Orbital welding system
CompactDual

ORBITALSERVICE®
THE FUTURE OF ORBITAL WELDING

Contents

Rev.0	Created

1. General information

Liability in relation to operating this system is explicitly limited to the function of the system. Other forms of liability of any kind whatsoever are expressly excluded. The user acknowledges this exclusion of liability when putting the system into operation.

The manufacturer is not able to monitor compliance with this manual; the conditions under which the equipment is installed, operated, used and maintained; or the methods used for this purpose.

Improper installation may result in damage to property and, in turn, put people at risk. Consequently, we assume no responsibility or liability whatsoever for loss, damage or costs that result directly from – or are in any way connected with – faulty installation, improper operation, or incorrect use and maintenance.

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Fax +49 (0) 6092 82294 -09
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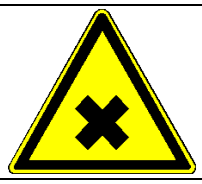
Website: www.orbitalservice-group.com

2. Safety instructions

Arc welding poses a risk of injury both to you and to others. When carrying out orbital welding, you must therefore observe the applicable safety and accident prevention regulations just as you would when performing other types of welding work.

	**Warning of hazardous electrical voltage** - Install and ground welding equipment in accordance with local - standards. - Do not touch live parts or electrodes with your bare hands or - wet protective equipment. - The place of work must be safe.
	**Warning of risk of fire** - Welding spatter can cause fires. - Do not store any flammable objects in the work area. - Dirt is often also flammable. - Remove all flammable cleaning agents prior to welding.
	**Warning of optical radiation** - Protect your eyes and body. Wear a suitable safety helmet with a filter unit and also protective clothing. - Nearby personnel must be protected by setting up protective curtains/screens/panels.
	**Warning of harmful fumes and gases** - Turn your face away from the welding fumes. - If necessary, extraction equipment should be used.
	**Warning of risk of explosion from hydrogenous gases** - Extreme caution must be exercised when using forming gases or gases that contain hydrogen. These gases are flammable. - Please observe the provisions of the applicable safety data sheets. - Make sure that there are no solvents in the ambient air before switching on the system, e.g. in paint lines.
	**Warning of high temperature** - Parts of the welding head may get hot during welding (e.g.: side parts)
	**General information!** - Observe the safety regulations for welding work in confined spaces and enclosed containers/vessels. - Do not wear any jewellery or loose clothing.

3. Scope of delivery

The following parts are included in the scope of delivery:

1 CompactDual

Please check that all the listed parts and assemblies are present and correct.

4. Front of machine

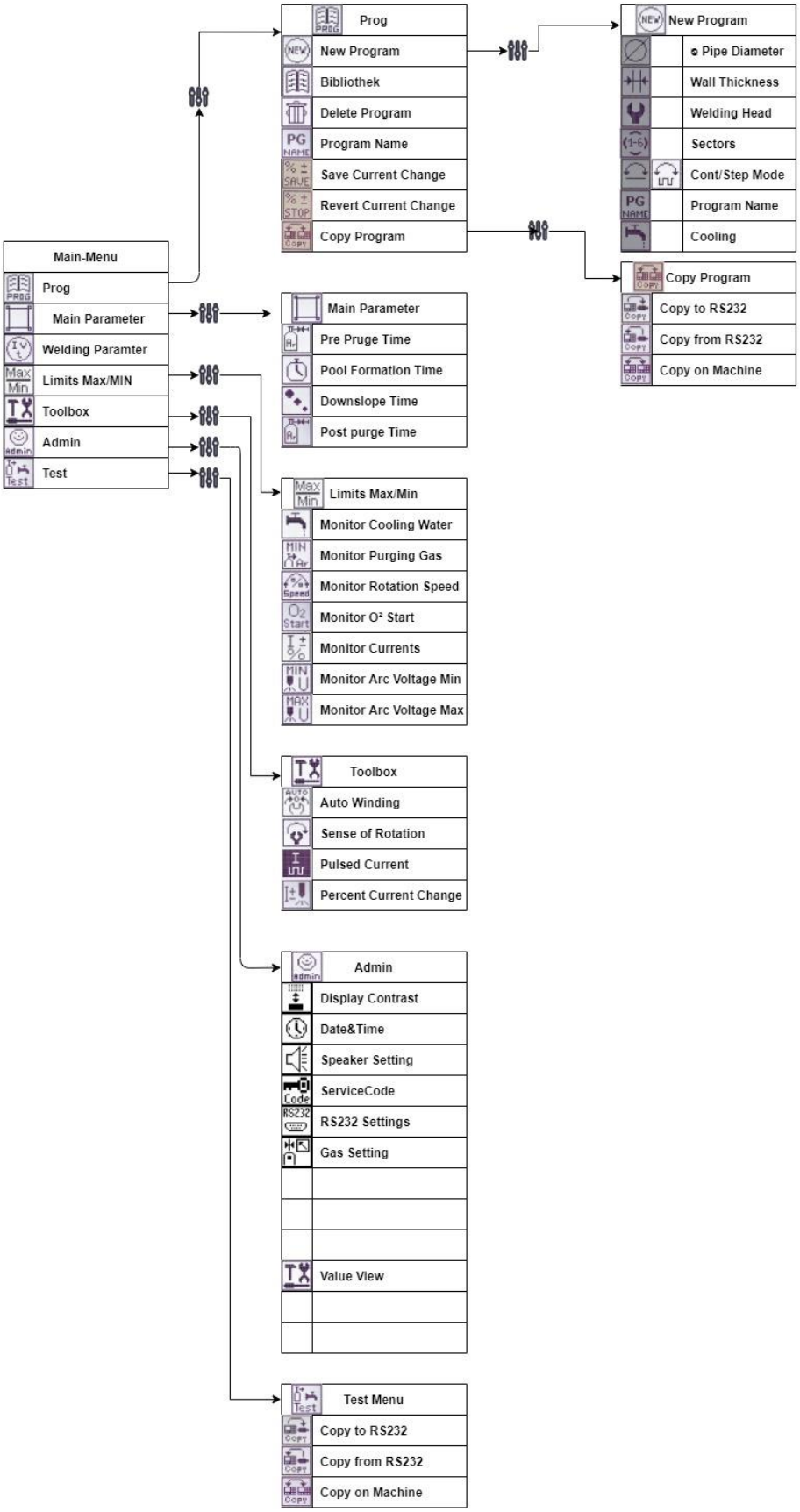
Information “Orbital welding set”

Press the right key (Orbital-Hand) to switch over between Hand / Orbital. The Orbital mode is activated if you can see the Orbital key for Orbitalservice in the field (you can also see this in our logo at the top of the page). You cannot adjust any gas times or welding currents with the red knob etc. You can only change the “Current pulses, constant and high-frequency” mode by pressing the key beneath this.

We do not recommend additional current pulses (up to a max. of 2.5 kHz). This only makes sense occasionally for special applications!

5. Rear of machine

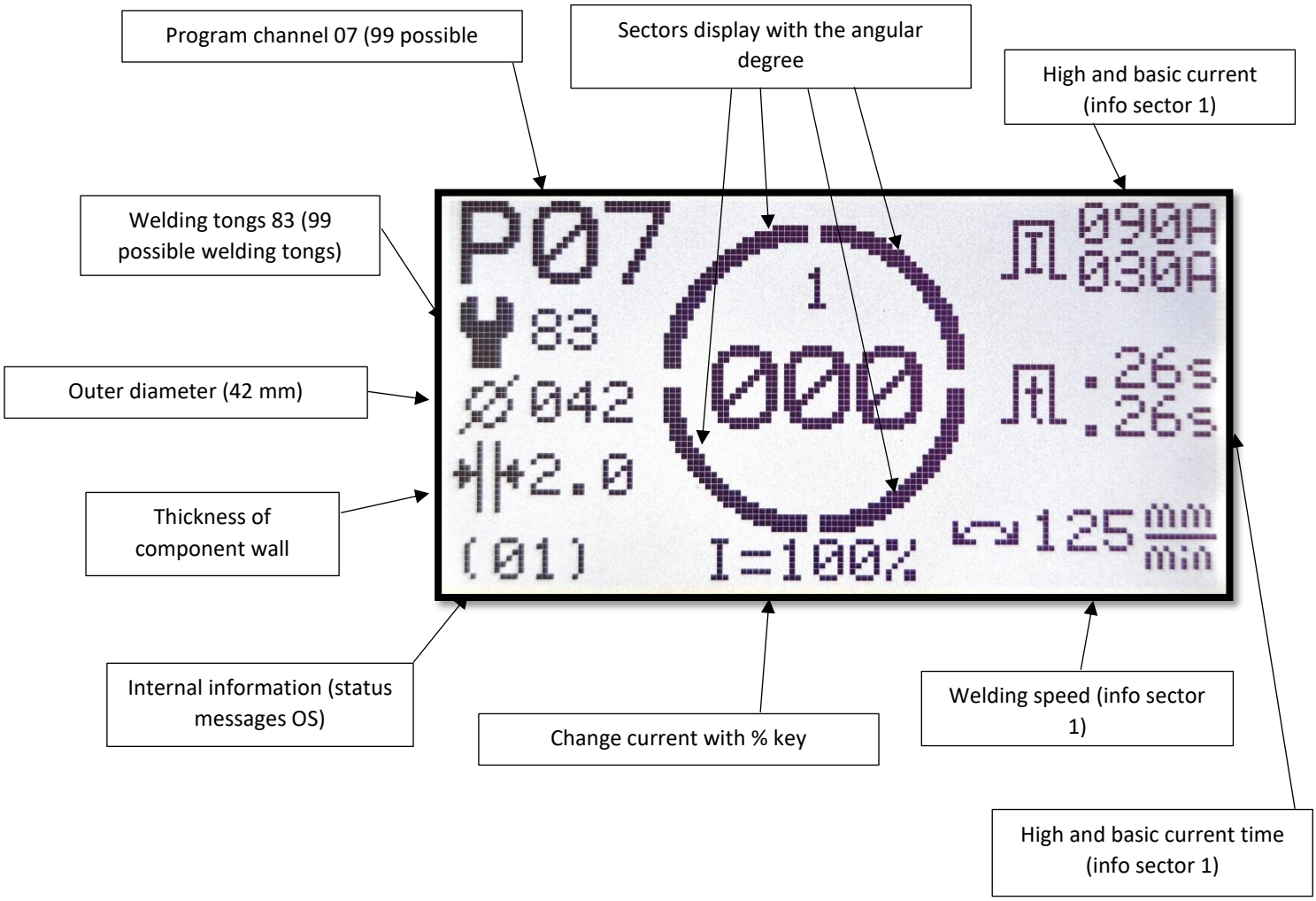
6. Menu tree


Main-Menu
Prog
Main Parameter
Welding Paramter
Limits Max/MIN
Toolbox
Admin
Test
Prog
New Program
Bibliothek
Delete Program
Program Name
Save Current Change
Revert Current Change
Copy Program
New Program
Pipe Diameter
Wall Thickness
Welding Head
Sectors
Cont/Step Mode
Program Name
Cooling
Copy Program
Copy to RS232
Copy from RS232
Copy on Machine
Main Parameter
Pre Pruge Time
Pool Formation Time
Downslope Time
Post purge Time
Limits Max/Min
Monitor Cooling Water
Monitor Purging Gas
Monitor Rotation Speed
Monitor O² Start
Monitor Currents
Monitor Arc Voltage Min
Monitor Arc Voltage Max
Toolbox
Auto Winding
Sense of Rotation
Pulsed Current
Percent Current Change
Admin
Display Contrast
Date&Time
Speaker Setting
ServiceCode
RS232 Settings
Gas Setting
Value View
Test Menu
Copy to RS232
Copy from RS232
Copy on Machine

7. Key assignment

	**Start key:** Use this key to start welding and confirm menus.
	**Stop key:** Use this key to stop welding or cancel a menu selection.
	**Program key**: Press this key to open the main menu where you can then create welding programs, for example.
	"Navigate" the menus by pressing the "**Arrow left key"**. You can also scroll through the library when creating programs or viewing programs that have already been used for welding. When not used for programming, the key also moves the welding tools, rotating them to the left. It can also be used to change parameters.
	"Navigate" the menus by pressing the "**Arrow up key"**. You can also scroll through the library when creating programs or viewing programs that have already been used for welding. When not used for programming, the key also moves the welding tools, rotating them to the right. It can also be used to change parameters.
	**Acknowledgement key:** This key is mainly used to confirm the individual menus and settings. It can also be used to adjust the welding current on a percentage basis in the main interface screen. Furthermore, the key is also an **Enter** confirmation key.

8. Main interface screen

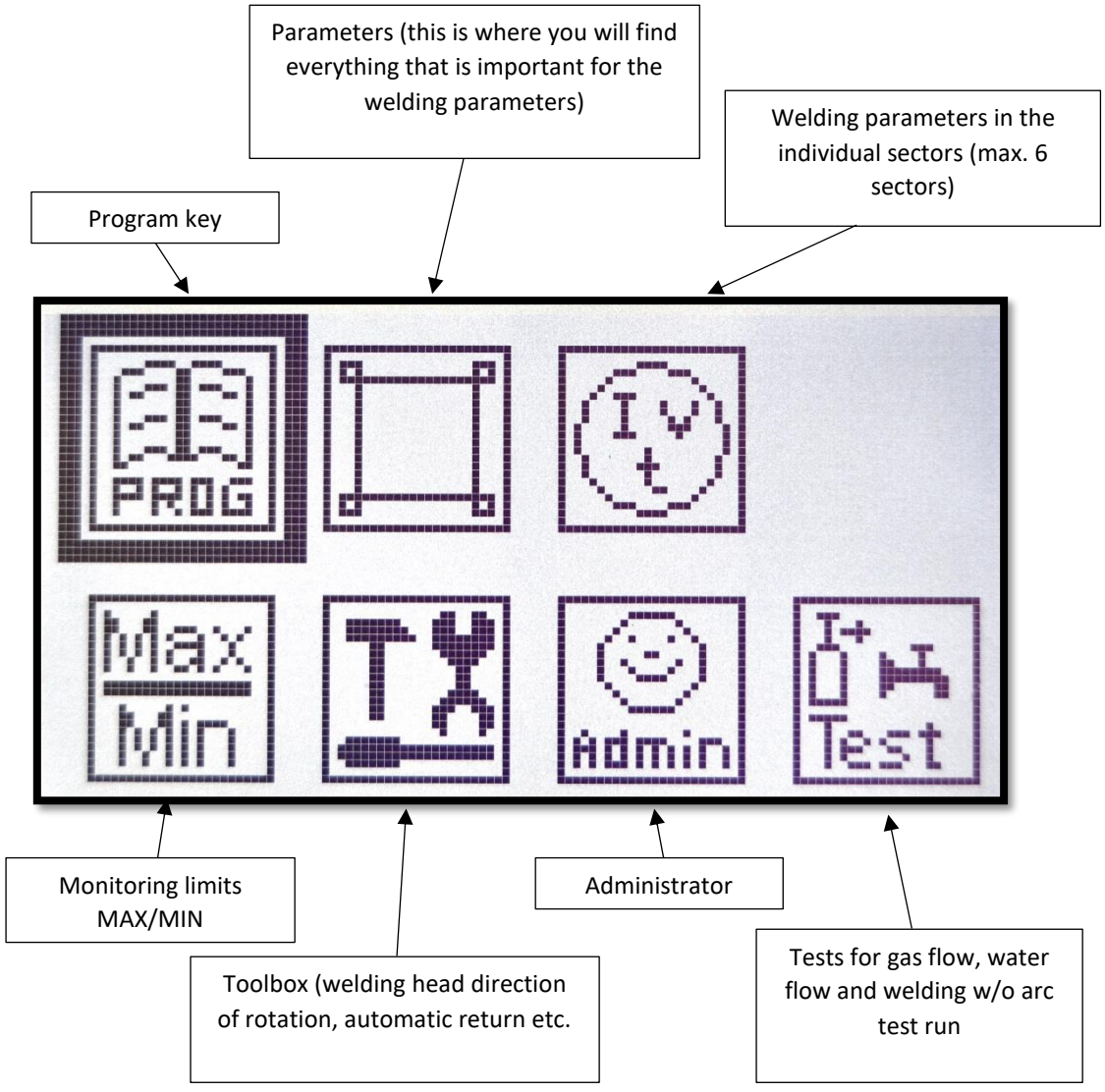


The welding process can only be started from the main interface screen with the ✓ key.

9. Main menu

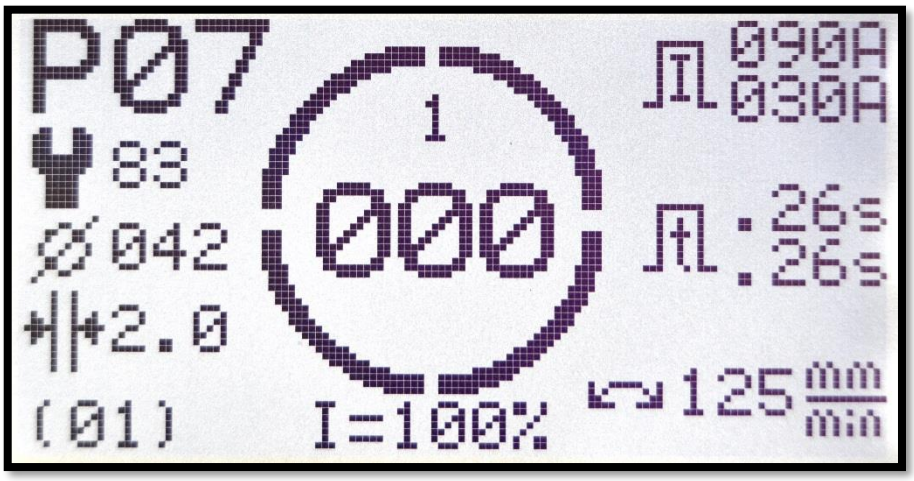
Press the ☰ key to open the main menu.

The symbol with the thick black frame is activated by pressing the key which takes you to the programming level.



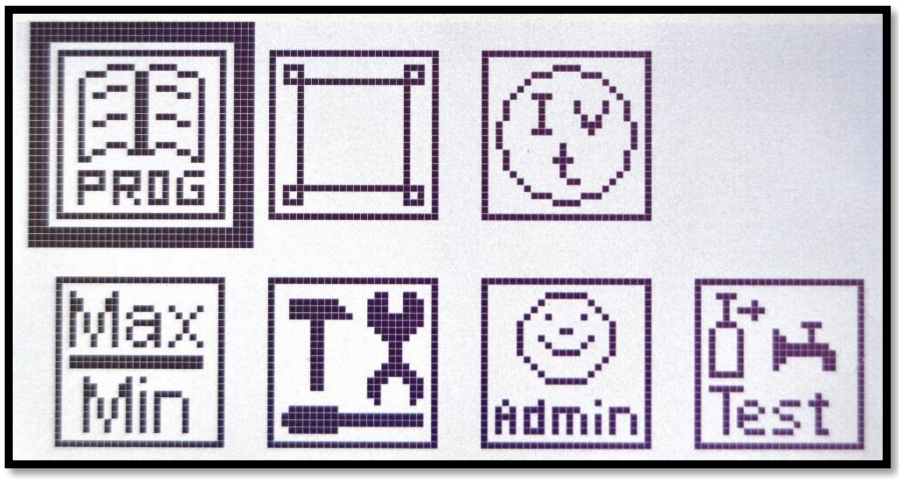
10. Creating a welding program

It is easy to create your first welding programs with the control system. Many years of tried and trusted basic calculations have been implemented in the software.

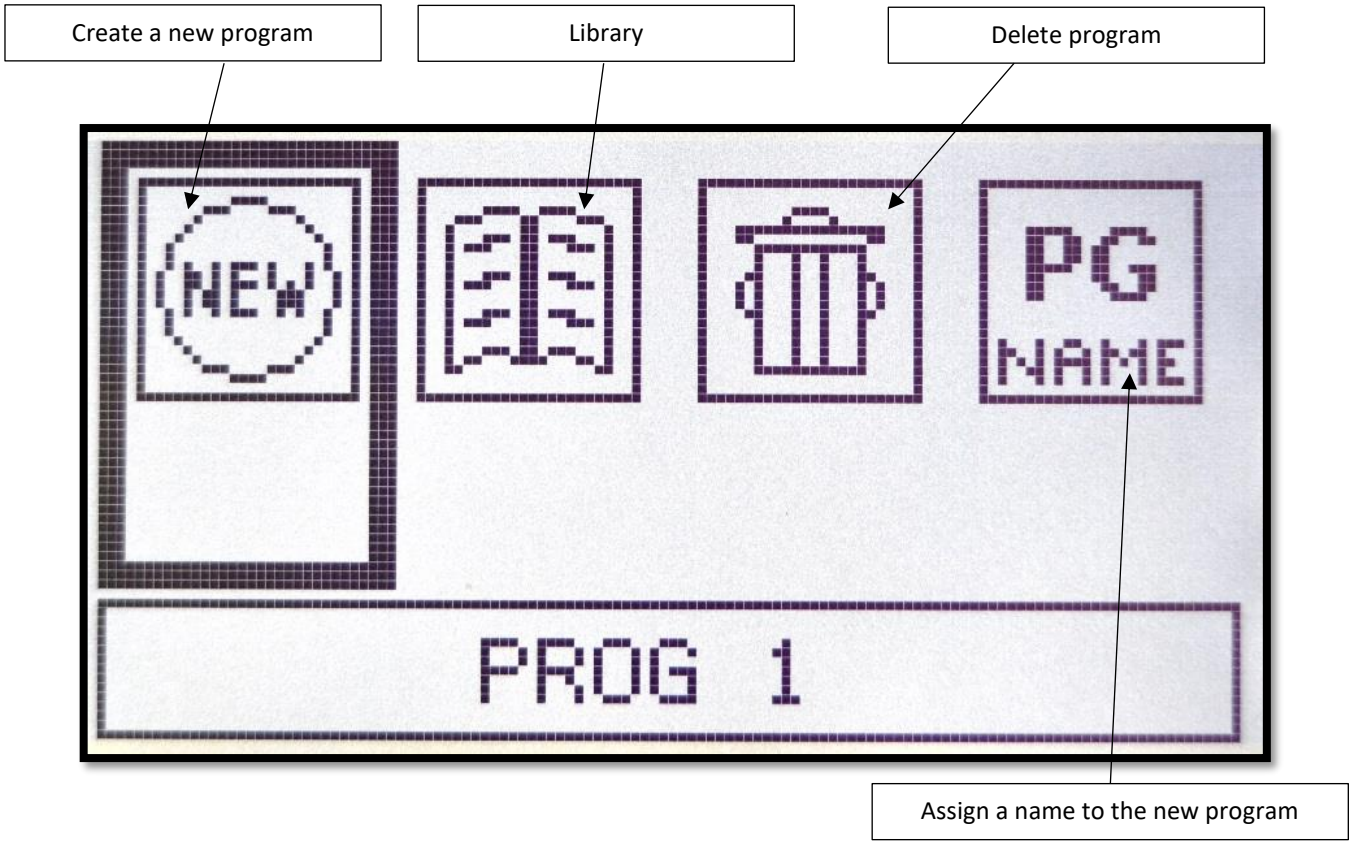


We would now like to create a demonstration program with one set of welding tongs. A tube with an outer diameter of 42.0 mm and a wall thickness of 2.0 mm is to be welded. We want to weld this tube-tube connection in 4 sectors.

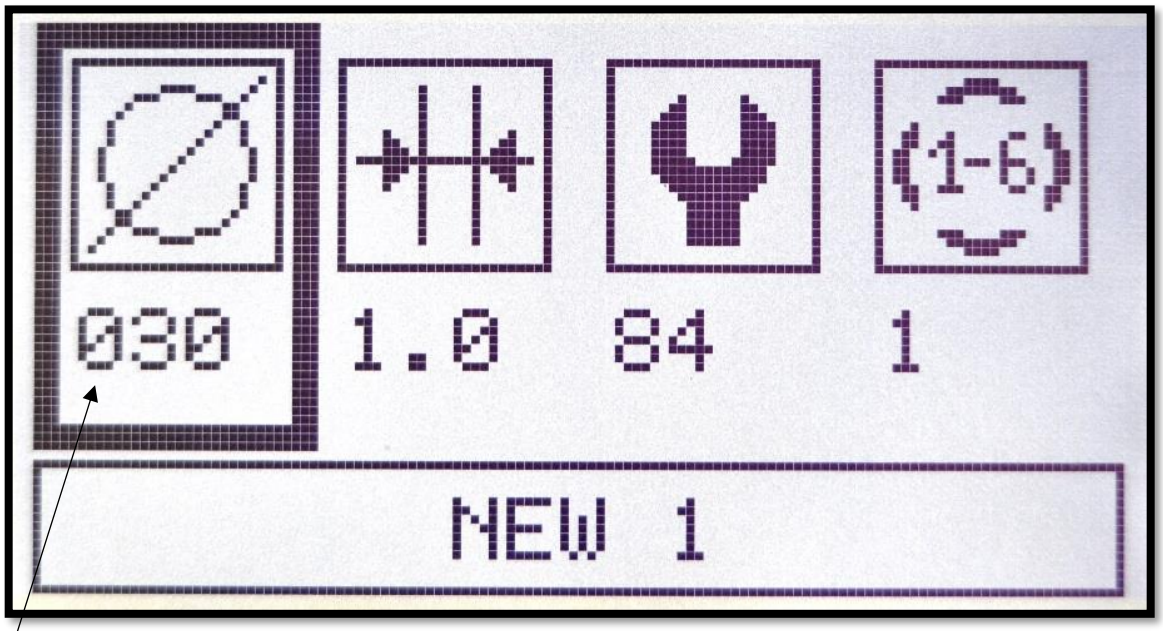
Press the key ☰



Press the key

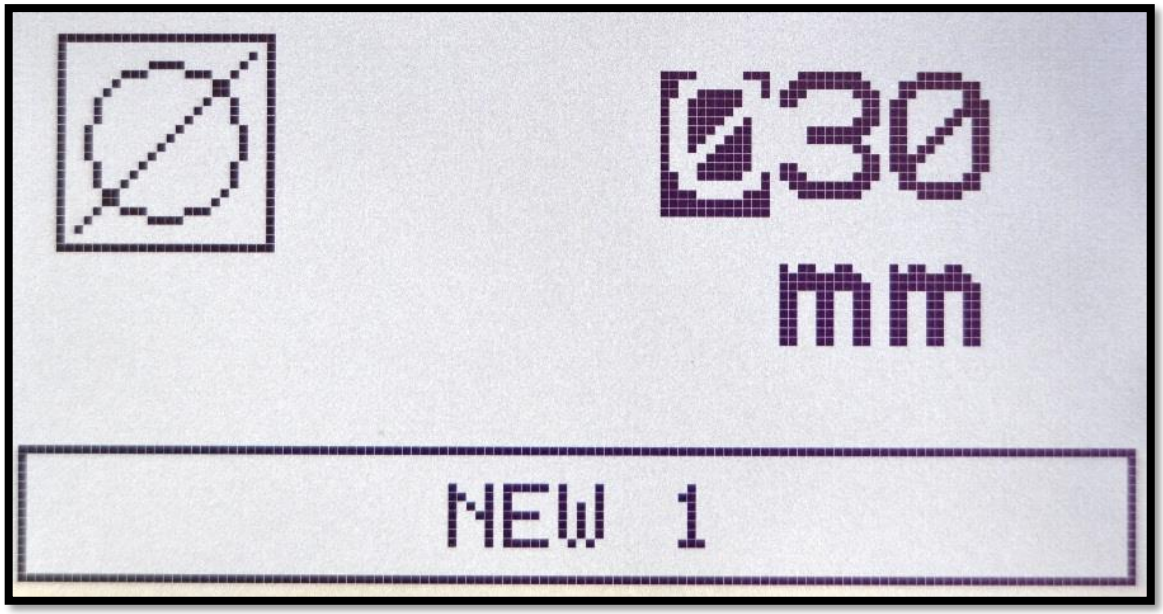


10.1 Tube diameter

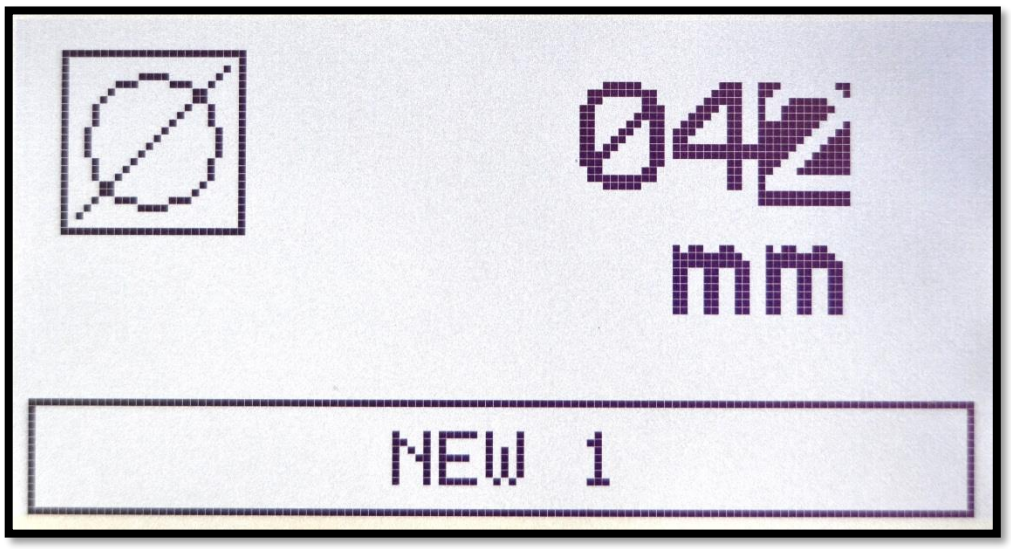


Outer diameter component

Press the key

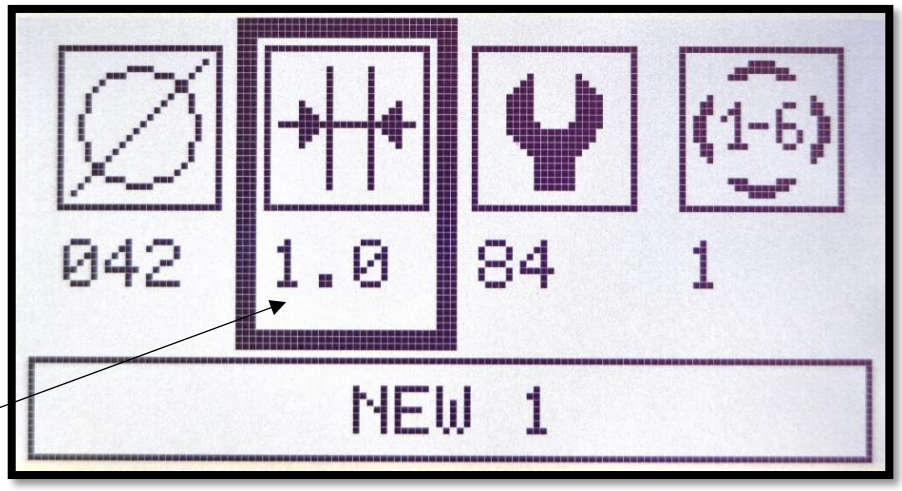


You can now use the ← ↑ keys and the enter setting key to enter the various data for diameter, wall thickness, number of welding tongs etc. You can change the number or value that has a black background with the arrow keys and then press the enter setting key. Pressing this once increases the number or value by one decimal power. You can also use the arrow keys to scroll through the values.



