





ENVIRONMENT SOLUTION



ENERGY SOLUTION

Energy Conservation & Environmental Improvement

Treating oil-contaminated condensate with superior quality auto drain traps



Condensate discharge accumulated in air lines of from air compressors cause problems of high air loss and high oil content, which leads massive to energy loss and environmental problems.

Condensate discharge traps such as float type and time solenoid valve types are significantly low in reliability. A typical malfunction of the float type trap is that the drain nozzle often clogs up with impurities such as scale due to the narrow drain nozzle size (0.7mm).

Time solenoid valve traps have massive air loss and a short lifespan, less than 1 year.

Condensate leak accidents can be prevented by installing a drain trap with zero air loss and effective discharge to drain lines of an air compressor located after cooler, air dryer, air tank and air filtration.

Condensate accumulated from an air compressor is severely contaminated by the oil within the compressor and pollutants in the air causing the air compressor to contain a high oil (Normal hexane) content of nearly 2,000ppm(2,000mg/L), affecting water quality of rivers and public health.

How much condensate is accumulated?

Ex) Air Compressor : 100HP

Air compressor : 100HP

Condensate Calculation Condition:

Compressor horsepower, working pressure, operation hours (daily/weekly), and machine efficiency.

Ex) Compressor HP, working pressure at 7kgf/cm², operation hours at 24hr/day, 330days/yr

Condensate Consumption - **42,822 (ℓ)** / yr at 80% efficiency

Climate Zone: Blue

	Jan	Feb	Mar	April	May	June	Jul	Aug	Sept	Oct	Nov	Dec
Temp(°C)	-3	-2	4	11	17	21	25	26	21	14	7	-1
Humidity(%)	65	62	62	65	69	71	79	76	72	68	63	66
Air comp"	126	149	778	1,863	2,977	3,879	5,717	5,712	4,005	2,436	1,203	330
Air Dryer	687	687	687	751	1,199	1,537	2,019	2,139	1,573	959	687	687
Totalℓ/month	813	836	1,465	2,614	4,176	5,452	7,736	7,851	5,578	3,395	1,890	1,017
Averageℓ/day	32.5	33.4	58.6	104.6	167.0	218.1	309.4	314.0	223.1	135.8	75.6	40.7

CONDENSATE DRAINAGE POINT (STANDARD LAYOUT)



Season	Air Comp ^o	Air R/Tank	R/Dryer	Filter
Winter	78%	11%	11%	-
Spring/Fall	61%	13%	21%	4%
Summer	61%	11%	25%	3%

Condensate Discharge



FLOAT TYPE

- Due to the small size of the drain nozzle diameter (0.7mm) float traps require frequent disassembly and cleaning.
- Impurities in the float cause air loss because the nozzle can't be closed.
- Oil viscosity reduces the floatable buoyancy for oil-injected compressors, requiring frequent replacement and unnecessary costs.



MANUAL VALVE

- Compressed air, produced by high-cost power, is discharged into the air in order to discharge condensate.
- Annual loss of compressed air at 7kgf/cm² working pressure, outlet diameter 3mm air loss consumption
outlet diameter 3mm air loss consumption
working pressure: 7kgf/cm²
outlet diameter: 3mm (air loss consumption 0.6559m³/min
operation hours: 24 hours/day
0.6559m³/min x 60min/hr x 24 hours/day x 330 days x 0.02/m³ = \$6,234



TIME CONTROL SOL VALVE

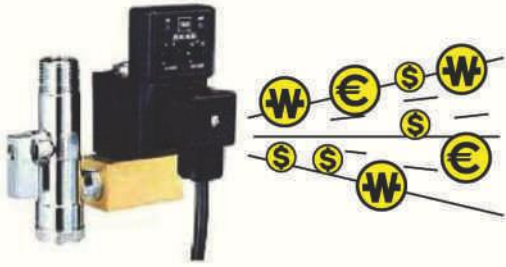
- Malfunction frequently occurs because compression pressure is directly applied to the solenoid valve.
- A large amount of air is lost because condensate is discharged via time setting regardless of the amount.
- During condensate discharge, excessive noise is caused.



DRAIN MASTER

- Level sensor type
- There is virtually ZERO air loss, ensuring high economic efficiency and fast recovery of initial investment.
- Large sized drains prevent clogging and self-restoration via emergency mode, which improves the safety of the solenoid valve.
- A strainer within the DRAIN MASTER prevents collection of scale.
- Automatic operation provides for easy maintenance.
- A variety of models are available for small and large capacity compressors air lines.

Energy loss caused by air loss, consumed from time control drain traps



* Precise time setting based on the amount of condensate is difficult to determine. Compressed air is lost during the discharge time.

ex) time solenoid valve air loss consumption with 10mm diameter
(based on 7mm) is $7.2872\text{m}^3/\text{min}$
setting time: 5 sec/5 min, condensate discharged for 1 second, air loss for 4 seconds.
12 times/hr x 4 sec/time = 48sec/hr
Operation 24 hrs/day 330 days
24 hrs/day x 48 sec/hr x 330 days/yr = 380,160 sec/yr
Annual energy consumption loss
 $7.2872\text{m}^3/\text{min} \times 380,160 \text{ sec/yr} \div 60 \text{ sec/min} = 46,173\text{m}^3/\text{yr}$
1 m³ air production cost at \$0.02
 $46,173\text{m}^3/\text{yr} \times \$0.02 = \$923.46$

Level Sensor Type Condensate Drain Trap Analysis

1. Drain Trap Usage

Types of Drain Traps	Analysis
Time Control Solenoid Type	A large amount of air is lost because condensate is discharged via time setting regardless of the amount.
Float Type	The trap has low reliability and frequent clogging occurs due to the small nozzle diameter (0.7mm).
Manual Valve Open	Compressed air, produced by high-cost power, is discharged into the air in order to discharge condensate.

2. Cost of Air Loss

Types of Drain Traps	Air Loss Calculation
Time Control Solenoid Type	\$923.46 / 1 point x 9 EA = \$8,311/year
Manual Valve Open	\$6,234 / 1 point x 9EA = \$56,097/year
Level sensor type(Drain Master)	Zero

Improvements

Drain Trap : Condensate Discharge Without Air Loss

Automatic level control drain system established

- Application of AI (artificial intelligence) electronic sensing system
- Discharge of condensate only (ZERO air loss)
- No clogging (easy maintenance and high efficiency)



Low labor cost and improved cleanliness when installing a manual valve

- Time solenoid valve installed which resulted in the reduction of power and part replacement costs and no noise
- Float drain trap installed
- No need for frequent disassembly and replacement

No oil content must be discharged in condensate

Separation of emulsified oil in condensate Extraction and treatment of pure oil

- * Reduction of the treated amount by 98%
- * Condensate of 5ppm or less discharged / regular drainage

Condensate causes frequent clogging in drain traps installed to oil injection compressors, which lowers efficiency, affects air quality, results in massive energy loss due to air loss, and contaminates water because of high oil content.

Installing a drain trap and/or oil-water separator, which only discharges condensate without losing energy maximizes efficiency in terms of operation and maintenance.

Condensate Treatment System, Oil-Water Separator

Oil-water separators are used for treating and purifying contaminated oil condensate from compressors air lines.



YUSOO-BREAKER (Filtration Type)

CONVENIENT YUSOO-BREAKER SERIES

Optimized design to maximize customer benefit

Minimal maintenance and superior efficiency maximizes our client's profitability.

Enhancing corporate image

- Corporate image requires not only manufacturing reputable products, but other factors such as social contribution and environmental friendliness play a vital role in today's society.

Best processing plan for condensate

- YUSOO BREAKER dramatically reduces the high cost in processing condensate and provides satisfactory results in improving work efficiency and corporate imaging.
- The YUSOO BREAKER New Series is the best functional product produced from dedicated research and development. Companies can enjoy the convenience and efficiency of our product.

