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Let's Solve Water

50 Hz

VM Series

CLOSE-COUPLED THREADED VERTICAL MULTISTAGE CENTRIFUGAL ELECTRIC PUMPS EQUIPPED WITH IE2, IE3 MOTORS (REG. (EU) 2019/1781)

ErP 2009/125/EC

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Directive 2009/125/EC of the European Union

The **Directive 2005/32/EC** on energy-using products (**EuP**) and the subsequent **Directive 2009/125/EC** on energy-related products (**ErP**) established the ecodesign requirements for products to reduce their energy consumption and consequently their environmental impact.

These requirements apply to products placed and used in the European Economic Area (European Union plus Iceland, Liechtenstein and Norway) as a stand-alone unit or as integrated parts in other products.

The table shows the Regulations that define the requirements for Lowara products::

Product	Regulations	From	Target
Pumps*	(EU) N. 547/2012	1 January 2015	**MEI** ≥ 0,4
Circulators**	(EC) N. 641/2009, (EU) N. 622/2012 e (EU) 2019/1781	1 August 2015	**EEI** < 0,23
Electric motors	(EU) 2019/1781 e 2021/341	1 July 2021	**IE2**: three-phase motors with a rated output ≥ 0,12 and < 0,749 kW **IE3**: three-phase motors with a rated output ≥ 0,75 and < 1000 kW
Variable speed drives (VSD)***	(EU) 2019/1781 e 2021/341	1 July 2021	**IE2**

* some types of pump, used for pumping clean water.
** circulators with a rated hydraulic output power of between 1 and 2500 W, designed for use in heating systems or in secondary circuits of cooling distribution systems.
*** variable speed drives with three-phase input and rated output power from 0,12 kW up to 1000 kW, rated for operating with motor included in the same regulations.

From 1 July 2023 it will be introduced additional requirements.

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VM SERIES
GENERAL INTRODUCTION

Our customers are central to our business.

Many years of collaboration with them across the different markets and all over the world has taught us that the Building Services market requires specific pump design to meet the challenge of the energy saving and market competitiveness, also through performances and reliability. Therefore Lowara has developed a new range of single piece vertical multistage pumps, the VM, to give an appropriate and dedicated solution to special applications and installations in the residential and commercial building services market.

Pump design

The VM is a non-self-priming vertical multistage, high pressure centrifugal pump, with threaded inlet and outlet manifolds. The pumps are close-coupled design and are equipped with non-standard Lowara motors. The VM is equipped with mechanical seal. The VM are highly modular pumps that are fitted with an innovative hydraulic design that secures high efficiency performances and an increased Mean Time Between Failure.

The VM is available in four different sizes; the design is made of a cast iron pump body coupled to an external stainless steel (EN 1.4301/ AISI 304) TIG welded sleeve with the mean of stainless steel tie rods screwed in the aluminium motor flange. The impellers are made in technopolymer.

Motor

The VM are equipped with Lowara designed and manufactured surface motors in accordance with EN standards. The VM series can be equipped as well with Lowara variable speed drivers.

Range declination

The VM series are available as:
- Single pump.
- Variable speed system.

SPECIFICATIONS

PUMP

- Flow rate: up to 14 m^3/h.
- Head: up to 98 m.
- Ambient temperature:
  - Three-phase motor versions from -15°C to +50°C.
  - Single-phase motor versions from -15°C to +45°C (from -15°C to +40°C for 3VM02P and all models with 0,95 kW motor).
- Temperature of the pumped liquid:
  - +90°C for versions with three-phase motor uses as EN 60335-2-41.
  - +60°C for versions with single-phase motor.
- Maximum operating pressure: 10 bar (PN 10).
- Connections: Rp threaded for both suction and discharge manifold.
- Hydraulic performances compliant with ISO 9906:2012 - Grade 3B.

MARKET SECTORS

BUILDING SERVICES.

APPLICATIONS

- Pressure boosting and water supply systems.
- Small to medium irrigation systems.
- Liquid handling systems.

MOTOR

- Electric short-circuit squirrel-cage motor, enclosed construction, air-cooled (TEFC).
- IP 55 protection degree.
- Insulation class 155 (F).
- Performances according to EN 60034-1.
- Standard voltage:
  - Single-phase: 220-240V, 50 Hz.
  - Three-phase: 220-240/380-415V, 50 Hz up to 3 kW.

The VM pumps for drinking water use are WRAS, ACS e D.M. 174 certified.

VM SERIES
APPLICATIONS, BENEFITS – BUILDING SERVICES

The VM series have been designed to cover a wide range of applications in the residential and small commercial building services from water supply to pressure boosting.

Applications

The VM series could be installed both in single private own house and in small/medium residential buildings.
The VM series will be as well your preferred choice for water supply and pressure boosting in small block offices and shops. The VM series could be finally installed as well for small/medium irrigation installation.

Benefits

Ease of installation: thanks to the limited dimensions due to the close-coupled vertical design, the VM is easy to handle and install.

Payback: Installing the VM series guarantee a very short payback period thanks to the high performance and to the competitive market positioning.

Reliability: The VM series secures as well reliable operations over time thanks to its robust and innovative design, heritage of the e-HM. This could be increased with the installation of the e-SM Drive: variable speed operation reduces mechanical stress on the pump components and water hammering during stopping.

Comfort: The VM series guarantee as well an increased user comfort thanks to very silent operation. The combination of the VM series with the e-SM Drive will secure constant pressures at any points of water in your building and constant temperatures even when other taps are opened!

Features

- Compact design with best-in class performances.
- Wide range of performances with 4 sizes and flow up to 14m³/h.
- Nominal pressure up to 10 bars.
- Robust and silent design due the sleeve configuration.
- IE2/IE3 Lowara manufactured motors: high performances and silent operations.
- "Essential O-ring design" that highly reduces the sealing weaknesses (Only 2 OR in the sleeve design).

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VM SERIES
GENERAL CHARACTERISTICS

VM..P SERIES	1	3	5	10
Max efficiency flow (m^3/h)	1,8	3,0	5,0	10,6
Flow range (m^3/h)	0,7÷2,4	1,2÷4,2	2,4÷7,2	5÷14
Maximum head (m)	92	96	99	93
Motor power (kW)	0,30÷1,1	0,30÷1,5	0,40÷2,2	1,1÷3
Max η (%) of pump	39	47	56	62
Minimum efficiency index **MEI** (≥)	0,7	0,7	0,7	0,7
Standard temperature (°C)	-30 +90			

1-10vmp_2p50-en_a_tg

CONNECTIONS

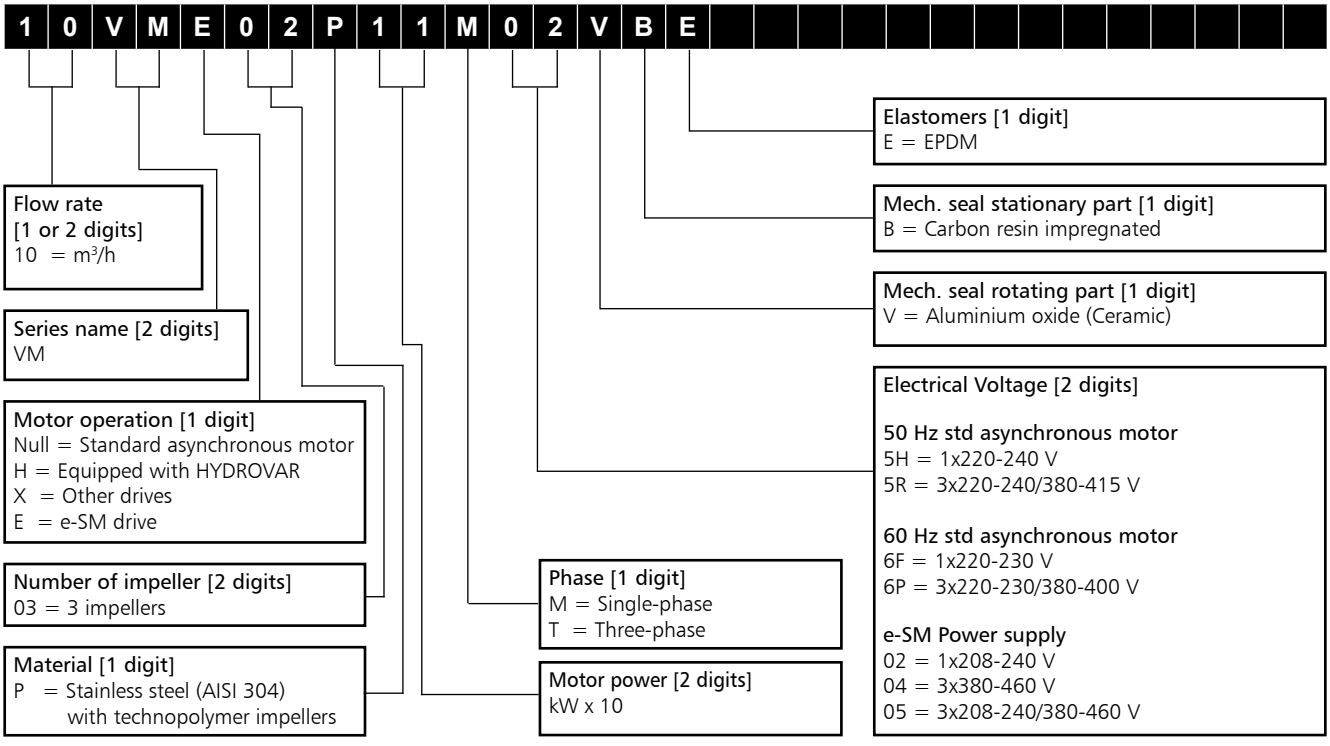
CONNECTION TYPE	VM..P SERIES			
	1	3	5	10
Rp thread (suction)	Rp 1	Rp 1	Rp 1 1/4	Rp 1 1/2
Rp thread (delivery)	Rp 1	Rp 1	Rp 1 1/4	Rp 1 1/2

1-10vm_2p50-en_a_tc

STORAGE AND TRANSPORT TEMPERATURE

-40°C to +60°C

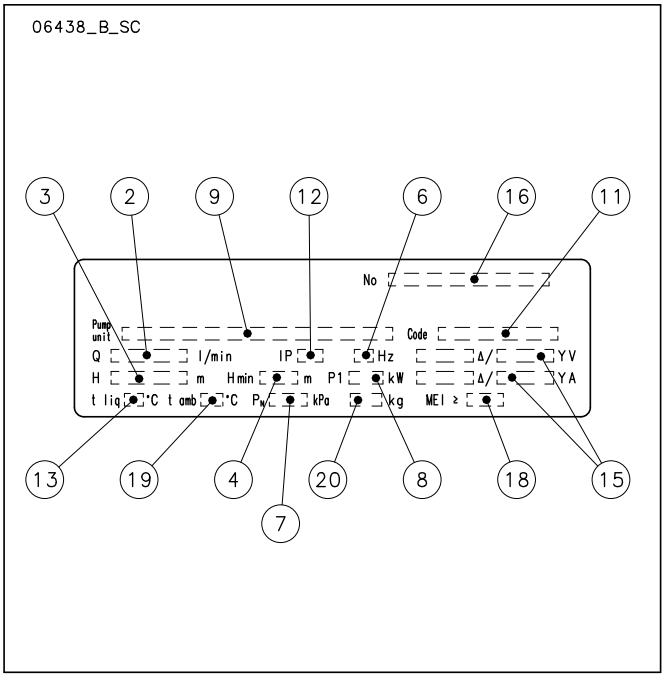
IDENTIFICATION CODE



EXAMPLE: 10VM05P30T5RVBE
10 = Flow rate 10 m^3/h, **VM** = VM series electric pump, **05** = number of impellers 5, **P** = P version (technopolymer impellers), **30** = 3 kW rated motor power, **T** = three-phase, **5R** = 50 Hz voltage 220-240/380-415V, **VBE** = Aluminium/Carbon mechanical seal and EPDM elastomers.

EXAMPLE: 10VME02P11M02VBE
10 = Flow rate 10 m^3/h, **VM** = VM series electric pump, **E** = e-SM (SMART) coupling, **02** = number of impellers 2, **P** = P version (technopolymer impellers), **11** = 1,1 kW rated motor power, **M** = single-phase, **02** = e-SM power supply 1x208-240, **VBE** = Aluminium/Carbon mechanical seal and EPDM elastomers.

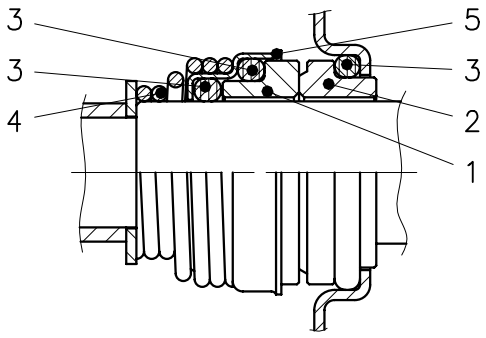
VM SERIES
ELECTRIC PUMP RATING PLATE



LEGEND

2 - Capacity range
3 - Head range
4 - Minimum head (EN 60335-2-41)
6 - Frequency
7 - Maximum operating pressure
8 - Electric pump unit absorbed power
9 - Pump / electric pump unit type
11 - Electric pump unit / pump part number
12 - Protection degree
13 - Maximum operating liquid temperature (uses as EN 60335-2-41)
15 - Rated voltage range
16 - Serial number (date + progressive number)
18 - MEI index (Regolation (EU) n. 547/2012)
19 - Maximum operating ambient temperature
20 - Electric pump weight

MECHANICAL SEAL



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LIST OF MATERIALS ACCORDING TO EN 12756

POSITION 1 - 2	POSITION 3	POSITION 4 - 5
V : Aluminium oxide (Ceramic)	E_2 : EPDM-WRAS	G : AISI 316
B_3 : Graphite		

1-10vm_ten-mec-en_b_tm

TYPE OF SEAL

TYPE	POSITION 1	2	3	4	5	*TEMPERATURE (°C)	OPERATING PRESSURE
	ROTATING PART	STATIONARY PART	ELASTOMERS	SPRINGS	OTHER COMPONENTS		
STANDARD MECHANICAL SEAL							
VB_3E_2GG	V	B_3	E_2	G	G	-30 + 90	PN10

* For single-phase versions limit the temperature to +60°C.

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1, 3, 5, 10 VM..P SERIES
ELECTRIC PUMP CROSS SECTION AND MAIN COMPONENTS

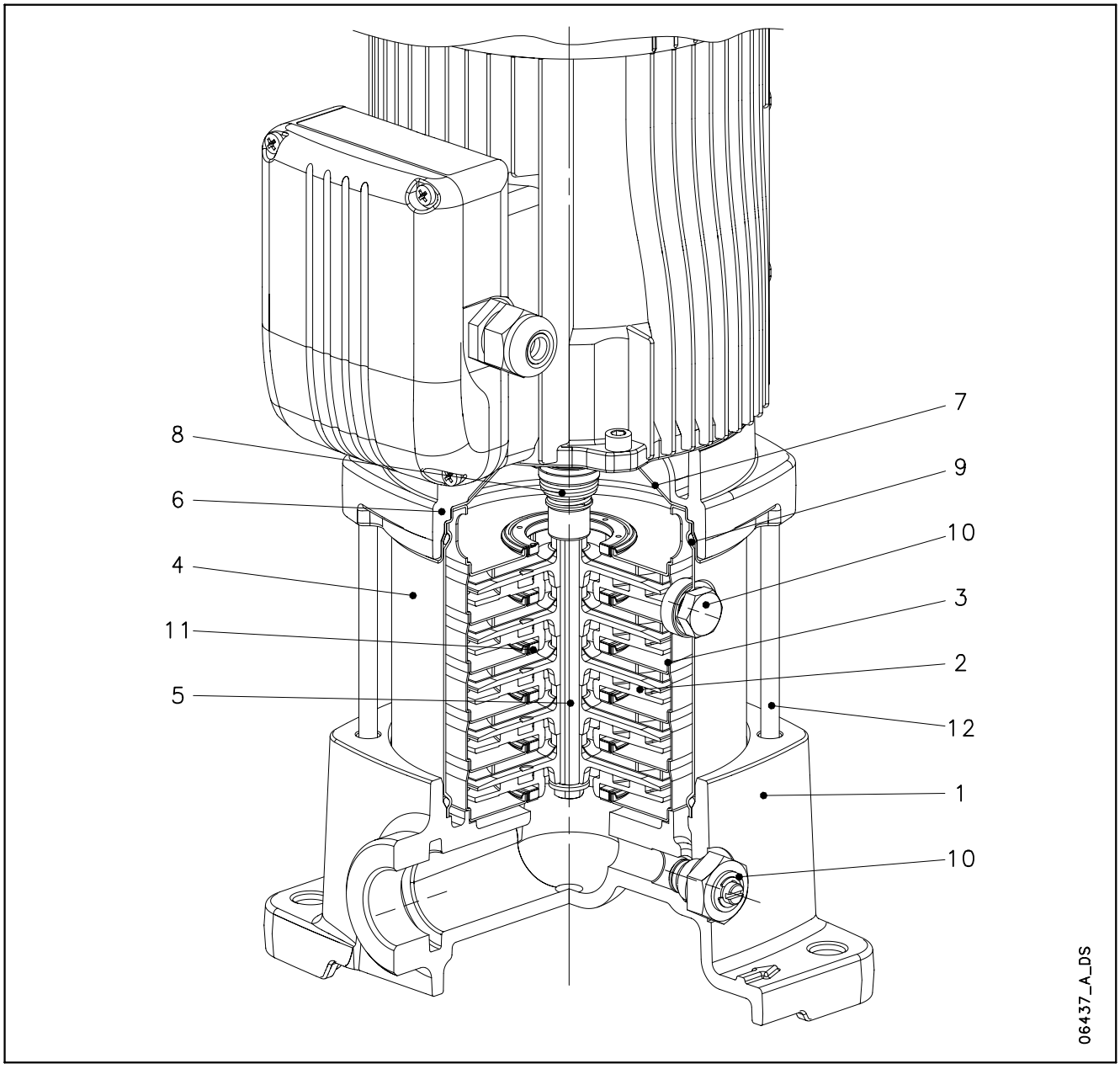

TABLE OF MATERIALS

REF. N.	NAME	MATERIAL	REFERENCE STANDARDS	
			EUROPE	USA
1	Pump body	Cast iron	EN 1561-GJL-200 (JL1030)	ASTM Class 25
2	Impeller	Technopolymer		
3	Diffuser	Stainless steel	EN 10088-1-X5CrNi18-10 (1.4301)	AISI 304
4	Outer sleeve	Stainless steel	EN 10088-1-X5CrNi18-10 (1.4301)	AISI 304
5	Shaft	Stainless steel	EN 10088-1-X5CrNi18-10 (1.4301)	AISI 304
6	Adapter	Aluminium	EN 1706-AC-AlSi11Cu2 (Fe) (AC46100)	-
7	Seal housing	Stainless steel	EN 10088-1-X5CrNi18-10 (1.4301)	AISI 304
8	Mechanical seal	Ceramic / Carbon / EPDM		
9	Elastomers	EPDM		
10	Fill / drain plugs	Stainless steel	EN 10088-1-X5CrNi18-10 (1.4301)	AISI 304
11	Wear ring	Technopolymer (PPS)		
12	Tie rods	Stainless steel	EN 10088-1-X17CrNi16-2 (1.4057)	AISI 431

1-3-5-10vm-p-en_b_tm

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VM SERIES
MOTORS (ErP 2009/125/EC)

- **Supplied three-phase surface motors with IE2 efficiency level for power < 0,75 kW, IE3 efficiency level for power ≥ 0,75 kW as standard according to EN 60034-30:2009 and EN 60034-30-1:2014.**
- Short-circuit squirrel-cage motor, enclosed construction with external ventilation (TEFC).
- **IP55** protection degree.
- Insulation class **155 (F)**.
- Electrical performances according to EN 60034-1.
- Metric cable gland according to EN 50262.
- **Single-phase** version:
  220-240 V 50 Hz
  Built-in automatic reset overload protection up to 2,2 kW.
  Maximum ambient temperature: 40 °C.
- **Three-phase** version:
  220-240/380-415 V 50 Hz for power up to 3 kW.
  Overload protection to be provided by the user.
  Maximum ambient temperature: 50 °C.

From 1 July 2021 in accordance with the **Regulations (EU) 2019/1781 and 2021/341**, the three-phase 50 Hz, 60 Hz or 50/60 Hz **surface motors** with **power outputs ranging from 0,12 to 0,749 kW** must have a minimum level **IE2** efficiency; the ones with power outputs ranging **from 0,75 and 1000 kW** must have a minimum level of **IE3** efficiency.

From 1 July 2023, it will be introduced additional requirements.

The following tables also contain the mandatory information pursuant to Annex I, section 2, of the aforementioned Regulations.

SINGLE-PHASE MOTORS AT 50 Hz, 2-POLE

P_N kW	MOTOR TYPE	IEC SIZE	Construction Design	INPUT CURRENT In (A) 220-240 V	CAPACITOR µF	CAPACITOR V	DATA FOR 230 V 50 Hz VOLTAGE min^{-1}	Is / In	η %	cosφ	Tn Nm	Ts/Tn	Tm/Tn	OPERATING CONDITIONS ** Altitude asl m	T. amb min/max °C	ATEX
0,50	SM63HM../1055	63	SPECIAL	3,46-3,30	16	450	2705	2.90	66,9	0,98	1,76	0,56	1,61	≤1000	-15/40	No
0,55	SM71HM../1055	71		3,76-3,99	16	450	2820	3,72	68,9	0,91	1,86	0,61	2,00			
0,75	SM71HM../1075	71		4,90-4,85	20	450	2765	3,42	70,1	0,96	2,59	0,58	1,75			
0,95	SM71HM../1095	71		6,25-5,89	25	450	2740	3,39	71,1	0,98	3,31	0,58	1,66			
1,1	SM80HM../1115	80		6,88-6,65	30	450	2800	3,89	74,7	0,96	3,75	0,46	1,72			
1,5	SM80HM../1155	80		9,21-8,58	40	450	2810	4,00	76,1	0,98	5,09	0,39	1,74			
2,2	PLM90HM../1225	90		12,5-11,6	70	450	2825	4,47	82,4	0,97	7,43	0,53	1,87			

** Operating conditions related only to the motor. For the electric pump refer to the IOM.

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VM SERIES
THREE-PHASE MOTORS AT 50 Hz, 2-POLE

P_N kW	Fabbricante / Modello	Grandezza IEC	Forma costruttiva	N. poli	f_N Hz	Dati relativi alla tensione di 400 V / 50 Hz: cosφ	Is / I_N	T_N Nm	Ts/T_N	Tm/Tn
0,30	SM63HM../303	63	SPECIALE	2	50	0,63	4,20	1,04	4,18	4,12
0,40	SM63HM../304	63				0,64	4,35	1,37	4,14	4,10
0,50	SM63HM../305	63				0,69	4,72	1,75	4,08	4,00
0,55	SM71HM../305	71				0,71	6,25	1,84	3,96	3,97
0,75	SM80HM../307 E3	80				0,78	7,38	2,48	3,57	3,75
1,1	SM80HM../311 E3	80				0,79	8,31	3,63	3,95	3,95
1,5	SM80HM../315 E3	80				0,80	8,80	4,96	4,31	4,10
2,2	PLM90HM../322 E3	90				0,80	8,77	7,28	3,72	3,70
3	PLM90HM../330 E3	90				0,79	7,81	9,93	4,26	3,94

P_N kW	Tensione U_N V: Δ 220 V	Δ 230 V	Δ 240 V	Y 380 V	Y 400 V	Y 415 V	Δ 380 V	Δ 400 V	Δ 415 V	Y 660 V	Y 690 V	n_N min^{-1}	Condizioni operative **: Altitudine s.l.m. m	T. amb min/max °C	ATEX
	I_N (A)														
0,30	1,66	1,82	1,96	0,96	1,05	1,13	-	-	-	-	-	2715 ÷ 2775	≤ 1000	-15 / 50	No
0,40	2,03	2,18	2,32	1,17	1,26	1,34	-	-	-	-	-	2745 ÷ 2800			
0,50	2,42	2,51	2,65	1,40	1,45	1,53	-	-	-	-	-	2690 ÷ 2765			
0,55	2,46	2,49	2,56	1,42	1,44	1,48	-	-	-	-	-	2835 ÷ 2865			
0,75	2,96	2,94	2,96	1,71	1,70	1,71	1,70	1,69	1,70	0,98	0,98	2875 ÷ 2895			
1,1	4,19	4,14	4,16	2,42	2,39	2,40	2,41	2,38	2,38	1,39	1,37	2870 ÷ 2900			
1,5	5,56	5,49	5,51	3,21	3,17	3,18	3,21	3,18	3,19	1,85	1,84	2870 ÷ 2895			
2,2	7,97	7,90	7,98	4,60	4,56	4,61	4,57	4,54	4,57	2,64	2,62	2880 ÷ 2900			
3	11,0	11,0	11,2	6,35	6,33	6,44	6,29	6,27	6,34	3,63	3,62	2865 ÷ 2895			

P_N kW	Rendimento η_N %: Δ 220 V Y 380 V 4/4	3/4	2/4	Δ 230 V Y 400 V 4/4	3/4	2/4	Δ 240 V Y 415 V 4/4	3/4	2/4	Δ 380 V Y 660 V 4/4	3/4	2/4	Δ 400 V Y 690 V 4/4	3/4	2/4	Δ 415 V 4/4	3/4	2/4	IE
0,30	67,1	69,6	65	67,1	66,5	60,2	67,1	63,3	55,7	-	-	-	-	-	-	-	-	-	2
0,40	70,4	73,2	68,9	70,4	70,3	64,5	70,4	67,2	60,2	-	-	-	-	-	-	-	-	-	
0,50	73	76,1	73,4	73	73,8	69,6	73	71,3	65,7	-	-	-	-	-	-	-	-	-	
0,55	74,1	74,2	70,4	74,1	73,6	68,8	74,1	72,7	67,1	-	-	-	-	-	-	-	-	-	
0,75	82,5	83,1	81,3	82,8	82,7	80,1	82,6	82,0	78,9	82,5	82,0	78,9	82,5	82,0	78,9	82,5	82,0	78,9	3
1,1	84,0	84,7	83,4	84,4	84,5	82,5	84,3	84,0	81,4	84,0	84,0	81,4	84,0	84,0	81,4	84,0	84,0	81,4	
1,5	85,6	86,5	85,8	85,9	86,4	84,9	86,0	86,0	84,0	85,6	86,0	84,0	85,6	86,0	84,0	85,6	86,0	84,0	
2,2	86.5	87,4	86,8	86,4	86,9	85,7	86,6	86,7	85,0	86,4	86,7	85,0	86,4	86,7	85,0	86,4	86,7	85,0	
3	87.2	88,5	88,3	87,5	88,2	87,5	87,5	87,8	86,4	87,2	87,8	86,4	87,2	87,8	86,4	87,2	87,8	86,4	

** Condizioni operative riferite esclusivamente al motore. Per l'elettropompa valgono i limiti previsti nel manuale d'uso

VM SERIES
ELECTRIC PUMP NOISE

The tables below show the mean sound pressure levels (Lp) measured at 1 meter distance in a free field according to EN ISO 11203. The noise values are measured on 50 Hz motors and have a tolerance of 3 dB (A) according to EN ISO 4871.

POWER kW	NOISE LpA dB
0,30	52
0,40	52
0,50	52
0,55	55
0,75	55
0,95	55
1,1	60
1,5	60
2,2	60
3	60

1-10vm_mot_2p50-en_a_tr

AVAILABLE MOTOR VOLTAGES, 2-POLE

	SINGLE-PHASE							
	50 Hz			60 Hz				
P_N kW	1 x 220-240	1 x 100	1 x 110-120	1 x 220-230	1 x 100	1x 110-115	1 x 120-127	1 x 200-210
0,50	s	-	-	s	-	o	-	-
0,55	s	o	o	s	o	o	o	o
0,75	s	o	o	s	o	o	o	o
0,95	s	o	o	s	o	o	o	o
1,1	s	-	o	s	-	o	-	o
1,5	s	-	-	s	-	o	-	o
2,2	s	-	-	s	-	-	-	-

	THREE-PHASE																	
	50 Hz							60 Hz								50/60 Hz		
P_N kW	3 x 220-230-240/380-400-415	3 x 380-400-415/660-690	3 x 200-208/346-360	3 x 255-265/440-460	3 x 290-300/500-525	3 x 440-460/-	3 x 500-525/-	3 x 220-230/380-400	3 x 255-265-277/440-460-480	3 x 380-400/660-690	3 x 440-460-480/-	3 x 110-115/190-200	3 x 200-208/346-360	3 x 330-346/575-600	3 x 575/-	3 x 230/400 50 Hz 3 x 265/460 60 Hz	3 x 400/690 50 Hz 3 x 460/- 60 Hz
0,30	s	o	o	o	o	o	o	s	o	o	o	o	o	o	o	o	o
0,40	s	o	o	o	o	o	o	s	o	o	o	o	o	o	o	o	o
0,50	s	o	o	o	o	o	o	s	o	o	o	o	o	o	o	o	o
0,55	s	o	o	o	o	o	o	s	o	o	o	o	o	o	o	o	o
0,75	s	o	o	o	o	o	o	s	o	o	o	o	o	o	o	o	o
1,1	s	o	o	o	o	o	o	s	o	o	o	o	o	o	o	o	o
1,5	s	o	o	o	o	o	o	s	o	o	o	o	o	o	o	o	o
2,2	s	o	o	o	o	o	o	s	o	o	o	o	o	o	o	o	o
3	s	o	o	o	o	o	o	s	o	o	o	o	o	o	o	o	o

s = Standard voltage o = voltage upon request - = Not available

vm-volt-lowa-en_b_te

Please contact the sales network to check other available voltages.

