

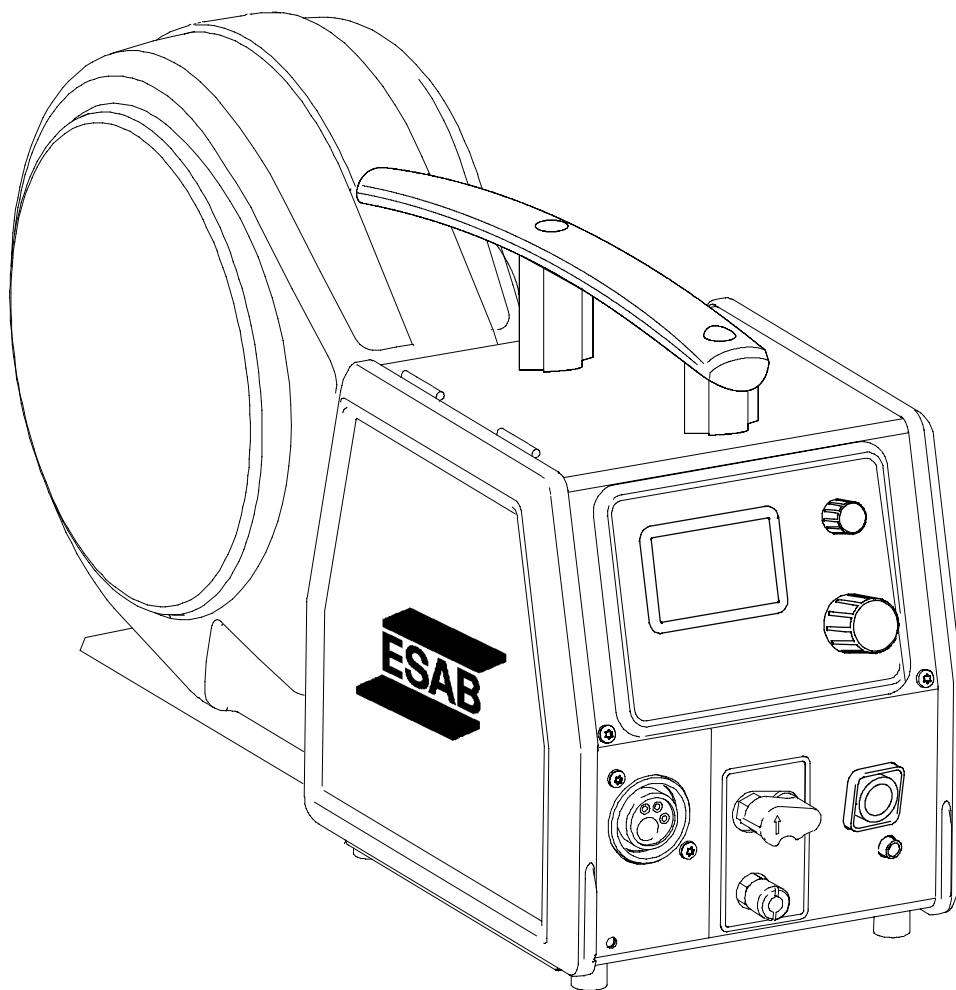


# ***Feed 3004***

# ***Feed 4804***

***Aristo™***

***AristoFeed 30-4, AristoFeed 48-4***



**Service manual**

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## READ THIS FIRST

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Maintenance and repair work should be performed by an experienced person, and electrical work only by a trained electrician. Use only recommended replacement parts.

This service manual is intended for use by technicians with electrical/electronic training for help in connection with fault-tracing and repair.

The circuit board is divided into numbered blocks, which are described individually in more detail in the description of operation. All component names in the wiring diagram are listed in the component description.

This manual contains details of all design changes that have been made up to and including July 2006.

The manual is valid for:

AristoFeed 30-4 and AristoFeed 48-4 with serial no. 038-xxx-xxxx, 105-xxx-xxxx, 136-xxx-xxxx, 214-xxx-xxxx, 233-xxx-xxxx, 249-xxx-xxxx, 445-xxx-xxxx, 451-xxx-xxxx.  
Feed 3004 and Feed 4804 with serial no. 620-xxx-xxxx.

**The AristoFeed 30-4, AristoFeed 48-4, Feed 3004 and Feed 4804 wire feed units have been designed and tested in accordance with the European and international IEC/EN 60974. On completion of any service or repair work, it is the responsibility of those who have performed the work to satisfy themselves that the product complies fully with the requirements of the above standards.**

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## INTRODUCTION

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The wire feeders are renamed:

<b>New name</b>	<b>Old name</b>
Feed 3004	AristoFeed 30-4
Feed 4804	AristoFeed 48-4

The wire feed units are intended for use with power sources equipped with CAN bus communication.

## TECHNICAL DATA

	Feed 3004	Feed 4804
<b>Power supply</b>	42 V 50 - 60 Hz	42 V 50 - 60 Hz
<b>Power requirement</b>	336 VA	378 VA
<b>Motor current</b>	8 A	9 A
<b>Wire feed speed</b>	0.8 - 25 m/min	0.8 - 25 m/min
<b>Welding gun connection</b>	EURO	EURO
<b>Max. diameter of wire bobbin</b>	300 mm (*440 mm)	300 mm (*440 mm)
<b>Wire dimension</b>	0.6 - 1.6 mm	0.6 - 2.4 mm
<b>Weight</b>		
basic unit	13 kg	18 kg
with bobbin carrier	16 kg	21 kg
with enclosed bobbin carrier	17.5 kg	22.5 kg
<b>Dimensions (l x w x h)</b>		
basic unit	380 x 265 x 340 mm	380 x 265 x 340 mm
with bobbin carrier	560 x 265 x 350 mm	560 x 265 x 350 mm
with enclosed bobbin carrier	690 x 285 x 420 mm	690 x 285 x 420 mm
<b>Shielding gas</b>	All types intended for MIG/MAG welding	All types intended for MIG/MAG welding
max pressure	5 bar	5 bar
<b>Coolant</b>	50% water / 50% glycol	50% water / 50% glycol
max pressure	5 bar	5 bar
<b>Permissible load at 60% duty cycle</b>	500 A	500 A
<b>Enclosure class</b>		
basic unit	IP23	IP23
with bobbin carrier	IP2X	IP2X
with enclosed bobbin carrier	IP23	IP23

\* Accessory

### Duty cycle

The duty cycle refers to the time as a percentage of a ten-minute period that you can weld at a certain load without overloading.

### Enclosure class

The **IP** code indicates the enclosure class, i. e. the degree of protection against penetration by solid objects or water. Equipment marked **IP23** is designed for indoor and outdoor use.


Equipment marked **IP2X** is designed for indoor use.

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# WIRING DIAGRAM

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## Component description

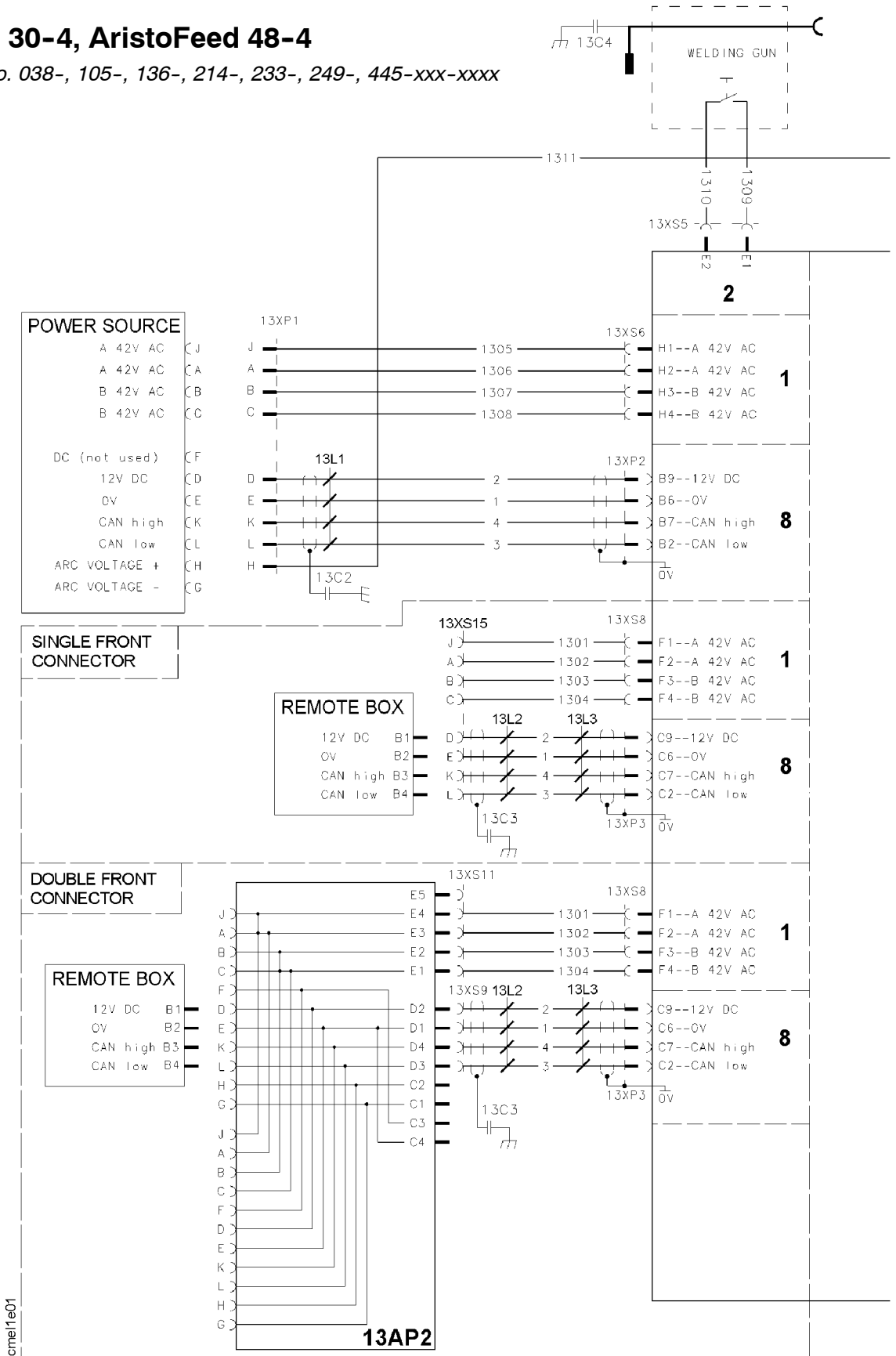
	<p><b>WARNING !</b></p> <p><b>STATIC ELECTRICITY can damage circuit boards and electronic components.</b></p> <ul style="list-style-type: none"><li>• Observe precautions for handling electrostatic-sensitive devices.</li><li>• Use proper static-proof bags and boxes.</li></ul>
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This component description should be read in conjunction with the wiring diagram. The description of operation contains a more detailed description of the functions of the components.

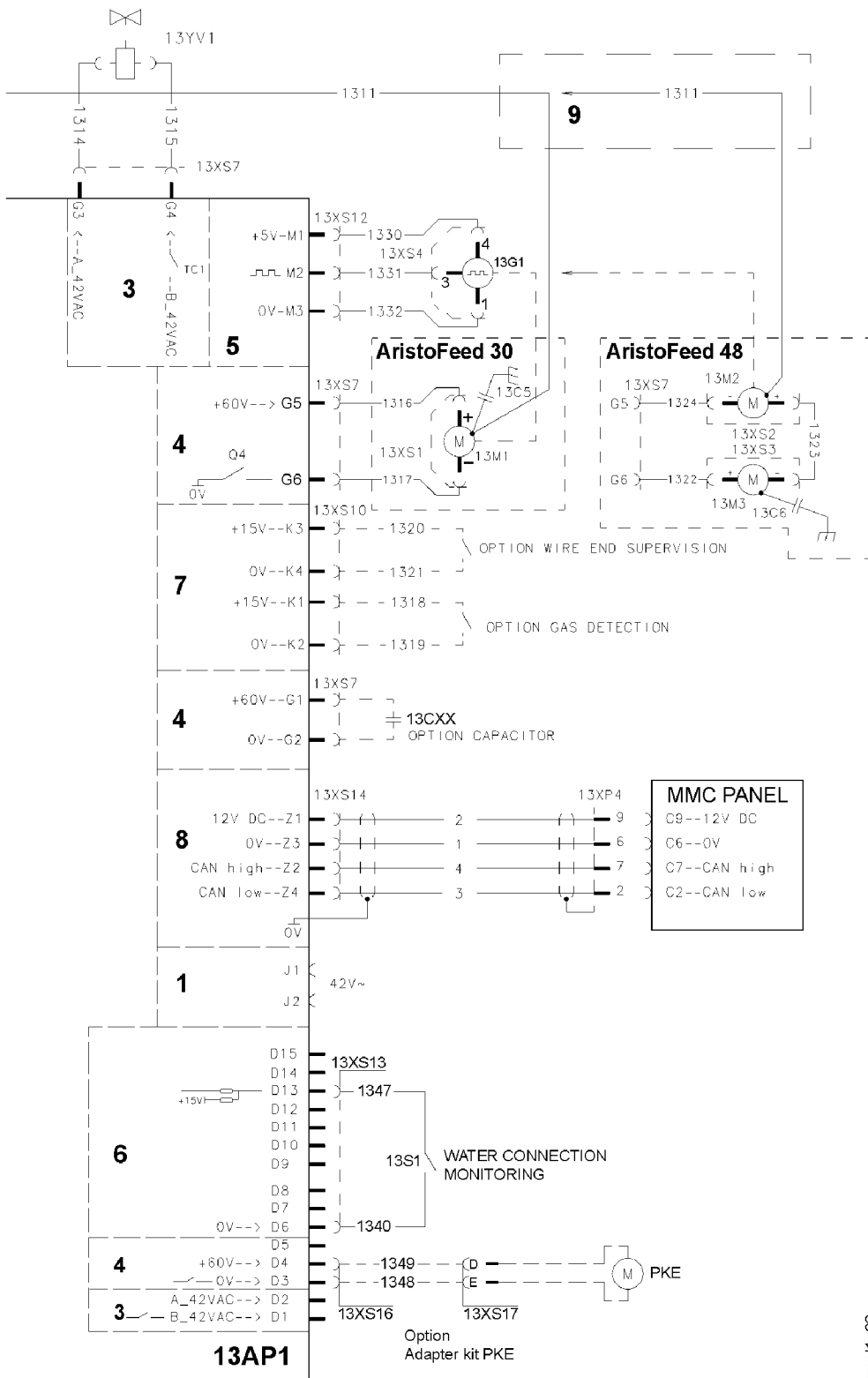
<b>1 MMC panel</b>	Control panel. See the description on page 10.
<b>13AP1</b>	Main circuit board, with the control electronics. See the description on page 11.
<b>13AP2</b>	Circuit board, contact interfacing.
<b>13C2 - 13C6</b>	Capacitor, 0.1 $\mu$ F
<b>13CXX</b>	Capacitor, 4700 $\mu$ F. Must be fitted when the wire feed unit is used under difficult applications (e.g. low mains voltage, long cables etc.).
<b>13G1</b>	Pulse generator. Incorporated in motor 13M1 or 13M2.
<b>13M1</b>	<i>Feed 3004:</i> Motor.
<b>13M2</b>	<i>Feed 4804:</i> Motor.
<b>13M3</b>	<i>Feed 4804:</i> Motor.
<b>13S1</b>	Microswitch, cooling water supply connection monitoring.
<b>13XP . .</b>	Plug connectors.
<b>13XS . .</b>	Socket connectors.
<b>13YV1</b>	Solenoid valve.