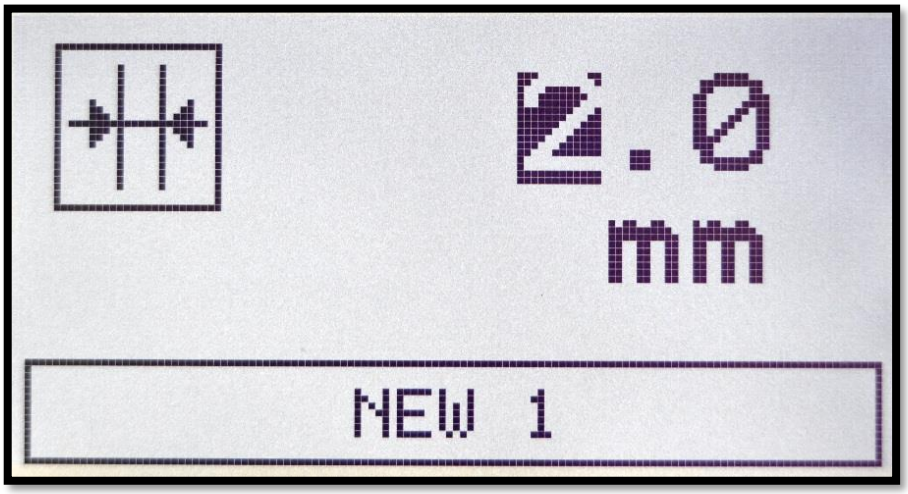
Press the key

10.2 Wall thickness

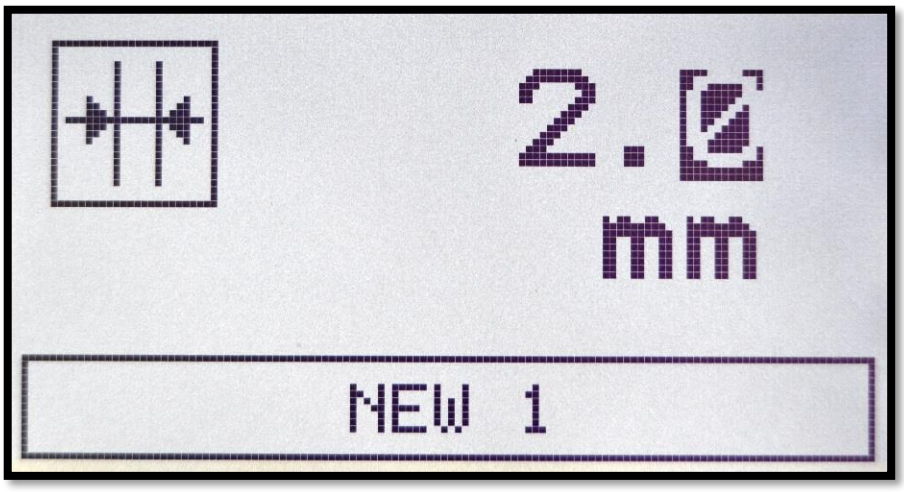


Thickness of component

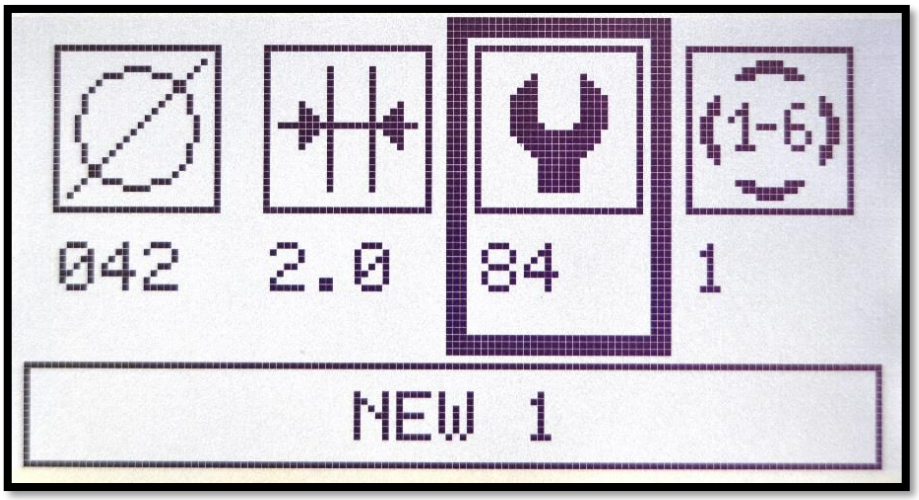
Press the key



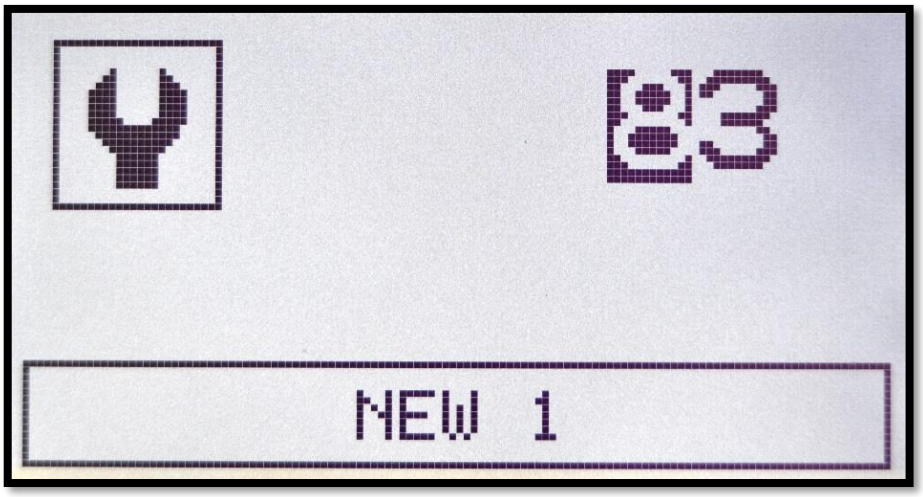
Press the key twice



10.3 Select tongs

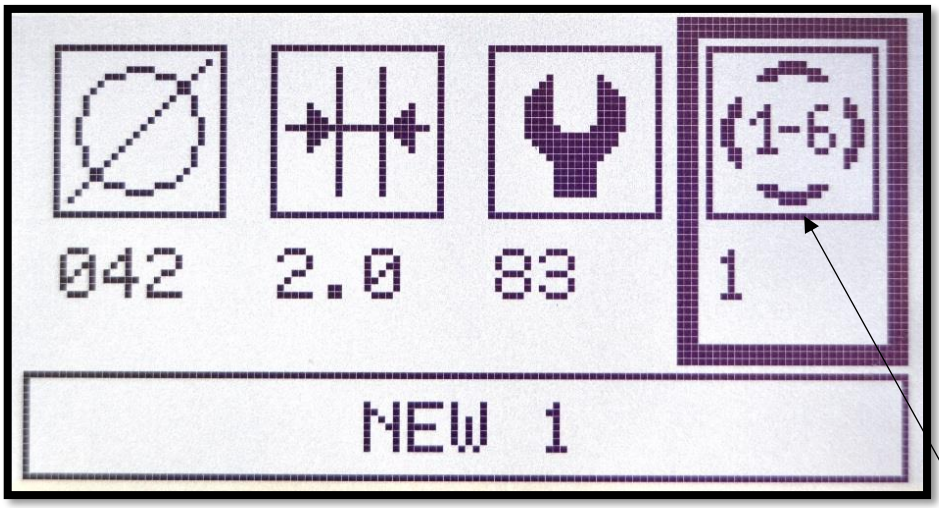


Press the key

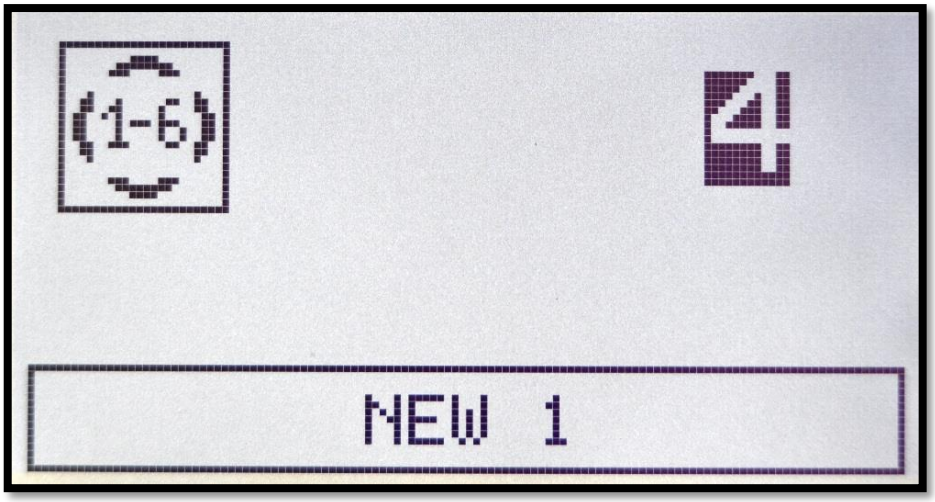


Number of welding tongs /welding tool

10.4 Welding sectors



Press the key

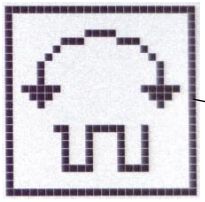


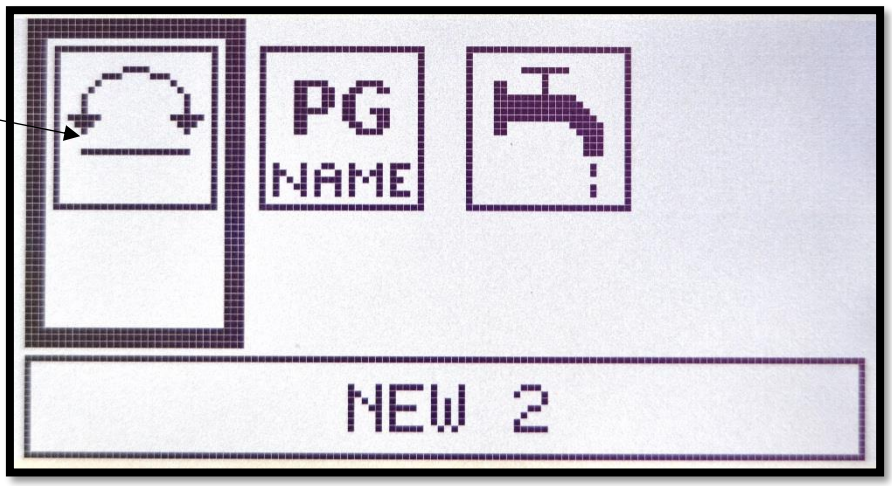
Desired number of sector segment levels (1-6 possible)

You can specify the number sectors in this menu item. This means that you can divide the tube up into up to 6 different segments. These are calculated automatically after specifying the tube's outer diameter, wall thickness, and entering continuous or stepped torch program (the step mode will be explained in the following Chapter).

This also describes how to change the angular degrees at which the various sectors are active, in more detail.

10.5 Step/cont rotation



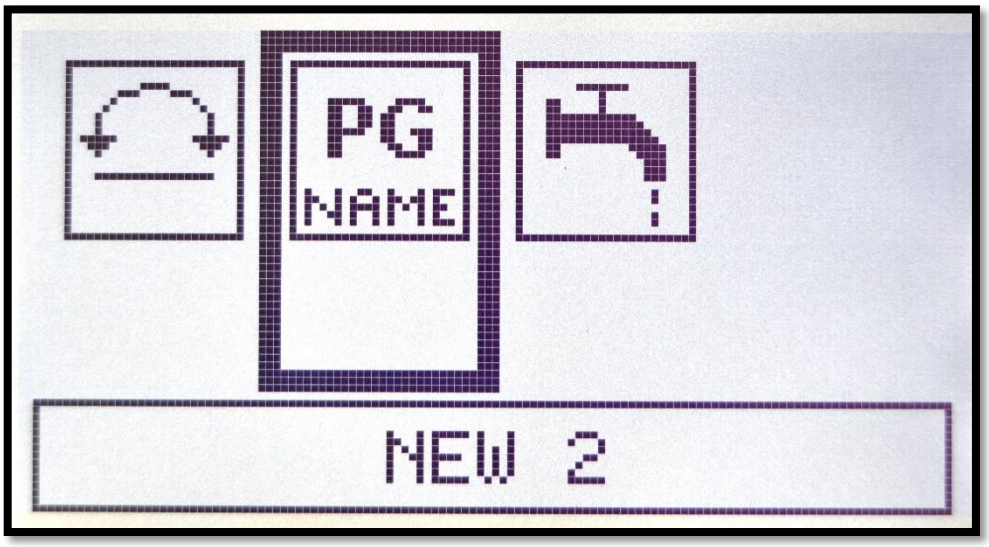


Altered symbol for
torch step mode
Step mode
Rotation

The rotation is determined in these menu items (bottom, New 2) (current rotation, continuous).

Change this to torch step mode by pressing the  key. The symbol then changes to the one shown at the top left of this page.

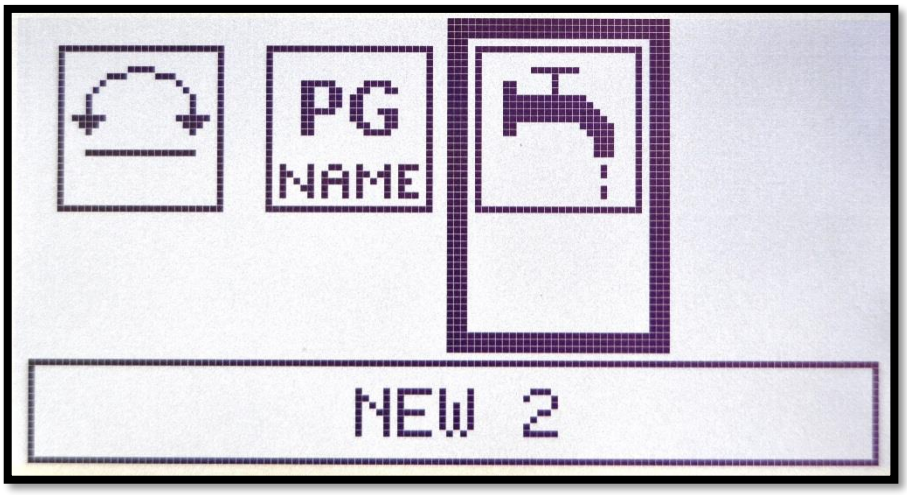
10.6 Program name



Press the key

Press the keys and the enter settings key to call up various characters, numbers, upper- and lowercase letters to give the program a name or describe it. This is important so that you can find it later on in the library and activate it at a later date.

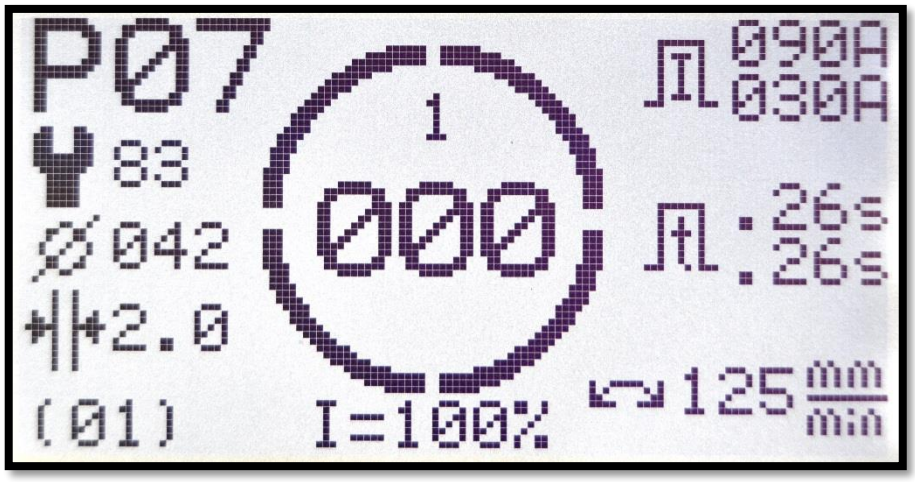
10.7 Welding head cooling



Press the key

If the water symbol does not switch to a black background when the key is pressed, the welding head tongs are gas-cooled. This is the case with welding tongs no. 83 (open tongs OWH 76-type LB). If the symbol does have a black background, you can operate the head with a chiller and a water-cooled hose pack. The flow and water temperature also monitored here and shown for the respective devices. Water-cooled welding heads, CWH 53-76 and 115 always have a black background, in other words they only work if a chiller is connected and in operation.

10.8 Finished welding program



Welding program no. P 07 fully calculated.

You will be shown important information on the tongs, program channel and the component on the left side of the screen and the welding parameters for sector 01 on the right side of the screen.

Changes in current are shown in the bottom part of the screen, currently at 100% (standard setting).

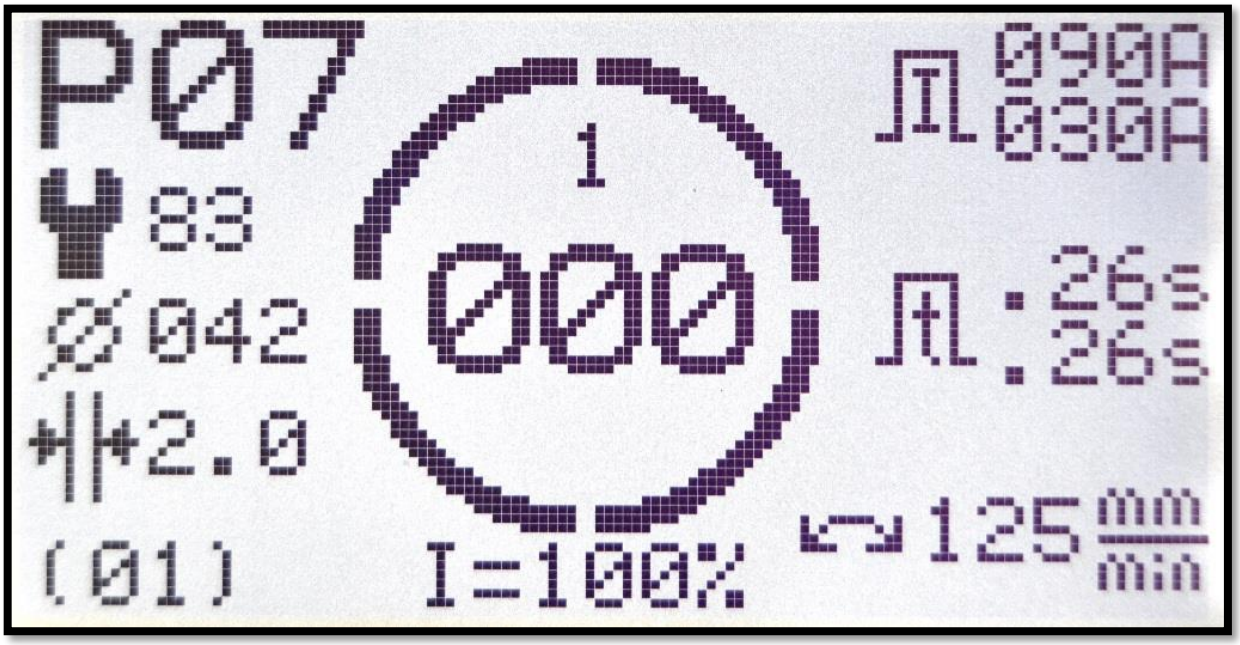
11. Adjusting a welding program

11.1 Welding library (database)

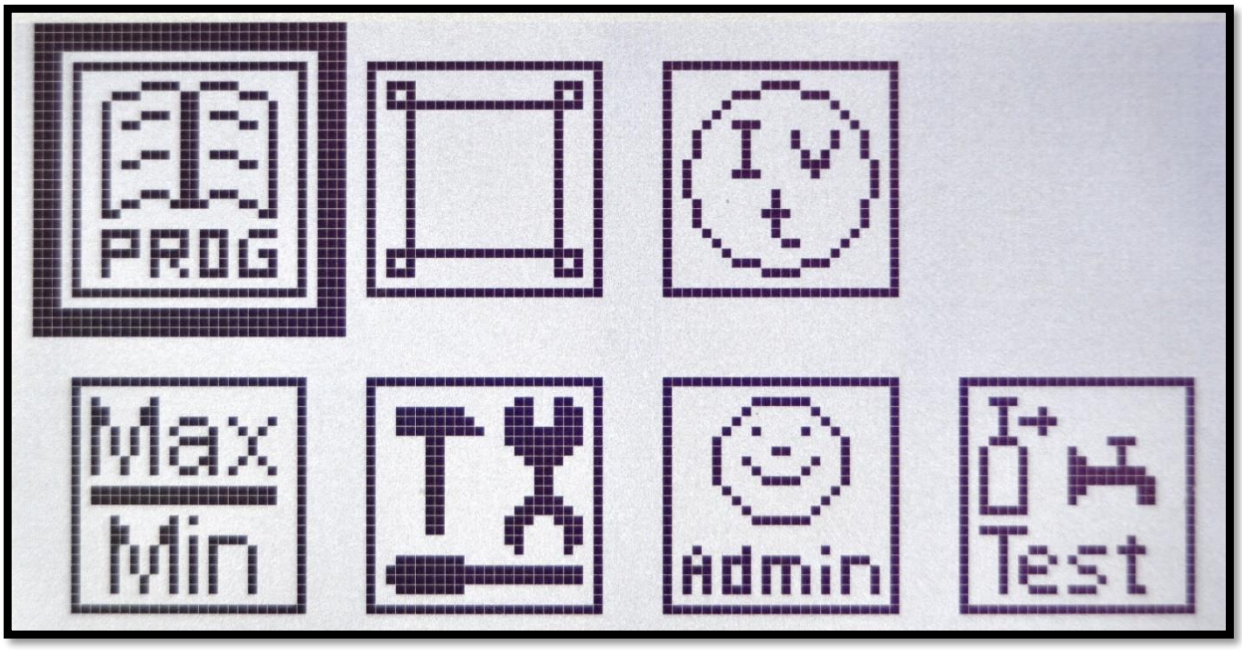
You can store (save) up to 99 welding programs, each with a max. of 6 sectors, in the database (library).

