

# ***LAF 1601/ LAF 1601M***



**Instruction manual**



## DECLARATION OF CONFORMITY

According to

The Low Voltage Directive 2006/95/EC, entering into force 16 January 2007

The EMC Directive 2004/108/EC, entering into force 20 July 2007

### Type of equipment

Welding power source

### Type designation etc.

LAF 1601 from serial number 935 xxx xxxx (2009 w.35)

### Brand name or trade mark

ESAB

### Manufacturer or his authorised representative established within the EEA

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### The following harmonised standard in force within the EEA has been used in the design:

EN 60974-1, Arc welding equipment – Part 1: Welding power sources

EN 60974-10, Arc welding equipment – Part 10: Electromagnetic compatibility (EMC) requirements

Additional information: Restrictive use, Class A equipment, intended for use in locations other than residential

**By signing this document, the undersigned declares as manufacturer, or the manufacturer's authorised representative established within the EEA, that the equipment in question complies with the safety requirements stated above.**

Date  
Laxå 2009-09-15

Signature

A handwritten signature in dark ink, appearing to read "Kent Eimbrodt", written over a light-colored background.

Kent Eimbrodt  
Clarification

Position  
Global Director  
Equipment and Automation

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# 1 SAFETY

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Users of ESAB 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 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 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 equipment must be familiar with:
  - its operation
  - location of emergency stops
  - its function
  - relevant safety precautions
  - welding and cutting
2. The operator must ensure that:
  - no unauthorized 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 drafts
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 extinguishing equipment must be clearly marked and close at hand.
  - Lubrication and maintenance must **not** be carried out on the equipment during operation.



## CAUTION

*This product is solely intended for arc welding.*



# WARNING



**Arc welding and cutting can be injurious to yourself and others. Take precautions when welding and cutting. Ask for your employer's safety practices which should be based on manufacturers' hazard data.**

**ELECTRIC SHOCK - Can kill**

- Install and earth the 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.**

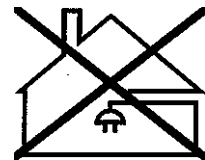
**Read and understand the instruction manual before installing or operating.**

**PROTECT YOURSELF AND OTHERS!**



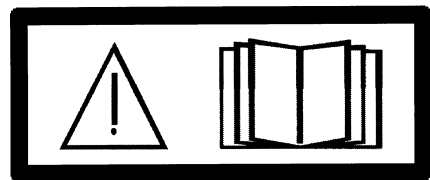
## CAUTION

*Class A equipment is not intended for use in residential locations where the electrical power is provided by the public low-voltage supply system. There may be potential difficulties in ensuring electromagnetic compatibility of class A equipment in those locations, due to conducted as well as radiated disturbances.*



## CAUTION

*Read and understand the instruction manual before installing or operating.*



**Dispose of electronic equipment at the recycling facility!**

In observance of European Directive 2002/96/EC on Waste Electrical and Electronic Equipment and its implementation in accordance with national law, electrical and/or electronic equipment that has reached the end of its life must be disposed of at a recycling facility.

As the person responsible for the equipment, it is your responsibility to obtain information on approved collection stations.

For further information contact the nearest ESAB dealer.

**ESAB can provide you with all necessary welding protection and accessories.**

## 2 INTRODUCTION

LAF 1601/ LAF 1601M are remote-controlled 3-phase welding power sources designed for high-efficiency mechanical submerged-arc welding (SAW).

The welding power sources are fan-cooled and are monitored by a thermal cutout against overload. When the thermal cutout is deployed the yellow lamp on the front panel illuminates automatically. The reset is carried out automatically when the temperature has decreased to a permitted level.

## 3 TECHNICAL DATA

	LAF 1601	LAF 1601M
<b>Mains connection:</b>	400/415/500 V, 3~50 Hz 400/440/550 V, 3~60 Hz	220/230/400/415/500 V, 3~50 Hz 230/400/440/550 V, 3~60 Hz
<b>Primary current</b>	$I_{max}$ 136 A	$I_{max}$ 235 A
<b>Permissible load at:</b> 100 % duty cycle	1600 A / 44 V	1600 A / 44 V
<b>Setting range</b>	100-1600 A / 24-44 V	100-1600 A / 24-44 V
<b>No-load voltage</b>	56 V	56 V
<b>No-load power</b>	230 W	230 W
<b>Efficiency</b>	89%	89%
<b>Power factor</b>	0,86	0,86
<b>Weight</b>	585 kg	585 kg
<b>Dimensions L x W x H</b>	774 x 598 x 1430	774 x 598 x 1430
<b>Insulation class (transformer):</b>	<b>H</b>	<b>H</b>
<b>Enclosure class</b>	<b>IP 23</b>	<b>IP 23</b>
<b>Application class</b>	<b>S</b>	<b>S</b>

### 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.

## 4 INSTALLATION

*The installation must be carried out by a professional.*

### Note

#### Mains supply requirements

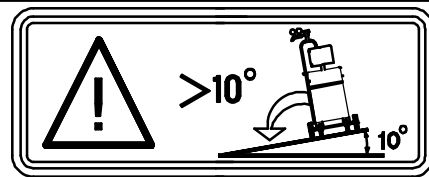
High power equipment may, due to the primary current drawn from the mains supply, influence the power quality of the grid. Therefore connection restrictions or requirements regarding the maximum permissible mains impedance or the required minimum supply capacity at the interface point to the public grid may apply for some types of equipment (see technical data). In this case it is the responsibility of the installer or user of the equipment to ensure, by consultation with the distribution network operator if necessary, that the equipment may be connected.

