MIG 301i / 401i / 501i

INVERTER MIG
Welding Power Source

Instruction manual

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INVERTER WELDING POWER SOURCE

MIG 301i

MIG 401i

MIG 501i

Instruction manual
For
Installation, Operation & General maintenance

CONTENTS

SAFETY

Users of ESAB welding equipment have the ultimate responsibility for ensuring that anyone who works on or near the equipment observes all the relevant safety precautions. Safety precautions must meet the requirements that apply to this type of welding equipment. The following recommendations should be observed in addition to the standard regulations that apply to the workplace.

Trained personnel well acquainted with the operation of the welding equipment must carry out all the work. Incorrect operation of the equipment may lead to hazardous situations, which can result in injury to the operator and damage to the equipment.

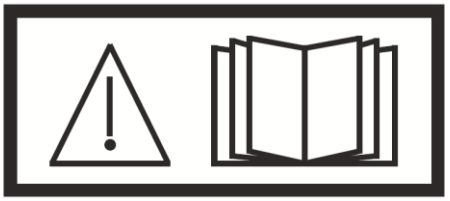
1. Anyone who uses the welding equipment must be familiar with:
   - its operation
   - location of emergency stops
   - its function
   - relevant safety precautions
   - welding

2. The operator must ensure that:
   - no unauthorized person is stationed within the working area of the equipment when it is started up.
   - no one is unprotected when the arc is struck

3. The workplace must:
   - be suitable for the purpose
   - be free from drafts

4. Personal safety equipment
   - Always wear recommended personal safety equipment, such as safety glasses, flameproof clothing, and safety gloves.
   - Do not wear loose—fitting items, such as scarves, bracelets, rings, etc., which could become trapped or cause burns.

5. General precautions
   - Make sure the return cable is connected securely.
   - Only a qualified electrician may carry out work on high voltage equipment.
   - Appropriate fire extinguishing equipment must be clearly marked and close at hand.
   - Lubrication and maintenance must not be carried out on the equipment during operation.

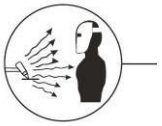
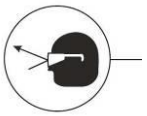
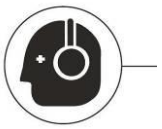


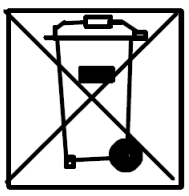
Read and understand the instruction manual before installing or operating.

ESAB can provide you with all necessary welding protection and accessories.

WARNING

Arc welding and cutting can be injurious to yourself and others. Take precautions when welding.
Ask for your employer's safety practices which should be based on manufacturers' hazard data.

	*ELECTRIC SHOCK – Can kill* • Install and earth the welding unit in accordance with applicable standards. • Do not touch live electrical parts or electrodes with bare skin, wet gloves or wet clothing. • Insulate yourself from earth and the workpiece. • Ensure your working stance is safe.
	*FUMES AND GASES – Can be dangerous to health* • Keep your head out of the fumes. • Use ventilation, extraction at the arc, or both, to take fumes and gases away from your breathing zone and the general area.
	*ARC RAYS – Can injure eyes and burn skin.* • Protect your eyes and body. Use the correct welding screen and filter lens and wear protective clothing. • Protect bystanders with suitable screens or curtains.
	*FIRE HAZARD* • Sparks (spatter) can cause fire. Make sure therefore that there are no inflammable materials nearby.
	*NOISE – Excessive noise can damage hearing* • Protect your ears. Use earmuffs or other hearing protection. • Warn bystanders of the risk.
	MALFUNCTION – Call for expert assistance in the event of malfunction. PROTECT YOURSELF AND OTHERS!
	CAUTION! *This product is solely intended for arc welding*

	Do not dispose of electrical equipment together with normal waste! In accordance with national law, electrical equipment that has reached the end of its life must be collected separately and returned to an environmentally compatible recycling facility. As the owner of the equipment, you should get information on approved collection systems from the local representative. By applying this directive you will improve the environment and human health

