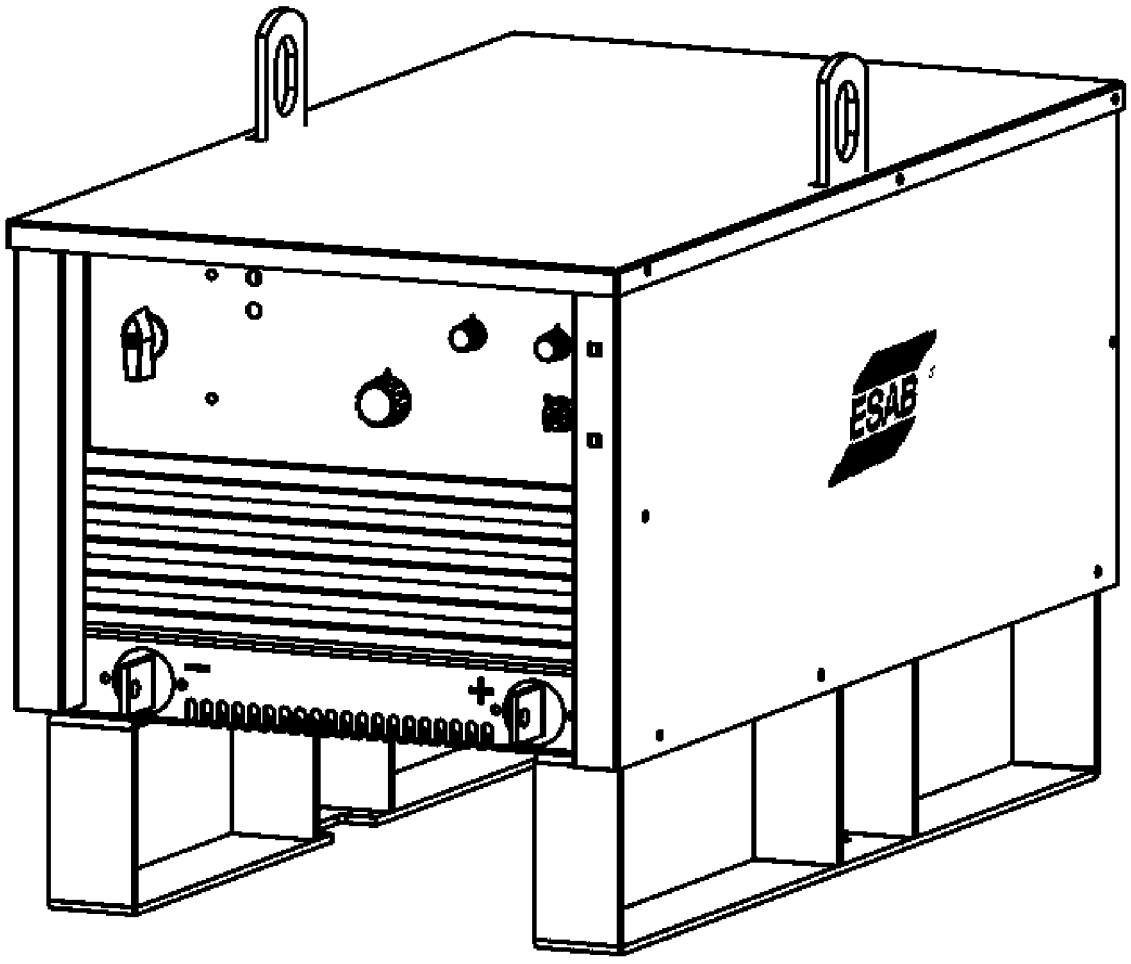
LHF 405 PIPEWELD
LHF 615 PIPEWELD



Service manual

0349 300 070 071024

Valid for serial no. 422, 423-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 October 2007.

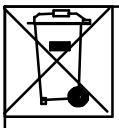
The LHF 405 PIPEWELD and LHF 405 PIPEWELD are designed and tested in accordance with international and European standards IEC/EN 60974-1 and IEC/EN 60974-10.
On completion of service or repair work, it is the responsibility of the person(s) etc. performing the work to ensure that the product does not depart from the requirements of the above standard.

INTRODUCTION

LHF 405/615 PIPEWELD are thyristor controlled welding rectifiers designed for welding with coated electrodes, TIG welding and arc air gouging.

The welding rectifiers can be used with the following remote control devices: N02, MMA1, MMA2, AT1, AT1 CoarseFine.

LHF 405/615 PIPEWELD are versions with meters, that allow current and voltage settings to be read from the front of the rectifier.



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!

TECHNICAL DATA

	LHF 405 PIPEWELD	LHF 615 PIPEWELD
Maximum load		
35 % duty cycle	400 A/36 V	610 A/44 V
60 % duty cycle	310 A/33 V	450 A/38 V
100 % duty cycle	240 A/30 V	345 A/34 V
Setting range	10A/20V–400A/36V	10A/20V–630A/44(49)V
Open circuit volt.	75 V	81 V
Open circuit output		
at 400 V	330 W	500 W
Power factor		
(max current)	0,80	0,89
Efficiency		
(max current)	70 %	74 %
Enclosure class	IP 23	IP 23
Application class	S	S
Weight	215 kg	303 kg
Dimens. lxwxh	1310/765/705	1310/765/705

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, LHF 405 PIPEWELD

Component description

WARNING !

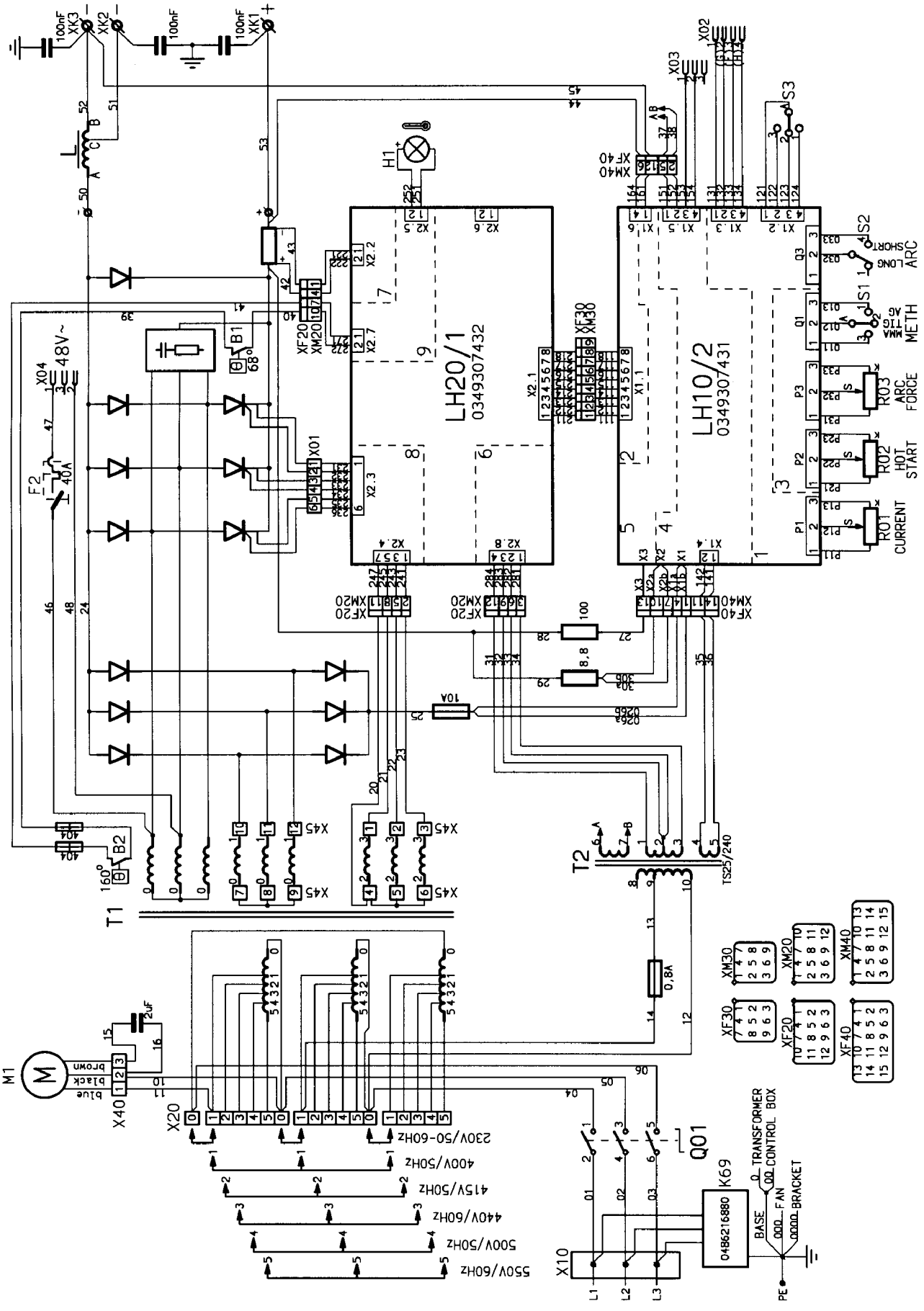
STATIC ELECTRICITY can damage circuit boards and electronic components.

