Examples of rubber bellows expansion joints with and without limiting rods

Expansion joints with limiting rods can be used to minimise the forces caused by the expansion joints. Expansion joints with limiting rods are always recommended for flanges larger than 4".

The pipes should be anchored so that they do not stress the expansion joints, manifolds and the pump. Follow the supplier's instructions and pass them on to advisers or pipe installers.

Electrical installation

The electrical installation must be carried out by an authorised person in accordance with local regulations and the relevant wiring diagram.

- The electrical installation of the booster system must be carried out in accordance with enclosure class UL type 3R.
- Make sure that the booster system is suitable for the power supply to which it is to be connected. Contact Grundfos if you have special voltage requirements.
- Make sure that the wire cross-section corresponds to the specifications in the wiring diagram.

6. Sizing

When sizing a booster system, the following must be taken 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 Grundfos Hydro Multi-B booster systems via WebCAPS, WinCAPS or this data booklet.

Sizing in WebCAPS or WinCAPS

We recommend that you size your Hydro Multi-B booster system in WebCAPS or WinCAPS, which are selection programs offered by Grundfos. For further information, see page 25.

WebCAPS and WinCAPS feature a user-friendly and easy-to-use virtual guide which leads you through the selection of the optimum booster system for the application in question.

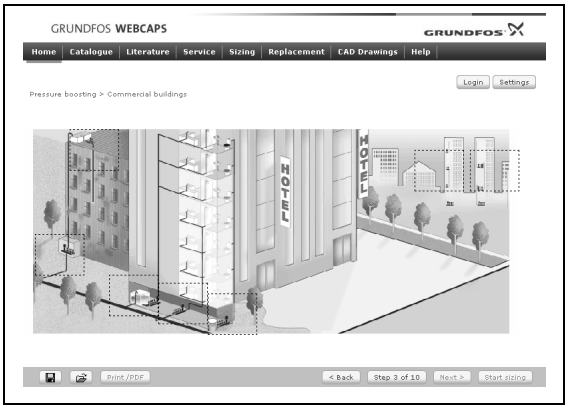

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Fig. 8 Sizing in WebCAPS

Sizing via this data booklet

There are seven steps:

1. maximum flow requirement
2. required discharge pressure
3. system layout
4. consumption profile and load profile
5. inlet pressure
6. selection of booster system
7. accessories.

Selection of diaphragm tank

It is recommended Hydro Multi-B booster sets are equipped with a diaphragm tank due to the stop function. Hydro Multi-B systems with the following pump types on system have the corresponding recommended diaphragm tank size:

Recommended diaphragm tank size	
Pump Type	**Tank size [gal.]**
CME 3	4.4
CME 5	4.4
CME 10	10.3
CME 15	10.3

Required discharge pressure

The required discharge pressure, p_{set}, of the Hydro Multi-B can be calculated from the following formula:

$p_{set} = p_{tap(min)} + (p_f/2.31) + (h_{max}/2.31)$

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

Key

p_{set} = Required discharge pressure [psi].

$p_{tap(min)}$ = Required minimum pressure at the highest tapping point [psi].

p_f = Total pipe friction loss [ft].

h_{max} = Height from booster discharge port to highest tapping point [ft].

$p_{in(min)}$ = Minimum inlet pressure [psi].

p_{boost} = Required boost [psi].

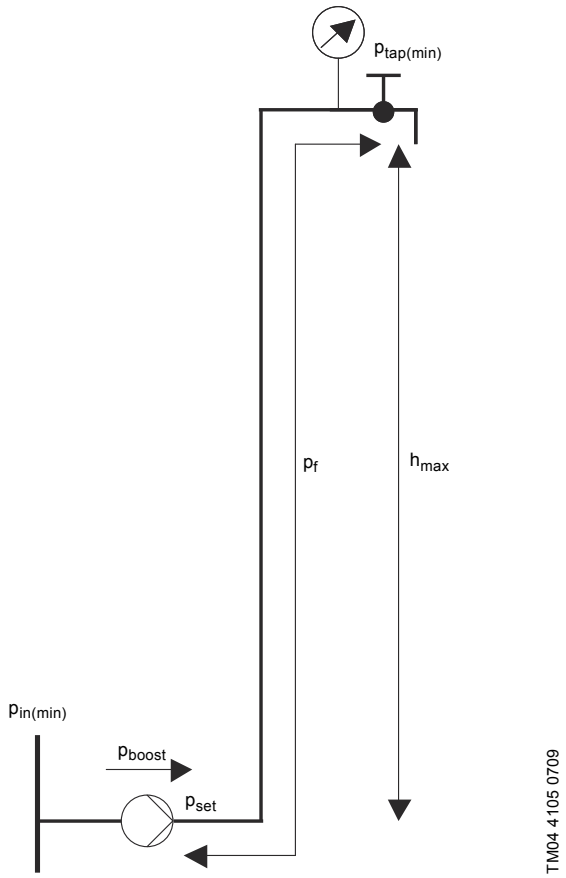


Fig. 9 Calculation of required discharge pressure

Calculation

$p_{tap(min)}$ = 45 psi

p_f = 25 ft

h_{max} = 50 ft

$p_{in(min)}$ = 30 psi

p_{set} = 45 + (25/2.31) + (50/2.31) = **77.5psi**

p_{boost} = 77.5 - 30 = 47.5 psi.

System layout

Not relevant for Hydro Multi-B.

Consumption profile and load profile

Not relevant for Hydro Multi-B.

Inlet pressure

The inlet pressure must be taken into consideration to ensure safe operation.

The values for inlet pressure and operating pressure should not be considered individually, but should always be compared.

Selection of booster system

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

Accessories

When the optimum Hydro Multi-B booster system has been selected, consider whether accessories are required.

Water shortage protection

Any booster system **must** be protected against water shortage.

The inlet conditions determine the type of water shortage protection to be used:

- If the system draws water from a tank or well, select a float switch, analog sensor or external electrode relay.
- If the system has an inlet pressure, select a pressure transmitter or a pressure switch.

