

# Submersible Sewage And Wastewater Pumps

## ENDURO SERIES



## TECHNICAL MANUAL



# ENDURO Series

## Submersible Sewage And Wastewater Pumps

### General Specifications



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### Fields of Application

- Domestic and industrial raw sewage waste transport
- Sewage treatment plants
- Liquids containing sludge and solid particles transport
- Factory waste water transport
- Liquids containing fibrous particles and other applications

### Pumped Liquids

Clean water, non-corrosive and non-flammable liquids, wastewater, sewage, liquids containing fibrous particles, domestic wastewater, and wastewater treatment plants, flood waters, biological fluids, fluids containing solid.

Please contact MAS DAF MAKINA SANAYI A.Ş. for special applications.

### Design

- ENDURO submersible pumps designed and manufactured according to the TS 12599 standard.
- In electrical motor winding, in F insulation class cable has been used according to TS 60085:2011. User and motor security is at the forefront by using a 2, 4 or 6 pole induction motor that has IP 68 protection class in accordance with TS 3033 EN 60529.
- It has possibility of use in several fields with special impeller design and ability of pump different wastewater depending on impeller structure.
- ENDURO submersible pumps, produced with modern casting and manufacturing technologies, can be made of different materials according to the application field and customer demands.
- In the components of the pump motor housing and the motor cable in the place of entry into casing, all sealing precautions are taken to be no leakage into the motor.
- Stuffing box in the helical structure having a creative design, keeps solid particles contained in the waste water away from the mechanical seal, thus it protects mechanical seal and offers a long operating life.
- An electrode system is used in case of water leakage caused by worn out mechanical seal or any other reason.
- Through the use of thermistor, protection is provided against motor overheating.
- H07RN-F special type cables are used according to TS EN 50525-2-21 standard. The core colors of the cable are selected according to HD 308.E14 Type (EPR) rubber is used as an isolated material that is resistant against the corrosive effect of the waste water.

### Shaft

Rotor shafts, which are used in ENDURO Series pumps, are completely AISI 420 stainless steel material. The shafts are manufactured in our modern machinery, with fine grinding has been made more precise. So that the rotor and pump impeller is designed to make a minimum deflection on the same shaft. According to usage space and customer requirements, the shaft can be made of suitable different materials.

### Bearings

3300, 6200 and 6300 Series bearings are used in ENDURO type pump.

### Shaft Seal

- SiC surface mechanical seals are used in ENDURO type pump.
- According to the size of the pump with double mechanical seal application has been made more secure seal.
- The mechanical seal friction on the surface is fixed by the pumped liquid.

Please consult MAS DAF MAKINA SANAYI A.Ş for choosing mechanical seal and O-Ring if pumped liquids are different from water.

### Technical Data

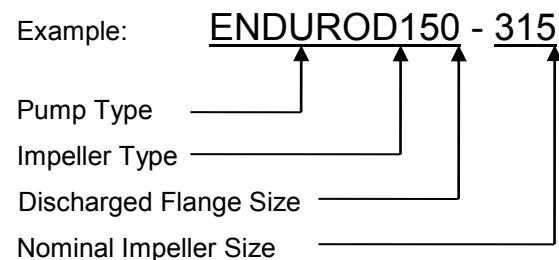
Discharge Flanges	DN 50 - DN 200 (PN 10 – PN 16)
Operating Pressure	10 bar
Impeller Diameter	ø140 - ø360
Q	20 - 600m <sup>3</sup> /h
Hm	10 - 45m.
Speed	1000 - 3600 d/d.
Temperature	Up to 40 °C
Pressure (P <sub>max</sub> )	10 bar

If the pump is diving deeper than the depth of 7 meters from the surface of the liquid, please notify in your orders.

### Driver

All ENDURO Series pumps are driven by electric motors according to IE2 efficiency class. Electric motors are used IE3 efficiency class according to customer requirements.

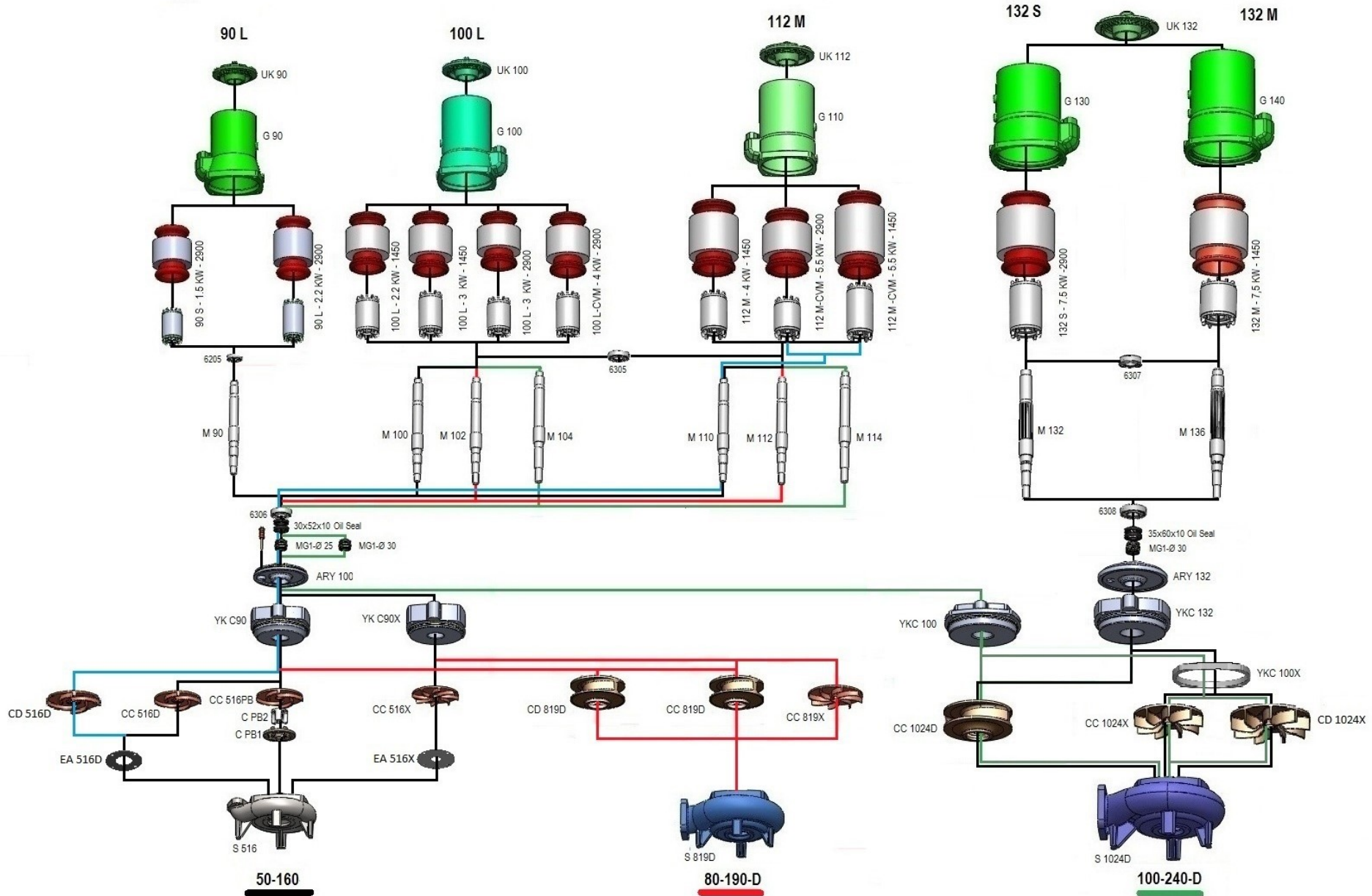
### Identification Code for Pump



**ENDURO Series**  
 Submersible Sewage And Wastewater Pumps  
 Common Part Table



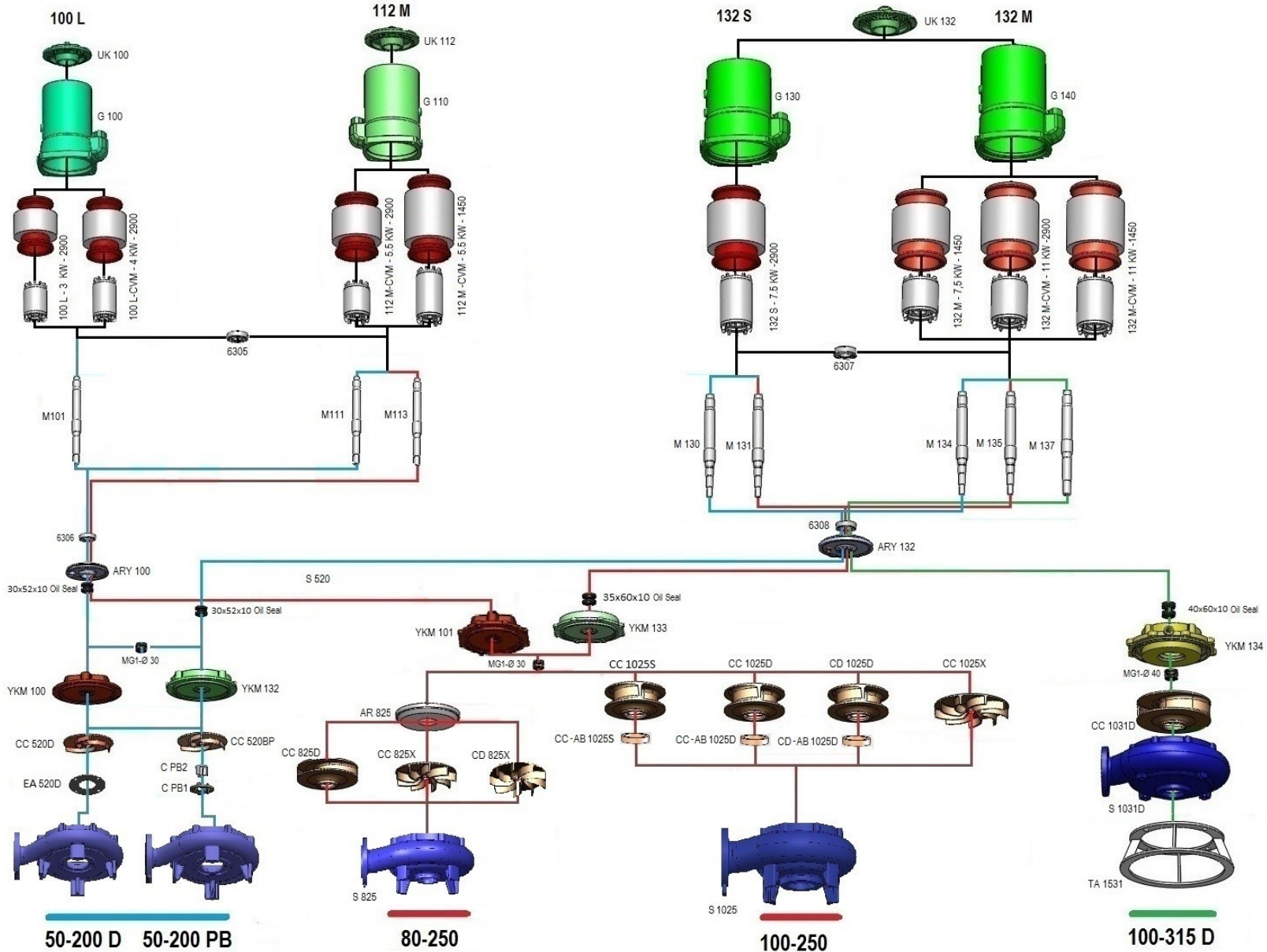
**Mas Grup**



**ENDURO Series**  
 Submersible Sewage And Wastewater Pumps  
**Common Part Table**



**Mas Grup**



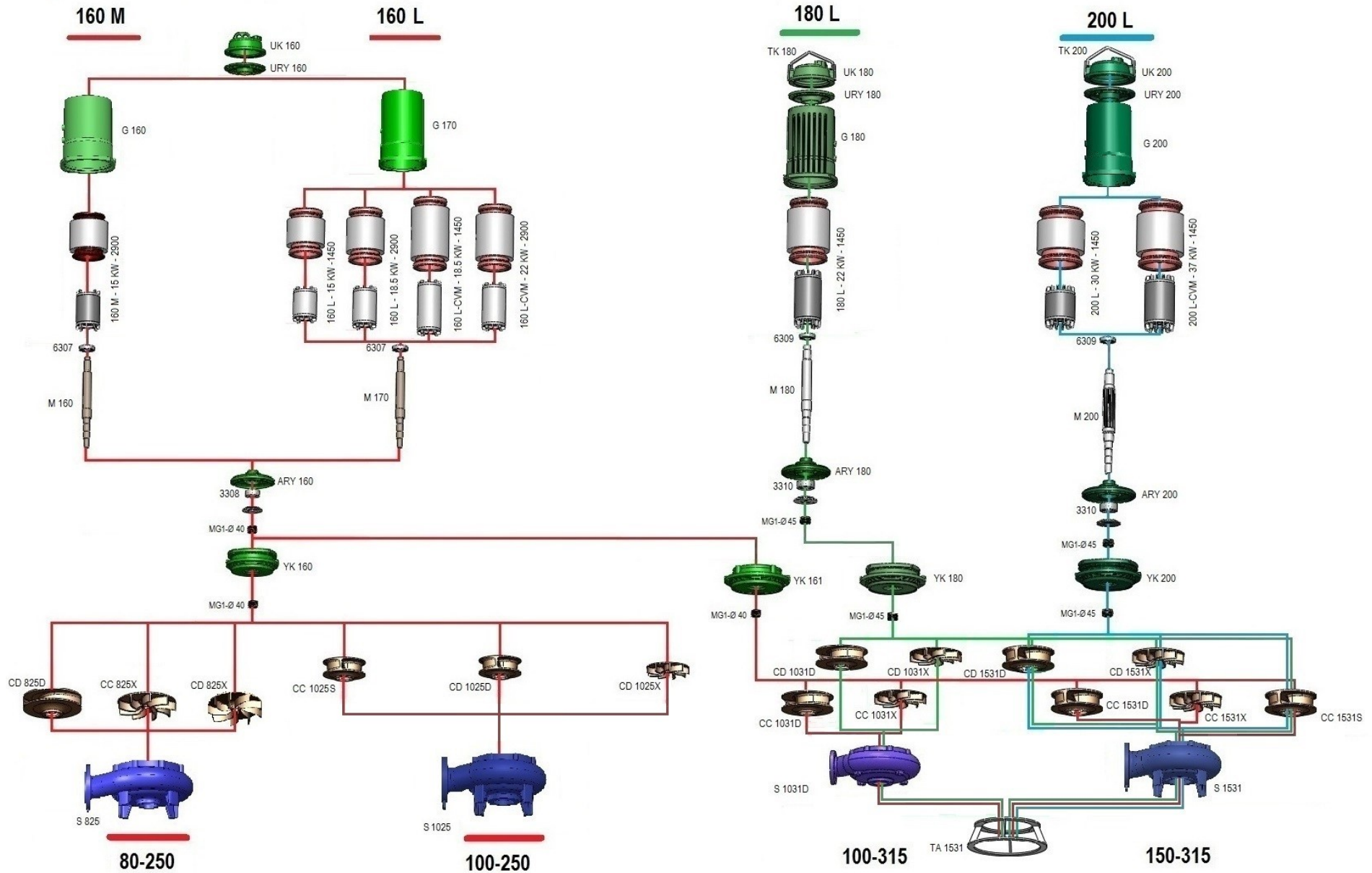
# ENDURO Series

Submersible Sewage And Wastewater Pumps

## Common Part Table



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## ENDURO Series

Submersible Sewage And Wastewater Pumps

### Impeller Types

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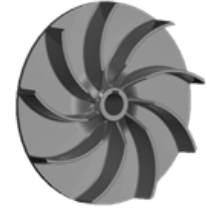


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#### X Type Vortex Impellers

In this type of impellers, liquid transfer is provided by vortex movement in front of impeller. Liquids are supplied transmission to the discharge flange by reducing contact the impeller. These types of impellers are suitable for pumping liquids containing long fibers (hair, thread, etc.), small solid particles and having a certain rate gaseous or air.

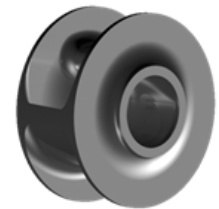
- Raw Sewage
- Activated Sludge
- Circulated and Heated Sludge
- Wastewater Containing Hair, Thread etc.



#### S Type Single Vane Impellers

These types of impellers for liquids containing long fibers, big solid particles (close to the diameter of the pump intake).

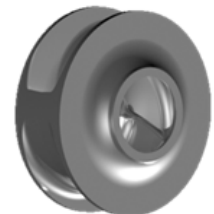
- Raw Sewage
- Solid - Liquid Mixtures
- Raw and Digested Sludge
- Activated Sludge
- Circulated and Heated Sludge



#### D Type Double Vane Impellers

These types of impellers for liquids containing up to certain size sludge and solid particles but not containing fiber, gaseous or air. Its symmetrical design provides balanced operation without vibration.

- Grilled Sewage
- Mechanically Purified Sewage
- Industrial Wastewater
- Activated Sludge
- Floodwaters



#### Grinding Blade Design

ENDURO Series submersible sewage and waste water pumps which have grinding blade design, can grind solid particles and fibers inside liquids and transport to the system. Thus, the blockage does not occur Enduro Submersible Pumps.

Special design grinding system is designed to work in accordance with difficult conditions. Grinding blades are manufactured from stainless steel which resistance corrosive effects with precision casting technology and have been made capable of against wear and tear at the most difficult operating conditions after heat treatment process.



