Aristo®

U82

Instruction manual

0460 896 501 US 20170323

Valid for: from program version 1.27H

DECLARATION OF CONFORMITY

According to

The EMC Directive 2004/108/EC, entering into force 20 July 2007
The RoHS Directive 2011/65/EC, entering into force 2 January 2013

Type of equipment
Control unit

Type designation

Aristo $U8_2$	Stock Code 0460 820 880
Aristo $U8_2$ Plus	Stock Code 0460 820 881
Aristo $U8_2$ Plus I/O	Stock Code 0460 820 882

Brand name or trade mark
ESAB

Manufacturer or his authorised representative established within the EEA
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The following harmonised standard in force within the EEA has been used in the design:

EN 60974-1, Arc Welding Equipment – Part 1: Welding Power Sources
EN 60974-10, Arc Welding Equipment – Part 10: Electromagnetic Compatibility (EMC) requirements

By signing this document, the undersigned declares as manufacturer, or the manufacturer's authorised representative established within the EEA, that the equipment in question complies with the safety requirements stated above.

Date	**Signature**	**Position**
Gothenburg		Global Director Equipment
2014-05-02	Stephen Argo	
	Clarification	

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1 SAFETY

NOTE!
The unit is tested by ESAB in a general set-up. The responsibility for the safety and function of the specific set-up lies with the integrator.

Users of ESAB equipment have the ultimate responsibility for ensuring that anyone who works on or near the equipment observes all the relevant safety precautions. Safety precautions must meet the requirements that apply to this type of equipment. The following recommendations should be observed, in addition to the standard regulations that apply to the workplace.

All work must be carried out by trained personnel well-acquainted with the operation of the equipment. Incorrect operation of the equipment may lead to hazardous situations, which could result in injury to the operator and damage to the equipment.

1. Anyone who uses the equipment must be familiar with:
   - its operation
   - the location of emergency stops
   - its function
   - the relevant safety precautions
   - welding and cutting or other applicable operation of the equipment
2. The operator must ensure that:
   - no unauthorized person is within the working area of the equipment when it is started up
   - no-one is unprotected when the arc is struck or work is started with the equipment
3. The workplace must:
   - be suitable for the purpose
   - be free from drafts
4. Personal safety equipment:
   - Always wear recommended personal safety equipment, such as safety glasses, flame-proof clothing, safety gloves
   - Do not wear loose-fitting items, such as scarves, bracelets, rings, etc., which could become trapped or cause burns
5. General precautions:
   - Make sure the return cable is connected securely
   - Work on high voltage equipment **may only be carried out by a qualified electrician**
   - Appropriate fire extinguishing equipment must be clearly marked and close at hand
   - Lubrication and maintenance must **not** be carried out on the equipment during operation

Read and understand the instruction manual before installing or operating.

PROTECT YOURSELF AND OTHERS!

CAUTION!

These INSTRUCTIONS are for experienced operators. If you are not fully familiar with the principles of operation and safe practices for arc welding equipment, we urge you to read our booklet, "Precautions and Safe Practices for Arc, Cutting and Gouging", Form 52-529 . Do NOT permit untrained persons to install, operate, or maintain this equipment. Do NOT attempt to install or operate this equipment until you have read and fully understand these instructions. If you do not fully understand these instructions, contact your supplier for further information. Be sure to read the Safety Precautions before installing or operating this equipment.

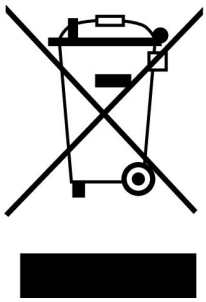
NOTE!

Dispose of electronic equipment at a recycling facility!

To conform with the European Directive 2012/19/EC on Waste Electrical and Electronic Equipment and its implementation in accordance with national law, electrical and/or electronic equipment that has reached the end of its life must be disposed of at a recycling facility.

As the person responsible for the equipment, it is your responsibility to obtain information on approved collection stations.

For further information contact the nearest ESAB dealer.



2 INTRODUCTION

To benefit as much as possible from your welding equipment, we recommend that you read this instruction manual.

For general information about operation, see the instruction manuals for the power source and wire feed unit.

The text in the display is available in the following languages: English, Swedish, Finnish, Norwegian, Danish, German, French, Italian, Dutch, Spanish, Portuguese, Hungarian, Polish, American, Czech, Chinese and Turkish.

NOTE!
There may be differences in the way the panel functions, depending on the product in which it is installed.

2.1 Control panel Aristo U82

The control panel is supplied with a mounting bracket with screws and an English instruction manual. A 1.2 m cable is mounted onto the panel. USB memory and an extension cable are available as accessories; see the "ACCESSORIES" chapter of this manual.

Instruction manuals in other languages can be downloaded from the Internet: www.esab.com

1. Connector for USB memory
2. Knob for moving cursor
3. Display
4. Soft keys 
5. Menu 
6. Enter 
7. Knob for increasing or decreasing set values and setting the voltage, #
8. Knob for increasing or decreasing set values and setting the wire feed speed, *

2.1.1 Keys and knobs

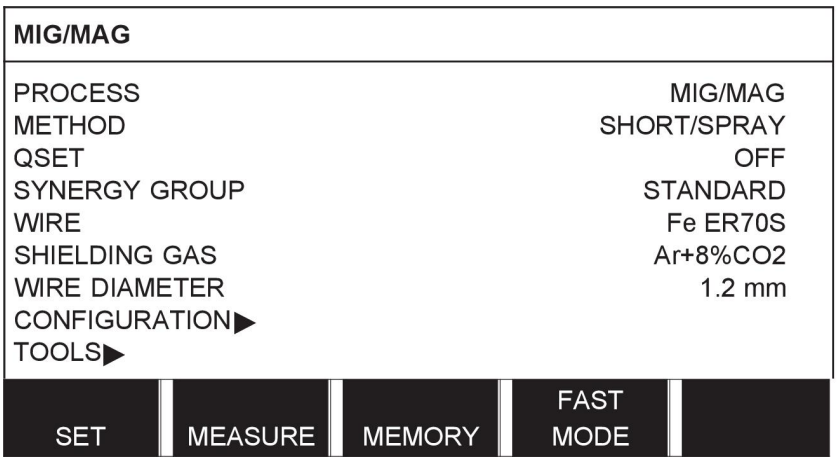
Soft keys (4)

The five keys in a row under the display have varying functions. These are “soft” keys, i.e. they can have different functions depending on which menu you are currently working in. The current function for these keys appears in the text in the bottom row of the display.

When the function is active, the key turns white: 

Menu key (5)

The Menu key  always takes you back to the main menu:



Enter key (6)

The enter key  confirms a selection.

Cursor knob (2)

Use the left knob to move the cursor to different rows in the display.

Plus/minus knobs (7, 8)

The right knobs increase or decrease the value of a setting. To the side of the knobs there is a symbol, a number sign # or a star *. Most numerical settings can be adjusted with either knob, although some settings must be made with a particular knob.

2.2 Location

On the reverse of the control panel, there is a foldout stand that lets you to place the panel onto a surface and view the display in an upright position. The stand also acts as a mounting device, allowing you to hang the control panel on the wire feed unit.

2.3 USB connection

External USB memories can be used to transfer programs to and from the control panel. See more in the "Export/Import" section.

The files produced in the control panel are stored as XML files. The USB memory must be formatted in FAT 32.

During normal use, there is no risk of “viruses” infecting the equipment. To eliminate this risk entirely, we recommend that the memory used with this equipment not be used for any other purpose.

Some USB memories may not work with this equipment. We recommend using USB memories from a reputable supplier. ESAB assumes no responsibility for any damage caused as a consequence of the incorrect use of a USB memory.

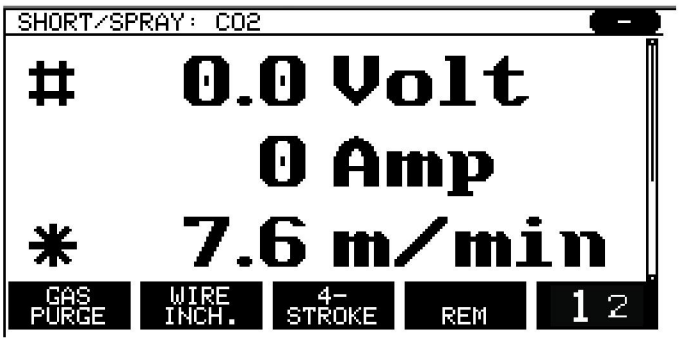
2.3.1 Insert the USB memory

Insert USB memory as follows:

- Turn off the power source's main switch.
- Open the cover on the left end of the control panel.
- Insert the USB memory into the USB port.
- Close the cover.
- Turn on the power source's main switch.

2.4 First step – choose the language

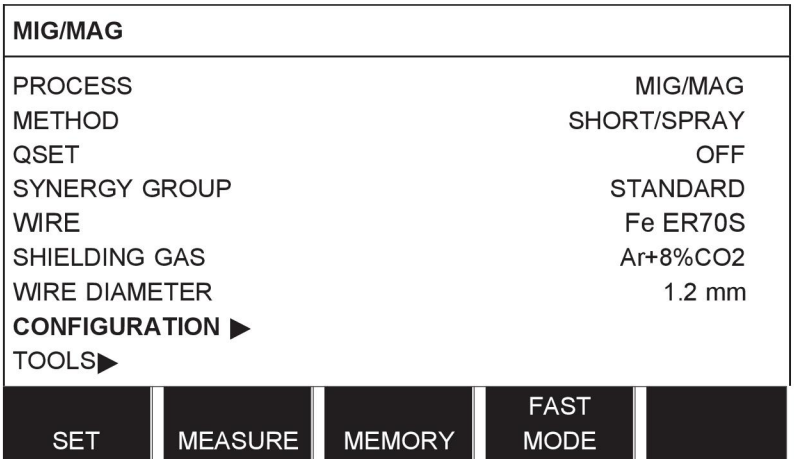
This menu appears in the display the first time you start the equipment.



By default, the control panel is set to English. To select your language, proceed as follows.

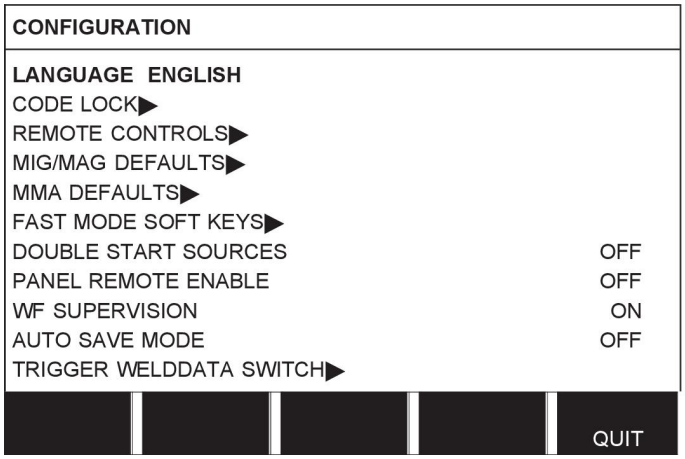
Press MENU  to open the main menu.

Using the left knob, position the cursor on the CONFIGURATION row.



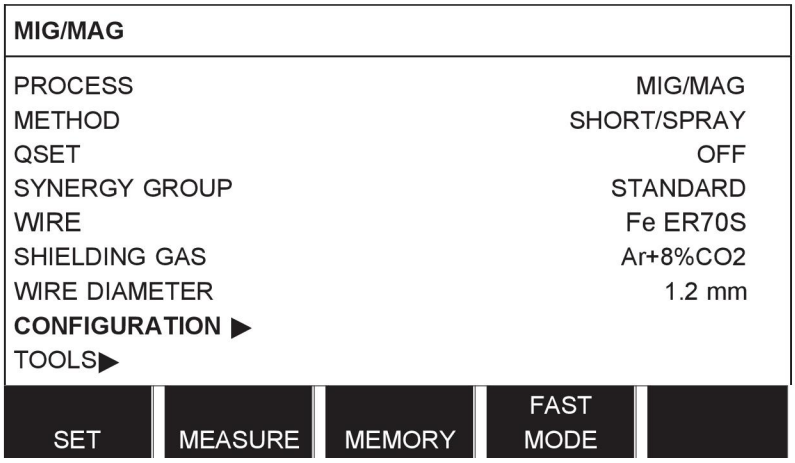
Press ENTER 

Position the cursor on the LANGUAGE row. Press ENTER to bring up a list of the languages that are available in the control panel.



Position the cursor on the row for your language, then press ENTER.

2.5 Display

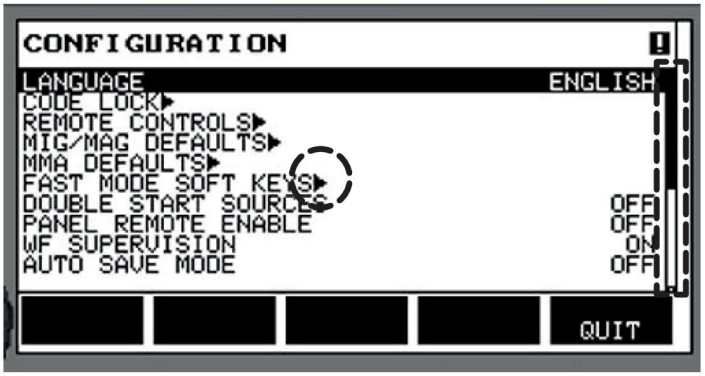


Cursor

The control panel's cursor is presented as a shaded field around the text, with the selected text turning white. The selection is displayed in the instruction manual in bold text.

Arrows and scroll bars

A black arrow behind the text indicates that there is more information behind a row. A scroll bar to the right of the display indicates that there are more rows in the list:



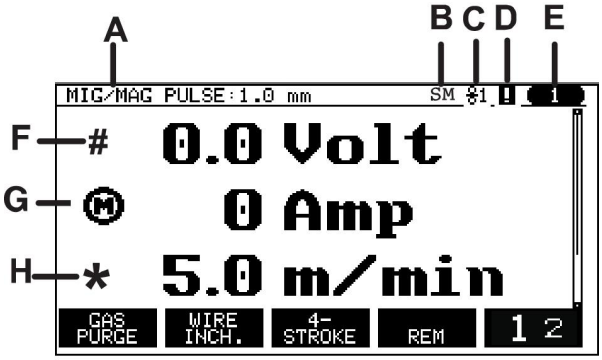
Text boxes

At the bottom of the display are five boxes containing text that describes the current function of the five keys directly below the boxes.

Energy saving mode

To increase the life of the background lighting, it is switched off after three minutes of no activity.

2.5.1 Symbols in the display



A The selected weld data set

B S = Setting limit activated
M = Measure limit activated

C Selected wire feed unit

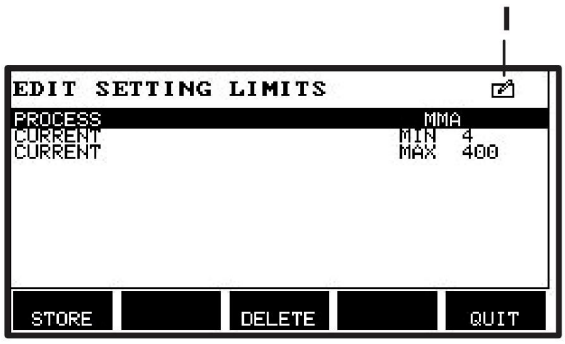
D Icon for VRD status and to display if a fault has occurred, see *"Icon for VRD and Fault indication"*, page 13.

E Recalled memory position number

F Select the plus/minus knob marked # to increase or decrease a parameter value.

G Measured motor current

H Select the plus/minus knob marked * to increase or decrease a parameter value.



I Editing mode, editing memory position

2.5.2 Icon for VRD and Fault indication

This icon is used for two independent indications:

- Display status of VRD in the connected power source
- Indicate if a fault has occurred

The VRD function ensures that the open-circuit voltage does not exceed 35 V when welding is not being carried out. In the power source, the VRD function is blocked when the system senses that welding has started. An active or not active VRD function is indicated in the same icon, as it is indicated if a fault has occurred. See the table below.

Icon	VRD status	Fault status
	VRD not active.	A fault has occurred, see the "Error log" section in the "TOOLS" chapter.
	VRD is active.	A fault has occurred, see the "Error log" section in the "TOOLS" chapter.
	VRD is active.	No faults.
Icon not displayed.	VRD not active.	No faults.

NOTE!
The VRD function works for power sources where it is implemented.

2.6 General information about settings

There are three main types of settings:

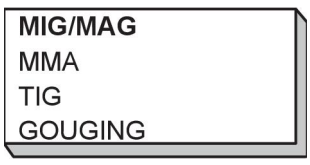
- Setting of numerical values
- Setting with given alternatives
- Setting of ON/OFF mode

2.6.1 Setting of numerical values

When setting a numerical value, one of the two plus/minus knobs is used to increase or decrease a given value. A number of values can also be changed using the remote control unit.

2.6.2 Setting with given alternatives

Some settings are made by selecting an alternative from a list.
Such a list might look like this:



Here, the cursor is placed on the row for MIG/MAG. By pressing ENTER in this position, the MIG/MAG alternative is selected. If you want to choose another alternative instead, position the cursor on the correct row by stepping up or down with the left knob. Then press ENTER. If you want to exit the list without selecting, press QUIT.

2.6.3 Settings ON/OFF

For some functions, it is possible to set the values ON and OFF. The synergy function during MIG/MAG and MMA welding is an example. The ON or OFF settings can be selected from a list of alternatives as described above.

2.6.4 QUIT and ENTER

The “soft” key farthest to the right is used primarily for QUIT, although it is occasionally used for other functions.

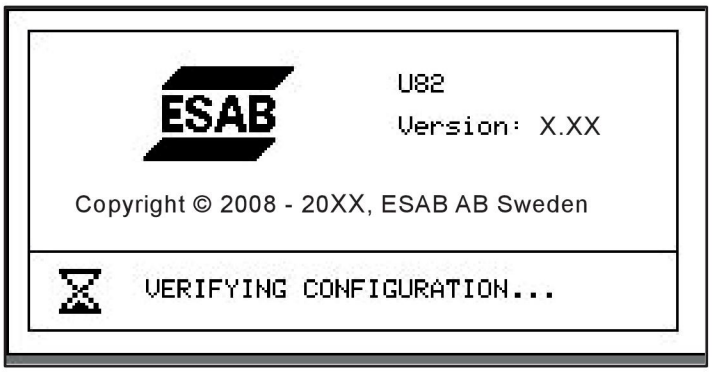
- Pressing QUIT moves you back to the previous menu or screen.

The  key is called ENTER in this manual.

- Pressing ENTER involves executing a selected choice in a menu or list.

3 MENUS

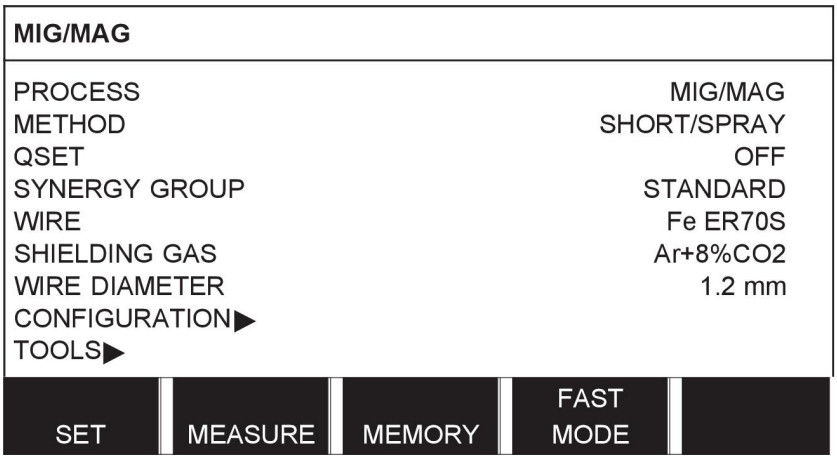
The control panel uses several menus. They are the Main, Configuration, Tools, Weld Data Setting, Measure, Weld Data Memory and Fast Mode. The menu structures are presented in the "MENU STRUCTURE" appendix at the end of this manual. During start-up, a start-up screen containing information about the current program version is also displayed briefly.



Start-up screen

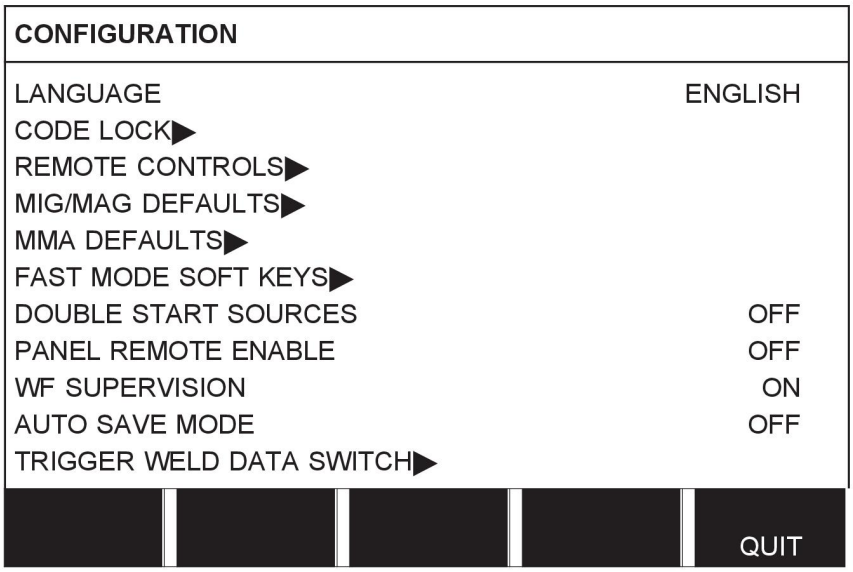
3.1 Main menu

In the MAIN MENU, you can change the welding process, welding method, wire type and so on.
From this menu, you can access all other submenus.



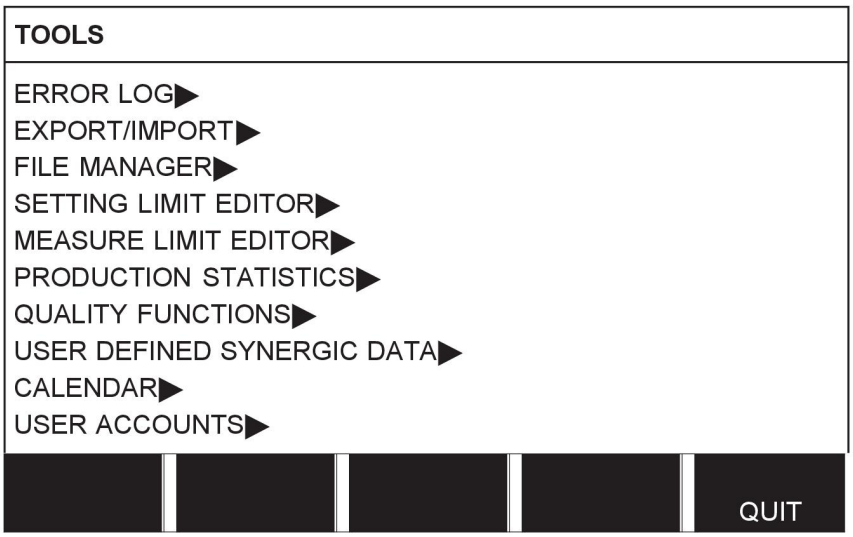
3.1.1 Configuration menu

In the CONFIGURATION menu, you can change language, other basic settings, units of measurement and so on.



3.1.2 Tools menu

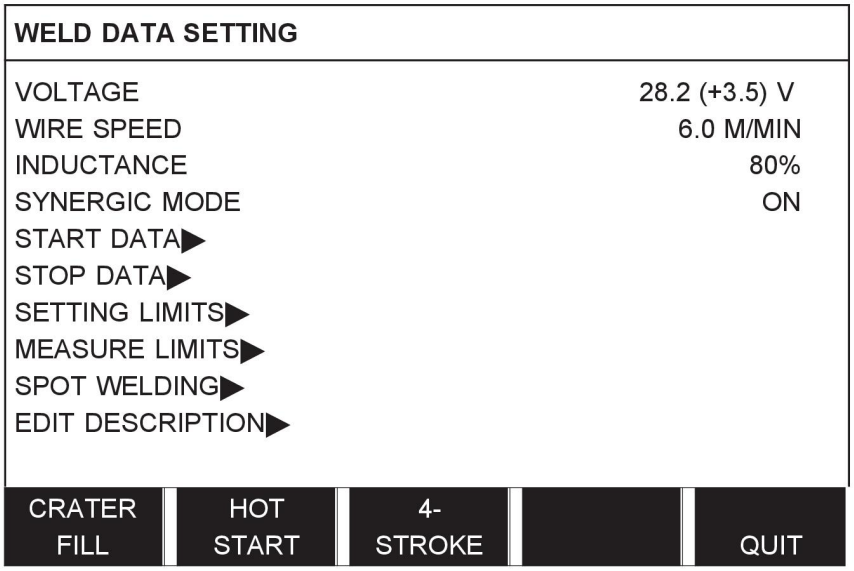
In the TOOLS menu, you can transfer files, view quality and production statistics, view error logs and so on.



