

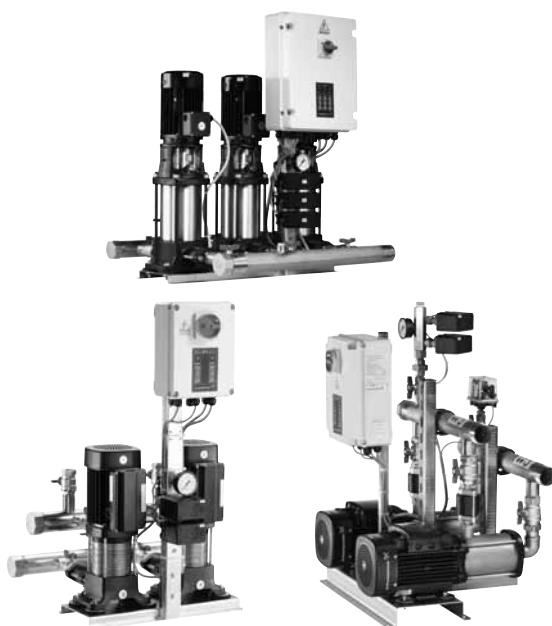
# Hydro Multi-S

Grundfos booster systems with two or three CM, CMV or CR pumps  
50 Hz



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# 1. Product introduction



**Fig. 1** Hydro Multi-S booster systems

Grundfos Hydro Multi-S booster systems are designed for pressure boosting of clean water.

Examples:

- blocks of flats
- hotels
- schools.

Grundfos Hydro Multi-S booster systems consist of two or three identical Grundfos CM, CMV or CR pumps connected in parallel and mounted on a common base frame and a control cabinet with motor-protective circuit breaker and integrated controller.

Hydro Multi-S booster systems are supplied as complete, pre-assembled and tested systems including suction and discharge manifolds, isolating valves, non-return valves, pressure gauge and pressure switches.

To ensure reliable operation, the booster system must be fitted with a suitable diaphragm tank. The size of the diaphragm tank can be found on page 20.

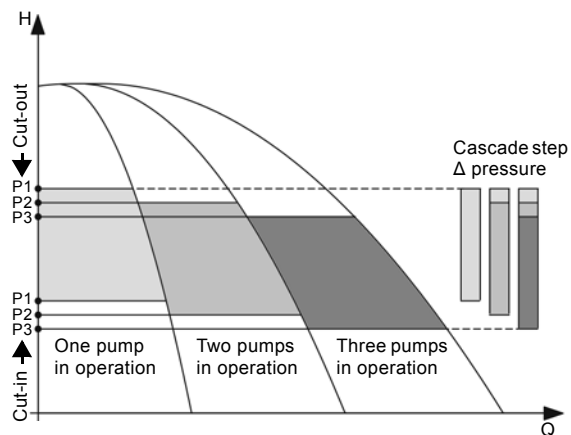
Automatic pump operation is based on system demand and controlled by pressure switches (one for each pump).

## How does Hydro Multi-S work?

When a tap is opened, water will be drawn from the diaphragm tank. The pressure will drop to the first cut-in pressure, and the first pump will cut in.

As the consumption rises, more pumps will cut in until the performance of the pumps in operation corresponds to the demand.

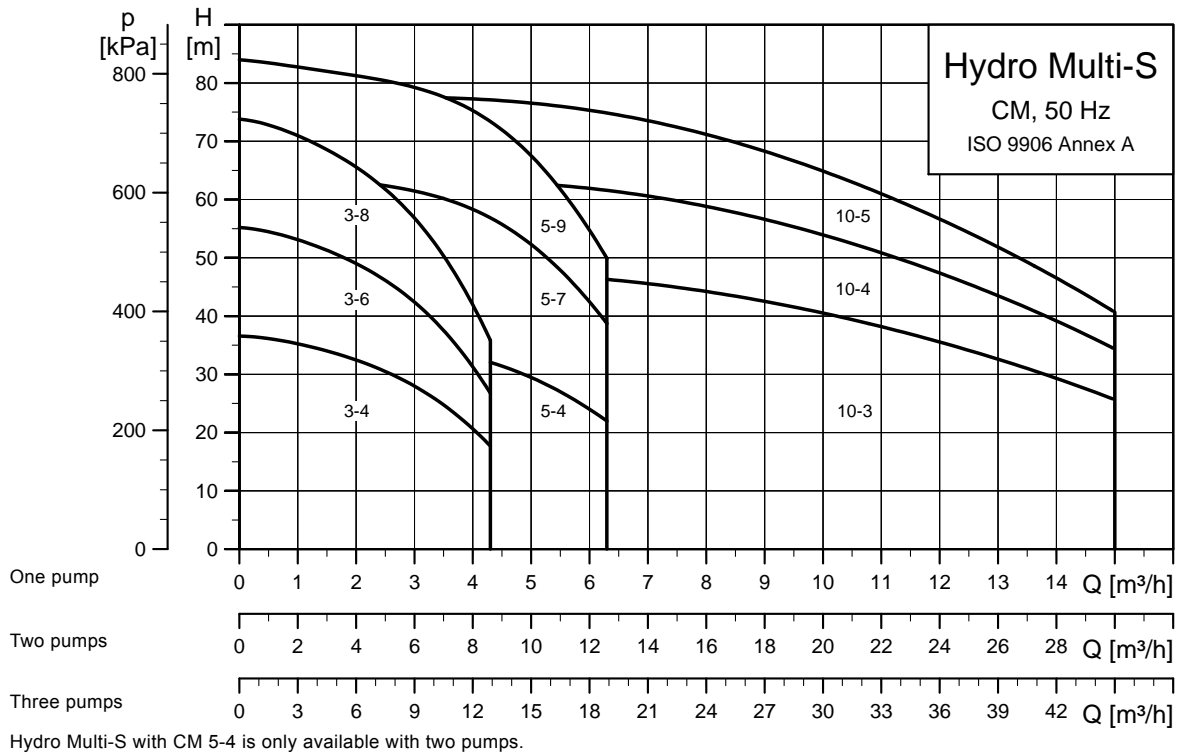
When the water consumption falls, the discharge pressure will rise to the cut-out pressure and the pressure switch will cut out one pump and as the consumption falls, more pumps will be cut out.