11.1.1 Saving welding programs

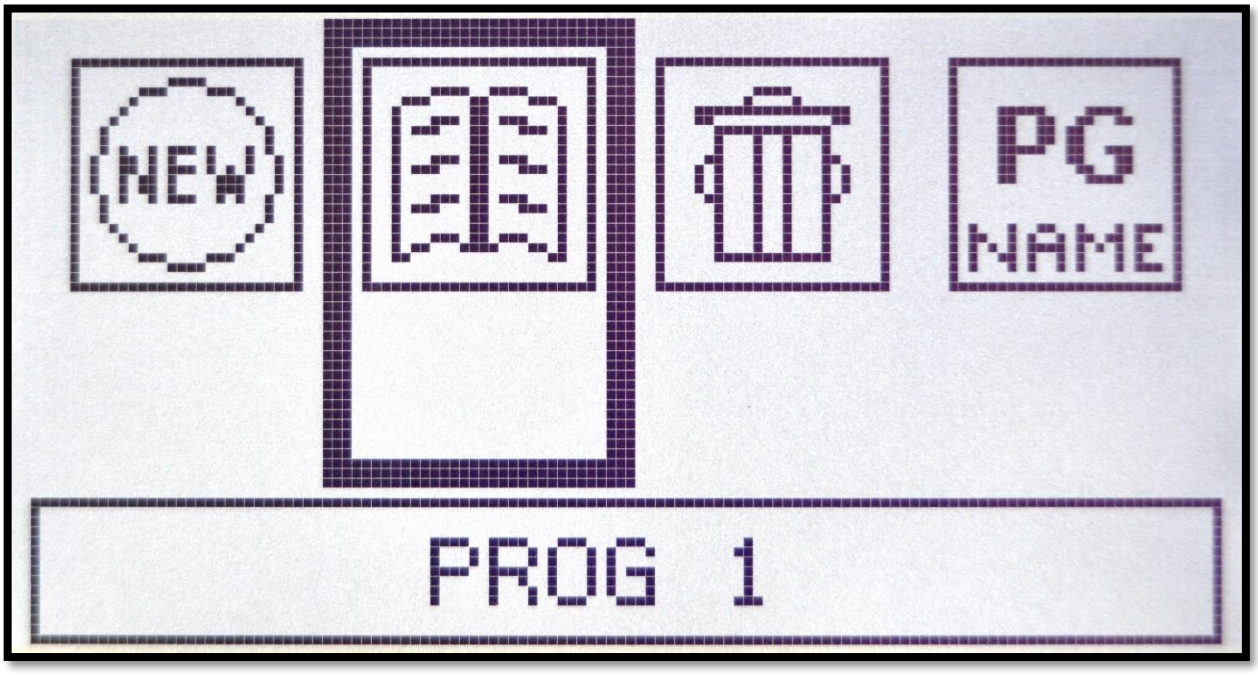
Initial screen



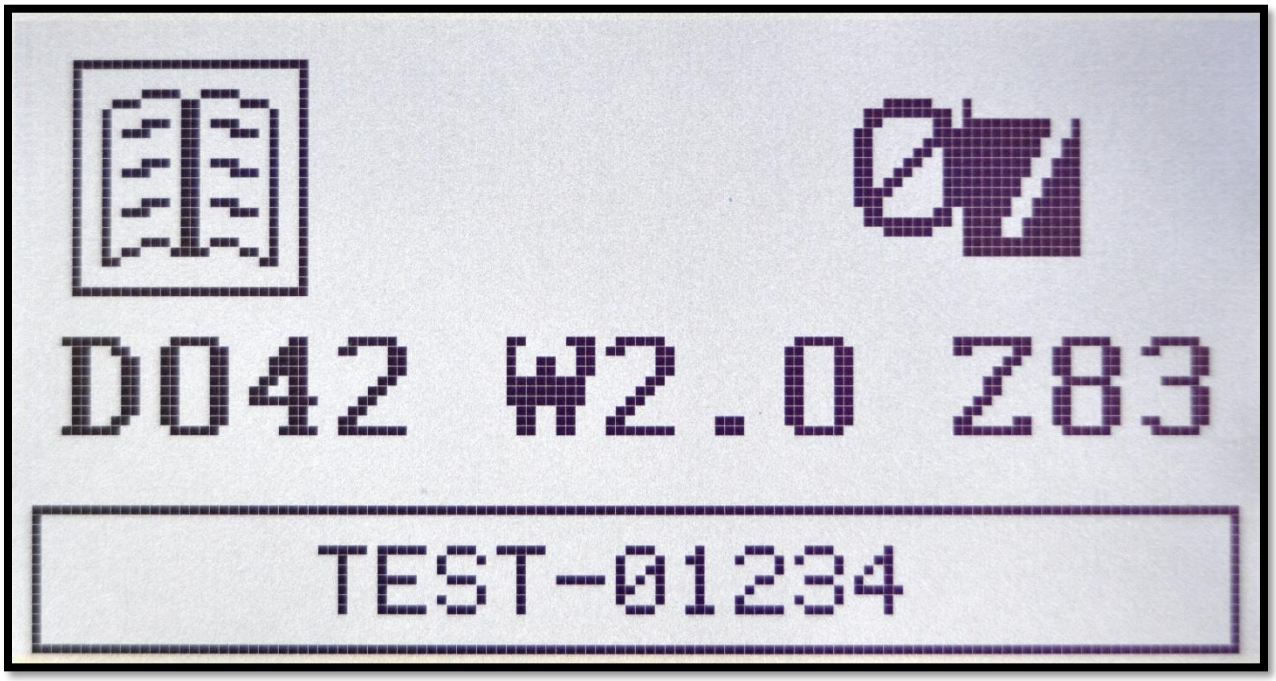
Press the menu ☰ key



Press the key

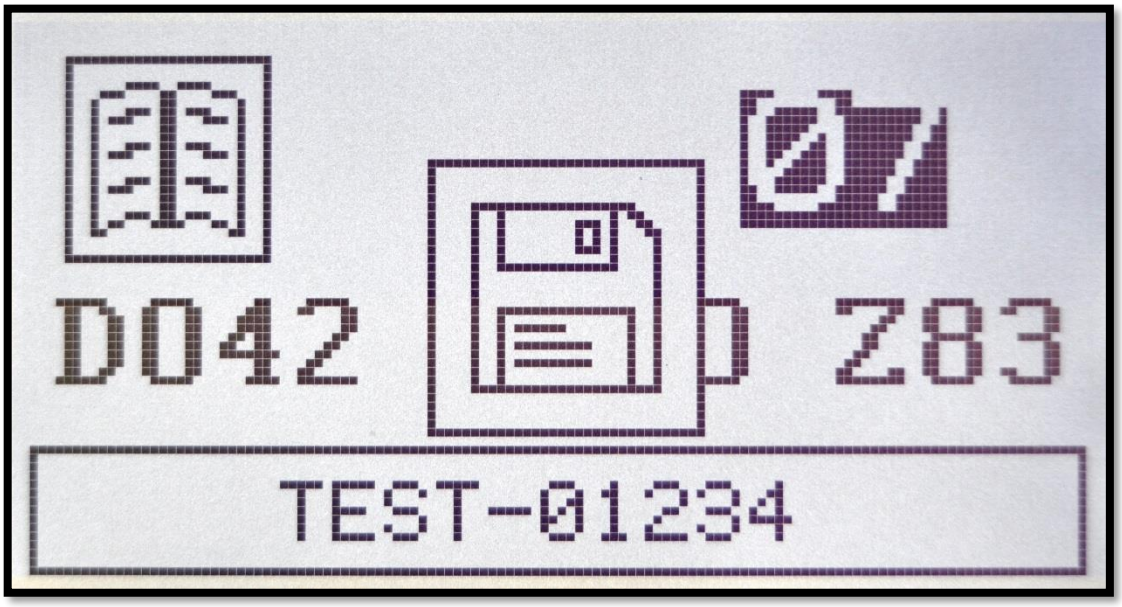


Press the key


D042 W2.0 Z83
TEST-01234

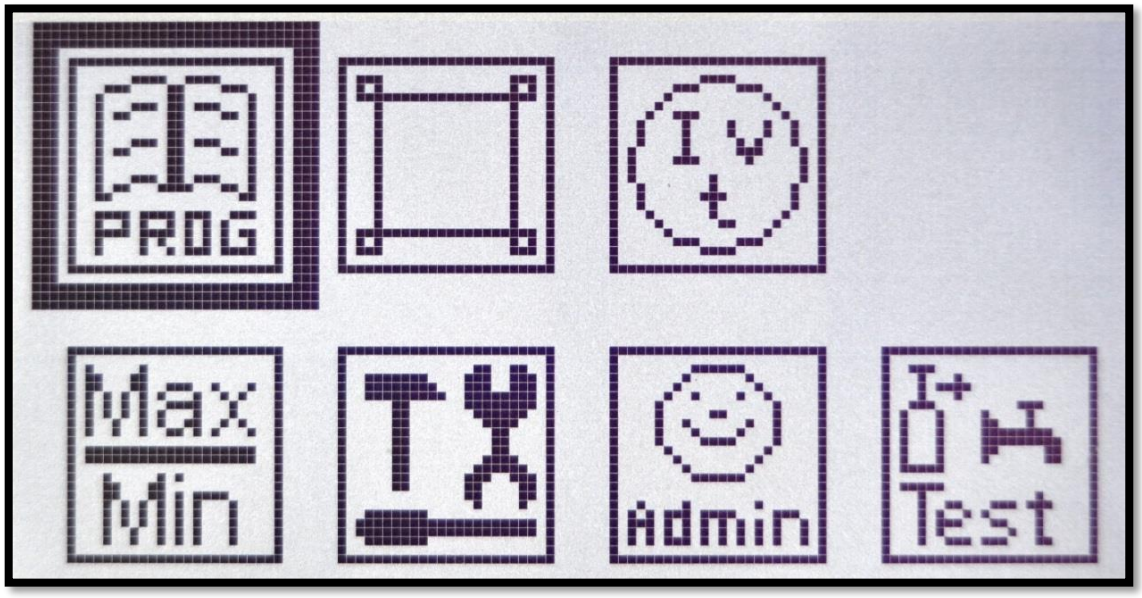
Use the arrow keys ↑ ← to search for and open the desired program. If the first number has a black background you can skip forward in tens and call up a number that is known very quickly; the second number with a black background is used to scroll through the ones, up to 99.

The selected program will be loaded after acknowledging with ⚙.

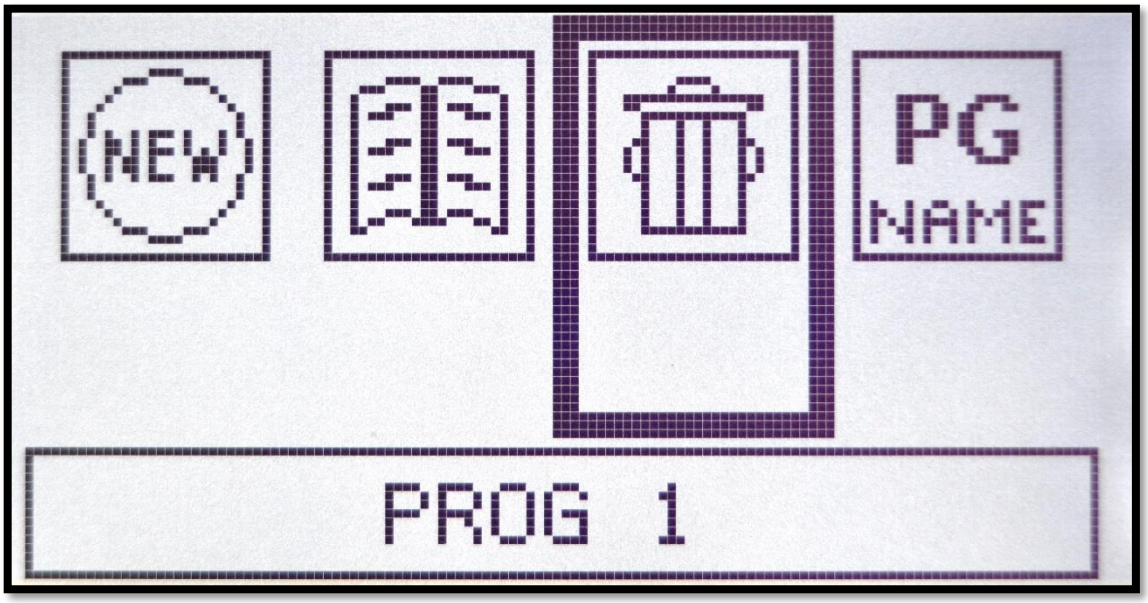


11.1.2 Deleting welding programs (from the library)

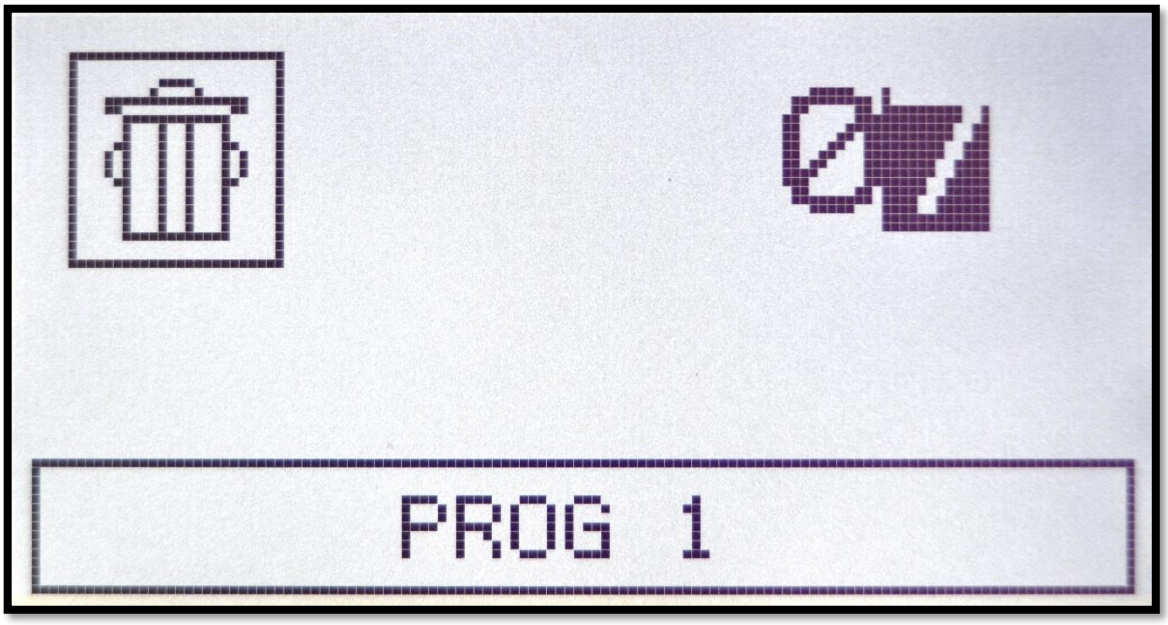
Press the menu key



Press the key



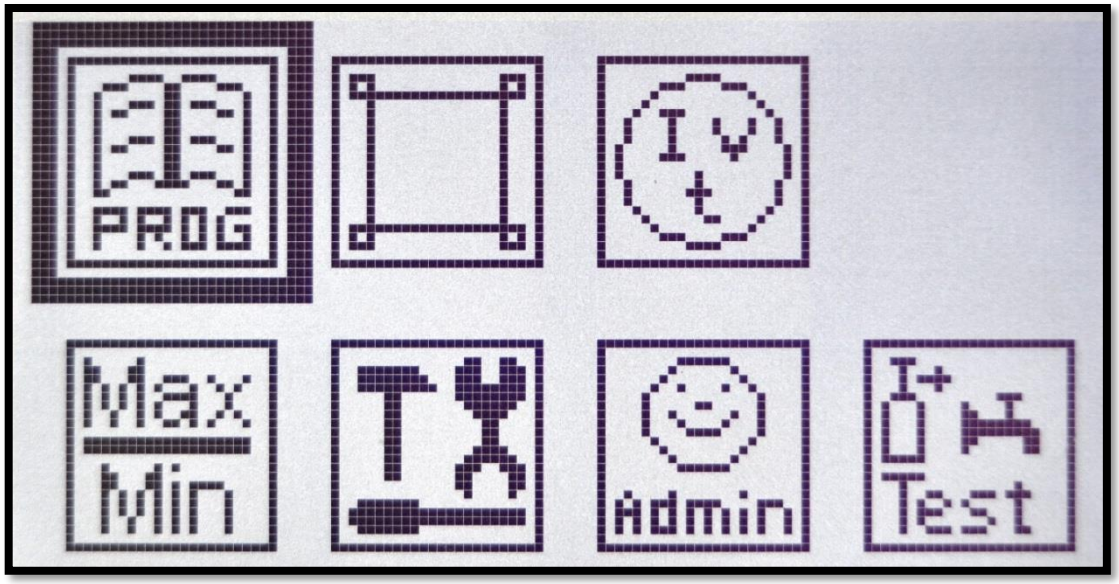
Navigate to “Recycle bin” with the key and select with .



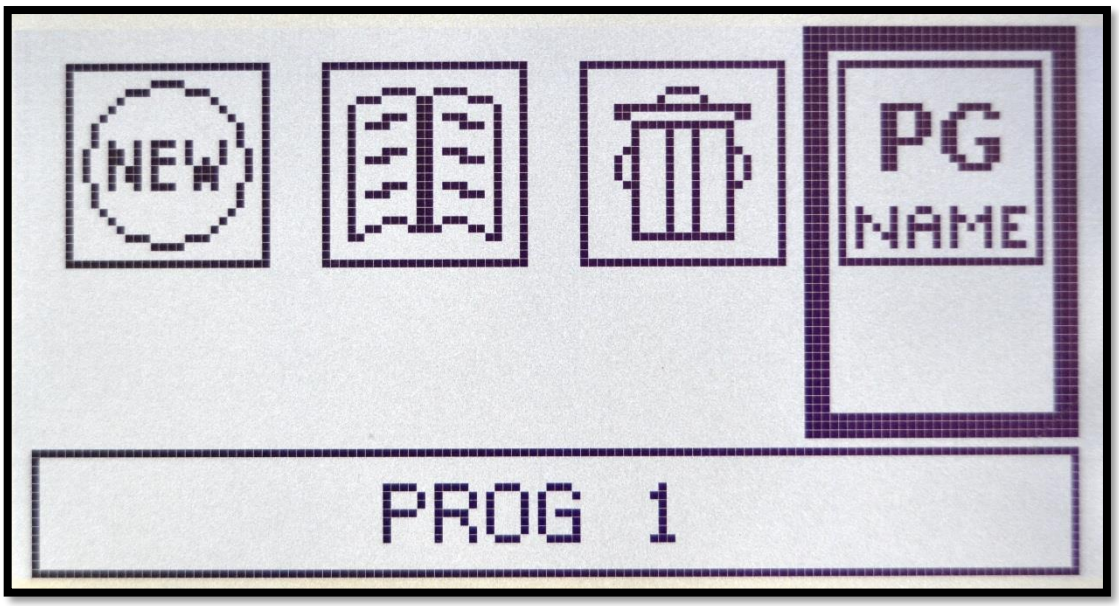
Confirm with the key and use the arrow keys to call up the program to be deleted; it will then be deleted following acknowledgement.

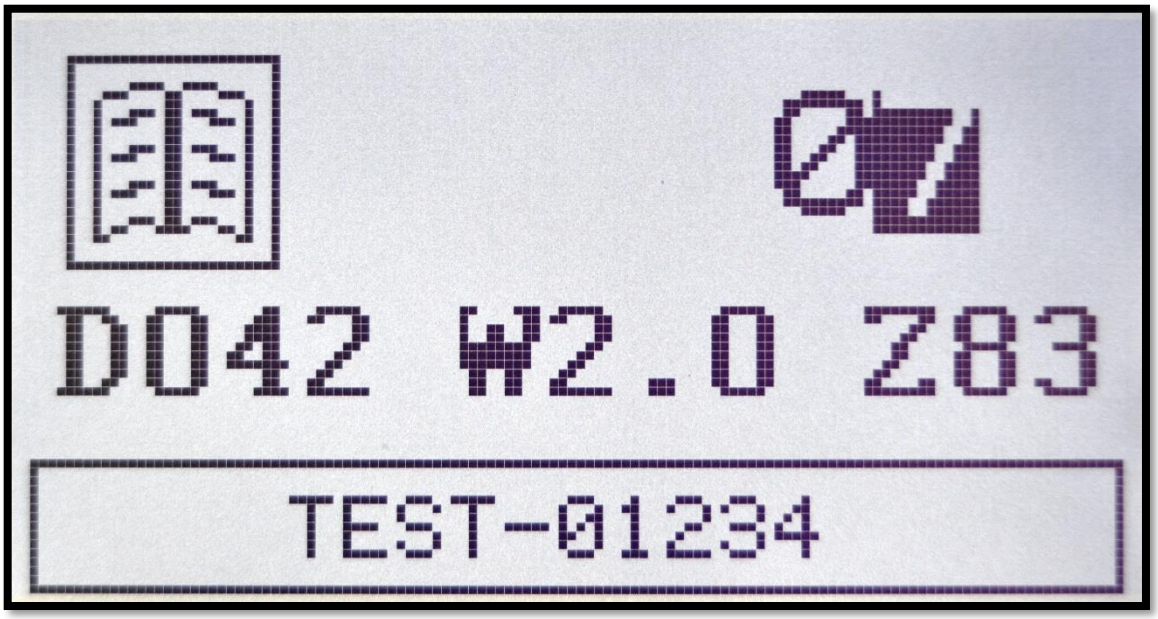
11.1.3 Changing the program name (new entry)

Press the menu ☰ key



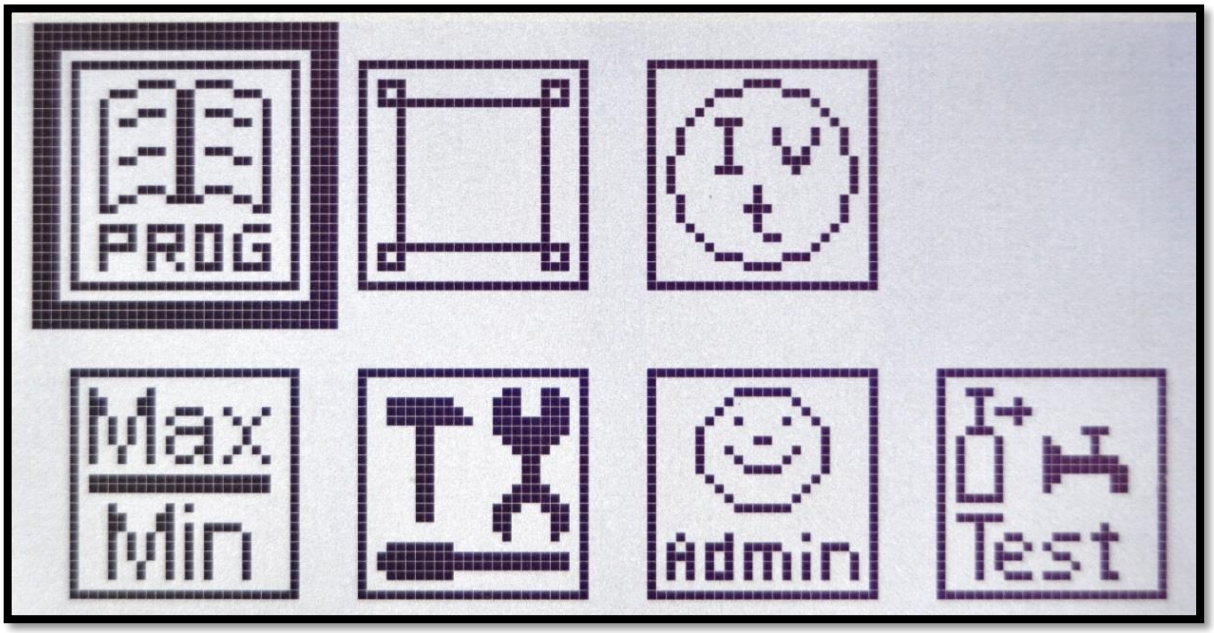
Press the menu ⚙ key



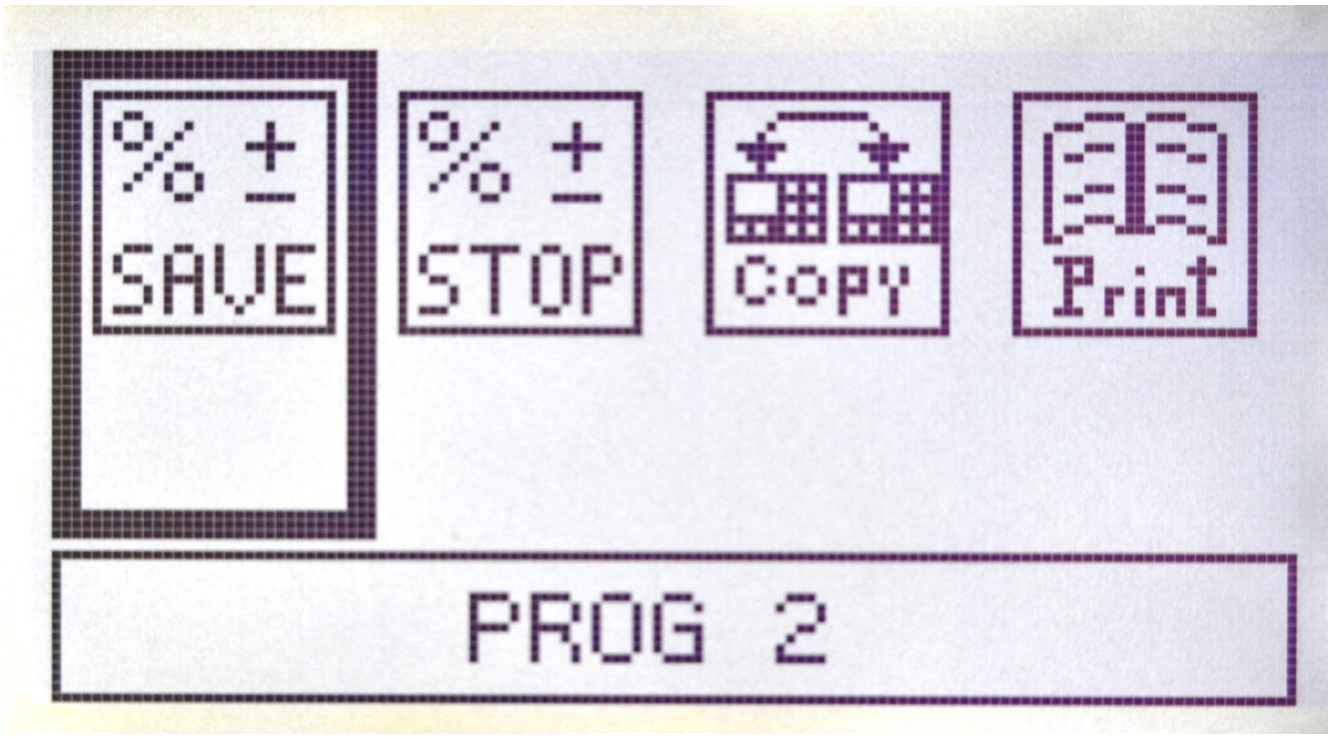

D042 W2.0 Z83
TEST-01234

11.2 Saving current and wire parameters (percentage changes)

Press the menu ☰ key



Press the menu ⚙ key



Altered parameters (current and wire speed) can be saved or reset in this menu item. This relates to current changes of ±50% before or during welding as well as the wire parameters (also ±50% in each case).

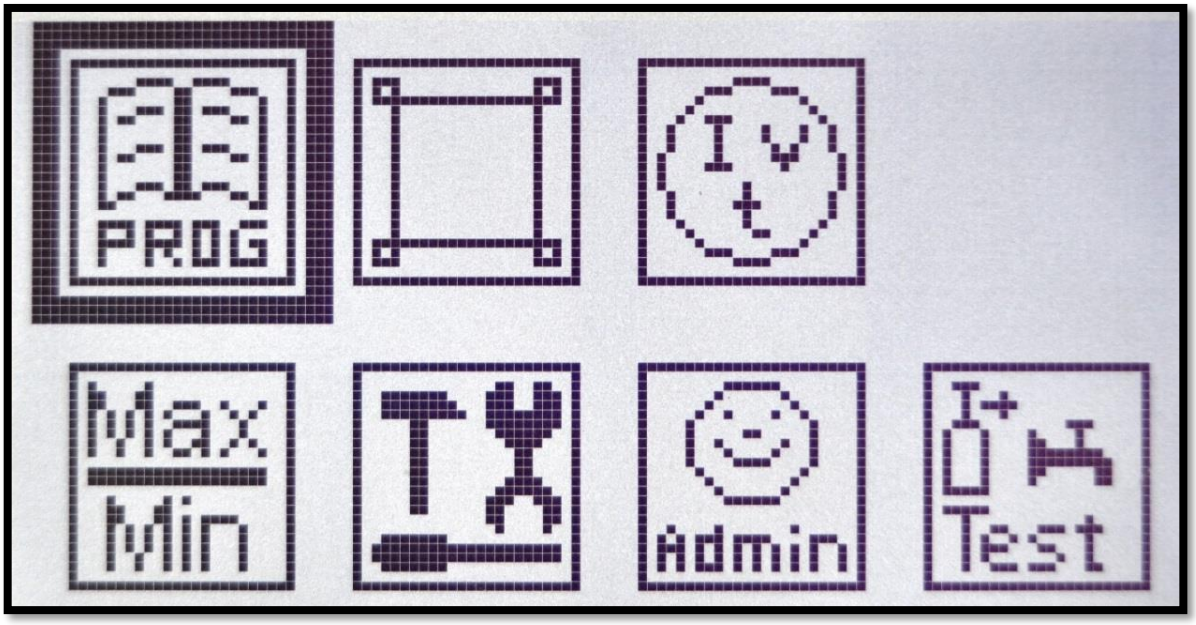
The values flashes alternately if both parameters have been changed.

Switching OFF and ON again does not change this function. The altered parameters can be stored with Save (altered parameters will be calculated into the program and the values reset to 100%).

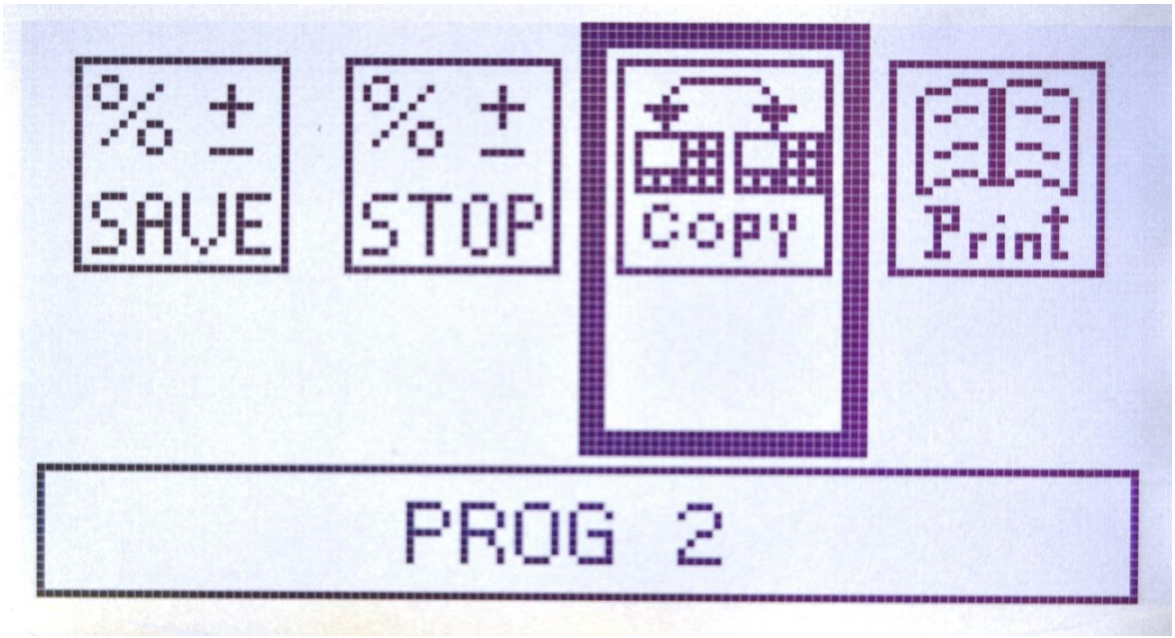
The changes will be lost if you press the Stop key and the machine then shows the initial value that were present before the change.

