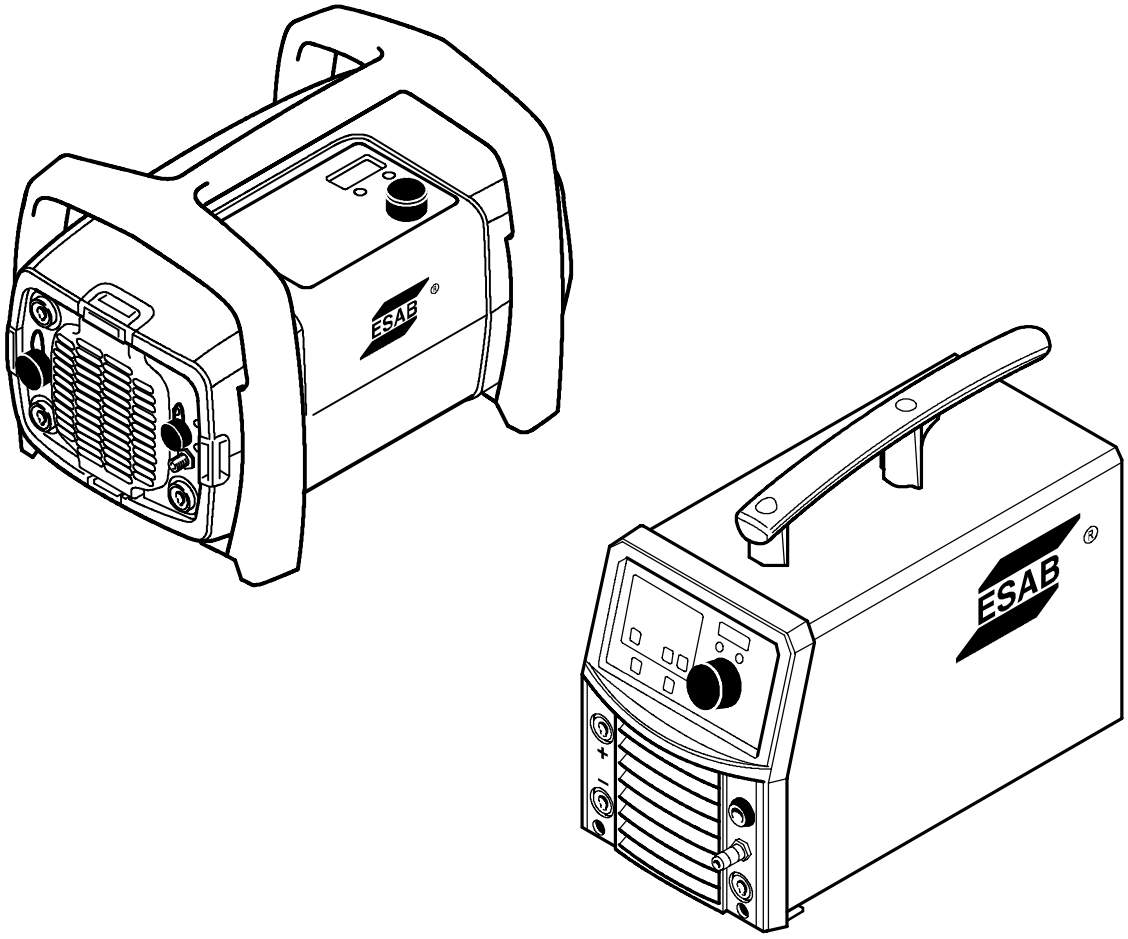
Caddy™ Tig 200i
Origo™ Tig 200i



Service manual

0740 800 164 061205

Valid for serial no. 402-xxx-xxxx to 620-xxx-xxxx

READ THIS FIRST

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.

Use the wiring diagram as a form of index for the description of operation. 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 November 2006.

The manual is valid for:
CaddyTig 200 and OrigoTig 200 with serial no. 402-xxx-xxxx, 610-xxx-xxxx, 613-xxx-xxxx.
Caddy™ Tig 200i and Origo™ Tig 200i with serial no. 620-xxx-xxxx.

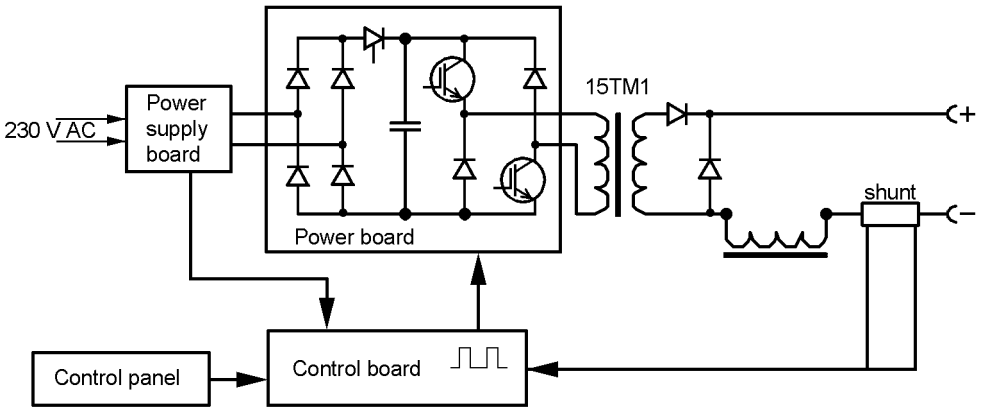
The CaddyTig 200, OrigoTig 200, Caddy™ Tig 200i and Origo™ Tig 200i are designed and tested in accordance with international and European standards IEC/EN 60974. On completion of service or repair work, it is the responsibility of the person(s) performing the work to ensure that the product still complies with the requirements of the above standard.

INTRODUCTION

The Power sources are renamed:

New name	**Old name**
Caddy™ Tig 200i	CaddyTig 200
Origo™ Tig 200i	OrigoTig 200

The power module of the power source is a single forward converter, operating at a switching frequency of 65 kHz. IGBT transistors are used as the switching elements. All power semiconductors are built into modules.



Schematic diagram of the power source

TECHNICAL DATA

	CaddyTig 200	**OrigoTig 200**
Mains voltage	230 V ±10% 1~ 50/60 Hz	230 V ±10% 1~ 50/60 Hz
Fuse (delayed-action)	16 A	16 A
Primary current I_{max}	36 A	36 A
Primary current I_{eff}	21 A	21 A
Voltage/current range		
(TIG)	3 A / 10 V -200 A / 18 V	3 A / 10 V -200 A / 18 V
(MMA)	4 A / 20 V -150 A / 26 V	4 A / 20 V -150 A / 26 V
Maximum permissible load at TIG		
25% duty cycle	200 A / 18 V	200 A / 18 V
35% duty cycle	180 A / 17 V	180 A / 17 V
60% duty cycle	140 A / 15.5 V	140 A / 15.5 V
100% duty cycle	110 A / 14.5 V	110 A / 14.5 V
Maximum permissible load at MMA		
25% duty cycle	150 A / 26 V	150 A / 26 V
35% duty cycle	140 A / 25.5 V	140 A / 25.5 V
60% duty cycle	110 A / 24.5 V	110 A / 24.5 V
100% duty cycle	90 A / 23.5 V	90 A / 23.5 V
Power factor at maximum current	0.62	0.62
Efficiency at maximum current	79 %	79 %
Open-circuit voltage	71 - 78 V	71 - 78 V
Operating temperature	-10°C - + 40°C	-10 °C till + 40°C
Constant A-weighed sound pressure	<70 db	<70 db
Dimensions, l x b x h	394 x 267 x 274 mm	380 x 180 x 300 mm
Weight	10 kg	9 kg
Enclosure class	IP 23C	IP 23C
Application class	S	S

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.

Application class

The symbol S indicates that the power source is designed for use in areas with increased electrical hazard.

WIRING DIAGRAM

The power source is based on a number of function modules. These are described in the component descriptions on the following pages. Wire numbers and component names in the wiring diagram show to which module each component belongs.

Wires/cables within modules are marked 100 – 6999.

Circuit boards within each module have names such as 20AP1 – 20AP99.

15 = module association, 1–69
AP = circuit board
1 = individual identification number, 0–99

Components within modules are named in a similar way.

WARNING !

STATIC ELECTRICITY can damage circuit boards and electronic components.

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

Component description

1 MMC module.

1AP1 Control panel (MMC panel).

1AP2 Display board.

2 Mains module.

2AP1 Power supply board.

2L1 Ferrite ring. The yellow/green cable must be wound two turns through the ferrite ring.

2L2 Ferrite ring.

2QF1 Mains switch.

2XS1 Flat pin sockets. **Important**: to obtain a proper electric connection, the complete cord set must be replaced if the sockets have to be replaced.

10 TIG module.

10AP1 TIG board.

10TV1 HF transformer.

10YV1 Gas valve, 230 V AC.

15 Power module.

15AP1 Power board.

15AP2 Secondary board.

15C1 Smoothing capacitor, 2000 uF.

15D1 Diode module with rectifier and freewheel diodes.

15EV1 Fan.

15L1 Inductor.

15RS1 Shunt. 60 mV at 100 A.

15ST1 Thermal switch, fitted in the winding of main transformer 15TM1. See page 29.

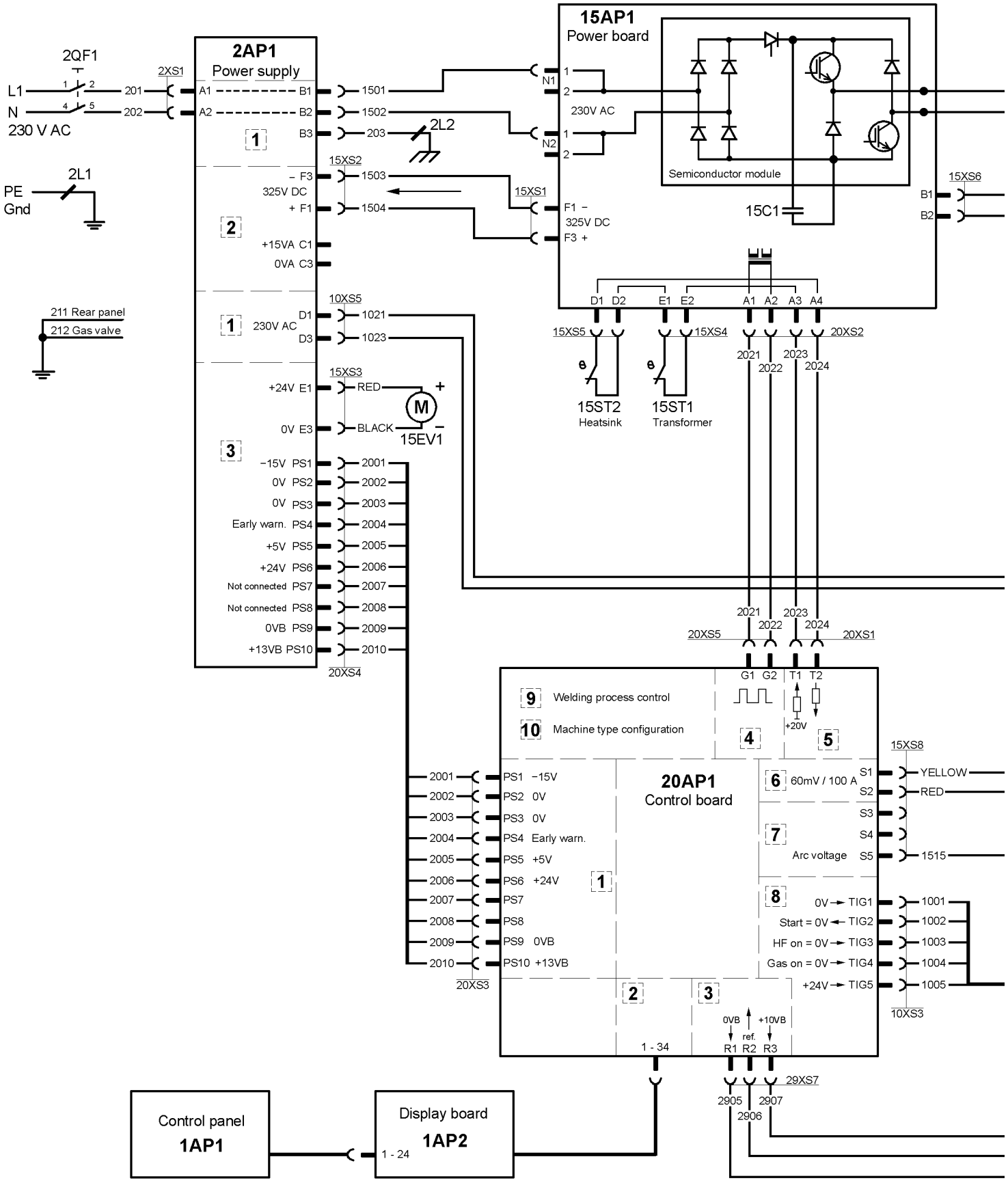
15ST2 Thermal switch, fitted on the heat sink. See page 29.

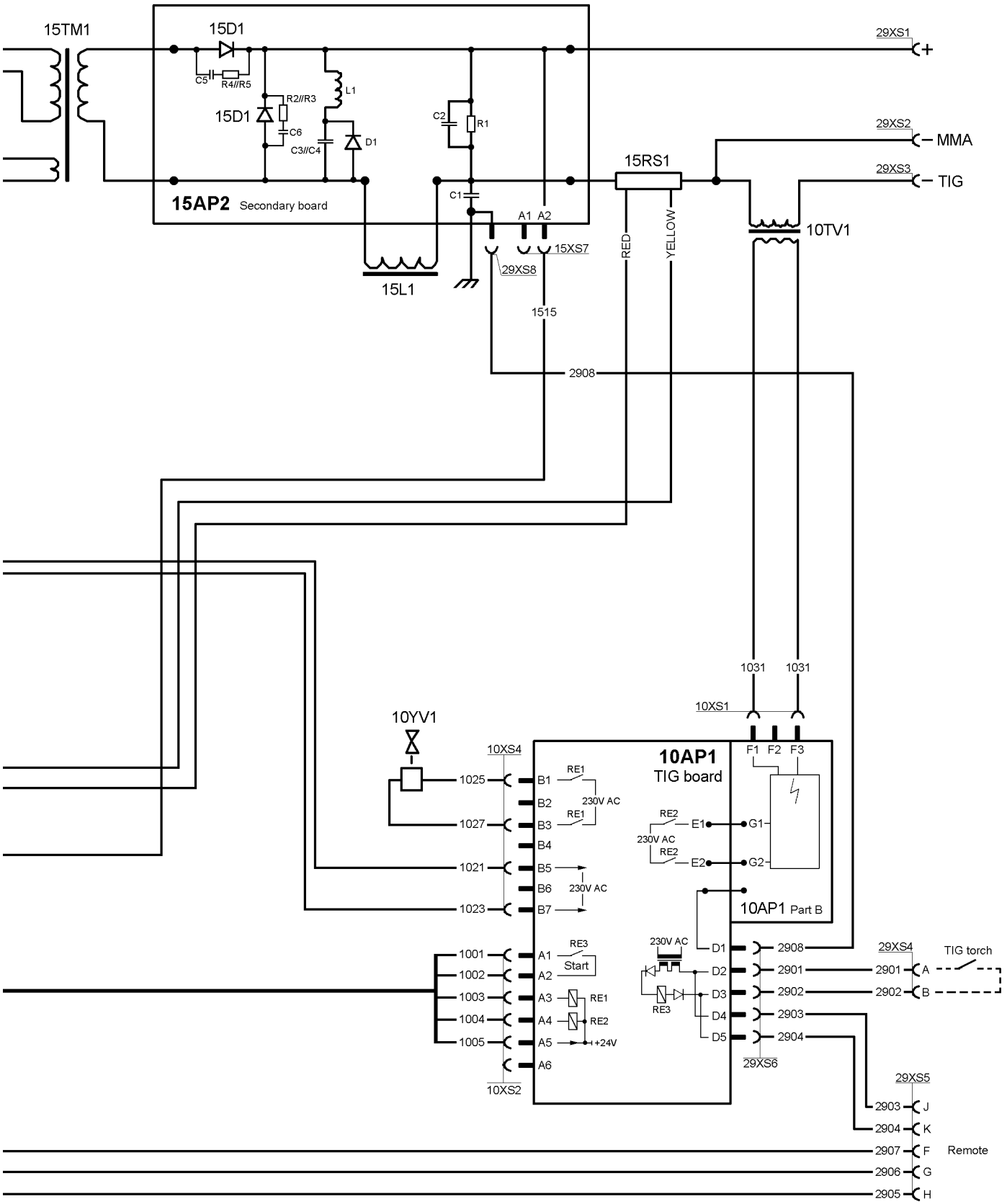
15TM1 Main transformer.

20AP1 Controller circuit board.

29XS5 Remote control socket. Only **CaddyTig 200**.

CaddyTig 200, OrigoTig 200




15TM1
15D1
C5
R4//R5
15D1
R2//R3
C6
C3//C4
L1
D1
C2
R1
C1
15AP2 Secondary board
15L1
A1 A2
15XS7
29XS8
1515
15RS1
RED
YELLOW
29XS1
+
29XS2
MMA
29XS3
TIG
10TV1
2908
1031 1031
10XS1
10YV1
10XS4
10AP1
TIG board
F1 F2 F3
1025
1027
1021
1023
B1
B2
B3
B4
B5
B6
B7
RE1
230V AC
RE2
E1
G1
E2
G2
10AP1 Part B
1001
1002
1003
1004
1005
A1
A2
A3
A4
A5
A6
RE3
Start
+24V
10XS2
D1
D2
D3
D4
D5
29XS6
2908
2901
2902
2903
2904
29XS4
TIG torch
A
B
29XS5
J
K
2907
F
Remote
2906
G
2905
H

DESCRIPTION OF OPERATION

This description of operation describes the function of circuit boards and other components in the power source. It is divided into sections, numbered to correspond to the circuit board numbers and divisions into function blocks.

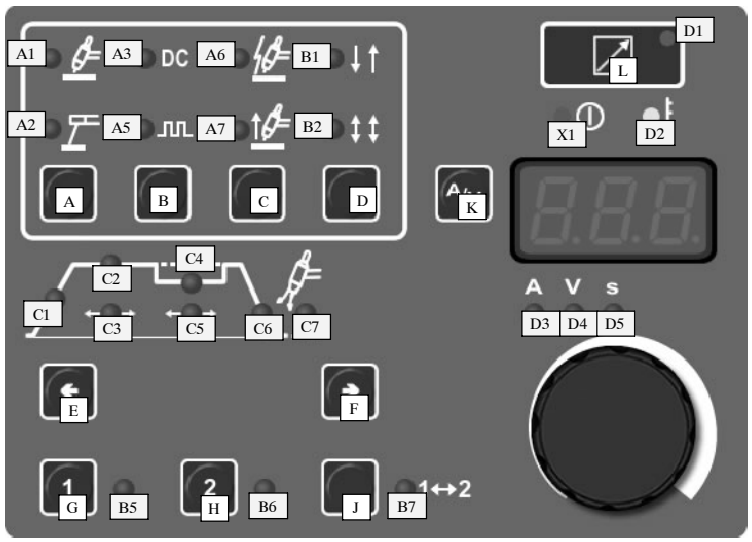
1AP1 Control panel

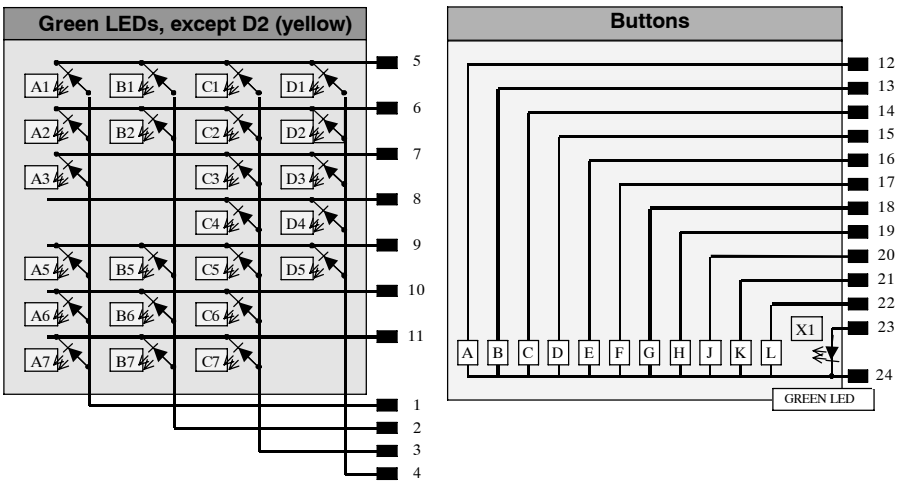
The control board processes the control signals to/from the control panel. See the description on page 26.

When the machine is switched on, the LEDs of the control panel and the display segments are tested by the software. The display then shows the machine type and software version.

Some of the LEDs of the control panel may gleam very weak when they are off, this is no fault. An activated LED lights with a clear light.
The control panel LEDs and the display segments can be tested by service functions, see pages 38 to 43.

