

DUAL-SPOTTER

ALUMINUM & STEEL

STUD WELDING SYSTEM



OPERATOR MANUAL

IMPORTANT: BEFORE STARTING THE EQUIPMENT, READ THE ENTIRE MANUAL.

THIS MANUAL MUST BE STORED IN A PLACE FAMILIAR TO ALL USERS FOR THE ENTIRE OPERATIVE LIFE-SPAN OF THE MACHINE. THIS EQUIPMENT MUST BE USED SOLELY FOR WELDING OPERATIONS BY SKILLED TECHNICIANS.

SAFETY PRECAUTIONS - WELDING CAN BE HARMFUL TO YOURSELF AND OTHERS.

1) ELECTRIC SHOCK - *May be fatal!*

Connect the welding machine to power lines according to applicable and NEMA regulations.

Do not touch live electrical parts or electrodes with bare skin, gloves or wet clothing.

Isolate yourself from exposed power, earth and the work piece bare metal.

Make certain machine and work piece are grounded to earth per applicable regulations.

2) FUMES AND GASES - *May be hazardous to your health!* Work in the presence of adequate ventilation and/or with fume extraction system preventing fume build-up work area.

3) ARC RAYS - *May injure the eyes & burn skin! Eye & skin protection must be worn!*

Protect your eyes with #5 DIN (min.) filtered lenses and protect your body with appropriate safety garments when spot welding. Protect others by installing adequate shields or curtains.

4) RISK OF FIRE AND BURNS - *Sparks may cause fires and burn the skin!* Be certain there are no flammable materials in the area and wear appropriate protective garments.

5) NOISE - This machine does not directly produce noise exceeding 80dB; however, Users must take all precautions required by local codes or laws in the event they are below this level.

6) PACEMAKERS - The magnetic fields created by high currents may affect the operation of pacemakers. Wearers of vital electronic equipment (pacemakers) should consult their physician before beginning any arc welding, cutting, gouging or spot welding operations.

7) EXPLOSIONS - Do not weld in the vicinity of containers under pressure, or in the presence of explosive dust, gases or fumes. . All cylinders and pressure regulators used in welding operations should be handled with care.

8) ELECTROMAGNETIC COMPATIBILITY - This machine is manufactured in compliance with the instructions contained in the harmonized standard, **and must be used solely for professional purposes in an industrial environment. There may be potential difficulties in ensuring electromagnetic compatibility in non- industrial environments.**

IN CASE OF MISUNDERSTANDING OR MALFUNCTIONS, REQUEST ASSISTANCE FROM QUALIFIED PERSONNEL OR CONTACT TECH SUPPORT @ 800-554-0074

1. DESCRIPTION OF TECHNICAL SPECIFICATIONS

MODE		SN:	
CE	S	EN50063:1989 ISO669:2000	
$U_{in}=1\sim 110V\pm 15\%$		$U_{20}=38V$	
$I_1(max)=8A$		$I_2(max)=8000A$	
Duty = 10 M4 AL Studs/min @ 80%		Weight=16kg	

SN——Series number

CE, EN, ISO——Certification standards

U_{in} —— rated supply voltage

U_{20} ——range of rated ac no-load voltage and number of adjustable steps

$I_1(max)$ ——max input welding current

$I_2(max)$ ——max output welding current

Duty——Duty cycle

Weight——weight of the welding equipment

2. Summary

The machine is for Capacitor Discharge Stud Welding, the weld able range is Ø3- Ø6mm. Stud materials are soft steel, stainless steel, aluminum, titanium (Ti), brass and copper. Stud Welding time is about 3/1000s-6/1000s, since this time is very short, the welding heat can not damage the base metal, even when the base metal is thin sheet.

2-1 Warnings / Attention

(1) Input power is AC115VAC, 1-phase. Please confirm the input voltage matches the electrical data on the back of machine.

(2) Turn switch to "OFF" position when not using the machine.

(3) Make sure turn "OFF" the switch, when connect or remove the cables of the machine.

(4) Any machine maintenance or repair requires switch be in "OFF" position for 5 minutes before starting work. This is required time to fully discharge capacitors.

(5) The stud clamp is inside the stud welding torch. The inside diameter of stud clamp must suitable the stud screw. Do not use worn stud clamp.

(6) Stud welding may to cause welding arc and metal spatter, protect yourself with appropriate safety garments and goggles.

(7) Before welding, confirm there are no flammable materials work areas.

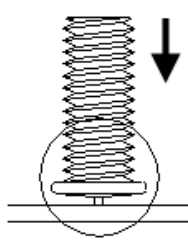
(8) The machine must use special stud screws (from dealer) to function properly.

(9) Please contact the manufacturer, as following situations: mechanical failure, reduce or increase the torch cable, change the standard equipment.