11.2.1 Copying welding program

Press the menu ☰ key

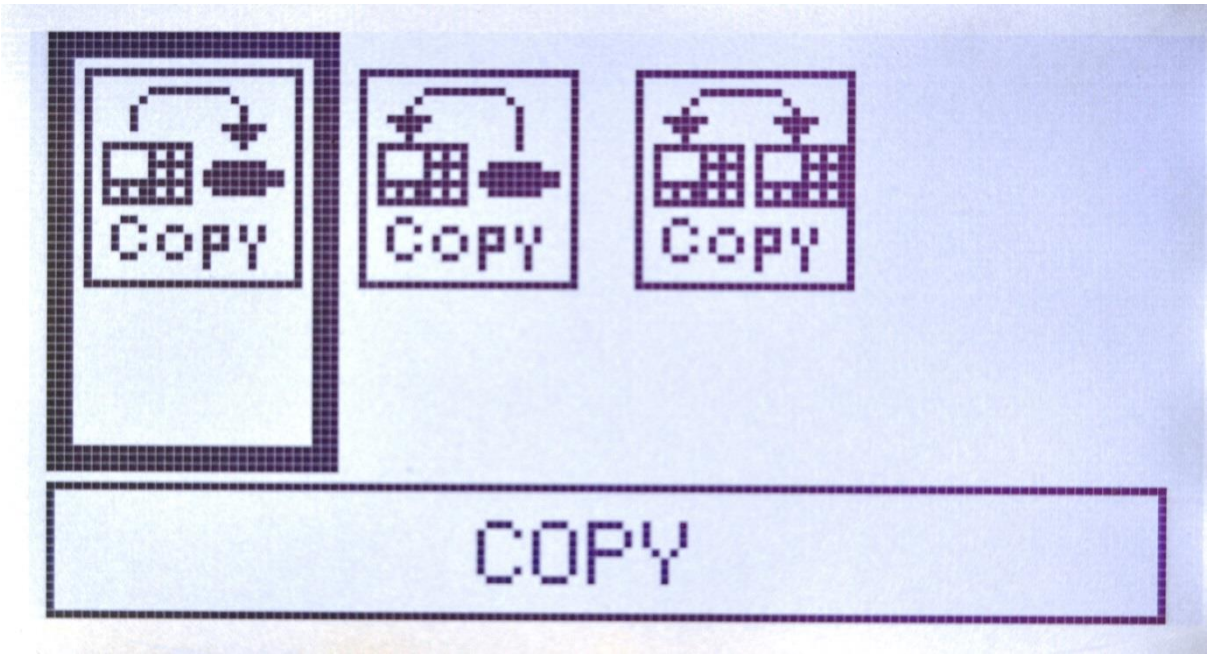


Press the menu ⁞⁞⁞ key



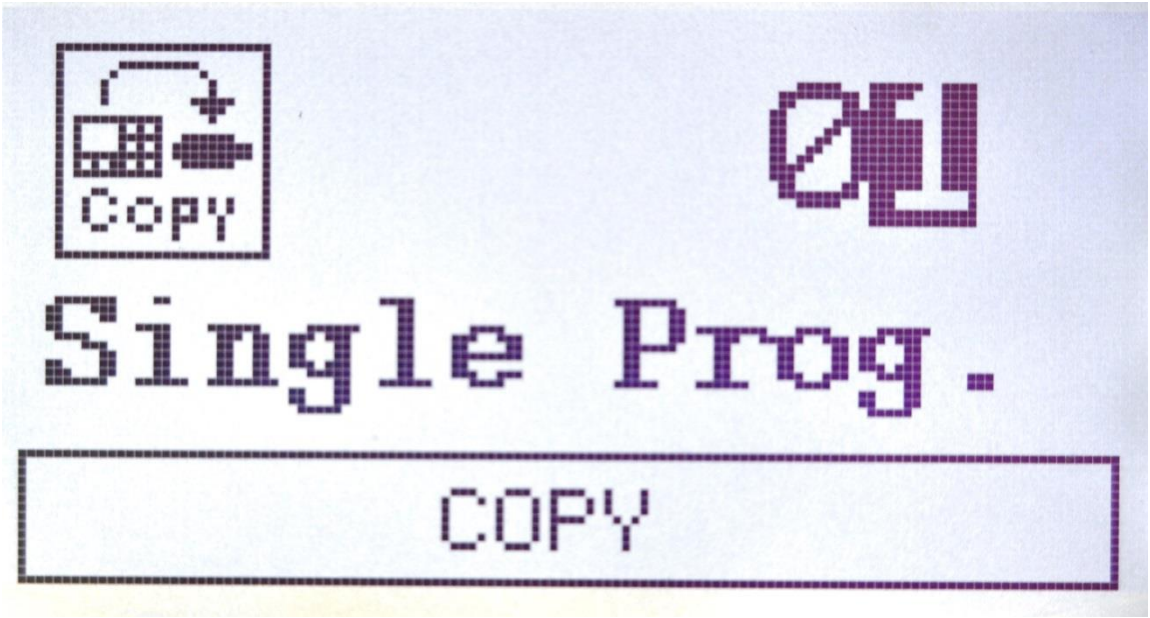
11.2.2 Copy from the control system

Press the menu key

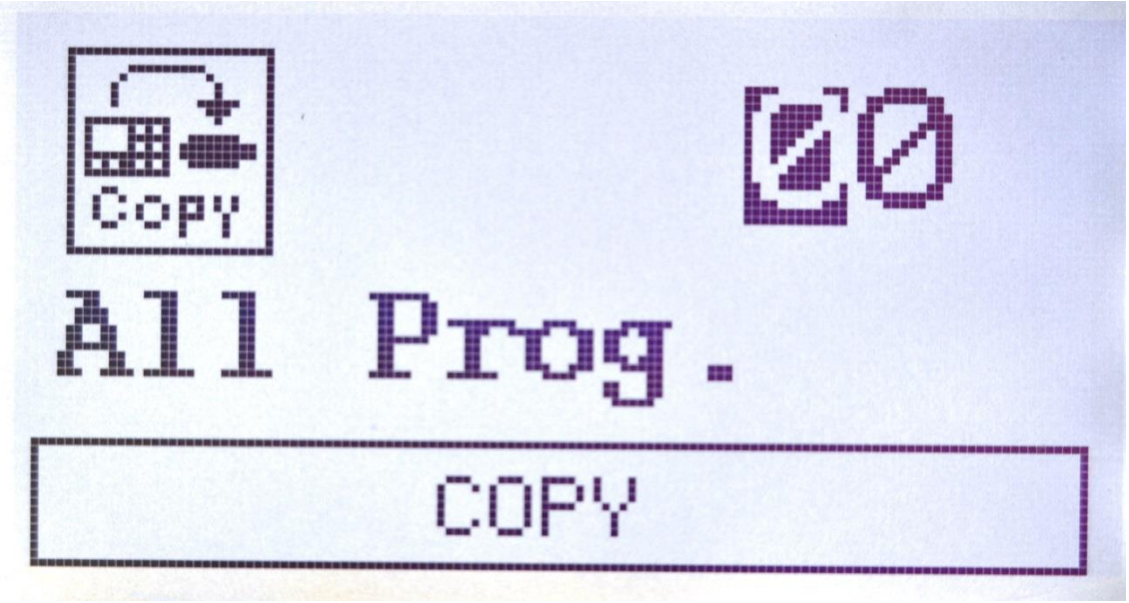


Orbitalservice offers small data carriers that can be plugged into the RS 232 port. You can copy 100 programs to these data carriers and import these into other systems, for example, or simply backup the parameters.

Press the menu key



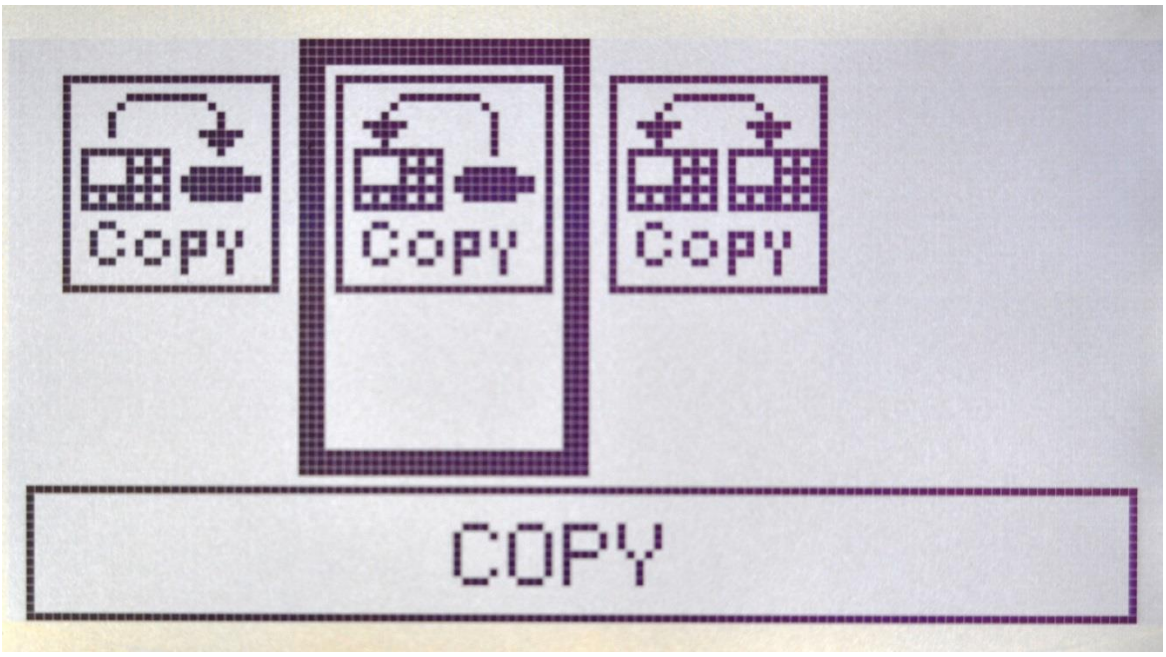
You can copy the chosen program with “Single Prog.”.



Select All progr. to copy all of the control system’s storage locations (99). These can then be transferred to a new device completely, for example.

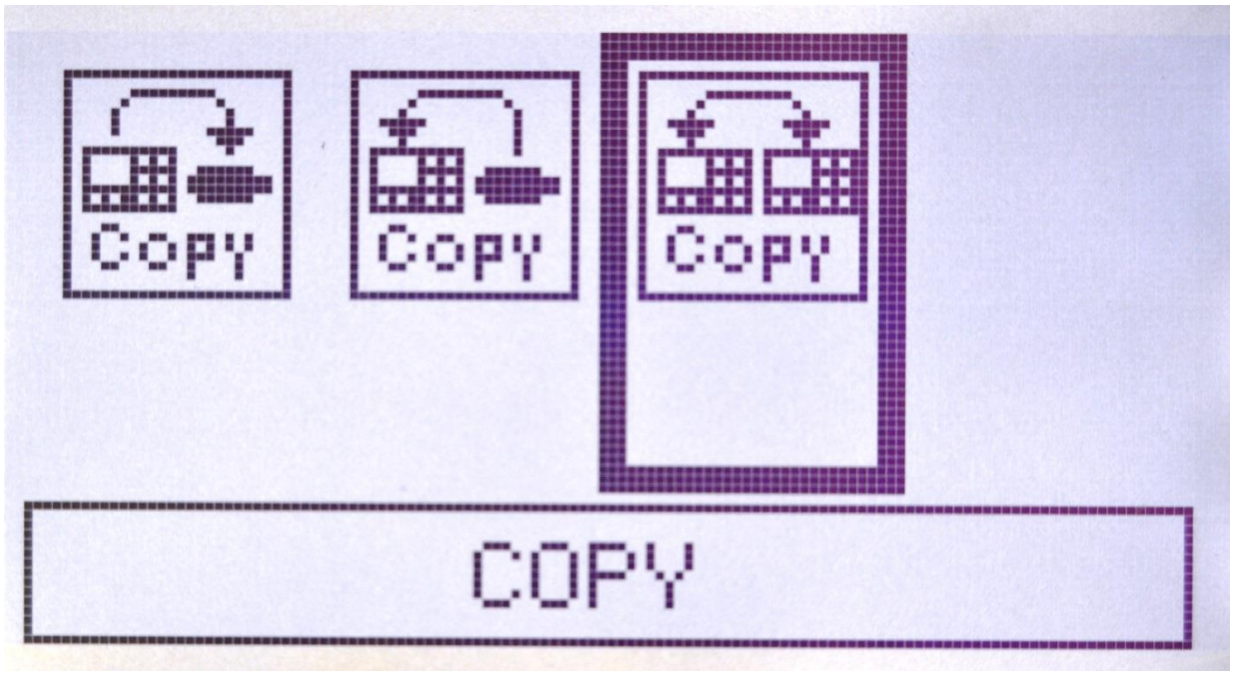
11.2.3 Copy to control system

In the second field, you can overwrite individual programs or the control system's entire 99 storage locations in reverse order with this memory stick.

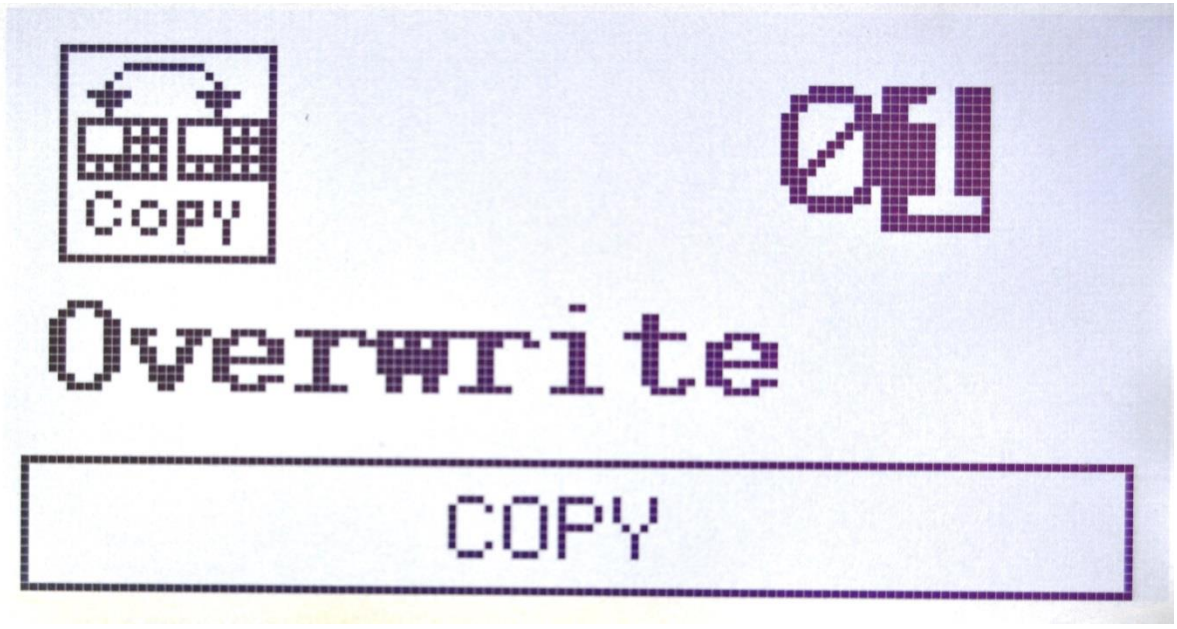


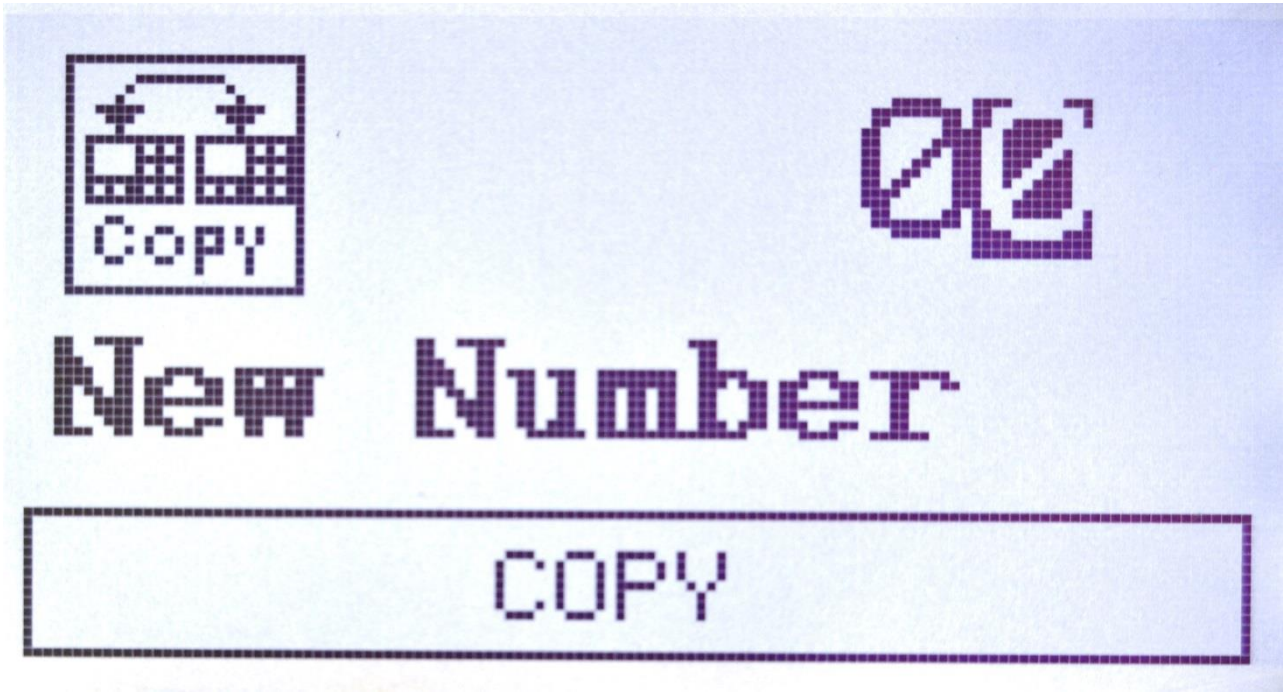
11.2.4 Internal copying

This menu item can be used to copy or move programs internally in the control system.



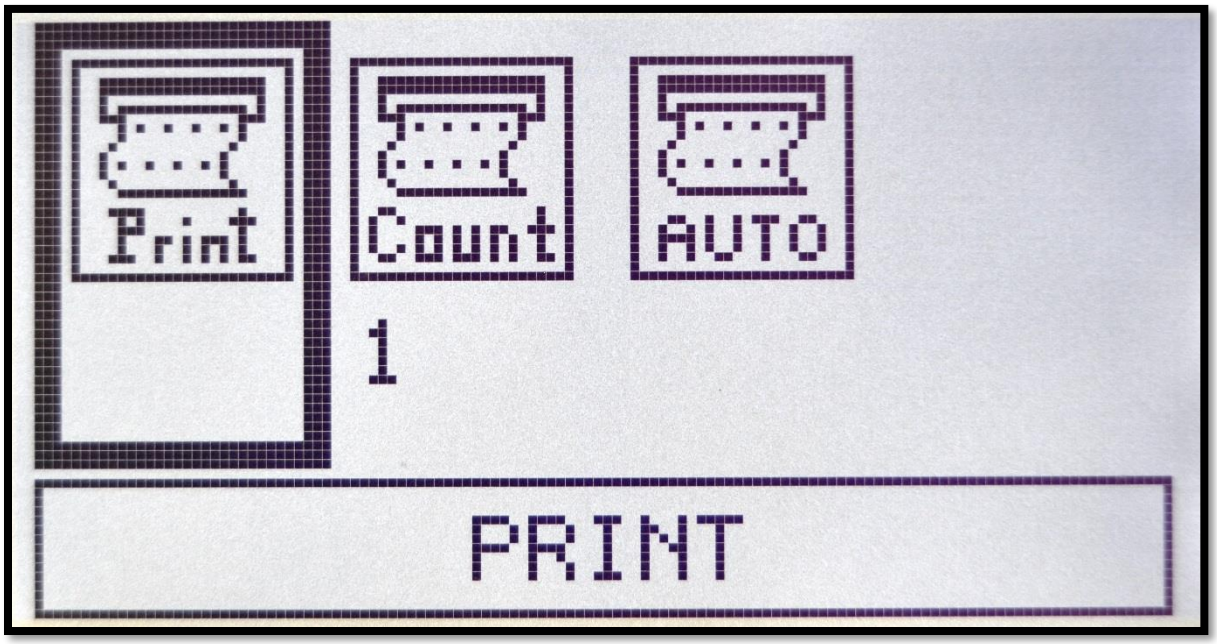
If you use the arrow keys to call up a number that is already in use, this “old” program will be overwritten.





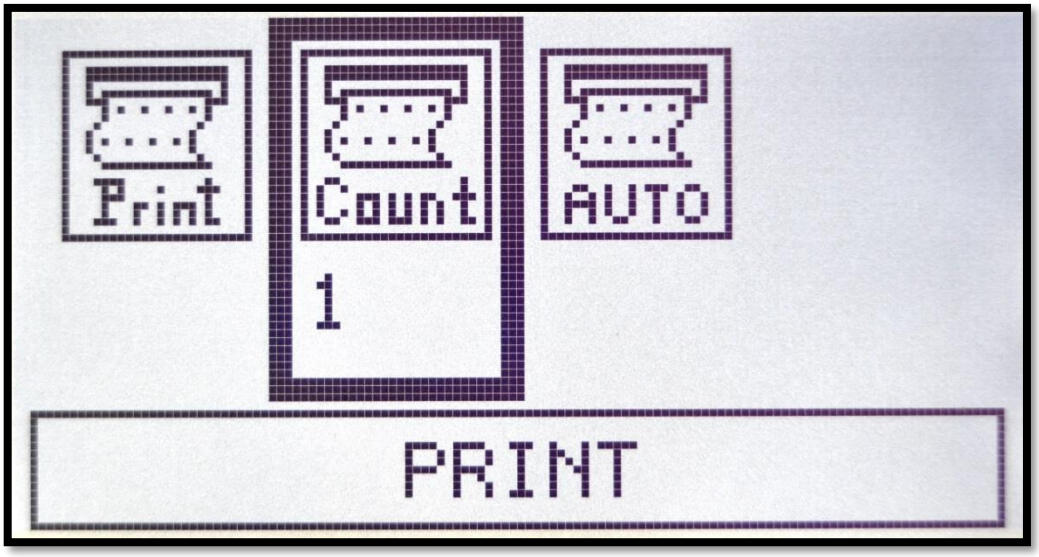
If you are at program channel “00”, the control system automatically generates a new program.

11.3 Printing out welding parameters



Press the key to print out the current dataset. If no weld has been carried out yet, only the target parameters will be printed; if a weld has been carried out, the welded and measured values and data will also be printed out along with any status and error messages.

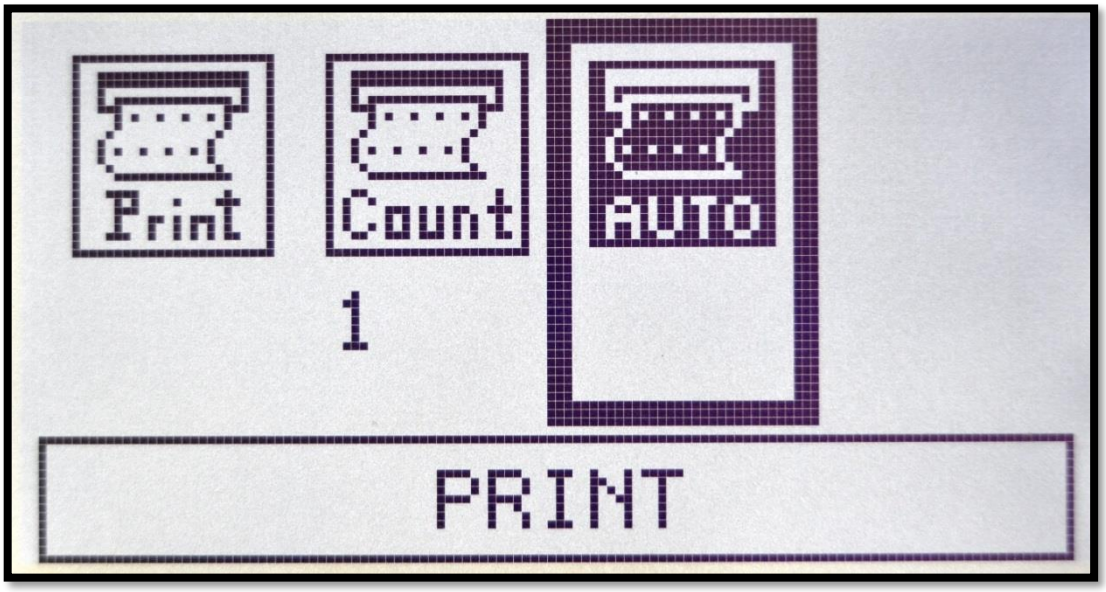
11.3.1 Weld counter



This is a normal counter (up to 9999). It can be reset with the arrow keys. If the printer is On and a radio link has been established, this counter will be printed out automatically after welding.

11.3.2 Automatic printout

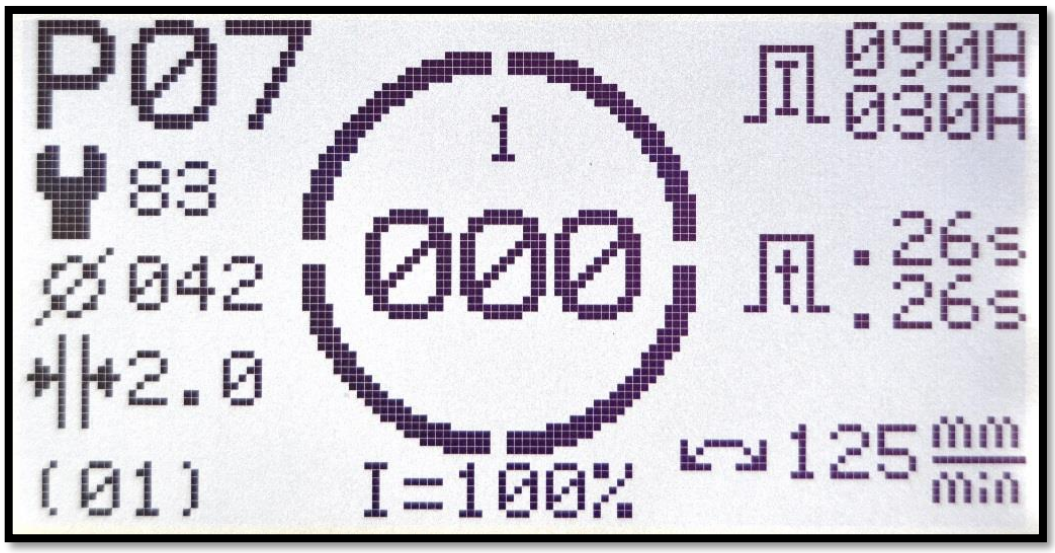
Press the ↑ and ⚙ keys.



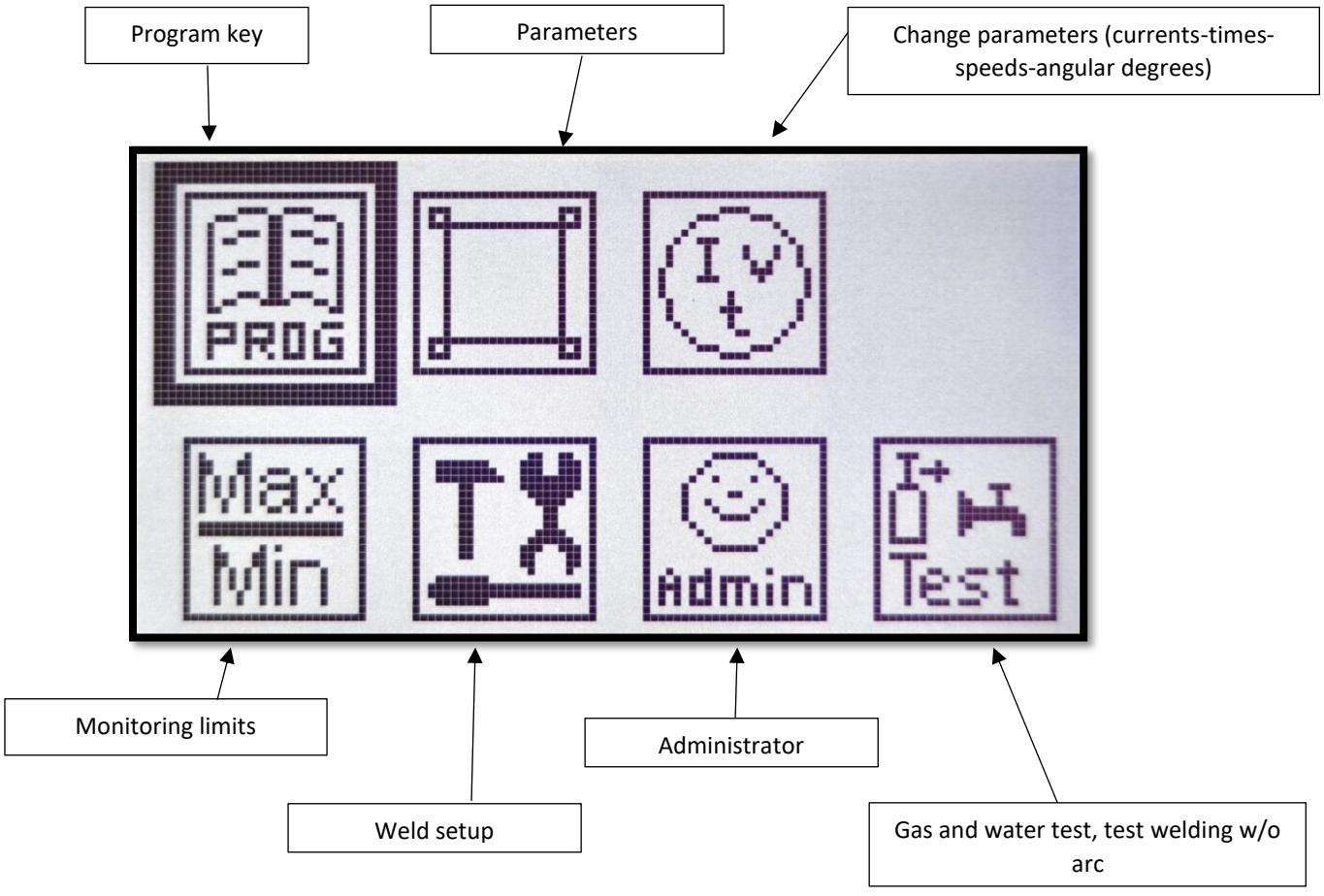
In this setting (and if a Bluetooth printer is connected) every weld will be printed out automatically after welding.