Customer Service and Warranty

- EnE provides excellent after service and technical support to ensure the utmost convenience in utilizing and managing its products.

Worry free oil-water separator capacity expansion !

YUSOO BREAKER meets the market demands for companies that want to increase compressor capacity.



Compressor capacity expansion is required when companies expand the size of their facilities.

Once an oil water separator is installed, the capacity is fixated and therefore needs to be replaced, which results in unnecessary costs and overlapping investments.

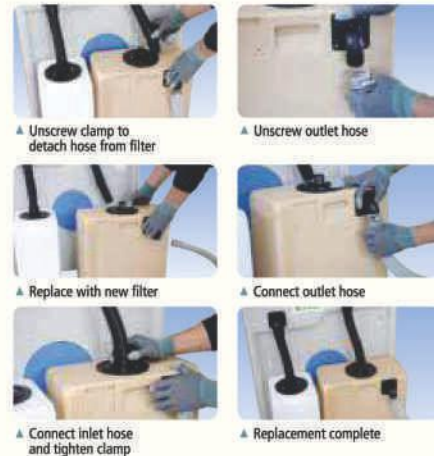
YUSOO-BREAKER New is the solution. The system capacity is increased by simply replacing the filter.

Oil-Water Separator Filtration Type

Simple filter replacement

Other oil-water separators in the market have filters installed inside of the oil-water separator. In many cases, there is condensate discharge which can splash onto clothing or contaminate the floors during filter replacement.

YUSOO-BREAKER New Series have filters outside of our oil-water separators. Therefore, filter replacement is simple and clean without messy condensate discharge flow..



Maintenance



YUSOO-BREAKER is prepared for simple filter replacement. It prevents overflow when the condensate capacity suddenly exceeds the processing capacity with the overflow pipe.

Replacement Filter Sets

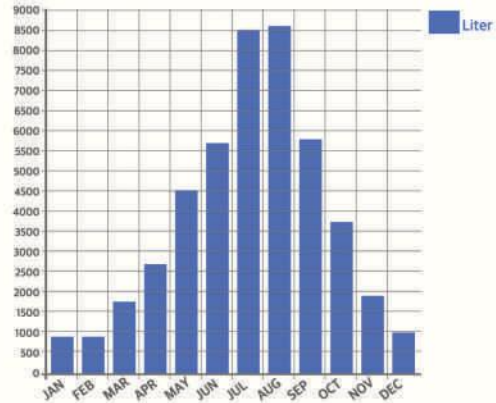


What is condensate?

Condensate accumulated by lubricated type air compressor is comprised of atmospheric borne water vapor and lubricant from the compression process. Post compression, condensate is dropped from the air stream in the cooling, refrigerated drying and filtration phases of the air treatment process.

How much is condensate is accumulated and why must it be disposed ?

From an air compressor of 100 horse-power capacity, approximately 45,880 liters of condensate is accumulated (pressure: 7 kgf/cm², operation time: 24hr/day, 365 days) per year. In general, emulsion state condensate containing oil is produced from an oil type air compressor. If condensate is discharged without processing it in accordance with environment standards, the natural environment becomes polluted.



Zone	Article	Normal Hexane Concentration		Daily Discharge Level of Wastewater Under 2,000m ³			Hydrogen Ion Concentration (PH)
		Mineral Oil (mg/L)	Animal/Vegetable Fat (mg/L)	BOD (mg/L)	COD (mg/L)	Floating Matter Mass (mg/L)	
Clean Zone		5 mg/L or less	5 mg/L or less	under 40	under 50	under 40	5.8 ~ 8.6
Zone A		10 mg/L or less	30 mg/L or less	under 80	under 90	under 80	5.8 ~ 8.6
Zone B		10 mg/L or less	30 mg/L or less	under 120	under 130	under 120	5.8 ~ 8.6
Specialized Zone		10 mg/L or less	30 mg/L or less	under 30	under 40	under 30	5.8 ~ 8.6

Auto-temperature Control : HEATING SYSTEM



A heater (optional) is installed to YUSOO-BREAKER to prevent freezing when the YUSOO-BREAKER is installed in climate exposed to freezing.

Auto-temperature controller can be purchased as an option to the YUSOO-BREAKER.

Function

Auto-temperature controller is automatically activated when the water temperature drops below the set value and is indicated by a display lamp.

Auto-temperature controller is deactivated when the water temperature reaches the set value.

Default temperature is set at 20° C.

Temperature setting can be adjusted within the range from 20° C ~ 120° C.

Caution

Auto-temperature controller must be used only when it is submerged in water, otherwise it may cause damage. The temperature range should be set from 20° C ~ 30° C.

Temperature outside this range may form deformation to the pre-separation tank.

Management Process





■ Green : Dry cool climate (Northern Europe, Canada, Northern States of U.S.A., Central Asia)
■ Blue : Temperate climate (Central & Sothern Europe, Central America, Korea)
■ Red : Humid, tropical climate (Coastal Zones)

