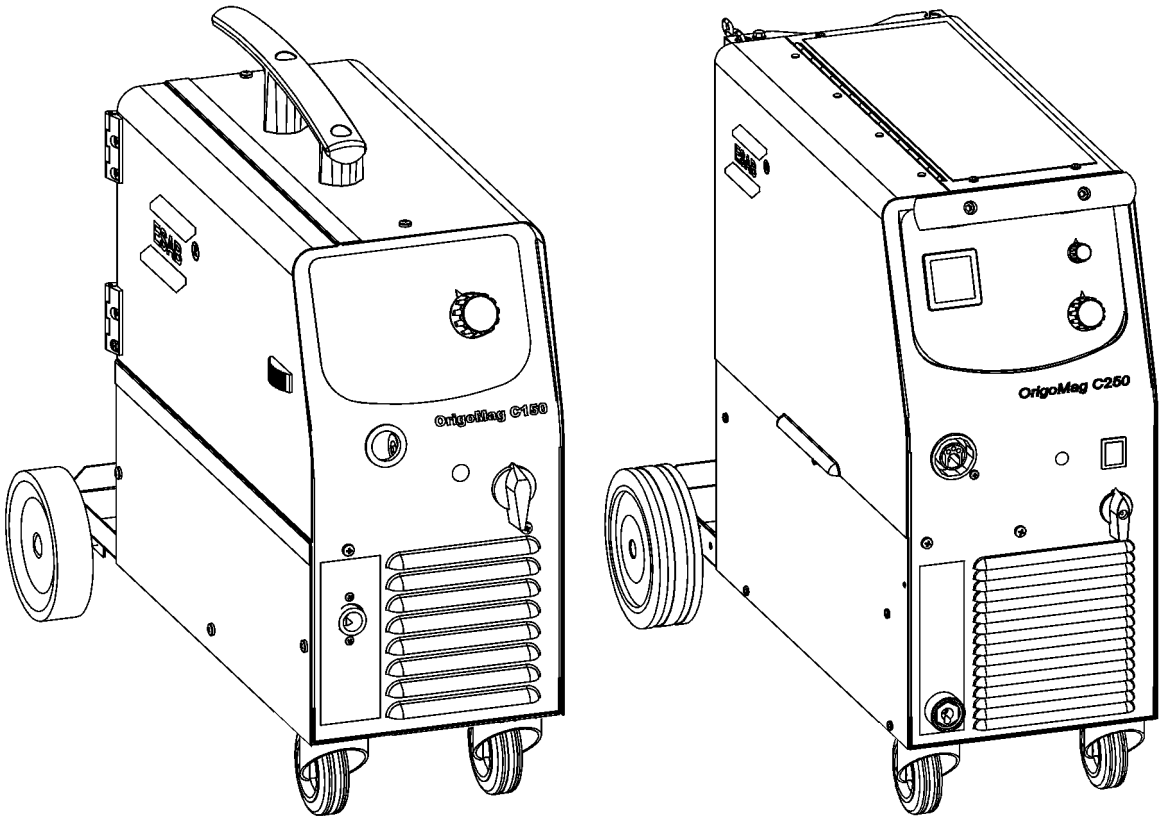
Mig C141/C151
Mag C171/C201/C251

Origo ™



Service manual

0349 300 076 080529

Valid for serial no. 736-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 May 2008.

The Origo™ Mig C141/C151, Mag C171/C201/C251 are designed and tested in accordance with international and European standard IEC/EN 60974-1 and EN 60974-10.
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.

INTRODUCTION

Origo™ Mig C141/C151, Mag C171/C201/C251 are step controlled power sources in a compact design, intended for welding with solid steel, stainless steel or aluminium wire as well as tubular wire with or without shielding gas.

The possibility of welding with homogeneous wire/shielding gas and welding with gasless tubular wire is obtained by switching the + and - connections on the switching terminal by the wire feed unit.

TECHNICAL DATA

	Origo™ Mig C141	Origo™ Mig C151	Origo™ Mag C171
Voltage	**220-230V, 1~ 50/60Hz**	**220-230V, 1~ 50/60Hz**	**220-230V, 1~ 50/60Hz**
Permissible load at 100% duty cycle	42A/16,1V	67A/17,4V	76A/17,8V
60 % duty cycle	54A/16,7V	87A/18,3V	98A/18,9V
@ % duty cycle	83A/18,2V @ 25%	95A/18,7V @ 50%	155A/21,7V @ 25%
20 % duty cycle	100A/17,0V	150A/16,0V	170A/21,0V
Setting range (DC)	35A/15,7V-83A/18,2V (130A/13,4)	30A/15,5V-95A/18,7V (150A/16,0V)	30A/15,5V-155A/21,7 V (170A/21,0)
Open circuit voltage	18,7-25,1V	17,3-24,3V	22,4-44,5V
Open circuit power	75W	110W	270W
Power factor at max load	0,91	0,92	0,91
Control voltage	220-230V, 50/60Hz	220-230V, 50/60Hz	42V, 50/60Hz
Wire feed speed	2,0-14m/min	2,0-14m/min	1,0-17m/min
Burnback time	-	-	0,02-0,25s
Spot welding	-	-	0,2-2,5s
Welding gun connection	fixed	fixed	EURO
Wire dimension range	0,6-0,8(Fe) 1,0 (Al) 0,8(cored) 0,8(CuSi)	0,6-0,8(Fe) 1,0 (Al) 0,8(cored) 0,8(CuSi)	0,6-0,8(Fe) 1,0(Al) 0,8(cored) 0,8-1,0(CuSi)
Max diameter/weight of wire bobin	200mm/5kg	200mm/5kg	300mm/15kg
Dimensions lxwxh	650x300x550	650x300x550	860x420x730
Weight	25kg	37,5kg	59kg
Operating temperature	-10 ÷ +40°C	-10 ÷ +40°C	-10 ÷ +40°C
Enclosure class	IP 23	IP 23	IP 23
Application classification	S	S	S

	Origo™ Mag C201	Origo™ Mag C251
Voltage	**220-230V, 1~ 50/60Hz**	**220-230V, 1~ 50/60Hz**
Permissible load at 100% duty cycle	90A/18,5V	110A/19,5V
60 % duty cycle	115A19,7V	140A/21,0V
@ % duty cycle	185A/23,3V @ 23%	200A/24,0V @ 30%
20 % duty cycle	200A/23,0V	250A/21,0V
Setting range (DC)	30A/15,5V-185A/23,3V (200A/23,0V)	40A/16,0V-200A/24,0V (250A/21,0V)
Open circuit voltage	19,6-44,9V	19,0-41,5V
Open circuit power	120W	200W
Power factor at max load	0,89	0,92

Control voltage	42V, 50/60Hz	42V, 50/60Hz
Wire feed speed	1,0–17m/min	1,9–19m/min
Burnback time	0,02–0,25s	0–0,25s
Spot welding	0,2–2,5s	0,2–2,5s
Welding gun connection	EURO	EURO
Wire dimension range	0,6–1,0(Fe) 1,0(Al) 0,8–1,0(cored) 0,8–1,0(CuSi)	0,6–1,2(Fe) 1,0–1,2(Al) 0,8–1,2(cored) 0,8–1,0(CuSi)
Max diameter/weight of wire bobin	300mm/15kg	300mm/15kg
Dimensions lxwxh	860x420x730	860x420x730
Weight	68kg	94kg
Operating temperature	–10 ÷ +40°C	–10 ÷ +40°C
Enclosure class	IP 23	IP 23
Application classification	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, Mig C141 / C151

Component description

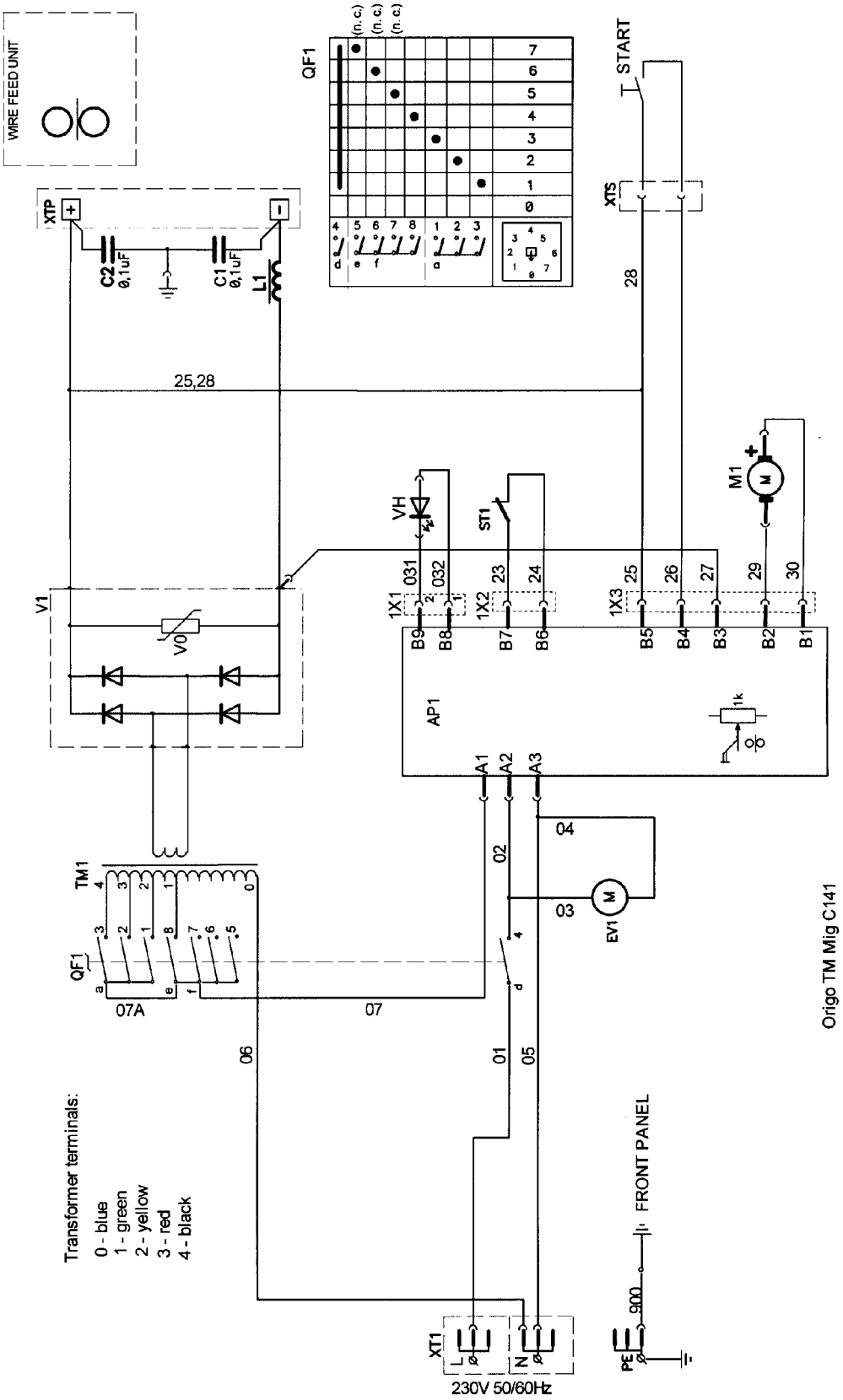
WARNING !

STATIC ELECTRICITY can damage circuit boards and electronic components.

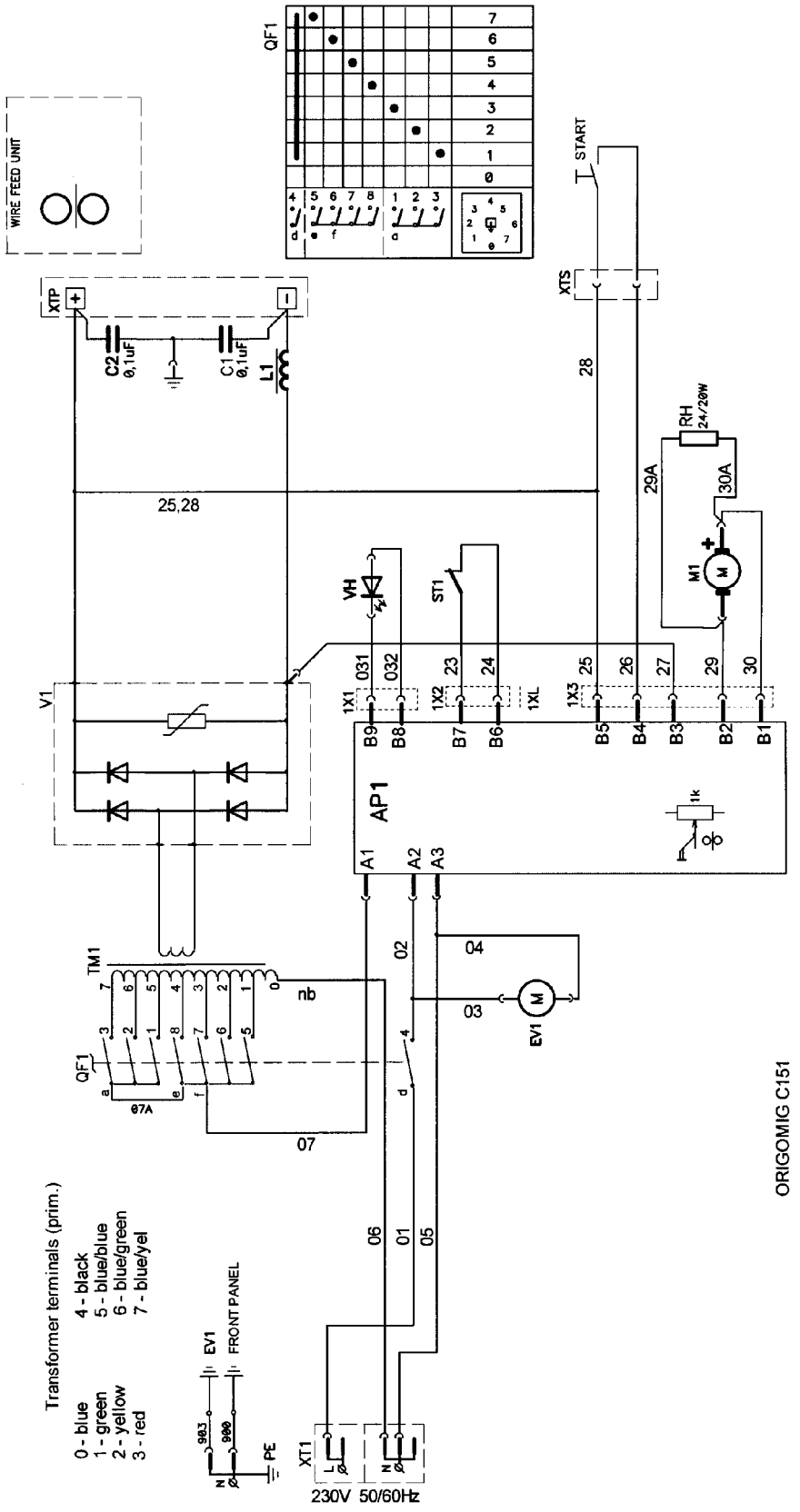
- **Observe precautions for handling electrostatic sensitive devices.**
- **Use proper static-proof bags and boxes.**