Tolerances on nominal voltages

- **50 Hz:**
  ±10% on the single voltage value shown on the rating plate.
  ±5% on voltage range shown on the rating plate.
- **60 Hz:**
  ±10% on the voltage values shown on the rating plate.

VM SERIES
PUMPS (ErP 2009/125/EC)

With the **Regulation (EU) N. 547/2012**, the European Commission has established the requirements of ecodesign for some typologies of pumps used for pumping clean water, placed on the market and operated as stand-alone units or as parts of other products.

For vertical multi-stage pumps (MS-V for the Regulations), the requirements refers to:
- just the pump and not the pump and motor assembly (electric or combustion);
- pumps with:
  - a nominal pressure PN not higher than 25 bar (2500 kPa);
  - a speed of 2900 min^{-1} (for electric pumps this means 50 Hz 2-pole electric motors);
  - a maximum flow of 100 m^3/h;
- use with clean water at a temperature ranging from -10°C to 120°C (the test is performed with cold water at a temperature not higher than 40°C).

This regulation states that water pumps shall have index MEI coming from a dedicated formula which considers hydraulic efficiency values at 'best efficiency point' (BEP), 75 % of the flow at BEP (Part load – PL) and 110 % of the flow at BEP (Over load – OL).

The Regulation also establishes the following deadline:

from	minimum efficiency index (MEI)
1st January 2015	MEI ≥ 0,4

Regulation (EU) n. 547/2012 – Annex II – point 2 (Product information requirements)

1) Minimum efficiency index: see the MEI column in the tables in the *General Characteristics* section.
2) The benchmark for most efficient water pumps is MEI ≥ 0,70.
3) Year of manufacture: see date on rating plate (≥ 2013).
4) Manufacturer: Xylem Service Italia Srl - Reg. No 07520560967 - Montecchio Maggiore, Vicenza, Italy.
5) Product type: see the PUMP TYPE column in the tables in the *Hydraulic performance* section.
6) Hydraulic pump efficiency with trimmed impeller: not applicable to these products.
7) Pump performance curves, including the performance curve: see the *Operating Characteristics* graphs in the following pages.
8) The efficiency of a pump with a trimmed impeller is usually lower than that of a pump with the full impeller diameter. The trimming of the impeller will adapt the pump to a fixed duty point, leading to reduced energy consumption. The minimum efficiency index (MEI) is based on the full impeller diameter.
9) The operation of this water pump with variable duty points may be more efficient and economic when controlled, for example, by the use of a variable speed drive that matches the pump duty to the system.
10) Information relevant for disassembly, recycling or disposal at end-of-life: observe the current laws and by-laws governing sorted waste disposal. Consult the product operating manual.
11) "Designed for use below – 10 °C only": note not applicable to these products.
12) "Designed for use above 120 °C only": note not applicable to these products.
13) Specific instructions for pumps as per points 11 and 12: not applicable to these products.
14) "Information on benchmark efficiency is available at": www.europump.org (Ecodesign section).
15) The benchmark efficiency graphs with MEI = 0.7 and MEI = 0.4 are available at www.europump.org, (Ecodesign, Efficiency charts). Refer to "Multistage Vertical 2900 rpm"

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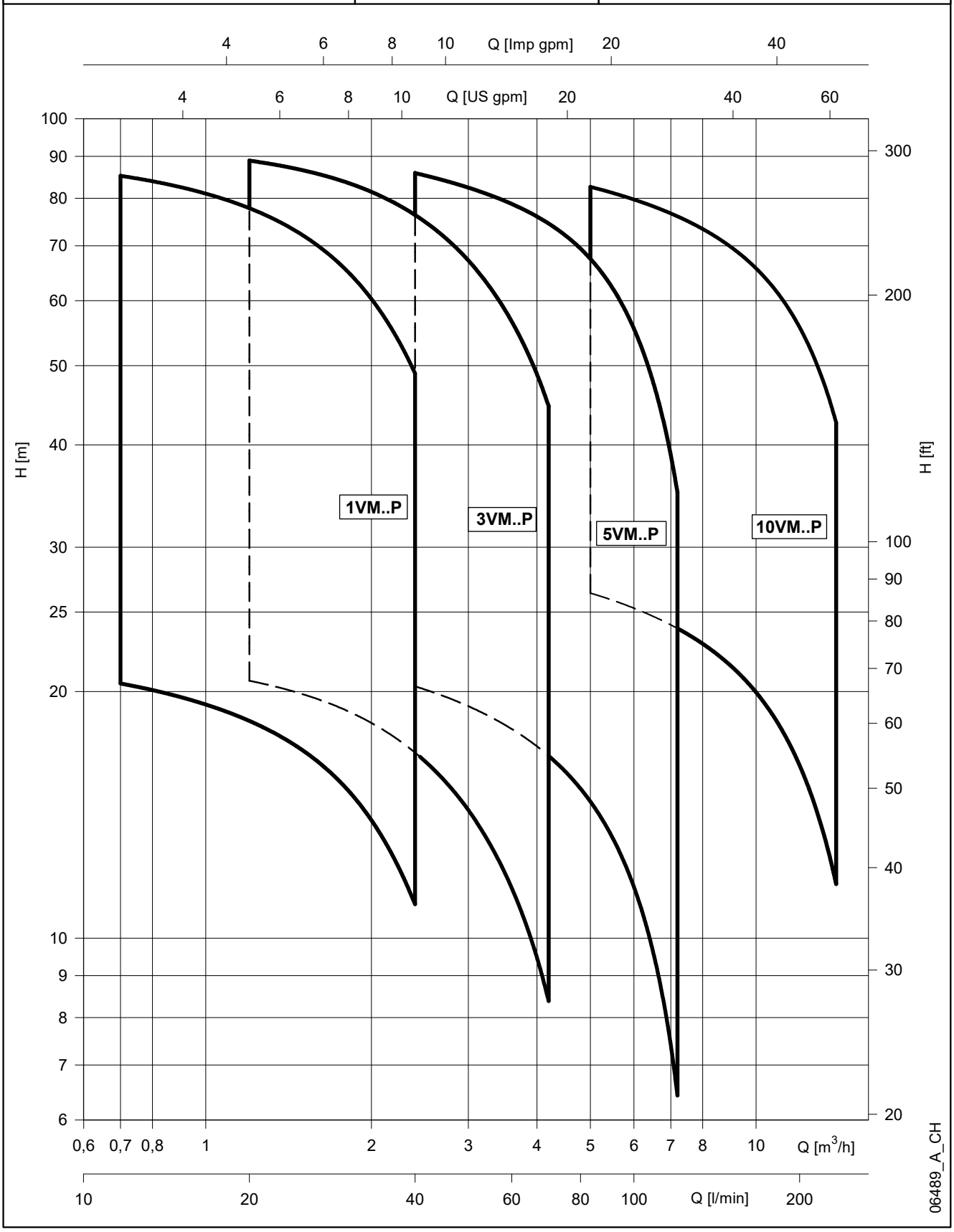
VM..P SERIES
HYDRAULIC PERFORMANCE RANGE AT 50 Hz, 2 POLES

VM..P	~ 2900 [rpm]	ISO 9906:2012 - Grade 3B



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VM..P SERIES
HYDRAULIC PERFORMANCE TABLE AT 50 Hz, 2 POLES

PUMP TYPE VM..P	VERSION	MOTOR P_N kW	MOTOR TYPE	ELECTRIC PUMP * P_1 kW	ELECTRIC PUMP * I 220-240 V A	ELECTRIC PUMP * I 380-415 V A	Q = DELIVERY l/min 0	11,7	16,0	21,0	26,0	31,0	36,0	40,0
							m^3/h 0	0,7	1,0	1,3	1,6	1,9	2,2	2,4
							H = TOTAL HEAD IN METRES OF COLUMN OF WATER							
1VM03	1 ~	0,50	SM63HM../1055	0,55	2,60	-	33,3	30,6	29,2	27,3	25,0	22,4	19,3	16,7
1VM04		0,50	SM63HM../1055	0,63	2,85	-	43,8	39,9	37,9	35,2	32,1	28,5	24,5	21,0
1VM05		0,50	SM63HM../1055	0,72	3,15	-	53,9	48,7	46,1	42,6	38,6	34,0	28,9	24,5
1VM06		0,75	SM71HM../1075	0,91	4,25	-	66,5	60,9	58,0	54,1	49,5	44,1	38,0	32,8
1VM07		0,75	SM71HM../1075	1,01	4,58	-	76,9	70,1	66,6	61,9	56,4	50,1	42,9	36,8
1VM08		0,95	SM71HM../1095	1,17	5,18	-	88,3	80,5	76,4	71,1	64,8	57,6	49,4	42,5
1VM02	3 ~	0,30	SM63HM../303	0,34	1,87	1,08	22,5	20,7	19,7	18,4	16,9	15,1	13,1	11,3
1VM03		0,30	SM63HM../303	0,46	1,94	1,12	32,6	29,6	28,1	26,1	23,7	21,0	17,9	15,4
1VM04		0,40	SM63HM../304	0,56	2,32	1,34	43,9	39,9	37,9	35,2	32,1	28,4	24,4	20,9
1VM05		0,50	SM63HM../305	0,67	2,61	1,51	54,2	49,0	46,3	42,9	38,9	34,4	29,3	25,0
1VM06		0,75	SM80HM../307 E3	0,80	2,75	1,59	68,5	63,6	60,9	57,2	52,7	47,5	41,5	36,2
1VM07		0,75	SM80HM../307 E3	0,92	2,97	1,71	79,5	73,6	70,4	66,0	60,7	54,6	47,6	41,5
1VM08		1,1	SM80HM../311 E3	1,05	3,68	2,12	91,6	85,2	81,7	76,8	70,9	63,9	55,9	48,9

PUMP TYPE VM..P	VERSION	MOTOR P_N kW	MOTOR TYPE	ELECTRIC PUMP * P_1 kW	ELECTRIC PUMP * I 220-240 V A	ELECTRIC PUMP * I 380-415 V A	Q = DELIVERY l/min 0	20,0	28,0	36,0	44,0	52,0	60,0	70,0
							m^3/h 0	1,2	1,7	2,2	2,6	3,1	3,6	4,2
							H = TOTAL HEAD IN METRES OF COLUMN OF WATER							
3VM02	1 ~	0,50	SM63HM../1055	0,53	2,55	-	23,6	21,5	20,4	18,9	17,1	15,0	12,8	9,6
3VM03		0,50	SM63HM../1055	0,64	2,87	-	34,4	31,2	29,5	27,2	24,6	21,7	18,4	14,0
3VM04		0,50	SM63HM../1055	0,76	3,29	-	45,0	40,3	37,7	34,5	30,9	26,8	22,5	16,6
3VM05		0,75	SM71HM../1075	0,99	4,51	-	57,8	52,5	49,6	45,9	41,5	36,5	31,1	23,7
3VM06		0,95	SM71HM../1095	1,18	5,22	-	69,4	63,1	59,4	54,9	49,6	43,7	37,2	28,3
3VM07		0,95	SM71HM../1095	1,31	5,68	-	80,3	72,3	67,9	62,5	56,2	49,2	41,6	31,2
3VM08		1,1	SM80HM../1115	1,48	6,59	-	93,0	84,6	79,9	73,9	66,8	58,9	50,2	38,3
3VM02	3 ~	0,30	SM63HM../303	0,43	1,92	1,11	23,2	20,9	19,6	18,1	16,2	14,1	11,9	8,7
3VM03		0,40	SM63HM../304	0,57	2,32	1,34	34,5	31,3	29,4	27,2	24,5	21,6	18,4	13,9
3VM04		0,50	SM63HM../305	0,71	2,67	1,54	45,3	40,6	38,0	34,9	31,3	27,3	23,0	17,1
3VM05		0,75	SM80HM../307 E3	0,90	2,93	1,69	59,5	55,0	52,4	49,0	44,8	39,9	34,5	27,1
3VM06		1,1	SM80HM../311 E3	1,08	3,71	2,14	71,8	66,7	63,7	59,7	54,7	48,9	42,5	33,5
3VM07		1,1	SM80HM../311 E3	1,24	4,02	2,32	83,5	77,3	73,7	68,9	63,1	56,3	48,8	38,3
3VM08		1,5	SM80HM../315 E3	1,41	4,83	2,79	95,8	88,9	84,9	79,5	72,9	65,2	56,6	44,6

PUMP TYPE VM..P	VERSION	MOTOR P_N kW	MOTOR TYPE	ELECTRIC PUMP * P_1 kW	ELECTRIC PUMP * I 220-240 V A	ELECTRIC PUMP * I 380-415 V A	Q = DELIVERY l/min 0	40,0	53,0	66,0	79,0	92,0	105	120
							m^3/h 0	2,4	3,2	4,0	4,7	5,5	6,3	7,2
							H = TOTAL HEAD IN METRES OF COLUMN OF WATER							
5VM02	1 ~	0,50	SM63HM../1055	0,61	2,76	-	23,9	20,4	18,9	17,4	15,5	13,3	10,6	6,6
5VM03		0,50	SM63HM../1055	0,78	3,36	-	35,0	28,7	26,5	24,2	21,5	18,2	14,0	8,0
5VM04		0,75	SM71HM../1075	1,06	4,75	-	47,6	39,8	37,1	34,3	30,8	26,4	20,9	12,9
5VM05		0,95	SM71HM../1095	1,29	5,64	-	59,5	49,4	46,0	42,4	38,0	32,5	25,6	15,6
5VM06		1,1	SM80HM../1115	1,51	6,76	-	72,1	60,5	56,6	52,3	47,2	40,6	32,3	20,4
5VM07		1,5	SM80HM../1155	1,81	7,97	-	84,6	72,1	67,8	63,0	57,2	49,7	40,1	26,1
5VM08		1,5	SM80HM../1155	2,00	8,92	-	96,3	81,4	76,2	70,6	63,7	55,1	44,0	28,1
5VM02	3 ~	0,40	SM63HM../304	0,53	2,29	1,32	24,1	20,4	18,9	17,3	15,5	13,3	10,5	6,6
5VM03		0,50	SM63HM../305	0,73	2,69	1,55	35,3	28,9	26,8	24,5	21,9	18,6	14,4	8,4
5VM04		1,1	SM80HM../311 E3	1,00	3,57	2,06	49,3	43,0	40,7	38,2	35,1	30,9	25,6	17,6
5VM05		1,1	SM80HM../311 E3	1,22	3,99	2,30	61,4	53,2	50,3	47,1	43,1	37,9	31,1	21,1
5VM06		1,5	SM80HM../315 E3	1,45	4,92	2,84	73,8	64,1	60,7	56,9	52,1	45,9	37,8	25,8
5VM07		1,5	SM80HM../315 E3	1,67	5,35	3,09	85,8	74,2	70,1	65,6	60,0	52,7	43,2	29,2
5VM08		2,2	PLM90HM../322 E3	1,94	6,77	3,91	98,6	85,9	81,4	76,3	70,0	61,8	51,0	35,0

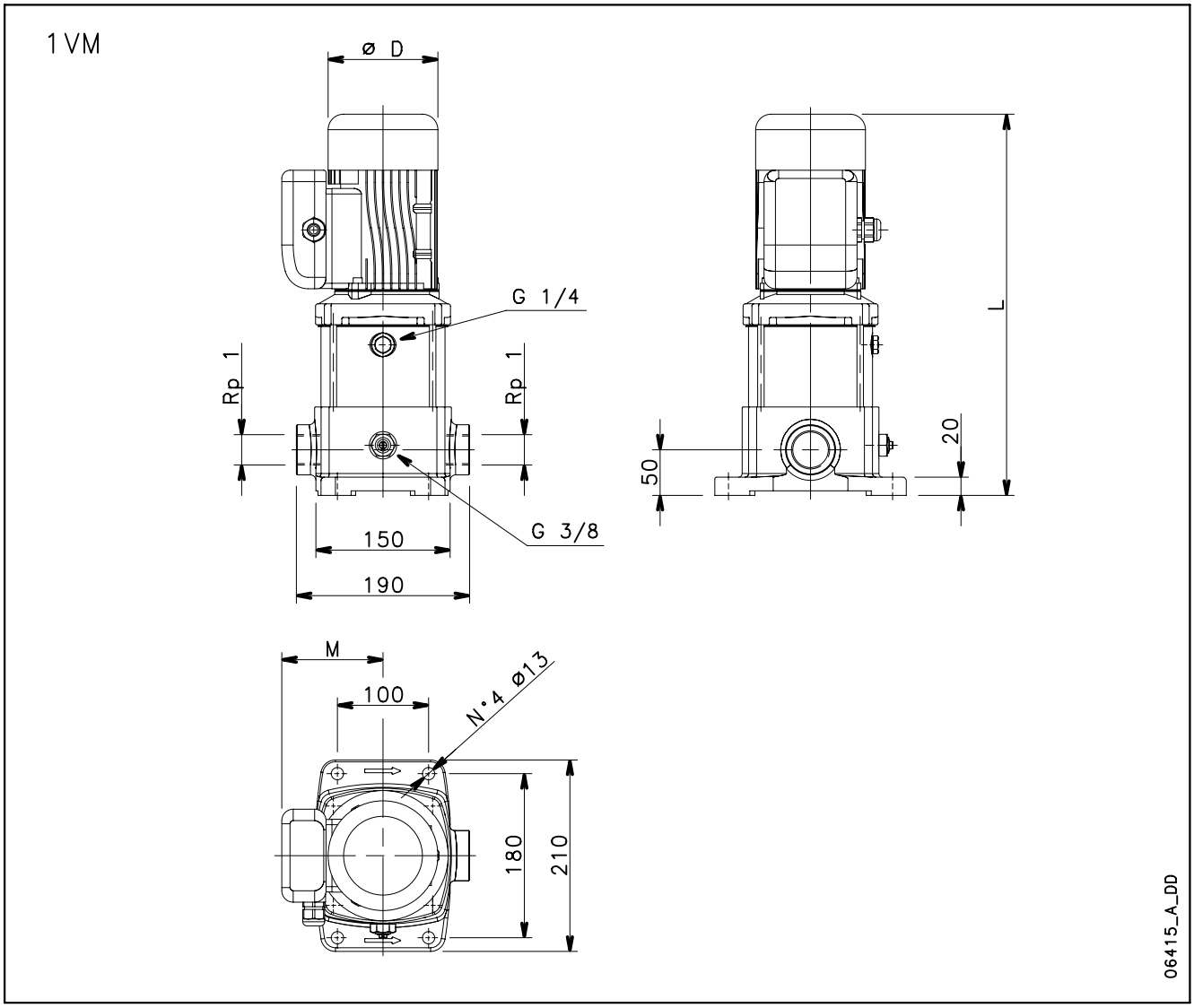
PUMP TYPE VM..P	VERSION	MOTOR P_N kW	MOTOR TYPE	ELECTRIC PUMP * P_1 kW	ELECTRIC PUMP * I 220-240 V A	ELECTRIC PUMP * I 380-415 V A	Q = DELIVERY l/min 0	83,3	108	133	158	183	208	233
							m^3/h 0	5,0	6,5	8,0	9,5	11,0	12,5	14,0
							H = TOTAL HEAD IN METRES OF COLUMN OF WATER							
10VM02	1 ~	1,1	SM80HM../1115	1,33	6,05	-	30,3	26,4	24,7	22,9	20,8	18,3	15,2	11,6
10VM03		1,5	SM80HM../1155	1,87	8,27	-	45,6	40,1	37,8	35,3	32,4	28,9	24,7	19,6
10VM04		2,2	PLM90HM../1225	2,38	10,8	-	61,1	54,2	51,2	47,9	44,1	39,6	33,9	27,1
10VM05		2,2	PLM90HM../1225	2,84	12,7	-	75,9	66,4	62,5	58,2	53,3	47,5	40,4	31,8
10VM02	3 ~	1,1	SM80HM../311 E3	1,22	4,00	2,31	30,8	27,3	25,8	24,0	22,0	19,5	16,5	13,0
10VM03		1,5	SM80HM../315 E3	1,75	5,48	3,17	46,2	41,4	39,2	36,8	34,0	30,7	26,5	21,4
10VM04		2,2	PLM90HM../322 E3	2,33	7,54	4,35	61,8	55,4	52,6	49,4	45,8	41,3	35,8	29,0
10VM05		3	PLM90HM../330 E3	2,91	10,0	5,80	77,3	69,5	66,0	62,1	57,5	51,9	45,0	36,5
10VM06		3	PLM90HM../330 E3	3,44	11,1	6,41	92,5	82,6	78,3	73,5	67,9	61,1	52,8	42,6

Hydraulic performances in compliance with ISO 9906:2012 - Grade 3B (ex ISO 9906:1999 - Annex A)

1-10vm-p-2p50-en_a_th

* Maximum value in specified range: P1 = input power; I = input current.

1VM..P SERIES
DIMENSIONS AND WEIGHTS AT 50 HZ, 2 POLES

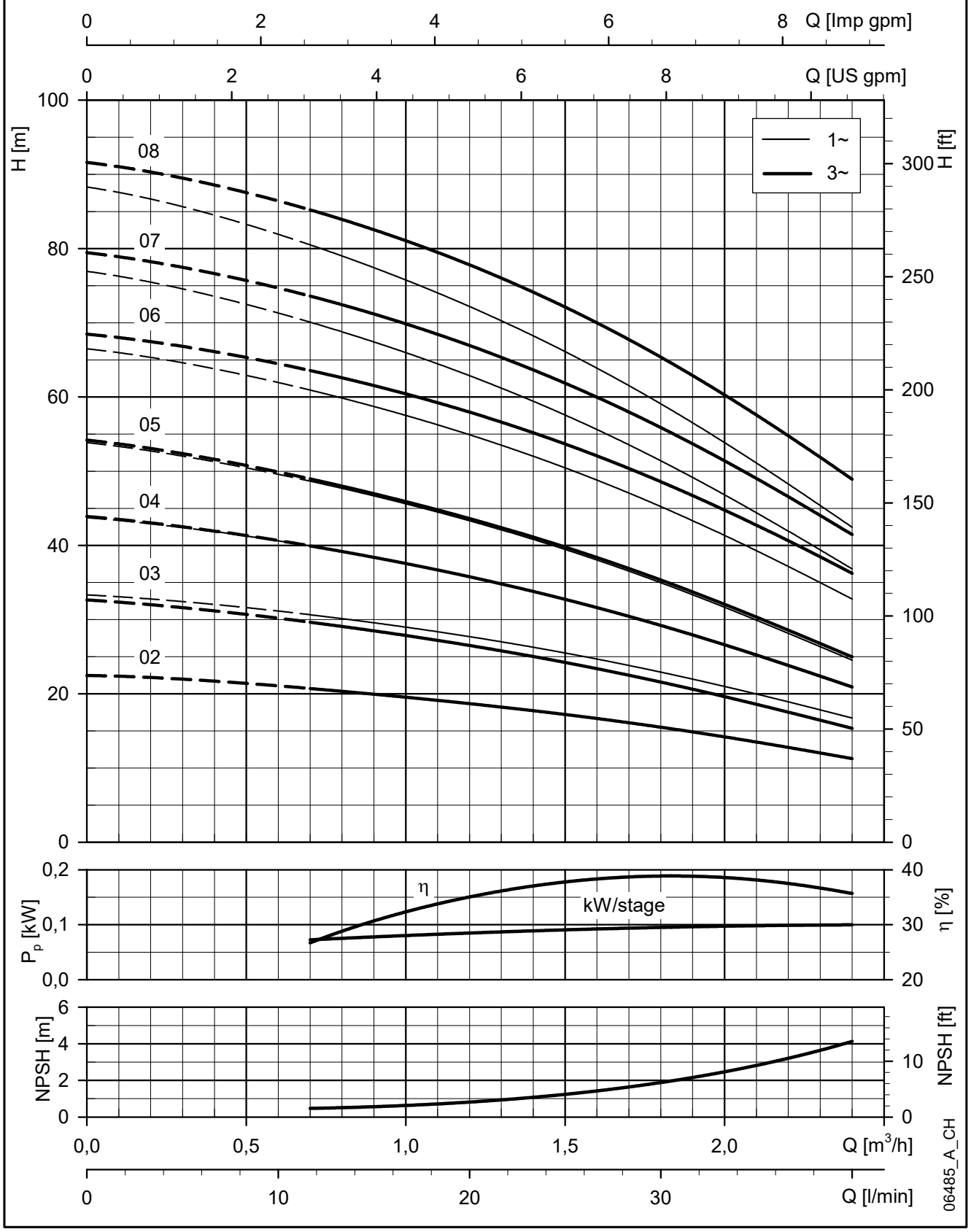


PUMP TYPE	VERSION	MOTOR		DIMENSIONS (mm)			PN	WEIGHT
		kW	SIZE	D	M	L	bar	kg
1VM03	SINGLE-PHASE	0,50	63	120	111	379	10	12
1VM04		0,50	63	120	111	399	10	13
1VM05		0,50	63	120	111	419	10	13
1VM06		0,75	71	140	121	453	10	15
1VM07		0,75	71	140	121	473	10	16
1VM08		0,95	71	140	130	493	10	17
1VM02	THREE-PHASE	0,30	63	120	111	379	10	11
1VM03		0,30	63	120	111	379	10	11
1VM04		0,40	63	120	111	399	10	12
1VM05		0,50	63	120	111	419	10	13
1VM06		0,75	80	155	129	497	10	18
1VM07		0,75	80	155	129	517	10	19
1VM08		1,1	80	155	129	537	10	20

1vm-2p50-en_a_td

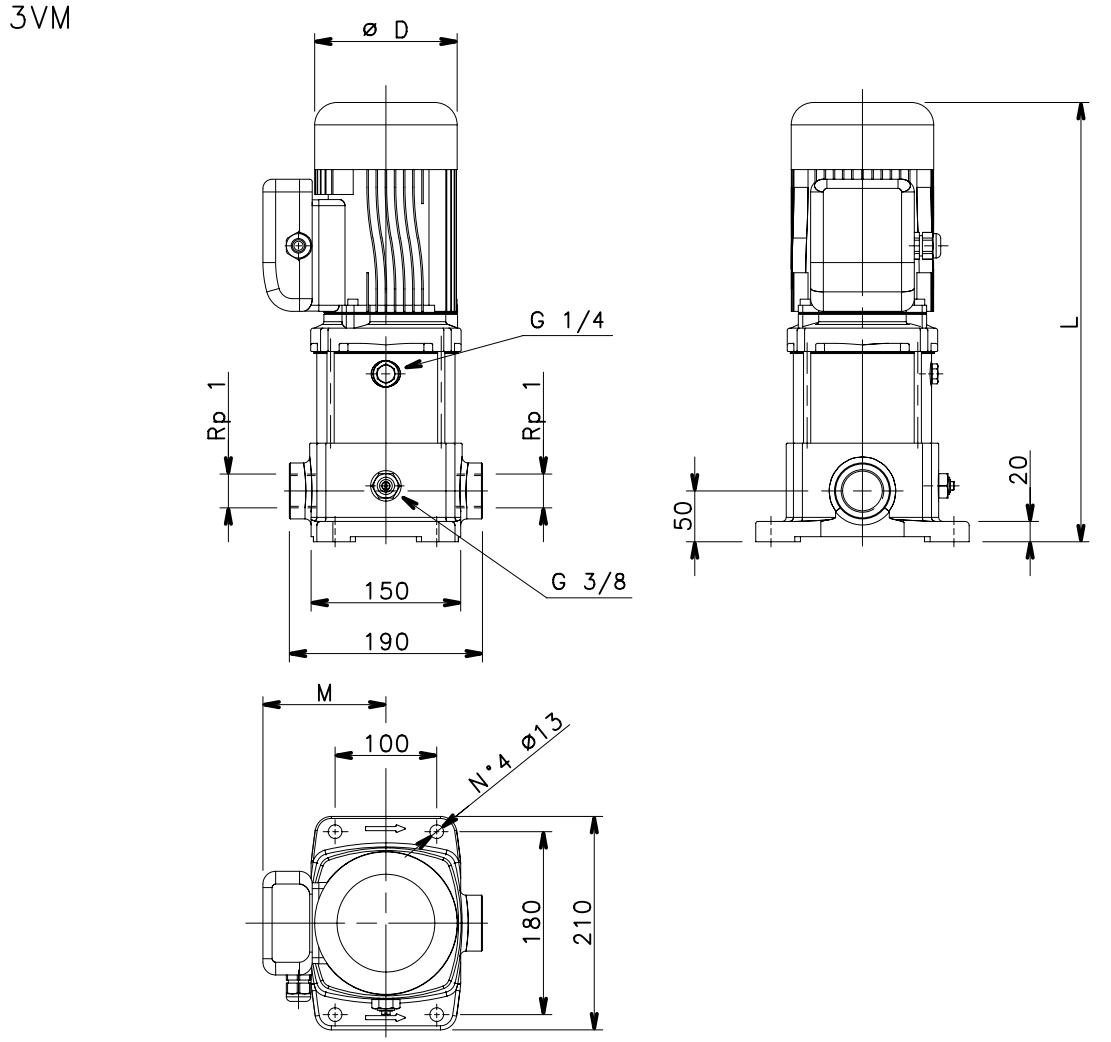
1VM..P SERIES
OPERATING CHARACTERISTICS AT 50 Hz, 2 POLES

1VM..P	~ 2900 [rpm]	ISO 9906:2012 - Grade 3B



These performances are valid for liquids with density ρ = 1 Kg/dm³ and kinematic viscosity ν = 1 mm²/sec.

