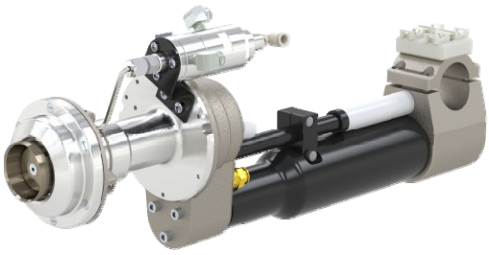
ASAHI SUNAC

Operation and Maintenance Manual

Rotary Atomizer
ESPO-TURBO II

ESA88A



Ec'Coater™ エコーター

This manual contains important information on warnings and cautions.
Read the manual thoroughly before starting to operate the equipment, and follow the instructions.
Always keep the manual handy until such time as the product is no longer being used. If your manual is lost or worn badly, do not hesitate to contact our agency which is closest to you, or Asahi Sunac Corporation directly, and ask us to send you a new one.

12th Edition: August 28, 2025

Introduction

Thank you for purchasing our product rotary atomized air electrostatic automatic gun ESPO-TURBO II <ESA88A>.

Please be sure to read this operation manual carefully before using this product so that you can always use it under the optimum conditions.
In particular, please fully understand the items in the specifications and use them according to the correct usage.

This product is used in combination with an electrostatic controller (BPS290).
Be sure to read the operation manual of the electrostatic controller carefully.

If you have any questions, please contact us by clearly stating the "product number" and "serial number" and contacting us on the back cover.

Please keep this operation manual in a safe place where you can easily refer to it.

12th Edition: August 28, 2025

Content

12th Edition: August 28, 2025

1 For safe and correct use

Please understand the contents of this instruction manual and be sure to follow the handling method. If you use it without following this instruction manual, **you may injure your body or damage your equipment and fire.**

The following safety precautions should be considered as minimum basic safety measures when using our products.

●Precautions are displayed in the following two stages.

⚠ **WARNING**	Hazards that can result in death or serious injury.
⚠ **CAUTION**	Danger that may result in minor or moderate injury or physical damage only.

●Other important points are indicated as follows:

NOTE	Observations to ensure the equipment's performance and functions are fully operational.

In addition, please observe all national and local laws and regulations related to fire, electricity, and safety, as well as the rules and regulations of your own company or business division.

≪Range of use suitable for the product≫

This product is an automatic spray gun designed to be installed in the coating booth equipped with an exhaust system, using special paint fluid prepared for rotary atomizer.

If you use the product under conditions other than the above, it will be used improperly. Also, please be careful as it may cause an accident.

《Warning and precautions for safe use》

⚠ WARNING

Fire and explosion

Preventing fire and explosion in coating shop

- **Do not use halogenated hydrocarbon solvents.**
  The aluminum alloy contained in this product's components may undergo a chemical reaction and explode.

- **Do not use this product outside its specifications.**
  Using it out of specification range may result in a fire hazard.

- **Provide adequate ventilation with ventilation equipment.**
  Volatilized organic solvents and other substances may remain and ignite, creating a risk of fire.

- **Clean the coating room and exhaust system (ducts and fans) regularly.**
  If the accumulated powder simply peels off, a spark may occur, which could cause a dust explosion.
  In the unlikely event of a fire, paint residue etc. will make it easier for the fire to spread and result in greater damage.

Prevent fire and electric shock caused by faulty earthing

- **All conductive objects in the coating booth (paint containers, peripheral equipment, etc.) must be grounded with an earth wire.**
  In an atmosphere ionized by high voltage, poorly grounded conductors can become charged, creating a risk of fire or electric shock due to spark discharge.
  The earth should be **Class D grounding or higher** (ground resistance 100 Ω or less).

- **Always keep the workpiece earthed.**
  Risk of fire or electric shock due to spark discharge from charged workpieces.

- **Paint hose must be grounded with an earth wire.**
  Static electricity can cause spark discharge, which can result in fire or electric shock.
  When paint flows through the injector and paint hose, static electricity is generated and becomes charged.

- **The paint container must be grounded with an earth wire (excluding the insulated stand specifications).**
  The paint path can cause the paint container to become charged, a risk of fire or electric shock.

- **The electrostatic controller must be grounded with an earth wire.**
  Static electricity can cause spark discharge, which can result in fire or electric shock.
  Connect the earth wire with screws or other fasteners to prevent it from coming loose.

《Warning and precautions for safe use》

⚠ WARNING

Fire and explosion

Prevent fire and electric shock caused by faulty earthing

- **Be sure to periodically remove any paint that has stuck to the hanger.**
  If paint adheres to the contact part between the hanger and the object, there is a risk of fire or electric shock due to poor earthing.
  The ground resistance value should be 1kΩ or less for metal (1MΩ or less for resin) (measurement voltage should be 500V or more).

- **Do not place any items in the coating booth that are not necessary for coating.**
  Static electricity can cause spark discharge, which can result in fire or electric shock.

- **Paint operator must take precautions to prevent static electricity.**
  Static electricity builds up on the human body, causing sparks to discharge, which may result in fire or electric shock.

Prevent fires caused by ignition of paints and solvents

- **When nozzle cleaning, turn off the power to the electrostatic controller.**
  If high voltage is applied during nozzle cleaning, there is a risk of fire.

- **Do not bring any spark-producing devices, matches, lighters, etc.**
  Risk of explosion or fire due to ignition of flammable materials.

Equipment misuse

Preventing accidents caused by poor maintenance

- **Any abnormal noise, vibration or high voltage leakage, immediately stop operation.**
  Product damage may result in a fire hazard.

- **Do not operate if any parts are damaged or missing.**
  Product damage may result in a fire hazard.

《Warning and precautions for safe use》

⚠ WARNING

Human protection

Protection from high voltage

- **Please wear anti-static shoes.**
  Static electricity builds up on the human body, causing sparks to discharge which may result in fire or electric shock.

- **Do not approach and touch the gun body while high voltage is applied.**
  Touch with high voltage parts may result in electric shock.

- **The coating work floor must have an anti-static construction with a leakage resistance of 1 MΩ or less.**
  There is a risk of electric shock to the operator.
  The scope of the antistatic structure is the entire work floor in a closed paint room.
  In an open paint booth, it is the area surrounded by 1.5m on either side of the booth opening and 2.5m in front of it.
  To maintain the antistatic effect, clean the work floor when it becomes dirty.

- **Do not use this product if you have a pacemaker.**
  The high voltage of this product may cause pacemakers to malfunction or stop functioning.

Protection from solvents, air and paint pressure

- **Do not spray paint towards person**
  Harmful substances may cause serious injury, including inflammation and poisoning.
  Pressurized paint can cause personal injury.

- **Wear protective glasses, a protective mask, and protective gloves[*1] when handling paint.**
  Harmful substances may cause serious injury, such as inflammation or poisoning.
  Carefully read the safety data sheet (SDS[*2]) of the paint you are using and take appropriate exposure prevention and protective measures.
  *1 When using protective gloves for skin absorption protection or to prevent dirt, it is necessary to prevent static electricity from building up on the human body. Be sure to ground it properly. (Recommended protective gloves are those specified in JIS T8118, or earth bands, etc.)
  *2 SDS：Safety Data Sheet

- **Clean the coating room and exhaust device (ducts and fans) regularly.**
  If the exhaust device does not function properly, harmful substances may cause serious injury, including inflammation and poisoning.

《Warning and precautions for safe use》

⚠ WARNING

- **Do not use this product outside its specifications.**
  Using it out of specification range may result damage to the product.

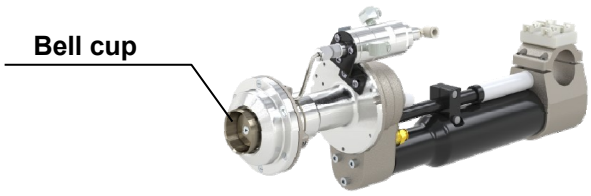
- **Do not immerse the coating machine, connection/extension cable or hoses in cleaning solvent.**
  Electrostatic sprayer are electrical machines, immersing them in cleaning solvents may cause break down.

- **Connection/extension cable and hose should be hung from the ceiling or side walls and not dragged across the floor.**
  It may cause damage such as scratches.
  When using conductive paint, be sure to suspend the paint hose from an insulating material such as a rubber tube.

- **Never use a metal brush to clean the sprayer or its components.**
  It may cause scratches, breakdowns, and poor coating results.
  The bell cup and bell cap are important parts of the sprayer.
  If you use a metal brush to scratch it, uniform coating will not be possible.

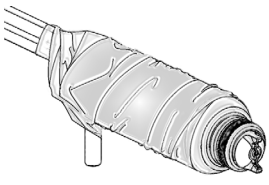
- **Check frequently for paint leaks, air leaks, and loose screw.**

- **Do not touch the bell cup of the sprayer carelessly.**
  There is a risk of injury if you come into contact with the edge of the bell cup, which is rotating at high speed. Please handle with care.

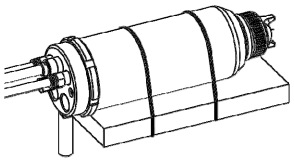


- **Do not install it like following.**

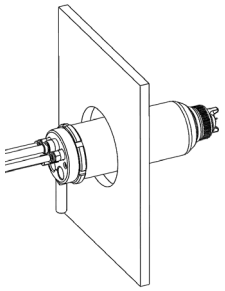
  Electrostatic guns apply high voltage to the tip of the gun and the rear is earthed, make sure there are no obstacles on the main body (insulated part).



①If the gun is used with the dirt-proof sheet wrapped around it, moisture will accumulate inside, causing an overcurrent error.



②If a metal plate is attached close to the gun body, insulation breakdown may occur between the charged part of the gun and the plate.



