

OPERATION'S MANUAL

For Flash stud welding machine

INTRODUCTION

- Thank you very much for adopting our stud welding machine.
- To use safely and properly, read this manual carefully before using.
- Keep this manual carefully after reading.

GENERAL PRECAUTION

- About handling of Welding machine (including Gun, Ground cable, and Power supply cable)
 - Since high voltage is generated in the machine, don't use with the cover removed.
 - Eliminate dust and water etc. from the plug and outlet.
 - Don't use in the rain or in the water.
 - Don't use in the place where much iron powder or dusts are existed.
 - Be sure to connect the ground cable to the ground.
 - Be sure to use the genuine parts or the parts that are authorized to use by our company.
 - Don't disassemble or reconstruct the machine.
 - Be careful the accident which results in injury or death while using.
 - Don't step on the welded stud bolt.
- About the setting place for the machine
 - Don't set and use the machine near the inflammable substance such as volatile oil, paints and gasoline etc.
 - Don't set the machine in the very hot or cold place. (The temperature at which the machine is used, 5°C~40°C)
 - Don't set the machine to the place in the direct sunshine.
 - Don't set the machine near the argon welding machine or the other welding machine which generate large current or electromagnetic wave. (Otherwise, it causes improper operation of the machine)
 - Don't set the machine on the place, which is vibratory and unstable.
 - Don't put heavy goods on the machine.
- About the rate of use of the machine.

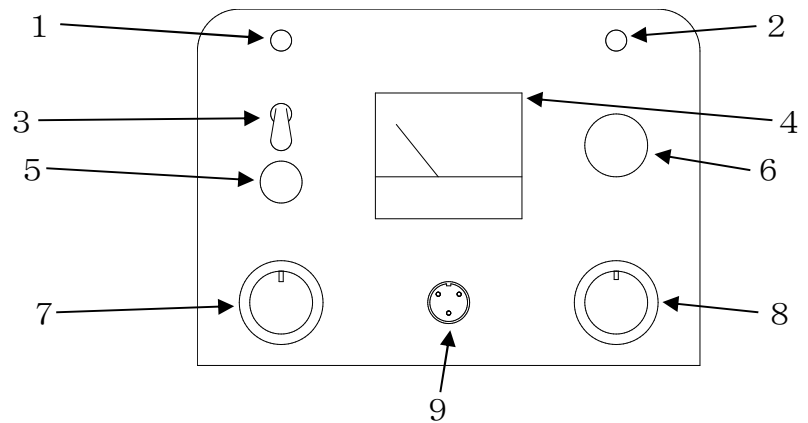
When weld more than 300 pierces within 0.5 second after completion charging, the transformer is not cooled sufficiently. Therefore, take a rest of 5 to 10 minutes every time 300 pierces are welded (it takes about 30 minutes) with the power switch remained to turn on.

PRECAUTION FOR USE (SAFTY)

- Use the machine in the range of power voltage AC90~110V (or AC180~220V).
(If use in the out of range, trouble, accident, or improper operation will possibly be caused)
- Try to use a mask to prevent dust and a goggle to protect eye. (When welding, a strong beam and welding spatters are generated instantaneously)
- Use a dry glove. Don't use a wet one. (Otherwise, it causes an electric shock)
- Before starting the actual welding, perform the trial welding to the test sample of the base metal to confirm the weld strength
- Confirm the tightness of cam lock and chuck etc. (If looses, it causes burn out)
- Don't repeat to turn the switch on and off frequently.
- Don't move the machine by pulling the cable (gun, ground and power supply).
(Otherwise, it causes electrical open)
- Don't use the machine when the cable is cracked or the internal wire is exposed.
- Stop working and disconnect the power supply cable from the outlet when it thunders nearby. (If struck by the lightning, it will possibly be difficult to repair)
- If possible, don't use a punch to position the stud bolt. When use an auto-punch, use it with the weakest range selected. (A deep punch mark causes weld defect)
- It will possibly be difficult to weld the material that contains much carbon.
- Polish the welding portion and ground portion to remove the rust, paint, or thick film of coating.
- Disconnect the power supply cable and contact with our company when abnormal noise, odor, or smoke is generated and when foreign material entered into the machine.
- Don't use to weld the material other than stud bolt.
- Our company doesn't guarantee the secondary accident.
Your understanding is highly appreciated.

