PRODUCT CATALOG

Franklin Electric

VR SERIES 60 Hz

VERTICAL MULTISTAGE PUMPS

franklinwater.eu

FPS

INDEX

NOTE: Franklin Electric S.r.l. reserves the right to amend specification without prior notice
For the most up-to-date product information, visit **franklinwater.eu**.

PRODUCT OVERVIEW

FEATURES AND BENEFITS

APPLICATIONS

Water Distribution,
Pressure Boosting,
Drinking water

Irrigation
Water treatment plants
Gardening, Sprinklers

Wash down unit
Boiler Feed

Domestic, industrial and
agricultural systems

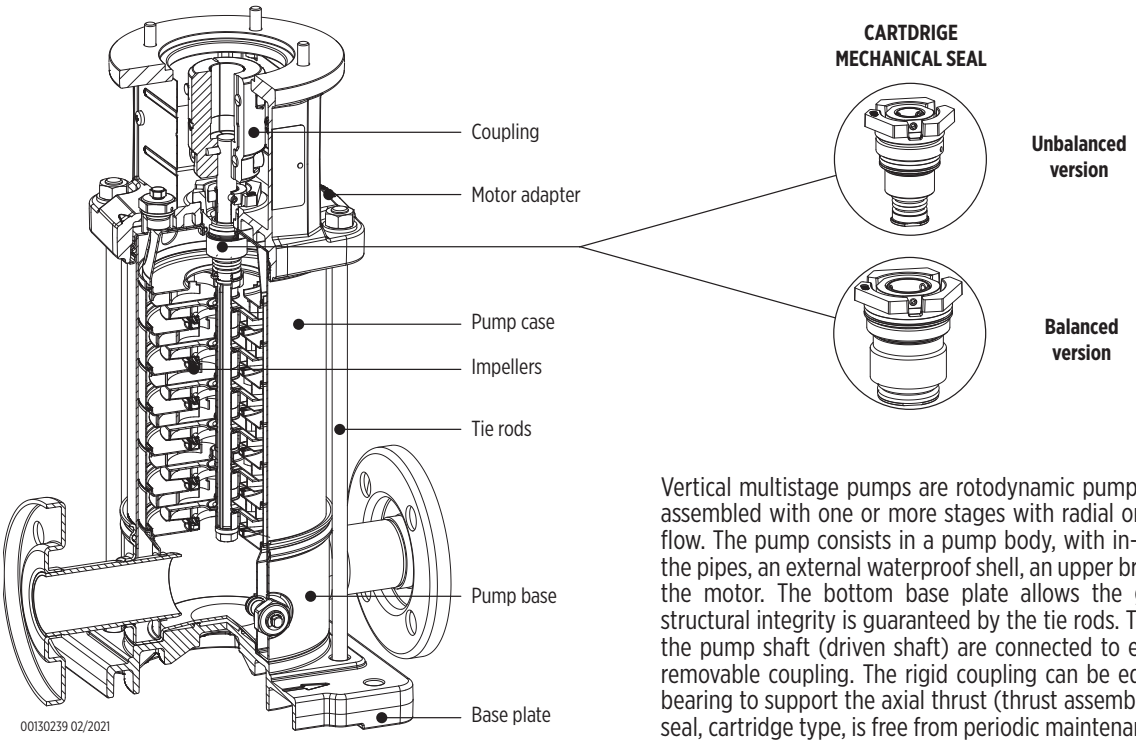
Circulation of hot and cold
water for heating, cooling,
conditioning systems

ROBUST AND RELIABLE

- Compact and solid structure
- Easy installation in-line ports
- All wetted parts in Stainless Steel
- Shaft bearing and guide bushing in silicon carbide
- WRAS approved PPS (VR 1-3-6-10-15-20) / PTFE (VR 30-45-65-95)
- Easily replaceable cartridge mechanical seal, no need to disassemble the pump; for models higher than 4 kW no need to remove the motor
- Reduced service and maintenance time
- Replaceable Stainless Steel wear ring in the neck of the impeller (only for VR 30-45-65-95)

HIGH QUALITY MATERIALS

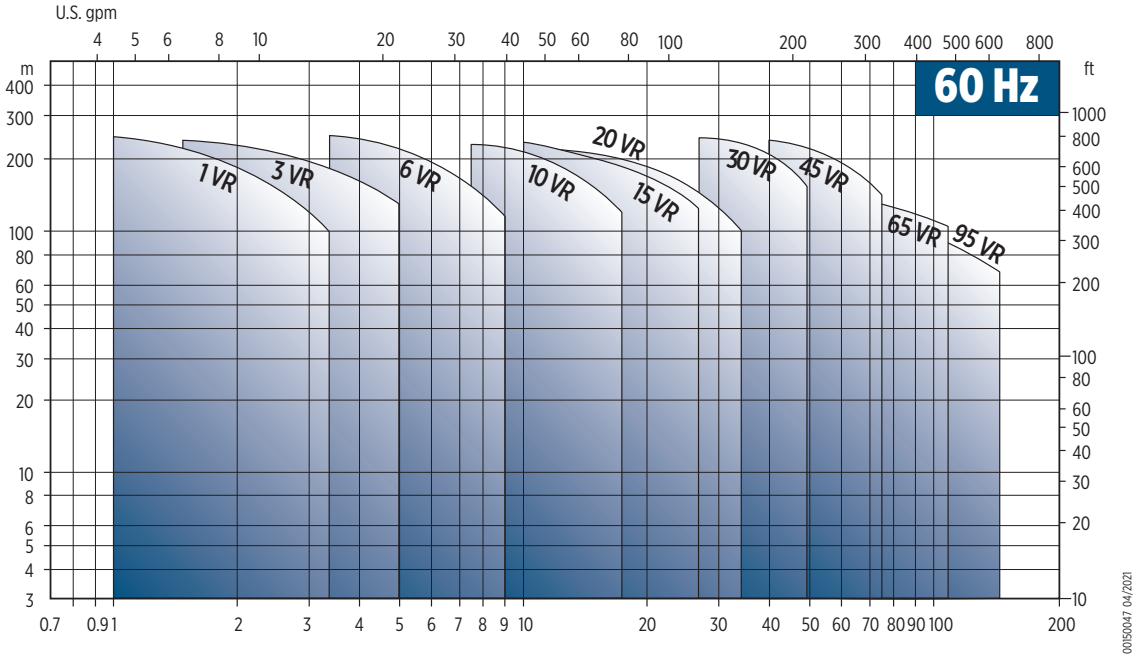
- Stainless steel impeller and diffuser for corrosion resistance
- Standard mechanical seal (EN 12756 ex DIN 24960) WRAS approved; balanced version for VR 30-45-65-95
- Standard IE3 motor, size B14 up to 4 kW / size B5 from 5.5 kW and above
- Intermediate bearing in silicon carbide to stabilize the pump shaft in models with a high number of stages



Vertical multistage pumps are rotodynamic pumps, not self-priming, assembled with one or more stages with radial or semiaxial (mixed) flow. The pump consists in a pump body, with in-line connections to the pipes, an external waterproof shell, an upper bracket that supports the motor. The bottom base plate allows the ground fixing. The structural integrity is guaranteed by the tie rods. The motor shaft and the pump shaft (driven shaft) are connected to each other by rigid, removable coupling. The rigid coupling can be equipped with a ball bearing to support the axial thrust (thrust assembly). The mechanical seal, cartridge type, is free from periodic maintenance.

PRODUCT OVERVIEW

FAMILY CURVES



PUMP IDENTIFICATION CODE

3	VR	7	0	H	F	1	B	-	D	6	E	D

Motor Voltage and Phase:

"0" (200 V only, 3-Phase)	"7" (220 V, 3-Phase)
"1" (115/230 V, 1-Phase)	"8" (380/415 V, 3-Phase)
"2" (230 V only, 1-Phase, 50 Hz)	"9" (415 V, 3-Phase)
"3" (230/460 V, 3-Phase)	"A" (190/380 V, 3-Phase)
"4" (460 V only, 3-Phase, 60 Hz)	"B" (230/400 V, 3-Phase, 50 Hz)
"5" (575 V only, 3-Phase)	"C" (400/690 V, 3-Phase, 50 Hz)
"6" (220 V, 1-Phase, 60Hz)	"D" (220/380 V, 3-Phase, 60 Hz)

Effiency (Enclosure): "D" (Premium, ODP); "X" (Premium, X-Proof); "E" (Premium, TEFC, IE3); "N" (Nema)

Speed (Hz): "5" (3000 rpm, 50 Hz); "7" (1500 rpm, 50 Hz); "6" (3600 rpm, 60 Hz); "8" (1800 rpm, 60Hz)

Frame:

"Q" (0,25 kW / 0,33 HP, Nema 56C)	"H" (5,5 kW / 7,5 HP, Nema 215TC)
"A" (0,37 kW / 0,5 HP, Nema 56C, IEC MEC71)	"J" (7,5 kW / 10 HP, Nema 215TC, IEC MEC132)
"B" (0,55 kW / 0,75 HP, Nema 56C, IEC MEC71)	"W" (11 kW / 15 HP, Nema 215TC, IEC MEC160)
"C" (0,75 kW / 1 HP, Nema 56C, IEC MEC80)	"K" (11 kW / 15 HP, Nema 256TC)
"D" (1,1 kW / 1,5 HP, Nema 56C, IEC MEC80)	"L" (15 kW / 20 HP, Nema 256TC, IEC MEC160)
"E" (1,5 kW / 2 HP, Nema 56C, IEC MEC90)	"X" (18,5 kW / 25 HP, Nema 256TC, IEC MEC160)
"Y" (1,5 kW / 2 HP, Nema 184TC)	"M" (18,5 kW / 25 HP, Nema 286TSC)
"F" (2,2 kW / 3 HP, Nema 56C, IEC MEC90)	"N" (22 kW / 30 HP, Nema 286TSC, IEC MEC180)
"U" (2,2 kW / 3 HP, Nema 184TC)	"Z" (30 kW / 40 HP, Nema 286TSC, IEC MEC200)
"I" (3 kW / 4 HP, IEC MEC100)	"P" (30 kW / 40 HP, Nema 326TSC)
"G" (3,7 kW / 5 HP, Nema 184TC)	"R" (37 kW / 50 HP, Nema 326TSC, IEC MEC200)
"O" (4 kW / 5,5 HP, IEC MEC112)	"S" (45 kW / 60 HP, Nema 365TSC, IEC MEC225)
"V" (5,5 kW / 7,5 HP, Nema 184TC, IEC MEC132)	"T" (55 kW / 75 HP, Nema 365TSC)

Motor type: "A" (Nema), "B" (IEC)

Mechanical seal:

"1" (QBE, E1)	"7" (BQQV, BV3)
"2" (QQE, E2)	"8" (QUE, E7)
"3" (QQV, V3)	"9" (QUV, V8)
"4" (QBV, V4)	"A"(BQBE, BE1)
"5" (UUE, E5)	"B"(BQQE, BE2)
"6" (UUV, V6)	

Connection: "F" (Round); "T" (Oval); "V" (Grooved)

Material: "G" (cast iron/304SS); "H" (AISI 304 / EN 1.4301); "N" (AISI 316 / EN 1.4401); "P" (AISI 316 / EN 1.4401 passivated)

Number of reduced impellers: "00" (none); "A1" (1A); "A2" (2A)

Number of stages/impellers

Pump model

Rated flow in m^3/h

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GENERAL FEATURES

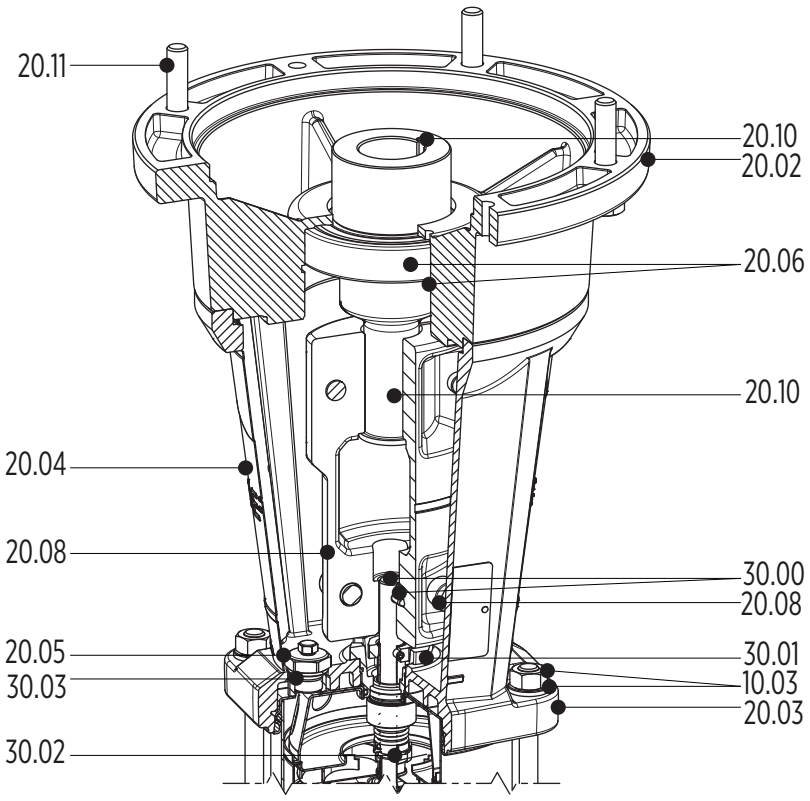
Model		1	3	6	10	15	20	30	45	65	95
Nominal flow [m³/h]		2	3.6	7.5	14	20	23	40	60	75	95
Maximum liquid temperature [°C]	Domestic uses	85 °C									
	Other uses	120 °C									
Max. ɳ hydraulic [%]		48.8	57.6	64.5	68.7	69.9	70.5	73.7	77.5	77.5	78.5
Range [m³/h]		1.0 - 3.4	1.7 - 5.0	3.5 - 9.0	7.5 17.0	10 - 28	12 - 34	24 - 48	40 - 74	35 - 105	55 - 138
Max. pressure	Standard version	26	26	26	26	26	26	32	32	25	25
Motor power [kW] (2 poles)		0.37 - 4.0	0.37 - 4.0	0.55 - 5.5	1.1 - 11.0	1.5 - 18.5	2.2 - 18.2	3-37	5.5 - 45.0	7.5 - 45.0	11-45
Material versions	G (Cast-iron + AISI 304 SS)	-	-	-	-	-	-	•	•	•	•
	I (AISI 304 SS)	•	•	•	•	•	•	-	-	-	-
	N (AISI 316L SS)	•	•	•	•	•	•	•	•	•	•
	P (AISI 316L SS passivated)	•	•	•	•	•	•	•	•	•	•
Hydraulic connection (dimensions)	F (Round flange) I (AISI 304 SS) version N (AISI 316L SS) version	DN 25 PN 25/40	DN 25 PN 25/40	DN 32 PN 25/40	DN 40 PN 25/40	DN 50 PN 25/40	DN 50 PN 25/40	-	-	-	-
	F (Round flange) G (Cast-iron) version N (AISI 316L SS) version	-	-	-	-	-	-	DN 65 PN16 PN 25/40	DN 80 PN16 PN 25/40	DN 100 PN16 PN 25/40	DN 100 PN16 PN 25/40
	T (Oval flange) I (AISI 304 SS) version	Rp 1" (DN 25) PN 16	Rp 1" (DN 25) PN 16	Rp 1" (DN 25) PN 16	Rp 1" ½ (DN 40) PN 16	Rp 2" (DN 50) PN 16	Rp 2" (DN 50) PN 16	-	-	-	-
	V (Victaulic) N (AISI 316L SS) version	1" (DN 25) PN 25	1" (DN 25) PN 25	1" ¼ (DN 32) PN 25	1" ½ (DN 40) PN 25	2" (DN 50) PN 25	2" (DN 50) PN 25	-	-	-	-

"-" = not available
• = available

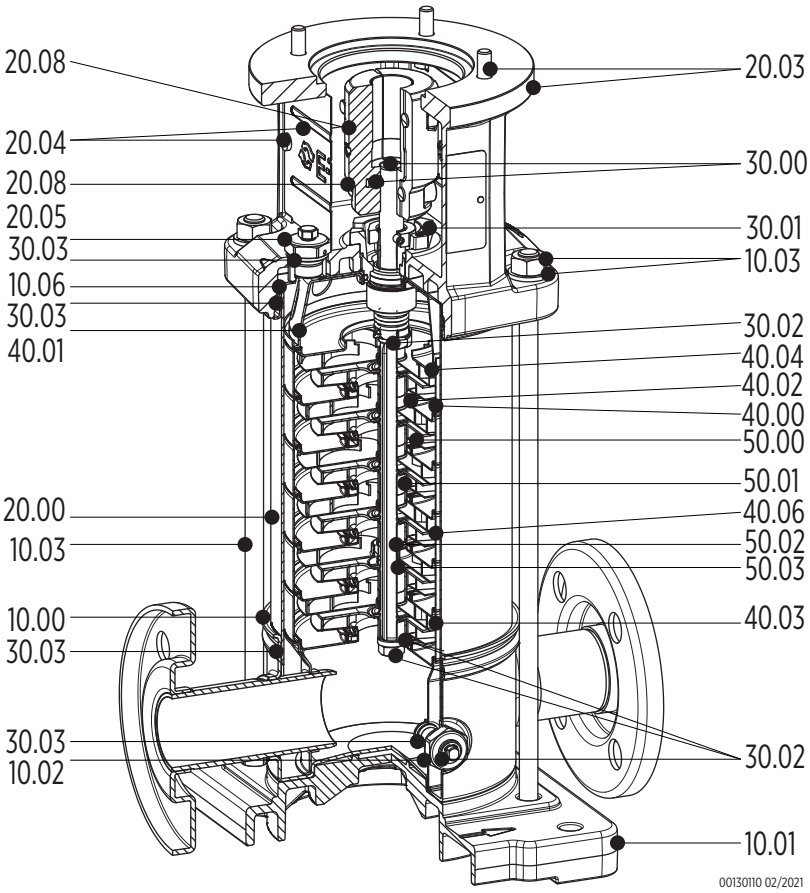
Spare parts and materials

1VR - 3VR - 6VR - 10VR

CONFIGURATION 5.5 KW AND ABOVE WITH THRUST BEARING



CONFIGURATION UP TO 4 KW WITHOUT THRUST BEARING



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PARTS IN CONTACT WITH LIQUID

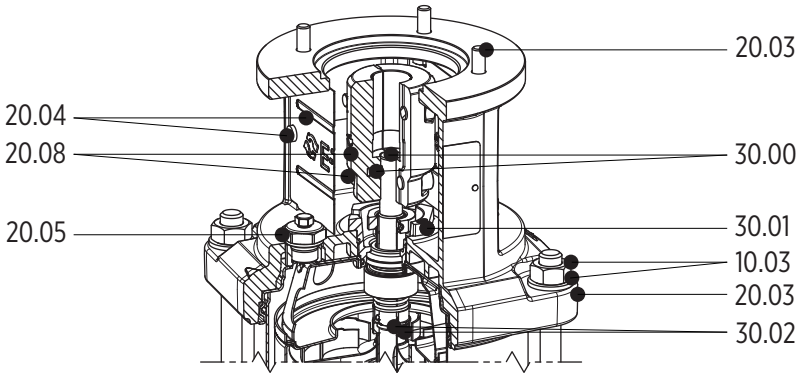
Ref. No.	Parts description	Material	Reference standard			
			I version		N version	
			ASTM	DIN/EN	ASTM	DIN/EN
10.00	**Pump casing**	Stainless Steel	AISI 304	1.4301	AISI 316L	1.4401
10.02	**Drain plug**	Stainless Steel	AISI 304	1.4301	AISI 316	1.4401
10.06	**Upper flange**	Stainless Steel	AISI 304	1.4301	AISI 316L	1.4401
20.00	**Outer case**	Stainless Steel	AISI 304	1.4301	AISI 316L	1.4401
20.05	**Filling plug**	Stainless Steel	AISI 304	1.4301	AISI 316	1.4401
30.00	**Pump shaft & Pin**	Stainless Steel	AISI 304	1.4301	AISI 316	1.4401
30.01	**Cartridge mechanical seal**	Stainless Steel / Carbon graphite / Silicon Carbide / EPDM				
30.02	**Mechanical seal fastening kit**	Stainless Steel	AISI 304	1.4301	AISI 316	1.4401
30.03	**Kit O-rings**	EPDM				
40.00	**Stage housing and diffuser**	Stainless Steel	AISI 304	1.4301	AISI 316L	1.4401
40.01	**Stage Centering outlet**	Stainless Steel	AISI 304	1.4301	AISI 316L	1.4401
40.02	**Floating neck ring**	Stainless steel / PPS	AISI 304	1.4301	AISI 316	1.4401
40.03	**Initial stage housing**	Stainless Steel	AISI 304	1.4301	AISI 316L	1.4401
40.04	**Last Stage with diffuser**	Stainless Steel	AISI 304	1.4301	AISI 316L	1.4401
40.06	**Stage housing and diffuser with bearing**	Stainless Steel / Silicon Carbide	AISI 304	1.4301	AISI 316	1.4401
50.00	**Impeller**	Stainless Steel	AISI 304	1.4301	AISI 316L	1.4401
50.01	**Impeller spacer**	Stainless Steel	AISI 304	1.4301	AISI 316L	1.4401
50.02	**Intermediate sleeve**	Silicon Carbide				
50.03	**Intermediate sleeve spacer**	Stainless Steel	AISI 304	1.4301	AISI 316L	1.4401

SPARE PARTS LIST

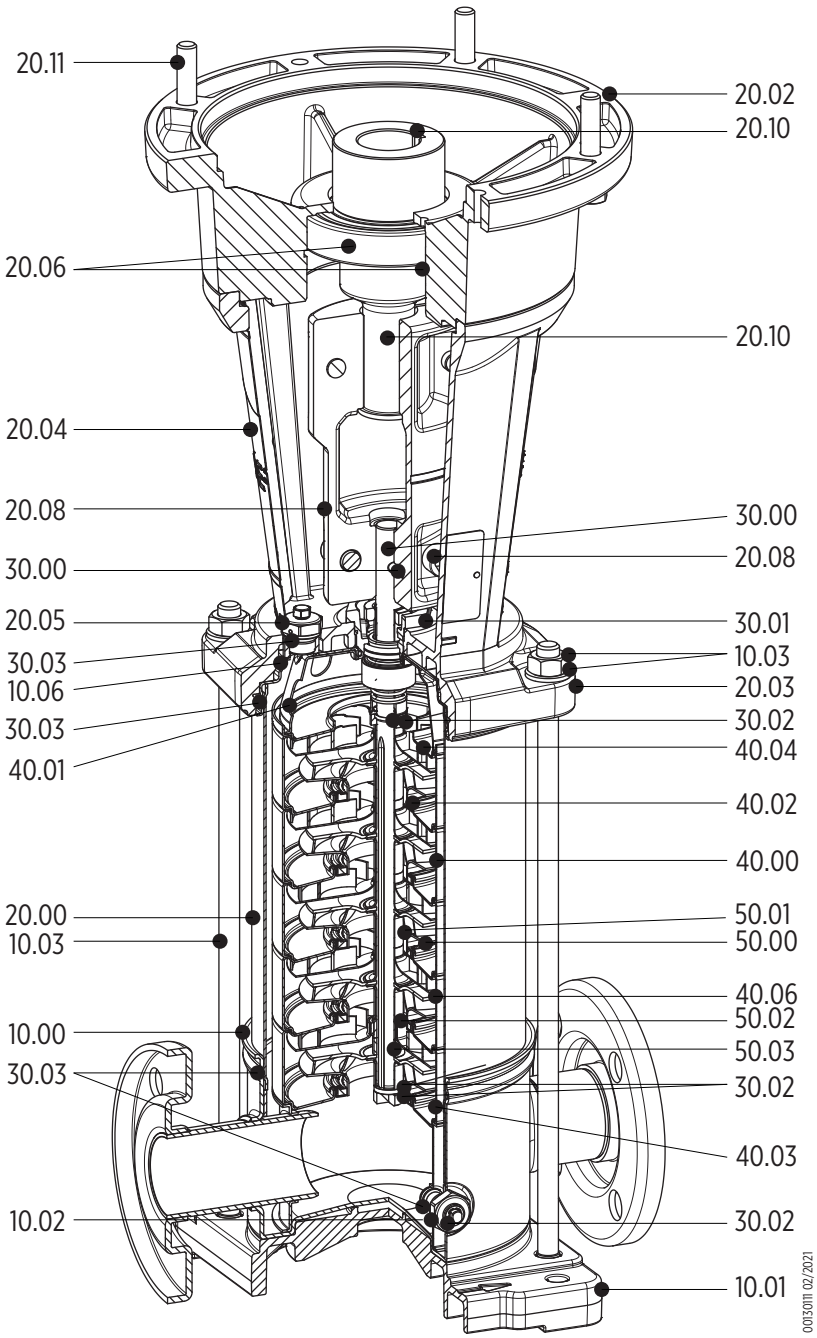
Ref. No.	Parts description
10.00	Pump casing
10.01	Pump base
10.02	Drain plug
10.03	Tie bolts, washers and nuts
10.06	Upper flange
20.00	Outer case
20.02	Motor flange
20.03	Motor bracket
20.04	Coupling guard
20.05	Filling plug
20.06	Kit bearings
20.08	Coupling
20.10	Motor shaft adapter
20.11	Lifting eyelets and bolts

Ref. No.	Parts description
30.00	Pump shaft & Pin
30.01	Cartridge mechanical seal
30.02	Kit screws, lower disks and rings
30.03	Kit O-rings
40.00	Stage housing and diffuser
40.01	Stage Centering outlet
40.02	Floating neck ring
40.03	Initial stage housing
40.04	Last Stage with diffuser
40.06	Stage housing and diffuser with bearing
50.00	Impeller
50.01	Impeller spacer
50.02	Intermediary sleeve
50.03	Intermediary sleeve spacer

15VR - 20VR



CONFIGURATION UP TO 4 KW WITHOUT THRUST BEARING



CONFIGURATION 5.5 KW AND ABOVE WITH THRUST BEARING

PARTS IN CONTACT WITH LIQUID

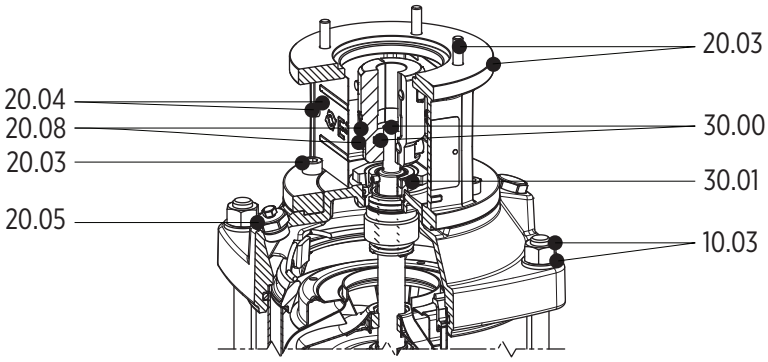
Ref. No.	Parts description	Material	Reference standard			
			I version		N version	
			ASTM	DIN/EN	ASTM	DIN/EN
10.00	**Pump casing**	Stainless Steel	AISI 304	1.4301	AISI 316L	1.4401
10.02	**Drain plug**	Stainless Steel	AISI 304	1.4301	AISI 316	1.4401
10.06	**Upper flange**	Stainless Steel	AISI 304	1.4301	AISI 316L	1.4401
20.00	**Outer case**	Stainless Steel	AISI 304	1.4301	AISI 316L	1.4401
20.05	**Filling plug**	Stainless Steel	AISI 304	1.4301	AISI 316	1.4401
30.00	**Pump shaft & Pin**	Stainless Steel	AISI 304	1.4301	AISI 316L	1.4401
30.01	**Cartridge mechanical seal**	Stainless Steel / Carbon graphite / Silicon Carbide / EPDM				
30.02	**Mechanical seal fastening kit**	Stainless Steel	AISI 304	1.4301	AISI 316	1.4401
30.03	**Kit O-rings**	EPDM				
40.00	**Stage housing and diffuser**	Stainless Steel	AISI 304	1.4301	AISI 316L	1.4401
40.01	**Stage Centering outlet**	Stainless Steel	AISI 304	1.4301	AISI 316L	1.4401
40.02	**Floating neck ring**	Stainless steel / PPS	AISI 304	1.4301	AISI 316	1.4401
40.03	**Initial stage housing**	Stainless Steel	AISI 304	1.4301	AISI 316L	1.4401
40.04	**Last Stage with diffuser**	Stainless Steel	AISI 304	1.4301	AISI 316L	1.4401
40.06	**Stage housing and diffuser with bearing**	Stainless Steel / Silicon Carbide	AISI 304	1.4301	AISI 316L	1.4401
50.00	**Impeller**	Stainless Steel	AISI 304	1.4301	AISI 316L	1.4401
50.01	**Impeller spacer**	Stainless Steel	AISI 304	1.4301	AISI 316L	1.4401
50.02	**Intermediate sleeve**	Silicon Carbide				
50.03	**Intermediate sleeve spacer**	Stainless Steel	AISI 304	1.4301	AISI 316	1.4401

SPARE PARTS LIST

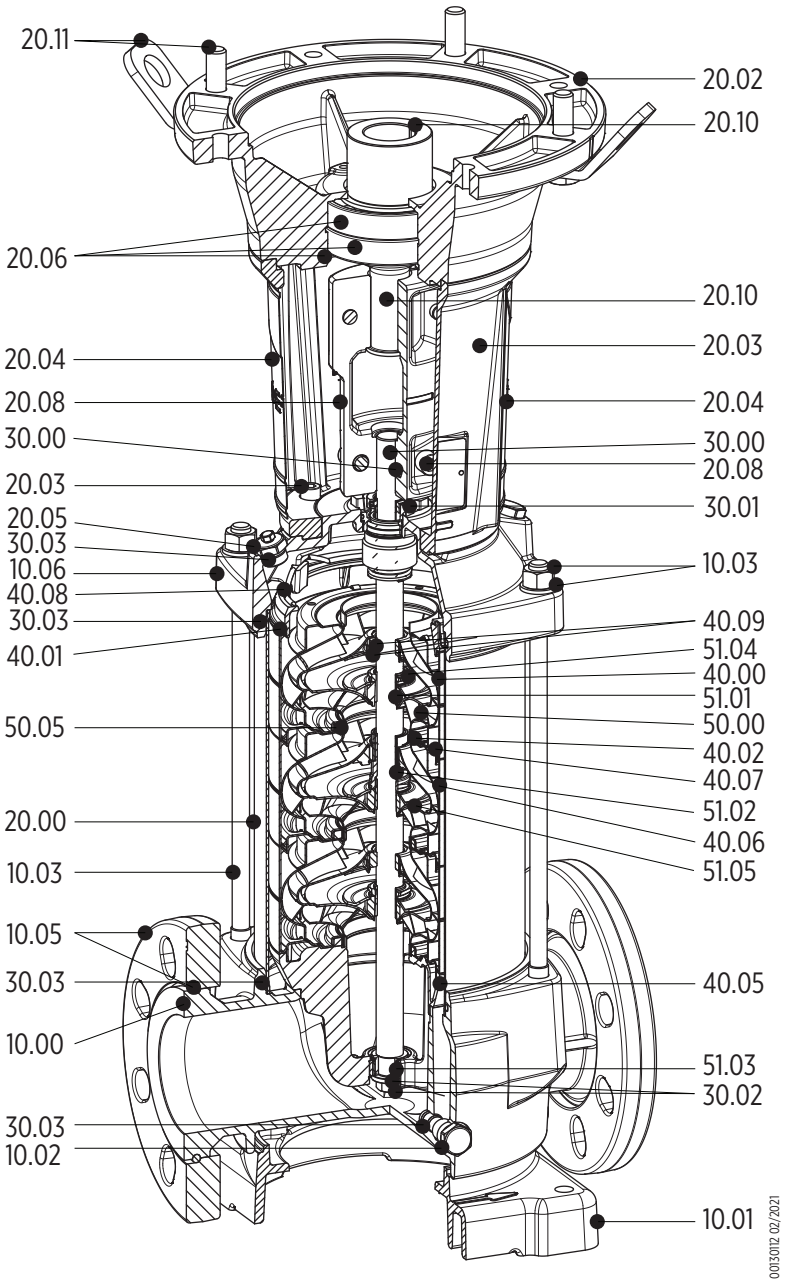
Ref. No.	Parts description
10.00	Pump casing
10.01	Pump base
10.02	Drain plug
10.03	Tie bolts, washers and nuts
10.06	Upper flange
20.00	Outer case
20.02	Motor flange
20.03	Motor bracket
20.04	Coupling guard
20.05	Filling plugs
20.06	Kit bearings
20.08	Coupling
20.10	Motor shaft adapter
20.11	Lifting eyelets and bolts

Ref. No.	Parts description
30.00	Pump shaft & Pin
30.01	Cartridge mechanical seal
30.02	Mechanical seal fastening kit
30.03	Kit O-rings
40.00	Stage housing and diffuser
40.01	Stage Centering outlet
40.02	Floating neck ring
40.03	Initial stage housing
40.04	Last Stage with diffuser
40.06	Stage housing and diffuser with bearing
50.00	Impeller
50.01	Impeller spacer
50.02	Intermediate sleeve
50.03	Intermediate sleeve spacer

30VR - 45VR - 65VR - 95VR



CONFIGURATION UP TO 4 KW WITHOUT THRUST BEARING



CONFIGURATION 5.5 KW AND ABOVE WITH THRUST BEARING

PARTS IN CONTACT WITH LIQUID

Ref. No.	Parts description	Material	Reference standard			
			G version		N version	
			ASTM	DIN/EN	ASTM	DIN/EN
10.00	Pump casing	Cast Iron / Stainless Steel	A48 Class 35	GJL-250	CF 8M / AISI 316	1.4408
10.02	Drain plug	Stainless Steel	AISI 304	1.4301	AISI 316	1.4401
10.06	Upper flange	Cast Iron / Stainless Steel	A48 Class 35	GJL-250	CF 8M / AISI 316	1.4408
20.00	Outer case	Stainless Steel	AISI 304	1.4301	AISI 316L	1.4401
20.05	Filling plugs	Stainless Steel	AISI 304	1.4301	AISI 316	1.4401
30.00	Pump shaft & Pin	Stainless Steel	AISI 431	1.4057	AISI 329	1.4460
30.01	Cartridge mechanical seal	Stainless Steel / Carbon graphite / Silicon Carbide / EPDM				
30.02	Mechanical seal fastening kit	Stainless Steel	AISI 316	1.4301	AISI 316	1.4401
30.03	Kit O-rings	EPDM				
40.00	Stage housing and diffuser	Stainless Steel	AISI 304	1.4301	AISI 316L	1.4401
40.01	Stage Centering outlet (Only 65/95 vers.)	Stainless Steel	CF 8 / AISI 304	14308	CF 8M / AISI 316	1.4408
40.02	Floating neck ring	PTFE				
40.05	Inlet spider bearing	Stainless Steel / Silicon Carbide	AISI 316	1.4301	AISI 316	1.4401
40.06	Stage housing and diffuser with bearing	Stainless Steel / Silicon Carbide	AISI 304	1.4301	AISI 316	1.4401
40.07	Flange clamping neck ring	Stainless Steel	AISI 304	1.4301	AISI 316L	1.4401
40.08	Spring ring	Stainless Steel	AISI 316	1.4301	AISI 316	1.4401
40.09	Secondary sleeve with ring	Stainless Steel / Carbon graphite	AISI 316	1.4301	AISI 316	1.4401
50.00	Impeller	Stainless Steel	AISI 304	1.4301	AISI 316L	1.4401
50.05	Wear ring	Stainless Steel	AISI 304	1.4301	AISI 316L	1.4401
51.01	Split cone	Stainless Steel	AISI 304	1.4301	AISI 316	1.4401
51.02	Intermediate sleeve nut	Stainless Steel / Silicon Carbide	AISI 316	1.4301	AISI 316	1.4401
51.03	Journal sleeve	Stainless Steel / Silicon Carbide	AISI 316	1.4301	AISI 316	1.4401
51.04	Split cone nut	Stainless Steel	AISI 304	1.4301	AISI 316L	1.4401
51.05	Intermediate impeller with screw	Stainless Steel	AISI 304	1.4301	AISI 316L	1.4401

SPARE PARTS LIST

Ref. No.	Parts description
10.00	Pump casing
10.01	Pump base
10.02	Drain plug
10.03	Tie bolts, washers and nuts
10.05	Kit flanges ring
10.06	Upper flange
20.00	Outer case
20.02	Motor flange
20.03	Motor bracket
20.04	Coupling guard
20.05	Filling plugs
20.06	Kit bearings
20.08	Coupling
20.10	Motor shaft adapter
20.11	Lifting eyelets and bolts
30.00	Pump shaft & Pin
30.01	Cartridge mechanical seal

Ref. No.	Parts description
30.02	Mechanical seal fastening kit
30.03	Kit O-rings
40.00	Stage housing and diffuser
40.01	Stage Centering outlet (ONLY 65/95 vers.)
40.02	Floating neck ring
40.05	Stage Centering inlet
40.06	Stage housing and diffuser with bearing
40.07	Flange clamping neck ring
40.08	Spring ring
40.09	Secondary sleeve with ring
50.00	Impeller
50.05	Wear ring
51.01	Split cone
51.02	Intermediate sleeve nut
51.03	Journal sleeve
51.04	Split cone nut
51.05	Intermediate impeller with screw

MOTORS

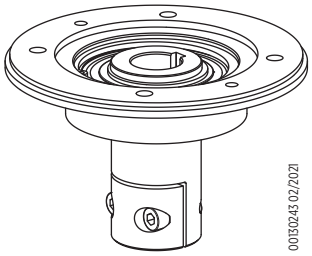
The pump must be coupled with a synchronous or asynchronous electric motor single-phase (up to 2.2 kW) or three-phase (up to 45 kW); dimensions according to IEC 60034-1 or Nema standard, based on motor type.

