ASAHI SUNAC

Operation and Maintenance Manual

High-Speed Rotary Atomizing Electrostatic Automatic Coating Gun

SUNBELL ECO II

ESA210VP

Ec'Coater™ エコーター

This manual contains important information on warnings and cautions.
Read the manual thoroughly before starting to operate this equipment, and follow the instructions.
If your manual is lost or worn badly, do not hesitate to contact Asahi Sunac Corporation and ask us to send you a new one.

19th Edition: June 25, 2025

Introduction

Thank you for purchasing our product High-Speed Rotary Atomizing Electrostatic Automatic Coating Gun, SUNBELL ECO II, <ESA210VP>.

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 (BPS300).
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.

Contents

19th Edition: June 25, 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 and used for painting with paint adjusted for rotary atomization electrostatic paint.
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.**

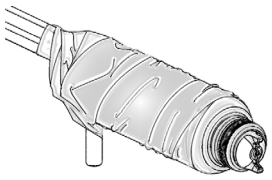
- **Do not touch the bell cup of the sprayer carelessly.**
  There is a risk of injury if you come into contact with the edge of the bell cup, which is rotating at high speed. Please handle with care.

《Warning and precautions for safe use》

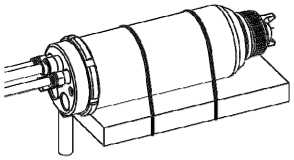
⚠ WARNING

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

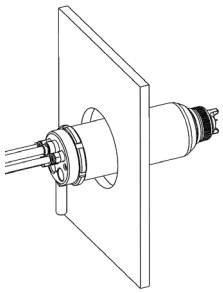
Electrostatic guns apply high voltage to the tip of the gun and the rear is earthed, make sure there are no obstacles on the main body (insulated part).



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 Equipment Overview

① Features

■ High-grade finish

The air cap provides a steady particle-distributed spray pattern, which prevents discoloration with metallic paint. The rotation controller and electrostatic controllers maintain constant coating conditions, resulting in high-grade film.

■ High transfer rate

Centrifugal force generated by the bell cup produces a high rate of atomization, and low-turbulence air, for a high rate of paint transfer.
The paint consumption as well as the booth maintenance cost can be reduced.
In addition, the air cap enables switching between wide and short patterns, which lets you select ideal coating pattern based on shapes of workpieces and contributes to significant reduction in paint consumption.

■ Compact body

This coating machine is equipped with a reliable air spindle and electrostatic generator. It is compact but sophisticated coating machine containing the spiral tube and bell cup cleaning system. It is designed to be installed on a robot and easily maintained.

■ Contamination-proof structure

The bell cup is automatically cleaned between cycles even during continuous operation to eliminate bits of paint, which would otherwise be flown out of the gun.
Combined with its original body cover (shroud) shape that prevents contamination in severe operating environment, it reduces “dirt in finish.”

■ High level of safety

A compact electrostatic high-voltage generator is built in the gun and boosted inside the gun to permit the control at a lower voltage from the controller. The voltage and current can be accurately monitored with a newly developed electrostatic controller.
Safe operation is guaranteed by high electric discharge rate and five failure detectors.

■ Excellent operability

The gun body can be directly mounted on the flange of a tube-contained robot to increase the robot moving area to the maximum.

■ Easy to clean

Inside/outside bell cup cleaning routes are provided as standard equipment. They use a very small amount of thinner to clean the equipment between cycles, preventing defects and waste, while improving first run.

② Components

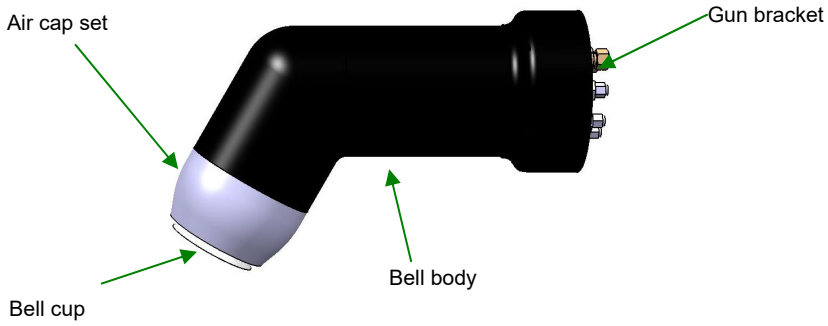
(1) Gun body

- It is made up of the air spindle, cascade (electrostatic generator), and spiral tube, and is cladded by the body cover (shroud).
- The paint route is insulated by the spiral tube and grounded by the bracket, which does not allow electrostatic coating with lower electric resistance paints, e.g. water-soluble paint.

(2) Bracket

- The bracket secures the tubes and cables in place for wiring connections. The gun is easily removable and mountable with the bracket.
- The maintenance window is provided for quick access to tubes and cables.

Figure 2-1 Components of ESA210VP



③ Option

（1）Shaping air cap set

Table 2-1 ● Part No.

No.	Model	Set no.		Bell cup	Baffle	Nozzle	Ring	Cap
		Specification	Part No.	Part No.	Part No.	Part No.	Part No.	Part No.
1	BAC70VP	φ70 cup variable pattern type	15F1	15F2	15F1-002	15F1-003	15F3-004	15F3-005
2	BAC40VP	φ40 cup variable pattern type	15F3	15F4	15F3-002	15F3-003	15F3-004	15F3-005

Table 2-2 ● Pattern width adjustable range

No.	Model	Pattern width (mm)
		0 100 200 300 400 500
1	BAC70VP	
2	BAC40VP	

Figure 2-2 BAC70VP Air cap set

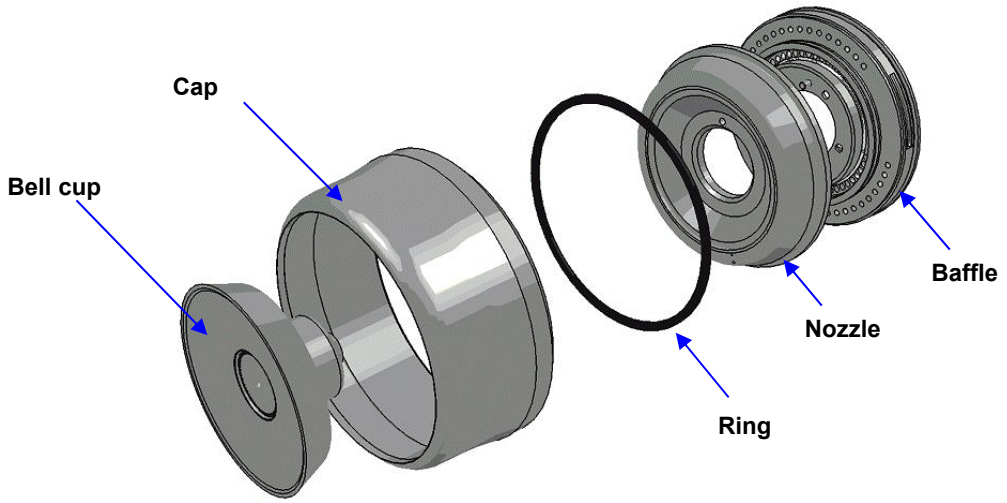
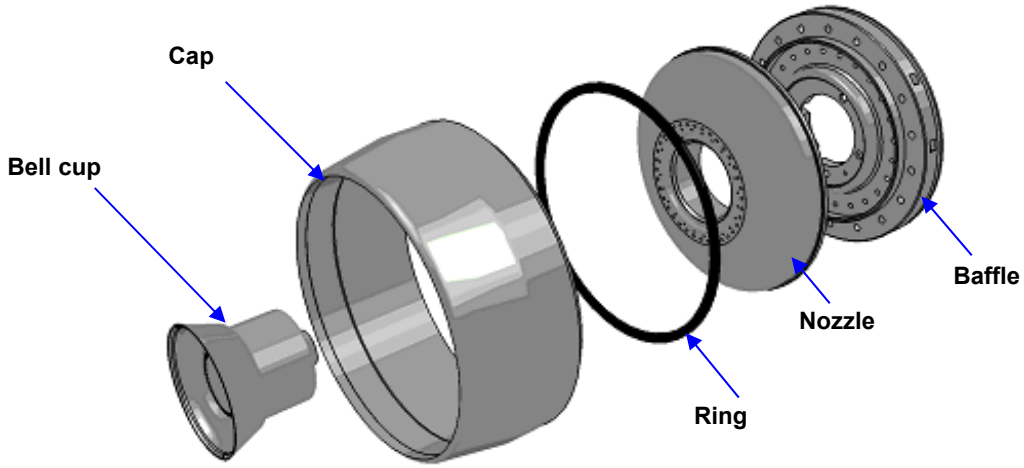


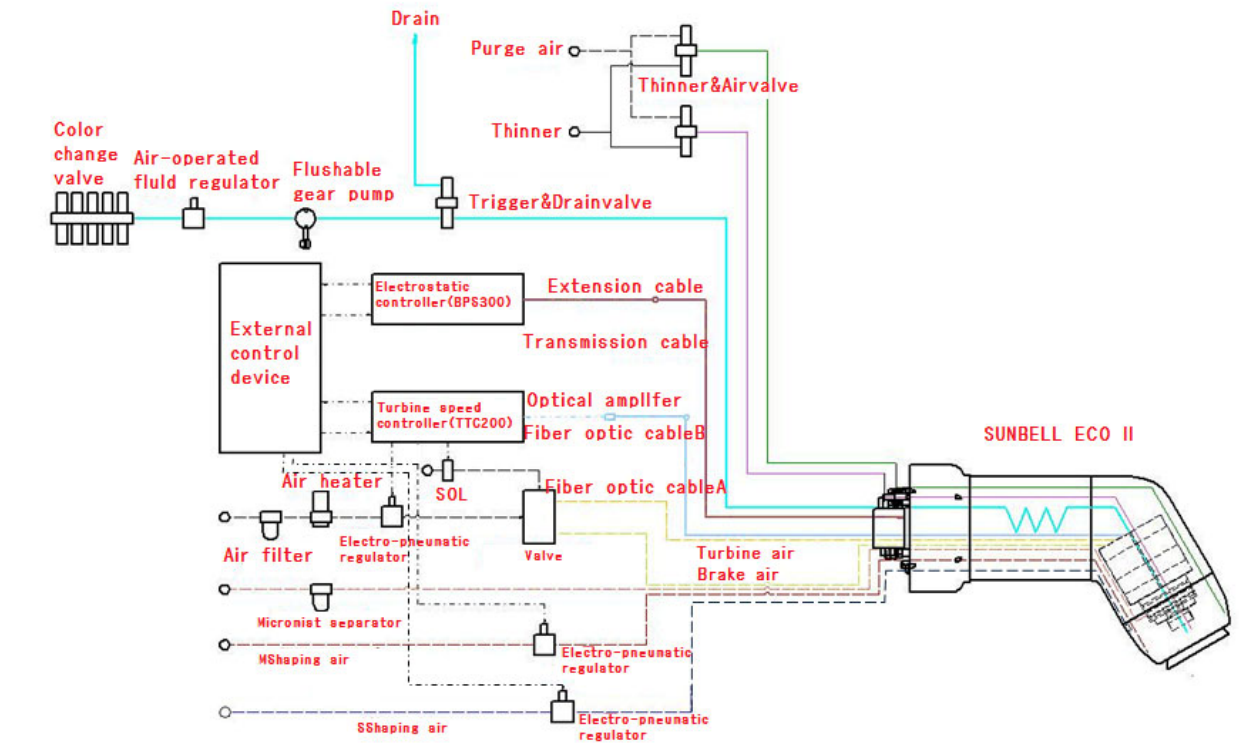
Figure 2-3 BAC40VP Air cap set



④ System structure

- Prepare separately and connect signal input/output cables to the electrostatic controller and rotation controller as well as air pipes and paint hoses as shown in the following diagram.
- Refer to the specification sheet for each of the system components for proper connections of electric cables, air pipes and paint hoses.

Figure 2-4 ESA210VP system diagram for reference



Part name	Model	Part No.	Instruction Manual
SUNBELL ECO II	ESA210VP-S	1823	ESA210VP
	ESA210VP-M	1824	
Electrostatic controller	BPS300	E-010390	BPS300
Rotation controller	TTC200	445-0134	TTC200
Transmission cable	LVA2	(Refer to 2-[4]-(1).)	ESA210VP
Fiber optic cable	-	(Refer to 2-[4]-(2).)	
Optical fiber amplifier	F80R	468-0025	Amplifier unit

● Part No. structure

Model	Part No.	Bell unit No.	Bracket unit No.	Specification
ESA210VP-S	1823	14A0	14FA	Electrostatic: Straight tube
ESA210VP-M	1824			Electrostatic: Spiral tube

(1) Transmission cable

● It connects between the gun and electrostatic controller, using a “transmission cable” and “extension cable” in combination that can extend up to 20m.

(1) Transmission cable

● It connects between the gun and electrostatic controller, using a “transmission cable” and “extension cable” in combination that can extend up to 20m.

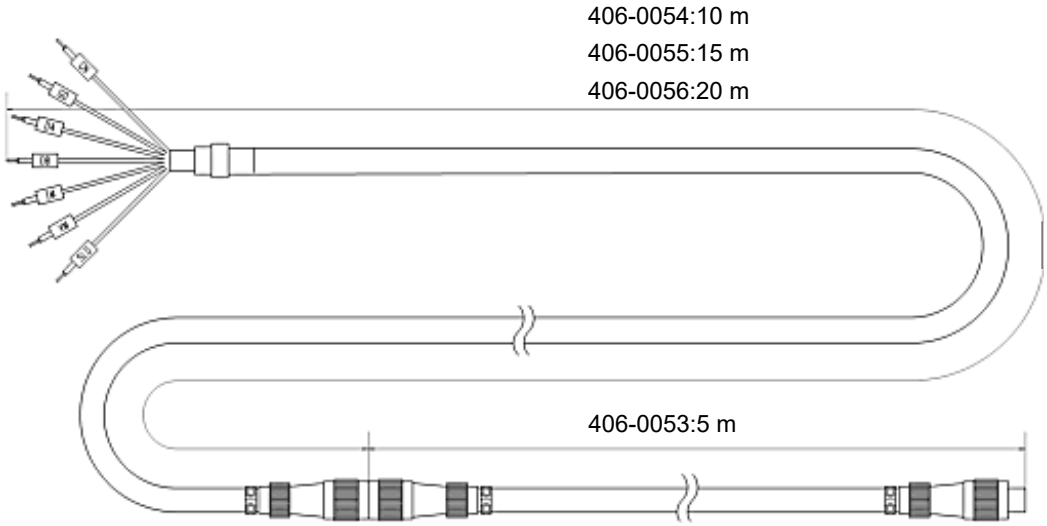
Table 2-3

No.	Part No.	Product name	Model	Specification
1	406-0053	Transmission cable	LVB5	5 m

Table 2-4

No.	Part No.	Part name	Model	Specification
1	406-0054	Extension cable	LVA2-10	10 m
2	406-0055	Extension cable	LVA2-15	15 m
3	406-0056	Extension cable	LVA2-20	20 m

Figure 2-5 Transmission cable connection diagram



(2) Fiber optic cable

● It detects the air spindle RPM and sends the signal to the rotation controller. It adjusts the rotation controller in response to the signal so that the RPM setting will be maintained during the paint process.

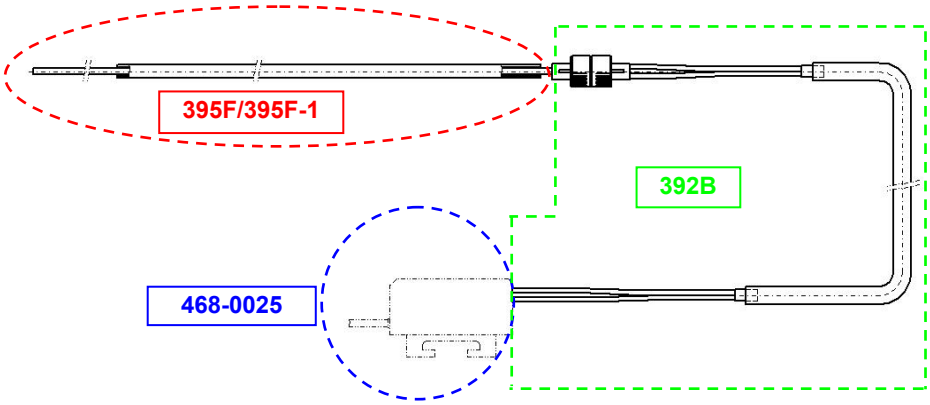
● Note that the optical fiber cables cannot be cut or relayed midway.

