

Power ARC Series



GeKaMac®



PoWeR ARC 2800

Users Manual

Please Read and Understand This Manual
Before Operating The Welding Machine

www.gedikwelding.com

| | |
|--|-------|
| Introduction | 2 |
| Description | 2 |
| Technical data | 3 |
| Usage limits (IEC 60974-1) | 3 |
| How to lift up the machine | 3 |
| Open the packaging | 3 |
| Installation | 3 |
| Connection to the electrical supply | 3 |
| Instructions for use | 4 |
| Electrode welding (MMA) | 4 |
| TIG welding | 5 |
| Maintenance | 6 |
| Optional | 6 |
| The pointing out of any difficulties and their elimination | 6 |
| Digital interface PCB replacement | 6 |
| Wiring diagram (Power ARC 2800) | 7 |
| Wiring diagram (Power ARC 2800) | 8 |
| Key to the electrical diagram | 9 |
| Colour key | 9 |
| Meaning of graphic symbols on machine | 10 |
| Spare parts list | 11-12 |
| Ordering spare parts | 13 |

Introduction

Thank you for buying our product.

In order to get the best performance out of the plant and ensure the maximum lifespan of its parts, the use and maintenance instructions contained in this manual must be read and strictly complied with, as well as **the safety instructions contained in the relevant folder**. If repairs to the plant are required, we recommend that our clients contact our service centre work-shops, as they have the necessary equipment and personnel that are specifically trained and constantly updated.

All our machines and equipment are constantly developed and so changes may be made in terms of their construction and features.

Description

Powerful, compact, and light-weight - thanks to the innovative digital welding control the **Power ARC 2800** units are the highest performance and most technically advanced electrode weld-ing generators you can find.

Built according to the very latest IGBT based inverter technology, these DC power sources thanks to their excellent arc characteristics, are recommended for highest standard appli-cations with any electrode.

Suitable for use on work sites, in assembly plants, for welding tuning and maintenance, the **Power ARC 2800** units ensure com-plete stability of welding parameters and, thanks to their "dy- namic fast characteristics" they are ideal for quality welding using particularly difficult base and cellulosic electrodes. The **Power ARC 2800** units can also be used for TIG welding with a "Lift" type ignition.

FEATURES

- Innovative and compact design.
- Compact size and light weight for easy transportation (also with strap).
- Metallic main structure with shock-proof plastic front panel.
- Protective visor on the control panel.
- Robust handle integrated into the chassis.
- Digital ammeters and voltmeters are standard fittings, with pre-setting of welding current and saving of the latest value (Hold function).
- Digital control of all welding parameters.
- Possibility of saving the welding parameters (99 automatic welding points - JOBS).
- Self-diagnosis device.
- Exceptional welding characteristics for all types of electrode, including cellulosic.
- MMA welding:
 - "Arc Force" adjustable to select the best dynamic charac-teristics for the welding arc.
 - "Hot Start" adjustable to improve ignition with particularly difficult electrodes.
 - Anti-sticking function to avoid the electrodes sticking.
- TIG welding:
 - TIG welding using the innovative "Lift" type themally con-trolled ignition (TCS). Ignition comes about precisely and quickly, reducing the inclusions of tungsten to a minimum and doing away with incisions into the workpiece to be welded.
 - A synergic SWS (Smart welding stop) system that reduces electrode consumption and avoids oxidation of the weld-ed joint.
- Overheating thermostatic protection.
- Automatic compensation for mains voltage fluctuations with-in $\pm 20\%$.
- Safety barrier against excess voltage from mains.

- The vrd (Voltage Reduction Device) can be activated, which reduces voltages to below 12 V, which means that the weld-




ing machine can be used in ambient conditions in which there is a high electrical risk, thereby providing maximum operator safety.

- An “Energy Saving” function that only activates ventilation of the generator when necessary, making significant energy saving possible and reducing maintenance, due to the small quantity of dust and pollutants that are taken in.
- Can be connected to motor-powered generators of adequate capacity providing high dependability - 16 kVA (Power ARC 2800).
- Useable with power supply cables more than 100 m long.
- Reduced energy consumption.
- This generator also conforms to all the standards and directives in force in the European Community.

Technical data

The general technical data of the system are summarized in table 1.

Table 1

| Model | | Power ARC 2800 |
|--|----------|--|
| Three-phase input 50/60 Hz | V | 400 ± 20% |
| Mains supply: Z_{max} | Ω | 0,059 |
| Input power @ I_2 Max | kVA | 10,5 |
| Delayed fuse (I_2 @ 100%) | A | 10 |
| Power factor / cos ϕ | | 0,95 / 0,99 |
| Efficiency degree | η | 0,83 |
| Open circuit voltage | V | 100 |
| Current range | A | 5 ÷ 270 |
| Duty cycle @ 100% (40°C) | A | 190 |
| Duty cycle @ 60% (40°C) | A | 210 |
| Duty cycle @ 30% (40°C) | A | 270 |
| Usable electrodes | mm | 1,6 ÷ 5,0 |
| Standards | | IEC 60974-1 IEC 60974-10   |
| Protection class | | IP 23 S |
| Insulation class | | F |
| Dimensions  | | 430 - 390 - 185 |
| Weight | kg | 15 |

WARNING: This equipment complies with EN/IEC 61000-3-12 provided that the maximum permissible system impedance Z_{max} is less than or equal to 0,059 Ω 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 Z_{max} less than or equal to 0,059 Ω .

