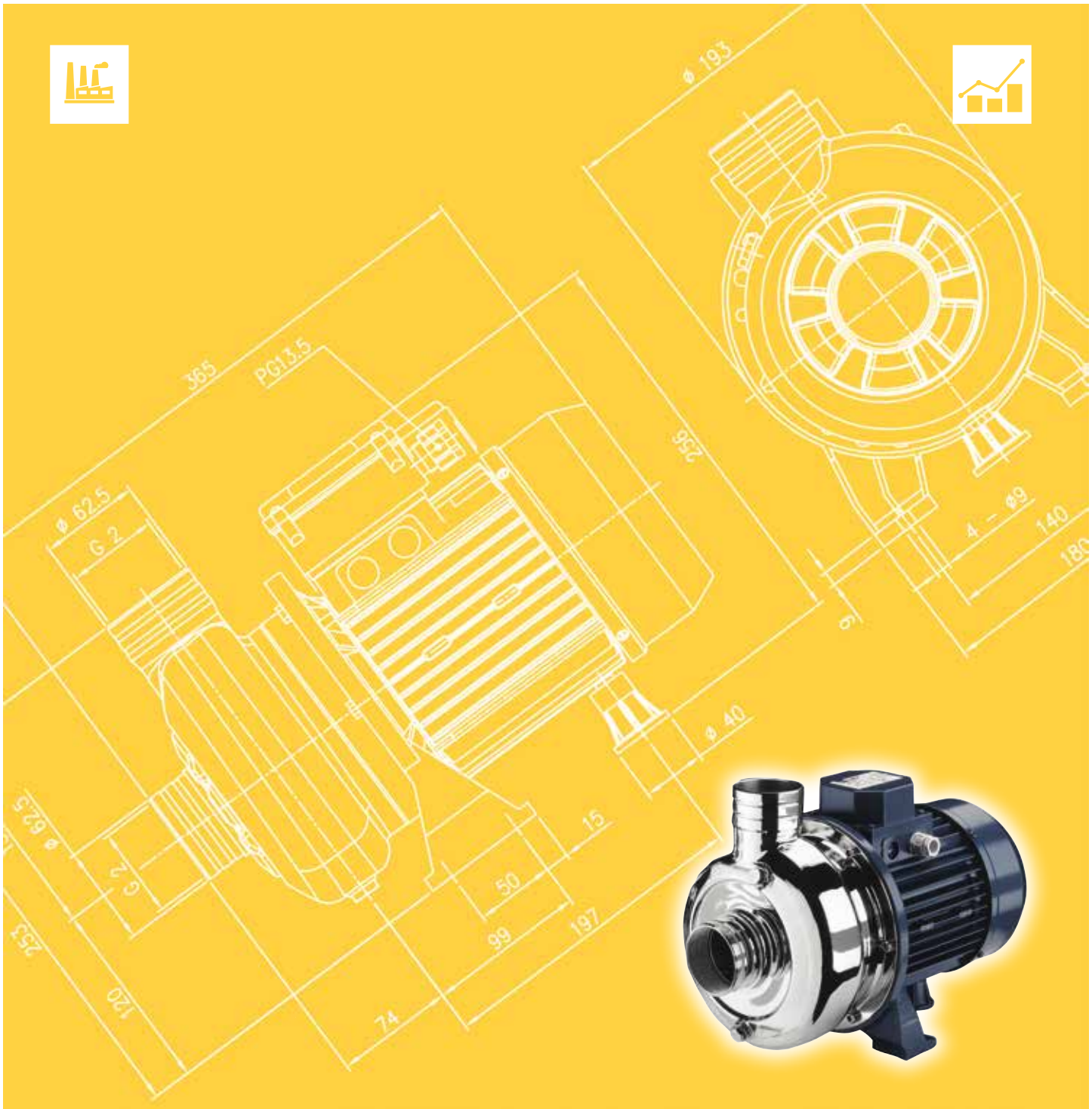
EBARA

Japanese Technology since 1912

DWO

Data Book 60Hz



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SPECIFICATIONS 60Hz

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PUMP			
Liquid Handled	Type of liquid		Moderate aggressive fluids, glycol solutions, liquids containing Impurities, liquids suitable for industrial washing equipments. **Not suitable for clean water**. For other industrial fluids please contact our Technical Customer Service.
	Temperature	[°C]	min. -5 max. +120 For full details see section "FLUID TEMPERATURE RANGE"
Maximum working pressure		[MPa]	0.8
Construction	Impeller		Open centrifugal type
	Shaft seal type		Mechanical seal
	Bearing		Sealed ball bearing
Pipe Connection	Suction	[inch]	G 2 (G2½ for DWO 3006-4006) UNI ISO 228
	Discharge	[inch]	G 2 UNI ISO 228
Material	Casing		EN 1.4301 (AISI 304)
	Impeller		EN 1.4301 (AISI 304)
	Casing cover		EN 1.4301 (AISI 304)
	Shaft seal		Ceramic/Carbon/NBR (for version see page 302-303-304)
	Shaft		EN 1.4301 (AISI 304) (wet extension)
	Bracket		Aluminium
Applicable standard of test			ISO 9006:2012 - Grade 3B

MOTOR			
Type		Electric - TEFC	
		Single Phase	Three Phase
Efficiency Level (Reg. 1781/2019)		- **	IE3*
No. of Poles		2	
Rotation speed	[min^{-1}]	≈ 3450	
Insulation Class		F	
Protection degree (CEI EN 60034-5)		IP 55	
Power rating	[kW]	1.7 ÷ 1.8	1.1 ÷ 3
	[HP]	2.3 ÷ 2.4	1.5 ÷ 4
Frequency	[Hz]	60	
Voltage	[V]	220-230 ±6%	220/380-460 ±10%
Capacitor		Built in	-
Over load protection		Built in	Provided by the user
Casing material		Aluminium	
Base material / Motor support		Aluminium	
Dimensions of cable entry		PG 11 - PG 13.5 - G 3/8 – M20x1.5 (see page 400)	