**Fig. 2** Operation with cut-in and cut-out

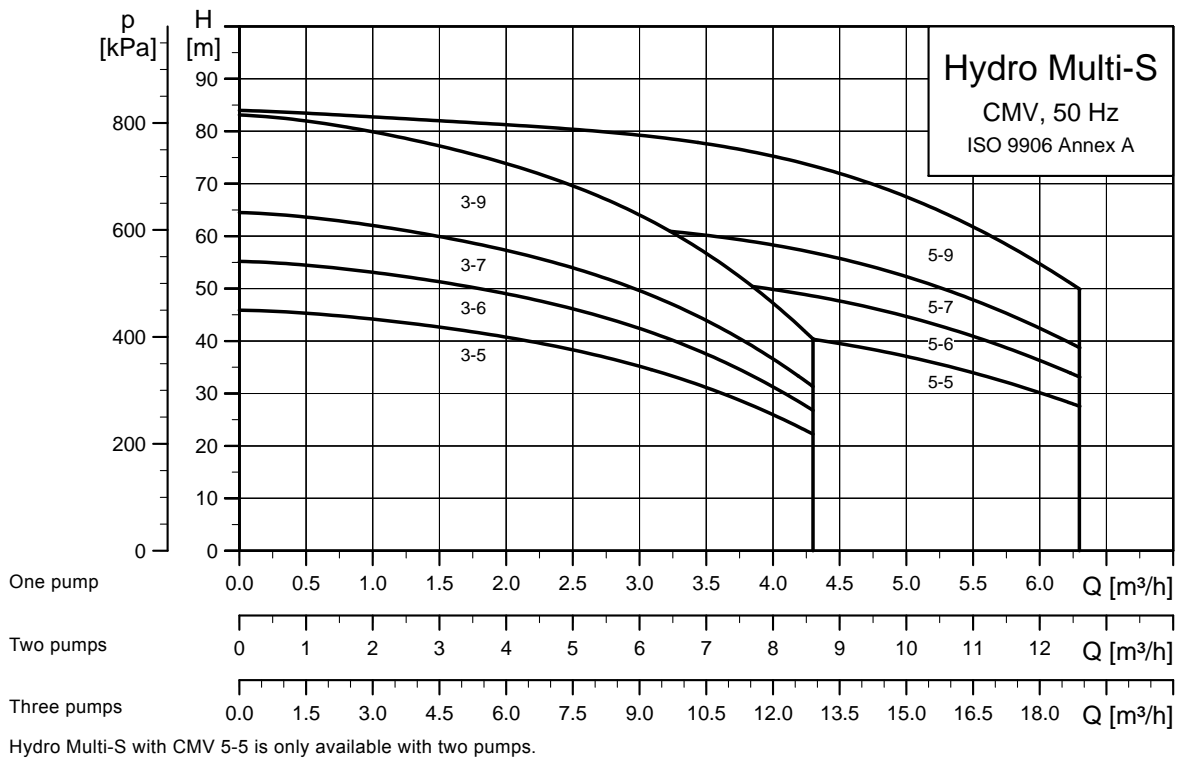
## 2. Performance range

### Hydro Multi-S with CM pumps



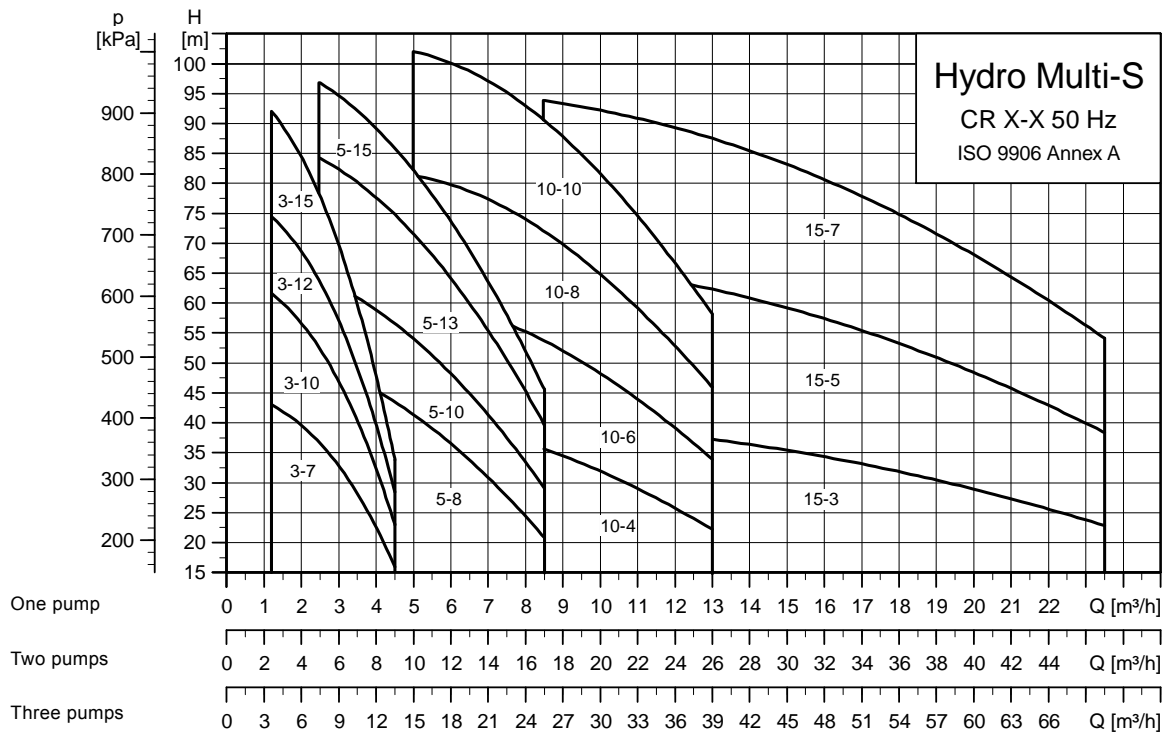
TM05 0548 1211

### Hydro Multi-S with CMV pumps



TM05 0027 1211

Hydro Multi-S with CR pumps



TM03 9805 4407

## 3. Product range

### Hydro Multi-S with CM pumps



GrA9833

Pump type	CM 3			CM 5			CM 10					
	-4	-6	-8	-4	-7	-9	-3	-4	-5			
<b>Hydraulic data</b>												
Maximum head [m]	36.7	55.2	73.8	37	65	84	47.6	63.2	77.8			
Maximum flow rate [m <sup>3</sup> /h]	12.6			18.6			43.5					
Liquid temperature [°C]	5-40			5-40			5-40					
Maximum operating pressure [bar]	10			10			10					
Maximum inlet pressure [bar]	The inlet pressure plus the pressure when the pumps are operating against a closed valve should always be lower than the maximum operating pressure.											
<b>Motor data</b>												
Number of pumps	2 or 3			2	2 or 3		2 or 3					
Motor power [kW]	Single-phase motor			0.5	0.67	0.9	0.67	1.3	1.9	1.9	-	-
	Three-phase motor			0.46	0.65	1.2	0.87	1.58	2.2	2.2	3.2	3.2
Supply voltage	3 x 380-415 V, PE, 50 Hz			•	•	•	•	•	•	•	-	-
	1 x 220-240 V, N, PE, 50 Hz			•	•	•	•	•	•	•	•	•
<b>Shaft seal</b>												
AQQE	•	•	•	•	•	•	•	•	•	•	•	
<b>Materials</b>												
Stainless-steel manifolds, stainless-steel base frame, standard valves												
	•	•	•	•	•	•	•	•	•	•	-	
Galvanized-steel manifolds, galvanized-steel base frame, standard valves (CME-A pumps only)												
	•	•	•	•	•	•	•	•	•	•	-	
Galvanized-steel manifolds, galvanized-steel base frame painted black, standard valves												
	A	A	A	A	A	A	A	A	A	A	A	
<b>Pipework connections</b>												
Rp 2	•	•	•	-	-	-	-	-	-	-	-	
Rp 2 1/2	-	-	-	•	•	•	•	•	•	•	•	
Rp 3	-	-	-	-	-	-	•	•	•	•	•	
<b>Functions</b>												
Automatic cascade control	•	•	•	•	•	•	•	•	•	•	•	
Automatic pump changeover	•	•	•	•	•	•	•	•	•	•	•	
Dry-running protection	•	•	•	•	•	•	•	•	•	•	•	
Emergency operation	•	•	•	•	•	•	•	•	•	•	•	
Automatic resetting of dry-running fault	•	•	•	•	•	•	•	•	•	•	•	
Startup delay between pumps	•	•	•	•	•	•	•	•	•	•	•	
Motor protection by means of a thermal overload relay	•	•	•	•	•	•	•	•	•	•	•	
Short-circuit protection by means of fuses	•	•	•	•	•	•	•	•	•	•	•	

• Available as standard.

A Only available in the ASEAN countries.