AP1	Circuit board
C1, C2, C3	Capacitor 0,1uF/250V
C4	Capacitor 47uF/275V
C5	Capacitor 2,2uF/300V
CO	Capacitor, C140: 33mF/40V, C150: 68mF/40V
EV1	Fan
KM1	Contactor 230V, 50-60Hz
L1	Inductor
M1	Feed unit motor
QF1	Switch, ON/OFF and C141: 4-step welding voltage selector C151: 7-step welding voltage selector
R13	Potentiometer, wire feed speed (placed on AP1)
R01, R02	Resistor 15Ω/20W
R1	Resistor 100kΩ/2W
RO	Resistor 15Ω/20W
ST1	Thermal switch, operates at 150ºC (C141) or at 130ºC (C151) . Thermal switch is mounted on the inductor.
TC2	Transformer for CO_2 heater, accessory
TM1	Main transformer
V1	Diode bridge
V2	Diode bridge
VH	LED yellow indication, thermal overload
XTP	Main welding current contact, single - pole
XT1, XT4	Terminal block

Mig C141

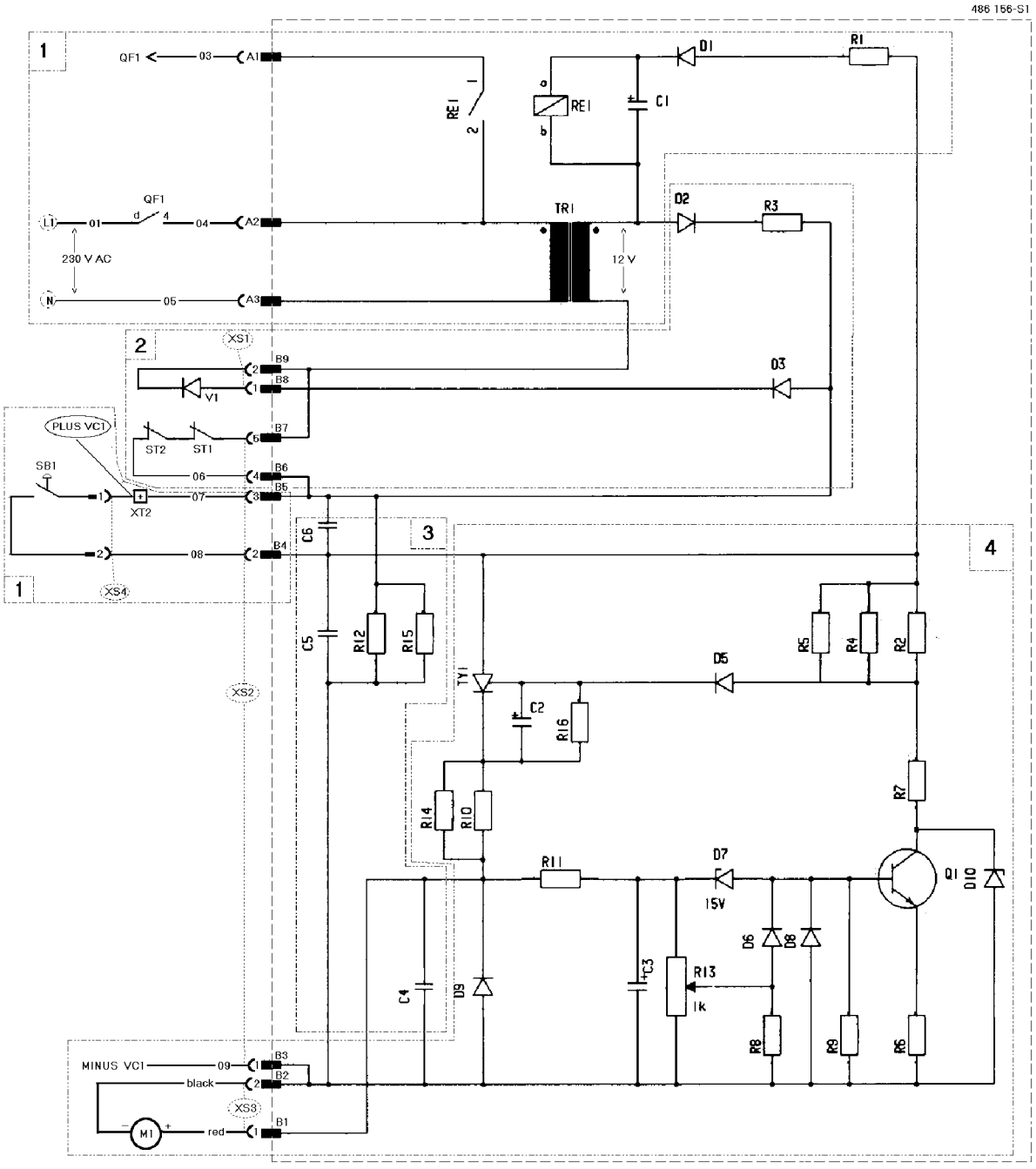

WIRE FEED UNIT
QF1
(n. c.)
(n. c.)
(n. c.)
START
XTS
XTP
C2 0,1uF
C1 0,1uF
L1
28
25,28
VH
ST1
M1
V1
V0
1X1
031
032
1X2
23
24
1X3
25
26
27
29
30
B9
B8
B7
B6
B5
B4
B3
B2
B1
AP1
1k
A1
A2
A3
04
02
03
EV1
TM1
QF1
07A
07
06
01
05
Transformer terminals:
0 - blue
1 - green
2 - yellow
3 - red
4 - black
FRONT PANEL
900
XT1
L
N
PE
230V 50/60Hz
Origo TM Mig C141

Mig C151


WIRE FEED UNIT
QF1
START
XTS
XTP
C2 0,1uF
C1 0,1uF
L1
28
25,28
RH 24/20W
29A
30A
M1
VH
ST1
V1
1X1
031
032
1X2
23
24
1XL
1X3
25
26
27
29
30
B9
B8
B7
B6
B5
B4
B3
B2
B1
AP1
1k
A1
A2
A3
TM1
02
04
03
EV1
QF1
07A
07
06
01
05
ORIGOMIG C151
Transformer terminals (prim.)
0 - blue
1 - green
2 - yellow
3 - red
4 - black
5 - blue/blue
6 - blue/green
7 - blue/yel
EV1
FRONT PANEL
903
900
PE
XT1
230V 50/60Hz

DESCRIPTION OF OPERATION

AP1 Control board



AP1:1 Control circuit

Pressing trigger switch SB1 on the welding torch energises relay RE1 from control power transformer TR1. The contacts on the relay connect main transformer TM1 to the mains power supply.
The power supply to RE1 is half-wave rectified by D1. Resistor R1 is connected in series with the relay and drops the voltage to it. Capacitor C1 (220μF) smoothes the voltage. It also delays the drop-off of relay RE1 by about 25 ms, to provide a burnback time.

AP1:2 Thermal overload cutout

In the event of a thermal overload, thermal overload cutout ST1 interrupts the secondary circuit from TR1, causing relay RE1 to drop off and de-energising the welding circuit. When not operated (i.e. with closed contacts), the cutouts short-circuit inputs B6 and B7.
Operation of either of the cutouts is indicated by LED V1. Interruption of the cutout circuit energises the LED via D2, R3 and D3. D2 is a half-wave rectifier, R3 limits the current through the LED and D3 protects it against reverse voltage.

AP1:3 RFI suppression and base load resistors

Capacitors C4 - C6 protect against RFI. Resistors R12 and R15 provide a minimum base load for the rectifier bridge: in addition, they act as discharge resistors for the capacitors.

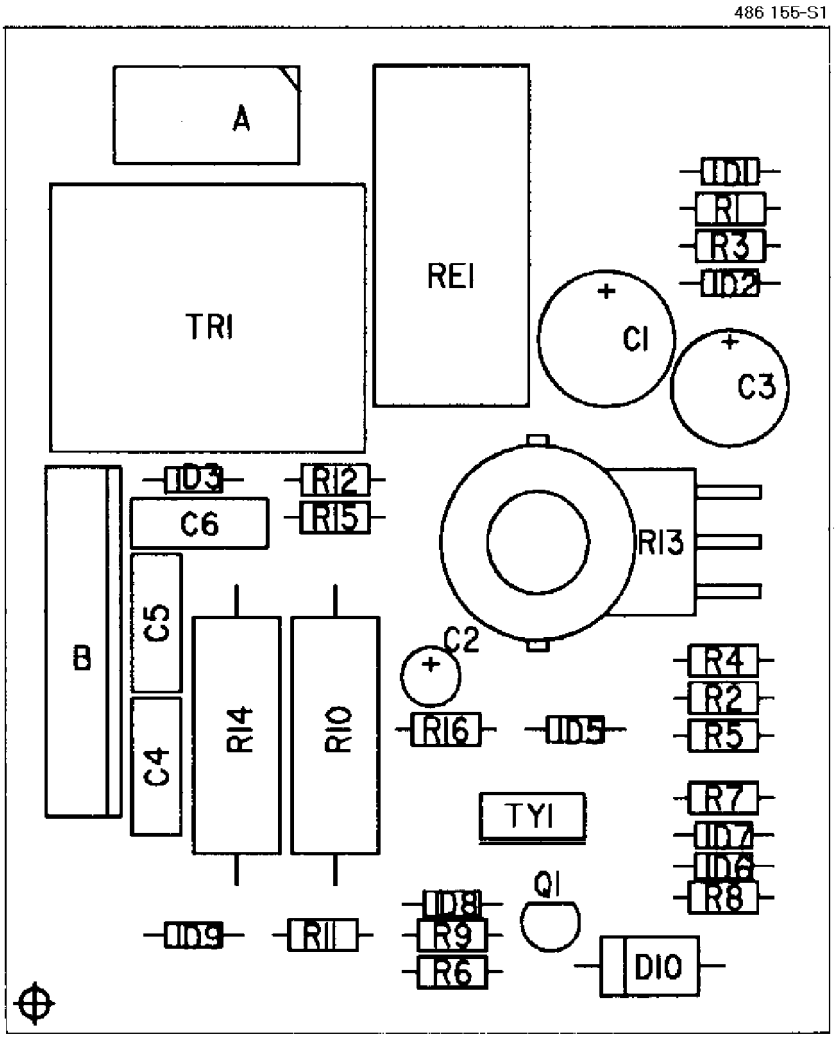
AP1:4 Motor drive circuit

The wire feed motor is powered by the rectified secondary voltage from main transformer TM1.
Pressing the welding torch trigger switch SB1 provides a supply to thyristor TY1 via contact B4 from the positive side of the main power rectifier VC1. Resistors R10 and R14 limit the motor starting current: excessive starting current would demagnetise the motor. D9 is a squelch diode protecting against back-emf from the motor.The ignition circuit for TY1 consists of R2, R4, R5, D5 and C2.
When Q1 is not conducting, operation of the circuit is as follows:
If the voltage at B4 exceeds the motor voltage, C2 charges via R2, R4 and R5. When the voltage on C2 reaches the trigger voltage (0.5 - 1.5 V), thyristor TY1 fires. This means that TY1 conducts each half-cycle when Q1 is not conducting.
D5 protects C2 against negative voltage when Q1 conducts.

Motor voltage control

C3, R11 and potentiometer R13 form a low-pass filter circuit for the motor supply. R13 picks off a suitable fraction of the motor voltage for connection to the base of Q1 via diode D6. Q1 starts to conduct at a bases voltage of 0.7 V. C2 charges more slowly, which means that thyristor TY1 fires later. Motor voltage is lowest when R13 is in its upper position, the minimum position. The base voltage is then high and Q1 conducts. The charging time for C2 becomes so long that thyristor TY1 misses some half cycles, firing only (for example) on every third cycle.
When R13 is in its lower (= maximum) position, the base voltage on Q1 is low and Q1 does not conduct. In this state, zener diode D7 determines the maximum motor voltage.

AP1 - Mig C141 / C151 component positions



WIRING DIAGRAM, Mag C171 / C201

Component description

WARNING !

