



Operating Manual

Multi-Spot M22AL CD Stud Welding Machine



OPERATION MANUAL

Read this manual carefully before using the machine.

Failure to respect the rules described herein shall exempt the manufacturer from any liability.

The machine has been designed, built and protected for the functions described below. Any other use not explicitly included shall be considered unacceptable.

The machine must be used in sufficiently ventilated rooms, in the absence of dust and moisture; in any case, where there is no risk of fire, explosion, or flooding.

The machine must be started, used and serviced by qualified personnel. Always follow current safety regulations.

The manufacturer shall not be held responsible for any damage caused by incorrect use of the machine.

INTRODUCTION

This device must be used exclusively for stud welding on electrically conductive materials (metals and alloys).

Welding takes place due to the high temperature generated by a concentrated electric arc, and thus highly dangerous situations may arise; it is therefore essential to pay the utmost attention to the chapter entitled SAFETY PRECAUTIONS.

This manual must be kept carefully in a place familiar to everyone using the machine. It must be consulted whenever doubts arise and be kept for the entire life-span of the machine; it will also be used for ordering replacement parts.

NOTE

*Only use original replacement parts.

*Always replace any damaged part of the unit.

*Do not use any torches other than the original.

*Do not use the unit without covers. This is dangerous for the operator and for those who are surrounding the work area. This also prevents the unit from cooling efficiently.

DESCRIPTION OF TECHNICAL SPECIFICATIONS

NOTE

Should there be a claim for losses or damages it must be made by the purchaser directly to the shipper who handled the unit.

When requesting information about this welding machine please state the machine's part number and serial number to ensure receiving accurate information relating to your machine.




The content is for your reference.

Please be subject to the actual products if anything is different or updated.

BEFORE STARTING THE EQUIPMENT, READ THE CONTENTS OF THIS MANUAL.

1. Mechanical/Electrical/Illustration Of Working Principle data

Electrical Data

MultiSpot M22 AL	SN:	
 	GB 902.3-89	
Input Power	1~AC110V 50/60Hz	
Capacitor	90,000μF	

2. CD Stud Mode

2-1. Summary

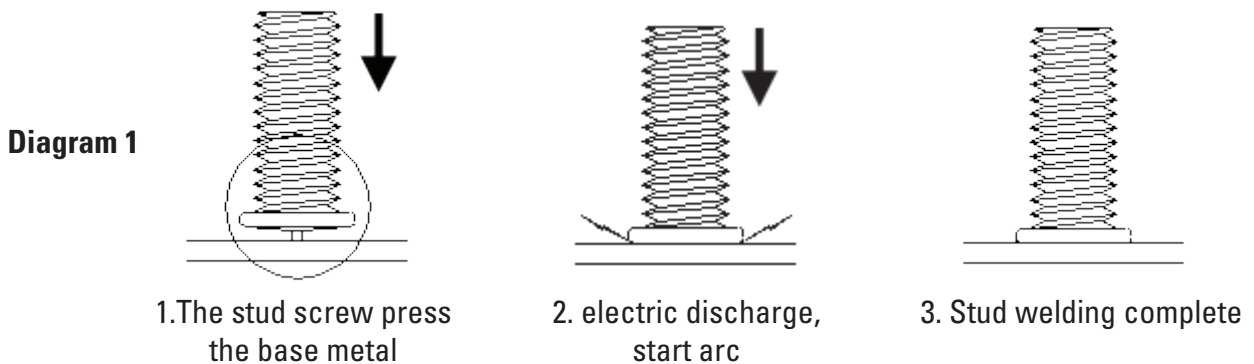
This machine is for Capacitor Discharge Stud Welding, the weldable range is Ø3- Ø8mm. Stud materials are soft steel, stainless steel, aluminum, titanium (Ti), brass and copper screw. Stud Welding time is about 3/1000s-6/1000s. Stud Welding time will not damage the base metal including sheet metal.

2-2. Attention

- (1) Input power is AC110V 15A.
- (2) Turn "off " the switch when not using the machine.
- (3) Turn "off " the switch when connecting or removing cables on the machine.
- (4) The machine maintenance and repair must turn "off " the switch after 5 minutes.
- (5) The stud clamp is located inside the stud welding torch. The inside diameter of stud clamp must be suitable for the stud screw. Do not use a worn stud clamp.
- (6) Stud welding may cause welding arcs and metal spatter, protect yourself with appropriate safety protection and goggles.
- (7) Make sure there are no flammable materials in the work area.
- (8) The machine must use the required stud screws.
- (9) Please contact the manufacturer for the following situations:
mechanical failure, reducing or increasing the torch cable length, exchanging the standard equipment.

