GB

Aristo®

MA4

Instruction manual

0458 818 174 GB 20110518

Valid from program version 1.30

GB

1 INTRODUCTION

This manual describes use of the **MA4** control panel, which is installed in the Feed 3004 and Feed 4804 wire feed units.

For general information on operation, see the wire feed unit and power source operating instructions.

1.1 Control panel

1 Display

2 Knob for setting the voltage

3 Knob for setting the wire feed speed and welding current

4 Increase (+) or Decrease (-) selected by the function pushbuttons. →

5 First, second and third function pushbuttons

1.2 Remote control unit

Using a remote control unit, the primary parameters of the welding process can be controlled from a device other than the control panel.

Machines with intergral control panels should have program version 1.21 or higher, in order for the remote control to function correctly.

Control panel's behaviour on connection of the remote control unit

- The display freezes in the menu showing when the remote control is connected.

  Measurement and setting values are updated, but only shown in those menus in which the values can be displayed.
- If a fault code symbol is displayed, it cannot be removed until the remote control has been disconnected.

2 MENUS

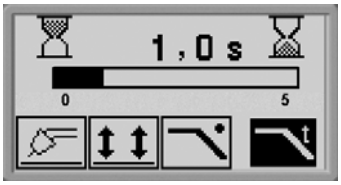
The control panel uses several different menus. They are the main, measurement and settings menus.

2.1 Main and measurement menus

The main menu is always displayed immediately after the machine is started. The menu shows the values which have been set. If the main menu is displayed when welding begins, it switches over automatically to show the measured values (measurement menu). The measured values will be displayed even after welding has been completed.

The settings menu can be accessed without losing the measurement values. It is only when the knob is turned that the setting values are displayed instead of the measured values.

2.2 Settings menu



Different values can be entered in the settings menu.

To access the settings menu, press  ,  ,  or  .

When the power source is switched off and restarted, the last values to be set are recalled.

3 MIG/MAG WELDING

3.1 Wire or electrode?

MIG/MAG welding uses a filler wire electrode wound on a carrier (bobbin or core) This type of electrode is referred to throughout this handbook as **wire**.

3.2 Settings

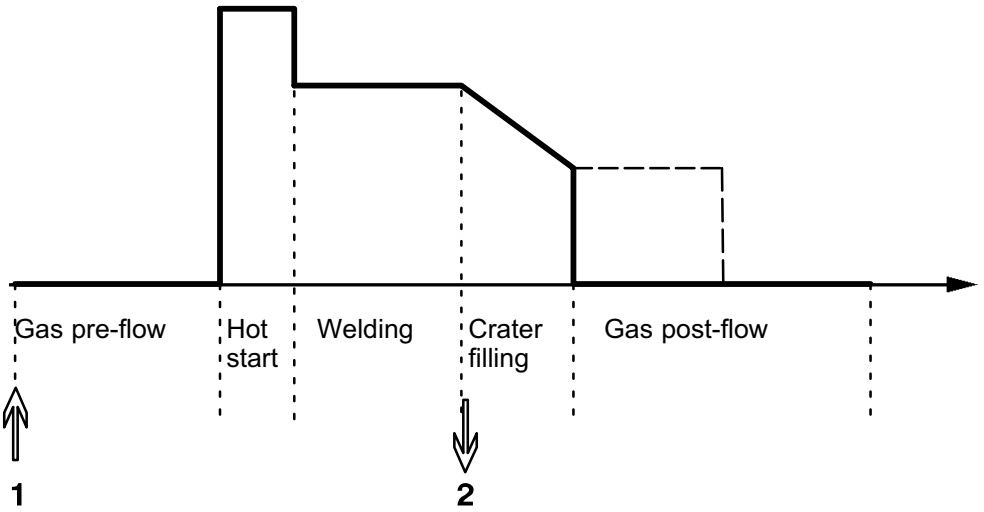
Settings	Setting range	In steps of:	Default setting
Process	MIG/MAG, MMA or Arc-air gouging	-	MIG/MAG
2/4-stroke*	2-stroke or 4-stroke	-	2-stroke
Crater filling*	ON or OFF	-	OFF
Crater filling time	0 - 5 s	0,1 s	1.7 s
Inductance	0 - 100	1	70
Gas pre-flow	0,1 - 25,0 s	0,1 s	0,1 s
Creep start	ON or OFF	-	ON
Burnback time	1 - 350 ms	10 ms	100 ms
Gas post-flow	0.1 - 20 s	1 s	1 s
Voltage	8 - 60 V	0,25 V (displayed with one decimal)	12 V
Wire feed speed	0,8 - 25,0 m/min	0,1 m/min	5 m/min