Understanding the curve charts

The x-axis showing the flow rate (Q) in gpm [m^3/h] is common to all the curves; the y-axis showing the head (H) in ft. [meters] has been adapted to the individual pump type.

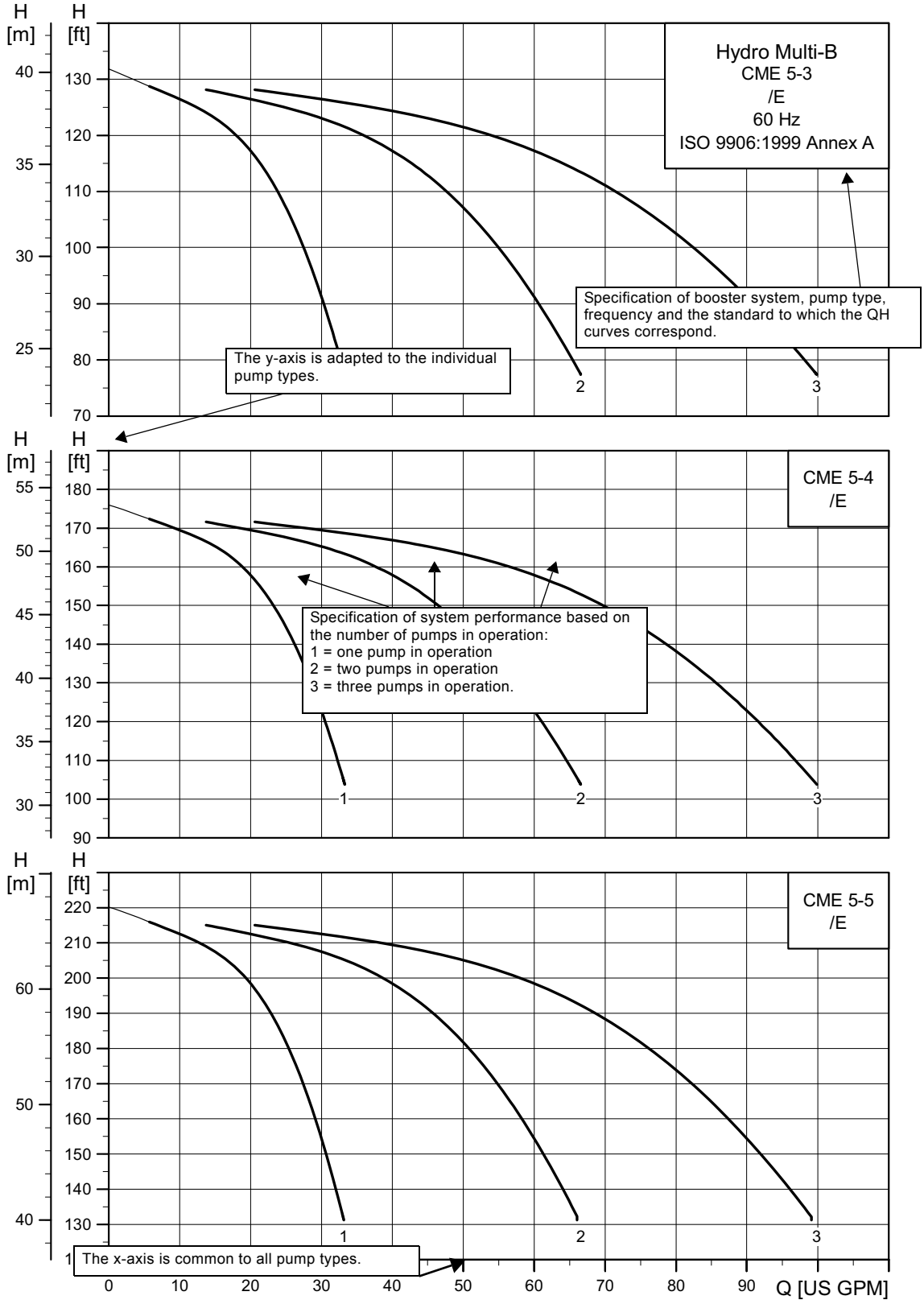


Fig. 10 Understanding the curve charts

How to select a system, example

- A flow rate of 312 gpm [70.9 m^3/h] is required.
- A head of 175 ft [53.34 metres] is required.

Draw a vertical line from the specified flow rate.

Draw a horizontal line from the head required.

The intersection of the two lines gives the number of pumps required for the system, i.e. three CME 15-3 pumps.

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

Only booster systems with performance ranges within the hatched area in the example should be selected.

