MIG 302i/402i/502i

INVERTER MIG/MAG
Welding Power Source

Instruction manual

MIG 302i/402i/502i

INVERTER MIG / MAG WELDING POWER SOURCE

Instruction manual
For
Installation, Operation & General maintenance

CONTENTS

Item	Page
Safety	3
Overview and Equipment	5
Technical Data	5
Main Control Functions	8
Installation	9
Welding Operations	11
Setting control method	13
Manual arc welding	24
Lift Tig Welding	25
Troubleshooting	26
Block Diagram	28
Part List and Exploded View	29
ESAB INDIA Locations and Contact details	35

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.

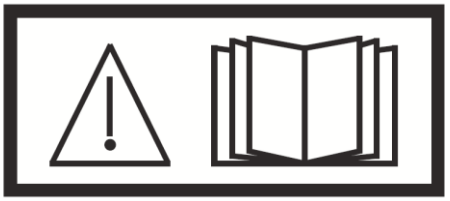
1. Anyone who uses the welding equipment must be familiar with:
   - its operation
   - location of emergency stops
   - its function
   - relevant safety precautions
   - welding

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.

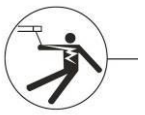
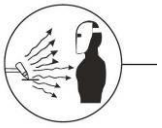
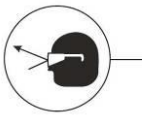
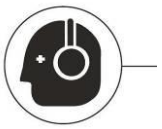


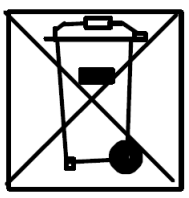
Read and understand the instruction manual before installing or operating.

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

Overview

The MIG 302i/402i/502i is an inverter based welding power source intended for MIG/MAG/MMA and Scratch TIG welding.

Equipment

MIG 302i/402i/502i
The power source is supplied with:

- Wire Feeder with interconnection cable (Option for 5M/10M/15M)
- 3m Earthing cable with clamp

Technical Data

Power Source	**MIG 302i**
Mains Voltage, V/Ph, Hz	415 (+15%/-20%) / 3, 50/60
Rated Input Power, KVA	12.5
No Load Voltage, V	68
Output Current Range MIG/MMA/TIG, A	MIG 30-300; MMA&TIG 20-300
Output Voltage Range MIG/MMA/TIG, V	15.5 - 29.0; 20.8 - 32.0; 10.8 - 22.0
Permissible load at 100% Duty Cycle MIG/MMA, A	300
Maximum Input power at idle mode, W	< 30
Power factor at maximum current	0.88
Efficiency at maximum current, %	90
Insulation class	H
Enclosure class	IP21S
Dimension (LXWXH), mm	535x245x425
Weight, Kg	23.5
Wire Feeder	**MIG 302i WF-2R**
Wire Feed Drive	2 Roll
Power Supply, VDC	24
Input Supply Current, A	2.5
Wire Feeder Speed, m/min	1.5 - 24(0.8mm); 1.5 -18(1.0mm)
Torch Connection	Euro
Wire Dimensions, mm	0.8 - 1.0
Weight, Kg	8

Power Source	**MIG 402i**
Mains Voltage, V/Ph, Hz	415 (+15%/-20%) / 3, 50/60
Rated Input Power, KVA	17.8
No Load Voltage, V	70
Output Current Range MIG/MMA/TIG, A	MIG 30-400; MMA & TIG 20-400;
Output Voltage Range MIG/MMA/TIG, V	15.5 - 34.0; 20.8 - 36.0;10.8 - 26.0;
Permissible load at 100% Duty Cycle MIG/MMA, A	400
Maximum Input power at idle mode, W	< 30
Power factor at maximum current	0.91
Efficiency at maximum current, %	90
Insulation class	H
Enclosure class	IP21S
Dimension (LXWXH), mm	615x290x510
Weight, Kg	31.5
Wire Feeder	**MIG 402i/502i WF- 4R**
Wire Feed Drive	4 Roll
Power Supply, VDC	24
Input Supply Current, A	3
Wire Feeder Speed, m/min	1.5 – 20.0
Torch Connection	Euro
Wire Dimensions, mm	0.8 - 1.2
Weight, Kg	10

Power Source	**MIG 502i**
Mains Voltage, V/Ph, Hz	415 (+15%/-20%) / 3, 50/60
Rated Input Power, KVA	25
No Load Voltage, V	81
Output Current Range MIG/MMA/TIG, A	MIG & MMA 50-500; TIG 20-500
Output Voltage Range MIG/MMA/TIG, V	16.5 - 39.0; 22.0 - 40.0; 10.8 - 30.0
Permissible load at 100% Duty Cycle MIG/MMA, A	500
Maximum Input power at idle mode, W	<30
Power factor at maximum current	0.937
Efficiency at maximum current, %	88.5
Insulation class	H
Enclosure class	IP21S
Dimension (LXWXH), mm	615x290x510
Weight, Kg	31.5
Wire Feeder	**MIG 402i/502i WF-4R**
Wire Feed Drive	4 Roll
Power Supply, VDC	24
Input Supply Current, A	3
Wire Feeder Speed, m/min	1.5 – 20.0
Torch Connection	Euro
Wire Dimensions, mm	0.8 - 1.6
Weight, Kg	10

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.

Main Control Functions and Features

- **Digital Display LED Screen**
  Sets and display of welding Current and Voltage, error code Display, and other control parameter display.

- **Gas Selection**
  CO_2, Mixed Gas and Argon

- **Wire Type Selection**
  - Solid Carbon Steel and Stainless Steel (MIG 302i / 402i / 502i)
  - Flux-cored Carbon Steel and Stainless Steel (MIG 402i / 502i)
  - Al-Si and Al-Mg Alloy (MIG 402i / 502i)

- **Wire Diameter Selection**
  - MIG 302i 0.8, 0.9 and 1.0 mm
  - MIG 402i 0.8, 0.9, 1.0 and 1.2 mm
  - MIG 502i 0.8, 0.9, 1.0, 1.2, 1.4 and 1.6 mm

- **Output Control**
  Synergic and Manual

- **Welding Control**
  2T, 4T, Special 4T and Spot

- **Gas Detection**
  Checks before welding whether a shielding gas is used.

- **Wire Inching**
  Gradual wire feeding should be done prior to welding.

- **Current and Voltage setting**
  Synergic mode: The voltage is automatically matched when setting the Current. The voltage knob provides the option to adjust the voltage within a range of ±9.9V for fine tune.
  Manual / Individual mode: Set the current and voltage independently.

- **Dynamic Arc**
  The control panel's knob enables the adjustment of values within the range of –9 to +9. The softest arc is represented by -9, while the hardest arc is represented by +9**.**

- **Spot Welding Time**
  The control panel allows for setting the spot-welding time in the range of 0.1 s to 10.0 s when in spot welding mode.

- **Arc Ending Current and Voltage**
  The ending current and voltage can be set using the knob on the control panel.

- **Manual Welding Current Setting**
  By using the knob on the control panel, the current can be adjusted within the setting range.

- **Store/Recall**
  To memorize, store, call and lock welding parameters.

- **Protection Function**
  Input over-voltage protection, Input under-voltage protection, Thermal protection, Over current protection.

Installation

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.

