ASAHI SUNAC

Operation and Maintenance Manual

Electrostatic controller

BPS900a

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.
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 the Asahi Sunac Corporation, directly, and ask us to send you a new one.

6th Edition: December 12, 2025

Introduction

Thank you very much for choosing our Electrostatic controller (BPS900a).

In order to use the equipment keeping the best condition for an extended period, please carefully read this manual before use. Above all, the specifications, warnings and prohibitory or cautionary instructions shown herein shall be fully understood and observed during the use of the equipment.

This machine is used with a dual electric field type powder auto gun (ECDa).

The equipment covered by this manual is designed for industrial coating work. It shall be used by only those who have been duly trained regarding the handling and scope of application and have an understanding of the operating procedure.

If you need further information about this manual, please call any of our branches listed on the back cover by specifying the "model" and "serial No." of your equipment.

* For details of the dual electric field type powder auto gun, refer to the instruction manual of "Dual Electric Field Type Powder Auto Gun.”

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1 For Your Safety

Contents of this instruction manual shall be fully understood and the instructions shown herein shall be strictly observed.
Using the machine without following instructions in this manual may lead to **bodily injury or damage to properties**.

The safety measures described herein are the minimum requirements and additional measures may also be required. All requirements provided by laws and legislations as well as rules and guidelines laid by your company or office shall be observed.

The cautionary instructions shown below shall be construed as minimum basic requirements for safety in the use of our product.

●Cautionary instructions are shown in three levels as defined below.

⚠ **WARNING**	Calls the user's attention to a situation that may lead to bodily injury and describes how to avoid that situation.
⚠ **CAUTION**	Calls the user's attention to a situation that may lead to damage or breakdown to the equipment and describes how to avoid that situation.
NOTE	Gives important or helpful information.

* Please remember that the situation mentioned under CAUTION may also lead to a serious disaster under certain circumstances.
All instructions are important for your safety and prevention of machine disorder and shall be strictly observed.

⚠ WARNING

Suitable range of use of the product

- This manual is applicable to our electrostatic controller BPS900a.
- The product enables to control Dual Electric Field Type Powder Auto Gun (hereinafter the auto gun).
- Please refer to individual manuals for precautions about the auto gun and coating equipment connected to the product.
- **This product is not explosion proof. Do not use the product in the hazardous zones 20 to 22, defined in IEC 60079-10-2.**
- Be sure to use the product with air supplied. The structure also takes into account heat dissipation by air.
- For further information on the purpose of the product and the materials used, please consult us.
- Please well note that any use under conditions other than specified above is considered misuse unless specially approved by us. In addition, please be careful because it may cause an accident.

2 Safety Management *Cautionary instructions in general powder spray coating

⚠ WARNING

To ensure the operational safety and prolonged use of the coating equipment, please observe the following instructions before, during and after the work.

- Please keep the object to be coated grounded for coating.
  Their grounding resistance shall not exceed 1 MΩ. (The measuring voltage shall be at least 500 V.)
  The object to be coated is generally grounded from a conveyor. They may become poorly grounded if powder sticks to the area in contact with the hanger. Charged objects to be coated generate sparks, possibly resulting in fire.
  The process must be managed to remove the powder sticking on the hanger on regular basis.
- Ground all metallic objects inside the coating booth.
  The air around the coating equipment in the coating booth is ionized by electrostatic high voltages to charge ungrounded metallic objects through convection. When any grounded object gets close to them, sparks may be generated, possibly resulting in fire. To prevent this, metallic objects inside the booth, e.g. coating equipment stand and safety fence, shall be correctly grounded using grounding wires. Do not place unnecessary tools and metallic objects inside the coating booth. Class D or superior grounding work (grounding resistance not exceeding 100 Ω) is required.
  *Technical Recommendation of National Institute of Occupational Safety and Health and Recommendations for Requirements for Avoiding Electrostatic Hazards in Industry by National Institute of Occupational Safety and Health, Japan
  New Coating Operation Handbook issued by Coating Equipment Manufacturer Association
- Wear electrostatic clothes: JIS T8118 and electrostatic shoes: JIS T8103 when working.
  The operators involved in electrostatic spray coating or working around them shall wear antistatic clothes with grounding wires and antistatic dirt-free soled shoes to prevent build-up of static electricity.
- The working floor shall be antistatic. For enclosed coating booths, the whole working floor shall be antistatic and, for open coating booths, the area surrounded by 1.5 m on both sides of the booth opening and 2.5 m in front shall be antistatic not to exceed 1 MΩ and kept clean.
- When cleaning the gun, never fail to turn off the power of the control unit and ground the gun tip.
  Applying electrostatic high voltage while cleaning the gun may lead to electric shock.
  The use of combustible powder coatings may lead to fire. Please ensure to turn off the power before interrupting the work or at completion. Please ensure not to touch the gun while applying an electrostatic high voltage.
- Do not use paint thinner or another solvent for cleaning. (Clean by air purging.)
- Some powder coatings contain poisonous components. Obtain and thoroughly read the Material Safety Data Sheet (SDS) for the powder to be used and take appropriate measures including wearing dust-proof mask: JIS T8151.

[SDS: Safety Data Sheet]

⚠ WARNING

- When operating, repairing or cleaning the gun, always wear appropriate dust-proof mask, dust-proof clothes and dust-proof goggles.
- Do not drag cables and hoses over the floor as doing so scratches or otherwise damages them. Please hang down from the ceiling or side wall as far as possible. (It is recommended to use a rack or such to support them.)
- Please keep the coating booth and exhaust system (duct and fan) clean by periodically cleaning. Note that merely removing accumulated dust may generate sparks, possibly resulting in dust explosion.
  Please be careful.
  In case a fire breaks out, it tends to spread and increase the damage if powder remains in the coating booth or the exhaust system.
  It is recommended to install a flame damper in the powder collector duct and interlock it with a flame detector in the coating booth.
- Please supply dry compressed air to the gun. (See Chapter 3 "Specifications".)
- Keep a fire extinguisher at your hand in case of fire from electrostatic accidents.
- The coating equipment may only be operated by those who have completed a training course for safe operation of coating equipment.
- For the use and installation of the equipment, comply with current regulations.
- Wear safety goggles, safety shoes and mask recommended by the powder coating manufacturer during the spray coating work. Other protective devices may also be required depending on the powder components and ventilation level.

<<Sources of ignition>>

Static electricity is generated when the powder runs through the injector or hose.
If parts of the coating equipment are not appropriately grounded, static electricity may cause sparks. These sparks may ignite sprayed powder cloud and other combustible substance, causing fire or explosion, possibly resulting in serious injury to the operators or damage to the equipment.

- Ensure enough ventilation of the area where a spraying operation is performed.
- Do not perform a spraying operation in the vicinity of an open flame, lamp or other source of ignition.
- Install the coating equipment in places where there is a ventilating device.
- Please check that the coating equipment and the object to be coated are grounded.
  If not, electrostatic discharge or sparks may be generated, resulting in fire or explosion.
- If you feel electric shock, even slightly, when handling the coating equipment, you shall immediately stop the spraying operation and check the grounded condition of each part. Do not restart the spraying operation until the cause is located and countermeasure is completed.
- An extinguishing device/machinery with a sufficient fire extinguishing ability must be provided at the area where a coating operation is performed.

[From 'Ordinance on Industrial Safety and Health, issued by Ministry of Health, Labour and Welfare' and 'Safety & Health Measures for Electrostatic Spray Coating, issued by Japan Industrial Safety & Health Association']

3 Specifications

(1) Body

Part name	Electrostatic controller
Model	BPS900a
Part Number	E-030200
Safety devices	Constant current control circuit Lower limit failure of gun current (E01) Upper limit failure of gun current: OCL (OCL) *The values in ( ) indicate error codes.
Input voltage	100 to 240 V AC
Power supply frequency	50/60 Hz
Consumption current	0.7 to 0.5 A
Rated output voltage (GUN)	Maximum AC 24 V
Operating temperature range	0°C to 40°C
Protection class	Front face: IP54, Inner side of board: IP 10 (Input voltage terminal block)
Connecting air pressure	0.5 to 0.6 MPa (Recommendation: Dynamic pressure 0.5 MPa when 70% and 70 L/min are set)
Max. air consumption	270 L/min(ANR)
Air connection port diameter	Φ10 (L-shaped, one-touch joint)
Mass	6.2 kg
Function	○ 99 (+ 3) coating recipe settings ・Coating recipe No. 1 to 99: User set recipes ・Coating recipe: Constant current control (H, M, and L)
	○ Measurement ・Measurement time: 30 sec*Can be changed.
	○ Gun applied voltage setting ・0 to 80 kV (Standard polarity: negative)
	○ Gun current setting (current setting for constant current control) ・1 to 80 μA
	○ Flow rate setting ・30 to 100%
	○ Paint transfer air rate (L/min) setting ・30 to 90 L/min (ANR)
	○ Operating time display, error log display, key lock, auto cleaning
Connectable coating gun	・Dual electric field type powder auto gun (ECDa)

NOTE

- **The maximum air consumption includes flow rates of the cleaning air that is supplied to the gun tip and of the fluid air that is supplied to powder tank in addition to the transfer air rate (main air and sub air).**

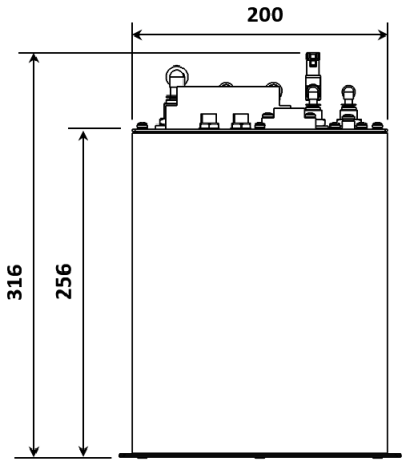
(2) Compressed air

JIS B 8392-1:2012		Quality class 162	Quality class 131
Number of contained solid particles (per 1 m^3) *Particle diameter: d	0.1 μm < d ≤ 0.5 μm	20,000 or less	20,000 or less
	0.5 μm < d ≤ 1.0 μm	400 or less	400 or less
	1.0 μm < d ≤ 5.0 μm	10 or less	10 or less
Water content		1.37 g/m^3 or less (Dew point at atmospheric pressure -17°C)	0.144 g/m^3 or less (Dew point at atmospheric pressure -42°C)
Oil content		0.1 mg/m^3 or less	0.01 mg/m^3 or less

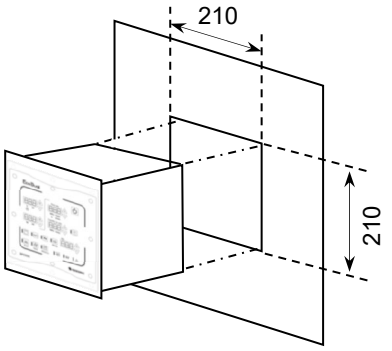
* Compressed air quality for our coating devices shall be satisfied with the quality class 162 or superior (desirably, 131), and the devices shall be maintained to satisfy the quality required for powder to be used.

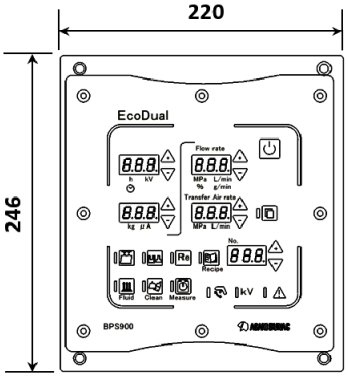
4 Outside Dimensions

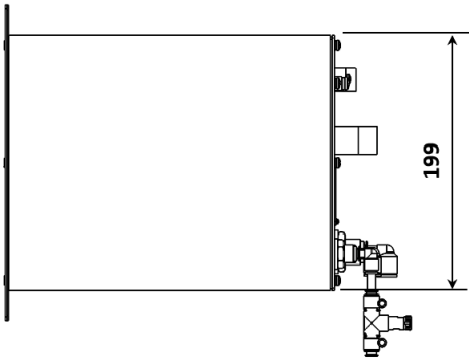
(Unit: mm)