TECHNICAL DATA

	MIG 301i	MIG 401i	MIG 501i
Mains Voltage, V/Ph, Hz	415(± 15%) /3,50		
Rated Input Power, KVA	9.5	19	26.5
No Load Voltage, V	70	70	70
Current Range MIG, A	60-300	40-440	50-550
Permissible load at 40% Duty Cycle MIG,	–	440A/36V	550A/41.5V
Permissible load at 60% Duty Cycle MIG,	300A/29V	400A/34V	500A/39V
Permissible load at 100% Duty Cycle MIG,	240A/26V	313A/29.7V	387A/33.4V
Power factor at maximum current	≥ 0.9		
Efficiency at maximum current	≥89%		
Insulation class	H	H	H
Enclosure class	IP 21S	IP 21S	IP 21S
Wire Diameter, mm	0.8-1.2	0.8-1.2	0.8-1.6
Dimension (LXWXH), mm	687X320X581		
Weight, Kg	45	45	50

Duty Cycle

The duty cycle refers to the time as a percentage of a ten-minute period that you can weld or cut at a certain load without overloading. The duty cycle is valid for 40 °C / 104 °F, or below.

Enclosure class

The IP code indicates the enclosure class, i.e. the degree of protection against penetration by solid objects or water.

INSTALLATION

The complete installation for MIG application should consists of the following items:

Sl. No	Description	Type	Quantity
1.	Welding Power Source	MIG 301i / 401i / 501i	1
2.	Wire feeder with Interconnections, Wire spool	MIG 301i wire feeder / MIG 401i wire feeder/ MIG 501i wire feeder	1
3.	MIG Torch		1
4.	Earth cable with clamp		1
5.	Heater - Optional	110V A.C for Co2	1
6.	GAS with regulator		1

CAUTIONS FOR INSTALLATION

- Provide a Switch Box for every Welding Power Source, and use designated fuse
- Tolerance of Power Voltage Variation is ± 10% of rated input voltage.

a) Installation place

- Install in the place where less moisture and dust exist. Avoid direct sunlight and rain, and maintain ambient temperature within –10^{o} to +45^{o} C as much as possible.

- Keep the welding power source at least 20 cm. away from the wall (if any).

- In case of installation of more two units side by side, a distance of more than 20 cm is recommended between the two power sources.

- Use a shield to protect the welding arc in case of excessive air draft.

b) Ventilation

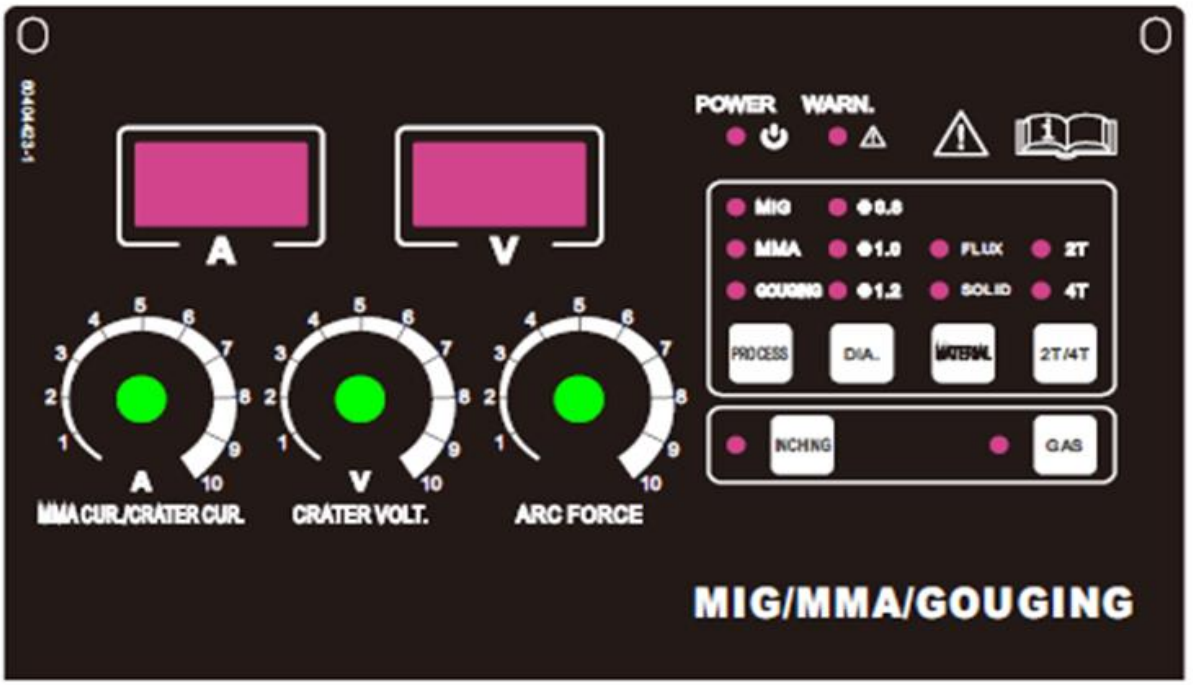
Adequate ventilation is recommended at the place of installation. For example the following guideline should be followed:

a) In case of the area being more than 300 square meters (per unit), no ventilation is required, provided the room is not completely airtight.
b) In case of the area being less than 300 square meters and the welding is continuously performed, adequate ventilation is recommended with the help of vent fan or exhaust duct.
c) While performing the grounding work, it is recommended that a skilled electrician does the work.

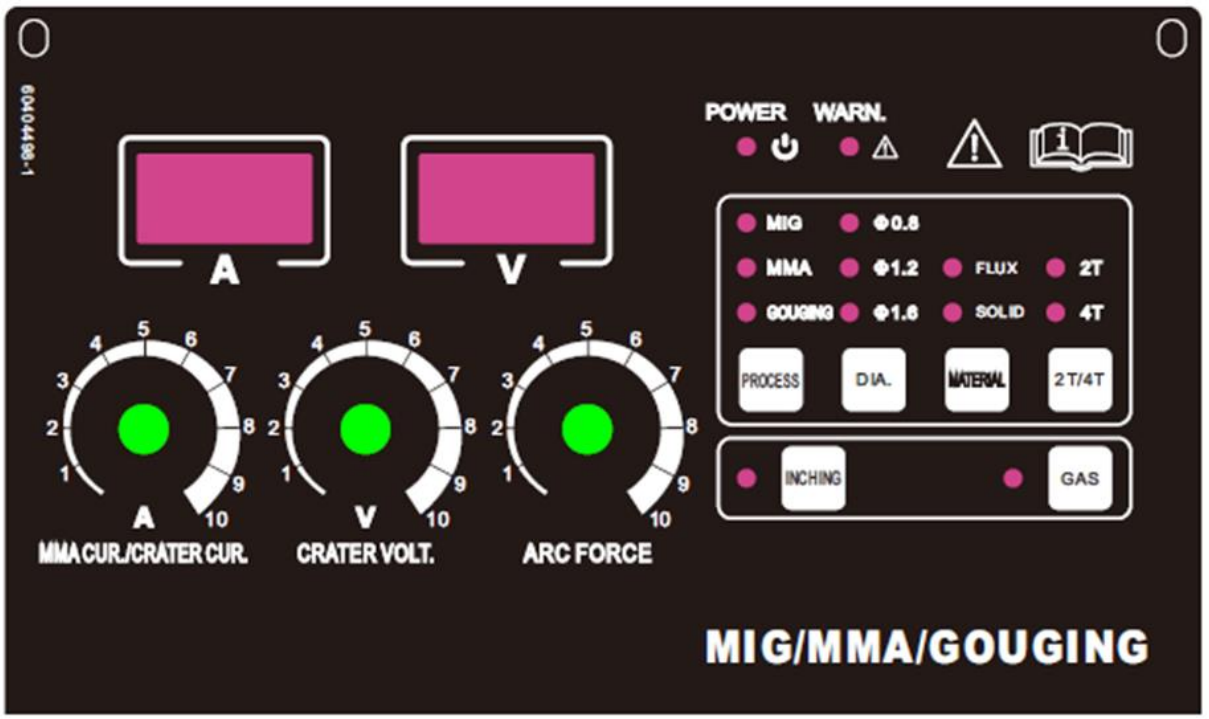
WELDING OPERATIONS

Front Panel

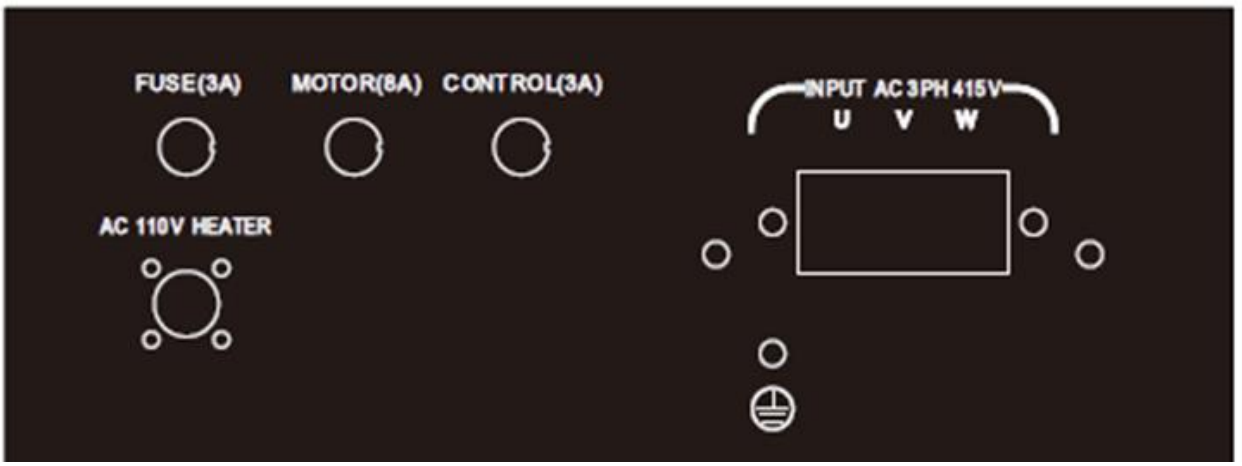
MIG 301i / 401i



MIG 501i



Rear Panel

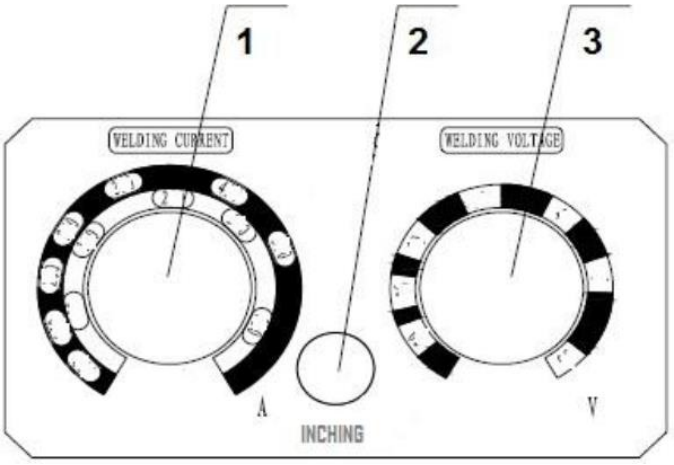


To start the power source, switch on the main switch on the front panel. To stop the power source, switch OFF the main switch.
Depending on the selection, put process switch on MIG/ MMA/ GOUGING mode.

MIG Mode

Welding current and voltage can be set by knobs on the wire feeder remote. INCHING push switch is on the wire feeder remote for inching wire without voltage. Flow of Gas can be checked by GAS switch on the front panel.
Selection of wire diameter, type of material and 2 stroke / 4 stroke mode can be selected on the front panel of the machine.
Crater voltage and current can be set by knobs on the machine front panel.