2-3. Stud welding

Contact type: apply to soft steel, stainless steel, aluminum, titanium (Ti), brass, and copper.

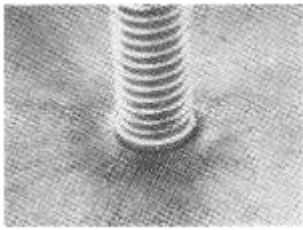


Secure the stud welding position. Press the torch trigger, press down, and the stud screw will be welded on the base metal immediately. Electric discharge, stud welding, and recharge will process automatically and safely. Traditional methods such as rivets, lock screws, and common welding can damage the base metal.

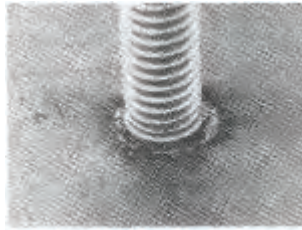
2-4. Stud welding visual test

Please refer to the following pictures, and evaluate the stud welding results.

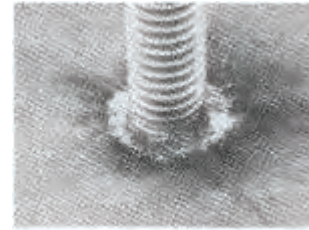
If the stud welding results are unacceptable refer to Page 6. Adjusting the charge voltage, torch head pressure, or torch head height may be necessary. (Note: adjust one setting at a time.)



1. Voltage not enough



2. Correct voltage



3. Too high voltage

2-5. Stud welding trouble shooting

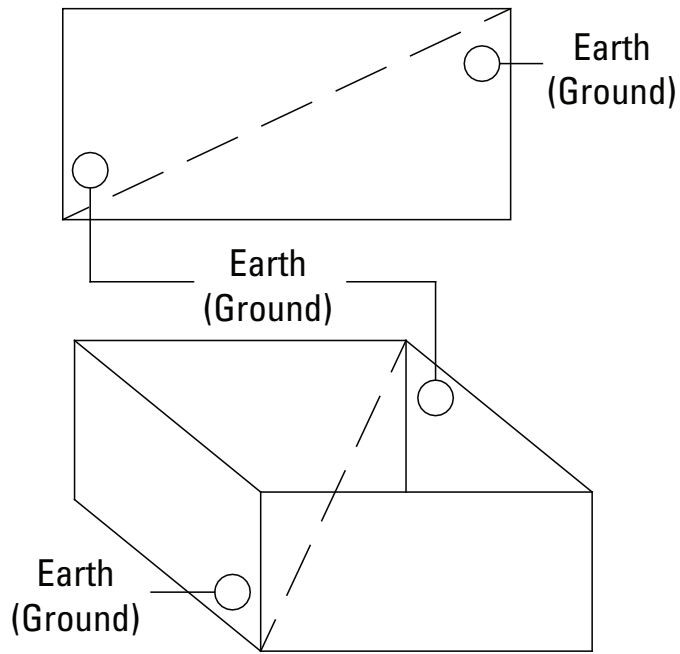
The following situations may cause unacceptable results. Correct before using the machine.

- (1) The earth (ground) cable and the metal are not creating a good connection.
- (2) Torch cable or earth (ground) cable is twisted.
- (3) The diameter of screw clamp and stud screws are incompatible, or screw clamp is worn.
- (4) The base metal is dirty, rusty, painted or other issues interfering with electricity conductivity.
- (5) The torch is not suitable for the base metal or stud screws.
- (6) The stud screws and the base metal are not creating acceptable connections (Note: the stud screw should contact the base metal perpendicularly).
- (7) The stud welding voltage is not correct.
- (8) The capacitor is damaged.
- (9) The welding torch must be kept stationary with no movement.
- (10) Stud screws are extending too long (or too short) from the stud clamp.
- (11) Base metal distortion or movement when welding.
- (12) Method for connecting the earth (ground) cable:

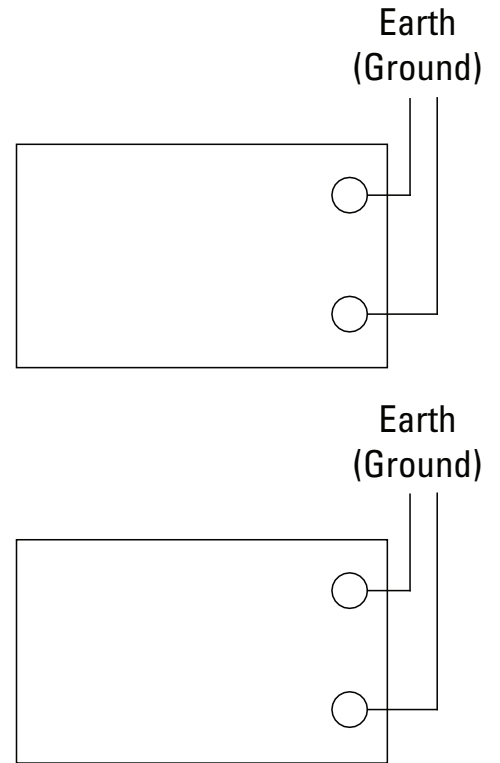
*Cable must contact the base metal directly and contact two earth (ground) cables.

*The earth (ground) cable must be connected diagonally on the base metal (Refer to the diagram below).

Correct connection



Incorrect connection



2-6. Stud Mode Cable Connection



(1) Cable connections (Refer to the diagram above).

1. The torch cable and earth (ground) cables use Euro type quick connectors. Push the plug into the socket, torch cable to "GUN (-)" socket, earth (ground) cable to "STUD EARTH (GROUND) (+)" socket, and turn right for secure connection.
2. The input cable and control cable connectors use screws to secure connections.
3. The earth (ground) cables must be clamped to the base metal.
4. All cables should be kept straight. If the cables are twisted it will interfere with stud welding.

(2) Negative connection----apply to zinc coated steel, steel plate, plate brass, and titanium stud screws. The earth (ground) cable connects to the "GUN (-)" socket, The torch cable connects to the "STUD EARTH (GROUND) (+)" socket.

The torch and earth (ground) cables exchange connections.

2-6.1 Controls on generator front panel

- A Output indicator**
During machine output, the red LED will light.
- A1 Connection indicator**
When the torch and earth (ground) cables have a good connection, the yellow LED will light.
- B Output voltage meter**
- C Output voltage adjustment for stud welding**
- D STUD torch connector**
- E SPOT earth (ground) connector**
- F Control cable connector**



2-7. Stud welding adjustments

Adjust stud welding according to the diameter of stud screws.

* Adjust charge voltage.

* Adjust welding torch pressure or clearance.

Stud screw adjustments are standard in the following diagram.

2-7-1 Charge voltage for soft and stainless steel stud screws:

Stud screw	Charge voltage (V)	Welding torch pressure (kgf)
M3-S	40	4.5~5.5
M3-F	55	4.5~5.5
M4-S	50	4.5~5.5
M4-F	63	4.5~5.5
M5-S	60	4.5~5.5
M5-F	105	4.5~5.5
M6-S	100	4.5~5.5
M6-F	120	4.5~5.5
M8-S	160	4.5~5.5
M8-F	170	4.5~5.5

Charge voltage for aluminum:

Stud screw	Charge voltage (V)
M3-S	50
M3-F	60
M4-S	60
M4-F	80
M5-S	75
M5-F	100
M6-S	120
M6-F	140

Weld torch pressure - Adjust pressure to minimum and test stud weld. Continue to increase pressure and test until satisfactory results.