**) These functions cannot be changed while welding is in progress.*

MIG/MAG

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

2-stroke

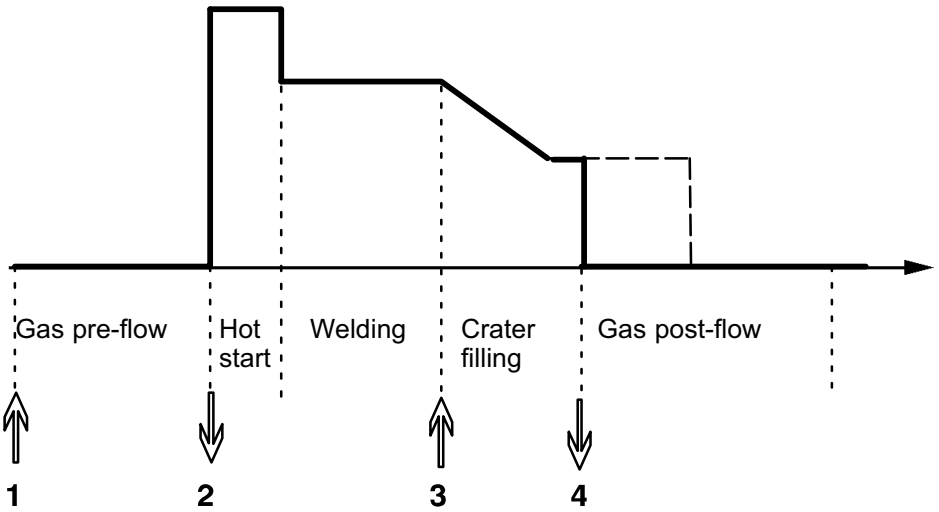


Functions when using 2-stroke control of the welding gun.

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.

4-stroke



Functions when using 4-stroke control of the welding gun

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).

Crater filling

Crater filling helps to avoid pore, thermal cracking and crater formation in the weld when welding stops.

Inductance

Low inductance produces a harsher sound and a more stable concentrated arc. Higher inductance gives a softer weld (less spatter) and a hotter process, allowing the weld pool to flow out more.

Gas pre-flow

Gas pre-flow indicates the time during which shielding gas flows before the arc is struck.

Creep start

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

Burnback time

Burnback time is a delay between the time when the wire starts to decelerate and when the power unit switches off the welding current. Too short a burnback time results in long filler wire stickout, with a risk of the wire being caught 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.

Gas post-flow

Gas post-flow is the time during which the shielding gas continues to flow after the arc has gone out.

Voltage

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

Irrespective of which menu is displayed, the setting value for the voltage can be changed. The value is only displayed in the main menu.

Wire feed speed

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

Irrespective of which menu is displayed, the setting value for the wire feed speed can be changed. The value is only displayed in the main menu.

3.3 Symbols in the display

Function symbols

 MIG/MAG

 Inductance

 2-stroke

 4-stroke

 Gas pre-flow

 Gas post-flow

 Crater filling

 Crater filling time

 Creep start

 Burnback time

Explanation of the symbols

 Active symbol (dark background). Active means that the function which the symbol represents can be activated. New values can only be set when the symbol is active.

 Inactive symbol (light background). Inactive means that settings for the function which the symbol represents cannot be changed.

From the settings menu, pressing an inactive symbol will return the machine to the main menu.

 A dot in the upper right-hand corner indicates that crater filling is ON.

Value symbols

The value symbols are displayed in the settings menu for each function.