# AristoFeed 30-4, AristoFeed 48-4

valid for serial no. 038-, 105-, 136-, 214-, 233-, 249-, 445-xxx-xxxx



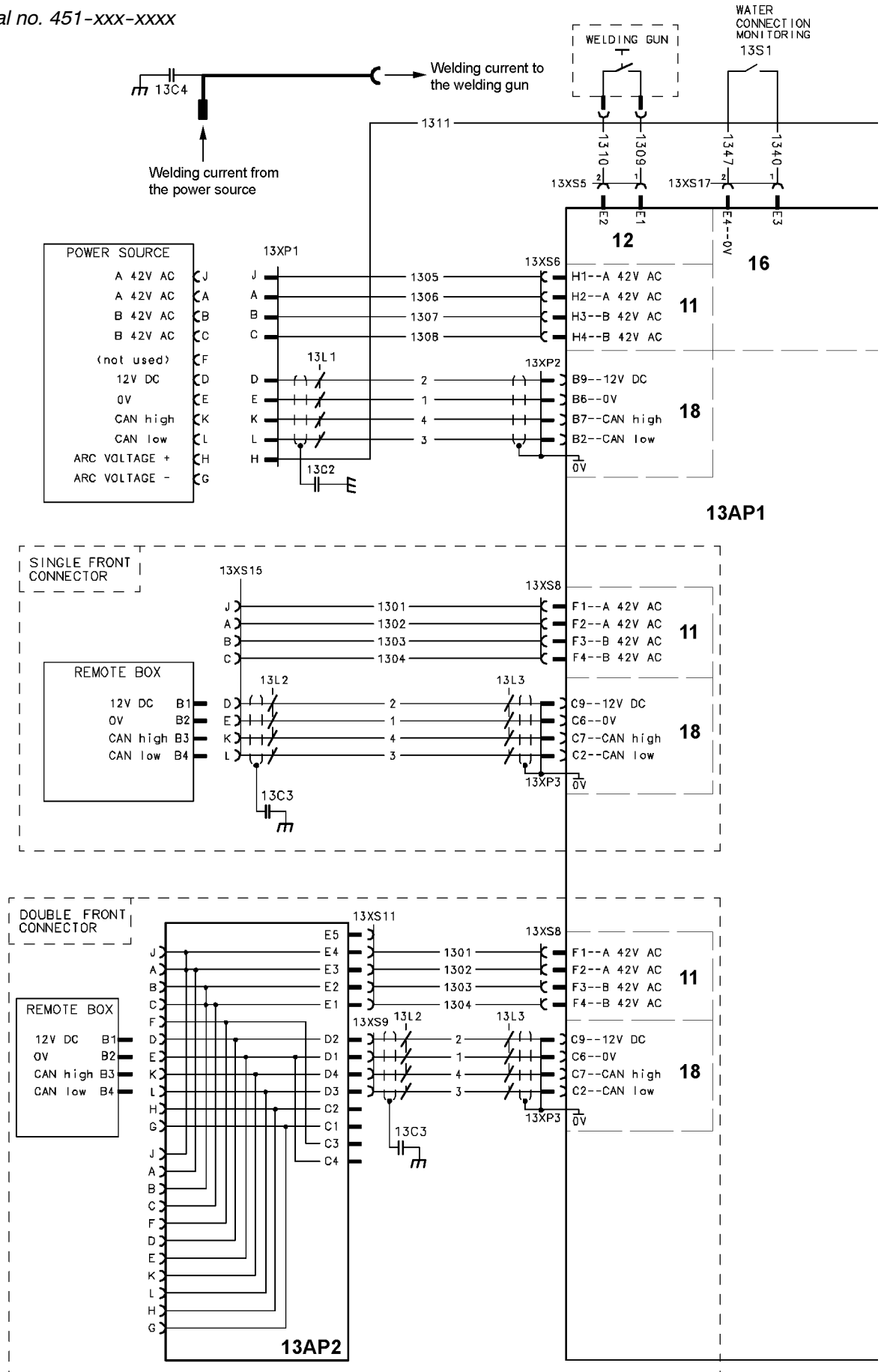
cmel1e01



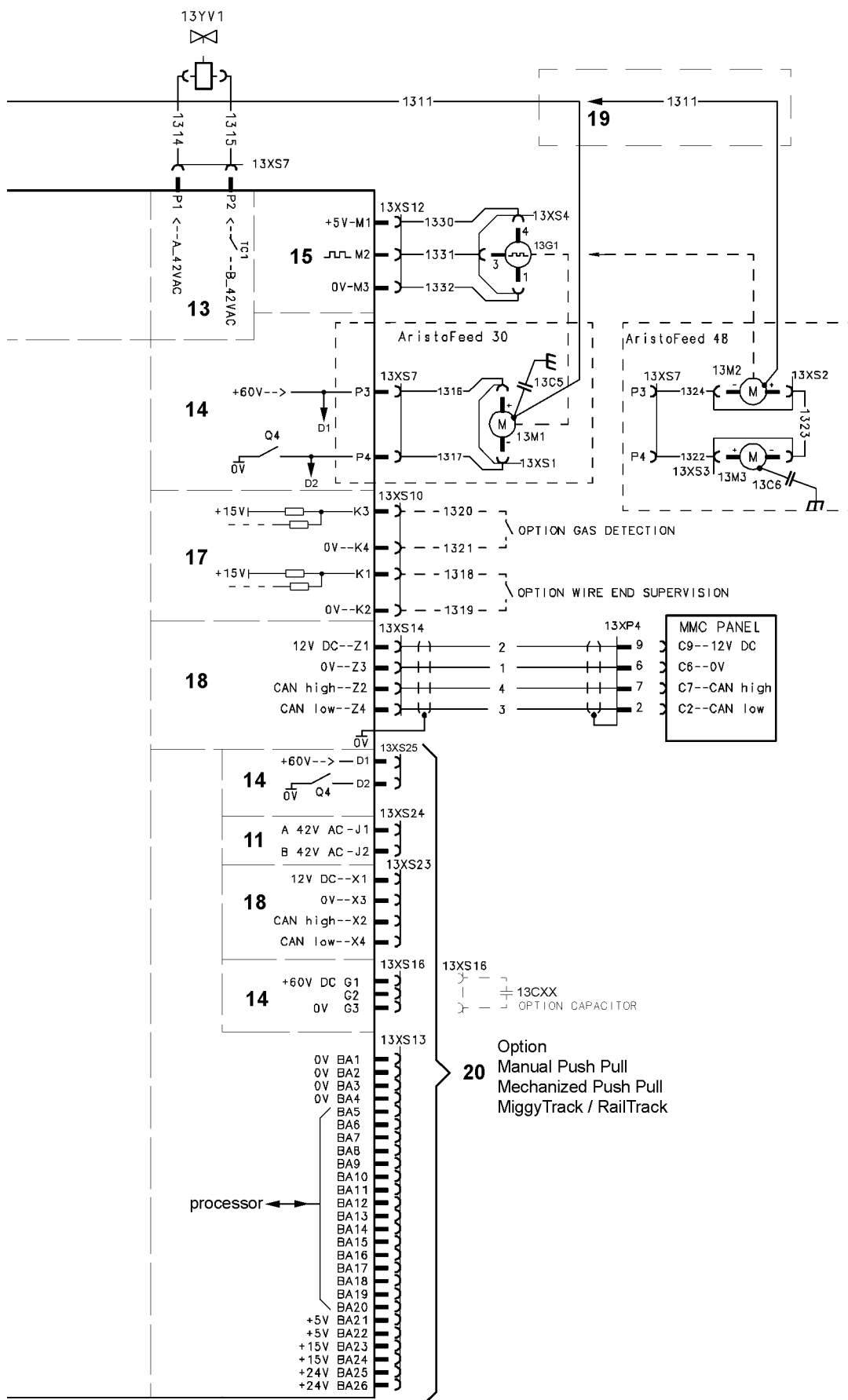
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# Feed 3004, Feed 4804, AristoFeed 30-4, AristoFeed 48-4

valid from serial no. 451-xxx-xxxx







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# DESCRIPTION OF OPERATION

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## 1 MMC panel

The MMC panel consists of a control panel and a welding data board. The power source, the wire feed unit and control panel each have their own microprocessor for control. The control panel is the central unit in the system: in addition to setting and controlling welding data, it also has overall control of the entire system.

### Setting the welding data

Man/machine communication (MMC) is facilitated by the modular design of the Aristo range. Control facilities vary from the simplest possible to those that provide more optimised control of the welding process for the best results.

The wire feed unit is supplied with one of the following control panels:

**The M0 panel**, empty panel for use with double wire feed units or with use of control box **U8**.

**The M2 panel**, with knobs for all settings/adjustments.



Control Panel M2

**The MA4 panel**, with knobs for setting the voltage and wire feed speed. Other settings by pushbuttons, with corresponding symbols on the display panel.



Control Panel MA4

**The MA6 panel**, with knobs for setting the voltage and wire feed speed. Other settings by pushbuttons, with text indication on the display panel.



Control Panel MA6

**The U6 panel**, with knobs for setting the voltage and wire feed speed / current. Other settings by pushbuttons, with text indication on the display panel.



Control Panel U6

The function description below refers to various fault codes. However, the M2 panel indicates faults by means of an LED, which can either flash or light steadily to indicate a fault. The fault indication function as well as detailed descriptions of the control panels can be found in separate manuals.

## 13AP1 Control board, valid for serial no. 038- to 445-xxx-xxxx

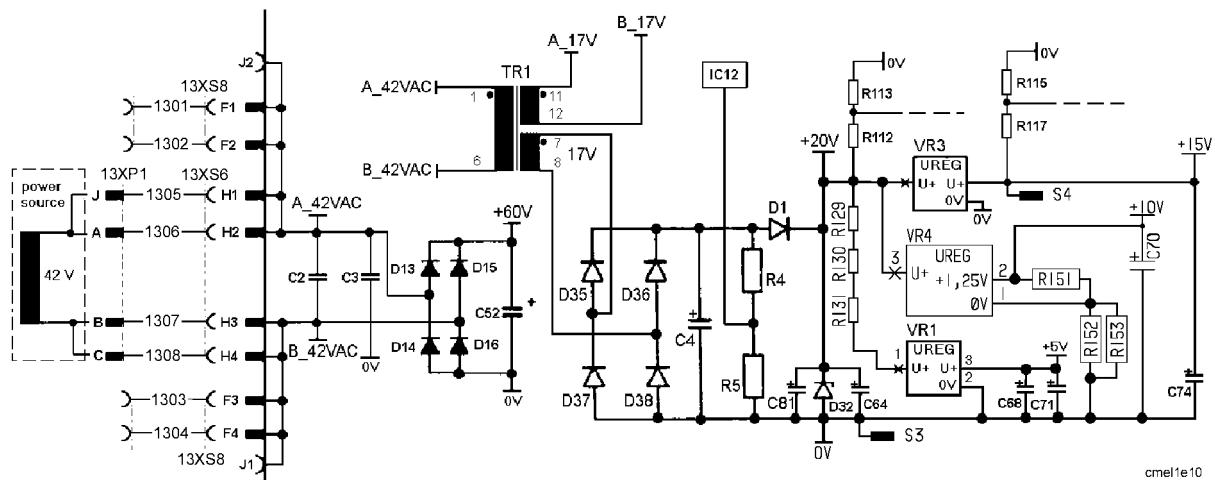
This description is valid for control board 0486 384 894, which is fitted in the AristoFeed up to and including serial no. 445-xxx-xxxx.

### Circuit board identity

The control board has a machine ID, a hardware ID and a unit type number. To read this you need the **Esat** service kit, see page 32.

The ID numbers are: **AristoFeed 30**, Machine ID = 8, **AristoFeed 48**, Machine ID = 9, Hardware ID = 0 or 255, Unit type = 3 (wire feeder unit)

### 13AP1:1 Power supply



The wire feed unit is supplied at 42 V from the control current power supply transformer in the welding power source. The feed unit can briefly draw up to about 9 A (the AristoFeed 48), or up to about 8 A (the AristoFeed 30) when accelerating the wire.

### AC supplies

Transformer TR1 is supplied with 42 V AC: this power supply is also used as the control power supply for the gas valve.

Transformer TR1 has two 17 V secondary windings, one of them (A\_17 V and B\_17 V) supplies the welding gun contact.

### DC supplies

60 V DC after diodes D13 - D16 is used to power the wire feed motor(s).

Diodes D35 - D38 rectify the 17 V supply. Voltage regulators VR1, VR4 and VR3 regulate the 20 V supply to 5 V, 10 V and 15 V respectively.

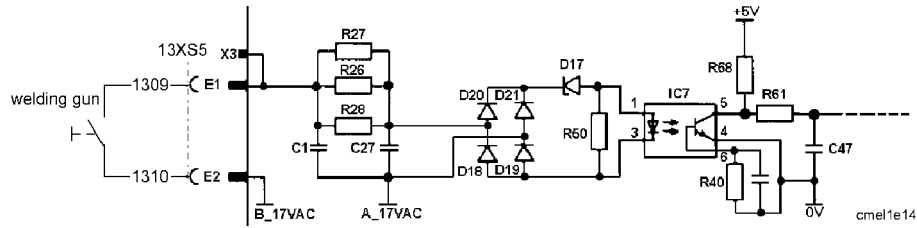
### Voltage monitoring

The secondary voltage from transformer TR1 is monitored by potential divider R4/R5: the voltage across R5 should normally be about 1.8 V. If this voltage drops to 1.25 V or less, IC12 generates a warning signal to the processor, which responds by stopping the wire feed and then all communication on the bus. The MMC panel displays fault code 4.

