Hydro Multi-B

Booster systems with 2 to 4 pumps

50 Hz

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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 mains 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
- blocks of flats
- hotels
- shopping centres
- hospitals
- schools.

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

The Hydro Multi-B comes in two control variants with at least one CME pump with integrated speed-controlled motor. This ensures perfect adaptation to the demand, high efficiency and protection against pressure surges in the installation.

The pumps are controlled in automatic cascade via the control cabinet mounted on the base frame.
The CU 323 controller controls the speed of the CME pump(s) and starts and stops the required number of CM pumps 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

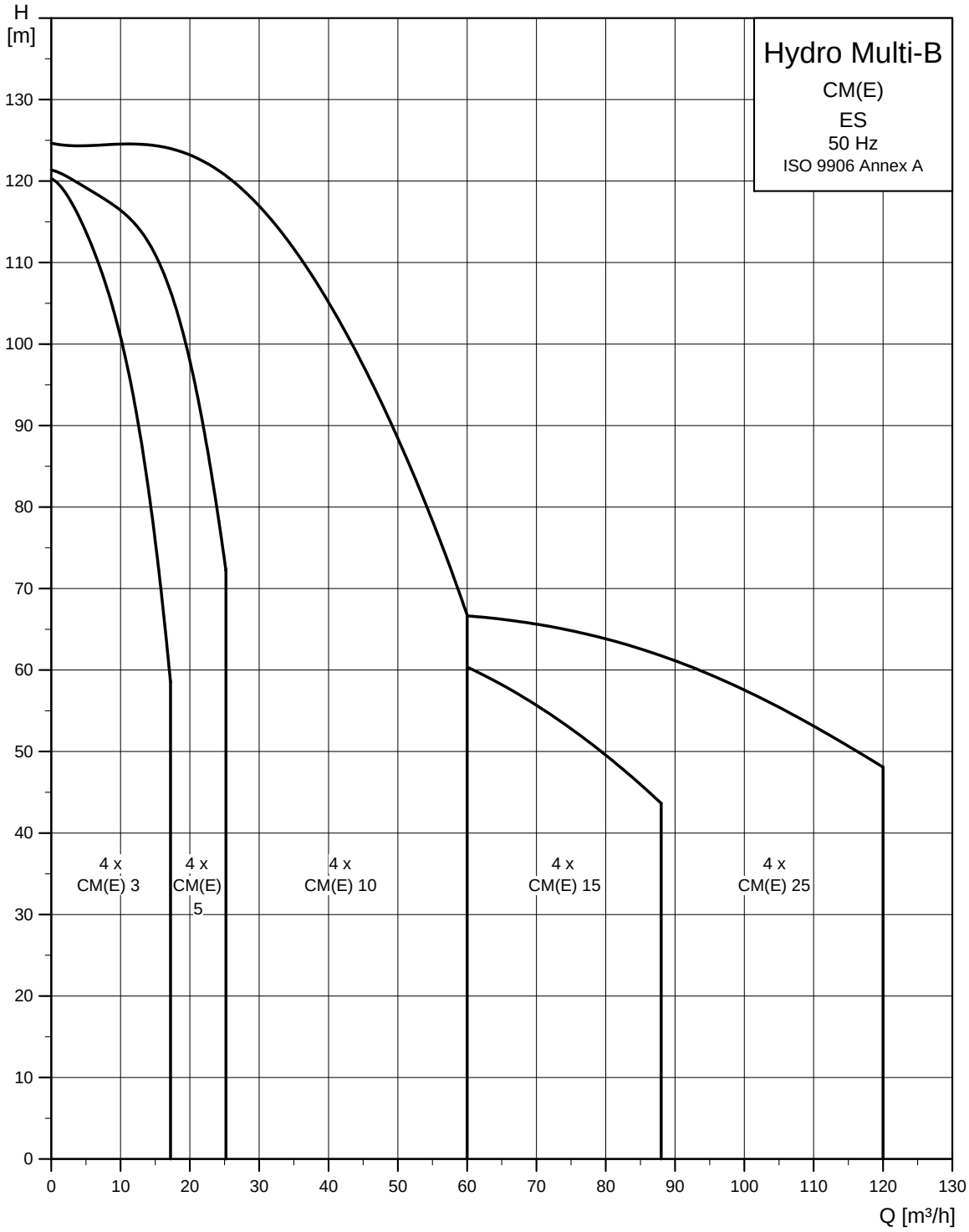
The components and design of the Hydro Multi-B have been chosen with focus on robustness and compactness. The booster system offers the user all the benefits of a complete solution with a single supplier who takes the responsibility of the complete system.

Ready, Set, Pump

Grundfos does not compromises when it comes to quality. Therefore, every system is thoroughly tested before is leaves the factory. On delivery, the system is assembled, tested and ready to pump as soon as it is connected to the water and power supplies.

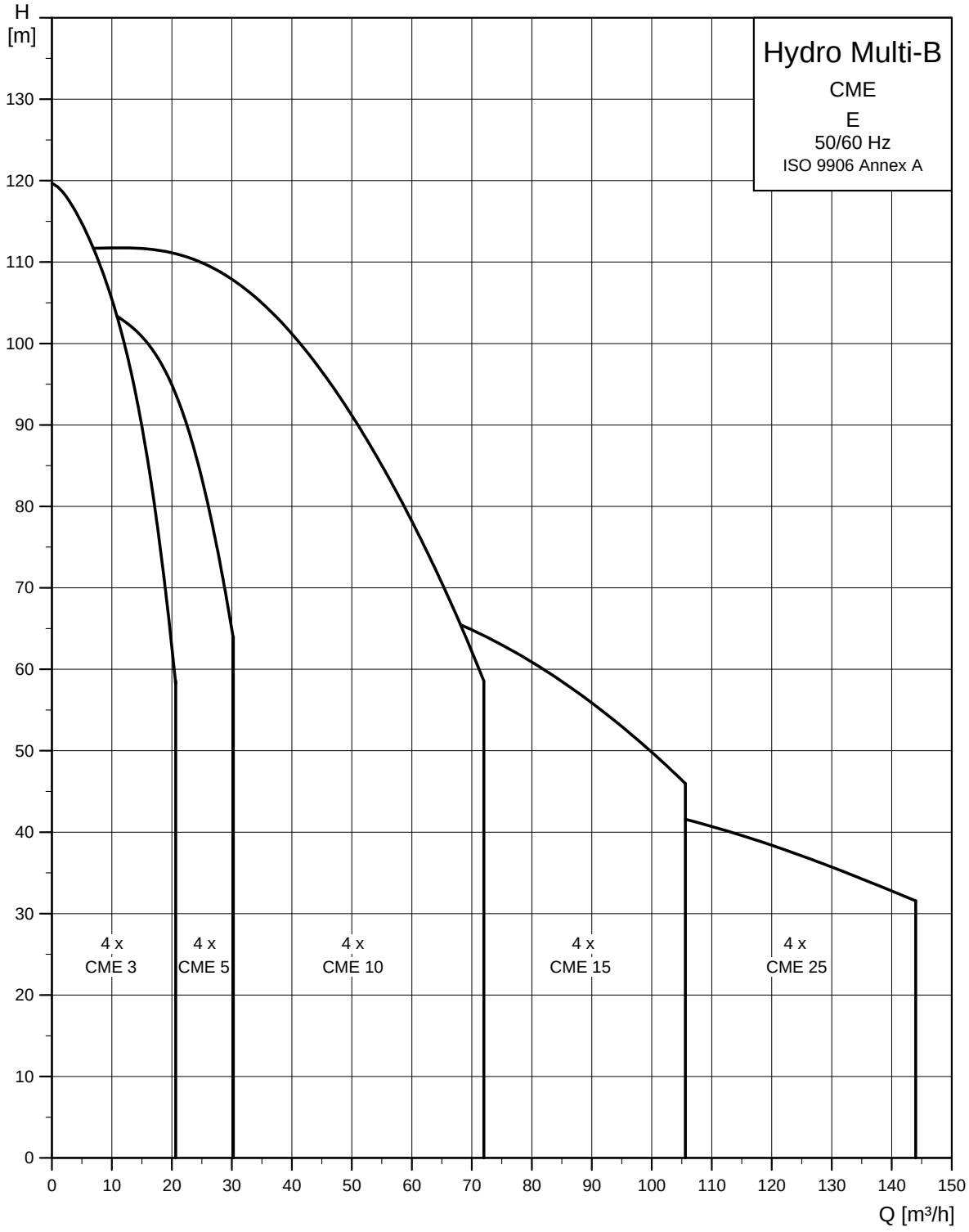
2. Product data

Performance range, 50 Hz



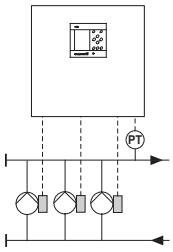
Note: The performance range is based on the standard range of the CM and CME pumps.

Performance range, 50/60 Hz



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

Product range



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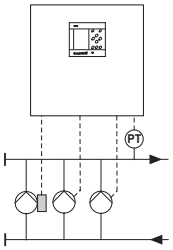

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Control variant	Hydro Multi-B E	Hydro Multi-B ES
Hydraulic data		
Maximum head [m]	120	125
Flow rate [m^3/h]	0 to 144	0 to 144
Liquid temperature [°C]	0 to +60	0 to +60
Maximum operating pressure [bar]	16	16
Pump and motor data		
Number of pumps	2 to 4	2 to 4
Motor power [kW]	0.55 to 7.5	0.55 to 7.5
Shaft seal		
AQQE (SiC/SiC/EPDM)	•	•
Materials		
CM(E) 3 to CM(E) 25: Stainless steel (EN/DIN 1.4301/AISI 304)	•	•
Manifold: Stainless steel	•	•
Manifold: Galvanised steel[1)]	❍	❍
Pipework connection		
Union	R 2 to R 2 1/2	R 2 to R 2 1/2
DIN flange	DN 80 to DN 125	DN 80 to DN 125
Functions		
Constant-pressure control	•	•
Pump cascade control	•	•
Automatic pump changeover	•	•
Stop function	•	•
Integrated frequency converter	•	•[2)]
Water shortage protection	❍	❍
Bus communication	❍	❍
Redundant primary sensor	❍	❍
Standby pumps	❍	❍
Tank-filling software	❍	❍

• Available as standard.
❍ Optional.
1) Galvanised-steel manifolds are standard in some countries. For further information, contact Grundfos.
2) Only one pump with integrated frequency converter.

Type key

Code	Example	Hydro Multi-B	ES	U	/G	1 CME 10-8 I	2 CM 10-8 A	3 x 380 V, 50 Hz
	Type range							
	System variants							
E	Two to four pumps with integrated frequency converter							
ES	One pump with integrated frequency converter and one to three mains-operated pumps							
	Application							
[-]	Constant-pressure boosting							
U	Tank filling							
	Manifold/base frame material							
[-]	Stainless steel (EN 1.4301, AISI 304)/mild steel (Q235)							
G	Galvanised steel/mild steel (Q235)							
OM	Other materials							
	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)							
	Number of mains-operated pumps, 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 16 bar.

Temperatures

Liquid temperature: 0 °C to +60 °C.

Ambient temperature: 0 °C to +40 °C.

Relative air humidity

Maximum 95 %.

3. Construction

Pump

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

CM pumps are fitted with mains-operated motors whereas the motor of CME pumps has an integrated frequency converter. Both CM and CME pumps have mechanical shaft seals.

CM

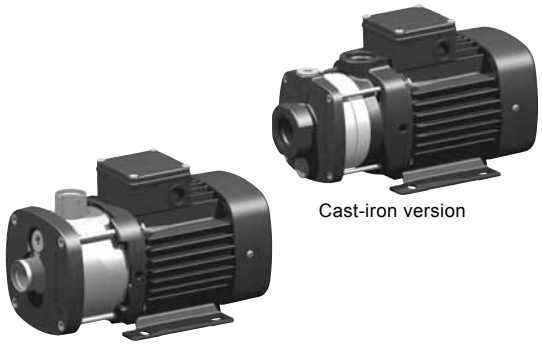


Fig. 2 Grundfos CM pumps

CME

Fig. 3 Grundfos CME pumps

The compactness of the Hydro Multi-B is only achievable due to the unique combination of size and performance offered by the Grundfos CM(E) pumps. Certain dimensions 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	96903467
Grundfos E-pumps	96570076

The data booklets are available on www.grundfos.com (WebCAPS). See also page 45.