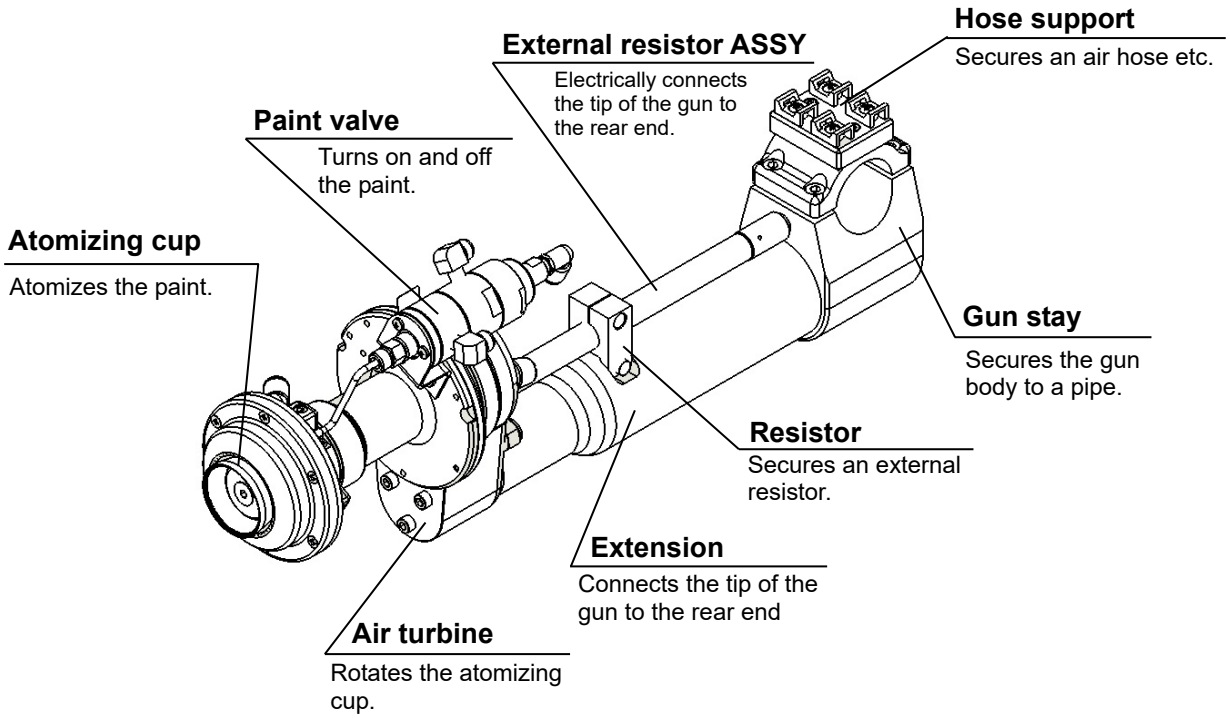
③If the gun body is inserted through a hole in a metal plate, insulation breakdown may occur, just as in ②.

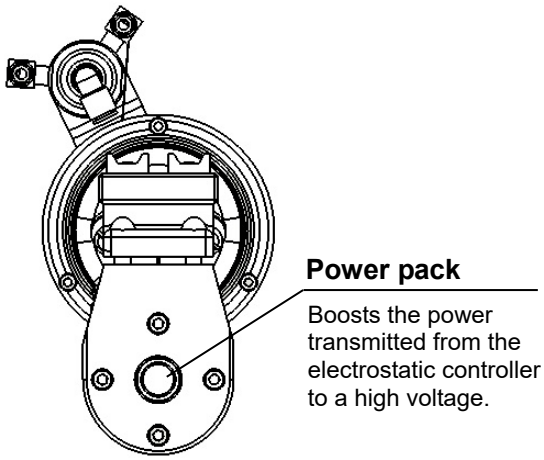
● **A fire extinguisher should always be kept near the work area.**
In case of a fire, make sure to have equipment that has been regularly inspected installed at all times.

● **When disposing of this product, please dispose of it in accordance with the laws of your country.**

2 Overview of the Equipment

2.1 Names and roles of parts





2.2 Gun body components

[1] Rotary atomized air electrostatic automatic gun “ESPO-TURBO II” body (ESA88A)
The gun body contains the power pack (high voltage generator).

[2] External resistor ASSY
Electrically connects the tip of the gun to the rear end and prevents residual charge from remaining at the tip of the gun when the power is turned off as a grounding route.

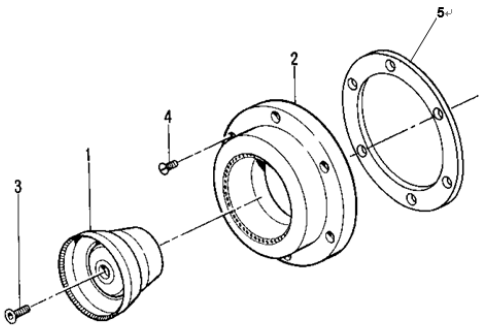
[3] Air turbine
Functions to rotate the atomizing cup with air.

[4] Paint valve
Functions to turn on/off the paint by air control.

2.3 Associated accessories (optional parts)

- Associated accessories and dedicated tools are items and tools required for the operation and use of the product.
  Select appropriate items from among those listed below in accordance with the application and conditions, and separately arrange for them.
- When arranging for associated accessory products and parts, check their part numbers and quantities with the instruction manual for each equipment.

2.3.1 Air nozzle set (AC series)



*Reference

Cup type	Pattern diameter (mm)
AC500A	460
AC600A	510
AC700A	560

*The pattern diameter varies depending on the amount of the paint to be sprayed and other conditions.

Air nozzle set components *Gaskets are available only for the Φ50 and Φ60 cups.

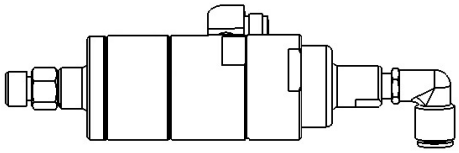
No.	Set		1 Atomizing cup		2 Air nozzle	3 Cup locking screw	4 Nozzle locking screw	5 Gasket
	Model	Part No.	Specifications	Part No.	Part No.	Part No.	Part No.	Part No.
1	AC500A	1578	Φ50 cup	1578-101	1578-102	1578-003	61-20410 *Six pieces are used for a set.	1578-005
2	AC600A	1581	Φ60 cup	1581-101	1581-002			
3	AC700A	1584	Φ70 cup	1584-101	1584-002			

2.3.2 Power transmission cable

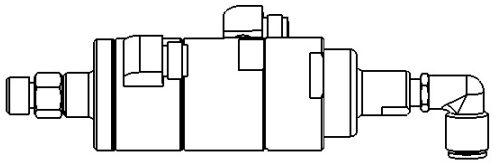
- You can connect the “connection cable” and “extension cable” up to 30 m between the coating equipment and electrostatic controller and use them as a power transmission cable.

No.	Part No.	Part name	Specifications
1	2535	Connection cable	10m
2	2530	Extension cable	10m

2.3.3 Paint valve



Two-way valve



Three-way valve

No.	Part No.	Part name	Model
1	1374	Two-way valve	PV21
2	1373	Three-way valve	PV31

2.3.4 Electrostatic controller (BPS290)

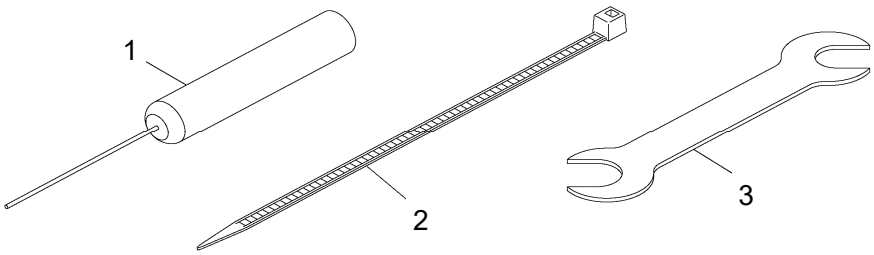
- The electrostatic controller controls the application of the high voltage of the power pack built in the coating machine body.
  It also detects and outputs various errors by monitoring current values during use.

Appearance of the BPS290

*For the detailed specifications, see the instruction manual for BPS290.

No.	Part name	Part No.	Specifications
1	BPS290	445-0161	Version in both Japanese and English
2		445-0162	Version in English
3	BPS290WB	6637	Water-based paint insulating stand system

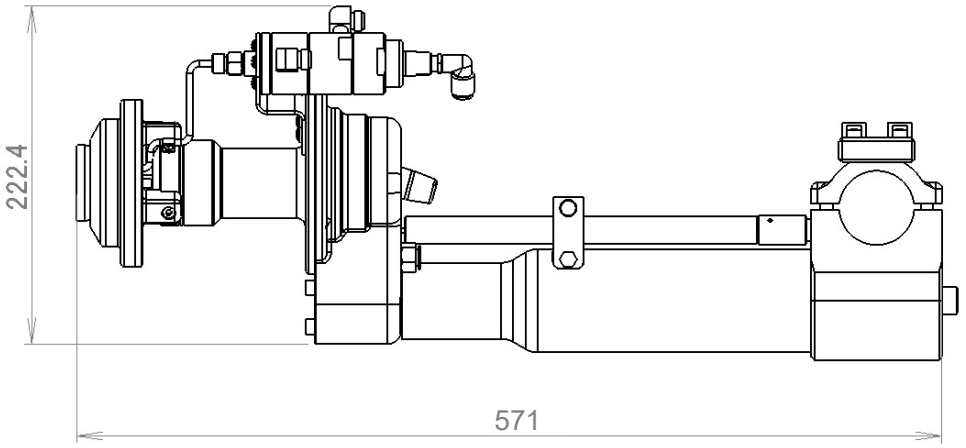
2.3.5 Dedicated tools



No.	Part No.	Part name	Qty
1	3545-001	Pin	1
2	316-0022	Pan-Ty	4
3	3503-003	Flat spanner	1

3 Specifications

3.1 External dimensions

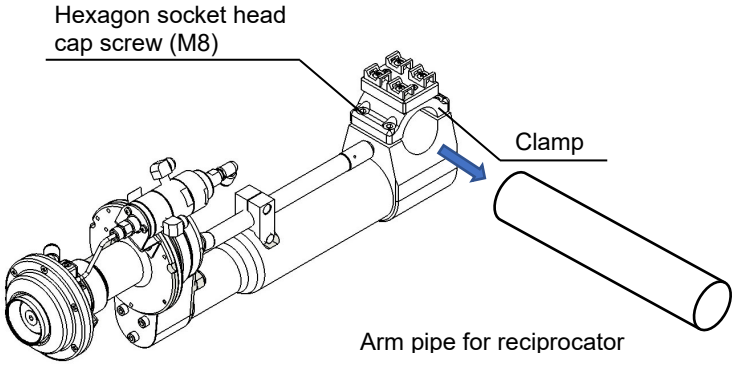


3.2 Product specifications

Model	ESA88A
Body dimensions (L x W x H)	571 × 120 × 222 mm
Mass	5,900g *Excluding electrostatic cables and hoses
Maximum fluid pressure	0.6 MPa
Maximum air pressure	0.6 MPa
Maximum applied voltage	-90 kV (-50 kV DC when the BPS290WB is used)
Maximum current value	120 μA
Valve operating pressure	Minimum operating pressure : 0.3 MPa, normal operating pressure: 0.4 to 0.5 MPa
Applicable air nozzle	AC500A/AC600A/AC700A
Electrostatic controller	BPS290 series
Connection cable length	10 meters *Extendable up to 30 meters in combination with extension cables.
Service environment	Temperature: 5 to 40°C, humidity: 40 to 80%
Standard atomized air pressure	Max: 0.22 MPa, Min: 0.12 MPa
Amount of paint sprayed	Max: 600 ml/min (at 17 sec/FC#4)
Standard air consumption	Air motor: 150 l/min, pattern air: 275 l/min (0.2 MPa)
Supply air conditions	Solid particle size: 0.1 μm or less
	Dew point under pressure: 10°C
	Dew point at atmospheric pressure: -17°C
	Remaining oil amount: 0.01 mg/m^3

4 Installation and connection of the gun

4.1 How to installation the gun



[1] Loosen the four hexagon socket head cap screws (M8).

[2] Insert the clamp into the arm pipe.

In this step, be careful with the correct up and down directions of the coating machine.

