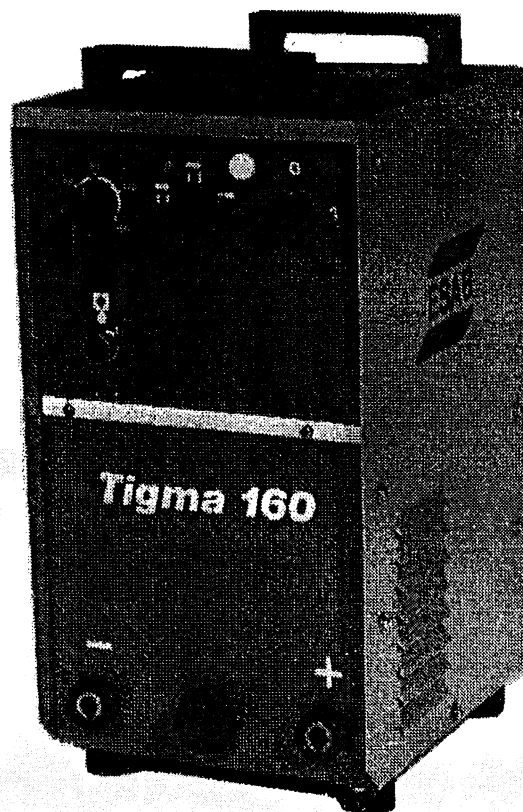


LTG160

Tigma 160

Welding power source



Service manual

LIST OF CONTENTS

Page

LTG 160	3
INTRODUCTION	3
COMPONENT DESCRIPTIONS	5
PULSE UNIT INTERFACE	8
SEQUENCE OF OPERATION	10
SERVICE DIAGRAM	13
COMPONENT POSITIONS, CIRCUIT BOARD A1, 1 270 560	14
COMPONENT POSITIONS, CIRCUIT BOARD A1, 1 270 591	15
CENTRAL ADAPTER TIG TORCHES	16
ACCESSORIES	17
INSTRUCTIONS AND SPARE PARTS LIST	18

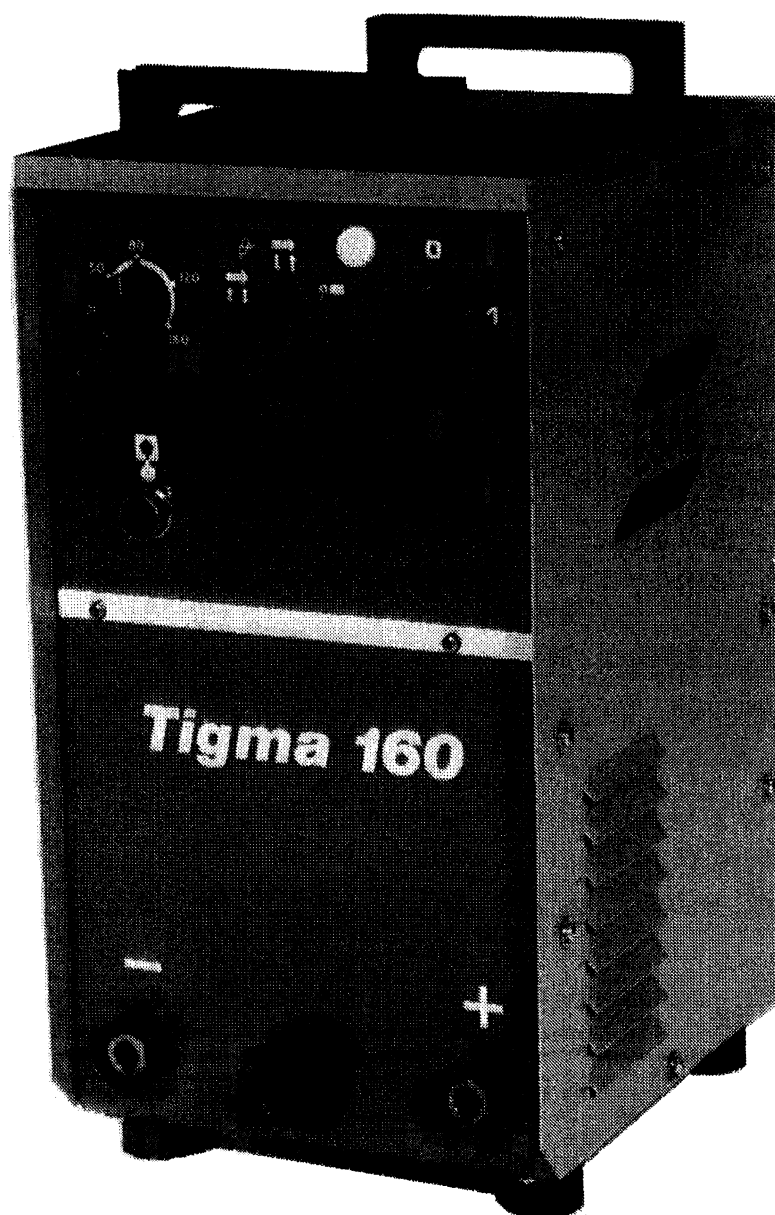
Rights reserved to alter specifications without notice

LTG 160

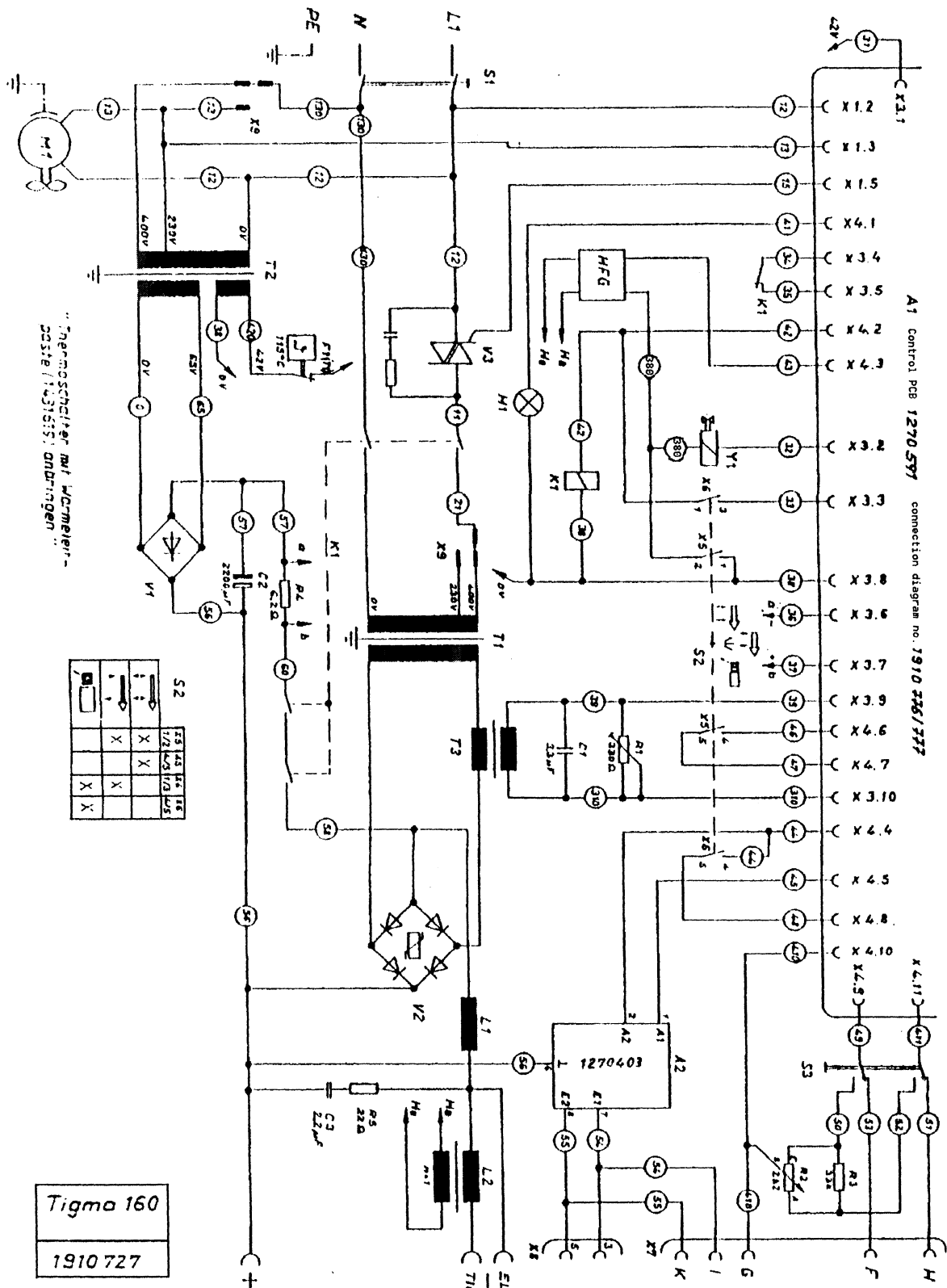
INTRODUCTION

This service manual is intended to be used together with the instructions. The spare parts list can be found in the instructions.

The instructions can be found in the service manual after the service diagrams. Note that page numbering in the instructions starts again from 1, and that several page numbers are omitted. This is because only the English part of the instructions has been included.



cnj0ap01



This circuit diagram is valid from machine no. 172 309. In earlier machines the sleeve connections H and F in the remote socket are different connected, see 'SERVICE DIAGRAM' on page 13

cnj0ae06

COMPONENT DESCRIPTIONS

Component designations

A2	LC filter
C1	Smoothing capacitor for current signal
C2	Smoothing capacitor for base current
C3	HF decoupling capacitor
F1	Thermal cutout
H1	Operating indicating lamp, 24 V incandescent lamp (not mains voltage). This lamp lights to indicate MMA welding and when the welding torch trigger is pressed when carrying out TIG welding.
K1	Main contactor
L1	Inductor
L2	HF transformer
M1	Fan motor
R1	Calibration resistor for current signal
R2	Current setting potentiometer
R4	Base current resistor
S1	Mains switch
S2	Welding mode selector switch. See the service drawing for truth table.
S3	Remote/Local changeover switch
T1	Main transformer
T2	Control power supply and base current transformer
V1	Base current rectifier
V2	Main rectifier. Fitted beneath a protective plate in the centre of the unit. 4 x 4 press-fit diodes.
V3	Triac, fitted to cooling fins at the back of the machine on the right-hand side. The filter (RC) is fitted directly to the triac.
X7	Connection for remote control unit
X8	Connection for TIG torch
X9	Terminal block for mains voltage adjustment reconnection
Y1	Solenoid valve

Supply voltage

As delivered, the machine is connected for 400 V. It can be reconnected for use on a 230 V single phase supply by changing connections on terminal strip X9, which is fitted on the left-hand side of the divider sheet.

