Portable Automatic Welding Carriage

T30002758

IK-72T-W1
Linear-track Welding Carriage
Operation Manual

For every person who will be engaged in operation and maintenance supervision, It is recommended to read through this manual before any operations, so as to permit optimum operation of this machine.

KOIKE

Preface

Thank you for buying our product. It is necessary to read this manual carefully in order to ensure the device can be operated in an appropriate, safe and effective way. In course of reading, please firstly understand how to operate and maintain this device. When working on the spot, coworkers must work in collaboration with each other which is crucial to safe and appropriate operations. So be sure to read this manual and all safety notes prior to use should be understood well and observed.

Safety Notes Prior to Use (be sure to read this manual carefully)

Our product has been designed with a view of safety, but any improper handling of this carriage can lead to fatal accidents. Operation and maintenance staff should read this manual carefully prior to operation, inspection and maintenance of this device. It is advised to place this manual nearby the device to refer to it by the staff.

- Do not mishandle this device ignoring the instruction in this manual.
- Be sure to fully understand all the instructions in this manual prior to use.
- For the purpose of safety, the duties of installation, maintenance, inspection and repair should be executed by qualified operators or the workers who have received adequacy training and fully understood the welder.
- For the purpose of safety, the duty of operating this device should be executed by the workers who have fully understood this manual or mastered very good skills.
- For the purpose of safe education, the equipment staff should participate in the seminars organized by some professional associations such as Welding Association and Welding League or Science Association and Science League in their head office or branches. It is required for the workers to take qualification exams of welding engineers and technicians.
- After finishing reading this manual, this manual should be placed with the warranty certificate together. Please refer to the manual if necessary at any time.
- If any questions, please contact the distributors or the departments of our company, Sales or local offices. The contact addresses and telephones are listed on the back cover of this manual.
- If the manual is lost or damaged, please subscribe a new copy from the distributors.
- If the device is resold, please deliver the manual with the device together to the new owner.

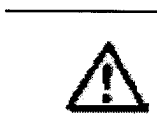
Symbol	Implication	Descriptions
	Be careful	General safety precautions, warms and dangers
	Watch your hands	If the hands reaches into the openings, the fingers can be got injured.
	Be careful: To prevent electric shock!	Electric shock could happen under specific circumstances.
	Grounding for the device	Operators should use the safe grounding terminals to make the device at earth potential.
	Unplug the device from mains jack.	When any breakdowns or lightning risks occur upon the device, the operator should unplug the device from the mains jack.
	To prevent explosions	Explosions can happen under specific circumstances.
	General precautions	General warnings.
	Be careful: the heat!	People can be hurt by the extra high temperature under specific circumstance.
	Be careful: flammable materials!	These materials are highly flammable under specific circumstance.
	Be careful: magnet!	Magnet generates a magnetic field and magnetic wave.
	To wear light-proof goggles.	Please wear light-proof goggles when watching the welding arc.
	To wear a dust / gas mask	In the course of creating dust, smoke or gas, masks should be worn.
	Refrain from lifting	Don't lift the carriage to prevent accidents caused by falling

Contents

1.Safety Instructions

Many accidents are resulted from ignoring safety instructions in course of operations, inspection and maintenance of the device. So prior to operations, inspections and maintenance of the device, please carefully read, understand and observe all safety precautions and safety notes prior to operations on the manual and the device.

- Read the manual carefully prior to use.
- Please observe relevant local laws and regulations on installing start power on the primary side, determining positions for installation, storing high-pressure gas, stocking products after mounting pipes and treating waste.
- The manual has provided safety notes prior to operations in order to prevent injures and damages.
- Incorrect operations can cause any possible injures and damages which can be classified into 3 kinds. They are denoted with different warning signs with different meanings to have people alert. These signs and watchwords are shown the warning labels taped on the device.

Warning Signs	Meanings	Descriptions
	**Danger**	If handled improperly, it is likely to result in deaths or serious injuries.
	**Alert**	If handled improperly, it can result in deaths or serious injuries.
	**Attention**	If handled improperly, it can result in injuries or actual damages. It is also referred to very common dangerous operations.
	Safety Notes Label	It provides the notes for the operators and maintenance personnel about the precautions prior to operations in order to prevent the device or peripheral units from possible faults.

- The above-mentioned serious injuries are referred to blindness, burns (caused by high / medium temperature), electric shock, fractures, poisoning, etc. which can possible leave sequela, or require hospitalization /being hospitalized for a long period of special care. The injury (except for serious injuries) is referred to the kinds of hurts, burns or electric shocks which do not require hospitalization or need to be hospitalized for a long period of special care. Actual damages are referred to damages to property and further loss due to equipment damages.

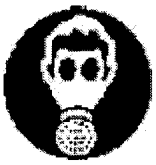
2. Safety Precautions Prior to Operation

⚠	Alert
Please strictly observe the following precautions, to avoid causing serious injury or death.	
	■ The design and manufacturing of the welding machine have taken into account the safety factors. However, the operators must strictly respect the alerts on the operating instructions and safety precautions prior to operation; otherwise it will cause serious injury or death. ■ Make sure that the non-staff away from the operating space of the welding machine and work area. ■ The welding machine can create magnetic field in the surrounding area. The magnetic field can affect certain types of sensors and clocks. For the same reason, unless permitted by the doctors, any person who has heart pacemakers at his/her heart is not allowed to get near the welding machine or the welding space at work. ■ For safety reasons, the duties of installation, maintenance, inspection and repair should be executed by personnel who have been trained and fully understood the welding machine or by qualified operators.. ■ For safety reasons, the duties of operations should be executed by personnel who have fully understood the operating instructions or are very skillful. ■ The welding machine must not be used for other purposes in addition to the electric arc welding operations provided by the manual. ■ The welding machine should not be modified. ■ Check around the device prior to operation in order to avoid any accidents. ■ Be sure to hold the handle when handling the welding machine. ■ If necessary, wear leather protective gloves to touch the devices in course of welding process or immediately after operation. Never touch before the welding surface cooling.

