

ENVISOL®



ISO9001/14001/CE

EMULSION SPLITTING EQUIPMENT

Installation and Operation Manual
for Oil-water separator



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1. SAFETY INFORMATION

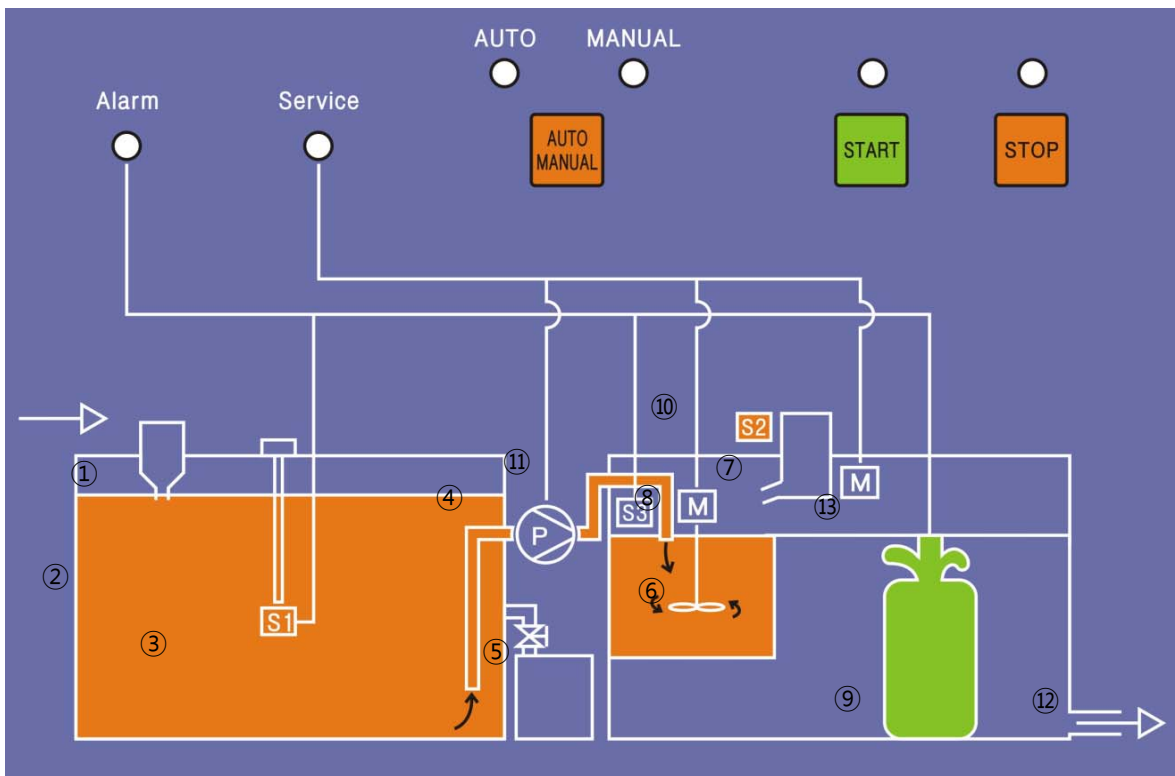
◆ **Please read this Manual before installation and use of Envisol®.**

◆ **All functions of ENVISOL® are guaranteed only when the instructions given in this Manual have been observed.**

◆ **Keep this Manual near the Emulsion Splitting Equipment for quick reference during error events and maintenance.**

1. Authentic filter bags and emulsion splitting chemical manufactured by EnE System must be used with this product.
2. The Emulsion Splitting Chemical must be stored in a dry place to preserve the effects of the chemical. The chemical exceeding the shelf life must be disposed of as it is no longer effective. (Warranty Period for the Chemical: 1 Year)
3. Request testing of your emulsified condensate to check applicability of ENVISOL®.
4. The Operator of ENVISOL® must ensure that no pollutants enter the storage tank other than emulsion condensate.
(It may affect the function of the product during emulsion splitting, or cause no splitting at all.)
5. A heater must be used if ENVISOL® is installed at a place exposed to a risk of freezing. (optional)
6. A time controlled type drain trap will accelerate emulsification and as a result it will consume more emulsion splitting chemical. For this reason, Auto Drain Trap from "Drain Master Series" of EnE System is recommended for improved efficiency and as a fundamental solution to the said problem.
7. Stop the product for maintenance, cleaning, filter bag replacement, chemical refill, etc. to ensure safety of the operator.
8. The operator should frequently check the state of the filter bags and the level of chemical, etc. to ensure that the product is maintained at the optimum condition.
9. The state of emulsion changes from time to time. The operator shall compare the turbidity of condensate with that of the sample in a bottle (provided with the Product) to ensure that condensate is discharged in compliance with the applicable standards.
10. All electrical work on the product shall be performed by a qualified electrician.
11. Install ENVISOL® on a floor that can collect potential leaked condensate (if applicable).
12. It is recommended that your ENVISOL® is checked by EnE System technicians on a regular basis to ensure maximum efficiency. EnE System provides the said service under a separate maintenance program agreement.
13. Product Warranty will not apply if the product is installed and used in violation of the instructions provided by EnE.

2. DESIGNATION (ESP-25)



- ① Press Relief Chamber ② Pre-separation Tank ③ Level Sensor(S1) ④ Metering Pump ⑤ Oil Drain Valve
 ⑥ Stirred Tank ⑦ Chemical Tank ⑧ Agitator Motor ⑨ Chemical Sludge Filter ⑩ Chemical Sensor(S2)
 ⑪ Agitator Level Sensor(S3) ⑫ Treated Water Outlet ⑬ Chemical Motor

① Press Relief Chamber: High pressure condensate is discharged from each outlet. If high pressure condensate is entered into the Pre-separation tank, the oil separation by specific gravity will be affected unless condensate is depressurized.

② Pre-separation Tank: Condensate containing a little bit of oil enters into the Pre-separation tank, and the oil is separated by gravity. Condensate after de-oiling is stored in this tank.

③ Level Sensor(S1): Activates the Emulsion Splitting Equipment by the amount of inflowing condensate.

④ Metering Pump: It is used to convey condensate from the Pre-separation Tank to the Stirred Tank in a metered flow.

⑤ Oil Drain Valve: When the oil layer becomes thick after it is separated from condensate by gravity, this valve is open to drain the oil.

⑥ Stirred Tank: This is the tank where emulsified condensate containing oil reacts to the chemical.

