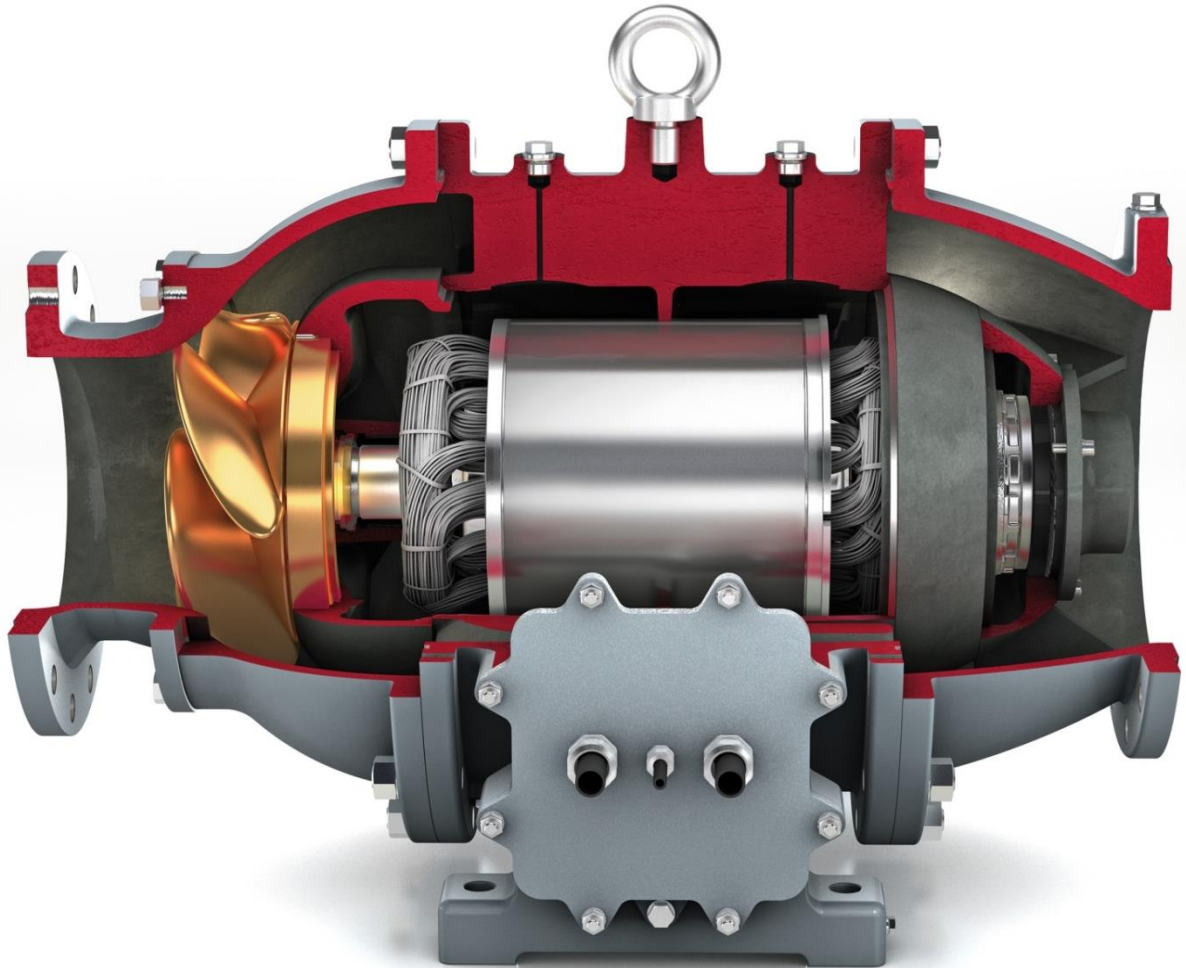




Nordic
Clean
Pumps

Energy back to life