This system, tested according to EN/IEC 61000-3-3, meets the requirements of EN/IEC 61000-3-11.

Usage limits (IEC 60974-1)

The use of a welder is typically discontinuous, in that it is made up of effective work periods (welding) and rest periods (for the positioning of parts, the replacement of wire and underflushing operations etc. This welder is dimensioned to supply a I_2 max nominal current in complete safety for a period of work of 40% of the total usage time. The regulations in force establish the total usage time to be 10 minutes. The work cycle is considered to be 40% of this period of time. If the permitted work cycle time is exceeded, an overheat cut-off occurs to protect the components around the welder from dangerous overheating. Activation of thermal protection is signaled by “t° C” flashing on control panel display (for further information see the paragraph in the manual for the MX control panel). After sev-

eral minutes the overheat cut-off rearms automatically and the welder is ready for use again.

How to lift up the machine

The weld machine has a strong handle all in one with the frame, used for transporting the machine manually only.

NOTE: These hoisting and transportation devices conform to European standards. Do not use other hoisting and transportation systems.

Open the packaging

The system essentially consists of:

- Power ARC 2800 weld unit.
- Welding cables or RTA TIG torch (optional).
- Neck strap CB 2 (optional).

Upon receiving the system:

- Remove the welding generator and all relevant accessories-components from their packaging.
- Check that the weld machine is in good condition, if not report any problems immediately to the seller-distributor.
- Make sure all ventilation grilles are open and that no foreign bodies are blocking the air circulation.

Installation

The installation site for the system must be carefully chosen in order to ensure its satisfactory and safe use. The user is responsible for the installation and use of the system in accordance with the producer's instructions contained in this manual. Before installing the system the user must take into consideration the potential electromagnetic problems in the work area. In particular, we suggest that you should avoid installing the system close to:

- Signalling, control and telephone cables.
- Radio and television transmitters and receivers.
- Computers and control and measurement instruments.
- Security and protection instruments.

Persons fitted with pace-makers, hearing aids and similar equipment must consult their doctor before going near a machine in operation. The environment in which the equipment is installed must be suitable for the casing's protection level.

This system is cooled by means of the forced circulation of air, and must therefore be placed in such a way that the air may be easily sucked in and expelled through the apertures made in the frame.

The welding unit is characterised by the following levels:

- Protection level IP 23 S indicates that the equipment can be used both indoors and outdoors.
- Use class “S” means that the equipment can be used in conditions subject to heightened electrical shock.

Connection to the electrical supply

Connection of the machine to the user line (electrical current) must be performed by qualified personnel.

Before connecting the welding machine to the mains power supply, make sure that rated voltage and frequency correspond to those provided by the mains power supply and that the welding machine's power switch is turned to “O”. Use the welder's own plug to connect it up to the main power supply. Proceed as follows if you have to replace the plug:

- 3 conducting wires are needed for connecting the machine to the supply.

Connect a suitable load of normalised plug (3p+t) to the power cable and provide for an electrical socket complete with fuses or an automatic switch. The ground terminal must be connected to the ground conducting wire (YELLOW-GREEN) of the supply.

Table 2 shows the capacity values that are recommended for fuses in the line with delays.

Table 2

| Model | | Power ARC 2800 |
|--------------------------------------|-----------------|----------------|
| Input power @ I ₂ Max | kVA | 10,5 |
| Delayed fuse (I ₂ @ 100%) | A | 10 |
| Duty cycle @ 30% (40°C) | A | 270 |
| Mains cable | | |
| Length | m | 4 |
| Section | mm ² | 1,5 |
| Ground cable | | |
| Section | mm ² | 35 |

NOTE: Any extensions to the power cable must be of a suitable diameter, and absolutely not of a smaller diameter than the special cable supplied with the machine.

Instructions for use

COMMAND AND CONTROL UNITS (Fig. A)

- Pos. 1** MX command and control panel. For detailed information on the control panel, see the instruction manual enclosed.
- Pos. 2** 6 pole remote control connector.
- Pos. 3** Positive pole quick connection.
- Pos. 4** Negative pole quick connection.
- Pos. 5** Power supply switch. In the "O" position the welder is off.
- Pos. 6** Mains cable.

Electrode welding (MMA)

Electrode welding is used for welding most metals (various types of steels, etc.) using rutilic, basic, and cellulosic electrodes with diameters from Ø 1,6 mm to Ø 5,0 mm.

- Connecting the welding cables (Fig. B):
Disconnect the machine from the mains power supply and connect the welding cables to the output terminals (Positive and Negative) of the welding machine, attaching them to the clamp and ground with the polarity specified for the type of electrode being used (Fig. B). Always follow the electrode manufacturer's instructions. The welding cables must be as short as possible, they must be near to one another, positioned at or near floor level. Do not touch the electrode clamp and the ground clamp simultaneously.
- Switch the welding machine on by moving the power supply switch to I (Pos. 5, Fig. A).
- Make the adjustments and select the parameters on the control panel (for further information see the paragraph in the manual for the MX control panel).
- Carry out welding by moving the torch to the workpiece. Strike the arc (press the electrode quickly against the metal and then lift it) to melt the electrode, the coating of which forms a protective residue. Then continue welding by moving the electrode from left to right, inclining it by about 60° compared with the metal in relation to the direction of welding.