○ ○Non-explosion-proof specification Table 2-5

No.	Part No.	Part name	Model	Specification
1	395F	Fiber optic cable A	-	2 m (To the gun)
	395F-1			5 m (To the gun)
2	392B	Fiber optic cable B	-	20 m (To the amplifier)
3	468-0025	Fiber optic amplifier	F80R	Non-explosion-proof specification
4	470-0007	Fiber cutter	FA500	-

*1) One fiber cutter is included in 395F/395F-1, 392B, and the accessory tool (35AA).
*2) It is not soled as a set with 395F/395F-1, 392B, or 468-0025.
Choose the parts as necessary from the above table.

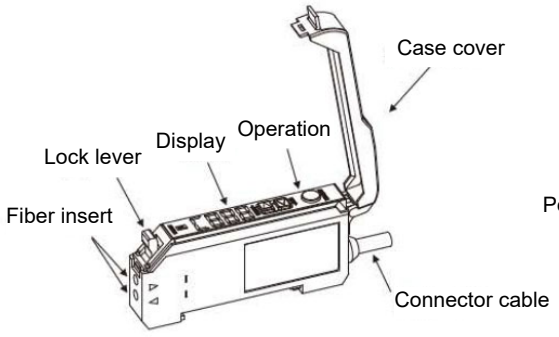
Figure 2-6 Optical fiber cable connection diagram



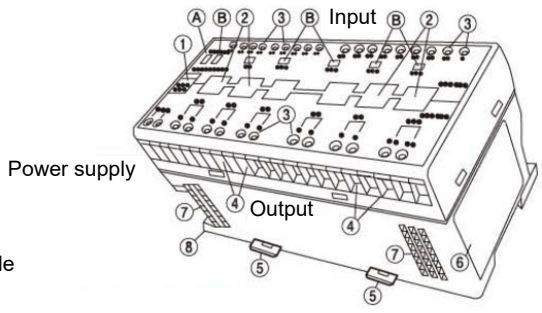
○ Explosion-proof specifications Table 2-6

No.	Part No.	Part name	Model	Specifications
1	468-0053	Fiber optic amplifier	XF12R-A	Explosion-proof type
2	467-0032	Barrier relay	TBD-DB201SA	Intrinsic safety explosion-proof
3	395F	Fiber optic cable A	—	2m（to the gun）
	395F-1			5m（to the gun）
4	392B-1	Fiber optic cable B	—	2m
※Fiber optic cable B with connector relay 1set and fiber cutter 1set.				
<Option>				
	470-0002	Fiber connector	FA7CN	Connection Cable A and B
	470-0007	Fiber cutter	FA500	1hole 1time use up

Figure 2-7　Outline for explosion-proof fiber optic amplifier and barrier relay

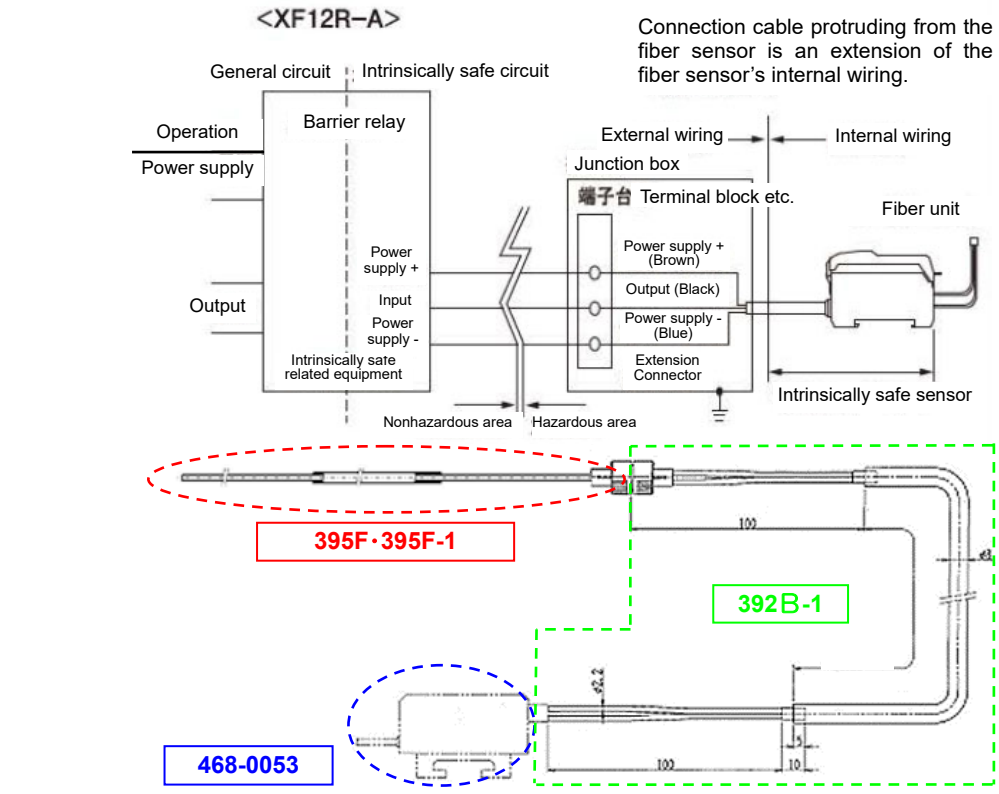


468-0053：Fiber optic amplifier



467-0032：Barrier relay

Figure2-8　Outline foe explosion-proof fiber optic cable



※Refer to the TDB-200 series instruction manual for the detailed wiring method of the intrinsically safe circuit.

(3) Electrostatic controller (Model: BPS300)

● It controls electrostatic voltage of the gun-integrated cascade (electrostatic generator).

Table 2-7

No.	Part No.	Part name	Model
1	E-010390	Electrostatic controller	BPS300

(4) Rotation controller (Model: TTC200)

● It sends the RPM of the bell cup via fiber optic cable and amplifier and controls the electropneumatic regulator (4-20mA) so that the RPM will be kept as specified by the control panel.

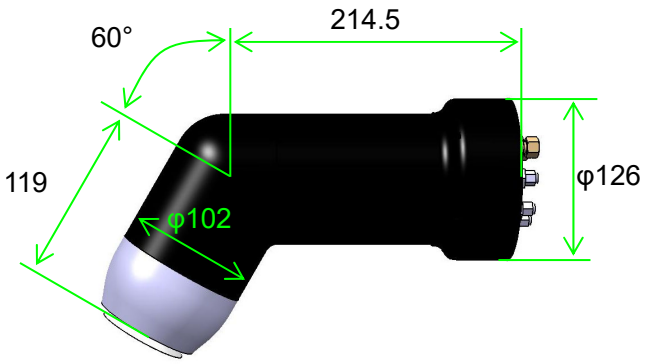
Table 2-8

No.	Part No.	Part name	Model
1	445-0139	Rotation controller	TTC200

3 Specification

Figure 3-1 Outside view

ESA210VP



No.	Item		Specification
1	Product data	Part name	SUNBELL ECO II
		Model	ESA210VP-S: Straight tube type ESA210VP-M: Spiral tube type
		Application	Robot-mounted painting
2	Appearance	Dimensions	ESA210VP: φ102 × 301.5 mm (Except air cap set, cable, tubes and sleeve)
		Weight	ESA210VP: 4600 g (Except cables, tubes and brackets for outer setting)
3 *1)	Applicable paint cleaning solvent	Applicable paint	Solvent type paint (paint with electric resistance of 10 MΩcm or below is not applicable for electrostatic coating)
		Applicable cleaning solvent	Cleaning solvent with electric resistance of 20 MΩcm or higher
4	Service environment	Temperature	5ºC to 40ºC
		Humidity	40% to 80%
		Air velocity through booth	0.3m/s to 0.4m/s
5	Air conditions	Bearing air	100 L/min (ANR) * At 0.5 MPa. Normal pressure: 0.5 MPa or higher
		Turbine air	500 L/min (ANR) (250 L/min(ANR) *40,000 rpm at no load)
		Shaping air	WP: Wide pattern shaping Air. 750 L/min (ANR) or less SP: Short pattern shaping Air. 750 L/min (ANR) or less
		Maximum pressure	Air route: 0.7 MPa Paint route: 1.0 MPa

No.	Item		Specification
		Air supply quality	Solid particle size: 0.1 μm or less Dew point under pressure: -20°C Residual oil content: 0.01 mg/m3
6	Normal turbine speed		With φ70 cup mounted: 40,000 rpm or less With φ40 cup mounted: 60,000 rpm or less
7	Electrostatic charge	Applied voltage	Max. -80 kV
		Constant current control	Max. 150 μA * Keep the current indicated on monitor at 90 μA or below.
8	Delivery rate	Paint	500 mL/min(ANR) (viscosity 20 sec/FC#4 or less) * This is for reference purpose only. If your conditions differ from those given for the reference, painting test should be held for your paint quality.
		Cleaning thinner	Cup interior cleaning: 1,000 mL/min(ANR) x 3 sec. or less Cup exterior cleaning: 300 mL/min(ANR) x 0.5 sec. or less

4 Installation and Connections

① **Installation of the main body**

(1) Fasten the gun securely to the reciprocator, robot arm or stationary stand.

(2) Be sure to ground the joint plate by connecting its grounding wire to the automatic coating machine. (The grounding resistance should be 1 kΩ or less)

⚠ WARNING

Correctly install the bracket. For electrostatic coating, a high-voltage electrostatic phenomenon is used to positively generate static electricity. If the brackets are incorrectly installed, it may cause electrostatic discharge or sparks, resulting in explosion and/or fire.

(3) Keep the metallic part of the gun tip at least 600 mm away from the nearest grounded object in the paint booth, such as water tank or conveyor rail.

(4) When installing more than one gun, keep high-voltage applied parts of adjacent coating machines at least 400 mm apart from each other.

(5) Keep the gun installation angle between directly below and the horizontal position.

⚠ CAUTION

If the gun is set pointing upward, the paint may flow out of the bell cup into the air spindle, possibly resulting in damage to the air spindle.

(6) Set the gun traveling speed to **54 m/min (900 mm/s) or less.**

⚠ CAUTION

If the gun travels too fast, it will affect the paint transfer rate and cause a failure of the gun or automatic machine.

(7) Keep the acceleration of the automatic machine at **0.3 G or less** at reverse.

⚠ CAUTION

Constant shock exceeding 0.3G will cause gun failure.

② Air route connections

(1) Bearing air

The machine uses a precision air spindle that keeps the turbine shaft airborne with air pressure. The precautions described below shall be strictly observed.

⚠ CAUTION

The air quality supplied to the air spindle shall be not lower than Class 131 as specified by JIS (the dew point of -20°C under pressure is equivalent to the dew point of -42°C at atmospheric pressure).
(Solid particle size: 0.1 µm; Dew point under pressure:-20°C; Residual oil content: 0.01 mg/m^3)

⚠ CAUTION

① Install a micro mist separator as close to the gun as possible (within 10m) on the air spindle. Make sure that each gun has one dedicated micro mist separator.
② Install an air route downstream the micro mist separator while observing not to include seal tape or liquid seal into the line. Before installing the gun, fully exhaust air to remove all dust in the tube.
③ Keep the bearing air ON at all times even after the completion of operation. It prevents seizure in case the turbine air supply turns on. It also prevents splashed fluid or thinner from getting inside.

③ (1) ESA210VP air connection

Table 4-1

No.	Marking	Item	Function	Requirement	Joint dia.
①	TA	Turbine air	Rotates the bearing.	500 L/min(ANR)(0.4 MPa)	φ10-8
②	PW	Wide-shape air	Adjusts wide pattern.	750 L/min(ANR)(0.4 MPa)	φ10-8
③	PS	Short-shape air	Adjusts short pattern.	750 L/min(ANR)(0.4 MPa)	φ10-8
④	BEA	Bearing air	Supports the high-speed rotary bearing.	100 L/min(ANR) (0.5 MPa or more)	φ6-4
⑤	BRK	Brake air	Brakes reverse rotation.	100 L/min(ANR)(0.5 MPa)	φ6-4
⑥	EX	Turbine exhaust	Turbine air ventilation	-	φ10-8

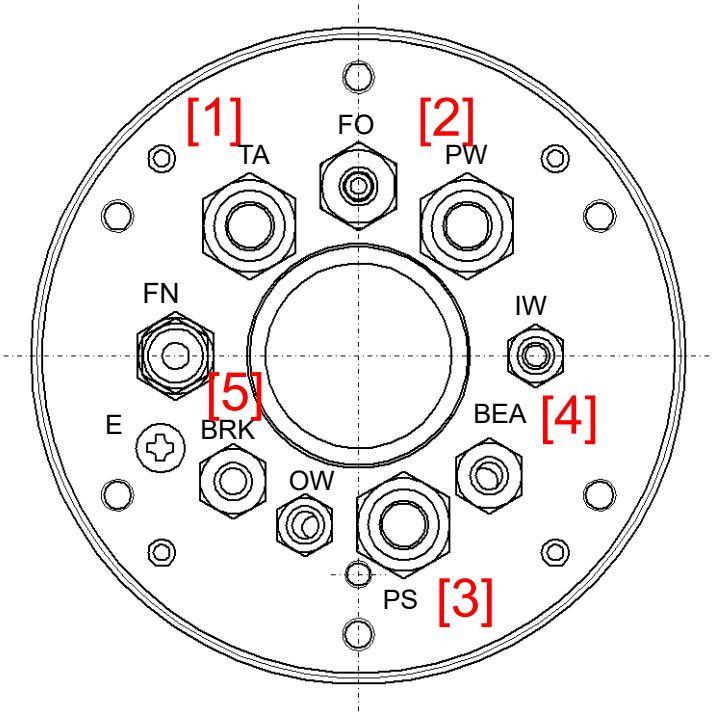


Figure 4-1

④ (2) ESA210VP, other connections

Table 3-2

The air supply to the gun should be arranged in accordance with the following table to ensure enough air quantity and pressure.

No.	Marking	Item	Function	Requirement	Joint dia.
①	FN	(5) Paint inlet	Paint supply	0.7 MPa or less	φ6-4
②	OW	(6) Cup exterior cleaning thinner	Cup exterior cleaning	Up to 300mL/min x 0.5 s 0.7 MPa or less	φ4-2.5
③	IW	(7) Cup interior cleaning thinner ※1)	Cup interior cleaning	500 to 1000 mL/min x 3 s or less 0.7 MPa or less	φ4-2.5
④	FO	(8) Fiber optic cable	Detect rotation	-	φ6-4
⑥	E	(10) Grounding	Gun grounding	Class D grounding	1.6mm or more
-	(Center)	(11) Transmission cable	Power transmission to cascade	-	φ6

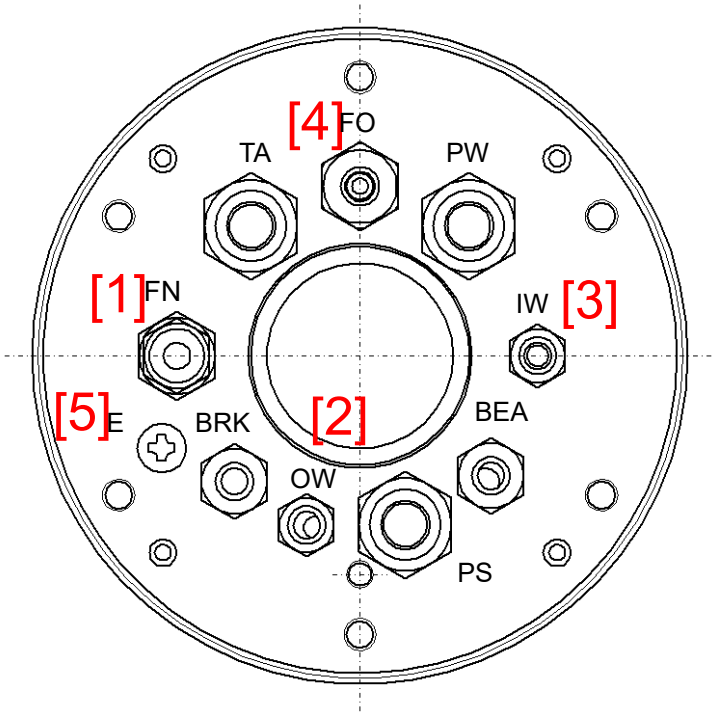


Figure 4-2

④ **Bell cup cleaning thinner route**

This equipment removes paint from the surfaces of the bell cup with its built-in routes where the bell cup is automatically cleaned. This enables to prevent defects due to paint clogging in the injection holes and paint sludge scattering.

(1) Adjust the thinner to clean the inner bell cup at 500 to 1000 mL/min for consecutive 3 second or less.

