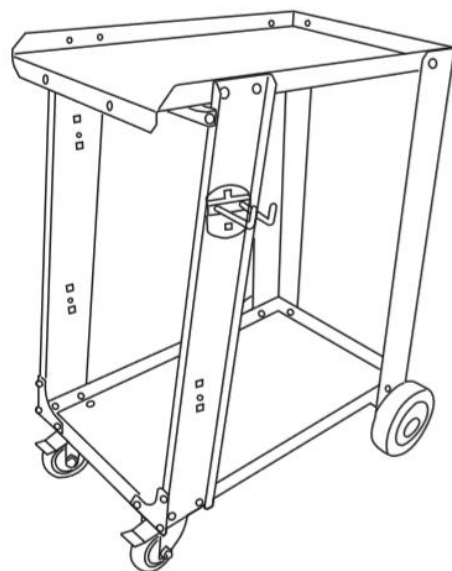




铝车身修复机 说明书



适用型号:

AE7004

版本号:

V-AR-7004-1903-01



请在操作此设备前仔细阅读本手册

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1. 技术参数

型号	AE70004
输入电压	AC220V
相数	单相
频率	50/60Hz
最大电容量	90000UF
输出功率	1.458KVA
建议植钉尺寸	M4~M8 (铝钉)

- 注：1. 建议使用 25A 以上 C/D Type 空气开关或漏电开关；
2. 黄绿线为地线，为确保安全，请确实接地，勿接入电源；
3. 请确认延长线电缆平方数达 1.5mm 平方以上。

2. CD Stud 螺柱焊介绍

2-1. 概要

电容式螺柱钉植焊机，可植焊螺丝径 4mm 起至 8mm 的软钢、不锈钢、铝、钛、黄铜以及铜材质螺柱钉。

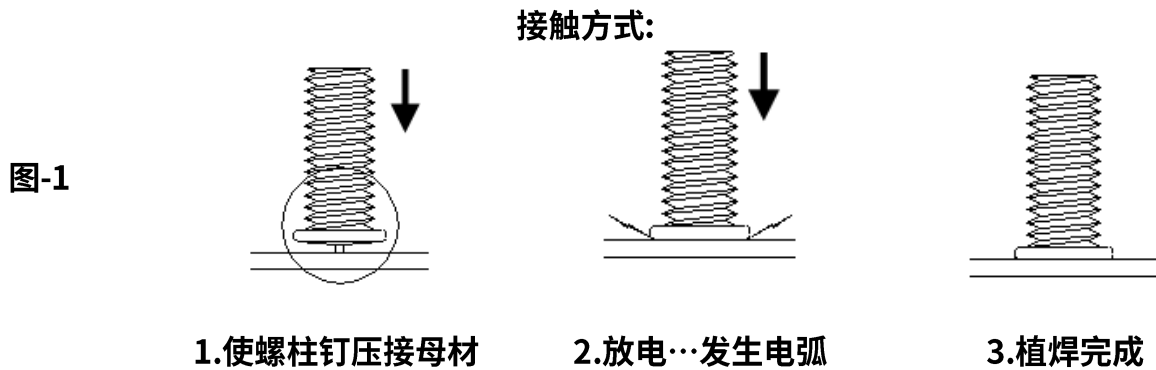
螺柱钉的植焊是在约 3/1000 秒至 6/1000 秒的极短时间内完成，所以植焊在薄母材上，亦不会因植焊的热烧损母材，破坏内部的涂装或保护层。

2-2. 注意事项

汽车钣金修复机在虽然设计上充分考虑了安全性，但在使用机器时为了尽量避免受到伤害，使用前请认真阅读使用说明书。

- 机器必须可靠接地。
- 不能使用容量不足及绝缘损坏的电缆
- 不允许在卸下机壳的情况下使用
- 不用时，切断输入电源
- 使用心脏起搏器的人不得靠近机器及作业场所，机器工作产生的磁场会对起搏器的运作产生不良影响
- 请使用绝缘手套
- 工作时，钢板涂层受热会产生有害的烟火和气体，建议使用呼吸保护用具
- 注意预防火灾等灾害的发生
- 电缆连接不良处，接地不良等电流回路不完全接触时，会引起通电发热，有引起火灾的危险。

2-3. 螺柱焊



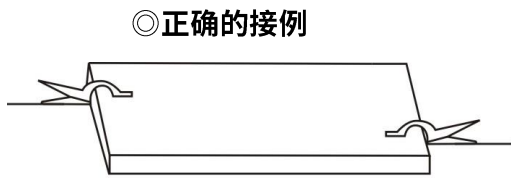
安装螺柱时，螺柱前端需突出三只固定脚架 2mm，决定螺钉位置后，将三只固定脚架平稳按压于母材，母材需平整而光洁，引扣板机，观察螺柱焊接强度，若强度不理想请调整焊枪压力，其工作顺序即是放电、植钉、再充电不断循环。

与卯钉、锁螺丝或焊接等工艺不同之处在于，植钉后母材背面不会有突出或破孔，所以本施工法不会有漏水、损坏外观的情形。

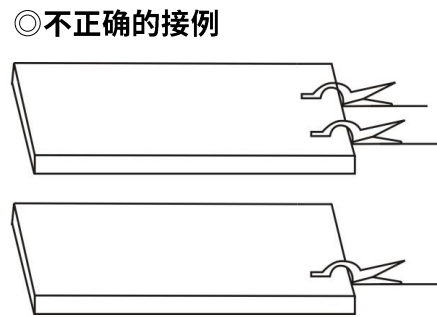
2-4. 植焊不良的原因

下列的任一项都会成为植焊不良的原因，所以要改正后再做植焊。

- (1) 接地线与母材接触不完全。
- (2) 植焊枪与接地线卷绕成圈形状。
- (3) 螺柱钉与夹头的口径不合或夹头损伤时。
- (4) 母材有污垢、生锈、涂漆以及有妨害通电的表面处理。
- (5) 对母材或螺柱钉的材质及轴径，使用的植焊枪有错误时。
- (6) 植焊面与螺柱钉没有成直角的接触。
- (7) 植焊电压的调整不适当。
- (8) 电容器的容量不足或损坏时。
- (9) 植焊枪的动作不良(三支固定脚松动、不齐、弯曲时)。
- (10) 螺柱钉的突出尺寸过长或过短。
- (11) 植焊瞬间(加压时)母材产生变形或移动。
- (12) 接地线连接的基本原则
 - ① 地线必须与母材直接接触，并要接 2 条以上
 - ② 接地线必须对母材成对角线的连接。