If the 20 V supply drops below 15 V or exceeds 25 V, the MMC panel displays fault code 9. This fault does not, however, disable any functions.

If the 15 V supply drops below 13 V or exceeds 17 V, the MMC panel displays fault code 8. This fault does not, however, disable any functions.

### 13AP1:2 Start / Stop

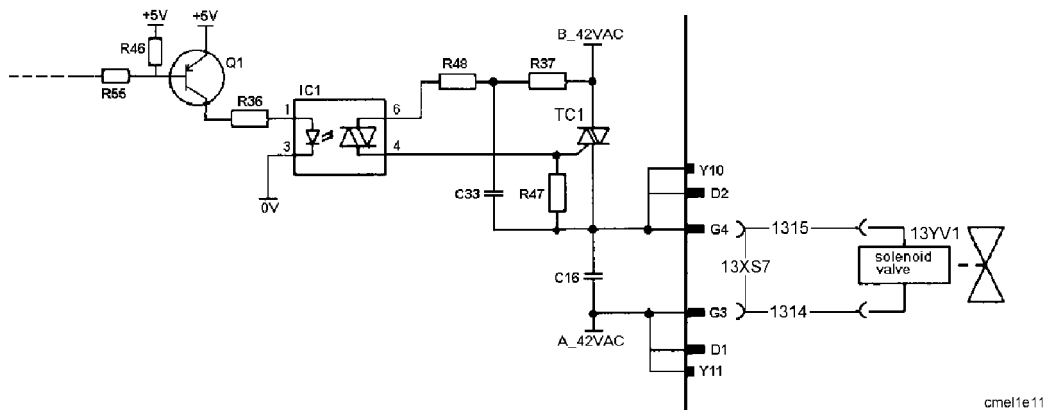


The welding gun switch contact is supplied at 17 V AC from transformer TR1.

Closing the switch contact activates optocoupler IC7, pulling C47 low.

When gas pre-flow starts, wire feed also starts and the power source generates welding voltage. If this is not followed by a flow of welding current within three seconds, the power source shuts down the welding power supply, although wire feed continues until the welding gun switch is released.

### 13AP1:3 Gas valve



The gas valve is controlled by the microprocessor. In normal operation the gas valve opens when the start signal is activated by the welding gun switch.

### 13AP1:4 Motor driving / braking

#### Driving

The motor is powered from the smoothed +60 V supply. Pulse-width modulation of transistor Q4 varies the effective motor voltage. The pulse frequency is 3.9 kHz, and the maximum conduction period is 97 % of the pulse period.

Freewheel diode D27 provides current path during the pulse off periods.

*AristoFeed 30*: The feed roller speed at the maximum wire feed speed of 25 m/min is 273 r/min.

*AristoFeed 48*: The feed roller speed at the maximum wire feed speed of 25 m/min is 167 r/min..

#### Current monitoring

Resistor R114 generates a voltage signal proportional to motor current. This voltage is applied to potential divider R105/R106 and the output is compared with a reference voltage at voltage comparator IC14:11. The reference voltage is provided by the microprocessor via R104.

Wire feeders with serial number prior to 136-xxx-xxx, with software version prior to 2.81A: The current limit is 15 A on starting. After one second, this is reduced to 8 A in the AristoFeed 30 and 9 A in the AristoFeed 48.

Wire feeders from serial number 136-xxx-xxx (from software version 2.81A)  
*AristoFeed 30*: The current limit is 15 A on starting. After one second, this is reduced to 13 A.

*AristoFeed 48*: The current limit is 18 A on starting and remains at 18 A. The current limit is related to the pulse peak current.

If the current exceeds the current limit, IC14:2 interrupts the gate pulse to Q4. The current falls, and Q4 conducts on the next gate pulse, which is again interrupted if the current is still too high. This sequence continues until the motor current has fallen below the current limit.

### Speed monitoring

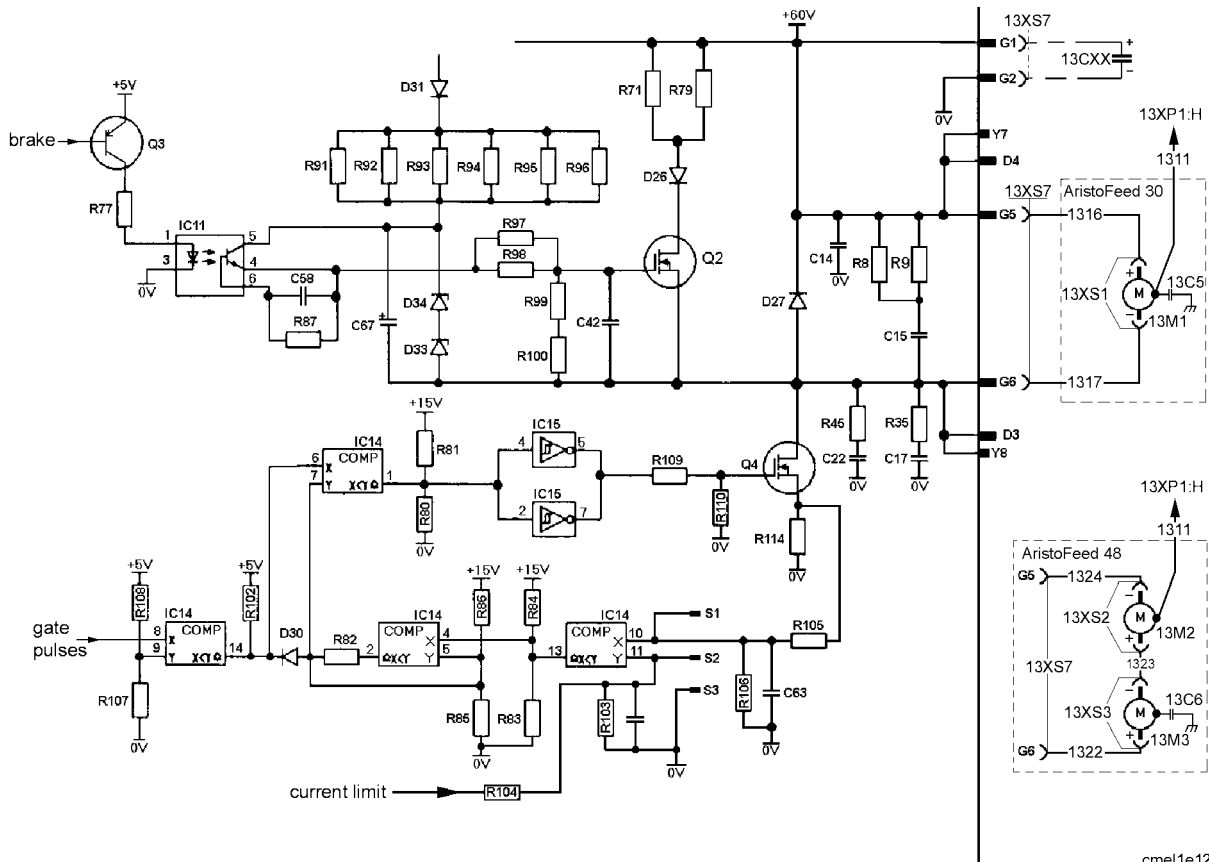
Wire feed speed is monitored by the microprocessor on the circuit board.

Wire feed is stopped if the feed speed deviates from the set speed by more than 1.5 m/min for more than 5.1 seconds. The MMC panel displays fault code 11.

### Braking

Capacitor C67 is charged via diode D31 when the motor starts. Zener diodes D33 and D34 limit the voltage to 15 V.

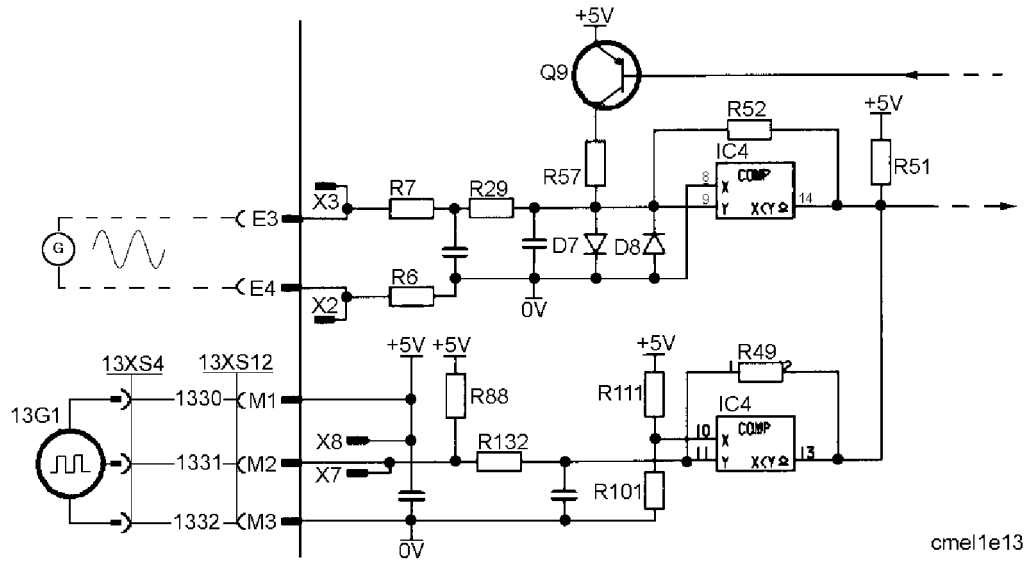
When optocoupler IC11 is energised, its output transistor conducts and connects capacitor C67 to the gate of transistor Q2, which conducts and short-circuits the motor supply via dynamic braking resistors R71 and R79. The resistors limit the current to about 20 A.



Schematic diagram of the motor drive stage

cmel1e12

### 13AP1:5 Pulse generator input



Pulse generator and tachometer inputs

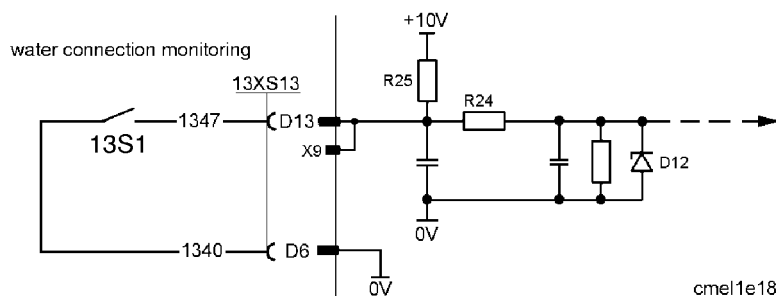
The pulse generator, 13G1, is fitted to drive motor 13M1 (AristoFeed 30), or 13M2 (AristoFeed 48).

It generates 60 pulses per revolution, which means that, at a wire feed speed of 25 m/min, the pulse frequency is 6552 Hz in the AristoFeed 30 and 8192 Hz in the AristoFeed 48.

The circuit board also has an input for use with motors fitted with tachometers: this input is not used in the AristoFeed 30/48.

The circuit board processor in the AristoFeed 30/48 controls transistor Q9 so that the input to the upper comparator IC4 is high (+5 V), which therefore disables the tachometer input.

### 13AP1:6 Monitoring the cooling water connection

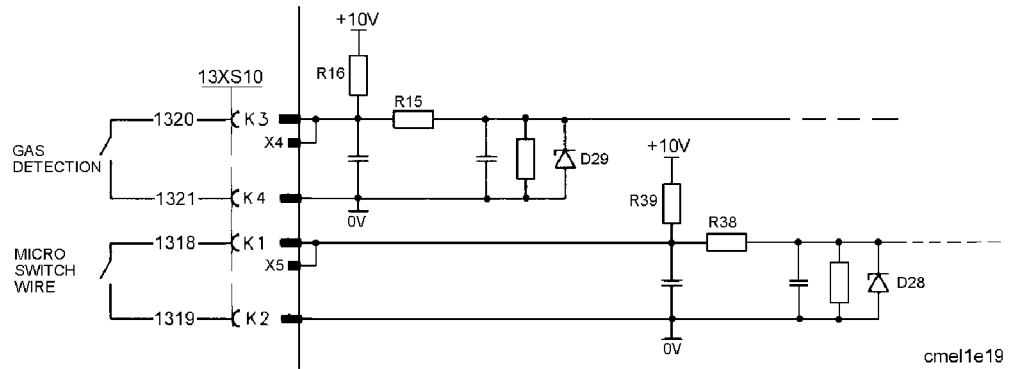


A microswitch is connected between contacts D13 and D6, and senses whether a water-cooled welding gun is connected to the wire feed unit: a closed connection between them indicates that the cooling water hoses are connected, and so provides a Start Enable signal to the system for the water pump.

The resistors connected to input D13 form a potential divider of the 10 V supply, to produce a +6 V signal for an open input. Input status is transmitted to the welding data board in the MMC panel via the data bus.

Other inputs and outputs on connector D are not used in this application.

### 13AP1:7 Monitoring wire and gas

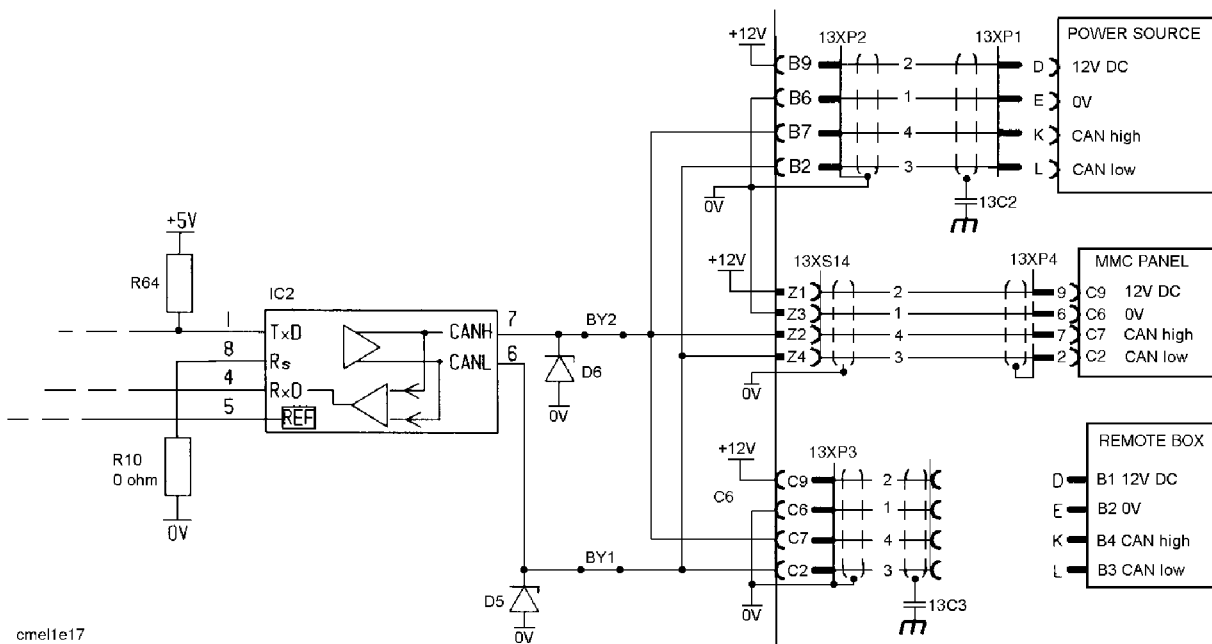


Circuit board 13AP1 is prepared for future monitoring of wire and gas supply. The MMC panel displays a fault code if either of the inputs is closed.

