

Technical data 50 & 60 Hz

Vertical centrifugal pumps

Series: DPLHS



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1 Pump introduction

1.1 General



Figure 1: The vertical, multi-stage centrifugal pump, DPLHS is produced by DP-Pumps.

1.2 Model key

Pump type	DPLHS	6	-100	
Materials	DPLHS			DP Vertical pump in superior grade AISI 316 (1.4401) 40 Bar.
Pump connections				Round flanges DIN or ASME.
Model / flow		6		Pump model indicates nominal flow in [m ³ /h].
Stages / head			-100	Indicates number of impeller stages (100 = 10).

1.3 Description of the product

The vertical, single or multistage pump serie DPLHS is designed for pumping clean, watery liquids. Suction and discharge of the pump are in-line, making the pump easy to install. The hydraulic assembly is installed vertically and driven by an electric motor.

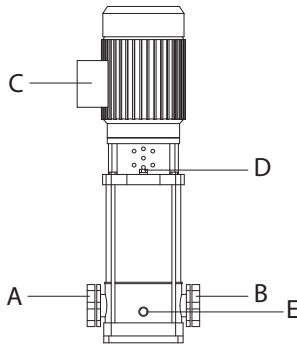
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All hydraulic parts of the pump are made of stainless steel, making the pump light and extremely suitable for applications that demand high grade materials, such as drinking water applications.

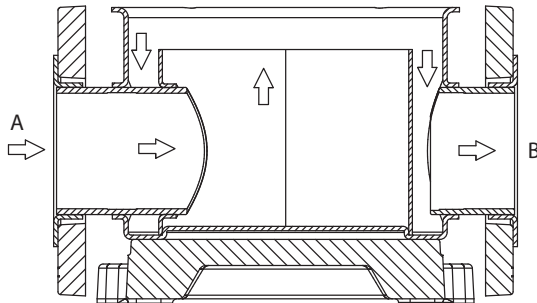
The DPLHS is designed for high pressures (up to 40 Bar)

1.4 Operation

The liquid is sucked in through the pump inlet (A) on the supply side under minimum pressure. The pump increases the pressure. The liquid leaves the pump through the pump outlet (B) on the delivery side under increased pressure.



- A Pump inlet
- B Pump outlet
- C Terminal box
- D Fill plug/air relief plug
- E Drain plug



1.5 Working range

The working range of the pumps in this series can be summarised as follows:

Table 1: Specification of the working range

Pump type	DPLHS
Ambient temperature [°C]	+4 to 40
Liquid temperature [°C]	-15 to 80 ¹
Maximum working pressure [bar]	40 ⁴
Allowable size of solids pumped	5µ to 1mm
Minimum supply pressure	Not cavitating ² .

Pump type	DPLHS
Viscosity liquid [cSt]	1 A higher viscosity may require more motor power. ⁵
Density liquid [kg/m ³]	1000 A higher density may require more motor power. ⁵
Cooling	The space above the cooling fan of the motor must at least be equal to 1/4 of the diameter of the inlet of the cooling fan of the motor in order to have a sufficient supply of air.
Number of starts	Related to the motor ³
Minimum frequency [Hz]	10
Maximum frequency [Hz]	60 ⁴

1. Higher temperatures are possible with seal TuC/Ca/EPDM - max temperature 120°C
2. Contact your supplier for more detailed advice.
3. For standard motors see the technical specifications. When the pump is fitted with another motor brand, please consult the motor supplier.
4. Pumps that are intended for 50 Hz operation, may not be connected to 60 Hz.

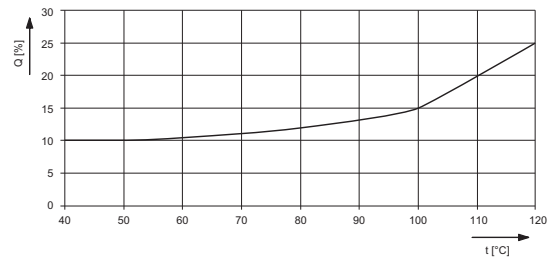


Figure 2: Minimum volume flows (Q) in% of Q optimum temperatures (t).

Table 2: Minimum volume flows (Q_{min})

DPLHS	Q _{min} in m ³ /h	
	50 Hz	60 Hz
6	0,8	0,96

Table 3: Specific applications

type	application area
DPLHS	Reverse osmosis installations and high pressure cleaning systems.

2 Performance characteristics

2.1 Performance curve details

The preceding diagrams give a global overview of all the pump models mentioned in this documentation. Detailed characteristics are given for each model showing the hydraulic efficiency, $NPSH_{req}$, and shaft power as well.

The performance of the pump depends on the number of stages. The number of stages are shown as a multiple of 10, as per example:

DPLHS 6-100 10 stage impellers

The detailed performance curves are in accordance with ISO 9906:2012 (Grade 3B). Vibration limits at rated speed and rated flow are according to ISO 9905.

