Pressure Booster System

Hya-Eco VP

Type Series Booklet

KSB

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Type Series Booklet Hya-Eco VP

Building Services: Water Supply

Pressure Booster Systems

Hya-Eco VP

Main applications

- Pressure boosting

Fluids handled

Pump for handling clean liquids not chemically and mechanically aggressive to the pump materials.

- Drinking water
- Service water
- Cooling water

Operating data

Operating properties

Characteristic		Value
Flow rate	Q [m³/h]	≤ 70 with a max. of 3 pumps[1)]
	Q [l/s]	≤ 19.5 with a max. of 3 pumps
Head	H [m]	≤ 110
Fluid temperature	T [°C]	≤ 70
		≤ 25 to DIN 1988 (DVGW)
Operating pressure	p [bar]	≤ 16
Inlet pressure	p_{vor} [bar]	≤ 6

Designation

Example: Hya-Eco VP 2 / 0406 / _ _ B

Designation key

Code	Description
Hya-Eco VP	Type series
2	Number of pumps
04	Movitec pump size
06	Number of stages
__	Inlet pressure [bar]
B	Design status

Design details

Design

- Fully automatic pressure booster package system
- Baseplate-mounted
- Either two or three vertical high-pressure centrifugal pumps, type Movitec, with oval flange
- One check valve and shut-off valves to DIN/DVGW for each pump
- Anti-vibration pads per pump
- Membrane-type accumulator (direct-flow) to DIN 4807-5 on the discharge side, approved for drinking water
- Pressure transmitter on the discharge side
- Pressure gauge for pressure indication
- Two standard volt-free changeover contacts for fault indication
- Design and function as per DIN 1988-500

Installation type

- Stationary installation

Drive

- Electric motor 60 Hz, 2-pole, IE2, special KSB model, for three-phase mains

Automation

- Control cabinet IP54
- Graphical display with operating panel
- LEDs indicating operational availability and fault of the system
- Service interface for connection to a PC
- Frequency inverter
- Transformer for control voltage
- Motor protection switch per pump
- Lockable master switch (repair switch)
- Pressure transmitter on the discharge side
- Wiring plan to VDE and parts list for electric parts
- Terminal strip/terminals with identification for all connections
- Terminal connection for digital dry running protection
- Remote ON connection
- Remote OFF connection

1) With stand-by pump as peak load pump

Configuration and function

Hya-Eco VP

1	Control unit	2	Control cabinet
3	Pump	4	Collecting line
5	Baseplate		

Design

Fully automatic pressure booster package system, with 2 to 3 vertical high-pressure pumps and continuously variable speed adjustment of each pump for fully electronic control of the required supply pressure, with two standard volt-free changeover contacts for fault indication.

Function
Automatic mode

Either two or three pumps (3) are controlled and monitored by a micro-processor control unit (1). Each pump is connected to a frequency inverter and controlled by the control unit so as to ensure a constant discharge pressure of the pressure booster system. As the demand increases or decreases, peak load pumps are started and stopped automatically.
As soon as the demand increases again after one pump has been stopped, another pump which has not been in operation before is started up. When the last pump has been stopped and the demand increases again, the next pump in line is started up in variable-speed operation. The stand-by pump is also included in the alternating cycle. The standard setting is for the pressure booster system to start automatically as a function of pressure; the actual pressure is measured by an analog pressure measuring device (pressure transmitter). The function of this pressure transmitter is monitored (live-zero). As long as the pressure booster system is in operation, the pumps are started and stopped as a function of demand (standard setting). In this way it is ensured that the individual pumps operate only in line with the actual demand. The use of variable-speed pumps reduces wear as well as the pumps' frequency of starts in parallel operation. If a duty pump fails, the next pump is started up immediately and a fault is output, which can be reported via volt-free contacts (e.g. to the control station). If the demand drops towards 0, the pressure booster system slowly runs down to the stop point.
The operating status is displayed via LEDs.

Function
Manual mode

In exceptional cases, the system can also be operated in manual mode.

Minimum flow for pump in manual mode

Minimum flow per pump in manual mode

Pump	Minimum flow per pump in manual mode [l/h]
Movitec 2B	200
Movitec 4B	400
Movitec 6B	600
Movitec 10B	1100
Movitec 15B	1600

Materials

Overview of available materials

Component	Material
Inlet casing	Stainless steel
Discharge casing	Stainless steel
Hydraulic system	Stainless steel
Mechanical seal	Complies with EN 12756
Primary ring	Silicon carbide
Mating ring	Hard carbon
Elastomer	EPDM
Baseplate	Steel, powder-coated
Hydraulic design	
Distributor pipe	Stainless steel
Valves	Copper base alloy/brass DVGW-approved
Membrane-type accumulator	Connection made of stainless steel, flow through valve to DIN 4807-5
Membrane	Approved for drinking water