Lower inductance


Higher inductance


No gas flow time


Long gas flow time


Creep start ON


Creep start OFF


Shorter burnback time


Longer burnback time

3.4 Settings example

This is an example of the settings used for MIG/MAG welding.

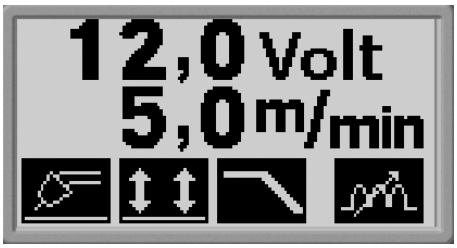
Settings	Value
Process	MIG/MAG
2/4-stroke	4-stroke
Crater filling	ON
Crater filling time	1 s
Inductance	80%
Creep start	OFF
Burnback time	150 ms
Gas pre-flow	0,7 s
Gas post-flow	3 s
Voltage	30 V
Wire feed speed	10,0 m/min

Process = MIG/MAG welding

- Display the main menu for MIG/MAG welding by pressing the first function pushbutton.

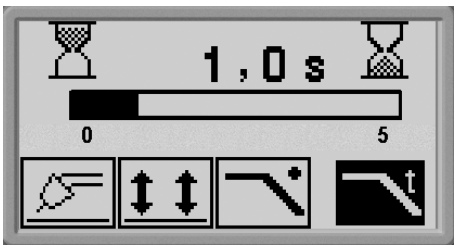
2/4-stroke = 4-stroke

- Press  to select **4-stroke**.



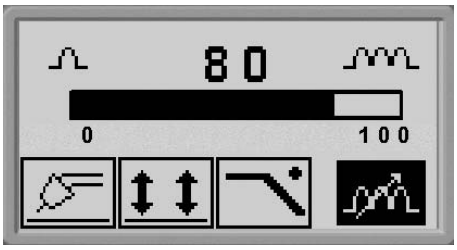
Crater filling = 1,0 seconds

- Press  to turn crater filling **ON**.
- Press  until the display shows **1,0 s**.



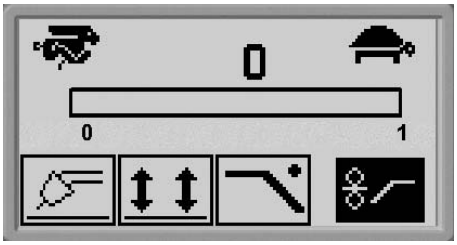
Inductance = 80 %

- Press  until  is shown in the display.
- Press  until **80** is shown in the display.



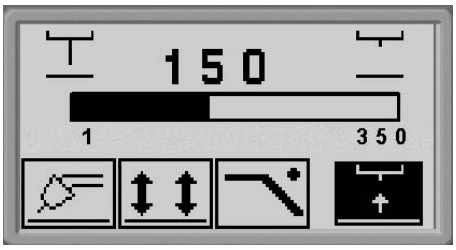
Creep start = OFF

- Press  until  is shown in the display.
- Press  until **1** is shown in the display.



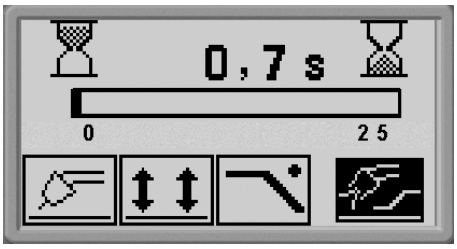
Burnback time = 150 milliseconds

- Press  until  is shown in the display.
- Press  until **150** is shown in the display.



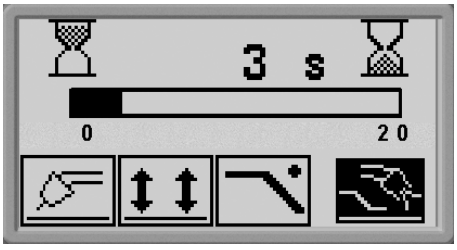
Gas pre-flow = 0.7 seconds

- Press  until  is shown in the display.
- Press  until **0,7 s** is shown in the display.



Gas post-flow = 3 seconds

- Press  until  is shown in the display.
- Press  until **3 s** is shown in the display.



