

Operation and Maintenance Manual

Perfect Heater

PH2 (2kW)
PH4 (4kW)
PH6 (6kW)



PH6



This manual contains important information on warnings and cautions. Read the manual thoroughly before starting to operate the equipment, and follow the instructions. Always keep the manual handy until such time as the equipment 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.

Thank you for buying our product.

Thank you for buying our Perfect Heater (PH Series).

Please read this manual carefully before starting to operate the equipment. Please pay particular attention to major specifications, warnings and precautions, including prohibited items. Use the equipment appropriately and with care, following the instructions. We hope that by doing so you derive benefit from use of the product over a long period of time.

The equipment covered by this manual is designed for industrial coating work. It shall be used by 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 us described on the back

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Please carefully read this manual and get acquainted with the equipment.

Please observe the operating procedures in the manual. Failure to do so may result in **personal injury and/or damage to property**.

This manual covers only minimum safety precautions, and it does not suggest or imply that no other precautions are required. Of course, each enterprise must observe its own rules as well as the laws and regulations of the country or region in which it operates, in addition to the safety precautions in the manual.

Again, shown on the pages that follow are basic and minimum safety precautions for use of our products.

●As shown below, safety precautions are classified into three categories based on the severity of hazards involved.

	WARNING	Alerts a hazardous situation which may result in personal injury, with instructions on how to avoid it.
	CAUTION	Alerts a hazardous situation which may result in damage or breakage to equipment, with instructions on how to avoid it.
	NOTICE	Indicates important methods and practical information.

※ A hazardous situation included in the CAUTION category could also cause a serious accident depending on how matters develop. All the precautions in the manual convey significant information that you should observe such precautions in order to ensure your own safety and prevent the equipment from failure.

WARNING

Equipment misuse hazard

This product is designed to heat the paint being pumped from the pressure pump to reduce the viscosity.

Be careful when using this product under conditions other than those listed above, as this will be considered improper use and may result in an accident.

Do not use acids, rust-causing materials or halogenated hydrocarbon solvents on this product. Should you have any questions with regard to the use of the equipment or materials to be used, please feel free to contact us.

This product acquires grade sd2G3 of the resisting pressure explosion-proof authorization that an industrial safety technological society executes.

Using the product under conditions other than specified above will be considered as abuse unless specially approved by us. In this case, great caution must be exercised to prevent possible accidents.

WARNING

Injection Hazard

《General Safety Precautions》

- This is a high-pressure painting equipment and an extreme care should be exercised to prevent serious personal injury.

This pump generates very high pressure to feed paint fluid to the airless spray gun. High-pressure spray or ruptured component pieces from point-blank range can inject fluid or fragments into your body, causing skin injury from which no small amount of toxic substances might enter into the body.

Should that happen, get a proper medical treatment by a specialist, immediately.

If you don't, you may suffer from a life-long disability or you may get amputated.

Fluid splashed in the eyes or on the skin can also cause serious injury.

《Emergency Medical Treatment: A Must》

If a high-pressure fluid splashes on your skin or into the eyes, go immediately to a specialist and tell him/her exactly what type of paint fluid you were using in order to obtain proper medical treatment.

- Don't point the gun at anyone or at any part of your body. Stay away from the trajectory of spray jet from the nozzle.
- Don't put your hand or fingers over the spray nozzle.
- Don't attempt to use the painting equipment -- until you are fully acquainted with its operation.
- Be extra vigilant when operating an air-spray painting equipment.

《Spray Gun Safety Mechanisms》

- The spray gun is equipped with safety mechanisms. Use them properly.
- Each time you use a spray gun, ensure, in advance, if all the safety mechanisms operate properly.
- Do not alter or modify or remove any part of the gun: the gun may behave unexpectedly and personal injury may result.

□ Trigger Lock

- When not spraying, always lock the trigger safety lock in order to disable trigger. If you forget to lock the trigger, it may be pulled accidentally.

□ Tip Guard

- When spraying, always put the tip guard on the gun. The tip guard alerts injection hazard, reducing occurrences as a result. The guard, however, cannot prevent hand or part of body from getting close to the nozzle accidentally.

□ Trigger Guard

- Don't spray with the trigger guard removed. This guard prevents the trigger from being pulled accidentally when the gun is dropped or hit by something.

《Nozzle Safety Precautions》

- Don't put your hand or fingers or anything over the spray nozzle.
- Be extra careful when cleaning or replacing the nozzle.

If the nozzle gets clogged while spraying, immediately lock the trigger safety lock and relieve the fluid pressure in accordance with the "**Pressure Relief Procedure**," and then take off the nozzle for cleaning.

It is dangerous to wipe sticky paint off the nozzle with some residual pressure still remaining or without locking the trigger safety lock.

WARNING

When relieving pressure, follow the procedure below:

《Pressure Relief Procedure》

To reduce the risks of injury from injection, splashing fluid on the skin or in the eyes, etc., relieve the pressure following this “Pressure Relief Procedure” whenever you:

Inspect the pump or gun, Remove or mount the nozzle for cleaning or replacement, Stop spraying. The step-by-step procedure:

- ① Lock the trigger.
 - ② Shut off air supply by turning the pressure control dial counter-clockwise, bringing down the pressure all the way.
 - ③ Relieve the ball cock, bring down the system pressure to zero, unlock the trigger and pull it for double-checking.
 - ④ Lock the trigger again.
- When the nozzle or hose is clogged or when it is suspected that some pressure still remains after going through the “Pressure Relief Procedure,” slowly loosen the chip guard mounting nut or the connector at hose end, gradually releasing the pressure until it is completely relieved. Then inspect the nozzle and hose.