11.4 Parameters (picture frame)

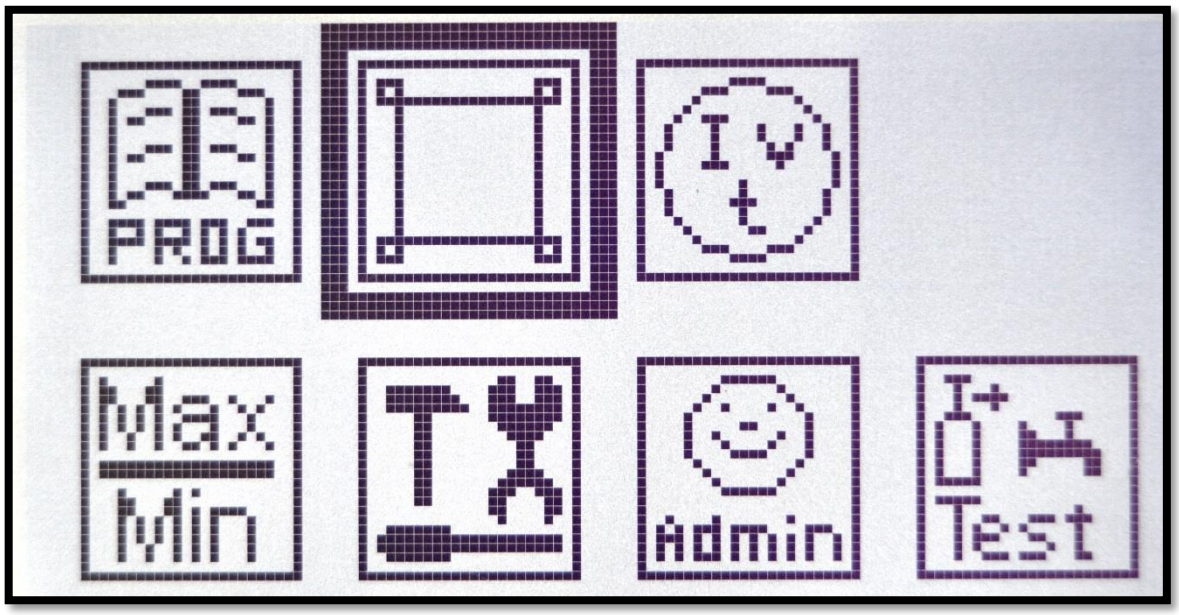
Main menu initial screen



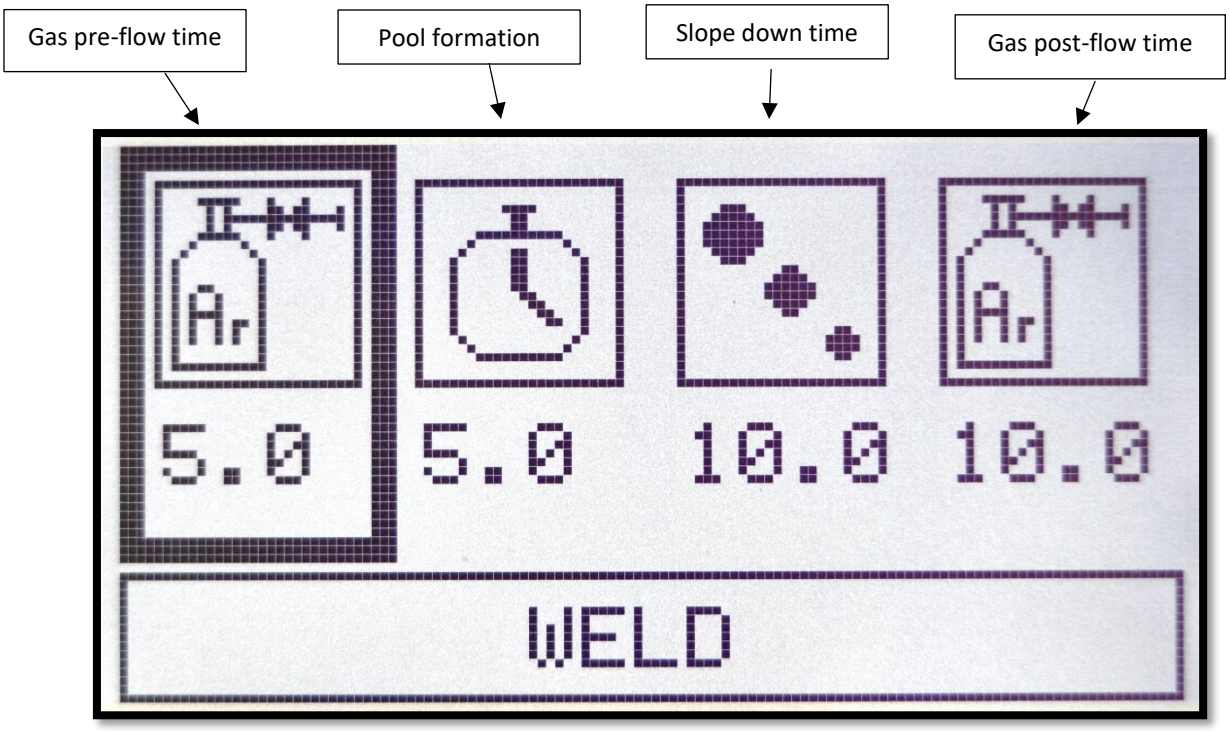
Press the ☰ key



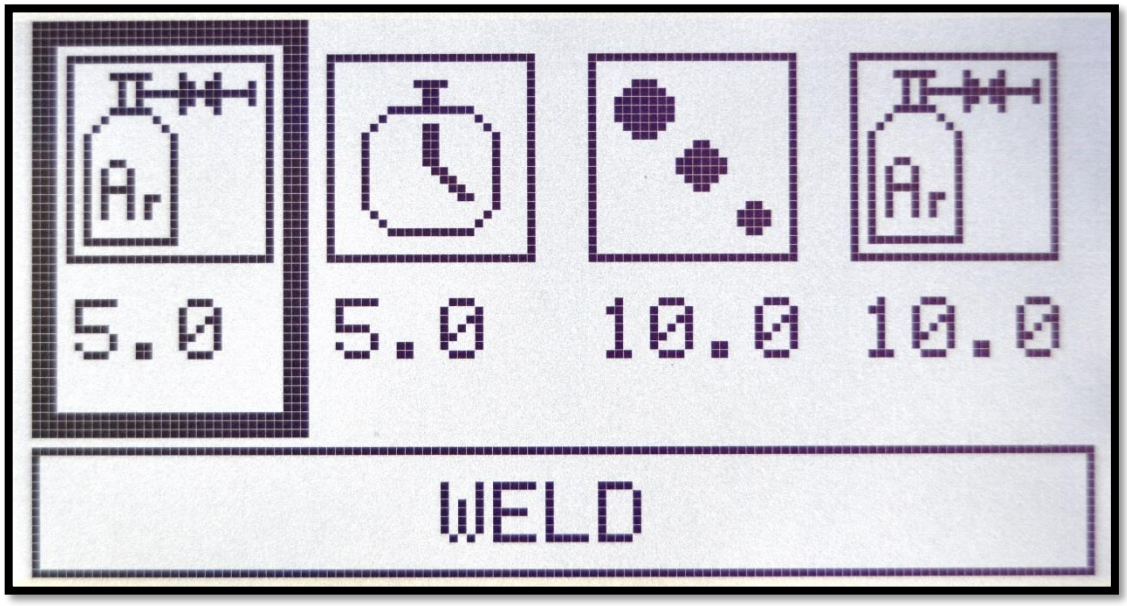
Press the ↑ key



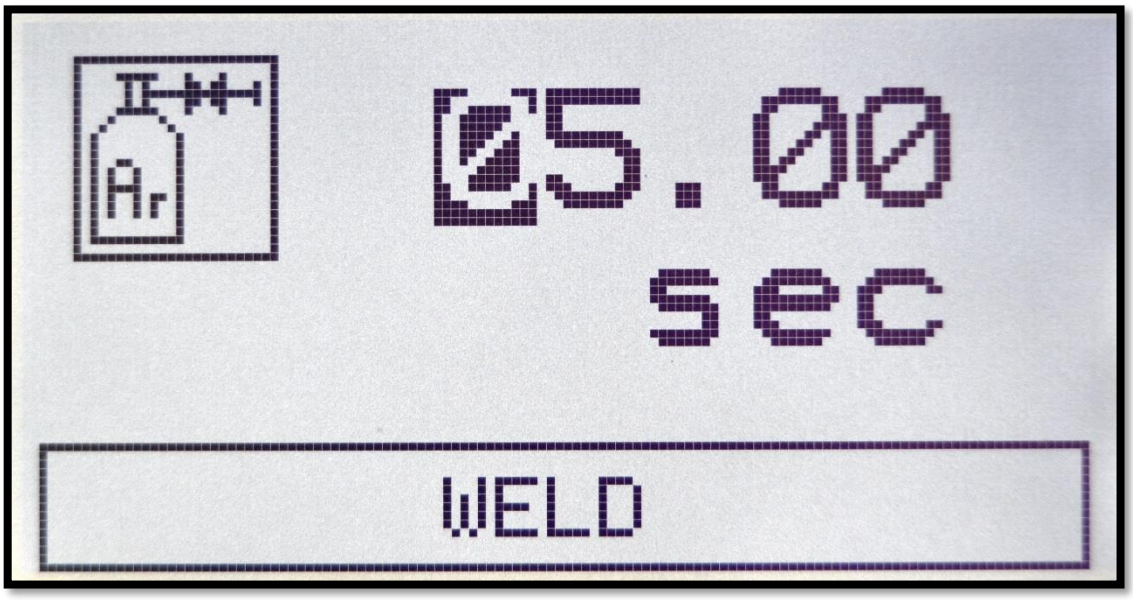
Press the ⚙ key



We would like to explain the changes in the following menus taking the gas pre-flow time as an example. The changes are always carried out in the same way.

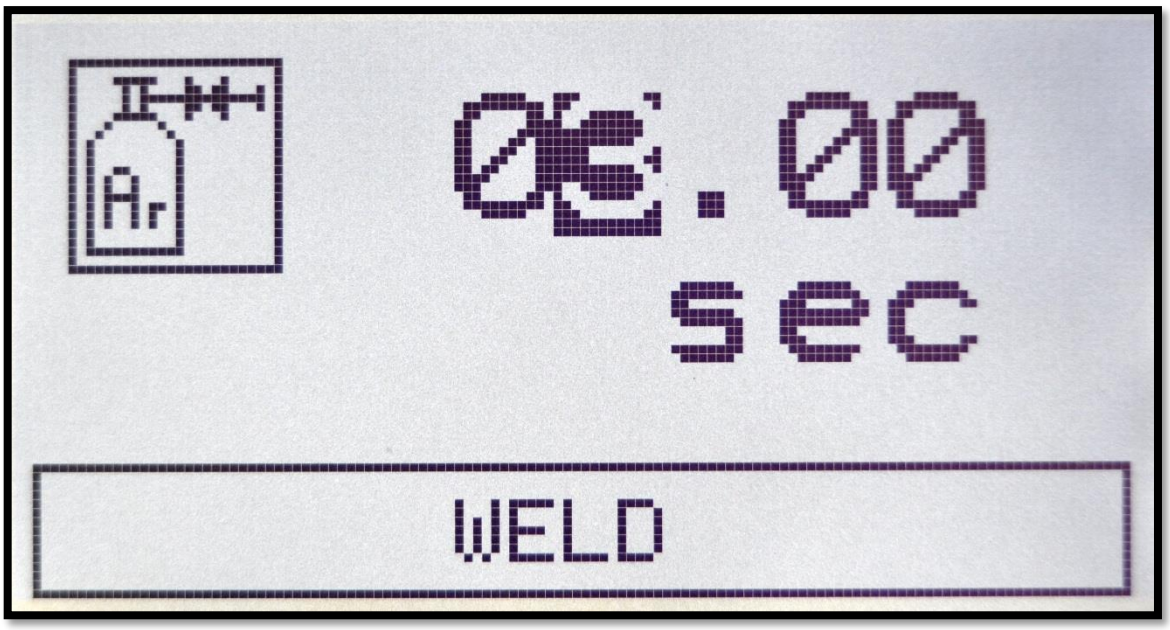


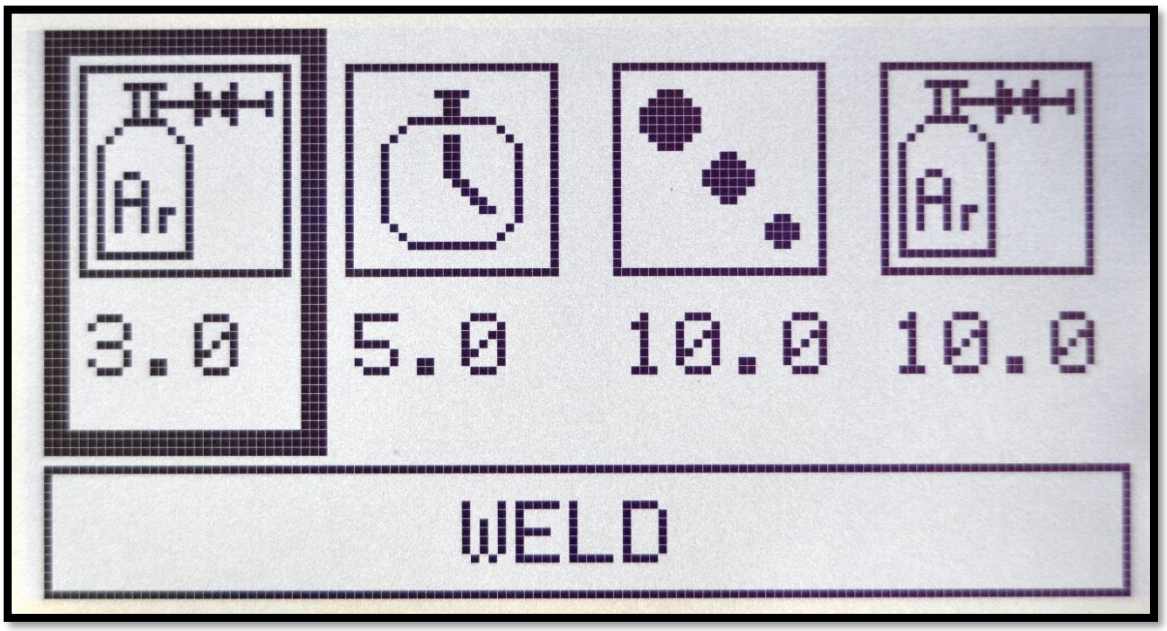
Press the key



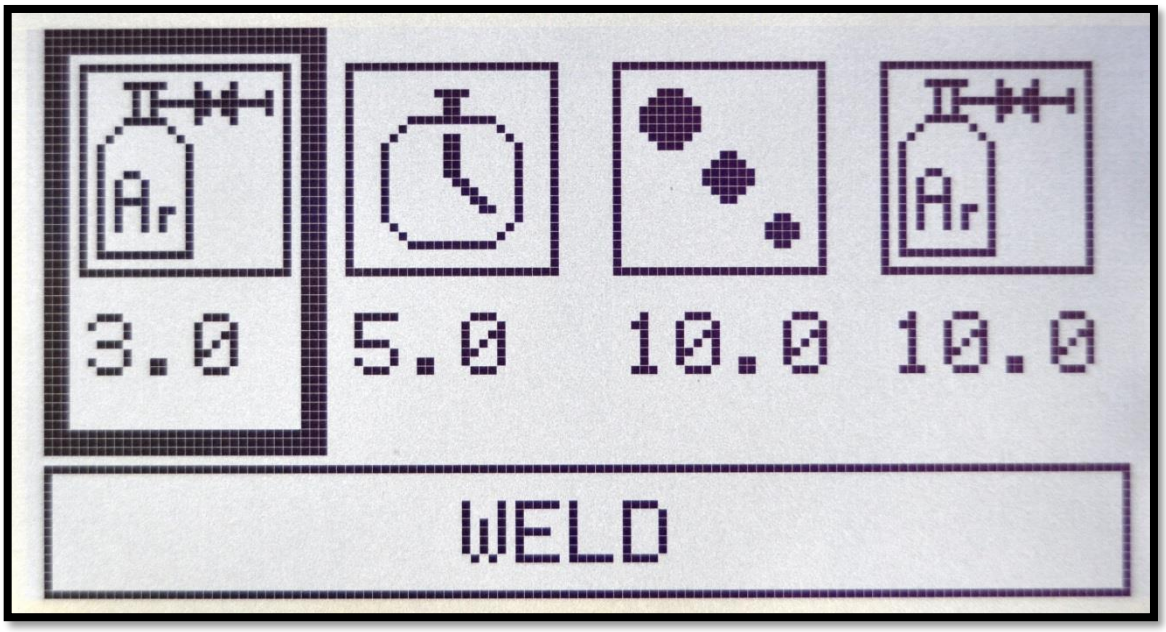
You want to change the control system's default value (5 sec gas pre-flow time) to just 3 sec.

Use the key to navigate to 5 sec and change the value as desired with the key. Then continue pressing the key until the disk appears at the end of the save process. The changed data has now been saved.

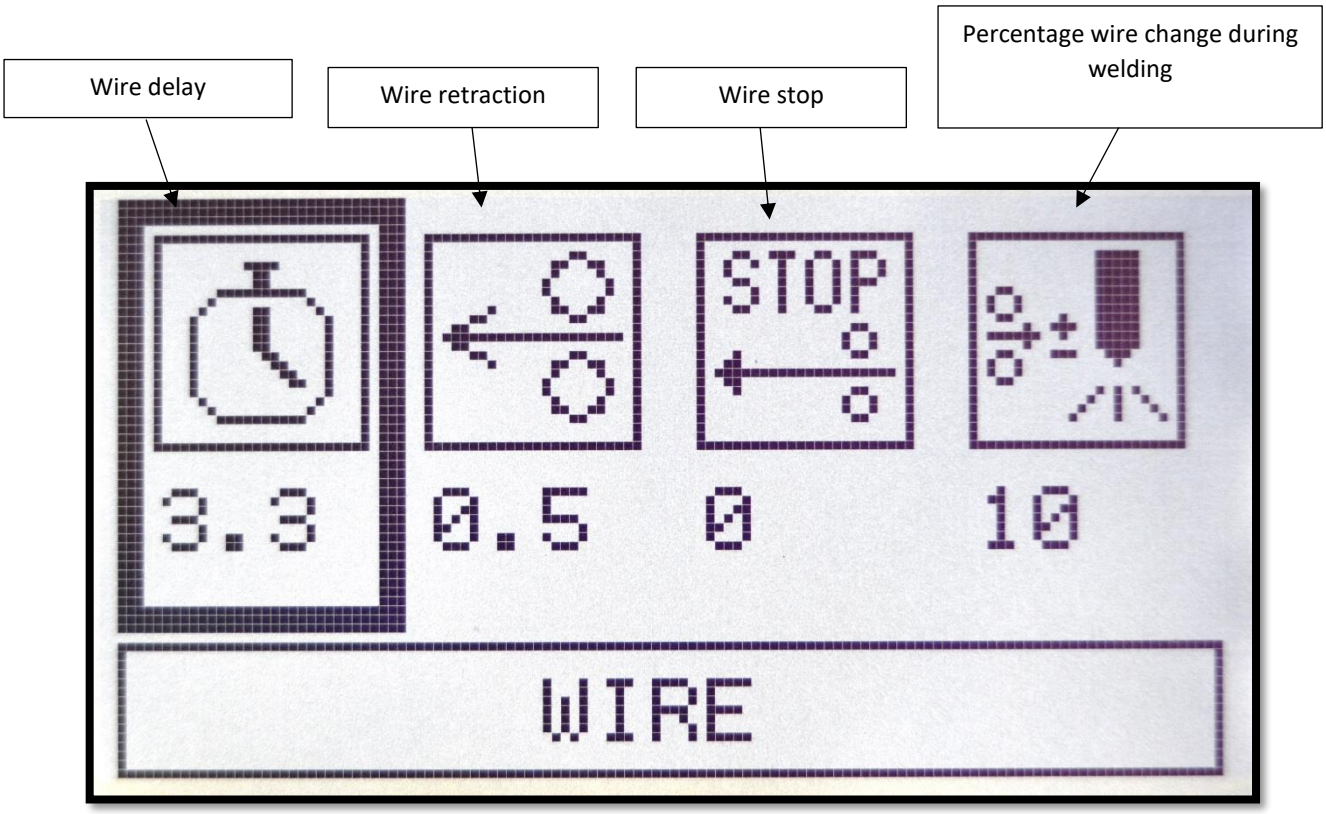




11.5 Further parameters



Continue pressing the ↑ key. This brings you to some more menus (depending on the software and hardware).



11.5.1 Wire delay

The wire delay is generated automatically by our Synergic help function. The wire delay roughly corresponds to the pool formation time This is the time in which the torch or tungsten electrode does not yet rotate and a weld pool forms. The wire delay can be changed freely.

Spare a thought for TIG manual welding. The hand torch also remains in the idle position until a twist-turn movement occurs indicating that we have “broken” through.

The wire delay should not be less than the pool formation time. Otherwise the wire reaches the electrode before the rotation and a short-circuit could occur.

11.5.2 Wire retraction

This value is calculated automatically. We usually weld with cold wire up to 360° (0° is shown in the figure). The wire is retracted 0.5 sec before 360° is reached so that it remains sharp and nothing gets in the way during overlapping (a 365° welding path is standard) and current reduction.

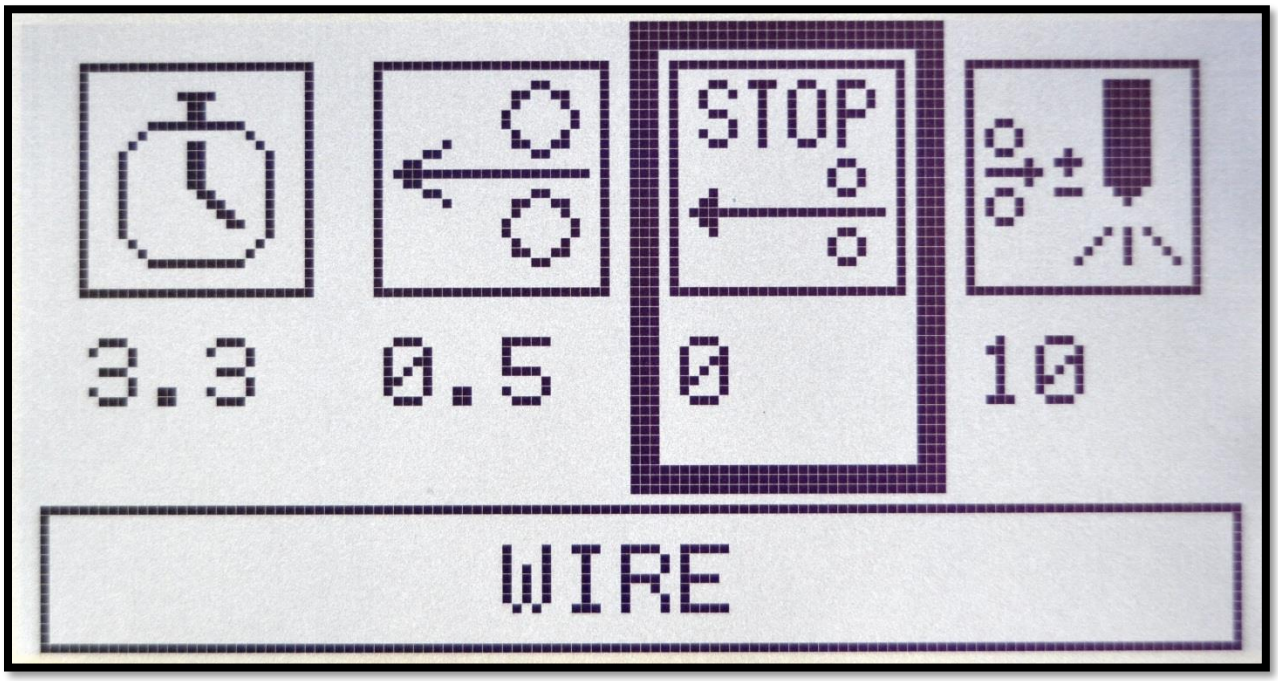
11.5.3 Percentage wire change during welding

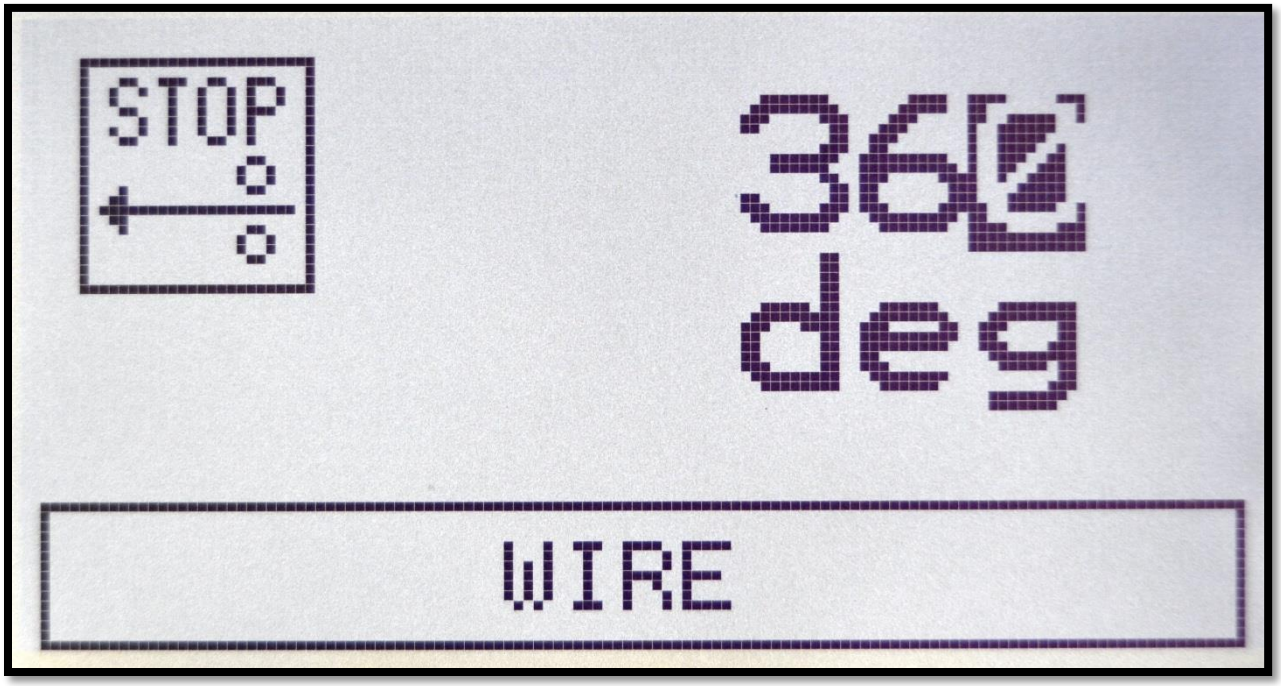
We give customers the opportunity to set their own value here (from 0% to 10%). A max. of 50% can be changed here (for the high and basic current values) with the same percentage for both.