	Alert
Please strictly observe the following precautions to prevent electric shock.	
	■ Do not touch any live parts; otherwise it will cause severe electrical shock or burns. When connected to the power input, the input circuit and the welding machine are internally charged. Even if the input power is turned off, the capacitor remains charged. When the welding power supplies output, the electrode and the metal base as well as the connected metal parts have been live. ■ Refrain from touching live parts. ■ The welding power distribution boxes and the metal base, as well as its positioning molds via electrical connections should be arranged in accordance with laws and regulations (electrical equipment technical standards) and should be grounded by a qualified electrical engineer. ■ Cut off all power at the input end by using the switch on the switch box before installation, maintenance and inspection. After cutting off the input power the capacitor remains live for a while. Prior to maintenance and inspection make sure there is no longer any residual voltage. ■ Keep regular maintenance and inspection. Repair all damaged parts before continuing normal operations. ■ Do not use any wires which fall short of power or have been damaged exposing conductor. ■ Securely tighten the wire connectors and make them insulated. ■ Have the welding wire securely connected on one side of the metal base as close to the position of the metal base. ■ Do not use the welding machine when its shell and cover are removed. ■ Cover the input and output terminals prior to use. ■ Refrain from the use of damaged or wet gloves. ■ When working in high places, be sure to use rescue ropes. ■ When the welding machine is out of work, be sure to shut down the power switches of all the facilities and disconnect the input power supply. ■ Do not wear wet clothing. ■ Never stand on a wet floor or touch the wet floor. ■ Do not use the welding machine outdoors on a rainy day/night. ■ Do not place the welding machine outdoors after work.

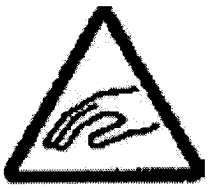
	■ Be sure to install the input supply fuse or breaker. ■ Check the input voltage of the welding machine prior to use. The allowable range of the input voltage is ± 10% of the rated voltage. It is prohibited to use the welding machine beyond the allowable voltage range. ■ The hard rubber sheathed wires have threaded metal plugs which should be securely tightened. ■ Be sure to make the hard rubber sheathed wires grounded. ■ Cut off the power, stop the operation and request an engineer with electrical expertise to repair in the following cases: ■ Wires are broken or worn out. ■ Damages caused by leakages of water or other liquid. ■ Operation fails, although following the instructions on the manual. ■ The welding machine has malfunction. ■ The performance of the welding machine is not normal, so it need to be adjusted. ■ Request a proficient and professional engineer to carry out maintenance, inspection or repair duties.

⚠	Attention
Please use protective utensils to protect yourself and others from damages caused by electric arc light and spatter / slag and noise interference。	
	■ Arc light contains harmful ultraviolet and infrared which can cause eye irritation or burns. ■ Spatters and slag can damage the eyes and cause burns. ■ Noise can cause hearing loss. ■ Wear anti-light goggles and protective gloves during the welding operation and monitoring welding. ■ Wear goggles to protect your eyes from damages by spatter or slag. ■ Place a protection shield around the welding scene to prevent arc light from irradiating the eyes of people around the site. ■ Wear labor protection products, such as leather gloves, long sleeves, leg covers, leather care skirts, masks, safety shoes, etc. ■ When the noise is too loud, wear anti-noise protection devices.

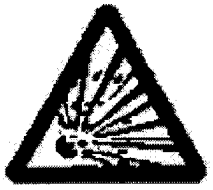
⚠	Attention
Use protective utensils to protect you and others from the damage caused by the fumes generated during welding operation.	
	■ Welding will produce smoke and gases. These smoke and gases are harmful to your health. ■ If the welding operation is conducted in a small space, it will lead to lack of oxygen which is most likely to cause suffocation. ■ To prevent gas poisoning and suffocation, it is required to use local waste disposal facility and effective gas masks in accordance with relevant regulations (it is set forth to prevent damage due to dust in industrial safety and health laws and regulations). ■ When the welding space is small, ensure that the space is adequately ventilated or the staff wears protective masks. Let the experienced staff on duty monitoring the welding. ■ If the welding operation is near the places where there are activities such like removing oil, cleaning and spraying, it will cause the generation of toxic gases. Therefore, the welding operation should not be conducted in the vicinity of these places. ■ If welding happens on galvanized steel or other coated steel, it will produce toxic fumes. Therefore, the plating should be removed before the welding operation or be sure to wear gas masks.

⚠	Attention
Please strictly observe the following precautions to prevent explosive gas bottles dumped or explosion spray.	
	■ If the gas bottles are dumped, they could result in death or serious injury. ■ Since the gas bottles are fitted with high-pressure gas, any improper disposal of the gas bottles can cause explosion spray or emissions of high pressure gas, causing an accident and resulting casualties. ■ Disposal the gas bottles in accordance with regulations (high-pressure gas control methods). ■ Do not expose gas bottles to high temperature. ■ Place the gas bottles in special cylinders bearing seat, to

	prevent the dumping of gas bottles. ■ Never generate arc in the gas bottles. Do not hang the torch on the gas bottles, nor does cause the electrode to touch the gas bottles. ■ When turning on the gas bottle valve, do not make your head close to the exhaust port. ■ When gas bottles are not in use, the surface of the bottles should be covered by protective cover. ■ Use the gas flow rate control meters manufactured or recommended by the welding machine manufacturer. ■ Read the instructions on using the gas flow rate control meters prior to use, and strictly observe precautions prior to operation. ■ Never use gas bottles which are leaking or damaged. ■ Gas bottles can only be used for specific purposes. ■ Do not apply oil or grease on the gas bottle valve. ■ When the gas bottle valve is difficult to turn, contact your dealer.

⚠	Attention
Please strictly observe the following precautions to prevent injury and damage due to rotating parts.	
	■ Keep hands, hair and clothing away from the cooling fan of the welding power supply or the feed rollers of the wire feed unit; otherwise they will be stuck. ■ When the wire is in the feeding process, the operator is not allowed to get his head close to the end of the torch; otherwise the wire will pierce the eyes. ■ When the wire spool is released, the operator can be injured. ■ It is not allowed to use the welder where the casing or the shell is removed. ■ Request personnel who fully understand the welding machine and get trained or qualified personnel to remove the casing of the equipment for maintenance, inspection and repair. Install a protective circle of the fence around the welding machine to prevent others from accidentally getting close to the device. ■ Do not put hands, fingers, hair and clothing near the rotating cooling fan and the rollers of the wire feed unit.