Manifold

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

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

An isolating valve and a non-return valve are fitted between the discharge manifold and the individual pumps. The non-return valve can be fitted on the suction side on request.

As an alternative, Hydro Multi-B is available with galvanised-steel manifolds in some countries. For further information, contact Grundfos.

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 pump.

Control cabinet and CU 323

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

The CU 323 is the control panel of 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 control panel 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, but tank-filling software is available on request.

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 cabinet is secured to the base frame by means of a stand.

System components

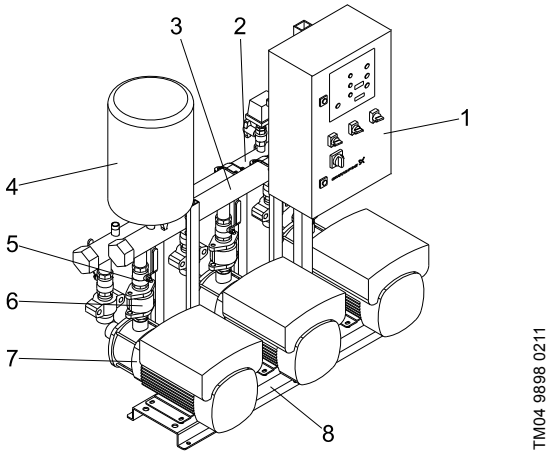


Fig. 4 Front view of Hydro Multi-B booster system

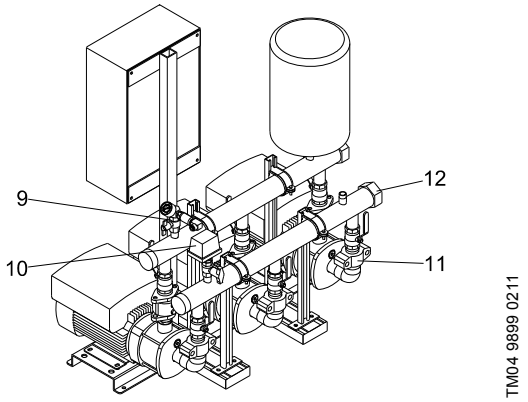
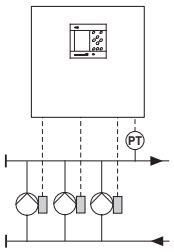
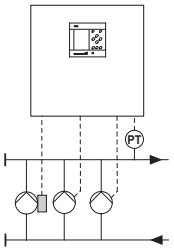
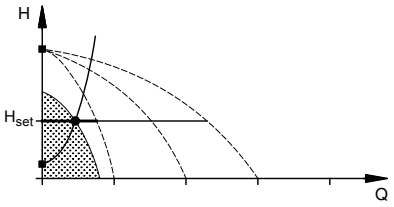
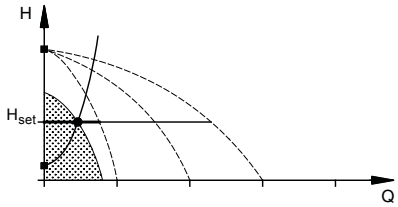
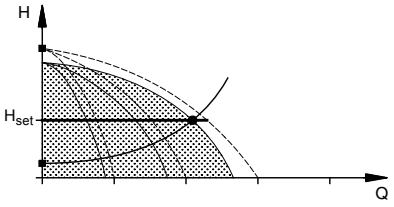
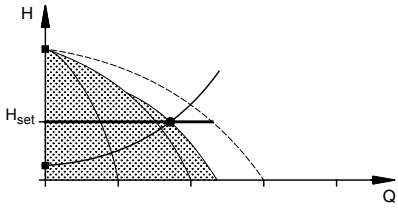


Fig. 5 Rear view of Hydro Multi-B booster system

Pos.	Description	Quantity
1	Control cabinet	1
2	Suction manifold	1
3	Discharge manifold	1
4	Diaphragm tank	1
5	Isolating valve	2 per pump
6	Non-return valve	1 per pump
7	Pump	2 to 4
8	Base frame	1
9	Pressure transmitter and pressure gauge	1
10	Pressure switch or inlet pressure sensor (optional)	1
11	Flexible clamp connection	1 per pump
12	Screw cap or blanking flange	2

4. Functions

Control variants

Control variant E	Control variant ES
Two to four speed-controlled CME pumps	One speed-controlled CME pump and one to three mains-operated CM pumps
 TM03 0993 0905	 TM03 0996 0905
One CME pump in operation.	One CME pump in operation.
 TM00 7995 2296	 TM00 7995 2296
Three CME pumps in operation.	One CME pump and two CM pumps in operation.
 TM00 7996 2296	 TM00 7998 2296
• 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.	• Control variant ES for constant-pressure applications maintains a constant pressure through continuous adjustment of the speed of the CME pump. The other pumps are cut in or out according to demand and to achieve a performance corresponding to the consumption. • The CME pump always starts first and will be the last to stop. If the pressure cannot be maintained by the pump, one or both CM pumps will be cut in. • Changeover among the mains-operated pumps is automatic and depends on load, time and fault.

Overview of functions

	Constant-pressure boosting		Tank filling	
Control variants	**E**	**ES**	**E**	**ES**
Functions via the CU 323 control panel				
Pump cascade control	●	●	-	-
Automatic pump changeover	●	●	●	●
Standby pumps	❍	❍	❍[1)]	❍[1)]
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	●	●	●	●
Protection in case of high tank level	-	-	●	●
Button lock function	●	●	●	●
Communication				
CIM module (CIM = Communication Interface Module)	❍	❍	❍	❍
External GENIbus connection (option)	❍	❍	❍	❍

● Standard.
❍ On request.
- Not available.
1) In systems with more than two pumps, one is standby pump as standard.

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.

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.

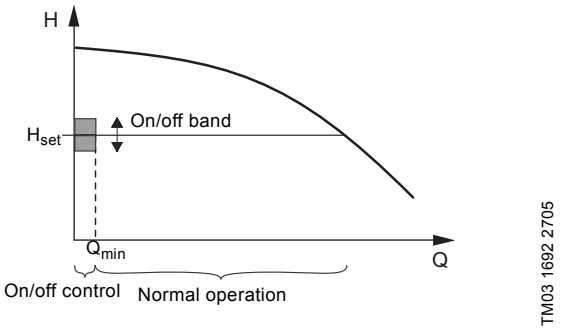


Fig. 6 On/off band

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

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.

Tank filling

If the booster system is ordered for tank filling, the CU 323 automatically controls the pumps in sequence so that the tank is filled in a safe and controlled manner.

Note: Tank filling is not standard, but special software is available on request.

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

As an option, the Hydro Multi-B can be fitted with a communication module that enables it to communicate with a SCADA system or a mobile phone.

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 cabinet.

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

The booster system should have a 1-metre 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. 7.

To achieve optimum operation and minimise noise and vibration, it may be necessary to consider vibration dampening of the booster system.

Noise and vibration are generated by the rotations in the motor and pump and by the flow in pipework and fittings. The effect on the environment is subjective and depends on correct installation and the state of the other parts of the system.

If booster systems are installed in blocks of flats or 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.

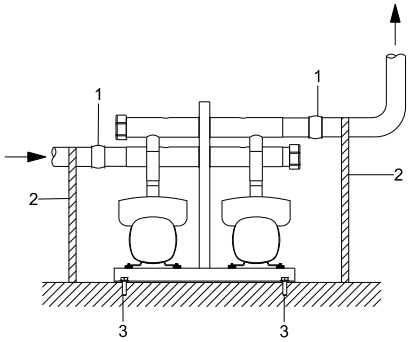


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Fig. 7 Example showing the position of expansion joints, pipe supports and mounting bolts

Pos.	Description
1	Expansion joint
2	Pipe support
3	Mounting bolts

Note: Expansion joints, pipe supports and mounting bolts shown in fig. 7 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 centre 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.

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Fig. 8 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 DN 100.

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 IP54.
- Make sure that the booster system is suitable for the power supply to which it is to be connected.
- Make sure that the wire cross-section corresponds to the specifications in the wiring diagram.
- ES systems should be protected against phase failure.

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 (recommended)

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 45.

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. 9 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.

1. Maximum flow requirement

Total consumption and 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	Q_{year}	Consumption period d	Q_{day}	fd	$Q(m)_{day}$	ft	Max. flow rate
		m^3/year	days/year	m^3/day		m^3/day		m^3/h
Residence building	Residence (2.5 persons)	183	365	0.5	1.3	0.65	1.7	0.046
Office building	Employee	25	250	0.1	1.2	0.12	3.6	0.018
Shopping centre	Employee	25	300	0.08	1.2	0.1	4.3	0.018
Supermarket	Employee	80	300	0.27	1.5	0.4	3.0	0.05
Hotel	Bed	180	365	0.5	1.5	0.75	4.0	0.125
Hospital	Bed	300	365	0.8	1.2	1.0	3.0	0.12
School	Pupil	8	200	0.04	1.3	0.065	2.5	0.007

Example: Hotel with 300 beds

Number of beds: n.

Total annual consumption: Q_{year} x n.

Consumption period: d.

Average consumption per day: (Q_{year} x n)/d.

Yearly maximum consumption: $Q(m)_{day}$ = fd x Q_{day}.

Maximum flow requirement per hour: Q_{max} = max. flow rate/hour x number of beds.

Calculation

n = 300 beds.

Q_{year} x n = 180 x 300 = 54,000 m^3/year.

d = 365 days/year.

(Q_{year} x n)/d = 54,000/365 = 148 m^3/day.

$Q(m)_{day}$ = fd x Q_{day} = 1.5 x 148 = 222 m^3/day.

Q_{max} = Max. flow rate/hour x number of beds = 0.125 x 300 = **37.5 m^3/h**.

2. 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 + (h_{max}/10.2)

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

Key

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

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

p_f = Total pipe friction loss [bar].

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

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

p_{boost} = Required boost [bar].

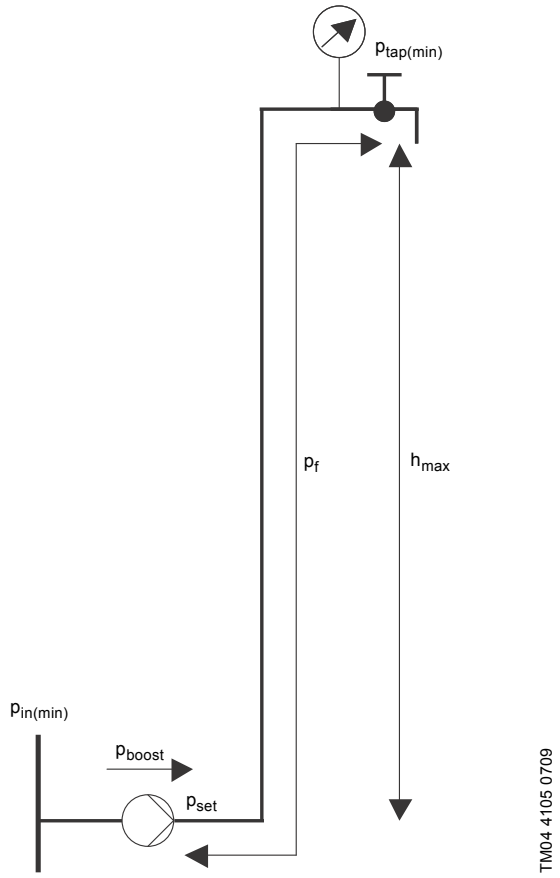


Fig. 10 Calculation of required discharge pressure

Calculation

$p_{tap(min)}$ = 2 bar

p_f = 1.2 bar

h_{max} = 12.5 metres

$p_{in(min)}$ = 2 bar

p_{set} = 2 + 1.2 + (12.5/10.2) = **4.4 bar**

p_{boost} = 4.4 - 2 = 2.4 bar.

3. System layout

Not relevant for Hydro Multi-B.

4. Consumption profile and load profile

Not relevant for Hydro Multi-B.

5. 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.

6. 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.

7. Accessories

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

Example

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 m^3/h is common to all the curves; the y-axis showing the head (H) in metres has been adapted to the individual pump type.

