INSTRUCTION MANUAL

DRY VACUUM PUMP

MODEL EV-PA 250
MODEL EV-PA 500

⚠ CAUTION

Read and understand this INSTRUCTION MANUAL thoroughly before using this equipment.

Keep this INSTRUCTION MANUAL on hand for future reference.

To Facility and Tool Manufactures:

Distribute this Instruction Manual to all end-user personnel actually operating this equipment.

Model EV-PA in this document is model code of Ebara.

Date	Contents
2019/04/04	Initial Release
2019/04/19	Drawing update
2019/05/21	Front page module name

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Manufacturer reserves the right to discontinue or change any specifications or
Designs without notice and without incurring obligations.
EV-PA in this instruction manual is our model code.

Environmental Basic Policies

It is our responsibility, as people of the earth, to protect nature's irreplaceable treasures and to pass them on to future generations.

As we undertake our business activities, we will establish environmental management systems and implement ongoing improvements and reviews, while striving to promote harmony between technology and nature, prevent environmental pollution, and improve the overall results of our environmental management activities. We are aware that environmental protection and management activities are the responsibility of all managers and employees of the Corporation, and each person will demonstrate this awareness when carrying out his or her duties.

We will widely publicize these basic policies to regional societies and the general public and work to make Ebara's position on the environment clear to society in general.

Foreword

Design of EBARA EV-PA series DRY VACUUM PUMP is based on superior engineering and long experience. To prevent any possible trouble and provide satisfactory operation and long life, it is important to thoroughly understand this EBARA EV-PA series DRY VACUUM PUMP by careful study of this manual. If any questions arise regarding this manual, please direct them to EBARA or your dealer. Your questions will be promptly answered and your suggestion may be considered for incorporation into our future products.

The design, specification and appearance are subject to change without prior notice

⚠ WARNING

Before using this equipment, read this INSTRUCTION MANUAL thoroughly. Manufactures warranty will be void, if the EV-PA series DRY PUMP has been incorrectly installed, operated or maintained or if it has been modified or repaired with parts not specified by manufacture.

EBARA is not liable for any injury or damage arising from an individual's carelessness, or misuse.

(1) Limited Warranty

The liability of EBARA CORPORATION under this Warranty covers the following.

Unless otherwise specified in the contact, the warranty period shall be either one year from the first date of operation or 18 months after the shipment from EBARA, whichever comes first.

1. When the purchased pump cause failure that owe to its design, manufacturing processes or other faultiness that EBARA is responsible to, EBARA will either repair the troubling parts or replace the pump at free of charge. No extension of warranty is available even when the pump was replaced during the original warranty program.
2. Fees will be charged for repair in the following circumstances and for consumable parts:
   (1) If the trouble occurs after the Warranty has expired.
   (2) If the trouble is caused by operating in the manner not described in the instruction manual or using under special condition.
   (3) If the trouble is caused by repair or remodeling of the pump by other than Ebara or authorization suppliers by Ebara.
   (4) If the trouble is caused by corrosion or by-products due to pumping the corrosive or reactive substance.
   (5) If the trouble is caused by corrosion or by-products due to pumping the water or codensability material.
   (6) If the trouble is caused by suction foreign material.
   (7) If the trouble is caused by fire, flood, earthquake, or other circumstances beyond EBARA's control.
3. EBARA will not be liable for any compensation for damage or injury resulting from breakdown of the pump.

(2) Repair and Servicing

Requests for repair or servicing of the pump shall be made to your dealer or to EBARA.

If any abnormal symptoms other than those displayed on the LCD controller appear, take action in accordance with the instruction of Section 8. "Troubleshooting".

If trouble occurs, to order repairs or servicing. Please contact EBARA CORPORATION or an authorized Agent/Distributor, and provide the information on the nameplate and details of the problem.

If you have any enquiries about the pump, please contact EBARA.

(3) Safty Notice

It is essential that those operating this pump should have the knowledge to identify and avoid hazardous conditions associated with the pump. Inadequate or rash operation may cause dangerous and serious accidents. Before installation and operation, the operator should first have a good knowledge of the pump construction, operation procedure, and its hazards (e.g., electrical, stored electrical, thermal). The operator should read through this instruction manual and other documents issued by EBARA in detail.

The following symbols are used to highlight important information and instructions that must be followed to prevent personal injury or damage to equipment. Please study the symbols carefully so that the meaning of any warning you encounter is immediately clear.

⚠ **DANGER** : indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.

⚠ **WARNING** : indicates a potentially hazardous situation which, if not avoided, could result in death or serious situation.

⚠ **CAUTION** : indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury or possible damage to the equipment or machine.

Note : is used to call attention or to emphasize essential information.

Precautions necessary for safe use of the EBARA EV-PA series DRY VACUUM PUMP are detailed in this instruction manual, while important items concerning precautions for handling EBARA EV-PA series DRY VACUUM PUMPare listed below.

⚠ **DANGER**

Keep the power supply to the pump turned off until you have finished the wiring and connecting work. Also remove the power connector and interrupt the Circuit Protector (CP) during this.

⚠ WARNING

- Carry out the electrical wireing only by qualified electricians.
- Connect the grounding wire.
- Do not use the power cable adapter.
- Granding at the power outlet should be checked by qualified.
- Install ELB (or CB) based on the law and the standard in the installation region. ELB (or CB) is not installed in the pump unit.
- Connect the pump to the power supply using the appropriate circuit breaker (lockout/tagout CB).
- Avoid contact and keep inflammable substances out of reach. The inlet and exhaust piping will remain at a high temperature during operation and for a short time after the pump has stopped.
- Do not use explosive, flammable, toxic or corrosive substances. This pump is suitable for use on clean and non-corrosive gases.
- Check for leaks after you have installed the pump.
- Avoid contact and keep inflammable substances out of reach. Do not remove the outer cover during operation. The pump unit and the inlet piping and exhaust piping will remain at a high temperature during operation and for a short time after the pump has stopped.
- Do not perform a withstand voltage test. Failure to comply could result in damage to the sensitive devices.
- Keep the power supply to the pump turned off until you have finished the wiring, installing and maintenance work. Also remove the power connector and interrupt the Circuit Protector (CP) during this.
- Do not insert any part of body to ventilation outlet. Moving parts of the cooling fan can crash and cut.
- Do not alter the pump member nor change any parts without the EBARA's consent or approval.

⚠ CAUTION

- Be careful not to overturn the pump when pushing and pulling it sideways, because the width of the pump is small to its height.
- Do not step on the pump or place objects on it.
- The exhaust piping made by polyvinyl chloride causes the noise thrugh the pipe.
- Do not apply the power supply from the pump's power pack to any other equipment as this will result in malfunctioning of the control units and in pump failure.
- Use the correct wiring materials and size to match the operating conditions in accordance with the power consumption rating and ambient air temperature of the pump.
- Vents at both ends of the pump. Place the pump at least 100mm from the stationary section. If the cooling air supply is insufficient, the pump temperature will rise and problems such as rotor contact will occur.
- Install pump in a location at an ambient not exceeding 30°C. Particular caution is required when the pump is operated in an enclosed room.
- Check the pump according to “8. Troubleshooting” before stopping suddenly. This pump doesn’t stop by signal “WARNING”. But signal “ALARM” or serious trouble occurs in a pump when pump driving is continued.

Note

- Placed the pump in an upright position. Do not stack as packing. When the pump is overturned, this will result in accident.
- A gap of at least 50mm should be left open for ventilation between the pump cover and the adjacent equipment.
- To fix the pump, the rubber feet of five each are attaches. If the pump is not stable, vibration and noise of the pump may be increased.
- Do not wire vacant pins.
- Apply a voltage between 4VDC and 27VDC on the equipment side. Do not apply 5VDC power on the equipment side. The output signals are generated from an open collector and the pump provides 5VDC power for input signals.
- The output signals are generated from an open collector.
- Wire all signals with the correct polarity (SIG./COM.).
- When output signals energize an inductive load such as a relay, insert a diode (100V. 1A class) to limit the back electromotive force during de-energization.
- The pump cannot start while the measuring instruments are warming up after the CP is placed in the ON position.
- Do not start the pump when a WARNING/ALARM has been generated. After you have taken the remedial actions, reset the pump.
- With the “AUTO MODE”, The pump starts driving when switched on in the state that short-circuited by the ”PUMP START pin” of the control connector.
- Do not supply a power till you confirm pump setting and safety complete when you use an “AUTO MODE”..
- With the “AUTO MODE”, the pump starts driving after warm-up completion automatically (When a pump is not abnormal).

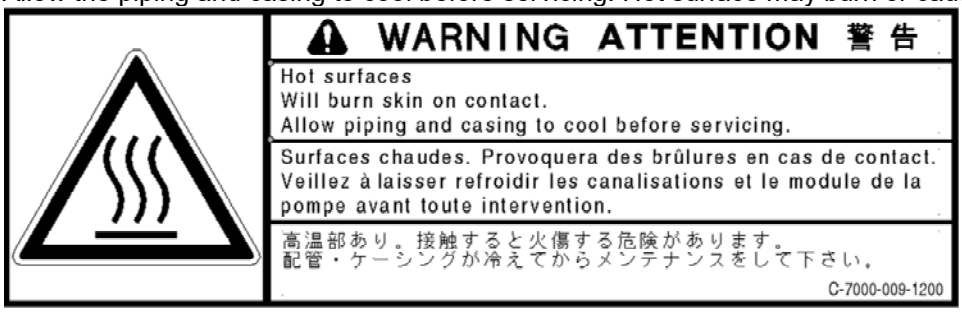
(4) Safty Warning Labels

Following safty labels are attached to pump covers.

1. High temperature warning
2. Hazardous voltage warning
3. Heavy object warning
4. Electric charge mark

1. High temperature warning

Allow the piping and casing to cool before servicing. Hot surface may burn or cause injury.