Note that changes must be made to both transformers, T1 and T2.

Thermal cutout

A piece of copper, acting as a thermal conductor, is fitted to the main transformer. It projects from the transformer, and a thermal switch is secured to the end of it by a screw. Good thermal contact is assured by the use of zinc paste between the switch and the copper strip. The switch operates at 115 °C, equivalent to a temperature of 150 °C in the transformer, and interrupts the 42 V control circuit power supply.

Current transformer

The current transformer, T3, which is used instead of a shunt, is connected to the secondary side of T1 to produce an output signal of about 30 VRMS at a welding current of 160 A.

Resistor R1 is used to calibrate the equipment at a current of 160 A.

Main contactor

The main contactor, K1, is fitted in the bottom of the enclosure in front of the main transformer. It has four normally-open contacts and one normally-closed contact, serving as three main contacts and two auxiliary contacts.

Two of the main contacts are used to switch the supply to the main transformer, while the third main contact and one of the auxiliary contacts switch the supply to the base current circuit.

The other (normally-closed) auxiliary contact is used to realise the gas post flow.

The control power supply transformer

The control power supply transformer, T2, is fitted in the bottom of the case. When connected to a 400 V supply, the 230 V winding becomes an autotransformer winding and supplies the cooling fan.

The secondary side of the transformer supplies 42 V for the control circuitry and 65 V for the base current circuit.

The base current circuit

V1 is the rectifier for the base current circuit.

The base current resistor, R4 (6.2 ohm, 5 A) limits the base current and serves also as a current shunt to provide a voltage signal to indicate that base current is flowing and to operate the current relay.

The control circuit

Conductors 12 and 13 supply transformer T1 on the circuit board with 230 V AC. The output voltage from the transformer is used as a synchronising signal for the triac, and is also rectified and regulated to produce a + 15 V power supply for the triac firing pulses drive circuitry.

Conductor 15 carries the firing pulses to the triac.

Conductors 12, 13 and 15 are sensitive to interference, and are therefore run by the shortest routes.

Voltage supply on the PC-board

The +VR supply is a 42 V control power supply that is rectified and smoothed only, but not regulated. It can vary with changes in the supply voltage.

There is no direct electrical connection between 0 VR and other 0 V points in the unit.

The ± 16 V supply to the current regulator is zener-stabilised. The unregulated supply is taken from the +VR supply via resistors R5 and R11 on the circuit board.

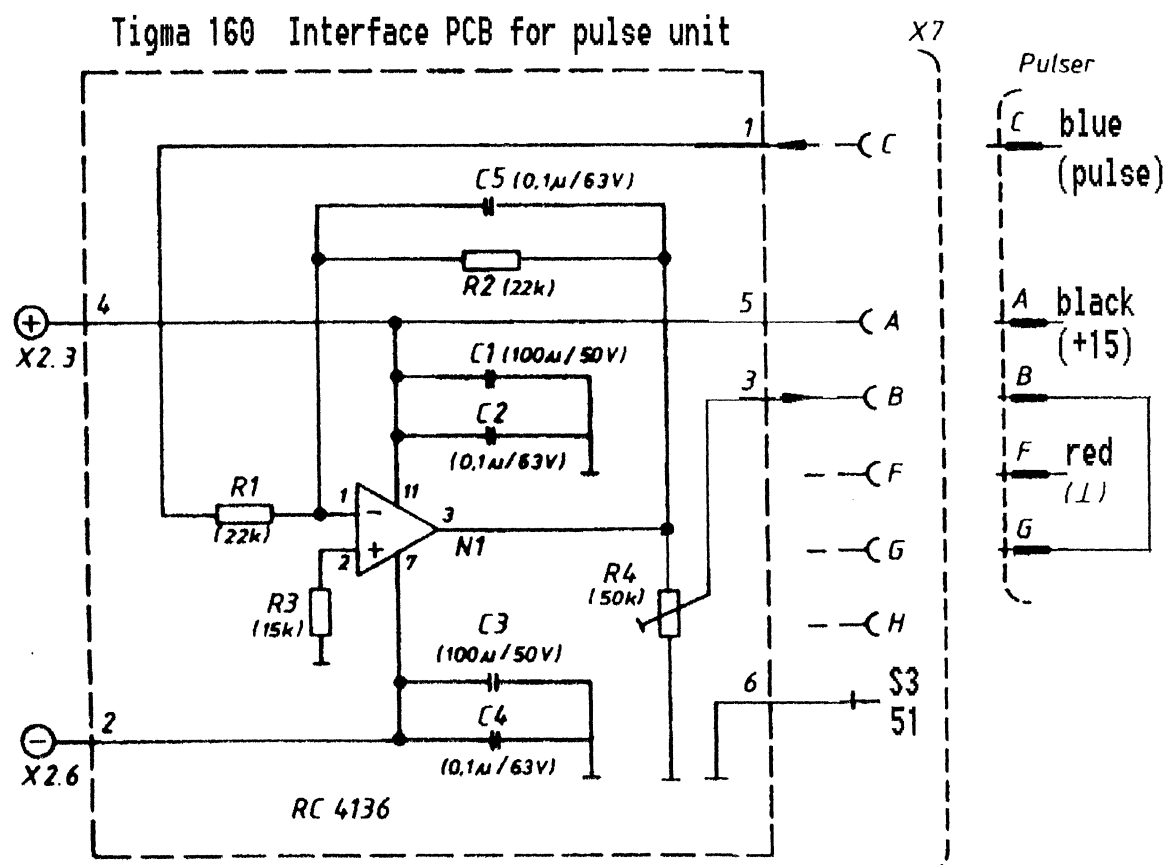
N2 on the circuit board is a + 15 V voltage regulator, supplying the trigger circuits for the triac. The regulator is supplied from transformer T1 on the circuit board.

The + 15 V and ± 16 V supplies have a common neutral point (0 V) at contact X4.11.

PULSE UNIT INTERFACE

The interface PC-board is supplied with positive voltage (+16V) from contact X2.3, the positive voltage is always on. Negative voltage is supplied by contact X2.6 (-16V), the negative voltage is on when relay K11 is activated. The connector X2 is on the main PC-board. Zero volt is connected to the interface PCB when the remote switch is in the remote position.

The pulse unit connector has to be connected as in the circuit diagram below.

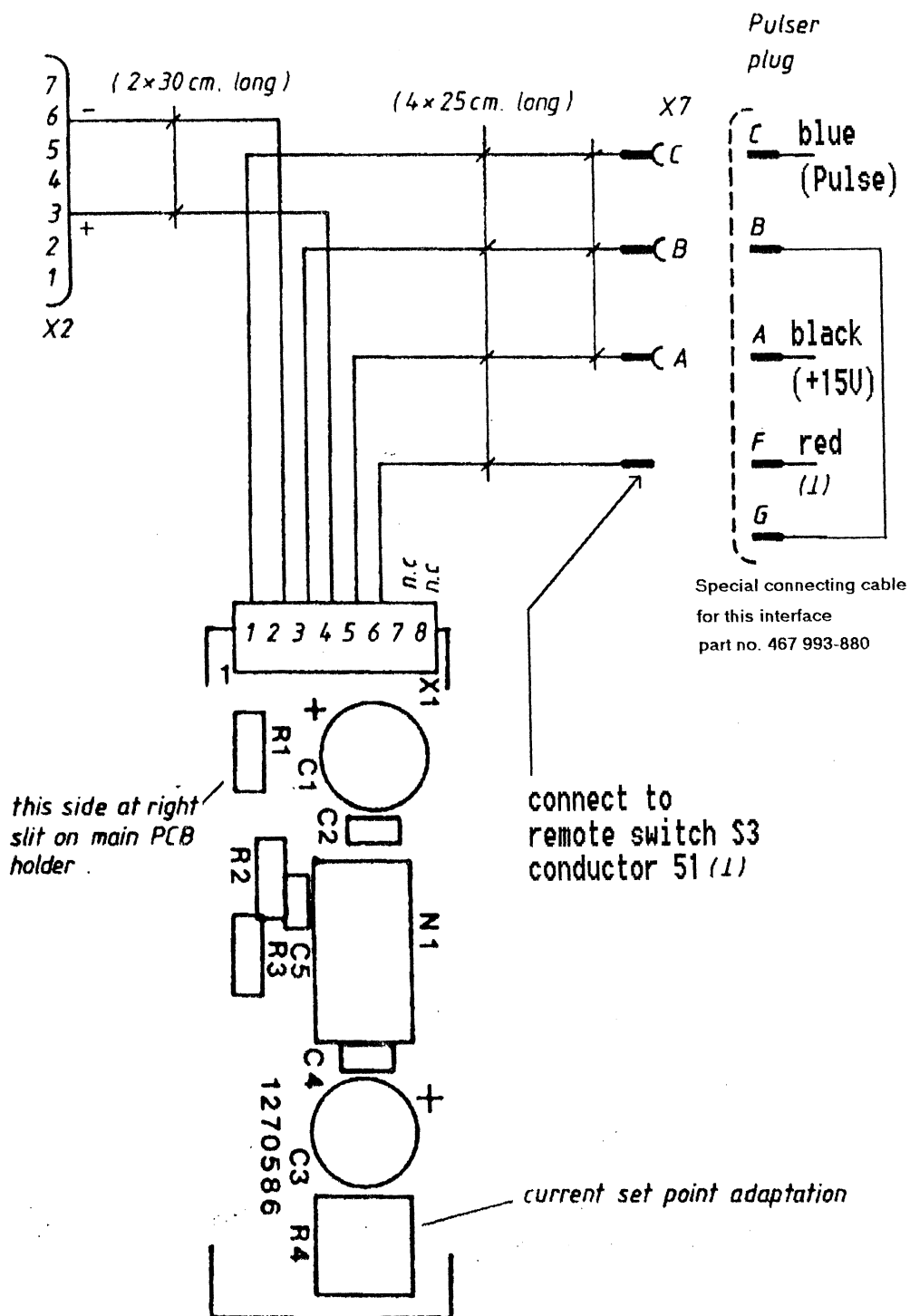


cnj0ae03

The pulse unit interface is available as an option to machines up to machine number 169 651. A special pulser connecting cable has to be used together with the interface unit.