The motors used for the measurements are standard DP. When using another motor brand the performance data, like Q/H, efficiency and shaft power must be corrected accordingly.

The characteristics given are based on:

- De-aerated water at a temperature of 20 °C
- Density of 1 kg/dm³
- Kinematical viscosity of 1 mm²/s (1 cst)

To prevent the pump from overheating, gathering gas, cavitation etc. a minimum flow has to be secured.

The minimum flow corresponds to a percentage of the optimum flow Q_{opt} in relation to the temperature of the liquid pumped.

2.2 Minimum efficiency index

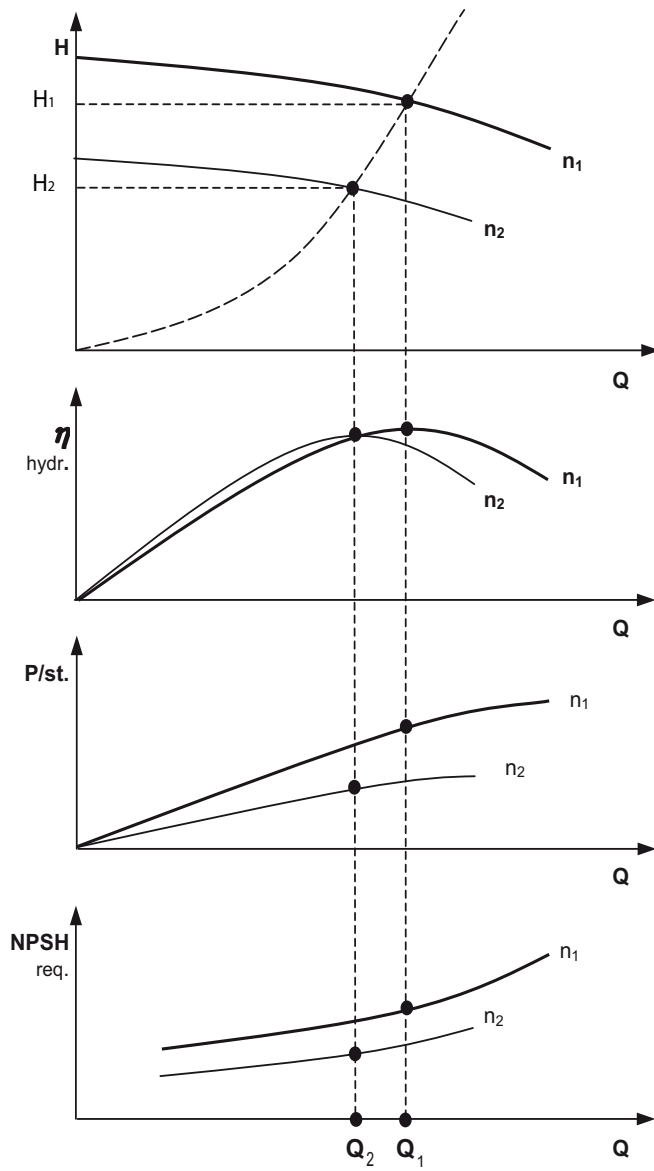
The minimum energy-efficiency level according to ErP regulations for water pumps is specified by the minimum efficiency index MEI. From 1 January 2015 the minimum efficiency index (MEI) for standardised water pumps is $\geq 0,4$.

:

2.3 Performance with variable frequency drive

The minimum frequency of the DP motor should be limited to 10 Hz to ensure sufficient cooling. When the rotational speed exceeds the nominal speed of the motor, make sure that the power output of the motor is suitable to drive the corresponding pump model.

The performance of the pump differs from the fixed speed performance according to the recalculation scheme.



$$Q_2 = \frac{n_2}{n_1} \cdot Q_1$$

$$H_2 = \frac{(n_2)^2}{(n_1)^2} \cdot H_1$$

$$\eta_2 = 1 - \left((1 - \eta_1) \cdot \left(\frac{n_1}{n_2} \right)^{0.1} \right)$$