Notch dimensions





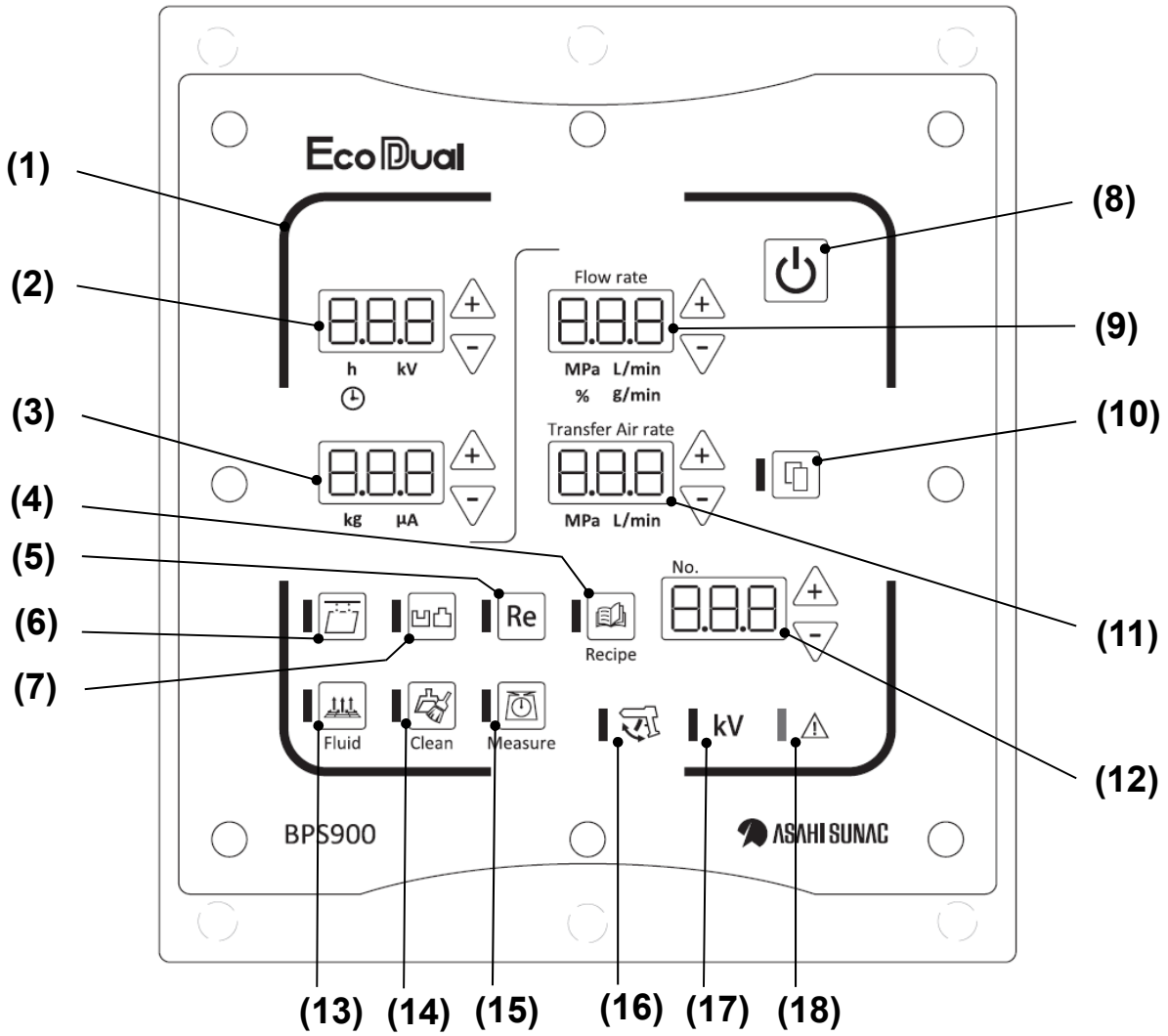


5 Names and Functions of Components

This chapter explains the functions and the names of the Electrostatic controller.

5.1 Front Panel

[Display section (LED)]



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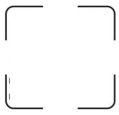
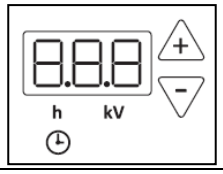
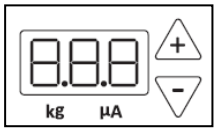
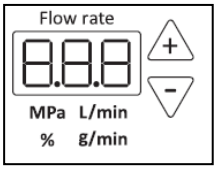
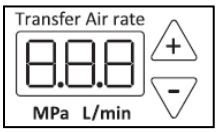
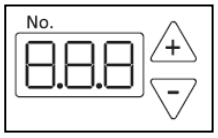
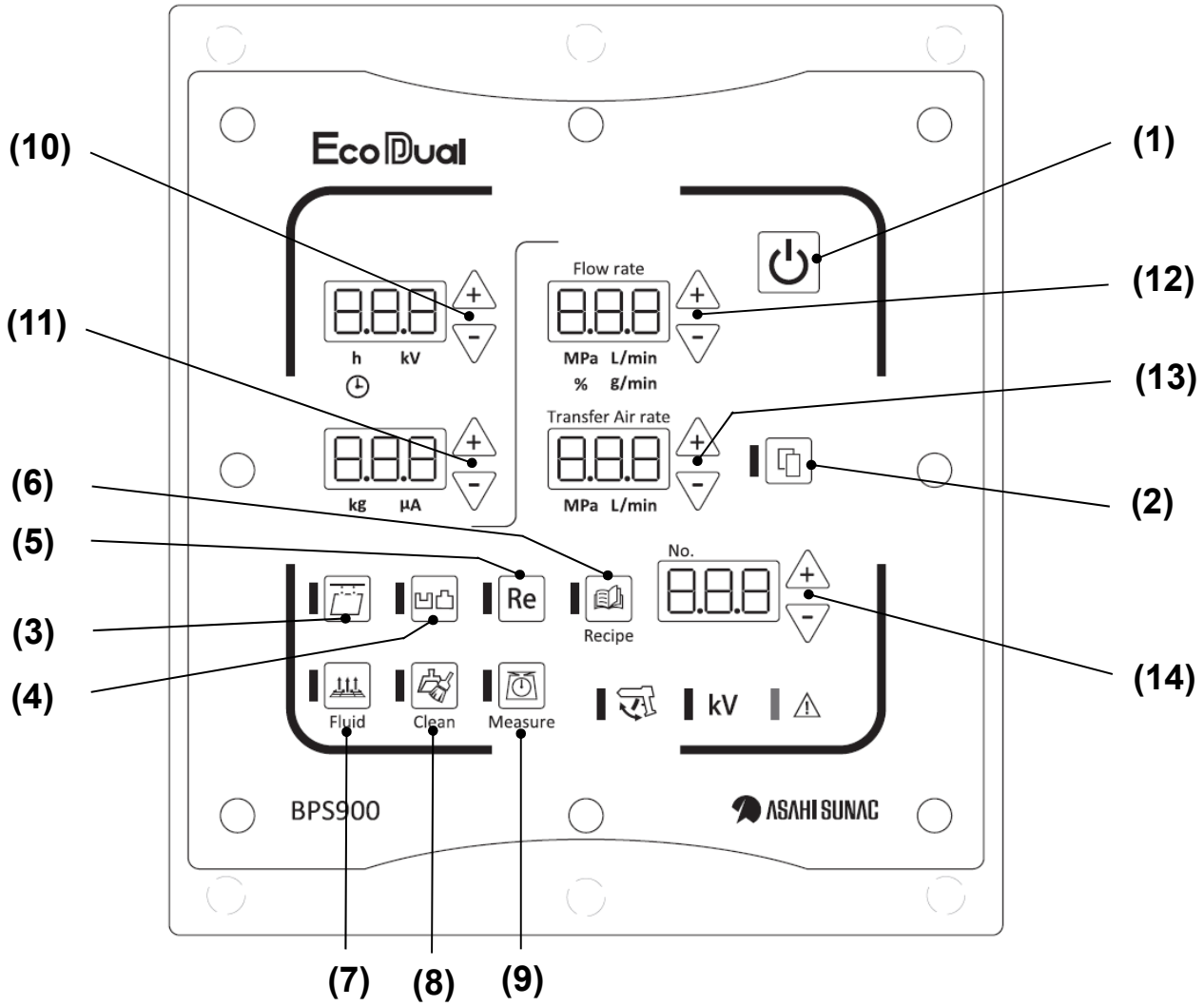
No.	Name	Function
(1)	 Outer frame line LED	・All lamps turn on when the machine is in the coating mode. ・While the key is locked, only the lower right turns off in the coating mode. ・The upper left and lower right blink when the machine is in the serviceman mode.
(2)	Gun applied voltage display 	・Displays a gun applied voltage. ・Displays the controller model at activation. ・Displays a parameter No. when the machine is in the serviceman mode.
	Unit [kV] LED	・Turns on when the machine is in the coating mode.
	Unit [ ] LED	・Turns on when the machine is in the measurement mode. ・Turns on when the machine is in the cleaning mode.
(3)	Gun current display 	・It displays a gun current. ・Displays a gun current monitor value during coating.
	Unit [µA] LED	・Turns on when the machine is in the coating mode.
(4)	 Recipe LED	・Turns on when a recipe is selected.
(5)	 L LED	・Turns on when L (Re-coating) is selected.
(6)	 H LED	・Turns on when H (Flat plate) is selected. ・Turns on when the machine is in the auto cleaning mode.
(7)	 M LED	・Turns on when M (Uneven plate) is selected.
(8)	 Operation LED	・Starts to light when the power is turned on and is always on.
(9)	Flow rate (Powder flow rate display) 	・Displays the flow rate when the coating conditions are displayed. ・Displays the actual measurement value of the main air when the air flow rate is displayed. ・Displays the program Ver. upon activation.
	Unit [MPa] LED	・Turns on when the machine is in the MPa mode and when the coating conditions are displayed.
	Unit [L/min] LED	・Turns on when the air flow rate is displayed.
	Unit [%] LED	・Turns on when the coating conditions are displayed.

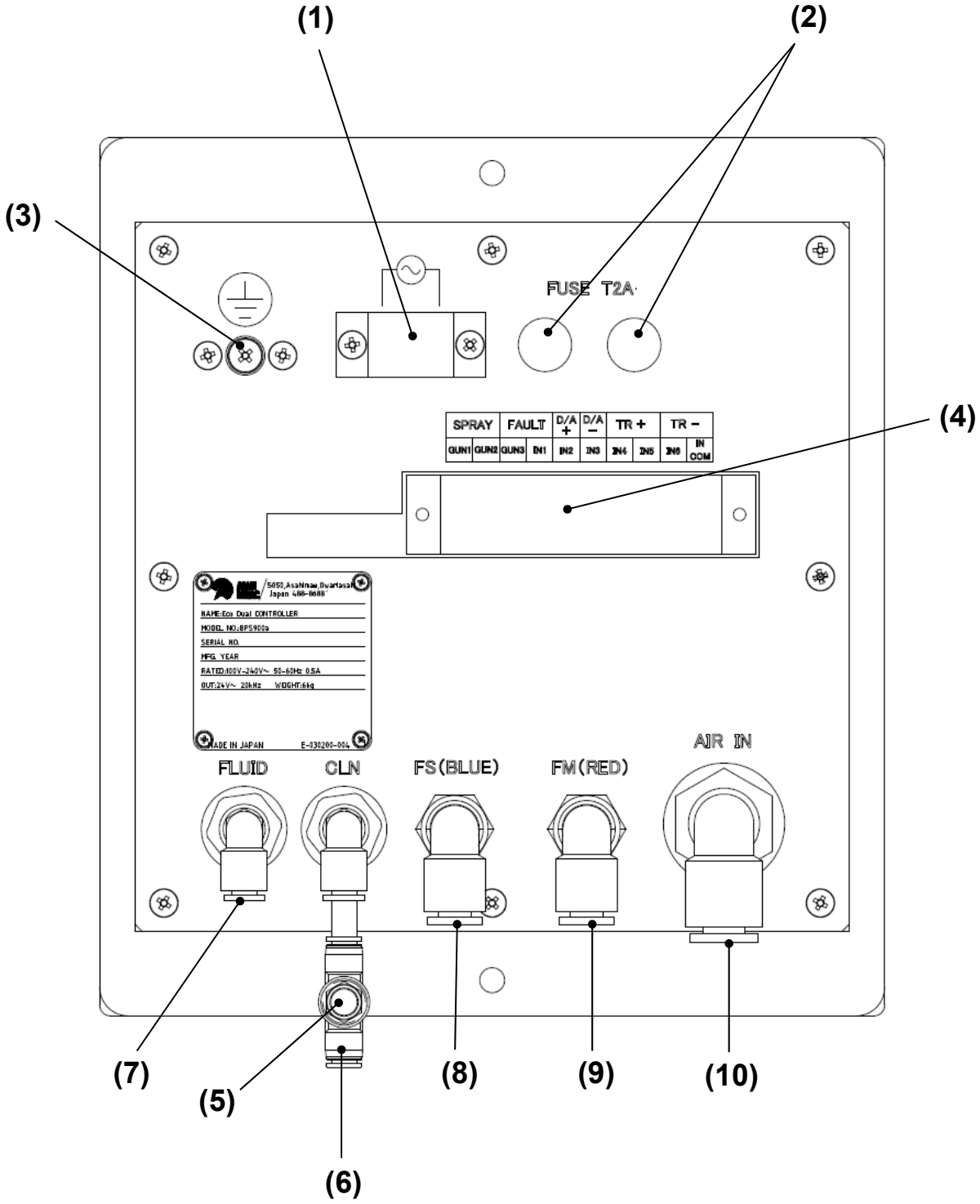
No.	Name	Function
(10)	Display switching LED	・Turns on when the air flow rate is displayed in the coating mode. ・Blinks when an error occurs.
(11)	Transfer Air rate (Transfer air rate display) 	・Displays the transfer air rate when the coating conditions are displayed. ・Displays the actual measurement value of the sub air when the air flow rate is displayed.
	Unit [MPa] LED	・Turns on when the machine is in the MPa mode and when the coating conditions are displayed.
	Unit [L/min] LED	・Turns on when the coating conditions are displayed. ・Turns on when the air flow rate is displayed.
(12)	Recipe No. display 	・Displays a recipe No. ・Displays the setting value when the machine is in the serviceman mode. ・Displays an error code when an error occurs.
(13)	Fluid LED	・Turns on when the fluid air forced ON is set.
(14)	Cleaning LED	・Turns on when the machine is in the cleaning mode.
(15)	Measurement LED	・Turns on when the machine is in the measurement mode.
(16)	Trigger LED	・Turns on when IN1 or IN4 (high-voltage remote signal) is ON.
(17)	kV High-voltage LED	・Turns on when high voltage is applied to the gun.
(18)	Error LED	・Blinks when an error occurs.