# ENDURO Series

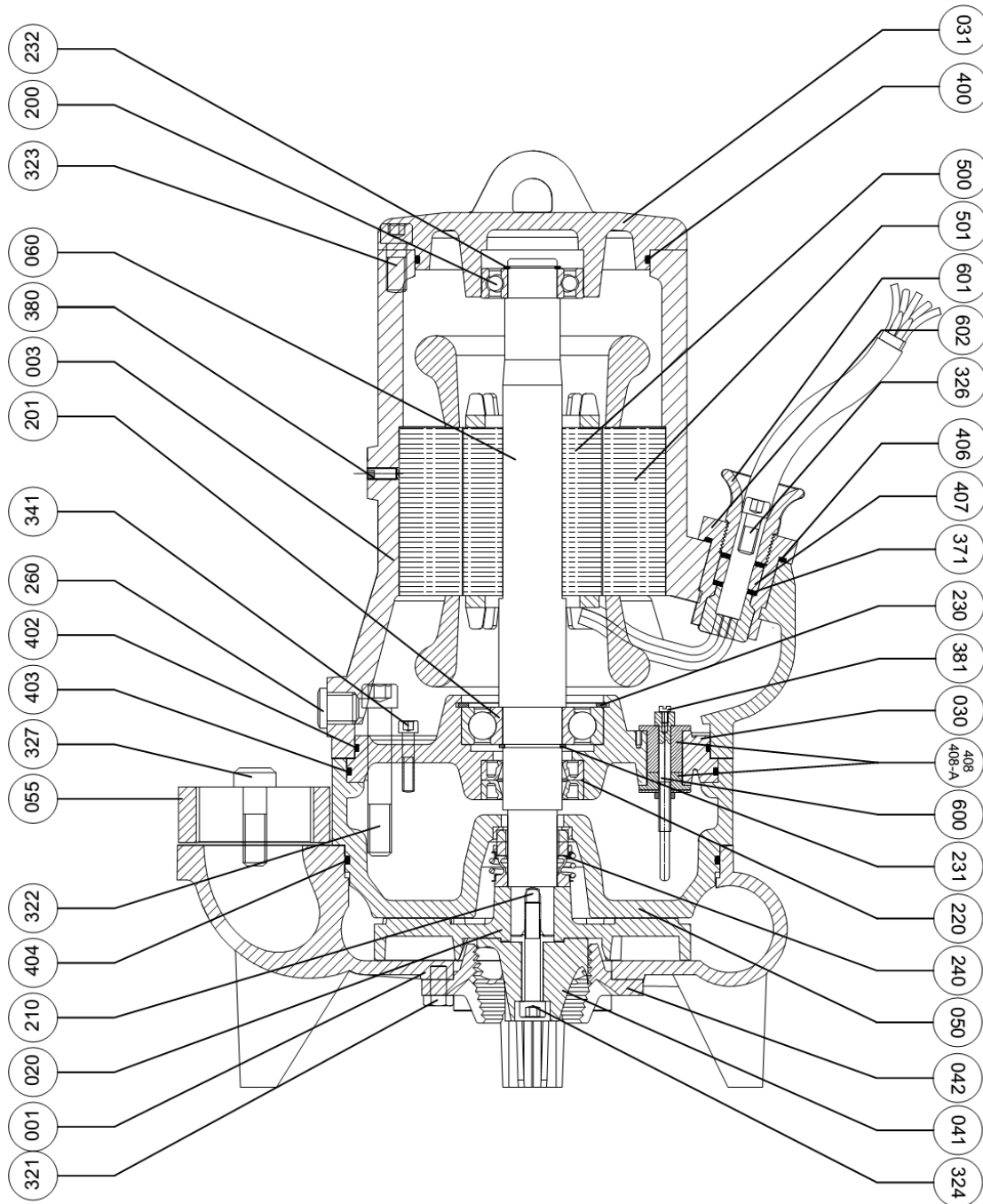
Submersible Sewage And Wastewater Pumps

Sectional Drawing and Part List

ENDURO 50-160PB



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PART NO	PART NAME	PART NO	PART NAME	PART NO	PART NAME
01	Volute Casing	230	Retaining Ring	381	Electrode Screw
03	Motor Casing	231	Retaining Ring	400	O-Ring
20	Impeller PB Type	232	Retaining Ring	402	O-Ring
30	Bottom Bearing Housing	240	Mechanical Seal	403	O-Ring
31	Top Bearing Housing	260	Plug	404	O-Ring
41	Cutter Blade ( inside )	321	Hexagon Head Bolt	406	O-Ring
42	Cutter Blade ( outside )	322	Imbues Bolt	407	Gland Gasket
50	Stuffing Box	323	Imbues Bolt	408-408A	Electrode Seal
55	Flange	324	Imbues Bolt	500	Rotor
60	Shaft	326	Hexagon Head Bolt	501	Stator
200	Top Bearing	327	Hexagon Head Bolt	600	Electrode
201	Bottom Bearing	341	Imbues Bolt	601	Gland
210	Impeller Key	371	Gland Gasket Washer	602	Gland
220	Oil Seal	380	Setscrew		

# ENDURO Series

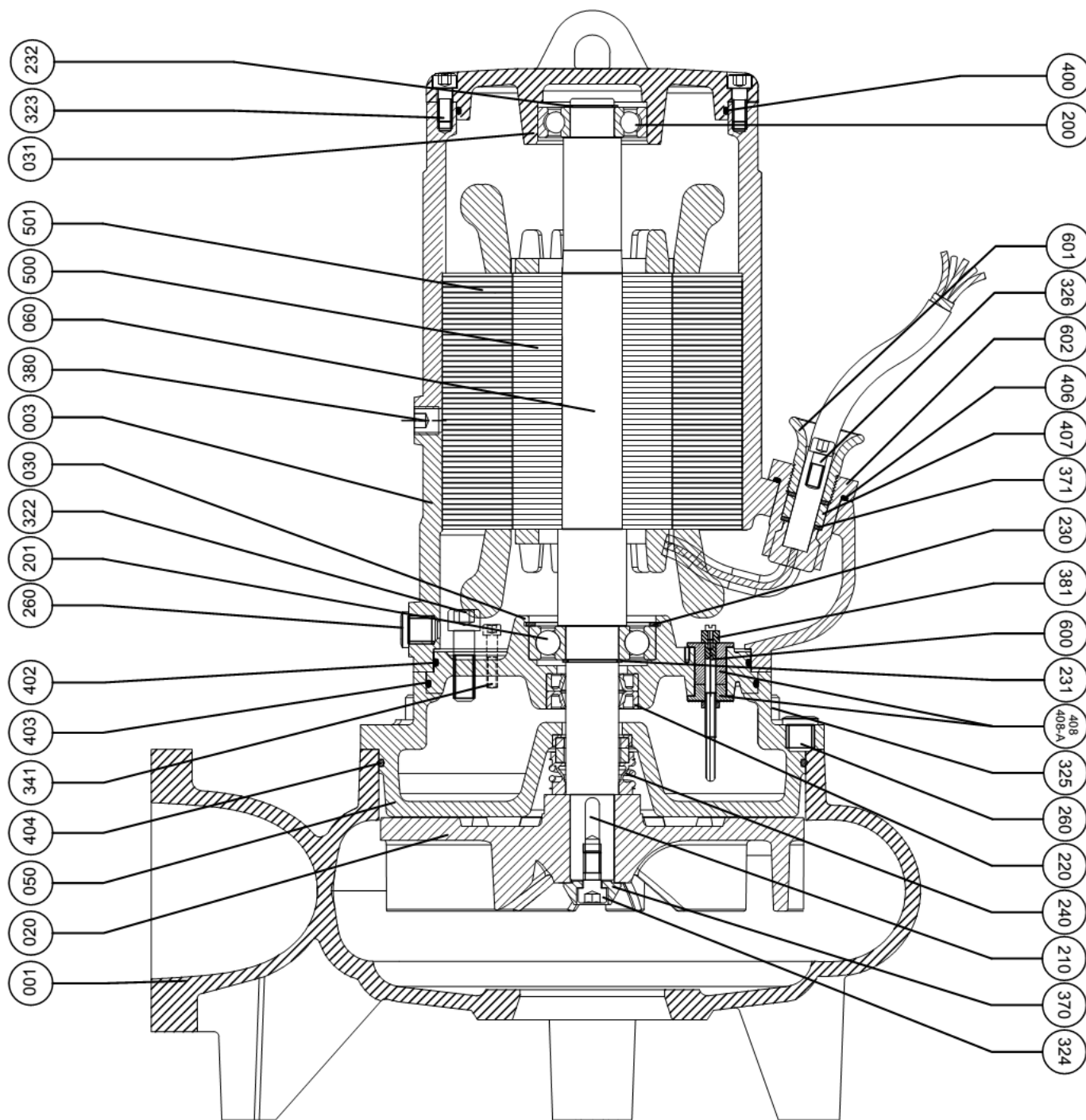
Submersible Sewage And Wastewater Pumps

Sectional Drawing and Part List

ENDURO 100-240X



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PART NO	PART NAME	PART NO	PART NAME	PART NO	PART NAME
01	Volute Casing	232	Retaining Ring	400	O-Ring
03	Motor Casing	240	Mechanical Seal	402	O-Ring
20	Impeller X Type	260	Plug	403	O-Ring
30	Bottom Bearing Housing	322	Imbues Bolt	404	O-Ring
31	Top Bearing Housing	323	Imbues Bolt	406	O-Ring
50	Stuffing Box	324	Imbues Bolt	407	Gland Gasket
60	Shaft	325	Imbues Bolt	408-408A	Electrode Gasket
200	Top Bearing	326	Hexagon Head Bolt	500	Rotor
201	Bottom Bearing	341	Imbues Bolt	501	Stator
210	Impeller Key	370	Impeller Washer	600	Electrode
220	Oil Seal	371	Gland Gasket Washer	601	Gland
230	Retaining Ring	380	Setscrew	602	Gland
231	Retaining Ring	381	Electrode Screw		



# ENDURO Series

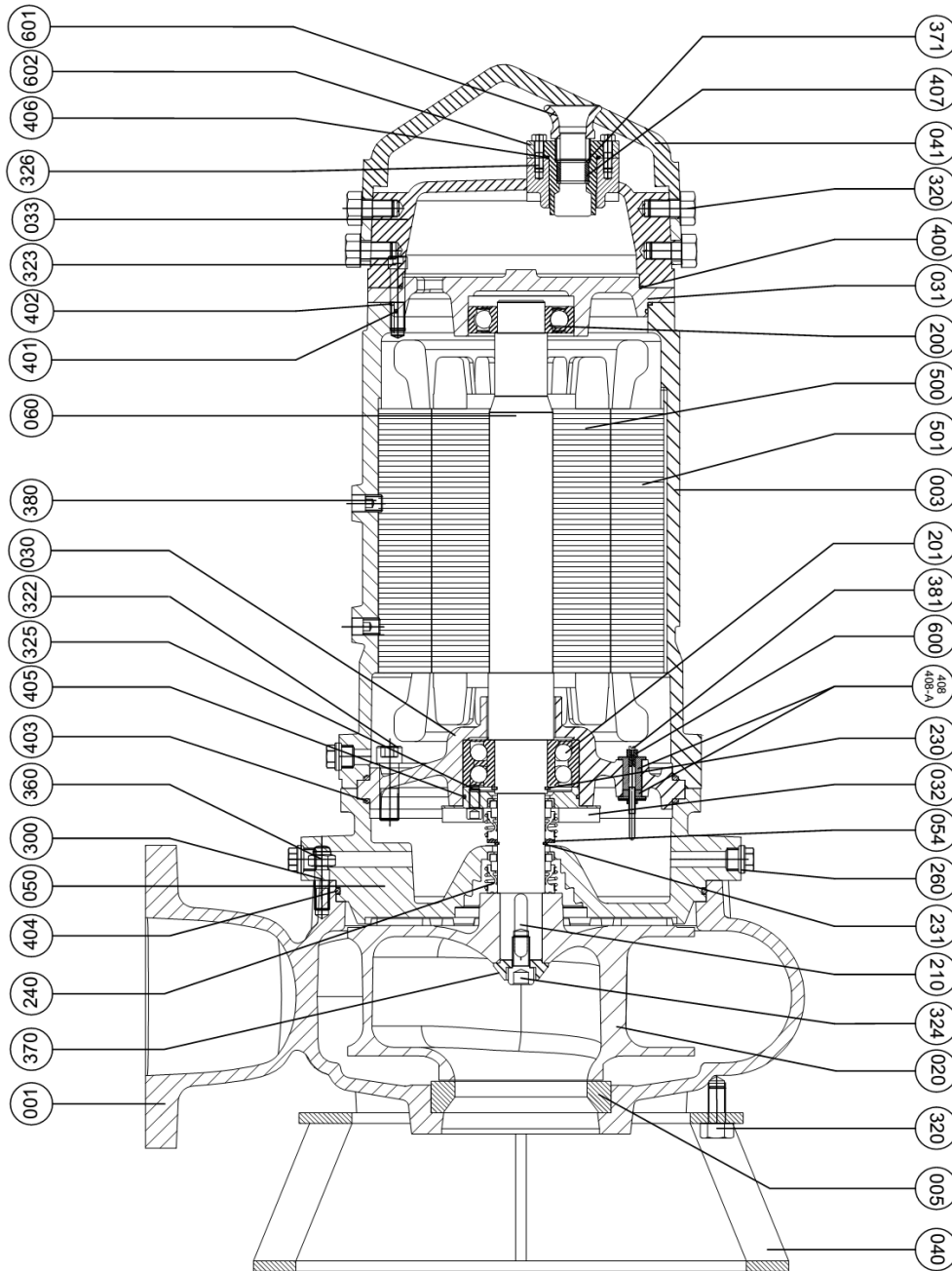
Submersible Sewage And Wastewater Pumps

Sectional Drawing and Part List

ENDURO 150-315 D



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PART NO	PART NAME	PART NO	PART NAME	PART NO	PART NAME
01	Volute Casing	230	Retaining Ring	400	O-Ring
03	Motor Casing	231	Retaining Ring	401	O-Ring
05	Wear Ring	240	Mechanical Seal	402	O-Ring
20	Impeller D Type	260	Plug	403	O-Ring
30	Bottom Bearing Housing	300	Stud	404	O-Ring
31	Top Bearing Housing	320	Hexagon Head Bolt	405	O-Ring
32	Bearing Cover	322	Imbues Bolt	406	O-Ring
33	Top Cover	323	Imbues Bolt	407	Bushing Gasket
40	Bottom Support Foot	324	Imbues Bolt	408-408A	Electrode Gasket
41	Handle	325	Imbues Bolt	500	Rotor
50	Stuffing Box	326	Imbues Bolt	501	Stator
54	Mechanical Seal Sleeve	360	Nut	600	Electrode
60	Shaft	370	Impeller Washer	601	Bushing
200	Top Bearing	371	Gland Gasket Washer	602	Gland
201	Bottom Bearing	380	Setscrew		
210	Impeller Key	381	Electrode Screw		

## ENDURO Series

Submersible Sewage And Wastewater Pumps

### Technical Data



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### Material Specifications

PART	MATERIAL						
	Cast Iron	Ductile Cast Iron	Chrome Steel	Chrome Nickel Steel	Chrome Nickel Molybdenum Steel	Cast Bronze	Silicium Carbide
Motor Casing	●						
Pump Casing	●	○		○	○		
Impeller	●	○		○	○	○	
Wear Ring	●	○					
Shaft			●				
Mechanical Seal							●

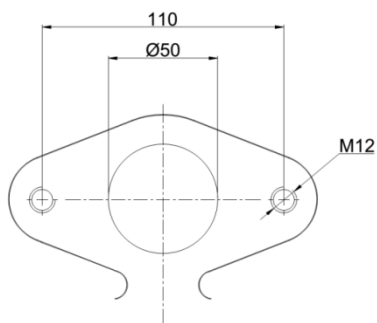
- Standard Material
- Optional Material

\* Different material options are available upon request.

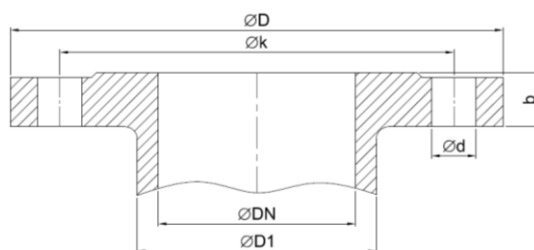
### Material Equivalent

Material	DIN 17007	EN-DIN	ASTM
Cast Iron	0.6025	GJL-250 (GG25)	A 48 Class 40-B
Nodular Cast Iron	0.7040	GJS-400-15 (GGG40)	A 536 Gr.60-40-18
Cast Bronze	2.1050.01	G-Cu Sn 10	B 584 C 90700
Chrome Steel	1.4021	X20 Cr 13	A 276 Type 420
Chrome Nickel Steel	1.4301	X5 Cr Ni 18.9	A 276 Type 304
Chrome Nickel Molybdenum Steel	1.4401	X5 Cr Ni Mo 18.10	A 276 Type 316

**DN50 Flange:**

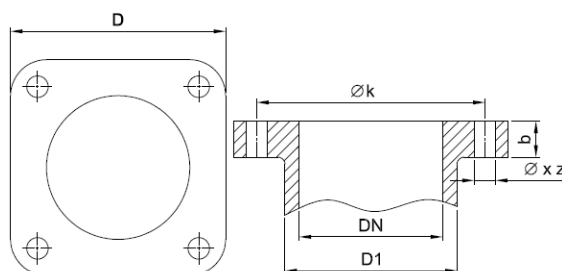


**Round Flange:**



PIPE		FLANGE			BOLTS		
NOMINAL SIZE (mm)	OUTER DIAMETER (mm)	DIAMETER (mm)	NOMINAL SIZE (mm)	OUTER DIAMETER (mm)	DIAMETER (mm)	NOMINAL SIZE (mm)	OUTER DIAMETER (mm)
DN	D1	D	b	k	z	M	d
50	65	165	20	125	4	M 16	18
80	97	200	22	160	4	M 16	18
100	118	220	22	180	8	M 16	18
150	170	285	24	240	8	M 20	23

**Square Flange:**



PIPE		FLANGE			BOLTS		
NOMINAL SIZE (mm)	OUTER DIAMETER (mm)	DIAMETER (mm)	NOMINAL SIZE (mm)	OUTER DIAMETER (mm)	DIAMETER (mm)	NOMINAL SIZE (mm)	OUTER DIAMETER (mm)
DN	D1	D	b	k	z	M	d
80	96	120	20	127	4	M 10	12
100	118	160	23	160	4	M 16	18

## ENDURO Series

Submersible Sewage And Wastewater Pumps

Mechanical Seal, Oil Seal And Bearings



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Pump Type	Motor Type (IEC)	Bearing		Mechanical Seal		Oil Seal		
		Top	Bottom	Quantity	MG1 Type Rubber Bellows			
50-160	90L	6205	6306	1	ø25 SiC-SiC	30 x 52 x 10		
	100L	6305	6306					
	112M	6305	6306					
50-200	100L	6305	6306	1	ø30 SiC-SiC	30 x 52 x 10		
	112M	6305	6306					
	132S	6205	6306					
	132M	6307	3308					
80-190	100L	6305	6306	1	ø25 SiC-SiC	30 x 52 x 10		
	112M	6305	6306					
80-250	112M	6305	6306	1	ø30 SiC-SiC	30 x 52 x 10		
	132S	6205	6306					
	132M	6307	3308					
	160M	6307	3308	2	ø30 SiC-SiC	-		
	160L	6307	3308					
100-240	100L	6305	6306	1	ø30 SiC-SiC	30 x 52 x 10		
	112M	6305	6306					
	132M	6307	6308					
100-250	112M	6305	6306	1	ø30 SiC-SiC	30 x 52 x 10		
	132M	6307	6308					
	160L	6307	3308	2	ø40 SiC-SiC	-		
100-315	132M	6307	6308	1	ø40 SiC-SiC	40 x 60 x 10		
	160L	6307	3308				2	ø40 SiC-SiC
	180L	6309	3310					
150-315	160L	6307	3308	2	ø40 SiC-SiC	-		
	180L	6309	3310					
	200L	6309	3310					