	■ When the wire is feeding, it not allowed for the operator to get his head close to the torch end. ■ When the wire spools are being stored, moved or mounted on the wire feed unit, use the wire stopper to fasten the end of the wire onto the spool. ■ When the spool is put onto the roller of the wire feed unit, the wire should be securely fastened to prevent it loose.

⚠	Attention
Please strictly observe the following precautions to prevent fire, explosion and blasting spray.	
 	■ The welding spatter and the hyper thermal metal base can lead to a fire. ■ If the steel bars and other wires of the base are loose in connections or the circuit is bad in electrical connections, the resistance will generate overheat and cause fire. ■ Arcing in containers of gasoline and other flammable materials can cause an explosion. ■ Welding on a sealed container or tube can cause blasting spray. ■ Never do the welding by where spatter can come into contact with combustible materials. ■ Do not weld near flammable gases. ■ Do not have the hot metal base near to combustibles just after welding. ■ Welding on ceilings, floors and walls can lead to fire indoor, so combustibles should be removed to the outside from the room. ■ Securely tighten the cable connections and have the wire firmly fixed by welding on one side of the metal base metal base as close to the location of the base. ■ Never weld gas-filled ducts. ■ Never weld sealed containers or pipes. ■ Place a fire extinguisher in the welding place, to prevent fires. ■ Do not weld any containers which are containing flammable materials. ■ It is not allowed for the operator to carry lighters, matches and other combustibles in course of welding.

3. Safety Label Placement

Safety labels and other operation-related labels are affixed to the devices.

- When operating the devices, operators should carefully read the labels and observe the instructions on the labels.
- Do not remove the labels. Always keep the labels legible.

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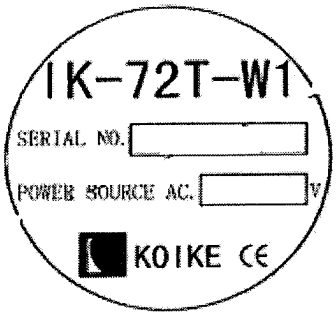
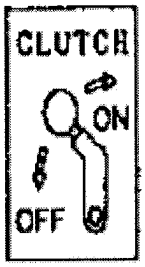
<tr>
<td> 
</td>
<td>Attention!
Be sure to use this lever to close the magnets when removing the guide tracks.
KOIKE</td>
<td> 

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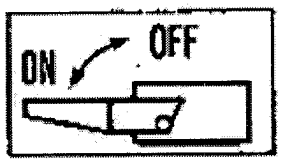
<tr>
<td>Alert
The manufacturer recommends fixing the device and the work board together using fixed facilities to prevent the device moving from the board and resulting accidents</td>
<td> 

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4 Features and Specifications

4.1 Features

The walking performance of the newly developed IK-72T-W1 welding equipment is the same to that of IK-72T and it can be used for straight welding by matching with 1D track. The control and operation of this new equipment is similar to that of MULTI standard model.

◎Specifications
Item: specifications
Type: IK-72T-W1 (standard welding type)

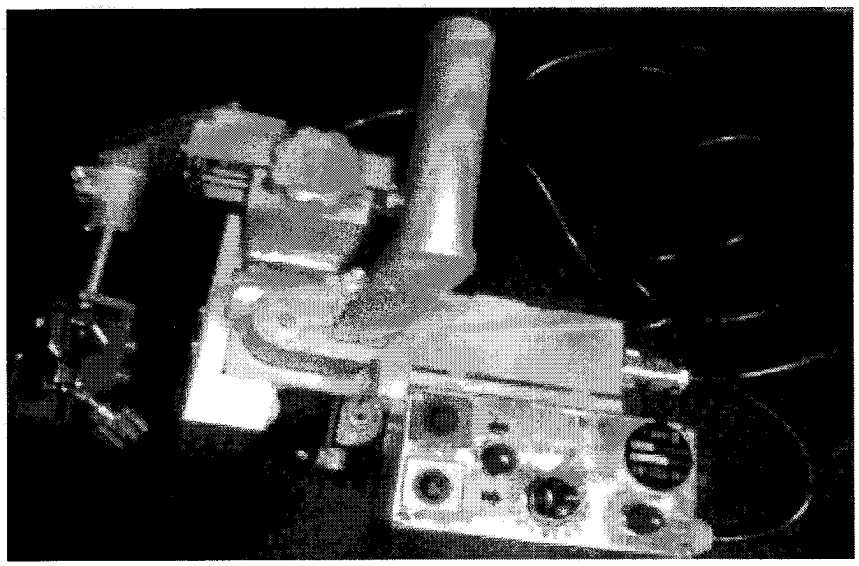
Driving mode: pinion and rack
Walking speed (mm/min): 150-1500
Adjustment range of welding gun
Horizontal angle: 40°~55°
Upward-downward: 45mm
Front-back: 45mm
Welding margin (mm)
Start: 125mm End: 140mm
Applicable welding manners: fillet welding, downward welding, vertical welding, overhead welding, and welding for other positions.
Tracking manner: move forward along the track direction.
Control power: AC220 50/60HZ single phase 1A
Power and linkage: soldering set switch signal (connected with the power supply device of wire feeder) (A point of output self protection type collector)
Operation switch (operation panel), walking direction transfer switch (also as power supply switch), power indicator, walking speed setting button, start button, stop button.
Mode switch (TEST ARC, NEUT, ARC ON)
Control cable, power cable and arc signal cable all in one type
Carriage itself→middle connection→power supply interface (16m)
↓
→wire feeder (6.5m)×1
Application range (carriage capabilities) straight line (above 1m)
Carriage weight: 4.5KG
Contour size(carriage itself): L 350mm×250mm×H230mm
Soldering set: WHM-500S 1)500A, special straight welding gun
WHM-500S 1)350A, special straight welding gun
Signal cable used joint: Panasonic

4.2 Configuration list

1) Major part: 1 set
2) Control panel box (hand held): 1set
3) Special welding torch:
4) Accessories
Fuse (1A) 1
Hex wrench (M6/M5): One for each type
5) Operation Manual/Warranty Bill: one for each

