MANUAL NO:P6367-3

OTC

DAIHEN Corporation

OWNER'S MANUAL

FOR

Inverter ACCUTIG 300P

MODEL: AVP-300 P6367

DO NOT DESTROY

IMPORTANT: Read and understand the entire contents of this manual, with special emphasis on the safety material throughout the manual, before installing, operating, or maintaining this equipment. This equipment and this manual are for use only by persons trained and experienced in the safe operation of welding equipment. Do not allow untrained persons to install, operate or maintain this equipment. Contact your distributor if you do not fully understand this manual.

DAIHEN Corporation WELDING PRODUCTS DIVISION

2: March 8, 1995
3: June 13, 1997

Upon contact, advise MODEL and MANUAL NO.

Notice : Machine export to Europe

This product does not meet the requirements specified in the EC Directives which are the EU safety ordinance that was enforced starting on January 1, 1995. Please make sure that this product is not allowed to bring into the EU after January 1, 1995 as it is.
The same restriction is also applied to any country which has signed the EEA accord.

Please ask us before attempting to relocate or resell this product to or in any EU member country or any other country which has signed the EEA accord.

1. SAFETY INFORMATION

The following safety alert symbols and signal words are used throughout this manual to call attention and to identify different levels of hazard and special instructions.

⚠ WARNING	WARNING gives information regarding possible personal injury or loss of life.

⚠ CAUTION	CAUTION refers to minor personal injury or possible equipment damage.

2. ARC WELDING SAFETY PRECAUTIONS

⚠ WARNING
ARC WELDING can be hazardous.
◆ PROTECT YOURSELF AND OTHERS FROM POSSIBLE SERIOUS INJURY OR DEATH. Especially: ・Keep children away. ・Pacemaker wearers keep away until consulting a doctor.
◆ Read and understand ・the summarized safety information given below and the original principal information that will be found in the table SAFETY STANDARDS.
◆ Have only trained and experienced persons perform installation, operation, and maintenance of this equipment.
◆ Use only well-maintained equipment. Repair or replace damaged parts at once.
ARC WELDING is safe when precautions are taken.

ELECTRIC SHOCK can kill.

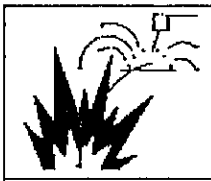
Touching live electrical parts can cause fatal shocks or severe burns. The electrode and welding circuit is electrically live whenever the output of the welding power source is on. The power line and internal circuit of the welding power source are also live when line disconnect switch is on. In semiautomatic or automatic wire welding, wire reel, drive assembly, and all metal parts touching the welding wire are electrically live.

1. Do not touch live electrical parts.
2. Wear dry, hole-free insulating gloves and body protection.
3. Insulate yourself from work and ground using dry insulating mats or covers.
4. Disconnect line disconnect switch before installing, changing torch parts or maintaining this equipment.
5. Properly install and ground this equipment according to its Owner's Manual and national, state, and local codes.
6. Ground the workpiece.
7. Keep all panels and covers of this equipment securely in place.
8. Do not use worn, damaged, undersized, or poorly spliced cables.
9. Do not touch electrode and any metal object if POWER switch is ON.
10. Do not wrap weld cables around your body.
11. Turn off POWER switch when not in use.

ARC RAYS can burn eyes and skin: FLYING SPARKS AND HOT METAL can cause injury. NOISE can damage hearing.

Arc rays from the welding produce intense heat and strong ultraviolet rays that can burn eyes and skin. Noise from some arc welding can damage hearing.

1. Wear a face protection with a proper shade of filter (See ANSI Z 49.1 listed in table SAFETY STANDARDS.) to protect your face and eyes when welding or watching.
2. Wear approved safety goggles.
3. Use protective screens or barriers to protect others from flash and glare: warn others not to watch the arc.
4. Wear protective clothing made from durable, flame-resistant material (wool and leather) and foot protection.
5. Use approved ear plugs or ear muffs if noise level is high.



WELDING can cause fire and explosion.

Sparks and spatter fly from the welding arc. The flying sparks and hot metal, spatter, hot workpiece, and hot equipment can cause fires and explosion.

1. Protect yourself and others from flying sparks and hot metal.
2. Do not weld where flying sparks can strike flammable material.
3. Remove all flammables within 35ft. (10.7m). If this is not possible, tightly, cover them with approved covers.
   - Be alert that welding sparks and hot metals from welding can easily go through small cracks and openings to adjacent areas.
4. Watch for fire, and keep a fire extinguisher nearly
   - Be aware that welding on a ceiling, floor, bulkhead, or partition can cause fire hidden side.
5. Do not weld on closed containers such as tanks or drums.

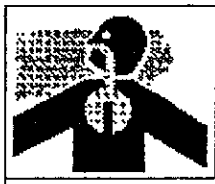
Accidental contact of electrode or welding wire to metal object can cause sparks, overheating, or fire.

6. Contact work cable to workpiece as close to the welding area as practical
   - to prevent welding current from traveling long, possibly unknown paths and causing electric shock and fire hazards.
7. Remove stick electrode from holder; cut off wire at contact tip when not in use.

8. Do not use the welding power source for other use than arc welding.
9. Wear oil-free protective garments such as leather gloves, heavy shirt, cuffless trousers, high shoes, and a cap.
   Loose weld cable connection can cause undesired sparks and excessive heating.
10. Tighten all weld cable connections.

Chipping and grinding cause flying metal. As welds cool, they can throw off slag.

11. Wear approved face shield or safety goggles. Side shield recommended.
12. Wear proper body protection to protect skin.



FUMES AND GASES can be hazardous to your health.

Arc welding may produce fumes and gases hazardous to health.

1. Keep your head out of the fumes; do not breath the fumes.
2. Ventilate the area and / or use exhaust at the arc to remove welding fumes and gases.
3. If ventilation is poor, use an approved air-supplied respirator.
4. Read the Material Safety Data Sheets (MSDSs) and the manufacture's instruction for metals, consumables, coatings, and cleaners.
5. Do not cut in locations near degreasing, cleaning, or spraying operations.
   The heat and rays of the arc can react with vapors to form highly toxic and irritating gases.

	This welder uses high frequency for arc starting.

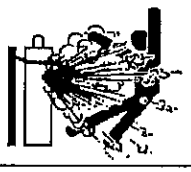
High-frequency may enter nearby units as shown below, causing electromagnetic troubles.
* Input cables, signal cables, telephone cables
* Radio sets, TV sets
* Computers and other control equipment
* Industrial detectors and safety units
* Pace makers, hearing-aid sets

For preventing electromagnetic troubles completely;
1. Make the welding cable as shortest as possible.
2. Install the welding cable along the floor or the ground as closest as possible.
3. Put the base cable together with the electrode cable each other.
4. Do not commonly use the base ground for other machine.
5. Close tightly all of the doors and covers of the welder, and fix them.
6. Do not press the torch switch other than the time at starting arc.
7. When electromagnetic troubles occurred, take the above measures and measures shown in this instruction manual until troubles are mostly corrected. Please contact DAIHEN , when necessary.
8. Those using heart pace makers must not come near the welder being operated and welding work site, until permission is given by doctors. Operation of the pace makers will be affected badly by high frequency.

ARC WELDING WORKSHOP is potentially hazardous.

FALLING, FALLING DOWN and MOVING machine can cause serious injury.
- ◆ Do not lift the welding power source with one eyebolt. Use two eyebolts to lift it.
- ◆ Put the welding power source and wire feeder solidly on a flat surface.
- ◆ Do not pull the welding power source on floor laid with cables and hoses.
- ◆ Do not put wire feeder on the welding power source.
- ◆ Do not put the welding power source and wire feeder where they will pit or fall.

WELDING WIRE can cause puncture wounds.
- ◆ Do not press gun trigger until instructed to do so.
- ◆ Do not point gun toward any part of the body, other people, or any metal when threading welding wire.



CYLINDER can explode if damaged.

Shielding gas cylinder contain high pressure gas. If damaged, a cylinder can explode.

1. Use only correct gas cylinders, regulators, hoses, and fittings designed for the specific application; maintain them in good condition.
2. Protect gas cylinder from excessive heat, mechanical shock, and arcs.
3. Keep cylinder in an upright position securely chained to stationary support or rack to prevent falling or tipping.
4. Keep cylinders away from any welding or other electrical circuit.
5. Never touch cylinder with welding electrode.
6. Read and follow instructions on compressed gas cylinders, associate equipment, and CGA publication listed in table SAFETY STANDARDS.

   Since gas cylinders are normally part of the welding process, be sure to treat carefully.
7. Turn face away from valve outlet when opening cylinder valve.
8. Keep protective cap in place over valve except when gas cylinder is in use or connected for use.

Rotating parts may cause injuries. Be sure to observe the followings.

If hands, fingers, hair and clothes are put near the rotating parts of fans and wire feeding roll of the feeder, biting may occur, causing injuries.

1. Do not use the welder in removing the case and the cover.
2. When the case is removed in maintenance/inspection and repair, certified operators or operators knowing the welder well must perform the working. By providing a fence, etc. around the welder, do not let other persons come near the welder carelessly.
3. Do not put your hands, fingers, hair ad cloths near the fans and wire feeding roll rotating.

PRINCIPAL SAFETY STANDARDS

Safety in Welding and Cutting, ANSI Standard Z49.1, from American Welding Society, 550 N.W. Lejeune Rd, Miami FL 33126.

Safety and Health Standards, OSHA 29 CFR 1910, from Superintendent of Documents, U.S. Government Printing Office, Washington, D.C.20402.

Recommended Practices for Plasma Arc Cutting, American Welding Society Standard AWS C5.2, from American Welding Society, 550 N.W.Lejeune Rd, Miami, FL 33126.

Recommended Safe Practices for the Preparation for Welding and cutting of containers That Have Held Hazardous Substances, American Welding Society Standard AWS F4.1, from American Welding Society, 550 N.W.Lejeune Rd, Miami, FL 33126.

National Electrical Code, NFPA Standard 70, from National Fire Protection Association, Batterymarch Park, Quickly, MA02269.

Safe Handling of Compressed Gases in Cylinders, CGA Pamphlet P-1, from Compressed Gas Association, 1235 Jefferson Davis Highway, Suite 501, Arlington, VA 22202.

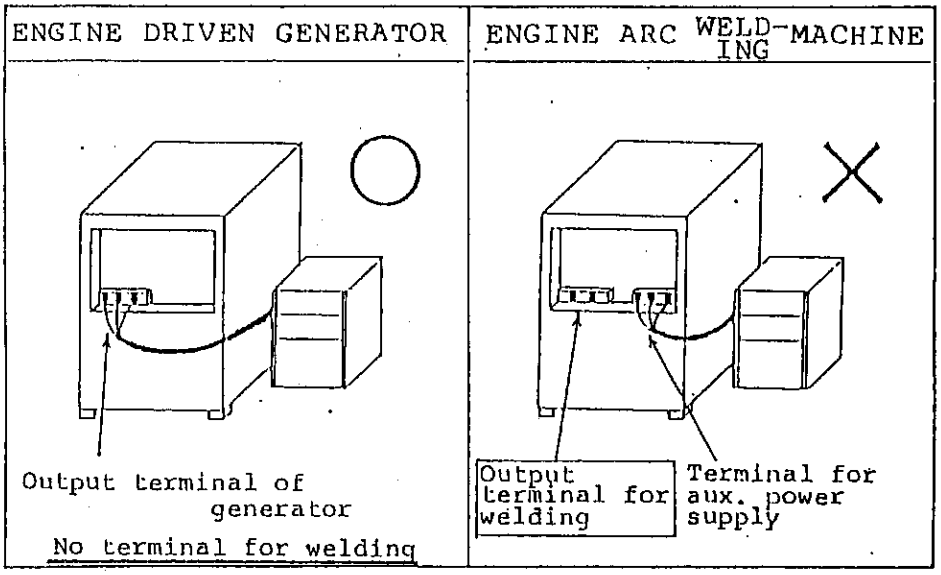
Code for Safety Welding and Cutting, CGA Standard W117.2, from Canadian Standards Association, Standards Sales, 178 Rexdale Boulevard, Rexdale, Ontario, Canada M9W 1R3.

Safe Practices For Occupation And Educational Eye And Face Protection, ANSI Standard Z87.1, from American National Standards Institute, 1430 Broadway, New York, NY10018.

Cutting And Welding Processes, NFPA Standard 51B, from National Fire Protection Association, Batterymarch Park, Quickly, MA 02269.

Cautions for use of an engine driven generator

DO NOT CONNECT THIS MACHINE WITH AUXILIARY POWER SUPPLY OF ENGINE DRIVEN ARC WELDING MACHINE.
BE SURE TO USE ENGINE GENERATOR PRODUCED FOR THE EXCLUSIVE USE OF GENERATOR.



Since the responsibility of an engine driven generator is very poor, the output voltage drops abnormally at a sudden change of current due to an arc start, for instance, and an arc break may be caused. (Nevertheless, there is no possibility that the welding machine is damaged by this.)

To prevent this from occurring, use an engine driven generator having the capacity of generator than about twice the rating VA of welding machine. Beside, 60Hz and 480V are proper for setting of an engine generator in a no-load running. (If the output voltage is too high, it damage the welding machine. Pay attention to this regard.) Be careful that an arc break apt to occur when two or more units of welding machine are used with one unit of engine generator, owing to influence of the respective welding machines.

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SCHEMATIC DIAGRAM

PARTS LAYOUT

Thank you very much for your purchase of AC/DC MULTI MODE ARC WELDING MACHINE "ACCUTIG" series.

This Owner's manual has been written to help you make the most of your AC/DC MULTI MODE ARC WELDING MACHINE "ACCUTIG".
Prior to using the ACCUTIG, please read carefully at least the section "OPERATION" for your safe and efficient welding. The section "MAINTENANCE" should be referred to before maintenance and machine repair after trouble, and "APPLICATION" referred to before maintenance and machine repair after trouble, and "APPLICATION" referred to using optional accessories and connection with another automatic welding machine.

1. COMPOSITION

1.1 Welding power source

Model	AVP-300		
	TIG welding		Stick welding
	AC	DC	(DC)
KVA(KW) at rated output	13.2 kVA 11.4 kW		
Rated input voltage	460V 3-phase		
Rated frequency	50 / 60 Hz		
Rated output current	300 A		
Welding, Crater-filler Input current range	Standard 10～300A	4～300A	10～250A
	Soft arc 10～200A		
	Hard arc 20～300A		
Pulse / Base current			—
Rated load voltage	32V	20V	30V
Max. no-load voltage	60V		
TIG welding start voltage	60V		
Rated duty cycle*	40%		
Temperature rise	160 ℃		
Gas pre- flow time	0.3 sec. (0.6 sec. is adjustable)		
Gas post- flow time	3～20 sec.		
Up- slope time	0～5 sec.		
Pulse frequency	0.5～15 Hz (at low pulse)		
	10～500 Hz (at high pulse)		
Pulse ratio	15～85 %		
Down- slope time	0～5 sec.		
Crater- filler operation	ON/OFF/REPEAT changeover system		
High frequency generation	Spark generation, super imposed type		
External dimensions (W×D×H)	14×22×25 in. (Without bolts) (360×550×625 mm)		
Mass	152 lbs (69 kg)		

* Attention:

Duty cycle is the ratio of arc time to total time. For purpose of these standards, the time period of one complete test cycle shall be 10 minutes. For example, in the case of a 40% duty cycle, rated load shall be applied continuously for four minutes and shall be off for six minutes.