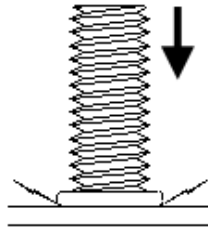
2-2. AL & Steel CD Spot Welding

2-2-1. AL Stud Welding (Diagram 1)

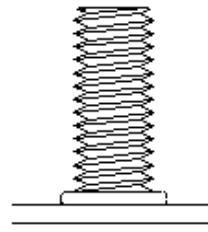
Contact type:



1. The stud pressed onto material - Compression



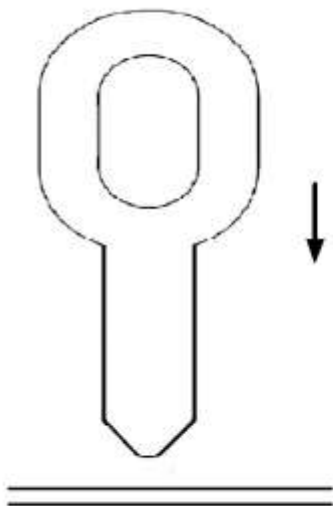
2. Capacitor discharge arc melts pin into puddle



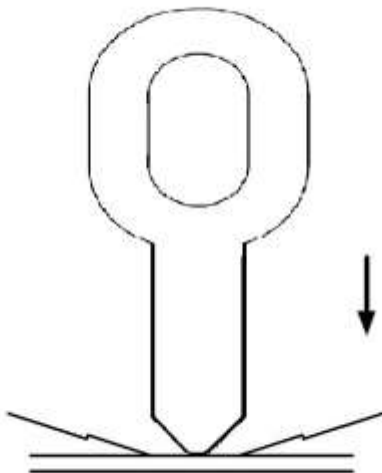
3. Completed AL stud weld

When mounting the stud, make sure the work piece is smooth and clean. The stud should extend about 2mm beyond the end of the earth legs. Confirm the stud is completely and securely inserted into the collet. Set the stud pin-end on the work surface and push down until earth pins make contact. Press the torch trigger, the stud will be welded on the base metal immediately. Check the stud welding strength. If the strength is not enough, please adjust the output power and/or torch pressure.

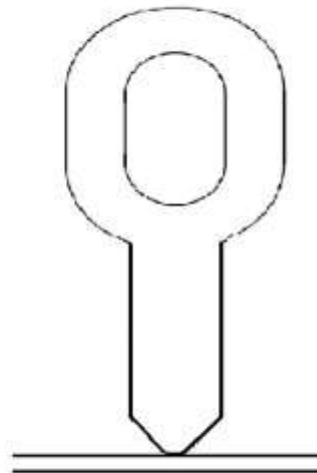
2-2-2. Steel Spot Welding (Diagram 2)



1. Washer contact to work



2. Discharge-arc



3. Finish welding

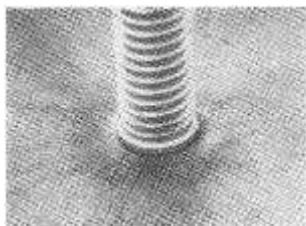
This capacitive discharge spot welding function applies heat to surface only so it does not heat effect the back side of work piece. The back of the work piece is not oxidized and any protective coating is not damaged or removed.

2-3. Stud welding visual test

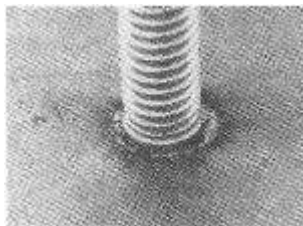
Please refer to the picture as follow, and assessment the stud welding results.

If the stud welding results are not good. Please refer to Part 2-7, and adjust the charge voltage, torch head pressure or torch head height, according as the standard. (Note: only adjust one parameter at a time.)

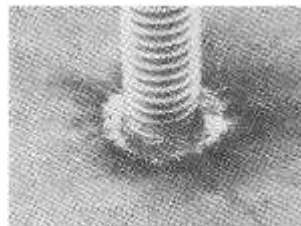
1.Voltage not enough



2. Correct voltage



3. Too high voltage



2-4. Stud weld trouble shooting

The following situations may cause inferior welds:

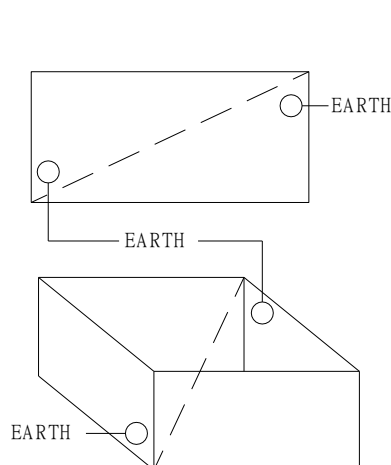
- (1) The earth legs and the metal are not good connection. (Clean tips and base material)
- (2) Torch cable or earth cable is loose in machine connectors. (Twist until tight)
- (3) The diameter of stud and collet are not a match. Or the collet is worn. (Replace collet)
- (4) The base metal dirty, rusty, paint or other problem interfere with electricity conductivity.
- (5) The stud is not suitable for the base metal. (check material & stud type to match)
- (6) The stud screw and the base metal are not good connection (Keep the stud screw connect the base metal vertically. Do not contact flange with base metal, only pin head).
- (7) The stud welding voltage is not correct. (Increase or decrease as required)
- (8) The capacitor is damage, or capacitance is not enough. (Replace capacitor)
- (9) Welding torch movement is mis-aligned. (The support feet must be even and square)
- (10) Stud screw extends too long or too short from the stud clamp. (Correct "stick-out")
- (11) Base metal distortion or moves when welding. (Support material)
- (12) Method for connect the earth cable:

① Cable must contact the base metal directly and must contact more than two points.