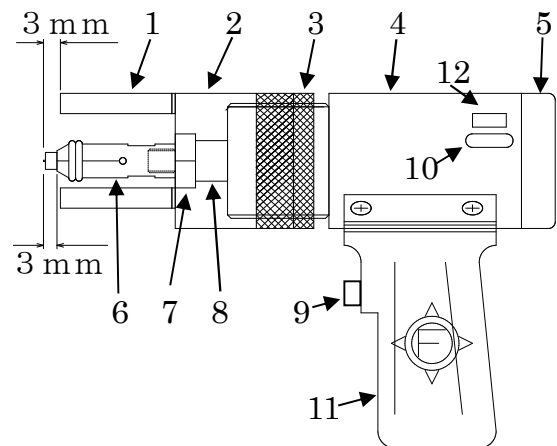
NAME OF OPERATION PART OF BODY

1. Power indicator light (green)
2. Charge indicator light (red)
3. Power switch
4. Charge voltmeter
5. Fuse holder
6. Voltage regulator knob
7. Gun cam lock
8. Ground cam lock
9. Remote connector



NAME OF EACH PART OF GUN

1. Gun stand (35 mm length)
2. Gun ring (40 Ø)
3. Lock ring (40 Ø)
4. Gun Cylinder
5. Gun cap (40 Ø)
6. Chuck
7. Holder
8. Gun shaft
9. Gun switch
10. Window for pressure indicator
11. Gun grip
12. Pressure scale



ACCESSARY

1. Gun
2. Ground cable
3. Power supply cable
4. Operation manual
5. Tool box

Fuse	One piece	Chuck	One piece for each size of stud bolt (up to M5 stud bolt for Mate model, other size stud bolt for other model)
Special tool	One set	Holder	One piece for 3~6 stud bolt One piece for 8~10 stud bolt (from 800 model)
Pressure gauge	One piece	Stopper	One piece for 3~10 stud bolt

ASSEMBLING OF WELDING MACHINE

1. Connection of Power supply cable

There are two size of cable, 25Ø 2P for 100 voltage and 30Ø 2P for 200 voltage.

Connect after confirming the power switch is off.

2. Connection of Gun and Ground cable (There are two way of connection, normal polarity connection and reverse polarity connection)

○ Normal polarity connection (For metal of Acid pickling/Polishing/Forged surface/ Grinding surface, Stainless and Aluminum etc.)

Connect the cam lock of gun and the cam lock of ground cable with the same color of cam lock on the boy (with the strait groove faced up) and turn to the left to lock it..

Connect the remote connector to the connector on the body with the thickest projection faced up, and lock it.

○ Reverse polarity connection (For metal with surface treatment, Galvanized sheet steel)

Connect the cam lock of gun and the cam lock of ground cable with the different color of cam lock on the boy (with the thickest convex faced up) and turn to the left to lock it.

3. Assembling of Chuck, Holder and Stopper

○ Fist, tighten the chuck and holder securely using special wrench and box as shown fig1.

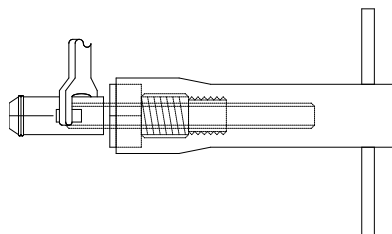
○ Insert the stud bolt in the chuck, screw in the stopper to the holder from the back and lock it with the lock nut so that the stud bolt projects about 3~5mm from the end of the chuck.

○ Then screw the above sets in the gun shaft and tighten it securely with the special box.

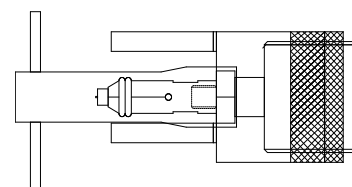
4. Adjustment of contact pressure for Stud bolt

○ Adjust the stud bolt projection from the end of the gun stand to 3mm using the pressure gauge..(see page 7)

When the length of the stud bolt is over 30mm, it can not be inserted completely in the chuck but no problem. In that case, set the gun stand using the pressure gauge. But don't set in such a way as the chuck clamps 5mm and the length unclamped is 25mm. See fig 2

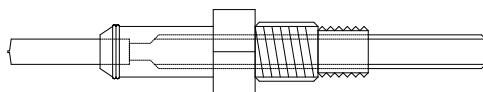


Tighten securely.