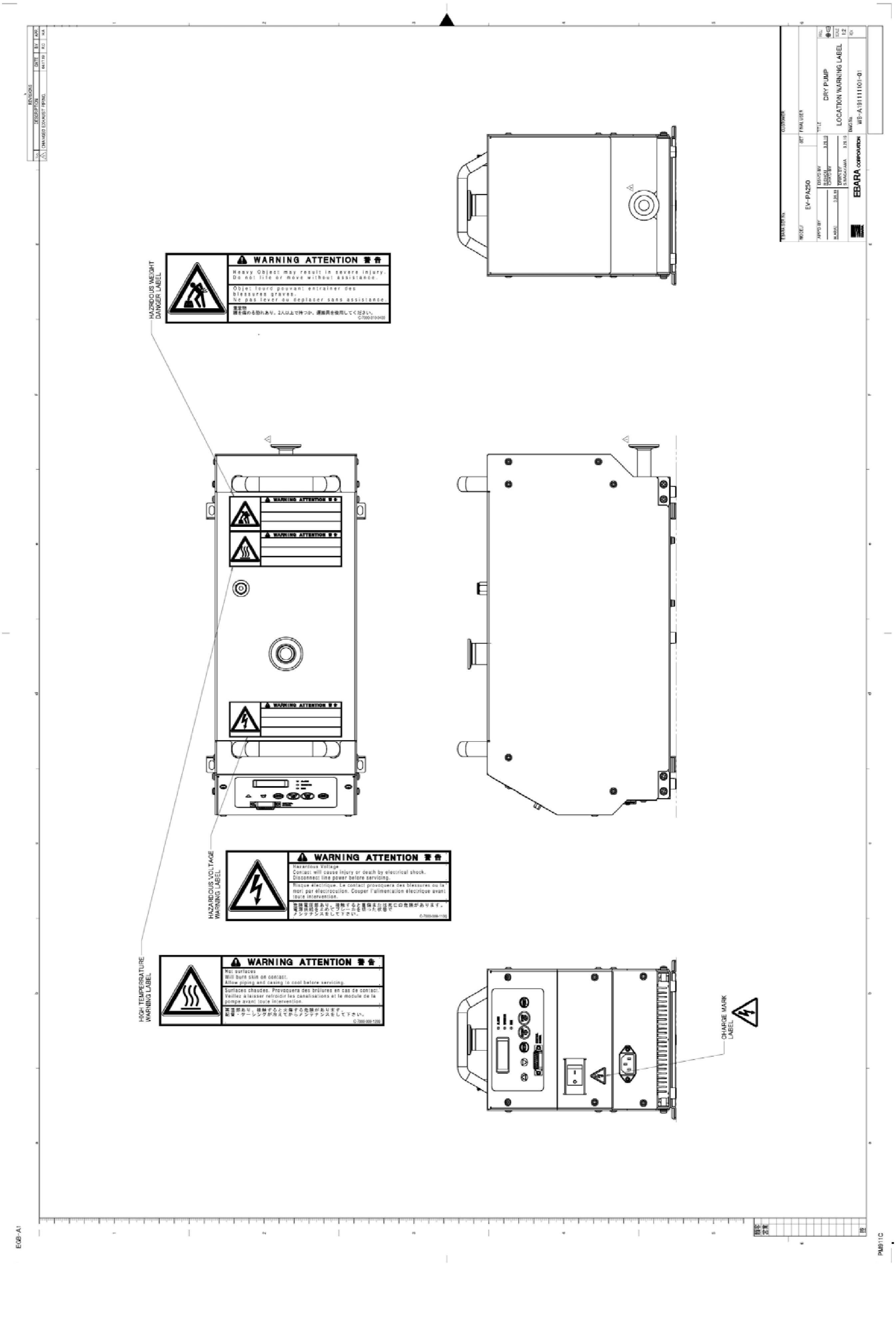
2. Hazardous voltage warning

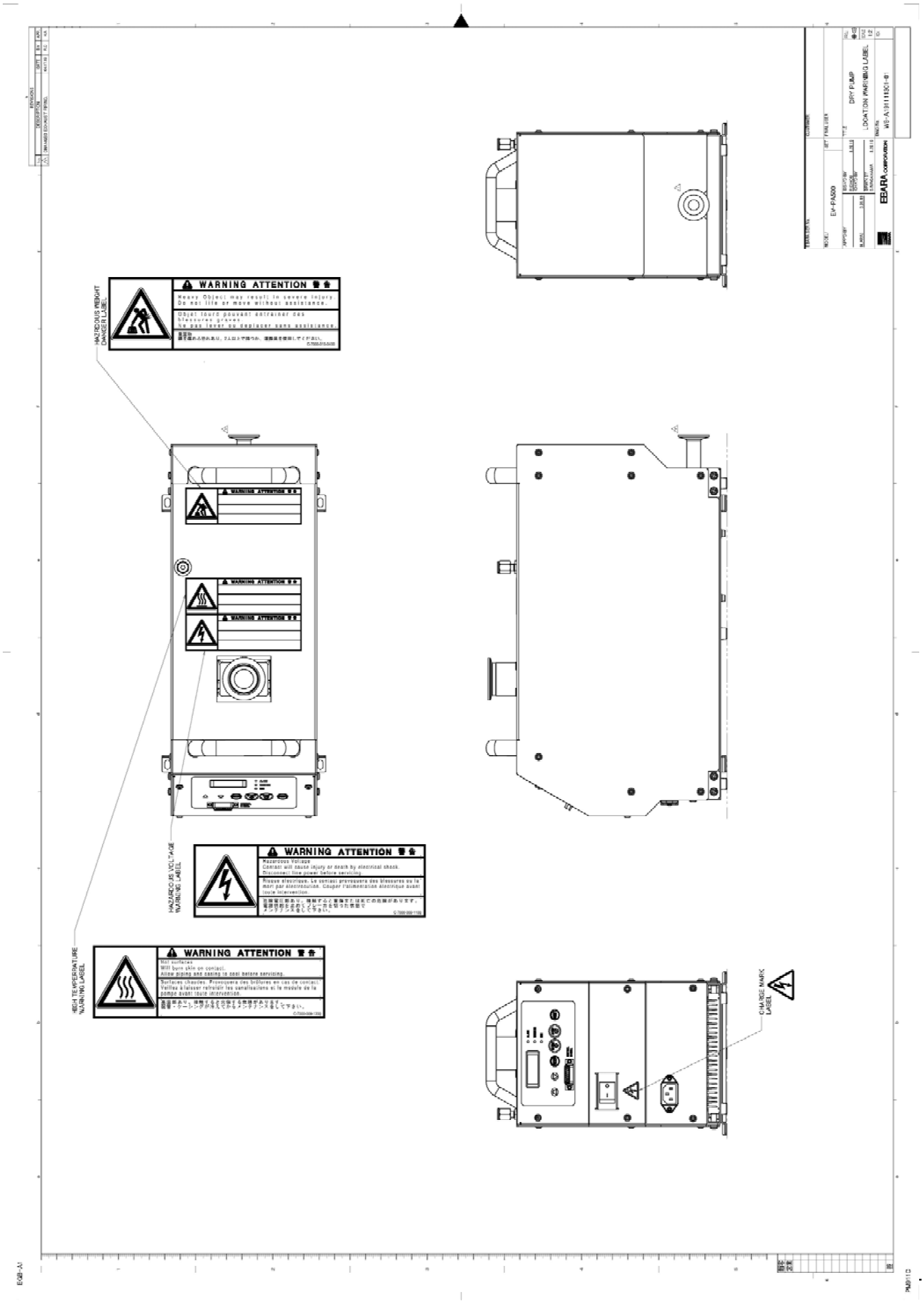
Turn power off and lockout before servicing. Hazardous voltage may shock, burn, or cause death.

3. Heavy object warning

Do not lift and move without assistance.　Heavy object may result in severe injury.

4. Electric charge mark


WARNING ATTENTION
HAZARDOUS VOLTAGE WARNING LABEL
HIGH TEMPERATURE WARNING LABEL
CHARGE MARK LABEL
EV-PA250
DRY PUMP
LOCATION WARNING LABEL
EBARA CORPORATION


WARNING ATTENTION
Heavy Object may result in severe injury
Do not lift or move without assistance.
Objet lourd pouvant entraîner des
blessures graves
Ne pas lever ou déplacer sans assistance
HAZARDOUS WEIGHT
DANGER LABEL
WARNING ATTENTION
Hazardous Voltage
Contact will cause injury or death by electrical shock.
Disconnect line power before servicing.
Risque électrique. Le contact provoquera des blessures ou la
mort par électrocution. Couper l'alimentation électrique avant
toute intervention.
HAZARDOUS VOLTAGE
WARNING LABEL
WARNING ATTENTION
Hot surfaces
Will burn skin on contact.
Allow piping and casing to cool before servicing.
Surfaces chaudes. Provoquera des brûlures en cas de contact.
Veillez à laisser refroidir les canalisations et le module de la
pompe avant toute intervention.
HIGH TEMPERATURE
WARNING LABEL
CHARGE MARK
LABEL
EV-PA500
DRY PUMP
LOCATION WARNING LABEL
EBARA corporation

(5) Environmental Concerns

Handling or operation the unit other than specified may induce adverse impacts on the environment. Follow the description below to handle, operate, and maintain the unit.

(1) Ask an authorized waste-disposal company to dispose packing materials from uncrating accoding to laws and ordinances applicable to the waste.

(2) Failure to do the unit maintenance (including overhaul) may trigger accidents causing injury or death, unit troubles, or environmental pollution. Plan the maintenance and perform it periodically to operate the efficiently. To dispose the standard consumption parts, follow effective laws and ordinances applicable in the area where the unit is installed.

(3) To dispose the unit, follow effective laws and ordinances applicable in the area where the unit is installed.

(6) Contents

1. Acceptance Check

Check the following items on receipt of the pump package.

(1) Check that the nameplate affixed to the outer cover of the pump to confirm that the pump supplied agrees with your order. Check the accessories against the packing list and the previously submitted drawings and documents to confirm that the all ordered accessories have been supplied.

(2) Check that no damage for the pump has occurred in transit.

(3) Store the pump in a dry and clean place if it is not installed at once after delivery.

Temperature : 5℃ to 40°C

Humidity : 80% or less

Note

Notify EBARA without delay when damage is discovered or when components are missing. Do not use when a leak is present as this will result in accident.

Note

Placed the pump in an upright position. Do not stack as packing. When the pump is overturned, this will result in accident.

2. Product Description

2.1 Outline

The EV-PA Series dry vacuum pump has a compact design and includes various sensors and controls to enhance reliability and operation.

This pump is suitable for use on clean and non-corrosive gases. Do not use eplosive, flammable, toxic, and water, codensability or corrosive substances.

2.1.1 Pump Module

The pump is a Dry vacuum pump which rotates a pair of non-contact rotors synchronized by magnet coupling. In the unit, a Booster Pump (BP) and the Main Pump (MP) are connected in series for ventilation.

2.1.2 Cooling Fan

Because the pump compresses gas from a vacuum to atmospheric pressure, compression heat is generated. Therefore cool the pump with cooling fan.

2.1.3 Exhaust

A check valve is built into the pump unit to prevent reverse flow of gas from the exhaust through the pump to the vacuum chamber when pump is stopped.

2.1.4 Gas ballast

Introduce gas ballast to prevent condensation of vapour and improve pumping of light gases. Air or nitrogen gas can be introduced to the Main Pump (MP) through the ballast port. The gas ballast flowrate is set by built-in orifice. (at atomosphere pressure)

2.2 Control System

EV-PA Series dry vacuum pumps have a built-in measuring unit consisting of a Circuit Protector (CP), Noise Filter (NF) and control source. During pump operation all operating conditions are monitored, including power supply and electric current for motor. Continuous operation is possible when there is a momentarily power failure (85V or less) of 1 sec or less.

2.2.1 Warning and Alarm

To assure the reliability of the pump as a vacuum exhaust system, the pump protection system generates two levels of alarm： WARNING and ALARM.

A WARNING signal is generated when pump operation exceeds the normal range. It therefore only draws attention that the normal operating values are not adhered to but does not signify that danger is imminent. The pump will continue to operate in this condition.

An ALARM signal output is generated and the pump will stop automatically when the upper mechanical safety limit is reached during pump operation.

All WARNING and ALARM signals are displayed on the front panel. For remote operation and monitoring, the signals are available as individual and group output.

Contact EBARA for details on checking the WARNING and ALARM setting condition.

2.3 Detailed Specifications

The following tables and figures are consulted for pump specification, dimension and performance details.

2.3.1 Specifications

Table 2.1 Specification

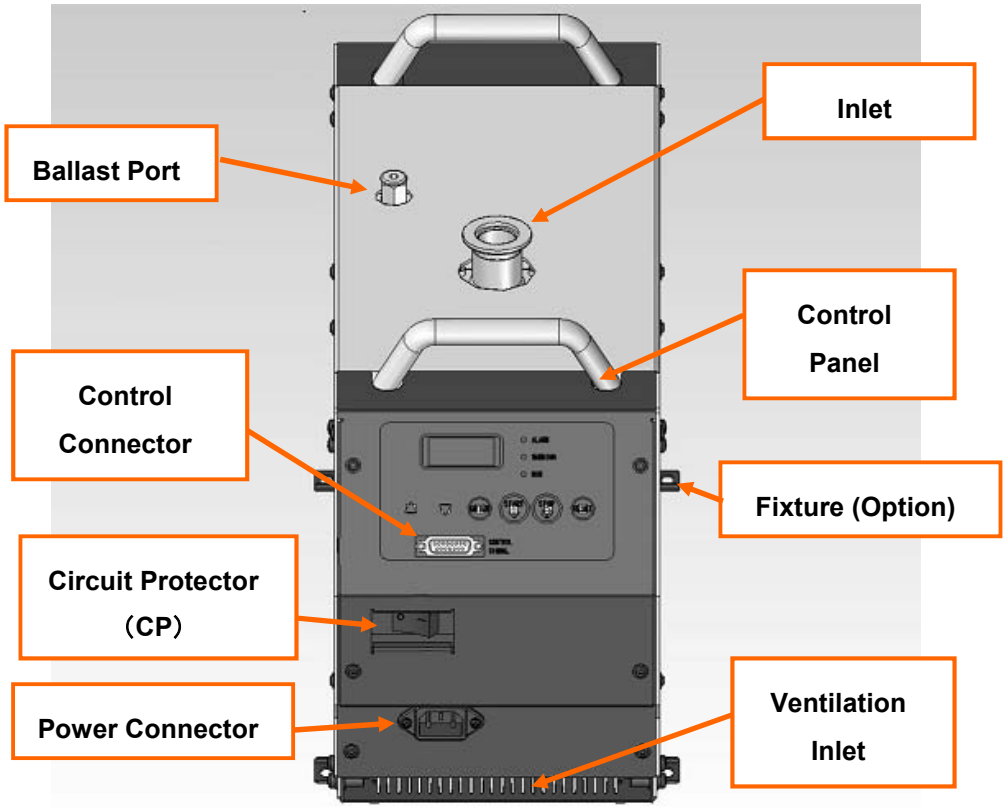
Model		EV-PA250	EV-PA500
Pumping Speed (Gas ballast setting)		230 L/min (200L/min)	500 L/min (430L/min)
Ultimate Pressure (Gas ballast setting)		0.5 Pa (2.0Pa)	
Connection	Gas Inlet	NW25	NW40
	Gas Outlet	NW 25	
Approx. power at ultimate pressure (Max Power)		240W (380W)	270W (600W)
Approx. Weight		16kg	21 kg
Ambient Temperature *		5℃ to 30℃	
Cooling System		Air Cooling	
Power Supply	Phase/Volt/Freq	Single Phase , 100-230V±10% , 50/60Hz	
	Power capacity	450VA	660VA
	Connection	HIRAKAWA HEWTECH Corp. CM-11	
Gas Ballast **	Connection	G1/8 Female	
	Flow rate	> 8.4 Pam^3/s (at atmosphere pressure)	
	Gas type	Dry Air or N_2	
Control Signal		D-sub 15Pin	
CP Rating		10A	
Acoustic noise test data ***		58 dB(A)	