Equipment Misuse Hazard

《General Safety Precautions》

- Misuse, such as use of too much pressure, unauthorized component modification, improper paints or solvents, use of worn or broken part, may result in a serious accident like pump breakage, unexpected fluid injection, fluid splashed in the eyes or on the skin that possibly causes personal injury, or even fire or explosion.
- Don't alter or modify pump parts without our authorization or approval, for such a change may result in equipment failure or malfunction.
- Inspect the whole system periodically. Repair or replace parts as required.
- When conducting spray operation, always wear eye protection, protective clothing, and breathing protection recommended by the paint/solvent manufacturer. Depending on the kind of pint fluid used and the ventilation performance, an additional personal protective equipment may be required. Please check it out with the paint/solvent manufacturer.

《Equipment Interior Pressure》

- Confirm the maximum fluid working pressure and maximum air input pressure of the pump. Be careful not to exceed these maximum pressures when operating the pump. Also, make sure that all component parts used for the equipment, such as hoses, connectors, swivels, are compatible with the maximum pressures. Should you find them not, set the pump at a pressure that **does not exceed the lowest maximum operating pressure of all parts and accessories used with the equipment.**
- Each time you use the equipment, retighten all the joints before use.

《Paint/Solvent Compatibility》

Check the compatibility of the paint and solvent with the “material of the pump parts they come into contact with” against the parts material specifications provided by the pump manufacturer -- before you introduce the fluid (paint/solvent) into the pump.



WARNING

《Hose Safety Precautions》

- High-pressure fluid in the hose can be very dangerous: it could cause injury to the operator or damage to the equipment, spewing out of cracks, damage, wear in the hose, triggered by misuse or spontaneously.
- Please handle hose carefully. To move a hose from one place to another, don't pull, but carry. Don't use paint or solvent that is not compatible with the interior and exterior materials of the hose.
- Check the hose for bending or squeezing, for if there is it may cause a local. Concentration of pressure, causing possible fluid leak.
- Don't leave hose in an environment where temperature may go up to 80°C or higher or where it may go down to - 40°C or lower.
- Securely retighten hose connectors and joints before use.
- Never use a broken hose. Check the hose throughout its length for cut, fluid leak, wear, blister, scratches, and loose fittings. Should you find anything wrong, stop using the hose right there and then, and replace.
- When you find fluid leak, take no stopgap measures, such as covering the leak hole by hand or adhesive tape. Such measures will only increase potential hazards.
- When you find fluid leak, replace the hose with a new one or contact our authorized repair shop.
- Use a hose that is compatible with our standard specifications.
- Our fluid hose standard specifications ensure a sufficient hose durability in a normal operating environment. However, tension is applied to a hose for many hours, it deteriorates in a relatively short time. When tension is applied frequently, it may not last longer than half a year. Under normal operating conditions, replacement in a year would be recommended.

《Moving Parts Hazard》

- When checking or servicing the pump and component parts, bring the pressure down in advance in accordance with the “**Pressure Relief Procedure**” on page 3 in order to prevent the pump from behaving unexpectedly
- With the pump running, don't leave the painting equipment unattended.
Each time you stop spraying for a break or at the end of shift, shut off the air supply
- Keep people away for the pump, children and adults who are not familiar with the airless painting operation.

Fire and Explosion Hazard

《Power Supply》

The terminal of the cable attached to the main body makes the power supply surely connect with the first power supply and the groundline safely, and received.

When connected place with this first power supply corresponds to a dangerous area in the explosion-proof area, the resisting pressure explosion-proof structural junction box is separately needed.

Please use the cable of our specification when you change the length of the cable attached to the main body.



WARNING

《Source of Fire》

As liquid flows through the pump and hose, static electricity is generated.

If each component of the painting equipment is not properly grounded, sparks may occur due to static electricity. When there are vaporized solvent, sprayed paint particles, floating dust and other flammables in the atmosphere near the painting equipment, these sparks can cause fire or explosion, possibly causing serious injury to the operator and damage to the equipment.

- Provide fresh air ventilation in the spray area.
- Keep the spray area free of open flames, pilot lights, and other flammables.
- Please do not set up the pump in the booth and the place sealed up.
- Please separate the pump and the distance with the place of the spraying work by at least 5m. Otherwise, a fire and the explosion might be caused according to the kind of paints. Please consult the paints maker.
- It is strict prohibition to wipe the pump with thinner while using it.
- When using a pole gun, stay clear of electric wires.
- Ensure that equipment and conductive painting objects in the work area are properly grounded. Take no chances: when these things are not properly grounded, fire or explosion can occur triggered by electrostatic spark.
- If you feel any electric shock while using the painting equipment, stop spraying immediately and check the grounding of each component of the equipment. Do not use the equipment until you identify and correct the problem.
- Keep a powerful fire extinguisher in the work area.

《Grounding》

To prevent hazards associated with static electricity, ground all the pumps, painting objects, painting equipment and components that are used in the area. If they are not properly grounded, ground properly, by all means, in accordance with the grounding procedure set forth by “Electrical Equipment Technical Standard (Class D grounding or equivalent).”

The grounding procedure for each of the painting system components is as follows:

Grounding Pump

The ground wire of the attachment is fasten in the tap hole in E mark part in front of the main body of the pump body with the screw, and then connect the other clip to a Class D grounding object.

Grounding Hose

- To ensure the grounding of a whole system, be sure to ground the hose. Especially when an extension hose is used, ensure that it is ground properly.
- Once every week, inspect the hose in use for electrical resistance. Class D grounding, our standard grounding, requires the resistance value to be 100Ω or lower. When the hose does not have a maximum resistance label on it, please check it out with the agency from whom you bought the hose or the hose manufacturer directly. Measure the electrical resistance of hose by connecting an ohmmeter to an appropriate location on the hose. If the resistance measured exceeds the maximum value allowed, replace the hose with a new one. Improper grounding of a hose puts the whole system in peril.