Allowable output current of continuous duty cycle (Duty cycle 100%)	Less than 190A

The welder can damage if used more than its duty cycle

SERVICE CONDITIONS

Ambient temperature	0 ℃ to 40 ℃
Elevation	between sea level and 3300 ft. (1000 m)
Gases and dust which the machine is exposed to	only the extent of those normally produced by arc welding
Input line voltage variation	within the range of ±10 percent of rated input voltage
Base of the machine	within 15 degree of horizontal

1.2 Standard accessories

Description	Specification	Q'ty	Remarks
Fuse	BLA005	1	
Bolt	M10-30	1	
Remote control box	P6367K00	1	
Nut	M10	1	
Washer	M10	1	
Bolt	M8-20	1	

1.3 Prepare at your side

(1) Argon gas and Argon cylinder
(Conforming t purity more than 99.9%)
(2) Filler wire
(3) Coated electrode of stick welding
(4) Electrode holder
Use safety holder
(5) Light shielding
(6) Input cable and grounding cable

Input cable (with welding machine side solderless terminal 15/64" in.(6 mm ϕ)), and grounding cable (with welding machine side solderless terminal 15/64" in.(6 mm ϕ)) are necessary to connect power board with welding machine.

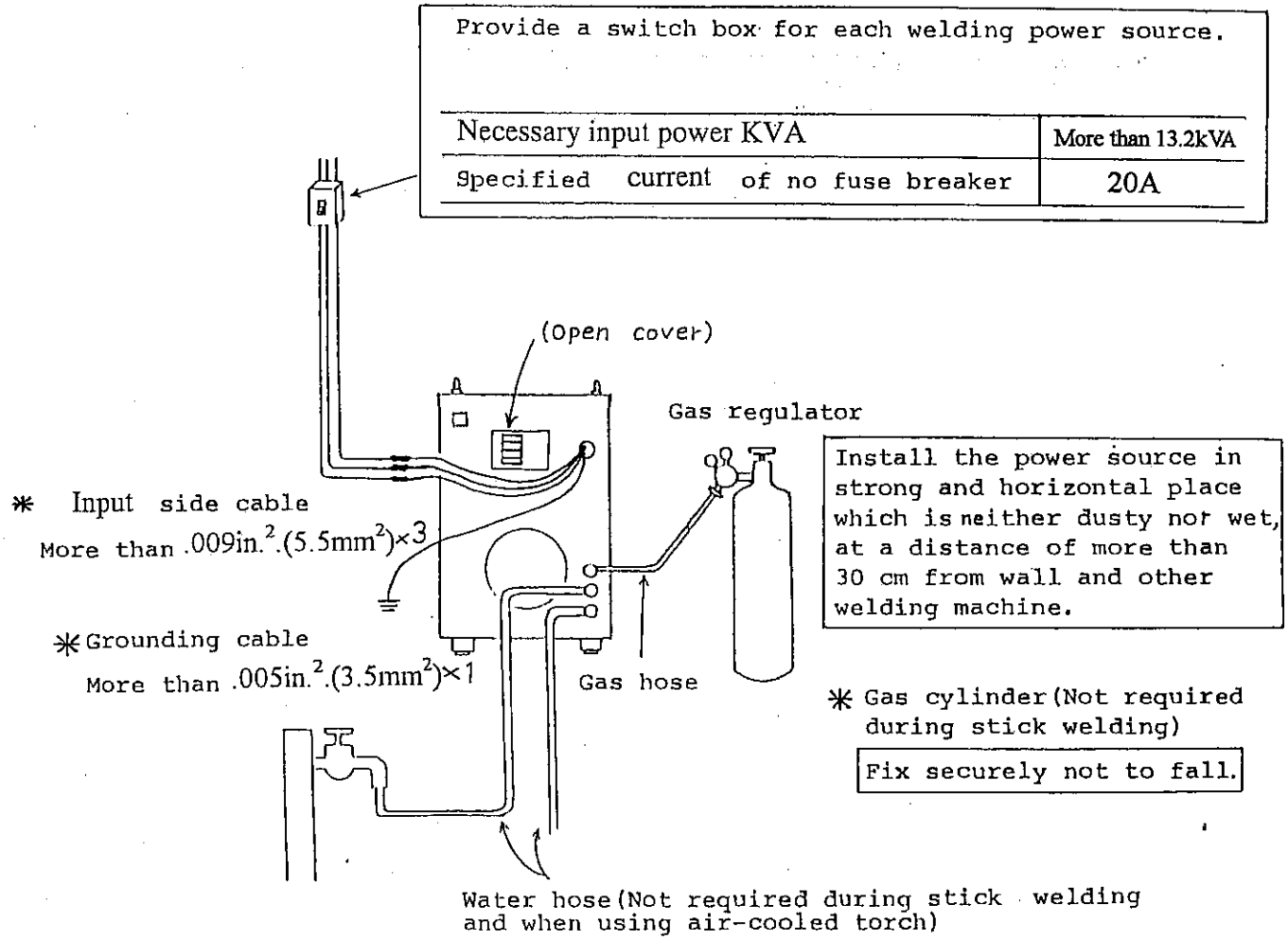
Input cable	More than .009 in.^{2} (5.5 mm^2) × 3 *
Grounding cable	More than .005 in.^{2} (3.5 mm^2) × 1

* When input cable length exceed 33.3ft.(10 m), use .012 in.^{2} (8 mm^2).

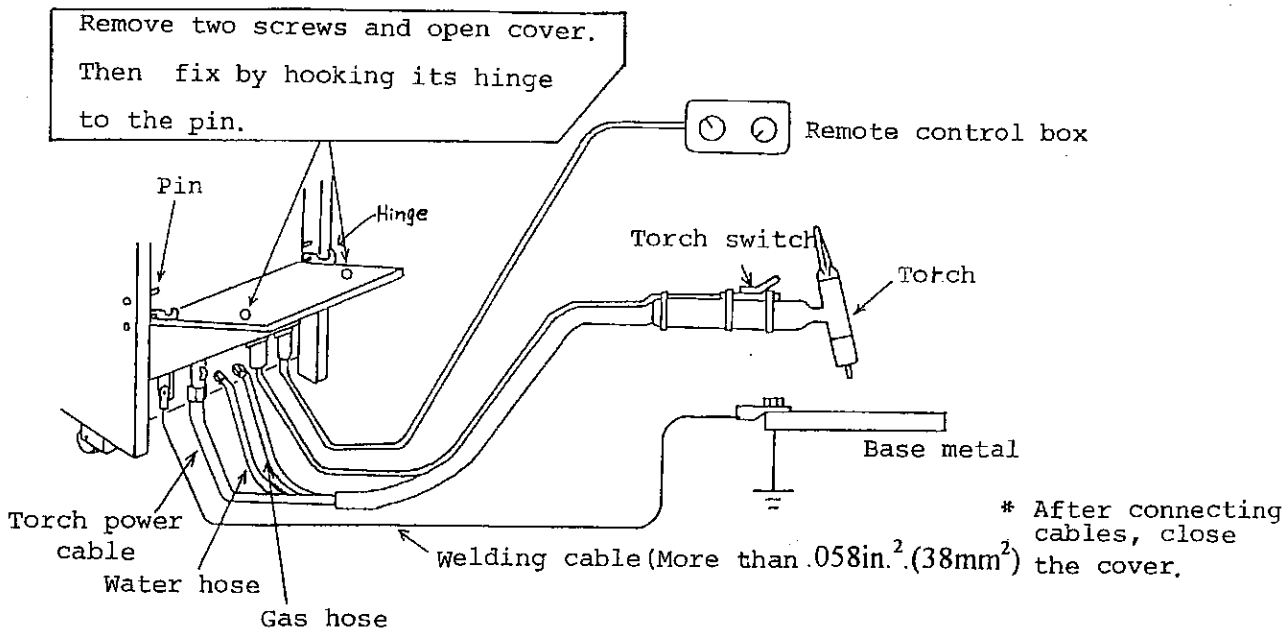
1.4 Connection of components

*:Prepared at your side

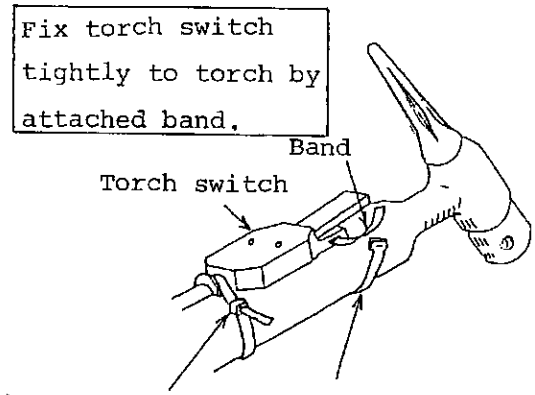
(1)Connection of power source side



(2) Output side of welding machine connection

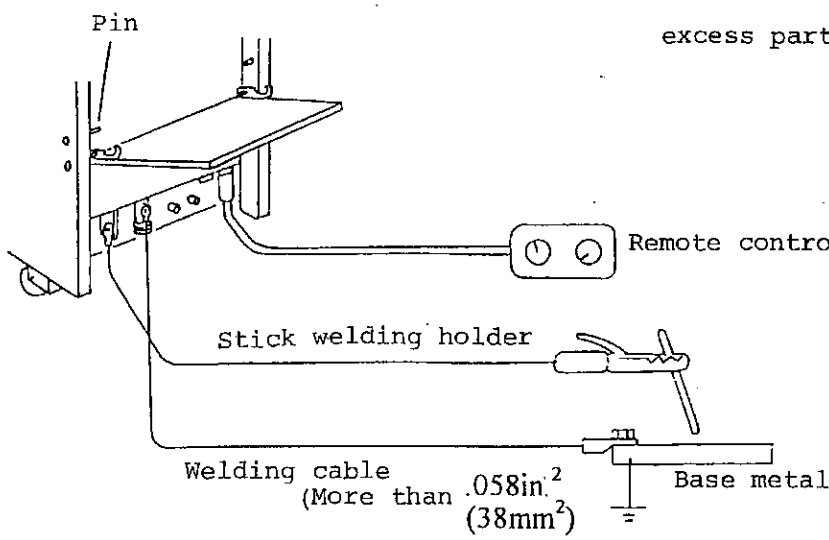


TIG Welding



(2) Pass the end through a hole and tighten by hand or pincers. Then cut off excess part.

(1) Wind band around torch body with burred side faced inside.

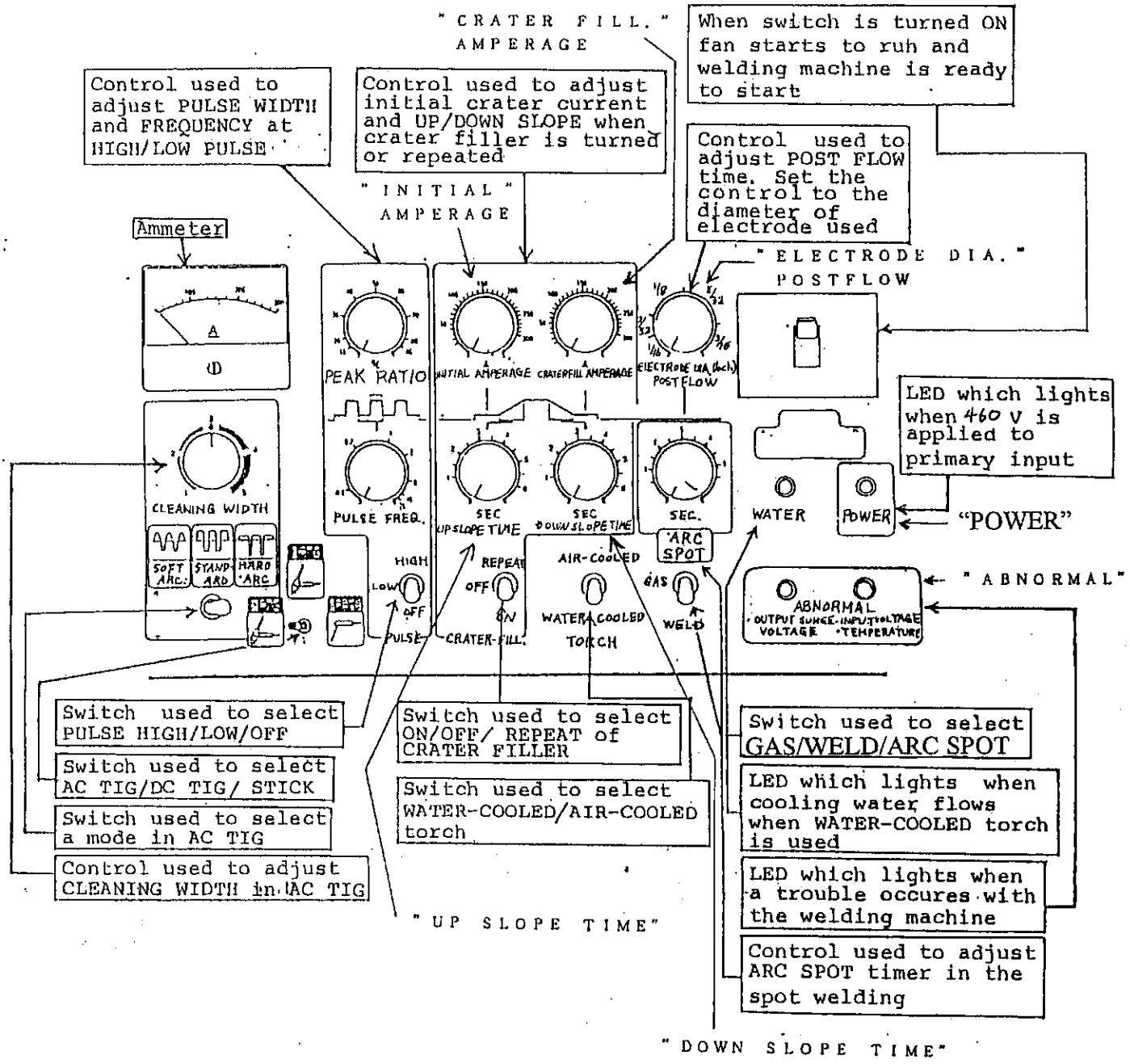


* After connecting cables, close the cover.