Table 3

| WELDING THICKNESS (mm) | Ø ELECTRODE (mm) |
|------------------------|------------------|
| 1,5 ÷ 3 | 2 |
| 3 ÷ 5 | 2,5 |
| 5 ÷ 12 | 3,2 |
| ≥ 12 | 4 |
| ≥ 20 | 5 |

Table 4

| Ø ELECTRODE (mm) | CURRENT (A) |
|------------------|-------------|
| 1,6 | 30 ÷ 60 |
| 2 | 40 ÷ 75 |
| 2,5 | 60 ÷ 110 |
| 3,2 | 95 ÷ 140 |
| 4 | 140 ÷ 190 |
| 5 | 190 ÷ 240 |

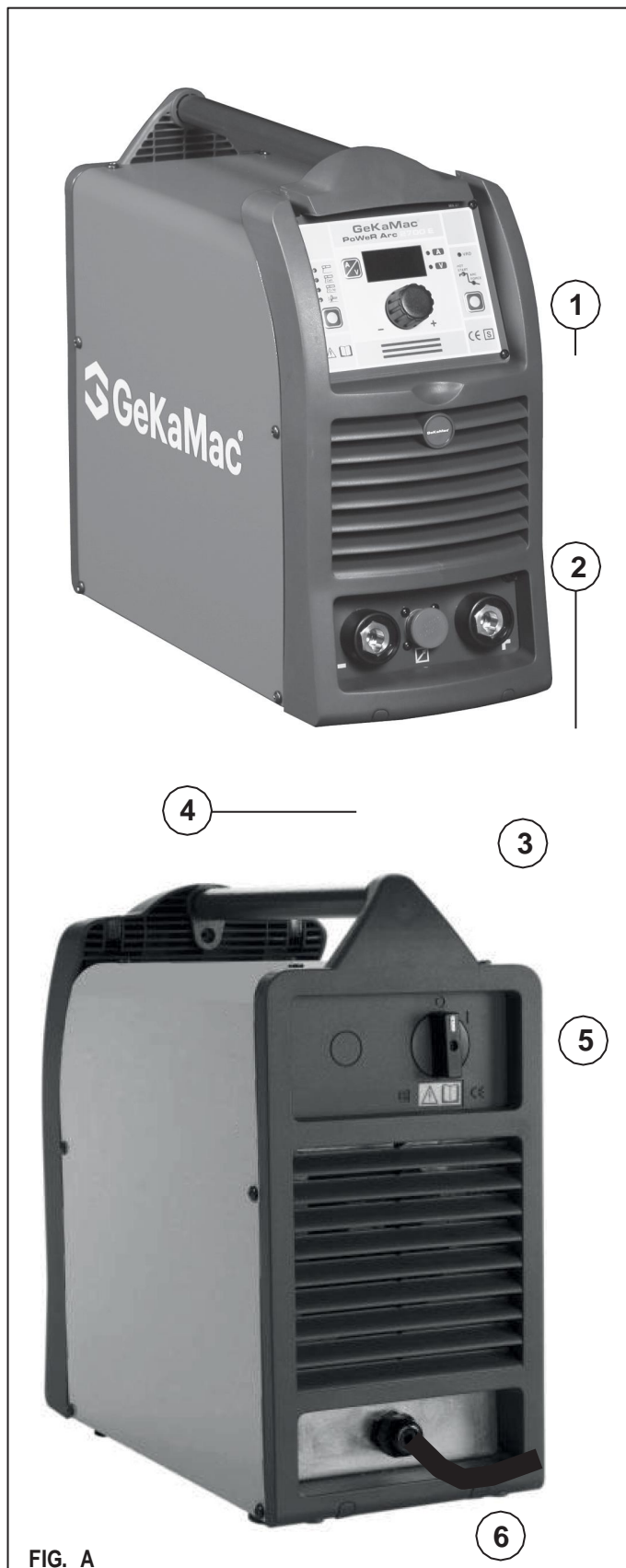


FIG. A

PART TO BE WELDED

The part to be welded must always be connected to ground in order to reduce electromagnetic emission. Much attention must be afforded so that the ground connection of the part to be welded does not increase the risk of accident to the user or the risk of damage to other electric equipment. When it is necessary to connect the part to be welded to ground, you should make a direct connection between the part and the ground shaft. In those countries in which such a connection is not allowed, connect the part to be welded to ground using suitable capacitors, in compliance with the national regulations.