⚠ CAUTION

Low thinner discharge rate likely leads to built-up paint after a long-term use. That may cause bell cup overflow.

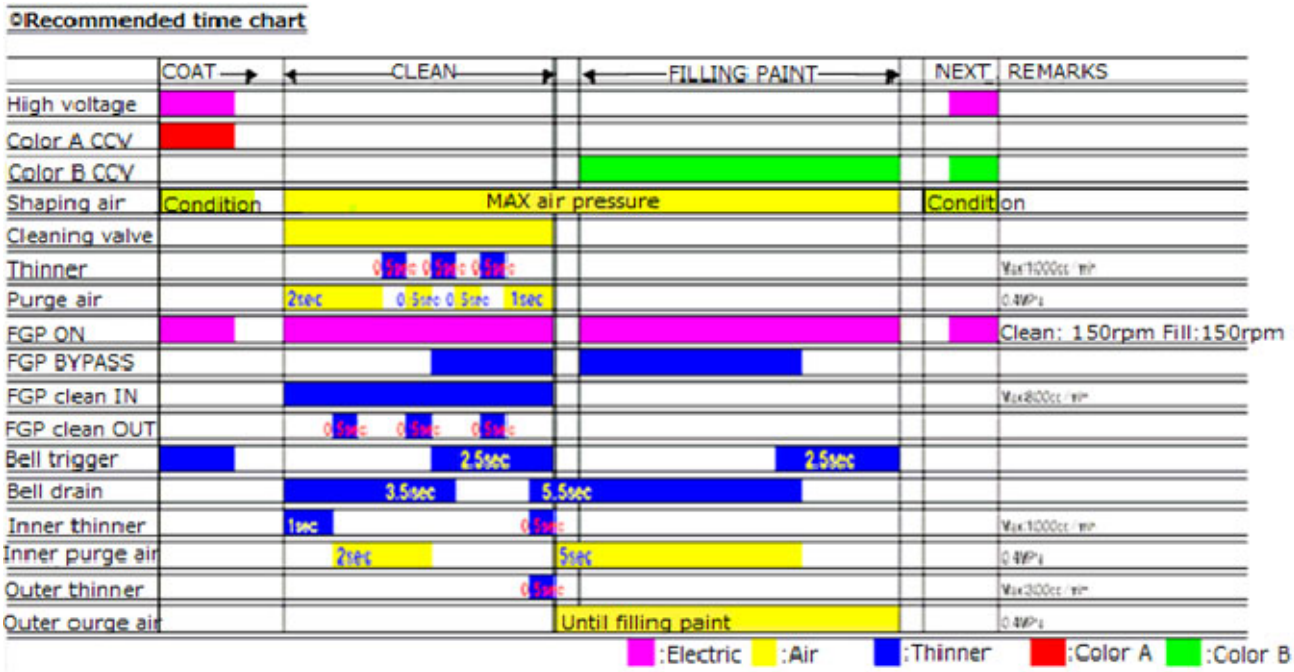
(2) Use thinner with paint resistance of 100 MΩ-cm or higher (as measured with the Asahi Sunac Electrostatic tester (Part No. 2717) and electrostatic resistance measurement probe (Part No. 2715-002)). It prevents static electricity from leaking to the ground through the route. If the thinner resistance is lower, air-purge the paint route inside the gun to discharge thinner out after cleaning.

(3) For cup exterior cleaning, discharge thinner at the rate of up to 300 ml/mm for 0.5 second or less, to be followed by air blow (at 0.3 MPa or higher). This prevents thinner splashing over the shaping air cap as the cup revolves.

(4) When any stain which cannot be removed by the exterior or interior cleaning of the bell cup, remove the bell cup and gently clean the surface with a soft brush or cloth.

(5) In the case that an ultrasonic cleaner is used, contact the cleaning solvent manufacturer to check safety and effectiveness of the cleaning solvent and confirm that there is no problem before your use.

Figure 4-3



To prevent connector contact failure, give the cable some slack so that there will be no tension in the cable when the gun moves.

(5) To prevent noise interference, route the connecting cable apart from other power cables.

⑥ Installation of fiber optic cables to bell coating machine

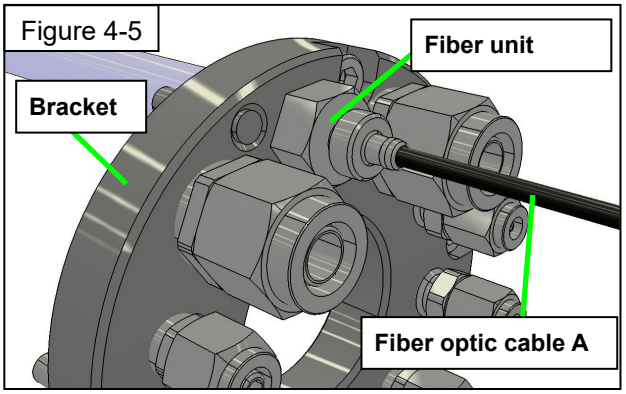
Connect the fiber optic cables with the following procedure.

(1) Install the fiber optic cables while taking caution not to bend or folded by a hose or machine.

When installing, take care not to damage or contaminate the lens at each end of the fiber optic cables.

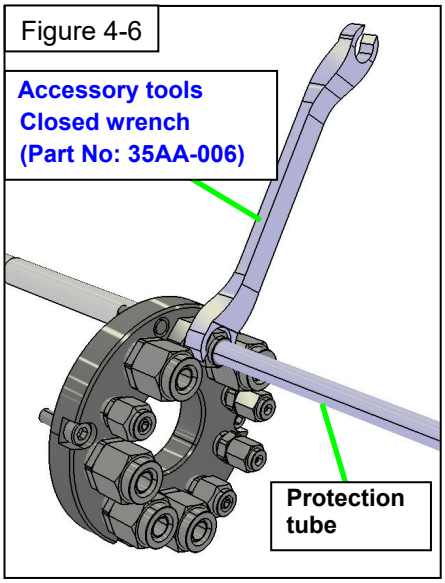
(2) After arranging optical fibers to the control panel as well as other tubes, insert the end of the fiber optic cable A, which has the connector and the protection tube on the cable, into the fiber unit installed on the bracket.
At this time, remove the nut, guide tube and sleeve of the fiber unit.

Figure 4-5



(5) When the fiber optic cable A adjustment is completed, check that the nut of the fiber optic cable A is fixed. Then, tighten the protection tube with the nut to secure to the holder of the bracket with the closed wrench of the accessory tool.

Figure 4-6



⑦ Connection of fiber optic cables A and B (For non explosion-proof specifications.)

(1) Each of fiber optic cable A and B is originally provided with a mating connector as a set. When connecting the cables, remove the mating connectors.

Figure 4-7

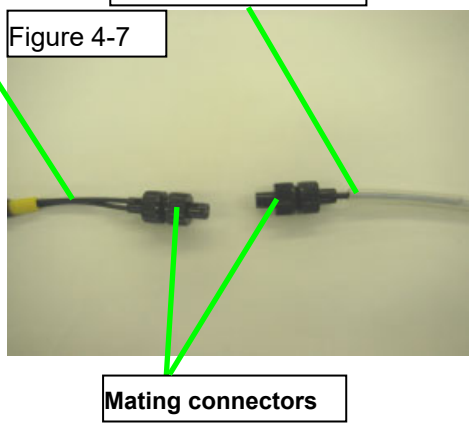
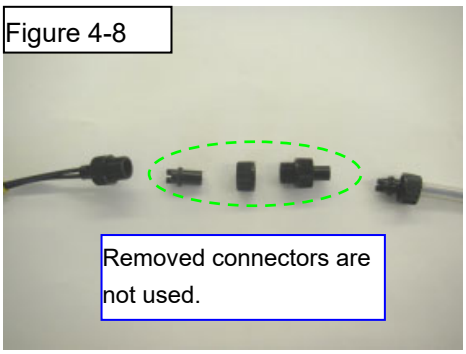
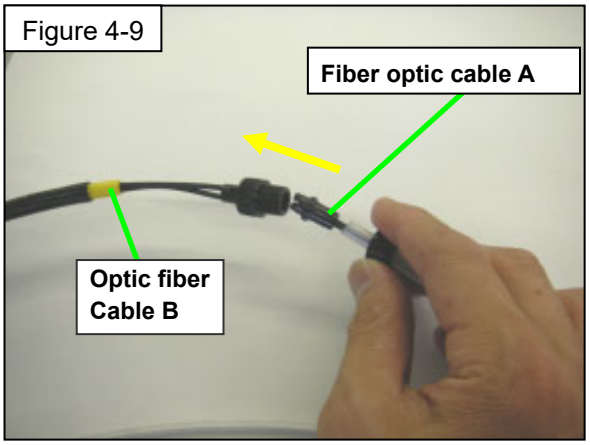


Figure 4-8



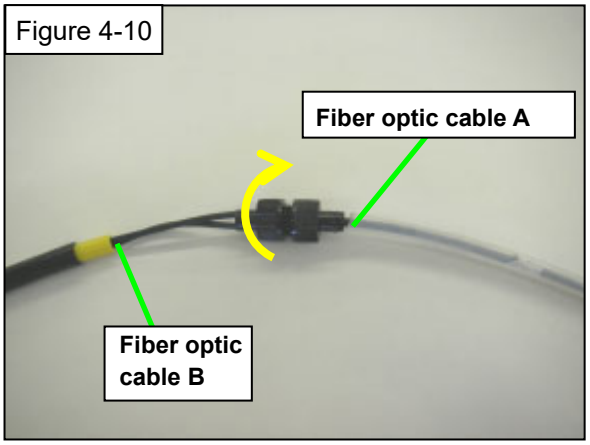
(2) Insert the fiber optic cable A into the connector of the fiber optic cable B.

Figure 4-9



(3) After inserting, firmly tighten the connector F of the fiber optic cables A and B.

Figure 4-10



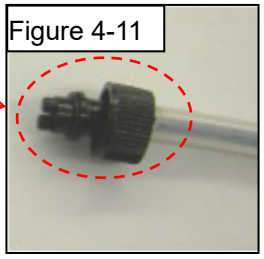
⑧ Cutting the fiber optic cables (For non explosion-proof specifications)

(1) If there is contaminated optic fibers with paint, etc. on the optic fiber cable A side of the connector between the fiber optic cables A and B, they cannot be removed for cleaning as they have been secured in a special manner.
Replace the fiber optic cable A with a new one.

⚠ CAUTION

The connecting part of the fiber optic cable A cannot be overhauled or replaced.
If it is contaminated with paint, etc., replace the fiber optic cable A as a whole.

Figure 4-11



(2) If the connecting end of the fiber optic cable A of the fiber optic cable B is contaminated with paint, etc, divide the connector and cut the end of optic fibers using the attached fiber cutter.

Figure 4-12

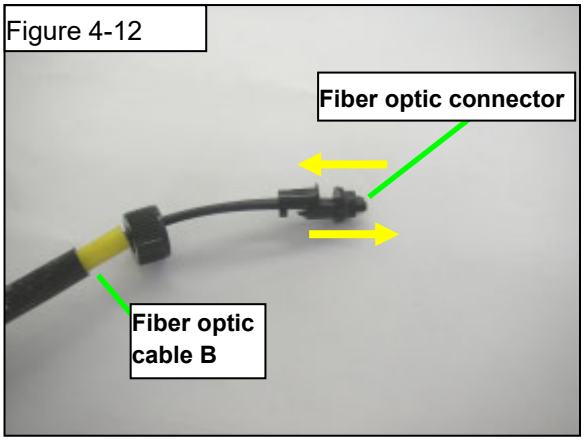


Figure 4-14

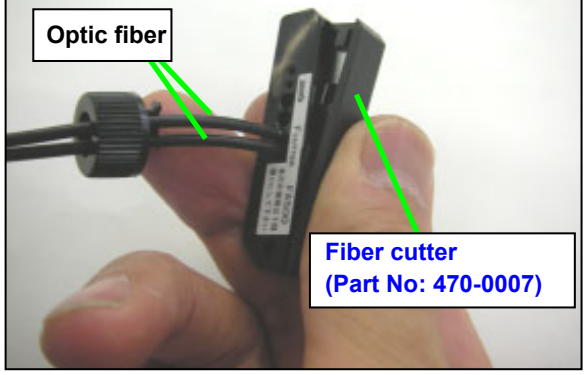
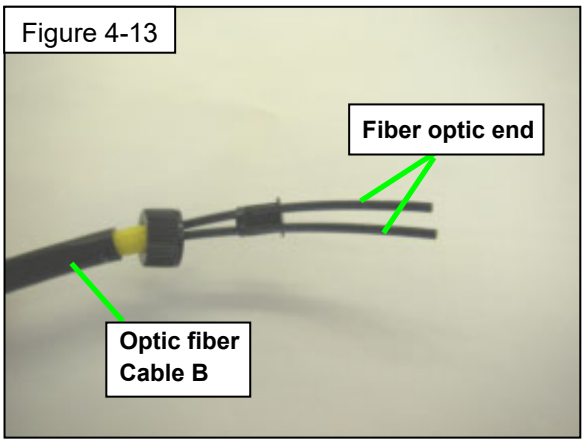
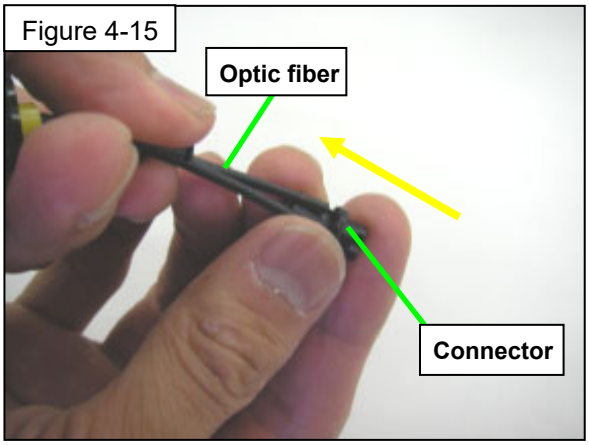


Figure 4-13



(3) After cutting the end of fibers, extend them by 0 to 0.2mm from the connector when assembling again.

Figure 4-15



⚠ CAUTION

Too long extrusion may lead to crushed end of optical fiber cable, causing detection error.

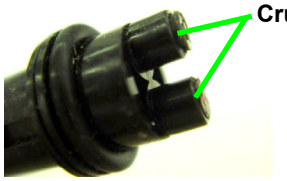
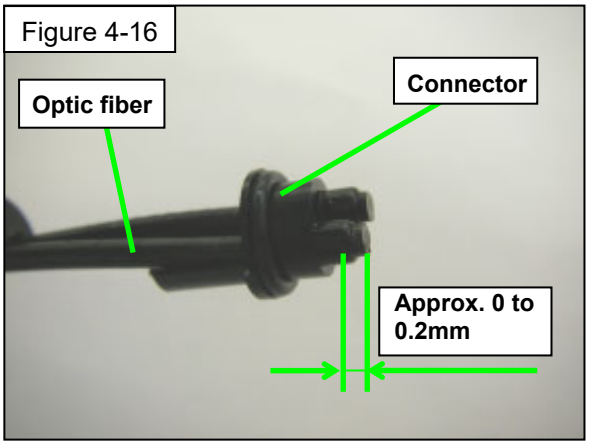
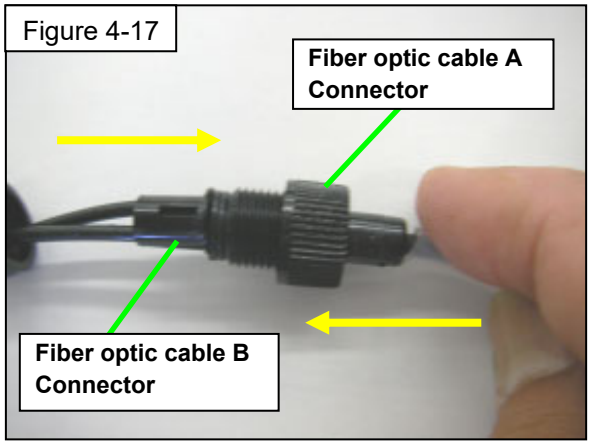


Figure 4-16



(4) After setting the optical fibers to the connector, connect with the fiber optic cable A.