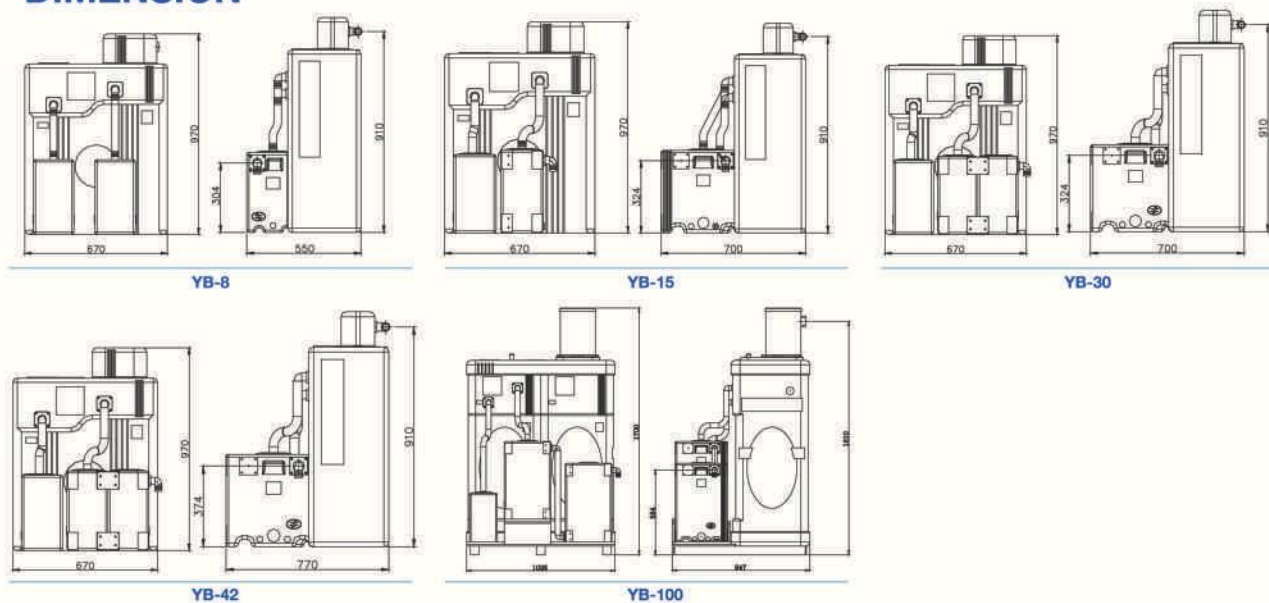
TECHNICAL DATA

YUSOO -BREAKER [®]	Installed Compressor Capacity (m ³ /min)						
	Climate zone	Screw Compressor				Piston Compressor	
		Turbin -Oil	VCL-Oil (*)	VDL-Oil (**)	Synthetic -Oil	Turbin -Oil	Synthetic -Oil
YUSOO - 8	Green	9.4	7.6	9.4	6.5-7.6	7.3	5.3-6.5
	Blue	8.0	6.5	8.0	5.5-6.5	6.2	4.5-5.5
	Red	6.5	5.4	6.5	4.5-5.3	5.1	3.7-4.4
YUSOO - 15	Green	17.5	14.5	17.5	13.0-14.5	14.0	10.5-12.3
	Blue	15.0	12.5	15.0	11.0-12.5	12.0	9.0-10.3
	Red	12.5	10.0	12.5	9.0-10.2	9.8	7.4-8.6
YUSOO - 30	Green	35.0	29.0	35.0	26.3-29.0	27.5	19.3-22.5
	Blue	30.0	25.0	30.0	22.5-25.0	23.5	16.5-19.0
	Red	24.5	20.5	24.5	18.5-20.5	19.5	15.5-18.5
YUSOO - 42	Green	49.0	41.5	49.0	37.5-41.5	34.5	25.8-31.0
	Blue	42.0	35.5	42.0	32.0-35.5	29.5	22.0-26.5
	Red	34.5	29.0	34.5	26.0-29.0	24.0	18.0-21.0
YUSOO - 100	Green	117.0	87.7	117.0	76.0-87.8	79.5	60.0-70.0
	Blue	100.0	75.0	100.0	65.0-75.0	68.0	51.0-60.0
	Red	78.0	58.5	78.0	50.7-58.5	53.0	39.8-47.0

(*) VCL-Oil : Mineral + Synthetic Oil

(**) VDL-Oil : Mineral Oil

DIMENSION



YUSOO - BREAKER [®]	YUSOO-8	YUSOO-15	YUSOO-30	YUSOO-42	YUSOO-100
Condensate Feed		3/4"		1"	
Condensate Discharge		1"		1"	
Temperature (min/max . °C)			+ 5 / 60		
Weight (kg)	25	29	39	45	125
Dimension(W x L X H mm)	670x550x970	670x700x970	670x700x970	670x770x970	1025x937x1472

- ▶ Temperature controller installation is required for dry cool climates. (Heater unit 110.220 VAC optional)
- ▶ Other than the above specified models, firm order is required for mass quantity production.
- ▶ Specifications may change without prior notice for the enhancement of the quality and performance of the products.

Emulsion Splitting Equipment for Effective Separation

An emulsion is a mixture of two or more liquids that are normally immiscible. Emulsions are part of a more general class of two-phase systems of matter called colloids.



ENVISOL[®] (Chemical Type)

INNOVATIVE ENVISOL[®] SERIES

Optimized design to maximize customer benefit

High effectiveness at low maintenance to expand the benefits of our valued client's profits.



Precise Emulsion, Effective Separation

ENVISOL[®] is safely contaminated with oil and emulsion processed efficiently from small to large capacity.

ENVISOL[®] comes in various models.

ENVISOL[®] successfully purifies emulsified condensate from air lines of compressed air systems.

Compressor Condensate Treatment

Condensate contaminated with oil accumulated from the compressor is part of industrial wastewater.

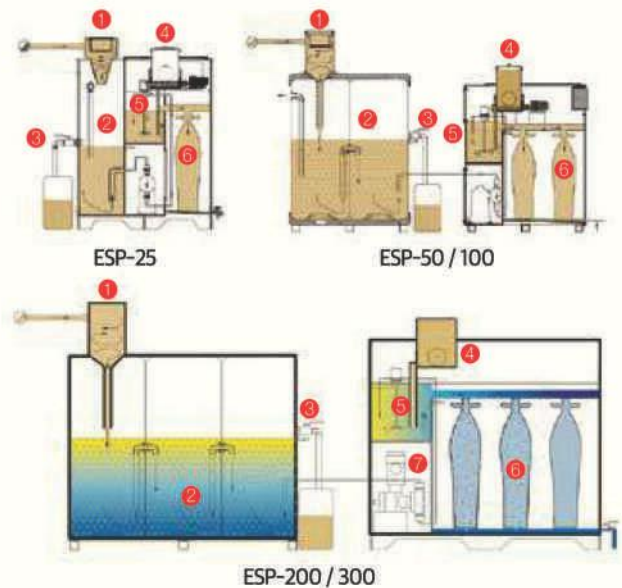
Treatment for contaminated condensate can be entrusted to specialized companies or can be treated on site with ENVISOL[®].

ENVISOL[®] satisfies the industrial needs and is cost efficient.



Oil-Water Separator for Air Compressor System ENVISOL[®] Chemical Type

Complete Automatic System

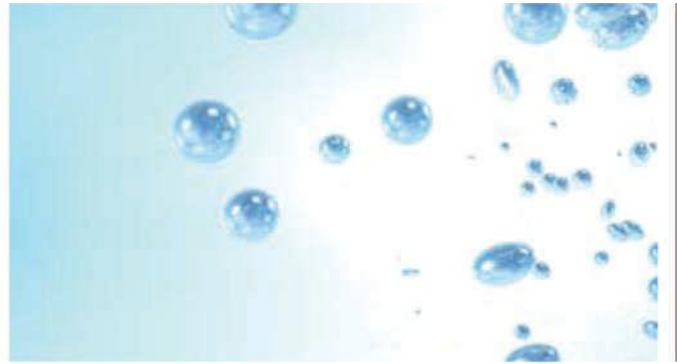


This process is unaffected by fluctuations in the wastewater flow. The separated oil is automatically discharged to the oil-tank (3) while the liquid levels are monitored by the electronic system. This capacitive electronic system accurately distinguished the difference from air, oil and emulsion. Emulsion cannot get into the oil-connector and the free oil parts cannot get into the splitting process.

Pre-treated wastewater is then pumped into the ENVISOL[®] reaction chamber (5) for full automatic treatment. The reaction process utilizes a dosage of a non-toxic aluminum mineral which is stored in the metering unit (4) as the splitting agent and added into the wastewater in precise amounts.

The splitting agent encapsulates the oil and dirt particles which results in easily filterable macro flock removed by the filter bag (6). The purified waste can then be discharged into the sewage system.

INNOVATIVE ENVISOL[®] SERIES



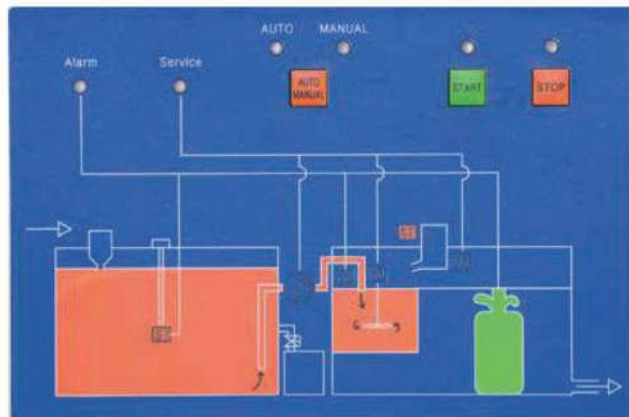
Splitting Agent

Continual adaptation of pH values and the use of chemicals is eliminated with the effective splitting agent (pH4 ~ pH10).



Filter Bags

- Large filter surface enables low water content of filter residue.
- Percolating residue mass on the filter cake won't dissolve.
- Low filter consumption due to filtration through filter bags.
- Quick and easy filter replacement.