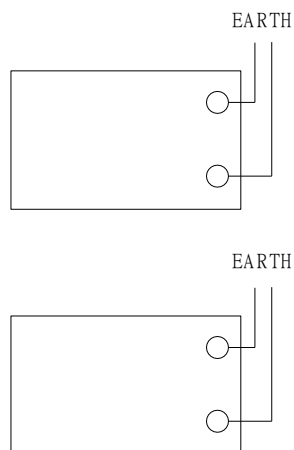
② The earth cable must connect on the diagonal position of the base metal.

(refer to the diagram as follow)

◎ correct connection



◎ incorrect connection



2-5. Welding mode, torch and earth cable choice

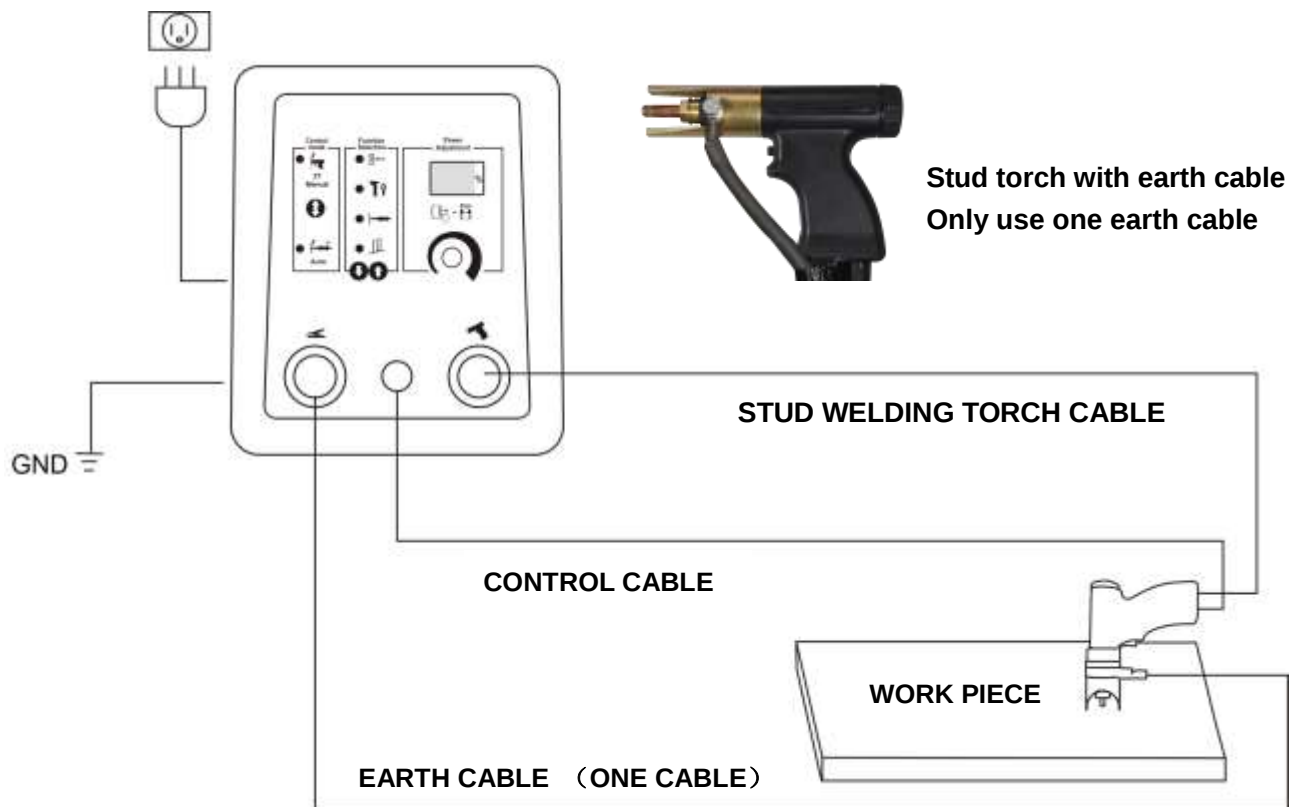
There are 3 welding mode for the machine

- (1) **Steel tab welding:** use torch tips or quick pull weld-tip slide hammer for the steel car body, please mount torch cable to socket “1” and control socket “4”, mount earth cable to socket “2”.
- (2) **Aluminum stud welding:** please mount stud welding torch to socket “1” and control socket “4”, mount earth cable to socket “2”. If using complete set stud welding torch with earth cable, it is also the same. Please mount earth cable to socket “2”.