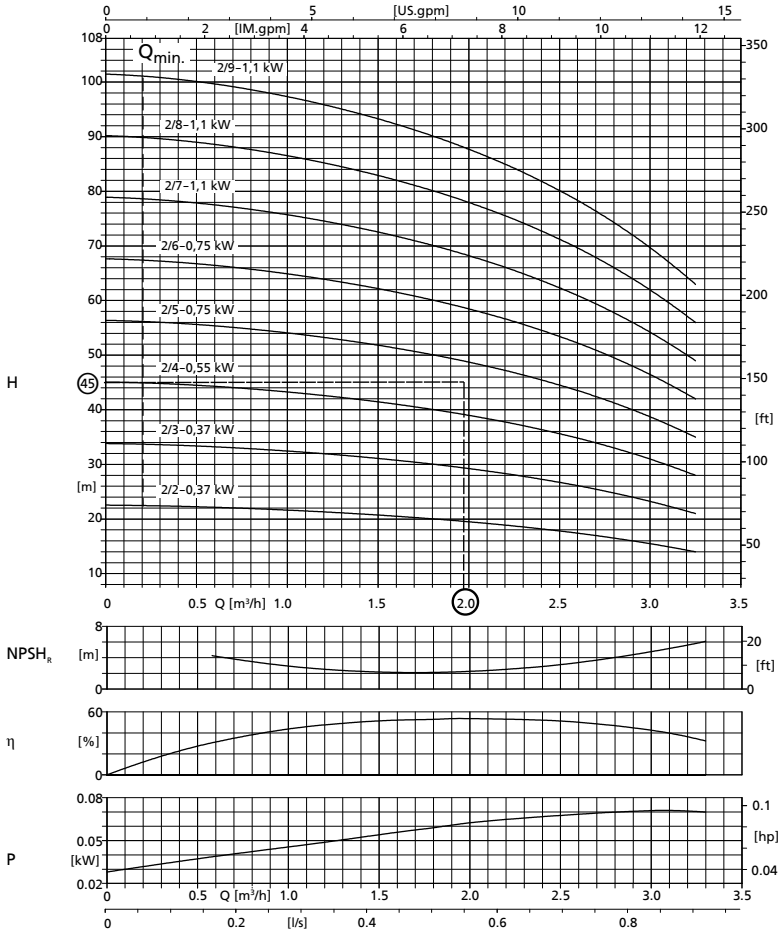
Product benefits

- Energy-efficient operation and constant pressure ensured by speed control of all pumps (all systems non-compliant with Drinking Water Directive, except for single-pump systems)
- Ease of use and fully automatic control by BoosterControl Advanced
- Corrosion-resistant by using high-quality stainless steel
- Ready-to-connect baseplate-mounted package system
- Pumps mounted on the baseplate on anti-vibration pads
- Suitable for drinking water installations, manufactured under stringent hygienic conditions

Selection information

Requirements:
Flow rate 4 m³/h
Start-up pressure 4.5 bar
Requested stand-by pump to DIN 1988
Solution:
Hya Eco-VP 2/0205 B

1. According to the table *Flow rate as a function of the number of pumps* the system may comprise 1 or 2 duty pumps (as stand-by pump is requested)
2. According to the table *Flow rate as a function of the number of pumps* the flow rate requirement can be either 4 m³/h (1 duty pump) or 2 m³/h (2 duty pumps)
3. The characteristic curves accordingly suggest Hya-Eco VP 2/205 (operating point close to Q_{opt})



The required flow rate is split according to the number of the duty pumps (not taking into account any stand-by pumps).

Flow rate as a function of the number of pumps

Duty pumps	Stand-by pumps	Flow rate as a function of the number of pumps
1	1	Required flow rate ≙ flow rate as per characteristic curve Q [m³/h]
2	0	Required flow rate / 2 ≙ flow rate as per characteristic curve Q [m³/h]
2	1	Required flow rate / 2 ≙ flow rate as per characteristic curve Q [m³/h]
3	0	Required flow rate / 3 ≙ flow rate as per characteristic curve Q [m³/h]

Technical data

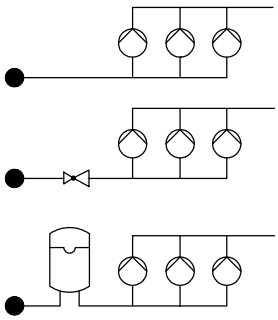
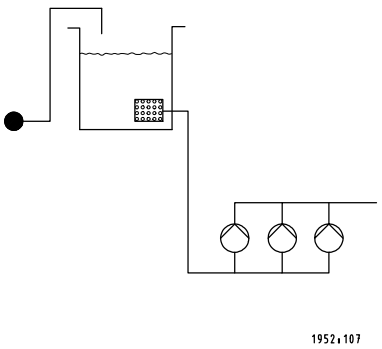
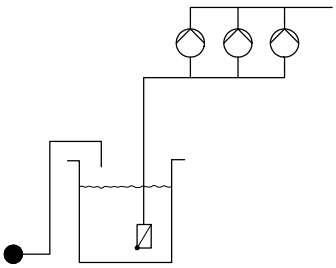
Systems with 2 and 3 pumps

Hya-Eco VP	Per motor		Total rated power requirement	Mat. No.	[kg]
	Rated power	Rated current			
	P_2 [kW]	[A]	[kVA]		
2/0202 B	0,37	0,89	1,3	29132656	120
2/0203 B	0,37	0,89	1,3	29132657	121
2/0204 B	0,55	1,32	1,9	29132658	122
2/0205 B	0,75	1,65	2,4	29132659	123
2/0206 B	0,75	1,65	2,4	29132660	127
2/0207 B	1,10	2,36	3,4	29132661	128
2/0208 B	1,10	2,36	3,4	29132662	129
2/0209 B	1,10	2,36	3,4	29132663	133
3/0202 B	0,37	0,89	1,9	29132664	147
3/0203 B	0,37	0,89	1,9	29132665	152.6
3/0204 B	0,55	1,32	2,9	29132666	150
3/0205 B	0,75	1,65	3,6	29132667	151
3/0206 B	0,75	1,65	3,6	29132668	158
3/0207 B	1,10	2,36	5,2	29132669	159
3/0208 B	1,10	2,36	5,2	29132670	160
3/0209 B	1,10	2,36	5,2	29132671	167
2/0402 B	0,55	1,32	1,9	29132672	120
2/0403 B	0,75	1,65	2,4	29132673	125
2/0404 B	1,10	2,36	3,4	29132674	126
2/0405 B	1,50	2,88	4,2	29132675	130
2/0406 B	1,50	2,88	4,2	29132676	136
2/0407 B	2,20	4,09	6,0	29132677	137
2/0408 B	2,20	4,09	6,0	29132678	144
3/0402 B	0,55	1,32	2,9	29132679	148
3/0403 B	0,75	1,65	3,6	29132680	154
3/0404 B	1,10	2,36	5,2	29132681	156
3/0405 B	1,50	2,88	6,3	29132682	162
3/0406 B	1,50	2,88	6,3	29132683	171
3/0407 B	2,20	4,09	8,9	29132684	172
3/0408 B	2,20	4,09	8,9	29132685	183
2/0602 B	0,75	1,65	2,4	29132686	122
2/0603 B	1,10	2,36	3,4	29132687	131
2/0604 B	1,50	2,88	4,2	29132688	136
2/0605 B	2,20	4,09	6,0	29132689	137
2/0606 B	2,20	4,09	6,0	29132690	146
2/0607 B	3,00	5,51	8,0	29132691	147
3/0602 B	0,75	1,65	3,6	29132692	150
3/0603 B	1,10	2,36	5,2	29132693	162
3/0604 B	1,50	2,88	6,3	29132694	171
3/0605 B	2,20	4,09	8,9	29132695	172
3/0606 B	2,20	4,09	8,9	29132696	184
3/0607 B	3,00	5,51	12,0	29132697	186
2/1002 B	1,50	2,88	4,2	29133769	167
2/1003 B	2,20	4,09	6,0	29133770	175
2/1004 B	3,00	5,51	8,0	29133771	193
2/1005 B	4,00	7,34	10,7	29133772	195
2/1006 B	4,00	7,34	10,7	29133773	207