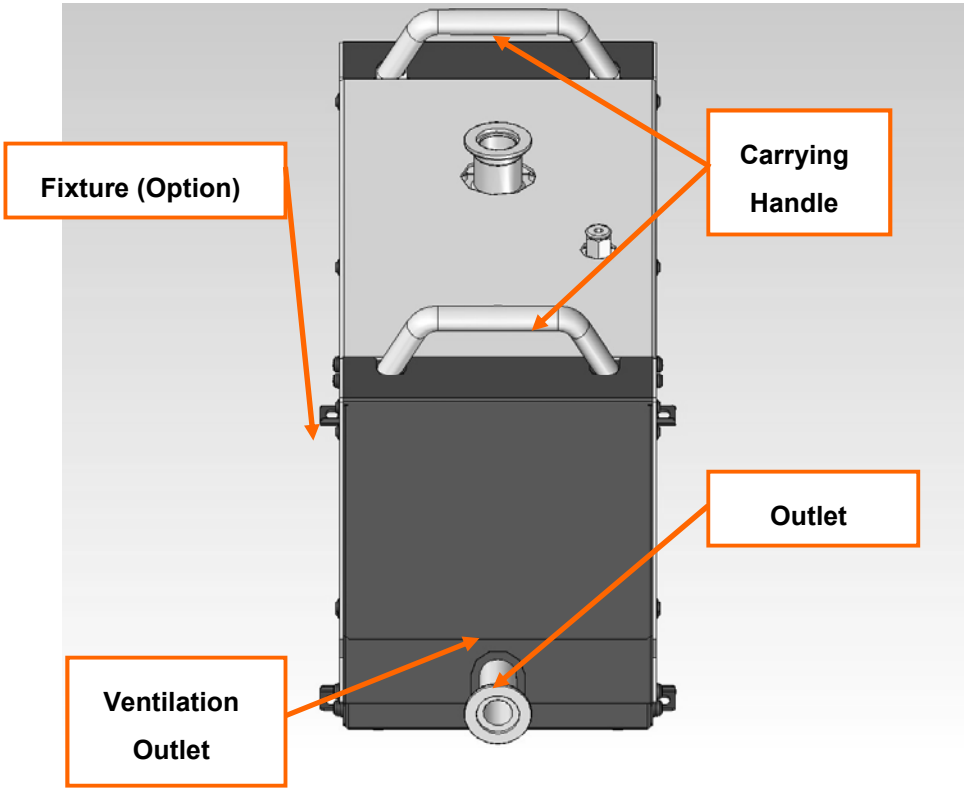
* The ambient air temperature must be less than 30℃.

** The gas ballast flow rate is set by a built-in orifice. (at atmosphere pressure)
When the gas ballast is supplied with high pressure, please set the supply pressure (0.05MPa(Gage pressure) or less) and set the gas ballast flow rate to 8.4Pam3/s.
The pumping speed and the ultimate pressure might be effected by the gas ballast frow rate.
Install valve, check valve, and filter to the ballast port if necessary.
The ability for moisture exhaust in the gas ballast is 10g/hr at the maximum.

*** Measured on the following condision
(1) Pump is operating under ultimate pressure. (no gas ballast)
(2) Measured at 1m distance from cover.

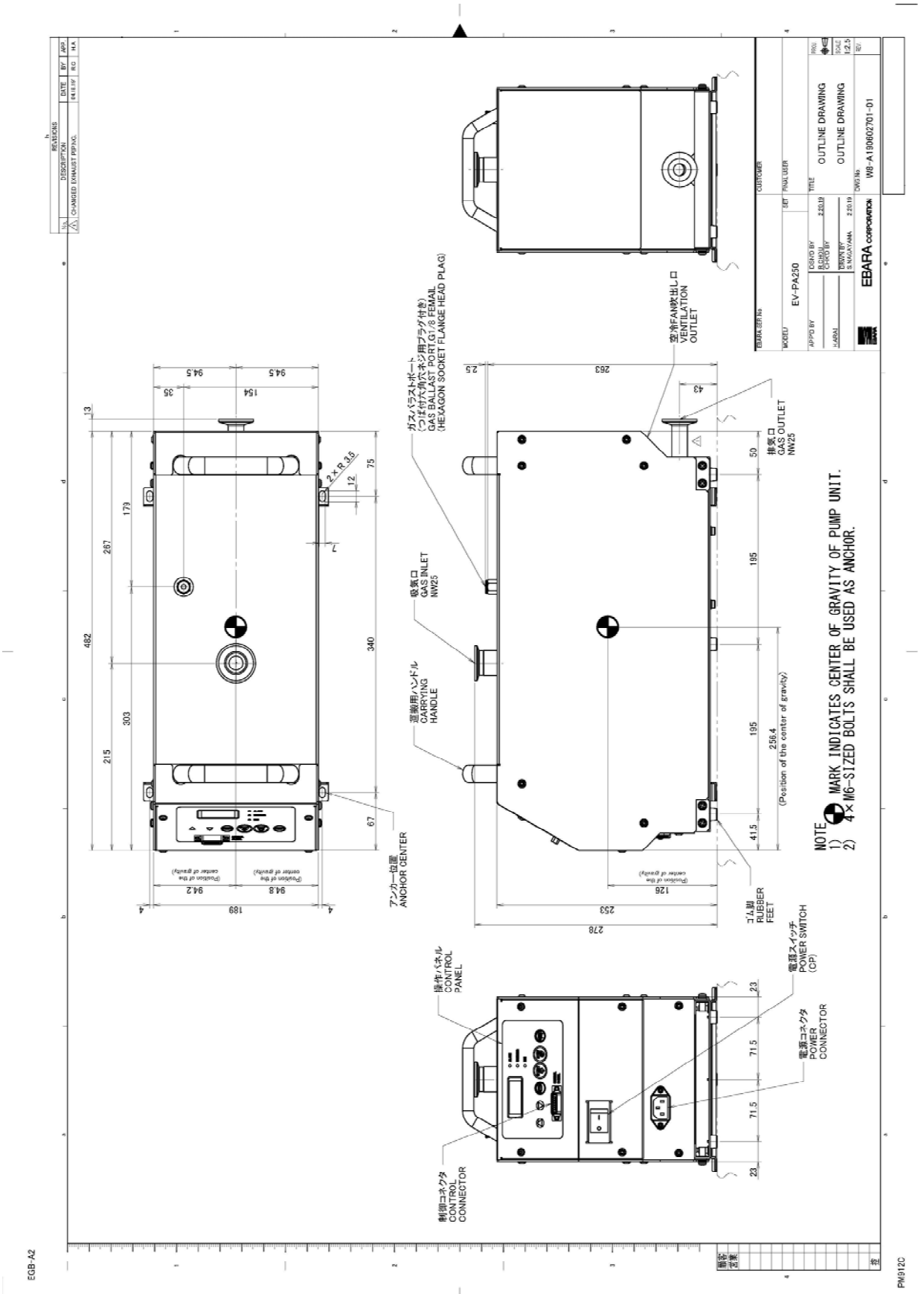
EV-PA Serise pump overview



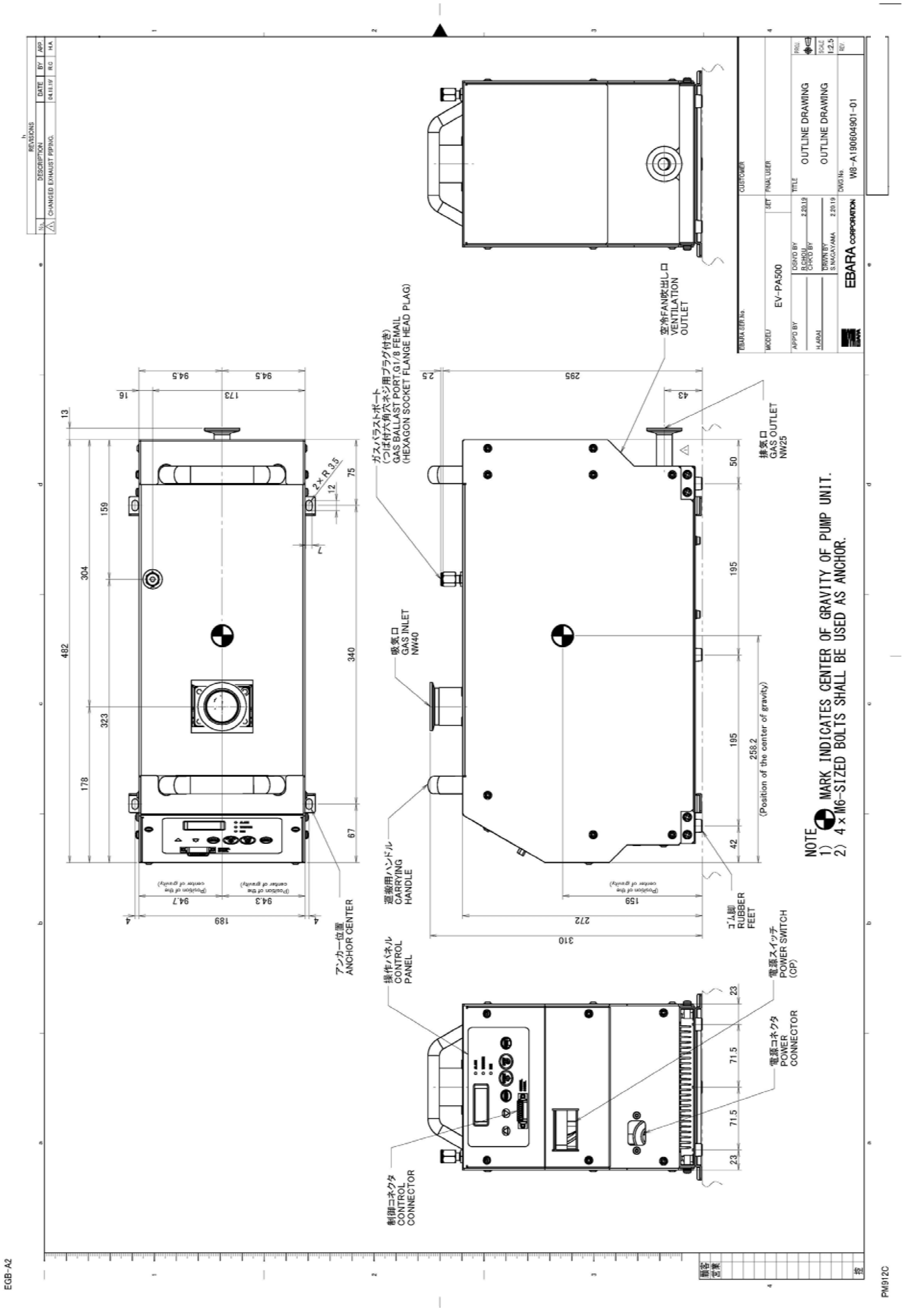


2.3.2 Outline Drawing

EV-PA250



EV-PA500



NOTE
1) MARK INDICATES CENTER OF GRAVITY OF PUMP UNIT.
2) 4×M6-SIZED BOLTS SHALL BE USED AS ANCHOR.
ガスバラストポート（つば付六角穴ネジ用プラグ付き） GAS BALLAST PORT,G1/8 FEMAIL (HEXAGON SOCKET FLANGE HEAD PLAG)
空冷FAN吹出し口 VENTILATION OUTLET
排気口 GAS OUTLET NW25
吸気口 GAS INLET NW40
運搬用ハンドル CARRYING HANDLE
ゴム脚 RUBBER FEET
アンカー位置 ANCHOR CENTER
操作パネル CONTROL PANEL
電源スイッチ POWER SWITCH (CP)
電源コネクタ POWER CONNECTOR
制御コネクタ CONTROL CONNECTOR
(Position of the center of gravity)
CHANGED EXHAUST PIPING.
EV-PA500
OUTLINE DRAWING
W8-A190604901-01
EBARA CORPORATION
EGB-A2
PM912C

