TECNA®

WELDING CONTROL UNIT TE101
USER MANUAL

MANUAL DE INSTRUCCIONES
DEL CONTROL DE SOLDADURA TE101

RELEASE SOFTWARE N° 1.3

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The TE101 is a microprocessor-based weld control unit for single-phase alternating current resistance welders. The task of this weld control unit is to manage the welder's components, especially the controlled diodes that adjust the welding current.

The TE101 work cycle is described in the weld programs by 13 programming parameters. As many as 99 different weld programs can be stored, 31 of which can be brought up directly from the outside.

The TE101 measures the welding current and controls it through set limits.

The TE101 is suitable both for manual and pneumatic operated welders.
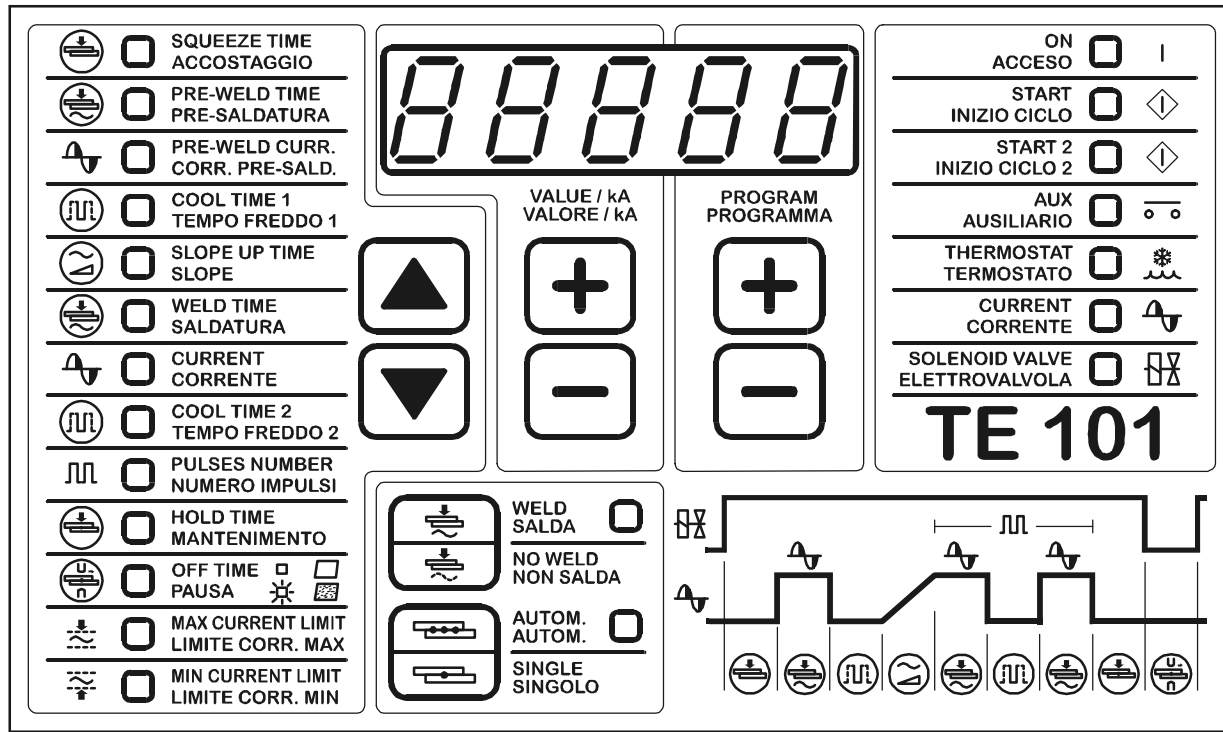
MAIN FEATURES