Hya-Eco VP	Per motor		Total rated power requirement	Mat. No.	[kg]
	Rated power	Rated current			
	P_2 [kW]	[A]	[kVA]		
3/1002 B	1,50	2,88	6,3	29133775	218
3/1003 B	2,20	4,09	8,9	29133776	230
3/1004 B	3,00	5,51	12,0	29133777	256
3/1005 B	4,00	7,34	16,0	29133778	259
3/1006 B	4,00	7,34	16,0	29133779	277
2/1502 B	3,00	5,51	8,0	29133781	213
2/1503 B	5,50	9,86	14,3	29133782	310
2/1504 B	7,50	13,20	19,2	29133783	320
2/1505 B	7,50	13,20	19,2	29133784	322
3/1502 B	3,00	5,51	12,0	29133786	281
3/1503 B	5,50	9,86	21,5	29133787	422
3/1504 B	7,50	13,20	28,8	29133788	437
3/1505 B	7,50	13,20	28,8	29133789	440

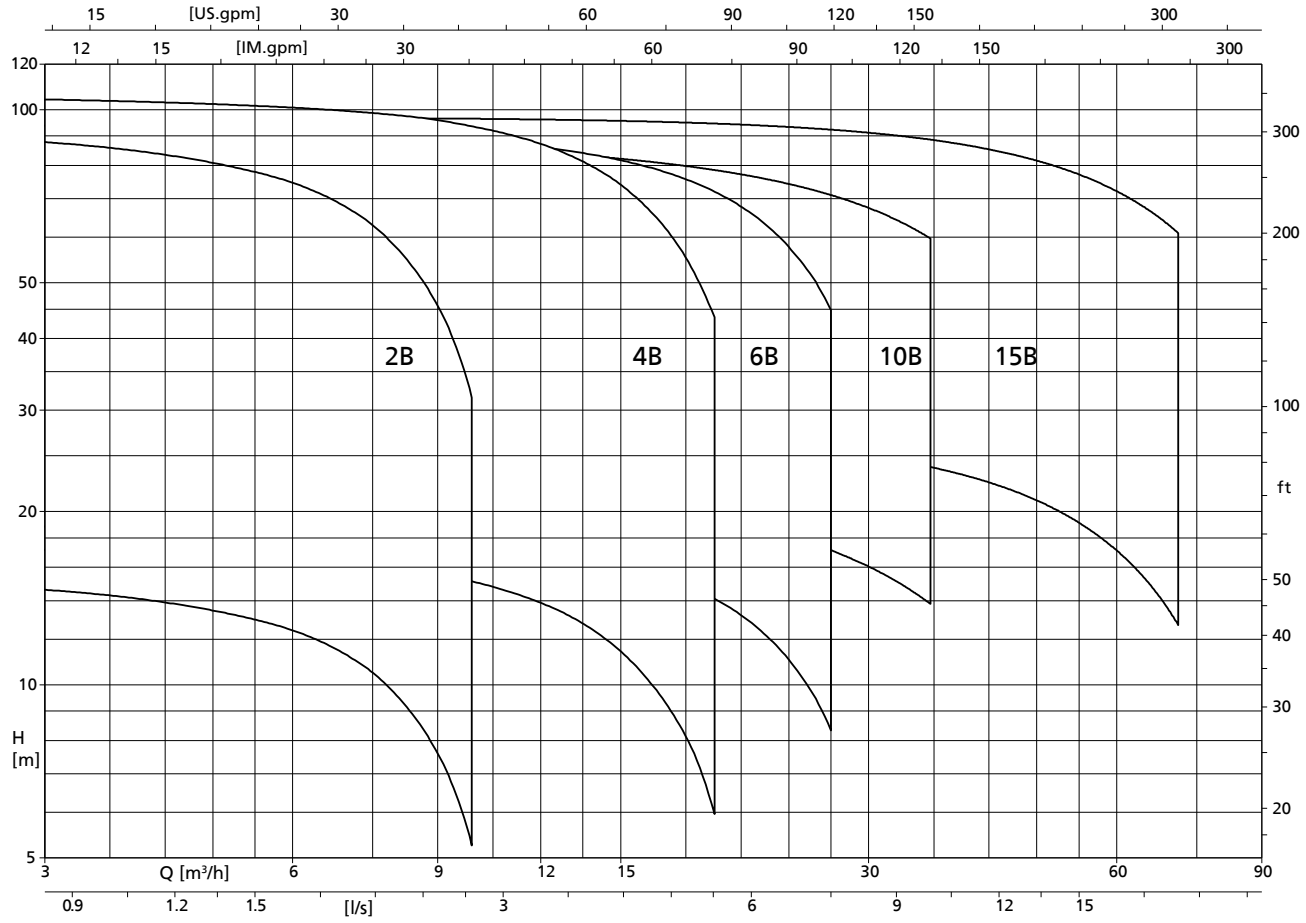
Type of connection

Types of connection (schematic)