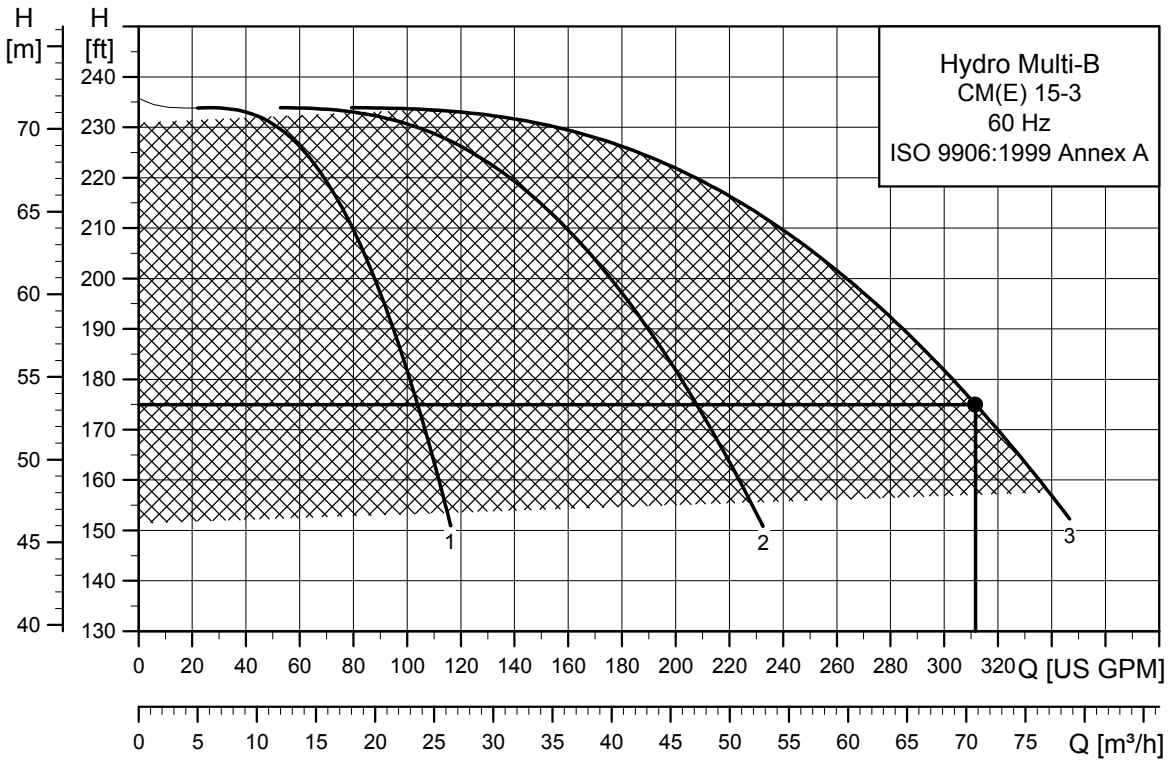


Fig. 11 Example of selection of system

7. Curve conditions

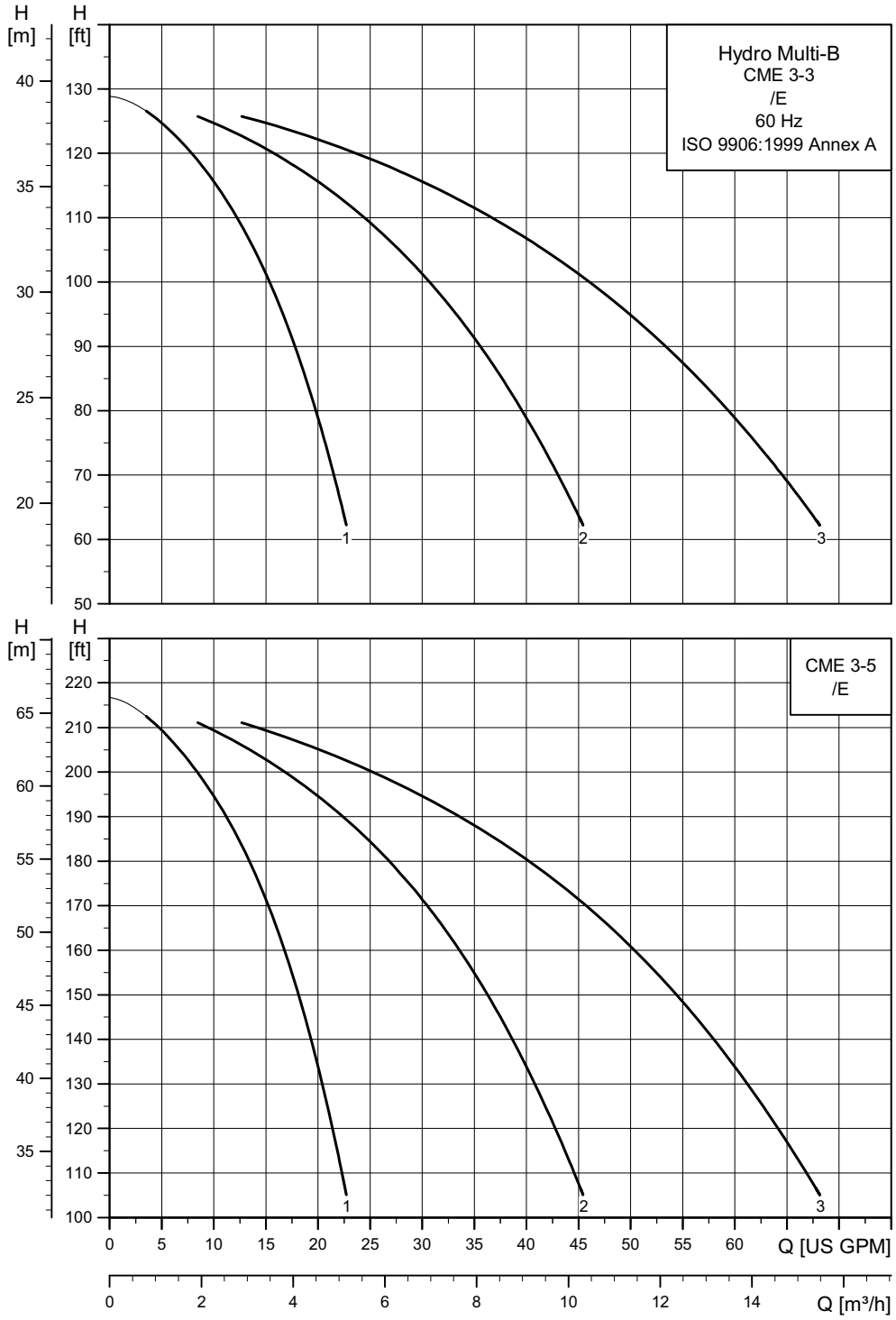
How to read the curve charts

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

- Tolerances to ISO 9906, Annex A, if indicated.
- Measurements have been made with airless water at a temperature of 68 °F [+20 °C].
- The curves apply to the following kinematic viscosity: υ = 1 mm^2/s (1 cSt).
- The QH curves apply to fixed speed 3480 min^{-1} (60 Hz).
  Note: Please refer to WebCAPS for pump curves which include the characteristic of the selected motor. In WebCAPS, it is also possible to adjust the curves, depending on the density and viscosity.