The default motors (Lafert brand) are Totally Enclosed Fan Cooled, air cooled, asynchronous, for non-explosive risk environments. However, explosion proof (ATEX) and three-phase synchronous motors are available on request.

The features of the original equipment motors up to 4 kW are indicated in the table below. If a different motor is used, it must have equivalent features. The drive-end side bearing must be blocked and the non drive-end side bearing must be spring loaded, otherwise you can order the up thrust bearing kit as optional device (see example in figure).

PTC 155 °C sensor are available on request from 0.75 kW uo to 7.5 kW.

PTC is standard from 11 kW.



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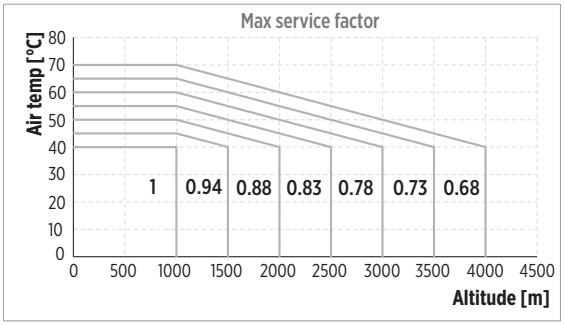
For IEC 60034-1 standard, available:

MEC 71 / MEC 80 / MEC 90 / MEC 100-112

Power		Phases	IEC Size	Design	[min-1]	Pump side bearing	Starting torque [Nm]	N %
[kW]	[HP]							
SINGLE-PHASE MOTORS								
0.37	**0.5**	1	71	B14	3330	6203-2Z	0.88	56
0.55	**0.75**	1	71	B14	3480	6203-2Z	1.2	65
0.75	**1**	1	80	B14	3450	6204-2Z	1.68	65
1.1	**1.5**	1	80	B14	3350	6204-2Z	1.55	74
1.5	**2**	1	90	B14	3300	6205-2Z	2.15	73
2.2	**3**	1	90	B14	3350	6205-2Z	3.15	76
THREE-PHASE MOTORS								
0.37	**0.5**	3	71	B14	3400	6203-2Z	2.53	72
0.55	**0.75**	3	71	B14	3450	6203-2Z	3.75	73
0.75	**1**	3	80	B14	3500	6204-2Z	9.87	77
1.1	**1.5**	3	80	B14	3480	6204-2Z	15	84
1.5	**2**	3	90	B14	3515	6205-2Z	14.76	85.5
2.2	**3**	3	90	B14	3480	6205-2Z	24	86.5
3	**4**	3	100	B14	3515	6206-2Z	45.1	88.1
4	5.5	3	112	B14	3520	6206-2Z	66.49	89

HEAVY DUTY MOTOR SIZING



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All values indicated on motor label and in the table refer to clean water and maximum working temperature according to the nameplate.

In case of high density and viscous liquids, please contact the manufacturer. When the ambient temperature and/or altitude overcome the nameplate values, it's necessesary to reduce the motor service factor below the nominal power.

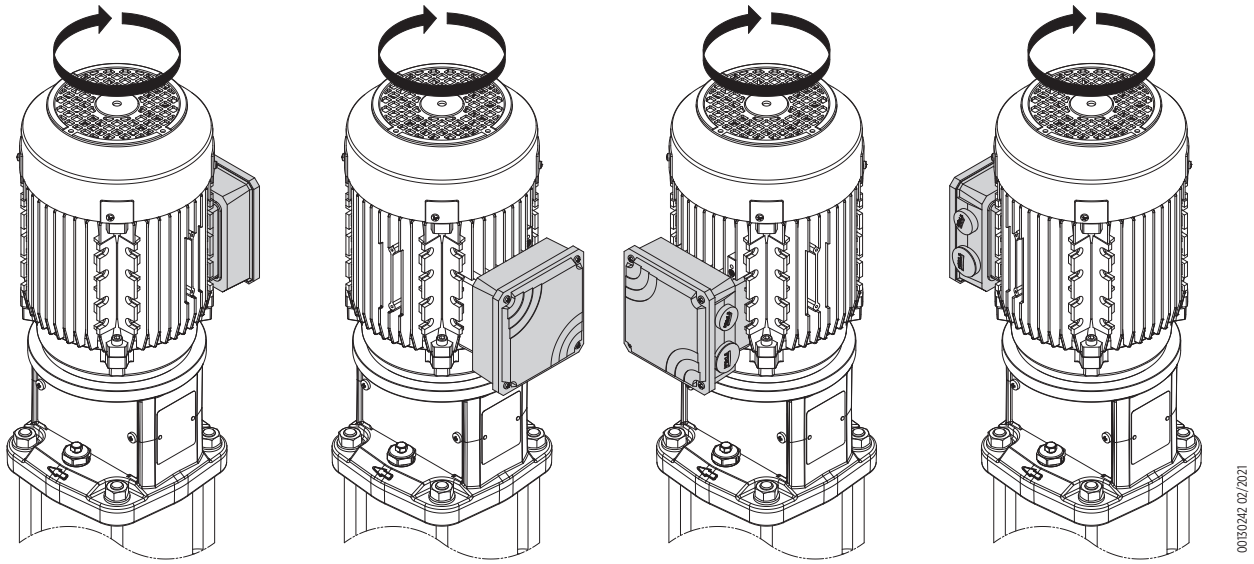
The graph shows how to choose the right maximum service factor applicable (share of the nominal power).

MOTORS

TERMINAL BOX POSITION*

It's possible to rotate the position of the motor in order to change the position of the terminal box.

* See operation manual for instructions



RIGHT (Standard) | FRONT | LEFT | BACK

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AEG LAFERT MOTORS

FEATURES

- Protection degree: IP55
- Max ambient temperature: 40 °C
- Insulation class: F
- Size B14 up to 4 kW, size B5 from 5.5 kW and above
- PTC 155°C default from MEC160 (from 11 kW)

SINGLE-PHASE MOTORS

- Voltage: 230 V
- Capacitor inside terminal box

SINGLE-PHASE MOTORS DESIGNED FOR RANGE OF RATED VOLTAGE 230 V 50 Hz											
POWER		IEC Size	Design	IN [A] 230 V	[min-1]	MN	ɳ %	cos ϕ	IA/IN	MA/MN	Weight [kg]
[kW]	[HP]										
0.37	**0.5**	71	B14	3.2	3330	1.1	56.0	0.89	3.1	0.8	7.1
0.55	**0.75**	71	B14	4.0	3480	1.5	65.0	0.98	5.7	0.8	8.5
0.75	**1**	80	B14	6.1	3450	2.1	65.0	0.89	5.3	0.8	11.4
1.1	**1.5**	80	B14	6.8	3350	3.1	74.0	0.95	4.4	0.5	11.8
1.5	**2**	90	B14	10.5	3300	4.3	73.0	0.95	3.7	0.5	17.3
2.2	**3**	90	B14	14.5	3350	6.3	76.0	0.90	5	0.5	19.3

THREE-PHASE MOTORS

- High Efficiency three-phase motors from 0.75 kW in compliance with Eco design Directive N. 640/2009.
- The standard design includes the following basic features to give a high level of fexibility
- Multi Mount Construction for an easy change of terminal box position
- Terminal box rotates by 90° to allow cable entry from any direction
- Voltage: up to 3 kW 230/400 V, 400/690 V from 4 kW and above
- Special voltage and special version on request

SINGLE-PHASE MOTORS DESIGNED FOR RANGE OF RATED VOLTAGE 220 V 60 Hz													
Efficiency class	POWER		IEC Size	Design	IN [A] 220 V	IN [A] Y 380 V	[min-1]	MN	ɳ %	cos ϕ	IA/IN	MA/MN	Weight [kg]
	[kW]	[HP]											
IE2	**0.37**	**0.5**	71	B14	1.8	1.0	3400	1.1	72.0	0.75	4.2	2.3	5.8
	0.55	**0.75**	71	B14	3.0	1.7	3450	1.5	73.0	0.77	4.6	2.5	6.2
IE3	**0.75**	**1**	80	B14	3.3	1.9	3500	2.1	77.0	0.78	8.9	4.7	9.5
	1.1	**1.5**	80	B14	4.7	2.7	3480	3.0	84.0	0.78	9.3	5.0	11.1
	1.5	**2**	90	B14	5.9	3.4	3515	4.1	85.5	0.8	8.4	3.6	14
	2.2	**3**	90	B14	8.0	4.6	3480	6.0	86.5	0.84	9.2	4.0	16
	3	**4**	100	B14	10.4	6.0	3515	8.2	88.1	0.88	8.8	5.5	228.
	4	**5.5**	112	B14	13.2	7.6	3520	10.9	89.0	0.89	10.9	6.1	26.5
	5.5	**7.5**	132	B5	18.2	10.5	3510	15.0	89.5	0.89	9.6	3.6	27.4
	7.5	**10**	132	B5	25.1	14.5	3520	20.3	90.2	0.87	10.4	4.5	36
	11	**15**	160	B5	34.3	19.8	3520	29.9	91.0	0.92	9.7	4.4	59
	15	**20**	160	B5	46.4	26.8	3520	40.7	91.0	0.92	9.6	3.7	68
	18.5	**25**	160	B5	62.0	35.6	3540	50.0	91.7	0.86	10.7	4.6	104
	22	**30**	180	B5	71.7	41.7	3530	59.5	91.7	0.88	10.4	4.5	104
	30	**40**	200	B5	94.0	54.0	3565	80.8	94.1	0.9	9	2.8	239
	37	**50**	200	B5	114.0	66.0	3560	99.0	93.9	0.91	8.5	2.6	249
	45	**60**	225	B5	137.0	79.0	3570	120	95.0	0.91	7.8	2.5	322

MOTORS EFFICIENCY

NEW INTERNATIONAL EFFICIENCY CLASSES OF MOTORS – IE CODE

IEC 60034-30:2008 defines the efficiency classes of motors worldwide.
IE1 = Standard Efficiency (comparable to EFF2)
IE2 = High Efficiency (comparable to EFF1)
IE3 = Premium Efficiency
The efficiency levels according to IEC 60034-30 are measured based on the test methods defined in IEC 60034-2-1:2007.
The IEC 60034-30 only defines requirements of efficiency classes and aims to create provisions for international consistency.
It does not define which motors must be supplied with which efficiency level. This is subject to respective regional legislation.

OUTPUT	IE1 code Standard Efficiency			IE2 code Standard Efficiency			IE3 code Standard Efficiency		
	2 poles	4 poles	6 poles	2 poles	4 poles	6 poles	2 poles	4 poles	6 poles
0.75	72.1	72.1	70.0	77.4	79.6	75.9	80.7	82.5	78.9
1.1	75.0	75.0	72.9	79.6	81.4	78.1	82.7	84.1	81.0
1.5	77.2	77.2	75.2	81.3	82.8	79.8	84.2	85.3	82.5
2.2	79.7	79.7	77.7	83.2	84.3	81.8	85.9	86.7	84.3
3	81.5	81.5	79.7	84.6	85.5	83.3	87.1	87.7	85.6
4	83.1	83.1	81.4	85.8	86.6	84.6	88.1	88.6	86.8
5.5	84.7	84.7	83.1	87.0	87.7	86.0	89.2	89.6	88.0
7.5	86.0	86.0	84.7	88.1	88.7	87.2	90.1	90.4	89.1
11	87.6	87.6	86.4	89.4	89.8	88.7	91.2	91.4	90.3
15	88.7	88.7	87.7	90.3	90.6	89.7	91.9	92.1	91.2
18.5	89.3	89.3	88.6	90.9	91.2	90.4	92.4	92.6	91.7
22	89.9	89.9	89.2	91.3	91.6	90.9	92.7	93.0	92.2
30	90.7	90.7	90.2	92.0	92.3	91.7	93.3	93.6	92.9
37	91.2	91.2	90.8	92.5	92.7	92.2	93.7	93.9	93.3
45	91.7	91.7	91.4	92.9	93.1	92.7	94.0	94.2	93.7

Efficiency values according to IEC 60034-30;2008.
Efficiency standard calculation: IEC 60034-2-1;2007

AEG LAFERT MOTORS

NOISE

The noise level of an electrical machine is determined by measuring the sound pressure level in accordance with curve A of the sound level meter to EN 60651 and is indicated in dB (A). The permitted noise levels of electrical machines are fixed in EN 60034 - 9 (IEC 34-9). The noise level of the motors is below these limit values. Structure-borne sound measurements are carried out in an an anechoic testing chamber to EN 21680-ISO 1680. The speed is corresponding to a main frequency of 50 Hz and the number of poles.

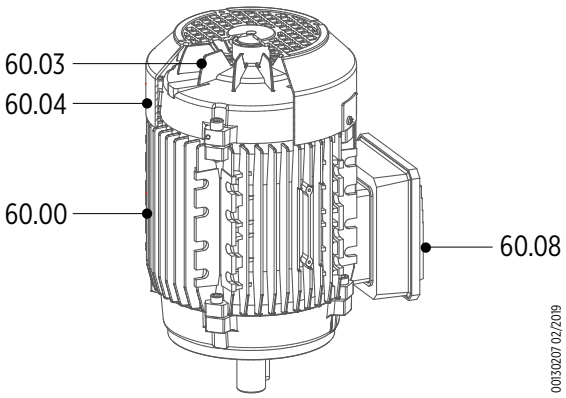
Noise levels

The noise values listed below refer to 50 Hz at rated voltage with a tolerance of up to +3 dB (A). Values for pole-changing motors are available on request. For 60 Hz supply, the values are 3-5 dB (A) higher. Sound pressure level (LpA) and sound power level (LWA) refers to three-phase motors with single-speed, dimensions and output ratings as per IEC 60072.

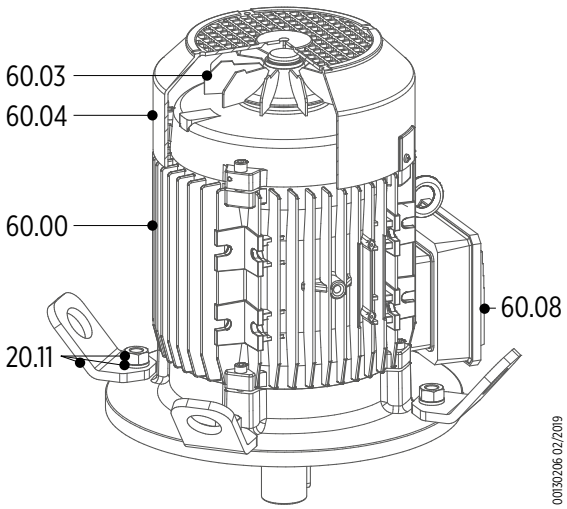
Frame size	2 poles		4 poles	
	LWA	LpA	LWA	LpA
56	60	51	50	41
63	61	52	50	41
71	64	55	54	45
80	75	63	63	51
90	77	65	64	52
100	81	69	65	53
112	83	71	68	56
132	85	76	75	63
160	91	78	79	66
180	94	81	82	70
200	95	82	84	72
225	96	84	92	80

MOTORS SPARE PARTS

UP TO 4 KW



FROM 5.5 KW

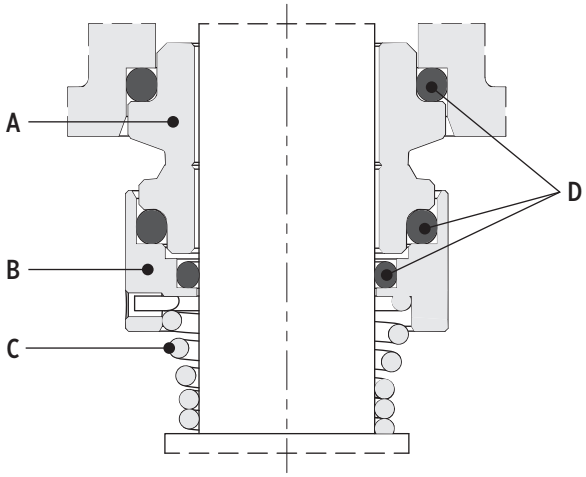


Ref. No.	Parts description
20.11	Lifting eyelets and bolts
60.00	Motor assembly
60.03	Fan
60.04	Fan cover and screws
60.08	Terminal box cover and base

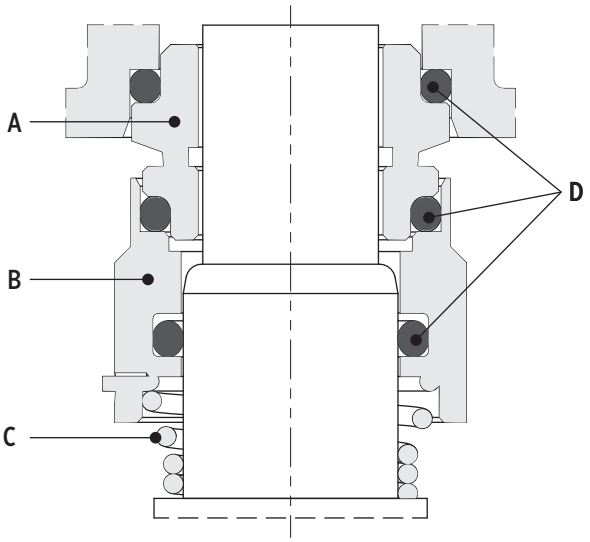
CARTRIDGE MECHANICAL SEAL SPECIFICATIONS

(fixed and rotating parts according to EN 12756)

UNBALANCED



BALANCED



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STANDARD VERSION (UNBALANCED)

Model	Type				Position				Temperature
					A Stationary part	B Rotating part	C Spring	D Elastomers	
E1*	B	Q	G	E	Graphite	Silicon carbide	AISI 316	EPDM	-30 °C / +120 °C

AVAILABLE ON REQUEST

Model	Type				Position				Temperature
					A Stationary part	B Rotating part	C Spring	D Elastomers	
E2*	Q	Q	G	E	Silicon carbide	Silicon carbide	AISI 316	EPDM	-30 °C / +120 °C
V3*	Q	Q	G	V	Silicon carbide	Silicon carbide	AISI 316	FKM	-10 °C / +120 °C
V4*	B	Q	G	V	Graphite	Silicon carbide	AISI 316	FKM	-10 °C / +120 °C
E5*	U	U	G	E	Tungsten carbide	Tungsten carbide	AISI 316	EPDM	-30 °C / +120 °C
E7 *	Q	U	G	E	Silicon carbide	Tungsten carbide	AISI 316	EPDM	-30 °C / +120 °C
V6*	U	U	V	G	Tungsten carbide	Tungsten carbide	AISI 316	FKM	-10 °C / +120 °C
V8	Q	U	V	G	Silicon carbide	Tungsten carbide	AISI 316	FKM	-10 °C / +120 °C

* Available in balanced version “B...” (ex. E1 - standard version --> BE1 - balanced version)

Type	Material
B	Graphite
E	EPDM
G	AISI 316
Q	Silicon carbide
V	FKM
U	Tungsten carbide

COMPATIBILITY OF FLUIDS AND MATERIALS

APPLICATION AND SECTORS	PUMP VERSION				CONCENTRATION (%) TEMPERATURE [°C]
	I	G	N	P	
	MECHANICAL SEAL TYPE				
WATER SUPPLY (CLEAN WATER)					
Water systems filtration and transfer; water works distribution and pressure boosting; residential, commercial buildings and industrial processes pressure boosting	E1	E1	E1	E1	100 %; +5 / +120 °C
Firefighting systems	E1	E1	E1	E1	100 %; +5 / +120 °C
Fountains	E1	E1	E1	E1	100 %; +5 / +120 °C
Drinkable water (only version approved for the application)	E1	E1	E1	E1	Models 1-20, Vers. I, N: 85°C Models 30-95, Vers. N: 85°C Models 30-95, Vers. G: 23°C
PRESSURE BOOSTING, TRANSFER AND RECIRCULATION - NON-FLAMMABLE, NON-CORROSIVE LIQUIDS					
Proccess-water systems (distilled, deionized, ...)	E1	E1	E1	E1	100 %; -25 / +110 °C
Car wash tunnels	E1	E1	E1	E1	100 %; +5 / +100 °C
Boiler feed systems (treated water) and condensate removal	E1	(S)	E1	E1	100 %; -5 / +100 °C
Machine tools (cooling lubricants)	V6	(S)	V6	V6	100 %; -5 / +100 °C
Coolant (Ethylene glycol-water solution)	-	-	E1	E1	max. 30 %; -20 / +120 °C
Coolant (Propylene glycol-water solution)	E1	E1	E1	E1	max. 30 %; -20 / +120 °C
LAMMABLE AND CORROSIVE LIQUID TRANSFER					
Flammable liquids	-	-	-	-	-
Mineral oils (1)	V4	V4	V4	V4	100 %; -5 / +110 °C
Acid or basic solutions, aggressive liquids:					
Acetic acid	-	-	E1	E1 (P)	max 80%; -10 / +70 °C
Aluminium sulfate	-	-	E2	E2	max 30%; -5 / +50 °C
Ammonia in water	E1	-	E1	E1	max 25%; -20 / +50 °C
Ammonium sulfate	-	-	E2	E2	max 10%; -10 / +60 °C
Benzoic acid	-	-	V4	V4	max 70%; 0 / +70 °C
Brackish water	-	-	-	E1	max 5%; 0 / +40 °C
Brine	-	-	-	E1	max 5%; 0 / +40 °C
Caustic soda	E2	E2	E2	E2	max 25%; 0 / +70 °C
Chloroform	V4	V4	V4	V4	max 100%; -10 / +30 °C
Citric acid	E1	-	E1	E1	max 5%; -10 / +70 °C
Copper sulfate	-	-	V3	V3	max 20%; +0 / +30 °C
Ferrous sulfate and ferric sulfate	-	-	E1	E1	max 10%; +5 / +30 °C
Formic acid	E1	-	E1	E1	max 5%; -15 / +25 °C
Glycerine	E1	E1	E1	E1	max 100%; +20 / +90 °C
Hydrochloric acid	-	-	V3	V3	max 2%; -5 / +25 °C
Nitric acid	V3	-	V3	V3	max 50%; -5 / +30 °C
Perchloroethylene	V4	V4	V4	V4	max 100%; -10 / +30 °C
Phosphates-polyphosphates	V3	-	V3	V3	max 10%; -5 / +90 °C
Phosphoric acid	-	-	E1	E1	max 10%; -5 / +30 °C
Propylene glycol	E1	E1	E1	E1	max 30%; -30 / +120 °C
Sodium hypochlorite	-	-	V3	V3	max 1%; -10 / +25 °C
Sodium nitrate	-	-	E2	E2	max 10%; +5 / +60 °C
Sodium sulfate	E2	E2 (S)	E2	E2 (P)	max 15%; -10 / +40 °C
Sulphuric acid	V3	V3 (S)	V3	V3 (P)	max 2%; -10 / +25 °C
Tannic acid	-	-	E1	E1	max 20%; 0 / +50 °C
Tartaric acid	V3	-	V3	V3	max 50%; -10 / +25 °C
Trichloroethylene	V4	V4	V4	V4	max 100%; -10 / +40 °C

"-" = Application not possible
(S) = Not recommended application
(P) = Recommended choice
(1) = Only for temperature < 0.2 times flash point [°C]

COMPATIBILITY OF FLUIDS AND MATERIALS

APPLICATION AND SECTORS	PUMP VERSION				CONCENTRATION (%) TEMPERATURE [°C]
	I	G	N	P	
	MECHANICAL SEAL TYPE				
AGRICULTURE AND FISH FARMING					
Clean water irrigation	E1	E1	E1	E1	100 %; +5 / +100 °C
Irrigation with added water (plant protection products, fertilizers, ...)	-	-	-	-	-
Fish farm (fresh water)	E1	E1	E1	E1	100 %; +5 / +100 °C
PROCESS-WATER TREATMENT *					
Ultra-filtration systems (maximum concentration of chlorides) *	-	-	-	E1	-
Reverse osmosis systems (maximum concentration of chlorides) *	-	-	-	E1	-
Softening, ionising, demineralising, distillation systems (fresh water pumping) *	E1	E1	E1	E1	-
Wash down and cleaning units (high aggressive detergents) *	-	-	E2	E2 (P)	-
Transfer or processing of sea or saline water *	-	-	-	-	-
Gas separators *	E1	E1	E1	E1	-
Swimmings (max. Chlorine concentration)	-	-	E1, V4	E1, V4	-

"-" = Application not possible
(S) = Not recommended application
(P) = Recommended choice
(1) = Only for temperature < 0.2 times flash point [°C]

* Please contact the Technical Department.

The table is to be considered as a general guide. It is important to consider the specific working conditions, in particular the concentration of the pumped liquid, the specific weight of the liquid and/or viscosity, the liquid temperature and pressure. All these conditions are relevant for the motor and pump performance. When pumping dangerous liquids, it is recommended to take safety precautions. For further details, please contact Franklin Electric.

Performance curves and technical data

ERP REGULATION

Information related to energy performance of the pump, according to Reg. 547/2012 CE:

1. Minimum efficiency index: MEI ≥ 0.7;
2. The benchmark for most efficient water pumps is MEI ≥ 0,70;
3. Year of manufacture: see nameplate or the label in the Instruction manual;
4. Manufacturer's name or trade mark, commercial registration number and place of manufacture: see nameplate or the label in the Instruction manual;
5. Product's type and size identificatory: see nameplate or the label in the Instruction manual;
6. Hydraulic pump efficiency with trimmed impeller: see nameplate or the label in the Instruction manual;
7. Pump performance curves for the pump, including efficiency characteristics: see technical datasheet (http://franklinwater.eu/products/);
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: see the Instruction manual;
11. ---;
12. ---;
13. ---;
14. Information on benchmark efficiency is available at http://europump.net/uploads/Fingerprints.pdf;
15. Benchmark efficiency graph for MEI = 0,7 and for MEI = 0,4 available at: http://europump.net/uploads/Fingerprints.pdf;

Information related to energy performance of the motor, according to Reg. 2019/1781 CE and modifications:

1. Nominal efficiency (η) at the full, 75 % and 50 % rated load and voltage (UN): see motor nameplate or the Catalogue (http://franklinwater.eu/products/);
2. Efficiency level: see motor nameplate or the catalogue;
3. The year of manufacture: see motor nameplate;
4. Manufacturer's name or trade mark, commercial registration number and place of manufacturer: see the motor nameplate;
5. product's model number: see motor nameplate or the catalogue (http://franklinwater.eu/products/);
6. Number of poles of the motor: see motor nameplate or the catalogue (http://franklinwater.eu/products/);
7. The rated power output(s) or range of rated power output (kW): see motor nameplate or the catalogue (http://franklinwater.eu/products/);
8. The rated input frequency(s) of the motor (Hz): see motor nameplate or the catalogue (http://franklinwater.eu/products/);
9. The rated voltage(s) or range of rated voltage (V): see motor nameplate or the catalogue (http://franklinwater.eu/products/);
10. The rated speed(s) or range of rated speed (rpm): see motor nameplate or the catalogue (http://franklinwater.eu/products/);
11. Information relevant for disassembly, recycling or disposal at end-of-life: see the motor Instruction manual;
12. information on the range of operating conditions for which the motor is specifically designed (http://franklinwater.eu/products/):

    a. altitudes above sea-level: 0-1000 m;
    b. ambient air temperatures, including for motors with air cooling: max. 40°C;
    c. ---;
    d. maximum operating temperature: max. 60°C;
    e. ---.

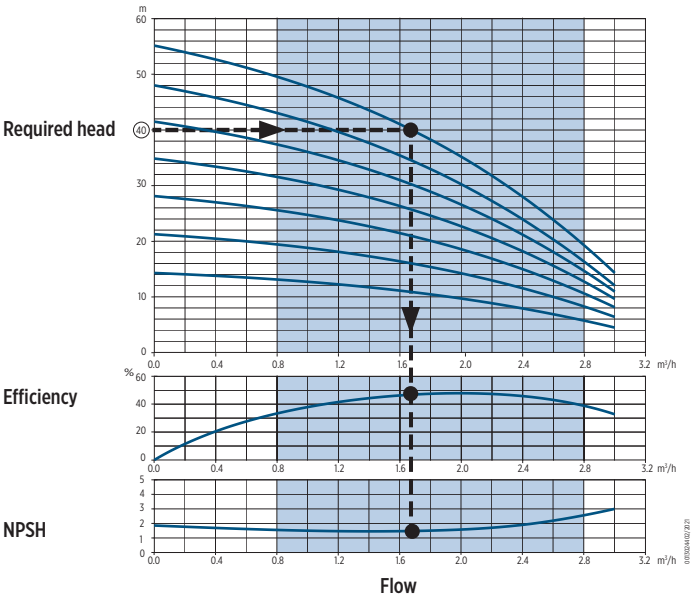
PERFORMANCE SELECTION

This section describes how to select the pump model that better suits your needs.

