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**INSTALLATION of PIPE SYSTEM
„KRAH”
and User Manual for Universal EF Control Unit
(welding device)**

PF– PolyControl plus



To connect (i.e. weld) pipes requires two executors.

Necessary accessories for connecting (i.e. welding) pipes are:

- Electro-Fusion welder device for welding of PEHD „KRAH" pipes
- Tensile ribbon or tensile chain for external clamping of socket
- Inner tensile ring for internal clamping of socket (only for pipes from DN 700 and larger)
- Cleaning cloth and technical alcohol for cleaning spigot and socket

PREPARE INSTRUCTIONS:

- ✓ Connecting points (socket and spigot) must be cleaned with technical alcohol. Connecting points should not be greasy, damp or dusty.
- ✓ Rotate the pipe that contacts of electro-fusion fittings are facing upwards.
- ✓ Retract the spigot to socket using excavators and pay attention to the electro-fusion fittings to prevent damage.
- ✓ Set tensile ribbon or tensile chain on the outside of the connecting point (fillister in socket) into provided trench and set up an inner ring (only for pipes above DN 700) in the inside of connecting point (2cm from end of the spigot).

All hand-tightened to the maximum.

- ✓ Check the fuel in the three-phase aggregate which minimum power must be 6kW.
- ✓ Check the fuel in pumps to drain trench of groundwater.