## Hydro Multi-S with CMV pumps



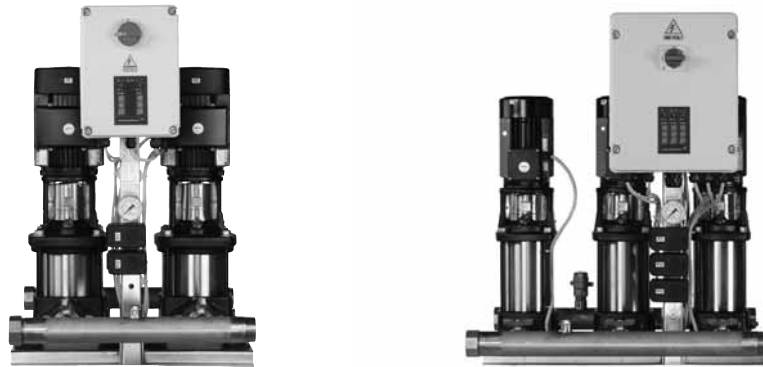
GrB2186 - GrB2184

Pump type	CMV 3				CMV 5				
	-5	-6	-7	-9	-5	-6	-7	-9	
<b>Hydraulic data</b>									
Maximum head [m]	43	52.8	62.4	81	45	55	64	84	
Maximum flow rate [m <sup>3</sup> /h]	12.6				18.6				
Liquid temperature [°C]	5-40				5-40				
Maximum operating pressure [bar]	10				10				
Maximum inlet pressure [bar]	The inlet pressure plus the pressure when the pumps are operating against a closed valve should always be lower than the maximum operating pressure.								
<b>Motor data</b>									
Number of pumps	2 or 3				2	2 or 3			
Motor power [kW]	Single-phase motor	0.5	0.67	0.9	-	0.9	1.3	1.3	1.9
	Three-phase motor	0.62	0.65	0.84	1.2	1.2	1.2	1.58	2.2
Supply voltage	3 x 380-415 V, PE, 50 Hz	•	•	•	-	•	•	•	•
	1 x 220-240 V, N, PE, 50 Hz	•	•	•	•	•	•	•	•
<b>Shaft seal</b>									
AQQE	•	•	•	•	•	•	•	•	
<b>Materials</b>									
Galvanized-steel manifolds, galvanized-steel base frame, standard valves	•	•	•	•	•	•	•	•	
Galvanized-steel manifolds, galvanized-steel base frame painted black, standard valves	A	A	A	A	A	A	A	A	
<b>Pipework connections</b>									
Rp 2	•	•	•	•	•	•	•	•	
Rp 2 1/2	-	-	-	-	-	-	-	-	
Rp 3	-	-	-	-	-	-	-	-	
<b>Functions</b>									
Automatic cascade control	•	•	•	•	•	•	•	•	
Automatic pump changeover	•	•	•	•	•	•	•	•	
Dry-running protection	-	-	-	-	-	-	-	-	
Emergency operation	•	•	•	•	•	•	•	•	
Automatic resetting of dry-running fault	•	•	•	•	•	•	•	•	
Startup delay between pumps	•	•	•	•	•	•	•	•	
Motor protection by means of a thermal overload relay	•	•	•	•	•	•	•	•	
Short-circuit protection by means of fuses	•	•	•	•	•	•	•	•	

• Available as standard.

A Only available in the ASEAN countries.

## Hydro Multi-S with CR pumps



GrA5737 - GrA5736

Pump type	CR 3				CR 5				CR 10				CR 15		
	-7	-10	-12	-15	-8	-10	-13	-15	-4	-6	-8	-10	-3	-5	-7
<b>Hydraulic data</b>															
Maximum head [m]	46	66	79	98	54	68	88	102	40	61	82	103	42	70	98
Maximum flow rate [m <sup>3</sup> /h]	13.5				25.5				39				69		
Liquid temperature [°C]	5-50				5-50				5-50				5-50		
Maximum operating pressure [bar]	10	10	16	16	10	10	16	16	10	10	16	16	10	10	16
Maximum inlet pressure [bar]	5.3	3.3	8.0	6.1	4.5	3.1	7.1	5.7	5.9	3.8	7.7	5.6	5.7	2.9	6.1
<b>Motor data</b>															
Number of pumps	2 or 3				2 or 3				2 or 3				2 or 3		
Motor power [kW]	0.55	0.75	1.10	1.10	1.1	1.5	2.2	2.2	1.5	2.2	3.0	4.0	3.0	4.0	5.5
Supply voltage	3 x 380-415 V, PE, 50 Hz				•				•				•		
	1 x 220-240 V, N, PE, 50 Hz				•				•				•		
<b>Shaft seal</b>															
HQQE	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
<b>Materials</b>															
Stainless-steel manifolds, stainless-steel base frame, standard valves	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Galvanized-steel manifolds, galvanized-steel base frame painted black, standard valves	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
<b>Pipework connections</b>															
Rp 2	•	•	•	•	•	•	•	•	•	•	•	•	-	-	-
Rp 2 1/2	-	-	-	-	-	-	-	-	•	•	•	•	-	-	-
Rp 3	-	-	-	-	-	-	-	-	-	-	-	-	•	•	•
<b>Functions</b>															
Automatic cascade control	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Automatic pump changeover	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Dry-running protection	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Emergency operation	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Automatic resetting of dry-running fault	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Startup delay between pumps	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Motor protection by means of a thermal overload relay	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Short-circuit protection by means of fuses	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•

• Available as standard.

A Only available in the ASEAN countries.



## 4. Identification

### Type key

Example	Hydro Multi	-S	2	CR 15-3	U3	A-	B-	A
<b>System name</b>								
<b>System type</b> S: Fixed-speed pumps								
<b>Number of pumps</b>								
<b>Pump type</b>								
<b>Supply voltage code</b> U3: 3 x 380-415 V, N, PE, 50 Hz U4: 3 x 380-415 V, PE, 50 Hz U5: 3 x 380-415 V, N, PE, 60 Hz U6: 3 x 380-415 V, PE, 60 Hz U9: 3 x 220-240 V, PE, 60 Hz UA: 3 x 440-480 V, PE, 60 Hz UC: 1 x 220-240 V, N, PE, 50 Hz UD: 1 x 220-240 V, N, PE, 60 Hz UE: 1 x 220-240 V, PE, 60 Hz UF: 3 x 208-230/440-480 V, N, PE, 60 Hz UG: 3 x 208-230/440-480 V, PE, 60 Hz								
<b>Design type</b> A: System with the breaker cabinet mounted on the system. B: System with wall-mounted breaker cabinet and 5 m wires.								
<b>Starting method</b> B: Direct on line (DOL) C: Star-delta (SD)								
<b>Material code</b> A: Stainless-steel manifolds, stainless-steel base frame, standard valves B: Stainless-steel manifolds, stainless-steel base frame, stainless-steel valves C: Galvanized-steel manifolds, galvanized-steel base frame, standard valves (CME-A pumps only) G: Galvanized-steel manifolds, galvanized-steel base frame, standard valves H: Galvanized-steel manifolds, galvanized-steel base frame painted black, standard valves I: Stainless-steel manifolds, stainless-steel base frame painted black, standard valves P: Stainless-steel manifolds, galvanized-steel base frame, standard valves								

## 5. Operating conditions

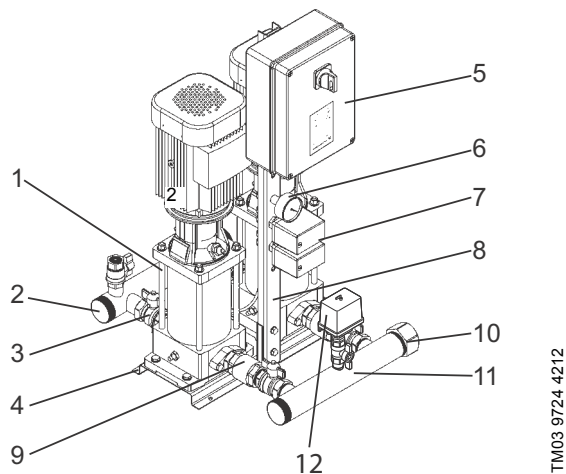
Data	Pump type	
	CM and CMV	CR
Maximum flow rate	Up to 45 m <sup>3</sup> /h	Up to 69 m <sup>3</sup> /h
Maximum operating pressure	10 bar	10/16 bar
Liquid temperature	5-40 °C	5-50 °C
Ambient temperature	5-60 °C	5-40 °C <sup>1)</sup> 5-60 °C <sup>2)</sup>
Power	Up to 3.2 kW	Up to 5.5 kW
Starting method	Direct on line Star-delta	
Supply voltage	3 x 380-415 V, PE, 50 Hz 1 x 220-240 V, N, PE, 50 Hz	
Voltage tolerance	- 10 %/+ 10 %	
Relative air humidity	Max. 95 %	
Enclosure class	IP54	

1) Applies to motor sizes of 0.37 kW and up to and including 0.75 kW.

2) Applies to motor sizes of 1.1 kW and up to and including 5.5 kW.

## 6. Construction

Hydro Multi-S booster systems consist of two or three identical CM, CMV or CR pumps connected in parallel and mounted on a common base frame provided with a control cabinet and all the necessary fittings.