*\*Please consult our company for different fluid applications.*

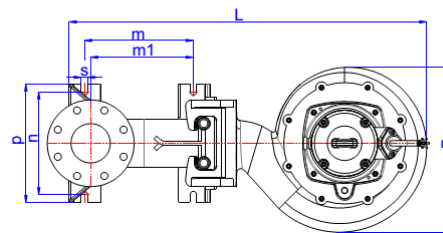
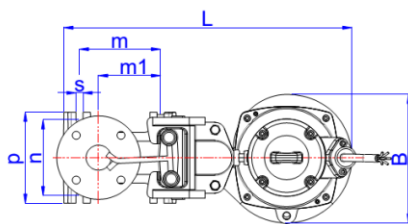
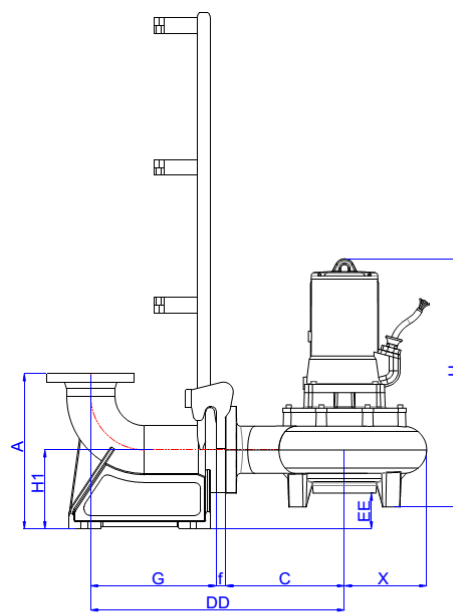
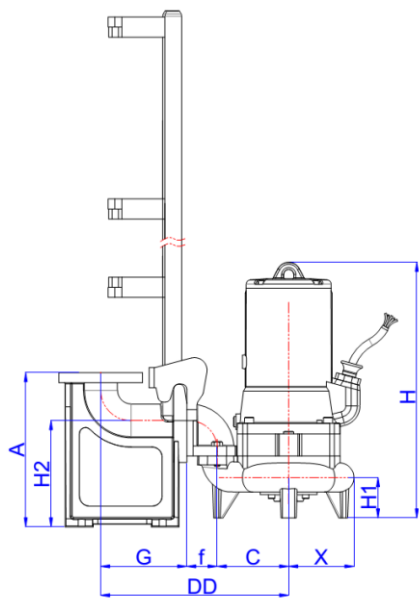
# ENDURO Series

Submersible Sewage And Wastewater Pumps

## The Automatic Coupling System Size Table



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**50-160**

**Other Models**

Pump Type	Motor Type (IEC)	DN	A	H	H1	H2	L	G	f	C	X	B	DD	EE	m1	m	n	p	s
50-160	90L	50	305	470	80	210	568	170	60	141	133	255	371	-	122	160	150	180	14
	100L			506															
	112M			540															
50-200	100L	50	245	525	85	645	710	170	20	227	160	313	417	115	122	160	150	180	14
	112M			560															
	132S			580															
	132M			680															
80-190	100L	80	337	570	100	645	710	170	20	227	160	313	417	115	122	160	150	180	14
	112M			605															
80-250	112M	80	337	630	110	645	830	275	20	227	160	313	417	115	122	160	150	180	14
	132S			650															
	132M			750															
	160M			805															
	160L			905															
100-240	100L	100	393	593	130	645	835	25	25	250	185	375	592	127	122	160	150	180	14
	112M			630															
	132M			750															
100-250	112M	100	393	675	145	645	910	317	25	300	210	420	642	127	259	275	260	300	16
	132M			795															
	160L			950															
100-315	132M	100	393	905	235	645	965	317	25	315	250	497	657	90	259	275	260	300	16
	160L			1025															
	180L			1100															
150-315	160L	150	410	1067	170	645	1025	331	25	355	270	530	711	90	274	275	300	340	16
	180L			1142															
	200L			1200															

## ENDURO Series

Submersible Sewage And Wastewater Pumps

### Assembly And Installation



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### Automatic Coupling System

The automatic coupling system easily connected and removal of the pump to the installation is to provide an improved system. It is not necessary doing some operations such as emptying the sump, where the pump is, and installing and uninstalling bolt, etc. to make the pump flange-pipe connections during the coupling.

### Necessary Parts for the Automatic Coupling System



- 1. Carrier Elbow:** It is a special strong and broad-based elbow which placed to the sump base before starting up. This elbow carries the weight of the pump. Therefore it must be assembled very stable to sump base.
- 2. Slideway:** It consists of from two parallel pipes. It is connected to the carrier elbow from the bottom. When lowering down the pump acts as guide. Length is set according to the depth of the tank in place.
- 3. Coupling Hook:** It is a carrier special part, which is connected to the discharge flange of the pump.
- 4. Special Coupling Gasket:** It is a rubber gasket, which located in the coupling hook. Through special shape, it prevents water leakage by expanding while the pump is running.
- 5. Carrier Chain:** It provides to dip the pump to the water. It is given with all ENDURO type pumps.

### Operation of the Automatic Coupling System



Figure 1



Figure 2



Figure 3



Figure 4

**Figure 1:** When suspended from the rear suspension hole pump stops inherently slightly tilted. In this case, the hook is passed to slideway.

**Figure 2:** The pump is slid down in inclined state.

**Figure 3:** When the special slots of the hook contact carrier brackets on the elbow, scrolling of the pump stops. Carrier chain is still tense.

**Figure 4:** When the carrier chain has been released, the weight of the pump is loaded to the elbow via hook. The press of the pump's weight to the elbow provides the gasket pressed against the elbow. When the pressure occurs in the pump, gasket prevents water leakage by expanding.

It is adequate the pump is pulled out from the chain for dismantling.

## ENDURO Series

Submersible Sewage And Wastewater Pumps

### Assembly And Installation

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### Suspended Connection

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The pump is hanged to the inlet of the pipe system on the ground by a special connecting device. Pump does not sit on the base of the sump. If required, the connection elbow can be used as a non-return valve. Steel discharge pipe between the pump and suspension part keeps the pump on suspension. Suspended connection can apply on 50-160, 50-200 (up to 5,5 kW) and 80-190 types. At suspended connection option, it should be noted that these pumps enable to operate more reliably by not bringing overload to the discharge pipe because of being lighter. It is not necessary for sump bottom to be flat and solid for suspended connection. Suspension elbow and complete suspension set are needed for this application.



Suspended Connection

### Hose Connection

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In this kind of application the pump is sat on the base of the sump. In this application the bottom of the sump should be flat and solid (in order to make the pump not to sink but to stay vertically). The pump is put down to the sump and uplifted by means of a chain. This application is used for small pumps. For ease of assembly and disassembly, should be used the flexible hose as a discharge pipe. Water is pumped up to the surface by a flexible hose and can be connected to a pipe system if necessary.



Hose Connection

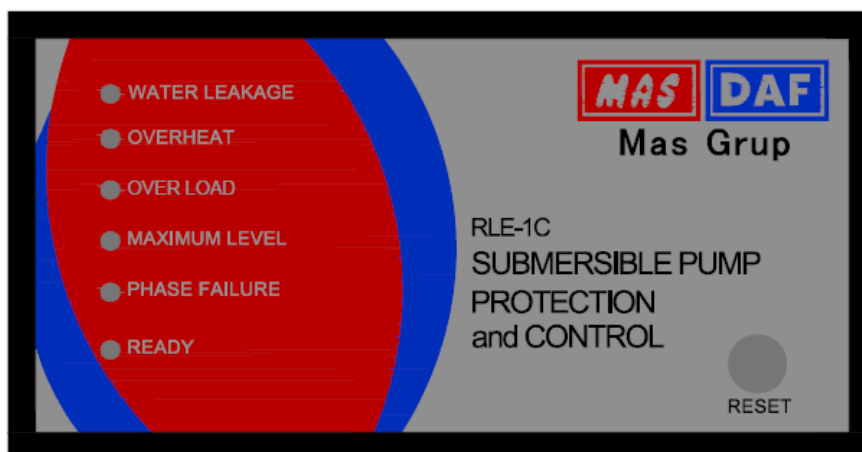
## ENDURO Series

Submersible Sewage And Wastewater Pumps

### Motor Protection and Control Relay



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When the device is switched on, all indicator lights blink in order and the control unit makes a self-check. If there is not any failure, NORMAL indicator light switches on in green indicating it is ready to run the motor.

**Water Leakage:** In case of water leakage into the motor casing or oil chamber, red indicator light switches on and the relay shuts down the motor. Alarm relay becomes activated and until the RESET button, which located on RELAY, is pressed, alarming goes on by blinking of red indicator light in short periods. In this fault, if the RESET button is not pressed, motor is not stepped in. In this case, must do maintenance by removing the pump and repair the case of water leakage. The sign by blinking continues until you press the RESET button. When RESET button is pressed, the lamp goes out and the alarm relay is deactivated.

**Overheat:** In case of overheating of motor windings, in which the temperature exceeds 130°C, the red indicator light switches on and the relay shuts down the motor. Indicator light blinks in short periods at alarming position. When motor has cooled down, relay restarts the motor while alarming goes on until the RESET button is pressed. Pressing the RESET button disables the alarm relay and indicator light stops blinking.

**Overload:** The relay shuts down the motor, if the current overload limit is exceeded. Alarm relay becomes activated and until the RESET button, which located on RELAY, is pressed, alarming goes on by blinking of red indicator light in short periods. As the failure is fixed, pressing the RESET button will disable the overload and the alarm relay, so the system turns back to normal conditions.

**Maximum Level:** When water level reaches the maximum level, which is set by the user, float switch sends on alarm signal. MAX yellow indicator light starts blinking. This alarm does not affect the current state (run or stop) of the pump. Pressing the RESET button disables the alarm relay and indicator light stops blinking. When RESET button is pressed, the lamp goes out and the alarm relay is deactivated.

**Phase Failure:** An external phase protection relay, mounted in the control panel, is connected to RLE-1C for checking phase sequence and phase failures. When there is a failure in mains voltage or in phase sequence, the motor is shut down by the relay and red indicator light starts blinking. By the time the failure is fixed, the motor restarts automatically while alarming goes on until the RESET button is pressed. When RESET button is pressed, the lamp goes out and the alarm relay is deactivated.

**Ready:** By the time all red indicator lights on RLE-1C switch off, green indicator light switches on, meaning that it is ready to run the motor. In case of failure, green indicator light switches off and the relay shuts down the motor.



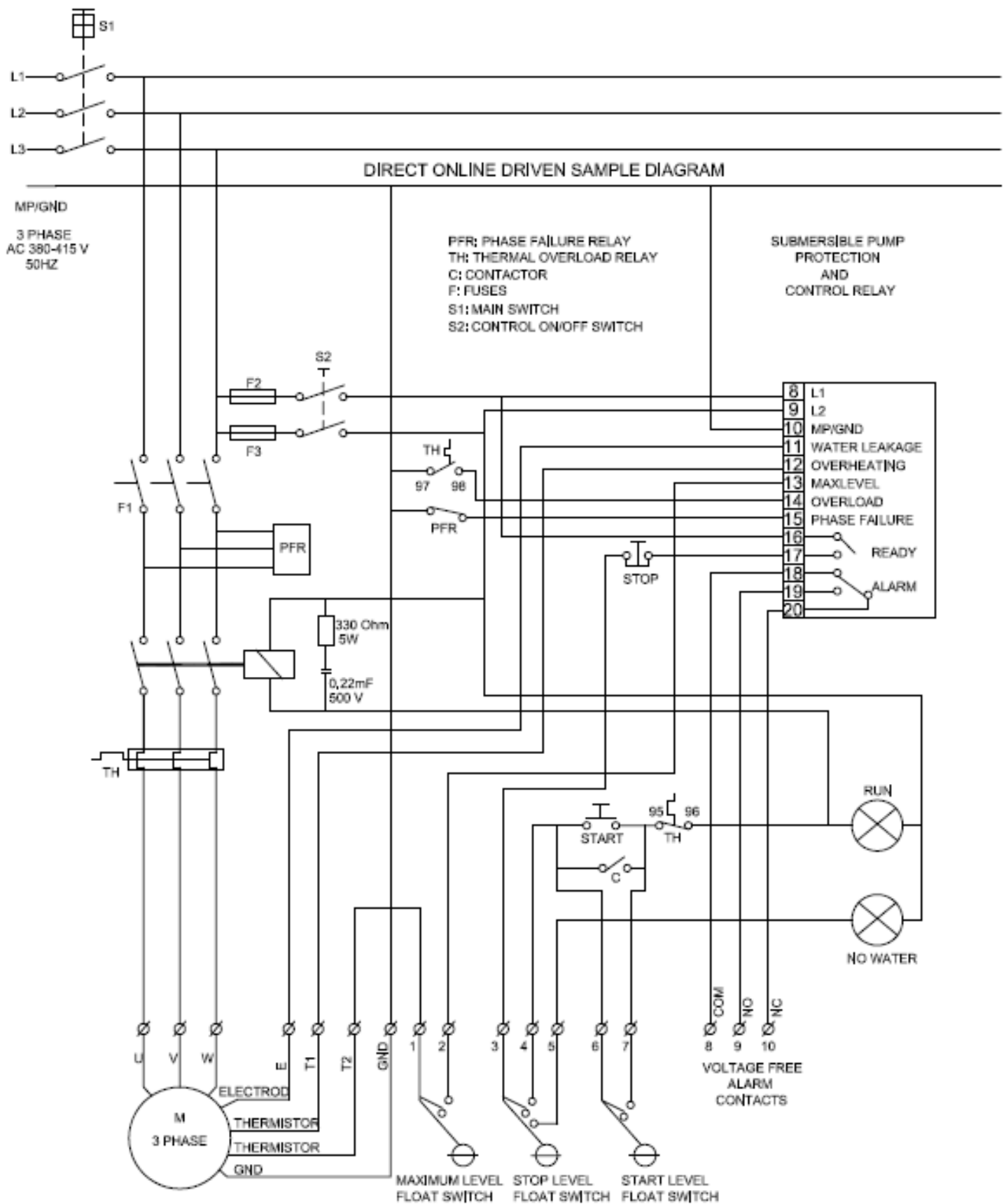
# ENDURO Series

Submersible Sewage And Wastewater Pumps

## Motor Protection and Control Relay Circuit Diagram



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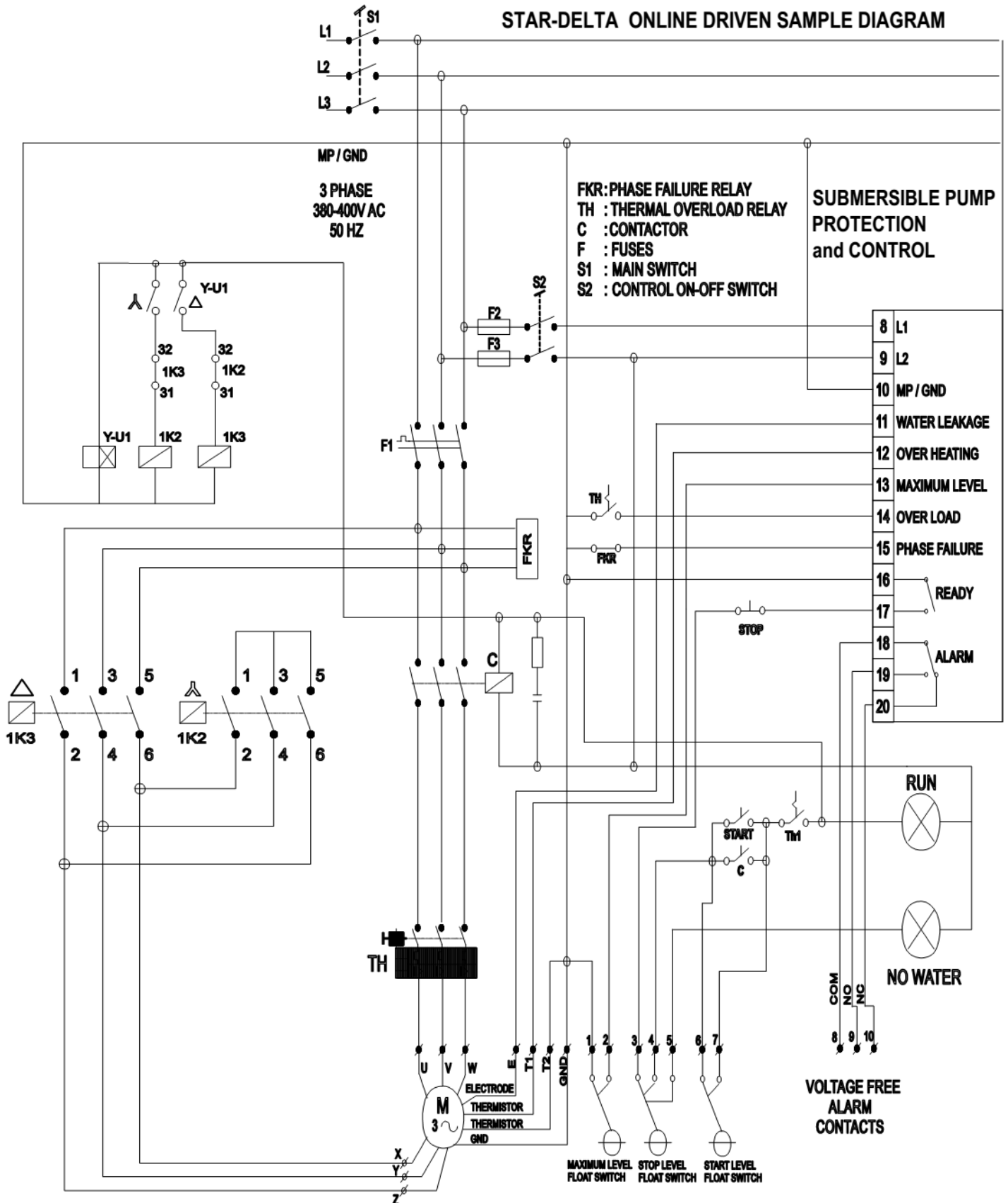
# ENDURO Series

Submersible Sewage And Wastewater Pumps

## Motor Protection and Control Relay Circuit Diagram



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## ENDURO Series

### Submersible Sewage And Wastewater Pumps

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### Single and Multiple Submersible Pump Control Panel

The control panel is designed in order to safer operation of ENDURO submersible pump can be claimed as extra. Single-pump or the 2 and 3 pump groups can be operated by the control panel.

In the pump operating principle of a multi-pump panel, all pumps can be operated simultaneously or as a backup.

For example, 2 ENDURO submersible pumps are controlled to get on panel of 2 groups. 1st pump is main, 2nd pump is waiting as a backup to run automatically as soon as the 1st pump stops or both are start at the same time for discharge high amounts of liquid.

### Control Panel General Features

- IP 55 protection class: It is isolated from dust, splashing water and wastewater environment gas.
  - Short Circuit Protection
  - Phase Failure and Protection Against Phase Sequence
  - Thermistor Protection
  - Water Leakage Protection
  - Over Current Protection
  - The Indicator Lights
  - Manual-Automatic Paco
  - Start-Stop As Manual
  - The Main Switch
- Equipments are available.