2.3.3 Performance Curve

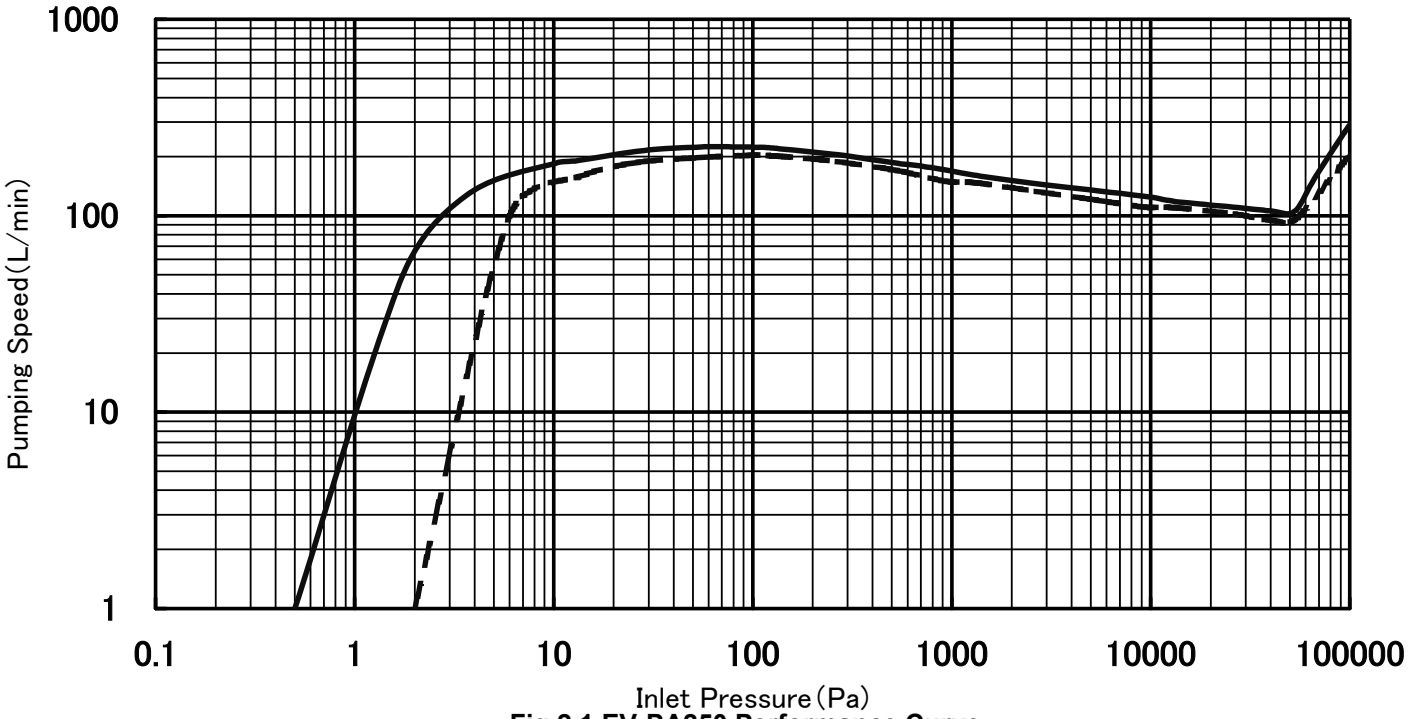


Fig 2.1 EV-PA250 Performance Curve

(Dashed line: Gas ballast setting)

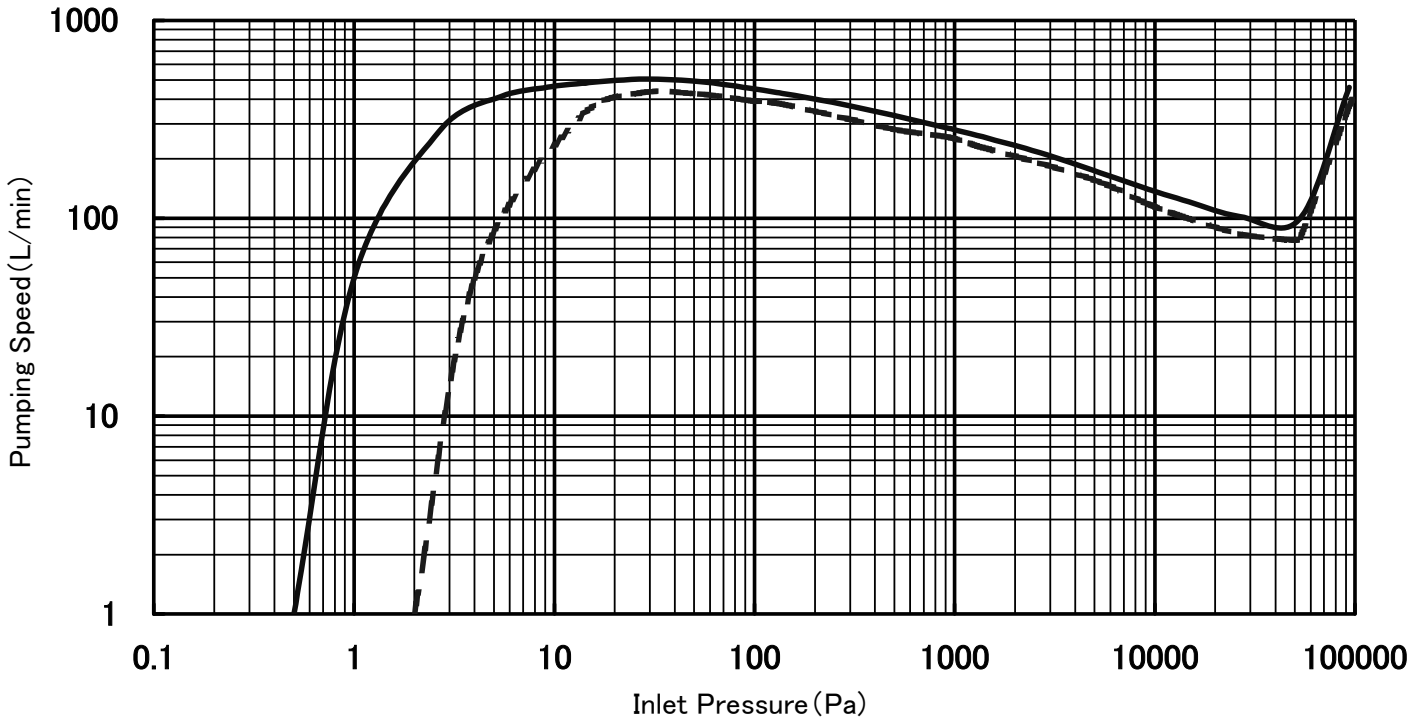


Fig 2.2 EV-PA500 Performance Curve

(Dashed line: Gas ballast setting)

2.3.4 System Flow

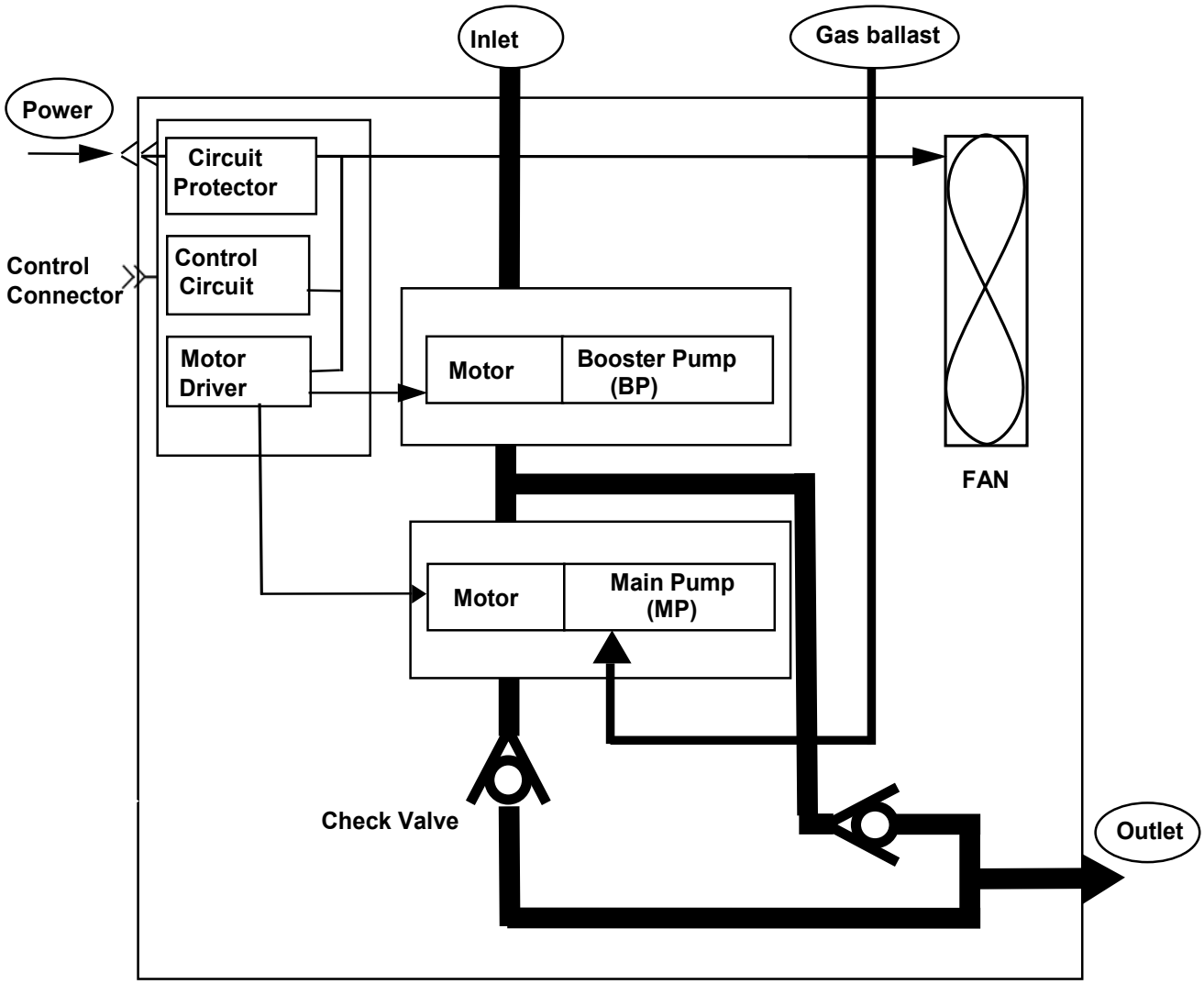


Fig 2.3 System Flow

3. Installation

Choose the parts suitable for use condition in the piping and a seal part. Pump performance is changed by the setting conditions such as the size / length of pump Iinlet / outlet.

3.1 Location

(1) This pump is designed for indoor installation. To install the pump, select a place following enviromental condition. Also allow for sufficient space to ensure easy pump installation and disassembly for maintenance.

Area of use:	Indoor Use only
Ambient temperature:	5℃ to 30℃
Humidity :	80% or less
Altitude restriction:	Max. 2000m
Pollution:	Pollution degree 2

Do not install the pump in the environment exposed rain, snow, ice or dust.

⚠ CAUTION

Install pump in a location at an ambient not exceeding 30°C. Particular caution is required when the pump is operated in an enclosed room.

⚠ CAUTION

Vents at both ends of the pump. Place the pump at least 100mm from the stationary section. If the cooling air supply is insufficient, the pump temperature will rise and problems such as rotor contact will occur.

⚠ CAUTION

Do not to overturn the pump when pushing and pulling it sideways, because the width of the pump is small to its height.

⚠ CAUTION

Do not step on the pump or place objects on it.

(2) Rubber feet of five each are attaches under the pump base. To fix the pump, install the pump on flat surface.

