



***ARC 601i***

**INVERTER MMA / GOUGING  
Welding Power Source**

**Instruction manual**



# ARC 601i

INVERTER WELDING POWER SOURCE



Instruction manual  
For  
Installation, Operation & General maintenance

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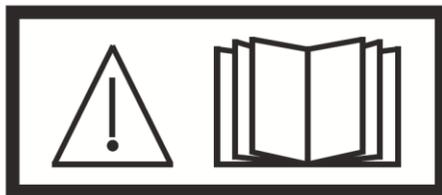
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# SAFETY

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.*

	<p><b>ELECTRIC SHOCK – Can kill</b></p> <ul style="list-style-type: none"> <li>• Install and earth the welding unit in accordance with applicable standards.</li> <li>• Do not touch live electrical parts or electrodes with bare skin, wet gloves or wet clothing.</li> <li>• Insulate yourself from earth and the workpiece.</li> <li>• Ensure your working stance is safe.</li> </ul>
	<p><b>FUMES AND GASES – Can be dangerous to health</b></p> <ul style="list-style-type: none"> <li>• Keep your head out of the fumes.</li> <li>• Use ventilation, extraction at the arc, or both, to take fumes and gases away from your breathing zone and the general area.</li> </ul>
	<p><b>ARC RAYS – Can injure eyes and burn skin.</b></p> <ul style="list-style-type: none"> <li>• Protect your eyes and body. Use the correct welding screen and filter lens and wear protective clothing.</li> <li>• Protect bystanders with suitable screens or curtains.</li> </ul>
	<p><b>FIRE HAZARD</b></p> <ul style="list-style-type: none"> <li>• Sparks (spatter) can cause fire. Make sure therefore that there are no inflammable materials nearby.</li> </ul>
	<p><b>NOISE – Excessive noise can damage hearing</b></p> <ul style="list-style-type: none"> <li>• Protect your ears. Use earmuffs or other hearing protection.</li> <li>• Warn bystanders of the risk.</li> </ul>
<p><b>MALFUNCTION – Call for expert assistance in the event of malfunction. PROTECT YOURSELF AND OTHERS!</b></p>	
	<p><b>CAUTION!</b> <i>This product is solely intended for arc welding</i></p>

	<p>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</p>
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## RATING

### RATING OF ARC 601i INVERTER WELDING POWER SOURCE

Contents of parameters		Unit	ARC601i	
Output	No-load voltage	V	82	
	Working voltage	V	22-44	
	Rated welding current	A	600	
	Welding current regulating range	A	50-600	
	Rated load duty cycle			100%
			520A	600A
Input	Number of phases	Phase	3	
	Frequency	Hz	50/60	
	Power supply voltage	V	415	
	Rated input current	A	45	
	Maximum effective input current	A	34.8	
	Rated input capacity	KVA	31.63	
$\eta$			$\geq 85\%$	
Insulation level			H	
Enclosure protection grade			IP21S	
Characteristics			Drooping characteristic	
Weight		Kg	50	
Dimensions (L* W* H)		mm	680x320x581	

## INSTALLATION

### Input wiring

- Ensure that the voltage, number of phases, frequency and capacity of the input power are consistent with the calibration values on the nameplate of the welding machine.
- Wiring shall be performed by professional electrician.
- The input cable and air inlet are located on the back panel of the welding machine. Please refer to the structure diagram of welding machine for detailed location.
- Connect the input cable to the power to ensure the reliable connection.
- The casing must be grounded, and the grounding bolt is located at the lower right corner of the back panel of the welding machine and marked with a grounding  $\ominus$  mark.
- The recommended specifications of ground wire, fuse protector or breaker are as follows:

Specifications for input cables, grounding wires and input fuse protectors or circuit breakers at 3-phase /50Hz rated load duty cycle							
Welding machine model	Duty cycle	Input voltage	Input current	Most effective Input current	Cable specification		Fuse protector or circuit breaker
					Three-phase input cable	Grounding wire	
ARC601i	60%	415V	45A	34.8A	>4 mm <sup>2</sup>	>2.5 mm <sup>2</sup>	63A

### Output connection

- The positive and negative electrodes of the output terminal are located at the lower part of the front panel and marked with "+" and "-" symbols.
- Connect one end of the negative output cable to the negative terminal, and the other end to the job.
- Connect one end of the positive output cable to the positive terminal, and the other end to the electrode holder.

