



# Discovery 300



GB

Instruction manual



---





---

**CONTENTS**

<b>1</b>	<b>INTRODUCTION .....</b>	<b>4</b>
<b>2</b>	<b>INSTALLATION .....</b>	<b>5</b>
2.1	CONNECTIONS TO THE ELECTRICAL MAINS NETWORK .....	5
2.2	FRONT PANEL .....	5
2.3	REAR PANEL .....	5
2.4	PREPARING FOR MMA WELDING .....	5
2.5	PREPARING FOR TIG WELDING .....	7
<b>3</b>	<b>COMMISSIONING .....</b>	<b>9</b>
3.1	USER INTERFACE .....	9
3.2	UNIT POWER-UP .....	10
3.3	RESET (LOAD FACTORY SETTINGS) .....	10
3.4	SET-UP (INITIAL SET-UP OF THE WELDING POWER SOURCE) .....	10
3.5	ALARMS MANAGEMENT .....	11
<b>4</b>	<b>WELDING SETTINGS .....</b>	<b>12</b>
4.1	WELDING PARAMETERS .....	12
4.2	ELECTRODE WELDING (MMA) .....	12
4.3	DC TIG WELDING .....	12
<b>5</b>	<b>TECHNICAL DATA .....</b>	<b>13</b>
5.1	DISCOVERY 300 .....	13
<b>6</b>	<b>SPARE PARTS .....</b>	<b>14</b>
6.1	DISCOVERY 300 .....	14
<b>7</b>	<b>ELECTRICAL DIAGRAM .....</b>	<b>17</b>
7.1	DISCOVERY 300 .....	17
7.2	REMOTE CONTROLLER CONNECTOR .....	19

## 1 INTRODUCTION

### IMPORTANT!

**This handbook must be consigned to the user prior to installation and commissioning of the unit.**


**Read the "General prescriptions for use" handbook supplied separately from this handbook before installing and commissioning the unit.**

**The meaning of the symbols in this manual and the associated precautionary information are given in the "General prescriptions for use".**

**If the "General prescriptions for use" are not present, it is mandatory to request a replacement copy from the manufacturer or from your dealer.**



**Retain these documents for future consultation.**

### LEGEND



DANGER!

This pictogram warns of danger of death or serious injury.

-  This symbol identifies an action that occurs automatically as a result of a previous action.
-  This symbol identifies additional information or a reference to a different section of the manual containing the associated information.

### NOTES

The figures in this manual are purely guideline and the images may contain differences with respect to the actual equipment to which they refer.

## INTRODUCTION

This professional and rugged welding power source for DC MMA and TIG welding with exceptional arc characteristics is designed to operate in harsh environmental conditions in the fields of professional maintenance, shipyards and offshore, building construction and heavy fabrication.

The combination of digital control and excellent welding with cellulosic electrodes is ideal for hydraulic applications and welding work on oil pipelines and in the petrochemical industry.

Up to 4 mm diameter electrode welding is possible in MMA.

In MMA welding the Hot Start and Arc Force functions are adjustable and they allow improved arc striking, a flatter bead and more uniform weld.

The Anti Sticking function makes it possible to detach the electrode rapidly from the workpiece in the event of accidental sticking.

The fan is turned on only during welding, at the end of the welding process it remains on for a fixed period of time according to welding conditions.

The fan is nonetheless controlled by specific thermal sensors that guarantee a correct cooling of the machine.

#### Accessories/ancillary devices that can be connected to the unit:

- Manual remote controller for remote adjustment of the welding current.

Consult your dealer for an updated list of accessories and the latest available new products.

## 2 INSTALLATION

**! DANGER!**  
**Lifting and positioning**

Read the warnings highlighted by the following symbols in the "General prescriptions for use".

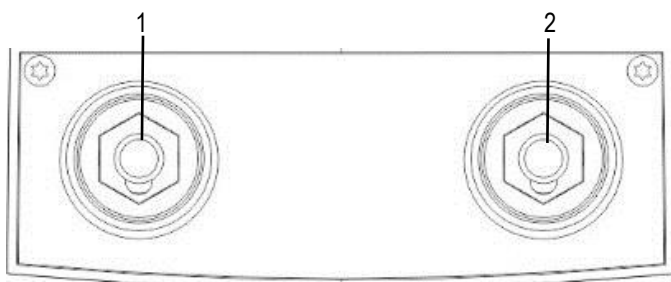
### 2.1 CONNECTIONS TO THE ELECTRICAL MAINS NETWORK

The characteristics of the mains power supply to which the equipment shall be connected are given in the section entitled "Technical data" on page 13.

The machine can be connected to motorgenerators provided their voltage is stabilised.

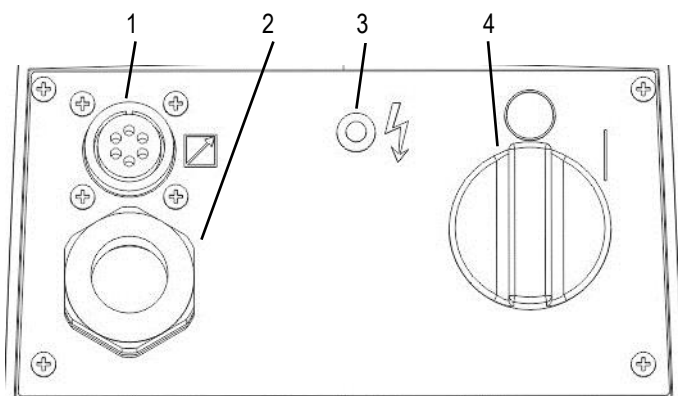
Connect/disconnect the various devices with the machine switched off.