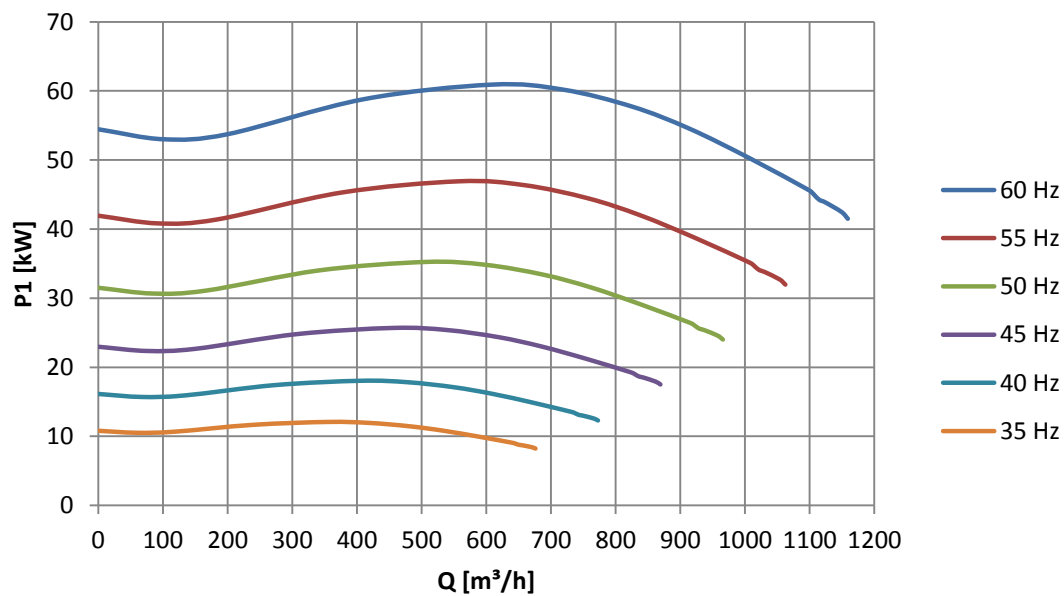
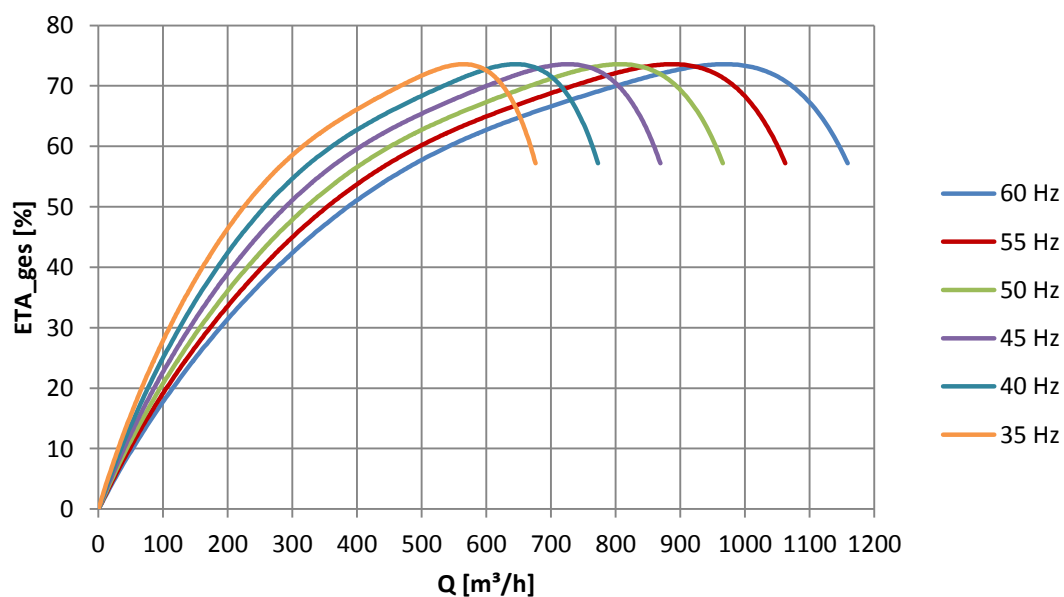
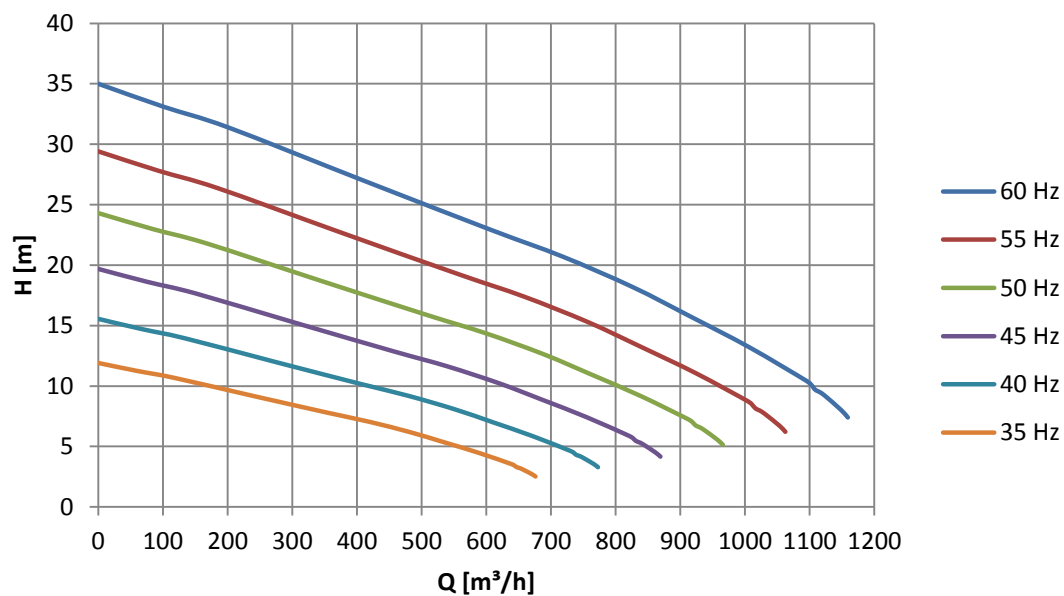