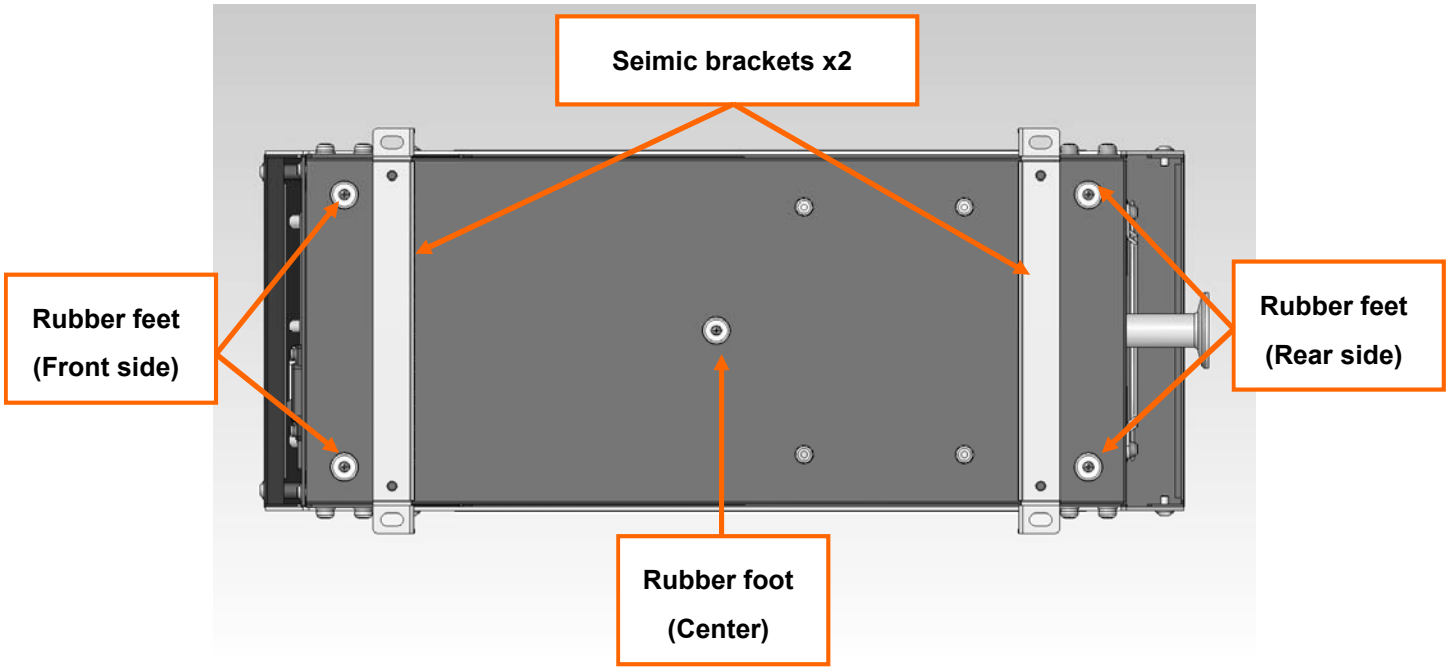
Note

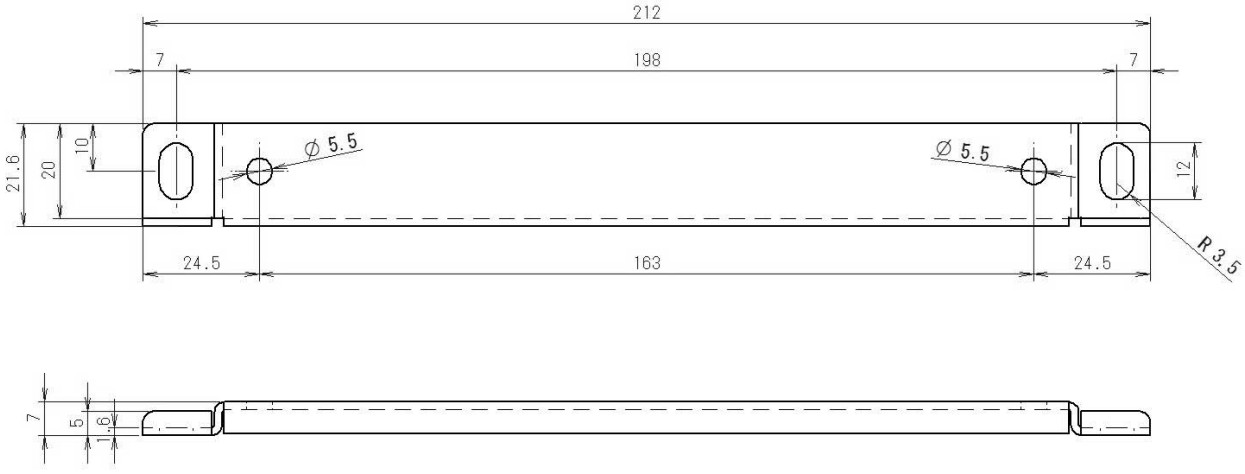
To fix the pump, the rubber feet of five each attaches. If the pump is not stable, vibration and noise of the pump may be increased.

To fix the pump, use the seimic brackets. (optional parts)

Following the information of weight distribution and the seimic brackets.

Model	weight (kg)	Loaded wight of each foot(N)		
		Front	Center	Rear
EV-PA250	16	26.5	31.4	36.3
EV-PA500	21	41.2	41.2	41.2





the seimic bracket（EV-PA250/500）

Material: Carbon Steel

3.2 Piping

3.2.1 Vacuum and Exhaust Piping

Heed the following cautions when connect the vacuum and exhaust pipes to the suction and exhaust flanges.

The ingress of foreign objects into the pump interior will prevent the pump from operating because a narrow clearance is not maintained in the pump

a) Remove all foreign matter from inside the piping.

b) Comfirm that no dirt or dust particles adhere to the flange surfaces and/or that the flange surfaces are damaged when connectiong. Provide a suitable means of preventing the ingress of reaction by-products adhering to the pipes and wafer fragments. For this purpose, a filter may be installed.

c) The weight of the pipes attached to the pump can cause misalignment and leaks from the flange connections. Be sure therefore to support the piping properly and not to apply undue force when aligning the flange faces. To reduce the transmission of vibration, it is recommended to insert flexible bellows when connecting the pipes to the suction and exhaust flanges of the pump. The length of the flexible bellows on the vacuum (suction) side will vary according to the vacuum drawn. Be sure to connect so that no undue force can be applied to the flexible bellows.

d) Decide a part to connect to the pump exhaust so that the exhaust pressure is not beyond atmospheric pressure.

⚠ WARNING

Check for leaks after you have installed the pump.

(Apply a pressure of 0.05 MPa or less for a leak check with pressurization.)

⚠ WARNING

Confirm the pump dose not come in contact with humans or inflammable substances. Do not remove the pump cover during operation.

The pump casing, inlet piping and exhaust piping become extremely hot during operation and for some time after stopping.

⚠ CAUTION

The exhaust piping made by polyvinyl chloride causes the noise thrugh the pipe.

3.2.2 Gas ballast Piping

When the gas ballast is supplied with pressurized gas, install regulator at the gas ballast port which is the connection type G1/8 Female. And adjust the supply pressure to 0.05MPa (Guage) pressure or less to set the gas ballast flow rate to 8.4Pam3/s.

3.3 Electrical Wiring

⚠ DANGER

Keep the power supply to the pump turned off until you have finished the wiring and connecting work. Also remove the power connector and interrupt the Circuit Protector (CP) during this.

⚠ WARNING

Carry out the electrical wireing only by qualified electricians.

⚠ WARNING

Install ELB(or CB) based on the law and the standard in the installation region. ELB (or CB) is not installed in the pump unit.

⚠ WARNING

Do not perform a withstand voltage test. Failure to comply could result in damage to the sensitive devices.

⚠ CAUTION

Do not apply the power supply from the pump's power pack to any other equipment as this will result in malfunctioning of the control units and in pump failure.

3.3.1 Power Supply Wiring

⚠ WARNING

Connect the pump to electrical supply with a suitable circuit breaker.
(lockout/tagout CB).

⚠ WARNING

Connect the grounding wire.

⚠ CAUTION

Use the correct wiring materials and size to match the operating conditions in accordance with the power consumption rating and ambient air temperature of the pump.

Connect the pump to a suitable earth point. Use the power cable with ground.

Insert the power cable in the grounding power outlet.

⚠ WARNING

Do not use the power cable adapter.

> ⚠ **WARNING**
>
> Granding at power outlet. Should be check by qualified electricians

Wire the connector for the main power supply (100-230V±10% AC at 1-phase 50Hz/60Hz).

Use the power cable recommended in Table 3.2.
Transient overvoltage on power supply: Installation category 2 of IEC 60364-4-443

Table 3.1 Receptacle Specifications

Pump model	EV-PA250	EV-PA500
Receptacle type	CM-11	
Recep. Manufactuer	HIRAKAWA HEWTECH Corp.	
Plug type (100V class)	VM0291	
Plug type (200V class)	VM0303B	
Power capacity VA	450	660

Table 3.2 Recommended Power Cable

Area	Voltage	Type	Manufacture	Specification	Suitable wire
Japan US	100~125V	NR VM602-VM0291 3M NON PB	HIRAKAWA HEWTECH Corp.	13A 125VAC 3m	AWG#16
Japan US EU	200~230V	NR VM0301 3M NON PB		10A 250VAC 3m Power outlet terminal: No plug	AWG#18

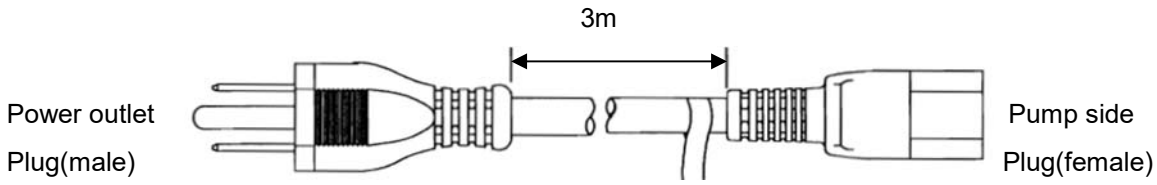


Fig.3.1 Sketch of Power cable（NR VM602-VM0291 3M NON PB）

If you have any requirement about the power cable, please contact EBARA or your dealer.

3.3.2 Control Signal Wiring

Connect wires to the control connector for remote operation and remote monitoring.

Tables 3.3 and 3.4 and Figs 3.2 show the pin assignments.

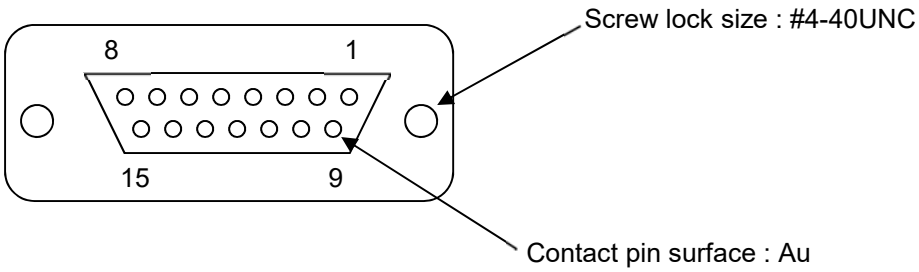


Fig 3.2 15 Pin D Sub-Miniature Female Receptacle

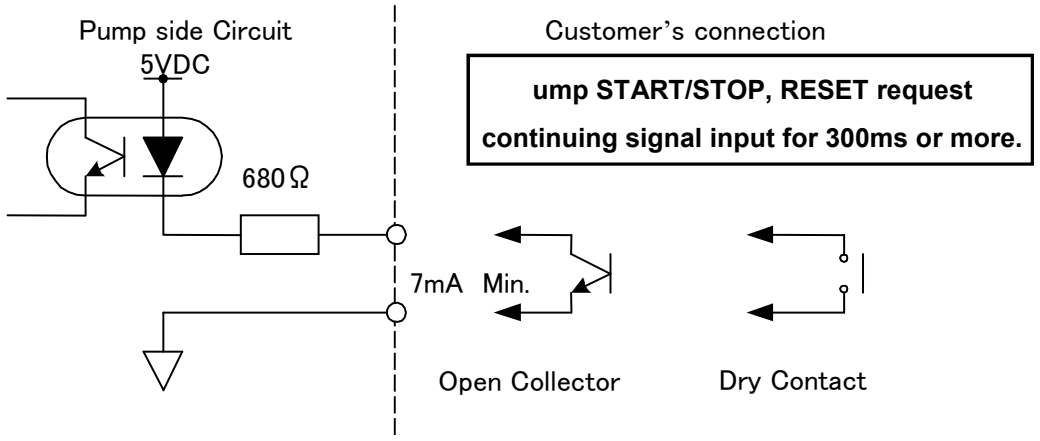
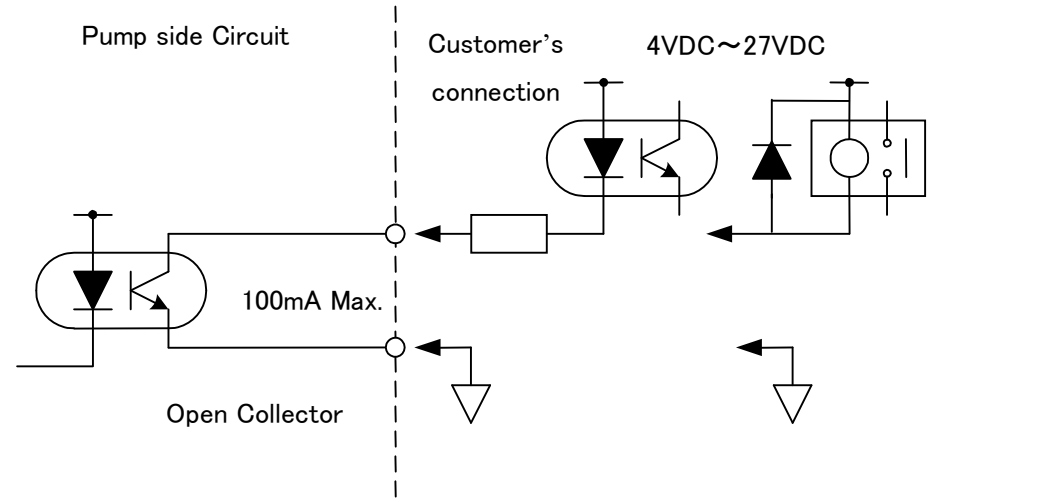
(As seen from connecting side)

Table 3.3 Control Connector Pin Assignments

Pin. No.	Signal name	I/O	Signal type
1	PUMP START (+)	IN	Run: CLOSE, Alternate
2	RESET (+)	IN	Reset: CLOSE, Alternate
3	PUMP START/STOP STATUS (+)	OUT	Run: CLOSE, Alternate
4	RESERVED (+)	OUT	
5	WARNING STATUS (+)	OUT	WARNING: OPEN, Alternate
6	ALARM STATUS (+)	OUT	ALARM; OPEN, Alternate
7	REMOTE STATUS (+)	OUT	REMOTE: CLOSE
8	–		
9	PUMP START (−)		
10	RESET (−)		
11	PUMP START/STOP STATUS (−)		
12	RESERVED (−)		
13	WARNING STATUS (−)		
14	ALARM STATUS (−)		
15	REMOTE STATUS (−)		

PUMP START/STOP, RESET request continuing signal input over 300ms.