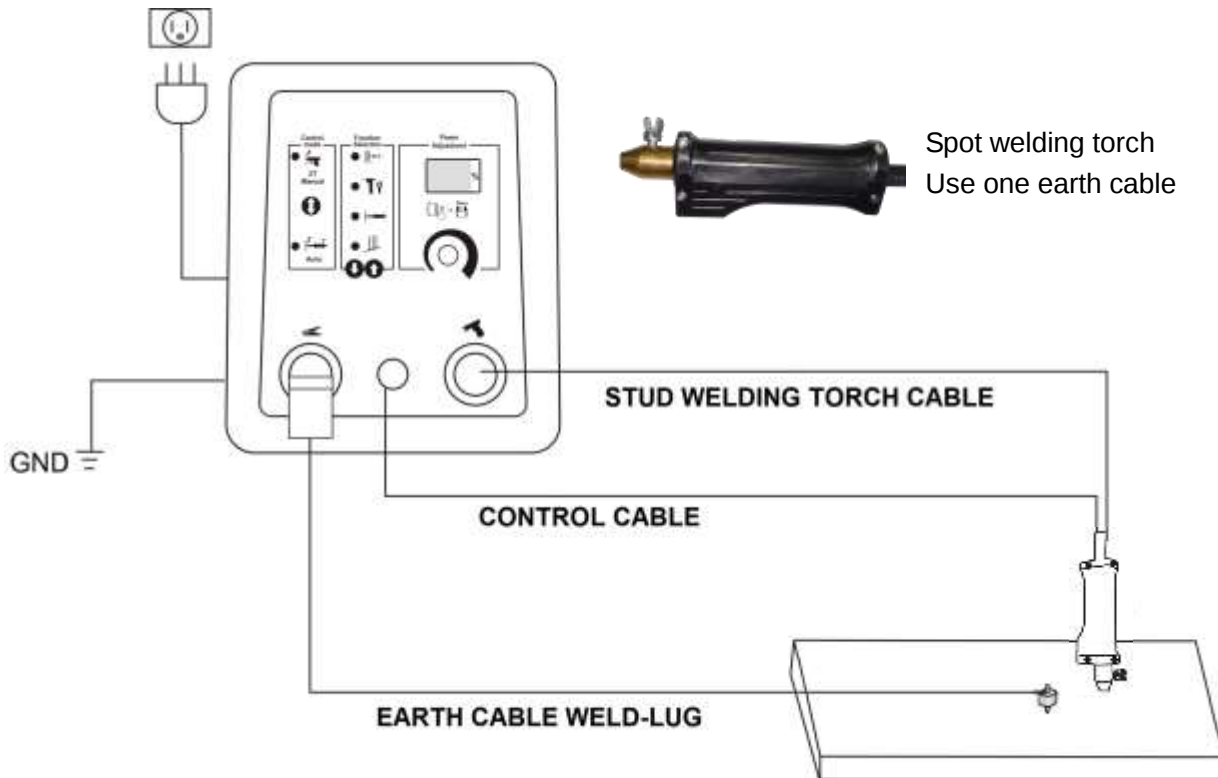


2-5-1. The cable connection, please refer to above the diagram.

1) For stud welding-torch with earth cable

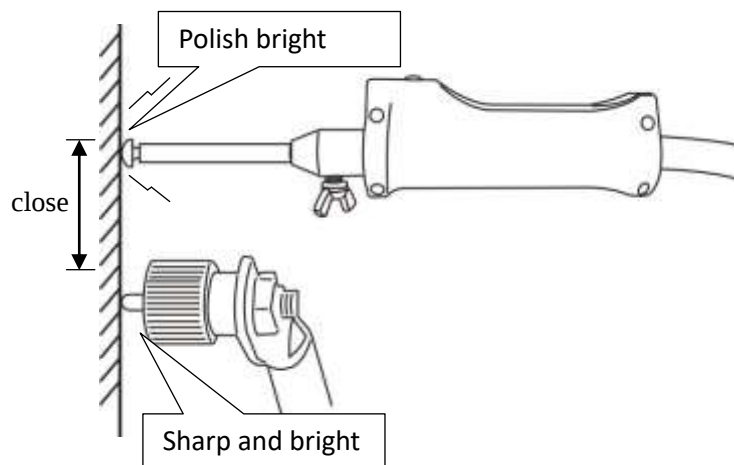


2) For spot welding

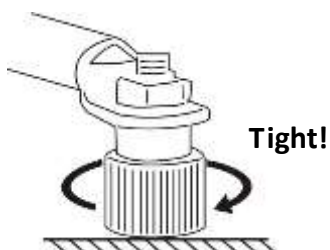


Installing Earth Weld-Tip Collar

- (1) Clean surface area for earth lead connection
- (2) Place torch with spot tip installed close to weld-tip collar electrode.



- (3) Screw collar to surface making 100% contact





2-5-2. Operation suggestions:

The machine is different from traditional spot welder as it uses patent power source design. The peak output current is over three times of traditional welder and the welding current is reducing to several milliseconds, so it can greatly reduce welding heat on the body panel and keep surface clean. However, if the output circuit has poor contact, it may burn black the work piece. It needs good conduction and good contact. Please note the following suggestion:

- 1) Polish and clean the work piece, whatever welding point or earth connection point.
- 2) The earth cable needs good contact, close to the welding point. Use two earth contacts, when aluminum stud welding. The welding point should be between the two earth contacts and keep equal distance.
- 3) Polish and clean the stud and electrode.
- 4) When use quick puller slide hammer, make sure to screw tight all conductive parts.
- 5) Press the torch, washer, electrode on the work piece with more strength, when welding operation. It is good for conduction. Please don't welding with weak pressure contact.