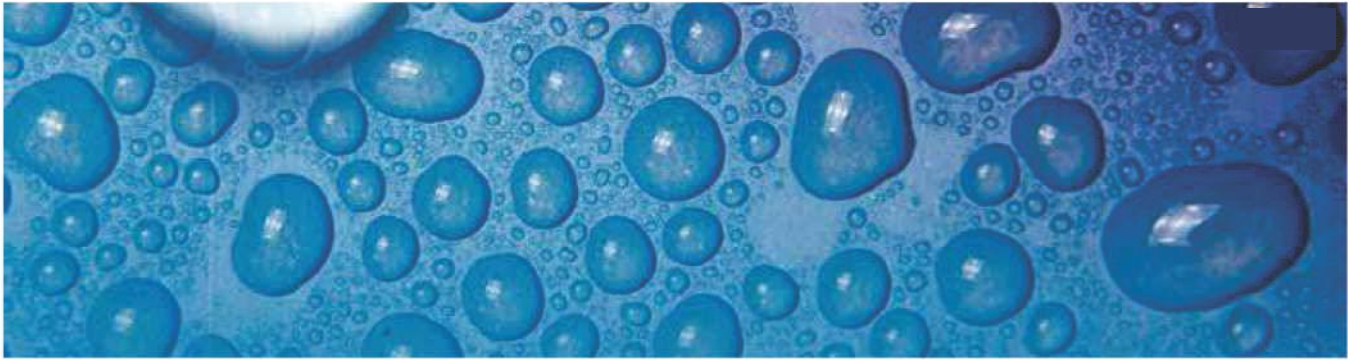
Process Monitoring Program

- Sequence controlling microprocessor.
- Splitting agent supply monitored.
- Permanent filter monitoring.
- Maintenance and alarm messages can be processed externally via output signal.
- Automatic operation enabled via monitoring system.

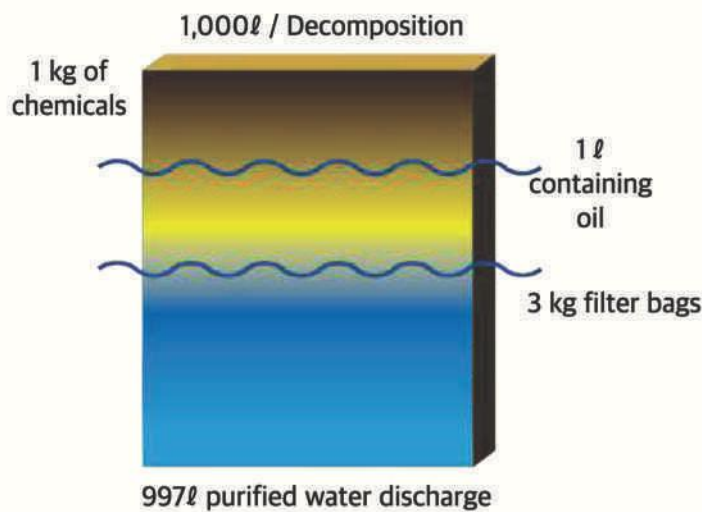


Diaphragm Water Pump

- Diaphragm type water pump adapted.
- Convenient installation and maintenance.
- High durability.



Decomposition Process



Industrial Wastewater

Condensate contaminated with oil accumulated from the compressor is part of industrial wastewater. Treatment for contaminated condensate can be entrusted to specialized companies or can be treated on site with ENVISOL[®]. ENVISOL[®] satisfies the industrial needs and is cost efficient.

ENVISOL[®]

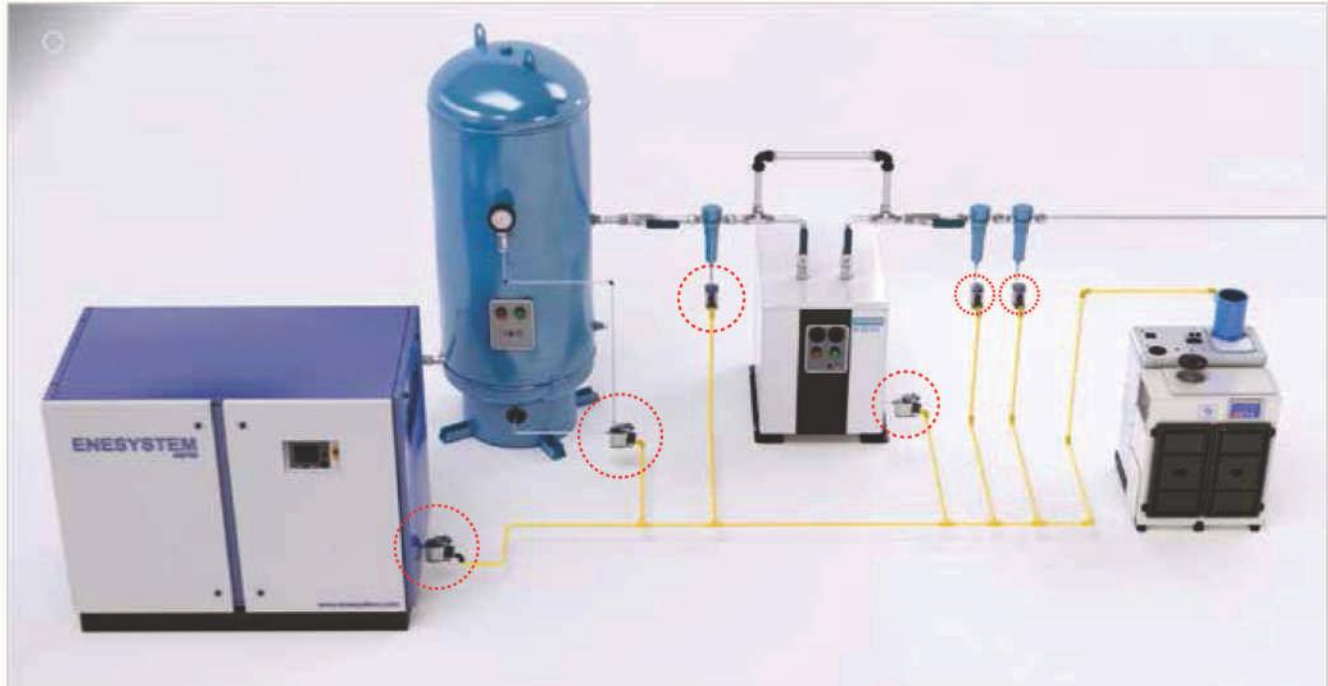
ENVISOL[®] is safe contaminated with oil and emulsion processing efficiently in small-to large capacity. ENVISOL[®] is equipped with a variety of models, product design and technology to maintain less and reliable. ENVISOL[®] has begun to successfully purify the emulsified condensate in compressed air systems from multiple vendors in the workplace.

Emission standards for water pollutants

Zone Factors	Hydrogen Ion Concentration (PH)	Normal Hexane Concentration		Daily Discharge Level Under 2,000m ³		
		Mineral Oil (mg/L)	Animal/Vegetable Fat (mg/L)	Biological Oxygen (BOD)	Biochemical Oxygen (COD)	Floating Matter Mass (SS)
Clean Zone	5.8 ~ 8.6	1 mg/L or less	5 mg/L or less	under 40	under 50	under 40
Zone A	5.8 ~ 8.6	5 mg/L or less	30 mg/L or less	under 80	under 90	under 80
Zone B	5.8 ~ 8.6	5 mg/L or less	30 mg/L or less	under 120	under 130	under 120
Specialized Zone	5.8 ~ 8.6	5 mg/L or less	30 mg/L or less	under 30	under 40	under 30

※ Source : Water Quality Regulations

Condensation Drainage Point (STANDARD)



