

60 Hz

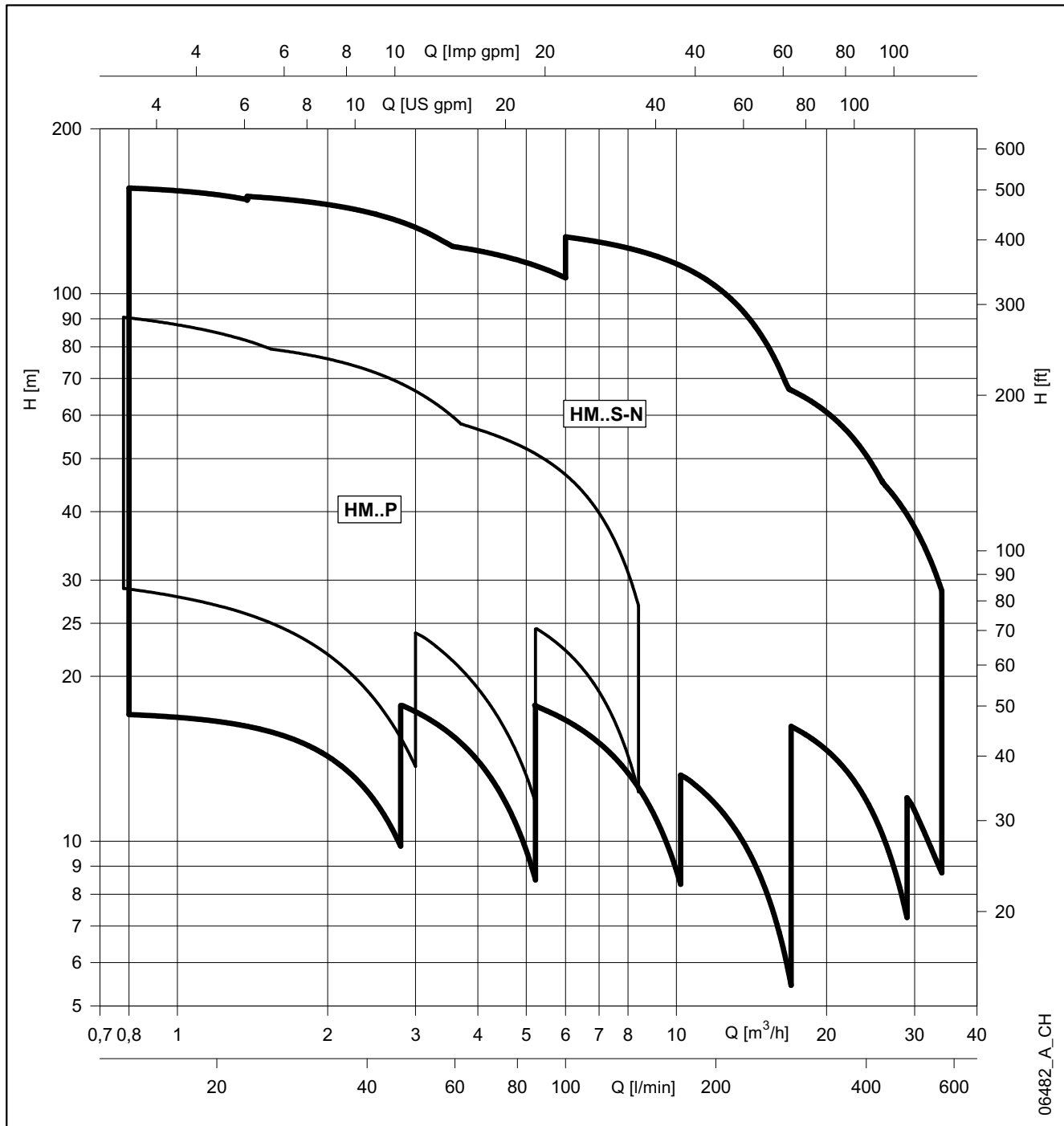


e-HM™ Series

HM..P - HM..S - HM..N

THREADED HORIZONTAL MULTISTAGE CENTRIFUGAL ELECTRIC PUMPS
EQUIPPED WITH IE3 MOTORS COMPLYING WITH IEC 60034-30

e-HM™ SERIES
HYDRAULIC PERFORMANCE AT 60 Hz



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e-HM™ 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 the industrial segments need customized and reliable compact pumps to ensure top performance of the systems and continuous quality of the production.

Therefore we have developed a wide range of horizontal multistage pumps, the e-HM™, to give an appropriate and dedicated solution to special applications and installations in the industry and in the building services market.



Pump design

The e-HM™ is a non-self-priming, end-suction horizontal multistage, high pressure centrifugal pump, with axial threaded inlet and radial threaded outlet. The pumps are close-coupled design and are equipped with non-standard Lowara motors. The e-HM™ is equipped with mechanical seal.

The e-HM™ 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 e-HM™ is available in two different configurations:

- "Compact" design for sizes 1HM, 3HM and 5HM up to 6 stages
- "Sleeve" design for sizes 1HM, 3HM and 5HM from 7 stages and above; any models of 10HM, 15HM and 22HM.

The "Compact" design is made of one single piece fabricated stainless steel pump body directly connected to the motor flange. The "Compact" has only one O-ring for the sealing of the casing that clearly reduces the leakages possibilities.

The "Sleeve" design is made of an external stainless steel TIG welded sleeve and of separate suction casing kept together with the mean of an aluminum casted pump bracket and of stainless steel tie rods screwed in the motor flange.

The e-HM™ is available in three different material execution:

- HM..P: Stainless steel pump body (EN 1.4301/ AISI 304) with Noryl™ impeller for sizes 1HM, 3HM, 5HM up to 6 stages.
- HM..S: full stainless steel (EN 1.4301/ AISI 304) – any models.
- HM..N: full stainless steel (EN 1.4401/ AISI 316) – any models.

Motor

The e-HM™ are equipped with surface motors designed and manufactured in accordance with EN standards.

The e-HM™ series can be equipped as well with variable speed drivers such as the Teknospeed and the Hydrovar™.

Range declination

The e-HM™ are available as:

- Fix speed Electric pump.
- Variable speed system with Teknospeed driver embedded (on request).

e-HM™ SERIES

APPLICATIONS, BENEFITS – BUILDING SERVICES

The e-HM™ series and the different available configurations have been designed to cover a wide range of applications in the residential and small commercial building services from the water supply to pressure boosting as well as heating and cooling applications.

Applications

The e-HM™ series could be installed both in single private-owned house and in small/medium residential buildings.

The e-HM™ series will be as well your preferred choice for water supply and pressure boosting in small block offices and shops. The e-HM™ series could be finally installed as well for small/medium irrigation installation.

Benefits

Payback: Installing the e-HM™ series guarantee a very short payback period as the premium efficiency makes the e-HM™ the lowest energy consuming fixed speed pump on the market.

Combined with Teknospeed makes the pump paying for itself in very quickly. (43% of reduced operating cost per year).

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

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



For the installers, the e-HM™ series are easy to install and the best choice for the end user in term of energy savings. The combination of the e-HM™ with the Teknospeed is the guarantee of quick and easy installation as the system is supplied with cable, plug and pressure transmitter. Only small vessels are required.

Features

- Compact design with best-in class performances.
- Wide range of performances with 6 sizes and flow up to 34 m³/h.
- Nominal pressure up to 10 bar with Noryl™ impellers and 16 bar with stainless steel impellers.
- Versatile design of the smaller sizes (up to 5HM).
 - Compact version with Noryl™ impellers for restricted space installation.
 - High efficiency version with stainless steel impellers when energy saving is a must.
- Robust and silent design of the larger sizes (from 10HM to 22HM) due the sleeve configuration.
- IE3 Lowara motors: high performances and silent operations.
- Stainless steel material for pump body and main components in contact with the pumped liquid.
- "Essential O-ring design" that highly reduces the sealing weaknesses (1 O-Ring for Compact, 2 for Sleeve).

e-HM™ SERIES APPLICATIONS, BENEFITS – INDUSTRY

The e-HM™ series and the different available configurations and standard options have been designed to cover a wide range of applications in industry from washing and cleaning machines, to cooling and heating applications, thru water treatment and filtration processes, food and beverage and pharmaceutical applications.

Applications

The e-HM™ series could be installed either in machines where compactness and high performances are a must or within industrial processes where the user looks for a reliable modular design with a restricted vertical footprint.

The e-HM™ series offers as well a wide range of standard options to fit every single requirement coming from the industry. The different material and configuration available allow e-HM™ series working with a wide range of liquid temperature starting -30°C to +120°C.

Benefits

Reliability: The e-HM™ series have been design to withstand heavy duty applications in Industry. For instance, e-HM™ balanced impeller helps decreasing the axial thrust withstand by the motor bearing extending its life time; pump body thickness has been increased by 20% to support heavy duty operation.

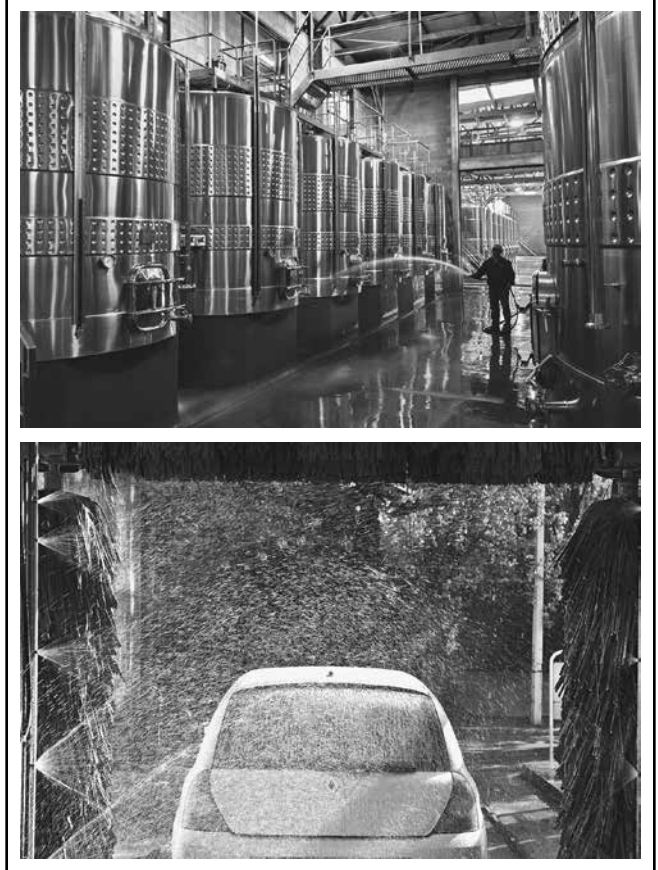
Versatility: The e-HM™ series have been designed to be modular, offering two different mechanical configurations (Very compact or highly efficient design) and multiple material executions (from Noryl™ impeller and AISI 304 pump body to full AISI 316 execution) and surface treatment (electropolishing and passivation). Multiple standard options make e-HM™ fitting in many different applications.

Performances: The e-HM™ series provide best-in class efficiency up to 72% that means 30% energy saving in average compare to similar pump design from the market. The e-HM™ series will be clearly your preferred choice to meet any efficiency requirements or simply to save money in your installation and processes.

A global platform: the e-HM™ series are assembled in different factories across the world to make e-HM™ always closer to our customers. Beyond our commitment to reduce the carbon footprint of e-HM™, this global platform secure that the same design is available everywhere with the same quality processes.

Features

- Wide range of performances with 6 sizes, flow up to 34 m³/h, pressure up to 157 meters.
- Nominal pressure up to 10 bar with Noryl™ impellers and 16 bar with stainless steel impellers
- More than 85% of the range has the same suction height (90mm) for easy installation or system upgrade.
- Wide range of temperatures for pumped liquid: -30°C to +120°C.
- Wide range of voltages for worldwide applications.
- Availability of UL (cURus) motor version for North American market (230/460V 60 Hz with 9 pins control box.
- "Essential O-ring design" that highly reduces the sealing weaknesses (1 O-Ring for Compact, 2 for Sleeve).
- IE3 Lowara motors: high performances and silent operations.



e-HM™ SERIES

GENERAL CHARACTERISTICS

HM..P SERIES	1	3	5
Max efficiency flow (m ³ /h)	2,3	3,6	6,2
Flow range (m ³ /h)	0,8 ÷ 3	1,4 ÷ 5,2	3 ÷ 8,4
Maximum head (m)	100	87,6	71,1
Motor power (kW)	0,40 ÷ 1,1	0,50 ÷ 1,5	0,75 ÷ 1,5
Max η (%) of pump	35	46	55
Standard temperature (°C)	-30 +90		

1-5hmp_2p60_a_tg

HM..S - HM..N SERIES	1	3	5	10	15	22
Max efficiency flow (m ³ /h)	2,1	3,6	7,2	12	19,5	20,9
Flow range (m ³ /h)	0,8 ÷ 2,8	1,4 ÷ 5,2	3 ÷ 10,2	6 ÷ 17	10 ÷ 29	13 ÷ 34
Maximum head (m)	157	153	131	138	84,1	67
Motor power (kW)	0,30 ÷ 1,5	0,30 ÷ 2,2	0,50 ÷ 3	1,1 ÷ 5,5	1,5 ÷ 5,5	2,2 ÷ 5,5
Max η (%) of pump	51	60	67	68	69	66
Standard temperature (°C)	-30 +90					

1-22hm_2p60_a_tg

CONNECTIONS

TYPE		HM..P - HM..S - HM..N SERIES					
		1	3	5	10	15	22
Rp thread (standard)	suction	1	1	1 1/4	1 1/2	2	2
	delivery	1	1	1	1 1/4	1 1/2	1 1/2
NPT thread (on request)	suction	1"	1"	1" 1/4	1" 1/2	2"	2"
	delivery	1"	1"	1"	1" 1/4	1" 1/2	1" 1/2
DN Victaulic® (on request)	suction	25	25	32	40	50	50
	delivery	25	25	25	32	40	40

1-22hm_2p50-en_b_tc

ELECTRIC PUMP NOISE

POWER	NOISE
kW	LpA dB
0,30	55
0,40	55
0,50	55
0,55	59
0,75	59
0,95	59
1,1	65
1,5	65
2,2	65
3	65
4	65
5,5	65

1-22hm_mot_2p60_a_tr

The table show the mean sound pressure (Lp) measured as per Curve A (Standard ISO 1680).
Noise values were measured with the 60 Hz running with a tolerance of 3 dB (A).

STORAGE AND TRANSPORT TEMPERATURE

from -40°C to +60°C.

e-HM™ SERIES

High efficiency horizontal multistage pump

MARKET SECTORS

BUILDING SERVICES.
INDUSTRY.

APPLICATIONS

- Pressure boosting and water supply systems.
- Washing and cleaning industry including vehicles washing.
- Circulation of hot and cold liquids (like water, water and glycol) for heating, cooling and conditioning systems.
- Water treatment applications.
- Handling of moderately aggressive liquids.



SPECIFICATIONS

PUMP

- Flow rate: up to 34 m³/h.
- Head: up to 157 m.
- Ambient temperature:
from -15°C to +50°C single-phase and three-phase versions.
- Temperature of the pumped liquid:
minimum from -10°C to -30°C according to gasket material.
maximum +90°C for three-phase version and uses according to EN 60335-2-41.
+120°C for three-phase version with stainless steel impellers (HM..S, HM..N) and uses other than EN 60335-2-41.
+60°C for single-phase version.
- Maximum operating pressure:
10 bar (PN 10) for pumps with Noryl™ impeller.
16 bar (PN 16) for pumps with stainless steel impeller.
- Connections: Rp threaded for both suction and discharge manifold.
- Hydraulic performances compliant with ISO 9906:2012 - Grade 3B (ex ISO 9906: 1999 - Annex A).

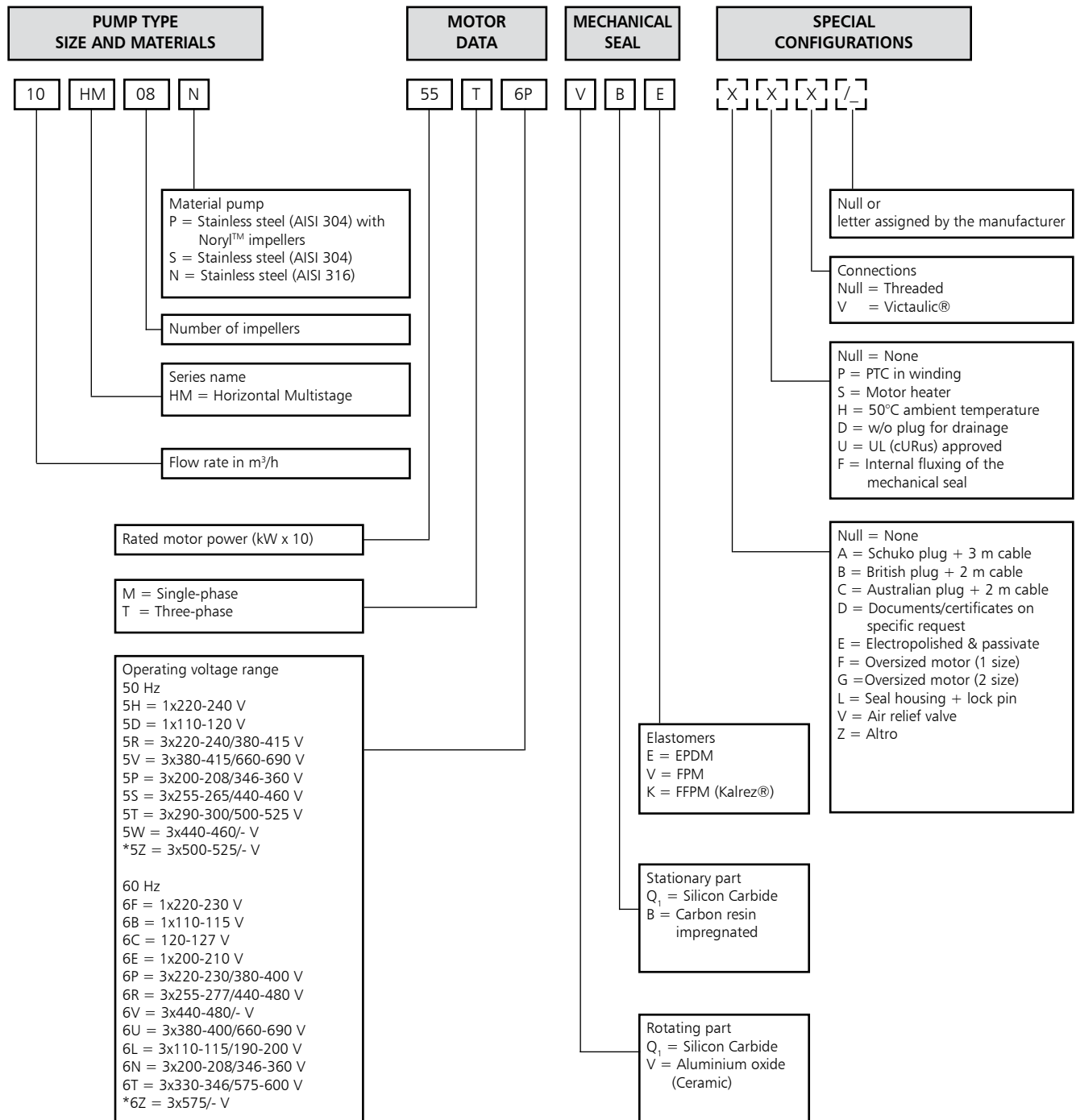


MOTOR

- Electric short-circuit squirrel-cage motor (TEFC), enclosed construction, air-cooled.
- 2-pole.
- IP 55 protection grade as motor only (EN 60034-5).
IP X5 as electric pump (EN 60335-1).
- Insulation class 155 (F).
- Performances according to EN 60034-1.
- Standard voltage:
Single-phase: 220-230 V, 60 Hz, 2 poles.
Three-phase: 220-230/380-400 V, 60 Hz, 2 poles.
- Three-phase from 0,75 to 5,5 kW efficiency class IE3.

All pumps are certified for drinking water use (WRAS and ACS).

e-HM™ SERIES IDENTIFICATION CODE

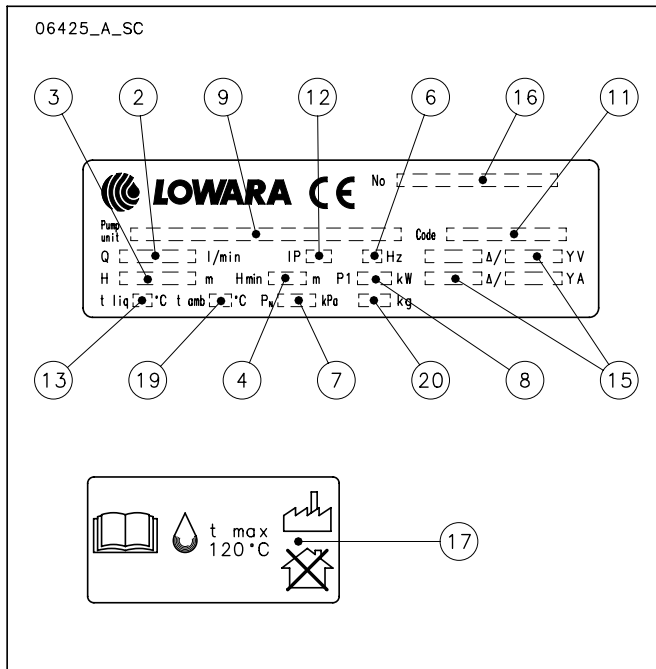


EXAMPLE: 10HM08N55T6PQBE
HM series electric pump, flow rate 10 m³/h, number of impellers 8, N version (AISI 316), rated motor power 5,5 kW, three-phase 60 Hz, voltage 220-230/380-400 V, Silicon/Carbide/EPDM mechanical seal.

* For uses other than EN 60335-2-41.
For special configurations please contact the sales network.

e-HM™ SERIES ELECTRIC PUMP RATING PLATE

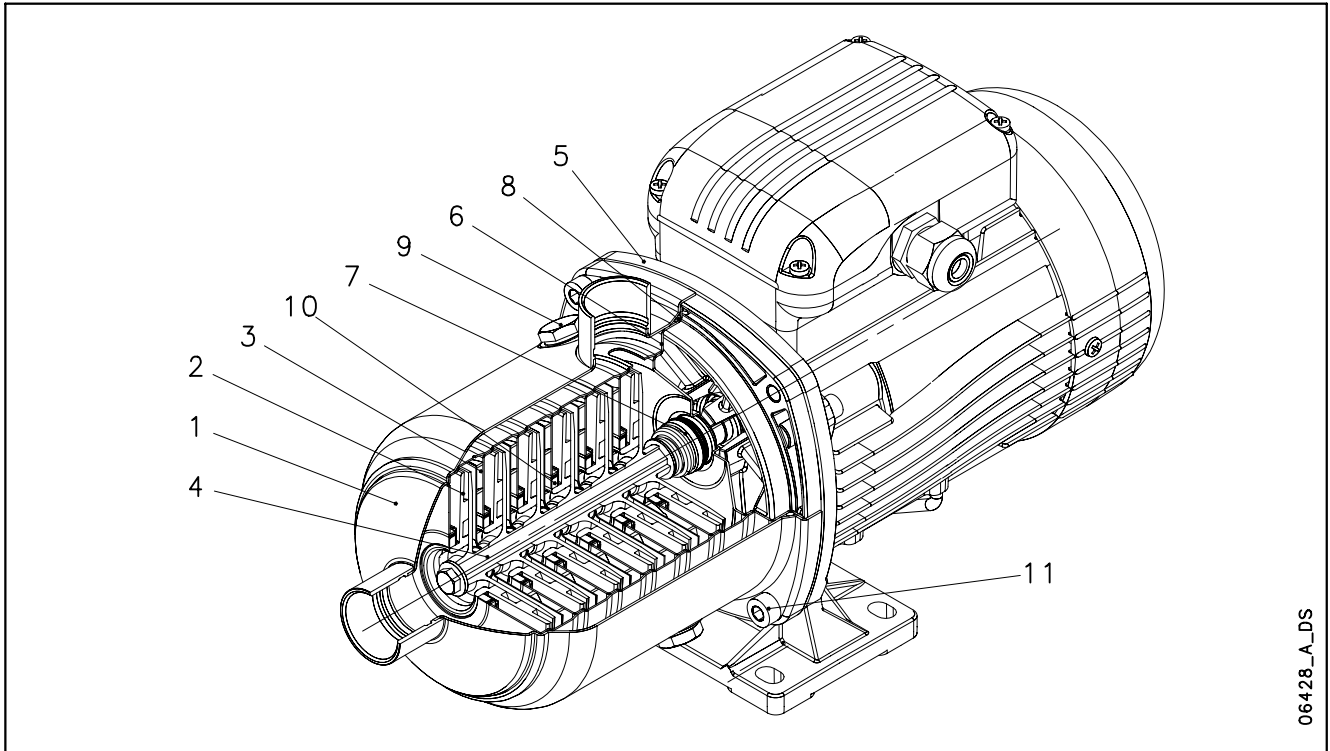
LEGEND



- 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)
- 17 - Maximum operating liquid temperature (uses other than EN 60335-2-41)
- 19 - Maximum operating ambient temperature
- 20 - Electric pump weight