* At 220/380V efficiency level is IE2; IE3 only at 460V

** **Single phase models not available for the European market**

PERFORMANCE RANGE and SELECTION CHART 60Hz

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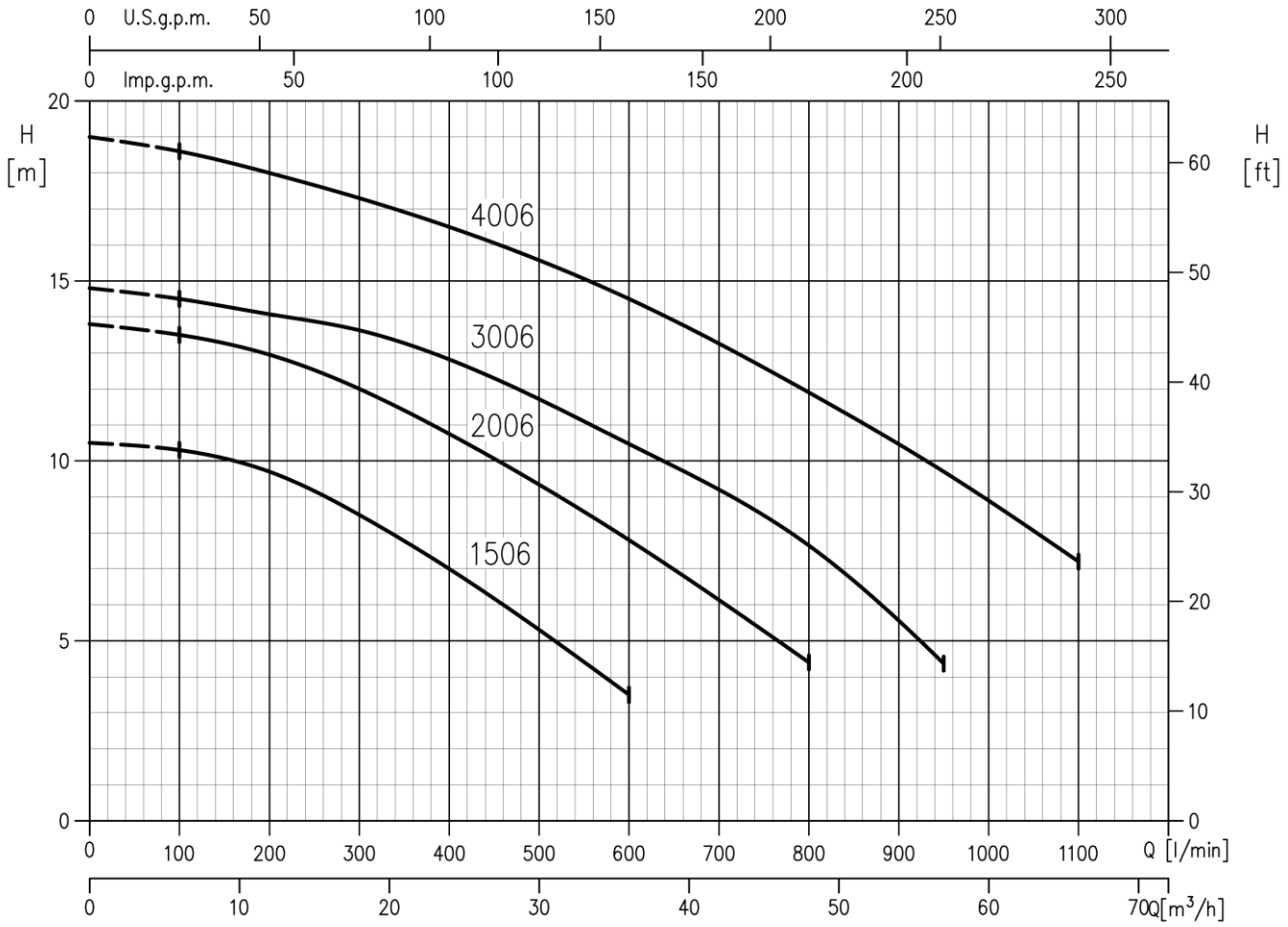
PERFORMANCE RANGE



SELECTION CHART

Pump type		Q=Capacity								
		l/min	0	100	200	300	400	600	800	950	1100
Single Phase	Three Phase	m³/h	0	6	12	18	24	33	42	57	66
		H=Total manometric head in meters									
DWO 1506 M	DWO 1506		10.5	10.3	9.7	8.5	7.0	3.5	-	-	-
DWO 2006 M	DWO 2006		13.8	13.5	12.9	12	10.7	7.8	4.4	-	-
-	DWO 3006		14.8	14.6	14.4	14.2	13.1	10.5	7.5	4.9	-
-	DWO 4006		19	18.6	18	17.3	16.5	14.5	11.9	9.7	7.2