oddesse

smart power for life

**High efficiency
permanent magnet-synchronous-
propeller pump
po-upl-s300.1**

Performance data and characteristic curve



60 Hz	Q	[m³/h]	0	100	200	300	400	500	600	700	800	900	1000	1100	1150
	H	[mWs]	34,8	33,2	31,3	29,4	27,3	25,2	23,1	21,0	18,7	16,3	13,6	10,1	8,0
	P1	[kW]	55,8	53,0	53,7	56,0	58,5	60,4	61,0	60,4	58,4	55,1	50,8	45,4	42,3
	eta*	[%]	0,0	17,3	31,5	43,0	51,5	57,6	62,2	66,3	70,1	73,2	73,5	67,0	59,4
55 Hz	Q	[m³/h]	0	92	183	275	367	458	550	642	733	825	917	1008	1054
	H	[mWs]	29,2	27,9	26,3	24,7	22,9	21,2	19,4	17,6	15,7	13,7	11,4	8,5	6,7
	P1	[kW]	43,0	40,8	41,4	43,1	45,1	46,5	47,0	46,5	45,0	42,4	39,1	35,0	32,6
	eta*	[%]	0,0	17,1	32,0	43,1	51,1	57,2	62,3	66,7	70,2	72,9	73,3	67,0	59,6
50 Hz	Q	[m³/h]	0	83	167	250	333	417	500	583	667	750	833	917	958
	H	[mWs]	24,2	23,0	21,8	20,4	19,0	17,5	16,0	14,6	13,0	11,3	9,4	7,0	5,6
	P1	[kW]	32,3	30,7	31,1	32,4	33,9	34,9	35,3	35,0	33,8	31,9	29,4	26,3	24,5
	eta*	[%]	0,0	17,1	32,0	43,1	51,1	57,2	62,3	66,7	70,2	72,9	73,3	67,0	59,6
45 Hz	Q	[m³/h]	0	75	150	225	300	375	450	525	600	675	750	825	863
	H	[mWs]	19,6	18,6	17,6	16,5	15,4	14,2	13,0	11,8	10,5	9,2	7,7	5,7	4,5
	P1	[kW]	23,6	22,4	22,7	23,6	24,7	25,5	25,7	25,5	24,6	23,2	21,4	19,2	17,8
	eta*	[%]	0,0	17,1	32,0	43,1	51,1	57,2	62,3	66,7	70,2	72,9	73,3	67,0	59,6
40 Hz	Q	[m³/h]	0	67	133	200	267	333	400	467	533	600	667	733	767
	H	[mWs]	15,5	14,7	13,9	13,0	12,1	11,2	10,3	9,3	8,3	7,2	6,0	4,5	3,6
	P1	[kW]	16,5	15,7	15,9	16,6	17,3	17,9	18,1	17,9	17,3	16,3	15,1	13,5	12,5
	eta*	[%]	0,0	17,1	32,0	43,1	51,1	57,2	62,3	66,7	70,2	72,9	73,3	67,0	59,6
35Hz	Q	[m³/h]	0	58	117	175	233	292	350	408	467	525	583	642	671
	H	[mWs]	11,8	11,3	10,7	10,0	9,3	8,6	7,9	7,1	6,4	5,5	4,6	3,4	2,7
	P1	[kW]	11,1	10,5	10,7	11,1	11,6	12,0	12,1	12,0	11,6	10,9	10,1	9,0	8,4
	eta*	[%]	0,0	17,1	32,0	43,1	51,1	57,2	62,3	66,7	70,2	72,9	73,3	67,0	59,6

* overall efficiency of pump and motor

High efficiency permanent magnet-synchronous-propeller pump

Design

The **oddesse** permanent magnet-synchronous-propeller pump is a single stage centrifugal pump with a surface treated open semi-axial impeller. The pump is driven by a rewindable three-phased permanent magnet-synchronous motor. The motor is designed as a wet-running motor with a watertight insulated winding, whereby the rotor is equipped with permanent magnets.