5. Operational Methods

5.1. Designations of all Parts



(1) Control panel box
Separated from the major machine body, the control panel box can be used for remote control. One side of the box is equipped with a slide block, which can be connected to a motor box equipped with a slide block.
(2) Motor box
(3) Demagnetized handle
It can make the magnet connected and separated easily.
(4) 1D track
1D (straight aluminum alloy guide track)
(5) Magnet
It is used to fix the guide track on the steel plate.
(6) Fixing roller
It can be combined with the guide track to make the device move smoothly.
(7) Welding torch support
The welding gun is placed in the middle part of the support.
(8) Lifting support
(9) Thermal baffle
(10) Clutch handle
When the handle of the clutch is placed at the right side, the clutch is OFF; when it is at the left side, the clutch is ON.
(11) Carrying handles

5.1.2 Operation Schematic Diagram of the Control Panel

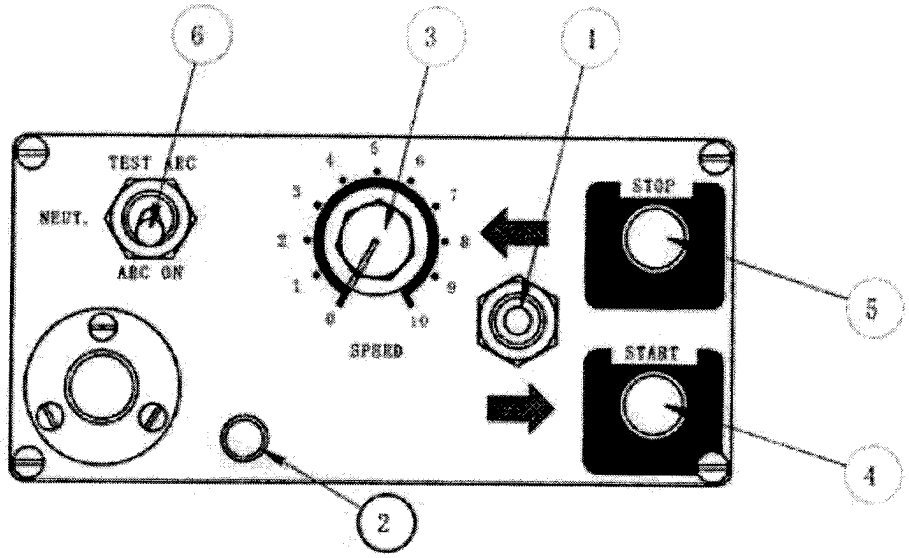


Fig.4 Operation Panel

1) Walking direction and power switch

This switch is used for selecting welding directions and switching the power supply.

2) Power indicator

When the power is supplied, the indicator lights on.

3) Walking speed control button

If the button is turned clock wise, its speed will increase; if the button is turned anti clock wise, its speed will decrease.

The speed dials correspond to the following speeds in the table.

The speeds shall be adjusted according to welding regulations.

Dial	Speed mm/min	Dial	Speed mm/min
1	120	6	930
2	300	7	1,080
3	460	8	1,240
4	610	9	1,400
5	780	10	1,500

4) Start button

Press the start button, the device will walk. The manner switch determines whether it welds while walking or not.

5) Stop button

Press this button, the device will stop. The manner switch determines whether it stops welding or not.

6) Manner selection switch

The switch includes three optional switching positions, and the functions of them are as follows:

Carrying handles are used for carrying the device.

TEST: When the switch is switched to this position, the wire feeder begins to work. When it is released, the feeder will restore its position.
ARC ON: When this function is selected, normal welding will begin.
Press the start button, the carriage will start arc welding while walking.
NEUT: When this function is selected and the start button is pressed, the carriage only walks and does not start welding.

5.1.3 Installation of the Guide Track

■ Install Safety Support

- When the device is fixed to a wall or a high place, the guide track and the device may fall off at the same time due to vibration.
  Fix the guide track on the hook bolt with a rope and use safety supports to fix both sides of the guide track.
- If the surface magnetic force of the magnet attracted to the steel plate decreases, the device will fall off too. Erase dusts, etc. off the magnet surface.
  (The strong magnetic force of the magnet can prevent the device from falling down business will reduce the cutting effect.)

■ To select guide track

- 1 D guide track (straight AL guide track)
  Used for plane cutting.
  For example: straight cutting of crown sheet and wall surface.

■ To fix guide track

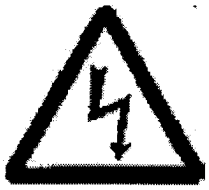
When the cutting tip is aligned to the mark line, do not knock the guide track pinion or the running surface with a hammer. The pits on the track pinion or running surface will cause irregular movement, such as vibration.

- 1 D guide track (straight AL guide track)

This guide track is used for plane cutting. The guide track is equipped with 4 permanent magnets with a disengaging rod. When the rod is lifted up and one end of it is lifted up, the magnets can be aligned. When the rod is put down, the magnets will be attracted. Use positioning model for further alignment and then install the guide track.

5.2 Welding Preparation and Operations

Weld according to the following procedures and refer to Fig. 6 "Wiring diagram of the system" and operation steps in section 5.1.

⚠	Alert
Please observe the following precautions strictly to avoid electric shock.	
	■ Cut off the control power and welding power and then operate according to steps (1) to (4).

(1) Connect the control lead to the metal capacitor of the control panel.
(2) Fix the special welding torch on the welding torch supporter of the carriage.

⚠	Attention
When fixing the welding torch support, be sure to use the accompanied rod or other tools with proper sizes.	
	■ Improper tools may cause personal injuries.

(3) Connect the welding torch with the corresponding solder wire feeder.
(4) Connect the 2-core metal capacitor of the control lead to the welding torch capacitor of solder wire feeder, and insert the input power plug to the nearest plug socket.

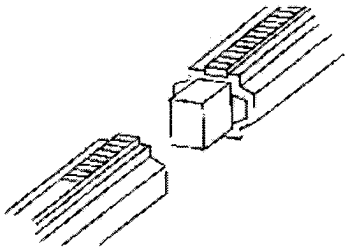
(Notes) The only interface signal of welding power is welding torch signal, which is output from the auto control type contact point A.