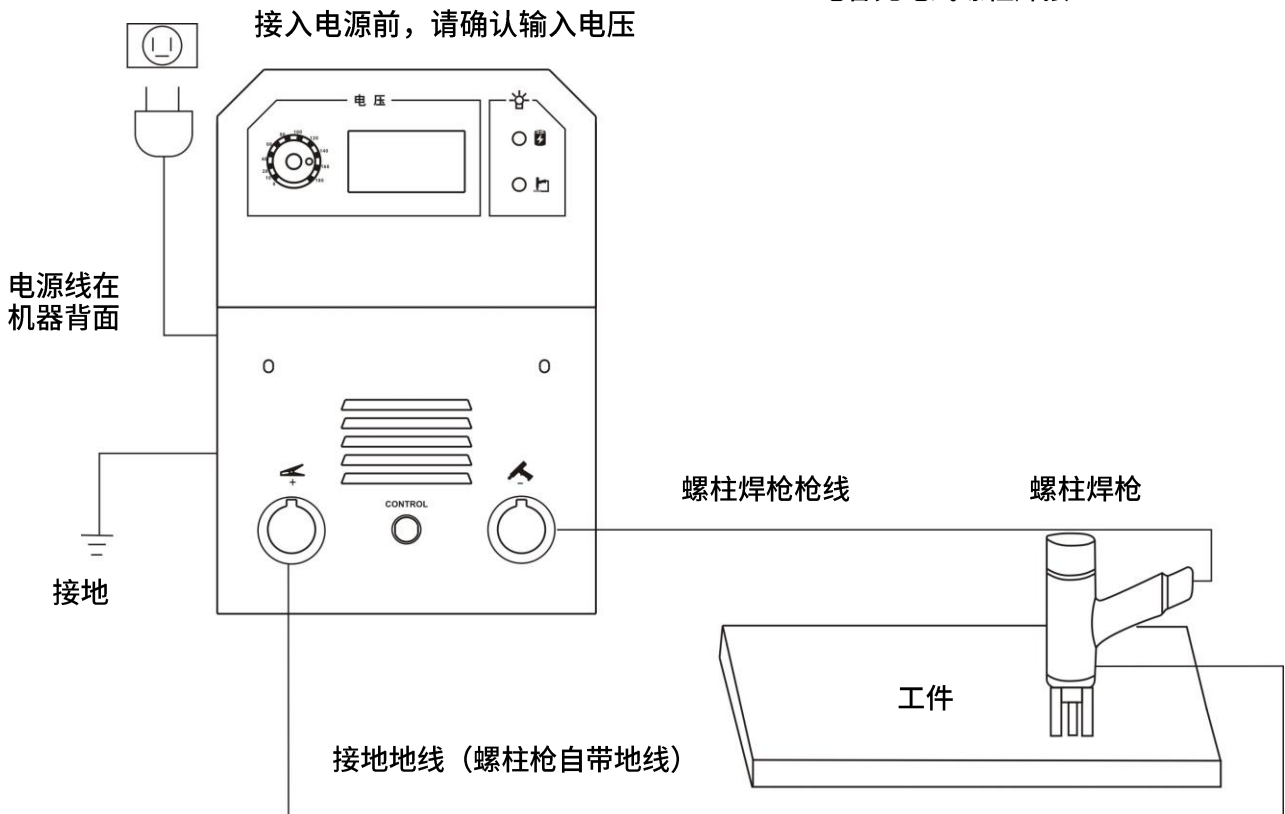
两个地线夹位于焊接点两面侧等距离位置，且距离越近越好



两个地线夹没有位于焊接点两面侧，或只夹一个地线夹

2-6. 植焊电线连接方法

电容充电式螺柱焊接



1. 请参考上图的接线方式。
 - 1) 植焊枪电线与接地电线，因凸轮锁插口内有锁止键，因此插至底后右转才能完全锁接上。
 - 2) 电源电线与控制电线须插入环锁插座以后，使用固定环来固定。
 - 3) 接地电线要使用 C 型夹具等牢夹在母材上。
 - 4) 各电线要伸直连接。电线形成圈状时会对螺柱钉植焊有不良的影响。
2. 逆极性连接---镀锌铁板、重叠钢板，黄铜板及钛螺柱钉植焊时：
把接地电线接在植焊枪电线插口(-)、接地电线插口(+)接上植焊枪电线，亦就是对调接线。