The radial bearings are lubricated by the motor filling. The filling is a mixture of glycol and water. It is biodegradable and secures the frost protection up to -15 °C. If necessary, it can be replaced by pure drinking water or by a more highly frost protection mixture.

Axial forces arising from the pump and motor are absorbed by a rotational direction-independent axial bearing with individual tilting pads.

Motors are encapsulated by a high quality mechanical seal. The pressure compensation between motor and its environment is granted by a reliable balance system. The motors are completed with water pressure-tight cables. They are earthed inside. The motors comply with the VDE-directives and the EC safety requirements for machinery.

The propeller pump is suitable for permanent or switched operation.

The **oddesse** permanent magnet-synchronous-propeller pump is characterized by a very high level of overall efficiency. The characteristic curve of the pump is recognized in accordance with DIN EN ISO 9906 class 2.

- | | |
|------------------------|--|
| • Degree of protection | IP68 (EN60034-5) |
| • Cable version | multicore rubber jacket round cable,
optional shielded round cable and cable suitable for
drinking water |
| • Cable length | 10 m, other lengths on request |
| • Temperature control | PT100 / PTC optional |
| • Materials | GG25 or bronze |

Operating data

For the operation of the motor it is necessary to use a suitable frequency converter programmed with special software. Additionally it is advisable to use a sine-wave filter or dU/dt-filter. The max. useable frequency of 120 Hz should be considered in the system design.

Additional parameters are:

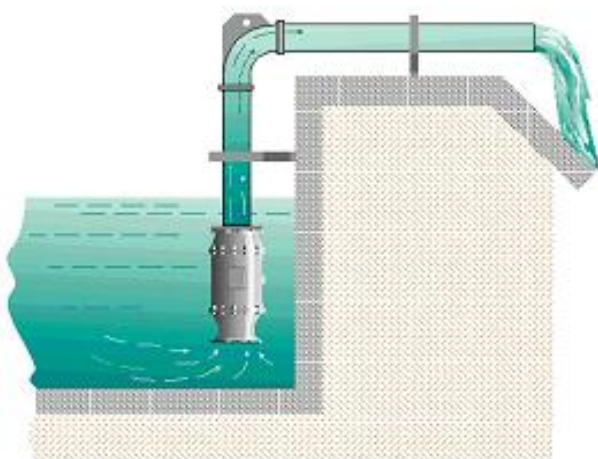
- | | |
|--|------------------------------------|
| • Acceleration time to minimum frequency | ≤ 3 s |
| • Stopping time to zero frequency | ≤ 3 s |
| • Switching frequency | max. 20/h, switching pause ≥ 1 min |
| • Nominal speed | 900 ... 1800 1/min (30 ... 60 Hz) |
| • Ambient temperature | max. 50 °C |
| • Tolerances | DIN VDE 0530 / IEC 34 |
| • Voltage tolerances | ±10 % System (power)-supply |
| • Frequency tolerances | -5 ... +10 % System (power)-supply |
| • Max. rate of the increase in voltage | dU/dt ≤ 500 V/μs |
| • Max. voltage peaks to ground | ≤ 1000 V |

Applications

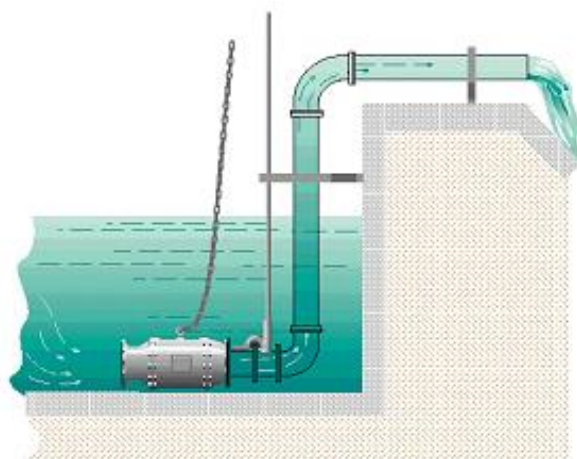
Propeller pumps are suitable for delivering of clean or slightly dirty water with a maximum sand content of 50 mg/l and water temperatures < 50 °C.