Grounding Spray Gun

A spray gun that is securely connected to the properly grounded hose and pump is considered to be grounded properly.

Grounding Painting Object

A contaminated hanger or grounding clip do not ensure proper grounding of a painting object. Keep the hanger and clip clean to maintain proper grounding.

Grounding Fluid Container

When your fluid container is made of conductive metal, you can place it on the grounded floor or table. When it is made of something else, you cannot.

Grounding Cleaning Solvent Can

- When the cleaning solvent is made of conductive metal, you can place it on the grounded floor or table. Don't place it on a non-conductive sheet, such as a sheet of paper or corrugated fiberboard. When you clean the pump or relieve the pressure, hold a metal part of the gun firmly to the side of a grounded metal container and then pull the trigger.



WARNING

《Cleaning Safety Precautions》

Before you get down to cleaning, ensure that the whole painting system and cleaning can are properly grounded. (see “Grounding Cleaning Solvent Can.”)

- When cleaning the system, take off the nozzle in accordance with the procedure set forth in the <<Nozzle Safety Precautions>> (on page 2), and bring the pressure down to a minimum level (that is required for flushing with solvent).
- To prevent electrostatic spark, hold a metal part of the gun firmly to the side of a grounded cleaning solvent can (made of metal), and trigger the gun for flushing.

《Solvent Safety Precautions》

Halogenated hydrocarbon solvent may explode when it comes into contact with the aluminum or plated portion of pressure vessel (pump, heater, filter, valve, gun, etc.), possibly causing fatal or serious injury.

Do not use halogenated hydrocarbon solvent.

【Example of halogenated hydrocarbon】

Chlorinated	Trichloroethylene, tetrachloroethylene and ethylene chloride
Bromated	N-propylbromide
Fluorinated	HCFC-225, HFC-43-10mee, HFE-449s1(HFE-7100)

(Shown above is not a conclusive list of halogenated hydrogen carbonates. For detail, contact the paint manufacturer.)



WARNING

Do not use to heat solvents only.

May result in accidents such as fires or explosions.

This Perfect Heater is a product that heats paint and reduces its viscosity.

Do not use for any other purpose.



WARNING

The paint mist and spraying atmosphere may lead to dyspnea and/or organic solvent poisoning.

Do not use the pump indoor or in a poorly ventilated place, e.g. in a tunnel or tank. When using the product, take enough care of yourself as well as the surrounding people and livestock.

NOTICE

The carbon alloy nozzle is precision-machined. To remove nozzle clogging, don't use a hard metal needle but use a soft wooden toothpick, etc. With a toothpick push the stuffed material from the tip of the nozzle, then air blow. A hard metal needle, if used, could damage the nozzle orifice beyond repair.

2

Specifications

① Construction of Perfect Heater

Perfect Heater is pressure-resistant and explosion-proofed for use in hazardous areas as defined in national and industry standards and in the regulations of state authorities. It incorporates a coiled stainless steel pipe which serves as liquid conductor and is cast as unitized with its aluminum body that provides a good heat conduction, along with a set of three cartridge heater elements enclosed in a metal case. The heat produced by the heater elements is conducted from the heater case to the coiled pipe to heat the medium or paint running through the pipe.

- (1) A thermometer installed at the outlet of the internal piping gives a visual check for the temperature of the paint coming out of the heating unit.
- (2) The heating unit uses thermally efficient cartridge type heater.
- (3) The temperature adjustment adopts the liquid expansion type, an accurate temperature can be adjusted.
- (4) A bimetallic safety device is provided, which breaks the circuit in the event of an excessively high temperature (about 105°C) being reached due to heat sensor trouble. It consists of a pair of series-connected manually re-setting type thermal protection switches that gives a double check for abnormal temperature rises.
- (5) A neon lamp (15) is lit only while electric current is following through the heater whereas it is allowed to stay off as the thermostat is working until the preset temperature is reached. *For the index number in parentheses (), see page 8.

NOTE

Once the present temperature has been reached, the paint temperature is kept constant within fairly narrow limits. In the system where a high pressure paint hose is longer than 15m, the thermostatic control should be set for the desired value of the paint temperature by taking into consideration the temperature gradient or different in temperatures between the outlet end of the heater and the end of the paint hose at the point of application.



CAUTION

The standard Perfect Heater is wired to operate on a commercial single-phase AC200V supply. Do not connect to three phase supply.

② Specification

Model	PH2	PH4	PH6
Part Number	41010	41011	41012
Voltage	AC200V single phase		
Power	1.8kW	3.6kW	5.4kW
Temperature	30~80°C		
Current	9A	18A	27A
Max pressure	25MPa		
Capacity	510cm ³	1020cm ³	1530cm ³
Measurement(mm)	260W×110D×235H	260W×235D×220H	260W×235D×330H
Weight	19kg	36.5kg	50kg
Number	T3947	T3948	T3949
Inlet diameter	G(PF)1/4	G(PF)1/4	G(PF)3/8
Outlet diameter	G(PF)1/4	G(PF)1/4	G(PF)3/8

Explosion-proof construction (sd2G3)