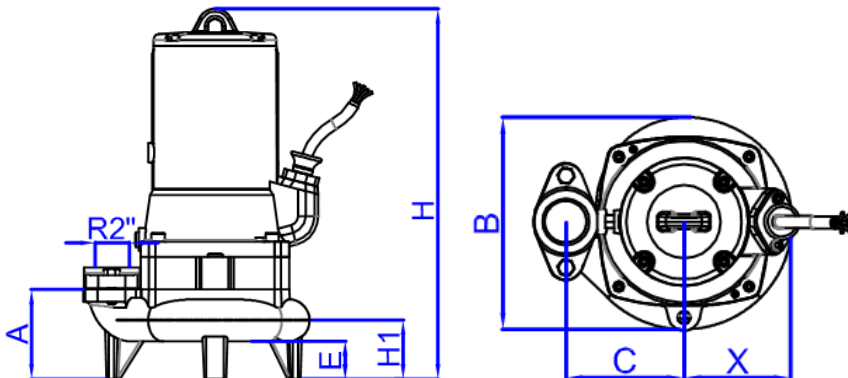
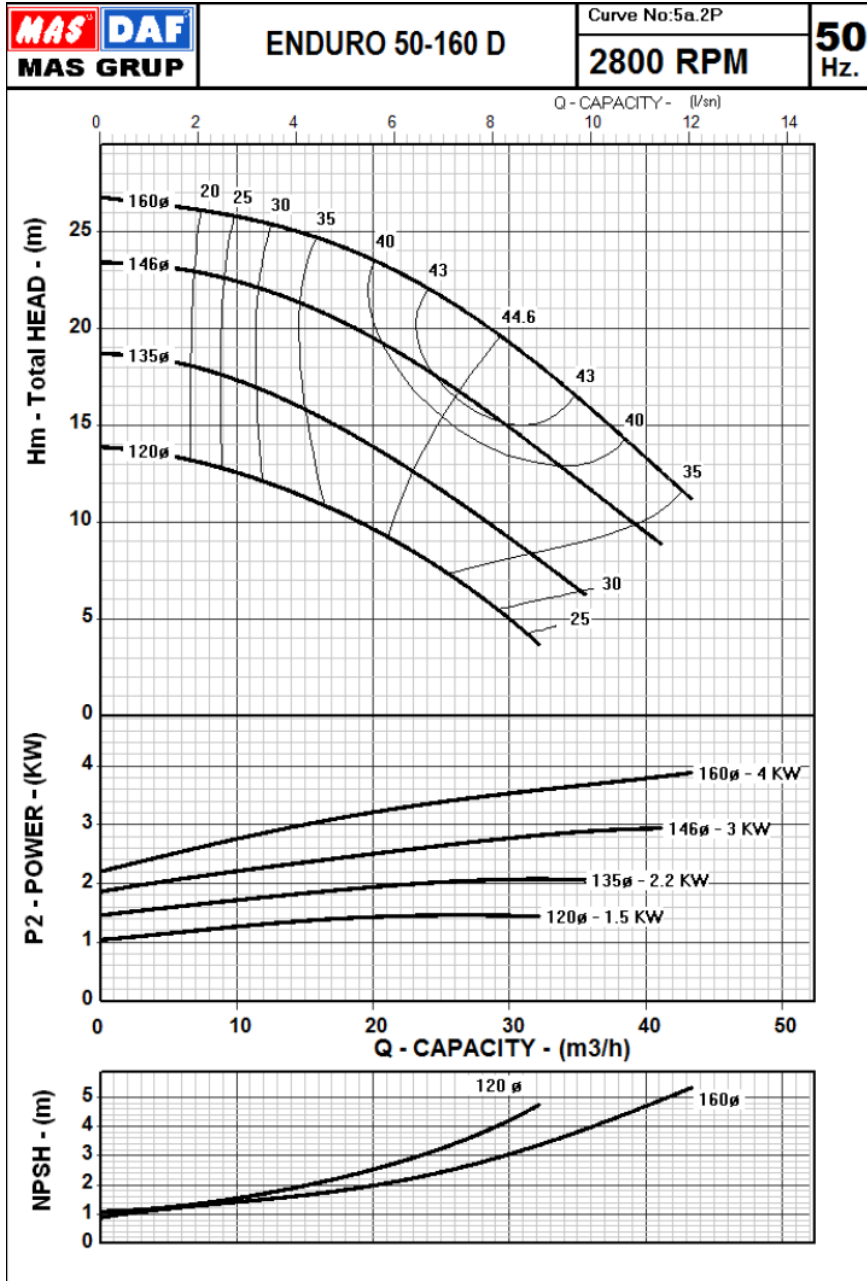
Floater is included in the package of submersible pump.

Control panel has all features of motor protection and control relay.

### ENDURO Submersible Pump Cable Features

- H07RN-F special type cables are used according to EN 50525-2-21 standard.
- The core colors of the cable are selected according to HD 308.
- EI4 Type (EPR) rubber is used as an isolated material that is resistant against the corrosive effect of the waste water.

Power (kW)	Drive	Cable (Using Desired)
1,5	Y <sub>DIRECT</sub>	4x1,5+3x1,5mm <sup>2</sup> – Single Cable
2,2	Y <sub>DIRECT</sub>	4x1,5+3x1,5mm <sup>2</sup> – Single Cable
3	Y <sub>DIRECT</sub>	4x1,5+3x1,5mm <sup>2</sup> – Single Cable
4	Y <sub>DIRECT</sub>	4x1,5+3x1,5mm <sup>2</sup> – Single Cable
5,5	Y <sub>DIRECT</sub>	4x2,5+3x1,5mm <sup>2</sup> – Single Cable
5,5	Y <sub>DIRECT</sub>	4x2,5+3x1,5mm <sup>2</sup> – Single Cable
7,5	Y <sub>DIRECT</sub>	4x2,5+3x1,5mm <sup>2</sup> – Single Cable
11 ( Compact )	Y <sub>DIRECT</sub>	4x4+3x1,5mm <sup>2</sup> – Single Cable
11	Y/Δ	7x4+3x1,5mm <sup>2</sup> – Single Cable
15	Y/Δ	7x4+3x1,5mm <sup>2</sup> – Single Cable
18,5 ( Compact )	Y/Δ	7x4+3x1,5mm <sup>2</sup> – Single Cable
18,5	Y/Δ	(4x4mm <sup>2</sup> ) + (4x4mm <sup>2</sup> + 3x1,5mm <sup>2</sup> ) – Dual Cable
22	Y/Δ	(4x6mm <sup>2</sup> ) + (4x6mm <sup>2</sup> + 3x1,5mm <sup>2</sup> ) – Dual Cable
30	Y/Δ	(4x6mm <sup>2</sup> ) + (4x6mm <sup>2</sup> + 3x1,5mm <sup>2</sup> ) – Dual Cable



PumpType	Motor Type (IEC)	Dbø	H	H1	E	A	C	X	B
50-160	90L	50	470	80	51	122.5	141	133	255
	100L		506						
	112M		540						

# ENDURO Series

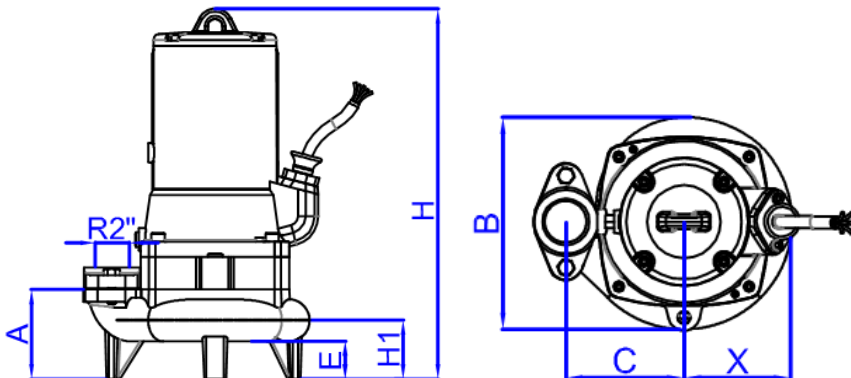
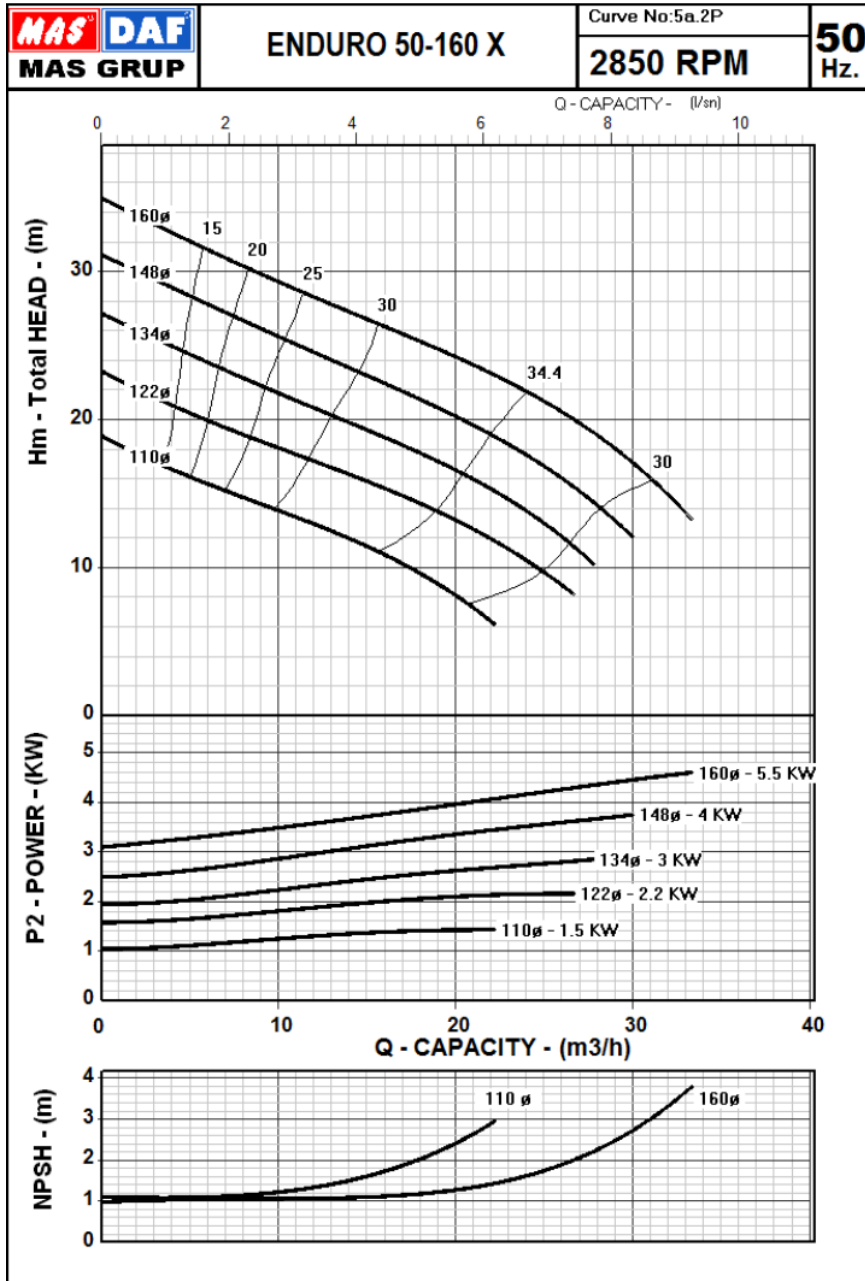
Submersible Sewage And Wastewater Pumps

## Performance Curves

## ENDURO 50-160 X – 2900 RPM



Mas Grup



PumpType	Motor Type (IEC)	Dbø	H	H1	E	A	C	X	B
50-160	90L	50	470	80	51	122.5	141	133	255
	100L		506						
	112M		540						

# ENDURO Series

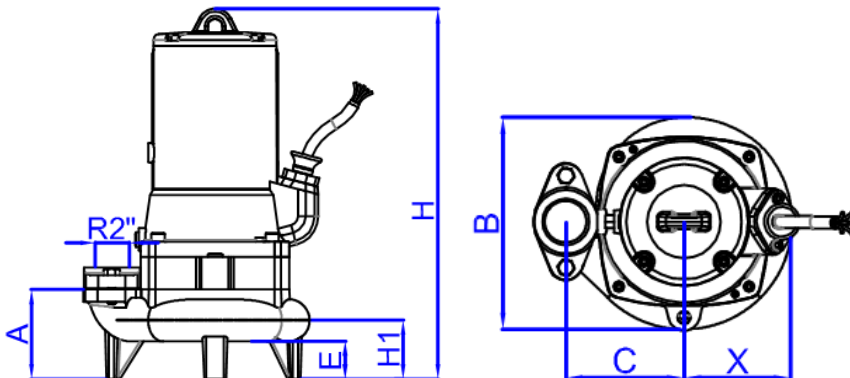
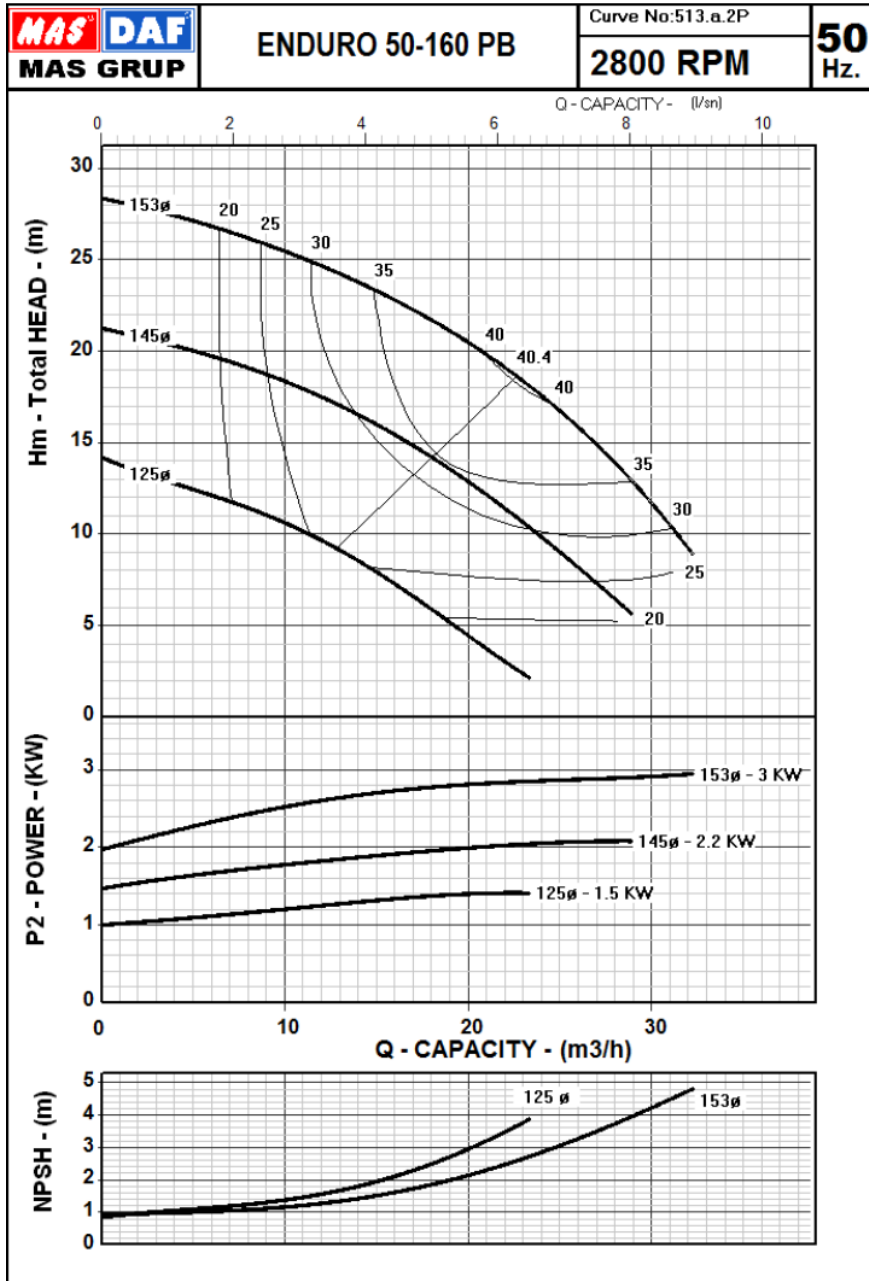
Submersible Sewage And Wastewater Pumps

## Performance Curves

## ENDURO 50-160 PB – 2900 RPM



Mas Grup



PumpType	Motor Type (IEC)	Dbø	H	H1	E	A	C	X	B
50-160	90L	50	470	80	51	122.5	141	133	255
	100L		506						

# ENDURO Series

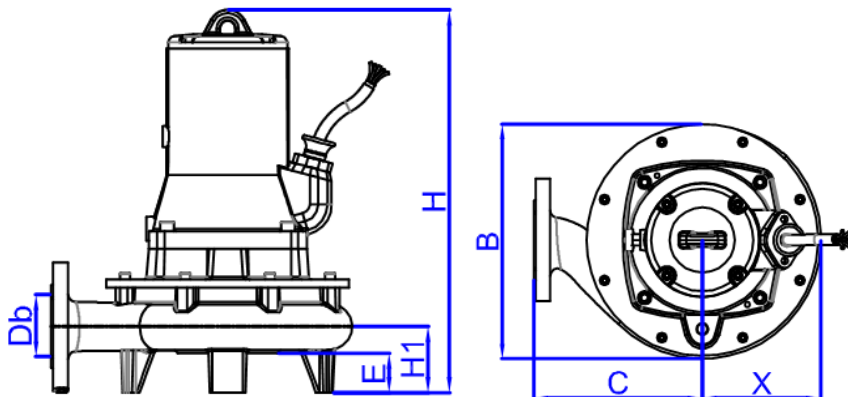
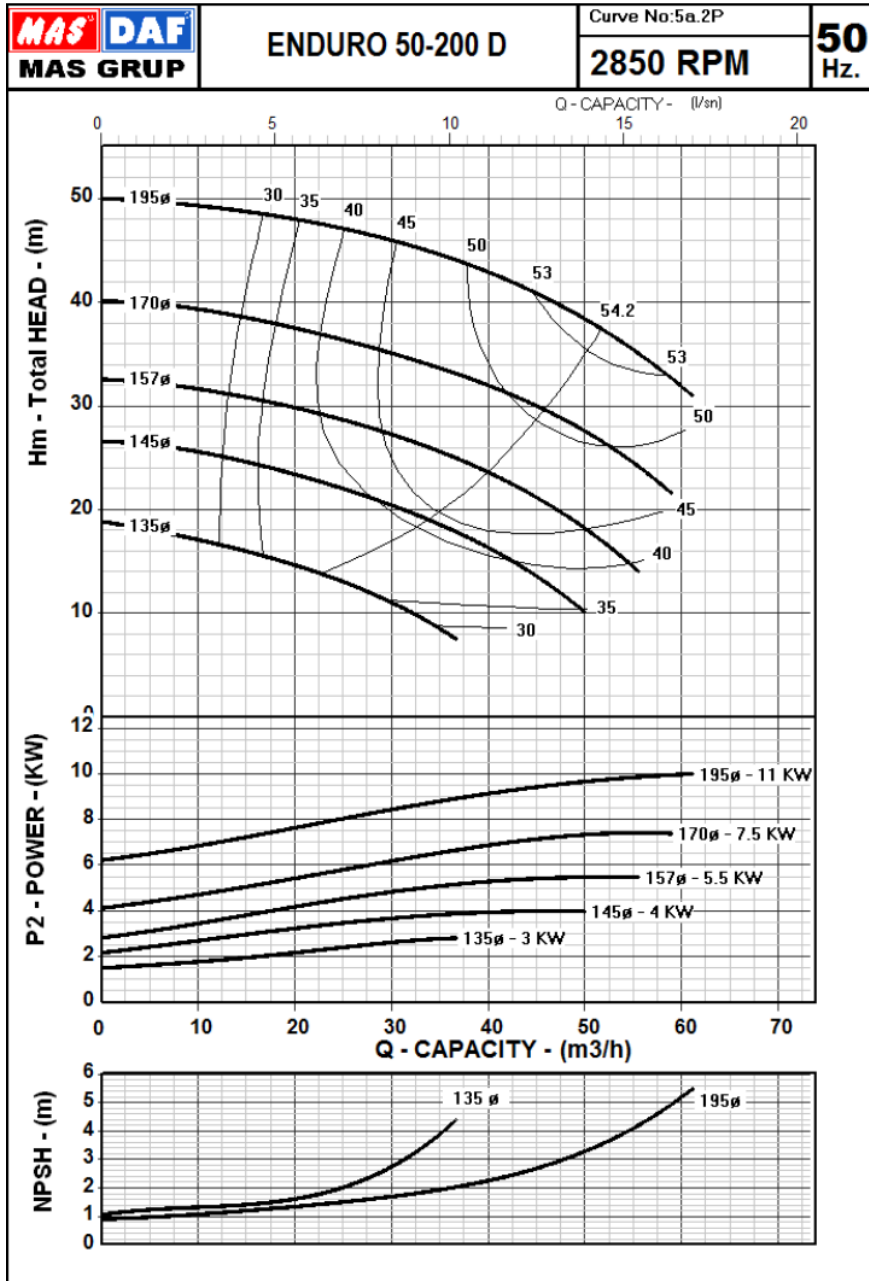
Submersible Sewage And Wastewater Pumps

