Cod. 006.0001.1720
30/03/2020 V.2.8

WELD THE WORLD

Micro Pulse 302MFK

Instruction Manual

Translation of original instructions

ENGLISH

INDEX

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 manual 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.

KEY

DANGER!

This pictogram warns of danger of death or serious injury.

WARNING!

This pictogram warns of a risk of injury or damage to property.

CAUTION!

This pictogram warns of a potentially hazardous situation.

INFORMATION!

This pictogram gives important information concerning the execution of the relevant operations.

- 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.
- § This symbol identifies a reference to a chapter of the manual.

1.1 INTRODUCTION

Micro Pulse 302MFK is a compact and rugged three-phase, synergic inverter power source for MIG/MAG, MMA and TIG LIFT welding.
Easy to transport, only 24 kg , it is the best option for maintenance and repair on field, shipyard and off -shore operations.
Polarity change allows welding with self-shielded wires.
Available MIG/MAG mode: manual, synergic, pulsed synergic and double pulsed synergic.
Pulsed Synergic and Double Pulsed Synergic modes ensure excellent appearance of the weld bead, without spatter or deformation when welding aluminium, stainless steel and regular steels.
A broad range of synergic MIG/MAG programs facilitates the selection of precise welding parameters rapidly and using all types of wire.
A perfect wire feeding is guaranteed thanks to a 4-rolls motor drive included in Micro Pulse 302MFK.

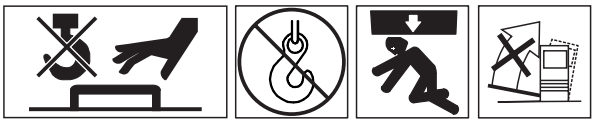
The fan is turned on only during welding, at the end of the welding process it remains on for a fixed period of time according to welding conditions.
The fan is nonetheless controlled by specific thermal sensors that guarantee a correct cooling of the machine.

Accessories that can be connected to the unit:
- Manual remote controller for remote adjustment of the welding current.

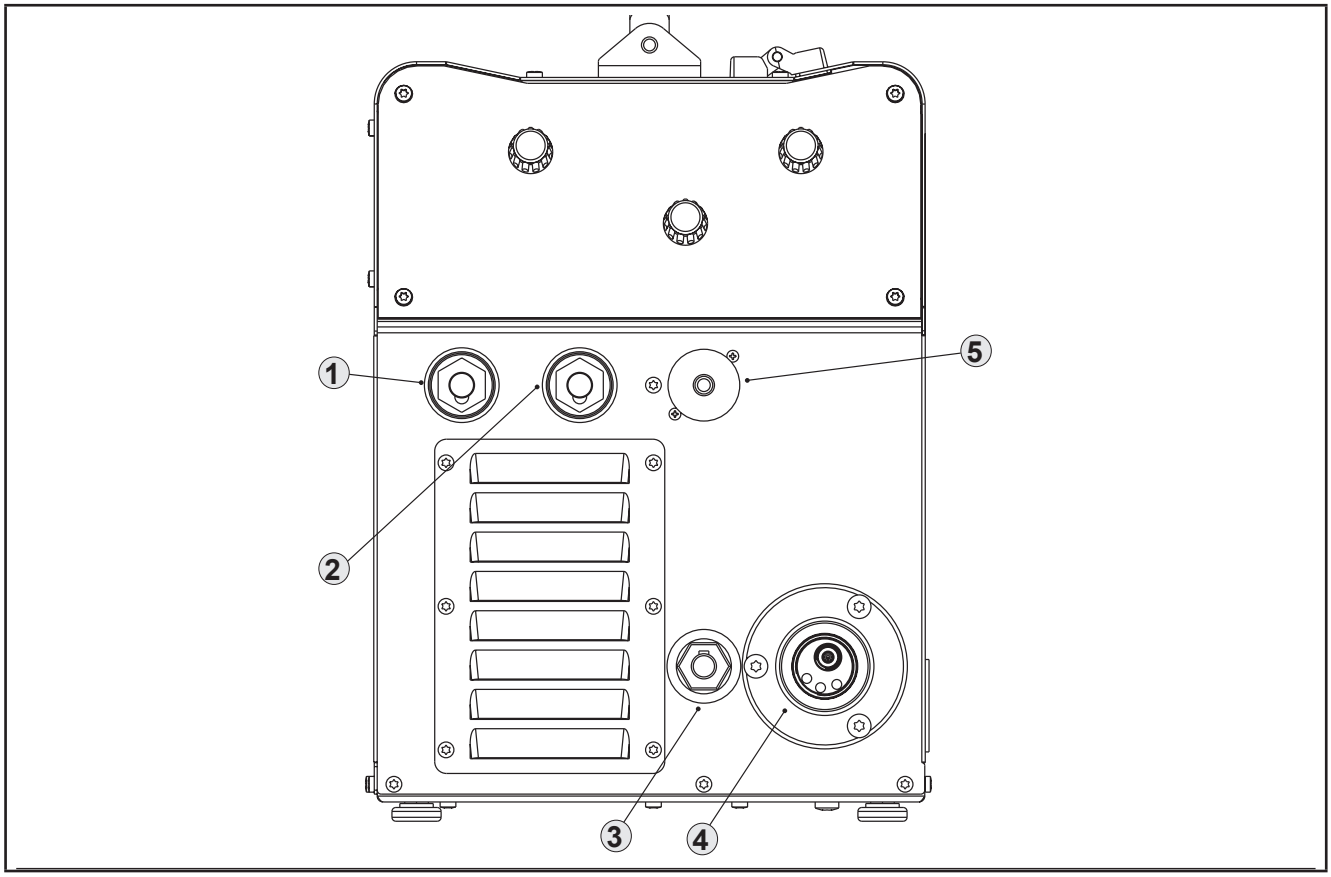
2 INSTALLATION

DANGER!
Lifting and positioning

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

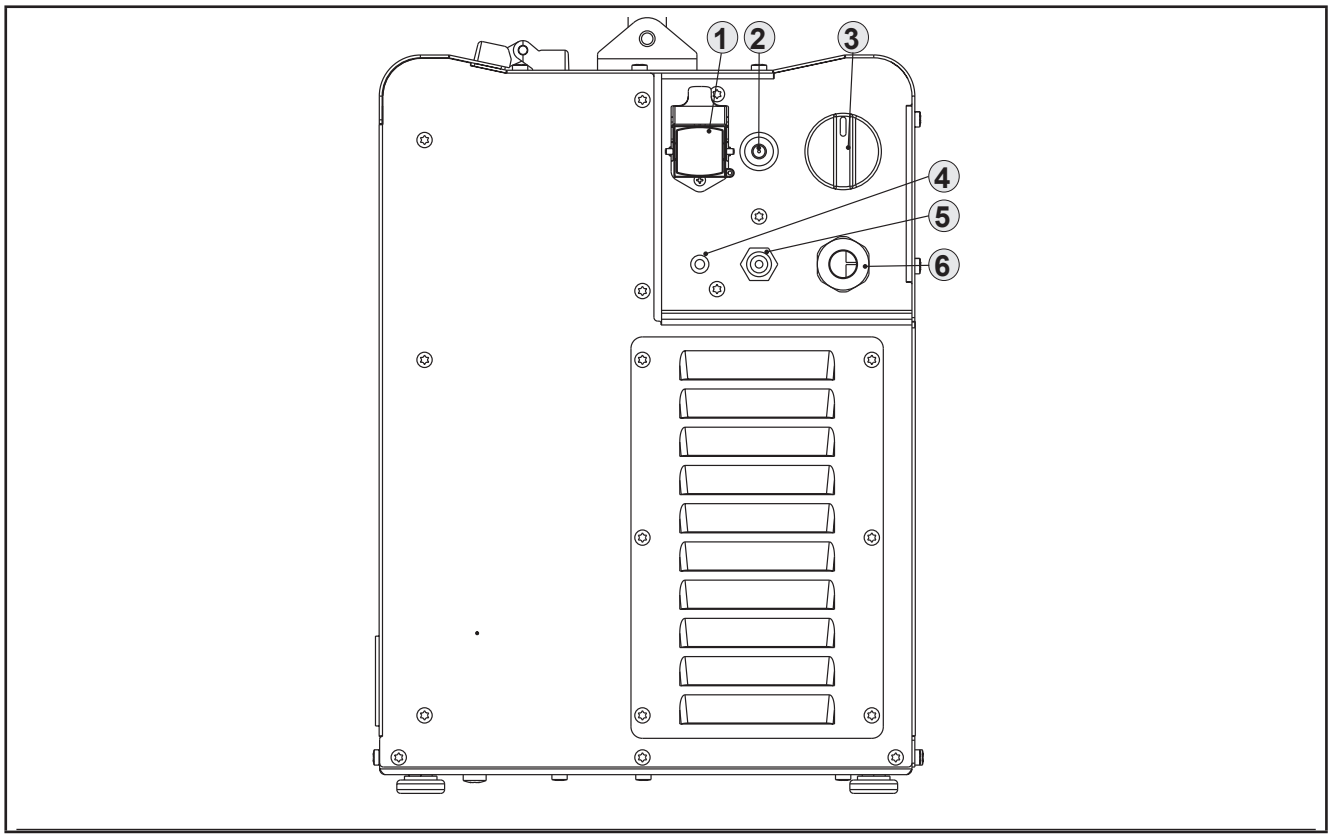


2.1 FRONT PANEL



- Negative pole welding socket [Item 1].
- Positive pole welding socket [Item 2].
- Polarity selector cable [Item 3].
- EURO TORCH welding socket [Item 4].
- Remote controller connector [Item 5].

2.2 REAR PANEL



- ○ Cooling unit power feeding connector [Item 1].
  - Voltage: 400 Va.c.
  - Current Output: 0.8 A
  - IP protection rating: IP20 (cap open) / IP66 (cap closed)
- ○ Wire feed motor power transformer fuse [Item 2].
  - Type: Delayed acting (T)
  - Amperage: 1.6 A
  - Voltage: 500 V
- ○ Welding power source ON/OFF switch [Item 3].
- ○ Mains protection ON LED[Item. 4].

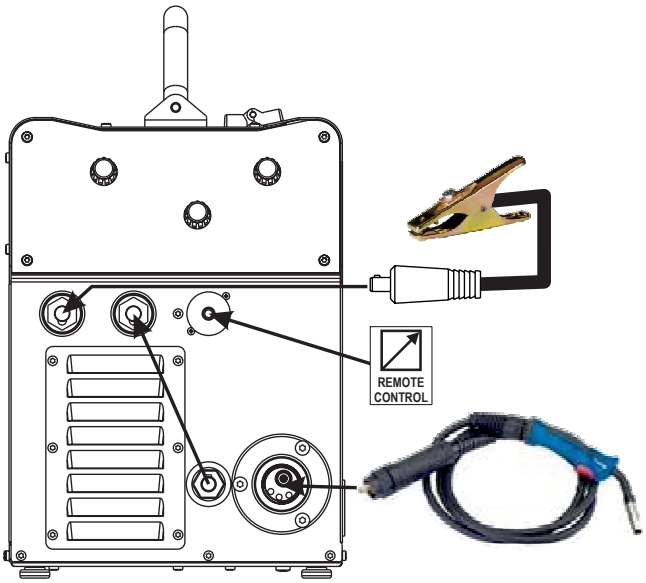
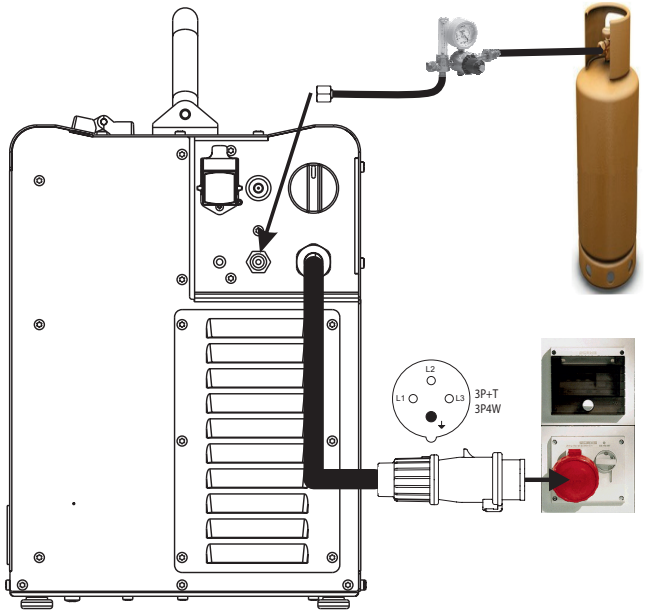
This LED illuminates in case of an absence of a phase in the power supply line.

- ○ Connector for gas feed hose between the gas cylinder and the power source [Item 5]
- ○ Power cable [Item 6].
  - Total length (including internal part): 3,5 m
  - Number and cross section of wires: 4 x 2,5 mm^2
  - Type of plug supplied: not supplied

2.3 MIG/MAG INSTALLATION

DANGER!
Electric shock hazard!

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

FRONT VIEW	REAR VIEW
	

1. Set the welding power source ON/OFF switch to "O" (unit switched off).
2. Connect the power source mains supply cable to the mains socket outlet.
3. Connect the gas hose from the welding gas cylinder to the relative socket.
4. Open the cylinder gas valve.
5. Connect the MIG/MAG torch plug to the EURO TORCH welding socket.
6. Connect the plug of the ground clamp to the welding socket on the basis of the polarity required.
7. Connect the plug of the polarity selector cable to the welding socket on the basis of the polarity required.
8. Connect the earth clamp to the workpiece being processed.
9. Set the welding power source ON/OFF switch to "I" (unit powered).
10. Select the following welding mode on the user interface: MIG/MAG
11. Feed the wire through the torch until it protrudes from the tip, pressing button on the unit's user interface. The insertion speed is 2.0 m/min for 3 seconds, subsequently increasing to 15 m/min. When the button is released wire feed is interrupted. This function produces a slower feed rate and hence greater precision when inserting the wire when it enters the torch nozzle.
12. Select the torch trigger procedure on the user interface.
13. Open the gas solenoid valve by pressing and releasing the button .
14. Use the flow control valve to adjust the flow of gas as required while the gas is flowing out.
15. Close the gas solenoid valve by pressing and releasing the button.

16. Set the required welding parameter values on the user interface.

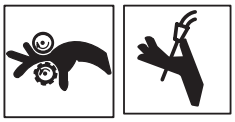
ⓘ On connecting and enabling a remote controller [RC] certain settings can be modified from said controller without having to take action on the user interface of the welding power source.

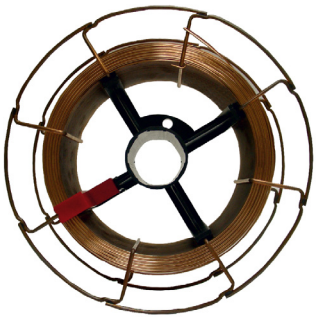
The system is ready to start welding.

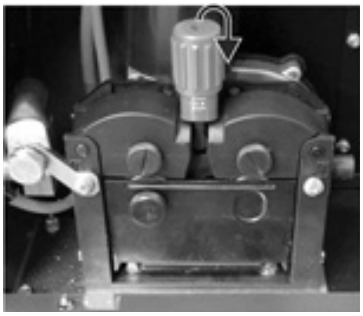
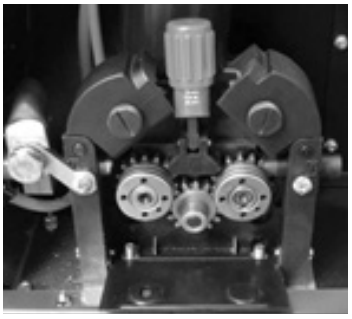
POSITIONING THE SPOOL AND THE WIRE IN THE WIRE FEEDER

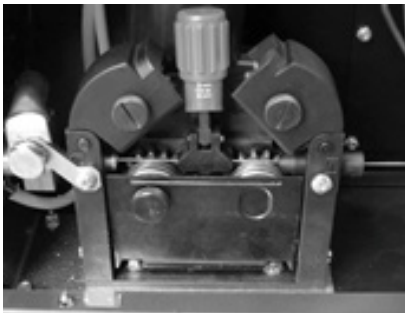
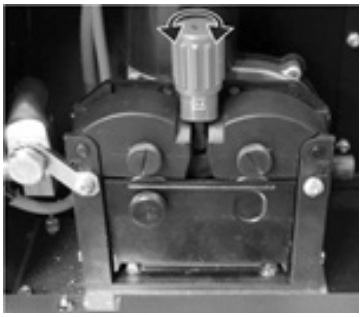
WARNING!
Mechanical Hazards

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



1. Open the unit side door to gain access to the spool compartment. 2. Unscrew the cap of the spool holder.	
3. If necessary, fit an adapter for the wire spool.	
4. Fit the spool in the spool holder, ensuring it is located correctly.	

5. Adjust the spool holder braking system by tightening/ loosening the screw in such a way that the wire feed force is not excessive and when the spool stops rotating no excess wire is released.	
6. Refit the plug.	
7. Lower the wire feeder pressure devices.	
8. Raise the wire feeder pressure arms. 9. Remove the protective cover.	

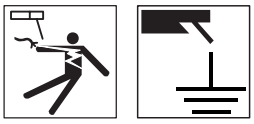
10. Check that the feed rolls are suitable for the wire gauge. • The diameter of the roll groove must be compatible with the diameter of the welding wire. • The roll must be of suitable shape in relation to the composition of the wire material. • The groove must be "U" shaped for soft materials (Aluminium and its alloys, CuSi3). • The groove must be "V" shaped for harder materials (SG2-SG3, stainless steels). • Rolls with a knurled groove profile are available for flux-cored wire. 11. Feed the wire between the wire feeder rolls and insert it into the MIG/MAG TORCH connector plug. 12. Make sure the wire is located correctly in the roll grooves.	
13. Close the wire feeder pressure arms. 14. Adjust the pressure system so that the arms press the wire with a force that does not deform it while also ensuring constant feed rate without slipping. 15. Refit the protective cover. 16. Set the welding power source ON/OFF switch to “I” (unit switched on). 17. Feed the wire through the torch until it protrudes from the tip, pressing button ⊛ on the unit front panel. 18. Close the spool compartment door in the side of the unit.	

2.4 PREPARING FOR MMA WELDING

1. Set the welding power source ON/OFF switch to “O” (unit switched off).
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!

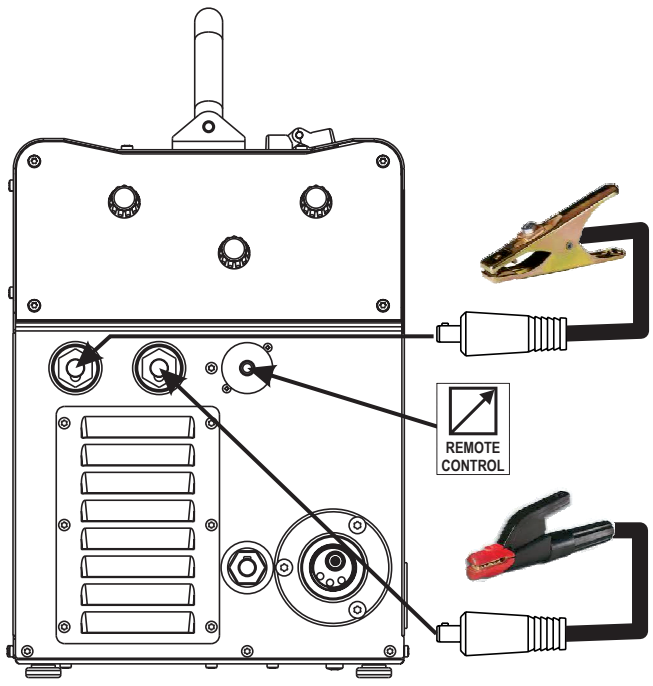
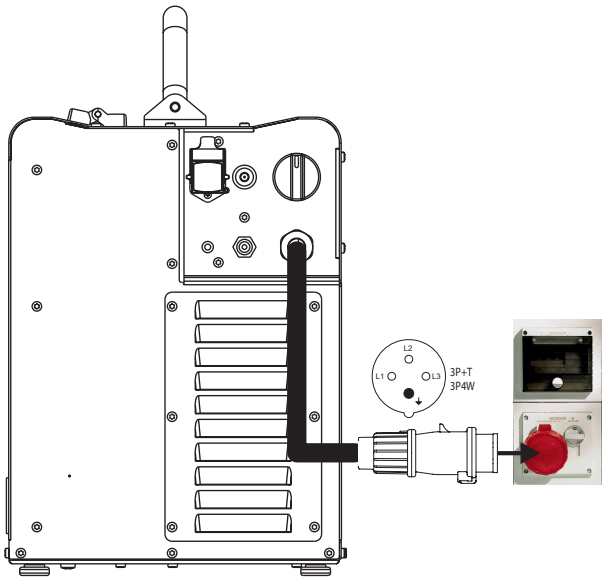
Read the warnings highlighted by the following symbols in the “General prescriptions for use”.



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.

ⓘ 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.

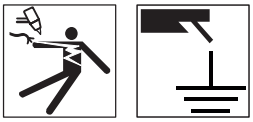
FRONT VIEW (polarity to basic electrode)	REAR VIEW
	

2.5 PREPARING FOR TIG WELDING

1. Set the welding power source ON/OFF switch to “O” (unit switched off).
2. Plug the power cable plug into a mains socket outlet.
3. Connect the gas hose from the welding gas cylinder to the rear gas connection.
4. Open the cylinder gas valve.
5. Connect the TIG torch plug to the EURO TORCH welding socket.
6. Choose the electrode based on the type of material and thickness of the workpiece to be welded.
7. Insert the electrode in the TIG torch.
8. Connect the torch plug to the welding socket on the basis of the polarity required by the type of electrode in question.
9. Connect the plug of the ground clamp to the welding socket on the basis of the polarity required.
10. Connect the earth clamp to the workpiece being processed.

DANGER!
Electric shock hazard!

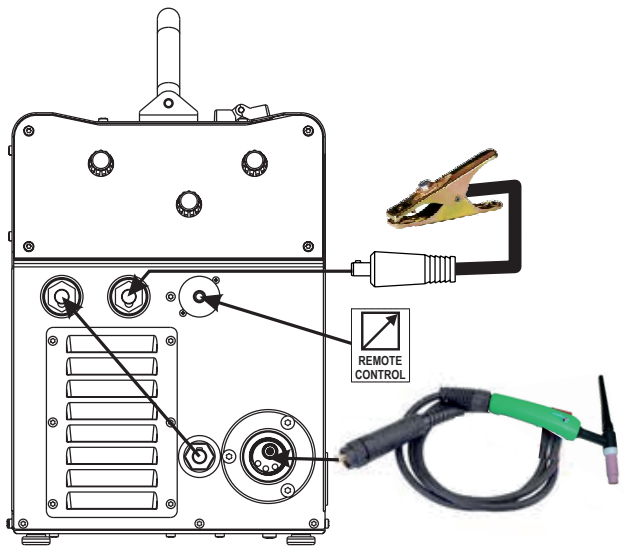
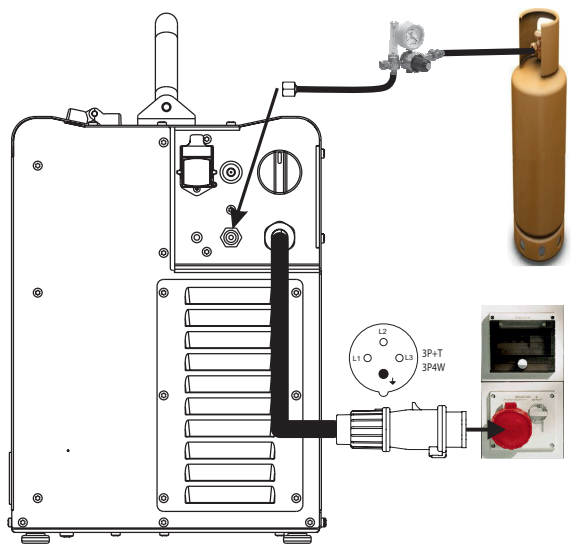
Read the warnings highlighted by the following symbols in the “General prescriptions for use”.



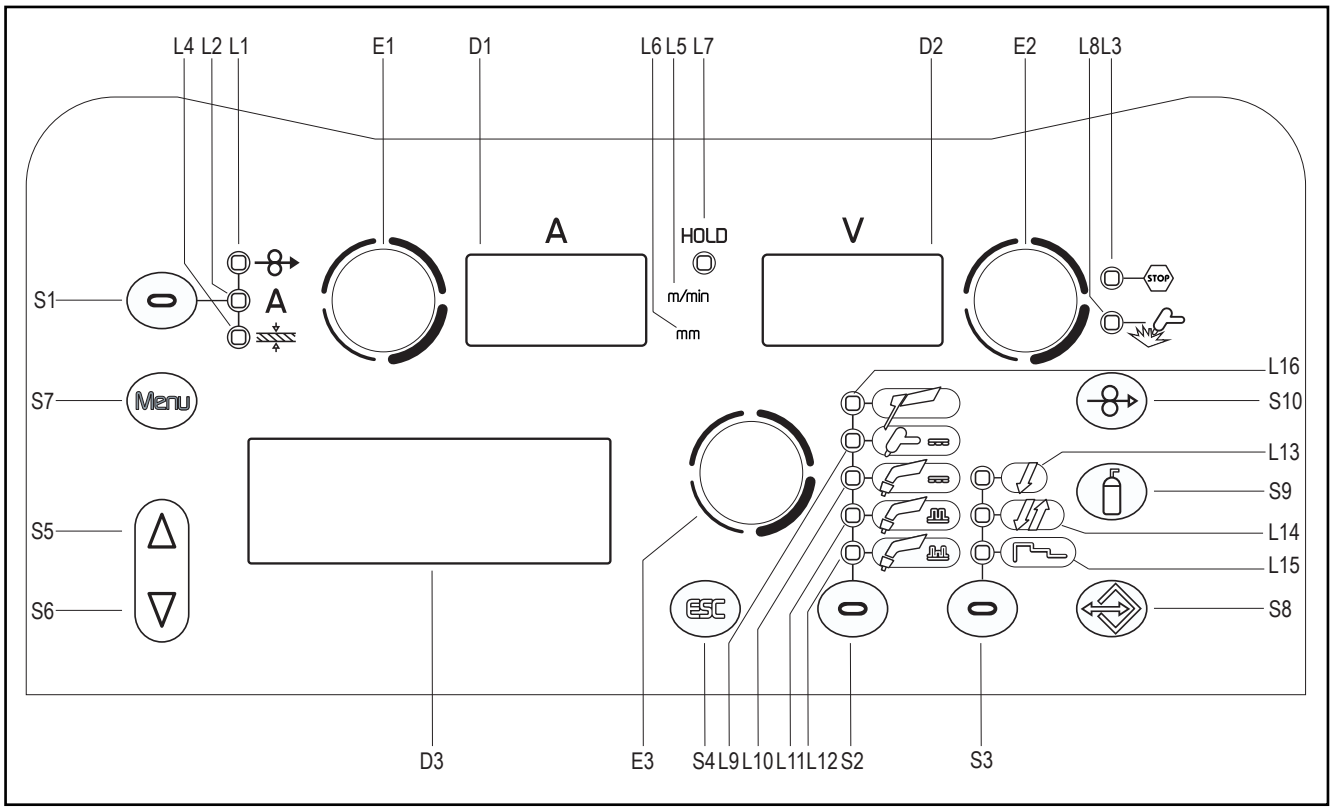
11. Set the welding power source ON/OFF switch to “I” (unit powered).
12. Select the following welding mode on the user interface: DC TIG
13. Press the torch trigger with the torch well clear of any metal parts. This serves to open the gas solenoid valve without striking the welding arc.
14. Use the flow control valve to adjust the flow of gas as required while the gas is flowing out.
15. Set the required welding parameter values on the user interface.

ⓘ When the remote controller [RC] is connected and the relative locking screw is tightened, welding current can be adjusted using the remote controller.

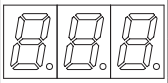
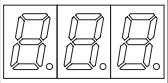
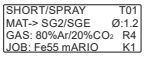
The system is ready to start welding.

