

Pressure Booster System

Hya-Eco VP

Type Series Booklet



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Type Series Booklet Hya-Eco VP

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Building Services: Water Supply

Pressure Booster Systems

Hya-Eco VP



Main applications

- Pressure boosting

Fluids handled

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

- Drinking water
- Service water
- Cooling water

Operating data

Overview of operating data

Characteristic		Value
Flow rate	Q	Up to 70 m ³ /h (19.5 l/s with 3 pumps max.) ¹⁾
Head	H	Up to 110 m
Fluid temperature	t	Up to 70 °C Up to 25 °C to DIN 1988 (DVGW)
Operating pressure	p =	Up to 16 bar
Inlet pressure	p _{in}	Up to 6 bar

Designation

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

Key to the designation

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

- Fully automatic pressure booster package system
- Long-coupled design
- 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, Part 5

Installation type

- Stationary installation

Drive

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

Automation

- Control cabinet IP 54
- 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 speed-controlled 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.

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
Hydraulics	
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

- Ready to connect due to standardised dimensions
- Constant pressure ensured by variable-speed pumps
- Corrosion-resistant due to internal stainless steel components
- Leakage monitoring and redundant system design (stand-by pump) ensure operating reliability

Selection information

Requirements:

Flow rate 4 m³/h

Start-up pressure 4.5 bar

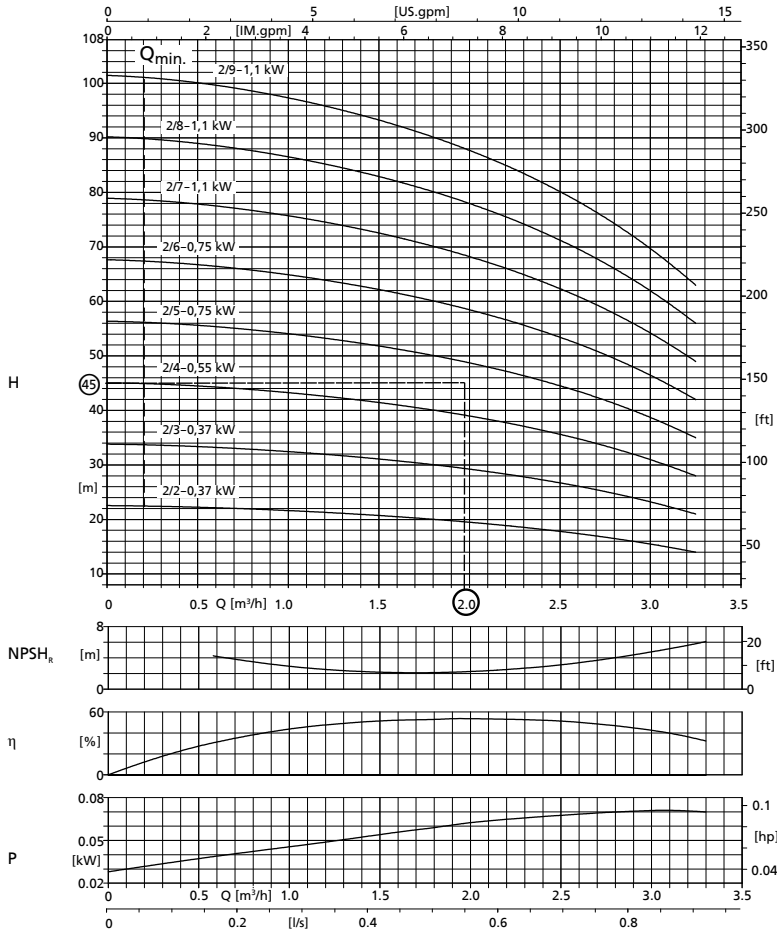
Requested stand-by pump to DIN 1988

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 $\hat{=}$ flow rate as per characteristic curve Q [m ³ /h]
2	0	Required flow rate / 2 $\hat{=}$ flow rate as per characteristic curve Q [m ³ /h]
2	1	Required flow rate / 2 $\hat{=}$ flow rate as per characteristic curve Q [m ³ /h]
3	0	Required flow rate / 3 $\hat{=}$ flow rate as per characteristic curve Q [m ³ /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				
2/0202 B	0,37	0,91	1,32	29132656	120	
2/0203 B	0,37	0,91	1,32	29132657	121	
2/0204 B	0,55	1,29	1,88	29132658	122	
2/0205 B	0,75	1,75	2,55	29132659	123	
2/0206 B	0,75	1,75	2,55	29132660	127	
2/0207 B	1,1	1,93	2,81	29132661	128	
2/0208 B	1,1	1,93	2,81	29132662	129	
2/0209 B	1,1	1,93	2,81	29132663	133	
3/0202 B	0,37	0,91	1,99	29132664	147	
3/0203 B	0,37	0,91	1,99	29132665	152,6	
3/0204 B	0,55	1,29	2,82	29132666	150	
3/0205 B	0,75	1,75	3,82	29132667	151	
3/0206 B	0,75	1,75	3,82	29132668	158	
3/0207 B	1,1	1,93	4,21	29132669	159	
3/0208 B	1,1	1,93	4,21	29132670	160	
3/0209 B	1,1	1,93	4,21	29132671	167	
2/0402 B	0,55	1,29	1,88	29132672	120	
2/0403 B	0,75	1,75	2,55	29132673	125	
2/0404 B	1,1	1,93	2,81	29132674	126	
2/0405 B	1,5	2,86	4,16	29132675	130	
2/0406 B	1,5	2,86	4,16	29132676	136	
2/0407 B	2,2	4,12	5,99	29132677	137	
2/0408 B	2,2	4,12	5,99	29132678	144	
3/0402 B	0,55	1,29	2,82	29132679	148	
3/0403 B	0,75	1,75	3,82	29132680	154	
3/0404 B	1,1	1,93	4,21	29132681	156	
3/0405 B	1,5	2,86	6,24	29132682	162	
3/0406 B	1,5	2,86	6,24	29132683	171	
3/0407 B	2,2	4,12	8,99	29132684	172	
3/0408 B	2,2	4,12	8,99	29132685	183	