⚠	Attention
Switch the welding power button to "No Self-Holding (or No Crater Treatment)".	
	■ When the welding power button is switched to "No Self-Holding (or No crater Treatment)", if the welding operation stops, the welding arc will not extinguish.

■ Guide Track Connection Method

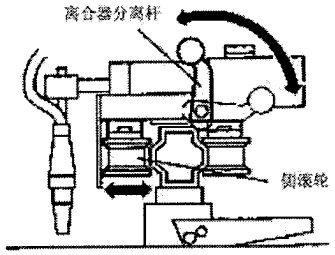
● 1 D guide track (straight AL guide track)

1. Separate off the magnets for connecting the guide racks
2. Align the connection direction as shown in the picture.
3. Insert and fix the guide rack.
4. After positioned, the guide track can be fixed with magnets.



4.3.5 To fix the machine body

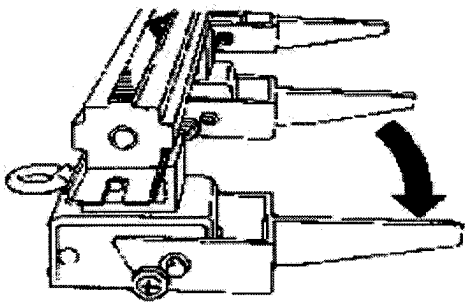
Lift up the clutch release lever, the side roller on one side of the machine will open outward. When the side roller opens, insert the machine at the end of the guide rack and fix it on the rack.



■ Dismantle guide rack

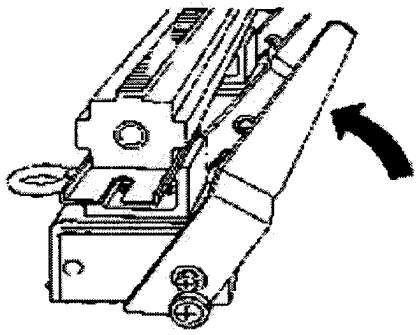
● When dismantling the guide rack, be sure to take the machine off the guide rack.

● Switch the disengaging rod of all fixing magnets to the position of OFF.



■ To separate the guide rack

● Press down the disengaging rod and fix the rack on the steel plate.



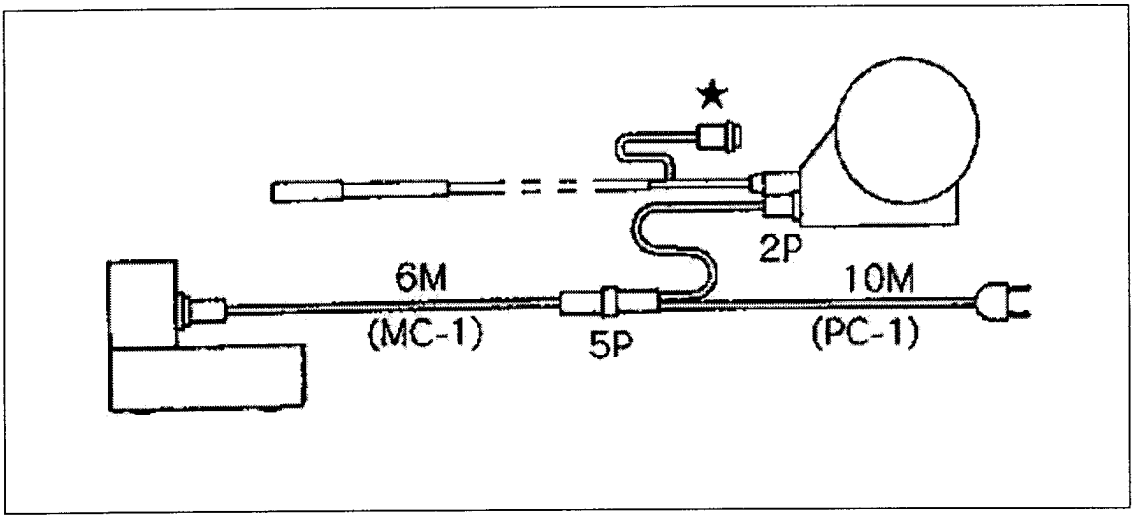
● If the guide rack is to be dismantled from the steel plate, the disengaging rod shall be lifted up.

(5) Switch on the welding power button, and insert solder wire into the welding torch. (Insert the welding torch lead wire directly)

⚠	Attention
When inserting the solder wire, do not put your head near the wire reaching out of the welding tip.	
	■ Otherwise, eyes may be hurt.

⚠	Attention
Please pay attention to the following precautions when soldering.	
	■ Use protective covers, protective masks or other protective welding equipments to protect the operators from damages caused by arc light, smoke and spatter.

5.3 System Wiring Diagram



5.4 Compatible Welding Machines and Signal Adapters

The welding carriage can be used combined with the semi-automatic (CO2, MAG) welding machines (power supply and feed device) which are commercially available.

The signal of welding torch is the only interface electrical signal communicating between the welding machines, and the output (contact point A on relays) signal of the welding carriage
is automatically controlled. Set the switch on the welding power supply side at the *No Self-Holding* (non-automatic) position.

The signal wire plug type is E "25-2P which can be used to connect the wire feed units manufactured by Matsushita or Daihen. It is recommended to purchase other types of plugs as spare parts for connection with other wire feed devices manufactured by other manufacturers if necessary. In this case, please contact us or contact the manufacturers of the wire feed device in order to acquire the appropriate welding torches compatible with the wire feed devices.

(Description)
Be sure to connect (1) the welding wire, (2) the gas hose and the (3) torch switch's wire with the wire feed device. According to different brands of the power, please use different metalwork and plugs. Please select appropriate applications

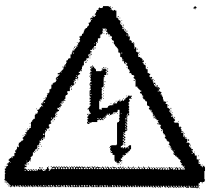
5.5 Precautions Prior to Operating

1) Check the operating voltage for meeting the technical specifications. If the difference exceeds ± 10% of the input voltage, it may cause malfunction.
2) Before welding, clean the running surfaces in order to remove residual obstruction, slag, spatter, etc. (To prevent slippage during the welding process).
3) When using a long cable, place the cable in an appropriate mean with the aid of the lifting equipment to prevent it stuck and wrapped.