FRONT VIEW (polarity for tungsten electrode)	REAR VIEW
	

3 USER INTERFACE



CODE	SYMBOL	DESCRIPTION
L1		illumination shows that the following parameter can be set: WIRE FEED RATE The value appears on the following display: D1
L2	A	**Short-Spray, pulsed and synergic MIG/MAG welding:** illumination shows that the following parameter can be set: WELDING CURRENT **HOLD function (at welding end):** Illuminates to show a value in the following unit of measurement: AMPERES The value appears on the following display: D1
L3	STOP	This LED illuminates to show an anomaly in the operating conditions. An alarm message appears on the following display: D3 ⓘ § "7 ALARM MANAGEMENT"
L4		illumination shows that the following parameter can be set: WELDING THICKNESS The value appears on the following display: D1
L5	mm	Illuminates to show a value in the following unit of measurement: MILLIMETRES Illuminates together with the following LED: The value appears on the following display: D1
L6	m/min	Illuminates to show a value in the following unit of measurement: METRES PER MINUTE Illuminates together with the following LED: The value appears on the following display: D1
L7	HOLD	Illuminates to show the last voltage and current values measured during welding. The LED is switched off when a new welding procedure is started, or when any of the welding settings is changed. The value appears on the display : D1-D2
L8		This LED illuminates to confirm the presence of power on the output sockets.
L9	⎓	This LED illuminates to show that the following welding mode is selected: TIG LIFT

CODE	SYMBOL	DESCRIPTION
L10		This LED illuminates to show that the following welding mode is selected: MANUAL MIG/MAG - SYNERGIC MIG/MAG
L11		This LED illuminates to show that the following welding mode is selected: PULSED SYNERGIC MIG/MAG
L12		This LED illuminates to show that the following welding mode is selected: DOUBLE PULSED SYNERGIC MIG/MAG
L16		This LED illuminates to show that the following welding mode is selected: MMA
L13		Illumination shows that the following function has been activated: 2 stroke procedure ⓘ § "8.1 2T MIG/MAG WELDING" A flashing signal means the following function is activated: 2 stroke procedure ⓘ § "8.2 2T SPOT MIG/MAG WELDING"
L14		Illumination shows that the following function has been activated: 4 stroke procedure ⓘ § "8.3 4T MIG/MAG WELDING" / § "8.4 4T B-LEVEL MIG/MAG WELDING"
L15		Illumination shows that the following function has been activated: 3 levels procedure ⓘ § "8.5 2T - 3 LEVEL MIG/MAG WELDING" / § "8.6 2T SPOT - 3 LEVEL MIG/MAG WELDING" / § "8.7 4T - 3 LEVEL MIG/MAG WELDING" / § "8.8 4T B-LEVEL - 3 LEVEL MIG/MAG WELDING".
D1		**During illumination of the following LEDs:** ⊸ / A / ≋ The display shows the value of the selected parameter.
		Welding: The display shows the effective amperes value during welding.
		HOLD function (at welding end): The display shows the last measured current value.
D2		**Data setting:** The display shows the value, in Volts, of the selected welding voltage.
		Parameters/functions setting (Synergic MIG/MAG welding): The display shows the arc correction value imposed by the operator with respect to the default value of the synergic curve. Arc correction is performed by means of encoder E2. After 3 seconds the display shows the effective volts value during welding.
		Welding: The display shows the effective voltage used when welding.
		HOLD function (at welding end): The display shows the last measured voltage value.
D3		**Data setting:** The display shows the various welding menus relative to the selected processes. The display shows the selected parameter.
S1		**Manual MIG/MAG mode:** The button is not active.
		Synergic MIG/MAG mode: The button cycles through the following LEDs in sequence, selecting only one: ⊸ / A / ≋
S2		This button selects the welding mode.
S3		This button selects the torch trigger procedure. ⓘ § "8 SELECTION OF THE WELDING MODE AND TORCH TRIGGER PROCEDURE"
S4		The button restores the main menu of display D3, starting from any other page. The button serves to exit any menu without saving any changes.
S5		The button scrolls the selection made on the menus upwards or to the right.
S6		The button scrolls the selection made on the menus downwards or to the left.
S7		The button selects the various submenus visible in the following display: D3
S8		**Press and release:**the button opens the JOBs upload menu. **Hold down for 3 seconds:** the button opens the JOBs save and delete menu.
S9		This button opens the gas solenoid valve to fill the circuit and calibrate the flow pressure with the regulator located on the gas cylinder. ⓘ § "6.3 GAS FLOW REGULATION" **GAS menu function:** Hold down the button for 3 seconds to open the menu.

CODE	SYMBOL	DESCRIPTION
S10		This button activates the wire feed to insert it through the MIG/MAG torch.
E1		**Data setting:** The encoder adjusts the main welding (and synergy) parameter, shown on the following display: D1
E2		**Manual MIG/MAG mode:** The encoder adjusts the welding voltage, and the relative value is shown, in volts, on the following display: D2
		Synergic MIG/MAG mode: The encoder is used to correct the factory-set value of the selected synergic curve, the value of which is shown on the following display: D3
E3		The encoder changes the setting of the selected parameter shown on the following display: D3 The selected parameter is shown by the following symbol: ➔.

4 UNIT POWER-UP

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

☞	**MOTOR MICROPULSE 302** **FW: XX.XX.XXX** **PROGRAM UPDATE** **MICRO PULSE 302** **FW: YY.YY.YYY** **WELDING MACHINE OK**	The message will appear on display: D3
	XX.XX.XXX= motor board software version. YY.YY.YYY= pulsed board software version.	

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

- The welding power source sets up for welding with the factory preset values..

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.
- During power-up all functions are inhibited and the following displays remain blank: D1, D2

5 RESET (LOAD FACTORY SETTINGS)

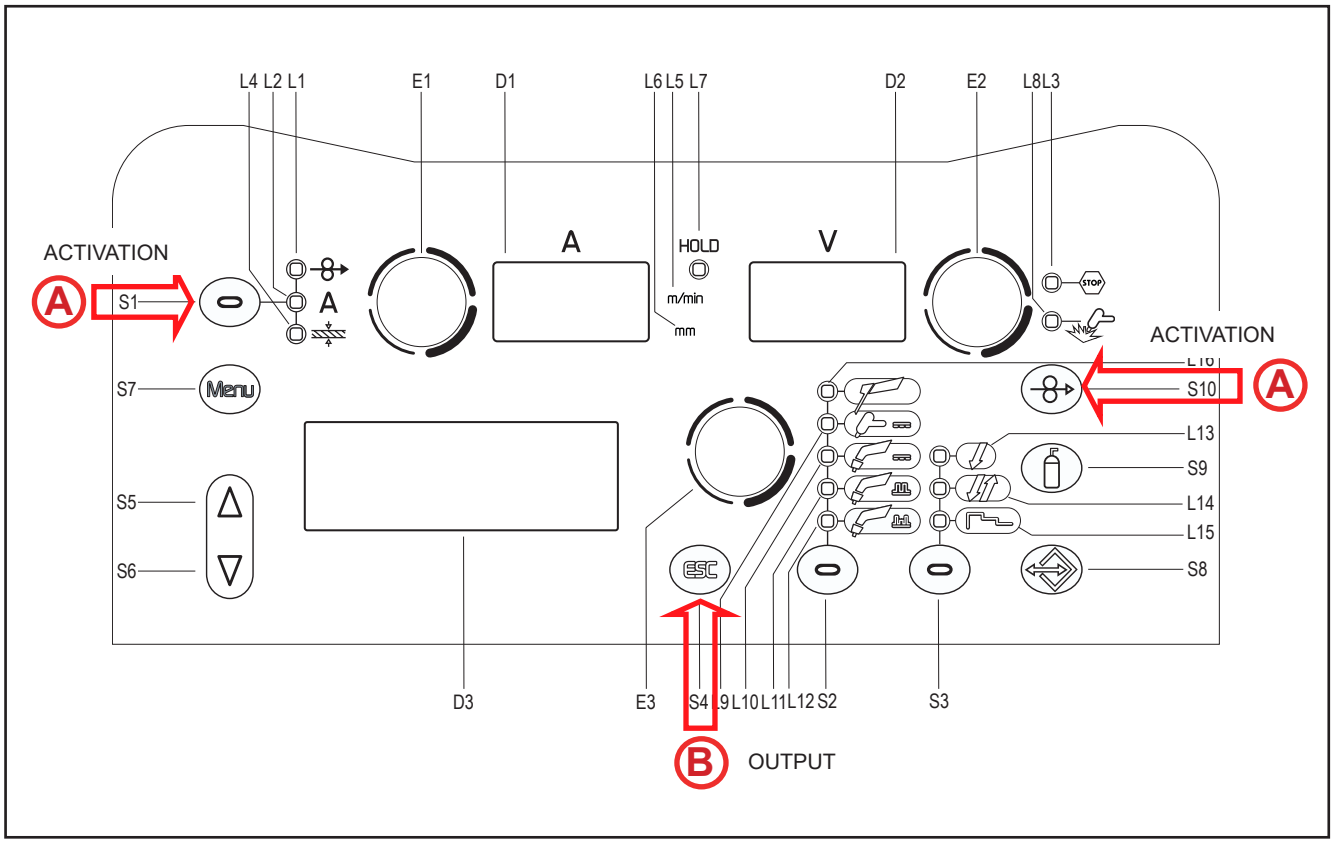
The reset procedure involves complete restoration of the default values, parameters and memory settings set in the factory.
The reset procedure is useful in the following cases:

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

5.1 PARTIAL RESET

The reset procedure involves restoration of the parameter values and settings, except the following settings:

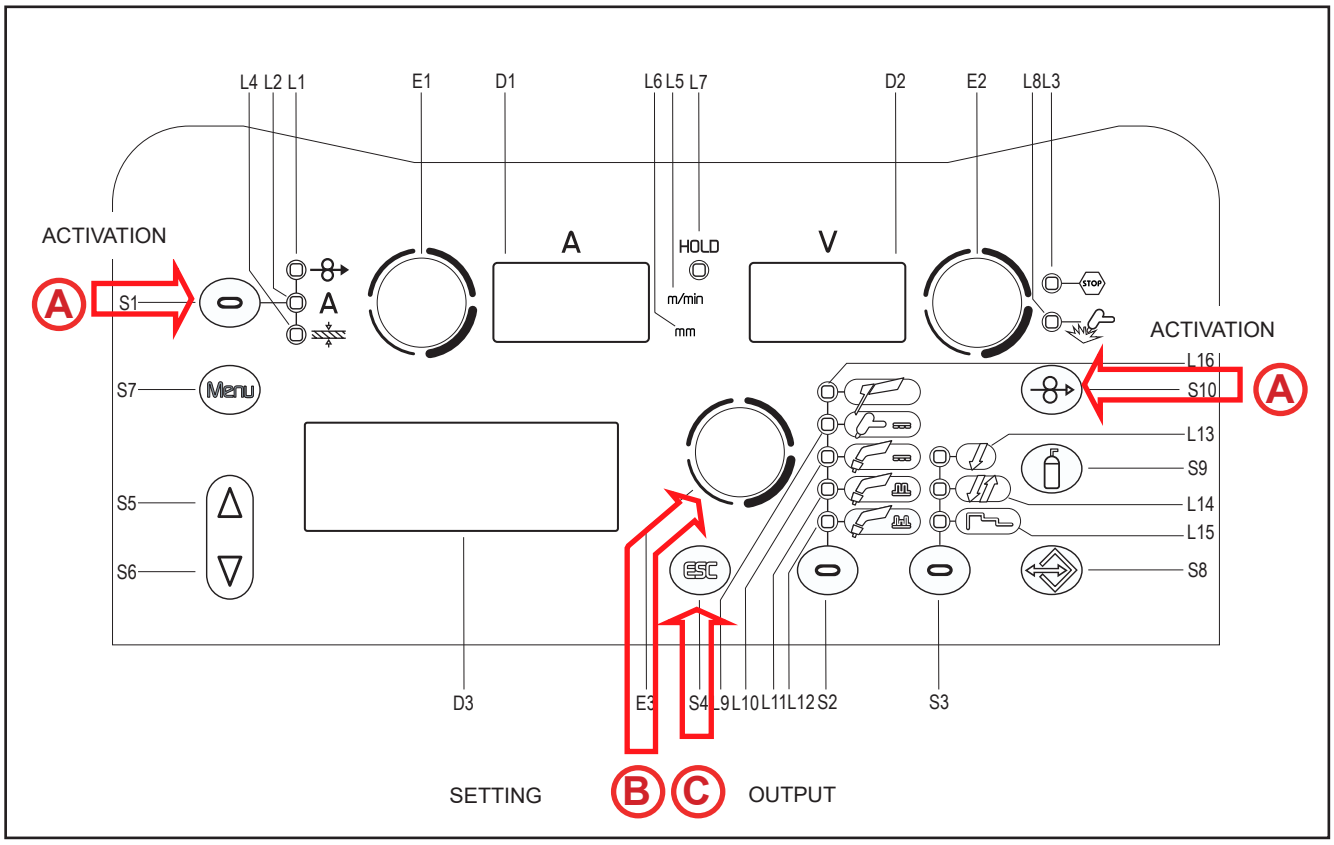
- Settings of the SETUP menu.
- Saved JOBs.
- Set language.



A	○ Set the welding power source ON/OFF switch to “O” to switch the unit off. ○ Set the welding power source ON/OFF switch to “I” to switch on the unit. ○ Simultaneously press the buttons **S1** and **S10** **[This operation must be carried out at the same time as the unit is switched on]** ○ ➲ **PARTIAL RESET SELECT TYPE OF RESET** : The message will appear on display: D3
B	○ **Exit without confirmation** - Set the welding power source ON/OFF switch to “O” to switch the unit off. - Set the welding power source ON/OFF switch to “I” to switch on the unit. ○ **Exit with confirmation** - Press **S4** ESC to save the setting and quit the menu. ➲ The display **D3** will show the message: **MEMORY CLEANING** - Wait for the memory clear procedure to terminate. ➲ The unit restarts with the power-up procedure.

5.2 TOTAL RESET

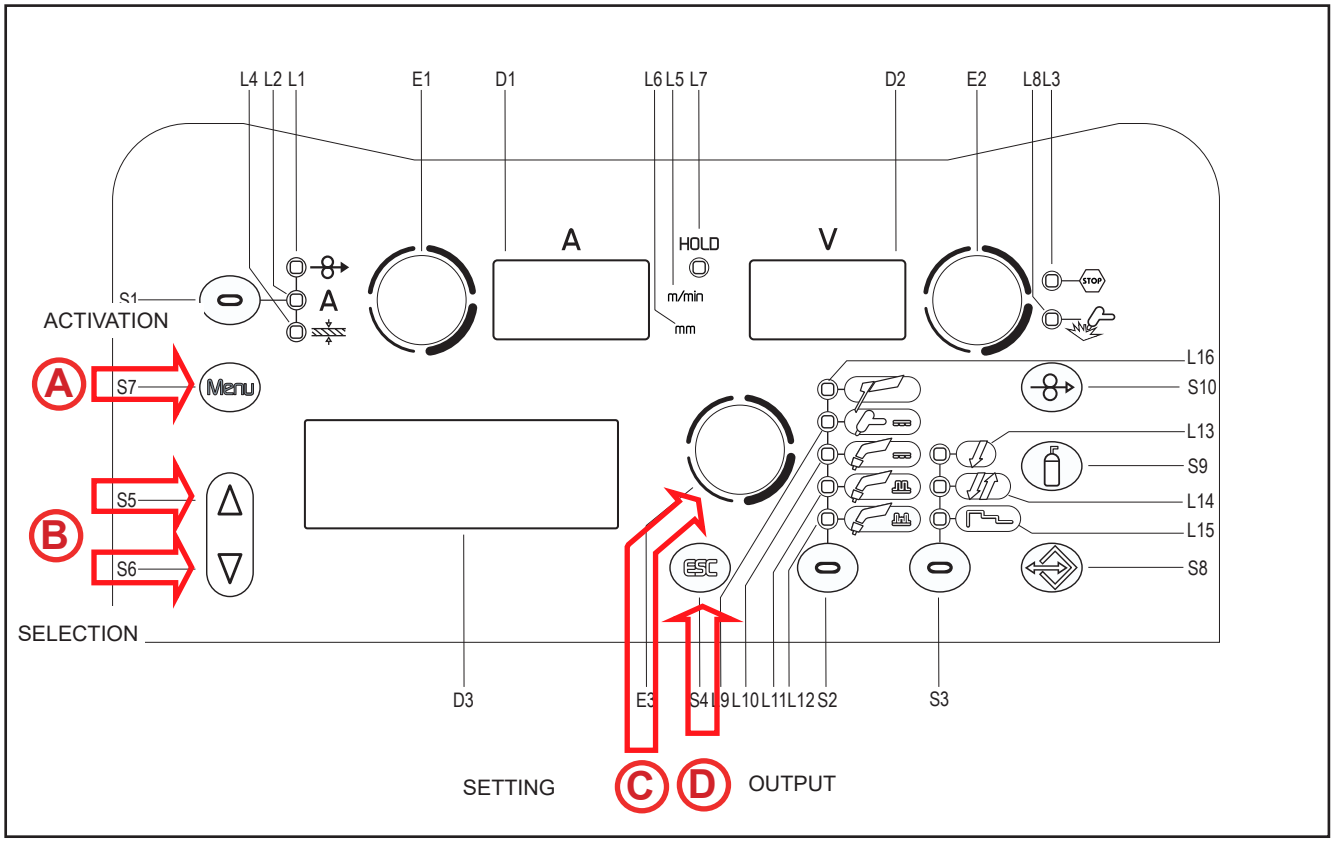
The reset procedure involves complete restoration of the default values, parameters and memory settings set in the factory.
All memory locations will be reset and hence all your personal welding settings will be lost!



A	○ Set the welding power source ON/OFF switch to “O” to switch the unit off. ○ Set the welding power source ON/OFF switch to “I” to switch on the unit. ○ Simultaneously press the buttons **S1** and **S10** **[This operation must be carried out at the same time as the unit is switched on]** ○ ➲ **PARTIAL RESET SELECT TYPE OF RESET** : The message will appear on display: D3
B	○ Use the **encoder E3**, to select the following “**TOTAL RESET** ”.
C	○ **Exit without confirmation** - Set the welding power source ON/OFF switch to “O” to switch the unit off. - Set the welding power source ON/OFF switch to “I” to switch on the unit. ○ **Exit with confirmation** - Press **S4** ESC to save the setting and quit the menu. ➲ The display **D3** will show the message: **MEMORY CLEANING** - Wait for the memory clear procedure to terminate. ➲ The unit restarts with the power-up procedure.

6 SET-UP (INITIAL SET-UP OF THE WELDING POWER SOURCE)

☞	With locked status active it is not possible to access this function.
	ⓘ § "6.2 LOCKING PROCEDURE".



Ⓐ	**SET UP at machine power on** ○ Set the welding power source ON/OFF switch to “O” to switch the unit off. ○ Set the welding power source ON/OFF switch to “I” to switch on the unit. ○ Press and hold down the button **S7** (Menu) **[** ☞ **This operation must be carried out at the same time as the unit is switched on]** ➲ **SET UP X/Y** : The message will appear for a few seconds on display **D3**. - X = number of the currently displayed menu page. - Y = total number of menu pages.
Ⓑ	○ Press buttons **S5** (△) and **S6** (▽) to scroll down the list of settings to edit. - Activation of the ADJUSTMENTS BLOCK calls for a specific procedure. - ⓘ § "6.2 LOCKING PROCEDURE"
Ⓒ	○ Using the **encoder E3**, edit the value of the selected setting.
Ⓓ	○ Press **S4** (ESC) to save the setting and quit the menu. - The unit restarts with the power-up procedure..

NOTE: During the normal operation, the operator can enter the SET UP menu by pressing the button **S7** (Menu) for 5 seconds (SET UP can therefore be accessed with machine on).

Tab. 1 - Setup Settings

MENU PAGE	SETTING	MIN	DEFAULT	MAX	NOTES	
SET UP 1/8	SELECT LANGUAGE				ENGLISH, ITALIANO, FRANÇAIS, DEUTSCH, ESPAÑOL, PORTUGUES, DUTCH, CESKY, SRBSKI, POLSKI, SUOMI	
SET UP 2/8	COOLING TYPE	ON	OFF	AUTO		
SET UP 3/8	DISPLAY CONTRAST	0 %	50 %	100 %		
SET UP 4/8	CONTROL TYPE	OFF	OFF	RC08	OFF	No control
					RC03	n°1 potentiometer
					RC04	n°2 potentiometers
					RC05	n°1 UP/DOWN
					RC06	n°2 UP/DOWN
					RC08	
SET UP 5/8	LOCK STATUS	OFF	OFF	LOCK 3	OFF	All adjustments enabled.
					LOCK 1	All adjustments are disabled with the exceptions shown in "Tab. 2 - Functions not disabled by Locks".
					LOCK 2	
					LOCK 3	
SET UP 6/8	ARC CORRECTION	VOLTS	VOLTS	m/min		
SET UP 7/8	PUSH-PULL	OFF	OFF	ON		
SET UP 8/8	HOUR COUNTER	0.0 h	0.0 h	0.0 h		

COOLING TYPE

- ON= The cooler is always running when the power source is switched on. This mode is preferable for heavy duty and automatic welding procedures.
- OFF= The cooler is always disabled because an air-cooled torch is in use.
- AUT= When the unit is switched on the cooler is switched on for 15 s. During welding procedures the cooler runs constantly. When welding is terminated the cooler continues to run for 90 s plus a number of seconds equivalent to the average current value shown using the HOLD function.

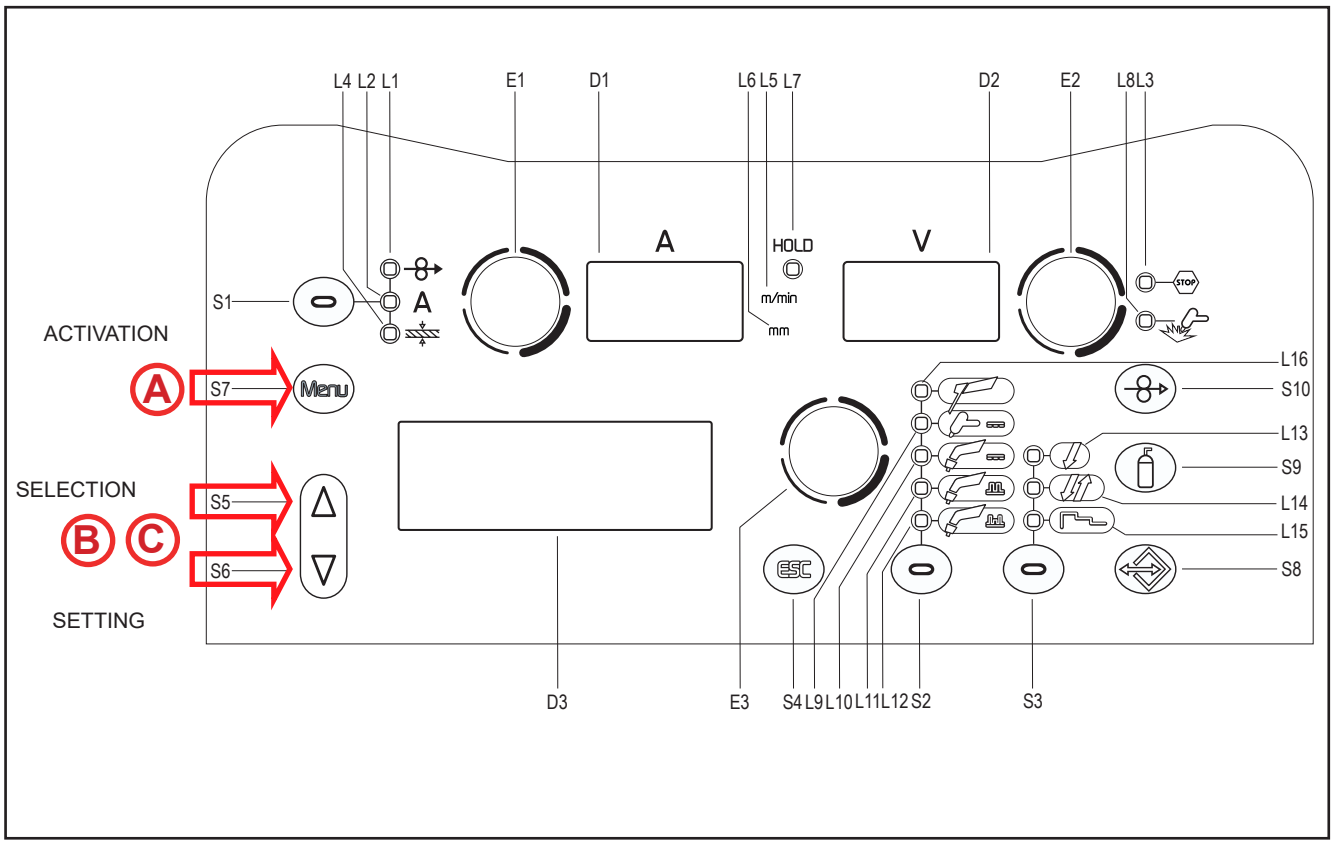
6.1 OPERATING HOUR COUNTER

The menu page shows the processing hour counters.

- **POWER ON** = Total number of hours the machine has been on (mains powered).
- **T.ARC ON** = Total number of hours of welding arc on.
- **P.ARC ON** = Partial number of hours of welding arc on.

SET UP	**8/8**
POWER ON	**7.2 h**
T. ARC. ON	**5.3 h**
P. ARC ON	**0.7 h**

The reading is carried out as follows: 7 hours and (0.2x60) 12 minutes.



A	**Partial count reset** ○ Press and hold down the button **S7** (Menu) for 3 seconds (SET UP with machine on).
B	○ Press buttons **S5** (△) and **S6** (▽) to select line "**SET UP 8/8**".
C	○ Simultaneously hold down buttons **S5** (△) and **S6** (▽) for 3 seconds. ➲ The value **P.ARC ON** will be taken to 0.0 h

CONTROL TYPE

- OFF= No remote controller enabled.

- RC03= The unit is enabled to receive commands from a remote control equipped with 1 potentiometer.
- RC04= The unit is enabled to receive commands from a remote control equipped with 2 potentiometers.
- RC05= The unit is enabled to receive commands from a remote control equipped with 1 UP/DOWN lever.
- RC06= The unit is enabled to receive commands from a remote control equipped with 2 UP/DOWN levers.

Remote controllers are used in the MIG/MAG, MMA e TIG LIFT DC processes.

LOCK STATUS

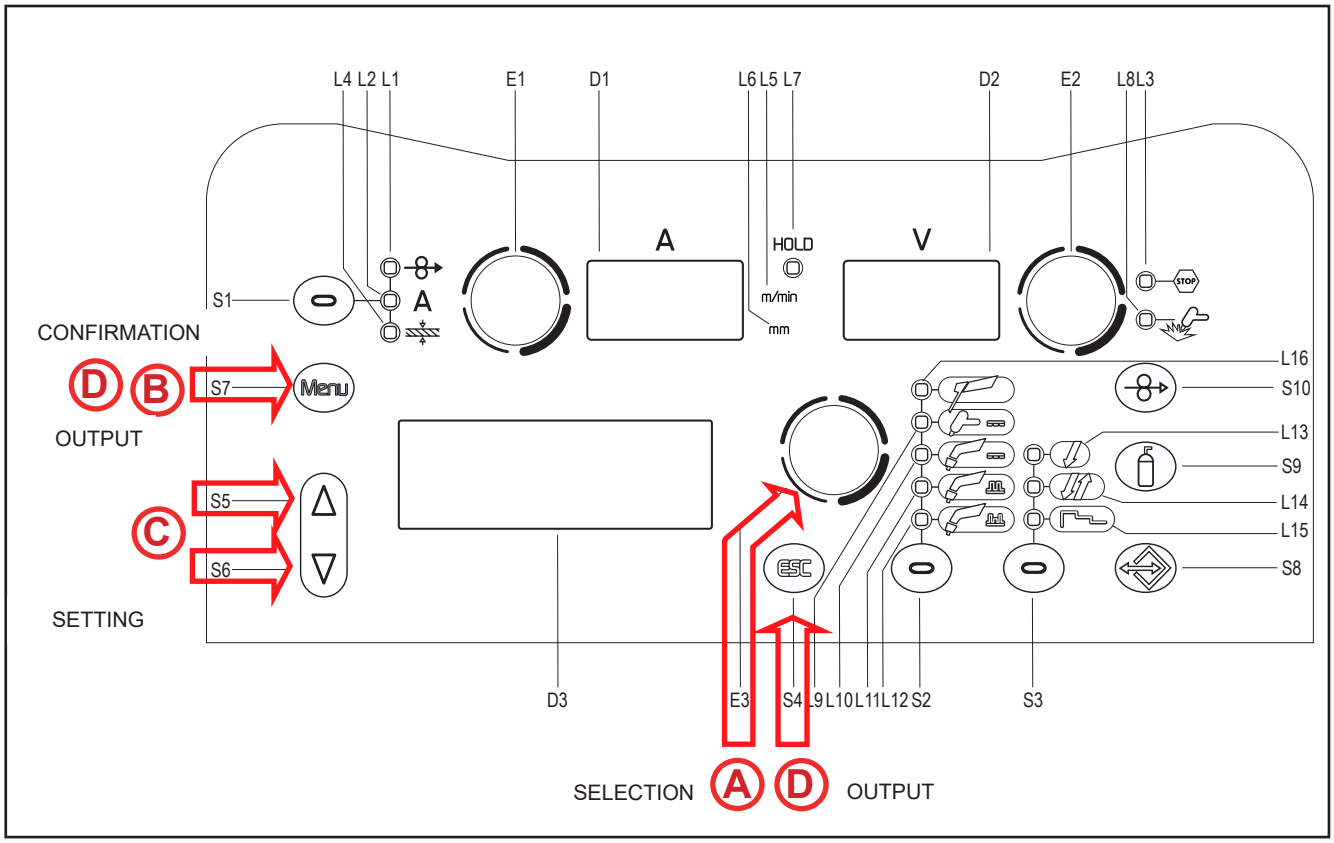
- OFF= All adjustments enabled.
- All adjustments are disabled with the exceptions shown in Table 2 page 17.