$$P_2 = \frac{(n_2)^3}{(n_1)^3} \cdot P_1$$

$$NPSH_{2, req.} = \frac{(n_2)^2}{(n_1)^2} \cdot NPSH_{1, req.}$$

Figure 3: Performance characteristics

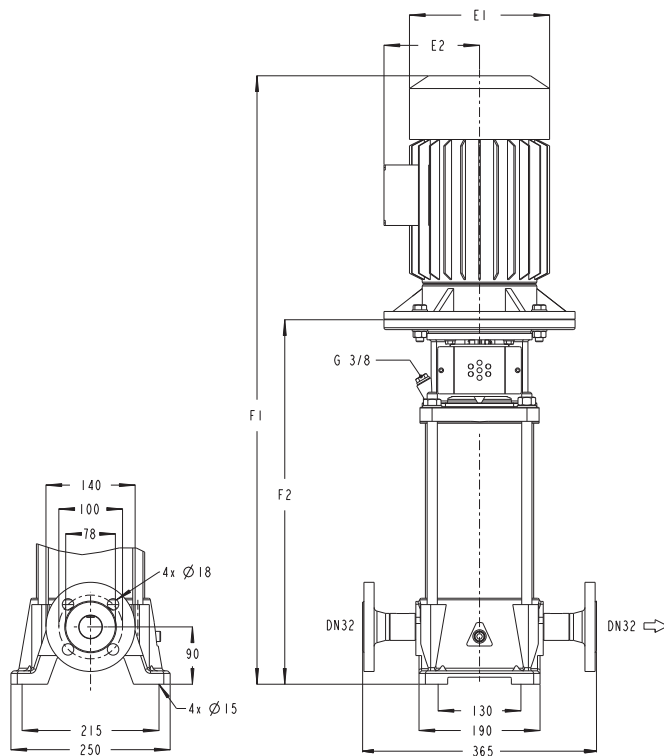
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3 Technical specifications

3.1 Dimensions and weights DPLHS 6 50 Hz

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DPLHS 6

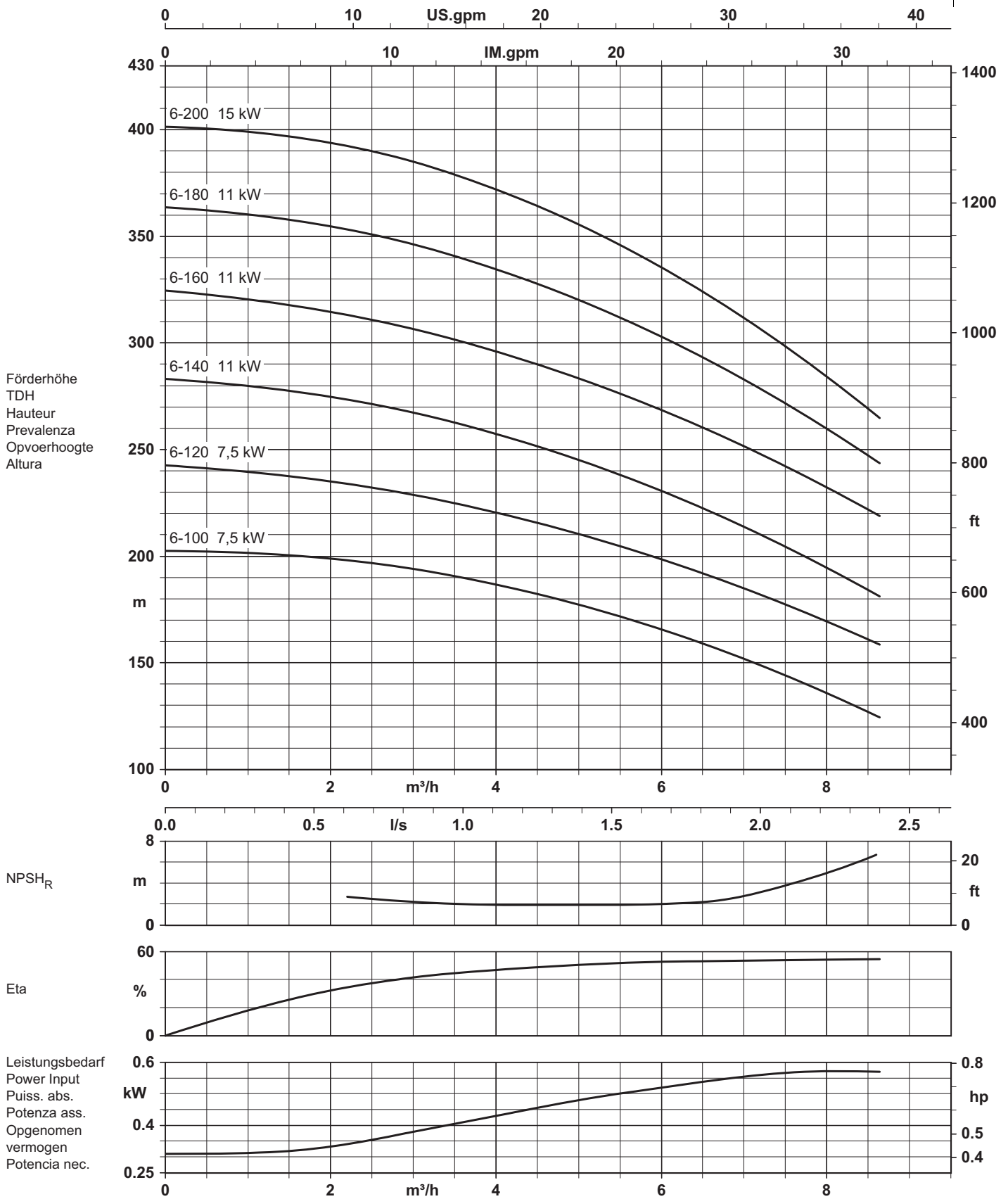
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DPLHS 6 50 Hz		General				
Model	P [kW]	E1 [mm] ¹	E2 [mm]	F1 [mm]	F2 [mm]	Net weight [kg]
6- 100	7,5	233	162	928	599	143
6- 120	7,5	233	162	1015	658	145
6- 140	11	315	206	1250	748	166
6- 160	11	315	206	1310	808	171
6- 180	11	315	206	1369	867	174
6- 200	15	315	206	1429	927	191