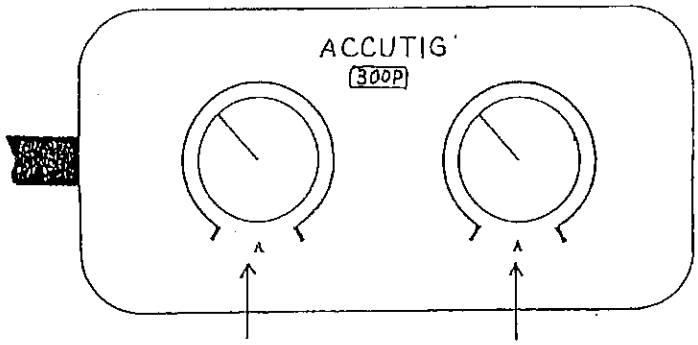
Stick welding
(with welding rod at (+) and base metal at (−))

2. OPERATION
2.1 Front panel operation

Front panel



Remoto control box



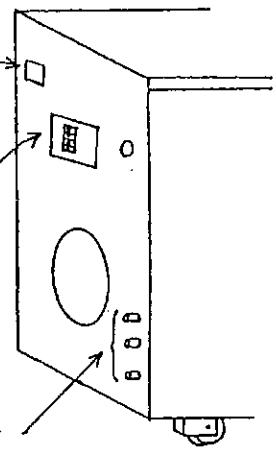
Welding current
(or base current at
low or high pulse
is selectable.)

Pulse current is
adjustable.
(This is not available
without pulse.)

Rear plate

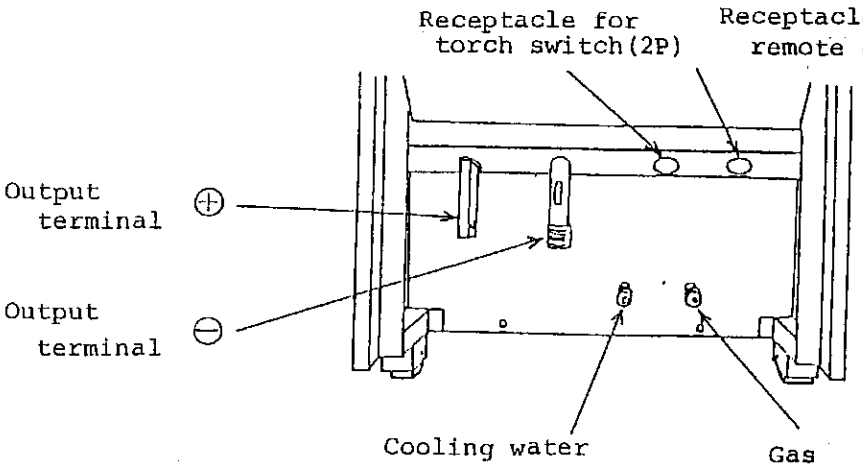
For pump AC115V
Do not any devices
other than the
cooling water
circulator.

3 phase
460V
Input and
grounding
terminal
(Open cover)



Gas and cooling water
connections

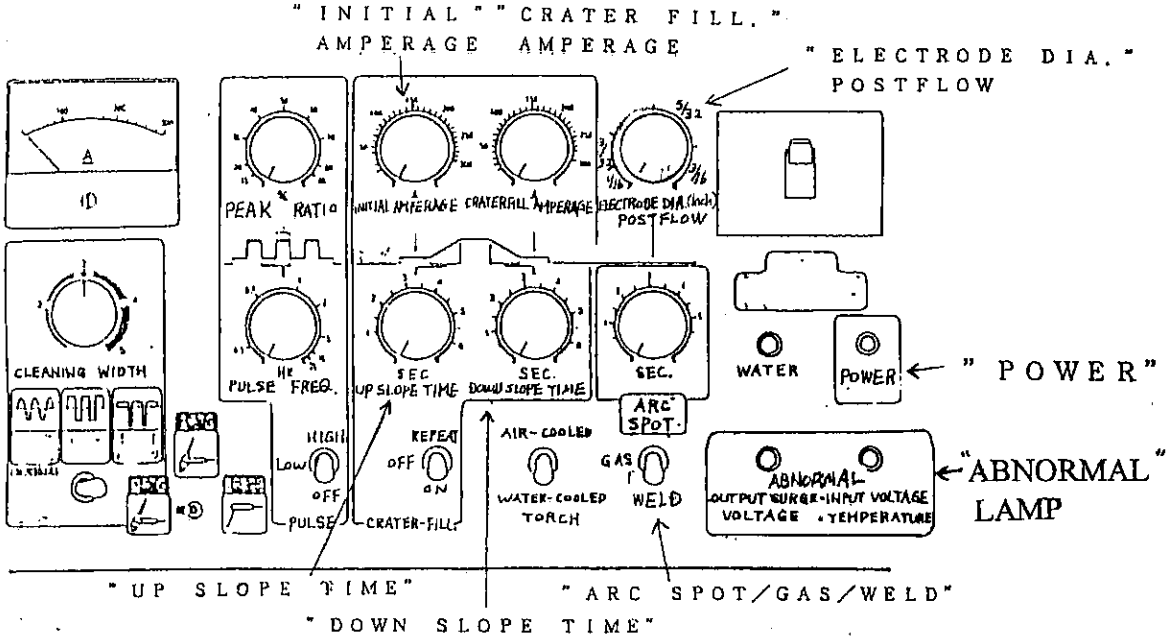
Output terminal



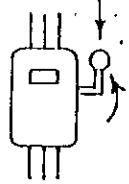
* Turn the power off before connecting or removing a cable from the output terminal
* Connect cables properly
* After connecting cables, close the cover

2.2 TIG welding

2.2.1 Setting procedure of switch and adjustment knob



① Turn on input side switch or no fuse breaker.



② " POWER" pilot lamp lights up.

③ Turn on "CONTROL POWER" switch.

④ Check that the "ABNORMAL" lamp is not lighting.

⑤ Set "DC TIG" or "AC TIG".

⑥ Set "AIR-COOLED/WATER-COOLED" changeover switch properly, depending upon type of torch to be used.

In case of using water cooled torch, it must be set to "WATER-COOLED". If it is set to "AIR-COOLED" torch may be burned.

⑦ In case of using water-cooled torch, make sure to flow water.

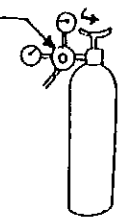
⑧ "WATER" pilot lamp lights up.

⑨ Open argon gas cylinder valve.

⑩ Set the "GAS".

⑪ Adjusting argon gas flow.

Clockwise : Increase
Counterclockwise : Decrease



⑫ Set the "WELD"

⑬ Set the "POST FLOW" knob according to electrode diameter.

⑭ Set the mode changeover switch and cleaning width at AC TIG

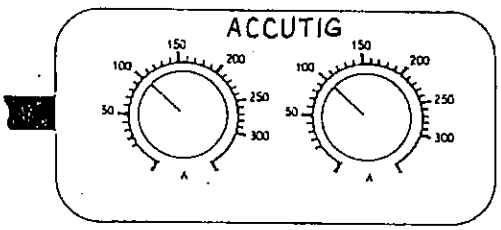
* For detail, refer to item 2.2.3

⑮ Set the "CRATER-FILLER" switch by welding operation

Operatable three kind of crater filler function "ON", "OFF" and "REPEAT"

"CRATER-FILLER" switch	ON OFF ON OFF Torch switch manipulation	Application
ON	Welding curr. Initial current / Crater filler current	Crater treatment at weld zone end.
OFF	Welding current	Take welding or for combination with other automatic machine.
REPEAT	Welding current / Move up torch to extinguish arc. Initial current / Crater filler current	For prevention of burn through in thin plate welding.

⑯ Set pulse changeover switch by welding.



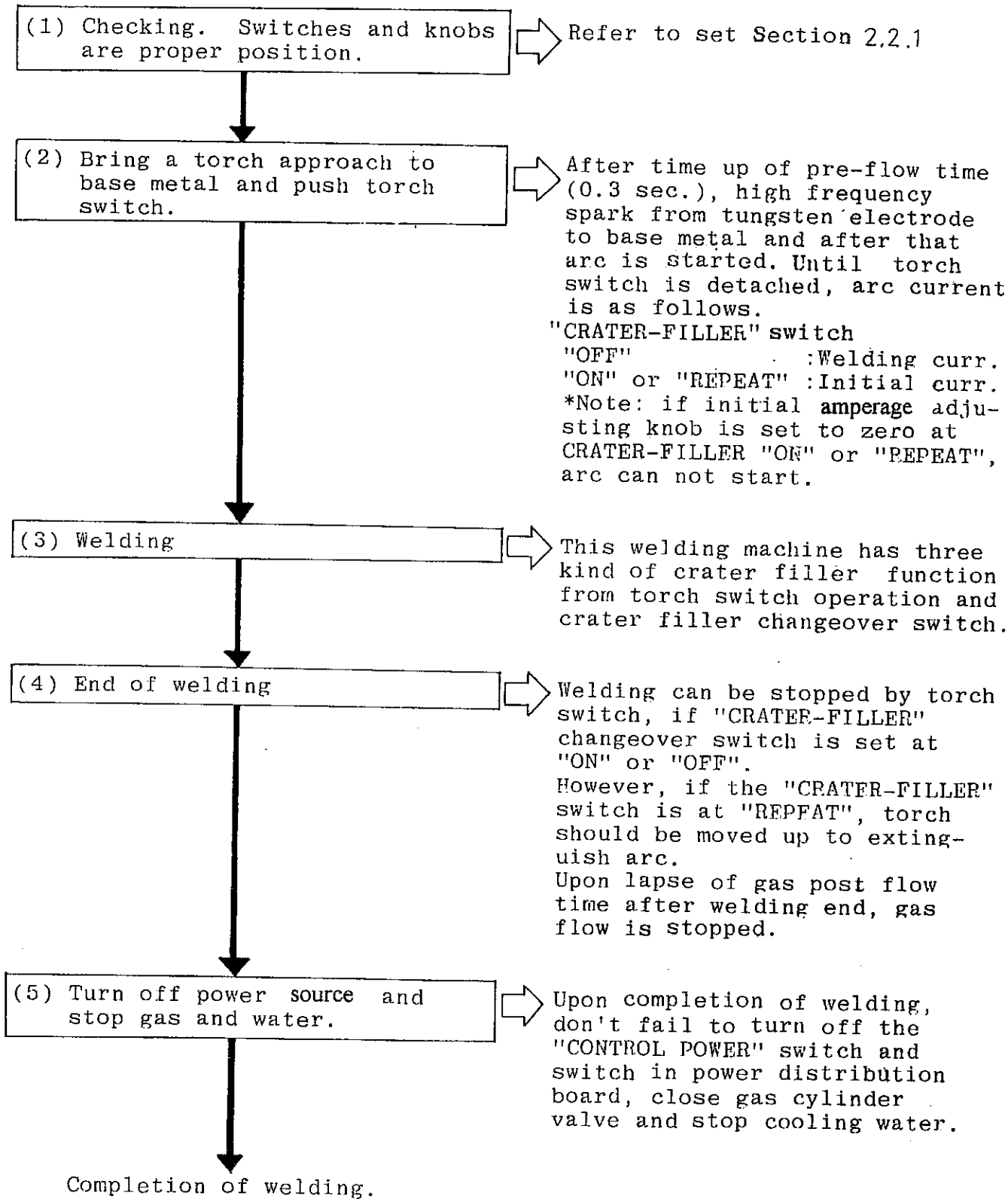
⑰ Set the base amperage knob on remote control box.

welding current is adjustable at pulse "OFF"

⑱ Set the pulse amperage knob on remote control box.

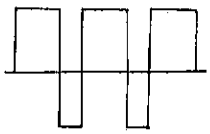
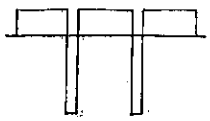
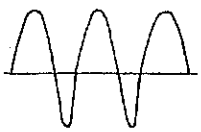
Unadjustable at pulse "OFF".

2.2.2 Operating process for TIG welding



2.2.3 Mode selection and cleaning width adjustment at AC TIG welding

(1) This power source is available the following three waves form mode at AC TIG. Select a mode suitable to your application.

Mode	Output current wave	Feature
STANDARD 	Produces rectangular wave current with peak values of positive and negative currents equal.	You can operate easily in all welding current.
HARD ARC 	Produces rectangular wave current with peak values of positive and negative currents different.	You can get deep penetration, so it is suitable for fillet weld of thick plate.
SOFT ARC 	Produce sinusoidal wave current with peak values of positive and negative currents equal.	You can get stable and silent arc, so it is suitable for butt weld of thick plate.

(2)Cleaning width adjustment

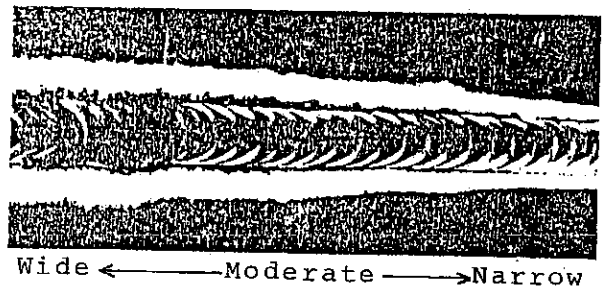
The "CLEANING WIDTH" adjustment knob is intended to change a strength of cleaning action for AC TIG arc welding of alluminum of other lights metals.

Shows relation between the "CLEANING WIDTH" adjustment knob setting and the welding result quaitatively.

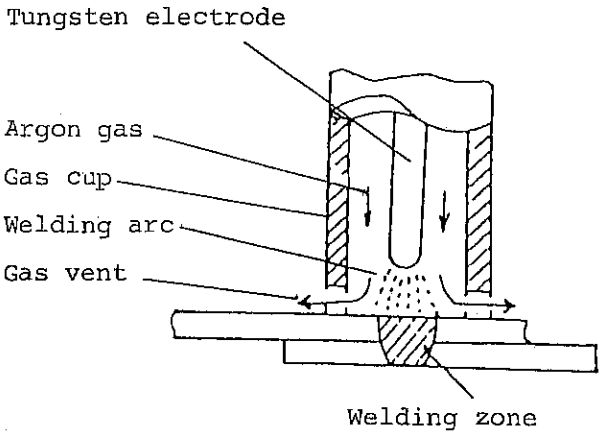
	Cleaning width	Depth of penetration	Electrode consumption
Cleaning width "NARROW"	Narrow	Deep	Less
↓	↓	↑	↓
"WIDE"	Wide	Shallow	Much

If wider cleaning width is required, however, set the knob to "WIDE", and when deeper penetration is required, set it to "NARROW", on the contrary.