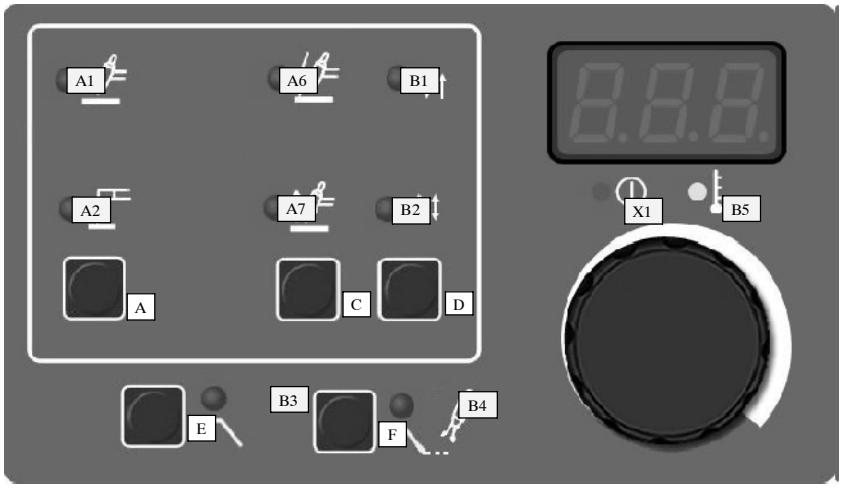
CaddyTig 200

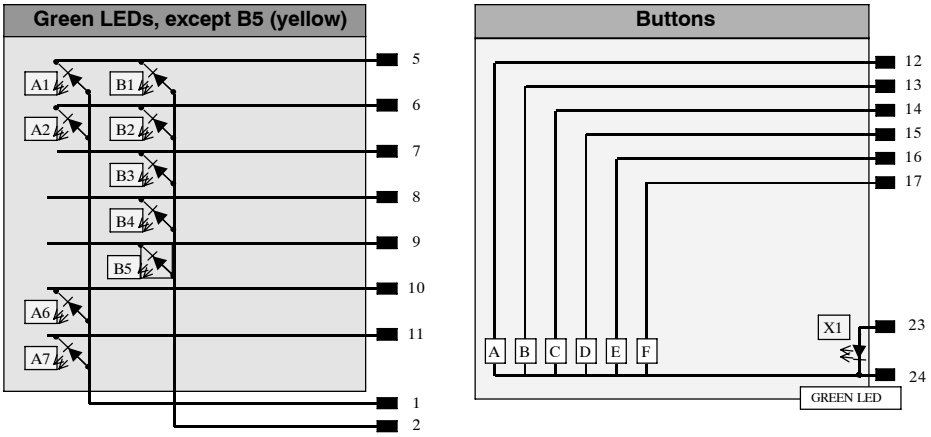




Control panel, CaddyTig 200

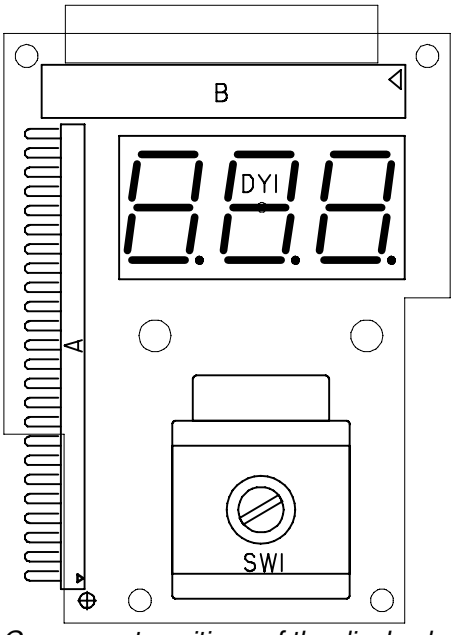
OrigoTig 200



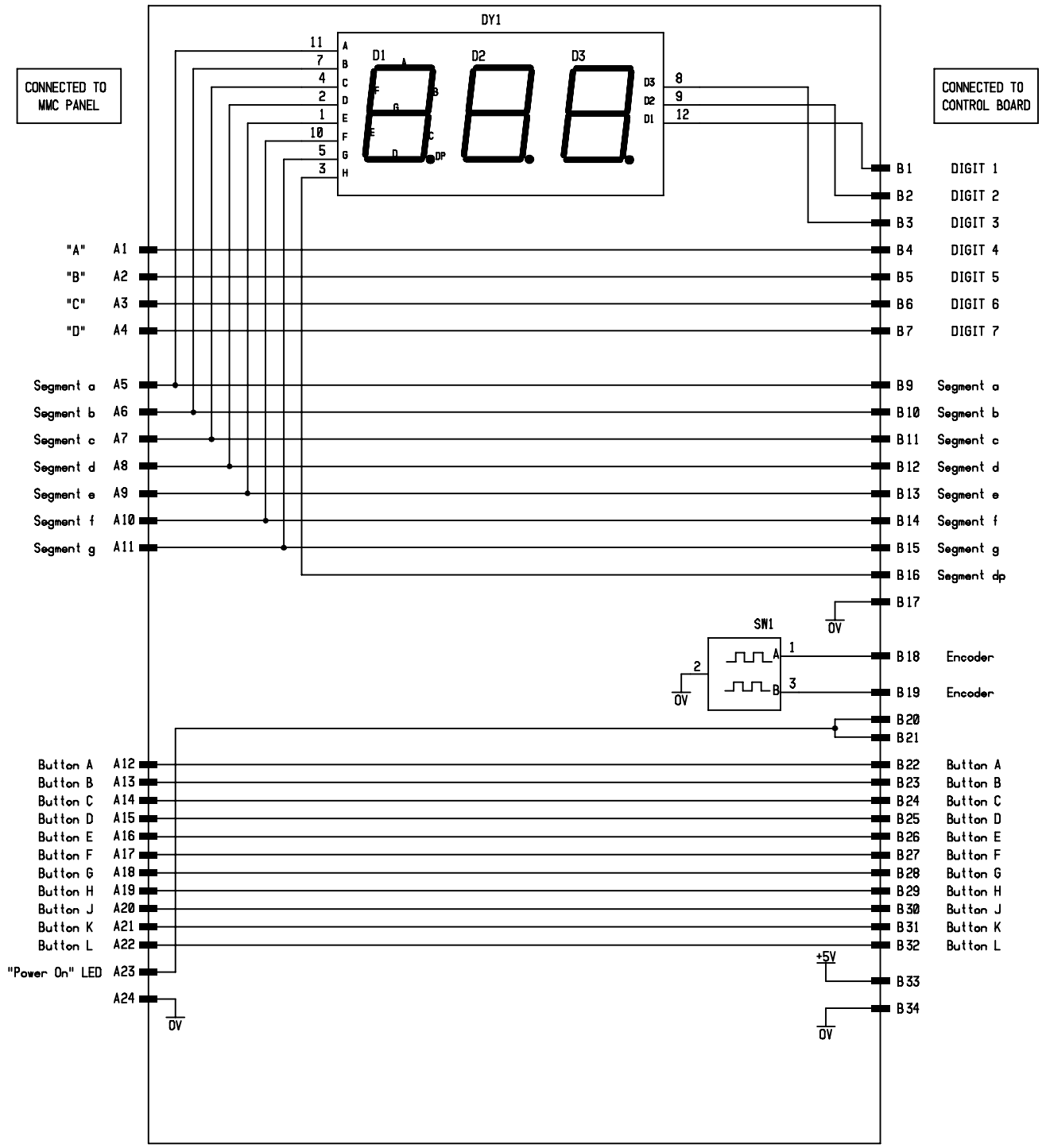


Control panel, OrigoTig 200

1AP2 Display board



Component positions of the display board



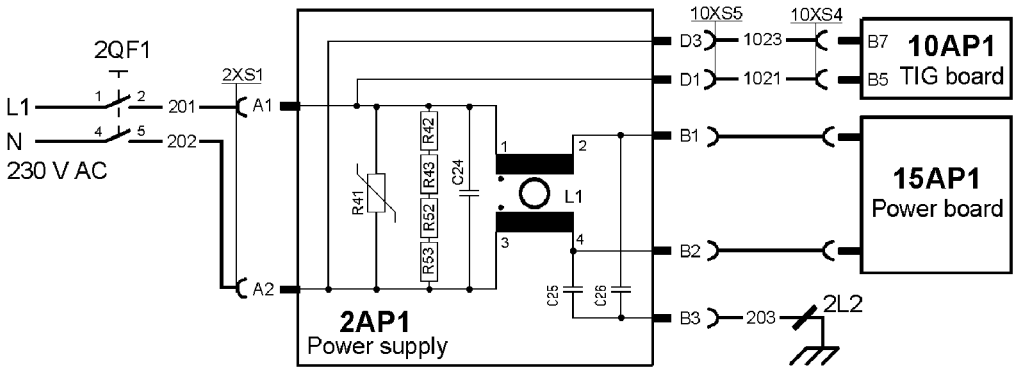
Circuit diagram of the display board

The display segments can be tested by a service function, see pages 38 to 43.

2AP1 Power supply board

The power supply board filters the mains voltage and generates internal supply voltages for the machine.

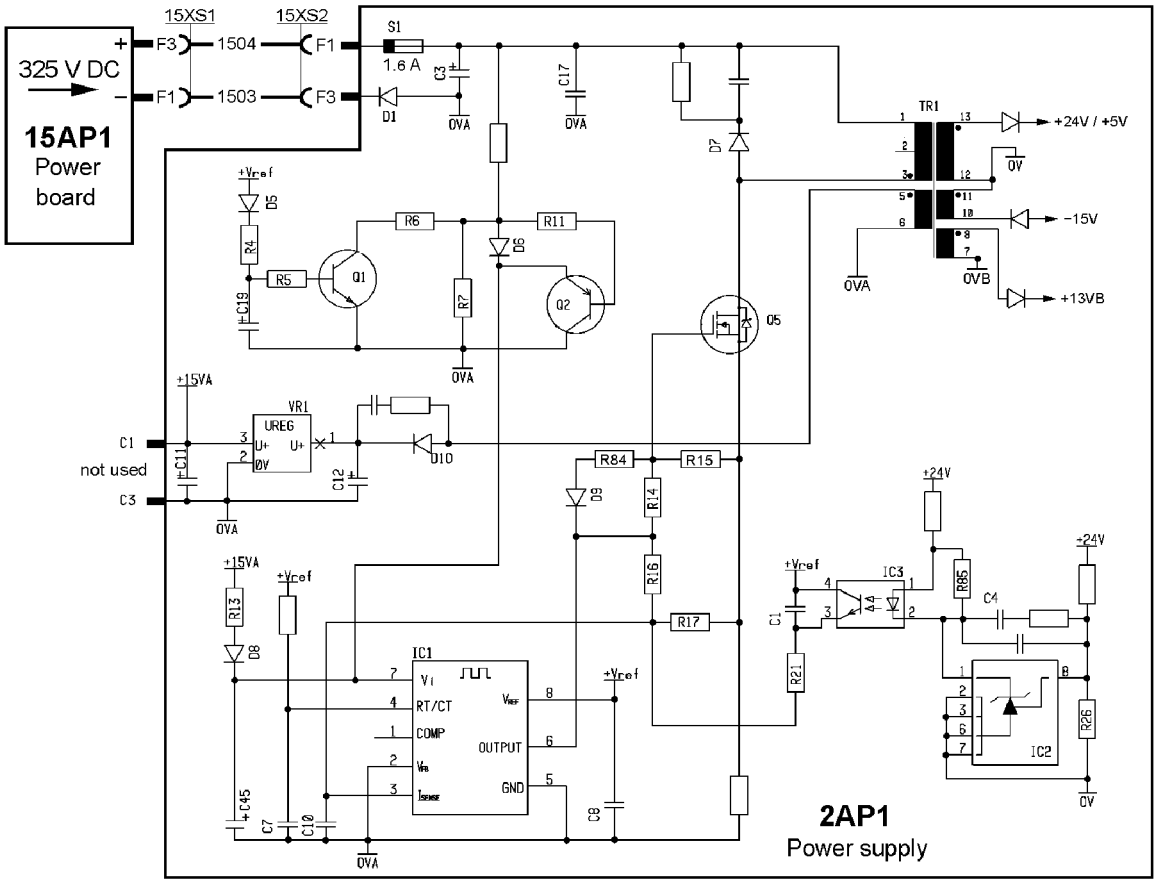
2AP1:1 Interference suppressor circuit



WARNING! Dangerous voltage - mains voltage.

The mains voltage is filtered by the power supply board. Power board 15AP1 rectifies the mains voltage. TIG board 10AP1 uses the mains voltage for supply to the HF generator and the gas valve.

2AP1:2 Primary circuit



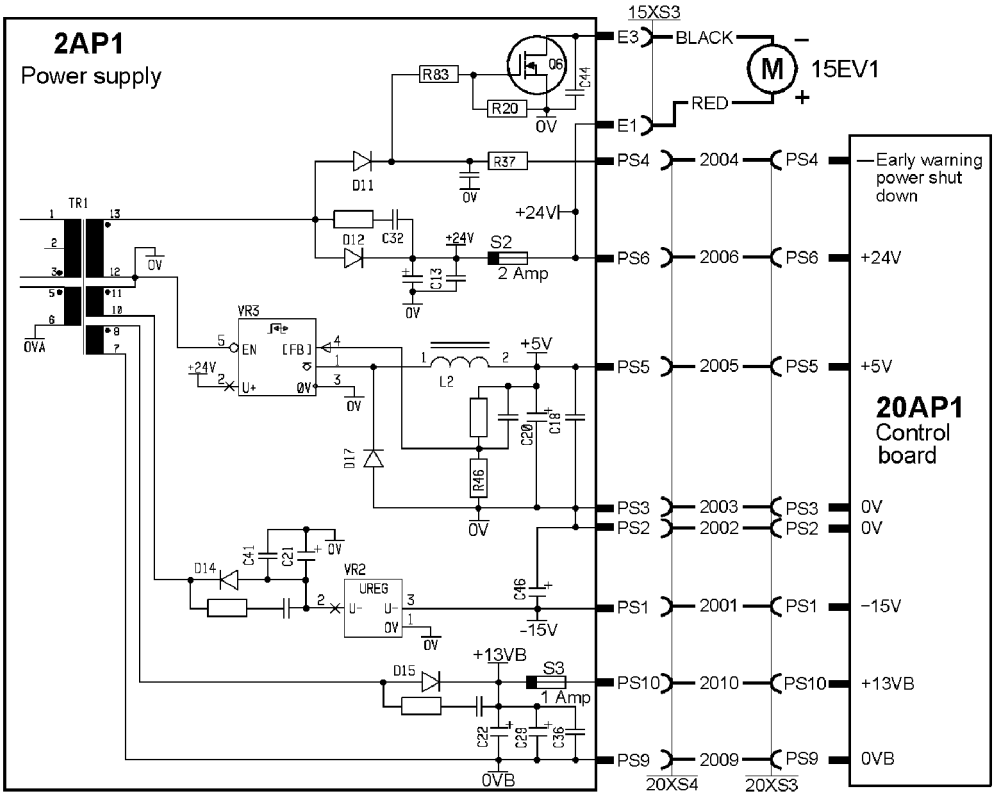
WARNING! Dangerous voltage - mains voltage.

The primary circuit is supplied with 325 V DC from the power board, 15AP1. S1 is a fuse with high rupturing capacity.

Transistor Q5 is the switching element in a switched voltage supply. The secondary voltage, +24 V, is sensed by IC2 and controlled by IC1.

The isolation voltage of transformer T1 and optocoupler IC3 is 4 kV.

2AP1:3 Secondary circuit



The secondary circuit delivers the following voltages:

+24 V
The voltage is controlled by IC1 on the primary side. It has a tolerance of ±0.6 V.

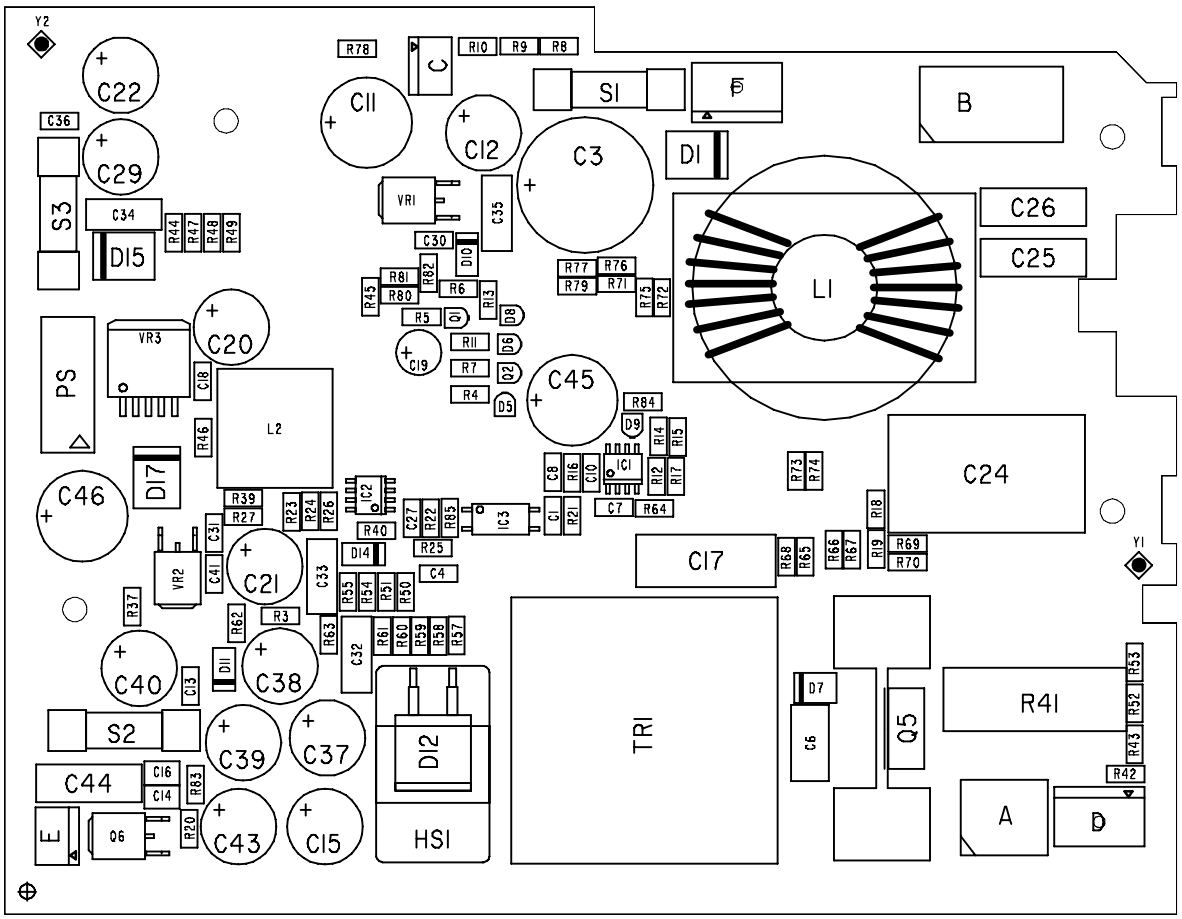
+5 V
The voltage is controlled by VR3. It has a tolerance of ±0.25 V.

-15 V
The voltage is controlled by VR2. It has a tolerance of ±0.75 V.

+13 VB
This voltage is unregulated. It has a tolerance of ±1.5 V.

Early warning power shut down
If the voltage goes low, output PS4 generates a warning signal to the processor on circuit board 20AP1 (see page 24). Transistor Q6 switches off the fan, 15EV1, at the same time.

2AP1 Component positions

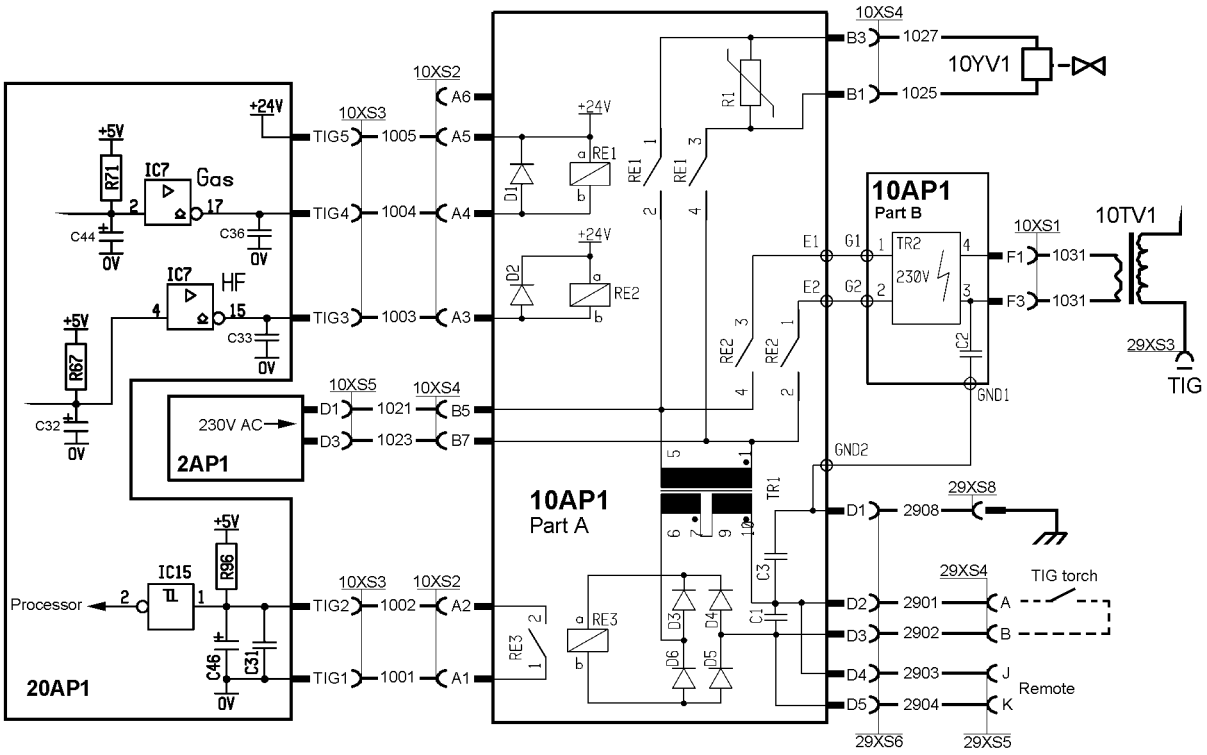


WARNING! Dangerous voltage – mains voltage.