Table 3.3 Signal Contacts

Input	
Output	

Note

Do not wire vacant pins.

Note

Apply a voltage between 4VDC and 27VDC on the equipment side. Do not apply 5VDC power on the equipment side. The output signals are generated from an open collector and the pump provides 5VDC power for input signals.

Note

Wire all signals with the correct polarity (SIG./COM.).

Note

When output signals energize an inductive load such as a relay, insert a diode (100V. 1A class) to limit the back electromotive force during de-energization.

4. Control Panel

4.1 Control panel Outline

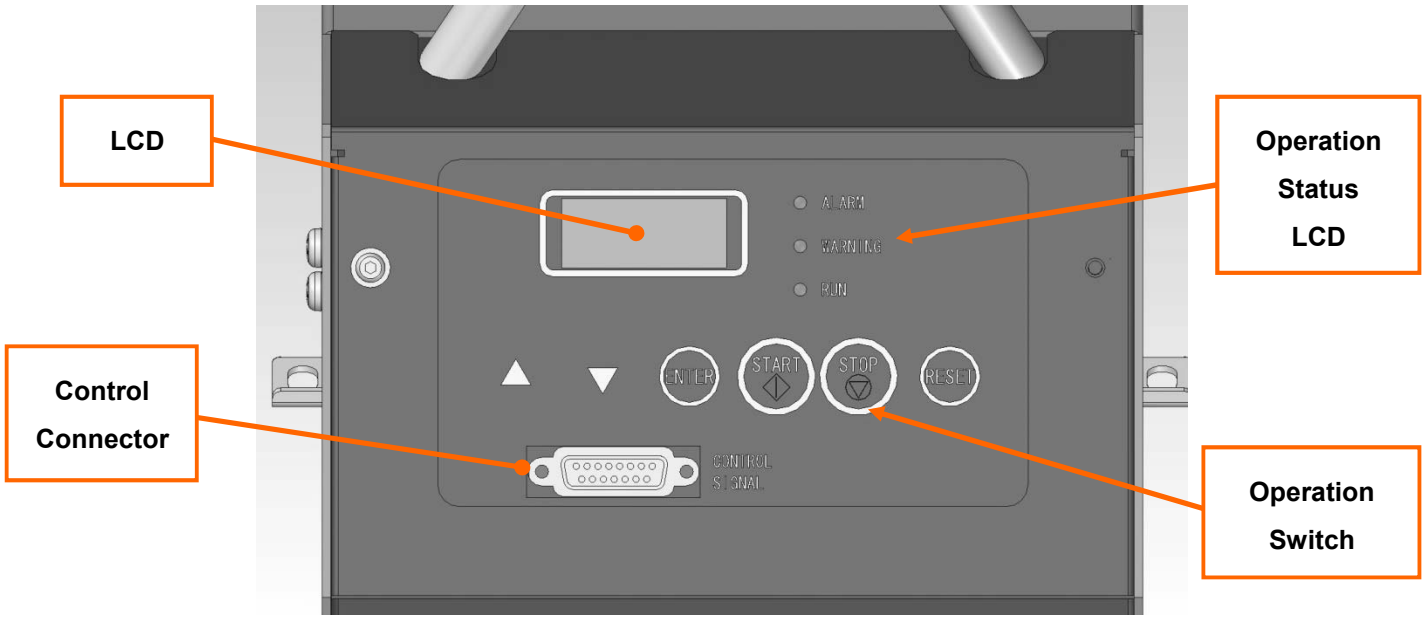


Fig 4.1 Controller on the Front Panel

[Buttons]	START	Pump Start
	STOP	Pump Stop
	▲ ▼	LCD Indication Change
	RESET	WARNING and ALARM Reset
	ENTER	Pump setting selection
[LED]	RUN	Pump running (green)
	WARNING	WARNING condition (orange)
	ALARM	ALARM condition (red)
[LCD]		For indication operation time, pump imformation and WARNING/ALARM status.

4.2 LCD Indication

The information of the pump, operation time and WARNING/ALARM status are displayed on the LCD of the controller.

For details of display, see Tables 4.1.

Table 4.1 LCD indications

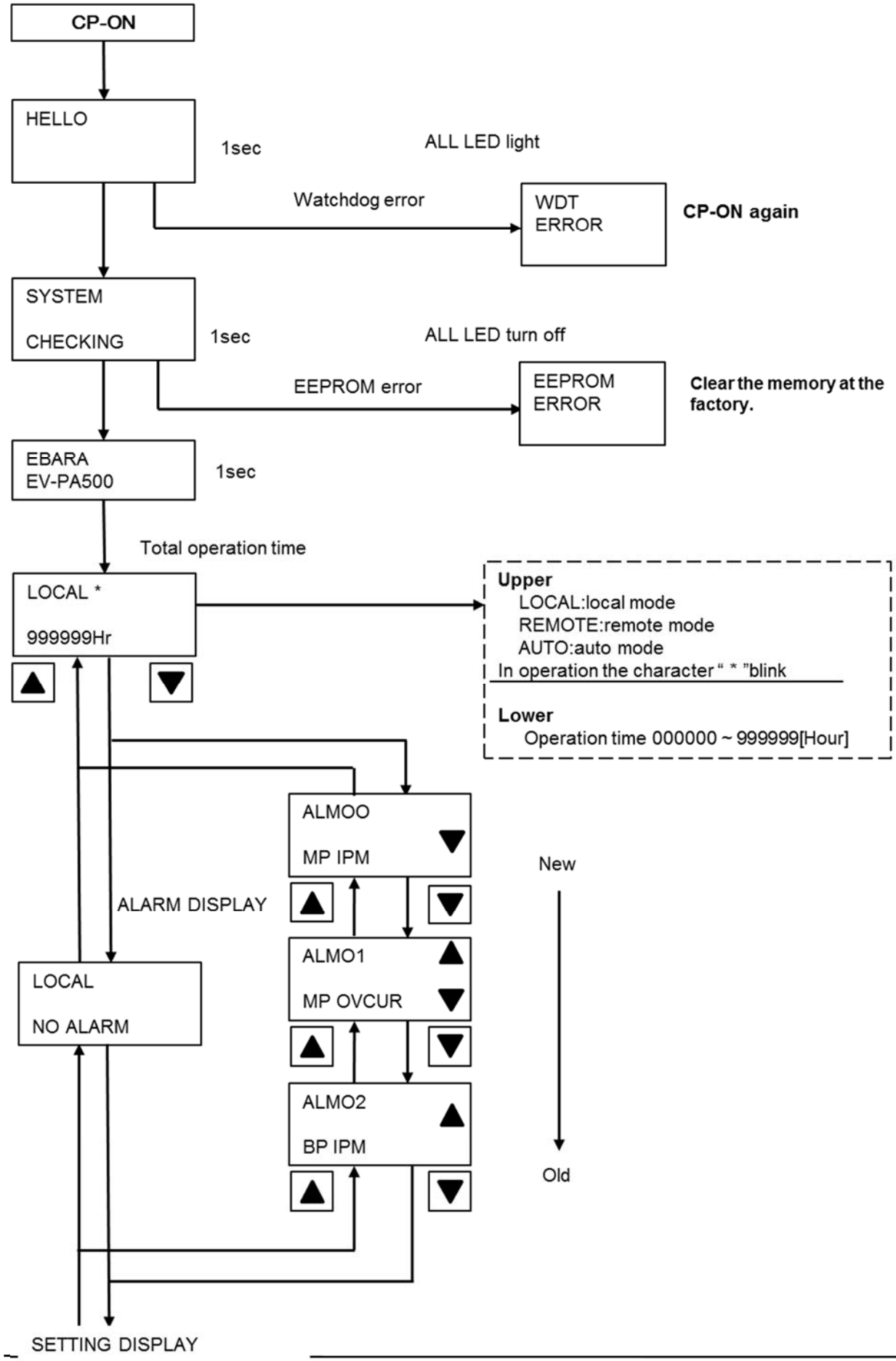
No.	Indications
1	Total operation time
2	WARNING／ALARM
3	Control mode
4	LCD backlight mode
5	Pump model

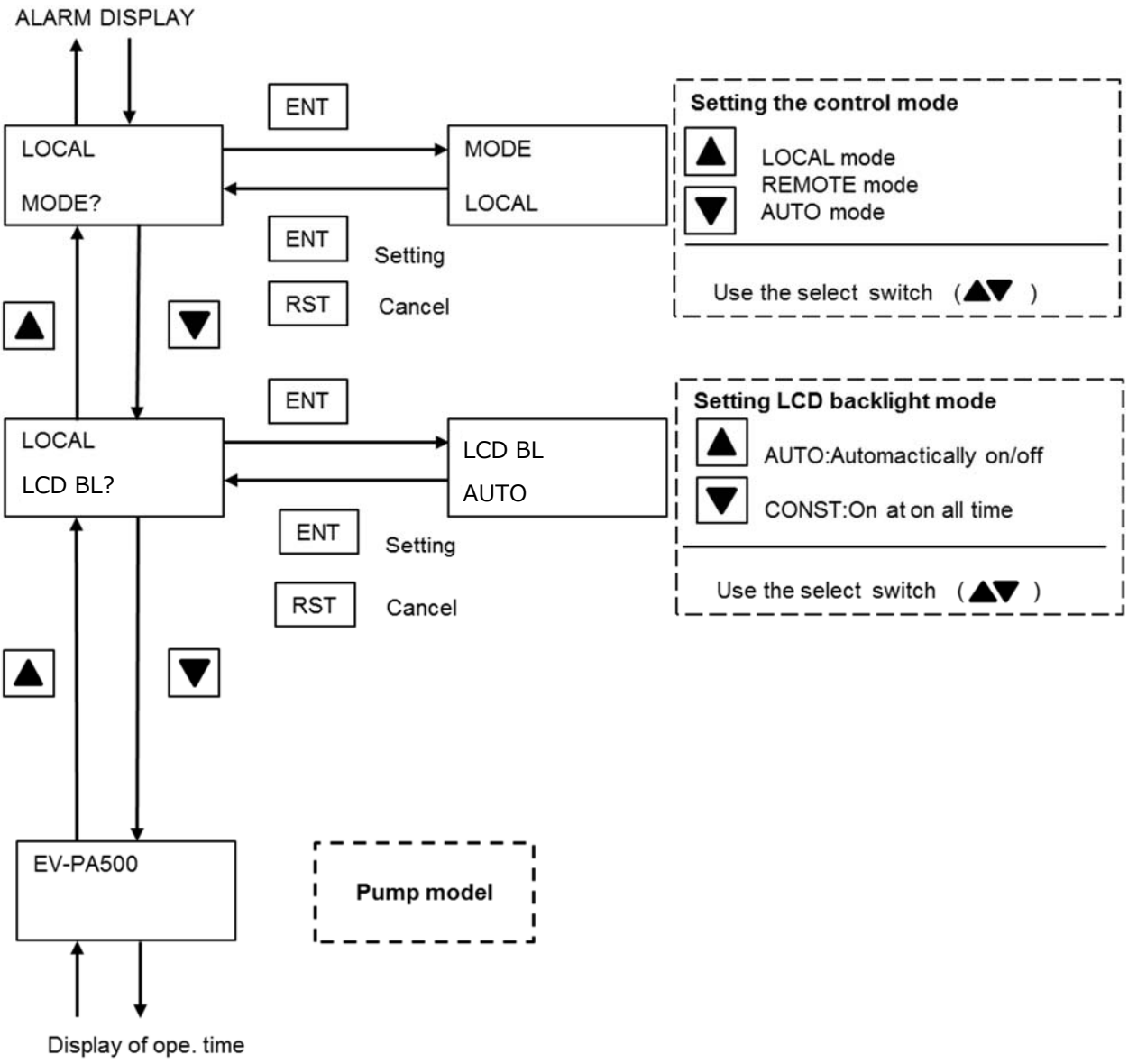
1. Total operation time is the total hours of operation after shipment from the factory.
2. When any warinig or alarm occurs, the LCD will be change the WARNING/ALARM display screen immediately.
3. Three control modes are available: ”LOCAL (local operation) “ and “REMOTE (remote operation) ” and “AUTO(auto operation)”. With the “AUTO MODE”, The pump starts driving when switched on in the state that short-circuited by the ”PUMP START pin” of the control connector. The pump starts driving after warm-up completion automatically (When a pump is not abnormal).