TYPE KEY and CURVES SPECIFICATIONS 60Hz

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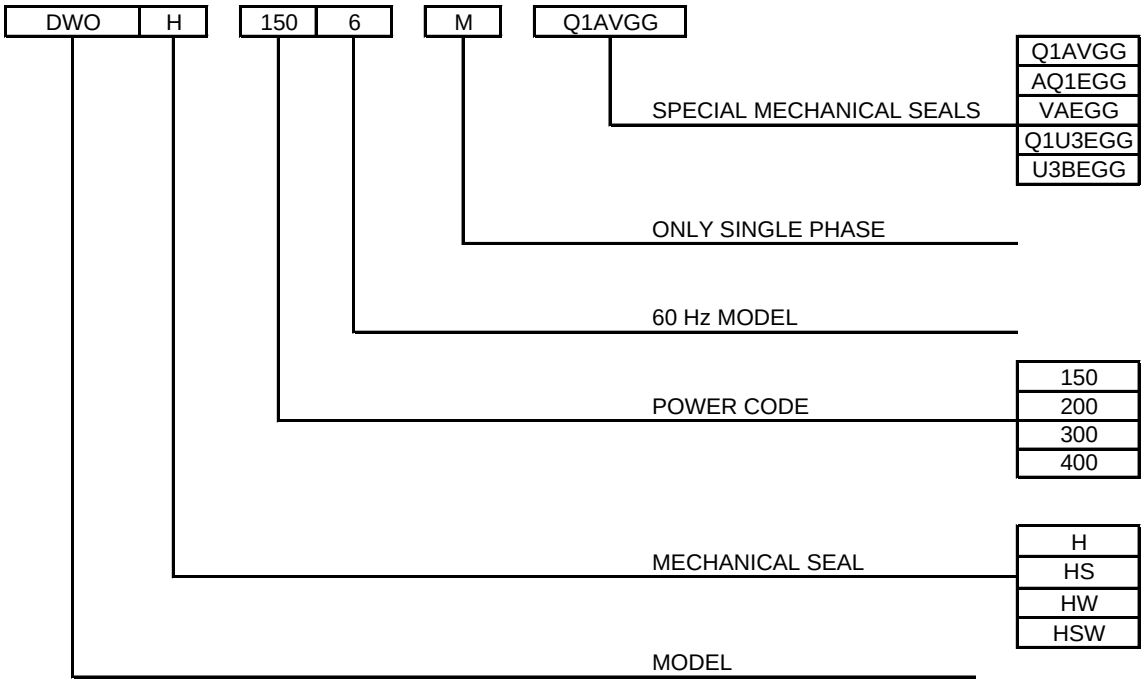
TYPE KEY



CURVES SPECIFICATIONS

The specifications below qualify the curves shown on the following pages.

Tolerances according to ISO 9006:2012 - Grade 3B.
The curves refer to effective speed of asynchronous motors at 60 Hz, 2 poles.
Measurements were carried out with clean water at 20°C of temperature and with a kinematic viscosity of $\nu = 1\ mm^2/s$ (1 cSt)
The continuous curves indicate the recommended working range. The dotted curve is only a guide.
In order to avoid the risk of over-heating, the pumps should not be used at a flow rate below 10% of best efficiency point.

Symbols explanation:

Q = volume flow rate
H = total head

PERFORMANCE CURVES

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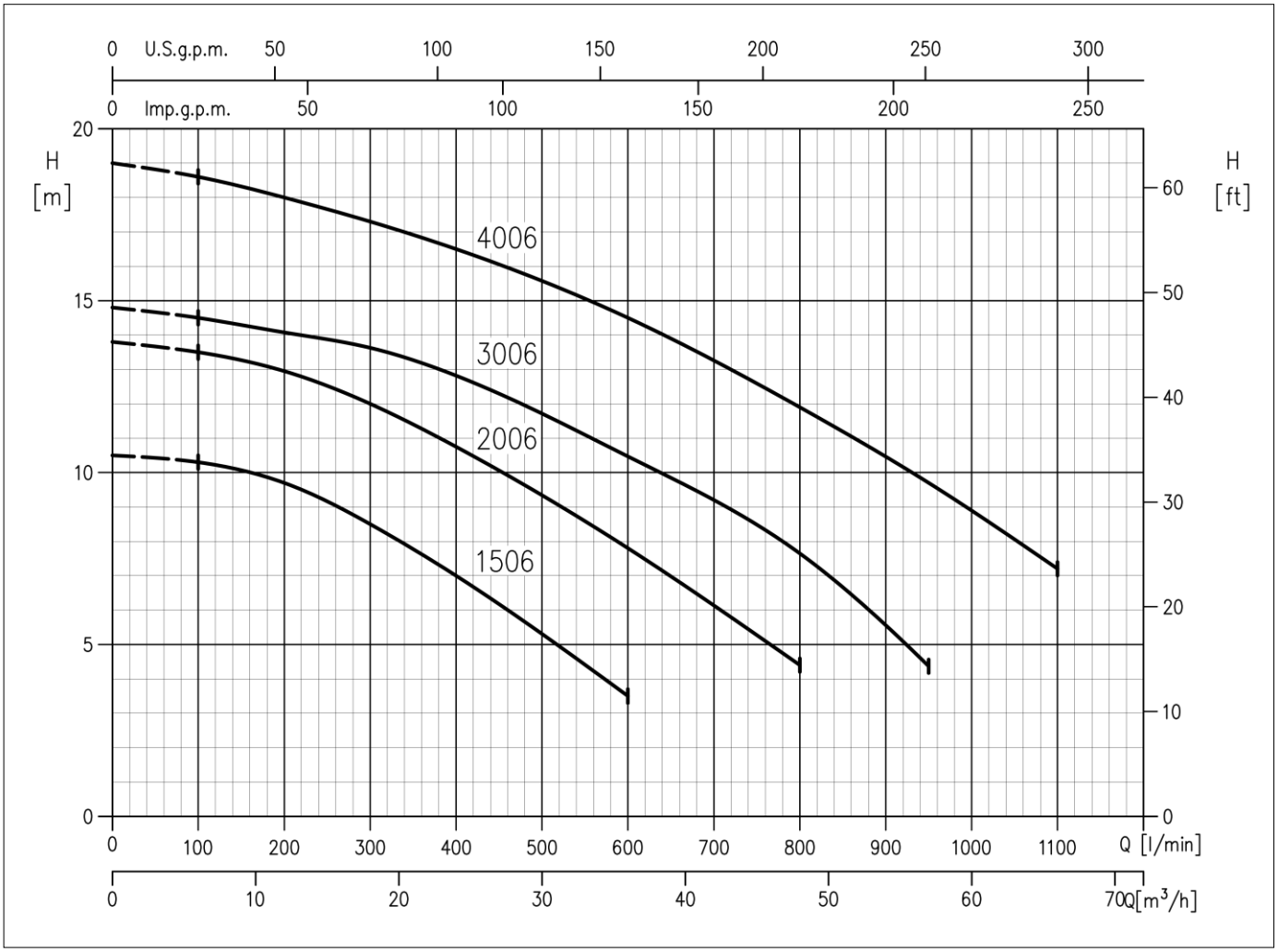
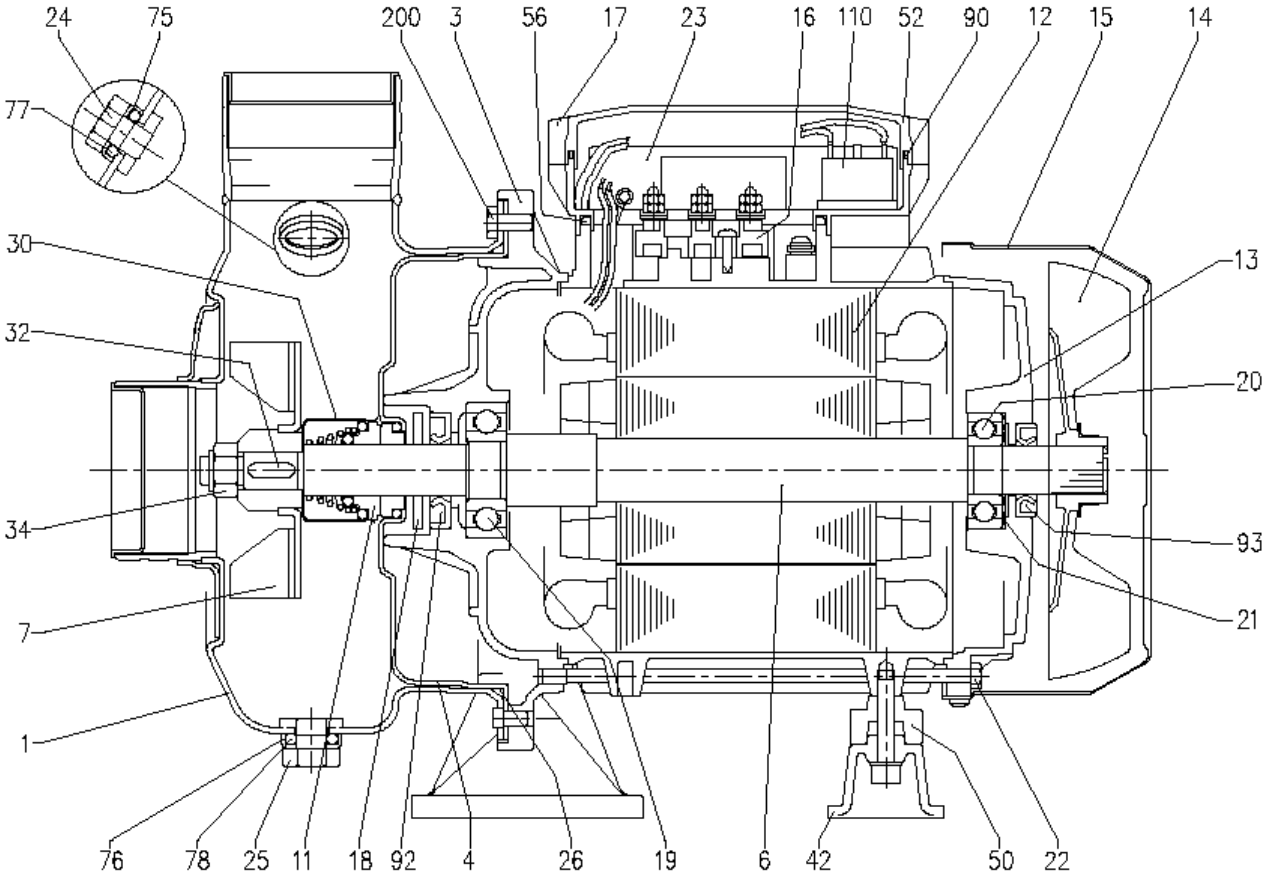
DWO 1506 - Impeller diameter = 88 mm
DWO 2006 - Impeller diameter = 88 mm
DWO 3006 - Impeller diameter = 118 mm
DWO 4006 - Impeller diameter = 118 mm