TABLE OF DEFAULT WELDING VOLTAGE AND TIME

PROFILIRANE CIJEVI PO DIN – u 16 961 SA ELEKTRO – FUZIJSKOM SPOJNICOM

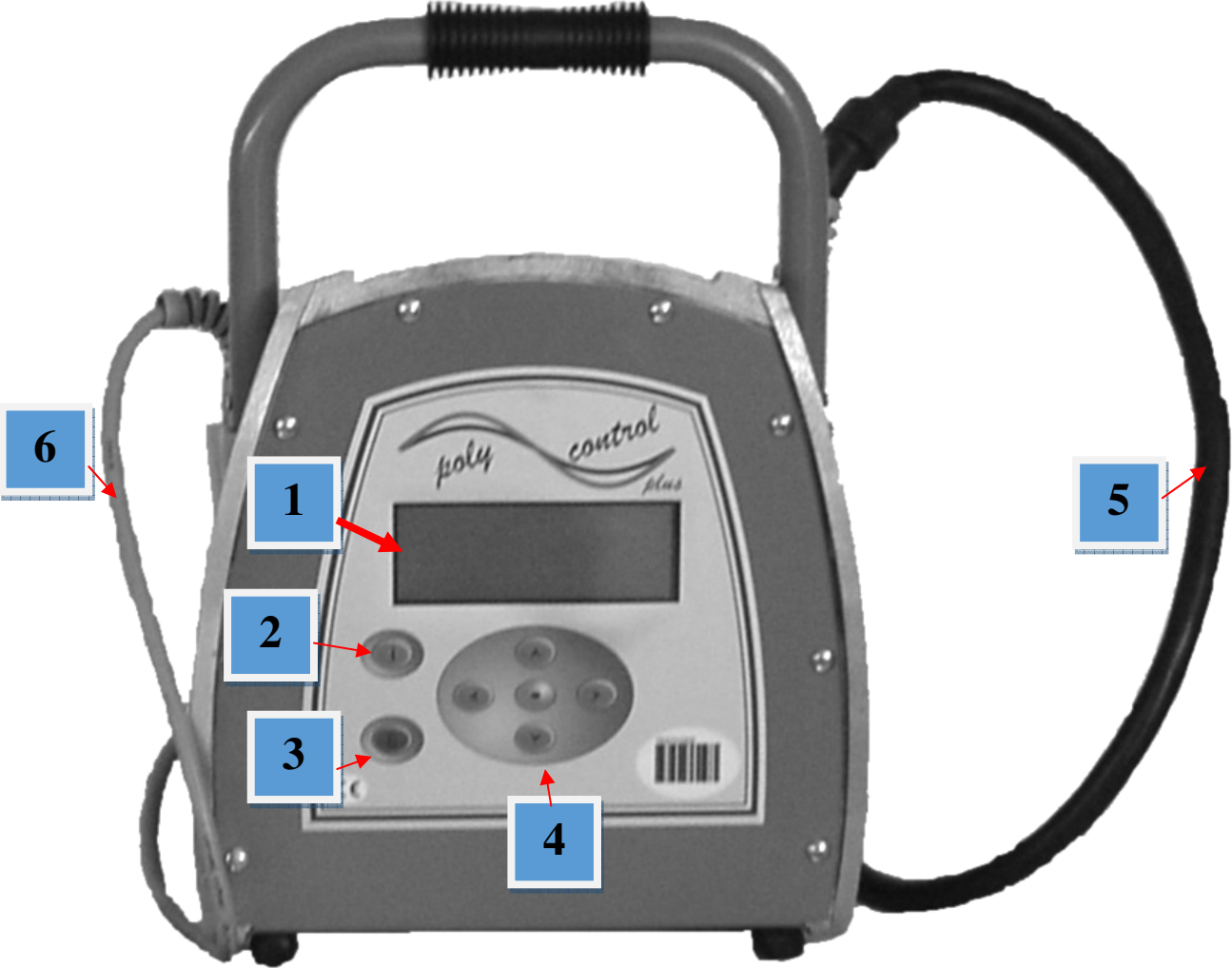
Diameter (mm)	Voltage (Volt)	Temperature 40° do 25°	Temperature 25° do 20°	Temperature 20° do 10°	Temperature 10° do 0°
DN 300	15 V	700 do 735	735 do 770	770 do 805	805 do 840
DN 400	18 V	800 do 840	840 do 880	880 do 920	920 do 960
DN 500	20 V	900 do 945	945 do 990	990 do 1035	1035 do 1080
DN 600	24 V	1020 do 1065	1065 do 1115	1115 do 1165	1065 do 1250
DN 700	25 V	1080 do 1120	1120 do 1170	1170 do 1230	1230 do 1280
DN 800	33 V	1020 do 1065	1065 do 1100	1100 do 1150	1150 do 1200
DN 900	38 V	900 do 945	945 do 990	990 do 1035	1035 do 1080
DN 1000	39 V	1000 do 1050	1050 do 1100	1100 do 1150	1150 do 1200
DN 1100	41 V	1100 do 1155	1155 do 1210	1210 do 1265	1265 do 1320
DN 1200	43 V	1200 do 1260	1260 do 1320	1320 do 1380	1380 do 1440
DN 1300	46 V	1300 do 1430	1430 do 1500	1500 do 1560	1560 do 1620
DN 1400	47 V	1400 do 1500	1500 do 1600	1600 do 1700	1700 do 1800
DN 1500	48 V	1800 do 1850	1850 do 1900	1900 do 2000	2100 do 2200
DN 1600 *	32 V	1000 do 1050	1050 do 1100	1100 do 1150	1150 do 1200
DN 1800 *	40 V	880 do 930	930 do 1000	1000 do 1070	1070 do 1150
DN 2000 *	39 V	1100 do 1155	1155 do 1210	1210 do 1265	1265 do 1320
DN 2200*	41 V	1200 do 1255	1255 do 1310	1310 do 1365	1365 do 1420
DN 2500*	44 V	1250 do 1345	1345 do 1410	1410 do 1470	1470 do 1530

-welding time is given in seconds

(* WELDING TIME WITH TWO WELDING DEVICES)

Be sure to comply with the above parameters for welding as well as instructions for welding PEHD pipes. Welding machine have the option of adjusting the welding time whit outdoor temperature. Maximum allowable external temperature is 40°

Controls and Plugs



- (1) Display
- (2) START (green)
- (3) STOP (red)
- (4) CURSOR (Selection key)
- (5) Welding Cable
- (6) Power Supply Cable
- (7) Power Switch



Starting a welding process

1. Preparation

To start up the control box (welding device) you have to follow the following steps in the given order:

1. Check device, cables and adapters optically and call KRAH d.o.o. from Croatia them in case of damage.
2. Unwind the power supply cable and the welding cable. It is not allowed to extend the welding cable!
3. Connect the detachable EF fitting to the welding cables of Control Box (wolding device).