1, 3, 5 HM..P SERIES

ELECTRIC PUMP CROSS SECTION AND MAIN COMPONENTS



06428_A_DS

TABLE OF MATERIALS

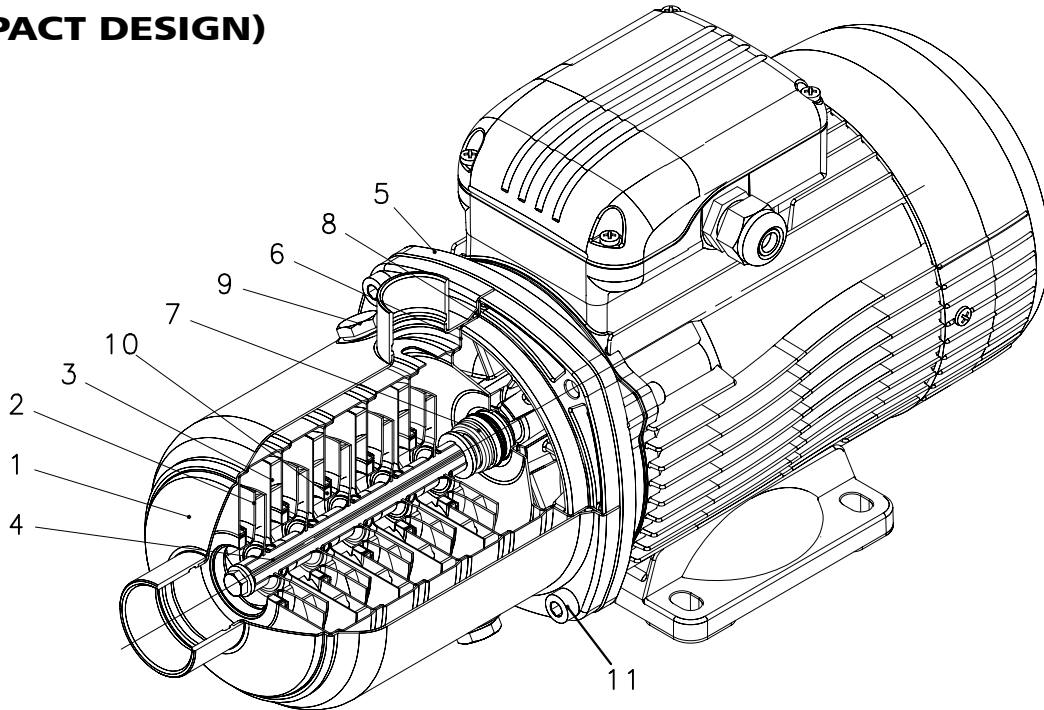
REF. N.	NAME	MATERIAL	REFERENCE STANDARDS	
			EUROPE	USA
1	Pump body	Stainless steel	EN 10088-1-X5CrNi18-10 (1.4301)	AISI 304
2	Impeller	Technopolymer (Noryl™)		
3	Diffuser	Stainless steel	EN 10088-1-X5CrNi18-10 (1.4301)	AISI 304
5	Shaft	Stainless steel	EN 10088-1-X5CrNi18-10 (1.4301)	AISI 304
5	Adapter	Aluminium	EN 1706-AC-AISI11Cu2 (Fe) (AC46100)	-
6	Seal housing	Stainless steel	EN 10088-1-X5CrNi18-10 (1.4301)	AISI 304
7	Mechanical seal	Ceramic / Carbon / EPDM		
8	Elastomers	EPDM		
9	Fill / drain plugs	Nickel-plated brass	EN 12164-CuZn39Pb3 (CW614N)	-
10	Wear ring	Technopolymer (PPS)		
11	Bolts and screws	Stainless steel	EN 10088-1-X5CrNi18-10 (1.4301)	AISI 304

1-3-5hm-p-en_a_tm

1, 3, 5 HM..S - HM..N SERIES

ELECTRIC PUMP CROSS SECTION AND MAIN COMPONENTS

(COMPACT DESIGN)



06426_A_DS

TABLE OF MATERIALS HM..S SERIES

REF. N.	NAME	MATERIAL	REFERENCE STANDARDS	
			EUROPE	USA
1	Pump body	Stainless steel	EN 10088-1-X5CrNi18-10 (1.4301)	AISI 304
2	Impeller	Stainless steel	EN 10088-1-X5CrNi18-10 (1.4301)	AISI 304
3	Diffuser	Stainless steel	EN 10088-1-X5CrNi18-10 (1.4301)	AISI 304
4	Shaft	Stainless steel	EN 10088-1-X5CrNiMo17-12-2 (1.4401)	AISI 316
5	Adapter	Aluminium	EN 1706-AC-ALSi11Cu2 (Fe) (AC46100)	-
6	Seal housing	Stainless steel	EN 10088-1-X5CrNi18-10 (1.4301)	AISI 304
7	Mechanical seal	Ceramic / Carbon / EPDM		
8	Elastomers	EPDM		
9	Fill / drain plugs	Stainless steel	EN 10088-1-X5CrNiMo17-12-2 (1.4401)	AISI 316
10	Wear ring	Technopolymer (PPS)		
11	Bolts and screws	Stainless steel	EN 10088-1-X5CrNi18-10 (1.4301)	AISI 304

1-3-5hm-cp-s-en_a_tm

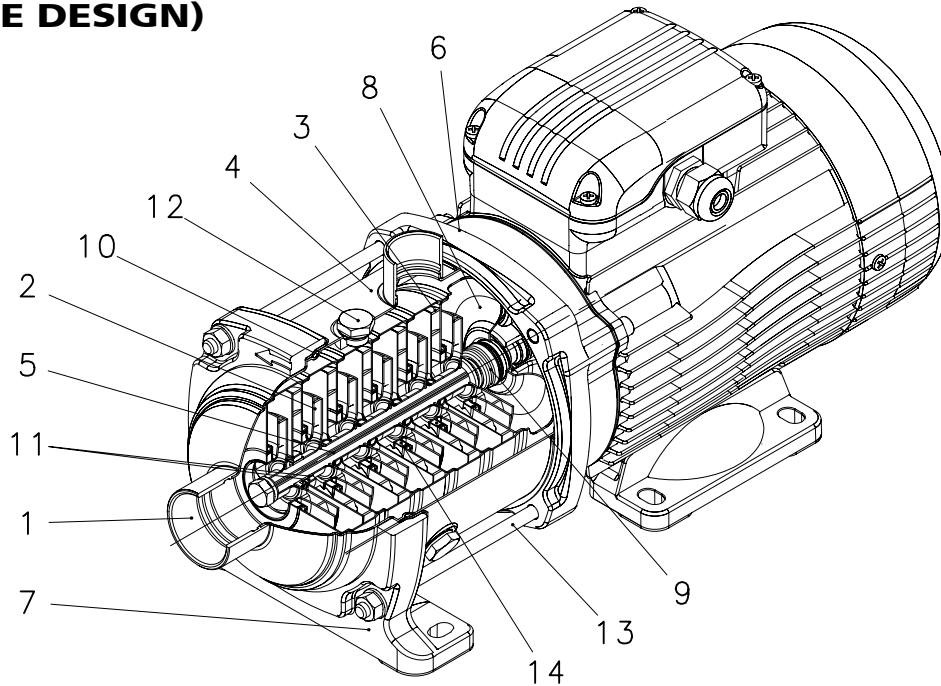
TABLE OF MATERIALS HM..N SERIES

REF. N.	NAME	MATERIAL	REFERENCE STANDARDS	
			EUROPE	USA
1	Pump body	Stainless steel	EN 10088-1-X2CrNiMo17-12-2 (1.4404)	AISI 316L
2	Impeller	Stainless steel	EN 10088-1-X2CrNiMo17-12-2 (1.4404)	AISI 316L
3	Diffuser	Stainless steel	EN 10088-1-X2CrNiMo17-12-2 (1.4404)	AISI 316L
4	Shaft	Stainless steel	EN 10088-1-X5CrNiMo17-12-2 (1.4401)	AISI 316
5	Adapter	Aluminium	EN 1706-AC-ALSi11Cu2 (Fe) (AC46100)	-
6	Seal housing	Stainless steel	EN 10088-1-X2CrNiMo17-12-2 (1.4404)	AISI 316L
7	Mechanical seal	Ceramic / Carbon / EPDM		
8	Elastomers	EPDM		
9	Fill / drain plugs	Stainless steel	EN 10088-1-X5CrNiMo17-12-2 (1.4401)	AISI 316
10	Wear ring	Technopolymer (PPS)		
11	Bolts and screws	Stainless steel	EN 10088-1-X5CrNi18-10 (1.4301)	AISI 304

1-3-5hm-cp-n-en_a_tm

1, 3, 5, 10, 15, 22 HM..S - HM..N SERIES ELECTRIC PUMP CROSS SECTION AND MAIN COMPONENTS

(SLEEVE DESIGN)



06427_A_DS

TABLE OF MATERIALS HM..S SERIES

REF. N.	NAME	MATERIAL	REFERENCE STANDARDS	
			EUROPE	USA
1	Head	Stainless steel	EN 10088-1-X5CrNi18-10 (1.4301)	AISI 304
2	Impeller	Stainless steel	EN 10088-1-X5CrNi18-10 (1.4301)	AISI 304
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-X5CrNiMo17-12-2 (1.4401)	AISI 316
6	Adapter	Aluminium	EN 1706-AC-AISI11Cu2 (Fe) (AC46100)	-
7	Ring with foot	Aluminium	EN 1706-AC-AISI11Cu2 (Fe) (AC46100)	-
8	Seal housing	Stainless steel	EN 10088-1-X5CrNi18-10 (1.4301)	AISI 304
9	Mechanical seal	Ceramic / Carbon / EPDM (PN10) - Silicon Carbide/Carbon/EPDM (PN16)		
10	Elastomers	EPDM		
11	Shaft sleeve and bushing	Tungsten carbide		
12	Fill / drain plugs	Stainless steel	EN 10088-1-X5CrNiMo17-12-2 (1.4401)	AISI 316
13	Tie rods	Stainless steel	EN 10088-1-X17CrNi16-2 (1.4057)	AISI 431
14	Wear ring	Technopolymer (PPS)		

TABLE OF MATERIALS HM..N SERIES

1-22hm-cm-s_a_tm

REF. N.	NAME	MATERIAL	REFERENCE STANDARDS	
			EUROPE	USA
1	Head	Stainless steel	EN 10088-1-X2CrNiMo17-12-2 (1.4404)	AISI 316L
2	Impeller	Stainless steel	EN 10088-1-X2CrNiMo17-12-2 (1.4404)	AISI 316L
3	Diffuser	Stainless steel	EN 10088-1-X2CrNiMo17-12-2 (1.4404)	AISI 316L
4	Outer sleeve	Stainless steel	EN 10088-1-X2CrNiMo17-12-2 (1.4404)	AISI 316L
5	Shaft	Stainless steel	EN 10088-1-X5CrNiMo17-12-2 (1.4401)	AISI 316
6	Adapter	Aluminium	EN 1706-AC-AISI11Cu2 (Fe) (AC46100)	-
7	Ring with foot	Aluminium	EN 1706-AC-AISI11Cu2 (Fe) (AC46100)	-
8	Seal housing	Stainless steel	EN 10088-1-X2CrNiMo17-12-2 (1.4404)	AISI 316L
9	Mechanical seal	Ceramic / Carbon / EPDM (PN10) - Silicon Carbide/Carbon/EPDM (PN16)		
10	Elastomers	EPDM		
11	Shaft sleeve and bushing	Tungsten carbide		
12	Fill / drain plugs	Stainless steel	EN 10088-1-X5CrNiMo17-12-2 (1.4401)	AISI 316
13	Tie rods	Stainless steel	EN 10088-1-X17CrNi16-2 (1.4057)	AISI 431
14	Wear ring	Technopolymer (PPS)		

1-22hm-cam-n-en_a_tm

e-HM™ SERIES MECHANICAL SEALS

LIST OF MATERIALS ACCORDING TO EN 12756

POSITION 1 - 2	POSITION 3	POSITION 4 - 5
V : Aluminium oxide (Ceramic)	E : EPDM	G : AISI 316
Q ₁ : Silicon Carbide	V : FPM	
B : Carbon, resin-impregnated	K : FFPM (Kalrez®)	

1-22hm_ten-mec-en_a_tm

TYPE OF SEAL

TYPE	POSITION					*TEMPERATURE (°C)	**OPERATING PRESSURE
	1 ROTATING PART	2 STATIONARY PART	3 ELASTOMERS	4 SPRINGS	5 OTHER COMPONENTS		
STANDARD MECHANICAL SEAL							
VBEGG	V	B	E	G	G	-30 + 90	PN10
OTHER TYPES OF AVAILABLE MECHANICAL SEAL							
VBVGG	V	B	V	G	G	-10 + 90	PN10
Q ₁ Q ₁ VGG	Q ₁	Q ₁	V	G	G	-10 +120	PN10
Q ₁ Q ₁ KGG	Q ₁	Q ₁	K	G	G	-20 +120	PN10
Q ₁ Q ₁ EGG	Q ₁	Q ₁	E	G	G	-30 +120	PN10
STANDARD MECHANICAL SEAL							
Q ₁ BEGG	Q ₁	B	E	G	G	-30 +120	PN16
OTHER TYPES OF AVAILABLE MECHANICAL SEAL							
Q ₁ Q ₁ VGG	Q ₁	Q ₁	V	G	G	-10 + 90	PN16
Q ₁ BVGG	Q ₁	B	V	G	G	-10 +120	PN16
Q ₁ Q ₁ KGG	Q ₁	Q ₁	K	G	G	-20 + 90	PN16
Q ₁ BKGG	Q ₁	B	K	G	G	-20 +120	PN16
Q ₁ Q ₁ EGG	Q ₁	Q ₁	E	G	G	-30 + 90	PN16

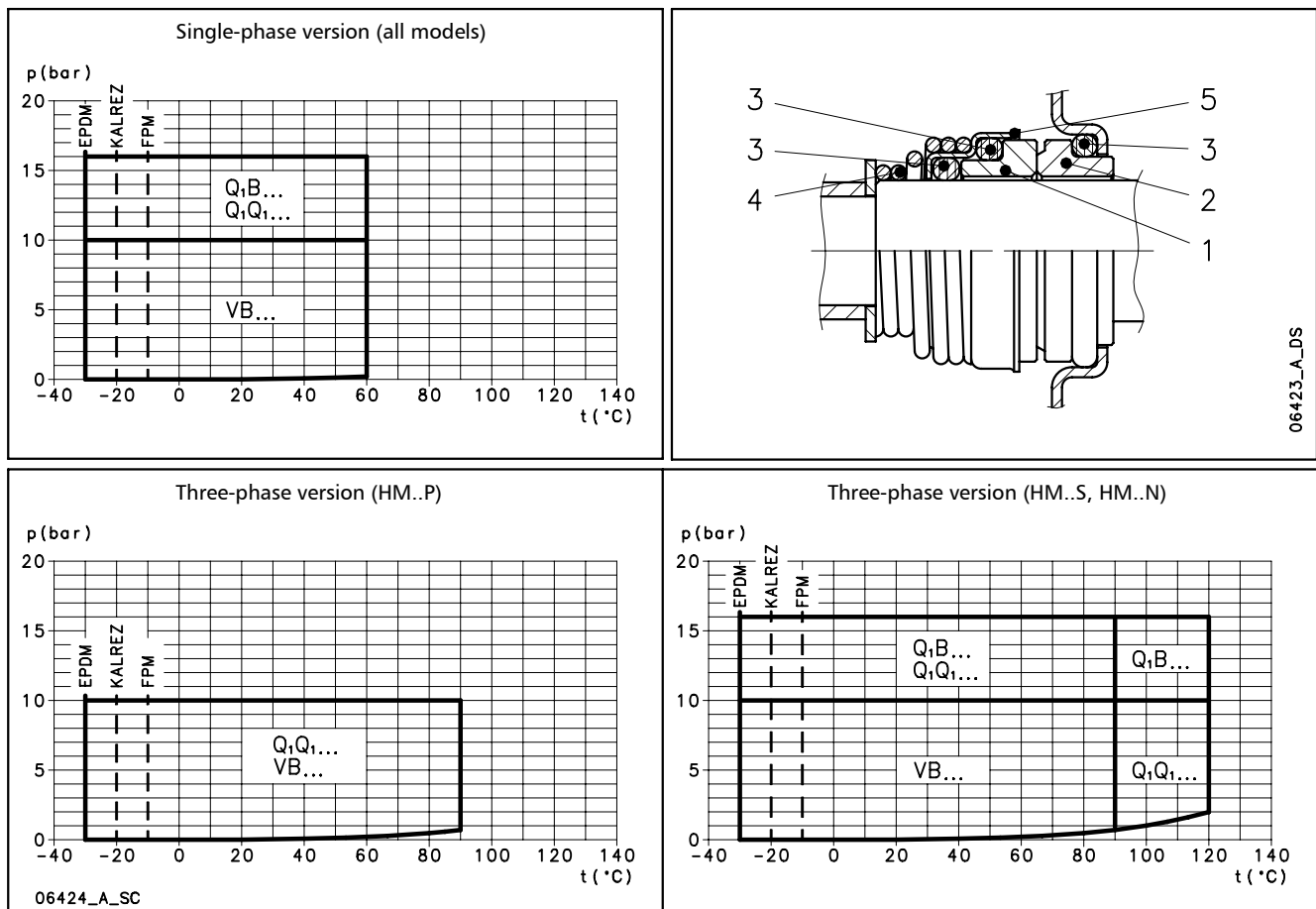
* For all single-phase versions limit the temperature to +60°C.

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For three-phase HM..P limit the temperature to +90°C.

** Refer to the PN column of the DIMENSIONS AND WEIGHTS tables.

PRESSURE/TEMPERATURE APPLICATION LIMITS FOR COMPLETE PUMP



COMPATIBILITY CHART FOR MATERIALS IN CONTACT WITH MOST COMMONLY USED LIQUIDS

LIQUID	CONCENTRATION	TEMPERATURE MIN/MAX (°C)	SPECIF. WEIGHT (Kg/dm ³)	VERSIONS			RECOMMEND. SEAL	ELASTOM.
				HM..P	HM..S	HM..N		
Acetic acid	80	-10 +70	1,05	•	•	•	Q1BEGG	E
Alkaline degreaser	5	80			•	•	Q1Q1VGG	V
Aluminium sulfate	30	-5 +50	2,71	•	•	•	Q1Q1EGG	E
Ammonia in water	25	-20 +50	0,99	•	•	•	Q1BEGG	E
Ammonium sulfate	10	-10 +60	1,77	•	•	•	Q1Q1EGG	E
Benzoic acid	70	0 +70	1,31		•	•	Q1BVGG	V
Boric acid	saturated	-10 +90	1,43		•	•	Q1Q1VGG	V
Butyl alcohol	100	-5 +80	0,81	•	•	•	Q1BEGG	E
Caustic soda	25	0 +70	2,13		•	•	Q1Q1EGG	E
Chloroform	100	-10 +30	1,48		•	•	Q1BVGG	V
Citric acid	5	-10 +70	1,54	•	•	•	Q1BEGG	E
Cleaning products	10	-5 +100			•	•	Q1Q1VGG	V
Copper sulfate	20	0 +30	2,28	•	•	•	Q1Q1VGG	V
Cutting fluid	100	-5 +110	0,90		•	•	Q1BVGG	V
Deionised, demineralised water	100	-25 +110	1	•	•	•	Q1BEGG	E
Denatured alcohol	100	-5 +70	0,81	•	•	•	Q1BEGG	E
Diathermic oil	100	-5 +110	0,90		•	•	Q1BVGG	V
Emulsion oil and water	any	-5 +90			•	•	Q1BVGG	V
Ethyl alcohol	100	-5 +40	0,81	•	•	•	Q1BEGG	E
Ethylene glycol	30	-30 +120		•	•	•	Q1BEGG	E
Formaldehyde	100	0 +30	1,13		•	•	Q1Q1KGG	K
Formic acid	5	-15 +25	1,22		•	•	Q1BKGG	K
Glycerine	100	+20 +90	1,26	•	•	•	Q1BEGG	E
Hydraulic oil	100	-5 +110			•	•	Q1BVGG	V
Hydrochloric acid	2	-5 +25	1,20	•	•	•	Q1Q1VGG	V
Hydroxide sodium	25	0 +70		•	•	•	Q1Q1EGG	E
Iron sulfate	10	-5 +30	2,09	•	•	•	Q1Q1EGG	E
Methyl alcohol	100	-5 +40	0,79	•	•	•	Q1BEGG	E
Mineral oil	100	-5 +110	0,94		•	•	Q1BVGG	V
Nitric acid	50	-5 +30	1,48	•	•	•	Q1Q1KGG	K
Perchloroethylene	100	-10 +30	1,60		•	•	Q1BKGG	K
Phosphates-polyphosphates	10	-5 +90		•	•	•	Q1Q1VGG	V
Phosphoric acid	1	-5 +30	1,33			•	Q1BVGG	V
Propyl alcohol (Propanol)	100	-5 +80	0,80	•	•	•	Q1BEGG	E
Propylene glycol	30	-30 +120		•	•	•	Q1BVGG	V
Sodium bicarbonate (Baking soda)	saturated			•	•	•	Q1BEGG	E
Sodium hypochlorite	1	-10 +25		•	•	•	Q1Q1VGG	V
Sodium nitrate	saturated	-10 +80	2,25		•	•	Q1BEGG	E
Sodium sulfate	15	-10 +40	2,60	•	•	•	Q1Q1EGG	E
Sulphuric acid	2	-10 +25	1,84		•	•	Q1BVGG	V
Tannic acid	20	0 +50		•	•	•	Q1BEGG	E
Tartaric acid	50	-10 +25	1,76		•	•	Q1Q1VGG	V
Trichloroethylene	100	-10 +40	1,46		•	•	Q1BKGG	K
Uric acid	80	-10 +80	1,89		•	•	Q1BEGG	E
Vegetable oil	100	-5 +110	0,95		•	•	Q1BVGG	V
Water	100	-5 +120		•	•	•	Q1BEGG	E
Water condensate	100	-5 +100	1	•	•	•	Q1BEGG	E
Water detergents, mineral oils mixture	10	-5 +80			•	•	Q1Q1VGG	V

tab-comp-hm-en_b_tm

The above table indicates the compatibility of materials depending on the pumped liquid. Check the specific weight of the liquid or the viscosity as this could affect the power input of the motor and hydraulic performance. For further details, please contact the sales network.

e-HM™ SERIES MOTORS

- **Standard three-phase surface motors**
≥ 0,75 kW supplied as IE3.
- Short-circuit squirrel-cage motor, enclosed construction with external ventilation (TEFC).
- IP 55 protection degree.
- Insulation class 155 (F).
- Electrical performances according to EN 60034-1.
- IE efficiency according to EN 60034-30 (≥ 0,75 kW).
- Cable gland with metric according to EN 50262.
- **Single-phase** version:
220-230 V, 60 Hz, 2 poles.
Built-in automatic reset overload protection up to 2,2 kW.
- **Three-phase** version:
220-230/380-400 V, 60 Hz, 2 poles.
Overload protection to be provided by the user.

SINGLE-PHASE MOTORS AT 60 Hz, 2-POLE

P _N kW	MOTOR TYPE	IEC SIZE	Construction Design	INPUT CURRENT I _n (A) 220-230 V	CAPACITOR		DATA FOR 220 V 60 Hz VOLTAGE						
					μF	V	min ⁻¹	I _s / I _n	η %	cosφ	T _n Nm	T _s /T _n	T _m /T _n
0,30	SM63HM../1036	63	SPECIAL	2,31-2,36	10	450	3350	3,41	62,0	0,95	0,85	0,68	1,88
0,40	SM63HM../1046	63		2,86-2,94	14	450	3385	3,80	67,5	0,94	1,13	0,73	2,04
0,50	SM63HM../1056	63		3,57-3,65	16	450	3365	3,73	66,8	0,95	1,42	0,69	2,07
0,55	SM71HM../1056	71		3,68-3,62	16	450	3400	4,28	70,2	0,97	1,54	0,66	2,11
0,75	SM71HM../1076	71		4,98-4,88	20	450	3380	3,90	69,8	0,98	2,12	0,64	1,91
0,95	SM71HM../1096	71		6,04-5,96	25	450	3370	3,80	72,9	0,98	2,69	0,58	1,86
1,1	SM80HM../1116	80		6,94-6,89	30	450	3435	4,54	74,2	0,97	3,06	0,62	2,03
1,5	SM80HM../1156	80		9,28-9,35	40	450	3455	4,91	76,3	0,96	4,14	0,49	2,19
2,2	PLM90HM../1226	90		12,3-11,7	60	450	3455	4,99	83,4	0,98	6,08	0,54	2,06

1-22hm-motm-2p60-en_a_te

e-HM™ SERIES

THREE-PHASE MOTORS AT 60 Hz, 2-POLE

P _N kW	Efficiency η_N %												IE
	Δ 220 V Y 380 V			Δ 230 V Y 400 V			Δ 380 V Y 660 V			Δ 400 V Y 690 V			
	4/4	3/4	2/4	4/4	3/4	2/4	4/4	3/4	2/4	4/4	3/4	2/4	
0,30	69,5	69,4	65,5	71,0	69,6	64,5	-	-	-	-	-	-	-
0,40	74,1	74,4	71,2	74,7	74,1	70,2	-	-	-	-	-	-	-
0,50	74,3	75,9	74,3	75,7	76,1	73,5	-	-	-	-	-	-	-
0,55	78,6	78,7	76,0	78,9	78,5	75,1	-	-	-	-	-	-	-
0,75	83,4	82,4	79,0	83,4	82,4	79,0	83,4	82,4	79,0	83,4	82,4	79,0	3
1,1	85,6	85,0	82,1	85,6	85,0	82,1	85,6	85,0	82,1	85,6	85,0	82,1	
1,5	87,2	87,0	84,6	87,2	87,0	84,6	87,2	87,0	84,6	87,2	87,0	84,6	
2,2	87,7	87,2	84,7	87,7	87,2	84,7	87,7	87,2	84,7	87,7	87,2	84,7	
3	89,1	88,8	86,9	89,1	88,8	86,9	89,1	88,8	86,9	89,1	88,8	86,9	
4	91,0	91,0	89,6	91,0	91,0	89,6	91,0	91,0	89,6	91,0	91,0	89,6	
5,5	91,0	90,5	88,6	91,0	90,5	88,6	91,0	90,5	88,6	91,0	90,5	88,6	

P _N kW	Model	IEC SIZE	Construction Design	N. of Poles	f _N Hz	Data for 380 V / 60 Hz Voltage				
						cos ϕ	I _s / I _N	T _N Nm	T _s /T _N	T _m /T _N
0,30	SM63HM../303	63	SPECIAL	2	60	0,79	4,81	0,87	3,44	3,50
0,40	SM63HM../304	63				0,79	5,03	1,16	3,42	3,44
0,50	SM63HM../305	63				0,83	4,94	1,48	3,31	3,33
0,55	SM71HM../305	71				0,81	6,15	1,54	3,23	3,30
0,75	SM80HM../307 E3	80				0,79	8,25	2,05	3,80	4,02
1,1	SM80HM../311 E3	80				0,80	9,11	3,01	4,15	4,29
1,5	SM80HM../315 E3	80				0,82	9,79	4,10	4,36	4,37
2,2	PLM90HM../322 E3	90				0,82	9,80	6,01	3,80	4,01
3	PLM90HM../330 E3	90				0,82	9,35	8,21	4,26	4,10
4	PLM100HM../340 E3	100				0,87	10,0	10,9	2,43	4,53
5,5	PLM112HM../355 E3	112				0,88	12,0	15,0	4,70	5,55