Figure 4-17

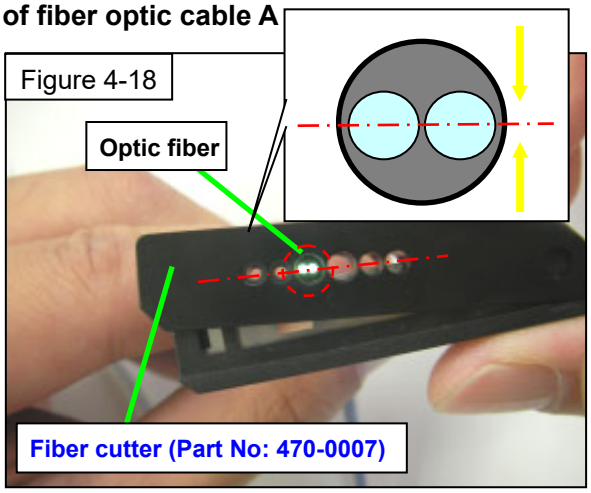


⑨ Cutting air spindle RPM detector connecting end of fiber optic cable A

(1) When paint flows back into the machine and the end of optic fibers on the air spindle rotation side of the fiber optic cable A is contaminated, cut the end of the optic fibers.

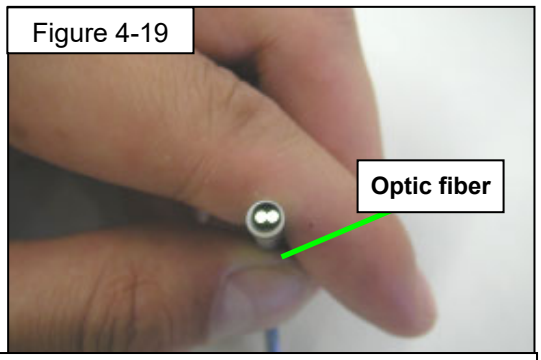
(2) To cut down the fibers, face them to the tooth of the cutter as shown in the figure below.

Figure 4-18



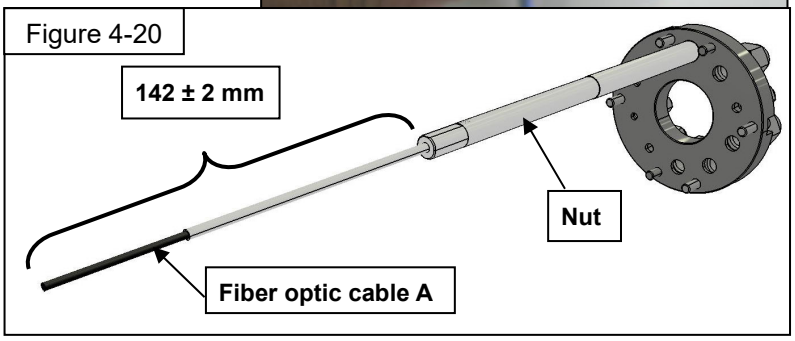
(4) After cutting, check cut sections of the optical fibers.

Figure 4-19



(5) After confirming the cut sections, adjust the projection length of the fiber optic cable A from the nut to be 142 ± 2 mm while gradually tightening the nut into necessary length of the fiber optic cable. Then, secure the nut.

Figure 4-20

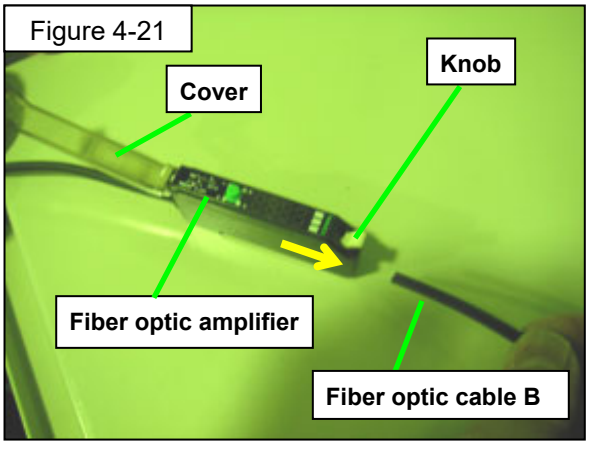


* After adjusting the length of the optic fibers, install to the bell body, fine-tune to have the optic fiber amplifier to be a given value, and run auto tuning.

⑩ Connection to fiber optic amplifier (For non explosion-proof specifications)

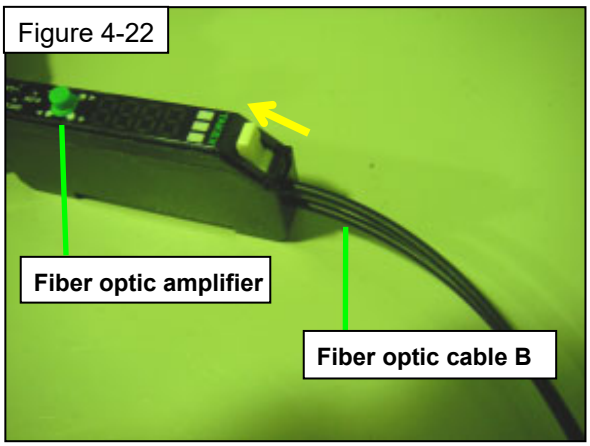
(1) Open the fiber optic amplifier cover and furthermore open the white knob.

Figure 4-21



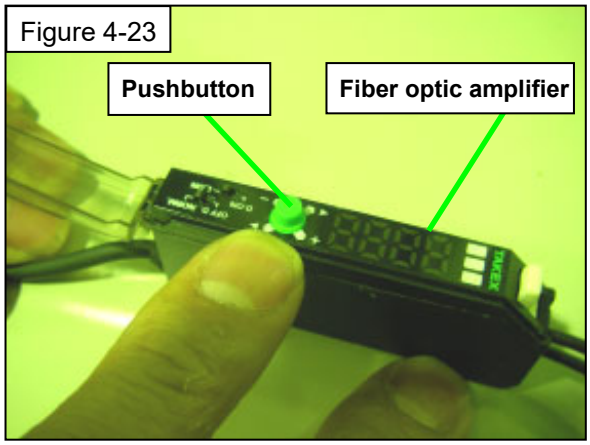
(2) Connect the fiber optic amplifier connecting end of the fiber optic cable B to the fiber optic amplifier. Then, put the white knob back.

Figure 4-22

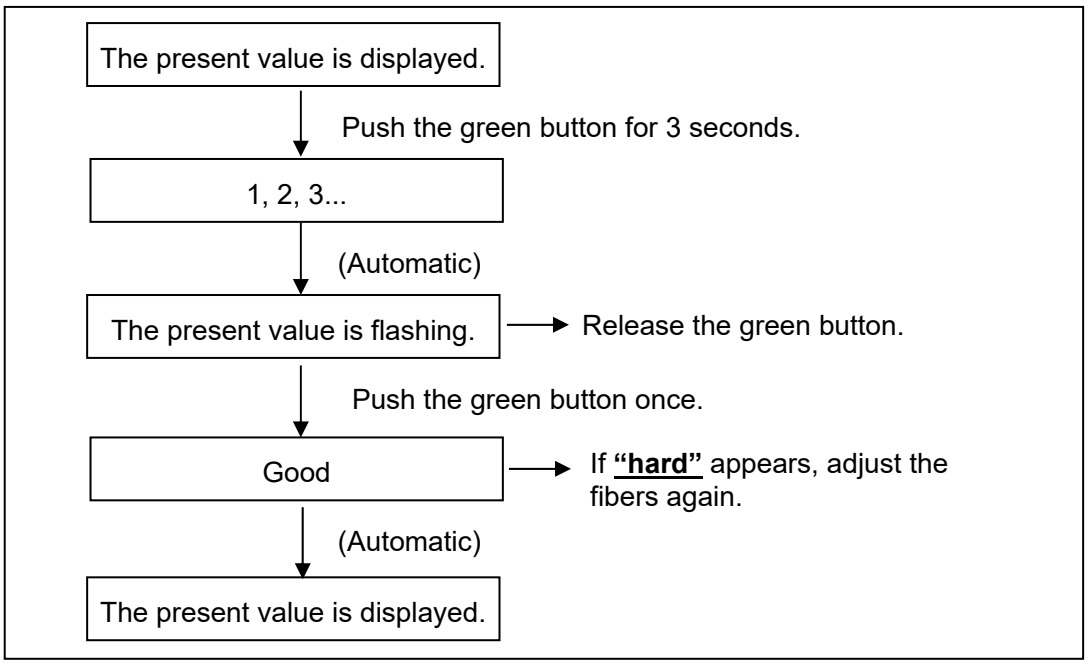


(3) After checking that it is fully connected, hold the green button on the fiber optic amplifier for 3 seconds to auto-tune the threshold.

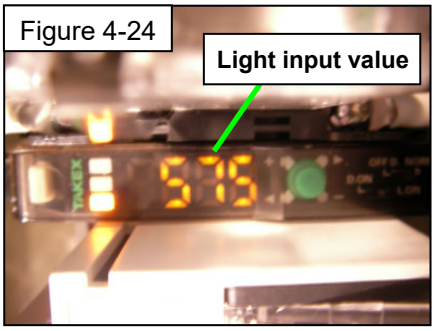
Figure 4-23



[Reference] Flow chart for auto tuning of optical fiber amplifier



⑪ **Adjustment of fiber optic cable position (For non explosion-proof specifications**)



(1) Set the bell cup and rotate lightly by hand.

(2) A high value and a low value are alternately displayed on the fiber optic amplifier after the bell cup rotates.

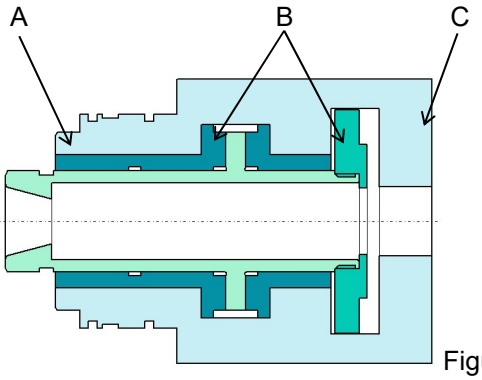
(3) The high value means a high feedback light amount while the low value means a low feedback light amount.
Please adjust the fiber optic cable position to have the high value to be at 500 or higher and the gap between the high value and the low value to be 300 or higher.

* Use the fiber optic amplifier on the “HISPEED MODE”.

Reference) Examples of optical fiber amplifier value setting.

Value H	Value L	Difference	Result
1800	200	1600	Good (Nearly adequate)
800	70	730	Good (Adequate)
400	15	285	**Re-adjusting needed (Too far or improper end face)**
250	5	245	**No good (Unstable at high speed)**

① **Air spindle**



A: Shaft
B: Air bearing
C: Turbine

Figure 5-1

(1) Air spindle handling

The air spindle operation procedure below shall be strictly observed.
Failure to do so may result in damage to the air bearing, causing breakage.
Be aware of injury risk as the shaft revolves at a high speed.

1) Before you run the air spindle, be sure to check that the shaft is not revolving.
Do not stop the cup directly by hand when it is still revolving.

⚠ WARNING

The shaft keeps on turning for a while on inertia even after the turbine air is turned OFF. The monitor may indicate "0 rpm" when the spindle is still running at around 100 rpm. If you touch the bell cup or shaft by hand at this time, you may get injured.
Be sure to check that the bell cup and the shaft have come to a complete stop, before inspection.

2) Before turning ON the turbine air, be sure to check that the bearing air pressure is 0.5 MPa or higher and that the shaft turns smoothly when lightly pushed by hand.
If the turbine air supply route is too long, increase the hose diameter to reduce the pressure loss.
3) Be sure to clean the shaft nose I. D. taper, into which the bell cup is mounted, at every time you mount or remove the bell cup so that you can maintain it free from paint.

⚠ CAUTION

If you turn the shaft with paint-contaminated bell cup mounted, the air bearing may get damaged.

4) Be sure to provide an interlock for the ON/OFF solenoid valve of the paint valve so that the paint valve will be automatically shut OFF when the turbine RPM drops to or below 10,000 rpm.
5) At the completion of an operation or when the air source of the air panel is shut off, be sure to stop the turbine air and, after waiting for 3 minutes or longer, check that the shaft is no longer turning. If the bearing air supply is shut off with the shaft still turning on inertia, the air spindle gets damaged.
6) When you stop the turbine air manually, check that all of the paint valves are closed or no mist is coming out of the cup.

(2) Air spindle repair

If you install and use the air spindle properly, you can enjoy high performance over many years. However, when the shaft does not turn lightly by hand even with the bearing air ON, or when the air spindle does not rev up to the rated rpm, you may have to replace it with a new one or a repair may be needed. Send the air spindle back to us for repair.

⚠ CAUTION

Please note that, once the air spindle is repaired or overhauled by those who have not been authorized by us, it will no longer be covered by our warranty as it is made of high-precision parts.

② Bell cup and shaping air cap

(1) Installing and removing

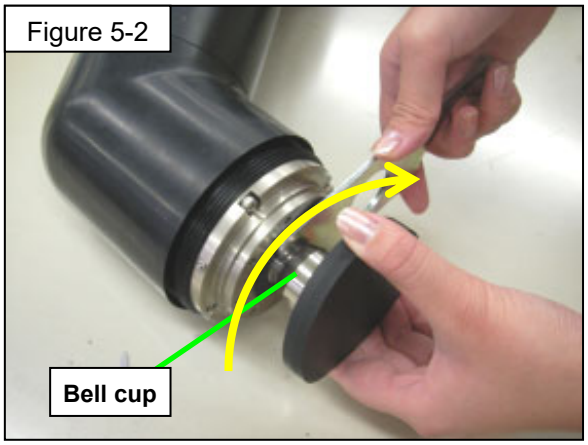
Check that bearing air is supplied and also the shaft rotation is completely still before mounting or removing the bell cup. Also, check that the static electricity outputs of the high-voltage generator is off.

1) After checking that the shaft nose I. D. taper is free from contamination, hold the shaft with the accessory tool, spanner A, and screw in the bell cup by hand with the accessory tool, pad (for φ70 cup and for φ60 cup).

2) Lastly, hold the bell cup with the attached pad and turn the bell cup by hand to fasten it. Do not use any tools other than specified tools such as adjustable wrench.
(Replace with a new bell cup if it is scratched or deformed.)

(*Regarding to the tools, refer to the operation manual of “Integral Air Cap BAC Series”.)

Figure 5-2



(2) Handling bell cup

This painting equipment uses a precision air bearing.
The mounted bell cup normally runs at ultra-high speed as fast as 20,000 to 40,000 rpm. So, if you failed to handle it properly, imbalance will occur to the bell cup, causing serious damage to the air bearing. To operate the equipment to the best performance all the time, conduct the following inspections before and after operation.

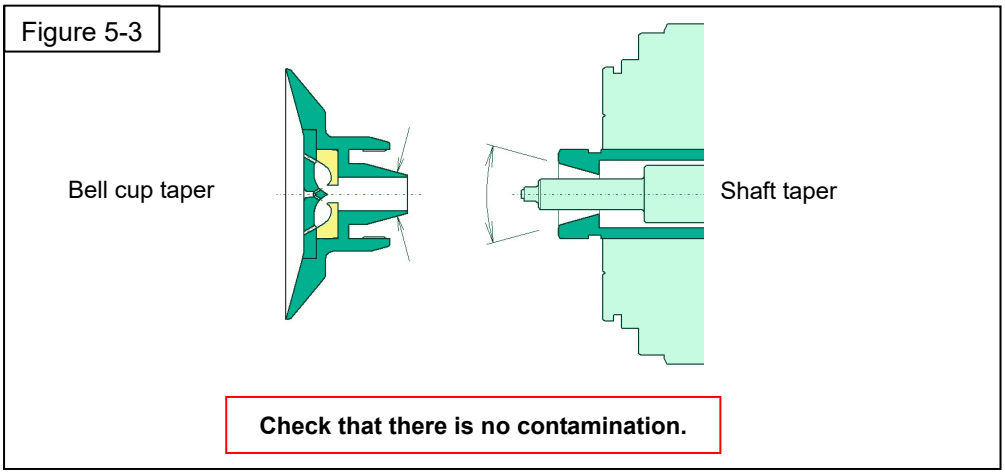
1) Before mounting the bell cup, put a needle (φ0.8 mm or smaller) through the fluid bore in the bell cup to see that it is not clogged.

2) To ensure the alignment between the bell cup and the shaft, keep both male and female tapers free from paint deposits at all times.

⚠ CAUTION

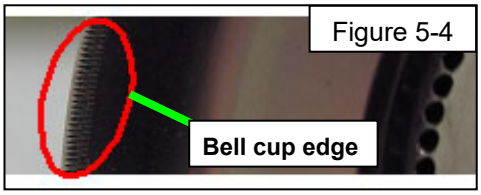
If you set the bell cup with its tapers contaminated with paint, imbalance will occur when the bell cup is rotated by the air spindle at a higher RPM, resulting in damage to the air spindle.