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

B1	Thermal switch: breaks at 68°C, resets at 59°C; fitted on the thyristor heatsink
B2	Thermal switch: breaks at 160°C
C1	Capacitor 2μF, for cooling fan
C2,C3	Capacitor 0,1μF
H1	Indicating lamp, white
H2	LED, yellow; on when thermal overload is activated, i.e. when one or both of thermal switcjes B1 and B2 are open
L	Inductor
LH20/1	Circuit board
M1	Fan
Q01	Mains switch
R01	Potentiometer 2kΩ, for controling the welding current
R03	Potentiometer 10kΩ, for ARC FORCE
R1	Base current resistor, 100Ω
RB	Shunt, 120mV@400A
S1	Selector switch, MMA/Air-Arc Gouging
T1	Main transformer
T2	Control transformer, supplied at 35V from X45, secondary 19V supplies circuit board LH20/1
V1,V3,V5	Main diodes
V2,V4,V6	Main thyristors

V7	Freewheel diode
V8,V9,V10, V11,V12,V13	Base current diodes
X01	Contact, 6 pole, male
X02	Remote control socket
X10	Mains terminal block
X20	Terminal block
X40	Terminal block
X45	Terminal block
XF20	Contact, 15 pole, female
XF30	Contact, 9 pole, female
XF40	Contact, 12 pole, female
XK1,XK2	Welding current terminals
XM20	Contact, 15 pole, male
XM30	Contact, 9 pole, male
XM40	Contact, 12 pole, male

LHF 405 PIPEWELD



WIRING DIAGRAM, LHF 615 PIPEWELD

Component description

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L	Inductor
LH20/1	Circuit board
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R01	Potentiometer 2kΩ, for controling the welding current
R03	Potentiometer 10kΩ, for ARC FORCE
R1	Base current resistor, 100Ω
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T1	Main transformer
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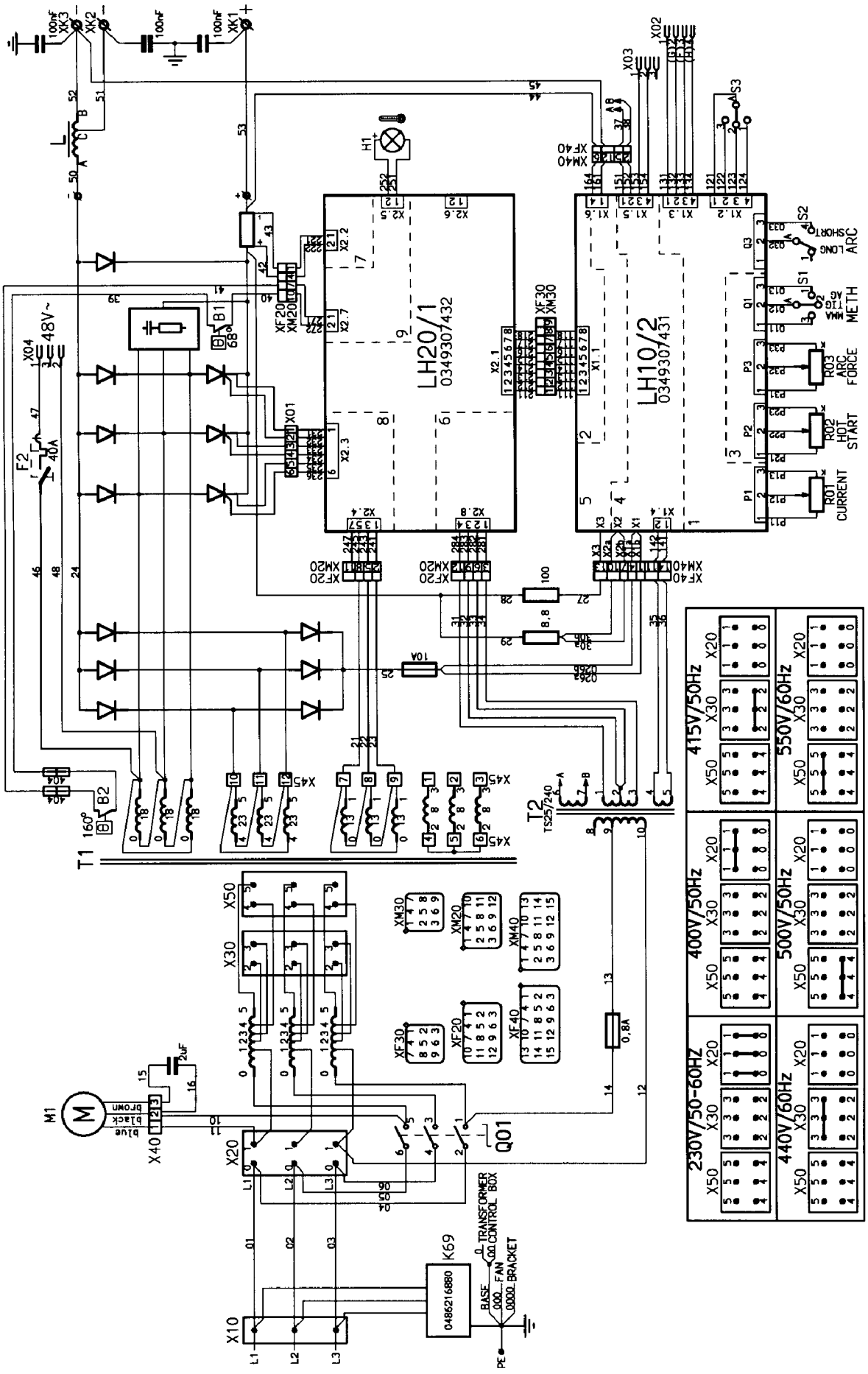
V2,V4,V6	Main thyristors

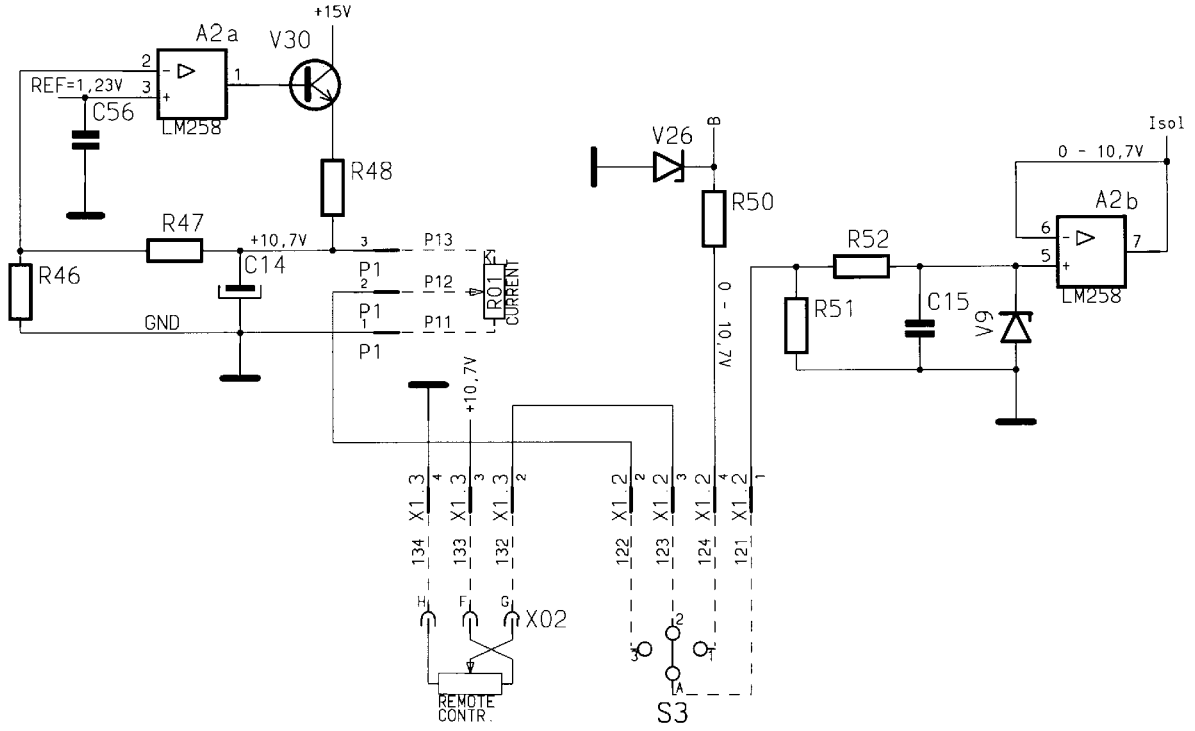
V7	Freewheel diode
V8,V9,V10, V11,V12,V13	Base current diodes
X01	Contact, 6 pole, male
X02	Remote control socket
X10	Mains terminal block
X20	Terminal block
X40	Terminal block
X45	Terminal block
XF20	Contact, 15 pole, female
XF30	Contact, 9 pole, female
XF40	Contact, 12 pole, female
XK1,XK2	Welding current terminals
XM20	Contact, 15 pole, male
XM30	Contact, 9 pole, male
XM40	Contact, 12 pole, male