3VM..P SERIES
DIMENSIONS AND WEIGHTS AT 50 HZ, 2 POLES

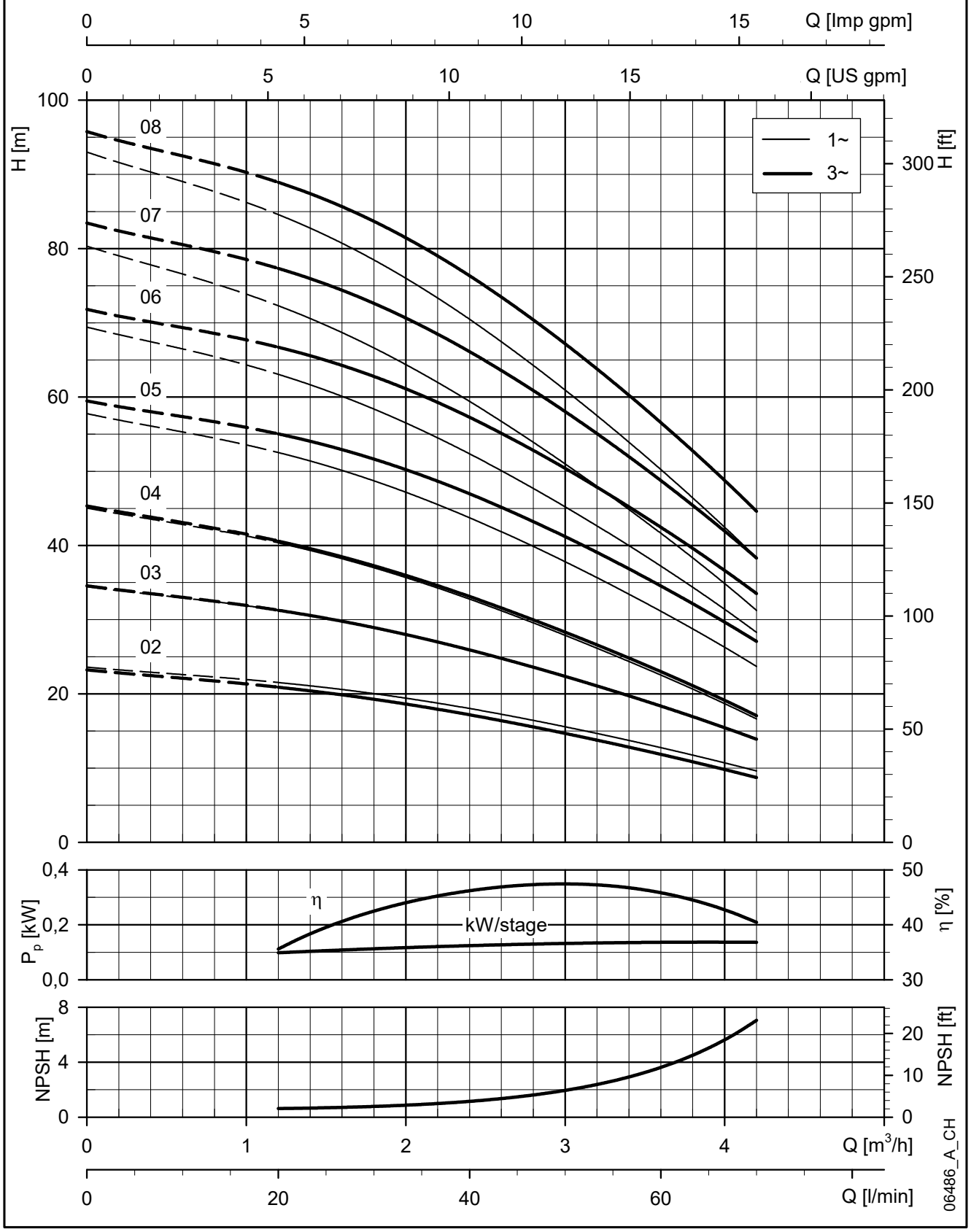


PUMP TYPE	VERSION	MOTOR		DIMENSIONS (mm)			PN	WEIGHT
		kW	SIZE	D	M	L	bar	kg
3VM02	SINGLE-PHASE	0,50	63	120	111	379	10	12
3VM03		0,50	63	120	111	379	10	12
3VM04		0,50	63	120	111	399	10	13
3VM05		0,75	71	140	121	433	10	15
3VM06		0,95	71	140	130	453	10	16
3VM07		0,95	71	140	130	473	10	17
3VM08		1,1	80	155	137	537	10	20
3VM02	THREE-PHASE	0,30	63	120	111	379	10	11
3VM03		0,40	63	120	111	379	10	12
3VM04		0,50	63	120	111	399	10	13
3VM05		0,75	80	155	129	477	10	18
3VM06		1,1	80	155	129	497	10	19
3VM07		1,1	80	155	129	517	10	20
3VM08		1,5	80	155	129	537	10	21

3vm-2p50-en_a_td

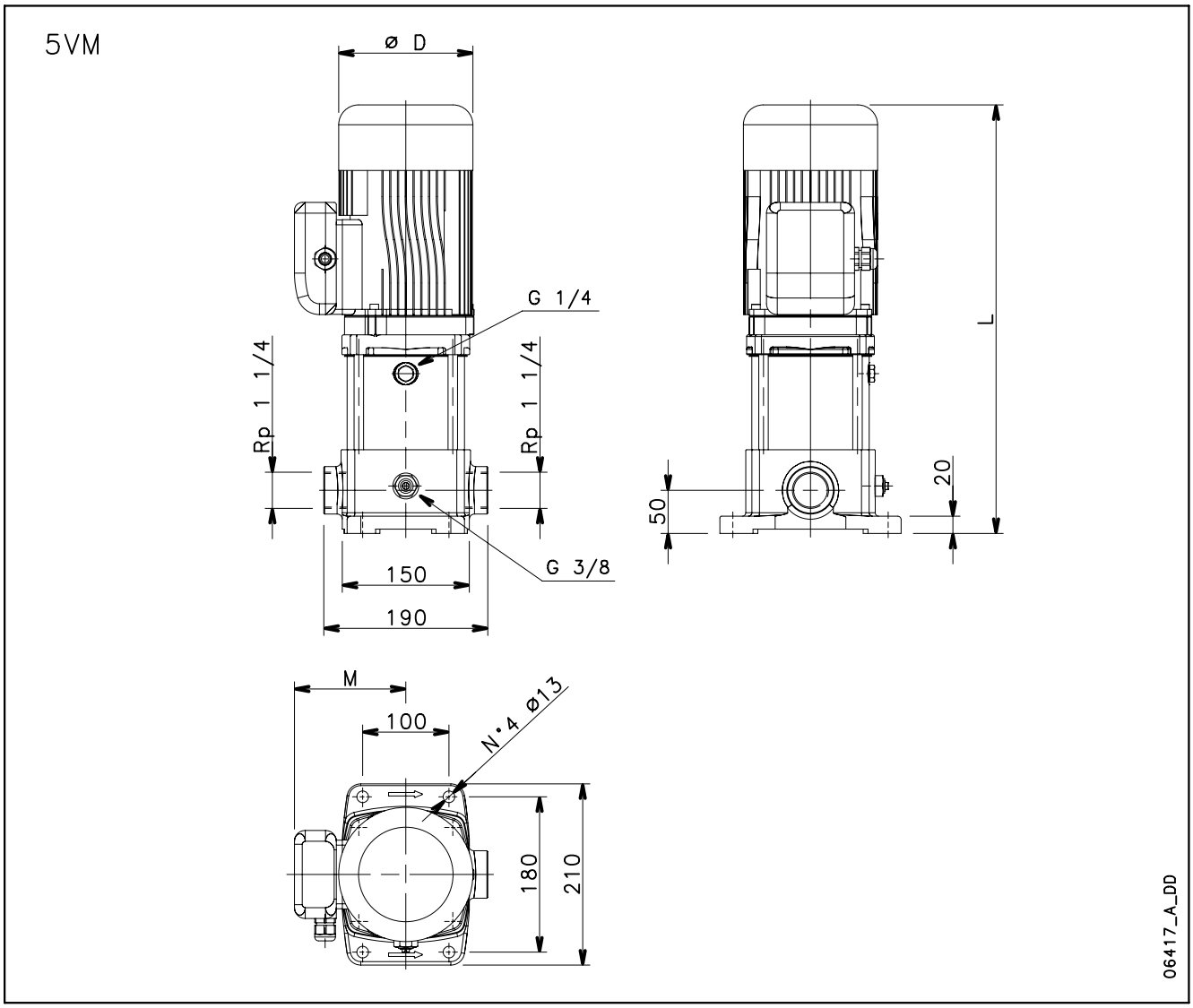
3VM..P SERIES
OPERATING CHARACTERISTICS AT 50 Hz, 2 POLES

3VM..P	~ 2900 [rpm]	ISO 9906:2012 - Grade 3B



These performances are valid for liquids with density ρ = 1 Kg/dm³ and kinematic viscosity ν = 1 mm²/sec.

5VM..P SERIES
DIMENSIONS AND WEIGHTS AT 50 HZ, 2 POLES

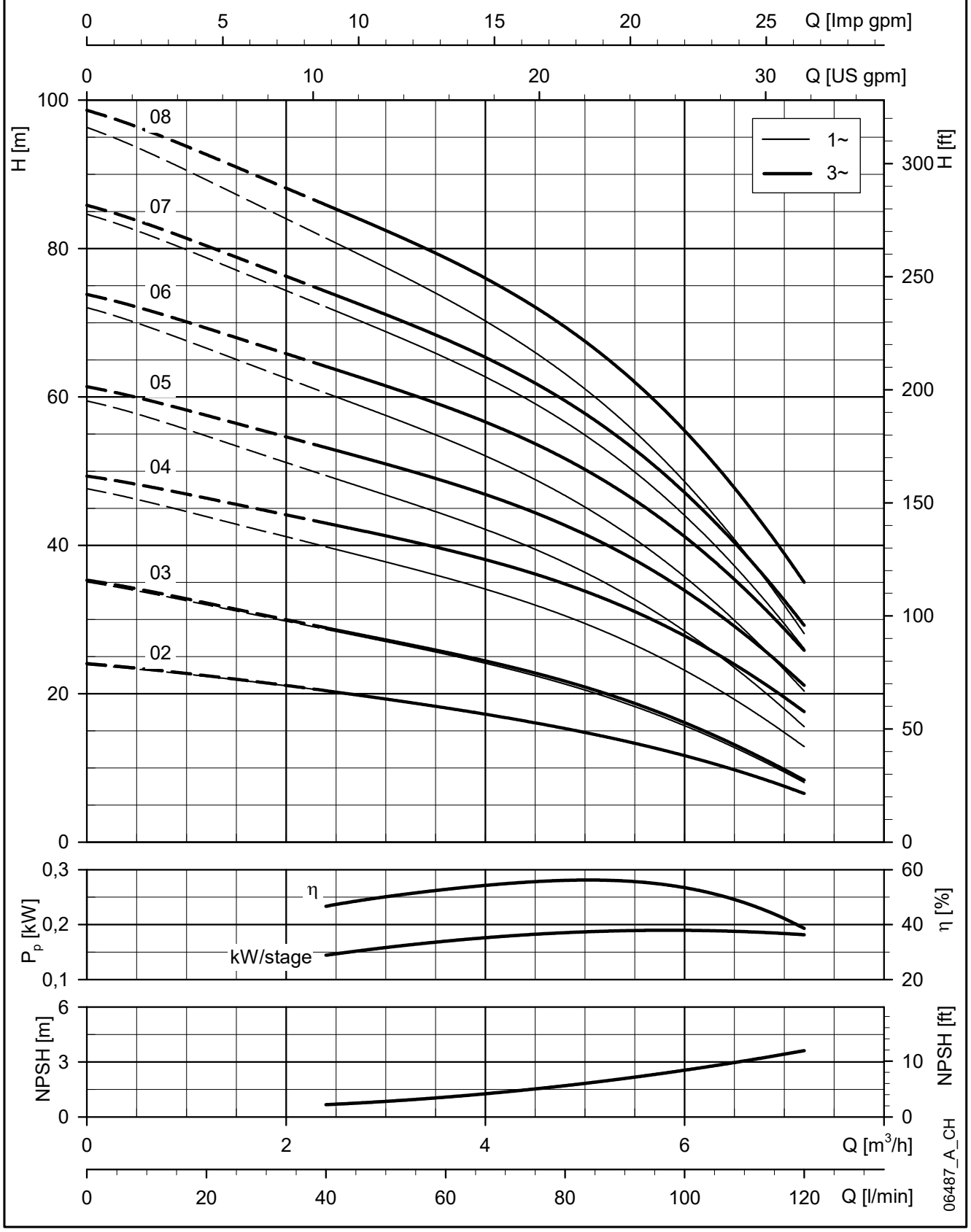


PUMP TYPE	VERSION	MOTOR		DIMENSIONS (mm)			PN	WEIGHT
		kW	SIZE	D	M	L	bar	kg
5VM02	SINGLE-PHASE	0,50	63	120	111	379	10	12
5VM03		0,50	63	120	111	379	10	12
5VM04		0,75	71	140	121	413	10	15
5VM05		0,95	71	140	130	433	10	16
5VM06		1,1	80	155	137	497	10	19
5VM07		1,5	80	155	137	517	10	21
5VM08		1,5	80	155	137	537	10	21
5VM02	THREE-PHASE	0,40	63	120	111	379	10	12
5VM03		0,50	63	120	111	379	10	12
5VM04		1,1	80	155	129	457	10	19
5VM05		1,1	80	155	129	477	10	19
5VM06		1,5	80	155	129	497	10	20
5VM07		1,5	80	155	129	517	10	21
5VM08		2,2	90	174	134	593	10	26

5vm-2p50-en_a_td

5VM..P SERIES
OPERATING CHARACTERISTICS AT 50 Hz, 2 POLES

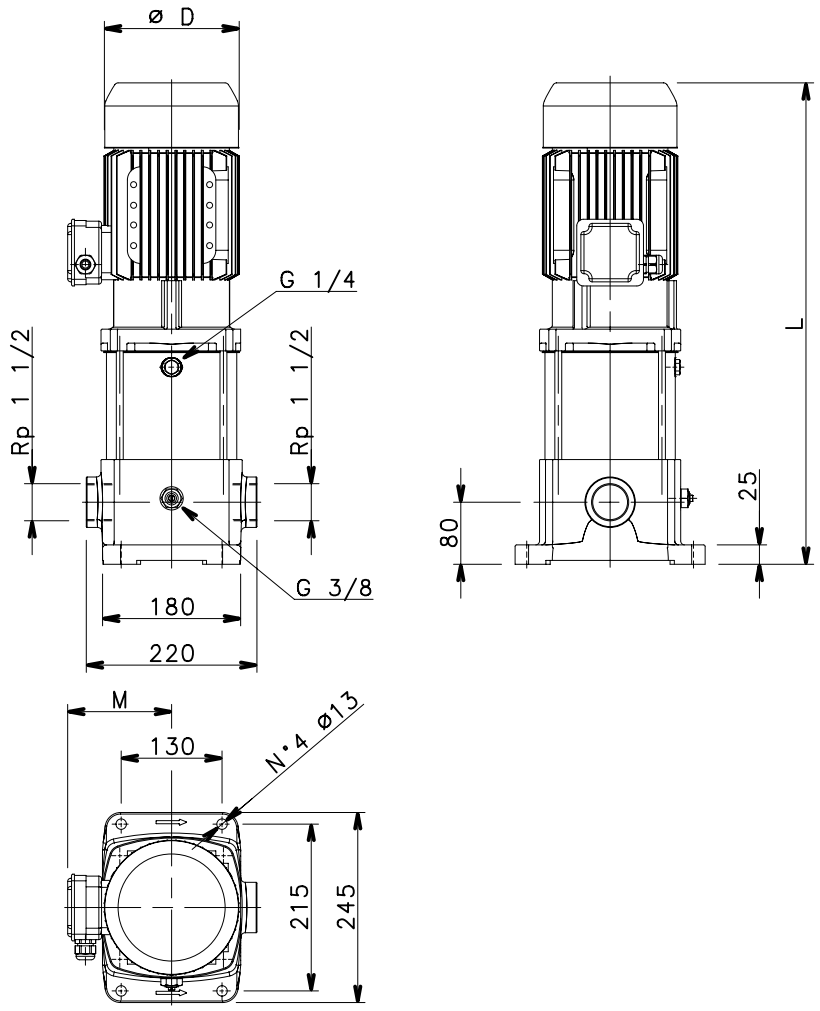
5VM..P	~ 2900 [rpm]	ISO 9906:2012 - Grade 3B



These performances are valid for liquids with density ρ = 1 Kg/dm³ and kinematic viscosity ν = 1 mm²/sec.

10VM..P SERIES
DIMENSIONS AND WEIGHTS AT 50 HZ, 2 POLES

10VM



PUMP TYPE	VERSION	MOTOR		DIMENSIONS (mm)			PN	WEIGHT
		kW	SIZE	D	M	L	bar	kg
10VM02	SINGLE-PHASE	1,1	80	155	137	501	10	23
10VM03		1,5	80	155	137	533	10	25
10VM04		2,2	90	174	159	621	10	34
10VM05		2,2	90	174	159	653	10	35

10VM02	THREE-PHASE	1,1	80	155	129	501	10	23
10VM03		1,5	80	155	129	533	10	25
10VM04		2,2	90	174	134	621	10	31
10VM05		3	90	174	134	653	10	35
10VM06		3	90	174	134	685	10	36

10vm-2p50-en_a_td

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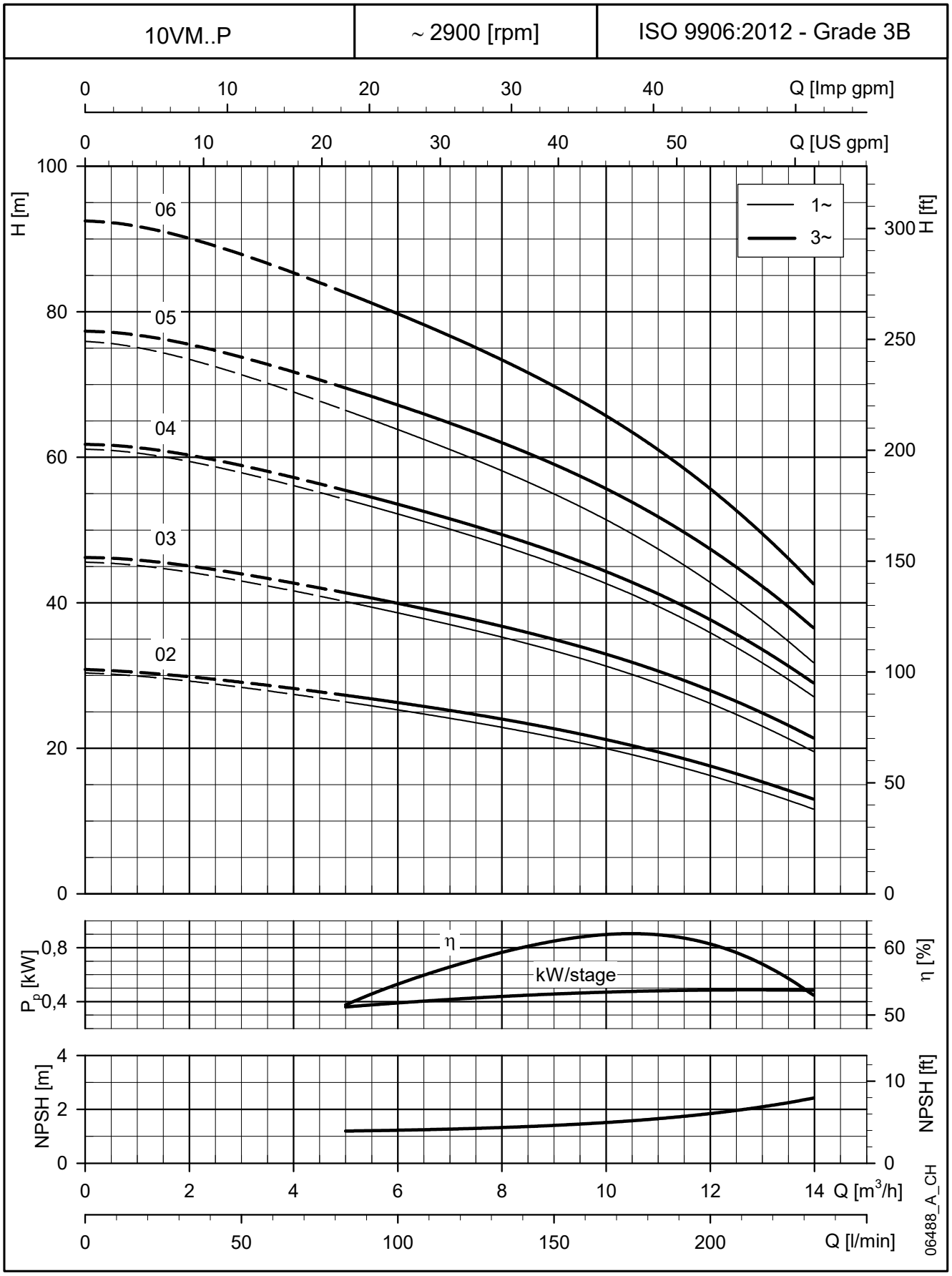
10VM..P SERIES
OPERATING CHARACTERISTICS AT 50 Hz, 2 POLES

10VM..P	~ 2900 [rpm]	ISO 9906:2012 - Grade 3B



These performances are valid for liquids with density ρ = 1 Kg/dm³ and kinematic viscosity ν = 1 mm²/sec.

LOWARA
a xylem brand

VME
VERSION WITH DRIVE AND PERMANENT MAGNET MOTOR (e-SM DRIVE)

VME SERIES (VM SMART)

Background and context

In every sector, from construction and industry to agriculture and building services the need for intelligent, compact and high-efficiency pumping systems is constantly growing.
That's why Lowara has developed the VM series: an integrated intelligent pumping system with electronically driven, permanent magnet motor (IE5 efficiency level).
The integrated control system, combined with the high performance, power and efficiency from the motor and hydraulics, guarantees impressively low operating costs. You also benefit from flexibility, precision and its ultra-compact size.

Savings

The electronics and permanent magnet motor are highly efficient and minimize power losses while transferring maximum energy to the hydraulic parts of the pump.
The refined control system with integrated microprocessor adjusts the motor speed, matching the required operating point of the pump or system requirements.
This reduces demand on electricity according to the required working conditions.
This creates economies, especially in systems where pump demand varies over time.

Flexibility

The compact size, low loss and increased control make the VM Smart series a good choice in applications and systems where fixed speed pumps are commonly used. The VM Smart series is easy to integrate in control and regulation loops thanks to the wide availability of compatible communication protocols, including analog and digital inputs.
The pump is supplied with a pressure sensor.

Ease of use and commissioning

VM Smart has an intuitive interface that guides the user through the installation, and a practical area to assist with connections.
The control system is integrated and no additional external electrical panel is required.

Application sectors

- Water supply systems in residential buildings
- Air conditioning
- Water treatment plants
- Industrial installations

e-SM System

- Single-phase power supply:
  208-240 V +/- 10%, 50/60 Hz
- Three-phase power supply:
  - from 0,37 kW to 1,5 kW:
    208-240 / 380-460 V +/- 10%, 50/60 Hz
  - 2,2 kW: 380-460 V +/- 10%, 50/60 Hz
- Power up to 2,2kW
- Protection class IP 55
- Can be linked up to 3 VM Smart pumps

Pump

- Flow rate: up to 17 m^3/h
- Head: up to 100 m
- Environment temperature: -20°C to + 50°C with no
- performance derating
- Temperature of pumped liquid: up to + 90°C
- Maximum operating pressure 10 bar (PN 10)
- The hydraulic performances meet the tolerances specified in ISO 9906:2012

Motor

- IE5 efficiency level (IEC TS 60034-30-2:2016)
- Synchronous electric motor with permanent magnets, closed structure, air-cooled (TEFC)
- Insulation class 155 (F)
- Overload protection and locked rotor with automatic reset incorporated

Regulations (EU) 2019/1781 e 2021/341 Annex I – point 4

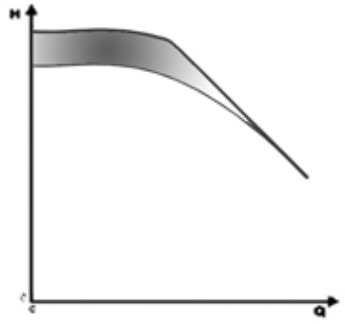
(Product information)

The requirements shall not apply to these variable speed drives, as they are integrated to permanent magnet motors, that aren't covered by the same regulations.

VME SERIES
(VM SMART)

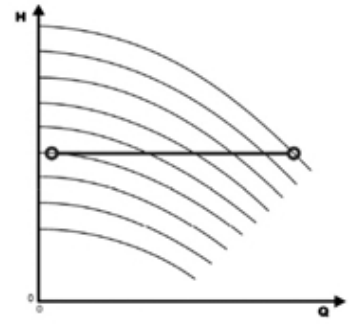
VM Smart series is equipped with an intelligent control that optimizes hydraulic performance while minimizing waste.

Integrated intelligence: the electronic control of the motor enables a 20% increase in performance compared to an equivalent fixed speed pump (area highlighted in figure "Integrated Intelligence").

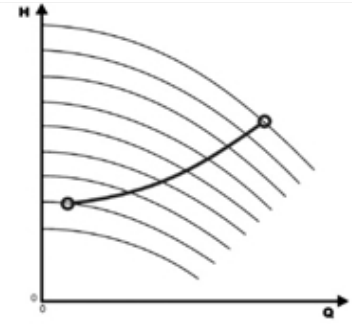


Integrated intelligence

Adjustment: This is possible both at constant pressure and according to the characteristic curve of the system, based on the customer's preferences.
Another option is according to an external signal or at a preset speed.



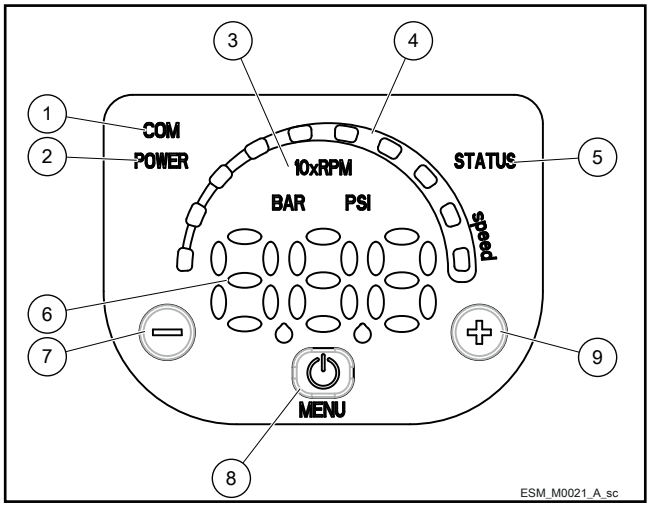
Control for constant pressure



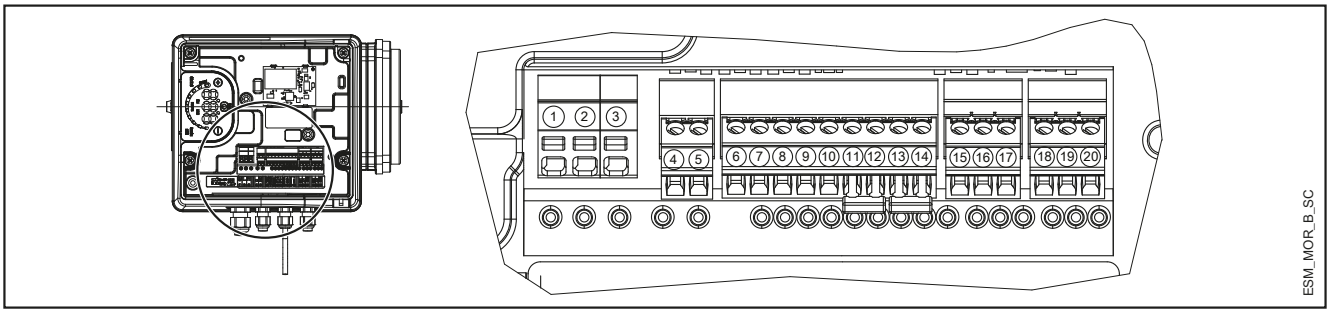
Control to match a system curve

Intuitive and simple interface: you can control the unit from just three buttons, with an easy to read display for parameters and alarms, designed for complete control of system operation.