Figure 5-3



3) Wipe off paint deposited on the nozzle with a soft cloth when taking out the bell cup.
   At this time, wipe with care so that paint may not be transferred to the female taper in the shaft I. D.
4) At the end of each 8-hour operation shift as a guide, be sure to clean the bell cup with a highly soluble thinner, air blow the inner and outer surfaces and check that the tapers and the fluid bore are clean and free from damage.
5) When dipping the bell cup into thinner, take care not to let them stack or come into contact with others.
   Place the bell cup carefully with the cup edge facing down.
6) Handle the bell cup edge (groove) carefully so as not to damage it.
   Scratches, such as dent of the bell cup edge, may affect the atomization performance. If it gets damaged, replace with a new one.

Figure 5-4



⚠ CAUTION

If you drop the bell cup or it is hit by something, be sure to replace it with a new one.
With a deformed bell cup, imbalance will occur when it is rotated by the air spindle at a higher RPM, resulting in damage to the air spindle.

⚠ CAUTION

Note that the paint mist may flow to the bun body side at too low shaping air rate, resulting more contaminating in the gun.

① **Post-operation cleaning**

(1) Cleaning the gun body

1) With the air cap and bell cup mounted, carefully clean the body cover (shroud) with a clean cloth soaked with thinner.

2) If contaminants are not wiped off, remove the body cover (shroud) and dip it into thinner for a few minutes and then wipe it off with a cloth again. (Do not immerse it in thinner too long.)

⚠ CAUTION

Do not clean the surfaces with brush or scraper. These tools leave scratches on the surface, making it liable to have deposition of contaminants. Once the surface gets contaminated, electrostatic charges at the gun nozzle likely leak to the ground, causing electrostatic failure.

⚠ WARNING

Some types of substances contained in the paint or solvent do harm if inhaled or brought into contact with your skin.
Paint works should be carried out at a well ventilated area to prevent the accumulation of such harmful substances.

(2) Cleaning the cap of the air cap, nozzle, and bell cup

1) Clean the paint route inside the gun with thinner.

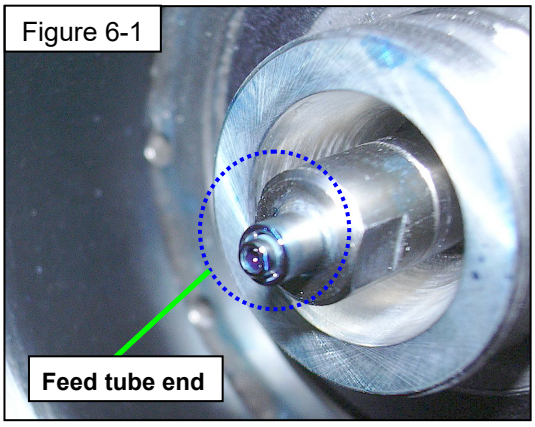
2) Make sure that electrostatic high-voltage generator has been turned OFF, remove electrostatic charges with a grounding rod and then the shaping air cap, and remove the bell cup with the special spanner.

3) Clean the bell cup using clean thinner.
If paint sticks and cannot be wiped off, keep the bell cup immersed in clean thinner for a while and then wash the paint away using a brush.

4) Wipe the air spindle shaft I.D. taper and the feed tube end with a clean cloth soaked with thinner.

5) Clean the surface of the air cap with thinner.
If contaminants are severe, take the shaping air cap apart and clean it together with internal parts.

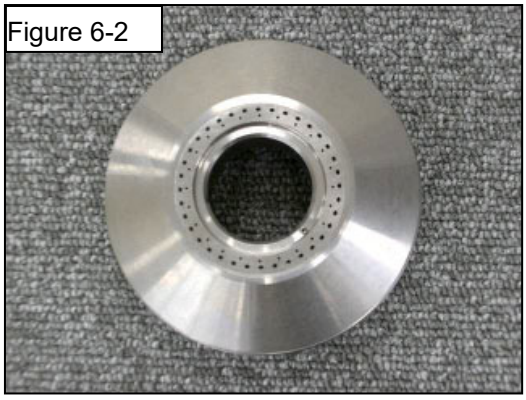
Figure 6-1



<How to clean the air cap set>

Use a soft blush and thinner to clean the air blow hole. Finally, blow air and remove paint sludge and thinner accumulated inside.

Figure 6-2



6) Finally, remove the bell cup from thinner and, after thoroughly drying the inside and outside of the cup with blown air, install it to the air spindle.
If paint sludge is accumulated inside the bell cup, remove the inner and clean the inside of the bell cup with a thin brush.

② Periodic inspection

Conduct periodic inspections in accordance with the table below in order to operate the equipment to the best performance.

Item	Corrective measures	Frequency
Check body appearance.	Replace with a new one if damaged.	1 day
Check bell cup paint hole for clogging.	Immerse in thinner and clean with blown air. If clogging persists after this, replace with a new one.	
Inspect paint contamination inside the bell cup	Remove the inner and clean with fine tips of brushes.	
Check feed tube end for contamination.	Remove contaminants with a soft cloth.	
Check body cover (shroud) for contamination.	Remove contaminants with a soft cloth.	
Check fiber optic cable.	Replace with a new one if damaged. If the light intensity is insufficient, check connections for poor contact.	
Check transmission cable.	Replace with a new one if damaged.	
Check bell cup for scratches and dents.	Replace with a new one.	1 week
Check air spindle shaft nose I. D. taper for contamination.	Remove contaminants with a soft cloth.	
Check valve for proper functions.	If thinner leaks by drops from the gun tip when thinner is filled in the paint route, replace the paint valve.	1 month
Check coil tube for internal contamination.	If paint deposits are seen for 50% or more of the entire length of tube, replace it with a new one.	
Check turbine air pressure.	If the air pressure is higher by 50% or more than the rated pressure, replace the turbine with a new one (or repair) and exhaust any water or oil in the bearing air routes. Replace filter as well.	
Check mist separator for air spindle for contamination.	Replace filter.	1 year

③ Consumables

(1) Tube set

Wear of the tube inner wall due to pigments and/or pigment deposits can cause paint routes to get clogged or failure due to contamination. Replace periodically.

1) Tube replacement .....6 months to 1 year

(The frequency may vary depending on the fluid characteristics.)

7 Replacing Parts

※ **The accessory tools indicate the tools of the optional tool set.**

※ **Although some of the images show different models in the following explanation, this will not affect disassembly and maintenance of this product.**

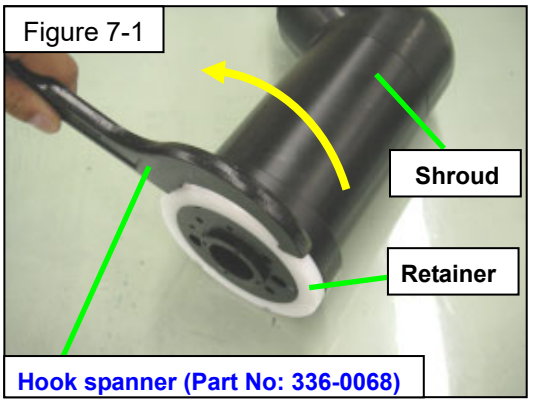
① **Mounting and dismounting the gun body**

● Drain pressure from the inner paint route after cleaning with thinner. Stop the turbine/shaping air and remove the shaping air cap and the cup.
Remove the fiber optic cables, transmission cable and hoses from the back plate in advance. Failure to do so may cause damage to the cables and hoses.

② Shroud

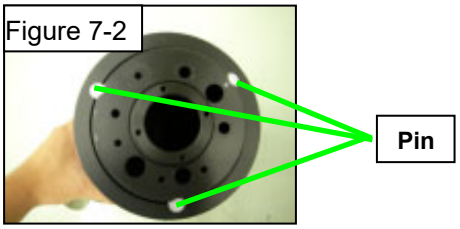
● Remove the retainer S, which secures the shroud, using the accessory tool, hook wrench.

Figure 7-1



● Remove the shroud while observing the locating pins.

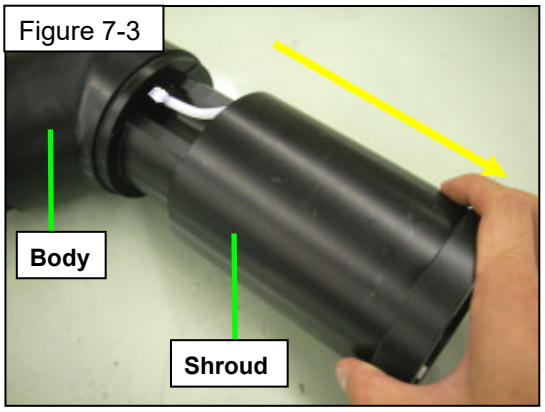
Figure 7-2



⚠ CAUTION

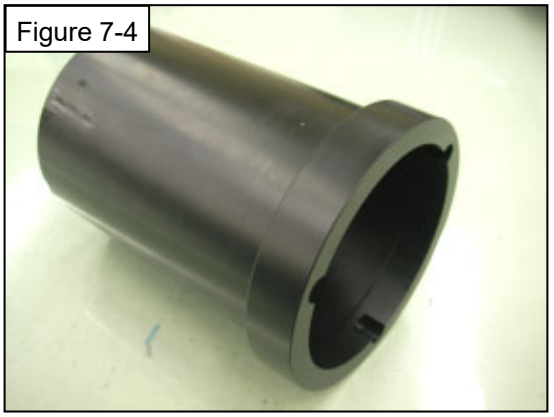
The pins come off when the shroud is removed. Work in a place where they may not be lost.

Figure 7-3



● Before assembling the shroud, clean the inside and outside of the shroud with thinner and dry it completely. Do not fail to install the locating pins before installing the retainer S.

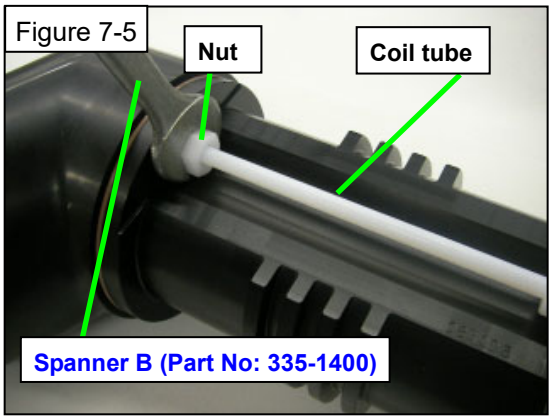
Figure 7-4



③ Tube setting

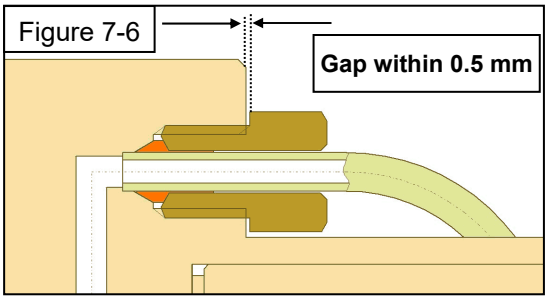
● Unscrew the nuts (Hex 14) that fasten the tube in place, using the accessory tool, spanner B. Disconnect the tube end from the gun and wind the tube off.

Figure 7-5



● When connecting, fully insert one end of the tube into the gun and tighten the nut.
At this time, check that the gap between the nut and the gun is within 0.5 mm. Wind the tube around the gun and fix the other end of the tube in place. After connecting each end, pull the tube by hand and confirm that it will not come off.

Figure 7-6



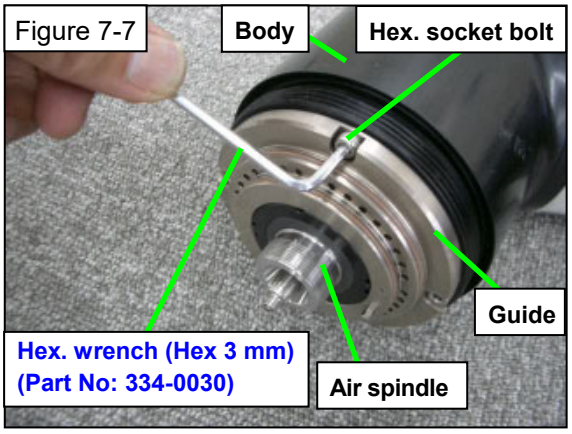
④ Air spindle

● Unscrew the four M4x10 hexagon socket head cap screws that secure the guide using the attached hexagon wrench (Hex 3 mm).

⚠ CAUTION

The torque driver, accessory tool, is specially designed for tightening. Do not use when removing.
It may be damaged.

Figure 7-7



● Take the notch near the shaping air outlet of the guide and pull off the air spindle.

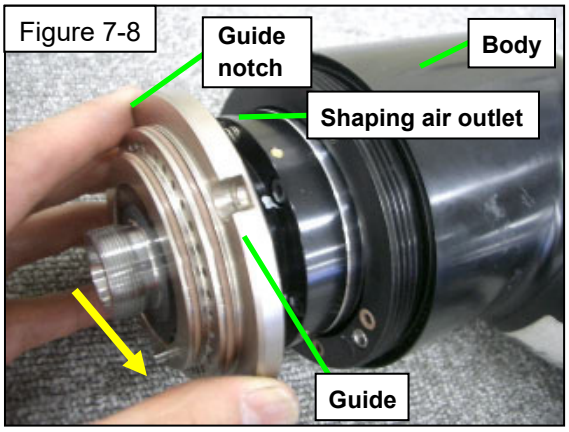
⚠ CAUTION

The two O-rings mounted on the body at the back side of the air spindle may come off when the air spindle is removed.
Remove the guide by pulling upward or work in a place where the fallen O-rings may not be lost.

⚠ CAUTION

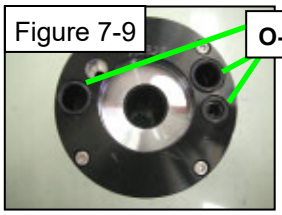
In pulling out the air spindle, be sure to remove the fiber optic cable beforehand. Removing the air spindle with the fiber optic cable attached may result in damage to the fiber optic cable.

Figure 7-8



● Remove the air spindle from the body and the guide.

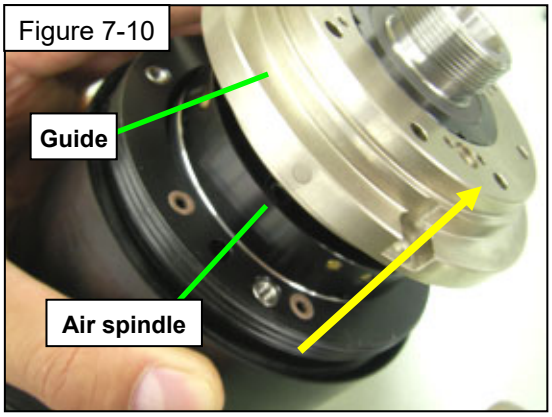
Figure 7-9



⚠ CAUTION

Three O-rings are mounted at the back side of the air spindle. After removing the air spindle, check for fallen O-rings.

Figure 7-10



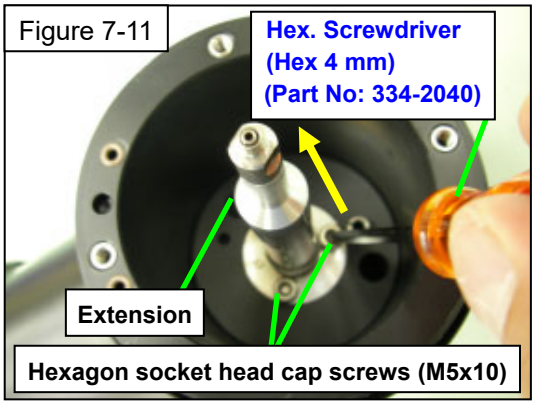
⑤ Feed tube

● Unscrew three M5x10 hexagon socket head cap screws with the accessory tool, hexagon screwdriver (Hex 4 mm) and remove the feed tube. Remove the extension while keeping the gun horizontally to prevent the feed tube inside the extension from falling down.