LHF 615 PIPEWELD



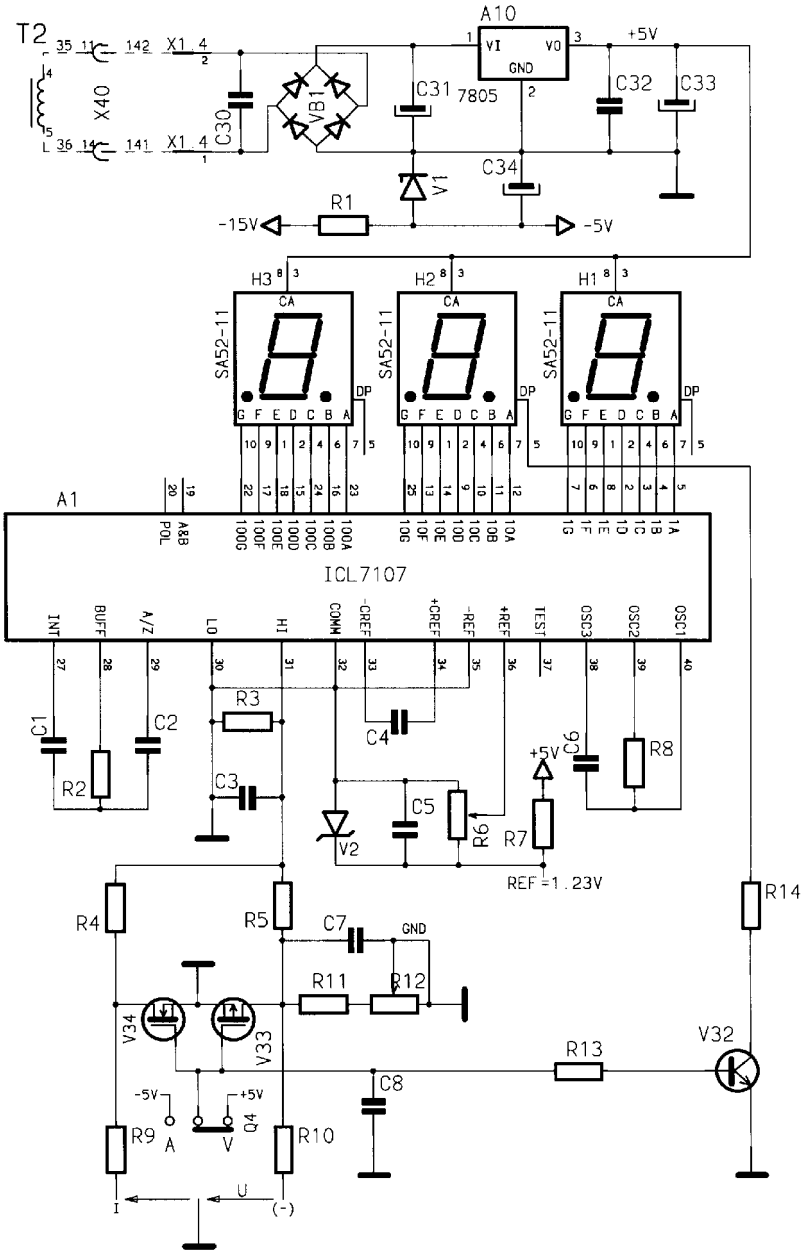
LH20/1 control board

LH20/1:1 Current setting



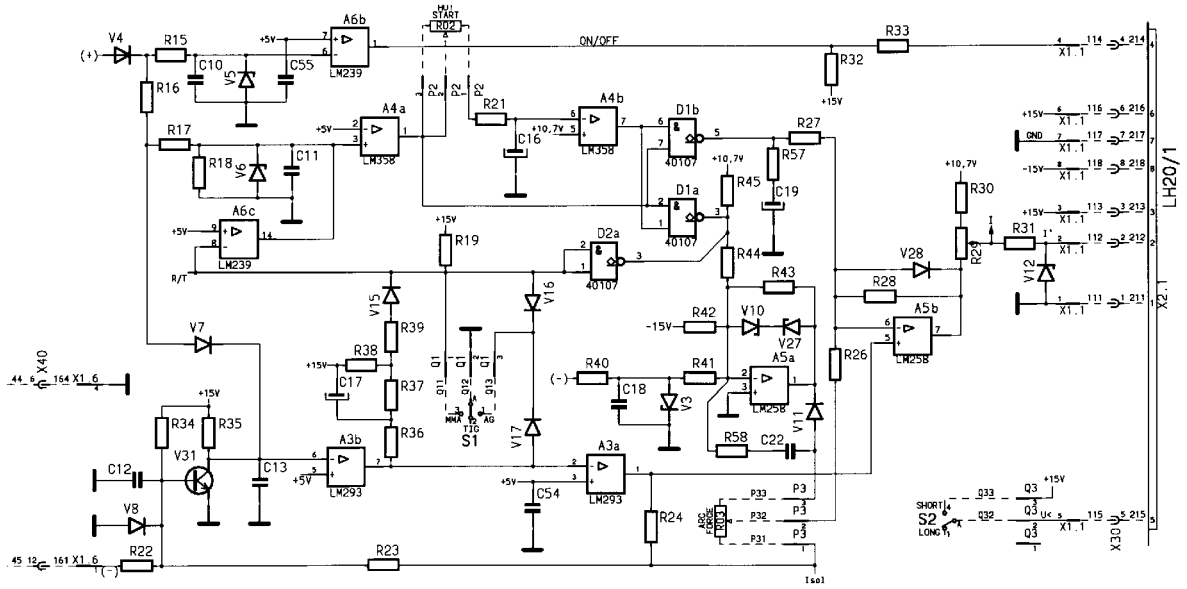
The bandgap reference 1,23V diode V2 on LH10/2 PCB makes up a primary voltage reference for current setting circuit and for digital meter. Current setting reference voltage 10,7V is derived from 1,23V by the amplifier made of A2a, V30, C14, R47, R46. The 10,7V voltage establishes reference for local current setting potentiometer R01 as well as remote control circuitry (X02 socket).

LH20/1:2 Current and voltage meter



The meter is based upon typical application of ICL7107 integrated circuit. Reference voltage 1,23V is derived from diode V2. +5V supply consists of C30, VB1, C31, A10, C32, C33, while -5V supply consists of R1, V1, C34. Measurement of voltage/current is selected with switch Q4. When Q4 is set to ”A” then gates of transistors V33 and V34 are on -5V potential, thus voltage signal is shorted to ground and current signal is transfered to HI input of ICL7107. When Q4 is set to ”V” then gates of transistors V33 and V34 are on +5V potential, thus current signal is shorted to ground and voltage signal is transfered to HI input of ICL7107. In ”V” mode transistor V32 is biased via R13 and lits up the decimal point on display. Potentiometer R6 serves for current measurement calibration while potentiometer R12 serves for voltage measurement calibration. If needed, current measurement calibration should be carried out prior to voltage measurement calibration – all refered to calibration procedure, see para. 3,4,5.

LH20/1:3 Functional control circuit ANTISTICK, HOTSTART, ARCFORCE

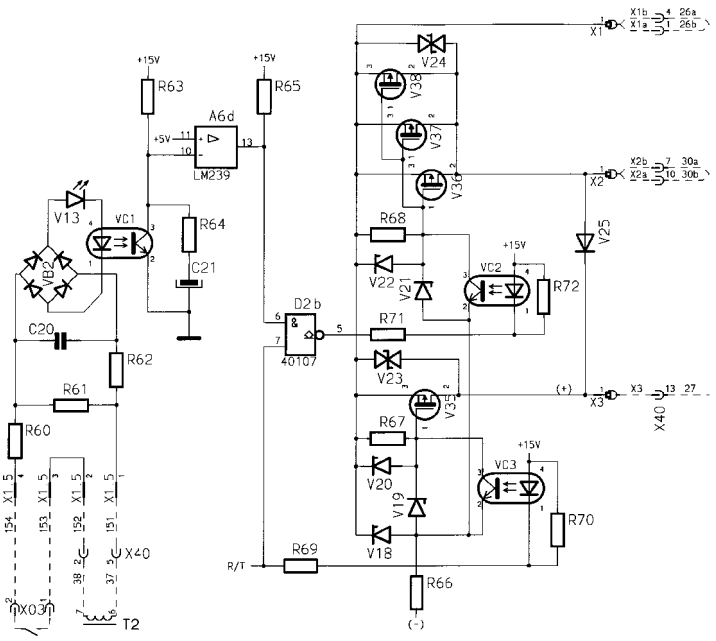


The ANTISTICK function is carried out by the circuit made of the A3 IC and the transistor V31. If the output voltage falls down below the ANTISTICK threshold, transistor V31 switches on, consequently switches off the output transistor of the A3b comparator and the output transistor of the A3a comparator switches on. It pulls down the current setting signal on the A5b non-inverting input to the minimum value, and consequently, it limits the output current of the power supply. In MMA mode operation of ANTISTICK is delayed by C17, R36, R37, R38 and R39. In TIG mode ANTISTICK operates without any delay while in AAG mode ANTISTICK is turned off.