In machines with higher serial numbers the pulse unit interface function is built in to the machine PC board, for those machines the normal pulser connecting cable has to be used (e.g. 367 144 - 881).

The Service diagram on page 13 is valid for both types of PC board.



Connection diagram for pulser interface

cnj0ae04

SEQUENCE OF OPERATION

MMA MODE

1. S2 switch contacts (X6) 1-3 and (X6) 4-5 are closed.
MMA relay K5, located on the PCB, is now energised via contact (X6) 4-5.
2. One n/o contact on K5 energises relay K11 on the PCB. K11 in turn energises the main contactor K1 via S2 switch contacts (X6) 1-3. The indicator lamp H1 is also illuminated at this time via PCB connection X4.1.

Another n/o contact on K5 closes in the current feedback circuit, this switches in parallel resistor R28 to reduce the actual current signal and so increase the welding voltage as required in this mode of operation.

3. Pilot current is now available via a 65V winding on T2, rectifier bridge V1, resistor R4 and two normally open contacts on the main contactor K1, an open circuit voltage of 95V is now at the output terminals.
4. When pilot current flows as sensed by R4, current relay K6 is energised, -13V is now available at connection X4.9 ie the top of the weld current pot. Triac V3 is now fired and main welding current is now available depending on the setting of R2. The maximum value of current can be set using R1.

5. Current Feedback

This is achieved by transformer T3 in the welding circuit and rectifier V3 located on the PCB. The signal from V3 being summed with the reference signal from the current potentiometer thus phasing back the triac causing the machine to droop.

TIG MODE - 2 stroke operation

1. S2 switch contacts (X6) 4-5 now open, therefore the MMA relay K5 on the PCB cannot be energised.
2. S2 switch contacts (X5) 1-2 now closed making a 0 volt connection to the solenoid valve and the HF oscillator circuits.
3. S2 switch contacts (X6) 1-3 still closed.

4. Torch switch closed

Relays K11 and K12 now energised via diode V5.

5. Relay K11 energises the main contactor K1 and also illuminates indicator lamp H1, pilot and main currents are now available.
6. Another contact on K11 is used to energise the HF oscillator via a n/c contact on K6.
7. Relay K12 energises relay K3 which then uses a n/o contact to maintain itself energised, this relay then energises the solenoid valve.
8. When welding commences current relay K6 is energised, its n/c contact then opens switching off the HF oscillator.
9. **Torch switch released** - post flow gas

Relays K11 and K12 open.

Relay K11 de-energises the main contactor K1, pilot and main current is now switched off. A normally closed contact on K1 now connects voltage +VR to the post flow timer circuit comprising V24, V23, R9 and C5. Transistor V24 energises after the post flow times out, this pulls off the voltage energising K3 which switches off the solenoid valve.

The gas post-flow time is determined by R9 (see the component placing diagram on page 15). As delivered, the time is set at 8 seconds, but can be adjusted between approx. 1 and 20 seconds.

TIG MODE - 4 stroke operation

1. S2 switch contacts (X5) 1-2 closed as in 2 stroke operation.
S2 switch contacts (X5) 4-5 closed.
S2 switch contacts (X6) 1-3 now open, preventing the main contactor K1 from being energised by this circuit as was the case with MMA and 2 stroke operation.

2. **Torch switch closed** first operation.

Relays K11 and K12 energise.

Relay K11 energises the HF oscillator.

Relay K12 maintains itself via one of its n/o contacts and contact (X5) 4-5 on switch S2.

3. A n/o contact on K12 now energises relay K3, a n/o contact on K3 keeps K3 maintained. Relay K3 then energises the solenoid valve.

4. **Torch switch released** first operation.

Relay K2 is now energised which in turn energises the main contactor K1 via PCB connection X4.2.

Indicator lamp H1 is also illuminated at this time. Open circuit voltage is now present and welding can commence. Once welding commences K6 will energise and the HF oscillator will switch off.

5. **Torch switch closed** second time.

Relays K11 and K12 are now switched off.

The welding current now begins to slope down, ie C3 on the PCB discharges lowering the X4.9 connection to the weld current potentiometer. At the end of the slope down time of 4 seconds the unit reverts to base current only.

- Slope down time.
Up to machine number 169 651 the slope down time is 4 seconds, not adjustable and not linear. The PCB component layout on page 14 is valid for those machines.

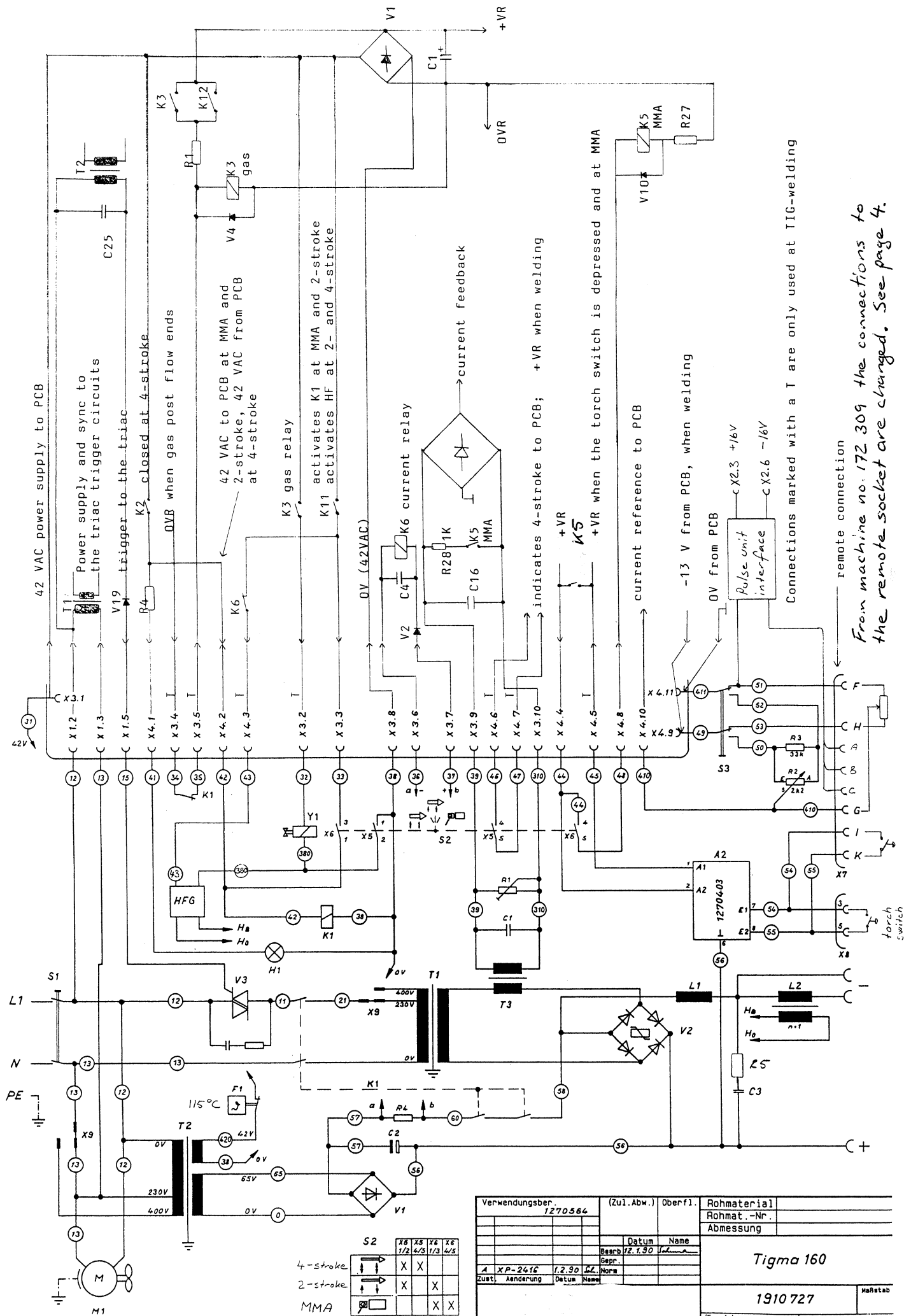
In machines with higher serial numbers the slope down time is linear and adjustable between 1 and 10 seconds, with potentiometer R76, on the PC board. The PCB component layout on page 15 is valid for those machines.

'SERVICE DIAGRAM' on page 13 is valid for both types of machines.

6. **Torch switch released** second time.