Hya-Eco VP	Per motor			Total rated power requirement	Mat. No.	[kg]
	Rated power	Rated current				
2/0602 B	0,75	1,75	2,55	29132686	122	
2/0603 B	1,1	1,93	2,81	29132687	131	
2/0604 B	1,5	2,86	4,16	29132688	136	
2/0605 B	2,2	4,12	5,99	29132689	137	
2/0606 B	2,2	4,12	5,99	29132690	146	
2/0607 B	3,0	5,55	8,07	29132691	147	
3/0602 B	0,75	1,75	3,82	29132692	150	
3/0603 B	1,1	1,93	4,21	29132693	162	
3/0604 B	1,5	2,86	6,24	29132694	171	
3/0605 B	2,2	4,12	8,99	29132695	172	
3/0606 B	2,2	4,12	8,99	29132696	184	
3/0607 B	3,0	5,55	12,11	29132697	186	
2/1002 B	1,5	2,86	4,16	29133769	167	
2/1003 B	2,2	4,12	5,99	29133770	175	
2/1004 B	3,0	5,55	8,07	29133771	193	
2/1005 B	3,0	5,55	8,07	29133772	195	
2/1006 B	4,0	7,3	10,62	29133773	207	
3/1002 B	1,5	2,86	6,24	29133775	218	
3/1003 B	2,2	4,12	8,99	29133776	230	
3/1004 B	3,0	5,55	12,11	29133777	256	
3/1005 B	3,0	5,55	12,11	29133778	259	
3/1006 B	4,0	7,3	15,93	29133779	277	
2/1502 B	3,0	5,55	8,07	29133781	213	
2/1503 B	5,5	10,29	14,97	29133782	310	
2/1504 B	7,5	13,23	19,25	29133783	320	
2/1505 B	7,5	13,23	19,25	29133784	322	
3/1502 B	3,0	5,55	12,11	29133786	281	
3/1503 B	5,5	10,29	22,46	29133787	422	
3/1504 B	7,5	13,23	28,87	29133788	437	
3/1505 B	7,5	13,23	28,87	29133789	440	

Type of connection

Types of connection (schematic)

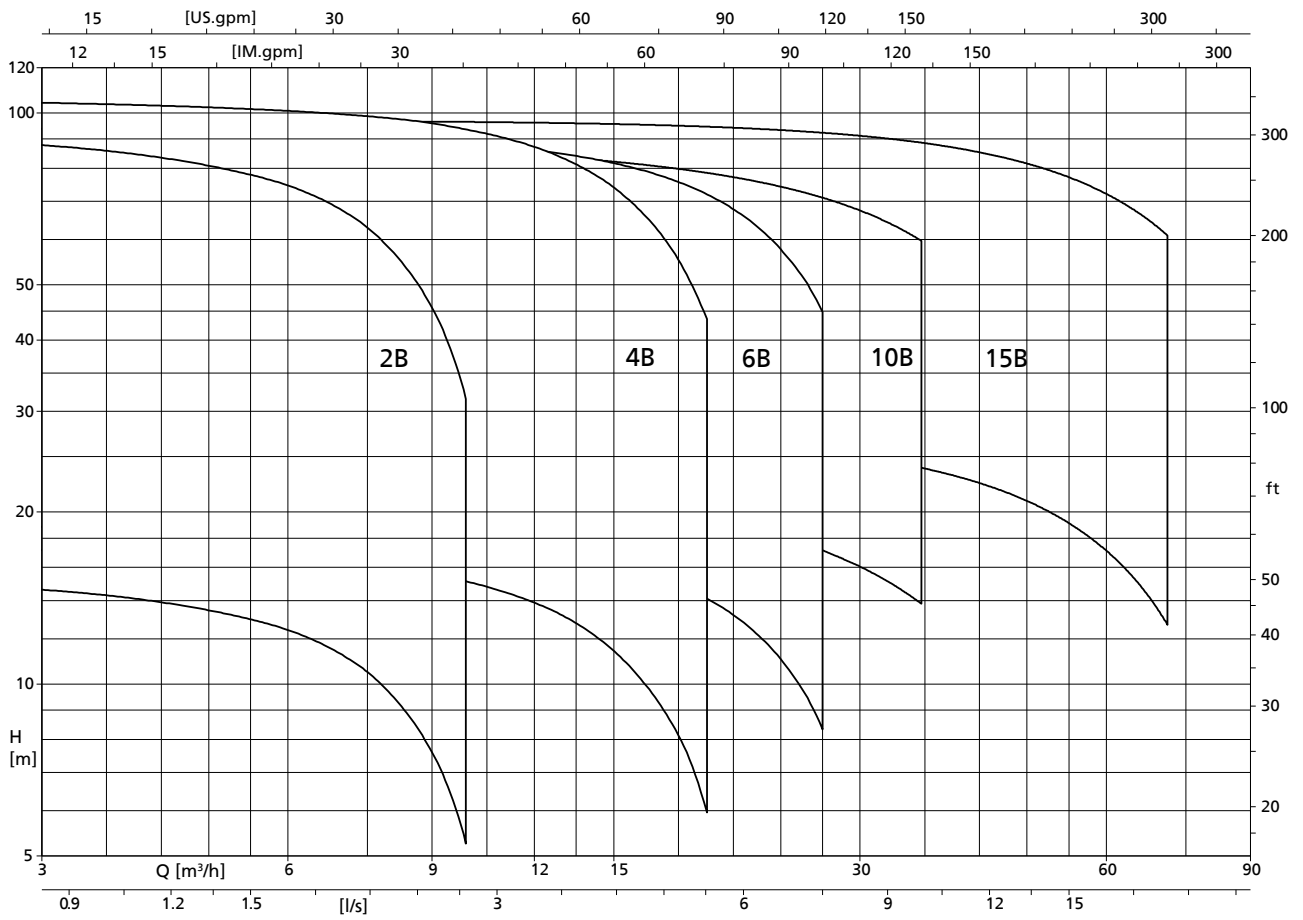
Direct	Indirect	
<p style="text-align: right;">1952+106</p>	<p>Unpressurised inlet tank at the same or at a higher level</p> <p style="text-align: right;">1952+107</p>	<p>Unpressurised inlet tank at a lower level (suction-lift operation) ²⁾</p> <p style="text-align: right;">1952+108</p>
<p>Inlet pressure monitoring (see Supplementary equipment or Accessories)</p>		
<p>At $p_{in} > 0.5$ bar (min. 1 bar, DIN 1988)</p> <ul style="list-style-type: none"> - Pressure switch - Pressure sensor <p>At $p_{in} < 0.5$ bar</p> <ul style="list-style-type: none"> - Pressure sensor - Flow monitoring 	<ul style="list-style-type: none"> - Float switch - Set of electrodes and relay - Dry running protection for PE inlet tank - Pressure sensor - Flow monitoring³⁾ 	<ul style="list-style-type: none"> - Float switch - Set of electrodes and relay - Dry running protection for PE inlet tank - Flow monitoring³⁾