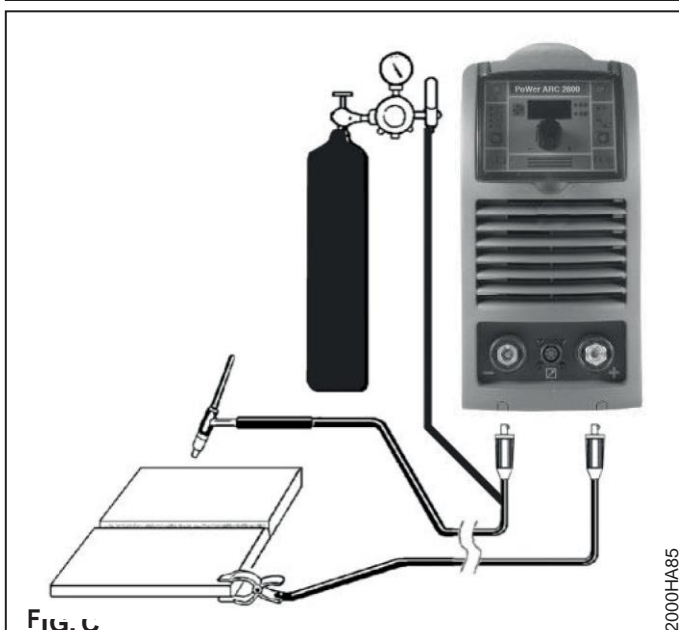
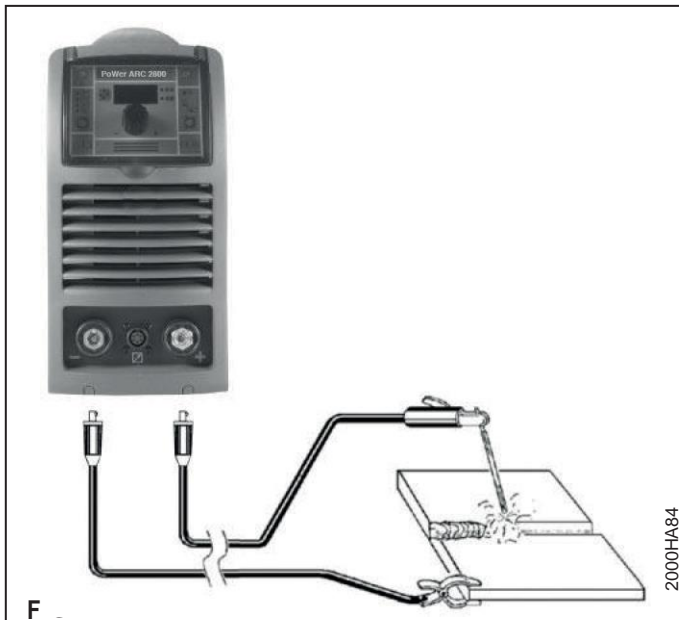
WELDING PARAMETERS

Table 3 shows some general indications for the choice of electrode, based on the thickness of the parts to be welded. The values of current to use are shown in the table with the respective electrodes for the welding of common steels and low-grade alloys. These data have no absolute value and are indicative data only. For a precise choice follow the instructions provided by the electrode manufacturer.

The current to be used depends on the welding positions and the type of joint, and it increases according to the thickness and dimensions of the part.

The current intensity to be used for the different types of welding, within the field of regulation shown in table 4 is:

- High for plane, frontal plane and vertical upwards welding.
- Medium for overhead welding.



- Low for vertical downwards welding and for joining small pre-heated pieces.

A fairly approximate indication of the average current to use in the welding of electrodes for ordinary steel is given by the following formula:

$$I = 50 \times (\varnothing e - 1)$$

Where:

I = intensity of the welding current

$\varnothing e$ = electrode diameter

Example:

For electrode diameter 4 mm

$$I = 50 \times (4 - 1) = 50 \times 3 = 150A$$

TIG welding

TIG welding melts the metal of the workpiece, using an arc struck by a tungsten electrode. The fusion bath and the electrode are protected by gas (Argon). This type of welding is used to weld thin sheet metal or when elevated quality is required.

1) Connecting the welding cables (Fig. C):

- Connect one end of the gas hose to the gas connector on the TIG torch and the other end to the Argon cylinder and open it.
- With the machine switched off:
 - Connect the ground cable to the snap-on connector marked + (positive).
 - Connect the relative ground clamp to the workpiece or to the workpiece support in an area free of rust, paint, grease, etc..
 - Connect the TIG torch power cable to the snap-on connector marked - (negative).

2) Switch the welding machine on by moving the power supply switch to I (Pos. 5, Fig. A).

3) Make the adjustments and select the parameters on the control panel (for further information see the paragraph in the manual for the MX control panel).

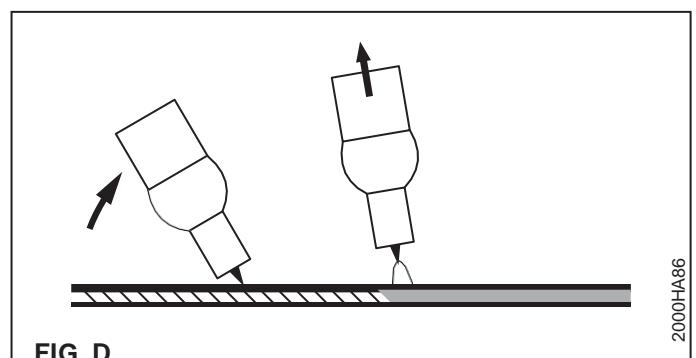
4) Open the gas cylinder and regulate the flow by adjusting the valve on the TIG torch by hand.

5) Ignite the electric arc by contact, using a decisive, quick movement at the welding current set ("Lift" type ignition - Fig. D).

To end welding:

- Lift the torch slowly, at a certain point the welding current decreases, and then stop.
- The welding machine follows an automatic down slope along with extinguishing of the arc.

6) When you have finished welding remember to shut the valve on the torch and the gas cylinder.



Maintenance

ATTENTION: Before carrying out any inspection of the inside of the generator, disconnect the system from the supply.

SPARE PARTS

Original spare parts have been specially designed for our equipment. The use of non-original spare parts may cause variations in performance or reduce the foreseen level of safety. We decline all responsibility for the use of non-original spare parts.