10AP1 TIG board

WARNING! Dangerous voltage - mains voltage.

The relay contacts, the gas valve 10YV1, the HF generator TR2 and the primary side of transformer TR1 are connected to 230 V mains voltage.



Circuit diagram of the TIG functions of the CaddyTig and OrigoTig

The processor on circuit board 20AP1 controls the HF generator and gas valve. They can be tested by service functions, see pages 38 to 43.

HF generator

When the welding torch switch is operated, and the open-circuit voltage is over 50 V, relay RE2 closes and turns on the HF generator, TR2. It remains activated until the arc strikes, or for a maximum of 0.7 seconds.

The voltage on the primary side of HF transformer 10TV1 is about 550 V. The secondary voltage is about 11 kV if a 4 metre long welding torch is connected. If the welding torch is 16 metre long, the HF spark is about 8 kV.

Due to electromagnetic interference regulations, the energy in the HF ignition spark is limited, and so the HF spark weakens with increasing length of the torch. The HF ignition is satisfactory for welding torches up to 16 metres.

Gas valve

When the torch switch is operated, relay RE1 closes and energizes the gas valve.
When the torch switch is released and the gas post-flow time has elapsed, the gas valve is deactivated.

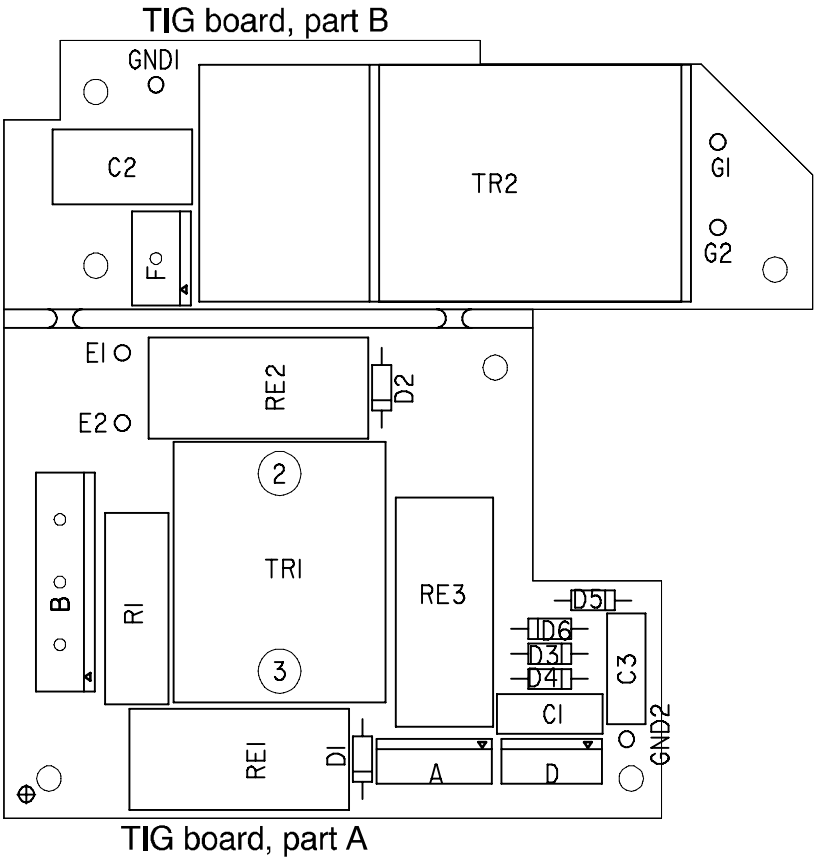
TIG torch switch

The secondary windings of transformer TR1 and rectifier bridge D3-D6 produce 24 V DC. This voltage energizes relay RE3 when the torch switch is closed.

The torch switch can be tested by a service function, see pages 38 to 43.

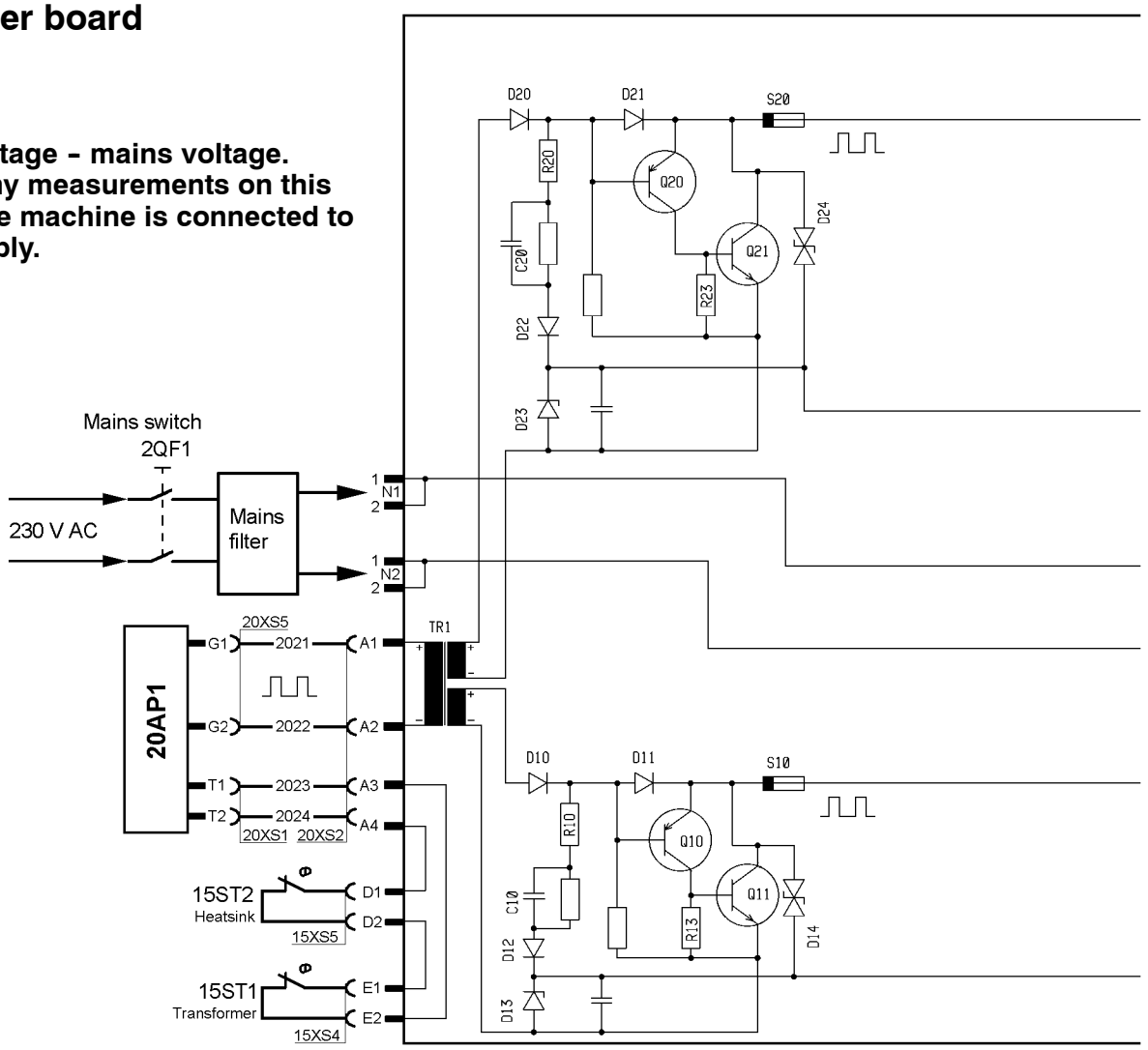
10AP1 Component positions

WARNING! Dangerous voltage - mains voltage.



15AP1 Power board

WARNING!
Dangerous voltage – mains voltage.
Never make any measurements on this board when the machine is connected to the mains supply.



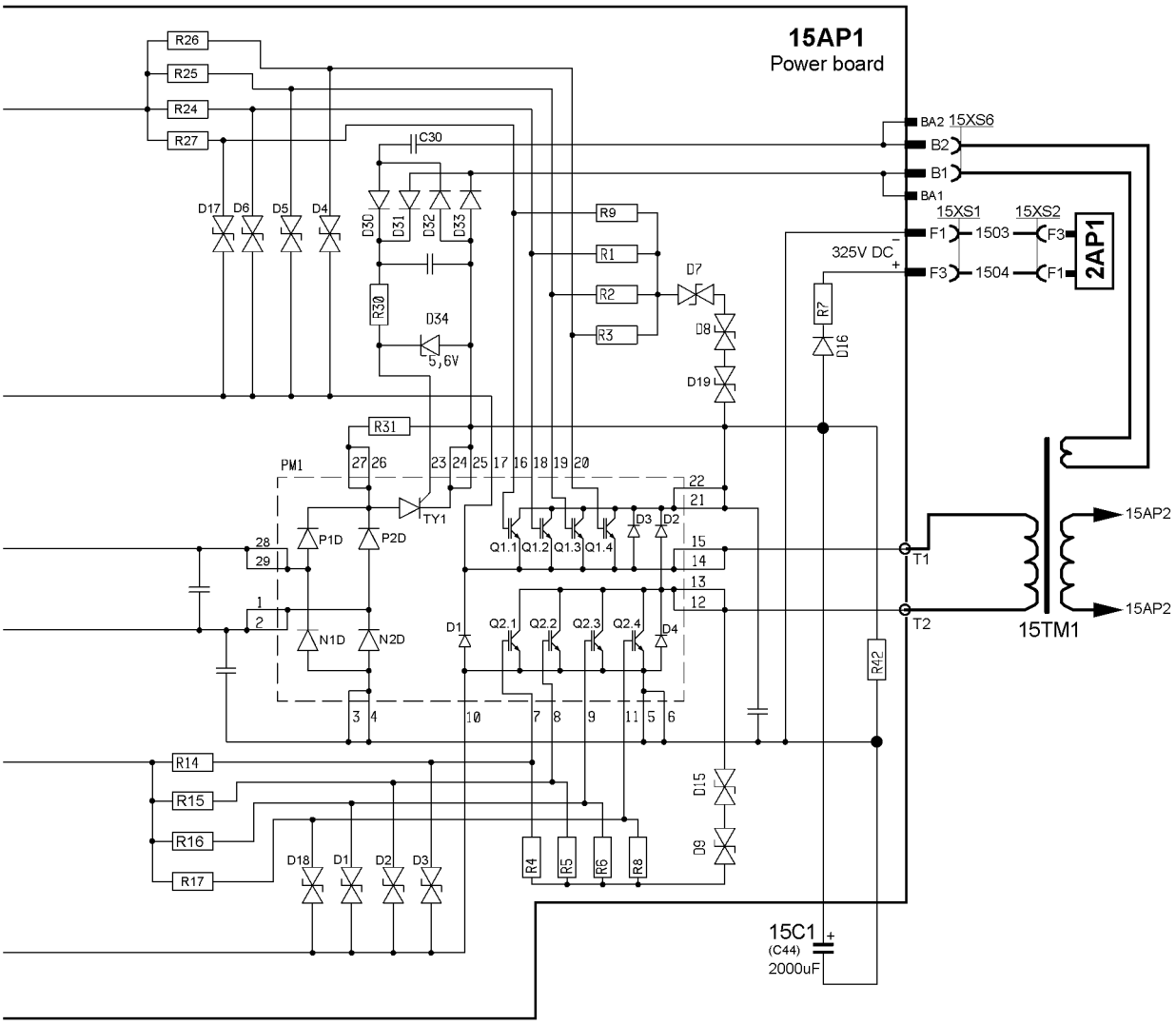
The power module is a single forward converter, operating at a switching frequency of 65 kHz. IGBT transistors are used as the switching elements. See page 49 and 50 for screen traces of waveforms and measurement instructions.

If the power board has failed, a replacement board must be mounted in accordance with the instructions on page 51.

The power board carries the mains rectifier, the charging circuit, the switching circuit and the gate circuit.
The mains rectifier and the switching transistors are integrated in a semiconductor module, PM1, which is part of the power board.

Charging circuit

When the mains power supply is turned on, the rectified mains voltage charges smoothing capacitor 15C1 via resistor R31. Thyristor TY1 short-circuits charge resistor R31 when the machine is loaded. If TY1 did not conduct, resistor R31 would burn out when the unit is on load.



Supply to 2AP1

The board supplies power supply board 2AP1 with 325 V DC (pins F1 and F3, connector 15XS1).

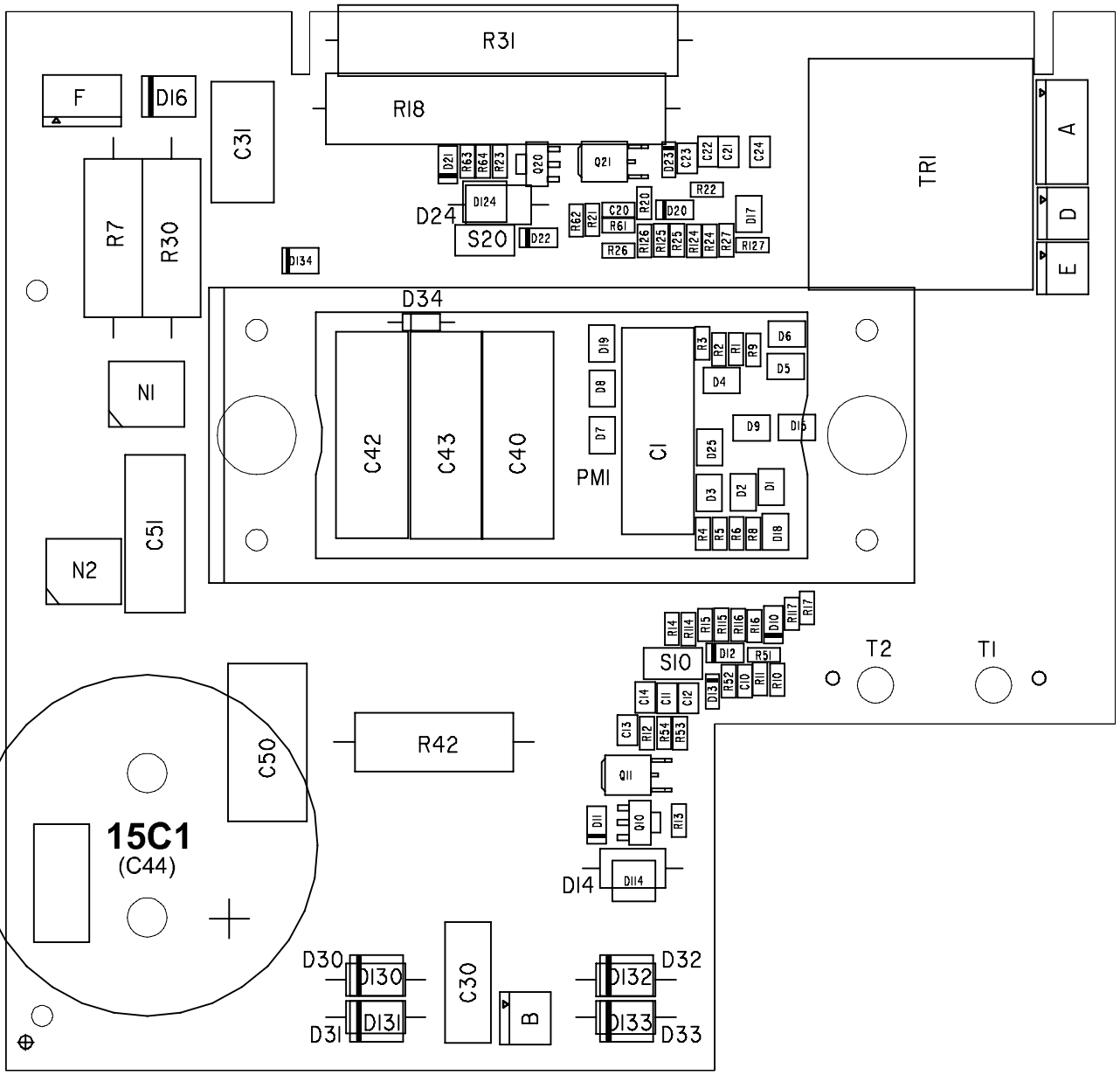
Gate driver stages

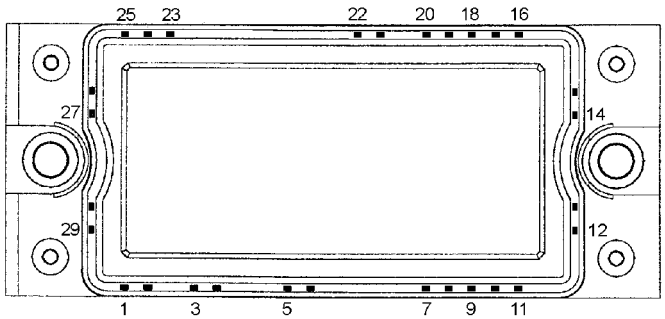
Transformer TR1 is a gate driver transformer for galvanic isolation of the drive circuits from controller board 20AP1. Fuses S10 and S20 protect the gate driver circuit if the IGBT transistors fail.

Switching circuit

The switching transistors are integrated in the semiconductor module. They are parallel-connected four and four.

15AP1 Component positions

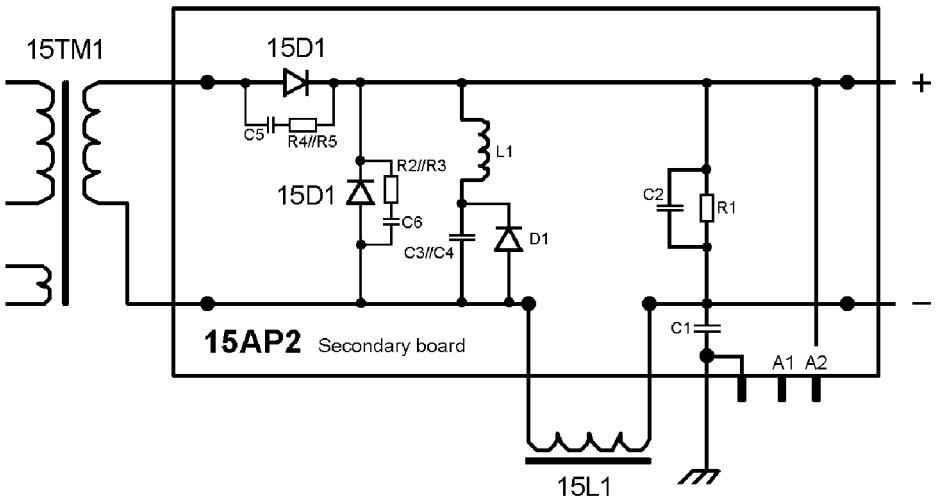




Pin positions of the semiconductor module

15AP2 Secondary board

The secondary board is fitted on the main transformer 15TM1, diode module 15D1 and inductor 15L1.

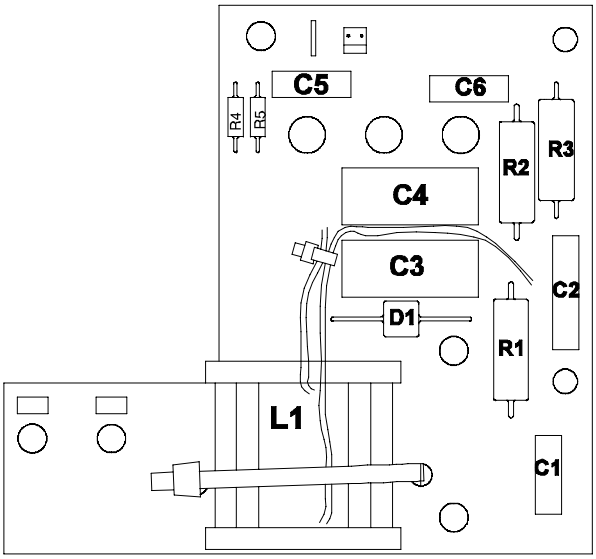


Diode module 15D1 comprises two diodes, rectifier and freewheel diode. During the time interval between two voltage pulses from transformer 15TM1, the freewheel diode maintain the welding current from inductor 15L1.