6. Maintenance

In order to prolong the working time of the device without any failure, in addition to proper use of the device, it is also necessary to keep routine maintenance (See 6.1. *Maintenance and Inspection*) .Please refers to the 6.3 *Failures and Troubleshooting,* if a failure occurs.

⚠	Alert
Please strictly comply with the following precautions to prevent electric shock.	



- Before checking, dismantling and repairing, disconnect the plug with the power outlet and cut off the control power. In the case that the device is being charged by the power supply but it is needed to check the device, please request an experienced electric engineer to execute this duty in order to avoid causing a short circuit or electric shock.
- The input power plug has a rounding clip. The clip is connected to the carriage through the control panel. Be sure to make clip grounded.
- The input voltage of the power plug should stay within the allowable range ± 10%; otherwise the printed circuit inside the control board can be destructed causing a short circuit.
- Do not damage the sheath of the control wire and the torch wire or expose them to heat; otherwise the insulating materials will be destroyed causing a short circuit.
- In order to prevent damage due to overheating on insulation materials, be sure to make current and torch operating speed below the specified limits.
- Do not pull the control wire and the torch wire; otherwise, the fixed parts and joints will be damaged causing damage to insulation.
- Do not let the carriage fall or be dumped; otherwise it will cause damage to the insulating material.

6.1 Daily Inspection

(1) Clean and inspect the wear of the nozzle tip.
(2) Clean up the insulation board.
(3) Clean the surface of the device and the slip fitting.
(4) Remove the dust on the rails, racks, magnets and the running surface of the rollers.
(5) Check the sliding parts for big gap and wear.

6.2 Weekly Inspection

(1) Clean up small wheels. (Remove iron scurf, etc)
(2) Check whether the profiling wheel rotates smoothly. (Clean up)
(3) Remove spatter on the carriage.

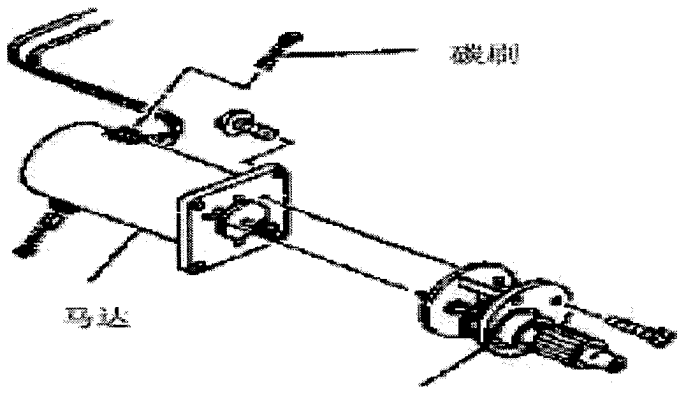
6.3 Monthly Inspection

(1) Check the torch holder, the follow-up arm, knobs and the baseboard of the carriage for loose locking screws.
(2) Check whether the torch and control wires are wound and damaged on sheath.
(3) Check whether the auto stop limit switch is functioning smoothly.
(4) Verify the smooth operation of the control device by using the front / back, up / down control knobs.
(5) Check the switch of the control panel for loosing or broken points and check the operation of the switch.
(6) Clean up the torch casing.
(7) Check the control panel, switches and controls for loosing and broken points, and check their operation situations.

6.4 Regular Checks Every Three Months or 1,000 Hours

Remove the carbon cap of motor to check the carbon brush for wear

motor	carbon brush	gear assembly



6.5 Checks Every 6 Months

1. Disassemble the gearbox and motor gear assembly. If necessary, use clean oil to remove the old grease inside the gearbox to do cleaning (using special oils).
2. Replace the excessively worn parts inside with new ones.

7. Troubleshooting

1）The device cannot move.（the motor cannot run）

Reasons of Failures	Inspection	Troubleshooting
1) The Power is turned off	Check the power; Check the plug.	
2) The fuse is broken	Check whether the 1A fuse installed in the control box is blown out.	Replace the blown fuse.
3) The power cables are disconnected	Use a detector to test the cables: "~" indicates being disconnected.	Fix the broken cables.
4) Poor contact	Check whether the wiring and terminal wiring board are connected correctly.	Reconnect the wires.
5) Switch failure	Remove the switch and use a detector to check whether the conduction is good between the terminals.	If the switch is damaged, it will be replaced.
6) Speed control resistor failure	Use a detector to detect the resistance which should be 50 KΩ.	If the resistor is damaged, it will be replaced.
7) The wires are disconnected.	Use a detector to check whether the conduction of the wires is good.	Replace the broken wires.
8) The contact of the motor carbon brush is bad.	Remove the carbon cap, take out the carbon brush and check the carbon brush for wear; check its flexibility at the same time.	Change the brush with a new one if it is badly worn.
9) Motor failure	If the above test results are normal, then the motor is likely to be faulty.	Repair or replace the motor with a new one.
10) Controller failure	If the above test results are normal, then the controller is likely to be faulty.	Replace the damaged controller.

2）The device does not run. (But the motor is running.)

Reasons of Failures	Inspection	Troubleshooting

1) speed control resistor	Remove the speed control resistor, and connect the detection probe to resistor terminals ② and ① or ② and ③; if the resistor is normal, slowly turn the knob, and the detector pointer should move between the 0-50KΩ.	Replace the faulty resistor
2) controller	If the 1) item test result is normal, it indicates that the controller is faulty.	Replace the faulty controller

3) The device does not run. (But the motor is running.)