[Input section (switch)]



No.	Name	Function
(1)	Operation switch	・Press this switch, and the machine enters the standby mode. ・Enters the coating mode when the machine is in the standby mode.
(2)	Display switching switch	・Switches between the coating condition display state and the air flow rate display state in the coating mode. ・Press it together with “+” or “-” to increase or decrease the value by 10 times as much as the normal operation. ・Hold down this switch, and the key lock is turned on/off in the coating mode. ・Resets an error when an error occurs and enters the coating mode.
(3)	H selection switch	・Enables to select the coating conditions for the flat plate coating.
(4)	M selection switch	・Enables to select the coating conditions for the uneven and complex parts.
(5)	L selection switch	・Enables to select the coating conditions for re-coating.
(6)	Recipe selection switch	・Select the coating conditions for a recipe.
(7)	Fluid switch	・It forcibly turns on/off the motor output and fluid air.
(8)	Cleaning switch	・Enters the cleaning mode when the machine is in the coating mode. ・Enters the coating mode when the machine is in the cleaning mode.
(9)	Measurement switch	・Enters the measurement mode when the machine is in the coating mode. ・Enters the coating mode when the machine is in the measurement mode.
(10)	Gun applied voltage setting switch	・Changes the gun applied voltage setting. ・Enables to adjust the parameter No. when the machine is in the serviceman mode.
(11)	Gun current setting switch	・Enables to change the gun current setting.
(12)	Powder flow rate setting switch	・Enables to change the powder flow rate.
(13)	Transfer air rate setting switch	・Enables to change the transfer air rate.
(14)	Recipe No. selection switch	・Enables to change the recipe No. ・Enables to change the setting value when the machine is in the serviceman mode.

5.2 Back Panel



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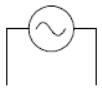
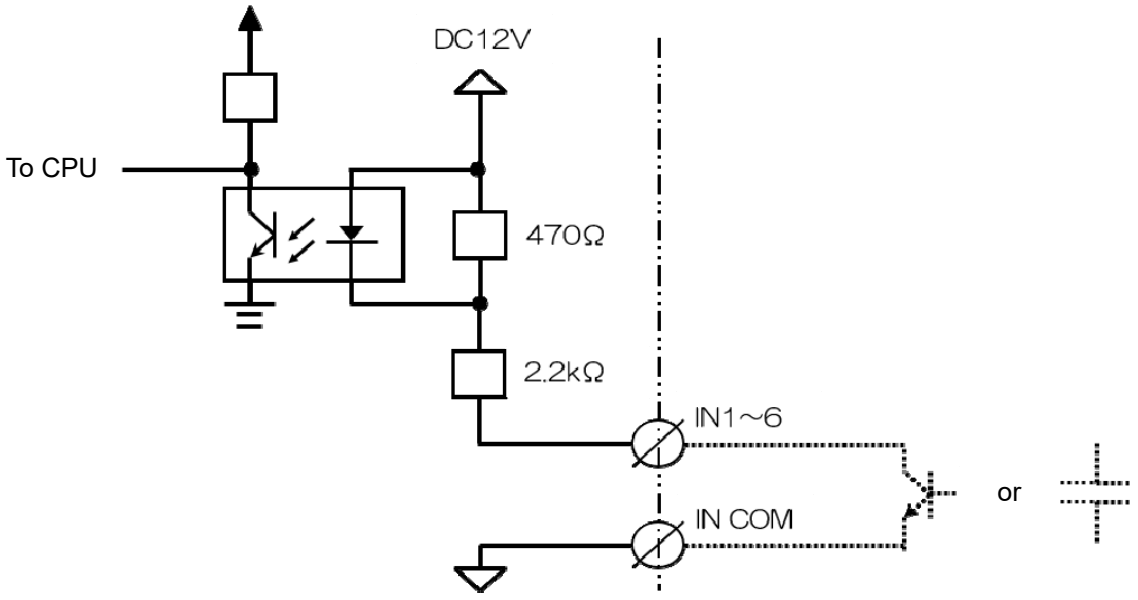
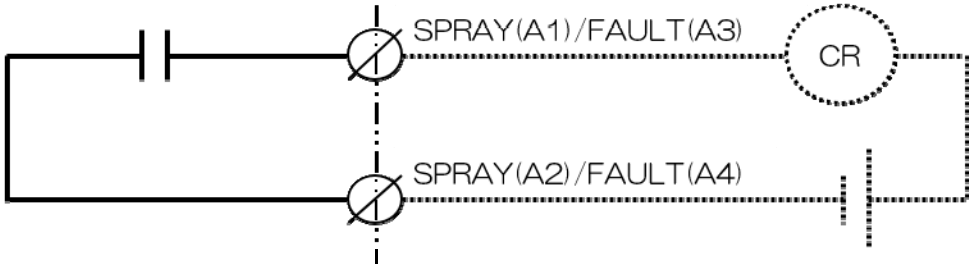
No.	Name	Notation	Function
(1)	Input voltage terminal block		・Terminal block of input voltage (M5). Supply the power source of 100 to 240 V AC.
(2)	Fuse	FUSE T2A	・Primary side power supply protection fuse (Time lag 2A fuse)
(3)	Grounding terminal		・Protective grounding terminal (Class D)
(4)	Input/output terminal block		・Terminal block to wire input, output and communication (M3).
(5)	Cleaning air adjuster knob	CLN	・Use the knob to adjust cleaning air flow rate that is supplied to the tip of the auto gun.
(6)	Cleaning air joint	CLN	・Connection port for the cleaning air tube to the tip of the auto gun (Φ6)
(7)	Fluid air joint	FLUID	・Connection port for fluid air tube to powder tank (Φ6)
(8)	Sub air joint	FS (BLUE)	・Connection port for the sub air tube to the injector (Φ8)
(9)	Main air joint	FM (RED)	・Connection port for the main air tube to the injector (Φ8)
(10)	Primary air source joint	AIR IN	・Connection port for air supply tube to the primary air source (Φ10)

(4) Description of input/output terminal block

<Input circuit>



<Output circuit>



AC/DC 30 V, 0.5 A or less

<Terminal block layout>

OUT				D/A		Communication			
A1	A2	A3	A4	A5	A6	A7	A8	A9	A10
SPRAY		FAULT		D/A +	D/A -	TR+		TR-	
B1	B2	B3	B4	B5	B6	B7	B8	B9	B10
GUN1	GUN2	GUN3	IN1	IN2	IN3	IN4	IN5	IN6	INCOM
GUN			IN						

<Names and details>

1) Input

Symbol	Terminal block No.	Name	Detail
IN1	B4	Operation input	Input to turn on the spray* (No-voltage contact point a)
IN2	B5	Powder flow rate increase input	Input to increase the powder flow rate (No-voltage contact point a)
IN3	B6	Powder flow rate decrease input	Input to decrease the powder flow rate (No-voltage contact point a)
IN4	B7	Operation input	Same as IN1* (No-voltage contact point a)
IN5	B8	Air purge input	Input to enter the cleaning mode ON to start the cleaning mode OFF to start the coating mode (No-voltage contact point a)
IN6	B9	Not in use	Disabled
INCOM	B10	Input COM	Common input terminal

*If either IN1 or IN4 is turned on, the spray will be turned on.

2) Output

Symbol	Terminal block No.	Name	Detail
SPRAY	A1	Operation output	Output when the spray ON is set.
	A2		(No-voltage contact point a)
FAULT	A3	Error output	Output when an error occurs.
	A4		(No-voltage contact point a)

3) Gun

Symbol	Terminal block No.	Name	Detail
GUN1	B1	Voltage supply to the gun	Connect the auto gun ECDa.
GUN2	B2		
GUN3	B3	Gun current detection	

4) D/A

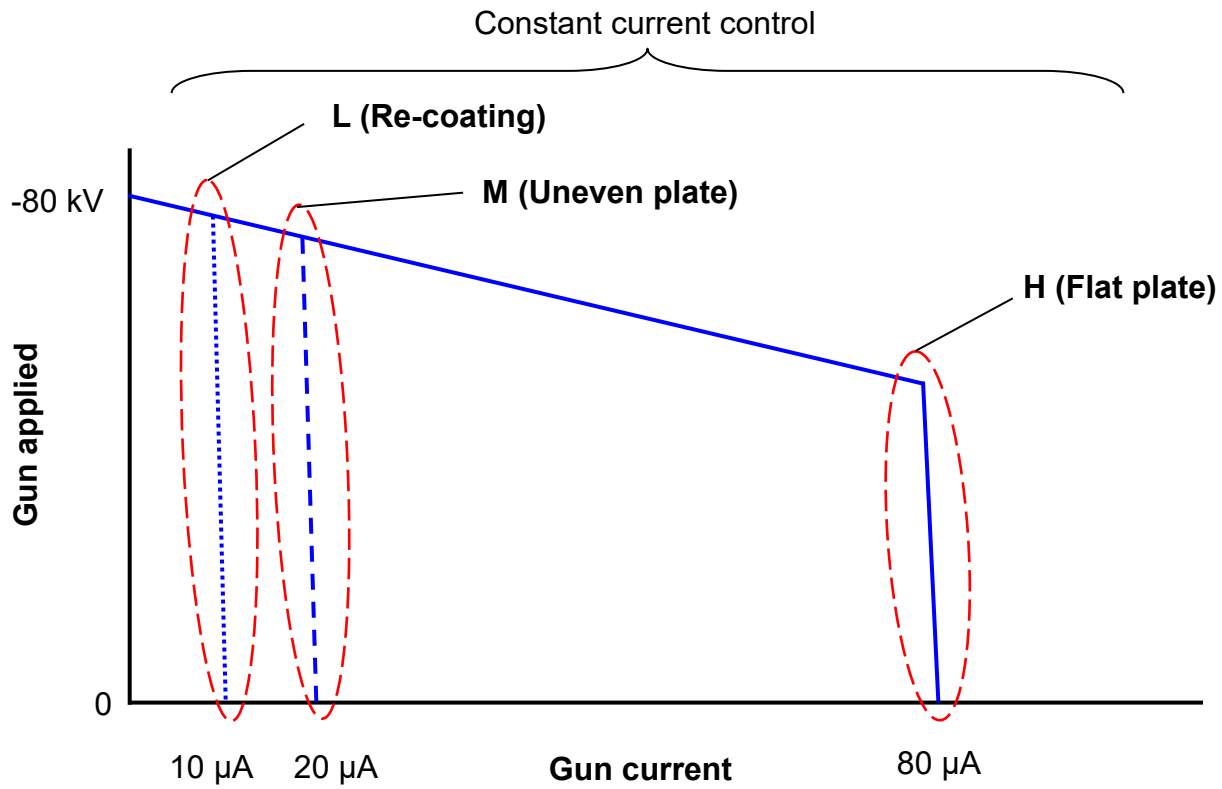
Symbol	Terminal block No.	Name	Detail
D/A +	A5	D/A output (+)	D/A output for SFC control
D/A -	A6	D/A output (-)	

5) Communication

Symbol	Terminal block No.	Name	Detail
TR+	A7	RS-485(+)	Connect PLC and SUNAC7000EX.
	A8		
TR-	A9	RS-485(-)	
	A10		

5.3 Constant Current Control (H, M, and L modes)

- **It enables to select the constant current control (H, M, and L modes) to setup optimum charging conditions for coating.**



Mode	Application	Gun applied voltage setting (Fixed)	Gun current setting value (Fixed)
H (Flat plate)	・It is suitable for coating on large and flat shapes and general coating.	80 kV	80 μA
M (Uneven plate)	・It is suitable for coating on complicated shapes with concave-convex surfaces.	80 kV	20 μA
L (Re-coating)	・It is suitable for re-coating or fine decorative coating.	80 kV	10 μA

NOTE

- **Constant Current Control (H, M, and L)**
  If overload current runs in a case that an auto gun approaches an object to be coated with high voltage applied on its gun tip, this function enables to control output of the high voltage that is applied on the gun tip. As a result, it does not exceed gun current setting values on the selected constant current control (H, M, and L).