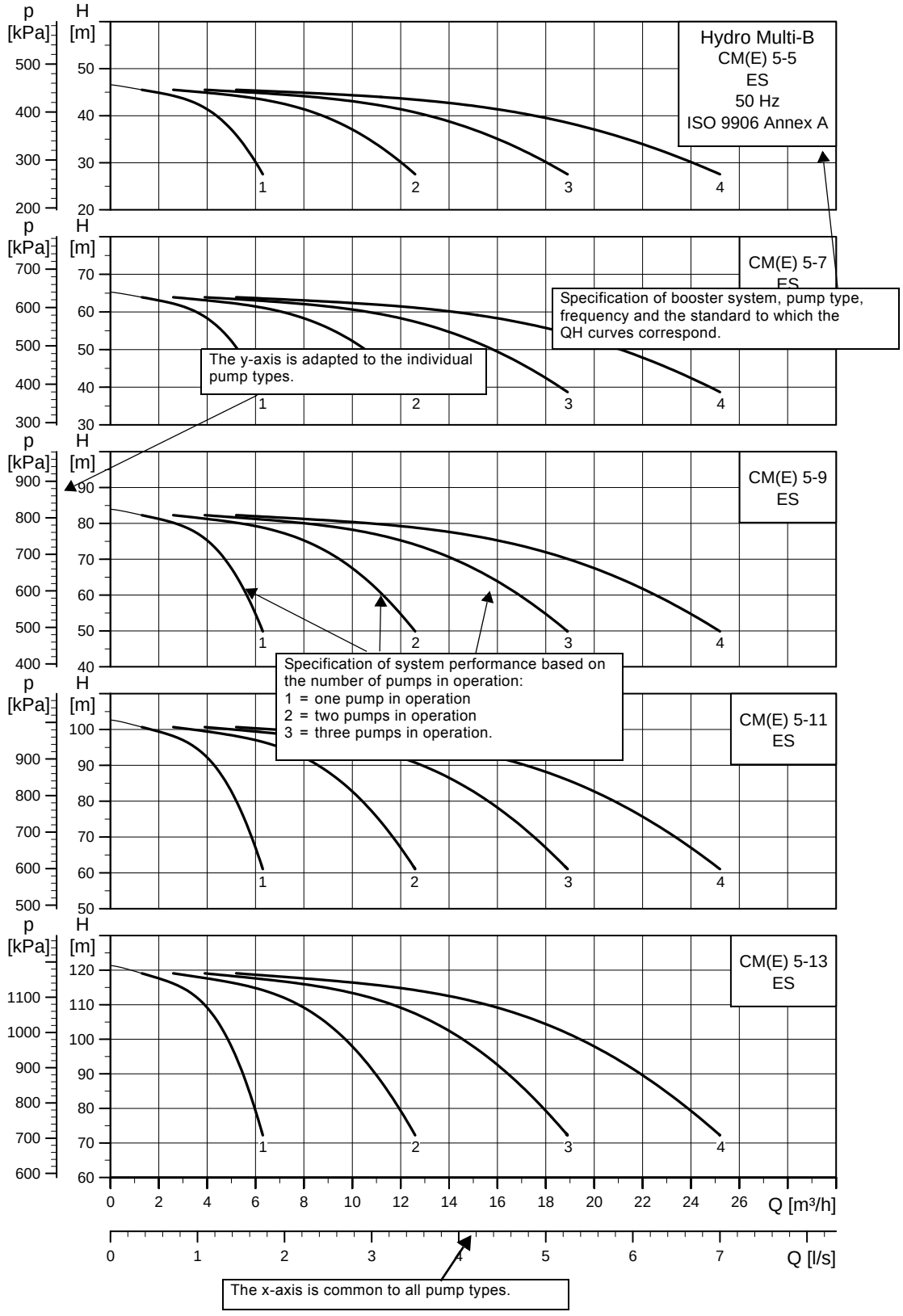


Fig. 11 Understanding the curve charts

How to select a system, example

- A flow rate of 37.5 m^3/h is required.
- A head of 44 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.

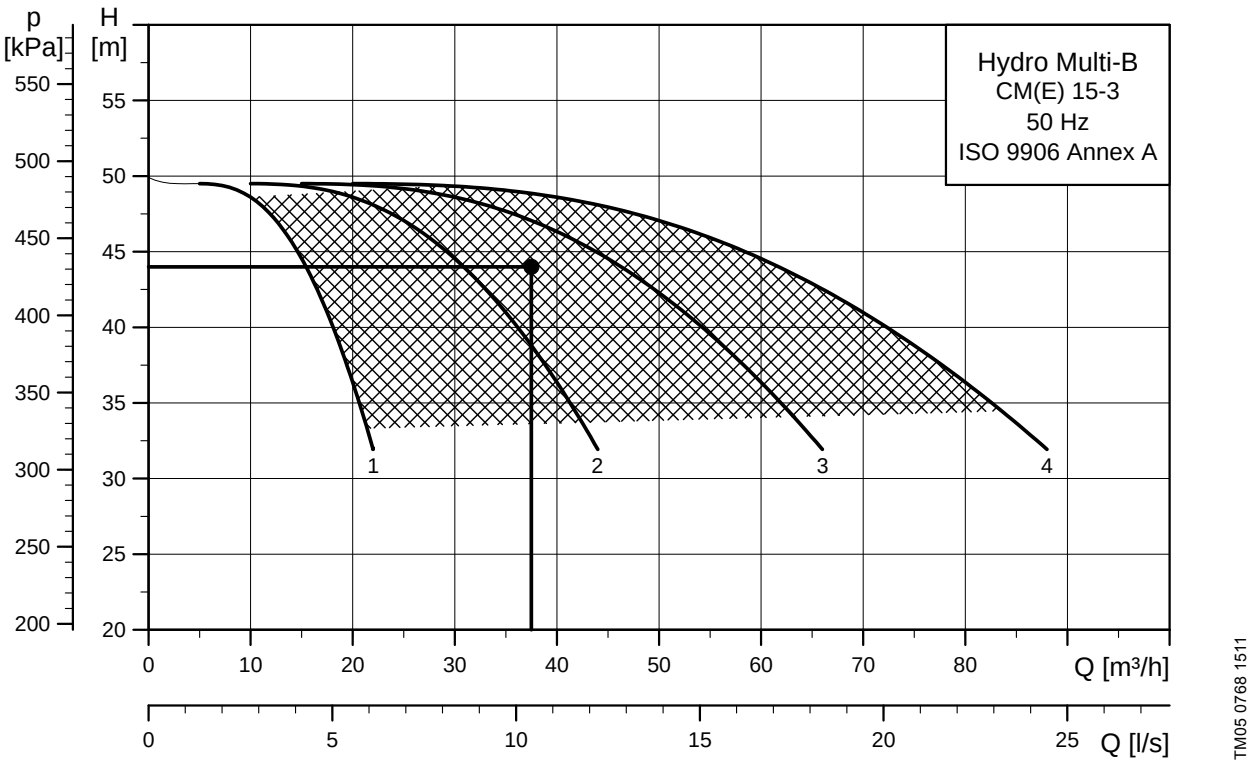


Fig. 12 Example of selection of system

7. Curve conditions

How to read the curve charts

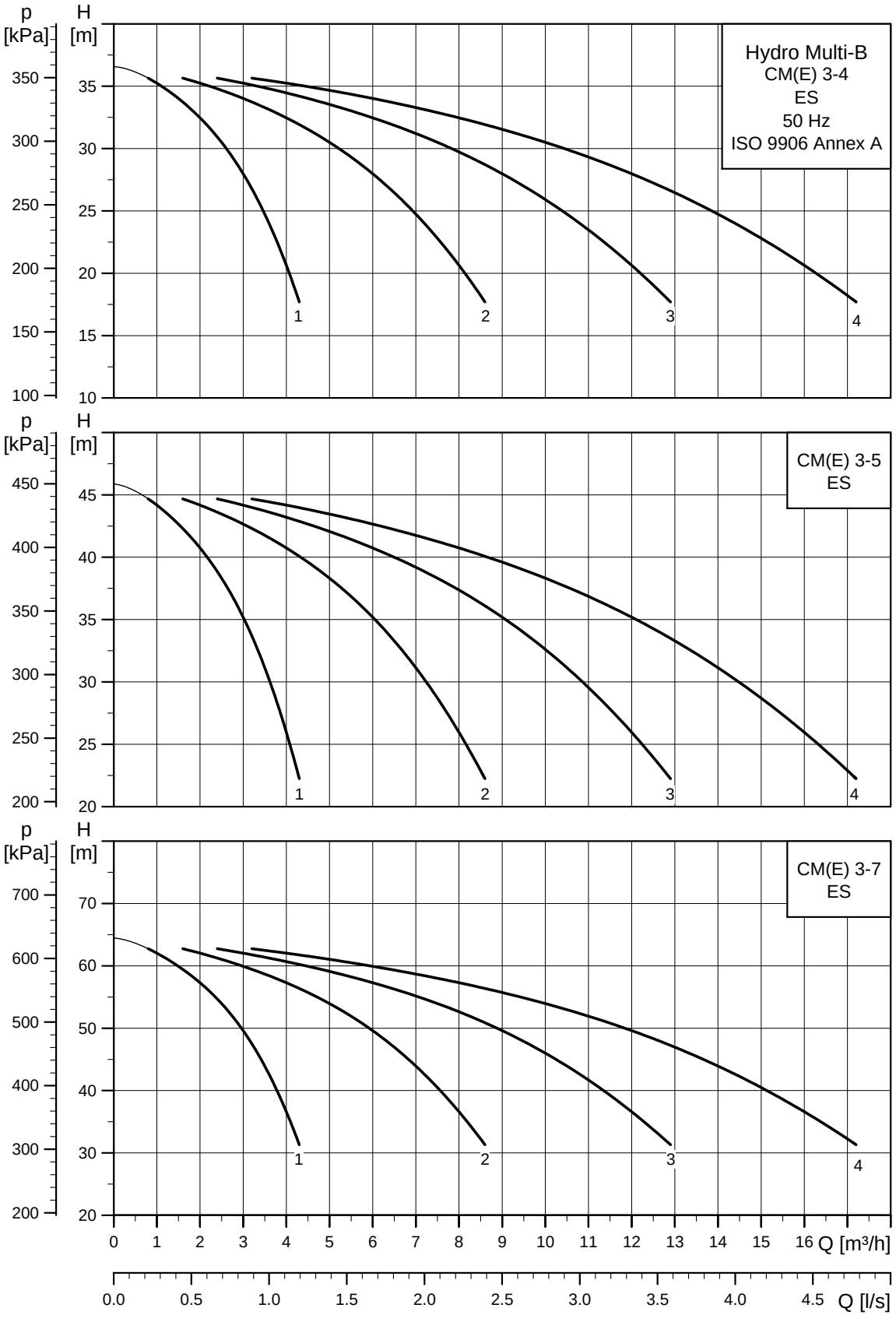
The guidelines below apply to the curves shown on the following pages:

- Tolerances to ISO 9906, Annex A, if indicated.
- Measurements have been made with airless water at a temperature of +20 °C.
- The curves apply to the following kinematic viscosity: υ = 1 mm^2/s (1 cSt).
- The QH curves apply to fixed speeds of 2900 min^{-1} (50 Hz) and 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.

The conversion between head H (m) and pressure p (kPa) applies to a water density of ρ = 1000 kg/m^3.