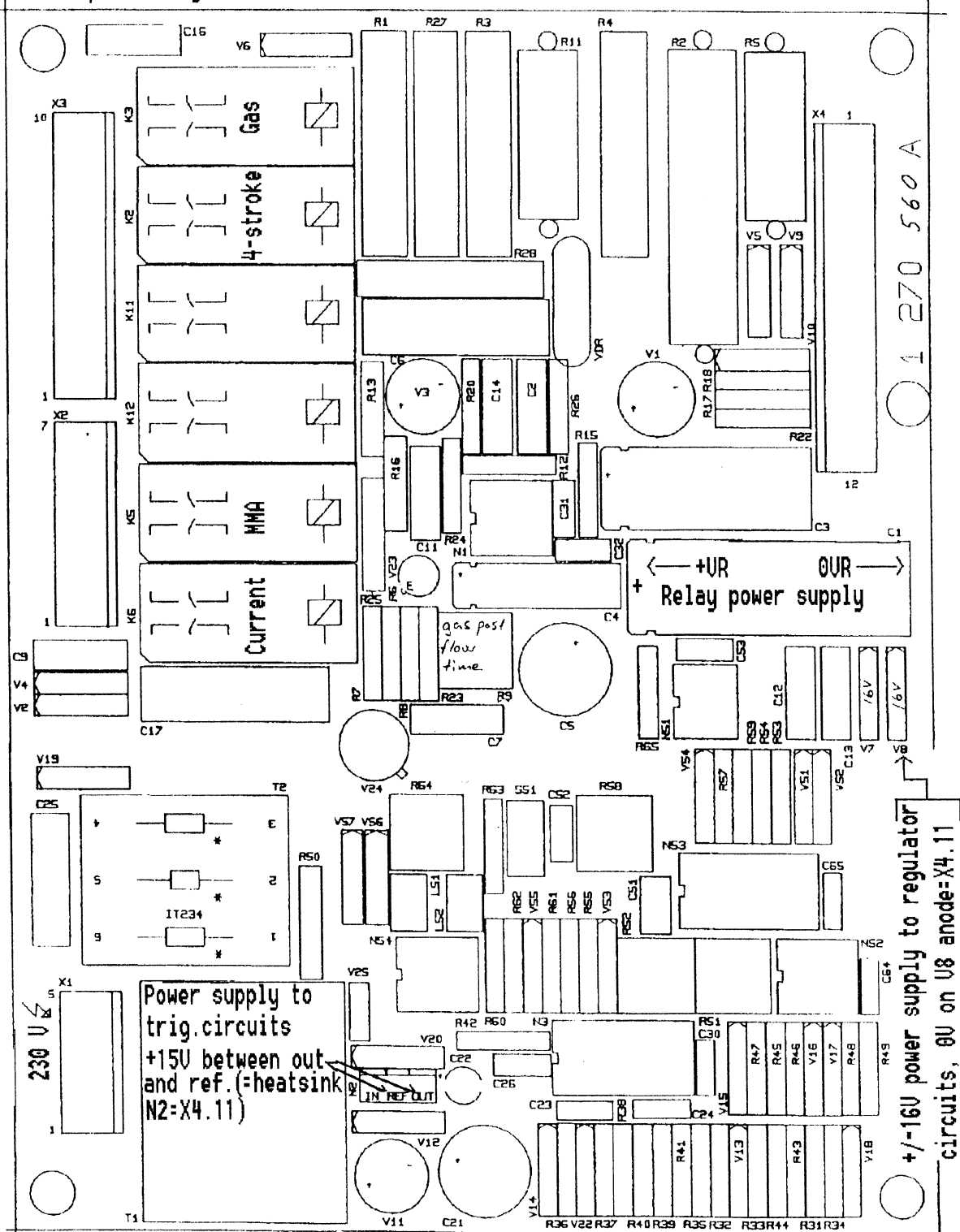
Relay K2 is now de-energised switching off K1, base current now stops.

Post gas now times out as explained in the 2 stroke mode of operation.



COMPONENT POSITIONS, CIRCUIT BOARD A1, 1 270 560

PCB component layout

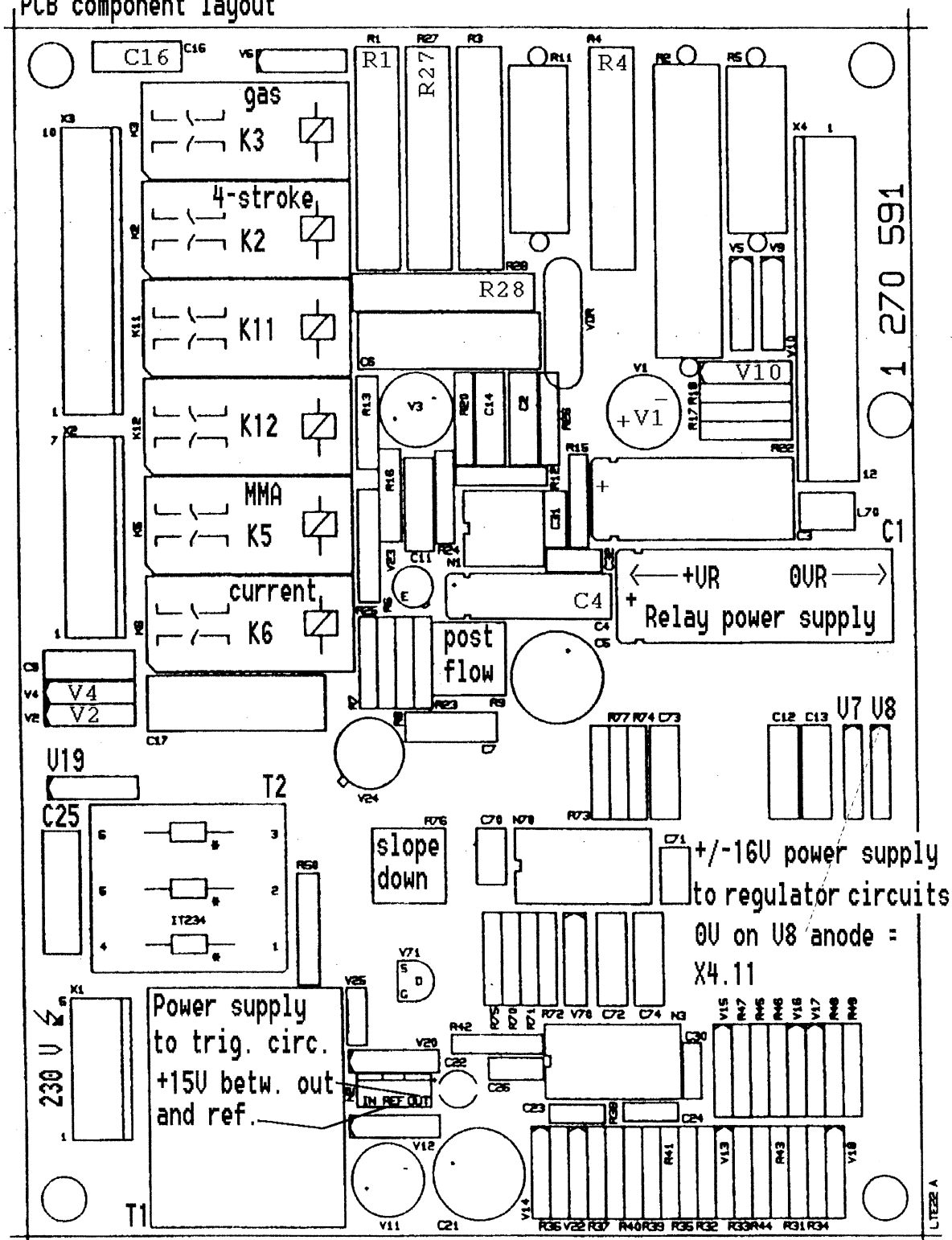


cnj0ae02

This diagram is valid up to machine number 169 651. The PC board has no build in pulse unit interface. The slope down is 4 seconds and not linear.

COMPONENT POSITIONS, CIRCUIT BOARD A1, 1 270 591

PCB component layout

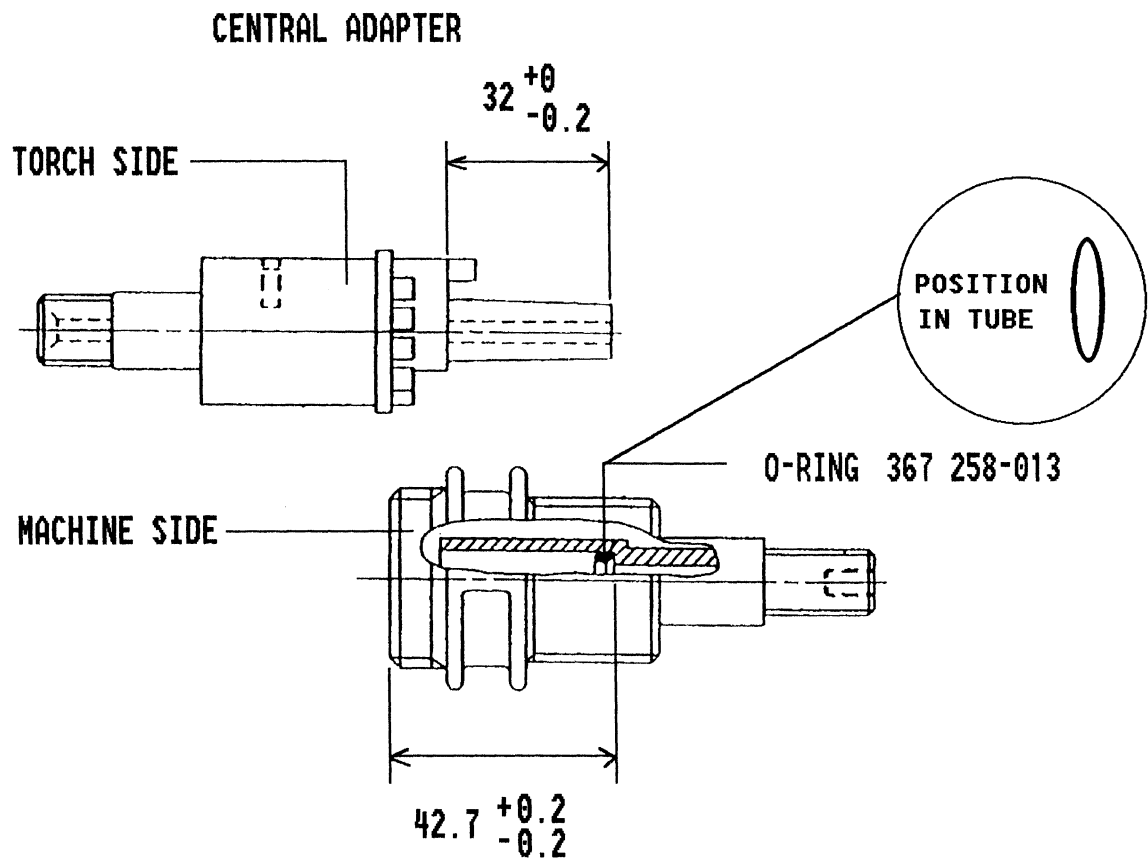


cnj0ae05

This diagram is valid for machines with a serial number higher than 169 651. The PC board has build in pulse unit interface and linear slope down 1 to 10 seconds, adjustable on potentiometer R76.