## CAUTIONS FOR INSTALLATION

- Provide a Switch Box for every Welding Power Source, and use designated fuse
- Tolerance of Power Voltage Variation is  $\pm 10\%$  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  $-10^{\circ}$  to  $+45^{\circ}\text{C}$  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

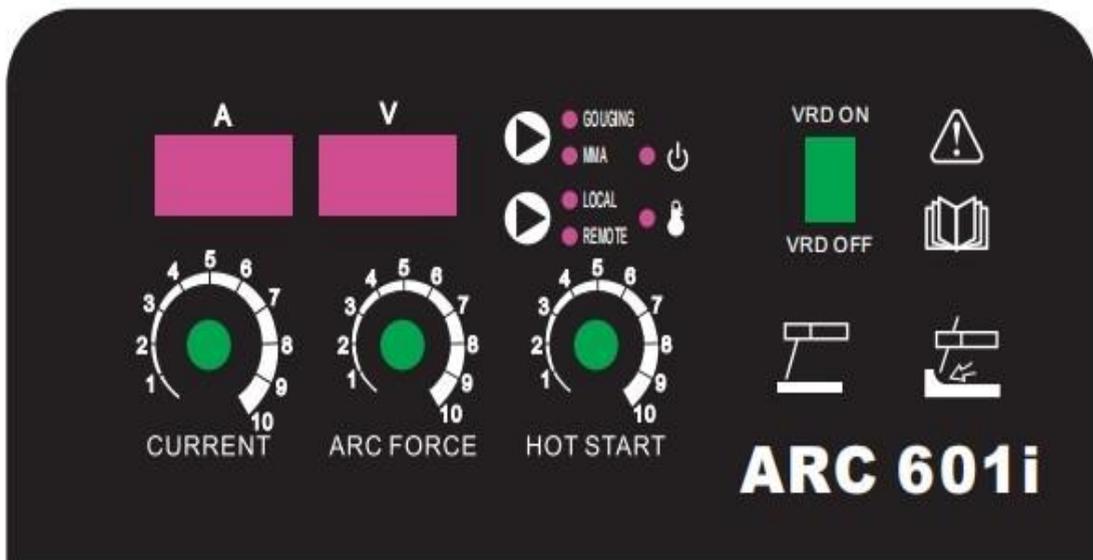
Adequate ventilation is recommended at the place of installation. For example, the following guideline should be followed:

- 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

- The power switch of the welding machine is located on the upper part of the rear panel of the welding machine.
- Turn on the power switch of the welding machine and the welding machine will be on.
- The power indicator light of the welding machine on the front panel will be on (the green light will be on), the digital display will display value, the fan will start running, and the output voltage will be available.

### Front Panel



### GOUGING / MMA

MMA or GOUGING mode of operation can be selected, selected LED will be on.

### LOCAL / REMOTE

LOCAL MODE: Output current control can be done from panel.

REMOTE MODE: Output current control can be done from remote controller.

### CURRENT

Welding / gouging current can be controlled in local mode.

### ARC FORCE

Arc force can be controlled by rotating this knob. Droplet transition performance can be improved.