- Synchronous controlled diodes command with adjustment of phase control weld current.
- True RMS built-in ammeter with 2 selectable ranges (18-56 kA).
- Storage of 99 welding programs, 31 recallable from the outside.
- Main weld time adjustment in half-periods.
- Pre-weld, slope and pulse functions.
- Current limits with external indicator for errors and possibility of stopping operations if limits are exceeded.
- Single and automatic cycle. WELD/NO WELD function.
- Current compensation to facilitate the welding of metal sheets and rods with traces of rust.
- Set-up to be connected to an additional cycle-start device.
- Possibility of disabling the autoretain function for use on manual control welders.
- First insert delay adjustment. It optimizes the balance of the machine absorption from the mains.
- Cycle-end output.
- Thermostat input.
- Self-adjustment to the mains frequency 50/60 Hz.
- Management of the solenoid valve 24 V dc, 5 W Max, with output protected against short circuit.
- Serial communication with insulated RS232 as an option.
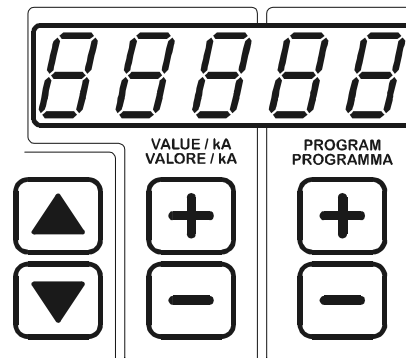
PROGRAMMING THE CONTROL UNIT

The following information is displayed on turning on the control unit:

- control unit model ($tE\ 101$)
- program version (for example: $rEL\ 1.3$)
- operating frequency (for example: $Fr\ 50$ for 50 Hz)
- ammeter range adjustment (for example $A\ 18$ for the 18 kA range)

Immediately afterwards, the TE101 switches to a wait condition from which you can both program and weld.

Once turned on, it displays the current program, i.e. the one that was previously selected via the keyboard to be run at cycle startup. At the end of each weld, the display will show both the program used and the output current.

Press any key to enter programming mode. The programming of the control unit consists in selecting the program to be used and the adjustment of its parameters, which describe the weld cycle.

The current program is displayed automatically, i.e. the last one that was selected via the keyboard. If you need to change it, make the selection through the keys + and − on the right-hand side increasing and decreasing the value displayed above the

Adjust the program parameters by selecting the parameters and then setting the required values one at a time. In order to better understand the meaning of each parameter, refer to the relevant paragraph.

The parameters, identified by an international symbol, are listed on the left side of the control unit; there is a warning light for each parameter. Make the selection using keys ▲ and ▼, the warning light of the selected parameter will turn on and its value be displayed.

Change the value of the selected parameter using middle keys ⊞ and ⊟ increasing and decreasing the value displayed above the keys.

Each parameter can have the minimum and maximum values outlined in the table below.

PARAMETER	DESCRIPTION	RANGE
SQUEEZE TIME	SQUEEZE TIME	0 - 99 cycles
PRE-WELD TIME	PRE-WELD TIME	00 - 99 cycles
PRE-WELD CURR.	PRE-WELD CURRENT	1 - 99 %
COOL TIME 1	COOL TIME 1	0 - 50 cycles
SLOPE UP TIME	SLOPE UP TIME	00 - 25 cycles
WELD TIME	WELD TIME	00.5 - 99.5 cycles
CURRENT	WELD CURRENT	1 - 99 %
COOL TIME 2	COOL TIME 2	1 - 50 cycles
PULSES NUMBER	PULSES NUMBER	0 - 9
HOLD TIME	HOLD TIME	00 - 99 cycles
OFF TIME	OFF TIME	1 - 99 cycles *
MAX CURRENT LIMIT	MAXIMUM CURRENT LIMIT	00.0 - 56.0 kA
MIN CURRENT LIMIT	MINIMUM CURRENT LIMIT	00.0 - 56.0 kA

* If the OFF TIME is set to 99 (and the ammeter is enabled), the control unit will compensate the minimum current to less than 2.0 kA (see paragraph "Weld current compensation").

Proceed in this way to set all the parameters to the desired welding value. Please note that there is no need to press any key to confirm the set data since it is stored automatically after the first weld. Once the programming phase is over, you can use the welder without having to confirm set or stored data.

STARTING THE WELDING CYCLE

On actuating the control device, the control unit will carry out the weld cycle.
The program used is the one selected via the keyboard unless another one is called from the outside. During welding, the program used is displayed.

If you perform welds by operating the additional control device connected to the START2 input, the program defined in the setup menu is the one that will always be used (see specific

During the weld cycle, the control unit displays the current function by turning on the relating warning light and displays its value.
At the end of the weld cycle, the measured current (if the ammeter is activated) and the program that was used will be displayed.

DESCRIPTION OF THE WORKING CYCLE

The user decides the TE101 control unit work cycle by adjusting the various programming parameters. These parameters describe operating time and current adjustments that make up the work cycle when carried out in sequence. The graph below shows in which sequence programmed functions are performed.