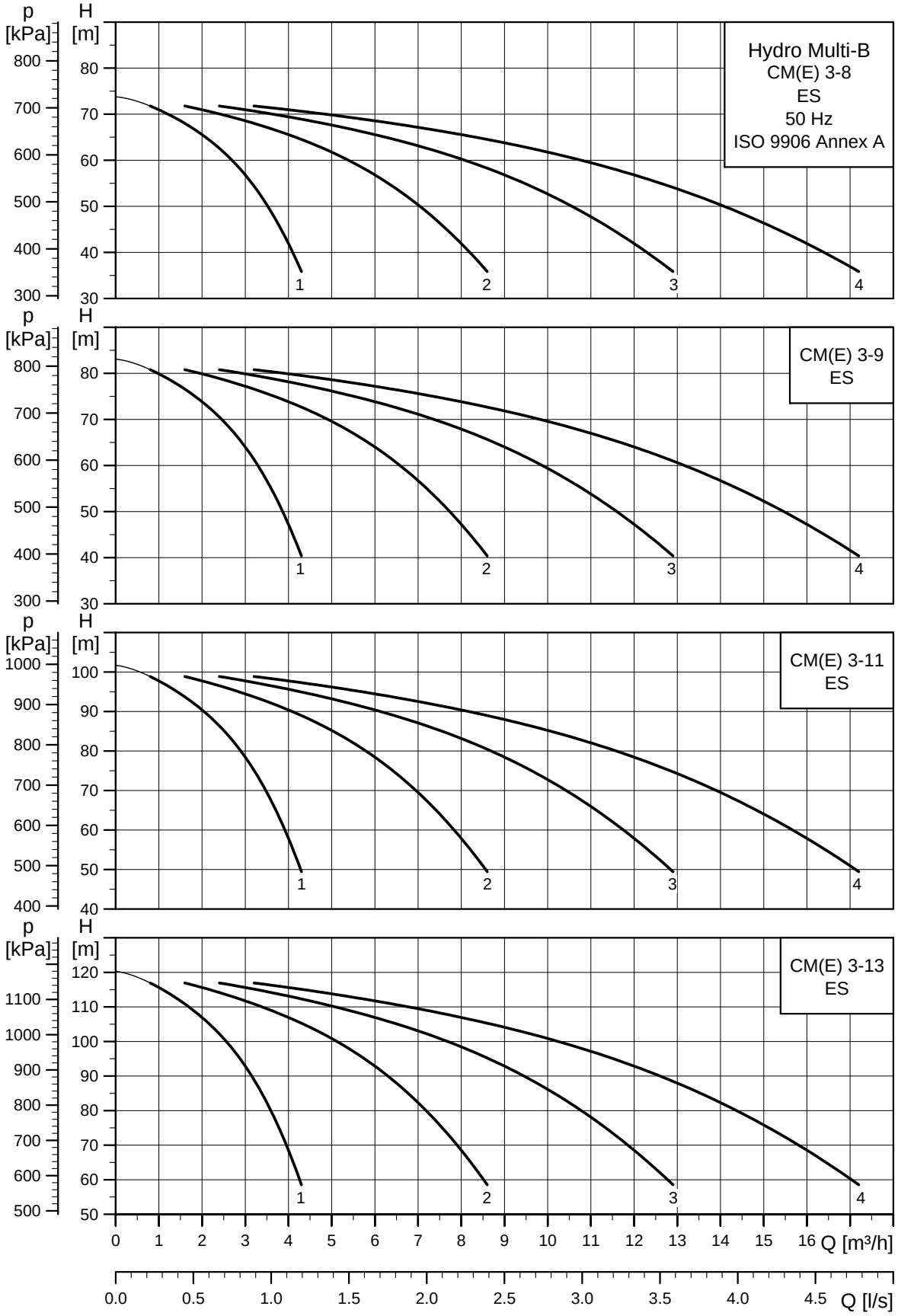
8. Performance curves

Hydro Multi-B ES with CM(E) 3, 50 Hz



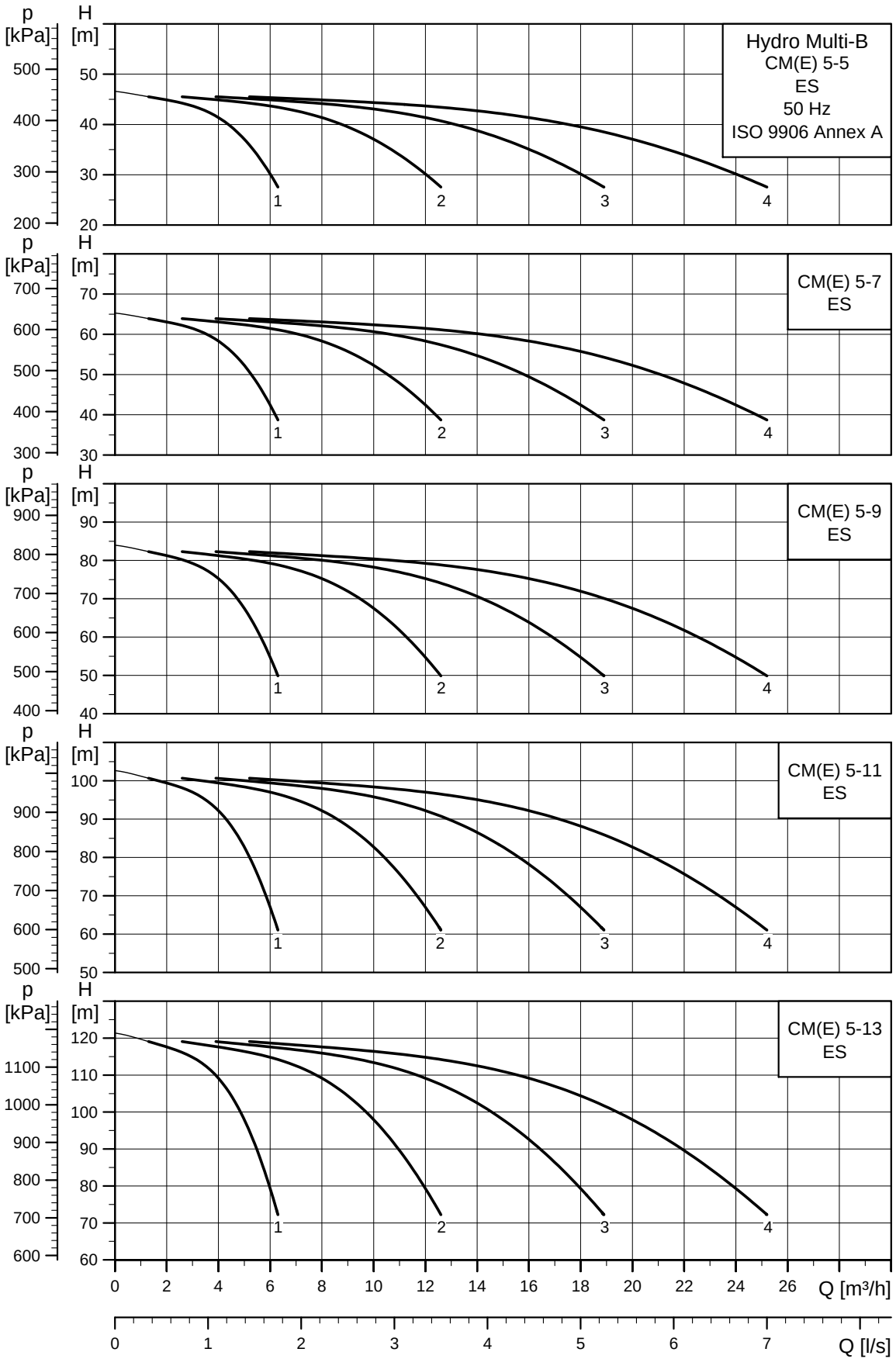
TM05 0624 1911

Hydro Multi-B ES with CM(E) 3, 50 Hz



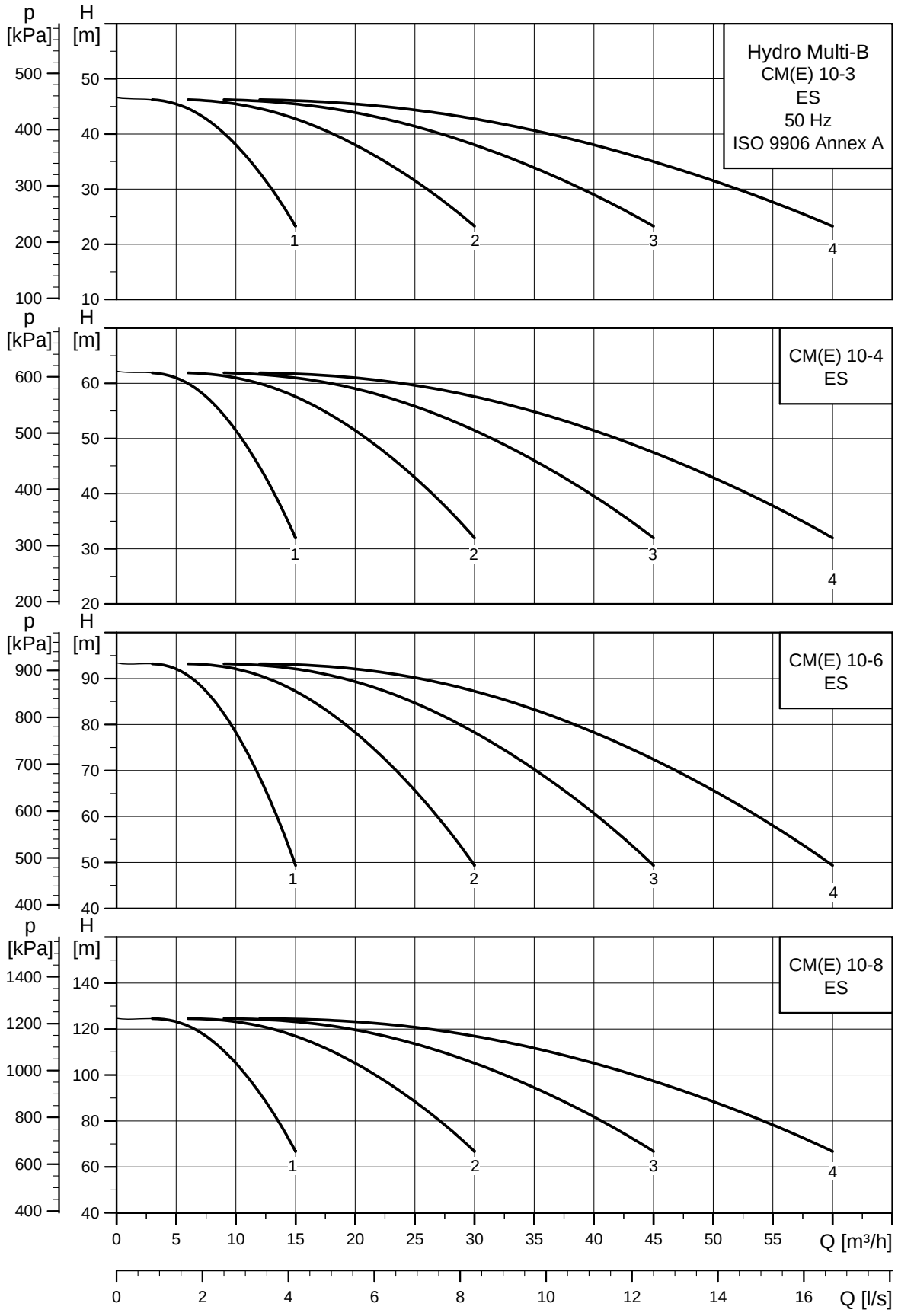
TM05 0623 1911

Hydro Multi-B ES with CM(E) 5, 50 Hz



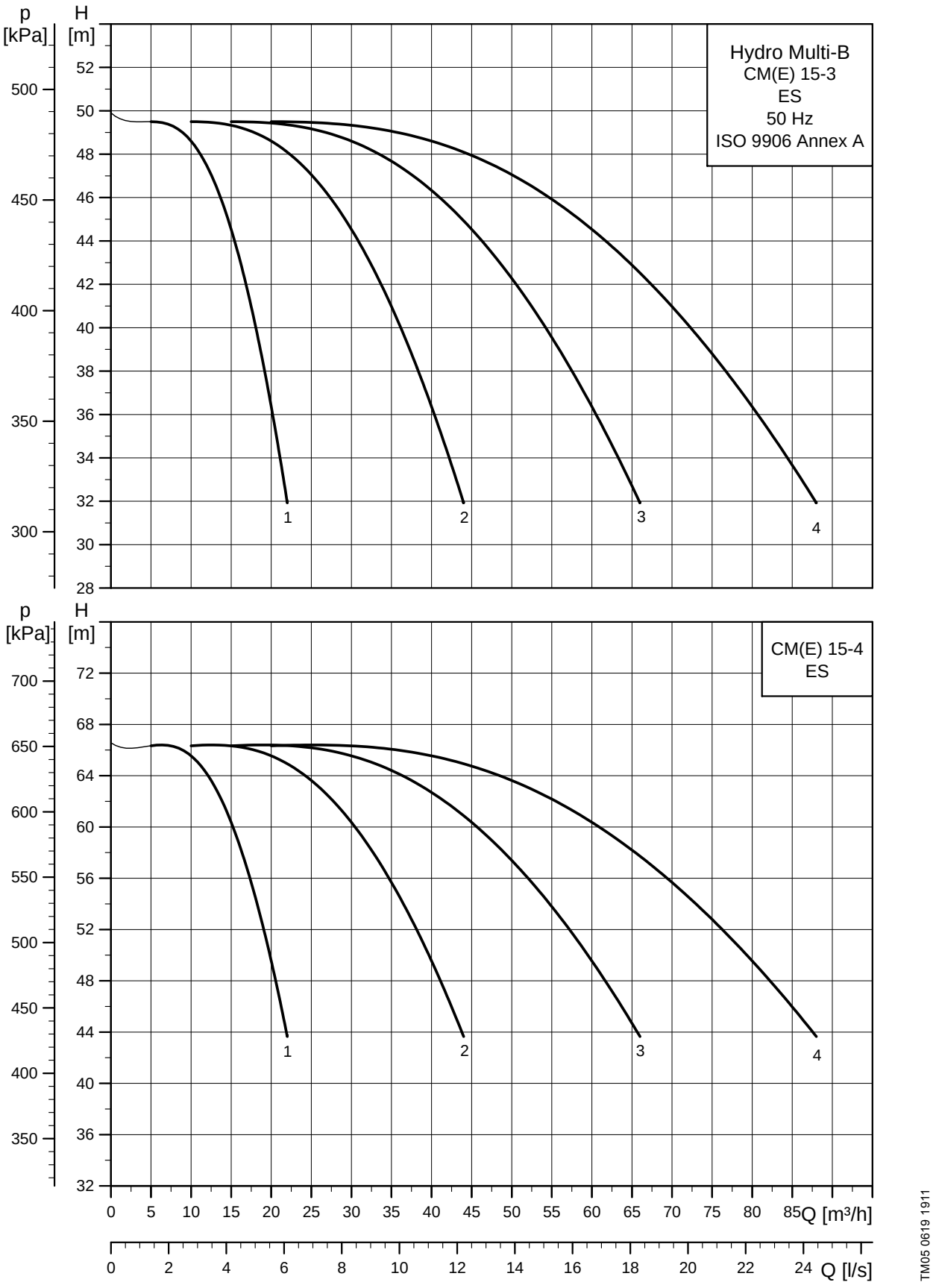
TM05 0621 1911

Hydro Multi-B ES with CM(E) 10, 50 Hz



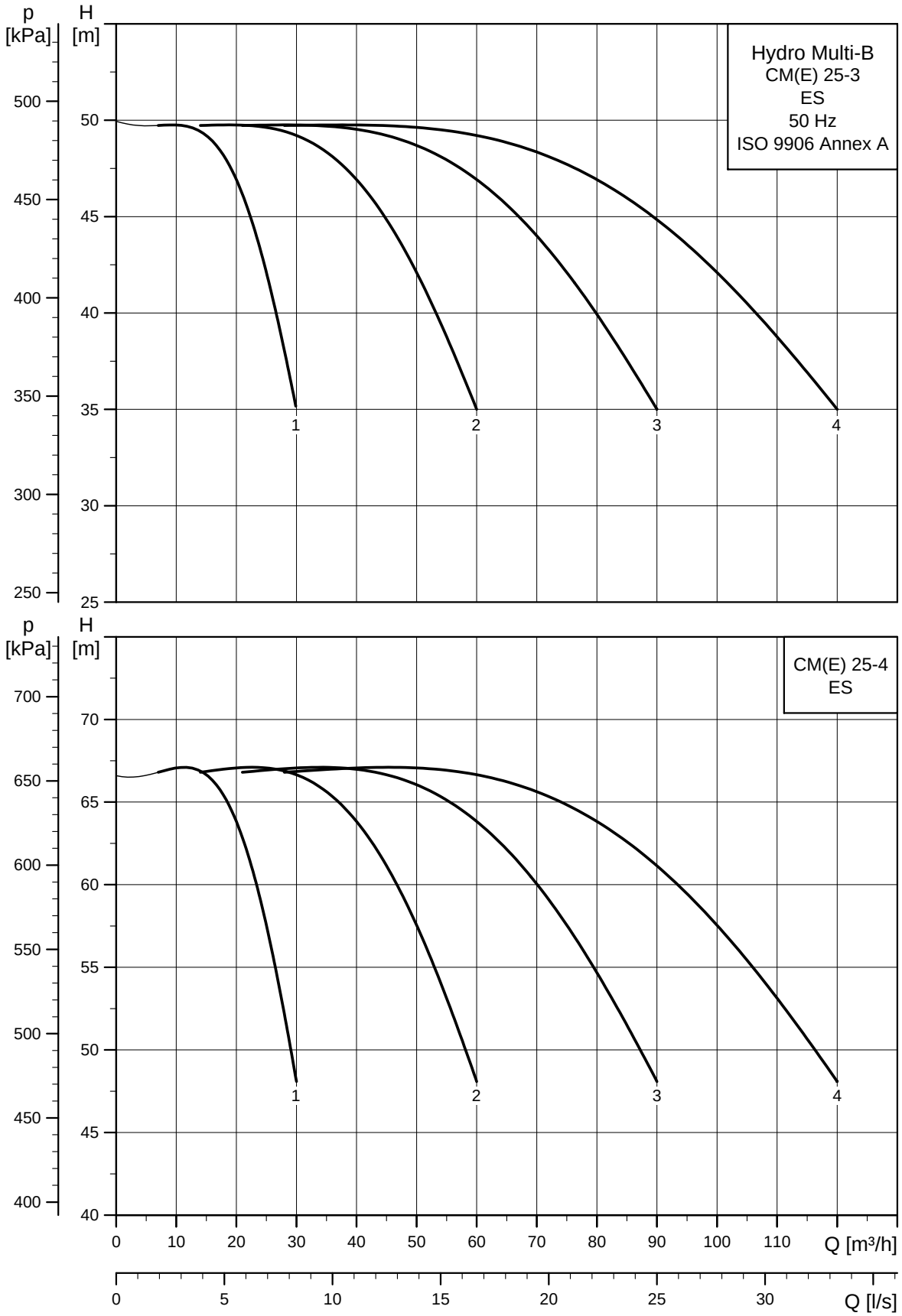
TM05 0620 1911

Hydro Multi-B ES with CM(E) 15, 50 Hz



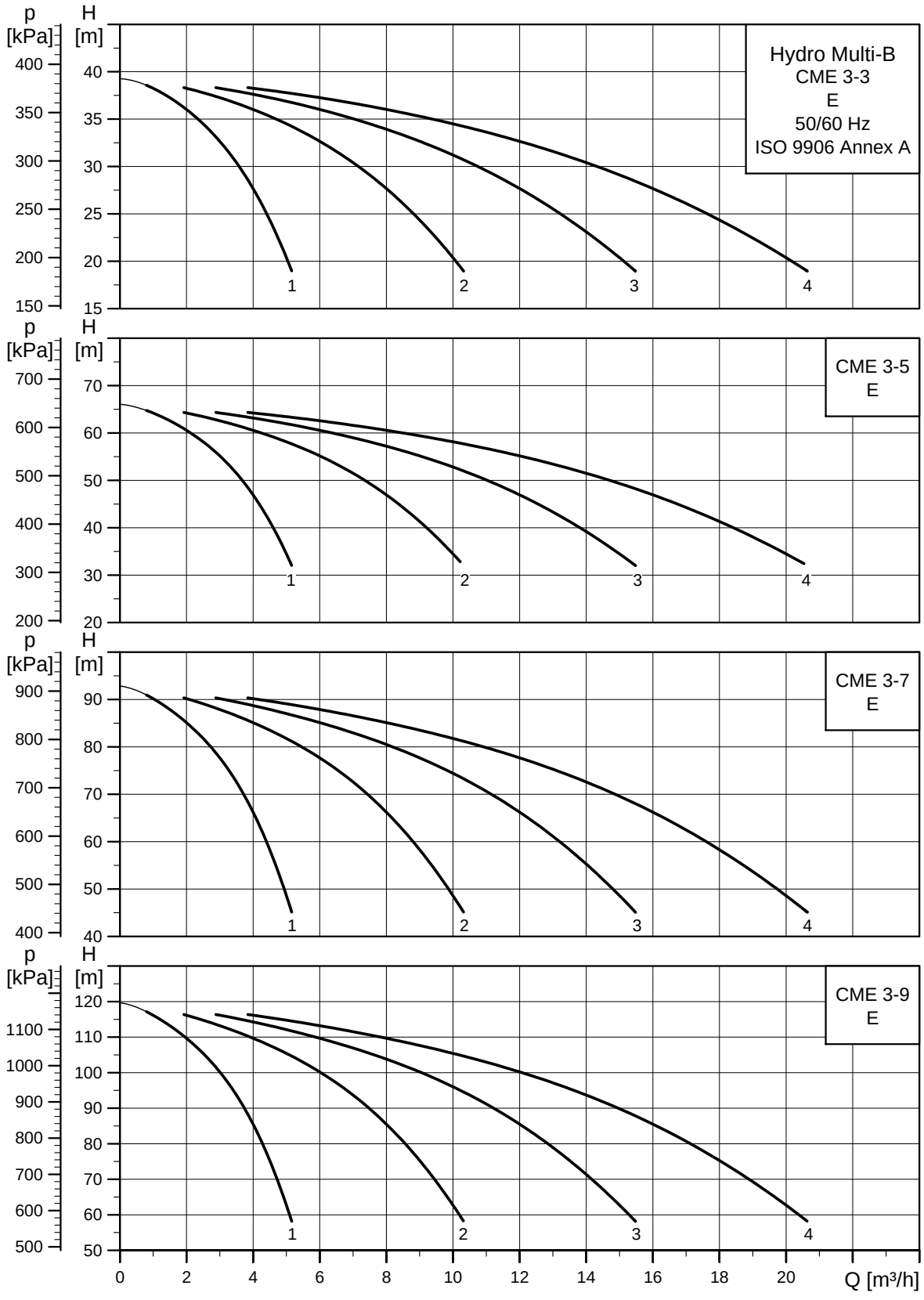
TM05 0619 1911

Hydro Multi-B ES with CM(E) 25, 50 Hz

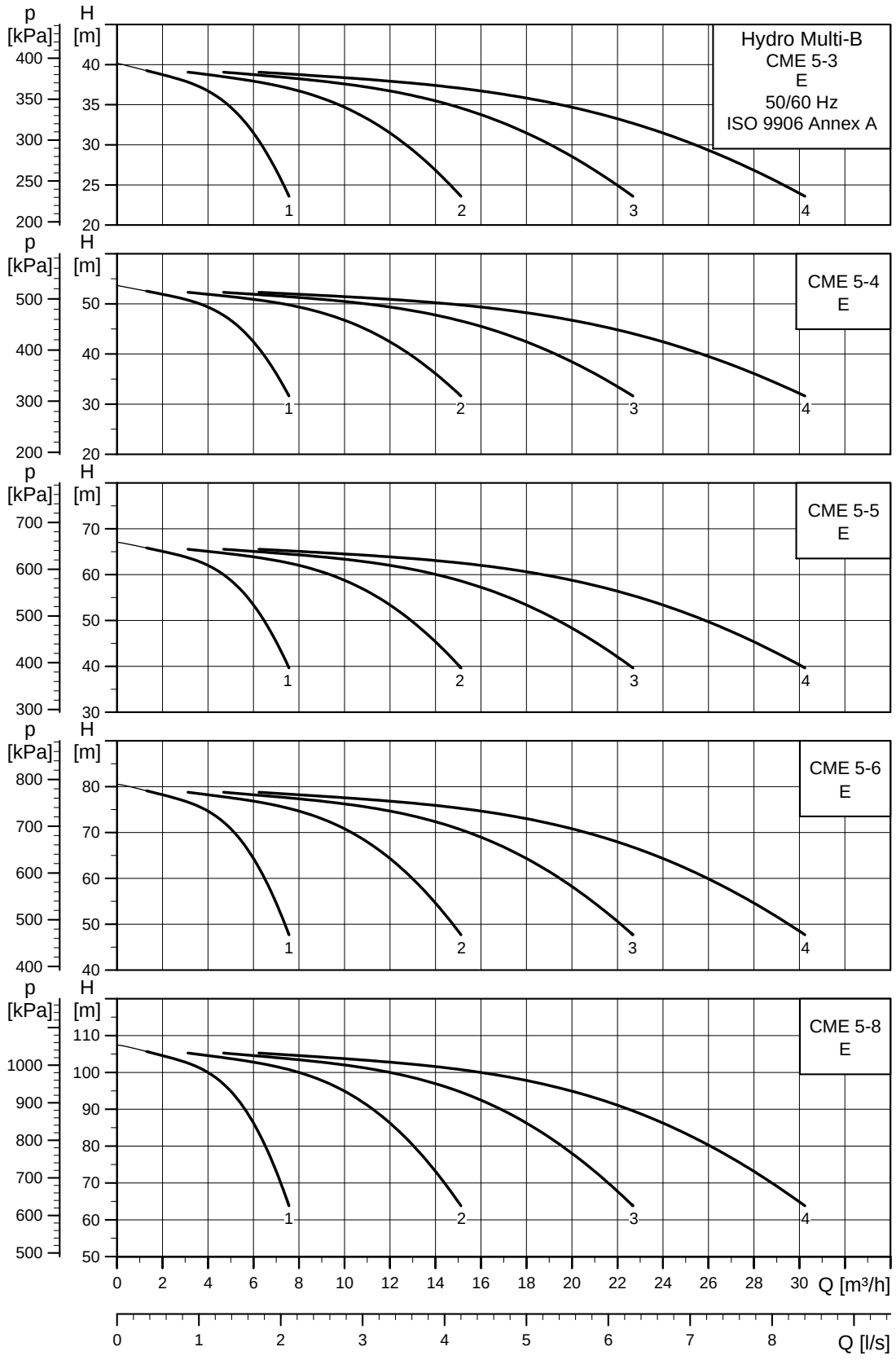


TM05 0618 1911

Hydro Multi-B E with CME 3

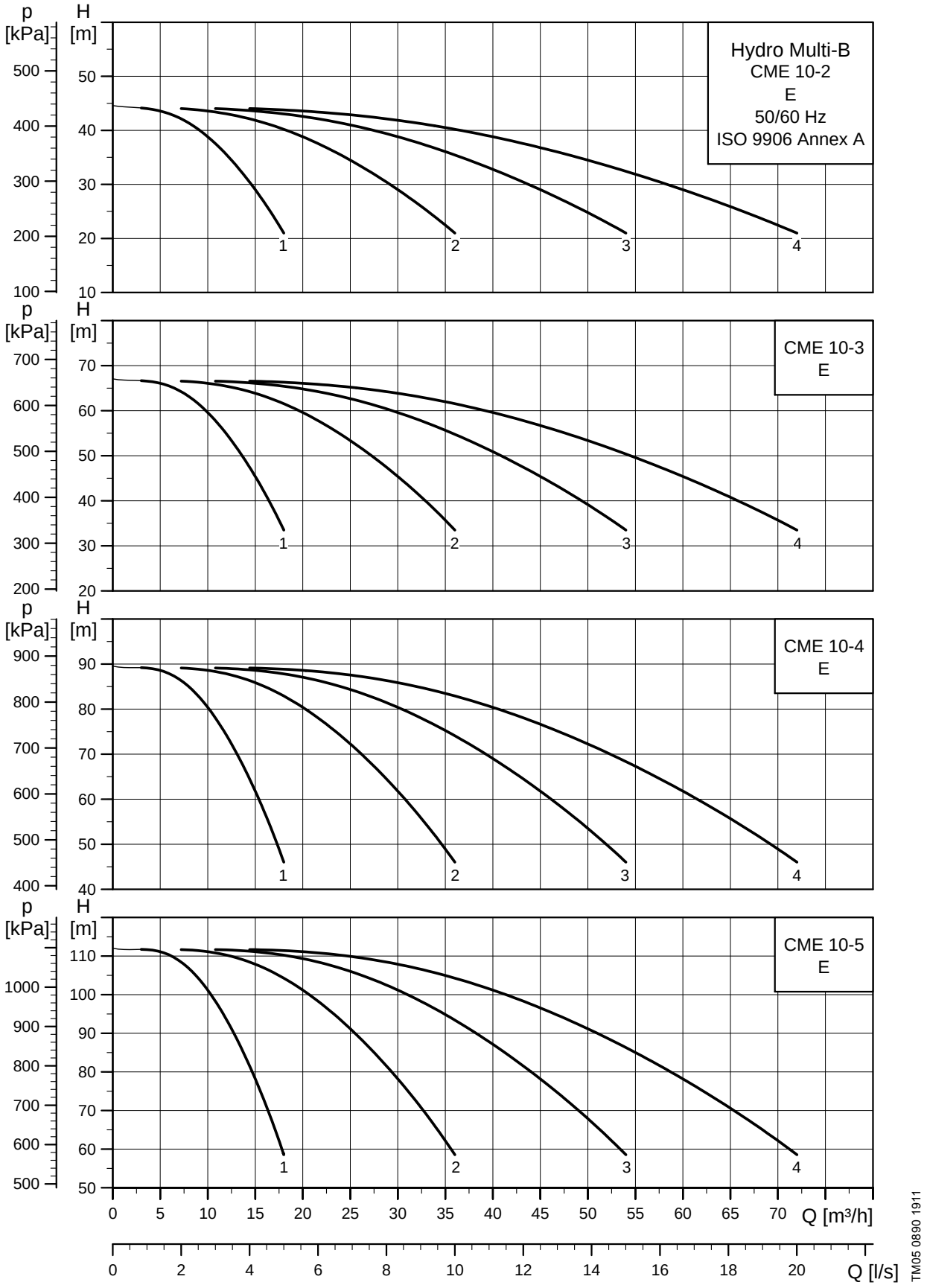


Hydro Multi-B E with CME 5

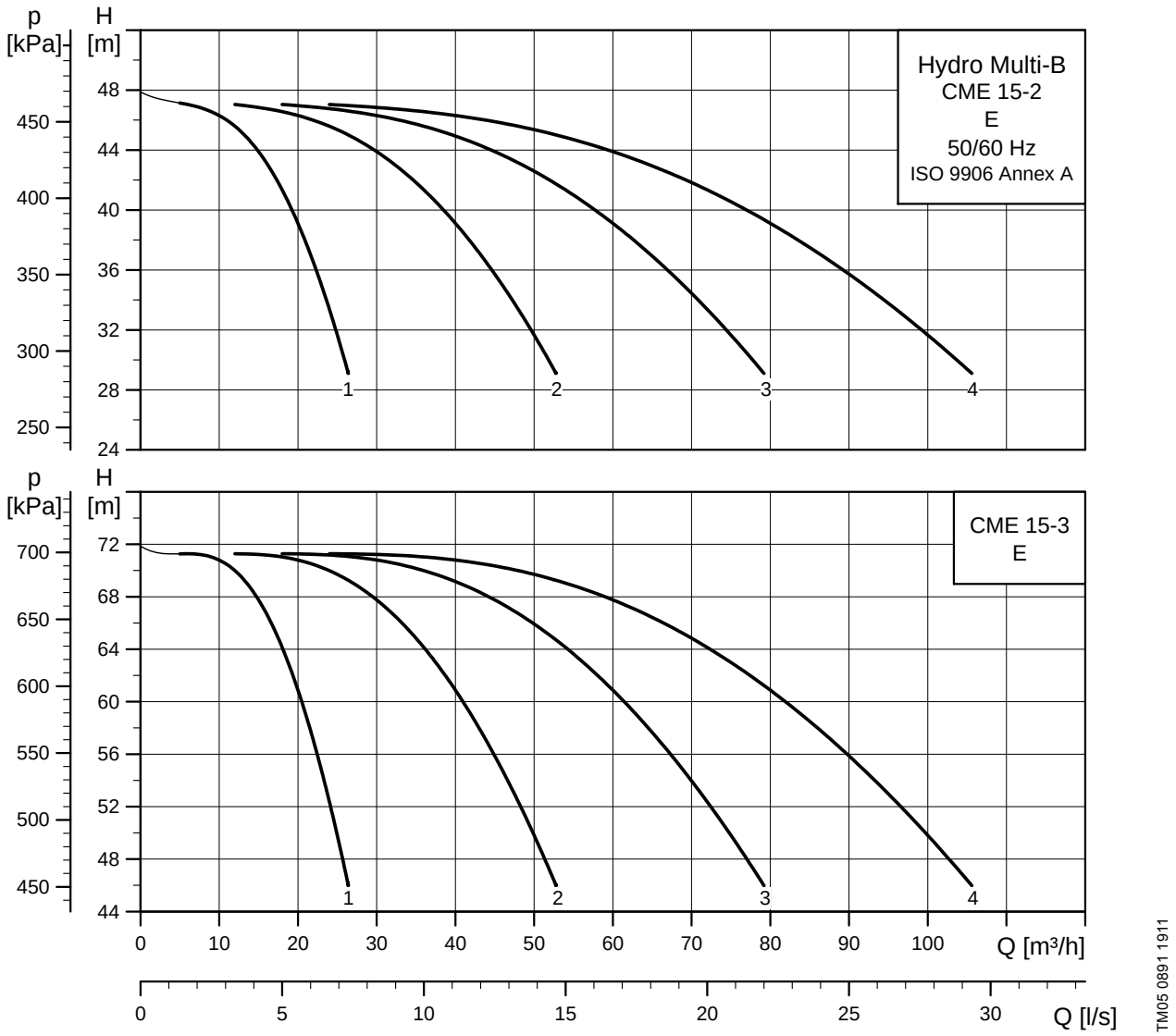


TM05 0889 1911

Hydro Multi-B E with CME 10

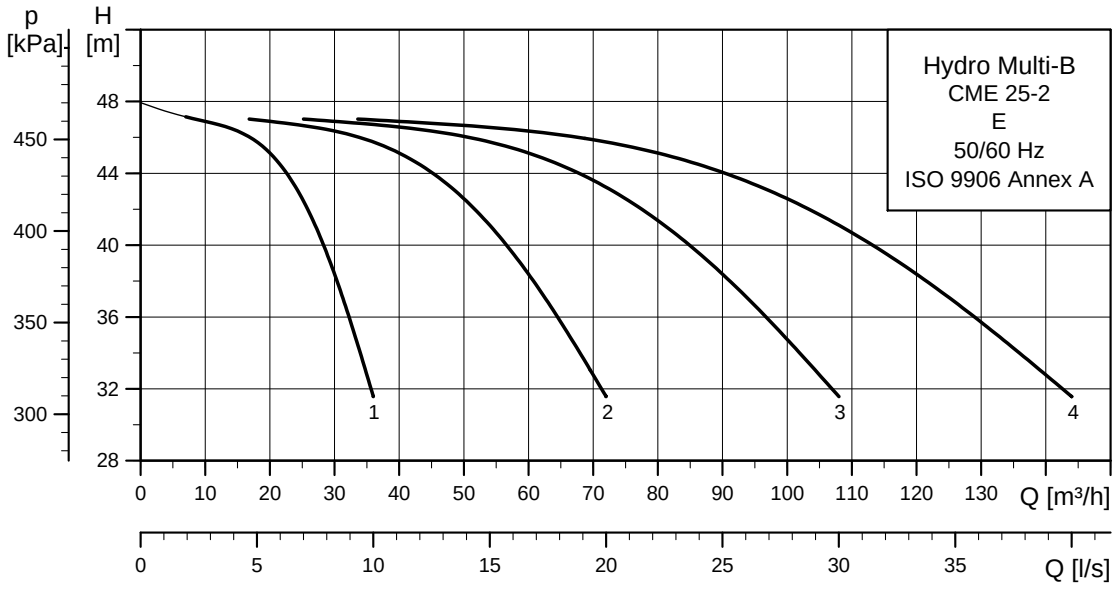


Hydro Multi-B E with CME 15



TM05 0891 1911

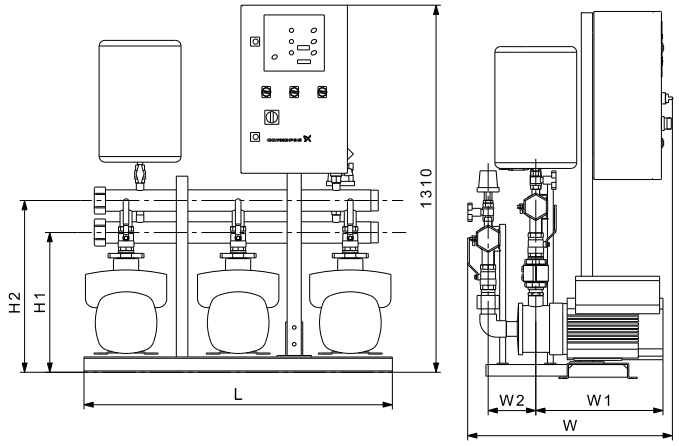
Hydro Multi-B E with CME 25



TM05 0892 1911

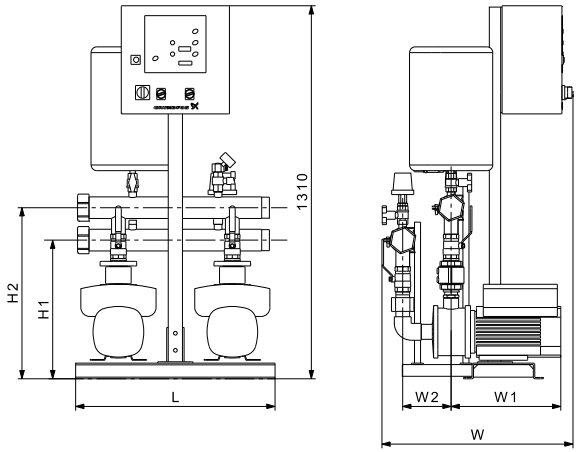
9. Technical data

Dimensional sketches



TM05 0552 1311

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



TM05 0551 1311

Fig. 14 Hydro Multi-B booster system with two CM(E) pumps

Electrical data, dimensions and weights

Hydro Multi-B ES with CM(E) 3/5, 50 Hz

Number of pumps	Pump type	Voltage [V]	Motor [kW]	Max. I_N / I_0 [A]	Connection	L [mm]	W [mm]	W1 [mm]	W2 [mm]	H1 [mm]	H2 [mm]	Tank [l]	Weight [kg]
2	CM(E) 3-4	U2	0.55	4.9	R 2	700	653	234	183	405	489	8	92
	CM(E) 3-5	U1	0.55	5.02 / 3.7	R 2	700	629	234	194	409	499	8	94
	CM(E) 3-7	U2	1.1	9.2	R 2	700	701	274	231	409	499	8	107
	CM(E) 3-8	U1	1.1	8.92 / 7.1	R 2	700	737	274	267	409	499	8	114
	CM(E) 3-9	U2	1.1	10.2	R 2	700	737	294	267	409	499	8	114
	CM(E) 3-11	U2	1.5	6.8	R 2	700	784	323	303	424	514	8	123
	CM(E) 3-13	U2	1.5	6.8	R 2	700	838	323	357	424	514	8	124
3	CM(E) 3-4	U2	0.55	6.1	R 2	1100	618	234	183	405	499	8	130
	CM(E) 3-5	U1	0.55	6.07 / 3.4	R 2	1100	630	234	195	409	499	8	134
	CM(E) 3-7	U2	1.1	11.3	R 2	1100	666	274	231	409	499	8	149
	CM(E) 3-8	U1	1.1	10.43 / 7.1	R 2	1100	702	274	267	409	499	8	159