⑦ Chemical Tank: The chemical is dispensed in a metered flow so that it reacts to the contaminated condensate.

⑧ Agitator Motor: This motor is used to mix the chemical and oil-contained condensate so as to remove emulsion.

⑨ Chemical Sludge Filter: This filter is used to break emulsion, and separate clear effluent from the flocked chemical.

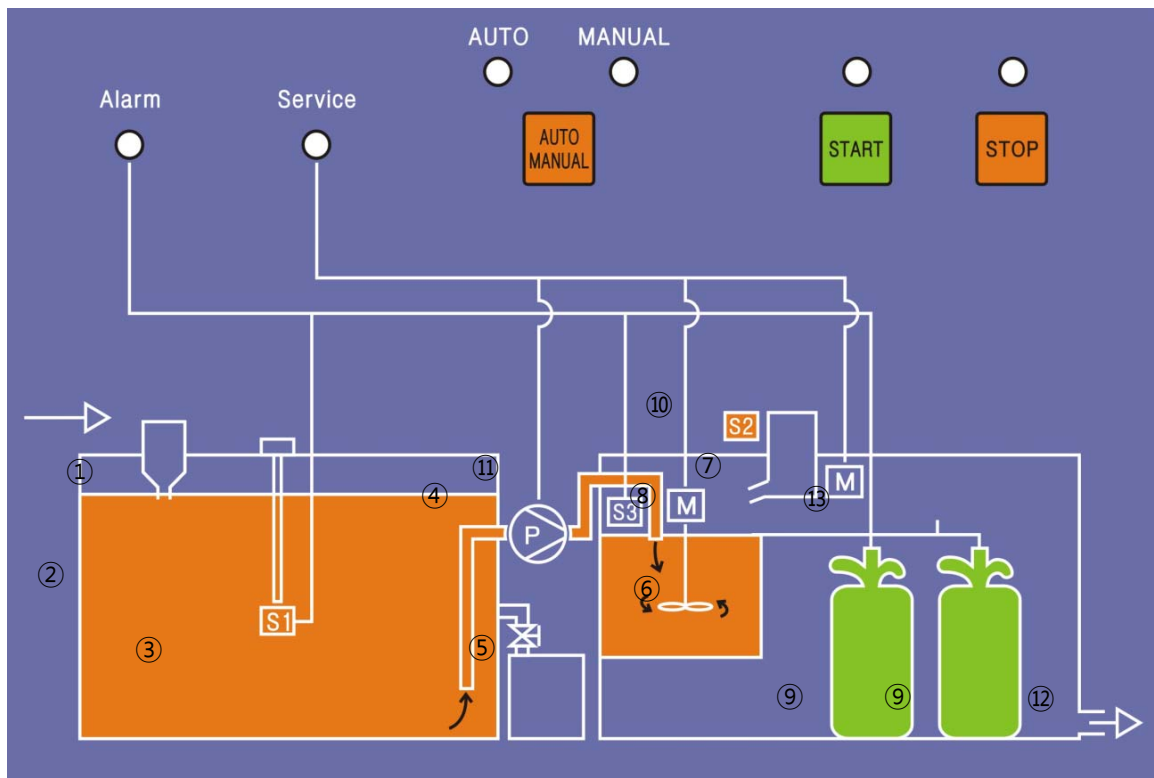
⑩ Chemical Sensor(S2): It is used to detect the chemical level.

⑪ Agitator Level Sensor(S3): It is used to detect the sludge level in the filter.

⑫ Treated Water Outlet: Clear water free of emulsion is discharged through this Outlet.

⑬ Chemical Motor: It is used to discharge the chemical in a metered flow.

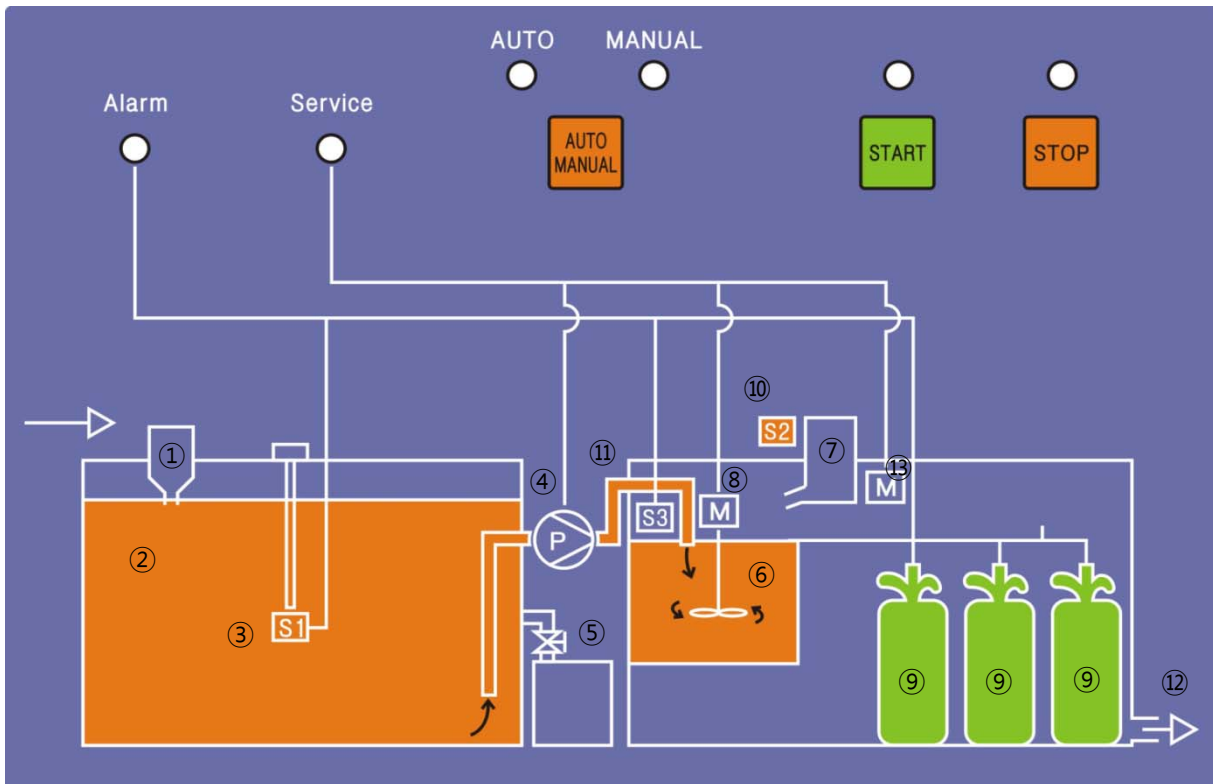
2. DESIGNATION (ESP-50 / 100)