1. Communication LED
2. Power on LED
3. Unit of measure LED
4. Speed LED bar
5. Status LED
6. Numeric display
7. Decrease key
8. On/off and menu key
9. Increase key



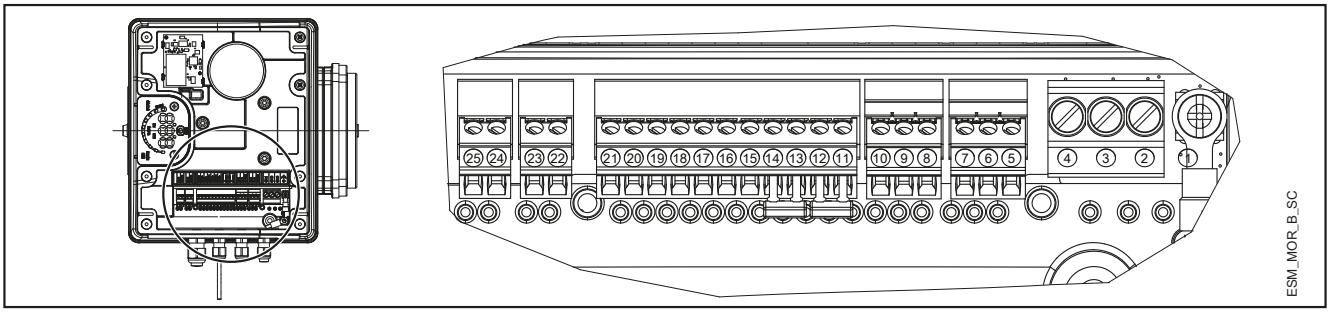
VME SERIES
SINGLE PHASE TERMINAL BLOCK



REF.	ITEM	DESCRIPTION
4	Fault Signal	COM - error status relay
5		NO - error status relay
6	Auxiliary Voltage Supply	Auxiliary voltage supply +15 VDC
7	Analog input 0-10V	Actuator mode 0-10 V input
8		GND for 0-10 V input
9	External Pressure sensor [also Differential]	Power supply external sensor +15 VDC
10		External sensor 4-20 mA input
11	External Start/Stop	External ON/OFF input reference
12		External ON/OFF input
13	External Lack of Water	Low water input
14		Low water reference
15	Communication bus	RS485 port 1: RS485-1N B (-)
16		RS485 port 1: RS485-1P A (+)
17		Electronic GND
18	Communication bus	RS485 port 2: RS485 port 2: RS485-2N B (-) active only with optional module
19		RS485 port 2: RS485 port 2: RS485-2P A (+) active only with optional module
20		Electronic GND

MorsM-en_a_sc

THREE-PHASE TERMINAL BLOCK



REF.	ITEM	DESCRIPTION
5	Communication bus	Electronic GND
6		RS485 port 1: RS485-1P A (+)
7		RS485 port 1: RS485-1N B (-)
8	Communication bus	Electronic GND
9		RS485 port 2: RS485 port 2: RS485-2P A (+) active only with optional module
10		RS485 port 2: RS485 port 2: RS485-2N B (-) active only with optional module
11	External Lack of Water	Low water reference
12		Low water input
13	External Start/Stop	External ON/OFF input reference
14		External ON/OFF input
15	External Pressure sensor	External sensor 4-20 mA input
16		Power supply external sensor +15 VDC
17	External Pressure sensor [also Differential]	External sensor 4-20 mA input
18		Power supply external sensor +15 VDC
19	Analog input 0-10V	GND for 0-10 V input
20		Actuator mode 0-10 V input
21	Auxiliary Voltage Supply	Auxiliary voltage supply +15 VDC
22	Motor running signal	Normally open contact
23		Common contact
24	Fault Signal	NO - error status relay
25		COM - error status relay

MorsT-en_a_sc

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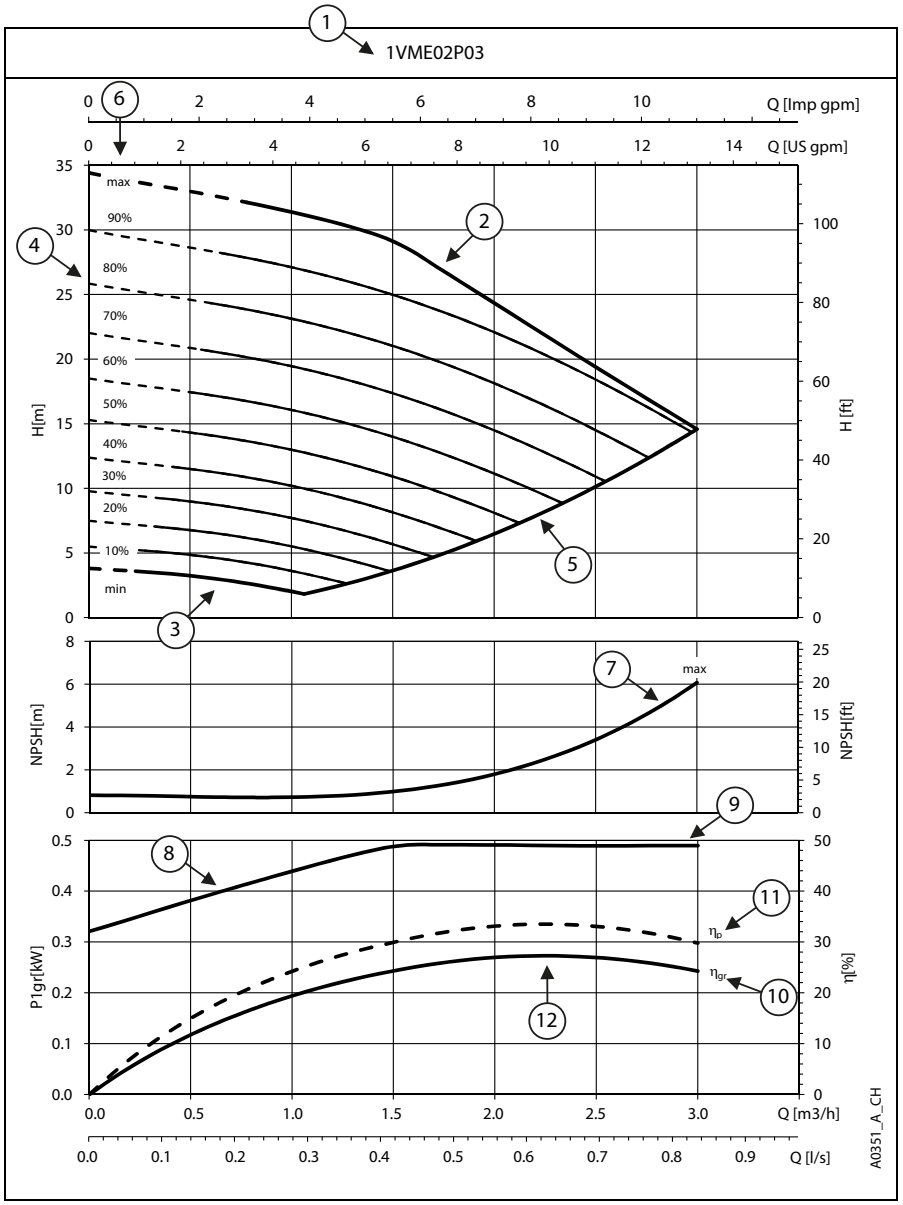
VME SERIES
HOW TO READ SMART PUMP SERIES CURVES

To exploit to the maximum potential of Smart Pumps it's important to properly read working curves:



① **Pump model**

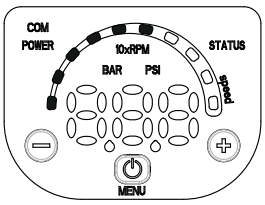
② **Maximum speed curve**: equal to 3600 rpm

③ **Minimum speed curve**: it refers to the minimum rpm level the motor can work at, it's calculated depending on the model of pump maximizing for each one the working area and allowing the highest system flexibility.

④ The **area with dotted lines** is where he pump can only operate intermittently for short period s of time.

⑤ Each **intermediate curve** between max and min speed shows the percentage of load the pump+motor+drive system is working at; it's easy to read also from the LED speed bar on the HMI keypad: at 90% there will be 9 led, at 80% there will be 8 and so on.

Example: at 60% there will be 6 lit led's



⑥ The **part load percentage** is calculated depending on maximum speed (*max*, 100%) and minimum speed (*min*, equal to 0%, which is the minimum part load step, below it the drive stays powered up but cannot work).

⑦ **NPSH**: is the net positive suction head of pump+motor+drive system working at maximum speed.

⑧ **$P1_{gr}$** is the power absorption in kW of pump+motor+drive system working at maximum speed.

⑨ **Load control**: the Smart Pump controls and limits power consumption at high flow/low head, in this way the motor stays protected from overload and ensure a longer life of pump+motor+drive system.

⑩ **η_{gr}** is the efficiency of pump+motor+drive system working at maximum speed.

⑪ **η_p** is the efficiency of the hydraulic part, working at maximum speed.

⑫ **Working point**: it's important to make sure the pump is working at the best working point, the one at highest efficiency.
It's easy to find it: it's the highest point of the hp pump efficiency curve; once you found it, you can learn also flow values from x-axis called Q and head values from y-axis called H which allow the system to work at the best working point.

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VME SERIES - SINGLE-PHASE VERSION
HYDRAULIC PERFORMANCE TABLE

PUMP	MOTOR		e-SM SET		Q = DELIVERY							
TYPE				* I	l/min 0	6,7	13,3	20,0	26,7	33,3	40,0	50,0
VME	P_N	TYPE	* P_1	208-240 V	m^3/h 0	0,4	0,8	1,2	1,6	2,0	2,4	3,0
Single-phase	kW	1x230 V	kW	A	H = TOTAL HEAD IN METRES OF COLUMN OF WATER							
1VME02P03M02	0,37	ESM80/103 HM..	0,49	2,24	34,4	33,3	32,1	30,6	28,3	24,4	20,4	14,6
1VME04P05M02	0,55	ESM80/105 HM..	0,69	3,07	57,5	55,3	53,1	50,4	46,7	39,3	32,0	21,9
1VME05P07M02	0,75	ESM80/107 HM..	0,91	4,04	80,8	78,0	75,0	71,7	63,0	53,5	44,1	30,8
1VME06P11M02	1,1	ESM80/111 HM..	1,33	5,85	99,8	96,3	92,8	88,5	83,2	76,1	65,5	47,9

PUMP	MOTOR		e-SM SET		Q = DELIVERY							
TYPE				* I	l/min 0	13,3	26,7	40,0	53,3	66,7	80,0	86,7
VME	P_N	TYPE	* P_1	208-240 V	m^3/h 0	0,8	1,6	2,4	3,2	4,0	4,8	5,2
Single-phase	kW	1x230 V	kW	A	H = TOTAL HEAD IN METRES OF COLUMN OF WATER							
3VME02P03M02	0,37	ESM80/103 HM..	0,49	2,24	35,5	34,3	31,2	25,0	19,5	14,5	9,8	7,5
3VME03P05M02	0,55	ESM80/105 HM..	0,69	3,07	53,2	51,3	47,1	37,9	29,8	22,7	16,1	12,4
3VME04P07M02	0,75	ESM80/107 HM..	0,91	4,06	70,9	68,3	63,9	51,6	40,6	31,1	22,3	17,3
3VME05P11M02	1,1	ESM80/111 HM..	1,33	5,85	88,6	85,5	82,4	74,3	59,5	46,6	34,8	28,8
3VME06P15M02	1,5	ESM80/115 HM..	1,78	7,78	100,5	96,8	93,2	86,6	77,0	64,1	49,3	42,0

PUMP	MOTOR		e-SM SET		Q = DELIVERY							
TYPE				* I	l/min 0	20,0	40,0	60,0	80,0	100,0	120,0	140,0
VME	P_N	TYPE	* P_1	208-240 V	m^3/h 0	1,2	2,4	3,6	4,8	6,0	7,2	8,4
Single-phase	kW	1x230 V	kW	A	H = TOTAL HEAD IN METRES OF COLUMN OF WATER							
5VME02P05M02	0,55	ESM80/105 HM..	0,69	3,07	36,3	34,8	33,4	29,1	23,4	18,7	14,1	8,9
5VME03P07M02	0,75	ESM80/107 HM..	0,92	4,06	54,2	52,4	49,8	39,9	32,5	25,8	18,8	11,5
5VME04P11M02	1,1	ESM80/111 HM..	1,33	5,85	72,3	69,9	66,3	57,8	47,4	38,2	28,6	18,6
5VME05P15M02	1,5	ESM80/115 HM..	1,78	7,80	90,4	87,4	82,9	77,9	64,2	52,3	40,1	27,3

PUMP	MOTOR		e-SM SET		Q = DELIVERY							
TYPE				* I	l/min 0	40,0	80,0	120,0	160,0	200,0	240,0	283,3
VME	P_N	TYPE	* P_1	208-240 V	m^3/h 0	2,4	4,8	7,2	9,6	12,0	14,4	17,0
Single-phase	kW	1x230 V	kW	A	H = TOTAL HEAD IN METRES OF COLUMN OF WATER							
10VME01P07M02	0,75	ESM80/107 HM..	0,91	4,04	22,6	22,2	21,2	20,0	16,6	13,5	10,4	6,8
10VME02P11M02	1,1	ESM80/111 HM..	1,34	5,86	38,0	37,2	35,4	30,7	24,7	19,2	13,4	6,7

* Maximum value in specified range: P1 = input power; I = input current.

1-10vme-esm-2p50-en_a_th

ELETTRICAL DATA TABLE

P_N	MOTOR TYPE	IEC SIZE	Construction Design	SPEED	INPUT CURRENT	DATA RELATED TO THE VOLTAGE OF 230V						IES
				(RPM)*	I (A)	In	cosφ	Tn	η %			
kW				min^{-1}	208-240 V	A		Nm	4/4	3/4	2/4	
0,37	ESM80/103 HM..	80	SPECIAL	3000	2,28-1,99	2,08	0,95	1,18	81,3	79,1	74,3	2
				3600	2,30-2,02	2,10		0,98	80,6	77,5	72,0	
0,55	ESM80/105 HM..	80		3000	3,27-2,85	2,96	0,97	1,75	83,3	82,2	78,8	2
				3600	3,27-2,85	2,96		1,46	83,3	81,5	77,5	
0,75	ESM80/107 HM..	80		3000	4,43-3,84	4,00	0,98	2,39	83,3	83,3	81,5	2
				3600	4,38-3,79	3,94		1,99	84,5	83,5	80,6	
1,10	ESM80/111 HM..	80		3000	6,26-5,35	5,64	0,99	3,50	85,7	85,1	82,7	2
				3600	6,20-5,32	5,63		2,92	85,9	84,6	81,4	
1,50	ESM80/115 HM..	80		3000	8,57-7,32	7,69	0,99	4,77	85,6	85,7	84,7	2
				3600	8,42-7,25	7,62		3,98	86,3	85,9	84,0	

* The indicated rotational speed are representing the upper and lower limits of the rated power operational speed range.

eHM-eVM_Smart-motm_en_a_te

In the range 3000-3600 rpm the nominal motor power is guaranteed. Above 3600 rpm it isn't possible work and the motor is automatically limited; below 3000 rpm it works partially load.

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VME SERIES - THREE-PHASE VERSION
HYDRAULIC PERFORMANCE TABLE

PUMP	MOTOR		e-SM SET			Q = DELIVERY							
TYPE			* I	* I	l/min 0	6,7	13,3	20,0	26,7	33,3	40,0	50,0
VME	P_N	TYPE	* P_1	208-240 V	380-460 V	m^3/h 0	0,4	0,8	1,2	1,6	2,0	2,4	3,0
Three-phase	kW		kW	A	A	H = TOTAL HEAD IN METRES OF COLUMN OF WATER							
1VME02P03T..	0,37	ESM80/303 HM..	0,49	2,14	1,45	34,4	33,3	32,1	30,6	28,4	24,4	20,5	14,6
1VME04P05T..	0,55	ESM80/305 HM..	0,69	2,77	1,92	57,5	55,3	53,1	50,4	46,7	39,4	32,1	21,9
1VME05P07T..	0,75	ESM80/307 HM..	0,91	3,55	2,41	80,8	78,0	75,0	71,7	63,0	53,5	44,1	30,8
1VME06P11T..	1,1	ESM80/311 HM..	1,37	4,92	3,44	99,8	96,3	92,8	88,5	83,2	76,1	65,4	47,9

PUMP	MOTOR		e-SM SET			Q = DELIVERY							
TYPE			* I	* I	l/min 0	13,3	26,7	40,0	53,3	66,7	80,0	86,7
VME	P_N	TYPE	* P_1	208-240 V	380-460 V	m^3/h 0	0,8	1,6	2,4	3,2	4,0	4,8	5,2
Three-phase	kW		kW	A	A	H = TOTAL HEAD IN METRES OF COLUMN OF WATER							
3VME02P03T..	0,37	ESM80/303 HM..	0,50	2,13	1,48	35,5	34,3	31,2	25,1	19,5	14,5	9,8	7,5
3VME03P05T..	0,55	ESM80/305 HM..	0,70	2,81	1,92	53,2	51,3	47,1	37,9	29,8	22,7	16,1	12,4
3VME04P07T..	0,75	ESM80/307 HM..	0,92	3,55	2,43	70,9	68,3	64,0	51,6	40,6	31,1	22,3	17,3
3VME05P11T..	1,1	ESM80/311 HM..	1,37	4,94	3,45	88,6	85,5	82,4	74,2	59,4	46,5	34,9	28,8
3VME06P15T..	1,5	ESM80/315 HM..	1,81	6,32	4,40	100,5	96,8	93,2	86,6	77,0	64,1	49,3	42,0

PUMP	MOTOR		e-SM SET			Q = DELIVERY							
TYPE			* I	* I	l/min 0	20,0	40,0	60,0	80,0	100,0	120,0	140,0
VME	P_N	TYPE	* P_1	208-240 V	380-460 V	m^3/h 0	1,2	2,4	3,6	4,8	6,0	7,2	8,4
Three-phase	kW		kW	A	A	H = TOTAL HEAD IN METRES OF COLUMN OF WATER							
5VME02P05T..	0,55	ESM80/305 HM..	0,69	2,81	1,91	36,3	34,8	33,4	29,1	23,5	18,7	14,1	8,9
5VME03P07T..	0,75	ESM80/307 HM..	0,92	3,55	2,43	54,2	52,4	49,8	39,9	32,5	25,8	18,8	11,5
5VME04P11T..	1,1	ESM80/311 HM..	1,37	4,95	3,45	72,3	69,9	66,3	57,8	47,4	38,2	28,6	18,6
5VME05P15T..	1,5	ESM80/315 HM..	1,82	6,35	4,42	90,4	87,4	82,9	78,0	64,2	52,3	40,1	27,3
5VME06P22T04	2,2	ESM80/322 HM..	2,33	-	5,44	99,6	96,1	90,9	85,3	78,6	69,2	55,6	37,2

PUMP	MOTOR		e-SM SET			Q = DELIVERY							
TYPE			* I	* I	l/min 0	40,0	80,0	120,0	160,0	200,0	240,0	283,3
VME	P_N	TYPE	* P_1	208-240 V	380-460 V	m^3/h 0	2,4	4,8	7,2	9,6	12,0	14,4	17,0
Three-phase	kW		kW	A	A	H = TOTAL HEAD IN METRES OF COLUMN OF WATER							
10VME01P07T..	0,75	ESM80/307 HM..	0,91	3,55	2,40	22,6	22,2	21,2	20,0	16,6	13,5	10,4	6,8
10VME02P11T..	1,1	ESM80/311 HM..	1,38	5,00	3,47	38,0	37,2	35,4	30,7	24,7	19,2	13,4	6,7

* Maximum value in specified range: P1 = input power; I = input current.

1-10vme-esmT-2p50-en_a_th

ELETTRICAL DATA TABLE

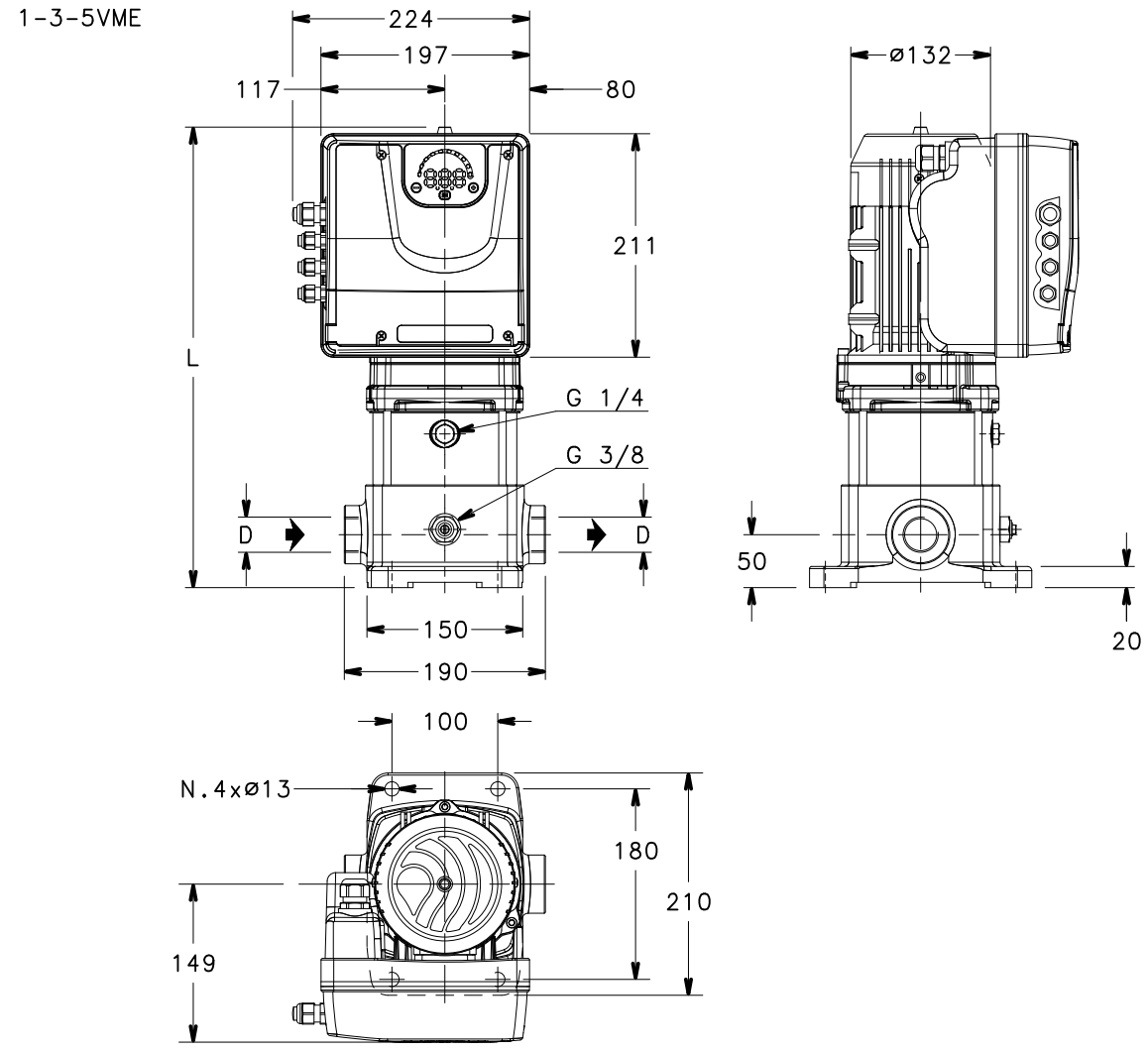
P_N	MOTOR TYPE	IEC SIZE	Construction Design	SPEED (RPM) *	INPUT CURRENT I (A)	DATA RELATED TO THE VOLTAGE OF 400 V In	cosφ	Tn	η %			IES
kW				min^{-1}	208-240/380-460 V	A		Nm	4/4	3/4	2/4	
0,37	ESM80/303 HM..	80	SPECIAL	3000	2,01-1,85/1,41-1,28	1,42	0,48	1,18	78,6	75,6	70,1	2
				3600	2,13-1,83/1,43-1,33	1,36		0,98	83,1	80,7	76,1	
0,55	ESM80/305 HM..	80		3000	2,81-2,57/1,89-1,69	1,88	0,52	1,75	81,1	79,3	75,5	2
				3600	2,90-2,52/1,90-1,73	1,80		1,46	85,4	83,8	80,6	
0,75	ESM80/307 HM..	80		3000	3,70-3,37/2,44-2,17	2,41	0,55	2,39	81,9	81,2	78,6	2
				3600	3,74-3,28/2,43-2,20	2,31		1,99	86,1	85,5	83,1	
1,10	ESM80/311 HM..	80		3000	5,12-4,73/3,41-3,01	3,35	0,57	3,50	82,8	81,3	77,7	2
				3600	5,15-4,69/3,45-3,06	3,32		2,92	83,5	81,6	77,6	
1,50	ESM80/315 HM..	80		3000	6,73-6,17/4,49-3,95	4,39	0,59	4,77	83,1	82,8	80,6	2
				3600	6,69-6,08/4,48-3,97	4,32		3,98	84,6	83,6	80,8	
2,20	ESM80/322 HM..	80		3000	- /6,03-5,32	5,81	0,62	7,00	87,6	87,4	85,9	2
				3600	- /5,93-5,24	5,74		5,84	88,9	88,2	86,3	

* The indicated rotational speed are representing the upper and lower limits of the rated power operational speed range.

eHM-eVM_Smart-mott-en_a_te

In the range 3000-3600 rpm the nominal motor power is guaranteed. Above 3600 rpm it isn't possible work and the motor is automatically limited; below 3000 rpm it works partially load.