TM03 9724 4212

**Fig. 3** Hydro Multi-S with CR 5 pumps

Pos.	Components	Number
1	Pump	2 or 3
2	Discharge manifold	1
3	Isolating valve	2 per pump
4	Base frame	1
5	Control cabinet	1
6	Pressure gauge	1
7	Pressure switch	1 per pump
8	Stand	1
9	Non-return valve <sup>1)</sup>	1 per pump
10	Screw cap	2
11	Suction manifold	1
12	Pressure switch <sup>2)</sup>	1

<sup>1)</sup> Non-return valve installed on the suction side of Hydro Multi-S CMV.

<sup>2)</sup> Optional on Hydro Multi-S CMV.

## CM, CMV pumps

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

The CM pump is horizontally mounted and the CMV pump is vertically mounted.

All pumps incorporate a maintenance-free mechanical O-ring shaft seal with fixed driver.

### Materials

The CM and CMV pumps are available in the following material variants:

Variants	Components	Materials
CM-A	Suction and discharge parts	EN-GJL-200
	Pump shaft	EN 1.4301/AISI 304
	Impellers/chambers	EN 1.4301/AISI 304
CM-I	Suction and discharge parts	EN 1.4301/AISI 304
	Pump shaft	EN 1.4301/AISI 304
	Impellers/chambers	EN 1.4301/AISI 304
CMV	Suction and discharge parts	EN-GJL-200
	Pump shaft	EN 1.4301/AISI 304
	Impellers/chambers	EN 1.4301/AISI 304



Fig. 4 CM pumps



Fig. 5 CMV pump

### Shaft seal

The shaft seal for the CM and CMV pumps is of the O-ring type, which makes it very flexible when different types of O-ring and seal face material are needed.

The shaft seal has a fixed seal driver which ensures a reliable rotation of all parts, even under the most extreme operating conditions.

Due to the special design of the shaft seal and the interfaces to the rest of the pump, the dry-running capabilities are significantly better compared to most other similar shaft seals and pump types.

Furthermore, improvements have been made to reduce the risk and effect of seizing up.



Fig. 6 Exploded view of shaft seal

**Note:** The available shaft seals for CM and CMV pumps are very robust and durable, but dry running must always be avoided.

### Motor

CM pumps are fitted with totally enclosed, fan-cooled, 2-pole motors with principal dimensions to EN 50347. Electrical tolerances comply with EN 60034.

### Electrical data

Enclosure class: IP55

Insulation class: F

Supply voltages: 3 x 380-415 V, PE, 50 Hz

1 x 220-240 V, N, PE, 50 Hz

A motor-protective circuit breaker is incorporated in the control cabinet.

Single-phase motors have a built-in thermal relay to IEC 34-11, TP 211 (slow overload and locked rotor).

## CR pump

The Grundfos CR pump is a non-self-priming, vertical, multistage centrifugal pump.

The pump consists of a base and a pump head. The chamber stack and the sleeve are secured between the pump head and the base with staybolts. The base has suction and discharge ports on the same level (in line).



TMI03 9925 4607

Fig. 7 CR pump

## Shaft seal

All pumps have a maintenance-free mechanical HQQE shaft seal of the cartridge type.

## Motor

The CR pump is fitted with a totally enclosed, fan-cooled, 2-pole Grundfos standard motor with principal dimensions to EN standards.

Electrical tolerances comply with EN 60034.

## Electrical data

Enclosure class: IP55

Insulation class: F

Supply voltages: 3 x 380-415 V, PE, 50 Hz

1 x 220-240 V, N, PE, 50 Hz

A motor-protective circuit breaker is incorporated in the control cabinet.

Single-phase motors have a built-in thermal relay to IEC 34-11, TP 211 (slow overload and locked rotor).

Three-phase Grundfos motors of 3 kW and up have a built-in thermistor (PTC) according to DIN 44082 (IEC 34-11: TP 211).

## Materials

Components	Materials	EN	AISI/ASTM
Pump head	Cast iron	EN-JL1030	ASTM 25B
Shaft	Stainless steel	1.4401 <sup>1)</sup> 1.4057 <sup>2)</sup>	AISI 316 AISI 431
Impeller	Stainless steel	1.4301	AISI 304
Chamber	Stainless steel	1.4301	AISI 304
Sleeve	Stainless steel	1.4301	AISI 304
Base	Cast iron	EN-JL1030	ASTM 25B
Neck ring	PTFE		
Rubber parts	EPDM		

<sup>1)</sup> CR 3, 5.

<sup>2)</sup> CR 10, 15.

## 7. Functions

### Description of functions

Hydro Multi-S offers the following features:

- Automatic cascade control of pumps by means of two or three pressure switches.
- Automatic pump changeover at any start/stop cycle.
- If a pump is in fault status, it is automatically taken out of operation.
- Automatic resetting of dry-running fault.
- Manual resetting of overload trip.
- Possibility of emergency operation.
- Pump and system protection:
  - Short-circuit protection by means of fuses.
  - Motor protection by means of a thermal overload relay.
  - Dry-running protection by means of a pressure switch or level switch (optional on Hydro Multi-S CMV).
  - Startup delay between two pumps:  
Prevents simultaneous startup of pumps.

## 8. Mechanical installation

### Installation

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

Place the booster system in such a way that there is sufficient clearance around it for the operator to be able to work freely.

Enclosure class: IP54.

### Motor cooling

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

- Place Hydro Multi-S in a well-ventilated room.
- Motor cooling fins, holes in fan cover and fan blades must be kept clean.

### Maximum ambient temperature

#### Hydro Multi-S with CM and CMV pumps

All motor sizes: Max. 60 °C.

#### Hydro Multi-S with CR pumps

0.37 to 0.75 kW: Max. 40 °C.

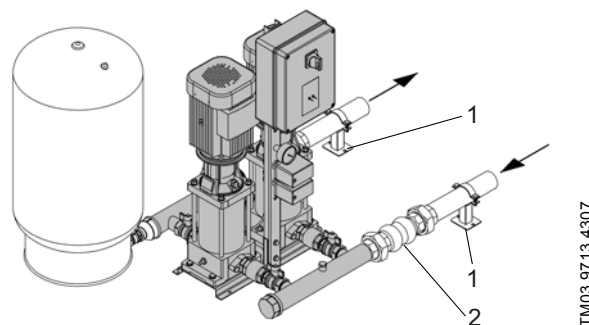
1.1 to 5.5 kW: Max. 60 °C.

### Pipework

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

The booster system should be tightened up prior to startup.

We recommend that you fit pipe supports both on the suction and the discharge side.



**Fig. 8** Example of installation with expansion joints and pipe supports (Grundfos standard scope of supply in grey colour)

Pos.	Description
1	Pipe support
2	Expansion joint

### Foundation

Position the booster system on an even and solid surface.

Hydro Multi-S systems with CM pumps must always be bolted to the floor.

Hydro Multi-S systems with CMV or CR pumps must either be bolted to the floor or fitted with machine shoes.

## 9. Sizing

### General

When sizing a booster system, it is important to ensure the following:

- The performance of the booster system must be able to meet the maximum duty demand, both in flow rate and pressure.
- The booster system should not be oversized as this will affect installation and operating costs.
- The size and number of pumps must be appropriate related to their performance. This also applies to the standby pump, if any.
- The number and size of the diaphragm tanks must be adequate.
- Dry-running protection must be installed.

### Pump size

The booster system should be capable of meeting the maximum duty demand. But as this will occur for a comparatively short part of the day only, it is important to select a type of pump which can meet the varying demand throughout the duty period.

We do not recommend to select a pump type with a performance lower than the lowest possible consumption, nor to select a pump type with a performance higher than the highest possible consumption.

### Number of pumps

In most applications, constant water supply is a major factor. Often it is not acceptable if the system does not maintain its maximum flow rate even during pump maintenance or repairs. In order to prevent any disruption of the supply in such a situation, the system is sized with a standby pump, i.e. Hydro Multi-S with two or three pumps in installations where the demand can be met just by one or two pumps, respectively.

### NPSH

In order to avoid cavitation, in the case of operation with a suction lift, long or winding suction line, always check the NPSH value of the pump at the highest duty flow rate (see the pump performance curve in the specific technical literature).