Example of cleaning width adjustment



2.3 TIG Arc Spot welding
2.3.1 Outline

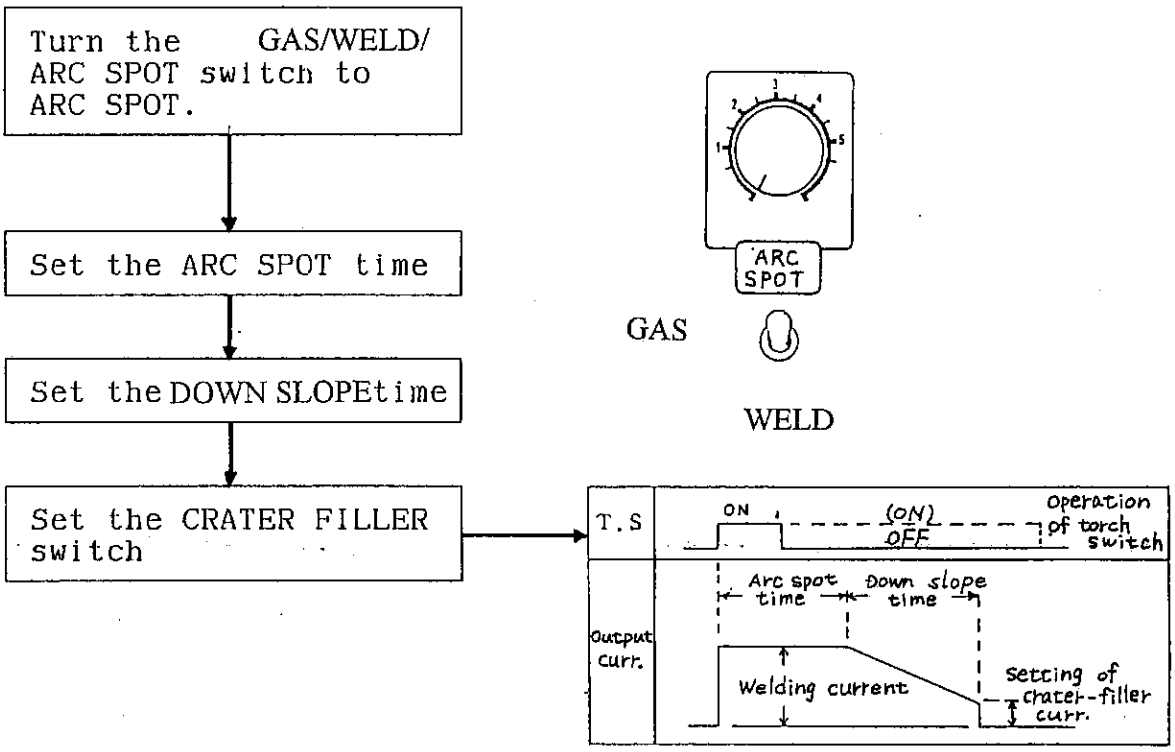


TIG arc welding is a kind of TIG arc welding by which two thin plates made overlap as shown in picture are joined as fused partially from one side by arc heat generated between a tungsten electrode and base metal. To perform the TIG arc spot welding, an arc spot insulating bush and nozzle must be prepared.

Ex. AW-18
Insulating bush: H21B70
Nozzle : H21B71

2.3.2 Setting switch and adjusting knobs

It is almost same as TIG arc welding please refer to item 2.2.1 "Setting procedure-------" .
Different part from TIG arc welding as follows.



2.3.3 Operation for TIG arc spot welding

① Check the setting of each switches and adjusting knob correctly.
→ Refer to 2.2.1 and 2.3.2. In the arc spot welding, pulse is also turned on when the pulse ON/OFF switch is turned to "ON".

↓

② Press the nozzle of torch to base metal and trigger torch switch.
→ After time up of pre-flow time(about 0.3 sec.), high frequency spark from tungsten electrode to base metal and after that arc started. If pre-flow time is not necessary change jumper refer to 3.1.

↓

③ welding
→ Welding arc continues between setting time of arc spot time and down slope time. Initial current is not produced in the arc spot welding.

↓

④ Weld stop
→ Arc spot time is fixed by arc spot timer.

↓

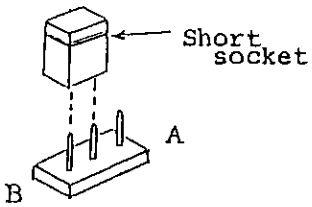
⑤ Stop the power source, gas and water
→ The end of welding operation, stop the control power, input side switch, no fuse breaker, argon gas and cooling water.

↓

Completion of welding

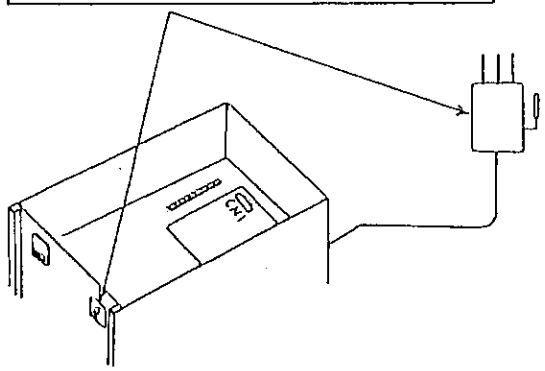
3. Improve welding operation
3.1 Built-in function and its adjustment

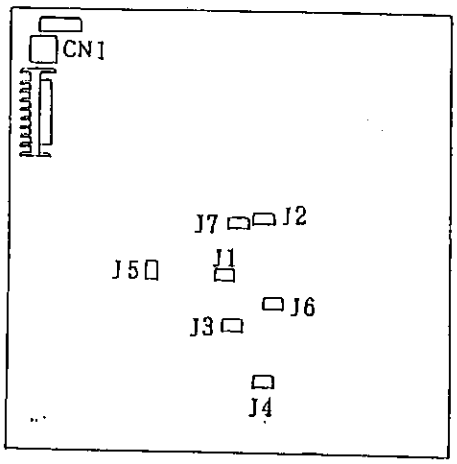
INVERTER ACCUTIG are provided with the switching functions to meet a variety of welding application as listed below. To do switching, open a top cover and replace a short socket of the jumper on P.C.B. P6137U.



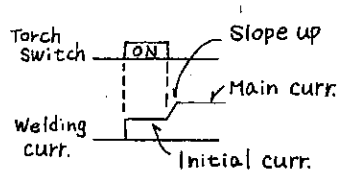
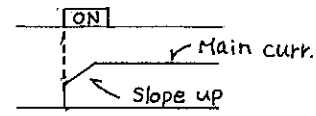
Position of jumper on P.C.B.

Before opening the top cover, turn off "CONTROL POWER" switch of front panel.





Function	Jumper	Setting of jumper	
		A(「A」:on shipment)	B
DC TIG starting current changeover function	J1	START HIGH	START LOW Switch to this setting when a hole is produced in welding of a thin plate
AC TIG starting current changeover function	J2	START HIGH	START LOW Switch to this setting when a hole is produced in welding of a thin plate
AC TIG starting current changeover function	J7	START TIME SHORT	START TIME LONG Switch to this setting when it is difficult to start welding with a genuine tungsten electrode
Preflow time changeover function	J4	PRE-FLOW TIME 0.3 sec.	PREFLOW TIME 0.6 SEC. PREFLOW TIME 0 is available by removing a socket from the jumper

Function	Jumper	Setting of jumper	
		A(「A」:on shipment)	B
Initial current ON/OFF switching	J3	INITIAL CURRENT ON 	INITIAL CURRENT OFF 
AC TIG meter indication changeover function	J6	INDICATION OF AVERAGE WELDING CURRENT	INDICATION OF POSITIVE WELDING CURRENT
Stick welding voltage reducing function	J5	VOLTAGE REDUCING OFF	VOLTAGE REDUCING ON

Note)Do not shift J8 from the position set on shipment from our factory.

3.2 Optional accessories
3.2.1 Welding torch
① Air cooling torch

Air cooling torch		Cable and hose		Extension cable and hose		Length
120A	AW(P)-9	4m	BMRHP-3004	4m	BAWS-1504 →	8m
				11m	BAWS-1511 →	15m
				16m	BAWS-1516 →	20m
150A	AW(P)-17	8m	BMRHP-3008	4m	BAWS-1504 →	12m
				11m	BAWS-1511 →	19m
200A	AW-26	4m	BMRHP-3004	4m	BAWS-2004 →	8m
				11m	BAWS-2011 →	15m
				16m	BAWS-2016 →	20m
		8m	BMRHP-3008	4m	BAWS-2004 →	12m
				11m	BAWS-2011 →	19m

② Cooling water torch (City water)

Water cooling torch		Cable and hose		Extension cable and hose		Length
300A	AW-18	4m	BAB-3504	4m	BAWS-3004 →	8m
210A	AW-20			11m	BAWS-3011 →	15m
210A	AW-25			16m	BAWS-3016 →	20m
		8m	BAB-3508	4m	BAWS-3004 →	12m
				11m	BAWS-3011 →	19m
600A	AW-12	4m	BAB-3504	4m	BAWS-5004 →	8m
				11m	BAWS-5011 →	15m
				16m	BAWS-5016 →	20m
		8m	BAB-3508	4m	BAWS-5004 →	12m
				11m	BAWS-5011 →	19m

③ Cooling water circulation device PU-301.

Water cooling torch		Cable and hose		Extension cable and hose			Length
300A	AW-18	4m	BMRHP-3004	4m	BAWS-3004	→	8m
				11m	BAWS-3011	→	15m
210A	AW-20			16m	BAWS-3016	→	20m
210A	AW-25	8m	BMRHP-3008	4m	BAWS-3004	→	12m
				11m	BAWS-3011	→	19m
600A	AW-12	4m	BMRHP-3004	4m	BAWS-5004	→	8m
				11m	BAWS-5011	→	15m
				16m	BAWS-5016	→	20m
		8m	BMRHP-3008	4m	BAWS-5004	→	12m
				11m	BAWS-5011	→	19m

3.2.2 Cooing water circulation device

Model	PU-301
Input voltage	200V±10% (single phase)
Frequency	50/60Hz
Output power	330W
Output capacity	5.2/6.2ℓ/min.
Output pressure	0.412MPa {4.2kgf/cm²}
Cooling power	246kJ/min. {59kcal/min}
Cooling system	Forced air cooling by radiator
Rated duty cycle	Continuously
Tank capacity	11ℓ
Dimensions (W×D×H)	305×545×337mm
Mass	19kg

Bracket kit(C) BBPU-3017 K5038

Part No.	Description	Q'ty
K5038B00	Bracket	1
U1946C00	Water hose Assembly	2
K2613B00	Part accessory	1

3.2.3 Other optional accessory

Description	Part No.	Remarks
Foot current control	K1104B00	
Foot switch	4259-004	with cable 5m (W-34092)
Torch switch	K509B00	with cable 4m
(Push button type)	K509C00	with cable 8m

3.2.4 Cable and hose

(1) For air-cooled torch

Parts name	BMRHP-3004			BMRHP-3008		
	Parts No.	Q'ty	Remarks	Parts No.	Q'ty	Remarks
Gas hose	P1042K00	1	3m, w/cap nuts at both end	P1042K00	1	3m, w/cap nuts at both end
Welding cable	P1042P00	1	38mm²×3m	P1042P00	1	38mm²×3m
Torch switch	K1108A00	1	w/2-conductor cable of 4m	K1109A00	1	w/2-conductor cable of 8m

(2) For city water

Parts name	BMRH-5004			BMRH-5008		
	Parts No.	Q'ty	Remarks	Parts No.	Q'ty	Remarks
Gas hose	P1042K00	1	3m, w/cap nuts at both end	P1042K00	1	3m, w/cap nuts at both ends
Welding cable	P1013X00	1	60mm²×3m	P1013X00	1	60mm²×3m
Torch switch	K1108A00	1	w/2-conductor cable of 4m	K1109A00	1	w/2-conductor cable of 8m
Water hose	P1042L00	2	5m, w/cap nuts at one end	P1042L00	2	5m, w/cap nut at one end
Water hose end piece	P1042M01	1		P1042M01	1	
Water hose connection	P1042M02	1		P1042M02	1	
Rubber hose for city water		1	30 cm		1	30 cm

(3) For water-cooled torch(Cooling water circulation device PU-301)

Parts name	BMRHP-3004			BMRHP-3008		
	Parts No.	Q'ty	Remarks	Parts No.	Q'ty	Remarks
Gas hose	P1042K00	1	3m, w/cap nuts at both end	P1042K00	1	3m, w/cap nuts at both end
Welding cable	P1042P00	1	38mm²×3m	P1042P00	1	38mm²×3m
Torch switch	K1108A00	1	w/2-conductor cable of 4m	K1109A00	1	w/2-conductor cable of 8m

3.2.5 Extension cable and hose

Description (Extension cable assembly)		Parts No.	Q'ty	Remarks
< BAWS-1504 > For extend the Model AW(P)-9 or AW(P)-17 (cable length is 4 m) torch to 8 m	Extension power cable	H587B00	1	4 m
	Control cable for remote extending	P1043R00	1	4-core×4 m
	Torch switch control cable	P1043S00	1	2-core×4 m
	Adopter	P1600N02	1	
	Connection cover	H558M01	1	With vinyl tape
< BAWS-1511 > For extend the Model AW(P)-9 or AW(P)-17 (cable length is 4 m) torch to 15 m	Extension power cable	H587C00	1	11 m
	Control cable for remote extending	K527H00	1	4-core×11 m
	Torch switch control cable	K527K00	1	2 core×11 m
	Adopter and connection cover are as BAWS-1504			
< BAWS-1516 > For extend the Model AW(P)-9 or AW(P)-17 (cable length is 4m) torch to 20 m	Extension power cable	H587D00	1	16 m
	Control cable for remote extending	K527J00	1	4-core×16 m
	Torch switch control cable	K527L00	1	2-core×16 m
	Adopter and connection cover are as BAWS-1504			
< BAWS-2004 > For extend the Model AW-26(cable length is 4 m) torch to 8 m	Extension power cable	H590B00	1	4 m
	Control cable for remote extending	P1043R00	1	4-core×4 m
	Torch switch control cable	P1043S00	1	2-core×4 m
	Connection cover	H558M01	1	With vinyl tape
< BAWS-2011 > For extend the Model AW-26(cable length is 4 m) torch to 15 m	Extension power cable	H590C00	1	11 m
	Control cable for remote extending	K527H00	1	4-core×11 m
	Torch switch control cable	K527K00	1	2-core×11 m
	Connection cover	H558M01	1	With vinyl tape
< BAWS-2016 > For extend the Model AW-26(cable length is 4 m) torch to 20 m	Extension power cable	H590D00	1	16 m
	Control cable for remote extending	K527J00	1	4-core×16m
	Torch switch control cable	K527L00	1	2-core×16m
	Connection cover	H558M01	1	With vinyl tape
< BAWS-3004 > For extend the Model AW-20 or AW-18(cable length is 4 m) torch to 8 m	Extension gas hose	P1043K00	1	4 m
	Extension water hose (For water supply)	P1043L00	1	4 m
	Extension power cable	H593H00	1	4 m
	Control cable for remote extending	P1043R00	1	4-core×4 m
	Torch switch control cable	P1043S00	1	2-core×4 m
	Connection cover	H558M01	1	With vinyl tape