GENERATOR

As these systems are completely static, proceed as follow:

- Periodic removal of accumulated dirt and dust from the inside of the generator, using compressed air. Do not aim the air jet directly onto the electrical components, in order to avoid damaging them.
- Make periodical inspections in order to individuate worn cables or loose connections that are the cause of overheating.

Optional

- **CD 6** manual remote control.

When this accessory is activated the welding current can only be remote controlled, and this value will be shown on the welding machine's display.

The digital control unit of the generator is fitted with a control recognition device which allows it to identify which device is connected and take action accordingly.

The remote control can be connected whether the welding machine is on or off.

NOTE: The MX control panel has a STAND-BY function that, when the remote control is on, switches off the inverter when the minimum welding current value is reached (to reinstate normal, correct functioning of the machine, increase the welding current value by rotating the remote control knob).

- External mechanical polarity inverter.

The pointing out of any difficulties and their elimination

The supply line is attributed with the cause of the most common difficulties. In the case of breakdown, proceed as follows:

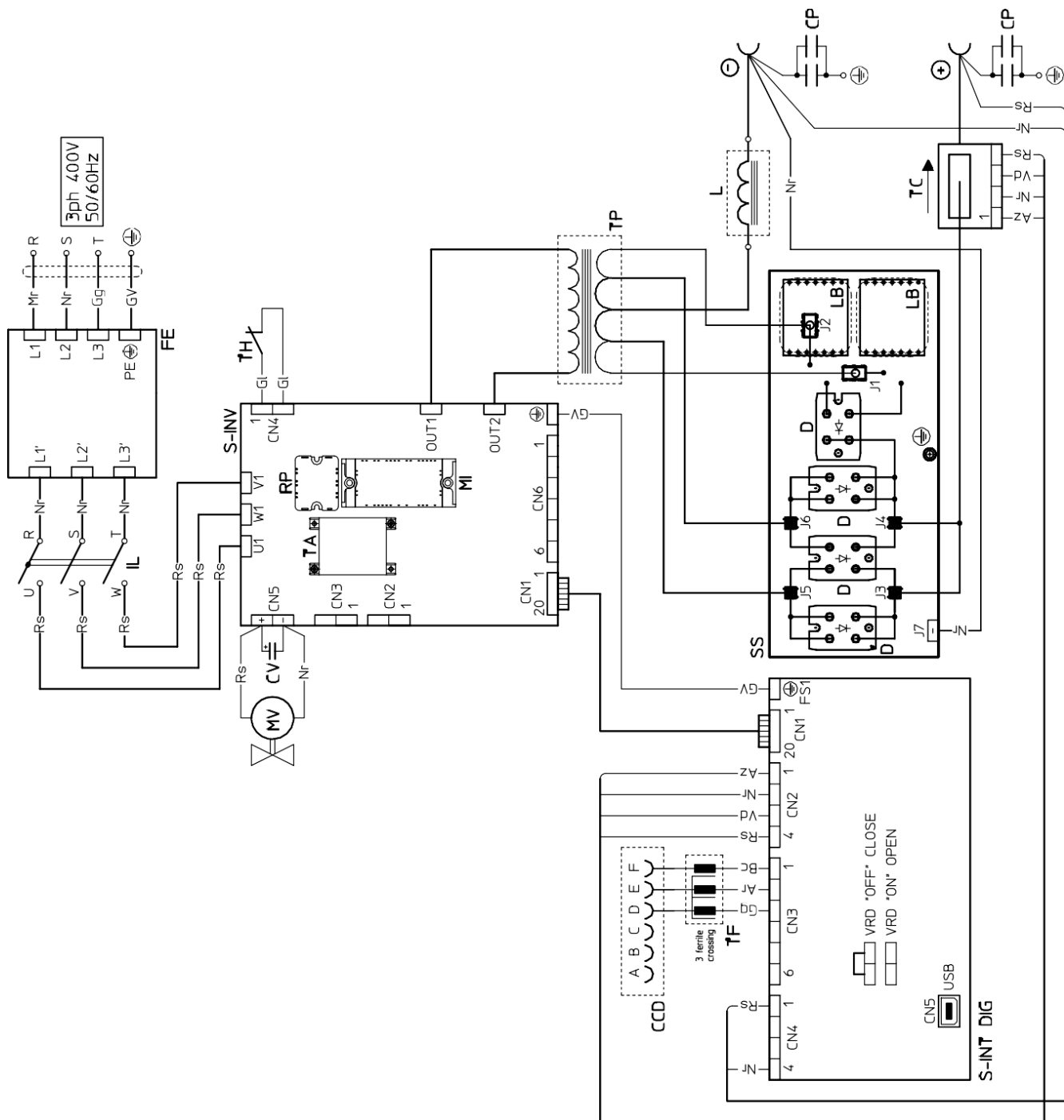
- 1) Check the value of the supply voltage
- 2) Check that the power cable is perfectly connected to the plug and the supply switch
- 3) Check that the power fuses are not burned out or loose
- 4) Check whether the following are defective:
 - The switch that supplies the machine.
 - The plug socket in the wall.
 - The generator switch.