CENTRAL ADAPTER TIG TORCHES

Problems with HF-flash over in the central adapter?
It might depend on on a gasleakage in the adapter. Check the following measurements:



cnjxxp01

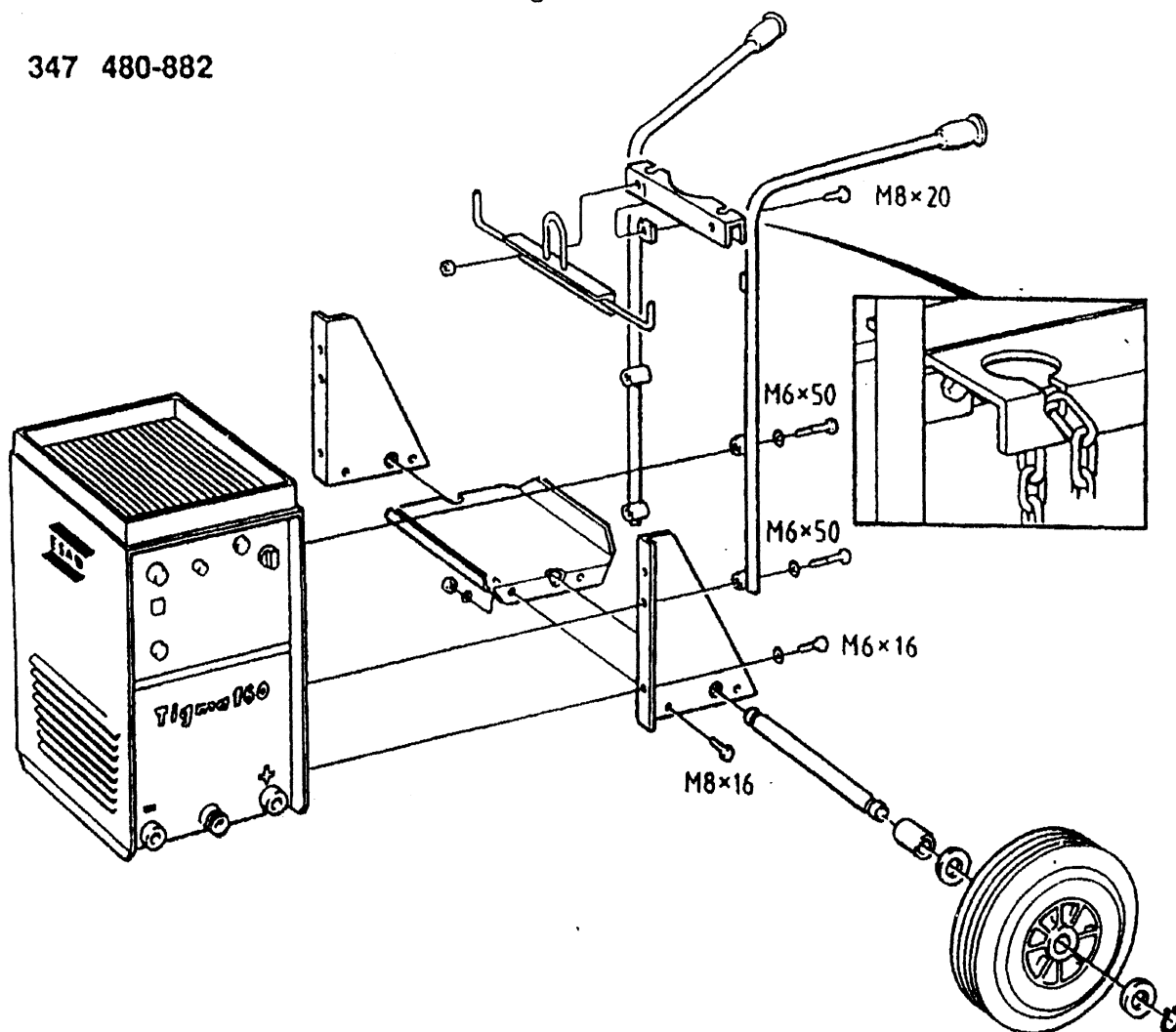
If you find any of these measurements wrong, change the faulty parts. Never put in two O-rings in the adapter it will only increase the problems in the long run.

ACCESSORIES

TROLLEY

Fitting instructions

347 480-882



cnj0ap03

PULSE UNIT PHA5

367 970-880

5 m CONNECTING CABLE TO PHA5

367 144-881

10 m CONNECTING CABLE TO PHA5

367 144-882

FOOT PEDAL FS002 INCL. CABLE

349 090-886

TIG TORCH BTD 153 SELF-COOLED 4 m

368 347-886

TIG TORCH BTD 153 SELF-COOLED 8 m

368 347-887

5 m connecting cable to PHA5 for machines with serial no. 169 651 and lower has order no. 467 993-880.

LTG

INSTRUCTIONS AND SPARE PARTS LIST

TIGMA 160

**Svetsutrustning
Welding equipment
Schweißausrüstung
Equipement de soudage**

**Bruksanvisning och reservdelsförteckning
Instruction manual and spare parts list
Betriebsanweisung und Ersatzteilverzeichnis
Manuel d'instructions et liste de pièces détachées**

LIST OF CONTENTS	Page
WARNING	10
INTRODUCTION	11
TECHNICAL DESCRIPTION ...	12
INSTALLATION	13
OPERATION	14
MAINTENANCE	15
ACCESSORIES	16
DIAGRAM	31
SPARE PARTS LIST	32

Rätt till ändring av specifikationer utan avisering förbehålles
 Rights reserved to alter specifications without notice
 Änderungen vorbehalten
 Sous réserve de modifications sans avis préalable

WARNING



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.

MALFUNCTION

- Call for expert assistance in the event of malfunction.

**READ AND UNDERSTAND THE INSTRUCTION MANUAL
BEFORE INSTALLING OR OPERATING.**

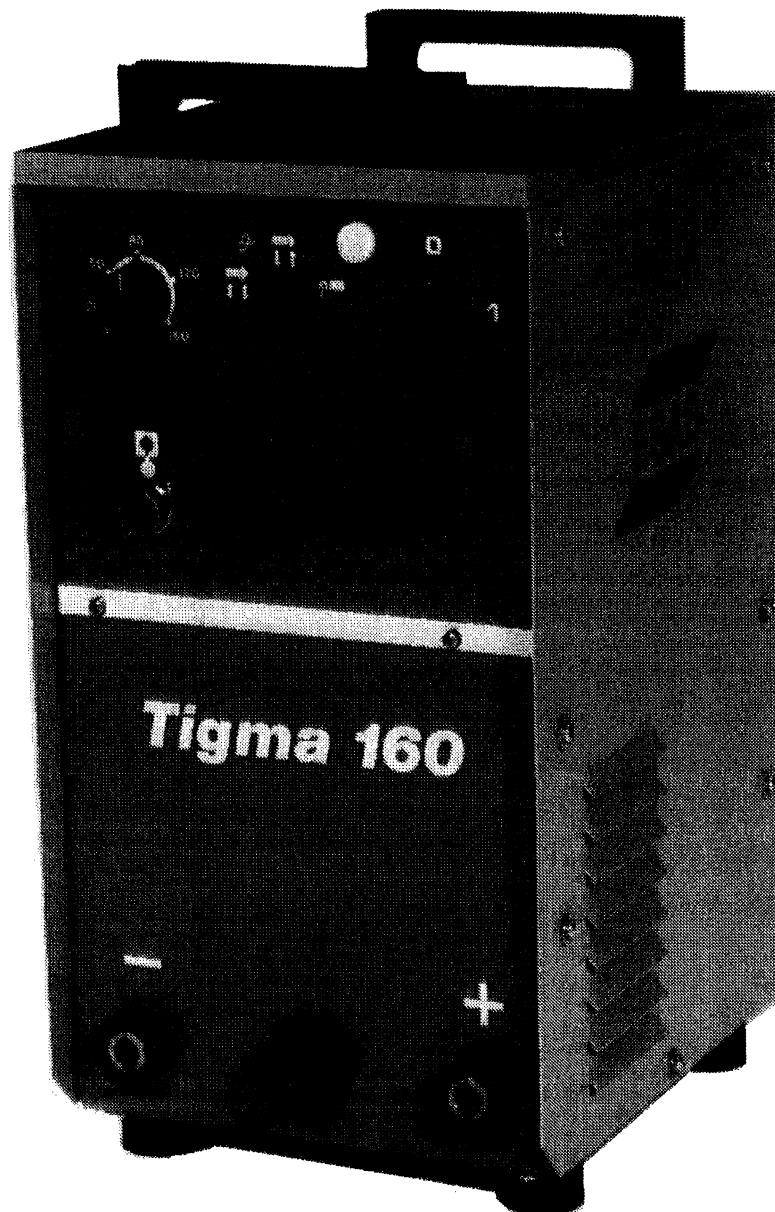
PROTECT YOURSELF AND OTHERS!

INTRODUCTION

LTG 160 is the name of ESAB's new rectifier intended for TIG and MMA welding. The machine is connected to single phase and has selectable voltage of 230 V or 400 V, 50 Hz.

Trouble-shooting and repairs demand a good professional knowledge. As a rule, all major repairs should only be carried out by specially trained personnel.

When contacting either ESAB or one of their retail dealers please state the machine type and serial number found on the rating plate.



cnj0ap01

TECHNICAL DESCRIPTION

TECHNICAL DESCRIPTION

LTG 160 consists of a power unit, a control unit and an ignition unit. The power unit is air cooled and contains a main transformer, bridge rectifier, inductor, cooling fan, main power switch and a control lamp. The control unit contains a potentiometer for current setting and the control electronics.