The HOT START function is carried out by the circuit made of the A4 and D1 ICs. When the welding starts and the arc is stroke, the +15V signal shows up on the non-inverting input of the A4a. The capacitor C16 is charged via resistor R21 and the potentiometer of the HOT START time setting. Time required for charging the C16 up to +10,7V is the time of the HOT START. Untill the voltage on the C60 is lower than 10,7V, there is a high level on the A4b output, and the output transistor of the D1b connects resistor R27 to the ground. It causes the approximately 35% voltage rise on the A5a output compared to inverting input thus increasing the welding current value. In TIG mode the HOT START is disabled by A6c.

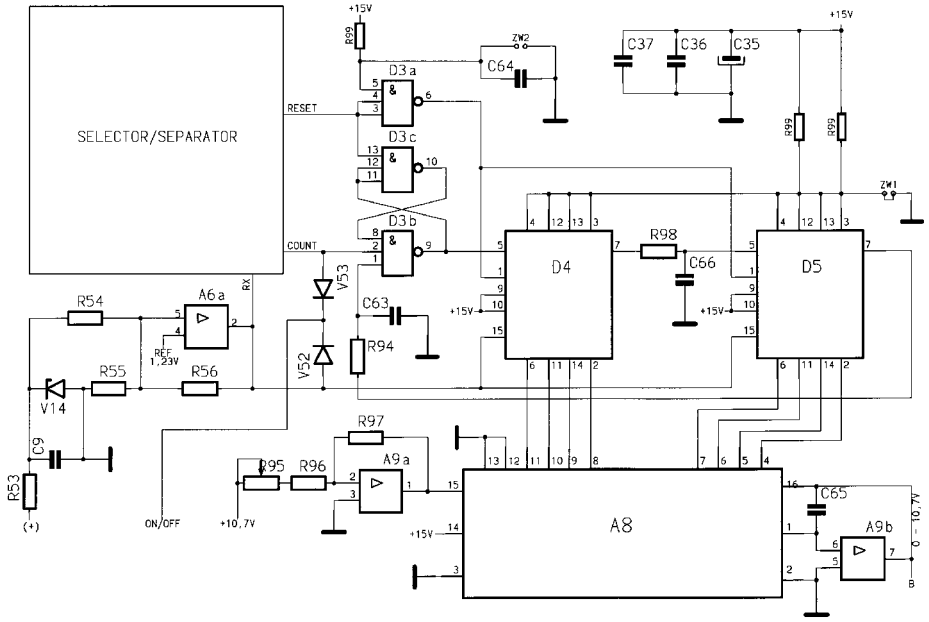
The ARC FORCE function is carried out by the circuit made of the A5a operational amplifier. As the machine output voltage crosses the ARC FORCE threshold and keeps decreasing, otput voltage of A5a also decreases. Consequently, the voltage on the slider of the R03 potentiometer decreases, voltage on the A5a output increases, thus increasing the welding current. The max current increment caused by the arc shortening, may be adjusted by means of the R03. In TIG mode the ARC FORCE is disabled by D2a.

LH20/1:4 TIG mode operation



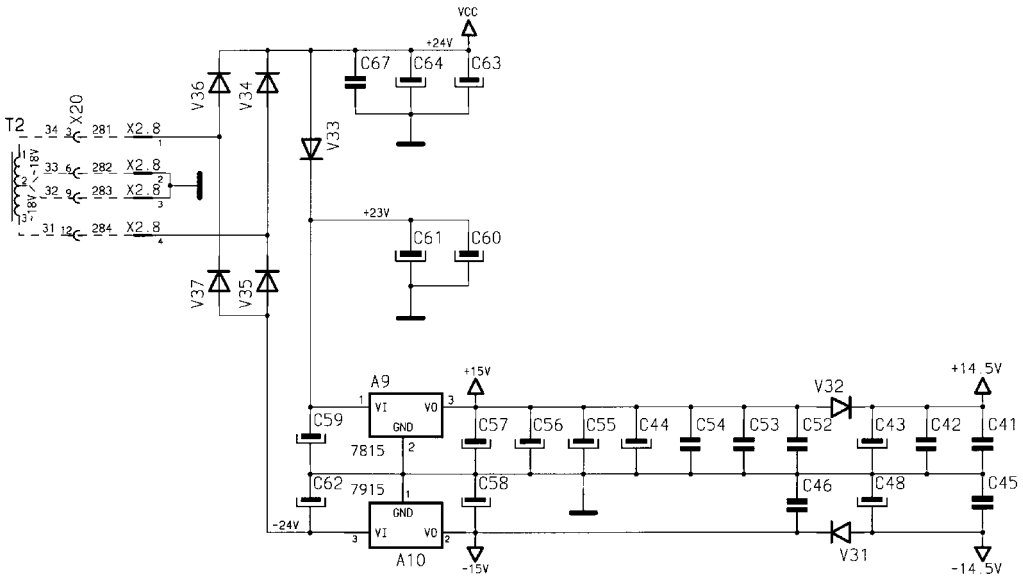
Tig mode is selected with switch S1 middle position. While TIG mode is active the ANTISTICK function is enabled, and HOT START and ARC FORCE functions are disabled.
In TIG mode transistor V35 is open. Transistors V36, V37, V38 are also open untill trigger on welding torch is pressed. After trigger is pressed rectifier bridge VB2 is supplied from transformer T2 winding via voltage divider R60, R61. Consequently transoptor VC1 is turned on (LED V13 is lit) what makes high level appear on D2b gate input, as well as transoptor VC2 is turned on through resistor R71. Transoptor VC2 turns on transistors V36, V37, V38 that control contact arc striking circuit, that consists of auxiliary bridge and resistor R1 (see the machine diagram).

LH20/1:5 Wireless remote current control receiver



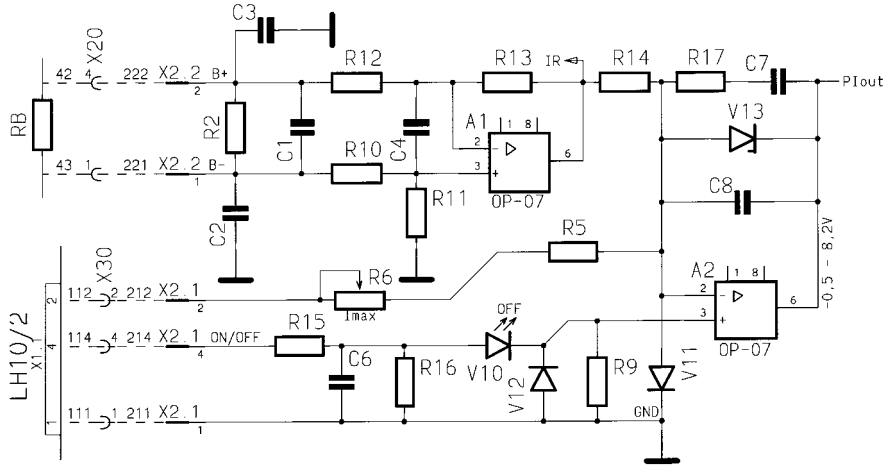
D4 and D5 ICs form 8 bit memory counter for transmitted value of welding current. A8 and A9 ICs form D/A converter that converts binary current value to analog within range of 0–10,7V. Comparator A6a forms detector of signal transmitted by transmitter N02. Received signal is processed in pulse selector and separator what serves for RESET and COUNT pulses identification. COUNT pulse duration is proportional to welding current value. Gate D3a generates pulse that sets counters D4 and D5 to zero.
D3b and D3c form flipper that controls pulse counting during current value transmission. Comparator A6b forms circuit that blocks the receiver during welding. Potentiometer R95 serves for control voltages calibration. For control voltage calibration refer to paragraph 4 of ”Testing and calibration procedure”.