These symbols refer to the programming parameters described in the next paragraph.
For safety reasons, the control unit does not start the weld cycle if the cycle-start signal is already activated when turned on; as such, simply clear the command and activate it again. Micro-interruptions or excessive power drops do not alter operations but just stop the control unit; turn the machine off and then back on to restore operations.

AUTOMATIC CYCLE FUNCTION

The control unit allows you to perform consecutive weld cycles each time the control device is activated. Start or stop the AUTOMATIC cycle using the key shown opposite.

When the warning light is off, the control unit performs the SINGLE cycle: only one weld cycle is performed each time the cycle-start signal energizes.
When the warning light is on, this means the control unit is set to AUTOMATIC cycle: the welder repeatedly carries out the weld cycle until the cycle-start device is released. The different welding cycles are repeated at the rate specified in the OFF TIME parameter.

WELD/NO WELD FUNCTION

Use the WELD/NO WELD function to perform test cycles without welding current. Start or stop the welding current using the key shown opposite.

When the warning light is on, the control unit is set to WELD and will perform the routine weld cycles. When the warning light is off, the control unit is set to NO WELD, complete test cycles will be performed without welding, while all time parameters are kept.

DESCRIPTION OF THE PARAMETERS

All the following parameters that indicate time are expressed in mains cycles, also called periods. The mains frequency determines how long a cycle lasts:

Mains frequency of 50 Hz, 1 period = 20 ms
Mains frequency of 60 Hz, 1 period = 16.6 ms

SQUEEZE TIME
The SQUEEZE TIME is the time interval between the beginning of the closing of the electrodes and the beginning of the welding current supply. The set value must be long enough to allow the electrodes to reach the correct clamping force before a weld begins. An insufficient adjustment of said time will produce sparks between the electrodes and the piece to be welded when welding starts and can trigger quality inconsistency. The sequence stops if the cycle-start signal de-energizes during the squeeze time.

PRE-WELD TIME
The PRE-WELD parameter indicates the duration of a current flow that can be carried out before the welding process to pre-heat the piece. Pre-weld is carried out with a current adjustment equivalent to that indicated in the PRE-WELD CURR. parameter. If this parameter is set to 0, the pre-weld will not be carried out.

PRE-WELD CURRENT
The value expressed in this parameter indicates current intensity used for carrying out the PRE-WELD.

COOL TIME 1
The COOL TIME 1 parameter indicates the time that elapses between the pre-weld (PRE-WELD TIME) and the weld.
When pre-weld is off (PRE-WELD TIME = 0) this cold time is not performed.

SLOPE UP TIME
The SLOPE UP TIME parameter describes the time it takes to reach programmed welding current intensity. The initial value of this slope is always equal to the minimum current while its final value is equal to the value programmed in the CURRENT parameter. The slope gradient is calculated automatically by the microprocessor according to the programmed values. The slope time is added to the welding time.

WELD TIME
The WELD TIME parameter is the current passage duration. It will be performed with a current intensity equal to that specified in the CURRENT parameter. This parameter is expressed with three digits since it can be adjusted with the accuracy of a half period. When pulse-operation is enabled, this parameter indicates the duration of each pulse.

CURRENT
The value expressed in CURRENT indicates the current intensity with which the welding is performed (WELD TIME).

COOL TIME 2
The COOL TIME 2 parameter is used in pulse operating mode and indicates the time that elapses between one weld pulse and the next. When the pulse operating mode is off (PULSES NUMBER = 0) this cold time is not performed.

PULSES NUMBER
The PULSES NUMBER parameter indicates the number of pulses with which the welding is carried out. When this parameter is set to 0, the pulse operating mode is disabled. The duration of every single pulse is that set in the WELD TIME parameter.
When the pulse operating mode is on, the total weld time (weld time × number of pulses) cannot be more than 150 periods.
During the process, when the warning light is on, this means that the pulse function is on.

HOLD TIME
The HOLD TIME parameter describes the time that elapses from the end of the weld to the opening of the electrodes. It helps the molten material to cool more quickly and prevents it from being stressed before adequately cooling.

OFF TIME
The OFF TIME parameter is the machine wait time and is exactly the time that elapses between one machine cycle and the next when the welder works in automatic.
Setting this parameter to 99 will activate the weld current compensation function (see specific paragraph). When the warning light is on during the process, this means that the compensation function is on.

