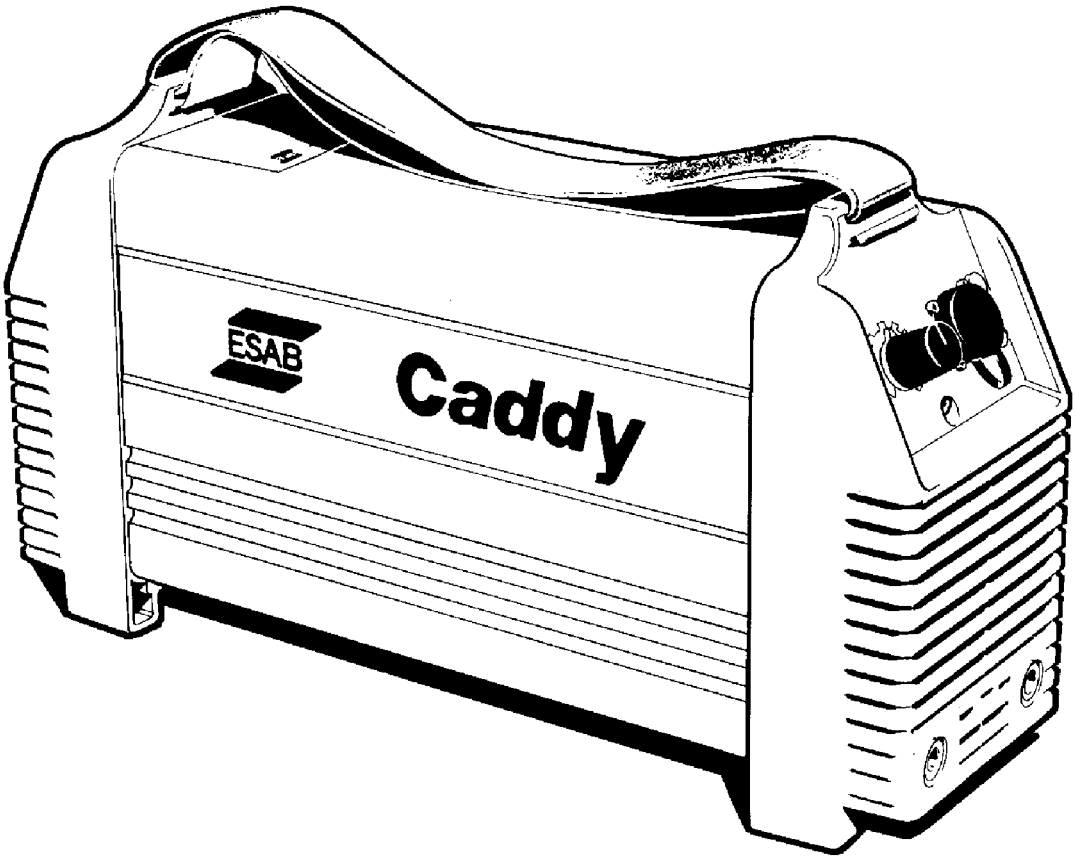
LHN 250
Caddy Professional 250



Service manual

0740 800 114 040427

Valid for serial no. 747-xxx-xxxx to 417-xxx-xxxx

LIST OF CONTENTS Page

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 April 2004.

The manual is valid for LHN 250 and Caddy Professional 250 with serial numbers:
747-xxx-xxxx, 011-xxx-xxxx, 220-xxx-xxxx and 417-xxx-xxxx.
From serial no. 417-xxx-xxxx Caddy Professional 250 is the only name of this product.

The LHN 250 and Caddy Professional 250 are designed and tested in accordance with international and European standard IEC/EN 60974-1 and EN 50199.
On completion of service or repair work, it is the responsibility of the person(s) etc. performing the work to ensure that the product does not depart from the requirements of the above standard.

WARNING

ARC WELDING AND CUTTING CAN BE INJURIOUS TO YOURSELF AND OTHERS. TAKE PRECAUTIONS WHEN WELDING. ASK FOR YOUR EMPLOYER'S SAFETY PRACTICES WHICH SHOULD BE BASED ON MANUFACTURERS' HAZARD DATA.

ELECTRIC SHOCK - Can kill
- Install and earth the welding unit in accordance with applicable standards.
- Do not touch live electrical parts or electrodes with bare skin, wet gloves or wet clothing.
- Insulate yourself from earth and the workpiece.
- Ensure your working stance is safe.

FUMES AND GASES - Can be dangerous to health
- Keep your head out of the fumes.
- Use ventilation, extraction at the arc, or both, to keep fumes and gases from your breathing zone and the general area.

ARC RAYS - Can injure eyes and burn skin.
- Protect your eyes and body. Use the correct welding screen and filter lens and wear protective clothing.
- Protect bystanders with suitable screens or curtains.

FIRE HAZARD
- Sparks (spatter) can cause fire. Make sure therefore that there are no inflammable materials nearby.

NOISE - Excessive noise can damage hearing
- Protect your ears. Use ear defenders or other hearing protection.
- Warn bystanders of the risk.

MALFUNCTION - Call for expert assistance in the event of malfunction.

READ AND UNDERSTAND THE INSTRUCTION MANUAL BEFORE INSTALLING OR OPERATING.

PROTECT YOURSELF AND OTHERS!

ESD

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

This component description relates to the wiring diagram on page 7.

The LHN 250 rectifier power unit is of primary-switched type, using parallel-connected MOSFET transistors as switching devices. Switching frequency is 48 kHz. The conduction interval ranges between zero and 9.5 µs, depending on the welding current being supplied. The conduction time and frequency are controlled by circuit board AP01.

AP01 Main circuit board with control electronics. See description on page NO TAG.

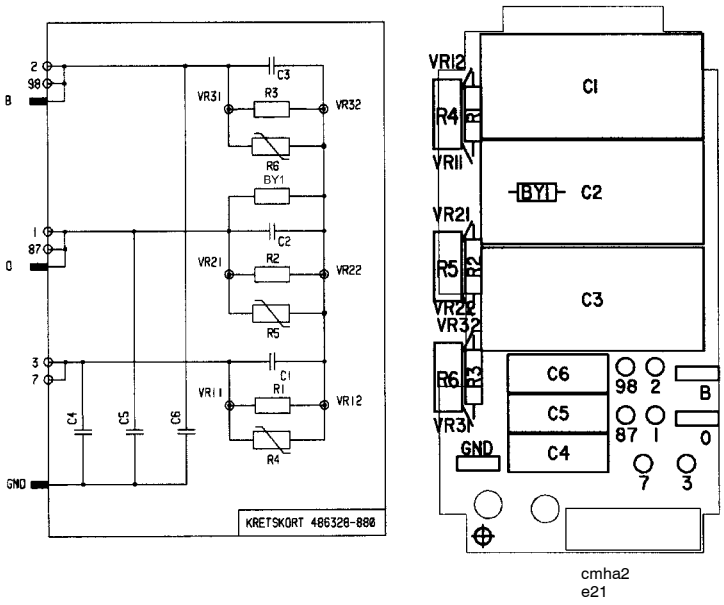
AP02 Circuit board with power transistors for the positive pole: see description on page 16.

WARNING: these transistors are at mains voltage.

AP03 Circuit board with power transistors for the negative pole: see description on page 18.

WARNING: these transistors are at mains voltage.

AP05 Suppression circuit board, EMC. Protects the environment from mains borne interference from the machine. The ferrite cores L09 and L10 are included in the circuit board. The cores are mounted on the connection wires to the board.



Circuit diagram and component positions circuit board AP05

C01 Capacitor, 0.1 µF, 1000 VDC, transient protection.

C02 - C03 Capacitor, 1000 µF, buffer/smoothing capacitors. These capacitors takes about two minutes to discharge after disconnecting the equipment from mains.

C04 Capacitor, 0.1 µF, 1000 VDC, protects the equipment against RFI.

C05 2 - capacitors, 4.7 µF: see L02.

C06	2 - capacitors, 1 nF. Protection against transient voltages.
EV01	Fan, 24 VDC.
HL01	Indicating lamp, 28 V, white, showing that the mains power supply is turned on.
L01	Secondary inductor.
L02	Inductor. Together with C05 and V06, this forms an LC circuit which reduces the risk of the arc extinguishing at low welding currents. Capacitor C05 in the LC circuit charges when V03 conducts. The circuit can temporarily maintain a high output voltage at low welding current, reducing the risk of the arc being extinguished. Diode V06 protects capacitor C05 against negative voltage.
L04	Coil (EMC), included in conductor 013.
L05	Ferrite ring core. Protection against transient voltages.
L06, L07	Ferrite ring cores. Protection against transient voltages.
L08	Ferrite ring cores. Protection against transient voltages.
L09	Ferrite ring core, included in AP05.
L10	Ferrite ring core, included in AP05.
QF1	Mains switch, 3-pole.
RP01	Potentiometer for adjusting welding current, 10 kΩ, 2 W.
RS01	Shunt, 119 mV ± 1mV at 250A.
ST01	Thermal overload cutout, fitted in the secondary inductor (L01) winding. Interrupts at 130 °C, recloses at 100 °C.
TC01	Control power supply transformer. Primary side is supplied at 400V. Dual secondary windings supply 20.5 V and 17 V to circuit board AP01.
TC02	Main transformer: see page 26 for installation instructions.
V01 - V02	Mains rectifier diode bridge, 35 A, 1200 V. After replacing the rectifier bridges, the machine must be soft-started: see instructions on page 21.

V03, V04 Rectifier and freewheel diodes.

V03 rectifies the welding current.
During the time interval between two voltage pulses from transformer TC02, the freewheel diodes V04 maintain the welding current from inductor L01. There are 2 rectifier diodes and 4 freewheel diodes.

On the cooling fins are three diode modules mounted. Each diode module has two diodes. If one diode module is faulty, all modules have to be replaced.

From serial number 011-148-xxxx a new diode module is used. The rated current for the new module, SCOMES MKK300.4, is 300 A. The rated current for the old module, Motorola MURP20040CT, is 200 A. Because of the higher rating only two modules are needed for the rectifier unit. The ordering no. for the new module is the same as for the old.

See page 23 for fitting instructions.

V05 LED, yellow.
Lit when thermal overload cutout ST01 opens due to high temperature.