LH20/1:6 Power supply



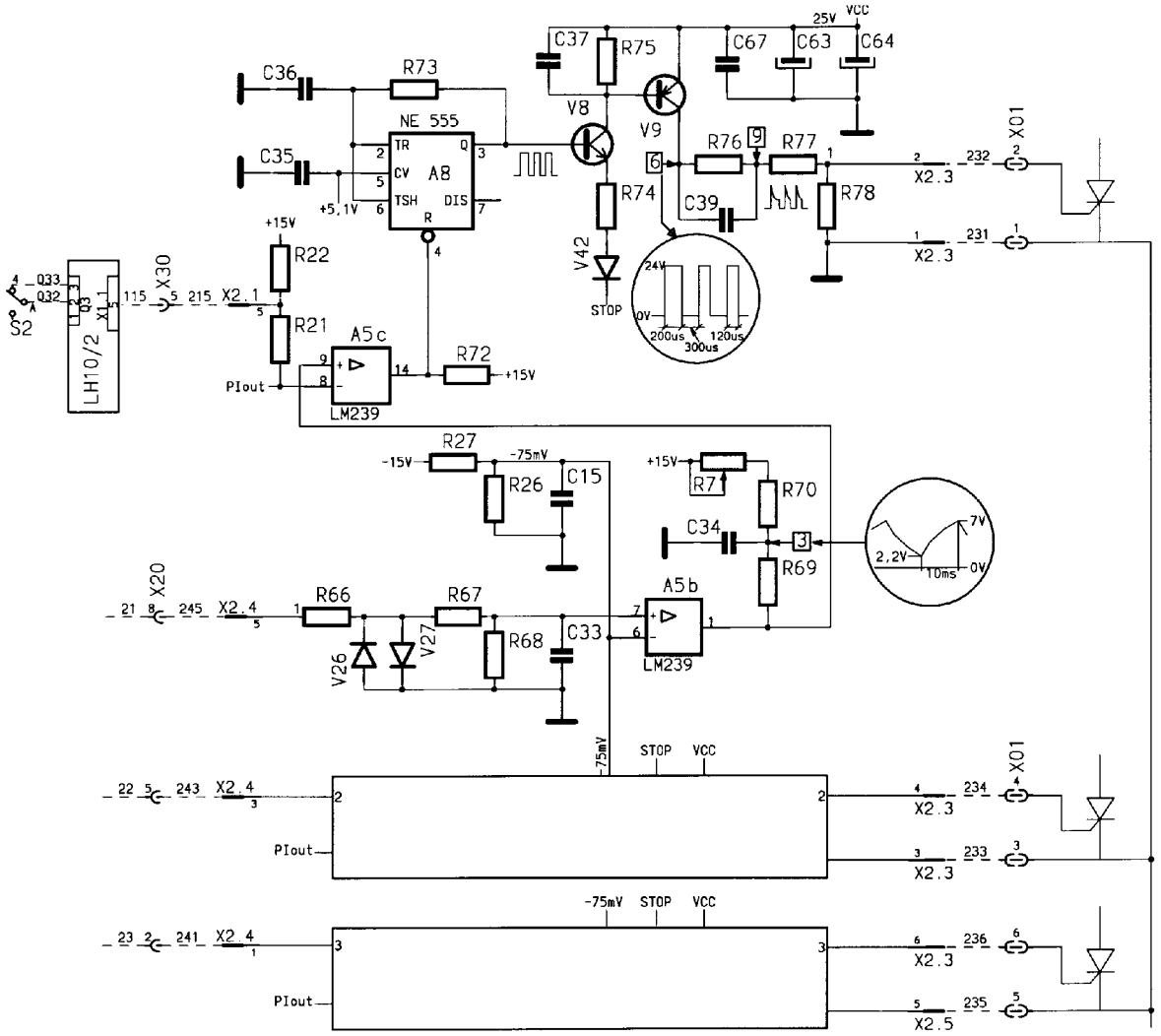
Power supply is placed on LH20/1 board and consists of positive and negative voltage sources.
Positive power supply.
+24V supplies thyristor control circuitry;
+15V supplies pulse circuitry on LH20/1 board and supplies function board LH10/2;
+14,5V supplies regulator and current shunt amplifier.
Negative power supply.
-15V supplies operational amplifiers on LH10/2 board;
-14,5V supplies regulator and current shunt amplifier.

LH20/1:7 Regulator and current shunt amplifier



The feedback signal from the current shunt is amplified by the rate of 50 in the differential amplifier made of the A1 operational amplifier and resistors R12, R13, R10, R11. Then, through the resistor R14, signal is given to the PI regulator made of the operational amplifier A2, R17, C7, C8 and voltage limiting diode V13.
The current setting signal is given to the regulator summing point (inverting input of the A2 OA), via potentiometer R6 and resistor R5 . The power supply may be disabled by the setting positive voltage through the resistor R15 and thus achieving the regulator output voltage that blocks thyristors firing circuit.

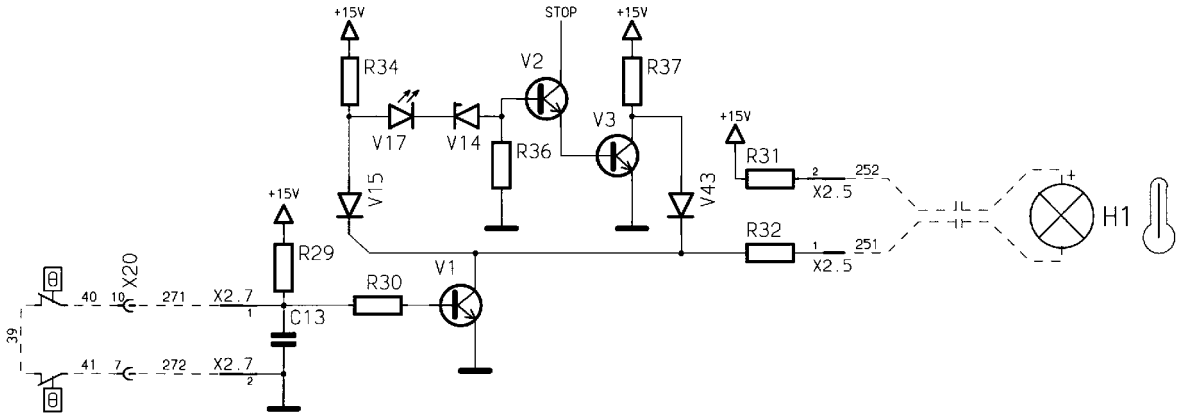
LH20/1:8 Synchronisation and thyristors firing



The synchronisation circuit consists of synchronised ramp generators, comparators, and firing pulse forming circuit.

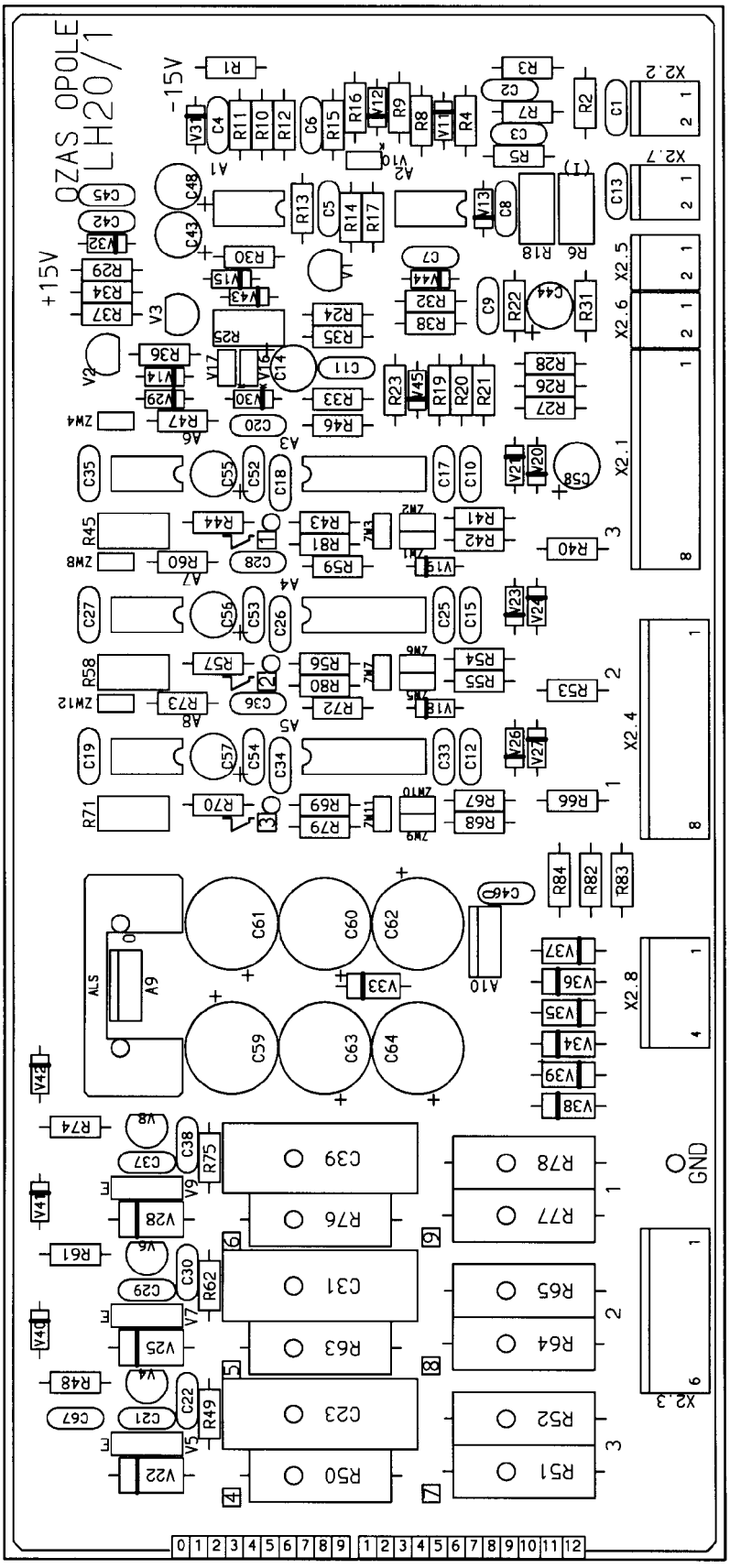
Signal from the synchronising winding goes via R66(53)(40) and diode limiter made V26(23)(20) and V27(24)(21) diodes, and then through divider R67(54)(41), R68(55)(42) to non-inverting input of the comparator A5b(A4b)(A3b). The R69(56)(43), R70(57)(44), C34(26)(18), R71(58)(45) parts connected to the output of this comparator make up synchronised ramp generator. The amplitude of the ramp is adjusted by means of the R71(58)(45) potentiometer. Ramp voltage is compared with the output voltage of the regulator in comparator A5c(A4c)(A3c). Thus the firing phase shift is created. The signal from the comparator enables the pulse generator A8(A7)(A6). Generator output controls the output driver made on transistors V8(6)(4), V9(7)(5). Driver may be disabled by the positive signal on the cathode of the V42(41)(40)) in a case of overtemperature or the lost of synchronisation. Shorting the R22 by setting switch ????? to SHORT makes the thyristors driving angle more narrow thus decreases control range of output voltage.