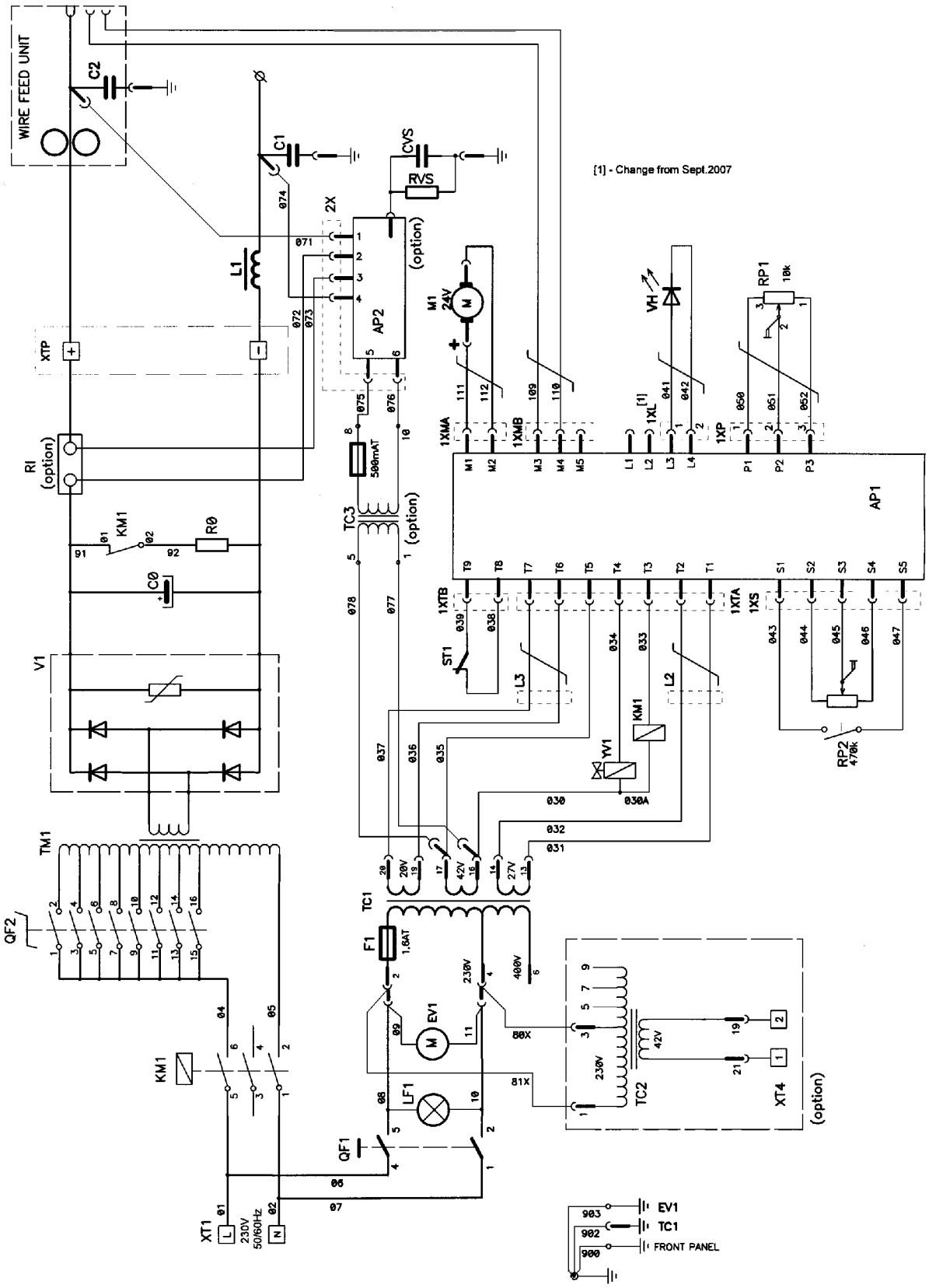
STATIC ELECTRICITY can damage circuit boards and electronic components.

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

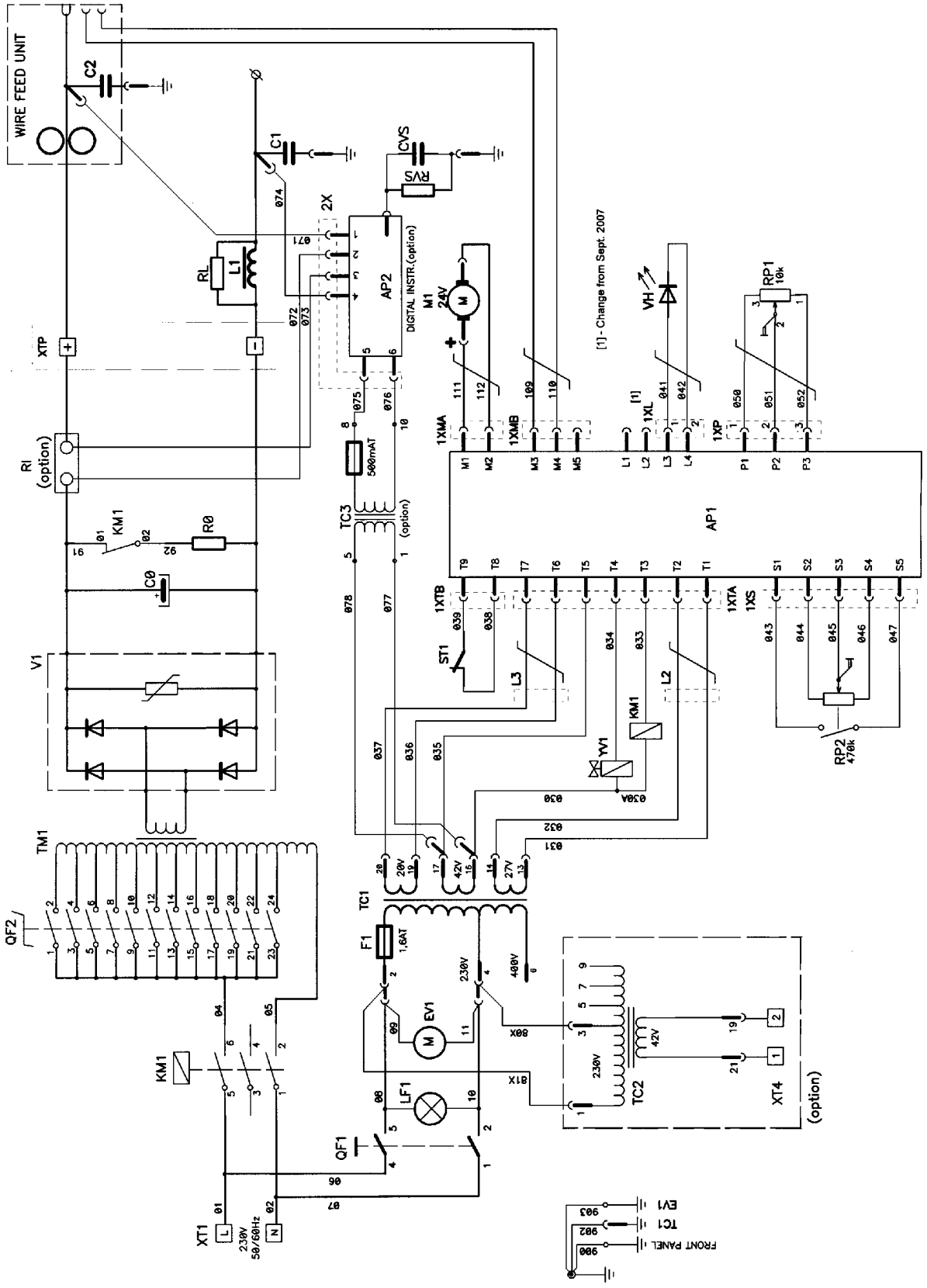
AP1	Circuit board
AP2	Digital instrument, accessory
C1, C2, CVS	Capacitor 0,1uF/250V
EV1	Fan
KM1	Contactor 42V, 50-60Hz
L1	Inductor
L2, L3	Ferrite core
LF1	Lamp, white, On/Off, 230V
M1	Feed unit motor
QF1	Switch, ON/OFF
QF2	Switch, 8-step welding voltage selector for C171 12-step welding voltage selector for C201
RO	Resistor 15Ω/20W
RVS	Resistor
RP1	Potentiometer, wire feed speed
RP2	Potentiometer with switch, spot welding
RI	Shunt, accessory
RL	Resistor
ST1	**C171:** Thermal switch, operates at 150°C. Thermal switch is mounted on the inductor. **C201:** Thermal switch, operates at 130°C. Thermal switch is mounted on the transformer.
TC1	Control transformer
TC2	Transformer for CO_2 heater, accessory
TC3	Transformer for digital instrument, accessory

TM1	Main transformer
V1	Diode bridge
VH	LED yellow indication, thermal overload
XTP	Main welding current contact, single – pole
XT1, XT4	Terminal block
YV1	Gas valve

Mag C171

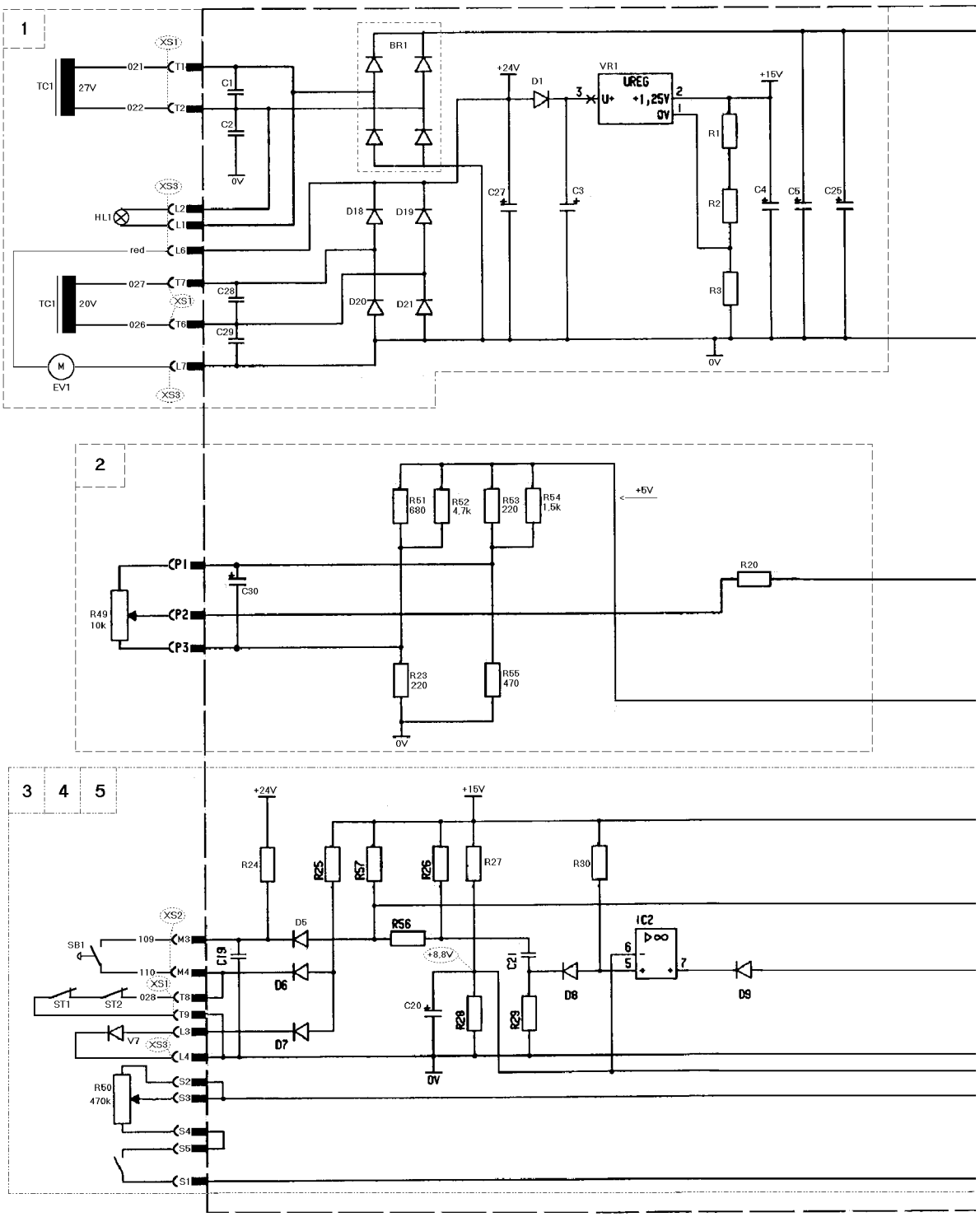

WIRE FEED UNIT
C2
C1
CVS
RVS
[1] - Change from Sept.2007
2X
(option)
L1
M1
24V
VH
RP1
10k
XTP
AP2
RI
(option)
1XMA
1XMB
1XL
1XP
AP1
KM1
R0
C0
TC3
(option)
V1
1XTB
1XTA
1XS
ST1
L3
L2
KM1
YV1
RP2
470k
TM1
QF2
TC1
F1
1.6AT
EV1
80X
81X
TC2
XT4
(option)
LF1
QF1
XT1
230V
50/60Hz
EV1
TC1
FRONT PANEL

Mag C201


WIRE FEED UNIT
C2
C1
CVS
RVS
2X
AP2
DIGITAL INSTR.(option)
M1
24V
[1] - Change from Sept. 2007
VH
RP1
10k
RL
L1
XTP
RI
(option)
KM1
R0
C0
V1
TM1
QF2
TC3
500mAT
(option)
1XMA
1XMB
1XL
[1]
1XP
AP1
1XTB
1XTA
1XS
ST1
L3
L2
KM1
YV1
RP2
470k
TC1
F1
1,6AT
230V
400V
EV1
LF1
QF1
KM1
XT1
230V
50/60Hz
TC2
42V
XT4
(option)
EV1
TC1
FRONT PANEL