2-6.1 螺柱焊面板功能

A ---输出指示灯

机器有输出时，红灯会亮。

A1---连接指示灯

当焊枪地线和工件连接良好，黄灯会亮。

B --- 电压表

C ---螺柱焊输出电压调整旋钮

D---螺柱焊枪接头

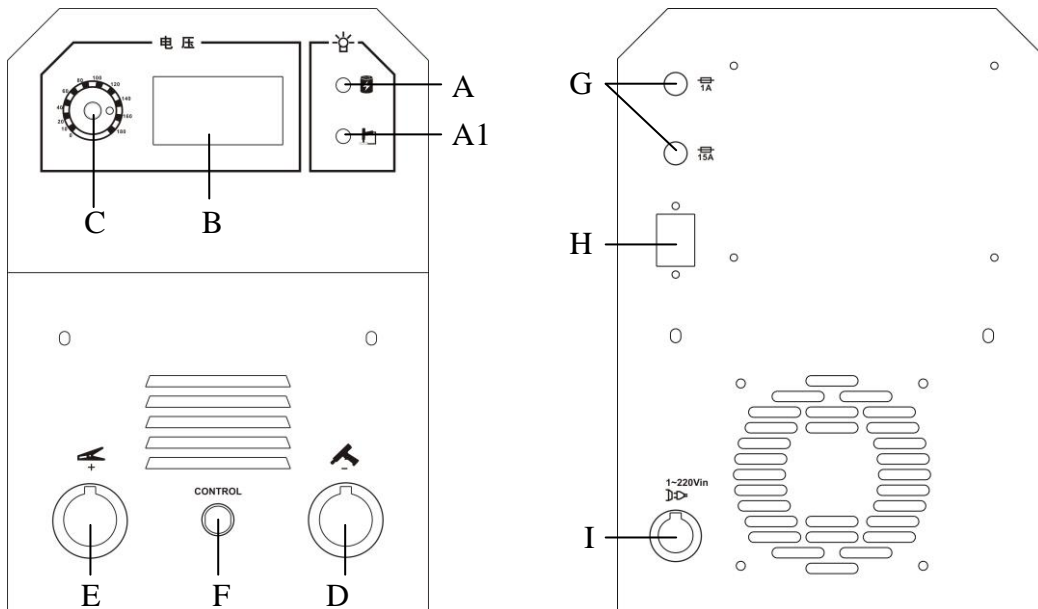
E---螺柱焊地线接头

F---控制端连接

G---保险丝

H---电源开关

I---电缆线（使用前请确认本机电源电压）



2-7. 植焊电力的调整方法

植焊电力的调整须配合要植焊的螺柱钉直径，来做①充电电压的调整②植焊枪的加压力或间隙调整等。
(各螺柱钉的调整值如下)

2-7-1 软钢、不锈钢螺柱钉的充电电压(参考)

螺柱钉	M3-S 型	M3-F 型	M4-S 型	M4-F 型	M5-S 型	M5-F 型	M6-S 型	M6-F 型	M8-S 型
充电电压 (V)	40	55	50	63	60	105	100	120	160

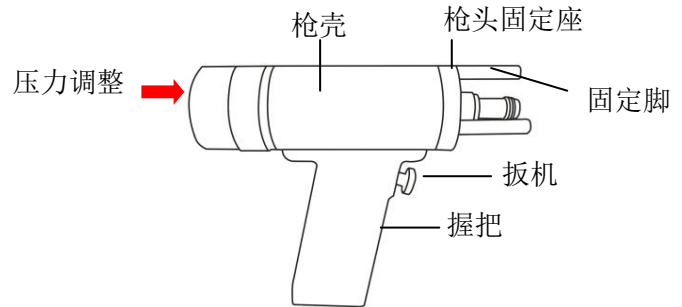
2-7-2 铝螺柱钉的充电电压（参考）

螺柱钉	M3-S 型	M3-F 型	M4-S 型	M4-F 型	M5-S 型	M5-F 型	M6-S 型	M6-F 型
充电电压(V)	50	60	60	80	75	100	120	140

2-8.植焊枪的加压力或间隙的调整

2-8-1 植钉枪(如右图)

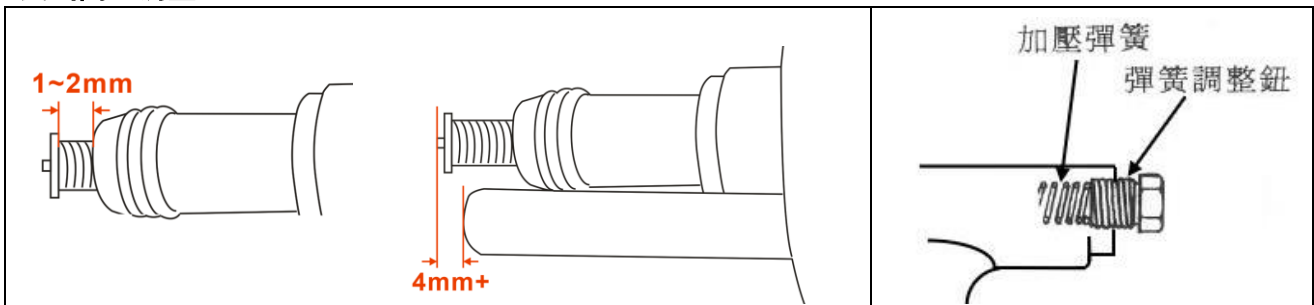
是一种把螺柱钉前端压接于母材植焊面的状态下，以接触方式放电的植焊枪，适合植焊螺柱钉长度至 150mm 以下的软刚、不锈钢等。



注：焊接时，如果以惯用手持枪，请以非惯用手按压枪尾箭头处（请看上图），确保三支固定脚皆稳定按压于母材表面。

焊接完毕后，请稍等一秒钟才拔枪

2-8-2 压力和螺柱突出间距调整



1. 如上图螺柱钉的植焊面比三支固定脚突出 1~2.0mm
2. 要加大植焊热时，将弹簧调整螺丝左旋转，使枪头 加压力减弱。
3. 使植焊热减低时将弹簧调整螺丝右旋转，使枪头加压力增强。
4. 加压力不足时，把后部盖套及弹簧调整钮取下，更换加压弹簧

2-8-3 夹头

夹头是挟持螺柱钉通上植焊电流的部品，所以必须使用与螺柱钉外径相同之夹头。夹头内径与螺柱钉外径不配合时，易产生螺柱钉轴部损伤或夹头的损耗成为植焊不良的原因，所以请多加注意。

2-9. 植焊作业的顺序

请注意植焊时的眼睛保护及周围的安全，依照下列顺序作业。

作业前：

- (1) 开始植焊前要清除母材植焊部的污垢、油、油漆、生锈。
- (2) 母材很薄，加压后会凹进去时，在植焊部的内侧要加上垫板。
- (3) 依照所使用的螺钉之材质、轴径及长度来决定使用的植焊枪。
- (4) 配合使用的螺柱钉尺寸形状，把适合的内径夹头及所定长度之档杆装在植焊鎗上。