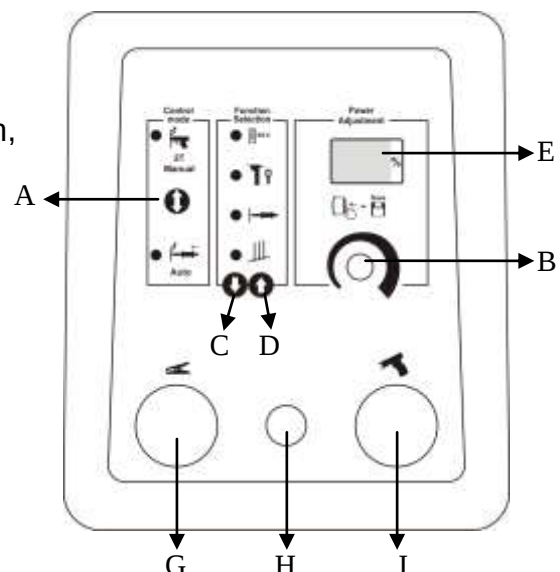
2-6. Control Panel

A—There are two modes to select

Auto mode: (steel only) On contact with welding torch, provided earth is connected, output is automatic. If the auto mode indicator is flickering, it means the machine is charging and cannot output.

Manual mode: trigger on the torch, the machine will output.

If the auto mode indicator is flickering, it means the machine is changing and can not output.



B— Output power adjust and save setting

Turn the knob clockwise, the output power will increase.

In general, the user only needs to select welding mode, the machine will auto match output power. But the user can adjust it according to actual situation.

Finish adjust welding mode and output power, the user can

press "knob B" (the number on meter will flicker for 3 seconds) for save the setting.

Press "C and D" (welding function selection) for 2 seconds. All welding parameters will restore factory settings.

C\D— welding function selection

After select welding mode,

the machine will auto match output power

and the corresponding indicator will light.

Press C or D to adjust welding function.

E— Power meter

The meter is display current power. The range is 0~99%.

G— Ground Cable

Install ground weld-pin cable plug & twist to lock.

H— Torch Control Cable

Install control cable plug from torch

I— Torch Power Cable

Install power cable plug from torch

J— Power switch Turn on, turn off the machine.

K— Input power cable

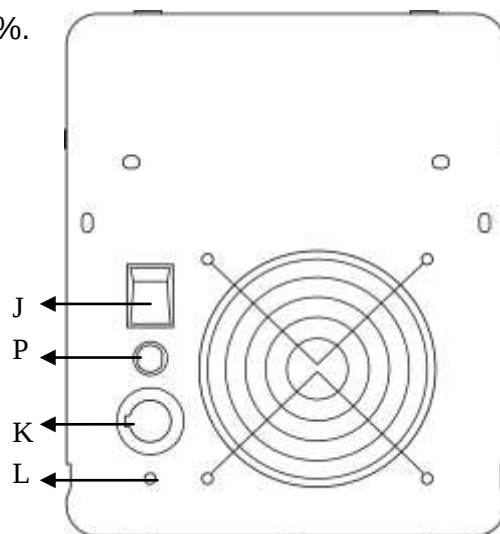
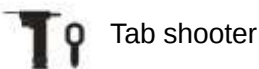
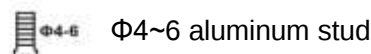
(Confirm the power voltage before use)

L— Ground connector for the machine case

P— Fuse

If the machine is overload, the fuse maybe blown.

The machine will stop and protected. Please check the machine and replace the fuse.



2-7. Stud welding torch

2-7-1 Torch (diagram on right)

Torch working principle:

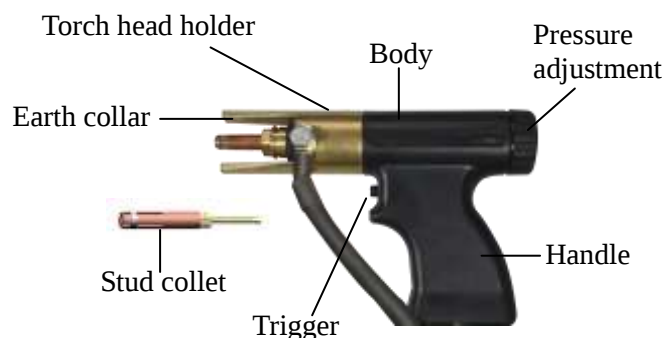
Insert stud screw in collet, 2mm extension.

Press the stud screw pin-head to the panel.

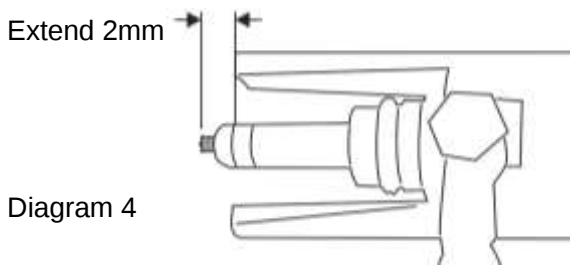
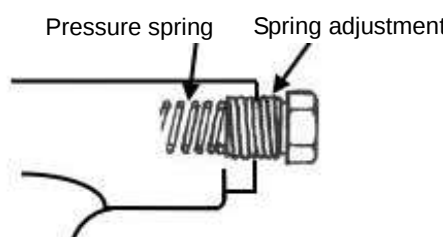
When ground collar contacts, pull trigger.