	CM(E) 3-9	U2	1.1	13.3	R 2	1100	702	294	267	409	499	8	157
	CM(E) 3-11	U2	1.5	10.3	R 2	1100	767	323	303	424	514	8	175
	CM(E) 3-13	U2	1.5	10.3	R 2	1100	821	323	357	424	514	8	177
4	CM(E) 3-4	U2	0.55	7.3	R 2	1500	618	234	183	405	499	8	163
	CM(E) 3-5	U1	0.55	6.95 / 7.1	R 2	1500	630	234	195	409	499	8	169
	CM(E) 3-7	U2	1.1	13.4	R 2	1500	666	274	231	409	499	8	185
	CM(E) 3-8	U1	1.1	11.74 / 12.5	R 2	1500	702	274	267	409	499	8	198
	CM(E) 3-9	U2	1.1	16.4	R 2	1500	702	294	267	409	499	8	195
	CM(E) 3-11	U2	1.5	13.8	R 2	1500	767	323	303	424	514	8	220
	CM(E) 3-13	U2	1.5	13.8	R 2	1500	821	323	357	424	514	8	224

Number of pumps	Pump type	Voltage [V]	Motor [kW]	Max. I_N / I_0 [A]	Connection	L [mm]	W [mm]	W1 [mm]	W2 [mm]	H1 [mm]	H2 [mm]	Tank [l]	Weight [kg]
2	CM(E) 5-5	U2	1.1	10.2	R 2	700	640	294	170	416	499	18	116
	CM(E) 5-5	U1	1.1	8.92 / 7.1	R 2	700	640	274	170	416	499	18	117
	CM(E) 5-7	U2	1.5	6.8	R 2	700	688	323	206	431	514	18	122
	CM(E) 5-9	U2	2.2	9.75	R 2	700	724	363	242	431	514	18	133
	CM(E) 5-11	U2	2.2	9.75	R 2	700	760	363	278	431	514	18	134
	CM(E) 5-13	U2	3.0	12.95	R 2	700	824	381	332	441	524	18	140
3	CM(E) 5-5	U2	1.1	6.1	R 2	1100	605	294	170	416	499	18	160
	CM(E) 5-5	U1	1.1	6.07 / 3.4	R 2	1100	605	274	170	416	499	18	162
	CM(E) 5-7	U2	1.5	11.3	R 2	1100	670	323	206	431	514	18	173
	CM(E) 5-9	U2	2.2	10.43 / 7.1	R 2	1100	706	363	242	431	514	18	187
	CM(E) 5-11	U2	2.2	13.3	R 2	1100	742	363	278	431	514	18	189
	CM(E) 5-13	U2	3.0	10.3	R 2	1100	814	381	332	441	524	18	202
4	CM(E) 5-5	U2	1.1	7.3	R 2	1500	605	294	170	416	499	18	198
	CM(E) 5-5	U1	1.1	6.95 / 7.1	R 2	1500	605	274	170	416	499	18	201
	CM(E) 5-7	U2	1.5	13.4	R 2	1500	670	323	206	431	514	18	220
	CM(E) 5-9	U2	2.2	11.74 / 12.5	R 2	1500	706	363	242	431	514	18	236
	CM(E) 5-11	U2	2.2	16.4	R 2	1500	742	363	278	431	514	18	239
	CM(E) 5-13	U2	3.0	13.8	R 2	1500	814	381	332	441	524	18	258

ES system with one CME pump and one to three CM pumps.
Supply voltage U1: 3 x 380-415 V - 10 %/+ 10 %, N, PE.
Supply voltage U2: 3 x 380-415 V - 5 %/+ 5 %, PE.
Maximum current in neutral conductor, Max. I_0 [A], applies to booster systems with single-phase pumps.
Dimensions may vary by ± 10 mm.