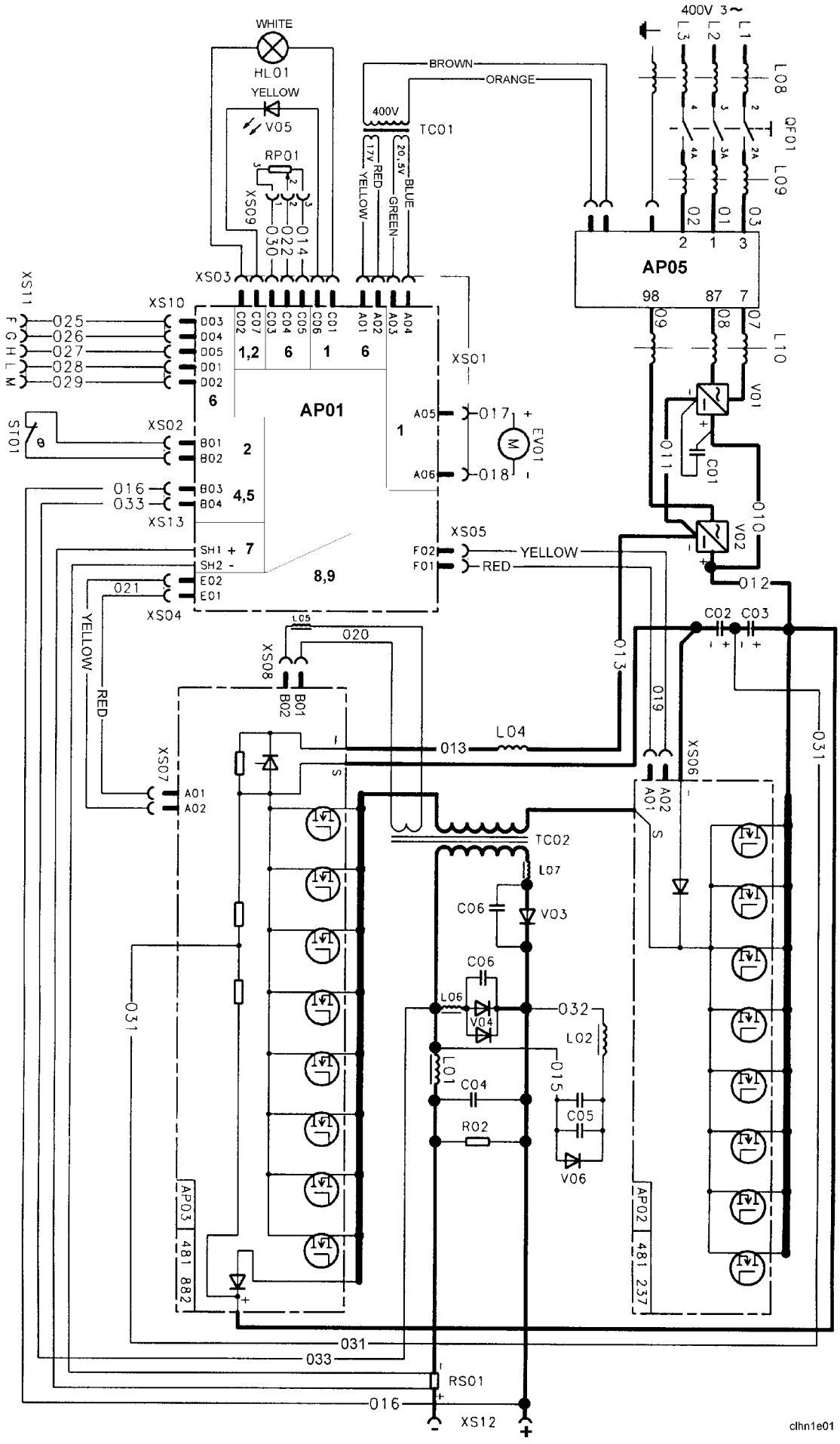
V06 Diode: see L02.

XS01 - XS13 Sleeve connectors.

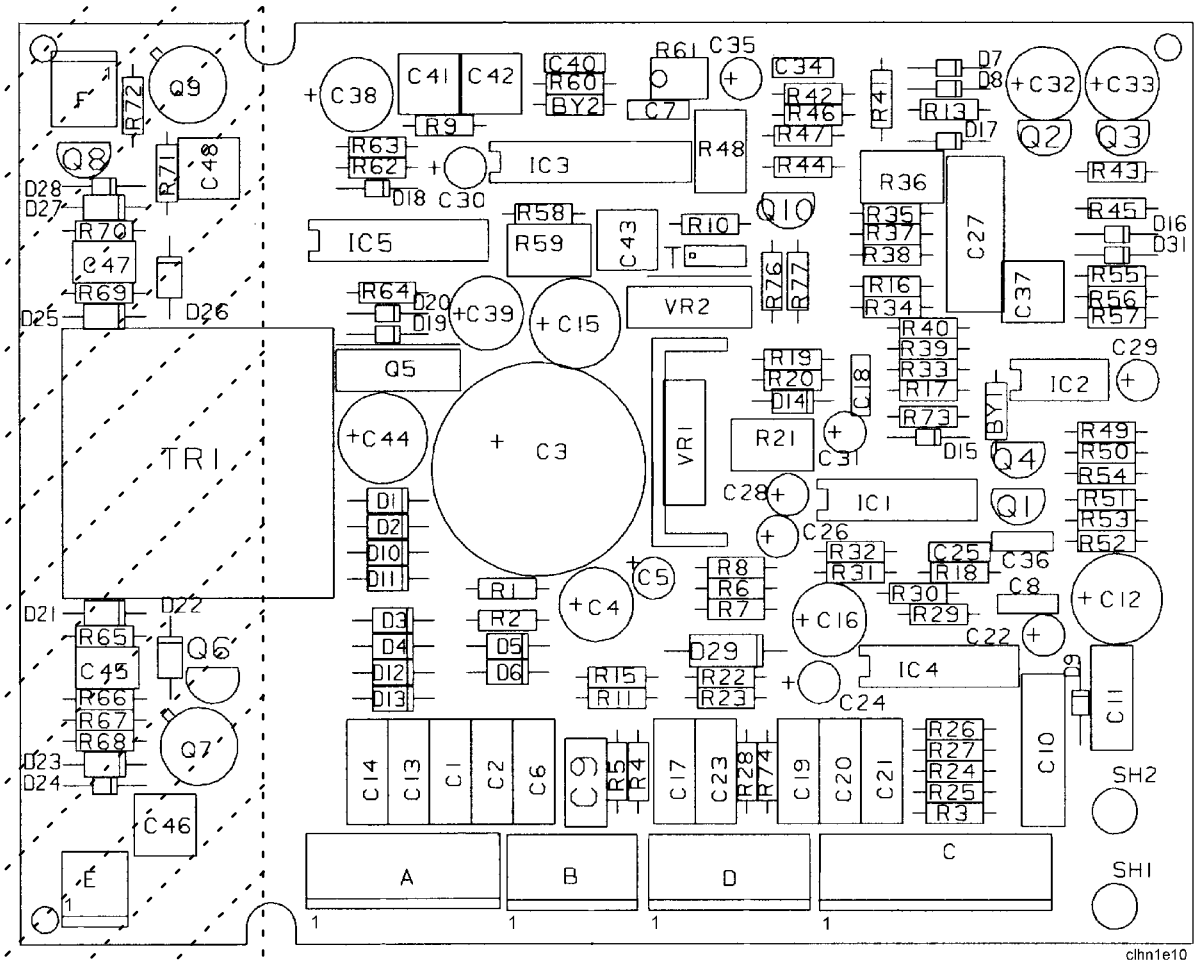
XS11 12-pole Burndy connector for connection of remote control unit.

XS12 Welding terminals (2 - OKC connectors).

WIRING DIAGRAM LHN 250, Caddy Professional 250

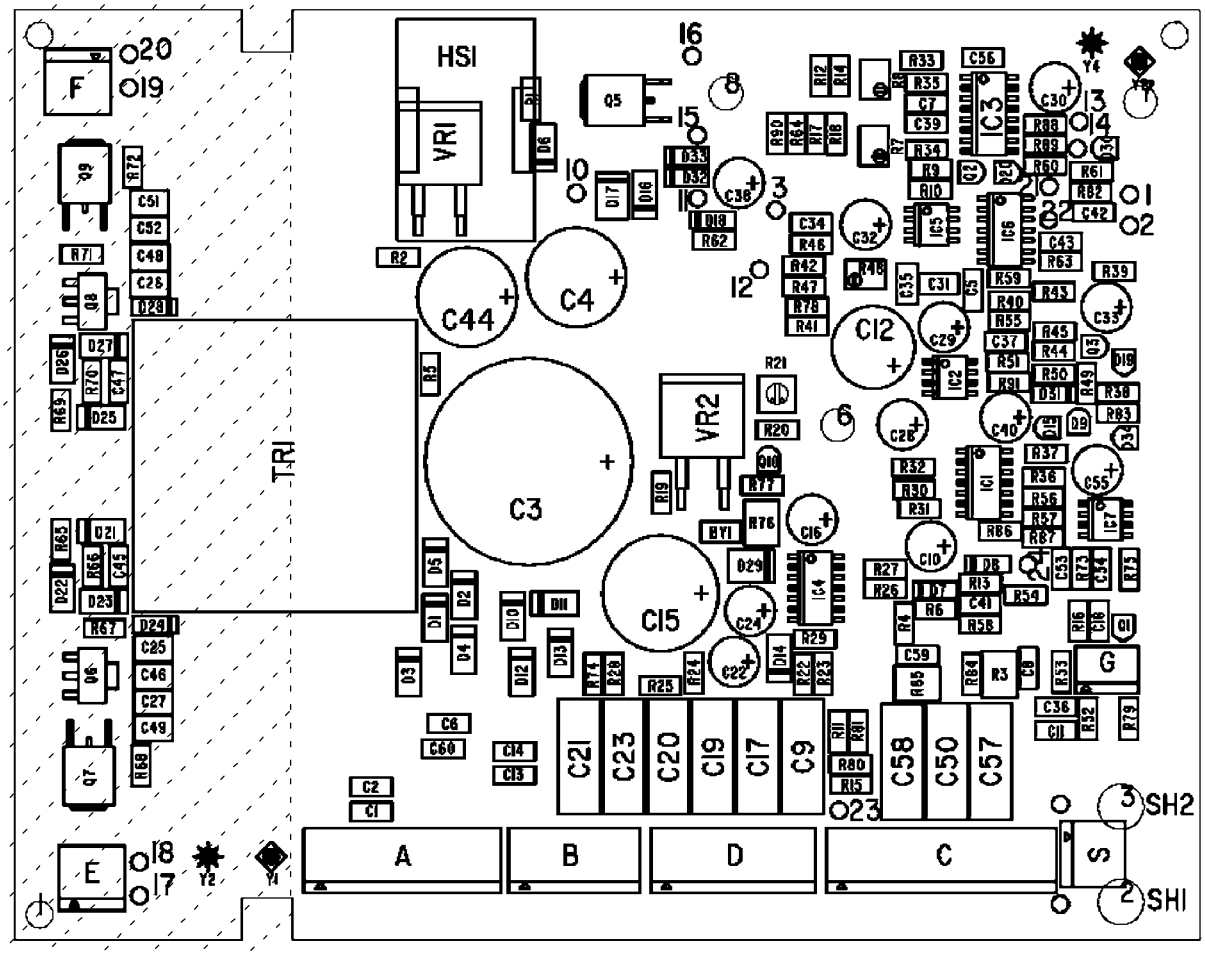


AP01 COMPONENT POSITIONS



Circuit board AP01 0481 870 884, fitted before serial number 220-xxx-xxxx

WARNING: high voltage in the shaded area



Circuit board AP01 0486 886 882, fitted from serial number 220-xxx-xxxx

WARNING: high voltage in the shaded area

From serial number 220-xxx-xxxx circuit board 0486 886 882 is fitted in the machines. The circuit board versions are fully interchangeable and can be used in any of the machines.