Main Supply

Power Source		MIG 302i	MIG 402i	MIG 502i
Mains Voltage		415V± 15%, 3Ph, 50/60Hz		
Power capacity	Grid	Above 30kVA	Above 30kVA	Above 40kVA
	Generation	Above 50kVA	Above 50kVA	Above 60kVA
Input protection device (switch box）	Air-Switch	Class C above 63A		
Cable	Input side of Power Source	4x 6mm2 or more		
	Output side of Power Source	50mm2 or more	50mm2 or more	70mm2 or more
	Housing ground wire	Greater than Power supply cable		

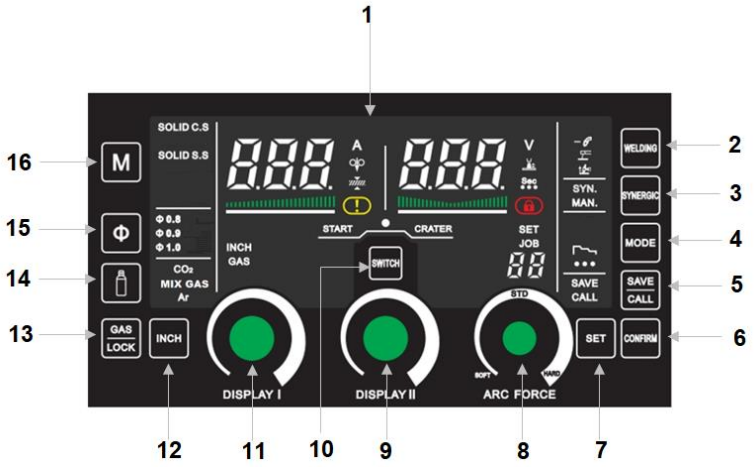
Supply from power generators

The power source can be supplied from different types of generators. However, some generators may not provide sufficient power for the welding power source to operate correctly. Generators with Automatic Voltage Regulation (AVR) or with equivalent or better type of regulation.

Welding Operations

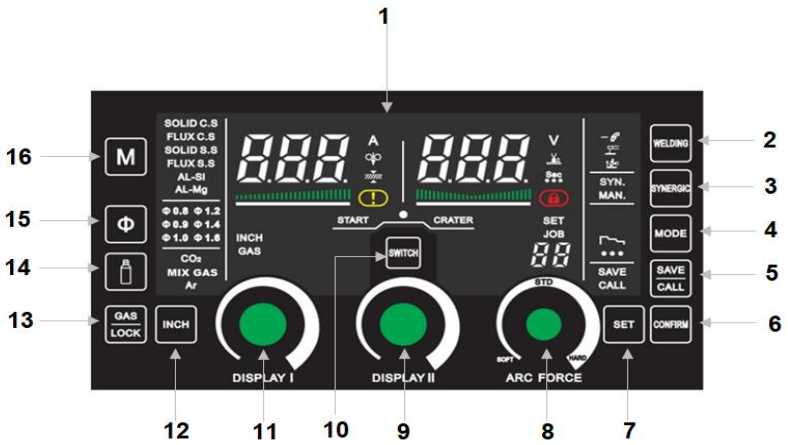
Control Panel Layout and Features – Power Source

MIG 302i



MIG 402i

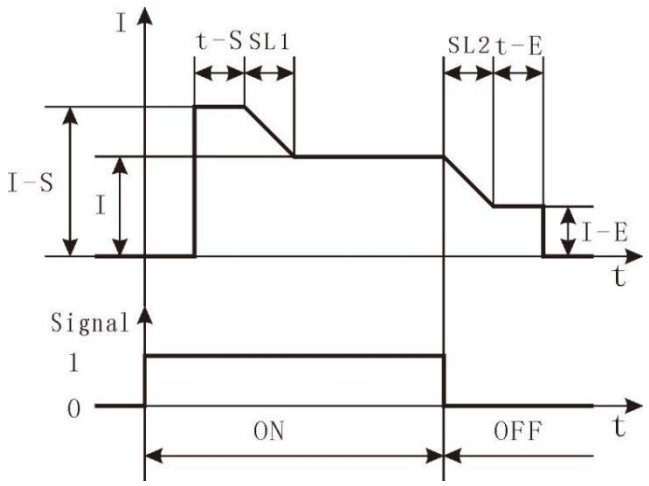
MIG 502i



Sl. No.	Description	Function
1	Segment Screen	Displaying current, voltage, wire feeding speed, parameter serial number value, fault indicator and other relevant information.
2	Welding Process	Selects the welding process MIG/MAG, MMA and TIG.
3	Synergic / Manual Method	Synergic mode: The voltage is automatically matched when setting the current, option for voltage adjustment ±9.9V through the voltage knob. Manual /Individual mode: Set the current and voltage independently.
4	Welding Control Mode	Selects the action sequence of welding torch in the welding process.
5	Store/Call	Used to save/call specified content for the user. Program storage capability: 16 nos
6	Operation	Program conformation function
7	System Setting	Select the current, voltage, and time parameters for each welding stage.
8	Arc Force Setting (Encoder 3)	The arc force is important in determining how the current changes in response to a change in the arc length.
9	Display 2 (Encoder 2)	Adjust welding voltage, time and other setting values and also achieve different function such as save, call, store under system setting.
10	Switch	Arc start current, welding current, arc stop current.
11	Display 1 (Encoder 1)	Adjust welding current, serial number and other setting values also achieve different function such as save, call, store under system setting.
12	Wire Inching	Quick manual wire feeding.
13	Gas Check / System Lock	To check gas flow; Press above 5 seconds to enter Lock/Unlock.
14	Shield Gas	Selection options for Co2, Mix Gas and Argon.
15	Wire Diameter	Selects the diameter of the welding wire
16	Wire Material	Selects the wire type - Solid Cabon Steel, Solid Stainless Steel, Flux-cored carbon steel, Flux-cored Stainless Steel, Al-Si alloy and Al-Mg alloy.

Setting control method

Setting time parameters in different stage:



Press Display 2(Encode 2 knob), after the indicator lamp (Seconds) under Digital display 2 light up. Turn the Display 1(Encoder 1 knob) to switch different parameters and turn Display 2(Encoder 2 knob) to set the time parameters. The parameters are described as follows：

t-S： Arc starting time, setting range 0-10s.

SL1： Transition time from arc starting to welding, setting range: 0.1-10s.
(when t-S = 0, the time parameter of SL1 is invalid)

SL2： Transition time from welding to arc stopping, setting range :0.1-10s.
(when t-E = 0, the time parameter of SL2 is invalid)

t-E： Arc End time, setting range: 0-10s.

spt： Spot, setting range: 0.1-10s.

sst： Stop time of spot-welding mode or repeated arc stopping mode, setting range :0.1-10s.

If use the above time control function, need to modify the corresponding “B” Parameter：

b21=ON： Time control function ON.

b21=OFF： Time control function OFF.

b22=ON： Intermittent welding/repeated arc stopping ON

b22=OFF： Intermittent welding/repeated arc stopping OFF.

2T Mode

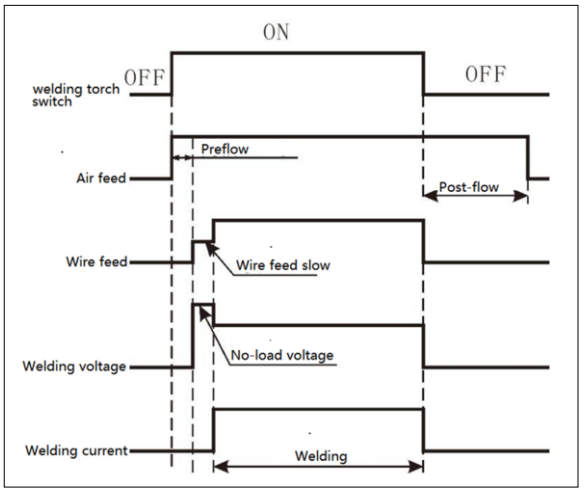
2T mode can be directly welded. "ON" and "OFF" of the welding torch are two steps.