P _N kW	Voltage U _N V								n _N min ⁻¹		Operating conditions **		
	Δ		Y		Δ		Y				Altitude Above Sea Level (m)	T. amb min/max °C	
	220 V	230 V	380 V	400 V	380 V	400 V	660 V	690 V					
	I _N (A)												
0,30	1,42	1,42	0,82	0,82					3275 ÷ 3325	1000 VI	-15 / 40		
0,40	1,75	1,75	1,01	1,01					3290 ÷ 3335				
0,50	2,15	2,10	1,24	1,21					3220 ÷ 3285				
0,55	2,27	2,22	1,31	1,28					3405 ÷ 3425				
0,75	3,03	3,01	1,75	1,74	1,75	1,74	1,01	1,00	3490 ÷ 3500				
1,1	4,24	4,24	2,45	2,45	2,44	2,43	1,41	1,40	3495 ÷ 3505				
1,5	5,58	5,53	3,22	3,19	3,23	3,22	1,86	1,86	3485 ÷ 3500				
2,2	7,97	7,93	4,60	4,58	4,59	4,57	2,65	2,64	3490 ÷ 3505				
3	10,9	10,8	6,30	6,23	6,32	6,29	3,65	3,63	3485 ÷ 3500				
4	13,4	13,2	7,76	7,62	7,78	7,63	4,49	4,41	3510 ÷ 3520				
5,5	18,2	18,0	10,5	10,4	10,5	10,5	6,08	6,06	3505 ÷ 3515				

** Operating conditions to be referred to motor only. About electric pump, refer to limits in user's manual.

1-22hm-ie3-mott-2p60-en_a_te

e-HM™ SERIES

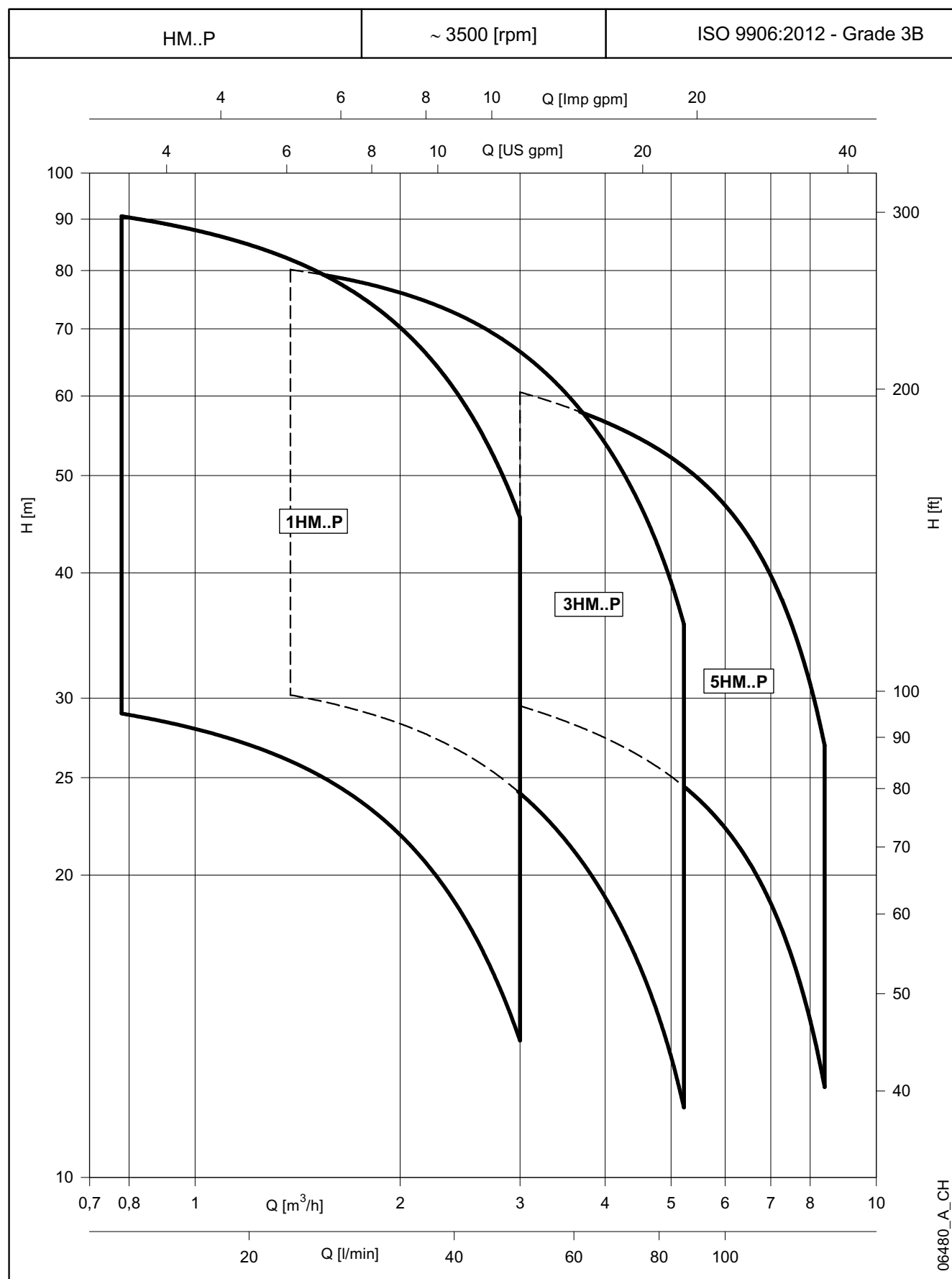
AVAILABLE VOLTAGES FOR SM and PLM MOTORS, 2-POLE

P _N kW	SINGLE-PHASE							
	50 Hz				60 Hz			
	1 x 220-240	1 x 100	1 x 110-120	1 x 220-230	1 x 100	1 x 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	-	-	-	-

P _N kW	THREE-PHASE																	
	50 Hz							60 Hz							50/60 Hz			
	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	
4	o	s	o	o	o	o	o	s	o	o	o	o	o	o	o	o	o	
5,5	o	s	o	o	o	o	o	s	o	o	o	o	o	o	o	o	o	

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

hm-volt-lowara-en_b_te

HM..P SERIES
HYDRAULIC PERFORMANCE RANGE AT 60 Hz, 2 POLES


HM..P SERIES

HYDRAULIC PERFORMANCE TABLE AT 60 Hz, 2 POLES

PUMP TYPE HM..P	VERSION	MOTOR		ELECTRIC PUMP			Q = DELIVERY							
		P _N kW	TYPE	* P ₁ kW	* I		l/min 0	13,0	19,0	25,0	31,0	37,0	43,0	50,0
					220-230 V	380-400 V	m ³ /h 0	0,8	1,1	1,5	1,9	2,2	2,6	3,0
					H = TOTAL HEAD IN METRES OF COLUMN OF WATER									
1HM02	1 ~	0,40	SM63HM../1046	0,58	2,83	-	32,4	29,5	27,8	25,9	23,5	20,9	18,0	14,3
1HM03		0,50	SM63HM../1056	0,81	3,80	-	47,8	43,2	40,6	37,5	33,9	29,9	25,5	20,0
1HM04		0,75	SM71HM../1076	1,07	4,84	-	64,8	58,8	55,4	51,4	46,7	41,4	35,5	28,1
1HM05		0,95	SM71HM../1096	1,29	5,81	-	80,7	73,1	68,9	63,9	58,1	51,4	44,1	34,9
1HM06		1,1	SM80HM../1116	1,55	7,08	-	98,1	89,5	84,6	78,8	71,9	63,9	55,1	44,0
1HM02	3 ~	0,40	SM63HM../304	0,47	1,64	0,95	31,8	28,6	26,9	24,8	22,5	19,8	16,9	13,2
1HM03		0,50	SM63HM../305	0,65	2,08	1,20	46,3	41,0	38,3	35,1	31,4	27,4	23,0	17,6
1HM04		0,75	SM80HM../307 E3	0,96	3,14	1,81	66,8	61,4	58,3	54,5	50,1	44,8	39,0	31,6
1HM05		1,1	SM80HM../311 E3	1,20	4,04	2,33	83,9	77,2	73,4	68,7	63,2	56,7	49,4	40,1
1HM06		1,1	SM80HM../311 E3	1,41	4,49	2,59	100	92,0	87,3	81,7	74,9	67,1	58,4	47,2

PUMP TYPE HM..P	VERSION	MOTOR		ELECTRIC PUMP			Q = DELIVERY							
		P _N kW	TYPE	* P ₁ kW	* I		l/min 0	23,0	34,0	45,0	56,0	67,0	78,0	87,0
					220-230 V	380-400 V	m ³ /h 0	1,4	2,0	2,7	3,4	4,0	4,7	5,2
					A	A	H = TOTAL HEAD IN METRES OF COLUMN OF WATER							
3HM02	1 ~	0,50	SM63HM../1056	0,76	3,57	-	33,7	30,7	28,7	26,1	23,0	19,5	15,7	12,3
3HM03		0,75	SM71HM../1076	1,07	4,84	-	51,0	46,5	43,5	39,6	34,9	29,7	24,0	18,9
3HM04		1,1	SM80HM../1116	1,43	6,53	-	68,8	63,2	59,6	54,6	48,6	41,7	34,1	27,3
3HM05		1,5	SM80HM../1156	1,80	8,50	-	86,6	79,9	75,5	69,4	61,9	53,3	43,8	35,3
3HM02	3 ~	0,50	SM63HM../305	0,60	1,96	1,13	33,0	29,5	27,2	24,5	21,3	17,9	14,1	10,7
3HM03		1,1	SM80HM../311 E3	0,99	3,60	2,08	52,7	48,9	46,4	43,0	38,5	33,4	27,7	22,6
3HM04		1,1	SM80HM../311 E3	1,28	4,19	2,42	69,9	64,7	61,3	56,5	50,6	43,7	36,1	29,3
3HM05		1,5	SM80HM../315 E3	1,56	5,14	2,97	87,6	81,1	76,9	71,0	63,6	55,0	45,5	37,0

PUMP TYPE HM..P	VERSION	MOTOR		ELECTRIC PUMP			Q = DELIVERY							
		P _N kW	TYPE	* P ₁ kW	* I		l/min 0	50,0	65,0	80,0	95,0	110,0	125	140
					220-230 V	380-400 V	m ³ /h 0	3,0	3,9	4,8	5,7	6,6	7,5	8,4
					A	A	H = TOTAL HEAD IN METRES OF COLUMN OF WATER							
5HM02	1 ~	0,75	SM71HM../1076	1,00	4,54	-	34,7	29,5	27,6	25,6	23,2	20,3	16,7	12,3
5HM03		1,1	SM80HM../1116	1,45	6,65	-	52,6	44,8	42,1	39,1	35,6	31,3	25,9	19,4
5HM04		1,5	SM80HM../1156	1,92	9,00	-	70,3	60,3	56,8	52,9	48,2	42,5	35,4	26,6
5HM02	3 ~	0,75	SM80HM../307 E3	0,88	2,97	1,71	35,5	30,7	29,0	27,1	24,8	22,0	18,5	14,1
5HM03		1,1	SM80HM../311 E3	1,30	4,25	2,45	53,3	46,0	43,4	40,6	37,2	33,0	27,7	21,1
5HM04		1,5	SM80HM../315 E3	1,69	5,44	3,14	71,1	61,5	58,0	54,2	49,7	44,1	37,0	28,3

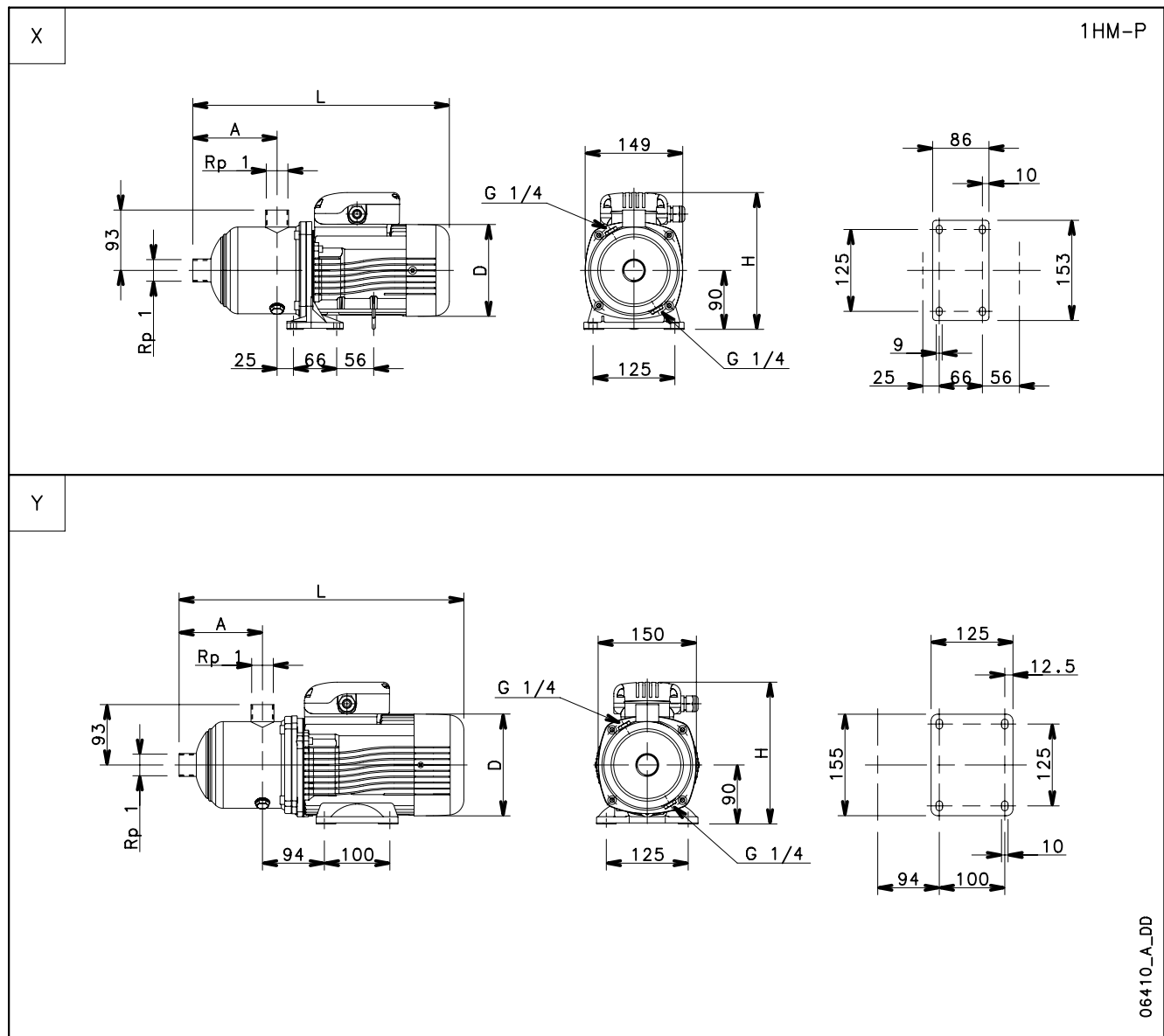
Hydraulic performances in compliance with ISO 9906:2012 - Grade 3B (ex ISO 9906:1999 - Annex A)

1-5hm-p-2p60_a_th

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

1HM..P SERIES

DIMENSIONS AND WEIGHTS AT 60 HZ, 2 POLES

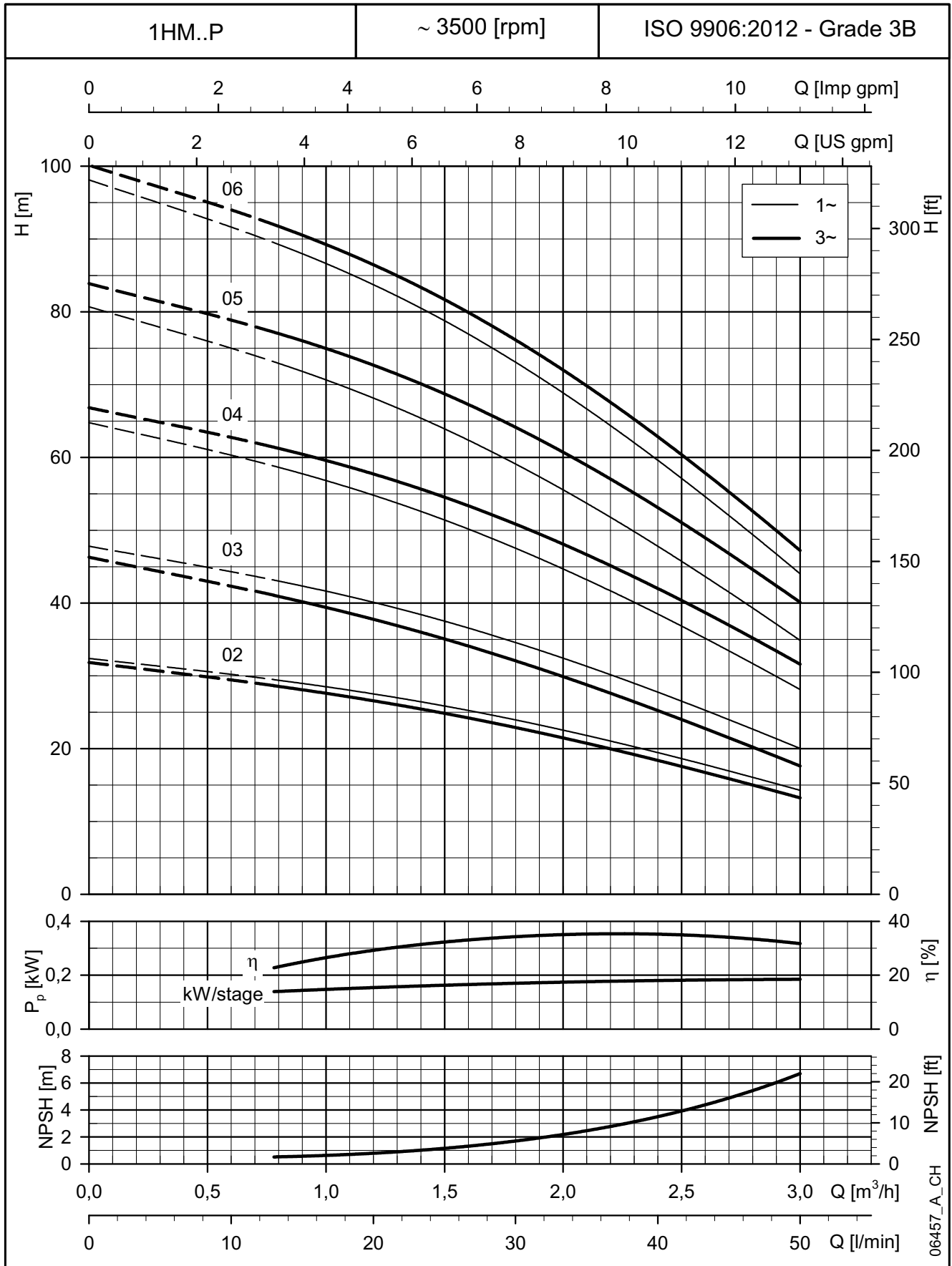


PUMP TYPE	VERSION	Ref.	MOTOR		DIMENSIONS (mm)				PN bar	WEIGHT kg
			kW	SIZE	A	D	H	L		
1HM02	SINGLE-PHASE	X	0,40	63	87	120	201	336	10	7
1HM03			0,50	63	87	120	201	336	10	7
1HM04			0,75	71	107	140	211	370	10	10
1HM05			0,95	71	127	140	220	390	10	11
1HM06		Y	1,1	80	147	155	227	455	10	14
1HM02	THREE-PHASE	X	0,40	63	87	120	201	336	10	7
1HM03			0,50	63	87	120	201	336	10	7
1HM04			0,75	80	107	155	219	415	10	13
1HM05		Y	1,1	80	127	155	219	435	10	14
1HM06			1,1	80	147	155	219	455	10	14

1hm-p-2p60_a_td

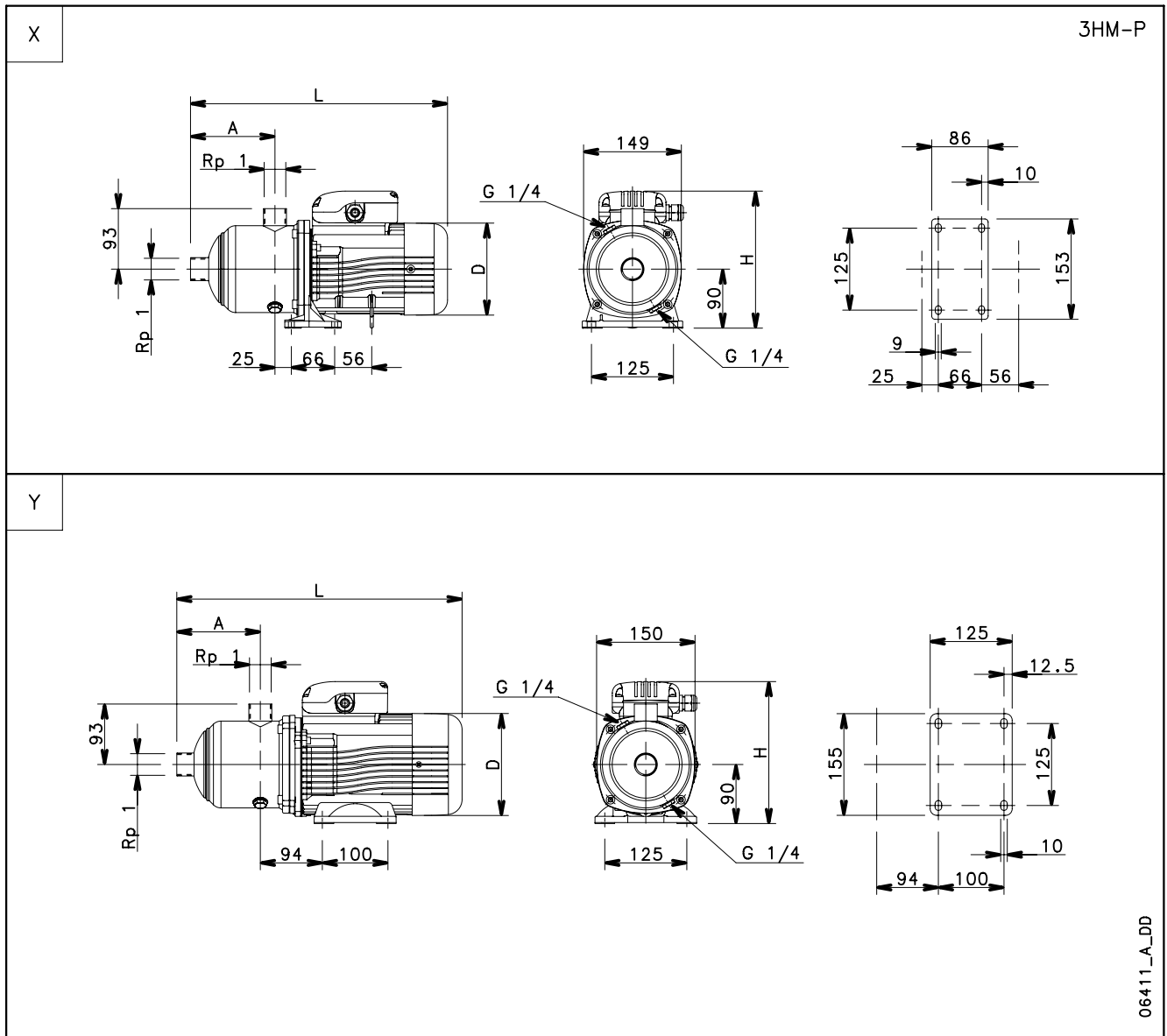
1HM..P SERIES

OPERATING CHARACTERISTICS AT 60 Hz, 2 POLES



These performances are valid for liquids with density $\rho = 1.0 \text{ Kg/dm}^3$ and kinematic viscosity $\nu = 1 \text{ mm}^2/\text{sec}$.