- irrigation and draining of agriculture areas
- regulation of water levels (land reclamation pumps and dyke draining pumps)
- circulating pumps in purification plant
- enhancement of oxygen in waters for breeding of fish
- dewatering of caves and security shafts
- watering and draining of sluices and floating docks
- trimming of ships and ferries

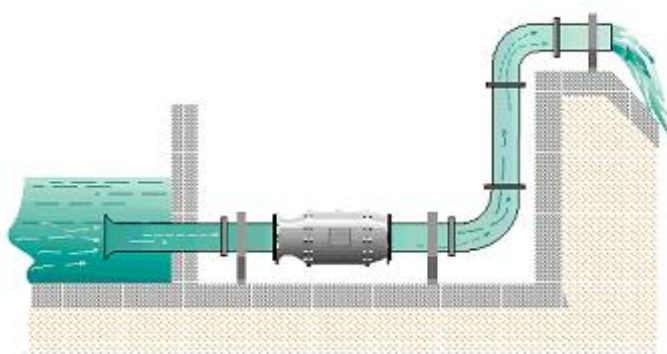
Kinds of installations



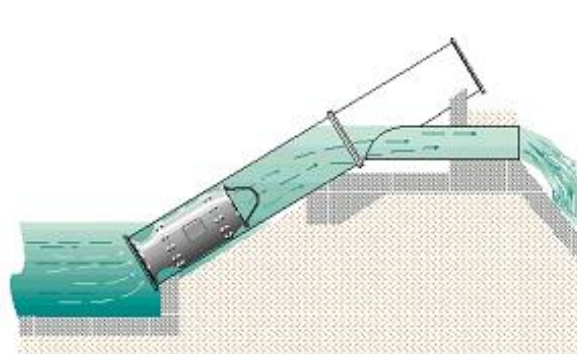
vertical, hanging at the pipe