### 4.1 Location



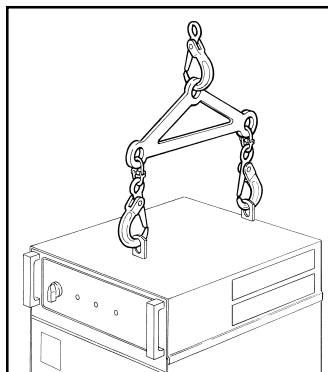
#### WARNING

*Fasten the equipment - particularly if the ground is uneven or sloping.*



- Place the welding power source on a level foundation.
- Make sure there is nothing to prevent the cooling.

#### Lifting instructions



## 4.2 Connections

- On delivery the welding power source is connected for 400 V.

- For other supply voltage:

Remove the left side plate.

Perform the switchings on the main and control transformer in accordance with the connection instruction on page 16.

- Select the mains cable with the correct cable area and fuse the cable with the correct fuse in accordance with local regulations (see the table on page 8).

- Remove the front plates (x 2).

- Connect the ground cable to the screw marked .

- Tighten the cable clamp (1).

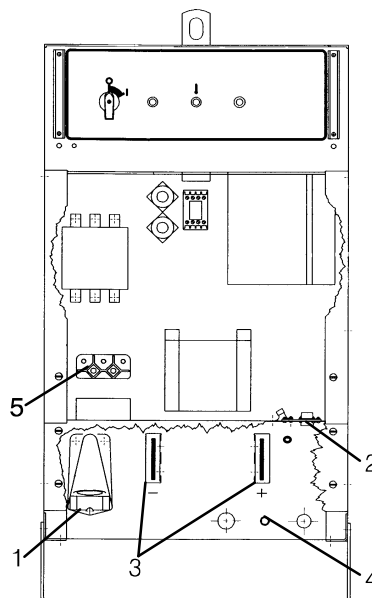
- Connect the mains cables to the main connection terminals L1, L2 and L3 (5).

- Connect the control cable between the welding power source and the control box to the 28-pin connector (2) on the inside of the welding power source.

- Connect the 1-pin measuring cable (4) for measuring the arc voltage to the return cable/ welding head.

- Connect a suitable welding and return cable in the connectors (3) marked + and - on the front of the welding power source.

- Fit the side/front plates.



### Mains connection

LAF 1601	50 Hz		60 Hz	
	Voltage (V)	400 / 415	500	400 / 440
Phase current $I_{1eff}$ (A)	136	108	136	108
Cable area (mm <sup>2</sup> )	3 x 70+35	3 x 50+35	3x70+ 35	3x70+ 35
Fuse, slow (A)	160	125	160	125

LAF 1601M	50 Hz			60 Hz		
	Voltage (V)	230	400 / 415	500	230	400 / 440
Phase current $I_{1eff}$ (A)	235	136	108	235	136	108
Cable area (mm <sup>2</sup> )	3x120+70	3x70+35	3x50+35	3x120+70	3x70+ 35	3x70+ 35
Fuse, slow (A)	200	160	125	200	160	125

#### Note:

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.



## 5 OPERATION

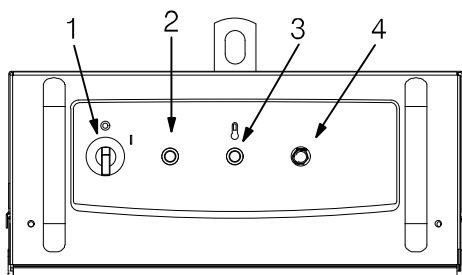
**General safety regulations for handling of the equipment can be found on page 4. Read through before you start using the equipment!**

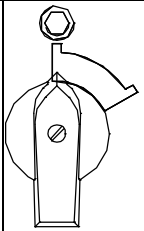




**Note!** Never use the welding power source without side plates.

**Note!** The power source must be set to analogue mode to use the PEI control unit.

### 5.1 Controls

The front panel contains:



1.		<p>Main circuit-breaker for switching the mains voltage and the fan on and off in the welding power source.</p> <ul style="list-style-type: none"> <li>• Position "1" On</li> <li>• Position "0" Off</li> </ul>
2.		<ul style="list-style-type: none"> <li>• The indicator lamp (white) illuminates when the main switch is switched on.</li> </ul>
3.	 	<p>Indicator lamp for overheating (yellow)</p> <ul style="list-style-type: none"> <li>• The indicator lamp illuminates when the thermal cutout is deployed due to excess temperature in the welding power source.</li> <li>• The indicator lamp goes out when the temperature in the welding power source has decreased to a permitted level.</li> </ul>
4.		<p>Pushbutton resetting the automatic fuse <i>FU2</i> for 42 V supply voltage.</p>

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## 6 MAINTENANCE

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### CAUTION

*All guarantee undertakings from the supplier cease to apply if the customer attempts any work in the product during the guarantee period in order to rectify any faults.*

### 6.1 Cleaning

#### 6.1.1 Welding power source



### WARNING!

Blocked air inlets or outlets will lead to overheating.