Direct	Indirect	
	Unpressurised inlet tank at the same or at a higher level	Unpressurised inlet tank at a lower level (suction-lift operation) [2]
 1952.106	 1952.107	 1952.108
Inlet pressure monitoring (see Supplementary equipment or Accessories)		
At p_{in} >0.5 bar (min. 1 bar, DIN 1988) - Pressure switch - Pressure sensor At p_{in} <0.5 bar - Pressure sensor - Flow monitoring	- Float switch - Set of electrodes and relay - Dry running protection for PE inlet tank - Pressure sensor - Flow monitoring[3]	- Float switch - Set of electrodes and relay - Dry running protection for PE inlet tank - Flow monitoring[3]

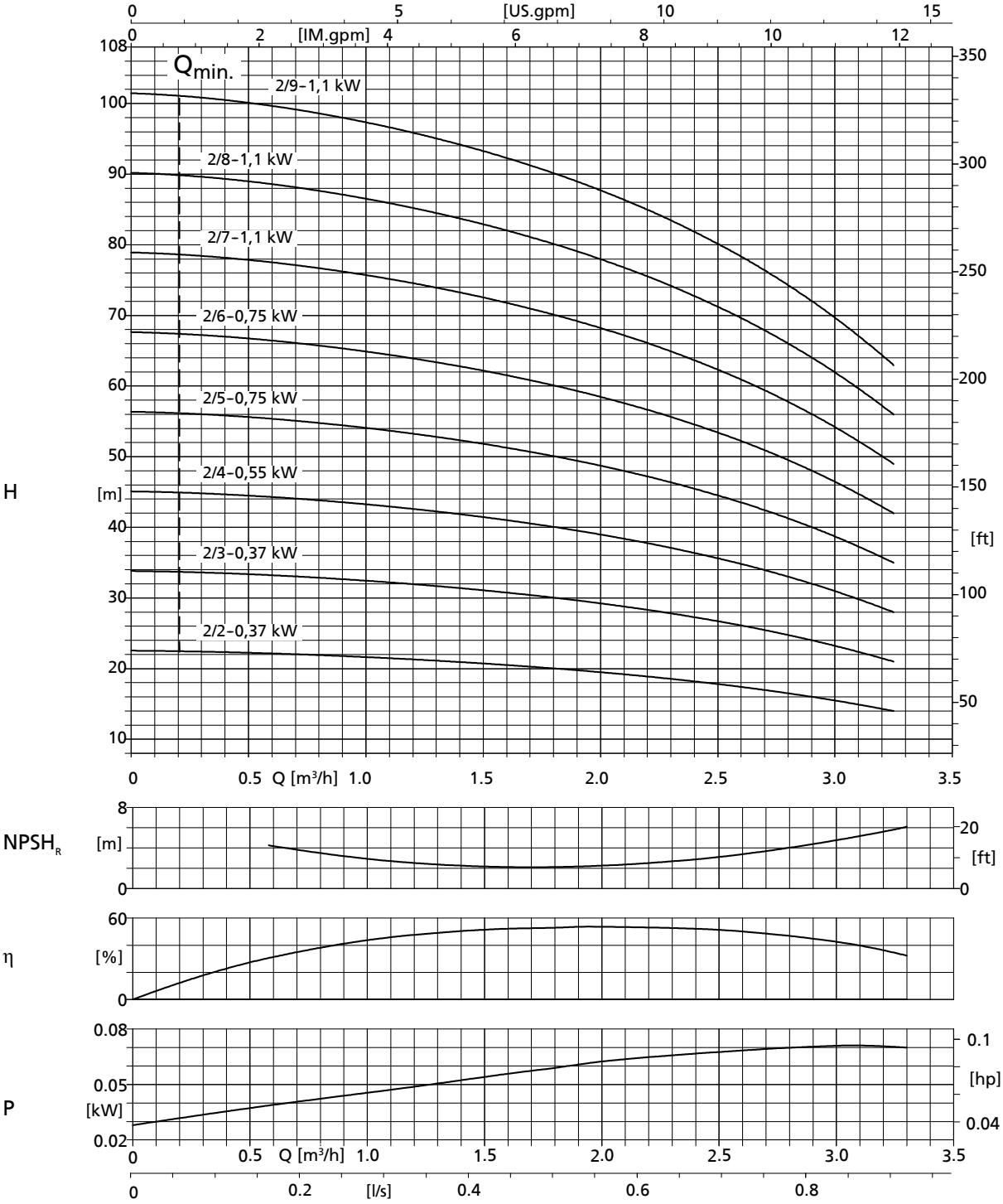
2) Non-priming pumps, suitable for suction-lift operation (for selection, please consult KSB)
3) Automatic reset is not possible for this type of dry running protection