horizontal, with automatic coupling device



horizontal, as in-line pump

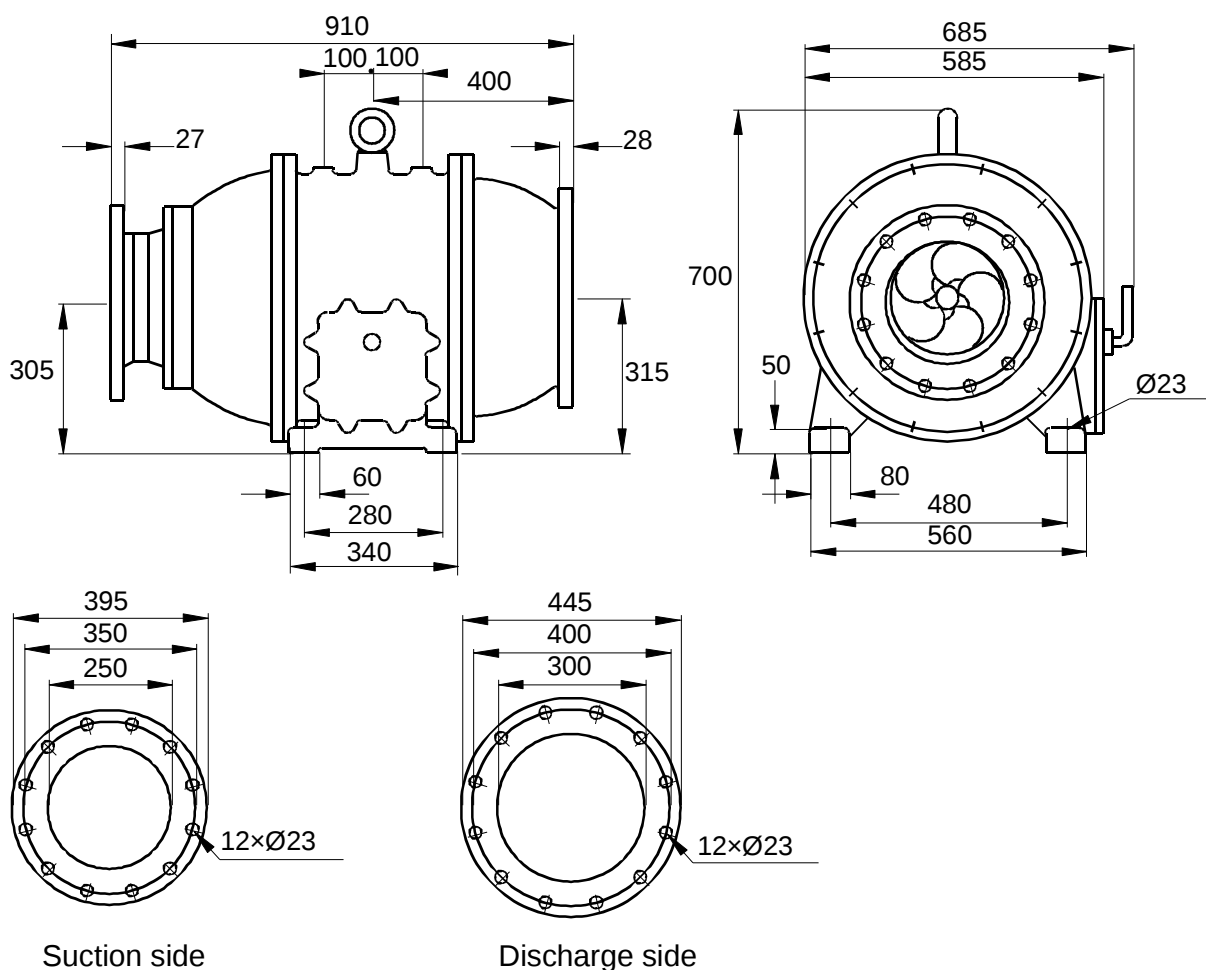


angular, in a duct

Material of construction

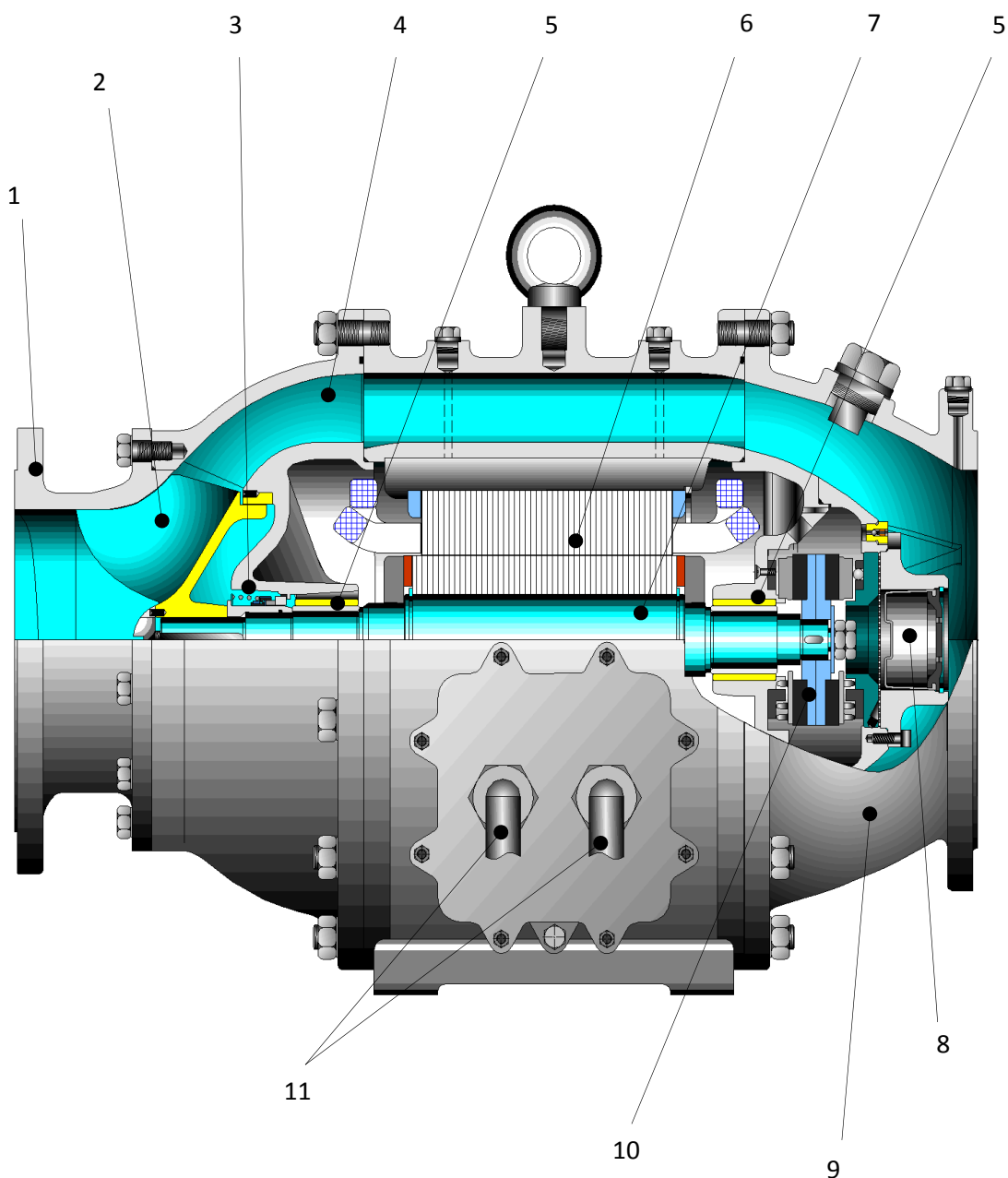
Components	Design	
	GG25	Bronze
Shaft	Stainless steel / 1.4462	
Impeller	Bronze	
Casing	GG25	Bronze
Radial bearing	Bronze	
Axial bearing	Stainless steel / Carbon	
Screws, nuts, bolts	Stainless steel / 1.4301	Stainless steel / 1.4539
GLRD mechanical seal	SiC / SiC	