3.1.3 Weld Data Setting menu

SET

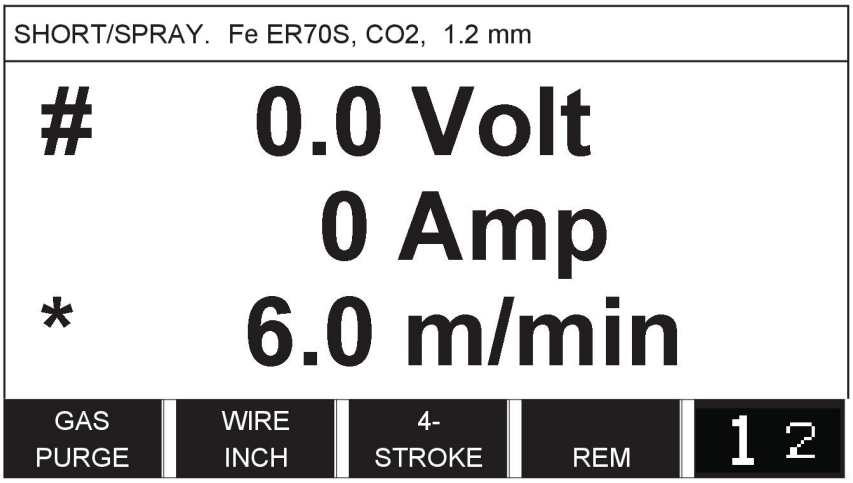
In the WELD DATA SETTING menu, you can adjust various welding parameters. This menu appears differently depending on which welding process is selected. The example shows MIG/MAG welding with short-/sprayarc.



3.1.4 Measure

MEASURE

In MEASURE, you can view measured values for various welding parameters while welding is in progress.



You can change the value of certain parameters in the Measure screen. The parameters you can change depend on which welding process is set. The parameter values that can be adjusted are always marked with # or *.

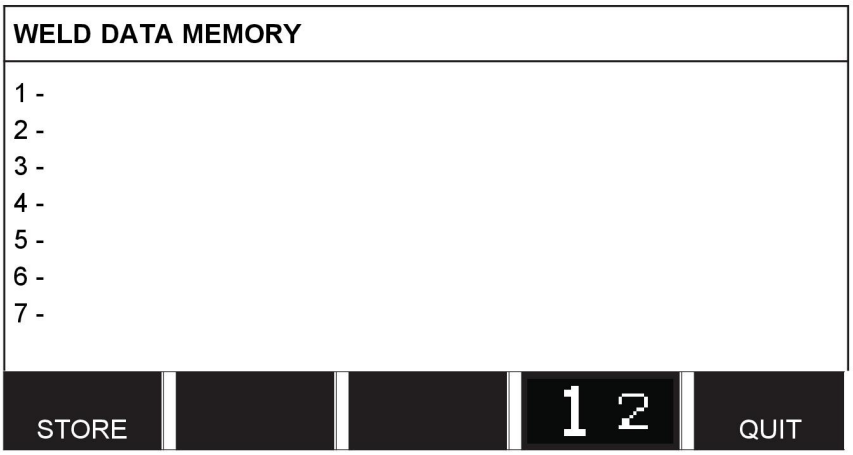
The measured values remain in the display even after welding has been completed. You can move to different menus without losing the measurement values. If the set value is altered when welding is not in progress, the measurement value is changed to zero in order to avoid confusion.

TIP: When pulsing, you can select whether the voltage value is displayed as an average or a peak value. This setting can be adjusted under MIG/MAG defaults; see the "MIG/MAG defaults" section.

3.1.5 Weld data memory menu

MEMORY

In the WELD DATA MEMORY menu, you can store, recall, delete, and copy various set weld data. The weld data sets can be stored in 255 different memory positions.

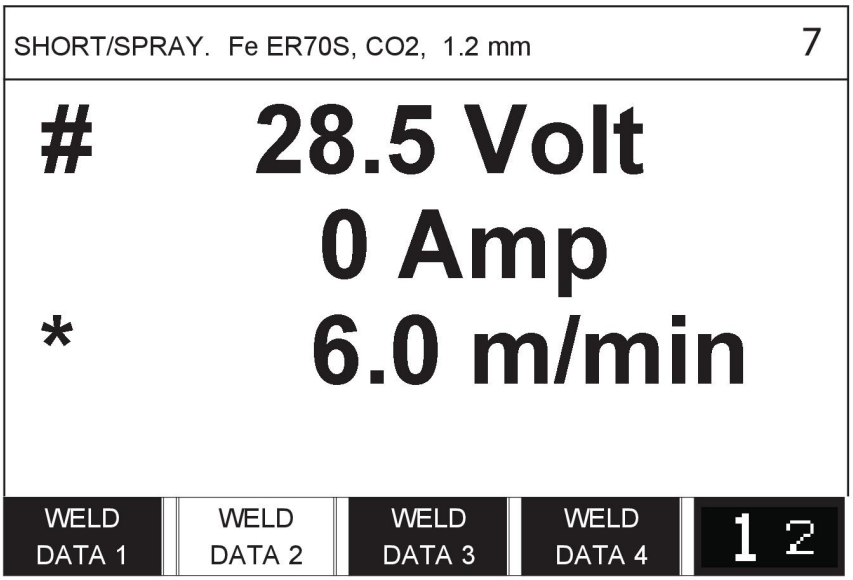


For further information, see the “MEMORY MANAGEMENT” chapter.

3.1.6 Fast mode menu

FAST MODE

In the FAST MODE menu, you can “link” soft keys to weld data memory positions. These settings are carried out in the Configuration menu. The number of the selected memory position is displayed in the upper-right corner.



For further information, see the “Fast mode soft keys” section.

4 MIG/MAG WELDING

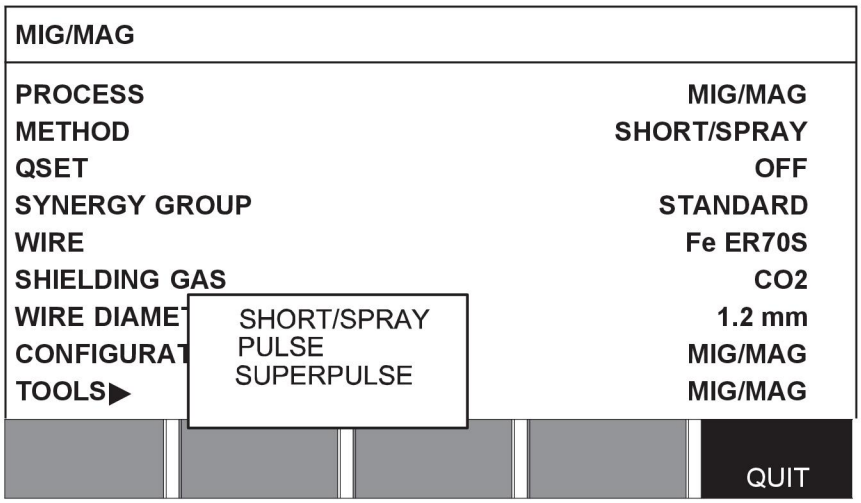
Main menu → Process

MIG/MAG welding melts a continuously supplied filler wire, with the weld pool protected by shielding gas.

Pulsing is used to influence the transfer of the droplets from the arc so that it remains stable and spatter free, even with low weld data.

For wire diameters that can be used for **MIG/MAG** welding with **SHORT-/SPRAYARC** and with **PULSING**, see the "WIRE AND GAS DIMENSIONS" appendix at the end of this manual.

When the MIG/MAG process is selected, you can choose between four methods by selecting Method with the left knob and then pressing ENTER. Choose between short-/sprayarc, pulse, or superpulse, then press ENTER again.



4.1 Settings in the Weld Data Setting menu

4.1.1 MIG/MAG welding with short-/sprayarc

Settings	Setting range	In steps of	Synergy dependent	Adjustable in synergy
Voltage	8 - 60 V	0.25 V (displayed with one decimal)	x	x
Wire feed speed[1)]	2.6 - 98.4 ft./min (0.8 - 30.0 m)	0.33 ft./min (0.1 m)		x
Inductance	0 - 100%	1%	x	x
Regulator type	1 - 12, 17	1	x	x
Synergy[3)]	OFF or ON	-	-	-
Gas pre-flow	0.1 - 25 s	0.1 s		x
Creep start	OFF or ON	-		x
“Hot start”	OFF or ON	-		x
“Hot start” time	0.0 - 10.0 s	0.1 s		x
“Hot start” wire feed	Complete wire feed range	0.33 ft./min (0.1 m)		x
"Hot start" voltage	8.0 - 60.0 V	0.25 V (displayed with one decimal)	x	x

Settings	Setting range	In steps of	Synergy dependent	Adjustable in synergy
“Touch sense”[5)]	10 - 16 A (0 - 16 A)			
Soft start	OFF or ON	-		x
Start parameter R	8 - 60	0.25 (displayed to one decimal)	x	
Crater filling	OFF or ON	-		x
Crater filling time	0 - 10 s	0.1 s		x
Final crater filling wire feed	4.9 ft./min (1.5 m) at current wire feed speed	0.33 ft./min (0.1 m)		x
Final crater filling voltage	8 - 24.7 V		x	
Final crater filling time	0.0–5.0 s	0.1 s	x	
Pinch-off pulse	10% - 120%	1 %		x
“Release pulse”[6)]	OFF or ON			
Burnback time	0 - 1 s	0.01 s		x
SCT[7)]	OFF, ON or SYNERGIC	-	x	x
Gas post-flow	0.1 - 25 s	0.1 s		x
Setting limits	1 - 50	-	-	-
Measure limits	1 - 50	-	-	-
Spot welding[8)]	OFF or ON	-		x
Spot welding time	0 - 25 s	0.1 s		x

[1)] The setting range is dependent on the wire feed unit used.

[3)] The setting range is dependent on the wire feed unit used. The synergic line on delivery: solid wire (Fe ER70S), shielding gas CO2 with wire 1.2 mm.

[5)] 0-16 A is applicable for 5000 series power sources.

[6)] The setting range is dependent on the wire feed unit used. Adjusted in the configuration menu MIG/MAG defaults.

*[7)] When SCT is configured to ON, the setting **Burnback time** is set to -0.05 s. When SCT is configured to OFF, the saved **Burnback time** value is used. When SCT is configured to SYNERGIC, the SCT value (ON or OFF) is picked from the synergic line.*

[8)] It is not possible to select spot welding (ON) if gun trigger mode is 4-stroke.

4.1.2 MIG/MAG welding with pulsing

Settings	Setting range	In steps of	Synergy dependent	Adjustable in synergy
Voltage	10 - 50 V	0.25 V (displayed with one decimal)	x	x
Wire feed speed[1)]	2.6 - 98.4 ft./min (0.8 - 30.0 m)	0.33 ft./min (0.1 m)		x
Pulse current[2)]	100 - 650 A	1 A	x	x
Pulse time	1.7 - 25.5 ms	0.1 ms	x	

Settings	Setting range	In steps of	Synergy dependent	Adjustable in synergy
Pulse frequency	16 - 312 Hz	2 Hz	x	
Background current	4 - 300 A	1 A	x	
Slope	1 - 9	1	x	
Synergy[3)]	OFF or ON	-	-	
Ka	0 - 100%	1%	x	
Ki	0 - 100%	1%	x	
Gas pre-flow	0.1 - 25 s	0.1 s		x
Creep start	OFF or ON	-		x
"Touch sense"[5)]	10 - 16 A (0 - 16 A)			
Soft start	OFF or ON	-		x
Start parameter S	8 - 60	0.25 (displayed to one decimal)	x	
“Hot start”	OFF or ON	-		x
“Hot start” time	0.0 - 10.0 s	0.1 s		x
“Hot start” wire feed	Complete wire feed range	0.33 ft./min (0.1 m)		x
"Hot start" voltage	8.0 - 50.0 V	0.25 V (displayed with one decimal)	x	x
"Hot start" pulse current[2)]	100 - 650 A	1 A	x	
"Hot start" background current	4 - 300 A	1 A	x	
"Hot start" pulse frequency	16 - 312 Hz	2 Hz	x	
Start parameter R	8.0 - 50.0	0.25 (displayed to one decimal)	x	
“Touch sense”	10 - 16 A			
Crater filling (pulsed/not pulsed)	OFF or ON	-		x
Crater filling time	0 - 10 s	0.1 s		x
Final crater filling wire feed	4.9 ft./min (1.5 m) at current wire feed speed	0.33 ft./min (0.1 m)		x
Final crater filling voltage	8 - 33.2 V		x	
Final pulse current	100 - max A		x	
Final background current	12 - 50 A		x	
Final frequency	20 - 270 Hz		x	
Final crater filling time	0.0–5.0 s	0.1 s	x	
Pinch-off pulse	20 % - 200 %	1 %		x
“Release pulse”[6)]	OFF or ON			
Burnback time	0 - 1 s	0.01 s		x
SCT[7)]	OFF, ON or SYNERGIC	-	x	x

Settings	Setting range	In steps of	Synergy dependent	Adjustable in synergy
Gas post-flow	0.1 - 25 s	0.1 s		x
Setting limits	1 - 50	-	-	-
Measure limits	1 - 50	-	-	-
Spot welding[8)]	OFF or ON	-		x
Spot welding time	0 - 25 s	0.1 s		x

[1)]The setting range is dependent on the wire feed unit used.

[2)]Minimal background current and pulse current are dependent on which product type is used.

[3)]The synergic line on delivery: solid wire (Fe ER70S), shielding gas CO2 with wire 1.2 mm.

[5)]0 - 16 A is applicable for 5000 series power sources.

[6)]Adjusted in the configuration menu MIG/MAG defaults.

*[7)]When SCT is configured to ON, the setting **Burnback time** is set to -0.05 s. When SCT is configured to OFF, the saved **Burnback time** value is used. When SCT is configured to SYNERGIC, the SCT value (ON or OFF) is picked from the synergic line.*

[8)]It is not possible to select spot welding (ON) if gun trigger mode is 4-stroke.

4.1.3 MIG/MAG welding with SuperPulse, primary/secondary, short-/sprayarc/pulsing

Main menu → Process → Method → Phase → Method

Settings	Setting range	In steps of	Synergy dependent	Adjustable in synergy
Phase	Primary or Secondary	-		x
Method	Short-/sprayarc or pulsing	-		x
Voltage	10 - 50 V	0.25 V (displayed with 1 decimal)	x	x
Wire feed speed[1)]	2.6 - 98.4 ft./min (0.8 - 30.0 m)	0.33 ft./min (0.1 m)		x
Inductance	0 - 100%	1%	x	x
Pulse current[2)]	100 - 650 A	1 A	x	
Pulse time	1.7 - 25.5 ms	0.1 ms	x	
Pulse frequency	16 - 312 Hz	2 Hz	x	
Background current	4 - 300 A	1 A	x	
Slope	1 - 9	1	x	
Ka	0 - 100%	1%	x	
Ki	0 - 100%	1%	x	
Regulator type		1		
Synergy[3)]	OFF or ON	-	-	-
Phase weld time	0.10 - 2.50 s	0.01 s		x
Gas pre-flow	0.1 - 25 s	0.1 s		x

Settings	Setting range	In steps of	Synergy dependent	Adjustable in synergy
Creep start	OFF or ON	-		x
Soft start	OFF or ON	-		x
Start parameter S	8.0 - 60.0	0.25 (displayed to one decimal)	x	
“Hot start”	OFF or ON	-		x
“Hot start” time	0.0 - 10.0 s	0.1 s		x
“Hot start” wire feed	Complete wire feed range	0.33 ft./min (0.1 m)		x
“Hot start” voltage	-14 to +27 V			-
"Hot start" pulse current[2)]	100 - 650 A	1 A	x	
"Hot start" background current	4 - 300 A	1 A	x	
"Hot start" pulse frequency	16 - 312 Hz	2 Hz	x	
Start parameter R	8.0 - 50.0	0.25 (displayed to one decimal)	x	
“Touch sense”[5)]	10 - 16 A (0 - 16 A)			x
Crater filling (pulsed/not pulsed)	OFF or ON	-		x
Crater filling time	0 - 10 s	0.1 s		x
Final crater filling wire feed	4.9 ft./min (1.5 m) at current wire feed speed	0.33 ft./min (0.1 m)		x
Final crater filling voltage	8 - 33.2 V		x	
Final pulse current	100 - max A		x	
Final background current	12 - 50 A		x	
Final frequency	20 - 270 Hz		x	
Final crater filling time	0.0–5.0 s	0.1 s	x	
Cut-off pulse	%			
Burnback time	0 - 1 s	0.01 s		x
SCT[7)]	OFF, ON or SYNERGIC	-	x	x
Gas post-flow	0.1 - 25 s	0.1 s		x
Setting limits	1 - 50	-	-	-
Measure limits	1 - 50	-	-	-
Spot welding	OFF or ON	-		x
Spot welding time	0 - 25 s	0.1 s		x
“Release pulse”[6)]	OFF or ON			x

[1)] The setting range is dependent on the wire feed unit used.

[2)] Minimal background current and pulse current are dependent on which product type is used.

3)The synergic line on delivery: solid wire (Fe ER70S), shielding gas CO2 with wire 1.2 mm.

5)0 - 16 A is applicable for 5000 series power sources.

6)Adjusted in the configuration menu MIG/MAG basic settings.

*7)When SCT is configured to ON, the setting **Burnback time** is set to -0.05 s. When SCT is configured to OFF, the saved **Burnback time** value is used. When SCT is configured to SYNERGIC, the SCT value (ON or OFF) is picked from the synergic line.*

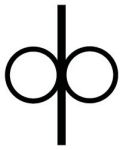
4.2 Function explanations for settings

Voltage

Higher voltage increases the arc length and produces a hotter, wider weld pool.

The voltage setting differs between synergy and non-synergy modes. In synergy mode, the voltage is set as a positive or negative offset from the synergic line of the voltage. In non-synergy mode, the voltage is set as an absolute value.

The voltage is set in the Measure, Weld Data Setting, or Fast Mode menus. When the remote control unit is used, the setting can be adjusted from here.



Wire feed speed

This sets the required feed speed of the filler wire in m/minute.

The wire feed speed is set in the Measure, Weld Data Setting, or Fast Mode menus. When the remote control unit is used, the setting can be adjusted from here.

Inductance

Higher inductance results in a wider weld pool and less spatter. Lower inductance produces a harsher sound, but a stable, concentrated arc.

Inductance is set in the Weld Data Setting menu.

Only applies to MIG/MAG welding with short-/sprayarc.

Regulator type
Affects the short-circuit process and heat in the weld.

The setting should not be altered.

Pulse current
The higher of the two current values in the case of pulsed current.

Pulse current is set in the Weld Data Setting menu with the synergy function switched off.

Only applies to MIG/MAG welding with pulsing.

Pulse time
The time the pulse current is active during a pulse period.

Pulse current is set in the Weld Data Setting menu with the synergy function switched off.

Only applies to MIG/MAG welding with pulsing.

Pulse frequency
Time for background current, which, along with the time for pulse current, gives the pulse period.

Pulse frequency is set in the Weld Data Setting menu with the synergy function switched off.

Only applies to MIG/MAG welding with pulsing.

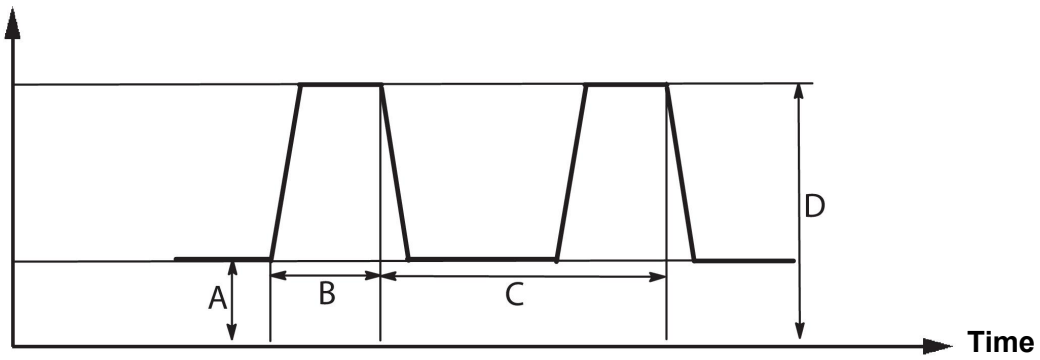
Background current

The lower of the two current values in the case of pulsed current.

Background current is set in the Weld Data Setting menu with the synergy function switched off.

Only applies to MIG/MAG welding with pulsing.

Current



MIG/MAG welding with pulsing

A = Background current

B = Pulse time

C = Pulse period time

D = Pulse current

Slope

“Slope” refers to the pulse current slowly increasing/decreasing to the set value. The “Slope” parameter can be set in nine stages, with each stage corresponding to 100 µs.

The slope significantly affects the sound. A steep slope produces a louder and sharper sound. Too gentle of a slope can, in the worst-case scenario, impair the pulse's ability to cut off the droplet.

Slope is set in the Weld Data Setting menu with the synergy function switched off.

Only applies to MIG/MAG welding with pulsing.

Ka

Ka is the proportional element and corresponds to the regulator's amplification. A low value means that the voltage is not maintained at a constant level as precisely.

Ka is set in the Weld Data Setting menu → Internal constants with the synergy function switched off.

Only applies to MIG/MAG welding with pulsing.

Ki

Ki is the integrating element that attempts to eliminate the fault in the longer term. Here too, a low value produces a weaker regulating effect.

Ki is set in the Weld Data Setting menu → Internal constants with the synergy function switched off.

Only applies to MIG/MAG welding with pulsing.

Synergy

Each combination of wire type, wire diameter and gas mixture requires a unique relationship between wire feed speed and voltage (arc length) to obtain a stable, functioning arc. The voltage (arc length) automatically “conforms” to the preprogramed synergic line you selected, which makes it much easier to find the correct welding parameters quickly. The link between wire feed speed and other parameters is known as the synergic line.

For wire and gas combinations, see the "WIRE AND GAS DIMENSIONS" appendix at the end of this manual.

It is possible to order different packages of synergic lines, although an authorized ESAB service engineer must install them.

To create your own synergic lines, see the "User defined synergic data" section.

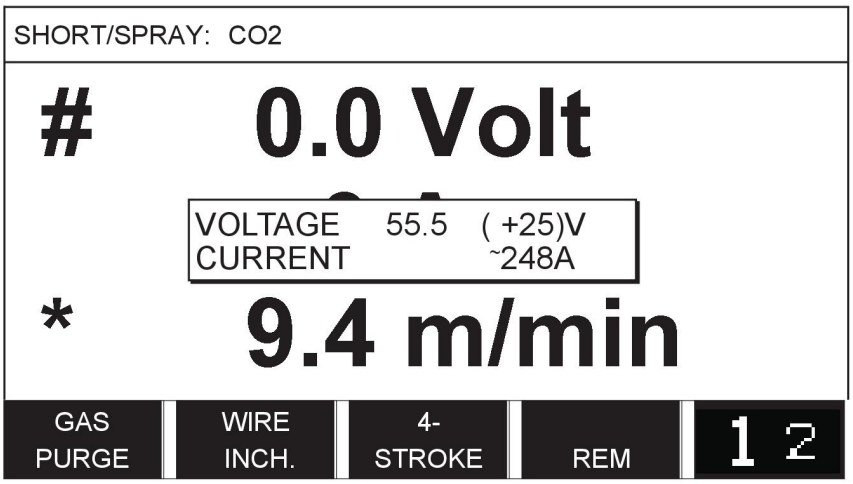
Synergy activation takes place in the Weld Data Setting menu.

Display of amperage estimation

Given the chosen synergic line an estimate of the amperage is calculated using the current wire feed speed. The setting is adjusted in the Configuration menu → MIG/MAG defaults.

The amperage estimate is displayed as a reference when the welder does not know what wire feed speed to set. Depending on joint type and the stick out (contact tip to work piece distance) that is used, there will be some deviation between amperage estimate and the actual measured amperage. Large deviation might mean that stick out should be adjusted for optimal weld results.

The estimated amperage is presented in the MEASURE menu, when the wire feed speed or the voltage is adjusted.



Estimate amperage is never presented **when welding using ROBOT or SAT synergy groups**, even though "Display Amperage Estimate" is set to ON.

Phase

In this function, choose between primary and secondary.

High data is set in primary and low data is set in secondary.

The settings are used to determine whether primary or secondary data is available for editing. It also determines which data is affected in measuring and remote modes. The wire feed speed shown in the Measure screen shows the speed in the selected phase. However, the voltage, current, and weld output are based on the measurement under both phases.

You can choose different synergy for the primary and secondary phases.

Primary or secondary phase is set in MIG/MAG SET when SuperPulse is selected and synergy is switched off.

Gas pre-flow

This controls the time during which shielding gas flows before the arc is struck.

Gas pre-flow is set in the Weld Data Setting menu → Start data.

Creep start

Creep start feeds out the wire at 50% of the set speed, until it makes electrical contact with the workpiece.

With hot start, it is 50% of the hot start time.

Creep start is set in the Weld Data Setting menu → Start data.

Soft start

Soft start means that, when the welding wire short-circuits against the workpiece, the wire feed stops. The feed unit begins to reverse the welding wire until the circuit with the workpiece is interrupted and the arc lights. The feed unit then starts to feed the welding wire in the correct direction, and a welding start is performed.

Soft start is set in the Weld Data Setting menu → Start data.

Applies to welding with feed units that support reversed wire feed.

Start parameter R

Start parameter R enables fine-tuning of the electric arc during the start moment when welding. Synergy must be OFF for this parameter to be available.

"Hot start"

“Hot start” increases the wire feed speed and the voltage for an adjustable time at the start of the welding process. The main purpose is to provide more energy when starting welding, which reduces the risk of poor fusion at the beginning of the joint.

Synergy – hot start

It is possible to increase the wire feed speed during a specific period compared to the present wire feed speed to provide more energy during the weld start and ensure penetration. The speed is set relative to the ordinary wire feed speed. The time starts when the arc is ignited and the length is the set hot start time. Synergy increases the wire speed by 6.6 ft./min (2 m).

Non-synergy – hot start

If non-synergy is selected, the voltage can be set.

During non-synergy and pulsing, voltage, pulse current, background current and frequency can be set.

NOTE!
It is possible to set negative values for the hot start wire feed and hot start voltage. This can be used with high weld data to give a smooth weld start by initially “stepping up” the weld data.

Hot start is activated in the Measure screen or in the Weld Data Setting menu → Start data.

Touch sense

The system detects when the wire comes into contact with the workpiece.

Touch sense is set in the Weld Data Setting menu → Start data.