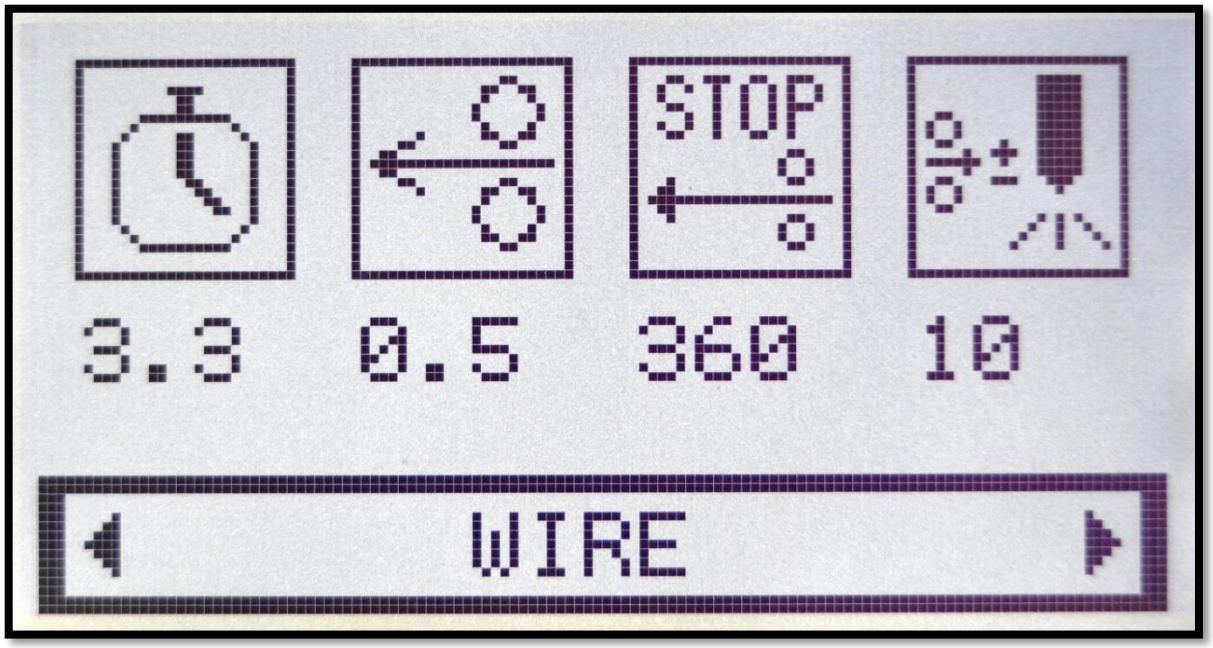
11.5.4 Wire stop

The wire stop indicates the point up to which the wire continues to rotate. The program says 0°. The wire thus rotates 365° up to the end of welding. We normally enter value of 360°.

Changing the wire stop to 360°





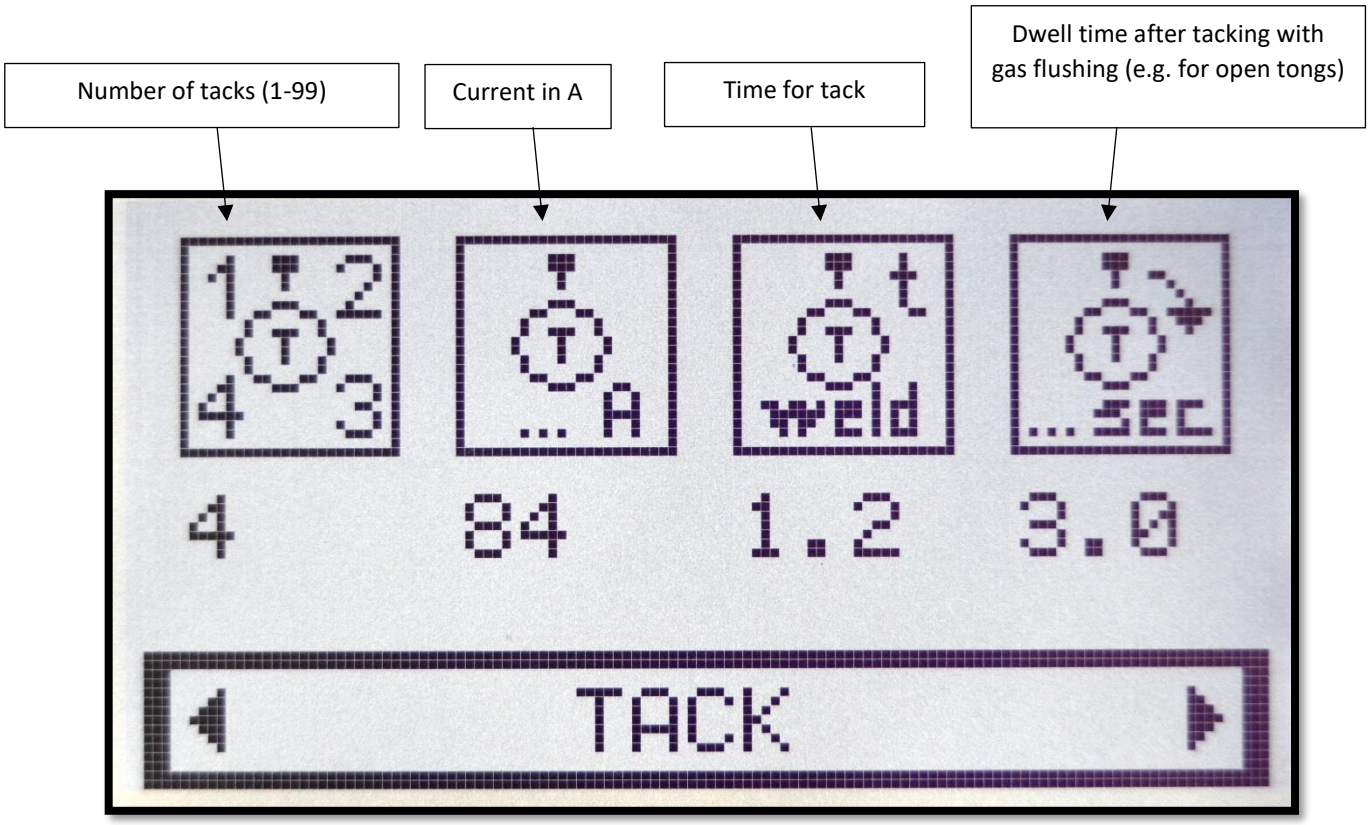


11.5.5 Activating the wire

Press the ☰ button to get to the “Wire” field at the bottom of the screen and then press the ⚙ key.

If the field has a black background, col wire mode is active. The parameters for wire speeds are programmed in the welding program (sectors).

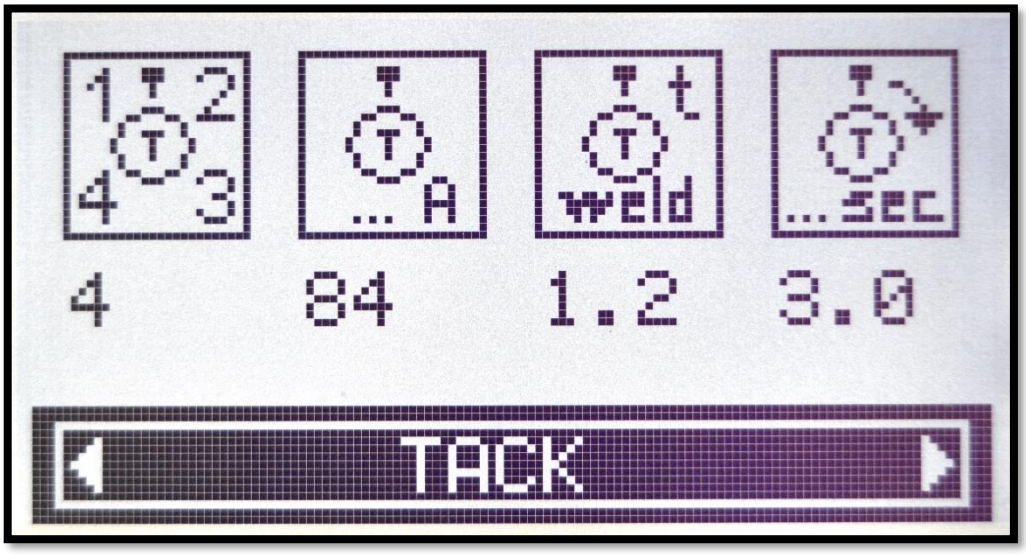
11.5.6 Automatic tack mode (TACK)



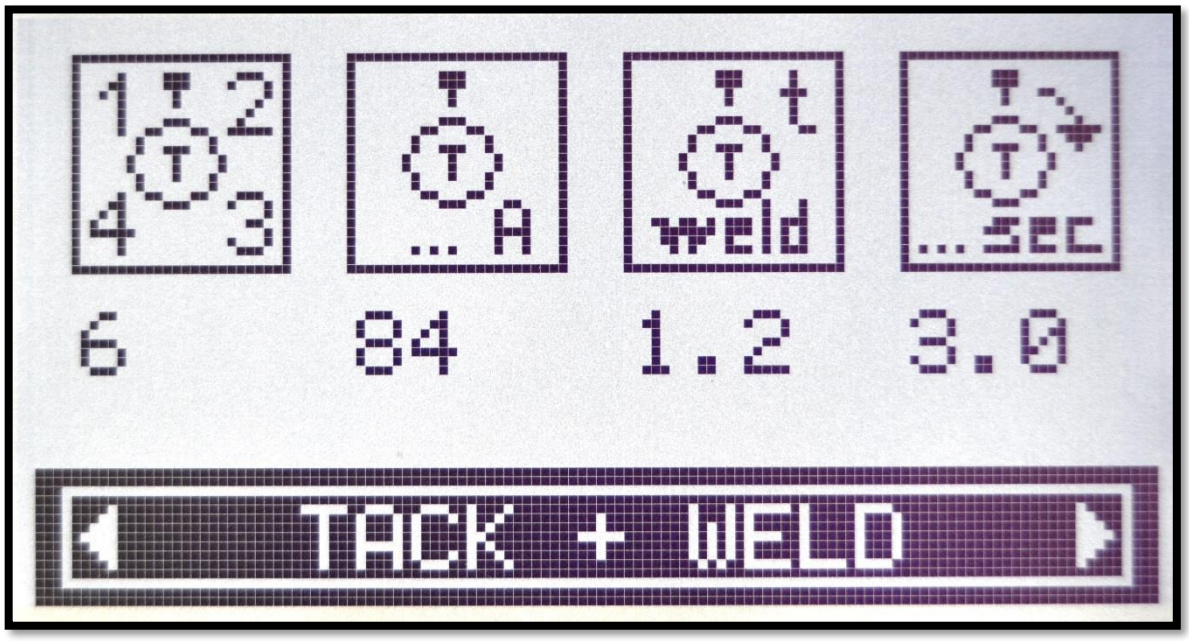
English tack (tacking)

Press the ☰ button to get to the “Tack” field at the bottom of the screen and then press the ⚙ key.

If the field has a black background, tack mode is active.



To change a parameter, simply “navigate” to the field with the arrow keys and activate it with the acknowledge key before changing the data with the arrow keys.

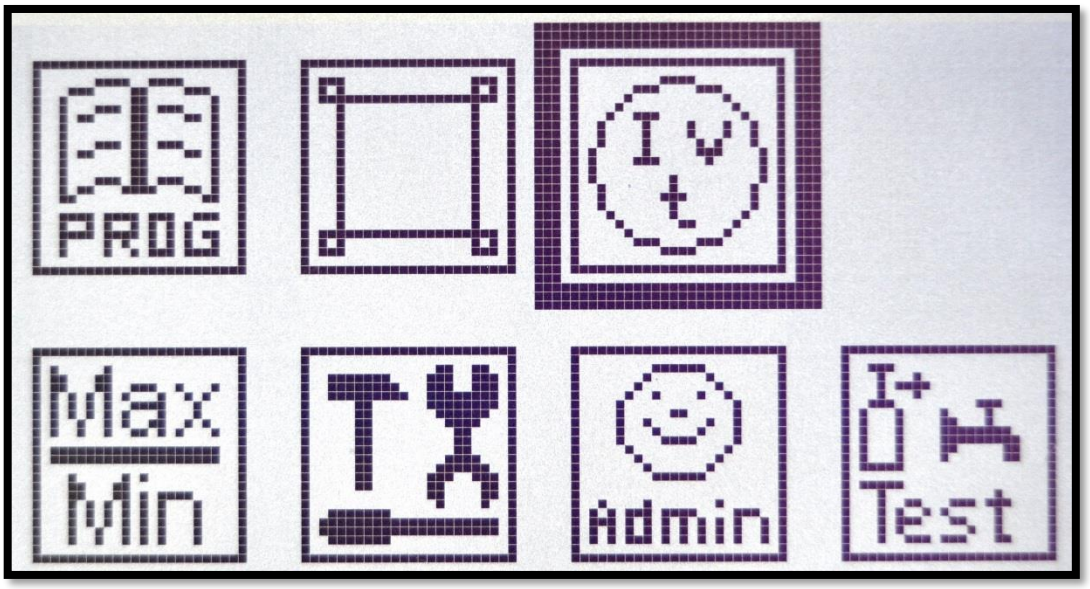


There is a second setting option in the “Tack” mode. This is called “Tack+Weld”.

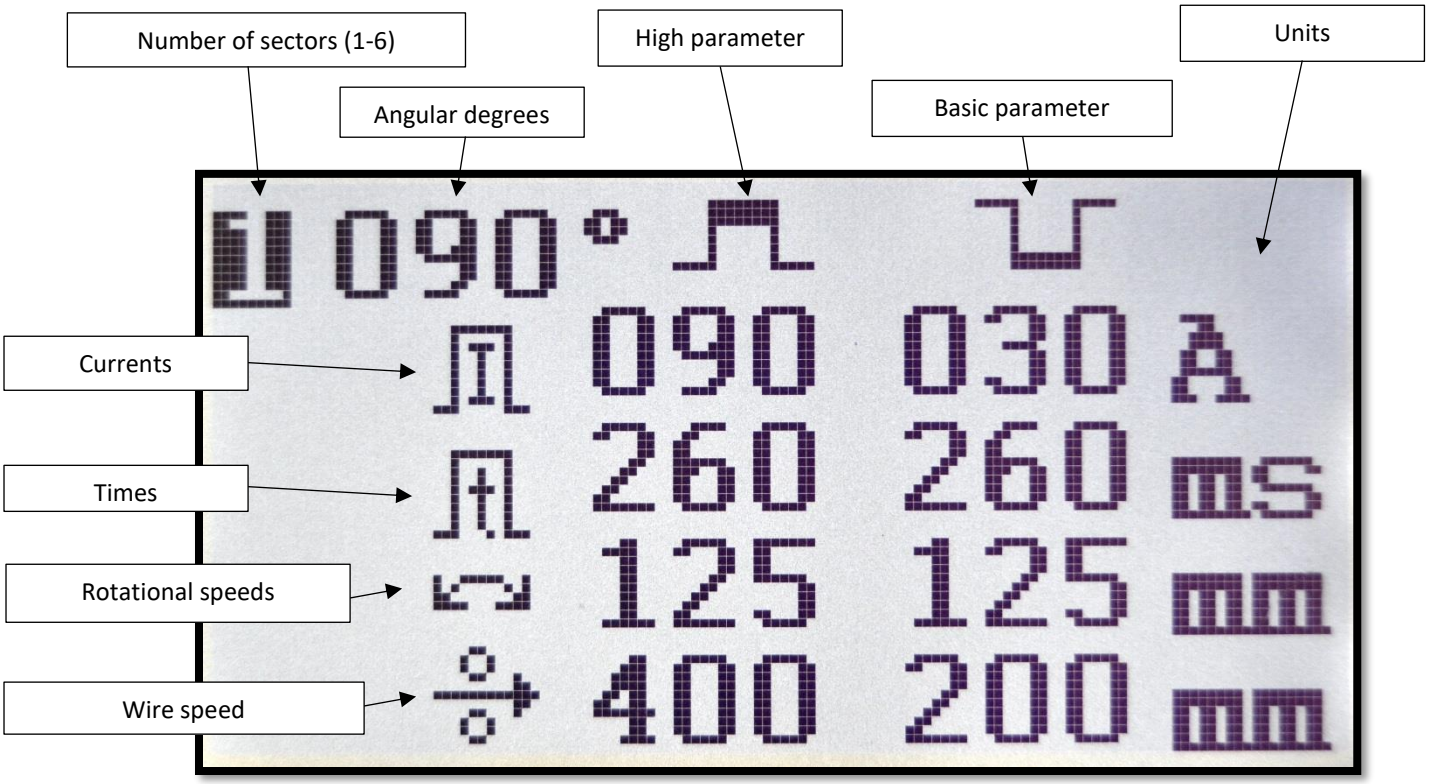
The welding tool hereby makes 6 tacks automatically around the circumference of the tube (360°). This makes sense when coiling up a hose pack with open tongs, for example. Welding then begins automatically.

You can “scroll” through the functions with the arrow keys ↑ ← and activate the selected function with the ⚙ key.

11.6 Changing welding parameters (sectors)



Press the key



You can only ever change or view the value or number that has a black background.

11.6.1 Number of sectors

You can “scroll” through the sectors with the ↑ ← arrow keys. You have the option of programming in 1 to 6 sectors.

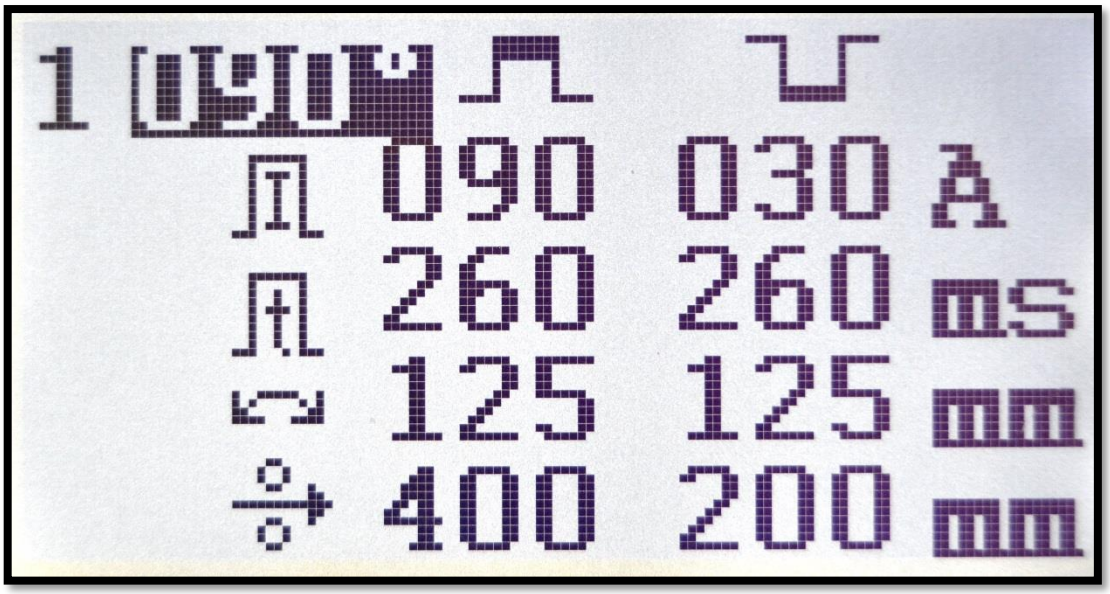
This number has to be defined during the automatic programming support (Synergic function auto program creation).

You will see the number of sectors linked to the welding parameters when “scrolling”. Make sure that the high current values decrease. Everything else is equal between the sectors.

For example, if you have set 4 sectors when creating the Synergic program, sectors 5 and 6 are also present and are calculated with the parameters from sector 4. The angular degrees are at 0°. If you write 420° in sector 5 (angular degrees), for example, this indicates that you wish to weld up to this value. However, you should change the high current too, otherwise the values from sector 4 will be used and you will weld up to 420° with these. In this case, you could simply have extended sector 4 to 420°.

11.6.2 Angular degrees

Press the ⚙ key to open the angular degrees.

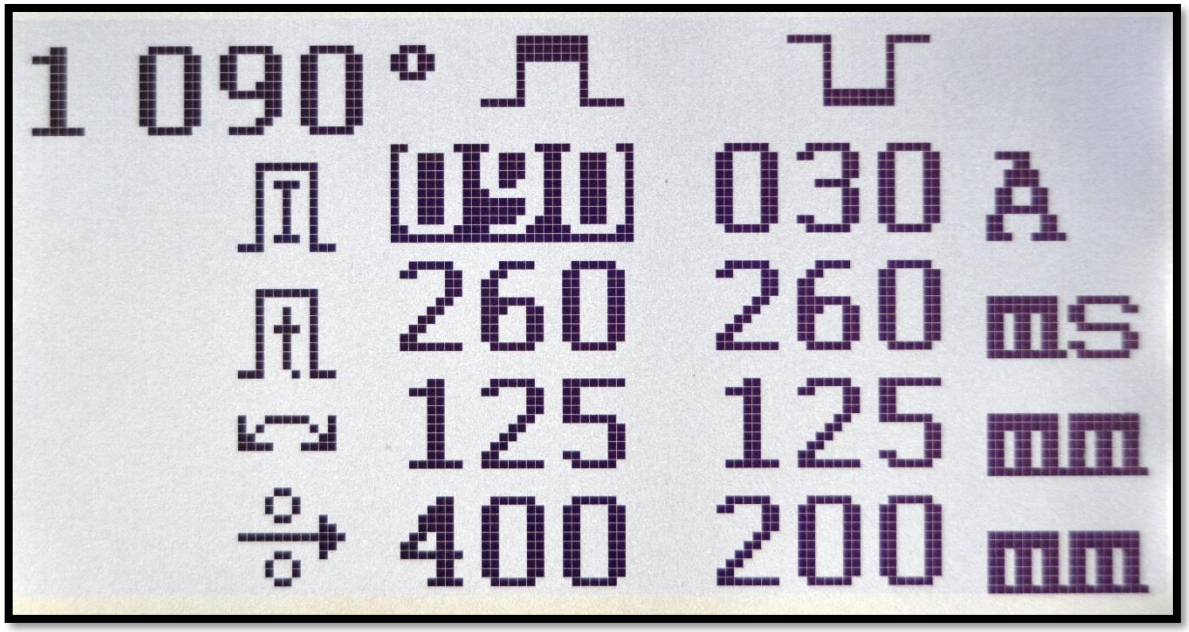


Press the key again to change these.

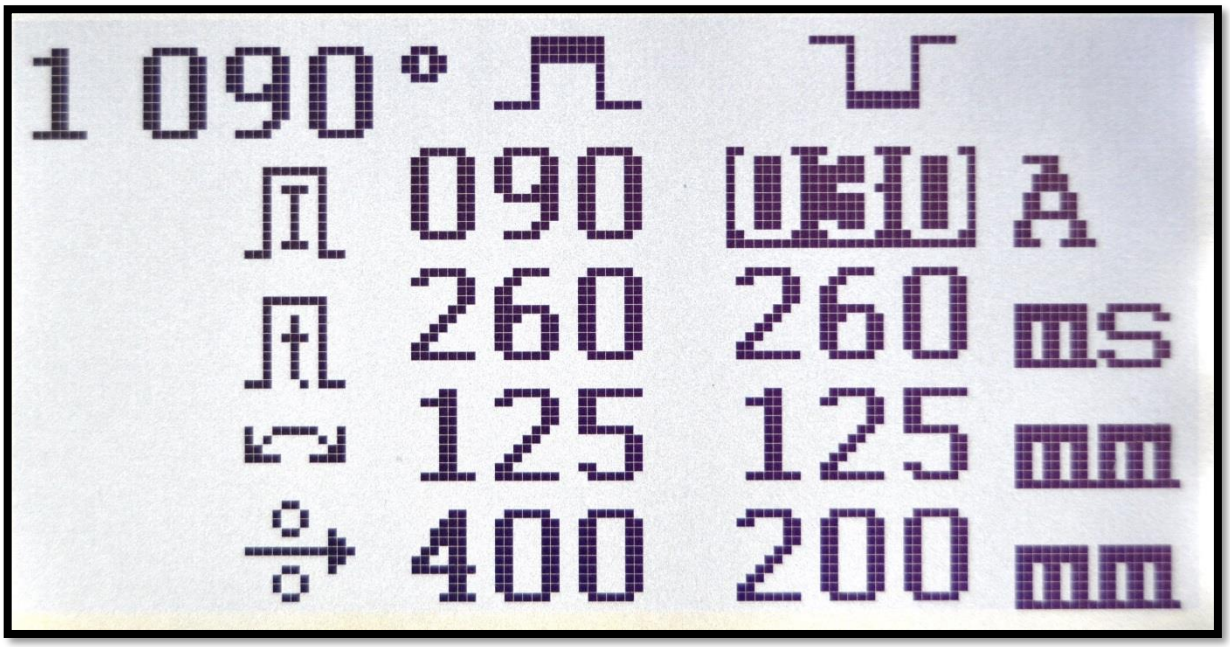
Changes are always made with the arrow keys and the ENT setting key.

If all three digits have a black background, you can sue the arrow key to “skip” to the further parameters and carry out changes.

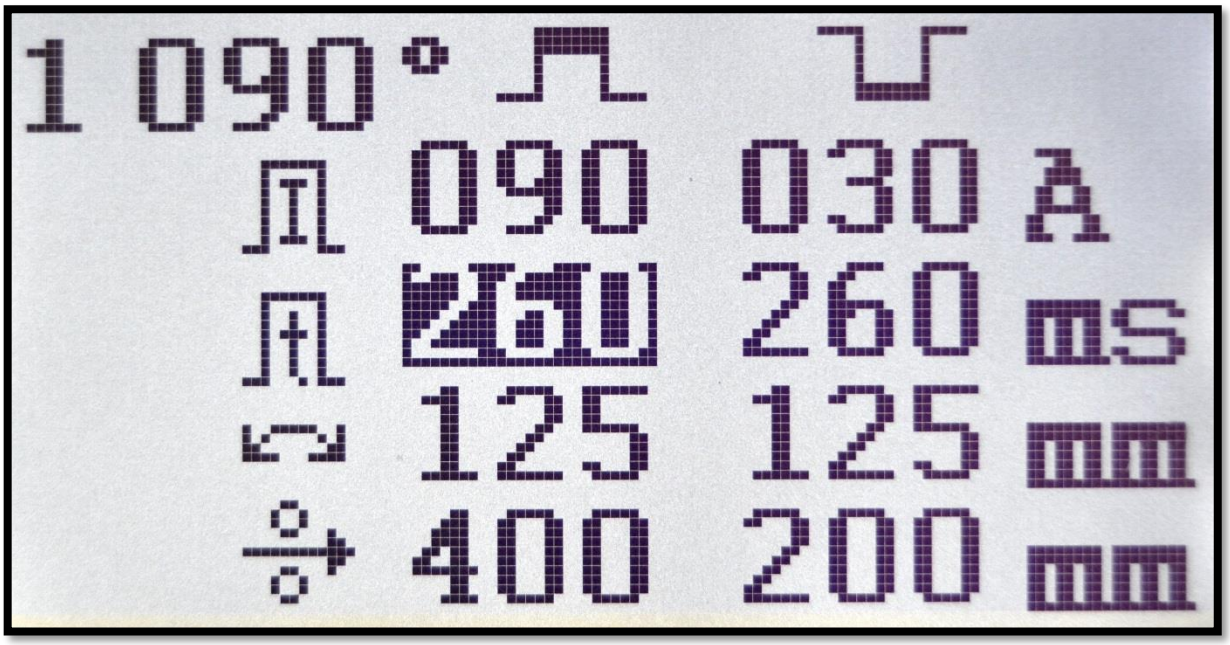
Change option high current sector 1



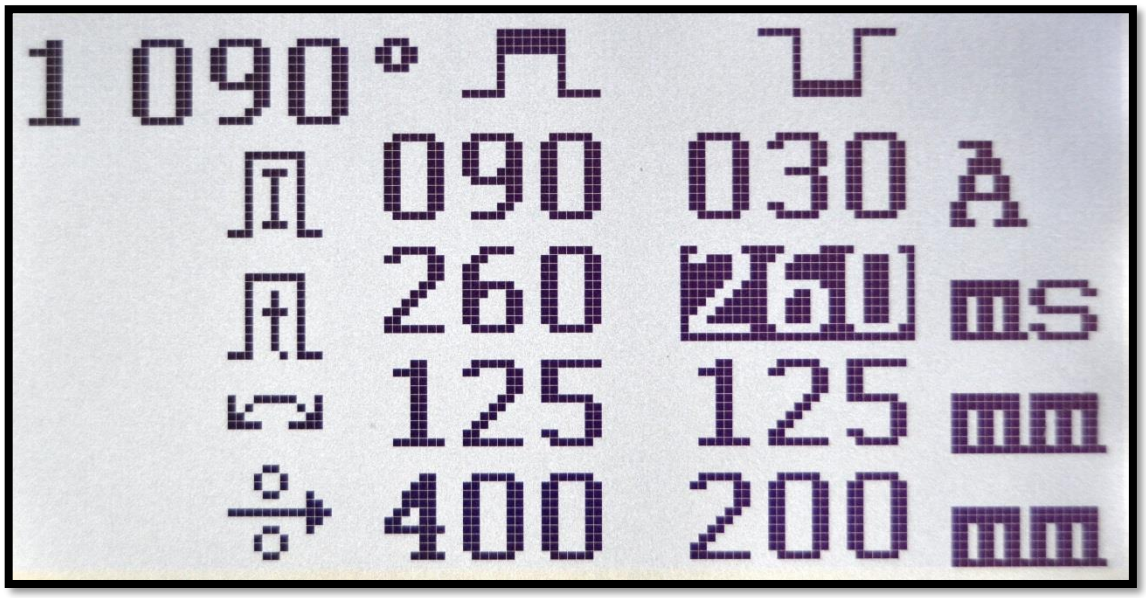
Change option basic current sector 1



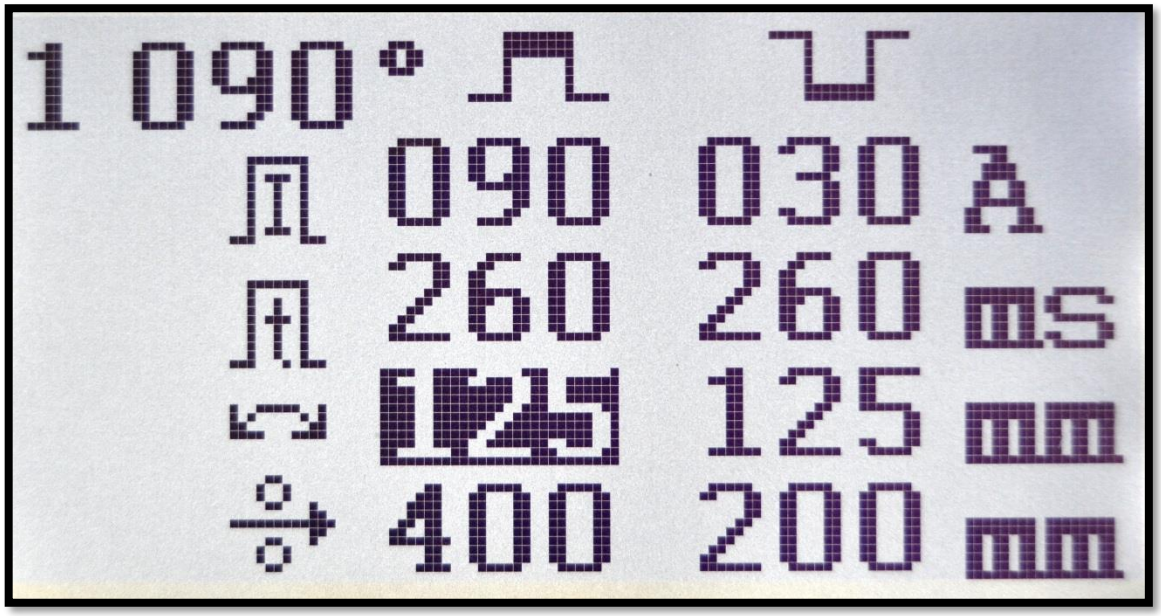
Change option high current time sector 1