6.2 LOCKING PROCEDURE

The procedure inhibits unit adjustments, allowing the user to modify only certain settings depending on the selected lock status. The procedure is used to prevent accidental alteration of the unit settings and welding settings by the operator.

Enabling

○ If no locking status is selected (LOCK STATUS = OFF) and if you wish to set up a limitation on use of the welding power source, display page 5/8 of the SETUP menu.



A	○ Use the **encoder E3** to select the required lock status.

Ⓑ	○ Press the **S7** (Menu) button to confirm. ➲ **ENTER PASSWORD: 0000 -** The message will appear on display: **D3** - ⓘ Default password: 0000
Ⓒ	○ Enter a 4 digit numerical password. ○ Use buttons **S5** (△) and **S6** (▽) to select the digit to be changed. ➲ The selected digit will flash **.** ○ Use **encoder E3** to set up the value.
Ⓓ	○ **Exit without confirmation** - Press the **S4** button (ESC). ➲ This action will automatically close the menu ○ **Exit with confirmation** - Press the **S7** button. (Menu) ➲ The unit restarts with the power-up procedure. ⓘ **The password becomes active. Make a note of the password you set!**

Tab. 2 - Functions not disabled by Locks

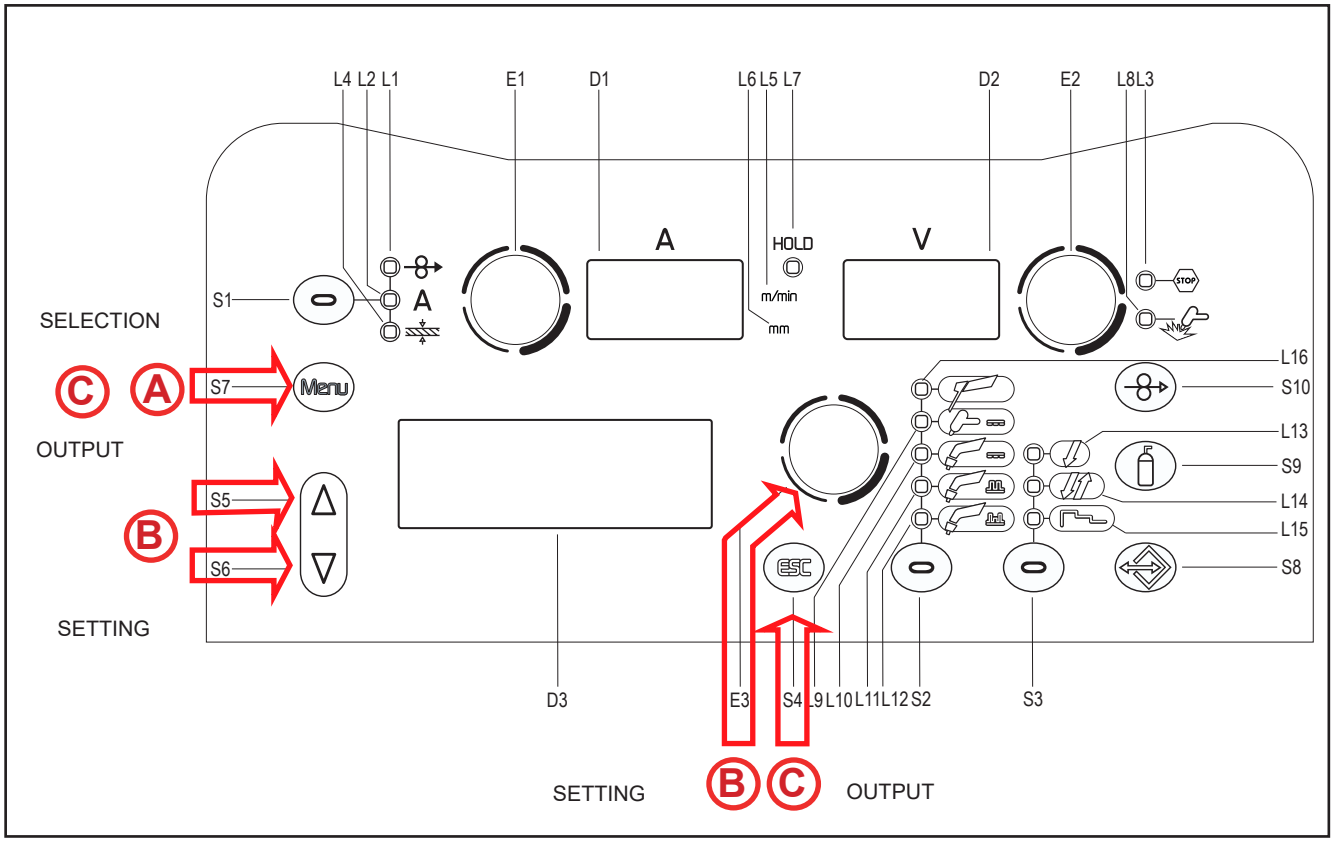
	TYPE OF REMOTE CONTROL				
LOCK	**USER INTERFACE/RC08**	**RC03**	**RC04**	**RC05**	**RC06**
OFF	All adjustments enabled.	All adjustments enabled.	All adjustments enabled.	All adjustments enabled.	All adjustments enabled.
1	Selection of torch trigger procedure (button **S7**) Display of main welding parameters (button **S1**) Arc correction (encoder **E2**) Wire insertion (button **S10**) Gas test (button **S9**)		Arc correction (Potentiometer Pot2)		Arc correction (UP/DOWN lever 2)
2	Selection of torch trigger procedure (button **S7**) Display of main welding parameters (button **S1**) Arc correction (encoder **E2**) Sinergy (encoder **E1**) Wire insertion (button **S10**) Gas test (button **S9**)	All adjustments enabled.	All adjustments enabled.	All adjustments enabled.	All adjustments enabled.
3 (*1)	Selection of torch trigger procedure (button **S7**) Display of main welding parameters (button **S1**) Arc correction (encoder **E2**) Wire insertion (button **S10**) Gas test (button **S9**)			Scroll JOBS (UP/DOWN lever 1)	Scroll JOBS (UP/DOWN lever 1)

*1: The LOCK 3 setting becomes active only when a JOB is loaded. When no JOB is loaded, the user interface is completely unlocked.

Disabling

If a lock status is selected, you can only edit parameters permitted by the currently active lock status. If you cannot recall the password the only way to exit lock status is to perform the welding power source RESET procedure.

NOTE: The welding power source must be on and set up for welding.



A	○ Press and hold down the button **S7** (Menu) for 5 second. ➲ The SET UP menu will be accessed, with the machine on. ➲ **LOCK...WRITE PASSWORD : 0000 -** The message will appear on display: **D3** ○ Enter the active 4 digit numerical password.
B	○ Use buttons **S5** (△) and **S6** (▽) to select the digit to be changed. ➲ The selected digit will flash.. ○ Use **encoder E3** to set up the value.
C	○ **Exit without confirmation** - Press the **S4** button (ESC). ➲ This action will automatically close the menu ○ **Exit with confirmation** - Press the **S7** button. (Menu) ➲ The unit restarts with the power-up procedure. Quit lock status.

6.3 GAS FLOW REGULATION

When the unit is powered on, the solenoid valve is enabled for 1 second.
This fills the gas circuit.

- Open the gas solenoid valve by pressing and releasing button **S9**.
- Adjust the pressure of the gas flowing from the torch by means of the flow meter connected to the gas cylinder.
- Close the gas solenoid valve by pressing and releasing the button **S9**.
- The solenoid valve is automatically closed after 30 seconds.

6.4 TORCH LOADING

WARNING!

Make sure the torch in use is correctly sized in relation to the welding current required and for the available and selected cooling type. This prevents the risk of burns to which the operator is potentially exposed, potential faults, and irreversible damage to the torch and the system.
If a torch is installed or replaced while the unit is running, the circuit of the newly installed must be filled with coolant to avoid the risk of damage to the torch in the case of high voltage arc strikes without any liquid in the circuit.

Power-up with operation of the cooler set to "ON" or "AUTO" mode
A check is performed automatically of the presence of liquid in the cooling circuit and the cooler is switched on for 30 seconds.
If the coolant circuit is full, the power source sets up in the most recent stable welding configuration.
If the coolant circuit is not full, all functions are inhibited and there will be no output power present.

➲ **CHECK COOLING UNIT -** The message will appear in display: **D3**

- Press button **S4** ESC or torch trigger to repeat the checking procedure for an additional 30 seconds.
  - If the problem persists rectify the cause of the alarm.
  - During this checking operation, the setup menu can be accessed by pressing button **S7** Menu for 5 seconds.

Power-up with operation of the cooler set to "OFF"
➲ Operation of the cooler and the cooler alarm are disabled.
➲ Welding is performed without liquid cooling of the torch.

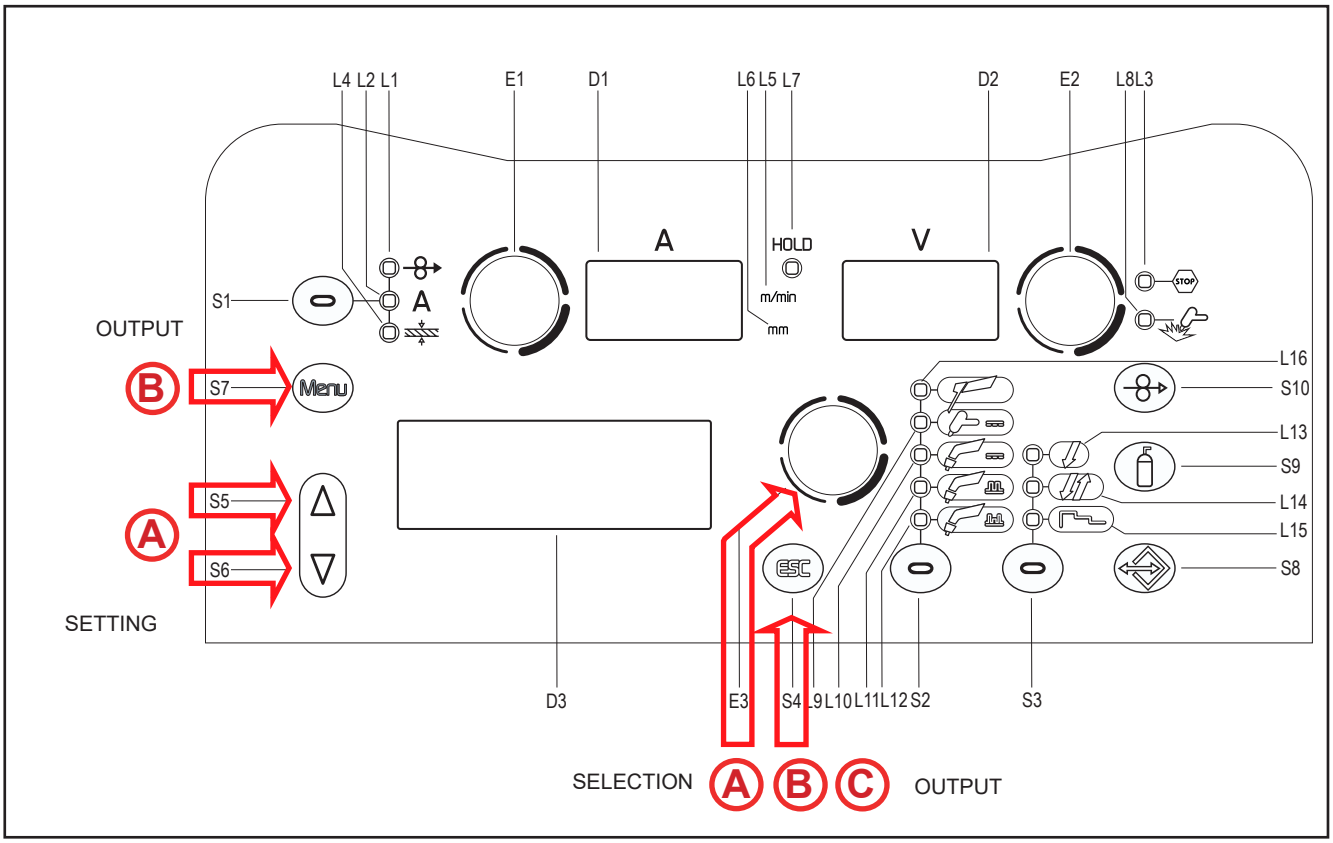
Torch change-over with operation of the cooler set to "AUTO"
Press and release the torch trigger.
➲ This serves to start the cooler for 80 seconds to fill the torch cooling circuit.

6.5 WELDING CIRCUIT CALIBRATION

When the wire feeder is used with its cable harness, the welding circuit “r” resistance can be measured by using the calibration function. This allows to achieve a consistent welding quality when the cable harness length and the torch is changed. The welding circuit resistance depends on the cable bundle and the torch used, therefore the calibration procedure must be repeated when these components are changed.

CALIBRATION after power source RESET
If the power source total RESET is carried out, the calibration value will be replaced by the default value.
If a partial RESET is carried out, the measured value will be stored.
Calibration is not compulsory therefore, should the user decide not to carry it out, the machine will keep the default value.

CALIBRATION PROCEDURE



The power source must be on and not set up for welding.
The power source remote control must be enabled.

A	○ Press and hold down for 3 seconds buttons **S5** △ and **S6** ▽ . ➲ **TOUCH THE WORKPIECE WITH THE GUIDE WIRE TIP AND PRESS THE TORCH TRIGGER-** The message will appear on display: **D3** ➲ **CAL -** The message will appear on display: **D1** ➲ Display D2 will show the welding circuit resistance value (mΩ) measured during the last calibration. After a total RESET, the default value will appear.

Remove the gas nozzle from the torch and lean the guide wire tip (without the wire) onto the surface

of the workpiece, making sure it sticks well; check that the contact between the guide wire tip and the workpiece is on a clean area of the piece's surface. Press the torch trigger to perform the calibration.

Calibration carried out correctly

Ⓑ	➲ **CALIBRATION SUCCESSFULLY COMPLETED -** The message will appear on display: **D3.** ➲ The calibration value appears on display : **D2**. You can make several subsequent calibrations by pressing and releasing the torch trigger. In this case the last value revealed is memorized. ○ **Exiting without saving** - Press the **S4** button (ESC). ○ **Exit and save** - Press the **S7** button. (Menu)

Calibration carried out incorrectly

Ⓒ	➲ **CAL. Err. -** The message will appear on display: **D1 - D2.** ➲ **REPEAT THE MEASUREMENT** The message will appear on display: **D3**. Press the torch trigger to perform the calibration. ○ **Exiting without saving** - Press the **S4** button (ESC).

7 ALARM MANAGEMENT

(STOP) This LED illuminates if an incorrect operating condition occurs.
➲ An alarm message will appear on display **D3.**

Tab. 3 - Alarm messages

MESSAGE	MEANING	EVENT	CHECKS
WARNING POWER SOURCE	**Overheating alarm** Indicates tripping of the welding power source thermal protection. Leave the equipment running so that the overheated components cool as rapidly as possible. When the problem is solved, the power source will be automatically reset.	All functions disabled. Exceptions: • cooling fan. • cooler (if switched on).	• Make sure that the power required by the welding process is lower than the maximum rated power output. • Check that the operating conditions are in compliance with the welding power source data plate specifications. • Check for the presence of adequate air circulation around the welding power source.
	Phase missing alarm Indicates the absence of a phase in the power supply line. The message appears at the same time as the mains protection activation LED switches on.	All functions disabled. Exceptions: • cooling fan. • cooler (if switched on).	• Check if the equipment power supply line has all the phases. • If the problem persists, qualified technical staff must be called out to carry out the repairs/maintenance operations.

MESSAGE	MEANING	EVENT	CHECKS
WARNING NO COMMUNICATION	Indicates the presence of problems in data communication between the power source and wire feeder. When the unit has cooled, the welding power source will reset automatically. Exit the alarm state by performing one of the following actions: • Switch the power source off.	All functions disabled. Exceptions: • cooling fan. • cooler (if switched on).	• Qualified technical personnel are required for repair/ maintenance jobs.
TORCH TRIGGER ALARM	Indicates that, when the wire feeder was powered on, a short circuit was detected on the torch trigger input. When the problem is solved, the power source will be automatically reset.	All functions disabled.	• Make sure the torch trigger is not pressed, jammed, or short circuiting. • Make sure the torch and MIG/MAG torch connector are intact.
WARNING COOLING SYSTEM	Indicates insufficient pressure in the torch cooling circuit. To exit the alarm condition and perform an operating check of the cooling unit press the following button: (ESC)	All functions are disabled. Exceptions: • cooling fan.	• Check that the connection to the cooling unit is correct. • Check that the O/I switch is set to "I" and that it illuminates when the pump is running. • Check that the cooling unit is filled with coolant. • Check that the cooling circuit is intact, notably the torch hoses and the internal connections of the cooling unit.
WARNING PROTECTION CURRENT	Indicates that the welding power source current surge protector has tripped. Exit the alarm state by performing one of the following actions: • Switch the power source off. • Press the following button: (ESC)	All functions are disabled. Exceptions: • cooling fan. • cooler (if switched on).	• Check that the programmed arc voltage value is not too high in relation to the thickness of the work to be welded.

8 SELECTION OF THE WELDING MODE AND TORCH TRIGGER PROCEDURE

Depending on the welding mode selected, specific torch trigger procedures are available. Certain procedures are available only after specific parameters or functions have been enabled or set through the associated menus.
The table shows the settings to be made to enable each procedure.

KEY
2T: 2 STROKE LIFT-ARC
2T/3L: 3 LEVEL 2 STROKE
2T SPOT: 2 STROKE SPOT
2T SPOT/3L: 3 LEVEL 2 STROKE SPOT
4T/3L: 3 LEVEL 4 STROKE
4T B-L/3L: 3 LEVEL 4 STROKE B-LEVEL
4T: 4 STROKE LIFT-ARC
4T B-L: 4 STROKE B-LEVEL
✓: Always available.
1: The procedure is active when the “SPOT TIME” parameter is set to a value other than “OFF”.
2: The procedure is active when the “B-LEVEL” parameter is set to a value other than “OFF”.

Tab. 4 - Torch trigger procedure selection

	PROCEDURE							
MODE	**2T**	**2T SPOT**	**4T**	**4T B-L**	**2T/3L**	**2T SPOT/3L**	**4T/3L**	**4T B-L/3L**
MMA								
CONTINUOUS DC TIG	✓		✓					
MANUAL MIG/MAG	✓	1	✓					
SYNERGIC MIG/MAG	✓	1	✓	2	✓	2	✓	2
PULSED SYNERGIC MIG/MAG	✓	1	✓	2	✓	2	✓	2
DOUBLE PULSED SYNERGIC MIG/MAG	✓	1	✓	2	✓	2	✓	2

8.1 2T MIG/MAG WELDING

1. Bring the torch up to the workpiece to be welded.
2. Press (1T) and keep the torch trigger pressed.

➲ The wire advances at the approach speed until making contact with the material. If the arc does not strike after 10 cm wire protrusion, wire feeding is locked and the welding unit outputs are de-energized.
The arc strikes and the wire feeder accelerates to the set feed rate value.

3. Release (2T) trigger to start the weld completion procedure.

➲ Gas flow continues for the time set in the post gas parameter (adjustable time).

8.2 2T SPOT MIG/MAG WELDING

1. Bring the torch up to the workpiece to be welded.
2. Press (1T) and keep the torch trigger pressed.

➲ The wire advances at the approach speed until making contact with the material. If the arc does not strike after 10 cm wire protrusion, wire feeding is locked and the welding unit outputs are de-energized.
The arc strikes and the wire feeder accelerates to the set feed rate value.
The welding procedure continues, at the preset current, for the time set with the spot time parameter.
The welding completion procedure starts.
The arc is extinguished.
Gas flow continues for the time set in the post gas parameter (adjustable time).

8.3 4T MIG/MAG WELDING

1. Bring the torch up to the workpiece to be welded.
2. Press (1T) and release (2T) the torch trigger.

➲ The wire advances at the approach speed until making contact with the material. If the arc does not strike after 10 cm wire protrusion, wire feeding is locked and the welding unit outputs are de-energized.
The arc strikes and the wire feeder accelerates to the set feed rate value.

3. Press (3T) the trigger to start the weld completion procedure.

➲ Gas flow continues until the torch trigger is released.

4. Release (4T) torch trigger to start the post gas procedure (adjustable time).

8.4 4T B-LEVEL MIG/MAG WELDING

1. Bring the torch up to the workpiece to be welded.
2. Press (1T) and release (2T) the torch trigger.

➲ The wire advances at the approach speed until making contact with the material. If the arc does not strike after 10 cm wire protrusion, wire feeding is locked and the welding unit outputs are de-energized.
The arc strikes and the wire feeder accelerates to the set feed rate value.
During normal speed welding, press and immediately release the torch trigger to switch to the second welding current.

ⓘ The trigger must not be pressed for more than 0.3 seconds; otherwise, the weld completion stage will start.
When the trigger is pressed and released immediately, the system returns to the welding current.

3. Press (3S) trigger and keep it pressed to start the weld completion procedure.

➲ Gas flow continues until the torch trigger is released.

4. Release (4T) torch trigger to start the post gas procedure (adjustable time).

8.5 2T - 3 LEVEL MIG/MAG WELDING

1. Bring the torch up to the workpiece to be welded.
2. Press (1T) torch trigger.

➲ The wire advances at the approach speed until making contact with the material. If the arc does not strike after 10 cm wire protrusion, wire feeding is locked and the welding unit outputs are de-energized.
The welding arc strikes and the wire feed rate changes to the first welding level (hot start), which is set as a percentage of the normal welding feed rate.

ⓘ This first level is used to create the weld pool: for example, when welding aluminium a value of 130 % is recommended.
The hot start level continues for the start time, which is settable in seconds; then switch to normal welding speed is performed in accordance with the start slope, which can be set in seconds.

3. Release (2S) the torch trigger to switch to the third welding level (crater filler), which is set as a percentage of the normal welding feed rate.

ⓘ The switch of welding current level in terms of crater filling is performed in accordance with the crater slope, which can be set in seconds.
This third level is used to complete the weld and fill the final crater (crater filler) in the weld pool: for example, when welding aluminium a value of 80 % is recommended.

4. The crater filler level continues for the crater time, which is settable in seconds; at the end of this time welding is interrupted and the post gas stage is performed.

8.6 2T SPOT - 3 LEVEL MIG/MAG WELDING

The welding process is the same as the CRATER 2S process, except that the welding procedure continues, at the preset current, for the time set with the spot time parameter.
The weld is closed in the same way as with the 2T - 3 LEVELS process.

8.7 4T - 3 LEVEL MIG/MAG WELDING

1. Bring the torch up to the workpiece to be welded.
2. Press (1T) torch trigger.

➲ The wire advances at the approach speed until making contact with the material. If the arc does not strike after 10 cm wire protrusion, wire feeding is locked and the welding unit outputs are de-energized.
The welding arc strikes and the wire feed rate changes to the first welding level (hot start), which is set as a percentage of the normal welding feed rate.

ⓘ This first level is used to create the weld pool: for example, when welding aluminium a value of 130 % is recommended.

3. Release (2S) trigger to switch to normal welding speed; then switch to normal welding speed is performed in accordance with the start slope, which can be set in seconds.
4. Press the torch trigger again (3T) to switch to the third welding level (crater filling), which is set as a percentage of the normal welding feed rate.

ⓘ The switch of welding current level in terms of crater filling is performed in accordance with the crater slope, which can be set in seconds.
This third level is used to complete the weld and fill the final crater (crater filler) in the weld pool: for example, when welding aluminium a value of 80 % is recommended.

5. Release the torch trigger a second time (4T) to close the weld and run the post gas procedure.

8.8 4T B-LEVEL - 3 LEVEL MIG/MAG WELDING

ⓘ The welding process is the same as the 4T - 3 LEVELS process except that during normal speed welding pressing and immediately releasing the torch trigger switches the unit to the second welding current.
The trigger must not be pressed for more than 0.3 seconds; otherwise, the weld completion stage will start.
When the trigger is pressed and released immediately, the system returns to the welding current.

1. Press (3T) and keep it pressed to start the crater filling procedure.

ⓘ The weld is closed in the same way as with the 4T - 3 LEVELS process.

9 PARAMETERS ACTIVATION

The welding parameters are available in accordance with the selected welding mode and procedure. Certain parameters are available only after other parameters or functions of the unit have been enabled or set.
The table shows the settings required to enable each parameter.

✓ : always available
1: Available selecting one of the "PF" curves (e.g.: SG2/SG3 **PF**)
2: Available selecting one of the "PR" curves (e.g.: SG2/SG3 **PR**)

Tab. 5 - Parameters activation

MENU ↓	MODE →											
	PROCEDURE →											
	PARAMETER ↓											
-	Arc correction in Volts			✓	✓	✓	✓	✓	✓	✓	✓	✓
-	Arc correction in metres per minute			✓	✓	✓	✓	✓	✓	✓	✓	✓
-	Arc correction with Power Root			2	2	2						
1st	INDUCTANCE	✓	✓									
2nd	INDUCTANCE			✓	✓	✓						
2nd	PR Start			2	2	2						
2nd	Arc Set						✓	✓	✓	✓	✓	✓
2nd	Pre Gas	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
2nd	Soft Start	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
2nd	Burn back	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
2nd	Post gas	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
2nd	Power focus			1	1	1						
2nd	Spot time	✓		✓			✓			✓		
2nd	B-level				✓	✓		✓	✓		✓	✓
2nd	Start 3lev					✓			✓			✓
2nd	Start time					✓			✓			✓
2nd	Crater 3lev					✓			✓			✓
2nd	Slope 3lev 1					✓			✓			✓
2nd	Slope 3lev 2					✓			✓			✓
2nd	Crater time					✓			✓			✓
2nd	Freq 2puls									✓	✓	✓
2nd	Range 2puls									✓	✓	✓
2nd	Cycle 2puls									✓	✓	✓
2°	Arc2 2puls									✓	✓	✓

9.1 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.
- - 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.

• VRD
- ○ This parameter reduces the potential across the welding sockets when welding is not in progress.
  The arc strike procedure is as follows:
  - Touch the workpiece with the electrode tip.
  - Raise the electrode.
  Power is released for several seconds.
  - Touch the workpiece with the electrode tip.
  The welding arc will strike.

• DOWN SLOPE
- ○ Time during which the current changes from the welding value to the end value by means of a slope.

• I FINAL
- ○ During electrode welding the parameter makes it possible to obtain a uniform deposit of filler material from the start to the end of the welding process, closing the deposition crater with a current such as to deposit a final droplet of filler material. By keeping the torch trigger pressed during the 3rd stroke, the crater filler current is maintained thereby ensuring optimal crater filling, until the post gas time is started by releasing the torch trigger (4th stroke).

• ARC CORRECTION IN VOLTS
- ○ This parameter corrects the synergic voltage value relative to the synergic point of the synergic and pulsed MIG/MAG processes, while it manages the correction of the voltage of the high value in the MIG/MAG double pulse process.
- ○ The default value for horizontal and frontal welding is 0.0 V.

- *NOTE: A value >0 produces an increase in the length of the welding arc, while a value <0 produces a shorter arc.*

• ARC CORRECTION IN METRES PER MINUTE

○ This parameter corrects the wire feed rate synergic value relative to the synergic point of the synergic and pulsed MIG/MAG processes, while it manages the wire feed rate of the high value in the MIG/MAG double pulsed process.
○ The default value for horizontal and frontal welding is 0.0 V.
- *NOTE: A value <0 produces an increase in the length of the welding arc, while a value >0 produces a shorter arc.*

• ARC CORRECTION WITH POWER ROOT

○ The parameter corrects the arc dynamics in the POWER ROOT process.
○ The default value is 0.
- *NOTE: Values >0 produce a «softer» weld, while values <0 produce a «harder» weld.*

• INDUCTANCE (MIG/MAG manual welding)

- *Consequences of a higher value:*
  - "Softer" welding.
  - Less spatter.
  - Less positive starting.
- *Consequences of a lower value:*
  - "Harder" welding.
  - More spatter.
  - More reliable starting.