3HM..P SERIES **DIMENSIONS AND WEIGHTS AT 60 HZ, 2 POLES**

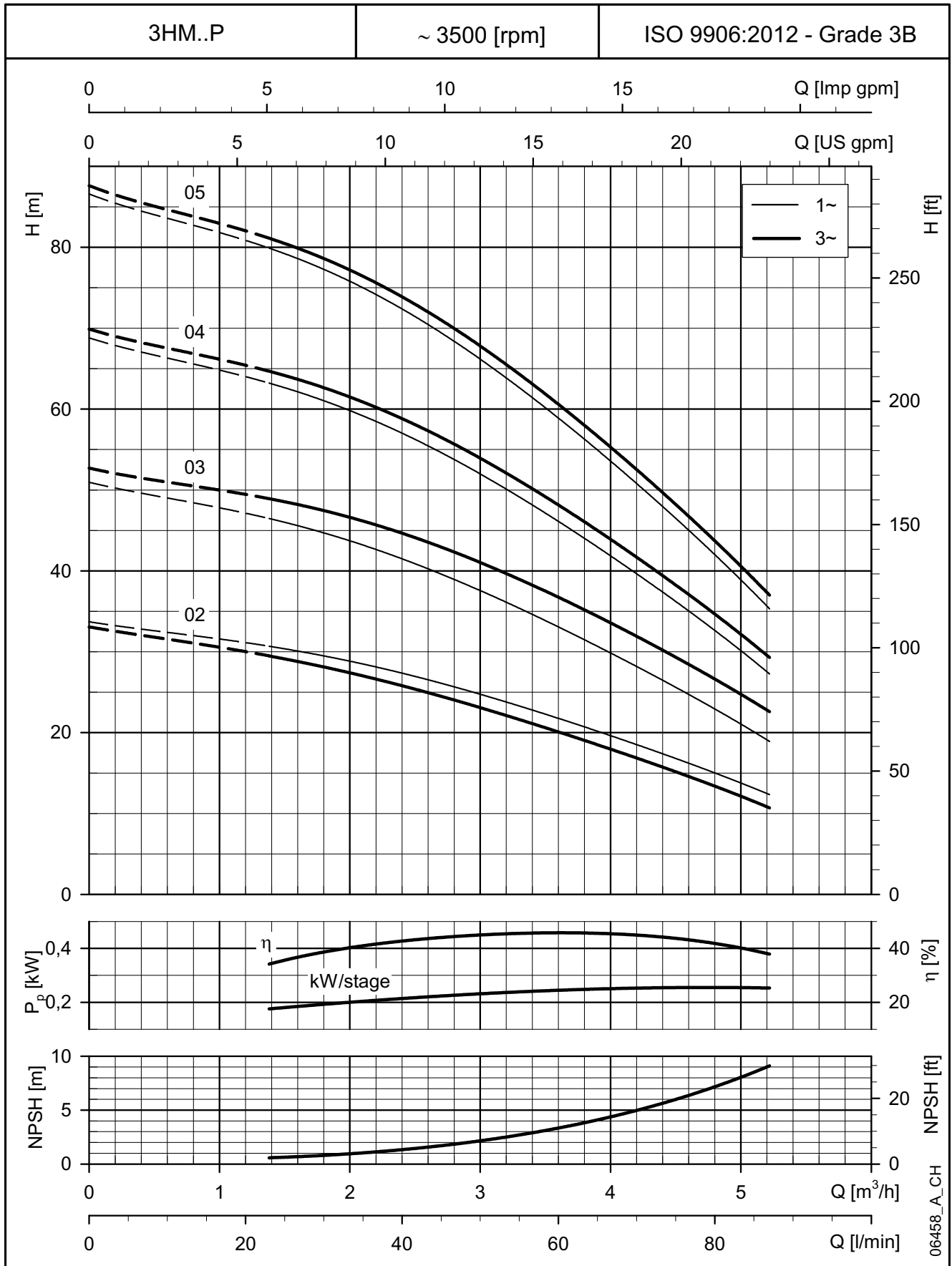


PUMP TYPE	VERSION	Ref.	MOTOR		DIMENSIONS (mm)				PN bar	WEIGHT kg
			kW	SIZE	A	D	H	L		
3HM02	SINGLE-PHASE	X	0,50	63	87	120	201	336	10	7
3HM03			0,75	71	87	140	211	350	10	9
3HM04		Y	1,1	80	107	155	227	415	10	14
3HM05			1,5	80	127	155	227	435	10	15
3HM02	THREE-PHASE	X	0,50	63	87	120	201	336	10	7
3HM03			1,1	80	87	155	219	395	10	13
3HM04		Y	1,1	80	107	155	219	415	10	14
3HM05			1,5	80	127	155	219	435	10	15

3hm-p-2p60_a_td

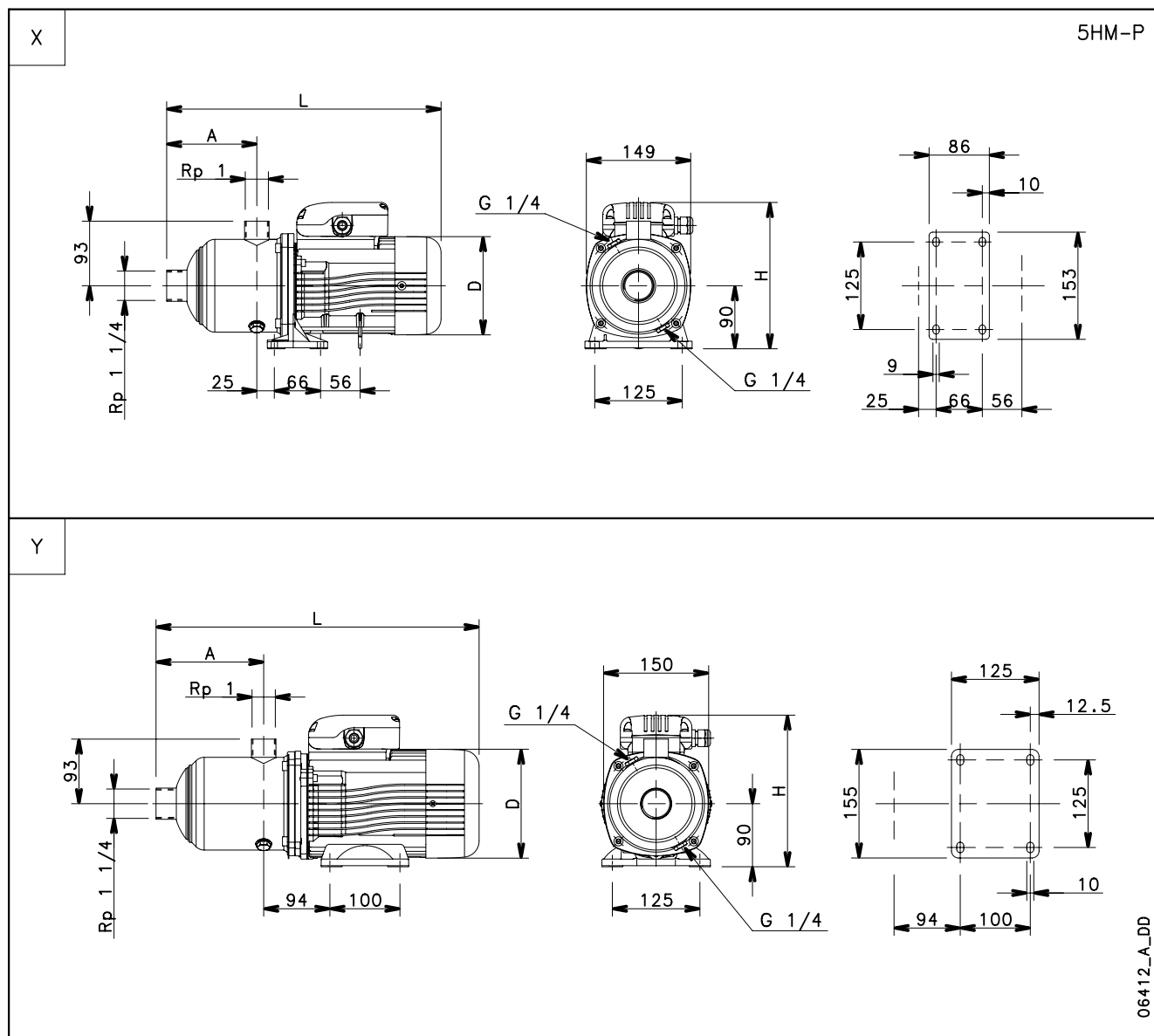
3HM..P SERIES

OPERATING CHARACTERISTICS AT 60 Hz, 2 POLES



These performances are valid for liquids with density $\rho = 1.0 \text{ Kg/dm}^3$ and kinematic viscosity $\nu = 1 \text{ mm}^2/\text{sec}$.

5HM..P SERIES DIMENSIONS AND WEIGHTS AT 60 HZ, 2 POLES

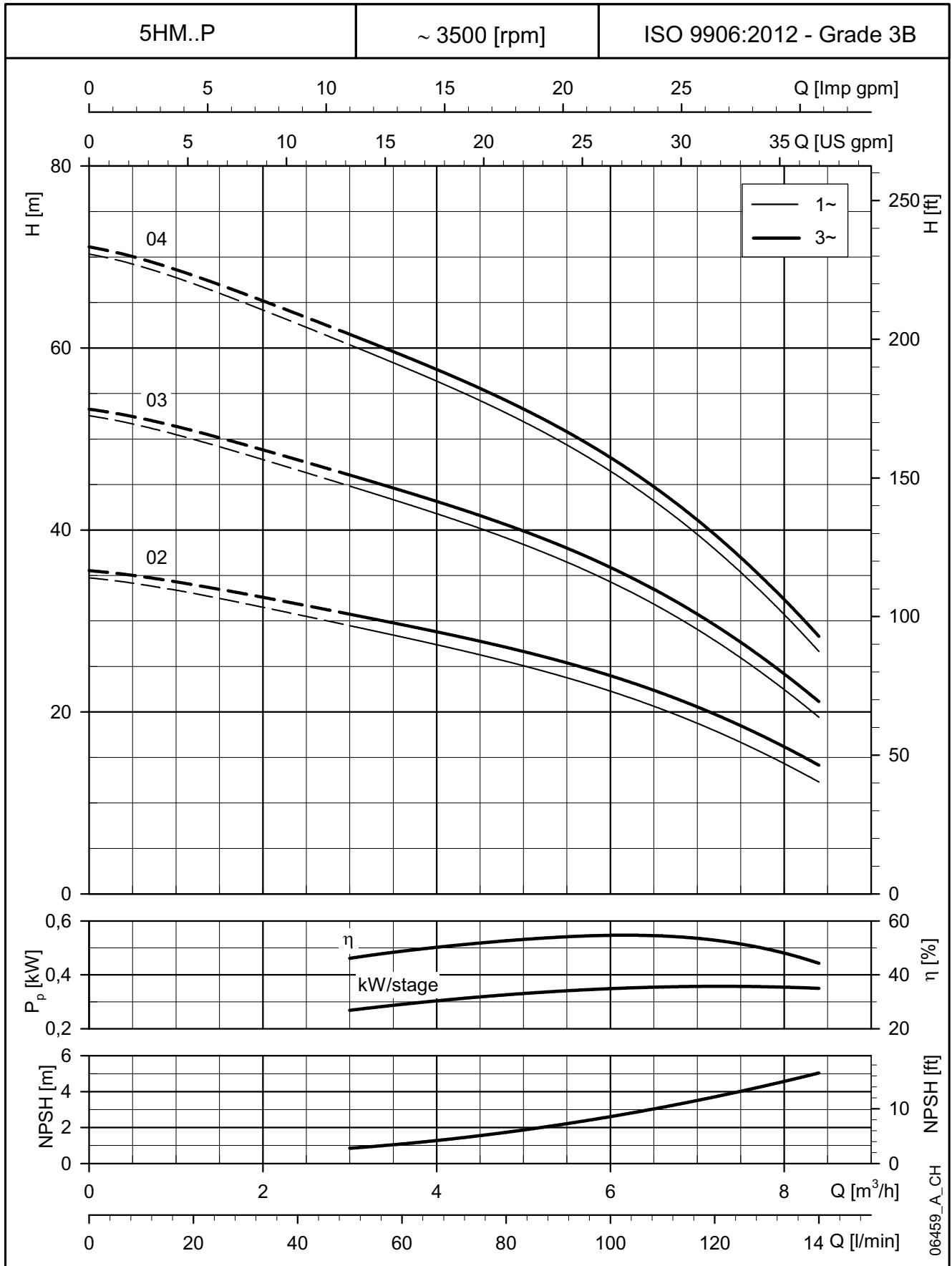


PUMP TYPE	VERSION	Ref.	MOTOR		DIMENSIONS (mm)				PN bar	WEIGHT kg
			kW	SIZE	A	D	H	L		
5HM02	SINGLE-PHASE	X	0,75	71	89	140	211	352	10	9
5HM03		Y	1,1	80	89	155	227	397	10	13
5HM04			1,5	80	109	155	227	417	10	15
5HM02	THREE-PHASE	Y	0,75	80	89	155	219	397	10	12
5HM03			1,1	80	89	155	219	397	10	13
5HM04			1,5	80	109	155	219	417	10	15

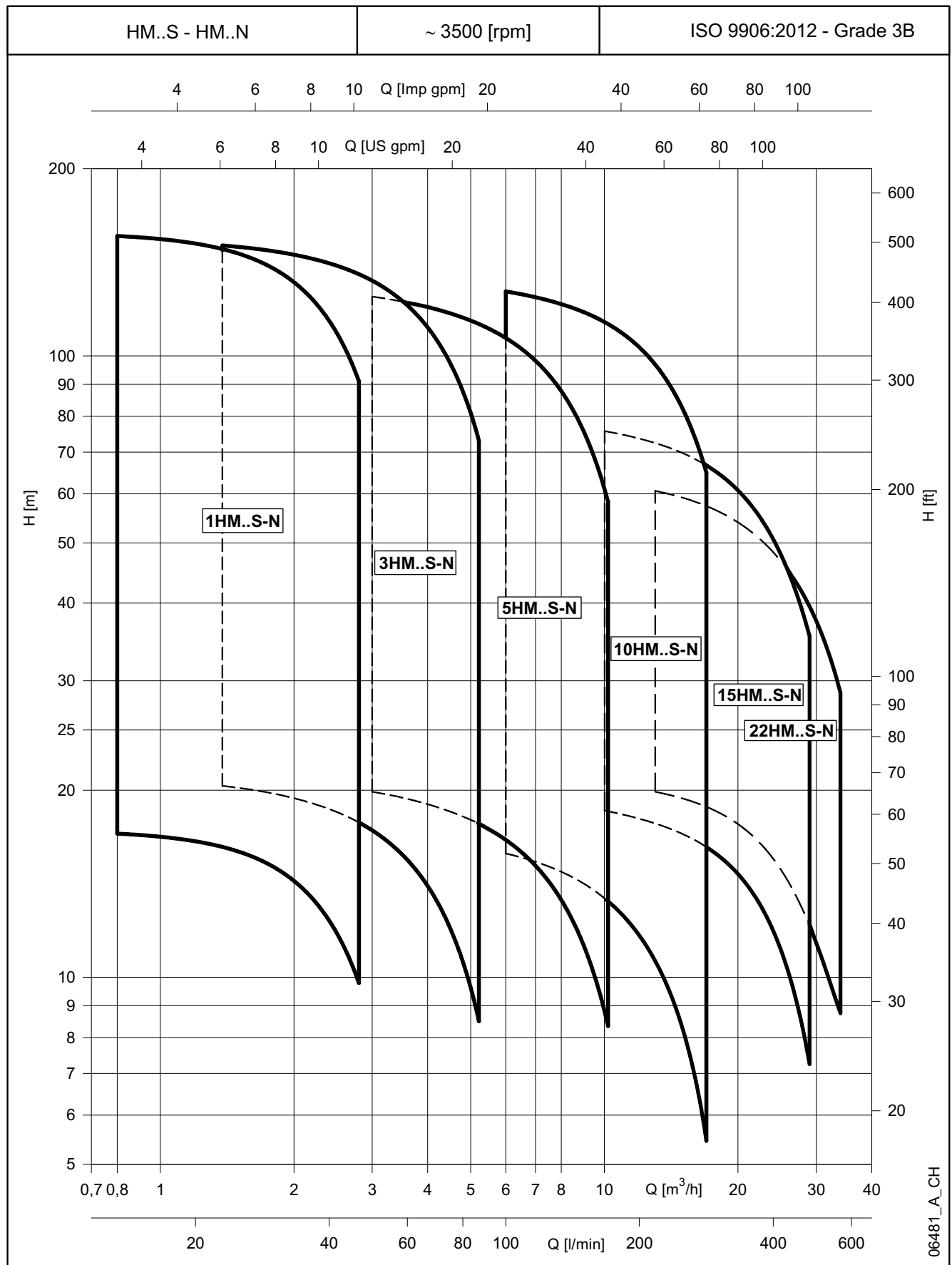
5hm-p-2p60_a_td

5HM..P SERIES

OPERATING CHARACTERISTICS AT 60 Hz, 2 POLES



These performances are valid for liquids with density $\rho = 1.0 \text{ Kg/dm}^3$ and kinematic viscosity $\nu = 1 \text{ mm}^2/\text{sec}$.

HM..S - HM..N SERIES
HYDRAULIC PERFORMANCE RANGE AT 60 Hz, 2 POLES


1, 3 HM..S - HM..N SERIES

HYDRAULIC PERFORMANCE TABLE AT 60 Hz, 2 POLES

PUMP TYPE HM..S HM..N	VERSION	MOTOR		ELECTRIC PUMP			Q = DELIVERY							
		P _N kW	TYPE	* P ₁ kW	* I		l/min 0	13,3	19,0	25,0	31,0	37,0	43,0	46,7
					220-230 V	380-400 V	m ³ /h 0	0,8	1,1	1,5	1,9	2,2	2,6	2,8
					A	A	H = TOTAL HEAD IN METRES OF COLUMN OF WATER							
1HM02	1 ~	0,30	SM63HM../1036	0,35	1,86	-	17,2	17,0	16,7	15,9	14,7	13,0	11,0	9,6
1HM03		0,30	SM63HM../1036	0,42	2,06	-	25,5	25,0	24,4	23,2	21,3	18,8	15,7	13,6
1HM04		0,30	SM63HM../1036	0,49	2,31	-	33,6	32,7	31,8	30,0	27,4	24,0	19,8	16,9
1HM05		0,40	SM63HM../1046	0,58	2,84	-	42,4	41,6	40,5	38,4	35,2	30,9	25,8	22,2
1HM06		0,50	SM63HM../1056	0,72	3,46	-	50,2	49,3	47,9	45,2	41,0	35,7	29,2	24,8
1HM07		0,75	SM71HM../1076	0,86	3,96	-	59,6	59,0	57,6	54,5	49,9	43,8	36,4	31,3
1HM08		0,75	SM71HM../1076	0,94	4,27	-	67,8	66,9	65,2	61,6	56,2	49,1	40,6	34,8
1HM09		0,75	SM71HM../1076	1,02	4,61	-	76,0	74,7	72,7	68,5	62,3	54,2	44,6	38,0
1HM10		0,95	SM71HM../1096	1,14	5,19	-	84,7	83,3	81,1	76,6	69,8	61,0	50,4	43,1
1HM11		0,95	SM71HM../1096	1,21	5,49	-	92,8	91,1	88,5	83,5	75,9	66,1	54,3	46,3
1HM12		0,95	SM71HM../1096	1,28	5,79	-	101	98,7	95,8	90,1	81,7	70,9	58,1	49,3
1HM13		1,1	SM80HM../1116	1,43	6,59	-	112	111	108	103	93,6	82,0	68,1	58,4
1HM15		1,5	SM80HM../1156	1,71	8,18	-	131	130	127	121	111	98	81,6	70,4
1HM17		1,5	SM80HM../1156	1,87	8,81	-	148	147	143	136	124	109	91,1	78,4
1HM18		1,5	SM80HM../1156	1,95	9,13	-	156	155	151	143	131	115	96	82,2
1HM02	3 ~	0,30	SM63HM../303	0,24	1,13	0,65	17,1	16,9	16,5	15,6	14,2	12,3	10,1	8,6
1HM03		0,30	SM63HM../303	0,32	1,25	0,72	25,2	24,7	24,0	22,5	20,3	17,4	14,0	11,7
1HM04		0,30	SM63HM../303	0,40	1,39	0,80	33,0	32,1	30,9	28,8	25,7	21,9	17,3	14,1
1HM05		0,40	SM63HM../304	0,50	1,70	0,98	41,5	40,3	38,9	36,3	32,5	27,9	22,4	18,7
1HM06		0,50	SM63HM../305	0,58	1,94	1,12	49,4	47,7	45,9	42,7	38,1	32,5	26,0	21,5
1HM07		0,75	SM80HM../307 E3	0,72	2,65	1,53	61,5	61,1	59,9	57,1	52,7	46,9	39,7	34,7
1HM08		0,75	SM80HM../307 E3	0,82	2,83	1,64	70,1	69,5	68,2	64,9	59,8	53,1	44,9	39,2
1HM09		0,75	SM80HM../307 E3	0,91	3,03	1,75	78,6	77,9	76,3	72,6	66,9	59,3	50,0	43,5
1HM10		1,1	SM80HM../311 E3	1,03	3,70	2,14	87,8	87,3	85,6	81,6	75,3	67,0	56,8	49,6
1HM11		1,1	SM80HM../311 E3	1,13	3,89	2,24	96,4	95,7	93,9	89,5	82,5	73,3	62,1	54,1
1HM12		1,1	SM80HM../311 E3	1,22	4,08	2,35	105	104	102	97,2	89,6	79,5	67,3	58,5
1HM13		1,1	SM80HM../311 E3	1,31	4,27	2,47	114	113	110	105	96,6	85,7	72,4	62,9
1HM15		1,5	SM80HM../315 E3	1,45	4,94	2,85	131	131	128	122	112	99	83,3	72,2
1HM17		1,5	SM80HM../315 E3	1,63	5,31	3,06	149	148	145	137	126	111	93,4	80,8
1HM18		1,5	SM80HM../315 E3	1,72	5,51	3,18	157	156	153	145	133	117	98	85,0

PUMP TYPE HM..S HM..N	VERSION	MOTOR		ELECTRIC PUMP			Q = DELIVERY							
		P _N kW	TYPE	* P ₁ kW	* I		l/min 0	23,0	34,0	45,0	56,0	67,0	78,0	87,0
					220-230 V	380-400 V	m ³ /h 0	1,4	2,0	2,7	3,4	4,0	4,7	5,2
					A	A	H = TOTAL HEAD IN METRES OF COLUMN OF WATER							
3HM02	1 ~	0,30	SM63HM../1036	0,47	2,25	-	21,1	20,7	19,8	18,5	16,8	14,6	11,8	9,1
3HM03		0,40	SM63HM../1046	0,63	3,01	-	31,7	31,1	29,8	27,8	25,2	21,9	17,7	13,7
3HM04		0,50	SM63HM../1056	0,82	3,83	-	42,0	41,1	39,1	36,4	32,8	28,3	22,7	17,4
3HM05		0,75	SM71HM../1076	1,03	4,67	-	53,3	52,5	50,3	47,1	42,8	37,3	30,4	23,7
3HM06		0,95	SM71HM../1096	1,21	5,49	-	64,0	62,9	60,3	56,5	51,4	44,8	36,5	28,5
3HM07		0,95	SM71HM../1096	1,35	6,04	-	74,3	72,6	69,3	64,7	58,6	50,7	41,0	31,6
3HM08		1,1	SM80HM../1116	1,57	7,16	-	85,8	84,6	81,3	76,3	69,7	60,9	49,9	39,2
3HM09		1,5	SM80HM../1156	1,83	8,64	-	97,2	96,7	93,2	88,0	80,8	71,2	59,0	47,0
3HM10		1,5	SM80HM../1156	1,99	9,25	-	108	107	103	97,1	88,9	78,1	64,5	51,2
3HM11		2,2	PLM90HM../1226	2,04	9,70	-	119	119	115	109	100	88,6	73,7	59,1
3HM12		2,2	PLM90HM../1226	2,19	10,3	-	130	130	125	118	109	95,8	79,6	63,7
3HM13		2,2	PLM90HM../1226	2,34	10,9	-	141	140	135	127	117	103	85,3	68,1
3HM14		2,2	PLM90HM../1226	2,49	11,6	-	151	150	145	136	125	110	90,8	72,3
3HM02	3 ~	0,30	SM63HM../303	0,38	1,34	0,77	21,0	20,3	19,3	17,9	16,2	13,9	11,1	8,4
3HM03		0,50	SM63HM../305	0,53	1,82	1,05	31,6	30,5	29,0	26,9	24,3	20,8	16,7	12,7
3HM04		0,50	SM63HM../305	0,66	2,10	1,21	41,4	39,4	37,1	34,1	30,3	25,6	20,0	14,7
3HM05		0,75	SM80HM../307 E3	0,92	3,03	1,75	54,5	54,3	52,5	49,6	45,7	40,4	33,7	27,1
3HM06		1,1	SM80HM../311 E3	1,11	3,84	2,22	65,5	65,5	63,4	60,1	55,4	49,2	41,1	33,2
3HM07		1,1	SM80HM../311 E3	1,27	4,18	2,41	76,3	76,1	73,5	69,6	64,2	56,8	47,4	38,1
3HM08		1,5	SM80HM../315 E3	1,43	4,88	2,82	87,4	87,4	84,6	80,3	74,1	65,8	55,0	44,5
3HM09		1,5	SM80HM../315 E3	1,60	5,23	3,02	98,2	98,1	94,8	89,8	82,8	73,4	61,3	49,4
3HM10		1,5	SM80HM../315 E3	1,76	5,59	3,23	109	109	105	99,3	91,5	80,9	67,4	54,2
3HM11		2,2	PLM90HM../322 E3	1,96	6,73	3,89	120	121	117	111	102	91,0	76,2	61,7
3HM12		2,2	PLM90HM../322 E3	2,12	7,07	4,08	131	131	127	120	111	98,7	82,7	66,8
3HM13		2,2	PLM90HM../322 E3	2,28	7,41	4,28	142	142	137	130	120	106	89,0	71,8
3HM14		2,2	PLM90HM../322 E3	2,44	7,78	4,49	153	152	147	140	129	114	95,2	76,7

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

1-3hm-s-n-2p60_a_th

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

5 HM..S - HM..N SERIES

HYDRAULIC PERFORMANCE TABLE AT 60 Hz, 2 POLES

PUMP TYPE HM..S HM..N	VERSION	MOTOR		ELECTRIC PUMP			Q = DELIVERY							
		P _N kW	TYPE	* P ₁ kW	* I		l/min 0	50,0	70,0	90,0	110,0	130	150	170
					220-230 V	380-400 V	m ³ /h 0	3,0	4,2	5,4	6,6	7,8	9,0	10,2
					H = TOTAL HEAD IN METRES OF COLUMN OF WATER									
5HM02	1 ~	0,50	SM63HM../1056	0,73	3,50	-	21,3	20,1	19,1	17,8	16,2	14,1	11,6	8,8
5HM03		0,75	SM71HM../1076	1,04	4,69	-	32,2	30,5	29,0	27,0	24,5	21,5	17,8	13,5
5HM04		0,95	SM71HM../1096	1,31	5,88	-	42,8	40,3	38,2	35,5	32,2	28,1	23,1	17,4
5HM05		1,1	SM80HM../1116	1,63	7,42	-	54,0	51,1	48,6	45,4	41,3	36,3	30,1	22,9
5HM06		1,5	SM80HM../1156	2,00	9,29	-	65,0	62,3	59,4	55,7	51,0	45,0	37,7	29,1
5HM07		2,2	PLM90HM../1226	2,16	10,2	-	76,3	73,4	70,2	66,0	60,6	53,8	45,4	35,3
5HM08		2,2	PLM90HM../1226	2,41	11,2	-	87,1	83,4	79,7	74,8	68,5	60,7	51,0	39,5
5HM09		2,2	PLM90HM../1226	2,66	12,3	-	97,7	93,4	89,0	83,3	76,2	67,3	56,3	43,4
5HM02	3 ~	0,50	SM63HM../305	0,58	1,93	1,11	21,2	19,5	18,3	16,8	15,1	13,0	10,5	7,6
5HM03		0,75	SM80HM../307 E3	0,92	3,05	1,76	32,8	31,6	30,3	28,5	26,2	23,3	19,7	15,4
5HM04		1,1	SM80HM../311 E3	1,22	4,08	2,35	43,8	42,3	40,5	38,1	35,1	31,3	26,5	20,8
5HM05		1,5	SM80HM../315 E3	1,50	5,01	2,89	54,9	53,0	50,8	47,9	44,2	39,4	33,4	26,2
5HM06		1,5	SM80HM../315 E3	1,77	5,63	3,25	65,7	63,2	60,5	57,0	52,4	46,6	39,4	30,8
5HM07		2,2	PLM90HM../322 E3	2,08	6,98	4,03	76,9	74,4	71,3	67,3	62,1	55,4	47,0	37,0
5HM08		2,2	PLM90HM../322 E3	2,35	7,57	4,37	87,7	84,7	81,1	76,5	70,5	62,8	53,2	41,8
5HM09		2,2	PLM90HM../322 E3	2,62	8,18	4,72	98,6	94,9	90,9	85,5	78,7	70,0	59,2	46,3
5HM10		3	PLM90HM../330 E3	2,92	9,73	5,62	110	106	102	95,7	88,2	78,6	66,7	52,4
5HM11		3	PLM90HM../330 E3	3,19	10,3	5,96	121	116	111	105	96,5	85,9	72,7	57,0
5HM12		3	PLM90HM../330 E3	3,46	11,0	6,32	131	126	121	114	105	93,1	78,7	61,5