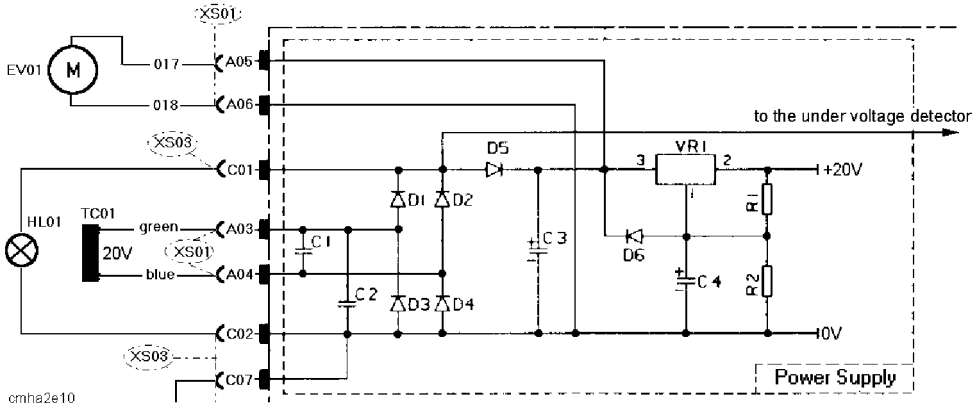
AP01 DESCRIPTION OF OPERATION

This description refers to the circuit diagram on page 7 and to the component position diagrams on pages 8 and 9. Only those items connected to the circuit board inputs and outputs are described here. If the circuit board is faulty, it must be replaced.

There are two versions of the circuit board, this description applies to both versions. The circuit boards are fully interchangeable.

After replacing the circuit board, the machine must be soft-started, as described on page 21.

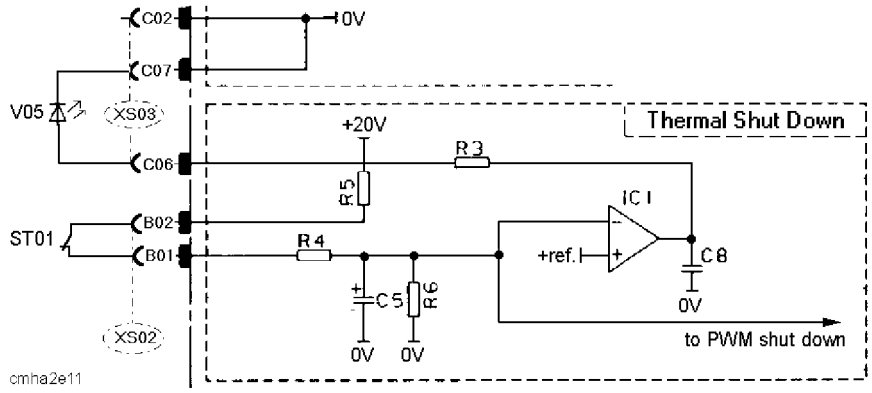
1 Power supply



Rectifier bridge D1-D4 is supplied at 20.5 V from transformer TC01. The rectified voltage is stabilised by voltage regulator VR1 to +20 ±1 V. All circuits on the circuit board except the current reference (6) and the gate circuit (9) are supplied from VR1.

Connections A05 - A06 supply 26 V DC ±2.5 V to the cooling fan.

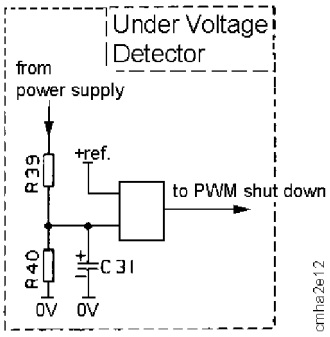
2 Thermal shutdown



This circuit interrupts the gate pulses from the pulse width modulator if the machine is overloaded. When it has not operated due to high temperature, the thermal overload cutout normally short-circuits inputs B01 and B02. If the cutout contact opens, IC1 lights LED V05 and the pulse width modulator (8) blocks the gate pulses.
See also ST01 in the component description.

The reference voltage to IC1, +ref., is generated by IC3: see page 13.

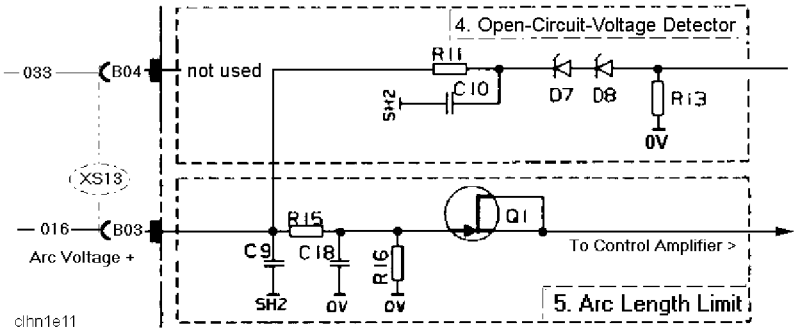
3 Under voltage detector



This circuit senses if the mains power supply voltage is too low. Loss of mains power supply for more than 10 ms, or low voltage, results in the pulse width modulator (8) blocking the gate pulses.

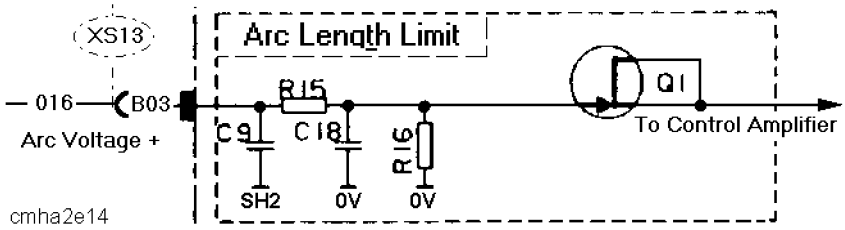
The reference voltage to IC1, +ref., is generated by IC3: see page 13.

4 Open-circuit voltage detector



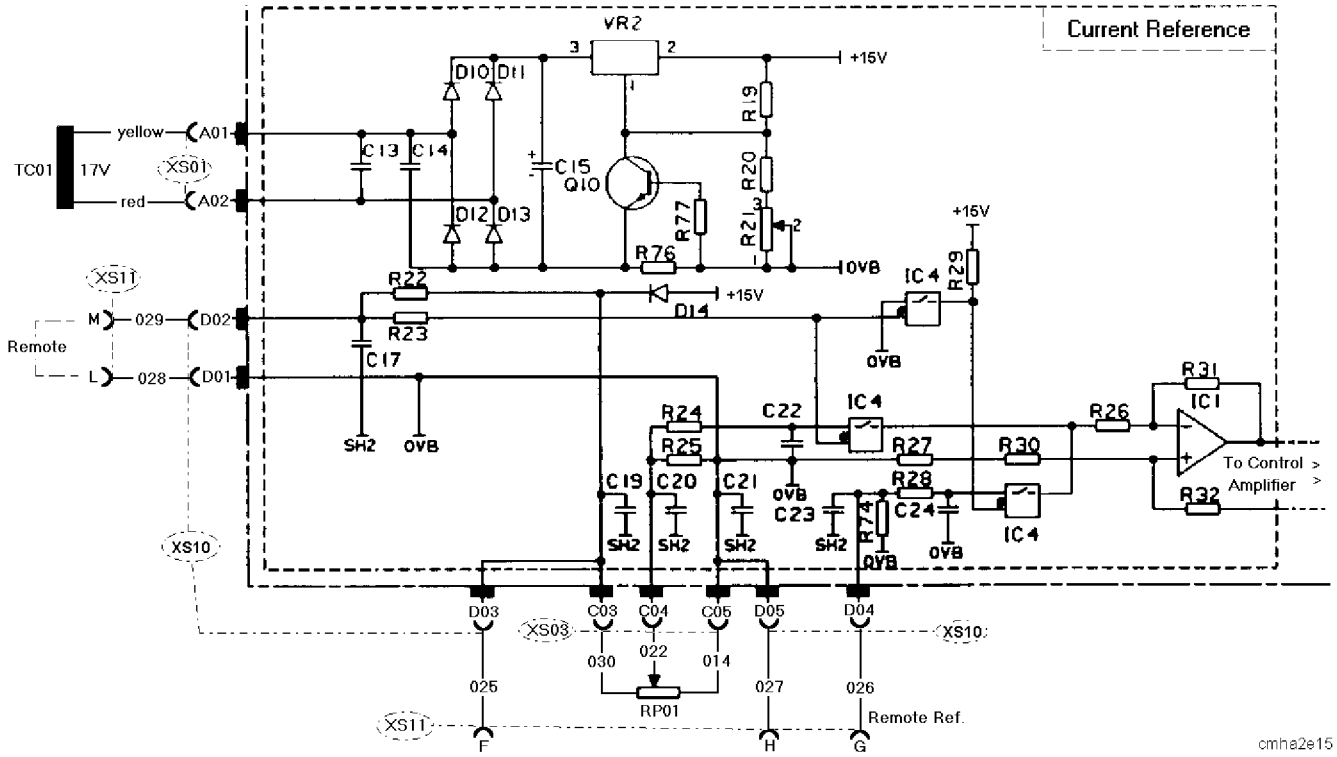
Voltages above 65V are defined as open-circuit voltage. Voltages below 45V are defined as welding voltages. When the machine is in open-circuit mode the current limit is at a low rate and the unit is ready for Hot Start.

5 Arc voltage limitation



This circuit, which restrict the arc voltage and open-circuit voltage, assists in limiting the arc length when welding in the 20 - 50 A current range.

6 Current reference



This circuit supplies a signal voltage to the current setting potentiometer and remote control unit. It also modifies the current reference signal to a suitable level for the control amplifier (7).

17 V from transformer TC01 is rectified and smoothed for supply to voltage regulator VR2. Potentiometer R21 adjusts the output voltage from VR2 for correct maximum current value from the current reference and control amplifier. After adjustment, the voltage between connection C03 and C05 must be 14 - 15 V.