2-8. Stud welding torch

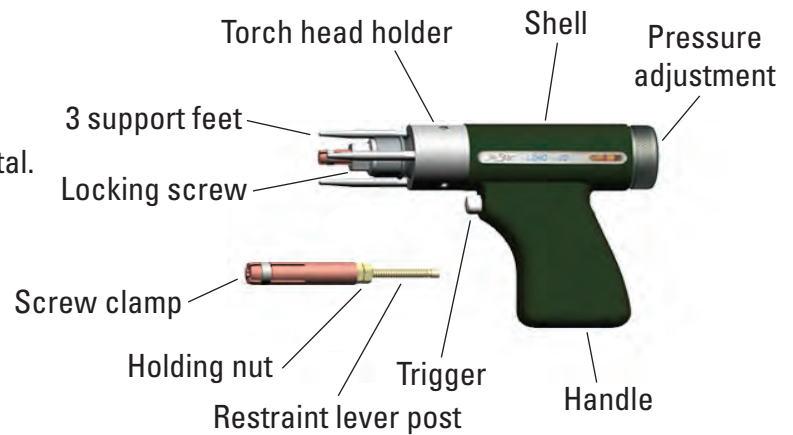
2-8-1 H-10 torch (as diagram on right)

Torch application process:

*Press the stud screw to connect with the base metal.

*The welding torch will discharge by contact.

*Length of stud screws less than 150mm.



2-8-2 Preparing the gun

(1) Having selected stud bolt (material, diameter, and length), place in the screw clamp.

(2) Loosen the holding nut, adjust the restraint lever post until the head of the stud bolt protrudes 2mm from the front of the screw clamp. Tighten the holding nut.

2-8-3 Stud screw clamp

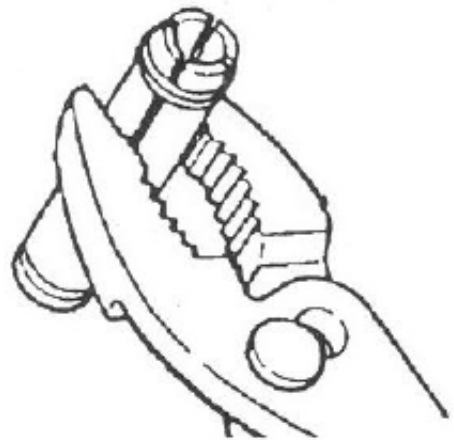
The stud screw clamp secures the stud screw while transferring welding current. Verify the diameter of the clamp is compatible with the stud screws. If the diameter of the clamp is not compatible to the stud screw, the stud screw and clamp can easily be damaged.

(1) Positioning the torch stud screw clamps

1. Use a socket wrench to loosen the locking screw on the clamp.
2. Pull out the screw clamp and restraint lever post.
3. Insert the screw clamp and restraint lever post on the torch head until it rests all the way down in the chuck. Make sure the diameter of the clamp is correct and the length of the restraint lever post is correct.
4. Use a socket wrench to tighten the locking screw on the clamp.

Note: When installing a new screw clamp, use pliers to clamp the groove of the screw clamp.

The groove expands during use and the stud screw will loosen. Use pliers to compress when this situation occurs. This will also extend the life of the screw clamp.



2-9. Operating processes for stud welding

Note: Protect your eyes and your body when stud welding. Please operate the machine as listed below.

2-9-1 Preparation for operation

- (1) Keep the workpiece free of dirt ,oil, paint and rust.
- (2) Thin base metal can easily dent under pressure. It may be necessary to add a base plate during stud welding.
- (3) Select a suitable stud welding torch, according to material, diameter, and length of the stud screw.
- (4) Be sure the diameter of the clamp and the length of the restraint lever post is compatible. Install the screw clamp and restraint lever post to the torch.
- (5) Be sure all cables are connected to the machine and workpiece. Input cable connects to AC110V/15A power.
- (6) Turn the charge adjustment to the objective and turn "on" the power switch.
Confirm the digital meter (DC voltage meter) display is "0.0".

Note: If the fan is not running after turning on the power switch, check the 15A fuse.

- (7) According to the stud welding adjustment standards (Page 10), adjust a suitable charge voltage for the stud screw.

*Turn right on the charge adjustment to set the charge voltage. Watch the digital meter to confirm.

*Once the charge voltage is determined, the machine will charge according to the setting.

*To ensure all preparation is completed operate stud welding as listed below.

2-9-2 Operate stud welding

- (1) Insert the stud screw to the screw clamp. (Diagram 24)

Note: Be sure the stud screw is inserted into the end of the screw clamp and is contacting the restraint lever post.

- (2) Keep the 3 support feet contacting the base metal. The torch should be pressed on base metal perpendicularly. (Diagram 25)

Note: Keep the torch contacting the base metal after inserting the stud screw.