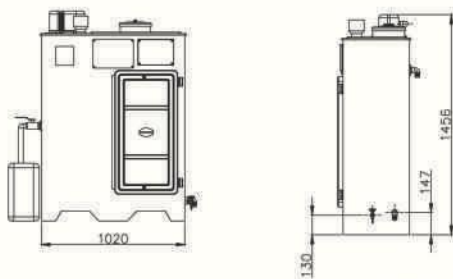
Management Process



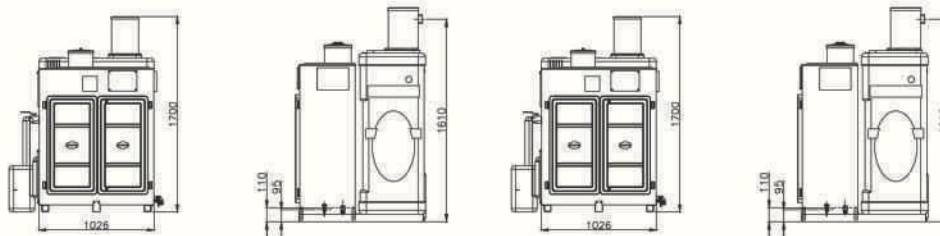
ENVISOL[®] Technical Data

	ESP- 25	ESP- 50	ESP- 100	ESP- 200	ESP- 300
Order Reference	ESP 025 000	ESP 050 000	ESP 100 000	ESP 200 000	ESP 300 000
Hourly Capacity	30L/hr	60L/hr	120L/hr	240L/hr	360L/hr
Compressor Capacity	25m ³ /min	50m ³ /min	100m ³ /min	200m ³ /min	300m ³ /min
Pre-Separation Tank Volume	170L	600L	600L	900L	900L
Reaction Tank Volume	31L	37L	37L	66L	66L
Splitting Agent Container Volume	9L	12L	12L	20L	20L
Filter Bag Volume	60L	2 x 60L	2 x 60L	3 x 60L	3 x 60L
Oil Collector	20L	20L	20L	20L	20L
Condensate Inlet	3/4"	1"(DN32mm)	1"(DN32mm)	1"(DN32mm)	1"(DN32mm)
Water Outlet	1"(DN32mm)	1"(DN32mm)	1"(DN32mm)	1"(DN32mm)	1"(DN32mm)
Over Flow	1"(DN32mm)	1"(DN32mm)	1"(DN32mm)	1"(DN32mm)	1"(DN32mm)
Oil Outlet	1"(DN32mm)	1"(DN32mm)	1"(DN32mm)	1"(DN32mm) x 2	1"(DN32mm) x 2
Sample Valve	1/4"	1/4"	1/4"	1/4"	1/4"
Power	220V/50.60hz/1P/100W	220V/50.60hz/1P/500W	220V/50.60hz/1P/500W	220V/50.60hz/3P/1000W	220V/50.60hz/3P/1000W
Temperature(Min/Max)	+1 ~ +50°C	+1 ~ +50°C	+1 ~ +50°C	+1 ~ +50°C	+1 ~ +50°C
Pressure Max	16Bar	16Bar	16Bar	16Bar	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. 180 Kg	Approx. 230 Kg	Approx. 250 Kg

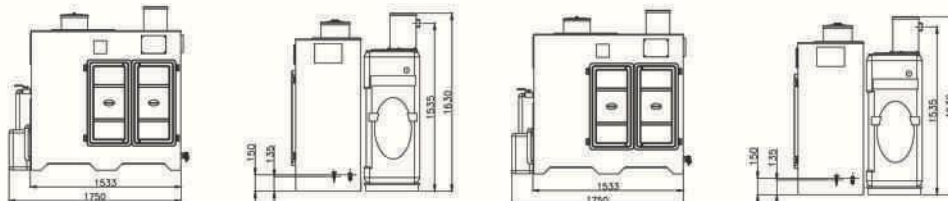
ESP - 25



ESP-50 / 100



ESP-200 / 300



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



ESP - 25

ESP-50 / 100

ESP-200 / 300

※ Specialized products manufactured on firm order basis.

※ Specifications may change without prior notice for the enhancement of the quality and performance of the products.

Condensate Drain System, Auto Drain Trap

Drain Master, attached with an A1 sensor, accurately detects any type of condensate accumulated from the compressing process using cutting-edge technologies.



DRAIN MASTER Series

Drain Master-S / Drain Master-HP
Drain Master-B & BS / Drain Master-V

EFFICIENT DRAIN MASTER-Series

Optimized design to maximize customer benefit



Energy Conservation

- ZERO loss of compressed air
- Uses of two sensors (High level, low level) protects energy loss by discharging air loss condensate selectively.



Durability[Hard-Anodizing]

- The coating applied to the housing is the same coating applied to industrial equipment such as aircrafts, is required to be highly durable and rust-proof so that the lifespan of the housing is semi-permanent.



Various Models, Attractive Designs

- Depending on the condensate quantity, models are subdivided into attractively designed models. Housing is processed by an anodizing method and die casting mold.



Self Restoration Alarm

- Automatic discharge alarm activated when condensate is not discharged in 2 minutes by scale.
- Alarm is signaled and the self restoration function activates the solenoid valve every 5 seconds per every 3 minutes. The self restoration alarm is converted back to normal mode when discharge is activated normally.

- **DRAIN MASTER-S&HP**
- **DRAIN MASTER-B&BS**
- **DRAIN MASTER-V**



Convenient Installation and Maintenance

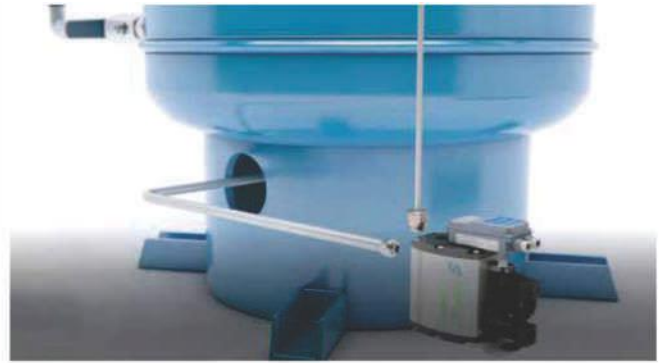
- Lead-in lines were added to make power connection easy and piping work convenient.
- Cleaning pollutants inside the housing is simple.
- The built-in strainer located in the housing, prevents sludge from blocking the valves.



Bimetal Temperature Controller (Optional Heating Unit)

- Use of stainless steel ensures high durability and corrosion resistance, and the automatic temp controller maintains constant temperatures.
- Connection to the lead-in line of DRAIN MASTER Series is done by the screw thread for easy installation.
- Automatic temperature controller is applicable to any DRAIN MASTER series as well as the existing condensate traps.
 - For freeze protection

Reason and solution of condensate occurrence in compressor system



Why does condensate occur?

During the compression process, air taken in from the atmosphere and saturated vapor flow to become water. Condensate occurs when the air is extremely polluted by dust, oil, etc. In the case of oil-free compressors, condensate is acidified.

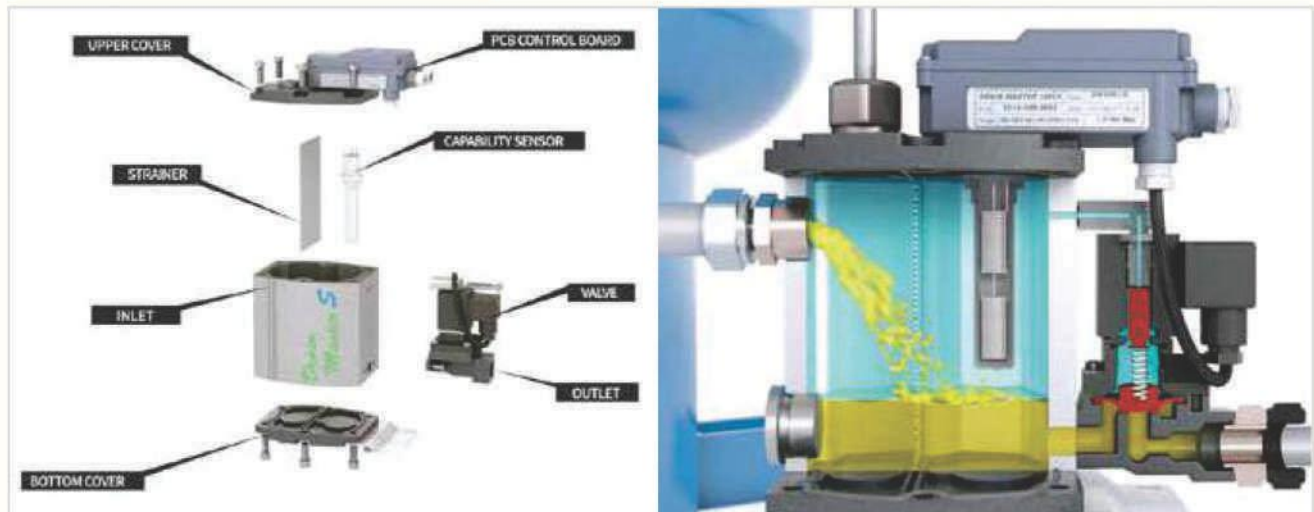
What is the problem with condensate?