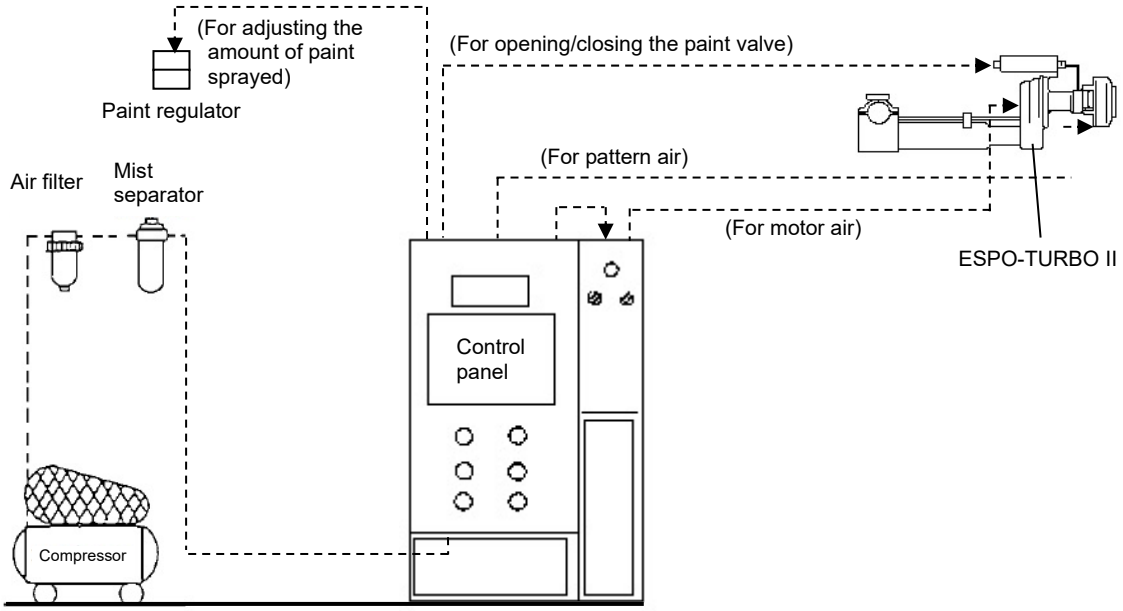
[3] Adjust the position so that the distances from the paint regulator and from the side walls of the reciprocator are at least 300 mm and that the distance between the Espo turbos is at least 600 mm.

[4] Adjust the gun body so that it is used below horizontal.

[5] Make an adjustment so that the spray distance will be 250 mm or more.

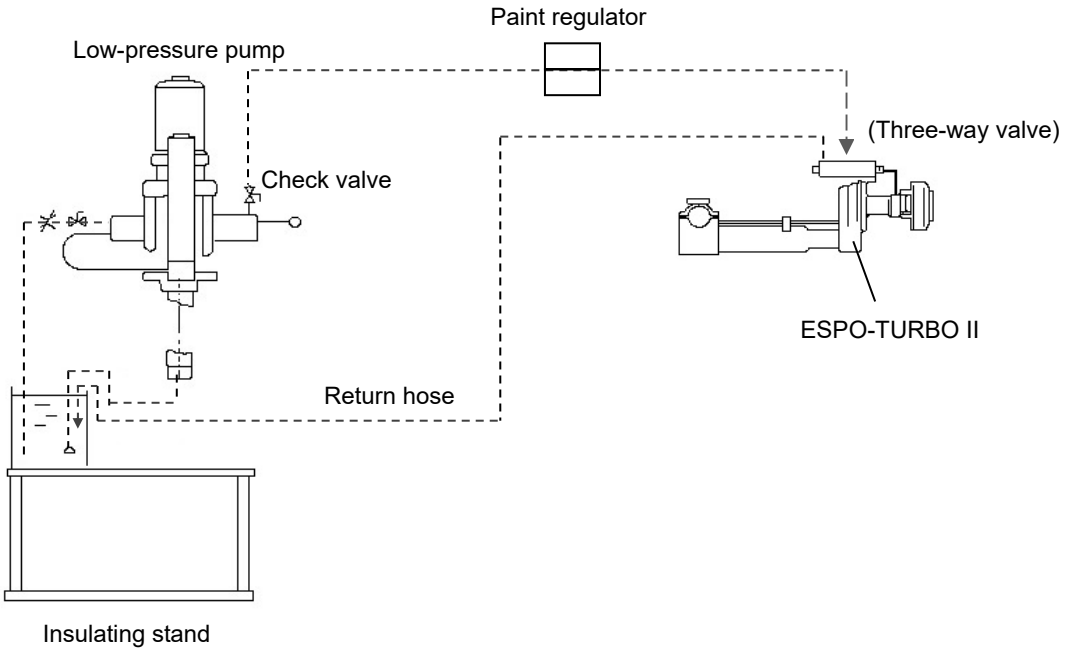
[6] Thoroughly tighten the four hexagon socket head cap screws (M8) to securely fix the gun.

4.2 Air hose pipes



Prepare compressed air of fine quality with as less dust, oil mist, and moisture as possible.
In addition, to prevent pressure loss along the way, use steel pipes of at least 3/4B inch for the air piping from the compressor to the control panel.

4.3 Paint hose piping



High voltage is applied to the paint inside the paint hose, so do not allow it to come into contact with other objects. When passing through the booth wall or supporting the fixed part, please use a combination of "penetration bushings" and "insulating supports" for piping.

5 Precautions Before Operation

ESPO-TURBO II is a coating machine applying high-voltage static electricity and may therefore trigger an accident, such as a fire or electric shock, due to incorrect handling or safety management.
The coating system is designed with emphasis on safety but should be handled with extreme care.

⚠ WARNING

- Do not bring objects to be coated into contact with the atomizing cup of the rotary atomized air electrostatic automatic gun.
  If objects to be coated come close to the atomizing cup due to inappropriate hanging or conveyor sway, they will generate sparks, resulting in a fire. In particular, when an insulating stand is used, maintain a sufficient spraying distance because large sparks will be generated.

- When using an insulating stand, keep the paint feeder at least 300 mm away from the surroundings. Paints with low electric resistance conduct electricity like wires and there is a risk of electric shock if they contact paint containers etc. A grounded safety fence is required for places facing aisles.

6 Paint Preparation

Before performing coating work, make coating preparations in accordance with the procedure described below.

⚠ CAUTION

Confirm that the power switch of the electrostatic controller is turned off.

6.1 Paint adjustment

- Preparing the paint

  Use “electrostatic thinner” as solvent. In addition, using a solvent slower in drying than air electrostatic thinner increases wraparound and penetration power and enables you to obtain good paint films more easily.

  By adjusting the resistance values of paints to approximately 20 to 70 MΩ, a satisfactory effect can be obtained in most cases. (In the case of a non-conductive paint, it is necessary to adjust its resistance value.)

  Some paints with an extremely low or high electric resistance value are not expected to have much electrostatic effect. Check the resistance values of paints using a paint resistance meter.

⚠ WARNING

If the pump is installed on the insulating stand and you touch or approach the pump installed for the supply of paint etc., be sure to turn off the electrostatic charge and ground the pump installed and paint. Furthermore, install a fence at least 30 cm away from the pump installed. If you approach it during electrostatic charging, there is a risk of an electric shock or ignition.

⚠ CAUTION

An electrostatic effect can hardly be expected from conductive paints with an extremely low electric resistance value, such as metallic and water-based paints, unless a paint supply system using an insulating stand is adopted.
In addition, when such a paint is used and a high voltage is applied, the high voltage cut-off circuit of the electrostatic controller will operate to cut off the high voltage with the sound of the warning buzzer. The warning buzzer will be reset by turning off the power switch of the electrostatic controller.

⚠ CAUTION

Use a paint and a solvent whose flash point is at least 5°C higher than the room temperature, and be sure to keep the ventilator operated.

NOTE

If compatibility between the gun/coating equipment and the paint is unclear, please consult us.

- Pouring the paint

  Pour the paint into the paint feeder.

  The general standard viscosity when using this coating equipment is about 15 to 25 sec/FC#4, but it is not necessarily limited by various conditions, such as the types of the paint and the solvent, the shape of the object to be coated, and the thickness of the paint film.

- Supplying the paint

  If air remains in the paint hose, the paint will be jetted interruptedly and the spraying condition will become unstable. For this reason, thoroughly purge air from the hose.

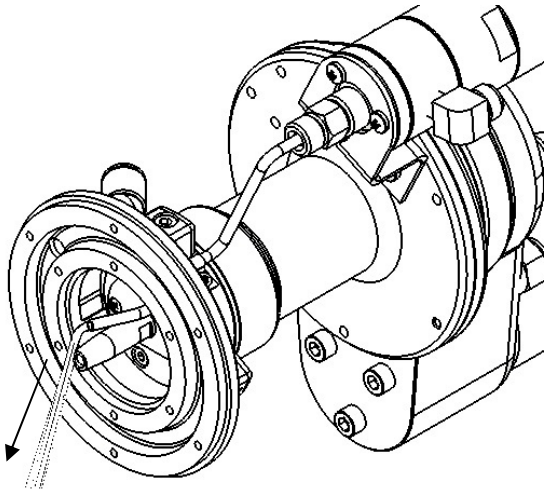
- Jetting the paint

  Jet the paint from the tip of the gun.

  Turn on the paint valve with no air supplied to the gun, and jet the paint from the tip of the gun.

  If air remains in the paint hose, the paint will be jetted interruptedly. For this reason, jet the paint until the air inside the hose is thoroughly purged.

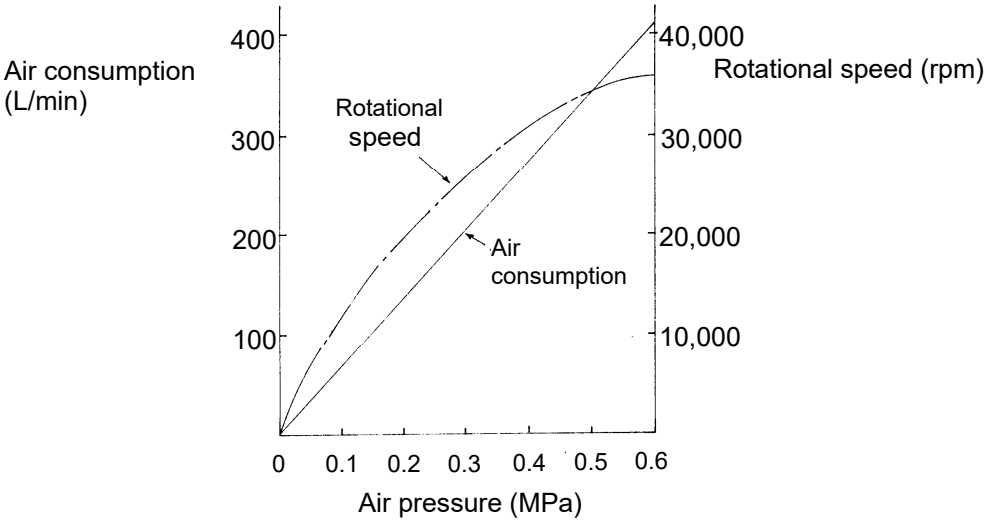
  (To perform this operation, detach the air nozzle set.)