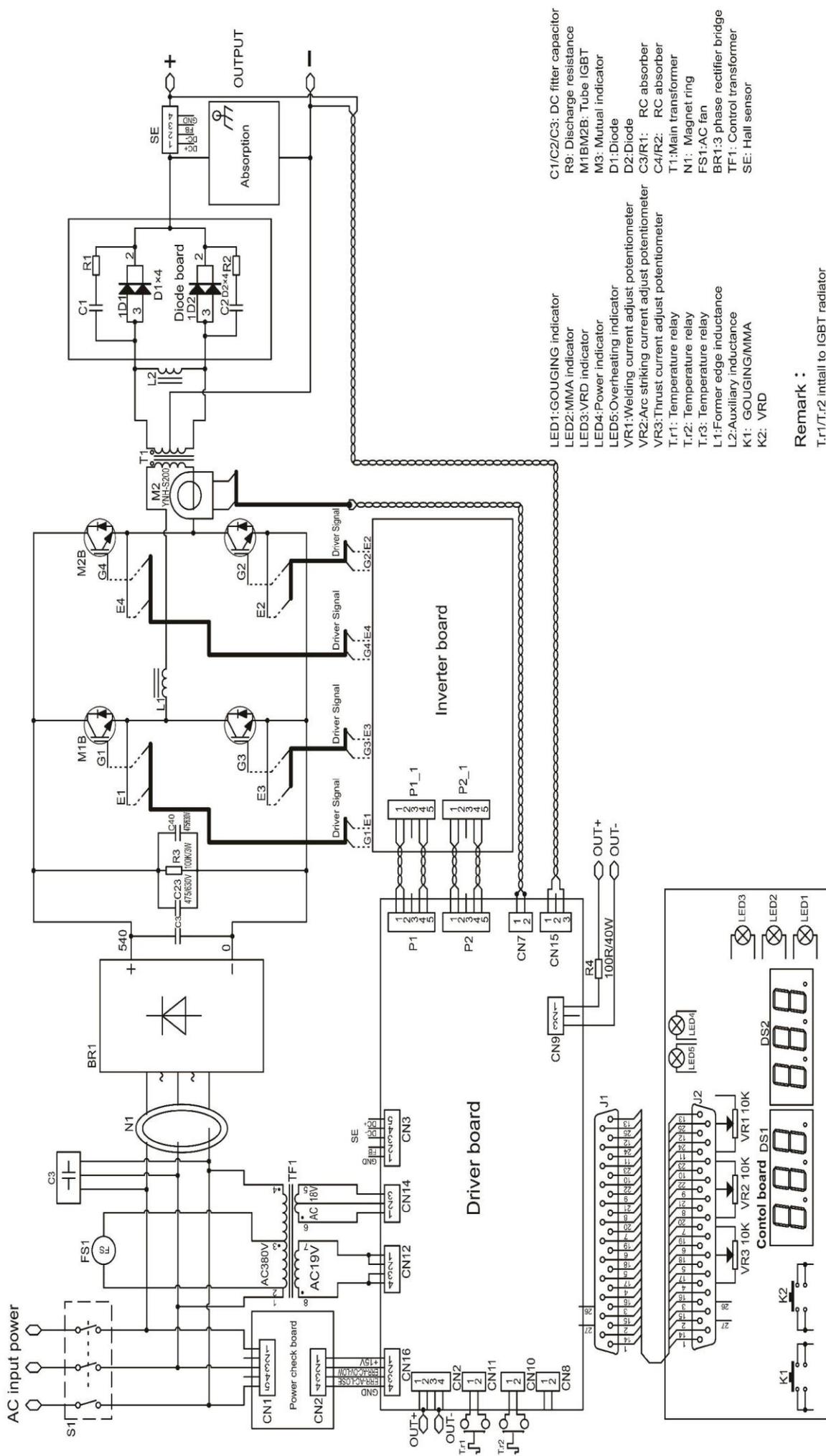
### HOT START

Arc striking performance can be improved.

**VRD ON / VRD OFF**

VRD function can be switched to ON or OFF condition.

Digital display will show output current value in AMP and output voltage value in Volt.



- C1/C2/C3: DC filter capacitor
- R9: Discharge resistance
- M1BM2B: Tube IGBT
- M3: Mutual indicator
- D1: Diode
- D2: Diode
- C3/R1: RC absorber
- C4/R2: RC absorber
- T1: Main transformer
- M1: Magnet ring
- FS1: AC fan
- BR1: 3 phase rectifier bridge
- TF1: Control transformer
- SE: Hall sensor

- LED1: GOUGING indicator
- LED2: MMA indicator
- LED3: VRD indicator
- LED4: Power indicator
- LED5: Overheating indicator
- VR1: Welding current adjust potentiometer
- VR2: Arc striking current adjust potentiometer
- VR3: Thrust current adjust potentiometer
- T.r1: Temperature relay
- T.r2: Temperature relay
- T.r3: Temperature relay
- L1: Former edge inductance
- L2: Auxiliary inductance
- K1: GOUGING/MMA
- K2: VRD

**Remark :**

- T.r1/T.r2 install to IGBT radiator
- T.r3 install to quickrecovery diode radiator

**General maintenance**

No additional maintenance for fan is required as all parts of the fan are sealed.

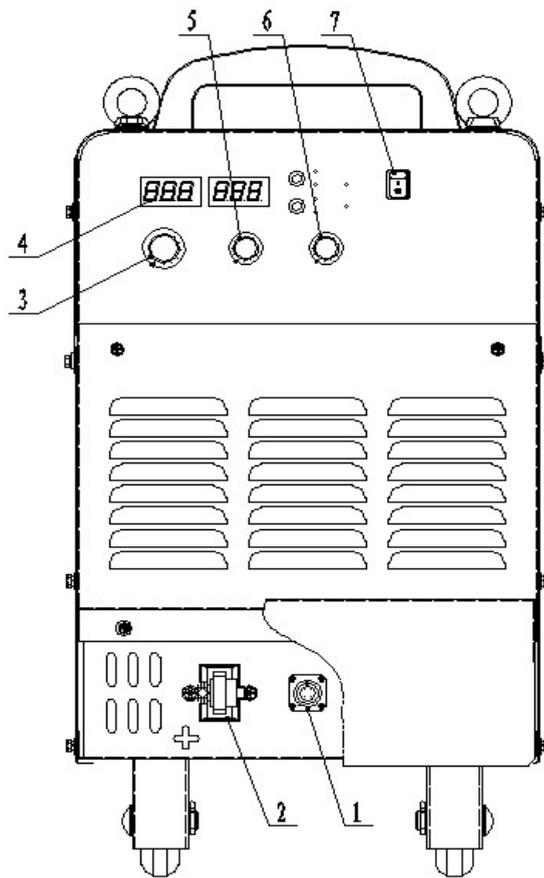
If the welding machine is used where there is a lot of dust, the dust may block the air duct of the welding machine and cause the welding machine to heat up. Therefore, it is necessary to use dry compressed air to remove the dust inside the welding machine at set intervals.