Rotation speed ≈ 3400 min^{-1}
Test standard: ISO 9006:2012 - Grade 3B

SECTIONAL VIEW DRAWING



SECTIONAL VIEW TABLE

N°	PART NAME	MATERIAL	DIMENSIONS	STANDARD	Q.TY
1	Casing	EN 1.4301 (AISI 304)			1
3	Motor bracket	Aluminium			1
4	Casing cover	EN 1.4301 (AISI 304)			1
6	Shaft with rotor	EN 1.4301 (AISI 304) wet extension			1
7	Impeller	EN 1.4301 (AISI 304)			1
11	Mechanical seal [4]	Carbon/Ceramic/NBR			1
12	Motor frame with stator	-			1
13	Motor cover	Aluminium			1
14	Fan	PP			1
15	Fan cover	Fe P04 Zincate			1
16	Terminal box	-			1
17	Terminal box cover [2]	Aluminium			1
18	Splash ring	NBR	40x17.5x3		1
19	Pump side ball bearing [5]	-			1
20	Fan side ball bearing [5]	-			1
21	Adjusting ring	Steel C70			1
22	Tie rod	Fe 420 Zincate		EBARA drawing	4
23	Capacitor [1]	-			1
24	Priming plug	EN 1.4305 (AISI 303)			1
25	Drain plug	EN 1.4305 (AISI 303)			1
26	O-ring [3]	NBR/FPM/EPDM	148.8x3.53		1
30	Mechanical seal protection	EN 1.4301 (AISI 304)			1
32	Key	EN 1.4401 (AISI 316)	5x5x15	UNI 6604	1
34	Impeller nut	EN 1.4301 (AISI 304)	M10x1.25	UNI 7474	1
42	Motor support	Aluminium			1
50	Spacer	-			1
52	Terminal box [1]	PP			1
56	Box gasket	NBR			1
75	Washer	EN 1.4301 (AISI 304)			1
76	Washer	EN 1.4301 (AISI 304)			1
77	O-ring [3]	NBR/FPM/EPDM	13.1x2.62	OR 117	1
78	O-ring [3]	NBR/FPM/EPDM	13.1x2.62	OR 117	1
90	Terminal box cover gasket [1]	NBR	171.12X2.62		1
92	Lip seal	-	18x40x7		1
93	Lip seal	-			1
110	Protector [1]	-			1
200	Screw	Stainless steel A2		UNI7323	6

[1] Only for Single phase
[2] Only for Three phase
[3] FPM for H-HS-HW-HSW-Q1AVGG (see pages 302, 303, 304)
EPDM for AQ1EGG-VAEGG-Q1U3EGG-U3BEGG (see pages 302, 303, 304)
NBR only for Standard version (see pages 302, 303, 304)
[4] See **MECHANICAL SEAL** pages 302, 303, 304
[5] See **BEARINGS** page 305

CONSTRUCTIONS

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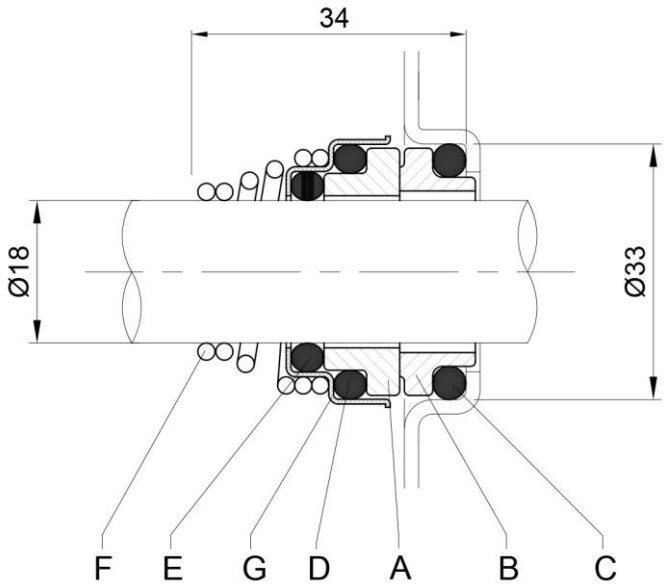
MECHANICAL SEAL



STANDARD

REF	PART NAME	MATERIAL
A	Rotary seal ring	Ceramic
B	Stationary seal ring	Carbon graphite
C	O-ring	NBR
D	O-ring	NBR
E	O-ring	NBR
F	Self driving spring	AISI 316
G	Frame	AISI 304

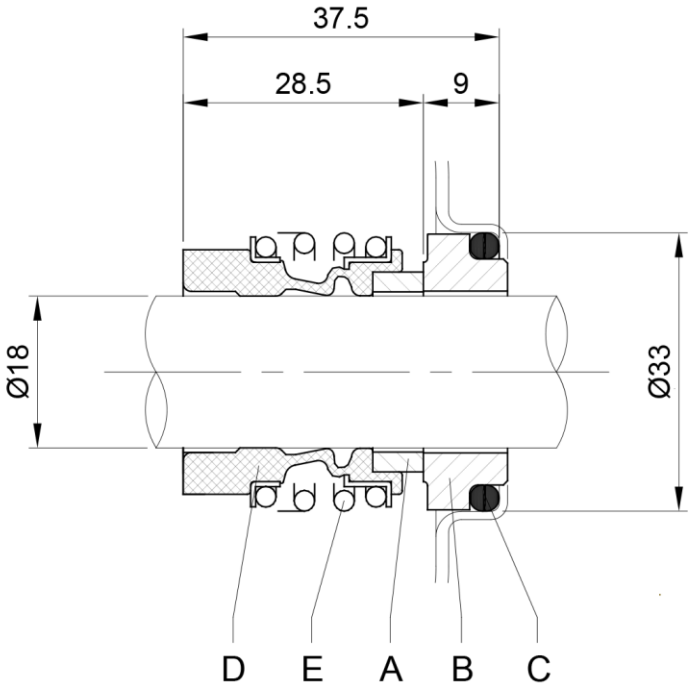
OPTIONAL

REF	PART NAME	MATERIAL			
		H	**HS**	**HW**	**HSW**
A	Rotary seal ring	Ceramic	Silicon carbide	Tungsten carbide	Silicon carbide
B	Stationary seal ring	Carbon graphite	Silicon carbide	Tungsten carbide	Tungsten carbide
C	O-ring	FPM	FPM	FPM	FPM
D	O-ring	FPM	FPM	FPM	FPM
E	O-ring	FPM	FPM	FPM	FPM
F	Self driving spring	AISI 316	AISI 316	AISI 316	AISI 316
G	Frame	AISI 304	AISI 316	AISI 316	AISI 316

