



AWE-16A

Electro-spark Deposition Welding Machine

USER MANUAL

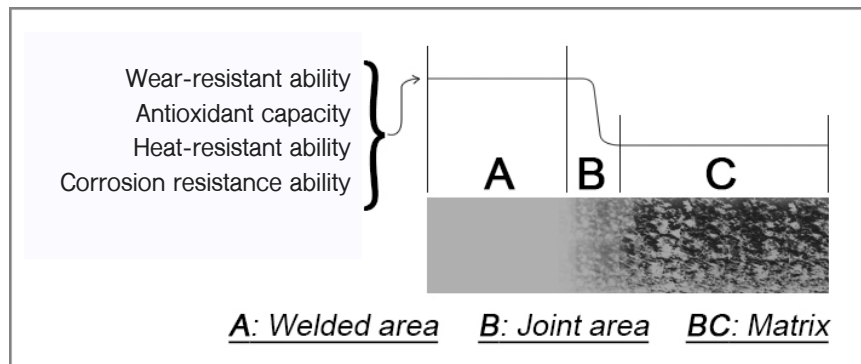
● CAUTION : PLEASE READ THIS USER MANUAL CAREFULLY BEFORE WELDING !

SUMMARY

Working principle of this machine:

Electro-spark deposition process is to use the high-energy power stored and release instantly between electrode and matrix with high frequency release, through air ionization channels formed between the electrode and matrix to generate an instant high temperature, high pressure micro-region. While ion state of the electrode materials in micro-melt into the matrix, forming metallurgical combination.

Not only due to quenching of metal surface to form martensite, and also deposition process of the narrow transition region to form ultra-fine austenitic organization. So electro-spark deposition process is not normal welding or coating process.



Feature of this AWE-16A:

- No annealing, not deformation to the matrix.
- High combination strength.
- High accurate welding areas.
- One machine multi functions: Welding / Surface hardening etc.
- Environment friendly.
- Easy to use: anyone can easily using this machine without profession training.
- Economy: can welding at scene to improve the efficiency and cost saving.

Equipment using range:

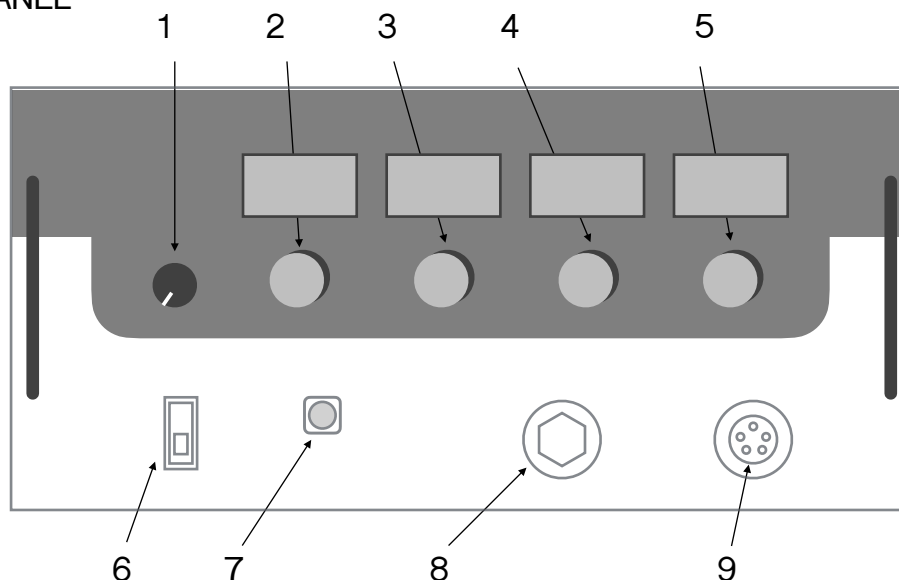
- Steel mold repair
- Tungsten surface hardening, surface coating
- Ductile iron; Gray iron; Cast iron defects welding (auto parts and industry castings etc. after welding small color difference, can pass metallographic and hardness test).
- Hydraulic parts ; axle ; seal welding.
- Electric equipments ; mineral equipments ; machine tools welding.

CHAPTER-1, MACHINE PANEL

Switch name and functions:

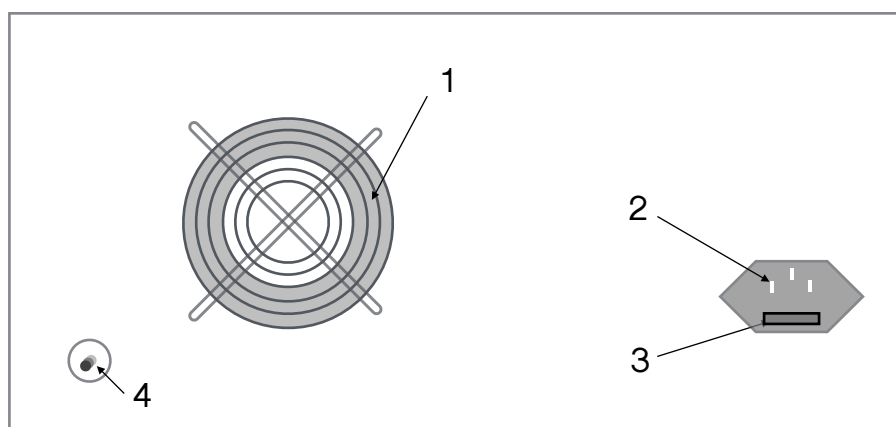
Before operation please be familiar with all switches of this machine.