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

5-hm-s-n-2p60_a_th

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

10, 15, 22 HM..S - HM..N SERIES

HYDRAULIC PERFORMANCE TABLE AT 60 Hz, 2 POLES

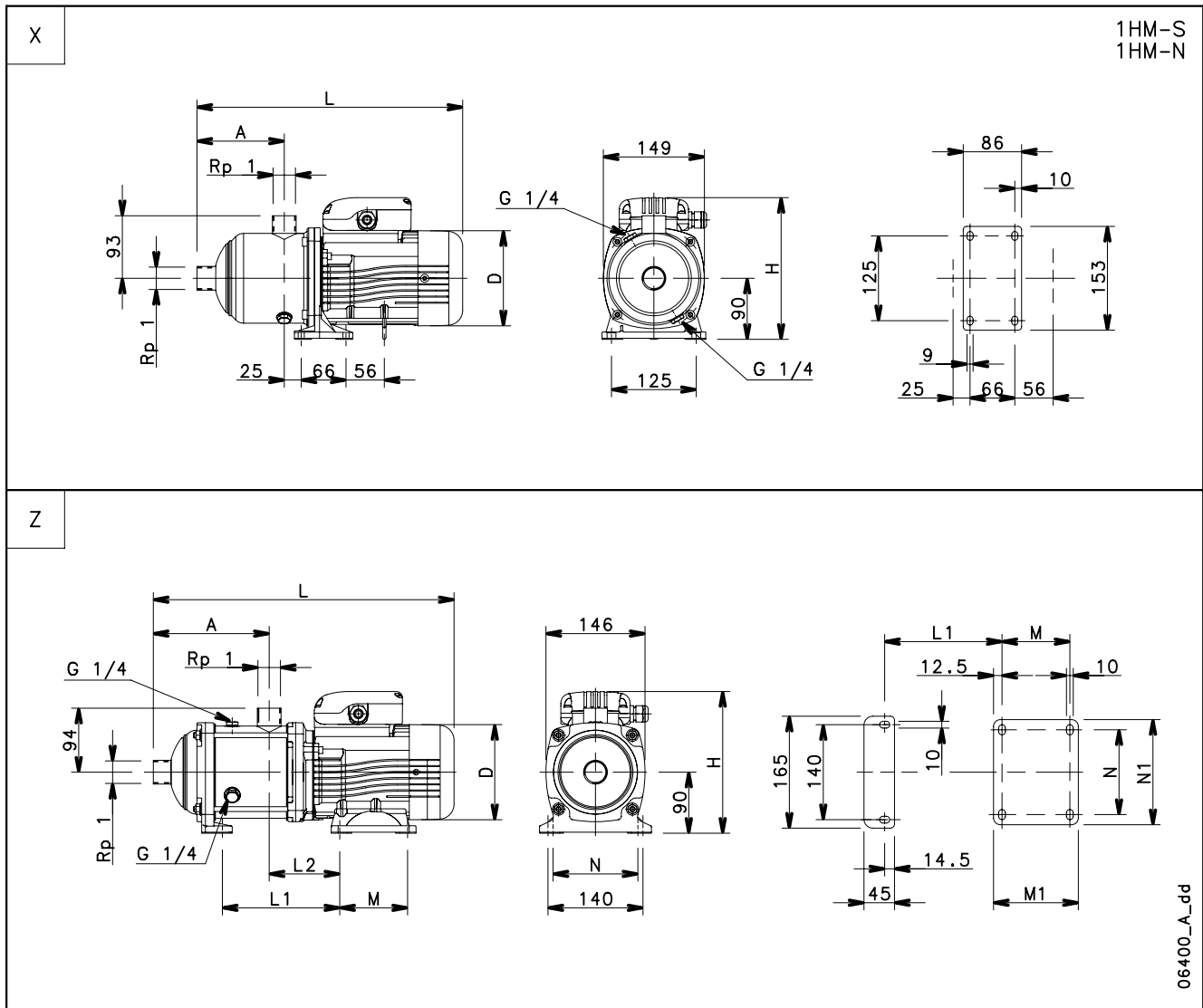
PUMP TYPE HM..S HM..N	VERSION	MOTOR		ELECTRIC PUMP			Q = DELIVERY							
		P _N kW	TYPE	* P ₁ kW	* I		l/min 0	100,0	131	162	193	224	255	283
					220-230 V	380-400 V	m ³ /h 0	6,0	7,9	9,7	11,6	13,4	15,3	17,0
					H = TOTAL HEAD IN METRES OF COLUMN OF WATER									
10HM01	1 ~	1,1	SM80HM../1116	1,03	5,02	-	17,2	15,9	15,0	13,8	12,2	10,3	8,1	5,6
10HM02		1,5	SM80HM../1156	1,75	8,36	-	33,9	31,5	29,9	27,9	25,2	21,9	17,9	13,8
10HM03		2,2	PLM90HM../1226	2,24	10,5	-	51,2	47,4	45,3	42,7	39,2	34,9	29,5	23,9
10HM01	3 ~	0,75	SM80HM../307 E3	0,79	2,77	1,60	17,2	16,0	15,1	13,9	12,3	10,4	8,2	5,8
10HM02		1,5	SM80HM../315 E3	1,51	4,69	2,71	34,1	31,6	30,0	28,0	25,3	22,0	18,0	13,9
10HM03		2,2	PLM90HM../322 E3	2,17	7,19	4,15	51,6	48,1	46,2	43,7	40,3	36,0	30,7	25,1
10HM04		3	PLM90HM../330 E3	2,86	9,62	5,56	68,8	64,1	61,5	58,1	53,7	47,9	40,9	33,4
10HM05		4	PLM100HM../340 E3	3,56	11,3	6,50	86,4	80,8	77,6	73,4	67,9	60,8	52,0	42,6
10HM06		4	PLM100HM../340 E3	4,22	12,9	7,45	103	96,4	92,5	87,4	80,7	72,1	61,5	50,3
10HM07		5,5	PLM112HM../355 E3	5,00	15,7	9,04	121	113	108	103	94,8	84,9	72,5	59,4
10HM08		5,5	PLM112HM../355 E3	5,65	17,1	9,87	138	128	123	117	108	96,2	82,1	67,1
PUMP TYPE HM..S HM..N	VERSION	MOTOR		ELECTRIC PUMP			Q = DELIVERY							
		P _N kW	TYPE	* P ₁ kW	* I		l/min 0	167	220	273	326	379	432	483
					220-230 V	380-400 V	m ³ /h 0	10,0	13,2	16,4	19,6	22,7	25,9	29,0
					H = TOTAL HEAD IN METRES OF COLUMN OF WATER									
15HM01	1 ~	1,5	SM80HM../1156	1,76	8,39	-	20,4	18,5	17,6	16,4	14,9	12,8	10,2	7,2
15HM01	3 ~	1,5	SM80HM../315 E3	1,52	5,07	2,93	20,6	18,8	17,9	16,7	15,2	13,2	10,6	7,6
15HM02		3	PLM90HM../330 E3	2,80	9,48	5,47	41,9	38,4	36,9	34,9	32,1	28,4	23,4	17,7
15HM03		4	PLM100HM../340 E3	4,38	13,2	7,65	63,1	57,4	54,9	51,6	47,2	41,6	34,8	27,5
15HM04		5,5	PLM112HM../355 E3	5,86	17,5	10,1	84,1	76,6	73,2	68,8	63,0	55,5	46,4	36,7
PUMP TYPE HM..S HM..N	VERSION	MOTOR		ELECTRIC PUMP			Q = DELIVERY							
		P _N kW	TYPE	* P ₁ kW	* I		l/min 0	217	275	333	391	449	507	567
					220-230 V	380-400 V	m ³ /h 0	13,0	16,5	20,0	23,5	26,9	30,4	34,0
					H = TOTAL HEAD IN METRES OF COLUMN OF WATER									
22HM01	1 ~	2,2	PLM90HM../1226	2,19	10,9	-	21,4	19,8	18,9	17,6	15,8	13,5	11,0	8,7
22HM01	3 ~	2,2	PLM90HM../322 E3	2,11	7,17	4,14	21,6	20,1	19,2	18,0	16,2	14,0	11,4	9,0
22HM02		4	PLM100HM../340 E3	4,04	12,4	7,19	43,9	41,2	39,6	37,4	34,4	30,2	24,9	18,1
22HM03		5,5	PLM112HM../355 E3	5,76	17,2	9,95	66,6	61,3	58,6	54,9	50,1	44,4	37,7	29,7

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

10-22hm-s-n-2p60_a_th

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

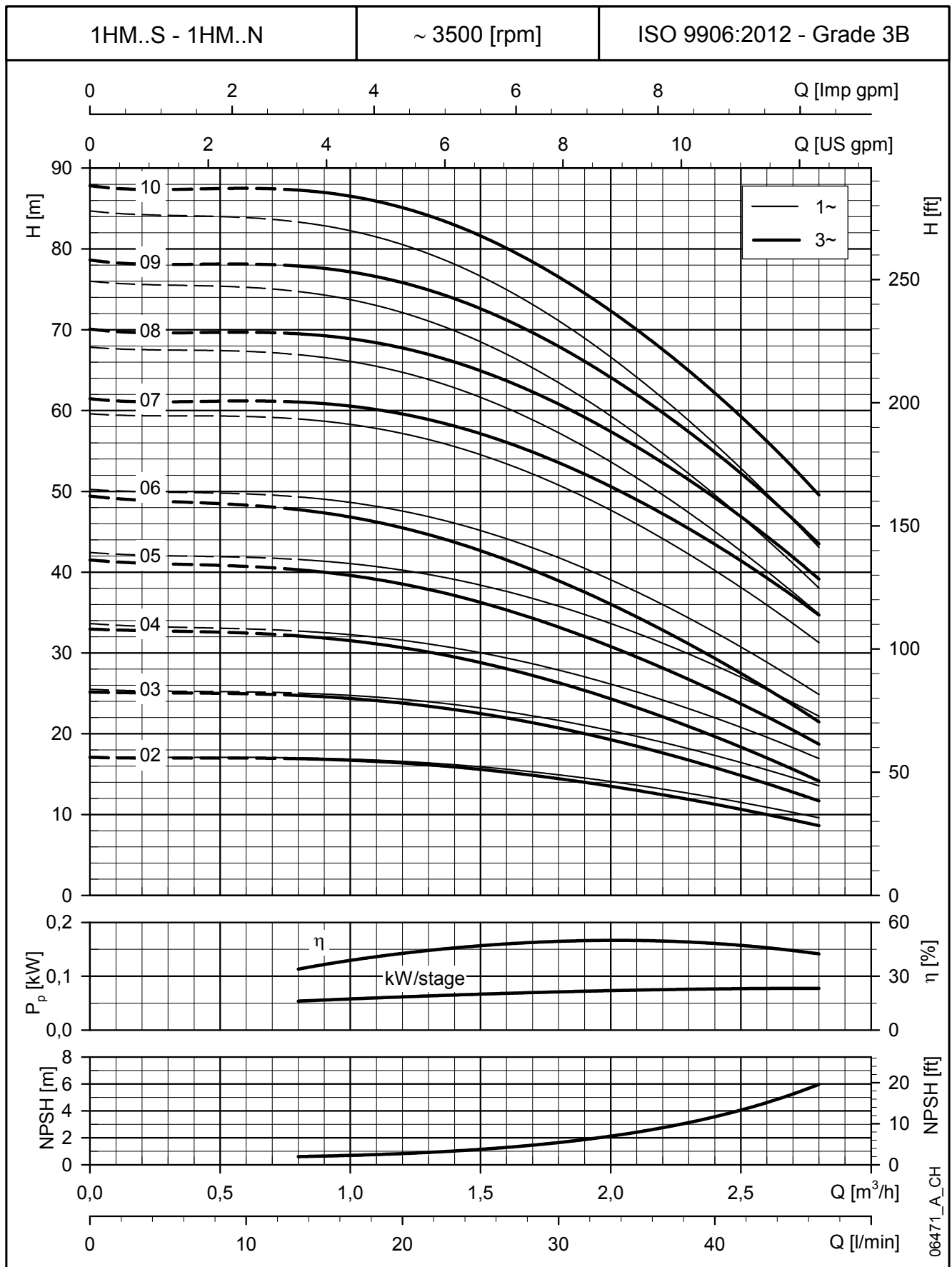
1HM..S - 1HM..N SERIES, (2 TO 10 STAGES)
DIMENSIONS AND WEIGHTS AT 60 HZ, 2 POLES



PUMP TYPE	VERSION	Ref.	MOTOR		DIMENSIONS (mm)										PN	WEIGHT
			kW	SIZE	A	D	H	L	L1	L2	M	M1	N	N1	bar	kg
1HM02	SINGLE-PHASE	X	0,30	63	87	120	201	336	-	-	-	-	-	-	10	6
1HM03			0,30	63	87	120	201	336	-	-	-	-	-	-	10	6
1HM04			0,30	63	107	120	201	356	-	-	-	-	-	-	10	7
1HM05			0,40	63	127	120	201	376	-	-	-	-	-	-	10	7
1HM06			0,50	63	147	120	201	396	-	-	-	-	-	-	10	8
1HM07		Z	0,75	71	151	140	211	424	153	104	100	125	125	155	10	11
1HM08			0,75	71	171	140	211	444	173	104	100	125	125	155	10	12
1HM09			0,75	71	191	140	211	464	193	104	100	125	125	155	10	12
1HM10			0,95	71	211	140	220	484	213	104	100	125	125	155	10	13
1HM02	THREE-PHASE	X	0,30	63	87	120	201	336	-	-	-	-	-	-	10	6
1HM03			0,30	63	87	120	201	336	-	-	-	-	-	-	10	6
1HM04			0,30	63	107	120	201	356	-	-	-	-	-	-	10	7
1HM05			0,40	63	127	120	201	376	-	-	-	-	-	-	10	7
1HM06			0,50	63	147	120	201	396	-	-	-	-	-	-	10	8
1HM07		Z	0,75	80	151	155	219	468	153	104	100	125	125	155	10	14
1HM08			0,75	80	171	155	219	488	173	104	100	125	125	155	10	15
1HM09			0,75	80	191	155	219	508	193	104	100	125	125	155	10	15
1HM10			1.1	80	211	155	219	528	213	104	100	125	125	155	10	16

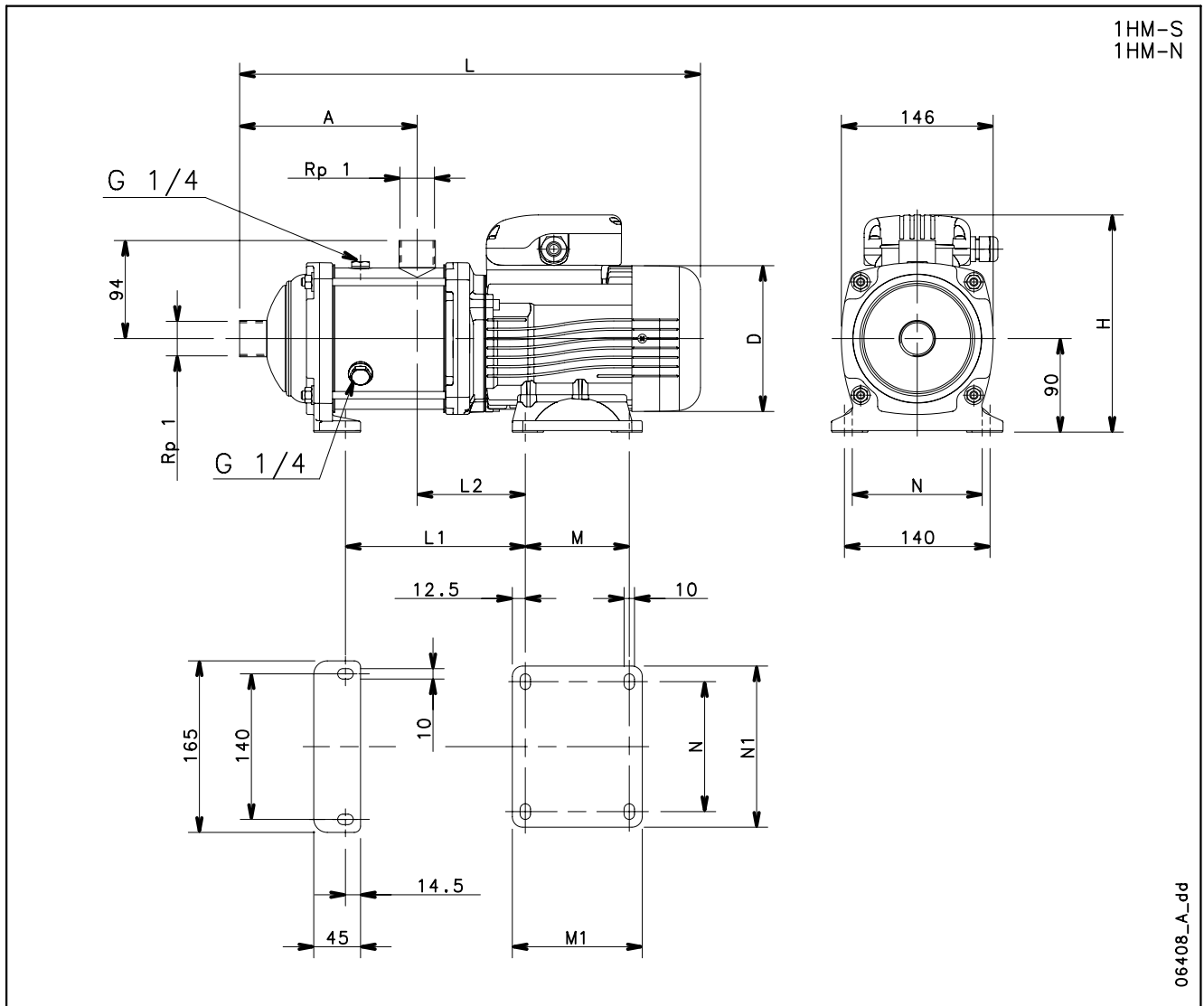
1HM..S - 1HM..N SERIES, (2 TO 10 STAGES)

OPERATING CHARACTERISTICS AT 50 Hz, 2 POLES



These performances are valid for liquids with density $\rho = 1.0 \text{ Kg/dm}^3$ and kinematic viscosity $\nu = 1 \text{ mm}^2/\text{sec}$.

**1HM..S - 1HM..N SERIES, (11 TO 18 STAGES)
DIMENSIONS AND WEIGHTS AT 60 HZ, 2 POLES**



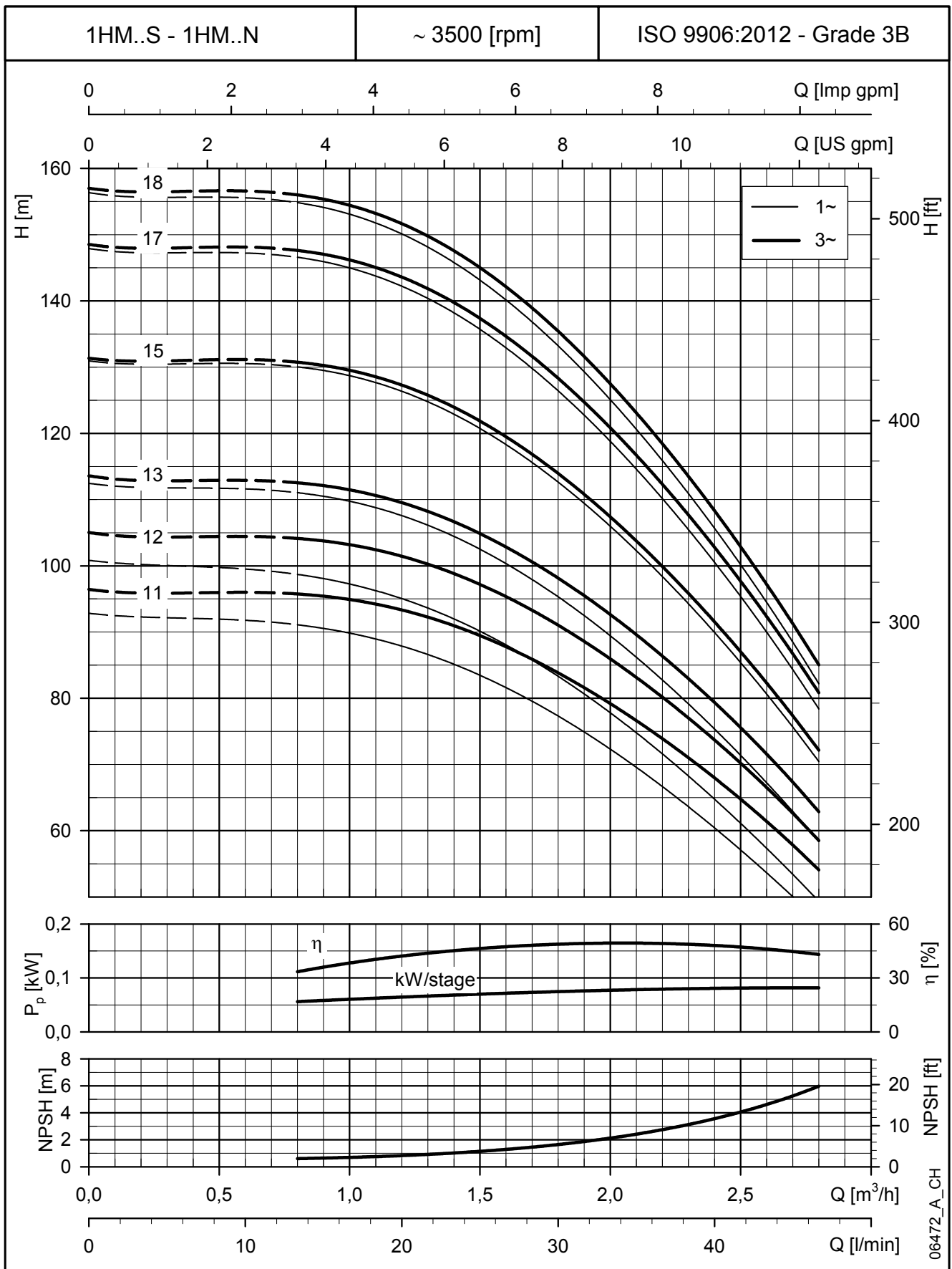
06408_A_dd

PUMP TYPE	VERSION	MOTOR		DIMENSIONS (mm)										PN	WEIGHT
		kW	SIZE	A	D	H	L	L1	L2	M	M1	N	N1	bar	kg
1HM11	SINGLE-PHASE	0,95	71	231	140	220	504	233	104	100	125	125	155	10	14
1HM12		0.95	71	251	140	220	524	253	104	100	125	125	155	16	14
1HM13		1,1	80	271	155	227	588	273	104	100	125	125	155	16	17
1HM15		1,5	80	311	155	227	628	313	104	100	125	125	155	16	19
1HM17		1,5	80	351	155	227	668	353	104	100	125	125	155	16	20
1HM18		1,5	80	371	155	227	688	373	104	100	125	125	155	16	20
1HM11	THREE-PHASE	1,1	80	231	155	219	548	233	104	100	125	125	155	10	17
1HM12		1,1	80	251	155	219	568	253	104	100	125	125	155	16	17
1HM13		1,1	80	271	155	219	588	273	104	100	125	125	155	16	17
1HM15		1,5	80	311	155	219	628	313	104	100	125	125	155	16	19
1HM17		1,5	80	351	155	219	668	353	104	100	125	125	155	16	20
1HM18		1,5	80	371	155	219	688	373	104	100	125	125	155	16	20

1hm-s-n-2-2p60_a_td

1HM..S - 1HM..N SERIES, (11 TO 18 STAGES)

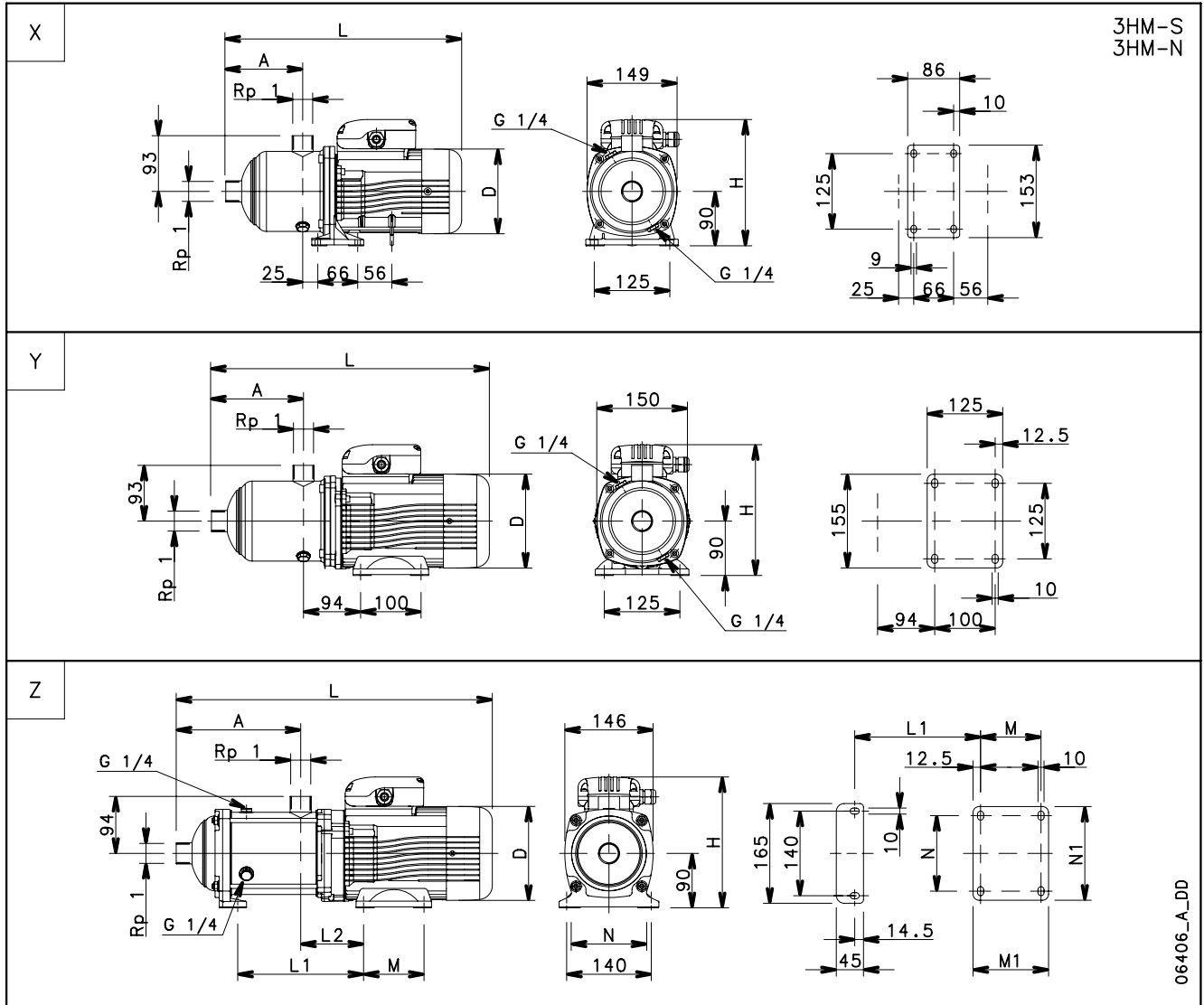
OPERATING CHARACTERISTICS AT 60 Hz, 2 POLES



These performances are valid for liquids with density $\rho = 1.0 \text{ Kg/dm}^3$ and kinematic viscosity $\nu = 1 \text{ mm}^2/\text{sec}$.