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

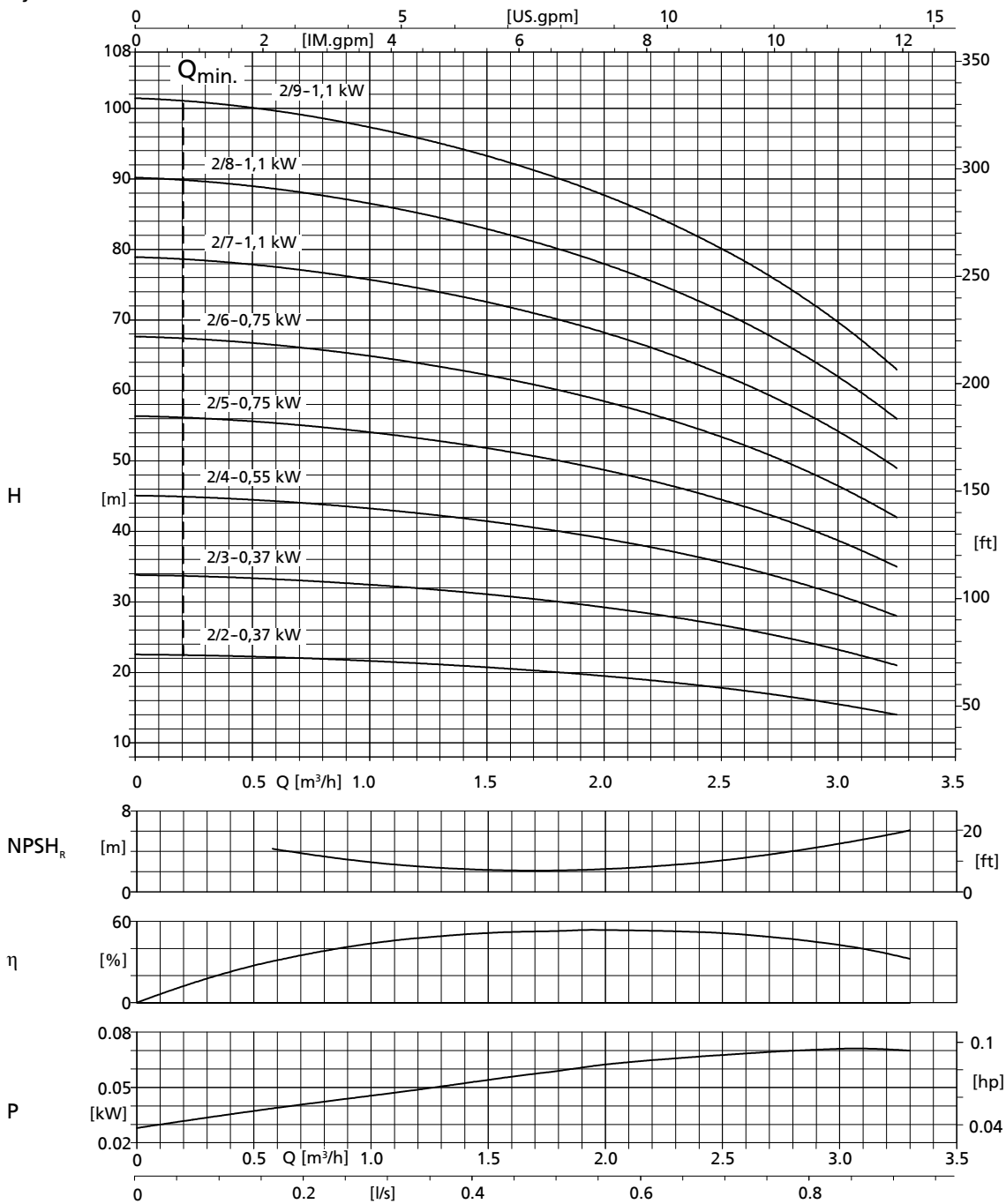
Selection chart

Shown for systems comprising 3 duty pumps



Characteristic curves

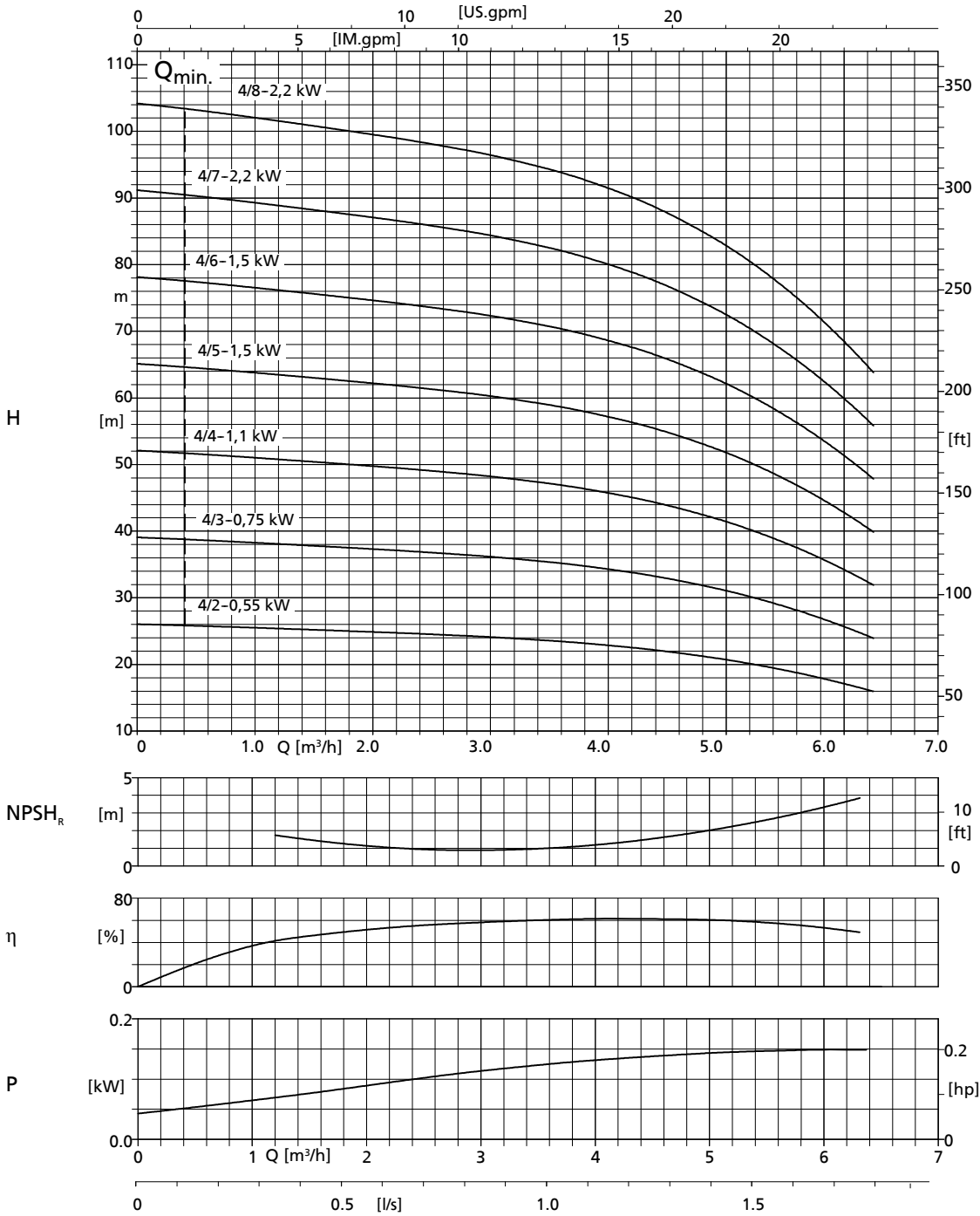
Hya-Eco VP with Movitec 2B



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 $\hat{=}$ flow rate as per characteristic curve Q [m³/h]
2	0	Required flow rate: 2 $\hat{=}$ flow rate as per characteristic curve Q [m³/h]
2	1	Required flow rate: 2 $\hat{=}$ flow rate as per characteristic curve Q [m³/h]
3	0	Required flow rate: 3 $\hat{=}$ flow rate as per characteristic curve Q [m³/h]