Hya-Eco; n = 3500 rpm



Characteristic curves

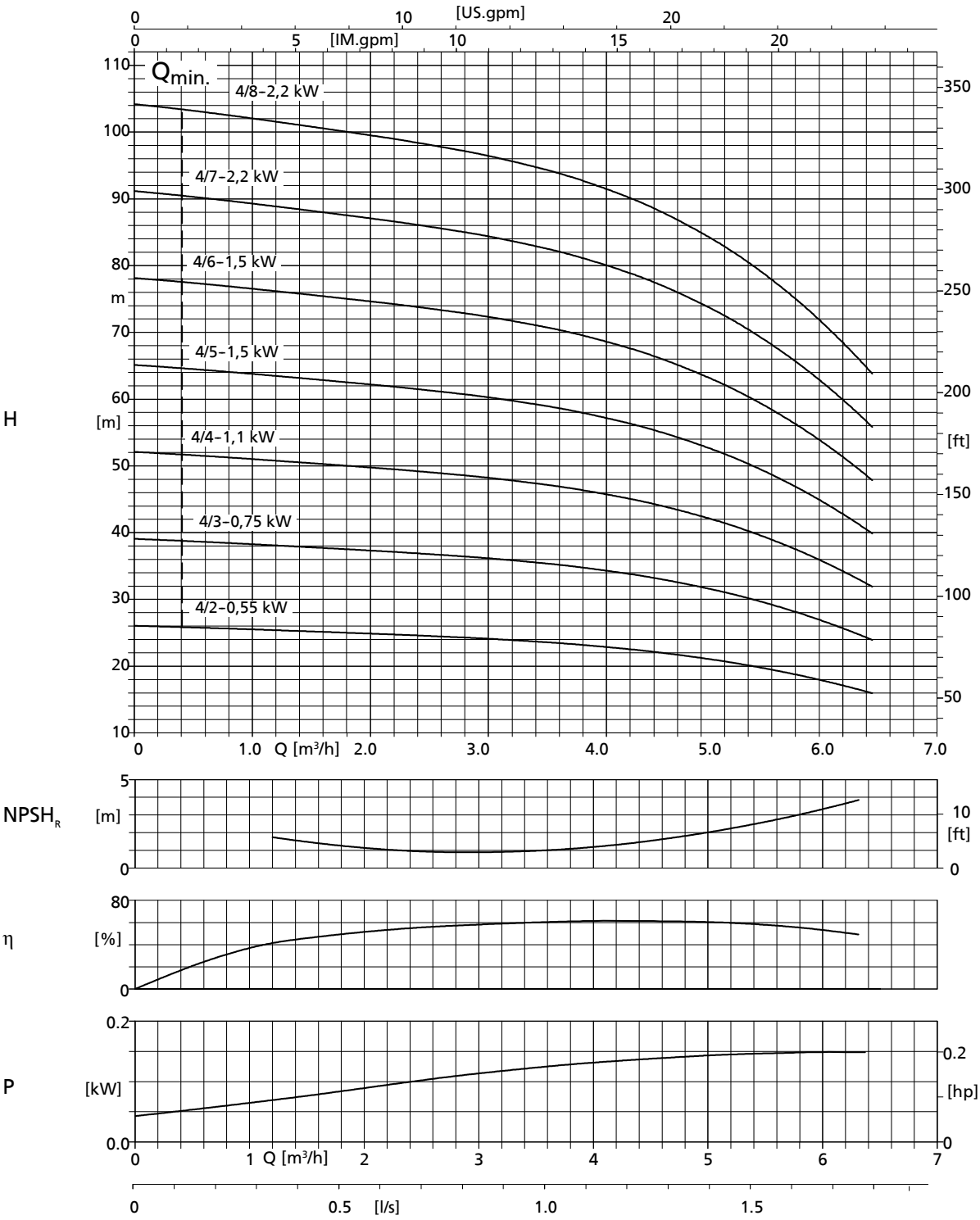
Hya-Eco VP with Movitec 2B



Flow rate as a function of the number of pumps

Duty pumps	Stand-by pumps	Flow rate as a function of the number of pumps
1	1	Required flow rate ≙ flow rate as per characteristic curve Q [m³/h]
2	0	Required flow rate: 2 ≙ flow rate as per characteristic curve Q [m³/h]
2	1	Required flow rate: 2 ≙ flow rate as per characteristic curve Q [m³/h]
3	0	Required flow rate: 3 ≙ flow rate as per characteristic curve Q [m³/h]

Hya-Eco VP with Movitec 4B



Flow rate as a function of the number of pumps

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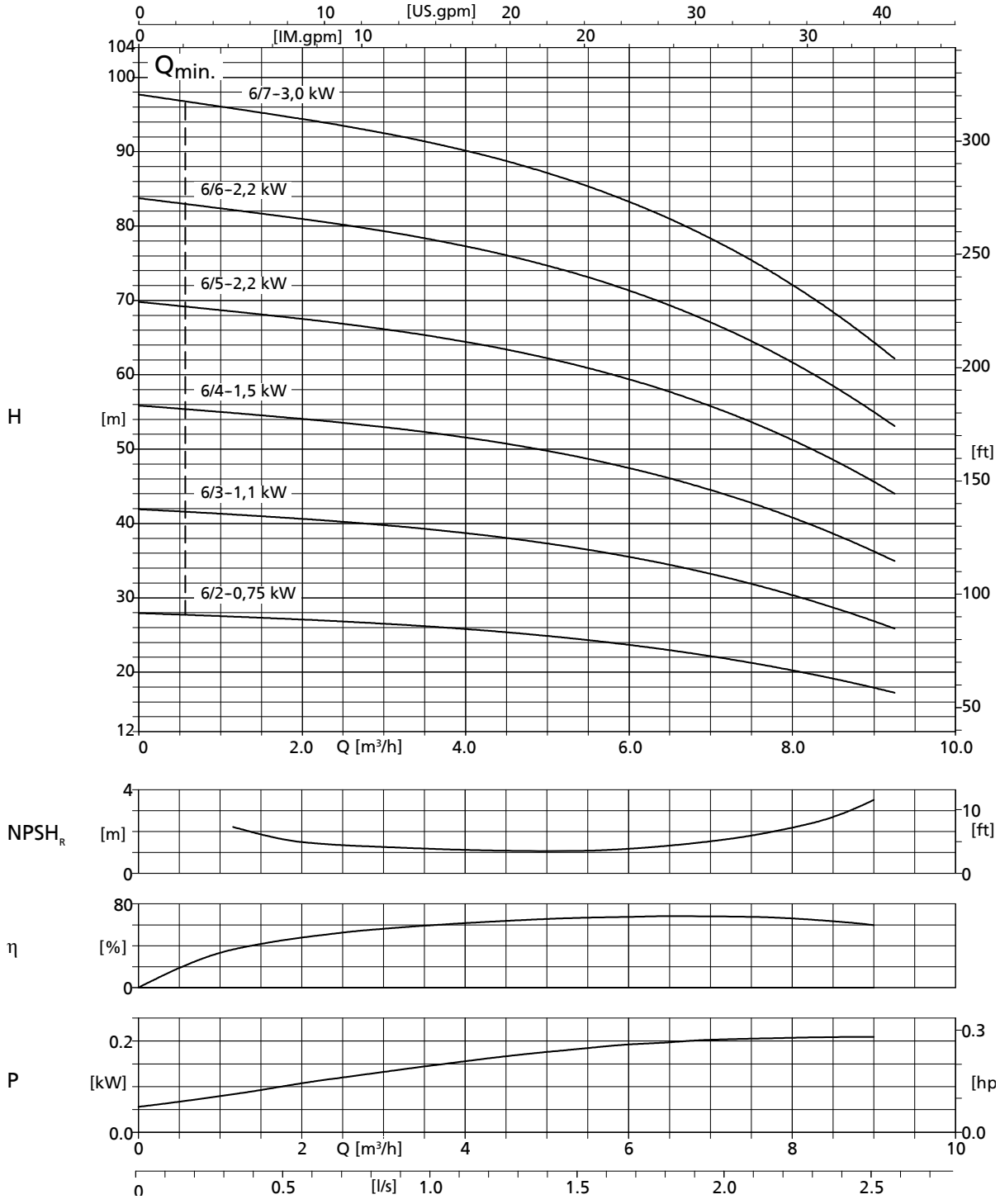
3	0	Required flow rate: 3 ≙ flow rate as per characteristic curve Q [m³/h]