3HM..S - 3HM..N SERIES, (2 TO 8 STAGES)

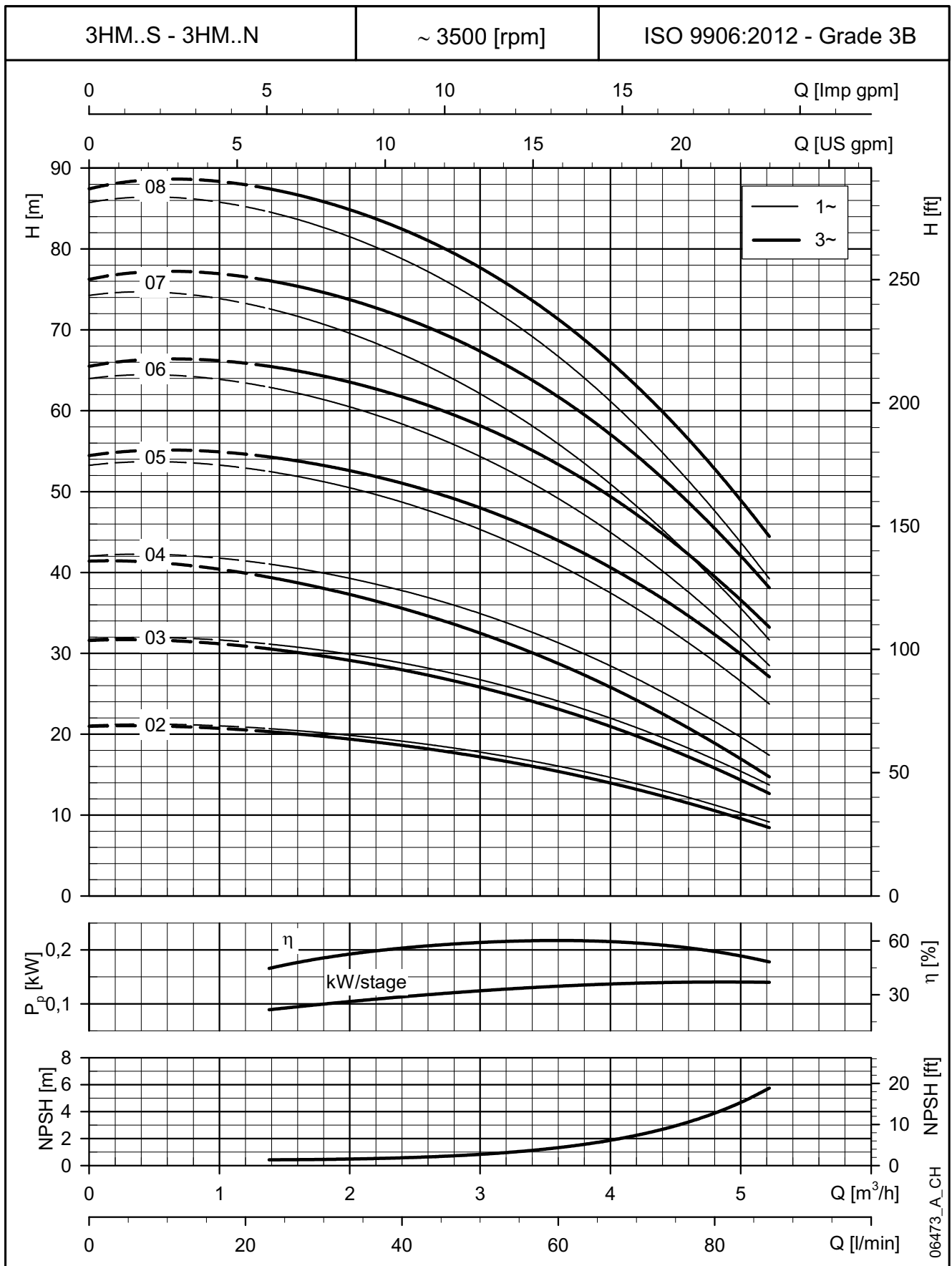
DIMENSIONS AND WEIGHTS AT 60 HZ, 2 POLES



PUMP TYPE	VERSION	Ref.	MOTOR		DIMENSIONS (mm)										PN	WEIGHT
			kW	SIZE	A	D	H	L	L1	L2	M	M1	N	N1	bar	kg
3HM02	SINGLE-PHASE	X	0,30	63	87	120	201	336	-	-	-	-	-	-	10	6
3HM03			0,40	63	87	120	201	336	-	-	-	-	-	-	10	7
3HM04			0,50	63	107	120	201	356	-	-	-	-	-	-	10	8
3HM05			0,75	71	127	140	211	390	-	-	-	-	-	-	10	10
3HM06			0,95	71	147	140	220	410	-	-	-	-	-	-	10	11
3HM07		Z	0,95	71	151	140	220	424	153	104	100	125	125	155	10	12
3HM08			1,1	80	171	155	227	488	173	104	100	125	125	155	10	16
3HM02	THREE-PHASE	X	0,30	63	87	120	201	336	-	-	-	-	-	-	10	6
3HM03			0,50	63	87	120	201	336	-	-	-	-	-	-	10	7
3HM04			0,50	63	107	120	201	356	-	-	-	-	-	-	10	8
3HM05		Y	0,75	80	127	155	219	435	-	-	-	-	-	-	10	13
3HM06			1,1	80	147	155	219	455	-	-	-	-	-	-	10	14
3HM07			1,1	80	151	155	219	468	153	104	100	125	125	155	10	15
3HM08		Z	1,5	80	171	155	219	488	173	104	100	125	125	155	10	17

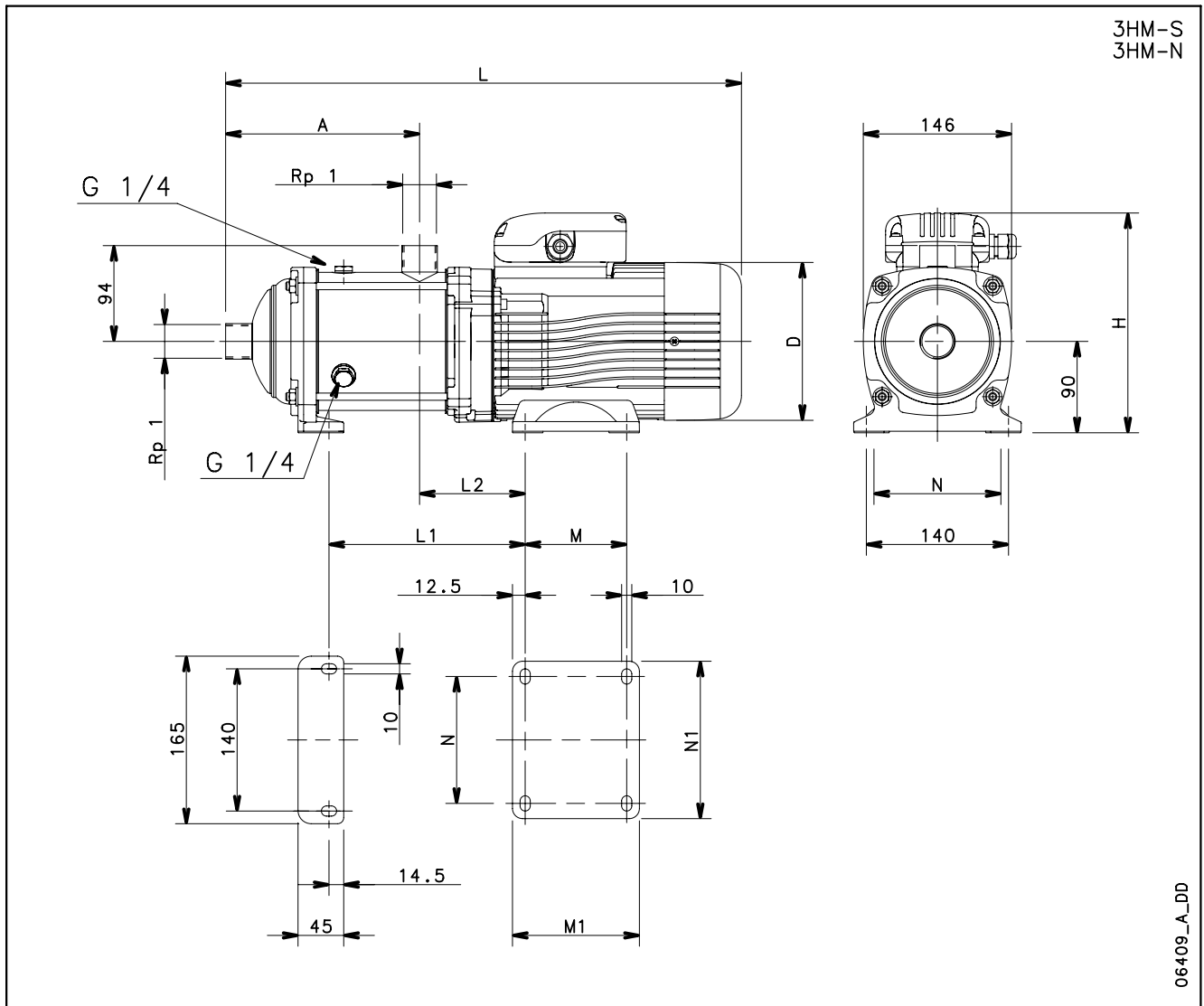
3hm-s-n-1-2p60_a_td

3HM..S - 3HM..N SERIES, (2 TO 8 STAGES) **OPERATING CHARACTERISTICS AT 60 Hz, 2 POLES**



These performances are valid for liquids with density $\rho = 1.0 \text{ Kg/dm}^3$ and kinematic viscosity $\nu = 1 \text{ mm}^2/\text{sec}$.

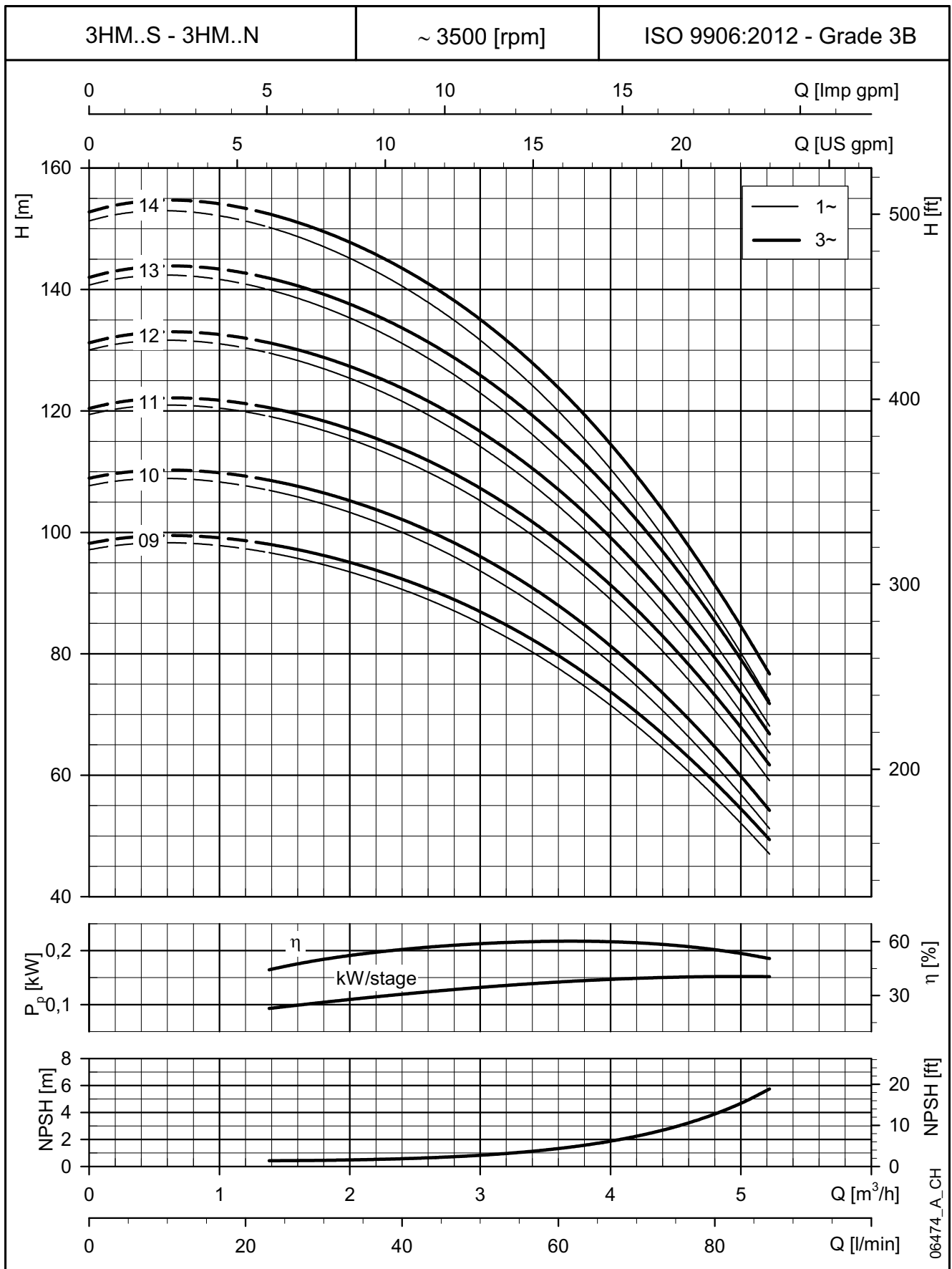
3HM..S - 3HM..N SERIES, (9 TO 14 STAGES)
DIMENSIONS AND WEIGHTS AT 60 HZ, 2 POLES



PUMP TYPE	VERSION	MOTOR		DIMENSIONS (mm)										PN	WEIGHT
		kW	SIZE	A	D	H	L	L1	L2	M	M1	N	N1	bar	kg
3HM09	SINGLE-PHASE	1,5	80	191	155	227	508	193	104	100	125	125	155	10	17
3HM10		1,5	80	211	155	227	528	213	104	100	125	125	155	16	17
3HM11		2,2	90	231	174	241	604	256	127	125	150	140	164	16	26
3HM12		2,2	90	251	174	241	624	276	127	125	150	140	164	16	26
3HM13		2,2	90	271	174	241	644	296	127	125	150	140	164	16	26
3HM14		2,2	90	291	174	241	664	316	127	125	150	140	164	16	27
3HM09	THREE-PHASE	1,5	80	191	155	219	508	193	104	100	125	125	155	10	17
3HM10		1,5	80	211	155	219	528	213	104	100	125	125	155	16	17
3HM11		2,2	90	231	174	224	604	256	127	125	150	140	164	16	23
3HM12		2,2	90	251	174	224	624	276	127	125	150	140	164	16	23
3HM13		2,2	90	271	174	224	644	296	127	125	150	140	164	16	23
3HM14		2,2	90	291	174	224	664	316	127	125	150	140	164	16	24

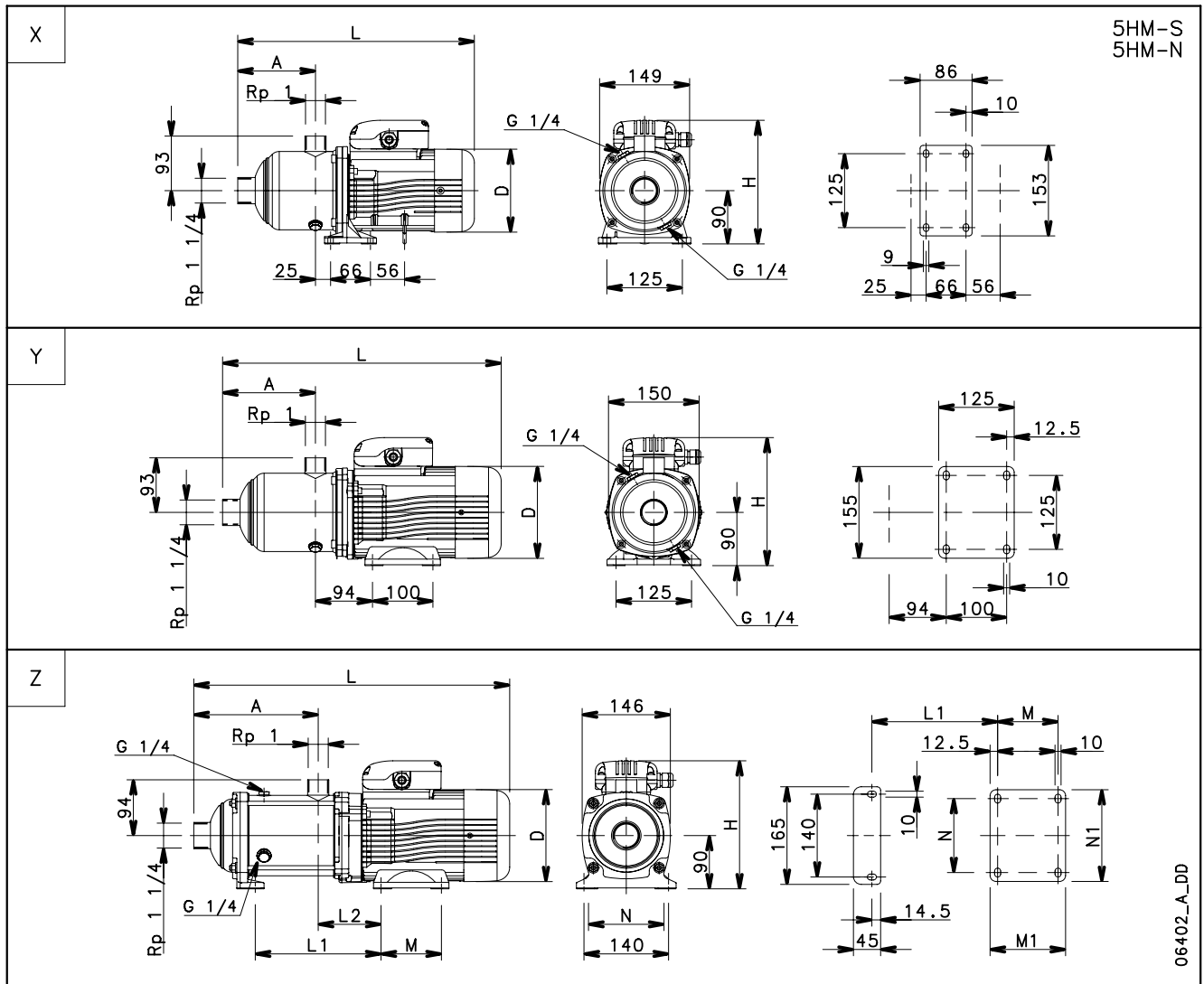
3hm-s-n-2-2p60_a_td

3HM..S - 3HM..N SERIES, (9 TO 14 STAGES) OPERATING CHARACTERISTICS AT 60 Hz, 2 POLES



These performances are valid for liquids with density $\rho = 1.0 \text{ Kg/dm}^3$ and kinematic viscosity $\nu = 1 \text{ mm}^2/\text{sec}$.

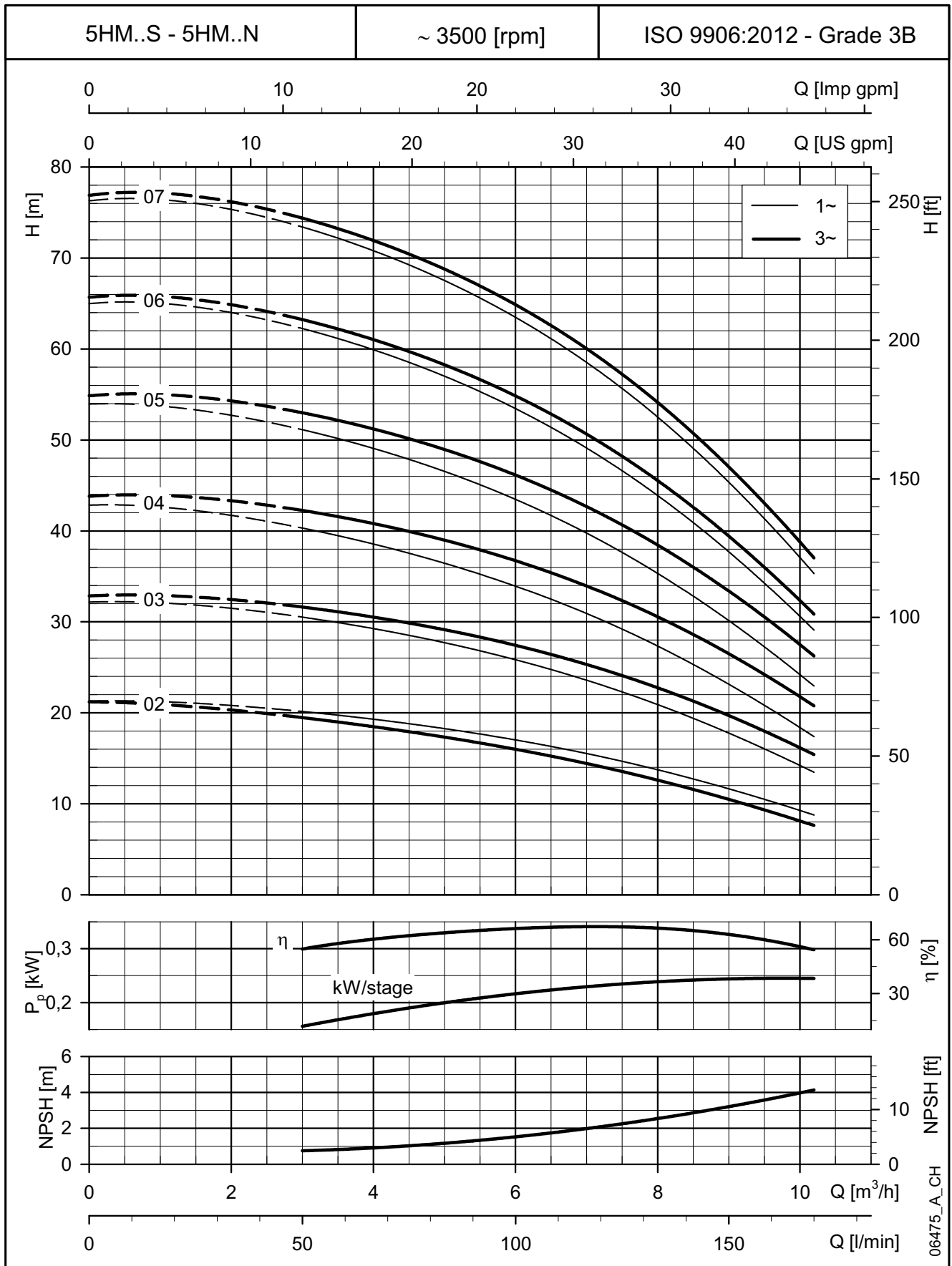
**5HM..S - 5HM..N SERIES, (2 TO 7 STAGES)
DIMENSIONS AND WEIGHTS AT 60 HZ, 2 POLES**



PUMP TYPE	VERSION	Ref.	MOTOR		DIMENSIONS (mm)										PN	WEIGHT
			kW	SIZE	A	D	H	L	L1	L2	M	M1	N	N1	bar	kg
5HM02	SINGLE-PHASE	X	0,50	63	104	120	201	353	-	-	-	-	-	-	10	7
5HM03			0,75	71	104	140	211	367	-	-	-	-	-	-	10	9
5HM04			0,95	71	129	140	220	392	-	-	-	-	-	-	10	11
5HM05		Y	1,1	80	154	155	227	462	-	-	-	-	-	-	10	14
5HM06			1,5	80	158	155	227	475	158	104	100	125	125	155	10	16
5HM07		Z	2,2	90	183	174	241	556	206	127	125	150	140	164	10	25

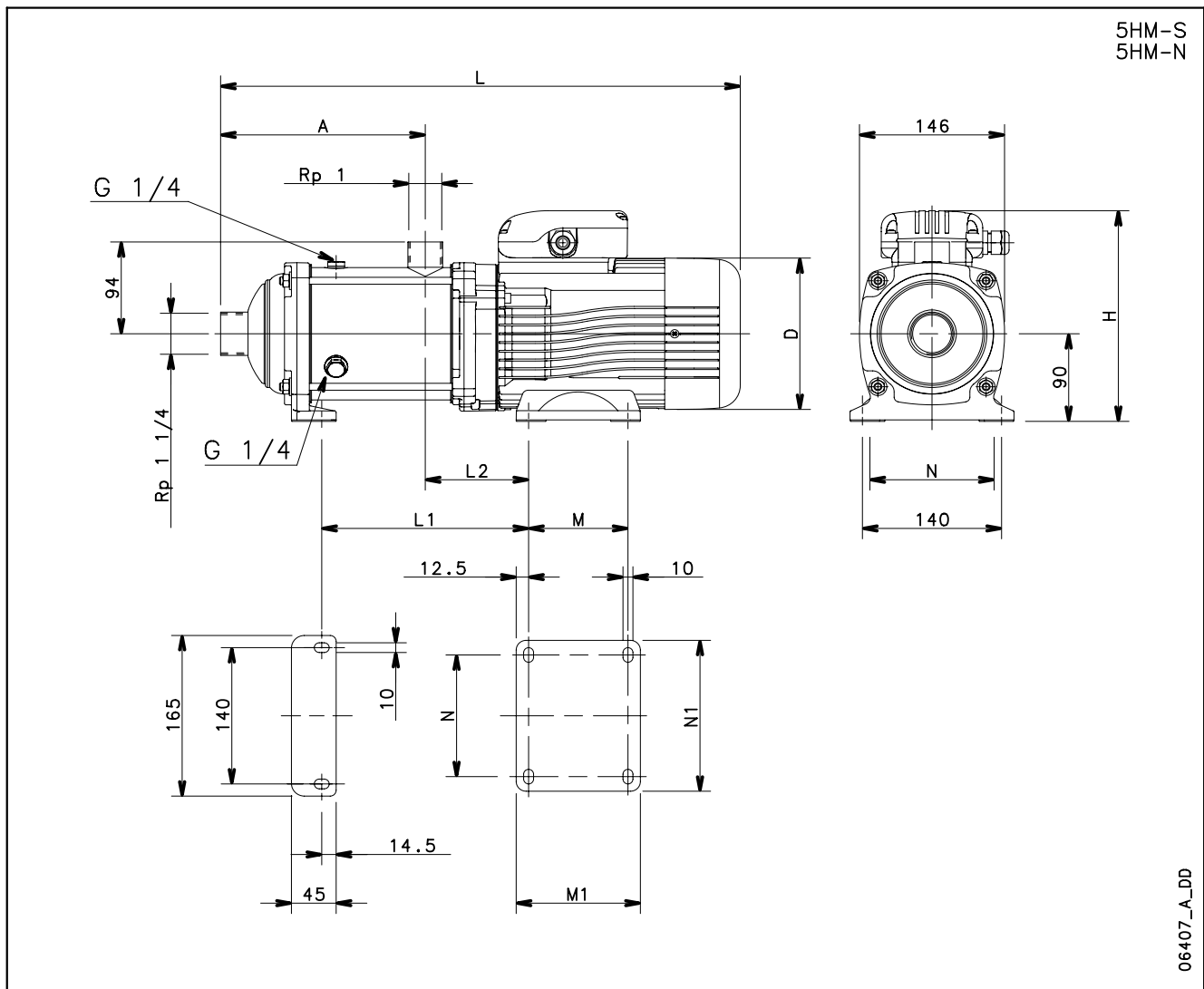
5HM02	THREE-PHASE	X	0,50	63	104	120	201	353	-	-	-	-	-	-	10	7
5HM03			0,75	80	104	155	219	412	-	-	-	-	-	-	10	12
5HM04			1,1	80	129	155	219	437	-	-	-	-	-	-	10	14
5HM05		Y	1,5	80	154	155	219	462	-	-	-	-	-	-	10	15
5HM06			1,5	80	158	155	219	475	158	104	100	125	125	155	10	16
5HM07		Z	2,2	90	183	174	224	556	206	127	125	150	140	164	10	22

5HM..S - 5HM..N SERIES, (2 TO 7 STAGES) OPERATING CHARACTERISTICS AT 60 Hz, 2 POLES



These performances are valid for liquids with density $\rho = 1.0 \text{ Kg/dm}^3$ and kinematic viscosity $\nu = 1 \text{ mm}^2/\text{sec}$.