Control on Wire Feeder



1.Welding Current 2. Wire Inch Push Button 3. Welding Voltage Setting

Main Supply

Make sure that the welding power source is connected to the correct supply voltage and that it is protected by the correct fuse rating. A protective earth connection must be made in accordance with regulations.
The power source will automatically adjust to the supplied input voltage.

Recommended specification of input cable, grounding wire and fuse

Power Source		MIG 301i	MIG 401i	MIG 501i
Mains Voltage	415V, 3Ph,50Hz			
Input Protector	Fuse	30A	40A	50A
Cross-section of cable	Welding cable	2.5 mm^2	4 mm^2	6 mm^2
	Grounding wire	> 6 mm2		

Connection of welding and return cable

The power source has two outputs, a positive terminal (+) and a negative terminal (-), for connecting welding and return cables.
Connect the return cable to the negative terminal on the power source. Secure the return cable's contact clamp to the work piece and ensure that there is good contact between the work piece and the output for the return cable on the power source.

Recommended specifications of the output cable

Power Source	MIG 301i	MIG 401i	MIG 501i
Cross-section of Cable (mm^2)	≥ 35	≥ 35	≥ 50

TROUBLESHOOTING

General Maintenance

All parts of the fan are sealed such that extra maintenance is not required for the fan. When operated at dusty place, the air duct may get plugged to cause the machine overheated, therefore, remove dust with dry compressed air regularly.

Overload Protection

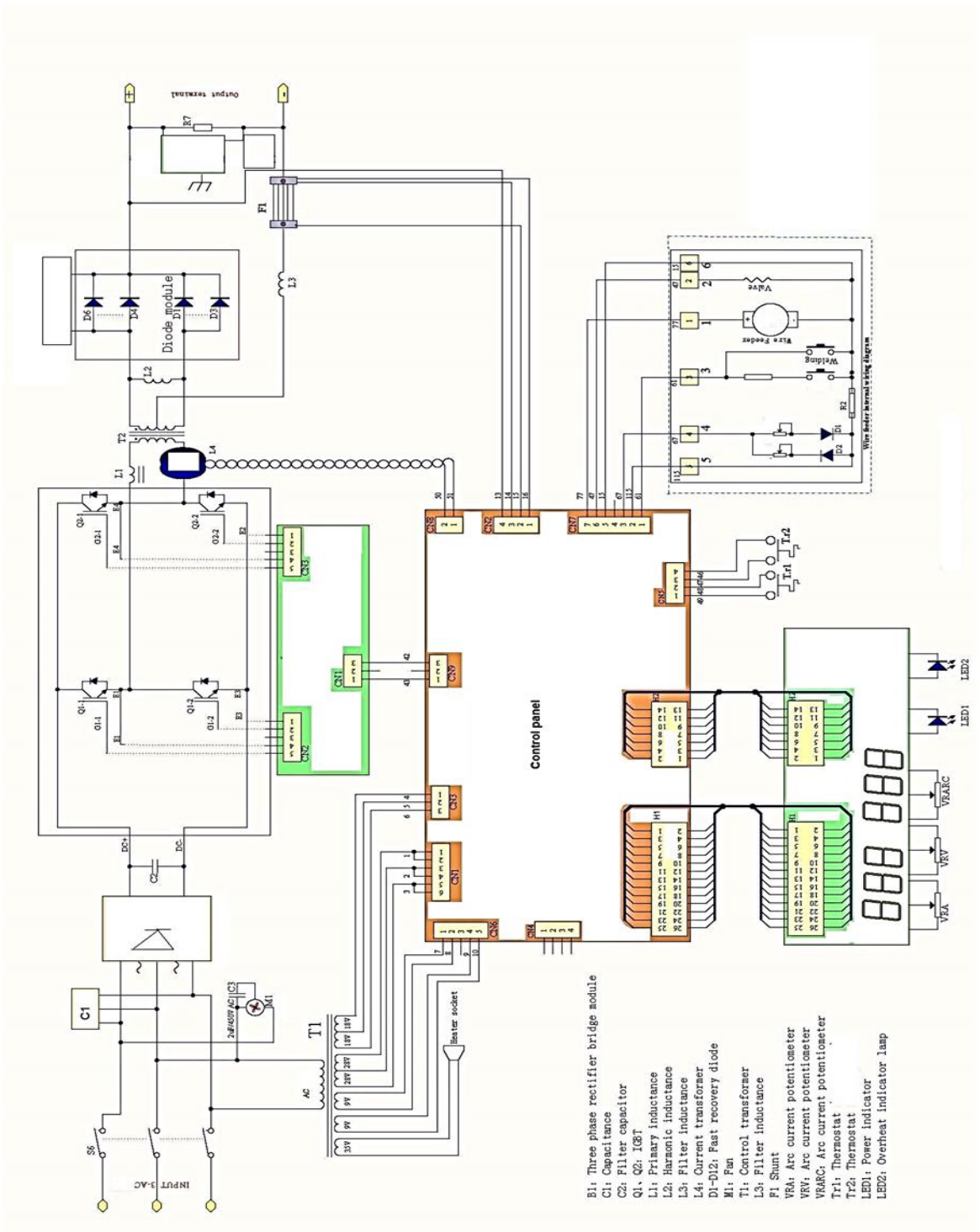
The thermostat inside the welding machine can effectively protect important power devices with overload or insufficient cooling avoided by the thermostat switch. When the machine is continuously overloaded or the power device IGBT and fast recovery diodes are not cooled adequately, the overheat indicator will be lighted, normal output of the welder will be stopped When these components are sufficiently cooled, the overheat indicator will be off, the digital indicator and the voltage output of the machine returns to normal.