Corrodes and contaminates compressed in the air piping, air tank, air filter, etc. have a tremendous impact to the equipment and products in the production field. During the winter, condensate is exposed to danger by frozen piping bursting in machinery and equipment.

Annual level of condensation with 75kw air compressor system



Components of Drain Master



Necessity for Auto Drain Trap

Condensate damage can be prevented by utilizing ball float or timer method drain traps. The disadvantages to utilizing ball float or timer drain traps is that the traps become clogged or expensive compressed air is flowed out in large quantities. DRAIN MASTER, gives an epoch change to existing condensate discharge systems for convenient condensate discharge.

Advantages of DRAIN MASTER



Electrostatic Capacity Sensor

Any condensate from compression process is accurately sensed and discharged.

ZERO Loss of Compressed Air

Uses of two sensors (High level, low level) protects energy loss by air loss discharging condensate selectively.

Counting Module (Optional)

- Daily, Weekly, Annual Count
- Counter Reset
- Counter Range : 999,999



Durability (Hard-Anodizing)

The coating applied to the housing is the same coating applied to industrial equipment such as aircrafts, is required to be highly durable and rust-proof so that the lifespan of the housing is semi-permanent.

Various Modern Designs

Depending on the condensate quantity, models are subdivided into 3 beautifully designed models. Housing is processed by an anodizing method and die casting mold.

Self Restoration Alarm

Self restoration alarm activated when condensate is not discharged in 2 minutes by scale.

Alarm is signaled and the automatic restoration function activated the electric motion ball every 5 seconds per every 3 minutes. The automatic discharge alarm is converted back to normal mode when discharge is activated normally.



Normal Mode

Alarm Mode



Convenient Installation and Maintenance

Lead-in lines were added to make power connection easy and piping convenient.

Cleaning pollutants inside the housing is simple.

The built-in strainer prevents sludge from blocking the valves.

DRAIN MASTER-*S&HP*

Solenoid Valve Type



DRAIN MASTER Principle of Operation

• **Figure 1**

Condensate flowed in through the lead-in line ① is gathered in the housing ②, the upper space of the diaphragm ③ through pilot control line ④ becomes dynamic pressure. If the diaphragm seat upper cover becomes dynamic pressure, the diaphragm is closed by spring pressure, which prevents the compressed air from escaping.

• **Figure 2**

When the condensate water level rises in the housing, it is sensed in the high level sensor ⑥, then the controlled solenoid valve is activated by closing the supply line. The compressed air in the upper space of the diaphragm becomes atmospheric pressure state by venting. The diaphragm valve ⑦ lifts pressure of inflow line and the condensate is discharged outside through a drain line ⑧.

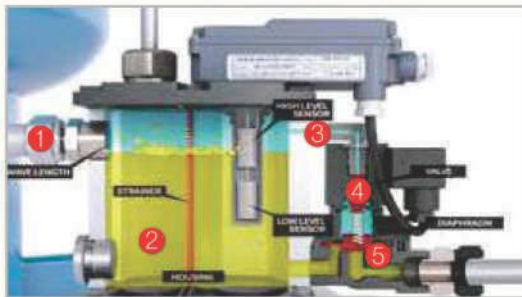


Figure 1



Figure 2

Bimetal Temperature Controller



Use of stainless steel ensures high durability and corrosion resistance, and the automatic temperature controller maintains constant temperatures.

Connection to the lead-in line of DRAIN MASTER Series is done by the screw thread for easy installation.

It is applicable to any model of DRAIN MASTER Series and also to the existing trap.

Automatic temperature controller is applicable to any DRAIN MASTER series as well as the existing condensate traps.

Power: 24VDC 110~230VAC

※ For freeze protection



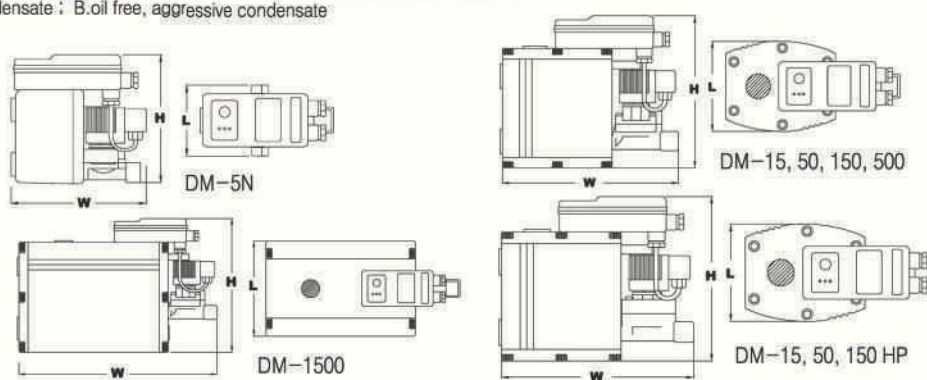
■ Green : Dry cool climate (Northern Europe, Canada, Northern States of U.S.A., Central Asia)
 ■ Blue : Temperate climate (Central & Sothern Europe, Central America, Korea)
 ■ Red : Humid, tropical climate (Coastal Zones)

TECHNICAL DATA

DRAIN MASTER <i>SHP</i>	Climate zone	Peak Compressor Performance m ³ /min	Peak Dryer Performance m ³ /min	Peak Filter Performance m ³ /min	Operating Pressure min / max (bar)	Temperature min / max (°C)	Application (*)
DM-5N	Green	8	16	80	0.8/16	+ 1 / 80	A. B
	Blue	7	14	70			
	Red	5	10	50			
DM-15	Green	24	48	240	0.8/16	+ 1 / 80	A. B
	Blue	21	42	210			
	Red	15	30	150			
DM-50	Green	80	160	800	0.8/16	+ 1 / 80	A. B
	Blue	70	140	700			
	Red	50	100	500			
DM-150	Green	170	340	1700	0.8/16	+ 1 / 80	A. B
	Blue	150	300	1500			
	Red	105	210	1050			
DM-500	Green	570	1140	5700	0.8/16	+ 1 / 80	A. B
	Blue	500	1000	5000			
	Red	350	700	3500			
DM-1500	Green	1750	3500		0.8/16	+ 1 / 80	A. B
	Blue	1500	3000				
	Red	1050	2100				
DM-15HP	Green	24	48	240	1.2/60	+ 1 / 80	A. B
	Blue	21	42	210			
	Red	15	30	150			
DM-50HP	Green	80	160	800	1.2/60	+ 1 / 80	A. B
	Blue	70	140	700			
	Red	50	100	500			
DM-150HP	Green	170	340	1700	1.2/60	+ 1 / 80	A. B
	Blue	150	300	1500			
	Red	105	210	1050			

*Application: A.oil contaminated condensate : B.oil free, aggressive condensate

DIMENSION



DRAIN MASTER <i>SHP</i>	DM-5N	DM-15	DM-50	DM-150	DM-500	DM-1500	DM-15HP	DM-50HP	DM-150HP	
Condensate Feed	1/2" x 2		3/4" x 3		1"x1, 3/4"x2		1/2" x 2		3/4" x 3	
Condensate Discharge	3/8"	1/2"							3/8"	
Voltage	Free voltage 90~260Vac, 24/48Vdc, 24/48Vac									
Housing Material	Aluminium, Hardcoated									
Weight (Kg)	1.30	1.65	2.20	3.30	5.30	7.30	1.95	2.50	4.05	
Dimension(WxLxH mm)	164x80x154	163x71x178	183x80x187	221x110x193	271x160x213	349x180x247	163x71x185	183x80x193	221x110x204	

- ▶ Temperature controller installation is required for dry cool climates (Heating unit 110.220 VAC optional)
- ▶ Other than the above specified models, production is possible based on request.
- ▶ Specifications may change without prior notice for the enhancement of the quality and performance of the products.