DESCRIPTION OF OPERATION

AP1 Control board



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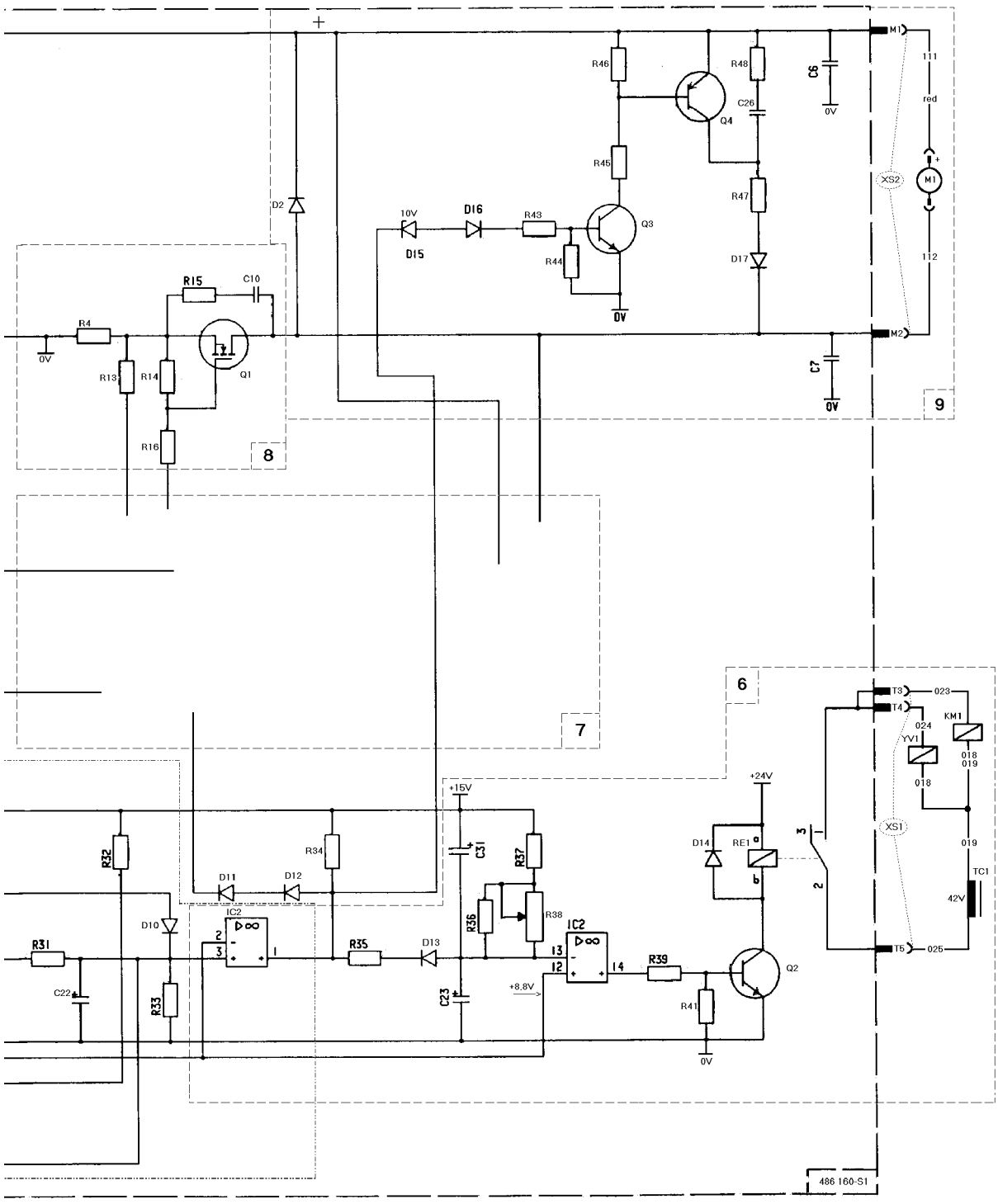
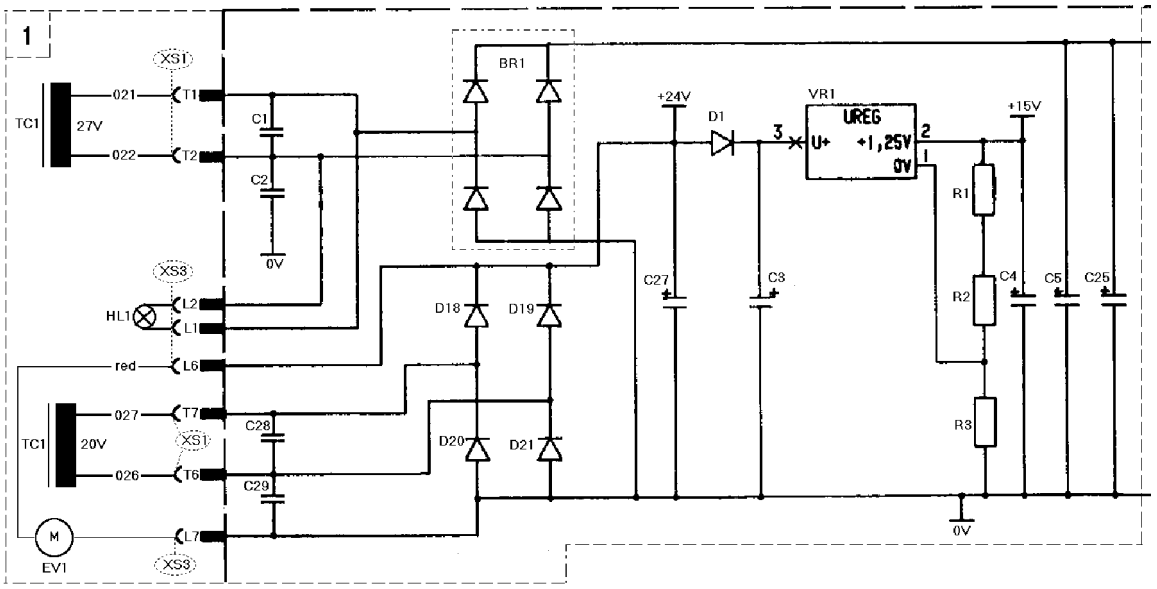

M1
111
red
XS2
M1
112
M2
C6
0V
R46
R48
C26
Q4
R45
R47
D2
10V
D16
R43
Q3
D15
R44
D17
0V
R15
C10
R4
0V
R13
R14
Q1
R16
8
9
C7
0V
7
6
T3
T4
023
024
KM1
YV1
018
019
018
XS1
019
TC1
42V
T5
025
+24V
D14
RE1
+15V
C31
R37
R32
R34
D11
D12
R38
IC2
R36
D10
IC2
R31
R35
D13
13
12
14
R39
Q2
C22
R33
C23
+8,8V
R41
0V
486 160-S1

clka1e04

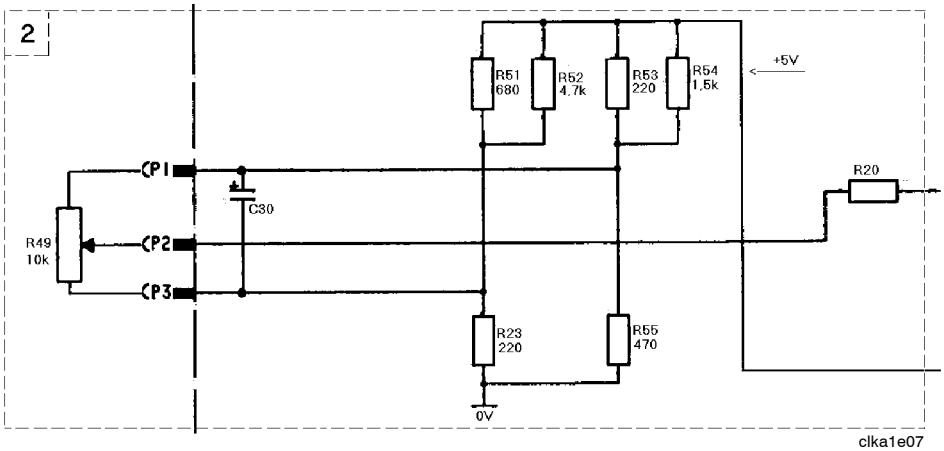
AP1:1 Power supply



Transformer TC1 supplies indicating lamp HL1 and rectifier bridge BR1 with 27 V AC. The unsmoothed DC output from BR1 is smoothed by capacitors C5 and C25 to produce an open-circuit voltage of 38 V ”10%.
This provides the power supply for the wire feeder motor.

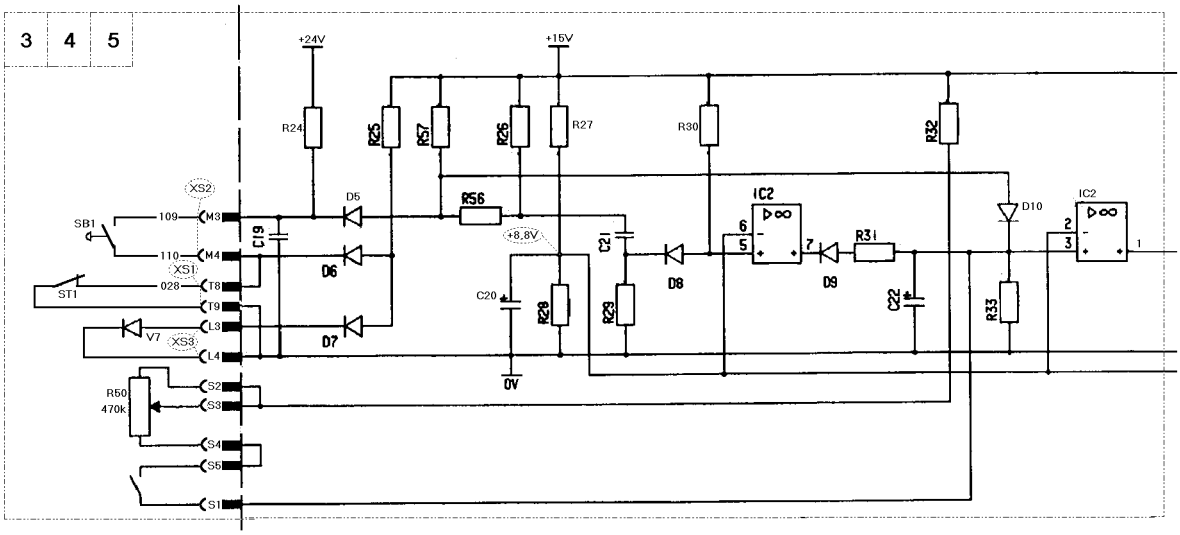
Connections T6 and T7 supply 20 V AC from transformer TC1 to diodes D18 - D21. The rectified voltage is about 24 V in the fan-cooled machines and somewhat higher in the 3-phase LKA 180. This supply powers fan EV1 in the fan-cooled machines. Voltage regulator VR1 is supplied via diode D1 to provide a regulated 15 ±0.6 V supply.

AP1:2 Reference circuit



Potentiometer R49 controls the wire feed speed and is connected to terminals P1 - P3. It is energised via resistors R51 - R55 and R23. The reference voltage is supplied through resistor R20 to the error amplifier.

AP1:3,4,5 Start / Stop, Thermal overload, Spot welding



clka1e08

Start / Stop circuit

When the torch trigger switch SB1 is not activated, the voltage between M3 and M4 is 24 V. Pressing the trigger switch shorts the circuit, producing a voltage of 0 V between M3 and M4.

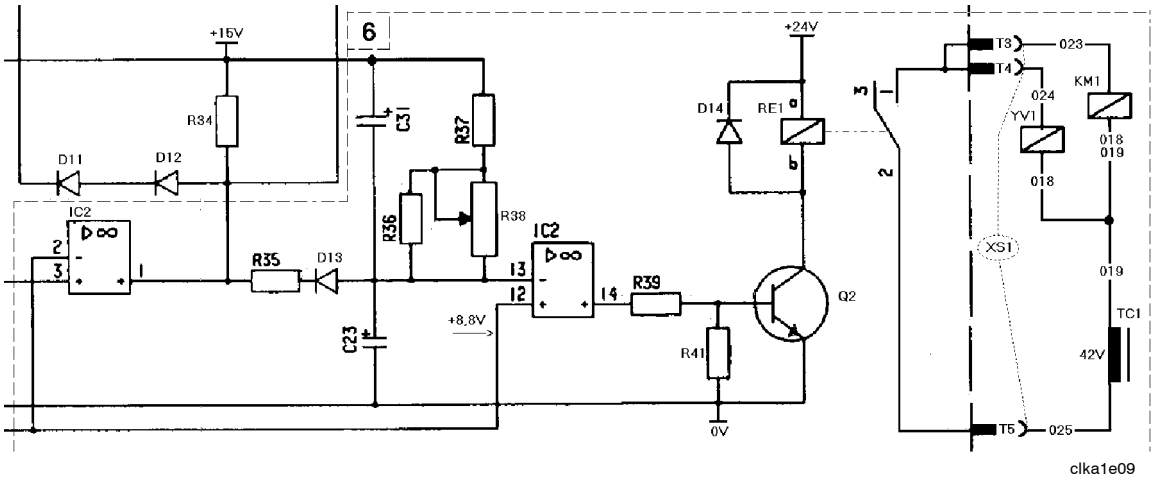
Thermal overload circuit

The machine contains thermal overload cutout, connected to inputs T8 and T9. If it operates, the torch trigger switch circuit cannot be short-circuited, with the result that wire feed cannot be started. When the thermal cutout has operated, LED V7 is energised to indicate this via diode D7.