Out of Phase, Over Voltage, Under Voltage Protection

A power supply detection section inside machine may be active when the input voltage phase, over voltage, under voltage to detect abnormal state. This fault will close the main circuit output, warning lights lit up at the same time.

BLOCK DIAGRAM

MIG 301i / 401i / 501i



PART LIST & EXPLODED VIEW

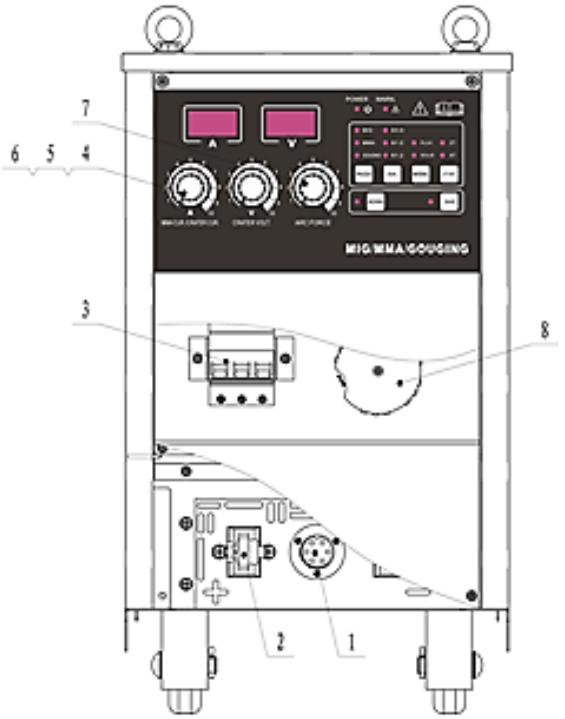


Table 1：

SL.NO.	Name of components	Material code
1	Air Socket	0012001002
2	Output Terminal	0040214018
3	Miniature circuit breaker	0011501062
4	Potentiometer knob	0010603056
5	Carbon film potentiometer	0010602038
6	Display panel	0030101564
7	Carbon film potentiometer	0010602038
8	Three-phase input conductor	0031001109