Hydro Multi-B ES with CM(E) 10/15/25, 50 Hz

Number of pumps	Pump type	Voltage [V]	Motor [kW]	Max. I_N [A]	Connection	L [mm]	W [mm]	W1 [mm]	W2 [mm]	H1 [mm]	H2 [mm]	Tank [l]	Weight [kg]
2	CM(E) 10-3	U2	2.2	9.75	R 2 1/2	700	667	385	170	487	601	24	168
	CM(E) 10-4	U2	3.0	12.95	R 2 1/2	700	714	402	200	487	601	24	175
	CM(E) 10-6	U2	4.0	16.3	R 2 1/2	700	786	402	260	487	601	24	180
	CM(E) 10-8	U2	5.5	22.8	R 2 1/2	700	846	454	320	499	613	24	196
3	CM(E) 10-3	U2	2.2	14.9	R 2 1/2	1100	657	385	170	479	592	24	229
	CM(E) 10-4	U2	3.0	19.7	R 2 1/2	1100	704	402	200	487	601	24	243
	CM(E) 10-6	U2	4.0	24.5	R 2 1/2	1100	786	402	260	487	601	24	254
	CM(E) 10-8	U2	5.5	34.6	R 2 1/2	1100	846	454	320	499	613	24	287
4	CM(E) 10-3	U2	2.2	20.05	DN 80	1500	724	385	210	495	609	24	298
	CM(E) 10-4	U2	3.0	26.45	DN 80	1500	731	402	200	495	609	24	318
	CM(E) 10-6	U2	4.0	32.7	DN 80	1500	813	402	260	495	609	24	334
	CM(E) 10-8	U2	5.5	46.4	DN 80	1500	873	454	320	507	621	24	383

Number of pumps	Pump type	Voltage [V]	Motor [kW]	Max. I_N [A]	Connection	L [mm]	W [mm]	W1 [mm]	W2 [mm]	H1 [mm]	H2 [mm]	Tank [l]	Weight [kg]
2	CM(E) 15-3	U2	4.0	16.3	DN 80	700	741	454	188	524	744	35	203
	CM(E) 15-4	U2	5.5	22.8	DN 80	700	771	454	218	524	744	35	219
3	CM(E) 15-3	U2	4.0	24.5	DN 100	1100	751	454	188	524	744	35	258
	CM(E) 15-4	U2	5.5	34.6	DN 100	1100	780	454	218	524	744	35	290
4	CM(E) 15-3	U2	4.0	32.7	DN 100	1500	751	454	188	524	744	35	340
	CM(E) 15-4	U2	5.5	46.4	DN 100	1500	780	454	218	524	744	35	387

Number of pumps	Pump type	Voltage [V]	Motor [kW]	Max. I_N [A]	Connection	L [mm]	W [mm]	W1 [mm]	W2 [mm]	H1 [mm]	H2 [mm]	Tank [l]	Weight [kg]
2	CM(E) 25-3	U2	5.5	22.8	DN 80	700	741	454	188	524	744	35	217
	CM(E) 25-4	U2	7.5	30.6	DN 80	700	771	454	218	524	744	35	218
3	CM(E) 25-3	U2	5.5	34.6	DN 100	1100	750	454	188	524	744	35	287
	CM(E) 25-4	U2	7.5	46.2	DN 100	1100	780	454	218	524	744	35	289
4	CM(E) 25-3	U2	5.5	46.4	DN 100	1500	750	454	188	524	744	35	386
	CM(E) 25-4	U2	7.5	61.8	DN 100	1500	780	454	218	524	744	35	389

ES system with one CME pump and one to three CM pumps.
Supply voltage U1: 3 x 380-415 V - 10 %/+ 10 %, N, PE.
Supply voltage U2: 3 x 380-415 V - 5 %/+ 5 %, PE.
Dimensions may vary by ± 10 mm.