Slope down function is operational when the 2/4 step switch is in the 4 step position and the trigger is pressed in and the current slopes down to 5 A in 4 seconds. (R76 at the PCB)

By pressing the torch trigger while welding and releasing it immediately the welding process is stopped without the slope- down function.

The machine is mains-stabilised and has a feed-back control system to maintain a constant welding current. The welding current is not affected by changes of temperature or fluctuations in mains voltage.

Automatic Gas Flow

When the torch trigger is pressed the gas flow starts automatically. The gas post-flow time is preset to 8 seconds. (R9 at the PCB)

TECHNICAL DATA

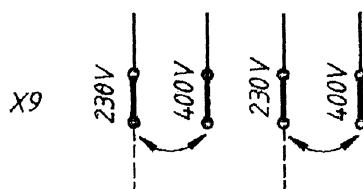
Power supply single phase 50 Hz	230/400 V
Fuse slow blow	16/10 A
Permissible load	
35%	160 A/16 V
60%	115 A/15 V
100%	90 A/14 V
Power factor λ	0.85
Slope-up	0.1 sec, not adjustable
Slope-down	4 sec.
Setting range TIG	5-160 A
Gas post-flow	8 sec fixed time.
Open Circuit voltage	90 V
Weight	51 kg
Dimension (lxwxh)	330x260x570 mm
Enclosure type	IP 21
Temperature Class	F
Standard	ISO 700 VDE 0542 K

INSTALLATION

OKC-connectors, mains cable and 5m of return cable are supplied with delivery.
WARNING! Disconnect mains cable before opening side wall.

1. The machine is connected to single phase 230 or 400V, 50Hz. The voltage selection is made on terminal X9 (left side above main transformer) see wiring diagram, cables 130 and 21 are connected to the required voltage which is marked on the transformer.

Do not touch this side where 4 contacts are connected



nja2op00

Change here (2 wires)

2. When MMA welding the return cable is connected to either the - or + socket depending on the electrodes used.
3. When TIG welding the torch is connected to the central socket the return cable is connected to the OKC socket marked +.
4. Connect the gas and set the correct flow.

OPERATION

All the LTG 160 controls are situated on the front panel.

- Switch the main power switch (1) on. The fan starts, check that the air flow through the machine is not obstructed.

- **TIG Welding**

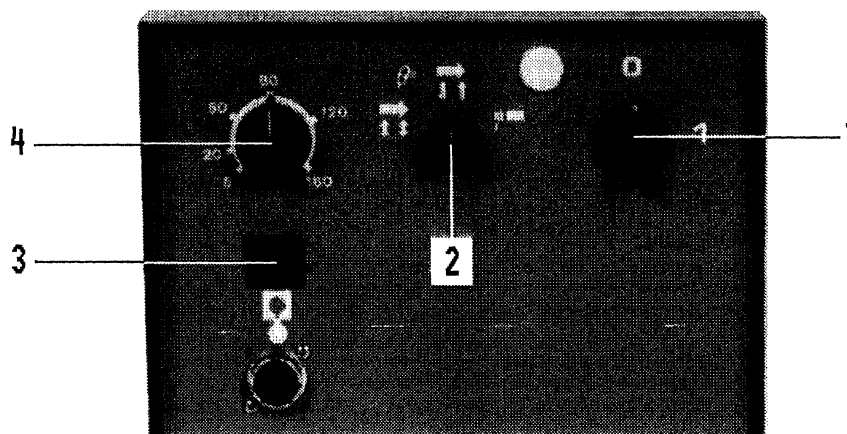
Set the mode selector (2) in the TIG position, the lamp is lit when the torch trigger is activated.

- Check that the TIG torch and the return cable are properly connected.
- Check that a correctly ground electrode is fitted to the torch.
- Use the correct gas and set the flow.
- Select internal or remote control with switch (3).
- Set the required welding current (4).
- The machine is now ready for welding. Refer to ESAB's TIG Handbook for welding instructions.

- **MMA Welding**

Check that the electrode holder and the return cable are properly connected.

- Check that a D.C. electrode is to be used.
- Set the mode selector (2) in the MMA position, the lamp is lit. is not obstructed.
- Select internal or remote control with the switch (3).
- Set the required welding current (4).
- The machine is now ready for welding.



nja2op02

MAINTENANCE

LTG 160 needs little maintenance. Normally it is enough to clean the machine using dry compressed air at a reduced pressure once a year. However, if the machine is used in a dusty or dirty environment cleaning should occur on a more regular basis.

IMPORTANT

This welding equipment has been designed, manufactured and tested to the highest quality standards to ensure long and trouble free life. However, regular maintenance is an essential part of keeping the machine operating in a reliable and safe manner and your attention is drawn to any maintenance instructions that are contained in this manual.

In general, all welding equipment should be thoroughly inspected, tested and serviced at least annually. More frequent checking will be required when the equipment is heavily used.

Wear and tear, particularly in electro-mechanical and moving components, are gradual processes. Caught in time, repair costs are small and the benefits in performance, reliability and safety are significant. Left alone, they can put the equipment, and you at risk.

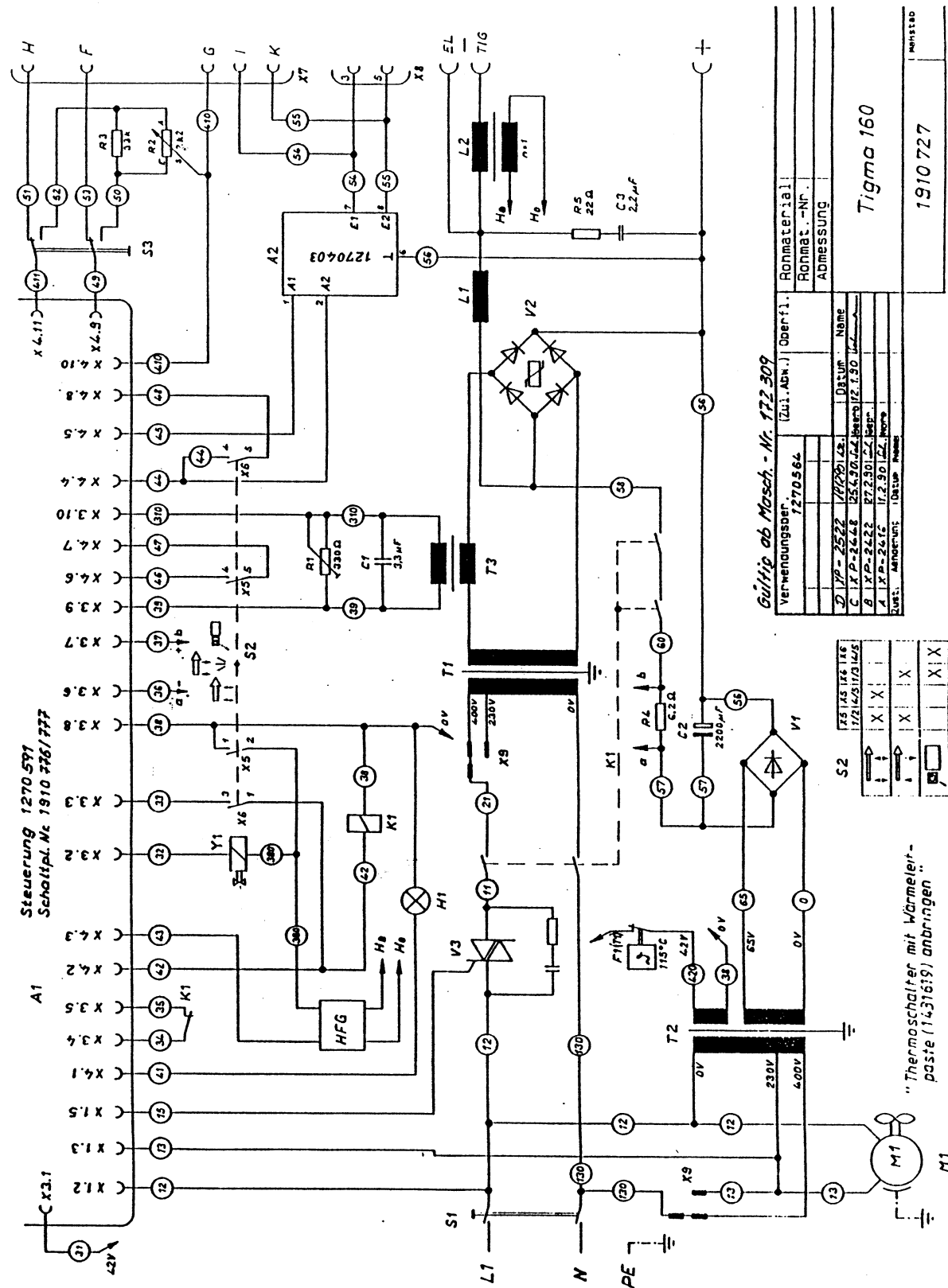
Have this equipment regularly inspected and maintained by an approved service centre.

ACCESSORIES

ACCESSORIES

Order Number.	
TIGMA 160 220/380 V, 50 Hz	467 375-880
Trolley	347 480-882
Pulse unit PHA 5	367 970-880
5 m Connecting cable to PHA 5	367 144-881
10 m Connecting cable to PHA 5	367 144-882
Foot pedal FS 002 incl. cable	349 090-886
TIG torch BTD 153 self-cooled 4 m	368 347-886
TIG torch BTD 153 self-cooled 8 m	368 347-887
Scanorama, welding helmet	366 734-880

Schema - Diagram - Schaltplan - Schéma



Reservdelsförteckning

Reservdelar beställs genom närmaste ESAB-representant, se sista sidan. Vid beställning v.v. uppgi typ och tillverkningsnummer samt benämningar och beställningsnummer enl. reservdelsförteckningen.

Spare parts list

Spare parts are to be ordered through the nearest ESAB agency as per the list on the back of the cover. Kindly indicate type of unit, serial number, denominations, and ordering numbers acc. to the spare parts list.