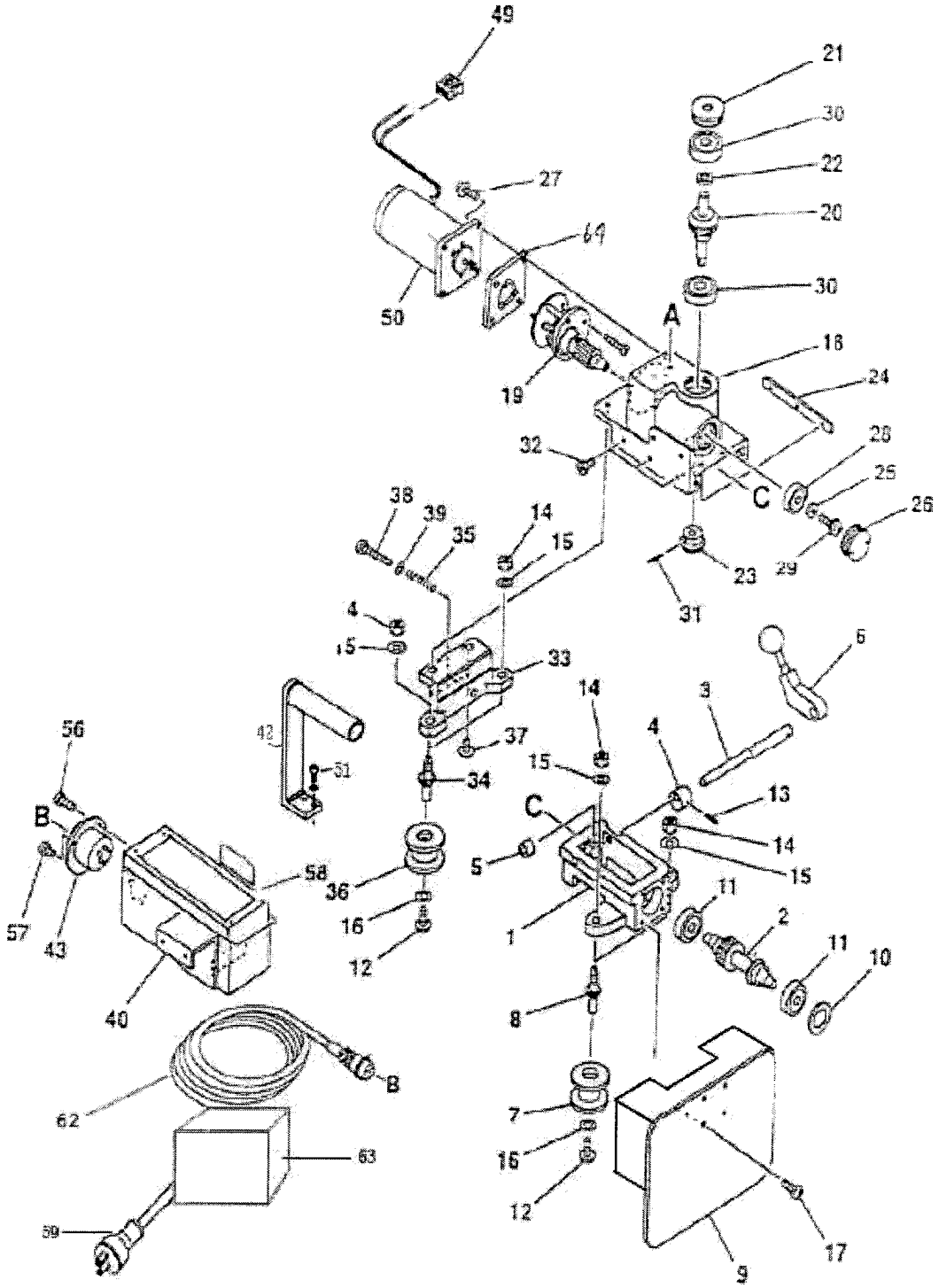
Reasons of Failures	Inspection	Troubleshooting
1) mechanical failure	Open the gear box and check the operation of the clutch.	Remove and clean dirt.
2) reduction gear idling	Although the motor is normal, the reduction gear remain idling even if the direction switch is turned and the driving wheel is braked manually..	Replace the gear (complete)

4) The device is not operating properly.

Reasons of Failures	Inspection	Troubleshooting
1) too fast as to the speed	Voltage is not normal.	Check voltage.
2) no low speed	1) Speed control resistor failure	Replace with a new resistor.
	2) Wire failure	Repair the wire.
	3) Motor failure	Repair the motor or install a new motor.
	4) Controller failure	Replace the controller.
3) no high speed	The supply voltage is reduced.	Use a detector to test voltage
4) vibration phenomenon	1)Gear wear	Replace with a new one.
	2)Clutch key wear	Replace or repair it.
	3)The gap between the shaft and the drive wheel is too large	Replace or repair it.
	4) The hoses or rubber insulated conductors affect the device running smoothly.	Pay attention when operating.
	5) The drive device and the drive wheel crack; or the external material wear.	Replace or repair them.

8. Part List

8.1 Main Body and Driving Parts



Main Body and Driving Parts

No.	Designation	Quantity	Stock No.	Remark
1.	Machine base	1	T60031674	
2.	Driveshaft group	1	T60031606	
3.	Clutch shaft	1	T60031607	
4.	Eccentric collar	1	T60031608	
5.	Stopper	1	T60031609	
6.	Clutch handle (group)	1	T60031610	
7.	Side wheel (Group)	2	T60031611	
8.	Side shaft (A)	2	T60031612	
9.	Heat-resistant plate	1	T89000497	
10.	Linkage	1	T60031684	
11.	Bearings	2	T60031033	
12.	Screws	4	SP-3*6	
13.	Spring pin	1	PR-2*12	
14.	Inner hex nut	4	NH-6	M6
15.	Washer	4	WF-6	M6
16.	Washer	4	WF-3	M3
17.	Screws	8	SP-4*8	M4*8
18.	Gearbox	1	T60031615	
19.	Reducer (group)	1	T61000715	
20.	Turbo (group)	1	T60031617	
21.	Bearing gland	1	T60031618	
22.	Collar (A)	1	T60031619	
23.	Helical gear (B)	1	T60031620	
24.	Side buttons	1	T60031621	
25.	Washer	1	T60031015	
26.	Bearing gland	1	T60031014	
27.	Screws	4	SP-4*16	M4*16
28.	Bearings	1	T60031033	627ZZ
29.	Screws	1	T60031674	M4*4
30.	Bearings	2	T60031034	628ZZ
31.	Spring pin	1	PR-2.5*16	
32.	Butterfly bolt	3	SS-5*5	
33.	Side wheel bracket	1	T60031675	
34.	Side wheel axle (B)	2	T60031613	
35.	Spring	1	T60031676	