8. Performance curves

Hydro Multi-B E with CME 3



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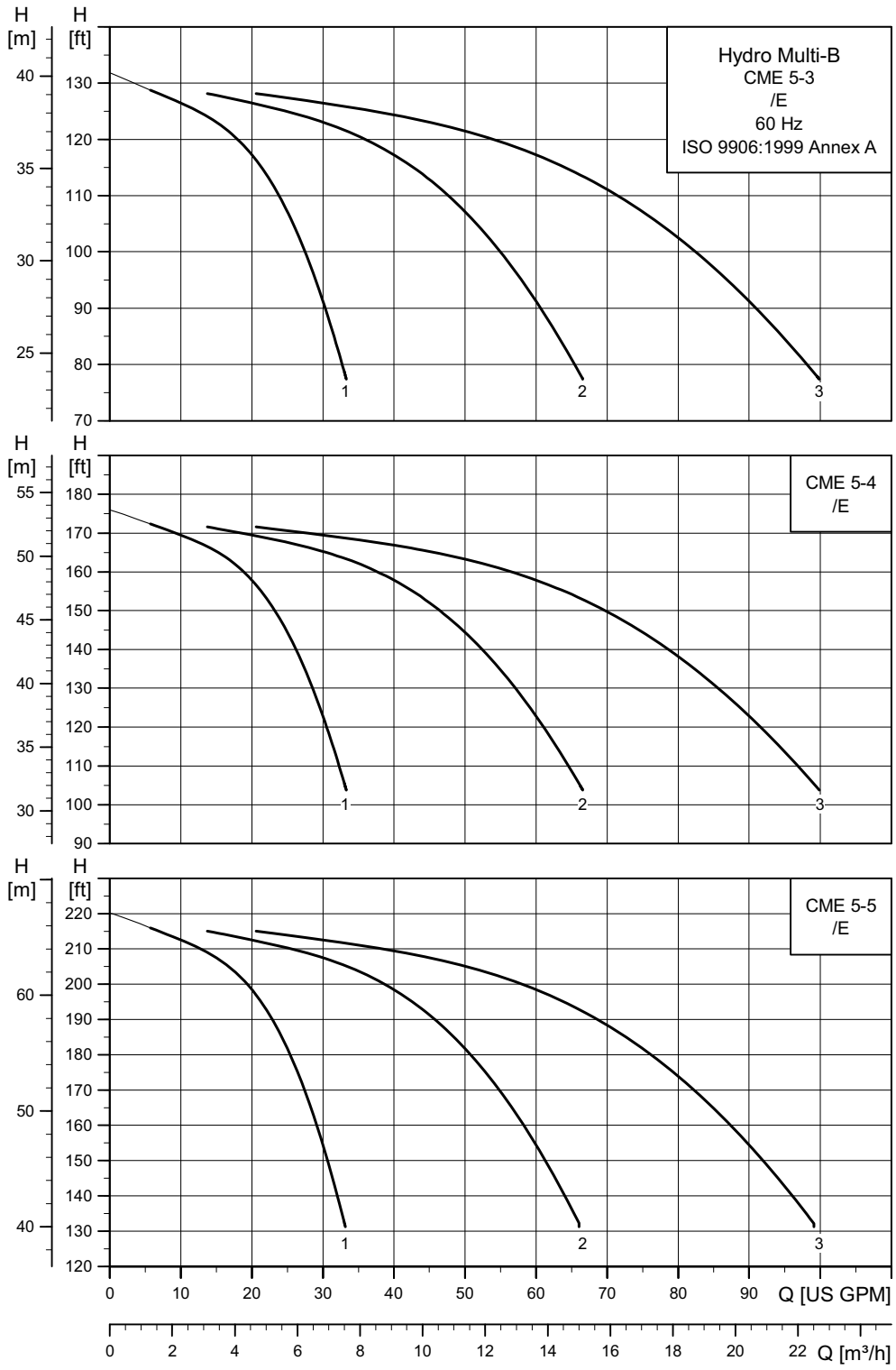
Hydro Multi-B E with CME 5