A: FRONT PANEL



- 1-electrode rotating direction change button ; 2-welding gun rotating speed adjustment button ;
3-voltage adjustment button ; 4-power output percentage adjustment button ; 5-frequency
adjustment button ; 6-power button ; 7-work button ; 8-bond strap ;
9-welding gun connector

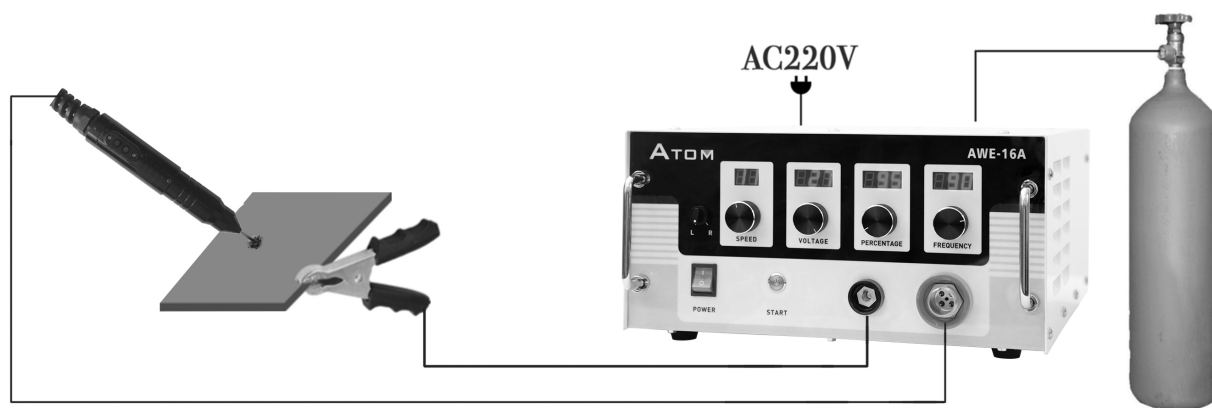
B: BACK PANEL



- 1-fan ; 2-220V socket ; 3-fuse ; 4-argon air input

CHAPTER-2, INSTALLATION

2-1 Installation diagram:



Please use 220V single-phase AC power supply. If power supply is not stable please use a stabilizer, if higher than 220v it may cause a damage to the machine. Do not replace the bond strap wire at liberty in case any damage to the machine. To change under manufacturer's guidance.

2-2 Installation guide:

- ① Connect the welding gun to the machine
- ② Connect bond strap to the machine (Make sure the bond strap connector fasten with machine and connect to the matrix)
- ③ Connect the argon gas on back side (Argon gas is not always necessary)
- ④ Connect power wire on back side
- ⑤ Insert welding rod to the welding gun, (supported diameter from 1.0mm to 3.2mm)
Unscrew the front cover of the welding gun, loosen the clamp with small key, insert welding rod to the welding gun and use the small key to tighten (confirm the welding rod in the chuck center), screw on the front cover.



- ⑥ Keep the welding rod 15–30mm outside the cover, so the argon air can protect the welding areas.



2-3 Start welding:

- ① Press “POWER” button to start the machine
- ② Turn direction button to “L” or “R” (when direction button on the middle welding rod will not rotate)
- ③ Adjust “SPEED” button to set the welding rod rotation speed (from 1 to 20)
- ④ Adjust “VOLTAGE” button to set output voltage (from 20 to 100)
- ⑤ Adjust “PERCENTAGE” button to set output percentage (from 20 to 160)
- ⑥ Adjust “FREQUENCY” button to set output frequency (from 50 to 500)
- ⑦ Press “START” button the welding rod will rotate and machine is ready to weld

CAUTION:

- **THE TEMPERATURE OF WELDING ROD WILL INCREASE VERY QUICKLY DURING WELDING, DO NOT TOUCH IT BY HAND**
- **IF NEED TO CHANGE THE ROTATION DIRECTION OF WELDING ROD, FIRST NEED TO PRESS “START” BUTTON TO STOP WELDING, THEN CHANGE TO REQUIRED DIRECTION. CHANGE ROTATE DIRECTION ON WORKING MODE MAY BURN THE MAINBOARD**
- **DO NOT CONTINUALLY USE THE WELDIN GUN FOR LONG TIME WITHOUT BREAK, IF THE WELDIN GUN GETS TOO HOT THEN NEED TO STOP WELDING AND MAKE IT COOL DOWN. THE CORRECT USAGE HABITS CAN EXTEN THE USING LIFE OF WELDIN GUN**