The 2T mode when b21=OFF

The procedure details as follows:

1. Press (Welding Control) button, select 2T mode.
2. Adjust the current or voltage through the encoder knob on the arc welding power supply or wire feeder panel.
3. Welding can be proceeded after setting the parameters**.**

When the torch switch is "ON", the arc is generated, and when the torch switch is "OFF", the arc is extinguished.



The 2T mode when b21=ON

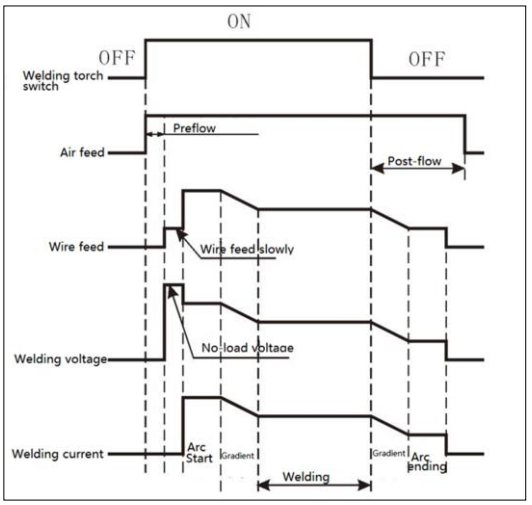
The procedure details as follows:

1. Press (Welding Control) button, select 2Tmode.
2. Adjust the current or voltage through the encoder knob on the welding power source or wire feeder remote.
3. Press (Switch) button and select (Arc starting) or (Are ending). Adjust the current through the encoder knob on the arc welding power supply or wire feeder panel when in the stage of arc starting or arc ending. At this time, adjust (Display 1/ Encoder 1 knob), indicator light [%] under [digital display1] will light up, the percentage of current in Welding stage is set at that time.

(For example: Welding current 100A, adjust [initial] to 150, then the actual initial set current is 100A*150%=150A).

4. Setting t-S Time for arc starting (initial) and setting T-E: time for arc stopping.
5. Welding can be proceeded after setting the parameters.

Remark: If set t-S=0, t-E=0, the effect of the 2T mode when b21=ON is the same as that when b21=OFF.



4T Mode

Arc-closing welding after welding can fill the arc pits and holes after welding.

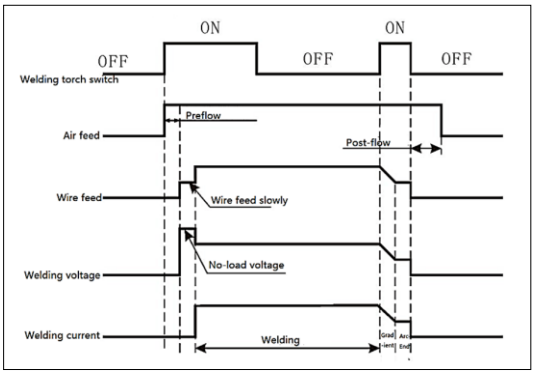
The ” ON” and ” OFF” of the welding torch are four steps.

<u>4T mode when b21=OFF</u>

The procedure details as follows:

1. Press (Welding Control) button, select 4T mode.
2. Adjust the current or voltage through the encoder knob on the welding power source or wire feeder remote.
3. Press (Switch) button to get (Arc ending) indicator light, adjust the current of (Arc ending) by help of encoder knob on panel.
4. Set the transition time from welding to arc stopping (the initial time is set to 0)
5. Welding can be proceeded after setting the parameters.

The arc is generated while the torch switch is ON. The welding arc will be self-lock when the welding torch switch is "OFF". When the welding torch switch (ON) is pressed again, the arc will be stopped. When the welding torch is released again (OFF), the welding arc will stop.



Four-step mode when b21=ON

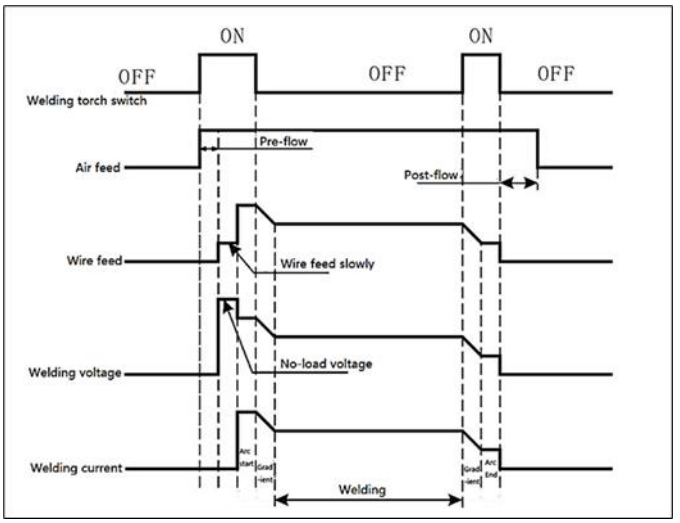
In the 4T mode the arc initiation (initial) current and voltage can be set, and the arc initiation (initial) process is controlled by the setting time, mainly to improve the arc initiation performance.

The procedure details as follows:

1. Press (Welding Control) button, select 4T mode.
2. Adjust the current or voltage through the encoder knob on the welding power source or wire feeder remote.
3. Press (switch) button to get the (Arc starting) indicator light. Adjust current and Voltage in arc-starting (initial) stage by panel encoder knob. Press (Display 2/Encoder 2 knob) to switch voltage indication state to seconds, and then use the panel (Display 2/Encoder 2 knob) to adjust the arc starting (initial) time (T-S), and further set the arc onset (initial) to normal welding transition time (SL1).
4. Welding can be proceeded after setting the parameters.

Remarks: If set t-S=0，the effect of the 4T mode when b21=ON is same as b21=OFF

The arc is generated while the welding torch switch is ON, arc starting. After reaching the set arc (initial) time (T-S), gradual change (SL1) enters the normal welding process. The welding arc will be self-lock when the welding torch switch is "OFF". When the welding torch switch (ON) is pressed again, gradual change (SL2) enters the arc ending process, the arc will be stopped When the welding torch is released again (OFF), the welding arc will stop.



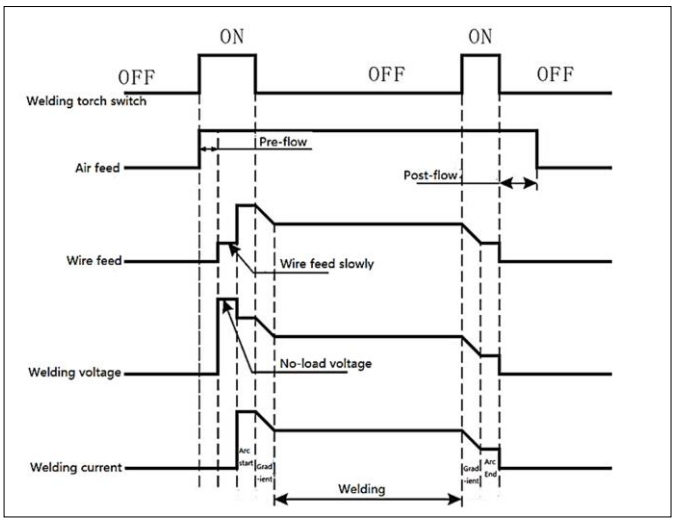
Special 4T Mode

In order to improve the performance of arc starting, the current and voltage value of arc starting can be set separately. Arc welding in the end of welding, the arc pit can be filled. In the special mode, parameter b21 is invalid, arc initiation and arc closure are completely controlled by the welding torch switch, and the "ON" and "OFF" of the welding torch are four-step operations.