If the diode module has failed, a replacement module must be fitted in accordance with the instructions on page 51.

Inductor L1 forms an LC circuit with C3//C4 and D1 to reduce the risk of arc extinction at low welding currents. When rectifier diode 15D1 conducts, the LC circuit charges up. The circuit is capable of temporarily maintaining a high arc voltage at low current, thus reducing the risk of arc extinction. Diode D1 prevents capacitor C3//C4 from going negative.

15AP2 Component positions



20AP1 Control board

The processor on the control board monitors and controls the various functions of the power source. It obtains information on welding data from the control panel.
If the circuit board is faulty, it must be replaced. Replacement circuit boards must be configured, see page 33. After replacing the circuit board, soft-start the machine. See the instructions on page 46.

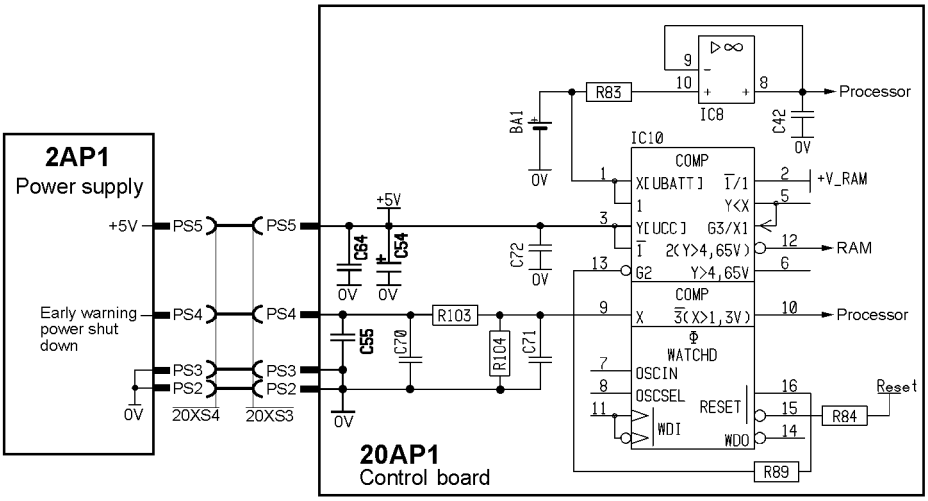
From serial no. 613-xxx-xxxx version 2 of the control board is fitted to the machines. The control boards are interchangeable up to and including serial no. 402-xxx-xxxx, from serial number 613-xxx-xxxx version 2 of the control board must be used.

Note: There are jumpers on the board that must be moved to the replacement board. See page 33 for version 1 of the board and page 35 for version 2.

20AP1:1 Power supply

Version 1 of the board has a battery backed RAM memory, version 2 uses a flash memory.

+5 V supply and battery backup, version 1 of 20AP1



Power supply +5 V, circuit board version 1

IC8 and IC10 monitor the voltage of battery BA1. The nominal battery voltage is 3 V. If it falls below 2.5 V, the display shows error message E06. Battery life is about five years. The battery voltage can be tested by service function no. 23, see page 38.

The machine can also operate without the battery, but data stored in the welding data memory, disappears when the mains voltage is switched off. At power-up default values will be read into the memory.

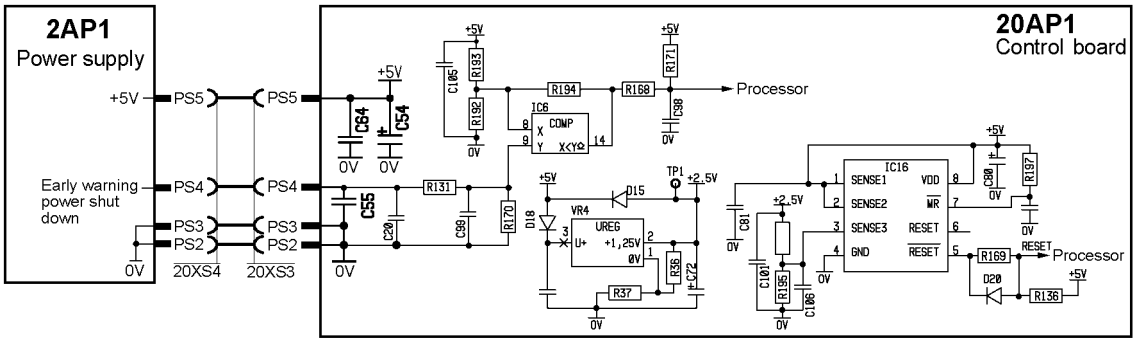
A voltage of about 2.5 V is supplied to IC10, pin 9. If this voltage drops below the threshold voltage of 1.3 V, pin 10 of IC10 goes low, providing the processor with a low power supply voltage signal. The processor then generates a ” ▔ ▔ ▁ ” warning signal in the display and stores current data.

If the +5 V supply to pin 3 of IC10 drops below 4.65 V, pin 15 goes low and inhibits the pulse width modulator. The processor receives a reset signal and data in the RAM memory is protected by the backup battery power supply.

Pin 2 of IC10 supplies the RAM memory with power, both when the machine is energised and when it is shut down.

When power to the machine is turned off, the display also shows ” ¯ — _ ” to confirm that the processor has stored the current data.

+5 V and +2.5 V, version 2 of 20AP1



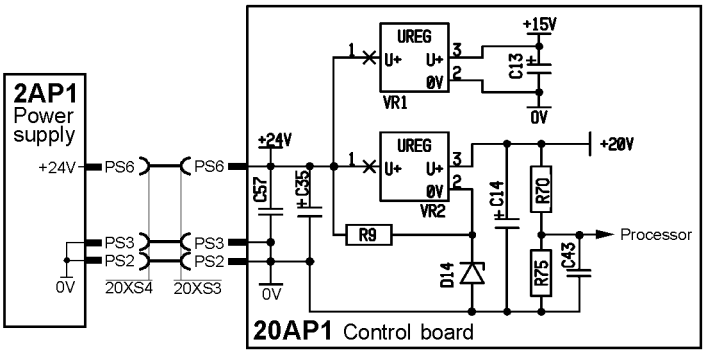
+5 and 2.5 V power supply, circuit board version 2

IC6 monitors the 24 V voltage supply to the 5 V regulator on circuit board 2AP1. IC16 monitors the 5 and 2.5 V supplies. Regulator VR4 supplies the processor with +2.5 V.

The voltage on terminal PS4 is normally about 24 V, when this drops below 20 V, pin 14 of IC6 goes low, providing the processor with a low power supply voltage signal. The processor then stores current data and generates fault code E4. When the 5 and 2.5 V voltages are passing below their treshold values, the processor receives a reset signal from IC16.

Fault code E4 is not displayed at normal power off

+15 V and +20 V

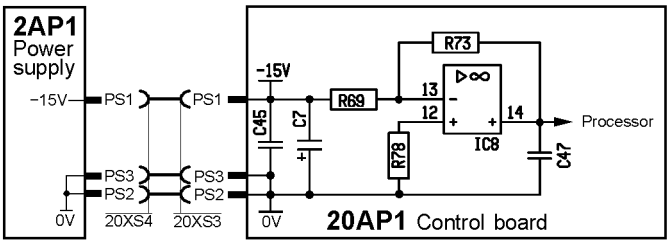


Voltage regulator VR2 produces an output voltage of +20 ±1.0 V, which supplies the pulse width modulator output stage. The voltage can be tested by service function no. 24, see page 38.

Potential divider R70/R75 supplies 2.6 V to the processor. This provides a signal that the power supply is available.

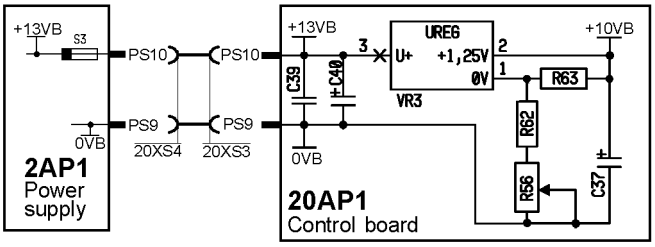
Voltage regulator VR2 produces an output voltage of +15 V, and this, together with the −15 V supply, powers the analogue circuits.

-15 V



The -15 V power supply is monitored by the processor. The voltage can be tested by service function no. 25, see page 38.

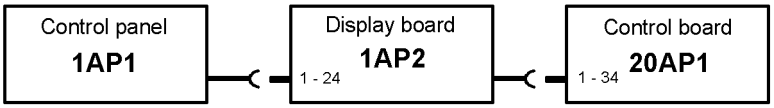
+10 VB



Voltage regulator VR3 produces a stabilised +10 V supply, which is used to supply the remote control unit. This supply is referred to as +10 VB, and its neutral point, 0 VB, is separated from the electronic neutral (0 V). Potentiometer R56 is used to adjust the voltage.

20AP1:2 Control panel interface circuits

All machine functions are set by the control panel. All processing of the control signals is carried out by the control board.

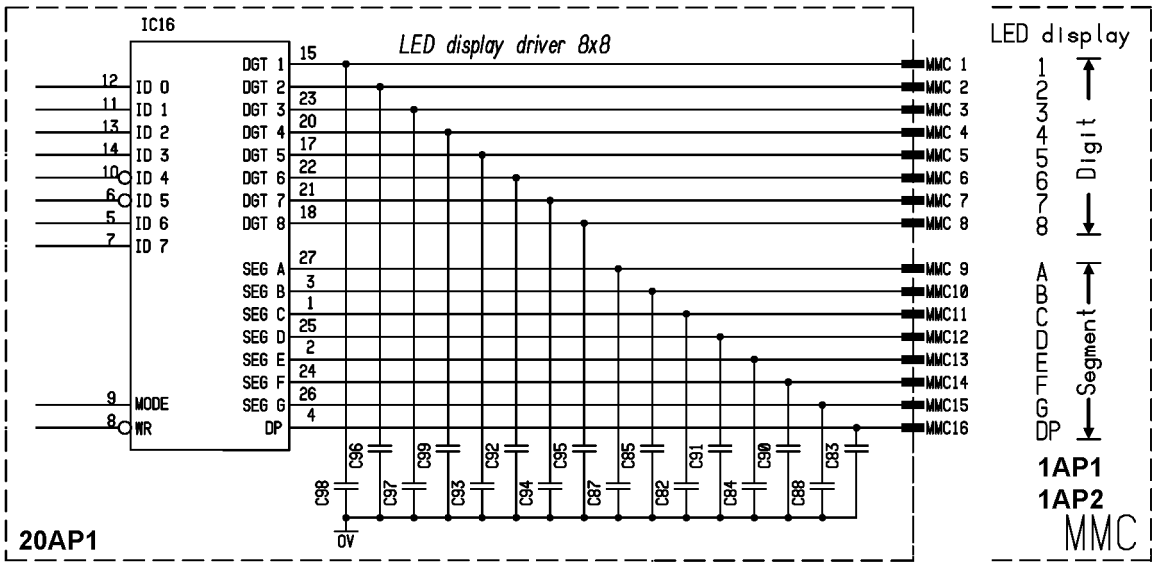


The signals between 1AP1 and 20AP1 pass 1AP2, the displayboard

See pages 11 to 13 for component positions and circuit diagram of the display board and the control panels.

LED display driver

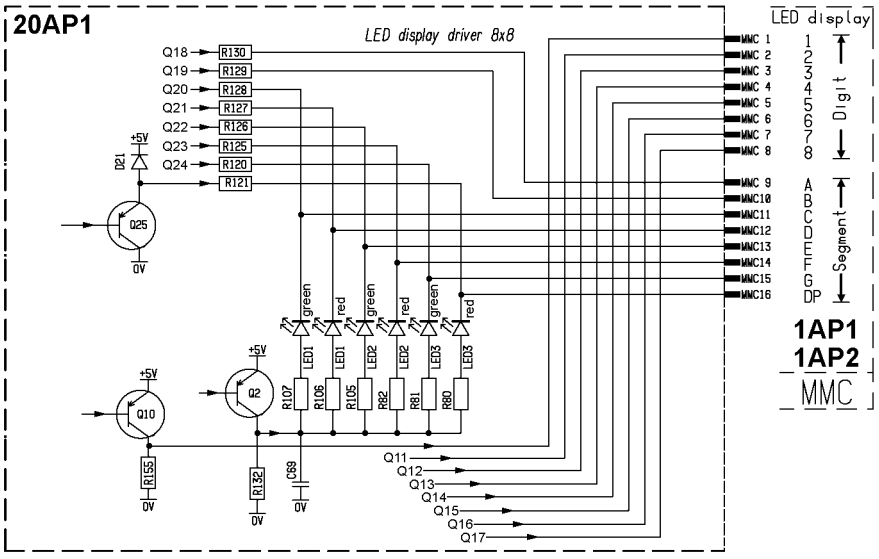
Version 1 of 20AP1



LED display driver, version 1 of 20AP1

The display window and the LEDs are driven by IC16, which is controlled by the processor.

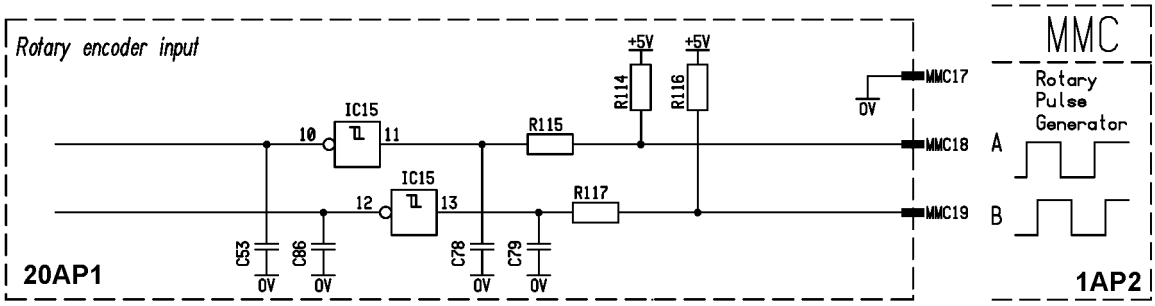
Version 2 of 20AP1



LED display driver, version 2 of 20AP1

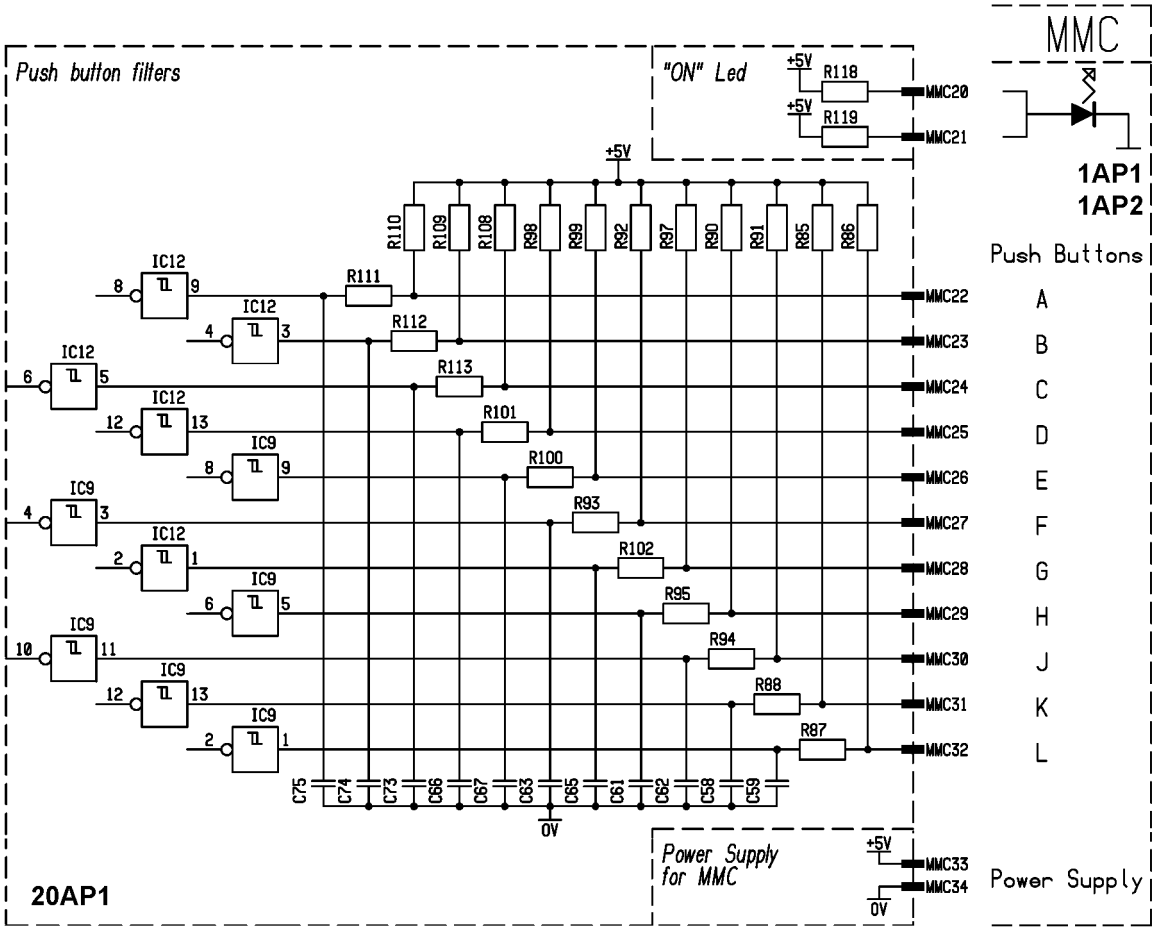
The display window, the display LEDs and LEDs LED1 to LED3 are driven by transistors Q2 and Q10–Q25, which are controlled by the processor.

Rotary encoder input



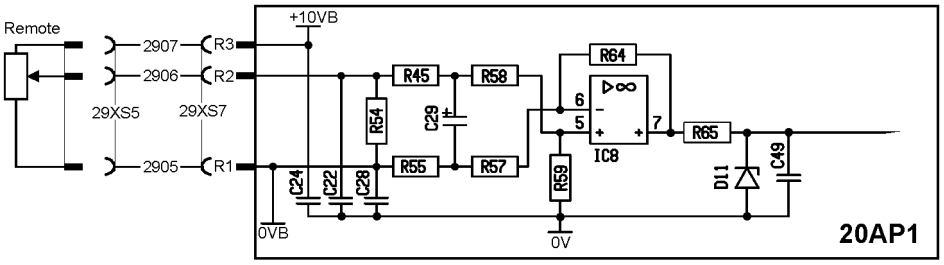
The pulse generator on the control panel is supplied at +5 V. Pulses are supplied from the pulse generator to connections MMC18 and MMC19 with a 90° mutual phase displacement. The pulse generator generates pulses only when its shaft is turned. Resistors R114 and R116 are pull-up resistors.

Push button filters



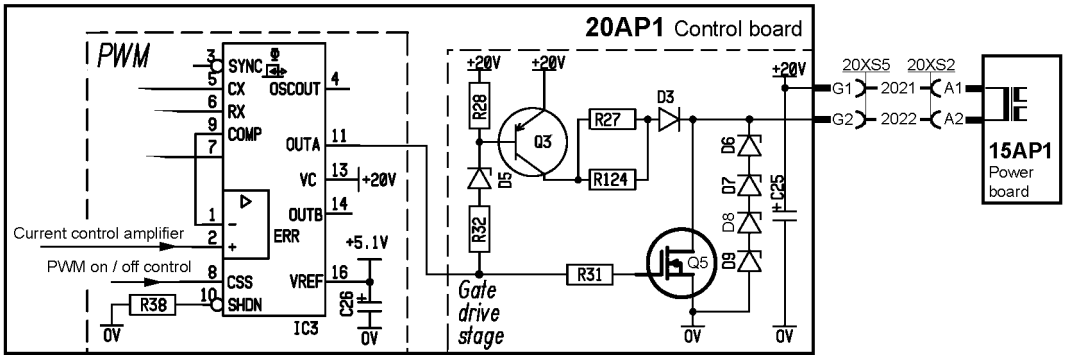
All pushbuttons are connected to 0 V, so that pressing any of them pulls down the corresponding input (MMC22 – MMC32) to 0 V. The signal is filtered by a filter network and then applied to the processor.

20AP1:3 Remote control input



If the remote control input is activated, but there is no reference signal, resistor R54 holds the reference input low. This results in a welding current of 3 A for TIG welding and 4 A for MMA welding. The remote control input can be tested by a service function:
Circuit board version 1, see service function no. 22 on page 39.
Circuit board version 2, see service function no. 16 on page 42.

20AP1:4 Pulse width modulator

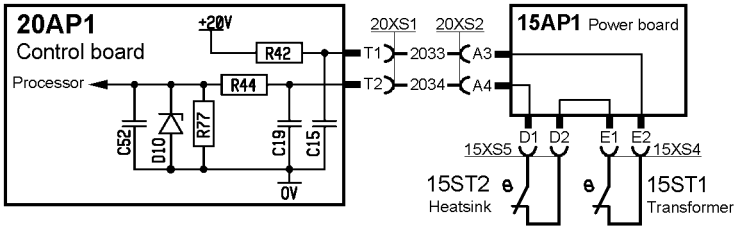


The pulse width modulator determines the frequency and pulse time of the switching transistors' control pulses. IC3 controls the pulse frequency, the pulse time and inhibition of pulses.