Spot welding circuit

Potentiometer R50 controls the spot welding time and incorporates a switch. When in the zero position, the switch is open.
When the switch in R50 and torch trigger switch SB1 are closed, capacitor C22 charges up through resistors R32 and R50. Wire feed stops when the voltage on C22 reaches 8.8 V. The trigger switch must be released and then pressed again before a new spot weld can be made.
The spot welding time can be adjusted between 0.2 and 2.5 seconds ±30%.

AP1:6 Burnback time

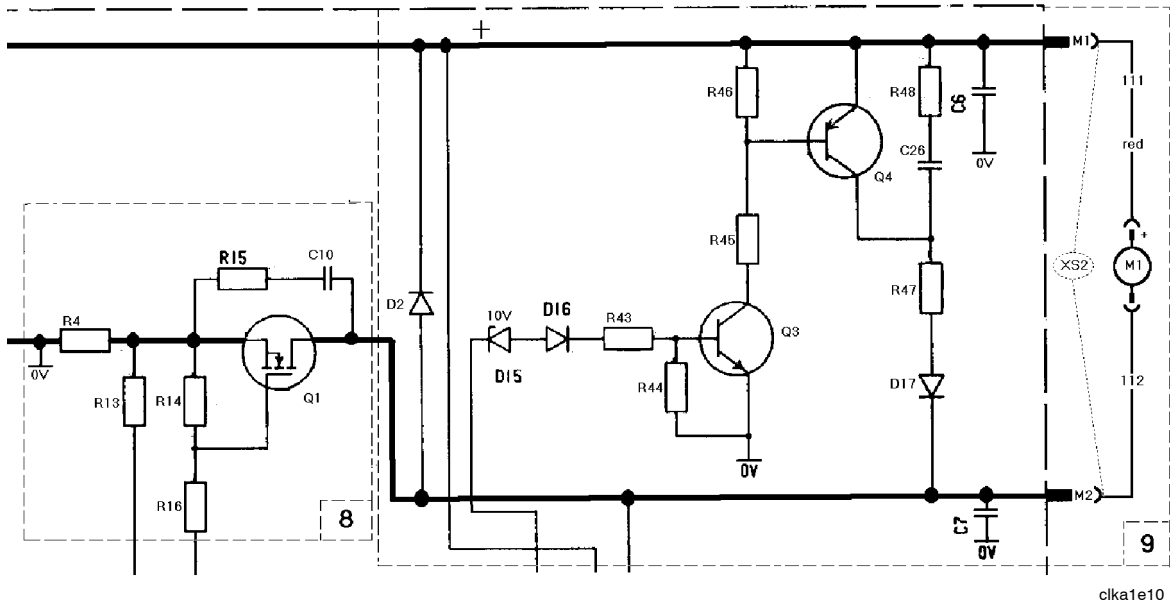


The burn-back time is the time from when wire feed ceases until contactor KM1 drops off.
During welding, the voltage at pin 13 of IC2 is low. The output of the inverter at pin 14 is therefore high, turning on transistor Q2 and activating relay RE1. When the torch trigger switch is released, or when the spot welding time expires, capacitor C23 charges up via resistors R36, R37 and R38. When the voltage across C23 reaches 8.8 V, output 14 of IC2 goes low, turning off Q2 and causing relay RE1 to drop off.

AP1:7 Control amplifier and pulse width modulator

The control amplifier compares the set value speed signal with the actual speed and supplies a control signal to the pulse width modulator. The actual value speed signal is provided by measuring the motor voltage.
The pulse width modulator controls the frequency and pulse time of current to the wire feed motor.

AP1:8,9 Motor driving / braking



clka1e10

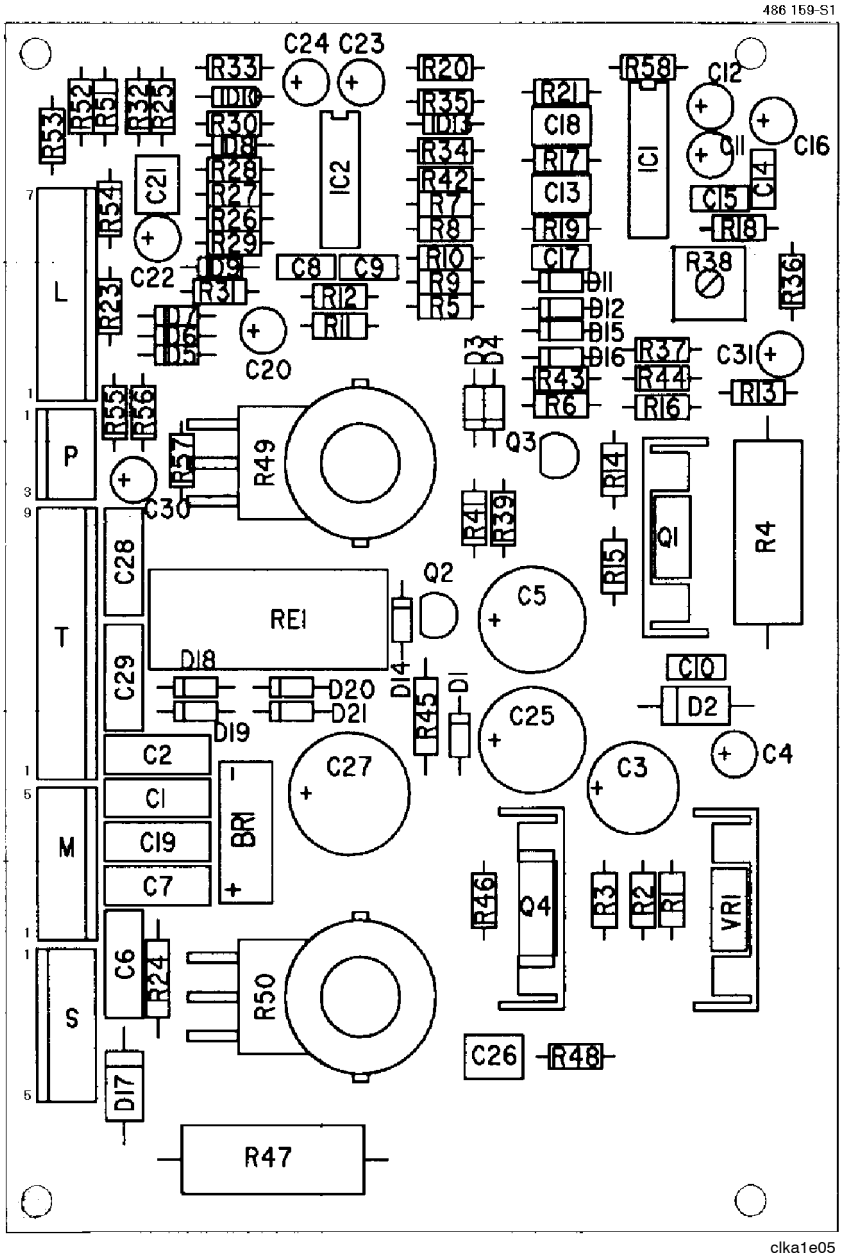
Motor driving circuit

The output stage of the pulse width modulator is connected to transistor Q1 via resistor R16.
A motor current signal is provided by measuring the voltage across resistor R4, connected to transistor Q1. If the voltage across R4 exceeds 1.1 V ±60 mV, the gate pulses to Q1 are inhibited. This provides a current limit of about 11 A.

Motor braking circuit

When wire feed is to stop, the pulse width modulator turns off the pulses to Q1. Transistors Q3 and Q4 turn on: transistor Q4 provides a path for dynamic braking current to flow through resistor R47 and diode D17.

AP1 - Mag C171 / C201 component positions



WIRING DIAGRAM, Mag C251

Component description

WARNING !

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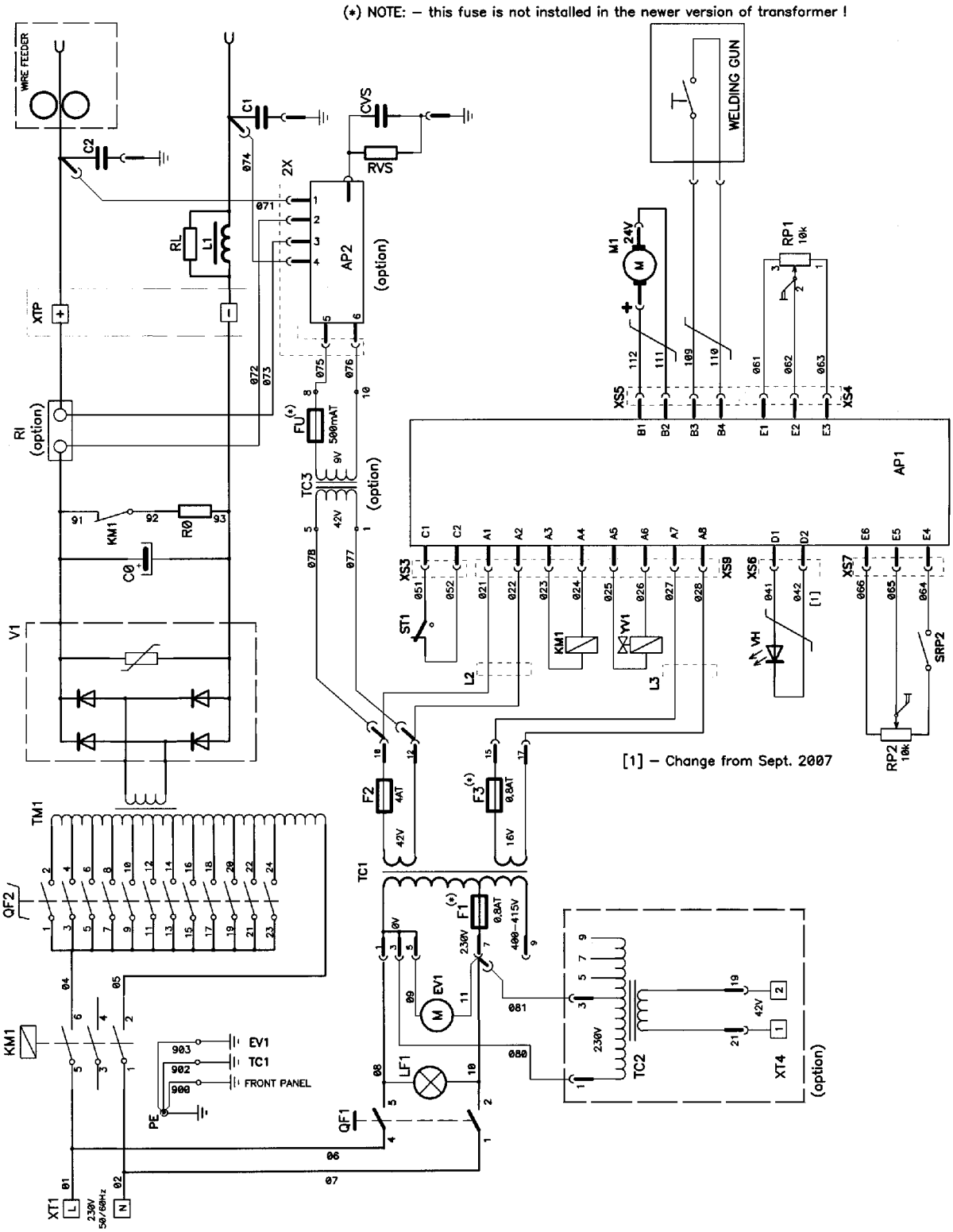
- **Observe precautions for handling electrostatic sensitive devices.**
- **Use proper static-proof bags and boxes.**

AP1	Circuit board
AP2	Digital instrument, accessory
C1, C2, CVS	Capacitor 0,1uF/250V
EV1	Fan
KM1	Contactor 42V, 50-60Hz
L1	Inductor
L2, L3	Ferrite core
LF1	Lamp, white, On/Off
M1	Feed unit motor
QF1	Switch, ON/OFF
QF2	Switch, 12-step welding voltage selector
RO	Resistor 15Ω/20W
RVS	Resistor
RP1	Potentiometer, wire feed speed
RP2	Potentiometer with switch, spot welding
RI	Shunt, accessory
RL	Resistor
ST1	Thermal switch, operates at 130°C. Thermal switch is mounted on the transformer.
TC1	Control transformer
TC2	Transformer for CO_2 heater, accessory
TC3	Transformer for digital instrument, accessory
TM1	Main transformer
V1	Diode bridge
VH	LED yellow indication, thermal overload

XTP	Main welding current contact, single – pole
XT1, XT4	Terminal block
YV1	Gas valve

Mag C251

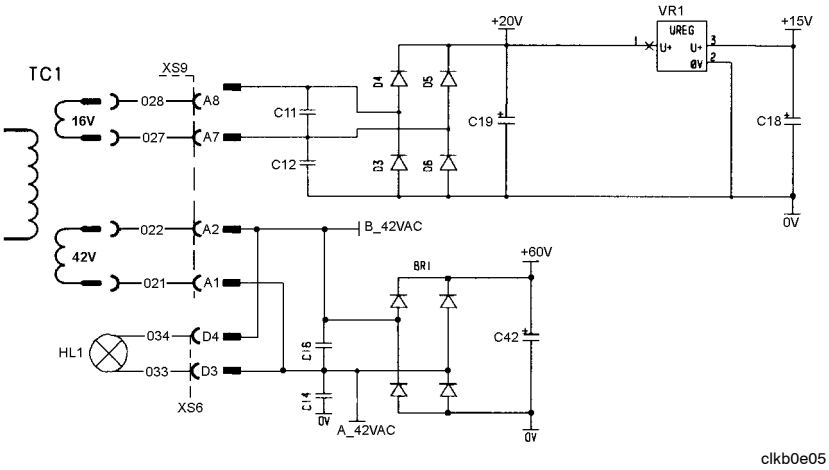

(*) NOTE: – this fuse is not installed in the newer version of transformer !
WIRE FEEDER
WELDING GUN
C1
C2
CVS
RVS
2X
AP2
(option)
RL
L1
XTP
RI
(option)
M1
24V
RP1
10k
XS5
XS4
AP1
FU
500mAT
TC3
(option)
KM1
R0
C0
V1
XS3
XS9
XS6
XS7
ST1
YV1
VH
SRP2
RP2
10k
L2
L3
[1] – Change from Sept. 2007
F2
4AT
F3
0,8AT
TM1
TC1
F1
0,8AT
QF2
EV1
LF1
QF1
TC2
XT4
(option)
EV1
TC1
FRONT PANEL
PE
XT1
230V
50/60Hz

DESCRIPTION OF OPERATION

AP1 Control board

AP1:1 Power supply

The circuit board uses two different supply voltages: 16 V for the electronics and 42 V for power supply to the motor, contactor and gas valve.



clkb0e05

Power supply to the electronic circuitry

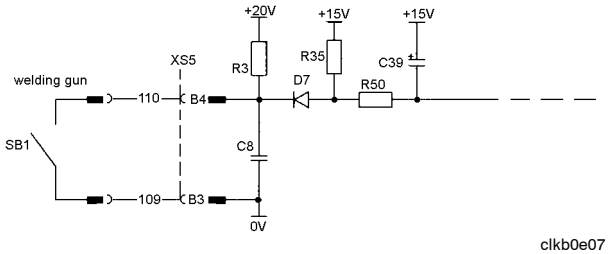
The 16 V power supply from transformer TC1 is rectified by diodes D3–D6 and regulated to 15 V by voltage regulator VR1.