The required information are:

- The required flow
- The input and output pressure
- The fluid features (density, viscosity, temperature, chemical aggressiveness and presence of abrasive particles)
- The connection type

Check if the pump piping type selected is able to withstand the maximum working pressure required (pump nominal pressure PN ≥ application nominal pressure).



The difference between the outlet required pressure and the input pressure allows to determine the head the pump must supply to the fluid. The duty point is determined crossing the values of flow and head.

For the best selection of multistage pump, proceed in this way:

1. Select the pump family according to the requested flow (close as much as possible to the best efficiency point).
2. Choose the number of stages nearest to the requested head.
3. Draw a vertical line from duty point to determine the absorbed power, the pump efficiency and the NPSH required.

If the viscosity of fluid is significantly different from clean water at ambient temperature, it's necessesary to change the selection parameters (contact the manufacturer). Moreover, in case the density or viscosity are higher than water values, it will be necessesary to consider a higher power sizing (contact the manufacturer).

NPSH check:

The available pump input NPSH value must be compared with the pump required value in order to avoid performance losses and wearing of the pump.

The maximum height of the pump from the liquid level (H) can be calculated with the following formula:

H = pb x 10.2 – NPSH – Hf – Hv – Hs

Where:

pb: Absolute barometric pressure or absolute pressure of the liquid on suction side [bar].

NPSH: Suction head at maximum duty flow rate [m]

Hf: Pressure drop in the suction pipe at maximum flow rate [m]

Hv: Vapour pressure [m] depending on the temperature of the liquid [m]

Hs: Safety margin [m] (minimum 0.5)

If the calculated value is less than "0", the pump must be positioned below the liquid level by the value of H.

Construction materials selection:

The mechanical seal and elastomers must be selected based on the chemical compatibility with the pumped fluid and the presence of abrasive particles.

In the same way, the pump materials (metal alloy) must be choosen according to the liquid aggressivity. The liquid aggressivity usually increases with the acidity or the basicity, the concentration of chlorides and salts dissolved, and the working temperature.

Use the table "Compatibility of fluids and materials" (page 18) for the right selection.

HYDRAULIC PERFORMANCE AT 60 HZ

1VR - 3VR

Pump model	Stages	Rated power		P1max * Bar	Q = Delivery											
					l/min 0	8.3	13.3	23.3	26.7	33.3	40.0	46.7	53.3	60.0	70.0	83.3
					m3/h 0	0.5	0.8	1.4	1.6	2.0	2.4	2.8	3.2	3.6	4.2	5.0
					US gpm 0	2.2	3.5	6.2	7.0	8.8	10.6	12.3	14.1	15.8	18.5	83.3
		[kW]	[HP]		H = Total meters head of water column [m]											
1 VR	2	0.37	0.5	3	20.1		18.3	16.3	14.3	12.8	10.0	7.3				
	3	0.37	0.5	4	29.6		26.8	23.5	20.4	18.3	14.1	10.1				
	4	0.37	0.5	6	38.8		34.7	30.1	26.0	23.1	17.5	12.3				
	5	0.55	0.75	7	49.7		44.7	39.1	34.0	30.3	23.3	16.8				
	6	0.55	0.75	9	58.9		52.6	45.7	39.4	35.0	26.6	18.8				
	7	0.75	1.0	10	71.7		65.9	58.6	51.6	46.6	36.7	27.4				
	8	1.1	1.5	12	81.3		75.1	67.0	59.1	53.4	42.2	31.5				
	9	1.1	1.5	14	91.3		84.2	75.0	66.0	59.6	46.9	35.0				
	10	1.1	1.5	15	101.3		93.2	82.8	72.8	65.6	51.6	38.3				
	11	1.1	1.5	17	111.2		102.0	90.5	79.5	71.6	56.2	41.5				
	12	1.5	2	18	123.3		113.8	101.8	89.9	81.4	64.5	48.4				
	13	1.5	2	19	133.3		123.0	109.9	97.0	87.8	69.5	52.1				
	14	1.5	2	19	143.4		132.2	118.0	104.1	94.1	74.4	55.8				
	15	2.2	3	19	152.8		141.0	126.0	111.2	100.5	79.4	59.3				
	17	3	4	18	172.8		159.3	142.1	125.3	113.1	89.2	66.5				
	19	3	4	17	191.2		176.3	157.2	138.5	125.0	98.2	72.8				
	22	3	4	16	220.8		203.3	181.0	159.3	143.6	112.6	83.2				
	25	4	5.5	15	259.2		240.1	215.2	190.7	173.0	137.8	104.4				
3 VR	2	0.37	0.5	3	21.3			19.9	19.1	18.5	17.4	16.3	16.0	12.4	10.0	
	3	0.55	0.75	4	32.4			30.2	29.0	28.1	26.4	24.8	24.3	18.9	15.4	
	4	0.55	0.75	6	42.5			39.1	37.3	36.0	33.6	31.4	30.8	23.3	18.6	
	5	1.1	1.5	7	54.7			52.3	50.7	49.4	46.9	44.4	43.7	34.9	29.2	
	6	1.1	1.5	9	65.5			62.5	60.4	58.8	55.7	52.7	51.8	41.3	34.3	
	7	1.1	1.5	10	76.3			72.5	69.9	68.0	64.4	60.8	59.8	47.5	39.3	
	8	1.5	2	12	88.5			84.4	81.7	79.7	75.7	71.7	70.6	56.7	47.5	
	9	1.5	2	14	99.4			94.7	91.6	89.3	84.7	80.3	79.0	63.3	52.9	
	10	2.2	3	15	109.7			104.6	101.3	98.8	93.7	88.8	87.4	69.9	58.4	
	11	2.2	3	17	120.5			114.8	111.0	108.3	102.7	97.2	95.7	76.4	63.7	
	12	2.2	3	18	131.2			124.9	120.8	117.7	111.6	105.6	103.9	82.9	69.0	
	13	2.2	3	19	141.9			135.0	130.4	127.1	120.4	113.9	112.1	89.2	74.2	
	14	2.2	3	18	152.6			145.0	140.0	136.4	129.2	122.1	120.2	95.5	79.3	
	15	3	4	18	162.1			154.2	149.0	145.2	137.5	130.0	127.9	101.6	84.1	
	16	3	4	18	172.7			164.1	158.5	154.5	146.3	138.2	136.0	107.8	89.2	
	17	3	4	17	183.2			174.0	168.0	163.7	154.9	146.4	144.0	114.0	94.2	
	18	3	4	17	193.8			183.9	177.5	172.9	163.6	154.5	151.9	120.1	99.2	
	19	3	4	17	204.3			193.7	186.9	182.0	172.2	162.6	159.9	126.2	104.1	
	21	4	5.5	15	233.7			223.3	216.2	210.9	200.3	190.0	187.1	150.6	126.4	
	23	4	5.5	14	255.7			244.0	236.1	230.3	218.6	207.2	204.0	163.9	137.4	

* P1max = maximum suction pressure at full speed

HYDRAULIC PERFORMANCE AT 60 HZ

6VR - 10VR

Pump model	Stages	Rated power		P1max * Bar	Q = Delivery																
					l/min 0	40.0	46.7	53.3	60.0	70.0	83.3	100.0	120.0	133.3	150.0	166.7	183.3	200.0	216.7	233.3	266.7
					m3/h 0	2.4	2.8	3.2	3.6	4.2	5.0	6.0	7.2	8.0	9.0	10.0	11.0	12.0	13.0	14.0	16.0
					US gpm 0	10.6	12.3	14.1	15.8	18.5	83.3	26.4	31.7	35.2	39.6	44.0	48.4	52.8	57.2	61.6	70.3
		[kW]	[HP]		H = Total meters head of water column [m]																
6 VR	2	0.55	0.75	4	21.6		19.2	17.9	16.4	14.9	13.1	10.5	9.1								
	3	0.75	1.0	7	33.0		30.4	28.4	26.3	24.1	21.4	17.7	15.5								
	4	1.1	1.5	9	43.6		40.2	37.7	34.9	31.9	28.3	23.3	20.4								
	5	1.1	1.5	11	54.3		49.6	46.4	43.0	39.2	34.7	28.4	24.8								
	6	1.5	2	14	66.1		61.0	57.3	53.2	48.7	43.4	35.9	31.5								
	7	2.2	3	16	76.5		70.7	66.4	61.6	56.4	50.2	41.4	36.3								
	8	2.2	3	18	87.2		80.4	75.5	69.9	63.9	56.9	46.8	41.0								
	9	2.2	3	20	98.0		90.0	84.4	78.2	71.4	63.4	52.1	45.5								
	10	2.2	3	20	108.6		99.5	93.3	86.3	78.8	69.9	57.3	50.0								
	11	3	4	19	118.3		108.7	101.9	94.3	86.1	76.3	62.3	54.2								
	12	3	4	19	128.9		118.1	110.7	102.4	93.4	82.6	67.4	58.6								
	13	3	4	18	139.4		127.5	119.4	110.4	100.6	89.0	72.5	62.9								
	14	3	4	18	150.4		136.6	128.8	119.7	108.5	94.4	76.9	66.9								
	15	4	5.5	17	166.8		153.5	145.4	135.8	123.9	109.0	90.5	79.8								
	16	4	5.5	16	177.8		163.4	154.7	144.4	131.7	115.8	96.0	84.6								
	17	4	5.5	16	188.8		173.2	163.9	152.9	139.4	122.5	101.5	89.4								
	18	4	5.5	15	199.7		183.0	173.1	161.4	147.0	129.2	106.9	94.1								
	19	5.5	7.5	14	211.2		194.3	184.0	171.8	156.7	137.9	114.4	100.8								
	20	5.5	7.5	14	222.1		204.2	193.3	180.4	164.5	144.6	119.9	105.7								
	21	5.5	7.5	13	233.1		214.0	202.5	188.9	172.2	151.3	125.4	110.5								
	23	5.5	7.5	13	254.9		233.5	220.8	205.8	187.5	164.6	136.2	119.8								
10 VR	2	1.1	1.5	6	28.8							26.9	26.1	25.7	24.8	22.4	19.4	13.6			
	3	2.2	3	9	43.4							41.0	39.9	39.3	37.9	34.4	29.8	21.2			
	4	2.2	3	12	57.6							54.0	52.5	51.6	49.7	45.0	38.9	27.5			
	5	3	4	15	71.1							66.6	64.7	63.7	61.3	55.4	47.8	33.5			
	6	4	5.5	18	88.1							83.5	81.3	80.0	77.3	70.4	61.3	44.1			
	7	4	5.5	19	102.5							96.8	94.2	92.7	89.5	81.3	70.7	50.7			
	8	5.5	7.5	19	117.3							111.0	108.0	106.4	102.7	93.4	81.3	58.4			
	9	5.5	7.5	18	131.7							124.3	120.9	119.0	114.8	104.3	90.6	64.9			
	10	7.5	10	17	146.8							139.5	135.9	133.8	129.3	117.7	102.6	74.0			
	11	7.5	10	16	161.3							153.0	148.9	146.7	141.6	128.9	112.2	80.7			
	12	7.5	10	16	175.8							166.4	161.9	159.4	153.9	139.9	121.7	87.4			
	13	7.5	10	15	190.3							179.7	174.8	172.0	166.0	150.8	131.1	93.9			
	15	11	15	13	220.8							210.0	204.4	201.3	194.4	177.0	154.3	111.4			
	17	11	15	12	250.0							236.8	230.4	226.8	218.8	199.0	173.2	124.7			

* P1max = maximum suction pressure at full speed

HYDRAULIC PERFORMANCE AT 60 HZ

15VR - 20VR

Pump model	Stages	Rated power		P1max * Bar	Q = Delivery														
					l/min 0	70.0	120.0	150.0	166.7	183.3	200.0	216.7	233.3	266.7	300.0	350.0	400.0	433.3	466.7	500
					m3/h 0	4.2	7.2	9.0	10.0	11.0	12.0	13.0	14.0	16.0	18.0	21.0	24.0	26.0	28.0	30.0
					US gpm 0	18.5	31.7	39.6	44.0	48.4	52.8	57.2	61.6	70.3	79.1	92.3	105.5	114.3	123.1	131.9
		[kW]	[HP]		H = Total meters head of water column [m]															
15 VR	1	1.5	2	7	18.8		17.1	16.7	16.0	14.8	13.0	10.7	7.7	-						
	2	3	4	15	38.6		34.9	33.9	32.4	30.4	27.2	23.0	17.6	13.7						
	3	4	5.5	20	60.3		55.4	54.1	52.0	49.0	44.5	38.4	30.1	24.3						
	4	5.5	7.5	20	80.3		73.7	71.9	69.1	65.1	59.1	50.9	39.9	32.1						
	5	7.5	10	20	106.2		94.7	92.6	89.7	84.3	78.1	68.9	56.4	47.0						
	6	11	15	18	128.3		116.4	113.9	110.6	104.8	97.9	86.7	72.4	61.1						
	7	11	15	17	149.5		135.2	132.3	128.4	121.5	113.2	100.0	83.3	70.2						
	8	11	15	17	170.6		153.9	150.4	145.8	137.8	128.2	113.0	93.9	78.9						
	9	15	20	16	190.8		172.6	168.9	164.0	155.3	144.8	127.9	106.4	89.5						
	10	15	20	15	211.7		191.3	187.1	181.6	171.8	160.0	141.2	117.3	98.5						
	11	15	20	14	232.6		209.8	205.1	199.0	188.2	175.2	154.4	128.1	107.5						
	12	18.5	25	12	255.3		231.7	226.8	220.4	208.8	194.9	172.5	143.9	121.3						
20 VR	1	2.2	3	7	20.7			18.6	18.4	17.5	16.5	14.9	12.8	11.0	11.3	-				
	2	4	5.5	15	43.5			39.8	39.1	37.8	36.2	33.6	30.3	27.5	22.3	16.2				
	3	5.5	7.5	20	65.7			60.1	58.8	56.9	54.5	50.7	45.9	41.4	33.6	24.6				
	4	7.5	10	20	91.2			82.6	81.0	78.1	74.6	70.9	64.2	58.5	49.3	37.9				
	5	11	15	20	114.7			104.2	102.2	98.6	94.2	89.7	81.4	74.3	62.8	48.6				
	6	11	15	18	137.6			126.5	123.9	120.1	115.7	110.4	100.4	91.8	77.5	60.7				
	7	15	20	17	159.5			147.1	144.1	139.9	135.0	129.0	117.5	107.5	90.9	71.4				
	8	15	20	16	182.0			167.5	164.1	159.1	153.5	146.5	133.3	121.9	102.8	80.5				
	9	18.5	25	15	206.0			190.5	186.8	181.4	175.1	167.6	153.1	140.3	119.0	93.9				
	10	18.5	25	14	228.6			211.2	207.0	201.0	193.9	185.4	169.2	154.9	131.2	103.3				

* P1max = maximum suction pressure at full speed

HYDRAULIC PERFORMANCE AT 60 HZ

30VR - 45VR

Pump model	Stages	Rated power		P1max * Bar	Q = Delivery											
					l/min 0	350.0	417.0	500	566.7	666.7	700.0	800.0	900.0	1000.0	1066.7	1166.7
					m3/h 0	21.0	25.0	30.0	34.0	40.0	42.0	48.0	54.0	60.0	64.0	70.0
					US gpm 0	92.3	109.9	131.9	149.5	175.9	184.7	211.0	237.4	263.8	281.4	307.8
		[kW]	[HP]		H = Total meters head of water column [m]											
30 VR	1-1a	3	4	2	25.6		20.2	18.9	17.2	15.0	12.8	10.2				
	1	4	5.5	7	35.6		28.1	26.6	25.0	23.4	21.2	18.6				
	2-2a	5.5	7.5	5	52.6		43.9	41.5	38.4	34.6	30.6	26.1				
	2-1a	7.5	10	10	62.0		51.4	48.8	45.8	42.6	38.7	34.0				
	2	11	15	15	72.2		59.5	57.1	54.5	51.7	48.1	43.6				
	3-2a	11	15	13	88.7		74.9	71.1	66.7	61.9	56.3	49.6				
	3-1a	11	15	18	98.3		81.8	78.3	74.2	69.8	64.3	57.8				
	3	15	20	20	107.4		89.3	86.2	82.5	78.5	73.4	67.0				
	4-2a	15	20	20	123.7		104.7	100.2	94.7	88.8	81.6	73.1				
	4-1a	15	20	20	133.2		111.7	107.4	102.3	96.7	89.8	81.3				
	4	18.5	25	20	144.0		120.9	116.9	112.3	107.0	100.6	92.2				
	5-2a	18.5	25	20	160.4		136.5	131.1	124.6	117.5	109.0	98.5				
	5-1a	18.5	25	20	170.0		143.5	138.4	132.3	125.4	117.2	106.8				
	5	22	30	20	179.4		150.6	145.8	140.0	133.6	125.6	115.3				
	6-2a	22	30	20	195.7		166.0	159.8	152.2	143.9	133.9	121.5				
	6-1a	22	30	19	205.2		173.0	167.1	159.8	151.8	142.1	129.8				
	6	30	40	17	217.2		184.0	178.5	171.9	164.3	155.2	143.0				
	7-2a	30	40	18	233.7		200.0	193.1	184.7	175.1	164.0	149.7				
	7-1a	30	40	17	243.4		207.2	200.6	192.6	183.4	172.5	158.3				
	7	30	40	15	253.1		214.4	208.1	200.4	191.6	181.0	167.0				
	8-2a	30	40	16	269.6		230.3	222.6	213.1	202.3	189.8	173.5				
	8-1a	37	50	15	279.8		239.1	231.7	222.8	212.4	200.3	184.2				
	8	37	50	13	289.6		246.4	239.3	230.7	220.7	208.9	192.9				
45 VR	1-1a	5.5	7.5	10	29.0					24.1	23.0	21.9	19.6	17.2	14.4	10.2
	1	7.5	10	10	36.7					30.3	29.7	28.6	26.4	24.4	21.6	17.5
	2-2a	11	15	20	57.2					50.9	49.1	47.1	43.1	38.9	34.3	26.6
	2-1a	11	15	20	64.7					56.6	55.2	53.1	49.2	45.6	40.8	33.3
	2	15	20	20	71.2					62.0	60.8	59.2	55.6	51.9	47.2	40.1
	3-2a	18.5	25	20	92.6					83.9	81.9	79.0	73.5	68.2	61.8	50.7
	3-1a	18.5	25	20	99.5					89.0	87.2	84.6	79.4	74.1	67.6	57.0
	3	18.5	25	20	106.3					94.2	92.5	90.3	85.3	79.9	73.4	63.2
	4-2a	22	30	20	126.9					114.7	112.2	108.6	101.8	94.7	86.4	72.2
	4-1a	30	40	20	135.1					122.2	120.0	116.9	110.5	103.4	95.3	81.7
	4	30	40	20	142.0					127.5	125.4	122.7	116.5	109.4	101.4	88.1
	5-2a	30	40	20	162.9					148.6	145.8	141.7	133.6	124.9	114.9	97.8
	5-1a	30	40	20	169.8					153.8	151.1	147.5	139.7	130.8	120.9	104.2
	5	37	50	20	177.1					160.0	157.5	154.3	146.8	138.0	128.2	111.9
	6-2a	37	50	20	198.0					181.2	178.0	173.5	164.1	153.6	141.9	121.8
	6-1a	37	50	19	204.9					186.5	183.4	179.3	170.2	159.6	148.0	128.2
	6	37	50	18	211.8					191.8	188.8	185.0	176.2	165.6	154.0	134.6
	7-2a	45	60	18	233.7					214.5	210.8	205.8	195.1	183.0	169.5	146.5
	7-1a	45	60	17	240.7					219.8	216.2	211.6	201.3	189.0	175.6	152.9
	7	45	60	17	247.7					225.1	221.7	217.4	207.4	195.1	181.7	159.3

* H1 = maximum suction pressure at full speed

HYDRAULIC PERFORMANCE AT 60 HZ

65VR - 95VR

Pump model	Stages	Rated power		P1max * Bar	Q = Delivery													
					l/min 0	417.0	500	666.7	750.0	833.3	1000.0	1166.7	1333.3	1466.7	1666.7	1833.3	1916.7	2000.0
					m^3/h 0	25.0	30.0	40.0	45.0	50.0	60.0	70.0	80.0	88.0	100.0	110.0	115.0	120.0
					US gpm 0	109.9	131.9	175.9	197.9	219.8	263.8	307.8	351.7	386.9	439.7	483.6	505.6	528.4
		[kW]	[HP]		H = Total meters head of water column [m]													
65 VR	1-1a	7.5	10	5	31.2		27.2	25.7	24.2	22.5	19.5	16.1	12.0	6.9				
	1	11	15	11	44.2		36.7	34.2	32.6	31.1	29.2	26.7	23.3	18.6				
	2-2a	15	20	11	56.6		54.7	53.2	51.1	48.4	43.8	38.1	31.6	23.6				
	2-1a	18.5	25	17	73.3		64.7	61.5	58.9	56.3	52.5	47.3	40.4	32.0				
	2	22	30	20	81.3		74.0	71.3	68.9	66.5	64.0	60.2	55.0	48.0				
	3-2a	22	30	20	97.1		91.5	88.6	85.4	81.4	75.5	67.9	58.8	47.2				
	3-1a	30	40	18	110.6		102.5	99.0	95.7	92.1	87.4	80.7	72.5	61.6				
	3	30	40	17	122.8		111.8	107.9	104.4	100.8	97.2	91.5	83.9	73.6				
	4-2a	37	50	16	135.8		127.4	123.5	119.5	114.7	107.7	98.4	86.9	71.9				
	4-1a	37	50	17	148.0		136.9	132.4	128.2	123.6	117.8	109.4	98.6	84.1				
	4	45	60	15	164.6		150.4	144.8	140.2	135.6	130.8	123.3	113.3	99.7				
	5-2a	45	60	13	180.7		168.3	162.7	157.4	151.3	143.2	131.9	118.0	99.8				
	5-1a	45	60	15	193.0		177.9	171.7	166.1	160.1	153.1	142.7	129.5	111.7				
95 VR	1-1a	11	15	11	38.6				29.9	28.5	27.1	25.6	23.3	20.1	16.4	9.9	5.8	
	1	15	20	18	52.3				39.5	36.1	33.8	32.3	30.7	28.5	25.5	19.8	16.2	
	2-2a	18.5	25	19	73.0				61.5	58.8	56.1	53.5	49.7	44.3	37.7	26.9	19.6	
	2-1a	22	30	20	86.7				71.0	66.4	62.8	60.1	56.9	52.5	46.7	36.5	29.7	
	2	30	40	20	103.0				84.3	79.0	74.6	70.9	67.4	63.7	58.9	49.6	43.5	
	3-2a	37	50	19	122.8				104.5	98.6	93.7	89.9	85.3	79.0	70.3	56.1	46.1	
	3-1a	37	50	19	137.8				116.4	109.9	104.2	99.3	94.4	88.6	80.9	67.3	58.0	
	3	45	60	18	153.7				129.1	122.1	115.5	109.6	104.4	99.1	92.4	79.6	71.0	
	4-2a	45	60	18	173.1				149.0	141.2	134.2	128.3	121.8	113.9	103.4	85.6	73.1	

* P1max = maximum suction pressure at full speed

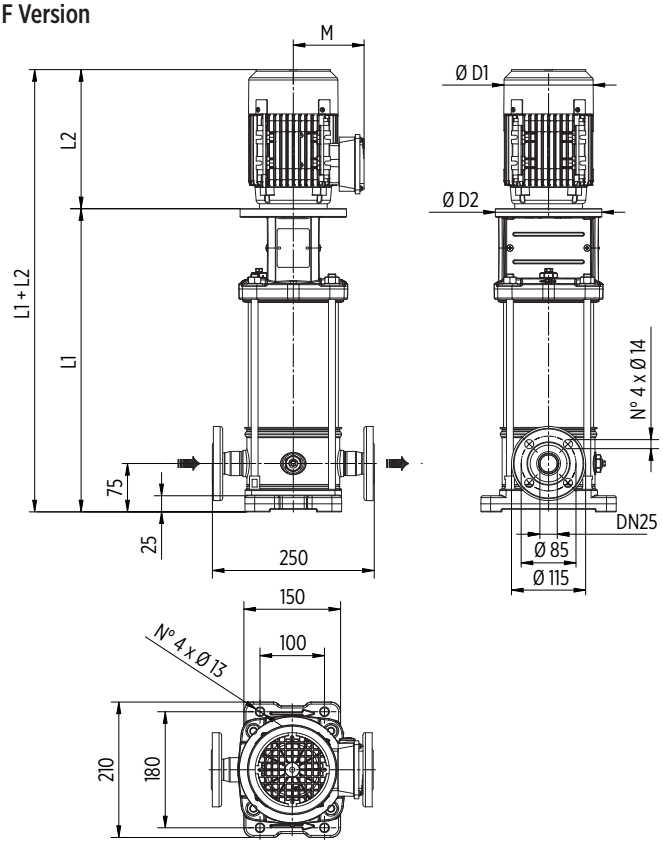
1 VR - 60 HZ

TECHNICAL DATA

Stages	Motor		Dimensions												Weight [kg]		
			L1	L2		L3	L4	L5	M		D1		D2	L1+L2	Pump	Motor	Electric Pump
	[kW]	Dim.	F	1-Phase	3-Phase	T	V	C	1-Phase	3-Phase	1-Phase	3-Phase					
2	0.37	71	322	-	216	297	297	297	-	110	-	139	170	538	12.5	5.8	18.3
3	0.37	71	345	-	216	320	320	320	-	110	-	139	170	561	13	5.8	18.8
4	0.37	71	367	-	216	342	342	342	-	110	-	139	170	583	13.5	5.8	19.3
5	0.55	71	390	-	216	365	365	365	-	110	-	139	170	606	14	6.2	20.2
6	0.55	71	412	-	216	387	387	387	-	110	-	139	170	628	14.5	6.2	20.7
7	0.75	80	435	-	232	410	410	410	-	129	-	160	170	667	15	9.5	24.5
8	1.1	80	457	-	232	432	432	432	-	129	-	160	170	689	15	11.1	26.1
9	1.1	80	480	-	232	455	455	455	-	129	-	160	170	712	15.5	11.1	26.6
10	1.1	80	502	-	232	477	477	477	-	129	-	160	170	734	16	11.1	27.1
11	1.1	80	525	-	232	500	500	500	-	129	-	160	170	757	16.5	11.1	27.6
12	1.5	90	547	-	267	522	522	522	-	138	-	180	170	814	17	14	31
13	1.5	90	570	-	267	545	545	545	-	138	-	180	170	837	17.5	14	31.5
14	1.5	90	592	-	267	567	567	567	-	138	-	180	170	859	18	14	32
15	2.2	90	615	-	267	590	590	590	-	138	-	180	170	882	18.5	16	34.5
17	3	100	660	-	290	-	635	635	-	138	-	180	170	950	19	18	37
19	3	100	705	-	290	-	680	680	-	138	-	180	170	995	20	18	38
22	3	100	772	-	290	-	747	747	-	138	-	180	170	1062	21.5	18	39.5
25	4	112	840	-	306	-	815	815	-	145	-	196	170	1146	23	22.8	45.8

DIMENSIONAL DRAWINGS

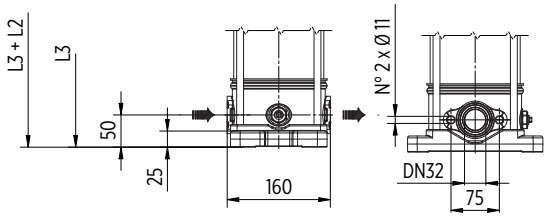
F Version



Round flanges on body type PN25/40: the pump is supplied without counterflanges (Optional accessories, including bolts and joints)

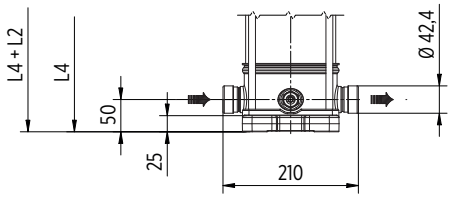
T Version

available from 1VR2 to 1VR23



Oval flanges on body type PN16: the pump is supplied without threaded oval counter flanges (Optional accessories, including bolts and joints)

V Version

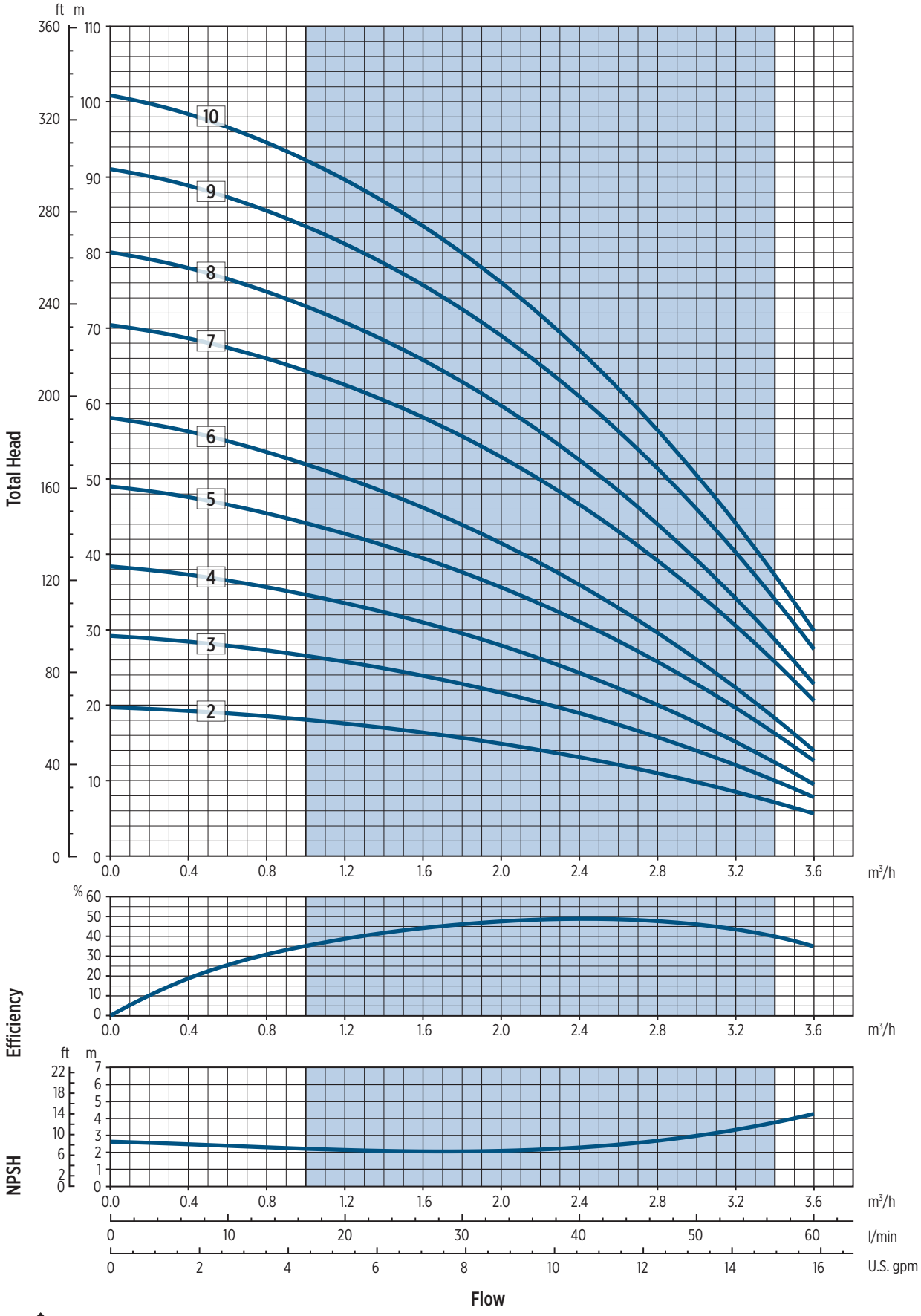


Connections with rapid fittings type "Victaulic": the pump is supplied without the collars (Optional accessories)