**Maximum flow requirement**

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

Consumer	Unit	$Q_{\text{year}}$	Consumption period	$Q_{\text{day}}$	fd*	$Q(m)_{\text{day}}$	ft*	Max. flow rate
		$\text{m}^3/\text{year}$	days/year	$\text{m}^3/\text{day}$		$\text{m}^3/\text{day}$		$\text{m}^3/\text{h}$
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

\* fd: Maximum consumption factor per day.  
ft: Maximum consumption factor per hour.

**Example: Hotel with 540 beds**

Number of beds:  $n$   
 Total annual consumption:  $Q_{\text{year}} \times n$   
 Consumption period:  $d$   
 Average consumption per day:  $(Q_{\text{year}} \times n)/d$   
 Maximum consumption per day:  $Q(m)_{\text{day}} = fd \times Q_{\text{day}}$   
 Maximum flow requirement per hour:  $Q_{\text{max}} = \text{max. flow rate/hour} \times \text{number of beds.}$

**Calculation**

$n = 540$  beds  
 $Q_{\text{year}} \times n = 180 \times 540 = 97,200 \text{ m}^3/\text{year}$   
 $d = 365$  days/year  
 $(Q_{\text{year}} \times n)/d = 97,200/365 = 266.3 \text{ m}^3/\text{day}$   
 $Q(m)_{\text{day}} = fd \times Q_{\text{day}} = 1.5 \times 266.3 = 399.4 \text{ m}^3/\text{day}$   
 $Q_{\text{max}} = \text{Max. flow rate/hour} \times \text{number of beds} = 0.125 \times 540 = 67.5 \text{ m}^3/\text{h.}$

### Required discharge pressure

The required discharge pressure,  $p_{\text{set}}$ , of Hydro Multi-S can be calculated with the following equation:

$$p_{\text{set}} = p_{\text{tap}(\text{min})} + p_f + (h_{\text{max}}/10.2)$$

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

### Key

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

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

$p_f$  = Total pipe friction loss [bar].

$h_{\text{max}}$  = Height from booster discharge port to highest tapping point [m].

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

$p_{\text{boost}}$  = Required boost [bar].

### Calculation

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

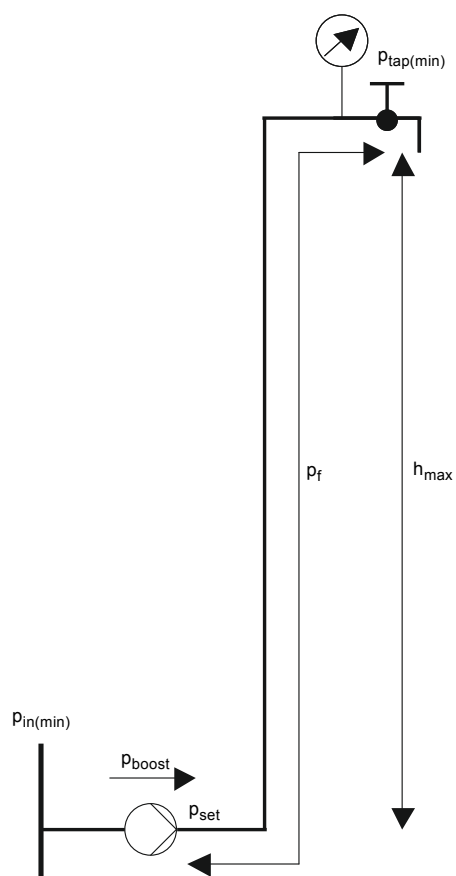
$$p_f = 1.2 \text{ bar}$$

$$h_{\text{max}} = 41.5 \text{ m}$$

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

$$p_{\text{set}} = 2 + 1.2 + (41.5/10.2) = 7.3 \text{ bar}$$

$$p_{\text{boost}} = 7.3 - 2 = 5.3 \text{ bar.}$$



TM04 4105 0709

Fig. 9 Calculation of required discharge pressure

## How to select a Hydro Multi-S

The required flow rate (Q), pressure (H) and number of pumps in the booster system can be provided by the system designer or determined by following the procedure as described on page 16.

The y-axes to the left of the chart give the head in metres and in kPa.

The x-axis has three scales which give the flow (Q) in  $\text{m}^3/\text{h}$ . The top axis indicates the single-pump flow, the middle axis accumulates the two-pump flow and the bottom axis accumulates the three-pump flow.

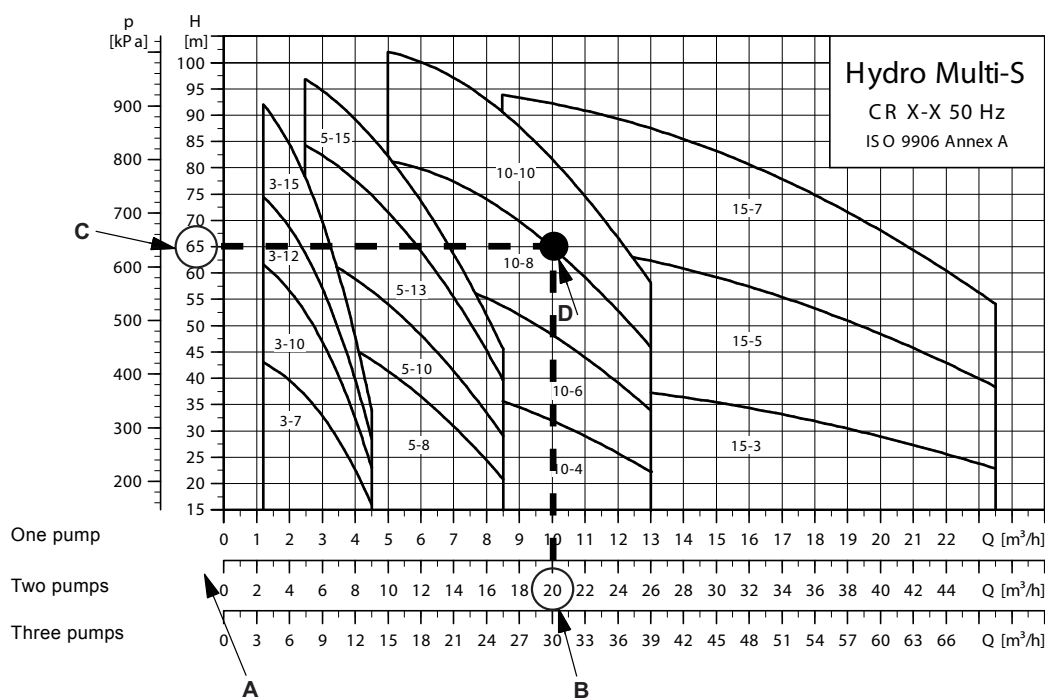


Fig. 10 Hydro Multi-S performance range

### Example

To select the booster system, follow the procedures below and use the performance curves on page 4.

A Two pumps are required in the booster system.

B A flow rate of  $20 \text{ m}^3/\text{h}$  is required.

Draw a vertical line from the required flow starting from the middle scale of the x-axis.

C A head of 65 m is required.

Draw a horizontal line from the required head.

The intersection point of the two lines gives the best pump type meeting the specifications.

D The booster system to be selected is:

Hydro Multi-S 2 CR 10-8.

Choose the Hydro Multi-S with three pumps if a standby pump is required as back-up.

E Complete the sizing by selecting a diaphragm tank and dry-running protection.

See the following section [Diaphragm tank sizing](#) and section [Diaphragm tank](#) on page 25.

TM04 0177 5007

## Diaphragm tank sizing

To ensure reliable automatic operation, the booster system must be fitted with a diaphragm tank. The tank should be connected to the discharge manifold or pipeline to meet the system requirement.