Voltage = 30 Volt

- Turn the knob to set the voltage until the display shows **30,0 Volt**.

Wire feed speed = 10,0 m/min

- Turn the knob to set the wire feed speed until the display shows **10 m/min.**

4 MMA WELDING

4.1 Settings

Settings	Setting range	In steps of	Default setting
Process	MIG/MAG, MMA or Arc-air gouging	-	MIG/MAG
"Hot start"*	ON or OFF	-	OFF
Hot start time	1 - 30	1	10
Arc force	0 - 10	0,5	3
Current Mig 4000i Mig 5000i	 16 - 400 A 16 - 500 A	 1 A 1 A	 100 A 100 A

**) This function cannot be changed while welding is in progress.*

MMA

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

Hot start

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.

Arc force

The arc force "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.

Current

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

Irrespective of which menu is displayed, the setting value for the current can be changed. The value is only displayed in the main menu.

4.2 Symbols in the display

Function symbols

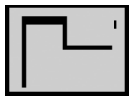
 MMA welding

 Arc force

 Hot start

Explanation of the symbols

 Active symbol (dark background). Active means that the function which the symbol represents can be activated. New values can only be set when the symbol is active.

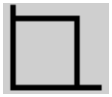
 Inactive symbol (light background). Inactive means that settings for the function which the symbol represents cannot be changed.

From the settings menu, pressing an inactive symbol will return the machine to the main menu.

 A dot in the upper right-hand corner indicates that “Hot start” is ON.

Value symbols

The value symbols are displayed in the settings menu for each function.

 No arc force

 Higher arc force

 Short hot start time

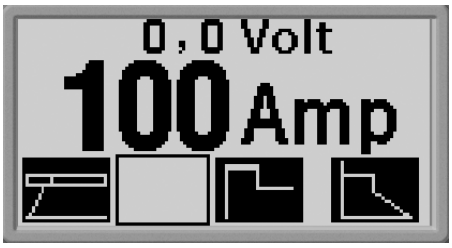
 Long hot start time

4.3 Settings example

Settings	Value
Process	MMA
“Hot start”	ON
Hot start time	12
Arc force	5
Current	250 Amp

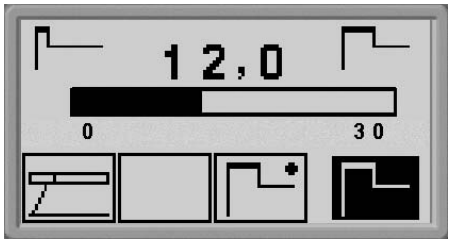
Process = MMA welding

- Display the main menu for MMA welding by pressing the first function pushbutton.



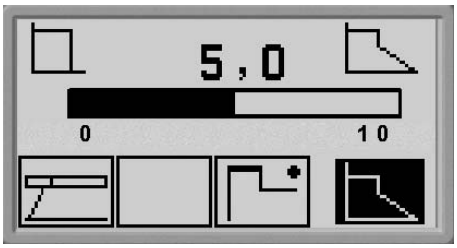
Hot start time = 12 seconds

- Press  to turn hot starting **ON**.
- Press  until **12,0** is shown in the display.



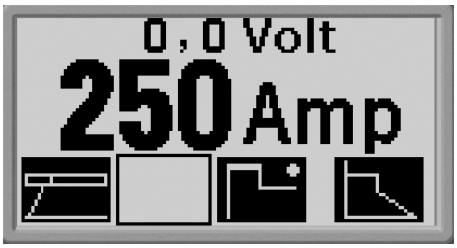
Arc force = 5

- Press  until  is shown in the display.
- Press  until **5,0** is shown in the display.



Current = 250 Ampere

- Turn the knob for setting the current until the display shows **250 Amp**.



5 ARC-AIR GOUGING

Arc-air gouging involves the use of a special electrode consisting of a carbon bar with a copper case. An arc is formed between the carbon bar and the workpiece, air is supplied to blow away the melted material, and a seam is formed.

5.1 Settings

Settings	Setting range	In steps of	Default setting
Process	MMA eller Arc-air gouging	-	MIG/MAG
Voltage	8-60 V	0,25 V (displayed with one decimal.)	37,0 V

Voltage

Higher voltage produces wider and deeper penetration into the workpiece.