Description (Extension cable assembly)		Parts No.	Q'ty	Remarks
< BAWS-3011 > For extend the Model AW-20 or AW-18(cable length is 4 m) torch to 15 m	Extension gas hose	K527B00	1	11 m
	Extension water hose (For water supply)	K527D00	1	11 m
	Extension power cable	H593J00	1	11 m
	Control cable for remote extending	K527H00	1	4-core×11 m
	Torch switch control cable	K527K00	1	2-core×11 m
	Connection cover	H558M01	1	With vinyl tape
< BAWS-3016 > For extend the Model AW-20 or AW-18(cable length is 4 m) torch to 20 m	Extension gas hose	K527C00	1	16 m
	Extension water hose (For water supply)	K527E00	1	16 m
	Extension power cable	H593K00	1	16 m
	Control cable for remote extending	K527J00	1	4-core×16 m
	Torch switch control cable	K527L00	1	2-core×16 m
	Connection cover	H558M01	1	With vinyl tape
< BAWS-5004 > For extend the Model AW-12(cable length is 4 m) torch to 8 m	Extension gas hose	P1043K00	1	4 m
	Extension water hose (For water supply)	P1043L00	1	4 m
	Extension power cable	H596B00	1	4 m
	Control cable for remote extending	P1043R00	1	4-core×4 m
	Torch switch control cable	P1043S00	1	2-core×4 m
	Connection cover	H558M01	1	With vinyl tape
< BAWS-5011 > For extend the Model AW-12(cable length is 4 m) torch to 15 m	Extension gas hose	K527B00	1	11 m
	Extension water hose (For water supply)	K527D00	1	11 m
	Extension power cable	H596C00	1	11 m
	Control cable for remote extending	K527H00	1	4-core×11 m
	Torch switch control cable	K527K00	1	2-core×11 m
	Connection cover	H558M01	1	With vinyl tape
< BAWS-5016 > For extend the Model AW-12(cable length is 4 m) torch to 20 m	Extension gas hose	K527C00	1	16 m
	Extension water hose (For water supply)	K527E00	1	16 m
	Extension power cable	H596D00	1	16 m
	Control cable for remote extending	K527J00	1	4-core×16 m
	Torch switch control cable	K527L00	1	2-core×16 m
	Connection cover	H558M01	1	With vinyl tape

3.3 Optional equipment

Refer to respective owner's manual.

3.3.1 TIG welding with filler wire.

(1) TIGUN

・TIGUN'S exclusive torch

Model	AWG - 1501	AWGW - 3001
Rated input current	150A	300A
Duty cycle	40 %	40 %
Cooling method	Air cooling	Water cooling
Cable length	8 m	8 m

・Controller

Mode	HC - 81
Rated input voltage	200 V, single phase
VA at rated output	200 VA

・Accessories

(2) TIG filler wire feeding system

・Controller

Model	HC - 71
Rated input voltage	Single phase 200V
VA at rated output	200VA

・Accessories

・Model CM-271 TIG FILLER wire feeder

・Wire guide assembly

Torch	Model of wire guide
AW - 18	BHC - 7118
AW - 26	BHC - 7126
AW - 17	BHC - 7117
AW - 9	BHC - 7109

3.3.2 Tungsten electrode

(1) Thoriated tungsten electrode

OTC's thoriated tungsten electrode contains 2% thorium, therefore it's consumption is a little, it has very good arc start and very operational.

	Measure (mm)		Welding current (A)	
Parts No.	Diameter	Length	AC	DC straight polarity
0831-005	0.5	150	10	20
0831-010	1.0	150	40	80
0831-016	1.6	150	100	150
0831-020	2.0	150	120	200
0831-024	2.4	150	135	250
0831-032	3.2	150	175	400
0831-040	4.0	150	300	500
0831-048	4.8	150	400	800
0831-064	6.4	150	500	1100

(Clean finishing) ···General popularly parts

	Measure (mm)		Welding current(A)	
Parts No.	Diameter	Length	AC	DC positive
0831-216	1.6	150	100	150
0831-224	2.4	150	135	250
0831-232	3.2	150	175	400

(2) Cerium tungsten electrode

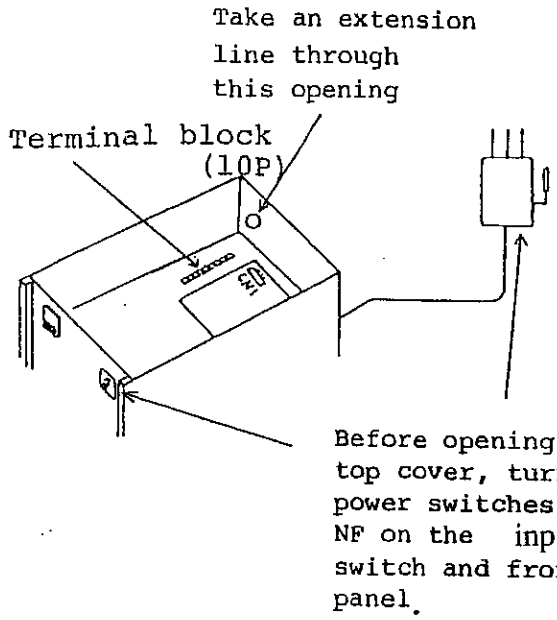
It's consumption is a little that OTC's cerium tungsten electrode.

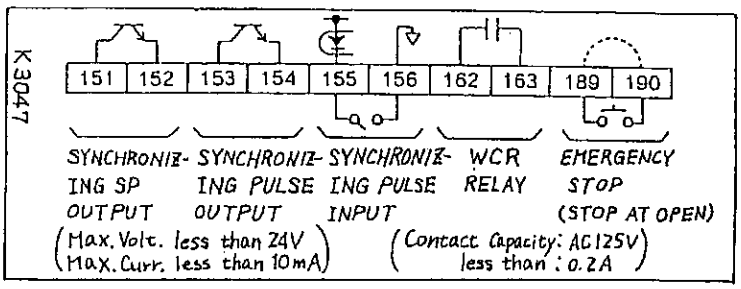
It has very good arc start and very operational.

	Measure (mm)		Welding current (A)	
Parts No.	Diameter	Length	AC	DC straight polarity
0870-016	1.6	150	130	150
0870-024	2.4	150	220	250
0870-032	3.2	150	290	400

3.4 Connection with automatic machine

Open the top cover. You will find a terminal block(10P) at the section shows on the right. signals shows below are sent to the terminal block. Connect a required signal. To prevent malfunction, use a twisted wire as the extension line for connection.





◎ Welding current relay (WCR) contacts (line nos. 162, 163)
Closed during welding current conducting
(Contact capacity : AC125V 0.2 or less)

◎ Synchronizing pulse input (line nos. 155, 156)
Pulse outputted during contact is short-circuited

◎ Synchronizing pulse output (line nos. 153, 154)
Output transistor ON during pulse generating
(Max. volt. and curr. : 24V 10mA)

◎ Emergency stop signal (line nos. 189, 190)
If terminals are opened, emergency stop is applied.

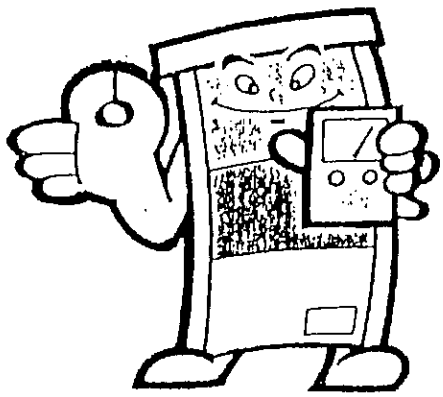
4. MAINTENANCE

4.1 Periodic checking

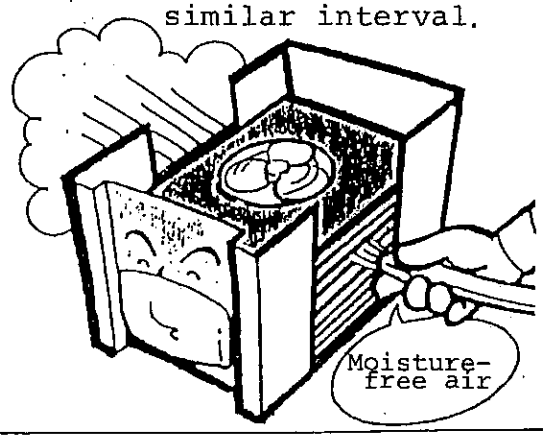
For safe and efficient use of the welding machine, periodic maintenance is the absolute necessity. Perform checking and necessary repair of the welding machine periodically without negligence.
Check of inside or terminals of the welding machine three minutes after turning off the line disconnect switch or NFB without fail.

POINT

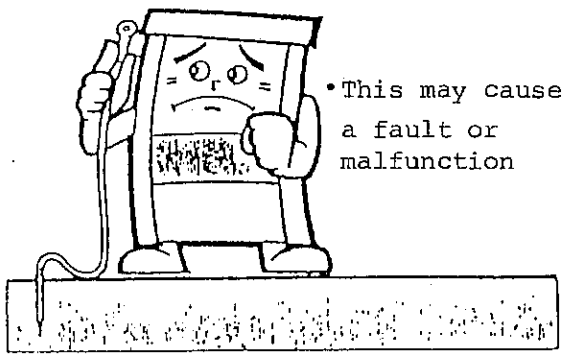
① Fluctuation of voltage is large.



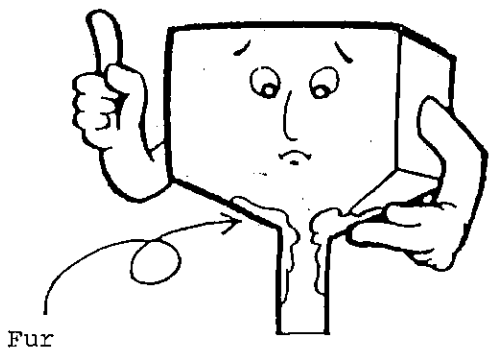
② Cleaning internal components every six months or at a similar interval.



③ Ground wire is disconnected.



④ Replacing the cooling water circulation device every month or at a similar interval.



⑤ Securely tighten line disconnecte, inside and outside cable, or insulating.

4.1.1 Daily checking

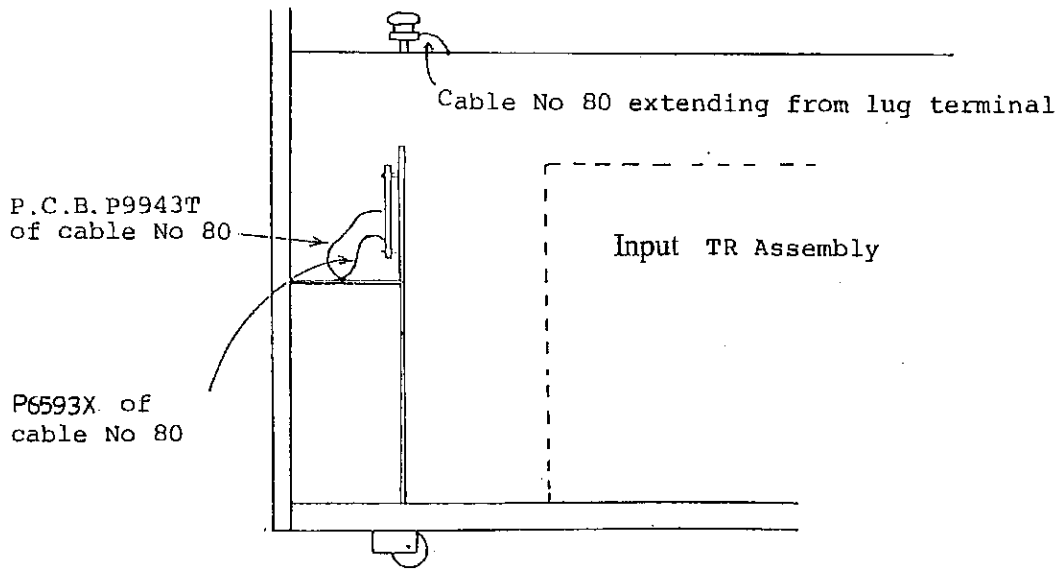
1) Check the welding machine for abnormal vibration, buzzing noise or smell.
2) Check the cable connections for abnormal heating.
3) Check fan of the power source to see that it begins rotating smoothly when "CONTROL POWER" switch is turned on.
4) Check the switches for movement.
5) Check to see that the cable are connected and insulated completely.
6) Check the cables for wire breakage.

4.1.2 Replacing high voltage electrolysis condenser

High Voltage electrolysis condenser C1,2 supply stable direct current to the input transistor inverter, and stabilized work of welding machine.
But electrolyte condenser enclose electrolyte as similar as battery, and it can not prevent decreasing electrolyte, so there is a limit to its power. Therefor, we recommend you to replace C1,2 every five year.

4.1.3 Dielectric strength test

Disconnect case grounding of line No.80 fasten terminal (3 pieces)



4.2 In the case that the "ABNORMAL LAMP" lights up

INDICATION LAMP	CHECK	CAUSE	COUNTERMEASURE
Output over-voltage	Is torch cable winded in welding circuit at AC TIG mode? 	Overvoltage is generated between output terminals.	Make the torch cable and base metal cable parallel and straight on. Turn off input power switch once. The unit is ready to use when the "ABNORMAL" lamp is off after turning on input power switch.
	Are torch cable and base metal cable too long AC TIG mode? 	Over voltage is generated between output terminals.	Make the cables short and parallel Turn off input power switch once. The unit is ready to use when the "ABNORMAL" lamp is off after turning on input power switch.
Input voltage tempera-true	Is duty cycle more than 40%? Duty cycle of this unit is 40% [Duty cycle 40%: Is 10 min the unit is operated for 4 min. at rated current, and without operation for 6 min.]	Inside the unit is over-heated.	Cool the unit for more than 10minutes keeping the fan running. Turn off input power switch after cooling. The unit is ready to use when the "ABNORMAL" lamp is off turning on input power switch.
	Is input voltage low? Is input voltage high?	Input voltage is less than -20% Input voltage is more than +15%	keep the rated input voltage within ±10%

4.3 Check list of welding abnormal

Symptom	Check
Arc is not generated	·Is the power switch turned off? ·Is not lack phase? ·Is fuse of the input side switch is burnt out? ·Is the torch switch connected or broken out? ·Is the base metal cable connected? ·When operating water-cooled torch, is cooling water fed? ·When operating water-cooled torch, are feed and return water connected reversely? ·Is emergency stop allied externally?
Arc is unstable	·Is a connection loosened? ·Is gas provided sufficiently? ·In the AC TIG welding, is the cleaning width appropriate? ·Is tungsten tip sharp or not?
Current can not be controlled	·Is the remote control connected or broke out?
Gas is fed continuously	·Is the switch turned to GAS CHECK?
Gas is not fed	·Is the gas hose connected? ·Is gas provided sufficiently ·Is valve of gas cylinder opened? ·Is mode switch turned to STICK WELDING?
Arc is not turned off	·Is crater filler switch turned to "ON" or "REPEAT"?
High frequency is not provided	·Is the torch switch connected or broke out? ·Is mode switch turned to STICK WELDING mode? ·Is stick welding of base metal cables connected? (Between (-) terminal and base metal) ·Is gas fed?