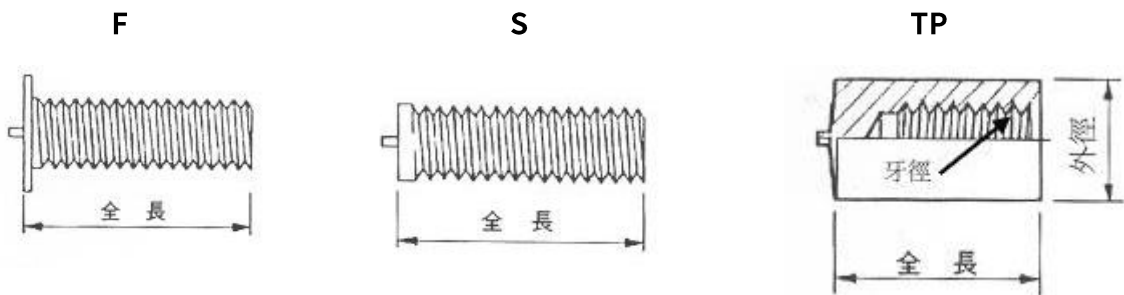
植焊：

- (5) 把螺柱钉插入夹头中。(注)螺柱钉要确实插到底的夹头内的档杆接触。
- (6) 把植焊鎗的三支脚接触到母材，使植焊鎗、与母材成直角压着。…图-25。
- (7) 扣按板机。…放电 → 植焊完成。
- (8) 植焊后放开板机，把植焊鎗直着缩回来。植焊鎗要直着的平缩退出来。

2-10. 订购螺柱钉时的注意事项

材质… 软钢、不锈钢、铝、钛、黄铜、铜。

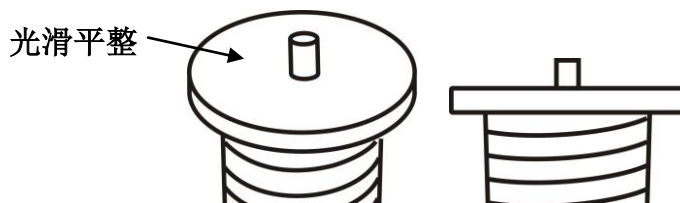
(1) 型别



(2) 尺寸… 外牙-----牙径*全长。 内牙-----外径*全长-牙径。

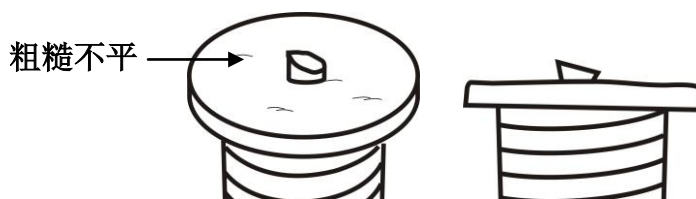
(3) 如何判别铝钉

正常铝钉：小凸点位于钉子正中央，凸点顶端平整，凸点大小与高度都有很好的一致性，大圆盘光滑平整。



不良铝钉：小凸点没有在钉子正中央，凸点顶端不平整，凸点大小与高度一致性很差，大圆盘粗糙不平

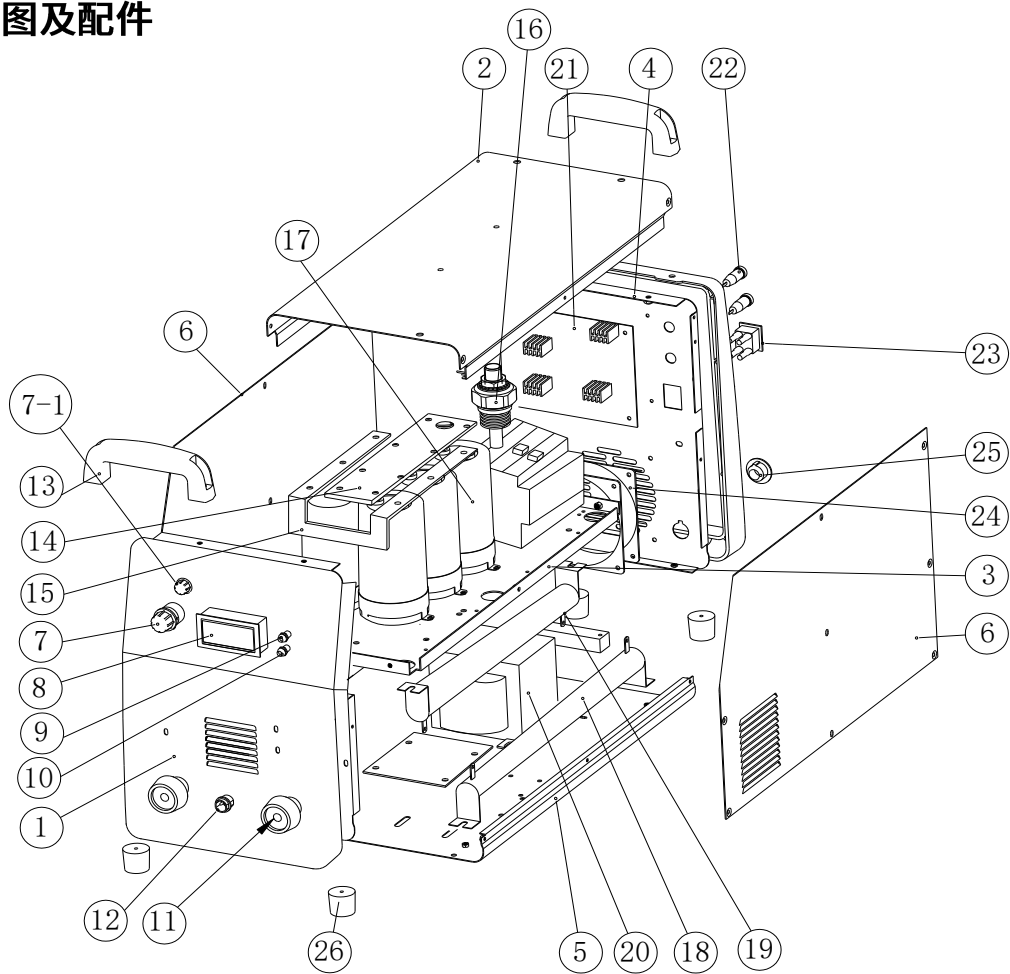
平



3. 故障排除

没有电源输入	<ol style="list-style-type: none">1. 检查电源2. 检查输入电缆3. 检查电源开关4. 联系厂家
不能焊接	<ol style="list-style-type: none">1. 检查输出端电缆(地线和枪)2. 检查连接(地线和枪)3. 检查保险丝4. 检查变压器温度是否过高5. 联系厂家
风扇不动作	<ol style="list-style-type: none">1. 检查风扇的供电电路2. 检查风扇, 可能被卡住3. 联系厂家
CD stud 螺柱焊模式	
不能调整输出电压	联系厂家