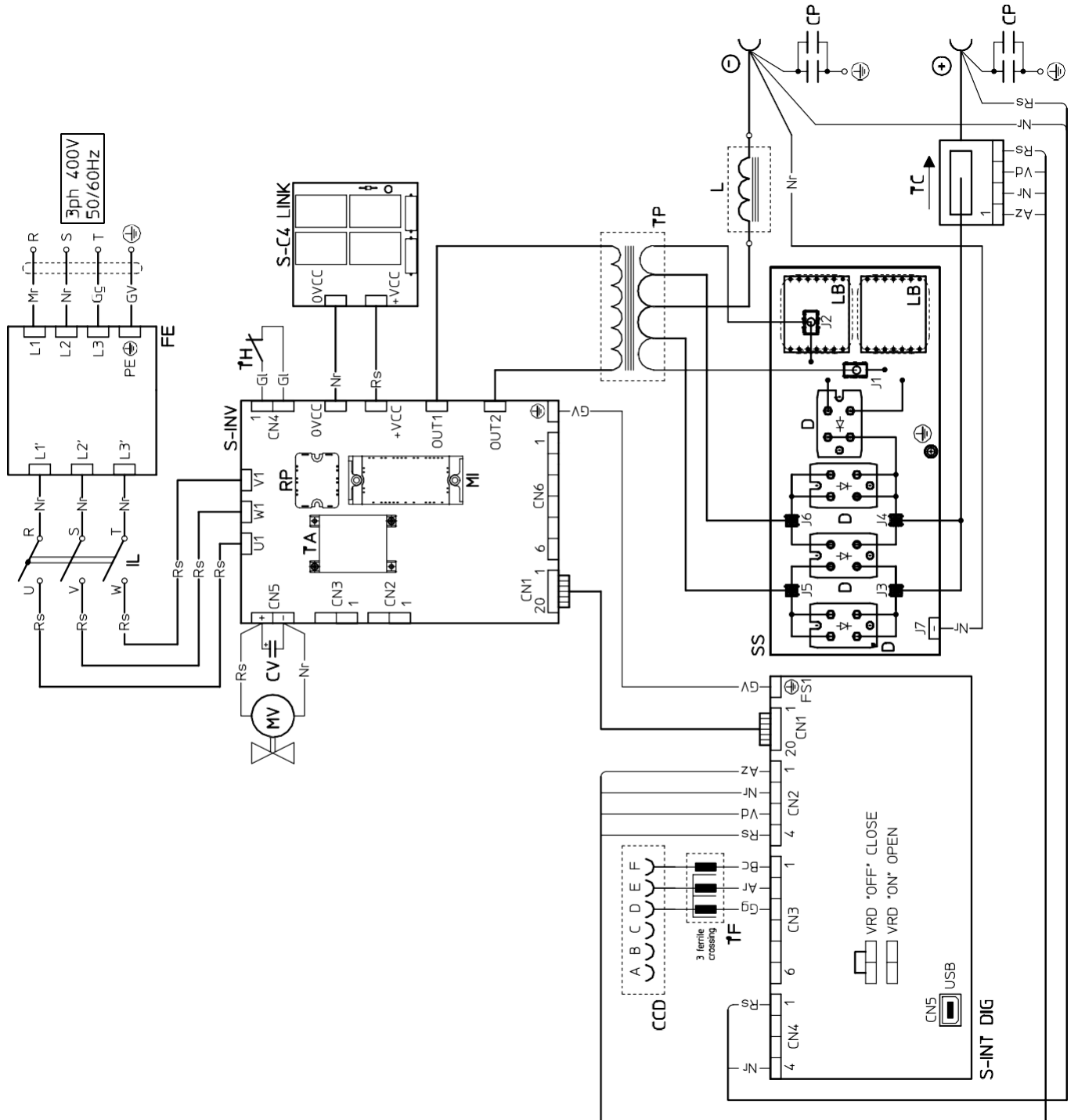
NOTE: Given the required technical skills necessary for the repair of the generator, in case of breakdown we advise you to contact skilled personnel or our technical service department.

Digital interface PCB replacement

- Unscrew the 4 screws fastening the front rack panel.
- Remove the adjustment knob.
- Extract wiring connectors from digital interface PCB.
- Unscrew small supporting columns.
- Remove the digital interface PCB by lifting it out of its supports.
- Proceed vice versa to assemble the new digital interface PCB.

EN Wiring diagram (POWER ARC 2800)





| | | | | | | | | | |
|------------------|-------------------------|-------------------------|---------------------|------------------|------------------|------------------|------------------|------------------|------------------|
| •1 CCD | •2 CP | •3 CV | •4 D | •5 FE | •6 IL | •7 L | •8 LB | •9 MI | •10 MV |
| •11 RP | •12 S-C4 LINK | •13 S-INT DIG | •14 S-INV | •15 SS | •16 TA | •17 TC | •18 TF | •19 TH | •20 TP |

EN Key to the electrical diagram

•1 Remote control socket •2 "Dinse" + and - pole capacitors •3 Fan motor condensator •4 Secondary diode •5 EMC filter •6 Power supply switch •7 Secondary inductor •8 Inductance Booster •9 Primary IGBT •10 Fan motor •11 Primary rectifier •12 Capacitors PCB •13 Digital interface PCB •14 Inverter PCB •15 Secondary circuit PCB •16 Auxiliary transformer •17 Current transducer •18 Toroidal ferrite •19 Secondary circuit thermostat •20 Transformer



