



AIR ELECTROSTATIC HAND GUN

【 TC-92 】

INSTRUCTION MANUAL

PREFACE

Thank you for choosing the HI MA TC-92 air electrostatic hand gun. As you know, the electrostatic spraying system serves efficient coat with a high-tension electrostatic application. In general, the high-tension voltage is considered as a very dangerous field, however, you will find out that this spraying system is completely safe in the structure and operation according to this manual. However, if you fail in operation, breakdown or dangerous situation will be produced. Therefore, importance items have been repeatedly described. Carefully read this manual if necessary during operation as well as before operation.

Note:1) Please read this manual from the beginning to end before operating the air electrostatic hand gun (TC-92). It is noted that if the gun is operated by other manners than the description in this manual, the gun is out of the guarantee.

2) Model TC-92, HV-2000A and TCN-20 are manufactured according to The European Safety Standards E.N.50 050 for Electrostatic Handheld Spray Equipment.

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Person who understands the electrostatic spraying system as well as the beginner should read "5. Safety Control" and strictly keeps the practical rules described in this paragraph.

The paragraph "4. Installation", "6. Check Before Operation" and "7. Operation" can be practical for well trained operators. Read other paragraphs if necessary.

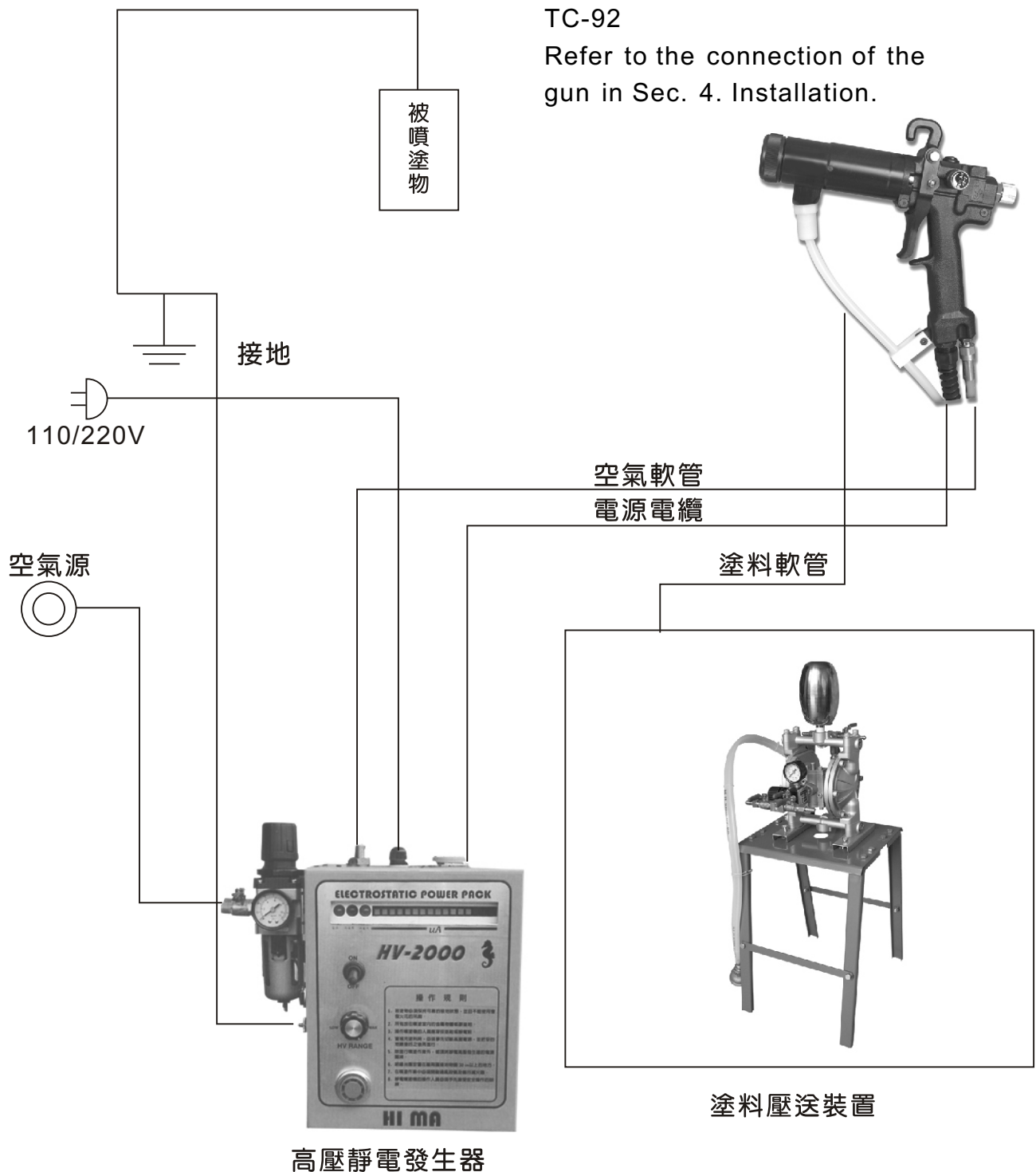
1.OUTLINE

This air electrostatic hand gun system (TC-92) includes the High-voltage generator (HV-2000A), paint pressurized-feeding unit (including the pressure pump, pressure tank, etc.)and electrostatic nozzle.

1-1 An Air Electrostatic Hand Gun Spraying System

AIR ELECTROSTATIC HAND GUN TC-92

Refer to the connection of the gun in Sec. 4. Installation.



2.SPECIFICATIONS

2-1. Air electrostatic hand gun

- (1) Model : TC-92
- (2) Withstand voltage: 80kv DC
- (3) Standard used voltage: 60kv DC
- (4) Overall length
 - Body of gun: 232mm
 - Flat nozzle(TCH-60) mount: 246mm
 - Round nozzle(TCP-35): 264mm
- (5) Weight of gun(excluding cable, hose and nozzle): 480g
- (6) High-tension cable: 5M or 10M
- (7) Paint pressure: 0 to 3kgf/cm² in ordinal max. 8kgf/cm²
- (8) Air pressure: 0.5 to 4kgf/cm² in ordinal max. 8kgf/cm²

2-2. High-voltage Generator (Refer to the manual for power pack HV-2000A)

- (1) Model: HV-2000A
- (2) Input voltage: 110~240 AC available, 50/60Hz
- (3) Output voltage: 60kv DC
- (4) Output current: 40 μ A
- (5) Shortcircuit current : 100 μ A or less
(Shortcircuited electrode at the nozzle of gun)
- (6) Overcurrent protection : Overcurrent cut-off system
- (7) Dimension Overall length: 305mm
Overall height: 320mm
Overall depth: 150mm
- (8) Net weight: 8.0kg

2-3. Air Hose

- (1) Model: AH22
- (2) Material: Grounding wire built-in urethane
- (3) Diameter Inner diameter: 6mm Outer diameter: 10mm
- (4) Length: 5M or 10M

2-4. Paint hose for HB110, HB110ES

- (1) Model:DH25
- (2) Material:Double hoses(Inner with Teflon lined)
- (3) Diameter Inner diameter :5mm Outer diameter :10mm
- (4) Length:5M or 10M

Note :Use the paint hose(DH26M)when the heater is used for paint.

2-6.DC high-tension cable

- (1)Withstandvoltage:90kv DC
- (2)Overalllength:5Mor 10M(7MforEStype)
- (3)Diameter:10mm

2-7.Paint pressurized feeding unit & pressure regulator

Refer to each of the operation manual.

Set a pressure of 3kgf/cm² or less for the paint.

Please consult to Asahi Sunac for the selection of the pressure pump if you need.

3.FEATURES

1) High controllability

The left side PATTERN ADJUSTING KNOB can more easy adjust the pattern. The World-most light weight gun with a light-touch trigger is suitable for long service operation without weariness.