Note

With the “AUTO MODE”, the pump starts driving when switched on in the state that short-circuited by the ”PUMP START pin” of the control connector.
Do not supply a power till you confirm pump setting and safety complete when you use an “AUTO MODE”.

4. Two LCD backlight modes are available: ”AUTO “ and “CONST ”.
   In auto mode the backlight of display will turn off automatically. During WARNING/ALARM has occurred, the backlight light up.
5. The pump model is set at the time of shipment from the factory.


CP-ON
HELLO
1sec
ALL LED light
Watchdog error
WDT
ERROR
CP-ON again
SYSTEM
CHECKING
1sec
ALL LED turn off
EEPROM error
EEPROM
ERROR
Clear the memory at the factory.
EBARA
EV-PA500
1sec
Total operation time
LOCAL *
999999Hr
Upper
LOCAL:local mode
REMOTE:remote mode
AUTO:auto mode
In operation the character " * "blink
Lower
Operation time 000000 ~ 999999[Hour]
ALMOO
MP IPM
New
ALARM DISPLAY
ALMO1
MP OVCUR
LOCAL
NO ALARM
ALMO2
BP IPM
Old
SETTING DISPLAY



Pump start

Hold down START button for a second

Display ALARM/WARING

When any warning or alarm occurs, the LCD will be change the WARNING/ALARM display screen immediately.

LCD BACKLIGHT MODE:AUTO MODE

In auto mode the backlight of display will turn off automatically.

During WARNING/ALARM has occurred, the backlight light up.

To light up backlight, press any button without START/STOP.(Local mode)

Table 4.2 ALARM list

No.	LCD	Description	Pump status	Condition for recovery	Remark
1	MP IPM	MP IPM Trip	MP/BP STOP	Corrective action and reset	
2	BP IPM	BP IPM Trip	MP/BP STOP	Corrective action and reset	
3	MP OVCUR	MP over current	MP/BP STOP	Corrective action and reset	
4	BP OVCUR	BP over current	MP/BP STOP	Corrective action and reset	
5	MP STEP	MP step out	MP/BP STOP	Reset the ALARM	
6	BP STEP	BP step out	MP/BP STOP	Reset the ALARM	
7	MP OLD	MP overload	MP/BP STOP	Corrective action and reset	
8	BP OLD	BP overload	MP/BP STOP	Corrective action and reset	
9	MP THRML	MP temterature high	MP/BP STOP	Corrective action and reset	
10	BP THRML	BP temperature high	MP/BP STOP	Corrective action and reset	
11	OV VOLT	Over voltage of driver	MP/BP STOP	Corrective action and reset	
12	PWR FAIL	Power failure	MP/BP STOP	Corrective action and reset	
13	COM ALM	Inner com. error	MP/BP STOP	Corrective action and reset	(*1)
14	EEPROM ERROR	EEPROM ERROR at CP ON	LCD display ERROR	Clear the memory at The factory	At CP ON
15	DRV WDT	Watchdog error(driver)	MP/BP STOP	CP ON again	

(*1) When COM ALM occurs, the driver of pump will be free run automatically.

Table 4.3 WARNING list

No.	LCD	Description	Pump status	Condition for recovery	remark
1	PFC FAIL	PFC error	PUMP RUN	PFC recovery	
2	FAN ERR	Cooling Fan error	PUMP RUN	FAN recovery	
3	EEP WAR	EEPROM error	PUMP RUN	CP ON again	(*2)

(*2)

When EEP WAR occurs, the operation time is not saved to EEPROM.

The pump will not start when a WARNING has been generated before starting.

5. Operation

5.1 Before Starting

(1) Turn on the power supply to the pump.

> **⚠ WARNING**
>
> Connect the pump to electrical supply with a suitable circuit breaker.
> (lockout/tagout CB)

> **⚠ WARNING**
>
> Install CB based on the law and the standard in the installation region. CB is not installed in the pump unit.

(2) All LED light on once, and LCD backlight turn on after placing the Circuit Protector (CP) into the ON position. The Circuit Protector (CP) is a rocker type.

> **Note**
>
> The pump cannot start while the measuring instruments are warming up after the CP is placed in the ON position.

> **Note**
>
> With the “AUTO MODE”, the pump starts driving when switched on in the state that short-circuited by the ”PUMP START pin” of the control connector. The pump starts driving after warm-up completion automatically (When a pump is not abnormal)..

> **Note**
>
> When you turn on CP again after turn off CP, you must turn on CP after over 10 seconds.

(3) When the WARNING/ALARM display appears on the LCD and LED of the controller or when any abnormal symptoms are found other than the display, take action in accordance with 8. "Troubleshooting." Even when the cause of the WARNING/ALARM display has been removed, it is maintained until the RESET signal is entered. Either press the RESET button or enter an external RESET signal from the control signal connector.

(4) Open the valve before starting the pump when the pump exhaust pipe is equipped with a valve.

> **⚠ CAUTION**
>
> Problems will occur when the pump is operated with the valve closed as the exhaust pipe will be pressurized.

5.2 START/STOP

The control mode can be set LOCAL/REMOTE at any time. After stopping the pump, set in accordance with the operating conditions. (See 4.2)

a) START

Hold down the START button on the controller for over a second, or enter the external pump start signal input from the control connector.

The cooling fan and pump will start and the RUN lamp on the controller will light.

The operation time count during pump operation.

[NOTE] The pump will not start when an WARNING/ALARM has been generated.

b) STOP

Press the STOP button on the controller or interrupt the external pump start signal from the control connector. The pump and the cooling fan will stop simultaneously.

The RUN LED goes out and the hour counter stop.

> ⚠ **WARNING**
>
> Avoid contact and keep inflammable substances out of reach. Do not remove the outer cover during operation. The pump unit and the inlet piping and exhaust piping will remain at a high temperature during operation and for a short time after the pump has stopped.

5.3 Operation when momentarily power failure happens

The momentarily power failure means that power supply voltage become 85V or less. The pump operation is continued when the supply voltage is back to normal within 1 second. The pump operation is stopped and the alarm displayed when the momentarily power failure is continued more than 1 second. Then LCD display “PWR FAIL”. In the momentarily power failure condition, the pump rotor is driven by inertia due to interception of power supply. Thus, pumping performance may be decreased than guaranteed specification.

6. Maintenance and Inspection

6.1 Routine Inspection

Check periodically that ALARM signal is not output on the controller or remote output. When the WARNING/ALARM display appears, take action in accordance with Section 8. "Troubleshooting".

⚠ DANGER

Keep the power supply to the pump turned off until you have finished the wiring and connecting work. Also remove the power connector and interrupt the Circuit Protector (CP) during this.

⚠ WARNING

Avoid contact and keep inflammable substances out of reach. Do not remove the outer cover during operation. The pump unit and the inlet piping and exhaust piping will remain at a high temperature during operation and for a short time after the pump has stopped.

Even when the cause of the WARNING/ALARM signal has been removed the signal will be maintained until the RESET signal is entered. After you have taken the remedial action, press the RESET button on the controller or enter the RESET signal from the control signal connector to reset the WARNING.

⚠ CAUTION

Check the pump according to “8. Troubleshooting” before stopping suddenly. This pump doesn’t stop by signal “WARNING”. But signal “ALARM” or serious trouble occurs in a pump when pump driving is continued.

⚠ CAUTION

Do not start the pump when a WARNING/ALARM has been generated. After you have taken the remedial actions, reset the pump.

If any abnormal symptoms other than those displayed on the LCD controller appear, take action in accordance with the instruction of Section 8. "Troubleshooting".

6.2 Maintenance Parts List

Following labels are attached to pump covers. When they are hard to read for discoloring or peeling off, please stick them again as directed.

Table 6.1 Labels

Label's Name		Parts No.
[WARNING]	HAZARDOUS VOLTAGE WARNING LABEL	C-7000-009-1100
[WARNING]	HIGH TEMPERATURE WARNING LABEL	C-7000-009-1200
[WARNING]	HEAVY OBJECT WARNING LABEL	C-7000-010-0400
[CAUTION]	CHARGE MARK LABEL	C-7000-001-9600

6.3 Instruction for cleaning

The covers of the pump can be clean with an alcohol-soaked cloth. Do not damage the labels of the pump.

6.4 Repair and Serving

If any abnormal symptoms other than those displayed on the LCD controller appear, take action in accordance with the instruction of Section 8. "Troubleshooting".

If trouble occurs, to order repairs or servicing. Please contact EBARA CORPORATION or an authorized Agent/Distributor, and provide the information on the nameplate and details of the problem. Please contact EBARA.

7. Storage / Disposal

7.1 Storage

If the pump is not used for a long period, proceed as follows to store the pump.

(1) Replace all gases inside the pump by purging them with dry Air or N2 gas.

(2) Seal off the inlet and outlet ports of the pump with blind flanges.

(3) Store the pump in a dry and clean place.

Temperatur: 5℃ to 40°C

Humidity : 80% or less

7.2 Disposal

To dispose the unit, follow effective laws and ordinances applicable in the area where the unit is installed.


Nye
The SmartGrease Company™

Flammability limits in air, lower, % by volume	Not available
Vapor pressure	Not available
Vapor density (air=1)	Not available
Density	1 g/cm³
Solubility (water)	Not available
Partition coefficient (n-octanol/water)	Not available
Auto-ignition temperature	Not available
Decomposition temperature	Not available

10. Chemical Stability & Reactivity Information

Chemical stability	Stable.
Conditions to avoid	Heat, flames and sparks.
Incompatible materials	Strong acids, alkalies and oxidizing agents. Alkaline metals. Alkaline earth metals. Powdered metals. Halogenated compounds.
Hazardous decomposition products	Carbon monoxide, carbon dioxide and/or low molecular weight hydrocarbons. Hydrogen fluoride. Carbonyl fluoride.

11. Toxicological Information

Acute effects	Inhalation of decomposition products may cause polymer fume fever, a temporary flu-like illness accompanied by fever, chills, and sometimes cough. Refer to Hazards Identification Section for additional information.
Carcinogenicity	This product does not contain any carcinogens or potential carcinogens as listed by OSHA, IARC and NTP.

12. Ecological Information

Ecotoxicity	This material is not expected to be harmful to aquatic life.

13. Disposal Considerations

Disposal instructions	Dispose in accordance with all applicable regulations. Under RCRA, it is the responsibility of the user of the product to determine, at the time of disposal, whether the product meets RCRA criteria for hazardous waste.

14. Transport Information

Department of Transportation (DOT) Requirements

Not regulated as dangerous goods.

15. Regulatory Information

CERCLA (Superfund) reportable quantity

None

Superfund Amendments and Reauthorization Act of 1986 (SARA)

Hazard categories	Immediate Hazard - No Delayed Hazard - No Fire Hazard - No Pressure Hazard - No Reactivity Hazard - No
Section 302 extremely hazardous substance	No
Section 311 hazardous chemical	No

Inventory status

Country(s) or region	Inventory name	On inventory (yes/no)*
Australia	Australian Inventory of Chemical Substances (AICS)	Yes
Canada	Domestic Substances List (DSL)	Yes
Canada	Non-Domestic Substances List (NDSL)	No
China	Inventory of Existing Chemical Substances in China (IECSC)	Yes
Europe	European Inventory of New and Existing Chemicals (EINECS)	Yes
Europe	European List of Notified Chemical Substances (ELINCS)	No
Japan	Inventory of Existing and New Chemical Substances (ENCS)	No
Korea	Existing Chemicals List (ECL)	Yes
Philippines	Philippine Inventory of Chemicals and Chemical Substances (PICCS)	Yes
United States	Toxic Substances Control Act (TSCA) Inventory	Yes

A "Yes" indicates that all components of this product comply with the inventory requirements administered by the governing country(s)

State regulations This product does not contain a chemical known to the State of California to cause cancer, birth defects or other reproductive harm.

16. Other Information

HMIS® ratings
Health: 0
Flammability: 1
Physical hazard: 0

NFPA ratings
Health: 3
Flammability: 1
Instability: 0

Prepared by
William M. Medeiros
Regulatory Affairs Manager

Disclaimer The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication . The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release. Nye Lubricants, Inc. makes no warranty with respect thereto and disclaims all liability with respect thereon.