6.2 Setting of coating conditions

- Setting the rotational speed

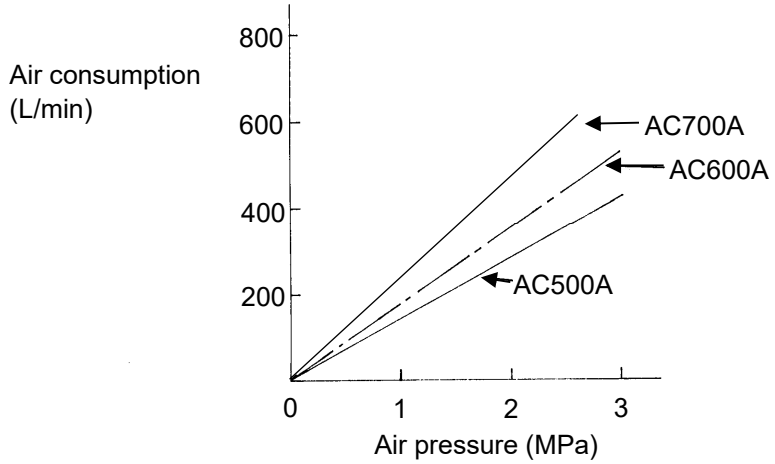
  When spraying an ordinary industrial paint, the optimum rotational speed of ESPO-TURBO II is between 10,000 and 20,000 rpm. The air pressure in this case is between 0.12 and 0.22 MPa.
  If RPM is excessively increased, atomization will be accelerated and the evaporation of the solvent will (seem to) be quickened, resulting in poor coating workability.



* The rotational speed for ordinary metal coating is 10,000 to 20,000 rpm, and the air consumption is approximately 150 L/min.

- Adjusting the pattern air pressure

  Pattern air reduces the lateral scattering of paint particles and provides them with penetration power. If pattern air is excessively strong, transfer efficiency will decrease, providing adverse effects such as the swinging of objects to be coated.
  Meanwhile if it is too weak, the dirt on the booth and conveyor will increase, so adjust the air pressure optimally.



Use a pattern air pressure of up to approximately 0.2 MPa in general.
The air consumption is 275 L/min in the case of the AC500A, 350 L/min in the case of the AC600A, and 410 L/min in the case of the AC700A.

- Spraying distance
  The spraying distance should be 150 mm or more at the closest distance between the nozzle tip and the object to be coated, and the coating machine should be in front of the front of the reciprocator.
  If the distance is excessively far, adhesion efficiency will decrease, and if the distance is excessively close, sparks may be generated.
  The optimum spraying distance is in the range of 250 to 300 mm.

- Operating speed
  Although the operating speed of the reciprocator is determined by the required thickness of the paint film, it is generally in the range of 15 to 45 m/min. (In general, satisfactory results can be obtained at 40 m/min or less.) If the required paint film cannot be obtained even at an operating speed exceeding 50 m/min, it is necessary to consider increasing the number of air electrostatic automatic guns or adding a paint heater. In such a case, please contact our coating engineering department. (Increasing the operating speed is not the best approach because it will result in a decrease in adhesion efficiency.)

- Cutting off spray atomization
  The operating stroke of the reciprocator is fixed, so cut off the paint on unnecessary portions in accordance with the length (or width) of the object to be coated.
  Adjust cutting by changing the settings of our reciprocator operation panel while checking the atomized state of the paint.

- Adjusting the applied voltage
  Adjust the applied voltage to an optimum value based on the type of the paint, the material of the object to be coated, and the required quality.
  Set the applied voltage to -70 to -90 kV DC in general, to -60 to -80 kV DC for metallic or water-soluble paints, and to -50 to -80 kV DC for woodwork coating.

6.3 Painting operation

Perform coating work in accordance with the instruction manual for the control panel.
Keep clear of the coating machine during operation. When approaching it, be sure to turn off the reciprocator, stop the rotary air of the atomizing cup, and ground the residual charge of the coating machine with an earth rod.

⚠ CAUTION

Before cleaning the gun, be sure to confirm that the electrostatic high-voltage generator is turned “OFF,” and remove electrostatic charges with an earth rod.

6.4 Handling during the suspension of and at the end of coating work

- Cleaning the atomizing cup
  Be sure to clean the atomizing cup during the suspension of and at the end of coating work.
  - Press “OFF” on the pushbutton switch for high voltage to turn off the high voltage.
  - Turn off the reciprocator and stop paint atomization, the cup rotary air, and the pattern air.
  - For safety, keep a grounded earth rod in secure contact with the air motor for at least ten seconds to thoroughly remove the residual charge of the coating machine body.
  - Detach the cup, and immerse it in a solvent so that the adhering paint can be easily removed.

- Put thinner on a soft brush to remove the paint inside and outside the atomizing cup. Be careful not to damage the cup. Do not clean the atomizing cup with a brush while it is attached to the main body of the painting machine, as this accelerates wearing.
- If the grooves on the edges of atomizing cups are particularly dirty, immerse the cups well in a solvent solution and then wash away along the direction of the grooves with a brush.

⚠ CAUTION

The atomizing cup is an important component for coating performance. Handle it with extreme care. If a dent or large scratch is found, do not use it.

- Cleaning the paint hose, the rotary atomization electrostatic coating machine, and the air control type paint regulator

  When you change paint colors or do not use the coating machine for a long time, clean inside of the paint path.
  - Press “OFF” on the high voltage switch to stop the generation of the high voltage.
  - Turn off the reciprocator, and stop paint atomization, the cup rotary air, and the pattern air.
  - For safety, keep a grounded earth rod in secure contact with the air motor for at least ten seconds to thoroughly remove the residual charge of the coating machine body.
  - Set the work selector switch to “CLEAN.”
  - Select manual operation mode, and drain the paint out of the paint path by operating the empty paint pump (feeding pressurized air can save time). At this time, reconfirm that the high voltage is turned off.
  - Switch the three-way cock of the pump, and push the paint by air out of the paint hose, the air control type paint regulator, and the rotary atomization electrostatic coating machine. After the paint is pushed out, close the cock.
  - Switch the suction pipe of the paint pump to the solvent tank to circulate the solvent through the paint path without flowing out of the tip of the automatic electrostatic coating machine (repeat this operation twice or three times with a clean solvent).
  - When you do not use the coating machine for a long time, thoroughly drain the solvent out of the paint path, or thoroughly fill the paint path with a solvent.
  - Wipe dirt off the surface of each unit with a cloth impregnated with a solvent.

- Cleaning the rotary atomization electrostatic coating machine
  - The extension (black resin rod) and the external resistor ASSY are important parts for safety. Impregnate a waste cloth with a solvent, wipe off dirt, and completely dry after cleaning, and confirm that the solvent on the surface is gone.
  - Keep clean by removing paint dirt on the front surface of ESPO-TURBO II and around the shaft with a brush, solvent, etc. If dirt is serious, a coating defect may occur.
  - Wipe the surfaces of the paint and air hoses with a waste cloth impregnated with a solvent. If dirt is serious, an overcurrent will flow and inhibit normal coating work.

⚠ WARNING

- Before cleaning the cup, do not fail to turn off the high voltage switch.
- If the paint used has a low electrical resistance value, no electrostatic effect will be made unless an insulating base is used.
  In general, it is necessary to use an insulating stand when the resistance value of the paint is 20 MΩ-cm or less at a set voltage of -60 kV or when the ammeter of the high voltage generator indicates -50 μA or more.
- The operator should be at least 1 meter away from the coating machine body. Approaching the coating machine may result in a risk of an electric shock.
- Do not place solvent containers inside the coating booth.

⚠ CAUTION

- When cleaning the head portion (atomizing cup and air nozzle portion) of ESPO-TURBO II, be sure to clean with pattern air pressure of 0.05 MPa or more.
  (If this operation is not performed, contaminated thinner may enter through the pattern air hole and cause a defect during coating.)
- Since the head portion is considered to be the lifeline of the coating system, handle it with extreme care to prevent it from falling and getting damaged.
- Be sure to discharge the drain of the air compressor once a day.
  Replace the cartridge elements of the air filter and the mist separator semiannually to annually.
- Be sure to filtrate the paint before use.
- Whenever two-component paints or paints likely to precipitate are used, thoroughly clean with a solvent so that no paint remains after use. Insufficient cleaning may deteriorate the durability of the valve, resulting in a paint leak.

Definition of overcurrent abnormality

The high voltage-charged portion of the electrostatic coating machine is protected by an insulating material. One of the causes of overcurrent abnormalities is that if a contaminant, such as a paint, adheres to the surface of this insulating material, an insulation defect will occur, and the current of the high voltage-charged portion will leak through the adhering paint and cause a spark or another dangerous situation.
The overcurrent protection circuit functions to monitor the leakage level of this high-voltage current and, when it exceeds the set current value, to stop the output of the high voltage generator to prevent electrostatic accidents. The state in which this circuit works is called an overcurrent abnormality.
In the event of an overcurrent abnormality, generally, the circuit is designed to execute a safety procedure, such as the deactivation of the coating line, in addition to warning output. For restoration, it is essential to find the portion with defective insulation and to restore insulation.

7 Maintenance and Inspections

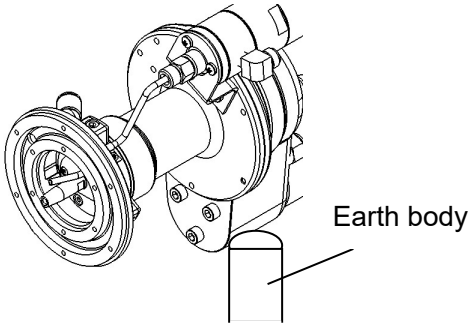
Always keep the gun, the paint hose, and the connection cables clean and free of paints and other contaminants. Also, always take care not to cause damage due to mechanical shock.

- Action at the end of work
  To suspend or finish coating work, follow the procedure described below.
  - When resuming the work within 24 hours
  (1) Turn off the power switch of the control panel.

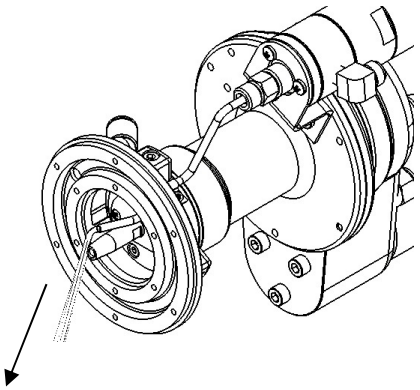
⚠ CAUTION

When the electric resistance value of the paint is low (resistance value: 2 MΩcm or less), a high voltage will be charged to the paint pump. Do not touch the pump during high voltage application.
Before touching the pump or replenishing the paint, turn off the power to the electrostatic controller, and ground the pump with an earth rod.