The procedure details as follows:

1. Press (Welding Control) button, select Special 4T mode.
2. Adjust the welding current or voltage through the encoder knob on the welding power source or wire feeder remote.
3. Press the (Switch) button to get the (Arc starting) indicator light, adjust the current and voltage in arc starting (initial) stage through the panel encoder knob, and can set the arc starting (initial) to normal welding transition time (SL1).
4. Press (Switch)button to get the (Arc ending) indicator light, adjust the current and voltage in arc extinguishing stage by adjust the panel encoder knob, and can set the transition time (SL2) from welding to arc stopping.
5. Welding can be proceeded after setting the parameters.

The arc is generated while the torch switch is ON arc starting. The welding arc will be self-lock when the welding torch switch is "OFF". When the welding torch switch (ON) is pressed again, the arc will be stopped. When the welding torch is released again (OFF), the welding arc will stop.



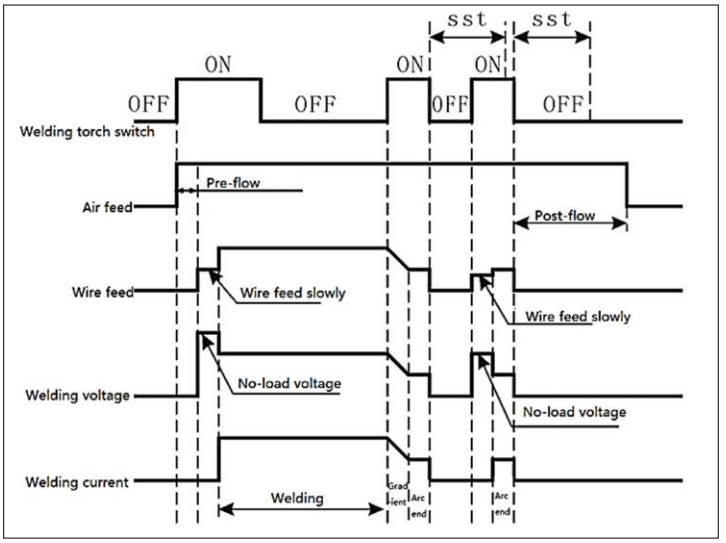
Repeat Arc Ending

Repeated arc stopping is mainly used to fill the arc pit and hole when arc stopping. The "ON" and "OFF" of the welding torch are four steps.
The procedure details as follows：

1. In 4T or Special 4Tmode, setting b22 to ON enters the repeated arc extinguishing mode (SST is the confirmation time of repeated arc ending stop)
2. Adjust the arc ending current or voltage by adjust the encoder knob on the arc welding power supply or wire feeder panel.
3. Welding can be proceeded after setting the parameters.

When the welding torch switch is "ON", the arc is generated and enters the arc starting stage. The welding arc will be self-lock when the welding torch switch is "OFF". When the welding torch switch (ON) is pressed again, enter the arc ending stage. The arc will stop after the welding torch switch is released again. If there is no action within the SST set time, the welding is finished; If the welding torch switch is closed again within the SST setting time, it will enter the second arc closing.

Remarks: Principle, in the 4T model, the repeatedly arc ending when b21 =OFF,
Repeated Arc Ending b22= ON when 4T mode b21=OFF



Spot Welding

Spot welding is mainly used for positioning welding, short time welding and thin plate welding. This mode is divided into ordinary spot welding and continuous spot welding (intermittent welding).

Ordinary Spot welding:

“ON” and “OFF” of the welding torch are two steps.

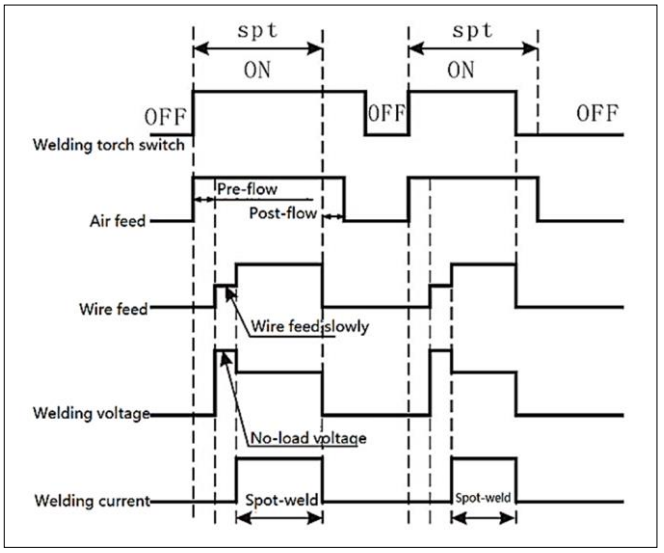
The detailed procedures are as follows:

1. Press the (Welding Control) button to select the (Spot welding) mode.
2. Adjust the arc ending current or voltage by adjust the encoder knob on the arc welding power supply or wire feeder panel.
3. Press (Display 2/ Encoder 2 knob) to (Digital Display Table 2) below (second) indicator light, then rotate (Encoder 2 knob) to adjust spot welding time SPT (adjustment range is 0.1s ~ 10s);
4. Lightly press (Encoder 2) to exit the time setting.
5. Welding can be proceeded after setting the parameters.

The arc is generated when the welding torch switch is "ON"; The arc is extinguished when the torch switch is set to "OFF".

If the welding torch switch is always "ON", the arc will be extinguished automatically when the SPT setting time reached. If the time is less than the set time of SPT, the spot welding will be finished when the welding torch is "OFF".

Ordinary Spot Welding



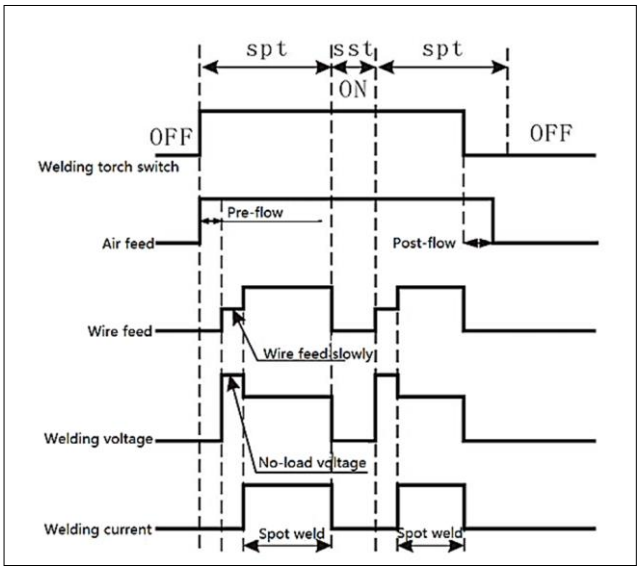
Continuous spot welding (intermittent welding):

1. Set [b22 =ON] in spot-welding mode, which is the continuous spot-welding.
2. SST is the stop time of continuous spot welding. The welding time is the spot-welding time under the ordinary spot-welding mode.

Arc is generated when the welding torch switch is ON, keep the welding torch switch on, and the arc will automatically go out when spot is set. After waiting for SST time, the arc is ignited again. Repeat this step until the welding torch switch is "OFF", the arc is extinguished, and the spot welding is finished.

Remark: When b21 =ON, if the setting arc starting time or arc extinguishing time is not 0, there will be arc starting stage or arc closing stage in spot welding mode. The corresponding logic diagram of arc starting or extinguishing stage can refer to the two-step mode (b21 =ON).