95000234-H

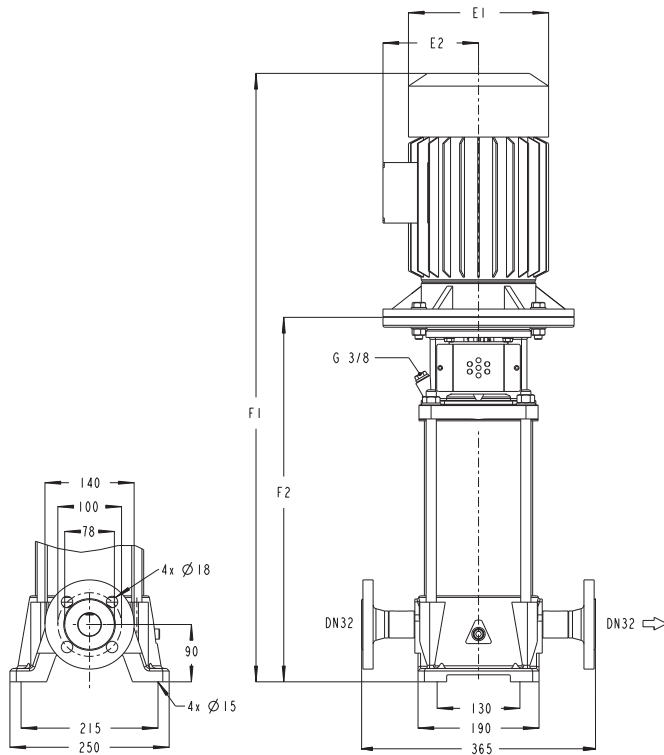
1. Diameter adapter flange 7,5 kW = 300 mm, 11-22 kW = 350 mm.

3.2 Hydraulic performance DPLHS 6 50 Hz ~2900 1/min



3.3 Dimensions and weights DPLHS 6 60 Hz

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DPLHS 6

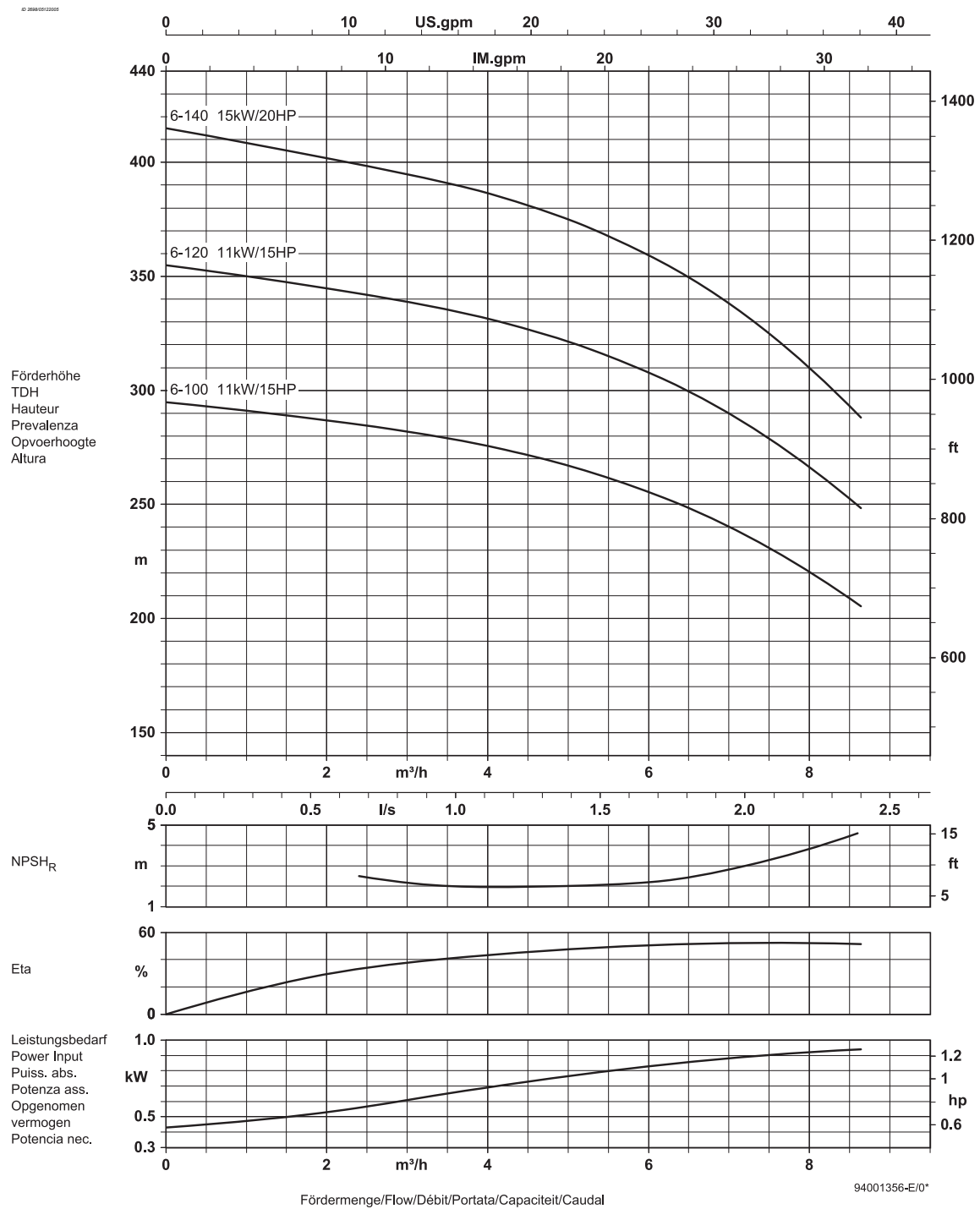
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DPLHS 6 60 Hz		General					
Model	P [kW]	P [HP]	E1 [mm] ¹	E2 [mm]	F1 [mm]	F2 [mm]	Net weight [kg]
6- 100	11	15	315	206	1131	629	165
6- 120	11	15	315	206	1190	688	168
6- 140	15	20	315	206	1250	748	185