Only applies to robot welding.

Crater filling

Crater filling makes controlled reduction in the heat and size of the weld pool possible when completing the weld. This makes it easier to avoid pores, thermal cracking and crater formation in the weld joint.

In pulse welding mode, it is possible to choose between pulsed and non-pulsed crater filling. Non-pulsed crater filling is the faster process. Pulsed crater filling takes a little longer, yet gives spatter-free crater filling when appropriate values are used.

Synergy – crater filling

In synergy mode, the crater filling time and the final wire feed speed are set in both pulsed and non-pulsed crater filling. The voltage and the pulse parameters drop to the final values with the help of synergy.

Non-synergy - crater filling

In non-synergy mode, the settings can be changed to give another arc length at the end of crater filling. A final time for the final value of crater filling can also be set.

The final voltage can be set for non-pulsed crater filling. The final voltage, final pulse current, final background current, and final frequency can be set for pulsed crater filling.

The final parameter values must always be equal to or lower than the set values for continuous welding. If the settings for continuous welding are lowered below the set final values, they also lower the final values. The final parameter values do not increase again if the setting for continuous welding is increased.

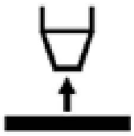
Example:
You have 13.1 ft./min (4 m) as the final wire feed speed and lower the wire feed speed to 11.5 ft./min (3.5 m). The final wire feed speed is also lowered to 11.5 ft./min (3.5 m). The final wire speed remains at 11.5 ft./min (3.5 m) even when the wire feed speed is increased again.

Crater filling is activated in the Measure screen or in the Weld Data Setting menu → Stop data.

Pinch-off pulse

Pinch-off pulse is applied to ensure that a ball is not formed on the wire when welding stops. Applies to MIG/MAG welding with short/spray arc and short pulsing. When pulsing, completion is synchronized with a pulse, finishing pulse.

Pinch-off pulse is set in the Weld Data Setting menu → Stop data.



Burnback time

Burnback time is a delay between the time when the wire starts to brake until the time when the power source switches off the welding voltage. Too short a burnback time results in a long wire stickout after finishing the welding, with a risk of the wire catching in the solidifying weld pool. Too long a burnback time results in a shorter stickout, with increased risk of the arc striking back to the contact tip.

Burnback time is set in the Weld Data Setting menu → Stop data.

Termination

Select either Final Pulse or SCT (Short Circuit Termination) here. SCT is a function that generates small, repeated short circuits at the end of welding until the wire feeding has totally stopped and contact with the workpiece has been broken.

Termination is set in the Weld Data Setting menu → Stop data.

Applies to welding with feed units that support reversed wire feed.

Release pulse

If the wire becomes stuck in the workpiece, the system detects this. A current pulse is transmitted to release the wire from the surface.

Applies to MIG/MAG welding with short/spray arc and short pulsing. When pulsing, completion is synchronized with a finishing pulse, which can be set between 20 and 200%.

The setting is adjusted in the Configuration menu → MIG/MAG defaults.

Gas post-flow

This controls the time during which shielding gas flows after the arc is extinguished.

Gas post-flow is set in the Weld Data Setting menu → Stop data.

Setting limits and measure limits

In limits, a limit number is selected. For settings, see the “Edit setting limits” and “Edit measure limits” sections.

Limits are activated in the Weld Data Setting menu.

Spot welding

Spot welding is used when you want to spot weld thin plates together.

NOTE!
It is **not** possible to shorten the welding time by releasing the trigger switch.

Spot welding is activated and spot welding time is set in the Weld Data Setting menu.

4.2.1 QSet

QSet is used for setting welding parameters. Using the plus/minus knobs, the arc length is increased or decreased from -18 to +18 steps.

SHORT ARC

When first starting welding with a new wire type/gas type, QSet automatically sets all the necessary welding parameters. Subsequently, QSet stores all the data to produce a good weld. The voltage then automatically conforms to changes in the wire feed speed.

SPRAY

When approaching the spray arc area, the value for QSet must be increased. Disengage the QSet function when welding with pure spray arc. All settings are inherited from QSet, with the exception of the voltage which must be set.

Recommendation: Make the first weld (6 seconds) with QSet on a test piece to obtain all the correct data.

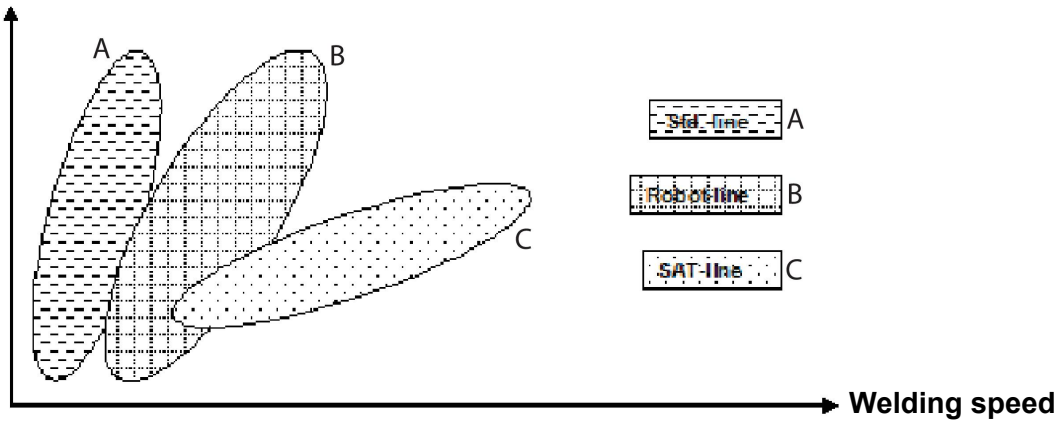
The QSet value is set in the Weld Data Setting menu for the MIG/MAG process and SHORT/SPRAY method.

4.2.2 Synergy group

It is possible to choose between the three synergy groups for mechanized welding:

- STANDARD
- ROBOT
- SAT

The relationship between welding speed and plate thickness for the various synergy groups:



A = STANDARD line

B = ROBOT line

C = SAT line

The **ROBOT** synergy group is used for robotic welding and other mechanized welding. It is suitable for higher transfer speeds than when welding on standard lines.

SAT stands for Swift Arc Transfer. This synergy group is suitable for high transfer-speeds, extreme angles and plate thicknesses of 2–3 mm.

For wire and gas combinations for SAT, see the "WIRE AND GAS DIMENSIONS" appendix at the end of this manual.

The synergy group is set in the Weld Data Setting menu for the MIG/MAG process.

4.3 SuperPulse

Main menu → Process → Method

The SuperPulse method is used for improved control of the weld pool and the solidification process. The weld pool has time to solidify partially between each pulse.

Benefits of using SuperPulse:

- Less sensitivity to root gap variations
- Better control of the weld pool during position welding
- Better control of penetration and penetration profile
- Reduced sensitivity to uneven heat conduction

SuperPulse can be seen as a programed changeover between two MIG/MAG settings. The time intervals are determined by the primary and secondary phase time settings.

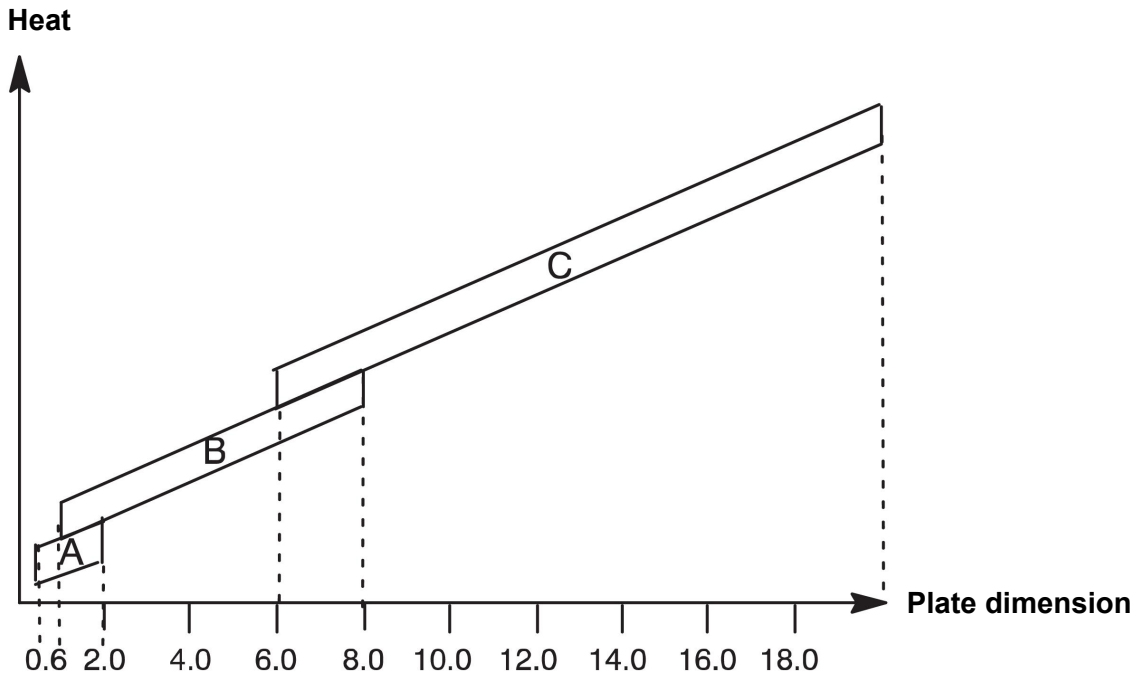
Welding always starts in the primary phase. When hot start is selected, primary data is used during the hot start time in addition to the phase time for the primary data. Crater filling is always based on secondary data. When a stop command has been activated during the primary phase time, the process immediately switches to secondary data. Weld completion is based on secondary data.

4.3.1 Wire and gas combinations

For wire and gas combinations, see the "WIRE AND GAS DIMENSIONS" appendix at the end of this manual.

4.3.2 Different pulsing methods

Below, you can see which pulsing method can be used, depending on the plate thickness to be welded.



A = Pulsing in primary phase and **short arc** in secondary phase

B = Pulsing in primary phase and **pulsing** in secondary phase

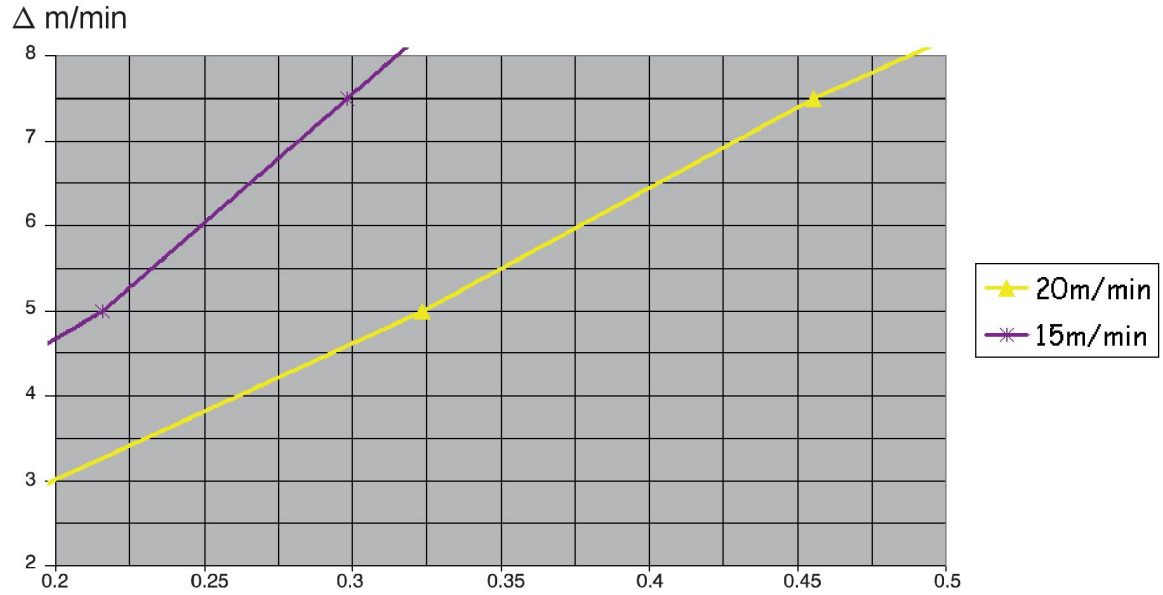
C = Spray in primary phase and **pulsing** in secondary phase

4.3.3 Wire feed unit

Only use wire feed unit Feed 3004 during SuperPulse welding.

Precautionary measures!
When using SuperPulse, there is a considerable load on the wire feed unit. To avoid endangering the functional safety of the wire feed unit, follow the limit values in the following diagram.

Difference in the wire feed speed



The graphs for 49.2 ft./min (15 m) and 65.6 ft./min (20 m) relate to primary wire feed speed. The cycle time is the sum of primary and secondary phase time.

The difference between primary and secondary wire feed speeds must not exceed the speed that is specified by the graphs for primary wire speed.

Example: If the cycle time is 0.25 s and the primary wire feed speed is 49.2 ft./min (15 m), the difference between the primary and secondary wire feed speeds must not exceed 19.7 ft./min (6 m).

Weld example A

In this example, we will weld a **10 mm plate** with **1.2 mm aluminum wire** and **argon shielding gas**.

Make the following settings using the control panel:

Process	SuperPulse	SuperPulse
Phase	**Primary**	**Secondary**
Method	Short-/sprayarc	Pulsing
Wire	AlMg ER5356	AlMg ER5356
Shielding gas	Ar	Ar
Wire diameter	1.2 mm	1.2 mm
Voltage	(+1.0 V)	(+3.0 V)
Wire feed speed	0.33 ft./min (15.0 m)	0.33 ft./min (11.0 m)
Phase time	0.1 s	0.1 s

Primary and secondary phase times are 0.1 s + 0.1 s **= 0.2 s**.

The difference in wire feed speed is 41 ft./min (15.0 m) - 29.5 ft./min (11.0 m) **= 11.5 ft./min (4 m)**.

Weld example B

In this example, we will weld a **6 mm plate** with **1.2 mm aluminum wire** and **argon shielding gas**.

Make the following settings using the control panel:

Process	SuperPulse	SuperPulse
Phase	**Primary**	**Secondary**
Method	Pulsing	Pulsing
Wire	AlMg ER5356	AlMg ER5356
Shielding gas	Ar	Ar
Wire diameter	1.2 mm	1.2 mm
Voltage	(+1.0 V)	(+2.0 V)
Wire feed speed	0.33 ft./min (12.5 m)	0.33 ft./min (9.0 m)
Phase time	0.15 s	0.15 s

Primary and secondary phase times are 0.15 s + 0.15 s **= 0.3 s**.

The difference in wire feed speed is 41 ft./min (12.5 m) - 29.5 ft./min (9.0 m) **= 11.5 ft./min (3.5 m)**.

5 MMA WELDING

Main menu → Process

MMA welding may also be referred to as welding with coated electrodes. Striking the arc melts the electrode, and its coating forms protective slag.

For electrode diameters that can be used for **MMA** welding, see the "WIRE AND GAS DIMENSIONS" appendix at the end of this manual.

5.1 MMA welding DC

Settings	Setting range	In steps of	Synergy dependent	Adjustable in synergy
Current[1)]	16 - 650 A	1 A		x
Arc force	0 - 100%	1%	x	
Min. current factor	0 - 100%	1%	x	
Regulator type	0 - 1		x	
Synergy	OFF or ON	-	-	-
Hot start	OFF or ON	-	x	
Hot start duration	1 - 30	1	x	
Hot start amplitude	%	-	x	
Setting limits	0 - 50	1	-	-
Measure limits	0 - 50	1	-	-

1)Maximum current depending on which product type is being used.

5.2 MMA welding AC

Settings	Setting range	In steps of	Synergy dependent	Adjustable in synergy
Current[1)]	16 - 650 A	1 A		x
Arc force	0 - 100%	1%	x	
Min. current factor	0 - 100%	1%	x	
Regulator type	0 - 1		x	
Synergy	OFF or ON	-	-	-
Hot start	OFF or ON	-	x	
Hot start duration	1 - 30		x	
Hot start amplitude	%	-	x	
Setting limits	0 - 50	1	-	-
Measure limits	0 - 50	1	-	-

1)Maximum current depending on which product type is being used.

5.3 Function explanations for settings

DC, Direct current

A higher current produces a wider weld pool, with better penetration into the workpiece.

The current is set in the Measure screen and Weld Data Setting or Fast Mode menus.

Arc force

The arc force is important in determining how the current changes in response to a change in the arc length. A lower value gives a calmer arc with less spatter.

The arc force is set in the Weld Data Setting menu when the synergy function is deactivated.

Min. current factor

The setting of min. current factor is employed when using certain specific electrodes.

The setting should not be altered.

Regulator type

Affects the short-circuit process and heat in the weld.

The setting should not be altered.

Synergy

Synergy for MMA welding means that the power source automatically optimizes the selected electrode type properties and dimension.

Synergy for MMA welding is activated in the Weld Data Setting menu.

Hot start

Hot start increases the weld current for an adjustable time at the start of welding, thus reducing the risk of poor fusion at the beginning of the joint.

Hot start for MMA is activated in the Weld Data Setting menu.

Setting limits and measure limits

In limits, a limit number is selected. For settings, see the “Edit setting limits” and “Edit measure limits” sections in the "TOOLS" chapter.

Limits are activated in the Weld Data Setting menu.

6 TIG WELDING

Main menu → Process

TIG welding

TIG welding melts the metal of the workpiece, using an arc struck from a tungsten electrode, which does not melt itself. The weld pool and the electrode are protected by shielding gas.

Pulsed current

Pulsing is used to give improved control of the weld pool and the solidification process. The pulse frequency is set so slow that the weld pool has time to solidify at least partially between each pulse. In order to set pulsing, four parameters are required: pulse current, pulse time, background current and background time.

6.1 Settings in the Weld Data Setting menu

6.1.1 TIG welding without pulsing DC

Settings	Setting range	In steps of
HF/LiftArc™	HF or LiftArc™	-
Live TIG-start[1)]	-	-
2/4 stroke[2)]	2 stroke or 4 stroke	-
Current[1)]	4 - 500 A	1 A
Slope up time[2)]	0 - 25 s	0.1 s
Slope down time[2)]	0 - 25 s	0.1 s
Gas pre-flow[2)]	0 - 25 s	0.1 s
Gas post-flow[2)]	0 - 25 s	0.1 s
HF automatic start pulse[2)]	OFF or ON	-
HF start pulse[2)]	4 - 500 A	1 A
Setting limits	0 - 50	1
Measure limits	0 - 50	1

[1)]Depending on which product type is being used.

[2)]Not valid or visible for Live TIG-start.

6.1.2 TIG welding with pulsing DC

Settings	Setting range	In steps of
HF/LiftArc™	HF or LiftArc™	-
2/4 stroke	2 stroke or 4 stroke	-
Pulse current[1)]	4 - 500 A	1 A
Background current	4 - 500 A	1 A
Pulse time	0.001 - 5 s	0.001 s
Background time	0.001 - 5 s	0.001 s
Slope up time	0 - 25 s	0.1 s

Settings	Setting range	In steps of
Slope down time	0 - 25 s	0.1 s
Gas pre-flow	0 - 25 s	0.1 s
Gas post-flow	0 - 25 s	0.1 s
HF automatic start pulse	OFF or ON	-
HF start pulse	4 - 500 A	1 A
Setting limits	0 - 50	1
Measure limits	0 - 50	1

[1)]Maximum current depending on which product type is being used.

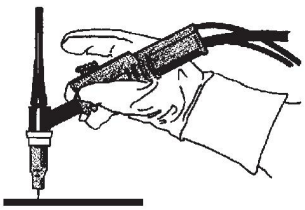
6.2 Function explanations for settings

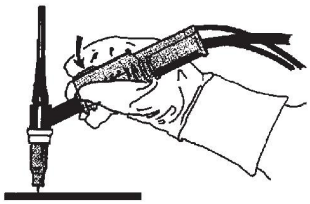
HF start

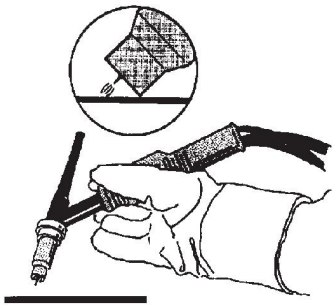
The HF start function strikes the arc, using a spark from the electrode to the workpiece, as the electrode is brought closer to the workpiece.

LiftArc™

The LiftArc™ function strikes the arc when the electrode is brought into contact with the workpiece and then lifted away from it.







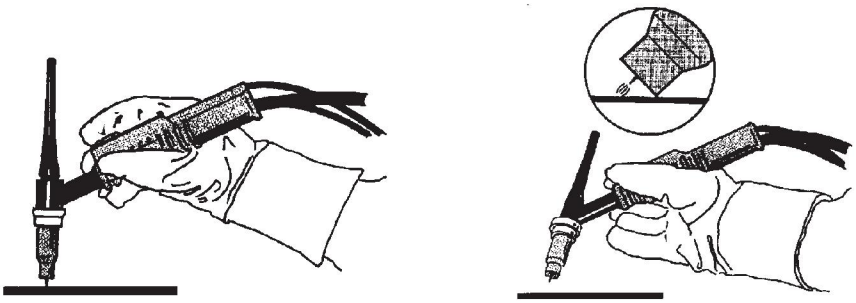
Striking the arc with the LiftArc™ function:

1. The electrode is touched on the workpiece.
2. The trigger switch is pressed, and a low current starts to flow.
3. The welder lifts the electrode from the workpiece: the arc strikes, and the current rises automatically to the set value.

LiftArc™ is activated in the main menu → Start method.

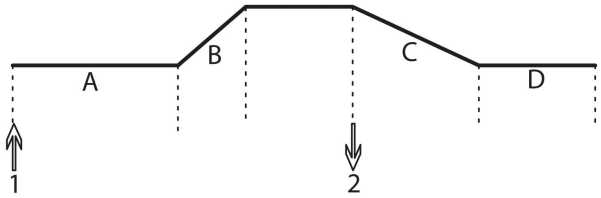
Live TIG-start

With “Live TIG start”, the arc strikes when the tungsten electrode is brought into contact with the workpiece and then lifted away from it.



- Activation of “Live TIG-start” performed in the process menu.

2-stroke



A = Gas pre-flow

B = Slope up

C = Slope down

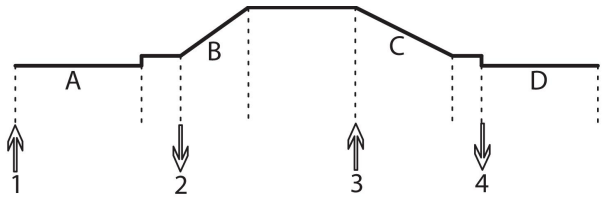
D = Gas post-flow

Functions when using 2-stroke control of the welding torch.

In 2-stroke control mode, pressing the TIG torch trigger switch (1) starts gas preflow (if used) and strikes the arc. The current rises to the set value (as controlled by the slope-up function, if in operation). Releasing the trigger switch (2) reduces the current (or starts slope down if in operation) and extinguishes the arc. Gas postflow follows, if it is in operation.

2-stroke is activated in the main menu → Trigger mode or in the Measure screen.

4-stroke



A = Gas pre-flow

B = Slope up

C = Slope down

D = Gas post-flow

Functions when using 4-stroke control of the welding torch.

In 4-stroke control mode, pressing the trigger switch (1) starts gas preflow (if used). At the end of the gas pre-flow time, the current rises to the pilot level (a few amperes), and the arc is struck. Releasing the trigger switch (2) increases the current to the set value (with slope up, if in use). At the end of welding, the welder presses the trigger switch again (3), which reduces the current to pilot level again (with slope down, if in use). Releasing the switch again (4) extinguishes the arc and starts gas post-flow.

4-stroke is activated in the main menu → Trigger mode or in the Measure screen.

Current

A higher current produces a wider weld pool, with better penetration into the workpiece.

The current is set in the Measure screen and Weld Data Setting or Fast Mode menus.

Only applies to TIG welding with constant current.

Pulse current

The higher of the two current values in the case of pulsed current. When pulsing, slope up and slope down are also pulsed.

Pulse current is set in the Weld Data Setting menu.

Only applies to TIG welding with pulsing.

Background current

The lower of the two current values in the case of pulsed current.

Background current is set in the Weld Data Setting menu.

Only applies to TIG welding with pulsing.

Pulse time

The time the pulse current is active during a pulse period.

Pulse time is set in the Weld Data Setting menu.

Only applies to TIG welding with pulsing.

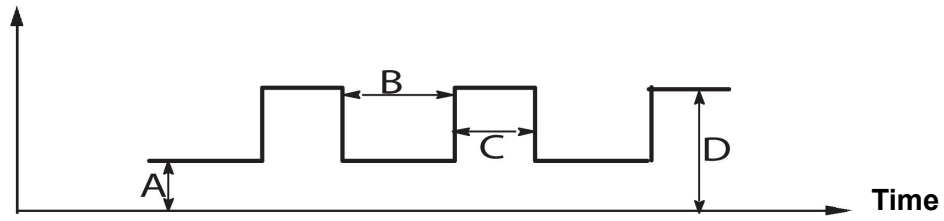
Background time

Time for background current, which, along with the time for pulse current, gives the pulse period.

Background time is set in the Weld Data Setting menu.

Only applies to TIG welding with pulsing.

Current



TIG welding with pulsing.

A = Background current

B = Background time

C = Pulse time

D = Pulse current

Slope up

The slope up function means that, when the TIG arc strikes, the current rises slowly to the set value. This provides 'gentler' heating of the electrode, and gives the welder a chance to position the electrode properly before the set welding current is reached.

Slope up is set in the Weld Data Setting menu.

Slope down

TIG welding uses "slope down", where the current falls 'slowly' over a controlled time, to avoid craters and/or cracks, when a weld is finished.

Slope down is set in the Weld Data Setting menu.