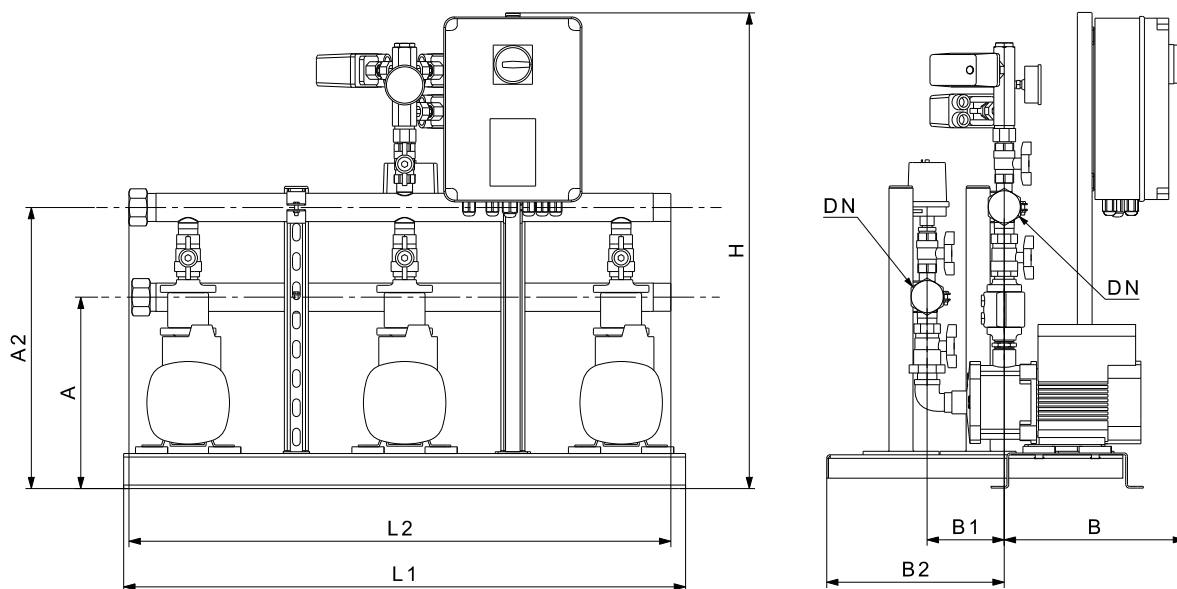
The minimum recommended tank volume is indicated in the table below:

Pump type	Recommended tank size	
	Two-pump system	Three-pump system
	[l]	[l]
CM 3-4	33	60
CM 3-6	33	33
CM 3-8	33	33
CM 5-4	60	
CM 5-7	60	80
CM 5-9	60	60
CM 10-3	130	170
CM 10-4	130	170
CM 10-5	130	130
CMV 3-5	33	33
CMV 3-6	33	33
CMV 3-7	33	33
CMV 3-9	33	33
CMV 5-5	50	
CMV 5-6	50	50
CMV 5-7	50	50
CMV 5-9	50	50
CR 3-7	33	33
CR 3-10	33	33
CR 3-12	33	33
CR 3-15	50	50
CR 5-8	50	50
CR 5-10	60	60
CR 5-13	80	80
CR 5-15	80	80
CR 10-4	100	100
CR 10-6	130	130
CR 10-8	130	130
CR 10-10	130	130
CR 15-3	170	170
CR 15-5	170	170
CR 15-7	200	200
CR 20-3	200	200
CR 20-5	200	200
CR 20-7	200	200

The recommended tank size is calculated on the basis of factory default settings of pressure switches.

## 10. Technical data

### Hydro Multi-S with two or three CM pumps - material code H



TM05 10252111

Fig. 11 Dimensional sketch of a Hydro Multi-S booster system with CM pumps

Pump type	U [V]	P2 [kW]	H [mm]	A [mm]	A2 [mm]	B [mm]	B1 [mm]	B2 [mm]	DN	Hydro Multi-S with two pumps			Hydro Multi-S with three pumps																		
										Dimensions [mm]		I <sub>1/1</sub> [A]	Weight [kg]	Dimensions [mm]		I <sub>1/1</sub> [A]	Weight [kg]														
										L1	L2			L1	L2																
CM 3-4	UC	0.5	815	330	480	310	268	292	1 1/2"	590	550	4.4 - 4.0	63	960	930	5.4 - 4.9	91														
CM 3-4	U4	0.46																3.2 - 3.4	63	7.7 - 7.1	73	5.2 - 6	73	7.7 - 7	96						
CM 3-6	UC	0.67																								304	328	340	364	6.3 - 5.7	68
CM 3-6	U4	0.65																7.7 - 7.1	73	5.2 - 6	73	7.8 - 9	101								
CM 3-8	UC	0.9																						6.3 - 5.7	71						
CM 3-8	U4	1.2	6.2 - 6.8	91	15.6 - 14.2	117	8.1 - 8.8	117	7.8 - 9	101																					
CM 5-4	UC	0.67									865	385	530	310	268	292	2"	590	575	6.3 - 5.7	71	960	945	7.7 - 7	99						
CM 5-4	U4	0.84	11.9 - 11.3	91	6.2 - 6.8	91	15.6 - 14.2	117	8.1 - 8.8	117																4.8 - 5.7	99				
CM 5-7	UC	1.3																										880	400	545	365
CM 5-7	U4	1.58	6.2 - 6.8	91	15.6 - 14.2	117	8.1 - 8.8	117	9.3 - 10.2	124																					
CM 10-3	UC	1.9									960	450	615	385	307	337	2 1/2"	625	615	15.6 - 14.2	117	990	980	19.1 - 17.4	165						
CM 10-3	U4	2.2	8.1 - 8.8	117	13.6 - 12.8	117	13.6 - 12.8	117	12.3 - 13.2	165																					
CM 10-4	U4	3.2																								6.2 - 6.8	91	15.6 - 14.2	117	8.1 - 8.8	117
CM 10-4	U4	3.2	13.6 - 12.8	117	13.6 - 12.8	117	13.6 - 12.8	117	20.4 - 19.2	180																					
CM 10-5	U4	3.2																								6.2 - 6.8	91	15.6 - 14.2	117	8.1 - 8.8	117

H: Galvanized-steel manifolds, galvanized-steel base frame painted black, standard valves

UC: 1 x 220-240 V, N, PE, 50 Hz

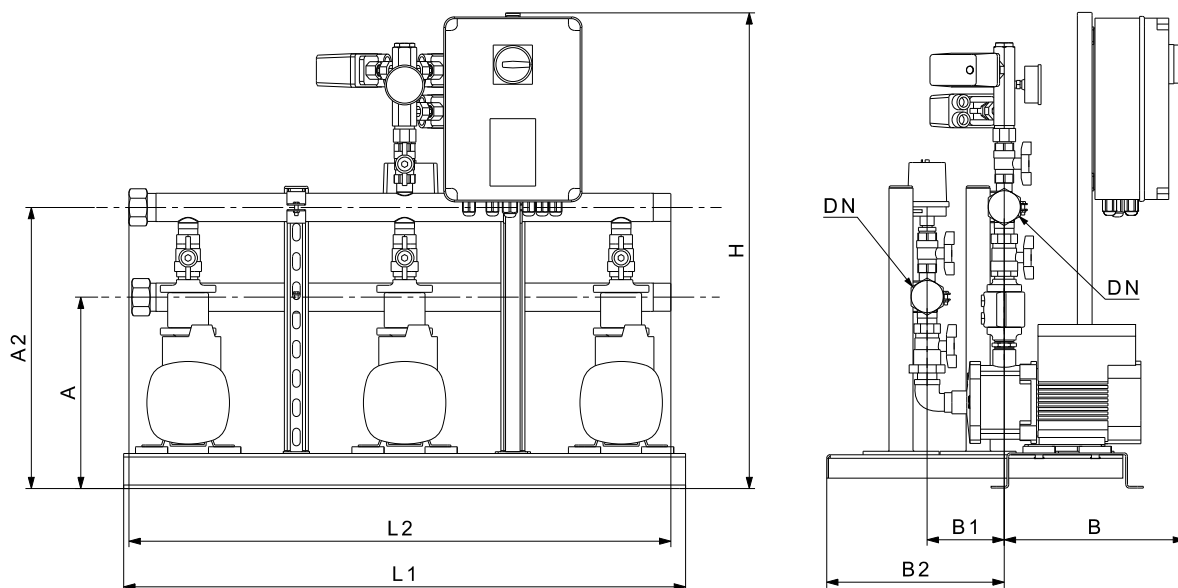
U4: 3 x 380-415 V, PE, 50 Hz

Please note that the dimensions stated may vary by  $\pm 20$  mm.