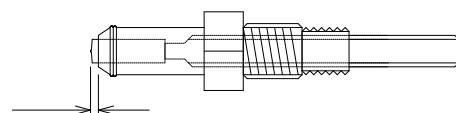


Tighten securely.

Fig 1



× Chuck clamping is short.



○ Proper

Fig 2

HOW TO WELD (TRIAL WELDING)

1. Prepare a base metal for trial welding

First prepare a metal plate, which is as thicker as possible and is the same kind of material as the one of the base metal actually welded. (If the base metal is thin, the strength of base metal is weaker than the weld strength. In addition, when using a punch, make a small punch mark as smaller as possible before the trial welding.)

2. Turn the power switch on.

The power indicator light (green) comes on and charge indicator light (red) flashes. With the voltage regulator knob turned to the left fully, the charge voltmeter of the model Mate 600 shows 20V~30V. (In case of the model 600S or more it shows 30V~40V)

3. Set the weld voltage for the stud bolt

Set the correct voltage according to the table of weld voltage. When turn the voltage regulator knob fast, there will possibly be the time lag between the actual voltage and the voltmeter reading. So turn it slowly. When the reading reach to the specified voltage, the charge indicator light stop flashing indicating that the welding is ready to start.

Note : In case of the Flash mate and Standard model, when the reading exceed the specified voltage, the voltage doesn't lower even if turn back the knob.

In this case, turn off the power switch and after the reading voltage lowers below

90V, turn back the knob, turn on the power switch and regulate the voltage.

(In case of Super and Twin model, the voltage can be adjusted freely)

4. Set the Gun pressure (Reference value)

For Iron, Stainless·····Set the reading of pressure scale to 3.

For Galvanized sheet steel, Metal with surface treatment, Aluminum·····Set the reading of pressure scale to 4.

5. Push the stud bolt on the welding point of base metal

Confirm that the three gun stands contact with the base metal securely.

6. Push on the gun switch

The flash arc is generated at the tip of stud bolt welding the stud bolt instantaneously. (When welding, flash beam and weld spatters generate. So be careful)

7. Confirm the weld strength

Although, there are Torque test and Pulling test etc. to confirm the weld strength, the bending test with a hammer or pliers and the torque test with screw tightened are generally conducted. The both tests should be conducted until the stud bolt is broken.

If the stud bolt is separated at the welding portion, either the voltage or the gun pressure is improperly regulated. So regulate them properly.

POINT OF WELDING

Gun, Ground

- Be sure to weld with the cable stretched. (If weld with the cable remained to wind, the voltage lowers weakening the weld strength.)
- Regulate the contact pressure of stud bolt correctly using pressure gauge. If regulate it visually, an error of 1- 2mm will possibly be avoidable causing weld defect.
When the size or length of stud bolt is changed, be sure to regulate the contact pressure of stud bolt using pressure gauge. (See page 7)
- The gun stand is a consumption article. While using the machine, the weld spatters stick on the gun stand. Replace it with a pliers or equivalent.
- The ground clip is a consumption article. Replace it when the clamping force is weakened.

Base metal

- It will possibly be difficult to weld the hard base metal (which contains much carbon).
Even if the weld strength of straight stud bolt is not so strong, when use the stud bolt with flange, the weld strength will possibly become stronger. Try this once.
- It is impossible to weld when oil (marker), iron powder, and rust are stuck on the portion of the welding.
- In case of the base metal with forged surface, the thickness of the forged surface is different according to the thickness of the base metal. To stabilize weld strength, it is recommend to remove the forged surface.
- When remove the surface treatment with grinder, use the fine grinder of 120 No. or more. Be careful not to make a sharp depression when grinding.
- When using a punch, make a small punch mark as smaller as possible. The projection of the stud bolt is important factor for the weld strength. The projection is not for the punch. When the welding is not successful, it may be caused by a deep punch mark.