Gas pre-flow

This controls the time during which shielding gas flows before the arc is struck.

Gas pre-flow is set in the Weld Data Setting menu.

Gas post-flow

This controls the time during which shielding gas flows after the arc is extinguished.

Gas post-flow is set in the Weld Data Setting menu.

Automatic start pulse

This function is used to achieve a stable arc rapidly.

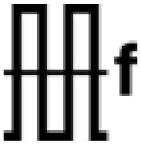
Preheating					
Tungsten electrode				**Setting value**	
				Shielding gas	
Ø	**Color**	**Type**		**Ar**	**Ar + 30% He**
1.6	Green	WP	⋁	-	-
1.6	Green	WP	∪	30	35
1.6	Golden	WL15	⋁	20	20
1.6	Golden	WL15	∪	30	35
2.4	Green	WP	⋁	45	-
2.4	Green	WP	∪	55	60
2.4	Golden	WL15	⋁	40	40
2.4	Golden	WL15	∪	45	50
3.2	Green	WP	⋁	55	-
3.2	Green	WP	∪	65	65
3.2	Golden	WL15	⋁	60	60
3.2	Golden	WL15	∪	70	70
4.0	Green	WP	⋁	70	75
4.0	Green	WP	∪	80	85

4.0	Golden	WL15	⋁	65	65
4.0	Golden	WL15	∪	70	75

WP = Pure tungsten electrode WL15 = Lantha alloyed tungsten electrode.

Electrode preheating is set in the Weld Data Setting menu.

Only applies to TIG welding with AC.



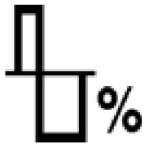
Frequency

Lower frequency (alternating current) transfers more heat to the workpiece and produces a wider weld pool.

Higher frequency produces a narrower arc with higher arc force (narrower weld pool).

Frequency is set in the Weld Data Setting menu.

Only applies to TIG welding with AC.



Balance

Setting the balance between the positive (+) electrode and negative (-) electrode half period during alternating current welding (AC).

Lower balance values produce more heat on the electrode and better oxide break-up on the workpiece.

Higher balance values produce more heat on the workpiece and better penetration.

Balance is set in the Weld Data Setting menu.

Only applies to TIG welding with AC.

Offset

Use this function to raise or lower the zero level.

With a raised zero level, the workpiece becomes hotter and achieves better penetration.

With a lowered zero level, the electrode becomes hotter and the workpiece achieves poorer penetration.

Offset is set in the Weld Data Setting menu.

Only applies to TIG welding with AC.

6.3 Other function explanations

Gas purging

Gas purging is used when measuring the gas flow, or to flush any air or moisture from the gas hoses before welding starts. Gas purging takes place for as long as the button is held depressed and takes place without voltage or wire feed starting.

Gas purging is activated in the Measure screen.

7 ARC AIR GOUGING

Main menu → Process

For arc air gouging, a special electrode is used comprised of a carbon rod with a copper casing.

An arc is formed between the carbon rod and the workpiece, which melts the material. Air is supplied so that the melted material is blown away.

The following electrode diameters can be selected for arc air gouging: 4.0, 5.0, 6.0, 8.0 and 10 mm.

Arc air gouging is not recommended for power sources below 400 A.

7.1 Settings in the Weld Data Setting menu

Settings	Setting range	In steps of
Voltage	8 - 60 V	1 V

7.2 Explanation of functions

Voltage

A higher voltage produces a wider weld pool, with better penetration into the workpiece.

The voltage is set in the Measure screen and Weld Data Setting or Fast Mode menus.

Inductance

NOTE!
The setting should not be altered.

Regulator type

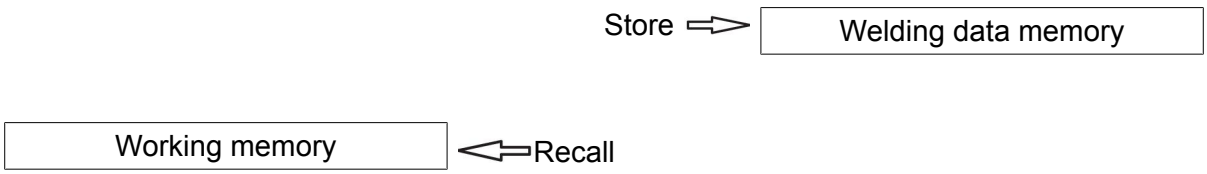
Affects the short-circuit process and heat in the weld.

The setting should not be altered.

8 MEMORY MANAGEMENT

8.1 Control panel working method

The control panel comprises two units: working memory and weld data memory.

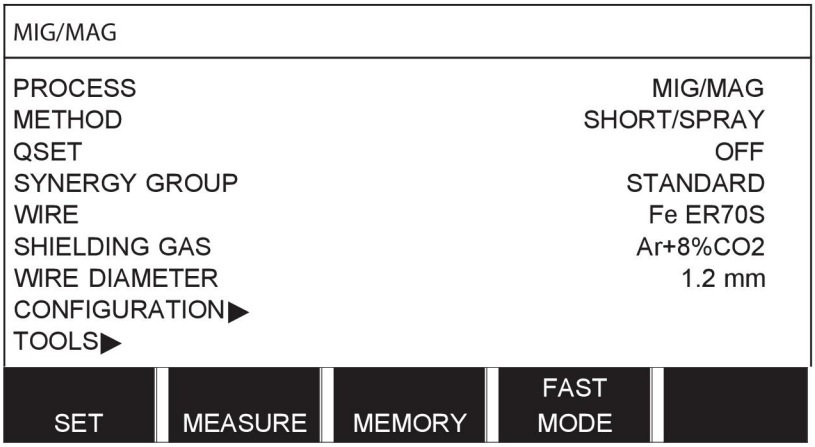


In the working memory, a complete set of weld data settings is created for storage in the weld data memory.

During welding, the content of the working memory controls the process. It is therefore also possible to recall a weld data set from the weld data memory to the working memory.

Note that the working memory always contains the most recently entered weld data settings. They can be recalled from the weld data memory or individually altered settings. In other words, the working memory is never empty or “zeroed.”

Main menu → Memory → Weld data memory



It is possible to **store up to 255 sets of** weld data in the control panel. Each set is given a number from 1 to 255.

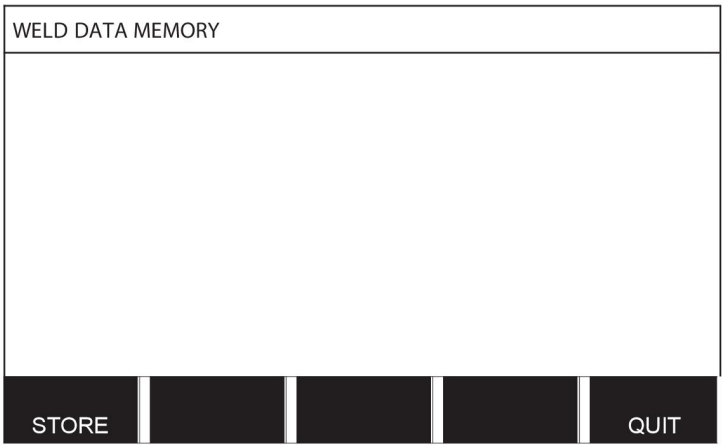
You can also **delete** and **copy** data sets and **recall** a set of weld data to the working memory.

Below are examples showing how to store, recall, copy and delete.

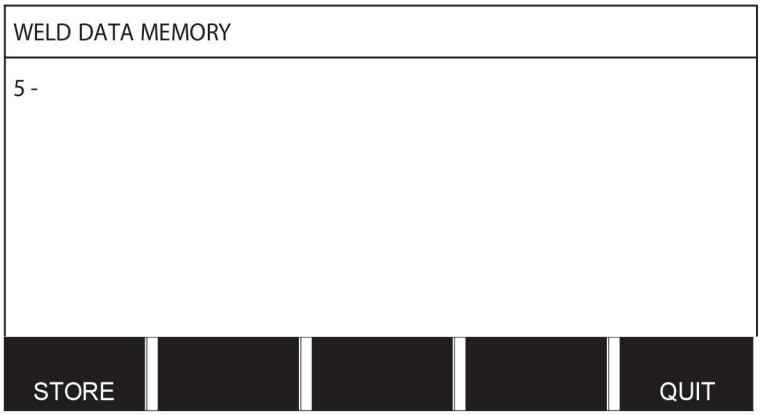
8.2 Store

If the weld data memory is empty, the following screen appears in the display.

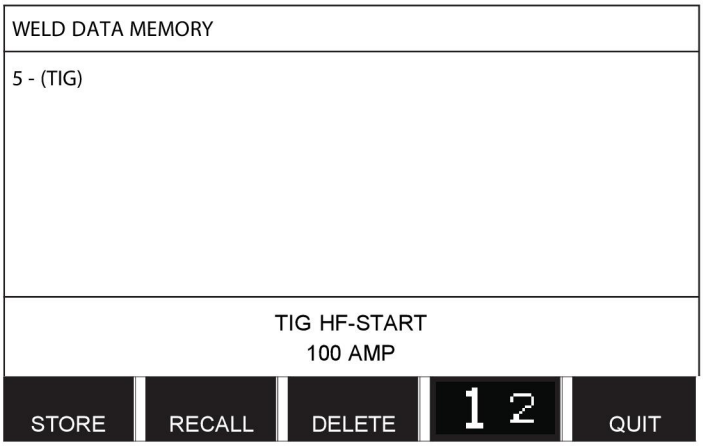
We are now going to store a set of weld data. It will be given memory position 5. Press STORE. Position 1 is displayed. Turn one of the setting knobs until you reach position 5. Press STORE.



Select row five using one of the knobs. Press STORE.



The following screen appears in the display.

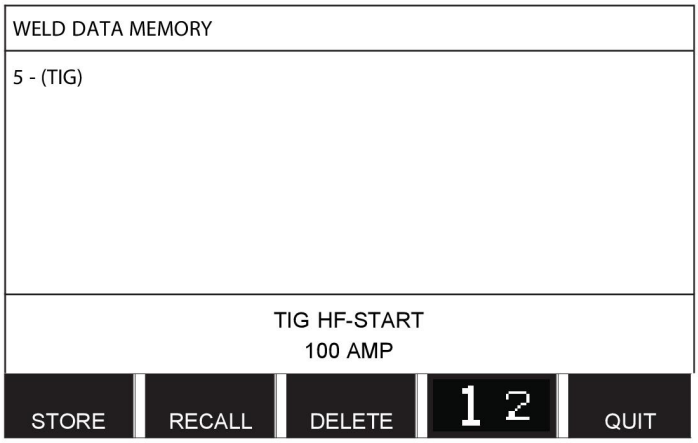


Parts of the content of data set number 5 are presented at the bottom of the display.

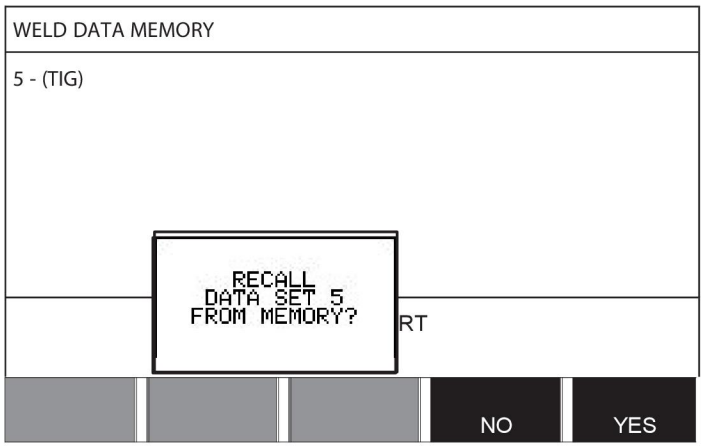
8.3 Recall

We are going to recall a stored data set:

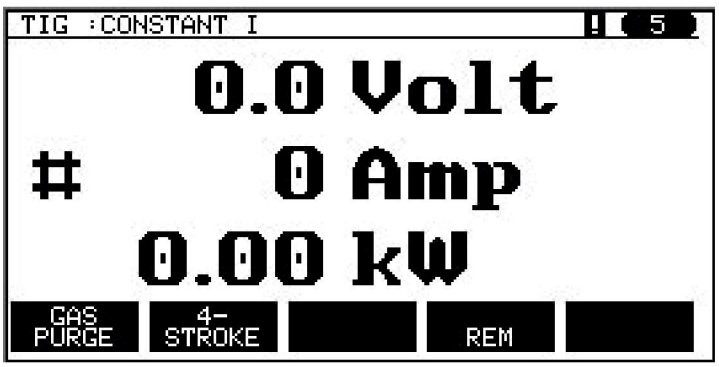
Select the row using one of the knobs. Press RECALL.



Press YES to confirm that you want to recall data set number 5.



The icon in the upper-right corner of the measurement display shows which memory position number has been recalled.

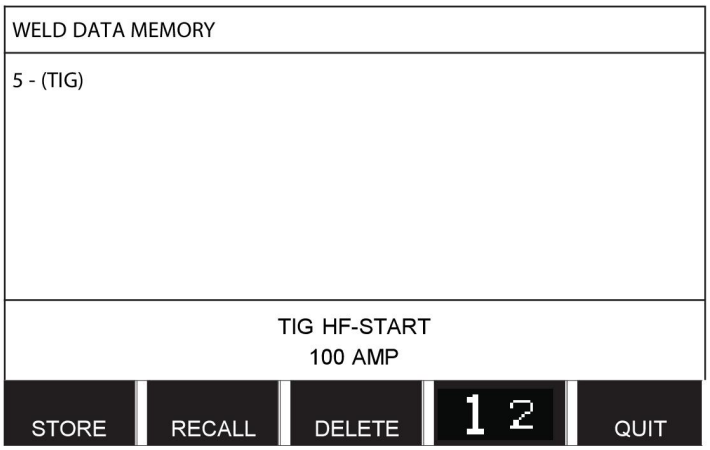


8.4 Delete

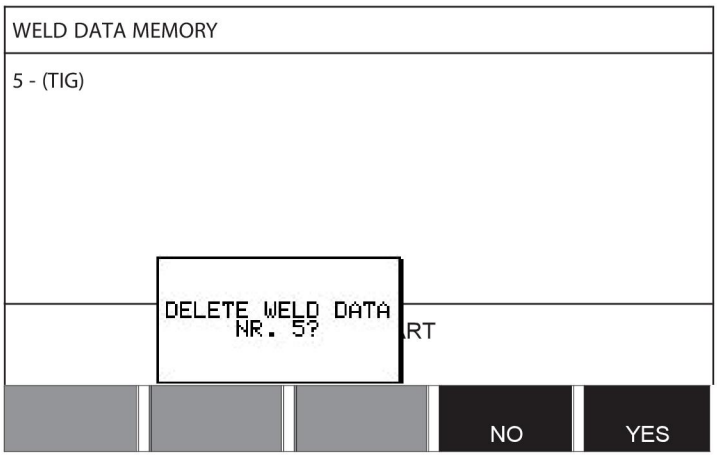
It is possible to delete one or more data sets from the Memory menu.

We are going to delete the data set we stored in an earlier example.

Select the data set. Press DELETE.



Press YES to confirm that you want to delete.

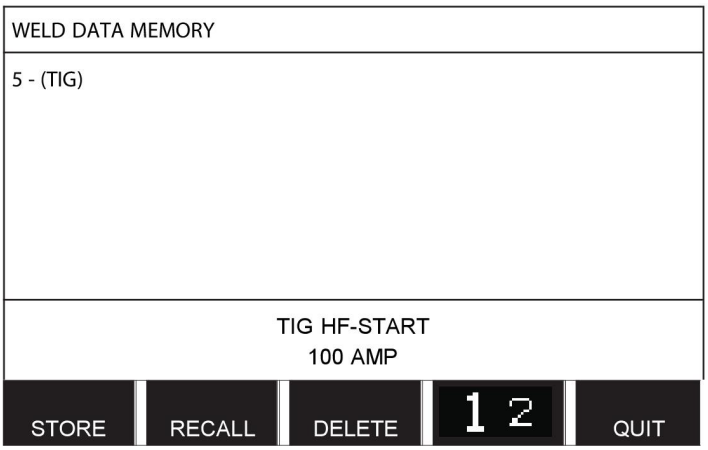


Return to the Memory menu with the NO key.

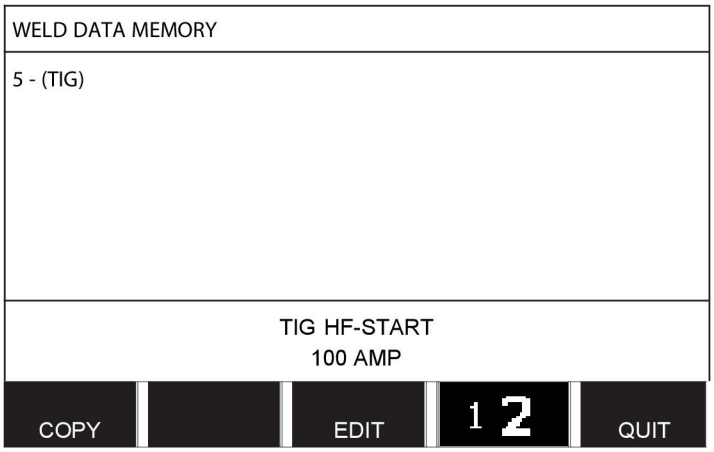
8.5 Copy

To copy the content of a weld data set to a new memory position, proceed as follows:

Select the memory position you want to copy and press "**1** 2" (2ND FUNCT).



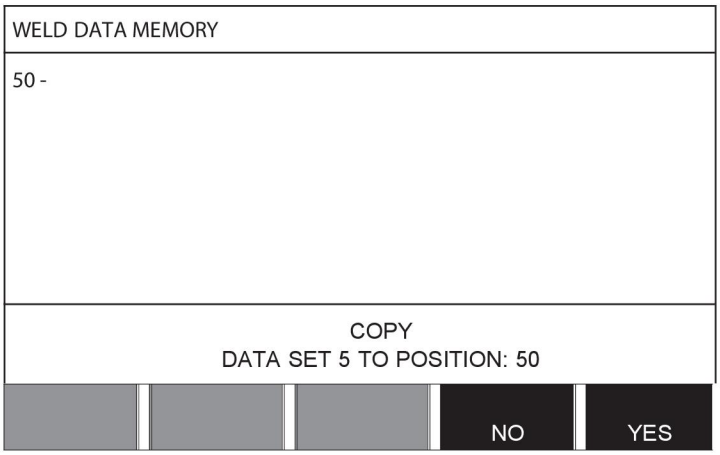
Press COPY.



We are now going to copy the content of memory position 5 to position 50.

Use one of the knobs to step to the selected memory position, in this case position 50.

Press YES.



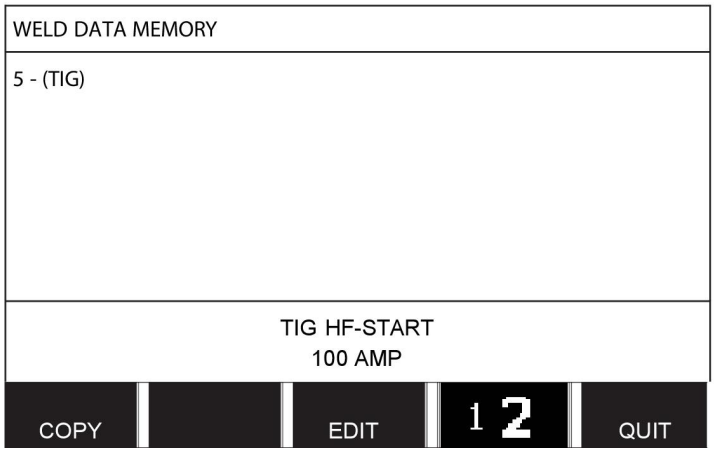
Weld data number 5 has now been copied to memory position 50.

Return to the Memory menu with QUIT.

8.6 Edit

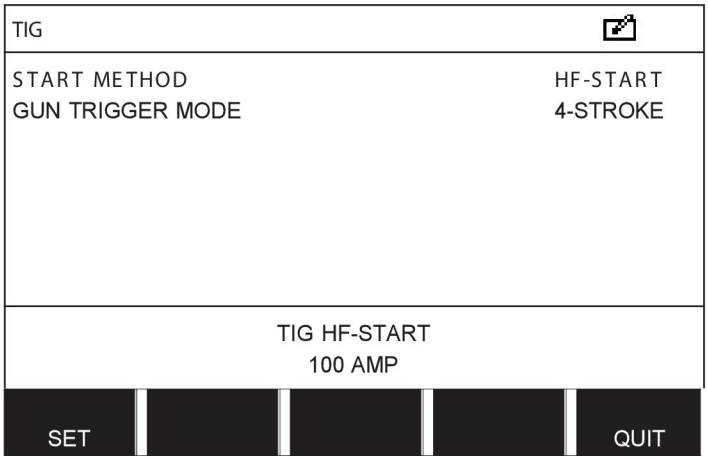
To edit the content of a weld data set, proceed as follows:

Select the memory position you want to edit and press "1 **2**" (2ND FUNCTION). Then press EDIT.

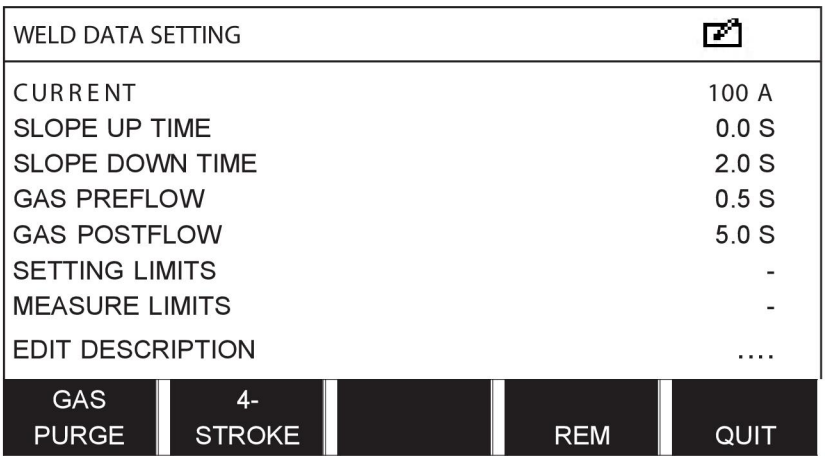


Part of the main menu is displayed, and the menu shows the symbol , which means that you are in an editing mode.

Select the setting you want to edit, then press ENTER. Select from the list, then press ENTER again.



Press SET to move to WELD DATA SETTING. Select the values you want to edit and adjust with the plus/minus knobs. End with QUIT.

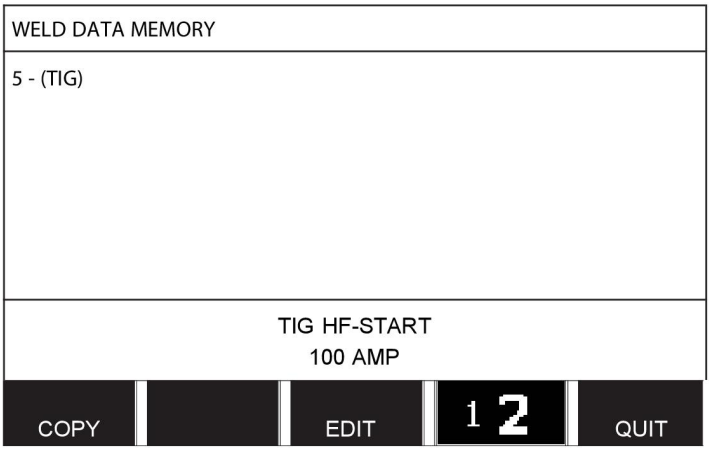


The setting for weld data number 5 has now been edited and stored.

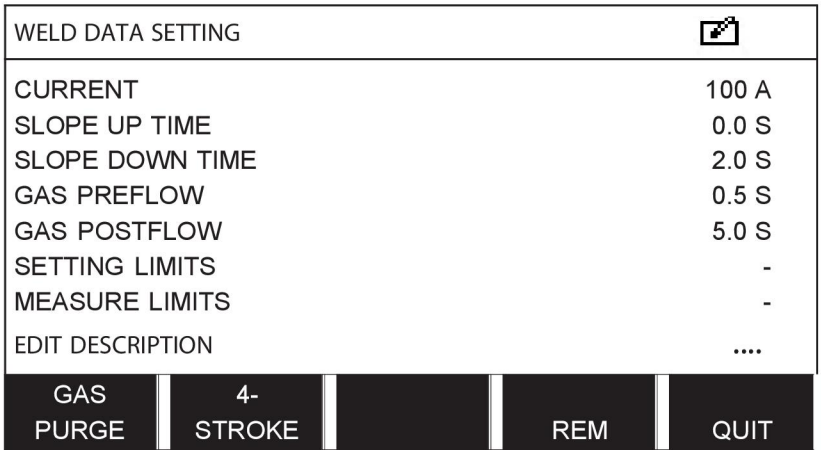
8.7 Name

To give a stored weld data set its own name, proceed as follows:

Select the memory position you want to name and press "1 **2**" 2ND FUNCTION. Then press EDIT.

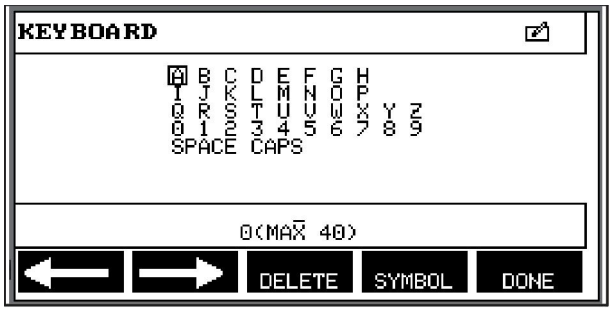


Press SET to move to WELD DATA SETTING. Select EDIT DESCRIPTION. Press ENTER.