Fault code 27 = out of wire. Fault code 32 = no gas flow.

Monitoring of wire and gas supplies is not at present implemented, but is planned as a future accessory function.

### 13AP1:8 The CAN bus



The circuit board includes a driver for the CAN bus, IC2, which looks after communication with the MMC panel and with other units in the system.

Although the welding power source supplies a +12 V power supply to the MMC panel, this is not used on circuit board 13AP1. 0 V on the circuit board is connected to 0 V in the MMC panel.

### Starting sequence

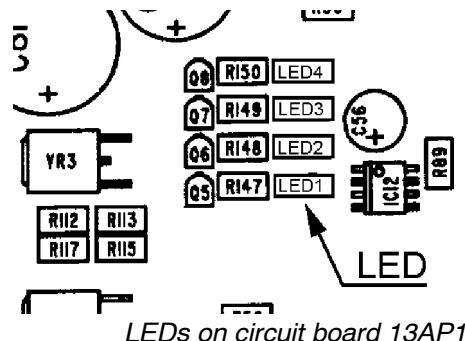
Circuit board 13AP1 carries an EEPROM, IC16, which forms the heart of operation of the board.

On power-up, the board's CAN controller reads in the bus speed from IC16: 400 kbit/s.

The circuit board displays the starting sequence from power-up.

LED1 lights, followed by LED2, after which both go out. This shows that the board has been initiated, and that the wire feed unit is in the application program.

During normal operation, all four LEDs on the board should be extinguished.



There is more information about the operation of the CAN bus in the service manual for the power source.

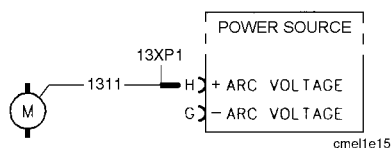
### Communication interruptions

The MMC panel displays fault codes 12 and/or 14 if communication between the panel and the wire feed unit or power source fails. On panels without a display, the fault indication lamp flashes instead.

Check the following points in the event of problems with CAN communication:

- That a terminating resistor is fitted: see the instructions on Page 35.
- The control cable:
  - Check that the correct type of cable is being used, i.e. the same as that between the power source and the wire feed unit when the equipment was delivered.
  - Check that the cores are correctly connected. CAN H and CAN L must be carried by the twinned pair.
- Check that all screen connections are sound.
- AristoFeed: Check that there is good contact at the connections to capacitors 13C2 and 13C3. See the main wiring diagram on Page 6.
- The power source: Check that there is good contact with the chassis connection to the control circuit board, the interference suppression board and the interference suppression capacitors.
- Check the power supply voltages on circuit board 13AP1.
- If there are no faults in any of the above, replace circuit board 13AP1.

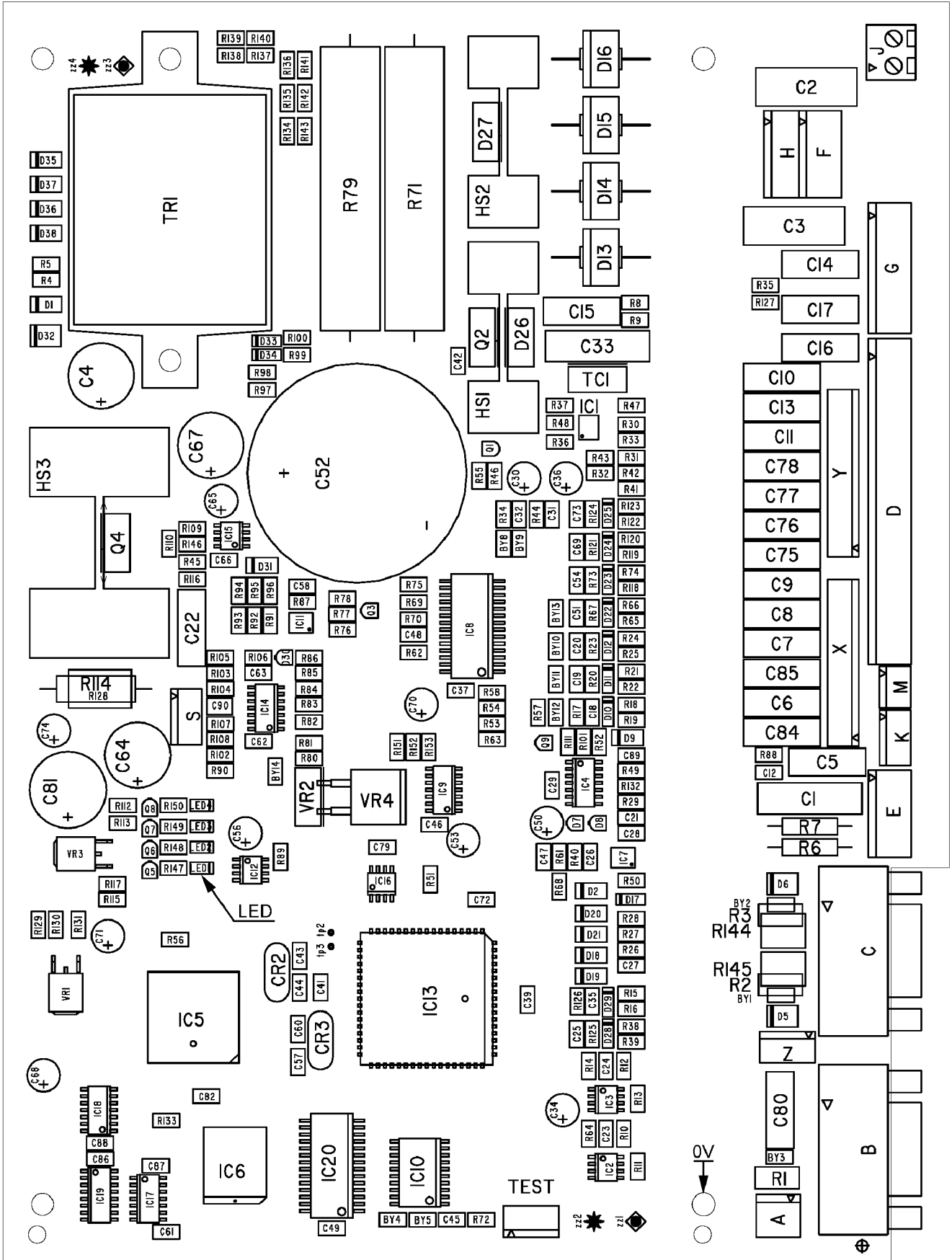
### 13AP1:9 Arc voltage sensing



In order to avoid spurious volt drops when measuring the welding arc voltage, the power source senses the arc voltage via the filler wire and the feeder unit motor.



13 AP1 Component positions



Control board 0486 384 894

cmek3e06

## 13AP1 Control board, valid from serial no. 451-xxx-xxxx

This description of operation is valid for control board 0487 187 88x, which is fitted in the wire feeders from serial no. 451-xxx-xxxx. This board can also be used as spare part for earlier versions of the wire feeders.

### Circuit board identity

The control board has a machine ID, a hardware ID and a unit type number. To read this you need the **Esat** service kit, see page 32.

- The machine ID determines which motor type and wire feeder mechanism the board is intended for. If the board is to be used for another type of motor or mechanism, the machine ID can be changed by Esat.
- The hardware ID shows design and type of circuit board.
- The unit type is used for identification on the can bus.

The ID numbers of the wire feeders are:

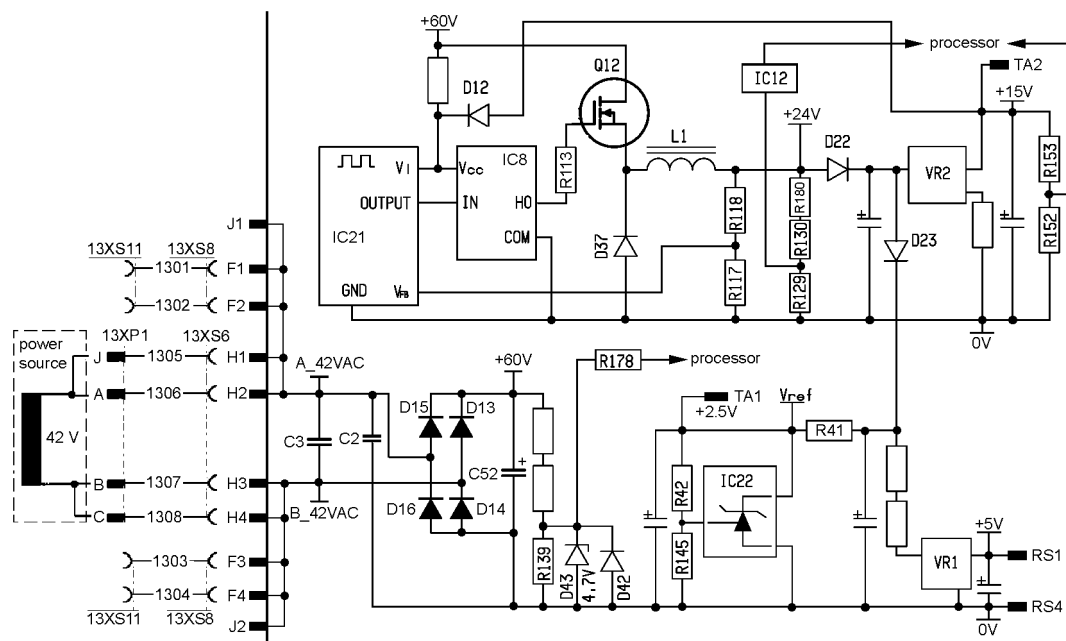
**Feed 3004** Machine ID = 8    **Feed 4804** Machine ID = 9

Hardware ID = 4

Unit type = 3 (wire feeder unit)

Spare part boards must be configured if the unit has an ELP switch, see page 21.

### 13AP1:11 Power supply



The wire feeder unit is supplied at 42 V from the control current power supply transformer in the welding power source. The feeder unit can briefly draw up to about 9 A (the Feed 4804), or up to about 8 A (the Feed 3004) when accelerating the wire.

### DC supplies

Diodes D13 – D16 rectify the 42 V AC supply. The rectified voltage is used to power the wire feeder motor(s). It also powers the switched voltage regulator.

IC21, IC8, Q12, L1 and D37 forms a switched voltage regulator. The +24 V output voltage of the regulator supplies the +15 V and +5 V regulators, VR2 and VR1. It also supplies the reference circuit IC22, which generates +2.5 V reference voltage, this is used by the analogue inputs of the processor.

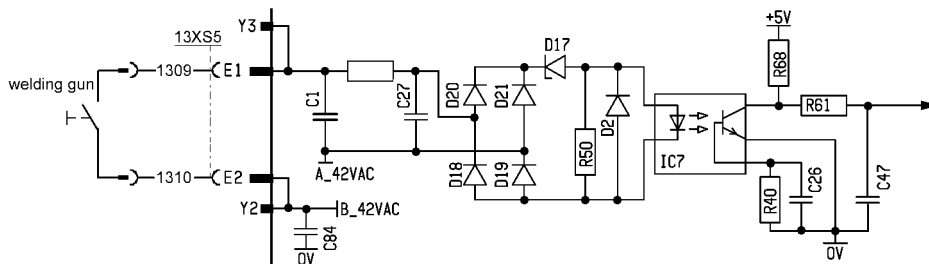
### Voltage monitoring

If the **+60 V** supply drops below 42 V or exceeds 78 V, the MMC panel displays fault code 9. This fault does not disable any functions.

The **+24 V** is monitored by IC12 and potential divider R129, R130, R180. If the voltage drops to 18 V or less, IC12 generates a warning signal to the processor, which responds by stopping the wire feed and then all communication on the bus. The MMC panel displays fault code 4.

The **+15 V** is monitored by the processor and potential divider R152/R153. If the 15 V supply drops below 13 V or exceeds 17 V, the MMC panel displays fault code 8. This fault does not, however, disable any functions.

### 13AP1:12 Start / Stop

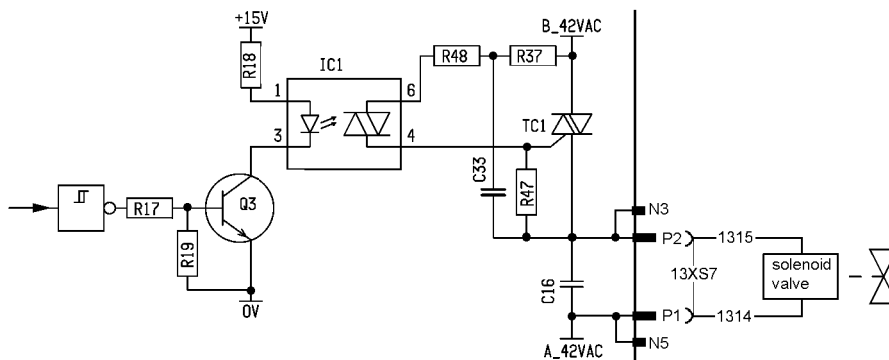


The welding gun switch contact is supplied at 42 V AC.

Closing the switch contact activates optocoupler IC7, pulling C47 low.