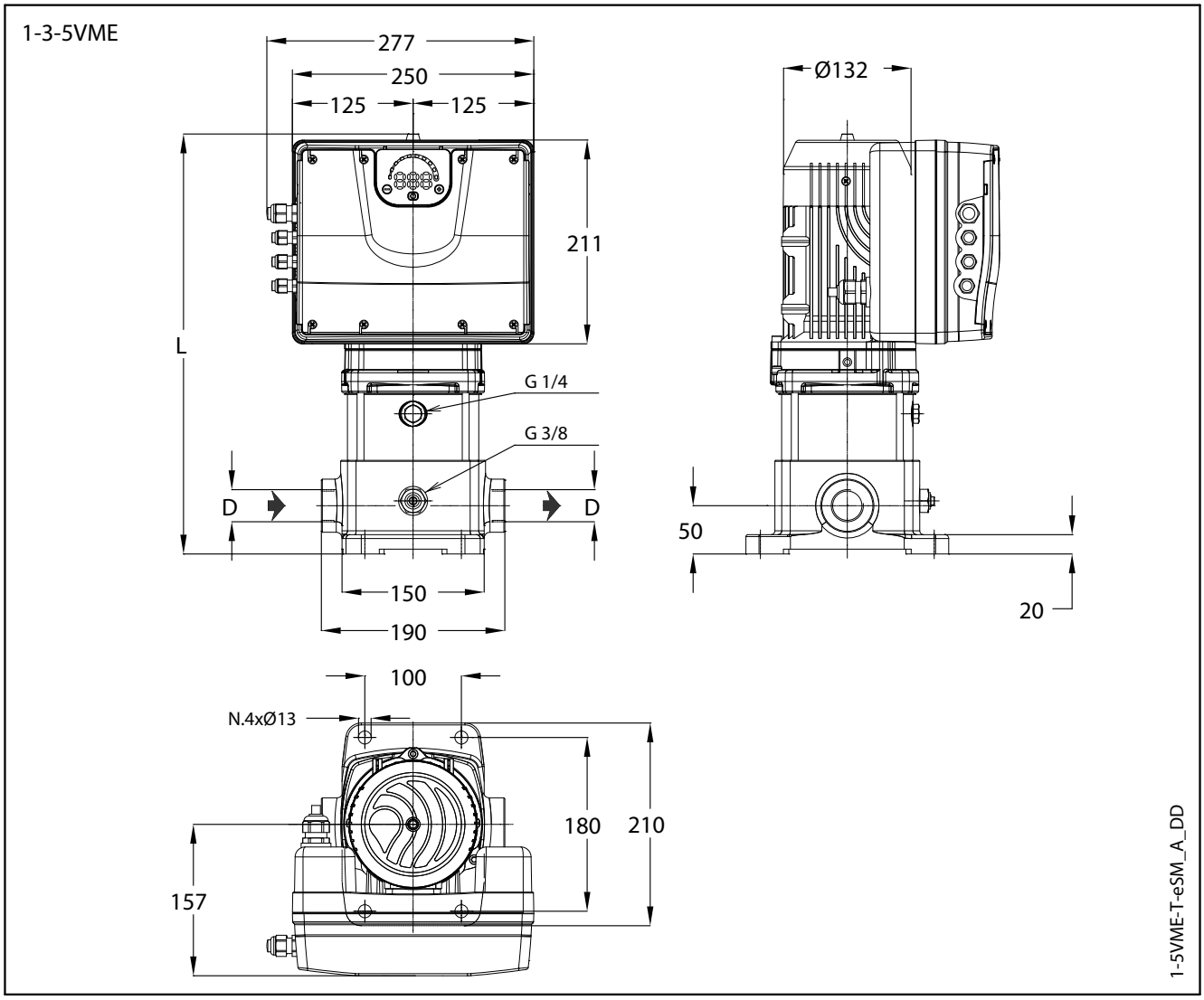
1, 3, 5VME SERIES - SINGLE-PHASE VERSION
DIMENSIONS AND WEIGHTS



PUMP TYPE	VERSION	MOTOR		DIMENSIONS (mm)		PN	WEIGHT
		kW	SIZE	D	L	bar	kg
1VME02P03M02	SINGLE-PHASE	0,37	80	Rp 1	415	10	14,8
1VME04P05M02		0,55	80	Rp 1	435	10	15,3
1VME05P07M02		0,75	80	Rp 1	455	10	15,6
1VME06P11M02		1,1	80	Rp 1	475	16	17,3
3VME02P03M02		0,37	80	Rp 1	415	10	14,8
3VME03P05M02		0,55	80	Rp 1	415	10	14,9
3VME04P07M02		0,75	80	Rp 1	435	10	15,3
3VME05P11M02		1,1	80	Rp 1	455	10	17,0
3VME06P15M02		1,5	80	Rp 1	475	16	17,5
5VME02P05M02		0,55	80	Rp 1 1/4	415	10	14,8
5VME03P07M02		0,75	80	Rp 1 1/4	415	10	14,9
5VME04P11M02		1,10	80	Rp 1 1/4	435	10	16,6
5VME05P15M02		1,5	80	Rp 1 1/4	455	10	17,0

1-5vme-esm-2p50-en_a_td

1, 3, 5VME SERIES - THREE-PHASE VERSION
DIMENSIONS AND WEIGHTS

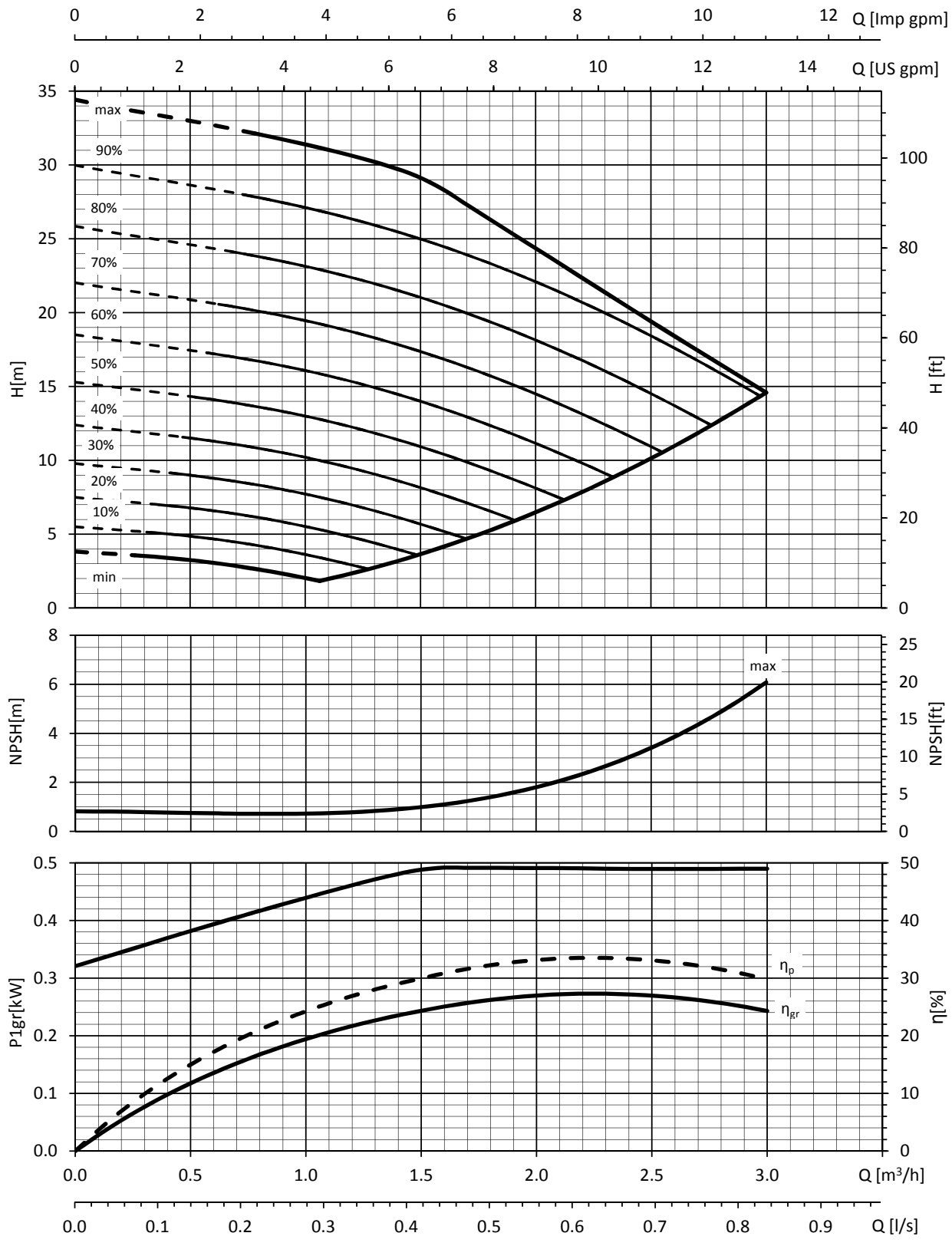


PUMP TYPE	VERSION	MOTOR		DIMENSIONS (mm)		PN	WEIGHT
		kW	SIZE	D	L	bar	kg
1VME02P03T..	THREE-PHASE	0,37	80	Rp 1	415	10	21,7
1VME04P05T..		0,55	80	Rp 1	435	10	23,0
1VME05P07T..		0,75	80	Rp 1	455	10	24,0
1VME06P11T..		1,1	80	Rp 1	475	16	26,5
3VME02P03T..		0,37	80	Rp 1	415	10	21,7
3VME03P05T..		0,55	80	Rp 1	415	10	22,0
3VME04P07T..		0,75	80	Rp 1	435	10	23,0
3VME05P11T..		1,1	80	Rp 1	455	10	25,5
3VME06P15T..		1,5	80	Rp 1	475	16	26,8
5VME02P05T..		0,55	80	Rp 1 1/4	415	10	21,0
5VME03P07T..		0,75	80	Rp 1 1/4	415	10	21,2
5VME04P11T..		1,1	80	Rp 1 1/4	435	10	22,2
5VME05P15T..		1,5	80	Rp 1 1/4	455	10	22,5
5VME06P22T04		1,5	80	Rp 1 1/4	475	10	24,2

1-5vme-esm-2p50T-en_a_td

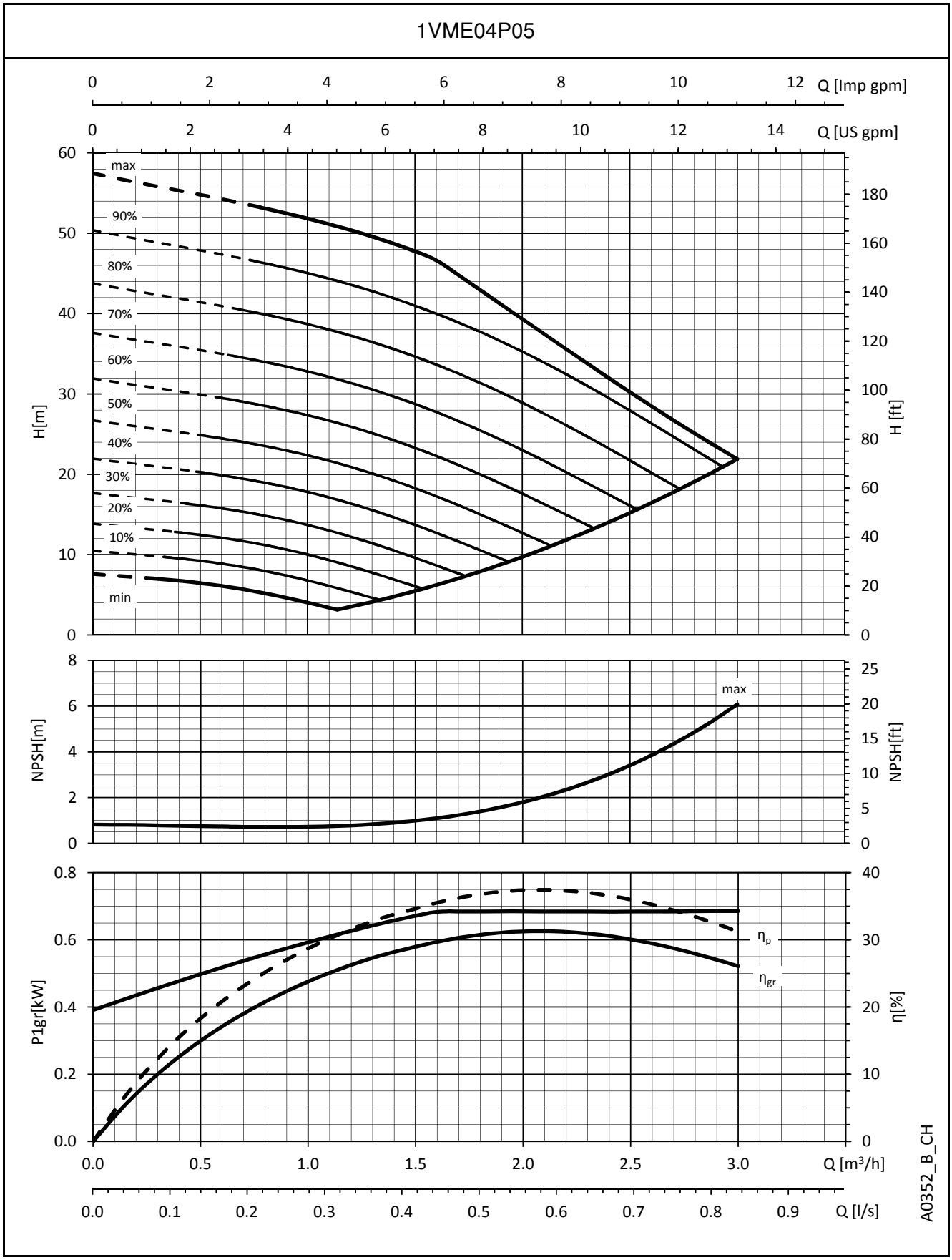
1VME SERIES
OPERATING CHARACTERISTICS

1VME02P03



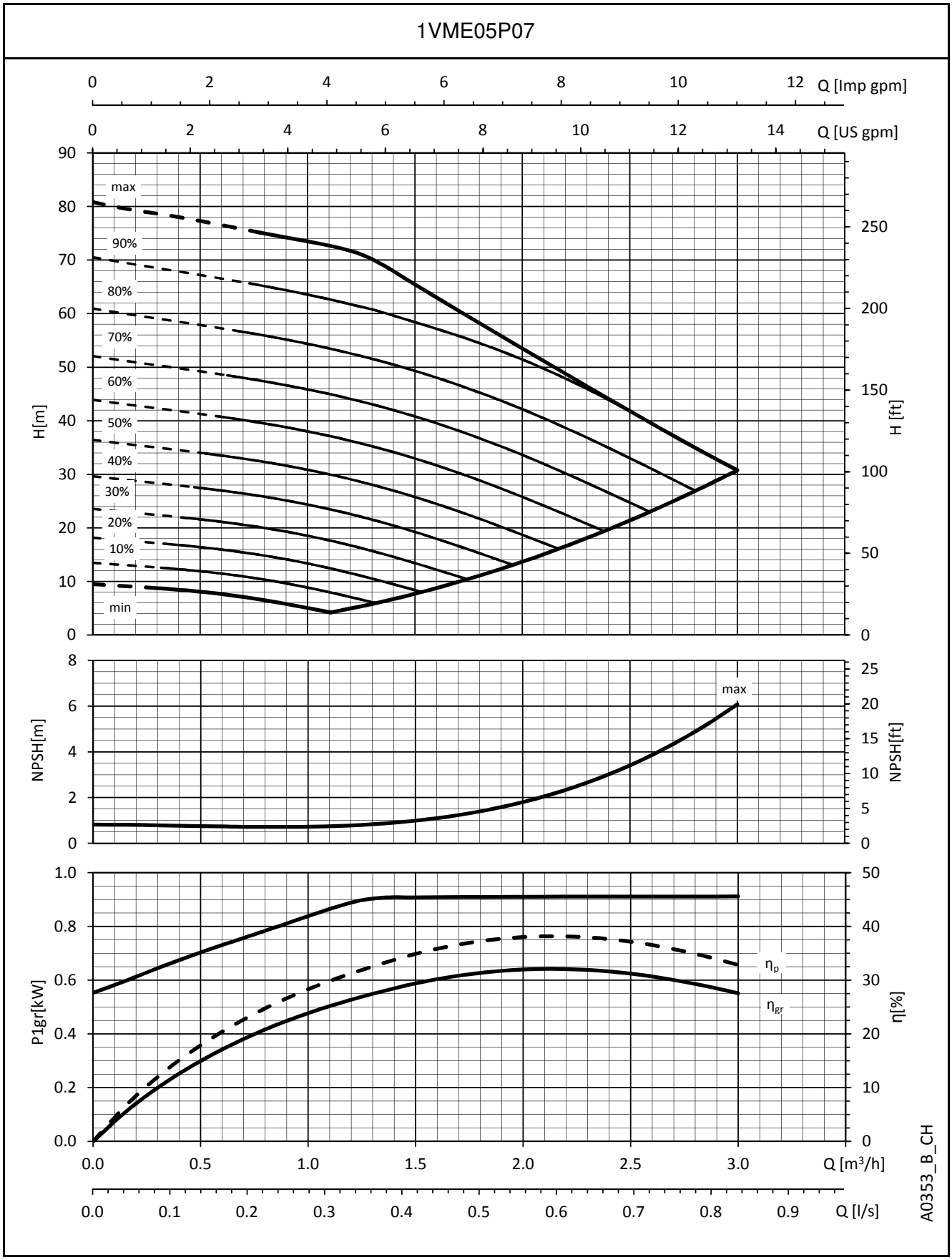
The performances are valid for liquid with density ρ = 1 Kg/dm³ and kinematic viscosity ν = 1 mm²/sec.

1VME SERIES
OPERATING CHARACTERISTICS



The performances are valid for liquid with density ρ = 1 Kg/dm³ and kinematic viscosity ν = 1 mm²/sec.

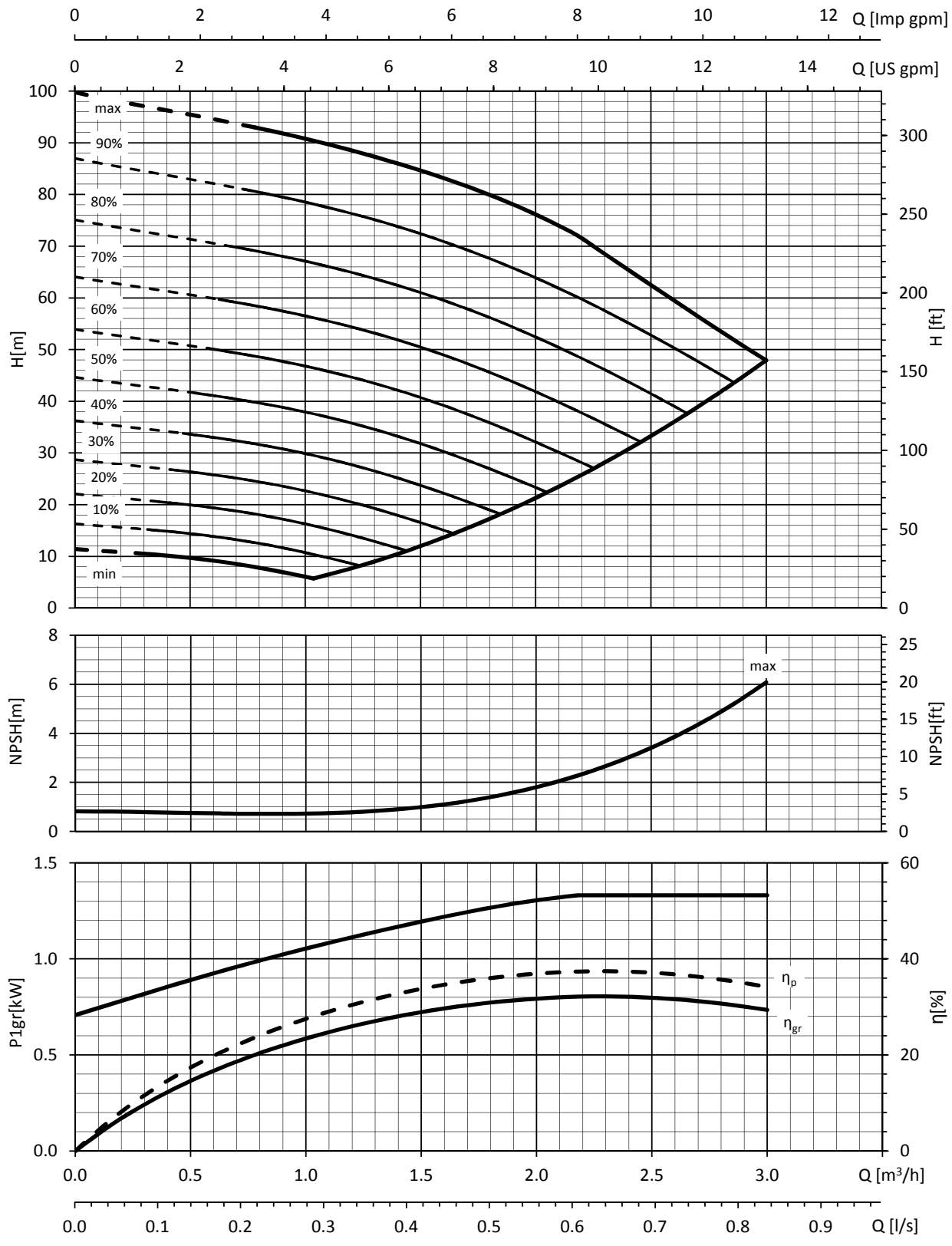
1VME SERIES
OPERATING CHARACTERISTICS



The performances are valid for liquid with density ρ = 1 Kg/dm³ and kinematic viscosity ν = 1 mm²/sec.

1VME SERIES
OPERATING CHARACTERISTICS

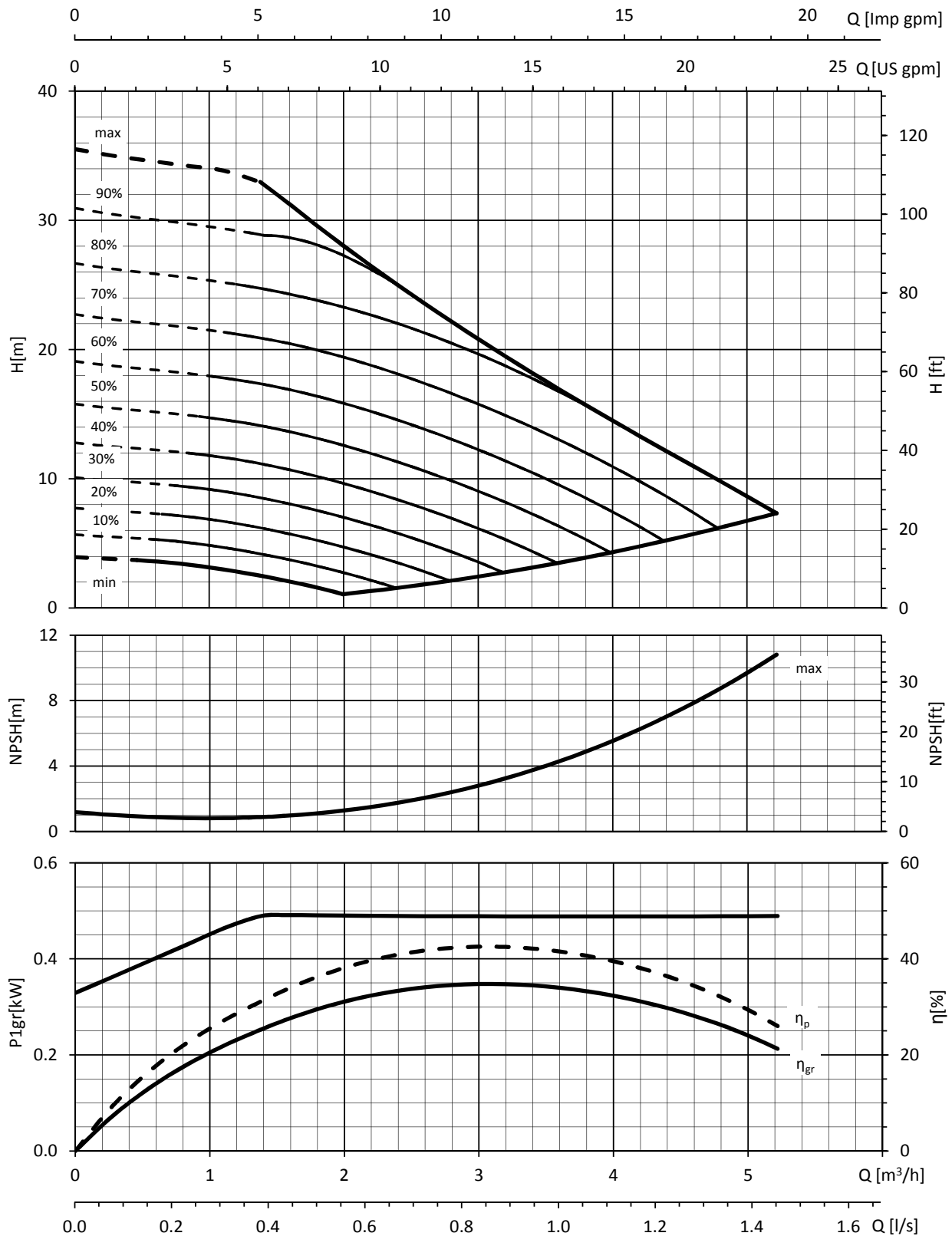
1VME06P11



The performances are valid for liquid with density ρ = 1 Kg/dm³ and kinematic viscosity ν = 1 mm²/sec.

3VME SERIES
OPERATING CHARACTERISTICS

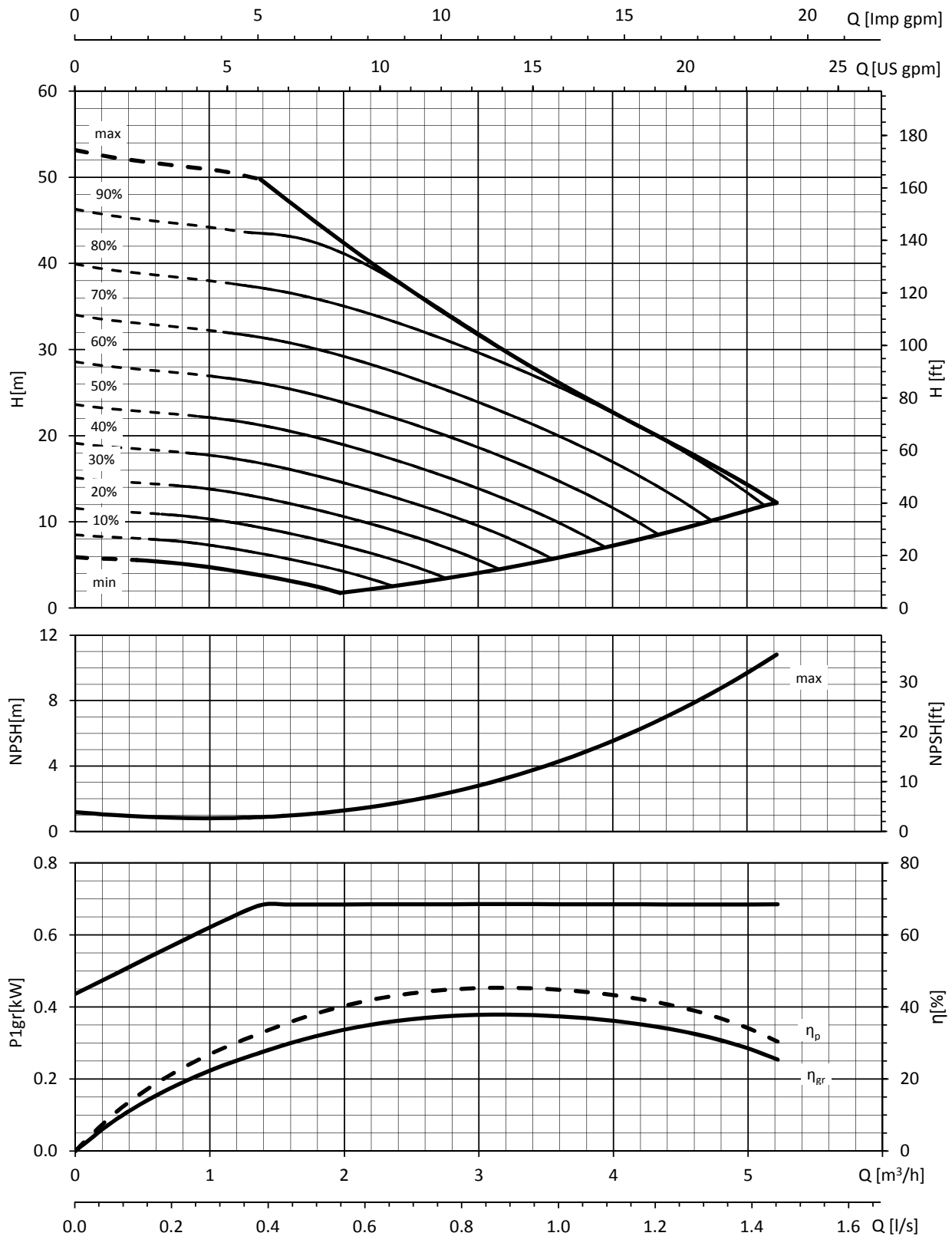
3VME02P03



The performances are valid for liquid with density ρ = 1 Kg/dm³ and kinematic viscosity ν = 1 mm²/sec.

3VME SERIES
OPERATING CHARACTERISTICS

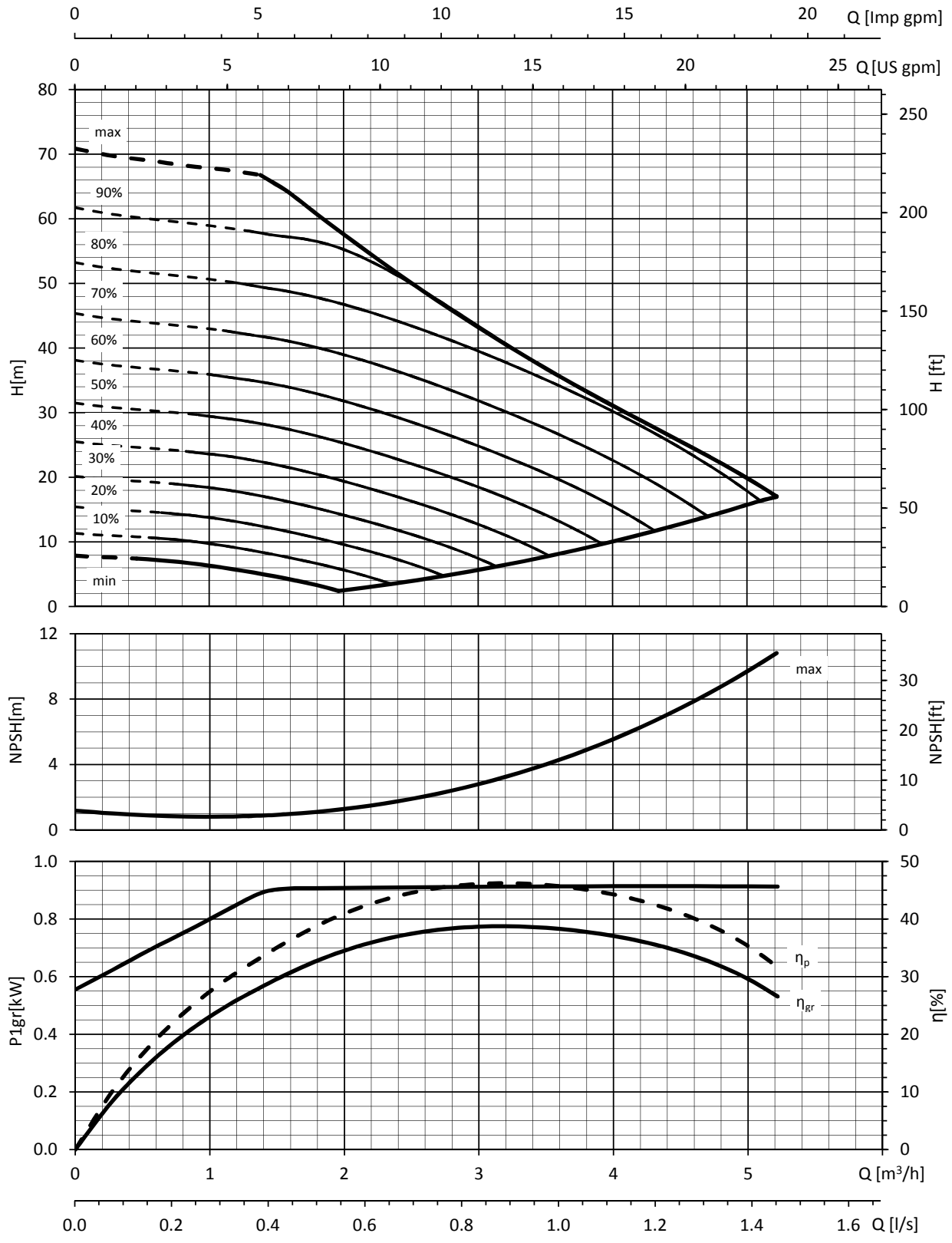
3VME03P05



The performances are valid for liquid with density ρ = 1 Kg/dm³ and kinematic viscosity ν = 1 mm²/sec.