## Performance Curves

## ENDURO 50-200 D – 2900 RPM



Mas Grup



PumpType	Motor Type (IEC)	Dbø	H	H1	E	C	X	B
50-200	100L	50	525	85	50	227	160	313
	112M		560					
	132S		580					
	132M		680					

# ENDURO Series

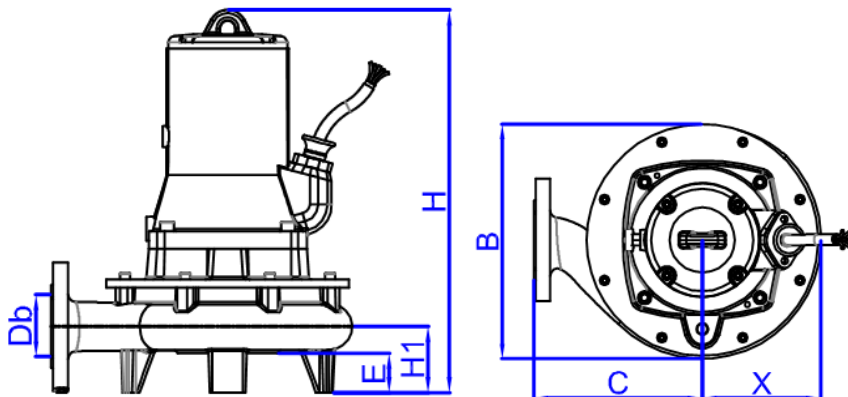
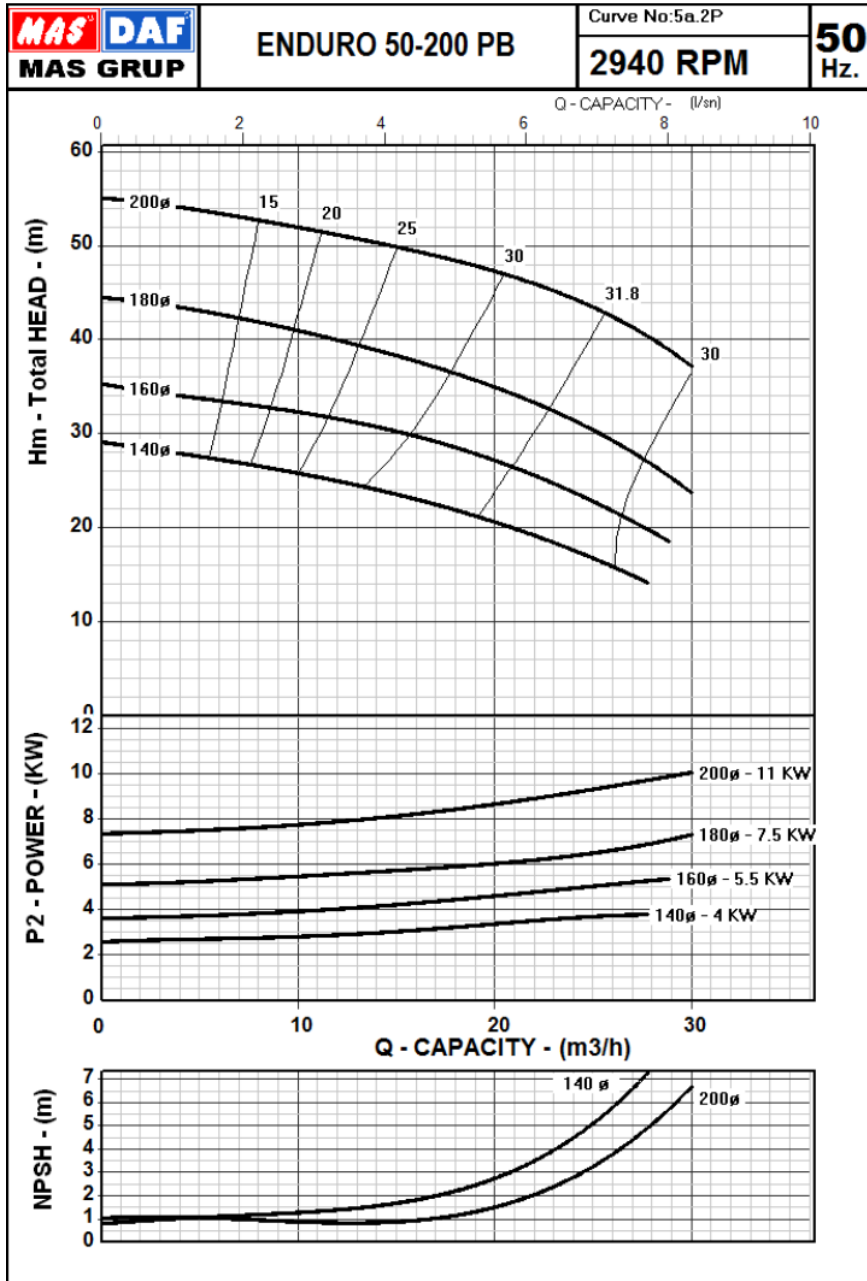
Submersible Sewage And Wastewater Pumps

## Performance Curves

## ENDURO 50-200 PB – 2900 RPM



Mas Grup



PumpType	Motor Type (IEC)	Dbø	H	H1	E	C	X	B
50-200	100L	50	525	85	50	227	160	313
	112M		560					
	132S		580					
	132M		680					



# ENDURO Series

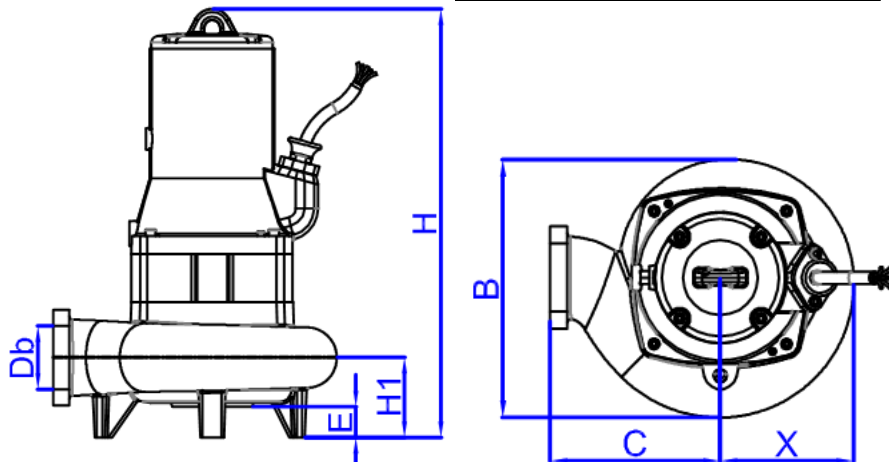
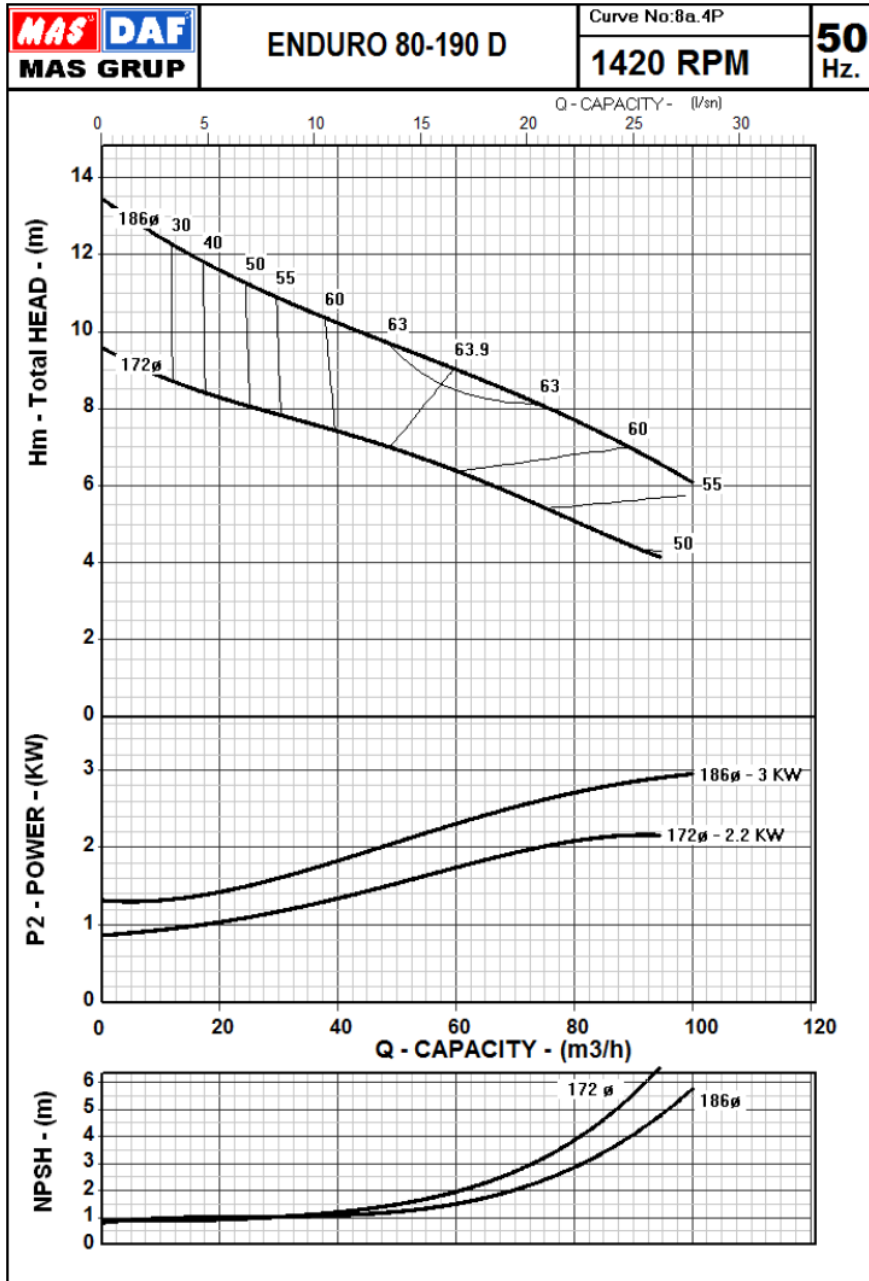
Submersible Sewage And Wastewater Pumps

## Performance Curves

## ENDURO 80-190 D – 1450 RPM



Mas Grup



PumpType	Motor Type (IEC)	Dbø	H	H1	E	C	X	B
80-190	100L	80	570	100	38.5	200	157	300
	112M		605					

# ENDURO Series

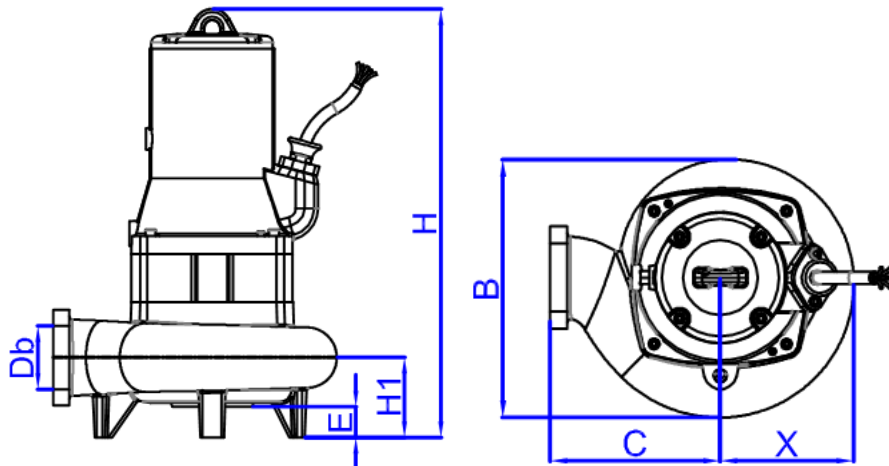
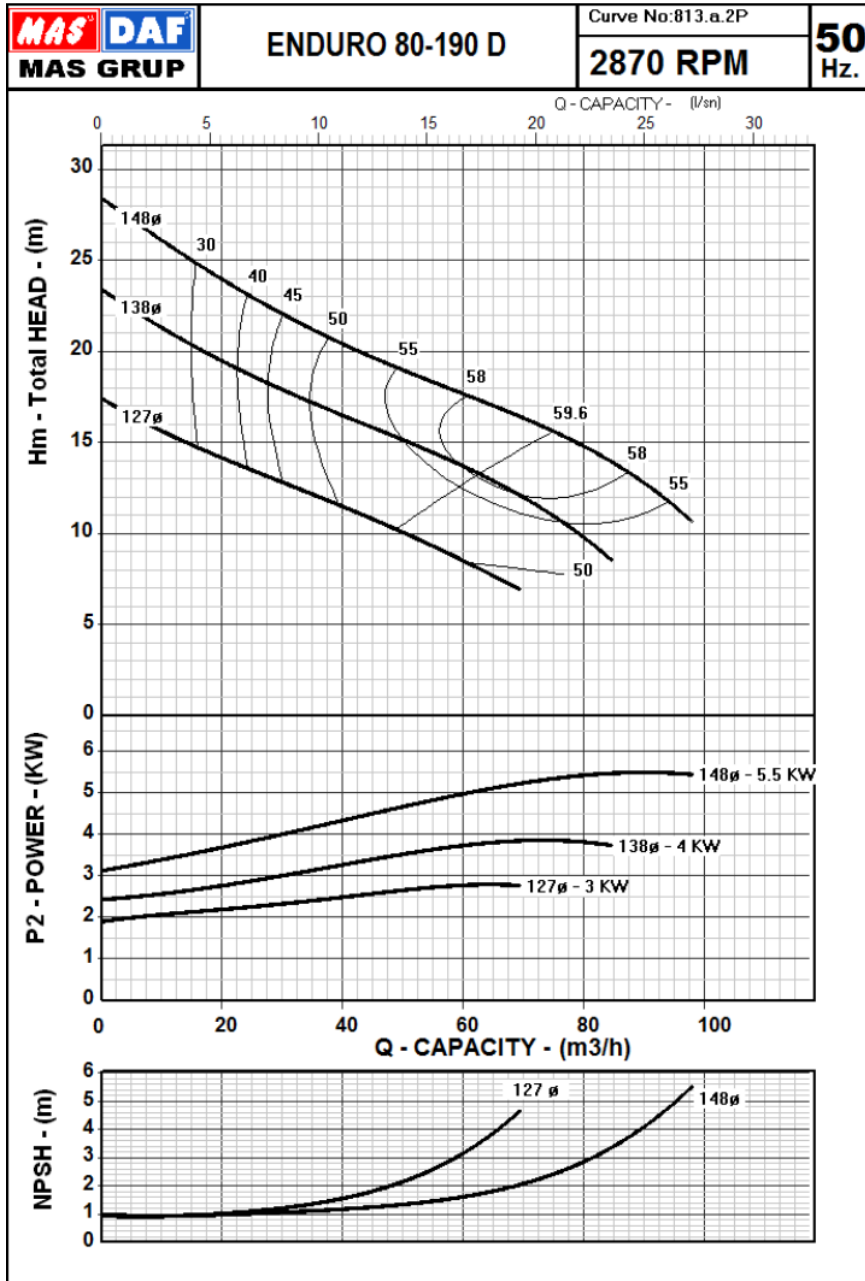
Submersible Sewage And Wastewater Pumps

## Performance Curves

## ENDURO 80-190 D – 2900 RPM



Mas Grup



PumpType	Motor Type (IEC)	Dbø	H	H1	E	C	X	B
80-190	100L	80	570	100	38.5	200	157	300

# ENDURO Series

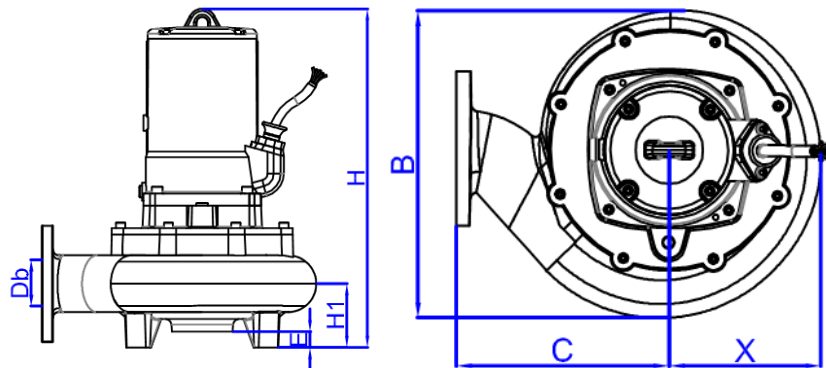
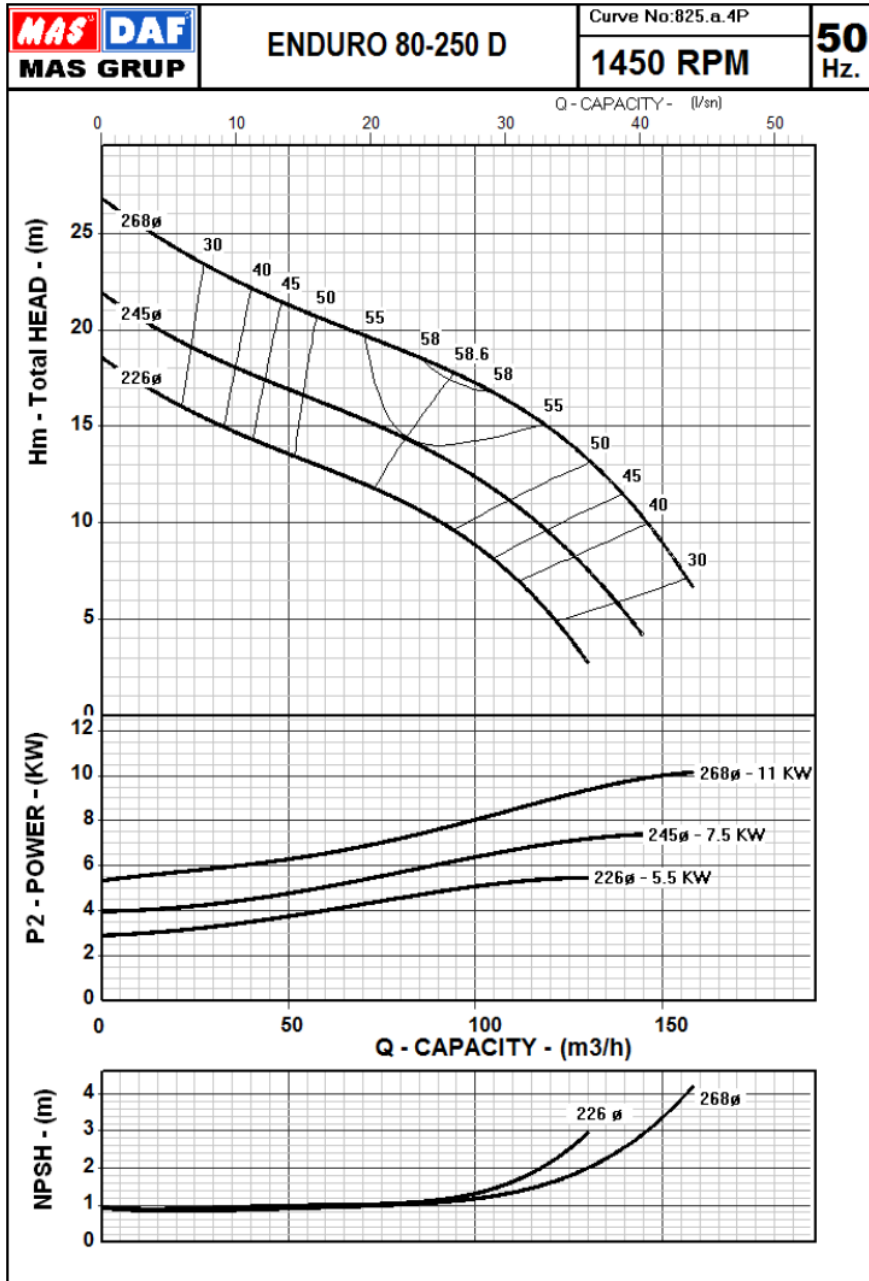
Submersible Sewage And Wastewater Pumps