Here, you have access to a keyboard that is used as follows:

- Position the cursor on the desired keyboard character using the left knob and arrow keys. Press ENTER. Enter a complete character string, with a maximum of 40 characters.
- Press DONE to store. The alternative you have named can now be seen in the list.



9 CONFIGURATION MENU

Main menu → Configuration menu

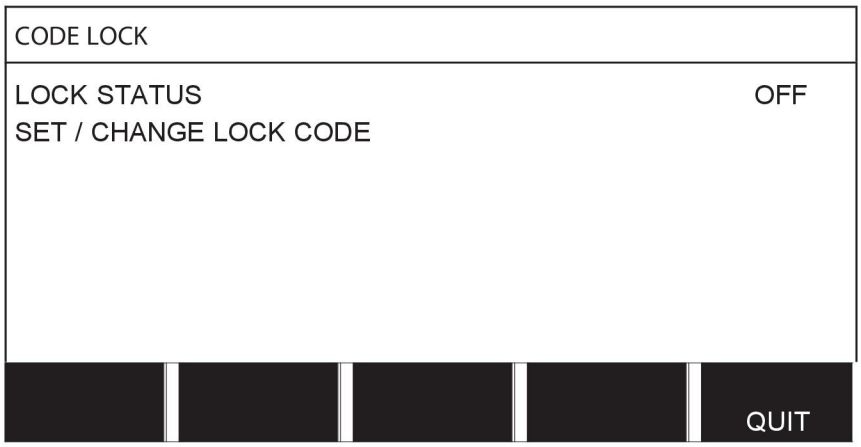
This menu contains the following submenus:

- Language, see the "First step – choice of language” section in the "INTRODUCTION" chapter.
- Code lock
- Remote control
- MIG/MAG defaults
- MMA defaults
- Fast mode soft keys
- Double start sources
- Panel remote enable
- WF supervision
- Auto save mode
- Measure limits stop weld
- Login required for welding
- Trigger weld data switch
- Multiple wire feeders
- Quality functions
- Maintenance
- Unit of length
- Measure value frequency
- Register key

9.1 Code lock

Main menu → Configuration menu → Code lock

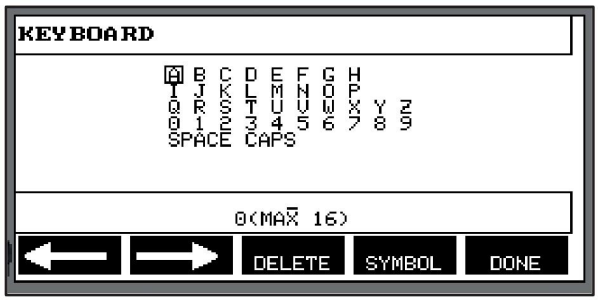
When the lock function is activated and you are in the Measure screen, remote mode, or Fast Mode menu, a password (lock code) is required to exit from the menus.



Code lock is activated in the Configuration menu.

9.1.1 Lock code status

In lock code status, you can activate/deactivate the lock function without deleting the existing lock code in the event you deactivate the function. If no lock code is stored and you try to activate the code lock, the keyboard is displayed for entering a new lock code.



To exit lock status.

When you are in the Measure screen or the Fast Mode menu and the code lock is **deactivated**, you can exit the menus without restrictions by pressing QUIT or MENU to go to the Menu.

If it is **activated** and you try to exit, leave REM or press soft button "1 2" (2ND FUNCT), the following screen appears in order to warn the user about the lock protection.

PRESS ENTER FOR LOCK CODE...

Here, you can select QUIT to undo and return to the previous menu, or proceed by pressing ENTER to enter the lock code.

You then move to the menu with the keyboard, where you can enter the code. Press ENTER after each character, and confirm the code by pressing DONE.

The following text box appears:

UNIT UNLOCKED!

If the code is incorrect, an error message is displayed that offers the option of trying again or returning to the original menu, i.e. the Measure screen or Fast Mode menu.

If the code is correct, all blocks to other menus are removed, although *the code lock remains activated*. This means that you can leave the Measure screen and Fast Mode menu temporarily and retain the lock status when you return to the menus.

9.1.2 Specify/edit lock code

In specify/edit lock code, you can edit an existing lock code or enter a new one. A lock code can comprise a maximum of 16 optional letters or figures.

9.2 Remote controls

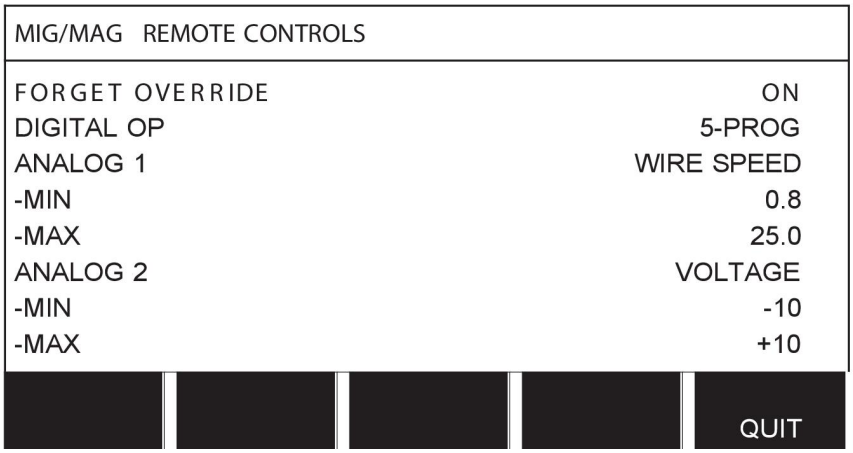
Main menu → Configuration menu → Remote controls

Non-CAN-bus connected remote control units must be connected via a remote control adapter. This function does not support the SuperPulse method.

After connection, activate the remote control unit in the Measure screen with the soft key REMOTE.

9.2.1 Forget override

Place the cursor on the REMOTE CONTROLS row. Press ENTER to bring up a list of alternatives.



With FORGET OVERRIDE in the “ON” position, the most recently recalled memory is automatically recalled before each new welding start. This eliminates the results of all weld data settings produced during the most recent welding procedure.

9.2.2 Configuration for digital remote control unit

Without remote control adapter

When connecting a CAN-based remote control unit, configuration takes place automatically, DIGITAL OP.

With remote control adapter

When using a digital remote control unit, specify the type of remote control unit being used.

Position the cursor on the DIGITAL OP row, then press ENTER to bring up a list from which you can select an alternative.

BINARY CODED • 32-program unit

10-PROGR • 10-program unit*

* Or Welding gun with RS3 program selection

9.2.3 Configuration for analog remote control unit

Without remote control adapter

When connecting a CAN-based remote control unit, configuration of ANALOG 1 and ANALOG 2 takes place automatically. The configuration cannot be altered.

With remote control adapter

With remote control adapter When you use an analog remote control unit, you can specify on the control panel which (maximum 2) potentiometers you want to use.

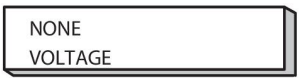
The potentiometers are called ANALOG 1 and ANALOG 2 in the control panel and refer to their own set parameters for the welding process, for example, wire feed parameter (ANALOG 1) and voltage parameter (ANALOG 2) with MIG/MAG.

If you position the cursor on the ANALOG 1 row and press ENTER, a list appears.

You can now select whether the potentiometer ANALOG 1 is used for WIRE SPEED or if it is not to be used (NONE).

Select the WIRE SPEED row and press ENTER.

If you position the cursor on the ANALOG 2 row and press ENTER, a list appears.



You can now select whether the potentiometer ANALOG 2 is used for VOLTAGE or if it is not to be used (NONE).

Select the VOLTAGE row and press ENTER.

All configuration for the remote control unit applies to any connected wire feed units. If you remove ANALOG 1 in the configuration, it applies to both wire feed units when you are using twin units.

9.2.4 Scale on inputs

You can set the control range for the potentiometers used. Do this by specifying minimum and maximum values in the control panel with the plus/minus knobs.

Note that you can set different voltage limits in synergy and non-synergy modes. The voltage setting in synergy is a deviation (plus or minus) of the synergy value. In non-synergy mode, the voltage setting is an absolute value. The value set applies to synergy when you are in synergy mode. If you are not in synergy mode, this is an absolute value.

There are also different voltage control limits for short-/sprayarc welding and pulsing in non-synergy mode.

Value after resetting

Synergy short-/sprayarc and pulsing	min -10 V	max 10 V
Non-synergy short-/sprayarc	min 8 V	max 60 V
Non-synergy pulsing	min 8 V	max 50 V

9.3 MIG/MAG defaults

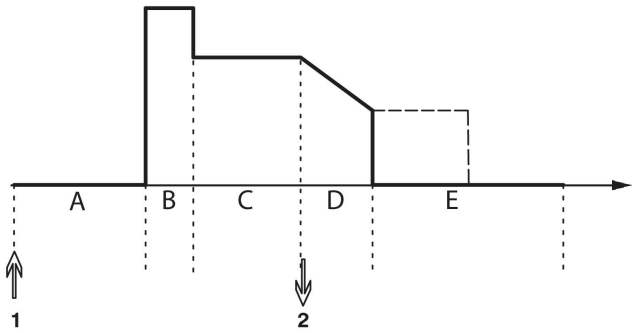
Main menu → Configuration menu → MIG/MAG defaults

In this menu, you can set:

- Gun trigger mode (2-stroke/4-stroke)
- 4-stroke configuration
- Soft key configuration
- Voltage measurement in pulsing
- AVC feeder
- “Release pulse”
- Voltage regulator flat static
- Delay time craterfill active
- Weld start arc off delay time
- Display Amperage Estimate

9.3.1 Gun trigger mode (2-stroke/4-stroke)

2-stroke



A = Gas pre-flow

B = Hot start

C = Welding

D = Crater fill

E = Gas post-flow

Functions when using 2-stroke control of the welding torch.

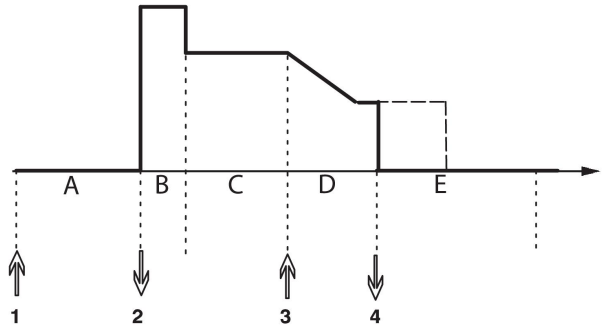
Gas pre-flow (if used) starts when the welding gun trigger switch is pressed (1). The welding process then starts. When the trigger switch is released (2), crater filling starts (if selected) and the welding current is stopped. Gas post-flow starts (if selected).

TIP: Pressing the trigger switch again while crater filling is in progress continues crater filling as long as the switch is held depressed (the dotted line). Crater filling can also be interrupted by quickly pressing and releasing the trigger switch while it is in progress.

2-stroke is activated in the Measure screen or Configuration menu or with a soft key in the Measure screen.

4-stroke

There are three start and two stop positions for 4-stroke. This is start and stop position 1. When resetting, position 1 is selected. See the “4-stroke configuration” section.



A = Gas pre-flow

B = Hot start

C = Welding

D = Crater fill

E = Gas post-flow

Functions when using 4-stroke control of the welding torch

Gas pre-flow starts when the welding gun trigger switch is pressed (1). Releasing the trigger switch starts the welding process. Pressing the trigger switch again (3) starts crater filling (if selected) and reduces the welding data to a lower value. Releasing the trigger switch (4) stops welding entirely and starts gas post-flow (if selected).

TIP: Crater filling stops, when the trigger switch is released. Keeping it held in instead continues crater filling (the dotted line).

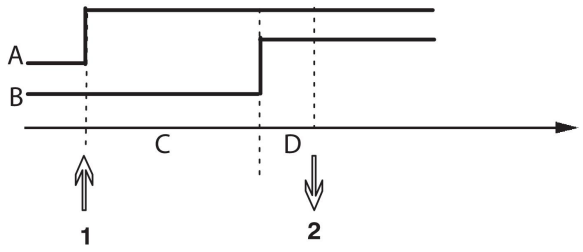
4-stroke is activated in the Measure screen or Configuration menu or with a soft key in the Measure screen. It is not possible to select gun trigger mode (4-stroke) if spot welding is ON.

9.3.2 4-stroke configuration

In 4-stroke configuration, various functions of 4-stroke start and stop can arise.

4-stroke start setting

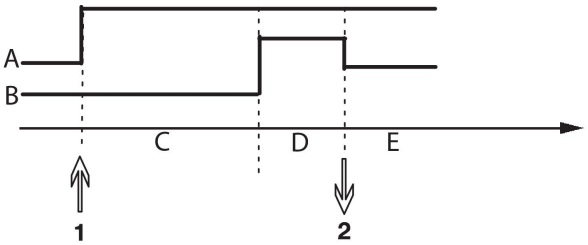
- Trigger-controlled gas pre-flow; see the “4-stroke” section.
- Time-controlled gas pre-flow.



A = Gas flow
B = Wire feed
C = Gas pre-flow
D = Welding

Press in the trigger switch (1), and gas pre-flow starts; after the set gas pre-flow time, the welding process starts. Release the trigger switch (2).

- Trigger-controlled hot start

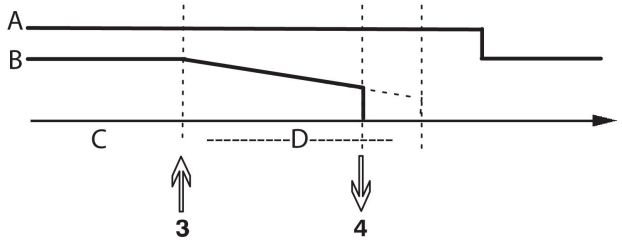


A = Gas flow
B = Wire feed
C = Gas pre-flow
D = Hot start
E = Welding

Press the trigger switch (1); gas pre-flow starts and hot start runs until the switch is released (2).

4-stroke stop setting

- Time-controlled crater filling with possible extension; see the "4-stroke" section.
- Trigger controlled crater filling time



A = Gas flow
B = Wire feed
C = Welding
D = Crater filling

Press the trigger switch (3); crater filling commences and expires. If the trigger switch is released (4) within the crater filling time (crater filling time shortened), welding is interrupted.

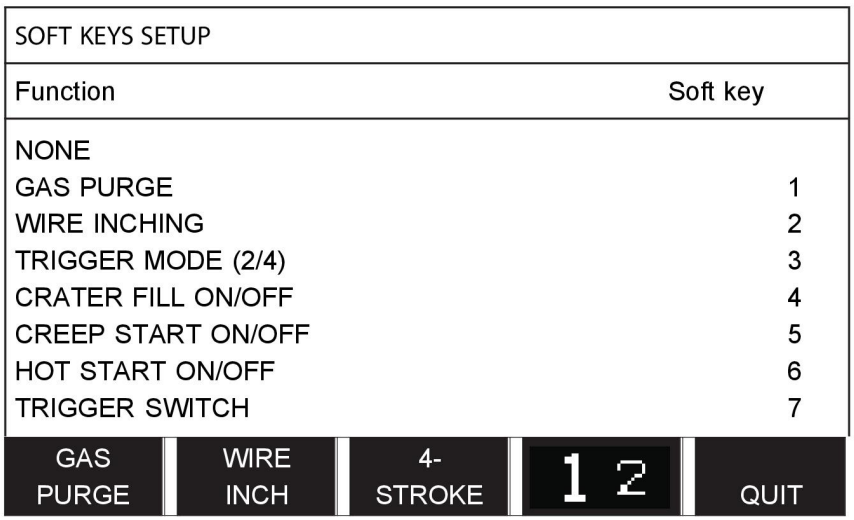
9.3.3 Soft key configuration

We previously described the control panel's “soft” keys. When MIG/MAG welding, the user has the option of setting the function of the keys by selecting from a list of set options. There are seven soft keys that can be allocated a function.

Choose between the following options:

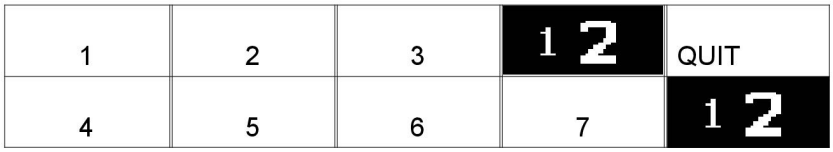
- None
- Gas purging
- Wire inching
- 2-stroke/4-stroke
- Crater filling ON/OFF
- Creep start ON/OFF
- Hot start ON/OFF
- Weld data switch with torch

In the display screen, there are two columns: one for **function** and one for **key number**.



The panel has five soft keys. By pressing the "**1** 2"(2ND FUNCT) key you obtain a further five soft keys.

When you allocate functions to these keys, they are numbered from the left as follows:



To allocate a new function to a soft key, proceed as follows:

- Position the cursor on the function row with the function NONE, then press the soft key with the function whose key number you want to change.
- Repeat this procedure with the key that has the key number you want to use.
- Position the cursor on the function row where you want to assign a new key number, then press the soft key on which you want to have the function.

You can allocate new functions to the other keys in the same way, by pairing one of the functions in the left column with a key number in the right column.

9.3.4 Voltage measurement in pulsing

Options for voltage methods in pulsing are as follows:

- Peak value in pulse voltage PULSE The voltage is measured only during the pulse section and filtered before the voltage value appears on the display.
- Voltage average value AVERAGE

The voltage is measured continuously and filtered before the voltage value appears.

The measurement values that appear on the display are used as input data for internal and external quality functions.

9.3.5 AVC feeder

Once you have connected an AVC wire feed unit (ARC VOLTAGE CONTROL), access the CONFIGURATION menu under MIG/MAG BASIC SETTINGS. Press ENTER at the AVC wire feed unit row, then select ON. The equipment is then reconfigured automatically to match an AVC wire feed unit.

9.3.6 Release pulse

If the wire becomes stuck in the workpiece, the system detects this. A current pulse is transmitted to release the wire from the surface.

In order to obtain this function, select RELEASE PULSE in the list under MIG/MAG BASIC SETTINGS, then press ENTER and select ON.

9.3.7 Voltage regulator flat static

VOLTAGE REGULATOR FLAT STATIC is normally be activated (ON).

This function is used for customer-specific solutions.

9.3.8 Delay time craterfill active

DELAY TIME CRATERFILL ACTIVE is a delay time that must pass after weld start in order to activate the CRATERFILL function when Crater filling is enabled.

The DELAY TIME CRATERFILL ACTIVE default value is 1.0 S .

9.3.9 Weld Start Arc Off Delay Time

This delay time defines a time period that starts at **weld start** and ends at **(weld start + WELD START ARC OFF DELAY TIME)**.

If multiple **arc on** and **arc off** events occur during the defined time period, then **arc off** events are not forwarded if the last event before the end of the defined time period is an **arc on** event.

If multiple **arc on** and **arc off** events occur during the defined time period and the last event before the end of the defined time period is an **arc off** event, then that **arc off** event is forwarded after the end of the defined time period.

Only the first **arc on** event that occurs during the defined time period is forwarded.

Example: If the sequence **arc on**, **arc off** and **arc on** events occur during the defined time period, then only the first **arc on** event is forwarded from the power source to connected equipment. The **arc off** event is first delayed in the power source but then deleted when the last **arc on** is received.

The **WELD START ARC OFF DELAY TIME** default value is 0.00 s.

This function is used for customer-specific solutions.

9.3.10 Display Amperage Estimate

Given the chosen synergic line an estimate of the amperage is calculated using the current wire feed speed. The default setting of this function is OFF.

Estimated amperage is never presented **when welding using ROBOT or SAT synergy groups**, even though "Display Amperage Estimate" is set to ON.

9.4 MMA defaults

Main menu → Configuration menu → MMA defaults

Drop welding

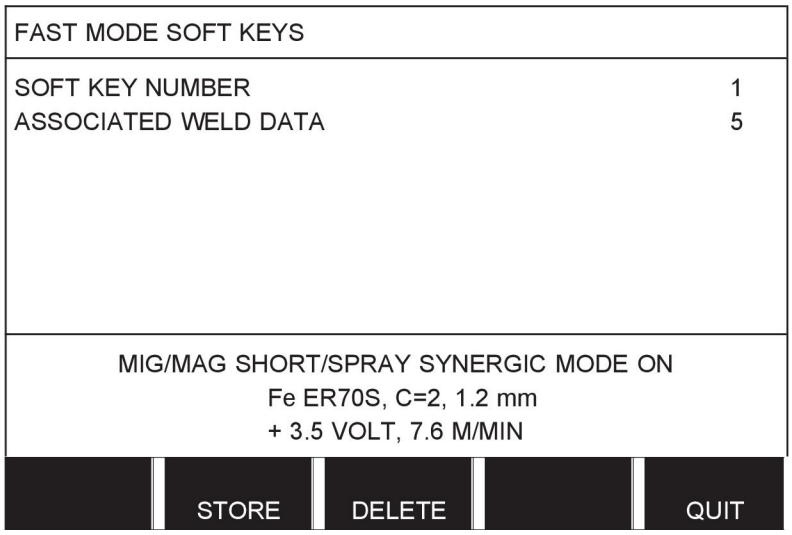
Drop welding can be used when welding with stainless electrodes. The function involves alternately striking and extinguishing the arc in order to achieve better control of the heat supply. The electrode needs only to be raised slightly to extinguish the arc.

Here, you can select ON or OFF.

9.5 Fast mode soft keys

The soft keys WELD DATA 1 to WELD DATA 4 are displayed in the Fast Mode menu. These are configured as follows:

Position the cursor on the SOFT KEY NUMBER row.



The keys are numbered 1 to 4 from left to right. Select the desired key by specifying its number using the plus/minus knobs.

Then step down with the left knob to the next row ASSOCIATED WELD DATA. Here, you can browse through the weld data sets stored in the weld data memory. Select the desired weld data number using the plus/minus knobs. Press STORE to save. To delete the stored set, press DELETE.

9.6 Double start sources

When this option is activated (ON), you can start MIG/MAG welding both from the wire feed unit's start input and from the power source's TIG-start input and vice versa. When welding is started from a start signal input, it must be stopped from the same input.

9.7 Panel remote enable

Main menu → Configuration menu → Panel remote enable

Ordinarily, you cannot make settings using the pushbuttons when the panel is in remote control mode. When PANEL REMOTE ENABLE is ON, the current/wire feed or voltage can be set using the control panel and remote control.

If PANEL REMOTE ENABLE is used in combination with limits, machine usage can be limited to a specific setting range. This applies to the following settings: wire feed and voltage for MIG/MAG welding, current setting for MMA and TIG welding, pulse current with pulsed TIG.

9.8 WF supervision

Main menu → Configuration menu → WF supervision

WF SUPERVISION is normally activated (ON). This function is used for customer-specific solutions.

9.9 Auto save mode

Main menu → Configuration menu → Auto save mode

When a weld data set has been recalled from a memory position in the weld data memory and you change the settings, the changes are automatically saved to the memory position when you recall a new weld data set from memory.

Saving weld data manually to a memory position disables the next automatic save.

The memory position in which the weld data set is stored is displayed in the upper-right corner of the Measure screen.

9.10 Measure limits stop weld

Main menu → Configuration menu → Measure limits stop weld

This function controls the behavior when a measure limits error arise.

There are three settings:

- ON
- ON,SUPERVISE
- OFF

When **Measure limits stop weld** is activated (ON) and a measure limits error arise, the welding will stop immediately.

The ON,SUPERVISE setting can be used if the power source USER ACCOUNTS functionality is being used. If the ON,SUPERVISE setting is selected and a measure limits error arise, the welding will stop immediately **and an administrator or senior user will have to enter his/her password** before welding can resumed. (For information about user accounts and user account levels, see separate section "User accounts" in this manual.)

The default setting for this function is OFF.

9.11 Login required for welding

Main menu → Configuration menu → Login required to weld

If Login required to weld is activated the user accounts must be activated and a login occurred to be able to weld.

9.12 Trigger weld data switch

Main menu → Configuration menu → Trigger weld data switch

This function permits changing to different pre-set weld data alternatives by fast-clicking (push button and then release directly) the welding torch's trigger. It is possible to choose

between single or double click. Single click means one fast click. Double click means two fast clicks.

FIRST CHANGE IN SEQUENCE ARC OFF can be set to NEXT or START

NEXT - A TRIGGER DATA SWITCH will change memory to next memory in the sequence.

START - A TRIGGER DATA SWITCH during ARC OFF will change memory to the first memory in the sequence if 4 seconds has pasted since the latest Trigger data switch occured.

A TRIGGER DATA SWITCH within 4 seconds from latest Trigger data switch will change memory to the next memory in the sequence.

It is possible to change between a maximum of five selected memory positions; see the "MEMORY MANAGEMENT" chapter.

OFF – No changeover between weld data.

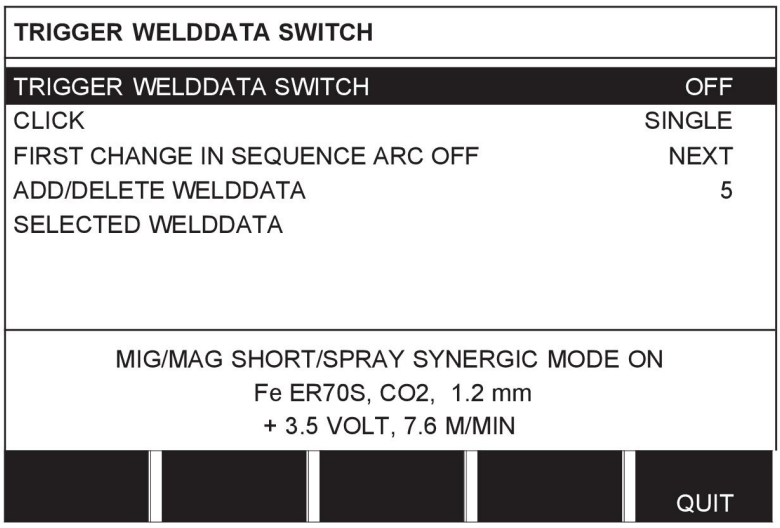
ARC OFF – The user cannot change between memory positions during welding.