42 V power supply

A_42VAC and B_42VAC are used as control power supplies for the contactor and gas valve. Indicating lamp HL1 is mounted on the front of the machine and shows that the power is turned on.

The supply is rectified by diode bridge BR1. The output voltage (60 V) supplies the wire feed unit motor.

AP1:2 Start / Stop



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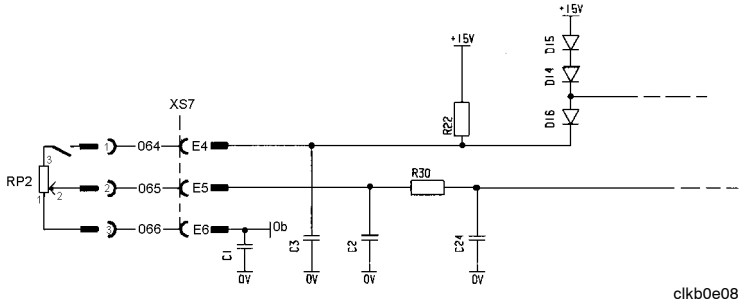
Closing contact SB1 on the welding torch starts the welding process.

Start- stop sequence.

AP1:3 Spot welding

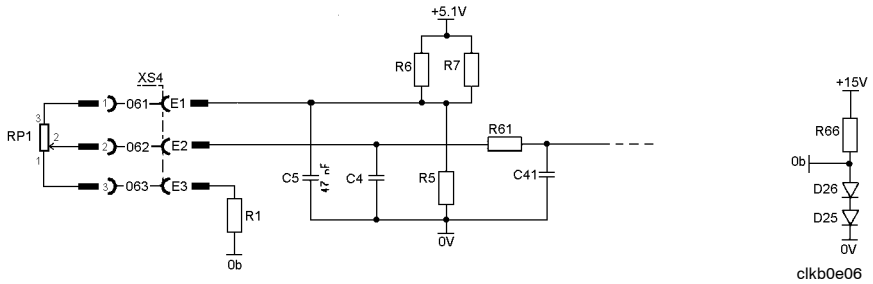


Spot welding is active when the switch in potentiometer RP2 is closed. Spot welding time is adjustable between 0.2 and 2.5 seconds.

If the welding torch trigger switch is released while a spot weld is being made, the welding sequence will be interrupted.. If the switch is held closed for longer than the spot weld time, welding stops when the spot weld time is up. To restart, the switch must be released and then operated again.

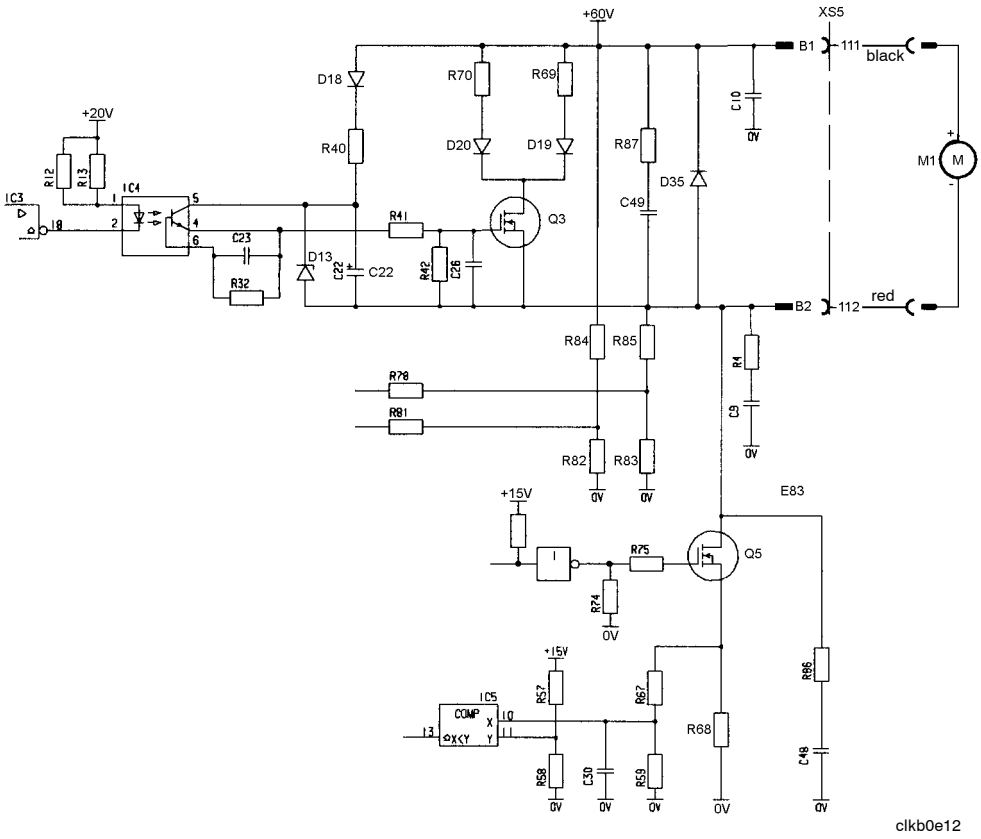
AP1:4 Wire feed speed

The wire feed speed adjustment range is 1.9 to 19 metre/minute.



The +5.1 V reference voltage (±1 %) is derived from the PWM circuit, which generates gate pulses for the motor drive transistor.

AP1:5 Motor driving / braking



The motor is powered by the smoothed +60 V supply. Pulse width modulation of transistor Q5 controls the motor voltage. The pulse frequency is about 9 kHz, and maximum conduction time of the pulses is about 98 % of the pulse cycle time.
During the Off parts of the pulse cycle, the motor current freewheels through diode D35.

At 24 V motor supply voltage, the wire feed roller speed is 160 r/min ±5 %. At a roller speed of 200 r/min, the wire feed speed is 19 m/min ± 5 %.

Speed control

The gate pulses to transistor Q5 are generated by a PWM circuit. Resistors R84 and R85 form a potential divider, providing a voltage signal that is proportional to the wire speed. The PWM circuit compares the set speed with the actual speed.

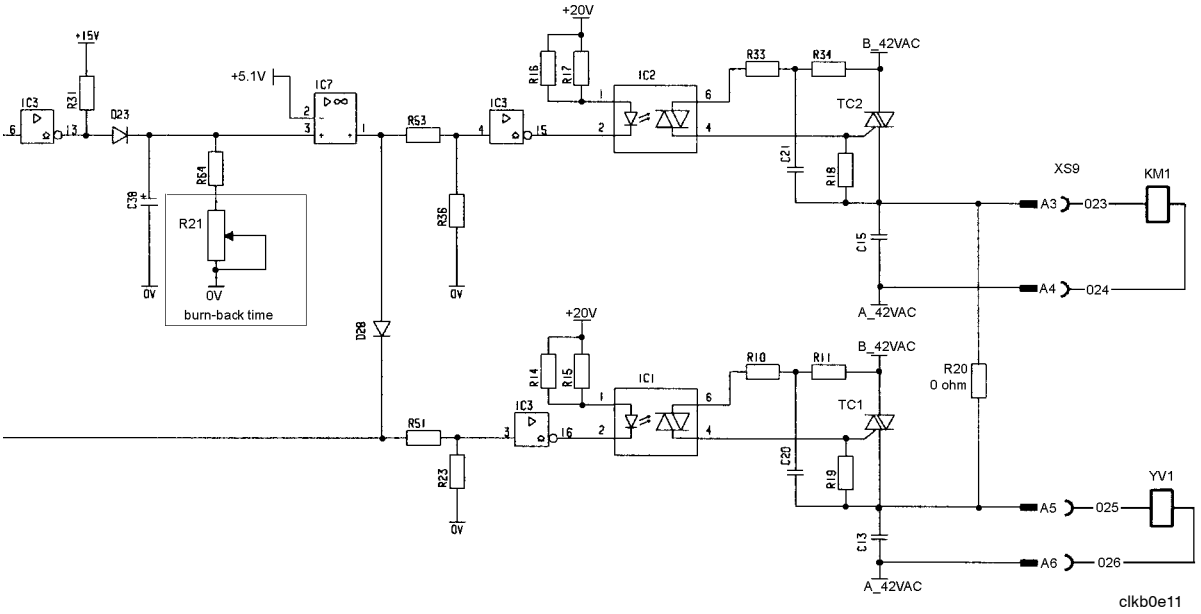
Current limit

The current limit is set at 5.5 A. The motor current is measured by resistor R68, which produces a voltage drop proportional to the current (1 A = 100 mV). The current limit restricts the conduction time of the gate pulses to transistor Q5.

Braking

When the motor starts, capacitor C22 charges via diode D18. The voltage is limited to 15 V by zener diode D13. The LED in optocoupler IC4 is activated when braking is required, connecting C22 (15 V) to the gate of transistor Q3. The transistor conducts and short-circuits the motor voltage via resistors R69 and R70, which limit the braking current to about 20 A.

AP1:6 Burnback time, contactor, gas valve



Burnback time

The burn-back time is the time from when motor braking starts until the main contactor opens. When welding stops, capacitor C38 is discharged through potentiometer R21. The time can be adjusted from 0 to 0.25 seconds.

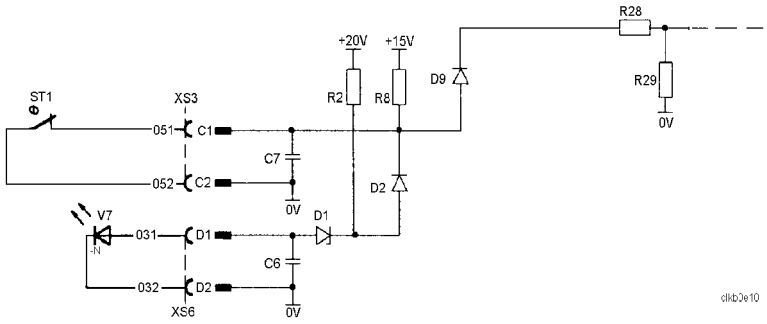
Energising the contactor

The contactor is controlled by triac TC2.

Gas valve

The gas valve is connected to board contacts A5 and A6, it receives its power supply from triac TC2 via resistor R20 (0Ω).