2) High coating efficiency

With new round nozzle and flat nozzle as well as the conventional electrostatic nozzle, outstanding turn-back characteristic leads highly efficient coat, resulting large reduction of waste paint.

3) Easy maintenance

Spare module components are easy replaceable, without troublesome adjustment at replacement and tightening screws.

4) Long service life

The needle in the coating seat is made of a fine ceramics and durable packing is made of a special filler compounded tetraethylene fluoride resin. In addition, □KALREZ□ is used in an O-ring, replaceable in short time.

5) High quality coating

The round nozzle of the air atomizing rotary jet system is suitable for cavity contained complicatedly contoured objects with the highest coating efficiency. In addition, the flat nozzle of a wide scope multi-step injection system provides excellent film for the metallic finish as well as the flat plate with few cavity.

6) Wide variety of coating selection

Model HB 110 and HB110ES guns are applicable in the metallic coating, water base coating and other conductive coatings as well as solid coating.

7) High safety system

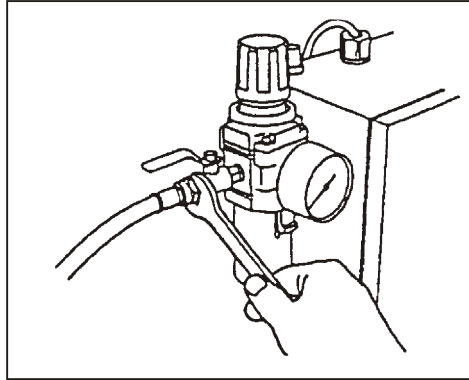
An electronic high speed switching system is provided on the high voltage generator (EH80B, EH80ES) for shutting off the high tension voltage, discharging Residual electric charge and alarming with buzzer, which is highly reliable safety system for the operator.

4.INSTALLATION

The general diagram for this air electrostatic hand gun spraying system is shown in Fig. 1.

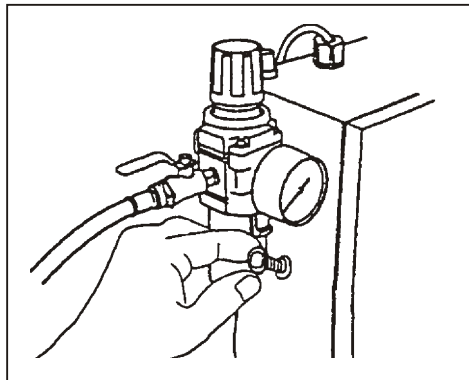
4-1.Connecting the air supply

Connect the air supply to the pneumatic regulator mounted on the power pack.
(joint dia. PF 1/4)



Note :For the detail of the power pack installation, refer t o the manual for
" DC high-voltage generator (HV-2000A)"

In addition,ground the power pack in a g rounding resistance of 10 ohms
or less with 3.5mm² or more dia. Wire.

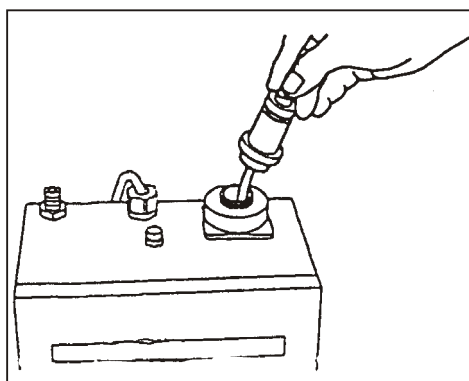


4-1.Connecting the high-tension cable

First clean the high-tension cable from the metal consent to another end with
a piece of cloth.

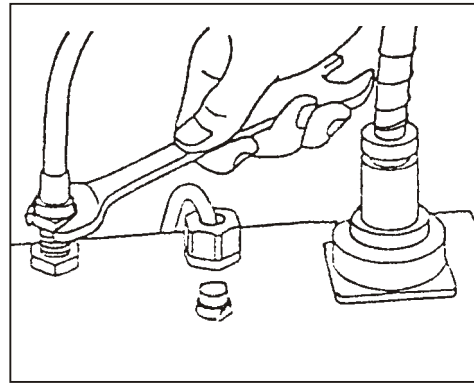
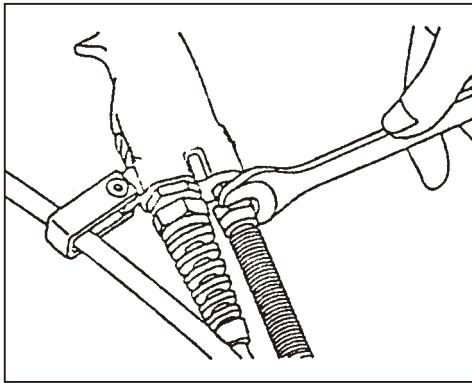
Then, mount the adapter onto □OUTPUT□ of the power pack before inserting the
high-tension cable into the adapter and securely tighten the cap. (joint dia.

PF 1/4)



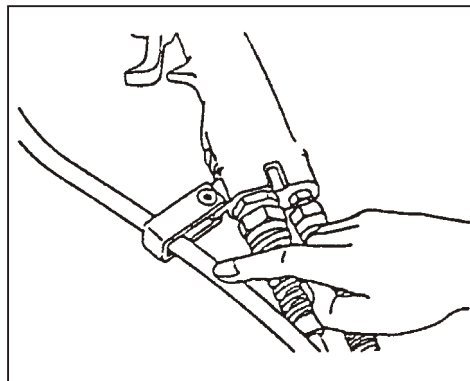
4-3. Connecting the air hose

TC-92: Connect one end of the black air hose to the nipple adjacent to the high-tension cable.



4-1. Connecting the paint hose

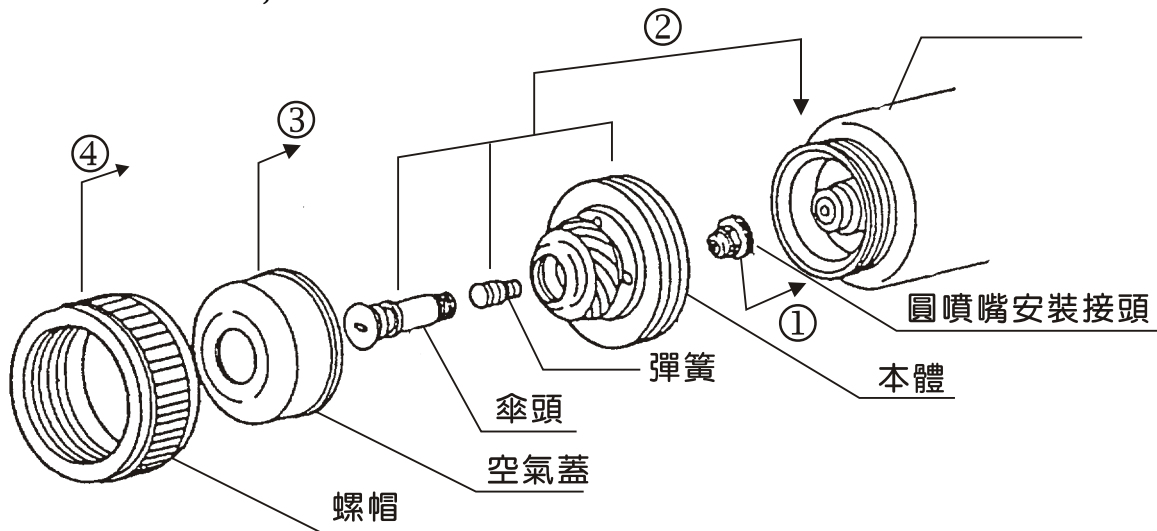
TC-92 : Tightly connect the milky hose jointed to the extension at the barrel to the paint pressurized supplier.