Main dimensions



- Weight 590 kg (without cable)
- Connection suction branch C250 DIN2532
- Connection outlet branch C300 DIN2532

Design



- | | | | |
|---|---|----|---|
| 1 | Suction casing | 7 | Permanent magnet rotor |
| 2 | Impeller | 8 | Reliable pressure balance system |
| 3 | Mechanical seal | 9 | Outlet branch |
| 4 | Diffuser | 10 | Thrust bearing with self-adjusting tilting pads |
| 5 | Water lubricated bearings | 11 | Motor cable |
| 6 | Rewindable stator with a watertight insulated winding | | |

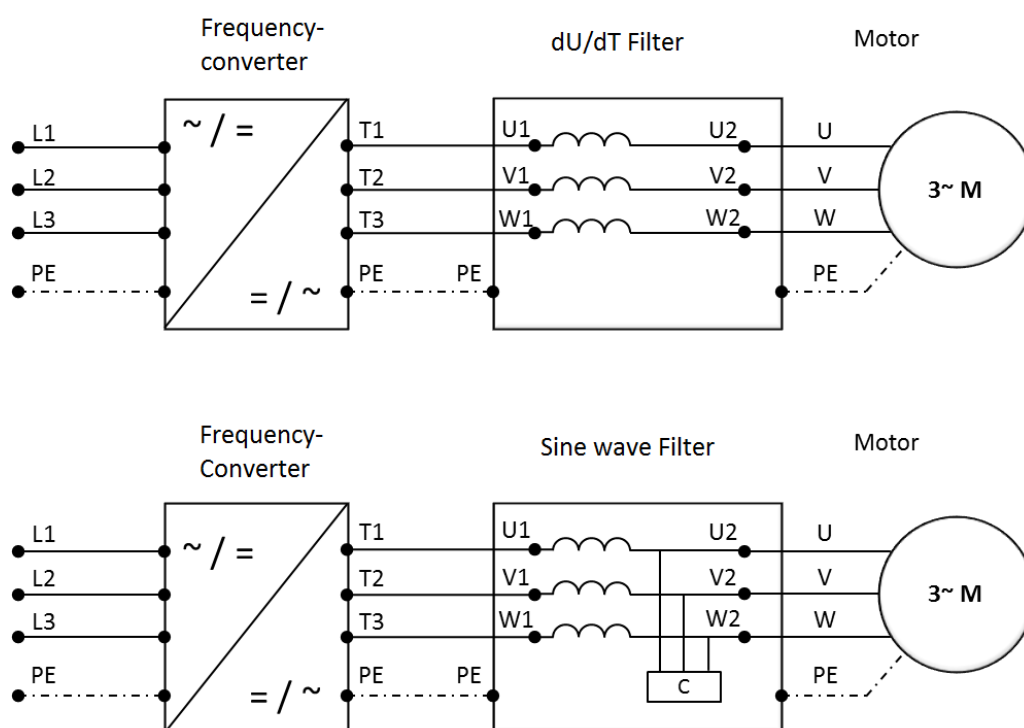
System components

po-upl-s300.1 • Grid 500 V • 50/60 Hz • 3 ~

Pn		Frequency converter		dU/dt - filter		Sine-wave filter	
		REFU		REDU		REFS	
kW	HP	IP21	IP54	IP00	IP54	IP00	IP54
4	5,5	21 087	54 087	00 130	54 100	00 180	54 126

The dimensioning of the system components is related to the rated data of the motor at a rated frequency of 60 Hz. For higher frequencies please consult with the oddesse service.