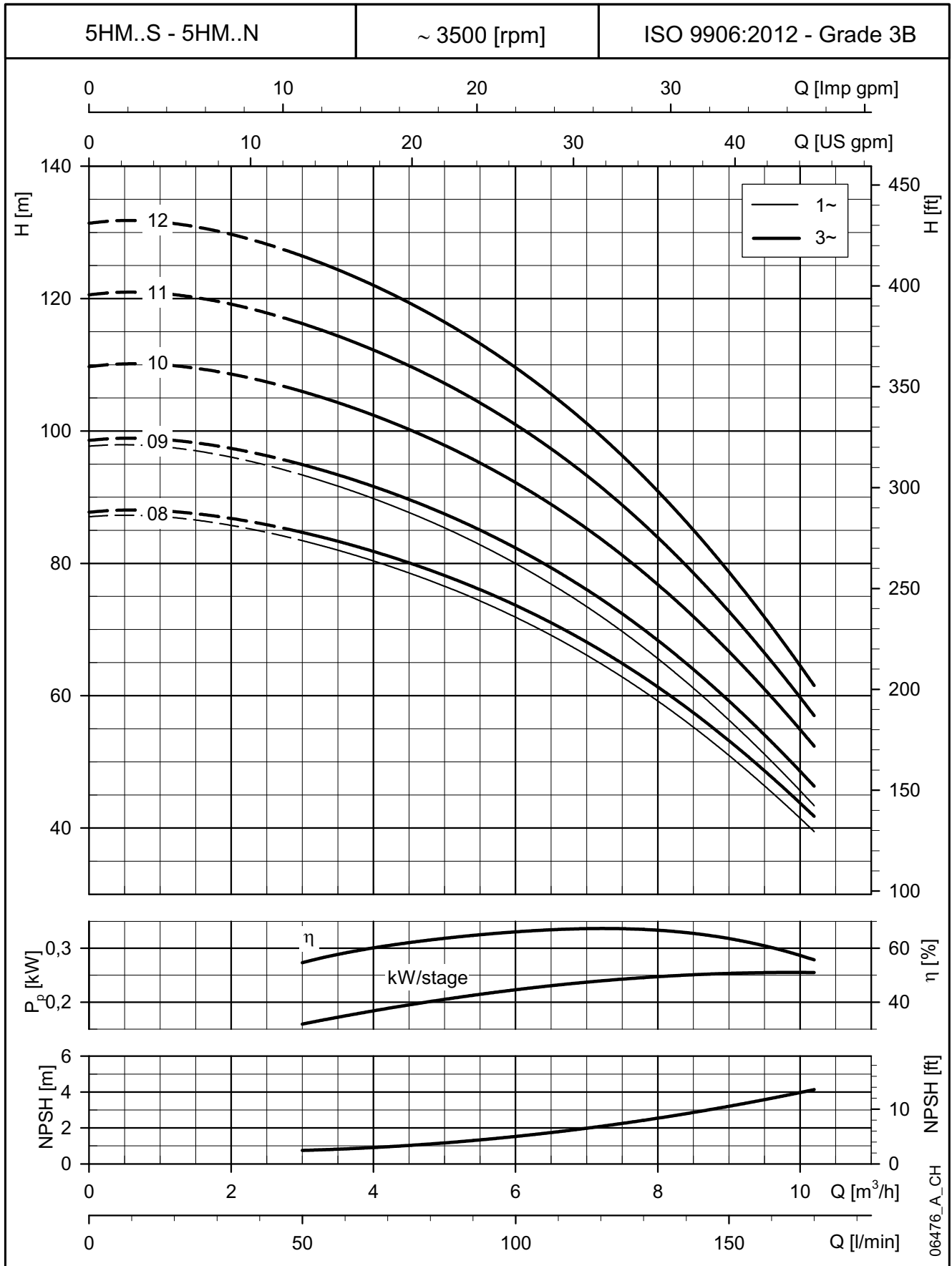
**5HM..S - 5HM..N SERIES, (8 TO 12 STAGES)
DIMENSIONS AND WEIGHTS AT 60 HZ, 2 POLES**



PUMP TYPE	VERSION	MOTOR		DIMENSIONS (mm)										PN	WEIGHT
		kW	SIZE	A	D	H	L	L1	L2	M	M1	N	N1	bar	kg
5HM08	SINGLE-PHASE	2,2	90	208	174	241	581	231	127	125	150	140	164	10	25
5HM09		2,2	90	233	174	241	606	256	127	125	150	140	164	10	26
5HM08	THREE-PHASE	2,2	90	208	174	224	581	231	127	125	150	140	164	10	22
5HM09		2,2	90	233	174	224	606	256	127	125	150	140	164	10	23
5HM10		3	90	258	174	224	631	281	127	125	150	140	164	16	26
5HM11		3	90	283	174	224	656	306	127	125	150	140	164	16	27
5HM12		3	90	308	174	224	681	331	127	125	150	140	164	16	27

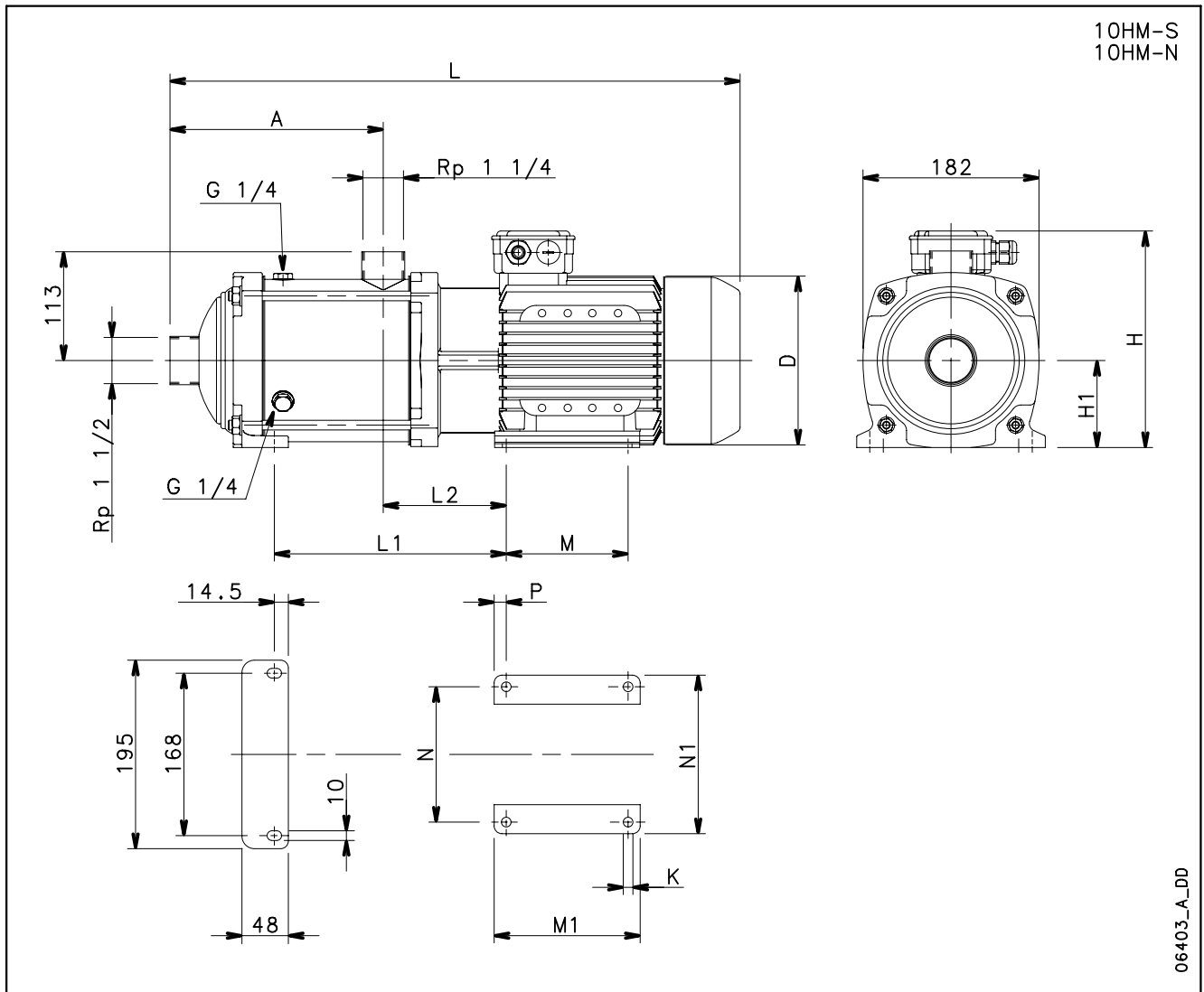
5hm-s-n-2-2p60_a_td

5HM..S - 5HM..N SERIES, (8 TO 12 STAGES) OPERATING CHARACTERISTICS AT 60 Hz, 2 POLES



These performances are valid for liquids with density $\rho = 1.0 \text{ Kg/dm}^3$ and kinematic viscosity $\nu = 1 \text{ mm}^2/\text{sec}$.

10HM..S - 10HM..N SERIES
DIMENSIONS AND WEIGHTS AT 60 HZ, 2 POLES

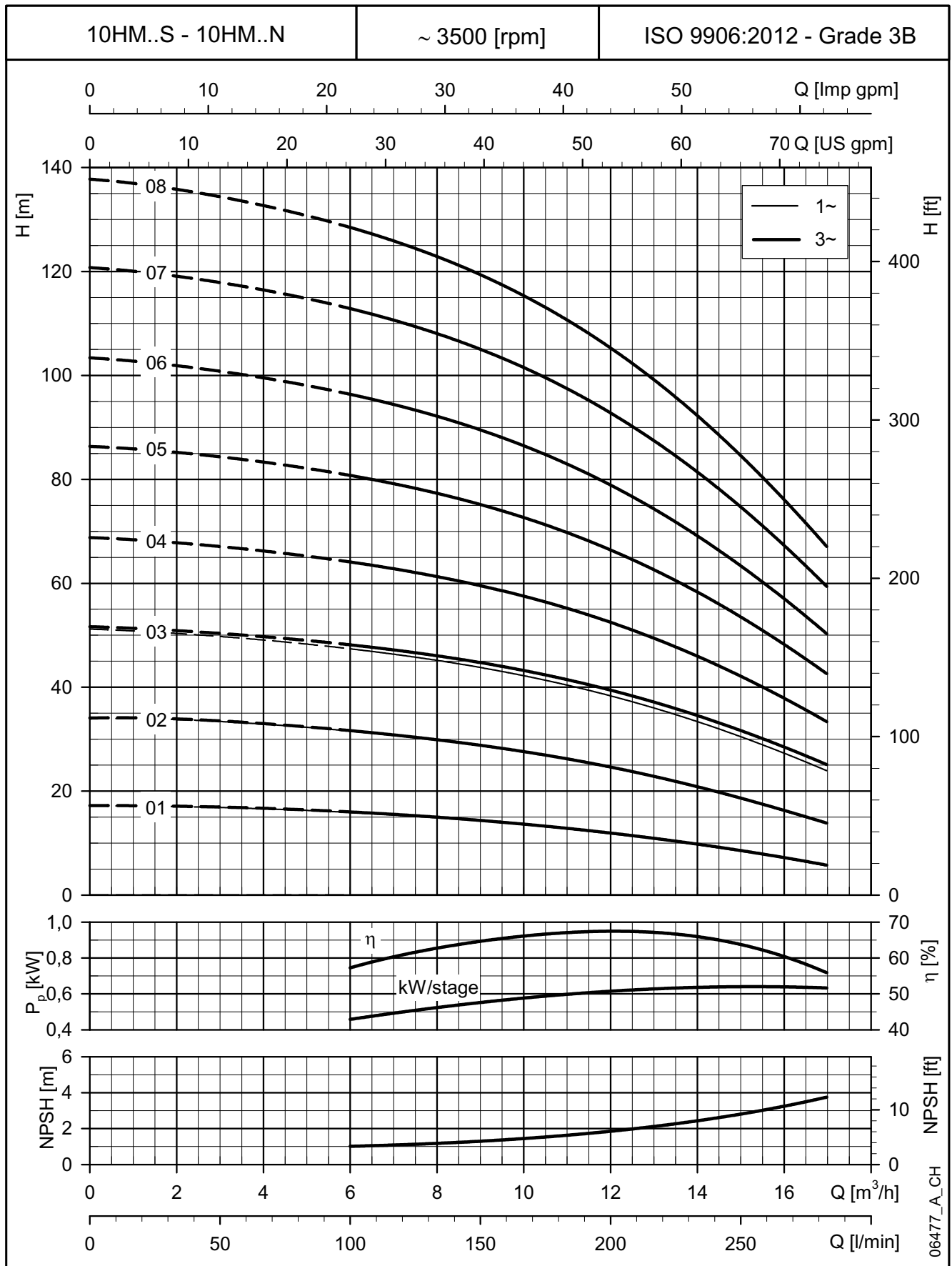


06403_A_DD

PUMP TYPE	VERSION	MOTOR		DIMENSIONS (mm)													PN	WEIGHT
		kW	SIZE	A	D	H	H1	L	L1	L2	M	M1	N	N1	P	K	bar	kg
10HM01	SINGLE-PHASE	1,1	80	125	155	227	90	443	122	105	100	125	125	155	12,5	10	10	16
10HM02		1,5	80	125	155	227	90	443	122	105	100	125	125	155	12,5	10	10	17
10HM03		2,2	90	125	174	241	90	499	144	128	125	150	140	164	12,5	10	10	26

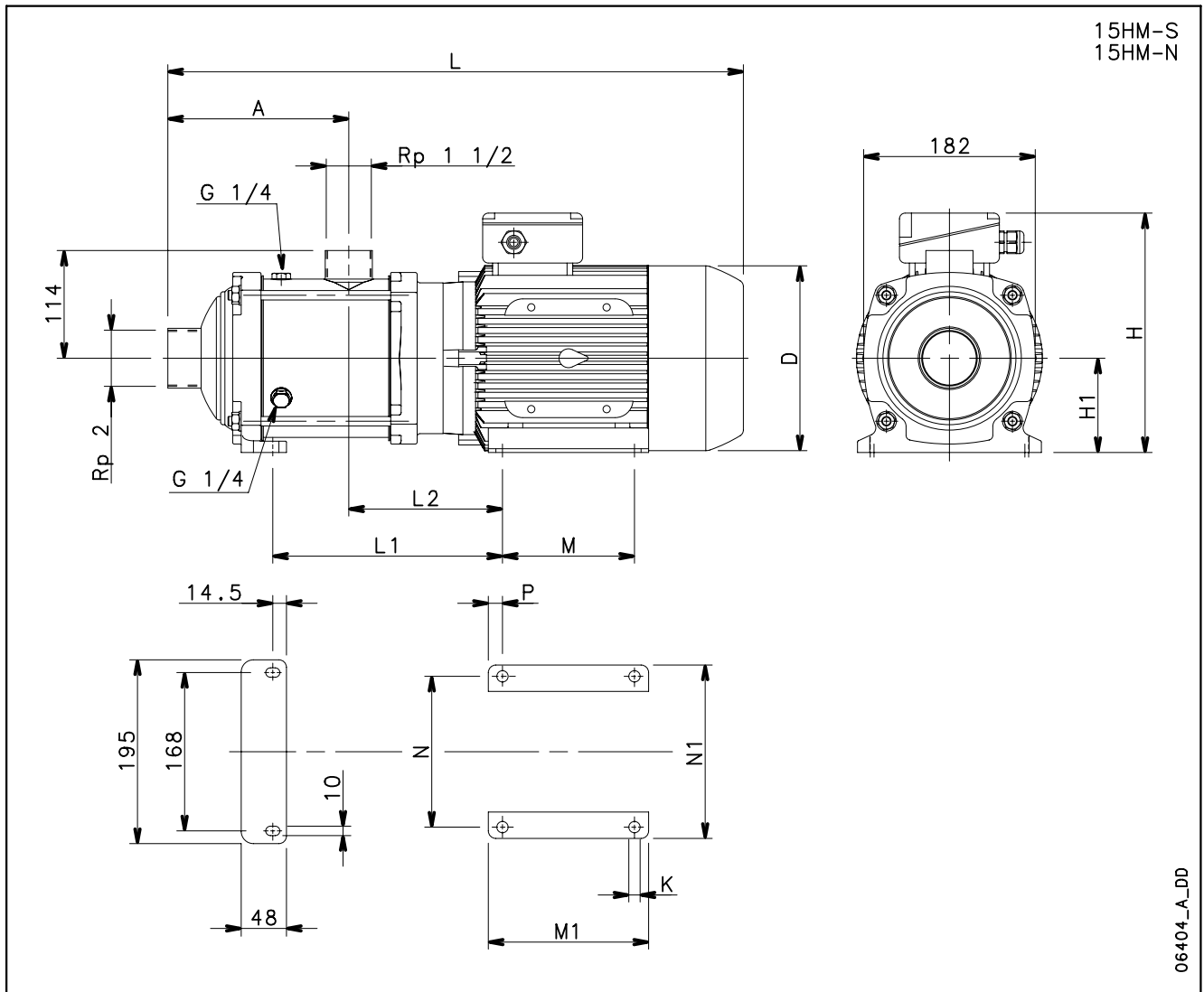
10HM01	THREE-PHASE	0,75	80	125	155	219	90	443	122	105	100	125	125	155	12,5	10	10	15
10HM02		1,5	80	125	155	219	90	443	122	105	100	125	125	155	12,5	10	10	17
10HM03		2,2	90	125	174	224	90	499	144	128	125	150	140	164	12,5	10	10	23
10HM04		3	90	157	174	224	90	531	176	128	125	150	140	164	12,5	10	10	27
10HM05		4	100	189	197	254	100	592	228	147	140	170	160	184	15	12	10	34
10HM06		4	100	221	197	254	100	624	260	147	140	170	160	184	15	12	10	35
10HM07		5,5	112	253	214	280	112	690	300	154	140	170	190	219	15	12	16	43
10HM08		5,5	112	285	214	280	112	722	332	154	140	170	190	219	15	12	16	44

10hm-s-n-2p60_a_td

10HM..S - 10HM..N SERIES
OPERATING CHARACTERISTICS AT 60 Hz, 2 POLES


These performances are valid for liquids with density $\rho = 1.0 \text{ Kg/dm}^3$ and kinematic viscosity $\nu = 1 \text{ mm}^2/\text{sec}$.

15HM..S - 15HM..N SERIES
DIMENSIONS AND WEIGHTS AT 60 HZ, 2 POLES



06404_A_DD

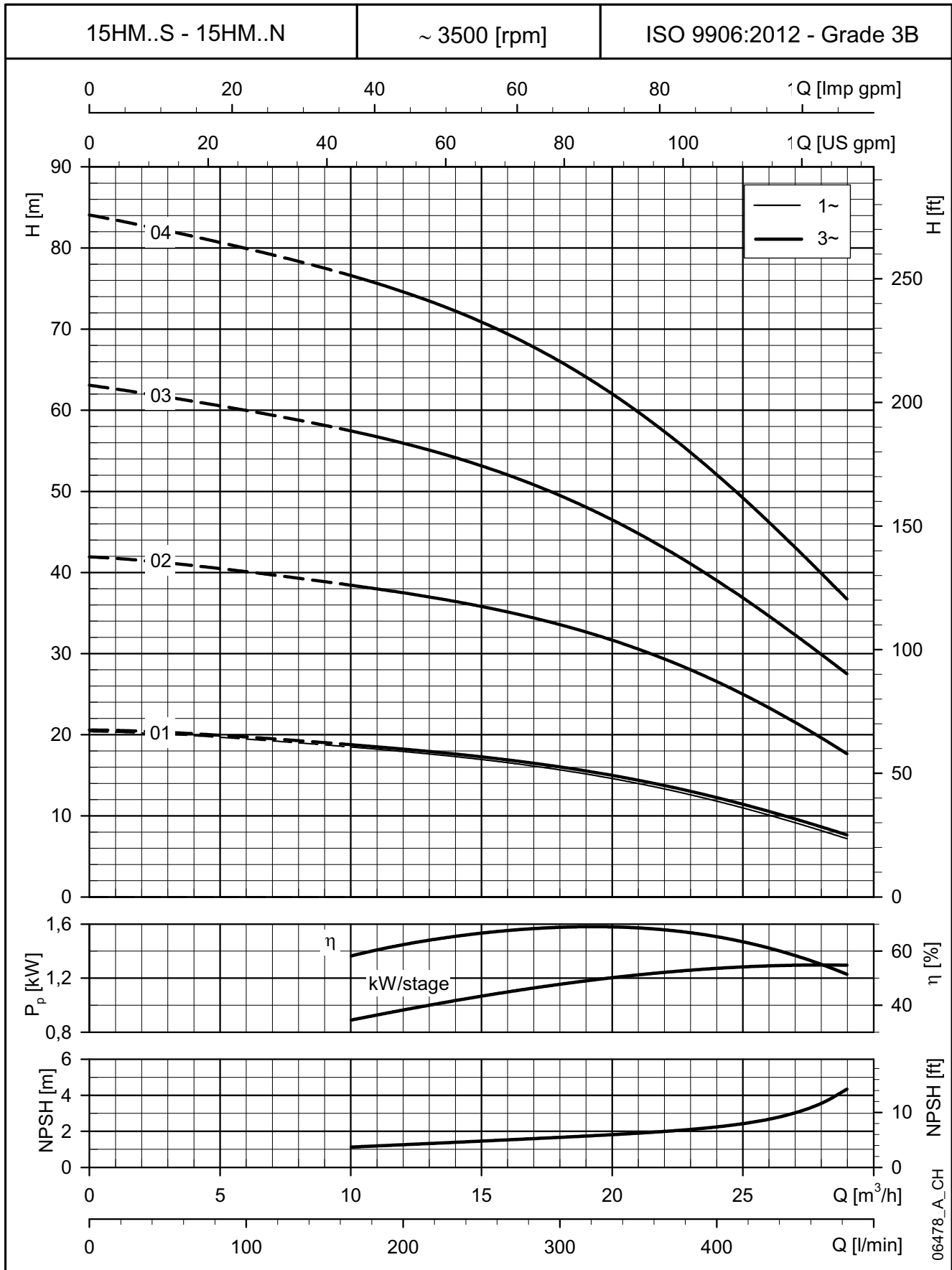
PUMP TYPE	VERSION	MOTOR		DIMENSIONS (mm)													PN	WEIGHT
		kW	SIZE	A	D	H	H1	L	L1	L2	M	M1	N	N1	P	K	bar	kg
15HM01	SINGLE-PHASE	1,5	80	144	155	227	90	478	154	121	100	125	125	155	12,5	10	10	17

15HM01	THREE-PHASE	1,5	80	144	155	219	90	478	154	121	100	125	125	155	12,5	10	10	17
15HM02		3	90	144	174	224	90	534	176	144	125	150	140	164	12,5	10	10	26
15HM03		4	100	144	197	254	100	563	196	163	140	170	160	184	15	12	10	32
15HM04		5,5	112	192	214	280	112	645	252	170	140	170	190	219	15	12	10	40

15hm-s-n-2p60_a_td

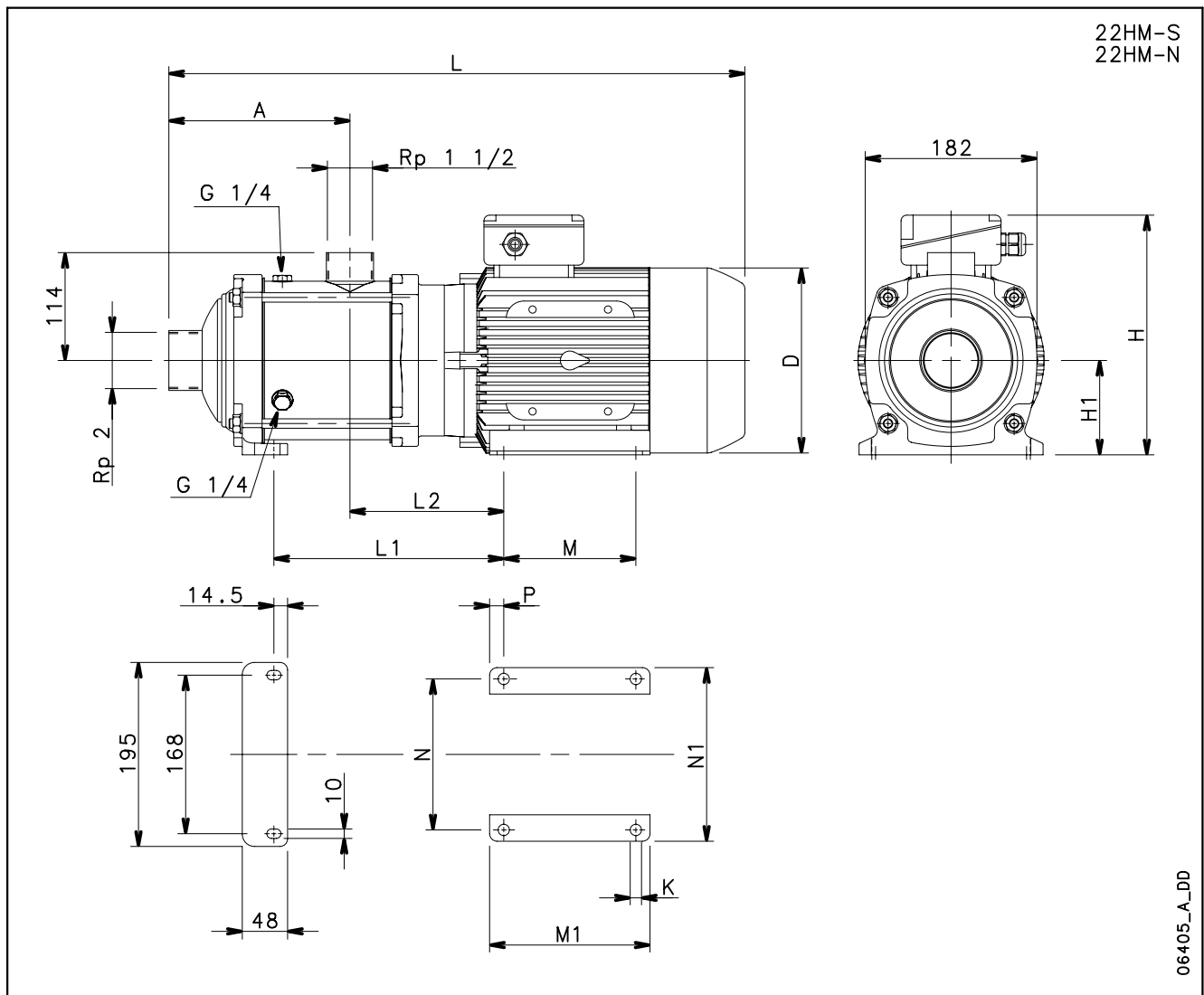
15HM..S - 15HM..N SERIES

OPERATING CHARACTERISTICS AT 60 Hz, 2 POLES



These performances are valid for liquids with density $\rho = 1.0 \text{ Kg/dm}^3$ and kinematic viscosity $\nu = 1 \text{ mm}^2/\text{sec}$.