4-5. Assembling the paint nozzle

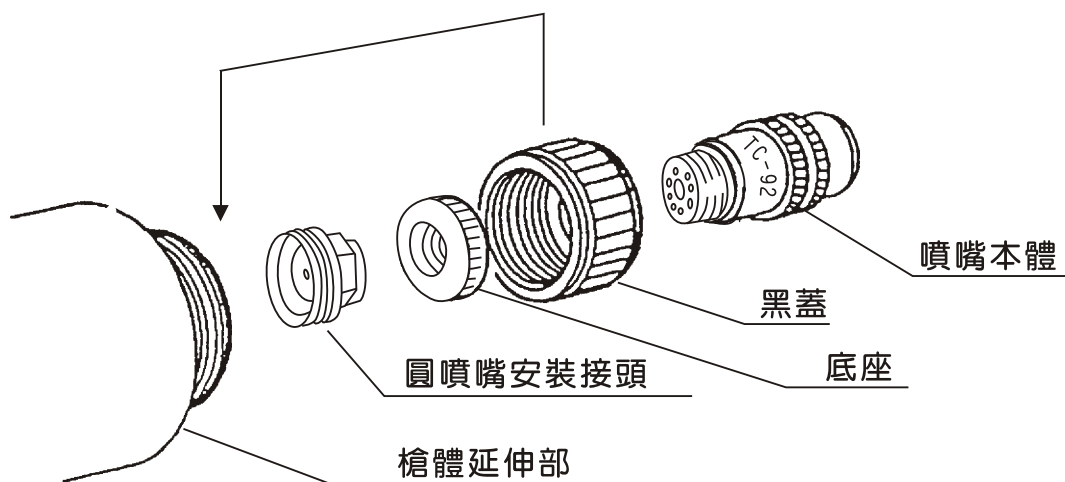
4-5-1. Round nozzle (TCP-35)

- 1) Tightly screw the jet into the extension head with the attached wrench for the nozzle.
- 2) Cover the jet with the air guide.
- 3) Fix the air guide by engaging the retaining nut inner thread with the outer thread of the jet.



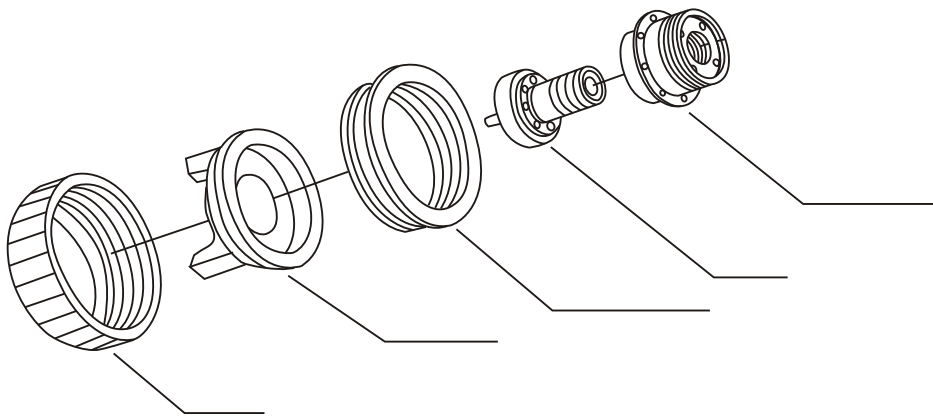
4-5-2. Round nozzle (TCN-20)

- 1) Unscrew the adapter to remove it from the nozzle.
- 2) Screw the nut to the nozzle.
- 3) Tightly screw the adapter to the nozzle.
- 4) Tightly screw the nut to the head of the extension.



4-5-2.Flat nozzle (TCH-60)

- 1) Remove the joint for the nozzle from the gun.
- 2) Tightly screw the paint nozzle into the nozzle joint by hand.
- 3) Couple the charging electrode into the paint nozzle and tightly screw the nozzle joint to the extension with the attached wrench (hex. 10) for the nozzle.
- 4) Fix the air cap by screwing the nut.
(For assembling of TCN-20, mount the nut and air cap as a pair.)



5. SAFETY CONTROL

In order to maintain the safety of operators and long service life of the coating system, be careful on the following item not only during operation but before and after operation.

1) Securely ground the power pack.

Securely grounding of the power pack is the first of the safety work.

The ground of all the component in the system is centered to the ground of the power pack.

2) Always maintain the object in the ground potential.

The object is ordinarily grounded through the conveyor, however, if a paint adheres to a contact portion with the hanger to fail in the conductivity, the charge in the object may spark to cause fire. To prevent the above phenomenon, periodically remove the adhered paint in the processing schedule.

3) Ground all the metallic matter in the booth

The air surrounding the gun is ionized by the high-tension voltage to charge various metallic matter not to be grounded in the booth. Then, a discharging spark may cause between such metallic matters and grounded material.

Accordingly, securely ground the metallic stand and safety fence with a proper grounding wire. In addition, do not put unnecessary paint cans, tools and other metallic matter in the spraying booth.

Ground the solvent vessel if it is put at a place adjacent to opening of the booth.

4) Operate the hand gun with bare hand.

The grip of the hand gun is grounded through the power pack.

If the gun is operated by gloved hand, the operator is subject to an electric shock with charged electricity when the operator touches to a grounded matter.

A big opening of the glove at the palm is recommended when a glove is used.

5) Put on leather-soled shoes or anti-static shoes.

As the operator put on a rubber-soled or synthetic resin shoes will be charged with an electricity from surrounding ionized air, the operator may be shocked when the operator touches to the rack or other metal components. Put on electrostatic shoes so as not to be charged when anti-static coating. Be careful that a piece of paint block does not adhere on the anti-static shoes.

6) For cleaning the nozzle, switch off the power supply of the power pack and ground the tip of the nozzle. If a high-tension voltage is generated during the cleaning of the nozzle, fire may be caused. Surely switch the power off when the operation is temporarily stopped or finished.

7) Do not use the metallic brush for cleaning the nozzle.

The nozzle is the most essential component for the spraying.

If the nozzle is scratched by the metallic brush, uniform spray pattern cannot be provided. Use the attached bamboo brush for cleaning the nozzle.

- 8) Do not dip the gun, High-tension cable or hoses in the solvent solution. The electrostatic spraying consists of an electric system.

Dipping of these components in the solvent may cause failure.

- 9) Suspend the high-tension cable and hoses from the beam or side wall without running on the floor. (For the conductive paint, suspend the paint hose with a rubber tube or other insulators.)

The high-tension cable and hoses may be broken if these are run on the floor.

- 10) Periodically clean the inside of the booth and exhaust fan and duct to always keep clear condition.

If a fire is happened to be caused under pieces of the paint block left in the booth and exhaust system, such paint block burns to expand the damage.

- 11) Sufficiently drain the pneumatic regulator and air compressor.

The water within the compressed air will lead a failure in spraying or operation of the alarm circuit to sound the buzzer.

Be careful on the water.

- 12) Keep the clearance of 150mm or more between the nozzle tip and objects.

The potential on the nozzle is automatically decreased in general when the nozzle approaches to the ground. However, the insulation of the paint pump (for metallic paint, wood paint, water-base paint and other low electric-resistance fluids) may lead big spark because of the potential of the pump is not dropped. Spray the object with sufficient clearance in the consideration of rolling or falling of the object.

- 13) Install the spraying equipment such a pump, material container 500mm or more spaced from other surrounding matters with the use of the insulation stand. For contacting the nozzle, switch the power pack off and ground the nozzle. As the low electric-resistance paint leads electricity as electric wire, the paint container is energized and provides an electric shock if touched. Then, install a grounded safety fence along aisle to prevent inadvertent touch of workers.

- 14) Install fire extinguishers for emergency.

CHECK BEFORE OPERATION

6-1. Checking the generation of the high-tension power

1) Open the air valve and set the air regulator in 3 to 4kgf/cm².

Then, supply the compressed air to the gun.

Check the joint of the hose for leakage.