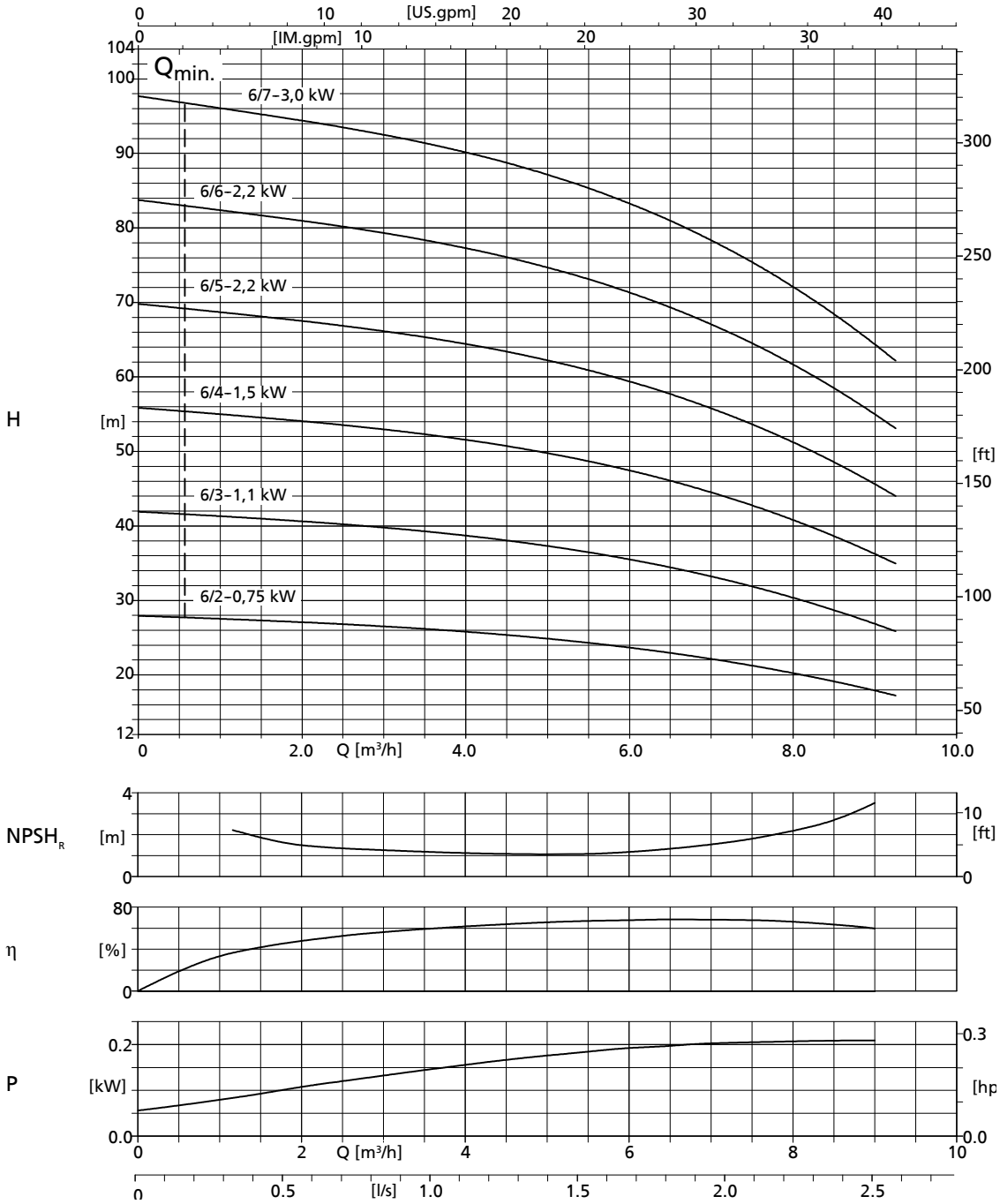
Hya-Eco VP with Movitec 4B



Flow rate as a function of the number of pumps

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

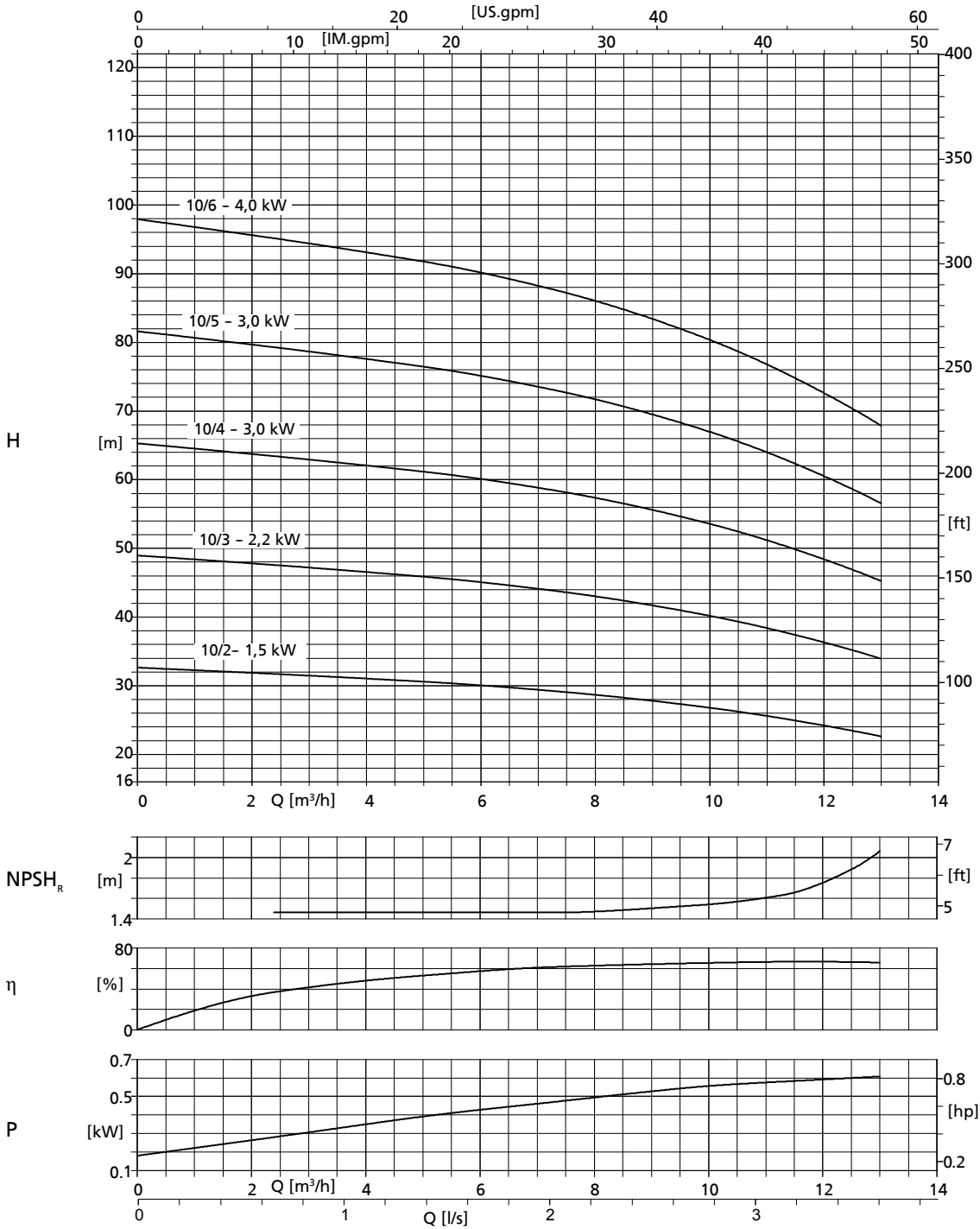
Hya-Eco VP with Movitec 6B



Flow rate as a function of the number of pumps

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

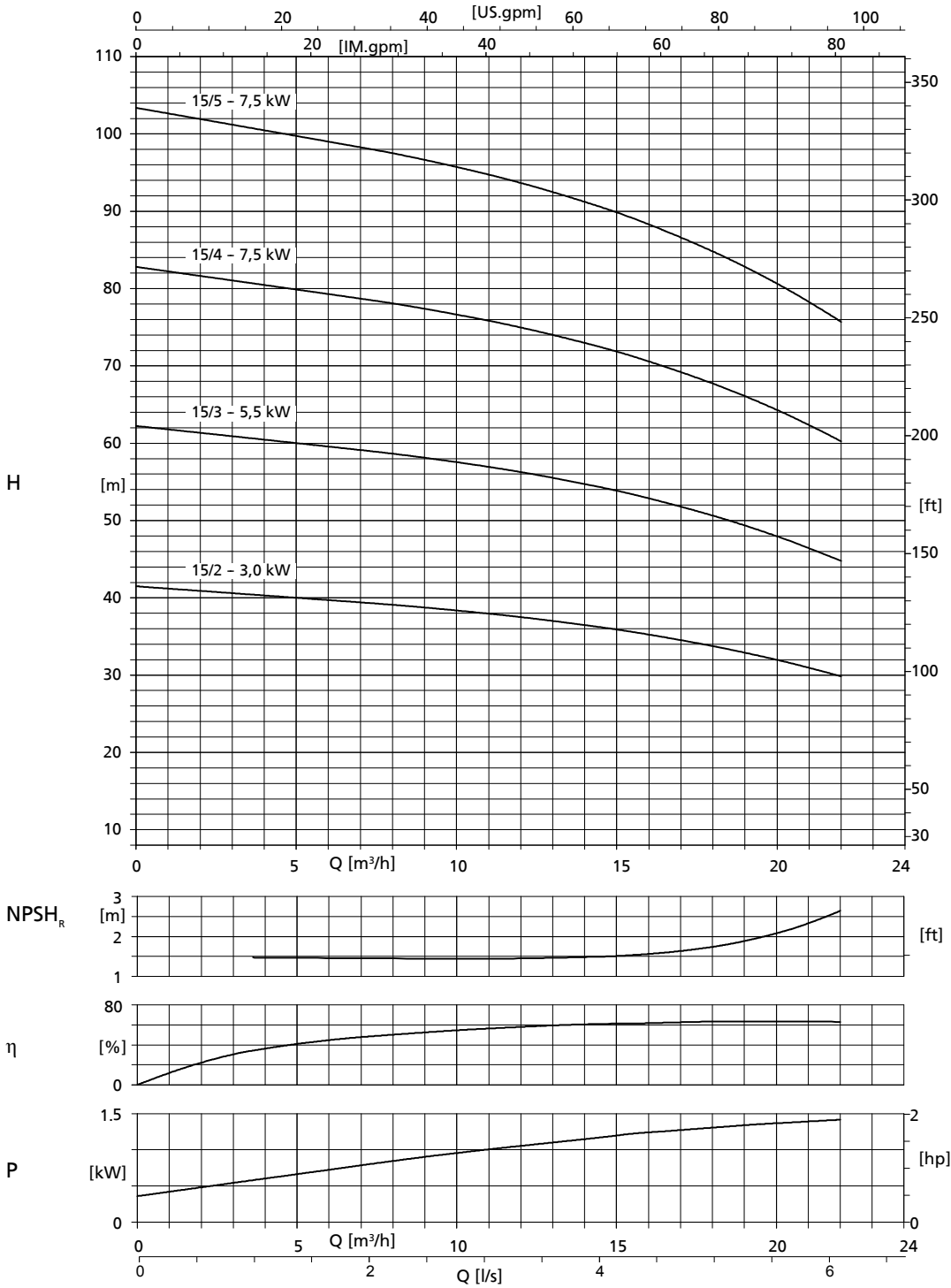
Hya-Eco VP with Movitec 10B



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
1	1	Required flow rate $\hat{=}$ flow rate as per characteristic curve Q [m³/h]
2	0	Required flow rate: 2 $\hat{=}$ flow rate as per characteristic curve Q [m³/h]
2	1	Required flow rate: 2 $\hat{=}$ flow rate as per characteristic curve Q [m³/h]
3	0	Required flow rate: 3 $\hat{=}$ flow rate as per characteristic curve Q [m³/h]