Change option basic current time



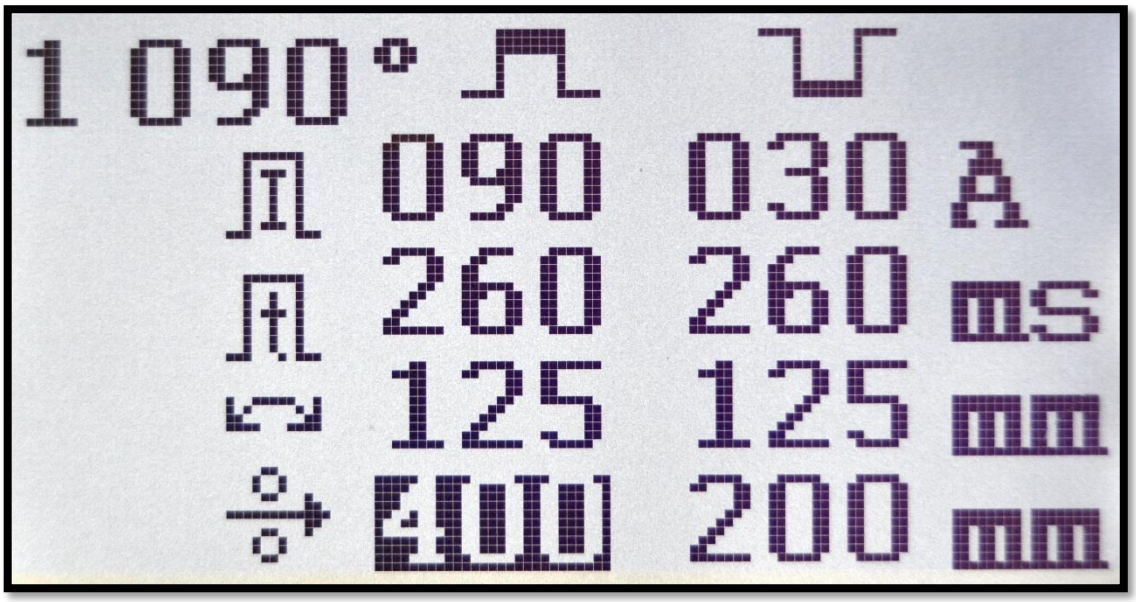
Change option high current speed



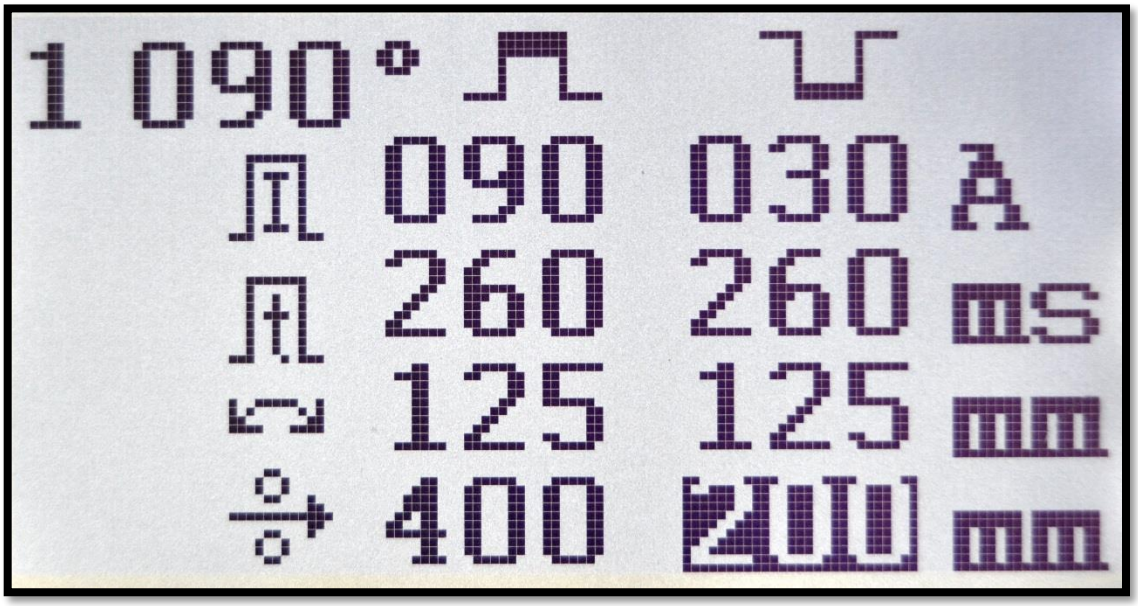
If continuous rotation is set as a default in the welding program (basic parameter), the value for high and basic speed is always identical. If you change the high value, for example, the basic value will also be changed.

2 different values can be set in the step mode (normally high values 0 mm/min, basic values 100 mm/min). This means that a large “tack” is made with the high current value at a standstill and the head is moved on with lower current values in the basic current.

Wire speed in high current



Wire speed in basic current

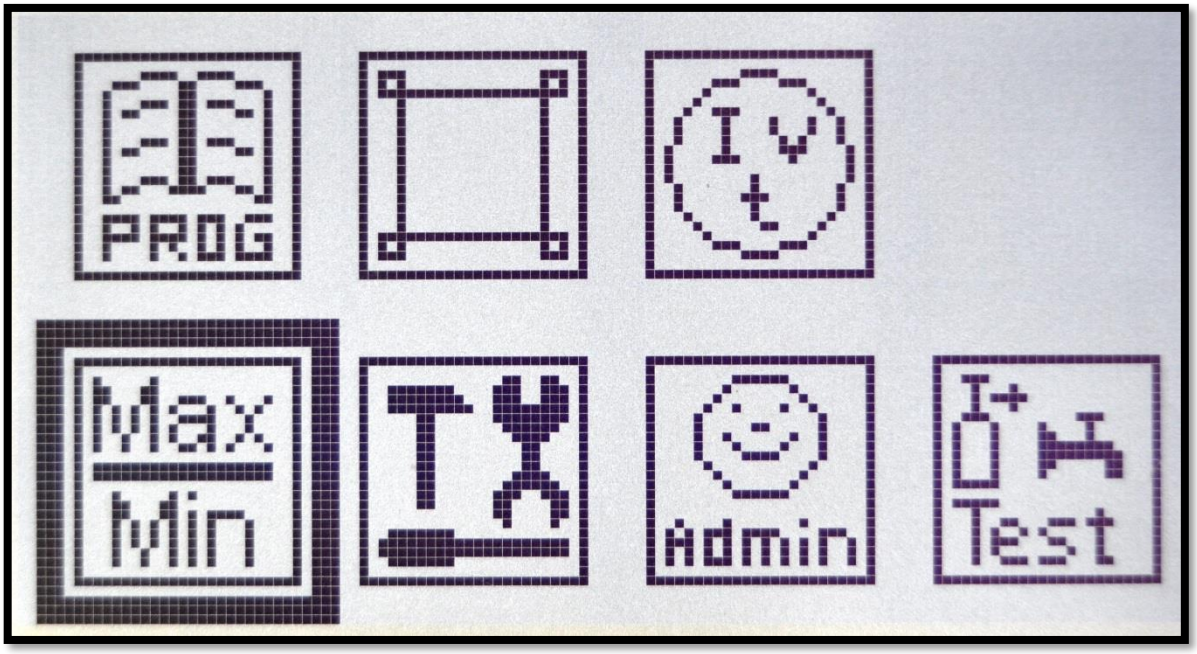


A help function has been integrated in programming in sector 1. Wit this, we have tried to protect you against possible errors (which is why sector 1 is so detailed):

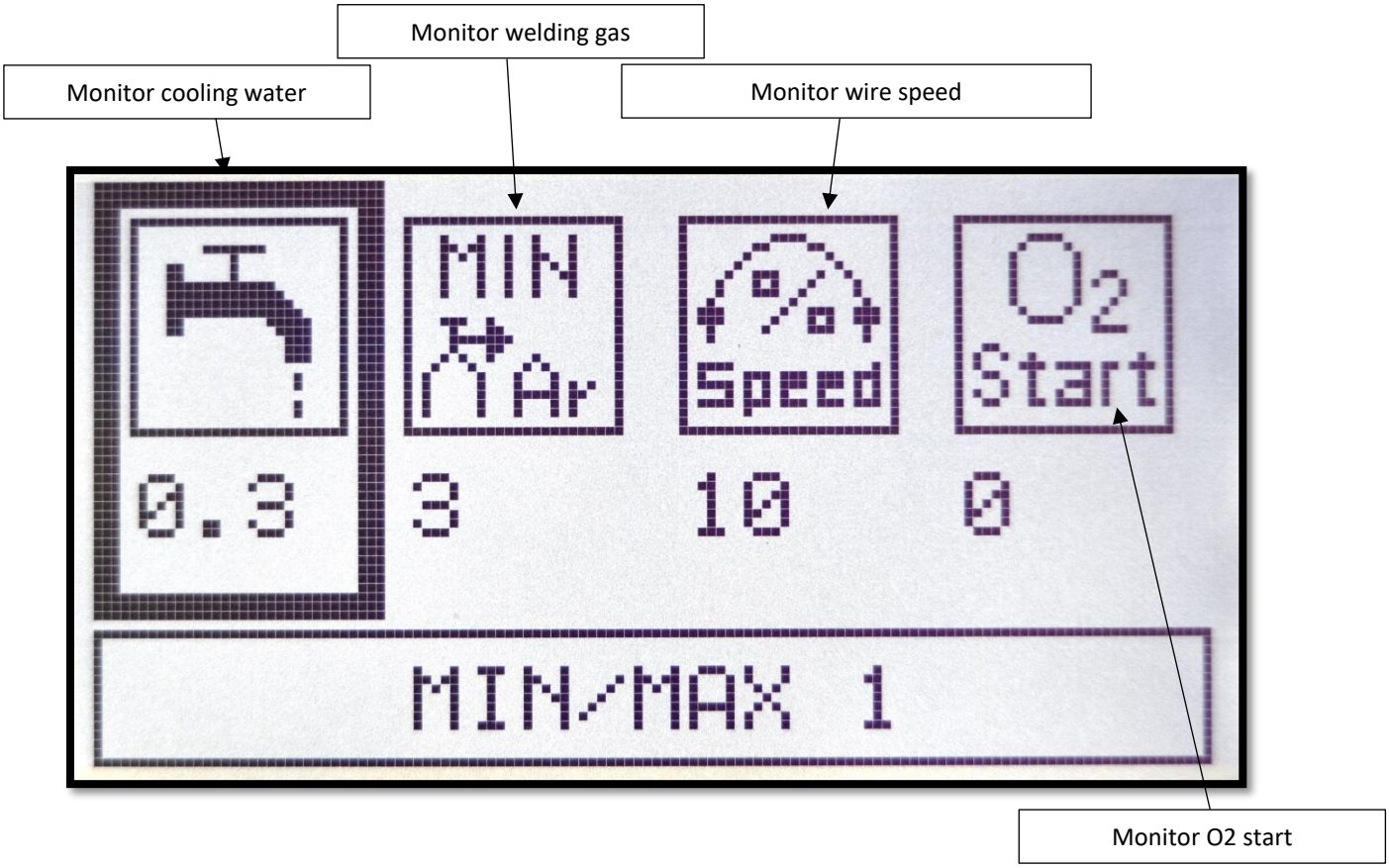
If you change the speeds (rotation and wire) as well as the pulse times (in sector 1), all of the values (except current) will be overwritten in all further sectors that are programmed.

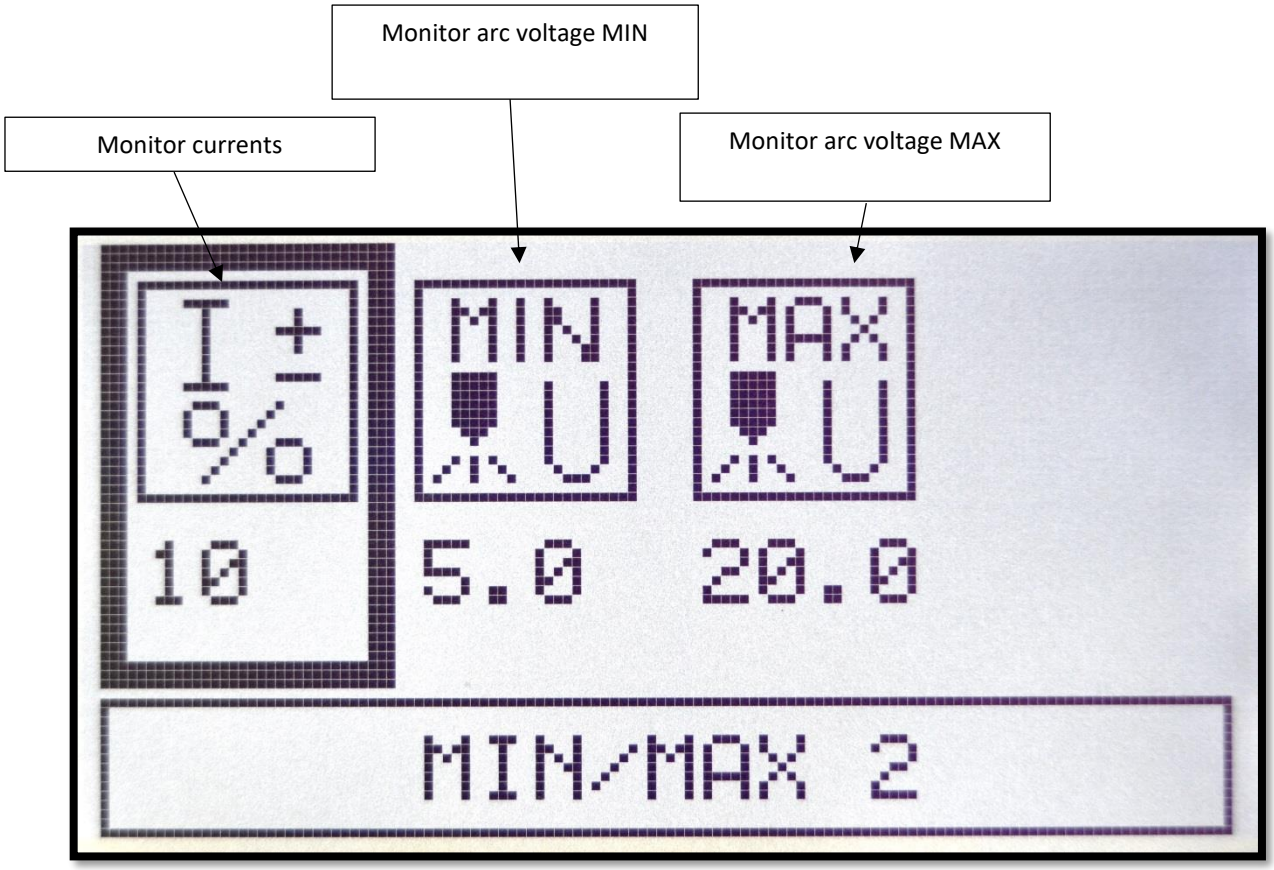
But if you want to deliberately enter other parameters, e.g. for wire speeds, you can enter them in other sectors without them being taken over in all of the sectors.

11.6.3 MAX/MIN menu



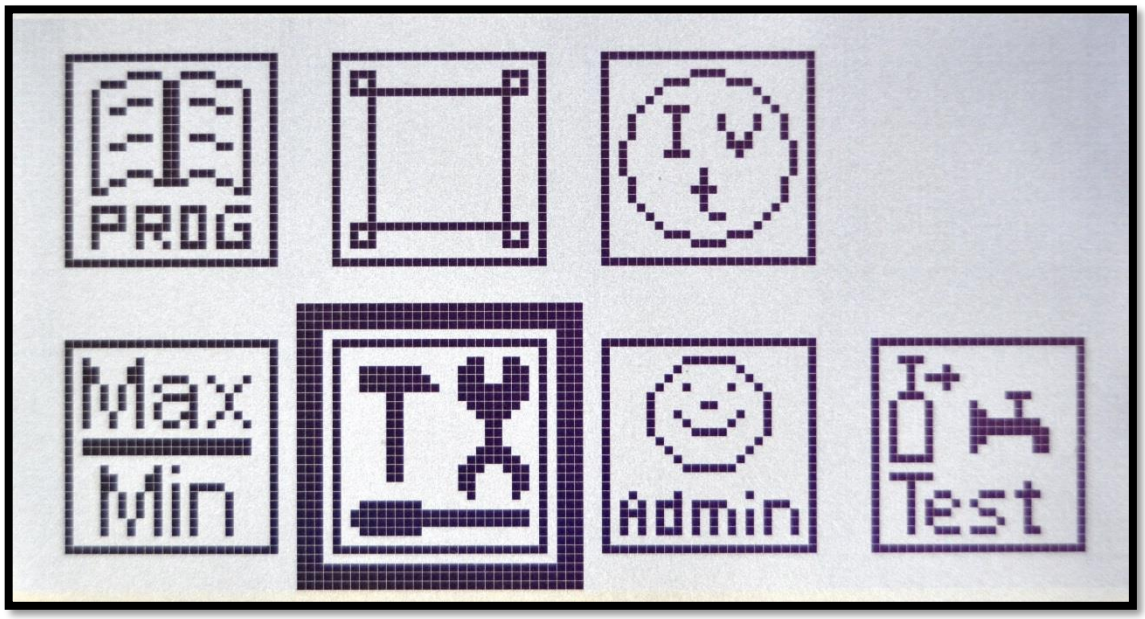
Press the key



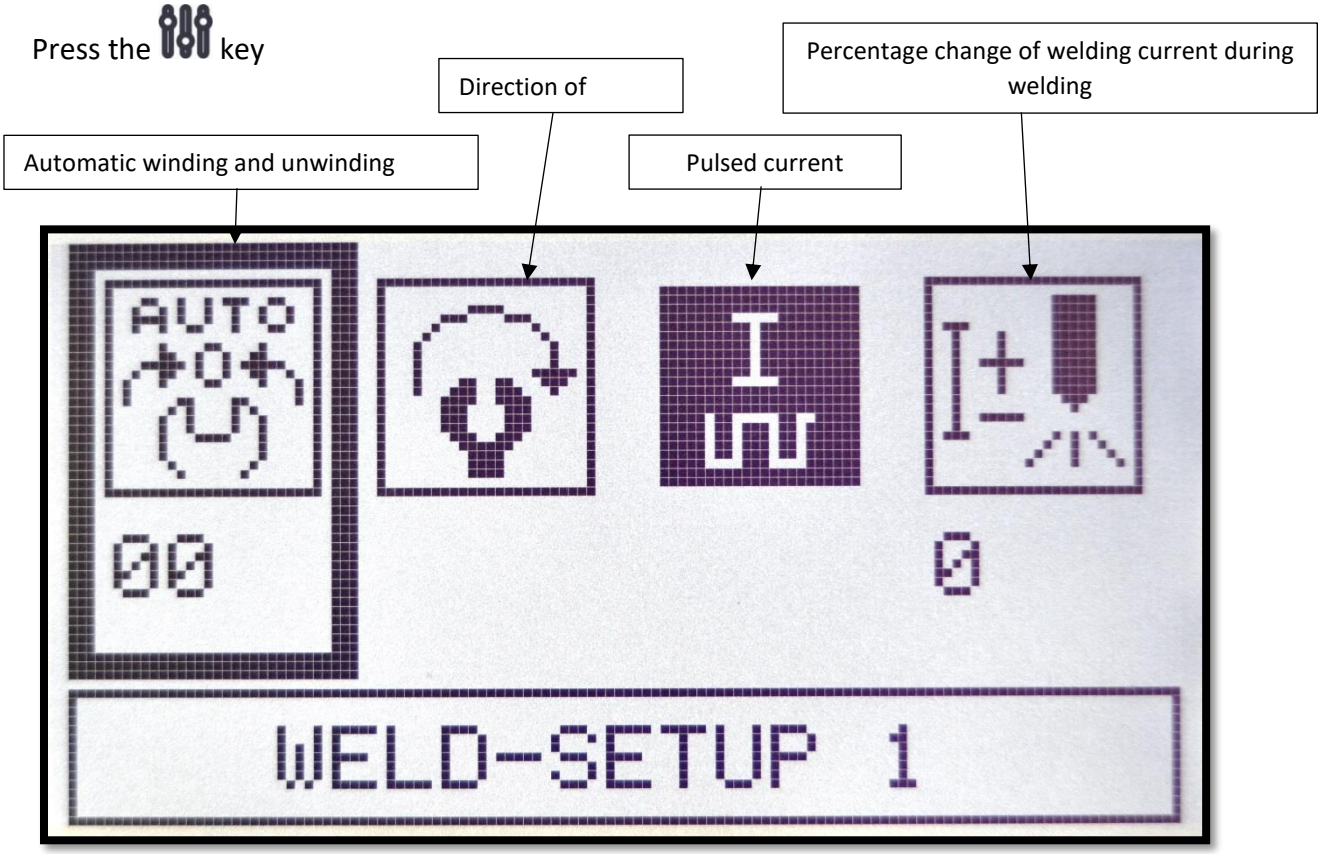


All of these values are set to 0 on delivery. The entered values are recommendations.

11.7 Weld setup

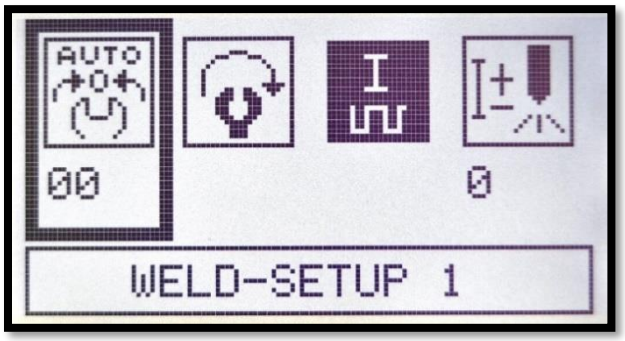


Press the key

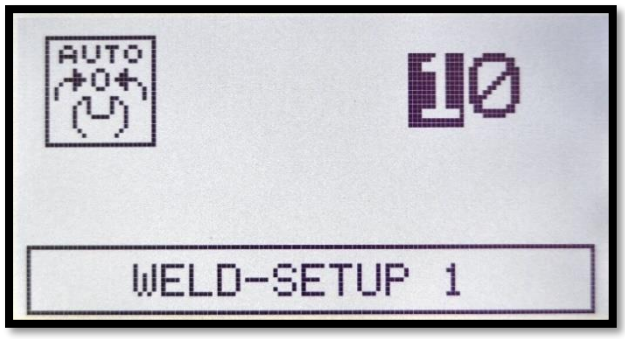


11.7.1 Automatic winding and unwinding

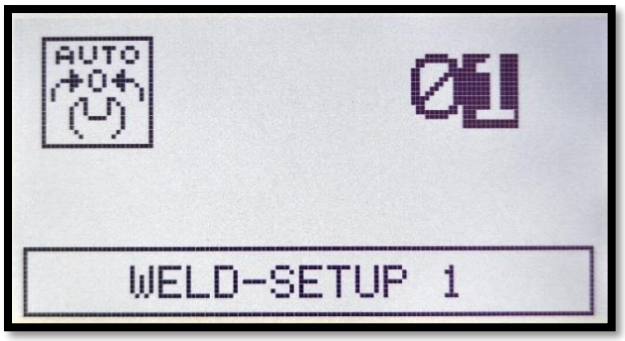
This function gives you the possibility of winding up the hose package before actual welding, e.g. with open welding tongs; the tongs then return to their starting position after welding.



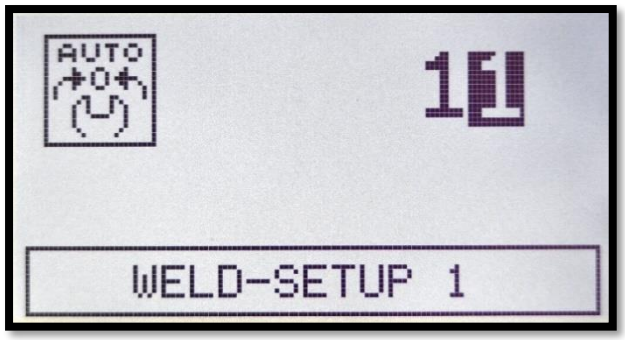
No winding and unwinding



Winding is activated, unwinding is not



No winding, simply “return” to the starting position



Both activated

11.7.2 Direction of rotation

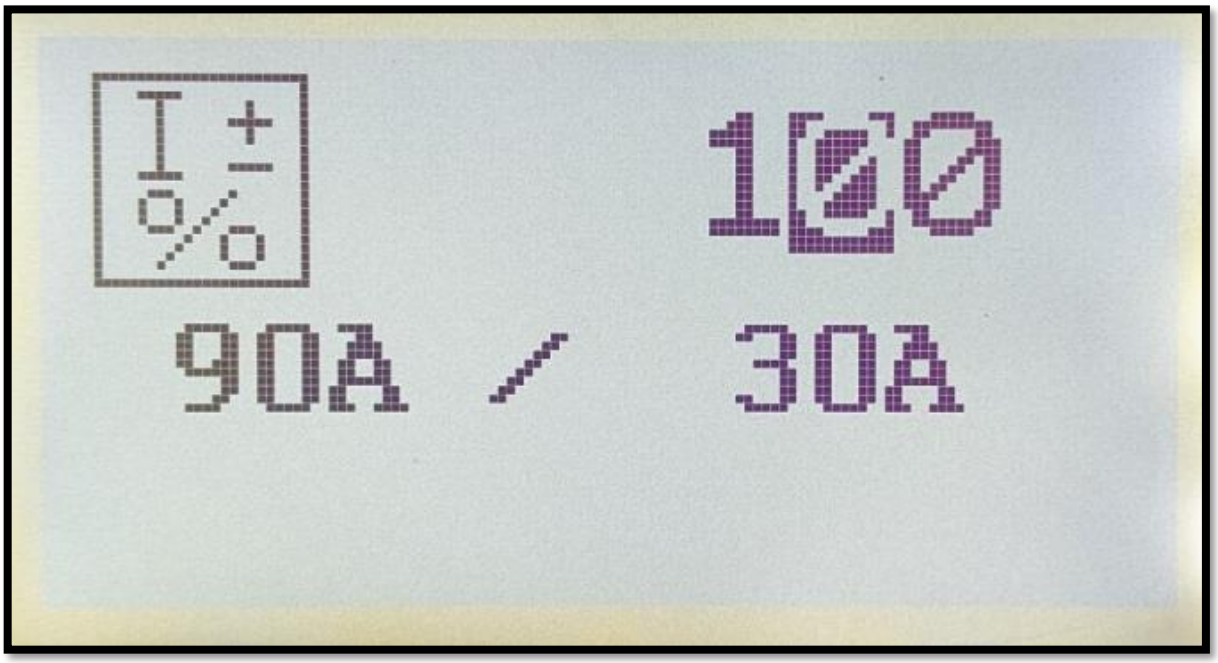
If a field does not have a black background, one direction, if it does, the other direction. Adjustments are made with the key

11.7.3 Pulsed current

Currents are usually always pulsed during orbital welding. If this is not required in special cases, this can be changed with the key. Only one current value then appears in the main interface screen and no pulse times.