4. Turn the power switch in OFF-position.

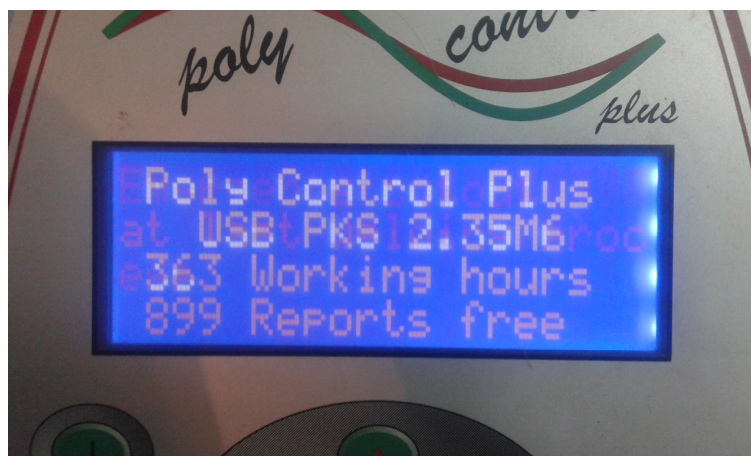
5. Check the fuel level before starting the welding process.

6. Start the generator before plugging in the control box (welding device). Wait until the generator output voltage has stabilized (240V). Frequency of supply voltage must be 50Hz.

7. Plug in the Control Box (welding device).

8. Switch on the power switch of the Control Box (welding device).

After this procedure the machine will indicate its function by two bleeps and the following message will appear in the display:



Row 1 and 2 show the *type* and *firmware revision* of the Control Box (welding device).

Row 3 counts the total *amount of working hours* (summed up fusion times).

Row 4 indicated the total *number of free reports* of the data recording system. In the case that the amount of free reports is smaller than 50, the letters of this row will flash.

Press the red **STOP**-key to confirm the rare memory space. The reports should be printed out, because there is the danger of data loss if the memory control option is deactivated.

After ten seconds the above shown display will disappear. In the following there could be shown system messages like *error messages* of previous welding cycles or *service notes*, which can be aborted by pressing the red **STOP**-key.

When the following display message appears, the machine is ready to carry out a new welding process.



Row 1 tells you the actual process step. Instead of “Connect Fitting” there could appear “No Contact” also. To go further you have to connect an EF fitting to the welding cables.

Row 2 and 3 show the active the commission number.

Row 4 give you the report number, which is related to the current commission number.

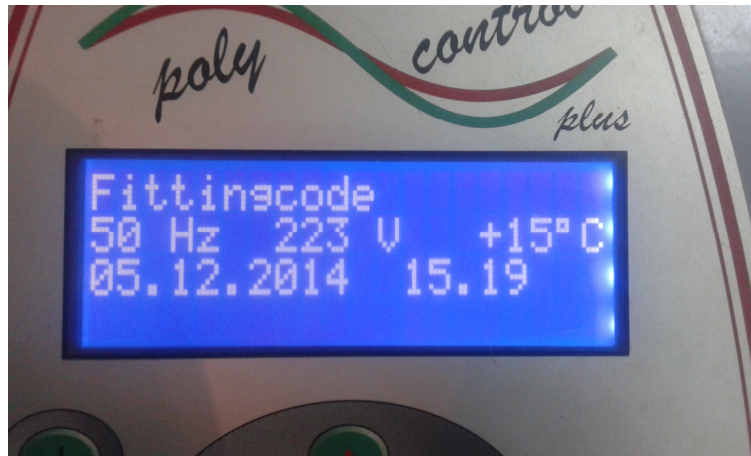
Welding Terminals:

- The contacts of the welding connector and the fitting plug must be clean – dirty or coated contacts can lead to overheating and burn at the connectors.
- Generally the terminals have to be protected against dirt. If there is a coating or loss of stick force on the connectors they have to be replaced.
- Use Adapters to connect certain fitting types. Adapters wear out with the time and have to be checked before every use.

Connect the welding terminals of the control unit (welding device) to the pins of the fitting. Take care on a firm and proper fit.

2. Barcode-Mode

As long as no fitting is connected, no welding process can be started. When connecting the welding terminals to the pin at the fitting pay attention to a firm a proper fit. As soon as a fitting is connected, the following message appears in the display:



Row 1 prompts you to read the fitting barcode. The respective procedure is described in the following sections.

Row 2 shows you the actual input frequency and voltage as well as the ambient temperature. In case of generator use check that the voltage is at about 240V-260V and frequency is at about 48Hz-52Hz.