Continuous Spot Welding



Voltage Adjustment Mode

Synergic adjustment instructions:

The welding voltage will change with the current. Follow the steps as bellow：

1. Press the (Voltage adjustment knob/ Display 2/Encoder 2) knob on the panel, the (Synergic) indicator lights up and enters unitary mode.
2. Adjust the (Display 2/Encoder 2) knob on arc welding power source panel or voltage knob on wire feeder. Adjust the voltage to the standard point "0", and enter the unified mode of welding.

Caution

a) In the unified mode, the negative direction of the standard point is to reduce the voltage, and the positive direction is to increase the voltage.

b) In the unified mode the welding voltage parameters need to adjust due to the different plate thickness.

Individual adjustment instructions：

Adjust current and voltage separately. Follow the steps as bellow：：

1. Press the (Voltage Adjustment/ Encoder 2/ Display 2) knob on the panel, and enter the (Individual) mode when the (Individual) indicator lights on.
2. Use the (Encoder 1/Display 1) knob to adjust the welding current and use the (Encoder 2/Display 2) knob to adjust the voltage.

Arc characteristic/ Dynamic

Arc characteristics are used to adjust the soft and hard arc. The setting steps are as follows：

1. Press “SET” button till “Cxx” will appear on Display 1
2. Press “Encoder 1” button, dXX will appear on Display 1
3. Rotate Encoder 1 to select d46.
4. Rotate Encoder 2 to set ON
5. Press Encoder 2 again to save the parameter
6. Arc force value will appear beside SAVE/CALL button
7. Rotate Arc Force knob to set Arc dynamics from ± 9

The adjustment range of arc characteristics is -9~0~+9. Adjust the arc to be hard in the positive direction and soft in the negative direction.

Arc Characteristics	Function
0	Commonly used, arc characteristics default values.
Forceful arc 0～9	The fusion depth of the welding seam is greater and can be easily penetrated. It is appropriate for welding in all positions, including high-speed welding, and ensures stable arc performance even when the power cable is extended.
Soft arc 0～-9	The fusion depth of the welding seam is shallow, making it challenging to achieve proper weld penetration. This is best suited for joining thin plates.

Gas Checking

Under the conventional interface, press the "GAS check /lock" key to open the air valve. Digital display 1 displays GAS, and Digital display 2 displays the countdown of GAS inspection. When the timer reaches 0, the valve closes. When the air valve is in the open state, lightly press the " GAS check /lock " key to close the air valve.

 Caution

Gas Check /Lock is a multiplex button. Pressing less than 5S will enter gas checking. If pressing equal to or more than 5s, the operation panel will be locked/unlocked.
If the gas detection button is not turned off in time, the gas checking will stop automatically after 20 seconds. The initial stop time is set to 20 seconds, which can be set by adjusting the C00 parameter.

Inching Wire Feeding

In the conventional interface, press and hold the “Inching wire feeding” button to start wire feeding. "Digital display 1" shows the real-time of wire feeding speed, and digital display 2 shows “Inc”. Release the button “Inching wire feeding” to stop wire feeding.

Method 1
Operate by “inching wire feeding” button on arc welding panel. The specific steps are as follows：
1. Press “Inching wire feeding” button on the panel, wire feeding directly.
2. Release the “Inching wire feeding” button, stop wire feeding.
Method 2
Operate by “inching wire feeding” button on remote of wire feeder. The specific steps are as follows：
1. Press” Inching wire feeding” button on remote of wire feeder, wire feeding directly.
2. Release the “Inching wire feeding” button, wire feeding stop.

Factory Setting Parameters

Code	Description	Default
C00	Maximum time of gas checking	20S
C01	Pre-gas time (Gas shield supply time before starting)	50mS
C02	Post-gas stopping time (Gas shield supply time after arc ending)	100mS
C03	Fan idle time	300S
C04	Raise speed of inching wire feeding	30mS
C07	The panel displays the wire feeding speed and the time of Synergic voltage offset value.	(50) 5S
C08	Time for maintaining welding end current and voltage value of panel	(40) 4S
C09	Selection of wire feeder	3
C12	Selection of Current/Voltage setting (0: Adjustment of wire feeder potentiometer. 2: Adjustment of welding machine panel encoder)	

Store/Call

Using the "store/call" function, can call the parameters saved inside the arc welding power source to quickly enter the work.

The storage procedure is as follows:

1. Set the welding parameters to be stored.
2. When standby, press the" Store /Call" button to enter the "storage mode" storage indicator power on, (Channel number digital tube) display shows the storage channel number, when all current and voltage operations on the welder panel and wire feeder are prohibited.
3. Rotate (Encoder 2/ Display-2) knob to select the storage channel number (1 ~ 16).
4. Press (Encoder 2) about 3 seconds, "Digital display 1 and Digital display 2" show "---" , indicating that parameters have been stored, Channel number digital tube turn off.

Channel Call

The channel is called by calling the parameters pre-stored in the corresponding channel numbers (1 to 16) to the current panel.

The procedure is as follows:

1. Press the (Store/Call) button twice to enter the "Call" mode when the machine in standby mode, the "Call" display light on, "Channel number digital tube" show the channel number.
2. Rotate the (Encoder -2/ Display- 2) knob to select the channel number to be called

(1～16)

3. Both (Digital display 1) and (Digital display 2) show “---” after 3 seconds to press (Encoder 2/ Display 2) indicating that the setting parameters have been successfully called.
   If release the call needed in the “call state”, please press (Store/call), the “call” light turn off, and the system will exit the call mode. The set parameters will not be called.

Lock

The utilization of the Lock function enables efficient safeguarding of welding process specifications through management. After activating the (Gas check/Lock) button to secure all buttons and knobs on the primary control panel become inoperable, with the exception of the inching wire feeding and (Gas check/Lock) button.

Manual arc welding

This welding power source can be used for manual DC arc welding.
The detail procedure is as follows:

1. Press the “Welding Process ” button and select the “Manual arc ”mode to enter the MMA welding function.
2. Digital display1 show setting welding current, Digital display 2 show setting arc force current.
3. Rotate (Encoder 1) knob to adjust the setting current, rotate (Encoder 2) knob to adjust the setting arc force current.
4. Press (set) button, Digital display 1 show (-H-), Digital display 2 shows the superimposed current of hot start, then need to rotate Encoder 2 knob to change the hot start current.
5. Press (set) button, Digital display 1 shows(-H-), Digital display 2 shows the superimposed current of hot start, then to rotate Encoder 1 knob, Digital display 1 shows (VRD) and Digital display 2 shows (OFF), rotate (Encoder 2) knob to set VRD ON/OFF.
6. Welding can be proceeded after setting the parameters.

VRD ON Condition

When VRD is ON, the welder output VRD voltage is 24V, then each arc start requires the VRD voltage to be reduced to below 12V before triggering the main circuit to open for normal arc star.

VRD OFF Condition

When VRD is OFF, the power source output gives no-load voltage, if the absence of welding continues for more than 1 minute, the power source will switch to the VRD function automatically, resulting in a shift of the output to VRD voltage and the arc start is the same as when VRD is ON.

Live Tig Welding

Lift TIG welding is a technique that involves using a contact arc method for tungsten TIG welding. In TIG mode, there are two methods available, control with a torch switch and control without a torch switch.