(2) Set the air pressure to be supplied to the gun to 0 MPa.
(3) Set the drive air pressure of the paint pumping device to 0 MPa.
(4) To remove residual charges, ground the head portion by touching an earth rod to it.



(5) Discharge the paint from the tip of the gun to release the residual pressure.
(To perform this operation, detach the air nozzle set.)



⚠ CAUTION

Take care not to drop the atomizing cup when removing the air nozzle set.
If the atomizing cup is dropped, it may get damaged.

⚠ WARNING

<u>It may cause personal injuries or an accident.</u>
When detaching the air nozzle set, take care not to touch the tip of the feed tube.

(6) Remove paint mist or other dirt adhering to tips of the gun and the shaft and the head with a waste cloth impregnated with a cleaning solvent.

⚠ CAUTION

If the solvent penetrates into the gun, an overcurrent abnormality may occur during the application of an electrostatic charge, making it impossible to perform electrostatic coating.
If static electricity leaks through paint adhering to the gun surface, an overcurrent abnormality occurs, making it impossible to perform electrostatic coating.

⚠ CAUTION

Do not leave the gun body, the power cable, the hoses, etc. immersed in the solvent during and after cleaning, or at the end of work. Electric and electronic circuits are packed inside the gun, and a structure is designed to prevent solvent from entering in normal use.
However, immersing in solvents for a long time may deteriorate their durability, resulting in a failure.

⚠ WARNING

If static electricity is applied to the gun with its surface wrapped with a sheet or the like for the purpose of preventing dirt, the sheet will become charged and cause a spark, resulting in a fire.

(7) Confirm that neither paint nor solvent remains on the surface of the gun. If paint or solvent adheres to the surface of the gun, remove it with a solvent, and then thoroughly remove the solvent by air blowing.

(8) Check daily before use that the connection cable to the gun is not damaged and is not excessively pulled by the operation of the robot.

⚠ CAUTION

The connection cable is not only for supplying power to the gun, but also for grounding and controlling the gun.
If you use the damaged cable, it may result in poor grounding, resulting in a fire or electric shock.

(9) Check daily before use that the gun stay and other metallic portions of the gun body are grounded. Measure the resistance between the gun stay and the grounding object, such as a booth, by a resistor, and confirm that it is 10 Ω or less.
(10) Check daily before use that the fixed portion of the gun is not loose and the gun does not come into contact with the object to be coated, etc.

- When work is not performed for 24 hours or more
  (1) Turn off the switches of the control panel.
  (2) Set the air pressure to be supplied to the gun to 0 MPa.
  (3) To remove residual charges, touch an earth body to the head portion. (10 seconds or more)
  (4) Detach the air nozzle set, and open the trigger valve to discharge the residual pressure from the tip of the gun.
  (5) Draw the suction pipe of the paint pump out of the paint container.
  (6) Drive the paint pump to discharge the paint through the paint return path.
  (7) Open the trigger valve of the gun to discharge the paint remaining inside the hose and the gun from the tip of the gun.
  (8) Draw in the cleaning solvent from the suction pipe, and discharge from the return side into the waste cleaning fluid container. Repeat this cleaning process until the inside of the paint pump becomes clean.
  (9) Change the paint valve to a return path to clean the hose.
  (10) Clean inside of the feed tube by discharging the solvent from the tip of the gun.
  (11) Stop the pump and open the trigger valve of the gun to release the residual pressure from the tip of the gun.
  (12) Remove paint mist or other dirt adhering to the gun and the air cap with a waste cloth impregnated with a cleaning solvent.
  (13) Immerse the atomizing cup in a solvent, and blow away dirt by blowing compressed air.

⚠ CAUTION

Clean the gun ten seconds after turning off the power switch of the electrostatic controller. More than 90% of fire accidents caused by electrostatic painting machines occur during cleaning of the cups, etc. Before cleaning the cups, etc., be sure to turn "off" the power switch.
In addition, keep fire extinguishers at hand in preparation for fire accidents.

⚠ CAUTION

Whenever using chemically curable paints like two-component paints or paints likely to precipitate, clean at the end of each work based on "When work is not performed for 24 hours or more."

⚠ CAUTION

If any abnormality occurs during work, immediately turn "off" the power switch of the electrostatic controller, and reduce the pressures of the air and paint supplied to the gun to 0 MPa.

⚠ CAUTION

Do not give a strong shock, such as dropping.
Although the gun is designed with sufficient consideration to strength, it may get damaged by a shock.

(14) With regard to the disposal of waste cleaning fluids, collect and recycle them using a solvent recovery equipment, or dispose them through an industrial waste contractor in accordance with laws and regulations.

- Maintaining other devices
  (1) For the maintenance of the paint feeder, see respective instruction manuals.
  (2) After the air control type paint regulator is used, remove daily the paint adhering to the resin portion of the mounting bracket with a solvent.

⚠ CAUTION

If a large amount of paint adheres to the surface of the mounting bracket for the air control type paint regulator, the charging current may leak through this paint, and an overcurrent abnormality may occur.

(3) Whenever two-component paints or paints likely to precipitate are used, thoroughly clean with a solvent after use, and periodically disassemble and clean on a monthly basis.

- Periodic inspections
  To enable the gun to operate to its maximum performance, perform periodic inspections according to the table shown below.
  The inspection timing is a guideline and depends on the usage conditions.

⚠ WARNING

<u>Risk of personal injury or accident by unexpected motions of the coating machine</u>
Before performing periodic inspections, turn off the power of the control panel, and release the pressure of air and the paint.

Item	Remedy	Frequency
Visual inspection of gun body	If the paint dirt is found, wipe the gun body with a soft cloth or brush impregnated with a cleaning solvent.	1 day
	If the gun body is damaged, replace it with a new one.	
Inspection of the atomizing cup for paint dirt	If the paint dirt is found on the atomizing cup, wipe off the dirt with a soft cloth or brush impregnated with a cleaning solvent.	
Inspection of the air jet hole in the air nozzle for clogging	Detach the air nozzle to immerse in a cleaning solvent, and then remove the dirt by air blowing.	
	If the dirt cannot be removed, replace the air nozzle with a new one.	
Inspection of the atomizing cup for scratches, dents, and groove wear	If a scratch or dent is found on the atomizing cup or the groove is worn, replace the atomizing cup with a new one.	
Inspection of the paint valve	If the paint leaks from the feed tube when the paint is pressurized and the paint valve is “closed,” clean the paint valve.	
	If there is an air leak sound when the valve is in “open”, replace the piston and the O-ring.	
Checking of the current value when applying static electricity	If the value is higher than usual, identify where the current is leaking, and replace the defective part.	
Inspection of the external resistor ASSY	If the paint dirt is found, clean with a soft cloth impregnated with a cleaning solvent. Then, dry by air blowing.	
	If there are symptoms such that the current value is not stable or a current leaks, replace the resistor ASSY with a new one.	
Inspection of the air motor	If any abnormality is found when the air motor rotates, replace the shaft or bearing.	
Inspection of the connection cables	If any damage is found, replace it with a new one.	
Inspection of parts for air leaks	If air leaks are found, replace the seal of the part concerned.	1 month
Inspection of the inside of the paint hose for dirt	If the paint dirt is found, clean through a cleaning solvent.	
	If the adhered paint cannot be removed, replace the paint hose with a new one.	

⚠ WARNING

If the pain adheres to the air motor portion and the tip contact portion of the external resistor ASSY during maintenance, remove it.

⚠ CAUTION

Do not unnecessarily disassemble the gun except in case of a failure.
In order to secure the electrical insulation and sealing function of the gun body, disassembly should be done only when replacing faulty parts.

⚠ CAUTION

The surface of the gun occasionally becomes warm by the heat of the high voltage generator, but it is not an abnormality.

Consumable parts

Prepare your spare parts according to use situations, referring to the rank category of the following consumable list.

Rank category	Part name	Part No.	Service life	Component unit	Page
A	Φ50 cup	1578-101	6 months	AC500A	8
	Φ60 cup	1581-101	6 months	AC600A	8
	Φ70 cup	1584-101	6 months	AC700A	8
	Muffler	3701-014	6 months	ESA88A	30
	External resistor ASSY	1774	6 months	ESA88A	30
B	Check valve seat	1373-002	12 months	PV21, 31	33, 34
	Shaft set	1373-006	12 months	PV21, 31	33, 34
	Valve seat	1373-008	12 months	PV21, 31	33, 34
	O-ring	101-6022	12 months	PV21, 31	33, 34
	Groovy seal	1372-022	24 months	Air turbine ASSY	31
C	Hexagon socket countersunk head screw	1578-003	-	AC500, 600, 700A	8
	Countersunk head screw	61-20410	-	AC500, 600, 700A	8
	Gasket	1578-005	-	AC500, 600A	8
	Screw with 2 washers	12-10306	-	ESA88A	30
	Cross recessed panhead screw	68-10508	-	ESA88A	30
	Cross recessed panhead screw	68-10408	-	ESA88A	30
	Hexagon socket head cap screw	03-80515	-	ESA88A	30
	Hexagon socket head cap screw	03-80825	-	ESA88A	30
	Hexagon socket head cap screw	03-80630	-	ESA88A	30
	Hexagon socket head cap screw	03-80635	-	ESA88A	30
	Hexagon socket head cap screw	03-80512	-	Air turbine ASSY	31
	Hexagon socket head cap screw	03-80508	-	Air turbine ASSY	31
	O-ring	130-6034	-	Air turbine ASSY	31
	O-ring	101-6028	-	Air turbine ASSY	31
	O-ring	130-6085	-	Air turbine ASSY	31
	O-ring	130-6095	-	Air turbine ASSY	31
D	Packing	1848-005	-	ESA88A	30
	Packing	1848-006	-	ESA88A	30
	O-ring	101-2018	-	PV21, 31	33, 34
	O-ring	101-6010A	-	PV21, 31	33, 34
	O-ring	130-6020	-	ESA88A	30

Rank A: Parts are consumed daily. Rank B: Parts are consumed in a mid term.

Rank C: Parts may be damaged or lost during disassembly.

Rank D: Parts that need to be replaced during disassembly.

* The service life of consumables in the above list differs depending on used paints, equipment conditions, etc., and is a reference value calculated on the assumption that it works eight hours a day for 20 days a month.

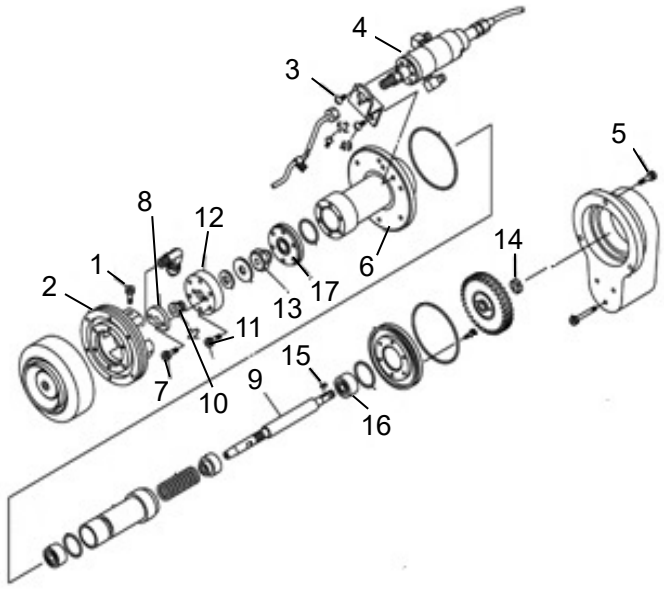
8 How to Replace Parts

Replace and repair parts in accordance with the procedure described below.
When attaching the screws and the O-rings for sliding portions shown below, apply white petrolatum.
Replace O-rings and other sealing parts for each ASSY portion as appropriate if they are found damaged or defective at the time of disassembly.