4.4 Trouble shooting table

(Mark ○ : Line No.)

No.	Trouble / Symptom		Cause	Remedy
1	Lower FM not rotated even if power switch NF is turned ON	"POWER" lamp PL1 dose not light	Switch of input side switch (or NFB)not closed	Check the input side switch
			Poor contact of input side cable	Check input side cable
		"POWER" lamp PL1 is lighting	Blown out of fuse F2	Replace it upon cause checking
			Trouble of blower FM	Check blower FM
2	"ABNORMAL" lamp PL3 light as power switch NF is turned ON		Trouble of thermal guard TH1 and TH2	Check thermal guard TH1 and TH2
			Abnormal heating of input and output transistor assembly	Turn OFF power switch NF once, turn ON again upon cause finding, and cool each cooling plate
			Input voltage is shortage	Check input voltage
			Input voltage is excessive	
	Output side overvoltage lamp PL4 as power switch NF is turned ON		Trouble of thermal circuit	Check and replace P.C.B. P9943S
			Trouble of control circuit	Check and replace P.C.B. P6137U
3	TIG "Water-cooled torch" dose not work even when torch switch is pressed		Trouble of pressure switch PS	Check pressure switch PS
4	Shield gas not discharged even if torch switch push ON	The gas not discharged even if the "GAS" check switch S2 is tipped to the "GAS" side	Trouble of +24V control power circuit	Check and replace P.C.B. P6137U
			Trouble of gas solenoid valve SOL	Check gas solenoid valve SOL
		Gas discharge as S2 is tipped to "GAS"	Trouble of gas control circuit	Check and replace P.C.B. P6137U
			Breaking of torch switch cable and poor contact of plug socket	Check (144) and (145)

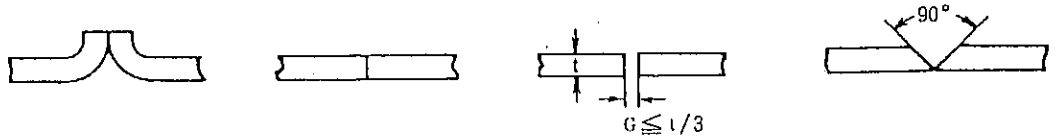
No.	Trouble / Symptom		Cause	Remedy
5	Shield gas not stopped flowing		Trouble of "GAS" check switch or breaking of line	Replace switch and check the line
			Trouble of gas control circuit	Check and replace P.C.B. P6137U
			Trouble of gas solenoid valve SOL	Check gas solenoid valve SOL
6	High frequency	No sparking sound is heard in internal discharge gap	Blown out of fuse F1	Replace it upon cause finding
			Breaking of R18	Check R18
			Trouble of high frequency circuit	Check and replace P.C.B. P6137U.P6019H
			Discharge gap is not good	Grind surface of electrode
			Breaking of torch switch cable or poor contact of plug socket	Check (144) and (145)
		Sparking sound is heard at internal discharge gap	Tungsten electrode turn white	Grind tungsten electrode
7	High frequency generated but arc dose not generated as torch switch push ON		Blown out of fuse F1 on P.C.B. P6137Q	Check and replace P.C.B. P9943W or P.C.B. P6023Q, P6137Q
			Trouble of output transistor driving circuit	Check and replace P.C.B. P9943W
			Trouble of control circuit	Check and replace P.C.B. P6137U
			Trouble of main circuit (Blown out of fuse F2,3)	Turn power switch off and contact our sales agent or OTC's office directly
8	Current adjustment impossible		Trouble of current detector	Check and replace P.C.B. P9790H
			Trouble of Control circuit	Check and replace P.C.B. P6137U
			Variable resister R12, R13, R20 or R21 for current adjustment	Check R12, R13, R20 or R21
			Breaking of remote control cable or poor contact of plug socket	Check (140), (141), (142), or (143)
9	Power switch "NF" trips		Do not turn power switch on again, and contact our sales agent or OTC's office directly	

5. WELDING CONDITIONS

5.1 TIG welding

5.1.1 Typical TIG welding conditions (at OFF pulse)

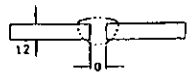
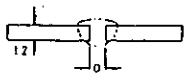
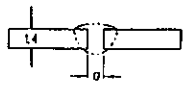
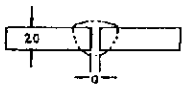
Material	Plate thickness (in.)	Electrode rod dia. (in.)	Filler rod dia. (in.)	Current (A)	Ar. gas flow rate (ℓ/min.)	No. of layers	Groove shape
Stainless steel (DCSP)	.024	.039,1/16	0~1/16	20~40	4	1	(a), (b)
	.039	.039,1/16	0~1/16	30~60	4	1	(a), (b)
	1/16	1/16,3/32	0~1/16	60~90	4	1	(b)
	3/32	1/16,3/32	1/16~3/32	80~120	4	1	(b)
	1/8	3/32,1/8	3/32~1/8	110~150	5	1	(b)
	5/32	3/32,1/8,5/32	3/32~1/8	130~180	5	1	(d), (c)
	3/16	3/32,1/8,5/32	3/32~5/32	150~220	5	1	(d), (c)
	1/4	1/8,5/32,3/16	1/8~3/16	180~250	5	1~2	(a), (c)
Deoxidized copper (DCSP)	.024	.039,1/16	0~1/16	50~70	3~4	1	(a), (b)
	.039	1/16	0~1/16	60~90	3~4	1	(a), (b)
	1/16	3/32	1/16~3/32	80~120	3~4	1	(b)
	3/32	3/32,1/8	3/32~1/8	110~150	4	1	(b)
	1/8	1/8,5/32	1/8~3/16	140~200	4~5	1	(c)
	5/32	1/8,5/32,3/16	5/32~3/16	180~250	4~5	1	(d), (c)
	3/16	5/32,3/16	3/16~1/4	250~300	5~6	1	(d), (c)
	1/4	5/32,3/16,1/4	3/16~1/4	300~400	5~6	1~2	(d), (c)
Aluminum (AC)	.039	1/16	0~1/16	50~60	5~6	1	(a), (b)
	1/16	1/16,3/32	0~1/16	60~90	5~6	1	(b), (a)
	3/32	1/16,3/32	1/16~3/32	80~110	6~7	1	(b)
	1/8	3/32,1/8	3/32~5/32	100~140	6~7	1	(b)
	5/32	1/8,5/32	1/8~3/16	140~180	7~8	1	(b)
	3/16	1/8,5/32,3/16	5/32~1/4	170~220	7~8	1	(b)
	1/4	5/32,3/16	5/32~1/4	200~270	8~12	1~2	(c), (d)
Magnesium (AC)	.039	1/16	0~1/16	30~40	3~4	1	(a)
	1/16	1/16,3/32	1/16~3/32	40~70	4~5	1	(b)
	3/32	1/16,3/32	1/16~3/32	60~90	4~5	1	(b)
	1/8	1/16,3/32	3/32~1/8	75~110	5~6	1	(b)
	5/32	3/32,1/8	1/8~5/32	90~120	5~6	1	(d), (c)
	3/16	1/8,5/32	1/8~3/16	110~150	5~6	1	(d), (c)
	1/4	1/8,5/32	5/32~3/16	130~170	6~7	1~2	(d), (c)



(a) (b) (c) (d)

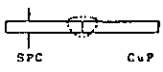
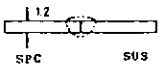
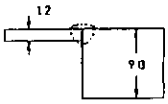
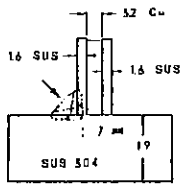
5.1.2 Approximate welding conditions for DC TIG pulse arc welding

(1) In case of flat position butt welding

Material	Edge preparation	Gap G in.	Pulse condition				Welding speed ft./min	Filler wire feed speed ft./min
			Pulse curr. A	Base curr. A	Pulse time sec	Base metal sec		
Mild steel spc		0	200	50	0.2	0.2	2	2
		3/64	150	20	0.3	0.35	1	2
		1/16	130	20	0.5	0.5	0.5	1.33
Stainless steel SUS304		0	150	50	0.16	0.16	2.7	0
		3/64	150	20	0.63	0.65	0.57	1.33
		1/16	130	20	0.38	0.87	0.33	1.33
		5/64	130	20	0.38	0.87	2.77	1.33
Copper Tcup-1		0	280	50	0.16	0.16	2.67	0
		3/64	280	50	0.25	0.25	1.67	2.5
		1/16	280	30	0.28	0.38	0.83	2.5
Titanium Tp-1		0	200	100	0.7	0.7	0.83	0

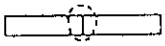
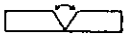
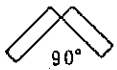
Shield gas : Argon (10ℓ/min) Electrode : Thoriated tungsten 1/8"in.(3.2 mm ϕ)
Filler wire : 3/64 in.(1.2mm) Arc length :5/64 in.(2 mm)

(2) In case of using joints of different heat capacity materials

Material	Edge preparation	Pass	Pulse condition				Welding speed ft./min	Filler wire feed speed ft./min
			Pulse curr. A	Base curr. A	Pulse time sec	Base metal sec		
Copper + Mild steel		1	250	50	0.25	1.0	0.33	2 (Cu)
Stainless + Mild steel		1	170	60	0.2	0.2	1.67	2 (SUS)
Mild steel		1	120	50	0.25	0.25	0.67	1
Stainless steel		4	160	50	0.3	0.35	0.28	2

Shield gas : Argon (10ℓ/min) Electrode : Thoriated tungsten 3/32"in.(2.4 mm ϕ)
Filler wire : 3/64 in.(1.2mm) Arc length : 5/64~0.12 in.(2~3 mm)

5.1.3 AC TIG Pulse welding conditions

Material	Edge preparation	Thickness (in.)	Pulse condition				Filler wire	
			Pulse curr. (A)	Base curr. (A)	Pulse time (sec)	Base time (sec)	Size (in.)	Feed speed (ft./min)
Aluminum		.039	70	25	0.5	0.5	1/16	2.5
		.059	80	40	0.5	0.5	1/16	3.2
		.059	90	25	0.5	0.5	1/16	2.5
		.059	85	25	0.5	0.5	3/64	3.2
		1/8	170	25	0.5	0.5	3/64	9.7
		0.12	170	25	0.5	0.5	1/16	5.7
		15/64	220	25	0.5	0.5	1/16	8.3
	 60° First pass	15/64	180	25	0.5	0.5	1/16	8.3
	Second pass		180	25	0.5	0.5	1/16	8.3
		1/8	170	25	0.5	0.5	3/64	9.7
		15/64	220	25	0.5	0.5	1/16	9
	 90°	0.12	12	25	0.5	0.5	1/16	2

5.2 Stick welding (Coated arc welding)

The table below shows current on typical coated electrodes of soft steel and 110 lbs/in. (50 kg/cm) high tension steel. For details, refer to conditions specified on a specific electrode.

General caution of welding rod

① Keep at a place of low humidity.

② Fully dry up before using.

③ When a gas burned is used to preheat a material or remove moisture from an weld point, heat the welding rod beyond 100℃.

④ Slugs and fume produced in the tack welding are likely to draw moisture on an weld. Remove them immediately after completion of the tack welding.

⑤ An wind shield must be provided when welding is performed outdoor under wind velocity of 10 ft./sec (3m/sec) or higher.

Welding current range (flat)

Electrode dia. in./mm ϕ / Coated electrode	0.1 (2.6)	1/8 (3.2)	5/32 (4.0)	0.18 (4.5)	0.2 (5.0)
Illuminate type	50~85	80~130	120~180	145~200	170~250
Lime titanium type	50~100	90~130	140~180	160~250	190~250
Low-hydrogen type	55~85	100~140	140~190		190~250

Welding current range (vertical and overhead)

Electrode dia. in./m m ϕ / Coated electrode	0.1 (2.6)	1/8 (3.2)	5/32 (4.0)	0.18 (4.5)	0.2 (5.0)
Illuminate type	40~70	60~110	100~150	120~180	130~200
Lime titanium type	50~90	80~130	110~170	125~190	140~210
Low-hydrogen type	50~80	90~130	120~180		160~210

6. PARTS LIST

If parts are required for replacement, direct order involving description and part number to our sales agent or OTC's office directly.