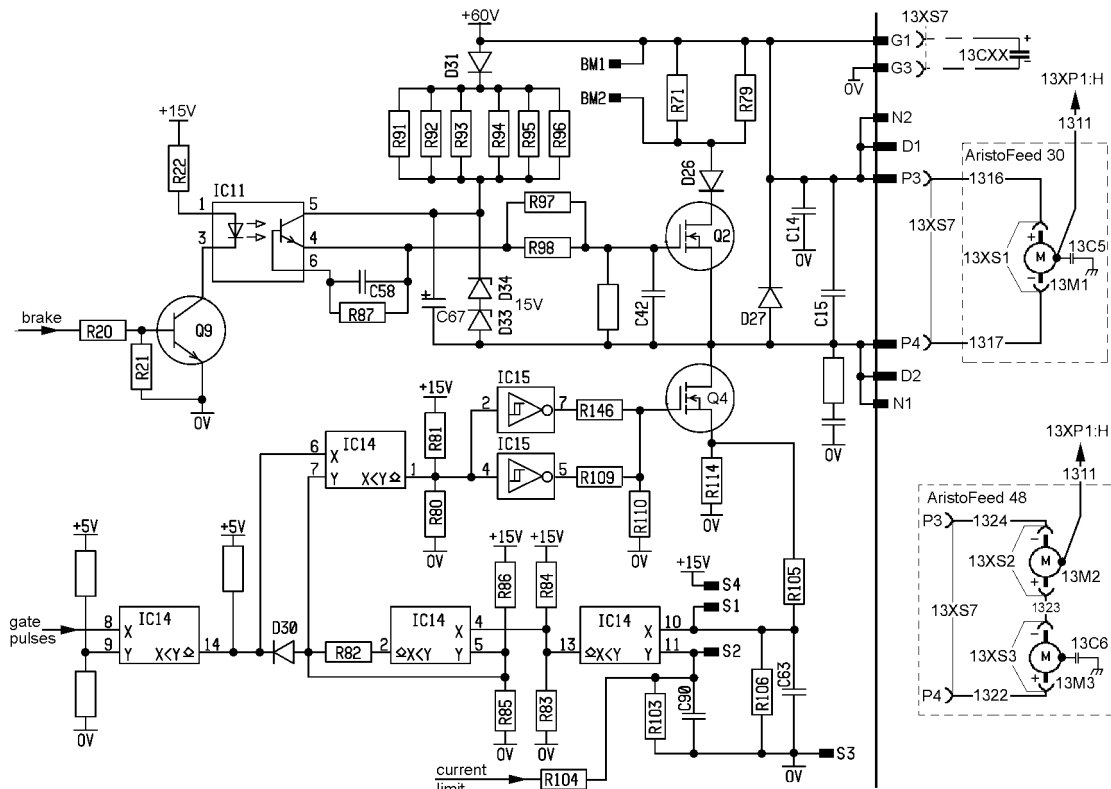
When gas pre-flow starts, wire feed also starts and the power source generates welding voltage. If this is not followed by a flow of welding current within three seconds, the power source shuts down the welding power supply, although wire feed continues until the welding gun switch is released.

### 13AP1:13 Gas valve



The gas valve is controlled by the microprocessor. In normal operation the gas valve opens when the start signal is activated by the welding gun switch.

## 13AP1:14 Motor driving / braking



Schematic diagram of the motor drive stage

### Driving

The motor is powered from the smoothed +60 V supply. Pulse-width modulation of transistor Q4 varies the effective motor voltage. Pulse frequency is 39 kHz, and the maximum conduction period is 99 % of the pulse period. Freewheel diode D27 provides current path during the pulse off periods.

*Feed 3004:* The feed roller speed at the maximum wire feed speed of 25 m/min is 273 r/min.

*Feed 4804:* The feed roller speed at the maximum wire feed speed of 25 m/min is 167 r/min..

### Current monitoring

Resistor R114 generates a voltage signal proportional to motor current. This voltage is applied to potential divider R105/R106 and the output is compared with a reference voltage at voltage comparator IC14:11. The reference voltage is provided by the microprocessor via R104.

The current limit is 20 A on starting. After one second, this is reduced to 13 A for the Feed 3004 and 15A for the Feed 4804. The current limit is related to the pulse peak current.

If the current exceeds the current limit, IC14:2 interrupts the gate pulse to Q4. The current falls, and Q4 conducts on the next gate pulse, which is again interrupted if the current is still too high. This sequence continues until the motor current has fallen below the current limit.

### Speed monitoring

Wire feed speed is monitored by the microprocessor on the circuit board.

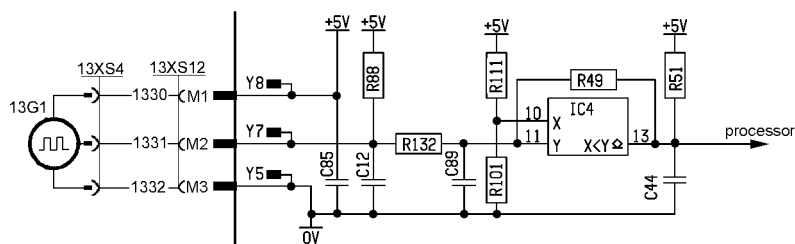
Wire feed is stopped if the feed speed deviates from the set speed by more than 1.5 m/min for more than 5.1 seconds. The MMC panel displays fault code 11.

### Braking

Capacitor C67 is charged via diode D31 when the motor starts. Zener diodes D33 and D34 limit the voltage to 15 V.

When optocoupler IC11 is energised, its output transistor conducts and connects capacitor C67 to the gate of transistor Q2, which conducts and short-circuits the motor supply via dynamic braking resistors R71 and R79. The resistors limit the current to about 20 A.

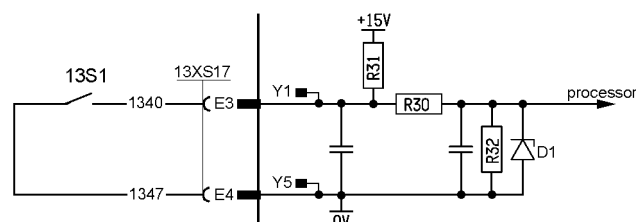
### 13AP1:15 Pulse generator input



The pulse generator, 13G1, is fitted to drive motor 13M1 (Feed 3004), or 13M2 (Feed 4804).

It generates 60 pulses per revolution, which means that, at a wire feed speed of 25 m/min, the pulse frequency is 6552 Hz in the Feed 3004 and 8192 Hz in the Feed 4804.

### 13AP1:16 Monitoring the cooling water connection



The wire feed unit with water connection is equipped with a detection system **ELP (ESAB Logic Pump)** which checks that the water hoses are connected. When connecting a water-cooled welding gun, the water pump starts.

Microswitch 13S1 senses whether a water-cooled welding gun is connected to the wire feed unit: a closed switch indicates that the cooling water hoses are connected, and so provides a Start Enable signal to the system for the water pump.

The resistors connected to input E3 form a potential divider of the 15 V supply, to produce about +6 V for an open input.

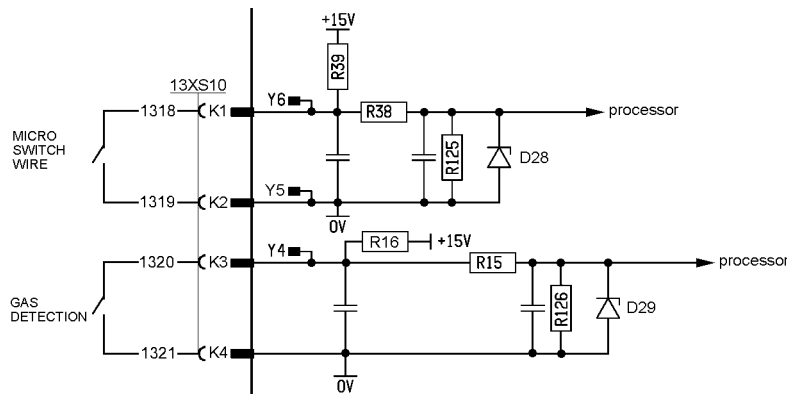
#### Note:

When a spare part board is installed in a wire feed unit with water connection, the board must be configured for ELP. (Valid from software version 3.07A.)

Use the service function selection of Esat and select:  
Service function / Assign ELP exist / Argument 2: Set ELP exist.

For more information on Esat, see page 32.

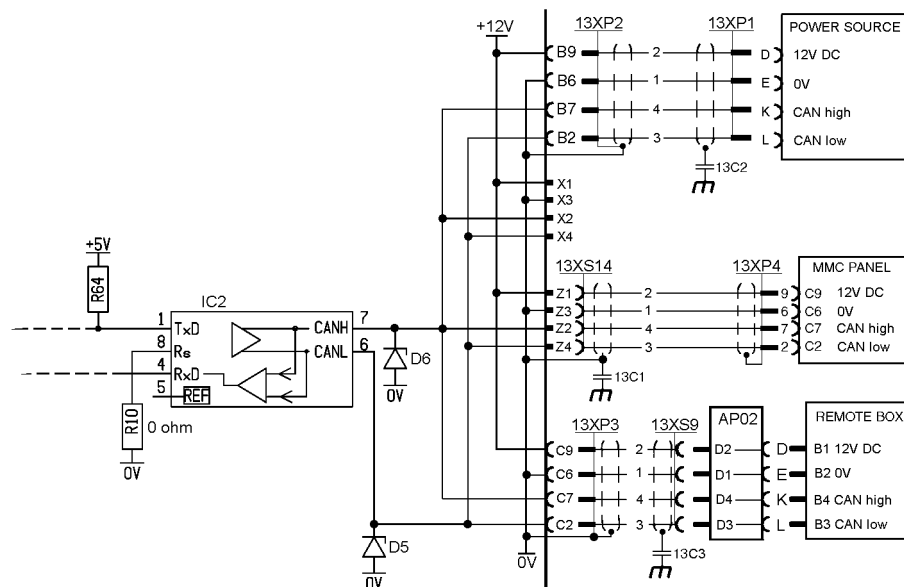
### 13AP1:17 Monitoring wire and gas



Circuit board 13AP1 is prepared for future monitoring of wire and gas supply. The MMC panel displays a fault code if either of the inputs is closed.

Fault code 27 = out of wire. Fault code 32 = no gas flow.

### 13AP1:18 The CAN bus



The circuit board includes a driver for the CAN bus, IC2, which looks after communication with the MMC panel and with other units in the system.

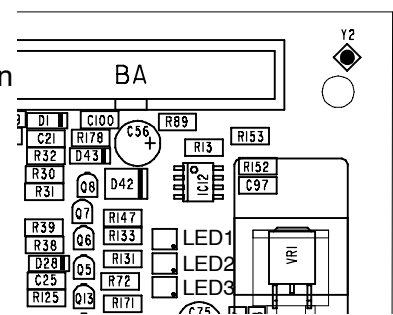
Although the welding power source supplies a +12 V power supply to the MMC panel, this is not used on circuit board 13AP1. 0 V on the circuit board is connected to 0 V in the MMC panel.

### Starting sequence

On power-up, the board's CAN controller reads in the bus speed from the micro processor: 400 kbit/s.

The circuit board displays the starting sequence from power-up.

LED1 lights red. Then LED1, LED2 and LED3 lights green.



LEDs on circuit board 13AP1

When the board has been initiated, and the wire feed unit is in the application program, LED1 flashes continuously with a green light.

There is more information about the operation of the CAN bus in the service manual for the power source.

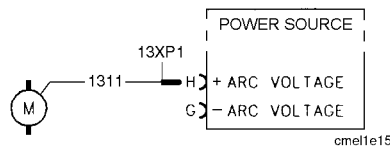
### **Communication interruptions**

The MMC panel displays fault codes 12 and/or 14 if communication between the panel and the wire feed unit or power source fails. On panels without a display, the fault indication lamp flashes instead.

Check the following points in the event of problems with CAN communication:

- That a terminating resistor is fitted: see the instructions on Page 35.
- The control cable:  
Check that the correct type of cable is being used, i.e. the same as that between the power source and the wire feed unit when the equipment was delivered.  
Check that the cores are correctly connected. CAN H and CAN L must be carried by the twinned pair.
- Check that all screen connections are sound.
- The feed unit: Check that there is good contact at the connections to capacitors 13C2 and 13C3. See the main wiring diagram on Page 6.
- The power source: Check that there is good contact with the chassis connection to the control circuit board, the interference suppression board and the interference suppression capacitors.
- Check the power supply voltages on circuit board 13AP1.
- If there are no faults in any of the above, replace circuit board 13AP1.

### **13AP1:19 Arc voltage sensing**



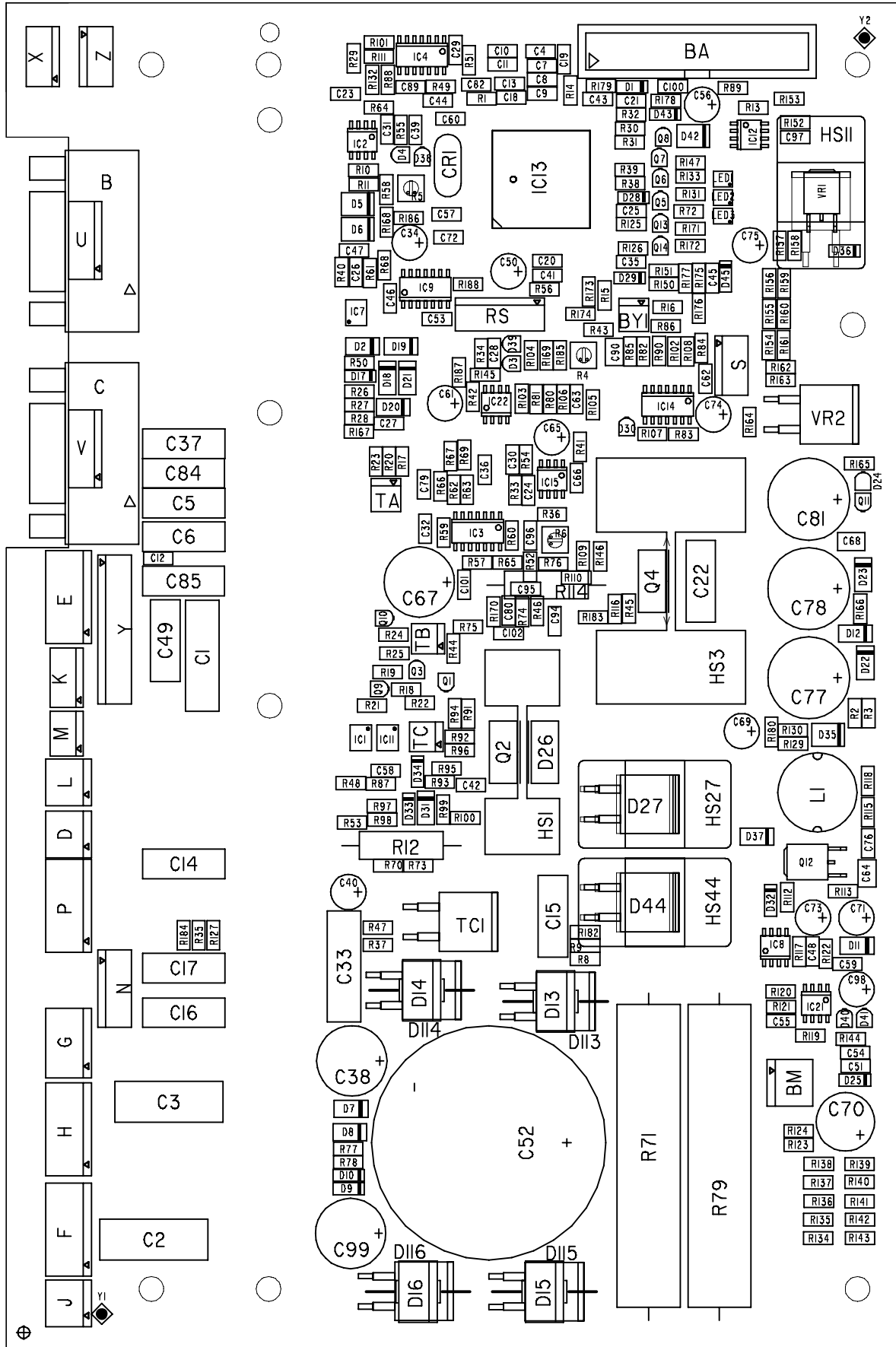
In order to avoid spurious volt drops when measuring the welding arc voltage, the power source senses the arc voltage via the filler wire and the feeder unit motor.