Lift TIG welding without controlled by torch switch:

1. Press “Welding Process” button to select TIG mode to enter Lift TIG welding function.
2. Press (Set) button, Digital display 1 shows (-S-) and Digital display 2 shows (OFF) for controlled without torch switch Lift TIG welding, now press the (Set) button to exit the torch switch with/without selection.
3. Turn the (Encoder 1) knob in order to adjust the welding current, which will be displayed on Digital display 1.
4. Now the welding machine outputs 24V VRD voltage, and the output current is maintained at 20A. When the tungsten electrode makes contact with the workpiece, the output current rapidly rises from 20A to the designated set current.

Lift TIG welding controlled by torch switch:

1. Press “Welding Process” button to select TIG mode to enter Lift TIG welding function.
2. To enable control of the torch switch, press the (Set) button. The digital display 1 will show (-S-) and the digital display 2 will show (OFF). Next, rotate the (Encoder 2) knob to switch OFF to ON.
3. In the Lift TIG mode, which is controlled by the torch switch, have the option to choose between two different welding control modes "2T" or "special 4T".
4. When the welding operation model is “ 2T”, the tungsten electrode contacts the workpiece and press the torch switch to maintain the output current at 20A.When the tungsten electrode is pulled up, the output current quickly increases from 20A to the setting welding current.
5. When utilizing the "special 4T" welding operation mode, TIG welding is performed with the added functionality of gradual acceleration and deceleration.

Troubleshooting

Perform these checks and inspections before sending for an authorised service technician.

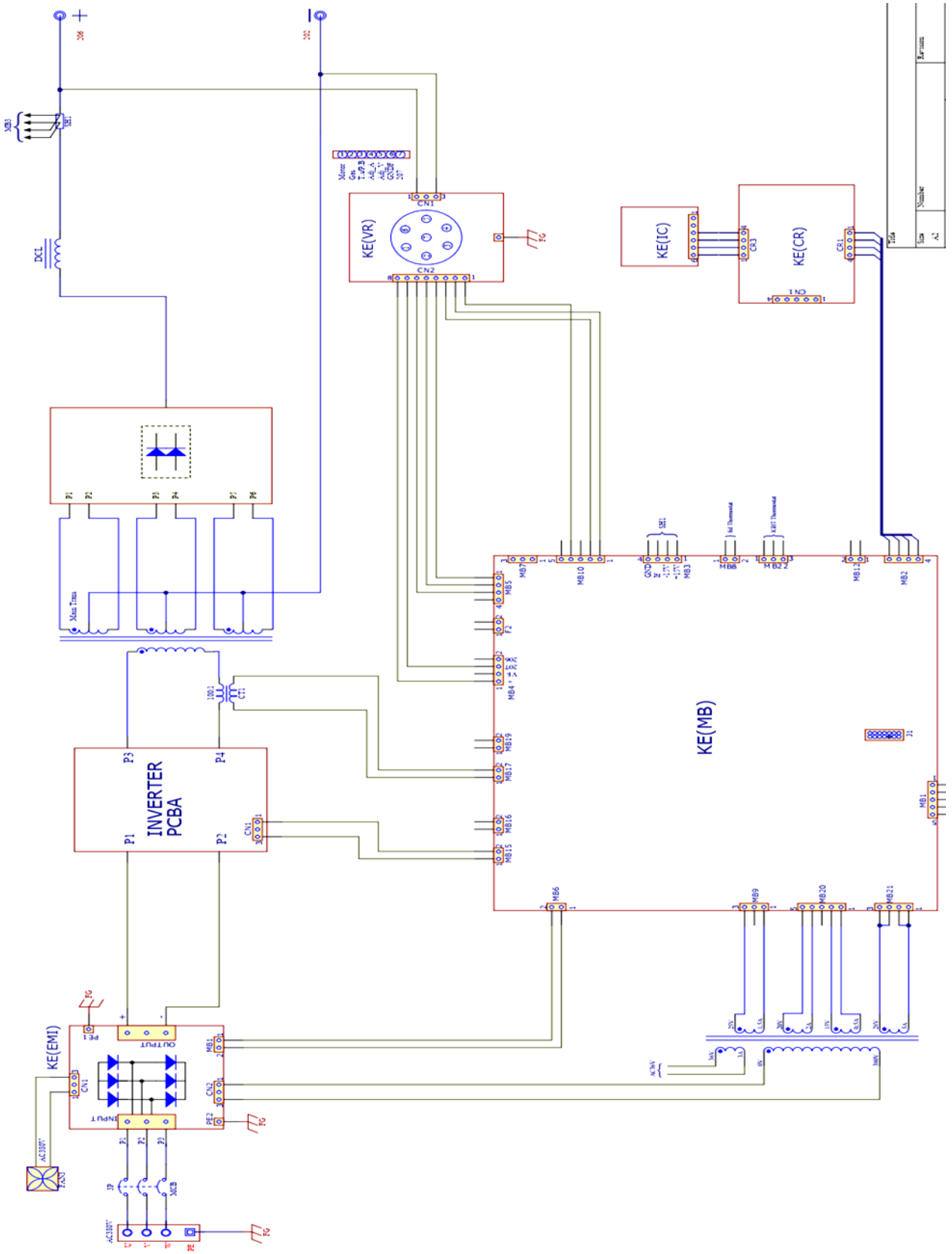
Power Source Error Codes and Solutions

Error Code	Fault	Solution
001	Input over voltage	Please confirm the input power supply voltage
002	Input under voltage	
003	Lack- phase (unused）	
005	Main control board+15V power supply abnormal	Check whether the output voltage of the control transformer is normal. Replace the main control board.
102/103	Radiator temperature abnormal	Confirm that the ambient temperature (below 40 degrees) and the utilization rate are within the rated range. Confirm whether there is dirt on the dust filter device and whether the filter screen is blocked. If this happens, clean or replace it
104	The temperature of the output terminal is abnormal	Securely attach the output terminal. Choose cables that possess larger cross-sectional areas. Select suitable cable terminals. Ensure that the fan is functioning correctly.
107	Primary side overcurrent	
108	Primary Transformer signal abnormal	Check whether the current transformer is connected to the control board. Contact ESAB service department.
109	The Hall current sensor on the secondary side is abnormal.	The current sensor is not connected to the control board. The current sensor is faulty. The control board is faulty
311/314	Welding database abnormal	Contact ESAB service department.
501	The signal transmitted to power source at the given current & voltage from wire feeder is abnormal.	Check whether the wire feeder's fuse is normal. Check whether the wire feeder's power cord is normal.

Error Code	Fault	Solution
601	The welding torch or inching switch signal is abnormal.	Check the welding torch or inching switch signal.
602	Welding method not set (unused)	
610	The welding process is interrupted for more than 5 seconds.	Release torch switch after arc break
611	Long short circuit during arcing or welding.	Release the torch switch to start the arc again.
612	Long time no load	Release the torch switch
701	Output overcurrent	Whether the positive and negative output ends of the secondary side are short-circuited. Ensure that the output diode module remains intact.
702	The external voltage detection line is abnormal	Check Control cable core is intact and connected to the torch.
703	Welding process abnormal	Check Short circuit between the conductive nozzle and the workpiece. Check Short circuit between the welding wire and the workpiece for a long time using.