Hya-Eco VP with Movitec 6B



Flow rate as a function of the number of pumps

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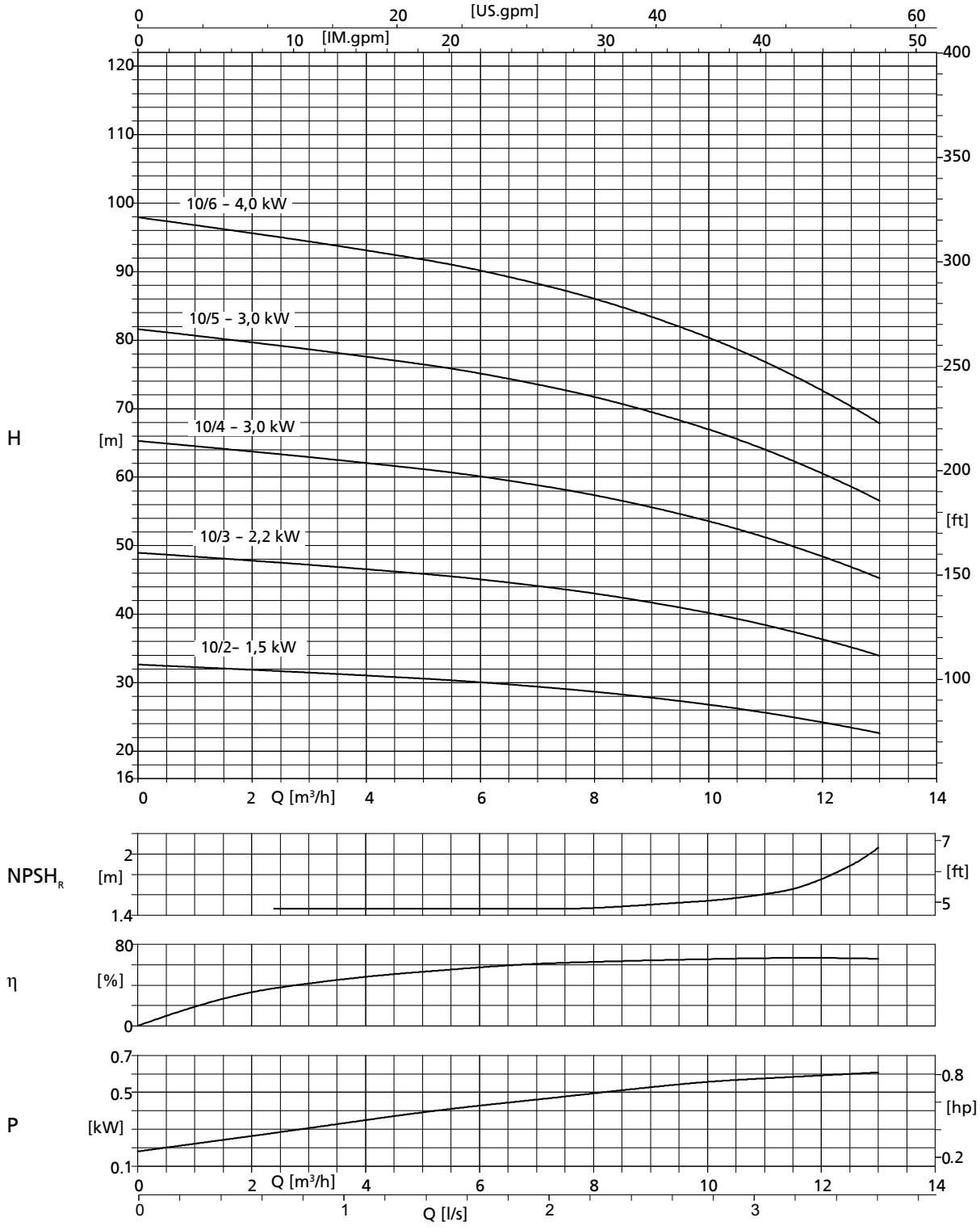
2	1	Required flow rate: 2 ≙ flow rate as per characteristic curve Q [m³/h]
3	0	Required flow rate: 3 ≙ flow rate as per characteristic curve Q [m³/h]