### **13AP1:20 Push Pull & I/O**

Terminals D, J, X and G and are used for the manual push pull, mechanized push pull, MiggyTrack and RailTrack options: see pages 25-27.

Terminal BA is for present not used for any standard options.

13AP1 Component positions



Control board 0487 187 88x



## CAN adapter option

The CAN adapter option is used when MiggyTrac, RailTrac or a welding gun with pull motor is connected to the wire feeder.

Connection instructions for the option are included in the delivery. There is a copy of the instructions on page 27.

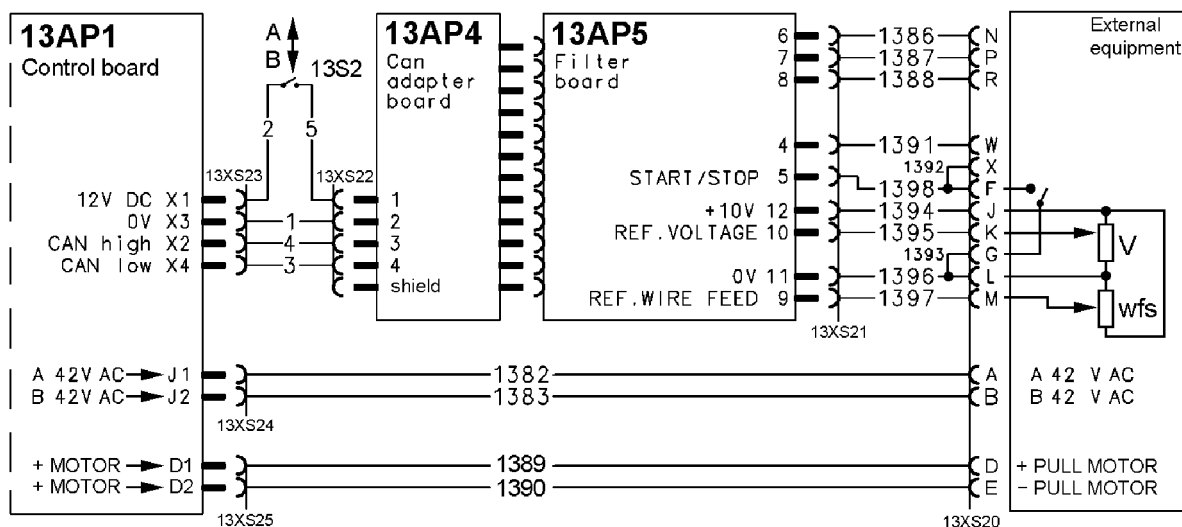
The option can be fitted to wire feeders with serial number 451-xxx-xxxx and there above.

The adapter board has a software identity, machine ID. The ID defines how the welding equipment reacts on the commands from the connected equipment. The CAN adapter options are delivered with correct machine ID. Spare part boards are delivered without machine ID. To read or change the machine ID you need the **Esat** service kit, see page 32.

The control panels M2, MA4, MA6 and U6 must have software version 1.21M or later. Wire feeders from serial no. 451-508-xxxx and with built-in control panels have this version. If an AristoPendant U8 is used, this must have software version 1.20K or later.

The CAN adapter board has a built-in terminating resistor. The resistor is disconnected on delivery of this option. In most operating cases it should be disconnected. It can however be connected by a jumper over terminal J1 on the CAN adapter board. See the component position diagram on page 26.

### MiggyTrac, RailTrac



Can adapter board, filter board and cable set connected to the control board of the wire feeder

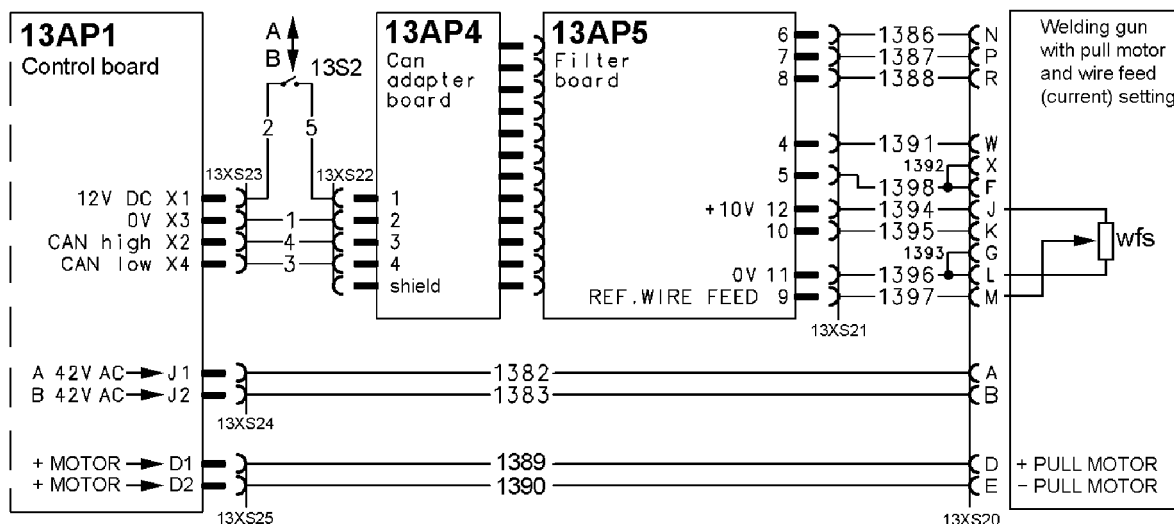
### Adapter option for MiggyTrac / RailTrac 0459 681 880

The adapter board is delivered with machine ID 2.

Switch 13S2 is used for activating / deactivating the external control functions. When the switch is in position **B**, the external controls are active and the control panel of the feeder is inactive. In position **A** the control panel is active and the external controls inactive.

If the wire feeder is controlled by an U8, switch 13S2 has to be in position B. Then external or internal control can be selected by the U8.

### Welding gun with pull motor



Can adapter board, filter board and cable set connected to the control board of the wire feeder

### Adapter option for welding gun with pull motor 0459 681 881

The adapter board is delivered with machine ID 7.

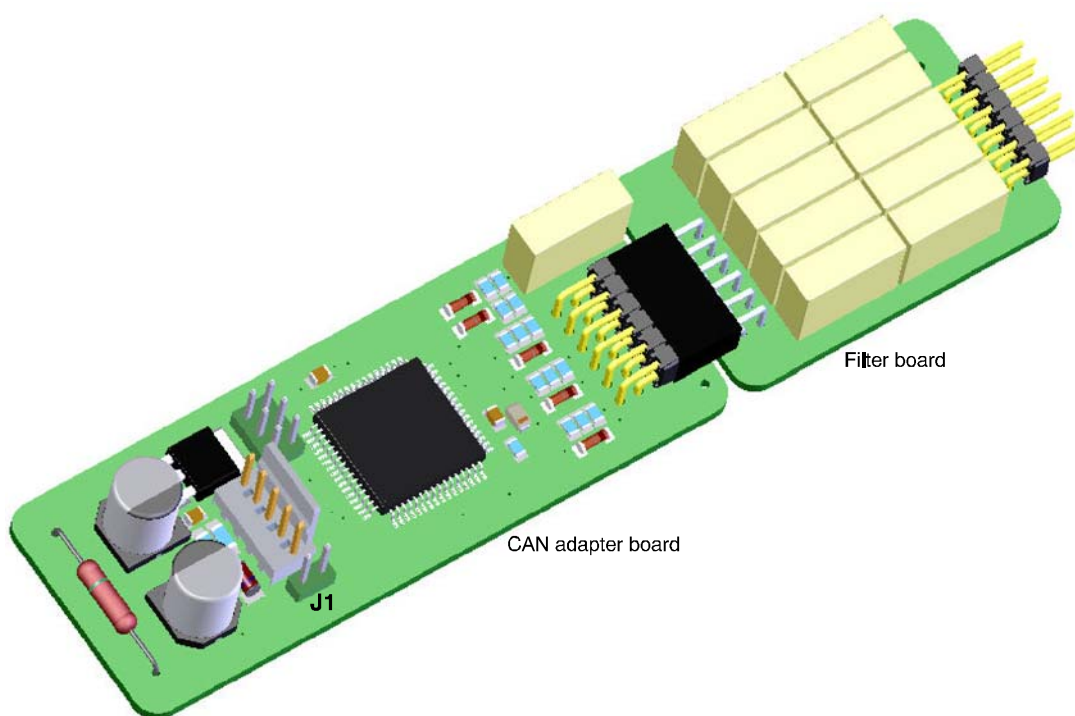
Switch **13S2** is used for activating / deactivating the wire feed speed potentiometer on the welding gun. When the switch is in position **B**, the potentiometer on the gun is active and the control panel of the feeder is inactive. In position **A** the control panel is active and the potentiometer on the gun is inactive.

If the wire feeder is controlled by an AristoPendant U8, switch 13S2 has to be in position B. Then external or internal control of the wire feed speed can be selected by the U8.

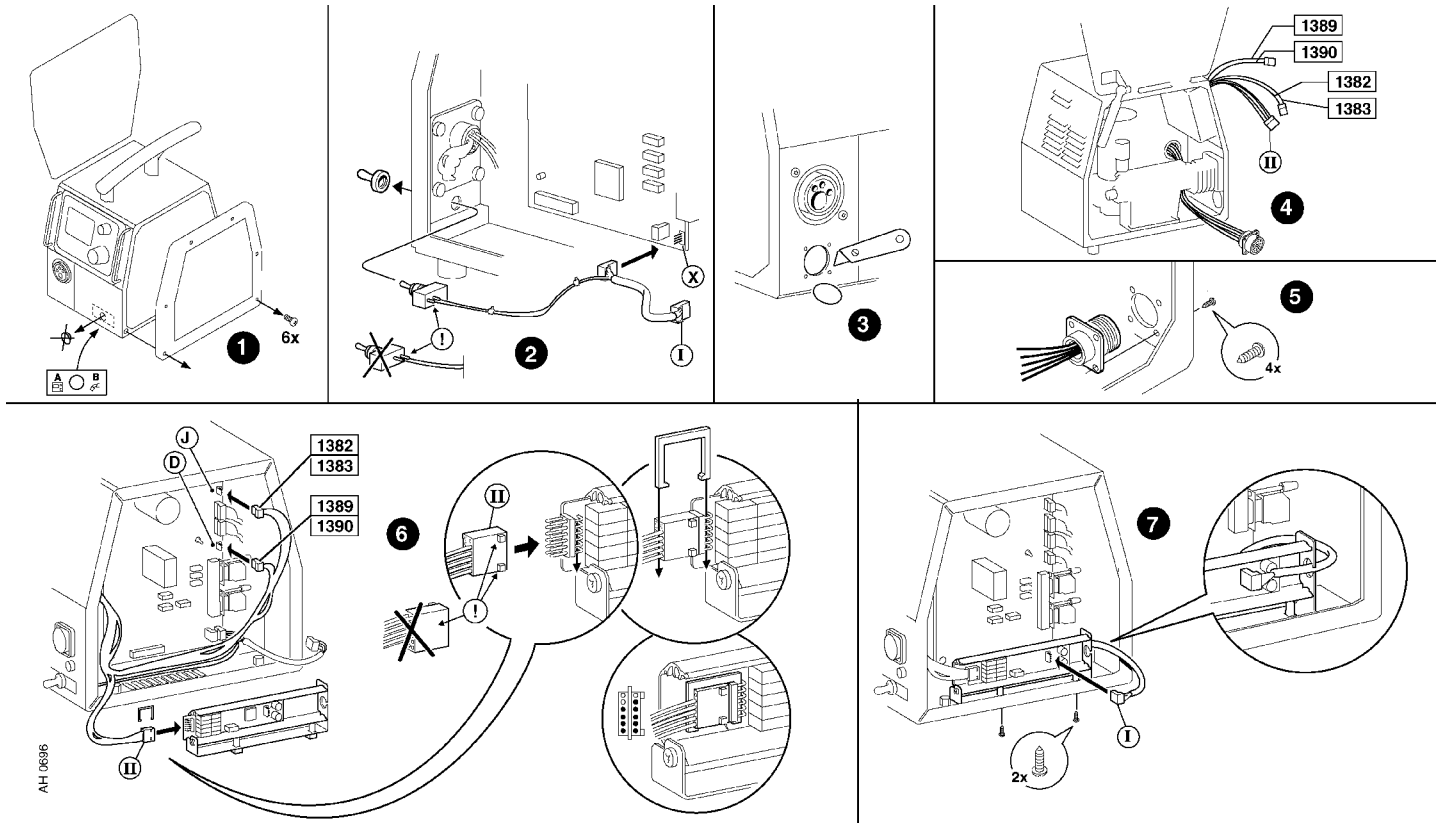
### Pull motor option without wire feed speed adjustment. 0459 020 883

This option includes connectors 13XS25, 13XS20 and wires 1389, 1390.