• INDUCTANCE

○ The value SYN=100 denotes the optimal synergic inductance value chosen by the manufacturer.
○ IMPORTANT NOTE: This inductance value does not correspond to the equivalent number set in manual MIG/MAG welding.
- *Consequences of a higher value:*
  - "Softer" welding.
  - Less spatter.
  - Less positive starting.
- *Consequences of a lower value:*
  - "Harder" welding.
  - More spatter.
  - More reliable starting.

• PR START

○ The value SYN=100 denotes the optimal synergic inductance value chosen by the manufacturer.
○ IMPORTANT NOTE: This inductance value corresponds to start-up with the POWER ROOT curves.
- *Consequences of a higher value:*
  - Less positive starting.
- *Consequences of a lower value:*
  - More reliable starting.

• ARC SET

○ In pulsed synergic welding this parameter directly influences the size of the welding pulses.
○ The value SYN=100 denotes the optimal synergic value chosen by the manufacturer.

- *IMPORTANT NOTE: This parameter should be adjusted as little as possible. To correct synergy it is advisable to use arc correction by means of the voltage parameter. This parameter can be useful if the material or gas used is different from that of the synergic curve.*
  - If you set a value other than SYN, this value is stored and fixed.
- *Consequences of a higher value:*
  - Hotter welding.
- *Consequences of a lower value:*
  - Cooler welding.

• PRE GAS
- Time of gas delivery before the arc strike.
- *CAUTION: an excessively long value will slow the welding procedure. Other than in the presence of special requirements the value should generally be kept at 0.0 s or anyway very low.*
- *Consequences of a higher value:*
  - This parameter allows a shielded environment to be created, thereby eliminating contaminants at the start of the welding pass.

• SOFT START (MIG/MAG manual welding mode)
- The SOFT START is the wire approach speed to the workpiece.
- The value is expressed as a percentage of the set feed rate.
- *Consequences of a lower value:*
  - The start of welding is "softer".
- *Consequences of a higher value:*
  - The welding start may prove difficult.

• SOFT START
- The SOFT START is the wire approach speed to the workpiece.
- The value is expressed as a percentage of the set feed rate.
- In synergic welding the optimal SOFT START value (indicated with SYN) varies in general with variations of the synergic parameters.
- In synergic welding, if the value SOFT START = SYN is selected the welding power source will always have the optimal SOFT START value set when the main welding parameter changes.
- If you set a value other than SYN, this value is stored and fixed.
- *Consequences of a lower value:*
  - The start of welding is "softer".
- *Consequences of a higher value:*
  - The welding start may prove difficult.

• BURN BACK (MIG/MAG manual welding mode)
- The BURN BACK value is associated with the quantity of wire that is burnt at the end of the welding procedure.
- *Consequences of a higher value:*
  - Wire significantly retracted into the torch nozzle.
- *Consequences of a lower value:*
  - Stick-out at welding start is longer.

• BURN BACK
- The BURN BACK value is associated with the quantity of wire that is burnt at the end of the welding procedure.
- In synergic welding the optimal BURN BACK value (indicated with SYN) varies in general with variations of the synergic parameters.
- In synergic welding, if the value BURN BACK = SYN is selected the welding power source will

always have the optimal BURN BACK value set when the main welding parameter changes.
  - ○ If you set a value other than SYN, this value is stored and fixed.
  - - *Consequences of a higher value:*
    - • Wire significantly retracted into the torch nozzle.
  - - *Consequences of a lower value:*
    - • Stick-out at welding start is longer.

• POST GAS
  - ○ Time of post gas delivery when the welding arc is extinguished.
  - ○ This is useful when welding at high current values or with materials that oxidise readily to cool the weld pool in an uncontaminated atmosphere.
  - ○ In the absence of specific requirements the value should generally be kept low.
  - - *Consequences of a higher value:*
    - • More effective pickling (improved appearance of workpiece at the end of the welding pass).
    - • Higher gas consumption.
  - - *Consequences of a lower value:*
    - • Lower gas consumption.
    - • Oxidation of electrode tip (more difficult arc strike).

• POWER FOCUS
  - ○ The parameter changes the concentration of the electric arc, increasing or reducing the energy transferred to the workpiece.
  - - *Consequences of a higher value:*
    - • Welding arc concentration.
    - • Penetration increase.

• SPOT TIME
  - ○ When the torch trigger is pressed the welding arc persists for the time set in the parameter.
  - ○ Press the torch trigger again to resume the welding process.
  - ○ The welding process cannot be interrupted once it has been started.
  - ○ When the torch trigger is pressed, if the arc does not strike within 10 seconds, the process is deactivated.
  - ○ The welding parameters can be modified during the welding process.

• B-LEVEL
  - ○ The parameter enables a special torch trigger function.
  - ○ Pressing and releasing the torch trigger rapidly in welding mode (in 2nd stroke) switches from the main welding current to a secondary current.
  - ○ Pressing and releasing the torch trigger again switches from the secondary current to the main current. This switching can be performed repeatedly at the discretion of the operator.
  - ○ To close the welding cycle (3rd stroke) press the torch trigger for a longer period of time. When the trigger is released the welding cycle will be closed (4th stroke).

• START 3LEV
• Start in 3 levels operation
  - ○ The parameter adjusts the 1st level wire feed rate as a percentage of the wire feed rate set for welding (2nd level).
  - ○ The time is determined by the operator on the basis of the time he presses the torch trigger during the third time.
  - ○ This is helpful to start the weld run with different heat input compared to steady state welding conditions.
  - ○ High values (e.g. 130 %) are generally required by aluminium alloys to create a weld pool.

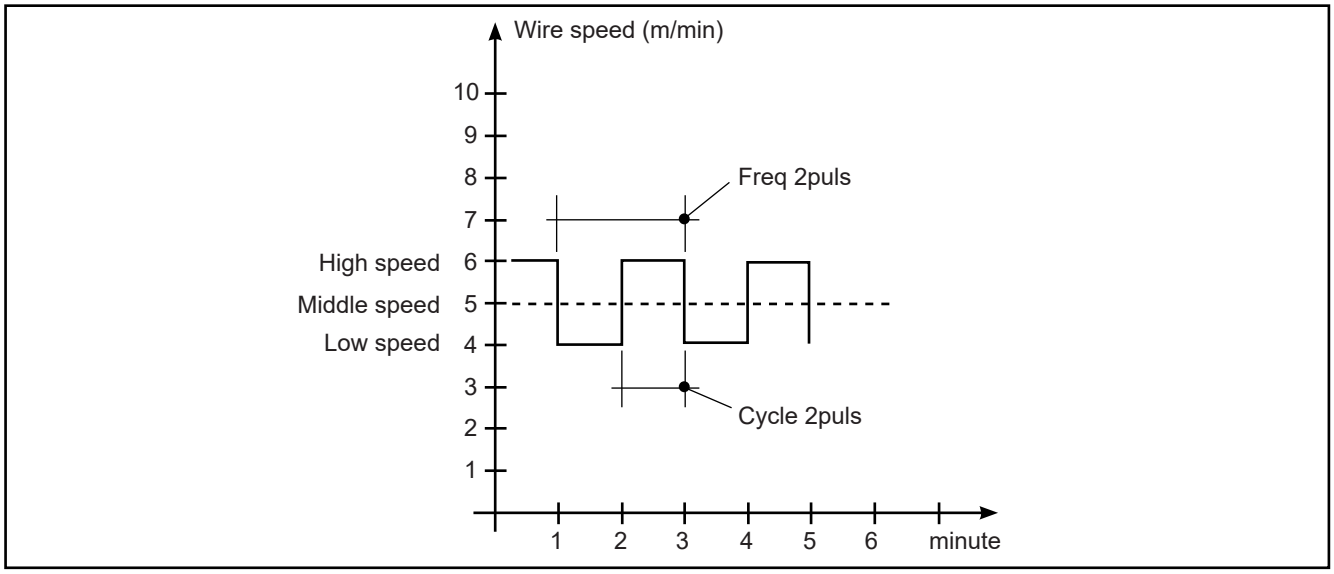
• CRATER 3LEV
• Crater in 3 levels operation
- ○ The parameter adjusts the 3rd level wire feed rate as a percentage of the wire feed rate set for welding (2nd level).
- ○ The time is determined by the operator on the basis of the time he presses the torch trigger during the third time.
- ○ This is helpful to finish the weld run with different heat input compared to steady state welding conditions.
- ○ This function is generally required with aluminium alloys, in which the final crater must be filled.
- - *Consequences of a lower value:*
  - • Less formation of the welding final crater (crater filler).

• SLOPE 3LEV 1
• Initial slope in 3-level operation
- ○ This parameter controls the slope time connecting the HOT START level and the welding level.
- ○ The setting is dependent on the specific needs of the operator.
- ○ Values from 0.5 s to 1.0 s are suitable for the vast majority of applications.

• SLOPE 3LEV 2
• Final slope in 3-level operation
- ○ This parameter controls the slope time connecting the welding level and the crater filler level.
- ○ The setting is dependent on the specific needs of the operator.
- ○ Values from 0.5 s to 1.0 s are suitable for the vast majority of applications.

• FREQ 2PULS
• Double pulsed frequency
- ○ This parameter adjusts the frequency of alternation of the two wire feed rates set with RANGE 2PULS parameter.
- ○ The setting is dependent on the specific needs of the operator.
- ○ The best results are obtained with frequencies of approximately 1.5 Hertz.

• RANGE 2PULS
• Double pulsed range
- ○ This parameter generates the two wire feed rates (high and low) utilised in double pulsed mode, which alternate with the frequency defined by the parameter FREQ 2PULS.
- ○ Values that are not excessively high are preferable for stability of the welding arc.
- ○ This value is expressed as a percentage of the set wire feed rate and it determines the high and low feed rate values in compliance with the following rule:
- ○ High wire feed rate= wire feed rate (D1) + [wire feed rate (D1)*RANGE 2PULS]/2
- ○ Low wire feed rate= wire feed rate (D1) - [wire feed rate (D1)*RANGE 2PULS]/2
- ○ Example: if a rate of 5 m/min is set on the main adjustment (on display D1) (average feed rate) and 40 % on RANGE 2PULS (on display D4), the wire feed rate will vary between 4 m/min (low feed rate) and 6 m/min (high feed rate).



- **CYCLE 2PULS**
- **Double pulsed duty cycle**
  - This parameter adjusts the high speed time.
  - The value is expressed as a percentage over the pulse frequency period.

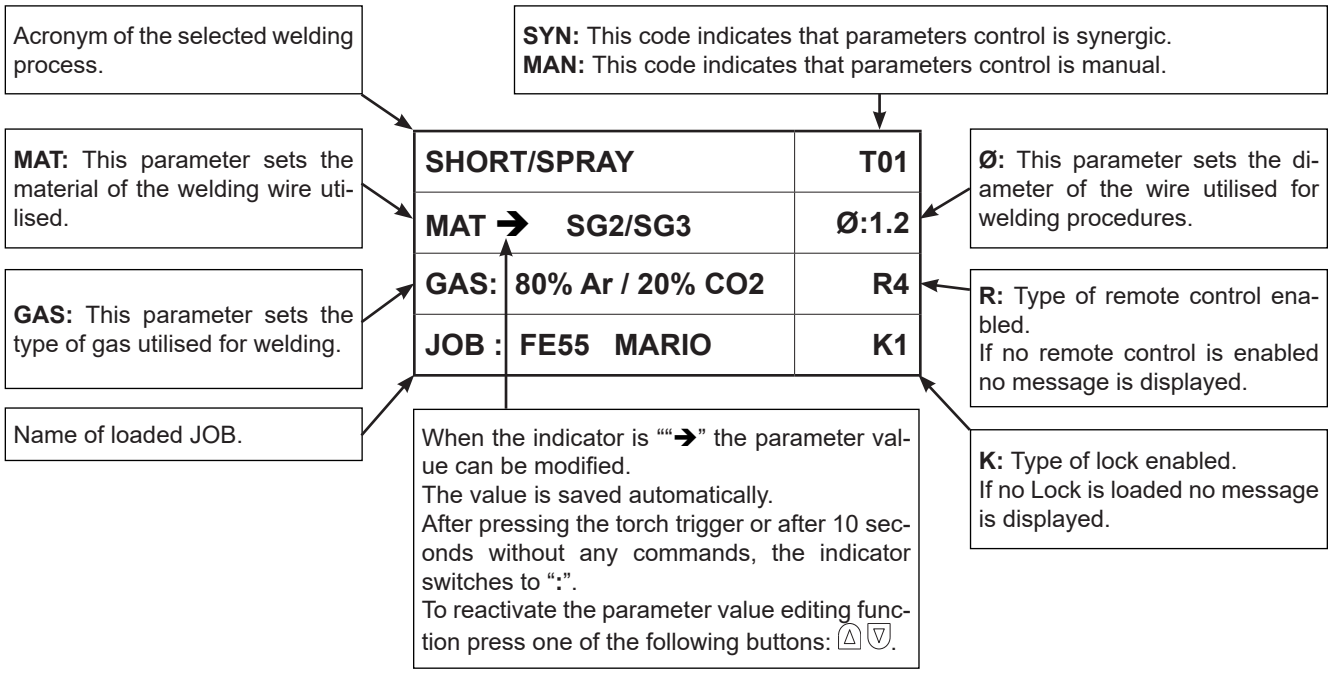
- **ARC2 2PULS**
- **Arc2 voltage in double pulsed mode**
  - The parameter corrects the synergic voltage value relative to the low wire feed rate of double pulsed mode.
  - *NOTE: A value >0 produces an increase in the length of the welding arc, while a value <0 produces a shorter arc.*

- **ARC2 2PULS**
- **Arc2 wire feed rate in double pulsed mode**
  - The parameter corrects the synergic value of the wire feed rate relative to the low voltage value of double pulsed mode.
  - *NOTE: A value <0 produces an increase in the length of the welding arc, while a value >0 produces a shorter arc.*

10 CHARACTERISTICS OF THE MENU LEVELS

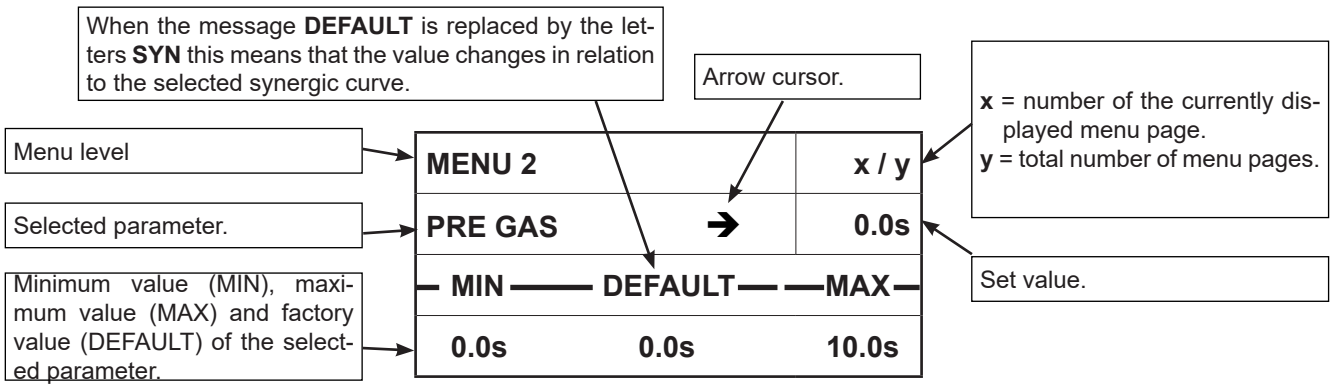
10.1 1ST LEVEL

The menu shows the setting of the most important welding parameters (or synergic settings) relative to the selected welding process.



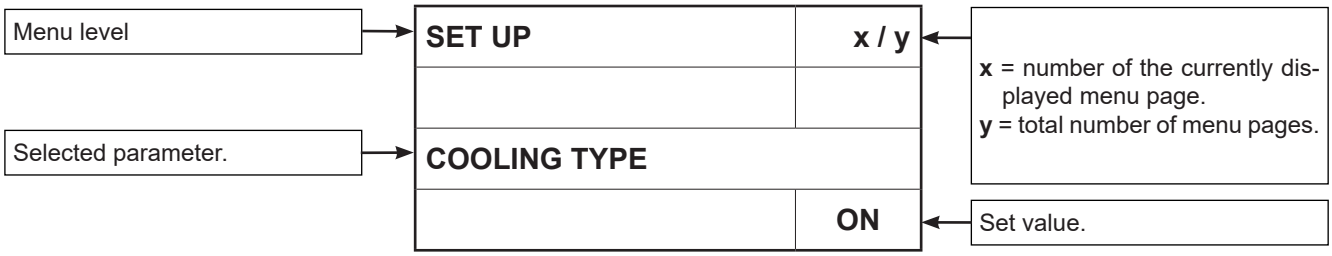
10.2 2ND LEVEL

For each process selection the menu shows the "secondary" welding parameters that can be modified with respect to their synergic values.
If the type of wire, gas, or diameter is changed within a welding process, the second level parameters return to their default values.
The changed parameters remain saved for the relative process selection (manual MIG/MAG, synergic, pulsed synergic, double pulsed synergic).
To save and retrieve the changes made, utilise the JOBs storage procedure.



10.3 3RD LEVEL

The menu contains the settings and values that are changed infrequently and are to be set up the first time the unit is powered up.
The changed parameters remain saved until the next modification or reset of the unit.
§ "6 SET-UP (INITIAL SET-UP OF THE WELDING POWER SOURCE)".



11 WELDING SETTINGS

11.1 WELDING CURVES SELECTION

SHORT/SPRAY	
MAT ➔ SG2/SG3	**Ø:1.2**
GAS: 80% Ar / 20% CO2	**R4**
JOB : FE55 MARIO	**K1**

○ Select parameter **MAT** by pressing buttons **S3** △ and **S4** ▽ .
- Using the **encoder E3** ◎, edit the value of the selected parameter.

○ Select parameter **Ø** by pressing buttons **S3** △ and **S4** ▽ .
- Using the **encoder E3** ◎, edit the value of the selected parameter.

○ Select parameter **GAS** by pressing buttons **S3** △ and **S4** ▽ .
- Using the **encoder E3** ◎, edit the value of the selected parameter.

11.1.1 Special curves: HIGH SPEED, POWER FOCUS and POWER ROOT

No specific procedures are required to activate these curves. The special curves appear in the list together with the standard curves.

HIGH SPEED CURVES:: the curves are available in HSL series power sources in PULSED MIG/MAG - DOUBLE PULSED MIG/MAG welding mode.
Pulsed HS is a special function in the pulsed MIG/MAG mode, featuring a very short and intense arc, EASILY controlled by the welder. HS pulsed, compared to other high deposition welding systems, allows the welder to achieve a comfortable arc without increased stress.

These curves differ from the other standard curves because of the acronym **HS** which is displayed after the reference to the welding wire material.

Example:

PULSED MODE	
MAT ➔ SG2/SG3 HS	**Ø:1.2**
GAS: 80% Ar / 20% CO2	**R4**
JOB : FE55 MARIO	**K1**

POWER FOCUS CURVES: the curves are available in HSL series power sources in SYNERGIC SHORT SPRAY MIG/MAG welding mode.
The difference between a standard MIG MAG and Power Focus is its concentration and pressure. The POWER FOCUS arc concentration allows the welder to focus the high temperature of the arc in the central section of the deposition, thus avoiding to overheat the sides of the welding. The thermally changed area with the Power Focus arc is less widespread.

These curves differ from the other standard curves because of the acronym **PF** which is displayed after the reference to the welding wire material.

Example:

SHORT/SPRAY	
MAT ➔ SG2/SG3 PF	**Ø:1.2**
GAS: 80% Ar / 20% CO2	**R4**
JOB : FE55 MARIO	**K1**

POWER ROOT CURVES:: the curves are available in SYNERGIC SHORT SPRAY MIG/MAG welding mode.
Power Root is an optimised short arc transfer with the feature of having a cold drop transfer. Power Root allows to achieve a very high quality in root passes.

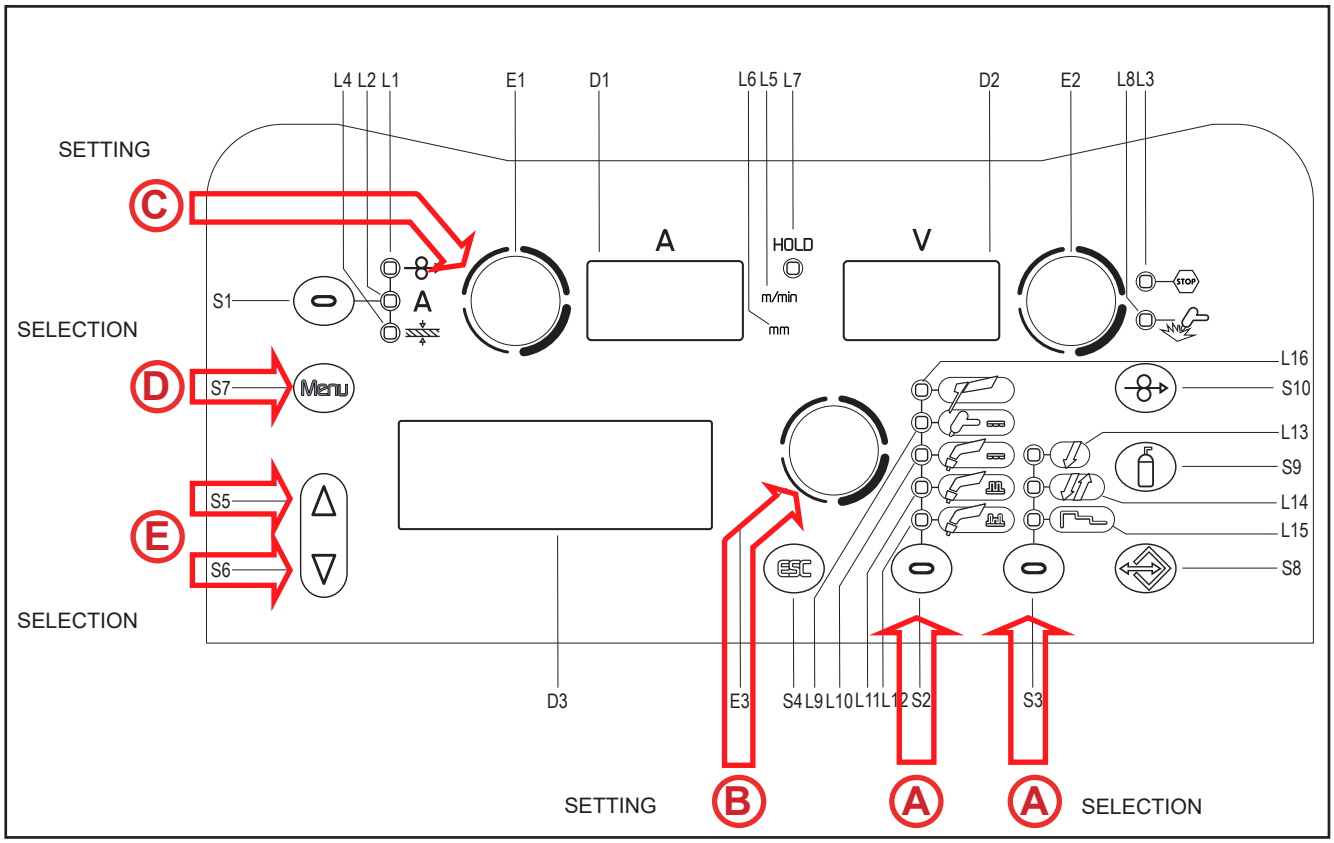
These curves differ from the other standard curves because of the acronym **PR** which is displayed after the reference to the welding wire material.

Example:

SHORT/SPRAY	
MAT ➔ SG2/SG3 PR	**Ø:1.2**
GAS: 80% Ar / 20% CO2	**R4**
JOB : FE55 MARIO	**K1**

11.2 MANUAL MIG/MAG WELDING

Welding is of the Short/Spray type.
Adjustment of the main welding parameters, wire feed rate and voltage is entirely at the discretion of the operator. The optimal work point must be identified for the required welding type.



A	**S2**	This button serves to select the following welding mode:
		MANUAL MIG/MAG
	S3	Use this button to select one of the following torch trigger procedures:
		2 STROKE 2 STROKE SPOT: The procedure is active when the “SPOT TIME” parameter is set to a value other than “OFF”.
		4 STROKE

Tab. 6 - Main settings and displays in MANUAL MIG/MAG mode

	DISPLAY D1	DISPLAY D2	DISPLAY D3
Data setting	Shows the wire feed rate setting in m/min, which can be altered by means of the following encoder: (E1).	Shows the set welding voltage, which can be adjusted with the following encoder: (E2).	Shows “---“.
Welding	Shows the average current measured during welding.	Shows the average voltage measured during welding.	Shows “---“.
HOLD function (At welding end)	Shows the average current measured during the last welding procedure performed.	Shows the average voltage measured during the last welding procedure performed.	Shows “---“.

11.2.1 Manual MIG/MAG parameters setting (1st level): inductance setting.

B	○ Using the **encoder E3**, edit the value of the selected parameter ⓘ The value is saved automatically.

IND: This parameter allows electronic adjustment of the welding inductance from the main menu.

→

SHORT/SPRAY
IND ➔100

11.2.2 Manual MIG/MAG parameters setting (1st level)

C	○ Using the **encoder E1**, edit the value of the selected parameter ⓘ The value is saved automatically.

Tab. 7 - 2nd level menu parameters in MANUAL MIG/MAG mode

PARAMETER	MIN	DEFAULT	MAX
WIRE FEED RATE	1.5 m/min	5.0 m/min	22.0 m/min

11.2.3 Manual MIG/MAG parameters setting (2nd LEVEL)

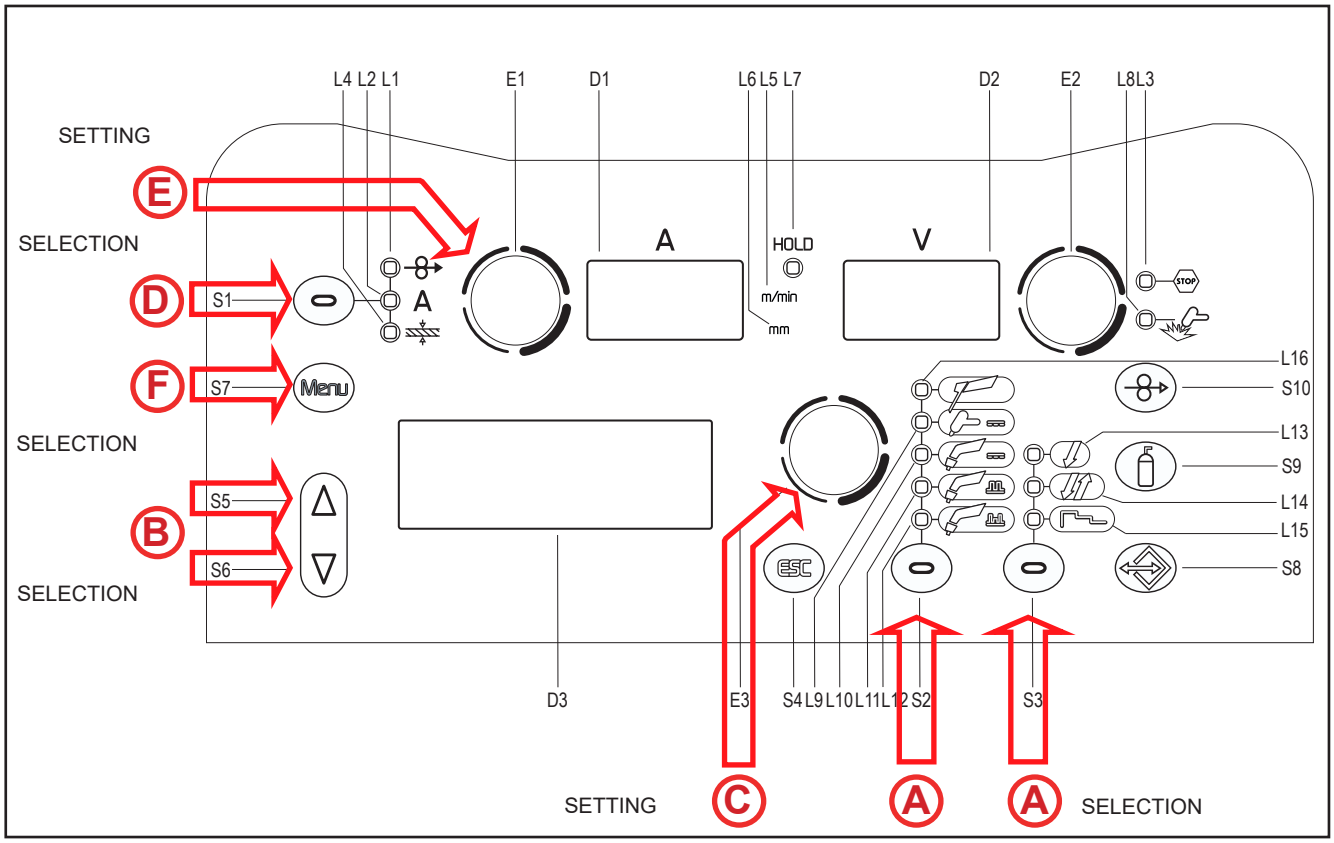
D	○ Press the button **S7** (Menu) to enter the 2nd level menu.
E	○ Scroll down the list of parameters to be edited by pressing buttons **S5** (△) and **S6** (▽)
B	○ Using the **encoder E3**, edit the value of the selected parameter ⓘ The value is saved automatically.