2) Switch the power supply of the power pack ON while holding the grip of the gun.

The green light is turned on.

The high-tension voltage has not been applied on the nozzle.

3) Pull the trigger. Air is injected from the nozzle, which operates the air flow switch built in the power pack to switch the generation of the high-tension power with the light of the high-tension indicator (red). The high-tension voltage is applied on the tip of the gun during the indication of red light.

Note : Switch the power supply of the power pack off after the completion of the check.

6-1. Adjusting the paint

As almost synthetic resin paint excluding a part of paint is electrostatically applicable, no adjustment of the paint is necessary. However, an adjustment of the solvent can get more an electrostatic effect. In addition, an extreme low electric-resistance paint is not so effective. Check the resistance with the paint resistance meter. The paint should be adjusted to a resistance in the range of 15M to 70M ohms to get a good electrostatic spraying.

Note : How to determine the electrostatic effect in good or not; Spray a grounded 20 to 30mm dia. Steel tube from one direction. When the coating film is formed to the opposite side, the electrostatic effect is almost determined in good.

Note : It is noted that the electrostatic effect is not expected in the metallic paint, water-base paint and other extreme low electric-resistance fluids. In addition, such paint may operate the high-tension cut-off circuit and alarm buzzer in the power pack. Switch the power supply of the power pack off to clear the alarm buzzer

OPERATION

7-1. Preparatory step

1) Fill the paint supplying unit with paint.

The viscosity for this spraying system is generally 9 to 30sec/FC #4, not limited by type of paint or solvent, contour of objects, coating thickness. The paint resistance should be measured before filling the paint supplier.

2) Operate the paint supplying unit to feed the paint to the gun.

Operate the pump under a low pressure (1kgf/cm²) regulated by the air regulator. Adjust the paint regulator at outlet of the pump to regulate the paint pressure to 2 to 3kgf/cm².

Note : Check that the power supply of the power pack is off again.

3) Injecting the paint from the gun.

Pull the trigger to inject the paint from the gun without atomization under air pressure of 0kgf/cm². Inject the paint until residual air in the hose is completely ejected so as no residual air in the hose leads a continuity of injection of paint. When the adjuster in the tail of the gun is turned counterclockwise, the paint injection is increased. While, when the adjuster is turned clockwise, the paint injection is decreased. In the coffee break, turn the adjuster clockwise to stop the paint injection or decrease the paint pressure at the paint supplying unit.

4) Increase the air pressure to check the atomizing condition.

regulate the atomizing air pressure to 2 to 3kgf/cm² and pull the trigger to atomize the paint. Regulate the air pressure according to the pattern of the nozzle.

<Flat nozzle>

The ATOMIZING ADJUSTING KNOB is turned counterclockwise to open the valve in usual use of the gun. Adjust the opening of the valve depending on the pattern size or paint atomization. For adjusting the pattern width, turn counterclockwise the PATTERN ADJUSTING KNOB to expand the pattern and while, turn clockwise it to narrow the pattern.

<Round nozzle>

Do not use the ATOMIZING ADJUSTING KNOB Use only the PATTERN ADJUSTING KNOB Ordinarily turn counterclockwise PATTERN ADJUSTING KNOB to fully open the valve. Turn PATTERN ADJUSTING KNOB depending on the pattern size and paint atomization.

7-2. Dstart of the operation

Note: Check the grounding of the power pack for grounding connection of the wire before switching the power supply.

Note: Do not put on a glove on the gun grip hand and rubber-soled shoes. The grip of the spray gun is maintained in the ground potential as far as the power pack is grounded. No electric shock will be received when the gun is gripped by a bare hand.

Note: Do not close the nozzle to the object. When the nozzle gradually approaches to a grounded matter, the voltage at the nozzle is automatically decreased, however, spark may be produced when the approaching speed is too fast.

- 1) Switch the power supply of the power pack ON. Pull the trigger to apply the high-tension voltage on the tip of the gun with the indication of the red light.
- 2) Start the spraying operation.
- 3) Switch the power supply of the power pack OFF when the spraying operation is Temporarily stopped or finished.

Note: Do not leave the gun on the work bench under the power supply of the power pack still being ON.

Note: For the use of a low resistance(2M ohm-cm or less) paint, install the paint pump on an insulation stand and use the HB110 or HB110es gun. In this case, as the high-tension voltage is charged on the paint pump, do not touch the paint pump. Surely switch the power supply of the power pack off and ground the pump or reservoir with a grounding rod before and operator touches to the pump or paint is filled into the before reservoir.

7-3 .Operation after spraying

Operation restart within 24 hours

- 1) Switch the power supply of the power pack off. Operate the power switch with another hand while holding the gun by hand. Do not lay the gun on the floor or ground.
- 2) Regulate the air regulator for atomizing to 0kgf/cm²
- 3) Regulate the air regulator for the paint pump to 0kgf/cm²
- 4) Eject residual air together with paint from the gun.
- 5) Slowly ground the nozzle to discharge the residual electrostatic charge under The trigger returned.
- 6) Wipe the nozzle and gun barrel with a solvent soaked piece of cloth to remove paint mist and dust. Remove the air guide from the round nozzle and air cap from the flat nozzle before cleaning.

Note: Do not leave the gun body, high-tension cable, hoses and other components in a solvent solution after cleaning or operation. Electrostatic coating unit is an electric unit. Long time dip will deteriorate the packing of failin seal.

Note: In the case of two liquid type paint or other chemically curing type paint and deposition paint, clean the paint passage at every end of spraying operation according to the following cleaning procedure for the long term rest of the spraying system,

7-4 Preparation for long term rest of the spraying system

(for 24 hours or more rest)

- 1) Switch the power supply of the power pack off.
- 2) Regulate the air regulator for atomizing to 0 kgf/cm²
- 3) Suck a paint from the container and eject it from the tube.
- 4) Operate the paint pump under a pressure of 1 kgf/cm² to drain the residual paint from the pump.
- 5) Pull the trigger to eject the residual paint in hose and gun.
- 6) Suck the solvent from the suction tube and eject it from the return side to clean the inside of the pump repeatedly.
- 7) Eject the solvent from the nozzle to clean the inside of the gun and hose.
- 8) Stop the pump to discharge the residual compressed air from the nozzle.
- 9) Wipe the nozzle and gun barrel with a solvent soaked piece of cloth to remove paint mist and dust. Remove the nozzle and clean the nozzle seat.

Note: Allow 10 seconds or more after the power supply of the power pack is switched off. Then, start the work for cleaning the gun. 92% or more of fire accident in the electrostatic spraying system has happened during the cleaning of nozzles or other components. Surely switch the power off at the cleaning work. Prepare a proper extinguisher for an emergency.

8.MAINTENANCE

8-1. Guns

- 1)Always carefully clean the gun with a solvent soaked soft brush or cloth. Do not dip the gun in the solution.
- 2)Do not disassemble the gun without reason in order to keep electrical insulation of the gun body.
- 3)Always set the gun on the hanger except the operation. Turn the power supply of the power pack tho off even if the spraying operation is stopped in short time.

8-2. Nozzles

- 1)Carefully clean the nozzle at the end of every shift.
- 2)Do not poke clogged nozzle with a metal wire or rod. Dip the nozzle in the solvent solution before purging it by compressed air. Do not use any metallic brush for cleaning.
- 3)Clean the nozzle sometimes during the spraying work.
Paint mist adgered on the nozzle may affect on the atomization of the paint and electrostatic effect.

8-3 Paint hose & High-tension cable

- 1)Always keep the hose and high-tension cable clean without paint and dirt.
- 2)Pay attention on the running route of the hose and cable not to be damaged by depression with shoes. heavy matters, vehicles, etc.

9. TROUBLESHOOTING ON SPRAYING OPERATION

A plural of complex phenomenon may be superimposed on a failure in coating finish.