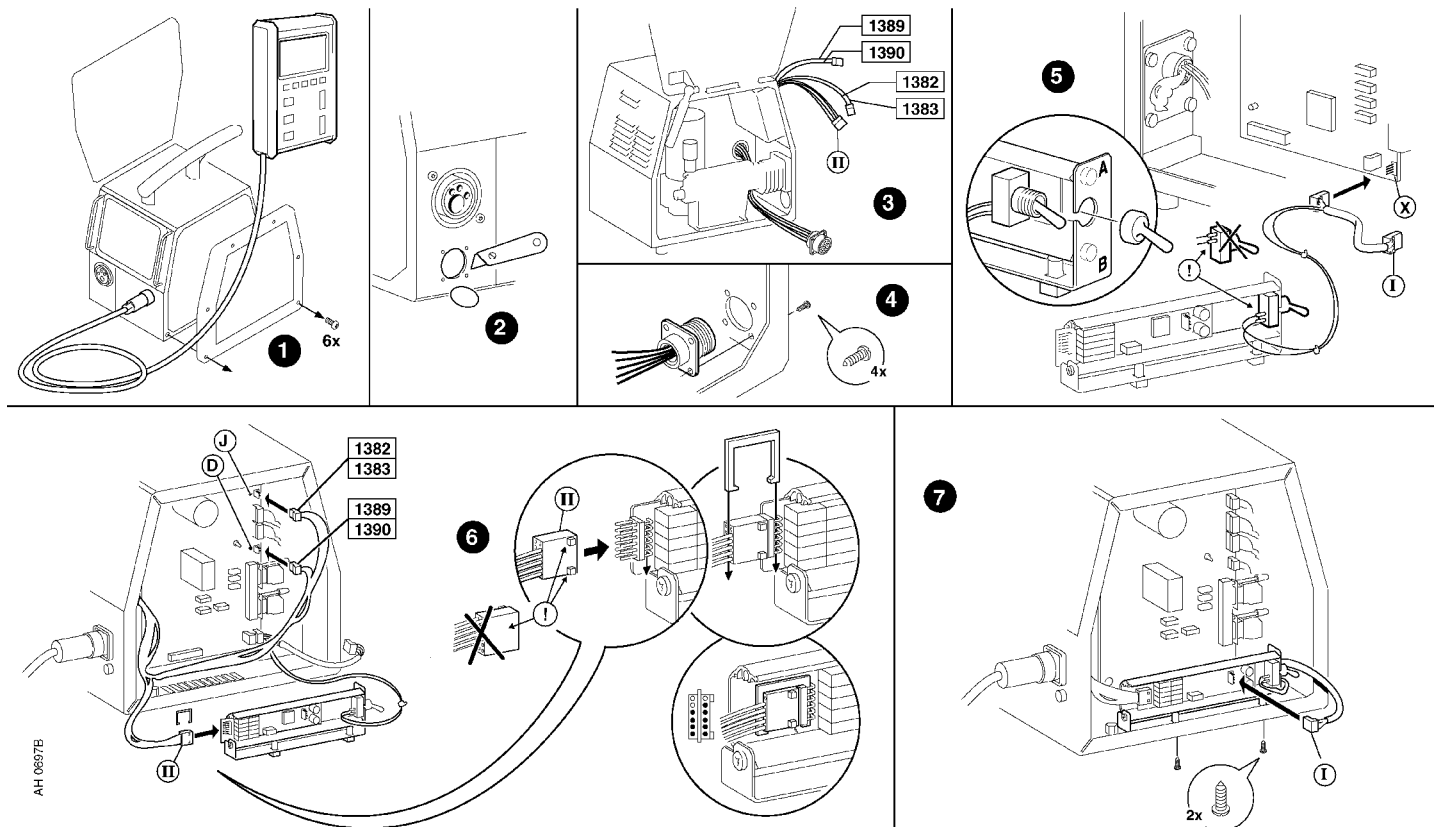
### Circuit board layout, CAN adapter and filter board



Connection instructions



Wire feeder with built-in control panel



Wire feeder controlled by U8, NOTE: the switch must be in position B.

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## REMOTE CONTROLS

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A number of remote control units can be connected to the Aristo, these are described in a separate service manual with filename / ordering no. 0740 800 170.

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## FAULT CODES

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Fault codes are used in order to indicate and identify a fault in the equipment.

### Fault log

All faults that occur when using the welding equipment are documented as error messages in the fault log: up to 99 error messages can be saved. When the fault log is full, the oldest message will automatically erase when the next fault occurs.

Only the most recent fault message is displayed on the control panel. To read the entire fault log, the machine must be connected to the ESAT: see service tools on page 32.

Faults are monitored/detected in two ways: by test routines that are run on initiation and by functions that can detect a fault when it occurs.

The control panel displays a unit number to indicate which unit has generated the fault. The following unit numbers are used:

- U0** = control panel                      **U2** = power source  
**U3** = wire feed unit                      **U4** = remote control unit

### Summary of fault codes

Fault code	Description	Control panel	Power source	Wire feed unit	Remote control unit
1	Memory error, EPROM	x	x	x	x
2	Memory error, RAM	x	x	x	
3	Memory error, external RAM	x			
4	+5 V power supply	x	x		
5	Intermediate DC voltage outside limits		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 speed servo			x	
12	Communication error (warning)	x	x	x	x
14	Communication error (bus off)	x			
15	Lost messages	x	x		x
16	High open-circuit voltage		x		
17	Lost contact with the wire feed unit	x			
18	Lost contact with the power source	x			
19	Memory error in data memory	x			

Fault code	Description	Control panel	Power source	Wire feed unit	Remote control unit
20	Memory allocation error	x			
22	Transmitter buffer overflow	x	x	x	
23	Receiver buffer overflow	x	x	x	
26	Program operating fault	x	x		
27	Out of wire			x	
28	Stack overflow	x	x	x	
29	No cooling water flow		x		
31	No reply from the display unit	x			
32	No gas flow		x	x	
40	Incompatible units	x			

## Fault code description

The fault codes for the control panel, power source and the remote control unit are described in the manuals for these units. This manual describes the fault codes for the wire feed unit.

Code	Description
<b>1</b>	<p><b>EPROM check sum error - program memory error</b></p> <p>Check sum test of the program memory, which is run only when initiating the unit after power-up. This fault does not disable any functions.</p> <p>The program memory is damaged. This is a serious fault, that can have unforeseen effects.</p> <p><b>Action:</b> Restart the machine. If the fault persists, load new software via Esat. If the fault still persists, replace circuit board 13AP1, which carries the memory chip.</p>
<b>2</b>	<p><b>Microprocessor RAM error</b></p> <p>The microprocessor is unable to read/write from/to a particular memory address in its internal memory. This test is performed only as part of initiation after power-up. This fault does not disable any functions.</p> <p><b>Action:</b> Restart the machine. If the fault persists, replace circuit board 13AP1, which carries the microprocessor chip.</p>
<b>8</b>	<p><b>+15 V power supply on circuit board 13AP1</b></p> <p>The voltage is too high or too low: it must be within the range 12.8 – 16.8 V. This fault does not disable any functions.</p>
<b>9</b>	<p><b>Control board 0487 187 88x:</b> <b>+60 V unregulated power supply on circuit board 13AP1</b></p> <p>The voltage is too high or too low: it must be within the range 42.3 – 78.6 V. This fault does not disable any functions.</p> <p><b>Control board 0486 384 894:</b> <b>+20 V unregulated power supply on circuit board 13AP1</b></p> <p>The voltage is too high or too low: it must be within the range 14.0 – 26.2 V. This fault does not disable any functions.</p>
<b>11</b>	<p><b>Wire feed speed</b></p> <p>The wire feed speed differs from the set value by more than 1.5 m/min for more than 5.1 seconds. This fault stops the wire feed.</p>

Code	Description
12	<p><b>Communication error (warning)</b></p> <p>The load on the system CAN bus is temporarily too high.</p> <p><b>Action:</b> Check the equipment to ensure that only one wire feed unit and/or remote control unit are connected. See also sections 13AP1:8 and 13AP1:18 'The CAN bus' on pages 16 and 22.</p>
15	<p><b>Lost messages</b></p> <p>The bus CAN circuit indicates that a message has been lost. No functions are disabled by this fault.</p> <p><b>Action:</b> Check that all units are correct connected to the CAN bus. See also sections 13AP1:8 and 13AP1:18 'The CAN bus' on pages 16 and 22.</p>
22	<p><b>Transmitter buffer overflow</b></p> <p>The control board is unable to transmit information to the other units at a sufficiently high speed.</p> <p><b>Action:</b> A break in the bus line can cause this fault. Check the CAN cabling. Turn off the mains power supply to reset the unit.</p>
23	<p><b>Receiver buffer overflow</b></p> <p>The control board is unable to process information from the other units at a sufficiently high speed. This fault is caused by abnormal loading of the microprocessor.</p> <p><b>Action:</b> Turn off the mains power supply to reset the unit.</p>
27	<p><b>Out of wire</b></p> <p>The wire feed unit is not feeding any wire. The current welding process will be stopped, and cannot be restarted.</p> <p><b>Action:</b> Load new wire.</p> <p>At present, wire monitoring is fitted only to special versions of wire feed units.</p>
28	<p><b>Stack overflow</b></p> <p>The program execution does not work.</p> <p>This fault should never occur in reality: the fault code is intended as an aid during development work. Contact ESAB if the fault does occur.</p>
32	<p><b>No gas flow</b></p> <p>Gas flow is too low.</p> <p><b>Action:</b> Check the gas valve, hoses and connectors.</p> <p>Gas monitoring is fitted only to special versions of wire feed units.</p>

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## SERVICE INSTRUCTIONS

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### **WARNING !**

**STATIC ELECTRICITY can damage circuit boards and electronic components.**

- Observe precautions for handling electrostatic-sensitive devices.
- Use proper static-proof bags and boxes.

### **What is ESD?**

A sudden transfer or discharge of static electricity from one object to another. ESD stands for Electrostatic Discharge.

#### *How does ESD damage occur?*

ESD can cause damage to sensitive electrical components, but is not dangerous to people. ESD damage occurs when an ungrounded person or object with a static charge comes into contact with a component or assembly that is grounded. A rapid discharge can occur, causing damage. This damage can take the form of immediate failure, but it is more likely that system performance will be affected and the component will fail prematurely.

#### *How do we prevent ESD damage?*

ESD damage can be prevented by awareness. If static electricity is prevented from building up on you or on anything at your work station, then there cannot be any static discharges. Nonconductive materials (e.g. fabrics), or insulators (e.g. plastics) generate and hold static charge, so you should not bring unnecessary nonconductive items into the work area. It is obviously difficult to avoid all such items, so various means are used to drain off any static discharge from persons to prevent the risk of ESD damage. This is done by simple devices: wrist straps, connected to ground, and conductive shoes.

Work surfaces, carts and containers must be conductive and grounded. Use only antistatic packaging materials. Overall, handling of ESD-sensitive devices should be minimized to prevent damage.

## Service aid

We can offer a number of service tools that will simplify the service.

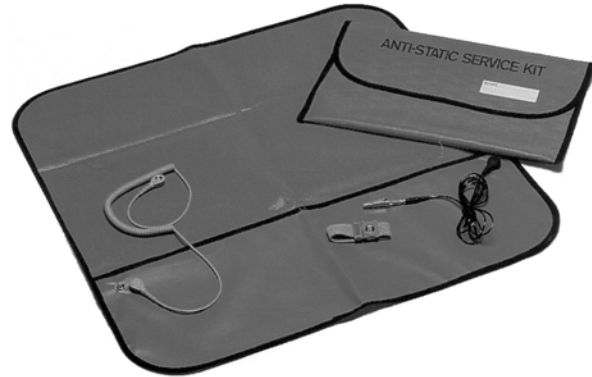
### Antistatic service kit

Ordering no. 0740 511 001

The kit makes it easier to protect sensitive components from electrostatic discharge.

Contents:

- A conductive mat (size 610 x 610 mm)
- A 1.5 metre long ground cable with a crocodile clip
- An adjustable wrist strap and cable with an inbuilt protective resistor



*Antistatic service kit*

### Esat service kit

Ordering no. 0458 847 880

The software update is made from a PC, it has to be managed by a trained serviceman. For this a computer program called Esat, **ESAB software administration tool**, is needed. The PC is connected to the welding equipment by a cable connector and a CAN reader. From the Esat it is possible to update the software in power source, wire feeder and control panel. Esat contains also service functions by which it is possible to control, change or read the different functions in the equipment.

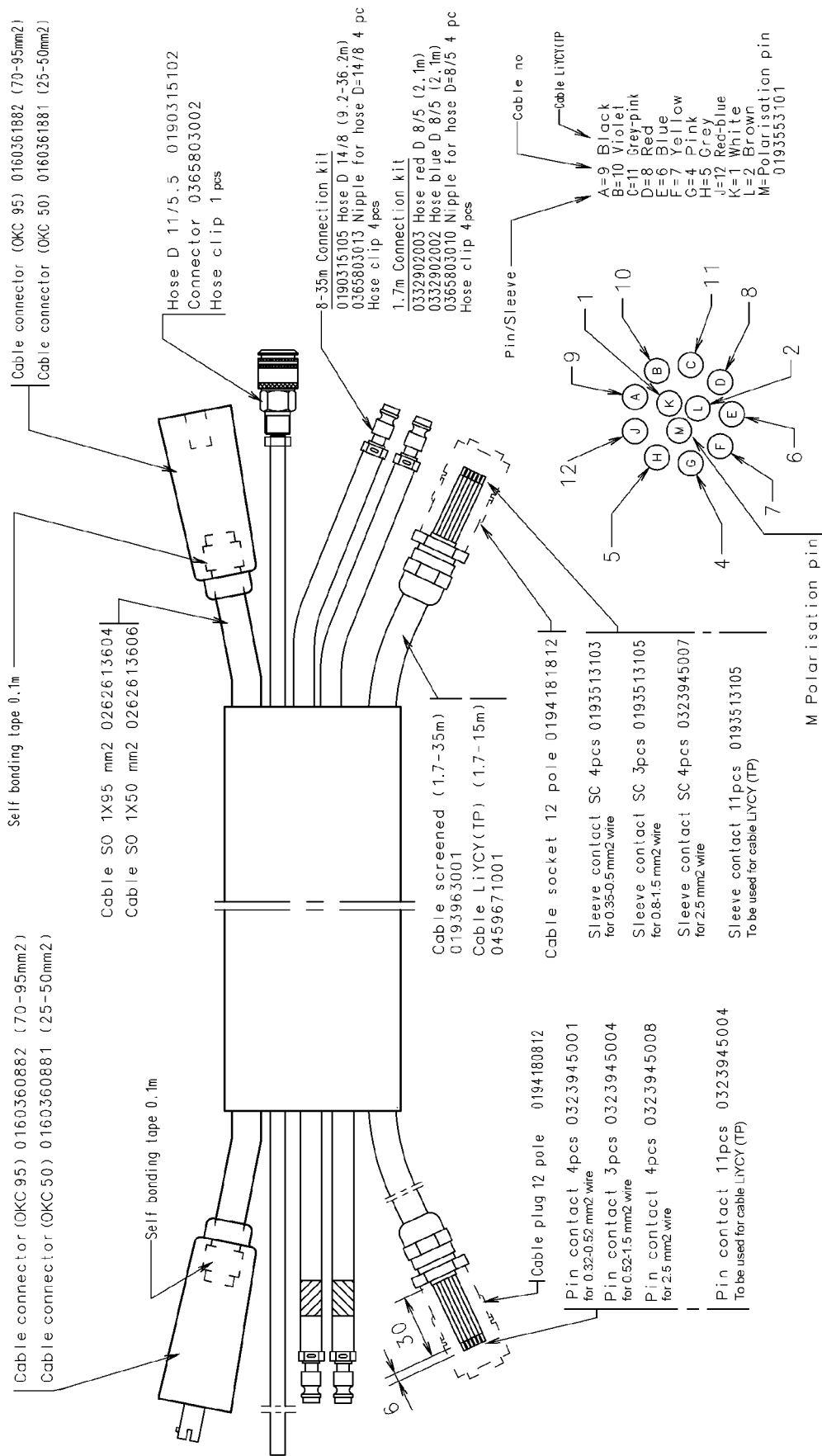
For the installation and use of Esat program you need a computer with operating system Windows 9x, NT4, 2000 or XP.