00150099 09/2023

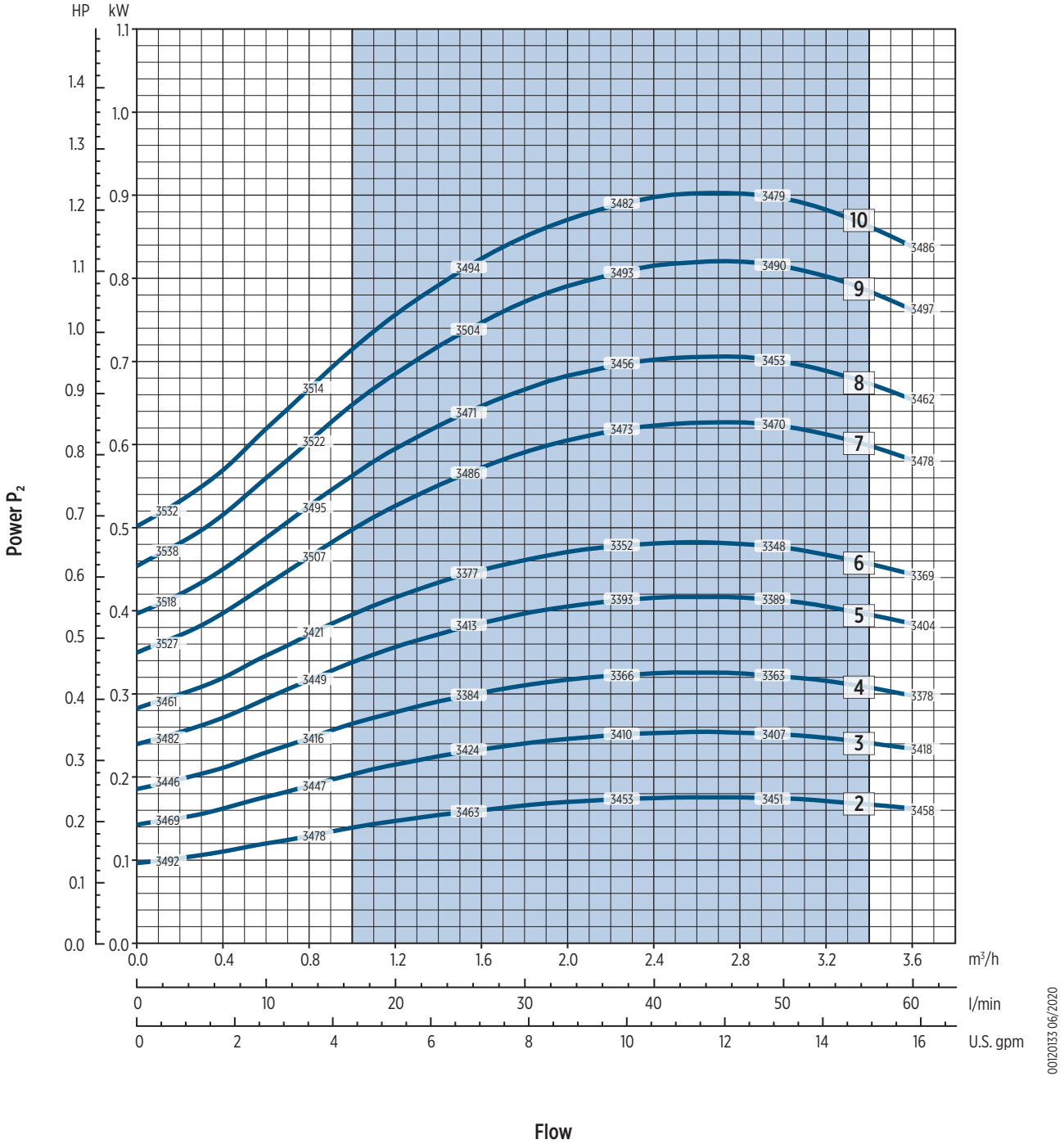
1 VR - PERFORMANCE CURVES AT 60 HZ

MEI ≥ 0,70



1 VR – PERFORMANCE CURVES AT 60 HZ

MEI ≥ 0,70



* The efficiency value is referred to or more stages only for full diameter impeller

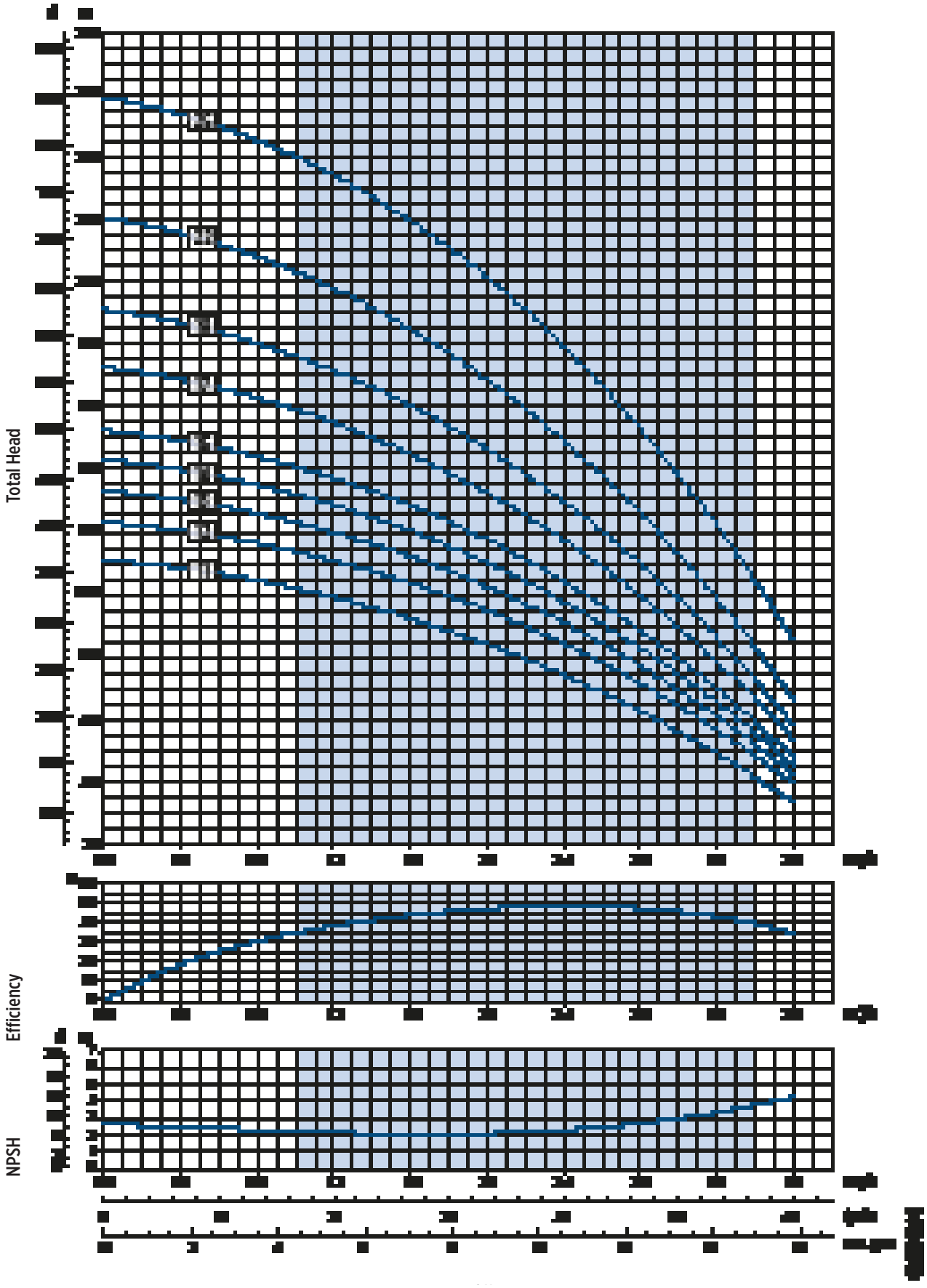
Performance curves of Q, H and P depend on the rpm number according to the following formula:

$$Q_2 = Q_1 \cdot \left(\frac{n_2}{n_1}\right) \quad , \quad H_2 = H_1 \cdot \left(\frac{n_2}{n_1}\right)^2 \quad , \quad P_2 = P_1 \cdot \left(\frac{n_2}{n_1}\right)^3 \quad , \quad \eta \text{ remains approximately the same.}$$

The rpm number related to the performance curves (Q-H-P) is indicated in the power chart.
Performance curves (Q-H-P) will change according to the formulas above.
Q=Flow, H=Head, P=Power, η=Efficiency

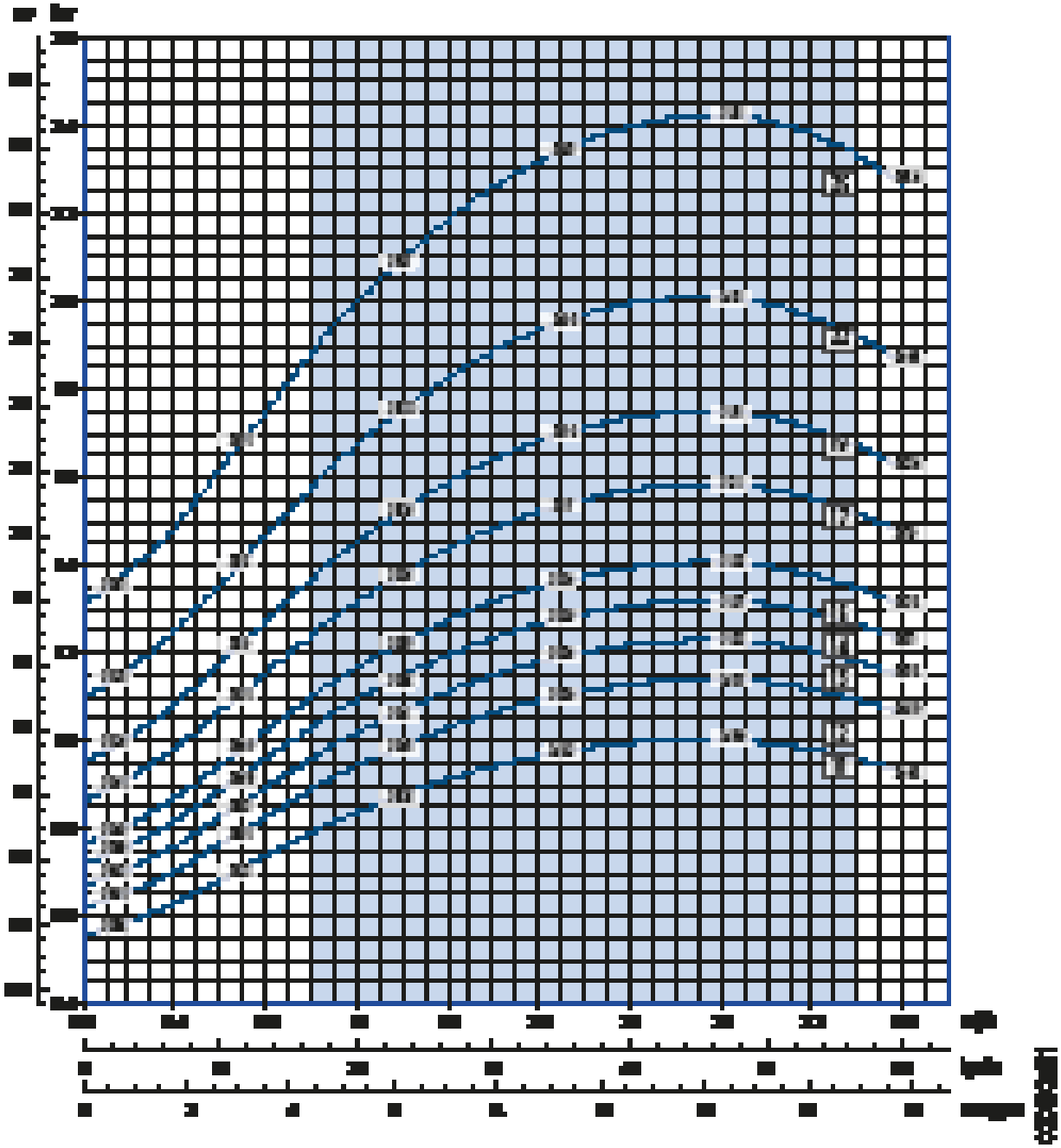
1 VR - PERFORMANCE CURVES AT 60 HZ

MEI ≥ 0,70



1 VR – PERFORMANCE CURVES AT 60 HZ

MEI ≥ 0,70



* The efficiency value is referred to or more stages only for full diameter impeller

Performance curves of Q, H and P depend on the rpm number according to the following formula:

$$Q_2 = Q_1 \cdot \left(\frac{n_2}{n_1}\right) \quad , \quad H_2 = H_1 \cdot \left(\frac{n_2}{n_1}\right)^2 \quad , \quad P_2 = P_1 \cdot \left(\frac{n_2}{n_1}\right)^3 \quad , \quad \eta \text{ remains approximately the same.}$$

The rpm number related to the performance curves (Q-H-P) is indicated in the power chart.
Performance curves (Q-H-P) will change according to the formulas above.
Q=Flow, H=Head, P=Power, η=Efficiency

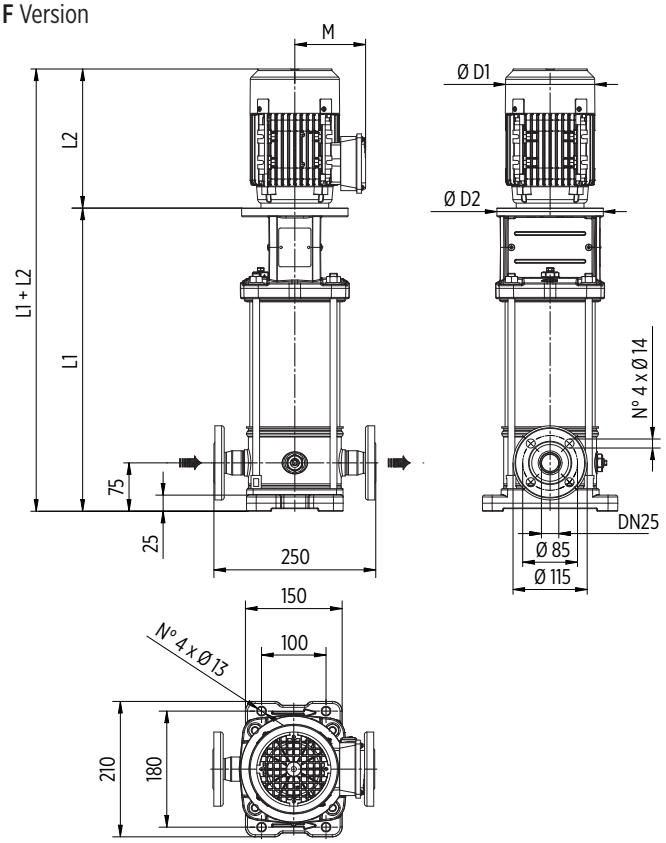
3 VR - 60 HZ

TECHNICAL DATA

Stages	Motor		Dimensions												Weight [kg]		
			L1	L2		L3	L4	L5	M		D1		D2	L1+L2	Pump	Motor	Electric Pump
	[kW]	Dim.	F	1-Phase	3-Phase	T	V	C	1-Phase	3-Phase	1-Phase	3-Phase					
2	0.37	71	322	-	216	297	297	297	-	110	-	139	170	538	12.5	5.8	18.3
3	0.55	71	345	-	216	320	320	320	-	110	-	139	170	561	13	6.2	19.2
4	0.55	71	367	-	216	342	342	342	-	110	-	139	170	583	13.5	6.2	19.7
5	1.1	80	390	-	232	365	365	365	-	129	-	160	170	622	14	11.1	25.1
6	1.1	80	412	-	232	387	387	387	-	129	-	160	170	644	14.5	11.1	25.6
7	1.1	80	435	-	232	410	410	410	-	129	-	160	170	667	15	11.1	26.1
8	1.5	90	457	-	267	432	432	432	-	138	-	180	170	724	15	14	29
9	1.5	90	480	-	267	455	455	455	-	138	-	180	170	747	15.5	14	29.5
10	2.2	90	502	-	267	477	477	477	-	138	-	180	170	769	16	16	32
11	2.2	90	525	-	267	500	500	500	-	138	-	180	170	792	16.5	16	32.5
12	2.2	90	547	-	267	522	522	522	-	138	-	180	170	814	17	16	33
13	2.2	90	570	-	267	545	545	545	-	138	-	180	170	837	17.5	16	33.5
14	2.2	90	592	-	267	567	567	567	-	138	-	180	170	859	18	16	34
15	3	100	615	-	290	-	590	590	-	138	-	180	170	905	18.5	18	36.5
16	3	100	637	-	290	-	612	612	-	138	-	180	170	927	18.5	18	36.5
17	3	100	660	-	290	-	635	635	-	138	-	180	170	950	19	18	37
18	3	100	682	-	290	-	657	657	-	138	-	180	170	972	19.5	18	37.5
19	3	100	705	-	290	-	680	680	-	138	-	180	170	995	20	18	38
21	4	112	750	-	306	-	725	725	-	145	-	196	170	1056	21	22.8	43.8
23	4	112	795	-	306	-	770	770	-	145	-	196	170	1101	22	22.8	44.8

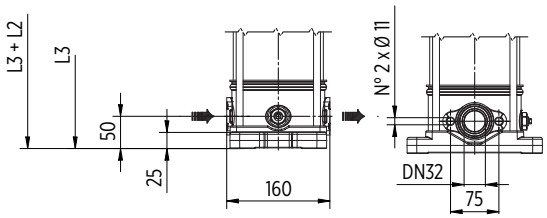
DIMENSIONAL DRAWINGS

F Version



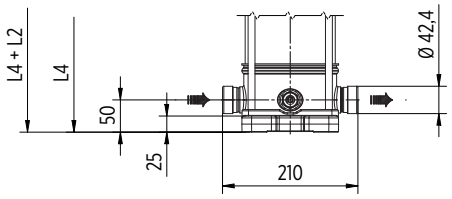
Round flanges on body type PN25/40: the pump is supplied without counterflanges (Optional accessories, including bolts and joints)

T Version available from 1VR2 to 1VR23



Oval flanges on body type PN16: the pump is supplied without threaded oval counter flanges (Optional accessories, including bolts and joints)

V Version

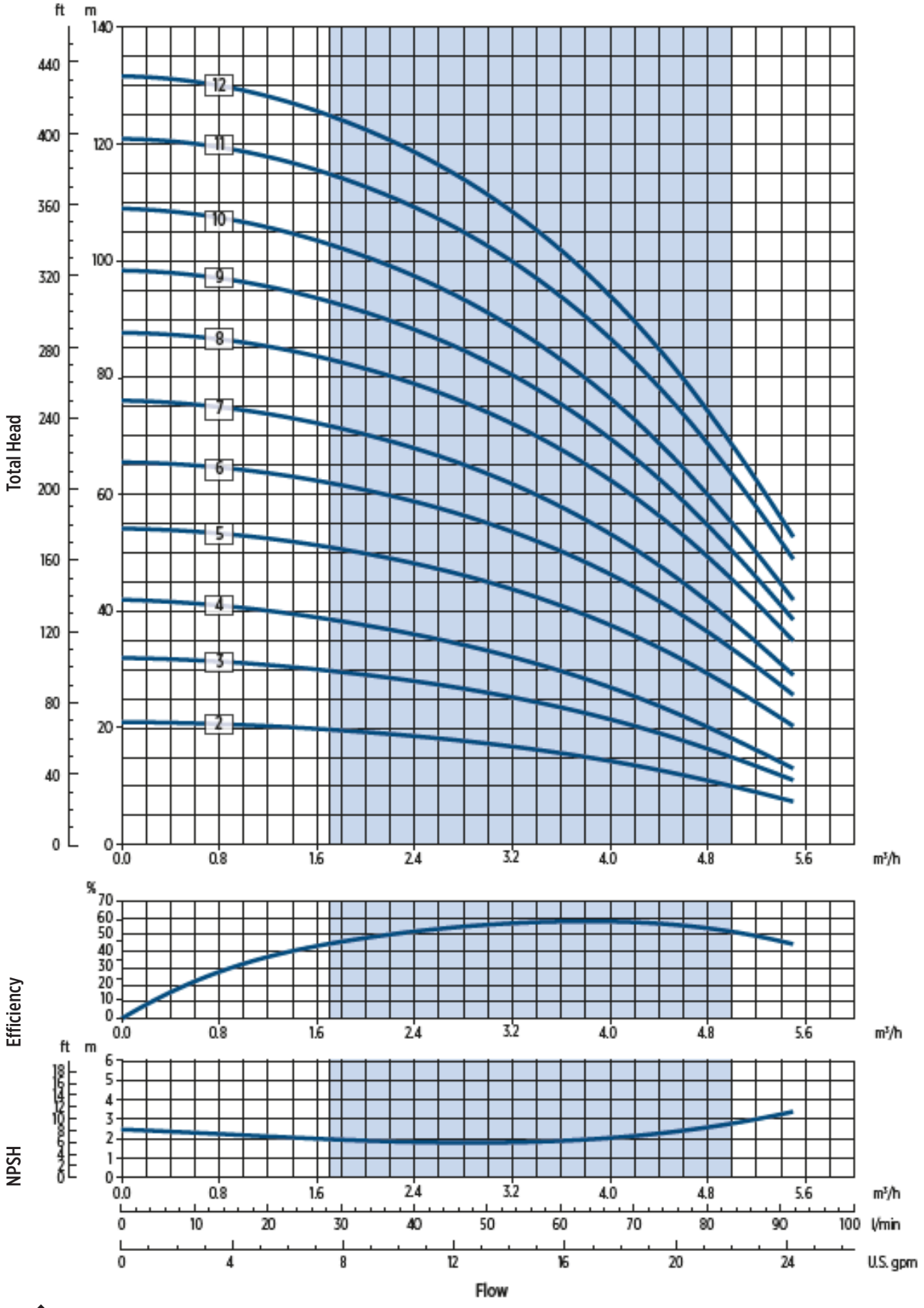


Connections with rapid fittings type "Victaulic": the pump is supplied without the collars (Optional accessories)

00130099 09/2023

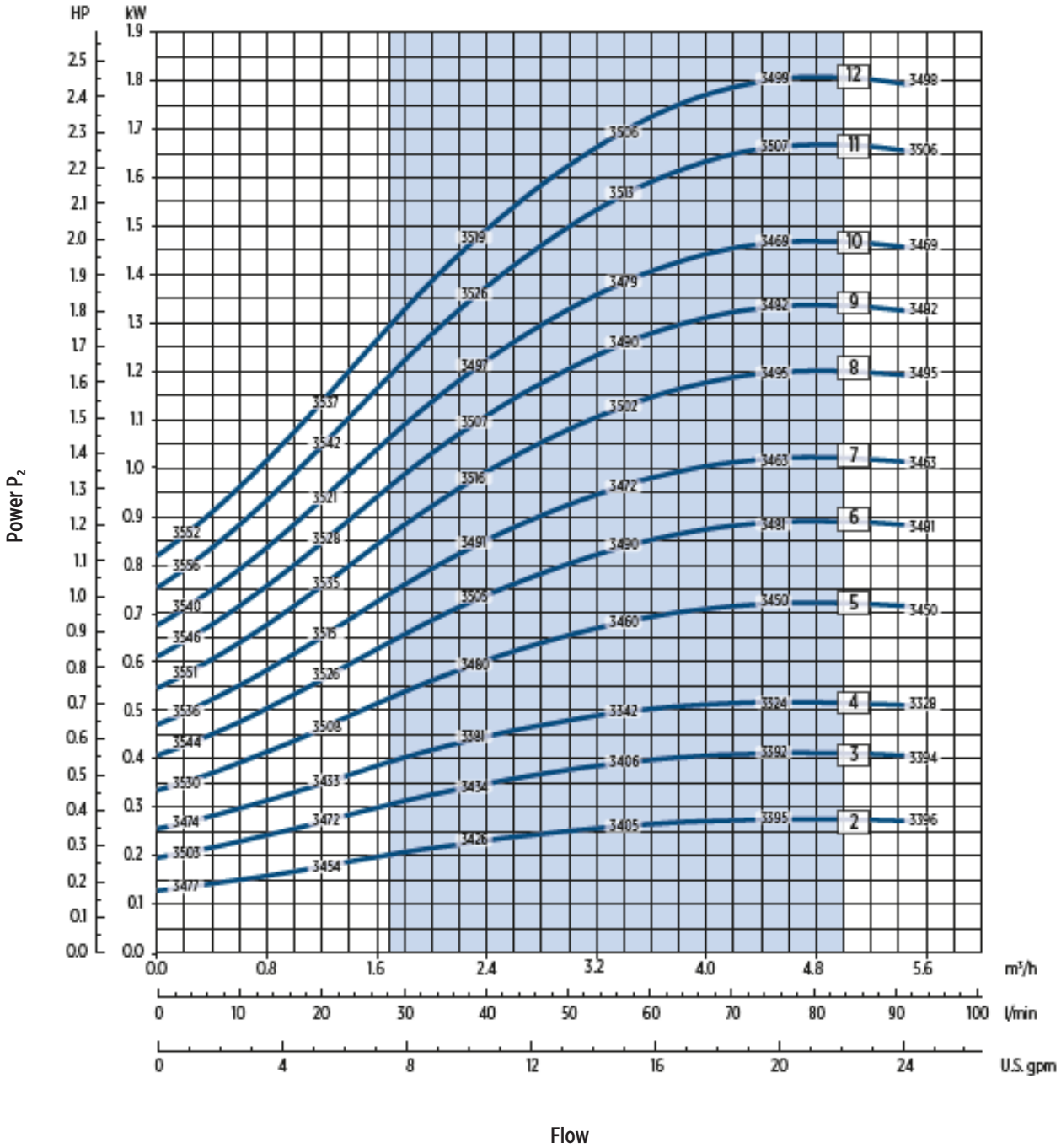
3 VR - PERFORMANCE CURVES AT 60 HZ

MEI ≥ 0,70



3 VR – PERFORMANCE CURVES AT 60 HZ

MEI ≥ 0,70



* The efficiency value is referred to or more stages only for full diameter impeller

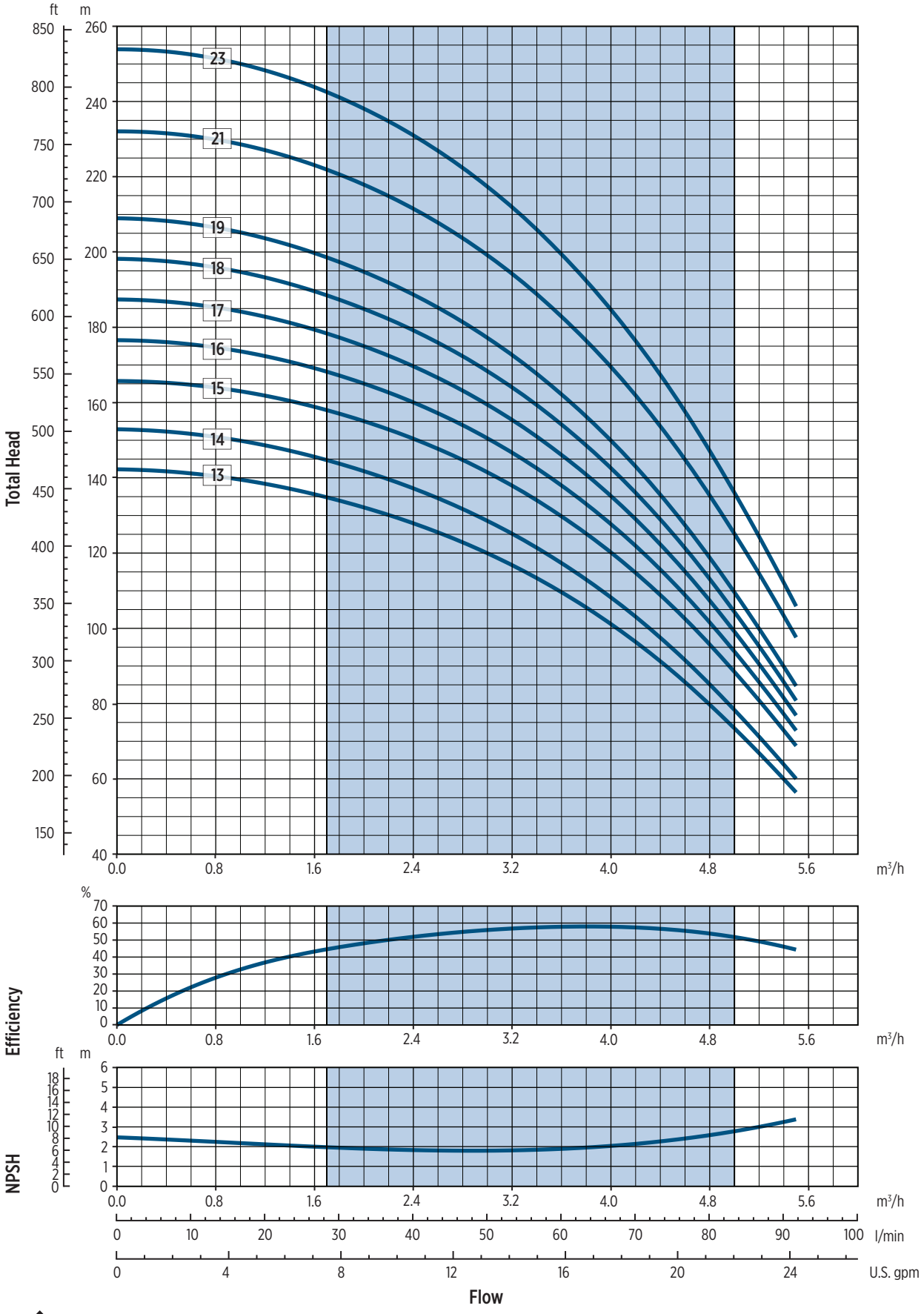
Performance curves of Q, H and P depend on the rpm number according to the following formula:

$$Q_2 = Q_1 \cdot \left(\frac{n_2}{n_1}\right) \quad , \quad H_2 = H_1 \cdot \left(\frac{n_2}{n_1}\right)^2 \quad , \quad P_2 = P_1 \cdot \left(\frac{n_2}{n_1}\right)^3 \quad , \quad \eta \text{ remains approximately the same.}$$

The rpm number related to the performance curves (Q-H-P) is indicated in the power chart.
Performance curves (Q-H-P) will change according to the formulas above.
Q=Flow, H=Head, P=Power, η=Efficiency

3 VR - PERFORMANCE CURVES AT 60 HZ

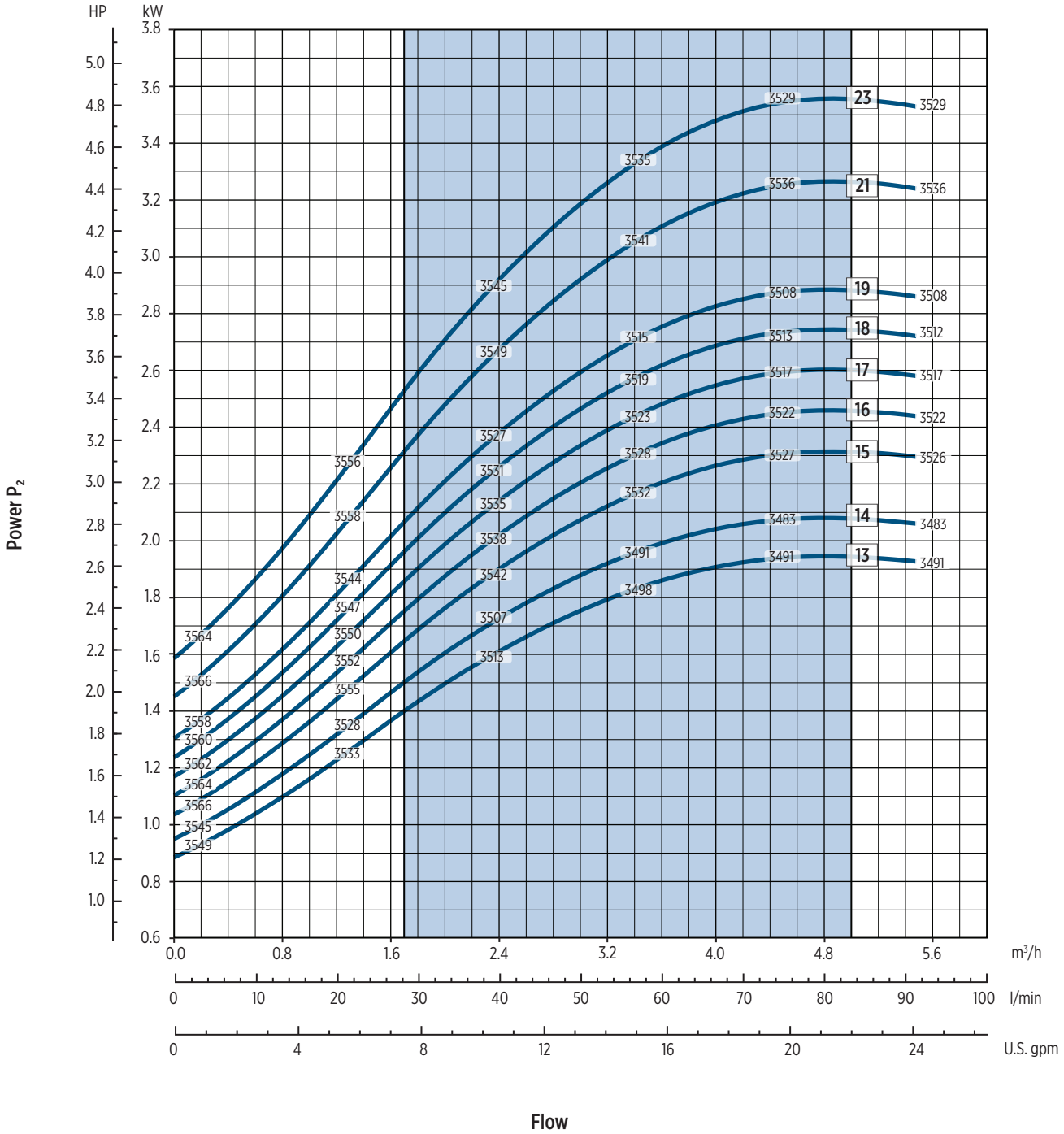
MEI ≥ 0,70



00120136 06/2020

3 VR - PERFORMANCE CURVES AT 60 HZ

MEI ≥ 0,70



* The efficiency value is referred to or more stages only for full diameter impeller