3

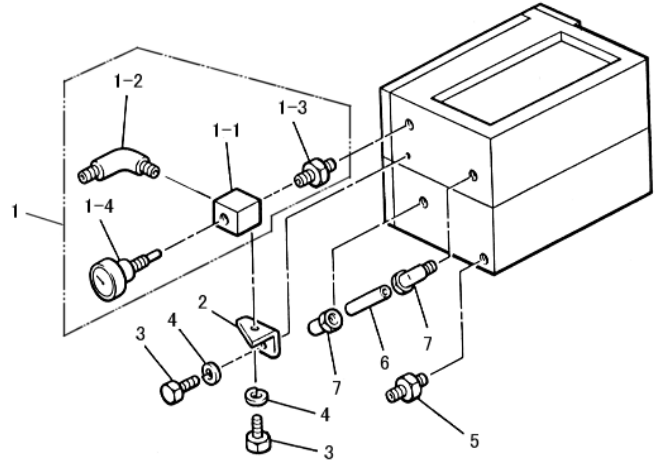
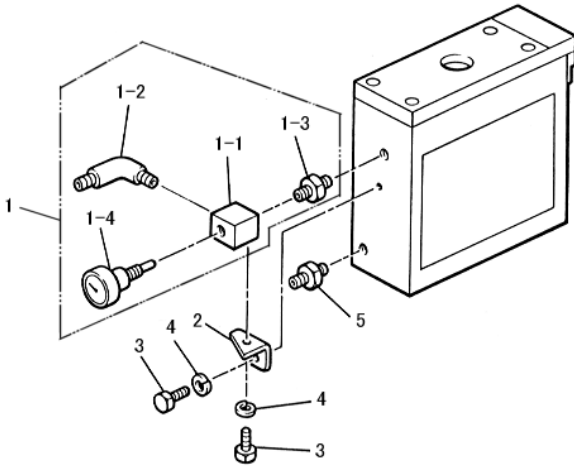
Exploded Diagram and Names of Parts

PH2
41010

PH2S
41010-1

PH4
41011

PH4S
41011-1



(PH2) Exclusive Parts

No.	Part No.	Part Name	Q'ty	Remark
1	41010-002	Manifold set	1	
-1	40526-28	Manifold	1	
-2	249-2302	L type hose joint	1	
-3	41010-005	High pressure nipple	1	
-4	315-0001	Thermostat	1	

No.	Part No.	Part Name	Q'ty	Remark
2	40423-010	Filter mounting bracket	1	
3	01-10610	Hex bolt	2	
4	41-50600	Spring washer	2	
5	247-2302	Hose joint	1	

(PH2S) Exclusive Parts

No.	Part No.	Part Name	Q'ty	Remark
1	41010-102	Manifold set	1	
-1	3903-012	Manifold	1	
-2	249-4302	L type hose joint	1	
-3	41010-105	High pressure nipple	1	
-4	315-0001	Thermostat	1	

No.	Part No.	Part Name	Q'ty	Remark
2	40423-010	Filter mounting bracket	1	
3	01-10610	Hex bolt	2	
4	41-50600	Spring washer	2	
5	247-4302	Hose joint	1	

(PH4) Exclusive Parts

No.	Part No.	Part Name	Q'ty	Remark
1	41010-002	Manifold set	1	
-1	40526-28	Manifold	1	
-2	249-2302	L type hose joint	1	
-3	41010-005	High pressure nipple	1	
-4	315-0001	Thermostat	1	
2	40423-010	Filter mounting bracket	1	

No.	Part No.	Part Name	Q'ty	Remark
3	01-10610	Hex bolt	2	
4	41-50600	Spring washer	2	
5	247-2302	Hose joint	1	
6	1011-032	Piping, pipe	1	
7	259-4312	Crunch joint	2	

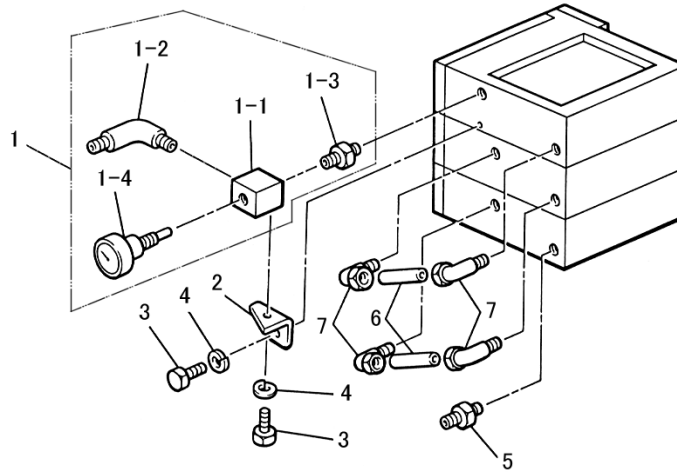
(PH4S) Exclusive Parts

No.	Part No.	Part Name	Q'ty	Remark
1	41010-102	Manifold set	1	
-1	3903-012	Manifold	1	
-2	249-4302	L type hose joint	1	
-3	41010-105	High pressure nipple	1	
-4	315-0001	Thermostat	1	
2	40423-010	Filter mounting bracket	1	

No.	Part No.	Part Name	Q'ty	Remark
3	01-10610	Hex bolt	2	
4	41-50600	Spring washer	2	
5	247-4302	Hose joint	1	
6	1011-032	Piping, pipe	1	
7	259-4312	Crunch joint	2	

PH6
41012

PH6S
41012-1



(PH6) Exclusive Parts

No.	Part No.	Part Name	Q'ty	Remark
1	41012-002	Manifold set	1	
-1	40526-28	Manifold	1	
-2	295-2303	L type nipple	1	
-3	41010-005	High pressure nipple	1	
-4	315-0001	Thermostat	1	
2	40423-010	Filter mounting bracket	1	