3VME SERIES
OPERATING CHARACTERISTICS

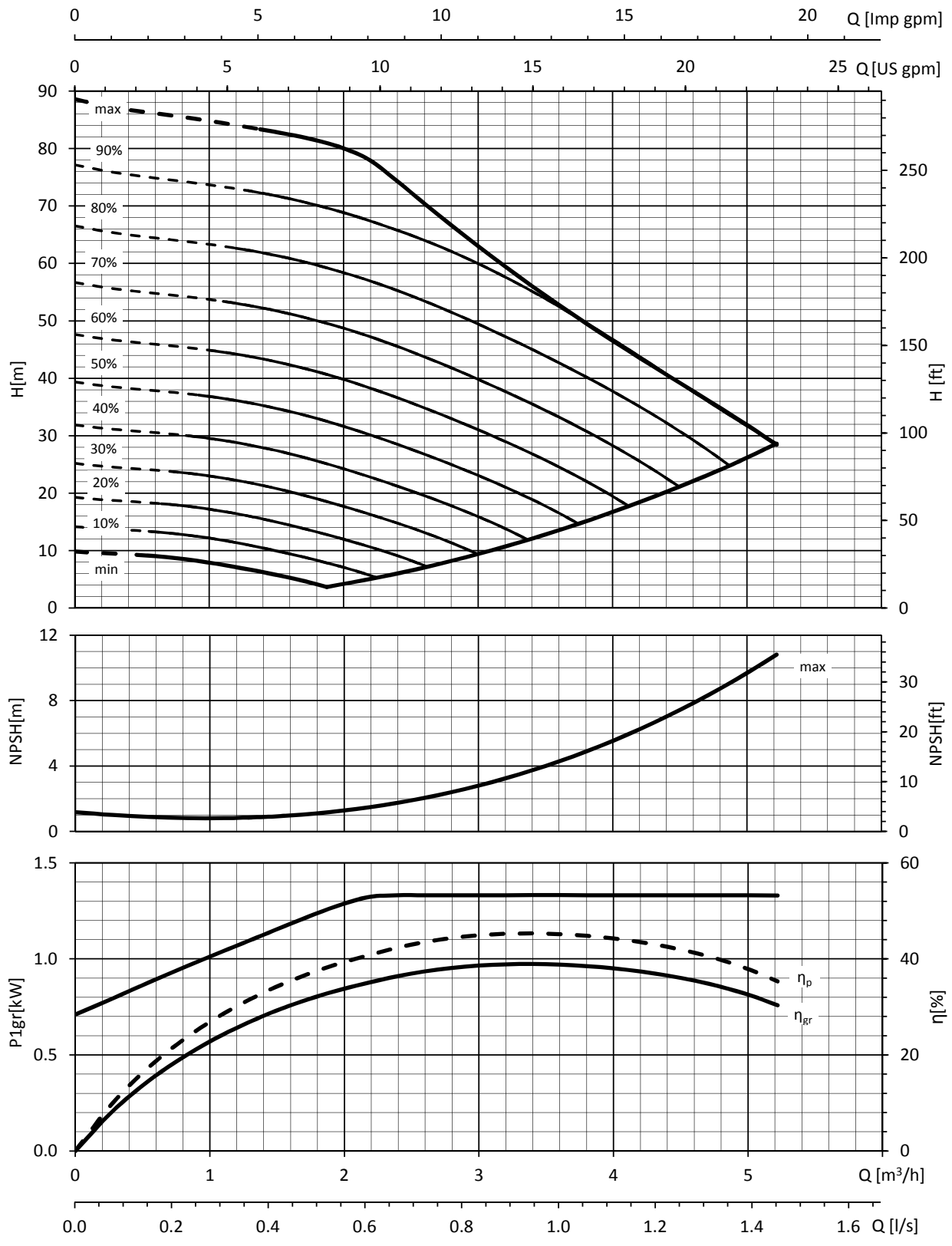
3VME04P07



The performances are valid for liquid with density ρ = 1 Kg/dm³ and kinematic viscosity ν = 1 mm²/sec.

3VME SERIES
OPERATING CHARACTERISTICS

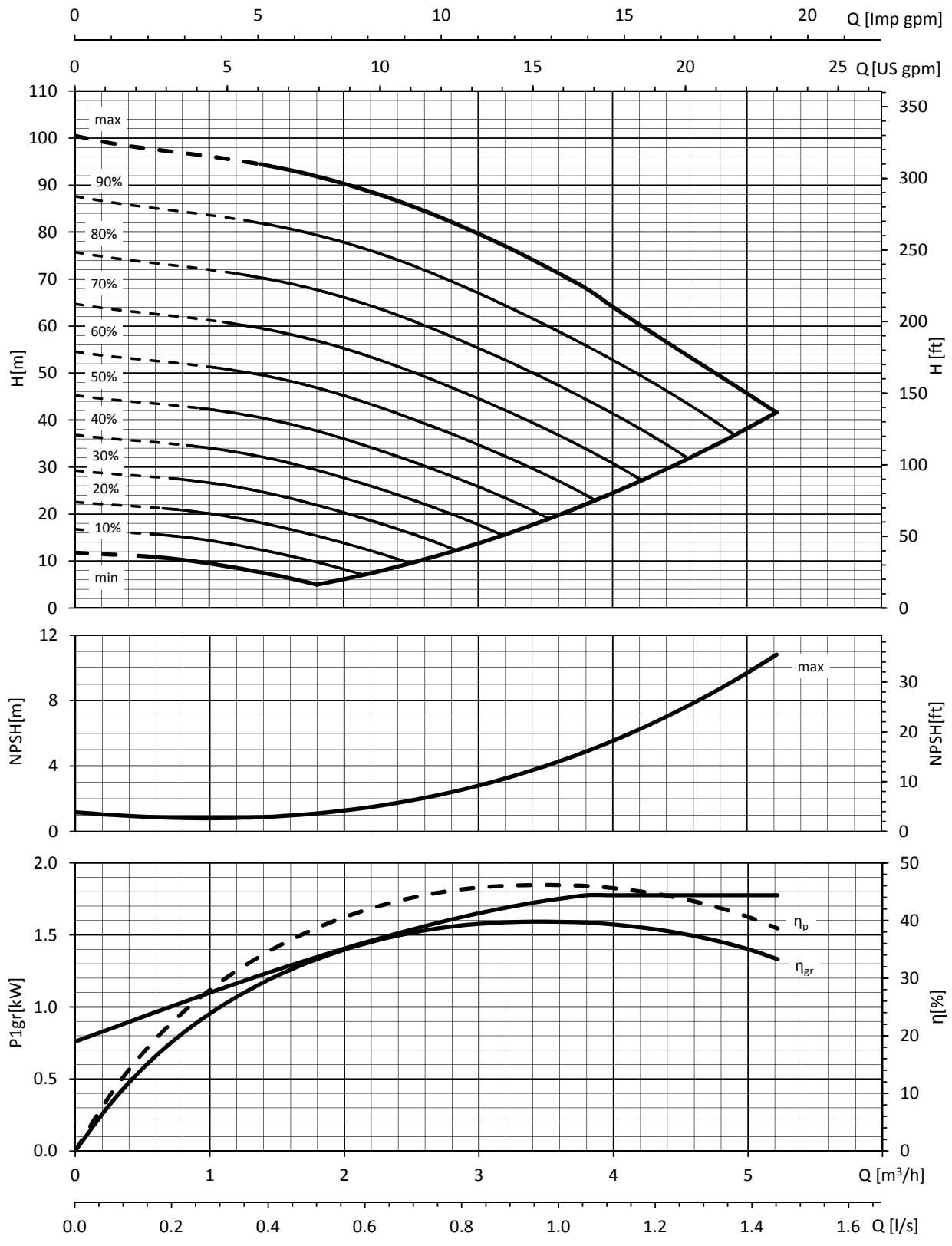
3VME05P11



The performances are valid for liquid with density ρ = 1 Kg/dm³ and kinematic viscosity ν = 1 mm²/sec.

3VME SERIES
OPERATING CHARACTERISTICS

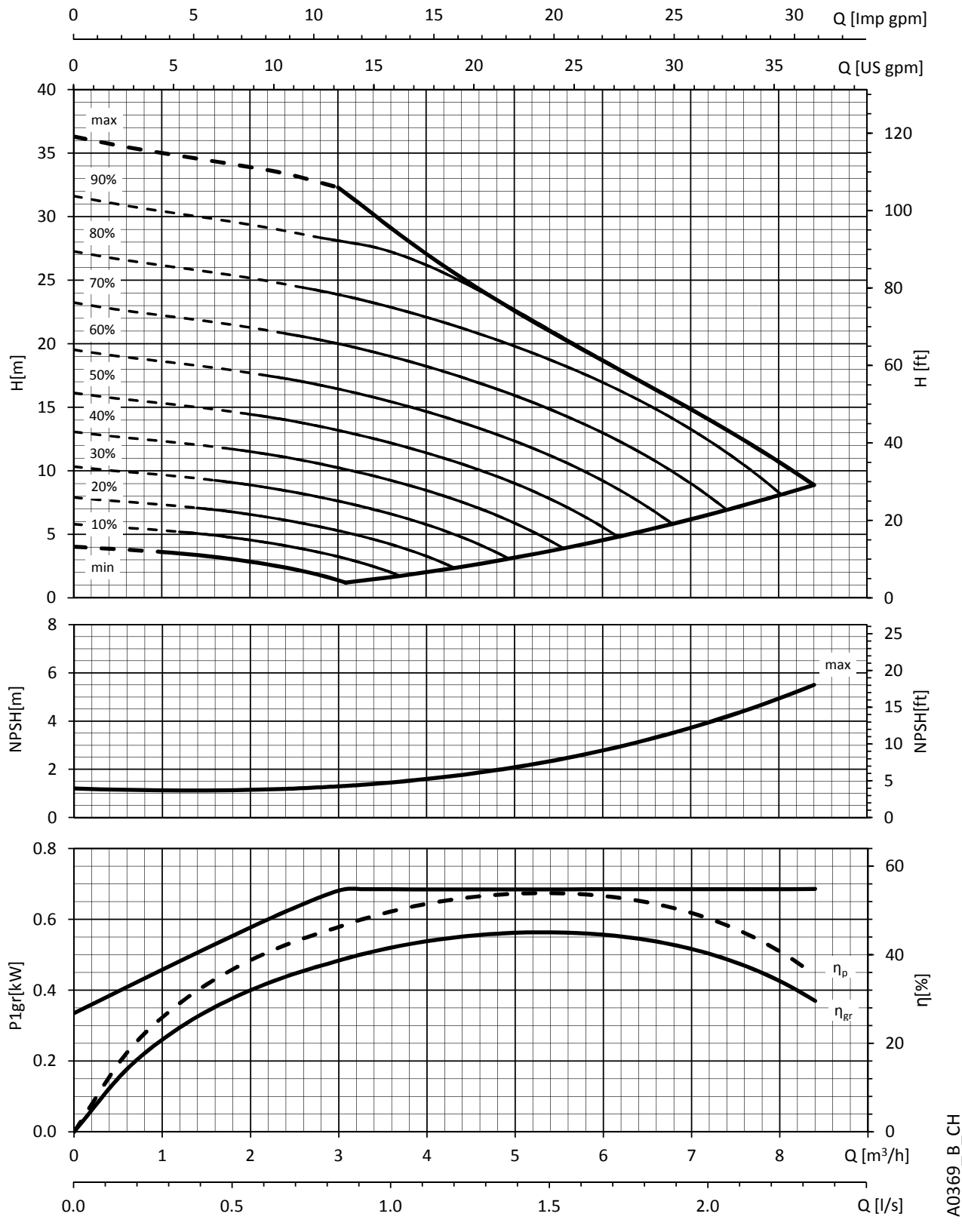
3VME06P15



The performances are valid for liquid with density ρ = 1 Kg/dm³ and kinematic viscosity ν = 1 mm²/sec.

5VME SERIES
OPERATING CHARACTERISTICS

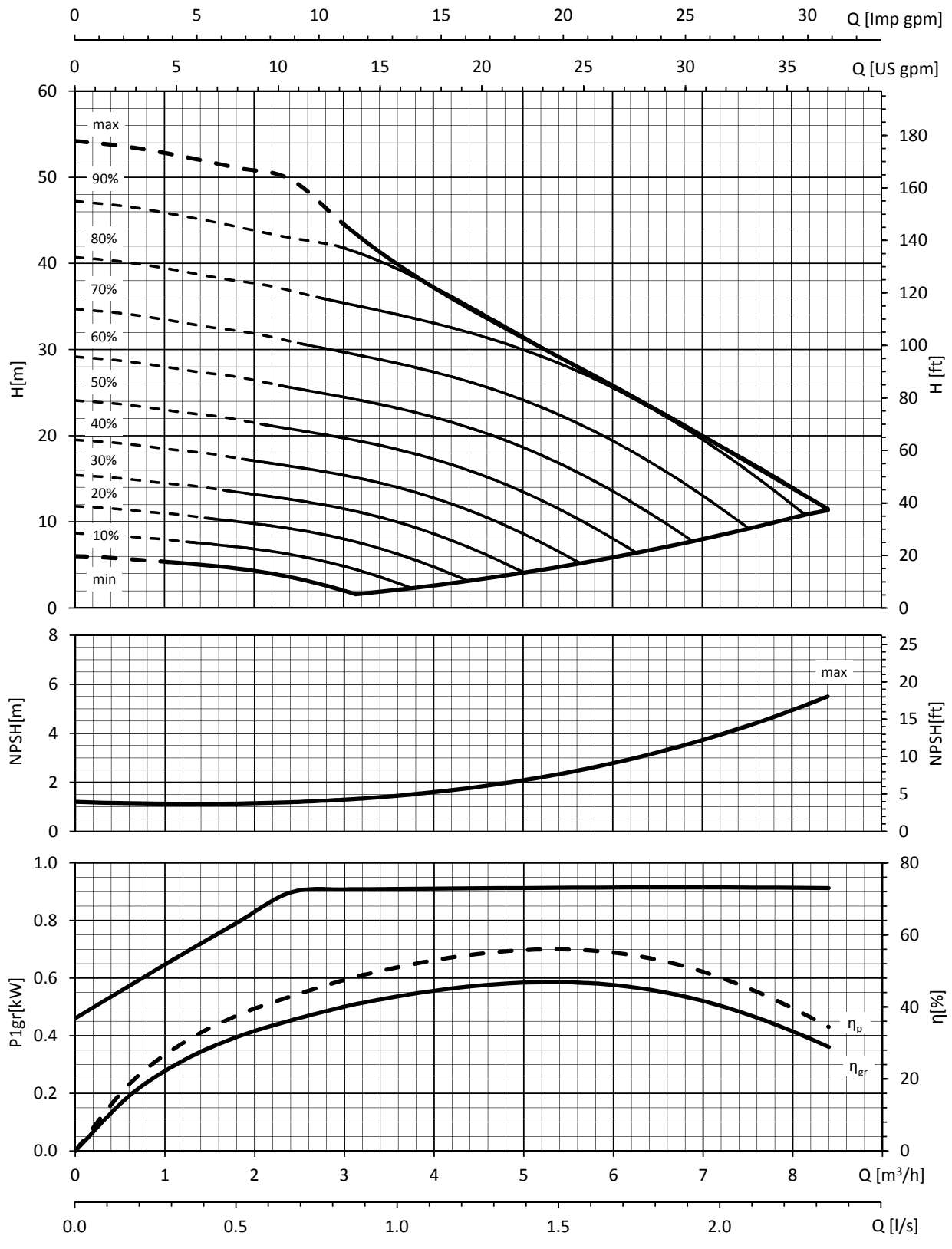
5VME02P05



The performances are valid for liquid with density ρ = 1 Kg/dm³ and kinematic viscosity ν = 1 mm²/sec.

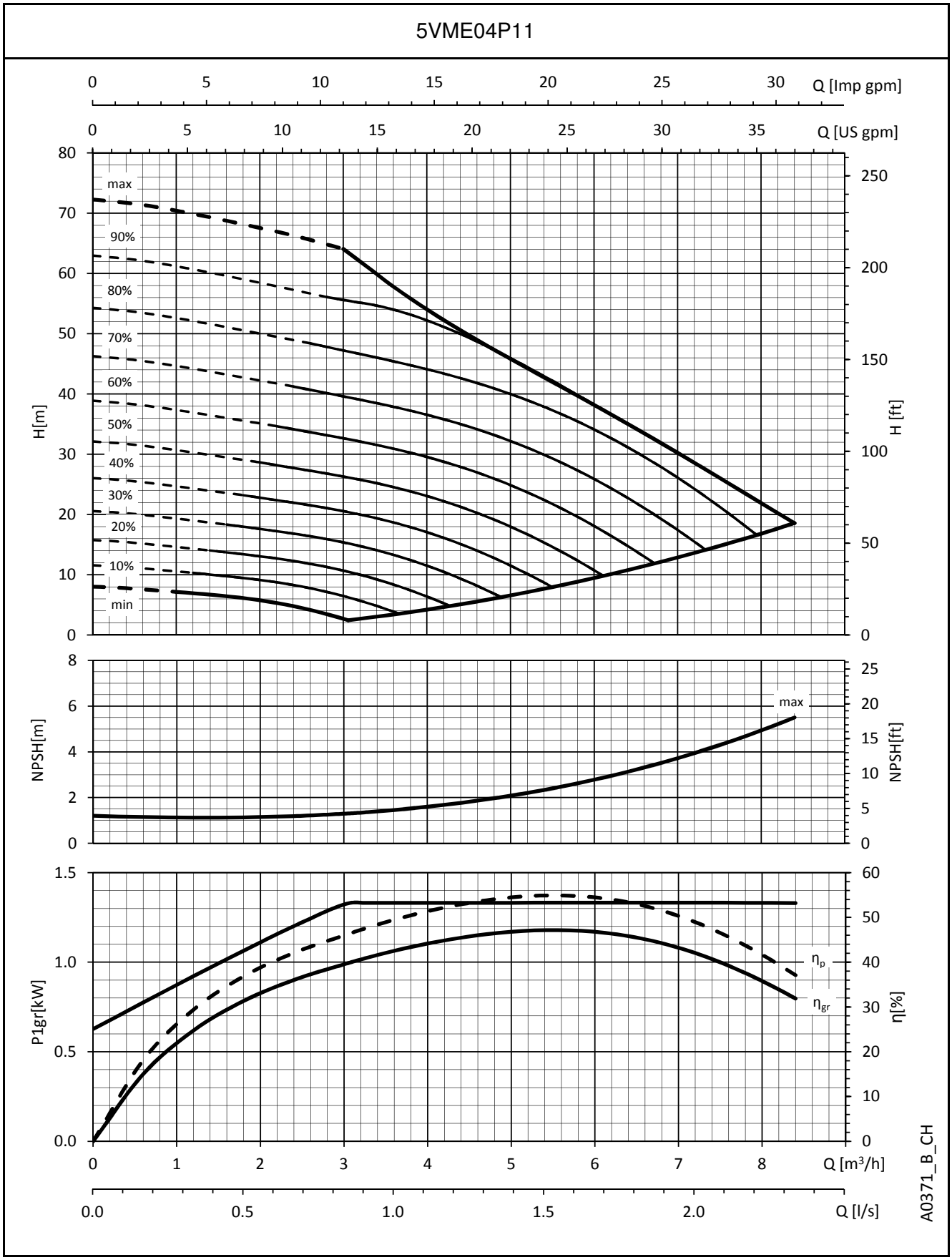
5VME SERIES
OPERATING CHARACTERISTICS

5VME03P07



The performances are valid for liquid with density ρ = 1 Kg/dm³ and kinematic viscosity ν = 1 mm²/sec.

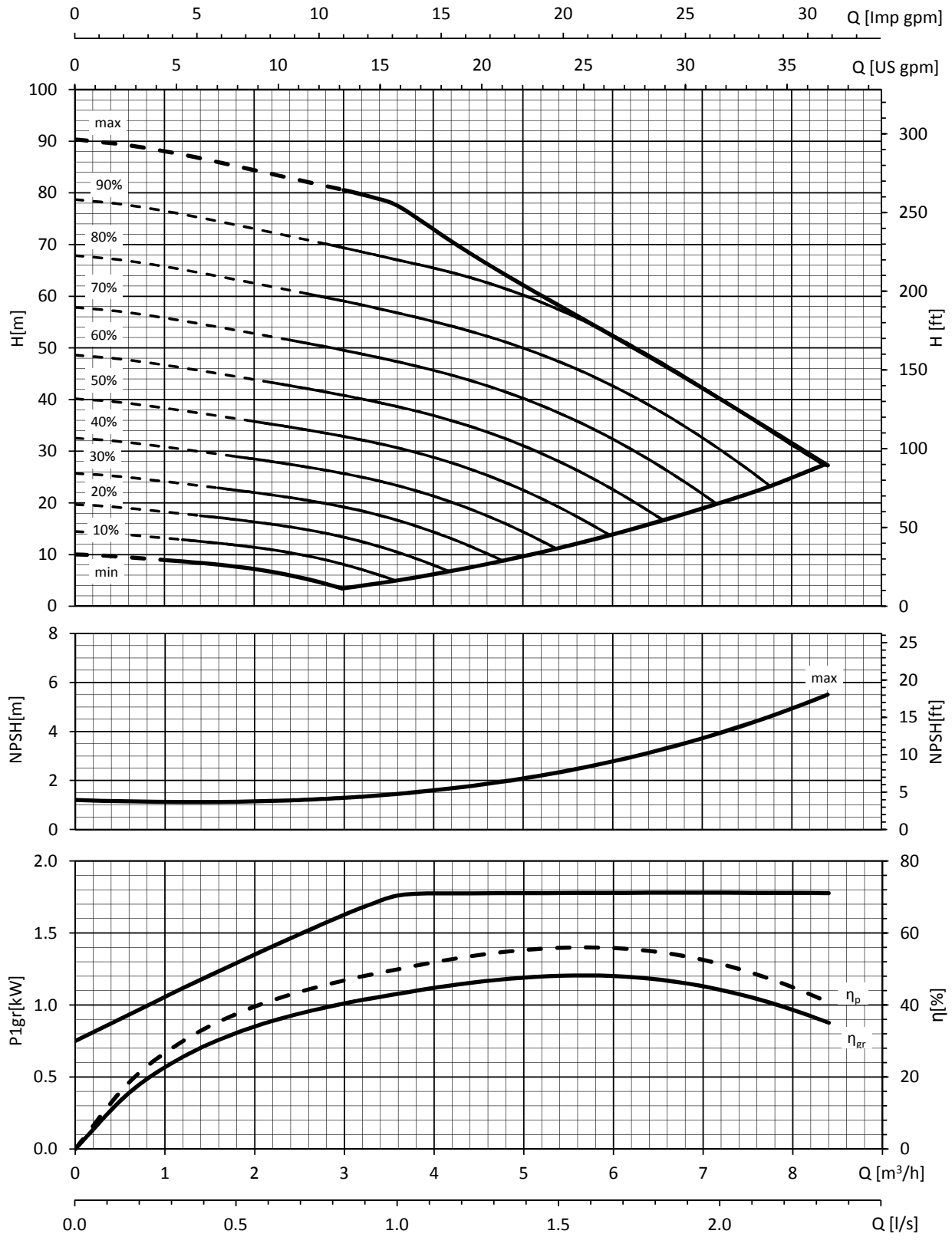
5VME SERIES
OPERATING CHARACTERISTICS



The performances are valid for liquid with density ρ = 1 Kg/dm³ and kinematic viscosity ν = 1 mm²/sec.

5VME SERIES
OPERATING CHARACTERISTICS

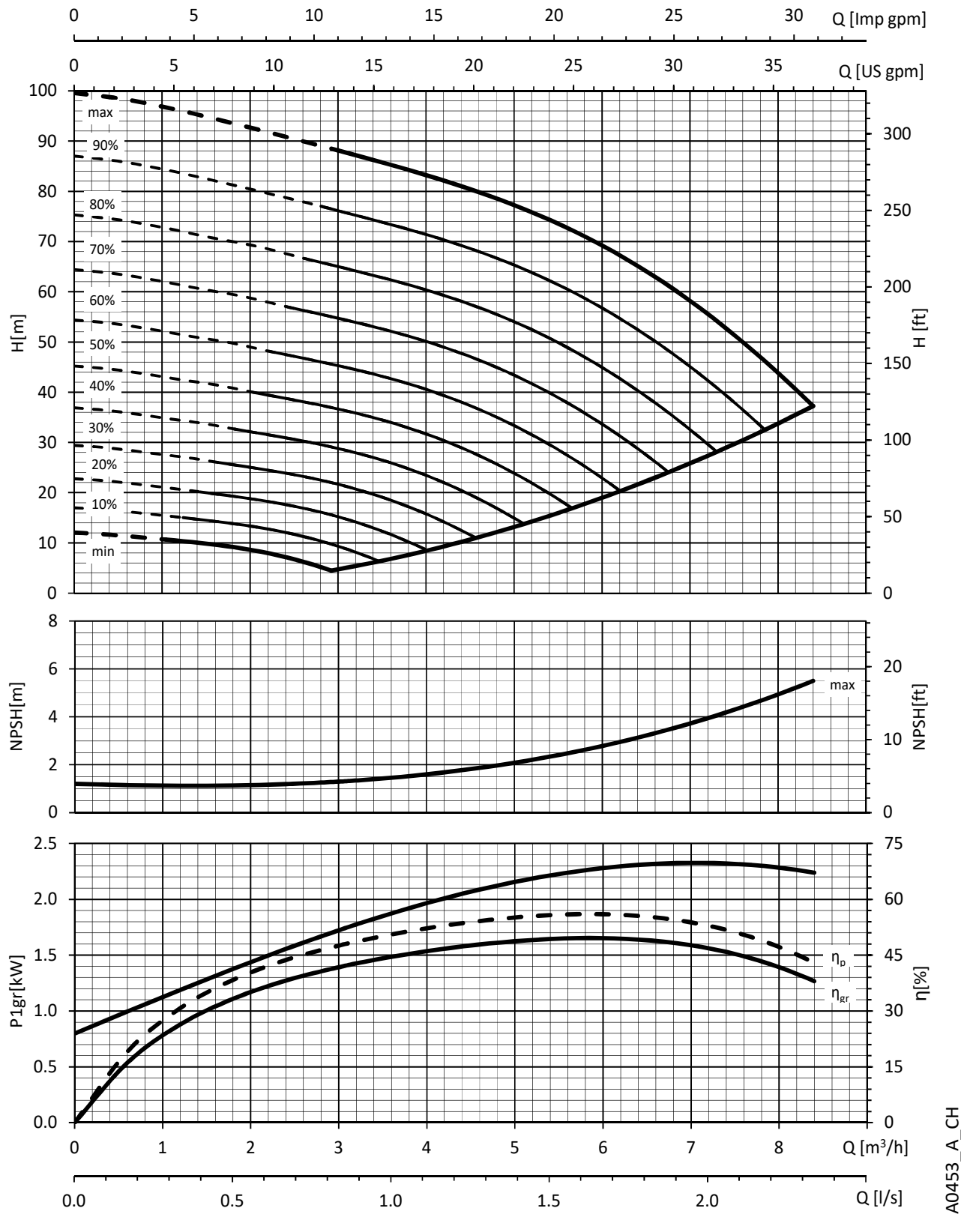
5VME05P15



The performances are valid for liquid with density ρ = 1 Kg/dm³ and kinematic viscosity ν = 1 mm²/sec.