5.2 Symbols in the display

Function symbol

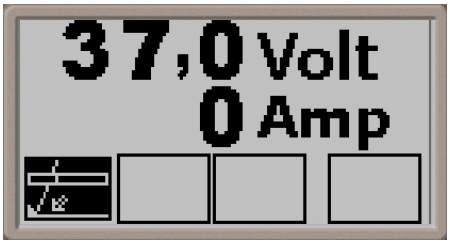
Arc-air gouging

5.3 Settings example

Setting	Value
Process	Arc-air gouging
Voltage	45 V

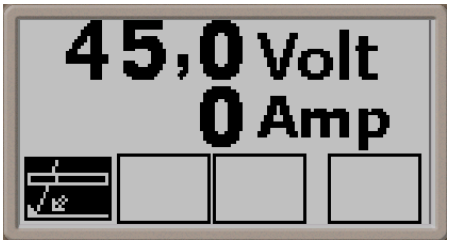
Process = Arc-air gouging

- Select the process by pressing the first function pushbutton until  is shown in the display.



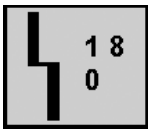
Voltage = 45 V

- Turn the knob for setting the voltage until the display shows **45 V.**



6 FAULT CODES

Fault codes are used to indicate that a fault has occurred in the equipment. They are shown in the display in the form of a symbol as follows:



Fault codes are updated every three seconds. The upper numeral in the symbol is the number of the particular fault code: see Item 6.1. The lower figure indicates where the fault is:
0 = the control panel
2 = the power unit
3 = the wire feed unit
4 = the remote control

The above symbol shows that the control panel (0) has lost contact with the power unit.

If several faults have been detected, only the code for the last fault to occur will be displayed.

Press any of the function keys in order to clear the symbol from the display.

Symbols may be steady or flashing, depending on the type of fault.

Flashing symbols are highlighted with “o” in the list of fault codes.

6.1 Fault code list

Fault code	Description	Control panel	Power unit	Wire feed unit	Remote control
1	Memory error, EPROM	x	x	x	x
2	Memory error, RAM	x	x	x	
3	Memory error, external RAM	x			
4	5V power supply	x	x		
5	High intermediate DC voltage		x		
6	High temperature		x		
8	Power supply 1*	x	x	x	x
9	Power supply 2*		x	x	x
10	Power supply 3*		x		
11	Wire feed servo			x	
12	Communication error (warning)	x	x	x	x
14	Communication error (bus off)	x			
15	Messages lost	x	x	x	x
16	High open-circuit voltage		x		
17	Lost contact with the wire feed unit	o			
18	Lost contact with the power unit	o			
19	Incorrect settings values in external RAM	x			
20	Memory allocation error	x			
22	Transmitter buffer overflow	x			
23	Receiver buffer overflow	x			

Fault code	Description	Control panel	Power unit	Wire feed unit	Remote control
26	Watchdog	x	x	x	
27	Out of wire			o	
28	Stack overflow	x	x	x	
29	No cooling water flow		o		
31	No reply from the display unit	x			
32	No gas flow			o	

Unit	Power supply 1*	Power supply 2*	Power supply 3*
Control panel	+3V		
Power unit	+15V	-15V	+24V
Wire feed unit	+15V	+ 20V	
Remote control	+13V	+10V	

6.2 Fault 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, send for 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, send for 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, send for 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 mains power supply to reset the unit. If the fault persists, send for 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 mains power supply to reset the unit. If the fault persists, send for 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 being overloaded.