9-1. Poor paint atomizing

Causes	Improvements
1) Too low in atomizing air pressure 2) Too much injected paint. 3) Too high in viscosity of paint. 4) Bent the electrode pin of nozzle. 5) Damaged nozzle. 6) Not suitable solvent. 7) Not adequate clearance between airguide and jet. (For the round nozzle TCN-20)	1) Boost air pressure up. 2) Adjust injection to low or boost atomizing air pressure. 3) Adjust the viscosity of paint to low. 4) Repair it or replace it with a new one. 5) Repair it or replace it with a new one. 6) Consult to Asahi Sunac or paint manufacturer. 7) Adjust clearance to be approx. 2mm. (One ture:1mm)

9-2. Too much spattering

Causes	Improvements
1) Too long in spray distance. 2) Too high in atomizing air pressure 3) Too low in electric resistance of paint. 4) Grounding of object is improper. 5) Too slow in exhausting speed.	1) Set the spray distance to be 150 to 200mm. 2) Lower the air pressure 3) Adjust the resistance from 20M to 70M ohms-cm. 4) Check and improve the grounding condition. 5) Boost exhausting speed.

9-3. Poor paint transfer efficiency

Causes	Improvements
1) Improper grounding of object. 2) Too high in atomizing air pressure. 3) Too long in spray resistance. 4) Too low in high-tension voltage. 5) Too high in exhausting speed. 6) Too high in electric resistance of paint.	1) Clean hanger to low grounding resistance. 2) adjust air pressure to proper level. 3) Set spraying clearance to be 150 to 220mm. 4) Boost voltage by turning output voltage adj. Knob 5) Low exhausting speed. 6) Adjust the resistance from 20M to 70M ohms-cm.

9-4. Hair on nozzle or hair on surface of objects

Causes	Improvements
1) Too fast in vaporization of solvent. 2) Too high in viscosity of paint.	1) Change it to a slower vaporizing solvent or adjust it with additives. 2) Lower viscosity of paint.

9-5. Pimple on coated surface

Causes	Improvements
<ol style="list-style-type: none"> 1) Poor atomization. 2) Dust on coated surface. 3) Dirty atomizing air. 4) Poor scattering of pigment. 	<ol style="list-style-type: none"> 1) Refer to para. 9-1. 2) Install filter in suction for spray booth and remove dust. 3) Clean or replace filter in air passage. 4) Check solvent or sufficiently filter paint.

9-6. Pitted orange peel with smallpox

Causes	Improvements
<ol style="list-style-type: none"> 1) Too high in temperature in spray booth or too rapidly vaporizing solvent. 2) Too high in temperature of object. 3) Too rapid in air circulation. 	<ol style="list-style-type: none"> 1) Adjust temperature in the booth or change solvent to a slower vaporizing one. 2) Adjust temp. In oven to low temp. of object. 3) Adjust air velocity to 0.5 to 1.0M/sec. around object.

9-7. Crawling from coated surface

Causes	Improvements
<ol style="list-style-type: none"> 1) Insufficient cleaning of object. 2) Dirty atomizing air. 3) Improper exhaust of curing oven. 	<ol style="list-style-type: none"> 1) Sufficiently clean and decrease object. 2) Clean or replace filter in air passage. 3) Improve exhaust to be sufficient capacity.

9-8. Sagging paint on coated surface

Causes	Improvements
<ol style="list-style-type: none"> 1) Too thick in coated film. 2) Too low in viscosity of paint. 3) Too slow in vaporization of solvent. 	<ol style="list-style-type: none"> 1) Low paint injection capacity or boost drive speed of gun. 2) Increase viscosity of paint. 3) Change it to a faster vaporizing solvent.

9-9. Poor hiding object

Causes	Improvements
<ol style="list-style-type: none"> 1) Too little in paint injection capacity. 2) Too low in viscosity of paint. 	<ol style="list-style-type: none"> 1) Adjust injection capacity and gun drive speed, and study wrap coating. 2) Increase viscosity of paint.

9-10. Pin holes on coated surface

Causes	Improvements
<ol style="list-style-type: none"> 1) Dirty atomizing air. 2) Too fast in vaporization of solvent. 3) Too high in temperature of object. 4) Insufficient dry of under coat. 5) Too short in setting time. 	<ol style="list-style-type: none"> 1) Clean or replace filter in air passage. 2) Change it to a slower vaporizing solvent. 3) Decrease temperature of object. 4) Sufficiently dry the under coat. 5) Set sufficient time for setting.

9-11. Blushing on coated surface

Causes	Improvements
1) Too high in temperature and humidity in booth and outside of booth. 2) Improperly selected solvent.	1) Change solvent to a slow vaporizing solvent and check air conditioning system. 2) Consult HIMA, or paint or solvent manufacturer.

9-12. Bubbling from coated surface

Causes	Improvements
1) Dirty atomizing air. 2) Insufficiently drying. 3) Too thick in coated film. 4) Too fast in vaporizing of solvent. 5) Too high in temperature in curing oven.	1) Clean or replace filter in air passage. 2) Sufficiently dry coated surface. 3) Decrease injection volume. 4) Change solvent to a slow vaporizing solvent. 5) Adjust temperature in a proper level.

9-13. Poor pattern configuration

Causes	Improvements
1) Paint fragments or dust adhere at outlet of atomizing air on nozzle. 2) Too high viscosity in paint. 3) Nozzle broken. 4) Improper adjusted pattern. (For flat nozzle)	1) Well clean nozzle with solvent and bamboo brush and filter paint. 2) Decrease viscosity. 3) Repair or replace nozzle. 4) Adjust pattern by turning PATTERN ADJUSTING KNOB knob.

10. TROUBLESHOOTING ON SPRAY EQUIPMENT

A plural of complex phenomenon may be superimposed on a failure in coating finish. The column of Note shows the reference paragraph, for instance, "4-5" is 4-5.

Mounting nozzle.

10-1. Hunting during operation

Causes	Improvements	Note
1) Insufficient tight in screwing nozzle.	1) Tightly screw nozzle.	4-5
2) Seat of valve seat ring damaged.	2) Replace valve seat.	12-1
3) Air contents in paint.	3) Check paint feeding system.	7-1
4) Insufficiently tightening of joint for mounting round nozzle.	4) Tight the mounting joint with a wrench (Hex 12).	12-1
5) Too little in injecting paint.	5) Increase injecting volume or decrease atomizing air pressure.	

10-2. Paint injection decreasing

Causes	Improvements	Note
1) Fail in pressurized paint feeding system	1) Check pressurized paint feeding system including pump and paint regulator.	11-2
2) Paint seat clogged with paint fragments and dust.	2) Remove paint seat and clean it.	
3) Nozzle clogged with paint fragments and dust.	3) Remove nozzle and clean it.	4-5

10-3. Paint leaking from nozzle

Causes	Improvements	Note
1) Paint seat and needle clogged with paint fragments and dust.	1) Remove paint seat and clean it.	11-2
2) Paint seat or needle worn or cracked.	2) Remove paint seat or clean it.	
3) Spring fatigue or O-ring worn in needle assembly.	3) Remove needle assembly or O-ring	11-2
4) Too high in paint feeding pressure.	4) Decrease feeding pressure.	11-2
5) Fatigue of O-ring in paint seat.	5) Replace O-ring.	11-2

10-4. Paint leak from extension

Causes	Improvements	Note
1) Packing in needle deteriorated.	1) Remove 2 set screws from extension and replace packing assembly.	11-2

10-5. Paint leak between cover and grip

Causes	Improvements	Note
1) Damaged seat of paint tube.	1) Replace paint tube.	11-1
2) Damaged O-ring of paint joint.	2) Replace O-ring and paint tube.	11-1

10-6. Air leak from nozzle even though trigger returned

Causes	Improvements	Note
1) Seat of air valve clogged with dust.	1) Clean or replace air seat and tappet.	11-3
2) Worn air seat and tappet.	2) Replace air seat and tappet.	11-3
3) Fatigue of spring.	3) Replace spring.	11-3
4) Worn and damaged O-ring.	4) Replace O-ring.	11-3

10-7. Spark at nozzle (insulation stand not used)

Causes	Improvements	Note
1) Damaged high resistance at head of high-tension cable.	1) Replace high-tension cable(EC90).	11-1

10-8. Spark at nozzle (insulation stand used)

Causes	Improvements	Note
1) Damaged high resistance at head of high-tension cable.	1) Replace high-tension cable(EC90).	11-1
2) Low resistance paint or metallic paint used.	2) Turn OUTPUT ASJUSTING KNOB knob of power pack to decrease output voltage.	