ON – The user can always change between memory positions.

3-PROG - Add 3 memory positions. Select 2-stroke (see section 9.3.1). 3-Prog is an extended form of 2-stroke with 3 memories tigger data switch. Trigger data switch will change to memory 1 when the welding gun trigger switch is pressed. The welding process then starts. When the trigger switch is released, Trigger data switch will change to memory 2 and the welding continues. Trigger data switch will change to memory 3 when the welding gun trigger switch is pressed again. When the trigger switch is released for the second time, crater filling starts (if selected) and the welding current is stopped. Gas post-flow starts (if selected).

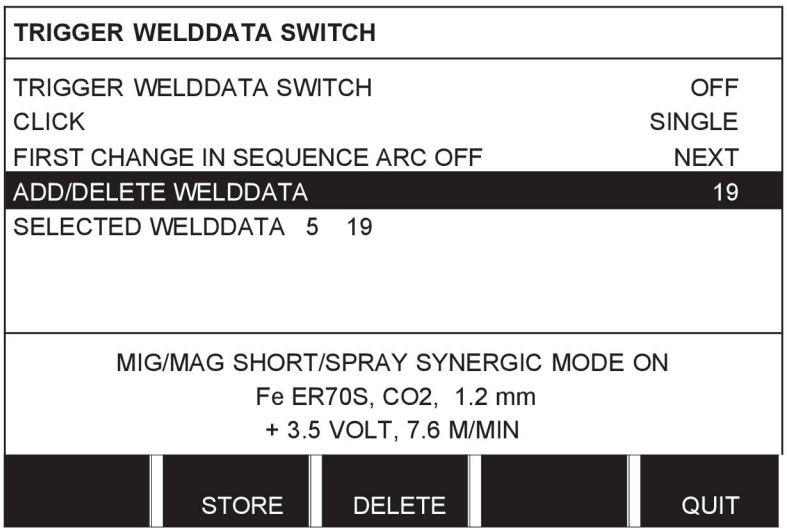
Activating weld data switch

Position the cursor on the TRIGGER WELD DATA SWITCH row, then press ENTER. Select OFF, ARC OFF, ON or 3-PROG. Press ENTER.



Choice of weld data from memory

Position the cursor on the ADD/DELETE WELD DATA row.



Select the numbers for the memories where current weld data is stored using the plus/minus knobs, then press STORE.

The SELECTED WELD DATA row shows which weld data has been selected and in what order they occur, from left to right. The weld data set for the most recently selected position is displayed under the line in the display.

To remove weld data, follow the same procedure as above, but press the DELETE key.

9.13 Multiple wire feeders

Main menu → Configuration menu → Multiple wire feeders

When connecting several wire feed units (max. 4), you must use wire feed units without a weld data unit, i.e. with an empty panel.

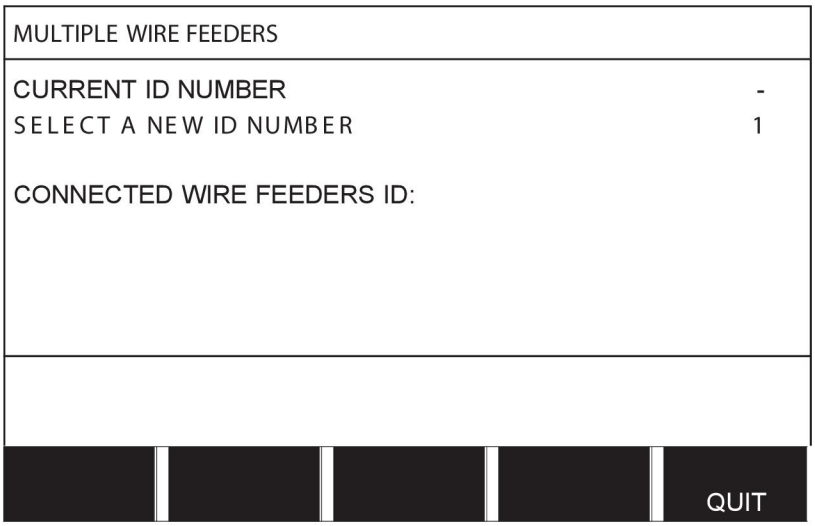
All wire feed units supplied have identity number 1.

The first thing you must do when connecting several wire feed units is to change the identity number (node address) of one wire feed unit.

To change the ID number, proceed as follows:

- Connect the first wire feed unit, then go to the MULTIPLE WIRE FEEDERS menu.
- Press and release the trigger switch to activate the wire feed unit.
- Read on the first row which ID number the wire feed unit has (should be 1 the first time). Then select a new ID number between 2 and 4.

Position the cursor on the SELECT A NEW ID NUMBER row. Set the desired number between 1 and 4 by stepping with the plus/minus knobs. Press ENTER.



On the top row, the figure for the ID number changes to the desired number.

- Connect the next wire feed unit.
- Press and release the trigger switch to activate this wire feed unit. You can now see that the unit has ID number 1.

Configuration is now complete, and you can start using the equipment normally. In the same way, it is possible to configure and run four wire feed units. What is important when using several wire feed units is that they are given different numbers so they can be distinguished; the specific ID numbers are not crucial.

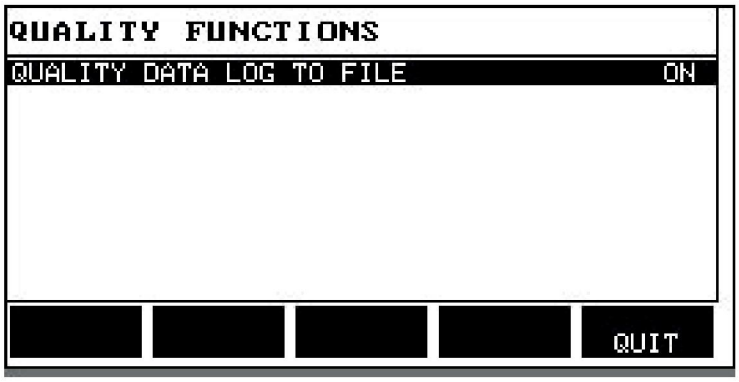
Be careful not to give the same ID to two wire feed units. If this occurs, rectify the situation by disconnecting one of the units and then starting the above procedure again from the beginning. You can always go to the “MULTIPLE WIRE FEEDERS” menu and check the ID number of the connected wire feed units by pressing the trigger switch.

On the CONNECTED WIRE FEEDERS ID row, you can see the ID number of all connected wire feed units.

9.14 Quality functions

Main menu → Configuration menu → Quality functions

The conditions for logging completed welds are set under Quality functions in the Configuration menu.



Select the row and press ENTER. If ON is selected, each weld is stored as a text file with the extension .aqd, with a new file every day. The following information is registered here:

- Time of welding start
- Duration of welding
- Maximum, minimum and average current during welding

- Maximum, minimum and average voltage during welding
- Maximum, minimum and average output during welding

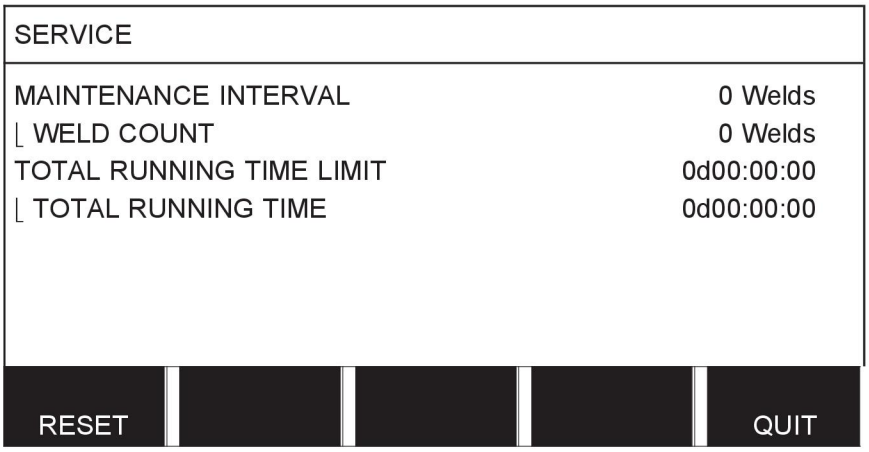
Read more about the quality function in the "Quality functions" section.

9.15 Maintenance

Main menu → Configuration menu → Maintenance

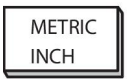
In this menu you set the maintenance interval, i.e. the number of weld starts executed before maintenance should be performed (e.g. change of contact tip). Specify the number of weld starts after which maintenance should be performed, by selecting the MAINTENANCE INTERVAL row and pressing ENTER. Then adjust the plus/minus knobs until you arrive at the value you want. When the interval has been passed, fault code 54 is displayed in the error log. Reset by pressing the RESET soft key.

When TOTAL RUNNING TIME LIMIT is selected instead of the number of starts, an authorized ESAB service technician is contacted.



9.16 Unit of length

Main menu → Configuration menu → Unit of length

The unit of measurement is selected here, metric or inches: 

9.17 Measure value frequency

Main menu → Configuration menu → Measure value frequency

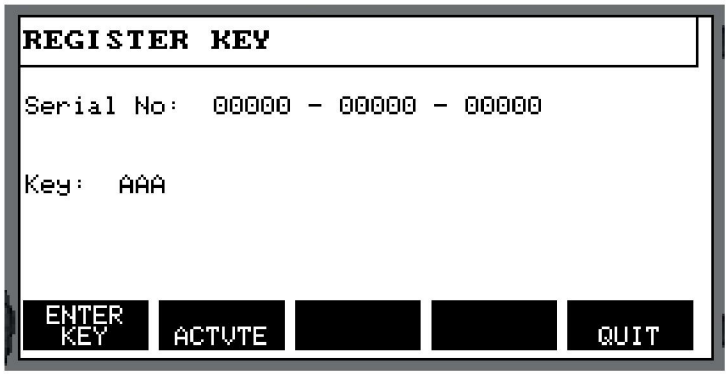
The frequency of the measurement value is set here by stepping to a value between 1 and 10 Hz using one of the plus/minus knobs. Measure value frequency affects only measure data in the calculations of quality data.

9.18 Register key

Configuration menu → Register key

With the function REGISTER KEY, you can unlock particular functions that are not included in the basic version of the control panel. For information regarding these functions, see the "MIG/MAG section in the "MENU STRUCTURE" chapter.

For access to these functions, you must contact ESAB. When you indicate the unit serial number, you get a key code, which is entered into the REGISTER KEY menu.



Press ENTER KEY and write the key code on the keyboard, which appears in the display. Position the cursor on the desired keyboard character using the left knob and arrow keys. Press ENTER. When the character string is registered, press DONE.

To activate the key, press ACTVTE. A message is shown: KEY ACTIVATED. If registration is unsuccessful, the message is: INCORRECT KEY. Check the key code and try again.

10 TOOLS

Main menu → Tools

This menu contains the following submenus:

- Error log
- Export/Import
- File Manager
- Edit setting limits
- Edit measurement value settings
- Production statistics
- Quality functions
- User-defined synergic data
- Calendar
- User accounts
- Unit information

10.1 Error log

Main menu → Tools → Error log

Fault management codes are used to indicate that a fault has occurred in the welding process. This is specified in the display with a pop-up menu. An exclamation mark ❗ appears in the upper-right corner of the display.

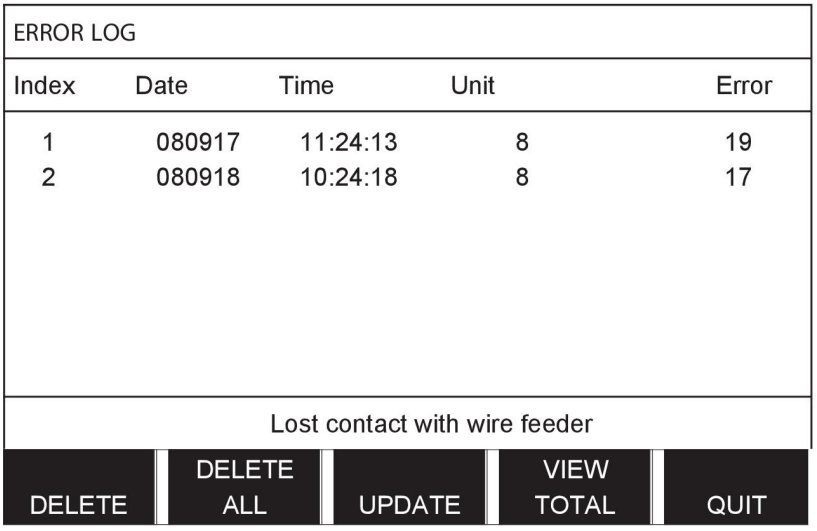
NOTE!

❗ disappears from the display as soon as you enter the error log menu.

All errors that arise during the use of the welding equipment are documented as error messages in the error log. Up to 99 error messages can be saved. If the error log becomes full, i.e. if 99 error messages have been saved, the oldest message is automatically deleted when the next fault occurs.

The following information appears in the error log menu:

- Error number
- Error date
- Error time
- Unit in which the error occurred
- Error management code



Units

1 = cooling unit	4 = remote control unit
2 = power source	5 = AC-unit
3 = wire feed unit	8 = control panel

10.1.1 Error code descriptions

Fault code	Description
1	**Program memory error (EPROM)** There is a fault in the program memory. This fault does not disable any functions. **Action:** Restart the machine. If the fault persists, contact a service technician.
2	**Microprocessor RAM error** The microprocessor is unable to read/write from/to a certain memory position in its internal memory. This fault does not disable any functions. **Action:** Restart the machine. If the fault persists, contact a service technician.
3	**External RAM error** The microprocessor is unable to read/write from/to a certain memory position in its external memory. This fault does not disable any functions. **Action:** Restart the machine. If the fault persists, contact a service technician.
4	**5 V power supply low** The power supply voltage is too low. The current welding process is stopped, and cannot be restarted. **Action:** Turn off the power supply to reset the unit. If the fault persists, contact a service technician.
5	**Intermediate DC voltage outside limits** The voltage is too low or too high. Too high a voltage can be due to severe transients on the mains power supply or to a weak power supply (high inductance of the supply or loss of a phase). The power unit is stopped, and cannot be restarted. **Action:** Turn off the power supply to reset the unit. If the fault persists, contact a service technician.
6	**High temperature** The thermal overload cutout has operated. The current welding process is stopped, and cannot be restarted until the cutout has reset. **Action:** Check that the cooling air inlets or outlets are not obstructed or clogged with dirt. Check the duty cycle being used to make sure that the equipment is not overloaded.

Fault code	Description
7	**High primary current** The power unit takes too much current from the DC voltage that supplies it. The power unit is stopped and cannot be started. **Action:** Turn off the power supply to reset the unit. If the error persists, send for a service technician.
8	**Power supply 1. Low battery voltage** The battery on the circuit board inside the $W8_2$ control unit needs to be replaced. If it is not replaced, the entire contents of the battery-backed memory will be lost at power off. **Action:** Contact an authorized ESAB service technician.
9	**Power supply 2** Error code from external source **Action:** Check manual for connected units.
10	**Power supply 3** Error code from external source **Action:** Check manual for connected units.
11	**Current servo / wire feed speed servo** Error code from external source **Action:** Check manual for connected units.
12	**Communication error (warning)** The load on the system CAN bus is temporarily too high. The power unit or wire feed unit may have lost contact with the control panel. **Action:** Check the equipment to ensure that only one wire feed unit or remote control unit is connected. If the fault persists, contact a service technician.
14	**Communication error** The system's CAN bus has temporarily ceased to work due to excessive load. The current welding process is stopped. **Action:** Check the equipment to ensure that only one wire feed unit or remote control unit is connected. Turn off the power supply to reset the unit. If the fault persists, contact a service technician.
15	**Messages lost** The microprocessor is unable to process incoming messages sufficiently quickly, with the result that information has been lost. **Action:** Turn off the power supply to reset the unit. If the fault persists, contact a service technician.
16	**High open-circuit voltage** The open-circuit voltage has been too high. **Action:** Turn off the power supply to reset the unit. If the fault persists, contact a service technician.

Fault code	Description
17	**Lost contact with another unit** The current activities are stopped, and the welding start is prevented. This error can be caused by a brake in the connection (i.e. the CAN cable) between the welding data unit and another unit. The unit concerned is displayed in the error log. **Action:** Check the CAN cabling. If the error persists, send for a service technician.
19	**Memory error in battery-powered data memory RAM** The battery lost voltage **Action:** Turn off the power supply to reset the unit. The control panel is reset. The settings are in English, with MIG/MAG, SHORT/SPRAY, Fe, CO2, 1.2 mm. If the error persists, send for a service technician.
22	**Transmitter buffer overflow** The control panel is unable to transmit information to the other units at a sufficiently high speed. **Action:** Turn off the power supply to reset the unit.
23	**Receiver buffer overflow** The control panel is unable to process information from the other units at a sufficiently high speed. **Action:** Turn off the power supply to reset the unit.
25	**Incompatible weld data format** Attempt to save weld data to a USB memory. The USB memory has a different data format than the weld data memory. **Action:** Use a different USB memory.
26	**Program error** Something prevented the processor from performing its normal tasks in the program. The program restarts automatically. The current welding process is stopped. This fault does not disable any functions. **Action:** Review the handling of welding programs during welding. If the error persists, send for a service technician.
27	**Out of wire / Hardware trap error** Error code from external source **Action:** Check manual for connected units.
28	**Program data lost** Program execution does not work. **Action:** Turn off the power supply to reset the unit. If the error persists, send for a service technician.
29	**No cooling water flow** Error code from external source This error is generated if sufficient cooling water flow is not reached 10 seconds after wake up from standby mode. **Action:** Check manual for connected units.

Fault code	Description
30	**Regulator time error level exceeded** Too long of a regulator time has occurred (only in MIG/MAG).
32	**No gas flow** Error code from external source **Action:** Check manual for connected units.
40	**Incompatible units** Incorrect wire feed unit is connected. Start is prevented **Action:** Connect the correct wire feed unit.
54	**Service interval passed** The service interval for changing the contact tip has passed. **Action:** Replace contact tip.
60	**Communication error** The system's internal CAN bus has temporarily stopped working due to an excessively high load. The current welding process stops. **Action:** Check that all the equipment is correctly connected. Turn off the power supply to reset the unit. If the error persists, send for a service technician.
64	**Control type load error** A not supported control type is sent from the $U8_2$ to the power source at start up/ recalled memory. **Action:** Change the regulator type.
70	**Current measurement value limit passed** The current measurement values have exceeded their limits. **Action:** Check that the current limit is correctly set as well as the quality of the joint.
71	**Voltage measurement value limit passed** The voltage measurement values have exceeded their limits. **Action:** Check that the voltage limit is correctly set as well as the quality of the joint.
72	**Power measurement value limit passed** The power measurement values have exceeded their limits. **Action:** Check that the power limit is correctly set as well as the quality of the joint.
73	**WF current measurement value limit passed** The WF current measurement values have exceeded their limits. **Action:** Check that the WF current limit is correctly set as well as the quality of the joint.
75	**Warning synergic data recalculated** Synergic data is recalculated. **Action:** Push the enter key to accept the recalculated data.

Fault code	Description
76	**Login required for welding** Weld start denied, owing to the fact that the user is not logged in. This error can only occur if the "Login Required Service" function is active. **Action:** Activate the user account and log in.
78	**Corresponding dip/spray line missing** The short/spray line corresponding to the chosen synergy line for pulse welding (constituted by the same material, gas mixture and dimension) is not available. **Action:** Create the corresponding user defined synergic short/spray line and restart.

10.2 Export/Import

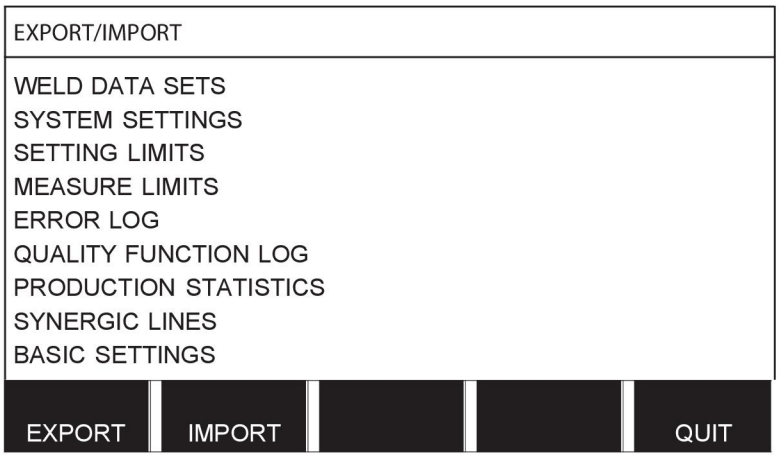
Main menu → Tools → Export/Import

In the Export/Import menu, it is possible to transfer information to and from the control panel through a USB memory.

The following information can be transferred:

- Weld data sets Export/Import
- System settings Export/Import
- Setting limits Export/Import
- Measure limits Export/Import
- Error log Export
- Quality function log Export
- Production statistics Export
- Synergic lines Export/Import
- Basic settings Export/Import

Insert the USB memory. See the "USB connection" section for a description of how to insert the USB memory. Select the row with the information to transfer. Press EXPORT or IMPORT, depending on whether you want to import or export the information.



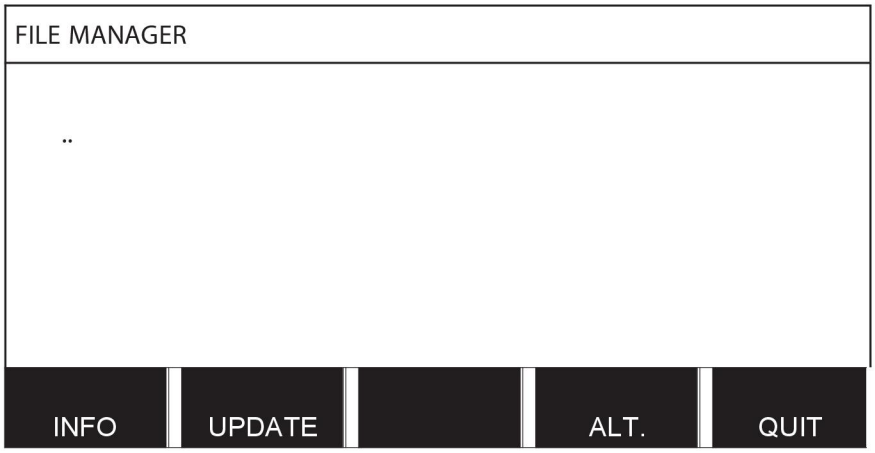
10.3 File Manager

Main menu → Tools → File Manager

In File Manager, you can process information in a USB memory (C:\). File Manager makes it possible to delete and copy weld data and quality data manually.

When the USB memory is inserted, the display shows the basic folder of the memory if no folder has been chosen.

The control panel remembers where you were the last time you used File Manager, so you return to the same place in the file structure when you come back.

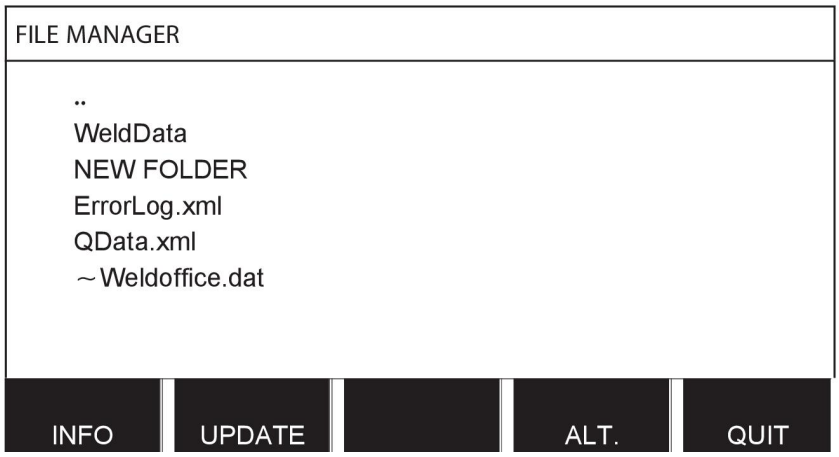


In order to ascertain how much storage space remains in the memory, use the INFO function.

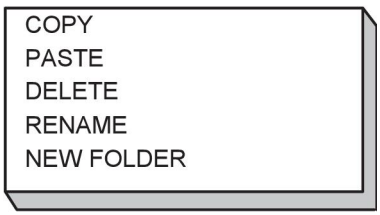
Update the information by pressing UPDATE.

When you want to delete, change name, create new folder, copy or paste, press ALT. A list then appears from which you can choose. If (..) or a folder is selected, you can only create a new folder or paste into a file that you have previously copied. If you select a file, the options RENAME, COPY, or PASTE is added if you previously copied a file.

Select a folder or file and press ALT.



This list is displayed when you have pressed ALT.



10.3.1 Deleting a file/folder

Select the file or folder you want to delete, then press ALT.

Select DELETE and press ENTER.

The file/folder is now removed. In order to delete a folder, it must be empty, i.e. first delete the files contained in the folder.

10.3.2 Renaming a file/folder

Select the file or folder you want to rename, then press ALT.

Select RENAME and press ENTER.

A keyboard appears in the display. Use the knob to the left to change row and the arrow keys to move left and right. Select the character/function to use, then press ENTER.

10.3.3 Creating new folder

Select where you want to put the new folder, then press ALT.

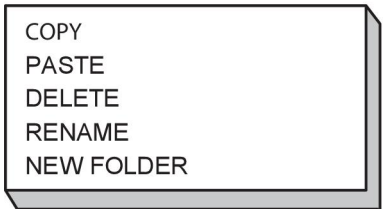
Select NEW FOLDER and press ENTER.