Fault code	Description
8	**Low battery voltage +3V (in the control panel)** The voltage of the memory backup battery is too low. If the battery is not replaced, the contents of the welding data memory in the control panel will be lost. This fault does not disable any functions. **Action:** Send for a service technician to replace the battery.
8	**+15V power supply (wire feed unit and power unit)** The voltage is too high or too low. **Action:** Send for a service technician.
8	**+13V power supply, (remote control unit)** The voltage is too high or too low. **Action:** Send for a service technician.
9	**-15V power supply (power unit)** The voltage is too high or too low. **Action:** Send for a service technician.
9	**+20V power supply, (wire feed unit)** The voltage is too high or too low. **Action:** Send for a service technician.
9	**+10 V power supply (remote control unit)** The voltage is too high or too low. **Action:** Send for a service technician.
10	**+24V power supply** The voltage is too high or too low. **Action:** Send for a service technician.
11	**Wire feed speed** The wire feed speed differs from the set value. Wire feed stops if this fault occurs. **Action:** Send for a service technician.
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, send for 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 mains power supply to reset the unit. If the fault persists, send for 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 mains power supply to reset the unit. If the fault persists, send for a service technician.
16	**High open-circuit voltage** The open-circuit voltage has been too high. **Action:** Turn off the mains power supply to reset the unit. If the fault persists, send for a service technician.

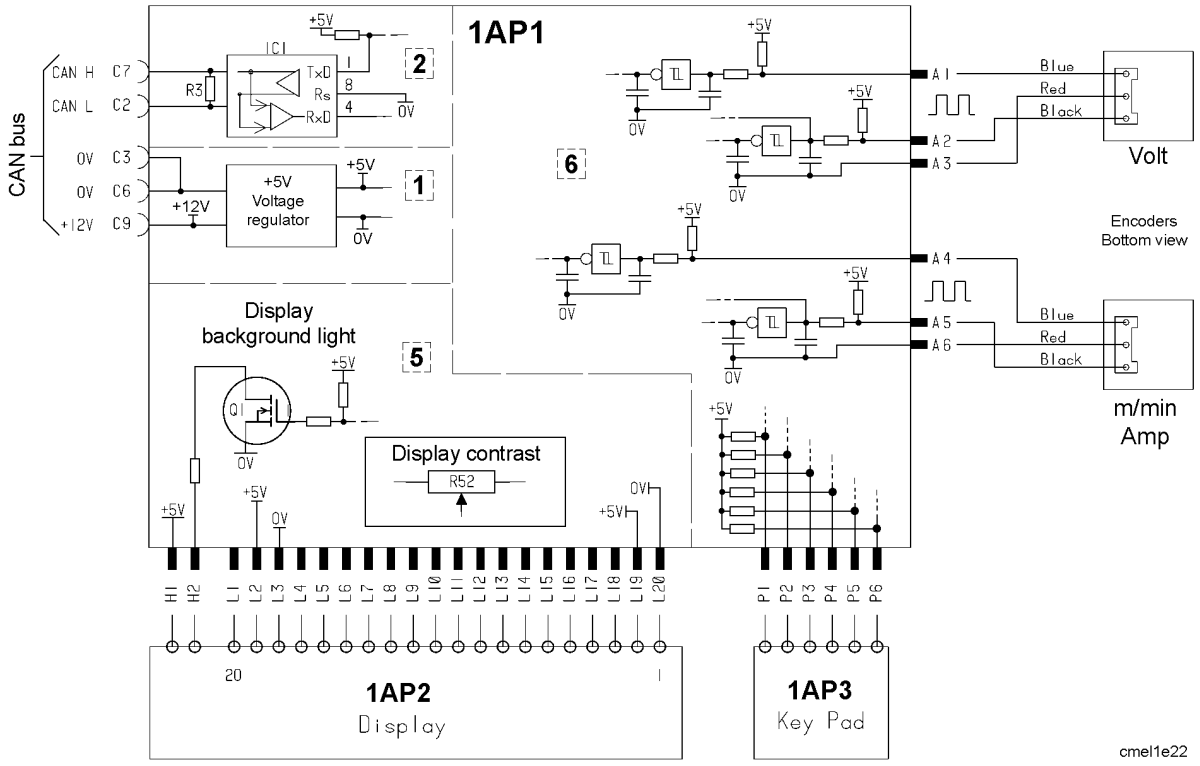
Fault code	Description
17	**Lost contact** The control panel has lost contact with the wire feed unit. The current welding process is stopped. **Action:** Check the cables. If the fault persists, send for a service technician.
18	**Lost contact** The control panel has lost contact with the power unit. The current welding process is stopped. **Action:** Check the cables. If the fault persists, send for a service technician.
19	**Incorrect settings values in external RAM** This fault will be detected if the information in the battery-backed memory has become corrupted. **Action:** The fault will correct itself, but the data stored in the current memory position will be lost.
20	**Memory allocation error** The microprocessor is unable to reserve sufficient memory space. This fault will generate fault code 26. **Action:** 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 mains 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 mains power supply to reset the unit.
26	**Watchdog** Something has prevented the processor from performing its normal program duties. The program restarts automatically. The current welding process will be stopped. This fault does not disable any functions. **Action:** If the fault recurs, send for a service technician.
27	**Out of wire (wire feed unit)** The wire feed unit is not feeding any wire. The current welding process will be stopped, and cannot be restarted. **Action:** Load new wire.
28	**Stack overflow** Program execution is not working. **Action:** Turn off the mains power supply to reset the unit. If the fault persists, send for a service technician.
29	**No cooling water flow** The flow monitor switch has operated. The current welding process is stopped, and cannot be restarted. **Action:** Check the cooling water circuit and the pump.
31	**No reply from the display unit** The microprocessor is not in contact with the display board. **Action:** Send for a service technician.
32	**No gas flow** Gas flow is less than 6 l/min. Welding cannot be started. **Action:** Check the gas valve, hoses and connectors.