Discharge current will weld stud to panel.

Remove torch from stud and install pull ring.

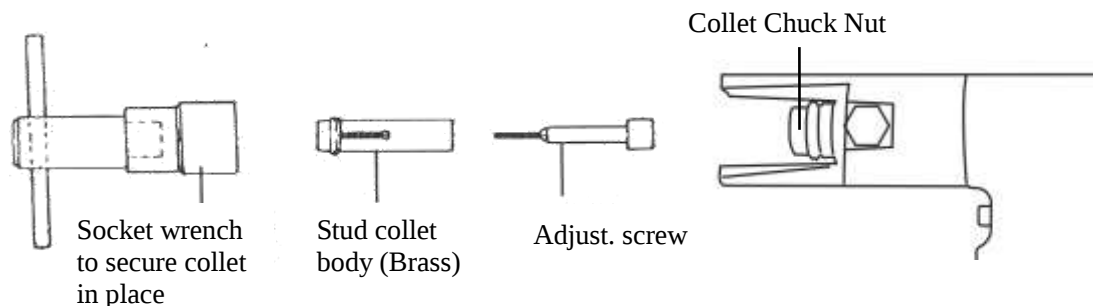


2-7-2 Adjust the pressure and extend distance

 Extend 2mm Diagram 4	 Pressure spring Spring adjustment
1. Stud screw extend 2.0mm from earth collar or pins, as the diagram 4 on left 2. Turn adjustment CCW: stud welding heat will increase & torch pressure will be reduced. 3. Turn adjustment CW: stud welding heat will be reduced & torch pressure will increase. 4. When torch pressure is not enough, please remove back cover and spring adjustment, then replace the pressure spring.	

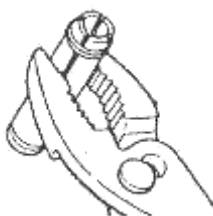
2-7-3 Stud Collet

Stud screw collet is the part for keep the stud screw carry welding current so make sure the diameter of the collet matches the stud screw. When the diameter of the collet is not suitable to the stud screw, the stud screw and clamp are easily damaged. That will cause stud welding trouble.



1. Use socket wrench to loosen the collet in the chuck.
2. Pull out the brass screw collet body with depth adjustment screw.
3. Insert the brass screw collet body with depth adjustment screw into torch head. Make sure the diameter of the clamp is correct and the stud stick-out length is correct.
4. Use socket wrench to locking the collet chuck nut.

Note: When Use new screw collet, must use pliers to clamp the groove of the screw collet. That can make sure the stud screw makes good contact with collet body.



The groove expands in use and causes the stud to be loose in the collet. Use pliers to clamp collet closed. This can extend life of the stud collet body.

2-8. Operating process for stud welding

WARNING: Where safety glasses, gloves and appropriate clothing before use!

2-8-1 Preparation for operation

- (1) Keep the work piece free of dirt, oil, paint and rust.
- (2) If the base metal is thin, it may deflect under pressure so add a base plate when stud welding.
- (3) Select suitable stud welding torch, according to material, diameter and length of the stud screw.
- (4) Make sure the diameter of the collet is correct and the length of the stud stick-out is correct.
- (5) Make sure all the cables connected to the machine and are contacting work piece.
- (6) Plug into line power and turn power switch to ON position.

2-8-2 Operating stud welding system

- (1) Insert the stud screw into stud collet body.

Note: Make sure the stud screw inserted with 2mm stick-out and adjustment screw is tight.

- (2) Keep earth support feet in contact the base metal. The torch presses on base metal.
- (3) Press torch trigger. Discharge→Stud welding complete.
- (4) After stud welding complete, release the trigger, lift torch off surface.

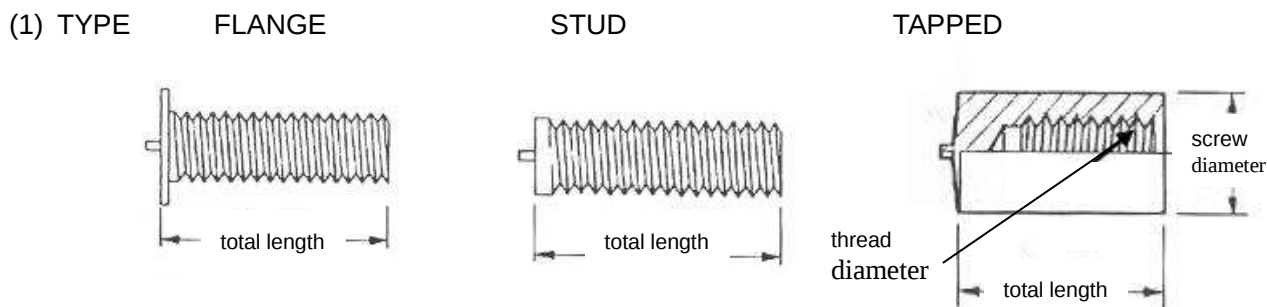
Please test stud welding and setting suitable the welding strength before formal production.