⚠ CAUTION

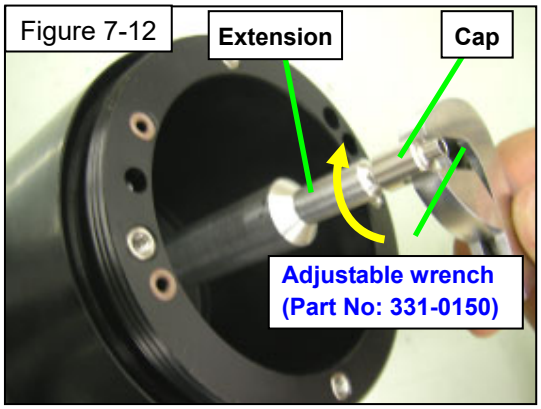
**The torque driver, accessory tool, is specially designed for tightening. Do not use when removing.
It may be damaged.**

Figure 7-11



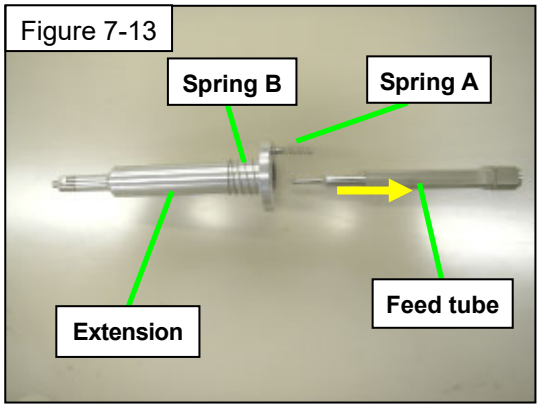
● The end cap has left-hand threads.
Remove it by rotating clockwise relative to the tip of cap using the accessory tool, adjustable wrench.

Figure 7-12



● Remove a feed tube contained in the extension. Check the direction of the spring B and assemble from the smaller diameter side.

Figure 7-13



● Mount all parts to the extension and set the gun horizontally again to mount. Mount it while having the spring A inserting into the ball holder.

Figure 7-14

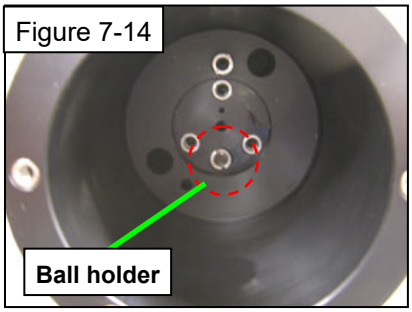
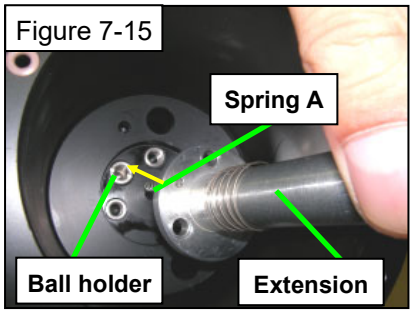


Figure 7-15



● Tighten the three M5x12 hexagon socket head cap screws at the torque of 300cN·m with the accessory tools, torque wrench and hexagon bit socket A.

Figure 7-16

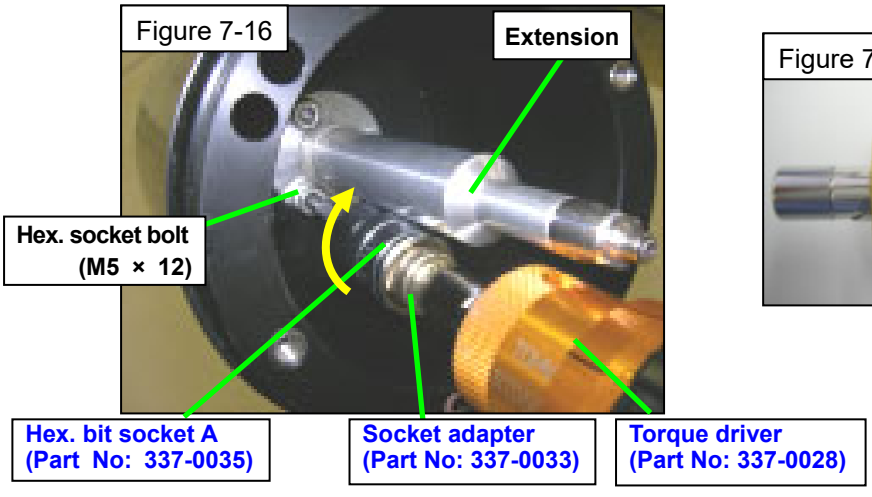
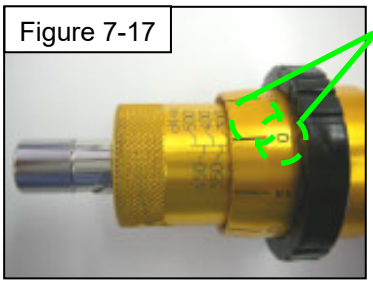
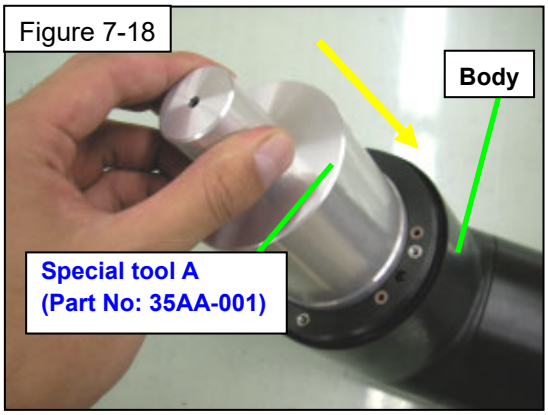


Figure 7-17



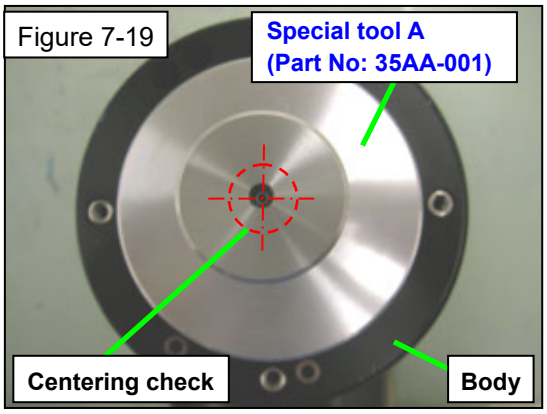
● Mount the accessory tool, special tool A, to the air spindle to check that the feed tube has been centered.

Figure 7-18



● Check that the end bore of the feed tube is seen at the center through the end bore of the accessory tool, special tool A. If the feed tube end bore does not seem centered, it may be shifted off due to an extension mounting failure or deformed cap/feed tube end. Inspect how the extension is mounted or replace the cap or the feed tube.

Figure 7-19



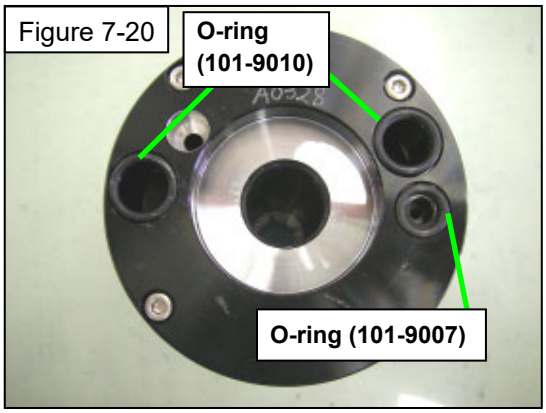
⑥ Air spindle installation

● Before installing the air spindle, check that two O-rings (101-9010) and another O-ring (101-9007) have been mounted at the back side of the air spindle.

⚠ CAUTION

Install with care not to damage the shaft sliding side and inside the rear and front bearings.

Figure 7-20

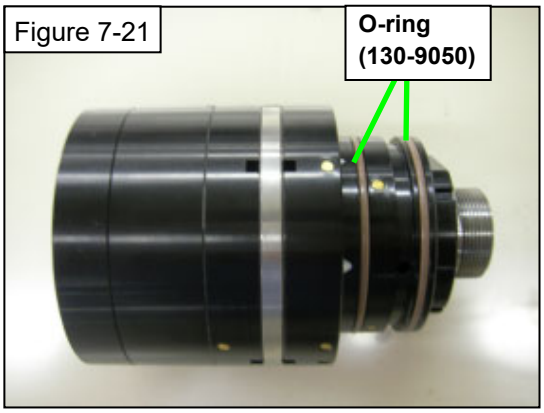


● Check the two O-rings (130-9050) mounted on the air spindle for swell or damage.

⚠ CAUTION

Swelling or damaged O-rings may cause failure of the air spindle due to bearing air leak or increase the air consumption, resulting in a pressure loss.

Figure 7-21

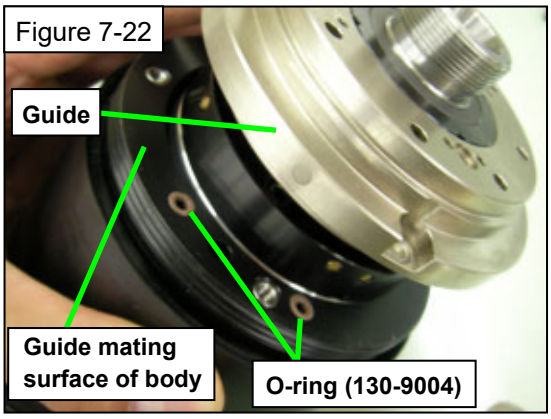


● Before setting the air spindle together with the guide to the body, check that the O-rings (130-9004) have been set on the guide mating surface of the body.

⚠ CAUTION

In installing the air spindle, check that the fiber optic cable has been removed. Installing the air spindle with the fiber optic cable attached may result in damage to the fiber optic cable.

Figure 7-22



● Set the extension together with the guide to the body.
When setting, align the locating tube guide in the body with the fiber optic detection bore at the back side of the air spindle.

Figure 7-23

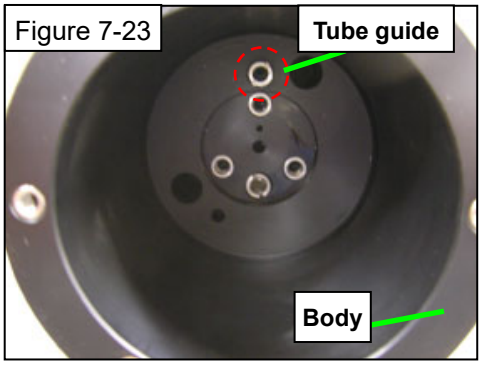
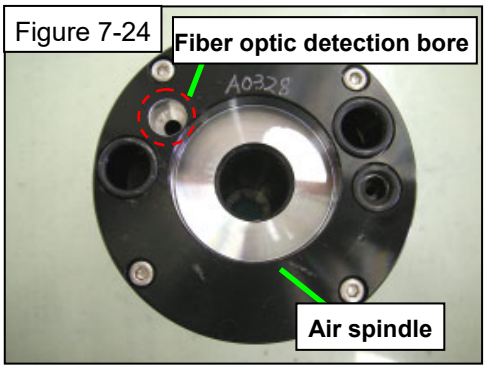
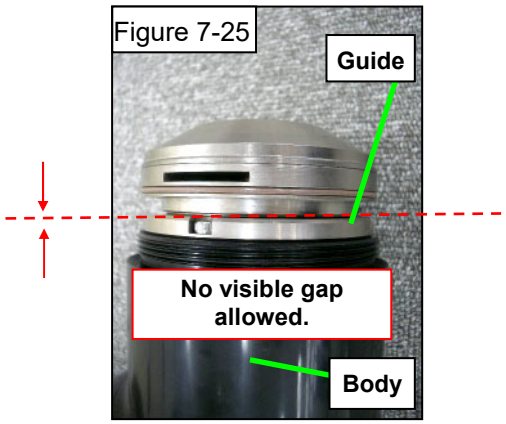


Figure 7-24



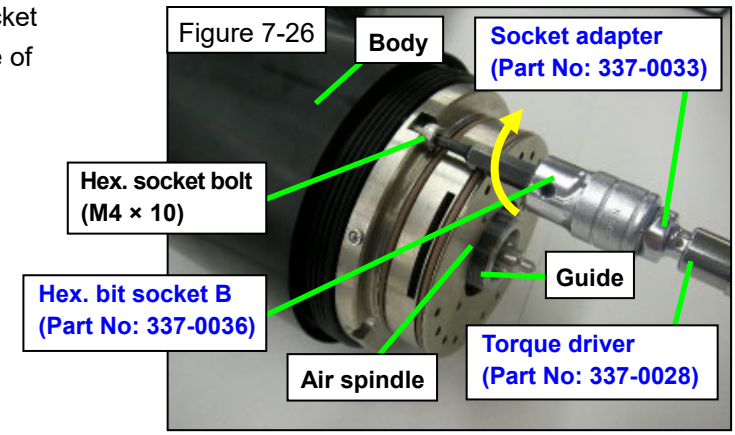
● After tightening the bolt, check that there is no gap between the guide and the body. If any, the O-ring may be incorrectly mounted in the air spindle or the feed tube may be incorrectly installed.

Figure 7-25



● Secure the guide with four M4x10 hex. socket head cap screws and tighten to the torque of 300cN·m with the accessory tools, torque wrench and hexagon bit socket B.

Figure 7-26



● Set the accessory tool, special tool E, to the shaft and check that the center hole on the accessory tool, special tool E is not in contact with the feed tube.

Figure 7-27

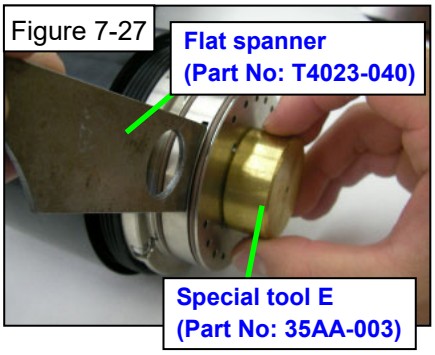


Figure 7-28

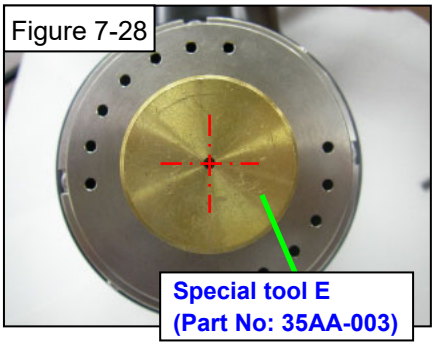
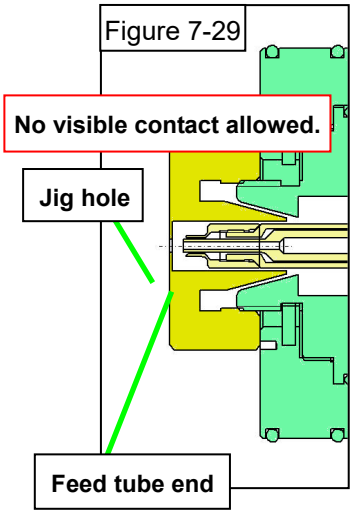


Figure 7-29

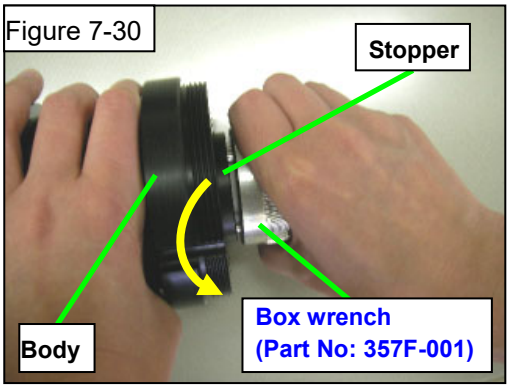


● When removing and reinstalling the air spindle, be sure to attach the fiber optic cable after reinstalling the air spindle.
When the fiber optic cable is removed and reinstalled, check/adjust auto-tuning and its sensitivity after every removal or reinstallation.

⑦ Cascade

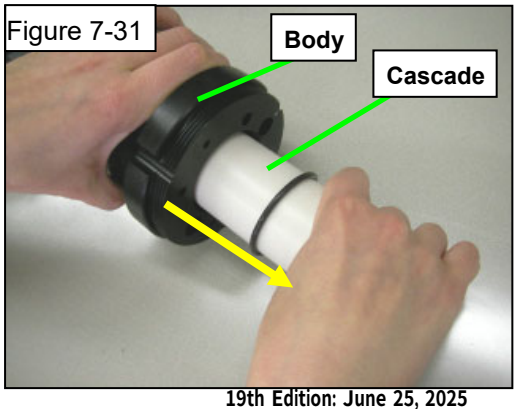
● Using the accessory tool, box wrench, loosen and remove the stopper secured on the body.

Figure 7-30



● Hold the rear part of the cascade with fingers and pull it off slowly.
Observe well not to splash thinner over the cascade connector.

Figure 7-31



● Remove the spring A, unscrew the Phillips flat head screw at the end of the cascade using the accessory tool, cross-ended screwdriver, and remove the packing and contact.