- ① Press Relief Chamber ② Pre-separation Tank ③ Level Sensor(S1) ④ Metering Pump ⑤ Oil Drain Valve
 ⑥ Stirred Tank ⑦ Chemical Tank ⑧ Agitator Motor ⑨ Chemical Sludge Filter ⑩ Chemical Sensor(S2)
 ⑪ Agitator Level Sensor(S3) ⑫ Treated Water Outlet ⑬ Chemical Motor

- ① Press Relief Chamber: High pressure condensate is discharged from each outlet. If the high pressure condensate is entered into the Pre-separation tank, the oil separation by specific gravity will be affected unless the condensate is depressurized.
- ② Pre-separation Tank: Condensate containing a little bit of oil enters into the Pre-separation tank, and the oil is separated by gravity. Condensate after the oil separation is stored in this tank.
- ③ Level Sensor(S1): It activates the Emulsion Splitting Equipment by the amount of inflow condensate.
- ④ Metering Pump: It is used to convey condensate from the Pre-separation Tank to the Stirred Tank in a metered flow.
- ⑤ Oil Drain Valve: When the oil layer becomes thick after it is separated from condensate by gravity, this valve is open to drain the oil.
- ⑥ Stirred Tank: This is the tank where emulsified condensate containing oil reacts to the chemical.
- ⑦ Chemical Tank: The chemical is dispensed in a metered flow so that it reacts to the contaminated condensate.
- ⑧ Agitator Motor: This motor is used to mix the chemical and oil-contained condensate so as to remove emulsion.
- ⑨ Chemical Sludge Filter: This filter is used to break emulsion, and separate clear effluent from the flocked chemical.
- ⑩ Chemical Sensor(S2): It is used to detect the chemical level.
- ⑪ Agitator Level Sensor(S3): It is used to detect the sludge level in the filter.
- ⑫ Treated Water Outlet: Clear water free of emulsion is discharged through this Outlet.
- ⑬ Chemical Motor: It is used to discharge the chemical in a metered flow.

2. DESIGNATION (ESP-200 / 300)



- ① Press Relief Chamber ② Pre-separation Tank ③ Level Sensor(S1) ④ Metering Pump ⑤ Oil Drain Valve
 ⑥ Stirred Tank ⑦ Chemical Tank ⑧ Agitator Motor ⑨ Chemical Sludge Filter ⑩ Chemical Sensor(S2)
 ⑪ Agitator Level Sensor(S3) ⑫ Treated Water Outlet ⑬ Chemical Motor

- ① Press Relief Chamber: High pressure condensate is discharged from each outlet. If the high pressure condensate is entered into the Pre-separation tank, the oil separation by specific gravity will be affected unless the condensate is depressurized.
- ② Pre-separation Tank: Condensate containing a little bit of oil enters into the Pre-separation tank, and the oil is separated by gravity. Condensate after the oil separation is stored in this tank.
- ③ Level Sensor(S1): It activates the Emulsion Splitting Equipment by the amount of inflow condensate.
- ④ Metering Pump: It is used to convey condensate from the Pre-separation Tank to the Stirred Tank in a metered flow.
- ⑤ Oil Drain Valve: When the oil layer becomes thick after it is separated from condensate by gravity, this valve is open to drain the oil.
- ⑥ Stirred Tank: This is the tank where emulsified condensate containing oil reacts to the chemical.
- ⑦ Chemical Tank: The chemical is dispensed in a metered flow so that it reacts to the contaminated condensate.
- ⑧ Agitator Motor: This motor is used to mix the chemical and oil-contained condensate so as to remove emulsion.
- ⑨ Chemical Sludge Filter: This filter is used to break emulsion, and separate clear effluent from the flocked chemical.
- ⑩ Chemical Sensor(S2): It is used to detect the chemical level.
- ⑪ Agitator Level Sensor(S3): It is used to detect the sludge level in the filter.
- ⑫ Treated Water Outlet: Clear water free of emulsion is discharged through this Outlet.
- ⑬ Chemical Motor: It is used to discharge the chemical in a metered flow.

3. PROCESS (Condensate Treatment)

(Please refer to Figures in Page 4, 5 and 6.)

- ◆ Emulsion Splitting Equipment "ENVISOL®" is used to purify condensate with the use of emulsion splitting chemicals. It is strongly recommended that suitability testing is performed with us before selecting this device.

The suitability of the product to your various applications will be reviewed.

- ◆ **You must comply with the applicable laws and regulations on wastewater treatment.**

Emulsified condensate enters into the Press Relief Chamber (1) and depressurized in the chamber.

Once depressurized, emulsified condensate is collected into the (2) Pre-separation Tank.

Alternatively, emulsified condensate can be conveyed to the tank from other tanks by a pump.

Oil contained in condensate floats to the surface by gravity in the pre-separation tank, creating a layer of oil on the wall.

When the level of oil-containing emulsified condensate has reached a specific level and is detected by the (3) Level Sensor (S1), the Pump (4) will start operating and condensate will be conveyed to the Stirred Tank in a metered flow. At this time only the pure emulsified condensate with oil separated from it by gravity will be conveyed initially.

The oil layer inside the pre-separation tank will accumulate more oil over time, and the valve (5) condensate conveyed in a metered flow will be mixed with the chemicals (7)

supplied in the Stirred Tank (6) by the Agitator Motor (8) and

it will create flock over time to continuously absorb the components of emulsion.

Emulsion condensate that is mixed over a specific period of time will become clear water.

The components of emulsion are removed by the flocked chemicals, and the flock and clear water are conveyed into the filter bag.

- Ⓞ The filter bag filters the flock to discharge (12) only the purified water to the environment through the waterway.

When the first filter bag is full, the second filter bag will filter the flock,

and the product is automatically stopped after a specific period of time with an

alarm signal displayed on the panel to indicate that the filter bags need to be replaced.

The system runs automatically when the condensate level inside the pre-separation tank is detected by the Level Sensor (S1) (3).

- ◆ Emulsified condensate is treated by the emulsion splitting chemicals.