Row 3 shows the date and time

Row 4 shows possible error messages

For welding in the Barcode-Mode, read in the barcode label, which is attached to the fitting you want to process. If it is not readable because of damage, you can use by the way of exception the readable barcode of an identical fitting of the same manufacturer or feed the numeric code manually into the device. **It is forbidden to use the barcode of a different fitting or a pipe with different diameter.**



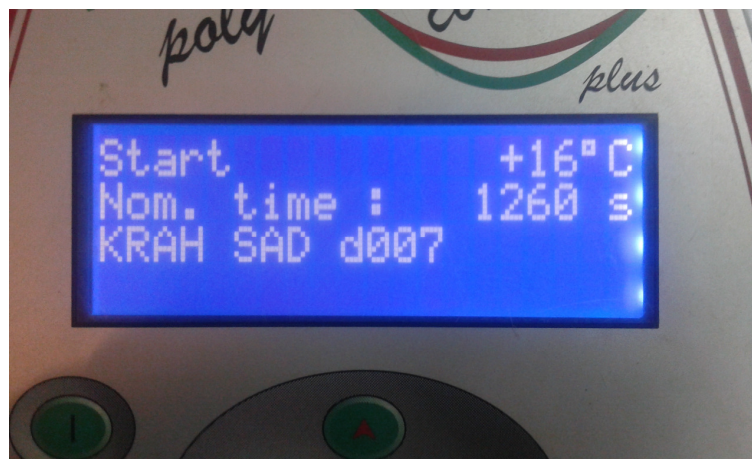
If you read in a barcode which is defect or invalid the code error will be displayed and indicated by a bleep.

Using the reading pen:

Place the tip of the reading pen left or right beside the bar code. Move the reading pen with a constant speed over the whole barcode. Do not stop the movement or lift the reading pen off.



You read-in the barcode by using the scanner or reading pen. If the device detects a valid barcode, it indicates its readiness by showing the following message:



Row 1 indicates that you have to press the green **START**-key to start the welding process. Before that you are obliged to check and compare the shown values with the ones given on the connected coupler.

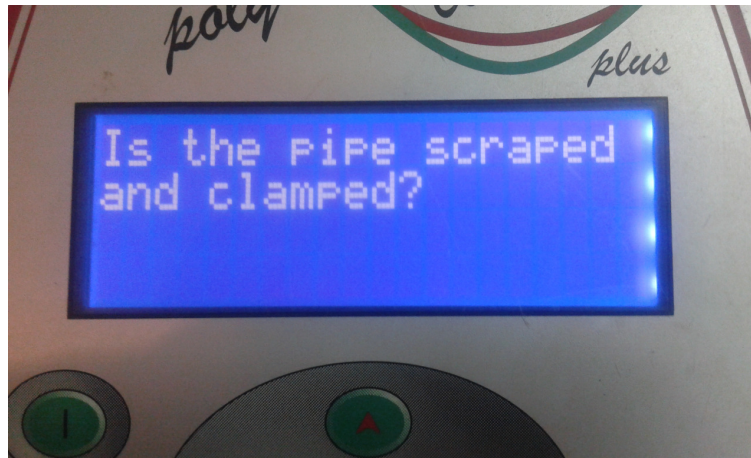
Row 2 shows the nominal welding time.

Row 3 shows the manufacturer, type and diameter decoded from the barcode.

There is also given the ambient temperature. If the fitting barcode provides *temperature compensation*, the nominal fusion time will be adapted to the ambient temperature.

Row 4 shows possible error messages.

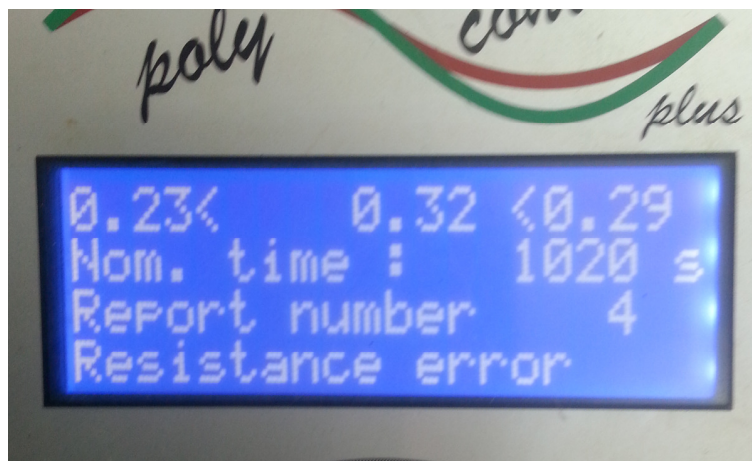
After pressing the green **START**-key a message will remind you of your duty to fix and prepare the pipes according to the general guidelines:



If you have any doubt about the right preparation, you can break off the procedure by actuating the red **STOP**-key. Confirm the proper preparation by pressing the green **START**-key.