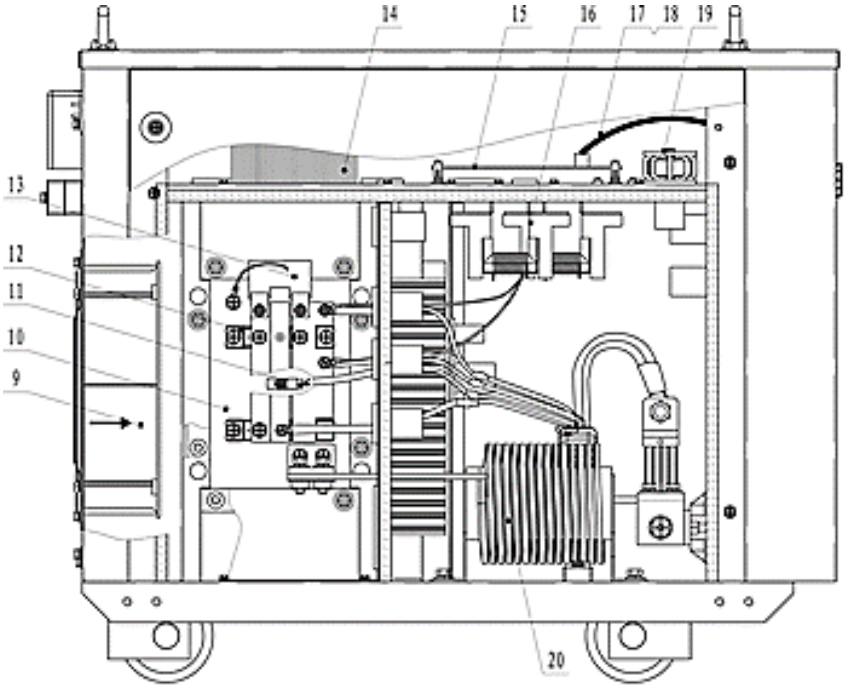


Table 2：

SL.NO.	Name of components	Material code
9	FAN	0011702012
10	Radiator（MIG 501i）	0060301221
	Radiator（MIG 401i）	0060301313
	Radiator（MIG 301ii）	0060301226
11	Thermostat	0011208018
12	Diode	0012102033
13	Diode absorption plate	0030101565
14	Control transformer	0060101177
15	control board（MIG 501i）	0030101938
	control board（MIG 401i）	0030101939
	control board（MIG 301i）	0030101652
16	Auxiliary inductance	0031001106
17	Horn pin seat （Half Gold Tin）[thread]	040204073-02
18	Horn pin seat （Half Gold Tin）[thread]	040204064-02
19	Feedback assembly	0030501892
20	Reactor (MIG-501i)	0030901137
	Reactor（MIG 301i/401i）	0030901140