### 2.2 FRONT PANEL



1. Negative pole welding socket.
2. Positive pole welding socket.

### 2.3 REAR PANEL



1. Remote controller connector.
2. Power cable.  
Total length (including internal part): 5,0 m  
① Number and cross section of wires: 4 x 2,5 mm<sup>2</sup>  
Power plug type: not supplied
3. Welding power source ON/OFF switch.
4. Mains protection ON LED.  
This LED illuminates if an incorrect operating condition occurs:
  - absence of a phase in the power supply line.

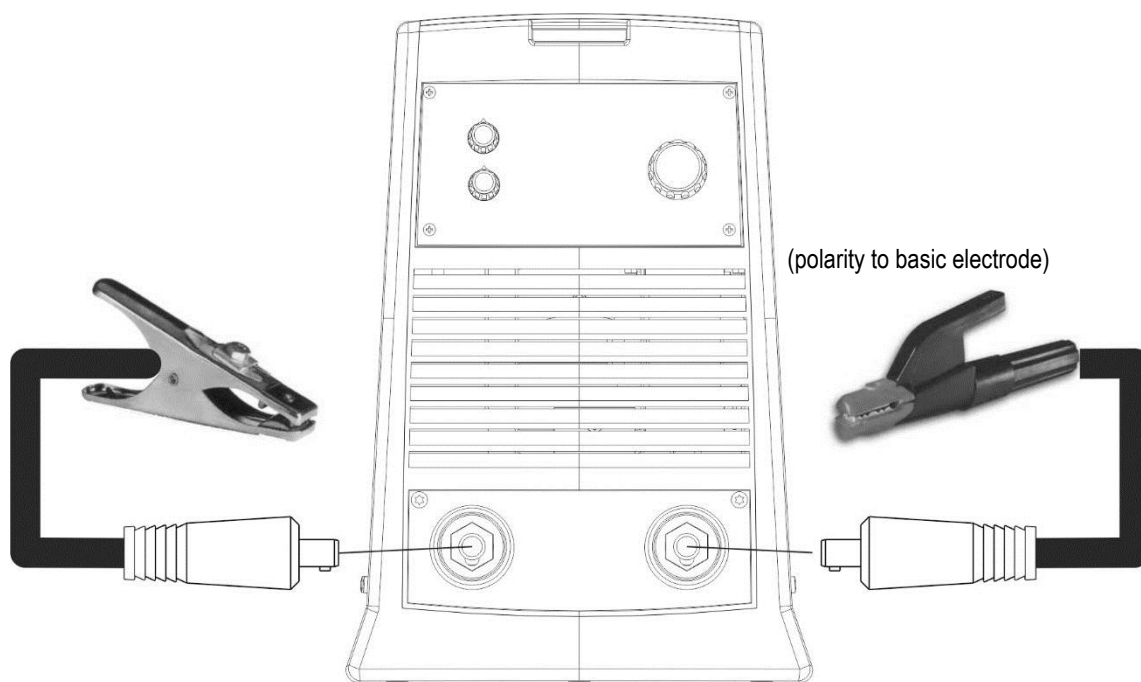
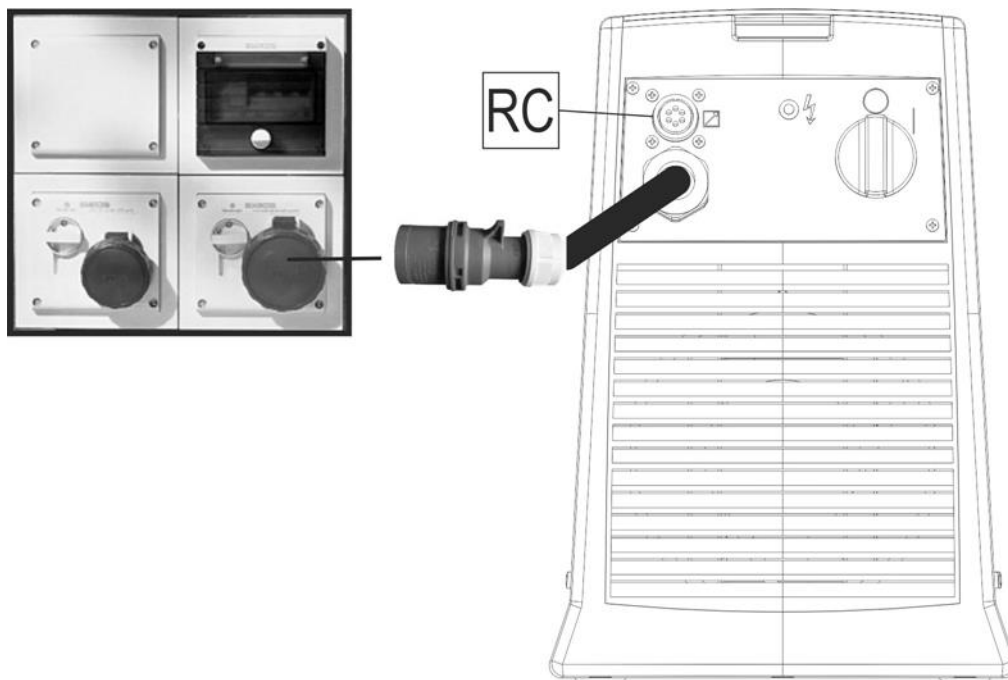
### 2.4 PREPARING FOR MMA WELDING

1. Set the welding power source ON/OFF switch to "O" (unit de-energized).
2. Plug the power cable plug into a mains socket outlet.
3. Choose the electrode based on the type of material and thickness of the workpiece to be welded.
4. Insert the electrode in the electrode holder.
5. Connect the electrode holder cable to the welding socket based on the polarity requested by the type of electrode used.
6. Connect the plug of the ground clamp to the welding socket on the basis of the polarity required.
7. Connect the earth clamp to the workpiece being processed.