Due to improvements or modifications of the components, the dimensions may change without any previous notification.

All pump types for Hydro Multi-S with two or three CM pumps, material code H is only available for ASEAN countries.

## Hydro Multi-S with two or three CM pumps



TM05 1025 2111

Fig. 12 Dimensional sketch of a Hydro Multi-S booster system with CM pumps

Pump type	U [V]	P2 [kW]	H [mm]	A [mm]	A2 [mm]	B [mm]	B1 [mm]	B2 [mm]	DN	Hydro Multi-S with two pumps				Hydro Multi-S with three pumps															
										Dimensions [mm]		Weight [kg]		Dimensions [mm]		Weight [kg]													
										L1	L2	I-/I	I-/I	L1	L2	I-/I	I-/I												
CM 3-4	UC	0.5	815	330	480	310	130	305	1 1/2"	590	550	4.4 - 4.0	65	68	960	930	5.4 - 4.9	95	100										
CM 3-4	U4	0.46										2 - 2.4	60	63			3 - 3.6	90	95										
CM 3-6	UC	0.67										6.3 - 5.7	70	73			7.7 - 7	100	105										
CM 3-6	U4	0.65										3.2 - 3.4	65	68			4.8 - 5.4	95	100										
CM 3-8	UC	0.9										7.7 - 7.1	75	78			9.4 - 8.7	105	110										
CM 3-8	U4	1.2										5.2 - 6	75	78			7.8 - 9	105	110										
CM 5-4	UC	0.67	865	385	530	310	135	305	2"	590	575	6.3 - 5.7	70	76	960	945	7.7 - 7	100	108										
CM 5-4	U4	0.84										3.2 - 3.8	70	76			4.8 - 5.7	100	108										
CM 5-7	UC	1.3										11.9 - 11.3	90	96			14.6 - 13.9	125	133										
CM 5-7	U4	1.58										6.2 - 6.8	90	96			9.3 - 10.2	125	133										
CM 5-9	UC	1.9										15.6 - 14.2	95	-			19.1 - 17.4	130	150										
CM 5-9	U4	2.2										8.1 - 8.8	95	-			12.3 - 13.2	130	150										
CM 10-3	UC	1.9	960	450	615	385	160	230	2 1/2"	625	615	15.6 - 14.2	105	122	990	980	19.1 - 17.4	150	175										
CM 10-3	U4	2.2										8.1 - 8.8	105	122			12.3 - 13.2	150	175										
CM 10-4	U4	3.2										13.6 - 12.8	115	122			20.4 - 19.2	165	190										
CM 10-5	U4	3.2										13.6 - 12.8	120	-			20.4 - 19.2	170	190										
												405	190	310															
												405	250	310															

I-: Stainless-steel base frame and manifolds, stainless-steel CM pumps/G: Galvanised-steel base frame and manifolds, cast-iron CM pumps

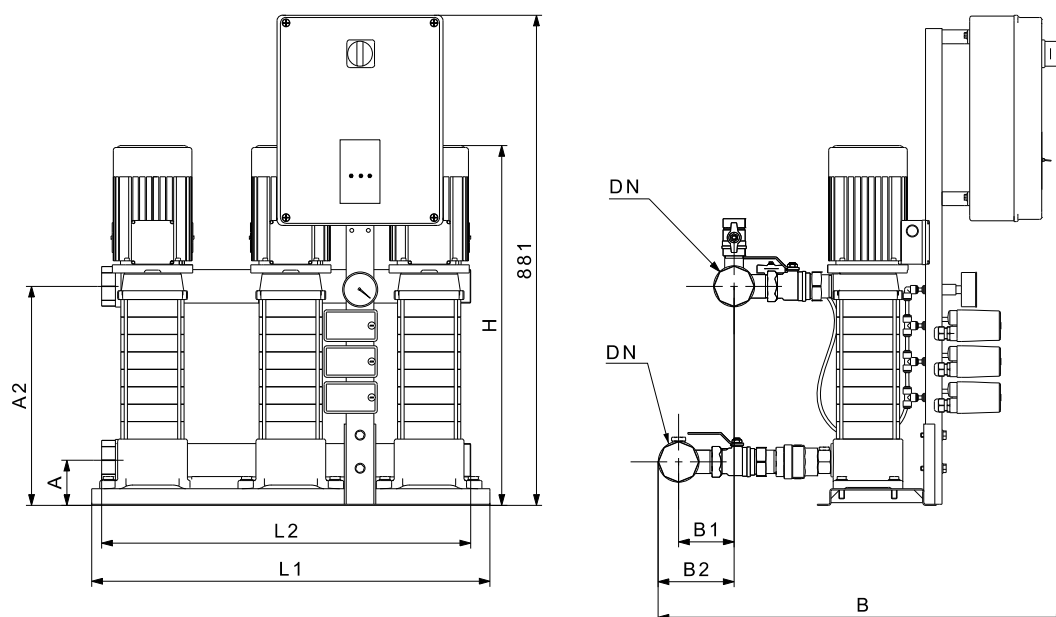
UC: 1 x 220-240 V, N, PE, 50 Hz

U4: 3 x 380-415 V, PE, 50 Hz

Please note that the dimensions stated may vary by ± 20 mm.

Due to improvements or modifications of the components, the dimensions may change without any previous notification.

## Hydro Multi-S with two or three CMV pumps



TM05 1101 2111

Fig. 13 Dimensional sketch of a Hydro Multi-S booster system with CMV pumps

Pump type	U [V]	P2 [kW]	H [mm]	A1 [mm]	A2 [mm]	B [mm]	B1 [mm]	B2 [mm]	DN	Hydro Multi-S with two pumps			Hydro Multi-S with three pumps				
										Dimensions [mm]		I <sub>1/1</sub> [A]	Weight [kg]	Dimensions [mm]		I <sub>1/1</sub> [A]	Weight [kg]
										L1	L2			G/H	L1		
CMV 3-5	UC	0.50	412	81	210	727	105	135	2"	500	460	4.4 - 4.0	32	750	710	5.4 - 4.8	38
CMV 3-5	U4	0.65			228							3.2 - 3.6	32			4.8 - 5.4	37
CMV 3-6	UC	0.50	470		228							4.4 - 4.0	34			5.4 - 4.8	40
CMV 3-6	U4	0.65	488		247							3.2 - 3.6	32			4.8 - 5.4	38
CMV 3-7	UC	0.90	544		289							7.6 - 7.1	35			9.4 - 8.7	41
CMV 3-7	U4	0.84	544		289							3.2 - 3.8	36			4.8 - 5.7	42
CMV 3-9	U4	1.20	544		289							5.2 - 6.0	36			7.8 - 9.0	42
CMV 5-5	UC	0.90	452		210							7.6 - 7.1	35			9.4 - 8.7	40
CMV 5-5	U4	1.20	452		210							5.2 - 6.0	35			7.8 - 9.0	41
CMV 5-6	UC	1.30	522		228							11.9 - 11.3	42			14.5 - 13.9	48
CMV 5-6	U4	1.20	522		228							5.2 - 6.0	36			7.8 - 9.0	41
CMV 5-7	UC	1.30	240		233							11.9 - 11.3	43			14.5 - 13.9	48
CMV 5-7	U4	1.58	240	233	6.2 - 6.8	42	9.3 - 10.2	48									
CMV 5-9	UC	1.30	576	269	11.9 - 11.3	45	14.5 - 13.9	50									
CMV 5-9	U4	1.58	576	269	6.2 - 6.8	44	9.3 - 10.2	50									

G: Galvanised-steel base frame and manifolds, cast-iron CMV pumps

UC: 1 x 220-240 V, N, PE, 50 Hz

U4: 3 x 380-415 V, PE, 50 Hz

Please note that the dimensions stated may vary by  $\pm 20$  mm.

Due to improvements or modifications of the components, the dimensions may change without any previous notification.