95000687-F

1. Diameter adapter flange 11-22 kW = 350 mm,

3.4 Hydraulic performance DPLHS 6 60 Hz ~3500 1/min



4 Motors and motor options

4.1 General

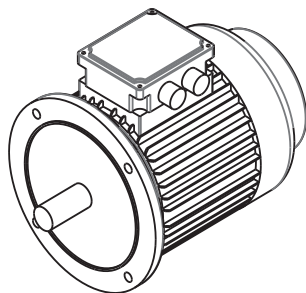
The standard DPmotors are produced conform the latest technical design, and comply with the international standards and EU directives regarding safety measures.

The motors can be specified as:

- Standard IE3 - optional IE4
- T.E.F.C. (totally enclosed fan cooled) Squirrel cage.
- AC induction motor.
- Protection IP55.
- Insulation class F.
- Temperature rise class B.
- Duty class S1, maximum 20 starts per hour.
- Noise levels conform IEC 60034-9.
- standard 3 x PTC.

The motors come in 3 different configurations.
Mounting in acc. with IEC60034-7 and dimensions in acc. with IEC 60072-1

00402



V1 flange

20091254

4.2 Options

- Provided with 10 pole **industrial connector** "Harting stecker" HAN 10, mounted in stead of the motor connection box, $\leq 7,5\text{kW}$.
- Provided with **Rain cover** on top of the fan hood.
- For motors $< 3\text{kW}$ provided with **3 x PTC** and/or **anti condensation heater (1x230V)**.
- Motors from other manufacturers like **Siemens** and **VEM** in efficiency class IE3
- Explosion proof, class **Eex e II T3**.
- Explosion proof, class **Eex d II T4**.
- Marine approved variant acc. bureau Veritas

4.3 Electrical motor data

Table 4: Motor data 3 phase, 2p 50 Hz

Article number	Rated power output [kW]	Rated Voltage [V]	Rated current [A]	Starting current Ia/In	Cos Phi	Tolerance rated voltage	Rated speed [rpm]	Motor efficiency	Sound pressure [dB(A)]	Cable gland	Max. starts per hour
3710111075	7,5	230/400	22,9/13,2	8,5	0,92	+10%, -10%	2920	88,6	64	2xM25x1,5	20
3710112075	7,5	400/690	13,2/7,7	8,5	0,92	+10%, -10%	2920	88,6	64	2xM25x1,5	20
3710111110	11	230/400	36,5/21,0	7,8	0,84	+10%, -10%	2950	90	71	2xM32x1,5	15
3710112110	11	400/690	21,0/12,2	7,8	0,84	+10%, -10%	2950	90	71	2xM32x1,5	15
3710111150	15	230/400	49,0/28,2	7,6	0,85	+10%, -10%	2945	90,3	70	2xM32x1,5	15
3710112150	15	400/690	28,2/16,3	7,6	0,85	+10%, -10%	2945	90,3	70	2xM32x1,5	15