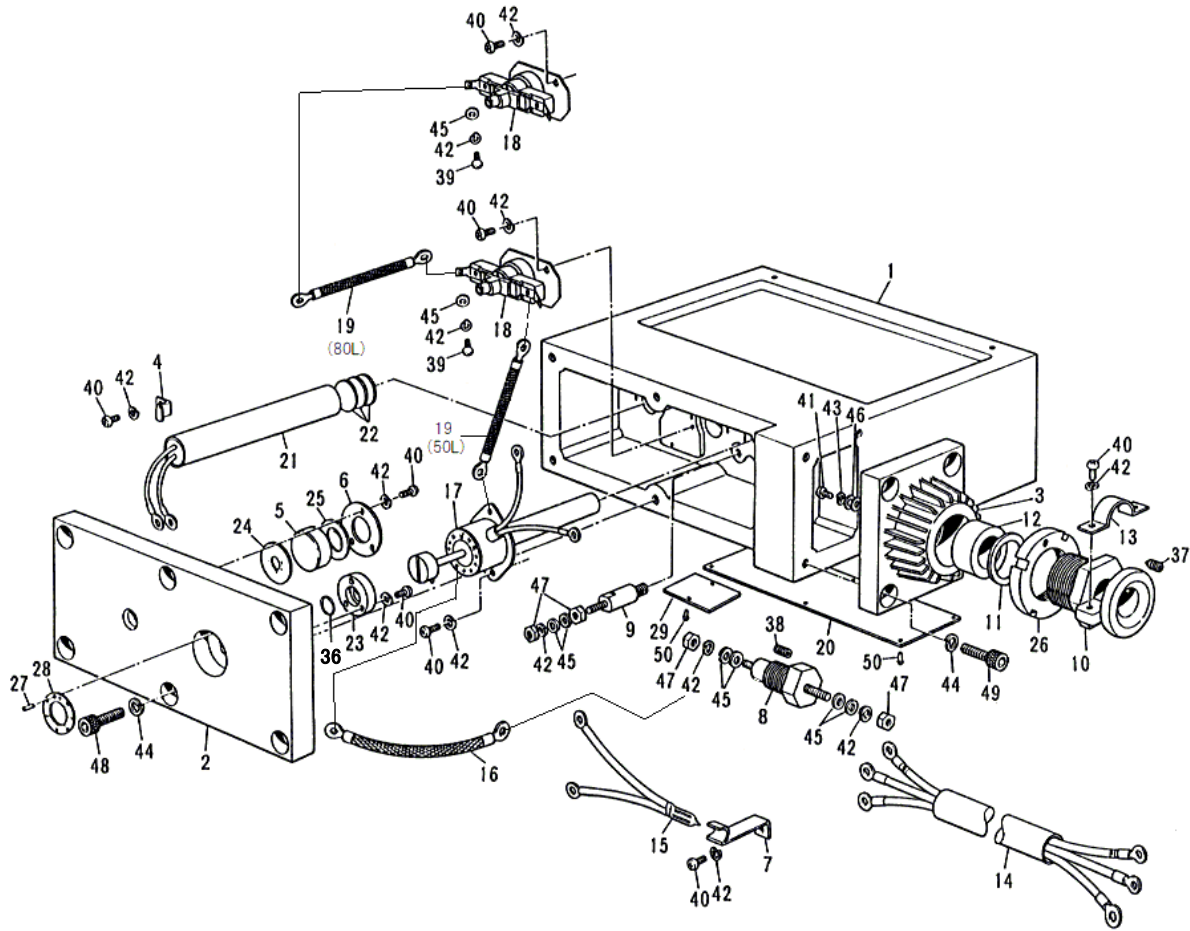
No.	Part No.	Part Name	Q'ty	Remark
3	01-10610	Hex bolt	2	
4	41-50600	Spring washer	2	
5	3201-012	Hose joint	1	
6	1011-032	Piping, pipe	2	
7	259-4312	Crunch joint	2	

(PH6S) Exclusive Parts

No.	Part No.	Part Name	Q'ty	Remark
1	41012-102	Manifold set	1	
-1	3903-012	Manifold	1	
-2	295-4303	L type nipple	1	
-3	41010-105	High pressure nipple	1	
-4	315-0001	Thermostat	1	
2	40423-010	Filter mounting bracket	1	

No.	Part No.	Part Name	Q'ty	Remark
3	01-10610	Hex bolt	2	
4	41-50600	Spring washer	2	
5	299-4303	Hose joint	1	
6	1011-032	Piping, pipe	2	
7	259-4312	Crunch joint	2	