MAX CURRENT LIMIT
This parameter sets the max current. For each weld, TE101 checks that the current supplied by the welder is less than the value set in this parameter. Otherwise, the situation is signaled and a fault can be generated (see specific paragraph). The function is off when the value is set to 0.

MIN CURRENT LIMIT
This parameter sets the minimum current. For each weld, TE101 checks that the current supplied by the welder is greater than the value set in this parameter. Otherwise, the situation is signaled and a fault can be generated (see specific paragraph). The function is off when the value is set to 0.

READING OF THE WELDING CURRENT

After each weld, the display shows the value of the supplied current.

The displayed value is the welding current's true RMS expressed in kA (1 kA = 1000 A). This value always refers to the main setting, i.e. that of the WELD TIME parameter (WELD); PRE-WELD TIME (PRE-WELD) and SLOPE UP TIME (SLOPE) currents are not measured.
In the case of pulse welds, the current value will be that of all the pulses.
If a test weld is performed in "NO WELD" mode, the visualized current value will be zero.
If no current circulated during the welding for any reason whatsoever, the control unit will show fault message *noCur*; simply press any key to reset it.
You can disable the ammeter via the setup menu and, in this case, no value is displayed relating to the current.

WELDING CURRENT LIMITS

TE101 allows the user to set some welding current control limits. The purpose is to monitor the stability of the welding current so as to achieve a constant welding quality.
Current values are set in the weld program through these parameters:

MAX CURR. LIMIT   upper current limit.
MIN CURR. LIMIT   lower current limit.

The check for the MIN and MAX limits can be deactivated individually by setting the relating parameter to 0.

When working, if the measured value of the welding current is beyond the set limits, the welding spot is considered "out-of-limit".
To report this condition, the displayed current flashes together with the warning light meaning that the limit is not respected. Also, the appropriate WRONG output signal is activated.
The WRONG signal is also generated when, due to a current measurement fault, it was not possible to determine that it was within limits.

The WRONG output is activated at the end of the WELD TIME, remains active during the HOLD TIME and until the cycle-start signal is released.
If working in AUTOMATIC cycle, the WRONG output remains active also during the OFF TIME.
If the stop function is active due to out-of-limits welding spots, and the welding generated this condition (*StoP* fault), the WRONG signal deactivates only when you reset the fault by pressing a key.

If the ammeter function is disabled (through the setup menu) you cannot program the limits (the parameters are not selectable).

STOP FUNCTION DUE TO OUT-OF-LIMITS SPOTS

You can stop the machine when a consecutive series of welds is performed beyond the set limits. The number of consecutive welding spots that stop the control unit is set through parameter "bL" in the setup menu (for its programming, see the relevant paragraph). This value can range from 0 to 9; by setting the value to 0, the function is disabled and therefore the welder will not stop when preset limits are exceeded.
Please, notice that, in order to be effectively considered and counted, the "out-of-limits" welding spots must follow each other. When the programmed condition occurs, the control unit stops and the display shows fault message *StoP*; moreover, the warning light that indicates the out-of-limits state will flash.
In order to clear this fault, simply press a key and the display will show the program and current of the last weld.

WELD CURRENT COMPENSATION FUNCTION

The weld current compensation function is used both to facilitate the welding of oxidized materials or materials containing paint residues and when adhesives are interposed between the metal sheets. The presence of these insulating materials can greatly limit current flow, typically during the first welding phase, and consequently decrease, varying from weld to weld, the real circulation time of the current with which the welding is performed.
The compensation function intervenes by continuously checking the welding current; if current does not exceed the preset 2000 A threshold, the weld time increases automatically.
Therefore, this will compensate current circulating discontinuity that may occur under these welding conditions.
We must take into account that this function should be used only in welding situations that cannot be solved in any other way since this system does not ensure weld quality.
To avoid excessive welding time, this function extends the welding time to a maximum of 99 periods. If this limit is reached, the control unit indicates that the weld has not been performed correctly, through fault *Err03,* and stops the machine. Press any key to restore operations.

Activate this function by setting the value of the OFF TIME parameter to 99; when it is active, the control unit will work in single cycle. The warning light of the OFF parameter stays on to warn you that the compensation function is active.
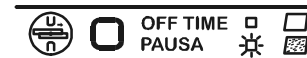
The compensation function acts only on the main WELD TIME (WELD). If the ammeter is disabled, you cannot use the compensation function.