4.爆炸图及配件



序号	世达维修配件编号	维修配件名称	序号	世达维修配件编号	维修配件名称
1	PAE7004-1	前板	15	PAE7004-15	电容负端串联板
2	PAE7004-2	上盖	16	PAE7004-16	可控硅
3	PAE7004-3	中隔板	17	PAE7004-17	电容
4	PAE7004-4	后板	18	PAE7004-18	电阻 6Ω,150W
5	PAE7004-5	底板	19	PAE7004-19	电阻 100Ω,150W
6	PAE7004-6	左右板	20	PAE7004-20	变压器
7	PAE7004-7	电位器	21	PAE7004-21	控制板
7-1	PAE7004-7-1	旋钮	22	PAE7004-22	保险丝座
8	PAE7004-8	数显表	22-1	PAE7004-22-1	保险丝 1A
9	PAE7004-9	红色 LED 灯	22-2	PAE7004-22-2	保险丝 15A
10	PAE7004-10	黄色 LED 灯	23	PAE7004-23	电源开关
11	PAE7004-11	欧式快插	24	PAE7004-24	风扇
12	PAE7004-12	控制插座	25	PAE7004-25	电源线扣
13	PAE7004-13	握把	26	PAE7004-26	脚垫
14	PAE7004-14	电容正端串联板			

5. 耗材/选配配件

世达耗材/选配配件编号	耗材/选配配件名称	世达耗材/选配配件编号	耗材/选配配件名称
PAE7004-27	植钉枪-圆形	PAE7004-32	拉拔挂钩 M4
PAE7004-28	M4 夹头	PAE7004-33	手转双柱拉拔器
PAE7004-29	铝钉 M4*15mm(铝 镁硅合金)	PAE7004-34	手转双柱拉拔器/轴承 式
PAE7004-30	铝钉 M4*15mm(铝 镁合金)	PAE7004-35	桥式手转四脚拉拔器 850
PAE7004-31	360 拉拔挂钩 M4		

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

1. Mechanical/Electrical/Illustration Of Working Principle data

Electrical Data

MODEL	AE70004
voltage	AC220V
Phase	1PH
frequency	50/60Hz
capacitance	90000UF
Output power	1.458KVA
Stud diameter	M4~M8

2. CD Stud Mode

2-1. Summary

The machine is for Capacitor Discharge Stud Welding, the weld able range is $\varnothing 3$ - $\varnothing 8$ mm (CD-800), $\varnothing 3$ - $\varnothing 10$ mm (CD-1000). Stud materials are soft steel, stainless steel, aluminum, titanium (Ti), brass and copper screw. Stud welding time is about 3/1000s-6/1000s, the time is very short, so the welding heat cannot damage the base metal, even the base metal is sheet metal.

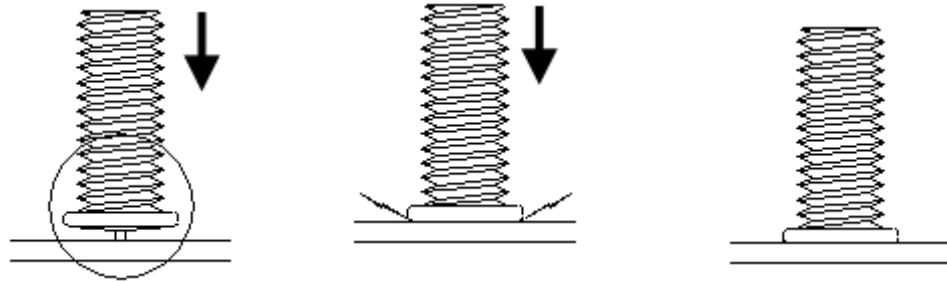
2-2. Matters need attention

1. Although safety is fully considered in the design of the auto sheet metal repair machine, please do carefully read the operation manual before using the machine in order to avoid injury.
2. The machine must be reliably grounded.
3. Do not use cables with insufficient capacity or damaged insulation
4. It is not allowed to be used when the casing is removed
5. Cut off the input power when not in use
- 6, Cardiac pacemakers should not be near the machine and the workplace, the magnetic field generated by the work of the machine will have a bad impact on the operation of the pacemaker.
7. Use insulating gloves.
- 8, when working, steel plate coating will produce harmful fireworks and gas when heated, it is recommended to use respiratory protective equipment.
9. Pay attention to the prevention of fire and other disasters.
10. Welding and heating steel plates may cause fire hazard
11. Where the cable is not connected properly and the current loop is not fully connected, it will cause electrification and heat, which may cause fire hazard

2-3. Stud welding

Contact type: apply to soft steel, stainless steel, brass and copper.

Diagram 1



**1.The stud screw press
the base metal**

**2. electric discharge, start
arc**

3. Stud welding complete

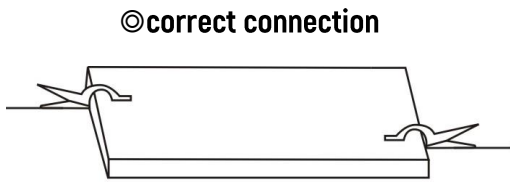
Fixed the Stud welding position, then press the torch trigger, the stud screw will be welded on the base metal immediately. Electric discharge, stud welding and recharge, all the process will operate automatically and safely.

Traditional method, such as rivets, lock screw and common welding, they must damage the base metal. But the stub welding does not damage the base metal.

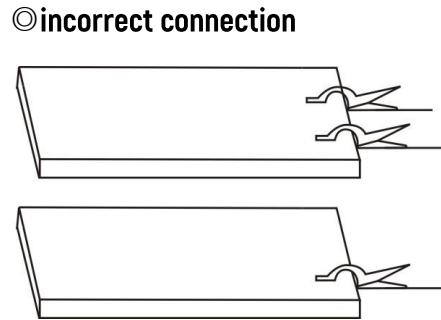
2-4. Stud welding trouble

The following situation may cause the trouble, please remedy them before use the machine.