Hya-Eco VP with Movitec 10B



Flow rate as a function of the number of pumps

Duty pumps	Stand-by pumps	Flow rate as a function of the number of pumps
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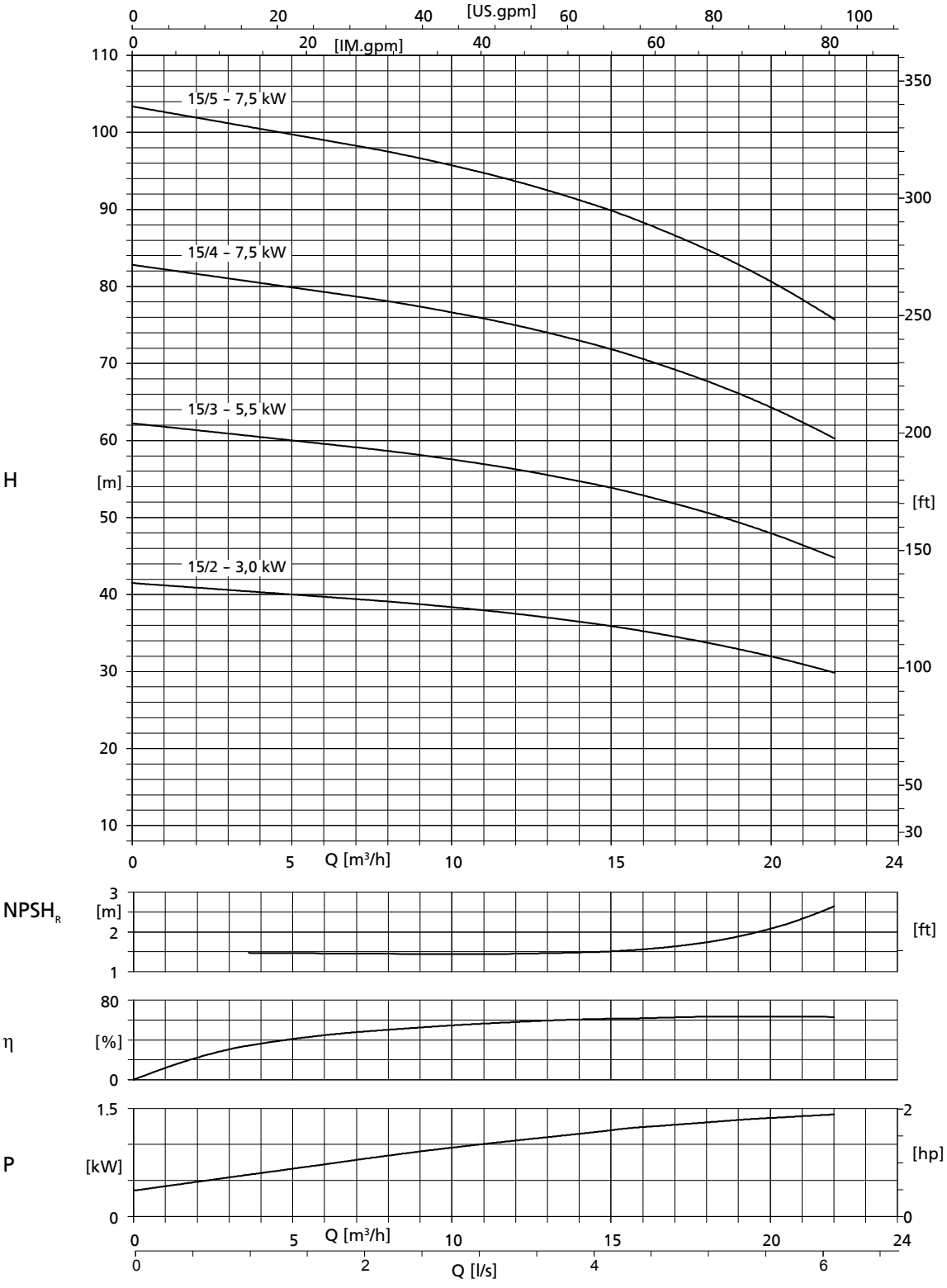
2	1	Required flow rate: 2 ≙ flow rate as per characteristic curve Q [m³/h]
3	0	Required flow rate: 3 ≙ flow rate as per characteristic curve Q [m³/h]