The reaction/splitting chemical consisting of aluminum oxide (bentonite) splits emulsion

to absorb oil molecules and to cover up the emulsion like a flocus. The components of the reaction/splitting chemical corresponds to PH 2 ~ 10 and therefore the oil contained

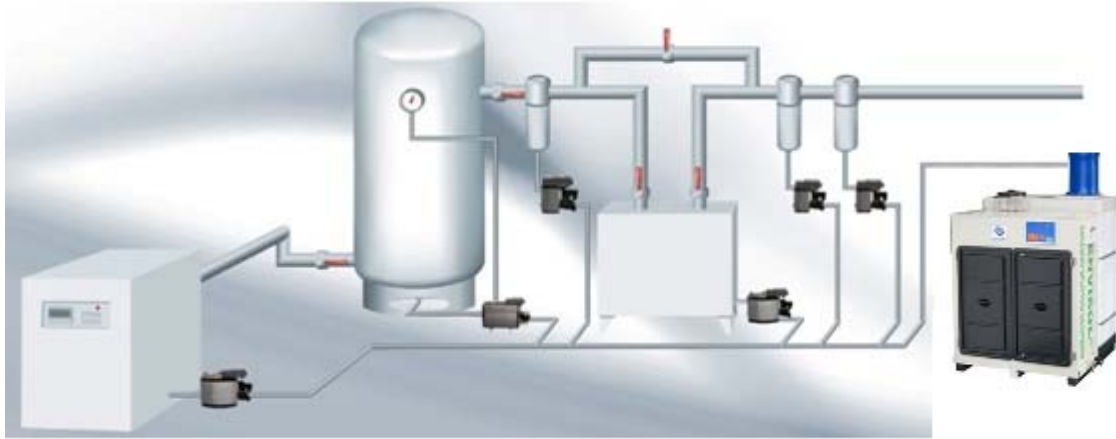
in condensate, is properly separated. When the chemical is mixed with condensate in the stirred tank, the oil particles turn into a floccus form.

This process is repeated several times until all the oil is bonded. Aluminum oxide

in the emulsion splitting chemical forms separate solid substances which are adhered to the filter bag and separated from water. The aluminum covering process continues

inside the oil floccus extracted by the filter bag after settlement, and the risk of oil spillage is reduced over time.

4. INSTALLATION



- ▶ Install the pipes as shown in the above picture ensuring that condensate enters through the ENVISOL® chamber.
- ▶ Install ENVISOL® on a level floor.
- ▶ Connect hoses to and from ENVISOL® ensuring that there is no leak.
- ▶ During installation of the condensate collection line, ensure that nothing interferes with the air pocket inside the pipe and the flow of condensate.



- ① Connect the oil container to the Pre Tank using the hose, and fasten the hose with the hose band.
- ② Install the Filter Bag as shown in the picture.
- ③ Fill the Chemical Container with the chemical as shown in the

- ④ Connect the Inlet of Pre Tank and the Water Outlet respectively to complete installation.



Filling the chemical

- ① Open the cover of the Chemical Container and fill with the chemical.



Filter Bag Installation

- ▶ Connect the drain line for purified condensate in such a way that the path to sewage is free

5. MAINTENANCE

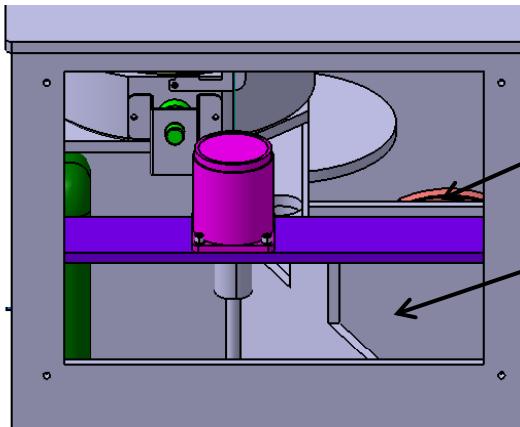
Checking of Condensate:

- ▶ Check the condensate discharged from ENVISOL® twice a week.

Adjust the chemical setting if it is visually the same as or darker than the specimen.



Cleaning of Agitator Container and Condensate Pipeline



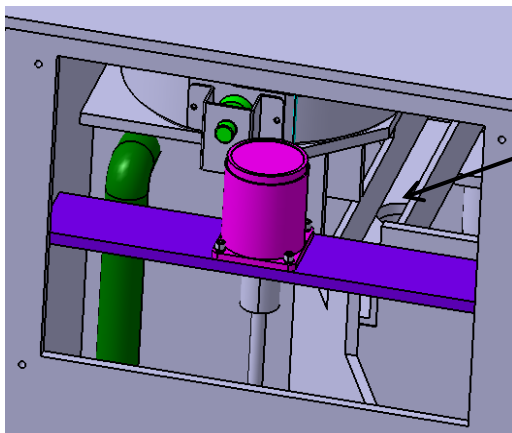
Sensor (Level Sensor)

Clean the chemical and around the Level Sensor.
(As it may cause malfunction of the Sensor.)

Brush off the chemical sludge from
the wall of Stirred Tank.

--> Clean once or twice a week.

EnE System shall not be held responsible for malfunction
of the product caused by the user's poor maintenance.



Condensate Flowing Path

Clean off the chemical.

--> Clean once or twice a week.

EnE System shall not be held responsible for malfunction
of the Product caused by the user's poor maintenance.

Cleaning the Filter Bag:



Upon replacement of the Filter Bags, clean the floor.

6. FILTER BAG REPLACEMENT

- ▶ Filter bags are easily replaced and kept clean with the ENVISOL® Series.

ESP-25



ESP-50 / 100



ESP-200 / 300



① Remove the Filter Bag and dispose of it in a separate container.

② Install new Filter Bags as shown in the picture.

③ The number of Filter Bags varies from Model to Model:

- ESP-25 Filter Bag --> 1
- ESP-50/100 Filter Bag --> 2
- ESP-200/300 Filter Bag --> 3
(Refer to the above pictures)

Note: Ensure that the filter bag touches the floor, and is fastened by the band.

Note: Once the filter bag is full of chemical sludge, replace with new ones.

Note: If the filter bag full of chemical sludge is not replaced in time, it may cause deformation of the Panel.

Replace the filter bag as soon as it is full.

7. LABORATORY SERVICE

- ▶ In normal circumstances, check the condensate once a week by comparing it with turbidity of the sample in the bottle provided.
- ▶ To analyze contents of the residual oil in the purified water, send 1 liter of condensate in a 1-liter glass bottle to the Company. (analysis fees will be charged)

8. HEATING SYSTEM

An automatic temperature controller (heating system) shall be installed with ENVISOL® to prevent the risk of freezing when it is installed and used at a place exposed to freezing.