The pulse frequency is 65 kHz +/- 1kHz, with a maximum pulse width of 43 - 44 % of the cycle width. See page 49 for screen traces of waveforms and measurement instructions.

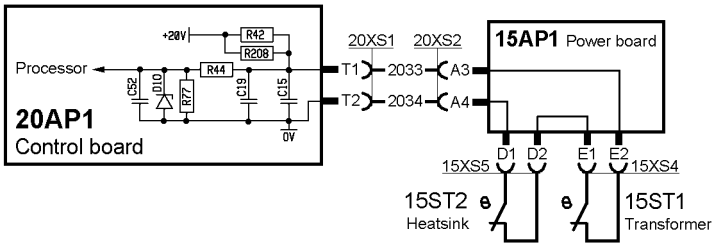
Transistor Q5 controls the primary winding of the pulse transformer on circuit board 15AP1.

20AP1:5 Temperature monitoring



Version 1 of circuit board 20AP1

The thermal overload switches, 15ST1 and 15ST2, are normally closed.
Terminal T2 of circuit board **version 1** is at 10 V.
Terminal T2 of circuit board **version 2** is at 0 V.



Version 2 of circuit board 20AP1

15ST2, which is fitted on the heat sink, opens at 75 °C. 15ST1, which is fitted in the winding of the main transformer, 15TM1, opens at 130 °C.

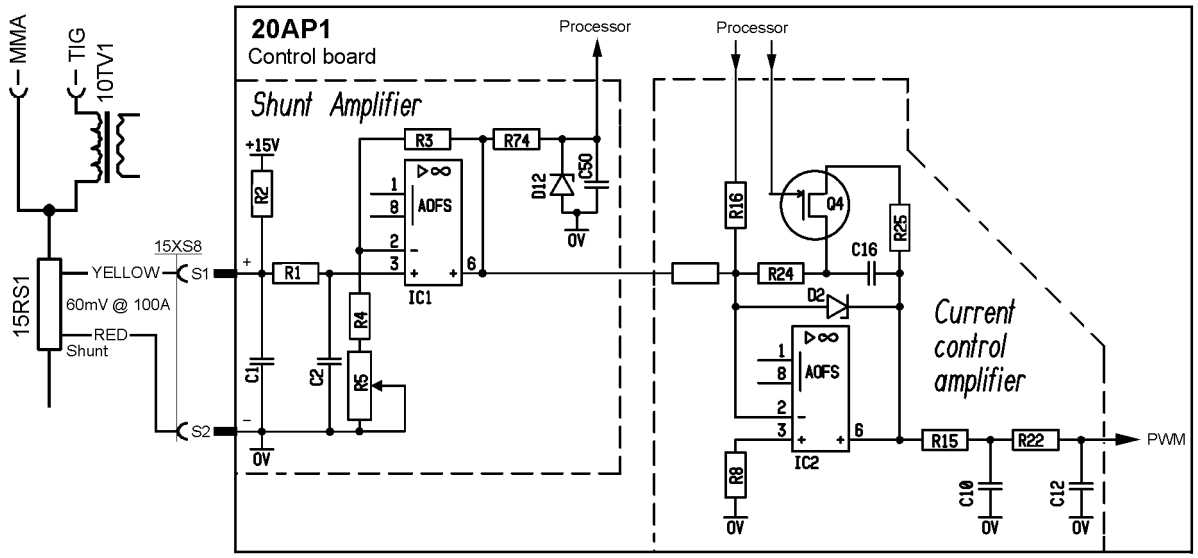
If either of the switches operates, the power source is stopped, a fault code is displayed and the temperature indication LED on the control panel lights.
Circuit board **version 1** displays fault code E13.
Circuit board **version 2** displays fault code E06.

The power source cannot be restarted until it has cooled sufficiently for the switch(es) to reclose.

The state of the thermal switches and the overload indication can be tested by service functions, see pages 38 to 43.

Version 1 of circuit board 20AP1: Sometimes the temperature indication LED may gleam weak when it is off, this is no fault. When the LED is activated, it lights with a clear light at the same time as the fault code is displayed.

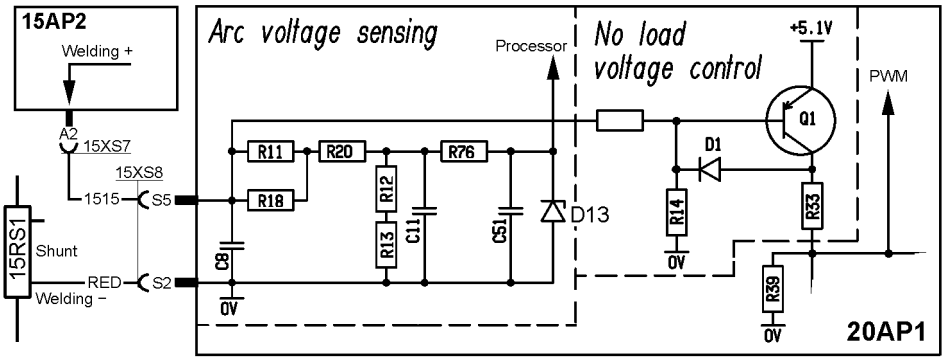
20AP1:6 Shunt and current control amplifier



The shunt produces 60 mV at a welding current of 100 A. The shunt response is linear to the welding current.

If the shunt is not connected to the circuit board, resistor R2 supplies about 1.4 to 1.9 V to the shunt input. This blocks the current control amplifier, i.e. the machine does not deliver any welding current.

20AP1:7 Arc voltage monitoring



This circuit measures and scales the arc voltage to a suitable level for the processor. 64 V arc voltage produces a voltage signal at the cathode of diode D13, 5.1 V at **version 1** of the board and 5.0 V at **version 2**.

MMA
When the current exceeds 10 A during welding start, the no-load voltage control is deactivated. When the arc voltage exceeds 52 V, welding stops and the no-load voltage control is activated.

The no-load voltage control holds the open-circuit voltage at about 70 V.

TIG
The no-load voltage control is inactive in the TIG welding mode. The open-circuit voltage is about 110 V. Arc voltages below 45 V are defined as welding. Output voltage is produced only when TIG welding is in progress.

20AP1:8 TIG functions

LiftArc TIG start
Output voltage is produced only when TIG welding is in progress.

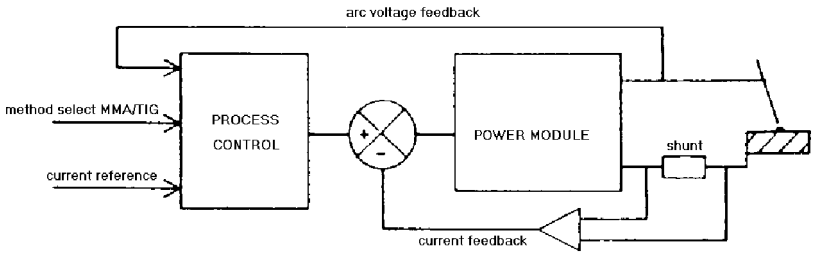
- Touch the electrode on to the workpiece.
- Press the torch trigger is pressed. The machine produces a current of about 6 A.
- Lift the electrode from the workpiece. The arc strikes and the current increases to 30 A.
- When the arc voltage exceeds 8 V, the current increases / decreases to the set current.

HF TIG start
Output voltage is produced only when TIG welding is in progress. Arc voltages below 45 V are defined as welding.

See also: 10AP1 TIG board, on page 18.

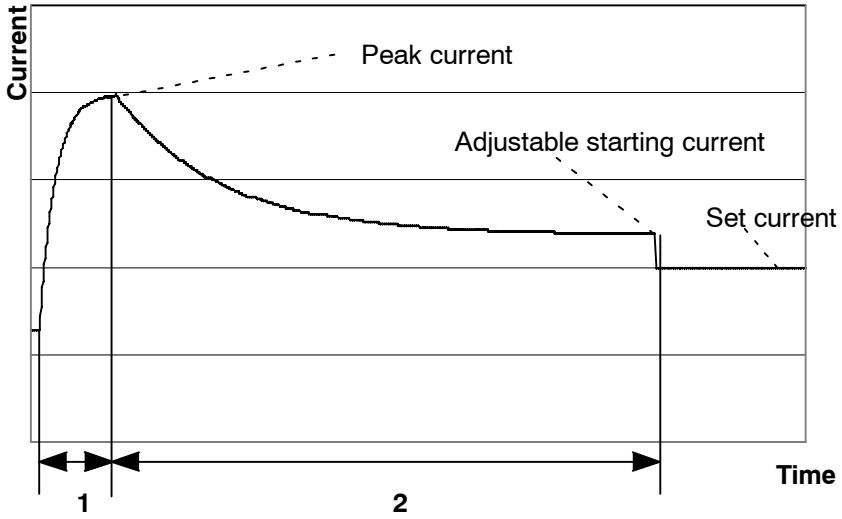
20AP1:9 Welding process control

The processor inputs are the set values of welding data and the arc voltage. The processor also calculates a set value signal for welding current, and supplies this to the current control amplifier.



The process regulator control principle

Hot start MMA



Starting current, MMA welding mode
***1**. Phase 1, fixed starting current depending on the set current.*
***2**. Phase 2, hot start = adjustable starting current.*

MMA normal welding mode
In the MMA normal welding mode, the welding current is briefly increased at the start of welding. The peak current, phase 1 in the diagram above, is engaged for 150 milliseconds.

Version 1 of circuit board 20AP1: The peak current is twice the normal welding current up to 80 A (i.e. twice the set value). If the set value is above 80 A, the peak current is the set value + 80 A, subject to a maximum of 230 A.

The hot start current, phase 2 above, is engaged for 600 milliseconds. It is set in per cent of the set current, but does never exceed the peak current.

Version 2 of circuit board 20AP1: The peak current is twice the normal welding current up to 150 A (i.e. twice the set value), subject to a maximum of 207 A.

The hot start current, phase 2 above, is engaged for 1.5 seconds. It is set in per cent of the set current, but does never exceed the peak current.

MMA drop welding mode
In the MMA drop welding mode, the peak current is three times the set value, but the duration is shorter at only 50 ms.

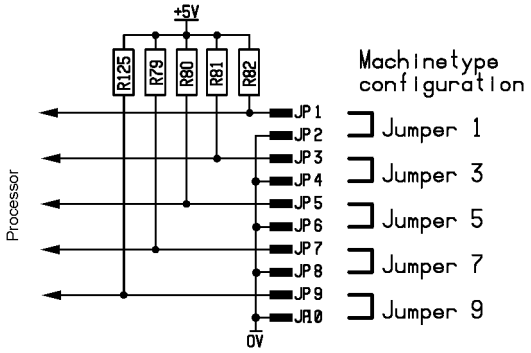
The hot start current, phase 2 above, is engaged for 240 milliseconds. It is set in per cent of the set current, but does never exceed the peak current.

20AP1:10 Machine type configuration

This circuit board is used for different machines, therefore it must be configured.

Version 2 of circuit board 20AP1: the board is configured by the software, see service function 23 and 24 on page 42.

Version 1 of circuit board 20AP1: the board is configured by jumpers on a terminal, follow the instruction below.



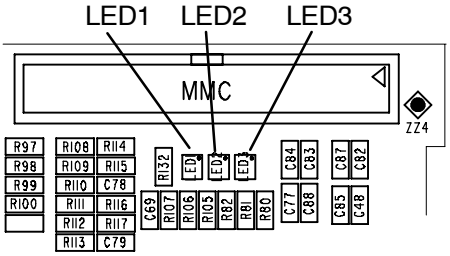
	1	3	5	7	9
OrigoTig 150	x	x	x	x	-
CaddyTig 150	-	x	x	x	-
CaddyArc 150	-	-	x	x	-
OrigoTig 200	x	x	x	-	-
CaddyTig 200	-	x	x	-	-

The jumpers on terminal JP must be set up for the machine type in which the board is used. See the table above.

20AP1:11 Power-up starting sequence

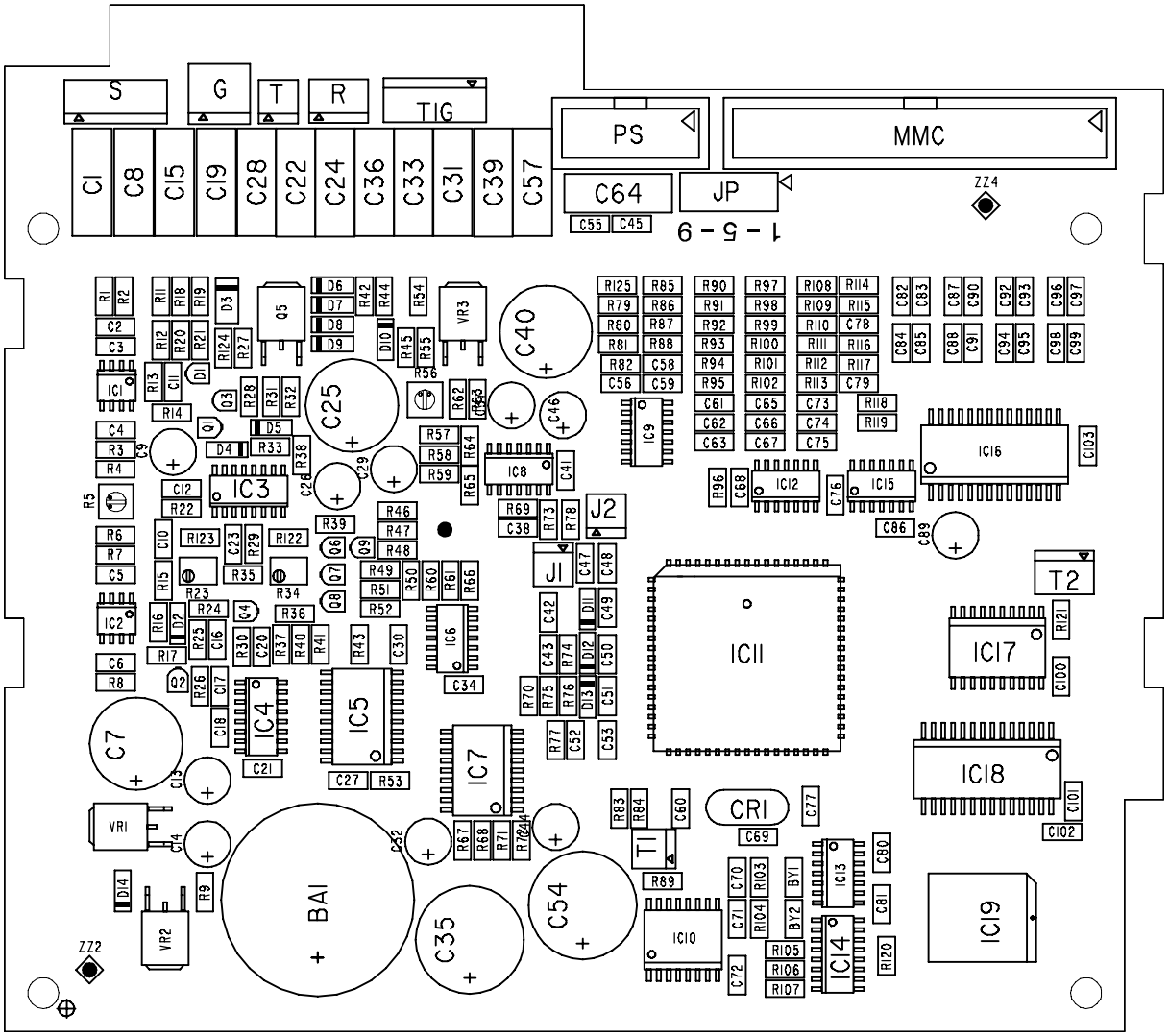
The starting sequence on power-up is only displayed by version 2 of circuit board 20AP1.

The circuit board displays the starting sequence from power-up.
LED1 lights red. Then LED1, LED2 and LED3 lights green.
When the board has been initiated, and the power source is in the application program, LED1 flashes continously with a green light.

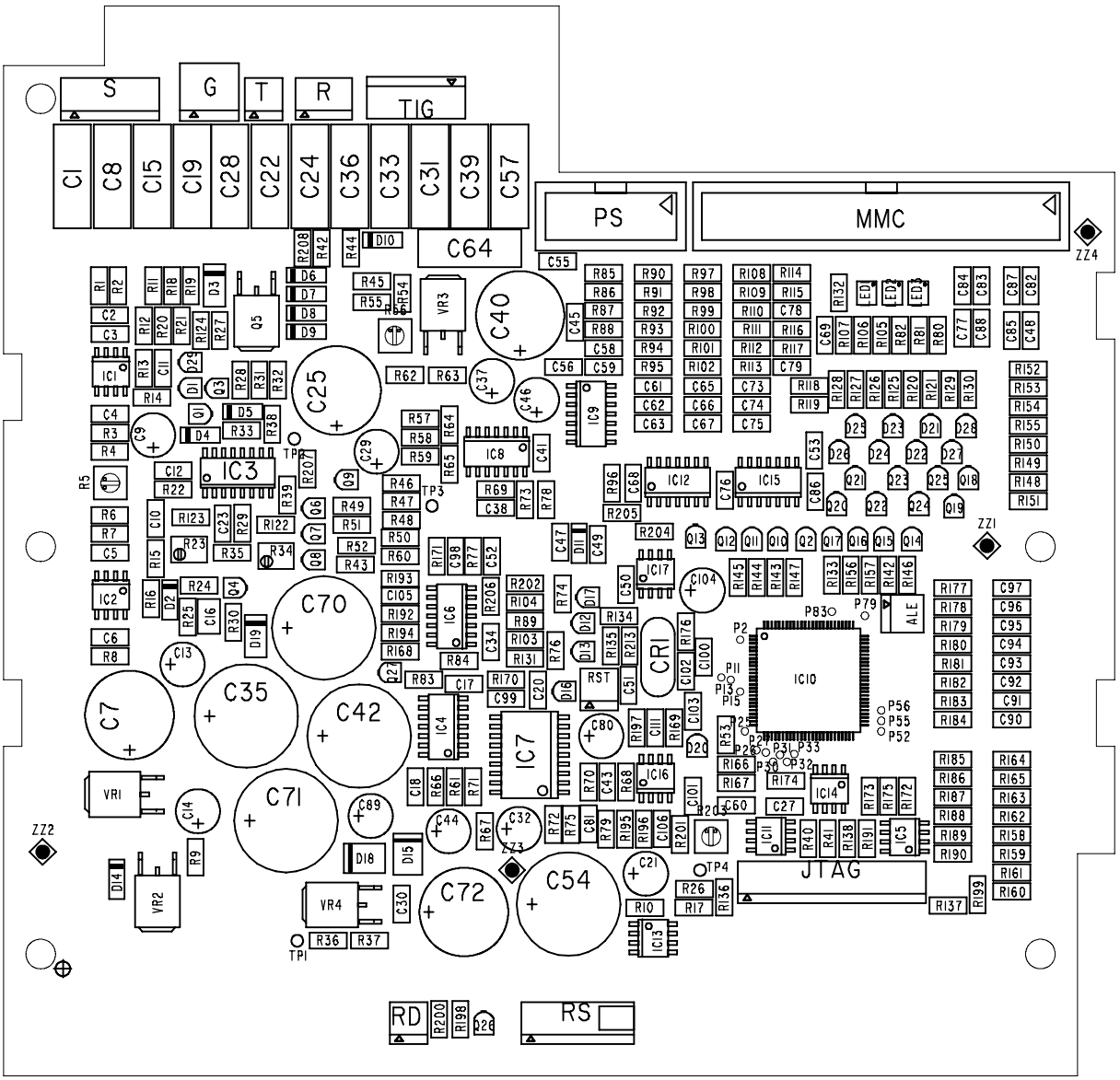


LEDs on circuit board 20AP1

20AP1 Component positions



*Component positions for **version 1** of circuit board 20AP1*



There must be a jumper between pin 5 and 6 on terminal RS

*Component positions for **version 2** of circuit board 20AP1*

FAULT CODES

Version 1 of circuit board 20AP1

Code	Description
E01	**Internal RAM fault** **Action:** Restart the machine. If the fault persists, replace circuit board 20AP1.
E02	**External RAM fault** **Action:** Restart the machine, and then reset it. If the fault persists replace circuit board 20AP1.
E03	**EPROM fault** **Action:** Restart the machine. If the fault persists, replace circuit board 20AP1.
E04	**Battery-backed RAM fault** **Action:** Restart the machine. If the fault persists, replace circuit board 20AP1.
E05	**Memory fault** **Action:** Restart the machine. If the fault persists, replace circuit board 20AP1.
E06	**Low battery voltage**, less than 2.5 V **Action:** Replace the battery. Reset by pressing any pushbutton.
E10	**+20 V out of limits**. Must be18.5 - 21.5 V **Action:** Check power supply board 2AP1. Automatic reset when the fault is repaired.
E11	**-15 V out of limits**. Must be -13.0 – 16.0 V **Action:** Check power supply board 2AP1. Automatic reset when the fault is repaired.
E13	**High temperature** **Action:** Check that the cooling fan works, and that the air inlet and cooling fins are clean. Automatic reset when the power source has cooled down.
E14	**Current servo fault** Automatic reset when the fault has cleared. May also be reset by pressing any pushbutton.
E99	**Strapping fault on the control board** **Action:** Switch off the machine, strap the control board as shown in the strapping (jumper) diagram on page 34.