The Esat service kit contents:

- CAN adapter PPCAN
- Connection Cable between CAN reader and power source
- CAN adapter software and Esat software on CD
- Instruction manual for Esat



# Spare parts for connection sets



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# INSTRUCTIONS

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This chapter is an extract from the instructions for the Feed 3004 and Feed 4804.

## SAFETY

Users of ESAB welding 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 welding 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 welding equipment. Incorrect operation of the equipment may lead to hazardous situations which can result in injury to the operator and damage to the equipment.

1. Anyone who uses the welding equipment must be familiar with:
  - its operation
  - location of emergency stops
  - its function
  - relevant safety precautions
  - welding
2. The operator must ensure that:
  - no unauthorized person is stationed within the working area of the equipment when it is started up.
  - no-one is unprotected when the arc is struck
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.

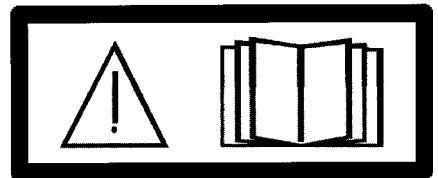


**This product is solely intended for arc welding.**




### WARNING!

Read and understand the instruction manual before installing or operating.



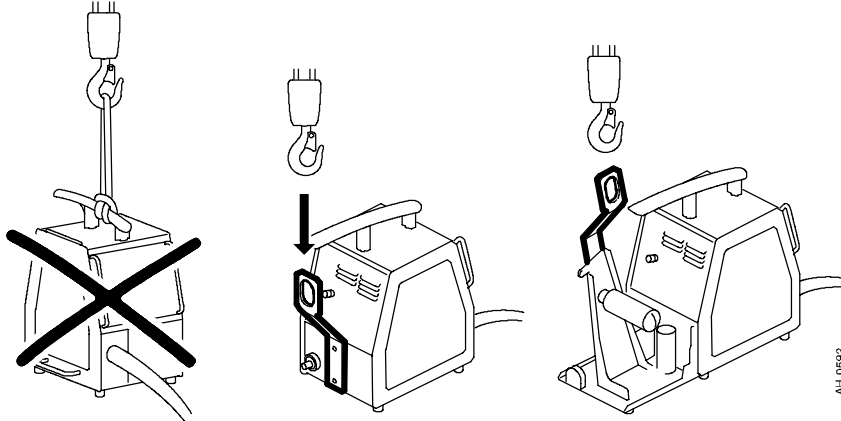
### WARNING!

When welding in an environment with increased electrical danger, only power sources intended for this environment may be used. These power sources are marked with the symbol .

## INSTALLATION

*The installation must be executed by a professional.*

### Lifting instructions



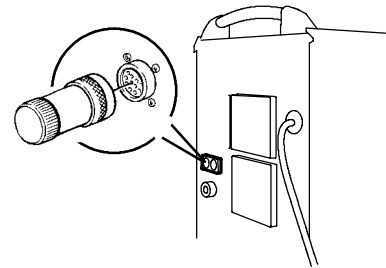
Ordering number for the lifting eye can be found in the spare parts list (accessories).

**Note!** If another mounting device is used, this should be insulated from the wire feed unit.

### Terminating resistors

In order to avoid communication interference, the ends of the CAN bus must be terminated by resistive loads.

One end of the CAN bus is at the wire feed unit control panel, which incorporates a terminating resistor. The other end is in the power source and it must be fitted with a terminating resistor, as shown in the diagram to the right.

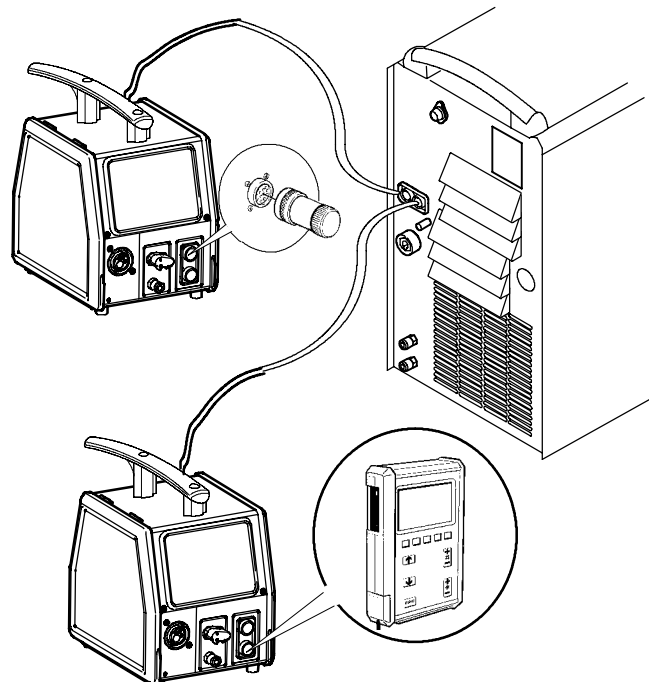


### Connection of multiple wire feed units

When connecting multiple wire feed units (maximum 4), use wire feed units without control panel (M0) and with control box AristoPendant U8.

Two feed units are to be connected according to the picture.

When connecting more than two feed units, an authorised ESAB service technician must perform the installation.



## OPERATION

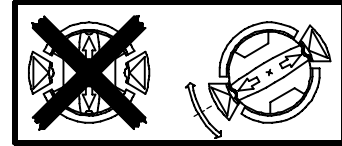
General safety regulations for the handling of the equipment can be found on page 34. Read through before you start using the equipment!

**NB!** The side panel of the wire feed unit must be closed during operation



### WARNING!

To prevent the reel from sliding off the hub: Lock the reel in place by turning the red knob as shown on the warning label attached next to the hub.



### WARNING!

Rotating parts can cause injury, take great care.

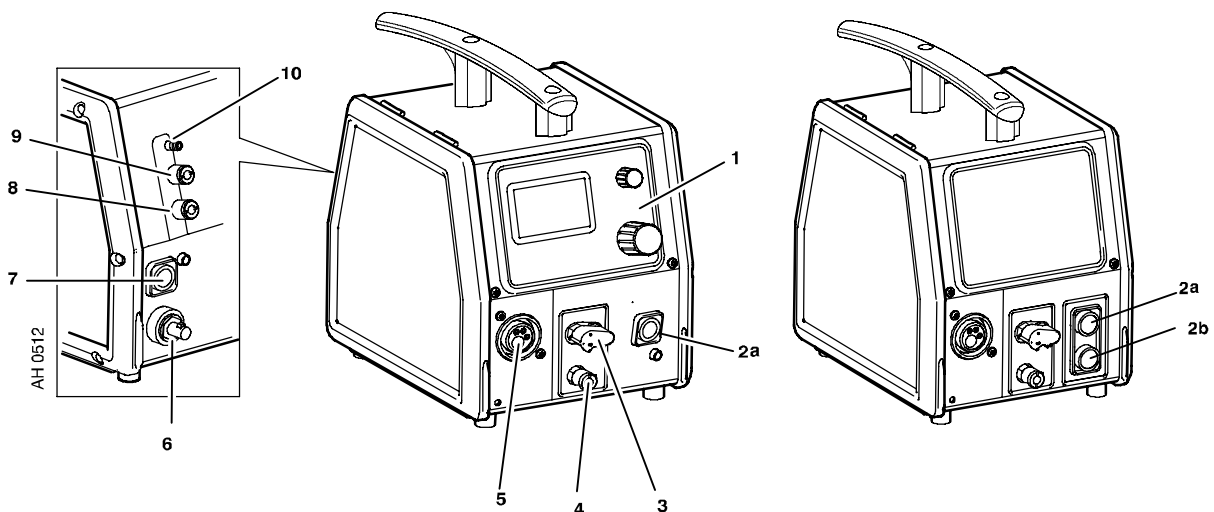


## Connections and controls

- |    |   |    |  |
|----|---|----|--|
| 1  | Control panel<br>(see respective instruction manual)            | 6  | Connection for welding current from the power source (OKC)               |
| 2a | Connection for remote control adapter                           | 7  | Connection for the control cable from the power source                   |
| 2b | Connection of AristoPendant U8.                                 | 8  | Connection for cooling water to the power source (cooling unit) - RED    |
| 3  | Connection with ELP* for cooling water to the welding gun- BLUE | 9  | Connection for cooling water from the power source (cooling unit) - BLUE |
| 4  | Connection for cooling water from the welding gun - RED         | 10 | Connection for protection gas  |
| 5  | Connection for the welding gun                                  |    |  |

NOTE! Cooling water connections only available on certain models.

\* ELP = ESAB Logic Pump, see Water connection on next page.



## Water connection

The wire feed unit with water connection is equipped with a detection system **ELP** (ESAB Logic Pump) which checks that the water hoses are connected.

### AristoMig 400 and 500

The power unit On/Off switch must be in the "0" position (Off) when connecting a water-cooled welding gun.

If a water-cooled welding gun is connected, the water pump starts automatically when the main On/Off switch is turned to "START" and/or when welding starts. After welding, the pump continues to run for 6,5 minutes, and then switches to the energy-saving mode.

### AristoMig 320 and 450

The power unit On/Off switch for cooling unit must be in the "I" position (ON) when connecting a water-cooled welding gun.

## Remote control unit

The remote control unit must be a CAN based remote control or it must be connected via a remote control adapter.

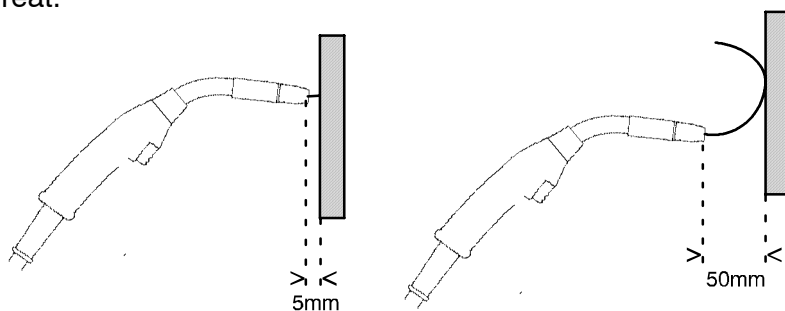
The power source and wire feed unit are set to remote control mode and buttons and dials are blocked when the remote control is connected. Functions can only be adjusted via the remote unit.

If the remote control unit is not to be used, the remote control unit must be disconnected from the power source / wire feed unit, as otherwise it will remain in remote control mode.

For more information about the operation of the remote control unit, see the operating instructions for the control panel.

## Setting the wire feed pressure

Start by making sure that the wire moves smoothly through the wire guide. Then set the pressure of the wire feeder's pressure rollers. It is important that the pressure is not too great.



cmek0p10

Fig 1

Fig 2

To check that the feed pressure is set correctly, you can feed out the wire against an insulated object, e.g. a piece of wood.

When you hold the welding gun approx. 5 mm from the piece of wood (fig. 1) the feed rollers should slip. If you hold the welding gun approx. 50 mm from the piece of wood, the wire should be fed out and bend (fig. 2).

## MAINTENANCE

### **Note:**

All warranty undertakings given by the supplier cease to apply if the customer attempts to rectify any faults on the machine during the warranty period.

## Inspection and cleaning

### Wire feed unit

Check regularly that the wire feed unit is not clogged with dirt.

- Cleaning and replacement of the wire feed unit mechanism's worn parts should take place at regular intervals in order to achieve trouble-free wire feed. Note that if pre-tensioning is set too hard, this can result in abnormal wear on the pressure roller, feed roller and wire guide.

### The brake hub

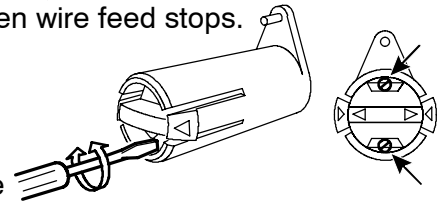
The hub is adjusted when delivered, if readjustment is required, follow the instructions below. Adjust the brake hub so that wire is slightly slack when wire feed stops.

- **Adjusting the braking torque:**

- Turn the red handle to the locked position.
- Insert a screwdriver into the springs in the hub.

Turn the springs clockwise to reduce the braking torque

Turn the springs anticlockwise to increase the braking torque. **NB:** Turn both springs through the same amount.



### Welding gun

- Cleaning and replacement of the welding gun's wear parts should take place at regular intervals in order to achieve trouble-free wire feed. Blow the wire guide clean regularly and clean the contact tip.

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## SPARE PARTS

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The spare parts list for the Feed 3004 and Feed 4804 is published in a separate document with filename 0458 716 990. This can be downloaded from the Internet: [www.esab.com](http://www.esab.com)



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