Since the current measurement refers to the entire welding time, including cycles when the current was less than the threshold, the displayed value can vary depending on the total welding time carried out. This is why current limits are not effective when the compensation function is active.

CALLING PROGRAMS FROM THE OUTSIDE

The control unit is equipped with inputs that allow you to call the welding programs from the outside (from a PLC for example).
More information is provided in the installation manual.

THERMOSTAT INPUT FUNCTION

The TE101 has an input for the connection of a thermostat positioned on the welder to stop it in case it overheats. Thermostat activation is indicated by the specific warning light on the panel.

You cannot weld until the machine has cooled and the thermostat has reset. If you start a weld cycle in this condition, the control unit will not carry out the cycle and will display fault *Err04.*

If the thermostat trips, check that cooling water is circulating in the required amounts and at the correct temperature. Also check that the work rating is not too high for the machine.
You can also connect a flow switch to this input to check the cooling water.

ADDITIONAL CONTROL DEVICE

The control unit has an additional input that lets you use a second control device to perform the weld cycle with a program other than the one used with the main control device. This input is called START2.

When the weld cycle is started by the additional control device, the program selected in the setup menu will always be run (see relevant paragraph), even if a different program is called by an external device.

SETUP MENU

Configuration parameters that are not part of the welding program are grouped in a menu called "setup menu". To access these functions you must press both ▲ and ▼ at the same time for 2 seconds. Now you will see the programmable parameters in sequence. Use keys ▲ and ▼ to select them. The setting is performed as usual using keys ⊕ and ⊖. Use key ▼ to exit from the setup menu once you reach the end of the list of functions.
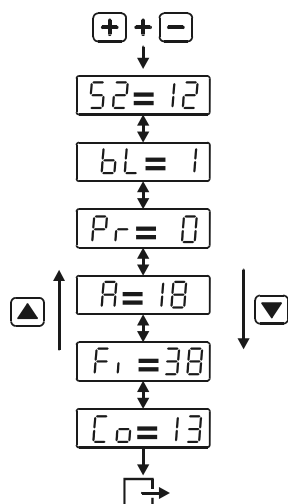
Programmable parameters are as follows:

PARAMETER	DESCRIPTION	RANGE
S2	START2 program number	1 - 99
bL	Stop due to out-of-limit current	0 - 9
Pr	Weld data printout	0 - 1
TO	Ammeter range	0 - 18 - 56
Fi	First insertion delay	35 - 99
Co	Cos φ adjustment	0 - 30

The welder manufacturer sets the Fi and Co parameters during installation and the end user normally does not need to change them. This is why they have been protected from accidental change. In order to change these parameters, you must display one of the locked parameters and press keys ⊕ and ⊖ at the same time for 2 seconds.

S2 - START2 PROGRAM NUMBER

Use parameter S2 (Start2) to select which of the 99 programs should be run when carrying out a weld started by the additional control device connected to input START2.

bL - STOP DUE TO OUT-OF-LIMIT CURRENT

The "bL" (BLock spots) parameter allows you to program the control unit so that it will stop when welds are performed with current values beyond the limits set in the weld program. The set value indicates the consecutive number of "out-of-limits" welds that cause the machine to stop. Set this value using keys ⊕ and ⊖ and range from 0 to 9.

When the value is set to zero, the function is disabled. As such, the welder never stops if the preset limits are exceeded.

Pr - WELD DATA PRINTOUT

The Pr (PRint) parameter allows you to print weld data. Printing is enabled by setting this value to 1, disabled when the parameter is set to 0.

For more information, please refer to paragraph "USING THE RS-232 SERIAL INTERFACE".

A – AMMETER RANGE

The A (Ammeter) parameter allows you to enable or disable the ammeter function and set its scale. You can set it as follows:

  0 = ammeter off
  18 = ammeter on with 18 kA range
  56 = ammeter on with 56 kA range

When the ammeter is off:
- current is not measured;
- no value is displayed;
- the current limits cannot be used;
- the compensation function cannot be used.

Fi – FIRST INSERTION DELAY

The Fi parameter indicates the first insertion delay. This function allows you to optimize the balance of machine absorption from the mains.

Since this setting is made by the welder manufacturer, the user does not need to perform any calibration. Relevant information is contained in the control unit installation manual.

Co - COS φ ADJUSTMENT

In resistance welders, the phase shift between the power supply voltage and the absorbed current (commonly identified with the cos φ parameter) changes depending on the transformer's features, the size of the welding circuit and the material to be welded.