Tab. 8 - 2nd level menu parameters in MANUAL MIG/MAG mode

PROCEDURE	PARAMETER		MIN	DEFAULT	MAX	NOTES
2 STROKE 2 STROKE SPOT	INDUCTANCE	(row 1/6)	1	100	200	
	PRE GAS	(row 2/6)	0.0 s	0.0 s	10.0 s	
	SOFT START	(row 3/6)	1 %	35 %	100 %	
	BURN BACK	(row 4/6)	1 %	25 %	200 %	
	POST GAS	(row 5/6)	0.0 s	1.0 s	10.0 s	
	SPOT TIME	(row 6/6)	0.1 s	OFF	25.0 s	The parameter value is saved for each welding mode.
4 STROKE	INDUCTANCE	(row 1/5)	1	100	200	
	PRE GAS	(row 2/5)	0.0 s	0.0 s	10.0 s	
	SOFT START	(row 3/5)	1 %	35 %	100 %	
	BURN BACK	(row 4/5)	1 %	25 %	200 %	
	POST GAS	(row 5/5)	0.0 s	1.0 s	10.0 s	

11.3 SYNERGIC MIG/MAG WELDING

Set the welding data (material, wire diameter, gas type), shown on display D3 and just one welding parameter, chosen among wire feed rate, Amperes, and workpiece Thickness, shown on display D1.
NOTE: The synergic curves were created with reference to a fillet weld in position PB (horizontal-vertical) with 10 mm stick-out (distance from torch to workpiece).
In general, the parameter set is the wire feed rate (associated with the deposition of filler material) and the synergic welding power source automatically sets the most suitable welding voltage.
Encoder E2 can be adjusted to correct the arc shown on display D3, in order to make minor adjustments in accordance with requirements.
The welding power source also automatically adjusts several secondary parameters that are relevant for welding quality.



A

S2 This button serves to select the following welding mode:

SYNERGIC MIG/MAG

S2 Press the button again.

ⓘ Near the message SHORT/SPRAY, “SYN” appears on the first line.

S3 Use this button to select one of the following torch trigger procedures:

2 STROKE
2 STROKE SPOT: The procedure is active when the “SPOT TIME” parameter is set to a value other than “OFF”.

4 STROKE
4 STROKE B-LEVEL: The procedure is active when the “B-LEVEL” parameter is set to a value other than “OFF”

3 LEVEL 2 STROKE
3 LEVEL 2 STROKE SPOT: The procedure is active when the “SPOT TIME” parameter is set to a value other than “OFF”. If the "SPOT TIME" parameter is active in the 3 LEVELS procedure, its value denotes the time for which the main welding current is supplied.

3 LEVEL 4 STROKE
3 LEVEL 4 STROKE B-LEVEL: The procedure is active when the “B-LEVEL” parameter is set to a value other than “OFF”

Tab. 9 - Main settings and displays in SYNERGIC MIG/MAG mode

	DISPLAY D1	DISPLAY D2
Data setting	Shows the main synergy parameter (wire feed rate, Amperes, recommended thickness), which can be adjusted with the following encoder: (E1).	Shows the set welding voltage, which can be adjusted with the following encoder: (E2). Encoder E2 can be adjusted to correct the arc shown on display D2, in order to make minor adjustments in accordance with requirements. The parameter corrects the arc dynamics in the POWER ROOT process
Welding	Shows the average current measured during welding.	Shows the average voltage measured during welding.
HOLD function (At welding end)	Shows the average current measured during the last welding procedure performed.	Shows the average voltage measured during the last welding procedure performed.

11.3.1 Synergic MIG/MAG parameters setting (1st level): synergic curve setting

B

○ Scroll down the list of parameters to be edited by pressing buttons **S5** △ and **S6** ▽

C

○ Using the **encoder E3**, edit the value of the selected parameter
ⓘ The value is saved automatically.

11.3.2 Synergic MIG/MAG parameters setting (1st level)

D

○ Press the button **S1** to scroll the settings to edit.
ⓘ The LED associated with the selected setting will illuminate.
ⓘ The value relative to the selected setting appears on the following displays: D1

E

○ Using the **encoder E1**, edit the value of the selected parameter
ⓘ The value is saved automatically.

Tab. 10 - 1st level menu parameters in SYNERGIC MIG/MAG mode

PARAMETER	MIN	DEFAULT	MAX	
WIRE FEED RATE	1.5 m/min	5.0 m/min	22.0 m/min	By changing the main adjustment value shown on display D1, the voltage value of the synergic curve shown on display D2 changes accordingly.
A WELDING CURRENT	Syn	Syn	Syn	
THICKNESS	Syn	Syn	Syn	By changing the main adjustment value shown on display D1, the voltage value of the synergic curve shown on display D2 changes accordingly. Reference is made to "T" fillet welds on identical thicknesses. The relative value is purely guideline.

Syn: By synergy we mean a simple and fast way to regulate the power source. Through this function, an optimum balancing of all the welding parameters in every position can be granted, thus helping the user.
This is the reason why the synergic curves of most of the wire types have been introduced, however these curves can be easily modified so as to allow the user to optimise his own welding procedure.
NOTE: The synergic curves were created with reference to a fillet weld in position PB (horizontal-vertical) with 10 mm stick-out (distance from torch to workpiece).

11.3.3 Synergic MIG/MAG parameters setting (2nd level)

F	○ Press the button **S7** (Menu) to enter the 2nd level menu.
B	○ Scroll down the list of parameters to be edited by pressing buttons **S5** (△) and **S6** (▽)
C	○ Using the **encoder E3**, edit the value of the selected parameter ⓘ The value is saved automatically.

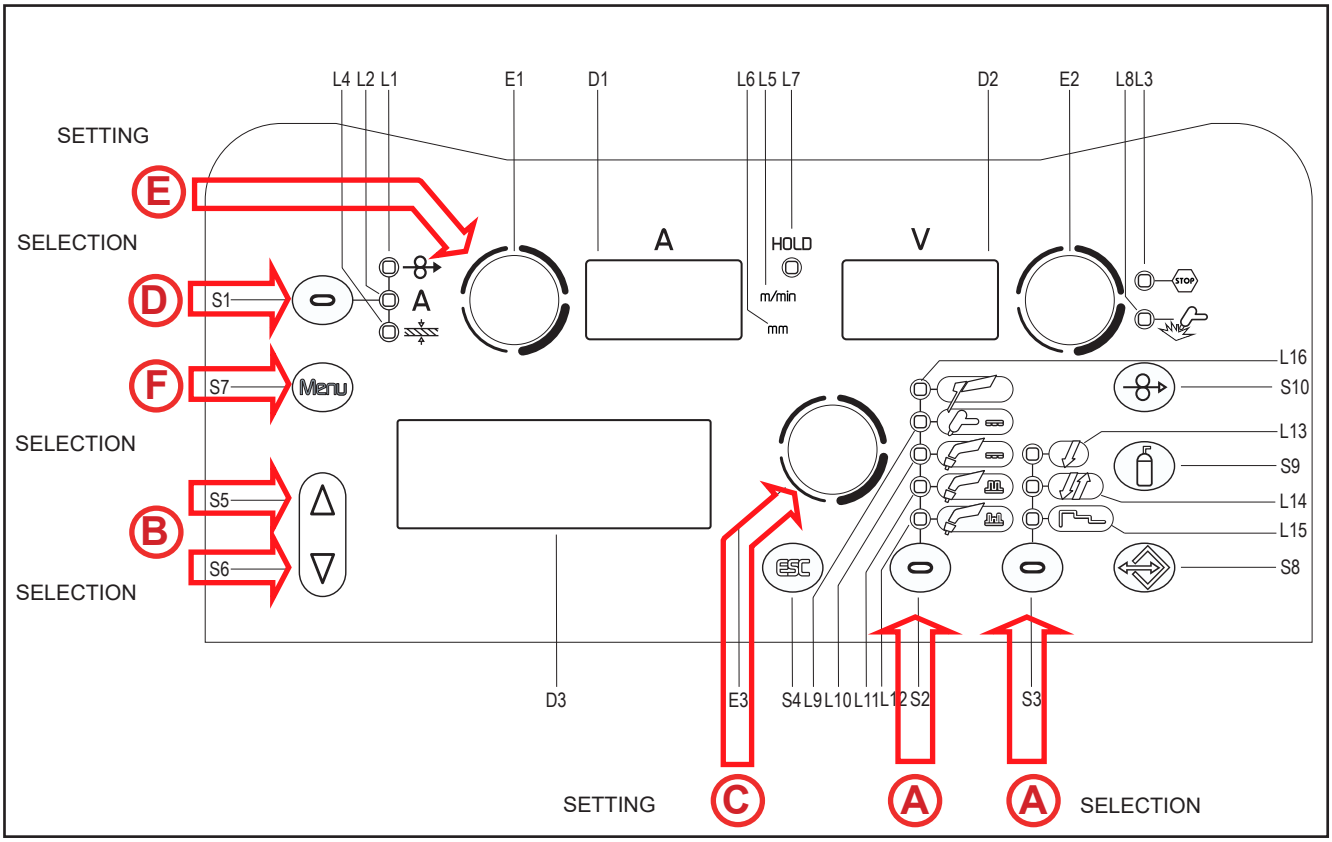
Tab. 11 - 2nd level menu parameters in SYNERGIC MIG/MAG mode

PROCEDURE	PARAMETER		MIN	DEFAULT	MAX	NOTES
2 STROKE 2 STROKE SPOT	INDUCTANCE	(row 1/7)	1	SYN	200	
	PR START	(row 1/7)	1	SYN	200	This parameter is present exclusively with POWER ROOT.
	PRE GAS	(row 2/7)	0.0 s	0.0 s	10.0 s	
	SOFT START	(row 3/7)	1 %	SYN	100 %	
	BURN BACK	(row 4/7)	1 %	SYN	200 %	
	POST GAS	(row 5/7)	0.0 s	1.0 s	10.0 s	
	SPOT TIME	(row 6/7)	0.1 s	OFF	25.0 s	The parameter value is saved for each welding mode.
	POWER FOCUS	(row 7/7)	-100 %	SYN	100 %	

PROCEDURE	PARAMETER		MIN	DEFAULT	MAX	NOTES
 4 STROKE 4 STROKE B-LEVEL	INDUCTANCE	(row 1/7)	1	SYN	200	
	PR START	(row 1/7)	1	SYN	200	This parameter is present exclusively with POWER ROOT.
	PRE GAS	(row 2/7)	0.0 s	0.0 s	10.0 s	
	SOFT START	(row 3/7)	1 %	SYN	100 %	
	BURN BACK	(row 4/7)	1 %	SYN	200 %	
	POST GAS	(row 5/7)	0.0 s	1.0 s	10.0 s	
	B-LEVEL	(row 6/7)	1 %	OFF	200 %	The parameter value is saved for each welding mode.
	POWER FOCUS	(row 7/7)	-100 %	SYN	100 %	
 3 LEVEL 2 STROKE 3 LEVEL 2 STROKE SPOT	INDUCTANCE	(row 1/13)	1	SYN	200	
	PR START	(row 1/13)	1	SYN	200	This parameter is present exclusively with POWER ROOT.
	PRE GAS	(row 2/13)	0.0 s	0.0 s	10.0 s	
	SOFT START	(row 3/13)	1 %	SYN	100 %	
	START 3LEV	(row 4/13)	10 %	130 %	200 %	
	START TIME	(row 5/13)	0.0 s	0.5 s	10.0 s	
	SLOPE 3LEV 1	(row 6/13)	0.1 s	0.5 s	10.0 s	
	SLOPE 3LEV 2	(row 7/13)	0.1 s	0.5 s	10.0 s	
	CRATER 3LEV	(row 8/13)	10 %	80 %	200 %	
	CRATER TIME	(row 9/13)	0.0 s	0.5 s	10.0 s	
	BURN BACK	(row 10/13)	1 %	SYN	200 %	
	POST GAS	(row 11/13)	0.0 s	1.0 s	10.0 s	
	SPOT TIME	(row 12/13)	0.1 s	OFF	25.0 s	The parameter value is saved for each welding mode.
	POWER FOCUS	(row 13/13)	-100 %	SYN	100 %	
 3 LEVEL 4 STROKE 3 LEVEL 4 STROKE B-LEVEL	INDUCTANCE	(row 1/11)	1	SYN	200	
	PR START	(row 1/11)	1	SYN	200	This parameter is present exclusively with POWER ROOT.
	PRE GAS	(row 2/11)	0.0 s	0.0 s	10.0 s	
	SOFT START	(row 3/11)	1 %	SYN	100 %	
	START 3LEV	(row 4/11)	10 %	130 %	200 %	
	SLOPE 3LEV 1	(row 5/11)	0.1 s	0.5 s	10.0 s	
	SLOPE 3LEV 2	(row 6/11)	0.1 s	0.5 s	10.0 s	
	CRATER 3LEV	(row 7/11)	10 %	80 %	200 %	
	BURN BACK	(row 8/11)	1 %	SYN	200 %	
	POST GAS	(row 9/11)	0.0 s	1.0 s	10.0 s	
	B-LEVEL	(row 10/11)	1 %	OFF	200 %	The parameter value is saved for each welding mode.
	POWER FOCUS	(row 11/11)	-100 %	SYN	100 %	

11.4 PULSED SYNERGIC MIG/MAG WELDING

Set the welding data (material, wire diameter, gas type), shown on display D3 and just one welding parameter, chosen among wire feed rate, Amperes, and workpiece Thickness, shown on display D1.
NOTE: The synergic curves were created with reference to a fillet weld in position PB (horizontal-vertical) with 10 mm stick-out (distance from torch to workpiece).
In general, the parameter set is the wire feed rate (associated with the deposition of filler material) and the synergic welding power source automatically sets the most suitable welding voltage.
Encoder E2 can be adjusted to correct the arc shown on display D2, in order to make minor adjustments in accordance with requirements.
The welding power source also automatically adjusts several secondary parameters that are relevant for welding quality.



A	**S2**	This button serves to select the following welding mode:
		PULSED SYNERGIC MIG/MAG
	S3	Use this button to select one of the following torch trigger procedures:
		2 STROKE 2 STROKE SPOT: The procedure is active when the “SPOT TIME” parameter is set to a value other than “OFF”.
		4 STROKE 4 STROKE B-LEVEL: The procedure is active when the “B-LEVEL” parameter is set to a value other than “OFF”
		3 LEVEL 2 STROKE 3 LEVEL 2 STROKE SPOT: The procedure is active when the “SPOT TIME” parameter is set to a value other than “OFF”. If the "SPOT TIME" parameter is active in the 3 LEVELS procedure, its value denotes the time for which the main welding current is supplied.
		3 LEVEL 4 STROKE 3 LEVEL 4 STROKE B-LEVEL: The procedure is active when the “B-LEVEL” parameter is set to a value other than “OFF”

Tab. 12 - Main settings and displays in PULSED SYNERGIC MIG/MAG mode.

	DISPLAY D1	DISPLAY D2
Data setting	Shows the main synergy parameter (wire feed rate, Amperes, recommended thickness), which can be adjusted with the following encoder: (E1).	Shows the set welding voltage, which can be adjusted with the following encoder: (E2). Encoder E2 can be adjusted to correct the arc shown on display D2, in order to make minor adjustments in accordance with requirements.
Welding	Shows the average current measured during welding.	Shows the average voltage measured during welding.
HOLD function (At welding end)	Shows the average current measured during the last welding procedure performed.	Shows the average voltage measured during the last welding procedure performed.

11.4.1 Pulsed Synergic MIG/MAG parameters setting (1st level): synergic curve setting.

B	○ Scroll down the list of parameters to be edited by pressing buttons **S5** △ and **S6** ▽
C	○ Using the **encoder E3**, edit the value of the selected parameter ⓘ The value is saved automatically.

11.4.2 Pulsed Synergic MIG/MAG parameters setting (1st level).

D	○ Press the button **S1** to scroll the settings to edit. ⓘ The LED associated with the selected setting will illuminate. ⓘ The value relative to the selected setting appears on the following displays: D1
E	○ Using the **encoder E1**, edit the value of the selected parameter ⓘ The value is saved automatically.

Tab. 13 - 1st level menu parameters in PULSED SYNERGIC MIG/MAG mode

PARAMETER	MIN	DEFAULT	MAX	
WIRE FEED RATE	1.5 m/min	5.0 m/min	22.0 m/min	By changing the main adjustment value shown on display D1, the voltage value of the synergic curve shown on display D2 changes accordingly.
A WELDING CURRENT	Syn	Syn	Syn	
THICKNESS	Syn	Syn	Syn	By changing the main adjustment value shown on display D1, the voltage value of the synergic curve shown on display D2 changes accordingly. Reference is made to "T" fillet welds on identical thicknesses. The relative value is purely guideline.

Syn: By synergy we mean a simple and fast way to regulate the power source. Through this function, an optimum balancing of all the welding parameters in every position can be granted, thus helping the user.
This is the reason why the synergic curves of most of the wire types have been introduced, however these curves can be easily modified so as to allow the user to optimise his own welding procedure.
NOTE: The synergic curves were created with reference to a fillet weld in position PB (horizontal-vertical) with 10 mm stick-out (distance from torch to workpiece).

11.4.3 Pulsed Synergic MIG/MAG parameters setting (2nd level).

F	○ Press the button **S7** (Menu) to enter the 2nd level menu.
B	○ Scroll down the list of parameters to be edited by pressing buttons **S5** (△) and **S6** (▽)
C	○ Using the **encoder E3** (◯), edit the value of the selected parameter ⓘ The value is saved automatically.

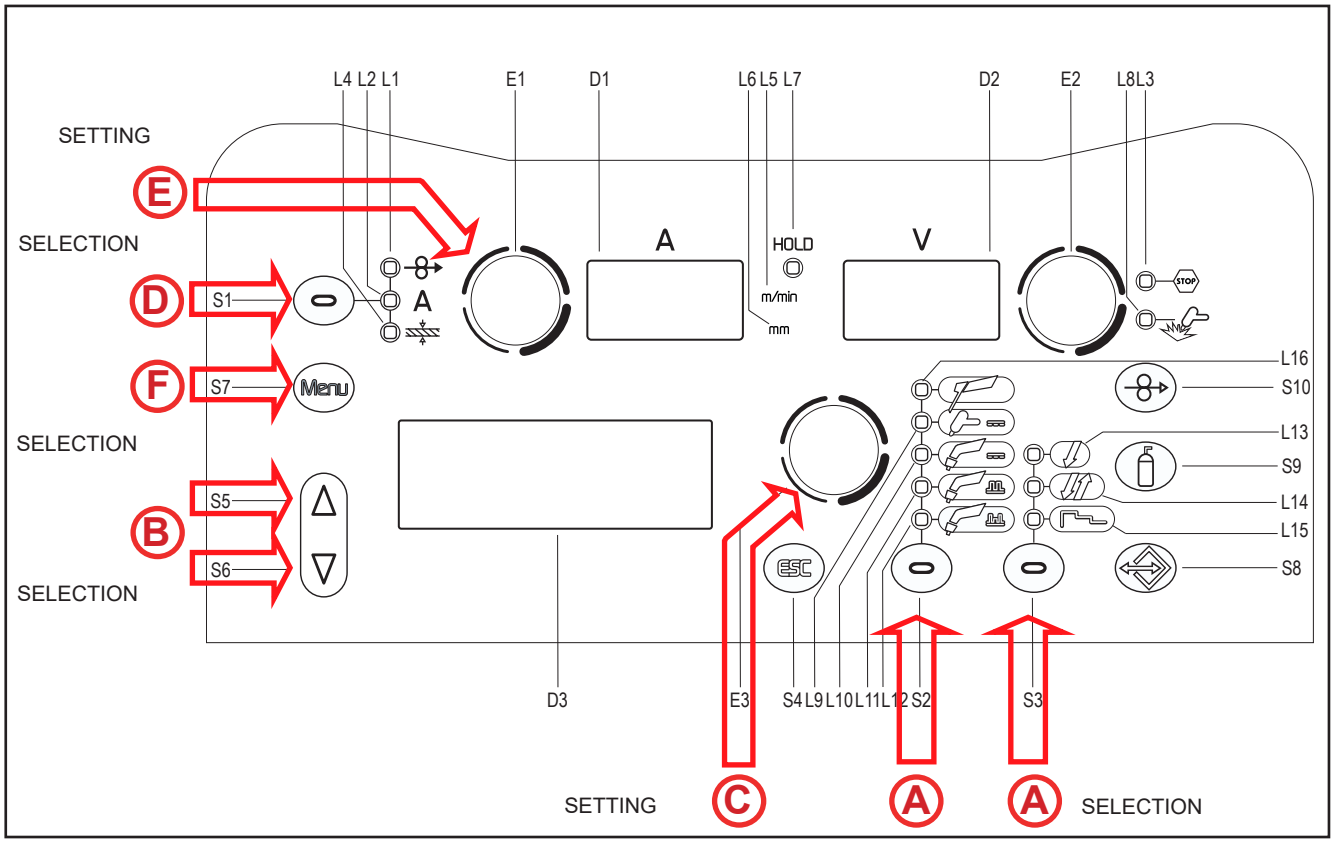
Tab. 14 - 2nd level menu parameters in PULSED SYNERGIC MIG/MAG mode

PROCEDURE	PARAMETER		MIN	DEFAULT	MAX	NOTES
2 STROKE 2 STROKE SPOT	ARC SET	(row 1/6)	1	SYN	200	
	PRE GAS	(row 2/6)	0.0 s	0.0 s	10.0 s	
	SOFT START	(row 3/6)	1 %	SYN	100 %	
	BURN BACK	(row 4/6)	1 %	SYN	200 %	
	POST GAS	(row 5/6)	0.0 s	1.0 s	10.0 s	
	SPOT TIME	(row 6/6)	0.1 s	OFF	25.0 s	The parameter value is saved for each welding mode.
4 STROKE 4 STROKE B-LEVEL	ARC SET	(row 1/6)	1	SYN	200	
	PRE GAS	(row 2/6)	0.0 s	0.0 s	10.0 s	
	SOFT START	(row 3/6)	1 %	SYN	100 %	
	BURN BACK	(row 4/6)	1 %	SYN	200 %	
	POST GAS	(row 5/6)	0.0 s	1.0 s	10.0 s	
	B-LEVEL	(row 6/6)	1 %	OFF	200 %	The parameter value is saved for each welding mode.
3 LEVEL 2 STROKE 2 STROKE SPOT	ARC SET	(row 1/12)	1	SYN	200	
	PRE GAS	(row 2/12)	0.0 s	SYN	10.0 s	
	SOFT START	(row 3/12)	1 %	SYN	100 %	
	START 3LEV	(row 4/12)	10 %	130 %	200 %	
	START TIME	(row 5/12)	0.0 s	0.5 s	10.0 s	
	SLOPE 3LEV 1	(row 6/12)	0.1 s	0.5 s	10.0 s	
	SLOPE 3LEV 2	(row 7/12)	0.1 s	0.5 s	10.0 s	
	CRATER 3LEV	(row 8/12)	10 %	80 %	200 %	
	CRATER TIME	(row 9/12)	0.0 s	0.5 s	10.0 s	
	BURN BACK	(row 10/12)	1 %	SYN	200 %	
	POST GAS	(row 11/12)	0.0 s	1.0 s	10.0 s	
	SPOT TIME	(row 12/12)	0.1 s	OFF	25.0 s	The parameter value is saved for each welding mode.

PROCEDURE	PARAMETER		MIN	DEFAULT	MAX	NOTES
 3 LEVEL 4 STROKE 4 STROKE B-LEVEL	ARC SET	(row 1/10)	1	SYN	200	
	PRE GAS	(row 2/10)	0.0 s	SYN	10.0 s	
	SOFT START	(row 3/10)	1 %	SYN	100 %	
	START 3LEV	(row 4/10)	10 %	130 %	200 %	
	SLOPE 3LEV 1	(row 5/10)	0.1 s	0.5 s	10.0 s	
	SLOPE 3LEV 2	(row 6/10)	0.1 s	0.5 s	10.0 s	
	CRATER 3LEV	(row 7/10)	10 %	80 %	200 %	
	BURN BACK	(row 8/10)	1 %	SYN	200 %	
	POST GAS	(row 9/10)	0.0 s	1.0 s	10.0 s	
	B-LEVEL	(row 10/10)	1 %	OFF	200 %	The parameter value is saved for each welding mode.

11.5 DOUBLE PULSED SYNERGIC MIG/MAG WELDING

Set the welding data (material, wire diameter, gas type), shown on display D3 and just one welding parameter, chosen among wire feed rate, Amperes, and workpiece Thickness, shown on display D1.
NOTE: The synergic curves were created with reference to a fillet weld in position PB (horizontal-vertical) with 10 mm stick-out (distance from torch to workpiece).
In general, the parameter set is the wire feed rate (associated with the deposition of filler material) and the synergic welding power source automatically sets the most suitable welding voltage. Encoder E2 can be adjusted to correct the arc shown on display D3, in order to make minor adjustments in accordance with requirements.
This mode involves a variable frequency pulse between two parameters of the Pulsed Synergic curve.



Ⓐ	**S2** This button serves to select the following welding mode: DOUBLE PULSED SYNERGIC MIG/MAG **S3** Use this button to select one of the following torch trigger procedures: 2 STROKE 2 STROKE SPOT: The procedure is active when the “SPOT TIME” parameter is set to a value other than “OFF”. 4 STROKE 4 STROKE B-LEVEL: The procedure is active when the “B-LEVEL” parameter is set to a value other than “OFF” 3 LEVEL 2 STROKE 3 LEVEL 2 STROKE SPOT: The procedure is active when the “SPOT TIME” parameter is set to a value other than “OFF”. If the "SPOT TIME" parameter is active in the 3 LEVELS procedure, its value denotes the time for which the main welding current is supplied. 3 LEVEL 4 STROKE 3 LEVEL 4 STROKE B-LEVEL: The procedure is active when the “B-LEVEL” parameter is set to a value other than “OFF”

Tab. 15 - Main settings and displays in DOUBLE PULSED SYNERGIC MIG/MAG mode

	DISPLAY D1	DISPLAY D2
Data setting	Shows the main synergy parameter (wire feed rate, Amperes, recommended thickness), which can be adjusted with the following encoder: (E1).	Shows the set welding voltage, which can be adjusted with the following encoder: (E2).
Welding	Shows the average current measured during welding.	Shows the average voltage measured during welding.
HOLD function (At welding end)	Shows the average current measured during the last welding procedure performed.	Shows the average voltage measured during the last welding procedure performed.

11.5.1 Double pulsed synergic MIG/MAG parameters setting (1st level): synergic curve setting.

Ⓑ	○ Scroll down the list of parameters to be edited by pressing buttons **S5** △ and **S6** ▽
Ⓒ	○ Using the **encoder E3**, edit the value of the selected parameter ⓘ The value is saved automatically.

11.5.2 Double pulsed synergic MIG/MAG parameters setting (1st level)

Ⓓ	○ Press the button **S1** to scroll the settings to edit. ⓘ The LED associated with the selected setting will illuminate. ⓘ The value relative to the selected setting appears on the following displays: D1
Ⓔ	○ Using the **encoder E1**, edit the value of the selected parameter ⓘ The value is saved automatically.