35-litre diaphragm tank will be delivered separately with the system.

Hydro Multi-B E with CME 3/5

Number of pumps	Pump type	Voltage [V]	Motor [kW]	Max. I_N / I_0 [A]	Connection	L [mm]	W [mm]	W1 [mm]	W2 [mm]	H1 [mm]	H2 [mm]	Tank [l]	Weight [kg]
2	CME 3-3	U1	1.1	10.0 / 7.1	R 2	700	660	274	165	405	499	8	97
	CME 3-5	U1	1.1	10.0 / 7.1	R 2	700	664	274	194	409	499	8	98
	CME 3-7	U2	1.5	6.6	R 2	700	716	323	231	424	514	8	124
	CME 3-9	U2	2.2	9.2	R 2	700	752	363	267	424	514	8	133
3	CME 3-3	U1	1.1	12.3 / 7.1	R 2	1100	611	274	165	405	489	8	140
	CME 3-5	U1	1.1	12.3 / 7.1	R 2	1100	633	274	195	409	499	8	142
	CME 3-7	U2	1.5	9.9	R 2	1100	695	323	231	424	514	8	181
	CME 3-9	U2	2.2	13.8	R 2	1100	731	363	267	424	514	8	195
4	CME 3-3	U1	1.1	14.2 / 14.2	R 2	1500	611	274	165	405	489	8	172
	CME 3-5	U1	1.1	14.2 / 14.2	R 2	1500	630	274	195	409	499	8	174
	CME 3-7	U2	1.5	13.2	R 2	1500	695	323	231	424	514	8	226
	CME 3-9	U2	2.2	18.4	R 2	1500	731	363	267	424	514	8	245

Number of pumps	Pump type	Voltage [V]	Motor [kW]	Max. I_N / I_0 [A]	Connection	L [mm]	W [mm]	W1 [mm]	W2 [mm]	H1 [mm]	H2 [mm]	Tank [l]	Weight [kg]
2	CME 5-3	U1	1.1	10.0 / 7.1	R 2	700	617	274	143	413	499	18	103
	CME 5-4	U2	1.5	6.6	R 2	700	638	323	152	431	514	18	127
	CME 5-5	U2	2.2	9.2	R 2	700	649	363	170	431	514	18	136
	CME 5-6	U2	2.2	9.2	R 2	700	692	363	206	431	514	18	138
	CME 5-8	U2	3.0	12.4	R 2	700	724	381	242	441	524	18	145
3	CME 5-3	U1	1.1	12.3 / 7.1	R 2	1100	581	274	143	413	489	18	148
	CME 5-4	U2	1.5	9.9	R 2	1100	616	363	152	431	514	18	185
	CME 5-6	U2	2.2	13.8	R 2	1100	670	363	206	431	514	18	201
	CME 5-8	U2	3.0	18.6	R 2	1100	724	381	242	441	524	18	212
4	CME 5-3	U1	1.1	14.2 / 14.2	R 2	1500	581	274	143	413	499	18	181
	CME 5-4	U2	1.5	13.2	R 2	1500	617	323	152	431	514	18	230
	CME 5-6	U2	2.2	18.4	R 2	1500	670	363	206	431	514	18	251
	CME 5-8	U2	3.0	24.8	R 2	1500	724	381	242	441	524	18	266

E system with two to four CME pumps.
Supply voltage U1: 3 x 380-415 V - 10 %/+ 10 %, N, PE.
Supply voltage U2: 3 x 380-415 V - 5 %/+ 5 %, PE.
Maximum current in neutral conductor, Max. I_0 [A], applies to booster systems with single-phase pumps.
Dimensions may vary by ± 10 mm.