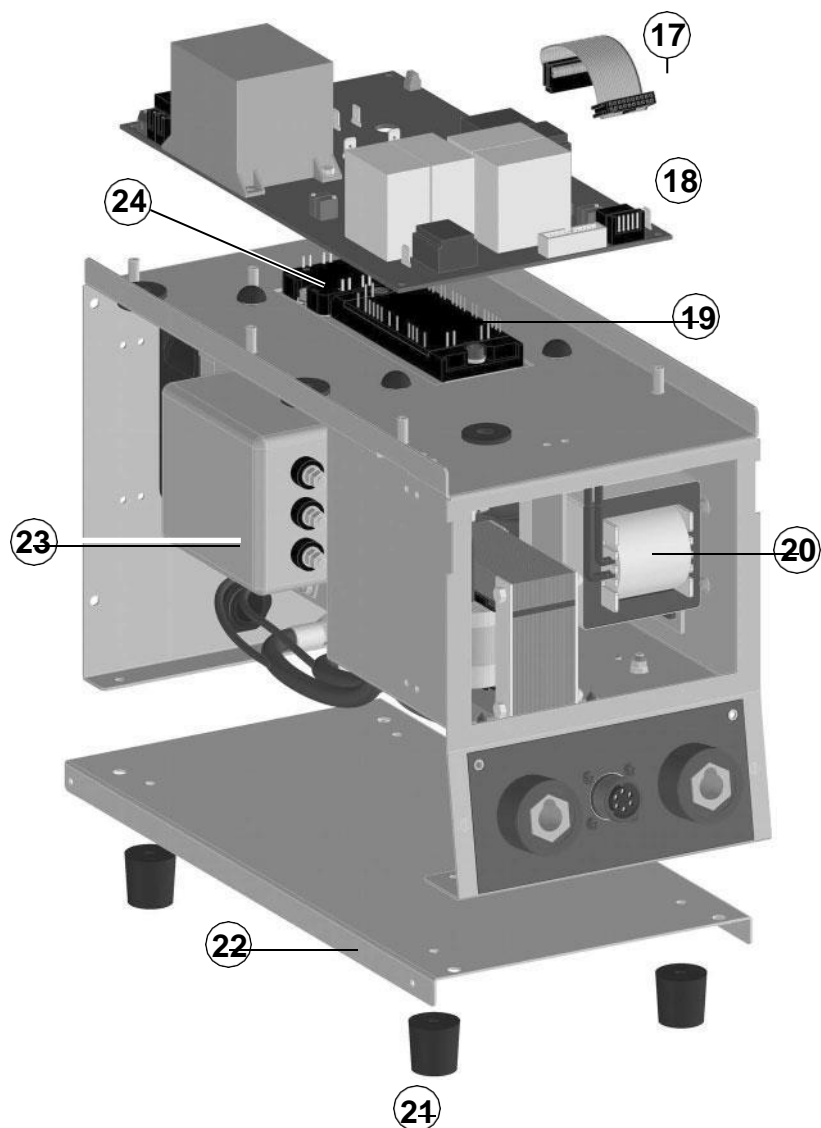
EN Meaning of graphic symbols on machine

- 1 Power supply switch
- 2 System for use in environments with increased risk of electroshock
- 3 Product suitable for free circulation in the European Community
- 4 Dangerous voltage
- 5 Grounding
- 6 Positive pole snap-in connector
- 7 Negative pole snap-in connector
- 8 Remote control socket
- 9 Warning!
- 10 Before using the equipment you should carefully read the instructions included in this manual
- 11 TIG welding
- 12 MMA welding
- 13 Special disposal