Hya-Eco VP with Movitec 15B

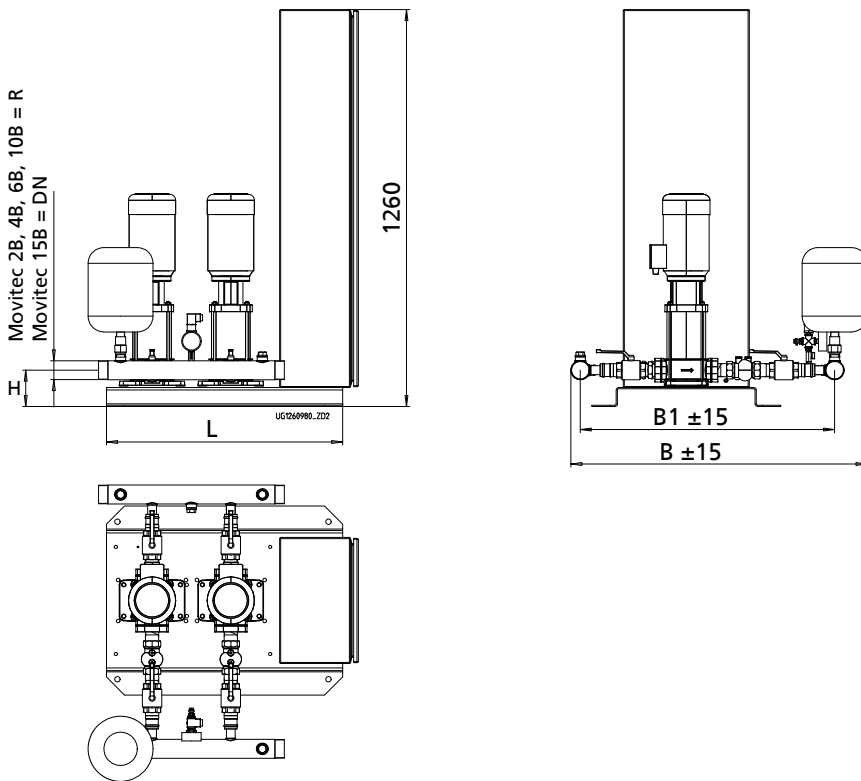


Flow rate as a function of the number of pumps

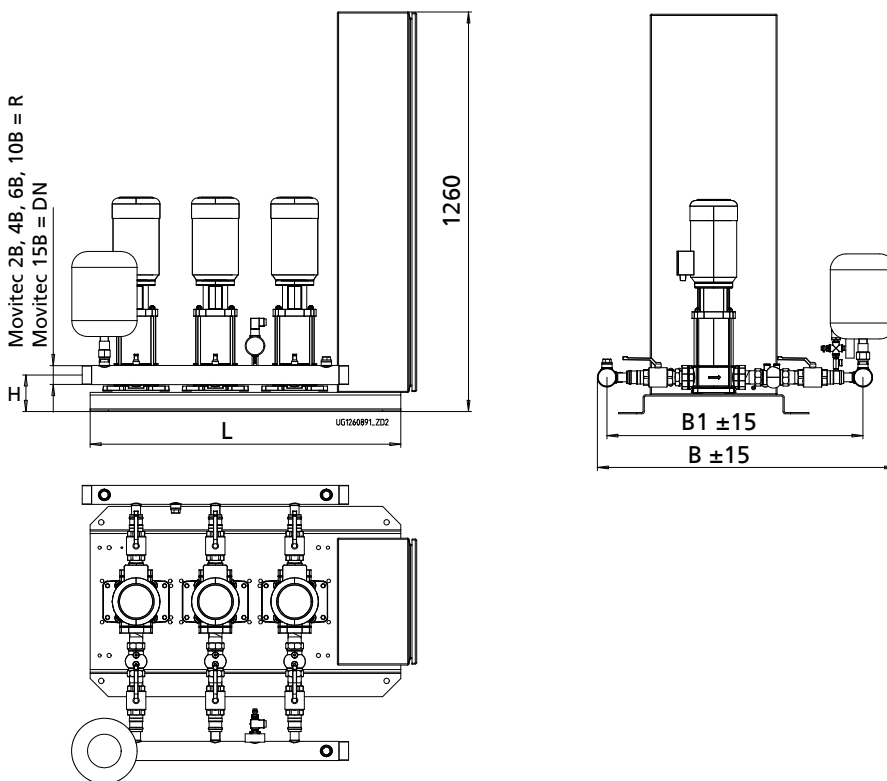
Duty pumps	Stand-by pumps	Flow rate as a function of the number of pumps
1	1	Required flow rate $\hat{=}$ flow rate as per characteristic curve Q [m³/h]
2	0	Required flow rate: 2 $\hat{=}$ flow rate as per characteristic curve Q [m³/h]
2	1	Required flow rate: 2 $\hat{=}$ flow rate as per characteristic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



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

- Either two or three vertical high-pressure centrifugal pumps (standard pumps)
- Hydraulic components made of stainless steel
- One check valve and shut-off valves for each pump
- Membrane-type accumulator on the discharge side, approved for drinking water

Dry running protection

Dry running protection

Part No.	Description	E No.	Mat. No.	[kg]
81-45	Dry running protection float switch With weight, PG cable gland and KTW approval Special lengths on request	5 m	19071650	1
		10 m	19070395	5,5
		20 m	19071651	1,8
81-45	Dry running protection float switch With KTW-approval Scope of supply: float switch with connection cable	5 m	11037630	1,1
		10 m	11037631	1,5
		20 m	11037632	2
81-45	Dry-running protection float switch ⁴⁾ Scope of supply: Float switch with connection cable	5 m	11037743	0,8
		10 m	11037744	1,3
		20 m	11037746	2,4
59-11	Weight for adjusting the float switch level (weight with fastening elements)		18040615	1,2
	Dry running protection, electrodes set, with analysis ⁵⁾ (When retrofitting it must be verified that sufficient space is provided in the control cabinet.)		01069615	0,3
			00533947	0,3

⁴⁾ Additional wiring to be effected by a trained electrician.

⁵⁾ Not for Hya-Solo DV

- Pressure transmitter on the discharge side
- Pressure indication via pressure gauge
- Powder-coated steel baseplate
- Pumps mounted on the baseplate with anti-vibration mounts

Control cabinet

- Control cabinet IP 54
- 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)
- 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 ON connection
- External OFF connection

Accessories

Supplementary equipment / options (E No.) supplied fitted to the pump set
 Accessories (Mat. No.) are included in the delivery but not fitted

Part No.	Description	E No.	Mat. No.	[kg]	
		E420			
693	Dry running protection ⁴⁾ , (inlet pressure > 0,5 bar) For Hya-Eco K / VP via pressure switch	Movitec 2, 4, 6, 10, 15	E400	18041026	1,2
693	Dry running protection ⁴⁾ , (inlet pressure > 0,5 bar) For Hya-Eco VP via pressure transmitter	Movitec 2, 4, 6, 10, 15	E410	18041027	1,5

Adapters

Adapters

Part No.	Description	Mat. No.	[kg]	
82-5	Adapter 2½"	Victaulic coupling DN 65	11036866	0,4