A heating system suitable for the model of your choice shall be used.

The Heating System can be purchased as an option when you purchase the product, or it can be

Function

When the water temperature drops below the set value, the heating system is automatically activated. The operational status of the controller is indicated by a lamp.

When the water temperature reaches the set value, the heating system is automatically stopped.

The temperature is set to 20°C as default, but it can be adjusted within the range of 20°C -

Installation

For installation of the heating system, place it on the screw groove of the pre separation tank. Electrical connections must be performed by a qualified technician.

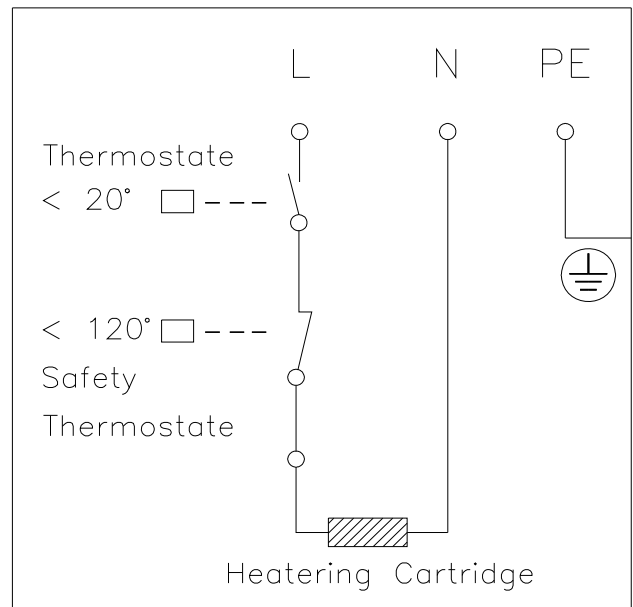
Caution

- ▶ The auto-temperature controller must be used only when it is submerged in water as it may cause damage and fire.
- ▶ The temperature shall be set to 20°C as anything outside this temperature range may cause deformation of ENVISOL®.



ESP-25, 50, 100, 200, 300

- ▶ Temperature Setting Range: 20°C ~ 30°C
- ▶ Range of Operation Temperature Control: 20°C ~ 120°C
- ▶ Voltage: 110Vac or 220Vac / 50~60Hz
- ▶ Power Consumption: 1.0 Kw
- ▶ Inlet Diameter: 2"(50A)



■ Other voltages also available upon request

9. TECHNICAL DATA

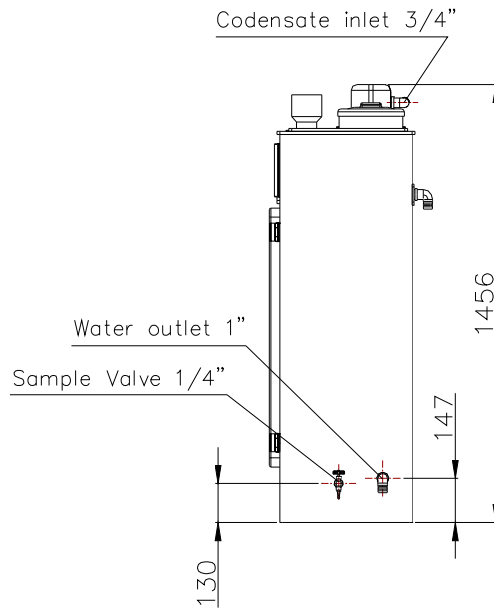
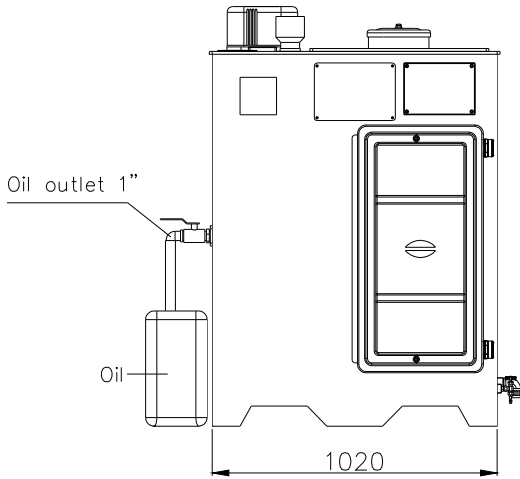
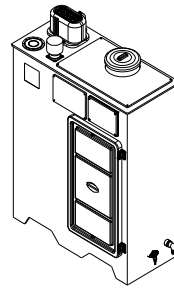
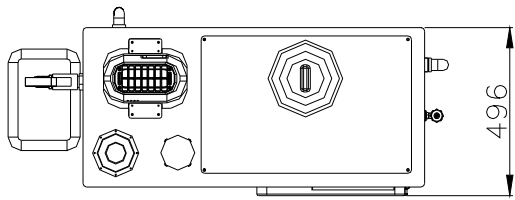
Model	ESP-25	ESP-50	ESP-100	ESP-200	ESP-300
Order Ref.	ESP 025 000	ESP 050 000	ESP 100 000	ESP 200 000	ESP 300 000
Hourly Capacity	30 l/hr	60 l/hr	120 l/hr	240 l/hr	360 l/hr
Compressor Capacity	25 m ³ /min	50 m ³ /min	100 m ³ /min	200 m ³ /min	300 m ³ /min
Pre Separation Tank Volume	170 l	600 l	600 l	900 l	900 l
Reaction Tank Volume	31 l	37 l	37 l	66 l	66 l
Splitting Agent Container Volume	9 l	12 l	12 l	20 l	20 l
Filter Bag volume	60 l	2 x 60 l	2 x 60 l	3 x 60 l	3 x 60 l
Oil collector	20 l				
Condensate inlet	3/4"			1"	
Water Outlet	1" (dia 32mm Hose)				
Over Flow	1" (dia 32mm Hose)				
Oil outlet	1" (dia 32mm Hose)				
Sample valve	1/4"				
Power	220Vac/50~60Hz 1P/100W	220Vac/50~60Hz 1P/500W	220Vac/50~60Hz 1P/500W	220Vac/50~60Hz 3P/1000W	220Vac/50~60Hz 3P/1000W
Temperature (min/max . °C)	+1 ~ +50 °C				
Pressure(Max)	16bar				
Dimensions (L X W X H) / mm	1,020X496X1,456	1,026X1,060X1,700	1,026X1,060X1,700	1,533X1,200X1,630	1,533X1,200X1,630
Weight (empty)	Approx. 85 Kg	Approx. 160 Kg	Approx. 160 Kg	Approx. 230 Kg	Approx. 230 Kg