**! DANGER!**  
**Electric shock hazard!**


Read the warnings highlighted by the following symbols in the "General prescriptions for use".

8. Set the welding power source ON/OFF switch to "I" (unit powered).
9. Select the following welding mode on the user interface: MMA
10. Set the required welding parameter values on the user interface.  
① When the remote controller [RC] is connected and the relative locking screw is tightened, welding current can be adjusted using the remote controller.  
The system is ready to start welding.




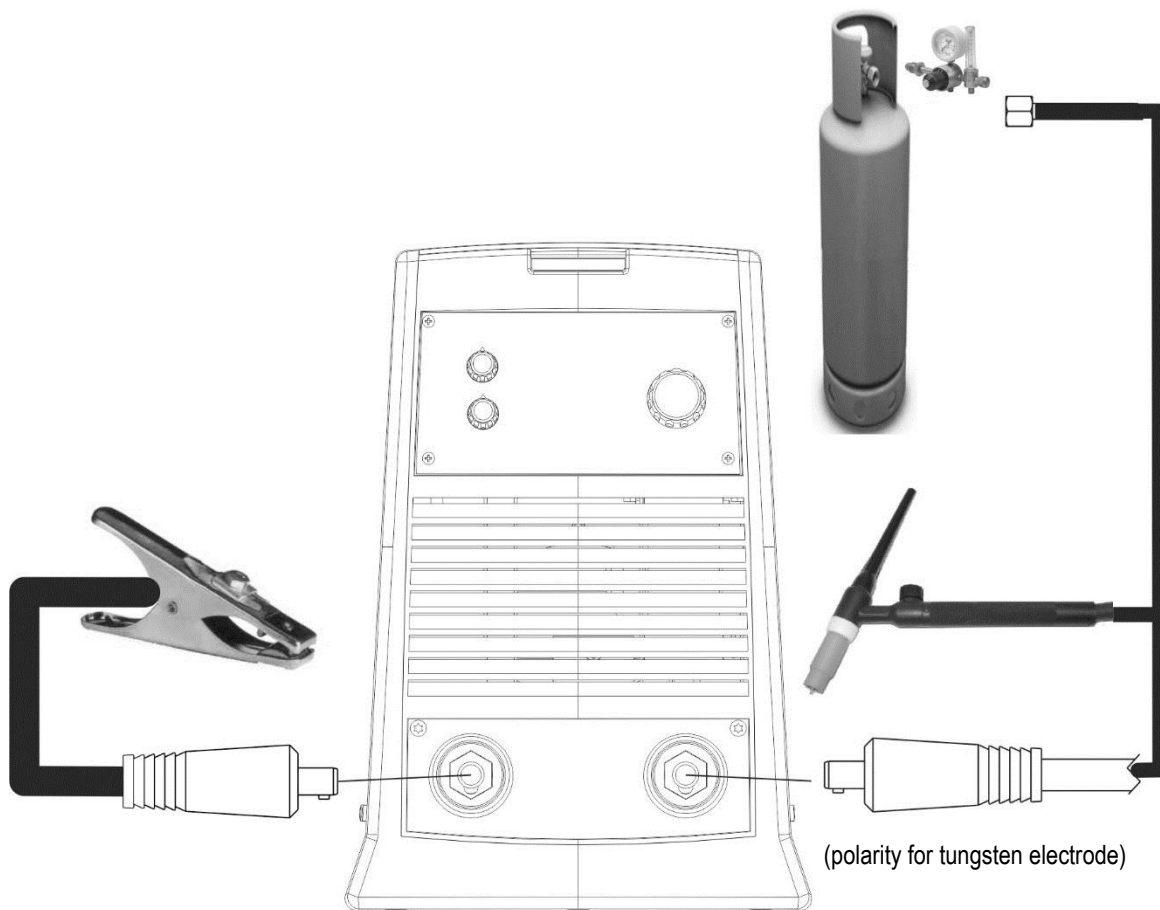
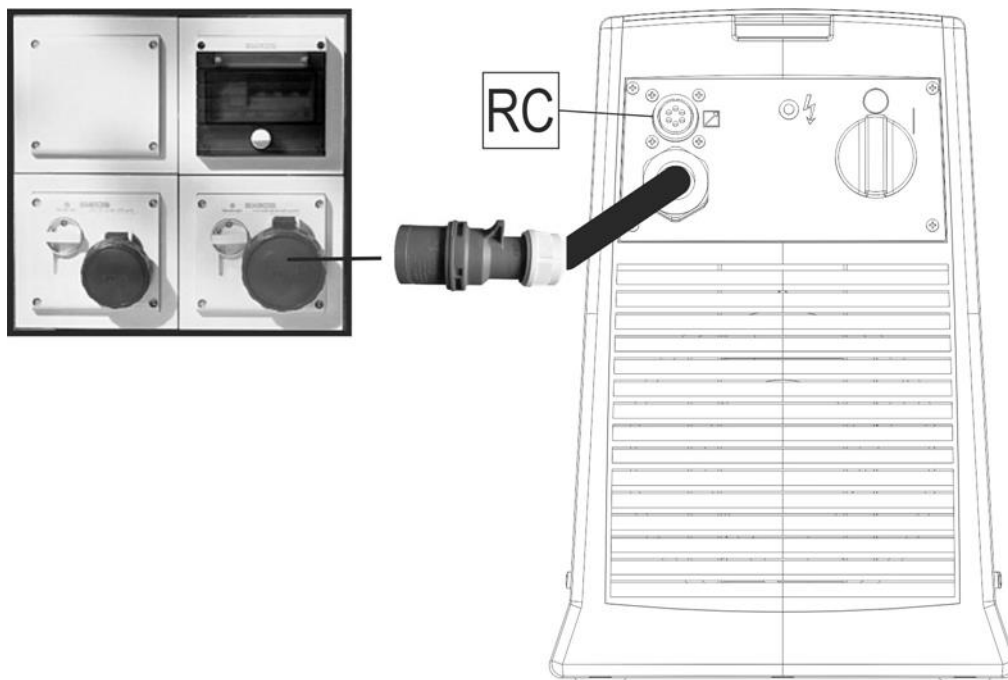
## 2.5 PREPARING FOR TIG WELDING