**Overload protection**

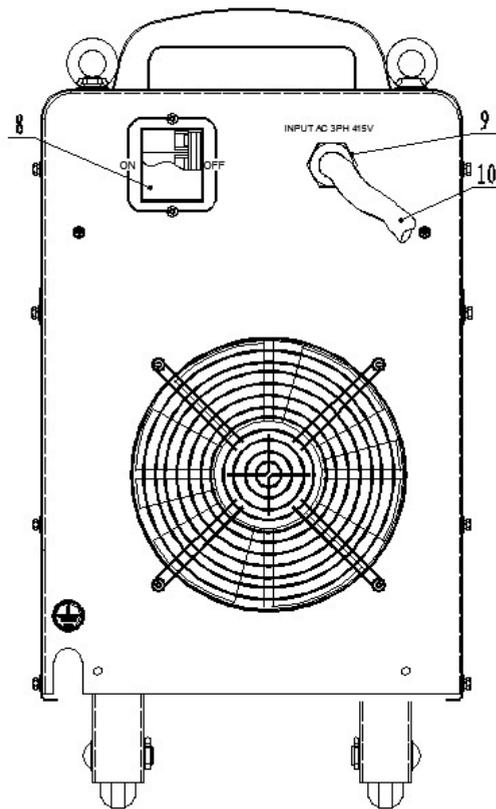
The temperature sensing device in the welding machine can provide effective protection of the important power devices of the welding machine, which uses the temperature switch to prevent overload or insufficient cooling. When continuous overload or power device IGBT and fast recovery diode cannot get adequate heat dissipation, the overheating indicator light will be ON, and the normal output of the welding machine will be stopped. When the power devices cool down, the overheating indicator light will go to OFF state and the output of the welding machine will automatically return to normal.

The control circuit of the welding machine has undervoltage protection. The too low input voltage of the welding machine will affect the normal welding work seriously. When the input voltage of the welding machine is too low, the output of the welding machine will be stopped. When it is found that there is no voltage at the output end, the power indicator light is ON, but the overheating indicator light doesn't work, please check the input power voltage.