## Performance Curves

## ENDURO 80-250 D – 1450 RPM



Mas Grup



PumpType	Motor Type (IEC)	Dbø	H	H1	E	C	X	B
80-250	132S	80	650	110	37	280	197	400
	132M		750					
	160M		805					
	160L		905					

# ENDURO Series

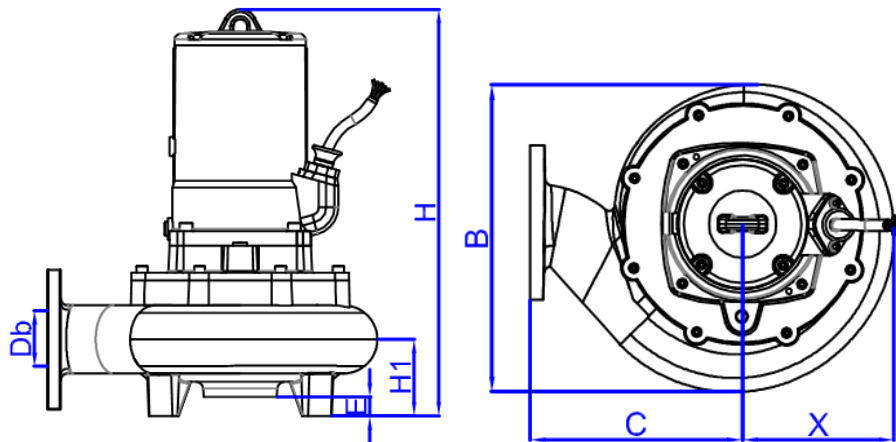
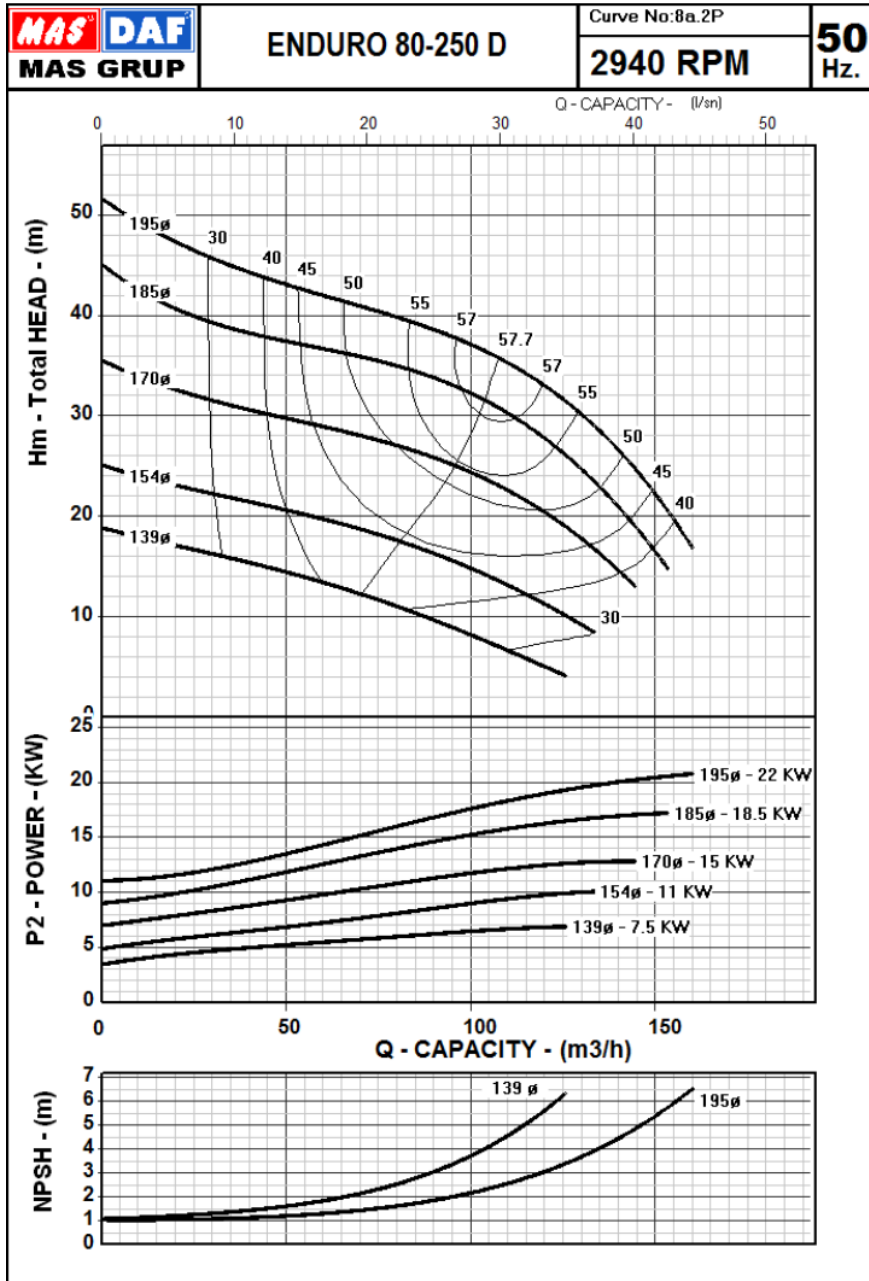
Submersible Sewage And Wastewater Pumps

## Performance Curves

## ENDURO 80-250 D – 2900 RPM



Mas Grup



PumpType	Motor Type (IEC)	Dbø	H	H1	E	C	X	B
80-250	112M	80	630	110	37	280	197	400
	132M		750					

# ENDURO Series

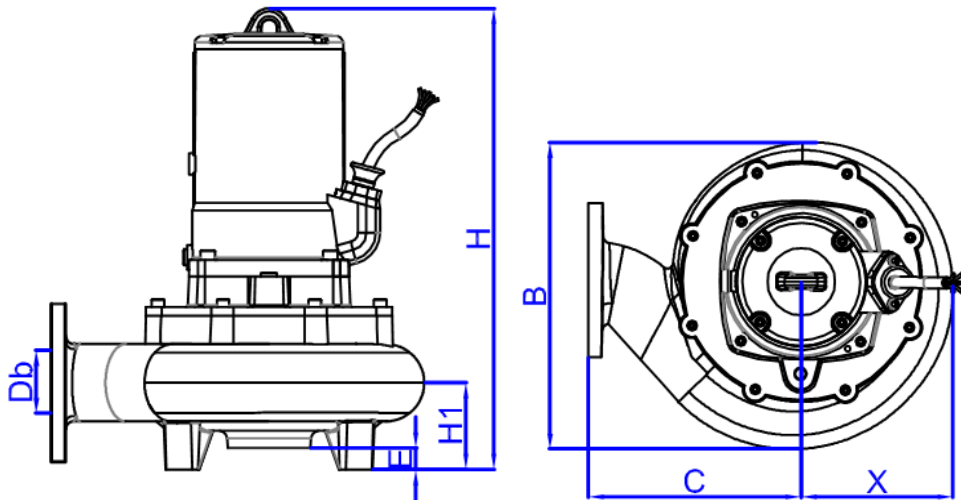
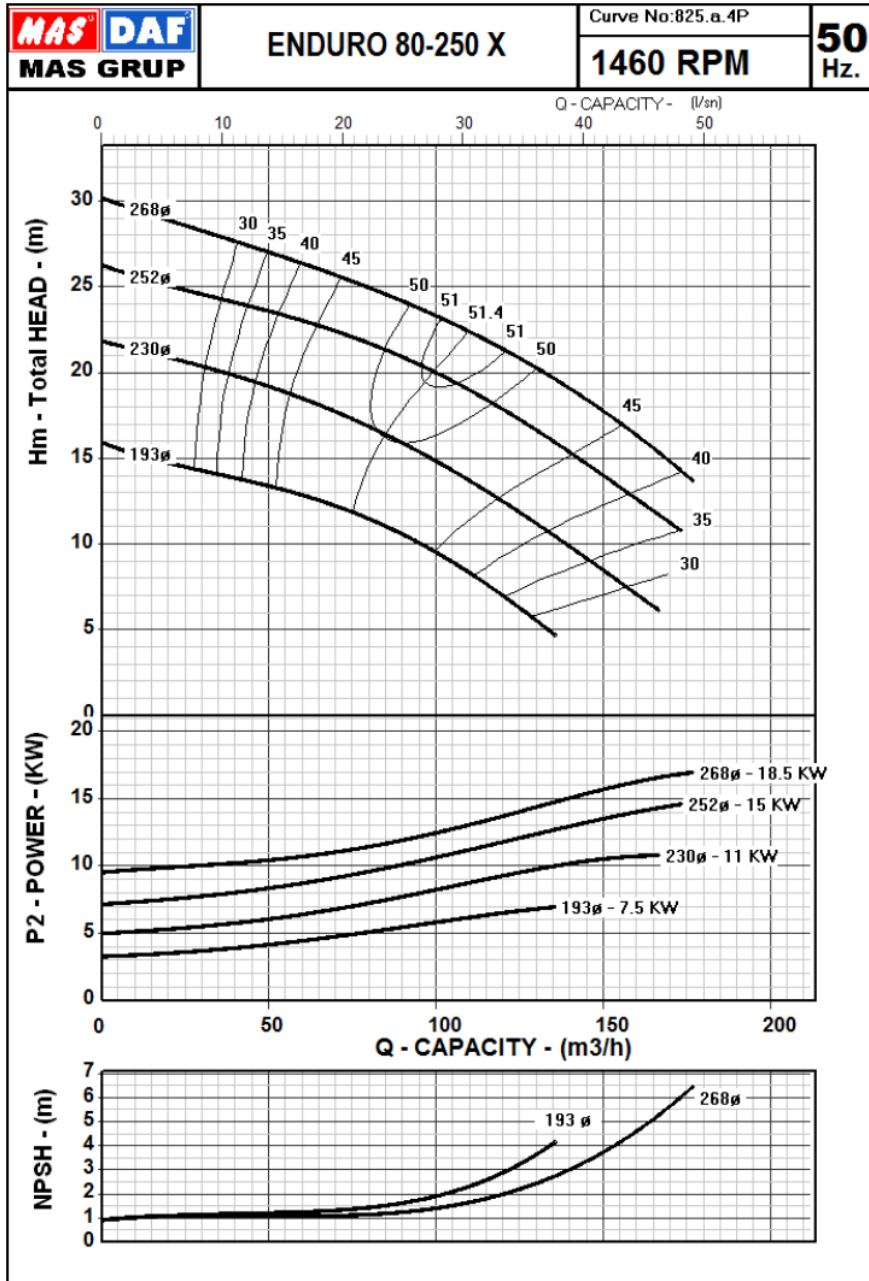
Submersible Sewage And Wastewater Pumps

## Performance Curves

## ENDURO 80-250 X – 1450 RPM



Mas Grup



PumpType	Motor Type (IEC)	Dbø	H	H1	E	C	X	B
80-250	132M	80	750	110	37	280	197	400
	160L		905					

# ENDURO Series

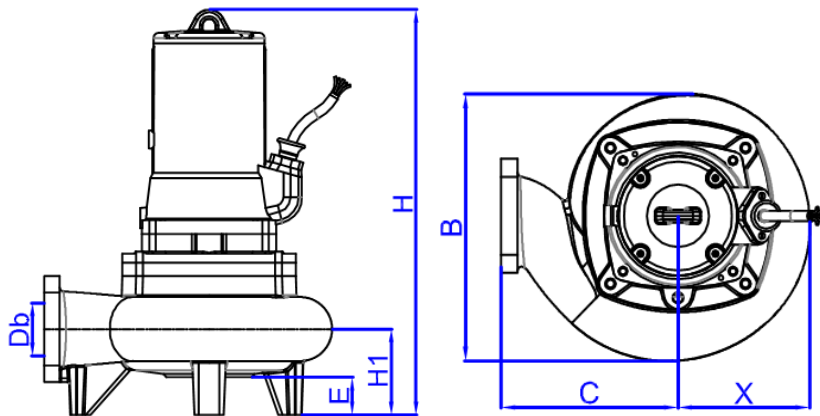
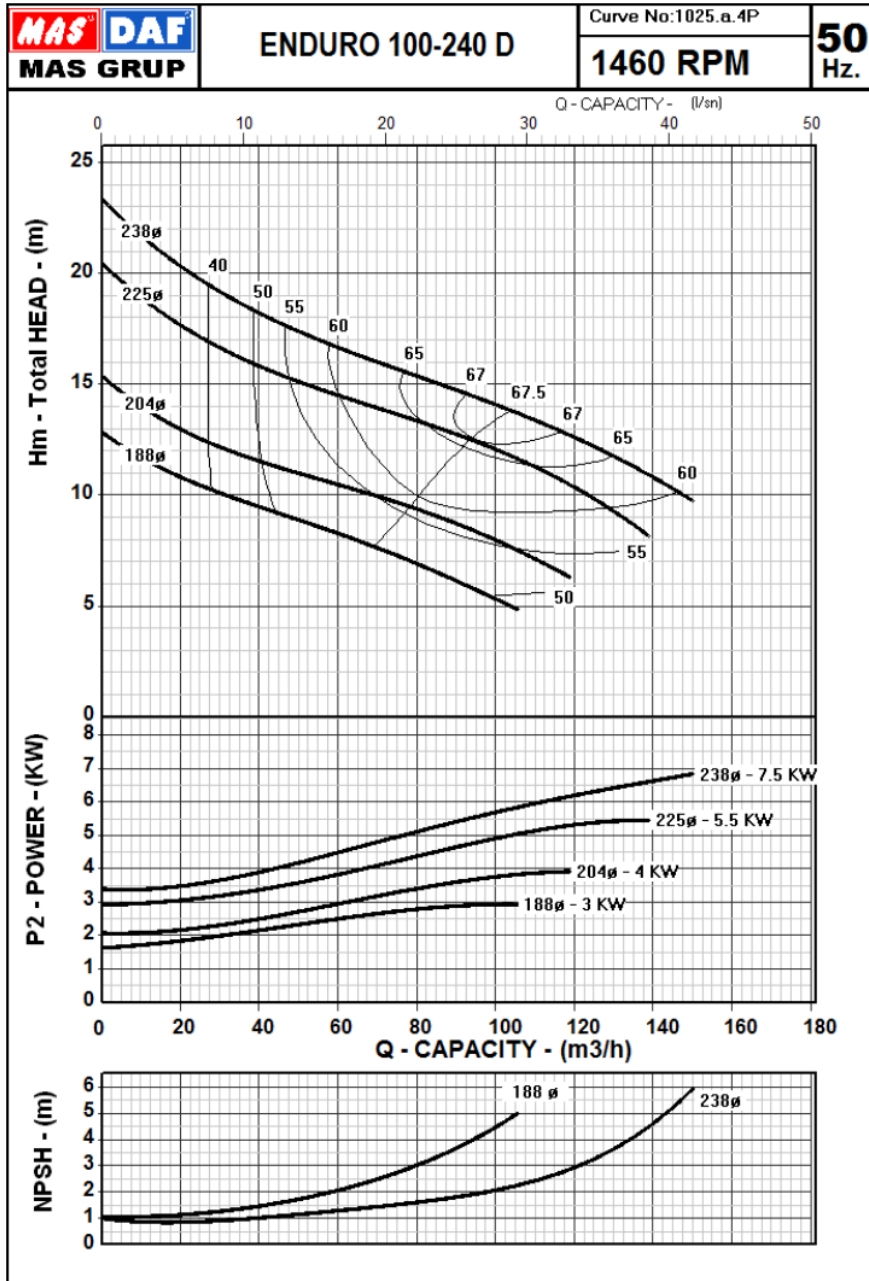
Submersible Sewage And Wastewater Pumps

## Performance Curves

## ENDURO 100-240 D – 1450 RPM



Mas Grup



PumpType	Motor Type (IEC)	Dbø	H	H1	E	C	X	B
100-240	100L	100	593	130	57	250	185	375
	112M		630					
	132M		750					