⚠ WARNING

Risk of personal injury or accident by unexpected motions of the coating machine. Before replacing and repairing parts, be sure to turn off the air supplied to the gun and the power to the electrostatic controller, discharge the paint inside the paint path, and clean the inside of the paint path.

(1) Replacing the bearing

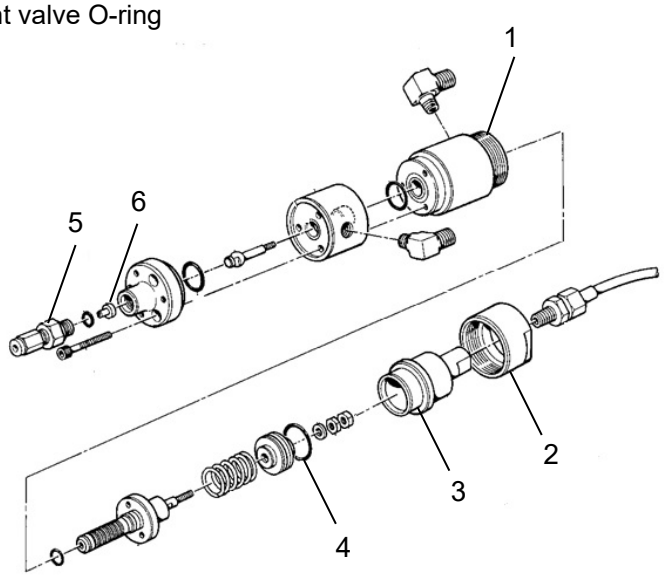


[1] Unfasten the three hexagon socket head cap screws (No. 1) to detach the head (No. 2).
[2] Unfasten the three cross-recessed pan head screws (No. 3) to detach the paint valve (No. 4) from the main body.
[3] Unfasten the three hexagon socket head cap screws (No. 5), and screw them into the removal tap position of the front body (No. 6). The entire front body will come out.
[4] Unfasten the two hexagon socket head cap screws (No. 7) to detach the seal cover (No. 8).
[5] Set a spanner (B = 7) on the two faces of the shaft (No. 9) and set a spanner (B = 19) on the groovy seal (No. 10) to loosen and detach them.
[6] Unfasten the six hexagon socket head cap screws (No. 11) to detach the head stay (No. 12).
[7] Set a spanner (B = 7) on the two faces of the shaft (No. 9) and set a spanner (B = 28) on the labyrinth seal (No. 13) to detach them.
[8] By softly tapping the shaft (No. 9) in the direction of the turbine with a resin hammer (do not use a metallic hammer), the shaft and the turbine will come out. Since a spring is contained, it will pop out, so care should be taken.
[9] Set a spanner (B = 7) on the two faces of the shaft (No. 9), and detach the fine U nut (No. 14) with long-nose pliers.
[10] Detach the turbine (No. 9) from the shaft, and pull out the woodruff key (No. 15) with long-nose pliers.
[11] Pull out the bearing (No. 16) from the shaft (No. 9).
[12] Detach the bearing retainer (No. 17), and pull out the bearing (No. 16).
[13] The attachment/assembly of a new bearing is the reverse of this procedure. Take care not to cause damage to the bearing, the turbine, etc.

(2) Replacing the connection cables

[1] Loosen the connectors of the electrostatic cable at the back of the gun stay (No. 41), disconnect each cable, and then replace it with a new one. Securely insert and tighten the connectors of the replaced cables.

(3) Replacing the paint valve O-ring



[1] Set a spanner (B = 36) on the valve body (No. 1), and with this spanner fixed, set a spanner (B = 36) on the cylinder retainer (No. 2) and turn this spanner to remove the cylinder retainer.

[2] Draw out the cylinder (No. 3) straight (do not rotate).

[3] Remove the O-ring (No. 4) to replace with a new one, apply water-insoluble grease to it, and attach in reverse order of the removal.

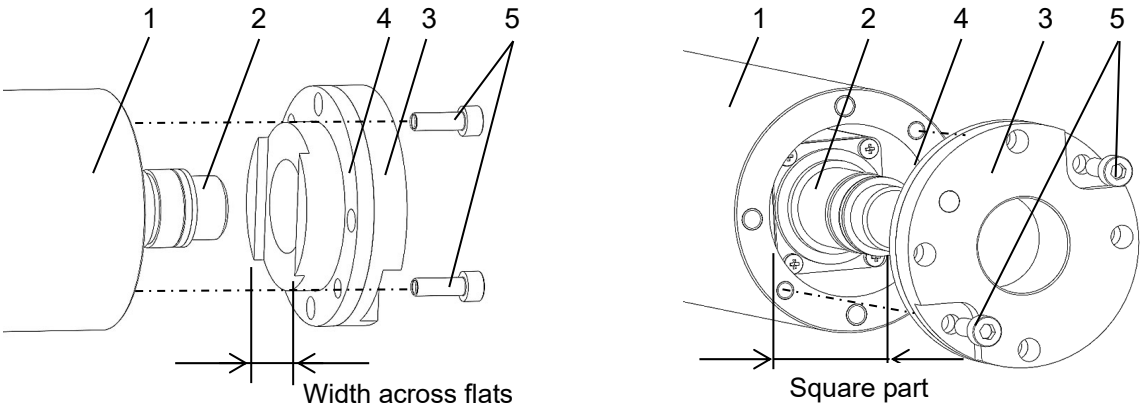
(4) Replacing the paint valve orifice (See the bearing replacement diagram as well.)

[1] Unfasten the cross-recessed pan head screw (No. 3) of the feed tube.

[2] Remove the joint (No. 5) and the feed tube.

[3] When the joint (No. 5) is removed, the orifice (No. 6) comes off together with it. Replace the orifice. The assembly is the reverse of this procedure.

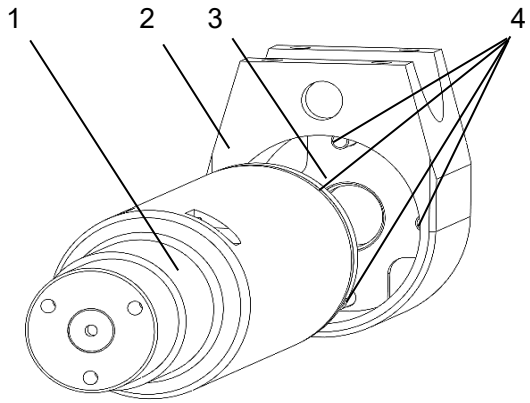
(5) Assembling the packing



[1] Place the No.4 Packing on the No.3 Spacer and assemble it to the No.1 Extension.
At this point, align the position so that the two sides of the No.3 Spacer are parallel to the square part of the No.2 Cascade.
Tighten No. 5 Hex socket bolt lightly so that the No.4 Packing does not protrude.

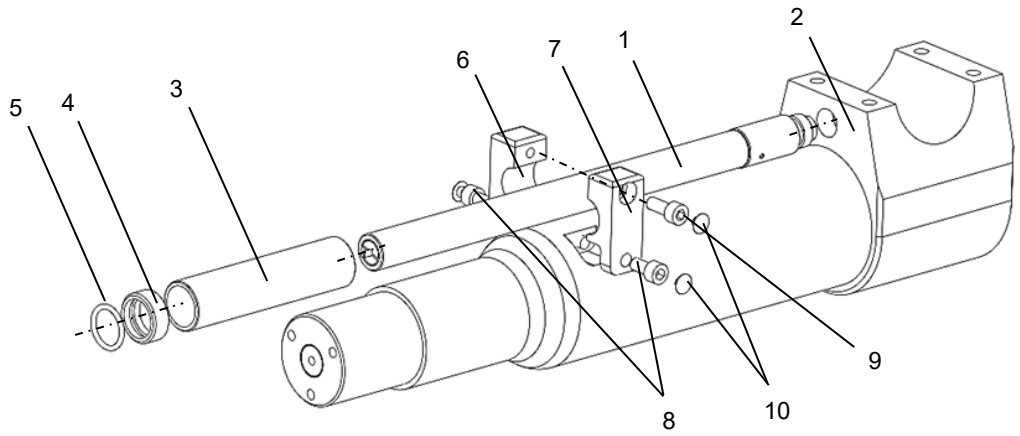
NOTE

If the No.4 Packing protrudes, it may not be possible to assemble it to the No. 2 Gun stay shown in the figure below.



[2] Insert the No.3 Packing into the rear of the gun stay.
Insert the No.1 Extension assembled in step [1] into the No.2 Gun stay and secure it with a No.4 Hex socket bolt.

(6) Assembly of External resistor ASSY and Peripheral components



[1] Assemble the No.1 External resistor ASSY to the No.2 Gun stay.