## Hydro Multi-S with two or three CR pumps

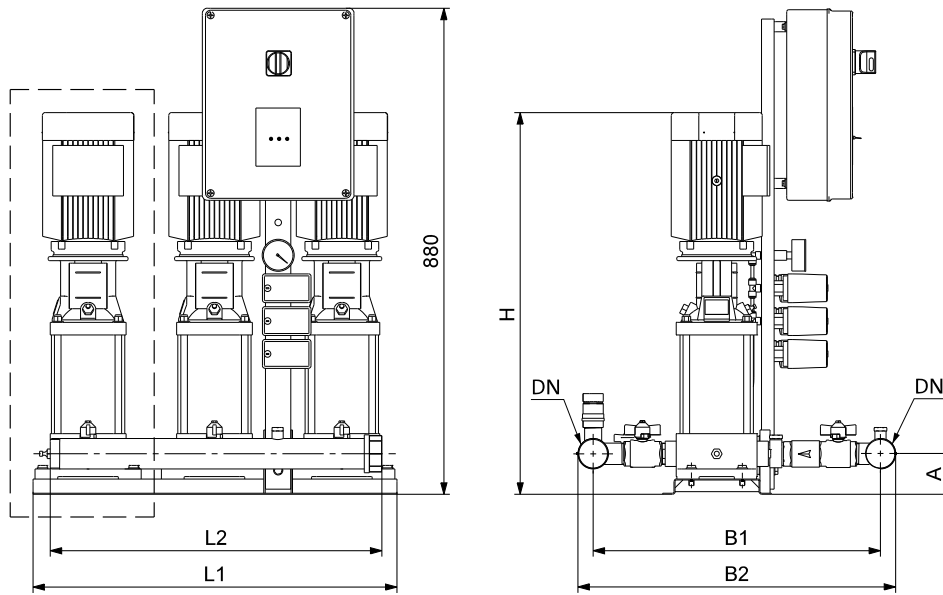


Fig. 14 Dimensional sketch of a Hydro Multi-S booster system with CR pumps

TM03 9721 4307

Pump type	U [V]	P2 [kW]	A [mm]	H [mm]	Hydro Multi-S with two pumps						Hydro Multi-S with three pumps																	
					Dimensions [mm]					I <sub>1/1</sub> [A]	Weight [kg]	Dimensions [mm]					I <sub>1/1</sub> [A]	Weight [kg]										
					DN	B1	B2	L1	L2			DN	B1	B2	L1	L2			G/H	G/H								
CR 3-7	UC	0.55	85	598	2"	620	680	500	470	5.66	64	2"	620	680	750	720	6.93	100										
CR 3-10	UC	0.75		652						7.21	71						8.83	110										
CR 3-12	UC	1.10		754						10.47	76						12.82	117										
CR 3-15	UC	1.10		808						10.47	78						12.82	120										
CR 3-7	U4	0.55		552						2.88	64						4.32	100										
CR 3-10	U4	0.75		652						3.72	71						5.58	110										
CR 3-12	U4	1.10		688						5.3	76						7.95	117										
CR 3-15	U4	1.10		742						5.3	78						7.95	120										
CR 5-8	UC	1.10		754						10.47	76						12.82	117										
CR 5-8	U4	1.10		688						5.3	76						7.95	117										
CR 5-10	U4	1.50		808						6.8	89						10.2	137										
CR 5-13	U4	2.20		929						9.5	96						14.25	147										
CR 5-15	U4	2.20		983						9.5	99						14.25	151										
CR 10-4	U4	1.50		120						739	692						752	600	570	6.8	117	2 1/2"	714	790	920	890	10.2	182
CR 10-6	U4	2.20								839										9.5	125						14.25	194
CR 10-8	U4	3.00	918		12.8	137	19.2	212																				
CR 10-10	U4	4.00	1015		16	161	24	248																				
CR 15-3	U4	3.00	130	835	2 1/2"	759	835	600	12.8	145	3"	789	877	920	890	19.2	224											
CR 15-5	U4	4.00		962					16	171						24	263											
CR 15-7	U4	5.50		1103					22	219						33	335											

Please note that the dimensions stated may vary by ± 20 mm.

Due to improvements or modifications of the components, the dimensions may change without any previous notification.



## 11. Accessories

### Diaphragm tank

A diaphragm tank must always be installed on the discharge side of the booster system.

**Note:** The diaphragm tanks are separate tanks without valve, fittings and pipes.



TM02 9097 1804

#### Diaphragm tank, 10 bar

Capacity [litres]	Connection	Product number
8	G 3/4	96528335
12	G 3/4	96528336
18	G 3/4	96528337
24	G 1	96528339
33	G 1	96528340
60	G 1	96528341
80	G 1	96528342
100	G 1	96528343
130	G 1	96528344
170	G 1	96528345
240	G 1	96528346

#### Diaphragm tank, 16 bar

Capacity [litres]	Connection	Product number
8	G 3/4	96573347
12	G 3/4	96573348
25	G 3/4	96573349
80	DN 50	96573358
120	DN 50	96573359
180	DN 50	96573360
300	DN 50	96573361

### Dry-running protection



TM02 1747 2001

Description	Product number
Dry-running protection by means of electrode relay (without electrodes and electrode cable)	96020079

### Audible alarm

The audible alarm sounds in case of a system alarm.

Description	Sound pressure level [dB(A)]	Location	Product number
Audible alarm	80	In control cabinet	96020178
	100		96020179

### Machine shoes



TM04 3245 3908

Machine shoes reduce any vibrations from the system to the floor, allowing the system to be height-adjusted by  $\pm 20$  mm.




Description	Hydro Multi-S with	Product number
Machine shoe	CM 3 or CM 5	96412344
	CMV 3 or CMV 5	
	CR 3 or CR 5	
	CM 10	96412345
CR 10 or CR 15		

**Note:** The product number covers one (1) machine shoe.

Hydro Multi-S with CM pumps must be bolted directly to the floor and therefore machine shoes cannot be used.

## 12. Alternative booster systems

### Alternative booster systems

Booster system	Data and features	
	Maximum head	10 to 150 m
	Flow rate	2 to 1080 m <sup>3</sup> /h
	Maximum operating pressure	16 bar
	Number of pumps	2 to 6
	Pump types	CR, CRI, CRE, CRIE
	Maximum head	10 to 100 m
	Flow rate	2 to 85 m <sup>3</sup> /h
	Maximum operating pressure	10 bar
	Number of pumps	2 or 3
	Pump type	CME, CRE, CRIE
	Maximum head	10 to 100 m
	Flow rate	2 to 55 m <sup>3</sup> /h
	Maximum operating pressure	16 bar
	Number of pumps	1
	Pump types	CRE, CR*

TM05 3234 2512

## Features

- Optimised for your application!
- Easy to install and commission with the built-in startup wizard
- Many communication options
- Very user-friendly
- Large colour display for setting and monitoring
- Modular design.

Gr-1015574

## Features

- Specially designed for water supply in buildings
- 100 % adaptation to consumption
- Easy to install and commission
- Small foot print
- Communication via Grundfos GO Remote.

Gr5164 - Gr5165

## Features

- Easy to install and commission
- Constant pressure
- Communication via Grundfos GO Remote.\*\*

\* Hydro Solo-E incorporates a CRE pump and Hydro Solo-S a CR pump.

\*\* Applies only to Hydro Solo-E.

## 13. Grundfos Product Center

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

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



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

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

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

The screenshot shows the Grundfos Product Center website. At the top, there is a navigation bar with the logo and menu items: HOME, FIND PRODUCT, COMPARE, YOUR PROJECTS, SAVED ITEMS, HELP. Below this is a search bar with a 'SEARCH' button. The main content area features four large buttons: SIZING (Enter pump sizing), CATALOGUE (Products and services), REPLACEMENT (Replace an old pump with a new), and LIQUIDS (Find pump by liquid). Below these is a 'QUICK SIZING' section with input fields for 'Flow (Q)\*' (m³/h) and 'Head (H)\*' (m), and radio buttons for 'Select what to size by': 'Size by application', 'Size by pump design', and 'Size by pump family'. A 'START SIZING' button is also present. At the bottom, there are links for 'ADVANCED SIZING' with options for 'Advanced sizing by application' and 'Guided selection'.

**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.

**CATALOGUE** gives you access to the Grundfos product catalogue.

**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.

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ECM: 1146925
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