Pressure reducer

Pressure reducer

Part No.	Size	Type Honeywell	Max. inlet pressure	Downstream pressure	Mat. No.	[kg]
69-7	R 1	D06 F...A	25 bar	1,5 - 6 bar	01057183	1,4
69-7	R 1	D06 FN...B	25 bar	0,5 - 2 bar	01057184	2,4
69-7	R 1¼	D06 F...A	25 bar	1,5 - 6 bar	01057185	2
69-7	R 1¼	D06 FN...B	25 bar	0,5 - 2 bar	01057186	2,8
69-7	R 2	D06 F...A	25 bar	1,5 - 6 bar	00522969	4,5
69-7	R 2	D06 FN...B	25 bar	0,5 - 2 bar	00522960	5,6
69-7	DN 65	D15	16 bar	1,5 - 6 bar	00522957	28,2
69-7	DN 65	D15N	16 bar	0,2 - 2 bar	00522959	37
69-7	DN 80	D15	16 bar	1,5 - 6 bar	00522958	41,5
69-7	DN 80	D15N	16 bar	0,2 - 2 bar	00522956	54
69-7	DN 100	D15	16 bar	1,5 - 6 bar	00119996	67
69-7	DN 100	D15N	16 bar	0,2 - 2 bar	00119997	87,5
69-7	DN 150	D15	16 bar	1,5 - 6 bar	00198244	150
69-7	DN 150	D15N	16 bar	0,2 - 2 bar	00198247	196
69-7	DN 200	D15	16 bar	1,5 - 6 bar	00198245	408
69-7	DN 200 Flanges drilled to PN 16, DIN 2533	D15N	16 bar	0,2 - 2 bar	00198248	580

Expansion joints

Expansion joints PN 10

Part No.	Description	Mat. No.	[kg]	
71-8	Expansion joints PN 10	R 1"	11037177	0,4
		R 1¼"	11037178	0,2
		R 1½" (not to DVGW)	11037179	0,3
71-8	DN 40 with adapter flange PN 10/16 type 50 with KTW approval		01125069	3,4
	DN 65 with adapter flange PN 10/16 type 50 with KTW approval		11037184	5,6
	DN 80 with adapter flange PN 10/16 type 50 with KTW approval		01125072	6,7
	Screwed flange R 1½ (internal thread) with screws, bolts and washers For expansion joint DN 40, type 49	Mat. Galvanised steel	18040968	5
		Mat. 1.4541	18040969	5
	Screwed flange R 2 (internal thread) with screws, bolts and washers For expansion joint DN 50, type 50	Mat. Galvanised steel	18040647	5
		Mat. 1.4541	18040646	5
	Screwed flange R 2½ (internal thread) with screws, bolts and washers For expansion joint DN 65, 49	Mat. Galvanised steel	18040649	6

Part No.	Description	Mat. No.	[kg]	
		Mat. 1.4541	18040648	7
	Screwed flange R 3 (internal thread) with screws, bolts and washers For expansion joint DN 80, type 49	Mat. Galvanised steel	18040970	7
		Mat. 1.4541	18040971	7

Expansion joints PN 16

Type 49, blue, variant C: integrated length-limited expansion joints

Drinking water-approved as per regulation of the German health authority (Bundesgesundheitsamt) of 1986

Part No.	Size	Material	Mat. No.	[kg]
71-8	DN 40	Rubber, St-TZN	01125068	4,8
71-8	DN 50	Rubber, St-TZN	01057406	8
71-8	DN 65	Rubber, St-TZN	01057407	8
71-8	DN 80	Rubber, St-TZN	01049847	5,5
71-8	DN 100	Rubber, St-TZN	01049848	6,6
71-8	DN 150	Rubber, St-TZN	01049850	11,4
71-8	DN 200	Rubber, St-TZN	11037185	10

Inlet tank with accessories

Inlet tank

Closed inlet tank under atmospheric pressure, made of polyethylene

Part No.	Total volume [l]	Effective volume [l]	Connection Inlet line	Connection Outlet line	Mat. No.	[kg]
591.01	300	150	R 1	DN 50	01136287	30
591.01	600	300	R 1½	DN 50	01136288	40
591.01	750	500	R 1½	DN 50	01136289	50
591.01	1500	800	2 x R 2	DN 80	01136290	150
591.01	1800	1000	2 x R 2	DN 80	01136291	170
591.01	2700	1500	2 x R 2	DN 100	01136292	250
591.01	3200	2000	2 x R 2	DN 125	01136293	330
591.01	2700	1500	DN 80	DN 100	01136294	250
591.01	3200	2000	DN 100	DN 125	01136295	330

Membrane-type accumulator made of steel

Part No.	Description	Type ⁶⁾ Nominal volume	Effective volume max.	Connection	Mat. No.	[kg]
591	Membrane-type accumulator ⁷⁾ Double connection PN 10	80 l	60	DN 50	01064950	33
		200 l	150	DN 50	01065001	56
		300 l	225	DN 50	01065002	61
		500 l	350	DN 50	01065003	91
		600 l	340	DN 50	01056394	258
		800 l	450	DN 50	00198687	270
		1000 l	450	DN 50	00198688	345
		1001 l	750	DN 65	01054867	420
591	Membrane-type accumulator ⁷⁾ Double connection PN 16	80 l	60	DN 50	00198689	70
		200 l	150	DN 50	00198690	116
		300 l	225	DN 50	00198691	110
		400 l	300	DN 50	00198692	180
		600 l	340	DN 50	01056395	298
		800 l	450	DN 50	00198693	270
		1000 l	450	DN 50	00198694	345
		1001 l	750	DN 65	01054868	345

⁶⁾ Total volume in l

⁷⁾ Adapter for DN 80 - DN 100: on request

Part No.	Description	Type ⁶⁾ Nominal volume	Effective volume max.	Connection	Mat. No.	[kg]
	Set of accessories DN 50	Blind flange for single connection			01054865	1
	Set of accessories DN 65	Blind flange for single connection			01054866	1
	Membrane rupture detector				01147508	1

⁶⁾ Total volume in l



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