Performance curves of Q, H and P depend on the rpm number according to the following formula:

$$Q_2 = Q_1 \cdot \left(\frac{n_2}{n_1}\right) \quad , \quad H_2 = H_1 \cdot \left(\frac{n_2}{n_1}\right)^2 \quad , \quad P_2 = P_1 \cdot \left(\frac{n_2}{n_1}\right)^3 \quad , \quad \eta \text{ remains approximately the same.}$$

The rpm number related to the performance curves (Q-H-P) is indicated in the power chart.
Performance curves (Q-H-P) will change according to the formulas above.
Q=Flow, H=Head, P=Power, η=Efficiency

6 VR - 60 HZ

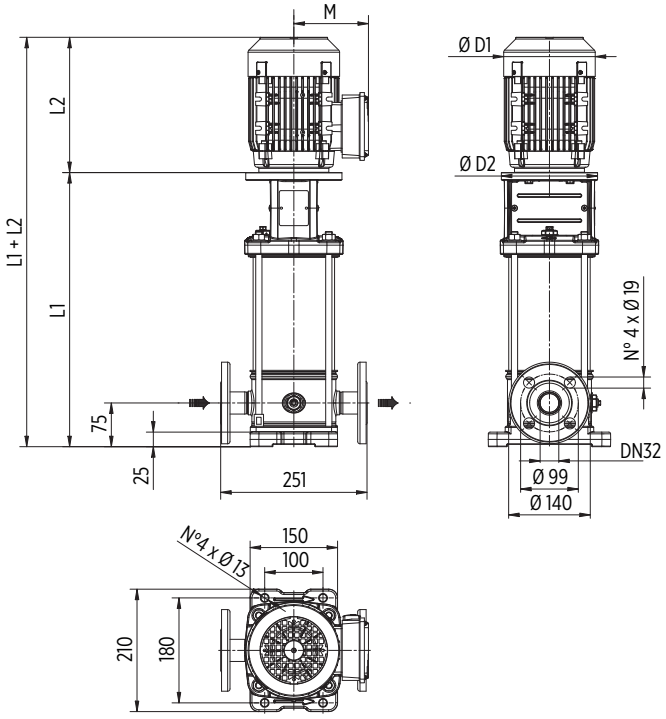
TECHNICAL DATA

Stages	Motor		Dimensions												Weight [kg]		
			L1	L2		L3	L4	L5	M		D1		D2	L1+L2	Pump	Motor	Electric Pump
	[kW]	Dim.	F	1-Phase	3-Phase	T	V	C	1-Phase	3-Phase	1-Phase	3-Phase					
2	0.55	71	329	-	216	304	304	304	-	110	-	139	170	545	13	6.2	19.2
3	0.75	80	355	-	232	330	330	330	-	129	-	160	170	587	13.5	9.5	23
4	1.1	80	381	-	232	356	356	356	-	129	-	160	170	613	14	11.1	25.1
5	1.1	80	407	-	232	382	382	382	-	129	-	160	170	639	14.5	11.1	25.6
6	1.5	90	433	-	267	408	408	408	-	138	-	180	170	700	15	14	29
7	2.2	90	459	-	267	434	434	434	-	138	-	180	170	726	15.5	16	31.5
8	2.2	90	485	-	267	460	460	460	-	138	-	180	170	752	16	16	32
9	2.2	90	511	-	267	486	486	486	-	138	-	180	170	778	16.5	16	32.5
10	2.2	90	537	-	267	512	512	512	-	138	-	180	170	804	17	16	33
11	3	100	563	-	290	538	538	538	-	138	-	180	170	853	17	18	35
12	3	100	589	-	290	564	564	564	-	138	-	180	170	879	17.5	18	35.5
13	3	100	615	-	290	590	590	590	-	138	-	180	170	905	18	18	36
14	3	100	641	-	290	616	616	616	-	138	-	180	170	931	19	18	37
15	4	112	667	-	306	-	642	642	-	145	-	196	170	973	19.5	22.8	42.3
16	4	112	693	-	306	-	668	668	-	145	-	196	170	999	20	22.8	42.8
17	4	112	719	-	306	-	694	694	-	145	-	196	170	1025	20.5	22.8	43.3
18	4	112	745	-	306	-	720	720	-	145	-	196	170	1051	21	22.8	43.8
19	5.5	132	983	-	328	-	958	958	-	160	-	225	300	1311	41	34	75
20	5.5	132	1009	-	328	-	984	984	-	160	-	225	300	1337	41.5	34	75.5
21	5.5	132	1035	-	328	-	1010	1010	-	160	-	225	300	1363	42.5	34	76.5
23	5.5	132	1087	-	328	-	1062	1062	-	160	-	225	300	1415	43.5	34	77.5

* VR 6/36 available only with Victaulic® connections

DIMENSIONAL DRAWINGS

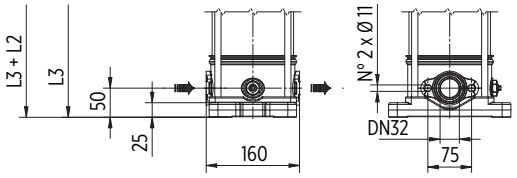
F Version



Round flanges on body type PN25/40: the pump is supplied without counterflanges (Optional accessories, including bolts and joints)

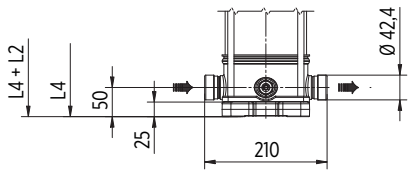
T Version

Available from 6VR2 to 6VR14



Oval flanges on body type PN16: the pump is supplied without threaded oval counter flanges (Optional accessories, including bolts and joints)

V Version

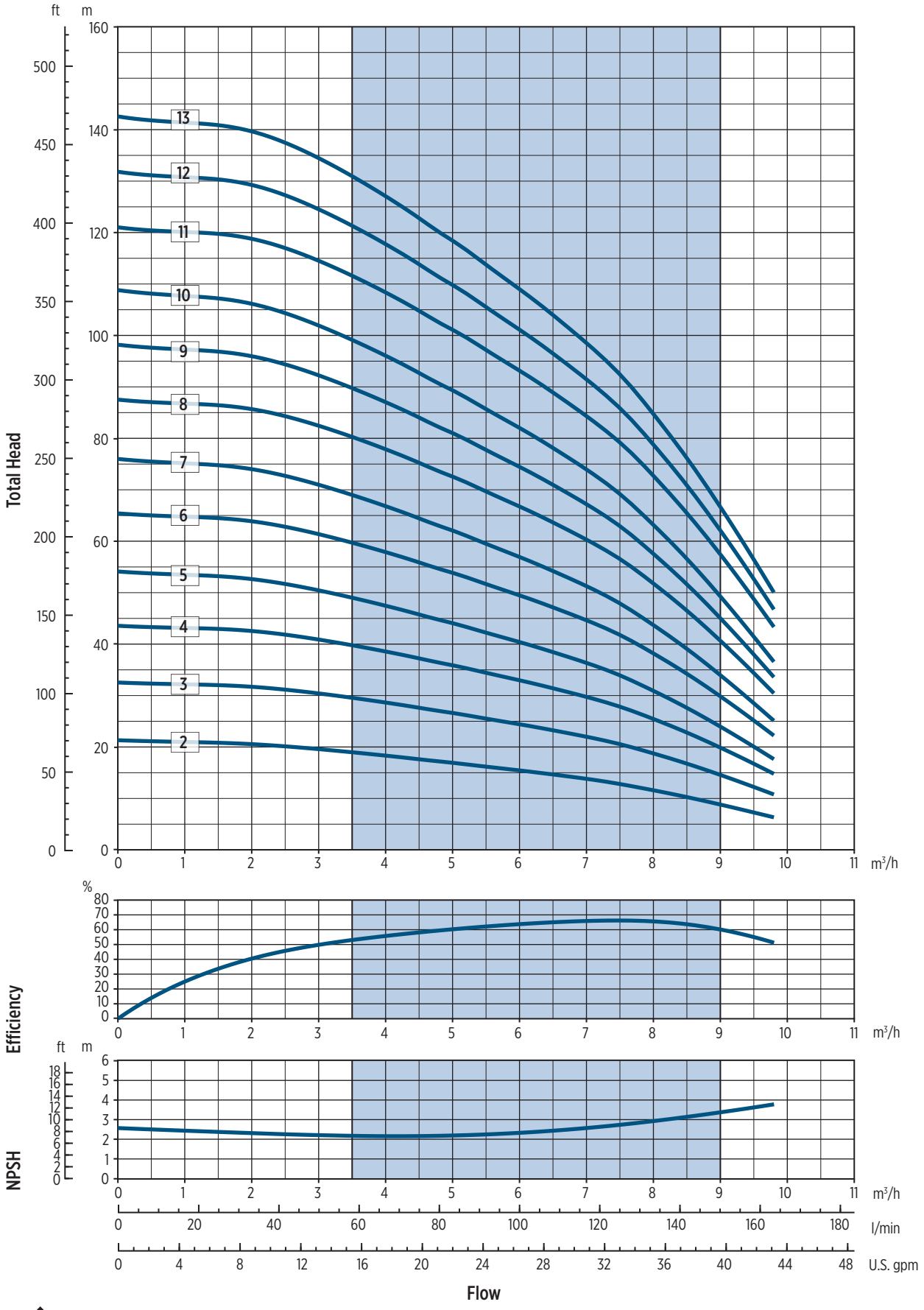


Connections with rapid fittings type "Victaulic": the pump is supplied without the collars (Optional accessories)

00150100 09/2023

6 VR - PERFORMANCE CURVES AT 60 HZ

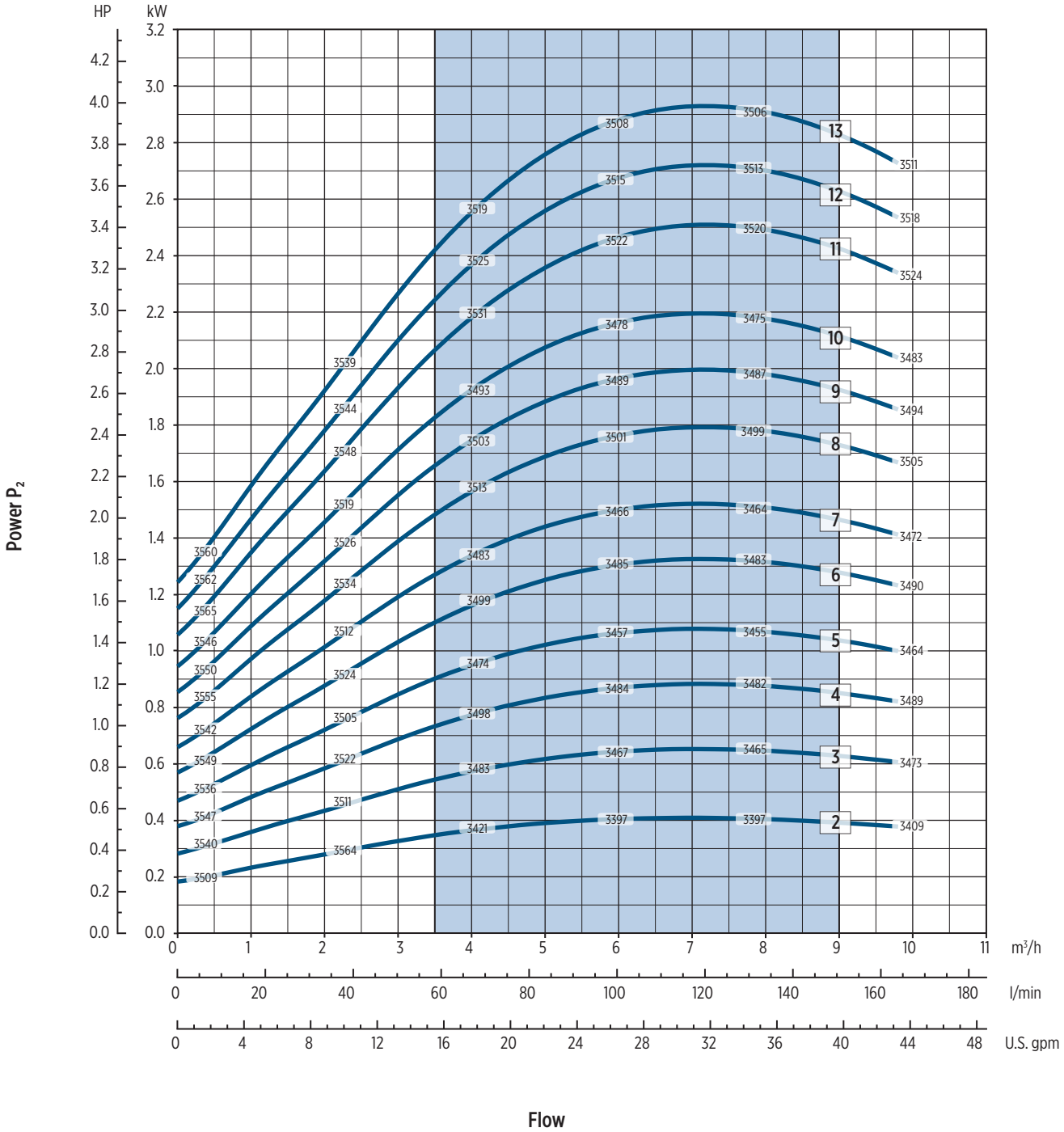
MEI ≥ 0,70



0012035 06/2020

6 VR – PERFORMANCE CURVES AT 60 HZ

MEI ≥ 0,70



* The efficiency value is referred to or more stages only for full diameter impeller

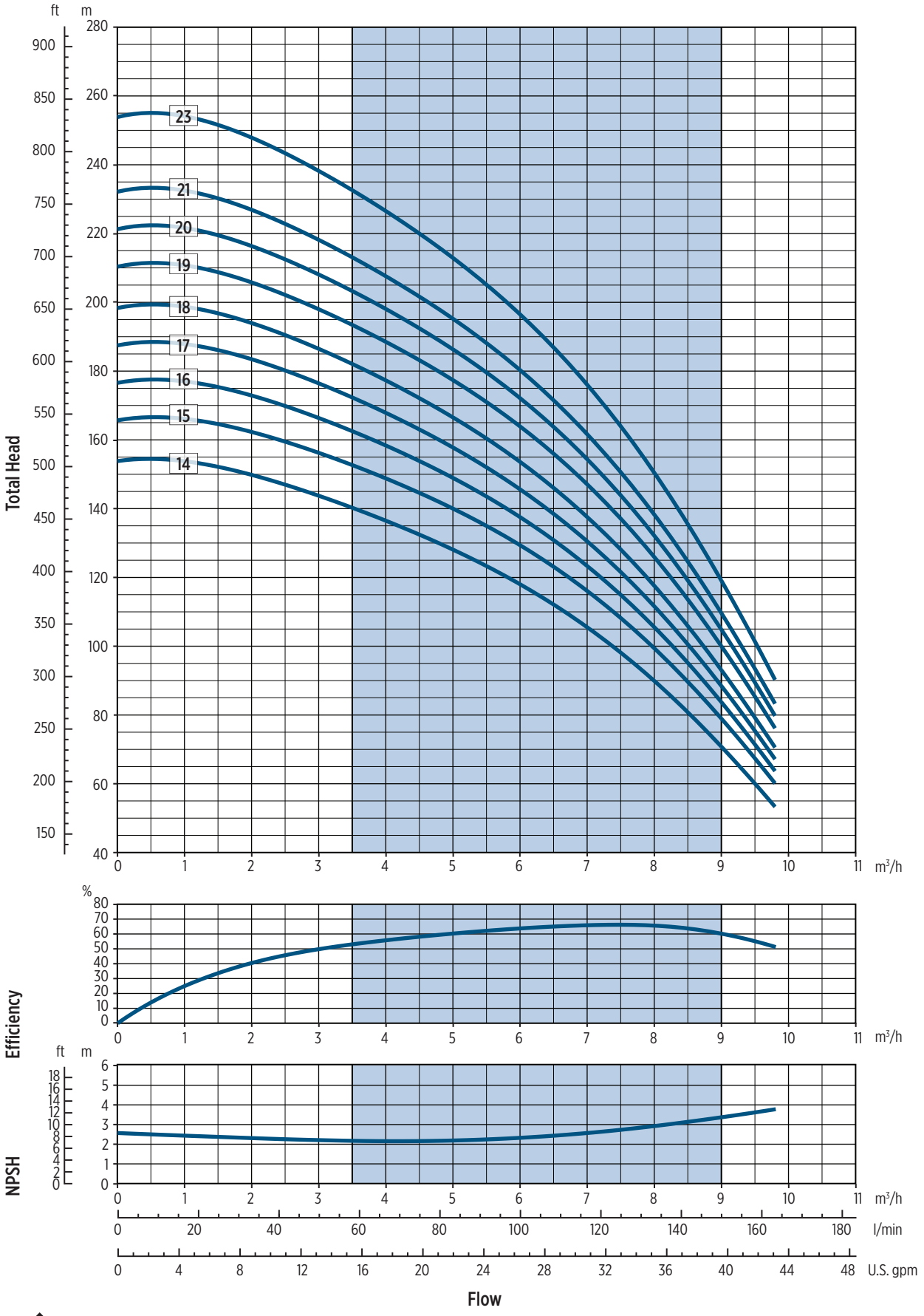
Performance curves of Q, H and P depend on the rpm number according to the following formula:

$$Q_2 = Q_1 \cdot \left(\frac{n_2}{n_1}\right) \quad , \quad H_2 = H_1 \cdot \left(\frac{n_2}{n_1}\right)^2 \quad , \quad P_2 = P_1 \cdot \left(\frac{n_2}{n_1}\right)^3 \quad , \quad \eta \text{ remains approximately the same.}$$

The rpm number related to the performance curves (Q-H-P) is indicated in the power chart.
Performance curves (Q-H-P) will change according to the formulas above.
Q=Flow, H=Head, P=Power, η=Efficiency

6 VR - PERFORMANCE CURVES AT 60 HZ

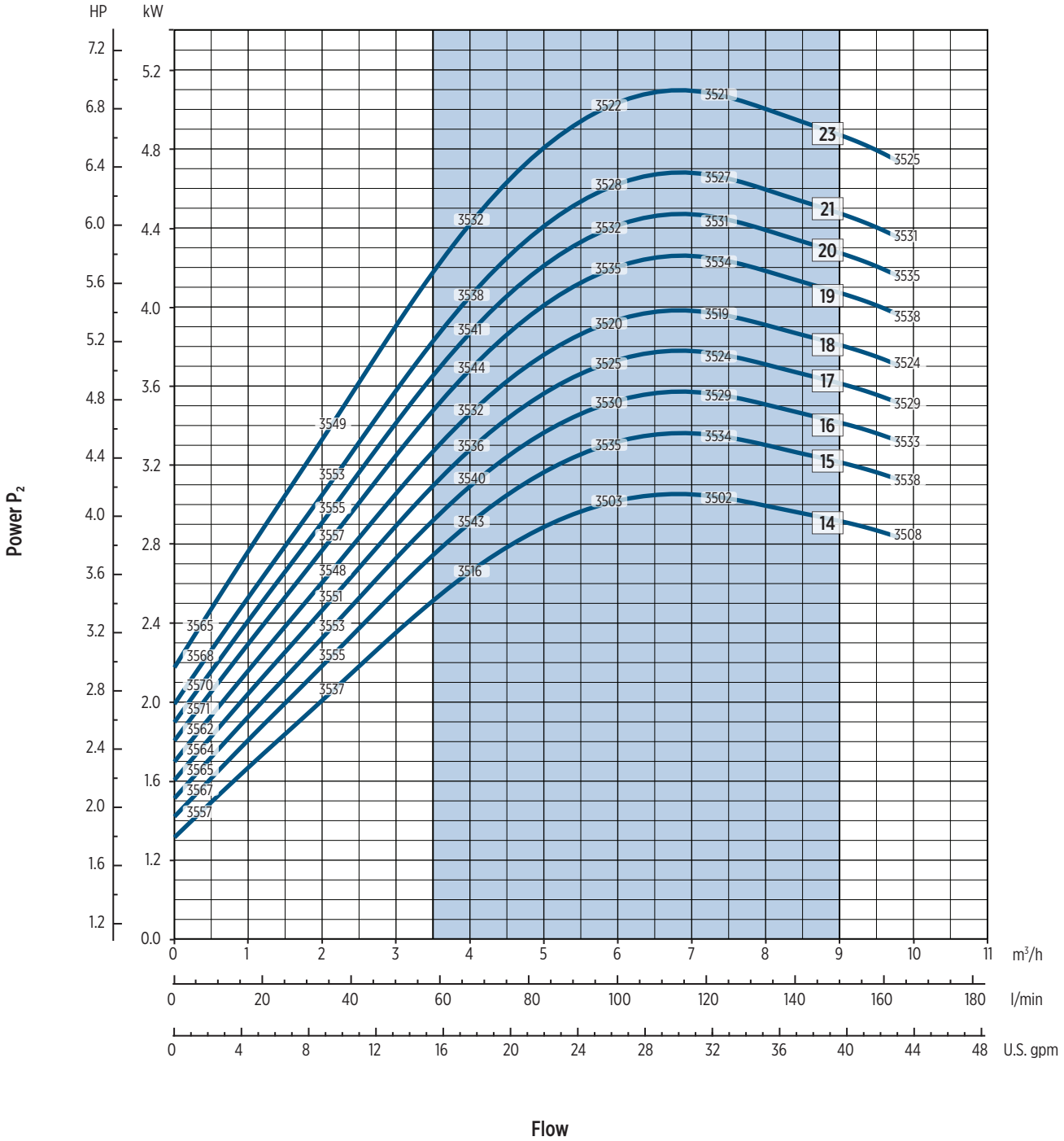
MEI ≥ 0,70



00120138 06/2020

6 VR – PERFORMANCE CURVES AT 60 HZ

MEI ≥ 0,70



* The efficiency value is referred to or more stages only for full diameter impeller

Performance curves of Q, H and P depend on the rpm number according to the following formula:

$$Q_2 = Q_1 \cdot \left(\frac{n_2}{n_1}\right) \quad , \quad H_2 = H_1 \cdot \left(\frac{n_2}{n_1}\right)^2 \quad , \quad P_2 = P_1 \cdot \left(\frac{n_2}{n_1}\right)^3 \quad , \quad \eta \text{ remains approximately the same.}$$

The rpm number related to the performance curves (Q-H-P) is indicated in the power chart.
Performance curves (Q-H-P) will change according to the formulas above.
Q=Flow, H=Head, P=Power, η=Efficiency

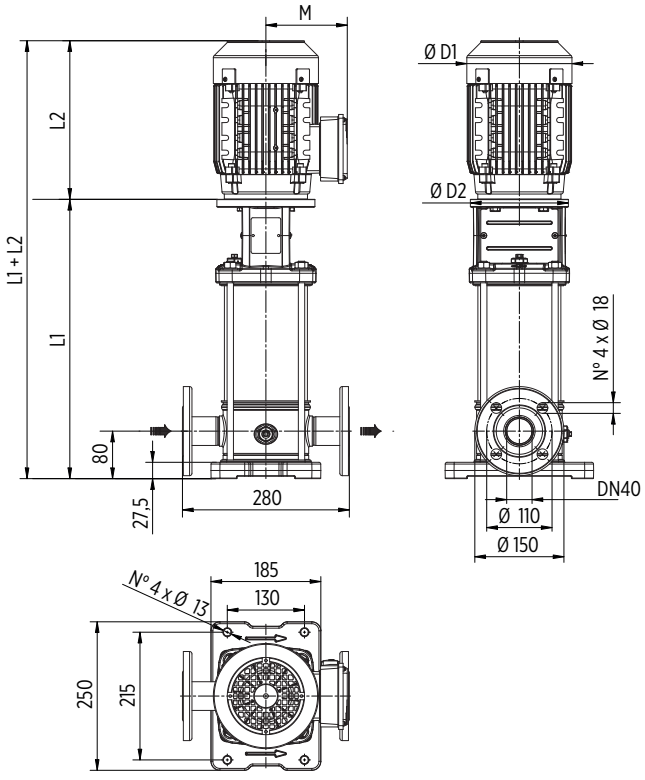
10 VR - 60 HZ

TECHNICAL DATA

Stages	Motor		Dimensions												Weight [kg]		
			L1	L2		L3	L4	L5	M		D1		D2	L1+L2	Pump	Motor	Electric Pump
	[kW]	Dim.	F	1-Phase	3-Phase	T	V	C	1-Phase	3-Phase	1-Phase	3-Phase					
2	1.1	80	350	-	232	350	350	350	-	129	-	160	170	582	14	11.1	25.1
3	2.2	90	380	-	267	380	380	380	-	138	-	180	170	647	14.5	16	30.5
4	2.2	90	410	-	267	410	410	410	-	138	-	180	170	677	15	16	31
5	3	100	440	-	290	440	440	440	-	138	-	180	170	730	15.5	18	33.5
6	4	112	470	-	306	470	470	470	-	145	-	196	170	776	16	22.8	38.8
7	4	112	500	-	306	500	500	500	-	145	-	196	170	806	17	22.8	39.8
8	5.5	132	742	-	328	742	742	742	-	160	-	225	300	1070	37.5	34	71.5
9	5.5	132	772	-	328	772	772	772	-	160	-	225	300	1100	38	34	72
10	7.5	132	802	-	350	802	802	802	-	160	-	225	300	1152	38.5	36	74.5
11	7.5	132	832	-	350	-	832	832	-	160	-	225	300	1182	39.5	36	75.5
12	7.5	132	862	-	350	-	862	862	-	160	-	225	300	1212	40	36	76
13	7.5	132	892	-	350	-	892	892	-	160	-	225	300	1242	40.5	36	76.5
15	11	160	972	-	425	-	972	972	-	194	-	248	350	1397	45	58	103
17	11	160	1032	-	425	-	1032	1032	-	194	-	248	350	1457	46.5	58	104.5

DIMENSIONAL DRAWINGS

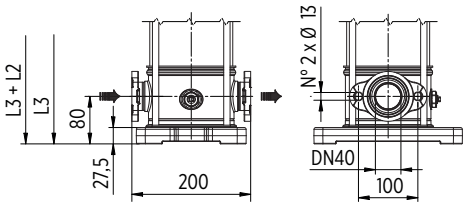
F Version



Round flanges on body type PN25/40: the pump is supplied without counterflanges (Optional accessories, including bolts and joints)

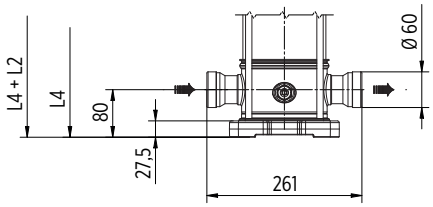
T Version

Available from 10VR2 to 10VR10



Oval flanges on body type PN16: the pump is supplied without threaded oval counter flanges (Optional accessories, including bolts and joints)

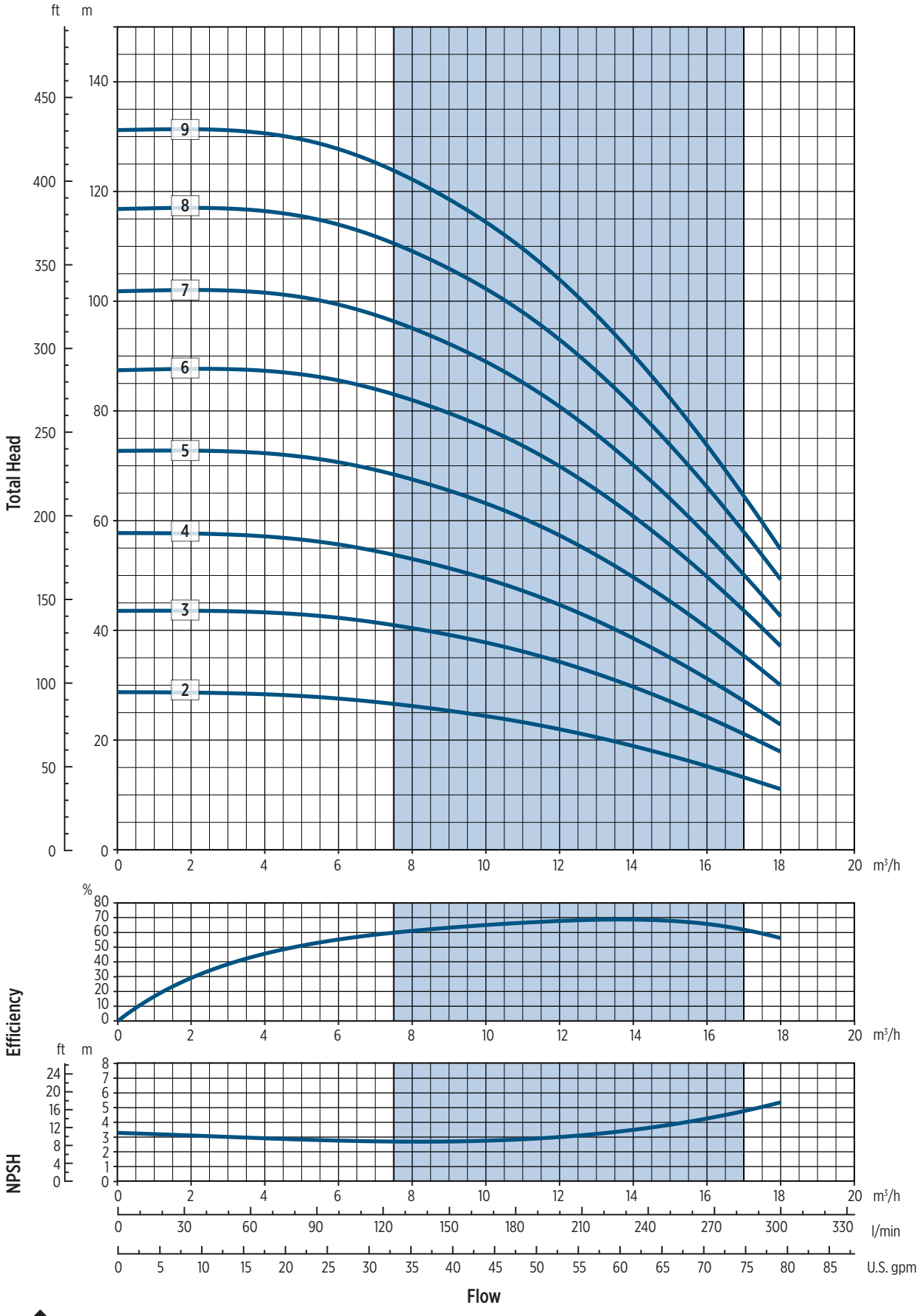
V Version



Connections with rapid fittings type "Victaulic": the pump is supplied without the collars (Optional accessories)