Materials

Emulsion Splitter	PP or ABS
Reaction Tank	PP
Splitting Agent Container	PMMA or ABS
Filter Bag	PP
Pressure relief chamber	PE
Oil collector	PE

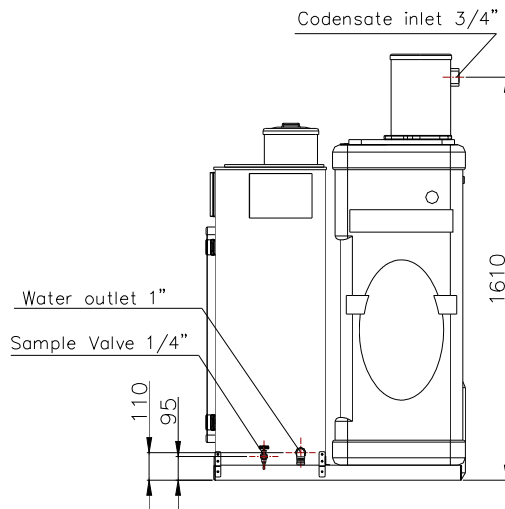
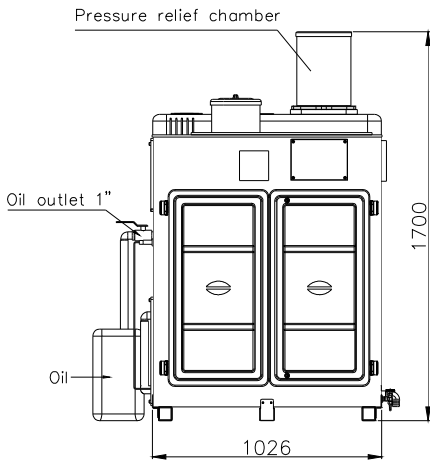
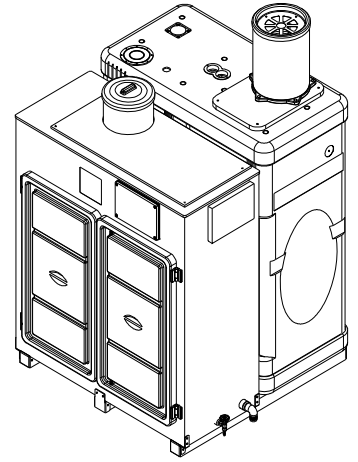
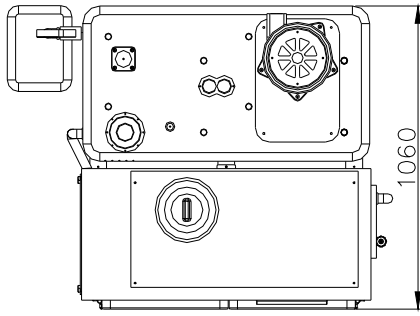
10. DIMENSIONS

ESP-25

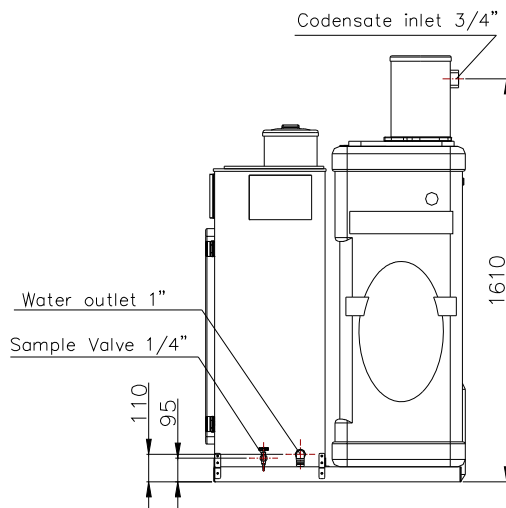
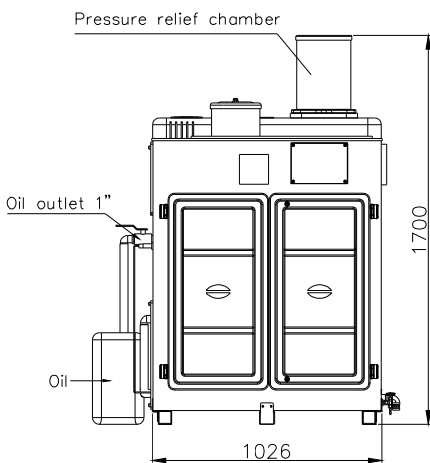
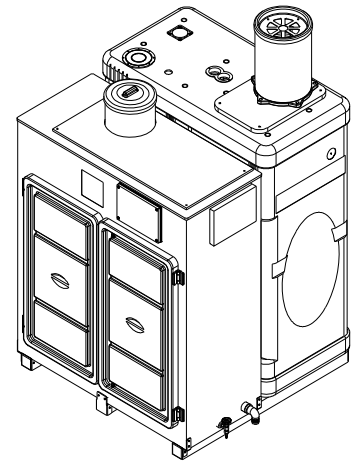
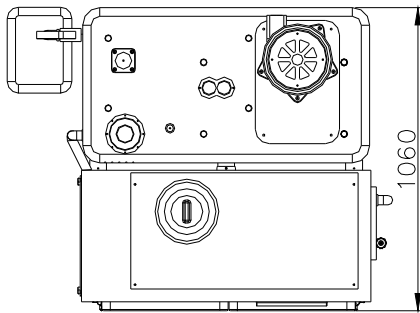


10. DIMENSIONS

ESP-50

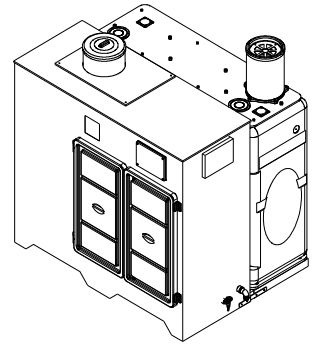
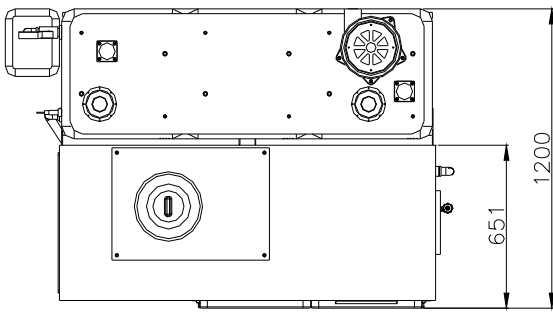