Version 2 of circuit board 20AP1

Code	Description
E04	**5 V power supply too low** The unregulated power supply voltage (+24 V) is too low: the smoothing capacitors cannot keep the voltage up enough for the processor to continue to operate. The processor stops all normal activities, expecting to be shut down. **Action:** Turn off the mains power supply to reset the unit. If the fault persists, check the power supply to circuit board 20AP1.
E06	**High temperature** The temperature monitoring circuit has operated. The power source is stopped, and cannot be restarted until the circuit has reset. See also page 29. **Possible causes:** Overloading, fan not working properly, cooling air inlets or outlets blocked or obstructed or dirt on the heat exchanger.
E11	**Current servo fault** Automatic reset when the fault has cleared. May also be reset by pressing any pushbutton.
E16	**High no-load voltage, VRD error** The open circuit voltage is too high. See also page 31. **Action:** Turn off the mains power supply to reset the unit. If the fault persists .....
E19	**Error in persistent memory** **Action:** Restart the machine. If the fault persists, replace circuit board 20AP1.

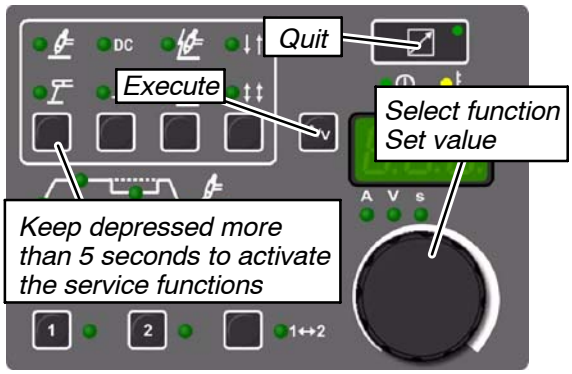
SERVICE FUNCTIONS

The control panel can acess a number of service functions. The service functions have several applications over and above service and fault tracing: those that are of importance for service and fault tracing are described here.

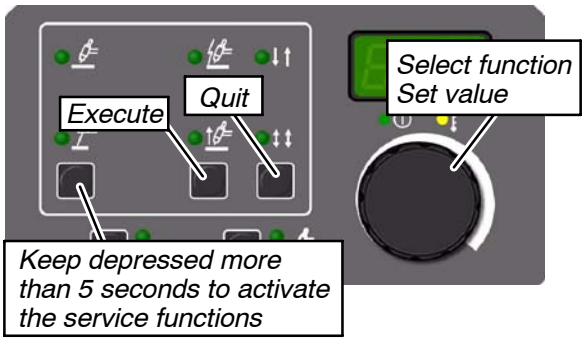
To access the service functions:

- Press the welding process selection key for more than five seconds. When the service function mode is active, the upper half of the left digit of the display lights up 
  The digit to the right indicates the number of the present service function.
- Press the [Quit] key to leave the service functions.

Version 1 of circuit board 20AP1



***CaddyTig**, control keys for the service functions*



***OrigoTig**, control keys for the service functions*

Function no.

1 Reset welding data
Resets all welding data variables to the default values.
Press [Execute]

2 Reset fault indication
Press [Execute]

8 Activate HF generator
Press [Execute] , the display shows “1”, the HF generator is inactive.
Press [Execute] to activate the HF generator, the display shows “0”.
Press [Execute] to deactivate the HF generator.
Press [Quit] to leave this function.

9 Activate gas valve
Press [Execute] , the display shows “1”, the gas valve is inactive.
Press [Execute] to activate the gas valve, the display shows “0”.
Press [Execute] to deactivate the gas valve.
Press [Quit] to leave this function.

10 Activate the thermal overload indication LED
Press [Execute] , the display shows “0”, the LED is off.
Press [Execute] to turn on the LED, the display shows “1”.
Press [Execute] to turn off the LED.
Press [Quit] to leave this function.

14 Deactivate the pulse width modulator

Press [Execute] , the display shows “1”, the pulse width modulator is on.
Press [Execute] to deactivate the pulse width modulator, the display shows “0”.
Press [Quit] to activate the pulse width modulator and to leave this function.

16 Show state of thermal switch input

Press [Execute] to read the input. “0” = closed thermal overload switch; “1” = open switch.
Press [Execute] for a new reading.
Press [Quit] to leave this function.

17 Show state of welding torch input

Press [Execute] to read the input. “0” = open torch switch; “1” = closed torch switch.
Press [Execute] for a new reading.
Press [Quit] to leave this function.

19 Activate current reference

Press [Execute] to activate this function. Set desired current value. **Note**: there is no current limit.
Press [Execute] to activate the current reference.
Press [Quit] twice to deactivate the current reference, and to leave the service functions.

20 Show arc voltage

Press [Execute] to read the actual voltage. The display shows a value between 0 and 255, scaling 0.25 V / unit. Voltages from 64 V and up are shown as 255.
Press [Execute] for a new reading.
Press [Quit] to leave this function.

21 Show current response

Press [Execute] to read the actual current. The display shows a value between 0 and 255, scaling 1 A / unit.
Press [Execute] for a new reading.
Press [Quit] to leave this function.

22 Show remote control

Press [Execute] to read the actual setting. The display shows a value between 0 and 255, scaling 0 = min. setting; 255 = max. setting.
Press [Execute] for a new reading.
Press [Quit] to leave this function.

23 Show battery voltage

Press [Execute] to read the actual voltage. The display must not show less than 127, which corresponds to a battery voltage of 2.5 V.
Press [Execute] for a new reading.
Press [Quit] to leave this function.

24 Show 20 V voltage

Press [Execute] to read the actual voltage. The display must show 121 to 141, which corresponds to 18.5 to 21.5 V.
Press [Execute] for a new reading.
Press [Quit] to leave this function.

25 Show -15 V voltage

Press [Execute] to read the actual voltage. The display must show 98 to 120, which corresponds to -13.0 to -16.0 V.
Press [Execute] for a new reading.
Press [Quit] to leave this function.

26 Activate max current reference

Press [Execute] to display the maximum current reference.
Press [Execute] to activate the current reference.
Press [Quit] twice to deactivate the current reference, and to leave the service functions.

30 LED test

Press [Execute] to run a test of the control panel LEDs.

Version 1 of circuit board 20AP1

31 Display test

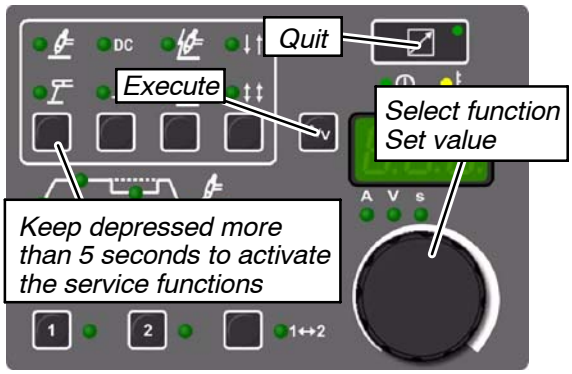
Press [*Execute*] to run a test of the display segments.

32 Program version

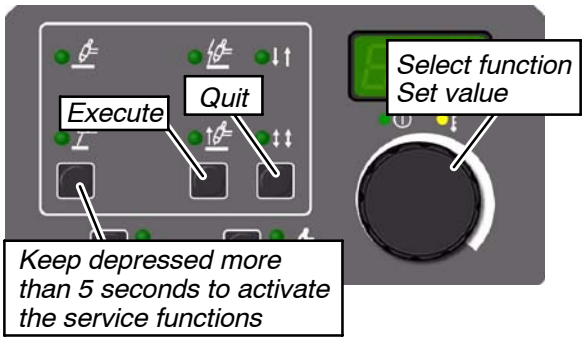
Press [*Execute*] to read the actual software version.
Press [*Quit*] to leave this function.

33 Machine type

Press [*Execute*] to read the actual machine type, set by the strapping on circuit board 20AP1.

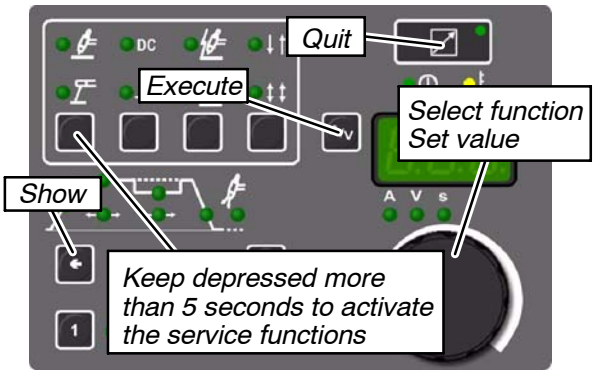


***CaddyTig**, control keys for the service functions*

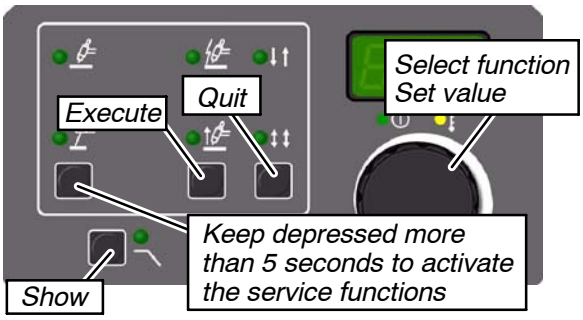


***OrigoTig**, control keys for the service functions*

Version 2 of circuit board 20AP1



***CaddyTig**, control keys for the service functions*



***OrigoTig**, control keys for the service functions*

Function no.

1 Show software version

Press [*Execute*] to read the actual software version.

2 Reset

Press [*Show*] to display the actual reset function.
Select reset function by turning the selection knob.
Press [*Show*] and then [*Execute*] to reset the selected function.
Press [*Quit*] to leave this function.

- If you have performed general reset:
  Turn Off and On the machine.
  The display shows E19 U0, reset this by pushing any button.

Available reset functions:
1 = General reset.
2 = Error log reset.
3 = Default parameter reset.
4 = Memory reset.

5 Activate HF generator

Press [*Execute*] , the display shows “1”, the HF generator is active.
Press [*Execute*] to deactivate the HF generator, the display shows “0”.
Press [*Quit*] to leave this function.

6 Activate gas valve

Press [*Execute*] , the display shows “1”, the gas valve is active.
Press [*Execute*] to deactivate the gas valve, the display shows “0”.
Press [*Quit*] to leave this function.

7 Activate the thermal overload indication LED

Press [*Execute*] to turn on the LED
Press [*Execute*] to turn off the LED.
Press [*Quit*] to leave this function.

9 Deactivate the no-load voltage control (idle control)

Press [*Execute*] , the display shows “1”, the idle control is on.
Press [*Execute*] to deactivate the idle control, the display shows “0”.
Press [*Execute*] to activate the idle control.
Press [*Quit*] to leave this function, the idle control is then off.
Turn Off and On the machine to reset it to normal idle control.

10 Deactivate the pulse width modulator

Press [*Execute*] , the display shows “1”, the pulse width modulator is on.
Press [*Execute*] to deactivate the pulse width modulator, the display shows “0”.
Press [*Quit*] to leave this function.

11 Show state of thermal switch input

Press [Execute] to read the input. “0” = closed thermal overload switch; “1” = open switch.
Press [Execute] for a new reading.
Press [Quit] to leave this function.

12 Show state of welding torch input

Press [Execute] to read the input. “0” = open torch switch; “1” = closed torch switch.
Press [Execute] for a new reading.
Press [Quit] to leave this function.

14 Show arc voltage

Press [Execute] to read the actual voltage. The display shows a value between 0 and 255, scaling 0.25 V / unit. Voltages from 64 V and up are shown as 255.
Press [Execute] for a new reading.
Press [Quit] to leave this function.

15 Show current response

Press [Execute] to read the actual current. The display shows a value between 0 and 255, scaling 1 A / unit.
Press [Execute] for a new reading.
Press [Quit] to leave this function.

16 Show remote control

Press [Execute] to read the actual setting. The display shows a value between 0 and 255, scaling 0 = min. setting; 255 = max. setting.
Press [Quit] and then [Execute] for a new reading.
Press [Quit] to leave this function.

17 Show 20 V voltage

Press [Execute] to read the actual voltage. The display must show 121 to 141, which corresponds to 18.5 to 21.5 V.
Press [Execute] for a new reading.
Press [Quit] to leave this function.

18 Show -15 V voltage

Press [Execute] to read the actual voltage. The display must show 98 to 120, which corresponds to -13.0 to -16.0 V.
Press [Execute] for a new reading.
Press [Quit] to leave this function.

19 LED test

Press [Execute] to run a test of the control panel LEDs.
When the test is executed, all LEDs except “power on” are off.
Turn Off and On the machine to reset it to normal function.

20 Display test

Press [Execute] to run a test of the display segments.
When the test is executed, all segmentrs are off.
Turn Off and On the machine to reset it to normal function.

21 Read / Set machine id for the MMC

Press [Show] to display the actual id.
Select id by turning the selection knob.
Press [Show] and then [Execute] to set the selected id.
Press [Quit] to leave this function.
Turn Off and On the machine.
The display shows E19 U0, reset this by pushing any button.
Access the service functions to confirm the configuration.

Available MMC id:
12 = Origo Tig 150 / Origo Tig 200
13 = Caddy Arc 150
14 = Caddy Tig 150 / Caddy Tig 200
Note: Other id numbers than in this table will make the board unusable.

22 Read / Set machine id for the power source

Press [Show] to display the actual id.
Select id by turning the selection knob.
Press [Show] and then [Execute] to set the selected id.
Press [Quit] to leave this function.
Turn Off and On the machine.
The display shows E19 U0, reset this by pushing any button.
Access the service functions to confirm the configuration.

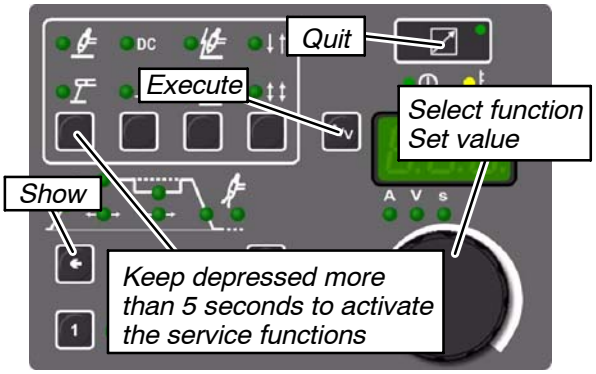
Available power source id:
18 = Origo Tig 150 / Caddy Arc 150 / Caddy Tig 150
19 = Origo Tig 200 / Caddy Tig 200
Note: Other id numbers than in this table will make the board unusable.

23 Read hardware id for the MMC

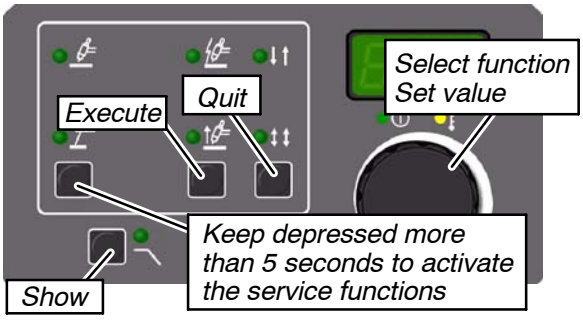
Press [Show] to display the actual id.
3 = Origo Tig 150 / Origo Tig 200 / Caddy Arc 150 / Caddy Tig 150 / Caddy Tig 200
Do **not** change the hardware id.
Press [Quit] to leave this function.

24 Read hardware id for the power source

Press [Show] to display the actual id.
3 = Origo Tig 150 / Origo Tig 200 / Caddy Arc 150 / Caddy Tig 150 / Caddy Tig 200
Do **not** change the hardware id.
Press [Quit] to leave this function.



***CaddyTig**, control keys for the service functions*



***OrigoTig**, control keys for the service functions*

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.

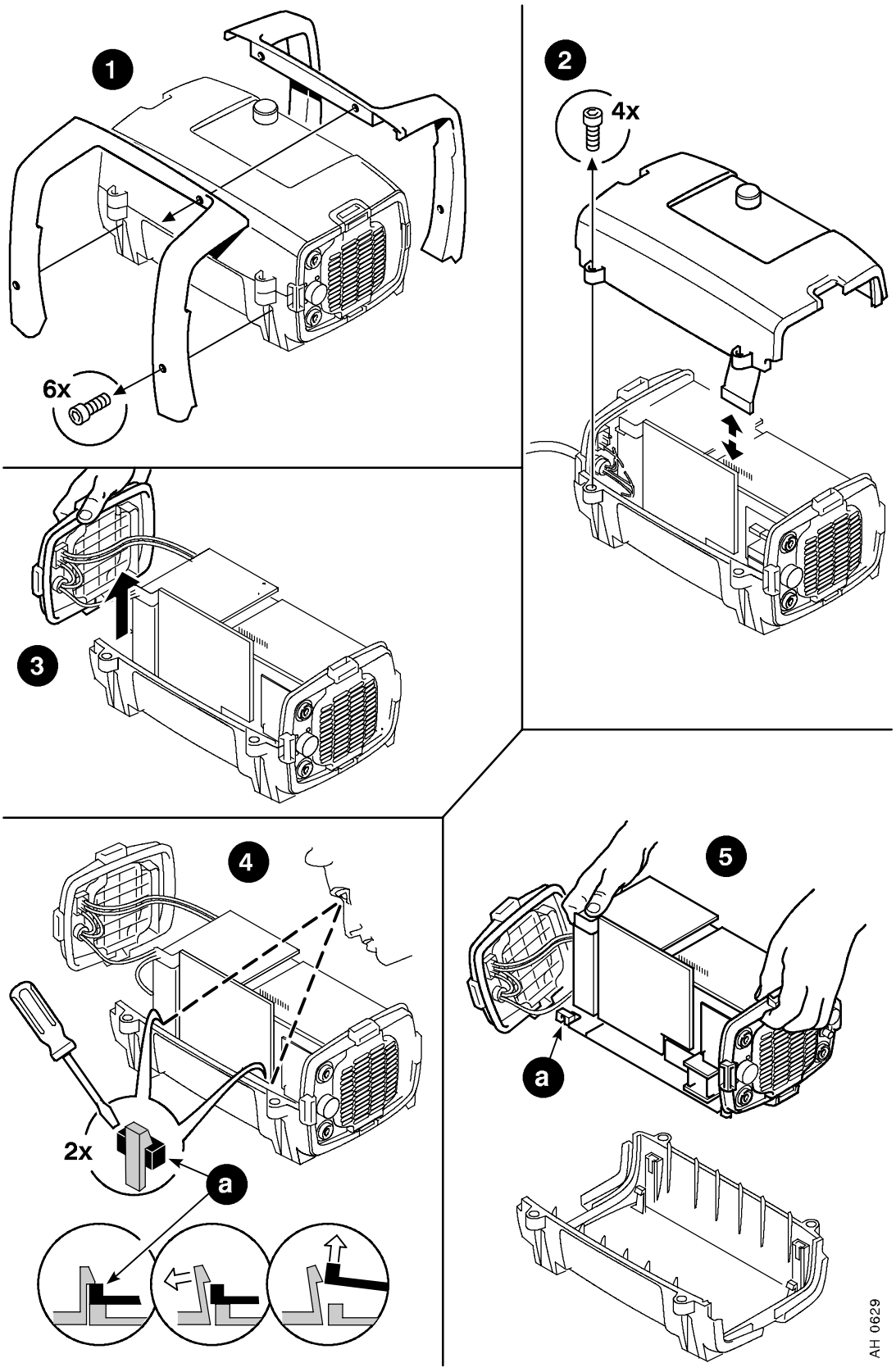
Special tools

Torx key
Torx key no. T10 and T25

Soft-starting tool SST 1
The soft-starting tool SST 1 is made for the CaddyArc, CaddyTig, OrigoTig and OrigoArc. It can be ordered from ESAB, ordering no. 0459 534 880.

The tool includes: Soft starting rectifier, cable set, voltage test board, gate pulse load and shunt voltage resistor for the OrigoArc.

Dismantling CaddyTig



Soft starting

We recommend soft starting of the machine after replacing control circuit board 20AP1, power supply board 2AP1 and circuit boards or components in the power module. Soft starting supplies the power module with a low voltage in order to avoid injury to persons or damage to components.