Table 5: Motor data 3 phase, 2p 60 Hz

Article number	Rated power output [kW]	Rated Voltage [V]	Rated current [A]	Starting current Ia/In	Cos Phi	Tolerance rated voltage	Rated speed [rpm]	Motor efficiency	Sound pressure [dB(A)]	Cable gland	Max. starts per hour
3710111110	11	230/400	34,5/19,8	6,7	0,89	+20%, -10%	3530	90	75	2xM32x1,5	15
3710112110	11	400/690	19,8/11,5	6,7	0,89	+20%, -10%	3530	90	75	2xM32x1,5	15
3710111150	15	230/400	46,6/26,8	6,6	0,9	+20%, -10%	3530	89,8	74	2xM32x1,5	15
3710112150	15	400/690	26,8/15,5	6,6	0,9	+20%, -10%	3530	89,8	74	2xM32x1,5	15

5 Materials

5.1 Overview of materials

Pos. nr.	Description	DPLHS
101	Pump casing	1.4408
108	Stage casing	1.4404
160	Cover	1.4404
10-6	Pump shroud	1.4404
210	Shaft	1.4401
230	Impeller	1.4404
341	Motor stool	1.4408
412	O-ring	FPM
525	Spacer sleeve	1.4404
529	Bearing sleeve	Tungsten-carbide
1)	Bearing	Ceramic
903	Vent plug	1.4401
905	Tie bolt	1.4057
920	Nut	1.4404
932	Circlip	1.4571


1. The bearing has no pos.nr. because it is a fixed part of the stage casing (108) or diffuser (171)

5.2 Materials conversion

Material	Description	Code and material nr.	Standard	ASTM / AISI ¹
1.4404	Chromium-nickel-molybdenum steel	X2CrNiMo 17-12-2	EN 10088	A276:316L
1.4408	Chromium-nickel-molybdenum cast steel	GX5CrNiMo 19-11-2	EN 10213	A743CF8M
1.4571	Chromium-nickel-molybdenum steel	X6CrNiMoTi17-12-2	EN 10088	A276:316Ti
1.4057	Chromium-nickel steel	X17CrNi16-2--QT800	EN 10088-3	A276:431
1.4401	Chromium-nickel-molybdenum steel	X5CrNiMo 17-12-2	EN 10088	A276:316


1. Note: The indication of the material designations to ASTM / AISI is not binding

5.3 Mechanical seal specifications


Pump series	DPLHS 6
Mechanical seal type (standard)	
Max. pressure	4000 kPa
Dynamic part	Carbon
Static part	Tungsten carbide
Elastomer	FPM (max 80°C)

6 Connections

6.1 Suction and discharge connections

Pump model key	DPLHS
	
Connection	Round flange ridged cast to pump casing
Norm	DIN EN 1092-2 PN 40
Pressure class	PN 40
DPLHS 6	DN 32

6.2 Suction and discharge connections optional ASME

Pump model key	DPLHS
	
Connection	Round flange ridged cast to pump casing
Norm	ASME B 16.5 cl.600
Pressure class	PN40
DPLHS 6	1 1/4"

7 Factory options

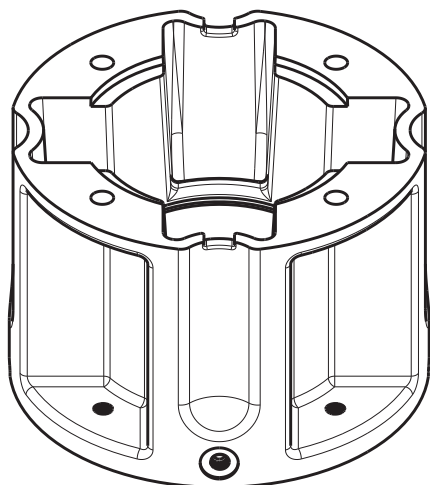
7.1 Factory options

Description:	Applicable model:	Standard:	Options
Mechanical:			
Color finish	All	Pump and motor RAL 5002	RAL 3000 (fire red)
De-staging	All	Intermediate impeller stage	Stage without impeller
Motor:			
Anti condensation heater	3 phase 7,5 kW - 15 kW	None	With anti condensation heater 1~230 V
Rain cover	3 phase 7,5 kW - 15 kW	None	Rain cover on fan hood
Harting stecker	3 phase 7,5 kW - 15 kW	None	Cable connection provided with 10-pole Harting stecker
Connection box position	7,5 kW - 37 kW	9h	0h, 3h, 6h
Increased motor power	7,5 kW - 30 kW	Standard motor power	One step higher motor power
Enlarged motor lantern	7,5 kW - 30 kW	Standard motor lantern	Motor lantern to fit one step higher motorpower
	3 phase 7,5 kW - 15 kW	400 / 692 V	230 / 400 V
Winding Voltage	3 phase 7,5 kW - 15 kW	400 V Y or Δ	500 V Y or Δ

8 Accessories

8.1 Thrust bearing housing

20061107200



Thrust bearing housing

20060227-B

The standard DP-Pumps motors are specially designed to drive the pump. When a standard IEC or NEMA norm motor has to be installed (or a special motor to fulfill the applications requirement, like explosion proof, high efficiency) a special bearing housing must be installed to relieve the motor of the axial force created by the pump.