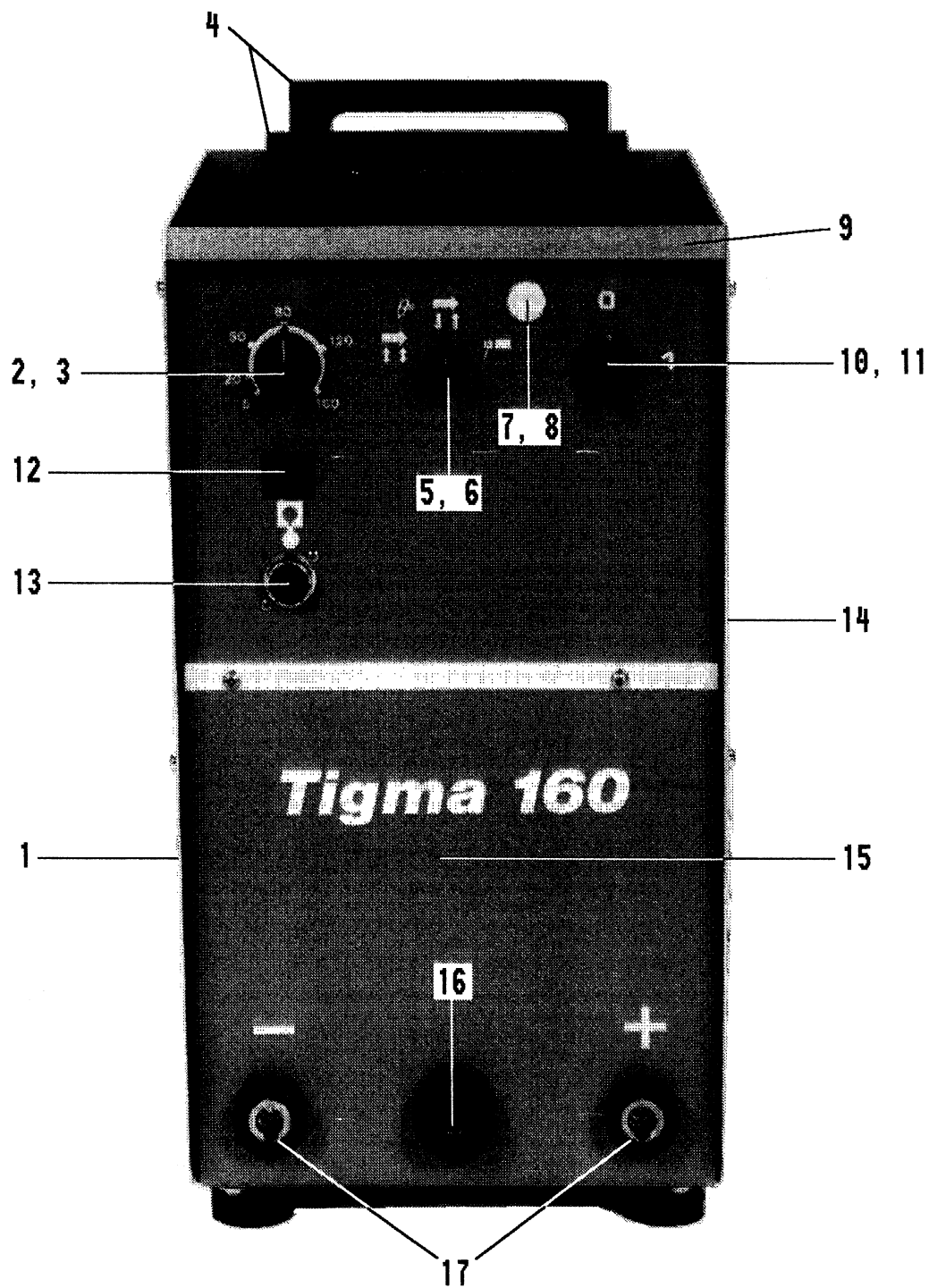
Ersatzteilverzeichnis

Die Ersatzteile können bei der nächsten ESAB-Vertretung bestellt werden, siehe letzte Seite. Bitte geben Sie Typenbezeichnung und Herstellnummer sowie Bezeichnungen und Bestellnummern lt. Ersatzteilverzeichnis an.

Liste de pièces détachées

Au dos de la brochure, vous trouverez l'adresse du représentant ESAB le plus proche. Prière du lui adresser votre commande, après avoir pris le soin de mentionner le type et le numéro de série de l'unité ainsi que le numéro de commande et la désignation conformément à la liste de pièces détachées.

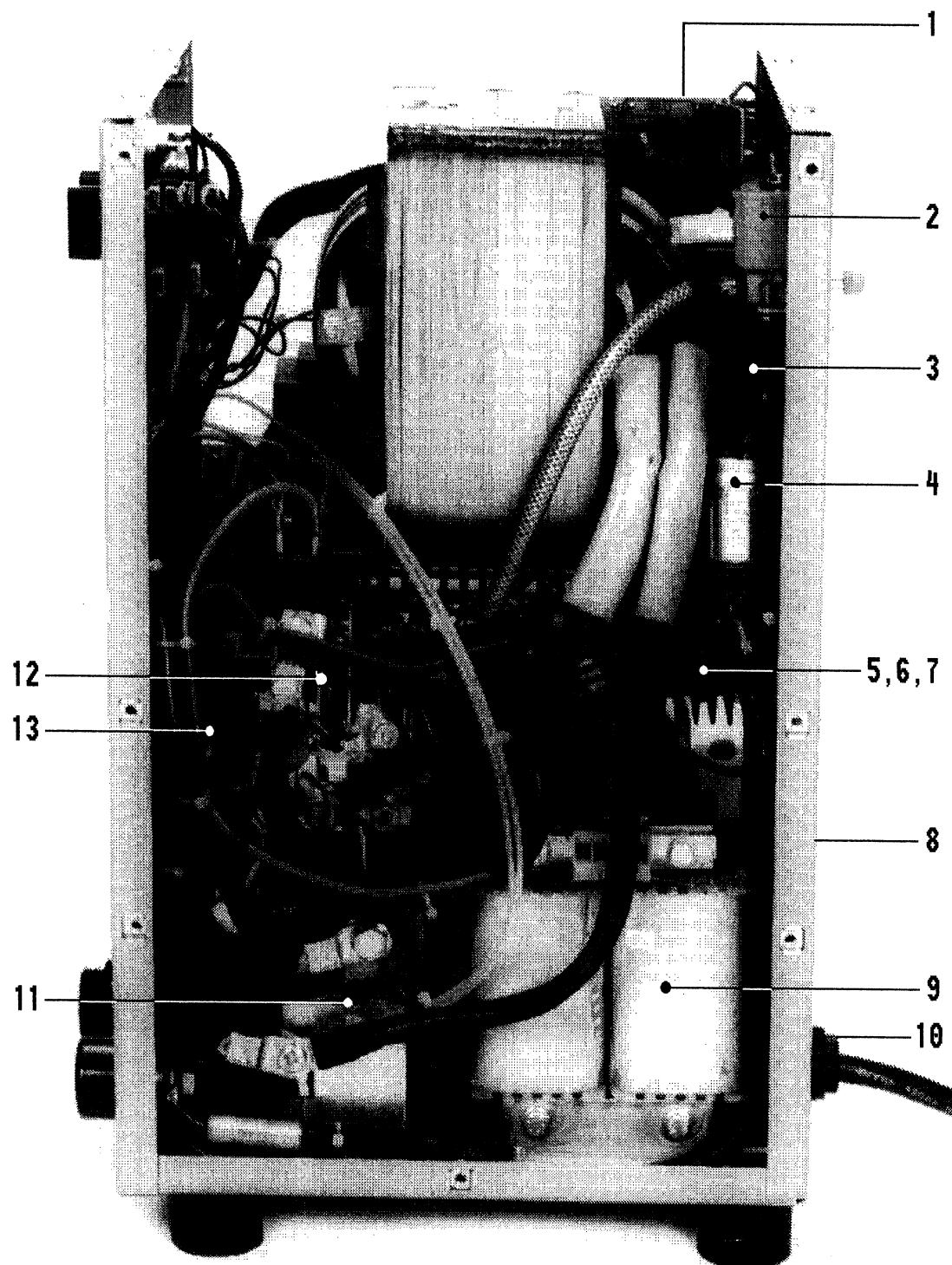
Pos nr Item no. Pos. Nr. No. de réf.	Ant Qty Anz Qté	Best nr Ordering no. Bestellnr. No. de commande	Benämning	Denomination	Bezeichnung	Désignation	Anm Remarks Anm. Remarque
01	1	467 375-880 467 606-001	LTG 160 Sidoplåt	Side plate	Deckblech, seite	Plaque latérale	
02	1	467 619-001	Potentiometer	Potentiometer	Potentiometer	R2	R2
03	1	467 622-001	Ratt	Knob	Knebel	Bouton	
04	2	156 388-001	Handtag	Handle	Griff	Poignée	
05	1	467 604-001	Kretskort	PC-board	Leiterplatte	Circuit imprimé	S2
06	1	467 623-001	Vred	Knob	Knebel	Bouton	
07	1	467 618-001	Lamphållare	Lampholder	Lampenhalter	Porte de lampe	
08	1	467 613-001	Lampa	Lamp	Meldeleuchte	Lampe	H1
09	1	467 609-001	Lock	Cover	Deckblech	Couvercle	
10	1	347 316-101	Strömbrytare	Switch	Schalter	Interrupteur	S1
11	1	347 316-102	Vred	Knob	Knebel	Bouton	S1
12	1	467 620-001	Omkopplare	Switch	Schalter	Sélecteur	S3
13	1	368 544-003	Uttag	Terminal	Anschluß	Prise	X7
14	1	467 605-001	Sidoplåt	Side plate	Seitenblech	Plaque latérale	
15	1	467 607-001	Frontplåt	Front panel	Frontteil	Plaque frontale	
16	1	367 258-880	Centralanslutning	Centralconnection	Zentralanschluss	Conexion centrale	
17	2	160 362-881	Maskinkontakt	Welding current terminal	Schweisstromanschluss	Borne de courant de soudage	



nja2op03

Reservdelsförteckning - Spare parts list - Ersatzteilverzeichnis - Liste de pièces détachées