Hydro Multi-B E with CME 10/15/25

Number of pumps	Pump type	Voltage [V]	Motor [kW]	Max. I_N [A]	Connection	L [mm]	W [mm]	W1 [mm]	W2 [mm]	H1 [mm]	H2 [mm]	Tank [l]	Weight [kg]
2	CME 10-2	U2	2.2	9.2	R 2 1/2	700	657	385	170	487	601	24	155
	CME 10-3	U2	5.5	22.0	R 2 1/2	700	695	454	170	499	613	24	197
	CME 10-4	U2	5.5	22.0	R 2 1/2	700	726	454	200	499	613	24	199
	CME 10-5	U2	5.5	22.0	R 2 1/2	700	786	454	260	499	613	24	202
3	CME 10-2	U2	2.2	13.8	R 2 1/2	1100	657	385	170	487	601	24	226
	CME 10-3	U2	5.5	33.0	R 2 1/2	1100	695	454	170	499	613	24	290
	CME 10-4	U2	5.5	33.0	R 2 1/2	1100	726	454	200	499	613	24	292
	CME 10-5	U2	5.5	33.0	R 2 1/2	1100	786	454	260	499	613	24	297
4	CME 10-2	U2	2.2	18.4	DN 80	1500	724	385	210	498	612	24	296
	CME 10-3	U2	5.5	44.0	DN 80	1500	763	454	210	510	624	24	382
	CME 10-4	U2	5.5	44.0	DN 80	1500	754	454	200	510	624	24	385
	CME 10-5	U2	5.5	44.0	DN 80	1500	813	454	260	510	624	24	391

Number of pumps	Pump type	Voltage [V]	Motor [kW]	Max. I_N [A]	Connection	L [mm]	W [mm]	W1 [mm]	W2 [mm]	H1 [mm]	H2 [mm]	Tank [l]	Weight [kg]
2	CME 15-2	U2	5.5	22.0	DN 80	700	741	454	188	524	744	35	219
	CME 15-3	U2	7.5	30.0	DN 80	700	742	454	188	524	744	35	228
3	CME 15-2	U2	5.5	33.0	DN 100	1100	751	454	188	524	744	35	295
	CME 15-3	U2	7.5	45.0	DN 100	1100	752	454	188	524	744	35	309
4	CME 15-2	U2	5.5	44.0	DN 100	1500	722	454	170	510	624	35	391
	CME 15-3	U2	7.5	60.0	DN 100	1500	754	454	200	510	624	35	408

Number of pumps	Pump type	Voltage [V]	Motor [kW]	Max. I_N [A]	Connection	L [mm]	W [mm]	W1 [mm]	W2 [mm]	H1 [mm]	H2 [mm]	Tank [l]	Weight [kg]
2	CME 25-2	U2	7.5	30.0	DN 80	700	740	454	188	524	744	35	228
3	CME 25-2	U2	7.5	45.0	DN 100	1100	752	454	188	524	744	35	309
4	CME 25-2	U2	7.5	60.0	DN 125	1500	778	454	188	540	813	35	419

E system with two to four CME pumps.
Supply voltage U1: 3 x 380-415 V - 10 %/+ 10 %, N, PE.
Supply voltage U2: 3 x 380-415 V - 5 %/+ 5 %, PE.
Dimensions may vary by ± 10 mm.
35-litre diaphragm tank will be delivered separately with the system.

10. Optional equipment

All optional equipment must be specified when ordering the Hydro Multi-B booster system as it must be fitted from factory prior to delivery.

Redundant primary sensor

TM04 4125 0809

Fig. 15 Redundant primary sensor

In order to increase the reliability, a redundant primary sensor can be connected as back-up sensor for the primary sensor.

Note: The redundant primary sensor must be of the same type as the primary sensor.

Description	Range [bar]	Product number
Redundant primary sensor	10	97747435
	16	97747434

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.

Description	Parameter	Product number
Float switch	5 m[1)]	96020142
	10 m[1)]	96819727
Pressure transmitter	0 ~ 4 bar	96020074
	0 ~ 6 bar	96020066
Pressure switch	0 ~ 6 bar	96433641

1) Cable length.

Non-return valve

As standard, non-return valves are fitted on the discharge side of the pumps of the booster system.

In systems with a suction lift, we recommend to install non-return valves on the suction side of the pumps to prevent water shortage.

Description	Product number
Non-return valve on suction side	97896859

Note: If a non-return valve is installed on the suction side, the height (H1) of the suction manifold will differ from the values stated in section *9. Technical data*, pages 38 to 41.

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	RS-485	In the CU 323	96824631
CIM 110	LON		96824789
CIM 200	Modbus		96824796
CIM 250	GSM		96824795
CIM 300	BACnet		96943639

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

Phase failure monitoring

The booster system should be protected against phase failure.

Description	Location	Product number
Phase failure monitoring	In control panel	91767242

Beacon

The beacon illuminates in case of a system alarm.

Description	Location	Product number
Beacon	On top of the control cabinet	91763002
	External[1)]	

1) Cable not included.

Acoustic alarm

The acoustic alarm sounds in case of a system alarm.

Description	Location	Product number
Acoustic alarm	In control cabinet	91763001

External transformer

An external transformer can provide isolated power supply for the CU 323 and relay in both tank-filling and pressure-boosting systems.

Description	Location	Product number
External transformer	In control panel	91073191

High-level lamp

The pilot lamp in the cabinet front illuminates if the pressure or level becomes too high.

Description	Product number
Pilot lamp (red)	91767281

Pilot lamp indicating alarm

A pilot lamp in the cabinet front illuminates in case of a system alarm.

Description	Product number
Pilot lamp (red)	91767281

Pilot lamp indicating operation

A pilot lamp in the cabinet front is on when the system is in operation.

Description	Product number
Pilot lamp (green)	91767280

11. Accessories

All accessories can be retrofitted to the Hydro Multi-B booster system.

Foot valve

TM04 4128 0809

Fig. 16 Foot valves

The booster system must be protected against dry running.

Foot valves are typically used in minor booster systems with a suction lift. For example when the Hydro Multi-B draws water from a break tank placed at a lower geodetic height than the booster system.

Foot valves are designed to ensure optimum suction conditions.

Description	Connection	Product number
Foot valve	Rp 2	956120
	Rp 3	956130
	Rp 4	956449

Float switch

In tank-filling systems, the float switches are installed in the tank to indicate the hydrostatic level of empty or full.

Description	Cable length [m]	Product number
Float switch	5	96020142
	10	96819727

Analog sensor

In tank-filling systems, the analog sensor is installed at the bottom of the tank to monitor the hydrostatic level.

Description	Level [m]	Product number
Analog sensor	1	97949405
	5	97949406

Additional documentation

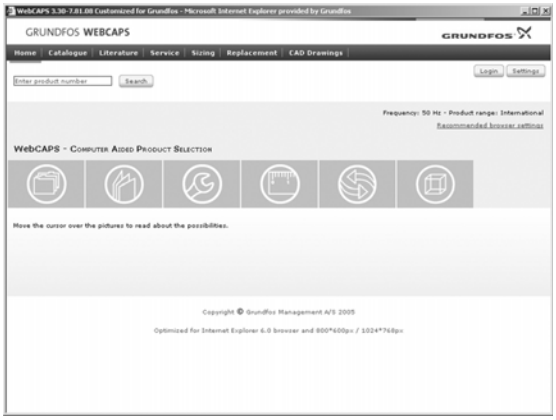
The publication numbers below refer to the printed documentation for Hydro Multi-B (group versions).

Document	Publication number
Installation and operating instructions	97822771
Quick guide	97850363

In addition to the printed documentation, Grundfos offers product information in WebCAPS on www.grundfos.com. See also page 45.

12. Further product documentation

WebCAPS

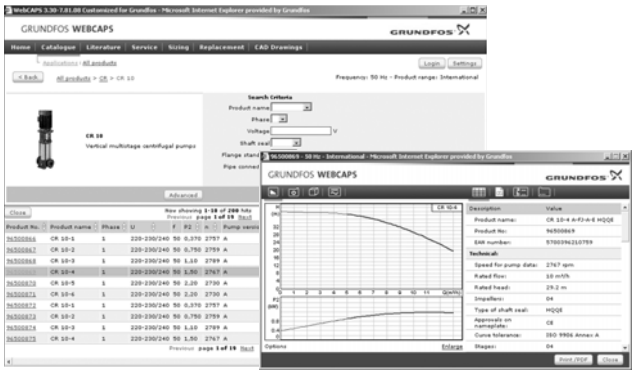


WebCAPS is a **Web**-based **C**omputer **A**ided **P**roduct **S**election program available on www.grundfos.com.

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

Information in WebCAPS is divided into six sections:

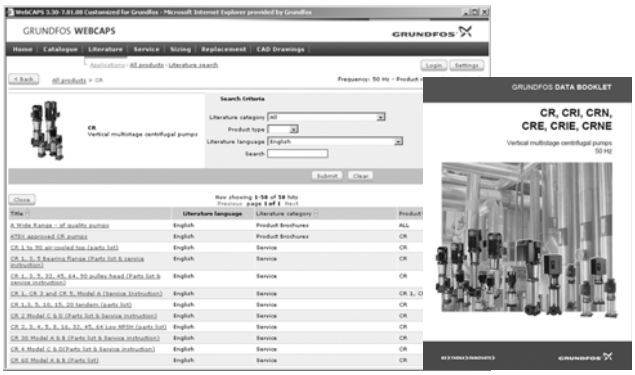
- Catalogue
- Literature
- Service
- Sizing
- Replacement
- CAD drawings.



Catalogue

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

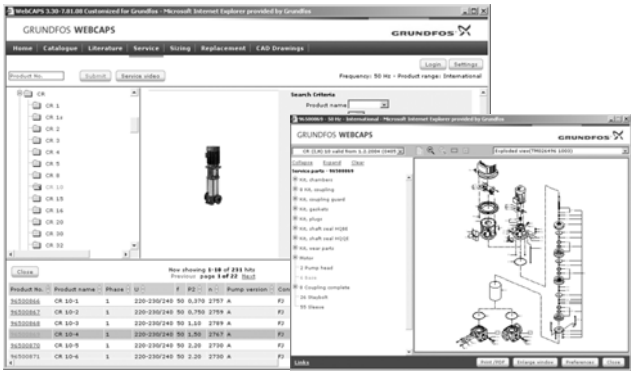
- technical data
- curves (QH, Eta, P1, P2, etc.) which can be adapted to the density and viscosity of the pumped liquid and show the number of pumps in operation
- product photos
- dimensional drawings
- wiring diagrams
- quotation texts, etc.



Literature

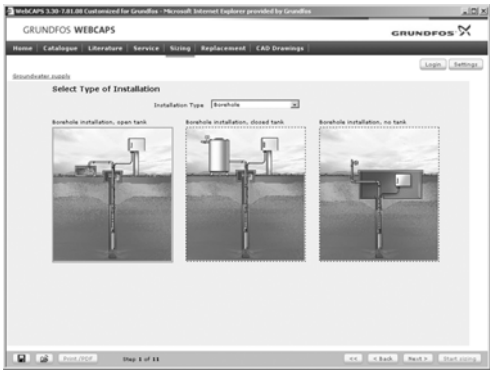
This section contains all the latest documents of a given pump, such as

- 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. 17 WinCAPS CD-ROM

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 CD-ROM and updated once a year.

Subject to alterations.

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