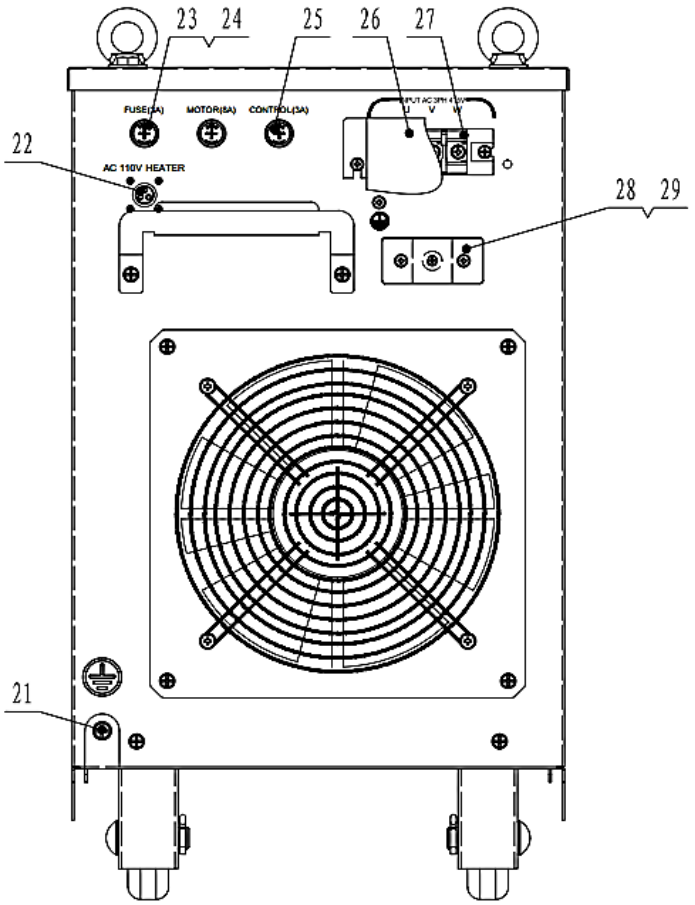


Table 3：

SL. NO.	Name of components	Material code
21	Grounding screw	0040113002
22	Heater socket	0012301275
23	Fuse hold	0011402002
24	Fuse	0011401024
25	Fuse	0011401008
26	Three-phase arc cover	0061301171
27	Combined connection terminal	0060701065
28	Retaining ring（die opening）	0061301150
29	Protective ring thimble（mold opening）	0061301147

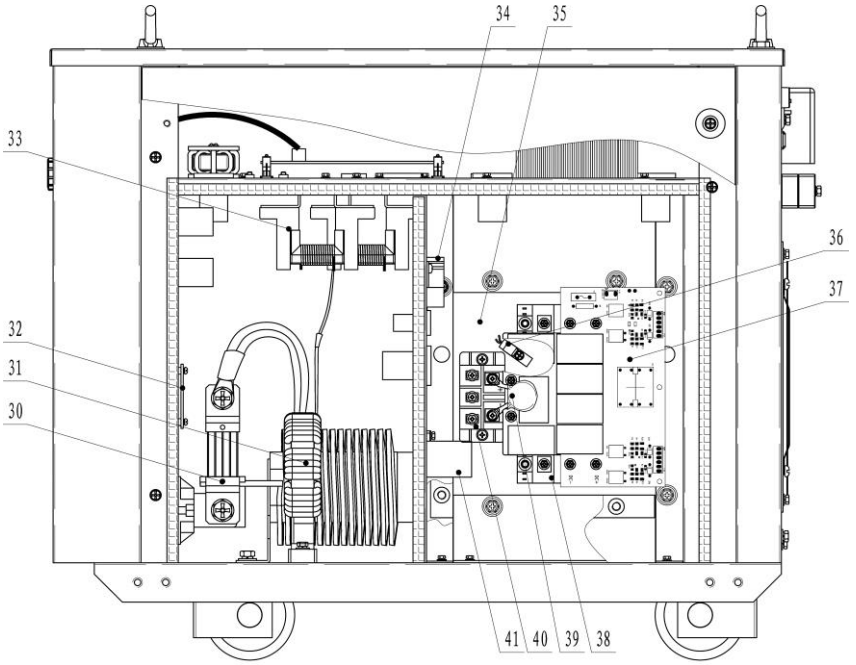


Table 4：

SL. NO.	Name of components	Material code
30	Shunt	0011305008
31	Main transformer（MIG 501i）	0030801558
	Main transformer（MIG 301i/401i）	0030801559
32	absorption plate	0030101644
33	Primary inductance	0031001108
34	Current transformer	0030501565
35	IGBT radiator（MIG 501i）	0060301222
	IGBT radiator（MIG 301i/401i）	0060301225
36	Thermostat	0011208025
37	Driver board	0030101591
38	IGBT（MIG 501i）	0012101028
	IGBT（MIG 301i/401i）	0012101029
39	VDR	0030501532
40	Three-phase rectifier bridge（MIG 501i）	012103013-01
	Three-phase rectifier bridge（MIG 301i/401i）	012103001-01
41	Capacitor	0010227001

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