10-9. Buzzer sounding in power pack (insulation stand not used)

Causes	Improvements	Note
1) Paint blocks adhering on extension.	1) Clean extension.	5-(8)
2) Paint blocks adhering on end of paint hose.	2) Clean hose.	5-(8)
3) Water leaves in air passage in extension.	3) Sufficiently drain water in air line. Switch power of power pack off and pull trigger by a single step to eject air together with water in air passage.	5-(11)
4) Low resistance paint or metallic paint used.	4) Use insulation stand.	7-2(3)
5) Damaged or worn packing in needle assembly leads paint leak.	5) Replace packing, needle assembly and O-ring.	

10-10. Buzzer sound in power (insulation stand not used)

Causes	Improvements	Note
1) Paint blocks adhering on extension.	1) Clean extension.	5-(8)
2) Paint blocks adhering on end of paint hose.	2) Clean hose.	5-(8)
3) Water leaves in air passage in extension.	3) Sufficiently drain water in air line.	5-(11)
	Switch power of power pack off and pull trigger by a single step to eject air together with water in air passage.	
4) Grounded material placed near insulation stand.	4) Separate insulation stand by 300mm or more from grounded material.	7-2(3)
5) Paint fragments adhere on insulation bar of insulation stand.	5) Clean insulation bar.	
6) Upper portion from insulation bar of insulation stand is grounded,	6) Discontinue grounding line of upper portion.	
7) Damaged or worn packing in needle assembly leads paint leak.	7) Replace packing, needle assembly and O-ring.	11-2

11. REPLACEMENT PROCEDURE & REPAIR

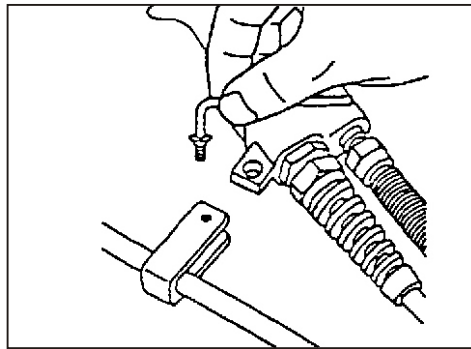
Component replacement and repair should be carried out according to the following procedure.

At the time, interrupt the supply of the compressed air to the gun, switch the powersupply of the power pack off and eject the residual paint in the paint feeding system.

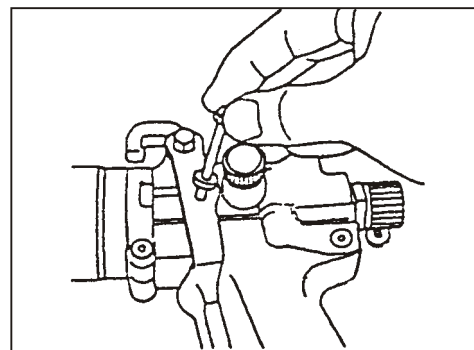
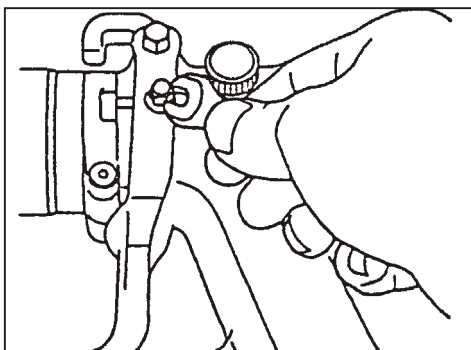
(The corresponding part number is indicated in the bracket after each of part names hereafter. The part number is listed in the part list in para. 12.)

11-1. Replacing the high-tension cable

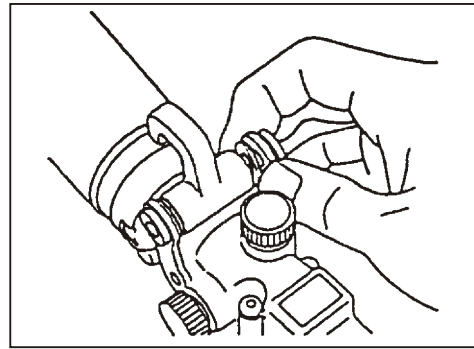
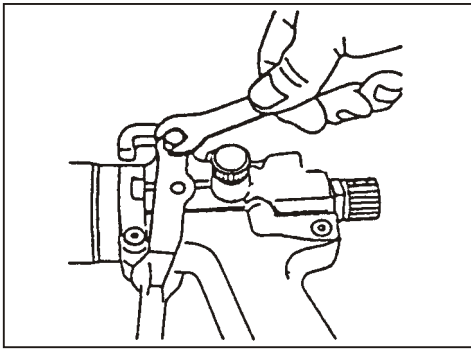
- 1) Unscrew and remove the hex. Socket head cap screw 15 for setting the paint hose in the grip and remove the paint hose from the grip end.



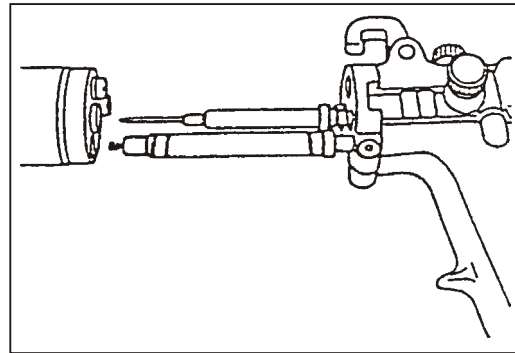
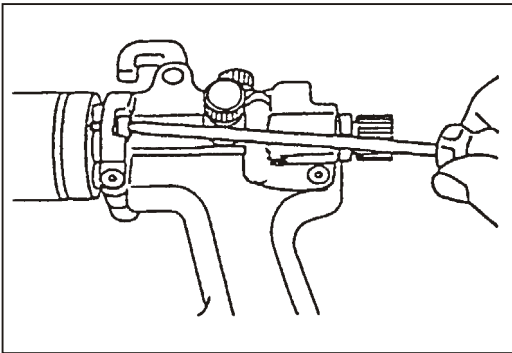
- 2) Remove the hex. Cap nut 37 in the center of the trigger and take rod 36 out. At the time, be careful not to lose the collar



- 3) Unscrew and remove the hex. Screw 34 to remove the pivot 33. Slightly expand the trigger laterally to pull the collar 32 out by Be careful not to lose the washer 31.

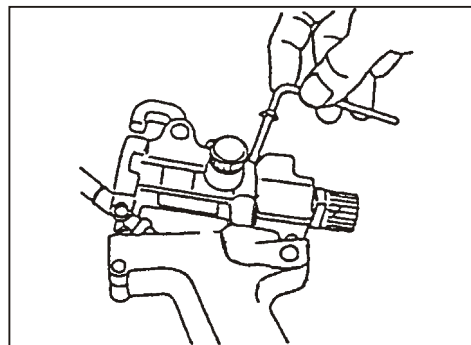
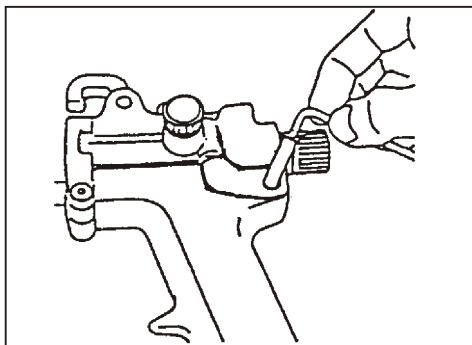


- 4) Remove the hex. Socket head cap screw 17 before strore straightly pull out the extension. Remove the needle assembly 21 if attached, Also, remove the 0-ring into tube.