- (1) The earth cable and the metal are not good connection.
- (2) Torch cable or earth cable is winding.
- (3) The diameter of screw clamp and stud screw is not suitable. Or screw clamp is worn.
- (4) The base metal dirty, rusty, paint or other problem interfere with electricity conductivity.
- (5) The torch is not suitable for the base metal or stud screw (material or diameter).
- (6) The stud screw and the base metal are not good connection (Keep the stud screw connect the base metal vertically).
- (7) The stud welding voltage is not correct.
- (8) The capacitor is damage, or capacitance is not enough.
- (9) Welding torch movement is abnormal. (The support foot is abnormal)
- (10) Stud screw extends too long or too short from the stud clamp.
- (11) Base metal distortion or move, when welding.
- (12) Method for connect the earth cable:
 - ① Cable must connect the base metal directly, and must connect more than two earth cables.
 - ② The earth cable must connect on the diagonal position of the base metal.
(refer to the diagram as follow)

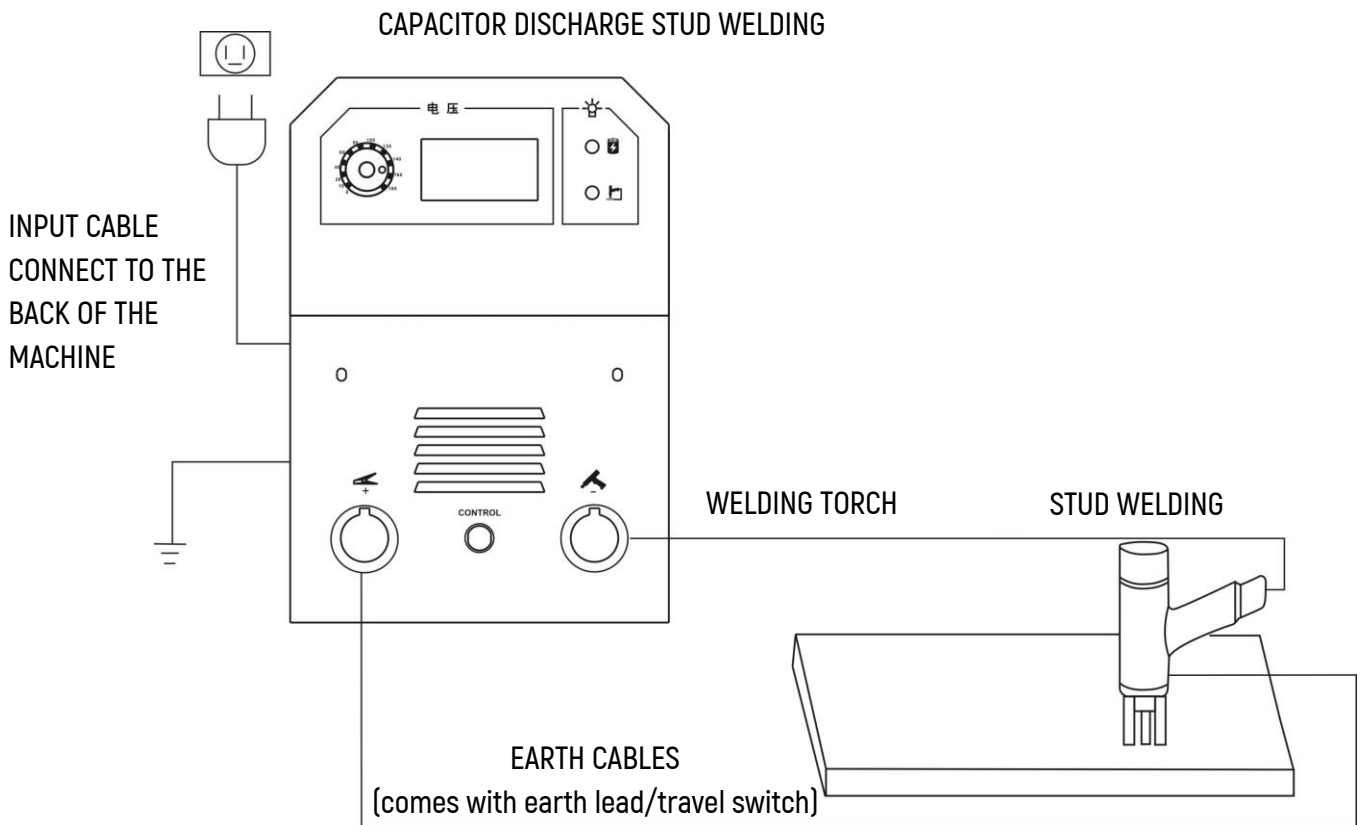


Two ground wires are clamped at equal distances on both sides of the weld joint, and the closer the distance, the better.



Two ground clamps are not located on either side of the weld joint, or only one ground clamp is clamped.

2-6. STUD Mode Cable connection



1. The cable connection, please refer to above the diagram.
First, please change the switch to the "STUD".
- 1) The torch cable and earth cable are use Euro type quick connector. Please push the plug to the end of the socket, torch cable to "GUN(-)" socket ,earth cable to "STUD EARTH(+)"socket ,and turn right, they will connect well.
- 2) The input cable and control cable connectors have screw. Please lock the screw to fixed the connector.

- 3) The earth cable must use clamp to fixed on the base metal.
- 4) All cables must keep straight .If the cable is winding, that will interfere with the stud welding.
- 2. Negative connection----apply to zinc coated steel , overlap steel plate, plate brass and titanium stud screw.

The earth cable connect to the "GUN(-)" socket, The torch cable connect to the "STUD EARTH(+)"socket.
That means the torch and earth cable exchange connection.

2-6.1 CONTROLS ON GENERATOR FRONT PANEL

A ---Output indicator

When the machine output, the red LED will light.

A1---Connection indicator

When the machine output, the red LED will light.