ESP-100



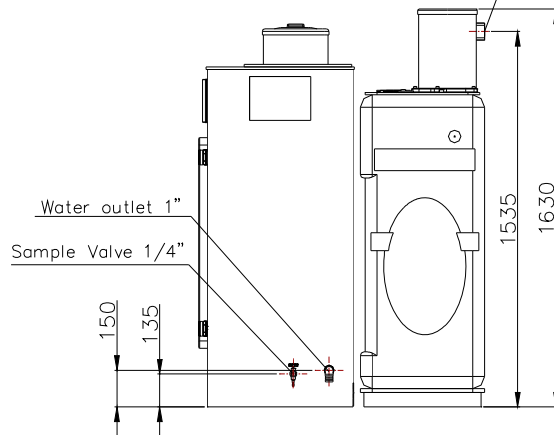
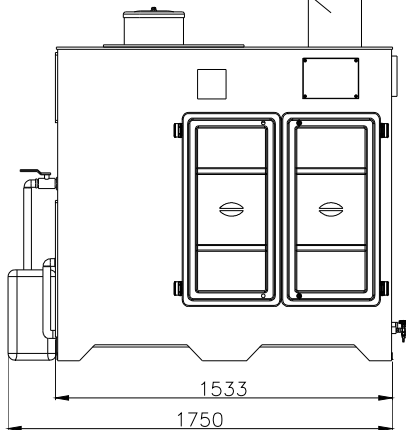
10. DIMENSIONS

ESP-200

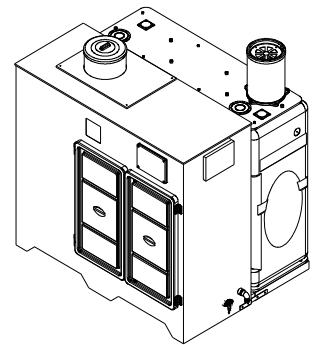
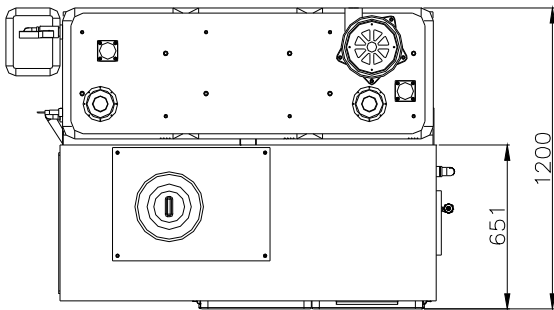


Pressure relief chamber

Codensate inlet 1"

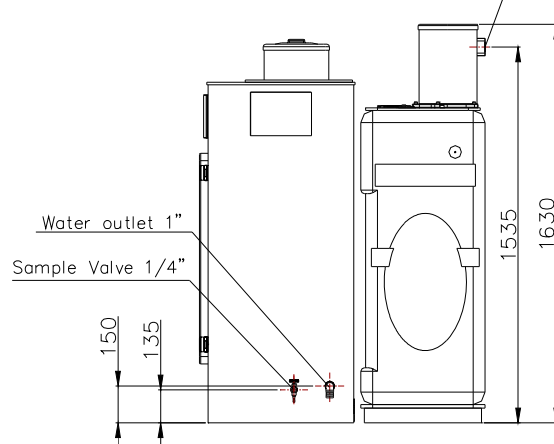
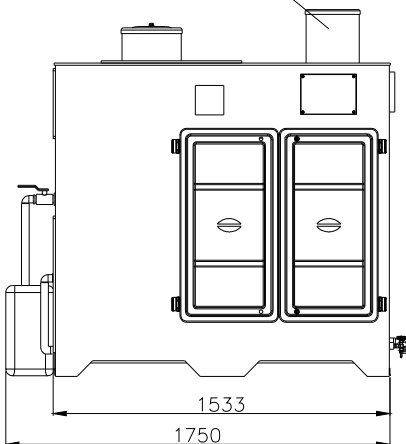