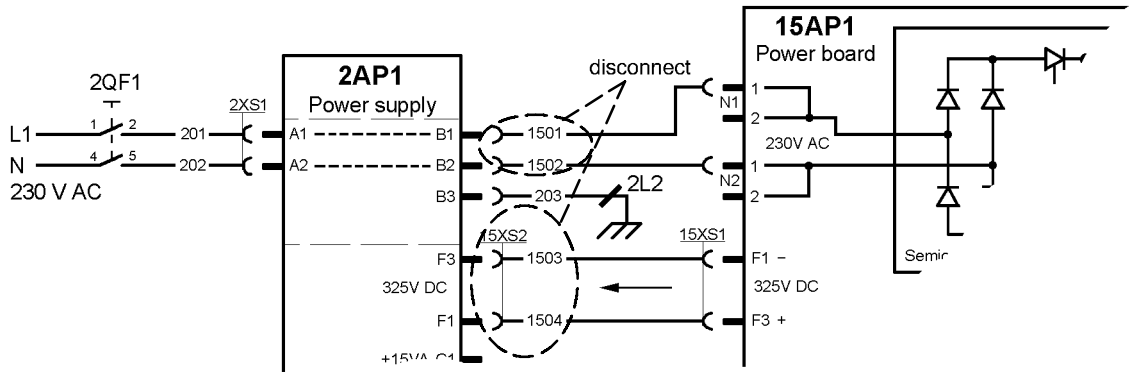
It is a good idea to use soft starting when fault tracing.

Special equipment

To soft-start the machine you need soft-starting tool SST 1, this is described on page 44.

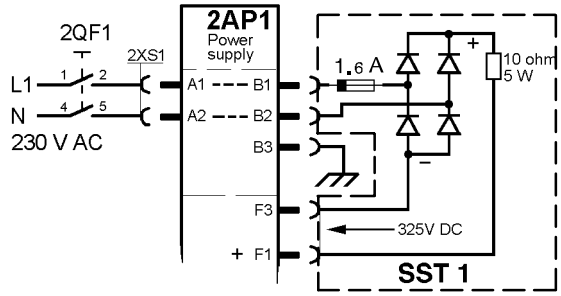
Instructions

1. Disconnect wires 1501, 1502, 1503 and 1504 from circuit boards 2AP1 and 15AP1.



Disconnections prior to soft starting

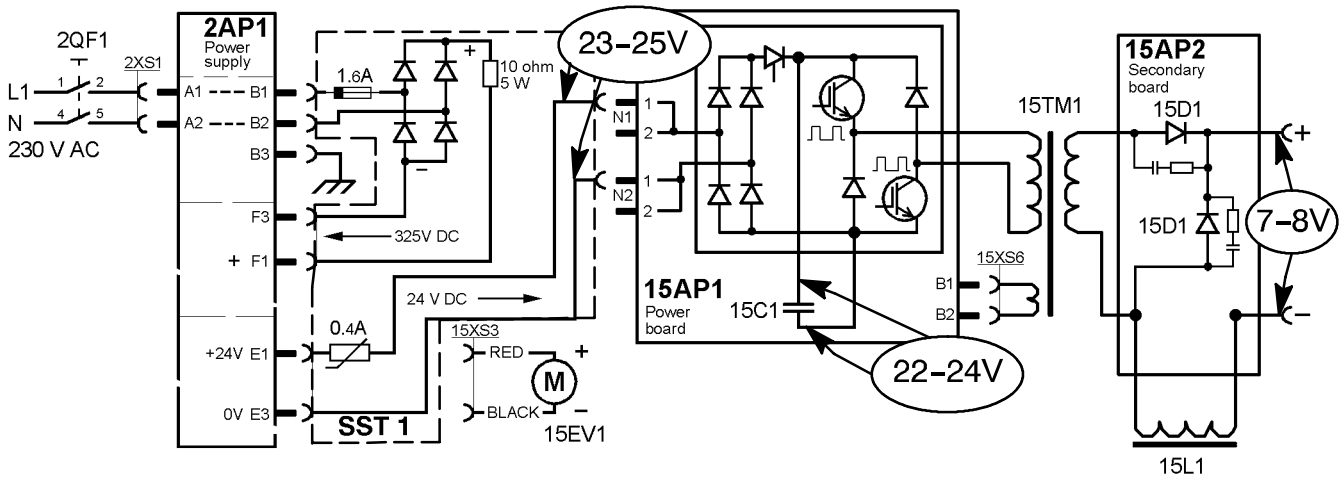
2. Connect the 230 V AC input of the SST 1 to terminals B1 and B2 on circuit board 2AP1.
3. Connect the 325 V DC output of the SST 1 to terminals F1 and F3 on circuit board 2AP1.



The SST 1 connected to 2AP1

4. Disconnect connector 20XS4 from terminal PS of power supply board 2AP1. Connect the voltage test cable of the SST 1 to terminal PS of power supply board 2AP1.
5. Connect the power source to the mains and turn on the mains switch.
6. Verify the output voltages from 2AP1, all LEDs on the SST 1 must light.
7. Switch off the machine. Disconnect the voltage test cable and reconnect connector 20XS4 to terminal PS of circuit board 2AP1.
8. Disconnect connector 15XS3 (supply to the fan) from terminal E of circuit board 2AP1. Connect the 24 V DC input of the SST 1 to terminal E of circuit board 2AP1.

9. Connect the 24 V DC output of the SST 1 to terminals N1:1 and N2:1 of power board 15AP1.

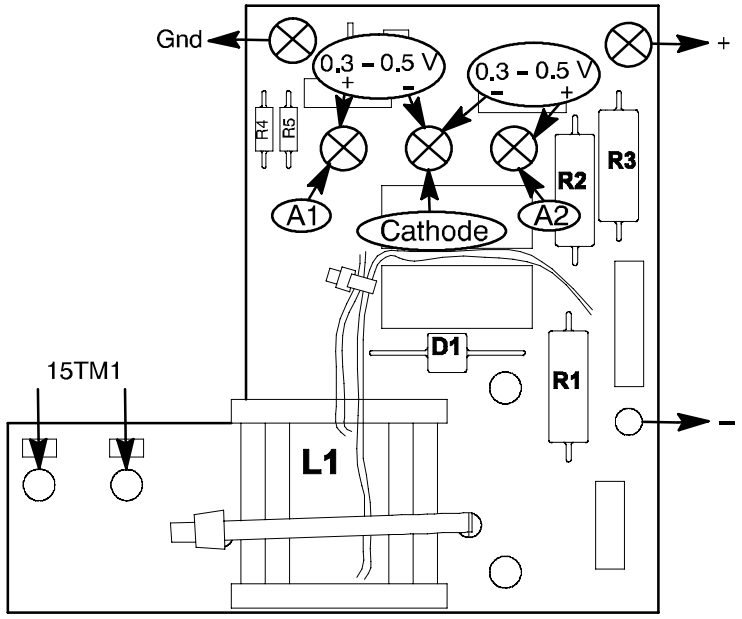


Circuit connections and measuring points for soft starting

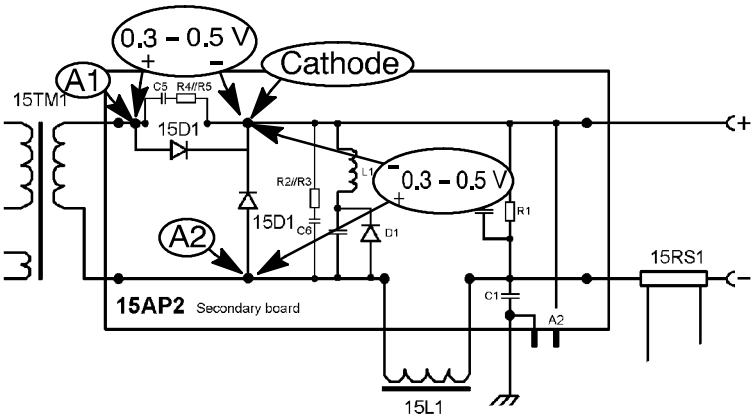
10. Switch on the machine and set it to MMA mode.
11. Check that the DC voltage across smoothing capacitor 15C1 is 22–24 V.
12. Check that the DC voltage at the welding terminals is about 7–8 V.
13. If all the measurements are as described above, reconnect the wires to restore the power source to normal operation mode and make a test weld.

Checking rectifier and freewheel diodes

1. Disconnect the machine from the mains.
2. Dismantle the housing of the machine.
3. Use a Torx key no. T25 to unscrew and remove five screws from circuit board 15AP2. The screws are marked ⊗ on the picture below,
4. Bend out the circuit board so that it has no contact with the connections of the diode module.
5. Use a multimeter in diode test position to measure the forward voltage drop of the two diodes: see the picture below. The voltage drop must be 0.3 to 0.5 V.
6. If the diode module has to be replaced, follow the instructions on page 51.



Measuring points, circuit board 15AP2



Circuit diagram and measuring points, circuit board 15AP2

Checking the gate pulses

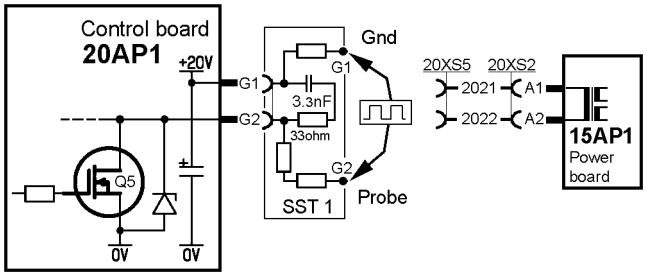
When checking the gate pulses, the machine can either be in soft-start mode or in normal operation mode.

Special equipment

To measure the gate pulses, you need a gate pulse load. This is included in soft-starting tool SST 1, which is described on page 44.

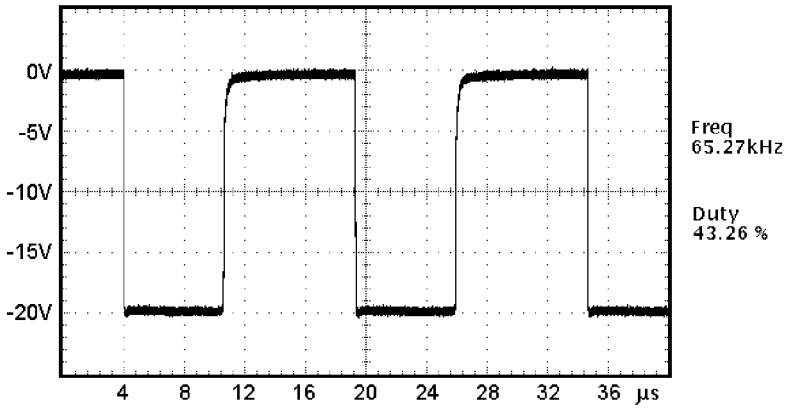
Instructions

1. Disconnect the machine from the mains.
2. Disconnect connector 20XS5 from terminal G on control board 20AP1.
3. Connect the gate pulse test cable of the SST 1 to terminal G on control board 20AP1.



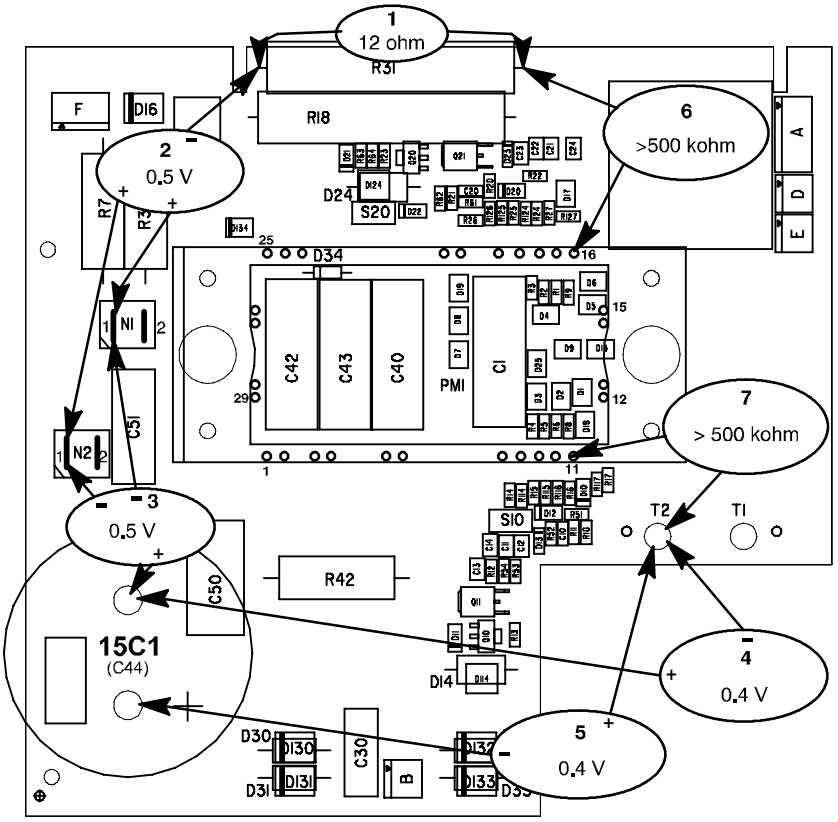
Measuring connection for the gate pulses

4. Switch on the machine.
5. Connect an oscilloscope to the SST 1, with the probe to terminal G2 and the screen to terminal G1.
6. Set the machine to MMA welding mode.
7. Measure the pulse frequency. It must be 65 kHz +/- 1kHz.
8. Measure the duration of the negative pulse. It must be 41 - 43 % of the cycle time, measured at a voltage level of -10 V.
9. The waveform of the pulses must be as shown below.

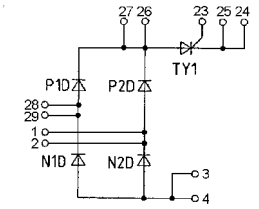


Gate pulses from circuit board 20AP1

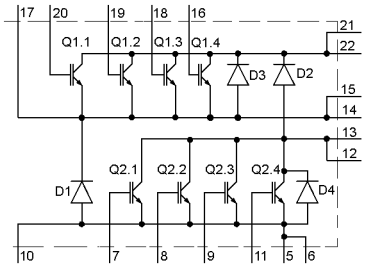
Checking the semiconductor module



Measuring points for the semiconductor module



Rectifier diodes and thyristor



IGBT transistors and freewheel diodes

Disconnect the machine from the mains and follow the instructions below.

Measurements 2 – 5: Use a multimeter in diode test position to measure the diodes. Measure with the positive and negative of the multimeter connected as shown in the picture above. The main transformer must be connected to terminals T1 and T2.

1. Resistor R31 (and thyristor TY1 in parallel): measure the resistance of R31. It must be 12 ohm (on some boards the resistance of R31 is 6.8 or 10 ohm, which are also approved values).
2. Diode P1D: measure between resistor R31 and terminal N1.
   Diode P2D: measure between resistor R31 and terminal N2.
   The forward voltage drop must be 0.4 to 0.6 V.
3. Diode N1D: measure between the negative of capacitor 15C1 and terminal N1.
   Diode N2D: measure between the negative of capacitor 15C1 and terminal N2.
   The forward voltage drop must be 0.4 to 0.6 V.
4. Diode D1 connected in parallel with D4: measure between the negative of capacitor 15C1 and terminal T2. The forward voltage drop must be 0.3 to 0.5 V.
5. Diode D2 connected in parallel with D3: measure between the positive of capacitor 15C1 and terminal T2. The forward voltage drop must be 0.3 to 0.5 V.
6. Transistors Q1.1, Q1.2, Q1.3 and Q1.4: measure the resistance between collector, R31, and gate, pin 16 of the module. The resistance must be higher than 500 kohm.
7. Transistors Q2.1, Q2.2, Q2.3 and Q2.4: measure the resistance between collector, terminal T2, and gate, pin 11 of the module. The resistance must be higher than 500 kohm.

Mounting components on the heat sink

Thermal paste

Apply thermal conducting paste to the components before fitting them to the heat sink.

Start by cleaning the heat sink, and then apply a **very thin**, even layer of thermal paste to the contact surfaces of the components. The purpose of the paste is to fill out any hollows in the surfaces of the components and the heat sink. Those parts of the component and the heat sink that are in true metallic contact may already have good thermal contact.

Mount the components as described below.

See the spare parts list for the order number for thermal paste. Use only the paste recommended by us.

Fitting instructions

15AP1 Power board with semiconductor module

1. Clean the heat sink and apply thermal conducting paste to the semiconductor module as described above.
2. Fit the board and tighten the screws to a torque of 2.5 Nm, and then further tighten them to 4.5 Nm.
3. Tighten the screws that connect transformer 15TM1 and capacitor 15C1 to circuit board 15AP1 to a torque of 4.5 Nm.

Warning: Incorrectly fitted components can cause failure. Do not tighten the screws to more than 4.5 Nm.

Note: If capacitor 15C1 or transformer 15TM1 have to be replaced, the power board must be removed and then refitted as described above.

15D1 Diode module

1. Clean the heat sink and apply thermal conducting paste to the diode module as described above.
2. Fit the module and tighten the screws to a torque of 2.5 Nm, and then further tighten them to 4.5 Nm.
3. Tighten the connections to circuit board 15AP2 to 4.5 Nm.
4. Tighten the screws that connect transformer 15TM1 and inductor 15L1 to circuit board 15AP2 to a torque of 4.5 Nm.

15ST2 Thermal overload switch

1. Clean the heat sink and apply thermal conducting paste to the thermal overload switch as described above.
2. Fit the thermal overload switch and tighten the screw to 2 Nm.

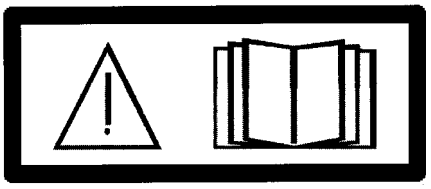
INSTRUCTIONS

This chapter is an extract from the instructions for the CaddyTig 200 and OrigoTig 200.

SAFETY

WARNING!

Read and understand the instruction manual before installing or operating.



INSTALLATION

The installation must be executed by a professional.

Placing

Place the power source so that its cooling air inlets and outlets are not obstructed.

Rating plate

The rating plate is located on the underside of the power source.

Mains power supply

Make sure that the welding power source is connected to the correct supply voltage and that it is protected by the correct fuse rating. The standards for the country in question must be complied with as regards the mains cable area. A protective earth connection must be made in accordance with regulations.

Recommended fuse sizes and minimum cable areas

	CaddyTig 200, OrigoTig 200
Mains voltage	230 V ±10 %, 1-phase
Mains frequency	50-60 Hz
Fuse (delayed-action)	
100A 20% duty cycle	10 A
120A 35% duty cycle	16 A
150A 35% duty cycle	20 A*****)
Mains cable, area	3 x 2.5 mm^2
Welding cable, area	16 mm^2

****) Note**:*

The installed mains cable plug is approved for maximum 16 A.

The cable area and fuse rating above comply with Swedish regulations. Use the welding power source in accordance with the relevant national regulations.

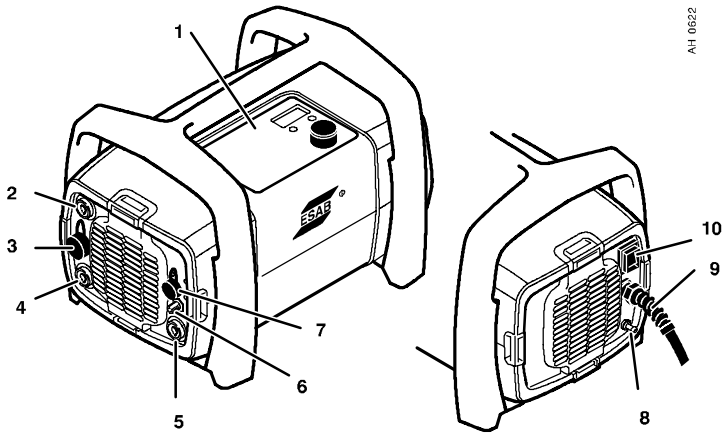
CaddyTig 200

OPERATION

General safety regulations for the handling of the equipment can be found on page 52. Read through before you start using the equipment!

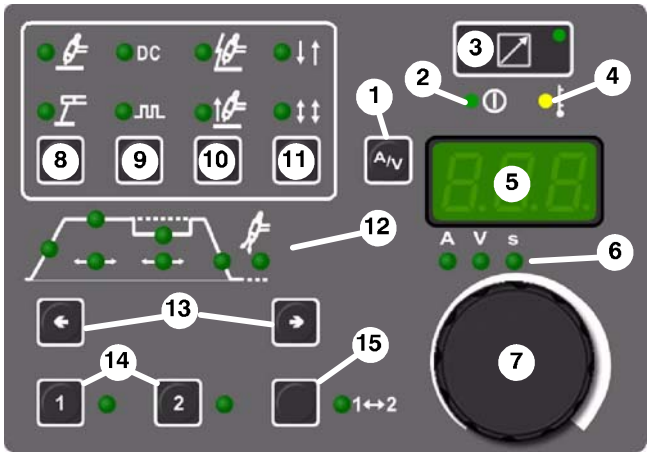
Connections and control devices

1. Control panel
2. TIG: Return cable connection (+)
   MMA: Welding cable connection (+)
3. Remote control unit connection
4. MMA: Return cable connection (–)
5. TIG torch connection (–)
6. Connection for gas to the TIG torch
7. Connection for the TIG torch switch
8. Connection for gas from gas bottle
9. Mains cable
10. Main power supply switch



Control panel

The control panel comprises a display, setting knob, LEDs and pushbuttons. Using the pushbuttons, it is possible to move between the various functions. The selected function is indicated by the relevant LED lighting up.