Q10, R76 and R77 limit the current from VR2 to 60 mA. The current limit protects the circuit board in the event of a short circuit in the cable to the remote control unit.

The reference input has a separate power supply and high-impedance input to the control amplifier, protecting it against short circuits between the remote control unit cable and the welding circuit.

Changeover to remote control is arranged by short-circuiting connections D01 and D02 through insertion of the plug into the socket for the remote control unit. The short circuit is in the form of a link between L and M in the plug.

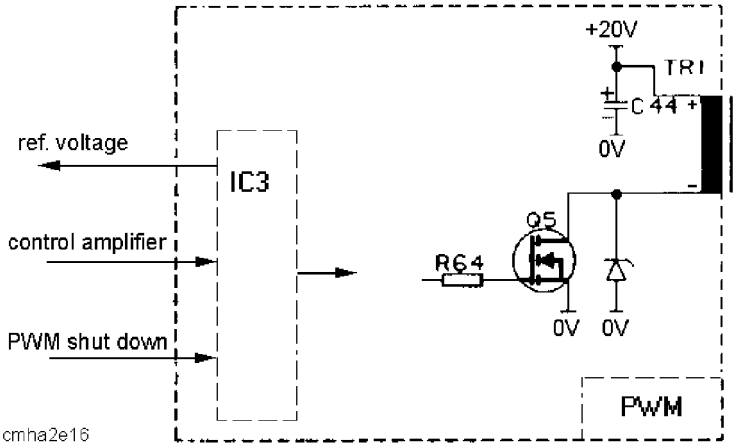
The current reference signal is connected to C04 or D04. The reference signal voltage is 0 V at minimum current and 14 - 15 V at maximum current. If inputs D01 and D02 are linked, but no remote control unit is fitted, resistor R74 holds the reference signal to the minimum level.

7 Control amplifier

The control amplifier sets a suitable welding current in relation to the current setting and arc voltage. The circuit can be divided up into two main parts:

- Average current control.
- Starting current control. The level of the hot start current is depending on the level of the set current. At 25A welding current the starting current is 25A. At 250A the starting current is 300A. The hot start time is about 0.5 seconds.
- Short-circuit current limit.

8 Pulse Width Modulator



The pulse width modulator determines the frequency and pulse time of the control pulses to the MOSFET transistors.

Pulse frequency is adjusted to 48.5 kHz ±0.5 kHz.
Maximum pulse time is 43 ±1% of the cycle time. Maximum pulse time results in maximum current and arc voltage. When no pulses are supplied by the pulse width modulator, no welding current will flow.

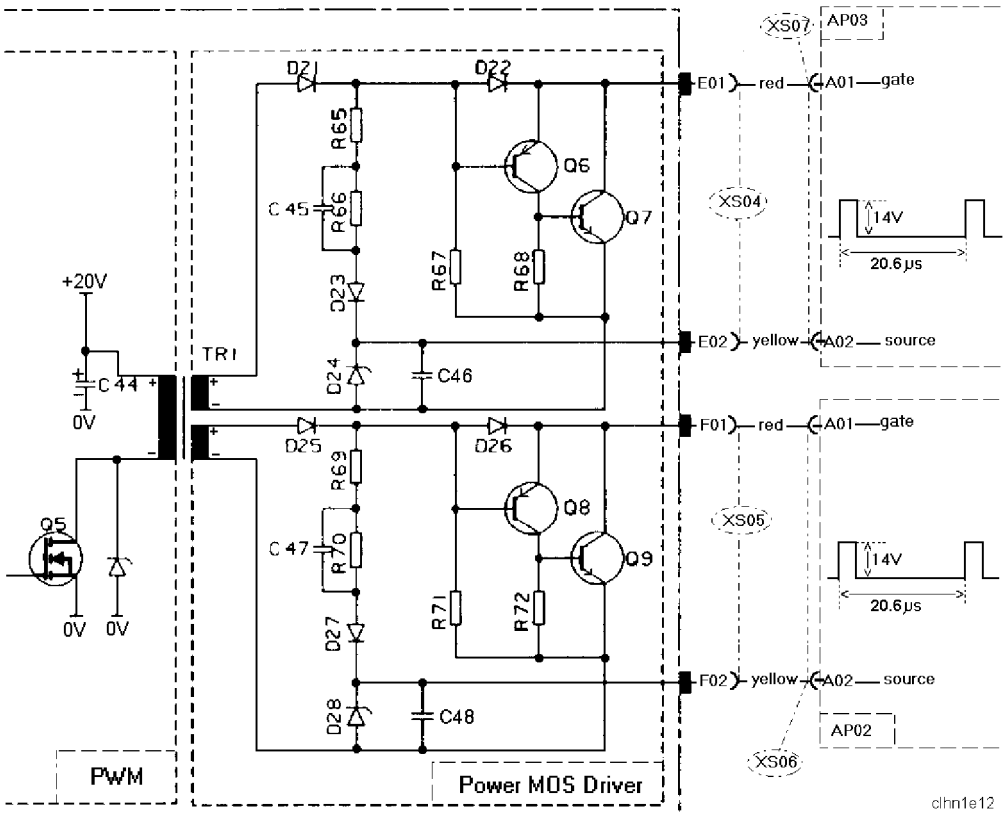
IC3 controls the pulse frequency, pulse time and blocking of pulses. The reference voltage from IC3 is +5.1 V on circuit board 0486 886 882. On circuit board 0481 870 884 the voltage is +2.5 V.

Transistor Q5 controls the primary winding of the pulse transformer.

NOTE:

The frequency and pulse time are very important parameters. If incorrectly adjusted, they can result in transistor failure in the main circuit.

9 Gate circuit



The driver stage for the MOSFET transistors provides control pulses to the gate-source of the power transistors. There is a separate output for each switching unit.

All gate circuits are galvanically isolated from other circuits on the board. The insulation voltage between the pulse width modulator and the gate circuits is 4 kV.

WARNING: the gate circuits are at mains voltage.

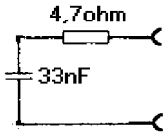
The two gate circuits are identical, and so only one is described here.

When Q5 conducts, a voltage pulse appears at the secondary winding of the transformer. This pulse is led via D21, D22 and connection E01 to the gate of the MOSFET transistors. It returns via the source, connection E02, D24 and C46. The peak gate - source voltage is 12 - 15V.

The presence of the gate pulse between connections E01 and E02 charges capacitor C46 to 5.6 V. When Q5 is turned off, the voltage from the pulse transformer changes polarity, resulting in transistors Q6 and Q7 starting to conduct. This results in a negative gate voltage, turning off the MOSFET transistors.

CHECKING THE GATE PULSES

If circuit board AP02 or AP03 has failed, the gate pulses must always be checked. Remove connections XS04 and XS05 (gate pulses), and connect a gate load to connections E01 and E02 and to F01 and F02.



Gate load

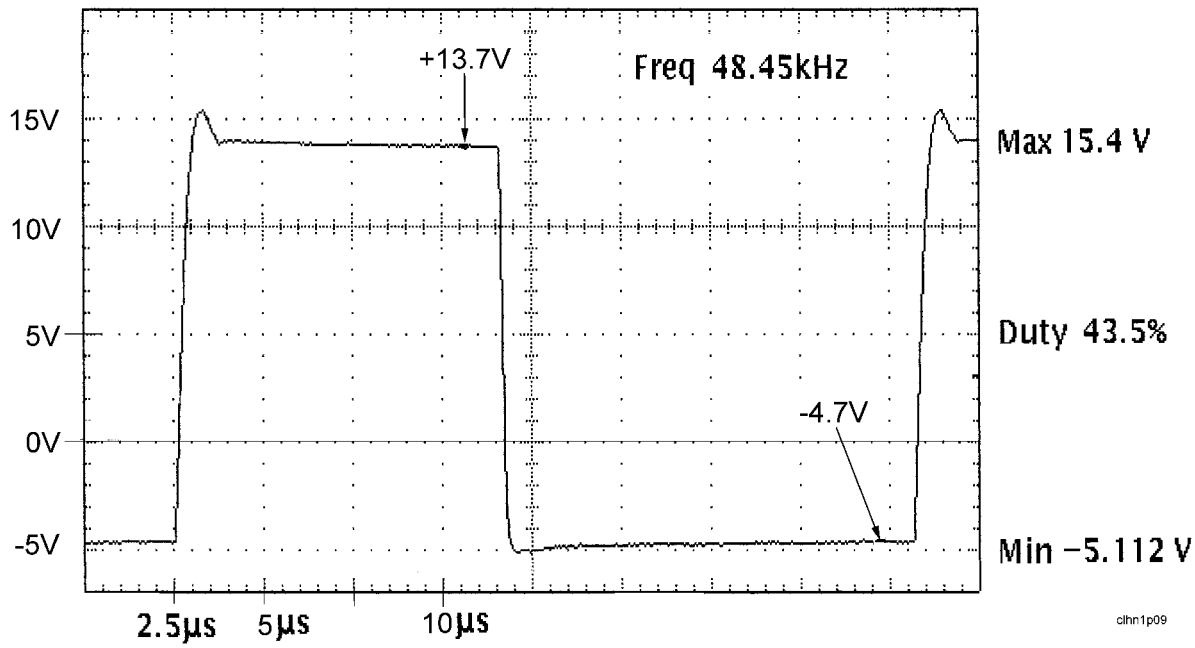
A set of different gate loads can be ordered from ESAB. The part number is 0468 469 003. The gate loads can be used to the following machines: LUC, LHL 130/160, LHL 250/315, LTL 160, LTL315, LUB 315, LHN, LTN, LTR, LTO, MechTig 315 and Protig 315.

IMPORTANT: never check the gate pulses when AP02 and AP03 are connected: always use a dummy gate load.

The gate pulse minimum level must be -3.5 to -5.5V, and the average maximum level 12 to 15V.
Frequency must be 48.5 kHz ±0.5 kHz. Check that the maximum pulse time, measured at a voltage level of +5 V, is 43 ±1% of the cycle time.