A keyboard then appears in the display. Use the knob to the left to change row and the arrow keys to move left and right. Select the character/function to use, then press ENTER.

10.3.4 Copying and pasting files

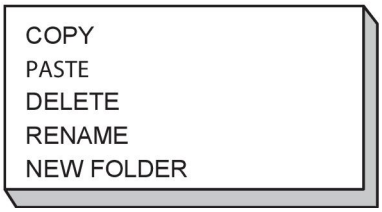
Select the file you want to copy, then press ALT.

Select COPY and press ENTER.



Position the cursor in the folder where you want to copy the file, then press ALT.

Select PASTE and press ENTER.



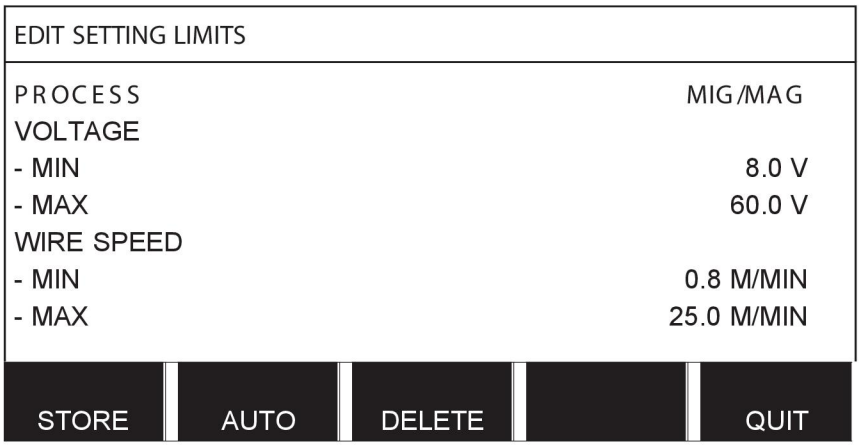
The copy is saved as "Copy of" plus the original name, e.g. Copy of WeldData.awd.

10.4 Edit setting limits

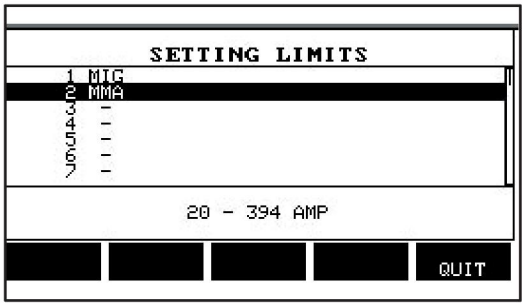
Main menu → Tools → Edit settings limits

In this menu, you set your own maximum and minimum values for various welding methods. The limits cannot be above or below the values for which the power source is dimensioned. There are 50 storage points. Select the row for an empty storage point, then press ENTER.

Select process (MIG/MAG, MMA, TIG) and press ENTER. For MIG/MAG, the maximum and minimum values for voltage and wire feed speed can be selected.



For MMA and TIG, the maximum and minimum values for current can be changed.



Once the values have been adjusted, press STORE. When asked whether to save the limit value to the selected storage point, press YES or NO. The storage point's values can be seen under the line at the bottom. In this case, storage point 2 for the MMA limit values is 20 to 394 A.

With AUTO, the limits are set automatically based on the limits set for each welding method.

When asked whether to set the setting limits automatically, press YES or NO, then STORE if you want to save the setting.

10.5 Edit measure limits

Main menu → Tools → Edit measure limits

In this menu, you set your own measurement values for the various welding methods. There are 50 storage points. Select the row for an empty storage point, then press ENTER. Select the process by pressing ENTER. Then select the welding process from the list that appears and press ENTER again.

The following values can be selected:

For MIG/MAG

- voltage: time (0-10 s), min., max., min. average, max. average
- current: time (0-10 s), min., max., min. average, max. average
- Output: min., max., min. average, max. average
- Wire feed unit current: min., max., min. average, max. average

TIP: To prevent feed problems, especially when robot welding, it is recommended that a max value is given for the feed unit motor current. High motor current indicates feed problems. To

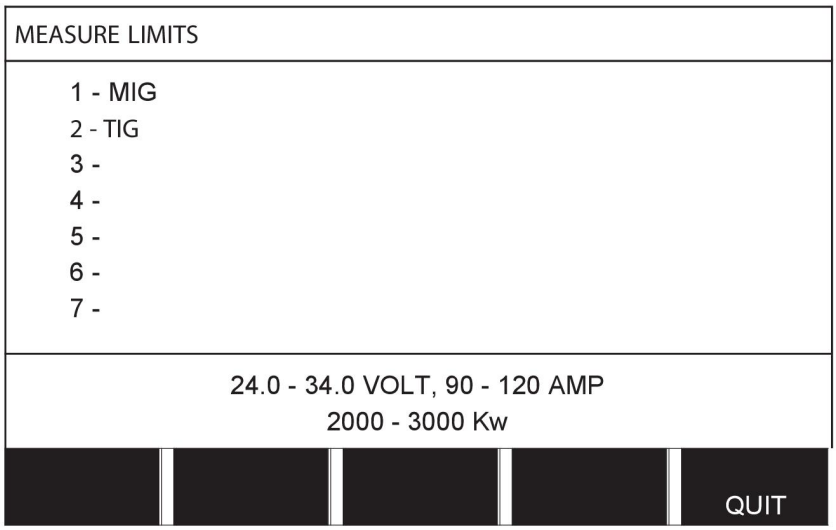
determine the correct max. value, it is recommended to monitor the motor current during one month of welding. Then a suitable maximum value is given.

For MMA and TIG

- voltage: time (0-10 s), min., max., min. average, max. average
- current: time (0-10 s), min., max., min. average, max. average
- Output: min., max., min. average, max. average

Set the desired value with one of the right knobs, then press STORE.

In the dialog box, you are asked if you want to store the selected storage point. Press YES to save the value. The storage point's values can be seen under the line at the bottom.



With AUTO, the limits are set automatically based on the most recently used measurement values.

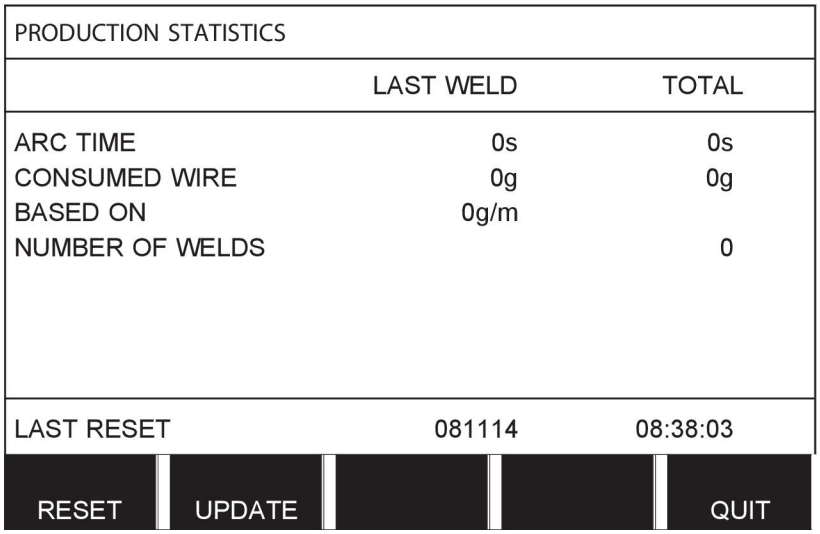
When asked if the measurement values are to be set automatically, press NO or YES and then STORE if the setting is to be retained.

10.6 Production statistics

Main menu → Tools → Production statistics

The production statistics keep track of the total arc time, the total amount of material and the number of welds since the most recent reset. They also keep track of the arc time and the amount of material used in the most recent weld. For informational purposes, the melted wire material per length unit calculated and when the most recent reset occurred are also displayed.

The number of welds does not increase if the arc time was shorter than 1 second. For this reason, the amount of material used for a short weld of this type is not displayed. However, material consumption and time are included in the total material consumption and time.



When you press RESET, all counters are reset. Date and time show the most recent reset.

If you do not reset the counters, they are all automatically reset when one of them has reached its maximum value.

Maximum counter values

Time	999 hours, 59 minutes, 59 seconds
Weight	13350000 grams
Quantity	65535

Material consumption is not counted when using customer-specific synergy lines.

10.7 Quality functions

Main menu → Tools → Quality functions

Quality functions keep track of various interesting weld data for individual welds.

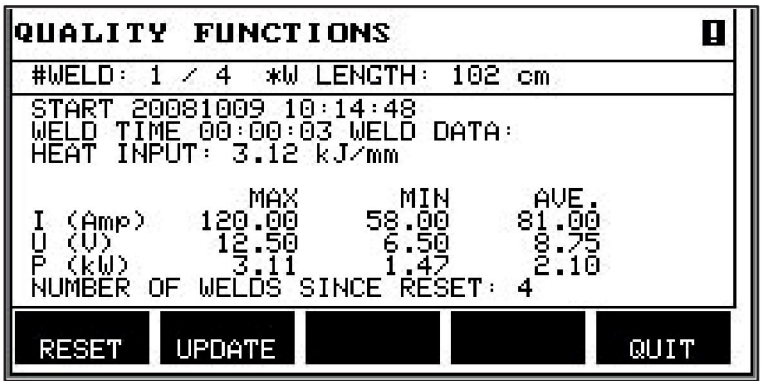
These functions are:

- Time of welding start
- Duration of welding
- Maximum, minimum and average current during welding
- Maximum, minimum and average voltage during welding
- Maximum, minimum and average output during welding

To calculate the heat input, the selected weld is highlighted Browse between the welds with the upper-right knob (#), and adjust the length of the joint with the lower knob (*). Press UPDATE and the welding unit calculates the heat input for the selected weld.

The number of welds since the most recent reset is displayed in the row at the bottom. Information can be stored about a maximum of 100 welds. In the event of more than 100 welds, the first one is overwritten. Welding must last for longer than one second to be registered.

The most recently noted weld appears in the display, although it is also possible to browse between other noted welds. All logs are deleted when you press RESET.



Description of welding data schedule

Each welding data schedule can have a short description. Under the SET menu and EDIT DESCRIPTION, the welding data schedule that has just been called up can be given a description of up to 40 characters using the integral keyboard. The current description can also be modified or deleted.

If the requested schedule has a description, it is shown in the MEMORY, MEASURE and REMOTE menu screens instead of the welding data parameters that are otherwise displayed.

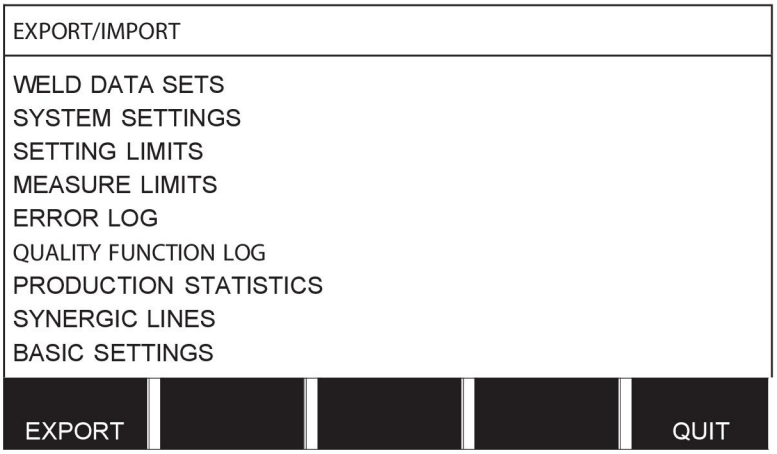
10.7.1 Store quality data

Main menu → Tools → Export/Import

The files produced in the control panel are stored as XML files. The USB memory must be formatted in FAT in order to work. The control panel can be used with ESAB's WeldPoint software, which is available separately.

Insert a USB memory into the control panel; see the "File Manager" section.

Select QUALITY FUNCTION LOG, then press EXPORT.



The entire set of quality data (information about the 100 most recent welds) stored in the control panel is now saved to the USB memory.

The file is in a folder called QData. QData is created automatically when you insert a USB memory.

Read more about the quality function in the "Quality function" section.

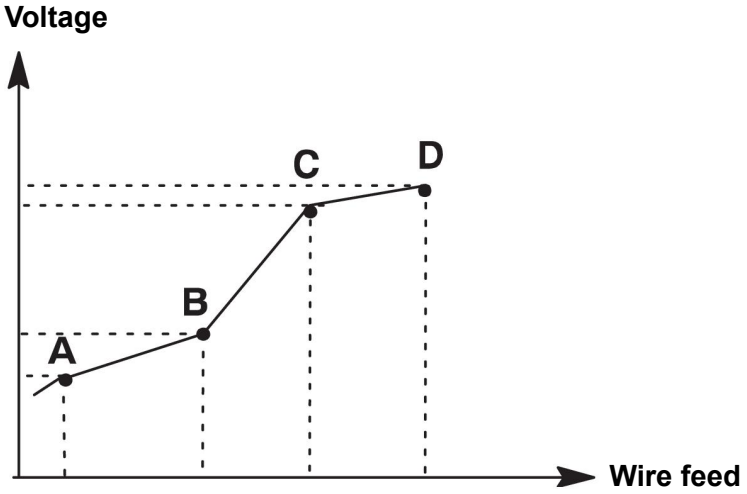
10.8 User-defined synergic data

Main menu → Tools → User-defined synergic data

It is possible to create your own synergic lines with respect to wire feed speed and voltage. A maximum of 10 such synergic lines can be saved.

A new synergic line is created in two steps:

- Define the new synergic line by specifying a number of voltage/wire speed coordinates; see points A to D in the following figure:



- Specify the wire/gas combination to which the synergic line applies.

10.8.1 Specify voltage/wire coordinates

To create a synergic line for the short-/sprayarc method, four coordinates are required; for the pulsing method, two coordinates are required. These coordinates must then be saved under separate weld data numbers in the weld data memory.

Short-/sprayarc

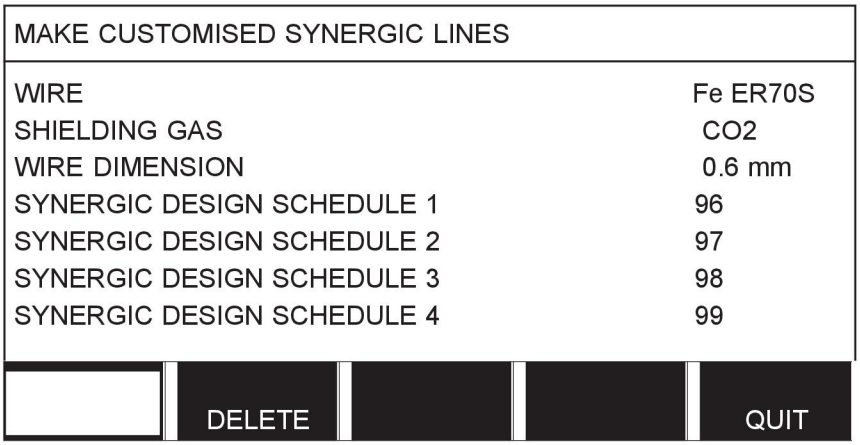
- Bring up the main menu and select the MIG/MAG SHORT/SPRAY method.
- Key in the desired values for voltage and wire feed speed for the first coordinate.
- Bring up the MEMORY menu and store the first coordinate to any number.
  The four coordinates for a short-/sprayarc line each can be saved as any number. By default, they are saved as numbers 96, 97, 98, and 99.
  A higher weld data number should contain higher values for voltage, start parameter R and wire feed speed than the nearest preceding weld data number.
  The welding parameters inductance and regulator type must have the *same value* in all four weld data numbers.
- Define the number of coordinates required, then proceed to the “Specify valid wire/gas combination” section.

Pulsing

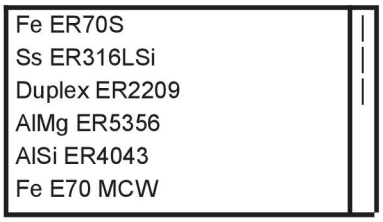
- Bring up the main menu and select the MIG/MAG PULSING method.
- Key in the desired values for voltage and wire feed speed for the first coordinate.
- Bring up the MEMORY menu and store the first coordinate to any number.
  A higher weld data number should contain higher values for voltage, wire feed speed, pulse frequency, pulse amplitude, start parameter R and background current than the nearest preceding weld data number.
  The welding parameters pulse time, Ka, Ki and “slope” must have the *same value* in both weld data numbers.
- Define the number of coordinates required, then proceed to the “Specify valid wire/gas combination” section.

10.8.2 Specify valid wire/gas combination

Position the cursor on the WIRE row and press ENTER.

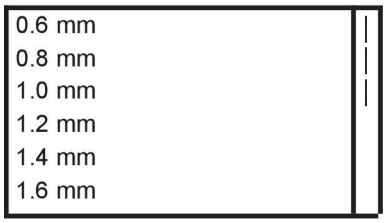


Select an alternative displayed in the list, then press ENTER.



Select in the same way for SHIELDING GAS, then press ENTER.

Select in the same way for WIRE DIAMETER, then press ENTER.



Select the SYNERGIC DESIGN SCHEDULE 1 row, then press STORE.

The operation is now complete—a synergic line has been defined.

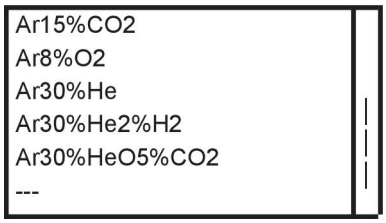
NOTE!
A corresponding short-/sprayarc synergy is needed for each pulsing instance.

When you create a new synergic line for the pulsing method, you therefore always receive a warning message stating that a corresponding line has not been created for the short-/sprayarc method. The message reads: *WARNING! No corresponding synergic line for short-/sprayarc.*

10.8.3 Create your own wire/gas alternative

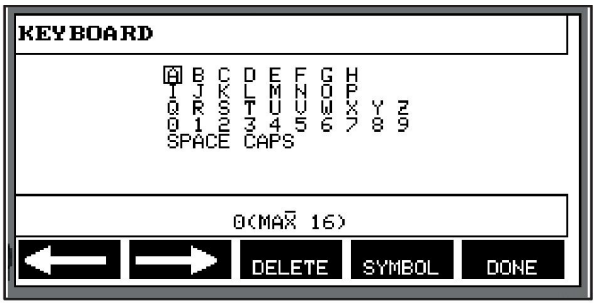
The lists of wire/gas alternatives can be extended with up to 10 alternatives of your own. At the bottom of each list, there is a blank row (---). By positioning the cursor on this row and pressing ENTER, you gain access to a keyboard that enables you to enter your own alternatives.

Select the row "---" and press ENTER.



The control panel's keyboard is used as follows:

- Position the cursor on the desired keyboard character using the left knob and arrow keys. Press ENTER. Enter a complete character string, with a maximum of 16 characters.
- Press DONE. The alternative you named appears in the list.



Delete a named alternative as follows:

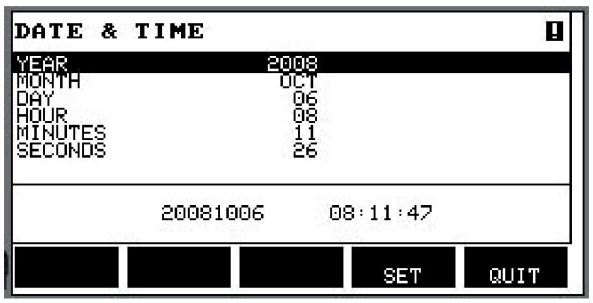
- Select your own wire/gas alternative from the relevant list.
- Press DELETE.

NOTE!
A named wire/gas alternative *cannot be deleted* if it is included in the weld data set that is currently in the working memory.

10.9 Calendar

Main menu → Tools → Calendar
Date and time are set here.

Select the row that is to be set: year, month, day, hour, minutes, seconds and UTC time zone. Set the correct value using one of the right-hand knobs. Press SET.

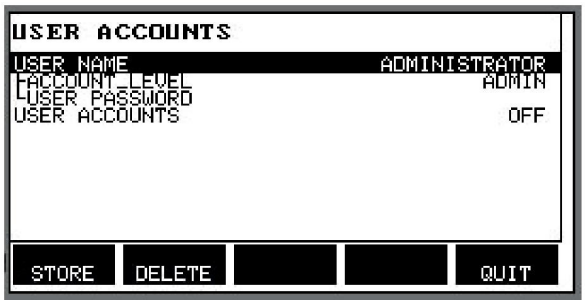


10.10 User accounts

Main menu → Tools → User accounts
Occasionally, it is particularly important from a quality perspective that the power source cannot be used by unauthorized parties.

User name, account level and password are registered in this menu.

Select USER NAME and press ENTER. Step down to an empty row, then press ENTER. Key in a new user name on the keyboard using the left knob and right and left arrows, then press ENTER. There is space for 16 user accounts. In the quality data files, it is evident which users executed a particular weld.



Under ACCOUNT LEVEL, choose from:

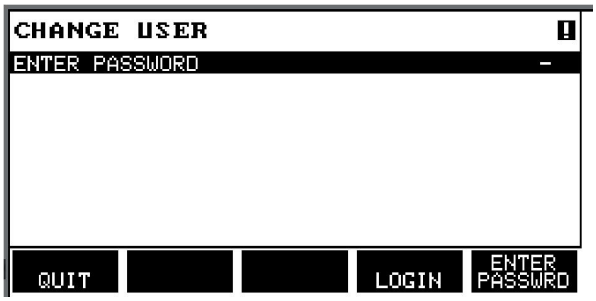
- Administrator, full access (can add new users)
- Senior user, can access everything except:
  - Code lock
  - multiple wire feeders
  - Calendar
  - User accounts
- Normal user, can access the Measure menu
- Weld memory user, can access the measure menu but cannot change voltage or wire feed speed
  - A memory welder can access the WELD data memory to recall other memories.
  - A memory welder cannot store or edit weld data memories.

In the USER PASSWORD row, key in a password using the keyboard. When the power source is switched on and the control panel activated, you are asked in the display to enter your password.

If you choose not to have this function but instead want the power source and control panel to be unlocked for all users, select USER ACCOUNTS OFF.

Change user

When USER ACCOUNTS is ON, this menu is visible. It makes it possible to change user. Enter a password for a user and log in or choose QUIT to return to the Tools menu.

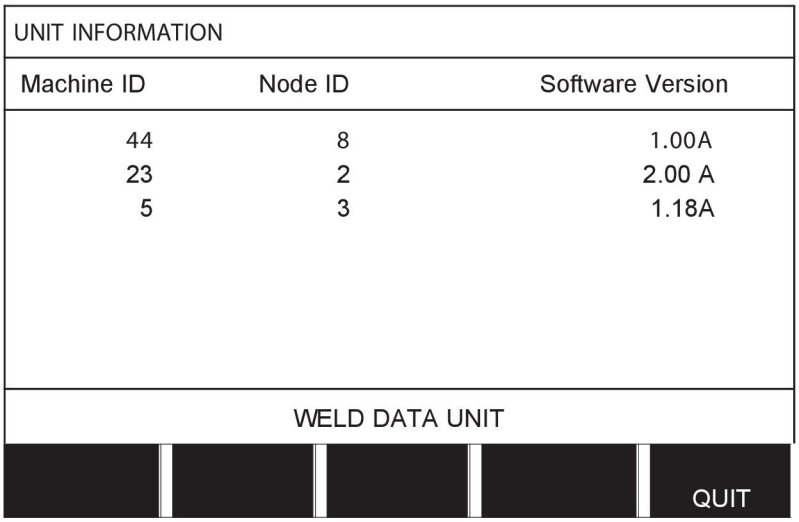


10.11 Unit information

Main menu → Tools → Unit information

In this menu, you can see the following information:

- Machine ID
- Node ID
  2 = power source
  3 = wire feed
  8 = control panel
- Software version


UNIT INFORMATION
Machine ID
Node ID
Software Version
44
8
1.00A
23
2
2.00 A
5
3
1.18A
WELD DATA UNIT
QUIT

11 ORDERING SPARE PARTS

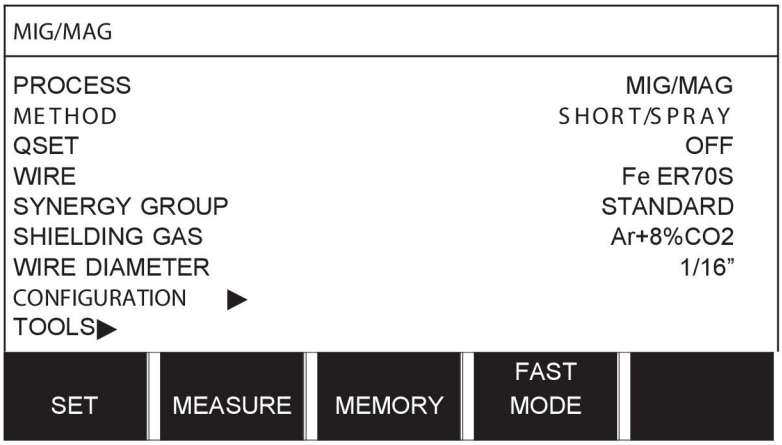
CAUTION!
Repair and electrical work should be performed by an authorised service technician. Use only original spare and wear parts.

$U8_2$ is designed and tested in accordance with the international and European standards 60974-1 and 60974-10. It is the obligation of the service unit that carried out the service or repair work to make sure that the product still conforms to said standard.

Spare parts and wear parts can be ordered through your nearest ESAB dealer, see the back cover of this document. When ordering, please state product type, serial number, designation and spare part number in accordance with the spare parts list. This facilitates dispatch and ensures correct delivery.