ESP-300

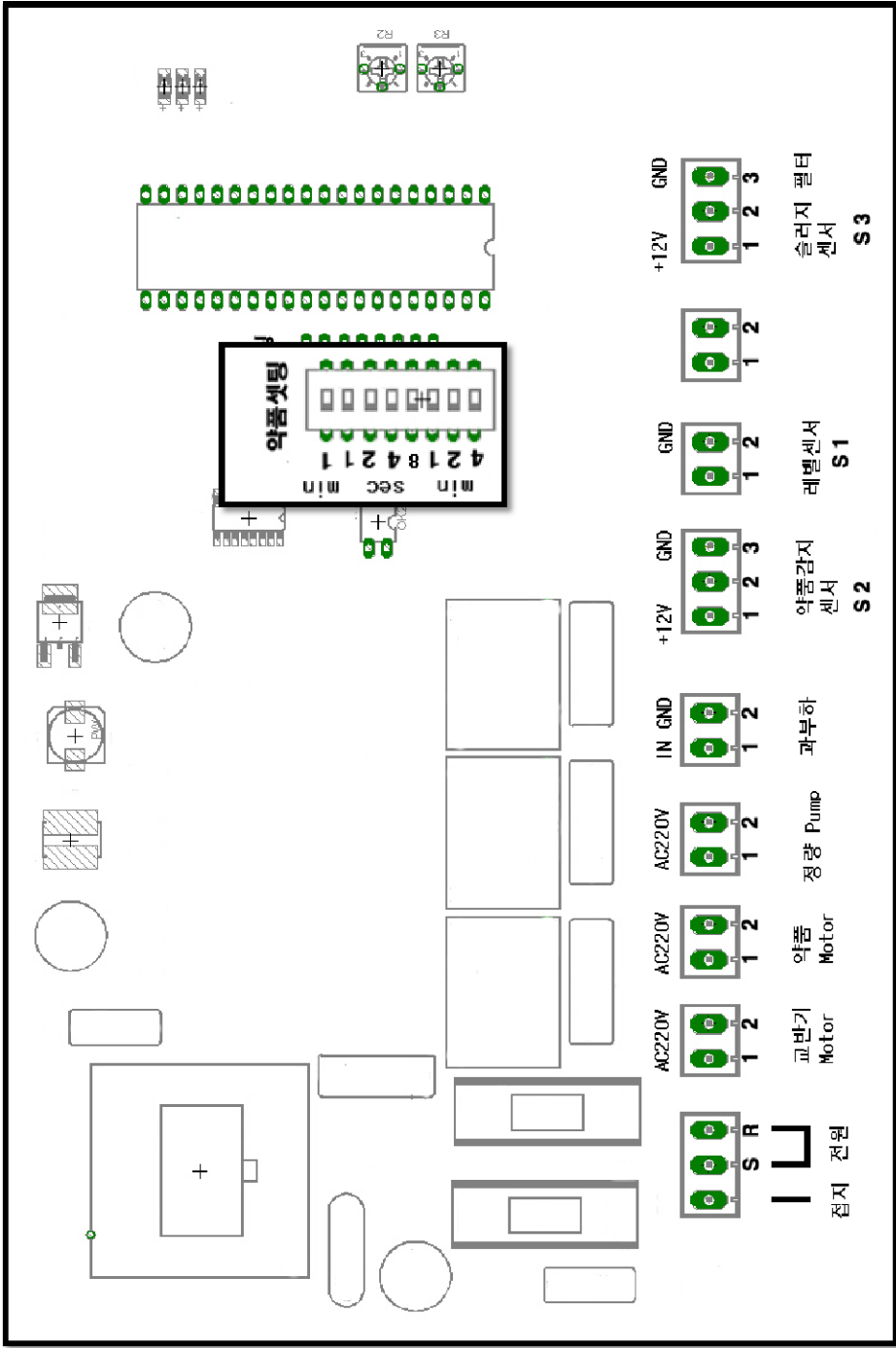


Pressure relief chamber

Codensate inlet 1"



11. ELECTRICAL INSTALLATION



- Sludge Filter Sensor
- Chemical Setting
- Level Sensor
- Chemical Sensor
- Overload
- Metering Pump
- Chemical Motor
- Agitator Motor
- Power
- Earth

12. CONSUMABLES AND PARTS

► Chemical and Filter Bag

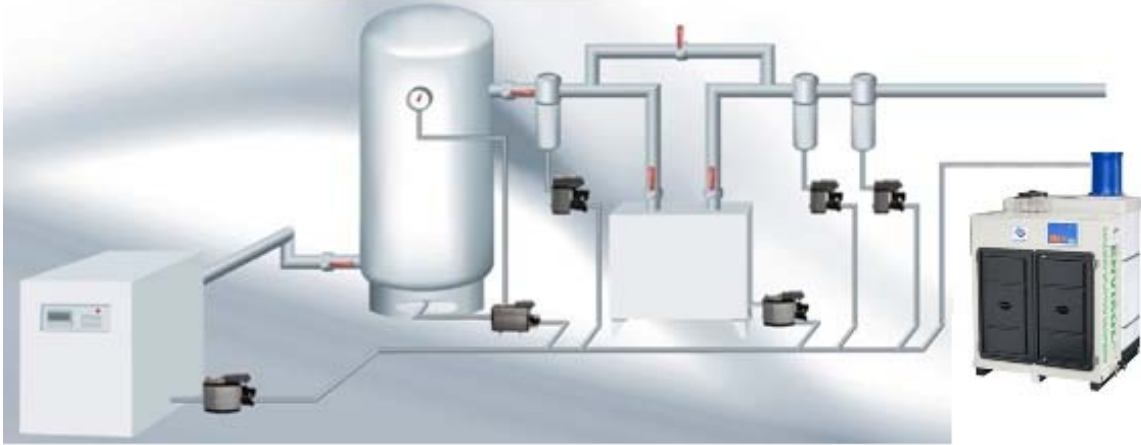
Designation	Order No.	Packing Unit	Weight
Chemical	YB SF 001	1BOX / 25Kg	25Kg
Filter Bag	EM 005 FS	1BOX / 5EA	2Kg

► Heater Unit

Designation	Order No.	Replacement filter set	Weight
Heater unit for ESP-25, 50, 100, 200, 300	HU YSOO 030	220Vac 50~60Hz 1.0Kw	5.1 (Kg)

► Parts

Designation	Order No.
Pressure Relief Chamber for ESP-25	AC YSOO 001
Pressure Relief Chamber for ESP-50, 100, 200, 300	AC YSOO 002
Agitator Motor for ESP-50, 100, 200, 300	AC MTOO 001
Chemical Motor for ESP-50, 100, 200, 300	AC MTOO 002
Chemical IR SENSOR for ESP-25, 50, 100, 200, 300	AC IROO 001
Agitator CR SENSOR for ESP-25, 50, 100, 200, 300	AC CROO 001
Chemical Vessel ASS'Y for ESP-25	AC MH25 001
Chemical Vessel ASS'Y for ESP-50, 100	AC MH50 001
Chemical Vessel ASS'Y for ESP-200, 300	AC MH200 001
Power Supply for ESP-50,100,200,300	AC PSOO 001
Control Display Panel for ESP-25	AC DP25 001
Control Display Panel for ESP-50, 100	AC DP50 001
Control Display Panel for ESP-200, 300	AC DP200 001
Pump for ESP-25	AC PU25 001
Pump for ESP-50	AC PU50 001
Pump for ESP-100	AC PU100 001
Pump for ESP-200	AC PU200 001
Pump for ESP-300	AC PU300 001
Oil Collector for ESP-25, 50, 100, 200, 300	AC YSOO 004
Material Case Cover for ESP-25, 50, 100	AC MCOO 001
Material Case Cover for ESP-200, 300	AC MCOO 002
Door Right for ESP-25, 50, 100, 200, 300	AC DROO 001
Door Left for ESP-50, 100, 200, 300	AC DROO 002
Pump Diaphragm for ESP-25	AC DI25 001
Pump Diaphragm for ESP-50	AC DI50 001
Pump Diaphragm for ESP-100	AC DI100 001
Pump Diaphragm for ESP-200	AC DI200 001
Pump Diaphragm for ESP-300	AC DI300 001
Test Kit (for turbidity test)	AC YSOO 003



OUR PRODUCT RANGE

► Auto Drain Trap (Level-sensor type)

DRAIN MASTER

- DRAIN MASTER *S* Auto Drain Trap (solenoid valve type)
- DRAIN MASTER *HP* Auto Drain Trap for High Pressure (Max 60 bar)
- DRAIN MASTER *B* Auto Drain Trap (Ball valve type)
- DRAIN MASTER *V* Auto Drain Trap for Vacuum

► Oil-water Separator

YUSOO-BREAKER

- Filter Type oil-water Separator

► Emulsion Splitting Equipment

ENVISOL

- Chemical Type Oil-water Separator