Input side transistor assembly

Symbol	Part No.	Description	Specification	Q'ty	Remarks
CT1	4813-006	Coil	THM0.025×5×25×3	1	
TR1AB	4534-222	Transistor module	2DI150Z-120	1	
DR1	4531-058	Diode module	PT5112	1	
SCR2	4530-148	Thyristor	PE40F-120	1	
TH1	4258-007	Thermal guard	OHD3-90B	1	
F2, 3	4610-033	Fuse	CR6L-30	2	
C5, 6	4518-459	Capacitor, polye metfilm	BUP0.01μF 2000V or ECW-H15H103JR	2	
C23	4518-429	Capacitor, polye metfilm	BUP0.022μF 1600V or ECW-H12H223JR	1	
C3AB C4AB	4518-417	Capacitor, polye metfilm	EEF2G156JBA116	4	
R5AB R6AB	4504-330	Resistor, wire wound	NCRF22V50Ω	4	
R2	4509-713	Resistor, carbon	RD1/2W 10kΩ J	1	
R3, 4	4509-856	Resistor, cement	20SH15kΩ KA	2	
DR2	4531-048	Diode module	RM20HA-24F	1	
R31	4509-817	Resistor, cement	10SH-N-10Ω JA	1	
C25	4517-404	Capacitor, polye metfilm	50WV0.01μF	1	

Output side transistor assembly

Symbol	Part No.	Description	Specification	Q'ty	Remarks
TR2ABC TR3ABC	4534-213	Transistor module	2DI150D-050	3	
DR3～6	4531-064	Diode module	2FI200A-060DZ	2	
DR7,8	4531-063	Diode module	PD308	1	
TH2	4258-007	Thermal guard	OHD3-90B	1	
C7～10	4518-429	Capacitor, polye metfilm	BUP0.022μF 1600V or ECW-H12H223JR	4	
C13, 14	4518-434	Capacitor, polye metfilm	PL630V 224k	2	
R7～10	4509-828	Resistor, cement	20SH-N-5Ω JA	4	
R32, 33	4509-829	Resistor, cement	10SH-N-0.82Ω JA	2	
SCR1	4530-137	Thyristor module	SG25AA60	1	
R29, 30	4508-016	Resistor, carbon	RD1S200kΩ J	2	
R24AB R25	4504-318	Resistor, wire wound	NCRF22V5Ω	3	
R26	4509-713	Resistor, carbon	RD1/2W 10kΩ J	1	

Symbol	Part No.	Description	Specification	Q'ty	Remarks
C15	4517-404	Capacitor, ceramic	50V0.01μ F	1	
C11AB,12	4518-411	Capacitor, polye metal	EEF2V206JBA116	3	
	P9790H00	Printed circuit board	P9790H00	1	
	P9943X00	Printed circuit board	P9943X00	1	

Front Panel

Symbol	Part No.	Description	Specification	Q'ty	Remarks
NF	4614-027	Circuit protector	295-111-62F-30A	1	
A	4403-050	Ammeter	W-W00403	1	
R14～16	4501-042	Potentiometer, carbon	RV24YN20SB 100KΩ	3	
R17 R20, 21	4501-039	Potentiometer, carbon	RV24YN20SB 5KΩ	3	
R22	4501-043	Potentiometer, carbon	RV24YN20SB 2KΩ	1	
R23	4501-044	Potentiometer, carbon	RV24YN20SB 300KΩ	1	
R28	4501-042	Potentiometer, carbon	RV24YN20SB 100KΩ	1	
S1	4251-045	Toggle switch	M-2020L/B	1	
S2	4251-039	Toggle switch	S-7B or AJ32120	1	
S3	4251-040	Toggle switch	S32-B	1	
S4～6	4251-041	Toggle switch	S3-B or AJ31120	3	
PL1	4600-206	Pilot lamp	199-RK460-200L	1	
PL2	4600-305	LED	00-99G	1	
PL3, 4	4600-302	LED	00-99R	2	

Output terminal

Symbol	Part No.	Description	Specification	Q'ty	Remarks
LF	4519-006	Noise filter	NDH001	1	
SOL	4813-001	Gas solenoid valve	W-31156	1	
PS	4255-016	Pressure switch	W-W00032	1	
CON1	4730-002	Metal plug socket receptacle	DPC25-2BP	1	
CON2	4730-018	Metal plug socket receptacle	DPC25-4BP	1	
R11	4504-410	Resistor, wire wound	GG60W 120Ω	1	
C.C	P6023S00	Coupling coil	P6023S00	1	
	P6593X00	Printed circuit board	P6593X00	1	
	P9943T00	Printed circuit board	P9943T00	1	

Chassis

Symbol	Part No.	Description	Specification	Q'ty	Remarks
	P6023Q00	Printed circuit board	P6023Q00	1	
	P9943S00	Printed circuit board	P9943S00	1	
	P6137X00	Printed circuit board	P6137X00	1	
	P9943W00	Printed circuit board	P9943W00	1	
	P6137U00	Printed circuit board	P6137U00	1	
F1	4610-032	Fuse	BLA005	1	

Frame

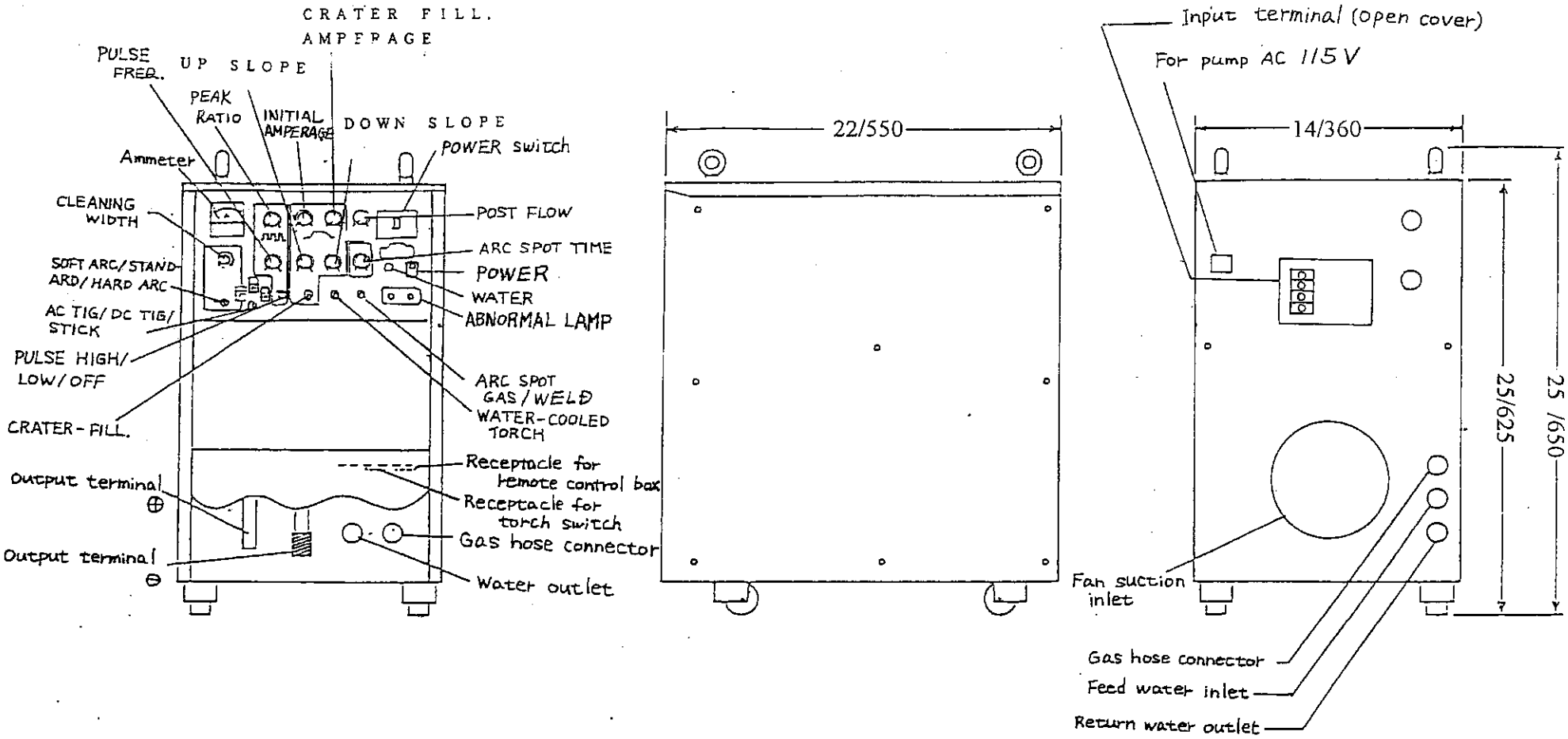
Symbol	Part No.	Description	Specification	Q'ty	Remarks
T1	P6367B00	Inverter transformer	P6367B00	1	
L1	P6023D00	High frequency reactor	P6023D00	1	
C1, 2	4511-329	Capacitor, electrolytic	LNR2W152MSMC0E	2	
FM	4805-026	Fan motor	109-602	1	
R1A~C	4504-411	Resistor, wire wound	NCRF24V 30Ω J	3	
R27A~C	4504-412	Resistor, wire wound	NCRF24V 300Ω J	3	
CON3	4730-165	Receptacle	WCF1041B	1	
C24	4511-330	Capacitor, electrolytic	LNR2W471MSMAWS	1	
R35	4508-016	Resistor, carbon	RD1S 200kΩ J	1	
R36, 37	4509-010	Resistor, metal film	RS3W 100kΩ J	2	

Remote control box

Symbol	Part No.	Description	Specification	Q'ty	Remarks
R12, 13	4501-104	Potentiometer, carbon	RV30YN20SB 5KΩ	2	
	4735-007	Knob	K2195(large ϕ40)	2	
	4730-005	Metal plug socket (4P)	DCP25-4A	1	

Sub-chassis

Symbol	Part No.	Description	Specification	Q'ty	Remarks
T2	4810-138	Aux. transformer	W-W00834	1	
T3	4810-136	Aux. transformer	W-W00839	1	
DCV	4814-012	Switching regulator	SPEC6774	1	
R18	4504-503	Resistor, wire wound	GG80W 200Ω	1	
C16	4517-418	Capacitor, ceramic	DE7100F222MAC400V	1	
C17~22	4518-418	Capacitor, polye metfilm	QXE2E104KTPT	6	
R19	4509-605	Resistor, metal film	RS2W 510Ω J	1	
R34	4509-861	Resistor, cement	20SH200Ω JA	1	
	P6228R00	Printed circuit board	P6228R00	1	
	P6019H00	Printed circuit board	P6019H00	1	
	P6137Q00	Printed circuit board	P6137Q00	1	
T4	4810-139	Aux. transformer	W-W00321	1	



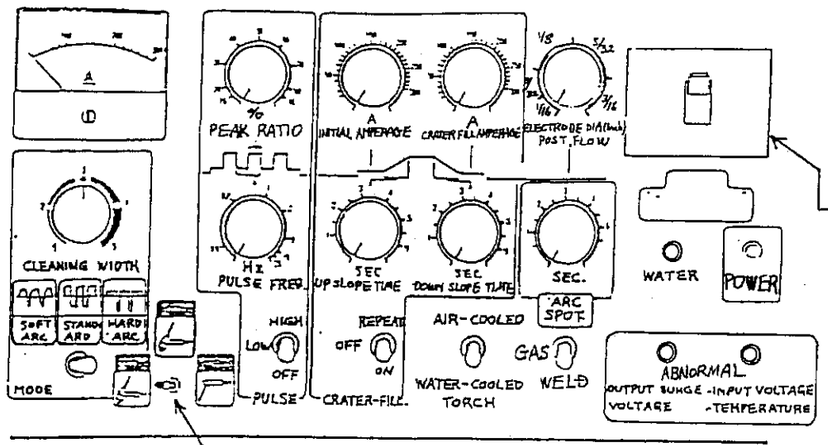
EXTERNAL VIEW

(Unit in./mm)

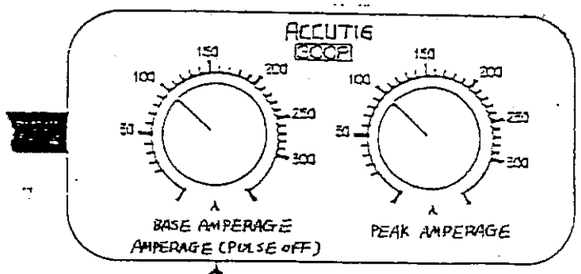
2.4 STICK WELDING

2.4.1 The switch and adjusting knob.

Set in order of figure.



REMOTE CONTROL BOX



(1) Turn on switch in input side power distribution board.

(2) " POWER " pilot lamp lights up.

(3) Turn on "CONTROL POWER" switch.

(4) Set "STICK/TIG" changeover switch to "STICK".

* Set the "STICK" just then generate the no load voltage between output terminal.

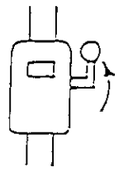
(5) Set the amperage knob.

* Guess welding current toward welding rod size as follows , but welding current is different by the material and welding position. For further details refer to a catalog of welding rod.

Welding rod size (in./mm ϕ)	Welding current (A)
1/16 (1.6)	20 - 40
5/64 (2.0)	30 - 60
0.10 (2.6)	50 - 100
1/8 (3.2)	80 - 140
5/32 (4.0)	110 - 210
0.2 (5.0)	140 - 250

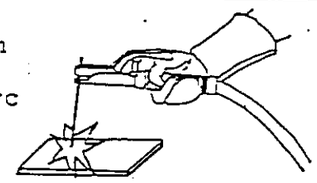
Other switch and adjusting knob are not relation for stick welding.

2.4.2 Welding work order



(1) Make certain that setting of the respective switches, dials and knobs is proper.

(2) Welding rod contact with base metal, when make arc start.



(3) Welding.

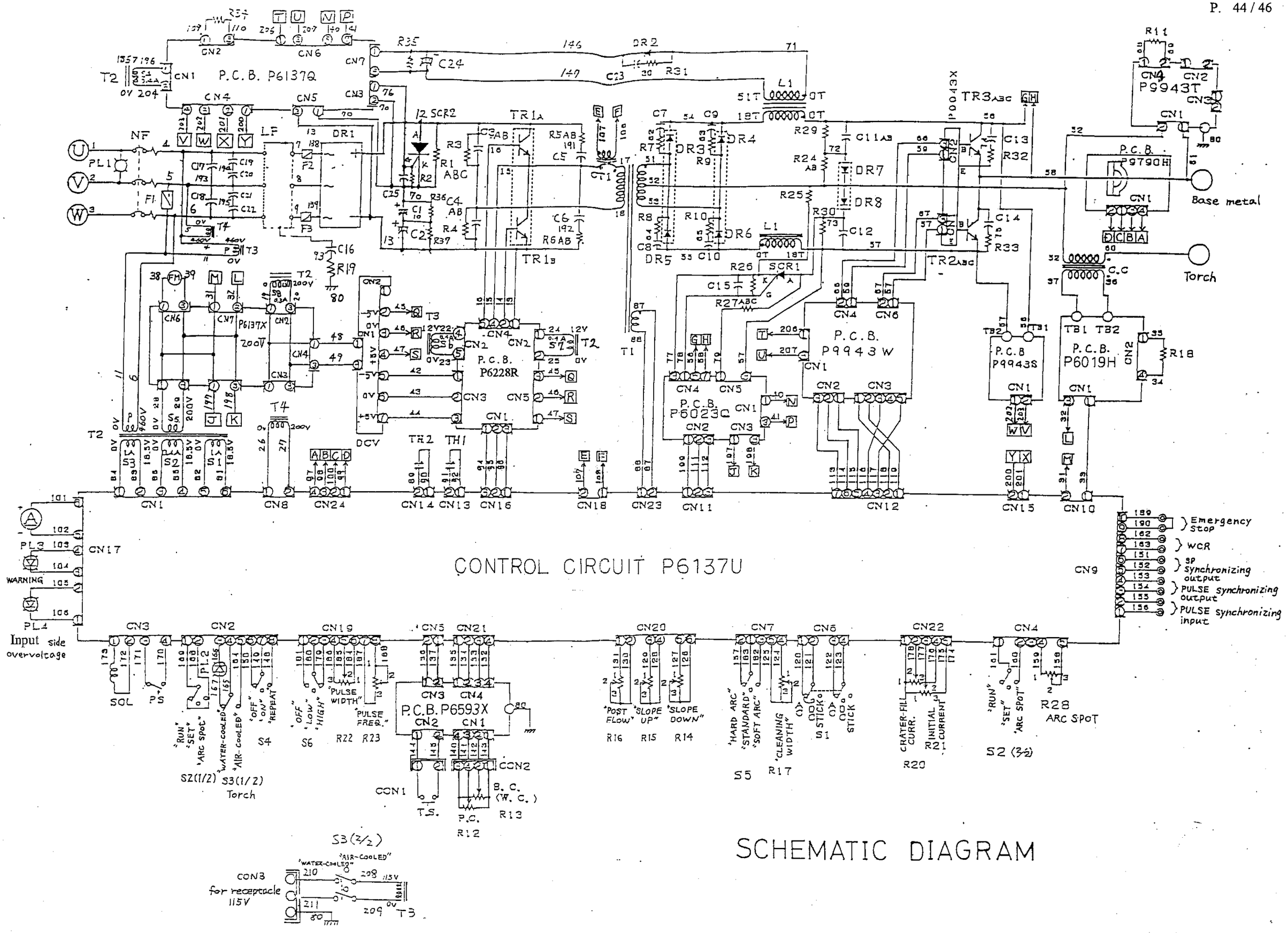
(4) Welding arc cut off by hang up the welding rod.