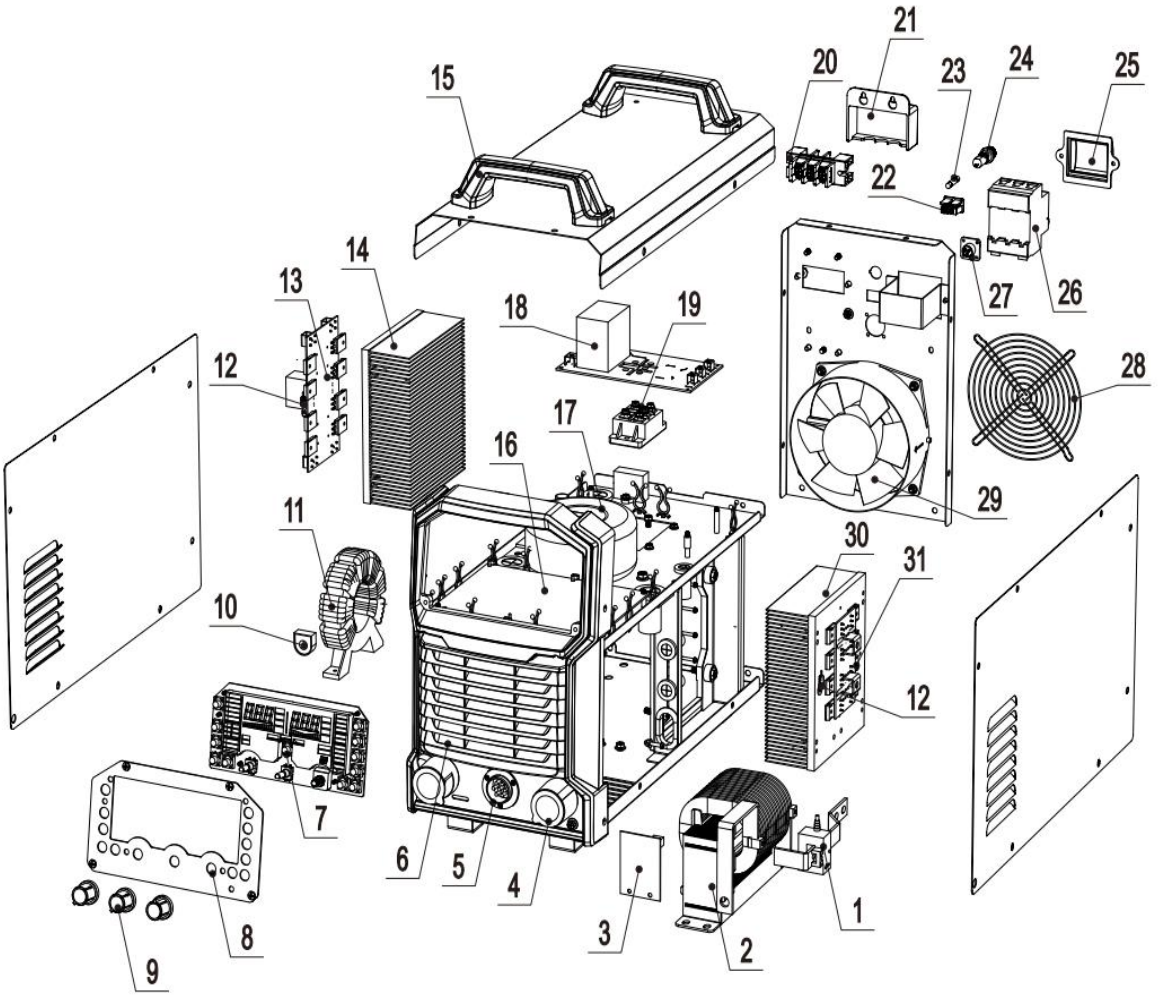
Block Diagram

MIG 302i / MIG 402i / MIG 502i



Part List and Exploded View

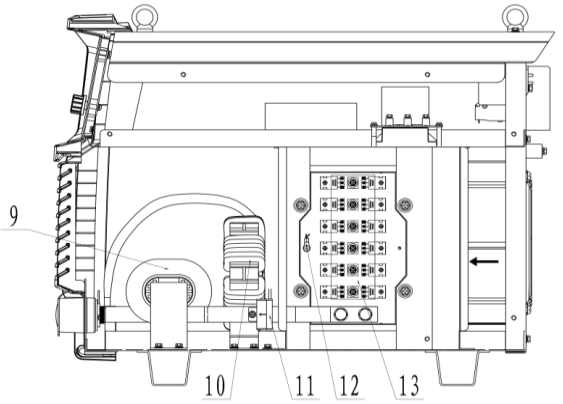
MIG 302i

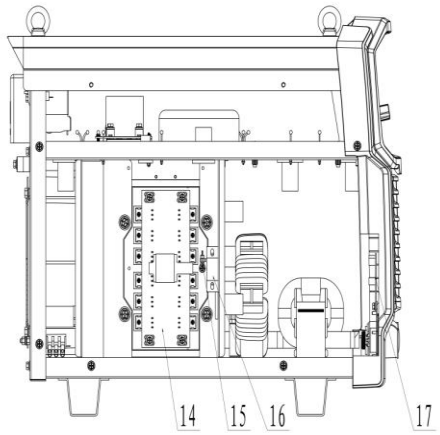


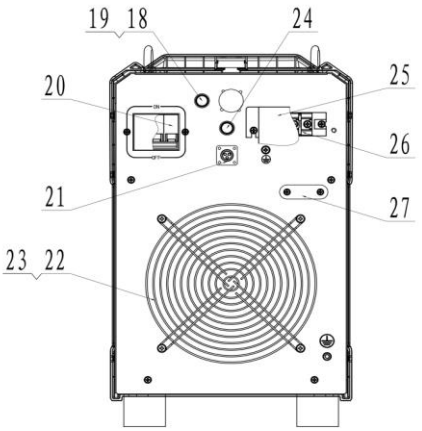
Item No	Parts Code	Parts Name
1	11301040	HALL CURRENT SENSOR
2	30901192	REACTOR
3	30103047	OUTPUT ABSORBING BOARD
4	50804049	CABLE SOCKET BLACK
5	12001022	AVIATION SOCKET(7-PIN)
6	60501103	FRONT P-PLASTIC SHELL
7	30103098	DISPLAY BOARD
8	6010100084	DISPLAY BOARD STICKER
9	10603066	POTENTIOMETER KNOB
10	11303030	HALL CURRENT SENSOR
11	30801685	MAIN TRANSFORMER
12	0011304008	TEMPERATURE SENSOR
13	30103043	INVERTER BOARD
14	60301407	IGBT RADIATOR
15	6020600002	HANDLE
16	30103092	CONTROL BOARD (1)
17	60101265	RING CONTROL TRANSFORMER
18	30103081	EMIBOARD
19	12103001-01	3P RECTIFIER MODULE
20	60701065	COMBINED CONNECTION TERMINAL
21	61301113	3P POWER SHIELD
22	0012301005	HEATER SOCKET
23	0011401024	FUSE
24	11402003	FUSE HOLDER
25	61301001	CIRCUIT BREAKER SHIELD
26	11501051	CIRCUIT BREAKER
27	0012301275	HEATER SOC MIGT
28	11701003	FAN SHIELD
29	11702080	FAN
30	60301400	DIODE RADIATOR
31	30103055	RECTIFIER PCB