Tab. 16 - 1st level menu parameters in DOUBLE PULSED SYNERGIC MIG/MAG mode

PARAMETER	MIN	DEFAULT	MAX	
WIRE FEED RATE	1.5 m/min	5.0 m/min	22.0 m/min	By changing the main adjustment value shown on display D1, the voltage value of the synergic curve shown on display D2 changes accordingly.
A WELDING CURRENT	Syn	Syn	Syn	
THICKNESS	Syn	Syn	Syn	By changing the main adjustment value shown on display D1, the voltage value of the synergic curve shown on display D2 changes accordingly. Reference is made to "T" fillet welds on identical thicknesses. The relative value is purely guideline.

Syn: By synergy we mean a simple and fast way to regulate the power source. Through this function, an optimum balancing of all the welding parameters in every position can be granted, thus helping the user.
This is the reason why the synergic curves of most of the wire types have been introduced, however these curves can be easily modified so as to allow the user to optimise his own welding procedure.
NOTE: The synergic curves were created with reference to a fillet weld in position PB (horizontal-vertical) with 10 mm stick-out (distance from torch to workpiece).

11.5.3 Double pulsed synergic MIG/MAG parameters setting (2nd level).

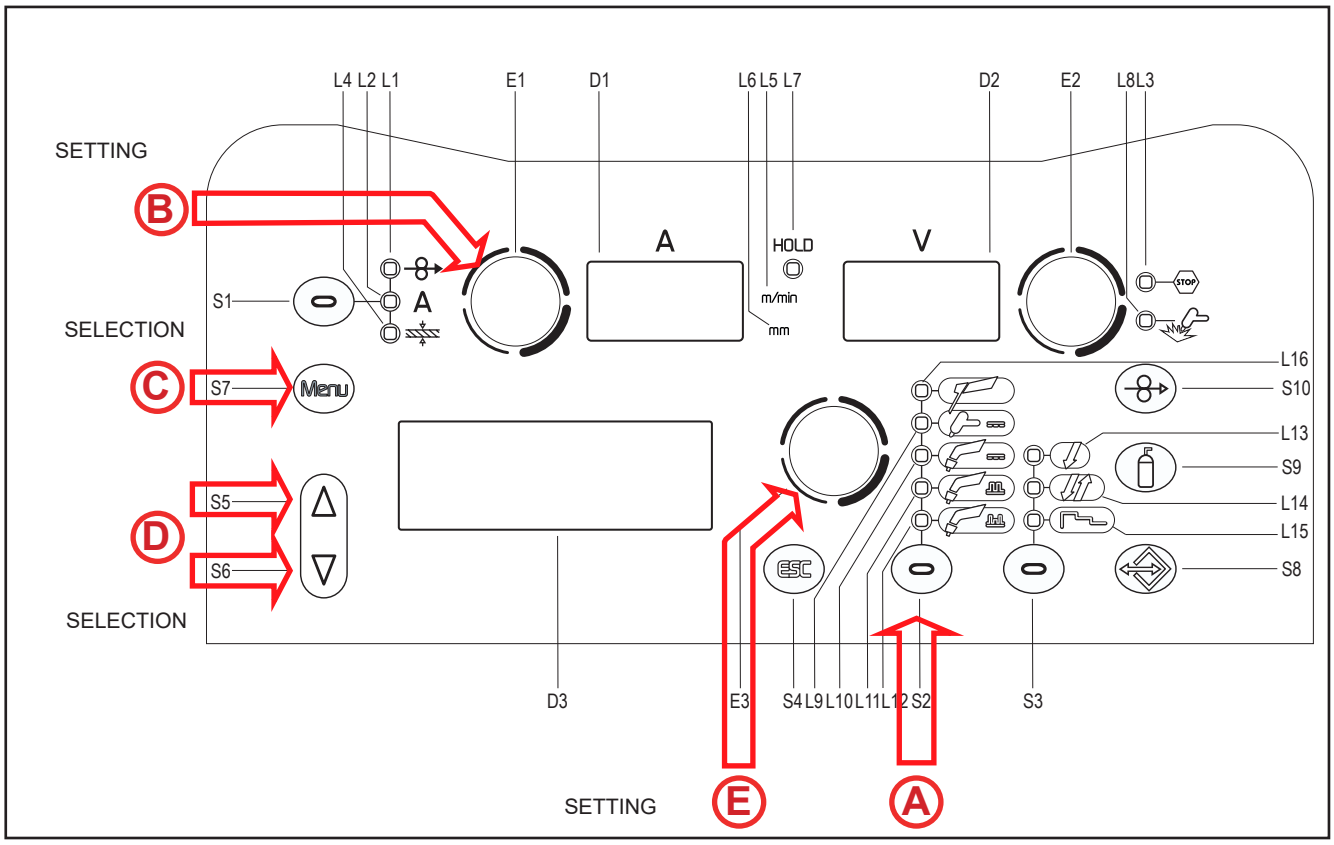
F	○ Press the button **S7** (Menu) to enter the 2nd level menu.
B	○ Scroll down the list of parameters to be edited by pressing buttons **S5** (△) and **S6** (▽)
C	○ Using the **encoder E3**, edit the value of the selected parameter ⓘ The value is saved automatically.

Tab. 17 - 2nd level menu parameters in DOUBLE PULSED SYNERGIC MIG/MAG mode

PROCEDURE	PARAMETER		MIN	DEFAULT	MAX	NOTES
2 STROKE 2 STROKE SPOT	ARC SET	(row 1/10)	1	SYN	200	
	PRE GAS	(row 2/10)	0.0 s	0.0 s	10.0 s	
	SOFT START	(row 3/10)	1 %	SYN	100 %	
	BURN BACK	(row 4/10)	1 %	SYN	200 %	
	POST GAS	(row 5/10)	0.0 s	1.0 s	10.0 s	
	SPOT TIME	(row 6/10)	0.1 s	OFF	25.0 s	The parameter value is saved for each welding mode.
	FREQ 2PULS	(row 7/10)	0.1 Hz	1.5 Hz	10.0 Hz	
	RANGE 2PULS	(row 8/10)	10 %	50 %	90 %	
	CYCLE 2PULS	(row 9/10)	10 %	50 %	90 %	
	ARC2 2PULS	(row 10/10)	- 9.9 V	0.0 V	9.9 V	
			- 4.0 m/min	0.0 m/min	4.0 m/min	

PROCEDURE	PARAMETER		MIN	DEFAULT	MAX	NOTES
 4 STROKE 4 STROKE B-LEVEL	ARC SET	(row 1/10)	1	SYN	200	
	PRE GAS	(row 2/10)	0.0 s	0.0 s	10.0 s	
	SOFT START	(row 3/10)	1 %	SYN	100 %	
	BURN BACK	(row 4/10)	1 %	SYN	200 %	
	POST GAS	(row 5/10)	0.0 s	1.0 s	10.0 s	
	B-LEVEL	(row 6/10)	1 %	OFF	200 %	The parameter value is saved for each welding mode.
	FREQ 2PULS	(row 7/10)	0.1 Hz	1.5 Hz	10.0 Hz	
	RANGE 2PULS	(row 8/10)	10 %	50 %	90 %	
	CYCLE 2PULS	(row 9/10)	10 %	50 %	90 %	
	ARC2 2PULS	(row 10/10)	- 9.9 V	0.0 V	9.9 V	
			- 4.0 m/min	0.0 m/min	4.0 m/min	
 3 LEVELS 2 STROKE 2 STROKE SPOT	ARC SET	(row 1/16)	1	SYN	200	
	PRE GAS	(row 2/16)	0.0 s	SYN	10.0 s	
	SOFT START	(row 3/16)	1 %	SYN	100 %	
	START 3LEV	(row 4/16)	10 %	130 %	200 %	
	START TIME	(row 5/16)	0.0 s	0.5 s	10.0 s	
	SLOPE 3LEV 1	(row 6/16)	0.1 s	0.5 s	10.0 s	
	SLOPE 3LEV 2	(row 7/16)	0.1 s	0.5 s	10.0 s	
	CRATER 3LEV	(row 8/16)	10 %	80 %	200 %	
	CRATER TIME	(row 9/16)	0.0 s	0.5 s	10.0 s	
	BURN BACK	(row 10/16)	1 %	SYN	200 %	
	POST GAS	(row 11/16)	0.0 s	1.0 s	10.0 s	
	SPOT TIME	(row 12/16)	0.1 s	OFF	25.0 s	The parameter value is saved for each welding mode.
	FREQ 2PULS	(row 13/16)	0.1 Hz	1.5 Hz	10.0 Hz	
	RANGE 2PULS	(row 14/16)	10 %	50 %	90 %	
	CYCLE 2PULS	(row 15/16)	10 %	50 %	90 %	
	ARC2 2PULS	(row 16/16)	- 9.9 V	0.0 V	9.9 V	
			- 4.0 m/min	0.0 m/min	4.0 m/min	
 3 LEVELS 4 STROKE 4 STROKE B-LEVEL	ARC SET	(row 1/14)	1	SYN	200	
	PRE GAS	(row 2/14)	0.0 s	SYN	10.0 s	
	SOFT START	(row 3/14)	1 %	SYN	100 %	
	START 3LEV	(row 4/14)	10 %	130 %	200 %	
	SLOPE 3LEV 1	(row 5/14)	0.1 s	0.5 s	10.0 s	
	SLOPE 3LEV 2	(row 6/14)	0.1 s	0.5 s	10.0 s	
	CRATER 3LEV	(row 7/14)	10 %	80 %	200 %	
	BURN BACK	(row 8/14)	1 %	SYN	200 %	
	POST GAS	(row 9/14)	0.0 s	1.0 s	10.0 s	
	B-LEVEL	(row 10/14)	1 %	OFF	200 %	The parameter value is saved for each welding mode.
	FREQ 2PULS	(row 11/14)	0.1 Hz	1.5 Hz	10.0 Hz	
	RANGE 2PULS	(row 12/14)	10 %	50 %	90 %	
	CYCLE 2PULS	(row 13/14)	10 %	50 %	90 %	
	ARC2 2PULS	(row 14/14)	- 9.9 V	0.0 V	9.9 V	
			- 4.0 m/min	0.0 m/min	4.0 m/min	

11.6 ELECTRODE WELDING (MMA)



A	**S2** This button serves to select the following welding mode: MMA

Tab. 18 - 1st level menu parameters in MMA mode

PARAMETER	MIN	DEFAULT	MAX
WELDING CURRENT	10 A	80 A	250 A

11.6.1 MMA Parameters Setting (1st Level)

B	○ Using the encoder **E1**, edit the value of the parameter. ⓘ The set value appears on the following displays: D1 ⓘ The value is saved automatically.

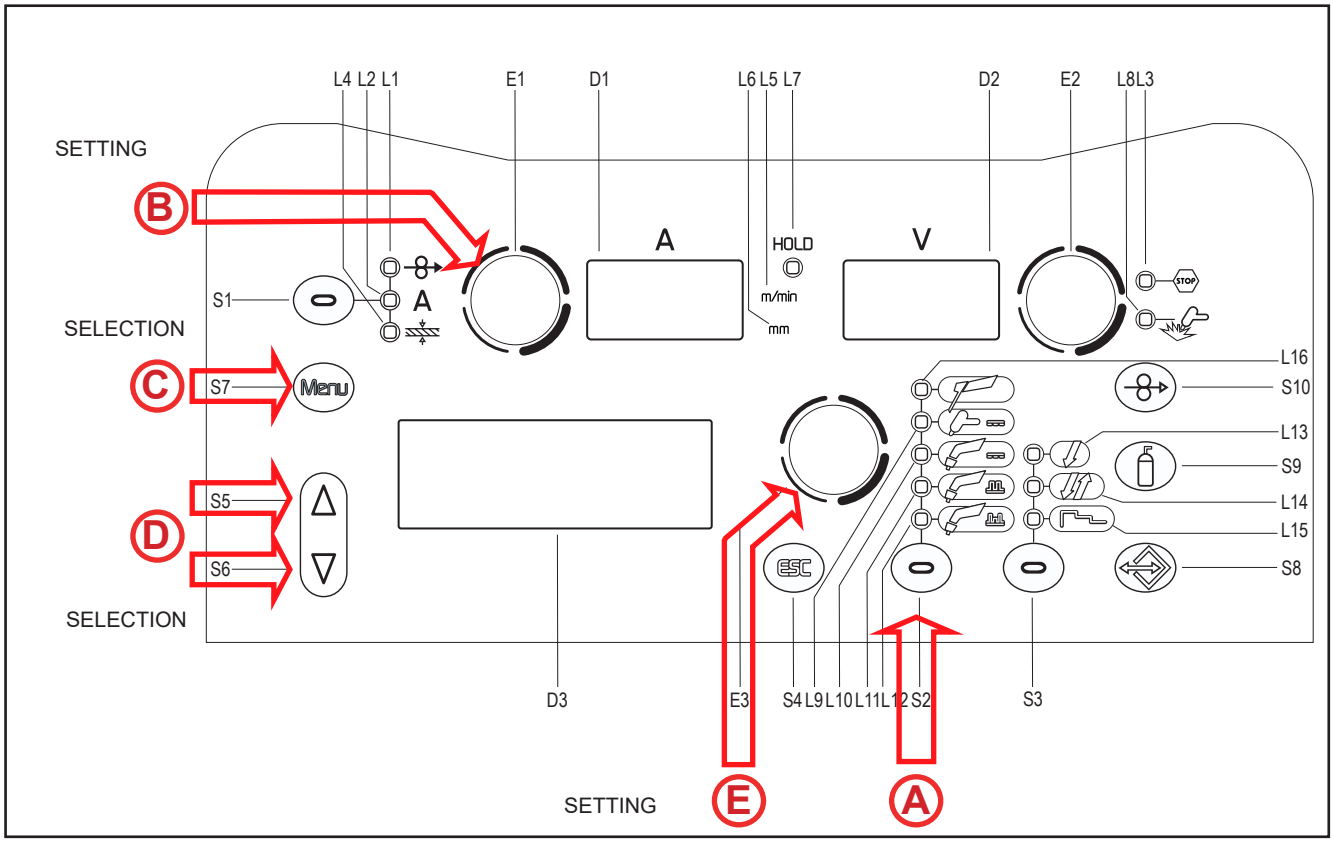
11.6.2 MMA Parameters Setting (2nd Level)

C	○ Press the button **S7** Menu to enter the 2nd level menu.
D	○ Scroll down the list of parameters to be edited by pressing buttons **S5** △ and **S6** ▽
E	○ Using the **encoder E3**, edit the value of the selected parameter ⓘ The value is saved automatically.

Tab. 19 - 2nd level menu parameters in MMA mode

PARAMETER	MIN	DEFAULT	MAX
HOT-START	0 %	50 %	100 %
ARC-FORCE	0 %	30 %	100 %
VRD MMA	OFF	OFF	ON

11.7 TIG LIFT DC WELDING



A	**S2** This button serves to select the following welding mode: TIG

Tab. 20 - 1st level menu parameters in TIG LIFT DC mode

PARAMETER	MIN	DEFAULT	MAX
WELDING CURRENT	10 A	80 A	250 A

11.7.1 TIG LIFT DC parameters setting (1st Level)

B	○ Using the encoder **E1**, edit the value of the parameter. ⓘ The set value appears on the following displays: D1 ⓘ The value is saved automatically.

11.7.2 TIG LIFT DC parameters setting (2nd level)

C	○ Press the button **S7** (Menu) to enter the 2nd level menu.
D	○ Scroll down the list of parameters to be edited by pressing buttons **S5** (△) and **S6** (▽)
B	○ Using the **encoder E3**, edit the value of the selected parameter ⓘ The value is saved automatically.

Tab. 21 - 2nd level menu parameters in TIG LIFT DC mode

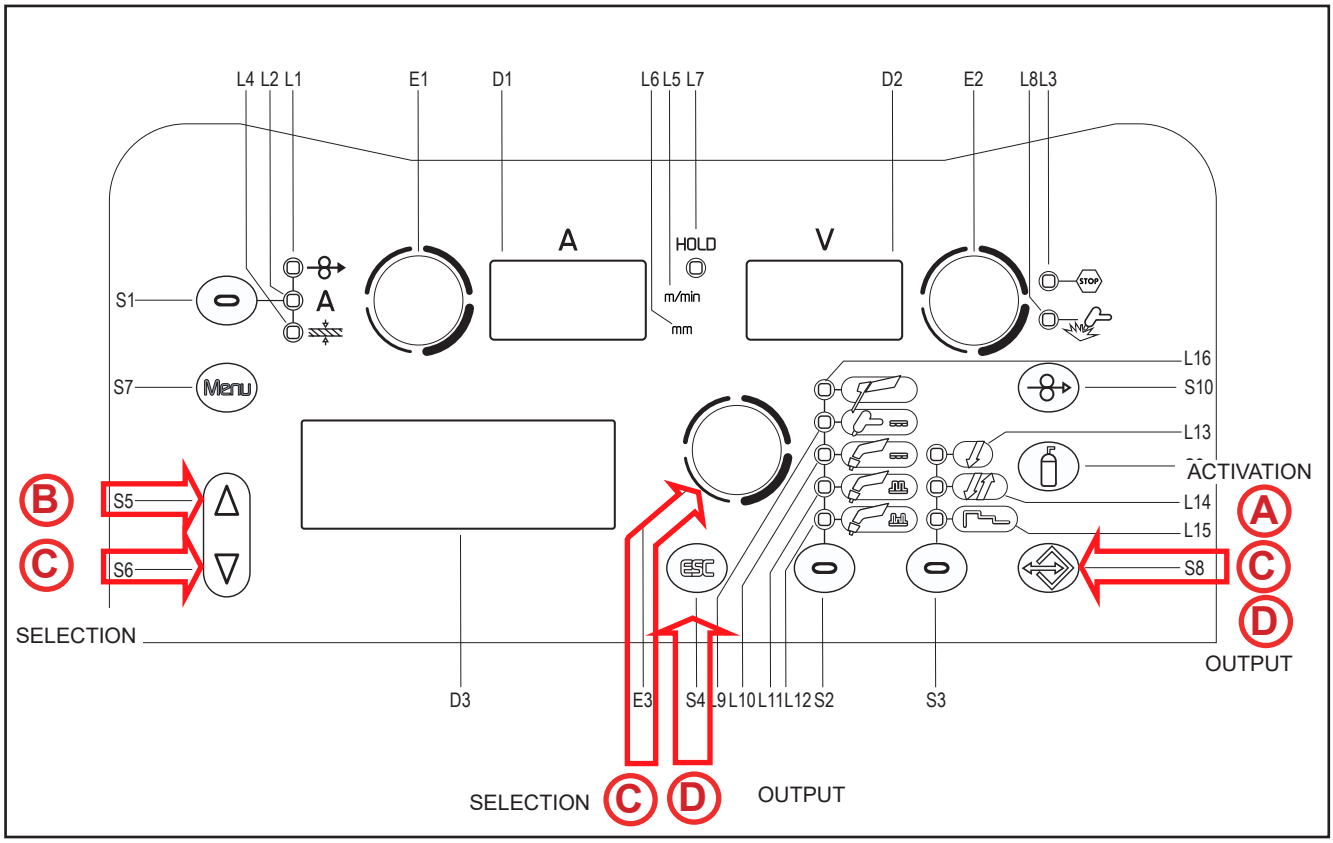
PARAMETER	MIN	DEFAULT	MAX
DOWN SLOPE	0.0 s	0.0 s	25.0 s
I FINAL	5 %	5 %	80 %
POST GAS	0.0 s	10.0 s	10.0 s

12 JOBS MANAGEMENT

Personalised welding settings, or JOBs, can be saved in memory locations and subsequently uploaded. Up to 99 jobs can be saved (j01-j99). The settings of the SETUP menu are not saved.
JOBs can be managed only when the unit is not in welding mode.

12.1 SAVING A JOB

This function is available when welding mode is not active.



A	○ Hold down **S8** to activate the job menu. ➲ The job menu appears in display: **D3**.
B	○ Press buttons **S5** and **S6** to select parameter **OPT**. ➲ The selected parameter is shown by the following symbol " ➔ ".
C	○ Use the **encoder E3**, to select the **SAVE** function. ○ Press buttons **S5** and **S6** to select parameter **JOB**. ○ Use the **encoder E3**, to select the position of the job to be renamed. ○ Hold down **S8** for 3 seconds. ➲ The first letter of the name blinks. ○ Use the **encoder E3**, to change the letter. ○ Press buttons **S5** and **S6** to select the character to be changed.

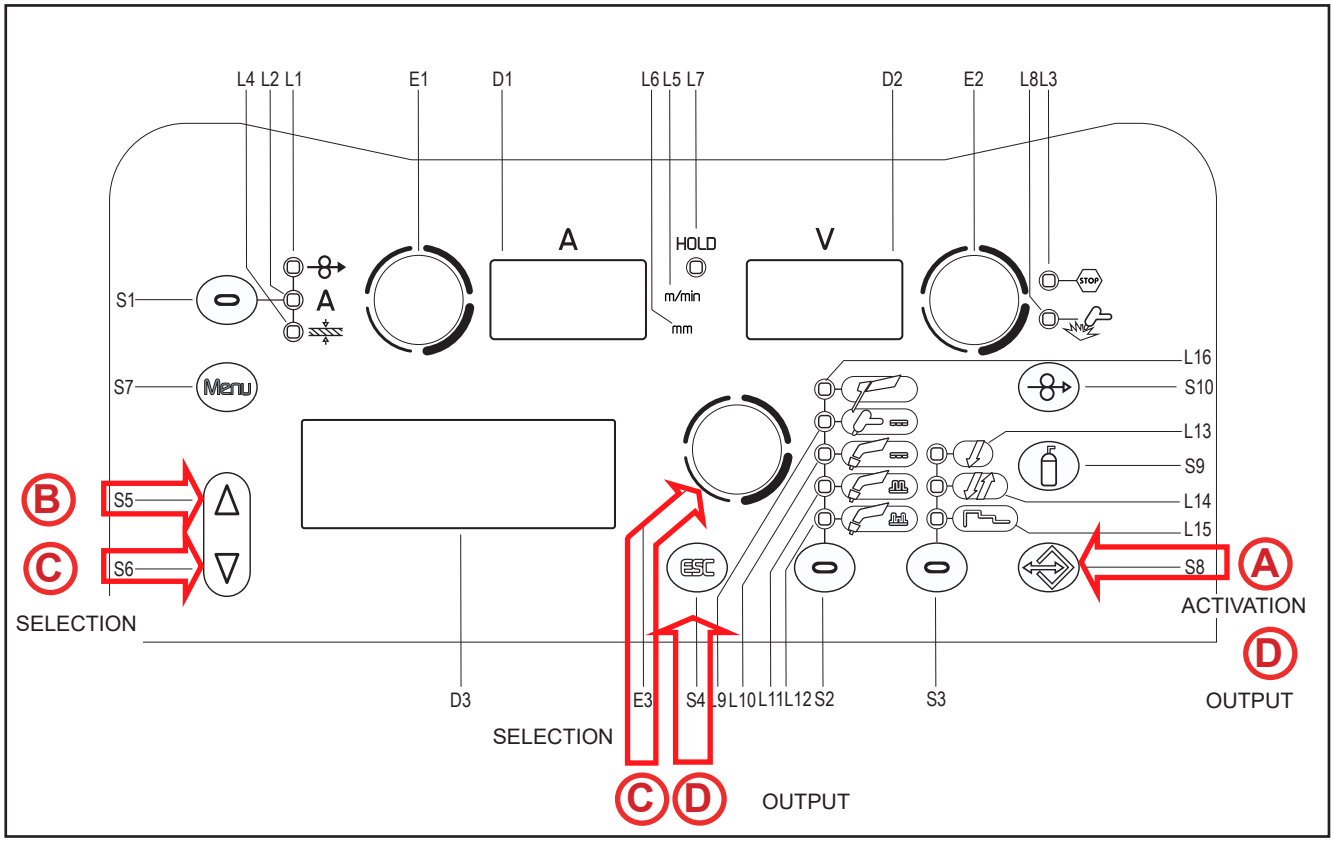
D	**Exit without confirmation** ○ Press the **S4** button (ESC). ➲ Return to the job menu. ○ Press the **S4** button (ESC). **Exit with confirmation** ○ Hold down **S8** for 3 seconds. ➲ This action will automatically close the menu ○ Press the **S8** button.

12.2 LOADING A USER JOB

If using a torch with UP/DOWN buttons you can scroll through the uploaded JOBs.
You can quit the uploaded job with the following methods:

- turn encoders **E1** - **E2** to change the welding current or voltage.
- press the welding mode selection button (button S6).
- Press the following button: (ESC)

If there are no JOBS loaded, the UP/DOWN buttons on the torch serve to adjust the welding current.
This function is available when the welding mode is disabled.

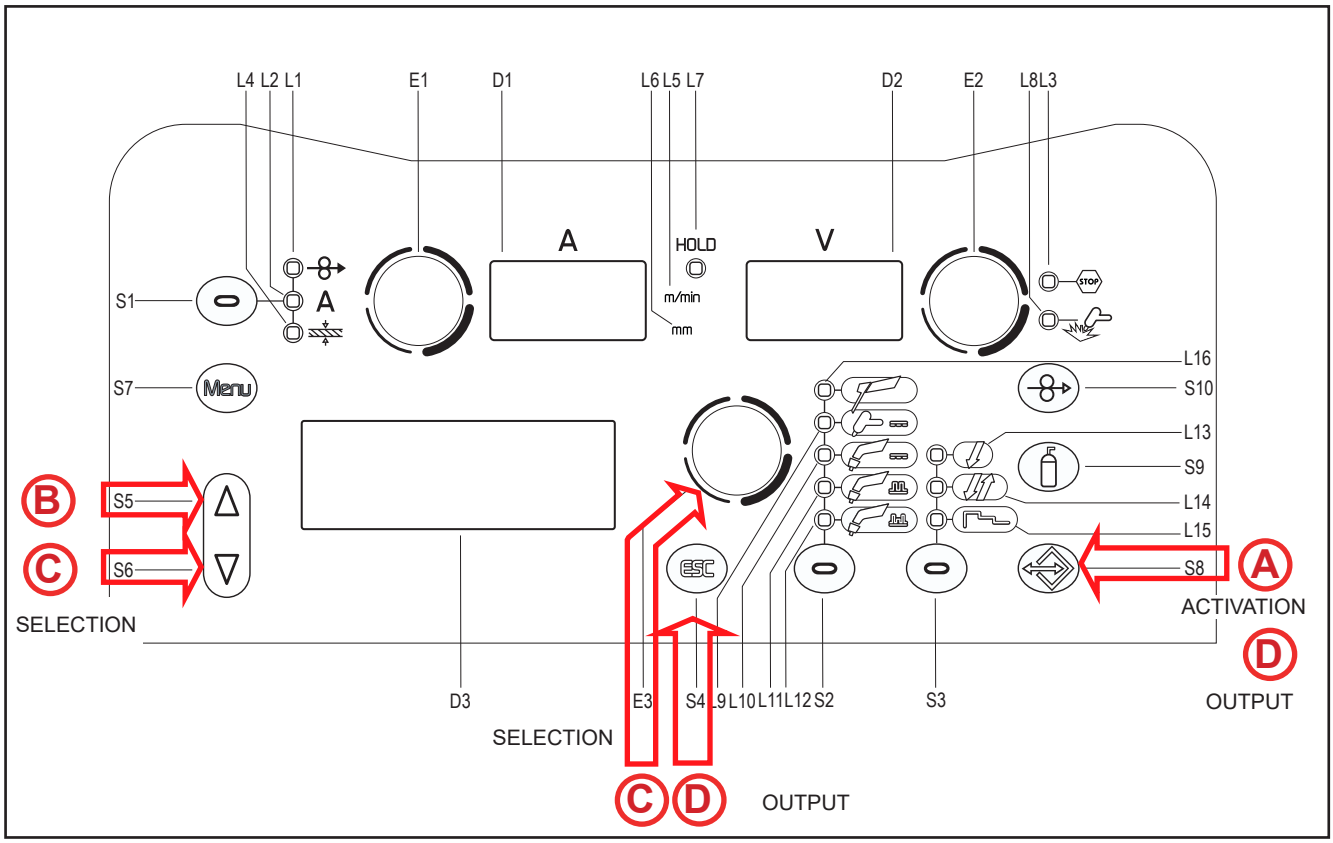


A	○ Hold down **S8** to activate the job menu. ➲ The job menu appears in display: **D3**.
B	○ Press buttons **S5** (△) and **S6** (▽) to select parameter **OPT**. ➲ The selected parameter is shown by symbol " ➔ ".

C	○ Use the **encoder E3**, to select the **LOAD** function. ○ Press buttons **S5** △ and **S6** ▽ to select parameter **JOB**. ➲ The JOB displayed is the one that was most recently used. ➲ When there are no saved jobs the following message appears on the bottom line: **NO JOB** ○ Using the **encoder E3**, select one of the jobs displayed.
D	**Exit without confirmation** ○ Press the **S4** button ESC. ➲ This action will automatically close the menu **Exit with confirmation** ○ Press the **S8** button. ➲ This action will automatically close the menu

12.3 DELETING A JOB

This function is available when welding mode is not active.