● Perfect Heater Body



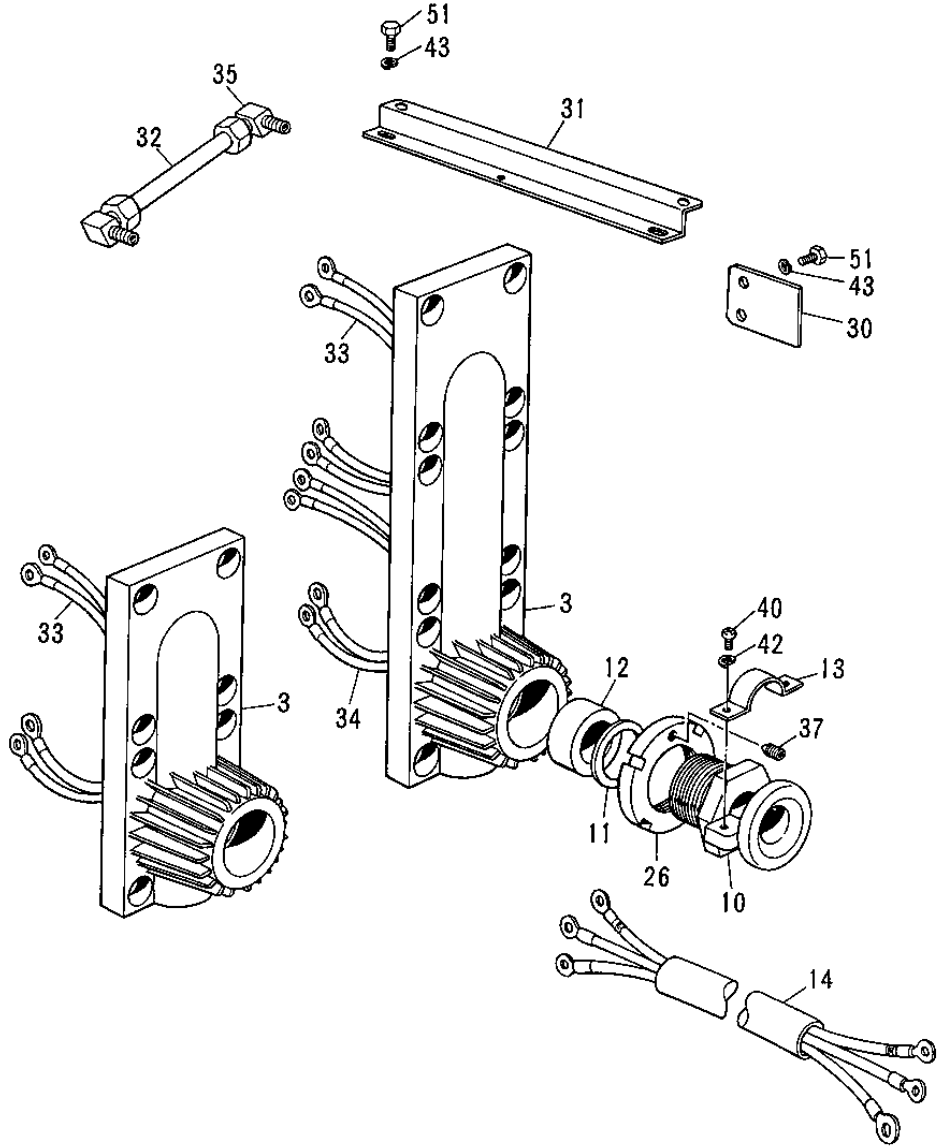
No.	Part No.	Part Name	Q'ty	Remark
1	1010-001	Heater body	1	
2	1010-002	Front cover	1	
3	1010-003	Side cover	1	
4	1010-004	Stopper	3	
5	1010-005	Glass	1	
6	1010-006	Glass holder	1	
7	1010-007	Lamp stay	1	
8	1010-008	Lead terminal	2	
9	1010-009	Terminal	2	
10	1010-010	Bell mouth	1	
11	1010-011	Support ring	1	
12	1010-012	Ring packing	1	
13	1010-013	Cable clamp	1	
14	1010-014	Cable	1	
※15	1010-015	Neon lamp	1	
16	1010-016	Heat proofed wire 100L	1	
※17	1010-017	Thermostat	1	
18	1010-018	Thermal breaker	2	
19	1010-019-1	Heat proofed wire 80L	1	
	1010-019-2	Heat proofed wire 50L	1	
20	1010-020	Name plate	1	
※21	1010-021-1	Cartridge heater 160L	2	both ends
	1010-021-2	Cartridge heater 70L	1	center

No.	Part No.	Part Name	Q'ty	Remark
22	1010-022	Heat-shield plate	9	
23	1010-023	Airtight plate	1	
24	1010-024	Packing (A)	1	
25	1010-025	Packing (B)	1	
26	1010-026	Bearing nut	1	
27	1010-027	Pin	2	
28	1010-028	Scale	1	
29	1010-029	Inspection mark	1	
※36	101-7006	O-ring	1	
37	86-50406	Screw	1	
38	83-50410	Screw	2	
39	73-20406	Screw (minus)	4	
40	68-10410	Screw (plus)	18	
41	68-10610	Screw (plus)	1	
42	41-50400	Spring washer	28	
43	41-50600	Spring washer	1	
44	41-50800	Spring washer	10	
45	37-10400	Plain washer	16	
46	37-10600	Plain washer	2	
47	15-20400	Nut	8	
48	03-50825	Bolt	6	
49	03-50820	Bolt	4	
50	91-40103	Rivet	6	

It is recommended to have spare parts marked with ※ always available.

PH4
Dedicated Parts

PH6
Dedicated Parts



(PH4) Exclusive Parts

No.	Part No.	Part Name	Q'ty	Remark
3	1011-003	Side cover	1	
30	1011-030	Connecting plate	2	
31	1011-031	Stay	2	

No.	Part No.	Part Name	Q'ty	Remark
33	1011-033	Heat proofed wire	2	
43	41-50600	Spring washer	9	
51	01-10610	Bolt	8	

(PH6) Exclusive Parts

No.	Part No.	Part Name	Q'ty	Remark
3	1012-003	Side cover	1	
10	1012-010	Bell mouth	1	
11	1012-011	Support ring	1	
12	1012-012	Ring packing	1	
13	1010-013	Cable clamp	1	
14	1012-014	Cable	1	

No.	Part No.	Part Name	Q'ty	Remark
30	1011-030	Connecting plate	4	
31	1011-031	Stay	2	
33	1011-033	Heat proof wire	2	
34	1012-034	Heat proof wire	2	
43	41-50600	Spring washer	13	
51	01-10610	Bolt	12	

4

Operating Procedures

⚠ WARNING

There is a possibility of fire or explosion

- Check that the devices, equipment and floor in the coating workshop and the parts of hangers that are in contact with the product to be coated are free from deposited paint.
- Do not bring any articles other than specified into the coating workshop. Articles brought into the workshop must be grounded.
- Do not smoke in the area where a spraying operation is performed.
- A fire extinguisher with a sufficient capacity must be provided at the area where a spraying operation is performed.
- The paint thinner brought into the coating workshop must be the minimum and stored in a metallic container closed with a lid.

The burn might be done.

- When a perfect heater is driven, the entire main body becomes a high temperature. It must not touch by bare-handed, and the skin must not come in contact.