10 VR - PERFORMANCE CURVES AT 60 HZ

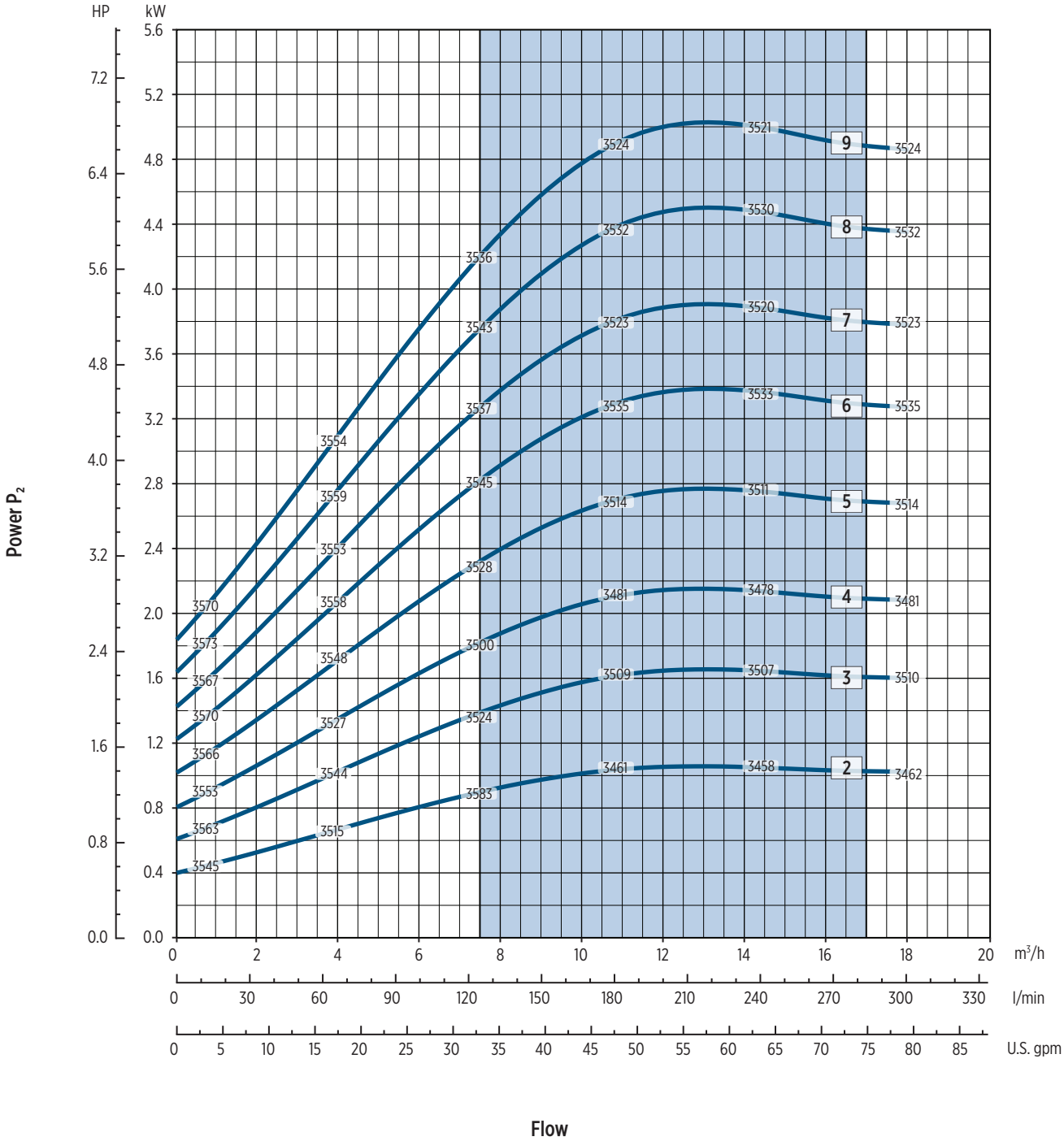
MEI ≥ 0,70



00120139 06/2020

10 VR – PERFORMANCE CURVES AT 60 HZ

MEI ≥ 0,70



* The efficiency value is referred to or more stages only for full diameter impeller

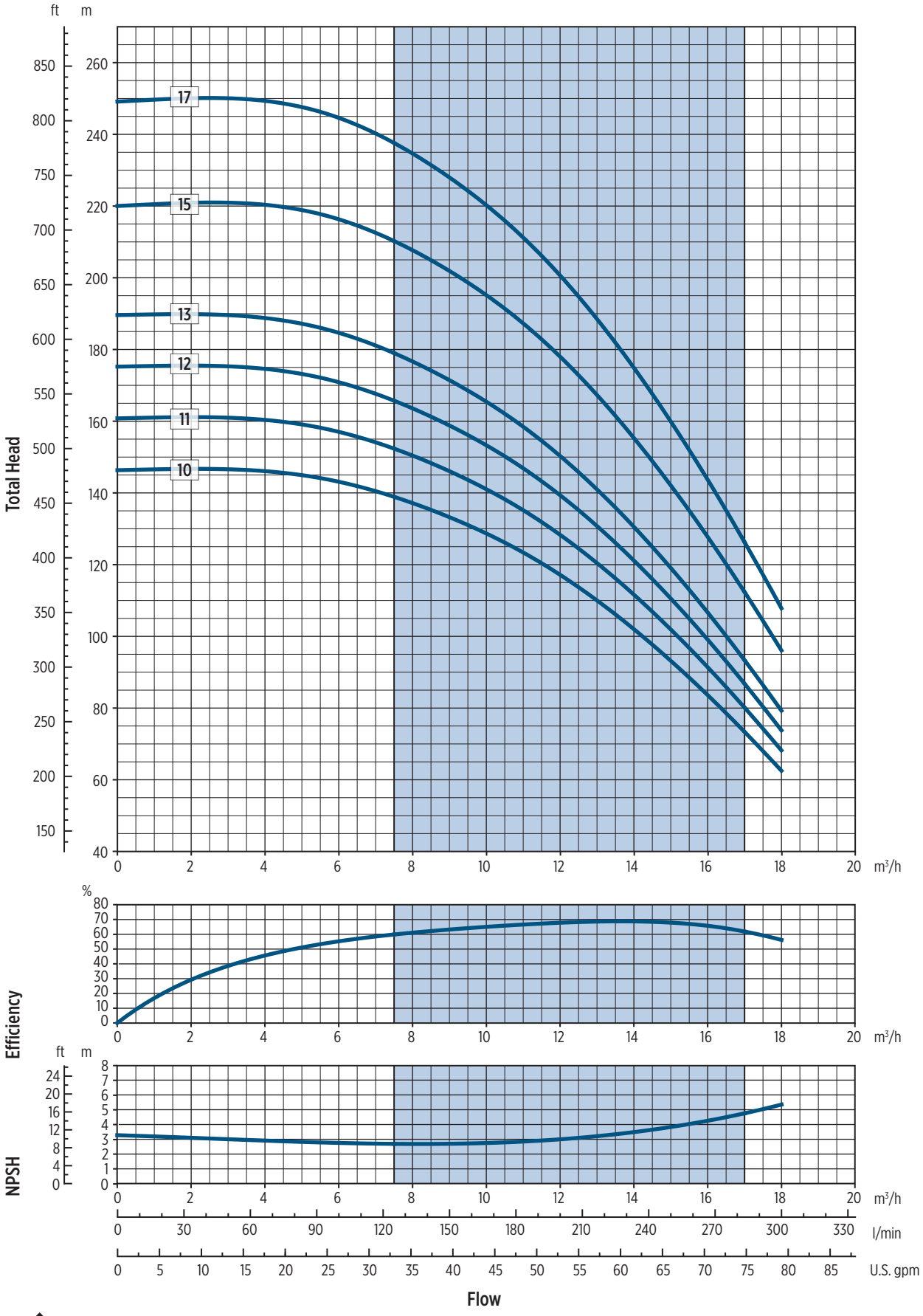
Performance curves of Q, H and P depend on the rpm number according to the following formula:

$$Q_2 = Q_1 \cdot \left(\frac{n_2}{n_1}\right) \quad , \quad H_2 = H_1 \cdot \left(\frac{n_2}{n_1}\right)^2 \quad , \quad P_2 = P_1 \cdot \left(\frac{n_2}{n_1}\right)^3 \quad , \quad \eta \text{ remains approximately the same.}$$

The rpm number related to the performance curves (Q-H-P) is indicated in the power chart.
Performance curves (Q-H-P) will change according to the formulas above.
Q=Flow, H=Head, P=Power, η=Efficiency

10 VR - PERFORMANCE CURVES AT 60 HZ

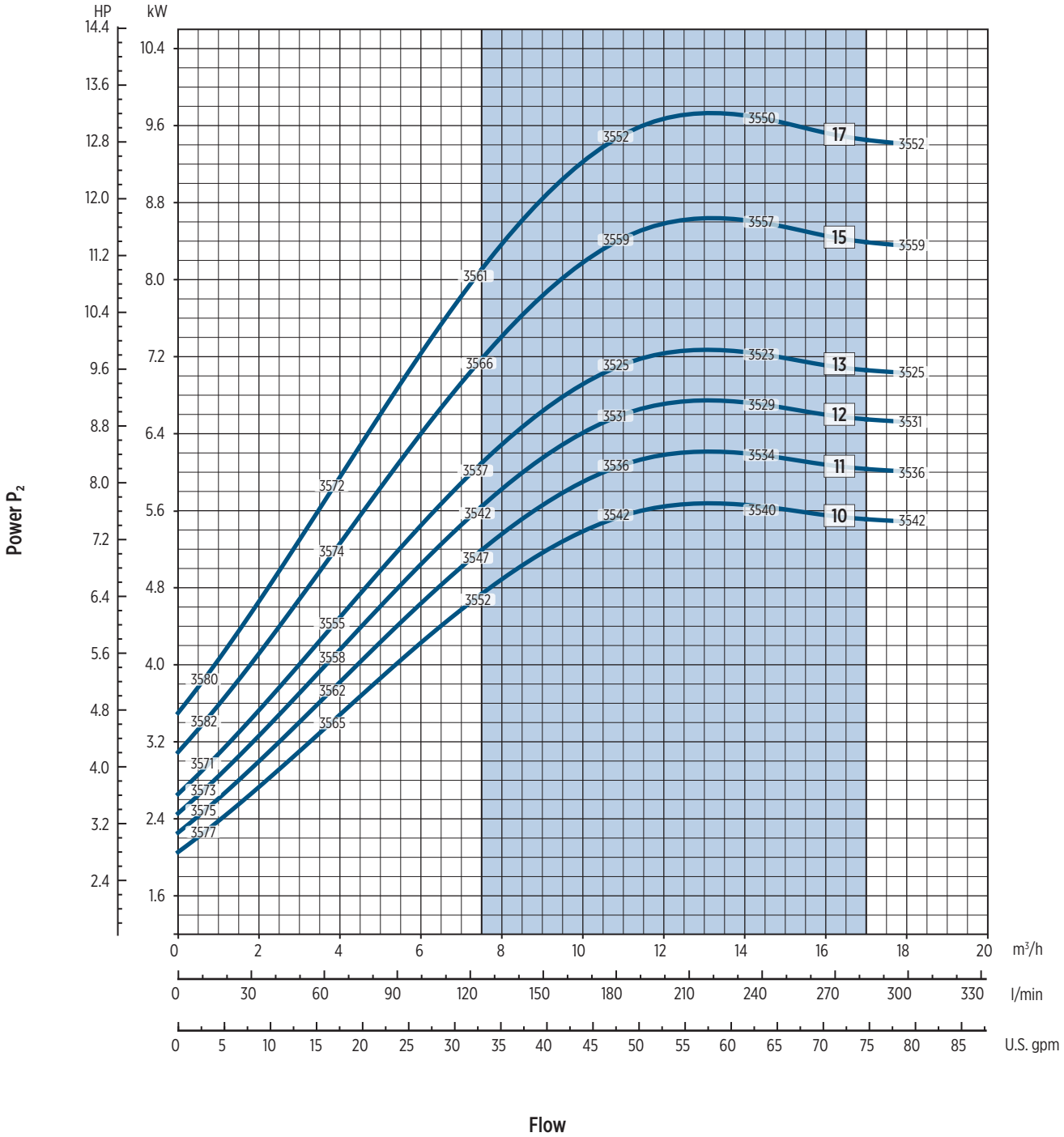
MEI ≥ 0,70



0012014D 06/2020

10 VR – PERFORMANCE CURVES AT 60 HZ

MEI ≥ 0,70



* The efficiency value is referred to or more stages only for full diameter impeller

Performance curves of Q, H and P depend on the rpm number according to the following formula:

$$Q_2 = Q_1 \cdot \left(\frac{n_2}{n_1}\right) \quad , \quad H_2 = H_1 \cdot \left(\frac{n_2}{n_1}\right)^2 \quad , \quad P_2 = P_1 \cdot \left(\frac{n_2}{n_1}\right)^3 \quad , \quad \eta \text{ remains approximately the same.}$$

The rpm number related to the performance curves (Q-H-P) is indicated in the power chart.
Performance curves (Q-H-P) will change according to the formulas above.
Q=Flow, H=Head, P=Power, η=Efficiency

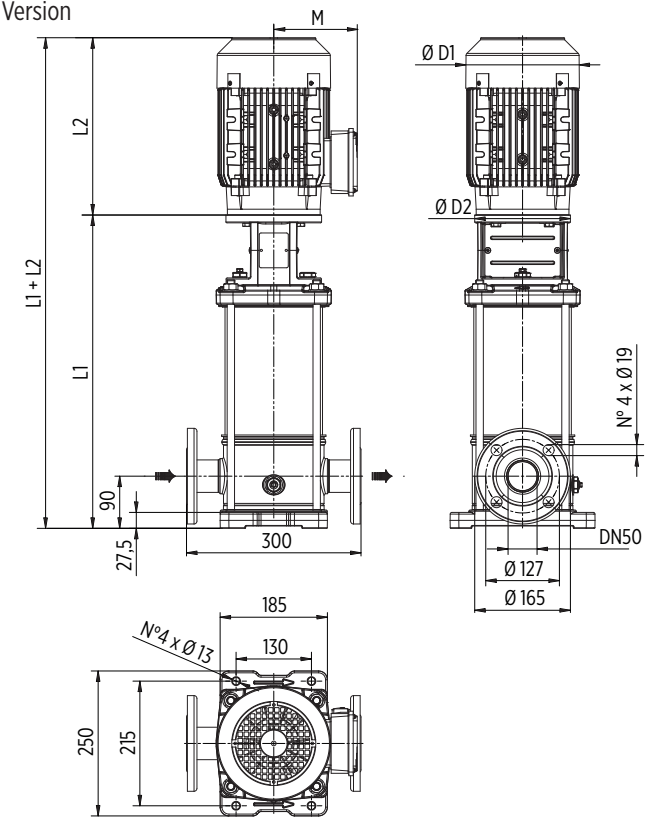
15 VR - 60 HZ

TECHNICAL DATA

Stages	Motor		Dimensions												Weight [kg]		
			L1	L2		L3	L4	L5	M		D1		D2	L1+L2	Pump	Motor	Electric Pump
	[kW]	Dim.	F	1-Phase	3-Phase	T	V	C	1-Phase	3-Phase	1-Phase	3-Phase					
1	1.5	90	396	-	267	396	396	396	-	138	-	180	170	663	18.5	14	32.5
2	3	100	396	-	290	396	396	396	-	138	-	180	170	686	20	18	38
3	4	112	444	-	306	444	444	444	-	145	-	196	170	750	21.5	23	44.3
4	5.5	132	704	-	328	704	704	704	-	160	-	225	300	1032	42.5	34	76.5
5	7.5	132	752	-	350	752	752	752	-	160	-	225	300	1102	44	36	80
6	11	160	820	-	425	820	820	820	-	194	-	248	350	1245	48.5	58	106.5
7	11	160	868	-	425	868	868	868	-	194	-	248	350	1293	50	58	108
8	11	160	916	-	425	-	916	916	-	194	-	248	350	1341	51.5	58	109.5
9	15	160	964	-	476	-	964	964	-	194	-	248	350	1440	53	64	117
10	15	160	1012	-	476	-	1012	1012	-	194	-	248	350	1488	54.5	64	118.5
11	15	160	1060	-	476	-	1060	1060	-	194	-	248	350	1536	55.5	64	119.5
12	18.5	160	1108	-	542	-	1108	1108	-	238	-	317	350	1650	57	98	154.5

DIMENSIONAL DRAWINGS

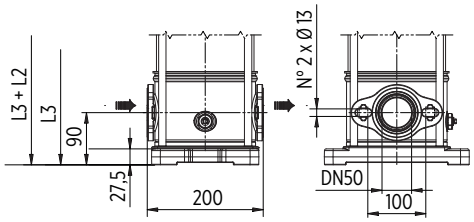
F Version



Round flanges on body type PN25/40: the pump is supplied without counterflanges (Optional accessories, including bolts and joints)

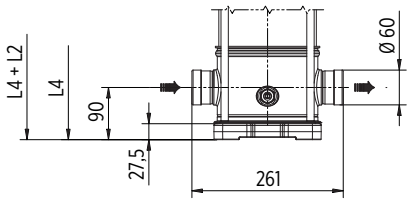
T Version

Available from 15VR1 to 15VR7



Oval flanges on body type PN16: the pump is supplied without threaded oval counter flanges (Optional accessories, including bolts and joints)

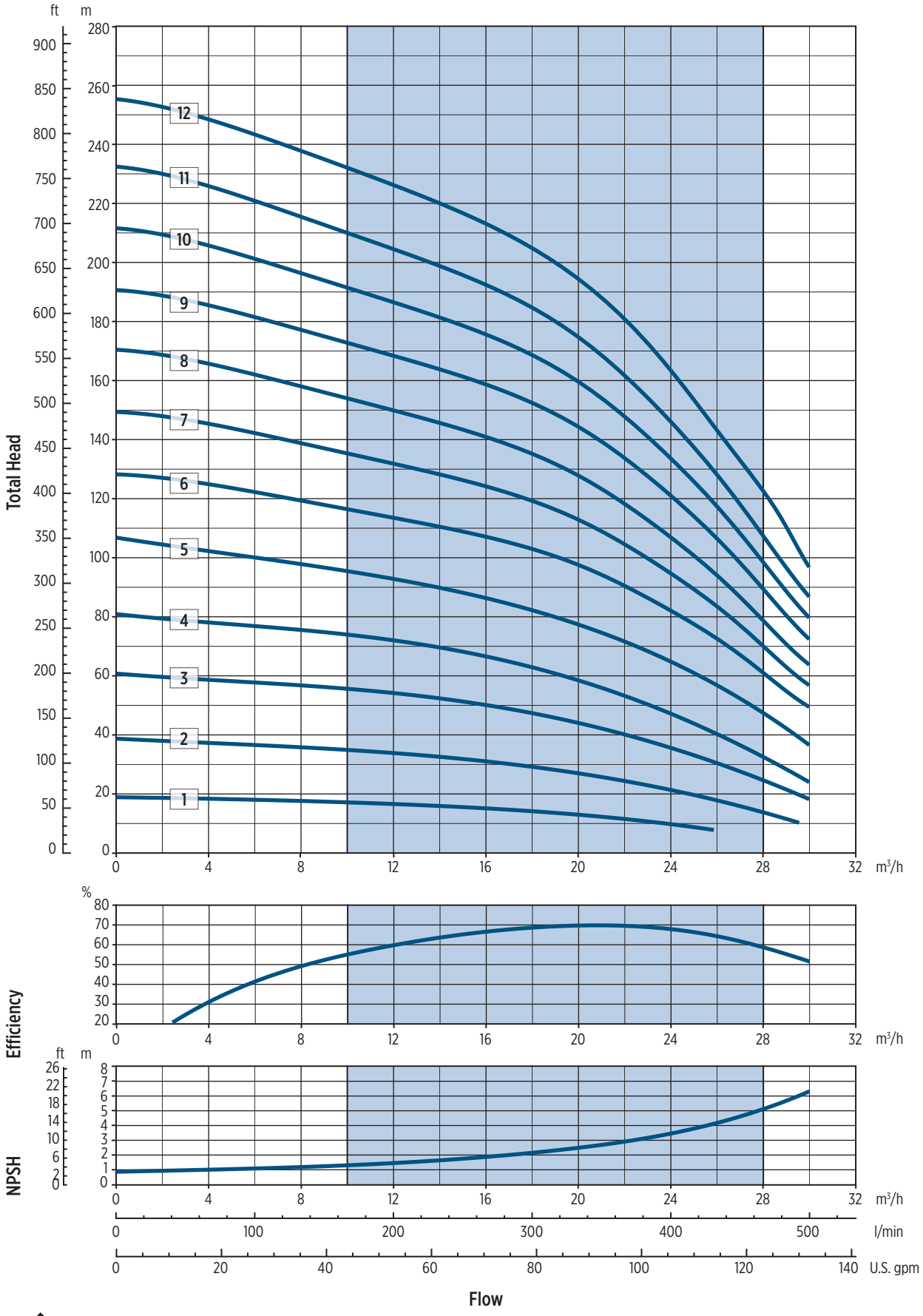
V Version



Connections with rapid fittings type “Victaulic”: the pump is supplied without the collars (Optional accessories)

15 VR - PERFORMANCE CURVES AT 60 HZ

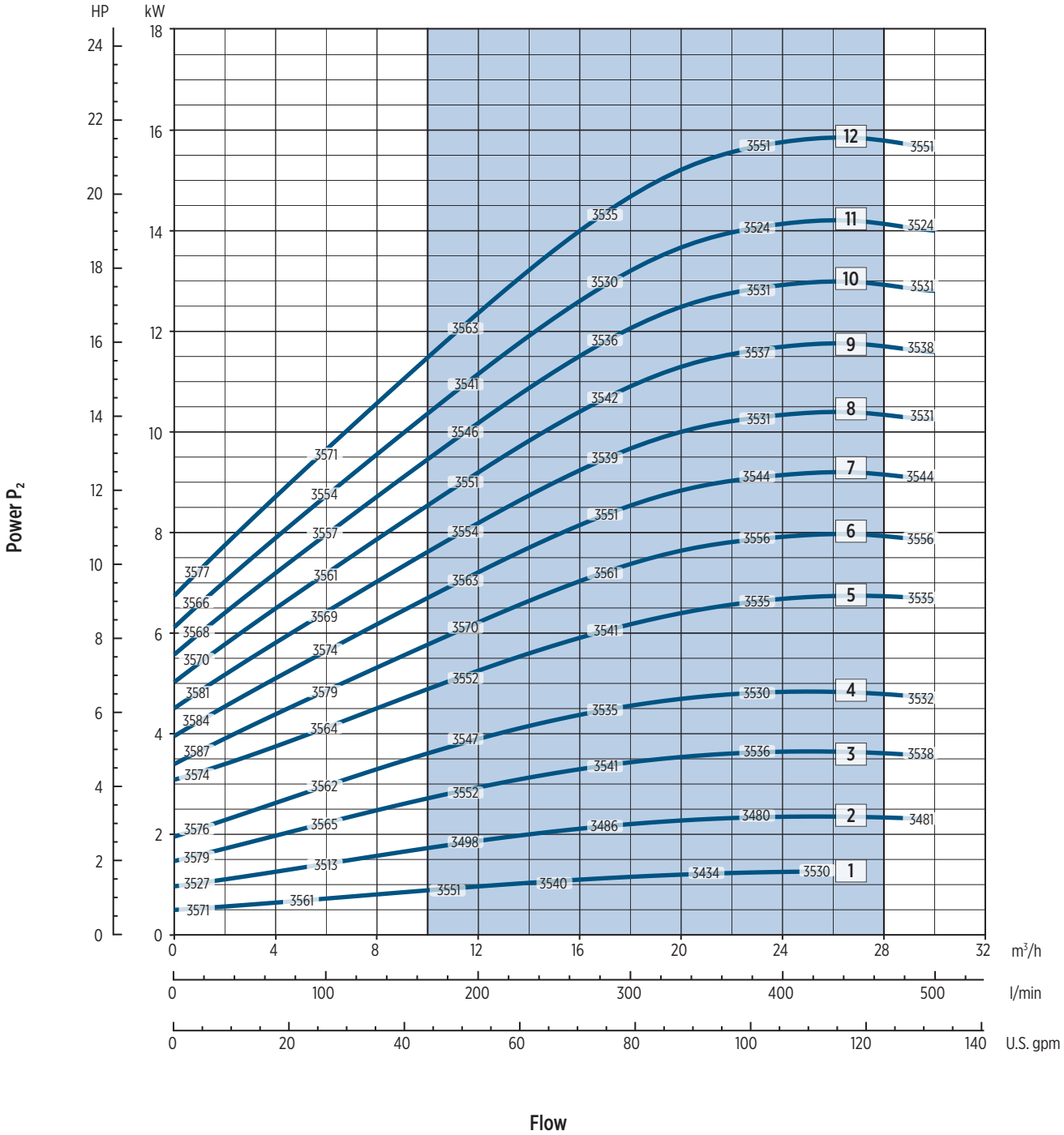
MEI ≥ 0,70



00120141 04/2021

15 VR - PERFORMANCE CURVES AT 60 HZ

MEI ≥ 0,70



* The efficiency value is referred to or more stages only for full diameter impeller

Performance curves of Q, H and P depend on the rpm number according to the following formula:

$$Q_2 = Q_1 \cdot \left(\frac{n_2}{n_1}\right) \quad , \quad H_2 = H_1 \cdot \left(\frac{n_2}{n_1}\right)^2 \quad , \quad P_2 = P_1 \cdot \left(\frac{n_2}{n_1}\right)^3 \quad , \quad \eta \text{ remains approximately the same.}$$

The rpm number related to the performance curves (Q-H-P) is indicated in the power chart.
Performance curves (Q-H-P) will change according to the formulas above.
Q=Flow, H=Head, P=Power, η=Efficiency

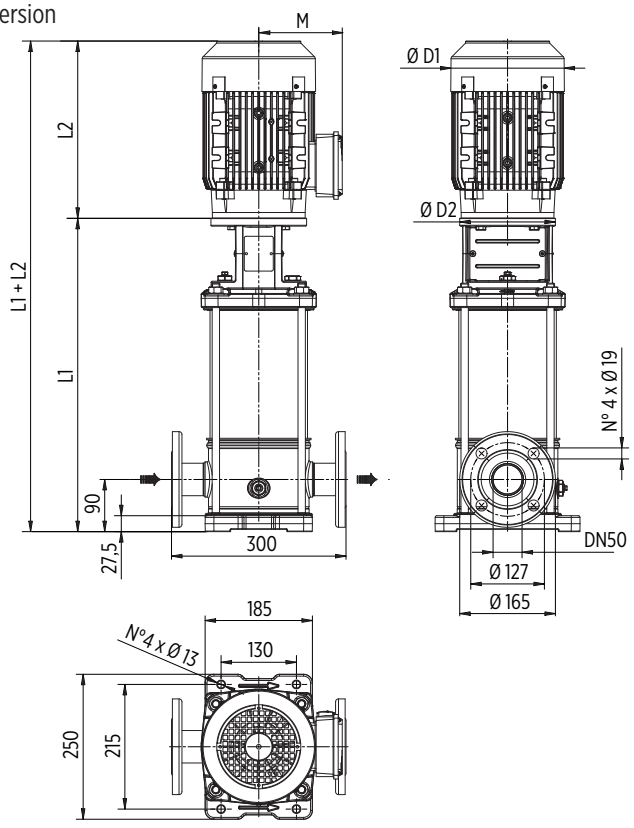
20 VR - 60 HZ

TECHNICAL DATA

Stages	Motor		Dimensions												Weight [kg]		
			L1	L2		L3	L4	L5	M		D1		D2	L1+L2	Pump	Motor	Electric Pump
	[kW]	Dim.	F	1-Phase	3-Phase	T	V	C	1-Phase	3-Phase	1-Phase	3-Phase					
1	2.2	90	396	-	267	396	396	396	-	138	-	180	170	663	18.5	16	34.5
2	4	112	396	-	306	396	396	396	-	145	-	196	170	702	20	23	42.8
3	5.5	132	656	-	328	656	656	656	-	160	-	225	300	984	41	34	75
4	7.5	132	704	-	350	704	704	704	-	160	-	225	300	1054	42.5	36	78.5
5	11	160	772	-	425	772	772	772	-	194	-	248	350	1197	47	58	105
6	11	160	820	-	425	820	820	820	-	194	-	248	350	1245	48.5	58	106.5
7	15	160	868	-	476	868	868	868	-	194	-	248	350	1344	50	64	114
8	15	160	916	-	476	-	916	916	-	194	-	248	350	1392	51.5	64	115.5
9	18.5	160	964	-	542	-	964	964	-	238	-	317	350	1506	53	98	150.5
10	18.5	160	1012	-	542	-	1012	1012	-	238	-	317	350	1554	54.5	98	152

DIMENSIONAL DRAWINGS

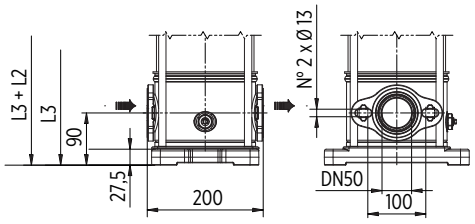
F Version



Round flanges on body type PN25/40: the pump is supplied without counterflanges (Optional accessories, including bolts and joints)

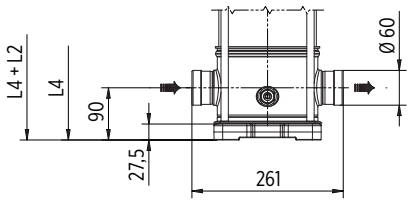
T Version

Available from 20VR1 to 20VR7



Oval flanges on body type PN16: the pump is supplied without threaded oval counter flanges (Optional accessories, including bolts and joints)

V Version

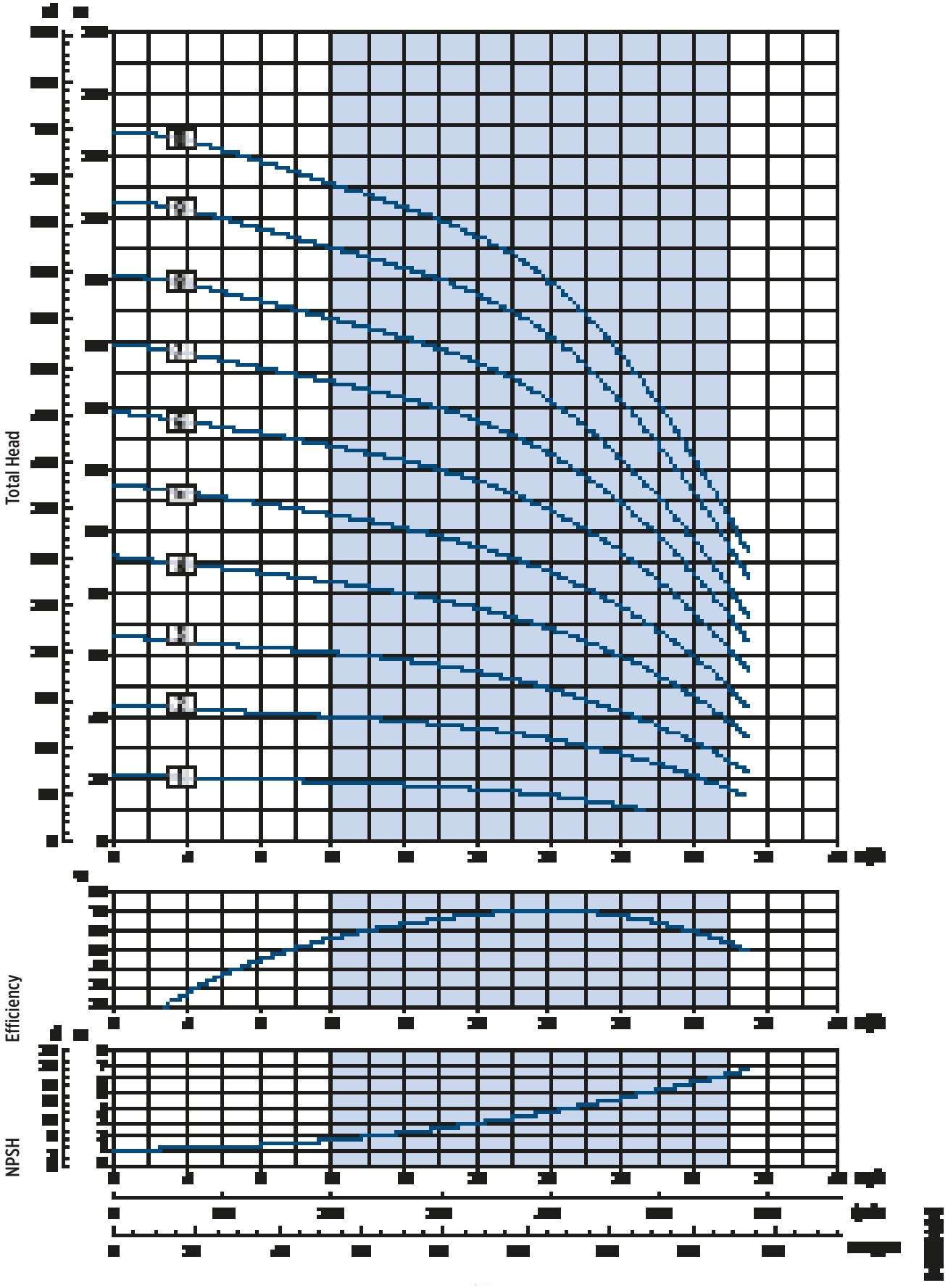


Connections with rapid fittings type "Victaulic": the pump is supplied without the collars (Optional accessories)