ATTENTION

Only a motor with a standard key can be installed with a thrust bearing housing.



ATTENTION

There is no need to change the motor stool of the pump. The bearing flange can be mounted on the standard motor stool of the pump.

8.1.1 Dimensions and weights.

The total height increase of the pump will be 113,5 mm / 4.47 inch. The weight of the thrust bearing housing kits are given in the table below:

Table 6: weight of the thrust bearing housings kits

Frame size	Motor-shaft	Kit art. nr.	Weight [kg]	Weight [lbs]
132	38	18708020	7,97	17.57
160	42	18708021	8,25	18.19
180	48	18708022	9,30	20.50
200	55	18708023	9,44	20.81

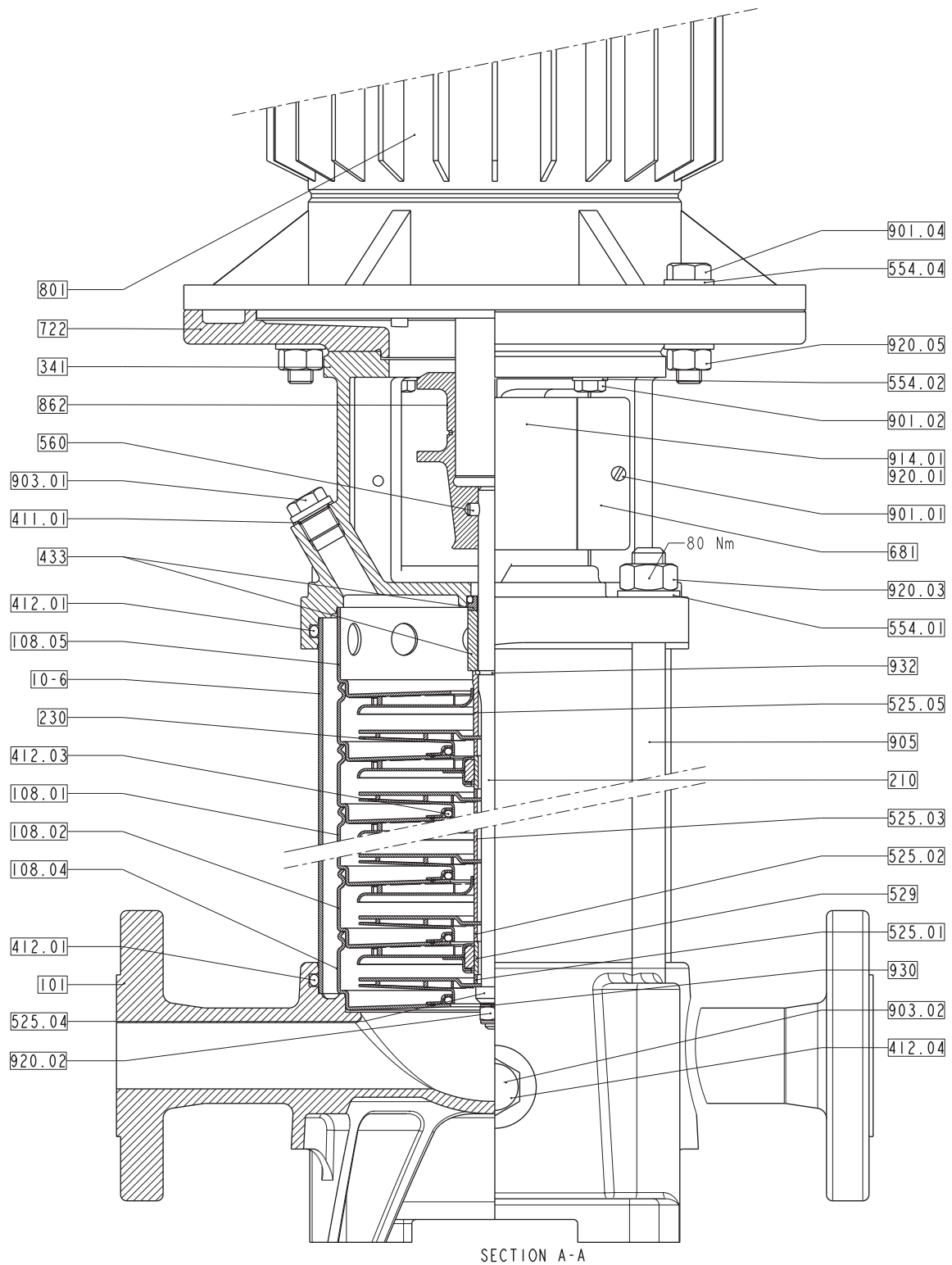
9 Sectional drawings

9.1 Parts list