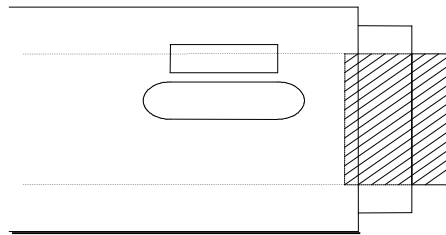
Others

- The chuck is a consumption article. The service life of it is extended according to the way of use. When the welding (insert in and out the stud bolt) is repeated, the insert portion become loose. In that case, tighten the chuck with a pliers or the equivalent to extend the service life of the chuck.

ADJUSTMENT OF GUN PRESSURE

Gun Cylinder

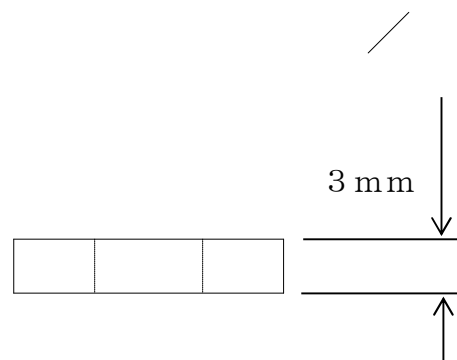
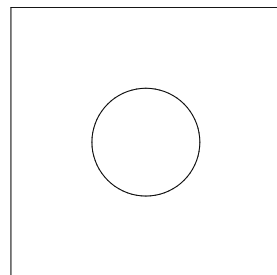
Adjust screw



Clockwise.....Pressure increases

Counterclockwise.....Pressure decreases

PRESSURE GAUGE



Level the pressure gauge and put the gun from the bottom.

Turn the gun ring to flush the surface of stud bolt with the pressure gauge.

Turn the lock ring and lock.

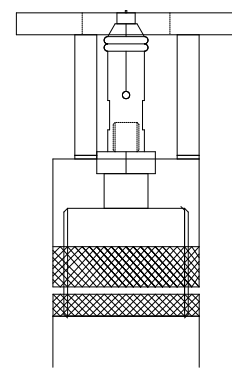
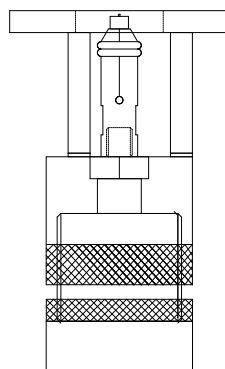
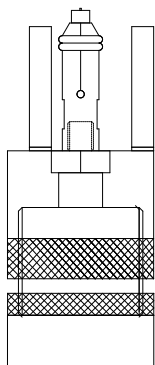


TABLE OF STANDARD VOLTAGE

Different size of stud bolt can be welded to the various kind of base metal by adjusting the contact pressure of the stud bolt and the voltage applied.

Stud dia	Voltage applied			
	M3	75	65	50
M4	110	80	65	50
M5	130	115	85	70
M6	160	140	100	90
M8	—	170	150	120
M10	—	—	170	150
M12	—	—	—	170
Model	600GXA	800GXA	1000GXA	1200SA

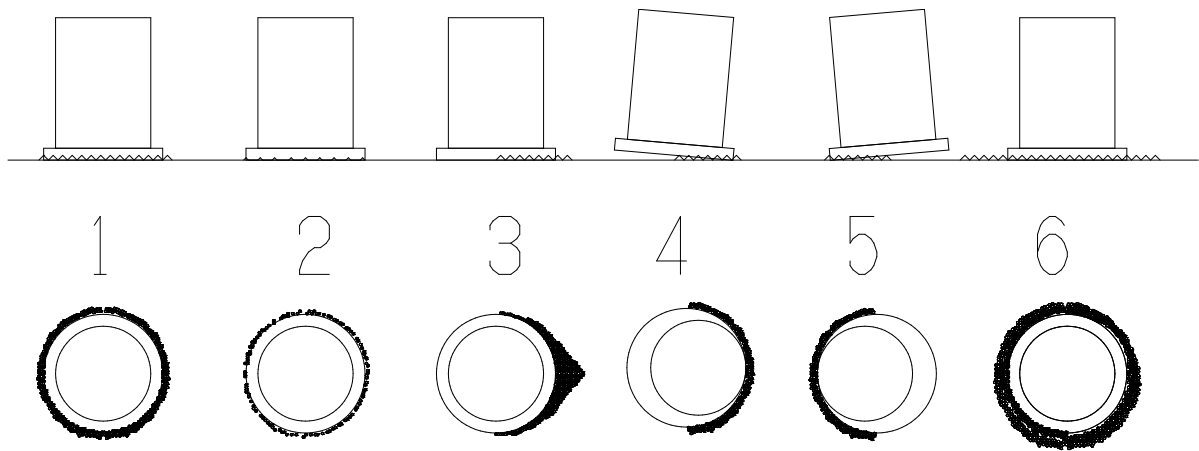
The table data shows the voltage when the straight stud bolt of the iron and the base metal pickled in acid are used. The voltage should be changed according to whether or not the stud bolt has a flange, presence of the surface treatment of base metal, and the material of base metal.