B ---Output voltage meter

C ---Output voltage adjustment for stud welding

D---STUD torch connector

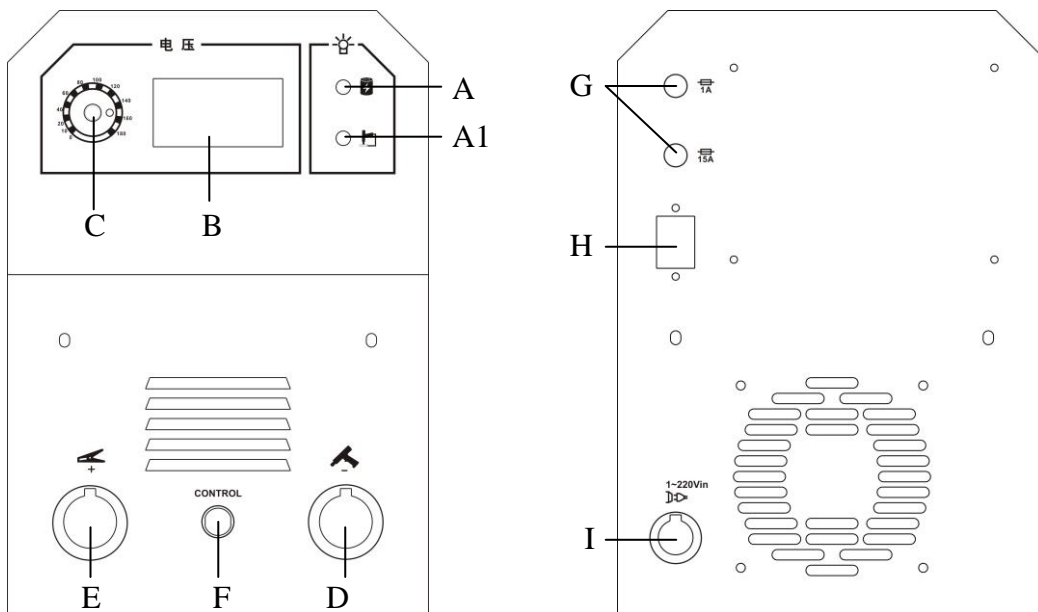
E---SPOT earth connector

F---output connector-for torch control

G---fuse

H---main switch

I---input power cable(confirm the power voltage before use)



2-7. Stud welding adjustment

Adjust the stud welding must according to the diameter of the stud screw.

- ①Adjust charge voltage
- ②Adjust welding torch pressure or clearance

All types stud screw adjustment standard as follow diagram.

2-7-1 charge voltage for soft steel, stainless steel stud screw:

Stud screw	M3-S	M3-F	M4-S	M4-F	M5-S	M5-F	M6-S	M6-F	M8-S
Charge voltage (V)	40	55	50	63	60	105	100	120	160

2-7-2 charge voltage for aluminum:

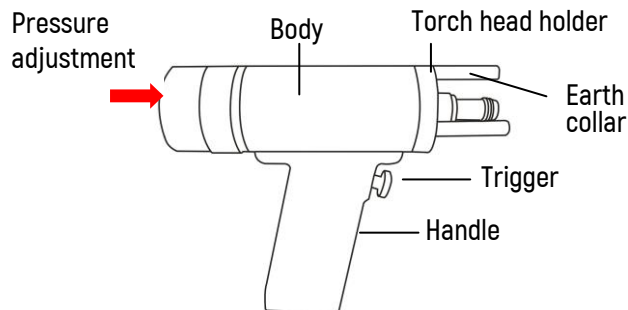
Stud screw	M3-S	M3-F	M4-S	M4-F	M5-S	M5-F	M6-S	M6-F
Charge voltage (V)	50	60	60	80	75	100	120	140

2-8. Stud welding torch

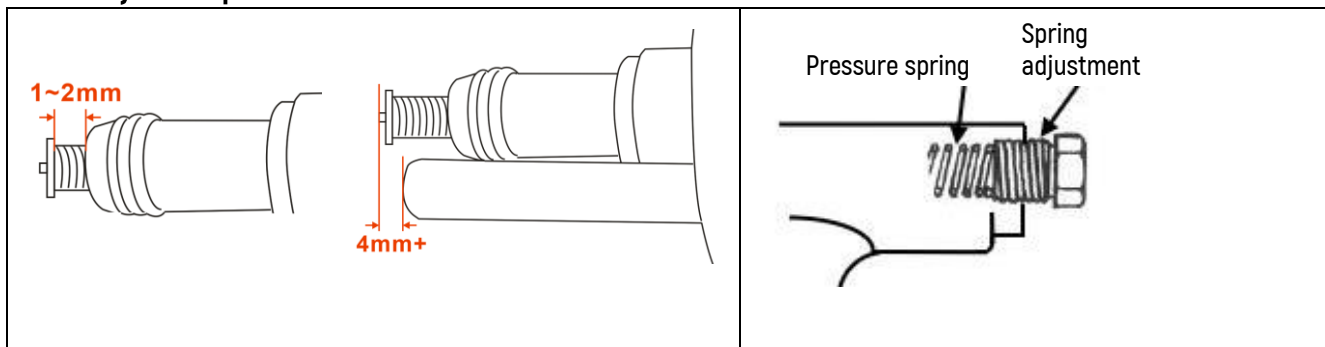
2-8-1 Torch (diagram on right)

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.



2-8-2 Adjust the pressure and extend distance



1. Stud screw extend 1-2.0mm from earth collar or pins, as shown in the figure above.
2. Turn spring adjustment CCW: stud welding heat will increase & torch pressure will be reduced.
3. Turn spring 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.

2-8-3 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.

2-9. Operating process for stud welding

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

2-9-1 preparation for operation

- (1)Keep the workpiece free of dirt ,oil, paint and rust.
- (2)If the base metal is thin, it will dent at pressure .It must add a base plate, when stud welding.
- (3)Select suitable stud welding torch, according as material, diameter, length of the stud screw,
- (4) Make sure the diameter of the clamp is correct and the length of the gag lever post is correct.
Install the screw clamp and gag lever post in the torch.
- (5)Make sure all the cables connect to the machine and workpiece. Input cable connect to AC100V/30A power.
- (6)Turn left the charge adjustment to the end, then turn "on" the power switch.
Confirm the digital meter (DC voltage meter) display "0.0".

Note: When turn on the power switch, the fan is not work. Please check the 15A fuse. Maybe it burn out.

- (7)According as stud welding adjustment standard, adjust suitable charge voltage for the stud screw. Turn right the charge adjustment to setting the charge voltage, Watch the digital meter to confirm it.
Once setting the charge voltage, the machine will charge, according as the setting.

So that ,the preparation have completed. Please operate stud welding as follow.

2-9-2 operate stud welding

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

Note: Make sure the stud screw insert to the end of the screw clamp and contact the gag lever post.

- (2)Keep the 3 support feet contact the base metal. The torch presses on base metal vertically.