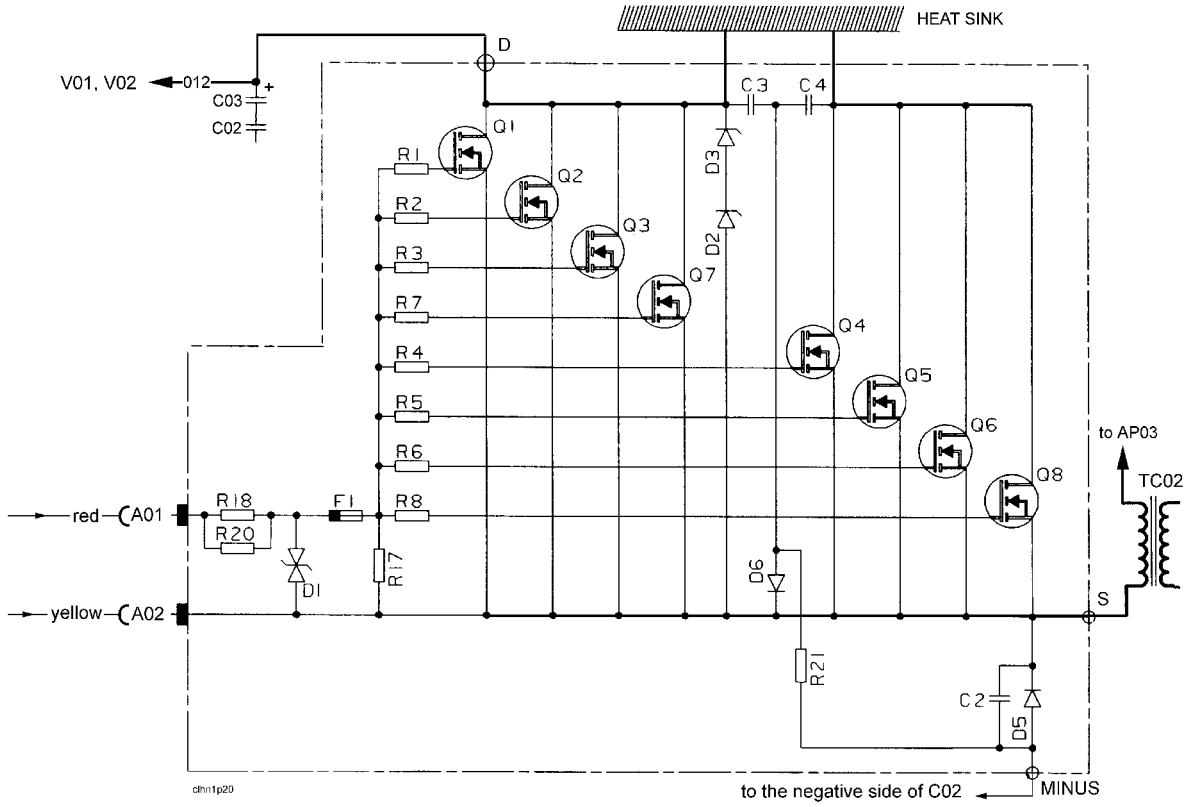
If the gate pulses are not within these tolerances, AP01 must be replaced.

After replacing AP01, the machine must be soft-started, as described on page 21.



Gate pulses as measured across the dummy gate load on circuit board AP01 between connections F01 and F02.

AP02 DESCRIPTION OF OPERATION



Circuit diagram circuit board AP02 (transistor board positive)

Individual transistors must not be replaced: if the circuit board is faulty, it must be replaced in its entirety. In addition, circuit board AP03 must also be replaced.
Instructions on removing and fitting the circuit board are to be found on page 24.

A01, A02 Connections A01 - A02 are for the gate pulses from circuit board AP01.

D1 - D3 Transient voltage protection.

D5 Back-emf protection diode (squelch diode) for main transformer TC02 when the transistors turn off.

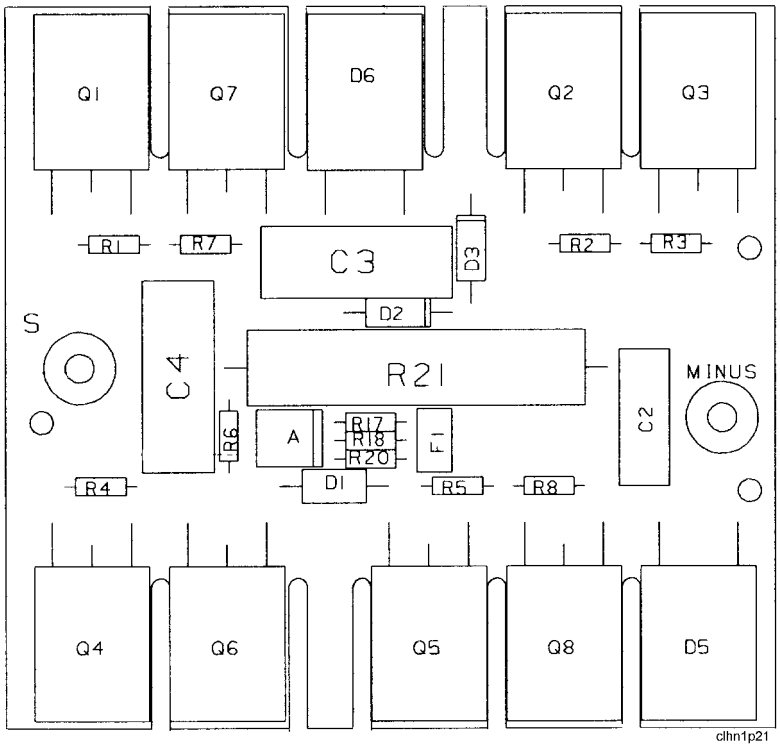
D6 See R21.

F1 Fuse, for protection of circuit board AP01 if circuit board AP02 fails.

R21 R21, C3, C4 and D6 are limiting the peak voltage at transistors Q1 - Q8.

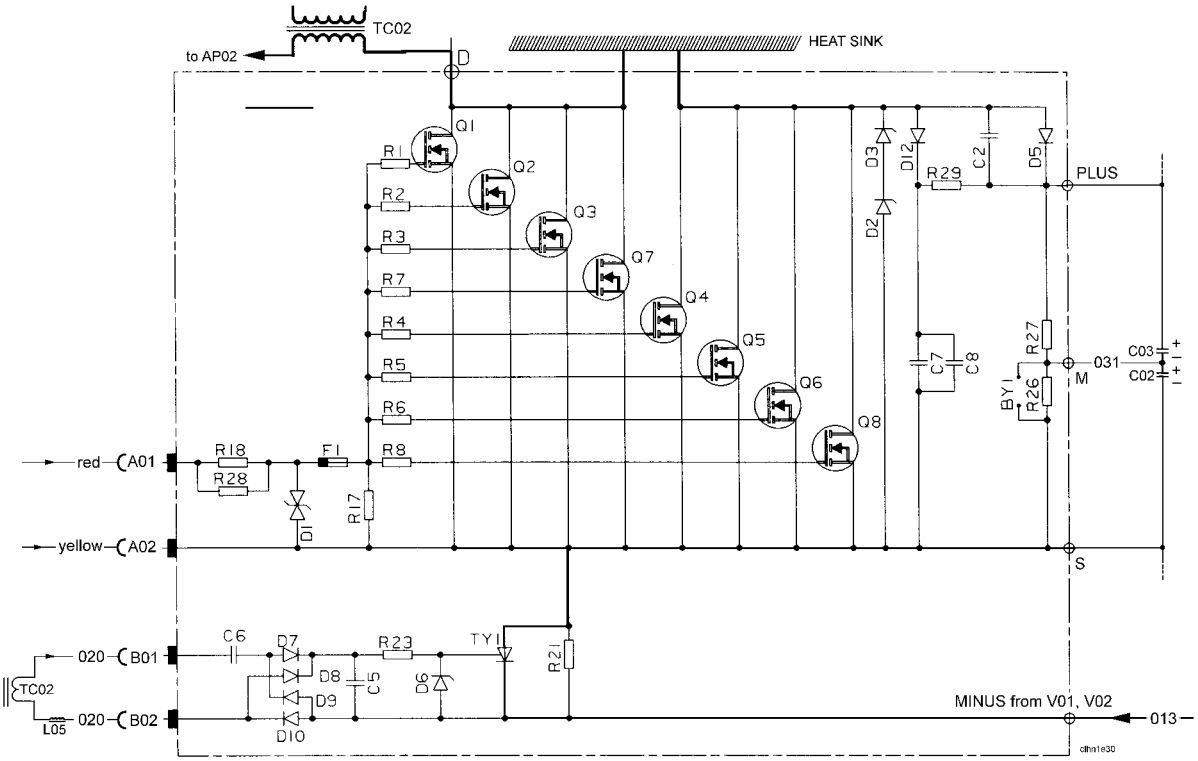
Q1-Q8 MOSFET transistors. These require a special instrument (see MOS TESTER on page 20) for testing.

Due to a change to transistors with higher current rating, transistor Q6 might not be fitted to the board. Spare part boards may have 7 or 8 transistors.



Component positions, circuit board AP02

AP03 DESCRIPTION OF OPERATION



Circuit diagram circuit board AP03 (transistor board negative)

Individual transistors must not be replaced: if the circuit board is faulty, it must be replaced in its entirety. In addition, circuit board AP02 must also be replaced.
See on page 24 for instructions on removing and fitting the circuit board.

A01, A02 Connections A01 - A02 are for the gate pulses from circuit board AP01.

B01, B02 When the machine is loaded, pulses from a trigger pulse winding on main transformer TC02 are supplied to connections B01 and B02, for use as gate pulses in controlling thyristor TY1.

D1 - D3 Transient voltage protection.

D5 Back-emf protection diode (squelch diode) for main transformer TC02 when the transistors turn off.

D12 See R29.

Q1 - Q8 MOSFET transistors. These require a special instrument (see MOS TESTER on page 20 for testing.

Due to a change to transistors with higher current rating, transistor Q8 might not be fitted to the board. Spare part boards may have 7 or 8 transistors.