# ENDURO Series

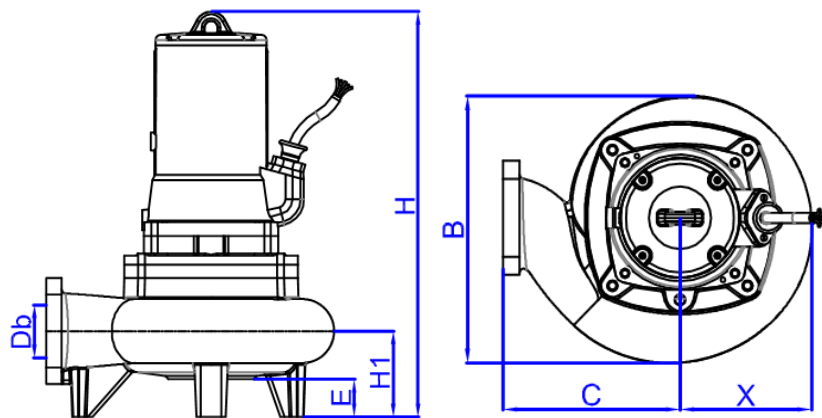
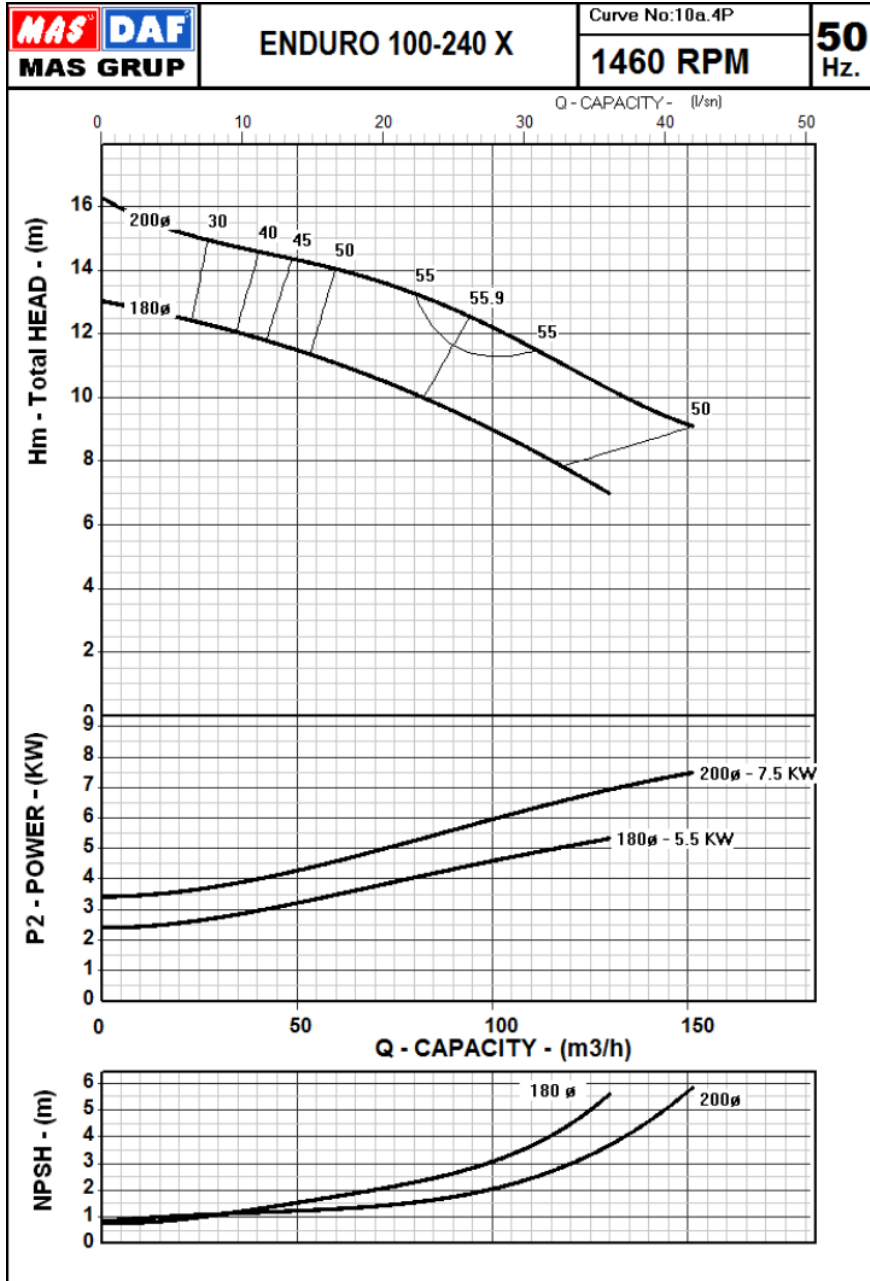
Submersible Sewage And Wastewater Pumps

## Performance Curves

## ENDURO 100-240 X – 1450 RPM



Mas Grup



PumpType	Motor Type (IEC)	Dbø	H	H1	E	C	X	B
100-240	112M	100	630	130	57	250	185	375
	132M		750					

# ENDURO Series

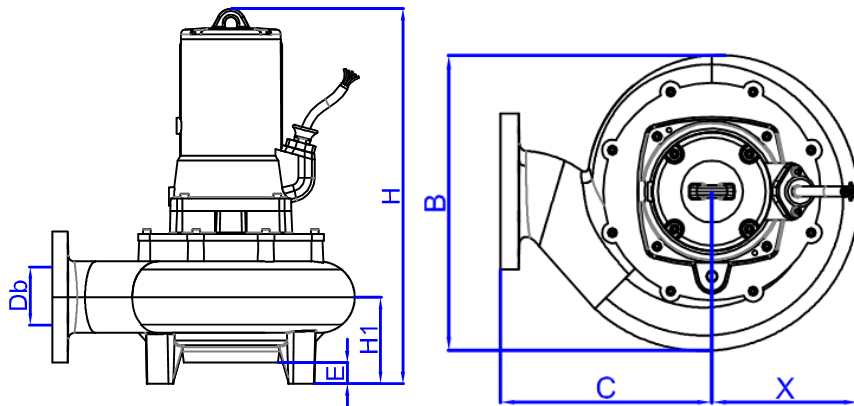
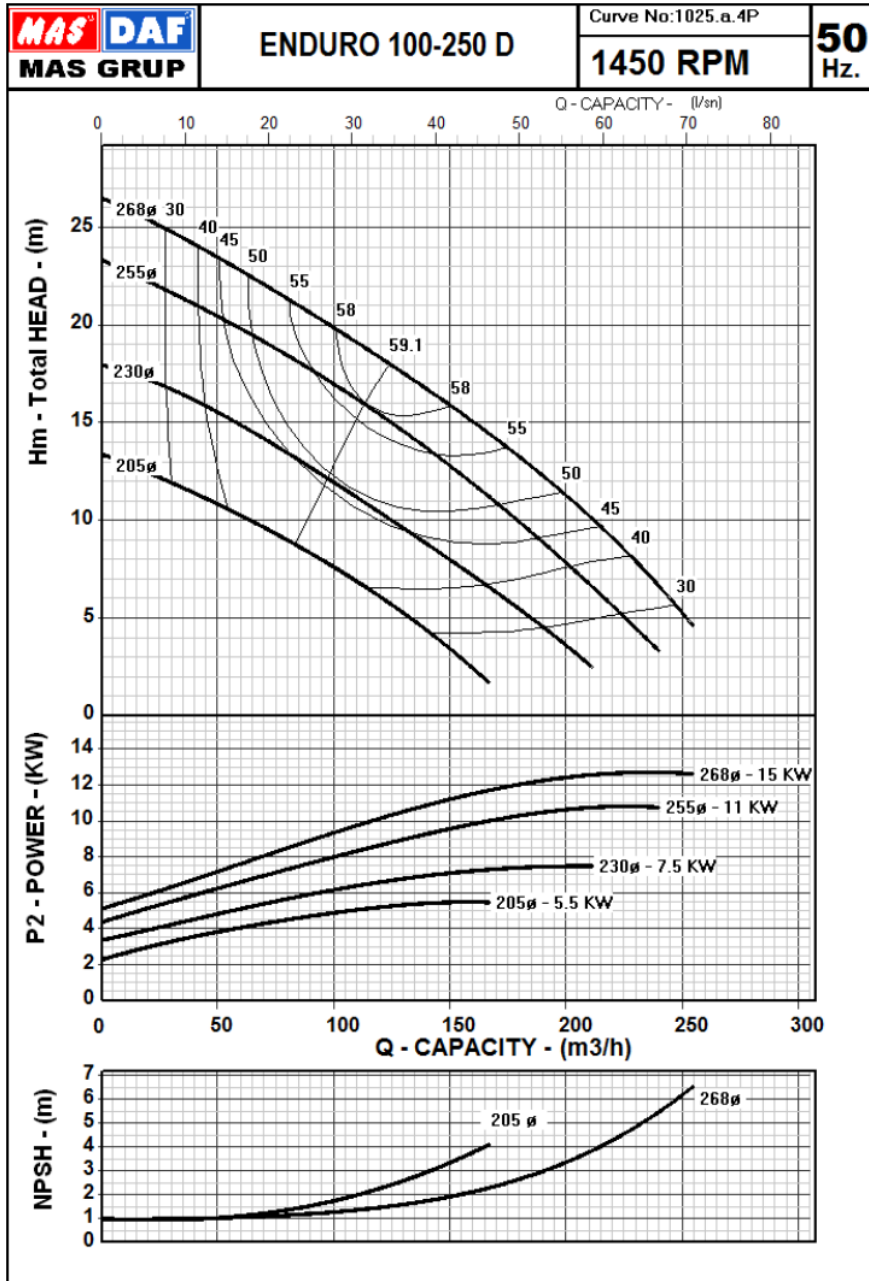
Submersible Sewage And Wastewater Pumps

## Performance Curves

## ENDURO 100-250 D – 1450 RPM



Mas Grup



PumpType	Motor Type (IEC)	Dbø	H	H1	E	C	X	B
100-250	112M	100	675	145	45	300	210	420
	132M		795					
	160L		950					



# ENDURO Series

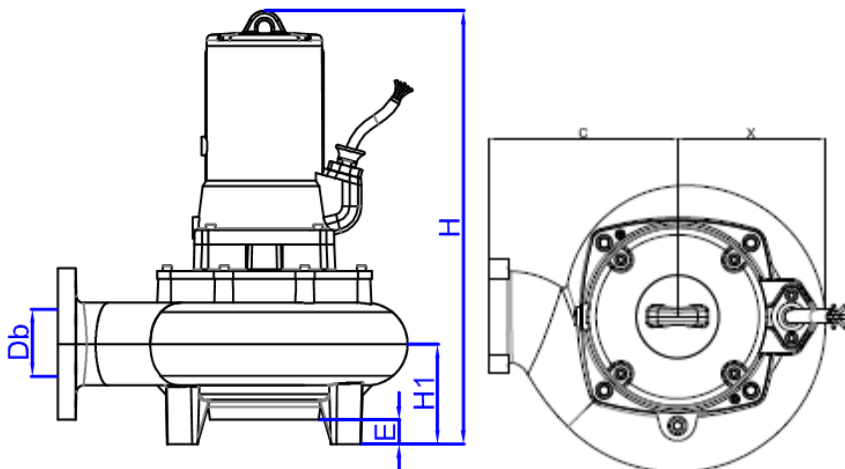
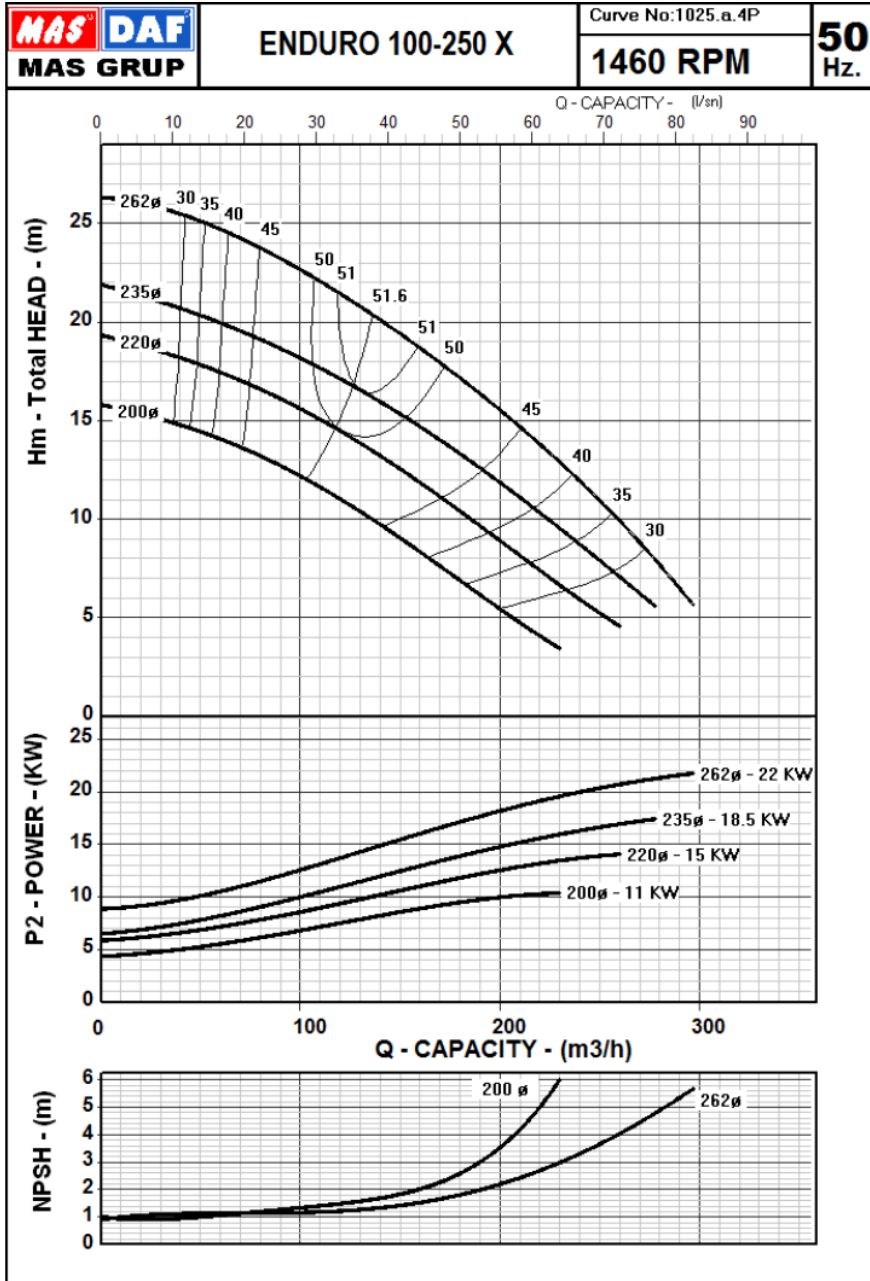
Submersible Sewage And Wastewater Pumps

## Performance Curves

## ENDURO 100-250 X – 1450 RPM



Mas Grup



PumpType	Motor Type (IEC)	Dbø	H	H1	E	C	X	B
100-250	132M	100	795	145	45	300	210	420
	160L		950					

# ENDURO Series

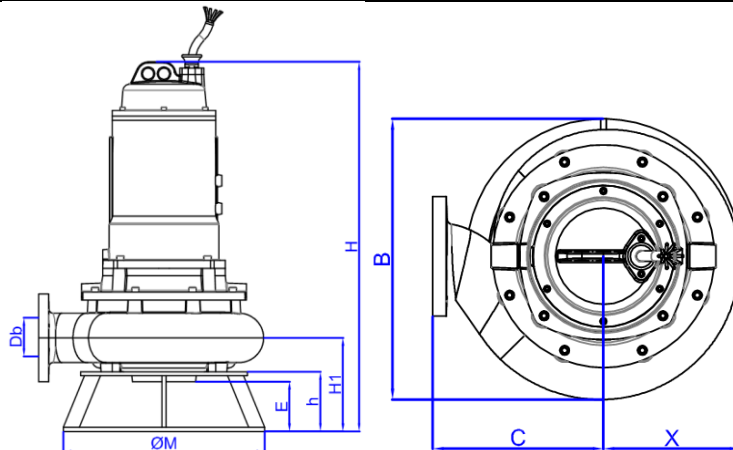
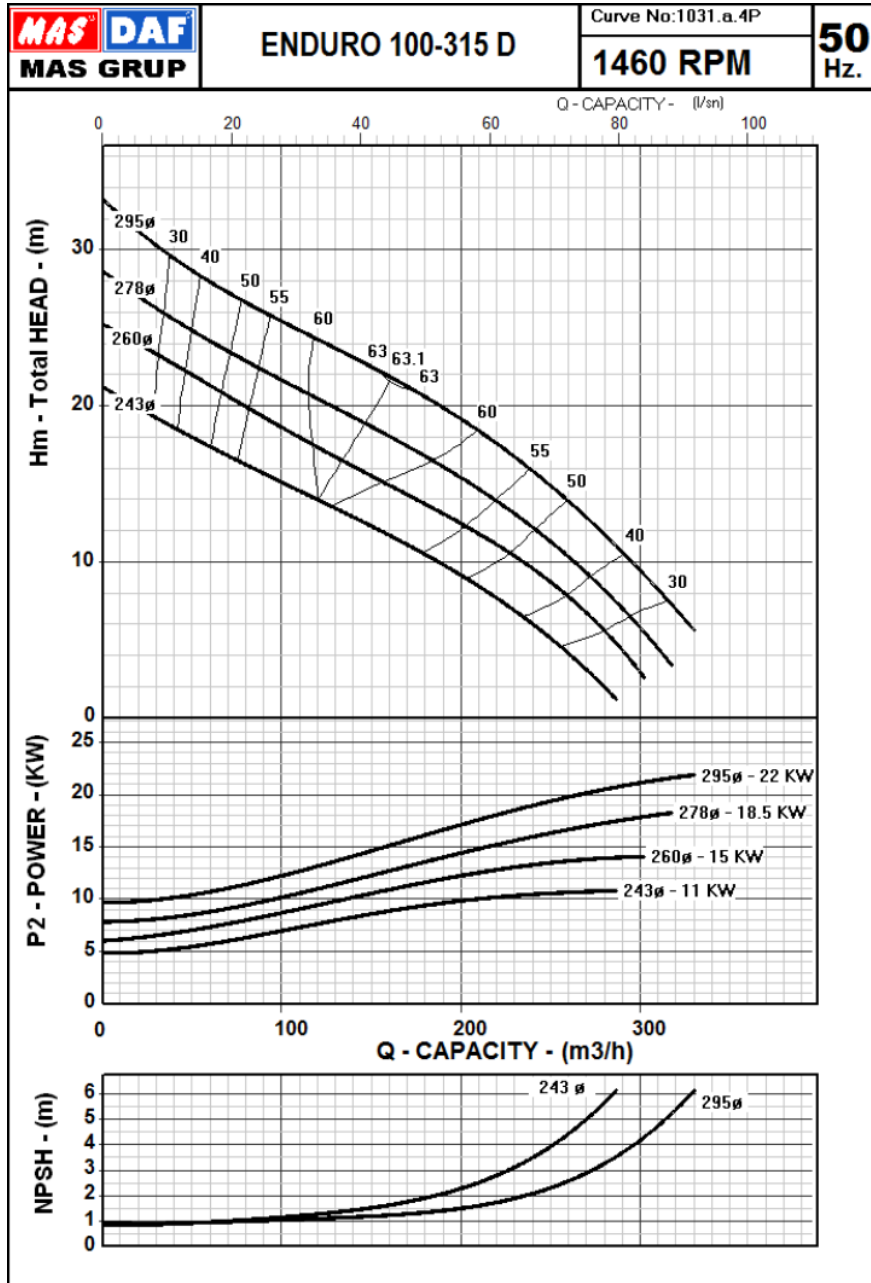
Submersible Sewage And Wastewater Pumps

## Performance Curves

## ENDURO 100-315 D – 1450 RPM



Mas Grup



PumpType	Motor Type (IEC)	DbØ	H	H1	h	E	MØ	C	X	B
100-315	132M	100	905	235	150	125	506	315	250	497
	160L		1025							
	180L		1110							