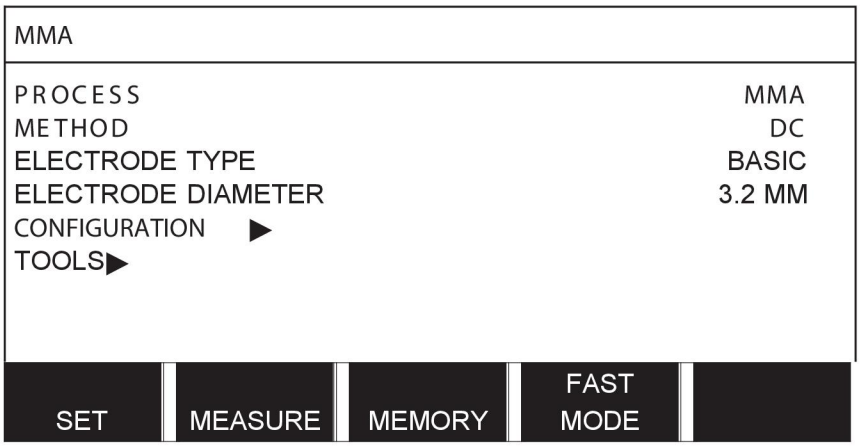
MENU STRUCTURE

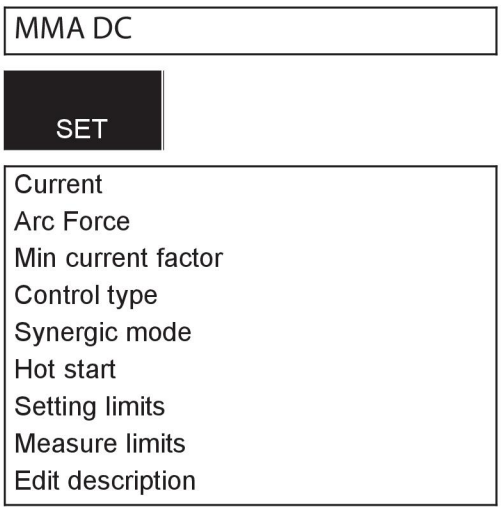
MIG/MAG



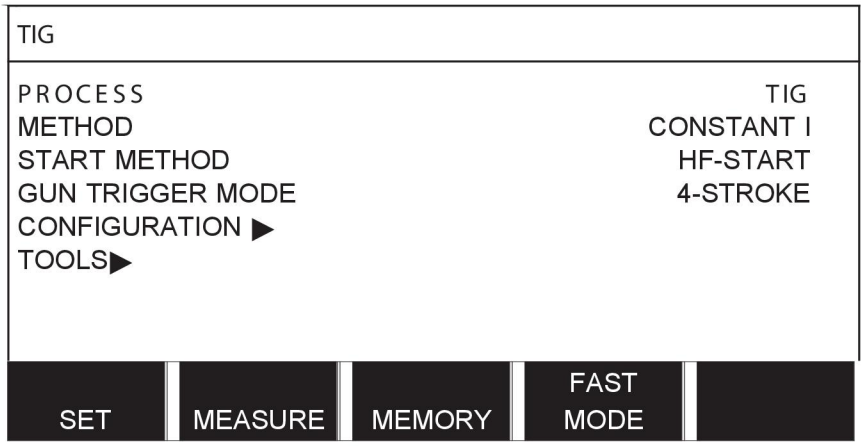
Short/Spray	Pulse	Superpulse
SET	SET	SET
Voltage Wire speed Inductance Control type Synergic Mode Start data - gas preflow - creep start - hot start - touch sense current - soft start Stop data - crater fill - burn back time - termination final pulse - pinch off pulse SCT - gas postflow Setting limits Measure limits Spot welding Edit description	Voltage Wire speed Pulse current Pulse time Pulse frequency Background current Slope Synergic Mode Internal constants -Ka -Ki Start data - gas preflow - creep start - soft start - hot start - touch sense current Stop data - crater fill - termination - final pulse - pinch off pulse - SCT - burn back time - gas postflow Setting limits Measure limits Spot welding Edit description	Voltage Wire speed Pulse current Pulse time Pulse frequency Background current Slope Synergic Mode Phase weldtime Internal constants -Ka -Ki Start data - gas preflow - creep start - hot start - soft start - touch sense Stop data - crater fill - termination - final pulse - pinch off pulse - SCT - burn back time - gas postflow Setting limits Spot welding Edit description

MMA



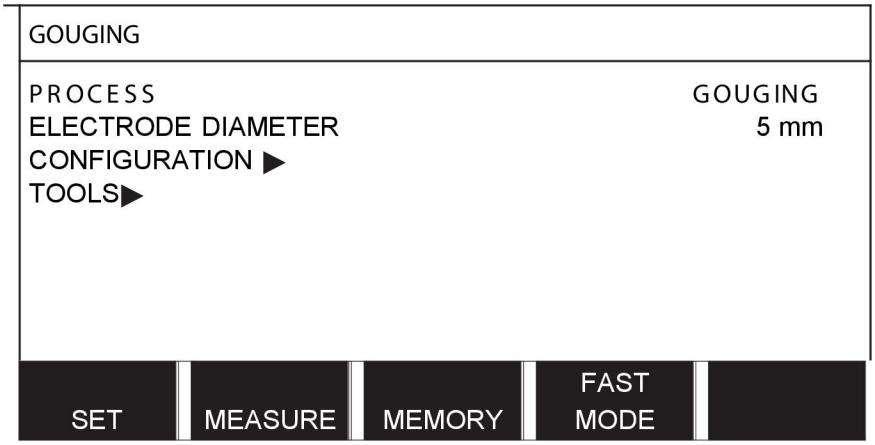


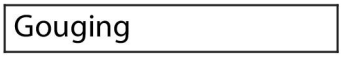
TIG

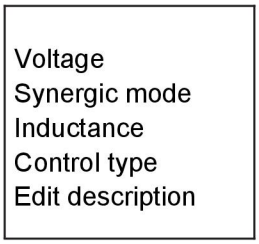


TIG Constant I	TIG Pulsed I
SET	SET
Current	Current
Slope up time	Background current
Slope down time	Pulse time
Gas preflow	Background time
Gas postflow	Slope up time
Setting limits	Slope down time
Measure limits	Gas preflow
Edit description	Gas postflow
	Setting limits
	Measure limits
	Edit description

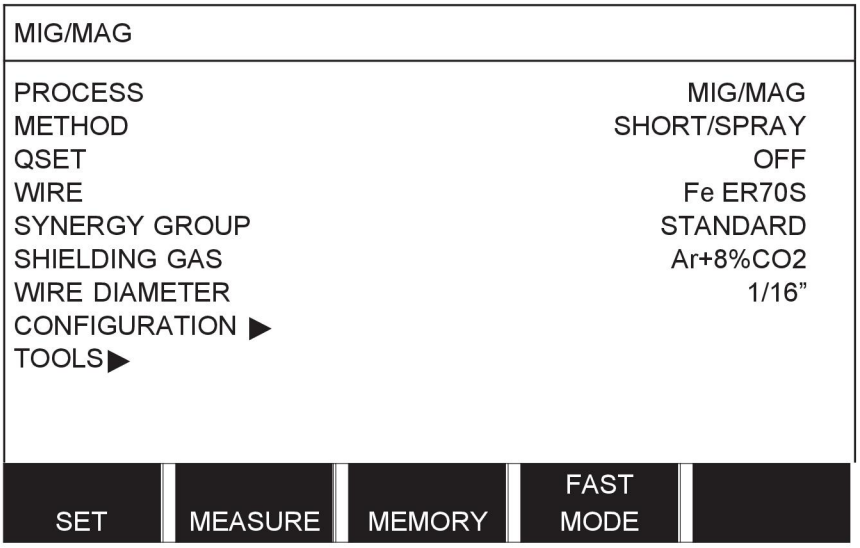
GOUGING







CONFIGURATION - TOOLS



Configuration	Tools
Language Code lock Remote controls MIG/MAG defaults -gun trigger mode -4-stroke configuration -soft keys configuration -volt.measure in pulsed -AVC feeder -release pulse -voltage regulator flat static -delay time craterfill active -weld start arc off delay time -show amperage set estimation MMA defaults -droplet welding Fast mode soft buttons Double start sources Panel remote enable WF Supervision Auto save mode Trigger welddata switch Multiple wire feeders Quality functions Maintenance Unit of length Measure value frequency Register key Error category config	Error log Export/import -weld data sets -system settings -setting limits -measure limits -error log -quality function log -production statistics -synergic lines -basic settings File manager Setting limit editor Measure limit editor Production statistics Quality functions User defined synergic data Calendar User accounts Unit information

Functional differences

Functions	**U8$_2$ Basic**	**U8$_2$ Plus**
Super Pulse	No	Yes
Limit editor	Yes	Yes
File manager	No	Yes
Auto save mode	No	Yes
Release pulse	Yes	Yes
Synergic lines	Basic package = 111 lines	Complete no of available lines
User defined synergic data	No	Yes
Production statistics	No	Yes

WIRE AND GAS DIMENSIONS

U8$_2$ Basic - MIG/MAG welding with SHORT-/SPRAYARC

Wire type	Shielding gas	Wire diameter
Low alloy or unalloyed wire (Fe ER70S)	CO_2	0.8 1.0 1.2 1.6*
	Ar + 18% CO_2	0.8 1.0 1.2 1.6*
	Ar + 8% CO_2	0.8 1.0 1.2 1.6*
	Ar + 23% CO_2	0.8 1.0 1.2 1.6*
Stainless solid wire (Ss ER316LSi)	Ar + 2% CO_2	0.8 1.0 1.2 1.6*
	Ar + 2% O_2	0.8 1.0 1.2 1.6*
Magnesium-alloyed aluminium wire (AlMg ER5356)	Ar	1.0 1.2 1.6*
Silicon-alloyed aluminium wire (AlSi ER4043)	Ar	1.0 1.2 1.6*
	Ar + 50% He	1.0 1.2 1.6*
Metal powder cored wire (Fe E70 MCW)	Ar + 18% CO_2	1.2 1.4* 1.6*
	Ar + 8% CO_2	1.2 1.4* 1.6*
Rutile flux cored wire (Fe E70 RFCW)	Ar + 18% CO_2	1.2 1.4* 1.6*
Basic flux cored wire (Fe E70 BFCW)	CO_2	1.2 1.4* 1.6*
	Ar + 18% CO_2	1.2 1.4* 1.6*
Metal powder cored stainless wire (Ss MCW)	Ar + 8% CO_2	1.2
	Ar + 2% O_2	1.2
	Ar + 18% CO_2	1.2
	Ar + 2% CO_2	1.2
Silicon bronze (ERCuSi-A)	Ar	1.0 1.2
	Ar + 1% O_2	1.0 1.2

**) Only for Mig 4000i, 4001i, 4002c, 4004i Pulse, 5000i, 5002c, 6502c*

U8$_2$ Basic - MIG/MAG welding with PULSE

Wire type	Shielding gas	Wire diameter
Low-alloy or non-alloy wire (Fe ER70S)	Ar + 18% CO_2	1.0 1.2 1.6*
	Ar + 8% CO_2	1.0 1.2 1.6*
Stainless wire (Ss ER316LSi)	Ar + 2% O_2	0,8 1.0 1.2 1.6*
	Ar + 2% CO_2	0,8 1.0 1.2 1.6*
Stainless solid wire (Ss ER308LSi)	Ar + 2% CO_2	0.9 1.0 1.2 1.6
Stainless solid wire (Ss ER309LSi)	Ar + 2% CO_2	1.0 1.2
Stainless solid wire (Ss 309 MoL)	Ar + 2% CO_2	1.0 1.2

Wire type	**Shielding gas**	**Wire diameter**
Stainless duplex wire (Duplex ER2209)	Ar + 30% He + 1% O_2	1.2
Magnesium-alloyed aluminium wire (AlMg ER5356)	Ar	1.0 1.2 1.6*
Magnesium-alloyed aluminium wire (AlMg ER5183)	Ar	1.6
Silicon-alloyed aluminium wire (AlSi ER4043)	Ar	1.0 1.2 1.6*
	Ar + 50% He	1.0 1.2 1.6*
Silicon-alloyed aluminium wire (AlSi ER4043)	Ar + 30% He	0.9 1.0 1.2
Silicon-alloyed aluminium wire (AlSi ER4047)	Ar	1.2 1.6
Silicon bronze (ERCuSi-A)	Ar	1.0 1.2
	Ar + 1% CO_2	1.0 1.2
Aluminium solid wire (Al99,5 ER1100)	Ar	1.2
Metal powder-filled cored wire (Fe E70 MCW)	Ar + 8% CO_2	1.2 1.4 1.6
	Ar + 18% CO_2	1.2 1.4 1.6
Metal powder cored Stainless wire (Ss MCW)	Ar + 2% O_2	1.2
	Ar + 2% CO_2	1.2
	Ar + 8% CO_2	1.2

**) Only for Mig 4000i, 4001i, 4002c, 4004i Pulse, 5000i, 5002c, 6502c*

U82 Plus - MIG/MAG welding with SHORT-/SPRAYARC

Wire type	Shielding gas	Wire diameter
Low alloy or unalloyed wire (Fe ER70S)	CO_2	0.8 0.9 1.0 1.2 1.6*
	Ar + 18% CO_2	0.8 0.9 1.0 1.2 1.6*
	Ar + 2% O_2	0.8 0.9 1.0 1.2 1.6*
	Ar + 5% O_2 + 5% CO_2	0.8 1.0 1.2 1.6*
	Ar + 8% CO_2	0.8 0.9 1.0 1.2 1.6*
	Ar + 23% CO_2	0.8 1.0 1.2 1.6*
	Ar + 15% CO_2 + 5% O_2	0.8 0.9 1.0 1.2 1.6*
	Ar + 16% CO_2	0.8 1.0 1.2 1.6*
	Ar + 25% CO_2	0.8 0.9 1.0 1.2 1.6*
	Ar + 2% CO_2	0.8 1.0 1.2 1.6*
	Ar + 5% O_2	1.0 1.2
Stainless solid wire (Ss ER316LSi)	Ar + 2% O_2	0.8 1.0 1.2 1.6*
	Ar + 30% He + 1% O_2	0.8 1.0 1.2 1.6*
	Ar + 2% CO_2	0.8 0.9 1.0 1.2 1.6*
	Ar + 3% CO_2 + 1% H_2	0.8 0.9 1.0 1.2 1.6*
	Ar + 32% He + 3% CO_2 + 1% H_2	0.8 0.9 1.0 1.2 1.6*
Stainless solid wire (Ss ER307Si)	Ar + 2% O_2	1.0 1.2
	Ar + 2% CO_2	0.8 1.0 1.2
Stainless duplex wire (Duplex ER2209)	Ar + 2% O_2	1.0
	Ar + 30% He + 1% O_2	1.0
Magnesium-alloyed aluminium wire (AlMg ER5356)	Ar	0.9 1.0 1.2 1.6*
Silicon-alloyed aluminium wire (AlSi ER4043)	Ar	0.9 1.0 1.2 1.6*
	Ar + 50% He	0.9 1.0 1.2 1.6*
Metal powder cored wire (Fe E70 MCW)	Ar + 18% CO_2	1.0 1.2 1.4* 1.6*
	Ar + 8% CO_2	1.0 1.2 1.4* 1.6*
Rutile flux cored wire (Fe E70 RFCW)	CO_2	1.2 1.4* 1.6*
	Ar + 18% CO_2	1.2 1.4* 1.6*
Basic flux cored wire (Fe E70 BFCW)	CO_2	1.0 1.2 1.4* 1.6*
	Ar + 18% CO_2	1.0 1.2 1.4* 1.6*
	SELF-SHIELDING	1.2 1.6*

Wire type	Shielding gas	Wire diameter
Stainless flux cored wire (Ss RFCW)	Ar + 18% CO_2	1.2
	Ar + 8% CO_2	1.2
	SELF-SHIELDING	1.6* 2.4*
Duplex rutile flux cored wire (E2209 FCAW)	Ar + 18% CO_2	1.2
Metal powder cored stainless wire (Ss MCW)	Ar + 8% CO_2	1.2
	Ar + 2% O_2	1.2
	Ar + 18% CO_2	1.2
	Ar + 2% CO_2	1.2
ERNiCrMo	Ar + 50% He	0.9
Silicon bronze (ERCuSi-A)	Ar + 1% O_2	1.0 1.2
	Ar	1.0 1.2
Ss ER347Si	Ar + 2% CO_2	0.8 1.0 1.2
Almg ER5087	Ar	1.0 1.2 1.6
Copper and aluminium wire (ERCuAl-A1)	Ar	1.0 1.2
	Ar + 1% O_2	1.0 1.2
Rutile flux cored wire (Fe RCW Dual-S)	CO_2	1.2

**) Only for Mig 4000i, 4001i, 4002c, 4004i Pulse, 5000i, 5002c, 6502c*

U82 Plus - MIG/MAG welding with PULSE

Wire type	Shielding gas	Wire diameter
Low alloy or unalloyed wire (Fe ER70S)	Ar + 18% CO_2	0.8 0.9 1.0 1.2 1.6*
	Ar + 2% O_2	0.8 0.9 1.0 1.2 1.6*
	Ar + 2% CO_2	0.8 1.0 1.2 1.6*
	Ar + 5% O_2 + 5% CO_2	0.8 0.9 1.0 1.2 1.6*
	Ar + 8% CO_2	0.8 0.9 1.0 1.2 1.6*
	Ar + 23% CO_2	0.8 1.0 1.2 1.6*
	Ar + 16% CO_2	0.8 1.0 1.2 1.6*
	Ar + 25% CO_2	0.9
	Ar + 5% O_2	1.0 1.2
Stainless solid wire (Ss ER316LSi)	Ar + 2% O_2	0.8 0.9 1.0 1.2 1.6*
	Ar 30% He + O_2	0.8 0.9 1.0 1.2 1.6*
	Ar + 2% O_2	0.8 0.9 1.0 1.2 1.6*
	Ar + 3% CO_2 + 1% H_2	0.8 0.9 1.0 1.2 1.6
	Ar + 32% He + 3% CO_2 + 1% H_2	0.8 0.9 1.0 1.2 1.6

Wire type	Shielding gas	Wire diameter
Stainless solid wire (Ss ER308LSi)	Ar + 2% CO_2	0.9 1.0 1.2 1.6
Stainless solid wire (Ss ER308LSi)	Ar + 2% O_2	0.9
Stainless solid wire (Ss ER309LSi)	Ar + 2% CO_2	1.0 1.2
Stainless solid wire (Ss 309 MoL)	Ar + 2% CO_2	1.0 1.2
Stainless solid wire (Ss ER307Si)	Ar + 2% O_2	1.0 1.2
	Ar + 2% CO_2	1.0 1.2
Stainless duplex wire (Duplex ER2209)	Ar + 30% He + 1% O_2	1.0 1.2
	Ar + 2% O_2	1.0
Magnesium-alloyed aluminium wire (AlMg ER5356)	Ar	0.8 0.9 1.0 1.2 1.6*
	Ar + 50% He	1.2
Magnesium-alloyed aluminium wire (AlMg ER5356)	Ar + 30% He	1.2
Magnesium-alloyed aluminium wire (AlMg ER5183)	Ar	1.6
Silicon-alloyed aluminium wire (AlSi ER4043)	Ar	0.9 1.0 1.2 1.6*
	Ar + 50% He	0.9 1.0 1.2 1.6*
Silicon-alloyed aluminium wire (AlSi ER4043)	Ar + 30% He	0.9 1.0 1.2
Silicon-alloyed aluminium wire (AlSi ER4047)	Ar	1.2 1.6
Metal powder cored wire (Fe E70 MCW)	Ar + 18% CO_2	1.0 1.2 1.4* 1.6*
	Ar + 8% CO_2	1.0 1.2 1.4* 1.6*
Metal powder cored stainless wire (Ss MCW)	Ar + 2% O_2	1.2
	Ar + 2% CO_2	1.2
	Ar + 8% CO_2	1.2
ERNiCrMo	Ar	1.0 1.2
	Ar + 50% He	0.9 1.0 1.2
	Ar + 30% He + 2% H_2	1.0
	Ar + 30% He + 0.5% CO_2	1.0
Silicon bronze (ERCuSi-A)	Ar + 1% O_2	1.0 1.2
	Ar	1.0 1.2
Stainless wire (1.3964)	Ar + 8% O_2	1.0LOW 1.0HIGH
Copper and aluminium wire (ERCuAl-A1)	Ar	1.0 1.2
	Ar + 1% O_2	1.0 1.2
Aluminium solid wire (Al99,5 ER1100)	Ar	1.2

**) Only for Mig 4000i, 4001i, 4002c, 4004i Pulse, 5000i, 5002c, 6502c*

MMA welding

Electrode type	Electrode diameter
Basic	1.6 2.0 2.5 3.2 4.0 4.5 5.0 5.6* 6.0*
Rutile	1.6 2.0 2.5 3.2 4.0 4.5 5.0 5.6* 6.0* 7.0*
Cellulose	2.5 3.2

**) Only for Mig 4000i, 4001i, 5000i*

Carbon, arc air
Electrode diameters (mm): 4.0 5.0 6.0 10.0 13.0

U8$_2$ Plus - MIG/MAG - ROBOT synergy group - with SHORT-/SPRAYARC

Wire type	Shielding gas	Wire diameter (mm)
AlMg ER5356	Ar	1.2, 1.6
AlSi ER4043	Ar	1.2, 1.6
ERCuSi-A	Ar	0.8, 1.0
ERCuAl-A1	Ar	1.0
ERCuSi-A	Ar + 1% CO_2	0.8, 1.0
Fe ER70S	Ar + 18% CO_2	0.8, 0.9, 1.0, 1.2
Fe ER70S	Ar + 8% CO_2	0.8, 0.9, 1.0, 1.2
Fe ER70S	CO_2	0.8, 0.9, 1.0, 1.2
Fe MCW 14.11	Ar + 18% CO_2	1.2, 1.4
Fe MCW 14.11	Ar + 8% CO_2	1.2, 1.4
Fe MCW 14.13	Ar + 18% CO_2	1.2, 1.4
Fe MCW 14.13	Ar + 8% CO_2	1.2, 1.4
Ss 307	Ar + 2% CO_2	0.8, 1.0, 1.2
Ss 307	Ar + 2% CO_2	0.8, 1.0, 1.2
Ss ER308LSi	Ar + 2% CO_2	0.8, 0.9, 1.0, 1.2
Ss 430 Lnb-Ti	Ar + 2% CO_2	1.0
Ss 430LNb	Ar + 2% CO_2	1.0
Ss 430Ti	Ar + 2% CO_2	0.9, 1.0

U8$_2$ Plus - MIG/MAG - ROBOT synergy group - with PULSE

Wire type	Shielding gas	Wire diameter (mm)
AlMg ER5356	Ar	1.2, 1.6
AlSi ER4043	Ar	1.2, 1.6
ERCuAl-A1	Ar	1.0
ERCuSi-A	Ar + 1% CO_2	1.0

Wire type	Shielding gas	Wire diameter (mm)
Fe ER70S	Ar + 18% CO_2	0.8, 0.9, 1.0, 1.2
Fe ER70S	Ar + 8% CO_2	0.8, 0.9, 1.0, 1.2
Ss 307	Ar + 2% CO_2	0.8, 1.0, 1.2
Ss ER308LSi	Ar + 2% CO_2	0.8, 0.9, 1.0, 1.2
Ss 430LNb	Ar + 2% CO_2	0.8, 1.0
Ss 430Ti	Ar + 2% CO_2	0.9, 1.0

$U8_2$ Plus - MIG/MAG - SAT synergy group

Wire type	Shielding gas	Wire diameter (mm)	Work area m/min
Fe ER70S	Ar + 8% CO_2	1.0	16 - 25
Fe ER70S	Ar + 18% CO_2	1.0	16 - 25
Fe ER70S	Ar + 8% CO_2	0.9	16 - 29
Fe ER70S	Ar + 18% CO_2	0.9	17 - 29
Fe ER70S	Ar + 8% CO_2	0.8	19 - 29
Fe ER70S	Ar + 18% CO_2	0.9	19 - 29
Ss 307	Ar + 2% CO_2	0.8	20 - 26
Ss 307	Ar + 2% CO_2	1.0	12 - 21
Fe MCW 14.11	Ar + 8% CO_2	1.2	6.5 - 14
Fe MCW 14.11	Ar + 18% CO_2	1.2	7 - 14
Fe MCW 14.11	Ar + 8% CO_2	1.4	5.9 - 12
Fe MCW 14.11	Ar + 18% CO_2	1.4	6.6 - 12
Ss 430LNb	Ar + 2% CO_2	1.0	14.2 - 25
Ss 430Ti	Ar + 2% CO_2	0.9	16 - 27
Ss 430Ti	Ar + 2% CO_2	1.0	14.2 - 25
Ss 430 Lnb-Ti	Ar + 2% CO_2	1.0	14.2 - 27.5
Ss ER308LSi	Ar + 2% CO_2	1.0	15-27.5
Ss ER308LSi	Ar + 2% CO_2	0.9	16 - 28
Ss ER308LSi	Ar + 2% CO_2	0.8	18 - 29.5

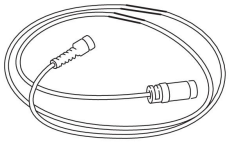
ORDERING NUMBERS

Ordering no.	Denomination
0460 820 880	Control panel Aristo™ $U8_2$*
0460 820 881	Control panel Aristo™ $U8_2$ Plus*
0460 820 882	Control panel Aristo™ $U8_2$ Plus I/O*
0459 839 037	Spare parts list

* For functional differences, see the "Functional differences" section.

Instruction manuals and the spare parts list are available on the Internet at **www.esab.com**

ACCESSORIES

0460 877 891	**Extension cable (connectors included)** 7.5 m 12-poles	
0457 043 880	**Adapter set 230 V AC / 12 V DC, for control box** (for training with the control box disconnected from the machine).	
0462 062 001	**USB Memory stick Gb 2**	

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