1. Set the welding power source ON/OFF switch to "O" (unit de-energized).
2. Plug the power cable plug into a mains socket outlet.
3. Choose the electrode based on the type of material and thickness of the workpiece to be welded.
4. Insert the electrode in the TIG torch.
5. Connect the torch plug to the welding socket on the basis of the polarity required by the type of electrode in question.
6. Connect the plug of the ground clamp to the welding socket on the basis of the polarity required.
7. Connect the earth clamp to the workpiece being processed.
8. Set the welding power source ON/OFF switch to "I" (unit powered).
9. Select the following welding mode on the user interface: DC TIG

 This model of welding machine has not been provided either with the control for gas flow (solenoid valve) or with the torch button.  
The system is ready to start welding.

## LIFT-ARC WELDING

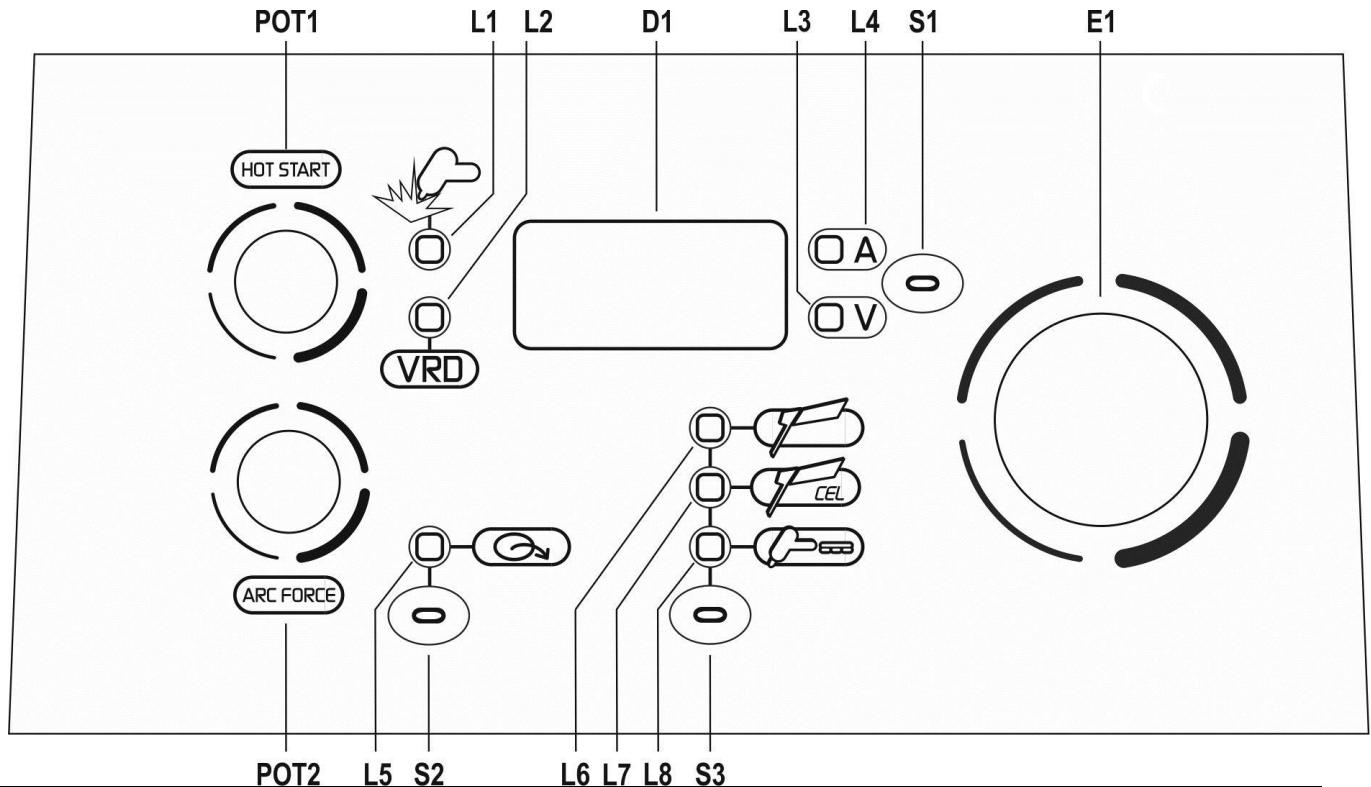
1. Open the torch valve to let the gas out.
2. Touch the workpiece with the torch electrode.
3. Slowly lift the torch to strike the arc.
-  The WELDING CURRENT reaches the preset value.
4. Quickly move the torch clear of the workpiece to extinguish the welding arc.
5. Close the torch valve to interrupt the gas flow.