2-9. Maintenance

- (1) The machine and torch must be kept away from dust, humidity, rain.
- (2) Avoid vibration, when moving the machine.
- (3) Do not connect the leads in reverse. This will protect the machine and insure good welds.
- (4) Keep torch head clean and check the screw contact to insure good welds
- (5) Turn off power supply switch when not in use.

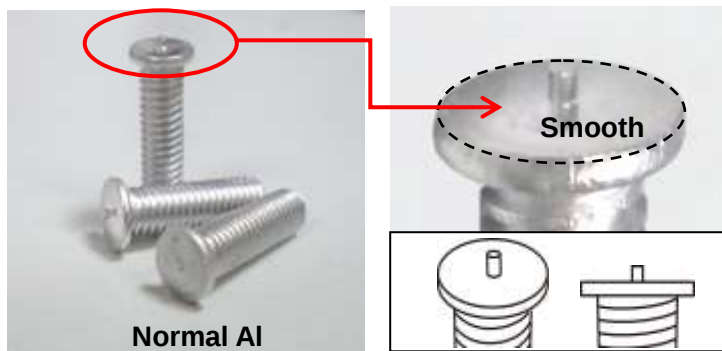
2-10. Select stud screw

TYPE: mild steel, stainless steel, aluminum, titanium (Ti), brass or copper

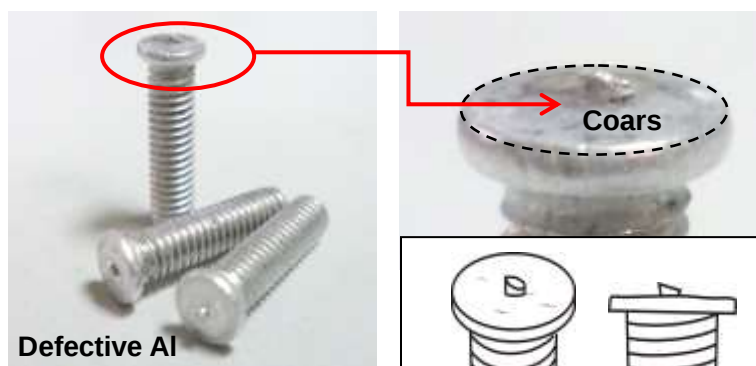


(2) Dimension outside thread----- thread diameter * total length
 internal thread -----screw diameter * total length - thread diameter

(3) Normal AL stud: The embossment is in the center of stud's end face. The top face of embossment is smooth. The size and height of the embossments are consistent. The end face of stud is smooth.



Defective AL stud: The embossment is not in the center of stud's end face. The top face of embossment is not smooth. The size and height of the embossments are uneven. The end face of stud is coarse.



3. Trouble shooting

The machine is equipped with three protection functions:

1) Over heat protection

There is a power transformer inside the machine that has with snap-disc thermal switch. The temperature of the transformer will rise following the machine work duty. If the machine is over duty and overheats, the "auto" and "manual" indicator on front will illuminate and the machine will stop output. For general body repairs, the machine duty cycle is adequate so, If the machine overheats with normal operation, please check the cooling fan.

2) Short circuit protection

If the torch and earth cable are kept in short circuit condition after a weld, the machine will not charge. The torch and earth cable circuits need to be OPEN for the machine to charge and be ready to weld.