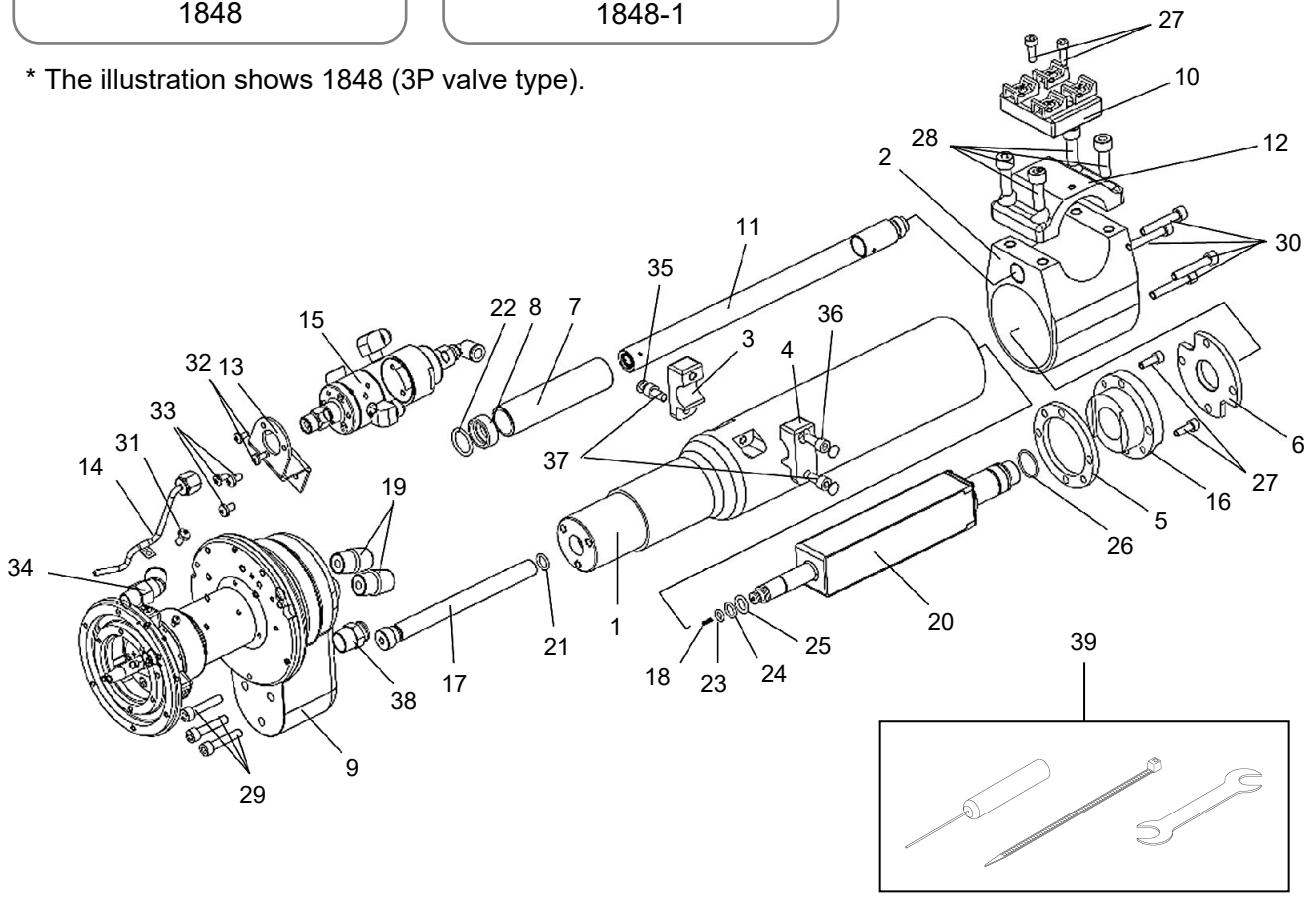
[2] Insert the No.3 Pipe over the No.1 External resistance ASSY and secure it by pushing it into the No.2 Gun stay side using the No.4 Stopper fitted with an No. 5 O-ring.

[3] No.1 External resistor ASSY is sandwiched between the No.6,7 Resistor supports and secured with No.8,9 Hex socket bolts.
Attach the No.10 Resin cap to the No.8,9 Hex socket bolt.

9 Components

ESA88A (3P valve type)	ESA88A (2P valve type)
1848	1848-1

* The illustration shows 1848 (3P valve type).

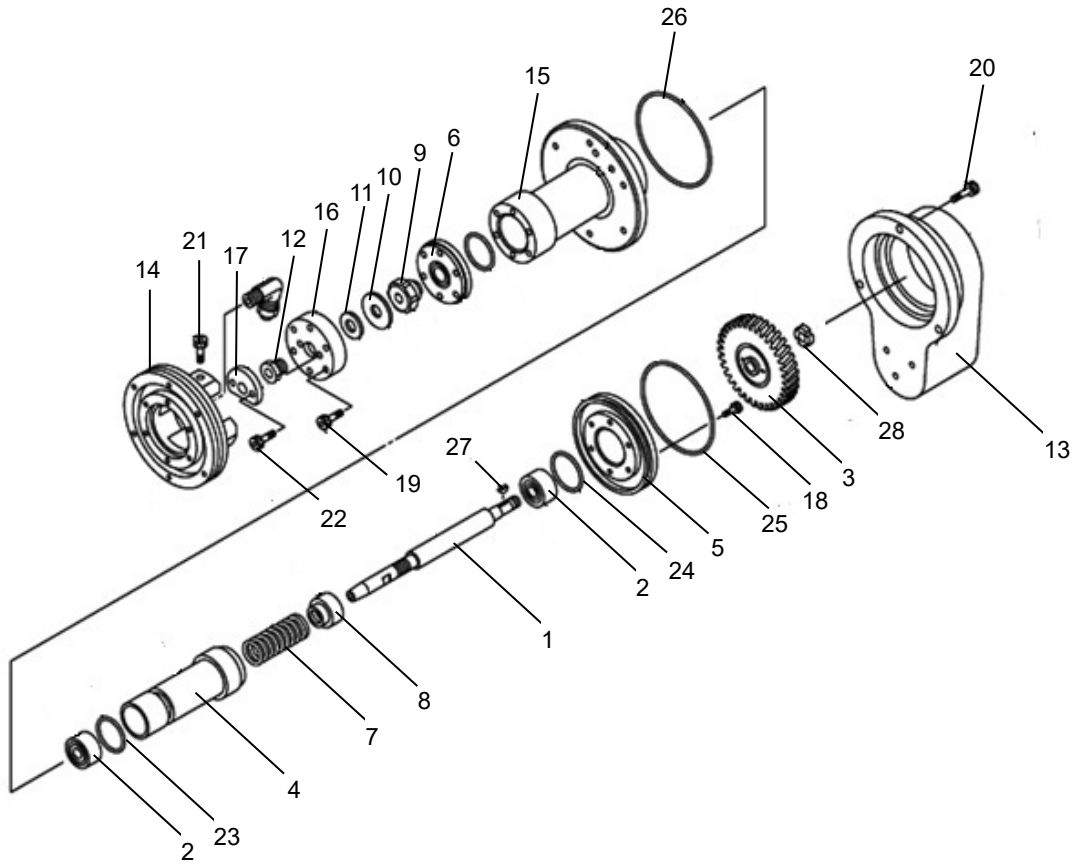


No.	Part No.	Part name	Qty	Remarks
1	1848-001	Extension	1	
2	1848-002	Gun stay	1	
3	1848-003	Resistor support L	1	
4	1848-004	Resistor support R	1	
5	1848-005	Packing	1	
6	1848-006	Packing	1	
7	1848-007	Pipe	1	
8	1848-008	Stopper	1	
9	1772	Air turbine ASSY	1	
10	1773	Hose support ASSY	1	
11	1774	External resistor ASSY	1	
12	1372-042	Clamp	1	
13	1372-054	Valve support	1	
14	1372-056	Feed tube set	1	
15	1373	ESPO-TURBO 3P valve	1	1848
	1374	ESPO-TURBO 2P valve	1	1848-1
16	1812-006	Spacer	1	
17	1812-037	Conducting bush	1	
18	2433-009	Spring	1	
19	3701-014	Muffler	2	

No.	Part No.	Part name	Qty	Remarks
20	131E-214	Cascade	1	
21	101-6010	O-ring	1	
22	101-6018	O-ring	1	
23	101-9006	O-ring	1	
24	101-9009	O-ring	1	
25	101-9010A	O-ring	1	
26	130-6020	O-ring	1	
27	03-80515	Hexagon socket head cap screw	4	
28	03-80825	Hexagon socket head cap screw	4	
29	03-80630	Hexagon socket head cap screw	3	
30	03-80635	Hexagon socket head cap screw	4	
31	12-10306	Screw with 2 washers	1	
32	68-10508	Cross recessed panhead screw	2	
33	68-10408	Cross recessed panhead screw	3	
34	348-0029	45° elbow union	1	
35	363-0023	Resin cap	3	
36	364-0038	Hexagon socket head cap screw	1	
37	364-0039	Hexagon socket head cap screw	2	
38	376-1003	Quick joint	1	
39	3545	Tool	1	

Air turbine ASSY

1772

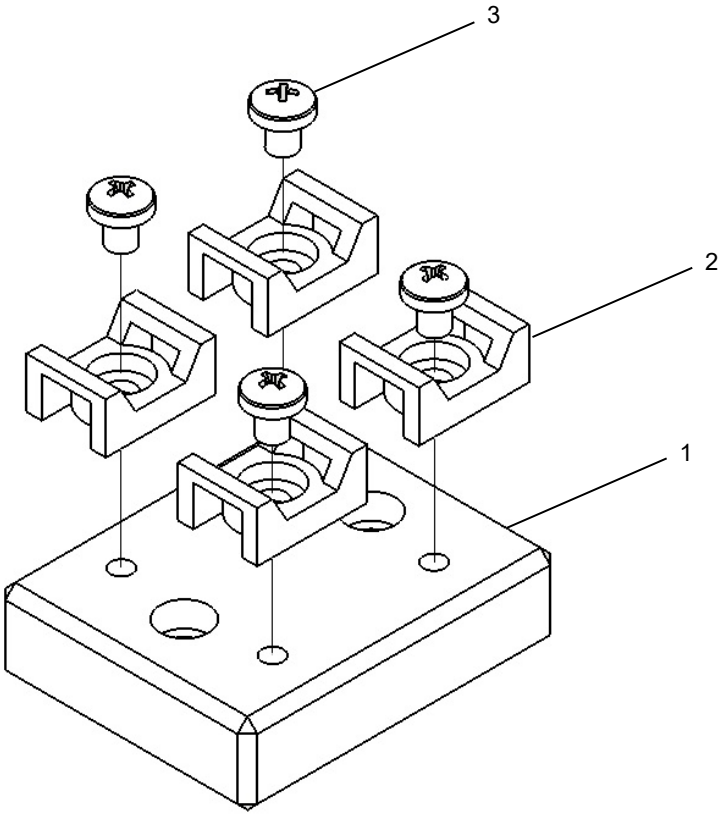


No.	Part No.	Part name	Qty	Remarks
1	1372-001	Shaft	1	
2	1372-002	Bearing	2	
3	1372-004	Turbine	1	
4	1372-008	Housing	1	
5	1372-012	Nozzle	1	
6	1372-014	Bearing retainer	1	
7	1372-015	Spring	1	
8	1372-016	Bearing retainer	1	
9	1372-017	Labyrinth seal	1	
10	1372-018	Seat seal	1	
11	1372-019	Retainer plate	1	
12	1372-022	Groovy seal	1	
13	1372-029	Body	1	
14	1372-032	Head	1	

No.	Part No.	Part name	Qty	Remarks
15	1372-110	Front body	1	
16	1372-120	Head stay	1	
17	1372-123	Seal cover	1	
18	03-80408	Hexagon socket head cap screw	6	
19	03-80415	Hexagon socket head cap screw	6	
20	03-80508	Hexagon socket head cap screw	3	
21	03-80512	Hexagon socket head cap screw	3	
22	70-10308	Oval countersunk head machine screw	2	
23	101-6028	O-ring	1	
24	130-6034	O-ring	2	
25	130-6085	O-ring	1	
26	130-6095	O-ring	1	
27	357-0005	Woodruff key	1	
28	361-0008	Fine U nut	1	