DRAIN MASTER-*B&BS*

Motorized Ball Valve type



Durability (Hard-Anodizing)

The coating applied to the housing is the same coating applied to industrial equipment such as aircrafts, is required to be highly durable and rust-proof so that the lifespan of the housing is semi-permanent.

Various Models, Attractive Designs

Depending on the condensate quantity, models are subdivided into attractively designed models. Housing is processed by an anodizing method and die casting mold.

DRAIN MASTER Principle of Operation

- Condensate flow through the ❶ lead in-line is gathered in the housing ❷.
- As the condensate within the housing accumulates, ❸ the first sensor is activated.
- OPEN is signaled from the main board, activating the automatic ball valve ❹ and the condensate is discharged through the discharge line.
- As the condensate accumulated in the housing is discharged, the lower sensor is activated ❺, and the CLOSE signal is activated, causing the automatic ball valve to close.
- There is virtually no air loss which increases competitive effectiveness.
- Discharge valve diameter gauge is 12Ø, therefore there is minimal clogging. When the alarm is activated, DRAIN MASTER condensate traps have automatic restoration capacity.
- DRAIN MASTER is easy to maintain due to automatic operation. Even when pressure is on standby, DRAIN MASTER operation is normal.
- In the event of abnormal operation, DRAIN MASTER can be operated manually. (Bypass valve not needed)
- Motorized Ball Valve Body: SCS13A, Ball: SUS 304
- Motorized Ball valve Open/Close time is short, therefore the ball valve is activated openly. (Scale discharge superior)

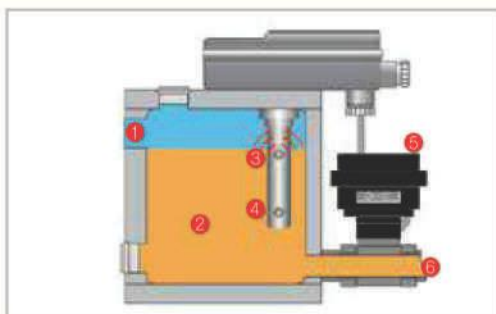


Figure 1

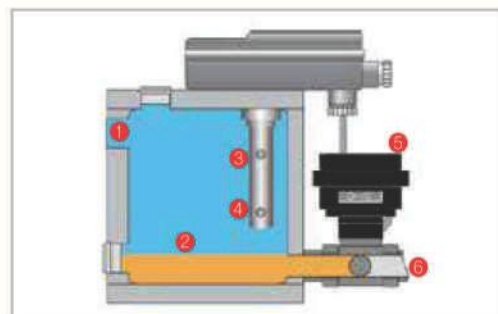


Figure 2

Convenient Installation and Maintenance

Lead-in lines were added to make power connection easy and piping convenient. Cleaning pollutants inside the housing is simple. The built-in strainer prevents sludge from blocking the valves.

Electrostatic Capacity Sensor

Any condensate from compression process can be sensed correctly and discharged.

ZERO Loss of Compressed Air

Uses of two sensors (High level, low level) protects energy loss by air loss discharging condensate selectively.

Self Restoration Alarm

Automatic discharge alarm activated when condensate is not discharged in 2 minutes by scale. Alarm is signaled and the automatic restoration function activated the electric motion ball every 5 seconds per every 3 minutes. The automatic discharge alarm is converted back to normal mode when discharge is activated normally.



Normal Mode

Alarm Mode



- Green : Dry cool climate (Northern Europe, Canada, Northern States of U.S.A., Central Asia)
- Blue : Temperate climate (Central & Southern Europe, Central America, Korea)
- Red : Humid, tropical climate (Coastal Zones)

TECHNICAL DATA

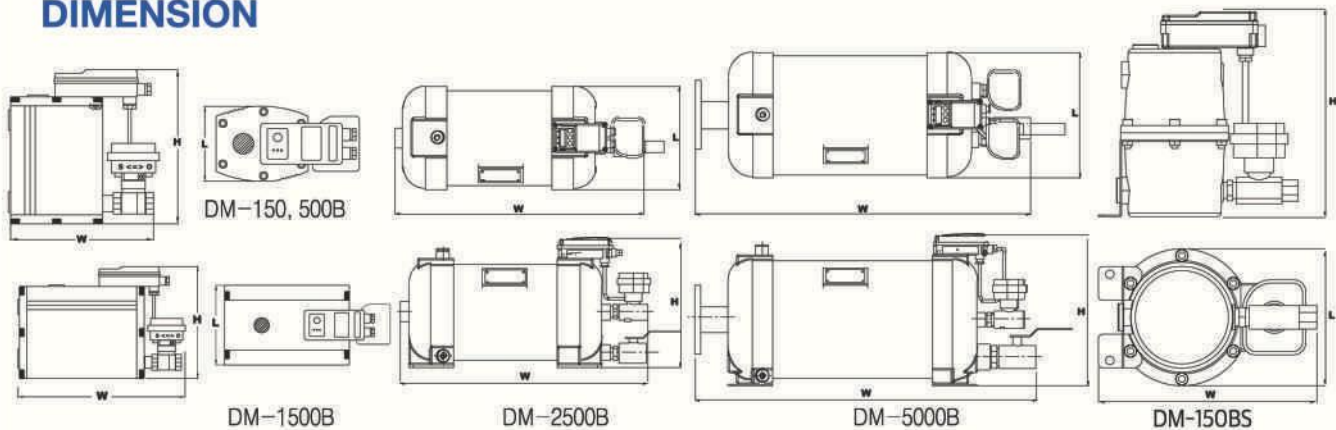
DRAIN MASTER <i>B&BS</i>	Climate zone	Peak Compressor Performance m ³ /min	Peak Dryer Performance m ³ /min	Peak Filter Performance m ³ /min	Operating Pressure min / max (bar)	Temperature min / max (°C)	Application (*)
DM-150B	Green	170	340	1700	0/16	+ 1 / 80	A . B
	Blue	150	300	1500			
	Red	105	210	1050			
DM-500B	Green	570	1140	5700	0/16	+ 1 / 80	A . B
	Blue	500	1000	5000			
	Red	350	700	3500			
DM-1500B	Green	1750	3500		0/16	+ 1 / 80	A . B
	Blue	1500	3000				
	Red	1050	2100				
DM-2500B	Green	2900	5800		0/12	+ 1 / 80	A . B
	Blue	2500	5000				
	Red	1750	3500				
DM-5000B	Green	5800			0/12	+ 1 / 80	A . B
	Blue	5000					
	Red	3500					
DM-150BS	Green	170	340	1700	0/16	+ 1 / 80	A . B
	Blue	150	300	1500			
	Red	105	210	1050			

*Application: A. oil contaminated condensate ; B. oil free, aggressive condensate

DRAIN MASTER	DM-150B	DM-500B	DM-1500B	DM-2500B	DM-5000B	DM-150BS
Condensate Feed	3/4"x3		3/4"x2. 1"x1	1"x1	FL 2"x1	3/4" x 3p NPT
Condensate Discharge		1/2" x1		3/4" x 1	3/4" x 2	1/2" x 1p NPT
Voltage	Free voltage 90~260Vac, 24/48Vdc, 24/48Vac					
Housing Material	AL. Hard coated			Stainless steel		
Weight (Kg)	3.90	6.00	7.50	28.00	40.00	9.20
Dimension(WxLxH mm)	222x110x232	273x160x242	340x180x247	564x231x293	787x282x343	264x163x269

- ▶ Temperature controller installation is required for dry cool climates (Heating unit 110.220 VAC optional)
- ▶ Other than the above specified models, production is possible based on request.
- ▶ Specifications may change without prior notice for the enhancement of the quality and performance of the products.