Resistor Error

Now, the welding device begins to measure the fitting resistance. In the case that it is outside the valid range, the error will be indicated by a bleep and a appropriate message will appear in the display:



Row 1 shows in the middle the measured resistance. At the left and right the borders of the resistance range given in the barcode is shown.

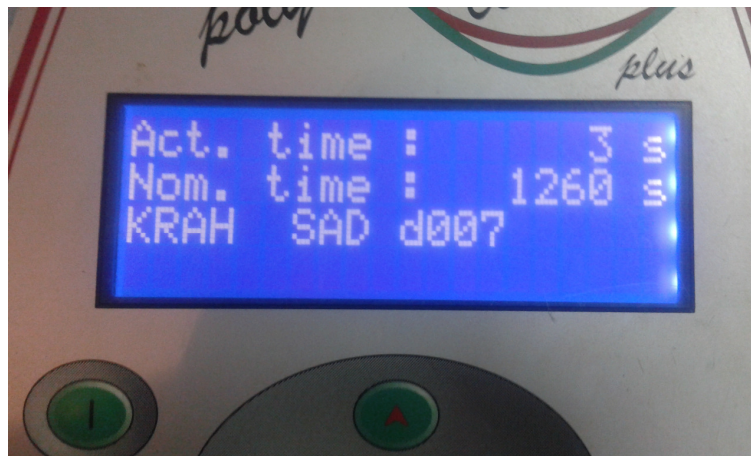
Row 2 shows the nominal welding time.

Row 3 shows the report number of the faulty process.

Row 4 shows "Resistor Error"

Plug the welding terminals out of fitting plugs. Check the connectors of the fitting and welding cable for dirt or coating. If the fitting causes another resistor error, it maybe defect. Replace it.

If no resistor error occurs, the welding device starts the welding process automatically. **To avoid danger for your health, do not touch the fitting or cables during the welding process.** The display shows the actual and nominal welding time:



Row 1 shows the actual welding time, which is counted upwards.

Row 2 shows the nominal welding time.

Row 3 shows the manufacturer, type and diameter.

Row 4 shows possible error messages.

The welding process will stop automatically when the actual time reaches the nominal time.

This will be indicated by two bleeps and the following message:




After stopping the welding process the data will be stored into the internal memory of the device. Pull off the welding connectors to go back to the start message.

3. Manual-Mode

Welding with the manual input of welding parameters can only be done by using a special code number or reading in a barcode with manual input authorisation. In case that you do not find the supervisor code in the annex of this instructions, please contact KRAH d.o.o. from Croatia.

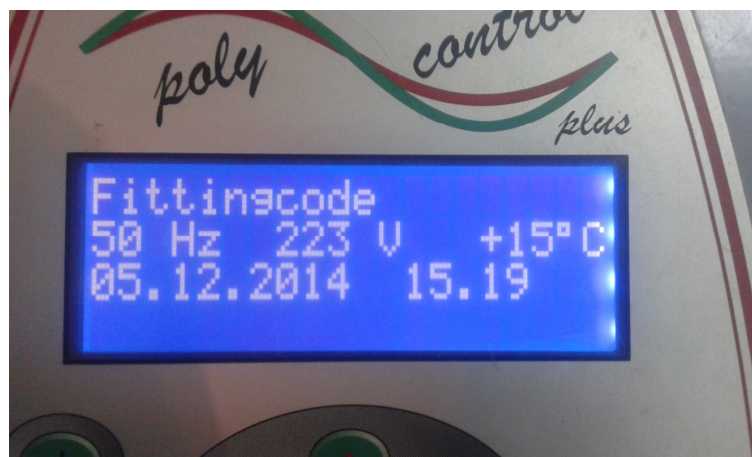
Power failure	Last welding was interrupted by a break of the power supply.	Last welding is faulty! Prepare pipe again and use a new Fitting!
Resistor error	Fitting resistance is out of the valid working range.	Clean the contacts. Use an other fitting.
	Fitting resistance out of the valid range given by barcode.	Clean the contacts Use an other fitting.
Service	The recommended service interval of 12 months or 200 working hours is exceeded.	The device has to be checked by an authorized service point. The device is still usable, but the manufacturer does not accept any liability for the device until it is checked up.
System error	Danger! Selftest found an error in the system.	Disconnect power supply immediately. Do not connect the device to the power supply any more. Send it to the next service point.
Temp. Meas. Error	Temperature measurement is faulty.	Plug in the removable welding cable. Switch device off and on. Welding cable or sensor defect.
Temperature error	Surrounding temperature out of working range (-10÷50°C).	