Hose support ASSY

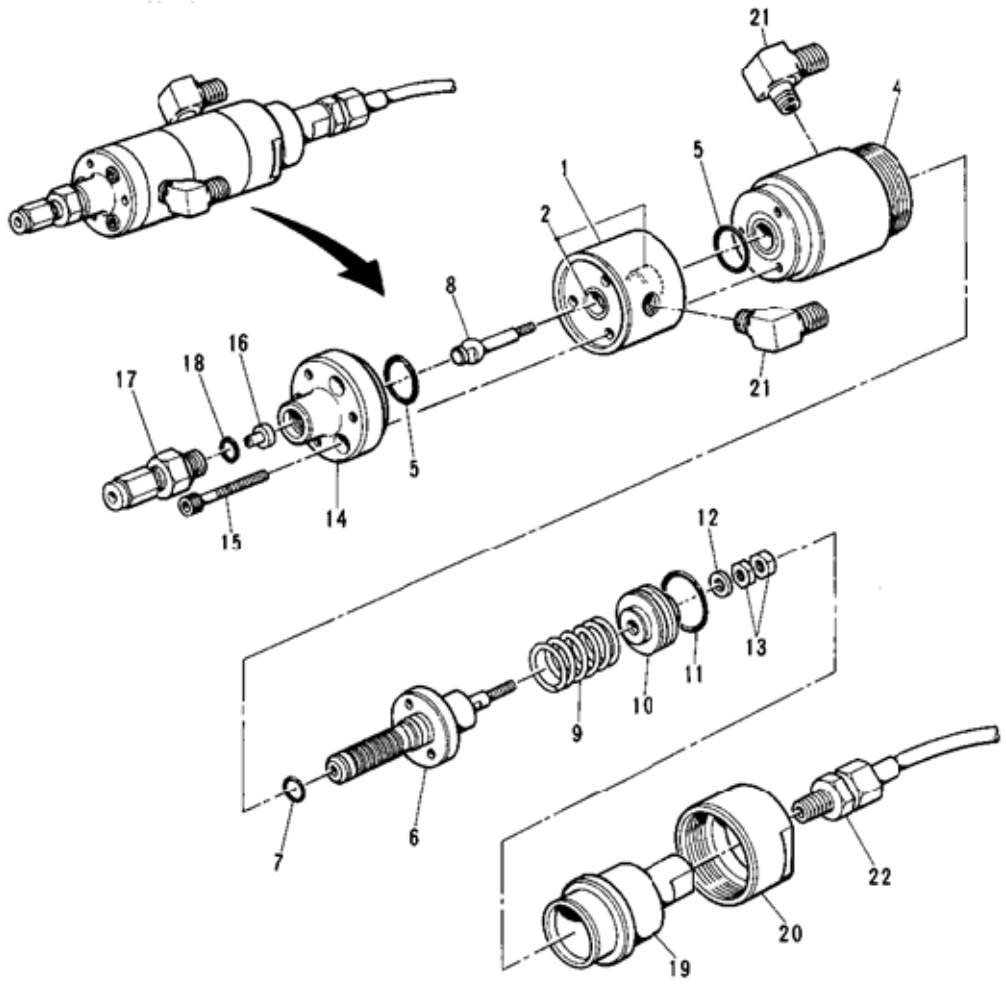
1773



No.	Part No.	Part name	Qty	Remarks
1	1372-043	Hose support	1	
2	360-0004	Tie mount type fixture	4	
3	68-10506	Cross recessed panhead screw	4	

ESPO-TURBO 3P valve (PV31)

1373

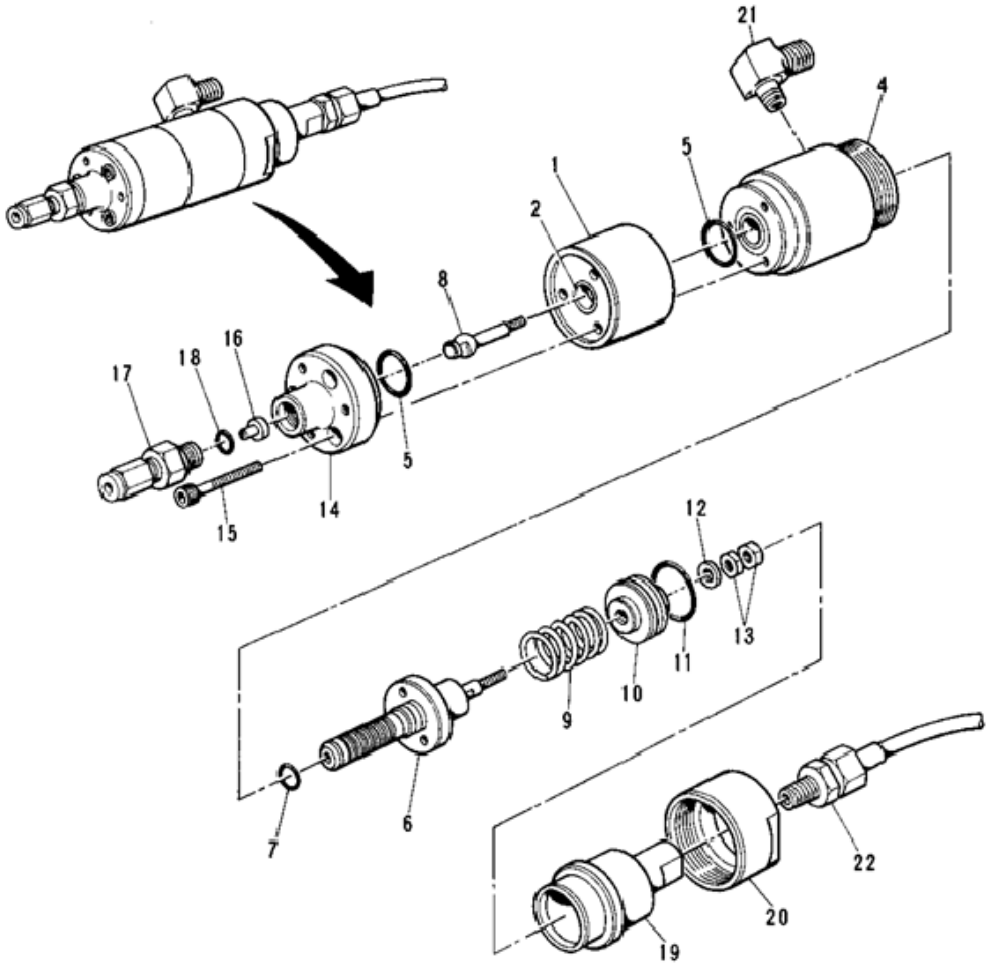


No.	Part No.	Part name	Qty	Remarks
1	1373-001	Seat housing	1	
2	1373-002	Check valve seat	2	
4	1373-004	Valve body	1	
5	101-2018	O-ring	2	
6	1373-006	Shaft set	1	
7	101-6010A	O-ring	1	
8	1373-008	Valve seat	1	
9	1373-009	Spring	1	
10	1373-010	Piston	1	
11	101-6022	O-ring	1	
12	37-70400	Flat washer	1	

No.	Part No.	Part name	Qty	Remarks
13	15-70400	Hexagon nut	2	
14	1373-014	Valve cap	1	
15	03-50430	Hexagon socket head cap screw	3	
16	1373-016-02	Orifice (Φ0.7)	1	
17	342-0008-1	Joint (main body)	1	
18	101-6008	O-ring	1	
19	1373-019	Cylinder	1	
20	1373-020	Cylinder retainer	1	
21	3210-001	Nipple	2	
22	384-0801	Quick joint	1	

ESPO-TURBO 2P valve (PV21)

1374



No.	Part No.	Part name	Qty	Remarks
1	1374-001	Seat housing	1	
2	1373-002	Check valve seat	1	
4	1373-004	Valve body	1	
5	101-2018	O-ring	2	
6	1373-006	Shaft set	1	
7	101-6010A	O-ring	1	
8	1373-008	Valve seat	1	
9	1373-009	Spring	1	
10	1373-010	Piston	1	
11	101-6022	O-ring	1	
12	37-70400	Flat washer	1	

No.	Part No.	Part name	Qty	Remarks
13	15-70400	Hexagon nut	2	
14	1373-014	Valve cap	1	
15	03-50430	Hexagon socket head cap screw	3	
16	1373-016-02	Orifice (Φ0.7)	1	
17	342-0008-1	Joint (main body)	1	
18	101-6008	O-ring	1	
19	1373-019	Cylinder	1	
20	1373-020	Cylinder retainer	1	
21	3210-001	Nipple	1	
22	384-0801	Quick joint	1	

10 Maintenance Log

Please use record the details that you conduct a maintenance service, such as replacement of a part, tear-down cleaning, post-failure repair, etc.

Equipment name			ESPO-TURBO II <ESA88A>		Purchase date:	
Date of service			Portion worked on	Description	Result	Who serviced
						In-house / Dealer / Asahi Sunac
						In-house / Dealer / Asahi Sunac
						In-house / Dealer / Asahi Sunac
						In-house / Dealer / Asahi Sunac
						In-house / Dealer / Asahi Sunac
						In-house / Dealer / Asahi Sunac
						In-house / Dealer / Asahi Sunac
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						In-house / Dealer / Asahi Sunac
						In-house / Dealer / Asahi Sunac
						In-house / Dealer / Asahi Sunac
						In-house / Dealer / Asahi Sunac
						In-house / Dealer / Asahi Sunac
						In-house / Dealer / Asahi Sunac

Note: Due to continuous improvements and modifications, the configurations specified herein are subject to change without prior notice.

11 Warranty

ASAHI SUNAC CORPORATION (the “Company”) shall provide the original purchaser (the “Purchaser”) with warranty service for a period of one (1) year from the date of purchase of the product, as follows:

- Should you find defects in design or workmanship with regard to parts, ship them back to the Company, with freight prepaid. The Company shall repair or replace the parts free of charge and reimburse the freight charges, provided that, as a result of an inspection and investigation of the parts conducted by the Company, the defects are deemed to be to attributable to the factors within the Company’s responsibility.

- In the following cases, free after-sales service is not provided.

  1. Failure resulting from an inappropriate method of installing this equipment.
  2. Failure resulting from a use method not conforming to this instruction manual or mishandling.
  3. Failure resulting from insufficient maintenance management of this equipment and incorrect handling such as non-conformance to the procedures specified in this instruction manual.
  4. Failure resulting from unauthorized alteration or structure change of this equipment without the Company’s consent.
  5. Failure due to force majeure such as earthquake, disaster, flood disaster or lightening.
  6. Warranty for consumables worn or deteriorated even in the case where this equipment is used correctly.
  7. Repair after the machine has been used outside Japan, and shipping cost.
  8. In addition to the above, failure due to circumstances beyond our control.

- As for items such as parts purchased by the Company from another manufacturer, the warranty of that manufacturer shall apply.

- As for any parts deemed to be defective, the Company shall not be held liable for any expenses beyond the provision of repair or replacement parts free of charge.

- The Company shall not be held liable for any damage to the Purchaser caused by factors not attributable to the Company, such as misuse of product, etc.

- When a transfer of title of this equipment takes place, please see to it that this Operation and Maintenance Manual is handed over to the new owner.
- This equipment is manufactured in compliance with the Laws and Regulations of Japan.
  In the rare eventuality of this equipment being used outside Japan, compliance with the safety standards of the relevant countries is of course mandatory.

12th Edition: August 28, 2025

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12th Edition: August 28, 2025