DIMENSION



DRAIN MASTER-V



DRAIN MASTER V is used for effective condensate discharge under extremely low pressure such as pressure in a vacuum.

-Working pressure 0.1 bar ~ 1.8 bar (abs)

-If working pressure is exceeded the sealing valve can be affected.

DRAIN MASTER V needs clean air or gas between 4 bar ~ 8 bar for condensate to discharge. Controlled air, residual air, gas, etc. within the housing may leak into the vacuum system. DRAIN MASTER V should be applied to a system where the quantity of air or gas will not cause a problem (e.g. formation of explosive gas) in terms of technologies, production processes and safety.

DRAIN MASTER BV is connected to the condensate lead-in line and requires balanced (equal) air line installation if a large quantity of condensate is accumulated.



FUNCTION

The level sensor within the housing detects the level of condensate and the condensate lead-in line is blocked. Pressure is formed in the housing if the condensate reaches the top dead point by supplying controlled air or gas via opening of the solenoid valve.

The pressure formed within the housing discharges when the motorized ball valve is operated. After the condensate is completely discharged, the solenoid valve blocks controlled air or gas to allow condensate inflow.

INSTALLATION

A regulator should be installed to maintain condensate discharge pressure between 4 bar ~ 8 bar.

Condensate discharge will not occur if the pressure is under 4 bar or the valve remains open OR the valve remains closed above 8 bar.

※ A small amount of controlled air or gas (approx. 1 liter) is discharged into the air when the valve is opened.

If explosive or hazardous gas is used for controlling the pipe line, the gas should be connected to a gas-collection tank for safety.

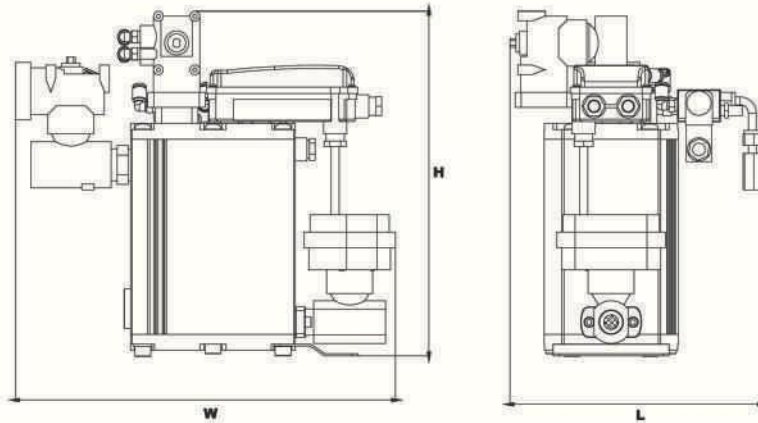


TECHNICAL DATA

Model	Vacuum Pressure (max)	Condensate Discharge (max)	Temperature (min/max)
DM-150 BV	0.1~1.8 bar	50ℓ/hr	+1°C ~ +80°C
DM-500 BV	0.1~1.8 bar	125ℓ/hr	+1°C ~ +80°C
DM-1500 BV	0.1~1.8 bar	180ℓ/hr	+1°C ~ +80°C

* Applicable up to -25°C if the temperature controller (optional) is installed

DIMENSION



DRAIN MASTER V	DM-150BV	DM-500BV	DM-1500BV
Condensate Feed	3/4"	3/4"	3/4"
Condensate Discharge	1/2"	1/2"	1/2"
Balancing Feed	3/8"	3/8"	3/8"
Housing Material	Aluminium. Hard coated	Aluminium. Hard coated	Aluminium. Hard coated
Weight (Kg)	4.2	6.0	8.0
Dimension(WxLxH mm)	210x315x285	220x310x290	280x400x310

- ▶ Temperature controller installation is required for dry cool climates (Heating unit 110.220 VAC optional)
- ▶ Other than the above specified models, production is possible based on request.
- ▶ Specifications may change without prior notice for the enhancement of the quality and performance of the products.

DRAIN MASTER Series Heating system



Automatic Temperature Controller (Heating Unit)

Use of stainless steel ensures high durability and corrosion resistance, and the automatic temp controller maintains constant temperatures.

Connection to the lead-in line of DRAIN MASTER Series is done by the screw thread for easy installation. Automatic temperature controller is applicable to any DRAIN MASTER series as well as the existing condensate traps.

※ For freeze protection

TECHNICAL DATA (Heating Unit)

Application Temp	-25 ~50°C	Power	110, 220Vac(±10%) 50~60Hz
Weight	0.4kg	Switching Temp'	On/+5 ~ Off/+15°C
Threaded Connection	G1/2"	Power Input	Pac < 125W
Material (Heating Cartridge)	Stainless Steel	Cable Cross-section	3 X 0.75mm ²
(Connecting Cable)	PVC	220Vac/125W	Order ref. : A DM 00-1
Operating Pressure(max)	60 bar	110Vac/125W	Order ref. : A DM 00-2

Power : 24Vdc, 110~230 Vac(+10%) / 50~60Hz / 125W

PEOPLE oriented technology, NATURE friendly company

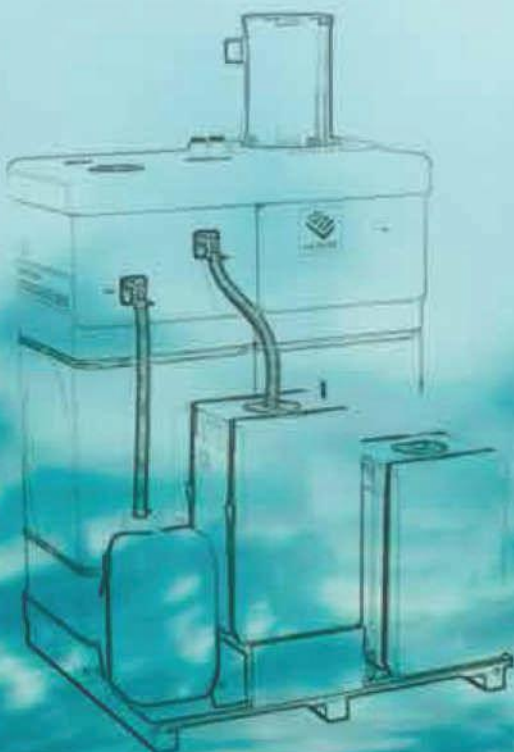
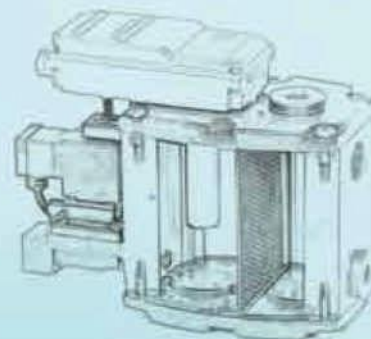
EnE System Co., Ltd is dedicated to research and development of effective condensation products for air compressor systems.

DRAIN MASTER Condensate Auto Drain Traps, YUSOO-BREAKER and ENVISOL[®] oil-water separators are developed and manufactured as convenient, reliable and cost-effective condensate discharge products.

Energy and environment are a major influent in today's industrial field.

As the demand for eco-friendly environment increases, we will continue to research and develop products that cater to market demand.

In Su, Jeon
CEO







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