6 Operation Preparation

This chapter explains about connections of cables and air tubes to the Electrostatic controller.

6.1 General Precautions Before Operation

⚠ WARNING

Sparks may be generated, possibly resulting in fire.

- **If metallic objects are not grounded, they may be charged and cause sparks.**
- **Do not place unnecessary metallic objects, such as tools, in coating booths.**
- **Please ensure to ground metallic objects inside the booth, e.g. stand and safety fence.**

Electrostatic discharge may cause an electric shock.

- **Do not directly touch objects to be coated or metals in the coating booth. Insufficient grounding causes electric shock.**
- **The operators involved in electrostatic spray coating or working around them shall wear antistatic clothes: JIS T8118 and antistatic shoes: JIS T8103 to prevent accumulation of static electricity.**

It may result in breathing problems or intoxication.

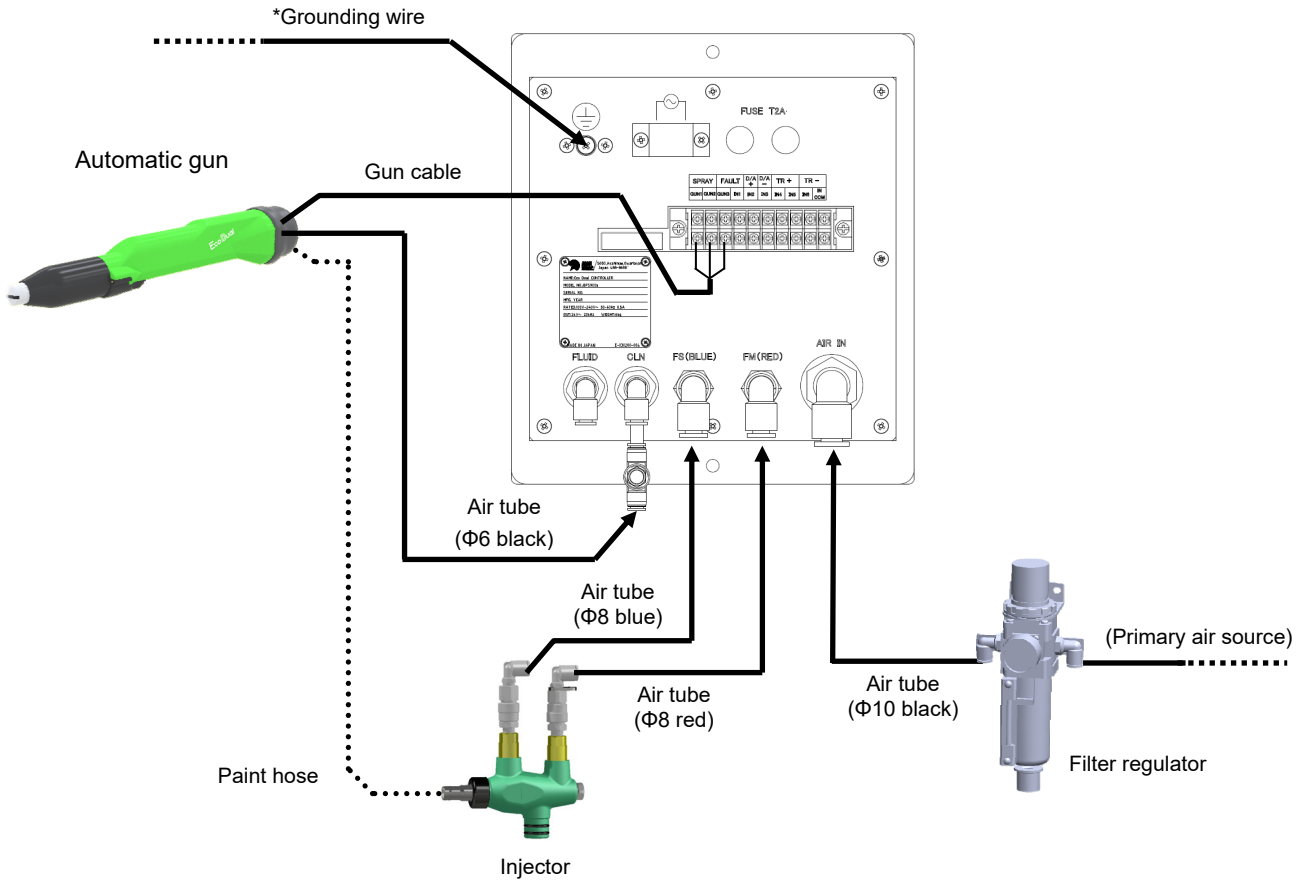
- **Some powder coatings contain poisonous components and may be harmful to human body or may cause dust hazard.**
- **Wear appropriate protective gears (work clothing: JIS T8118, electrostatic shoes: JIS T8103, protective goggles: JIS T8147, dust respirators: JIS T8151) when operating, repairing, and cleaning the equipment.**

⚠ CAUTION

- **If there is a sign of breakdown including defect or failure, investigation shall be conducted within the range of the specified maintenance works. The maintenance works shall be canceled if the investigation did not find a cause. Please contact us immediately for appropriate and accurate repair.**

6.2 Connections of Cables and Air Tubes to Back Panel

(For injector specifications)



⚠ WARNING

- **Make sure to connect the grounding wire to a class D grounded booth or a structural steel column with the grounding resistance of 100 Ω or less.**
- **Do not co-tighten multiple grounding wires because this is a protective ground terminal.**

NOTE

- **See Chapter 5.2 for details of the connections to the back side of the electrostatic controller BPS900a.**

⚠ WARNING

- **Jet-out of compressed air may be harmful to human body or may lead to accidents.**
- **Please ensure that tubes are firmly connected.**

6.3 Connecting the Primary Power Supply

⚠ WARNING

- **It may be harmful to human body or may lead to accidents.**
- **For connection of the primary power supply, make sure that the electrostatic controller is not powered on.**

7 Descriptions of Settings and Display Screen

This chapter explains about the indications displayed on the panel of the electrostatic controller.

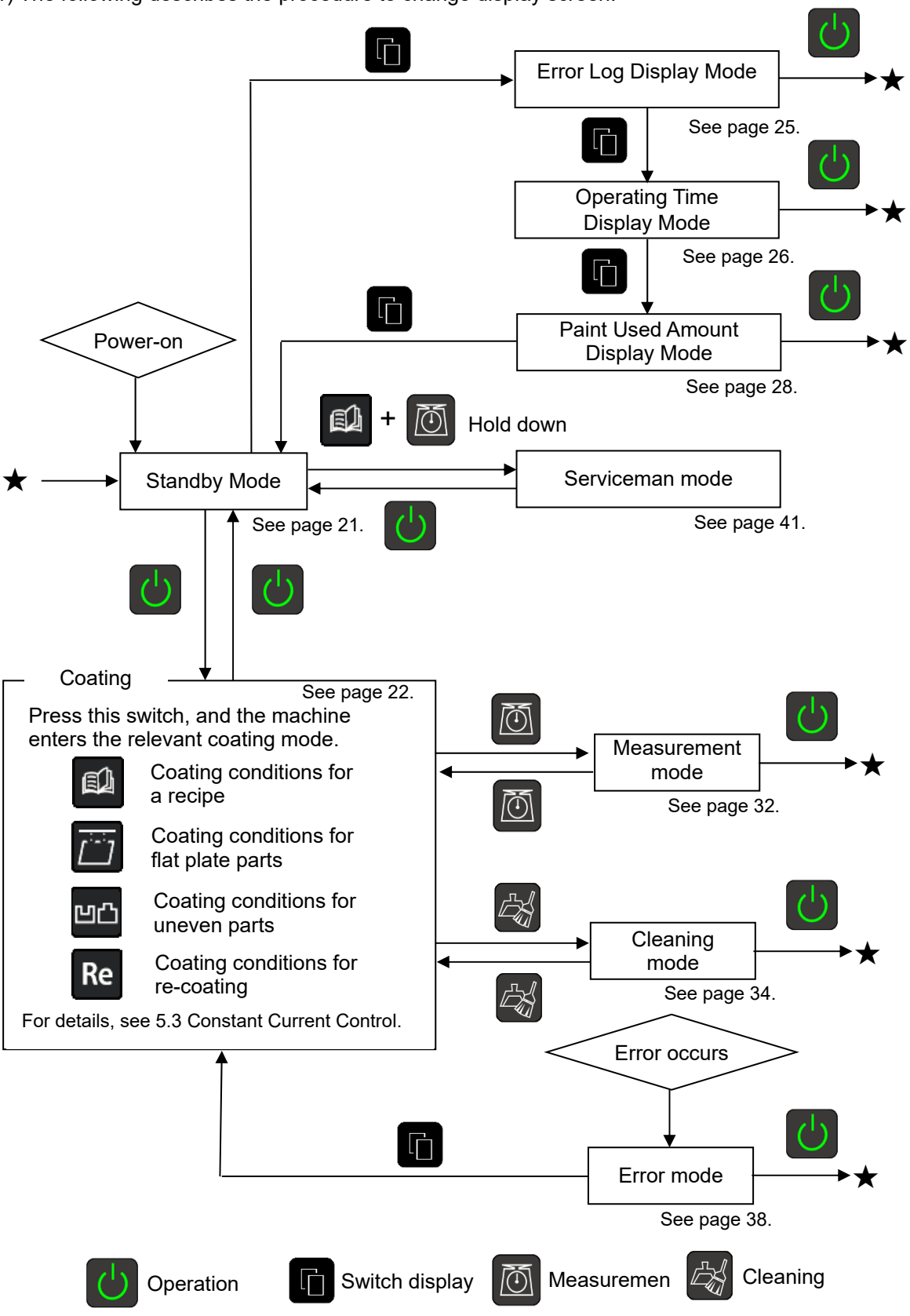
7.1 Types of Display Screen

The following table shows the indications displayed on the panel.

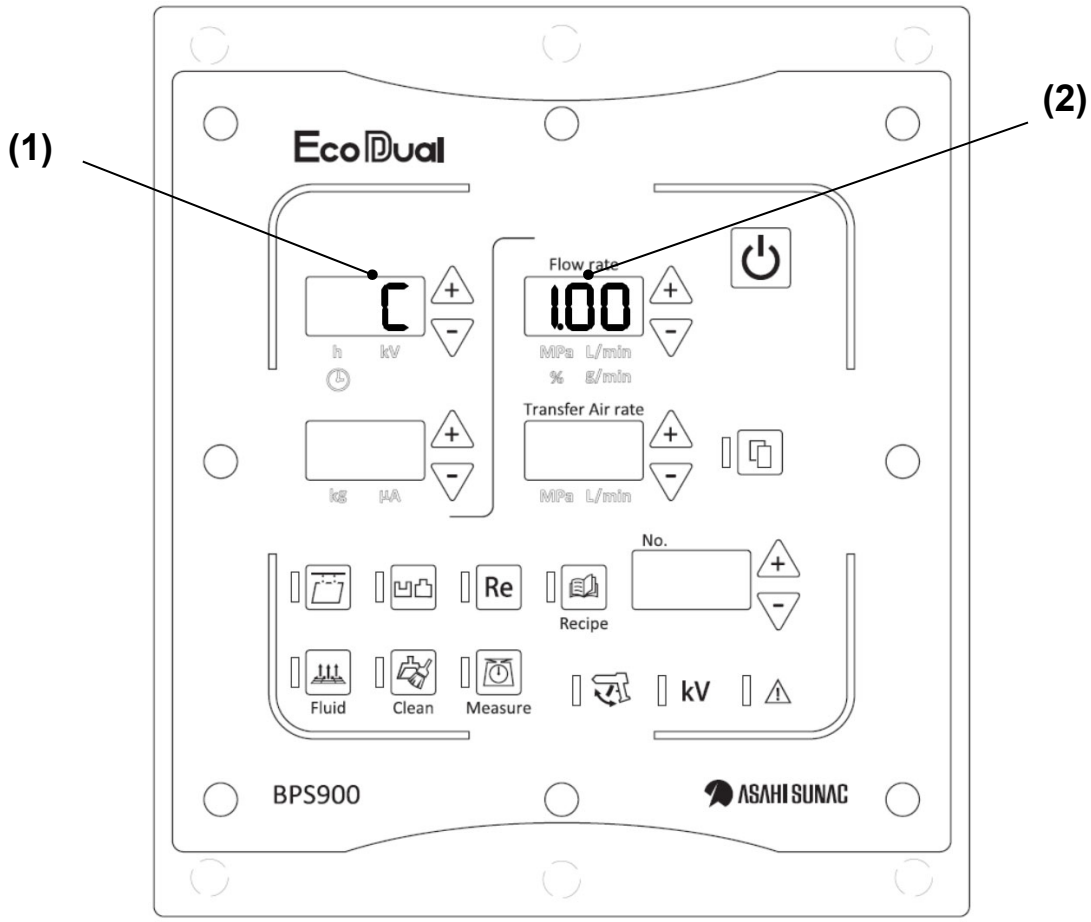
Display screen (mode)	Description	Detailed description
● Starting indication	・When the power is turned on, the unit type and program version are displayed for approximately 3 seconds.	See Chapter 7.3.
● Standby Mode	・ ⏻ Only the operation switch LED turns on.	See Chapter 7.4.
● Coating Mode	・When the operation input is turned ON, high voltage application and air are turned ON. ・The flow rate, transfer air rate, gun applied voltage, and gun current values are displayed and can be changed. * The gun applied voltage and gun current cannot be edited with the constant current control (H, M, and L).	See Chapter 7.5.
● Error Log Display Mode	・The error code (see Chapter 11) and detection value of the error that occurred are displayed. ・You can check the errors detected in the past.	See Chapter 7.6.
● Operating Time Display Mode	・Displays the operating time or total operating time.	See Chapter 7.7.
● Paint Used Amount Display Mode	・Displays the paint used amount and calculated powder flow rate.	See Chapter 7.8.
● Measurement mode	・Displays the measurement time, powder flow rate, and transfer air rate. ・Measure The measurement switch LED turns on. ・Enables to measure the powder flow rate (g/min) of the paint.	See Chapter 9.
● Cleaning mode	・Displays cleaning time. ・Clean The cleaning switch LED turns on. ・It enables to clean (air purge) the powder path.	See Chapter 10.
● Error mode	・Displays the setting value when an error occurs and the error code of the detected error.	See Chapter 11.
● Serviceman mode	・Displays the parameter No. and the setting value corresponding to the parameter No.	See Chapter 12.