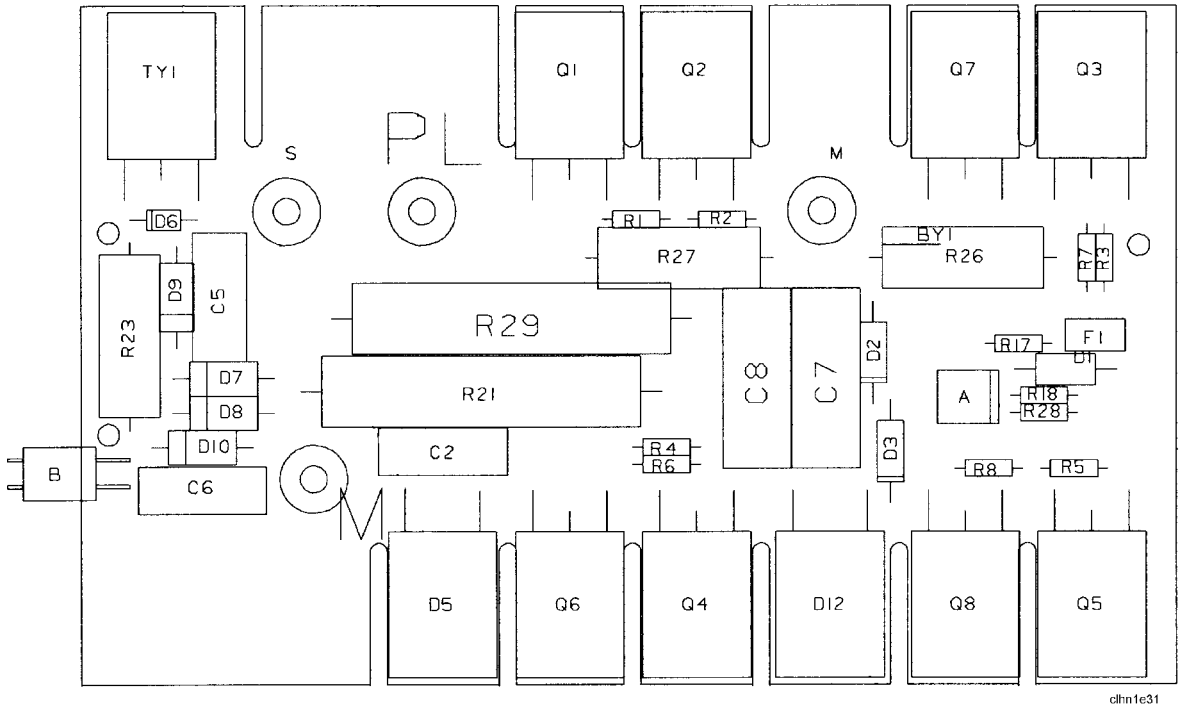
R21 Charging resistor, 12Ω, 10W, for buffer capacitor C02 (C03). When energising the power unit, pulses from control circuit board AP01 are delayed by 300 ms to allow the buffer capacitor to charge.

R26 Discharge resistor for buffer capacitor C03. Discharge time for the capacitor, after turning off the mains power supply, is about two minutes.

R27 Discharge resistor for buffer capacitor C02. After turning off mains power supply, discharge time for the capacitor is about two minutes.

R29 R29, C7, C8 and D12 are limiting the peak voltage at transistors Q1 - Q8.

TY1 Thyristor for shunting charging resistor R21 when the machine is loaded. If TY1 did not conduct, resistor R21 would burn out when the unit is on load.



Component positions, circuit board AP02

MOS TESTER

The MOS tester is a special instrument, and can be ordered only from ESAB. The part number is 0468 469 001.

Connect the instrument as follows:

- Disconnect the power unit from the mains.
- Disconnect capacitor C02 and C03.
- Remove the gate connections from AP01.
- Connect the clip on the red wire to the red wire (the gate wire) on the transistor board.
- Connect the clip on the yellow wire to the yellow wire (the source) on the transistor board.
- Connect the black wire to the cooling fins (drain).

Testing

- Press the pushbutton marked TEST.
- If the board is healthy, both the red and green LED's should flash alternately, about once a second.
- If the transistor board is short-circuited, the red LED will light continuously (note that the green LED may also flash, or be continuously lit.)
- If the transistor board is open-circuited, the green LED will be continuously lit. Check that there is good electrical contact between the clip of the black wire and the cooling fins.

IMPORTANT

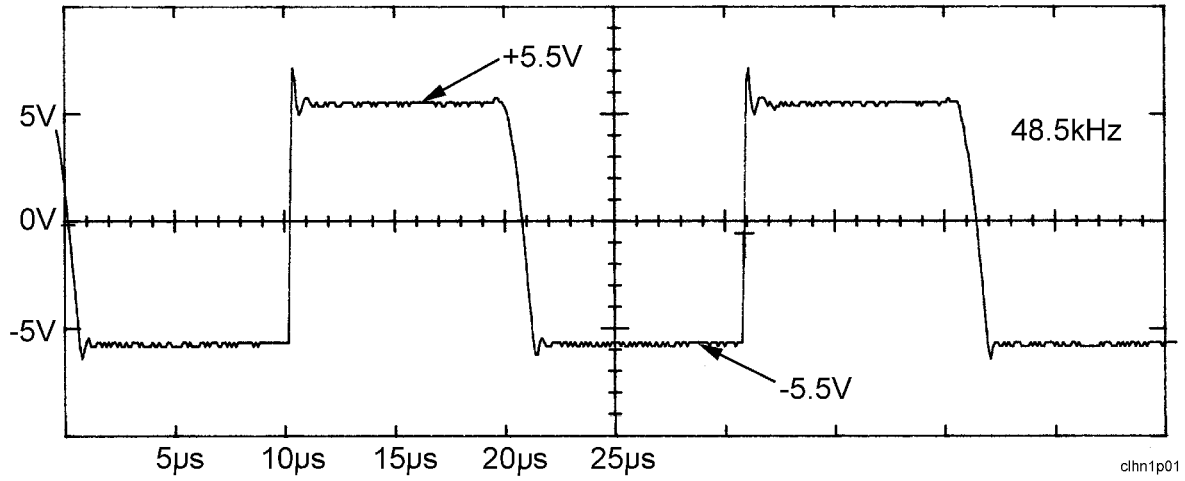
Even if only one transistor board is indicated as faulty, both boards must be replaced.

Check the gate pulses from AP01 before commissioning the new transistor boards: see instructions on page 15.

After replacement of the boards, the machine must be soft-started.

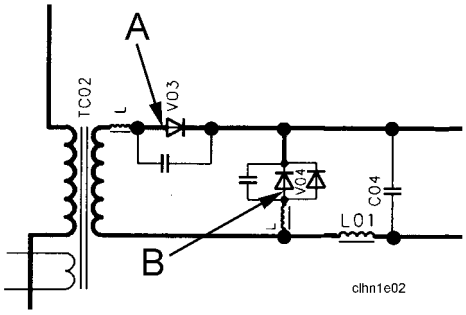
SOFT STARTING

- Remove and insulate wires 007 and 008 from rectifier bridge V01, also remove and insulate wire 009 to rectifier bridge V02: see the circuit diagram on page 7.
- Connect an external power supply, having a current limit of 1A, to the positive and negative connections on V01.
- Adjust the power supply voltage to 30V.
- Power the remaining parts of the unit from the normal power supply.
- Measure the output voltage from the machine. This must be 5.5V ±1V.
- Measure the secondary voltage from transformer TC02. With a voltage of 30V across the buffer capacitor, the waveform must appear as shown below.

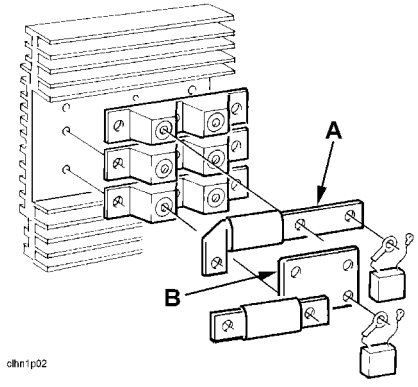


Secondary voltage at TC02 for 30 V across the buffer capacitors

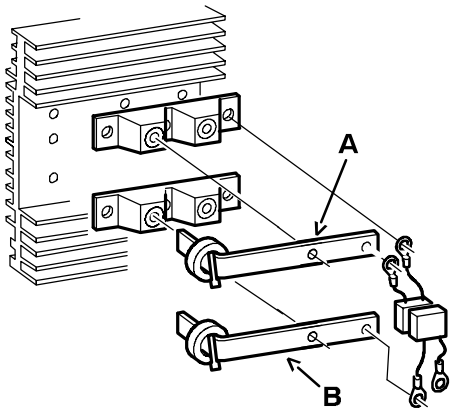
- Measure the voltage with the oscilloscope probe connected to **A** and the screen to **B** according to the picture below.



Measuring points for the secondary voltage at TC02



Up to and including ser. no. 011-147-xxxx

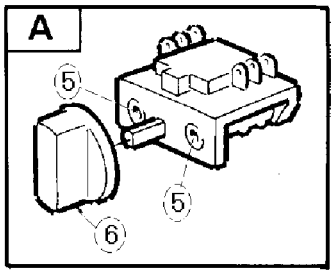


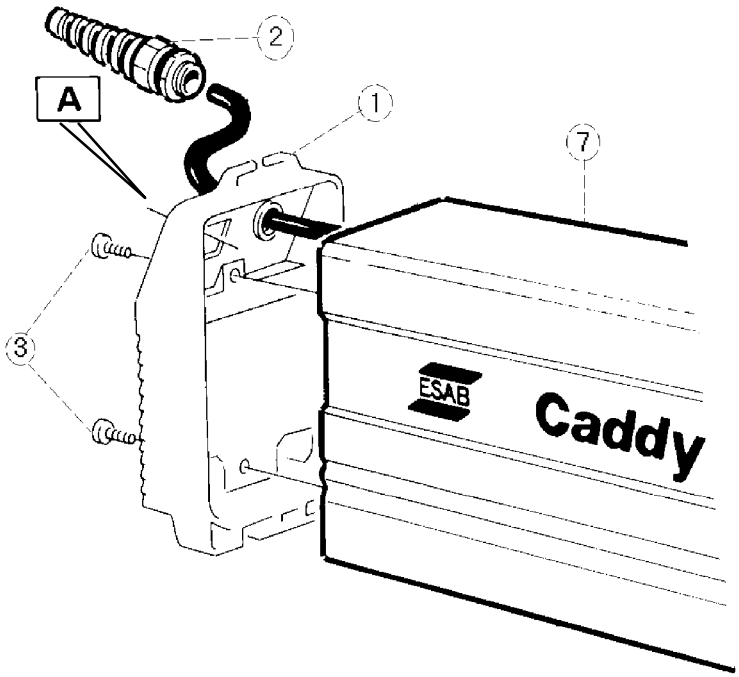
From serial no. 011-148-xxxx

ASSEMBLY/DISASSEMBLY

REMOVAL OF REAR PANEL AND CASING

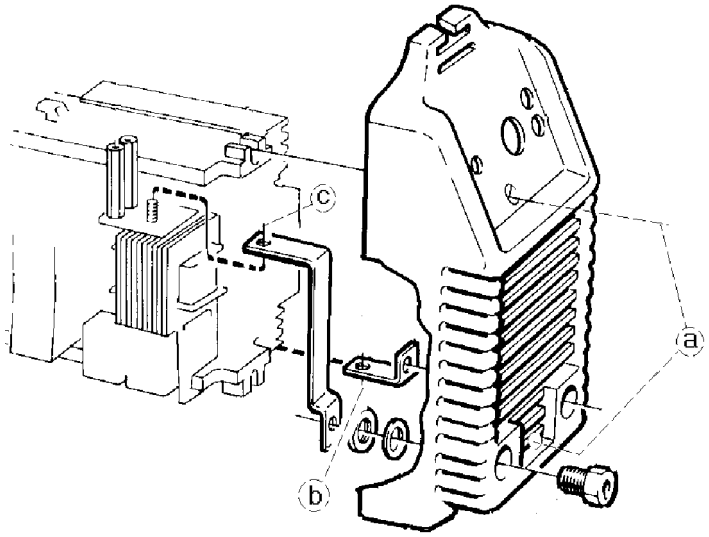
- Remove the strap from the rear panel (1).
- Remove the cable bushing (2) and slide it back along the cable.
- Remove the two screws (3).
- Remove switch knob (6) and screws (5). Remove the rear panel from the casing (7).
- Pull the casing back, over the rear panel and the mains cable.