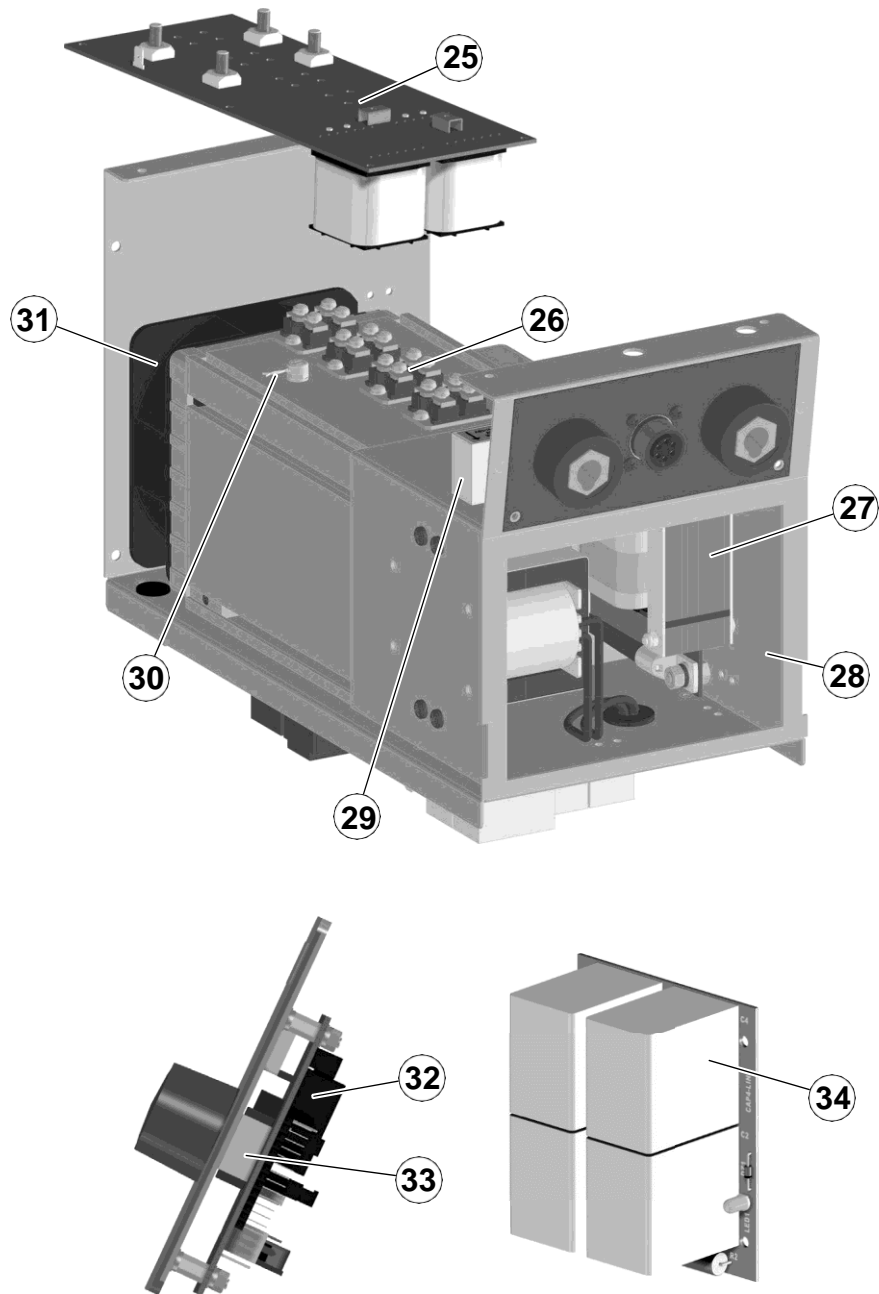
| Pos. | Cod. | Descrizione | Description |
|------|--------|---|---|
| 1 | 352453 | Visiera rack frontale | Front rack transparent visor |
| 2 | 439388 | Pannello rack con adesivo "GEKAMAC" | Rack panel with "GEKAMAC" sticker |
| 3 | 438888 | Manopola senza indice Ø29mm | Ø29mm Knob without index |
| 4 | 468191 | Adesivo logo GEKA Ø20mm | CEA logo sticker Ø20mm |
| 5 | 352452 | Pannello frontale senza adesivo logo GEKA Ø20mm | Front panel without GEKA logo sticker Ø20mm |
| 6 | 403611 | Attacco rapido | Quick connection |
| 7 | 466952 | Adesivo frontale | Front sticker |
| 8 | 419050 | Connettore comando a distanza | Remote control socket |
| 9 | 462694 | Gancio attacco tracolla | Carrying belt hook |
| 10 | 438108 | Maniglia | Handle |
| 11 | 438710 | Manopola interruttore alimentazione | Mains switch knob |
| 12 | 435755 | Interruttore alimentazione | Mains switch |
| 13 | 352404 | Pannello posteriore | Rear panel |
| 14 | 235993 | Cavo alimentazione | Mains cable |
| 15 | 427895 | Pressacavo completo di ghiera | Cable clamp with lock ring |
| 16 | 420493 | Coperchio con adesivi logo GEKA | Cover with GEKAGE logo stickers |

EN Spare parts list



| Pos. | Cod. | Descrizione | Description |
|------|--------|---|--|
| 17 | 413481 | Cablaggio ausiliario | Auxiliary wiring |
| 18 | 240471 | Complesso inverter primario (composto da Scheda inverter, Raddrizzatore primario e IGBT primario) | Inverter primary assembly (composed by Inverter PCB, Primary rectifier and Primary IGBT) |
| 19 | 286037 | IGBT primario | Primary IGBT |
| 20 | 481404 | Trasformatore | Transformer |
| 21 | 431331 | Piedino d'appoggio | Foot |
| 22 | 404924 | Basamento | Base |
| 23 | 376887 | Filtro EMC | EMC Filter |
| 24 | 455508 | Raddrizzatore primario | Primary rectifier |

EN Spare parts list



| Pos. | Cod. | Descrizione | Description |
|------|---------|---|--|
| 25 | 377140 | Scheda circuito secondario | Secondary circuit PCB |
| 26 | 423236 | Diode secondario | Secondary diode |
| 27 | 240233 | Induttore secondario | Secondary Inductor |
| 28 | 449493 | Telaio metallico interno | Internal metallic frame |
| 29 | 481946 | Trasduttore di corrente | Current transducer |
| 30 | 478786 | Termostato circuito secondario | Secondary circuit thermostat |
| 31 | 486383 | Motore ventilatore | Fan motor |
| 32 | 377089D | Scheda interfaccia digitale | Digital Interface PCB |
| 33 | 454150 | Encoder | Encoder |
| 34 | 377157 | Scheda condensatori (solo per POWER ARC 2800) | Capacitors PCB (only for POWER ARC 2800) |

Power ARC Series



GeKaMac[®]



Gedik Welding Inc.

Ankara Caddesi No: 306 Şeyhli 34906 Pendik - İstanbul / Turkey

P. +90 216 378 50 00 • **F.** +90 216 378 20 44

www.gedikwelding.com