Base metal	Reading of contact press	Voltage applied	Connect
Iron	4 (on scale)	Above voltage	Normal
Iron w/surface treat	4 (on scale)	10%up of above voltage	Reverse
Stainless	3 (on scale)	5%down of above voltage	Normal
Aluminum	3 (on scale)	Above voltage	Normal

Note : The above table data are all reference value. After regulating the data (contact Pressure and voltage) and welding was succeeded, you are recommended to keep that value in table for a next welding.

CHECKING FOR WELD CONDITION

1. Weld condition after welding stud bolt



2. JUDGEMENT AND MESUREMENT

Judgement	Quality	Reason	Measure
1. Correct volt.	○	Weld spatters are stuck evenly on the portion of welding.	Adjust contact pressure.
2. Low voltage.	×	Weld spatters are not stuck around the portion of welding.	Increase volt.
3. Arc leans to one side.	×	Weld spatters are not stuck around the portion of welding but stuck on one side.	Change ground position.
4. Inclination of stud bolt.	×	Chuck and holder are not straight against the gun shaft.	Assemble correctly or replace chuck
5. Inclination of stud bolt.	×	Height of gun stand is different.	Align height.
6. High voltage	×	Weld spatters are stuck widely around stud bolt.	Decrease volt
7. Burning of bolt thread.	×	Stud bolt threads are sparked due to the welding with the chuck loosened.	Replace chuck.

BEFORE ASKING FOR REPAIR

When finding the trouble on the machine, check the following items in the table before asking for the repair.

Symptoms	Checking points	Measure
No power on.	1.Fuse burn out. 2.Power supply cable broken. 3.Power metal outlet separated.	1.Replace 2.Replace 3.Soldering
No voltmeter needle moves. (No charge)	1.Print circuit board disconnected. 2.Print circuit board broken. 3.Voltmeter broken. 4.Lead wire between voltmeter and condenser disconnected.	1.Connect. 2.Replace 3.Replace. 4.Connect
Volt reading different from actual volt.	1.Voltmeter broken. 2.Voltmeter out of order.	1.Replace 2.Replace
Meter needle moves beyond full position with power s/w on.	1.Rectifier broken. 2.Print circuit board broken.	1.Replace 2.Replace
No discharging. (Charged, but welding impossible)	1.No ground to base metal. 2.Insulation coating on base metal. (Alumite) 3.Gun cable broken.	1.Ground 2.Remove coating 3.Repair
Charging (welding) with no power s/w on.	1.Main thyristor broken. 2.Print circuit board broken. 3.Using other welding machine around here.	1.Replace 2.Replace 3.Detach
Fuse blown out frequently.	1.Charging time too short. 2.Forien material contacts with electronic parts.	1.Lengthen time 2.Eliminate
Noise like a puncture.	1.Capacitor broken. 2.Print circuit board broken.	1.Replace 2.Replace
Smoke and burning odor generated.	1.Transformer burning. 2.Harness burning.	1.Replace 2.Replace
Gun shaft doesn't move.	1.Lead wire in gun wound.	1.Repair
Gun shaft moves unsmoothly.	1.Gun shaft scratch at the portion of bearing.	1.Repair