Number (ZN)	Description:
101	Pump casing
108	Stage casing
210	Shaft
230	Impeller
341	Motor stool
411	Joint ring
412	O-ring
433	Mechanical seal
525	Spacer sleeve
529	Bearing sleeve
554	Washer
560	Pin
681	Coupling guard
722	Taper piece, flanged
801	Flanged motor
831	Fan impeller
832	Fan hood
833	Terminal box
835	Terminal board
862	Coupling shell
901	Hexagon head bolt
903	Screwed plug
905	Tie bolt
914	Hexagon socket head cap scr.
920	Nut
930	Safety device
932	Circlip
10-6	Pump shroud
81-37	Terminal box coverplate

9.2 Sectional drawing DPLHS 6

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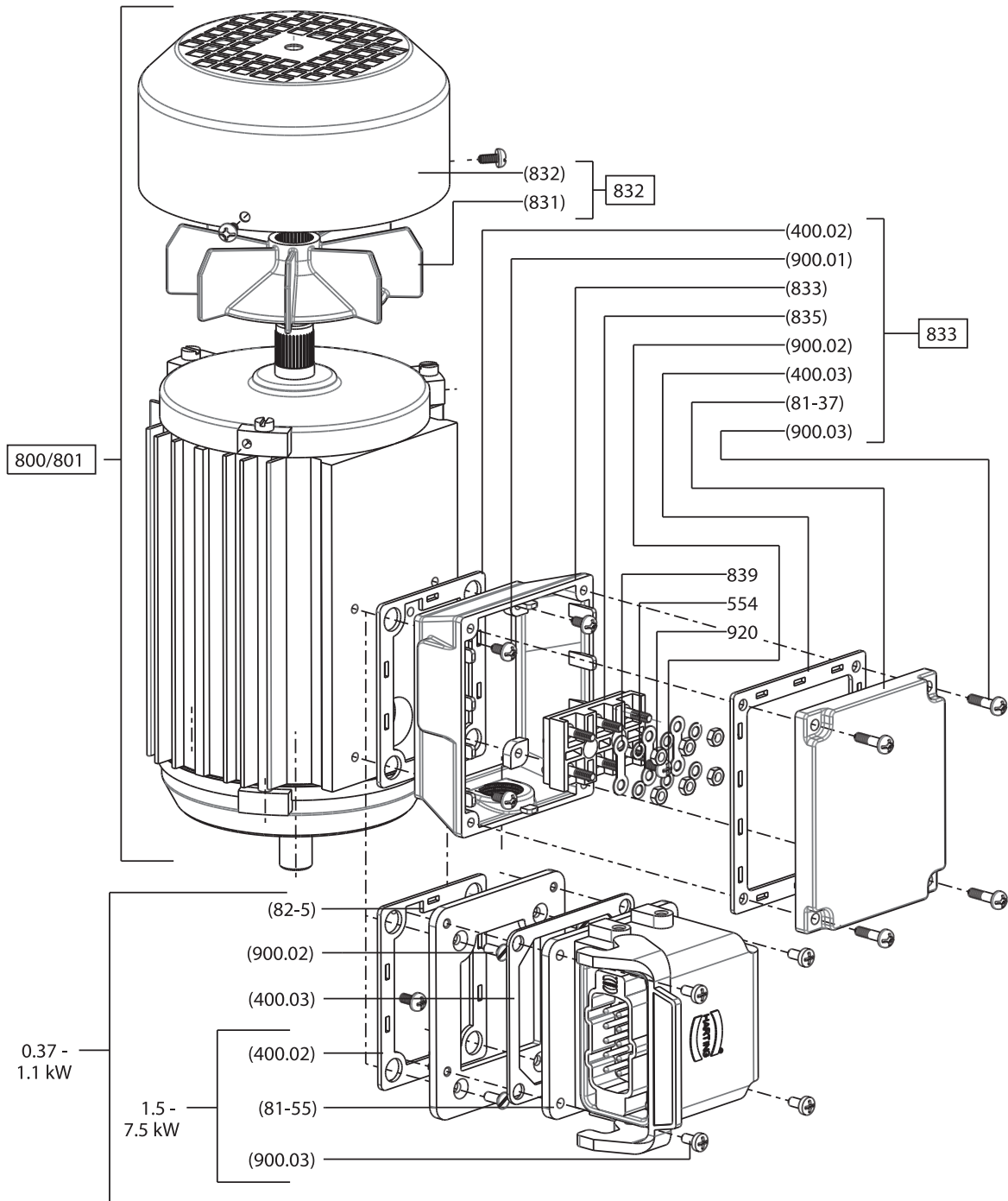


Figure 4: Motor exploded view





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