No.	Designation	Quantity	Stock No.	Remark
36.	Side wheel (group)	2	T60031611	
37.	Screws	2	SP-5*14	
38.	Inner hex bolts	1	BC-5*30	
39.	Washer	1	WF-5	
40.	Control box	1	T89000192	
41.	Operation panel	1	T61000566	
42.	Handle	1	T61000601	
43.	Metal socket	1	6N100062	220V,4P
44.				
45.				
46.				
47.				
48.				
49.				
50.	Motor	1	T89002359	
52.				
53.				
54.				
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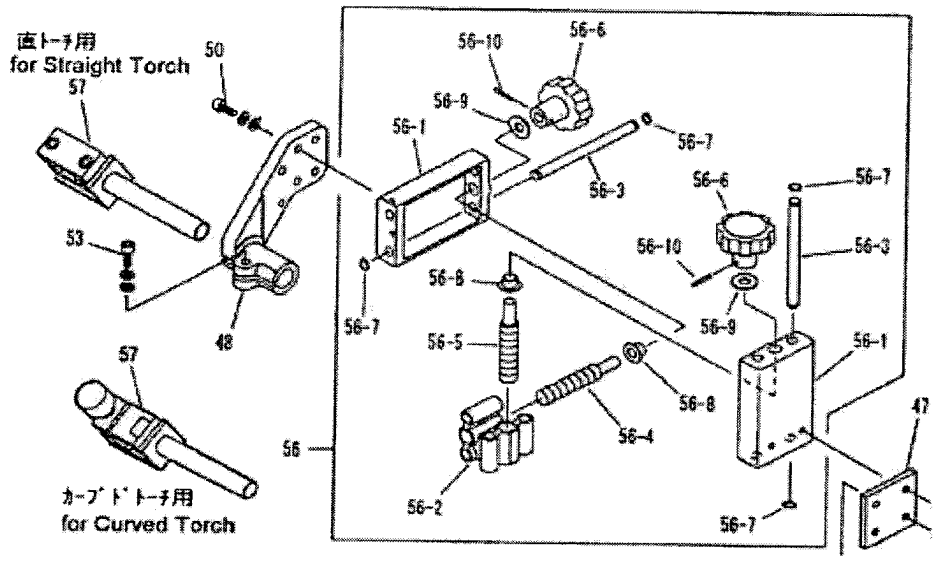
57.				
58.				
59.	Rubber plug	1	T30002899	STD
	Rubber plug	1	T60030280	KAR
62.	Power cord (group)	I	T95D01139	STD
	Power cord (group)	1	T95D01893	KAR
64.	Motor flange	1	T89002359	
	Heat-proof plate pad	1	T89000612	

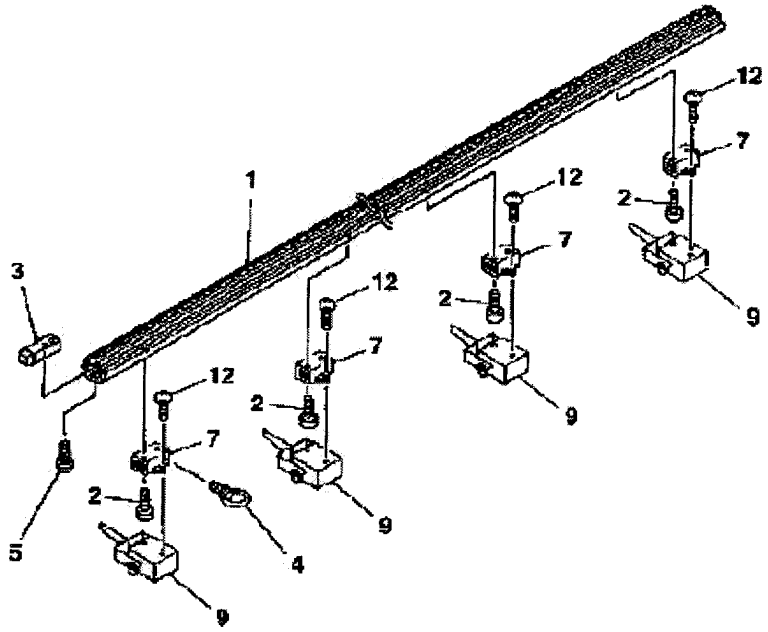
8.2 Torch Holder



56	Slide unit assembly	1	T61000645	
56-1	Slide base	2	T61000595	
56-2	Nut	1	T61000596	
56-3	Shaft	4	T61000598	
56-4	Screw shaft	1	T61000600	
56-5	Screw shaft(left)	1	T61000659	
56-6	Handle	2	T61000061	
56-7	Stop ring	4	T6B520080	STW-8
56-8	DU bush with brim	2	T64000016	MB0808-15FDU
56-9	DU washer	2	T6D520006	WC06DUN
56-10	Spring pin	2	T6B022518	PR-2.5×18
57	Torch holder ass'y(for straight torch)	1	T61001643	
57	Torch holder ass'y(for curved torch)		T61000676	

8.3 Track

8.3.1 Linear Guide Track



8.4. Parts of the Track

No.	Designation	Quantity	Stock No.	Remarks
1	Linear Track	1	T60031648	Only applied to guide tracks.
2	Screws	8	SP-5×14	M5 × 4 with SW
3	Linkage Block	1	T60031694	
4	Ring Bolts	2	60031654	
5	Screws	2	SP-6×20	M6×20
7	Magnet Bracket(A)	4	60031657	
8	Magnet Bracket(B)	1	60031658	Only applied to 2D,3D
9	Magnet	4	60031682	120kg, only applied to 1D
	Magnet	5	60031682	120kg 2D,3D
10	Linkage Pin	1	60031695	only applied to 2D,3D
11	Hex Nuts	10	NH-5	only applied to 2D,3D
12	Screw	10	SP-5×14	M5×14
13	Linkage Plates	1	60031659	only applied to 2D,3D
14	Screw Nut	1	NB-6	M6

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