22HM..S - 22HM..N SERIES
DIMENSIONS AND WEIGHTS AT 60 HZ, 2 POLES

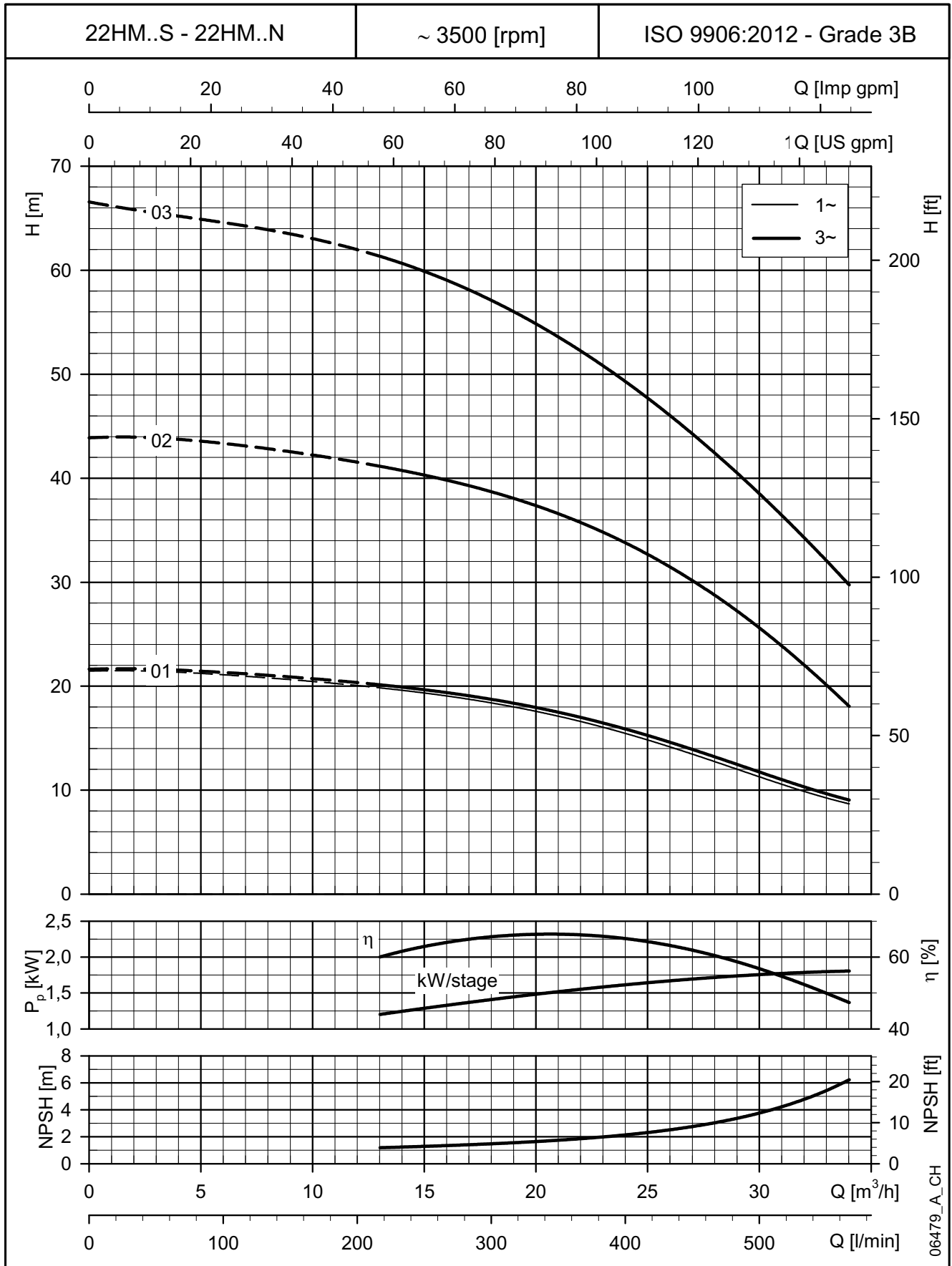


PUMP TYPE	VERSION	MOTOR		DIMENSIONS (mm)													PN	WEIGHT
		kW	SIZE	A	D	H	H1	L	L1	L2	M	M1	N	N1	P	K	bar	kg
22HM01	SINGLE-PHASE	2,2	90	144	174	241	90	534	176	144	125	150	140	164	12,5	10	10	25
22HM01	THREE-PHASE	2,2	90	144	174	224	90	534	176	144	125	150	140	164	12,5	10	10	22
22HM02		4	100	144	197	254	100	563	196	163	140	170	160	184	15	12	10	32
22HM03		5,5	112	144	214	280	112	597	204	170	140	170	190	219	15	12	10	39

22hm-s-n-2p60_a_td

22HM..S - 22HM..N SERIES

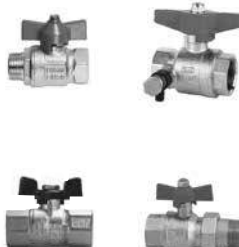
OPERATING CHARACTERISTICS AT 60 Hz, 2 POLES



These performances are valid for liquids with density $\rho = 1.0 \text{ Kg/dm}^3$ and kinematic viscosity $\nu = 1 \text{ mm}^2/\text{sec}$.

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 GALVANISED STEEL
		002161200	SQUARE-D FYG22(2,8-7), Rp1/4" CONNECTION GALVANISED STEEL
		002161201	SQUARE-D FYG32(5,6-10,5), Rp1/4" CONNECTION GALVANISED STEEL
		002161336	ITALTECNICA PM/5(1-5), Rp1/4" CONNECTION GALVANISED STEEL
		002161337	ITALTECNICA PM/12(2,5-12), Rp1/4" CONNECTION GALVANISED STEEL
		002161338	ITALTECNICA PM/12S(1-8,5), Rp1/4" CONNECTION GALVANISED STEEL
Pressure gauge 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

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: 1A / CTF-NP)
(unavailable for submerged or submersible 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: 1A / 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 submersible 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.
- c) **EN 10204:2004 - type 3.1** (Lowara identity code: 1A / CTF-31 or 1B / CTF-31)
- includes test report (*Factory Test Report* or *Audit Test Report*), list of materials, EC Declaration of Conformity (in addition to the one accompanying the product), certificates / declarations concerning materials in contact with water.

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.

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 h_z at which to install the machine under safe conditions, the following formula must be verified:

$$h_p + h_z \geq (NPSH_r + 0.5) + h_f + h_{pv} \quad (1)$$

where:

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

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

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

h_{pv} is the vapour pressure of the liquid at the operating temperature, expressed in m. of liquid. h_{pv} is the quotient between the P_v 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 at pages 60-61 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 $\gamma = 1 \text{ kg/dm}^3$

Flow rate required: 25 m³/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 m³/h, of 2 m.

For water at 15 °C

$$h_p = P_a / \gamma = 10,33\text{m}, h_{pv} = P_v / \gamma = 0,174\text{m} (0,01701 \text{ bar})$$

The H_f 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 p_s AND ρ DENSITY OF WATER TABLE

t °C	T K	p_s bar	ρ kg/dm ³	t °C	T K	p_s bar	ρ kg/dm ³	t °C	T K	p_s bar	ρ kg/dm ³
0	273,15	0,00611	0,9998	55	328,15	0,15741	0,9857	120	393,15	1,9854	0,9429
1	274,15	0,00657	0,9999	56	329,15	0,16511	0,9852	122	395,15	2,1145	0,9412
2	275,15	0,00706	0,9999	57	330,15	0,17313	0,9846	124	397,15	2,2504	0,9396
3	276,15	0,00758	0,9999	58	331,15	0,18147	0,9842	126	399,15	2,3933	0,9379
4	277,15	0,00813	1,0000	59	332,15	0,19016	0,9837	128	401,15	2,5435	0,9362
5	278,15	0,00872	1,0000	60	333,15	0,1992	0,9832	130	403,15	2,7013	0,9346
6	279,15	0,00935	1,0000	61	334,15	0,2086	0,9826	132	405,15	2,867	0,9328
7	280,15	0,01001	0,9999	62	335,15	0,2184	0,9821	134	407,15	3,041	0,9311
8	281,15	0,01072	0,9999	63	336,15	0,2286	0,9816	136	409,15	3,223	0,9294
9	282,15	0,01147	0,9998	64	337,15	0,2391	0,9811	138	411,15	3,414	0,9276
10	283,15	0,01227	0,9997	65	338,15	0,2501	0,9805	140	413,15	3,614	0,9258
11	284,15	0,01312	0,9997	66	339,15	0,2615	0,9799	145	418,15	4,155	0,9214
12	285,15	0,01401	0,9996	67	340,15	0,2733	0,9793	155	428,15	5,433	0,9121
13	286,15	0,01497	0,9994	68	341,15	0,2856	0,9788	160	433,15	6,181	0,9073
14	287,15	0,01597	0,9993	69	342,15	0,2984	0,9782	165	438,15	7,008	0,9024
15	288,15	0,01704	0,9992	70	343,15	0,3116	0,9777	170	443,15	7,920	0,8973
16	289,15	0,01817	0,9990	71	344,15	0,3253	0,9770	175	448,15	8,924	0,8921
17	290,15	0,01936	0,9988	72	345,15	0,3396	0,9765	180	453,15	10,027	0,8869
18	291,15	0,02062	0,9987	73	346,15	0,3543	0,9760	185	458,15	11,233	0,8815
19	292,15	0,02196	0,9985	74	347,15	0,3696	0,9753	190	463,15	12,551	0,8760
20	293,15	0,02337	0,9983	75	348,15	0,3855	0,9748	195	468,15	13,987	0,8704
21	294,15	0,24850	0,9981	76	349,15	0,4019	0,9741	200	473,15	15,550	0,8647
22	295,15	0,02642	0,9978	77	350,15	0,4189	0,9735	205	478,15	17,243	0,8588
23	296,15	0,02808	0,9976	78	351,15	0,4365	0,9729	210	483,15	19,077	0,8528
24	297,15	0,02982	0,9974	79	352,15	0,4547	0,9723	215	488,15	21,060	0,8467
25	298,15	0,03166	0,9971	80	353,15	0,4736	0,9716	220	493,15	23,198	0,8403
26	299,15	0,03360	0,9968	81	354,15	0,4931	0,9710	225	498,15	25,501	0,8339
27	300,15	0,03564	0,9966	82	355,15	0,5133	0,9704	230	503,15	27,976	0,8273
28	301,15	0,03778	0,9963	83	356,15	0,5342	0,9697	235	508,15	30,632	0,8205
29	302,15	0,04004	0,9960	84	357,15	0,5557	0,9691	240	513,15	33,478	0,8136
30	303,15	0,04241	0,9957	85	358,15	0,5780	0,9684	245	518,15	36,523	0,8065
31	304,15	0,04491	0,9954	86	359,15	0,6011	0,9678	250	523,15	39,776	0,7992
32	305,15	0,04753	0,9951	87	360,15	0,6249	0,9671	255	528,15	43,246	0,7916
33	306,15	0,05029	0,9947	88	361,15	0,6495	0,9665	260	533,15	46,943	0,7839
34	307,15	0,05318	0,9944	89	362,15	0,6749	0,9658	265	538,15	50,877	0,7759
35	308,15	0,05622	0,9940	90	363,15	0,7011	0,9652	270	543,15	55,058	0,7678
36	309,15	0,05940	0,9937	91	364,15	0,7281	0,9644	275	548,15	59,496	0,7593
37	310,15	0,06274	0,9933	92	365,15	0,7561	0,9638	280	553,15	64,202	0,7505
38	311,15	0,06624	0,9930	93	366,15	0,7849	0,9630	285	558,15	69,186	0,7415
39	312,15	0,06991	0,9927	94	367,15	0,8146	0,9624	290	563,15	74,461	0,7321
40	313,15	0,07375	0,9923	95	368,15	0,8453	0,9616	295	568,15	80,037	0,7223
41	314,15	0,07777	0,9919	96	369,15	0,8769	0,9610	300	573,15	85,927	0,7122
42	315,15	0,08198	0,9915	97	370,15	0,9094	0,9602	305	578,15	92,144	0,7017
43	316,15	0,09639	0,9911	98	371,15	0,9430	0,9596	310	583,15	98,70	0,6906
44	317,15	0,09100	0,9907	99	372,15	0,9776	0,9586	315	588,15	105,61	0,6791
45	318,15	0,09582	0,9902	100	373,15	1,0133	0,9581	320	593,15	112,89	0,6669
46	319,15	0,10086	0,9898	102	375,15	1,0878	0,9567	325	598,15	120,56	0,6541
47	320,15	0,10612	0,9894	104	377,15	1,1668	0,9552	330	603,15	128,63	0,6404
48	321,15	0,11162	0,9889	106	379,15	1,2504	0,9537	340	613,15	146,05	0,6102
49	322,15	0,11736	0,9884	108	381,15	1,3390	0,9522	350	623,15	165,35	0,5743
50	323,15	0,12335	0,9880	110	383,15	1,4327	0,9507	360	633,15	186,75	0,5275
51	324,15	0,12961	0,9876	112	385,15	1,5316	0,9491	370	643,15	210,54	0,4518
52	325,15	0,13613	0,9871	114	387,15	1,6362	0,9476	374,15	647,30	221,20	0,3154
53	326,15	0,14293	0,9862	116	389,15	1,7465	0,9460				
54	327,15	0,15002	0,9862	118	391,15	1,8628	0,9445				

G-at_npsb_sc

FLOW RATE		NOMINAL DIAMETER in mm and inches																			
m³/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		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	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						

G-at-pct-en a th

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

V = water speed (m/s)

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	-	-	-	0,2	0,2	0,2	0,4	0,4	0,6	0,9	1,1	1,3
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_a_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	Imp. gal. per minute Imp. gal./min	US gal. 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 ₂ O	millimetre of mercury mm Hg
1,0000	0,0010	1 x 10 ⁻⁵	1.45 x 10 ⁻⁴	1.02 x 10 ⁻⁴	0,0075
1000,0000	1,0000	0,0100	0,1450	0,1020	7,5006
1 x 10 ⁵	100,0000	1,0000	14,5038	10,1972	750,0638
6894,7570	6,8948	0,0689	1,0000	0,7031	51,7151
9806,6500	9,8067	0,0981	1,4223	1,0000	73,5561
133,3220	0,1333	0,0013	0,0193	0,0136	1,0000

LENGTH

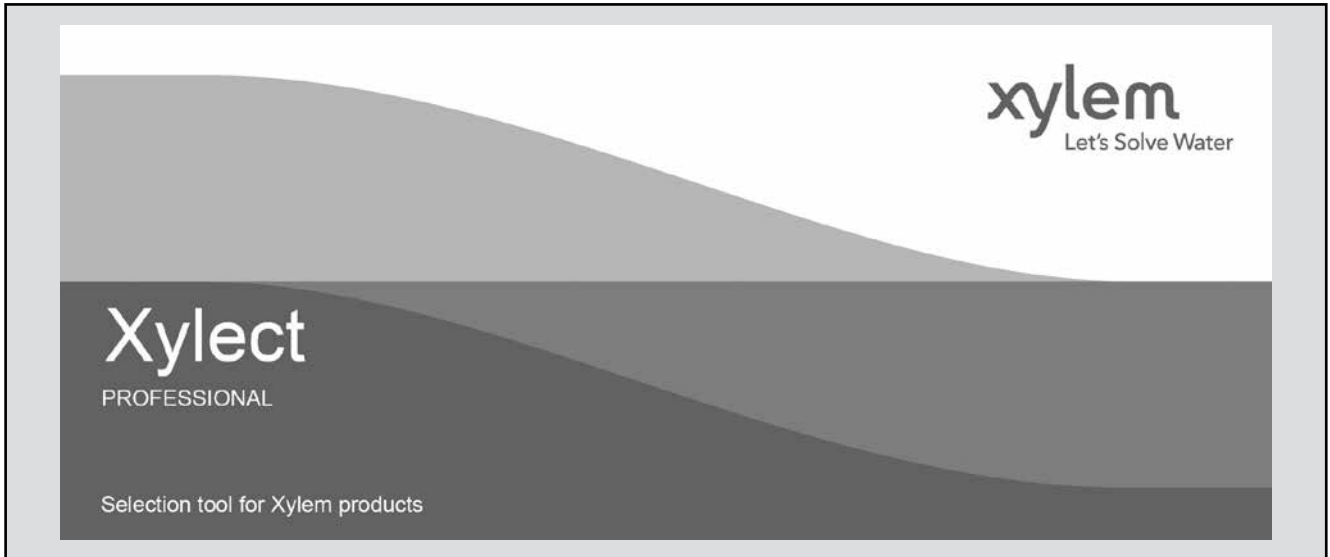
millimetre mm	centimetre cm	metre m	inch in	foot ft	yard yd
1,0000	0,1000	0,0010	0,0394	0,0033	0,0011
10,0000	1,0000	0,0100	0,3937	0,0328	0,0109
1000,0000	100,0000	1,0000	39,3701	3,2808	1,0936
25,4000	2,5400	0,0254	1,0000	0,0833	0,0278
304,8000	30,4800	0,3048	12,0000	1,0000	0,3333
914,4000	91,4400	0,9144	36,0000	3,0000	1,0000

VOLUME

cubic metre m ³	litre litro	millilitre ml	imp. Gallon imp. gal.	US gallon US gal.	cubic foot ft ³
1,0000	1000,0000	1 x 10 ⁶	219,9694	264,1720	35,3147
0,0010	1,0000	1000,0000	0,2200	0,2642	0,0353
1 x 10 ⁻⁶	0,0010	1,0000	2.2 x 10 ⁻⁴	2.642 x 10 ⁻⁴	3.53 x 10 ⁻⁵
0,0045	4,5461	4546,0870	1,0000	1,2009	0,1605
0,0038	3,7854	3785,4120	0,8327	1,0000	0,1337
0,0283	28,3168	28316,8466	6,2288	7,4805	1,0000

G-at_pp-en_a_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, and Vogel 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.

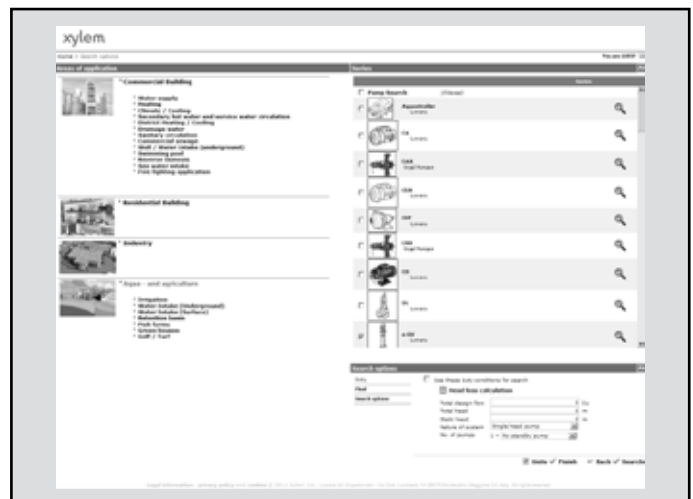
The possibility to search by applications and the detailed information output given makes it easy to make the optimal selection without having detailed knowledge about the Lowara and Vogel products.

The search can be made by:

- Application
- Product type
- Duty point

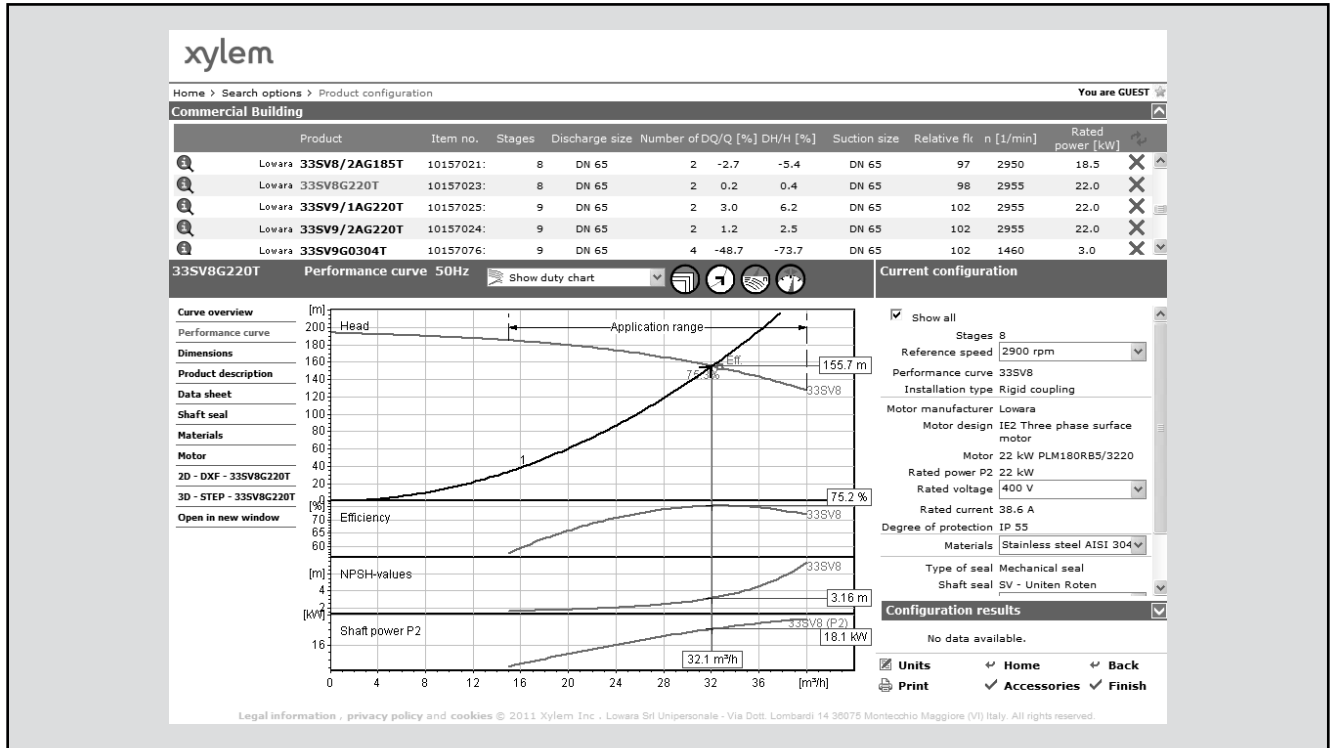
Xylect™ gives a detailed output:

- 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™



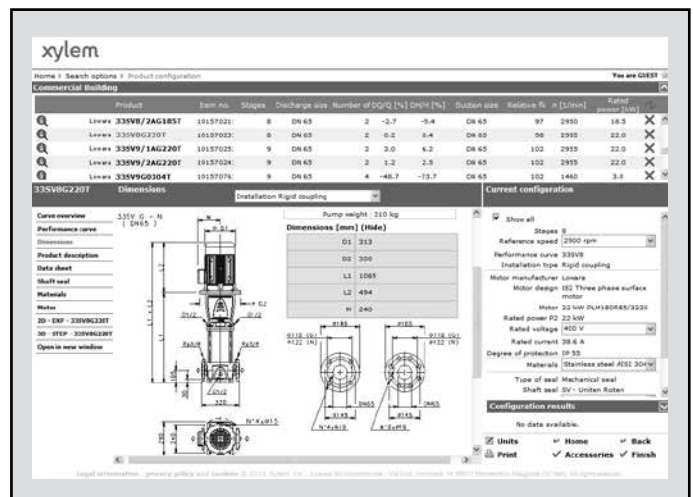
The detailed output makes it easy to select the optimal pump from the given alternatives.

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 user has a My Xylect 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.

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