A	○ Hold down **S8** to activate the job menu. ➲ The job menu appears in display: **D3**.
B	○ Press buttons **S5** △ and **S6** ▽ to select parameter **OPT**. ➲ The selected parameter is shown by symbol " ➔ ".
C	○ Use the **encoder E3**, to select the **DELETE** function. ○ Press buttons **S5** △ and **S6** ▽ to select parameter **JOB**. ➲ The JOB displayed is the one that was most recently used. ➲ When there are no saved jobs the following message appears on the bottom line: **NO JOB** ○ Using the **encoder E3**, select one of the jobs displayed.

Ⓓ	**Exit without confirmation** ○ Press the **S4** button (ESC). ➲ This action will automatically close the menu **Exit with confirmation** ○ Press the **S8** button. ➲ This action will automatically close the menu

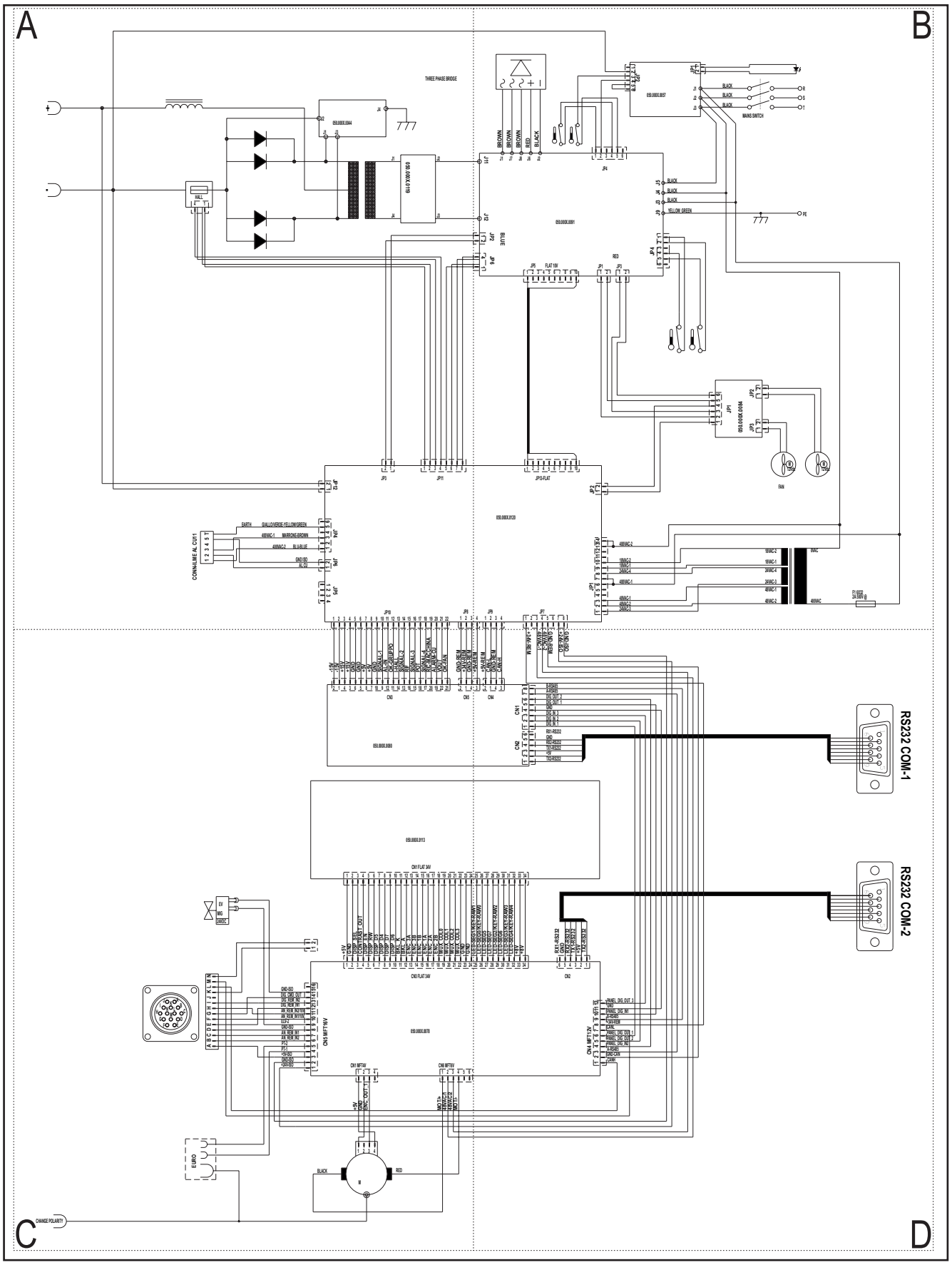
13 TECHNICAL DATA

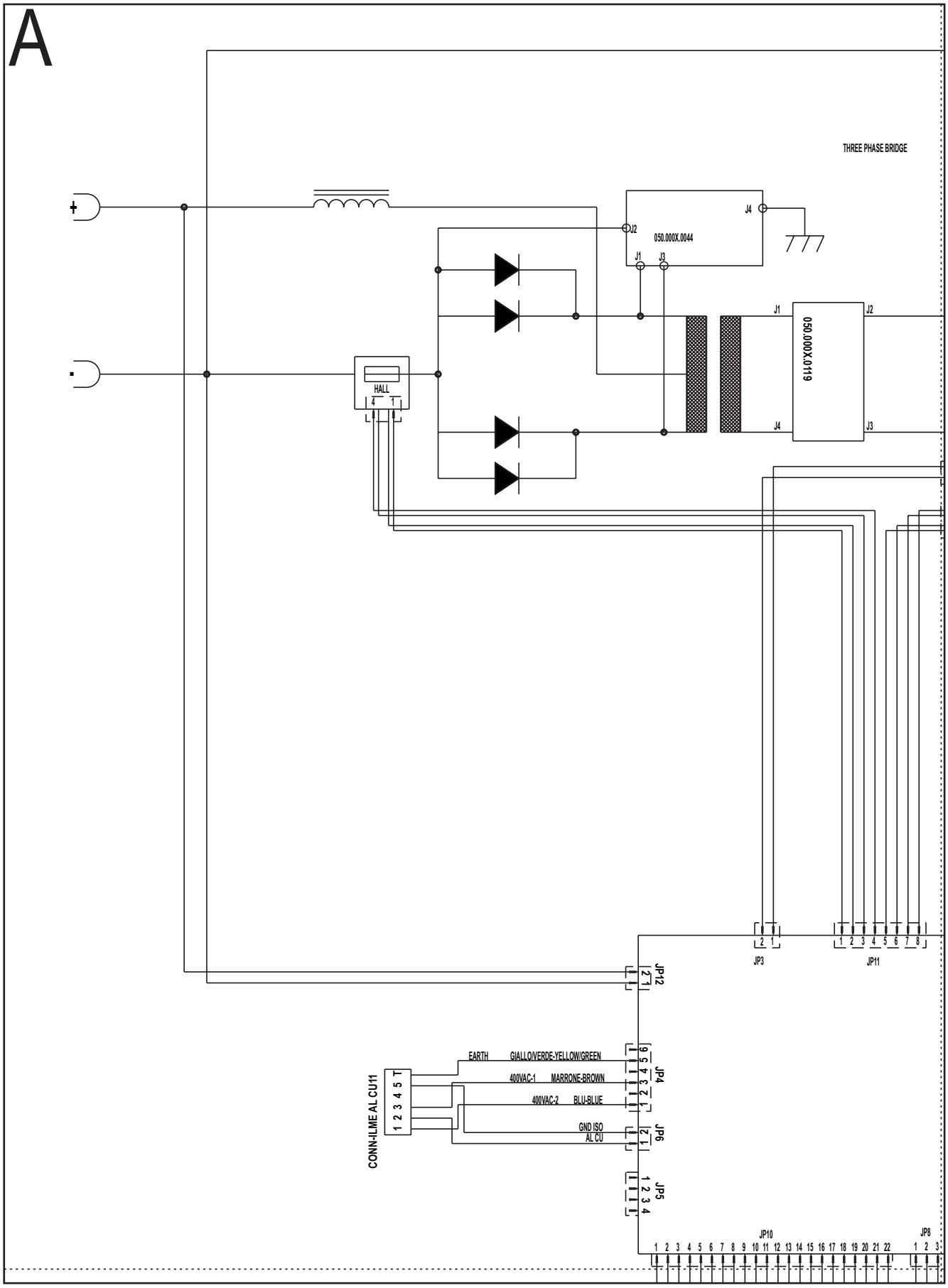
Directives applied	Waste electrical and electronic equipment (WEEE)
	Electromagnetic compatibility (EMC)
	Low voltage (LVD)
	Restriction of the use of certain hazardous substances (RoHS)
Construction standards	EN 60974-1; EN 60974-5; EN 60974-10 Class A
Conformity markings	CE Equipment compliant with European directives in force
	S Suitable in an environment with increased hazard of electric shock
	Compliant with WEEE directive
	RoHS Equipment compliant with RoHS directive

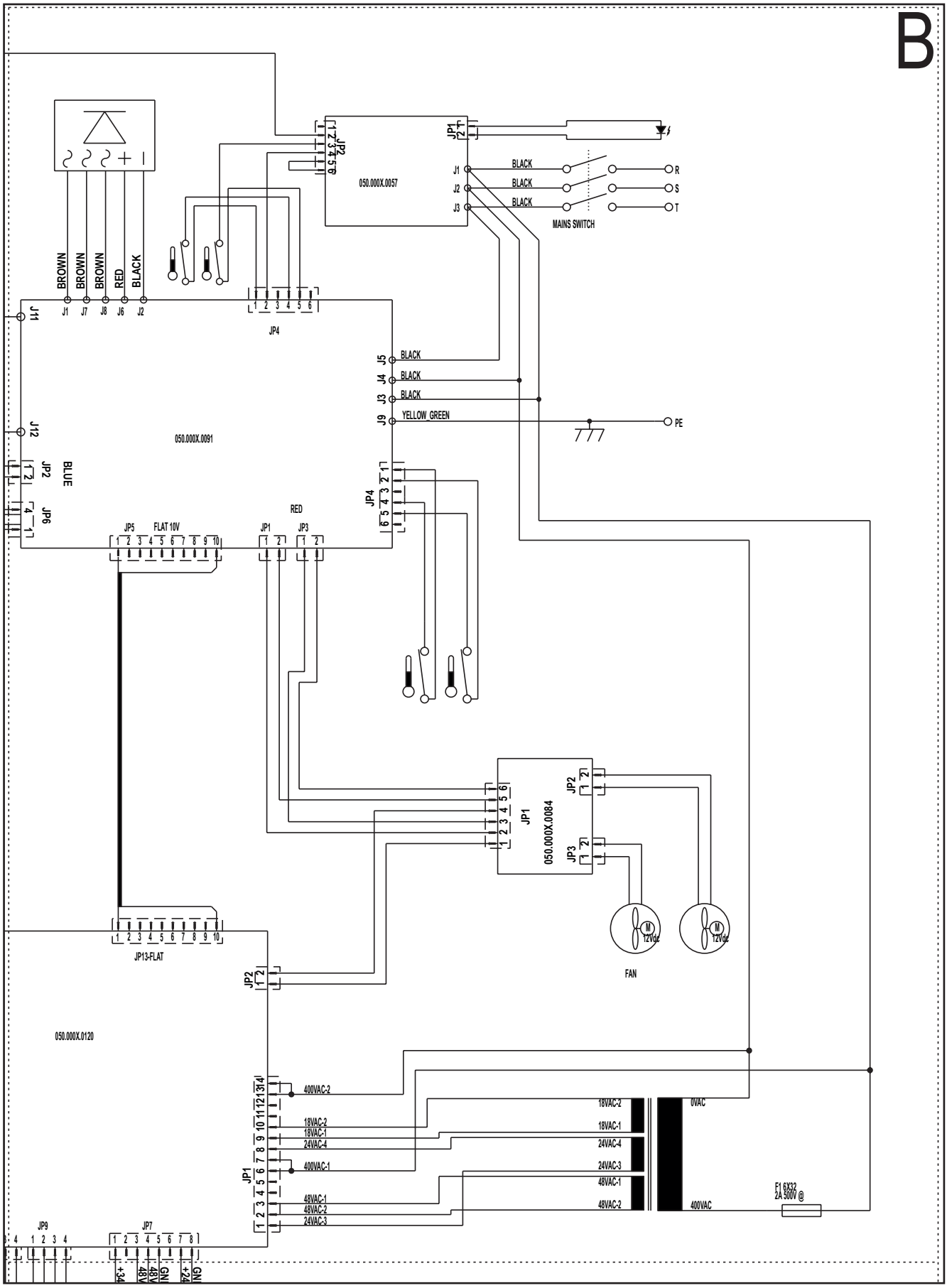
Supply voltage	3 x 400 Va.c. ± 15 % / 50-60 Hz			
Mains protection	16 A Delayed			
Zmax	This equipment complies with IEC 61000-3-12 provided that the maximum permissible system impedance is less than or equal to 158 mΩ at the interface point between the user's supply and the public system. It is the 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 158 mΩ.			
Dimensions (D x W x H)	560 x 280 x 390 mm			
Weight	24.0 kg			
Insulation class	H			
Protection rating	IP23			
Cooling	AF: Air-over cooling (fan assisted)			
Maximum gas pressure	0,5 MPa (5 bar)			
Static characteristic	MMA Falling characteristic			
	TIG Falling characteristic			
	MIG/MAG Flat characteristic			
Welding mode		MMA	TIG	MIG/MAG
Current and voltage adjustment range		10 A - 20.4 V 250 A - 30.0 V	10 A - 10.4 V 250 A - 20.0 V	5 A - 14.2 V 300 A - 29.0 V
Welding current / Working voltage	35% (40° C)	---	---	300 A - 29.0 V
	40% (40° C)	250 A - 30.0 V	---	---
	50% (40° C)	---	250 A - 20.0 V	---
	60% (40° C)	220 A - 28.8 V	240 A - 19.6 V	230 A - 25.5 V
	100% (40° C)	190 A - 27.6 V	210 A - 18.4 V	200 A - 24.0 V
Maximum input power	35% (40° C)	---	---	10.3 kVA – 9.7 kW
	40% (40° C)	8.7 kVA – 8.4 kW	---	---
	50% (40° C)	---	6.1 kVA -5.8 kW	---
	60% (40° C)	7.3 kVA – 7.0 kW	5.8 kVA – 5.5 kW	6.9 kVA – 6.5 kW
	100 % (40° C)	6.1 kVA -5.8 kW	4.8 kVA – 4.5 kW	5.8 kVA – 5.5 kW

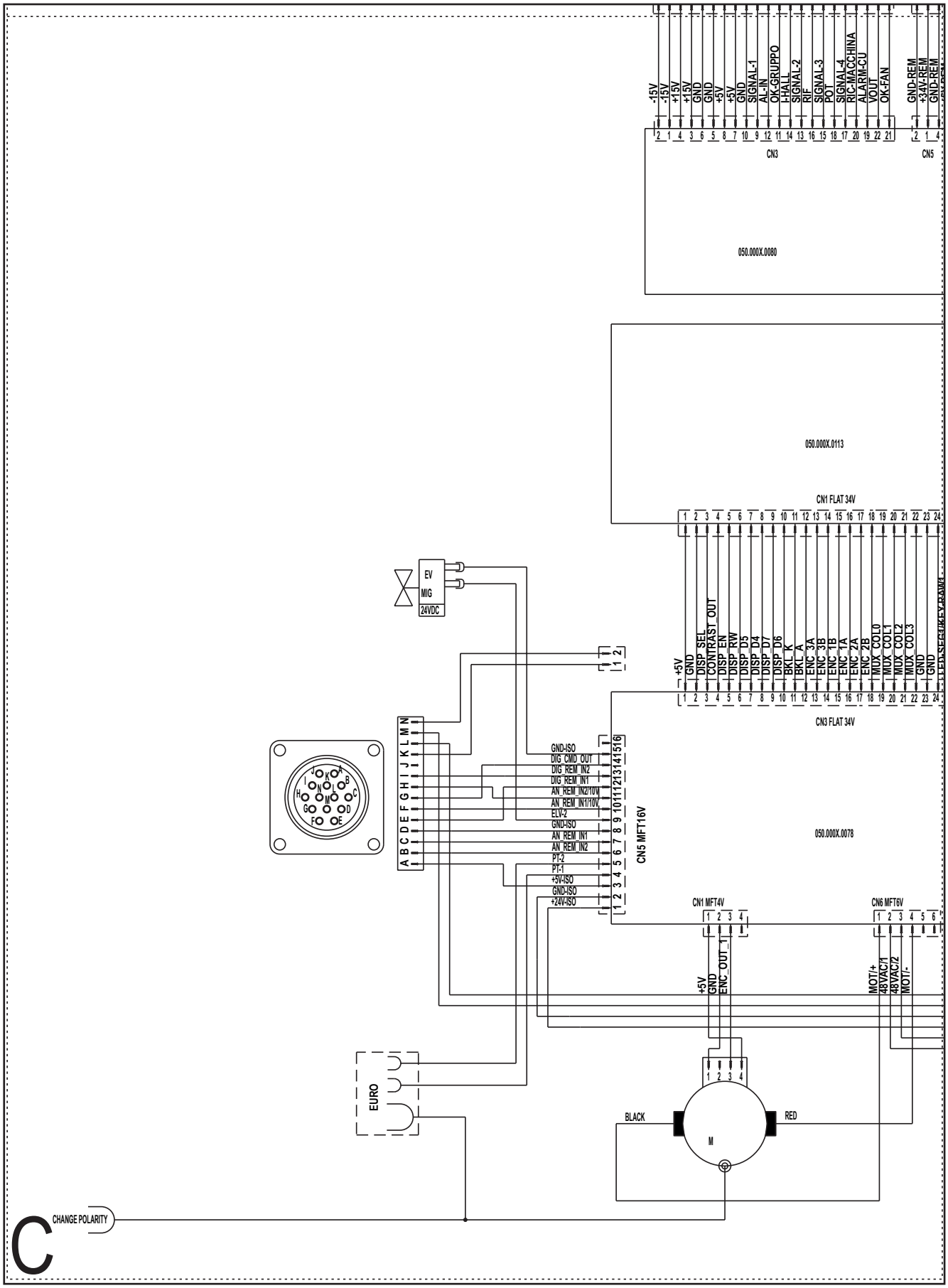
Maximum input current	35% (40° C)			15.0 A
	40% (40° C)	12.7 A		
	50% (40° C)		8.8 A	
	60% (40° C)	10.6 A	8.3 A	10.0 A
	100 % (40° C)	8.8 A	6.8 A	8.4 A
Actual input current	35% (40° C)			8.8 A
	40% (40° C)	8.0 A		
	50% (40° C)		6.2 A	
	60% (40° C)	8.2 A	6.4 A	7.7 A
	100 % (40° C)	8.8 A	6.8 A	8.4 A
No-load voltage (U0)		60 V		
Reduced no-load voltage (Ur)		11 V		
Power source efficiency	Efficiency (300A / 29,0V): 87,8%			
	No-Load condition power consumption (U1= 400 Va.c.): 30 W			
Essential raw materials	According to the information provided by our suppliers, this product does not contain essential raw materials in quantities greater than 1g per component.			

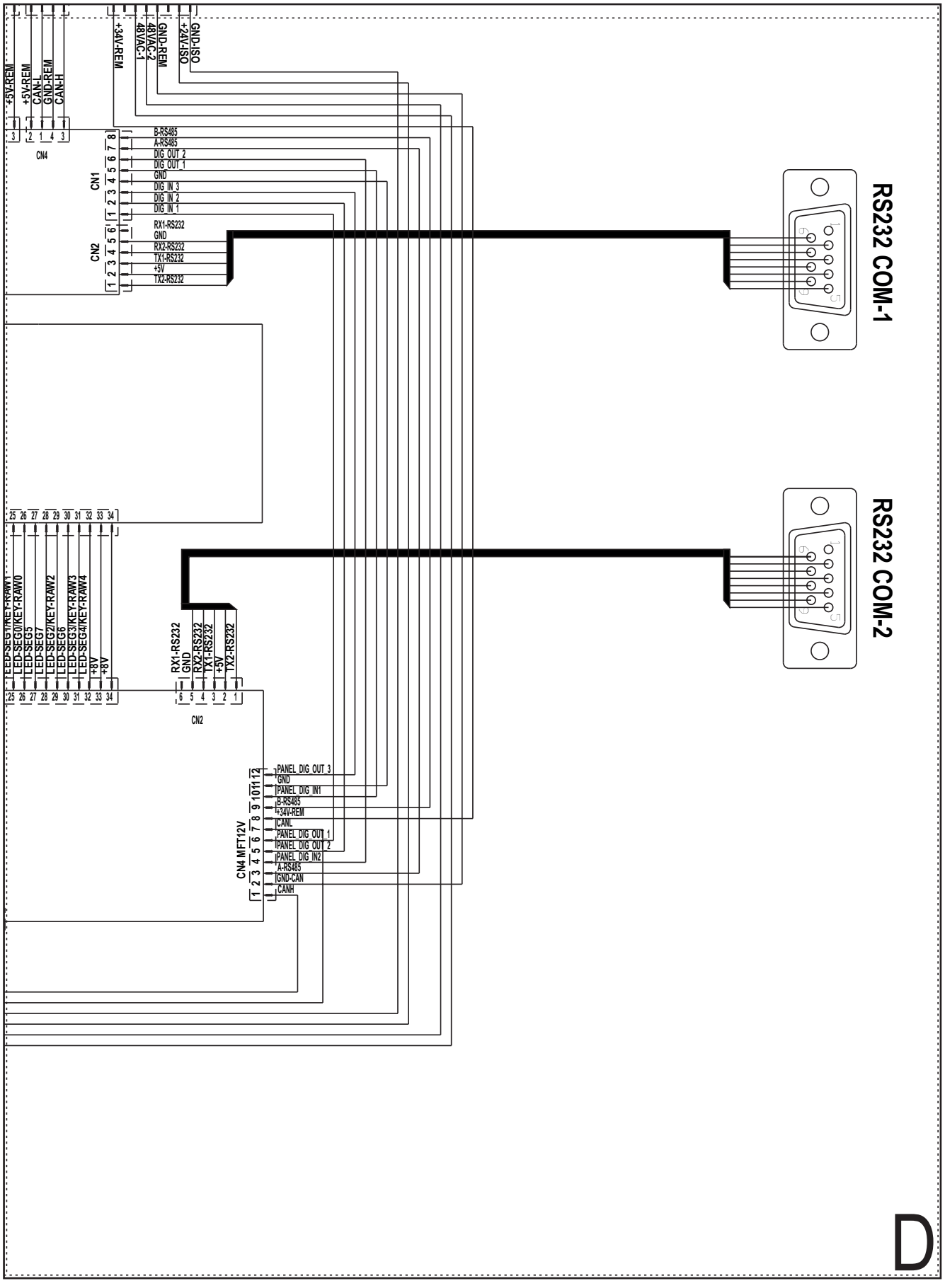
14 WIRING DIAGRAM



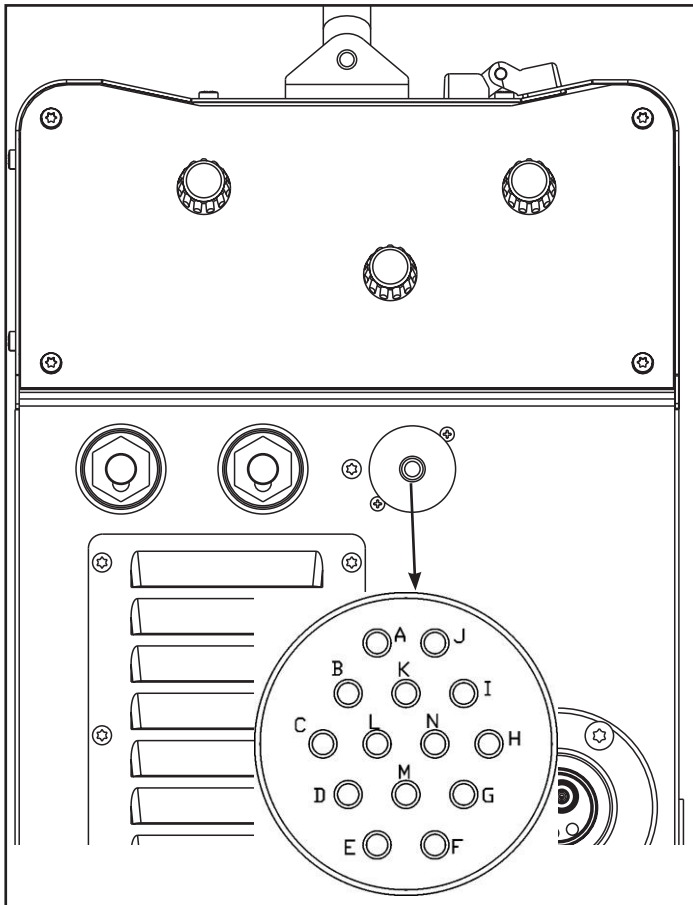

A
THREE PHASE BRIDGE
+
-
J4
J2
050.000X.0044
J1
J3
J1
J2
050.000X.0119
J4
J3
HALL
4
1
JP3
JP11
JP12
EARTH
GIALLO/VERDE-YELLOW/GREEN
400VAC-1
MARRONE-BROWN
400VAC-2
BLU-BLUE
GND ISO
AL CU
JP4
JP6
JP5
CONN-ILME AL CU11
1 2 3 4 5 T
JP10
JP8


B
050.000X.0057
050.000X.0091
050.000X.0084
050.000X.0120
BROWN
BROWN
BROWN
RED
BLACK
BLACK
BLACK
BLACK
YELLOW GREEN
BLUE
RED
MAINS SWITCH
R
S
T
PE
FAN
JP1
JP2
JP3
JP4
JP5
JP6
JP7
JP9
JP13-FLAT
FLAT 10V
400VAC-2
18VAC-2
18VAC-1
24VAC-4
400VAC-1
48VAC-1
48VAC-2
24VAC-3
0VAC
400VAC
F1 6X32
2A 500V @


-15V
-15V
+15V
+15V
GND
GND
+5V
+5V
GND
SIGNAL-1
AL-IN
OK-GRUPPO
I-HALL
SIGNAL-2
RIF
SIGNAL-3
POT
SIGNAL-4
RIC-MACCHINA
ALARM-CU
VOUT
OK-FAN
GND-REM
+34V-REM
GND-REM
CN3
CN5
050.000X.0080
050.000X.0113
CN1 FLAT 34V
+5V
GND
DISP_SEL
CONTRAST_OUT
DISP_EN
DISP_RW
DISP_D5
DISP_D4
DISP_D7
DISP_D6
BKL_K
BKL_A
ENC_3A
ENC_3B
ENC_1B
ENC_1A
ENC_2A
ENC_2B
MUX_COL0
MUX_COL1
MUX_COL2
MUX_COL3
GND
GND
CN3 FLAT 34V
EV
MIG
24VDC
GND-ISO
DIG_CMD_OUT
DIG_REM_IN2
DIG_REM_IN1
AN_REM_IN2/10V
AN_REM_IN1/10V
ELV-2
GND-ISO
AN_REM_IN1
AN_REM_IN2
PT-2
PT-1
+5V-ISO
GND-ISO
+24V-ISO
CN5 MFT16V
050.000X.0078
CN1 MFT4V
CN6 MFT6V
+5V
GND
ENC_OUT_1
MOT/+
48VAC/1
48VAC/2
MOT/-
EURO
BLACK
RED
M
CHANGE POLARITY
C