SPECIAL

REF	PART NAME	MATERIAL			
		Q1AVGG	**VAEGG**	**Q1U3EGG**	**U3BEGG**
A	Rotary seal ring	Silicon carbide	Ceramic	Silicon carbide	Tungsten carbide
B	Stationary seal ring	Metallized carbon	Metallized carbon	Tungsten carbide	Graphite
C	O-ring	FPM	EPDM	EPDM	EPDM
D	O-ring	FPM	EPDM	EPDM	EPDM
E	O-ring	FPM	EPDM	EPDM	EPDM
F	Self driving spring	AISI 316	AISI 316	AISI 316	AISI 316
G	Frame	AISI 316	AISI 316	AISI 316	AISI 316

MECHANICAL SEAL



SPECIAL

REF	PART NAME	MATERIAL **AQ1EGG**
A	Rotary seal ring	Metallised carbon
B	Stationary seal ring	Silicon carbide
C	O-ring	EPDM
D	Bellows	EPDM
E	Frame + spring	AISI 316

FLUID TEMPERATURE RANGE

The maximum allowable temperature for the pumped fluid is a determining factor for the operational life of the pump. A primary role in this limitation is played by the materials of the mechanical seals (rings and elastomers), whose thermal resistance often defines the upper limit. The general construction materials of the pump (casing, impeller) and the lubricant used also contribute to defining the maximum temperature. Although the fluid properties and operating conditions have an impact, the choice of suitable seal materials for the operating temperature is crucial to prevent leaks and ensure the reliability of the pumping system.

To preserve optimal performance and prevent failures, we recommend to operate within the following limits:

STANDARD	TEMPERATURE	
mechanical seal	MIN	MAX
STANDARD	-5 °C	90 °C

OPTIONAL	TEMPERATURE	
mechanical seal	MIN	MAX
H *	-5 °C	110 °C
HS *	-5 °C	110 °C
HW *	-5 °C	110 °C
HSW *	-5 °C	110 °C

SPECIAL	TEMPERATURE	
mechanical seal	MIN	MAX
Q1AVGG *	-5 °C	110 °C
AQ1EGG	-5 °C	120 °C
VAEGG	-5 °C	120 °C
Q1U3EGG	-5 °C	120 °C
U3BEGG	-5 °C	120 °C

* in case the pumped fluid is water in combination to FPM elastomers, a maximum temperature fluid of 75°C is recommended in order to guarantee a longer life of the sealing parts

BEARINGS

Pump type		Ball Bearing	
Single Phase	Three Phase	Pump side	Fan side
DWO 1506 M	DWO 1506	6204	6203
DWO 2006 M	DWO 2006	6204	6203
-	DWO 3006	6204	6203
-	DWO 4006	6305	6205

DIMENSIONS and WEIGHT

60Hz

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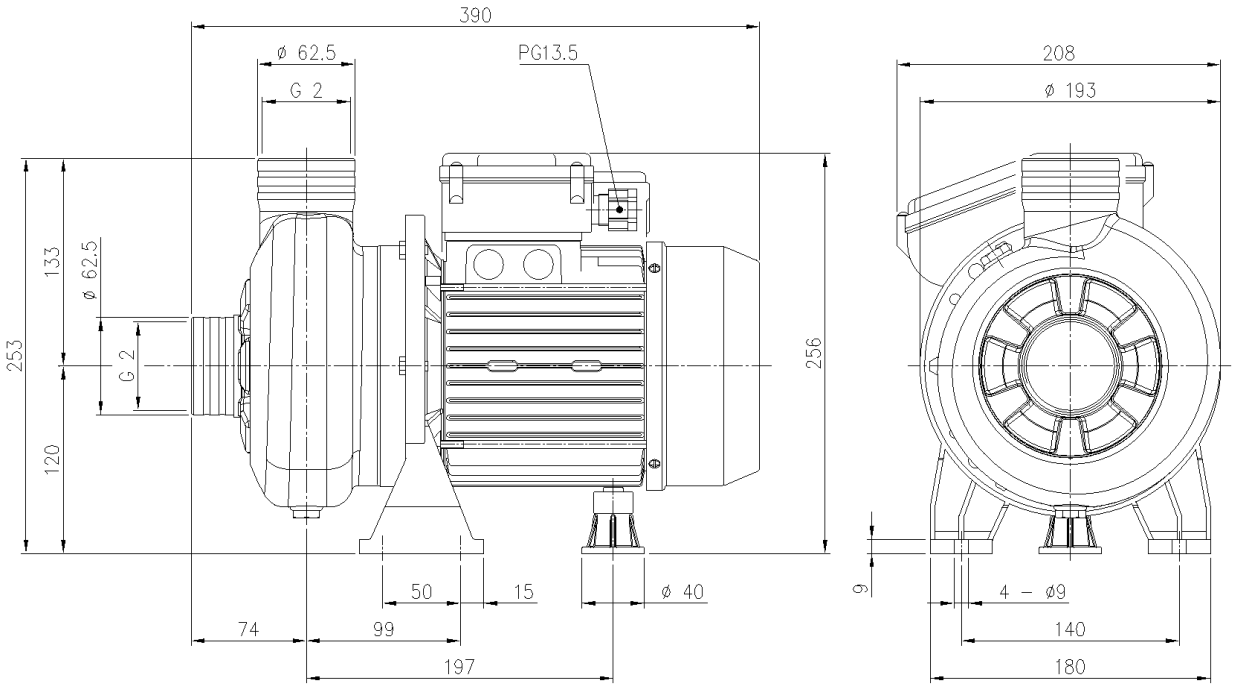
PUMP