⚠ CAUTION

If a trouble, inconvenience or other sign of failure is found, check within the specified scope of maintenance according to the subsequent section “Troubleshooting” (on page 18 and subsequent).

If the problem persists, stop checking and immediately contact us for proper and complete repair.

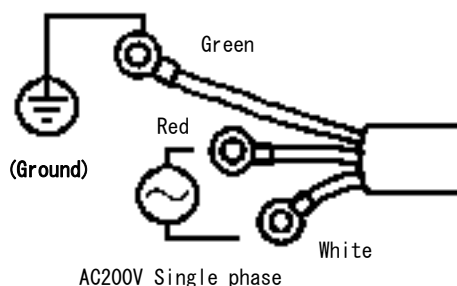
① General precautions for installation and operation

- (1) After the installation site has been selected, the heater unit must be securely grounded or earthed. The power cord has three conductors. Note that the grounding conductor or earth wire has a green covering. Adequate grounding should be provided. A grounding earth connection is not obtained by simply allowing the wire to be hung down on a concrete floor or by connecting its end to the painted or coated surface of a metal post.

⚠ WARNING

There is a possibility of fire or explosion

- Please ground (earth) the painting machine and the object surely. They may discharge static electricity or generate sparks to cause fire or explosion.



- (2) Determine the desired value of the paint temperature to be used. The temperature thermostat (sensing unit) has an adjustment knob with a graduated dial. The standard dial permits settings 80°C.

CAUTION

The standard Perfect Heater is wired to operate on a commercial single-phase AC200V supply. Do not connect to three phase supply.

NOTE

Presetting this thermostatic control should be carried out only when the heater is at a room temperature (referred to as “normal temperature” hereinafter).

- (3) Whenever the top cover (2) of the heater unit is opened up, care should be taken to keep in flammable, dust or other foreign substances from getting into the unit.
(The numbers referred to in this chapter are taken from “Chapter 3. Exploded Diagram and Names of Parts” on Page 8)
- (4) Before the pump is stopped for a temporary interruption of spraying or after a day-work, and when the system is not flushed (with the paint left as filling its passages), allow the paint to re-circulate through the system until the paint falls off in temperatures to a normal temperature level.

CAUTION

Please empty all paints in the paints route after lowering the temperature of paints to the room temperature to prevent it with scorching of paints in the paints route of a perfect heater.

② Three essential factors for successful hot airless spraying operation

In finishing any particular object using the hot airless spray equipment, a combination of the following three important factors should be worked out carefully.

(1) Paint pressure

Generally the proper amount of paint pressure ranges from 5~10Mpa. Once a good atomization of paint has been verified, it is advisable to use as low paint pressure as possible. It should be noted that any variations in paint pressures up to 0.5Mpa will seldom affect the finish that can be obtained.
(Please use it for the air electrostatic and air-spray by each proper pressure.)

(2) Paint temperature

The hot spraying conditions for typical types of medium are presented in table form below for informational purposes. (for airless spray type)

Paint type	Dilution ratio (by weight)		Viscosity of diluted paint Sec/FC#4(20°C)	Heating temperature(°C)	Spraying conditions	
	Undiluted liquid	Solvent			Liquid pressure (MPa)	Nozzle size
Lacquer	100	35~40	35 ~ 40	50 ~ 60	5 ~ 6	06~07C
High-solid lacquer	100	35~40	35 ~ 40	50 ~ 60	5 ~ 6	06~07C
Melamine resin paint	100	15~20	40 ~ 45	60 ~ 70	5 ~ 6	06~07C
Phthalic acid resin enamel	100	10~15	40 ~ 45	60 ~ 70	5 ~ 6	06~07C
Vinyl chloride enamel	100	35~40	35 ~ 40	60 ~ 70	5 ~ 6	07~09C
Oil surface	100	10~15	50 ~ 55	70 ~ 80	6 ~ 7	06~07C
Melamine based primer surface	100	15~20	50 ~ 55	60 ~ 70	5 ~ 6	07~09C
Acrylic resin enamel	100	30~40	60 ~ 70	60 ~ 70	6 ~ 7	06~07C

(The dilution ratio decreases respectively for the air electrostatic and air-spray.)

(3) Solvent composition and consistency

Another important factor is the composition and volume of the solvent to be used. The novice at the hot spraying technique will use relatively “thick” paints. Remember, the paint film thickness can be regulated by the volume of the solvent.

NOTE

The dilution solvent must use the high boiling point compared with normal temperature (cold) painting.

(Please inquire of the paints maker or our company about details.)

5

Operation

① Operation (The following information is given, provided that the heater unit is used with the hot airless spray system)

The first step is to make a trial using a solvent, thinner or cleaning liquid only to verify that all necessary operations are properly performed. This preparatory operation will not only help you find any leaking point in the paint circulating system but also remove all contaminants from the paint passages within the system.

(1) Place a suction hose (suction filter) into a container full of a prepared paint or solvent.



WARNING

It becomes respiratory disturbances and an organic solvent poisoning.

● If it inhales or it touches the skin, the material contained in paints and the solvent becomes harmful.

Please follow the instruction matter of the material safety data that paints and the solvent maker show.

● Please work in the point where ventilation is good so that the poisonous substance should not accumulate.

(2) Gradually open the air regulator valve (turn its knob clockwise) set to low pressure 2~3MPa of the pump unit to supply it with compressed air, thus setting it into action.

(3) After the pump starts to run, put the drain hose into the paint container and open drain cock (usually located under the material filter). This should be accomplished to remove air from the entire working system. And then after it is confirmed that the bubble doesn't mix with paints, the drain cock is shut.

(4) The trigger safety lock of gun is released without putting up the nozzle to gun, a small amount of paints is ramp up to the empty can etc. As a result, the foreign substance and air in the paints route are exhausted.