LH20/1:9 Thermal overload circuit

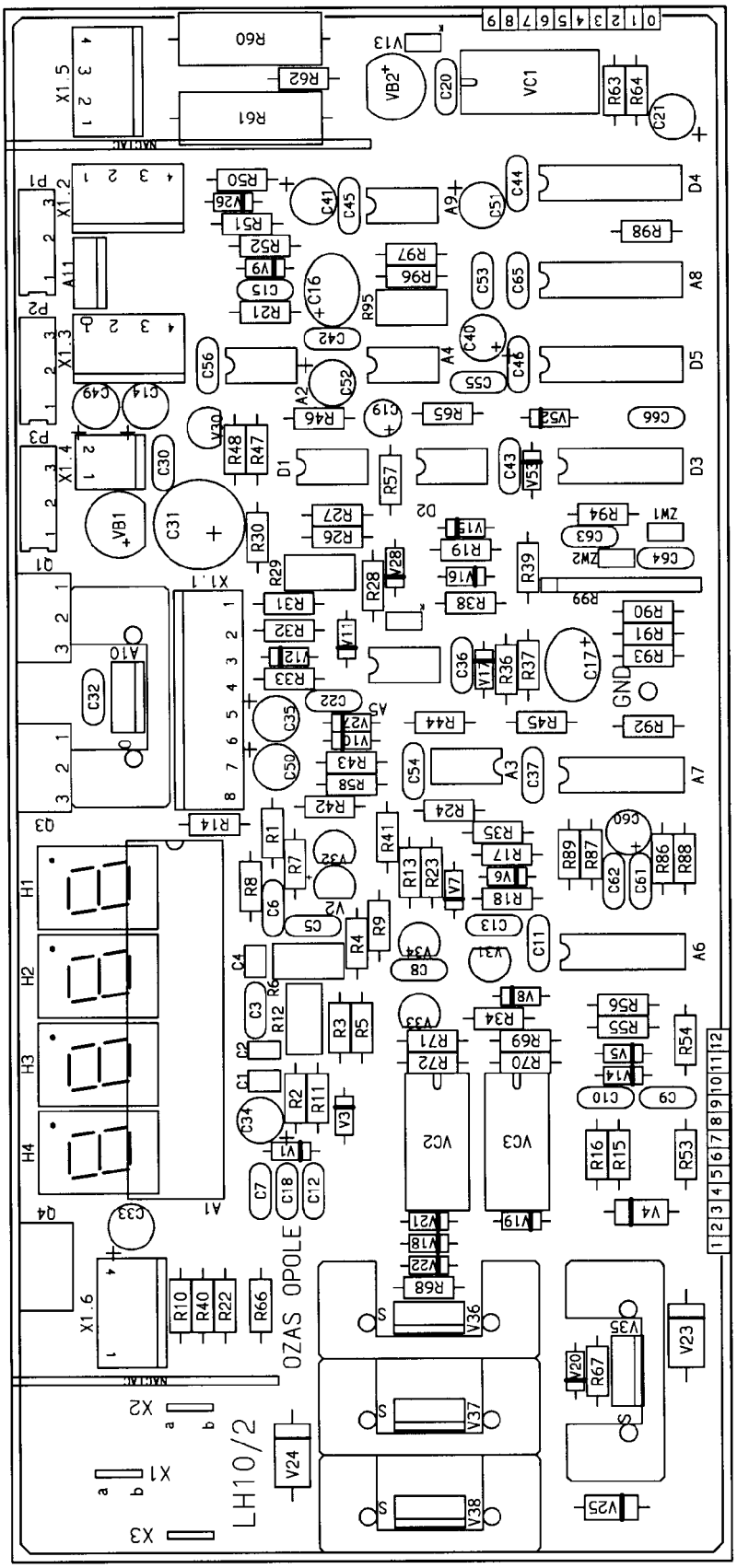


The circuit co-operates with NC thermal switches connected in series. Opening of any of them (placed on the transfer or the rectifier) switches the V1 transistor on. Closed the V1 transistor switches on the H1 indication lamp and disables thyristors firing.

LH20/1 - Components layout



LH10/2 - Components layout



CHECKING AND CALIBRATION PROCEDURES

1. Check whether the connection of the power transformer windings is suitable to the mains supply.
2. Switch the welder by means of the switch on the front panel. The lamp marked ”I” should light.
3. Ammeter calibration.
   a. set the V/A switch on machine front panel to “A” (current measurement),
   b. set switch S3 to “INT” and switch S1 to “MMA”,
   c. set max current value with potentiometer R01 (Current Setting), potentiometers R02 (HOT START) and R03 (ARC FORCE) set to minimum,
   d. with multiturn potentiometer R6 set display value at:
      - 400A (LHF 405 PIPEWELD) or at
      - 610A (LHF 615 PIPEWELD),
   e. set min current value with potentiometer R01 (Current Setting),
   f. with potentiometer R29 set display value at 10A.
4. Remote control receiver current value calibration.
   a. set switch S3 to “EXT2”,
   b. remove jumper from ZW1 on LH10/2 board and put it onto ZW2,
   c. by means of potentiometer R95 set display value at:
      - 425A (LHF 405 PIPEWELD) or at
      - 650A (LHF 615 PIPEWELD),
   d. put the jumper back from ZW2 to ZW1 and set S3 to “INT”
5. Voltmeter calibration.
   a. set the V/A switch on machine front panel to “V” (voltage measurement),
   b. connect reference voltmeter to machine output terminals,
   c. by means of potentiometer R12 on LH10/2 set machine voltmeter readout equal to reference voltmeter readout.
6. Checking of the ramp amplitudes on the LH20/1 PCB.
   Thorough setting of the ramp amplitudes is anticipated as the part of the fabrication process, on specialised testing post. It is also possible to make it directly in the machine, for instance during repair or in a case of suspicion that ramps are discalibrated.
   To carry it out:
   a. put the jumper ZW3 on the LH20/1 PCB. Diodes V16, V17 should light with the same intensity. If not, balance the intensity by means of the potentiometer R45,
   b. remove jumper ZW3, and put in on ZW7; check intensity of light of diodes V16, V17 I; balance intensity, if it’s not balanced,
   c. remove jumper ZW7, and put in on ZW11; check intensity of light of diodes V16, V17 I; balance intensity, if it’s not balanced. Remove the jumper.
7. Setting the current range.
   a. set the current setting potentiometer on the maximum,
   b. set S2 switch to “Long”,

c. load the welding power source to achieve approximately:
   - 36V (LHF 405 PIPEWELD) or
   - 44V (LHF 615 PIPEWELD),

d. by means of the potentiometer R6 on LH20/1 board set the output current equal to:
   - 400A@36V (LHF 405 PIPEWELD) or
   - 610A@44V (LHF 615 PIPEWELD),

e. check the setting of the following values of the output current:
   - 10A@22V; 100A@24V; 200A@28V; 400A@36V (LHF 405 PIPEWELD) or
   - 10A@22V; 200A@28V; 400A@36V; 610A@44V (LHF 615 PIPEWELD).