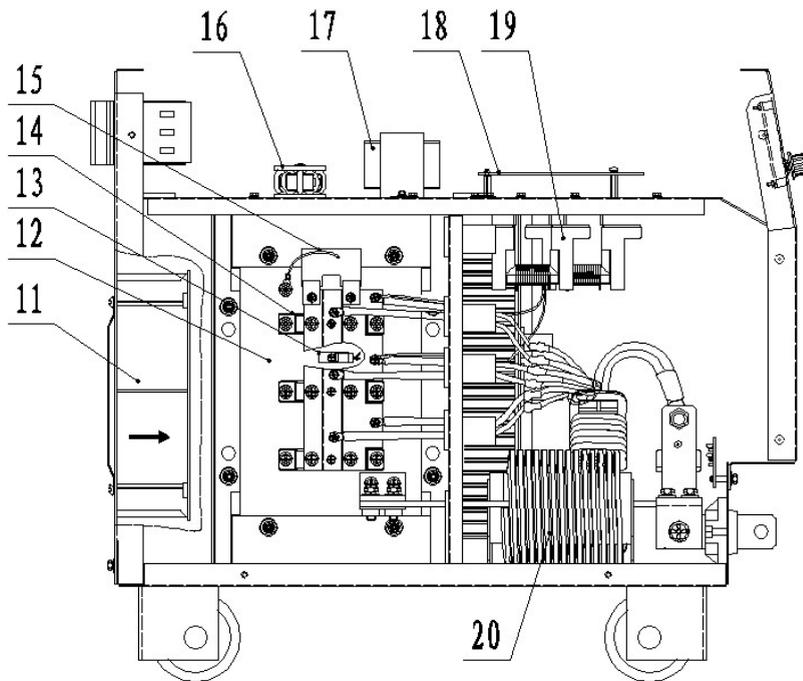
## Parts List and Exploded view



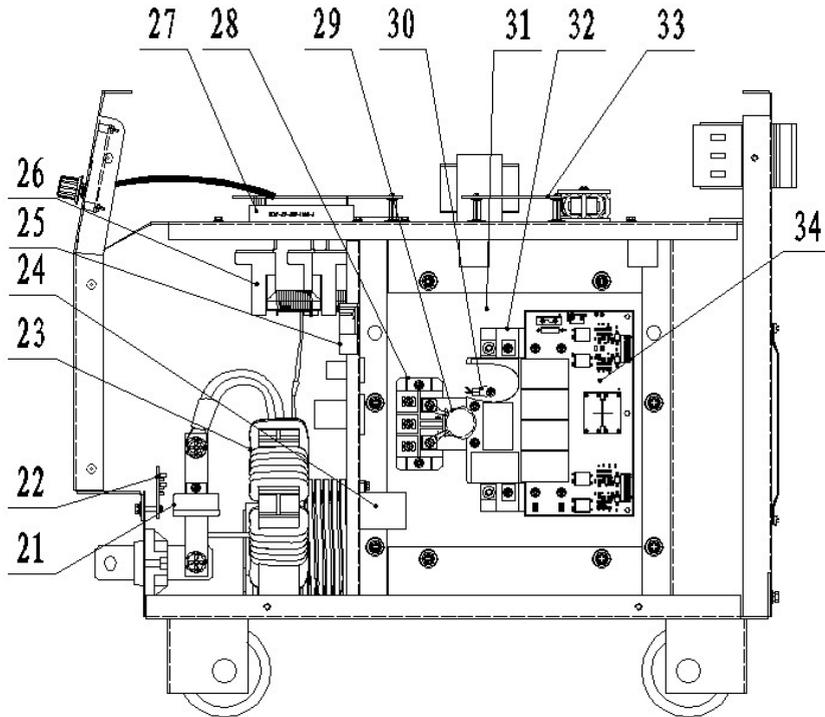
No	PART NO	DESCRIPTION
1	0012001004	4-CORE AVIATION SOCKET ARC601i
2	0040214018	OUTPUT TERMINAL ARC 601i
3	0010603056	WELDING CURRENT KNOB ARC 601i
4	0030101884	CONTROL PANEL ARC 601i
5	0010603057	PUSH CURRENT KNOB ARC 601i
6	0010603057	ARC STRIKE CURRENT KNOB ARC601i
7	0011504006	ROCKER SWITCH ARC 601i



8	0011501003	MINIAT.CIRCUIT BREAKER ARC601i
9	0050802003	CABLE CONNECTOR ARC 601i
10	0030501596	INPUT CABLE ARC 601i



11	0011702012	AXIAL FLOW FAN ARC 601i
12	0060301221	F.REC'RY DIODE RADIAT.ARC601i
13	0012102033	F.REC'ERY DIODE MODULE ARC601i
14	0030604330	F.REC'RY DIODE MOD (CU B.BAR) ARC601i
15	0030101676	DIODE ABSORPTION BOARD ARC601i
16	0031001123	THREE-PHASE INPUT CABLE ARC601i
17	0060101171	CONTROL TRANSFORMER ARC 601i
18	0030101831	TIMING DRIVE BOARD ARC 601i
19	0031001106	SEC'DARY SIDE INDUCTOR ARC601i
20	0030901137	REACTOR ARC 601i



21	0011301005	HALL SENSOR ARC 601i
22	0030101565	ABSORPTION BOARD ARC 601i
23	0030801644	MAIN TRANSFORMER ARC 601i
24	0010227001	CAPACITOR ARC 601i
25	0011303003	CURRENT TRANSFORMER ARC 601i
26	0031001122	PRIMARY SIDE INDUCTOR ARC 601i
27	0010110030	CEMENT RESISTOR ARC 601i
28	0012103002-01	3PH REC'ER BRIDGE MOD. ARC601i
29	0010114003	VOLT.DEPE'NT RESISTOR ARC 601i
30	0011304008	TEMPERATURE SENSOR ARC 601i
31	0060301222	IGBT RADIATOR ARC 601i
32	0012101070	IGBT MODULE ARC 601i
33	0030101618	PWR SUP.DETECTION BRD ARC 601i
34	0030101427	INVERTER BOARD ARC 601i

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