SINGLE PHASE
DWO 1506/2006



Pump type	Weight [kgf]
DWO 1506	13,6
DWO 2006	15,7

DIMENSIONS and WEIGHT

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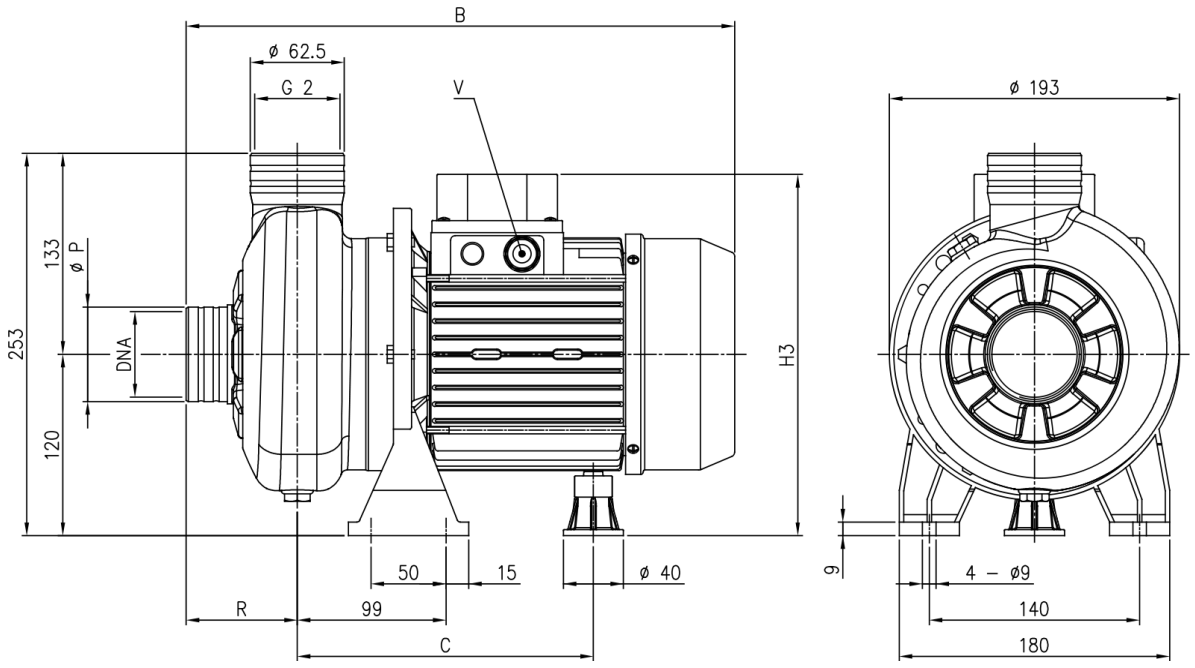
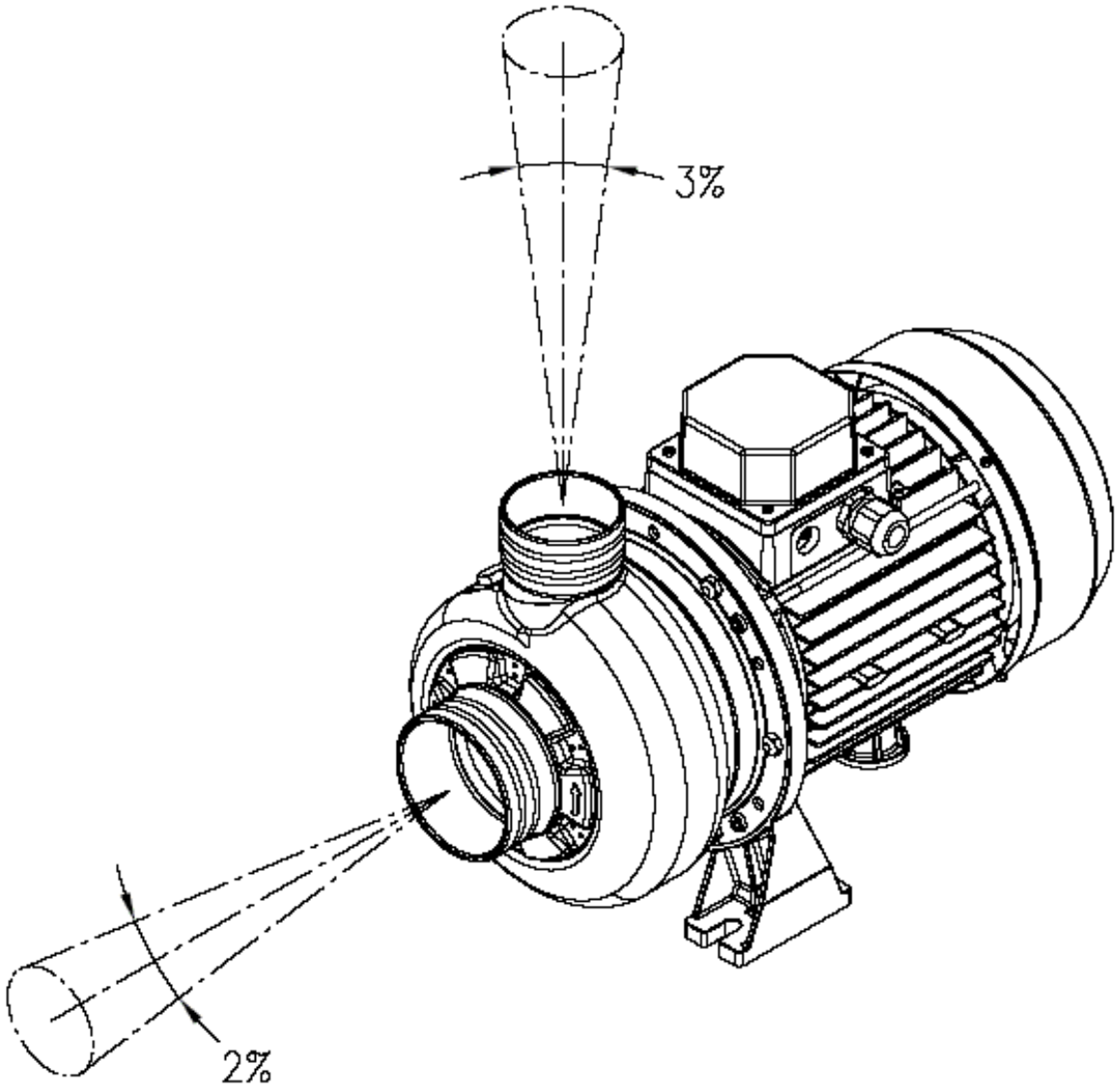
PUMP