7.2 To Change the Display Screen

(1) The following describes the procedure to change display screen.



7.3 Display at Power-On



- The unit model is displayed in (1).
  C: DF unit, A: SFC type

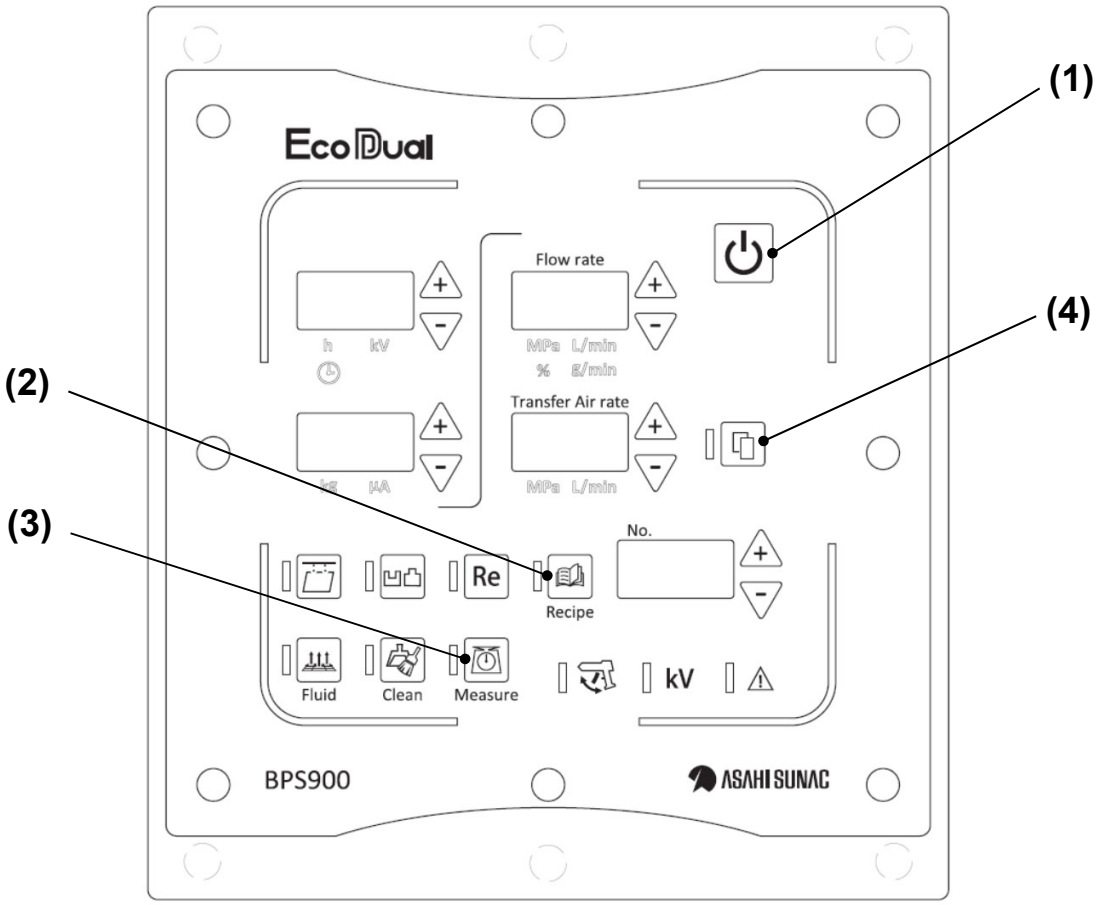
- The program version is displayed in (2).

NOTE

- **The electrostatic controller displays the starting indication for about 3 sec after the power is turned on.**
- **While the starting indication appears, any input through key operations are not allowed.**

7.4 Standby Mode

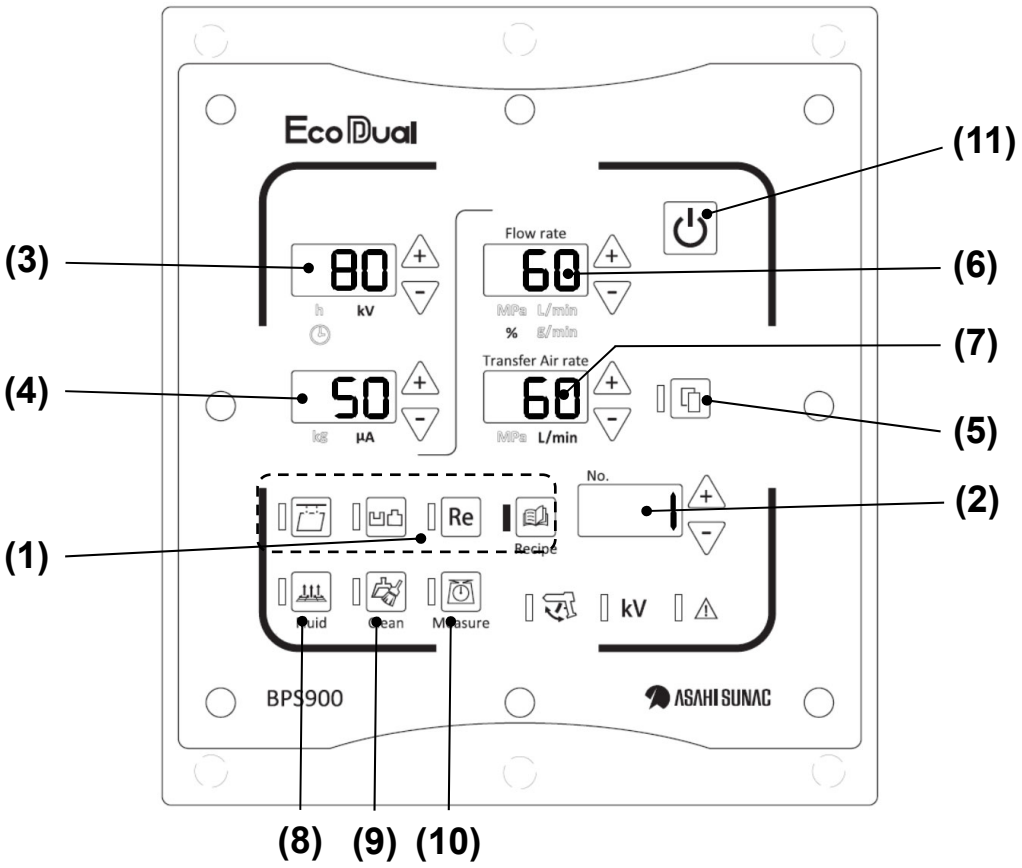
In this mode, even if the operation input is turned on, the coating work cannot be started because the high voltage application and air to the gun are not turned on.



No.	Summary
(1)	Press , and the machine enters the coating mode.
(2)	Hold down Recipe and Measure together, and the machine enters the serviceman mode.
(3)	
(4)	Press , and the machine enters the error log display mode.

7.5 Coating Mode

In this mode, when the operation input is turned on, a high voltage is applied to the gun and air is turned on at the same time.



*The bracket ( ) shows the unit.

No.	Summary
(1)	・The LED of the selected coating condition turns on. Press [flat plate] to select the flat plate mode. Press [uneven plate] to select the uneven plate mode. Press [Re] to select the re-coating mode. Press [Recipe] to select the recipe mode.
(2)	・Displays the recipe No. 1 to 99. [When Recipe LED is ON] [No. + -] Press the + key to change the value by +1. Press the - key to change the value by -1. Press the + or - key together with [copy] to change the value by +10 or -10.
(3)	・Displays the gun applied voltage [kV]. *The standard polarity is negative. ・Press the "+" or "-" key to increase or decrease the voltage in the range of 0 to 80 kV.

No.	Summary
(4)	・Displays the gun current (μA) when no high voltage is generated. Also, press the "+" or "-" key to increase or decrease it in the range of 1 to 80 μA. ・Displays the gun current detected value (μA) when high voltage is generated. ◇10 μA or more Example)  ◇Less than 10 μA Example)  ◇Under constant current control Example) 
(5)	・Switches between the coating condition display state and air flow rate display state. * The display switching LED turns on when the air flow rate is displayed. ・Hold down this switch to turn ON and OFF the key lock. * While the key is locked, the lower right LED turns off.
(6)	・Displays the flow rate. Press the "+" or "-" key to increase or decrease it in the range of 30 to 100%. ・Displays the actual measurement value (L/min) of the main air when the air flow rate is displayed.
(7)	・Displays the transfer air rate. Press the "+" or "-" key to increase or decrease it in the range of 30 to 90 L/min. ・Displays the actual measurement value (L/min) of the sub air when the air flow rate is displayed.
(8)	・Press Fluid to forcibly turn on/off the motor and fluid air.
(9)	・Press Clean, and the machine enters the cleaning mode. If this button is pressed again in the cleaning mode, the machine goes back to the coating mode.
(10)	・Press Measure, and the machine enters the measurement mode. If this button is pressed again in the measurement mode, the machine goes back to the coating mode.
(11)	・Press , and the machine enters the standby mode.

⚠CAUTION

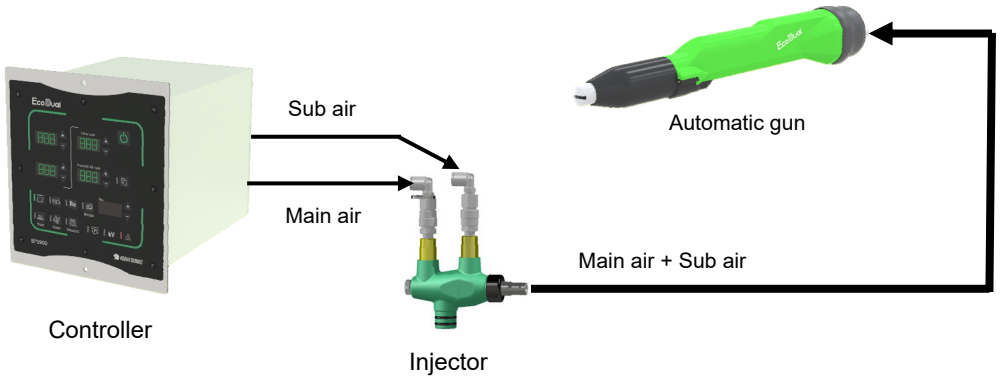
- **Do not clean inside the injector or powder hose while using the cleaning switch, unless it is ensured that there is no powder remaining in the powder tank. If the tank has powder remained and this operation is executed, the powder from the tank will be ejected.**

NOTE

- **Relationship between "Flow rate (%)" and "Transfer Air rate (L/min)"**

・Air used in the auto gun unit is divided into the “main air”, which determines the powder flow rate (g/min), and the “sub air”, which assists powder transfer through a powder hose to the gun.

・The transfer air rate of the electrostatic controller indicates the sum of the main air flow rate and the sub air flow rate discharged from the auto gun.