- (3) Press torch trigger. Discharge Stud welding complete.

- (4) After stud welding complete, release the trigger, move back the torch vertically. (Diagram 26)

*Test the stud welding settings for suitable welding strengths before production use.

Diagram 24

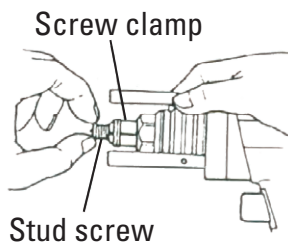


Diagram 25

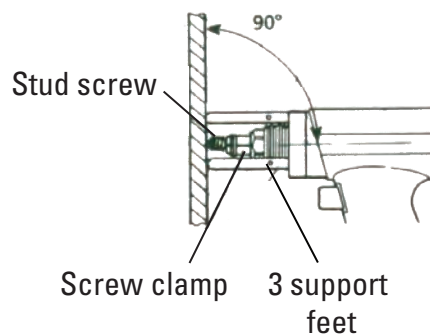
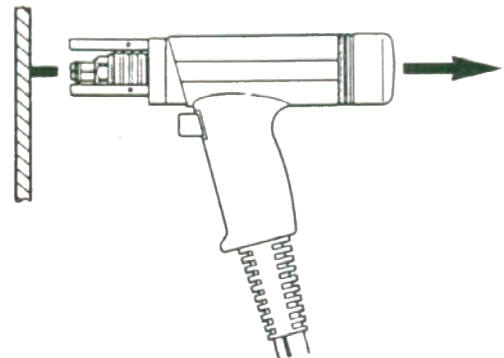


Diagram 26



2-10. Maintenance

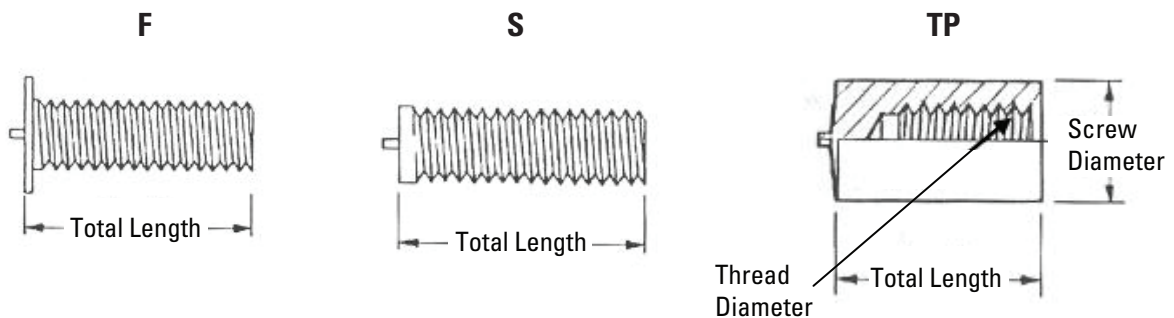
- (1) The machine and torch must be kept away from dust, humidity, and rain.
- (2) Avoid vibration when moving the machine.
- (3) Do not connect machine cables in reverse.
- (4) Clean off dust, debris, and verify screw tension to keep the machine in operating condition.
- (5) Turn off the machine when not in use.
- (6) Do not immediately adjust the capacitor to high voltage. Adjustments can be made after significant use (more than 6 months).

Turn the charge voltage adjustment to the limit. From 30V, begin to increase the voltage slowly. Increase the maximum voltage to 180V. The adjustment process from 30-180V take about 10 minutes. After the 10 minute adjustment, turn off the power switch and then turn on again. Then adjust to the desirable voltage.

2-11. Selecting stud screws

Metal: soft steel, stainless steel, aluminum, titanium (Ti), brass ,copper

(1) Model



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

3. Trouble shooting

No power	1.	Check the source power
	2.	Check the input cable
	3.	Check the main switch
	4.	Contact the manufacturer
No weld	1.	Check the output cable (torch & ground)
	2.	Check the connection & gun torch
	3.	Check power fuse
	4.	Check transformer (overheated)
	5.	Contact the manufacturer
Fan is not working	1.	Check for power at the fan
	2.	Check the fan (clean debris from fan)
	3.	Contact the manufacturer
CD stud mode		
Cannot adjust the output voltage	Contact the manufacturer	

Notes

Notes



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