7 ORDERING SPARE PARTS

Note!
All guarantee undertakings from the supplier cease to apply if the customer himself attempts any work in the product during the guarantee period in order to rectify any faults.

Spare parts may be ordered through your nearest ESAB dealer, see the last page of this publication.

Diagram



Ordering number

Ordering no.	Denomination
0458 535 884	Aristo® MA4
0458 818 170	Instruction manual SE
0458 818 171	Instruction manual DK
0458 818 172	Instruction manual NO
0458 818 173	Instruction manual FI
0458 818 174	Instruction manual GB
0458 818 175	Instruction manual DE
0458 818 176	Instruction manual FR
0458 818 177	Instruction manual NL
0458 818 178	Instruction manual ES
0458 818 179	Instruction manual IT
0458 818 180	Instruction manual PT
0458 818 181	Instruction manual GR
0458 818 182	Instruction manual PL
0458 818 183	Instruction manual HU
0458 818 184	Instruction manual CZ
0458 818 127	Instruction manual RU, GB
0458 818 187	Instruction manual US
0458 818 990	Spare parts list Aristo® MA4

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

NOTES

NOTES

ESAB subsidiaries and representative offices

Europe

AUSTRIA
ESAB Ges.m.b.H
Vienna-Liesing
Tel: +43 1 888 25 11
Fax: +43 1 888 25 11 85

BELGIUM
S.A. ESAB N.V.
Brussels
Tel: +32 2 745 11 00
Fax: +32 2 745 11 28

BULGARIA
ESAB Kft Representative Office
Sofia
Tel/Fax: +359 2 974 42 88

THE CZECH REPUBLIC
ESAB VAMBERK s.r.o.
Vamberk
Tel: +420 2 819 40 885
Fax: +420 2 819 40 120

DENMARK
Aktieselskabet ESAB
Herlev
Tel: +45 36 30 01 11
Fax: +45 36 30 40 03

FINLAND
ESAB Oy
Helsinki
Tel: +358 9 547 761
Fax: +358 9 547 77 71

FRANCE
ESAB France S.A.
Cergy Pontoise
Tel: +33 1 30 75 55 00
Fax: +33 1 30 75 55 24

GERMANY
ESAB GmbH
Solingen
Tel: +49 212 298 0
Fax: +49 212 298 218

GREAT BRITAIN
ESAB Group (UK) Ltd
Waltham Cross
Tel: +44 1992 76 85 15
Fax: +44 1992 71 58 03

ESAB Automation Ltd
Andover
Tel: +44 1264 33 22 33
Fax: +44 1264 33 20 74

HUNGARY
ESAB Kft
Budapest
Tel: +36 1 20 44 182
Fax: +36 1 20 44 186

ITALY
ESAB Saldatura S.p.A.
Bareggio (Mi)
Tel: +39 02 97 96 8.1
Fax: +39 02 97 96 87 01