9 Supervisor Code



4 8 5 2 9 9 9 9 0 3 0 3 9 9 9 1 1 0 0 8

As long as no fitting is connected, no welding process can be started. When connecting the welding terminals to the pin at the fitting pay attention to a firm a proper fit. As soon as a fitting is connected, the following message appears in the display:



Row 1 prompts you to read the fitting barcode. The respective procedure is described in the following sections.

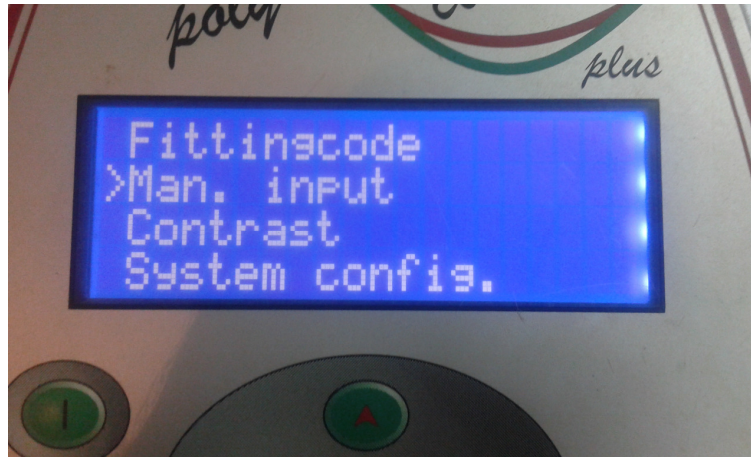
Row 2 shows you the actual input frequency and voltage as well as the ambient temperature. In case of generator use check that the voltage is at about 240-260V and frequency is at about

48Hz-52Hz.

Row 3 shows the date and time

Row 4 shows possible error messages

After connecting the fitting, press the select key ● to show the function menu in the display:

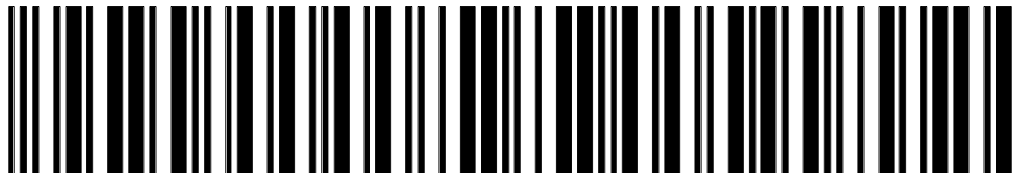


The function menu contains a list of available functions. The first three are shown in the display. The symbol > represents the cursor, which marks the menu item to be selected.

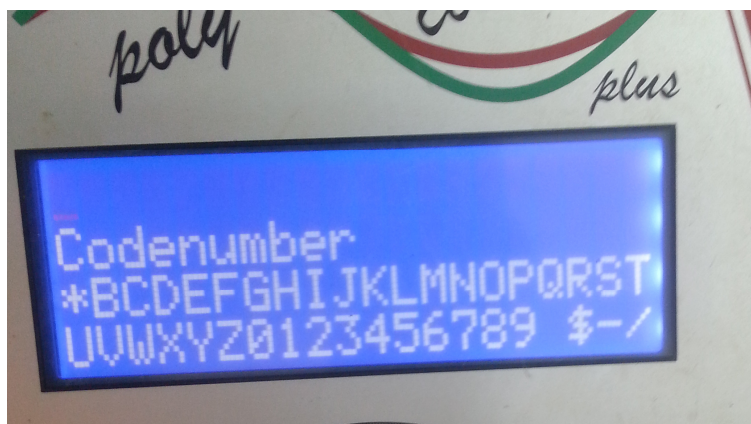
Use the ◀-keys to move the cursor to the item **Man. Input** and press select key ●.

By following message you are asked to enter the code number or to read in a barcode with manual input authorisation (e.g. supervisor code / foreman code).