Figure 7-32

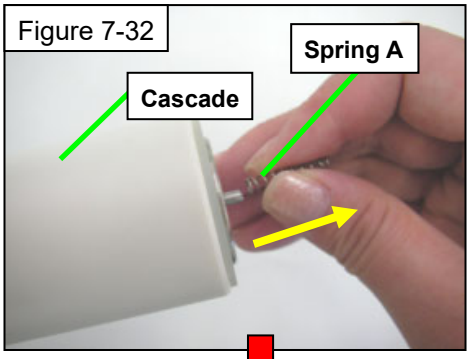


Figure 7-34

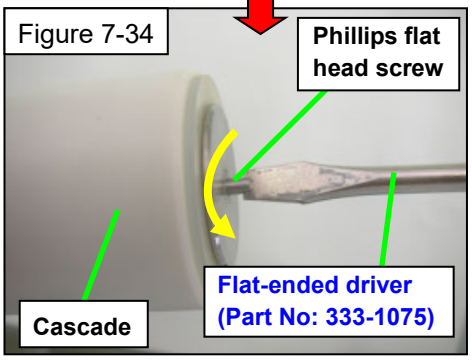
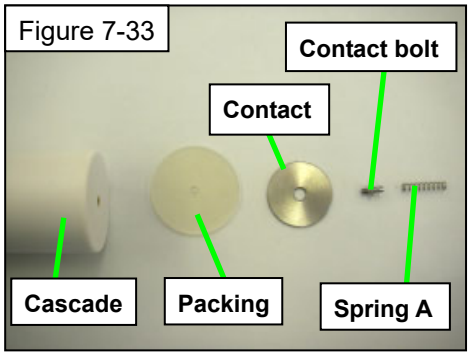


Figure 7-33



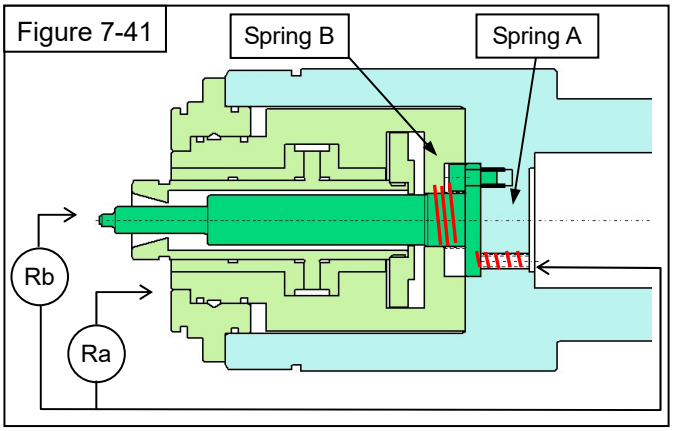
● Wipe the cascade body with thinner soaked clean cloth.
After installing the parts, wipe the body again with alcohol such as IPA to remove oils completely and dry them well.
Then, assemble again.

⚠ CAUTION

After wiping the cascade with thinner, do not air-blow. Oils, water and dust contained in the compressed air may stick to the cascade, resulting in an electrostatic failure.

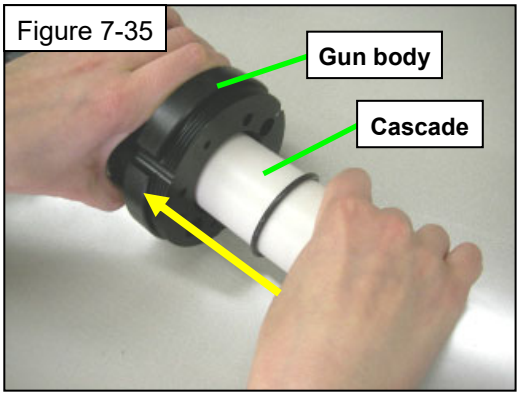
● With the cascade removed, measure the resistance between the spring A and the feed tube and that between spring A and the air spindle shaft using a tester to check that neither resistance exceeds 10 Ω.
If a higher resistance is found, polish the contacts on the springs A and B respectively for cleaning.

Figure 7-41



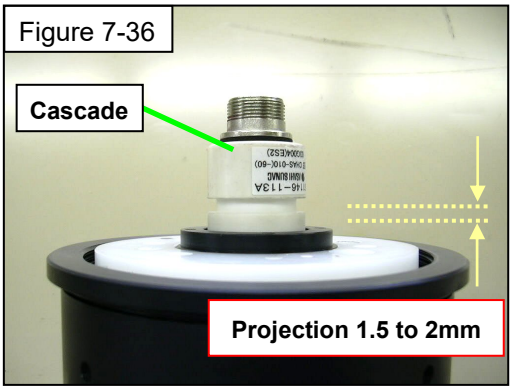
● Put the cascade into the gun body, carefully not to touch a large diameter portion of the cascade by bare hand.
Also, do not touch the hole on the gun by bare hand, into which the cascade is to be inserted.

Figure 7-35



● Install the stopper using the accessory tool, box wrench. At this time, check that the stopper projection from the gun end is between 1.5 mm and 2 mm.

Figure 7-36



⑧ Functional check

● Before performing a functional check, be sure to supply the bearing air and rotate the air spindle shaft by hand to check with eyes that it continues turning smoothly. If air leaks from the joint between the gun and the bracket, check connections again.

⚠ CAUTION

Supplying the turbine air with the bearing air leaking decreases the air pressure to the air spindle, resulting in a very short service life and/or damage.

● Use the electrostatic controller (BPS300) to auto-tune with the gun.
Apply electrostatic charges with the bell cup and shaping air cap mounted and switch the electrostatic controller mode (M14). Then, the auto-tuning is completed within about a minute.

* Refer to the operation manual of “BPS300 Electrostatic Controller” for auto-tuning details.

8 Troubleshooting

① Painting performance

Event	Cause	Countermeasure
Fluttering spray	① Low discharge rate, dripping from feed tube.	Remove the bell cup and adjust the discharge rate so that paint flows through the feed tube continuously.
	② Air inclusion in paint route.	Check remaining paint amount and the pump suction seat.
Dropping discharge rate	① Clogged paint valve seat.	Remove the paint seat and clean the seat and the orifice.
	② Paint deposited on the valve internal paint route.	Disassemble and clean the route.
		Review solubility of cleaning solvents and cleaning methods.
		Replace the coil tube set with a new one.
Paint does not stop running	① Paint sludge and dirt inclusion in the valve seat.	Remove the paint seat and clean the seat and the orifice. At the same time, clean fluid passage.
Orange peel	① Bell cup surface too dry.	Shorten the bell cup thinner cleaning period.
		Reduce turbine RPM.
		Make slower dryness of thinning solvent.
Fish eye	① Paint deposits are built up in bell cup groove or wear.	Remove contaminants. Review cleaning method.
		Replace the bell cup with a new one.
	② Scratches or dent at the bell cup edge.	Replace the bell cup with a new one.
Paint film too thick.	① Electrostatic not effective.	Reduce bell cup RPM.
		Make slower dryness of thinning solvent.
	② Improper painting environment	Reduce the gun speed.
		Adjust paint booth air flow speed to 0.3 to 0.4m/s.

② Coating machines

Event	Cause	Countermeasure
Turbine will not rotate.	① Paint backflow to turbine due to overflow from cup	Shorten the bell cup thinner cleaning period.
		Clean the bell cup fluid hole. Review solubility of cleaning solvents and cleaning methods. Make slower dryness of thinning solvent.
		Adjust the gun operating posture to level or downward when painting.

	② Paint backflow to turbine due to discharge at bell cup stop.	Check the paint valves. Replace as required. Relieve pressure from the paint route at the end of paint work. Check that the interlock is triggered at 10,000 rpm.
	Turbine seizure	Check that the bearing air pressure is maintained at 0.5MPa or more at all times. Cup imbalance due to contaminated tapered bell cup mounting surface -> Clean shaft and bell cup tapered surfaces. (Refer to “Handling bell cup” in this manual.) Imbalance due to dent made when ball cup was dropped → Replace it with a new one. Look into other bell cups as well. Imbalance due to accumulated pigments in bell cup → Review bell cup cleaning method.
No turbine speed display	Fiber optic cable comes off.	Check that the length of the fiber optic projection into the gun is appropriate. Adjust so that there will be no tension in the cable as gun moves.
	Contaminated fiber optic cable end and turbine rotor	Cut the end face with the accessory tool, cutter. Confirm that paint or thinner does not get inside the gun. (Refer to “Paint overflow from bell cup.”)
	Kinked fiber optic cable	Replace the fiber optic cable with a new one.

③ Static electricity

Event	Cause	Countermeasure
Electrostatic errors*1)	① The safety circuit of the electrostatic paint control unit is activated.	Check the spray distance and adjust it to a distance at which no electrostatic failure occurs. Adjust hangers or conveyor so that workpieces do not sway. Check that the gun approaches workpieces too fast and take measures against workpieces swaying.
	② High humidity in booth.	Paint at reduced voltage.
	③ Water inclusion in air routes	Drain water from the air pipes and air routes in the gun.
	④ Paint contamination in gun body.	Clean the cover and the gun body and remove paint deposits, using thinner with high volatility. Then air blow to dry well. *2)
	⑤ Paint resistance too low allowing electric current to the grounding through the paint route.	Adjust suitable paint resistance value. *3)

	⑥ Metallic particles deposited inside the paint hose, allowing electric current to grounding through the paint route.	Clean the paint route with thinner. *4) Review the cleaning timing chart. Replace the spiral tube set with a new one.
	⑦ Poor connection or disconnection of connector cable.	Replace the connector cable.
	⑧ Surrounding noise detected by the electrostatic paint control unit.	Take measure against noise interference. (Refer to the “Electrostatic Controller BPS300” instruction manual.)

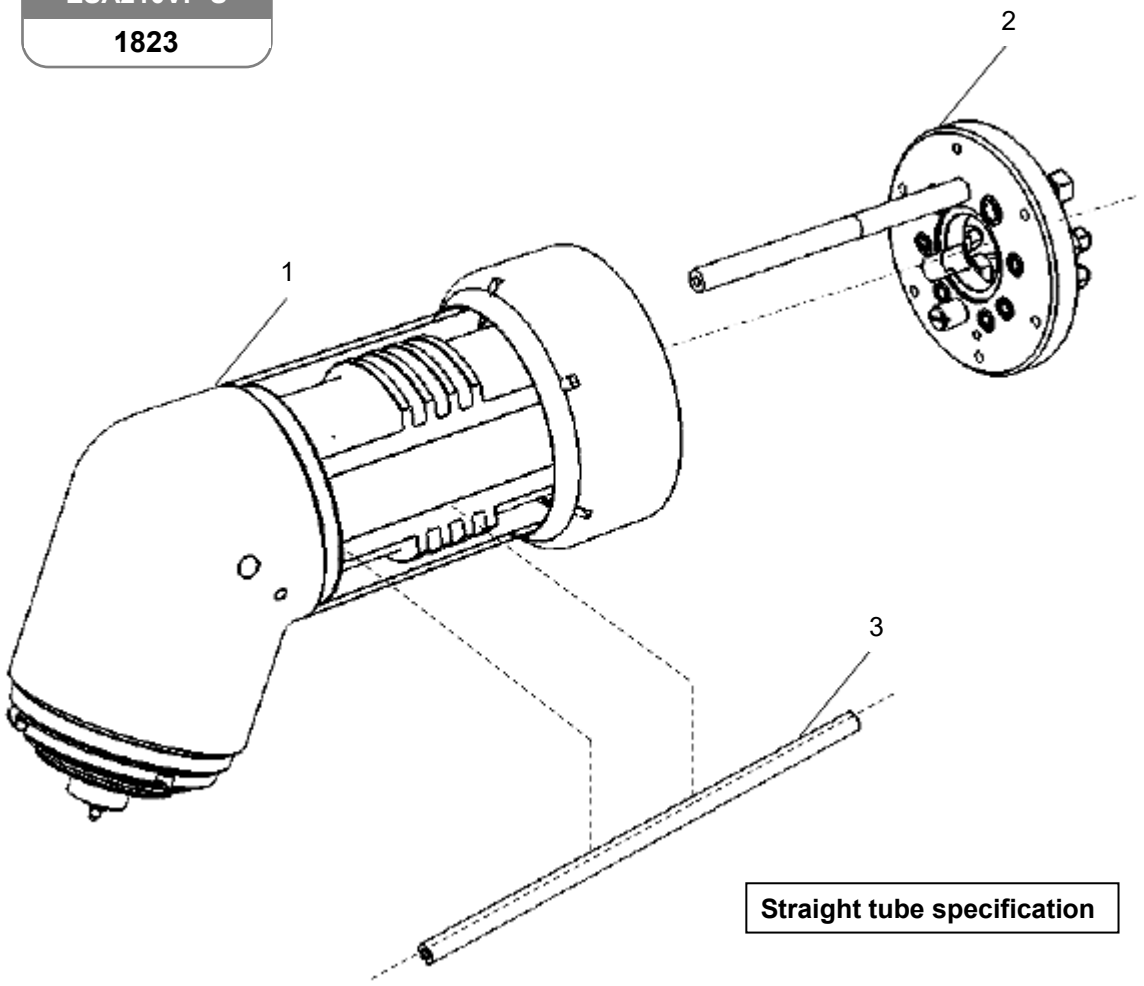
NOTE

***1) Refer to the “Electrostatic Controller BPS300” instruction manual for details about electrostatic error indications.**
***2) Be sure to wipe off with thinner soaked clean cloth. Do not spray thinner with a spray gun for cleaning.**
***3) Adjust the paint resistance value to 80 μA or less on the monitor display.**
***4) Although metallic particles deposits are different from one paint to another, thoroughly clean the paint route with thinner at the end of each paint work as a principle.**

9 Exploded Diagram and Names of Parts

ESA210VP-S

1823

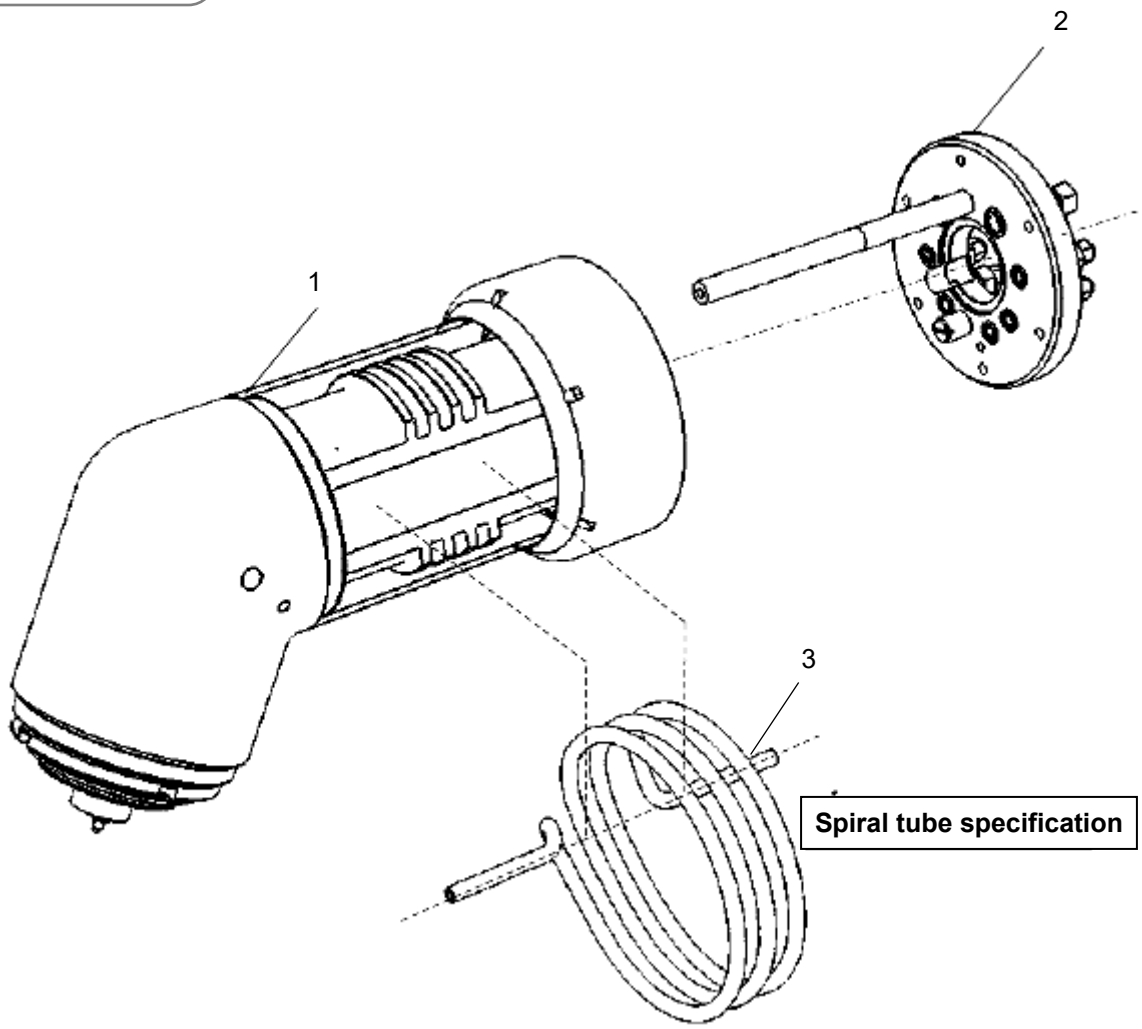


No.	Part No.	Part name	Qty	Remarks
1	14A0	Bell unit	1 set	
2	14FA	Bracket unit	1 set	