(ex.) Changing from the coating condition (1) to (2)

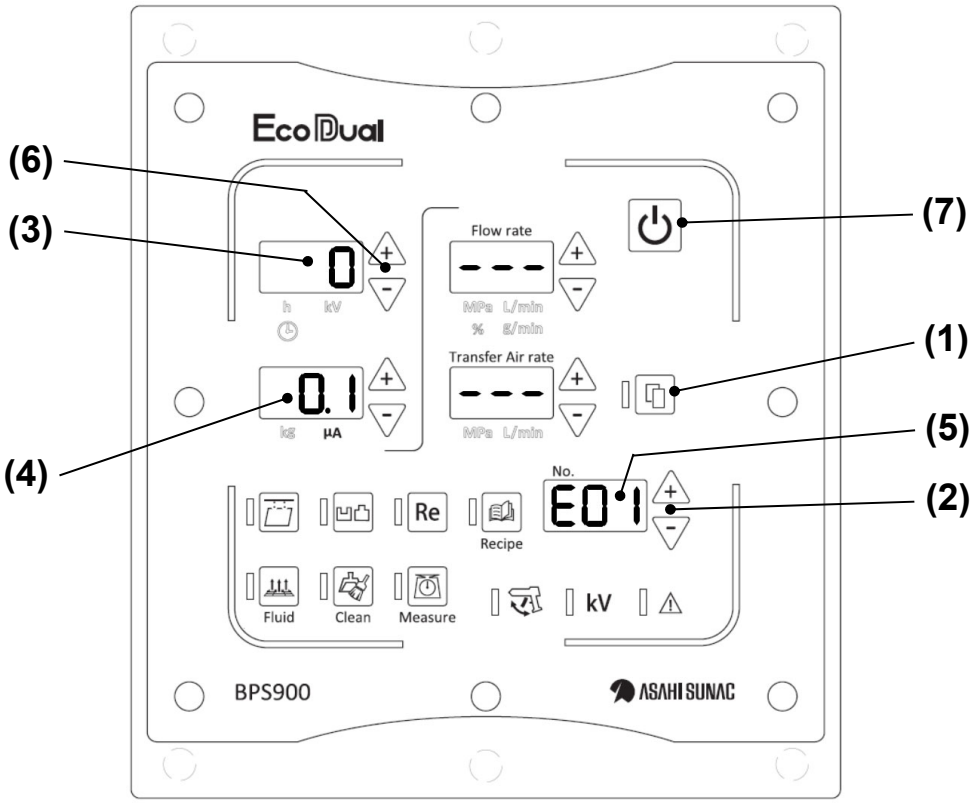
Condition No.	Powder flow rate (%)	Transfer air rate (L/min)	Main air (L/min)	Sub air (L/min)
(1)	70	90	60	30
(2)	50	90	46	44

・The ratio between the main air flow rate and the sub air flow rate is changed so that the paint powder flow rate (g/min) will increase or decrease proportionally as the flow rate (%) is changed.

7.6 Error Log Display Mode

Press  in the standby mode to display the error logs.

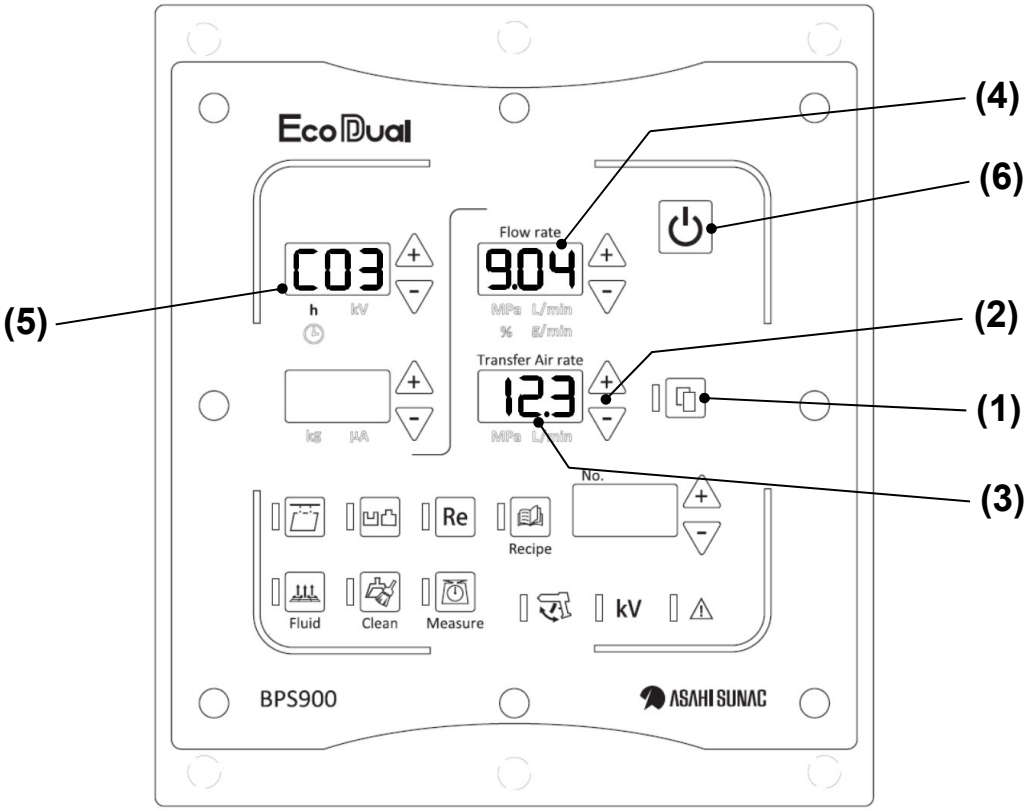
Up to 100 error logs can be saved. If the logs reach 101, the oldest log is deleted.



No.	Summary
(1)	・Press  , and the machine enters the operation time display mode.
(2)	・To reset all the error logs, hold down “+” and “-” at the same time.
(3)	・Displays the order with 0 to 99. *Only the saved error logs are displayed. *0 is the latest and 99 is the oldest error logs. *When there is no error log, “---” is displayed.
(4)	・Displays the detected value. *Turns off when there is no error log.
(5)	・Displays an error code. *For error codes, see Chapter 11. *When there is no error log, “---” is displayed.
(6)	・Switches the order of the error logs.
(7)	・Press  , and the machine enters the standby mode.

7.7 Operating Time Display Mode

Press [ ] in the error log display mode to display the operating time and total operating time.

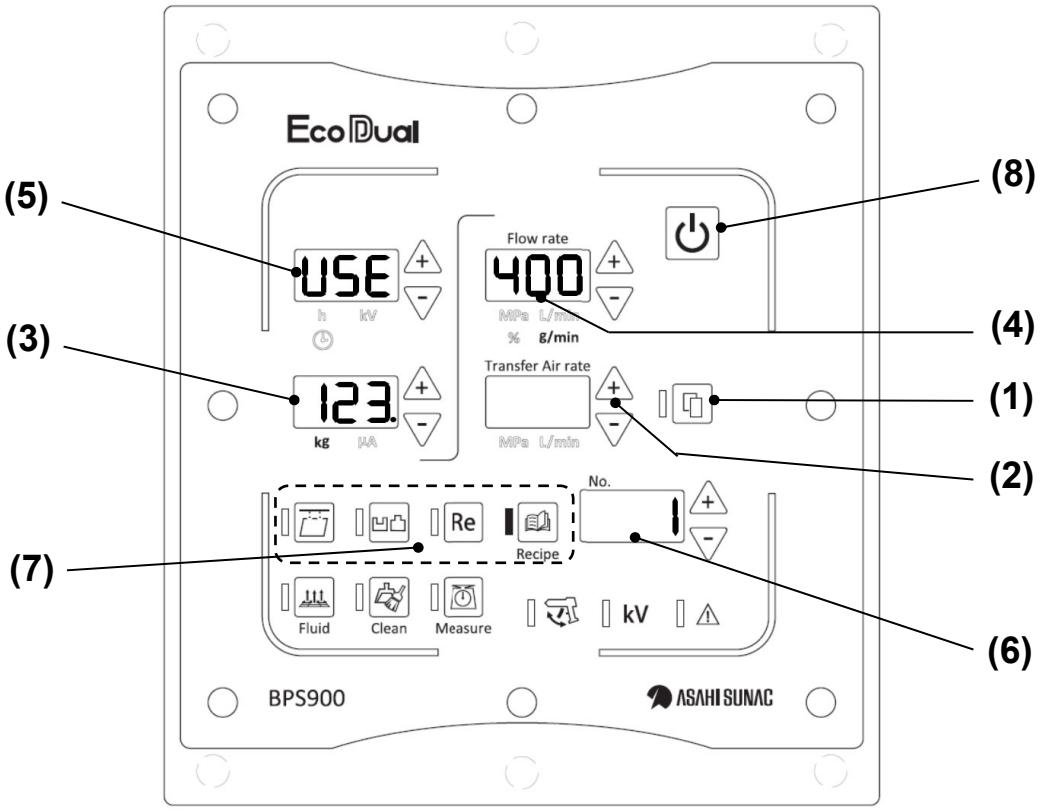


No.	Summary
(1)	・Press [ ], and the machine enters the paint used amount mode.
(2)	・To reset the operating time, hold down “+” and “-” at the same time.
(3)	・Displays the operating time. ◇0 minute to 9 hours 59 minutes Example) 1 hour and 23 minutes  ◇10 hours 0 minute to 99 hours 59 minutes Example) 12 hours 30 minutes to 39 minutes  ◇100 hours or more Example) 123 hours 0 minute to 59 minutes  *Up to 999 hours can be displayed.

No.	Summary
(4)	・Displays the total operating time (1st to 3rd digits). ◇0 minute to 9 hours 59 minutes Example) 1 hour and 23 minutes  ◇10 hours 0 minute to 99 hours 59 minutes Example) 12 hours 30 minutes to 39 minutes  ◇100 hours or more Example) 123 hours 0 minute to 59 minutes 
	・Displays the total operating time (4th to 6th digits). Example) 123000 hours  *The maximum total operating time is 999999 hours. *The unit [h] LED turns on.
(6)	・Press  , and the machine enters the standby mode.

7.8 Paint Used Amount Display Mode

Press [ ] in the operating time display mode to display the paint used amount and calculated powder flow rate.



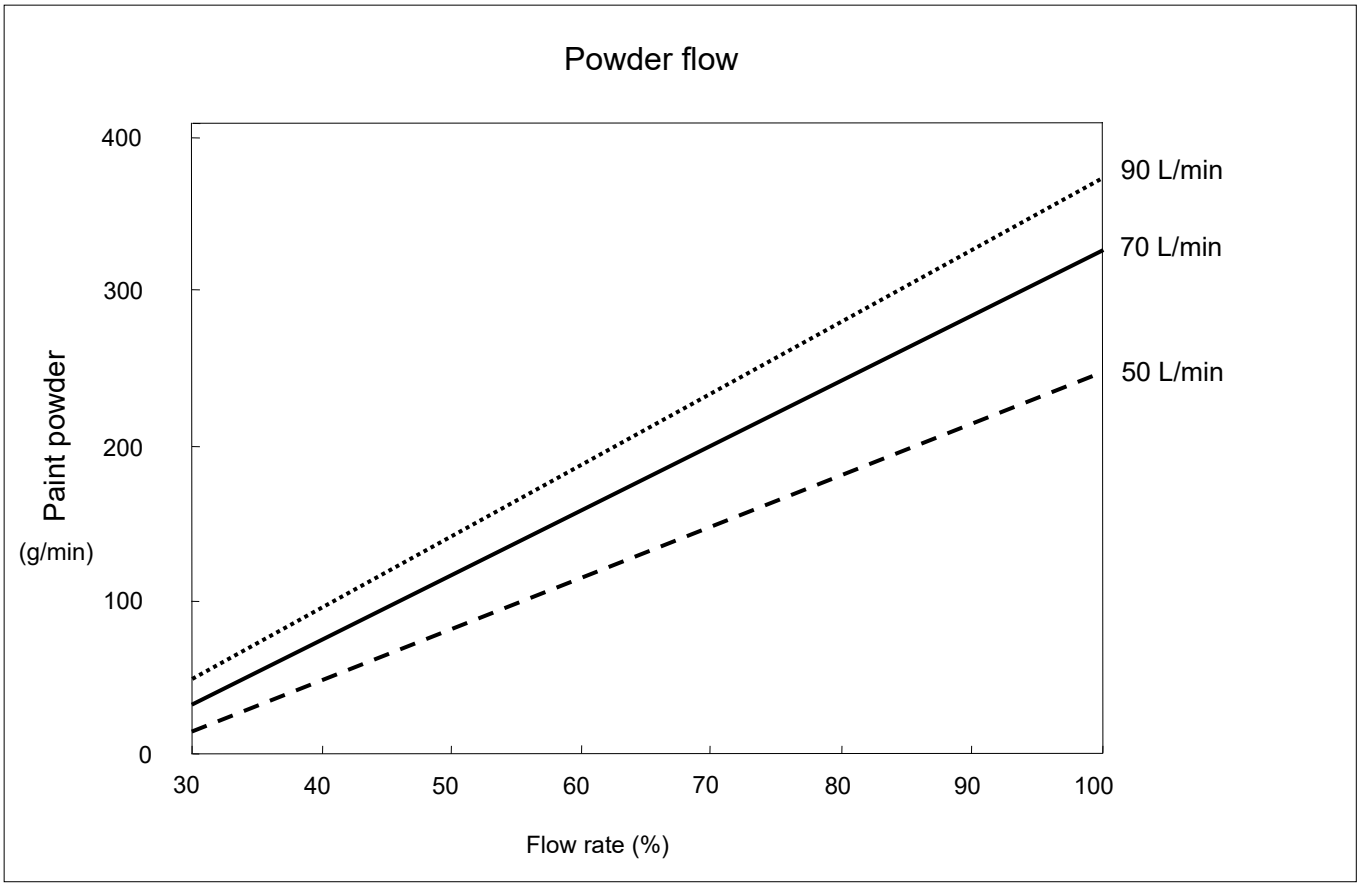
No.	Summary
(1)	・Press [ ], and the machine enters the standby mode.
(2)	・To reset the paint used amount, hold down “+” and “-” at the same time.
(3)	・Displays the paint used amount. Example) 123 kg  Example) 12.3 kg  Example) 0.9 kg  *Up to 999 kg can be displayed. *The unit [kg] LED turns on.