Supervisor Code

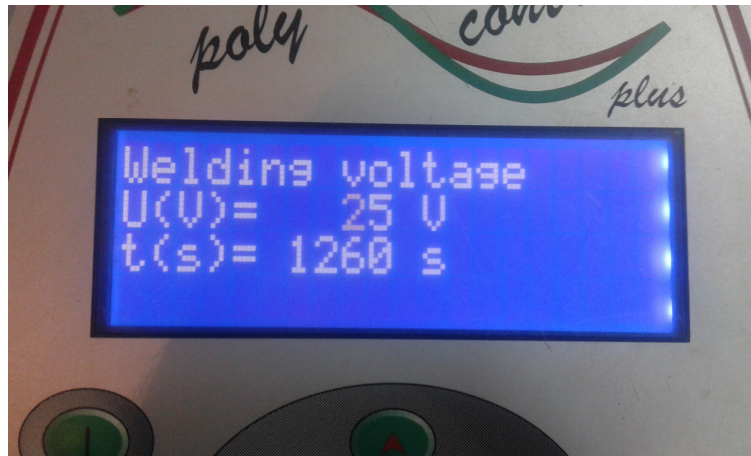


4 8 5 2 9 9 9 9 0 3 0 3 9 9 9 1 1 0 0 8



A present barcode can be read in by using the reading pen or scanner. The input of the code number can be done by using the shown letter input field.

If a valid code was entered, the display shows the entry fields of the welding parameters.



Row 1 shows the name of the active entry field (here: Welding Voltage).

Row 2 shows the welding voltage entry field.

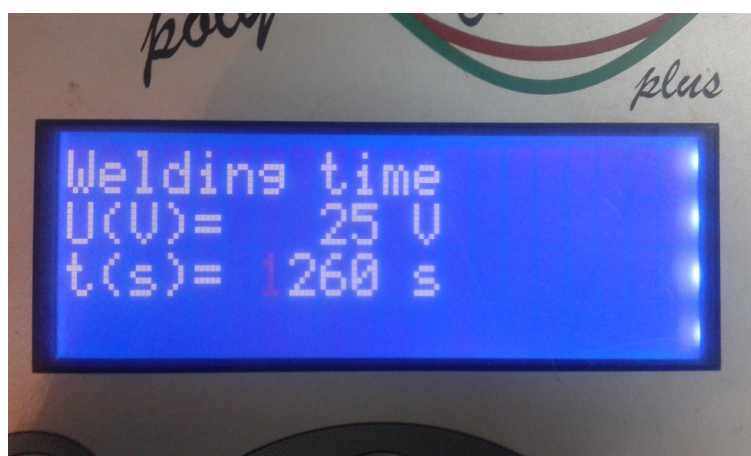
Row 3 shows the welding time entry field

An underlined or flashing digit marks the number to be changed. Read welding voltage from TABLE OF DEFAULT WELDING VOLTAGE AND TIME (on page 3);

- ◆ Increases or decreases the digit which is marked.
- ◀ ▶ Moves the marking to the left or right digit.

START Confirms the entered welding voltage.

After pressing the **START**-button the entry field for the welding time will be activated:

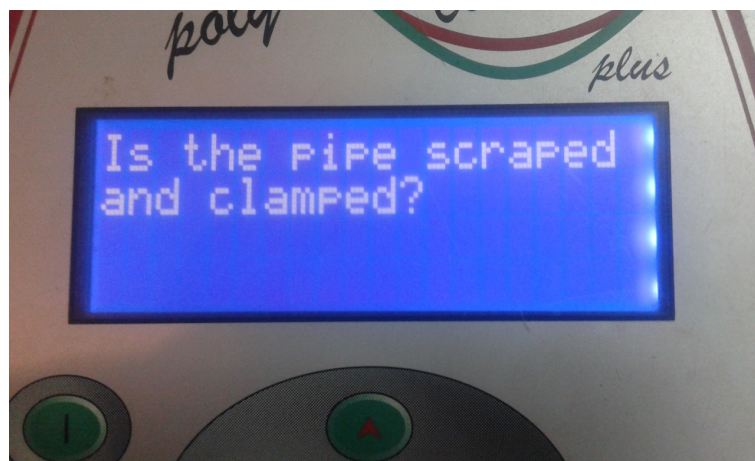


The value will be entered the same way as described above. Read welding time from TABLE OF DEFAULT WELDING VOLTAGE AND TIME (on page 3).

After the confirmation with the **START** button the welding parameters will be shown once again.