AP1:7 Thermal overload cutout

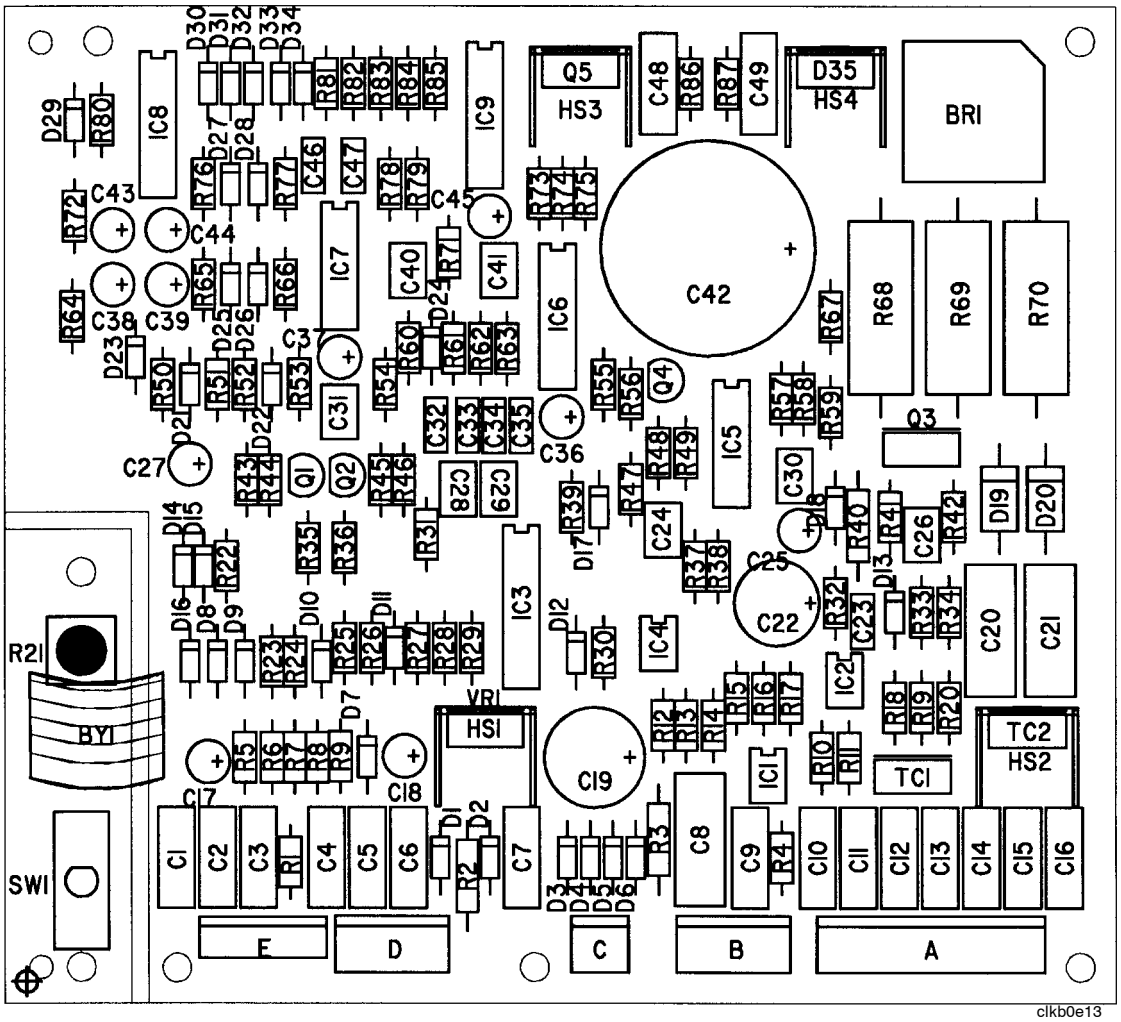


The thermal overload cutout ST1 is mounted on the cooling fins of the diode bridge, and operates at a temperature of 130 °C.

A current normally flows through the cutouts from the +20 V supply via R2 and D2, and from the +15 V supply via R8. The voltage at contact C1 is kept low by the switch. If a cutout operates, C1 goes high and the output signals from the board are disabled.

Operation of the cutout causes a current to flow from +20 V to 0 V via R2, D1 and LED V7, which indicates operation of the cutout.

AP1 - Mag C251 component positions



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WARNING !

STATIC ELECTRICITY can damage circuit boards and electronic components.

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

What is ESD?

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

How does ESD damage occur?

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

How do we prevent ESD damage?

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

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

Thermal switch (thermostat) replacement procedure

1. Spare thermostat must be the same type as replaced one.
2. Spare thermostat should be mounted within radius of 10mm or less from broken thermostat. If it's possible and safe for transformer/inductor winding, broken thermostat may be removed. Then the spare thermostat is to be mounted right in place of broken one.
3. Spare thermostat should adjoin protected winding as tight as possible.
4. Spare thermostat must be secured with silicone glue of working temperature of 200^{o}C or higher.

INSTRUCTIONS

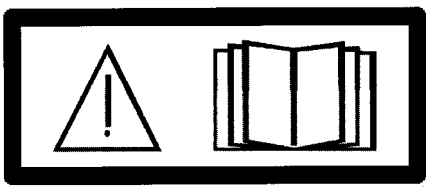
This chapter is an extract from the instructions for Mig C141/151, Mag C171/C201/C251.

SAFETY

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

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

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



WARNING!

Read and understand the instruction manual before installing or operating.

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 take fumes and gases away 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 earmuffs 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!

WARNING!

Do not use the power source for thawing frozen pipes.

This product is solely intended for arc welding.

Do not dispose of electrical equipment together with normal waste!

In observance of European Directive 2002/96/EC on Waste Electrical and Electronic Equipment and its implementation in accordance with national law, electrical equipment that has reached the end of its life must be collected separately and returned to an environmentally compatible recycling facility. As the owner of the equipment, you should get information on approved collection systems from our local representative.

By applying this European Directive you will improve the environment and human health!

INSTALLATION

The installation must be executed by a professional.

Note!
Connect the power source to the electricity mains with a network impedance of (C141 – 0,41; C151 – N/A; C171 – N/A; C201 – 0,32; C251 – 0,212) ohm or lower. If the network impedance is higher, there is a risk of flicker in the illuminators.

WARNING!
This product is intended for industrial use. In a domestic environment this product may cause radio interference. It is the user's responsibility to take adequate precautions.

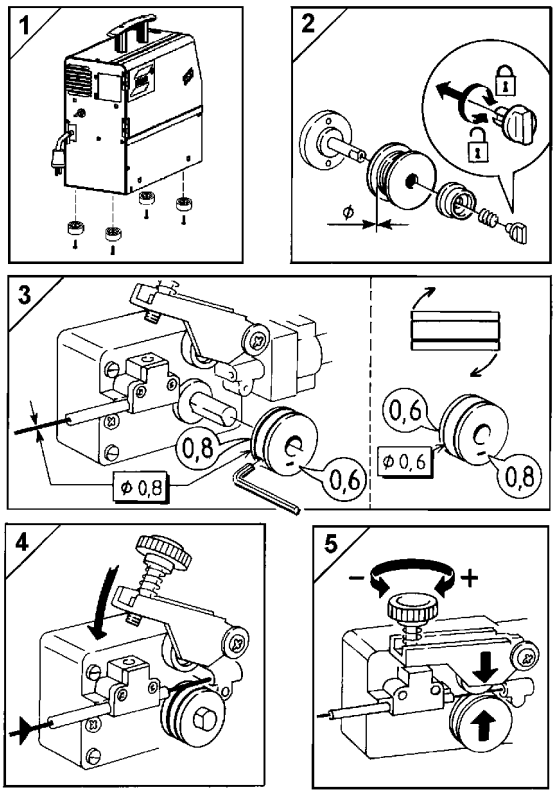
Placing

Position the welding power source such way that its cooling air inlets and outlets are not obstructed.

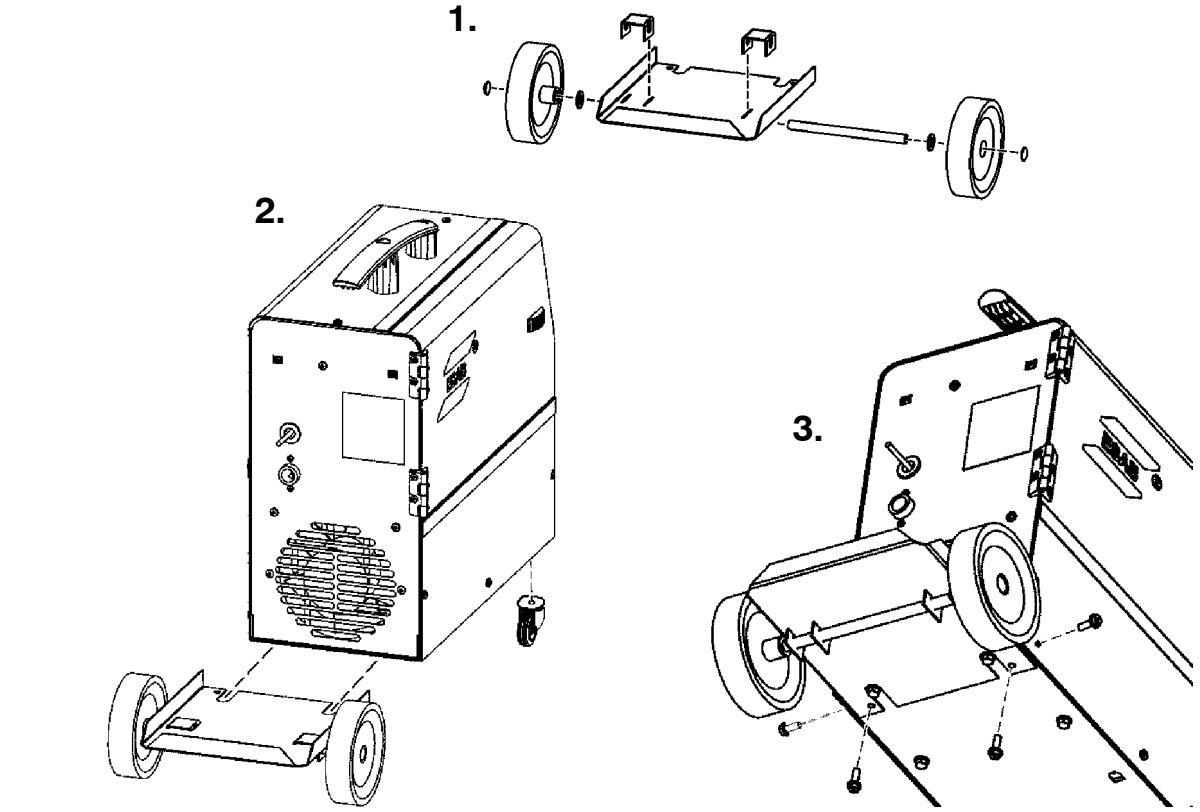
Assembly of components

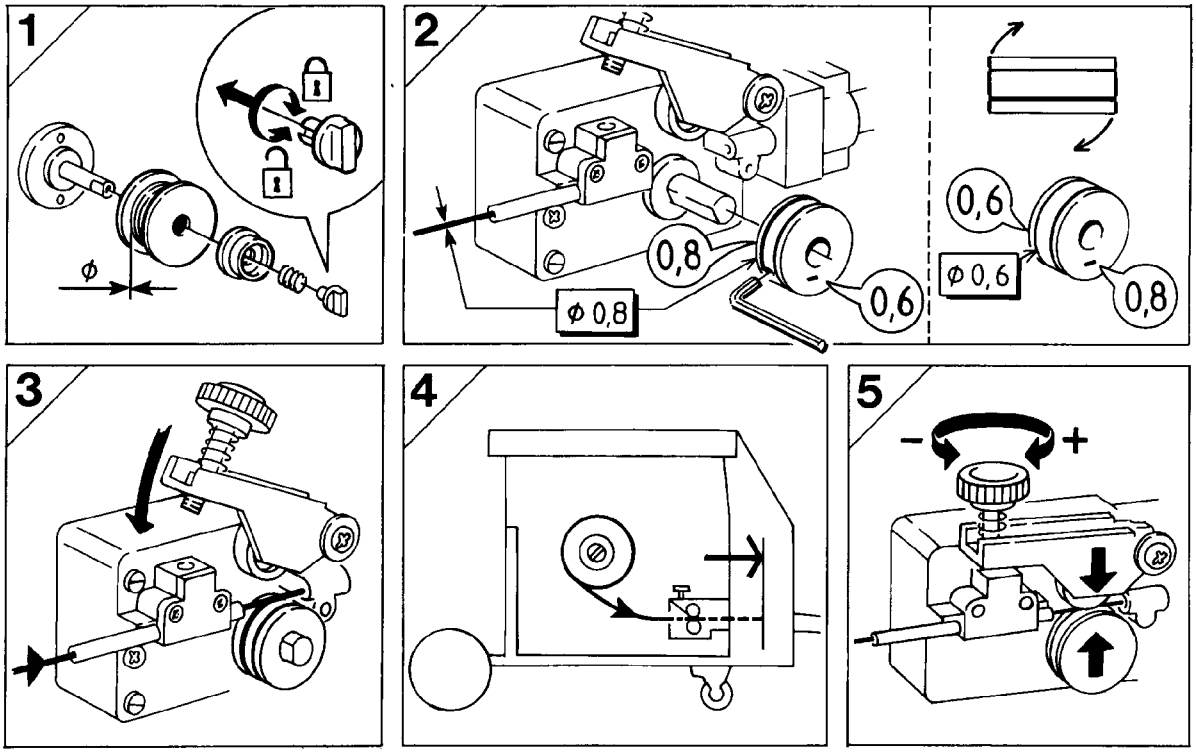
WARNING!
For packing and shipment of the machine the wheels are detached from the unit.
Before use attach the wheels according to instruction.