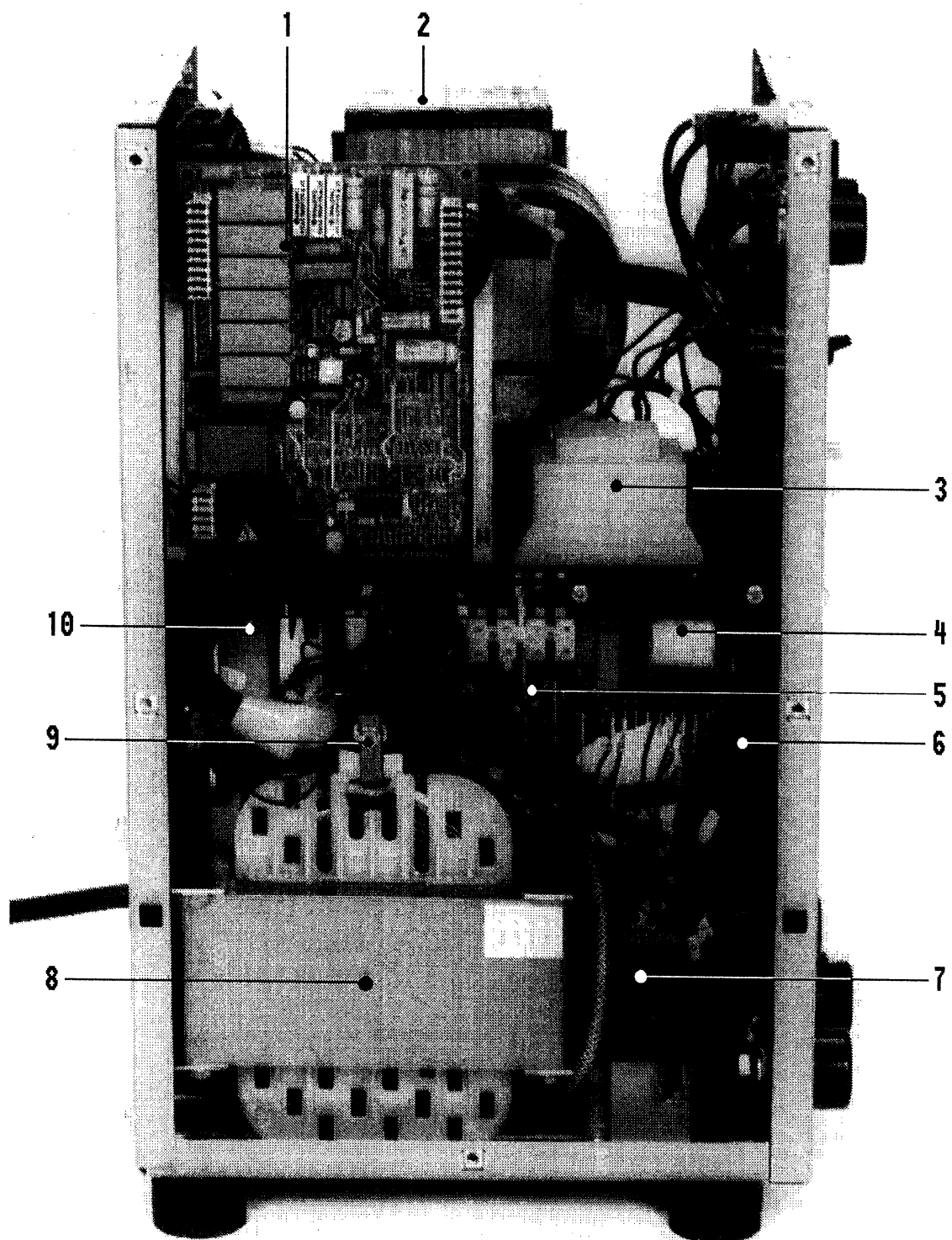
Pos nr Item no. Pos. Nr. No. de réf.	Ant Qty Anz Qté	Best nr Ordering no. Bestellnr. No. de commande	Benämning	Denomination	Bezeichnung	Désignation	Anm Remarks Anm. Remarque
01	1	467 614-001	Motstånd	Resistor	Widerstand	Résistance	R1
02	1	193 054-002	Magnetventil	Solenoid valve	Magnetventil	Electrovanne	Y1
03	1	467 621-001	Fläkt	Fan	Gebläse	Ventilateur	M1
04	1	467 615-001	Kondensator	Capacitor	Kondensator	Condensateur	
05	1	467 616-001	Kylkropp med triac	Cooling element with triac	Kühlkörper mit triac	Elément réfrigérant avec triac	V3
06	1	467 617-001	Triac	Triac	Triac	Triac	V3
07	1	467 601-001	Kretskort	PC-board	Leiterplatte	Circuit imprimé	V3
08	1	467 608-001	Bottenplåt och bakstycke	Base plate and rear panel	Grundplatte und Rückteil	Plaque de base et plaque arrière	
09	1	467 625-001	Manövertransformator	Control transformer	Steuertrafo	Transformateur de commande	T2
10	1	467 815-001	Kabelavlastare	Cable clamp	Leitungsentlastung	Porte-câble	
11	1	367 245-880	HF-spole	HF-coil	HF-spule	Bobine HF	L2
12	1	467 611-001	Likriktare	Rectifier	Gleichrichter	Redresseur	V1
13	1	467 610-001	Motstånd	Resistor	Widerstand	Résistance	R4



nja2op04

Reservdelsförteckning - Spare parts list - Ersatzteilverzeichnis - Liste de pièces détachées

Pos nr Item no. Pos. Nr. No. de réf.	Ant Qty Anz Qté	Best nr Ordering no. Bestellnr. No. de commande	Benämning	Denomination	Bezeichnung	Désignation	Anm Remarks Anm. Remarque
01	1 1	467 603-001 468 230-001	Kretskort Kretskort	PC-board PC-board	Leiterplatte Leiterplatte	Circuit imprimé Circuit imprimé	A1 A1 (Ser.No > 169.652)
02	1	467 598-001	Induktor	Inductor	Induktor	Inducteur	L1
03	1	468 228-001	HF-don	HF-unit	HF-Gerät	Dispositif HF	HFG
04	1	467 602-001	Filter	Filter	Filter	Filtre	
05	1	467 624-001	Likriktare	Rectifier	Gleichrichter	Redresseur	V2
06	1	467 610-001	Motstånd	Resistor	Widerstand	Résistance	R4
07	1	467 612-001	Kontaktor	Contacteur	Schütz	Contacteur	K1
08	1	467 598-001	Transformator	Transformer	Trafo	Transformateur	T1
09	1	467 850-001	Termostat	Thermostat	Thermostat	Thermostat	F1
10	1	467 600-001	Strömvkännare	Current indication	Stromabnehmer	Détecteur de courant	T3



nja2op05

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 2 726 80 05

THE CZECH REPUBLIC

ESAB VAMBERK s.r.o.
Prague
Tel: +420 2 819 40 885
Fax: +420 2 819 40 120

DENMARK

Aktieselskabet ESAB
Copenhagen-Valby
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: +49 212 298 204

GREAT BRITAIN

ESAB Group (UK) Ltd
Waltham Cross
Tel: +44 1992 76 85 15
Fax: +44 1992 71 58 03

ESAB Automation Ltd
Andover
Tel: +44 1264 33 22 33
Fax: +44 1264 33 20 74

HUNGARY

ESAB Kft
Budapest
Tel: +36 1 20 44 182
Fax: +36 1 20 44 186

ITALY

ESAB Saldatura S.p.A.
Mesero (Mi)
Tel: +39 02 97 96 81
Fax: +39 02 97 28 91 81

THE NETHERLANDS

ESAB Nederland B.V.
Utrecht
Tel: +31 30 248 59 22
Fax: +31 30 248 52 60

NORWAY

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

POLAND

ESAB Sp.z.o.o
Warszaw
Tel: +48 22 813 99 63
Fax: +48 22 813 98 81

PORTUGAL

ESAB Lda
Lisbon
Tel: +351 1 837 1527
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.
Alcobendas (Madrid)
Tel: +34 91 623 11 00
Fax: +34 91 661 51 83

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 31 333 43 33
Fax: +55 31 361 31 51

CANADA

ESAB Group Canada Inc.
Mississauga, 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 44 58

Asia/Pacific

AUSTRALIA

ESAB Australia Pty Ltd
Ermington
Tel: +61 2 9647 1232
Fax: +61 2 9748 1685

CHINA

Shanghai ESAB A/P
Shanghai
Tel: +86 21 6539 7124
Fax: +86 21 6543 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 01 88
Fax: +62 21 461 29 29

MALAYSIA

ESAB (Malaysia) Snd Bhd
Selangor
Tel: +60 3 703 36 15
Fax: +60 3 703 35 52

SINGAPORE

ESAB Singapore Pte Ltd
Singapore
Tel: +65 861 43 22
Fax: +65 861 31 95

ESAB Asia/Pacific Pte Ltd
Singapore
Tel: +65 861 74 42
Fax: +65 863 08 39

SOUTH KOREA

ESAB SeAH Corporation
Kyung-Nam
Tel: +82 551 289 81 11
Fax: +82 551 289 88 63

THAILAND

ESAB (Thailand) Ltd
Samutprakarn
Tel: +66 2 393 60 62
Fax: +66 2 748 71 11

UNITED ARAB EMIRATES

ESAB Middle East
Dubai
Tel: +971 4 338 88 29
Fax: +971 4 338 87 29

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-CIS

ESAB Representative Office
Moscow
Tel: +7 095 937 98 20
Fax: +7 095 937 95 80

ESAB Representative Office
St Petersburg
Tel: +7 812 325 43 62
Fax: +7 812 325 66 85

Distributors

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

www.esab.com



ESAB Welding Equipment AB
SE-695 81 LAXÅ
SWEDEN
Phone +46 584 81 000
Fax +46 584 123 08

www.esab.com