8. HOT START checking.
   a. set 100A output current by means of the setting knob,
   b. connect instantly the 0,24Ω load. Observe the output current. It should amount to 130A for 1s. Then it should fall down within another 0,2 s to 100A. Measurements should be carried out by means of the oscilloscope with memory,
   c. disconnect the load.
9. ARC FORCE checking.
   a. set 100A output current with the setting knob,
   b. set the ARC FORCE knob to minimum,
   c. gradually load the power source untill output voltage is about 13V; the actual output current should be 100–103A,
   d. set the ARC FORCE knob to maximum, load the power source to achieve 24V voltage on output,
   e. gradually increase the load, following the voltage; starting from the threshold of 18,5V – actual output current should increase; at the 13V on the output, the actual output current should be 185A.
10. ANTISTICK checking.
   a. set the ARC FORCE knob to minimum,
   b. set 100A output current by means of the setting knob in MMA mode,
   c. gradually increase the load, following the voltage; after achieving 5V the actual output current should be reduced to the level < 32A after 2s delay.
11. Checking of the wired remote control unit.
   a. connect cable of remote controller to the socket X02,
   b. set switch S3 to “EXT1” and S1 to “AAG” or “MMA”,
   c. check if setting of current value within full range is possible both for unloaded and for loaded source.
12. Checking of the wireless remote control unit (rcu).
   a. set switch S3 to “EXT2” and S1 to “AAG” or “MMA”,
   b. with use of wireless rcu check the transmission for both polarisations and for following current values: min, 100A, 200A, 300A, max. Observe current value changes on machine display.

   NOTE: In TIG mode (switch S1 set to “TIG”) wireless remote control is not operational.
13. Checking of machine operation in TIG mode.

a. set switch S3 to “INT”, S1 to “TIG” and S2 to “SHORT”,

b. connect pins (1) and (2) of socket X03 (press the trigger of connected to machine welding torch) and set current value to 100A, after releasing the trigger there should be initial current value for contact arc striking diplayed,

c. load the source with 1Ohm + 0,24Ohm welding resitors – no current should flow through the resistors as the trigger is released (output voltage = 0V),

d. press the trigger on welding torch, 6–8A current should flow through the resistors,

e. simulate lifting of the electrode and arc striking – just disconnect and connect again the 0,24Ohm resistor; that should cause 100A current flow through the welding resistors (according to the value set in p. 13.b.).

SERVICE INSTRUCTIONS

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 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

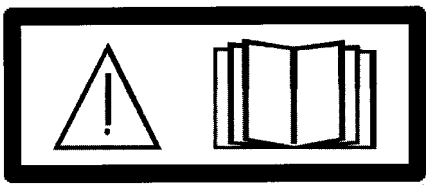
This chapter is an extract from the instructions for LHF 405 PIPEWELD, 615 PIPEWELD.

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.

INSTALLATION

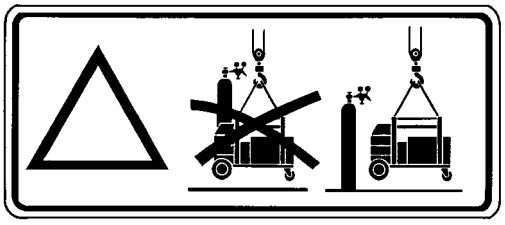
The installation must be executed by a professional.

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.

Lifting instructions

The power supply should be lifted by means of its lifting eye. The handle is only intended for pulling it along the ground.

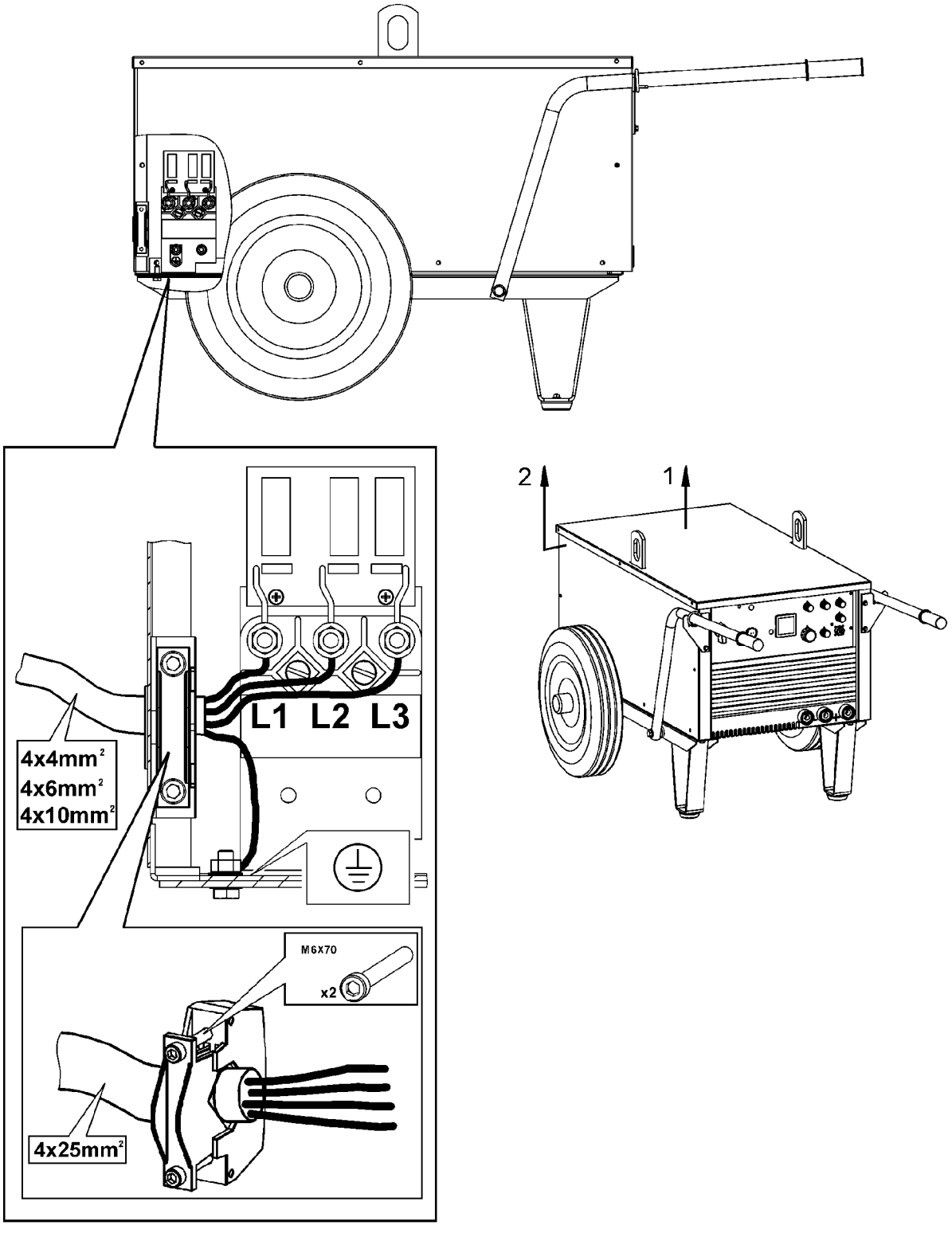


- Check that the welding rectifier is configured for the **available mains supply** before connecting it to the mains.
- See Connecting to mains for cable rating and fuse rating.
- Connect the mains cable to the rectifier according to the relevant regulations and install a suitable fuse in the main fuse box.
- Make sure the welding rectifier is not covered or positioned so that cooling is obstructed.