# ENDURO Series

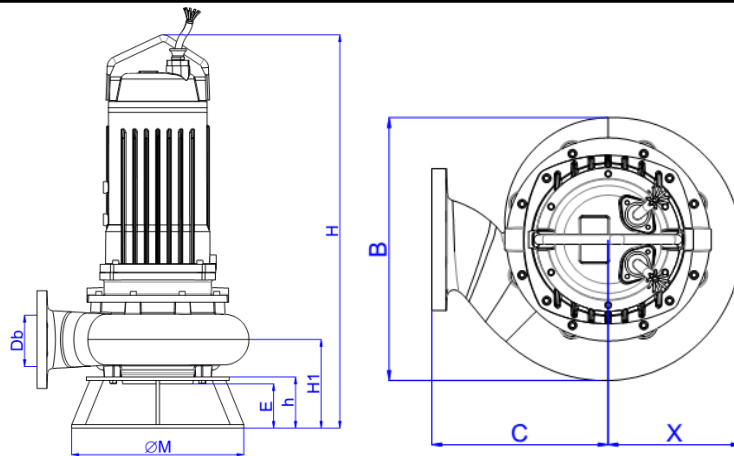
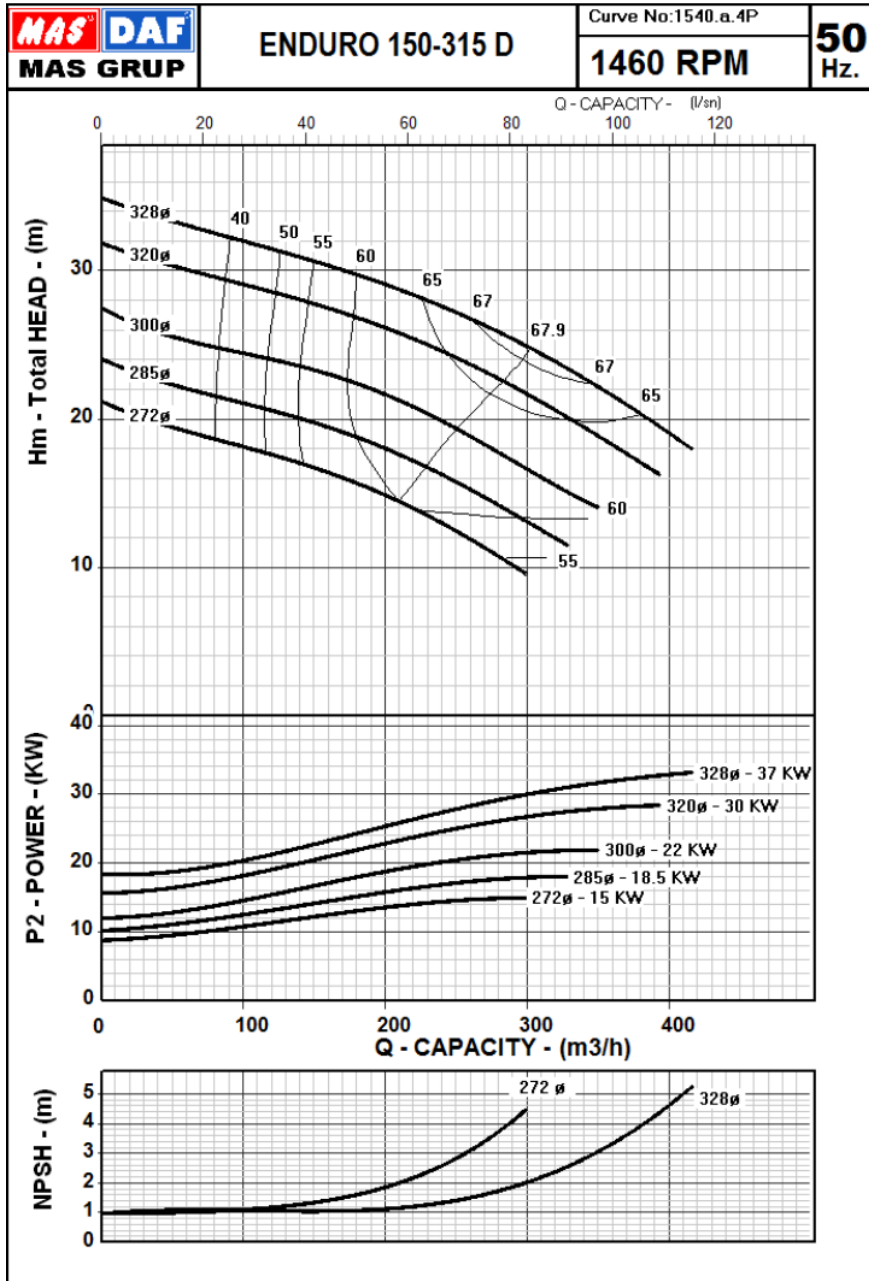
Submersible Sewage And Wastewater Pumps

## Performance Curves

## ENDURO 150-315 D – 1450 RPM



Mas Grup



PumpType	Motor Type (IEC)	Db $\phi$	H	H1	h	E	M $\phi$	C	X	B
150-315	160L	150	1067	260	150	130	506	355	270	530
	180L		1142							
	200L		1200							

# ENDURO Series

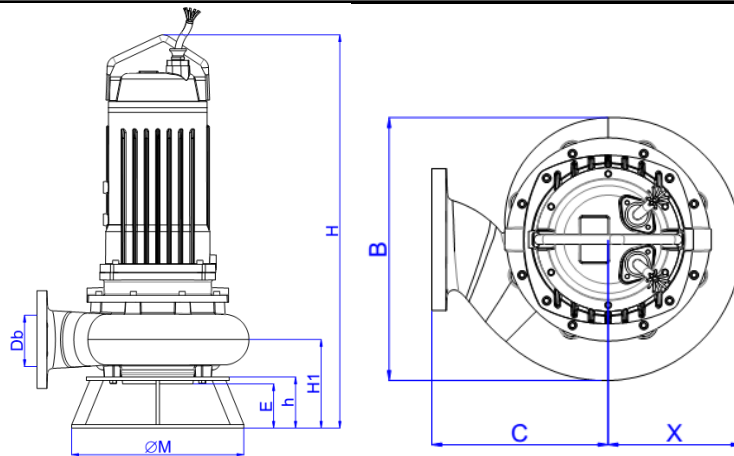
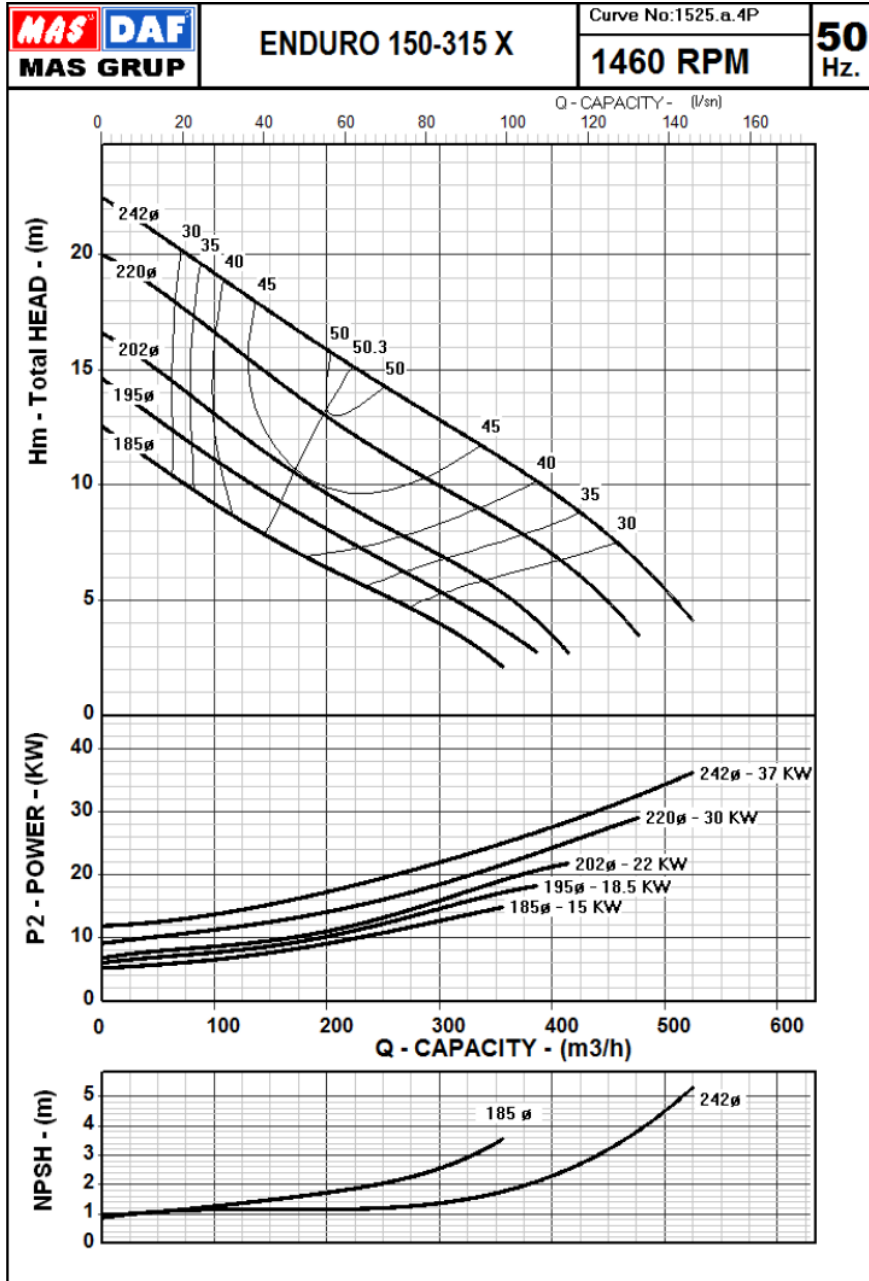
Submersible Sewage And Wastewater Pumps

## Performance Curves

## ENDURO 150-315 X – 1450 RPM



Mas Grup



PumpType	Motor Type (IEC)	Dbø	H	H1	h	E	Mø	C	X	B
150-315	160L	150	1067	260	150	130	506	355	270	530
	180L		1142							
	200L		1200							

# ENDURO Series

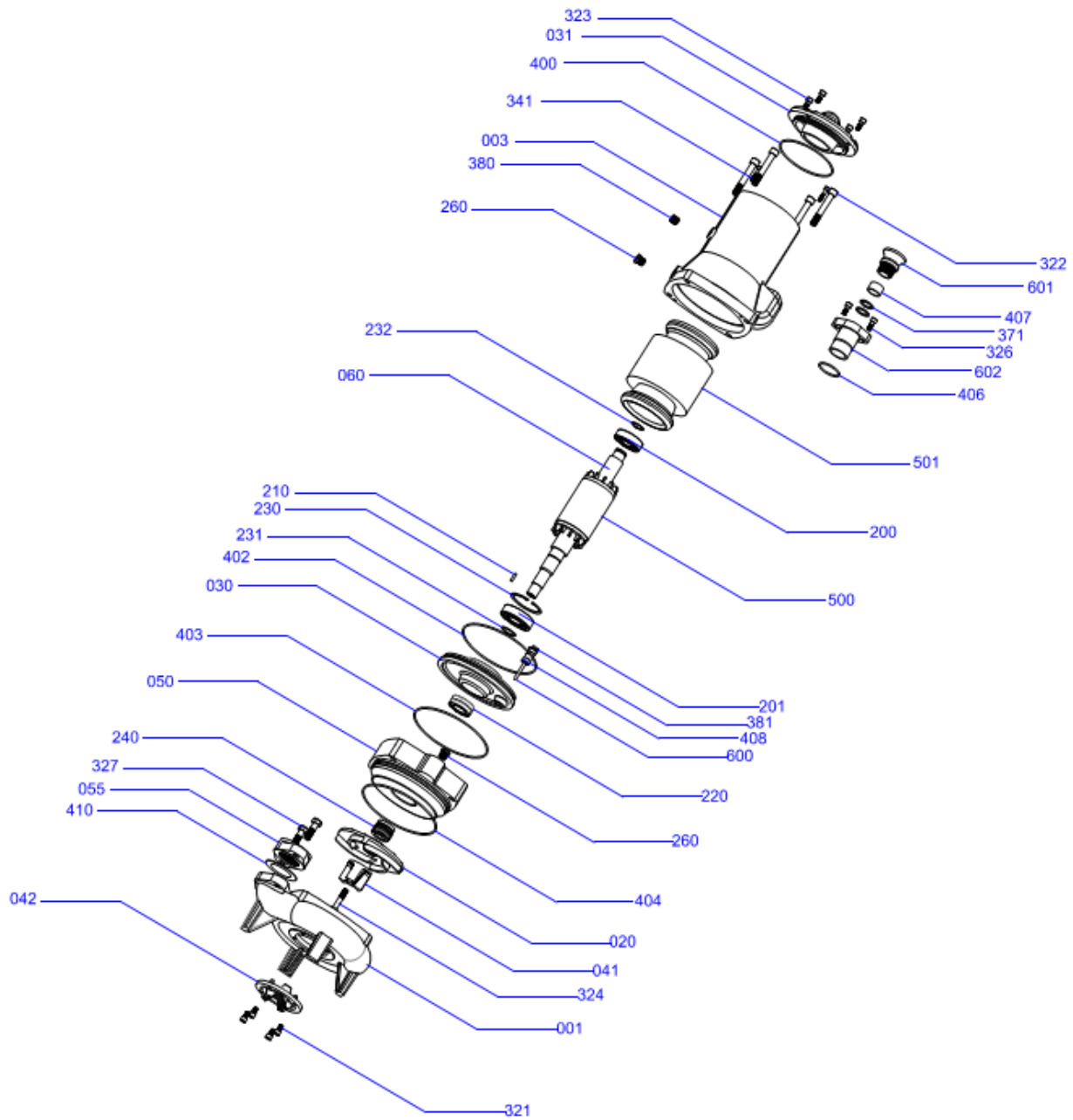
Submersible Sewage And Wastewater Pumps

Drawing for Dismantling

Small Pumps With Grinding Blade



Mas Grup



PART NO	PART NAME	PART NO	PART NAME	PART NO	PART NAME
01	Volute Casing	230	Retaining Ring	381	Electrode Screw
03	Motor Casing	231	Retaining Ring	400	O-Ring
20	Impeller PB Type	232	Retaining Ring	402	O-Ring
30	Bottom Bearing Housing	240	Mechanical Seal	403	O-Ring
31	Top Bearing Housing	260	Plug	404	O-Ring
41	Cutter Blade ( inside )	321	Hexagon Head Bolt	407	Gland Gasket
42	Cutter Blade ( outside )	322	Imbues Bolt	408	Electrode Gasket
50	Stuffing Box	323	Imbues Bolt	410	Flange Gasket
55	Flange	324	Imbues Bolt	500	Rotor
60	Shaft	326	Hexagon Head Bolt	501	Stator
200	Top Bearing	327	Hexagon Head Bolt	600	Electrode
201	Bottom Bearing	341	Imbues Bolt	602	Gland
210	Impeller Key	371	Gland Gasket Washer		
220	Oil Seal	380	Setscrew		

# ENDURO Series

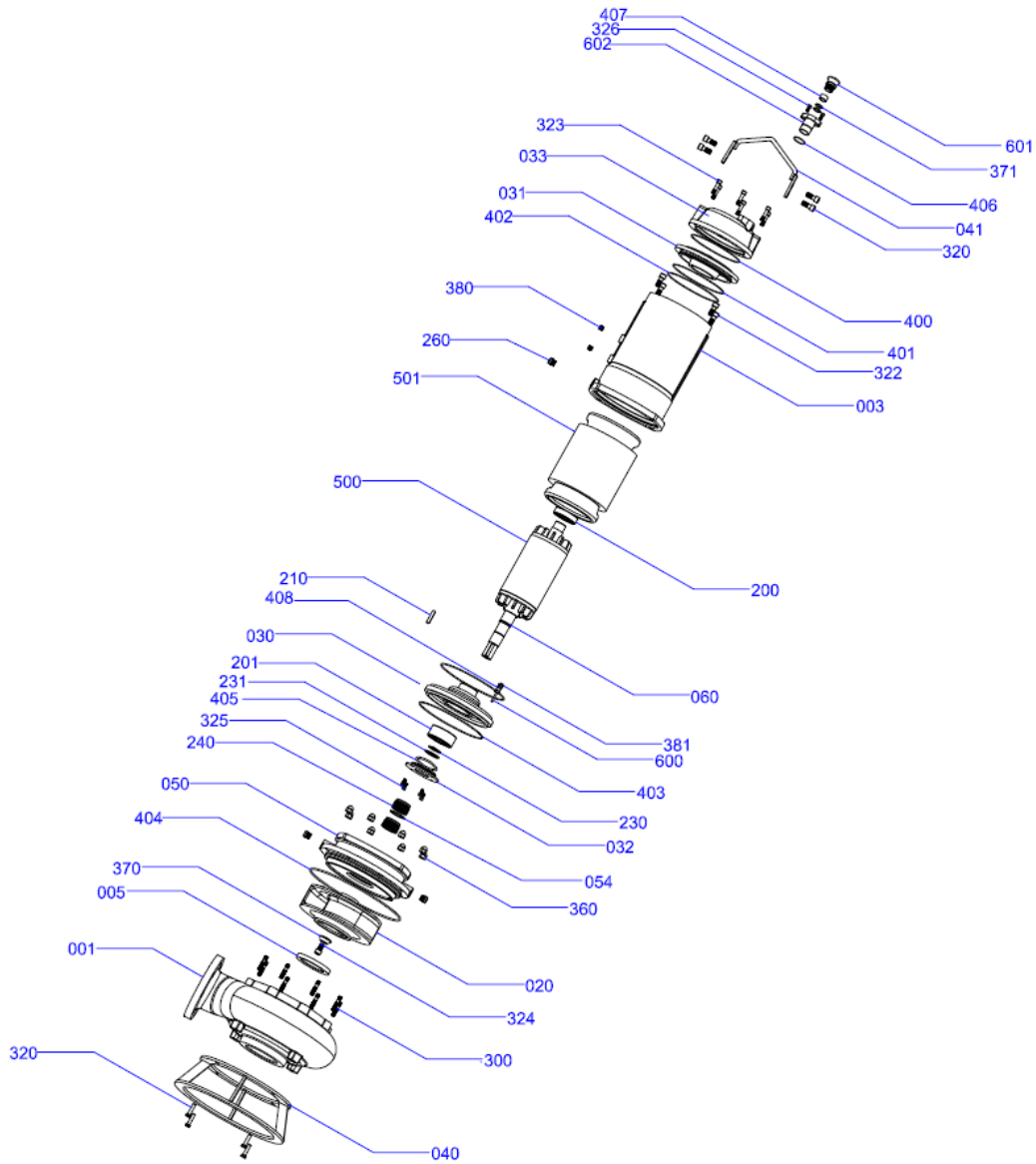
Submersible Sewage And Wastewater Pumps

Drawing for Dismantling

Pumps With Double Mechanical Seal



Mas Grup



PART NO	PART NAME	PART NO	PART NAME	PART NO	PART NAME
01	Volute Casing	230	Retaining Ring	400	O-Ring
03	Motor Casing	231	Retaining Ring	401	O-Ring
05	Wear Ring	240	Mechanical Seal	402	O-Ring
20	Impeller D Type	260	Plug	403	O-Ring
30	Bottom Bearing Housing	300	Stud	404	O-Ring
31	Top Bearing Housing	320	Hexagon Head Bolt	405	O-Ring
32	Bearing Cover	322	Imbues Bolt	406	O-Ring
33	Top Cover	323	Imbues Bolt	407	Bushing Gasket
40	Bottom Support Foot	324	Imbues Bolt	408	Electrode Gasket
41	Handle	325	Imbues Bolt	500	Rotor
50	Stuffing Box	326	Hexagon Head Bolt	501	Stator
54	Mechanical Seal Sleeve	360	Nut	600	Electrode
60	Shaft	370	Impeller Washer	601	Bushing
200	Top Bearing	371	Gland Gasket Washer	602	Gland
201	Bottom Bearing	380	Setscrew		
210	Impeller Key	381	Electrode Screw		



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