SUGGESTED SETTINGS FOR DIFFERENT MATERIALS

	CURRENT	PERCENTAGE	FREQUENCY
DUCTILE IRON	30 ~ 60	30 ~ 100	50 ~ 200
GREY IRON	30 ~ 60	30 ~ 100	50 ~ 200
ALUMINUM	40 ~ 80	40 ~ 120	200 ~ 400
BRASS	40 ~ 90	40 ~ 130	200 ~ 500
TUNGSTEN COATING	50	50	200

- **VOLTAGE** : high voltage high power output.
- **PERCENTAGE**: high percentage high single pulse power output.
- **FREQUENCY**: Pulse frequency in unit time, different material has different welding feature, so not means higher frequency faster welding speed, need to adjust the frequency base on different materials. Low resistance materials need high frequency such as Aluminum/Copper/brass, high resistance materials need low frequency such as Ductile iron/Grey iron/Steel/Stainless steel.

CHAPTER-3, BASIC OPERATING METHODS

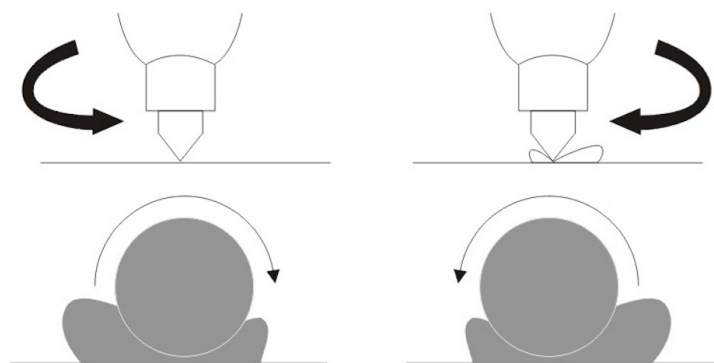
3-1 Prepare work before welding:

- ① Clean the matrix, need to clean defect areas before welding, remove the oil/impurity/rust etc. Surface oxidized matrix also need to be cleaned up to ensure the combined strength of welding.
- ② Make sure bond strap has connected with matrix.
- ③ Wear sun glasses and glove

3-2 Start welding:

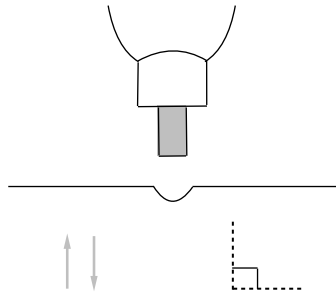
A. Features of electro-spark deposition welding

- ① The place where the electrode touch will be the deposition welding area.
- ② During welding, the rotating direction will deposits more than the opposite direction.

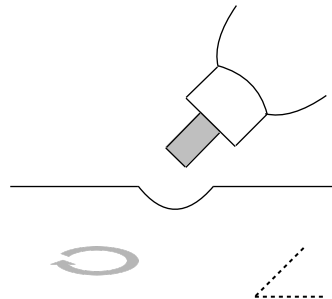


- ③ The welding electrode just need to lightly touch with the matrix, no need high pressure on it.

B. Operation



[A-A]



[B-B]

- If the hole diameter is similar (similar as welding rod diameter, see picture **[A-A]**), just keep the welding gun vertical to the matrix surface, move the welding gun up and down to finish welding. Can use hammer to flatten out the welded areas to reduce porosity and eliminate internal stress.
- If the hole diameter is bigger than welding rod diameter (see picture **[B-B]**), just keep the welding gun 45–60 degree angle to the matrix surface, start welding from the center of the defect hole to the edge and move as a circle. Can use hammer to flatten out the welded areas to reduce porosity and eliminate internal stress.
- When finish welding, keep the deposition thickness 0.5–1mm out of the matrix surface for further machining or grinding.

CHAPTER-4, FAULT DIAGNOSIS AND ELIMINATION

Make sure all the connection are connected correctly.

- Power indicator off and the cooling fan does not rotating, check whether the fuse was broken or power cable connection off.
- Other abnormal reactions, long time continue use of the machine will cause overheated problems, need to reduce the overheat for a moment.
- Power indicator on and cooling fan rotating but voltage and frequency panel no display, maybe machine problems, please contact us for repairing.
- Welding gun rotating but no power output and can not welding, please check the bond strap wire connected or not, if correct connected, please contact us for repairing.
- When press the “WORK” button the welding gun does not rotate but has electro-spark when electrode touch with matrix, maybe welding gun motor problems, need to contact us for repairing.
- No argon air flow out of the welding gun (welded areas black color), please check the argon meter and argon tube.

CAUTION: THE INNER STRUCTURE OF WELDING GUN IS COMPLICATE, WITHOUT PERMISSION OR PROFESSIONAL TRAINING DO NOT REPAIR BY YOURSELF, OR WE WILL NOT RESPONSIBLE FOR ANY DAMAGE, PLEASE CONTACT US IF ANY PROBLEM HAPPENS.



Made in China.

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