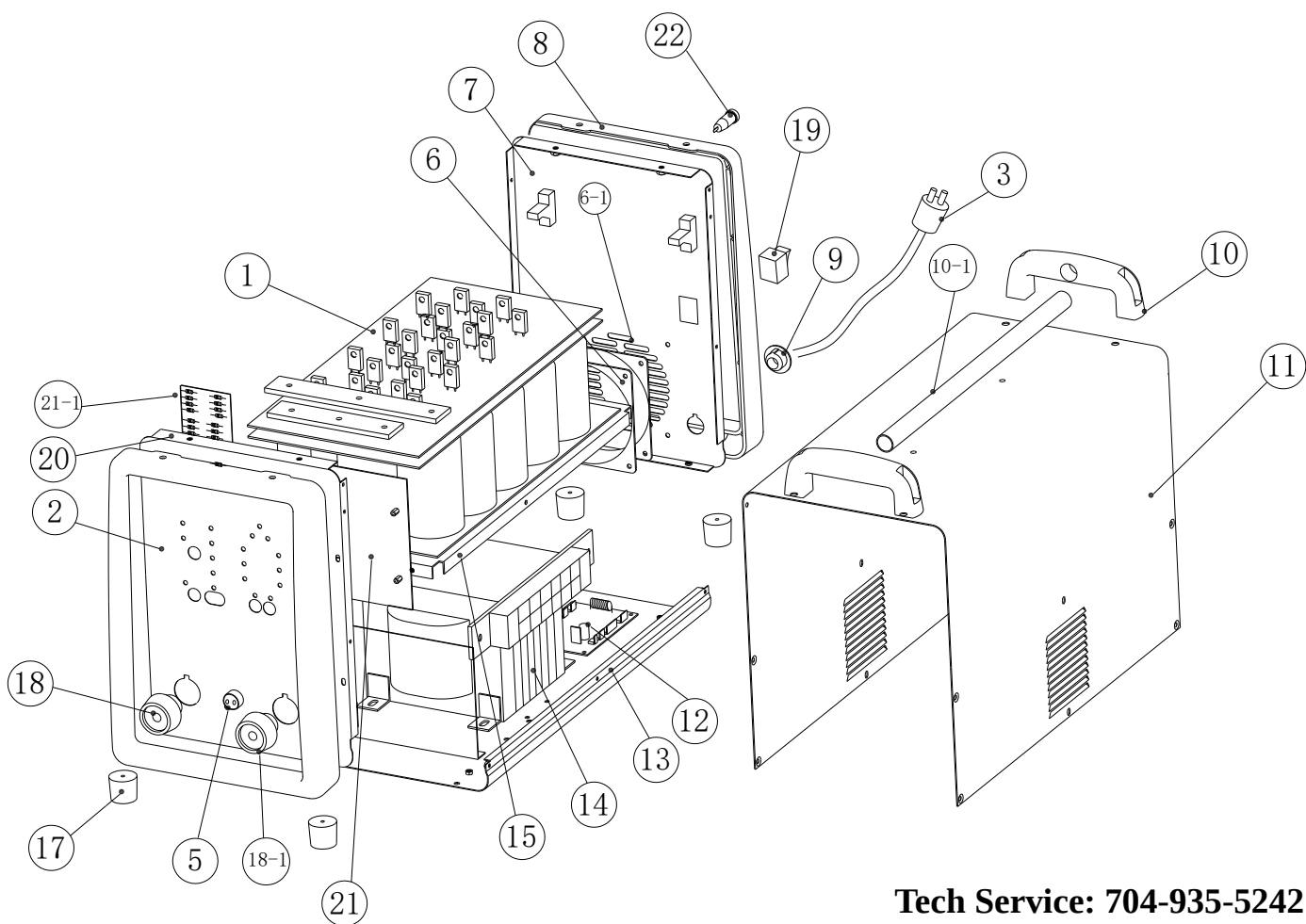
3) Over current protection

The power supply is protected by a fuse. If the fuse is broken, the machine experienced a problem and fuse should be replaced. If it fails again, please contact service department.

No power	1. Check the source power. 2. Check the input cable. 3. Check the main switch. 4. Please contact to the manufacturer.
No weld	1. Check the output cable for torch & earth 2. Check the connection for torch & earth. 3. Check power fuse 4. Check transformer, maybe over heat 5. Please contact to the manufacturer.
Fan is not working	1. Check the power of fan. 2. Check the fan, maybe something stuck in the fan. 3. Please contact to the manufacturer.

EXPLODED PARTS LIST

No.	Part No.	Description	No.	Part No.	Description
1	597N5810	driver and capacitor board	13	597N9832	bottom panel
2	597N5815	front panel touchpad	14	597N5813	main transformer
3	570.0010	input power cable with plug	15	597N9833	inside panel
5	175N9037	control socket	17	530.0025	rubber foot
6	530.0024	fan	18	511N0014	quick socket
6-1	530.0024A	fan cover	18-1	511N0014R	quick socket-red
7	597N9830	back panel	19	530.0020	main switch
8	597N5312	plastic frame	20	597N9834	front panel
9	400N2106	cable strain relief	21	597N5811	control board
10	540.0018	handle	21-1	597N5812	up PCB
10-1	540.0017	steel tube for handle	22	597N5913	fuse holder 15A
11	597N9831	top cover			
12	597N5813	power board			



Tech Service: 704-935-5242

ACCESSORIES LIST

POS.	CODE NO.	DESCRIPTION	QTY	PICTURE
1	UNI-9516	Euro slide hammer with hook m14 with hook	1	
2	DTK-8004	M5 weld-tip Steel with brass coated	1	
3	UNI-9517	Holder for M5 weld-tip	1	
4	UNI-2101	Wiggle wire 13MM high 1Pound 0.5kg	32	
5	UNI-2110	Wire tip with groove	1	
6	UNI-1001	Dimple 2.2 STUD	25	
7	UNI-1002	Dimple 2.6 STUD	25	
8	UNI-1004	Stud tip tapered	1	
9	UNI-9523	Tab holder with long shaft 60mm with black plastic sheet	1	
10	UNI-1005	Rivet tip tapered	1	
11	UNI-1007	Spot shrink tip	1	
12	UNI-9524	Tip holder tapered 8mm	1	
13	UNI-1242	Stud screw M4*15 (#6061) AL/SI	100	
14	UNI-1142	Stud screw M4*15 (#5052) AL/MG	100	

15	UNI-2040	Swivel shaft pull tab M4 (with an adaptor)	10	
16	UNI-1262	Stud screw M6*16 (#6061) AL/SI	100	
17	UNI-1162	Stud screw M6*16 (#5052) AL/MG	100	
18	UNI-2060	Swivel shaft pull tab M6	10	
19	UNI-1061	Pull Tab Straight (Copper coated)	25	
20	UNI-1062	Pull Tab Twist (Copper coated)	25	
21	UNI-9805	Wrench 5.5*7mm	1	
22	UNI-9600	Tab Shooter Tool	1	