Connecting to mains

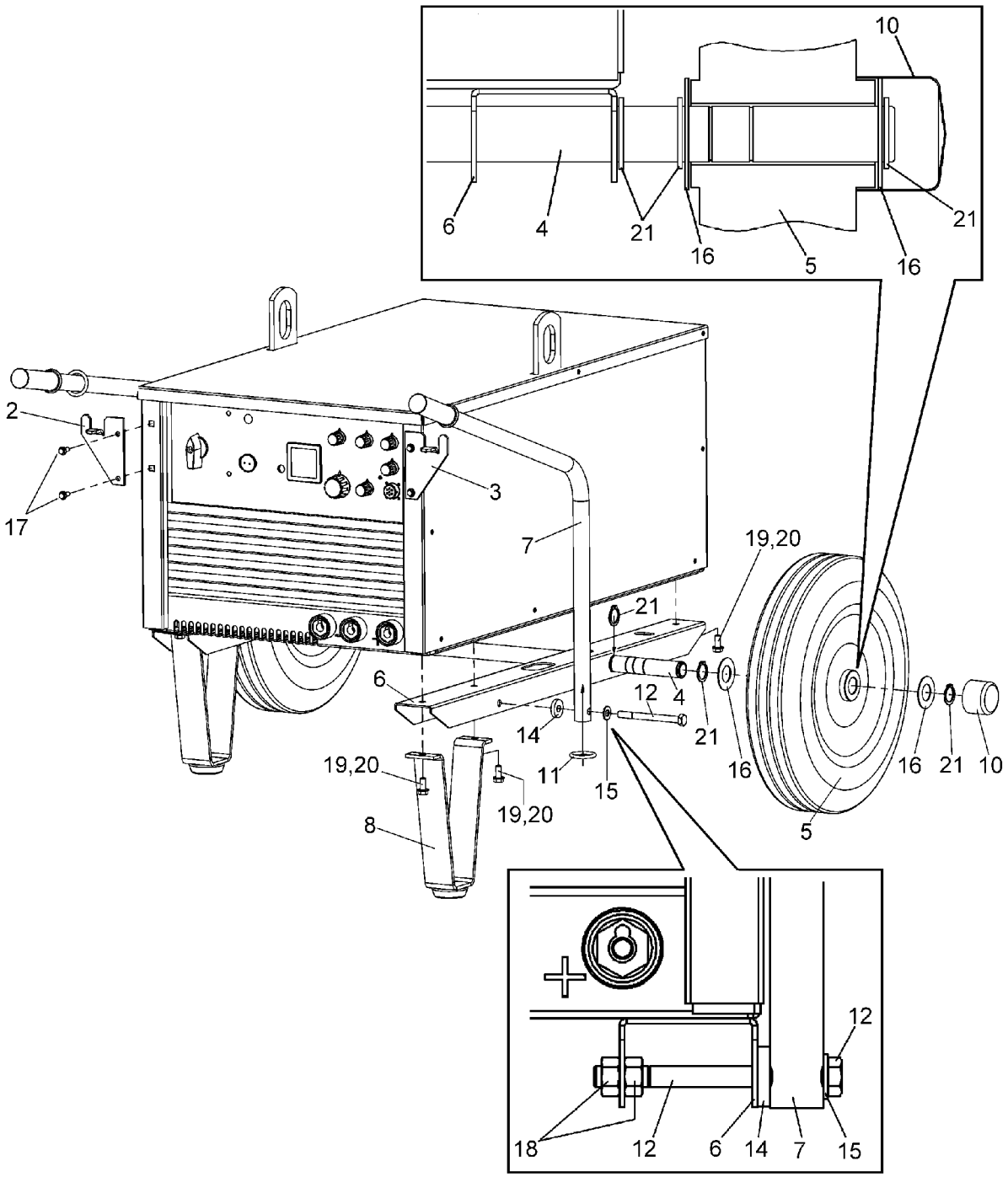
	LHF 405 PIPEWELD	**LHF 615 PIPEWELD**
Frequency	50 Hz	50 Hz
Voltage	230/400/415/500 V	230/400/415/500 V
Current at		
100% duty cycle	44/25/25/20 A	59/34/34/27 A
60% duty cycle	56/32/32/26 A	78/45/45/36 A
35% duty cycle	71/41/41/33 A	103/59/59/47 A
Fuse, slow	63/35/35/25 A	80/63/63/50 A
Cable area (4xmm2)	10/6/6/4	25/10/10/10

	LHF 405 PIPEWELD	**LHF 615 PIPEWELD**
Frequency	60 Hz	60 Hz
Voltage	230/440/550V	230/440/550V
Current at		
100% duty cycle	44/23/18 A	59/31/25 A
60% duty cycle	56/29/23 A	78/41/33 A
35% duty cycle	71/37/30 A	103/54/43 A
Fuse, slow	63/35/25 A	80/63/50 A
Cable area (4xmm2)	10/6/4	25/10/10



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.*

Assembly of components

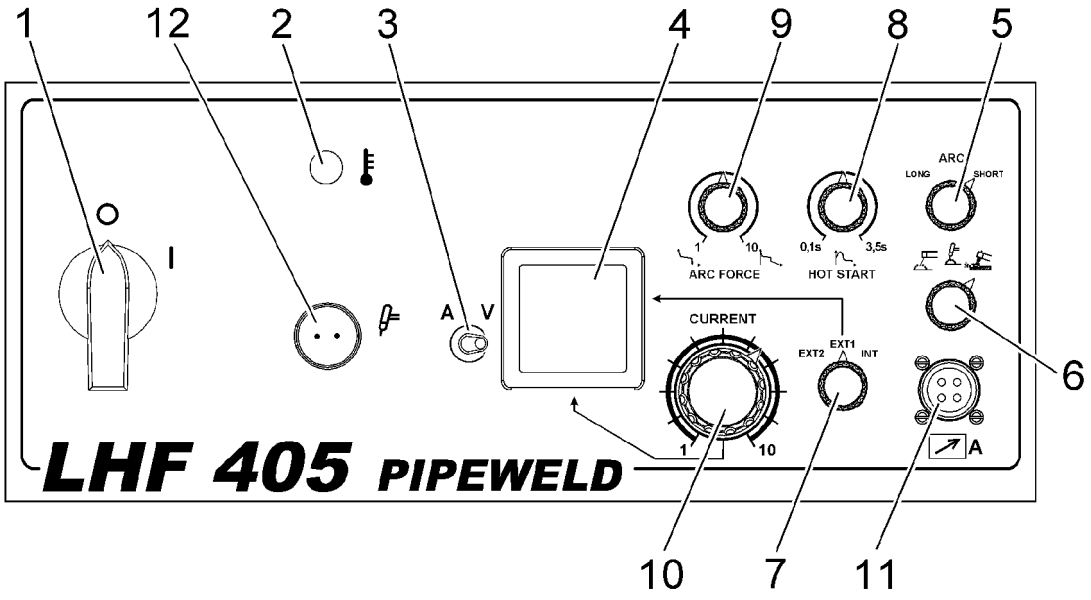


OPERATION

- Select suitable earth and return cables and connect them to the terminals marked + and – on the front of the rectifier. Connect the return cable to the work piece.
- Set switch (1) to position ”I”. The display (4) will light and the fan will start.
- Select the welding method using the switch (6).
- Adjust the welding current:
  a. if the switch (7) is set to “INT” (local current setting), the current should be set with knob (10),
  b. if the switch (7) is set to “EXT1” (remote wired current setting), the current should be set with knob on remote control unit, that should be connected to terminal (11),
  c. if the switch (7) is set to “EXT2” (remote wireless current setting), the current should be set with use of remote control unit N02 in following way:
     1 set the welding current with knob on N02,
     2 put the unit on workpiece, make sure that metal bottom of the unit has good contact with workpiece,
     3 touch with electrode the round metal terminal on the top of remote control unit and wait untill the red control light on the unit turns OFF.
     The current is set.

  During current setting its value can be observed on display (4), provided that switch (3) is set towards “A”.
- The rectifier is now ready for welding.

Controls and connections



1. Mains supply switch
2. Yellow lamp, thermal cut-out
3. Switch for display selection - Volt. or Amp
4. Digital display for welding parameters
5. Arc lenght switch, long/short
6. Method selector switch: Arc Air Gouging, MMA, TIG
7. Remote switch
8. Hot Start
9. Arc Force
10. Current setting
11. Remote socket
12. Connection for start signal from the TIG welding torch

MMA welding

Set switch (6) to  . In MMA mode implicitly “anti stick” function is ON. It prevents of sticking the electrode to workpiece during arc striking.

TIG welding

Set switch (6) to  . In TIG mode output voltage of machine is ON after the welding torch switch is pressed. After arc initiation current rises from minimum possible value until it reaches the value set by operator.

It is recommended to set switch (6) to “SHORT”.

Arc Air Gouging

Set switch (6) to  . In Arc Air Gouging mode current should be set close to maximum value in order to ensure proper gouging conditions.

It is recommended to use LHF 615 PIPEWELD for gouging.

Overheating protection

If the internal temperature becomes too high, the welding is interrupted and disabled. This state is indicated by permanent lighting of the orange indicating lamp on the front of the unit. It resets automatically when the temperature falls down.

MAINTENANCE

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.

Only those persons who have appropriate electrical knowledge (authorised personnel) may remove the safety plates to connect or carry out service, maintenance or repair work on welding equipment.

Cleaning

Check regularly that the power source is free from dirt.

How often, and to what extent, cleaning should be carried out depends on the welding process, arc time, disposition and the surrounding environment. It will normally suffice to blow the power source clean using compressed air (reduced pressure) once a year.

If the power source is very dirty, brushing and vacuuming are recommended.

- Disconnect the welding power source from the mains current supply.
- Remove the adapter from the socket. Lock the socket to prevent unauthorised connection.

  At fixed installations, the safety switch should be set to the off position. Lock the switch.
- Remove the power source's safety plates for best access.

After cleaning, all safety plates must be mounted before you connect the power source to the mains supply.

ORDERING OF SPARE PARTS

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

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.
Amersfoort
Tel: +31 33 422 35 55
Fax: +31 33 422 35 44

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

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

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

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

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