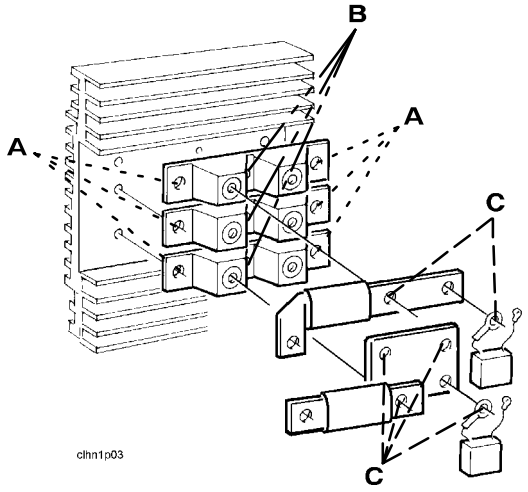
REMOVAL OF FRONT PANEL

- Remove the rear panel and casing. Remove screws (a).
- Remove the positive busbar from the rectifier unit. Screw (b) is accessible from beneath the machine.
- Remove the two nuts (c) and remove the negative busbar from the shunt.
- Remove connectors XS10 and XS03 from circuit board AP01.

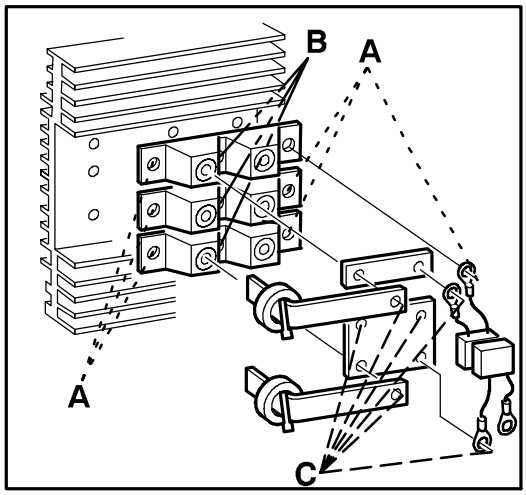


FITTING THE DIODE MODULES

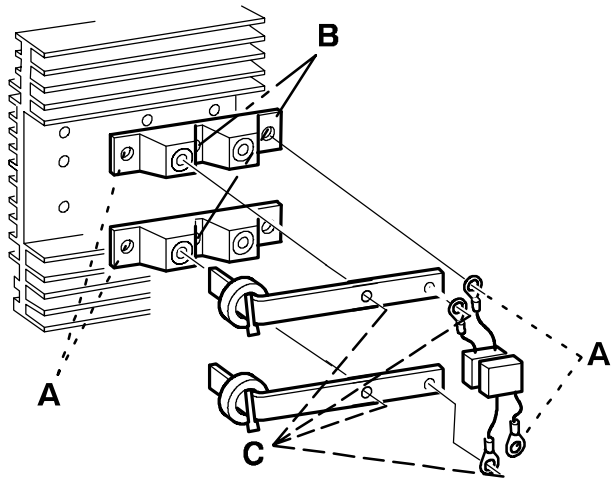
- Clean the contact surface of the heat sink with extremely fine abrasive paper.
- Apply a thin film of contact oil (see item 506 in the spare parts list) to the contact surfaces.
- Fit the diode modules and tighten the screws **A** (M6) to a torque of 6 Nm. Tighten the screws **B** (M4) to a torque of 1 Nm.
  The screws **C** (1/4" 20UNC2B) are to be tightened to a torque of 6 Nm.



Before serial number 011-xxx-xxxx



From serial number 011-xxx-xxxx



From serial number 011-148-xxxx

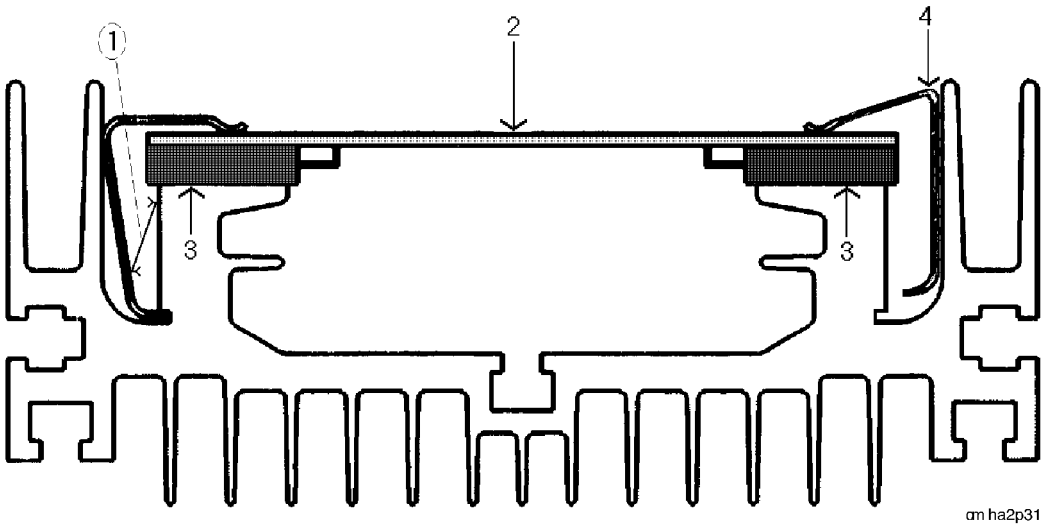
From serial number 011-148-xxxx a new diode module is used. The rated current for the new module, SCOMES MKK300.4, is 300 A. The rated current for the old module, Motorola MURP20040CT, is 200 A. Because of the higher rating only two modules are needed for the rectifier unit. The ordering no. for the new module is the same as for the old.

When replacing the diode modules in machines with serial number prior to 011-148-xxxx it is sufficient to use only two modules if the new type, SCOMES MKK300.4, is mounted.

The busbars with item numbers 333, 334, 336, 434 and 436, see the spare parts list, are not more available. If they have to be replaced, fit the new type of diode modules and the busbars with item no. 543.

REMOVAL OF TRANSISTOR CIRCUIT BOARDS AP02 AND AP03

- Remove the rear panel and casing.
- Remove all wires and busbars connected to the board.
- Remove the springs that hold the board (2) in position by prising them off with a screwdriver (1) between the cooling flange and the spring.



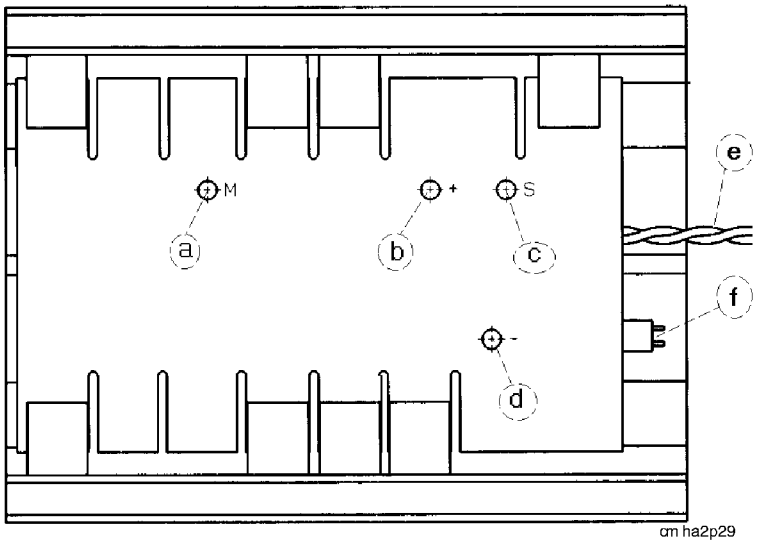
Removal/refitting of transistor circuit board

REFITTING THE TRANSISTOR CIRCUIT BOARD

- When replacing the transistor circuit board, both boards must always be replaced and new springs must be fitted.
- Clean the contact surface (3) of the heat sink with extremely fine abrasive paper.
- Apply a thin film of contact oil (see item 506 in the spare parts list) to the contact surfaces.
- Place the circuit board (2) on the cooling fins. Secure first one spring on each side of the board by pressing the spring down with a screwdriver (4). Then secure the remaining springs.

  The springs must be fitted where there are components that are to be in contact with the heath sink. Due to a change to transistors with higher current rating, there might be less transistors on the spare part board than on the original board.
- When fitting cable lugs and busbars to the boards, it is important that the washers are fitted in the correct order. Start by placing the lug on the foil, and then fit a flat washer, a spring washer and finally the screw.

Connections to circuit board AP03



a Wire 031 to the connection between C02 and C03.

b Busbar connected to positive on C03.

c Busbar connected to negative on C02.

d Wire 013 from negative of rectifier V02.

e Gate connection from circuit board AP01.

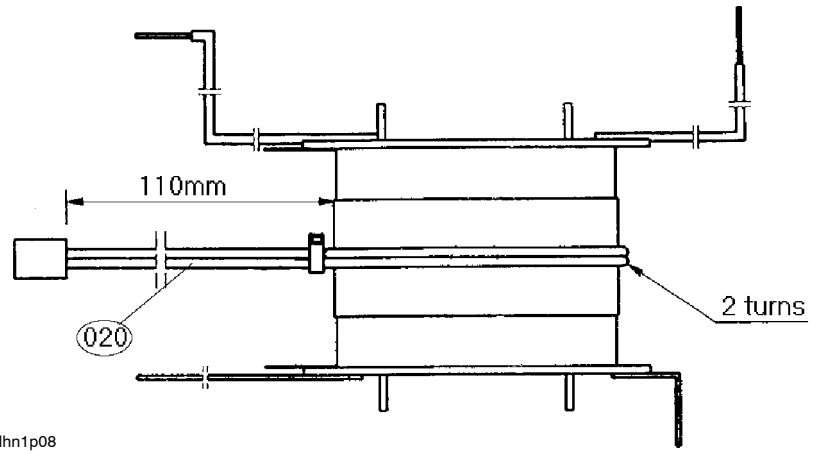
f Connector XS08 from transformer TC02

FITTING THE MAIN TRANSFORMER TC02

When replacing the main transformer, it is also necessary to replace the transformer core. This is because the core is bonded with adhesive, and cannot be disassembled.