No.	Summary
(4)	・Displays the paint powder flow rate (calculated value) corresponding to the recipe number. Example) 400 g/min  *Up to 999 g/min can be displayed. *The symbol [g/min] LED turns on.
(5)	・Displays the mode name "USE".
(6)	・Displays the recipe No. [When Recipe LED is ON]
(7)	・The LED of the selected coating condition turns on. Press  to select the flat plate mode. Press  to select the uneven plate mode. Press  to select the re-coating mode. Press  to select the recipe mode. ・The display of the powder flow rate (calculated value) is updated.
(8)	・Press  , and the machine enters the standby mode.

8 Coating Condition

8.1 Reference Data of Powder Flow Rate

Air supply pressure on the primary side	Dynamic pressure 0.5 MPa
Injector	AJ1
Powder hose	Inner diameter Φ11　6 m
Dual electric field type powder handgun unit	AXR II-100DF
Paint	Epoxy polyester paint



* Data results above vary according to powder paint types, air pressure setting value on the primary side, insert sleeves for the injector, use state of paint hoses (wear, paint sticking) or other factors. Please refer as guidelines. For accuracy of powder flow rates, please make measurements (see Chapter 9).

8.2 Contents of Preset Coating Conditions

Electrostatic controller has the preset values of the coating conditions shown in Table 1.

Table 1 Contents of Preset Coating Conditions

Setting	Adjustable range	Flat plate mode	Uneven plate mode	Re-coating mode	Recipe mode (No. 1 to 99)
Powder flow rate	30 to 100 %	70	70	70	70
Transfer air rate	30 to 90 L/min	70	50	40	60
Gun applied voltage	0 to 80 kV	80	80	80	80
Gun current (Constant current control)	1 to 80 μA	80	20	10	50

is a fixed value.

NOTE

- **You can change the gun applied voltage and gun current with the coating recipe No. 1 to 99 in the recipe mode.**
  The gun current cannot be edited in the constant current control (H, M, and L) and measurement mode.

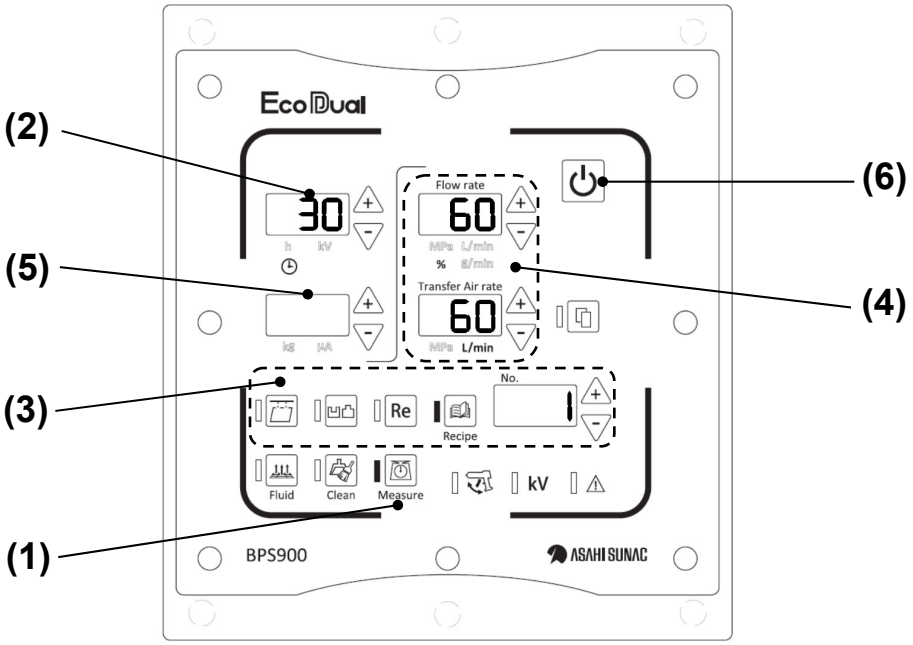
9 Measurement

This chapter explains about the measurement of powder flow rate that is sprayed from the auto gun, which is used for the measurement function of the electrostatic controller.

9.1 Measurement Method

NOTE

- **The measurement mode can be activated from “Coating Mode (Chapter 7.5)”.**
- **The measurement time can be adjusted between 10 and 99 seconds. Adjust it in the serviceman mode (see the parameter No. 28 in Chapter 12).**



Operation procedure	Operation	Operation result
1	Push ((1) Measure) in the coating mode.	・The machine enters the measurement mode. ・The measurement LED Measure lights up. ・The number of seconds of the measurement time is displayed in ((2)).
2	Press any of 〈 / / Re / Recipe 〉 ((3)).	・Select the measurement condition (recipe No. or flat plate, uneven plate, or re-coating). ・Each setting ((4)) can be changed.
3	Connect a powder collection bag (ex. bag filter) to the outlet (nozzle) where the auto gun discharges powder paint.	

Operation procedure	Operation	Operation result
4	Set the operation input ON. (Measurement begins.)	* When the count of measuring time becomes zero, powder spraying stops automatically and LED lamps of ((5)) and ((1) Measure) become blinking.
5	Use a weight scale and measure weight of powder paint collected in the collecting bag.	
6	Enter the weight of the discharged paint in ((5)) in grams.	
7	Press ((1) Measure).	・The machine enters the coating mode. ・The weight data is saved.

* When ((6) ⏻) is pressed, the machine enters the standby mode regardless of the procedure.

In this case, the entered weight data is not saved.

NOTE

- **High voltage is not applied on the auto gun in the measurement mode.**
- **Cancelling the measurement, set the operation input OFF.**
- **The function counts down the measurement time only while the operation input is ON.**

10 Powder Path Cleaning

This chapter describes how to clean powder paths (injector/powder hose/auto gun) with the air purging function of the electrostatic controller.

⚠ WARNING

- **Failure to do so may result in personal injury.**

⚠ CAUTION

- **Do not clean inside the injector or powder hose while using the cleaning switch unless it is ensured that paint will not be sucked.**

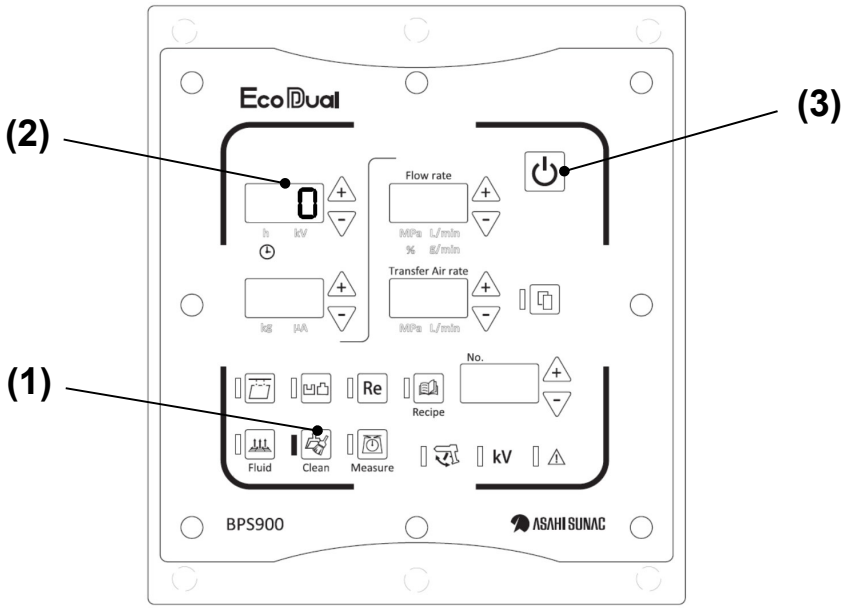
NOTE

- **High voltage is not applied on the auto gun in the cleaning mode.**

10.1 How to Operate Cleaning Mode

NOTE

- **The cleaning mode can be activated from “Coating Mode (Chapter 7.5)”.**



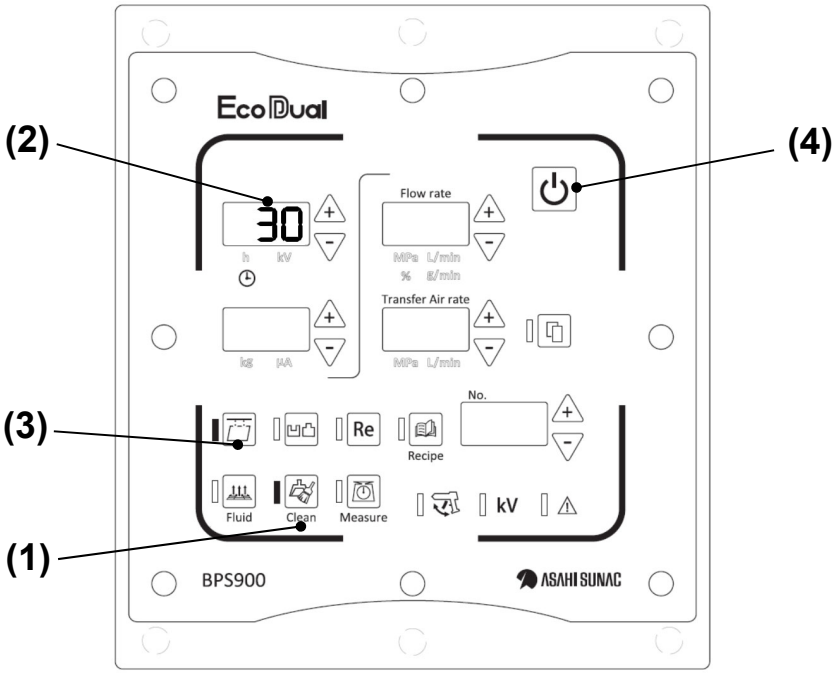
Operation procedure	Operation	Operation result
1	Push ((1) Clean) in the coating mode.	・The machine enters the cleaning mode. ・The cleaning LED Clean lights up. ・The main air and sub air are maximized.
2	Set the operation input ON.	・The air begins to flow through the powder path (injector to powder hose to auto gun). ・Up to 99 sec of the cleaning time is displayed in ((2)). ・The trigger LED turns on.
3	Set the operation input OFF.	・Cleaning is stopped.
4	Press ((1) Clean).	・The machine enters the coating mode.

*When ((3) ⏻) is pressed, the machine enters the standby mode regardless of the procedure.

10.2 How to Operate Auto Cleaning Mode

NOTE

- **The auto cleaning mode can be activated from “Coating Mode (Chapter 7.5)”.**



To use the auto cleaning mode, you need to change the default settings beforehand.

Change the value of parameter No. 19 to 1 or more.

(See 12.1 How to change default settings (serviceman mode) on page 41.)

Operation procedure	Operation	Operation result
1	Push ((1) Clean) in the coating mode.	・The machine enters the auto cleaning mode. ・The cleaning LED (Clean) lights up. ・The H LED ( ) blinks. ・The cleaning setting time is displayed in ((2)). ・The main air and sub air are maximized.

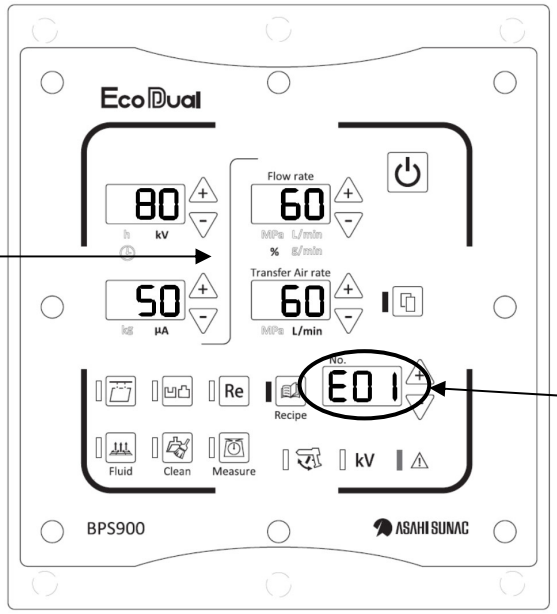
Operation procedure	Operation	Operation result
2	Press ((3)).	・The H LED ( ) lights up. ・The air begins to flow through the powder path (injector to powder hose to auto gun) by the supply air pressure. ・The countdown starts from the setting value, and the remaining time (in seconds) is displayed in ((2)). ・During the count, "_" is displayed at the bottom left of the number. Example)  ・If you press ((3)) during cleaning, cleaning is stopped. Press ((3)) again to start with the current count.
3	The countdown is over.	・The air will turn off automatically. ・The H LED turns off.
4	Press ((1) Clean).	・The machine enters the coating mode.