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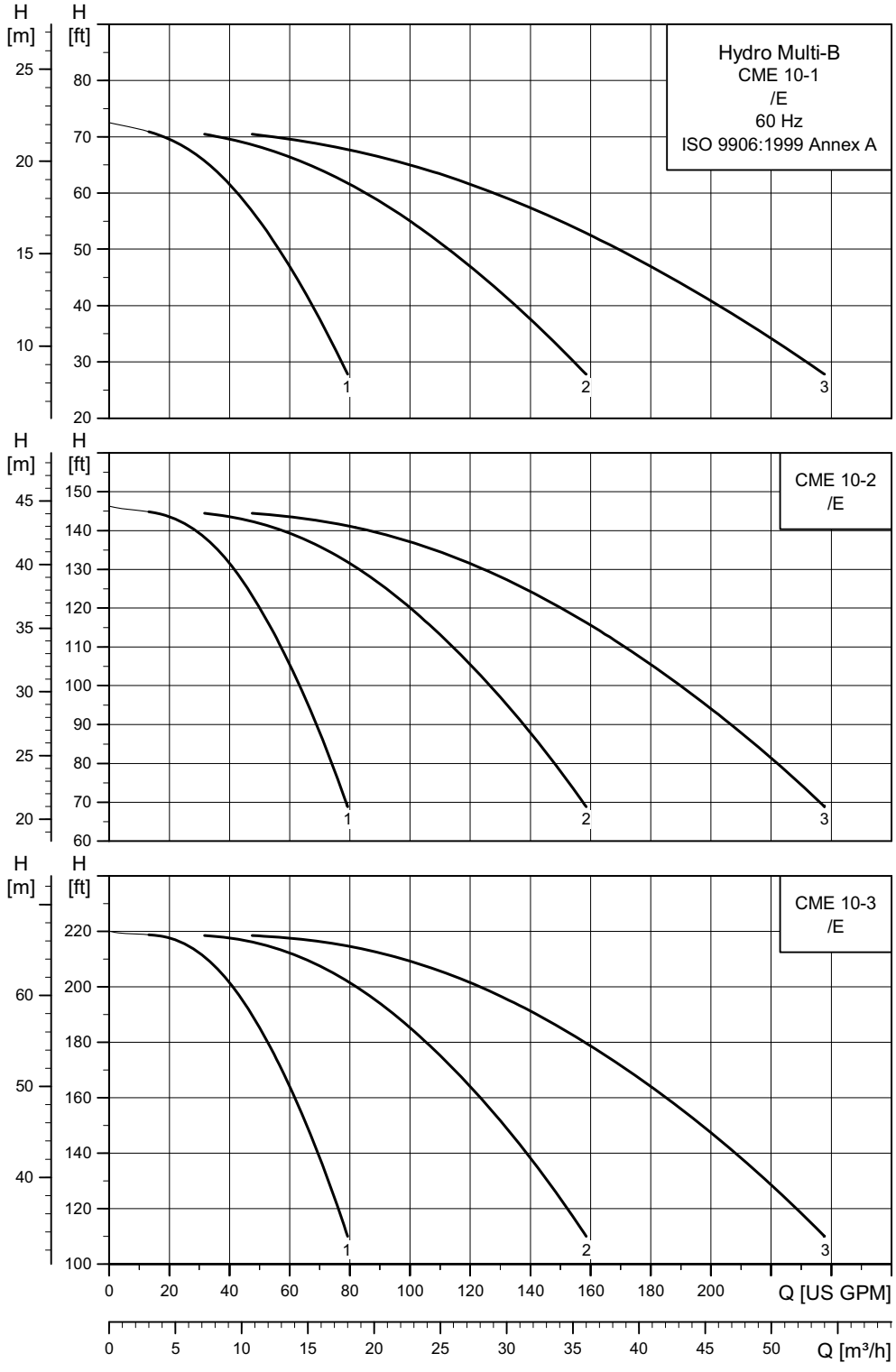
Hydro Multi-B E with CME 10



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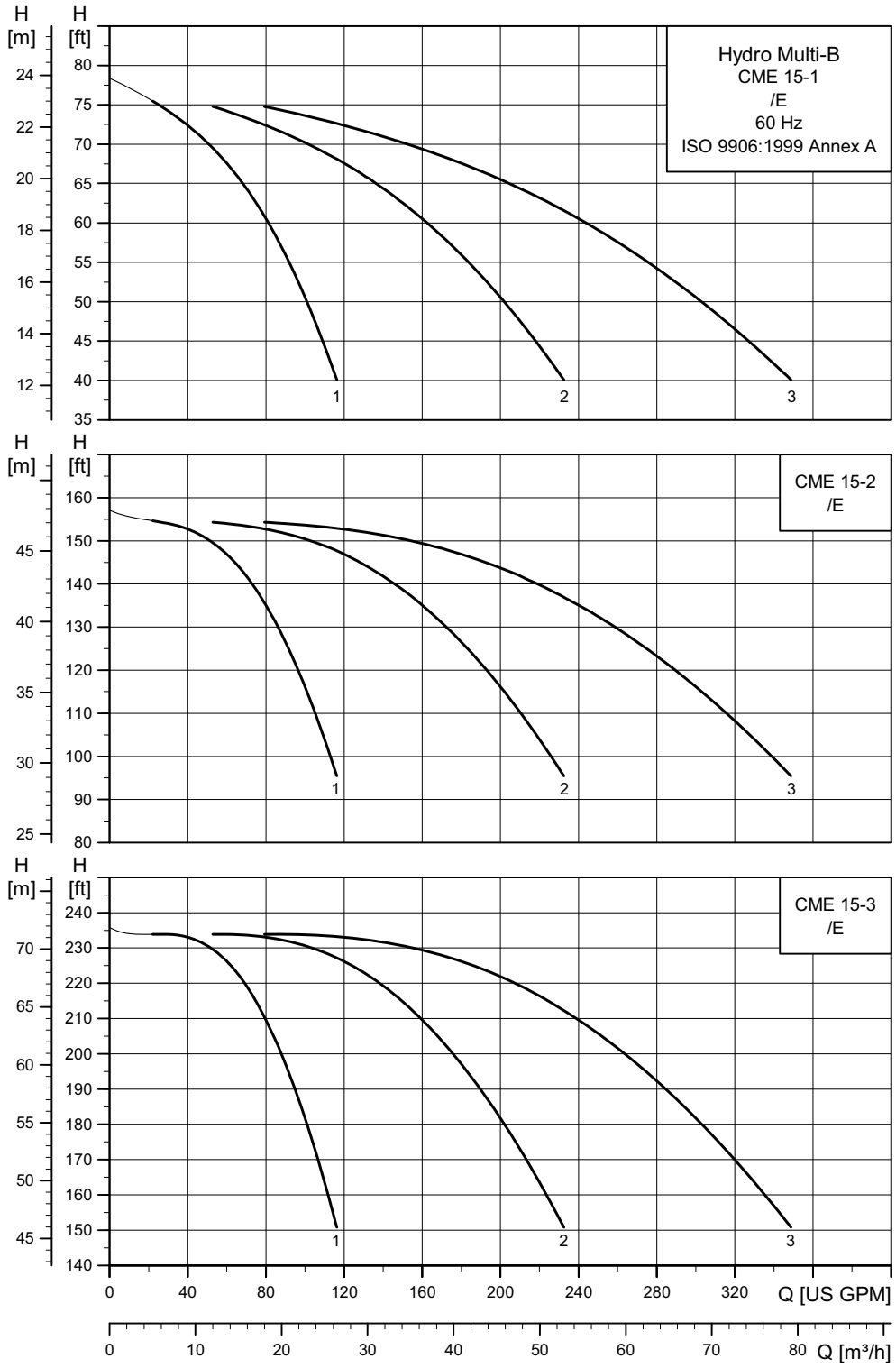
Hydro Multi-B E with CME 15