Hya-Eco VP with Movitec 15B



Flow rate as a function of the number of pumps

Duty pumps	Stand-by pumps	Flow rate as a function of the number of pumps
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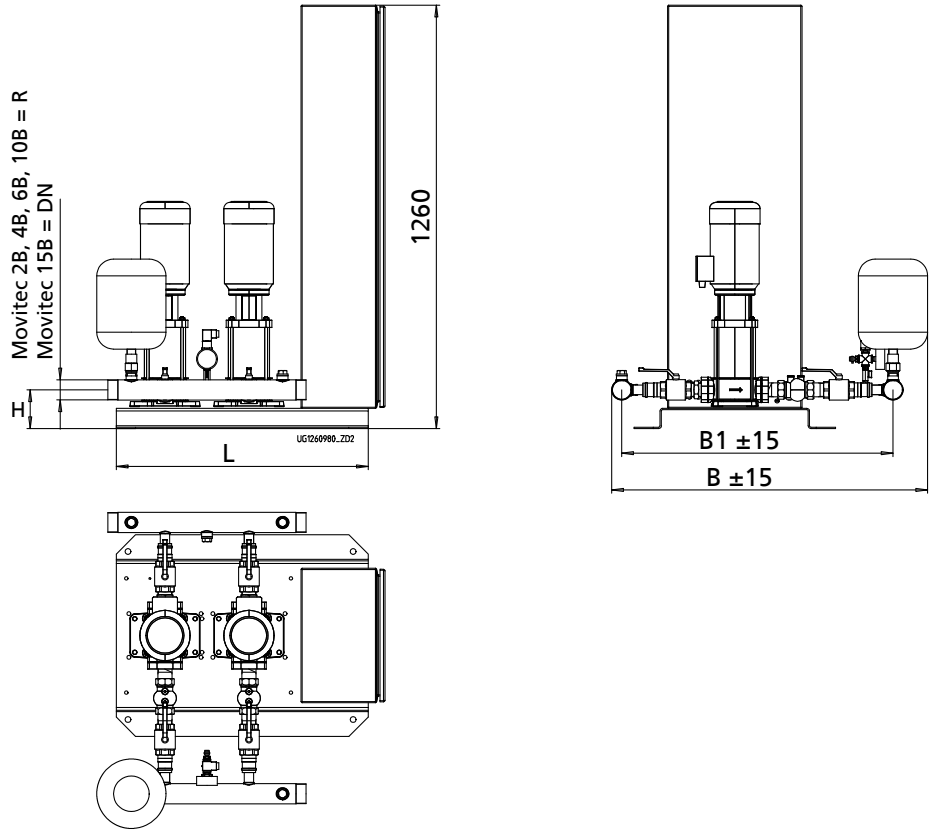
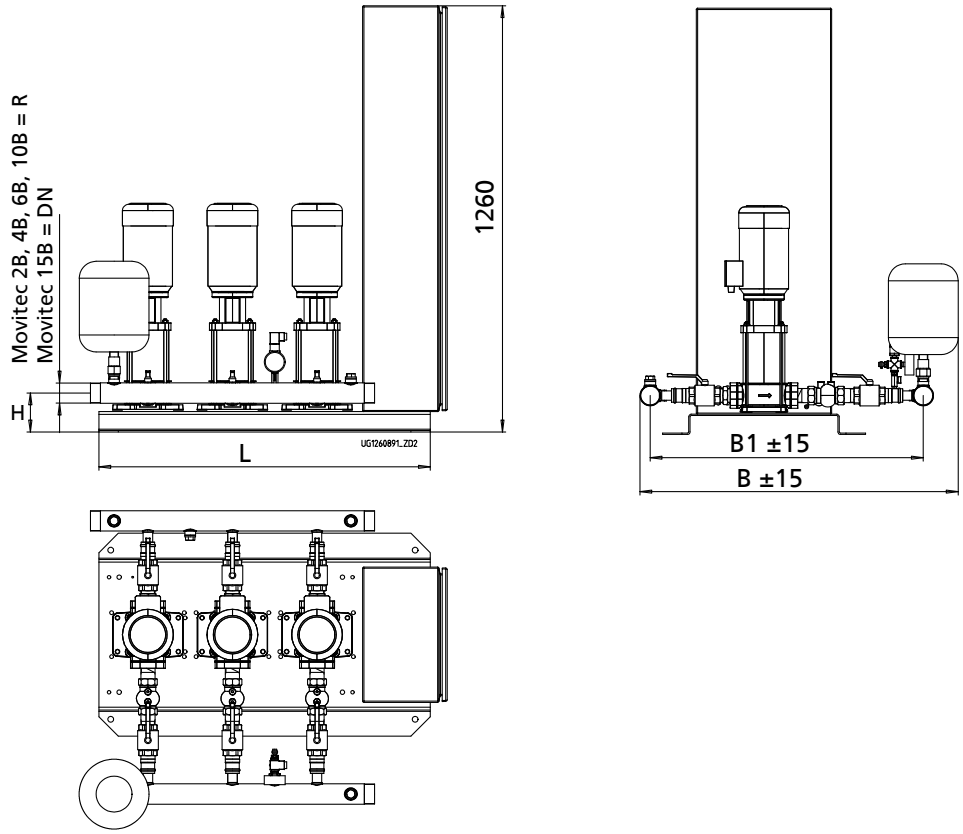
3	0	Required flow rate: 3 ≙ flow rate as per characteristic curve Q [m³/h]

Dimensions

Hya-Eco VP with Movitec 2B, 4B, 6B, 10B and 15B with 2 pumps



Hya-Eco VP with Movitec 2B, 4B, 6B, 10B and 15B with 3 pumps



Thread R to DIN EN 10226
Flanges drilled to EN 1092-1 PN 16

Dimensions [mm]

Number of pumps	2	3	Movitec
B	874	874	2B/.. and 4B/..
	941	941	6B/..
	1018	1018	10B/..
	1087	1087	15B/..
B1	740	740	2B/.. and 4B/..
	808	808	6B/..
	885	885	10B/..
	884	884	15B/..
L	750	980	2B/.. and 4B/..
	750	980	6B/..
	750	980	10B/..
	980	1210	15B/..
R	R 2	R 2	2B/.. and 4B/..
	R 2	R 2	6B/..
	R 2	R 2	10B/..
DN	DN 80	DN 80	15B/..
H	115	115	2B/.. and 4B/..
	115	115	6B/..
	145	145	10B/..
	145	145	15B/..

Scope of supply

Depending on the model, the following items are included in the scope of supply:

Pressure booster system

- Two to three vertical high-pressure centrifugal pumps (standard pumps)
- Membrane-type accumulator on the discharge side, approved for drinking water
- Pressure transmitter on the discharge side
- Pressure gauge
- Powder-coated steel baseplate
- Pumps mounted on the baseplate with anti-vibration mounts

Per pump:

- Check valve
- Shut-off valves

Control cabinet

- Control cabinet IP54
- Pump control and monitoring unit
- Graphical display with operating panel
- LEDs indicating operational availability and fault of the pressure booster system
- Service interface for connection to a PC
- Transformer for control voltage
- Motor protection switch per pump
- Lockable master switch (repair switch)
- Terminal strip/terminals with identification for all connections
- Circuit diagram, settings for frequency inverters and list of electrical components
- Connection for analog or digital dry running protection equipment
- External connection ON
- External connection OFF

Accessories

See the separate type series booklet Accessories for Pressure Booster Systems 1954.5.

12.10.2016

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