On the TE101, the Co parameter (COs φ) allows you to adjust the control unit to the cos φ of the machine on which it is installed. Proper adjustment allows you to obtain the widest current adjustment scale and the lowest minimum weld current.

Since this setting is made by the welder manufacturer, the user does not need to perform any calibration. Relevant information is contained in the control unit installation manual.

AUTORETAIN FUNCTION

In pneumatically-operated welders, once current is delivered the welding control unit ends the weld cycle even if the cycle-start command is lacking. This function, called autoretain, avoids making welds with welding times other than those planned.

In the TE101, this function can be disabled in order to use the control unit on manually-operated welders or for other functional requirement. In this case if the cycle start command is released while current is supplied, the control unit immediately stops welding and disables the solenoid valve.

Keep in mind that even if autoretain is enabled, the control unit terminates the cycle immediately and disables the solenoid valve (causing the electrodes to open) if the cycle-start signal de-energizes when the electrodes close (SQUEEZE TIME).

If autoretain is off, and current stops flowing when the cycle-start command is deactivated, the weld is not performed with the programmed parameters. This fault is indicated by an appropriate fault message: *St.rEL*.

Since the autoretain function is made by the welder manufacturer, the user does not need to change this setting. More information is provided in the installation manual.

USING THE RS-232 SERIAL INTERFACE (OPTIONAL)

You can equip the control unit with an expansion card, code 50214) to connect it to a printer or a personal computer which must be fitted with a RS232 serial interface card to document production data.

Make the connection through a standard female 9-pin connector with the following connections:

PIN 2	TRANSMISSION (TD)
PIN 3	RECEPTION (RD)
PIN 4	DTR (ALWAYS ON)
PIN 5	MASS (SIGNAL GROUND)
PIN 6	DSR (ALWAYS ON)
PIN 7	RTS
PIN 8	CTS

The RS232 port of a computer can be connected using a straight cable (RD and TD signals not exchanged). If using a USB/RS232 converter, it can be connected directly to interface RS232.

The control unit does not perform any type of hardware or software flow control at the serial port. The printer or PC serial port must be configured with the following values:

SPEED	9600 BAUD
WORD LENGTH	7 BIT
PARITY	EVEN
STOP BIT	1

Print is activated in the setup menu through the Pr parameter. The following data is printed for each weld:
- Number of weld program used.
- Number of cycles with which the weld was carried out. PRE-WELD TIME and SLOPE UP TIME are not considered.
- Welding current measured in kA.
- Spot progressive number (it resets automatically on reaching 99999 and is stored even if the machine is off).
- Spot out-of-limit warning.

Examples of weld data documentation:

```
CONTROL UNIT TE101
SOFTWARE RELEASE 1.3
PROG TIME CUR. SPOT  LIM E
 01  10.0 12.2 00001 ---      (Limits disabled)
 02 132.5 16.2 00002 ---      (Weld with 5 pulses of 26.5 cycles)
 01  10.0 ---- 00003 ---      (Ammeter disabled)
 01  10.0 12.2 00004  OK      (Current within limits)
 01  10.0 12.7 00005 MAX      (Current above MAX limit)
 01  10.0 11.4 00006 MIN      (Current below MIN limit)
 01   4.0 11.3 00007 --- *    (Error St.rEL, limits disabled)
 01   6.5 11.8 00008 *** *    (Error St.rEL, limits enabled)
 03  14.0 **** 00009 --- *    (Error Err12, both limits disabled)
 03  14.0 **** 00010 *** *    (Error Err12, limits enabled)
 01  10.0 00.0 00011 --- *    (Error noCur, both limits disabled)
 01  10.0 00.0 00012 MIN *    (Error noCur, and lower limit enabled)
 04  99.0 1.86 00013 --- *    (Error Err03, compensation fault)
 01  10.0 11.4 00014 MIN *    (Limits enabled, Current below MIN limit,
                               Welder stop due to StoP fault)
```

The * character at the end of the line means that the weld triggered a fault that required a manual intervention to reset it (see list of errors).

Detailed information on RS232 use is contained in a specific manual available on request.

MAINTENANCE

Do not use water jets to clean the control unit since water could penetrate inside. Also, do not use strong solvents, thinners or gasoline that may damage the plastic parts.

The ammeter does not require calibration but it is advisable to check its working efficiency on a regular basis.