Origo™ Mig C141

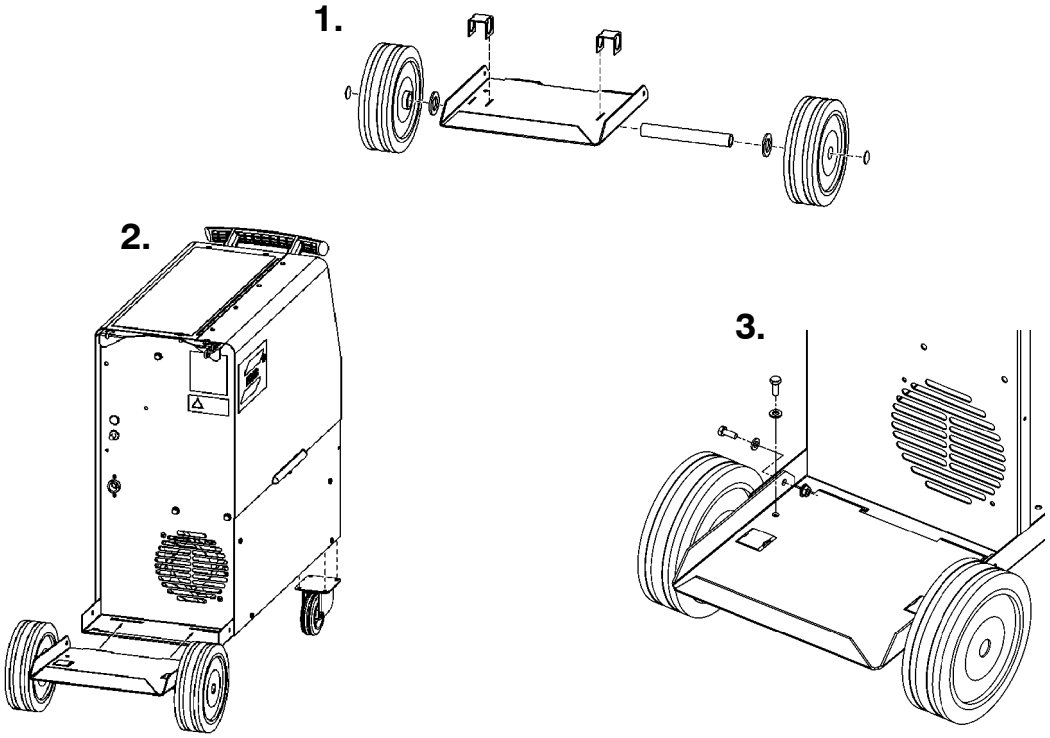


Origo™ Mig C151

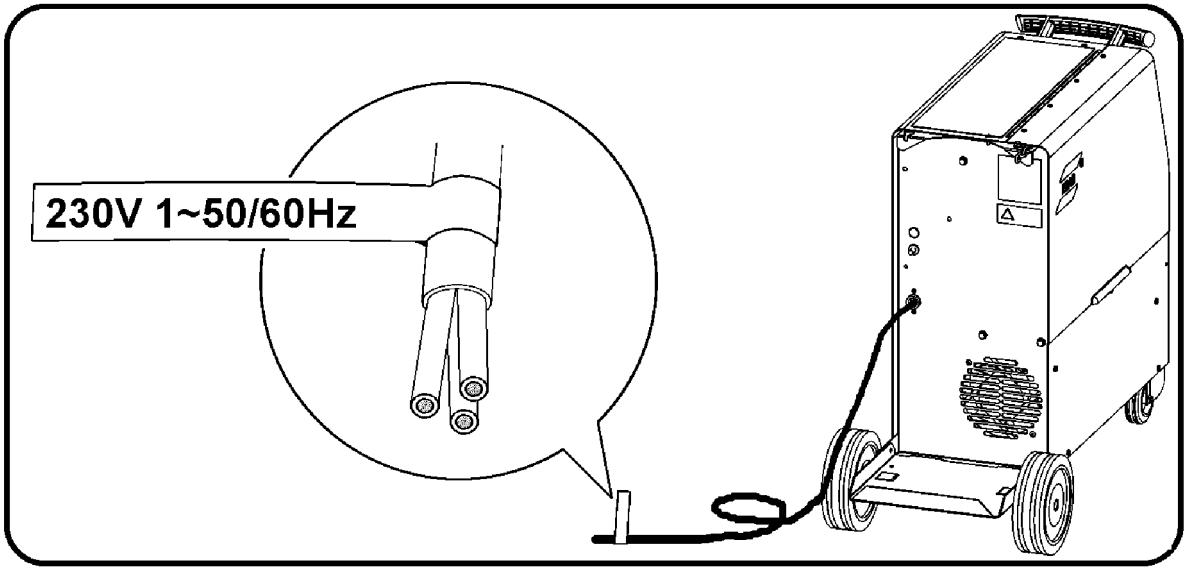




Origo™ Mag C171/C201/C251



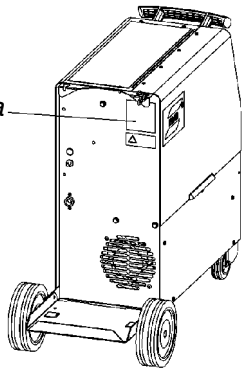
Electrical installation



Mains power supply

Check that the unit is connected to the correct mains power supply voltage, and that it is protected by the correct fuse size. A protective earth connection must be made, in accordance with regulations.

Rating plate with supply connection data



	Origo™ Mig C141	**Origo™ Mig C151**	**Origo™ Mag C171**	**Origo™ Mag C201**	**Origo™ Mag C251**
Voltage V	220-230V, 1~ 50/60Hz	220-230V, 1~ 50/60Hz	220-230V, 1~ 50/60Hz	220-230V, 1~ 50/60Hz	220-230V, 1~ 50/60Hz
Current A					
at 100% duty cycle	5,1	8,3	12,0	13,0	16,6
at 60% duty cycle	7,0	12,0	15,7	18,2	23,4
at @% duty cycle	11,5A @25%	13,0 @50%	27,8 @ 25%	36,2 @ 23%	38,7 @ 30%
at 20% duty cycle	13,8	20,4	29,7	39,0	47,5
Cable area mm^2	3 x 1.5	3 x 1.5	3 x 1.5	3 x 2.5	3 x 4,0
Fuse slow **A**	10	10 (16*)	16	20	35

NB: *The mains cable areas and fuse sizes as shown above are in accordance with Swedish regulations. They may not be applicable in other countries: make sure that the cable area and fuse sizes comply with the relevant national regulations.*
**- in the supply networks of high level of short circuit power (low impedance of network) it is recommended to use 16A fuse.*

OPERATION

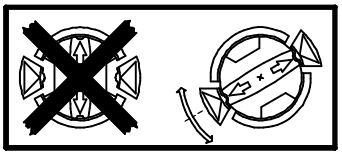
General safety regulations for the handling of the equipment appear from page 33. Read through before you start using the equipment!

WARNING!

Rotating parts can cause injury, take great care.

WARNING!

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



WARNING - TIPPING RISK!

There is a risk of tipping while transportation and operation, if the welding machine leans more than 10°. In that case appropriate securing has to be provided !

Connection and control devices

1 Mains supply switch with indicating lamp, only in C171/C201/C251

2 Orange indicating lamp, overheating

3 Welding voltage switch
C141: OFF + 4 steps (mains ON/OFF)
C151: OFF + 7 steps (mains ON/OFF)
C171: 8 steps
C201: 12 steps
C251: 12 steps

4 EURO - connector for welding gun, only in C171/C201/C251

4a Welding gun, fixed, only in C141/C151

5 Connection for return cable (-),only in C251

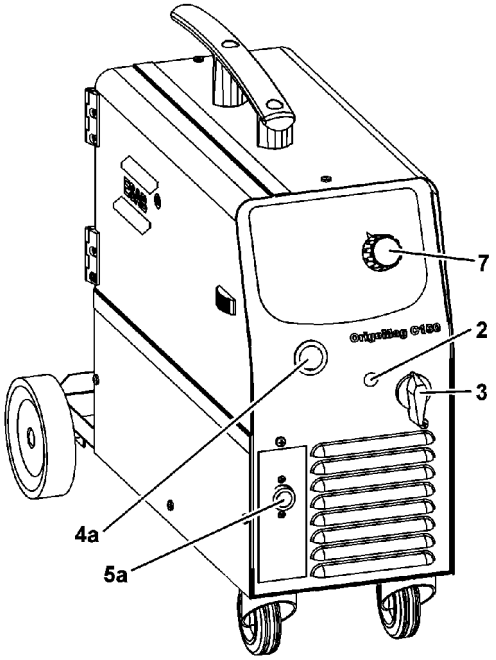
5a Return cable with clamp, fixed, only in C140/C150/C170/C200

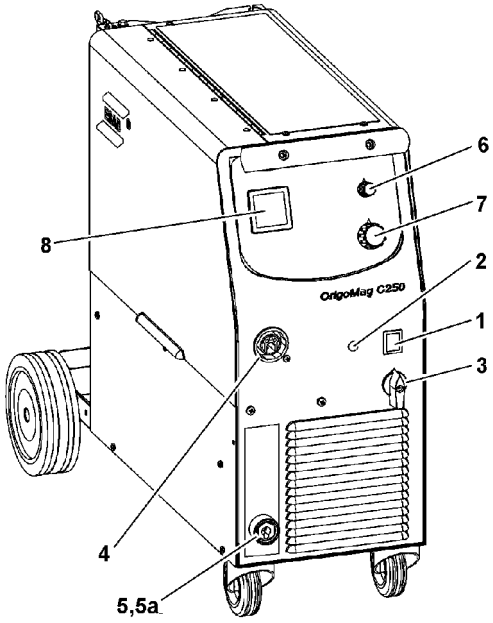
6 Knob for spot welding - ON/OFF and time setting, only in C171/C201/C251

7 Knob for wire speed setting

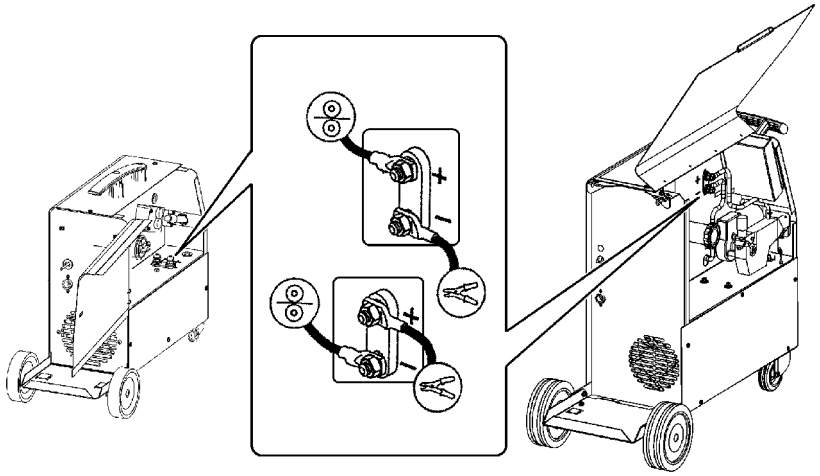
8 Digital instrument - V / A, only in C171/C201/C251 (option,see user manual)

9 Knob for burn-back time setting.
In C251 located in wire feeder compartment.
In C171/C201 located on control board.





Welding without gas



Wire feed pressure

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

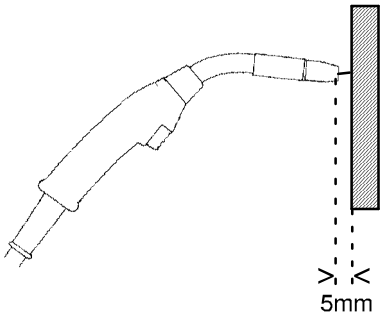


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Fig 1

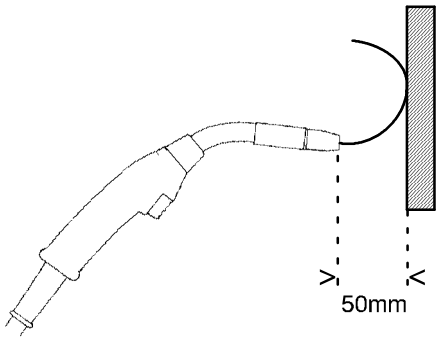


Fig 2

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

When you hold the gun approx. 5 mm from the piece of wood (fig. 1) the feed rollers should slip.

If you hold the gun approx. 50 mm from the piece of wood, the wire should be fed out and bend (fig. 2).

Replacing and inserting wire

- Open the side panel.
- Disconnect the pressure sensor by folding it backwards, the pressure rollers slide up.
- Straighten out the new wire 10–20 cm. File away burrs and sharp edges from the end of the wire before inserting it into the wire feed unit.

- Make sure that the wire goes properly into the feed roller track and into the outlet nozzle and the wire guide.
- Secure the pressure sensor.
- Close the side panel.

Overheating protection

When the machine is switched on with the mains switch [1] or [3] depending on machine model, indicating lamp [1] is on and lamp [2] off – the machine is ready to operate. If the internal temperature becomes too high, the welding is interrupted and disabled. This state is indicated by lighting of the orange indicating lamp [2] on the front of the machine. It resets automatically when the temperature has fallen.

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.

Inspection and cleaning

Check regularly that the power source is free from dirt.

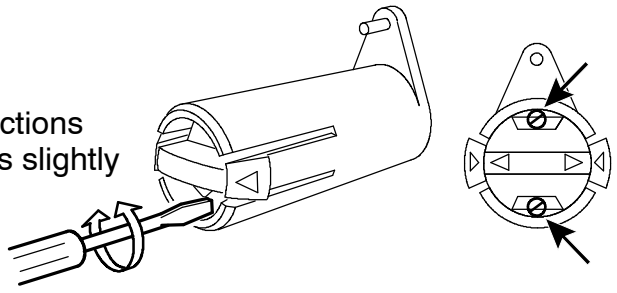
The power source should be regularly blown clean using dry compressed air at reduced pressure. More frequently in dirty environments. Otherwise the air inlet/outlet may become blocked and cause overheating.

Welding gun

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

The brake hub

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



- **Adjusting the braking torque:**
  - Turn the red handle to the locked position.
  - Insert a screwdriver into the springs in the hub.

  Turn the springs clockwise to reduce the braking torque

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

FAULT TRACING

Try these recommended checks and inspections before sending for an authorised service technican.

Type of fault	Actions
No arc	• Check that the mains power supply switch is turned on. • Check that the welding current supply and return cables are correctly connected. • Check that correct current value is set.
Welding current is interrupted during welding	• Check whether the thermal overload trip has operated (indicated by the orange lamp on the front). • Check the main power supply fuses.
Thermal overload trips operate frequently	• Check to see whether the air inlets/outlets are clogged. • Make sure that you are not exceeding the rated data for the power source (i.e. that the unit is not being overloaded).
Poor welding performance	• Check that the welding current supply and return cables are correctly connected. • Check that the correct current value is set. • Check that the correct welding wires are being used. • Check the main power supply fuses. • Check the wire feed unit – if proper rolls are applied and properly set the pressure of the wire feeder's pressure rollers

ORDERING OF SPARE PARTS

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

NOTES

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