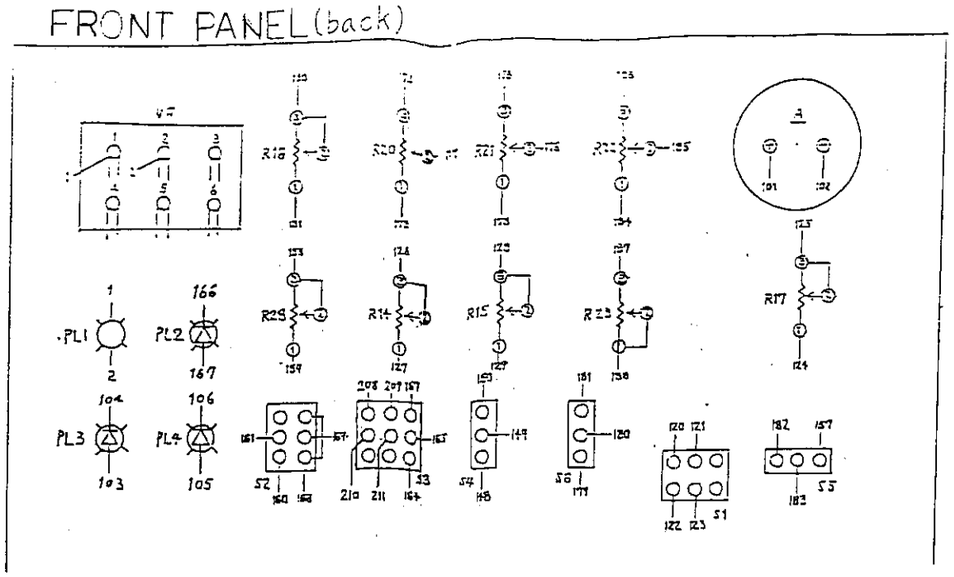
(5) Turn off power supply.

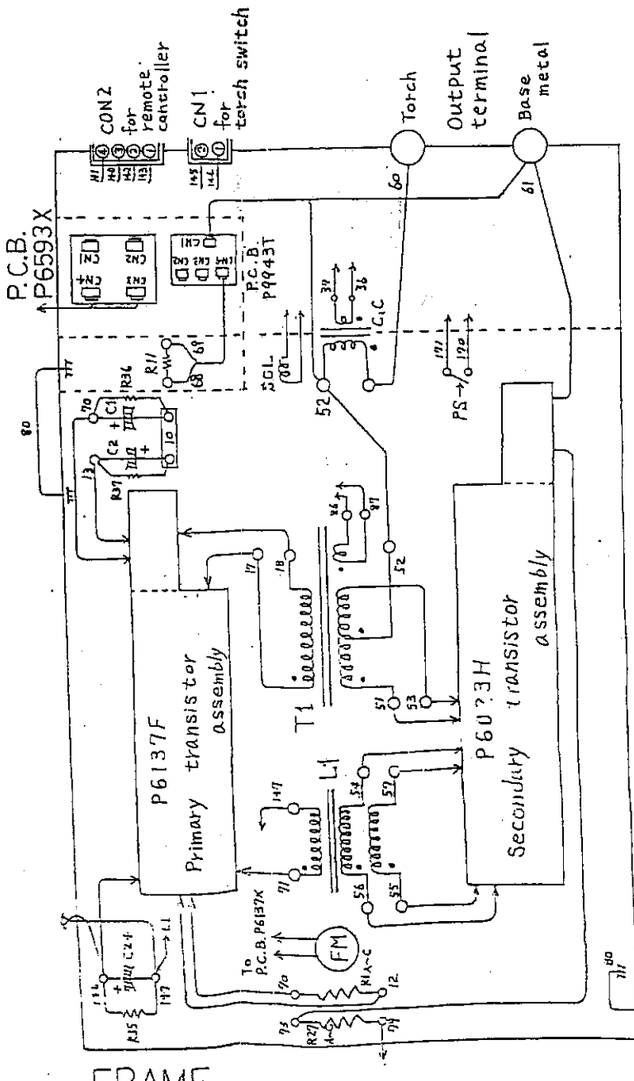
Completion of welding

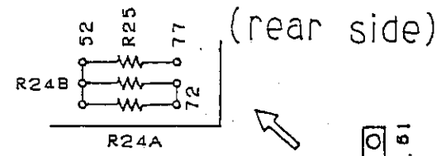
Voltage reducing function

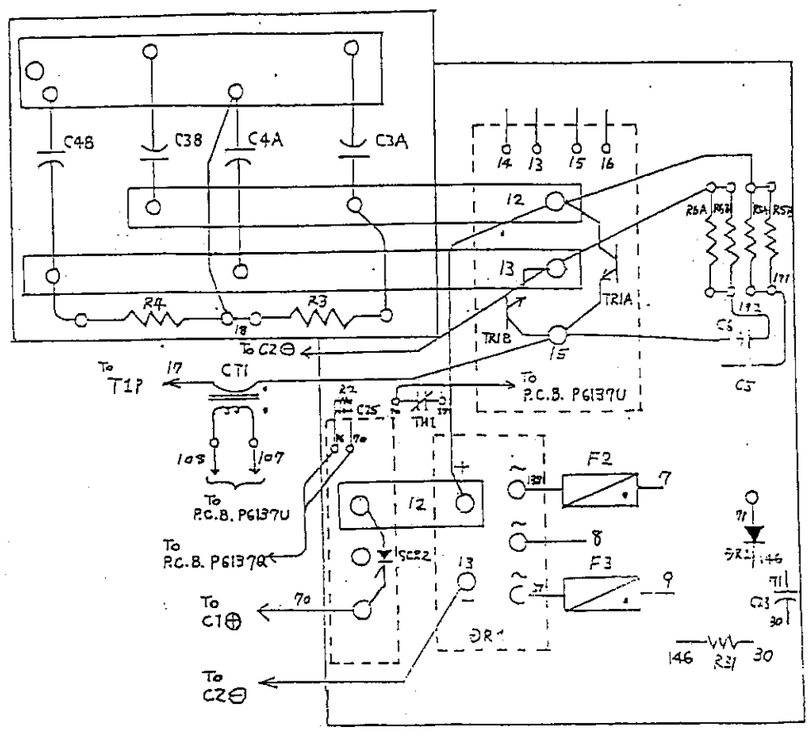
Model AVP-300 has Voltage reducing function ON/OFF changeover circuit. Setting "OFF" on shipment. But Voltage reducing function can be "ON" when the exchangeable jumper J5 is transferred from "A" to "B" side on P.C.B. P6137U.


P.C.B. P6137Q
CN1
CN2
CN3
CN4
CN5
CN6
CN7
T1
T2
T3
T4
L1
NF
LF
PL1
F1
F2
F3
DR1
DR2
DR3
DR4
DR5
DR6
DR7
DR8
SCR1
SCR2
TR1A
TR1B
TR2ABC
TR3ABC
P6137X
P.C.B. P6228R
P.C.B. P6023C
P.C.B. P9943W
P.C.B P9943S
P.C.B. P6019H
P9943T
P9790H
P.C.B. P6593X
Base metal
Torch
Input side overvoltage
Emergency Stop
WCR
SP synchronizing output
PULSE synchronizing output
PULSE synchronizing input
CONTROL CIRCUIT P6137U
SCHEMATIC DIAGRAM

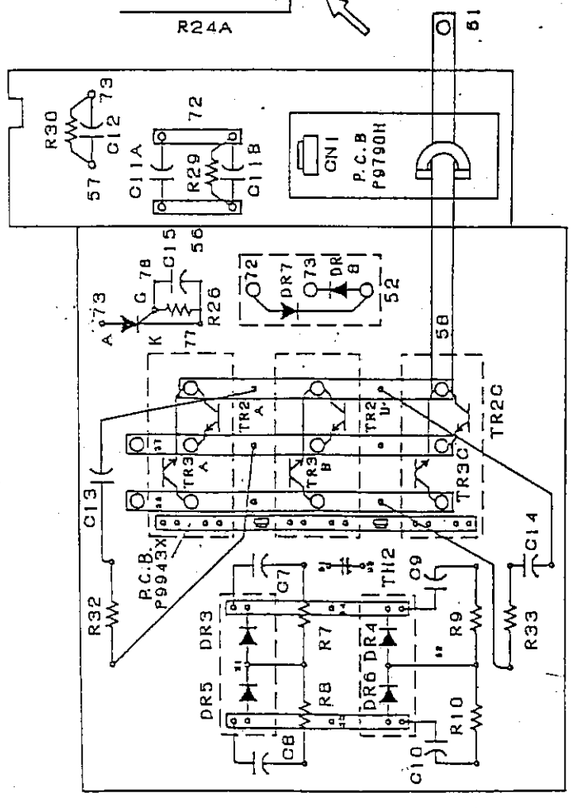








Input heat sinks

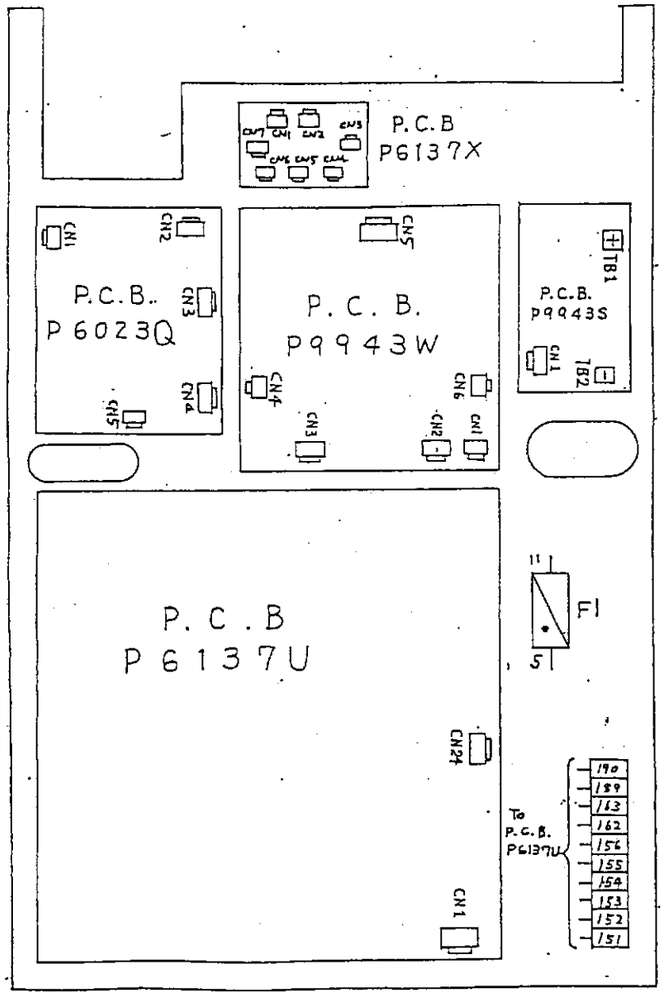


Output heat sinks

PARTS LAYOUT(1/2)

CHASSIS

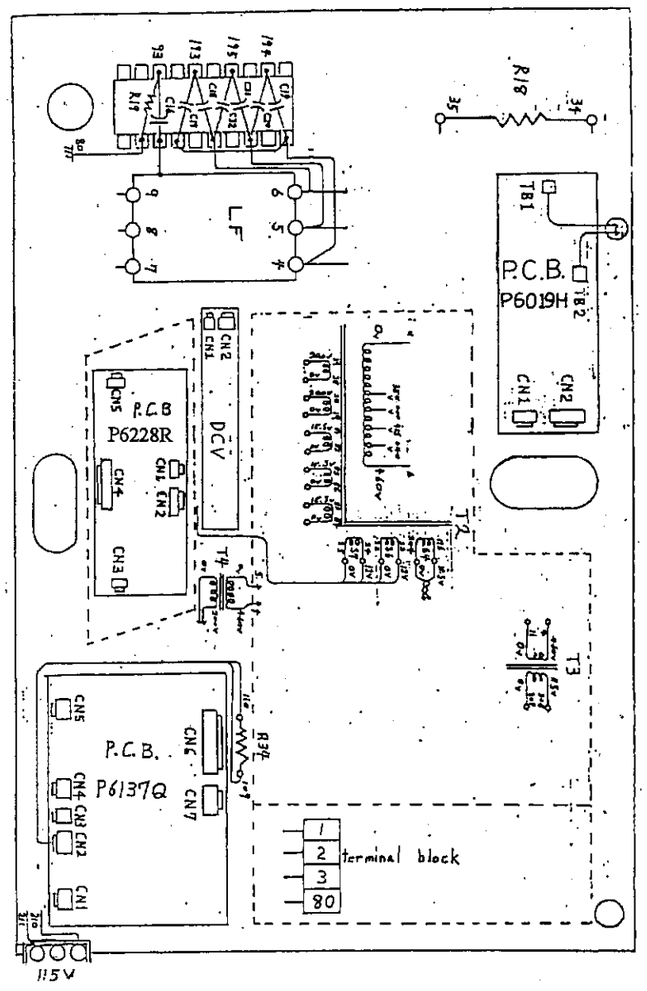
(front)



(rear)

SUB CHASSIS

(front)



(rear)

PARTS LAYOUT (2/2)