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9. Technical data

Dimensional sketches

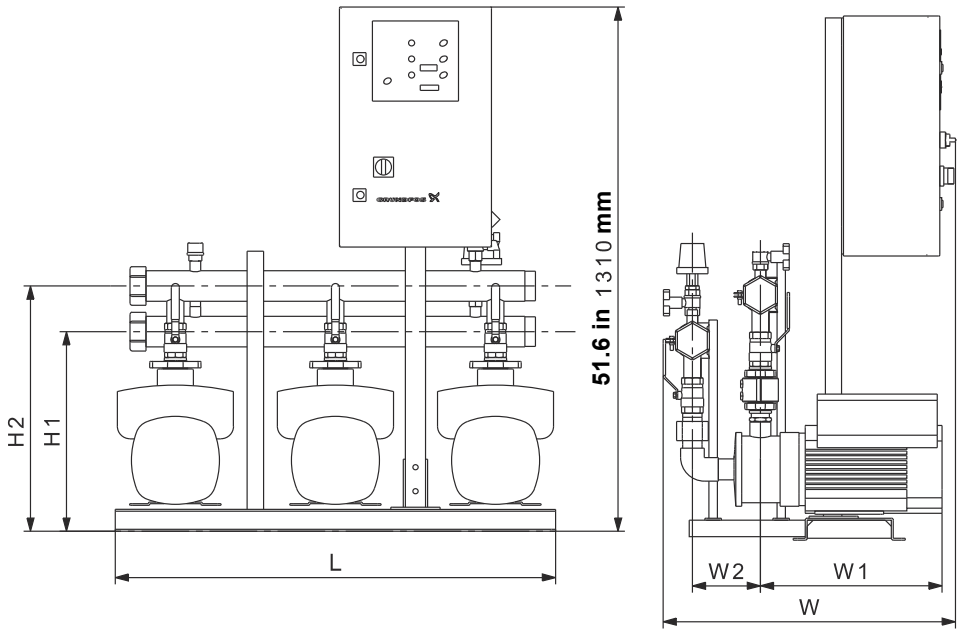

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Fig. 12 Hydro Multi-B booster system with three CM(E) pumps

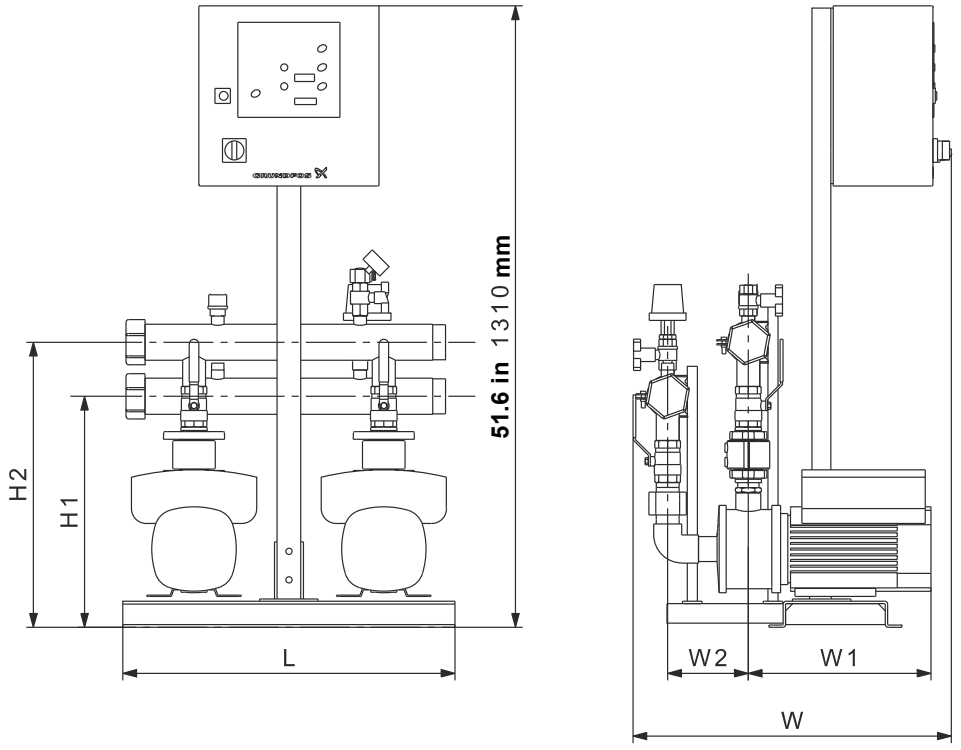

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Fig. 13 Hydro Multi-B booster system with two CM(E) pumps

Hydro Multi-B E with CME, 60 Hz

Number of pumps	Pump type	Motor [hp]	Voltage [V]	FLA [Amps] U1 / U2 / U3	Connection	L [in]	W [in]	W1 [in]	W2 [in]	H1 [in]	H2 [in]	Tank [gal]	Weight [kg]
2	CME 3-3	1.5	U1	13.1	2" NPT	27.6	26.0	10.8	7.1	17.6	22.1	4.4	214
	CME 3-5	1.5	U1	13.1		27.6	26.1	10.8	7.0	17.6	22.1	4.4	216
3	CME 3-3	1.5	U1	19.7		43.3	24.1	10.8	5.6	17.6	22.1	4.4	309
	CME 3-5	1.5	U1	19.7		43.3	24.9	10.8	7.0	17.6	22.1	4.4	313