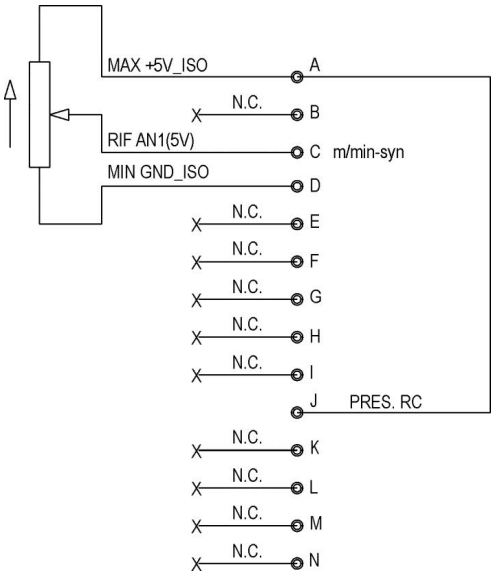

+5V-REM
+5V-REM
CAN-L
GND-REM
CAN-H
CN4
+24V-REM
48VAC-1
48VAC-2
GND-REM
GND-ISO
+24V-ISO
CN1
CN2
B-RS485
A-RS485
DIG OUT 2
DIG OUT 1
GND
DIG IN 3
DIG IN 2
DIG IN 1
RX1-RS232
GND
RX2-RS232
TX1-RS232
+5V
TX2-RS232
RS232 COM-1
RS232 COM-2
LED-SEG7/KEY-RAW1
LED-SEG0/KEY-RAW0
LED-SEG5
LED-SEG7
LED-SEG2/KEY-RAW2
LED-SEG6
LED-SEG3/KEY-RAW3
LED-SEG4/KEY-RAW4
+8V
+8V
RX1-RS232
GND
RX2-RS232
TX1-RS232
+5V
TX2-RS232
CN2
CN4 MFT12V
PANEL DIG OUT 3
GND
PANEL DIG IN1
B-RS485
+24V-REM
CANL
PANEL DIG OUT 1
PANEL DIG OUT 2
PANEL DIG IN2
A-RS485
GND-CAN
CANH
D

14.1 REMOTE CONTROL



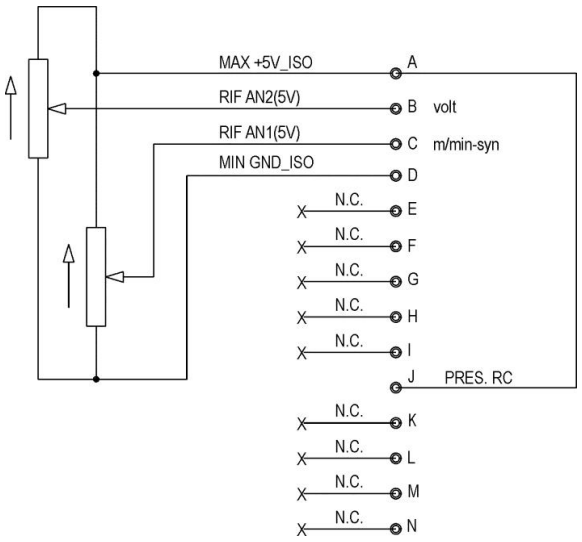
Pin	Name	Voltage	Input/Output
A	+5V-ISO	5 V d.c.	Out
B	AN REM IN2	0-5 V	In
C	AN REM IN1	0-5 V	In
D	GND-ISO	GND	Out
E	DIG REM IN1	0-5 V	In
F	AN REM IN1/10V	0-10 V	In
G	DIG CMD OUT	0-5 V	Out
H	AN REM IN2/10V	0-10 V	In
I	DIG REM IN2	0-5 V	In
J	-	-	Not use
K	-	-	Not use
L	-	-	Not use
M	-	-	Not use
N	-	-	Not use

14.1.1 RC03: Wiring diagram



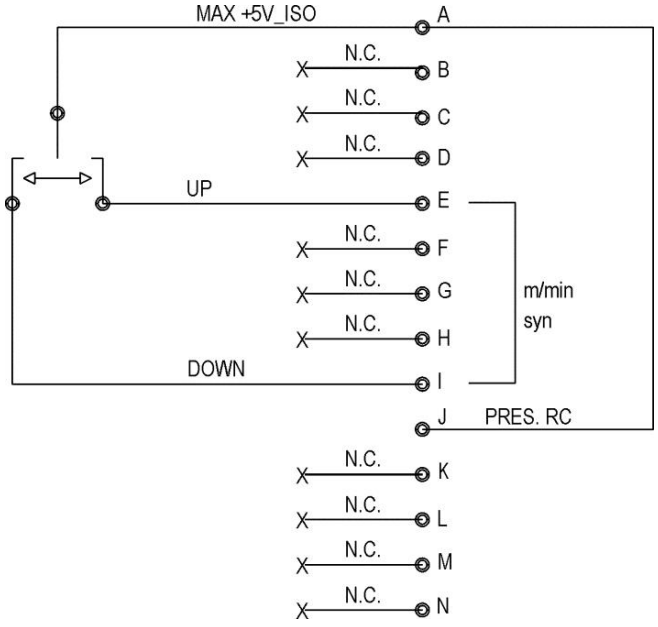
10 kOhm - 100 kOhm potentiometer

14.1.2 RC04: Wiring diagram

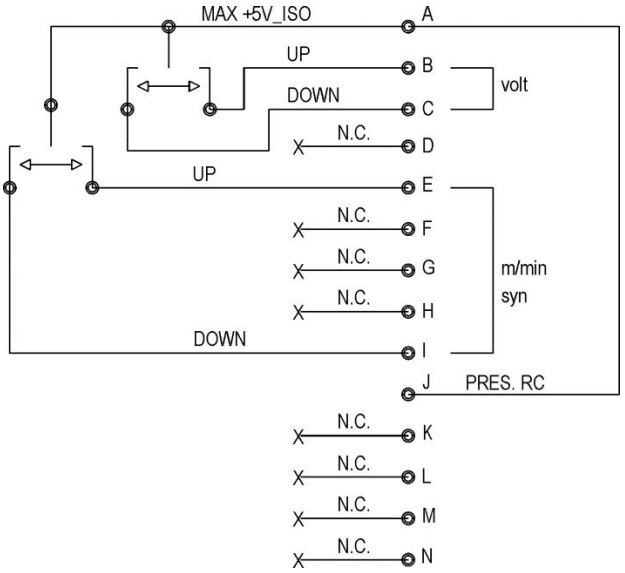


10 kOhm - 100 kOhm potentiometer

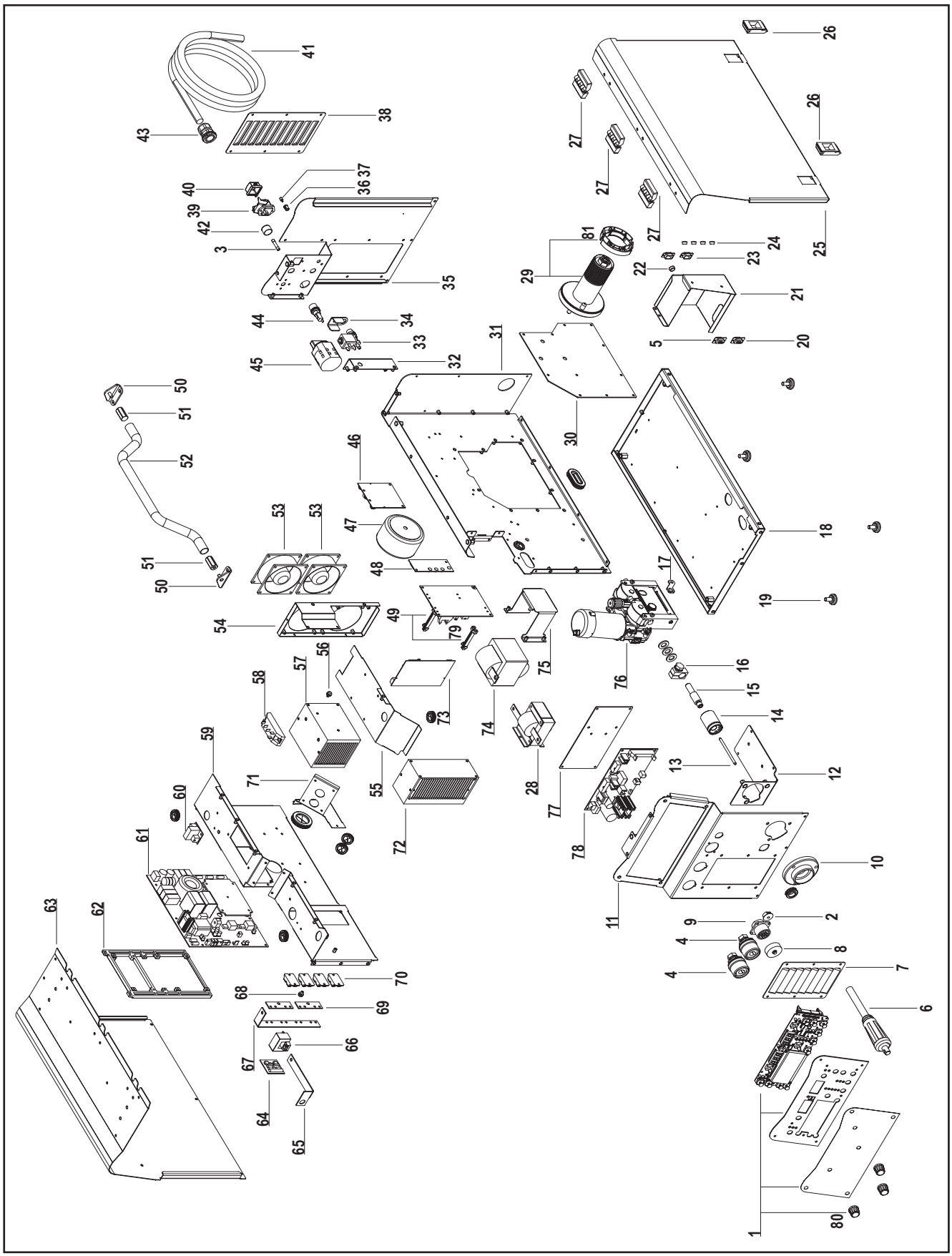
14.1.3 RC05: Wiring diagram



14.1.4 RC06: Wiring diagram

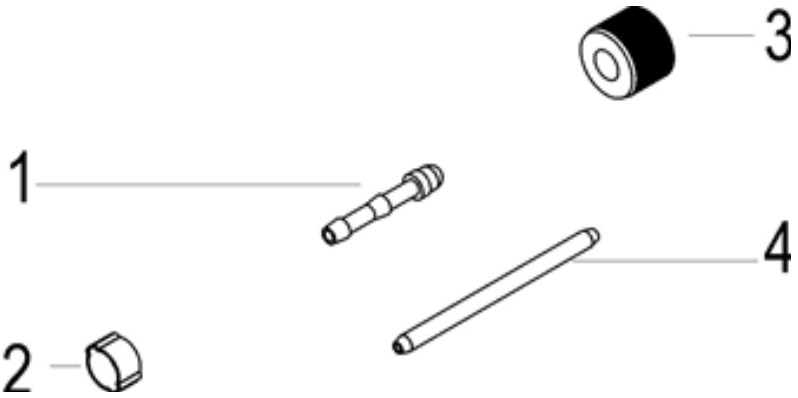


15 SPARE PARTS



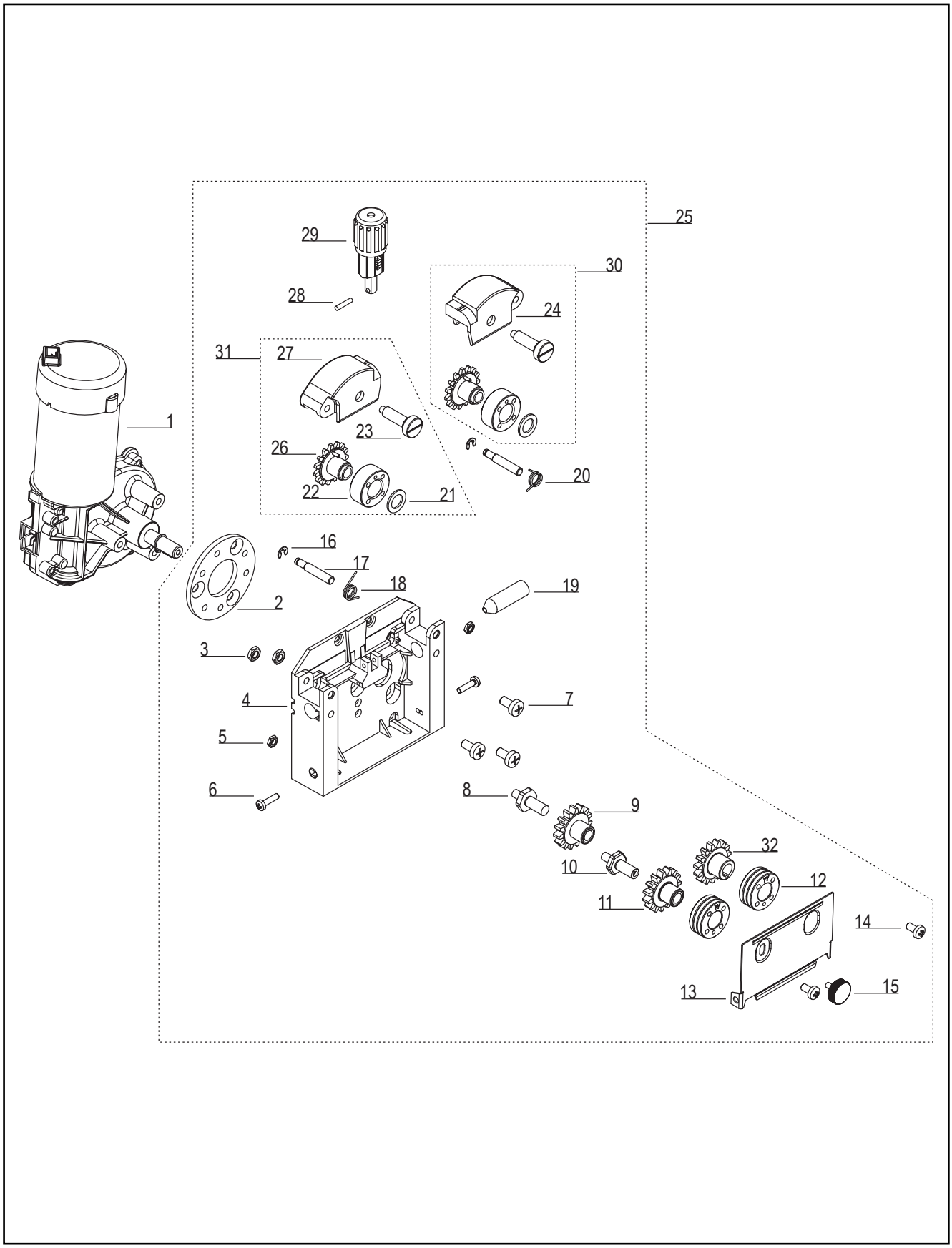
No.	CODE	DESCRIPTION
1	050.5121.0000	COMPLETE FRONT LOGIC PANEL
2	016.0011.0014	CAP
3	040.0007.1160	FUSE
4	021.0001.0259	COMPLETE FIXED SOCKET
5	022.0002.0270	RS232 CABLE (COM1)
6	022.0002.0055	POLARITY SELECTOR CABLE
7	011.0009.0208	BLIND METAL FRONT PLATE
8	021.0004.2994	REMOTE CONNECTOR CAP
9	022.0002.0266	REMOTE LOGIC CABLE
10	021.0001.2005	PLASTIC HOUSING
11	011.0009.0221	FRONT PLATE
12	011.0009.0224	MOTOR SUPPORT PLATE
13	021.0001.2028	CAPILLARY TUBE FOR EURO CONNECTOR
14	021.0001.2001	AXIAL GAS BODY
15	021.0001.2015	BRASS GUIDE FOR EURO CONNECTOR
16	021.0001.2010	CURRENT CLAMP FOR BRASS GUIDE
17	011.0002.0037	BRASS GUIDE BLOCK BRACKET
18	011.0009.0200	BOTTOM COVER
19	016.0009.0003	RUBBER FOOT
20	022.0002.0153	RS232 CABLE (COM2)
21	011.0009.0222	FRONT PROTECTION PLATE
22	016.0011.0008	CAP Ø=12
23	021.0014.0302	RS232 CONNECTOR CAP
24	016.0011.0001	CAP Ø=10
25	011.0000.0891	DOOR PLATE
26	011.0006.0002	PLATE SLIDE CLOSURE
27	011.0006.0006	PLASTIC HINGE
28	044.0004.0013	INDUCTANCE
29	011.0006.0062	SPOOL SUPPORT
30	011.0009.0219	INTERNAL PLATE
31	011.0009.0220	INTERNAL SUPPORT PLATE
32	011.0009.0203	REAR FIXING PLATE
33	017.0001.5542	SOLENOID VALVE
34	011.0002.0018	SOLENOID VALVE BLOCK PLATE
35	011.0009.0202	REAR PLATE
36	016.4107.0001	LED HOLDER
37	022.0002.0198	RED LED CABLE
38	011.0009.0206	BLIND METAL REAR PLATE
39	022.0002.0073	C.U. POWER SUPPLY WIRING
40	021.0013.0007	C.U. POWER CONNECTOR CAP
41	045.0002.0005	NEOPRENE CABLE
42	016.0011.0004	FUSE HOLDER CAP
43	045.0000.0007	COMPLETE CABLE CLAMP
44	040.0006.1880	FUSE HOLDER
45	040.0001.0015	THREE-POLE SWITCH
46	050.0002.0057	THREE-PHASE POWER INPUT PROTECTION BOARD
47	041.0006.0009	AUXILIARY TRANSFORMER
48	050.0002.0119	PRIMARY CAPACITOR BOARD
49	050.0001.0120	BUS BOARD
50	011.0009.0213	HANDLE TUBE SUPPORT PLATE
51	016.0002.0001	PIN
52	011.0009.0214	HANDLE TUBE
53	003.0002.0015	FAN
54	011.0009.0207	FANS SUPPORT PLATE
55	011.0009.0204	INTERNAL DEFLECTOR PLATE

56	040.0003.1003	THERMAL CUT-OUT 75°C
57	015.0001.0013	HEAT SINK
58	032.0001.8215	THREE PHASE BRIDGE RECTIFIER
59	011.0009.0209	DEFLECTOR PLATE
60	050.0001.0084	FAN CONTROL BOARD
61	050.0003.0091	POWER BOARD
62	012.0003.0000	INTERNAL FRAMES
63	011.0000.0881	COVER PLATE
64	050.0003.0044	SNUBBER BOARD
65	045.0006.0079	HALL-SOCKET COPPER BRACKET
66	041.0004.0501	HALL EFFECT SENSOR
67	045.0006.0078	DIODES-HALL COPPER BRACKET
68	040.0003.1007	THERMAL CUT-OUT 85°C
69	045.0006.0053	DIODES-TRANSFORMER COPPER BRACKET
70	032.0002.2403	ISOTOP DIODE
71	011.0009.0205	OBLIQUE PLATE FOR DEFLECTOR
72	015.0001.0014	HEAT SINK
73	050.0023.0080	PULSE BOARD
74	042.0003.0003	POWER TRANSFORMER
75	011.0009.0121	TRANSFORMER SUPPORT PLATE
76	002.0000.0019	WIRE FEED MOTOR
77	011.0009.0223	MOTOR BOARD SUPPORT PLATE
78	050.0024.0078	MOTOR BOARD
79	040.0003.1003	BOARDS SUPPORT GUIDE
80	014.0002.0002	KNOB WITHOUT POINTER
81	002.0000.0287	RINGNUT FOR SPOOL SUPPORT



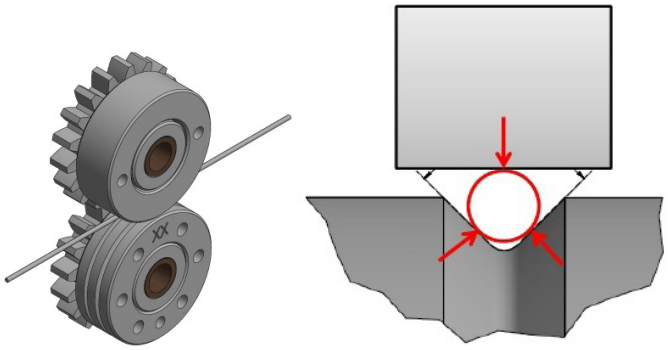
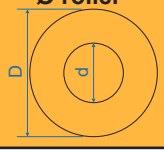
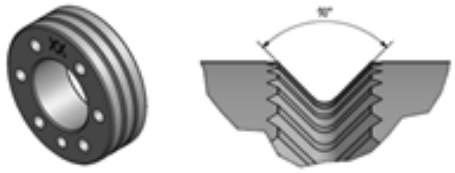
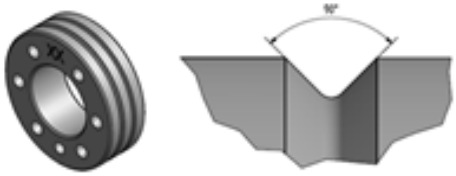
No.	CODE	DESCRIPTION
	021.0000.0009	TORCH CONNECTORS COMPLETE KIT
1	016.5001.0822	HOSE ADAPTOR 1/4
2	016.0007.0001	HOSE CLAMP Ø= 11-13
3	016.5001.0823	NUT 1/4
4	021.0001.2028	CAPILLARY TUBE

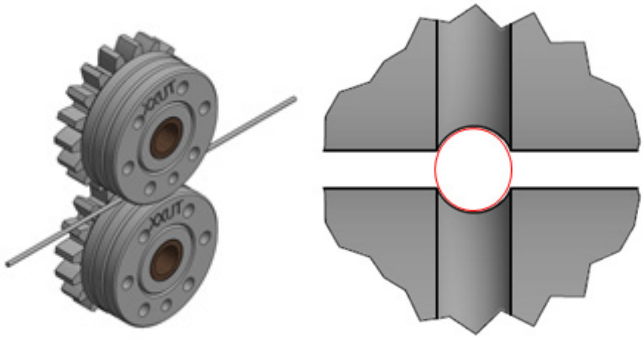
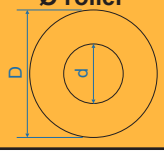
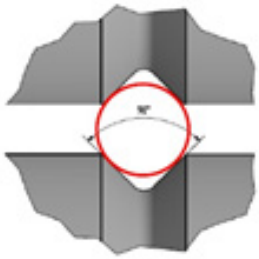
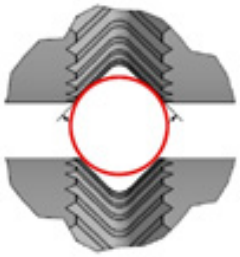
15.1 WIRE FEEDER MOTOR

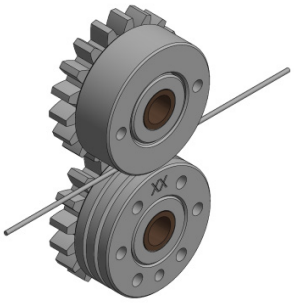
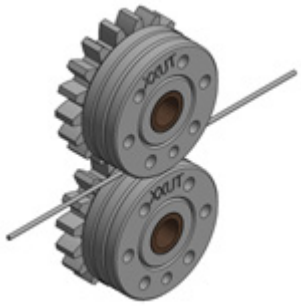
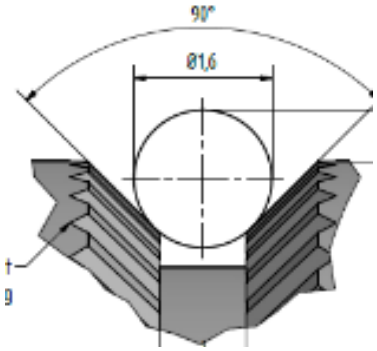
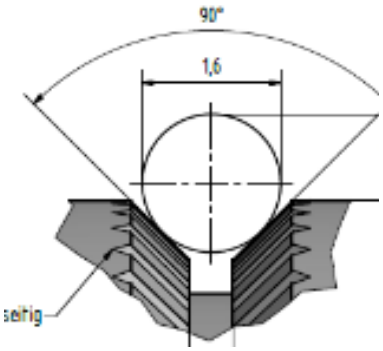
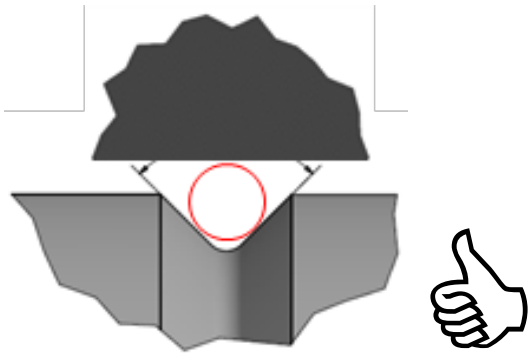
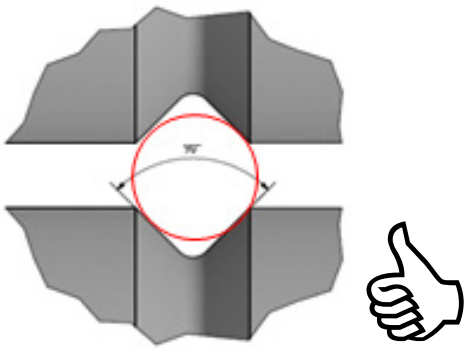
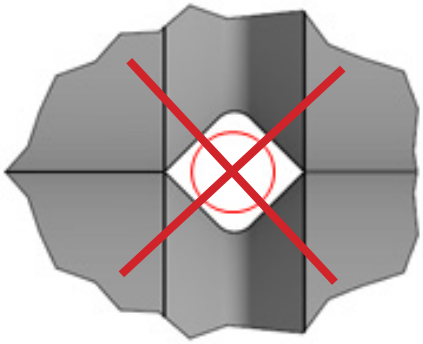
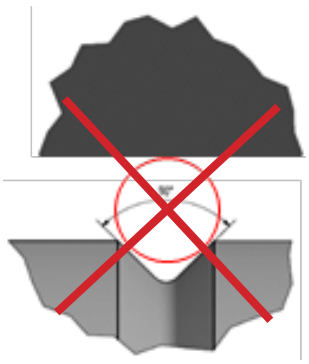


No.	CODE	DESCRIPTION
1	002.0000.0353	MOTOR COIL
2	002.0000.0308	DISTANCE RING
3	002.0000.0349	NUT M6
5	002.0000.0348	NUT M5
4	002.0000.0327	FEED PLATE
6	002.0000.0347	SCREW M4x18
7	002.0000.0350	SCREW M6x12
8	002.0000.0341	SHAFT (1)
9	002.0000.0343	MAIN GEAR DRIVE
10	002.0000.0340	SHAFT (2)
11	002.0000.0342	GEAR DRIVE
12	002.0000.0121	FEED ROLL
13	002.0000.0345	INTERNAL PROTECTION PLATE
14	002.0000.0324	SCREW M5x10
15	002.0000.0346	RETAINING SCREW M5x6
16	002.0000.0352	SNAP RING 4 mm
17	002.0000.0336	JOINT AXLE
18	002.0000.0337	LEFT SPRING
19	002.0000.0297	INLET GUIDE WITH SOFT LINER
20	002.0000.0338	RIGHT SPRING
21	002.0000.0371	WASHER
22	002.0000.0370	PRESSURE ROLL
23	002.0000.0372	PRESSURE ROLL AXLE
24	002.0000.0368	RIGHT PRESSURE ARM
25	002.0000.0061	WIRE FEEDER BODY COMPLETE
26	002.0000.0369	GEAR WHEEL UPPER
27	002.0000.0367	LEFT PRESSURE ARM
28	002.0000.0319	PIN
29	002.0000.0339	COMPLETE PRESSURE DEVICE
30	002.0000.0366	COMPLETE RIGHT PRESSURE ARM
31	002.0000.0365	COMPLETE LEFT PRESSURE ARM
32	002.0000.0344	GEAR WHEEL UPPER

15.2 WIRE FEED ROLLERS

Dual drive roller (2 rollers with grooves, 2 flat rollers)			
			
Code	**Ø wire**	**Ø roller** 	**GROOVE TYPE**
002.0000.0119	0.6-0.8	D=30x12/d=14 V	
002.0000.0120	0.8-1.0	D=30x12/d=14 V	
002.0000.0121	1.0-1.2	D=30x12/d=14 V	
002.0000.0124	1.0-1.2	D=30x12/d=14 VK	
002.0000.0122	0.8-1.0	D=30x12/d=14 U	
002.0000.0123	1.0-1.2	D=30x12/d=14 U	
002.0000.0369	GEAR ADAPTOR FEED ROLL (BRONZE BUSHING)		
002.0000.0370	SMOOTH FOR DUAL DRIVE ROLLER		

Double driving roll (4 rolls with grooves) - RECOMMENDED SETUP			
			
Code	**Ø wire**	**Ø roller** 	**GROOVE TYPE**
002.0000.0170	1.0-1.2	D=30x12/d=14 V DOUBLE D.	
002.0000.0178	1.0-1.2	D=30x12/d=14 VK DOUBLE D.	
002.0000.0369	GEAR ADAPTOR FEED ROLL (BRONZE BUSHING)		

STANDARD FEED ROLLS VS TWIN FEED ROLLS	
Standard drive roller	Double drive roller
	
	
Wire centre position compared to the groove edge	
	
	

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