00130102 09/2023

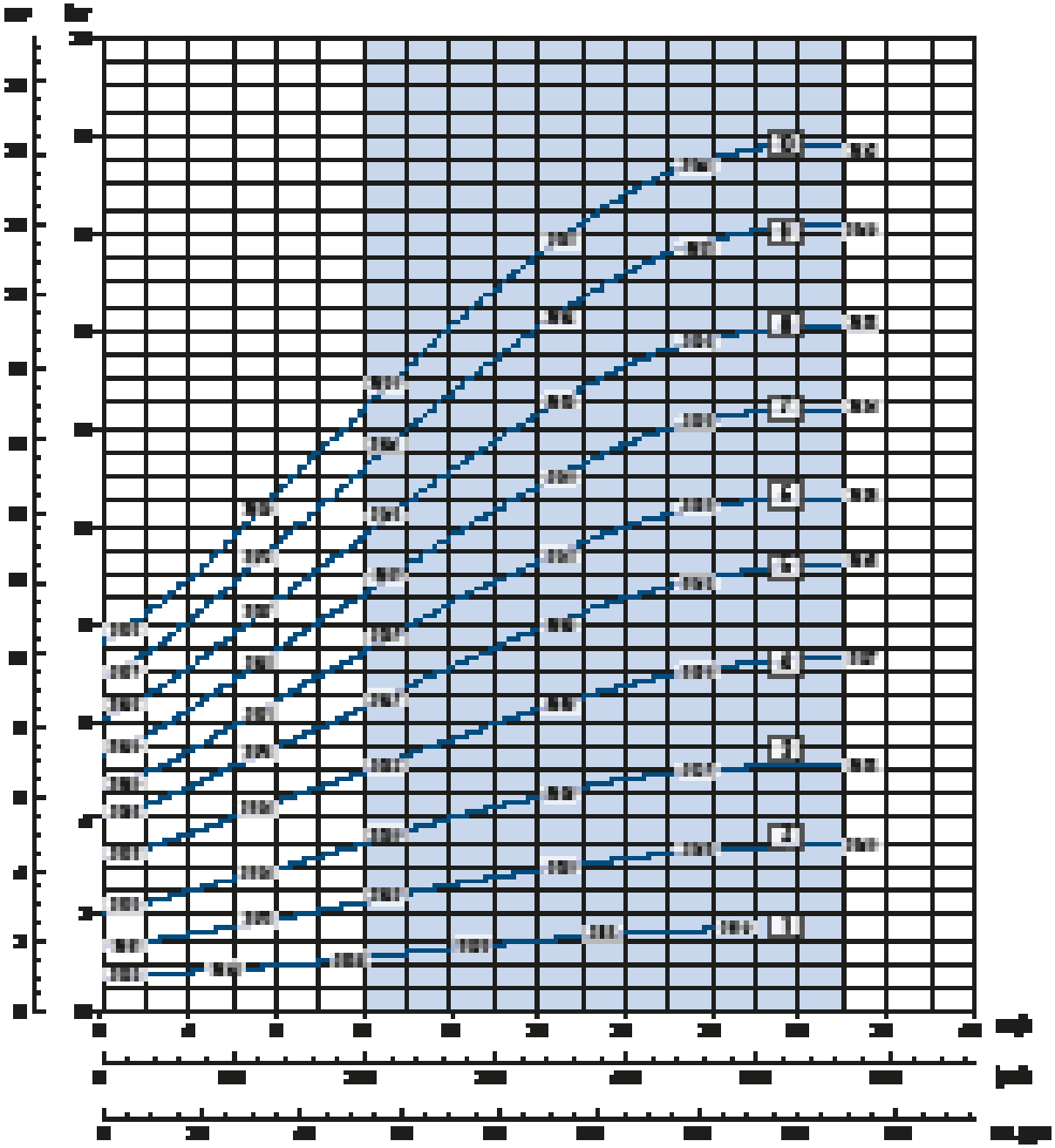
20 VR - PERFORMANCE CURVES AT 60 HZ

MEI ≥ 0,70



20 VR – PERFORMANCE CURVES AT 60 HZ

MEI ≥ 0,70



* The efficiency value is referred to or more stages only for full diameter impeller

Performance curves of Q, H and P depend on the rpm number according to the following formula:

$$Q_2 = Q_1 \cdot \left(\frac{n_2}{n_1}\right) \quad , \quad H_2 = H_1 \cdot \left(\frac{n_2}{n_1}\right)^2 \quad , \quad P_2 = P_1 \cdot \left(\frac{n_2}{n_1}\right)^3 \quad , \quad \eta \text{ remains approximately the same.}$$

The rpm number related to the performance curves (Q-H-P) is indicated in the power chart.
Performance curves (Q-H-P) will change according to the formulas above.
Q=Flow, H=Head, P=Power, η=Efficiency

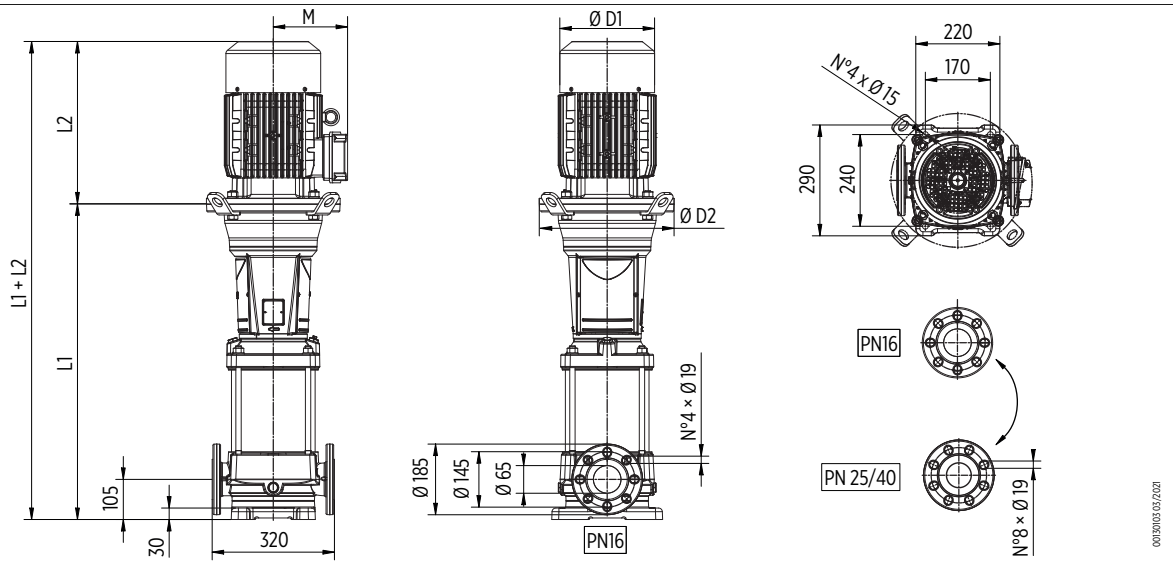
30 VR - 60 HZ

TECHNICAL DATA

Stages	Motor		Dimensions						Weight [kg]		
	[kW]	Dim.	L1	L2	M	D1	D2	L1+L2	Pump	Motor	Electric Pump
1-1a	3	100	431	290	138	180	170	721	48	18	66
1	4	112	431	306	145	196	170	737	48	22.8	70.8
2-2a	5.5	132	724	328	160	225	300	1052	72.5	34	106.5
2-1a	7.5	132	724	350	160	225	300	1074	72.5	36	108.5
2	11	160	744	425	194	248	350	1169	76	58	134
3-2a	11	160	826	425	194	248	350	1251	80	58	138
3-1a	11	160	826	425	194	248	350	1251	80	58	138
3	15	160	826	476	194	248	350	1302	80	64	144
4-2a	15	160	908	476	194	248	350	1384	84	64	148
4-1a	15	160	908	476	194	248	350	1384	84	64	148
4	18.5	160	908	542	238	317	350	1450	84	97.5	181.5
5-2a	18.5	160	991	542	238	317	350	1533	88	97.5	185.5
5-1a	18.5	160	991	542	238	317	350	1533	88	97.5	185.5
5	22	180	991	542	238	317	350	1533	87.5	109	196.5
6-2a	22	180	1073	542	238	317	350	1615	91.5	109	200.5
6-1a	22	180	1073	542	238	317	350	1615	91.5	109	200.5
6	30	200	1078	658	297	399	400	1736	95	228	323
7-2a	30	200	1160	658	297	399	400	1818	99	228	327
7-1a	30	200	1160	658	297	399	400	1818	99	228	327
7	30	200	1160	658	297	399	400	1818	99	228	327
8-2a	30	200	1242	658	297	399	400	1900	103	228	331
8-1a	37	200	1242	658	297	399	400	1900	103	242	345
8	37	200	1242	658	297	399	400	1900	103	242	345

DIMENSIONAL DRAWINGS

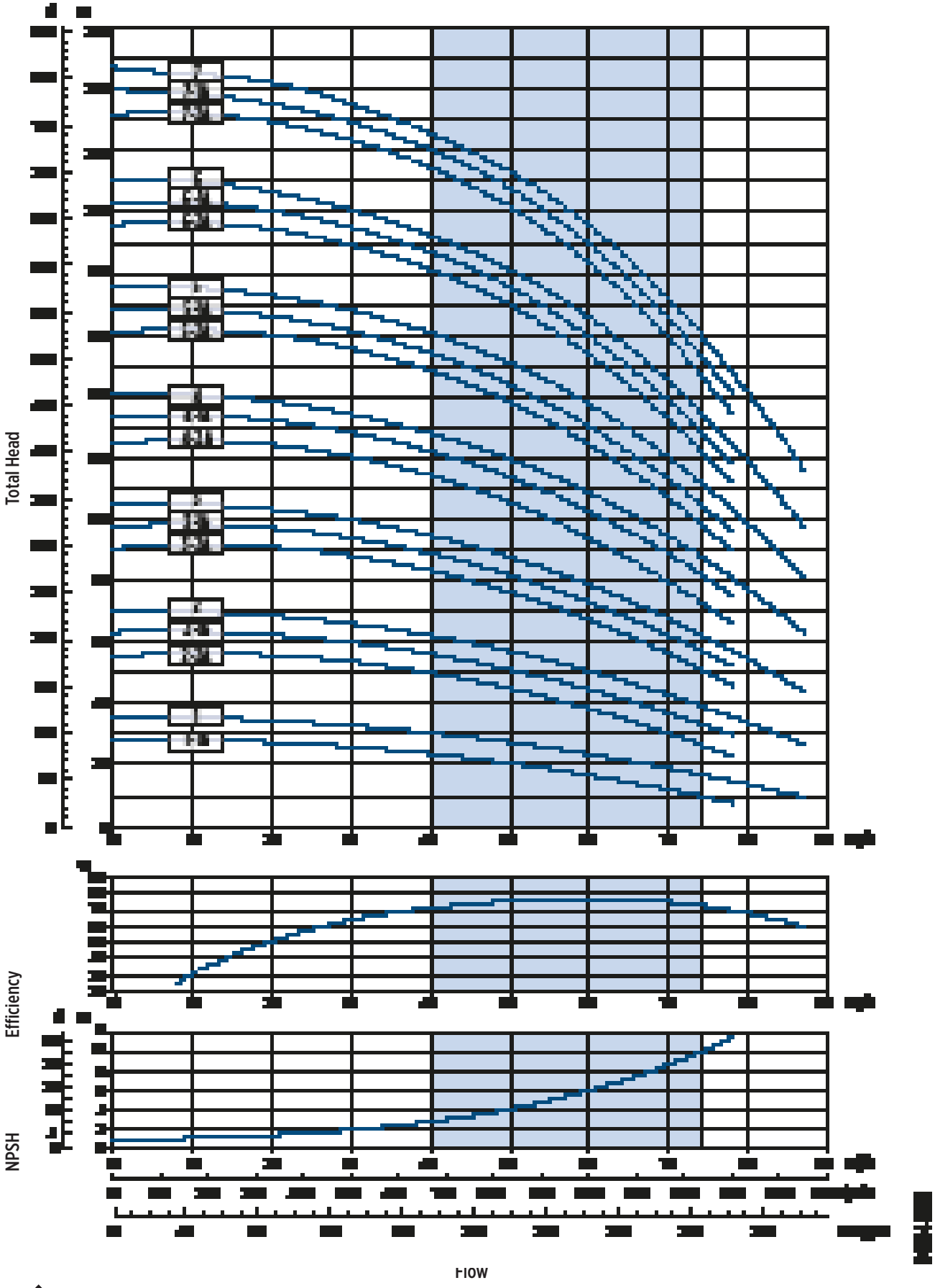
F Version



The pump is supplied without counterflanges (Optional accessories, including bolts and joints)

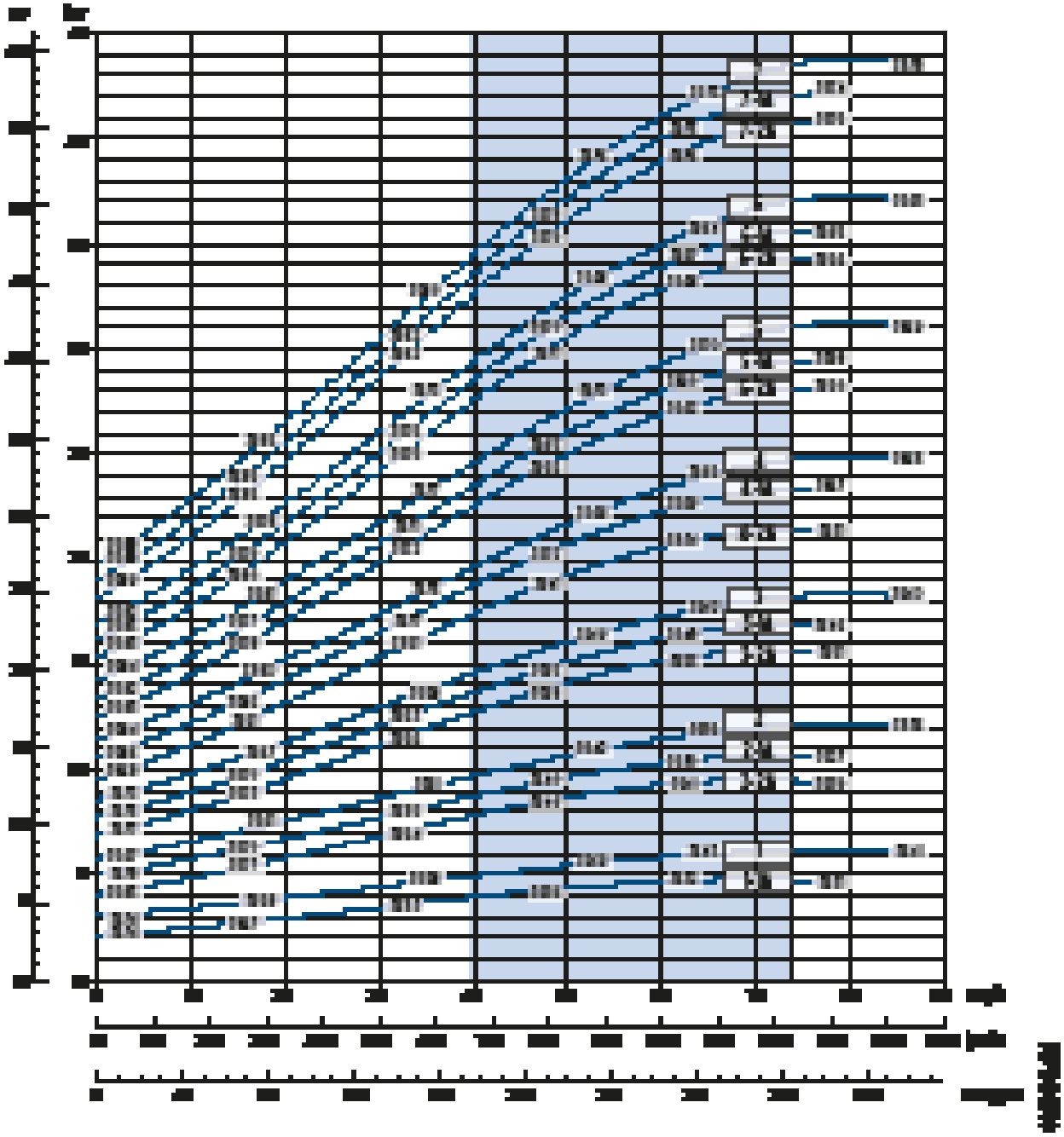
30 VR - PERFORMANCE CURVES AT 60 HZ

MEI ≥ 0,70



30 VR – PERFORMANCE CURVES AT 60 HZ

MEI ≥ 0,70



* The efficiency value is referred to or more stages only for full diameter impeller

Performance curves of Q, H and P depend on the rpm number according to the following formula:

$$Q_2 = Q_1 \cdot \left(\frac{n_2}{n_1}\right) \quad , \quad H_2 = H_1 \cdot \left(\frac{n_2}{n_1}\right)^2 \quad , \quad P_2 = P_1 \cdot \left(\frac{n_2}{n_1}\right)^3 \quad , \quad \eta \text{ remains approximately the same.}$$

The rpm number related to the performance curves (Q-H-P) is indicated in the power chart.
Performance curves (Q-H-P) will change according to the formulas above.
Q=Flow, H=Head, P=Power, η=Efficiency

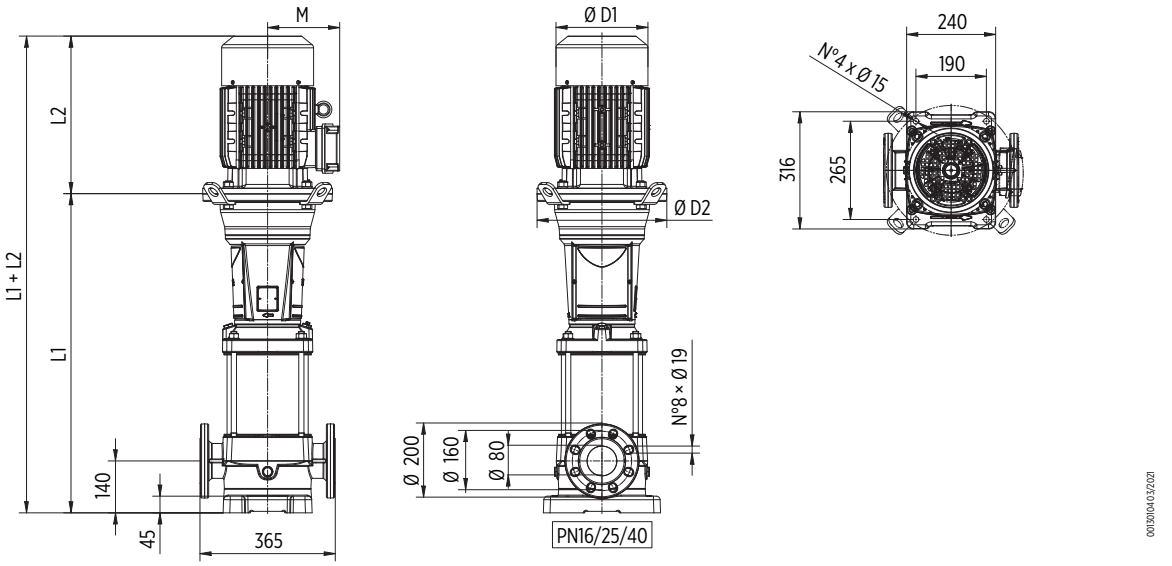
45 VR - 60 HZ

TECHNICAL DATA

Stages	Motor		Dimensions						Weight [kg]		
	[kW]	Dim.	L1	L2	M	D1	D2	L1+L2	Pump	Motor	Electric Pump
1-1a	5.5	132	677	328	160	225	300	1005	74.5	34	108.5
1	7.5	132	677	350	160	225	300	1027	74.5	36	110.5
2-2a	11	160	779	425	194	248	350	1204	81.5	58	139.5
2-1a	11	160	779	425	194	248	350	1204	81.5	58	139.5
2	15	160	779	476	194	248	350	1255	81.5	64	145.5
3-2a	18.5	160	861	542	238	317	350	1403	85.5	97.5	183
3-1a	18.5	160	861	542	238	317	350	1403	85.5	97.5	183
3	18.5	160	861	542	238	317	350	1403	85.5	97.5	183
4-2a	22	180	943	542	238	317	350	1485	89.5	109	198.5
4-1a	30	200	948	658	297	399	400	1606	92.5	228	320.5
4	30	200	948	658	297	399	400	1606	92.5	228	320.5
5-2a	30	200	1031	658	297	399	400	1689	96.5	228	324.5
5-1a	30	200	1031	658	297	399	400	1689	96.5	228	324.5
5	37	200	1031	658	297	399	400	1689	96.5	242	338.5
6-2a	37	200	1113	658	297	399	400	1771	100.5	242	342.5
6-1a	37	200	1113	658	297	399	400	1771	100.5	242	342.5
6	37	200	1113	658	297	399	400	1771	100.5	242	342.5
7-2a	45	225	1195	699	328	465	450	1894	106.5	308	414.5
7-1a	45	225	1195	699	328	465	450	1894	106.5	308	414.5
7	45	225	1195	699	328	465	450	1894	106.5	308	414.5

DIMENSIONAL DRAWINGS

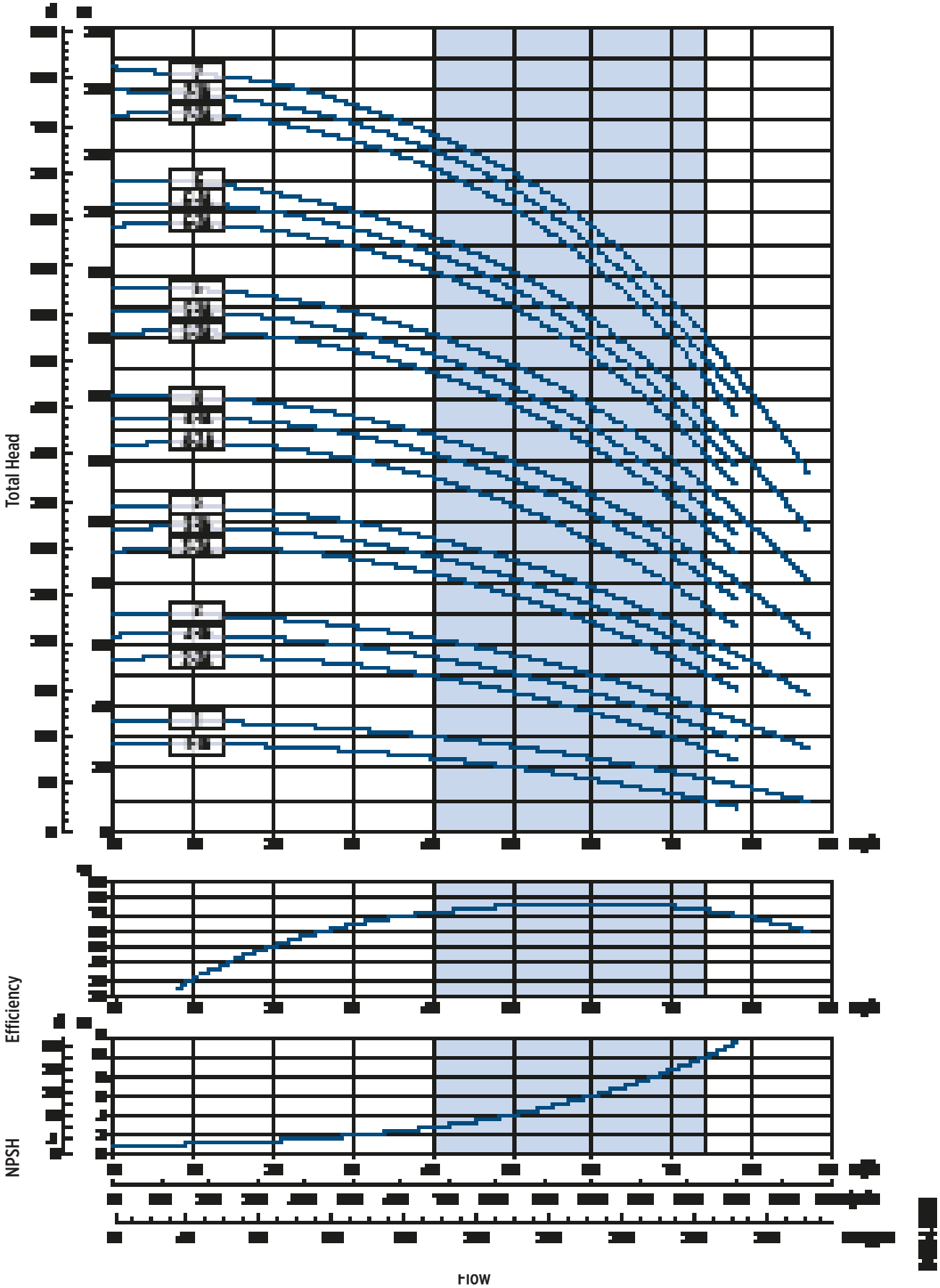
F Version



The pump is supplied without counterflanges (Optional accessories, including bolts and joints)

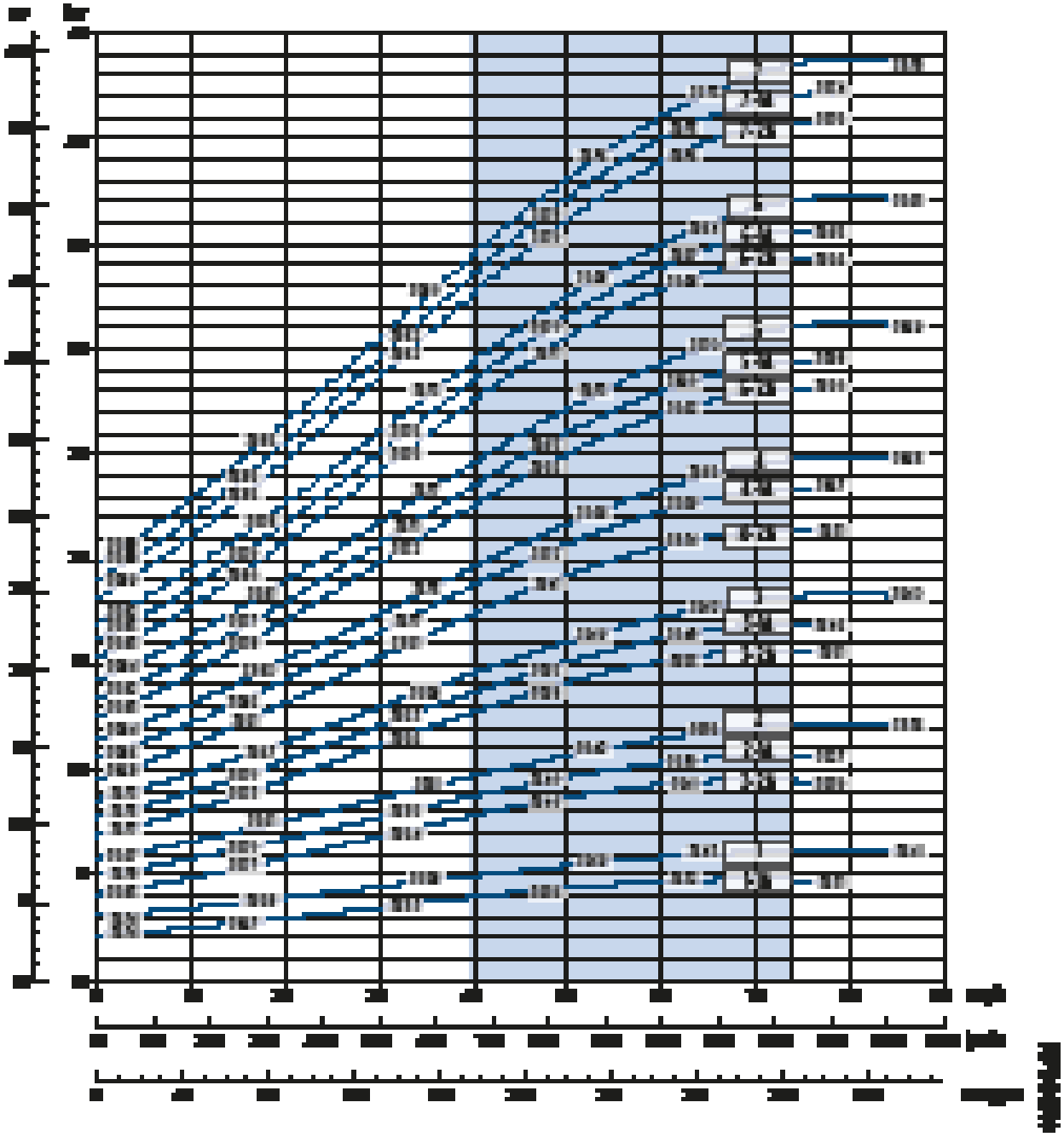
45 VR - PERFORMANCE CURVES AT 60 HZ

MEI ≥ 0,70



45 VR – PERFORMANCE CURVES AT 60 HZ

MEI ≥ 0,70



* The efficiency value is referred to or more stages only for full diameter impeller

Performance curves of Q, H and P depend on the rpm number according to the following formula:

$$Q_2 = Q_1 \cdot \left(\frac{n_2}{n_1}\right) \quad , \quad H_2 = H_1 \cdot \left(\frac{n_2}{n_1}\right)^2 \quad , \quad P_2 = P_1 \cdot \left(\frac{n_2}{n_1}\right)^3 \quad , \quad \eta \text{ remains approximately the same.}$$

The rpm number related to the performance curves (Q-H-P) is indicated in the power chart.
Performance curves (Q-H-P) will change according to the formulas above.
Q=Flow, H=Head, P=Power, η=Efficiency

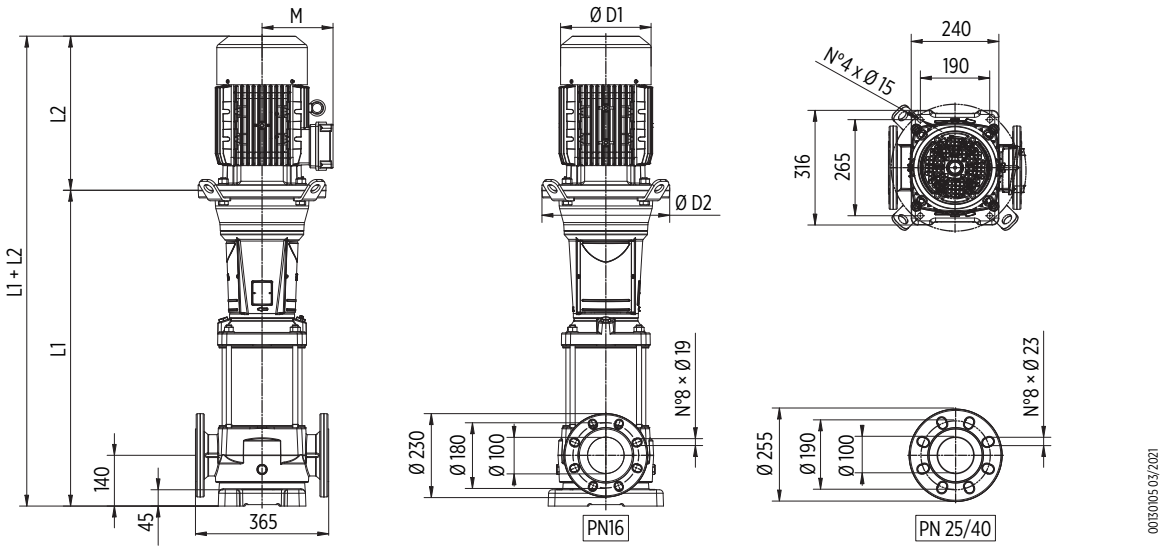
65 VR - 60 HZ

TECHNICAL DATA

Stages	Motor		Dimensions						Weight [kg]		
	[kW]	Dim.	L1	L2	M	D1	D2	L1+L2	Pump	Motor	Electric Pump
1-1a	7.5	132	737	350	160	225	300	1087	80.5	36	116.5
1	11	160	757	425	194	248	350	1182	84	58	142
2-2a	15	160	849	476	194	248	350	1325	88.5	64	152.5
2-1a	18.5	160	849	542	238	317	350	1391	88.5	97.5	186
2	22	180	849	542	238	317	350	1391	88	109	197
3-2a	22	180	941	542	238	317	350	1483	92.5	109	201.5
3-1a	30	200	946	658	297	399	400	1604	96	228	324
3	30	200	946	658	297	399	400	1604	96	228	324
4-2a	37	200	1038	658	297	399	400	1696	100.5	242	342.5
4-1a	37	200	1038	658	297	399	400	1696	100.5	242	342.5
4	45	225	1038	699	328	465	450	1737	102.5	308	410.5
5-2a	45	225	1131	699	328	465	450	1830	107	308	415
5-1a	45	225	1131	699	328	465	450	1830	107	308	415