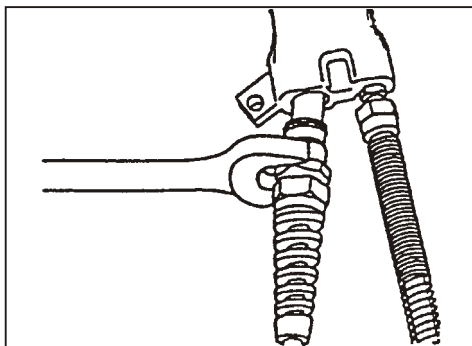
Note: Straightly pull the extension out. If tilts, the needle may be damaged.

- 5) Remove the hex. Flat head cap screw 14 for fixing the sleeve 15 with sleeve and remove the hex. Socket head button screw on the upper portion of the gun to separate the grip 13 from the gun body.



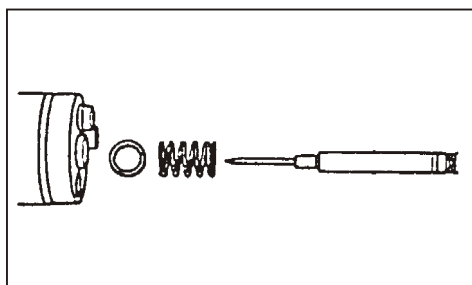
Note: On assembling, do not tightly screw the hex. Socket head button screw.

6) Remove the high-tension cable(EC-90) from the grip end.

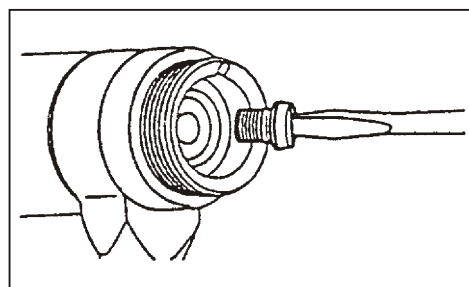
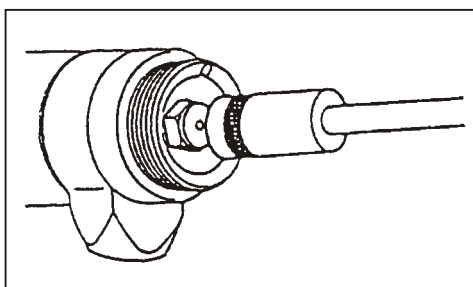


11-2. Replacing the needle assembly, packing pair and paint seat.

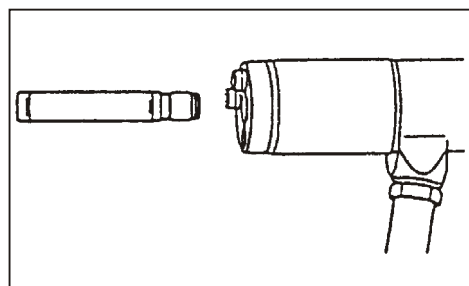
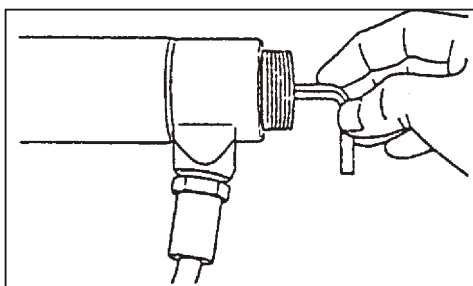
- 1) Carry out the operation of the item 1) to 4) in 11-1.
- 2) Pull the needle assembly 21 out from the extension.



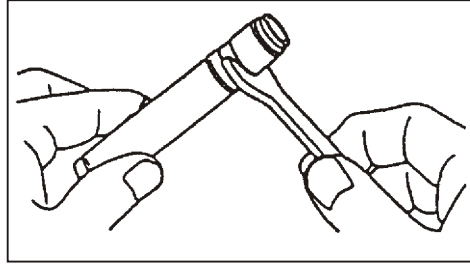
3) Remove the round nozzle set joint 22, paint seat 24 and valve seat ring 42.



4) Insert a 6mm L-wrench into the bore at the top of the extension to push out the guide 20 and packing pair 19.

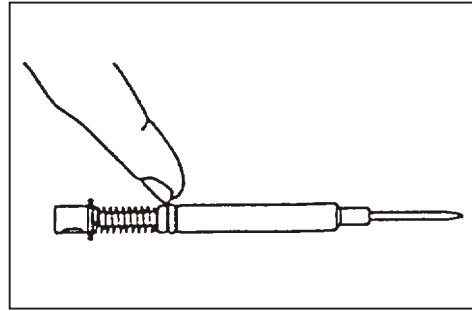
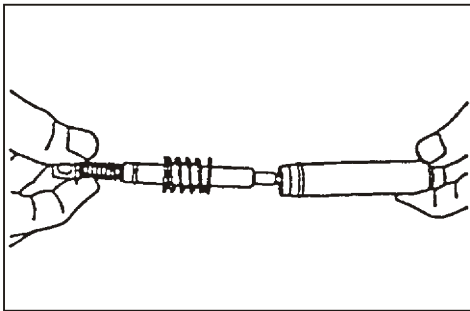


- 5) Separate the packing pair from the guide. Replace the packing pair with a new one and mount the O-ring 44.



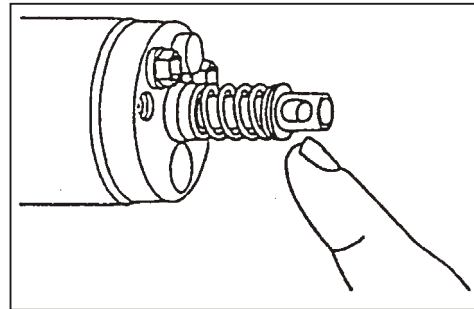
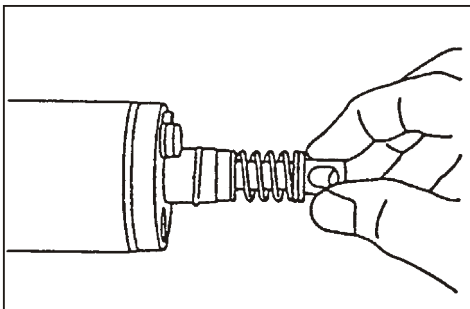
- 6) Mount the O-ring 46 to the new needle assembly.

Assemble the spring 20 with the retainer 21 and engage it with the guide, and then slowly insert the needle into the packing.



Note: Insert the needle into the packing in such manner of slowly pushing and returning the needle. If forcedly push the needle, the packing may be broken to cause the paint leakage.

- 7) Replace the O-ring 45 in the guide with a new one and set it into the center bore of the extension under the hole in the rod of the needle assembly in horizontal.

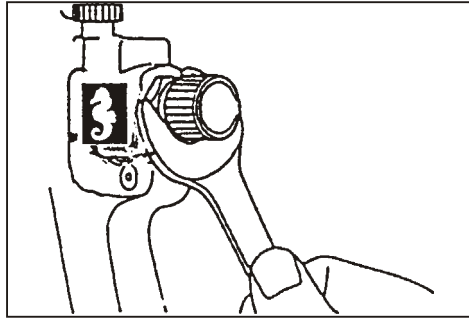


- 8) Assemble the gun in the reverse of the above item 4,) 3,) 2,) and 1,) in para.