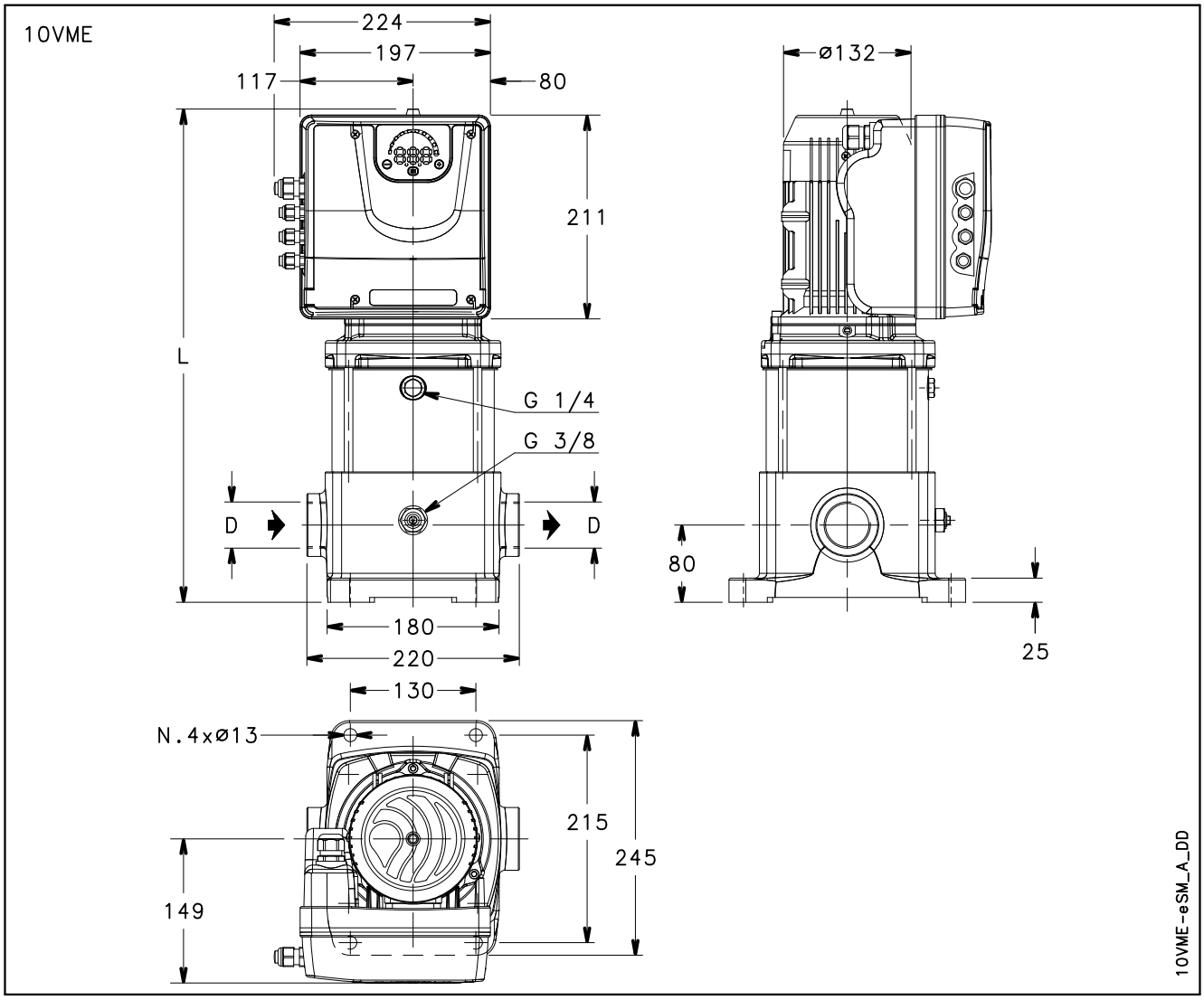
5VME SERIES
OPERATING CHARACTERISTICS

5VME06P22



The performances are valid for liquid with density ρ = 1 Kg/dm³ and kinematic viscosity ν = 1 mm²/sec.

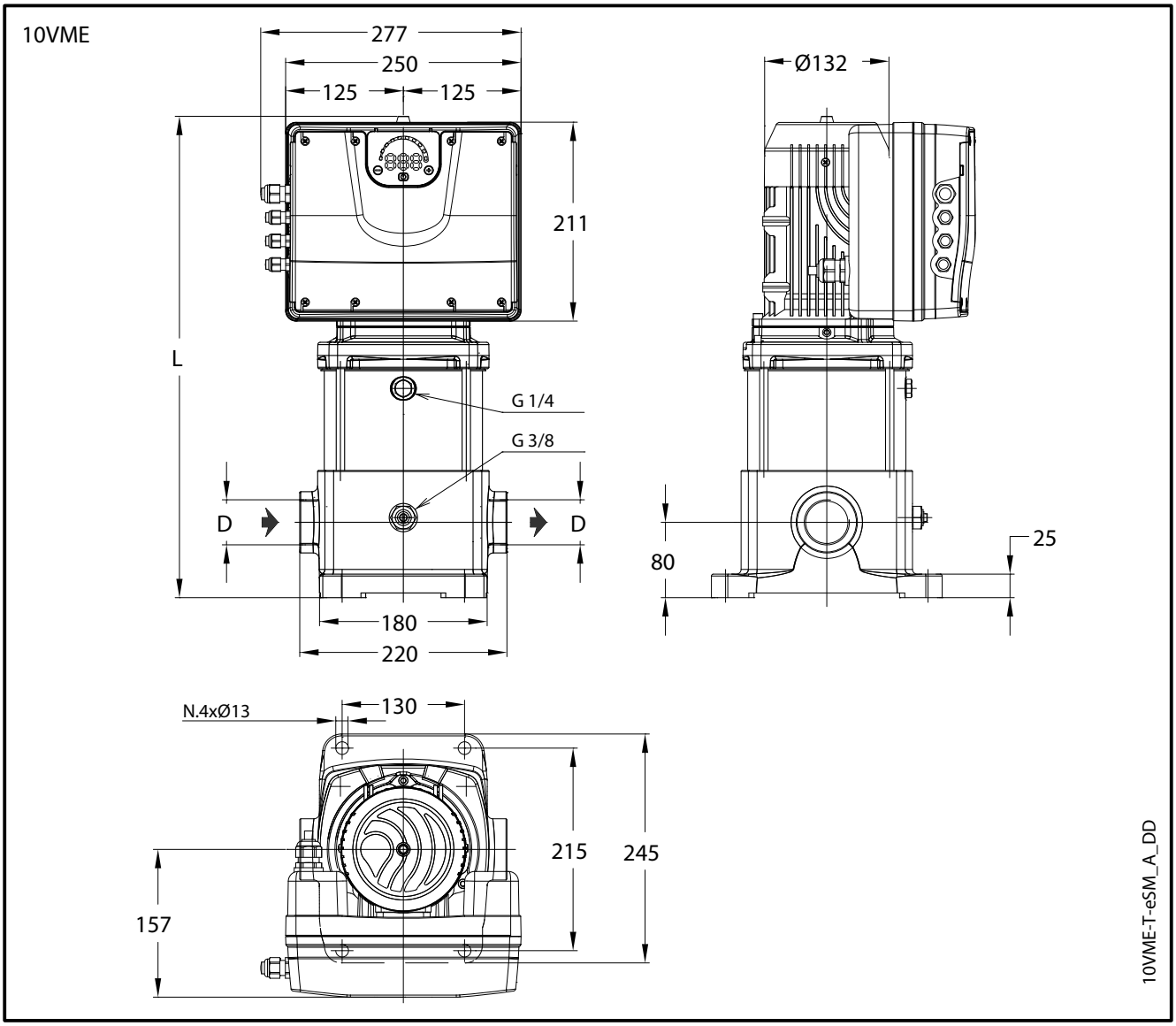
10VME SERIES - SINGLE-PHASE VERSION
DIMENSIONS AND WEIGHTS



PUMP TYPE	VERSION	MOTOR		DIMENSIONS (mm)		PN	WEIGHT
		kW	SIZE	D	L	bar	kg
10VME01P07M02	SINGLE-PHASE	0,75	80	Rp 1 1/2	479	10	19,9
10VME02P11M02		1,1	80	Rp 1 1/2	479	10	21,5

10vme-esm-2p50-en_a_td

10VME SERIES - THREE-PHASE VERSION
DIMENSIONS AND WEIGHTS

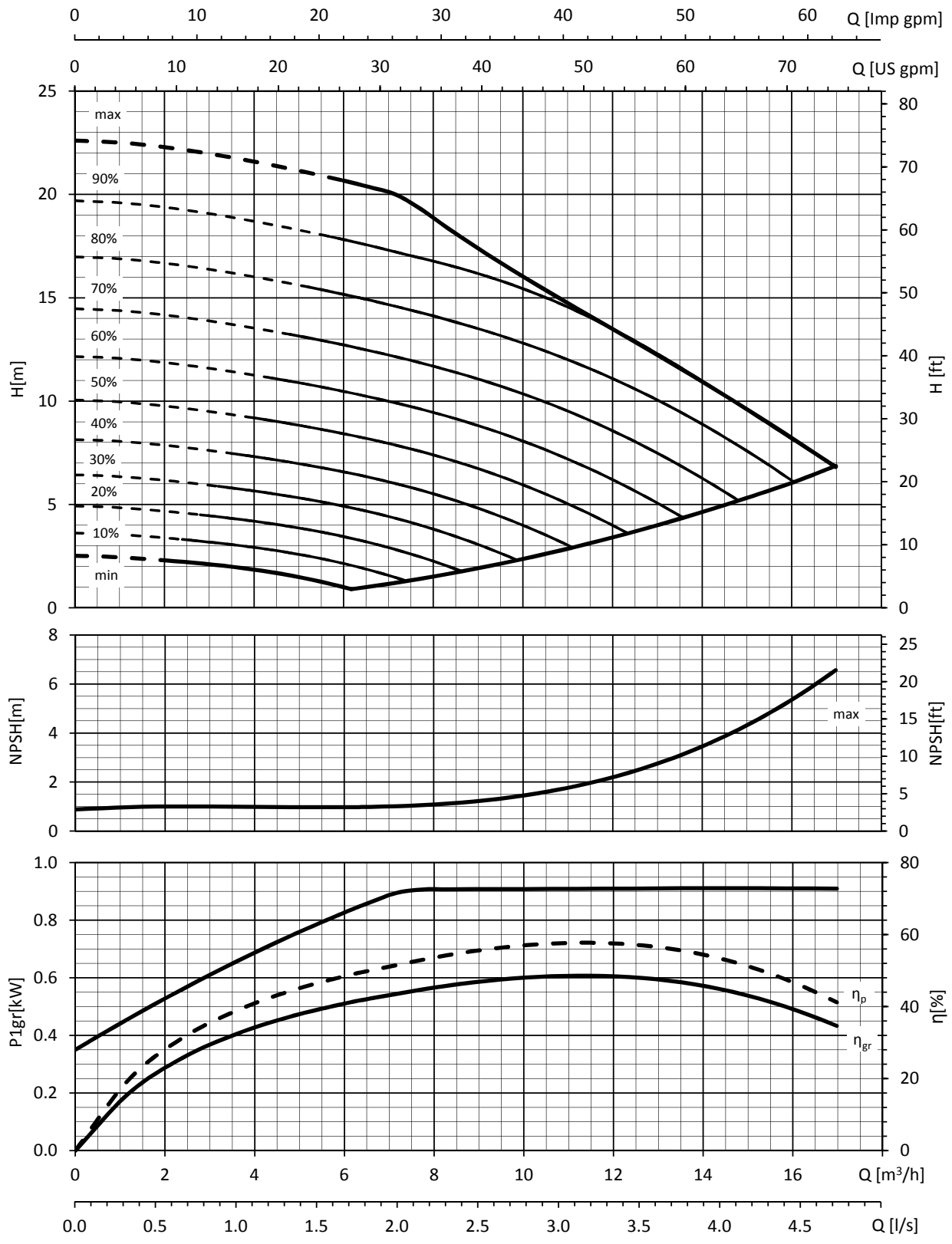


PUMP TYPE	VERSION	MOTOR		DIMENSIONS (mm)		PN	WEIGHT
		kW	SIZE	D	L	bar	kg
10VME01P07T..	THREE-PHASE	0,75	80	Rp 1 1/2	479	10	25,3
10VME02P11T..		1,1	80	Rp 1 1/2	479	10	27

10vme-esm-2p50T-en_a_td

10VME SERIES
OPERATING CHARACTERISTICS

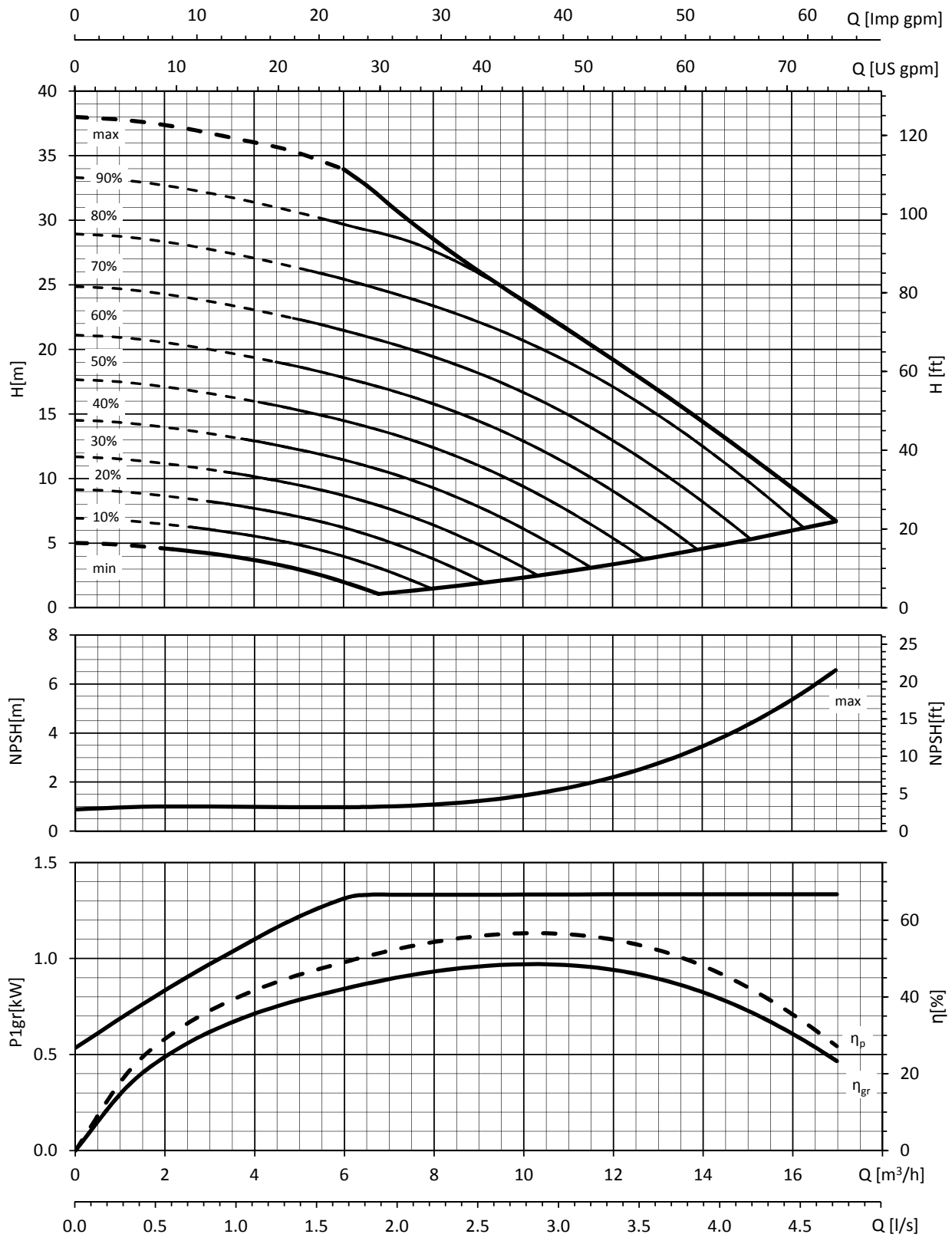
10VME01P07



The performances are valid for liquid with density ρ = 1 Kg/dm³ and kinematic viscosity ν = 1 mm²/sec.

10VME SERIES
OPERATING CHARACTERISTICS

10VME02P11



The performances are valid for liquid with density ρ = 1 Kg/dm³ and kinematic viscosity ν = 1 mm²/sec.

LOWARA
a xylem brand

ACCESSORIES

ACCESSORIES

MODEL	REF.	CODE	DESCRIPTION
Ball valve	1"	002676438	1" FF PN38 WITH DRAIN, CHROME PLATED BRASS
	1"	002679402	1" FF PN30, CHROME PLATED BRASS
	1" 1/4	R02661422	1"1/4 FF PN30, CHROME PLATED BRASS
	1" 1/2	R02661427	1"1/2 FF PN30, CHROME PLATED BRASS
	2"	R02661424	2" FF PN25, CHROME PLATED BRASS
	1"	002675155	1" MF PN40, CHROME PLATED BRASS
	1" 1/4	R02661318	1"1/4 MF PN30, CHROME PLATED BRASS
	1" 1/2	002675369	1"1/2 MF PN25. CHROME PLATED BRASS
	2"	002679408	2" MF PN25, CHROME PLATED BRASS
	1"	002679403	1" MF WITH UNION JOINT, CHROME PLATED BRASS
	1" 1/4	002679404	1"1/4 MF WITH UNION JOINT, CHROME PLATED BRASS
	1" 1/2	002676452	1"1/2 MF WITH UNION JOINT, CHROME PLATED BRASS
	2"	NO CODE	2" MF WITH UNION JOINT, CHROME PLATED BRASS
Non-return valve	1"	002675029	1" MF SUCTION MALE, PN 25, BRASS
	1" 1/4	002675036	1"1/4 MF SUCTION MALE, PN 25, BRASS
	1" 1/2	002675043	1"1/2 MF SUCTION MALE, PN 25, BRASS
	2"	002675032	2" MF SUCTION MALE, PN 40, BRASS
	1"	002675300	1" MF SUCTION MALE, PN16, STAINLESS STEEL AISI304
	1" 1/4	002675301	1"1/4 MF SUCTION MALE, PN16, STAINLESS STEEL AISI304
	1" 1/2	002675302	1"1/2 MF SUCTION MALE, PN16, STAINLESS STEEL AISI304
	2"	002675303	2" MF SUCTION MALE, PN16, STAINLESS STEEL AISI304
	1"	002675295	1" FF PN32, STAINLESS STEEL AISI316
	1" 1/4	002675296	1"1/4 FF PN28, STAINLESS STEEL AISI316
	1" 1/2	002675297	1"1/2 FF PN28, STAINLESS STEEL AISI316
	2"	002675298	2" FF PN23, STAINLESS STEEL AISI316
Union 3 Pieces MF	1"	R02671048	1" MF, GALVANISED STEEL
	1" 1/4	R02671050	1"1/4 MF, GALVANISED STEEL
	1" 1/2	R02671052	1"1/2 MF, GALVANISED STEEL
	2"	R02671054	2" MF, GALVANISED STEEL
	1"	002672655	1" MF, STAINLESS STEEL AISI 316
	1" 1/4	002672656	1"1/4 MF, STAINLESS STEEL AISI 316
	1" 1/2	002672657	1"1/2 MF, STAINLESS STEEL AISI 316
	2"	002672658	2" MF, STAINLESS STEEL AISI 316
GENYO	1"	109120160	GENYO 8A/F12
		109120161	GENYO 8A/F12, WITH ELECTRICAL CABLE
		109120170	GENYO 8A/F15
		109120171	GENYO 8A/F15 WITH ELECTRICAL CABLE
		109120180	GENYO 8A/F22
		109120181	GENYO 8A/F22 WITH ELECTRICAL CABLE
		109120210	GENYO 16A/R15-30
		109120211	GENYO 16A/R15-30 WITH ELECTRICAL CABLE
Diaphragm tank	8 lt	106110550	8 LITRES-8 BAR, 1" CONNECTION, FLANGE IN GALVANISED STEEL
	24 lt	106110560	24 LITRES-8 BAR, 1" CONNECTION, FLANGE IN GALVANISED STEEL
	24 lt	106111180	24 LITRES-10 BAR, 1" CONNECTION, FLANGE IN GALVANISED STEEL
	24 lt	106111190	24 LITRES-16 BAR, 1" CONNECTION, FLANGE IN GALVANISED STEEL
	18 lt	106227110	18 LITRES-10 BAR, 1" CONNECTION, FLANGE IN STAINLESS STEEL AISI304
	24 lt	106110660	24 LITRES-10 BAR, 1" CONNECTION, FLANGE IN STAINLESS STEEL AISI304
	24 lt	106110630	24 LITRES-16 BAR, 1" CONNECTION, FLANGE IN STAINLESS STEEL AISI304

ACCESSORIES

MODEL	REF.	CODE	DESCRIPTION
Flexible Hose	1"	002542016	1" MF, L=170MM PN16, REINFORCING BRADING IN GALVANISED STEEL
		002542001	1" MF, L=180MM PN16, REINFORCING BRADING IN GALVANISED STEEL
		002542002	1" MF, L=230MM PN16, REINFORCING BRADING IN GALVANISED STEEL
		002542018	1" MF, L=360MM PN16, REINFORCING BRADING IN GALVANISED STEEL
		002542012	1" MF, L=400MM PN16, REINFORCING BRADING IN GALVANISED STEEL
		002542007	1" MF, L=430MM PN16, REINFORCING BRADING IN GALVANISED STEEL
		002542003	1" MF, L=450MM PN16, REINFORCING BRADING IN GALVANISED STEEL
		002542010	1" MF, L=500MM PN16, REINFORCING BRADING IN GALVANISED STEEL
		002542000	1" MF L=550MM PN16, REINFORCING BRADING IN GALVANISED STEEL
		002542014	1" MF L=600MM PN16, REINFORCING BRADING IN GALVANISED STEEL
		002542004	1" MF, L=700MM PN16, REINFORCING BRADING IN GALVANISED STEEL
		002542019	1" MF, L=800MM PN16, REINFORCING BRADING IN GALVANISED STEEL
		002542022	1" MF, L=1000MM PN16, REINFORCING BRADING IN GALVANISED STEEL
	1" 1/4	002542040	1"1/4 MF L=700MM PN16, REINFORCING BRADING IN GALVANISED STEEL
		002542041	1"1/4 MF L=800MM PN16, REINFORCING BRADING IN GALVANISED STEEL
		002542042	1"1/4 MF L=900MM PN16, REINFORCING BRADING IN GALVANISED STEEL
		002542044	1"1/4 MF L=1000MM PN16, REINFORCING BRADING IN GALVANISED STEEL
	1"1/2	002542050	1"1/2 MF L=500MM PN16, REINFORCING BRADING IN GALVANISED STEEL
		002542054	1"1/2 MF L=800MM PN16, REINFORCING BRADING IN GALVANISED STEEL
	2"	002542069	2" MF L=500MM PN16, REINFORCING BRADING IN GALVANISED STEEL
		002542070	2" MF L=600MM PN16, REINFORCING BRADING IN GALVANISED STEEL
	1" + Elbow	002542006	1" MF 440+ELBOW PN16, REINFORCING BRADING IN GALVANISED STEEL
		002542008	1" MF 480+ELBOW PN16, REINFORCING BRADING IN GALVANISED STEEL
		002542013	1" MF 500+ELBOW PN16, REINFORCING BRADING IN GALVANISED STEEL
		002542011	1" MF 550+ELBOW PN16, REINFORCING BRADING IN GALVANISED STEEL
		002542043	1" MF800+ELBOW PN16, REINFORCING BRADING IN GALVANISED STEEL
Pressure Switch	1/4"	002161101	SQUARE-D FSG2(1,4-4,6), Rp1/4" CONNECTION GLAVANISED STEEL
		002161200	SQUARE-D FYG22(2,8-7), Rp1/4" CONNECTION GLAVANISED STEEL
		002161201	SQUARE-D FYG32(5,6-10,5), Rp1/4" CONNECTION GLAVANISED STEEL
		002161336	ITALTECNICA PM/5(1-5), Rp1/4" CONNECTION GLAVANISED STEEL
		002161337	ITALTECNICA PM/12(2,5-12), Rp1/4" CONNECTION GLAVANISED STEEL
		002161338	ITALTECNICA PM/12S(1-8,5), Rp1/4" CONNECTION GLAVANISED STEEL
Pressure gaude with radial connection	1/4"	002110201	0-6 BAR, DRY TYPE, ABS CASE, 1/4" BRASS CONNECTION, D=50MM
		002110242	0-10 BAR, DRY TYPE, ABS CASE, 1/4" BRASS CONNECTION, D=63MM
		002110243	0-16 BAR,DRY TYPE, ABS CASE, 1/4" BRASS CONNECTION, D=63MM
		002110251	0-10 BAR, DRY TYPE, AISI304 CASE, 1/4" AISI316 CONNECTION, D=63MM
		002110252	0-16 BAR, DRY TYPE, AISI304 CASE, 1/4" AISI316 CONNECTION, D=63MM
Hexagon Nipple	1"	002671855	1", GALVANISED STEEL
	1" 1/4	002671856	1"1/4, GALVANISED STEEL
	1" 1/2	002671857	1"1/2, GALVANISED STEEL
	2"	002671858	2", GALVANISED STEEL
	1"	002671820	1", STAINLESS STEEL AISI 316
	1" 1/4	002671821	1"1/4, STAINLESS STEEL AISI316
	1" 1/2	002671822	1"1/2, STAINLESS STEEL AISI316
	2"	002671823	2", STAINLESS STEEL AISI 316
90° Elbow	1"	002670655	1" MF, GALVANISED STEEL
	1" 1/4	002670656	1"1/4 MF, GALVANISED STEEL
	1" 1/2	002670657	1"1/2 MF, GALVANISED STEEL
	2"	002670658	2" MF, GALVANISED STEEL

ACCESSORIES

MODEL	REF.	CODE	DESCRIPTION
	1"	002670505	1" FF, GALVANISED STEEL
	1" 1/4	R02671434	1"1/4 FF, GALVANISED STEEL
	1" 1/2	002670557	1"1/2 FF, GALVANISED STEEL
	2"	002670558	2" FF, GALVANISED STEEL
	1"	002670633	1" MF, STAINLESS STEEL AISI 316
	1" 1/4	002670634	1"1/4 MF, STAINLESS STEEL AISI 316
	1" 1/2	002670635	1"1/2 MF, STAINLESS STEEL AISI 316
	2"	002670636	2" MF, STAINLESS STEEL AISI 316
	1"	002670594	1" FF, STAINLESS STEEL AISI 316
	1" 1/4	002670595	1"1/4 FF, STAINLESS STEEL AISI 316
	1" 1/2	002670596	1"1/2 FF, STAINLESS STEEL AISI 316
	2"	002670597	2" FF, STAINLESS STEEL AISI 316
Fittings	1/4"	R02671244	CROSS 1/4" 3F1M, CHROME PLATED BRASS
		002670881	CROSS 1/4" 4F, STAINLESS STEEL AISI 316
		R02671020	90° ELBOW 90° 1/4" FF, CHROME PLATED BRASS
		R02671018	90° ELBOW 90° 1/4" MF, CHROME PLATED BRASS
		002670590	90° ELBOW 90° 1/4" FF, STAINLESS STEEL AISI 316
		002670629	90° ELBOW 90° 1/4" MF, STAINLESS STEEL AISI 316
		002670777	TEE 1/4"" FFF, STAINLESS STEEL AISI 316
		R02672030	TEE 1/4"" FFF, CHROME PLATED BRASS
		002679216	TEE 1/4"" FFM, CHROME PLATED BRASS
		002679215	TEE 1/4"" FMF, CHROME PLATED BRASS
		002679225	TEE 1/4"" MFM, CHROME PLATED BRASS
		002679221	TEE 1/4"" MMF, CHROME PLATED BRASS
		002679217	TEE 1/4"" MMM, CHROME PLATED BRASS
		R02661811	BALL VALVE 1/4" FF PN15, CHROME PLATED BRASS
		002675311	BALL VALVE 1/4" FF PN60, STAINLESS STEEL AISI 316
		002675345	BALL VALVE 1/4" MF PN15, CHROME PLATED BRASS
		002675351	BALL VALVE 1/4" MF PN63, STAINLESS STEEL AISI 316
	1/2"	002679264	CROSS 1/2" 4F, CHROME PLATED BRASS
		002670883	CROSS 1/2" 4F, STAINLESS STEEL AISI 316
		R02671420	90° ELBOW 90° 1/2" FF, GALVANISED STEEL
		002670592	90° ELBOW 90° 1/2" FF, STAINLESS STEEL AISI 316
		002670631	90° ELBOW 90° 1/2" MF, STAINLESS STEEL AISI 316
		002670779	TEE 1/2" FFF, STAINLESS STEEL AISI 316
		R02672034	TEE 1/2" FFF, CHROME PLATED BRASS
		002679222	TEE 1/2" MMF, CHROME PLATED BRASS
		002679223	TEE 1/2" MMM, CHROME PLATED BRASS
		002679226	TEE 1/2" MFM, CHROME PLATED BRASS
		002679230	TEE 1/2" FFM, CHROME PLATED BRASS
		002675313	BALL VALVE 1/2" FF PN60, STAINLESS STEEL AISI 316
		R02661820	BALL VALVE 1/2" MF PN15, CHROME PLATED BRASS
		002675352	BALL VALVE 1/2" MF PN63, STAINLESS STEEL AISI 316
		002675327	BALL VALVE 1/2" FF PN15, CHROME PLATED BRASS
	1"	002670755	TEE 1" FFF, GALVANISED STEEL
		002670781	TEE 1" FFF, STAINLESS STEEL AISI 316
5 Ways Fitting	1"	167320240	R1", BRASS

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REPORTS AND DECLARATIONS

REPORTS AND DECLARATIONS

i) Test reports

a) **Factory Test Report** (Lowara identity code: 1A)
(not available for all pump types; contact Customer Service in advance)
- Test report compiled at the end of the assembly line, including flow-head performance test (ISO 9906:2012 – Grade 3B) and tightness test.

b) **Audit Test Report** (Lowara identity code: 1B)
- Test report for electric pumps compiled in the test room, comprising flow-head-pump input-pump efficiency performance test (ISO 9906:2012 – Grade 3B)

c) **NPSH Test Report** (Lowara identity code: 1B / CTF-NP)
(unavailable for submerged or submergible pumps)
- Test report for electric pumps compiled in the test room, comprising flow-NPSH performance test (ISO 9906:2012 – Grade 3B)

d) **Noise Test Report** (Lowara identity code: 1B / CTF-RM)
(unavailable for submerged pumps)
- Report indicating sound pressure and power measurements (EN ISO 20361, EN ISO 11203, EN ISO 4871) using the
  - intensimetric (EN ISO 9614-1, EN ISO 9614-2), or
  - phonometric method.

e) **Vibration Test Report**
(unavailable for submerged or submergible pumps)
- Report indicating vibration measurements (ISO 10816-1)

ii) Declaration of product conformity with the technical requirements indicated in the order

a) **EN 10204:2004 - type 2.1** (Lowara identity code: CTF-21)
- does not include test results on supplied or similar products.

b) **EN 10204:2004 - type 2.2** (Lowara identity code: CTF-22)
- includes test results (materials certificates) on similar products.

iii) Issue of a further EC Declaration of Conformity,

- in addition to the one accompanying the product, it comprises references to European law and the main technical standards (e.g.: MD 2006/42/EC, EMCD 2004/108/EC, ErP 2009/125/EC).