PANEL WARNING LIGHTS

ON / ACCESO	Indicates that mains voltage is present.
START / INIZIO CICLO	Indicates that the main cycle-start control is on.
START 2 / INIZIO CICLO 2	Indicates that the additional cycle-start control is on.
AUX / AUSILIARIO	Indicates that the stop command with pressure-only is actuated. This input is activated by a pedal first stage or by other devices that should inhibit the weld (such as flow switches, pressure switches or the interlocking system of another welder, for example).
THERMOSTAT / TERMOSTATO	Indicates that the safety thermostat tripped.
CURRENT / CORRENTE	Indicates that the control unit is generating the command pulses for the SCRs.
SOLENOID VALVE / ELETTROVALVOLA	Indicates that the solenoid valve is actuated.

LIST OF ERRORS

The following error messages are displayed when switching on the control unit or when it is in standby.

MESSAGES	CAUSE	REMEDY
Err 10	When turned on, the control unit was unable to measure a stable mains frequency.	Turn off the welder. Have a skilled technician check that the control unit's power supply is 24 V AC and frequency 50 or 60 Hz +/- 1%.
Err 22	A failure occurred in relay RL1 that enables the solenoid valve's output. The contacts of relay RL1 are glued. This error may also appear during the execution of the welds when the relay fails.	Contact welder manufacturer customer service to replace relay RL1.

The following error messages are displayed on receiving a weld cycle start command. If programming errors occur, they are related to the program you tried to run. The cycle will not start if one of these errors occur.

MESSAGES	CAUSE	REMEDY
Err01	While working with pulses, the total weld time (weld time × number of pulses) is longer than the 150-period limit. You cannot exceed this limit otherwise the machine will overheat.	Press a key to clear the error. Reduce the welding time or the number of pulses so that their product is less than 150 periods.
Err02	The value set in MIN. CURR LIMIT is higher than that set in MAX CURR. LIMIT.	Reset this error by pressing any key. Set the minimum current limit to a value below the maximum limit.
Err04	Tripping of the safety thermostat located inside the welder or another device connected to the THERM input (a flow switch, for example).	Reset this error by pressing any key. Check that the correct amount of water circulates inside the welder and/or check thermostat working efficiency.
Err13	There is a parity error when calling the welding program from the outside.	Clear this error by pressing any key. Check the wiring of the signals for recalling the programs and the working efficiency of the external device that manages them.
Err20	The value of one of the welding program's parameters is beyond preset limits. This can be caused by a loss of data due to electrical noise or malfunctions.	Clear this error by pressing any key. Check all the values of the parameters set in the current program (or in the program called up from the outside that you wanted to carry out) and correct them if necessary. If this problem recurs frequently, contact customer service.
Err21	There is a failure in relay RL1 that enables the solenoid valve's output. Relay RL1 is faulty (the contacts do not close).	Clear this error by pressing any key. Contact welder manufacturer customer service to replace relay RL1.

The following error messages are displayed during the weld cycle. The cycle stops if one of the following errors occur:

MESSAGES	CAUSE	REMEDY
St.rEL	Start RELeased The autoretain function is disabled, the cycle-start device was released before ending the weld and this interrupted it.	Reset this error by pressing any key. Be sure to keep the cycle start device active to the end of the weld.

The following error messages are displayed at the end of the weld cycle.
If in automatic cycle, the presence of one of the following errors will terminate the weld sequence.

MESSAGES	CAUSE	REMEDY
noCur	NO CURrent No current flow during the last weld.	Reset this error by pressing any key. If current did not flow at all (the weld was not performed): - Thermostats not connected to the control unit may have disabled the firing module. - Check weld circuit continuity; loose connections, oxidation or sealants inserted in the electrodes may prevent the passage of current. If current is supplied but the control unit is unable to detect it, have a skilled technician check the integrity of the current transducer and its connection to TE101.
StoP	STOP A certain number of welds were performed outside set limits.	Reset this error by pressing any key. See chapter "CURRENT LIMITS".
Err03	The compensation function is activated and the control unit extended the weld time up to the max limit of 99 periods. The set weld time was not performed with a welding current higher than threshold.	Clear this error by pressing any key. Check welding conditions before resuming the production. If pieces are excessively oxidized, they must be cleaned.
Err12	There occurred a welding with a too-high current signal for the ammeter's scale (full scale fault).	Reset this error by pressing any key. If possible, increase ammeter range, otherwise reduce the current adjustment in the welding program.