THREE PHASE
DWO 1506/2006/3006/4006



Pump type	Dimension [mm]							Weight [kgf]
	B	C	H3	R	P Ø	V	DNA	
DWO 1506	390	197	239	74	62,5	M20x1.5	G 2	15,5
DWO 2006	390	197	239	74	62,5	M20x1.5	G 2	17,3
DWO 3006	395	197	239	78	80	M20x1.5	G 2½	19,2
DWO 4006	455	230/241	244	78	80	M20x1.5	G 2½	22,3

GEOMETRIC TOLERANCES



DIMENSIONS and WEIGHT

60Hz

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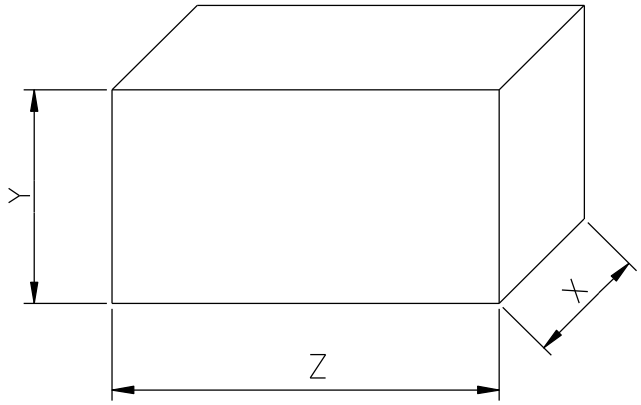
PACKING



Pump type		Packing [mm]						Weight [kgf]	
		X		Y		Z			
Single Phase	Three Phase	[1~]	[3~]	[1~]	[3~]	[1~]	[3~]	[1~]	[3~]
DWO 1506 M	DWO 1506	245	245	315	315	590	590	14,5	16,3
DWO 2006 M	DWO 2006	245	245	315	315	590	590	16,3	18,2
-	DWO 3006	-	245	-	315	-	590	-	21,2
-	DWO 4006	-	245	-	315	-	590	-	23,1

[1~] Single phase
[3~] Three phase

MOTOR DATA

Pump type	Power		Efficiency	Capacitor		Efficiency (% load) and power factor				Input	Full load current		Locked rotor current	
						η %					[A]		[A]	
Single Phase	[kW]	[HP]	[IE]	[μF]	[V]	50%	75%	100%	cos-φ	[kW]	110 V	220 V	110 V	220 V
DWO 1506 M	1,7	2,3	- **	31,5	450	-	-	-	0,97	2,08	-	9,7	-	55,0
DWO 2006 M	1,8	2,4	- **	40	450	-	-	-	0,95	2,29	-	10,5	-	69,0

Pump type	Power		Efficiency	Efficiency (% load) (380 V) η %			Efficiency (% load) (460 V) η %			Input	Full load current [A]			Locked rotor current [A]		
Three Phase	[kW]	[HP]	[IE]	50%	75%	100%	50%	75%	100%	[kW]	220 V	380 V	460 V	220 V	380 V	460 V
DWO 1506	1.1	1.5	IE3*	84.2	84.7	84.5	83.2	84.7	85.7	1.75	5.3	3.1	2.9	40.2	23.2	28.1
DWO 2006	2.2	3.0	IE3*	86.5	86.8	86.2	86.9	87.8	87.4	2.48	7.5	4.3	4.1	55.7	32.2	38.9
DWO 3006	2.2	3.0	IE3*	86.5	86.8	86.2	86.9	87.8	87.4	2.48	7.5	4.3	4.1	55.7	32.2	38.9
DWO 4006	3.0	4.0	IE3*	86.8	87.0	87.5	87.0	87.9	88.5	3.42	10.2	5.9	5.6	75.7	43.7	52.8

* At 220/380V efficiency level is IE2; IE3 only at 460V

** **Single phase models not available for the European market**

04/24

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