No.	Part No.	Part name	Qty	Remarks
3	13EC-115	Straight tube set	1 set	
4	14A4-1	Spare parts set	1 set	
5	13EC-037	Plain stich grounding wire	1	Accessories

ESA210VP-M

1824

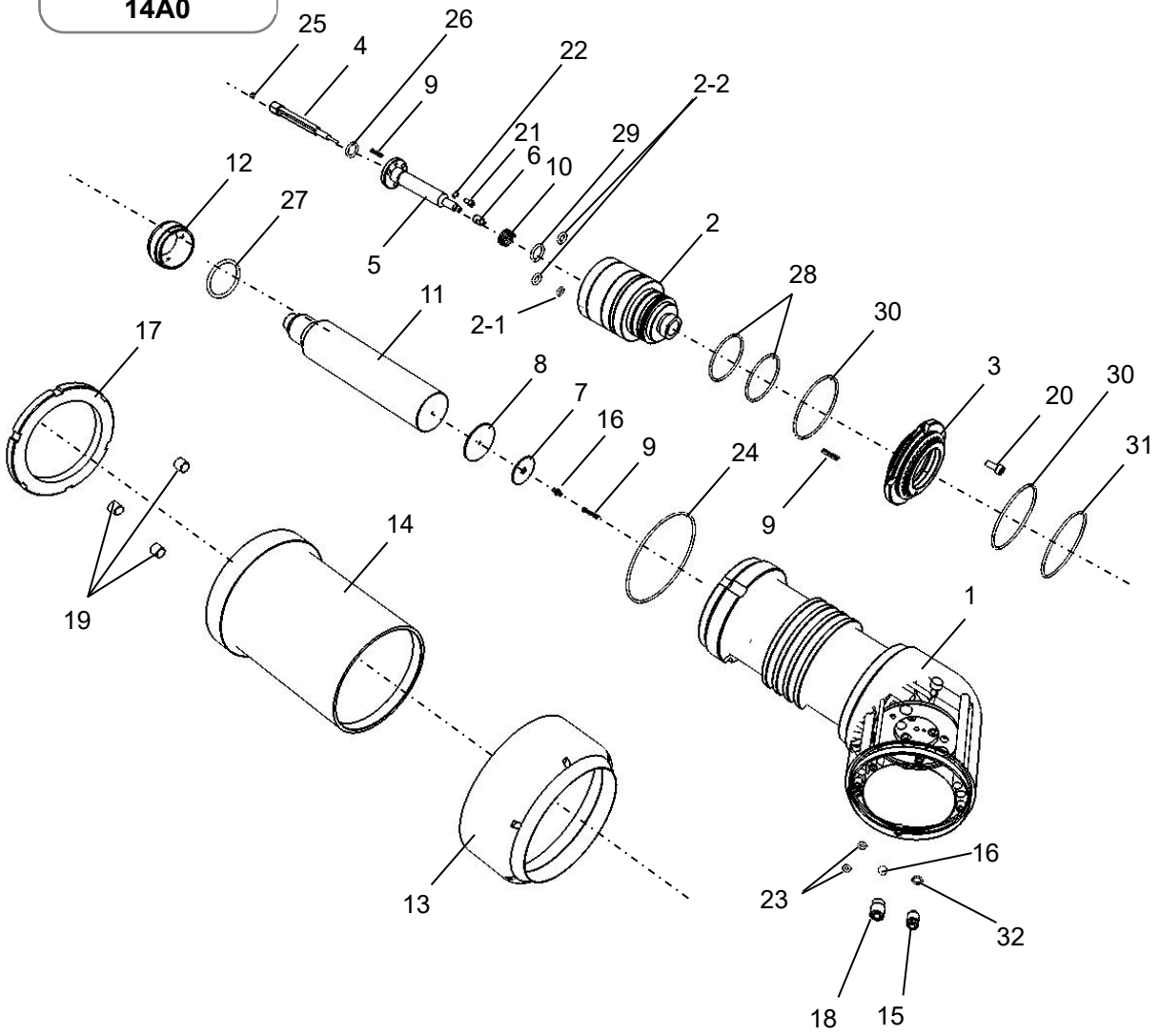


No.	Part No.	Part name	Qty	Remarks
1	14A0	Bell unit	1 set	
2	14FA	Bracket unit	1 set	

No.	Part No.	Part name	Qty	Remarks
3	13EC-015	Coil tube set	1 set	
4	14A4-1	Spare parts set	1 set	
5	13EC-037	Plain stich grounding wire	1	Accessories

Bell unit

14A0

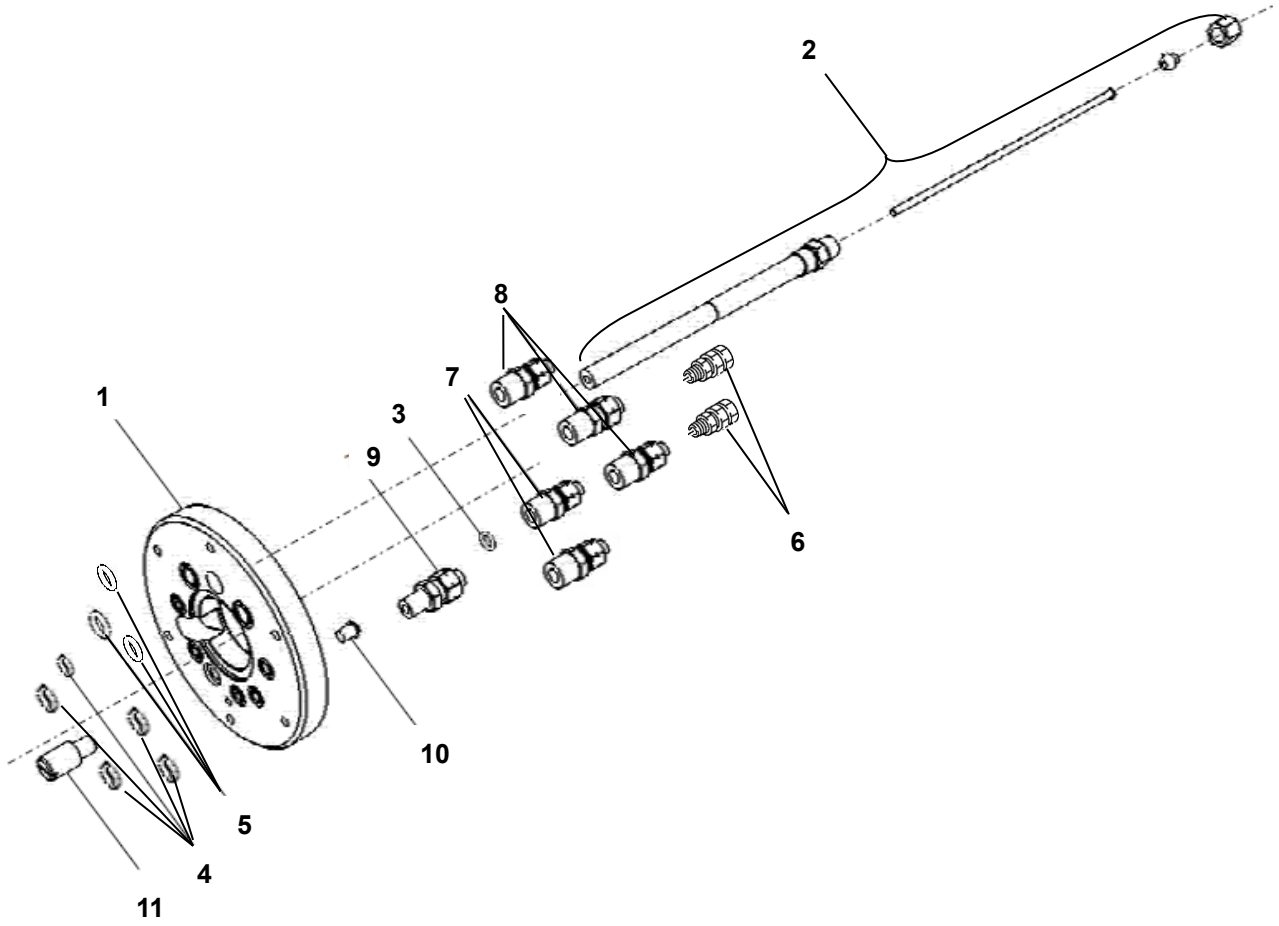


No.	Part No.	Part name	Qty	Remarks
1	14A0-001	Body	1	
2	321-0019	Air spindle	1	
2-1	101-9007	O ring	1	
2-2	101-9010	O ring	2	
3	14EF-003	Guide	1	
4	13AA-004	Feed tube	1	
5	13AA-005	Extension	1	
6	13AA-006	Cap	1	
7	13AA-007	Contact	1	
8	13AA-008	Packing	1	
9	13AA-009	Spring A	3	
10	13AA-010	Spring B	1	
11	13AE-011	Cascade	1	
12	1813-012	Stopper	1	
13	1813-013	Retainer M	1	
14	13EC-014	Shroud	1	
15	14A0-016	Tube guide	1	
16	2201-016	Floater	1	

No.	Part No.	Part name	Qty	Remarks
17	13EC-019	Retainer S	1	
18	13EC-020	Ball holder	1	
19	13EC-021	Pin	3	
20	03-70408	Hex. socket bolt	4	
21	03-70512	Hex. socket bolt	3	
22	360-0118	Ribbed lock washer	3	
23	130-9004	O ring	2	
24	130-9090	O ring	1	
25	101-9004	O ring	1	
26	101-9014	O ring	1	
27	102-6040	O ring	1	
28	130-9050	O ring	2	
29	101-9016	O ring	1	
30	130-9067	O ring	2	
31	130-9055	O ring	1	
32	129-9006	O ring	1	
33	13AE-029	Cover	1	

Bracket unit

14FA

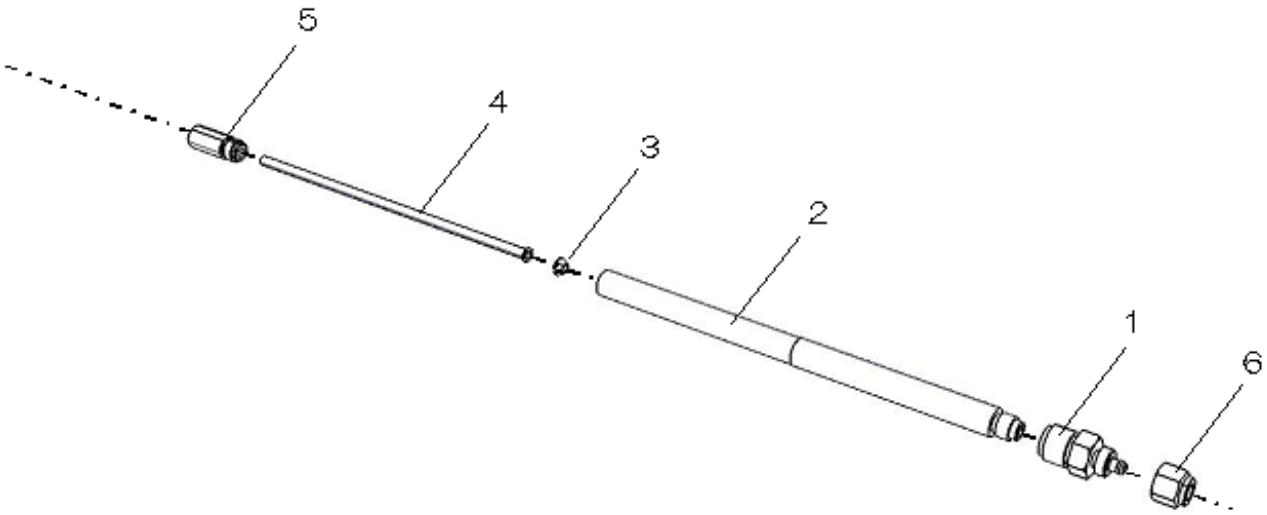


No.	Part No.	Part name	Qty	Remarks
1	14FA-001	Joint plate	1	
2	1709-2	Fiber unit	1	
3	101-2006	O ring	1	
4	101-9007	O ring	5	
5	101-9010	O ring	3	
6	342-0165	Connector	2	

No.	Part No.	Part name	Qty	Remarks
7	345-0057	Connector	2	
8	345-0056	Connector	3	
9	342-0133	Nipple	1	
10	12-10510	2-point sems screw	1	
11	149A-005	Bolt	2	
12	1813-033	Sleeve	1	

Fiber unit

1709-2

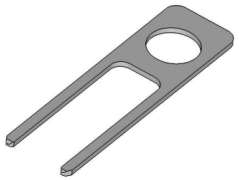
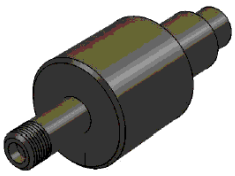
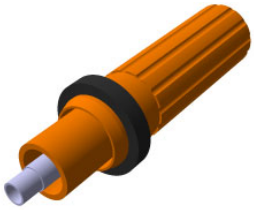


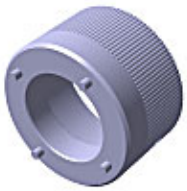
No.	Part No.	Part name	Qty	Remarks
1	14A5-001	Connector	1	
2	1709-202	Fiber holder	1	
3	1709-003	Sleeve	1	

No.	Part No.	Part name	Qty	Remarks
4	14A5-104	Teflon tube	1	
5	1709-005	Nut	1	
6	342-0162	Cap nut	1	

Accessory tools

35AA-2

Flat spanner Part No: 15F3-012 (For bell cup)	Pad (For φ70 cup type) Part No: 157C-012 (For φ70 bell cup)	Pad (For φ40 cup) Part No: 15F4-003 (For φ40 bell cup)
		
Cup tool Part No: 15F3-111 (Forφ70 bell cup type)	Cup tool Part No: 15F3-211 (Forφ40 bell cup type)	Cross-head screwdriver Part No: 333-0002 (For screws)
		
Belt wrench Part No: 337-0034 (For body)	Hook spanner Part No: 336-0068 (For retainer S)	Closed wrench 12-14 Part No: 35AA-006 (For connector, nipple)
		
Hex. wrench (Hex 3mm) Part No: 334-0030 (For guide)	Hex. Screwdriver (Hex 4 mm) Part No: 334-2040 (For feed tube)	Adjustable wrench Part No: 331-0150 (For feed tube)
		
Torque driver Part No: 337-0028 (For feed tube, guide and 2-port valves)		
		

Special tool A Part No: 35AA-001 (For air spindle)	Hex. bit socket A (4 mm) Part No: 337-0035 (For feed tube)	Hex. bit socket B (3 mm) Part No: 337-0036 (For guide)
		
Socket adapter Part No: 337-0033 (For torque driver)	Box wrench Part No: 357F-001 (For cascade)	Special tool C Part No: 35AA-004 (For 2-port valves)
		
Special tool D Part No: 35AA-002 (For 2-port valves)	Special tool E Part No: 35AA-003 (For feed tube)	Flat-ended driver Part No: 333-1075 (For cascade)
		
Fiber cutter Part No: 470-0007 (For fiber optic cables)	Closed wrench 10-12 Part No: 35AA-005 (For connector/nipple)	Hex. bit socket B (2.5 mm) Part No: 337-0037(For nozzle)
		

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			High-Speed Rotary Atomizing Electrostatic Automatic Coating Gun <ESA210VP>		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
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						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, our 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.

[MEMO]

19th Edition: June 25, 2025

●When transferring this machine to another owner, attach the instruction manual to the machine.

● This machine has been manufactured according to the laws and legislations of Japan and may only be used in Japan.

When using the machine in another country, it is necessary to observe the safety standards in that country.

19th Edition: June 25, 2025

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