Note: Keep torch contact the base metal, after insert the stud screw.

- (3)Press torch trigger. Discharge→Stud welding complete.
- (4) After stud welding complete, release the trigger, move back the torch vertically.

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

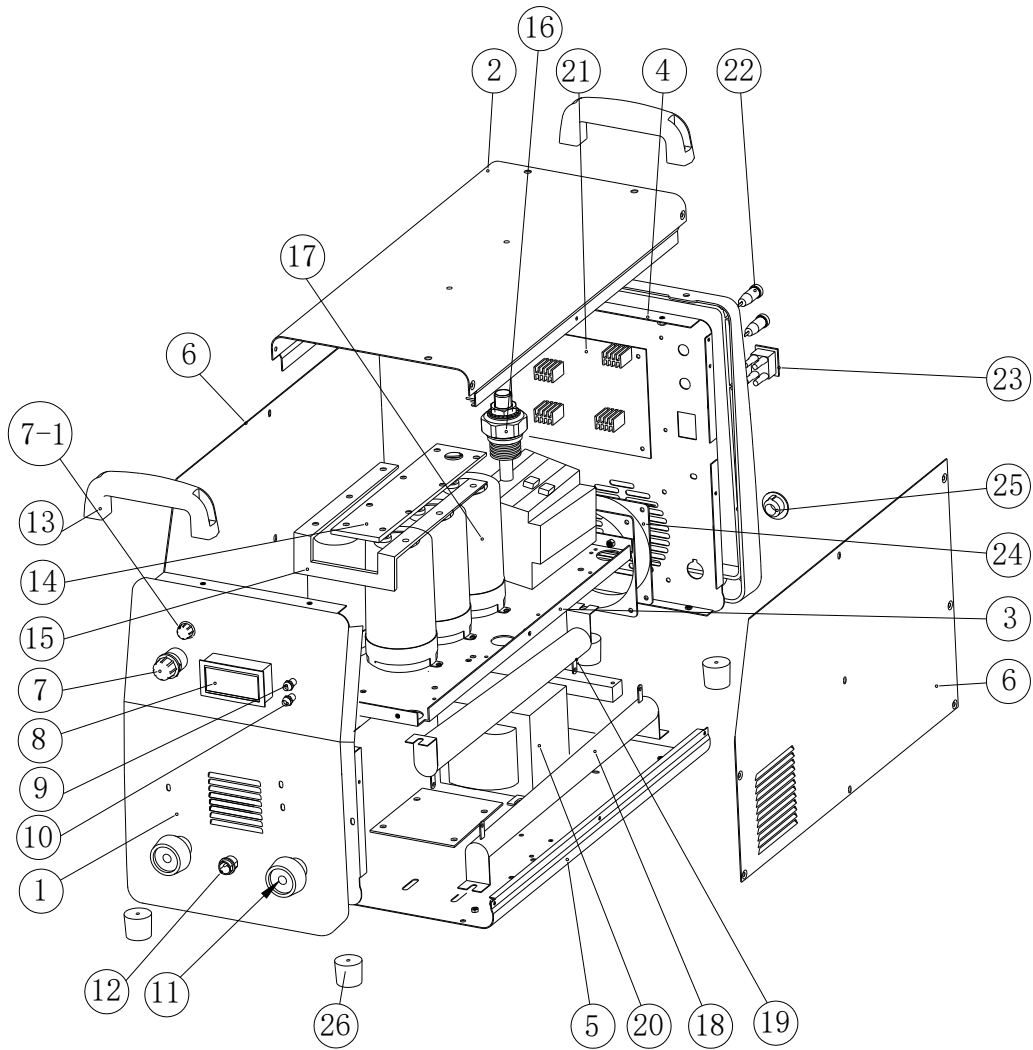
2-10. Maintenance

- (1)The machine and torch must to keep away from dust, humidity, rain.
- (2) Avoid vibration, when move the machine.
- (3) Do not put the machine reversely, protect the machine.
- (4)Clean the dust and check the screw, which can keep the machine in good condition.
- (5)Turn off the switch, when not use the machine.
- (6)Do not adjust the capacitor to high voltage immediately, after use for long time (more than 6 months).
Turn left the charge voltage adjustment to the end. From 30V, begin to increase the voltage slowly, Increase the maximum voltage at 180V.The adjustment process is slow. From 30-180V, it need about 10 minutes. After about 10 minutes adjustment, turn off the power switch, then turn it on again.
Then, adjust the voltage, which you need.

2-11. Select stud screw

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

4. AE7004



NO.	Code	Description	NO.	Code	Description
1	PAE7004-1	front panel	15	PAE7004-15	capacitor connector(-)
2	PAE7004-2	top cover	16	PAE7004-16	SCR
3	PAE7004-3	inside baffle	17	PAE7004-17	capacitor
4	PAE7004-4	back panel	18	PAE7004-18	Wire wound resistors 6Ω,150W
5	PAE7004-5	bottom board	19	PAE7004-19	Wire wound resistors 100Ω,150W
6	PAE7004-6	Left/right panel	20	PAE7004-20	stud welding aux transformer
7	PAE7004-7	potentiometer	21	PAE7004-21	stud welding PCB board
7-1	PAE7004-7-1	knob	22	PAE7004-22	fuse holder
8	PAE7004-8	digital meter	22-1	PAE7004-22-1	fuse 15A
9	PAE7004-9	red lamp	22-2	PAE7004-22-2	fuse 1A
10	PAE7004-10	yellow lamp	23	PAE7004-23	switch
11	PAE7004-11	Plug	24	PAE7004-24	fan
12	PAE7004-12	control socket	25	PAE7004-25	cable holder
13	PAE7004-13	Handle	26	PAE7004-26	foot pad
14	PAE7004-14	capacitor connector(+)			

5. Accessories

Code	Description	Code	Description
PAE7004-27	Stud welding torch	PAE7004-32	Puller washer M4
PAE7004-28	Stud welding connector M4	PAE7004-33	Puller L300
PAE7004-29	Stud screw-aluminum(AL-Mg-Si) M4*15mm	PAE7004-34	Puller
PAE7004-30	Stud screw-aluminum(AL-Mg) M4*15mm	PAE7004-35	Puller
PAE7004-31	360 pulling ring M4		



铝车身修复机 说明书

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