Number of pumps	Pump type	Motor [hp]	Voltage [V]	FLA [Amps] U1 / U2 / U3	Connection	L [in]	W [in]	W1 [in]	W2 [in]	H1 [in]	H2 [in]	Tank [gal]	Weight [kg]
2	CME 5-3	1.5	U1	13.1	2" NPT	27.6	25.3	10.8	5.8	18.2	22.6	4.4	227
	CME 5-4	2	U1,U2,U3	17.8 / 11.2 / 5.8		27.6	26.1	12.7	6.0	19.1	23.6	4.4	280
	CME 5-5	2	U3	17.8 / 11.2 / 5.8		27.6	26.6	12.7	6.7	19.1	23.6	4.4	300
3	CME 5-3	1.5	U1	19.7	2" NPT	43.3	22.9	10.8	5.8	18.2	22.6	4.4	326
	CME 5-4	2	U1,U2,U3	26.7 / 16.8 / 8.7		43.3	24.3	12.7	6.0	19.1	23.6	4.4	408
	CME 5-5	2	U3	26.7 / 16.8 / 8.7		43.3	26.4	12.7	6.7	19.1	23.6	4.4	443

Number of pumps	Pump type	Motor [hp]	Voltage [V]	FLA [Amps] U1 / U2 / U3	Connection	L [in]	W [in]	W1 [in]	W2 [in]	H1 [in]	H2 [in]	Tank [gal]	Weight [kg]
2	CME 10-1	1.5	U1	13.1	2.5" NPT	27.6	25.9	11.6	4.5	21.4	26.5	10.3	331
	CME 10-2	3	U2,U3	16.6 / 8.5		27.6	25.9	15.2	5.7	21.7	26.8	10.3	342
	CME 10-3	5	U2,U3	26.8 / 12.2		27.6	27.4	17.9	6.9	22.2	27.3	10.3	434
3	CME 10-1	1.5	U1	19.7	2.5" NPT	43.3	25.9	11.6	4.5	21.4	26.5	10.3	487
	CME 10-2	3	U2,U3	24.9 / 12.75		43.3	25.9	15.2	5.7	21.7	26.8	10.3	498
	CME 10-3	5	U2,U3	40.2 / 18.3		43.3	27.4	17.9	6.9	22.2	27.3	10.3	639

Number of pumps	Pump type	Motor [hp]	Voltage [V]	FLA [Amps] U1 / U2 / U3	Connection	L [in]	W [in]	W1 [in]	W2 [in]	H1 [in]	H2 [in]	Tank [gal]	Weight [kg]
2	CME 15-1	3	U2,U3	16.6 / 8.5	3" NPT	27.6	29.2	15.2	6.0	22.9	29.9	10.3	472
	CME 15-2	5	U2,U3	26.8 / 12.2		27.6	29.2	17.9	6.0	23.3	30.4	10.3	483
	CME 15-3	7.5	U2,U3	39.4 / 17.8		27.6	29.2	17.9	7.2	23.3	30.4	10.3	503
3	CME 15-1	3	U2,U3	24.9 / 12.75	4" ANSI	43.3	29.6	15.2	6.0	23.4	30.4	10.3	639
	CME 15-2	5	U2,U3	40.2 / 18.3		43.3	29.6	17.9	6.0	23.9	30.9	10.3	650
	CME 15-3	7.5	U2,U3	59.1 / 26.7		43.3	29.6	17.9	7.2	23.9	30.9	10.3	681

E system with two or three CME pumps.
Supply voltage U1: 1 x 208-230 V - 10 %/+ 10 %, N, PE.
Supply voltage U2: 3 x 208-230 V - 5 %/+ 5 %, N, PE.
Supply voltage U3: 3 x 460 V - 5 %/+ 5 %, N, PE.
Dimensions may vary by ± 1 in.

10. Accessories

CIM communication module

The CU 323 can be connected to an external communication network via an add-on fieldbus CIM module.

Module	Fieldbus protocol	Location	Product number
CIM 050	GENIbus	In the CU 323	96020422
CIM 110	LonWorks		96020415
CIM 200	Modbus RTU		96020417
CIM 250	GSM		96020418
CIM 300	BACnet MS/TP		96020420
CIM 500	Modbus TCP		98436291

For further information about communication via CIM modules, data transfer and fieldbus protocols, see the CIM documentation available on www.grundfos.com (WebCAPS).

Additional documentation

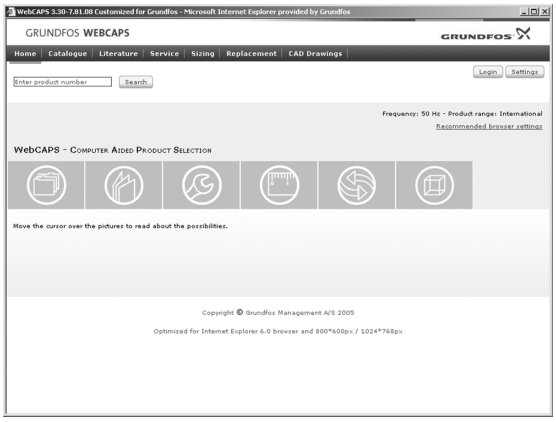
The publication numbers below refer to the printed documentation for Hydro Multi-B (group versions).

Document	Publication number
Installation and operating instructions	98504518
Quick guide	98515759

In addition to the printed documentation, Grundfos offers product information in WebCAPS.

11. Further product information

WebCAPS

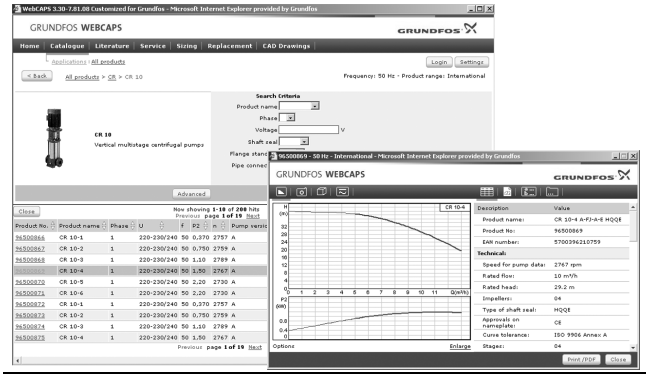


WebCAPS is a **Web**-based **C**omputer **A**ided **P**roduct **S**election program available on www.grundfos.com.