1. Selection of current (A) or voltage (V) indication during welding.
2. Indicating lamp, mains power supply On.
3. Remote control unit On / Off.
4. Indicating lamp, overheating.
5. Display.
6. Indication of the parameter that is shown in the display, Ampere, Volt or seconds.
7. Knob for setting data.
8. Selection of TIG or MMA welding mode.
9. Selection of TIG DC or TIG pulse welding.
10. Selection of TIG HF start or TIG LiftArc start .
11. Selection of TIG 2–stroke or TIG 4–stroke control mode.
12. TIG welding parameter settings, see page 56.
13. Selection buttons for the TIG welding parameters, see page 56.
14. Selection buttons for the welding parameter memory, see page 58.
15. Change of parameter memory controlled by the TIG torch trigger, see page 58.
    Note: if a remote control unit is activated, the parameter memory can not be controlled by the TIG torch trigger.

Remote control unit

The remote control unit has to be connected to the remote control unit socket on the machine. To activate the remote control, press the remote control symbol  This is confirmed by the green LED lighting up. When the remote control unit is activated the control panel is deactivated.

If pulsed current is chosen in TIG mode, it is the pulse current that is remotely controlled.

Note: if change of parameter memory by TIG torch trigger 

is selected in TIG mode, the remote control unit can not be activated in MMA mode nor in TIG mode.

Overheating protection

The welding power source has a thermal overload trip which operates if the temperature becomes too high, interrupting the welding current and lighting a yellow indicating lamp on the front of the power source. The thermal overload trip resets automatically when the temperature has fallen.

TIG WELDING

During TIG welding, the return cable must be connected to (+) and the TIG torch to (–). If they are connected in reverse, the tungsten electrode will melt.

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

Settings

TIG without pulsing and TIG with pulsing

Function	Setting range	In steps of	Default value
2/4 stroke *	2 stroke or 4 stroke	–	2 stroke
HF / LiftArc™ *	HF or Liftarc™	–	LiftArc™
Gas pre-flow time**	0 – 5 s	0.1 s	0.5 s
Slope up time	0 – 10 s	0.1 s	0.0 s
Slope down time	0 – 10 s	0.1 s	1.0 s
Gas post-flow time	0 – 25 s	0.1 s	2.0 s
Current	3 – 200 A	1 A	60 A

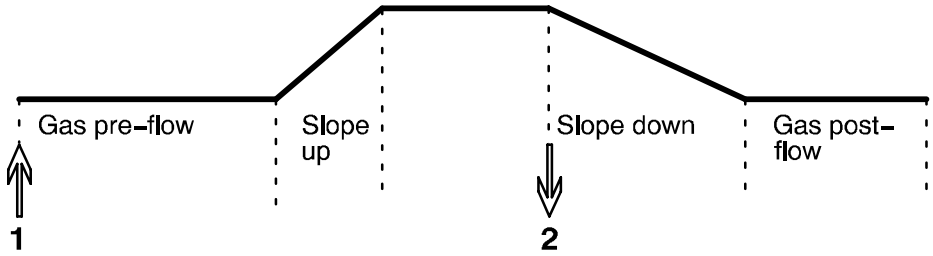
TIG with pulsing

Function	Setting range	In steps of	Default value
Pulse time	0.01 – 2.5 s	0.01 s	1.0 s
Micro pulse**	0.001 – 0.250 s	0.001 s	
Background time	0.01 – 2.5 s	0.01 s	1.0 s
Micro pulse**	0.001 – 0.250 s	0.001 s	
Pulse current	3 – 200 A	1 A	60 A
Background current	3 – 200 A	1 A	20 A

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

****)** *Gas pre-flow time and micro pulse are hidden functions, see page 56.*

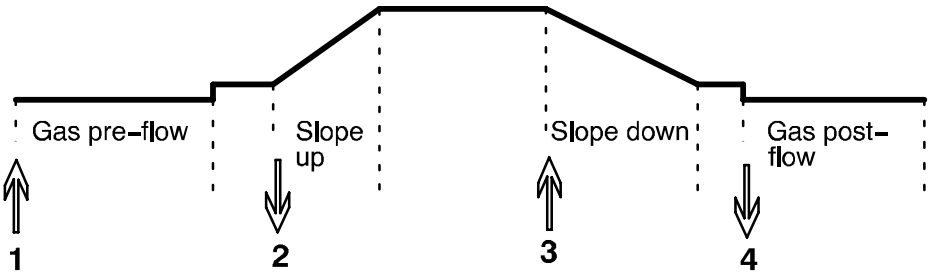
2 stroke



Functions when using 2 stroke control of the welding torch.

In the **2 stroke** control mode, pressing the trigger switch starts gas pre-flow (if used) and strikes the arc (1). 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 post-flow follows if it is in operation.

4 stroke



Functions when using 4 stroke control of the welding torch.

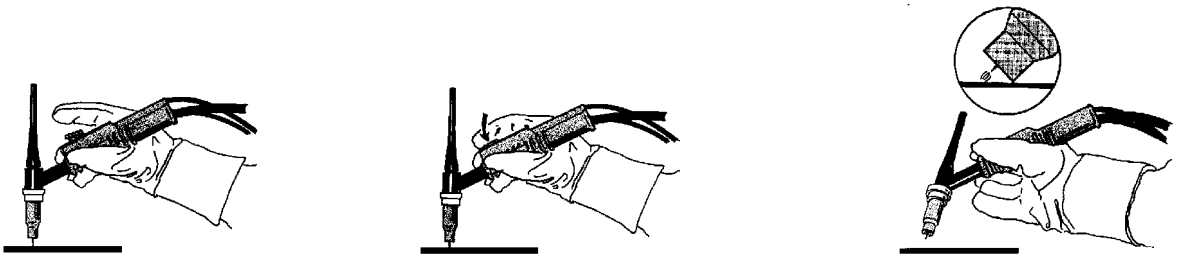
In the **4 stroke** control mode, pressing the trigger switch starts gas pre-flow (if used) (1). At the end of the gas pre-flow time, the current rises to the pilot level (a few ampere), and the arc is struck. Releasing the trigger switch (2) increases the current to the set value (with slope up, if 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.

HF

The HF function strikes the arc by means of a spark from the electrode to the workpiece.

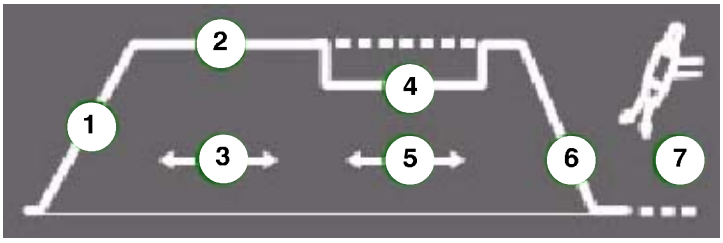
LiftArc™

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

Parameter settings

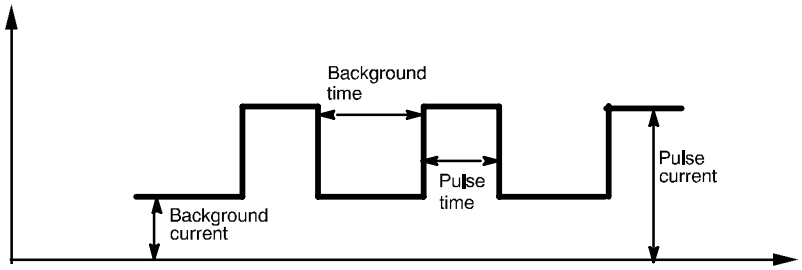


1. Slope up
2. Pulse current or continous current
3. Pulse time
4. Background current
5. Background time
6. Slope down
7. Gas post-flow time

Pulse and background time

The setting range for these parameters is normally 0.01 – 2.5 seconds. However, by using micro pulse, times down to 0.001 seconds can be set. When the micro pulse function is active, times shorter than 0.25 seconds are displayed without a decimal point.

Micro pulse is a hidden function, to activate micro pulse, follow the description below.



TIG welding with pulsing.

Hidden TIG functions

The setting options for gas pre-flow time and micro pulse, are obtained by pressing the arrow buttons,  and  , simultaneously for at least 1 second.
The display then shows a letter and a number.

To select micro pulse, the machine must be in pulse welding mode.

Function	Settings	Default setting
A = gas pre-flow time	0 – 5 s	0.5 s
b = micro pulse	**0** = Off; **1** = On	**0**

Select function by using the arrow buttons to step up and down.
Select setting with the setting knob.

Leave hidden functions by pressing the arrow buttons simultaneously for 1 second.

MMA WELDING

The CaddyTig 200 gives direct current, and you can weld most metals to alloy and non-alloy steel, stainless steel and cast iron. The CaddyTig 200 allows you to weld most coated electrodes from ∅ 1.6 to ∅ 3.25.

Settings

Function	Setting range	In steps of	Default value
Current	4 - 150 A	2 A	100 A
Hot start *	0 - 99	1	0
Arc force *	0 - 99	1	5
Drop welding *	On / Off	-	Off
ArcPlus™ *	On / Off	-	On

*****) *These functions are hidden functions, see the description below.*

Hidden MMA functions

The setting options for hot start, arc force, drop welding and ArcPlus are obtained by pressing the arrow buttons,  and  , simultaneously for at least 1 second.
The display then shows a letter and a number.

Function	Settings	Default setting
C = arc force	0 - 99	5
d = drop welding	**0** = Off; **1** = On	0
F = welding control ArcPlus™	**1** = Off; **0** = On	0
H = hot start time	0 - 99	0

Select function by using the arrow buttons to step up and down.
Select setting with the setting knob.

Leave hidden functions by pressing the arrow buttons simultaneously for 1 second.

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 setting alters the machine's dynamics. A softer/harder arc can be obtained. 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.

Drop welding

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

Welding current control - ArcPlus™

The CaddyTig 200 is supplied with ArcPlus™, a type of control that produces an intensive, concentrated and calm arc. It recovers quickly after a drop short-circuit, which reduces the risk of the electrode becoming stuck. In most welding applications the best result is achieved if ArcPlus™ is On.

WELDING DATA MEMORY

Four different sets of welding data parameters can be stored in the machine's memory: two for TIG welding and two for MMA welding.

Press button 1 or 2 for 5 seconds to store the data in the memory. At the beginning the green LED shines constantly, and then starts flashing when the data has been saved.

To switch between the predefined settings, press button 1 or 2

In the TIG mode, the data memory can also be changed by briefly pressing the torch switch, irrespective of wether welding is in progress or not.

Press 1↔2 to activate this function, activated function is indicated by the green LED.
Note: if change of parameter memory by the torch switch is activated, the remote control unit can not be activated in MMA mode nor in TIG mode.

If four-stroke control mode has been selected, a brief depression of the torch switch will change welding data memory. The same applies for two-stroke control mode if welding is not in progress.

When welding with two-stroke control, welding data memory can be changed by briefly releasing the welding torch switch.

The welding data memory is battery-backed, so that the settings remain even if the machine has been switched off or disconnected from the mains.

MAINTENANCE

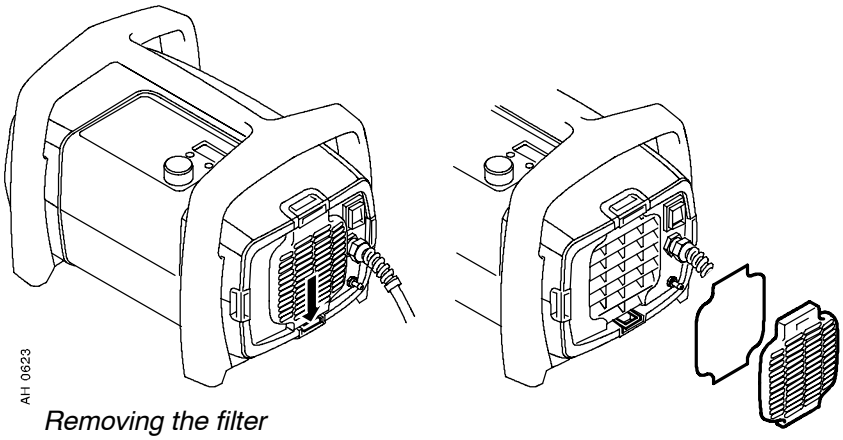
Regular maintenance is important for safe, reliable operation.

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.

The CaddyTig 200 requires little maintenance. In normal cases, it is sufficient to blow it clean using dry compressed air once a year, but this should be done more often if it is set up in a dusty, dirty area.

Cleaning the dust filter

- Remove the fan grille.
- Release the dust filter.
- Blow the filter clean with compressed air (reduced pressure).
- Replace the fan grille with the dust filter.



Removing the filter

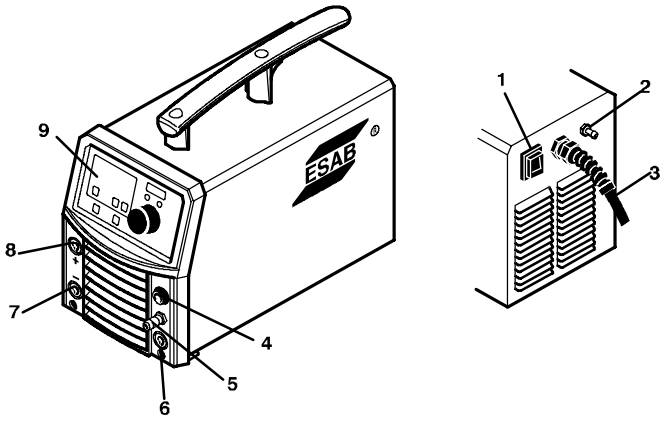
OrigoTig 200

OPERATION

General safety regulations for the handling of the equipment can be found on page 52. Read through before you start using the equipment!

Connections and control devices

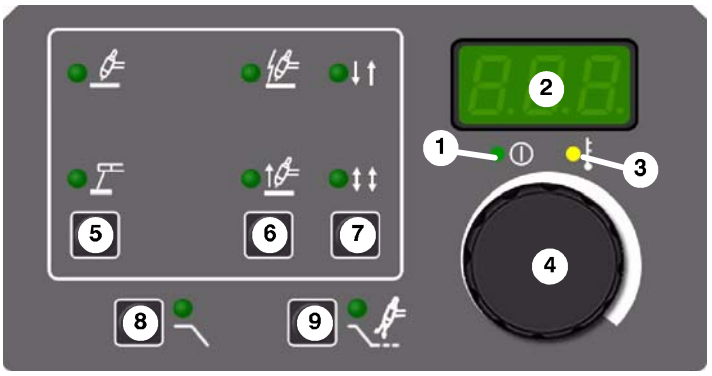
1. Mains switch
2. Connection for gas from gas bottle
3. Mains cable
4. Connection for the TIG torch switch
5. Connection for gas to the TIG torch
6. TIG torch connection (–)
7. MMA: return cable connection (–)
8. TIG: return cable connection (+)
   MMA: welding cable connection (+)
9. Control panel



Control panel

The control panel comprises a display, setting knob, LEDs and pushbuttons. Using the pushbuttons, it is possible to move between the various functions. The selected function is indicated by the relevant LED lighting up.

1. Indicating lamp, mains power supply On.
2. Display.
3. Indicating lamp, overheating.
4. Knob for setting data.
5. Selection of TIG or MMA welding mode.
6. Selection of TIG HF start or TIG LiftArc start .
7. Selection of TIG 2-stroke or TIG 4-stroke control mode.
8. Slope-down time.
9. Gas post-flow time.



Overheating protection

The welding power source has a thermal overload trip which operates if the temperature becomes too high, interrupting the welding current and lighting a yellow indicating lamp on the front of the power source. The thermal overload trip resets automatically when the temperature has fallen.

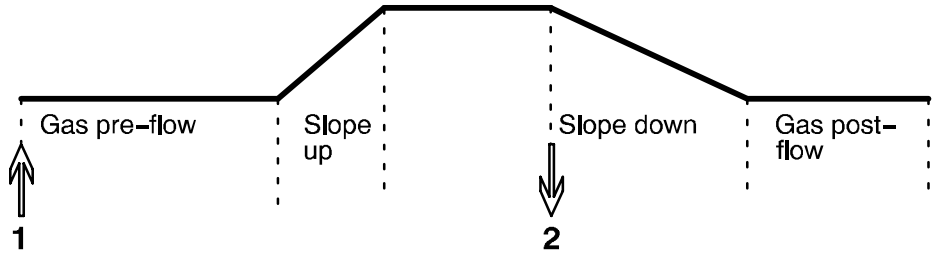
TIG WELDING

During TIG welding, the return cable must be connected to (+) and the TIG torch to (–). If they are connected in reverse, the tungsten electrode will melt.

Settings

Function	Setting range	In steps of	Default value
2/4 stroke	2 stroke or 4 stroke	–	2 stroke
HF / LiftArc™	HF or Liftarc™	–	LiftArc™
Slope-down time	0 – 10 s	0.1 s	1.0 s
Gas post-flow time	0 – 25 s	0.1 s	2.0 s
Current	3 – 200 A	1 A	60 A

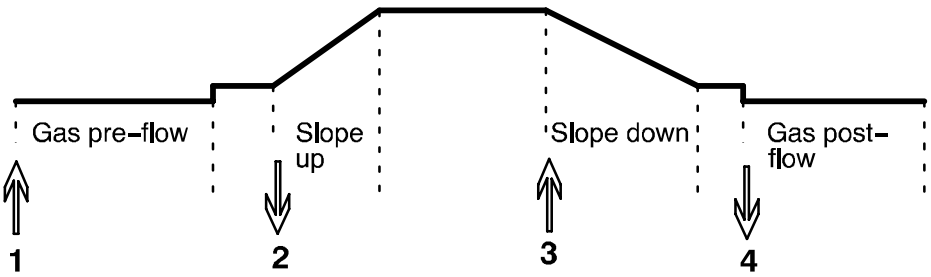
2 stroke



Functions when using 2 stroke control of the welding torch.

In the **2 stroke** control mode, pressing the trigger switch starts gas pre-flow (if used) and strikes the arc (1). 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 post-flow follows if it is in operation.

4 stroke



Functions when using 4 stroke control of the welding torch.

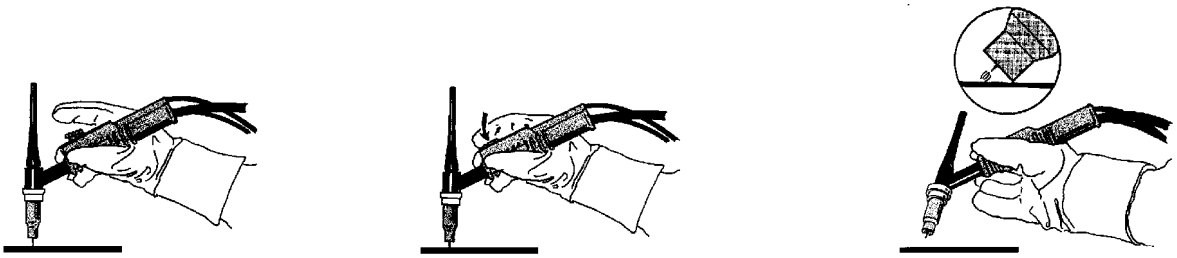
In the **4 stroke** control mode, pressing the trigger switch starts gas pre-flow (if used) (1). At the end of the gas pre-flow time, the current rises to the pilot level (a few ampere), and the arc is struck. Releasing the trigger switch (2) increases the current to the set value (with slope up, if 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.

HF

The HF function strikes the arc by means of a spark from the electrode to the workpiece.

LiftArc™

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

MMA WELDING

The OrigoTig 200 gives direct current, and you can weld most metals to alloy and non-alloy steel, stainless steel and cast iron.The OrigoTig 200 allows you to weld most coated electrodes from ∅ 1.6 to ∅ 3.25.

MAINTENANCE

Regular maintenance is important for safe, reliable operation.

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.

The OrigoTig 200 requires little maintenance. In normal cases, it is sufficient to blow it clean using dry compressed air once a year, but this should be done more often if it is set up in a dusty, dirty area.

SPARE PARTS

The spare parts lists are published in separate documents.

Product	**Filename**
Caddy Tig 200i	0459 264 990
Origo Tig 200i	0459 262 990

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

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.
Mesero (Mi)
Tel: +39 02 97 96 81
Fax: +39 02 97 28 91 81

THE NETHERLANDS
ESAB Nederland B.V.
Utrecht
Tel: +31 30 2485 377
Fax: +31 30 2485 260

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

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

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 5308 9922
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 3 5296 7371
Fax: +81 3 5296 8080

MALAYSIA
ESAB (Malaysia) Snd Bhd
Selangor
Tel: +60 3 8027 9869
Fax: +60 3 8027 4754

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

Representative offices

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

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

ROMANIA
ESAB Representative Office
Bucharest
Tel/Fax: +40 1 322 36 74

RUSSIA
LLC ESAB
Moscow
Tel: +7 095 543 9281
Fax: +7 095 543 9280

LLC ESAB
St Petersburg
Tel: +7 812 336 7080
Fax: +7 812 336 7060

Distributors

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

www.esab.com

ESAB AB
SE-695 81 LAXÅ
SWEDEN
Phone +46 584 81 000

www.esab.com

061127