### 3 COMMISSIONING

#### 3.1 USER INTERFACE



CODE SYMBOL	DESCRIPTION
L1	This LED illuminates to confirm the presence of power on the output sockets.
L2	Illumination shows that the following function has been activated: VRD (reduced output voltage). The no-load voltage between the welding sockets is switched from $U_0$ to $U_r$ (see technical data).
L3	Illuminates to show a value in the following unit of measurement: VOLTS
L4	Illuminates to show a value in the following unit of measurement: AMPERES
L5	This LED indicates that the current reference setting is imposed by the remote controller.
L6	This LED illuminates to show that the following welding mode is selected: MMA
L7	This LED illuminates to show that the following welding mode is selected: CELLULOSE
L8	This LED illuminates to show that the following welding mode is selected: TIG DC CONTINUOUS
D1	<b>Parameters/functions setting:</b> The display shows the selected parameter. <b>Welding:</b> The display shows the effective amperes or volts value during welding.
S1	<b>Welding:</b> This button selects the parameter to be shown on the following display: D1 Possible choices: (A) Effective welding current - (V) Effective welding voltage <b>Parameters/functions setting:</b> This button selects the parameter to be shown on the following display: D1 Possible choices: (A) Effective welding current - (V) Effective welding voltage
S2	<b>Press and release:</b> the button enables the device to receive the welding current control signal from a remote controller. <b>Keep the button pressed while powering on the power source:</b> the button opens the SETUP menu.
S3	This button selects the welding mode.
E1	<b>Welding:</b> The encoder sets the value of the following parameter: WELDING CURRENT <b>Parameters/functions setting:</b> The encoder provides the facility to alter the selected parameter.
POT1	<b>MMA:</b> The potentiometer sets the value of the following parameter: HOT START
POT2	<b>MMA:</b> The potentiometer sets the value of the following parameter: ARC FORCE

### 3.2 UNIT POWER-UP

Set the welding power source ON/OFF switch to "I" to switch on the unit.

➔ The message appears on the following displays: D1

#### First power-up or power-ups following a RESET procedure

The welding power source sets up for welding with the factory presets.

#### Subsequent power-ups

The welding power source sets up for welding in the latest stable welding configuration that was active at the time of power-off.

### 3.3 RESET (LOAD FACTORY SETTINGS)

The reset procedure involves complete restoration of the default values, parameters and memory settings set in the factory.

All memory locations will be reset and hence all your personal welding settings will be lost!

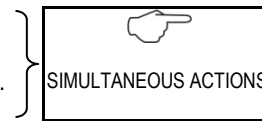
The reset procedure is useful in the following cases:

- Too many changes made to the welding parameters so user finds it difficult to restore defaults.
- Unidentified software problems that prevent the welding power source from functioning correctly.

Set the welding power source ON/OFF switch to "O" to switch the unit off.

S2 S3 Hold down both buttons simultaneously.

Set the welding power source ON/OFF switch to "I" to switch on the unit.



➔ The message appears on the following displays: D1

Wait for the memory clear procedure to terminate.

### 3.4 SET-UP (INITIAL SET-UP OF THE WELDING POWER SOURCE)

Set the welding power source ON/OFF switch to "O" to switch the unit off.

S2 Hold down the button.

Set the welding power source ON/OFF switch to "I" to switch on the unit.



➔ The acronym relative to the setting to be edited appears on the following displays: D1

E1 Using the encoder, edit the value of the selected setting.

#### Exit without confirmation

S2 Press the button.

➔ This action will automatically close the menu.

#### Exit with confirmation

Press any button (except S2).

➔ This action will automatically close the menu.

**Tab. 1 - Setup settings**

ACRONYM	SETTING	MIN	DEFAULT	MAX
Vrd	OUTPUT VOLTAGE REDUCTION	oFF	oFF	on
U.EL.	LONG ARC VOLTAGE MMA	37	*SYN	65

\*SYN: This code indicates that parameters control is synergic. The optimal value of this parameter is set automatically by the microprocessor on the basis of the preset welding current value. This value can be displayed but it is not user-adjustable.

When SYN is installed, to display the synergic value press the following button: S1

### OUTPUT VOLTAGE REDUCTION

Voltage must be reduced when maximum output voltage of the power source cannot exceed a limit value set by specific standards on the use of welding power sources in shipyards, offshore platforms, etc.

### LONG ARC VOLTAGE MMA

This parameter inhibits power output when the potential between electrode and workpiece exceeds the preset threshold level.

Consequences of a higher value: the welding arc persists even with a significant distance between the electrode and the workpiece.

Consequences of a lower value: faster exit from weld.

### 3.5 ALARMS MANAGEMENT

➡ An alarm message appears on the following display: D1

**Tab. 2 - Alarm messages**

MESSAGE	MEANING	EVENT	CHECKS
AL. HEA.	<p><b>Overheating alarm</b> Indicates tripping of the welding power source thermal protection. Leave the unit running so that the overheated components cool as rapidly as possible. When the unit has cooled, the welding power source will reset automatically.</p>	<p>All functions disabled. Exceptions: - Cooling fan. - Cooler (if switched on).</p>	<ul style="list-style-type: none"> <li>- Make sure that the power required by the welding process is lower than the maximum rated power output.</li> <li>- Check that the operating conditions are in compliance with the welding power source data plate specifications.</li> <li>- Check for the presence of adequate air circulation around the welding power source.</li> </ul>
	<p><b>Phase missing alarm</b> Indicates the absence of a phase in the power supply line. The message appears when the mains protection activation LED switches on.</p>	<p>All functions disabled. Exceptions: - Cooling fan.</p>	<ul style="list-style-type: none"> <li>- Check if the equipment power supply line has all the phases. If the problem persists: - qualified technical personnel are required for repair/maintenance jobs.</li> </ul>

## 4 WELDING SETTINGS

### 4.1 WELDING PARAMETERS

#### WELDING CURRENT

Output current value during welding.