Adhesive and tape are required when fitting a new transformer, in addition to the coil and core. Part numbers for the requisite adhesive and tape are shown as item 301 in the spare parts list.

- Transfer wire 020 and connector XS08 to the new transformer. If the wire needs to be replaced, it is important to use the correct type of insulation (Teflon)

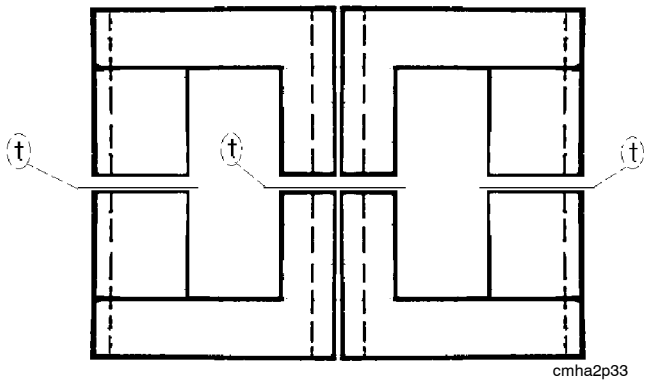


clhn1p08

Fitting wire 020

- Apply a layer of tape (t) to each of the three airgaps in the transformer core. Use the tape specified in the spare parts list.

  Apply Loctite 649 to the contact faces between the cores and between the core and coil. Secure the transformer in position in the machine. The adhesive takes about 20 minutes to harden.



cmha2p33

Airgap (t) in the transformer core

TECHNICAL DATA

Load capacity	
At 35% duty cycle	250 A / 30 V
At 60% duty cycle	180 A / 27 V
At 100% duty cycle	140 A / 26 V
Operating range	Stepless 5-250 A
Open-circuit voltage	50 - 80 V
Mains power supply	
Voltage	400 V 3~
Primary current	12 A
Frequency	50-60 Hz
Fuse rating	16 A
Mains cable cross sectional area	4x1.5mm^2
Application class	S
Enclosure class	IP23
Dimensions l x b x h	472 x 142 x 256 mm
Weight	Approx. 11 kg

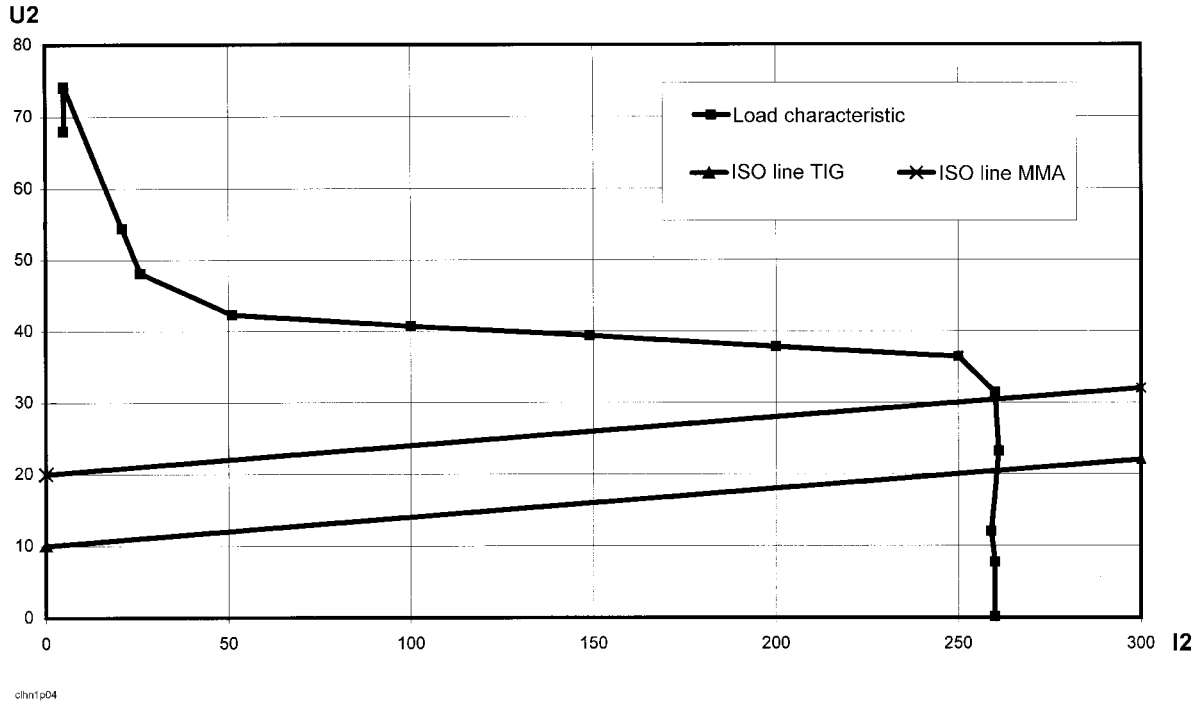
Duty cycle
The duty cycle refers to the time in per cent of a ten-minute period that you can weld at a certain load without overloading the welding power source.

Enclosure class
The **IP** code indicates the enclosure class, i. e. the degree of protection against penetration by solid objects or water. Equipment marked **IP 23** is designed for indoor and outdoor use.

Application class

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

LOAD CHARACTERISTIC



clhn1p04

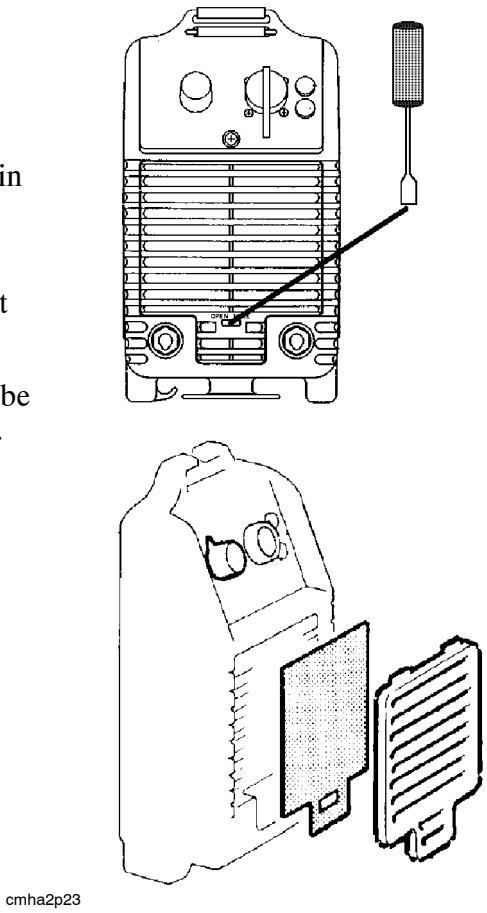
MAINTENANCE

Clean the air filter in the front panel of LHN 250 regularly, and replace it if damaged.

Remove the filter by inserting a screwdriver in the slit in the grille and prising out the lower part of the grille, as shown on the right.

Remove the entire casing once a year and blow the dust out of the machine with dry compressed air.

If the machine is used in dusty or dirty areas, it should be blown clean, and the filter be cleaned, more frequently.



cmha2p23

Removal of filter

INSTRUCTIONS

This chapter is an extract from the LHN 250 Instruction Manual.

INTRODUCTION

Note
This product is solely intended for arc welding.

The LHN 250 is a transistor controlled welding power source designed for welding with coated electrodes and for TIG welding (touch start).

Equipment

LHN 250 is equipped with a remote control socket which activates automatically when a remote control device is connected. NOTE! The contact pins L and M must be strapped in the remote device's connection cable for automatic activation to function. The inverter is supplied with a 3 meter long mains cable.

LHN 250 is delivered with 5 meter long welding and return cables. These are attached to cable connectors allowing quick change of polarity.

The manufacturer's serial number is stamped on the rating plate.

Field of application

LHN 250 supply direct current, which allows you to weld most alloyed and non-alloyed steels, stainless steels and cast iron.

With the LHN 250 you can use coated electrodes from ∅1.6 to ∅ 5 mm.

Tig-welding

TIG welding is particularly useful when high quality standards are required and when welding thin sheet.
Before using the LHN 250 for TIG welding it must be equipped with a TIG torch and gas valve, a cylinder of argon, an argon regulator, tungsten electrodes and, if necessary, suitable filler metal. The best method to use is the touch start, where you gently stroke the tungsten electrode against the workpiece to establish the arc.

INSTALLATION

WARNING

This product is intended for repair and maintenance welding
In domestic or office environment this product may cause radio interference.
It is the responsibility of the user to take adequate precautions.

Placing

Place the machine so that there is nothing to prevent the cooling air from passing through it.

Connection

To get maximum performance from the LHN 250 it must be fitted with a 16A slow fuse.

The LHN 250 have mains voltage compensation, which means that ±10% fluctuation in the supply voltage produces only ±0.2% variation in the welding voltage.

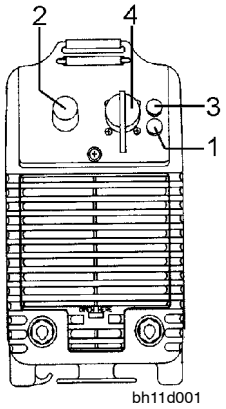
LHN 250 is intended for 400V, 3 phase supplies. It can be used with 50 Hz or 60 Hz supplies.

OPERATION

Start-up

The power switch is at the rear of the LHN 250. The white lamp on the front will glow when the power is on.

1. Yellow light-emitting diode, indicates overtemperature.
2. Welding current control 4-250 A
3. White lamp
4. Remote control socket



Important!
Only use the accompanying welding cable and return cable, with a cross-sectional area of 35 mm^2.
(See list of spare parts for order number).

Overload protection

To save you worrying about overloading the LHN 250 it has a thermal cut-out that will trip before the temperature becomes too high. You can tell when the rectifier has been overloaded because the yellow light comes on and it will no longer be possible to weld.

FAULT TRACING

Possible faults and measures to take

Type of fault	Measure
No arc is generated by the welding power source.	• Make sure the mains switch is on. • Check that the welding and return cables are properly connected. • Make sure the welding current set is correct.
The welding current is interrupted in the course of welding.	• Check if the thermal cut-out has tripped (the orange indicating lamp on the front panel is on). • Check the mains fuse.
The thermal cut-out trips frequently.	• Check that the filter is not packed with dust. • Check that the ratings of the welding power source have not been exceeded (overload of the power source).
Poor welding result.	• Check that the welding and return cables are properly connected. • Make sure the welding current set is correct. • Check that there is nothing wrong with the electrodes.

SPARE PARTS

The spare parts list for the LHN 250 and Caddy Professional 250 is published in a separate document with filename / ordering no: 0457 552 990.

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