(5) Adjust the working air pressure applied to the pump to obtain the desired level of paint pressure.

(6) Turn on the perfect heater. Open the circulation valve.

Please set it to extent where the number of pump strokes operates once every 5 - 10 seconds for airless pump.

The paint is now fed under pressure and circulated through the system including this heater unit. As it passes the unit, it will be heated to the preset value of the temperature in 5 to 10 minutes.

For spaying operation, be sure to keep the circulation valve open.

Note it should be left open when the operation is interrupted temporarily.

(7) Insure that the nozzle (tip) of the spray gun, which is the proper size and type, is selected and set in the gun to be used for the job.



WARNING

There is a possibility of injuring.

● Please set the safety lock of the trigger of gun when you detach the nozzle when you do not do the spraying.

(8) As soon as the desired paint temperature and pressure levels are both reached, start spraying.

②Cleaning Procedure

To change the paint from one color to another, proceed with the cleaning operation as follows:

CAUTION

Please do the washing work after lowering the temperature of paints to the room temperature to prevent it with scorching of paints in the paints route of a perfect heater.

- (1) Please lower the operation pressure of the pump, make to 0MPa, and put out the suction pipe (suction filter) from the paints can.
- (2) Place the drain hose into the paint container. Keep the circulation valve fully open by turning its knob in a counterclockwise direction. Open the drain cock. With this set up low pressure 2~3Mpa, the operation of the pump allows the paint to return into the container.
- (3) Put the suction hose and filter set and the drain hose into a solvent-filled container. The container will be filled with 2 to 3 liters of solvent or compatible cleaning liquid. Start the pump and allow the solvent to circulate freely through the system for a period of several minutes. Stop the pump and level the solvent within the system for a while as it is filled, and hence proceed to the flushing of the system. This will save the volume of the solvent required. Repeat filling, circulating and flushing the system several times until the interiors of system components – paint passages – are thoroughly cleaned out. Then proceed to the filling of a new colored paint.

WARNING

There is a possibility of injuring.

- When color change of paint or suspending operation be sure to lock the trigger. If you fail to do so, the gun may be accidentally triggered.

6

Maintenance and Periodical Inspection

[1] Maintenance

(1) Daily work

Check that no liquid is leaking from joint parts.

Check that the indication on the thermometer is proper for the set temperature.

*Due to heat loss, the indicated temperature may be slightly lower than the set temperature.

When using paint which settles easily, clean the inside of the channel with cleaning fluid and fill it with cleaning fluid after the work.

(2) Weekly work

Before holidays, even in the case of the paint which does not settle, clean and fill the channel with the cleaning fluid.

Wipe dirt on the area around the temperature control knobs and temperature display so that adjustment and checks can be performed.

[2] Consumables replacement frequencies

The durability of times of the Oil Sensbey (temperature controller, #17) is 50000. Store the Oil Sensbey as a spare part and replace it periodically according to the table below.

<Reference for durable periods>

ON/OFF cycle	Operating hours per day	Operating days per month	Approximate usable months
10 minutes/time	8 hours	25 days	Approximately 41.6 months
5 minutes/time	8 hours	25 days	Approximately 20.8 months

Example of usable months:

Durability		Times per hour		Operating hours per day		Operating days per month		Approximate usable months
50,000 times	÷	6 times	÷	8 hours	÷	25 days	≐	42 months
50,000 times	÷	12 times	÷	8 hours	÷	25 days	≐	21 months

Indication	Possible causes	Remedy
Paint temperature will not rise at all.	No current supplied to heater circuit.	Check a power supply line or reset the thermal protection switch.
	Defective thermostat (17).	Replace the thermostat.
	Broken wire of any cartridge heater (21).	Replace the cartridge heater element.
Too low heating temperature.	Improper setting of thermostat.	Re-adjust or replace the thermostat (17).
	Too low line voltage.	Check the voltage across the lines AC200V \pm 10%.
	Defective thermostat (17).	Replace the thermostat.
	Broken wire of any cartridge heater (21) .	Replace the cartridge heater element.
	Too high flow rate.	Throttle the flow of the paint circulating through the system, or increase the heater capacity.
Too high hating temperature.	Improper setting of thermostat.	Re-adjust or replace the thermostat (17) .
	Defective thermostat (17) .	Replace the thermostat.
The pilot light will no be turned off.	Defective thermostat (17) .	Replace the thermostat.
	Too high flow rate.	Increase the capacity of the heater.
The pilot light will no be lit.	No power supply.	Check a power supply line or reset the thermal protection switch.
	Defective thermostat (17) .	Replace the thermostat.
	Broken light element (15) .	Replace the pilot light.
	Defective thermal breaker (18) .	Reset button is strongly pushed or replace.

* The figure in parentheses is a number of "3. Exploded diagram and names of parts" (Page.8).

Resetting the thermal protection switch

- The thermal protection switch is a bimetallic safety device which opens the heater circuit in the event of an excessively high temperature being reached. In this event, the neon pilot light is turned off and will not be lit again. The most probable cause is a fault or malfunction of the temperature sensing unit (Thermostat). When the sensing unit is suspected of being defective, it should be replaced. The safety device should be reset to restore its original contact state.
- Resetting must be made when the heater cools off to a normal temperature. The bimetallic safety device cannot be reset at elevated temperatures. Since the device is comprised of two bimetallic disks connected in series, the heater circuit is opened either by either of the two or both of them. Therefore, both RESET buttons must be pressed to reset the bimetallic disks.
- Actuation of the RESET button causes the bimetallic disk to be reversed with a snap so that the contacts will be set into their normally open positions. If the bimetallic disk fails to be reversed on resetting, the device will not function properly during operation.

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 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 lightning.
 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.

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- When a transfer of title of this equipment takes place, please ensure 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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