#### HOT-START

This parameter aids electrode melting at the time of arc striking.

Consequences of a higher value:

- Easier arc strike.
- Increased spatter at welding start.
- Increase of strike area.

Consequences of a lower value:

- More difficult arc strike.
- Less spatter at welding start.
- Smaller strike area.

#### ARC FORCE

This parameter helps to avoid electrode sticking during welding. During electrode fusion low conductivity parts of the coating become detached and tend to become interposed between the electrode tip as it is fusing and the workpiece. This condition results in an interruption of the arc. In addition, it may occur that the electrode comes into contact with the workpiece creating a short circuit and consequent quenching of the arc. To avoid arc quenching the power source therefore delivers instantaneous peak currents in correspondence with preset arc voltage thresholds.

Consequences of a higher value:

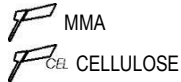
- Fluidity during welding.
- Welding arc stability.
- Greater electrode fusion in workpiece.
- More welding spatter.

Consequences of a lower value:

- The arc is extinguished more easily.
- Less welding spatter.

### 4.2 ELECTRODE WELDING (MMA)

S3 Use this button to select one of the following welding modes:

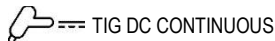


**Tab. 3 - Parameters of the 1st level menu: MMA mode**

PARAMETER	MIN	DEFAULT	MAX	NOTES
WELDING CURRENT	10 A	80 A	300 A	
MAXIMUM CURRENT WITH REMOTE CONTROLLER				
HOT-START	0 %	-	100 %	The value is calculated as a percentage of the preset welding current.
ARC FORCE	0 %	-	200 % (MMA) 400 % (CEL)	The value is calculated as a percentage of the preset welding current. The value is limited to 300A max.

### 4.3 DC TIG WELDING

S3 This button serves to select the following welding mode:









**Tab. 4 - Parameters of the 1st level menu: CONTINUOUS DC TIG mode**

PARAMETER	MIN	DEFAULT	MAX
WELDING CURRENT	5 A	80 A	300 A

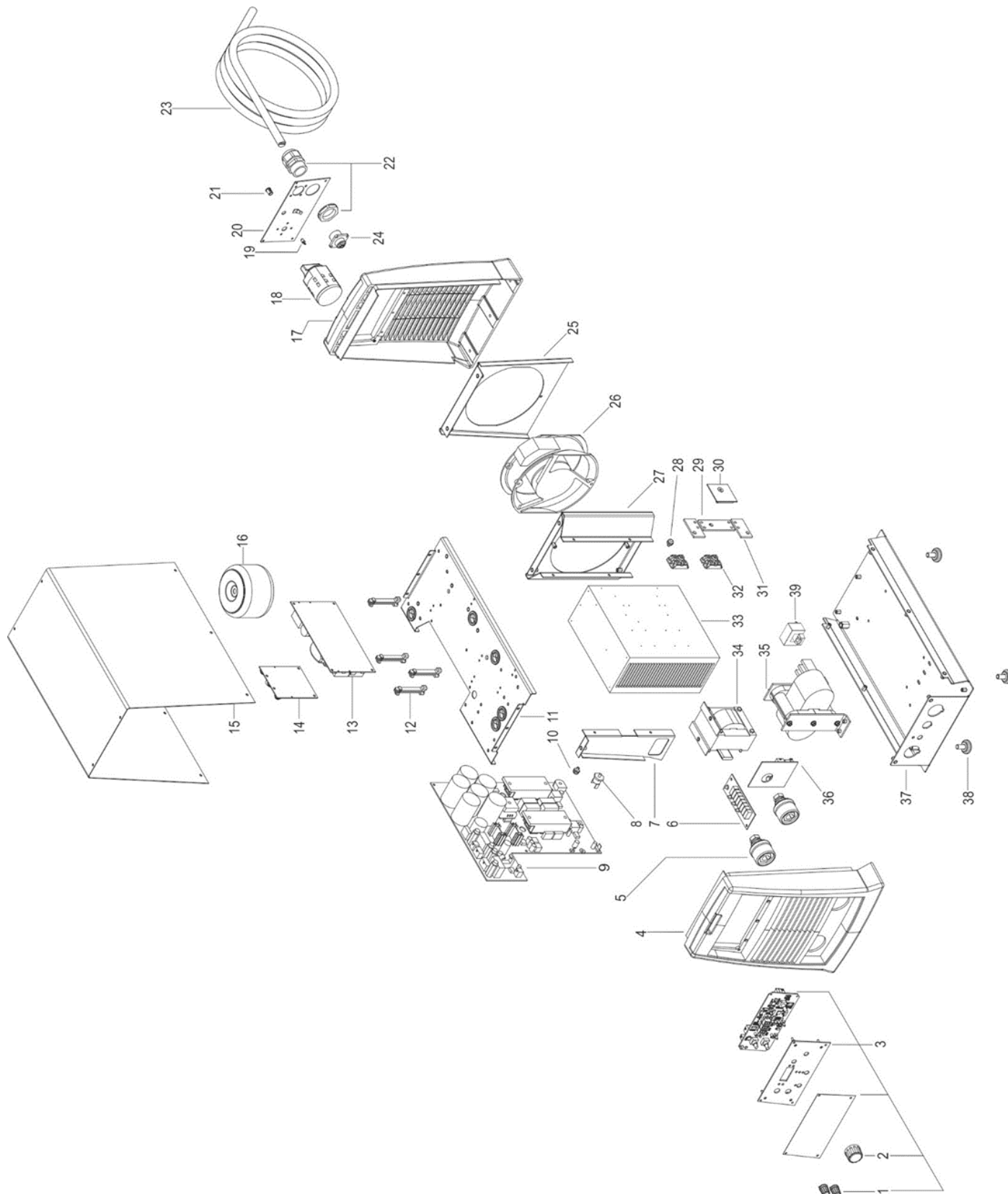
## 5 TECHNICAL DATA

### 5.1 DISCOVERY 300

<b>Directives applied</b>	Waste electrical and electronic equipment (WEEE)	
	Electromagnetic compatibility (EMC)	
	Low voltage (LVD)	
	Restriction of the use of certain hazardous substances (RoHS)	
<b>Construction standards</b>	EN 60974-1; EN 60974-10 Class A	
<b>Conformity markings</b>		Equipment compliant with European directives in force
		Equipment suitable in an environment with increased hazard of electric shock
		Equipment compliant with WEEE directive
		Equipment compliant with RoHS directive
<b>Supply voltage</b>	3 x 400 Va.c. $\pm$ 15 % / 50-60 Hz	
<b>Mains protection</b>	20 A 500V Delayed	
<b>Z<sub>max</sub></b>	This equipment complies with IEC 61000-3-12 provided that the maximum permissible system impedance is less than or equal to 38 m $\Omega$ at the interface point between the user's supply and the public system. It is the responsibility of the installer or user of the equipment to ensure, by consultation with the distribution network operator if necessary, that the equipment is connected only to a supply with maximum permissible system impedance less than or equal to 38 m $\Omega$ .	
<b>Dimensions ( L x D x H )</b>	460 x 230 x 325 mm	
<b>Weight</b>	20.8 kg	
<b>Insulation class</b>	H	
<b>Protection rating</b>	IP23S	
<b>Cooling</b>	AF: Air-over cooling (fan assisted)	
<b>Maximum gas pressure</b>	0,5 MPa (5 bar)	
<b>Static characteristic</b>	MMA	 Drooping characteristic
	TIG	 Drooping characteristic
<b>Current and voltage adjustment range</b>	MMA	10 A / 20.4 V - 300 A / 32.0 V
	TIG	5 A / 10.2 V - 300 A / 22.0 V
<b>Welding current / Working voltage</b>	MMA	40 % (40° C) 300 A - 32.0 V
		60 % (40° C) 230 A - 29.2 V
		100 % (40° C) 200 A - 28.0 V
	TIG	50 % (40° C) 300 A - 22.0 V
		60 % (40° C) 250 A - 20.0 V
		100 % (40° C) 210 A - 18.4 V
<b>Maximum input power</b>	MMA	40 % (40° C) 13.3 kVA – 10.7 kW
		60 % (40° C) 9.9 kVA – 7.9 kW
		100 % (40° C) 8.4 kVA – 6.6 kW
	TIG	50 % (40° C) 10.3 kVA – 7.9 kW
		60 % (40° C) 8.4 kVA – 6.2 kW
		100 % (40° C) 6.7 kVA – 4.8 kW
<b>Maximum supply current</b>	MMA	40 % (40° C) 19.1 A
		60 % (40° C) 14.3 A
		100 % (40° C) 12.3 A
	TIG	50 % (40° C) 14.8 A
		60 % (40° C) 12.2 A
		100 % (40° C) 9.4 A
<b>Maximum Effective Supply Current</b>	MMA	40 % (40° C) 12.1 A
		60 % (40° C) 11.1 A
		100 % (40° C) 12.3 A
	TIG	50 % (40° C) 10.5 A
		60 % (40° C) 9.5 A
		100 % (40° C) 9.4 A
<b>No-load voltage (U<sub>0</sub>)</b>	MMA	76 V
	TIG	76 V
<b>Reduced no-load voltage (U<sub>r</sub>)</b>	MMA	9 V
	TIG	9 V