MSDS sections updated Composition / Information on Ingredients: Component Summary

MATERIAL SAFETY DATA SHEET

MSDS No. EW050044
Revised Date: 2007/10/12

CODE: 050-00446, 050-00463, 050-06661, 051-00459, 051-07517, 052-00467, 052-06925, 052-07221, 053-00453, 053-06531, 054-00461, 054-00466, 054-07220, 054-07225, 055-00457, 055-06895, 055-07515, 056-06663, 057-00451, 057-00456, 058-00469

IDENTITY Ethanol(99.5)

1. IDENTIFICATION OF THE SUBSTANCE OR MIXTURE AND OF THE SUPPLIER

PRODUCT IDENTIFIER :Ethanol(99.5)
MANUFACTURER : Wako Pure Chemical Industries, Ltd.
SUPPLIER : SUPPLIER(In JAPAN) : Wako Pure Chemical Industries, Ltd.
ADDRESS : 1-2, Doshomachi 3-chome, Chuo-ku, Osaka, 540-8605, Japan
TELEPHONE NUMBER & EMERGENCY TELEPHONE NUMBER: (06)6203-3741

SUPPLIER(In U.S.A.) : Wako Chemicals USA, Inc.
ADDRESS : 1600 Bellwood Road, Richmond, VA 23237, U.S.A.
TELEPHONE NUMBER : (804)271-7677
EMERGENCY TELEPHONE NUMBER : (800)424-9300 (CHEMTREC)

SUPPLIER(In EUROPE) : Wako Chemicals GmbH, Germany
ADDRESS : Fuggerstrasse 12 ,D-41468 Neuss, GERMANY
TELEPHONE NUMBER & EMERGENCY TELEPHONE NUMBER : (02131)311-0
RECOMMENDED USE : Research use only.

2. HAZARDS IDENTIFICATION

GHS CLASSIFICATION :
Flammable liquids: Category 2
Serious eye damage/eye irritation: Category 2A
Germ cell mutagenicity: Category 1B
Toxic to reproductive: Category 1A
Specific target organ systemic toxicity Single exposure: Category 3<the respiratory tract irritation >
Specific target organ systemic toxicity Single exposure: Category 3<anesthesia>
Specific target organ systemic toxicity Repeated exposure: Category 1<liver>
Specific target organ systemic toxicity Repeated exposure: Category 2<nervous system>

HAZARD SYMBOL :

DANGER

HAZARD STATEMENTS :
Highly flammable liquid and vapour
Causes serious eye irritation
May cause genetic defects
May damage fertility or the unborn child
May cause respiratory irritation; or May cause drowsiness and dizziness<the respiratory tract irritation >
May cause respiratory irritation; or May cause drowsiness and dizziness<anesthesia>
Causes damage to organs through prolonged or repeated exposure<liver>
May cause damage to organs through prolonged or repeated exposure<nervous system>

PRECAUTIONARY STATEMENTS :
Avoid breathing fume/gas/vapours.
Do not eat, drink or smoke when using this product.
Ground/Bond container and receiving equipment if electrostatically sensitive material is for reloading. if product is as volatile as to generate hazardous atmosphere:
Keep away from ignition sources such as heat/sparks/open flame. -No smoking.
Keep container tightly closed.
Take precautionary measures against static discharge.
Use explosion-proof electrical/ventilating/ lighting/.../equipment. ... other specified by the manufacturer/supplier or the competent authority.
Use only non-sparking tools.
Use personal protective equipment as required.
Wash hands thoroughly after handling.
Get medical attention/advice if you feel unwell. .
If eye irritation persists, get medical advice/attention.
IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
In case of fire, use ... for extinction ... appropriate media specified by the manufacturer/supplier or the competent authority if water increases risk.
Store container tightly closed in well-ventilated place -if product is as volatile as to generate hazardous atmosphere.
Store locked up.
Dispose of contents/container to a located point (in accordance with local/regional/national/international regulation).

3. COMPOSITION/INFORMATION ON INGREDIENTS

CHEMILCAL IDENTITY :Ethanol
SYNONYMS : Ethyl alcohol; Anhydrous alcohol; Ethyl hydrate
FORMULA : C2H5OH
MOLECULAR WEIGHT :46.07
CAS NUMBER : 64-17-5
TSCA INVENTORY : Listed

EINECS No. : 200-578-6
EC INDEX NUMBER : 603-002-00-5

4. FIRST AID MEASURES

GENERAL ADVICE :Wash off immediately with soap and plenty of water. In the case of respirable dust and/or fumes, use self-contained breathing apparatus and dust impervious protective suit. Use personal protective equipment.

INHALATION : Move victim to fresh air. If breathing is difficult, give oxygen. If irritation persists, consult a physician.
SKIN CONTACT :Remove contaminated clothes and shoes, rinse skin with plenty of water or shower. Use soap to help assure removal. If irritation persists, consult a physician.
EYE CONTACT : Remove any contact lenses at once. Flush eyes well with flooding amounts of running water for at least 15 minutes. Assure adequate flushing by separating the eyelids with sterile fingers. If irritation persists, transport to a hospital immediately.
INGESTION : Rinse mouth, give plenty of water to dilute the substance. Never give anything by mouth to an unconscious person. Consult a physician.

5. FIRE FIGHTING MEASURES

EXTINGUISHING MEDIA : Carbon dioxide, dry chemical powder, alcohol resistant foam, water
FIRE & EXPLOSION HAZARDS : Flammable liquid. Hazardous toxic and irritating fumes or smoke may be emitted. Vapors may travel considerable distance to ignition source and flash back.
SPECIAL PROTECTIVE EQUIPMENT FOR FIREFIGHTERS :Firemen should wear normal protective equipment(full bunker gear)and positive-pressure self-contained breathing apparatus.

6. ACCIDENTAL RELEASE MEASURES

PERSONAL PRECAUTIONS : Remove ignition sources and ventilate the area. In case of insufficient ventilation, wear suitable respiratory equipment. Avoid contact with skin and eyes.
ENVIRONMENTAL PRECAUTIONS :Prevent spills from entering sewers, watercourses or low areas.
METHODS FOR CLEANING UP : Do not touch spilled material without suitable protection(See section 8). Take up spilled material with ashes or other absorbents. After material is completely picked up, wash the spill site with soap and water and ventilate the area. Put all wastes in a plastic bag for disposal and seal it tightly. Remove, clean, or dispose of contaminated clothing.

7. HANDLING AND STORAGE

PRECAUTION FOR SAFE HANDLING :Avoid contact with eyes, skin and clothing. Avoid prolonged or repeated exposure. Handle material with suitable protection away from source of heat or ignition and use non-sparking type tools. Use explosion-proof electrical equipments and lighting. This material is hygroscopic.
CONDITIONS FOR SAFE STORAGE : Store away from sunlight in well-ventilated dry place at room temperature (preferably cool place). Keep container tightly closed.
INCOMPATIBILITIES : Oxidizers, peroxides, acids, acid chlorides, acid anhydrides, alkali metals, ammonia

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

ENGINEERING MEASURES :Use exhaust ventilation to keep airborne concentrations below exposure limits. Use only with adequate ventilation.
VENTILATION : Local Exhaust ; Necessary, Mechanical(General) ; Recommended
INDIVIDUAL PROTECTION MEASURES ;
Respiratory protection :Use a NIOSH/MSHA or European Standard EN149 approved respirator if the vapor concentrations exceed regulatory guidelines.
Hand protection : Chemical resistant gloves
Eye protection : Safety glasses(goggles)
Skin protection : Protective clothing

CONTROL PARAMETER :
OSHA Final Limits :TWA= 1000 ppm, 1900 mg/m3
ACGIH TLV(s) : TWA= 1000 ppm, 1880 mg/m3

9. PHYSICAL AND CHEMICAL PROPERTIES

APPEARANCE :	Colourless clear liquid
ODOUR :	Characteristic odour
pH :	Not available
MELTING POINT :	-117 ° C= -179 ° F
INITIAL BOILING POINT :	78.5 ° C= 173.3 ° F
FLASH POINT :	12.8 ° C= 55.0 ° F (TCC)
FLAMMABILITY (solid, gas) :	-----
EXPLOSIVE LIMITS :	Lower; 3.3 %, Upper; 19 %
VAPOR PRESSURE :	5.33 kPa (at 20 ° C= 68 ° F)
VAPOR DENSITY :	1.6(Air=1)
RELATIVE DENSITY :	0.789 - 0.791 g/ml (at 20 ° C= 68 ° F)
SOLUBILITY IN ;	
WATER :	Miscible
ALCOHOL :	Miscible
ETHER :	Miscible

ACETONE : Miscible
PARTITION COEFFICIENT : -0.32
AUTOIGNITION TEMPERATURE : 371 - 427 ° C= 700 - 801 ° F
DECOMPOSITION TEMPERATURE :Not available

10. STABILITY AND REACTIVITY

CHEMICAL STABILITY : Will not occur.
CONDITIONS TO AVOID : Sunlight, heat, open flames, high temperature, sparks, static electrical charge, other ignition sources, moisture
INCOMPATIBILE MATERIALS : Oxidizers, peroxides, acids, acid chlorides, acid anhydrides, alkali metals, ammonia
HAZARDOUS DECOMPOSITION PRODUCTS :Carbon monoxide may be formed.

11. TOXICOLOGICAL INFORMATION

ACUTE TOXICITY(oral/dermal/inhalation) : TDLo(orl,man): 700mg/kg(NTOTDY 8,77,1986)
LD50(orl,rat): 9000mg/kg(VCVGK* -, 93, 1984)
LC50(ihl,rat): 20000ppm/10H(NPIRI* 1,44,1974
TCLo(ihl,human): 2500mg/m3/20M(VCVGK* -, 93,1984)
SKIN CORROSION/IRRITATION : Skin; rabbit; 20mg/24H; Moderate(85JCAE -, 189, 1986)
EYE DAMAGE/EYE IRRITATION : rabbit; 100mg/4S; Moderate(FCTOD7 20,573,1982)
RESPIRATORY OR SKIN SENSITIZATION :Not available
GERM CELL MUTAGENICITY : DNA damage; S.cerevisiae; 850mmol/L(MUREAV 326,165,1995)
Mutation in microorganisms; S.typhimurium; 11pph(ENVRAL 52, 225, 1990)
Cytogenetic analysis; human; lymphocyte; 2.5pph/24H(MUREAV 537, 117, 2003)
TOXIC TO REPRODUCTION : TDLo(orl,woman): 250mg/kg(37 W preg); Effects on Embryo or Fetus - other effects to embryo (AJOGAH 145,251,1983)
TDLo(orl,rat): 22.5gm/kg(female 11-20 D preg); Specific Dveropmental Abnormalities - Central Nervous Systems(NETEEC 24, 719, 2002)
STOST-SINGLE EXPOSURE : Human ihl, 5000ppm(9,4mg/L), respiratory tract irritation and confusion(ACGIH 2001)
STOST-REPEATED EXPOSURE : Not available
ASPIRATION TOXICITY : Not available
CARCINOGENICITY : TDLo(orl,mouse): 320mg/kg/50W-I(CALEDQ 13,345,1981)
ADDITIONAL INFORMATION ;
NTP : Not listed
IARC : Animal evidence is inadequate
OSHA : Not listed
ACGIH :Not Classifiable as a Human Carcinogen (A4)
EPA GENETOX PROGRAM 1988, Positive: Rodant dominant lethal
EPA GENETOX PROGRAM 1988, Negative: Aspergillus-forward mutation; SHE-clonal
EPA GENETOX PROGRAM 1988, Negative/limited: Carciogenicity-mouse/rat

12. ECOLOGICAL INFORMATION

ECOTOXICITY : LC50(daphnids): 5463.9mg/L/48hr ECETOC TR91 2003
PERSISTENCE AND DEGRADABILITY :This material is biodegradable.
BIOACCUMULATION POTENTIAL : Not available
MOBILITY IN SOIL : Not available
OTHER ADVERSE EFFECTS : WGK; 1

13. DISPOSAL CONSIDERATION (INCLUDING CONTAINER)

Burn in small portion in a chemical incinerator equipped with an afterburner and scrubber in accordance with all applicable regulations. Any disposal practice must be in compliance with country, local, state, and federal laws and regulations (contact country, local or state environmental agency for specific rules).

After contents are completely removed, the container is abandoned. (in accordance with local/regional/national/international regulation).

14. TRANSPORT INFORMATION

IATA :
UN NUMBER : UN1170
UN PROPER SHIPPING NAME : Ethanol
CLASS or DIVISION : Flammable liquid.(Class 3)
PACKING GROUP : PG II
MARINE POLLUTANT : Yes
DOT(Department of Transportation) :
IDENTIFICATION NUMBER : UN1170
PROPER SHIPPING NAME : Ethanol
HAZARD CLASS : Flammable liquid (Class 3)

15. REGULATORY INFORMATION

US REGULATIONS ;
CAA/111 Volat. Org. Comp., NIOSH Recommend. Subst., IARC Subst. Not Assig. Overall Eval., NTP Test. Prog., DOT Haz. Mat., Mass. Subst.

List , New Jers. RTK Haz. Subst. List , Penn. Haz. Subst. List , Canad. WHMIS IDL 0.1% conc.
EPA : CERCLA RQ= Not listed
EPCRA TPQ= Not listed
EPA FIFRA 1998 STATUS OF PESTICIDES: Red Completed
OSHA :TQ= Not listed
NFPA : HR= health-0 , flam.-3 , react.-0
HMIS : HR= health-1 , flam.-3 , react.-0

16. OTHER INFORMATION INCLUDING INFORMATION ON PREPARATION AND REVISION OF THE SDS

No specific notes