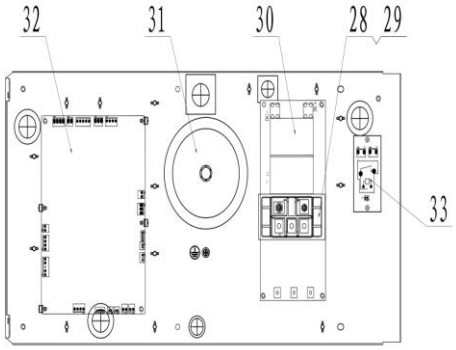
MIG 402i


1
8
3
2
5
4
6
7


9
10
11
12
13

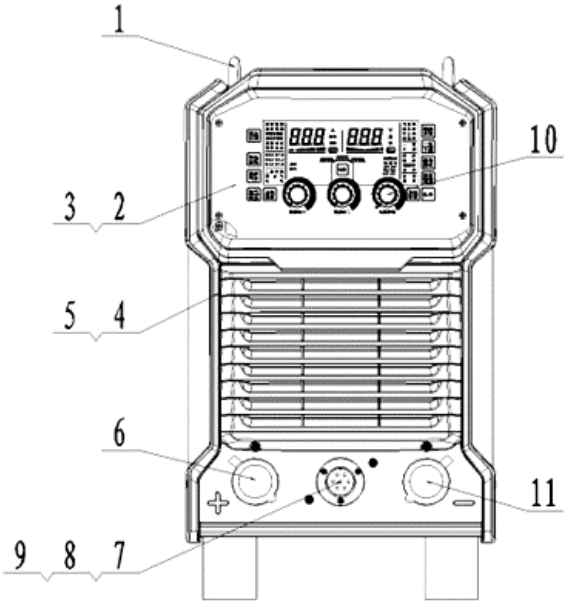

14
15
16
17

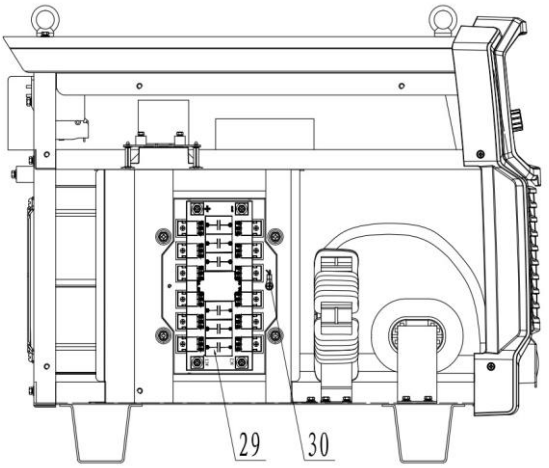

19
18
24
20
25
26
21
27
23
22


32
31
30
28
29
33

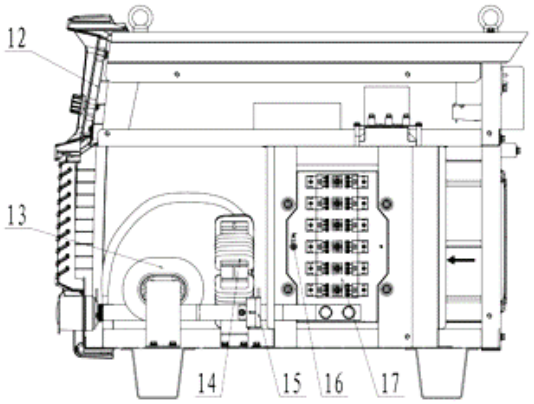
Item No	Parts Code	Parts Name
1	40103001	EYEBOLT (M8)
2	30103098	DISPLAY BOARD
3	6010100083	DISPLAY BOARD STICKER
4	60501107	FRONT PANEL(PLASTIC SHELL)
5	60501108	IC CARD COVER
6	50804012	WELDING CABLE SOCKET (BLACK)
7	12001022	AVIATION SOCKET(7-PIN)
8	10603066	POTENTIOMETER KNOB
9	30901193	REACTOR
10	30801686	MAIN TRANSFORMER
11	11301039	HALL CURRENT SENSOR
12	0011402002	FUSE HOLDER
13	30101989	DIODE BOARD
14	30103020	INVERTER BOARD
15	0011304008	TEMPERATURE SENSOR
16	11303031	CURRENT TRANSFORMER
17	30103047	OUTPUT ABSORBING BOARD
18	11401024	FUSE(8A)
19	11402003	FUSE HOLDER
20	11501050	CIRCUIT BREAKER
21	12301275	HEATER SOC MIGT
22	11701005	FAN SHIELD
23	11702089	FAN
24	0011401008	FUSE
25	61301004	3P POWER SHIELD
26	60701065	COMBINED CONNECTION TERMINAL
27	12301012	LINE
28	12103033	3P RECTIFIER MODULE
29	30607225	RECTIFIER PLATE AL
30	30103046	EMIBOARD
31	60101265	RING CONTROL TRANSFORMER
32	30103093	CONTROL BOARD (1)
33	30101941	FAN CONTROL PANEL

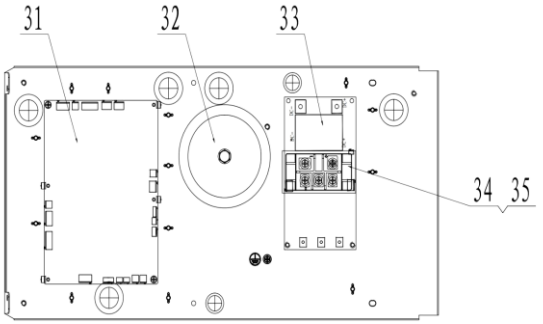
MIG 502i

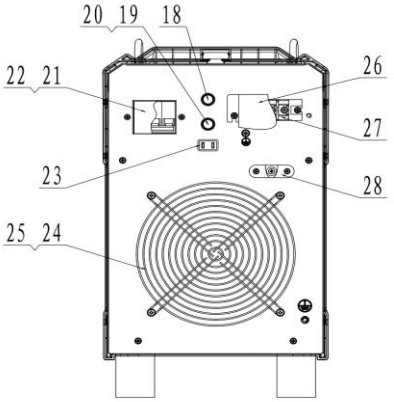




Item No	Parts Code	Parts Name
1	40103001	EYEBOLT (M8)
2	30103098	DISPLAY BOARD
3	60405050	DISPLAY BOARD STICKER
4	60501107	FRONT PANEL (PLASTIC SHELL)
5	30101855	IC CARD COVER
6,11	50804012	WELDING CABLE COUPLER EQUIPMENT: SOCKET (BLACK)
7	30103047	OUTPUT ABSORBING BOARD AND AVIATION SOCK
8	30607119	AVIATION SOCKET INSTALLATION BOARD
9	12001022	AVIATION SOCKET(7-PIN)
10	10603065	POTENTIOMETER KNOB
29	30103020	INVERTER BOARD
30	0011304008	TEMPERATURE SENSOR







Item No	Parts Code	Parts Name
12	11604027	DIGITAL SCREEN
13	30901187	REACTOR
14	30801684	MAIN TRANSFORMER
15	11301039	HALL CURRENT SENSOR
16	11304010	TEMPERATURE SENSOR
17	30103063	DIODE BOARD
18	0011401008	FUSE (3A)
19	0011402002	FUSE HOLDER
20	0011401024	FUSE (8A)
21	11501050	CIRCUIT BREAKER
22	61301001	CIRCUIT BREAKER SHIELD
23	0012301275	HEAT SOCKET
24	11702077	FAN
25	11701005	FAN SHIELD
26	0061301152	THREE-PHASE ARC EXTINGUISHING SHIELD
27	0060701065	COMBINED CONNECTING TERMINAL
28	12301012	LINE
31	30103105	CONTROL BOARD (1)
32	60101265	RING CONTROL TRANSFORMER
33	30103089	EMI BOARD
34	0012103013	THREE PHASE RECTIFIER MODULE
35	60301350	RECTIFIER BRIDGE RADIATOR

ESAB INDIA LIMITED

Registered and Head Office
13, Industrial Estate, III Main Road
Ambattur, Chennai - 600058
Telephone: + 91 44 42281100
Fax: + 91 44 4228 1107
Email: info@esab.co.in

Web: www.esabindia.com