WebCAPS contains detailed information on more than 220,000 Grundfos products in more than 30 languages.

Information in WebCAPS is divided into six sections:

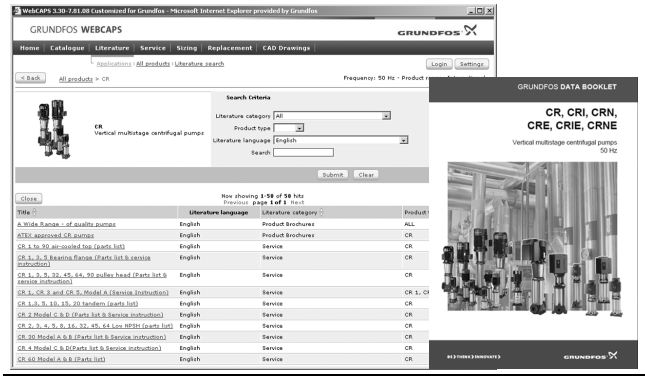
- Catalog
- Literature
- Service
- Sizing
- Replacement
- CAD drawings.



Catalog

Based on fields of application and pump types, this section contains the following:

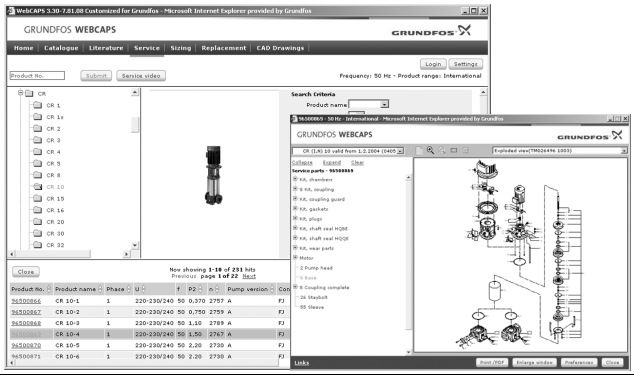
- technical data
- curves (QH, Eta, P1, P2, etc.) which can be adapted to the density and viscosity of the pumped liquid and show the number of pumps in operation
- product photos
- dimensional drawings
- wiring diagrams
- quotation texts, etc.



Literature

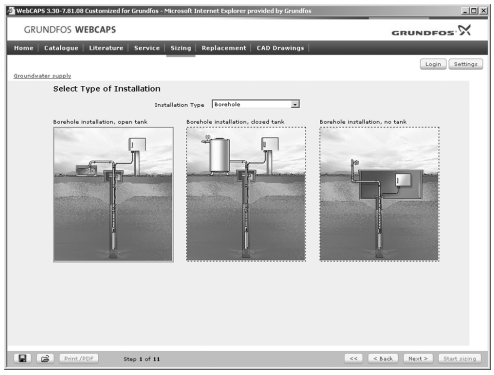
This section contains all the latest documents of a given pump, such as

- data booklets
- installation and operating instructions
- service documentation, such as Service kit catalogue and Service kit instructions
- quick guides
- product brochures.



Service

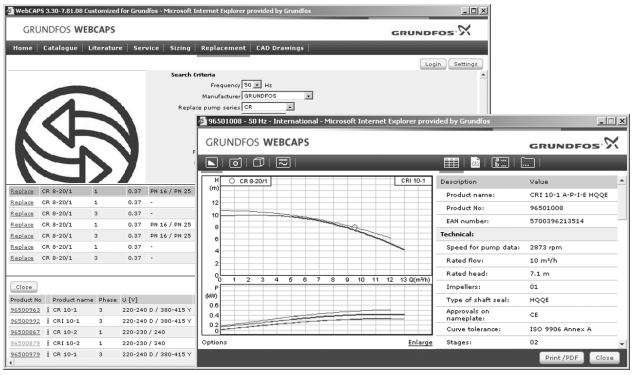
This section contains an easy-to-use interactive service catalogue. Here you can find and identify service parts of both existing and discontinued Grundfos pumps.
Furthermore, the section contains service videos showing you how to replace service parts.



Sizing

This section is based on different fields of application and installation examples and gives easy step-by-step instructions in how to size a product:

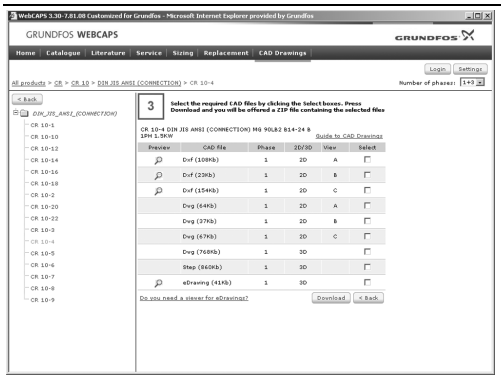
- Select the most suitable and efficient pump for your installation.
- Carry out advanced calculations based on energy, consumption, payback periods, load profiles, life cycle costs, etc.
- Analyse your selected pump via the built-in life cycle cost tool.
- Determine the flow velocity in wastewater applications, etc.



Replacement

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

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



CAD drawings

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

These formats are available in WebCAPS:

2-dimensional drawings:

- .dxf, wireframe drawings
- .dwg, wireframe drawings.

3-dimensional drawings:

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

WinCAPS

Fig. 14 WinCAPS DVD

WinCAPS is a **Win**dows-based **C**omputer **A**ided **P**roduct **S**election program containing detailed information on more than 220,000 Grundfos products in more than 30 languages.

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

WinCAPS is available on DVD and updated once a year.

GO CAPS

Mobile solution for professionals on the GO!

CAPS functionality on the mobile workplace.

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