## 6 SPARE PARTS

### 6.1 DISCOVERY 300

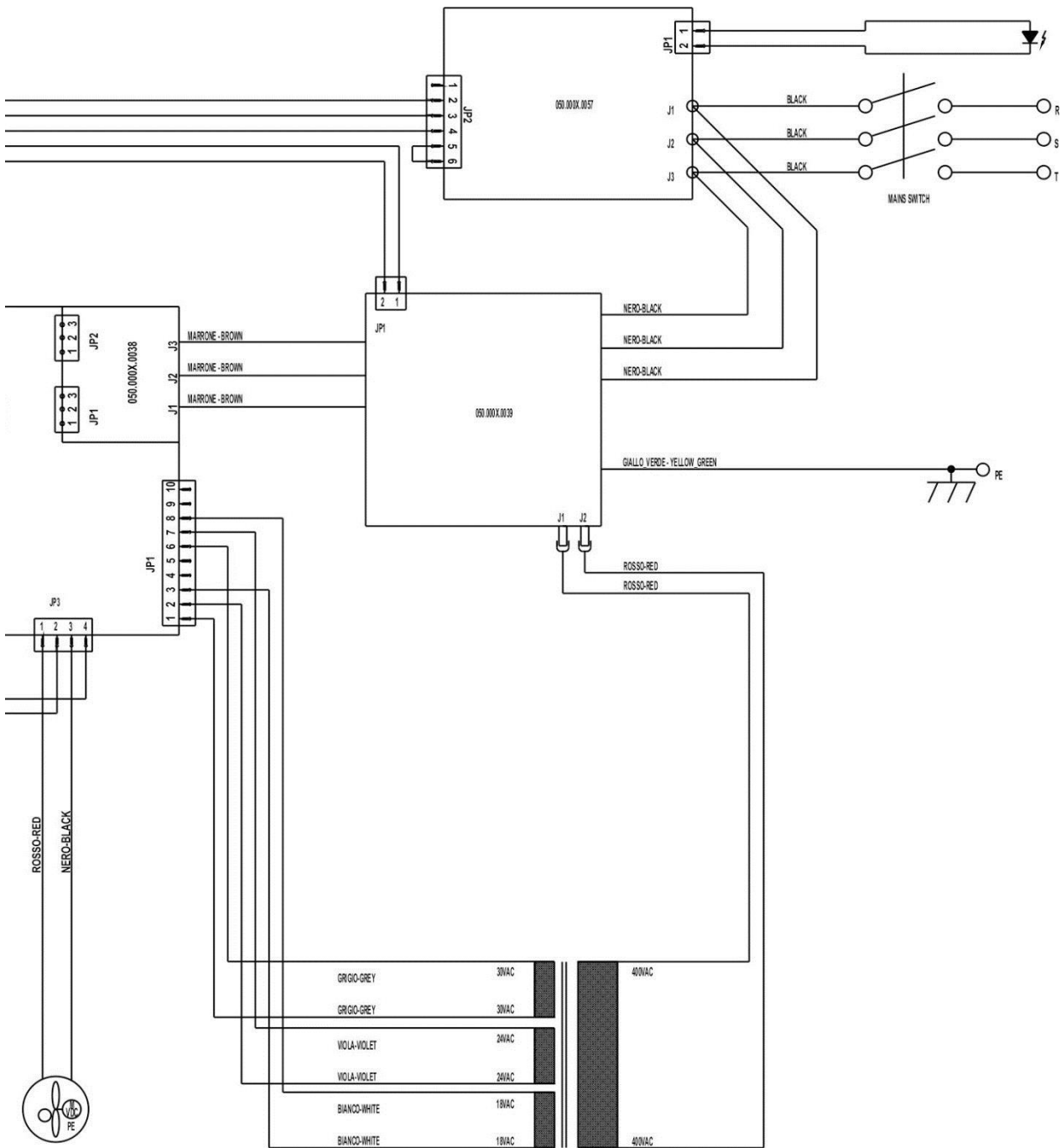


N°	CODE	DESCRIPTION
1	014.0002.0012	KNOB WITH CAP + INDICATOR
2	014.0002.0010	KNOB WITH CAP + INDICATOR
3	050.5046.0000	FRONT PANEL
4	010.0006.0038	FRONT PLASTIC
5	021.0001.0259	FIXED SOCKET
6	050.0001.0119	PRIMARY CAPACITOR BOARD
7	011.0008.0029	LATERAL PLATE
8	040.0003.0060	TERMAL SWITCH
9	050.0003.0036	POWER BOARD
10	040.0003.1270	THERMAL CUT-OUT 70°C L=200mm
11	011.0008.0021	UPPER PLATE
12	016.0010.0001	BOARDS SUPPORT GUIDE
13	050.0002.0039	MAINS FILTER BOARD
14	050.0002.0057	POWER SUPPLY CONTROL BOARD
15	011.0000.0161	COVER PLATE
16	041.0006.0004	AUXILIARY TRANSFORMER
17	010.0006.0034	REAR PLASTIC PANEL
18	040.0001.0017	THREE-POLE SWITCH
19	022.0002.0190	LED WIRING
20	013.0012.0002	REAR PANEL
21	016.4107.0001	LED HOLDER
22	045.0000.0050	CABLE CLAMP
23	045.0002.0019	NEOPRENE CABLE
24	022.0002.0005	REMOTE LOGIC CABLE
25	011.0008.0010	EXTERNAL FAN SUPPORT
26	003.0002.0003	FAN
27	011.0008.0011	INTERNAL FAN SUPPORT
28	040.0003.1170	THERMAL CUT-OUT 70°C L=300mm
29	045.0006.0058	DIODE-DIODE BRACKET
30	050.0003.0044	SNUBBER BOARD
31	045.0006.0061	DIODES-TRANSFORMER COPPER BRACKET
32	032.0002.2003	ISOTOP DIODE
33	015.0001.0006	HEAT SINK
34	044.0004.0025	OUTPUT INDUCTOR
35	010.0007.0002	POWER TRANSFORMER
36	050.0001.0031	OUTPUT FILTER BOARD
37	011.0008.0001	LOWER COVER
38	016.0009.0003	RUBBER FOOT
39	041.0004.0300	HALL EFFECT SENSOR

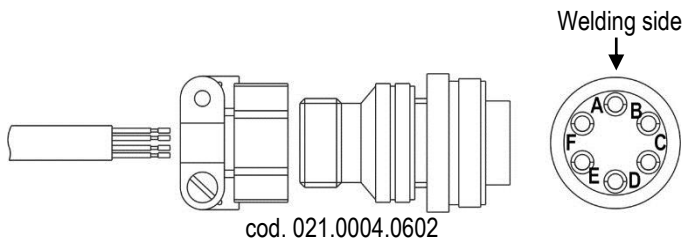








**7.2 REMOTE CONTROLLER CONNECTOR**



**Remote Controller**