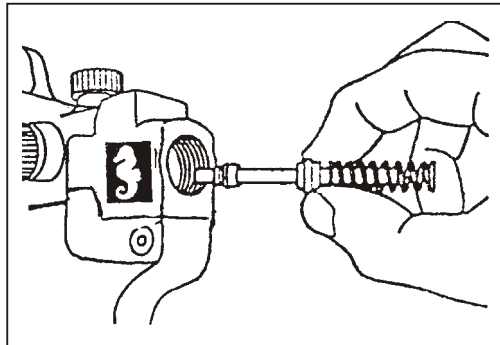
11-1

11-3. Replacing the air seat and tappet

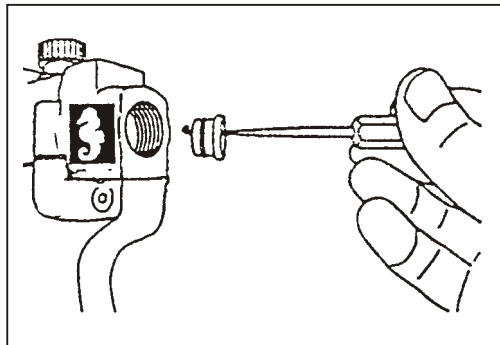
- 1) Loosen the adapter 5 mounted on the tail of the body and remove it.



- 2) Pull the spring 4 and tappet 3 out.



- 3) Remove the air seat with a screw driver.

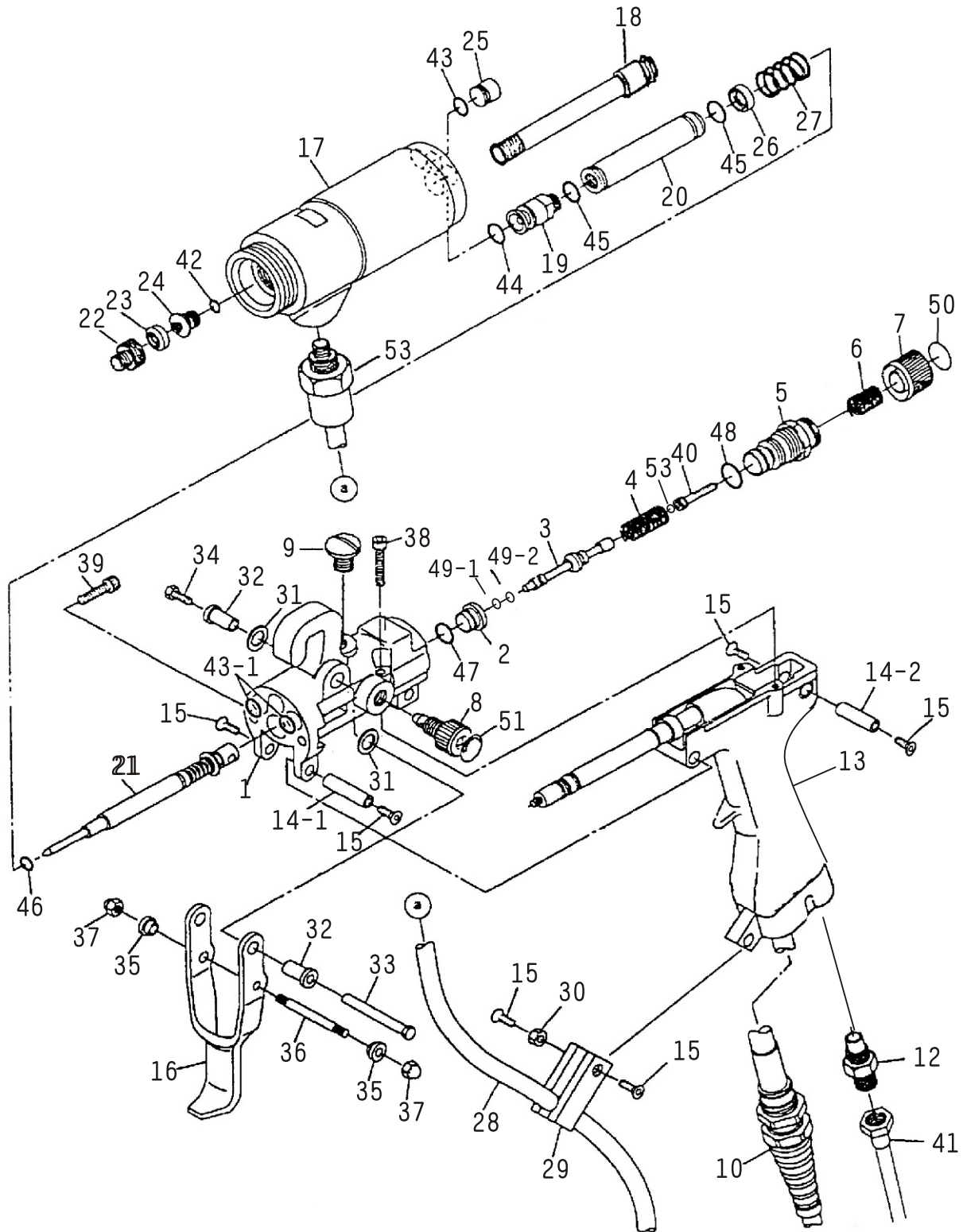


- 4) Fix the O-ring 47 to the new air seat and push them into the body.
- 5) Fix 2 pieces of the back-up ring 49 to the new tappet and insert them into the body from the back-up ring side.

Note: A resin screw is used for fixing the adapter to the gun body. Be careful not to slant the screw. The thread is slightly hard, then, screw it with a wrench.

12. DISASSEMBLING ILLUSTRATION & COMPONENT TABLE

12-1. Air Electrostatic Hand Gun Model : TC-92



COMPONENT TABLE FOR AIR ELECTROSTATIC HAND GUN (Hb110. HB110ES)

Key	Description	Q'ty	Remark	Key	Description	Q'ty	Remark			
1	Body	1set		29	Hose. Supporter	1				
2	Air seat	1		30	Nut	1				
3	Tappet	1		31	Washer	1				
4	Spring	1		32	Collar(1)	1				
5	Adapter	1		33	Pivot	1				
6	Spring	1		34	Hex.bolt	2				
7	Adjuster	1		35	Collar(2)	2				
8	Valve set	2		36	Rod	1				
9	Cap	1		37	Hex.Nut	1				
10	High Tension cable	<table border="1" style="display: inline-table; vertical-align: middle;"><tr><td>5m</td></tr><tr><td>10m</td></tr></table>	5m	10m	1		38	Socket hex. Bolt	2	
5m										
10m										
11	Air tube	1	TC-90	39	Socket hex. Bolt	1				
12	Air joint	1		40	Socket hex. Bolt					
13	Grip	1		41	Air hose set	<table border="1" style="display: inline-table; vertical-align: middle;"><tr><td>5m</td></tr><tr><td>10m</td></tr></table>	5m	10m	1	
5m										
10m										
14	Sleeve(1)	1		42	O'ring	1				
15	Socket hex. Bolt	8		43	O-ring	4				
16		1		43-1	O'ring	1				
17	Extension	1		44	O'ring	1				
18	Extension AIR tube	2		45	O'ring	2				
19	Packing set	1		46	O'ring	1				
20	Guide	2		47	O'ring	1				
21	Needle set	1		48	O'ring	2				
22	Joint	1		49-1	O'ring	1				
23	Valve seat ring	1		49-2	O'ring	1				
24	Seat(Paint)	1		53	paint.hose joint (1)	1				
25		1		53	paint.hose joint (2)	1				
26	Retainer	2		53	paint.hose joint (3)	1				
27	Spring	1								
28	Paint hose	<table border="1" style="display: inline-table; vertical-align: middle;"><tr><td>5m</td></tr><tr><td>10m</td></tr></table>	5m	10m	1					
5m										
10m										