*When ((4)) is pressed, the machine enters the standby mode regardless of the procedure.

11 Error Display Screen

This chapter explains about the error abnormality information when the electrostatic controller detects abnormal states during coating.

The setting value at the time when an error occurs is displayed.



An error code is displayed.

11.1 Error Display Screen and Its Description

Error code (Error display)	Content of error	Estimated cause	Measure
OCL	・Upper limit failure of gun current * This failure occurs when the gun current exceeds the threshold value (110 µA) during coating.	(1) Close distance between the gun and grounding (2) Faulty controller	(1) Extend the spray distance. Reduce the gun applied voltage. (2) Contact us.
E01	・Lower limit failure of gun current * The failure occurs when gun current runs below the lower limit of the gun current for 0.2 sec or more during coating. * Default lower limit setting of gun current (parameter No.12): 0.5 µA	(1) Low gun applied voltage (2) Poorly connected cable (3) Disconnected cable (4) Grounding failure with objects to be coated or booth (5) Faulty gun (6) Faulty controller	(1) Increase the gun applied voltage. (2) Connect again the cable. (3) Replace the cable. (4) Connect again the grounding. (5) to (6) Contact us.
E02	・Upper limit failure when gun current is OFF * This failure occurs when the gun current runs above the threshold value (4 µA) while high voltage is not generated.	(1) Faulty controller (2) Charging from the outside (3) False detection by nozzles	(1) Contact us. (2) Review the layout of the guns. (When multiple guns are used) (3) Clean the guns and review the layout of the guns.
E31	・EEPROM failure * Initial settings and painting conditions be deleted.	(1) Performing initialization (2) Faulty controller (Faulty EEPROM)	(1) Re-entering setting values. (2) Contact us.

11.2 Warning Display Screen and Its Description

Error code (Warning display)	Content of warning	Estimated cause	Measure
E13	・Main air flow rate lower limit warning * This warning occurs when the main air flow rate falls below the threshold value.	(1) Supply air pressure drop (2) Air tube clogging/bending	(1) Adjust the air pressure. (2) Replace the air tube.
E14	・Main air flow rate upper limit warning when it is OFF * This warning occurs when the main air flow rate exceeds the threshold value when spray is OFF.	(1) Air leak	(1) Check and repair air path leak.
E16	・Sub air flow rate lower limit warning * This warning occurs when the sub air flow rate falls below the threshold value.	(1) Supply air pressure drop (2) Air tube clogging/bending	(1) Adjust the supply air pressure. (2) Replace the air tube.
E17	・Sub air flow rate upper limit warning when it is OFF * This warning occurs when the sub air flow rate exceeds the threshold value when spray is OFF.	(1) Air leak	(1) Check and repair air path leak.
E32	・Memory clear * Operating hours and error history be deleted.	(1) Power off for a long time (2) Faulty controller (Faulty SRAM)	(1) Use as it is. (2) Contact us.

*A warning lights up the error code but does not stop application of high voltage and air.

*A warning is automatically reset when the cause is removed.

*If the above action does not eliminate the warning, contact us.

11.3 Motions upon Errors and How to Reset Error Display

The product makes the following motions at errors.

The following shows how to reset error displays.

Error code (Error display)	Motions at errors		How to reset
	Electrostatic charging	Air	
OCL	OFF	OFF	・Press  . ・Press  . ・Set the operation input OFF.
E01	OFF	OFF	・Press  . ・Press  .
E02			
E31			
E32			

*In the case of "Press  " and "Set the operation input OFF," the machine enters the coating mode.

*In the case of "Press  ," the machine enters the standby mode.

*If E01 and/or E02 occurs together with OCL, the warning cannot be reset by “Set the operation input OFF.”

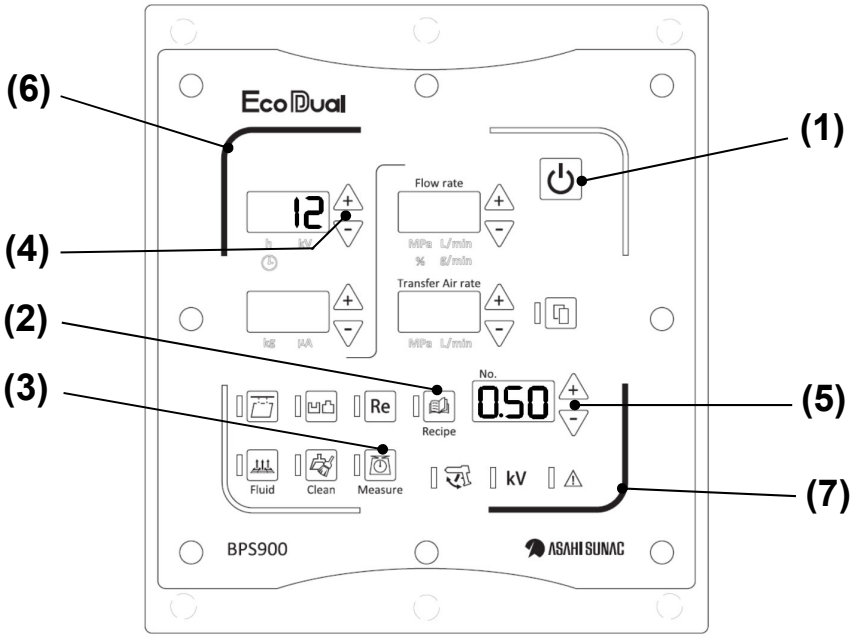
⚠ WARNING

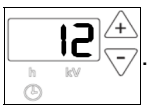
- **Electric shock may be harmful to human body or may lead to accidents. Wear electrostatic clothes: JIS T8118 and electrostatic shoes: JIS T8103 when working.**

12 Change of Default Settings

This chapter explains how to change the default settings of the electrostatic controller.

12.1 How to Change Default Settings (Serviceman Mode)



Operation procedure	Operation	Operation result
1	Press (1) ⏻. * This is not required if it is already in the standby mode.	・The machine enters the standby mode (only the operation LED lights up).
2	Hold down (2) 📖 and (3) ⏰ at the same time.	・The machine enters the serviceman mode. ・The outer frame lines (upper left (6), lower right (7)) LEDs blink.
3	Press the increase/decrease key of (4) 	・The parameter No. is increased/decreased. ・If the key is pressed as holding down ⧉, the value is increased/decreased by 10 times as much as the normal operation.
4	Press the increase/decrease key of (5) 	・The setting value corresponding to the parameter No. is increased/decreased. ・If the key is pressed as holding down ⧉, the value is increased/decreased by 10 times as much as the normal operation.
5	Press (1) ⏻.	・The machine enters the standby mode.

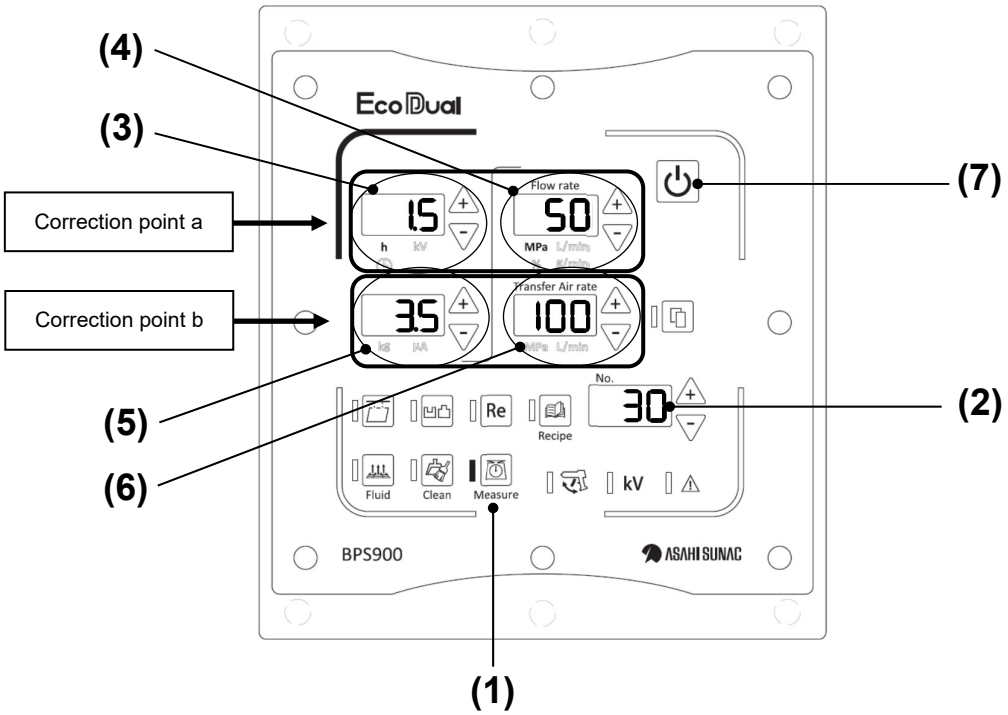
12.2 Default Settings (Excerpt)

Parameter No.	Setting item	Unit	Default setting	Max. value	Min. value
12	Setting value of lower limit failure of gun current	μA	0.50	40.00	0.25
17	Detection of lower limit failure of gun current (0: OFF/ 1: ON)		1	1	0
18	Gun applied voltage (guideline) display (0: OFF/ 1: ON)		0	1	0
19	Auto cleaning time (0: OFF/1 or more: ON)	seconds	0	99	0
28	Measurement mode timer	seconds	30	99	10
39	Main air flow rate error (0: OFF/ 1: ON/ 2: Warning)		2	2	0
40	Sub air flow rate error (0: OFF/ 1: ON/ 2: Warning)		2	2	0
49	Initial measurement time (correction point a)	seconds	30	60	10
50	Initial measurement time (correction point b)	seconds	20	60	10
51	SFC correction point a	V	1.5	2.4	0
52	SFC correction point b	V	3.5	2.5	5.0
53	SFC correction value a	g	50	0	300
54	SFC correction value b	g	100	0	300

13 Calibration Measurement for SFC Type (A)

This chapter explains how to calibrate the A:SFC type unit.

13.1 How to Operate Calibration Measurement



Operation procedure	Operation	Operation result
1	Press ((1) Measure) in service man mode.	・This is the calibration measurement screen when the unit type is A:SFC type. ・The measurement LED Measure lights up. ・The number of seconds of the measurement time at the correction point a is displayed in ((2)). ・The units of ((3)) and ((4)) blink to show that the [correction point a] is selected.
2	Press the "+" or "-"key in ((3)).	・The value of the SFC correction point a changes.
3	Set container as measuring cup to discharge port of SFC paint powder.	

Operation procedure	Operation	Operation result
4	Set the operation input ON. (Start measuring the correction point a.)	・When the count of measuring time becomes zero, powder spraying stops automatically.
5	Measure the weight of powder paint collected in the measuring cup with a weight scale.	
6	Press the "+" or "-" key in ((4)). * Enter the weight of the discharged paint in grams.	・The SFC correction value a changes.
7	Press ((1) ).	・The correction point switches from a to b, and the units of ((5)) and ((6)) blink to show that the [correction point b] is selected. ・The number of seconds of the measurement time at the correction point b is displayed in ((2)).
8	Press the "+" or "-" key in ((5)).	・The value of SFC correction point b changes.
9	Perform the procedures from 3 to 5.	
10	Press the "+" or "-" key in ((6)). * Enter the weight of the discharged paint in grams.	・The SFC correction value b changes.
11	Press ((7) ).	・The machine enters the standby mode.

* For calibrating one point, set the correction point a and SFC correction value a to zero and measure only the correction point b.
* The measurement time for calibration measurement can be changed. (See Parameter No. 49 to 50 in Chapter 12.)

14 Equipment Maintenance

This chapter explains about maintenance of the electrostatic controller.

・Protect the powder coating equipment from powder or other dirt and keep clean at all time.
・Make sure to remove all powder coatings attached on the equipment.

● Consumable parts

The durable period of BPS900a is 10 years except for consumables.

Although the durable period of the following consumables varies according to the use environment, it is recommended to replace them within the durable periods (reference values) shown below.
Replacement of the parts requires special knowledge and skills. Be sure to contact our repair division when replacement.

Part Number	Name	Q'ty	Replacement time	Remarks
E0D2050044100	Switching power supply	1	5 years	Products with E-030200 in the nameplate
EJN7040072M01	Glass tube fuse	2	At blowout	Time lag 2A
E0D2070026W00	Switching power supply	1	5 years	Products with E-03020A in the nameplate

15 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			Electrostatic controller <BPS900a>		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
						In-house / Dealer / Asahi Sunac

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

16 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.

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