Electrical Connection



Sine-wave filter



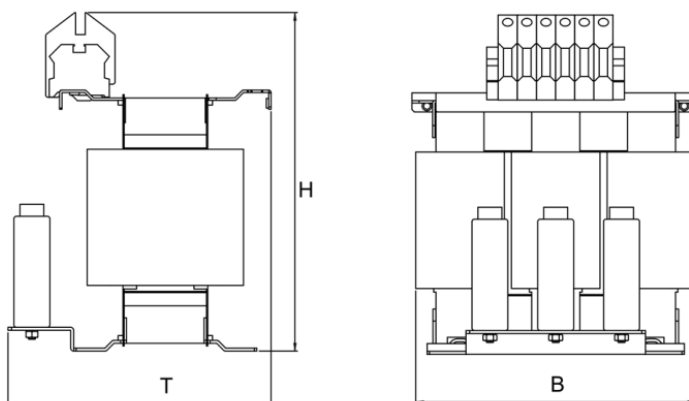
Design

Sine-wave filters can be connected between inverter output and submersible motor. The pulse-width modulated (PWM) inverter output voltage is converted into a sinus voltage. Especially with long motor cables sinusoidal filters should be used to reduce parasitic capacities of the motor cable. It helps to reduce noise levels. Not only emissions on the motor cables are significantly attenuated, but also the voltage peaks, which are caused by the inverter switching frequency. The purpose of a sine-wave filter is to prevent damage to the motors` winding insulation. By using a sine-wave filter additional losses and motor noises are reduced. The use of shielded cables may be dispensed with in certain cases.

Electrical data

• Voltage	3 x 500 V
• Frequency	60 Hz
• Max. cable length	500 m (depending on power range)
• Overload	1,6 x I _n (1 min); every 10 min
• Clock frequency	≥ 3,6 kHz
• Operating temperature	40 °C; without power reduction
• Operating altitude	1000 m, without power reduction

Dimensions



Type		In	Dimensions			Weight
		A	B [mm]	H [mm]	T [mm]	m [kg]
REFS00...	110	110	360	388	295	54
REFS54...	106	106	855	690	690	135

Examples of installations in fishfarms



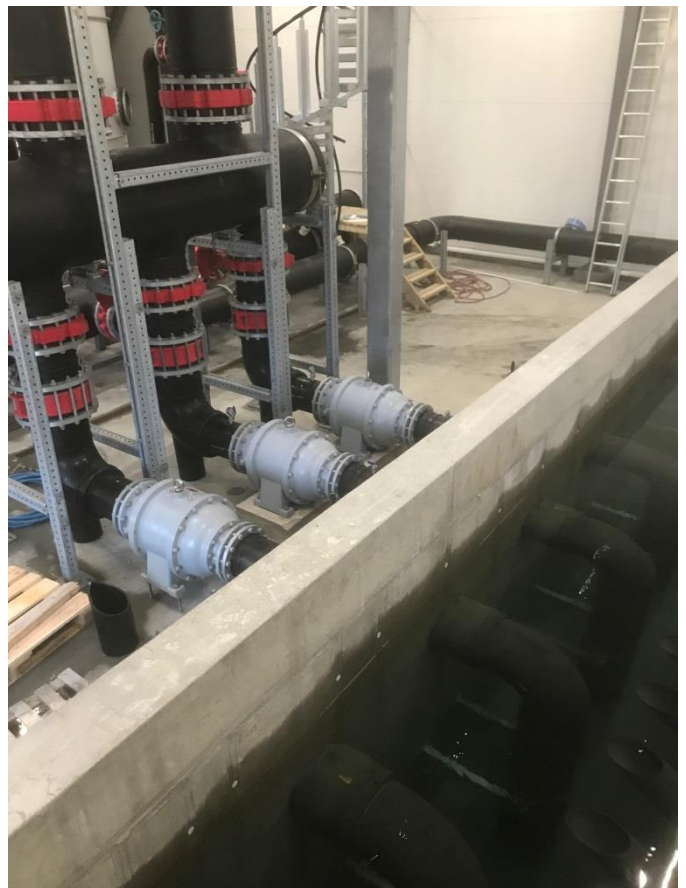
Two pumps in series



Inline installation



Vertical installation



Inline installation

Example of Nordic Clean Pump well design by using oddesse po-upl-s 300.1 pumps and quick lock.

Maximum flowrate 4.200 m³/h at 10 meter delivery head



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