THE NETHERLANDS
ESAB Nederland B.V.
Amersfoort
Tel: +31 33 422 35 55
Fax: +31 33 422 35 44

NORWAY
AS ESAB
Larvik
Tel: +47 33 12 10 00
Fax: +47 33 11 52 03

POLAND
ESAB Sp.zo.o.
Katowice
Tel: +48 32 351 11 00
Fax: +48 32 351 11 20

PORTUGAL
ESAB Lda
Lisbon
Tel: +351 8 310 960
Fax: +351 1 859 1277

ROMANIA
ESAB Romania Trading SRL
Bucharest
Tel: +40 316 900 600
Fax: +40 316 900 601

RUSSIA
LLC ESAB
Moscow
Tel: +7 (495) 663 20 08
Fax: +7 (495) 663 20 09

SLOVAKIA
ESAB Slovakia s.r.o.
Bratislava
Tel: +421 7 44 88 24 26
Fax: +421 7 44 88 87 41

SPAIN
ESAB Ibérica S.A.
Alcalá de Henares (MADRID)
Tel: +34 91 878 3600
Fax: +34 91 802 3461

SWEDEN
ESAB Sverige AB
Gothenburg
Tel: +46 31 50 95 00
Fax: +46 31 50 92 22

ESAB international AB
Gothenburg
Tel: +46 31 50 90 00
Fax: +46 31 50 93 60

SWITZERLAND
ESAB AG
Dietikon
Tel: +41 1 741 25 25
Fax: +41 1 740 30 55

UKRAINE
ESAB Ukraine LLC
Kiev
Tel: +38 (044) 501 23 24
Fax: +38 (044) 575 21 88

North and South America

ARGENTINA
CONARCO
Buenos Aires
Tel: +54 11 4 753 4039
Fax: +54 11 4 753 6313

BRAZIL
ESAB S.A.
Contagem-MG
Tel: +55 31 2191 4333
Fax: +55 31 2191 4440

CANADA
ESAB Group Canada Inc.
Missisauga, Ontario
Tel: +1 905 670 02 20
Fax: +1 905 670 48 79

MEXICO
ESAB Mexico S.A.
Monterrey
Tel: +52 8 350 5959
Fax: +52 8 350 7554

USA
ESAB Welding & Cutting Products
Florence, SC
Tel: +1 843 669 44 11
Fax: +1 843 664 57 48

Asia/Pacific

CHINA
Shanghai ESAB A/P
Shanghai
Tel: +86 21 2326 3000
Fax: +86 21 6566 6622

INDIA
ESAB India Ltd
Calcutta
Tel: +91 33 478 45 17
Fax: +91 33 468 18 80

INDONESIA
P.T. ESABindo Pratama
Jakarta
Tel: +62 21 460 0188
Fax: +62 21 461 2929

JAPAN
ESAB Japan
Tokyo
Tel: +81 45 670 7073
Fax: +81 45 670 7001

MALAYSIA
ESAB (Malaysia) Snd Bhd
USJ
Tel: +603 8023 7835
Fax: +603 8023 0225

SINGAPORE
ESAB Asia/Pacific Pte Ltd
Singapore
Tel: +65 6861 43 22
Fax: +65 6861 31 95

SOUTH KOREA
ESAB SeAH Corporation
Kyungnam
Tel: +82 55 269 8170
Fax: +82 55 289 8864

UNITED ARAB EMIRATES
ESAB Middle East FZE
Dubai
Tel: +971 4 887 21 11
Fax: +971 4 887 22 63

Africa

EGYPT
ESAB Egypt
Dokki-Cairo
Tel: +20 2 390 96 69
Fax: +20 2 393 32 13

SOUTH AFRICA
ESAB Africa Welding & Cutting Ltd
Durbanvill 7570 - Cape Town
Tel: +27 (0)21 975 8924

Distributors

For addresses and phone numbers to our distributors in other countries, please visit our home page

www.esab.com

www.esab.com

110426