11.7.4 Percentage change to the welding parameters

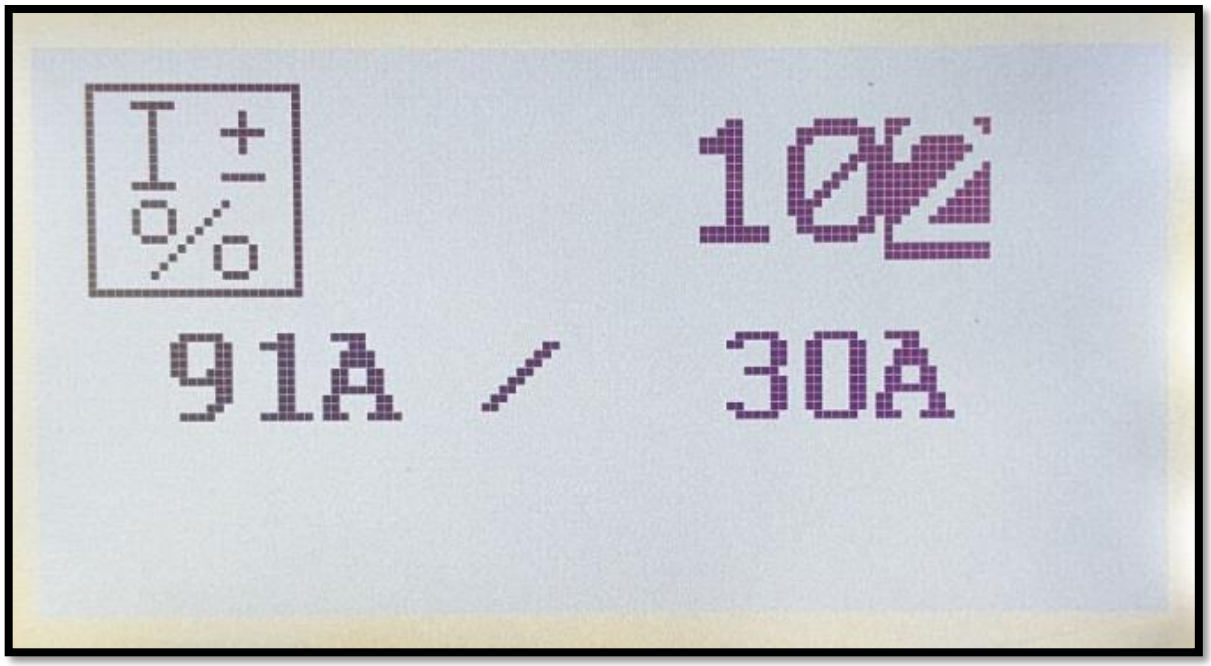
This function is activated during welding with the key.



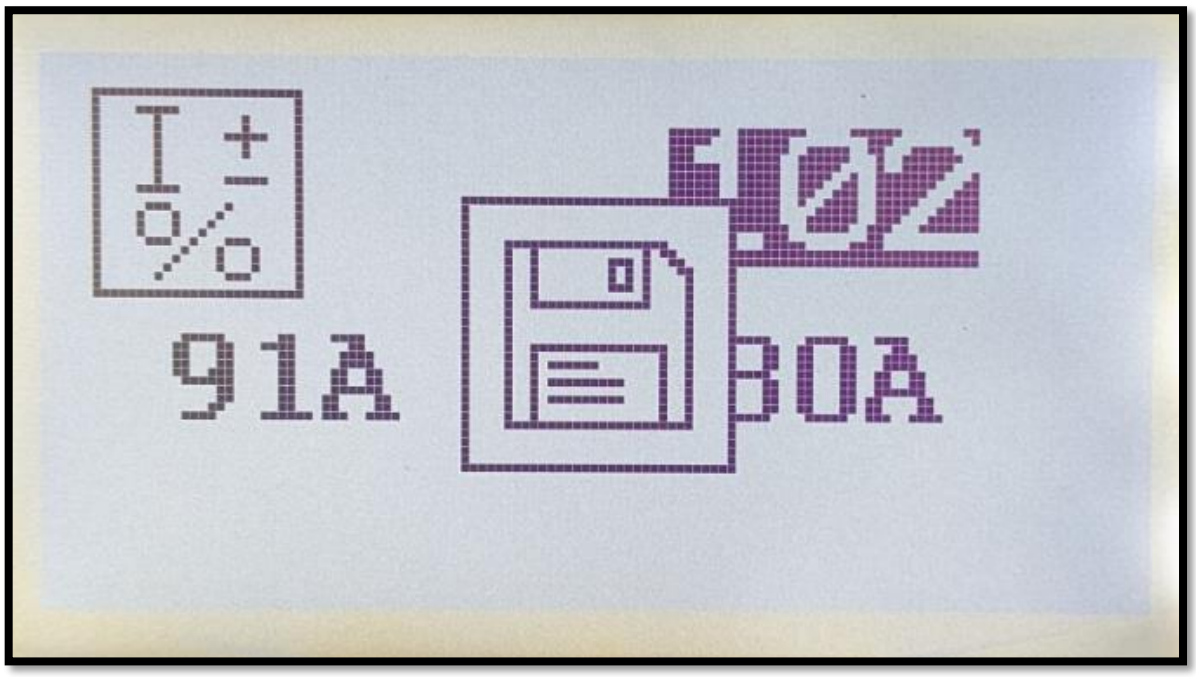
Possible settings are 1-50%. This means that you can increase and decreases the current values by a max. of 50% during welding.

Example:

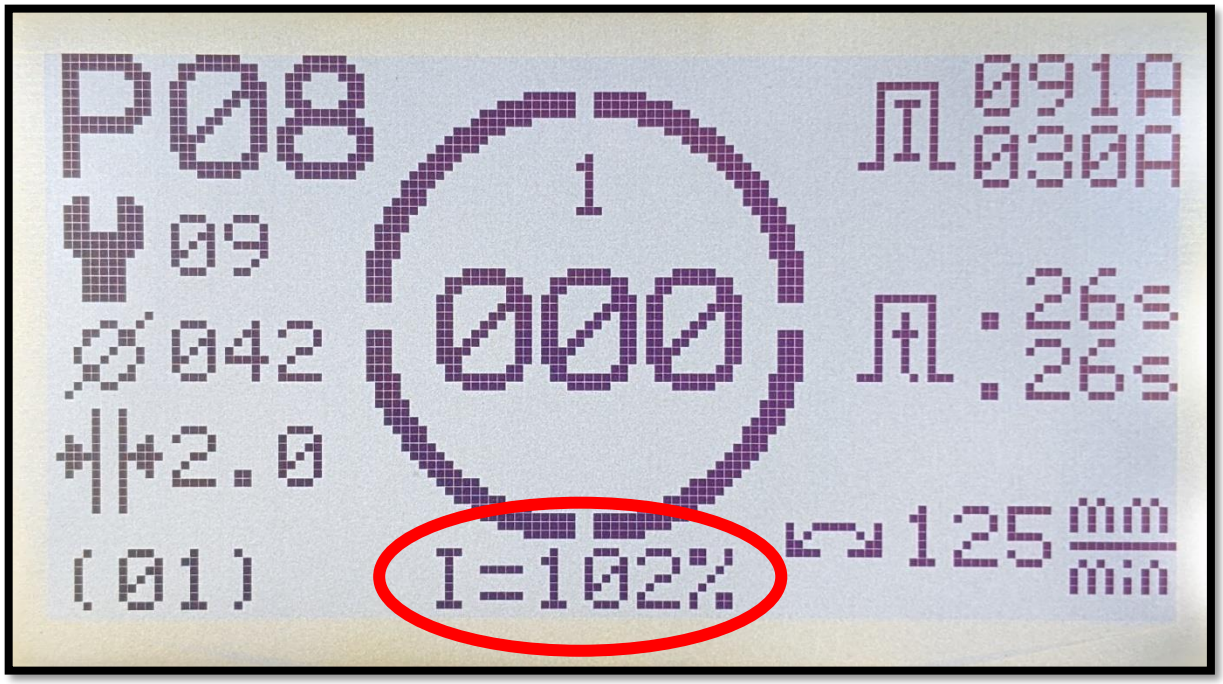
You set 102%. If you now press the key during welding, the current value for high and basic current will be increased by 2%.



Press the key

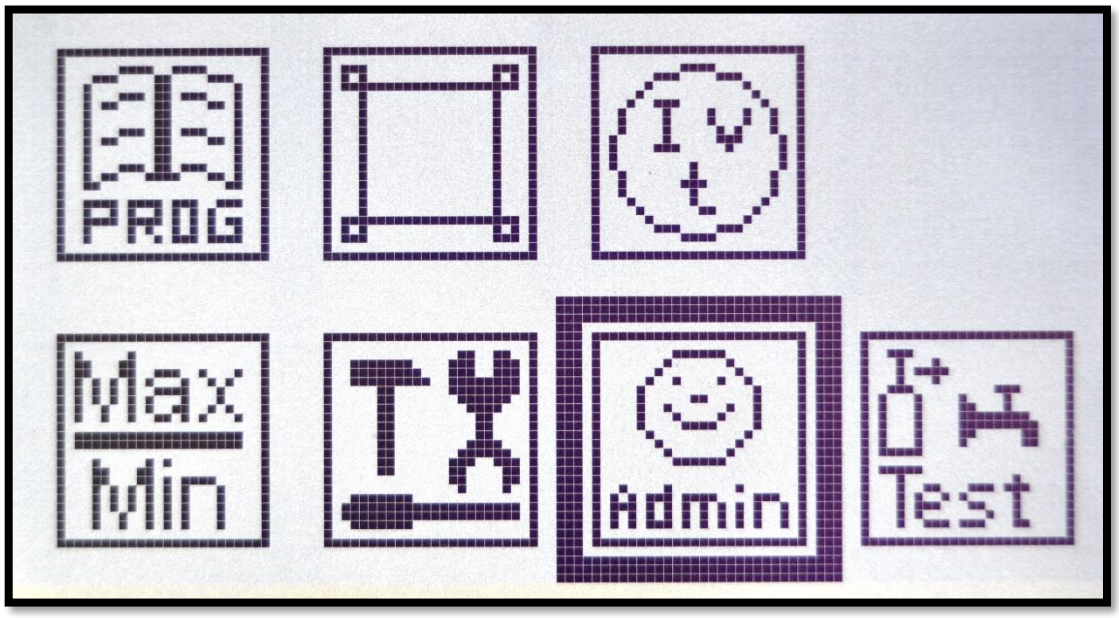


These changes are shown with a black background beneath the welding circle. Changes to the cold wire are also shown here.

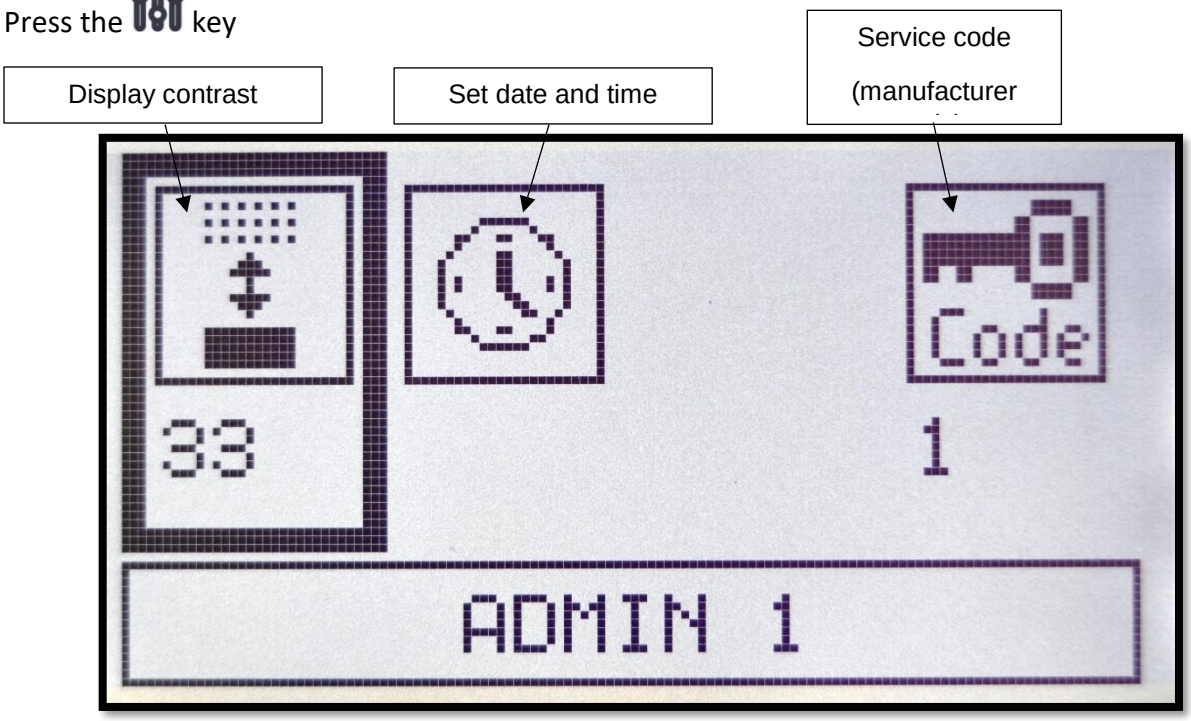


All of this can be saved after welding if you wish. The data is then saved to the program.

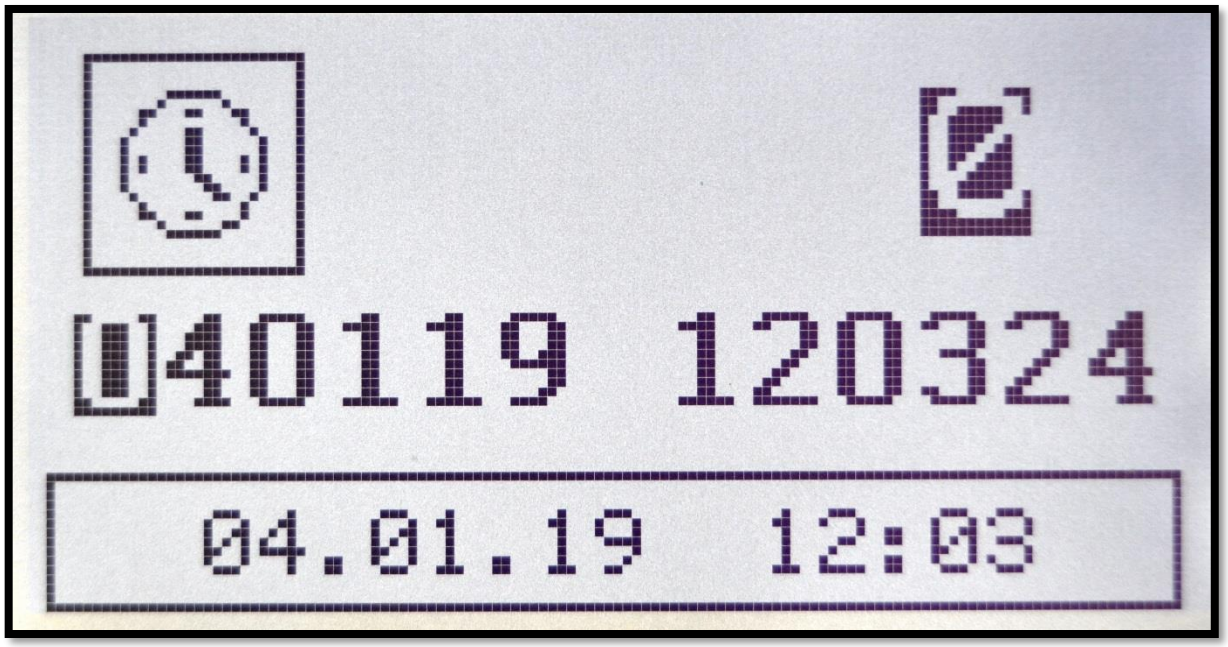
12. Administrator menu



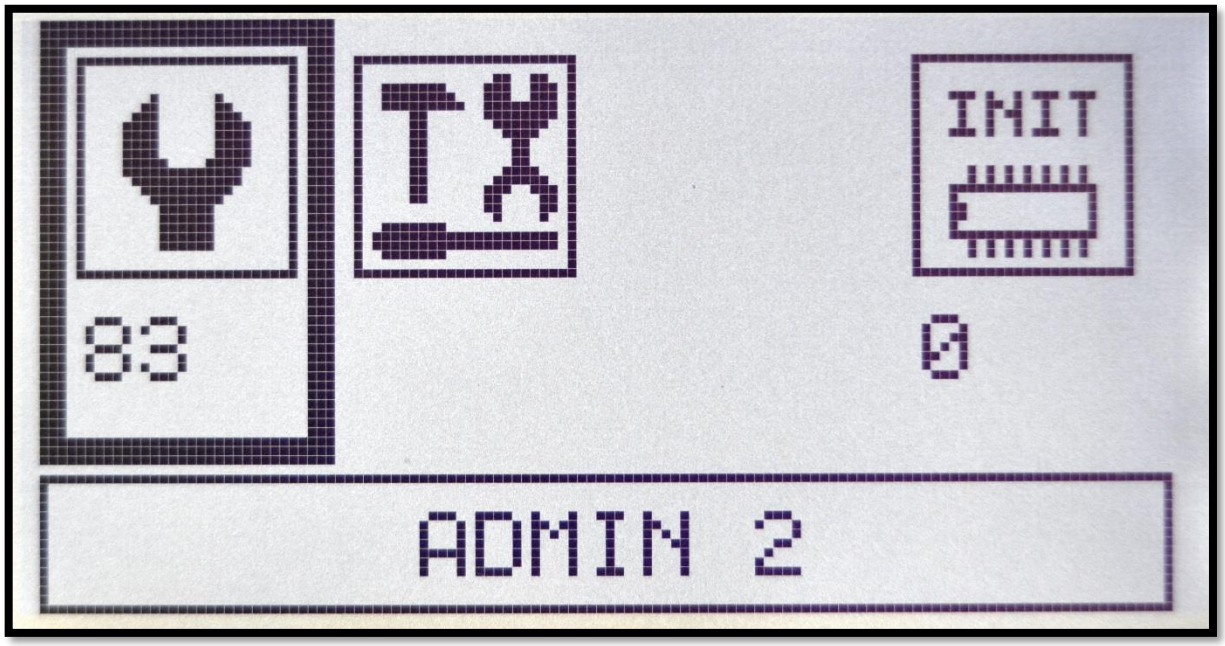
Press the key



12.1 Set date and time

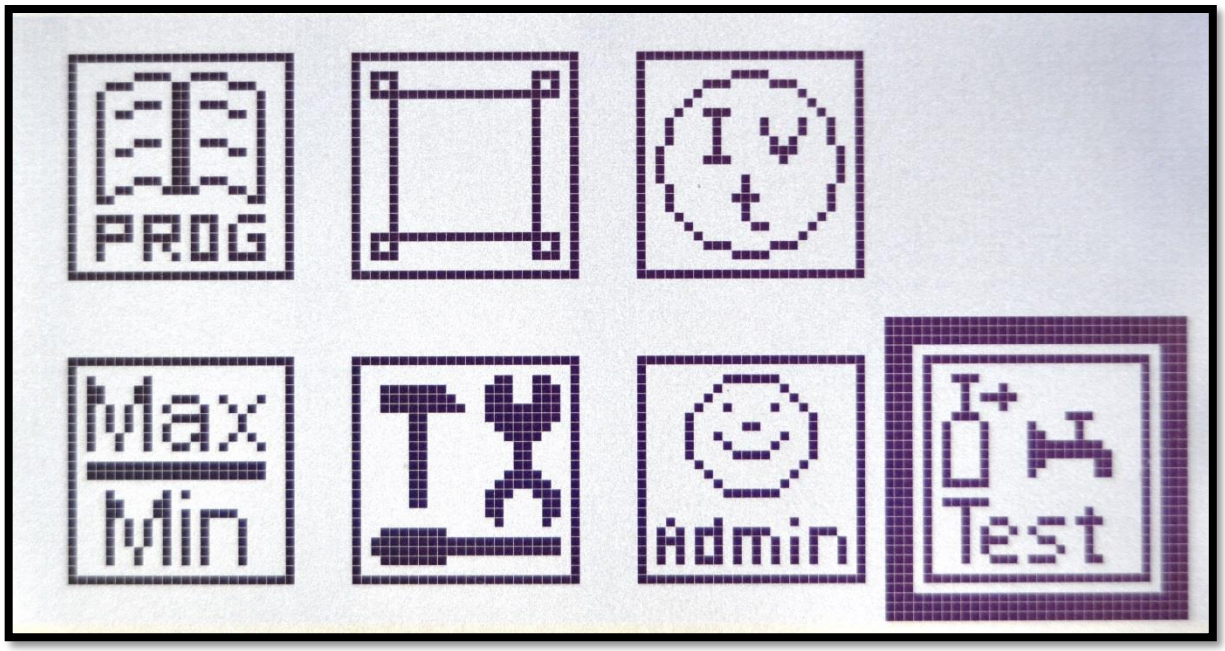


12.2 Admin page 2



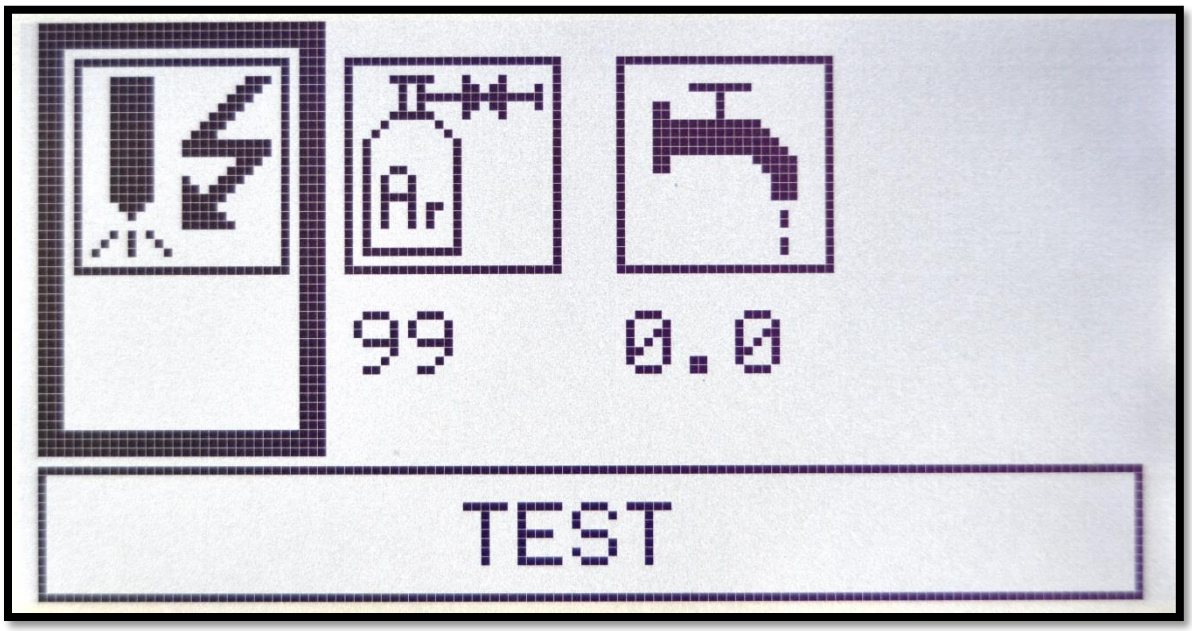
This fields and functions cannot be accessed by customers. This is where the welding tongs, for example are programmed (database) as well as various pieces of information about the hardware and software.

13. Test menu



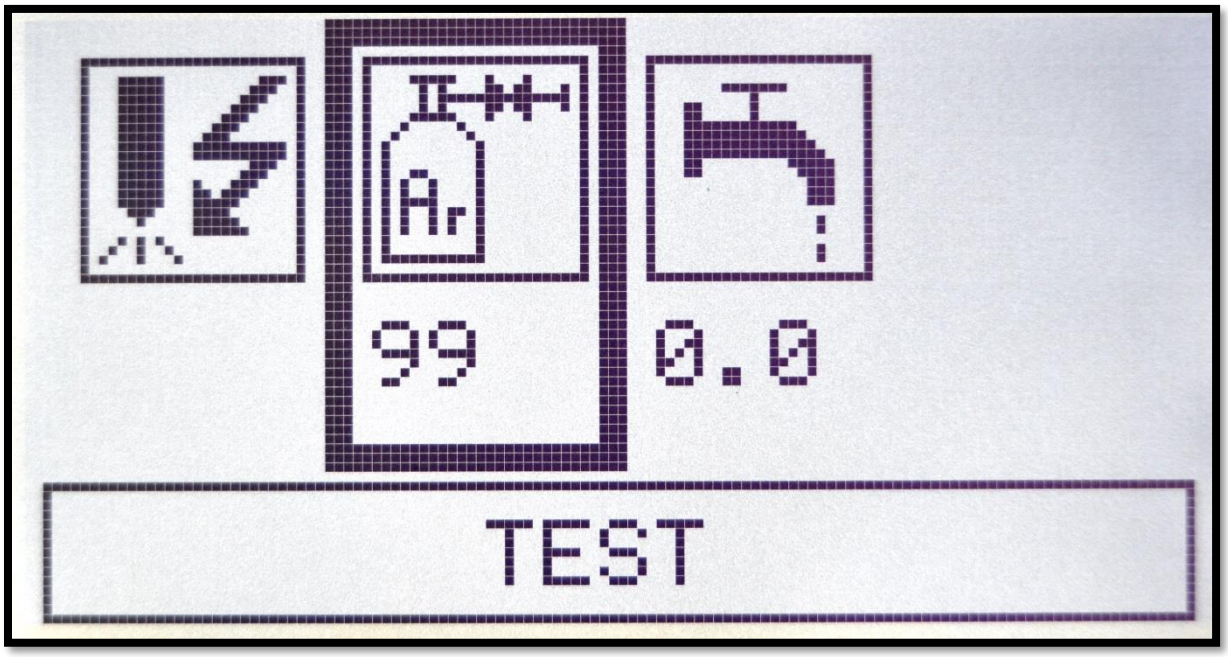
Press the key

13.1 Welding w/o arc



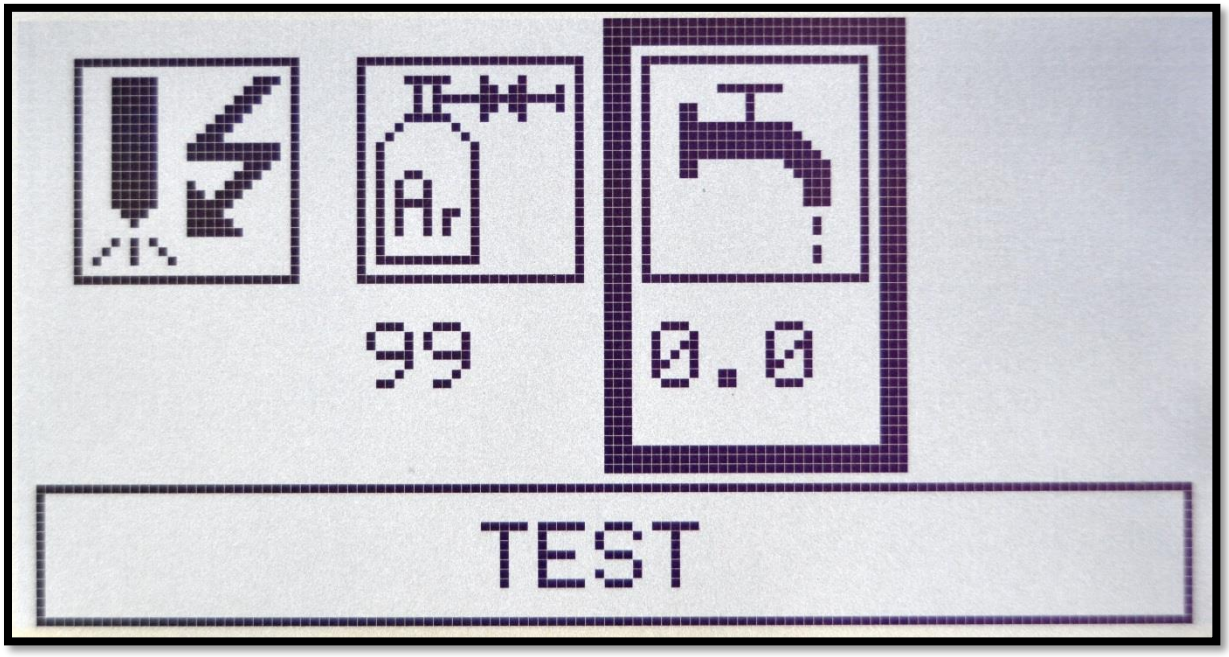
Welding w/o arc (no current test run) If this has a black background → test run

13.2 Gas test



Gas test. If the field has a black background, the solenoid valve will be activated and a gas test carried out with flow control.

13.3 Water test



Water test. If the field has a black background, the solenoid valve will be activated and a water test carried out with flow control.

14. Customer service and after-sales support

To order spare parts, please see the separate spare parts list.

Minor defects can be rectified by qualified personnel who have been trained by Orbitalservice GmbH. Major damage must be repaired at our facilities.

To have any faults/malfunctions corrected, please contact us directly.

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