Check carefully the correctness of the parameters before confirming them by pressing the green **START**-key. The following message will remind you of your duty to fix and prepare the pipes according to the general guidelines:

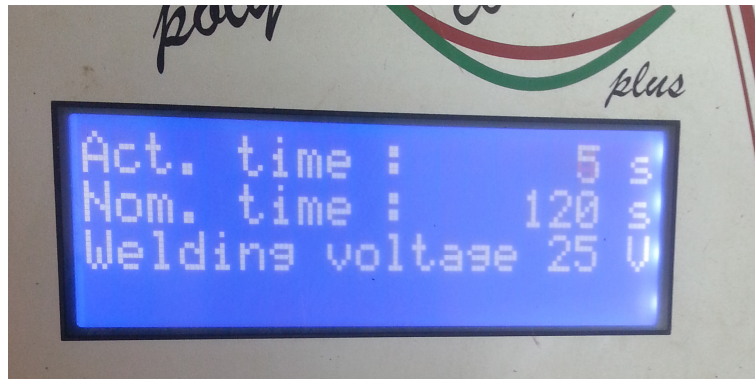


If you have any doubt about the right preparation, you can break off the procedure by actuating the red **STOP**-key. Confirm the proper preparation by pressing the green **START**-key.

The welding device starts the welding process automatically.

To avoid danger for your health, do not touch the fitting or cables during the welding process.

The display shows the actual and nominal welding time:



Row 1 shows the actual welding time, which is counted upwards.

Row 2 shows the nominal welding time.

Row 3 shows the nominal welding voltage.

Row 4 shows possible error messages.

The welding process will stop automatically when the actual time reaches the nominal time.

This will be indicated by two bleeps and the following message:



After stopping the welding process the data will be stored into the internal memory of the device. Pull off the welding connectors to go back to the start message.

After have finished welding, switch off the power switch of the Control Box (welding device)

Plug out welding device before turning off the generator.

MOST IMPORTANT THINGS

- ✓ **IMPORTANT:** During welding and cooling time pipes should not be disturbed and shake
- ✓ **IMPORTANT:** During welding and cooling time excavation work about backfill around pipes must be on hold because they can cause shaking and dirt
- ✓ **IMPORTANT:** During cooling do not take off the outer tensile ribbon or tensile chain or inner ring.
- ✓ **IMPORTANT:** Cooling time determined by weather conditions. It must not be less than the time of welding. The cooling time is longer as the pipe diameter is smaller! Cooling time is over when the temperature of connection point is same as temperature of surrounding air (or pipes).
- ✓ **IMPORTANT:** The outer tensile ribbon or tensile chain and inner ring need to be tighten after 60-70% of the welding time and at the beginning of cooling.

9 Conformity Declaration

DE Konformitätserklärung des Herstellers
GB Manufacturer's Conformity Declaration
FR Certificat de conformité
IT Dichiarazione di Conformità del Costruttore
ES Declaracion de conformidad del fabricante
PT CERTIFICADO DE CONFORMIDADE



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DE erklärt, dass die Schweißmaschine
GB declares that the welding machine
FR déclare que la machine electrosoudable
IT dichiara che la saldatrice
ES declara que la máquina de soldar
PT declara que o equipamento

Polymatic Plus (Top)	- 230V / 50Hz – 110V / 50Hz – 48V / 50 Hz 200Hz
Polymatic (Data)	- 230V / 50Hz – 110V / 50Hz – 48V / 50 Hz
Digimatic (Time / Data)	- 230V / 50Hz – 110V / 50Hz
Monomatic (Light), Durimatic	- 230V / 50Hz – 110V / 50Hz
Tiny M (Data), Polycode	- 230V / 50Hz – 110V / 50Hz
PolyControl (Plus / Top)	- 230V / 50Hz
Polyweld	- 230V / 50Hz – 48V / 50 Hz
Transformer Box (2600VA / 2800VA)	- 230V / 50Hz

DE gemäß den folgenden gesetzlichen Richtlinien, Vorschriften und Verordnungen hergestellt wurde:
GB is made in compliance with the following directives, standards and legal regulations:
FR est conforme aux normes, règles ou directives suivantes:
IT è conforme alle disposizioni delle seguenti direttive, normative e prescrizioni che rispondono alle seguenti leggi:
SP está conforme con lo dispuesto en la legislación vigente:
PT foi fabricado e testado com o disposto nas seguintes regulamentações em vigor:

73/23/EEC Low Voltage Directive
89/336/EEC Electro Magnetic Compatibility

EN 60335-1 / IEC 335-1
ISO 12176 (1-4); ISO/TR 13950; UNI 10566
DVS 2208

Alsfeld, 01.01.2007

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Legal Status:
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Gliessen HRB-Nr. 3276
Dir.: Ing. Bernd Merle
Hofweg 1/1

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