DIMENSIONAL DRAWINGS

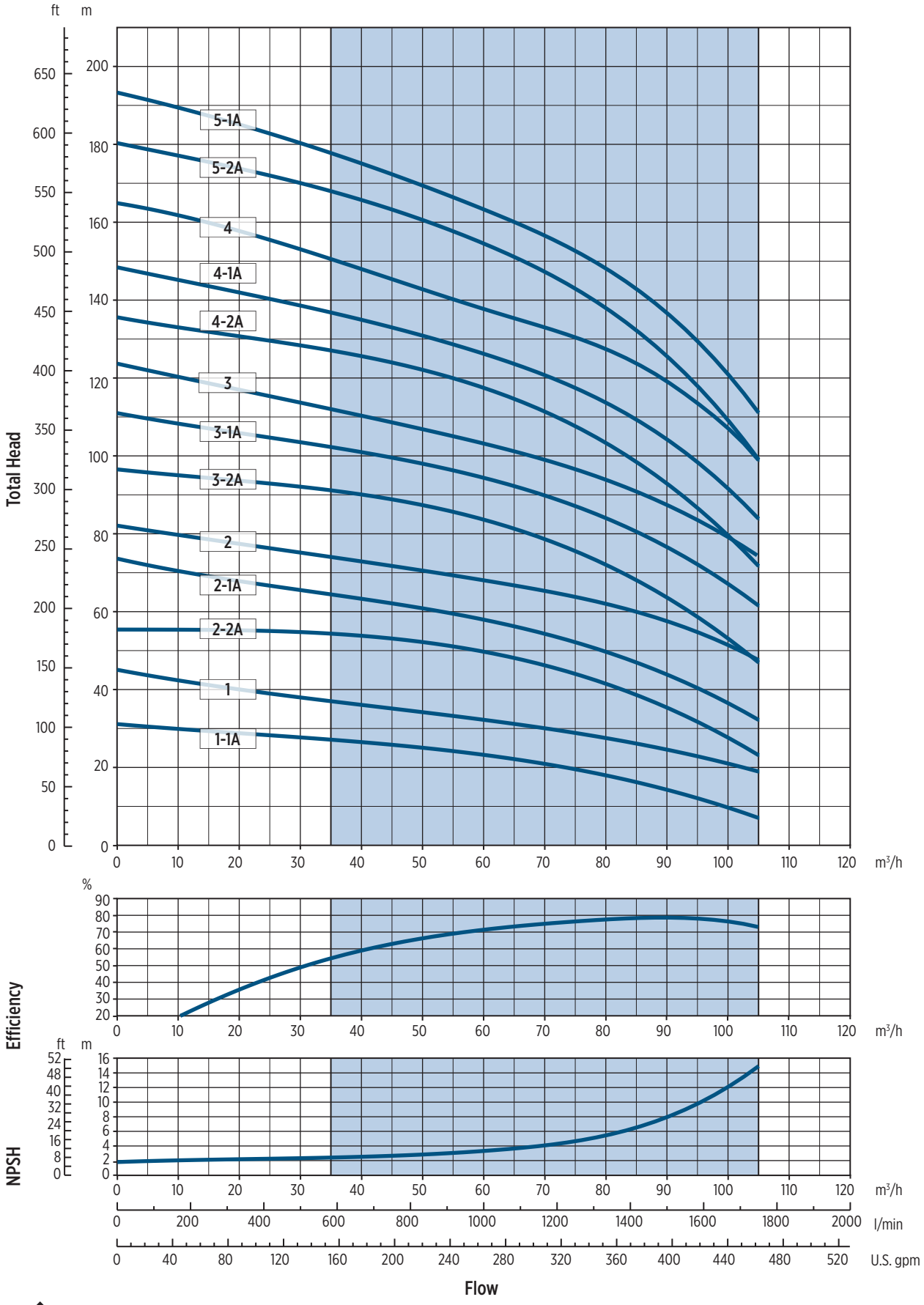
F Version



The pump is supplied without counterflanges (Optional accessories, including bolts and joints)

65 VR – PERFORMANCE CURVES AT 60 HZ

MEI ≥ 0,70



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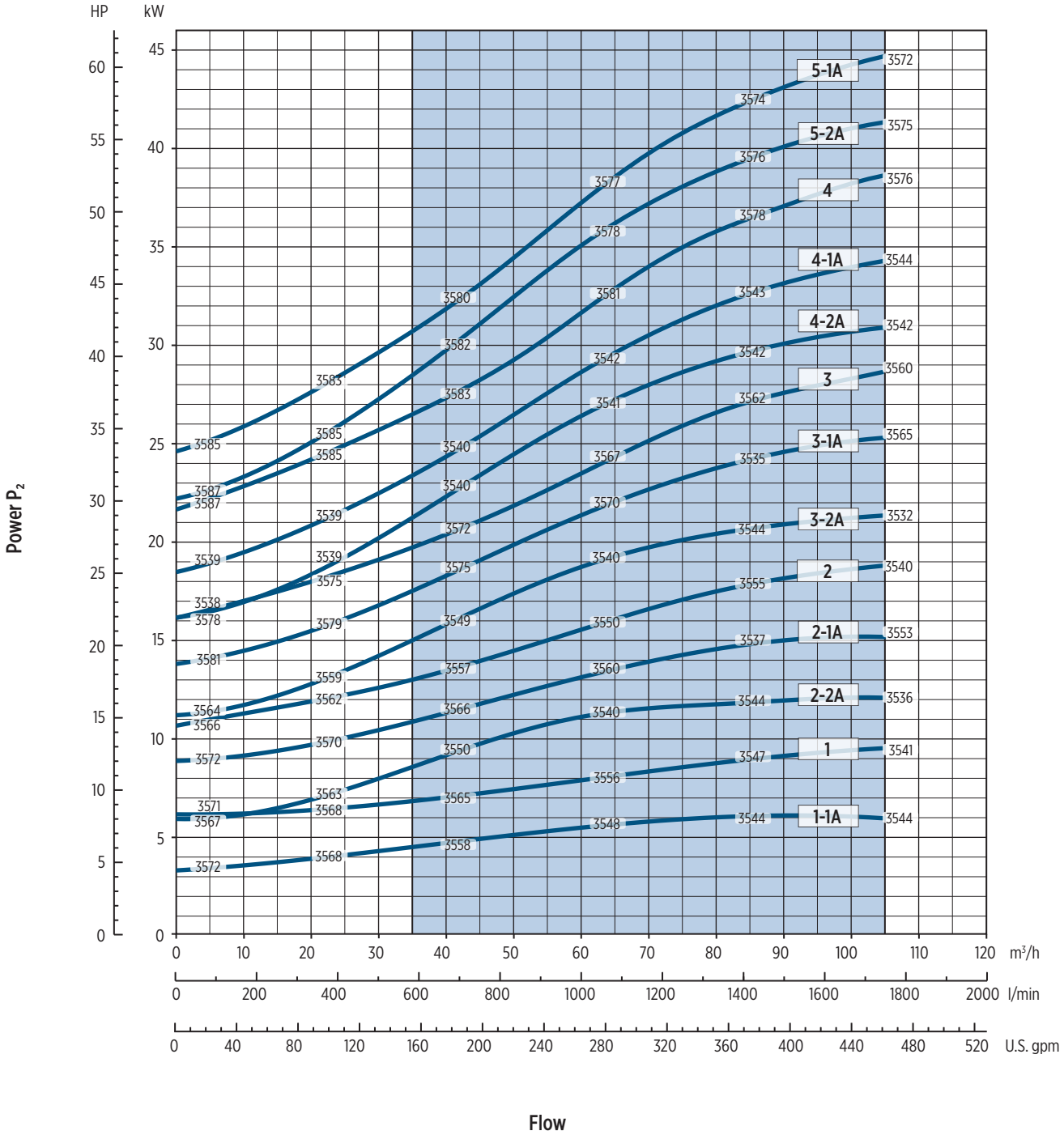
65 VR – PERFORMANCE CURVES AT 60 HZ

MEI ≥ 0,70



* The efficiency value is referred to or more stages only for full diameter impeller

Performance curves of Q, H and P depend on the rpm number according to the following formula:

$$Q_2 = Q_1 \cdot \left(\frac{n_2}{n_1}\right) \quad , \quad H_2 = H_1 \cdot \left(\frac{n_2}{n_1}\right)^2 \quad , \quad P_2 = P_1 \cdot \left(\frac{n_2}{n_1}\right)^3 \quad , \quad \eta \text{ remains approximately the same.}$$

The rpm number related to the performance curves (Q-H-P) is indicated in the power chart.
Performance curves (Q-H-P) will change according to the formulas above.
Q=Flow, H=Head, P=Power, η=Efficiency

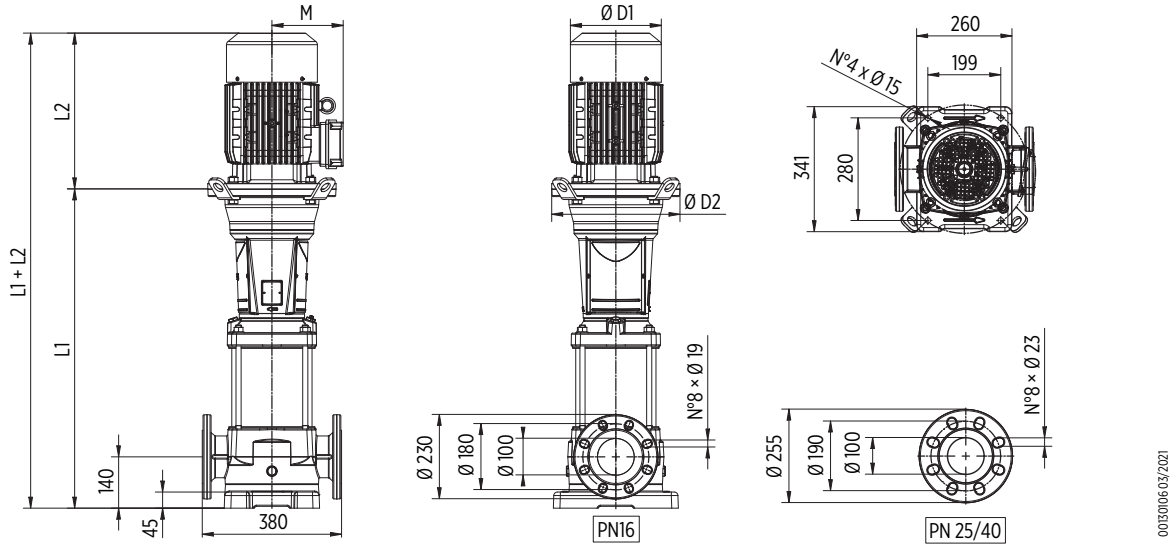
95 VR - 60 HZ

TECHNICAL DATA

Stages	Motor		Dimensions						Weight [kg]		
	[kW]	Dim.	L1	L2	M	D1	D2	L1+L2	Pump	Motor	Electric Pump
1-1a	11	160	757	425	194	248	350	1182	85.5	58	143.5
1	15	160	757	476	194	248	350	1233	85.5	64	149.5
2-2a	18.5	160	849	542	238	317	350	1391	89	97.5	186.5
2-1a	22	180	849	542	238	317	350	1391	89	109	198
2	30	200	854	658	297	399	400	1512	92	228	320
3-2a	37	200	946	658	297	399	400	1604	95.5	242	337.5
3-1a	37	200	946	658	297	399	400	1604	95.5	242	337.5
3	45	225	946	699	328	465	450	1645	98	308	406
4-2a	45	225	1038	699	328	465	450	1737	101.5	308	409.5

DIMENSIONAL DRAWINGS

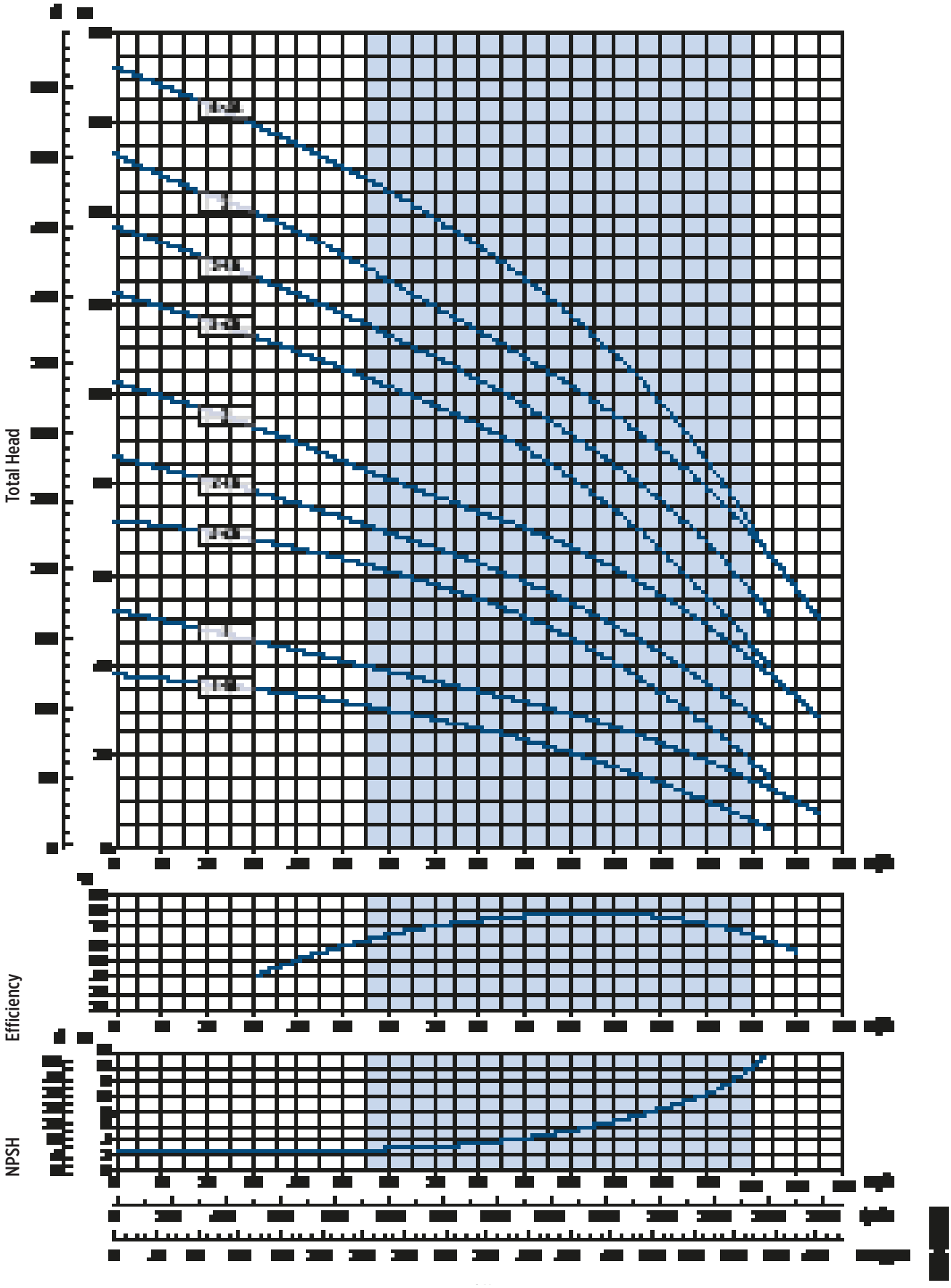
F Version



The pump is supplied without counterflanges (Optional accessories, including bolts and joints)

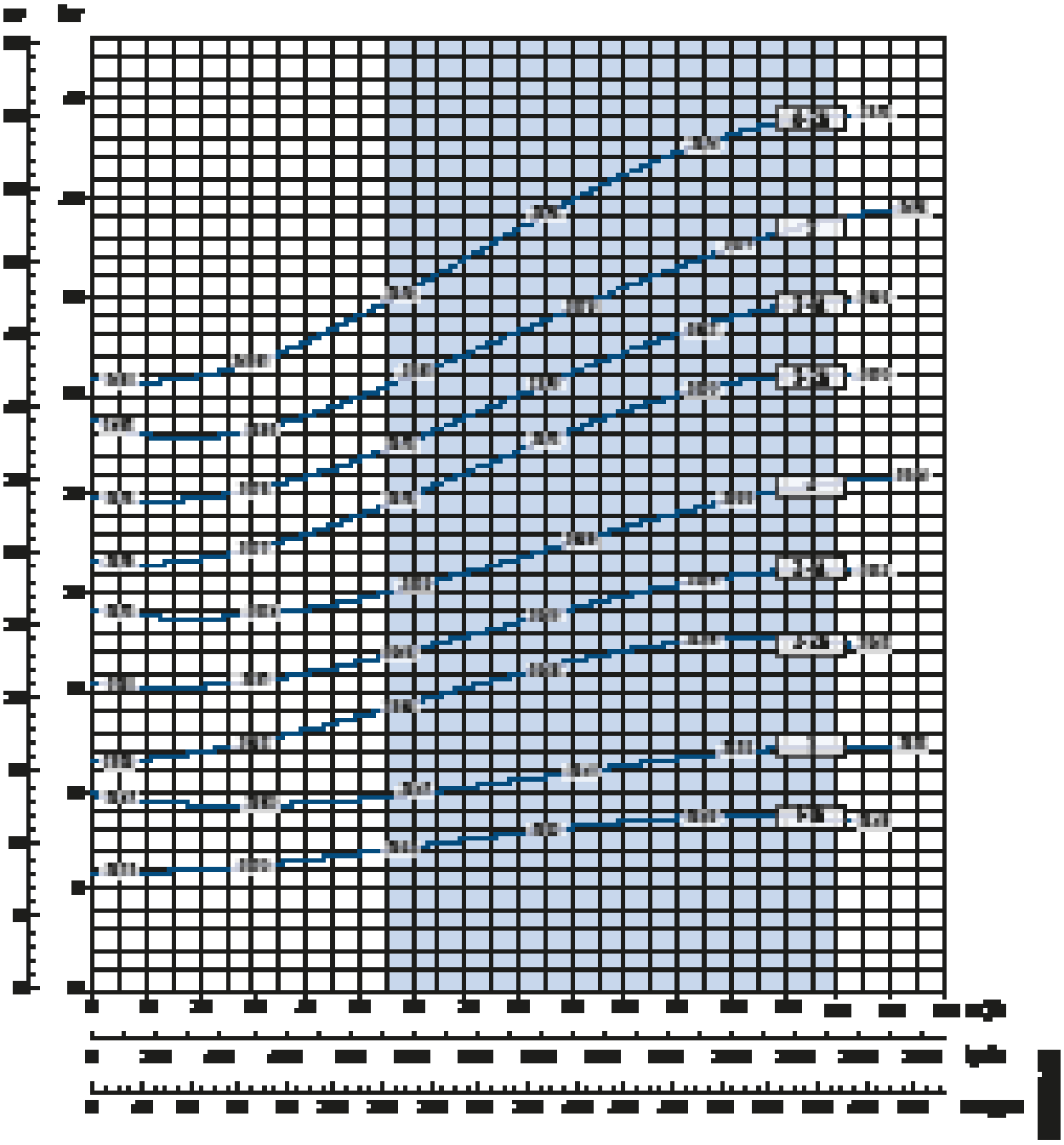
95 VR – PERFORMANCE CURVES AT 60 HZ

MEI ≥ 0,70



95 VR – PERFORMANCE CURVES AT 60 HZ

MEI ≥ 0,70



* The efficiency value is referred to or more stages only for full diameter impeller

Performance curves of Q, H and P depend on the rpm number according to the following formula:

$$Q_2 = Q_1 \cdot \left(\frac{n_2}{n_1}\right) \quad , \quad H_2 = H_1 \cdot \left(\frac{n_2}{n_1}\right)^2 \quad , \quad P_2 = P_1 \cdot \left(\frac{n_2}{n_1}\right)^3 \quad , \quad \eta \text{ remains approximately the same.}$$

The rpm number related to the performance curves (Q-H-P) is indicated in the power chart.
Performance curves (Q-H-P) will change according to the formulas above.
Q=Flow, H=Head, P=Power, η=Efficiency

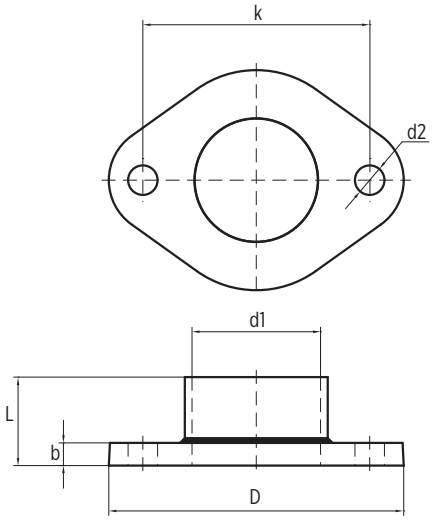
Accessories

HYDRAULIC CONNECTION

OVAL COUNTERFLANGES

DN	COLLARS					HOLES		PN
	D	dl	k	L	b	d2	N°	
32	99	Rp 1" ¼ / NPTI" ¼	75	33	8	11	2	16
40	130	Rp 1" ½ / NPTI" ½	100	35	10	13		
50		Rp 2" / NPT 2"		39				

Kit round counterflanges available on request; AISI 304 (EN 1.4301)

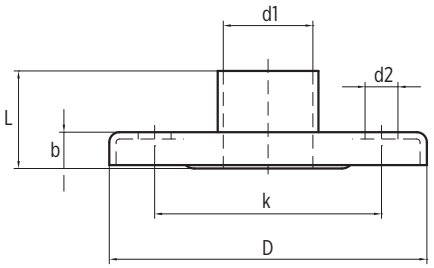


001300107 02/2018

ROUND THREADED COUNTERFLANGES ACCORDING TO EN 1092-1

DN	DIMENSIONS					HOLES		PN
	D	dl	k	L	b	d2	N°	
25	115	Rp 1" / NPT 1"	85	43	16	14	4	25
32	140	Rp 1" ¼ / NPT 1" ¼	100			18		
40	150	Rp 1" ½ / NPT 1" ½	110					
50	165	Rp 2" / NPT 2"	127		18	19	8	
65	185	Rp 2" ½ / NPT 2" ½	145	32	18	18	8	16
80	200	Rp 3" / NPT 3"	160	34	20			
100	220	Rp 4" / NPT 4"	180	40				

Kit round counterflanges available on request:
DN 25-32-40-50: galvanized steel, AISI 304 (EN 1.4301), AISI 316L (EN 1.4404)
DN 65-80-100: galvanized steel, AISI 316 (EN 1.4401)

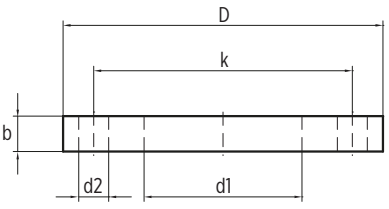


001300108 02/2018

WELD-ON ROUND COUNTERFLANGES ACCORDING TO EN 1092-1

DN	DIMENSIONS					HOLES		PN
	D	dl	k	L	b	d2	N°	
65	185	77.5	145	-	22	18	8	25/40
80	200	90.5	160		24			
100	235	116	190		26	22		

Kit round counterflanges available on request; AISI 316 (EN 1.4401)

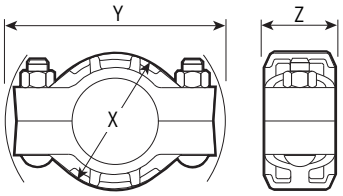


001300109 02/2018

HYDRAULIC CONNECTION

VICTAULIC COUNTERFLANGES

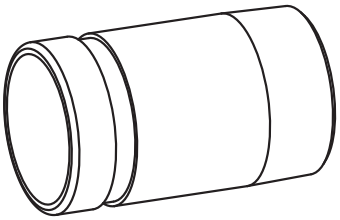
COLLARS			
DN	DIMENSIONS		
	X	Y	Z
32	67	127	48
50	92	149	48

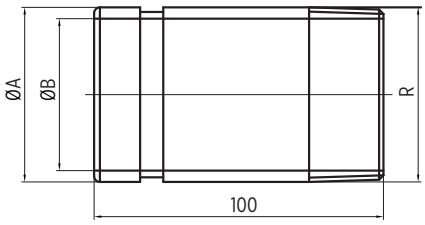


00130024 7 03/2021

NIPPLE			
DN	DIMENSIONS		
	Ø A	Ø B	R *
32	42.2	35.0	1" ¼
50	60.3	52.5	2" -11

* Pipe threads UNI EN 10226-1





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HIGH PRESSURE KIT

Assembling kit for high pressure set with two pumps. This kit allows the hydraulic connection between the pumps. Please contact Franklin Electric for more information.

VARIABLE FREQUENCY DRIVES (VFD) – DRIVE-TECH INVERTER

Available for motor or wall installation.

APPLICATIONS

- Booster sets
- HVAC systems with electric circulation pumps
- Control of electric pumps (wall-mounted inverter with kit)

FEATURES

- Energy saving thanks to variable speed control
- Smooth start-up and stop
- Longer system life and greater system reliability
- Simplified installation on the motor or on the wall
- Quick commissioning through guided initial configuration
- Installation possible in damp and dusty environments due to IP55 degree protection
- High thermal and mechanical performance thanks to all-aluminium casing

SPECIFICATION

- **Advanced user experience due to:**
  - Programming and monitoring via display or smartphone and FE Connect, available for Android, iOS devices
  - Remote control using a smartphone placed nearby as a modem
  - Copy / pasting pre-imposed programmes between different devices
  - Ability to send reports via email
  - Multilingual support
- **Multiple control methods:**
  - Constant pressure control
  - Constant or proportional differential pressure control
  - Constant temperature control
  - Control at constant differential temperature
  - Constant flow control
  - Control with external frequency signal or pre-set at 1 or 2 values
- **Integrated protections against:**
  - Overvoltage and undervoltage
  - Overcurrent and no load
  - Dry running
  - Overheating
- **EMC compatibility:**
  - Each inverter is equipped with an integrated EMI filter to comply with EN55011 Class A (or EN61800-3 Category C2). By installing an additional input filter, it is possible to achieve class B (C1)
- **Group operation (COMBO):**
  - Up to 8 connected units
  - Alternated operation to equalise electric pump wear
  - Automatic exchange between Master and Slave units in case of failure of one unit to guarantee the continued operation of the set
- **Advanced motor controls:**
  - Control of new generation asynchronous motors

VARIABLE FREQUENCY DRIVES (VFD) – DRIVE-TECH INVERTER

SYSTEM PERFORMANCE

- Mains supply frequency: 50-60 Hz (± 2%)
- Maximum working temperature at nominal load: +40 °C
- Maximum altitude at nominal load: 1000 metres above sea level
- Relative humidity: max 95% (without condensation)
- Degree of protection: IP55 (NEMA 4) or degree of motor protection if mounted on the motor (protect the device from direct exposure to sunlight and atmospheric influences)
- Connectivity: RS 485 serial port for COMBO operation (up to 8 units) + SMART Bluetooth communication + RS485 serial port for MODBUS RTU communication

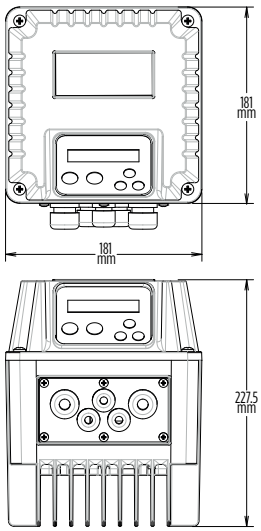
ELECTRICAL FEATURES AND PERFORMANCE

DrivE-Tech Model	Vin [Vac] ± 15 %	Max Vout [VAC]	Max current at input	Max current at output	Typical motor * P_2	Size
2.015	1 x 230	1 x 230	15	9	1.1	1
		3 x 230		7	1.5	
2.030	1 x 230	1 x 230	20	9	1.5	
		3 x 230		11	3	
2.040	1 x 230	3 x 230	38	18	4	2
2.055	1 x 230	3 x 230	53	25	5.5	
3.040	3 x 230	3 x 230	21	18	4	
3.055	3 x 230	3 x 230	31	25	5.5	
3.075	3 x 230	3 x 230	35	30	7.5	
4.022	3 x 400	3 x 400	10	6	2.2	1
4.040	3 x 400	3 x 400	13.5	9	4	
4.055	3 x 400	3 x 400	16	14	5.5	2
4.075	3 x 400	3 x 400	21	18	7.5	
4.110	3 x 400	3 x 400	31	25	11	
4.150	3 x 400	3 x 400	35	30	15	
4.185	3 x 400	3 x 400	42	38	18.5	3
4.220	3 x 400	3 x 400	52	48	22	
4.300	3 x 400	3 x 400	68	65	30	
4.370	3 x 400	3 x 400	78	75	37	
4.450	3 x 400	3 x 400	88	85	45	

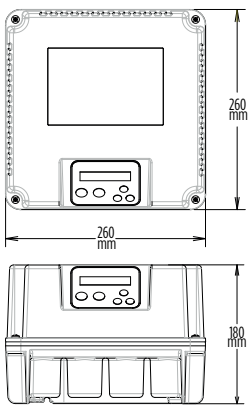
* Typical power. Refer to the motor current when selecting the appropriate DrivE-Tech model

** VR pumps equipped with DrivE-Tech mounted on motor fan are available on request only for models 1-20, up to 15 kW

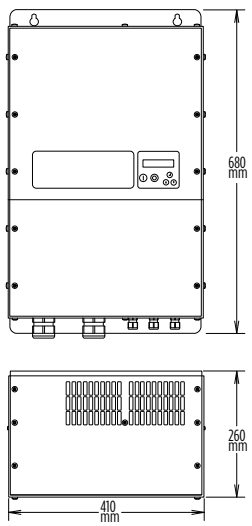
Size 1



Size 2



Size 3



VARIABLE FREQUENCY DRIVES (VFD) - DRIVE-TECH INVERTER

TECHNICAL FEATURES

- Power supply frequency: 50/60 Hz (± 2%)
- Maximum ambient temperature at nominal current: 40 °C (104 °F)
- Maximum altitude at nominal current: 1000 metres above sea level
- Degree of protection: IP55 (size 1, 2); IP54 (size 3)
- Settable digital output signals (normally open or normally closed):
  - Motor start signal
  - Alarm signal
  - DOL 1 Pump signal
  - DOL 2 Pump signal
- Analogue input (10 or 15 V cc):
  - 4-20 mA
  - 4-20 mA
  - 4-20 mA / 0-10 Vdc (settable)
  - 4-20 mA / 0-10 Vdc (settable)
  - 4 digital inputs, normally open or normally closed (settable), for starting and stopping the motor
- RS485 serial communication

INSTALLATION

- DrivE-Tech can be installed directly on the motor fan cover or fixed to the wall.
- **Motor mounting kit:**
  - The motor cooling fan also cools the DrivE-Tech.
  - The special assembly kit allows a solid coupling between the two units.

ErP REGULATION

Information related to energy performance of the motor, according to Reg. 2019/1781 CE and modifications:

EFFICIENCY REQUIREMENTS FOR VARIABLE SPEED DRIVES

Efficiency requirements for variable speed drives shall apply as follows: From 1 July 2021, the power losses of variable speed drives rated for operating with motors with a rated output power equal to or above 0,12 kW and equal to or below 1 000 kW shall not exceed the maximum power losses corresponding to the IE2 efficiency level. Energy efficiency for VSDs, expressed in International Energy efficiency classes (IE), is determined based on the power losses as follows: The maximum power losses of the IE2 class are 25 % lower than the reference value referred to in table:

Reference VSD losses and test load displacement factor for the IE class determination of VSDs			
Apparent output power of VSD (kVA)	Rated power of Motor (kW) (indicative)	Reference power losses (kW), at 90 % rated motor stator frequency and 100 % rated torque-producing current	"Test load displacement factor cos phi (+/- 0,08)"
0.278	0.12	0,100	0.73
0.381	0.18	0.104	0.73
0,500	0.25	0.109	0.73
0.697	0.37	0.117	0.73
0.977	0.55	0.129	0.73
1.29	0.75	0.142	0.79

If the apparent output power of a VSD is between two values in Table 6, the higher power loss value and the lower value of the test load displacement factor shall be used for the IE class determination.

ERP REGULATION

1. Power losses in % of the rated apparent output power: see the documentation of the VSD;
2. Efficiency level: 'IE2';
3. Manufacturer's name or trade mark, commercial registration number and address: see the nameplate;
4. Product's model identifier: see the nameplate;
5. Apparent output power or range of apparent output power (kVA): see the nameplate and the catalog;
6. Indicative motor rated power output(s) PN or range of rated power output (kW): see the nameplate and the catalog;
7. rated output current (A): see the nameplate and the catalog;
8. Maximum operating temperature (40 °C);
9. Rated supply frequencies: 50-60 Hz;
10. Rated supply voltage(s) or range of rated supply voltage (V): see the nameplate;

CONSTRUCTION OPTIONS

MOTORS

- With PTC sensor
- Heavy duty (for heavy application)
- 4 poles

VFD

- Installed on motor and wired

PUMPS

- Mechanical seal, wear parts and elastomers are available in EPDM or FKM, combined with wear parts in SiC/Graphite, SiC/SiC, WC/WC.
- Balanced mechanical seal: the design allows to reduce the liquid trust on wear parts, extending the product life.
- Optional upperthrust bearings for motors up to 4 kW: to save the motor bearing from the pump upper thrust and in the cases where the motor doesn't fulfil the minimum conditions requested, it's availabe the optional upper thrust bearing. The instalaltion of upperthrust bearing is reversible (it's ever possible to come back to the standard version or install it).
- High pressure pumps: reinforced desing pumps with PN 50 bar maximum working pressure (only Victaulic connections and available models).
- Passivated pumps: for pumping of corrosive liquids (eg. reverse osmosis systems) are available pumps in AISI 316 / CF-8M, with chemical treatment and special design features, for higher corrosion resistant.

CATALOG REVISION CHANGES NOTICE

Rev. No.	Changes	Page
01	Updating mechanical seal “Available on request” materials	19
	Updating performance tables 30VR - 45VR - 65VR	29-30
	Updating performance curves 30VR (1 - 7 stages)	34-35
02	Updating ErP motor regulation	64-65
	Updating “motors” tables	68-69
	Updating performance curves 30VR (8-13 stages)	76-77
03	Updating “Construction options”	86

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