N.B.: if the request is made after receipt of the product, communicate the code (name) and serial number (date + progressive number).

iv) Manufacturer's declaration of conformity

- relative to one of more types of products without indicating specific codes and serial numbers.

v) Other certificates and/or documentation on request

- subject to availability or feasibility.

vi) Duplication of certificates and/or documentation on request

- subject to availability or feasibility.

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TECHNICAL APPENDIX

NPSH

The minimum operating values that can be reached at the pump suction end are limited by the onset of cavitation.

Cavitation is the formation of vapour-filled cavities within liquids where the pressure is locally reduced to a critical value, or where the local pressure is equal to, or just below the vapour pressure of the liquid.

The vapour-filled cavities flow with the current and when they reach a higher pressure area the vapour contained in the cavities condenses. The cavities collide, generating pressure waves that are transmitted to the walls. These, being subjected to stress cycles, gradually become deformed and yield due to fatigue. This phenomenon, characterized by a metallic noise produced by the hammering on the pipe walls, is called incipient cavitation.

The damage caused by cavitation may be magnified by electrochemical corrosion and a local rise in temperature due to the plastic deformation of the walls. The materials that offer the highest resistance to heat and corrosion are alloy steels, especially austenitic steel. The conditions that trigger cavitation may be assessed by calculating the total net suction head, referred to in technical literature with the acronym NPSH (Net Positive Suction Head).

The NPSH represents the total energy (expressed in m.) of the liquid measured at suction under conditions of incipient cavitation, excluding the vapour pressure (expressed in m.) that the liquid has at the pump inlet.

To find the static height hz at which to install the machine under safe conditions, the following formula must be verified:

hp + hz $\geq$ **(NPSHr + 0.5) + hf + hpv** ①

where:

hp is the absolute pressure applied to the free liquid surface in the suction tank, expressed in m. of liquid; hp is the quotient between the barometric pressure and the specific weight of the liquid.

hz is the suction lift between the pump axis and the free liquid surface in the suction tank, expressed in m.; hz is negative when the liquid level is lower than the pump axis.

hf is the flow resistance in the suction line and its accessories, such as: fittings, foot valve, gate valve, elbows, etc.

hpv is the vapour pressure of the liquid at the operating temperature, expressed in m. of liquid. hpv is the quotient between the Pv vapour pressure and the liquid's specific weight.

0,5 is the safety factor.

The maximum possible suction head for installation depends on the value of the atmospheric pressure (i.e. the elevation above sea level at which the pump is installed) and the temperature of the liquid.

To help the user, with reference to water temperature (4° C) and to the elevation above sea level, the following tables show the drop in hydraulic pressure head in relation to the elevation above sea level, and the suction loss in relation to temperature.

Water temperature (°C)	20	40	60	80	90	110	120
Suction loss (m)	0,2	0,7	2,0	5,0	7,4	15,4	21,5

Elevation above sea level (m)	500	1000	1500	2000	2500	3000
Suction loss (m)	0,55	1,1	1,65	2,2	2,75	3,3

Friction loss is shown in the tables of this catalogue. To reduce it to a minimum, especially in cases of high suction head (over 4-5 m.) or within the operating limits with high flow rates, we recommend using a suction line having a larger diameter than that of the pump's suction port. It is always a good idea to position the pump as close as possible to the liquid to be pumped.

Make the following calculation:

Liquid: water at ~15°C $\gamma = 1$ kg/dm^3
Flow rate required: 25 m^3/h
Head for required delivery: 70 m.
Suction lift: 3,5 m.
The selection is an 33SV3G075T pump whose NPSH required value is, at 25 m^3/h, of 2 m.

For water at 15 °C

hp = Pa / γ = 10,33m, hpv = Pv / γ = 0,174m (0,01701 bar)

The Hf flow resistance in the suction line with foot valves is ~ 1,2 m.
By substituting the parameters in formula ① with the numeric values above, we have:

$10,33 + (-3,5) \geq (2 + 0,5) + 1,2 + 0,17$

from which we have: $6,8 > 3,9$

The relation is therefore verified.

VAPOUR PRESSURE
VAPOUR PRESSURE ps AND ρ DENSITY OF WATER TABLE

t	T	ps	ρ
°C	K	bar	kg/dm³
0	273,15	0,00611	0,9998
1	274,15	0,00657	0,9999
2	275,15	0,00706	0,9999
3	276,15	0,00758	0,9999
4	277,15	0,00813	1,0000
5	278,15	0,00872	1,0000
6	279,15	0,00935	1,0000
7	280,15	0,01001	0,9999
8	281,15	0,01072	0,9999
9	282,15	0,01147	0,9998
10	283,15	0,01227	0,9997
11	284,15	0,01312	0,9997
12	285,15	0,01401	0,9996
13	286,15	0,01497	0,9994
14	287,15	0,01597	0,9993
15	288,15	0,01704	0,9992
16	289,15	0,01817	0,9990
17	290,15	0,01936	0,9988
18	291,15	0,02062	0,9987
19	292,15	0,02196	0,9985
20	293,15	0,02337	0,9983
21	294,15	0,24850	0,9981
22	295,15	0,02642	0,9978
23	296,15	0,02808	0,9976
24	297,15	0,02982	0,9974
25	298,15	0,03166	0,9971
26	299,15	0,03360	0,9968
27	300,15	0,03564	0,9966
28	301,15	0,03778	0,9963
29	302,15	0,04004	0,9960
30	303,15	0,04241	0,9957
31	304,15	0,04491	0,9954
32	305,15	0,04753	0,9951
33	306,15	0,05029	0,9947
34	307,15	0,05318	0,9944
35	308,15	0,05622	0,9940
36	309,15	0,05940	0,9937
37	310,15	0,06274	0,9933
38	311,15	0,06624	0,9930
39	312,15	0,06991	0,9927
40	313,15	0,07375	0,9923
41	314,15	0,07777	0,9919
42	315,15	0,08198	0,9915
43	316,15	0,09639	0,9911
44	317,15	0,09100	0,9907
45	318,15	0,09582	0,9902
46	319,15	0,10086	0,9898
47	320,15	0,10612	0,9894
48	321,15	0,11162	0,9889
49	322,15	0,11736	0,9884
50	323,15	0,12335	0,9880
51	324,15	0,12961	0,9876
52	325,15	0,13613	0,9871
53	326,15	0,14293	0,9862
54	327,15	0,15002	0,9862

t	T	ps	ρ
°C	K	bar	kg/dm³
55	328,15	0,15741	0,9857
56	329,15	0,16511	0,9852
57	330,15	0,17313	0,9846
58	331,15	0,18147	0,9842
59	332,15	0,19016	0,9837
60	333,15	0,1992	0,9832
61	334,15	0,2086	0,9826
62	335,15	0,2184	0,9821
63	336,15	0,2286	0,9816
64	337,15	0,2391	0,9811
65	338,15	0,2501	0,9805
66	339,15	0,2615	0,9799
67	340,15	0,2733	0,9793
68	341,15	0,2856	0,9788
69	342,15	0,2984	0,9782
70	343,15	0,3116	0,9777
71	344,15	0,3253	0,9770
72	345,15	0,3396	0,9765
73	346,15	0,3543	0,9760
74	347,15	0,3696	0,9753
75	348,15	0,3855	0,9748
76	349,15	0,4019	0,9741
77	350,15	0,4189	0,9735
78	351,15	0,4365	0,9729
79	352,15	0,4547	0,9723
80	353,15	0,4736	0,9716
81	354,15	0,4931	0,9710
82	355,15	0,5133	0,9704
83	356,15	0,5342	0,9697
84	357,15	0,5557	0,9691
85	358,15	0,5780	0,9684
86	359,15	0,6011	0,9678
87	360,15	0,6249	0,9671
88	361,15	0,6495	0,9665
89	362,15	0,6749	0,9658
90	363,15	0,7011	0,9652
91	364,15	0,7281	0,9644
92	365,15	0,7561	0,9638
93	366,15	0,7849	0,9630
94	367,15	0,8146	0,9624
95	368,15	0,8453	0,9616
96	369,15	0,8769	0,9610
97	370,15	0,9094	0,9602
98	371,15	0,9430	0,9596
99	372,15	0,9776	0,9586
100	373,15	1,0133	0,9581
102	375,15	1,0878	0,9567
104	377,15	1,1668	0,9552
106	379,15	1,2504	0,9537
108	381,15	1,3390	0,9522
110	383,15	1,4327	0,9507
112	385,15	1,5316	0,9491
114	387,15	1,6362	0,9476
116	389,15	1,7465	0,9460
118	391,15	1,8628	0,9445

t	T	ps	ρ
°C	K	bar	kg/dm³
120	393,15	1,9854	0,9429
122	395,15	2,1145	0,9412
124	397,15	2,2504	0,9396
126	399,15	2,3933	0,9379
128	401,15	2,5435	0,9362
130	403,15	2,7013	0,9346
132	405,15	2,867	0,9328
134	407,15	3,041	0,9311
136	409,15	3,223	0,9294
138	411,15	3,414	0,9276
140	413,15	3,614	0,9258
145	418,15	4,155	0,9214
155	428,15	5,433	0,9121
160	433,15	6,181	0,9073
165	438,15	7,008	0,9024
170	433,15	7,920	0,8973
175	448,15	8,924	0,8921
180	453,15	10,027	0,8869
185	458,15	11,233	0,8815
190	463,15	12,551	0,8760
195	468,15	13,987	0,8704
200	473,15	15,550	0,8647
205	478,15	17,243	0,8588
210	483,15	19,077	0,8528
215	488,15	21,060	0,8467
220	493,15	23,198	0,8403
225	498,15	25,501	0,8339
230	503,15	27,976	0,8273
235	508,15	30,632	0,8205
240	513,15	33,478	0,8136
245	518,15	36,523	0,8065
250	523,15	39,776	0,7992
255	528,15	43,246	0,7916
260	533,15	46,943	0,7839
265	538,15	50,877	0,7759
270	543,15	55,058	0,7678
275	548,15	59,496	0,7593
280	553,15	64,202	0,7505
285	558,15	69,186	0,7415
290	563,15	74,461	0,7321
295	568,15	80,037	0,7223
300	573,15	85,927	0,7122
305	578,15	92,144	0,7017
310	583,15	98,70	0,6906
315	588,15	105,61	0,6791
320	593,15	112,89	0,6669
325	598,15	120,56	0,6541
330	603,15	128,63	0,6404
340	613,15	146,05	0,6102
350	623,15	165,35	0,5743
360	633,15	186,75	0,5275
370	643,15	210,54	0,4518
374,15	647,30	221,20	0,3154

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TABLE OF FLOW RESISTANCE IN 100 m OF STRAIGHT CAST IRON PIPELINE (HAZEN-WILLIAMS FORMULA C=100)

FLOW RATE			NOMINAL DIAMETER in mm and inches																
m^3/h	l/min		15 1/2"	20 3/4"	25 1"	32 1 1/4"	40 1 1/2"	50 2	65 2 1/2"	80 3"	100 4"	125 5"	150 6"	175 7"	200 8"	250 10"	300 12"	350 14"	400 16"
0,6	10	v	0,94	0,53	0,34	0,21	0,13												
		hr	16	3,94	1,33	0,40	0,13												
0,9	15	v	1,42	0,80	0,51	0,31	0,20												
		hr	33,9	8,35	2,82	0,85	0,29												
1,2	20	v	1,89	1,06	0,68	0,41	0,27	0,17											
		hr	57,7	14,21	4,79	1,44	0,49	0,16											
1,5	25	v	2,36	1,33	0,85	0,52	0,33	0,21											
		hr	87,2	21,5	7,24	2,18	0,73	0,25											
1,8	30	v	2,83	1,59	1,02	0,62	0,40	0,25											
		hr	122	30,1	10,1	3,05	1,03	0,35											
2,1	35	v	3,30	1,86	1,19	0,73	0,46	0,30											
		hr	162	40,0	13,5	4,06	1,37	0,46											
2,4	40	v		2,12	1,36	0,83	0,53	0,34	0,20										
		hr		51,2	17,3	5,19	1,75	0,59	0,16										
3	50	v		2,65	1,70	1,04	0,66	0,42	0,25										
		hr		77,4	26,1	7,85	2,65	0,89	0,25										
3,6	60	v		3,18	2,04	1,24	0,80	0,51	0,30										
		hr		108	36,6	11,0	3,71	1,25	0,35										
4,2	70	v		3,72	2,38	1,45	0,93	0,59	0,35										
		hr		144	48,7	14,6	4,93	1,66	0,46										
4,8	80	v		4,25	2,72	1,66	1,06	0,68	0,40										
		hr		185	62,3	18,7	6,32	2,13	0,59										
5,4	90	v			3,06	1,87	1,19	0,76	0,45	0,30									
		hr			77,5	23,3	7,85	2,65	0,74	0,27									
6	100	v			3,40	2,07	1,33	0,85	0,50	0,33									
		hr			94,1	28,3	9,54	3,22	0,90	0,33									
7,5	125	v			4,25	2,59	1,66	1,06	0,63	0,41									
		hr			142	42,8	14,4	4,86	1,36	0,49									
9	150	v				3,11	1,99	1,27	0,75	0,50	0,32								
		hr				59,9	20,2	6,82	1,90	0,69	0,23								
10,5	175	v				3,63	2,32	1,49	0,88	0,58	0,37								
		hr				79,7	26,9	9,07	2,53	0,92	0,31								
12	200	v				4,15	2,65	1,70	1,01	0,66	0,42								
		hr				102	34,4	11,6	3,23	1,18	0,40								
15	250	v				5,18	3,32	2,12	1,26	0,83	0,53	0,34							
		hr				154	52,0	17,5	4,89	1,78	0,60	0,20							
18	300	v					3,98	2,55	1,51	1,00	0,64	0,41							
		hr					72,8	24,6	6,85	2,49	0,84	0,28							
24	400	v					5,31	3,40	2,01	1,33	0,85	0,54	0,38						
		hr					124	41,8	11,66	4,24	1,43	0,48	0,20						
30	500	v					6,63	4,25	2,51	1,66	1,06	0,68	0,47						
		hr					187	63,2	17,6	6,41	2,16	0,73	0,30						
36	600	v						5,10	3,02	1,99	1,27	0,82	0,57	0,42					
		hr						88,6	24,7	8,98	3,03	1,02	0,42	0,20					
42	700	v						5,94	3,52	2,32	1,49	0,95	0,66	0,49					
		hr						118	32,8	11,9	4,03	1,36	0,56	0,26					
48	800	v						6,79	4,02	2,65	1,70	1,09	0,75	0,55					
		hr						151	42,0	15,3	5,16	1,74	0,72	0,34					
54	900	v						7,64	4,52	2,99	1,91	1,22	0,85	0,62					
		hr						188	52,3	19,0	6,41	2,16	0,89	0,42					
60	1000	v							5,03	3,32	2,12	1,36	0,94	0,69	0,53				
		hr							63,5	23,1	7,79	2,63	1,08	0,51	0,27				
75	1250	v							6,28	4,15	2,65	1,70	1,18	0,87	0,66				
		hr							96,0	34,9	11,8	3,97	1,63	0,77	0,40				
90	1500	v							7,54	4,98	3,18	2,04	1,42	1,04	0,80				
		hr							134	48,9	16,5	5,57	2,29	1,08	0,56				
105	1750	v							8,79	5,81	3,72	2,38	1,65	1,21	0,93				
		hr							179	65,1	21,9	7,40	3,05	1,44	0,75				
120	2000	v								6,63	4,25	2,72	1,89	1,39	1,06	0,68			
		hr								83,3	28,1	9,48	3,90	1,84	0,96	0,32			
150	2500	v								8,29	5,31	3,40	2,36	1,73	1,33	0,85			
		hr								126	42,5	14,3	5,89	2,78	1,45	0,49			
180	3000	v									6,37	4,08	2,83	2,08	1,59	1,02	0,71		
		hr									59,5	20,1	8,26	3,90	2,03	0,69	0,28		
210	3500	v									7,43	4,76	3,30	2,43	1,86	1,19	0,83		
		hr									79,1	26,7	11,0	5,18	2,71	0,91	0,38		
240	4000	v									8,49	5,44	3,77	2,77	2,12	1,36	0,94		
		hr									101	34,2	14,1	6,64	3,46	1,17	0,48		
300	5000	v										6,79	4,72	3,47	2,65	1,70	1,18		
		hr										51,6	21,2	10,0	5,23	1,77	0,73		
360	6000	v										8,15	5,66	4,16	3,18	2,04	1,42		
		hr										72,3	29,8	14,1	7,33	2,47	1,02		
420	7000	v											6,61	4,85	3,72	2,38	1,65	1,21	
		hr											39,6	18,7	9,75	3,29	1,35	0,64	
480	8000	v											7,55	5,55	4,25	2,72	1,89	1,39	
		hr											50,7	23,9	12,49	4,21	1,73	0,82	
540	9000	v											8,49	6,24	4,78	3,06	2,12	1,56	1,19
		hr											63,0	29,8	15,5	5,24	2,16	1,02	0,53
600	10000	v												6,93	5,31	3,40	2,36	1,73	1,33
		hr												36,2	18,9	6,36	2,62	1,24	0,65

The hr values must be multiplied by:

0,71 for galvanized or painted steel pipes

0,54 for stainless steel or copper pipes

0,47 for PVC or PE pipes

hr = flow resistance for 100 m of straight pipeline (m)

V = water speed (m/s)

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FLOW RESISTANCE
TABLE OF FLOW RESISTANCE IN BENDS, VALVES AND GATES

The flow resistance is calculated using the equivalent pipeline length method according to the table below:

ACCESSORY TYPE	DN											
	25	32	40	50	65	80	100	125	150	200	250	300
	Equivalent pipeline length (m)											
45° bend	0,2	0,2	0,4	0,4	0,6	0,6	0,9	1,1	1,5	1,9	2,4	2,8
90° bend	0,4	0,6	0,9	1,1	1,3	1,5	2,1	2,6	3,0	3,9	4,7	5,8
90° smooth bend	0,4	0,4	0,4	0,6	0,9	1,1	1,3	1,7	1,9	2,8	3,4	3,9
Union tee or cross	1,1	1,3	1,7	2,1	2,6	3,2	4,3	5,3	6,4	7,5	10,7	12,8
Gate valve	-	-	-	0,2	0,2	0,2	0,4	0,4	0,6	0,9	1,1	1,3
Foot check valve	1,1	1,5	1,9	2,4	3,0	3,4	4,7	5,9	7,4	9,6	11,8	13,9
Non return valve	1,1	1,5	1,9	2,4	3,0	3,4	4,7	5,9	7,4	9,6	11,8	13,9

G-a-pcv-en_b_th

The table is valid for the Hazen Williams coefficient C=100 (cast iron pipework);
for steel pipework, multiply the values by 1,41;
for stainless steel, copper and coated cast iron pipework, multiply the values by 1,85;
When the **equivalent pipeline length** has been determined, the flow resistance is obtained from the table of flow resistance.
The values given are guideline values which are bound to vary slightly according to the model, especially for gate valves and non-return valves, for which it is a good idea to check the values supplied by manufacturers.

VOLUMETRIC CAPACITY

Litres per minute l/min	Cubic metres per hour m^3/h	Cubic feet per hour ft^3/h	Cubic feet per minute ft^3/min	Imperial gallon per minute Imp. gal/min	U.S. gallon per minute US gal/min
1,0000	0,0600	2,1189	0,0353	0,2200	0,2642
16,6667	**1,0000**	35,3147	0,5886	3,6662	4,4029
0,4719	0,0283	**1,0000**	0,0167	0,1038	0,1247
28,3168	1,6990	60,0000	**1,0000**	6,2288	7,4805
4,5461	0,2728	9,6326	0,1605	**1,0000**	1,2009
3,7854	0,2271	8,0208	0,1337	0,8327	**1,0000**

PRESSURE AND HEAD

Newton per square metre N/m^2	kilo Pascal kPa	bar bar	Pound force per square inch psi	Metre of water m H_2O	Millimetre of mercury mm Hg
1,0000	0,0010	1×10^{-5}	$1,45 \times 10^{-4}$	$1,02 \times 10^{-4}$	0,0075
1 000,0000	**1,0000**	0,0100	0,1450	0,1020	7,5006
1×10^5	100,0000	**1,0000**	14,5038	10,1972	750,0638
6 894,7570	6,8948	0,0689	**1,0000**	0,7031	51,7151
9 806,6500	9,8067	0,0981	1,4223	**1,0000**	73,5561
133,3220	0,1333	0,0013	0,0193	0,0136	**1,0000**

LENGTH

Millimetre mm	Centimetre cm	Metre m	Inch in	Foot ft	Yard yd
1,0000	0,1000	0,0010	0,0394	0,0033	0,0011
10,0000	**1,0000**	0,0100	0,3937	0,0328	0,0109
1 000,0000	100,0000	**1,0000**	39,3701	3,2808	1,0936
25,4000	2,5400	0,0254	**1,0000**	0,0833	0,0278
304,8000	30,4800	0,3048	12,0000	**1,0000**	0,3333
914,4000	91,4400	0,9144	36,0000	3,0000	**1,0000**

VOLUME

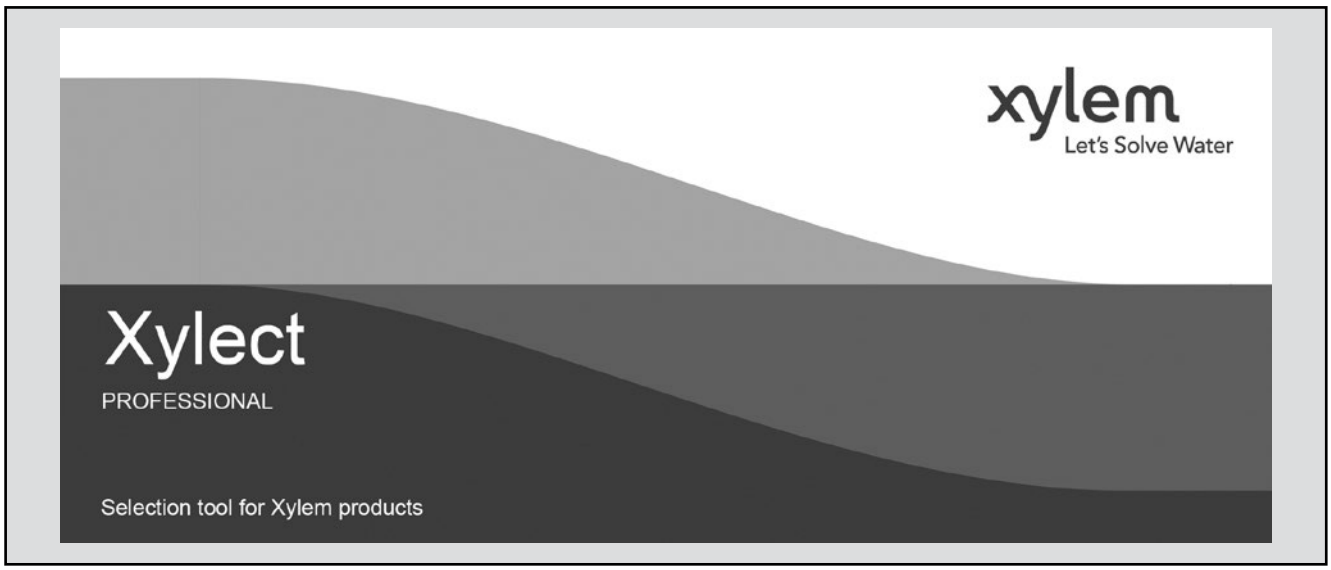
Cubic metre m^3	Litre L	Millilitre ml	Imperial gallon imp. gal.	U.S. gallon US gal.	Cubic foot ft^3
1,0000	1 000,0000	1×10^6	219,9694	264,1720	35,3147
0,0010	**1,0000**	1 000,0000	0,2200	0,2642	0,0353
1×10^{-6}	0,0010	**1,0000**	$2,2 \times 10^{-4}$	$2,642 \times 10^{-4}$	$3,53 \times 10^{-5}$
0,0045	4,5461	4 546,0870	**1,0000**	1,2009	0,1605
0,0038	3,7854	3 785,4120	0,8327	**1,0000**	0,1337
0,0283	28,3168	28 316,8466	6,2288	7,4805	**1,0000**

TEMPERATURE

Water	Kelvin K	Celsius °C	Fahrenheit °F	$°F = °C \times \frac{9}{5} + 32$ $°C = (°F - 32) \times \frac{5}{9}$
icing	273,1500	0,0000	32,0000	
boiling	373,1500	100,0000	212,0000	

G-at_pp-en_b_sc

FURTHER PRODUCT SELECTION AND DOCUMENTATION
Xylect



Xylect is pump solution selection software with an extensive online database of product information across the entire Lowara range of pumps and related products, with multiple search options and helpful project management facilities. The system holds up-to-date product information on thousands of products and accessories.

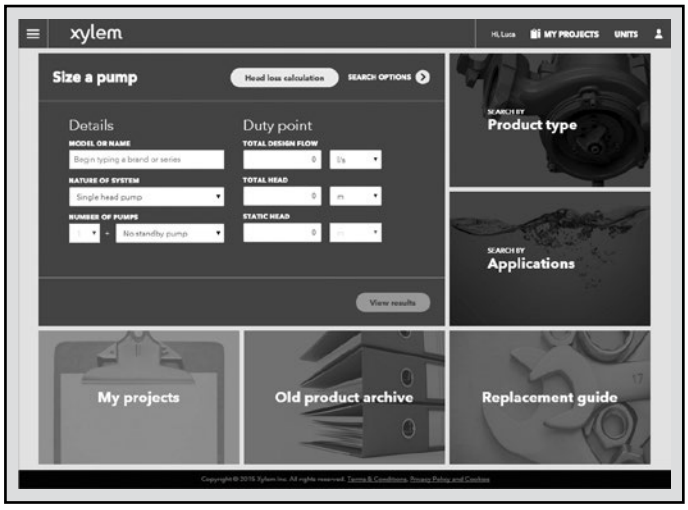
The possibility to search by applications and the detailed information output given makes it easy to make the optimal selection without having detailed knowledge about the Lowara products.

The search can be made by:

- Application
- Product type
- Duty point

Xylect gives a detailed output:

- List with search results
- Performance curves (flow, head, power, efficiency, NPSH)
- Motor data
- Dimensional drawings
- Options
- Data sheet printouts
- Document downloads incl dxf files



The search by application guides users not familiar with the product range to the right choice.

FURTHER PRODUCT SELECTION AND DOCUMENTATION
Xylect

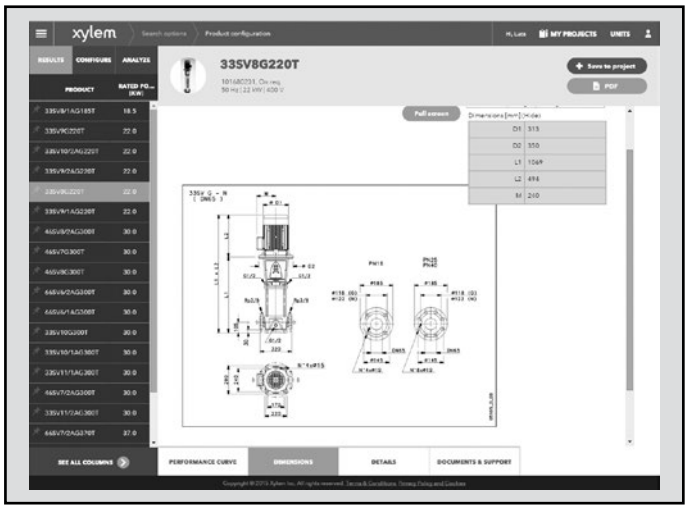
The detailed output makes it easy to select the optimal pump from the given alternatives.

The best way to work with Xylect is to create a personal account. This makes it possible to:

- Set own standard units
- Create and save projects
- Share projects with other Xylect users

Every registered user has a proper space, where all projects are saved.

For more information about Xylect please contact our sales network or visit www.xylect.com.



Dimensional drawings appear on the screen and can be downloaded in dxf format.

Xylem |'zīləm|

1) The tissue in plants that brings water upward from the roots;
2) a leading global water technology company.

We're a global team unified in a common purpose: creating advanced technology solutions to the world's water challenges. Developing new technologies that will improve the way water is used, conserved, and re-used in the future is central to our work. Our products and services move, treat, analyze, monitor and return water to the environment, in public utility, industrial, residential and commercial building services settings. Xylem also provides a leading portfolio of smart metering, network technologies and advanced analytics solutions for water, electric and gas utilities. In more than 150 countries, we have strong, long-standing relationships with customers who know us for our powerful combination of leading product brands and applications expertise with a strong focus on developing comprehensive, sustainable solutions.

For more information on how Xylem can help you, go to www.xylem.com/uk

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