- Clean the welding power source as necessary.  
Dry compressed air is recommended for the purpose.

#### 6.1.2 Contactor



### WARNING!

**Never** use compressed air to clean the contactor without first taking it apart completely.

**Note:**

To ensure the reliable operation of the contactor, the magnetic parts must be kept clean.

If the contactor has to be cleaned it **must** be taken apart, and all the pieces be cleaned.

Alternatively, the contactor can be replaced.

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## 7 ORDERING OF SPARE PARTS

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*Repair and electrical work should be performed by an authorized ESAB serviceman. Use only ESAB original spare and wear parts.*

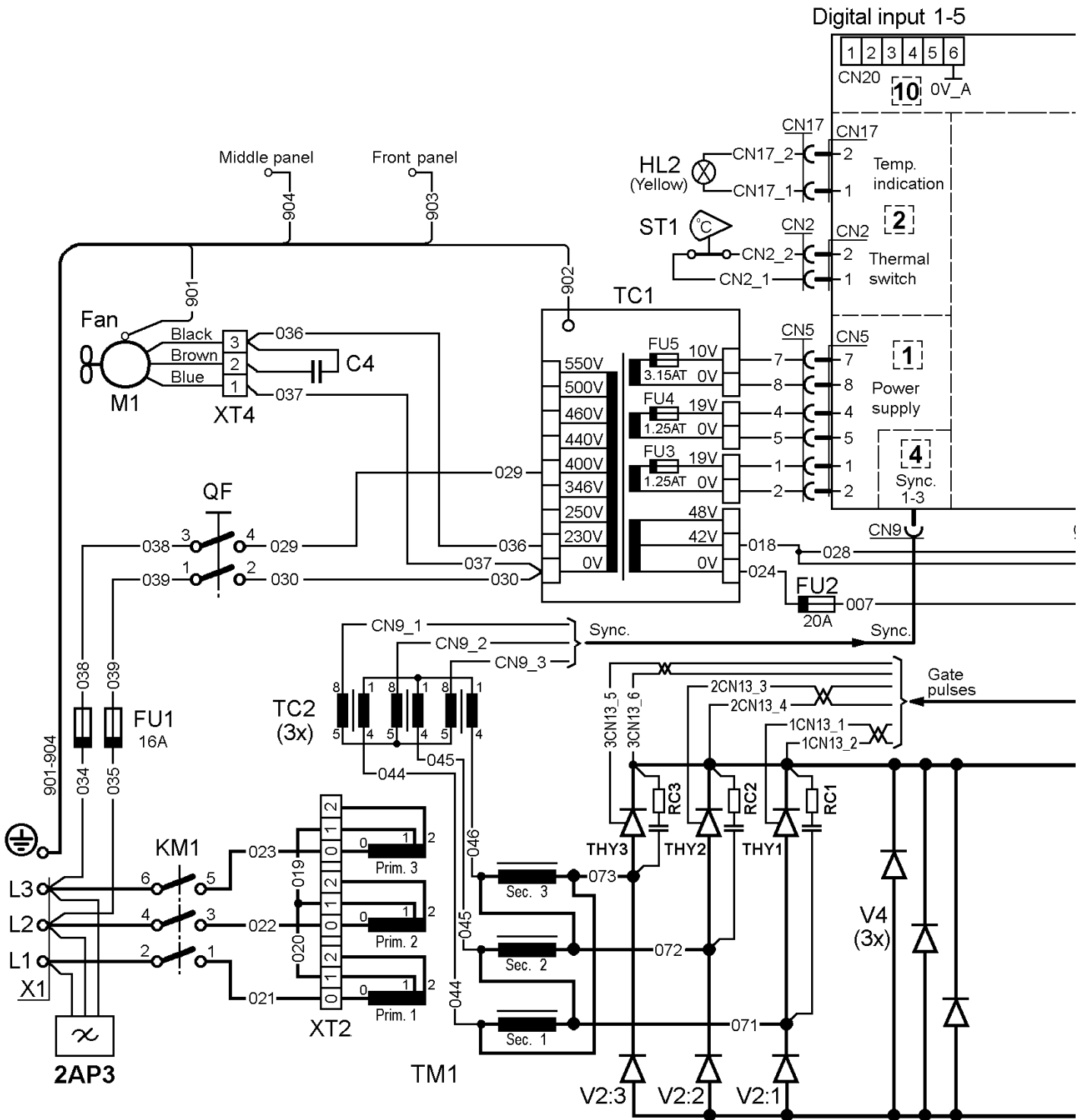
**LAF 1601/ LAF 1601M is designed and tested in accordance with the international and European standards EN 60974-1 and EN 60974-10. It is the obligation of the service unit which has carried out the service or repair work to make sure that the product still conforms to the said standard.**

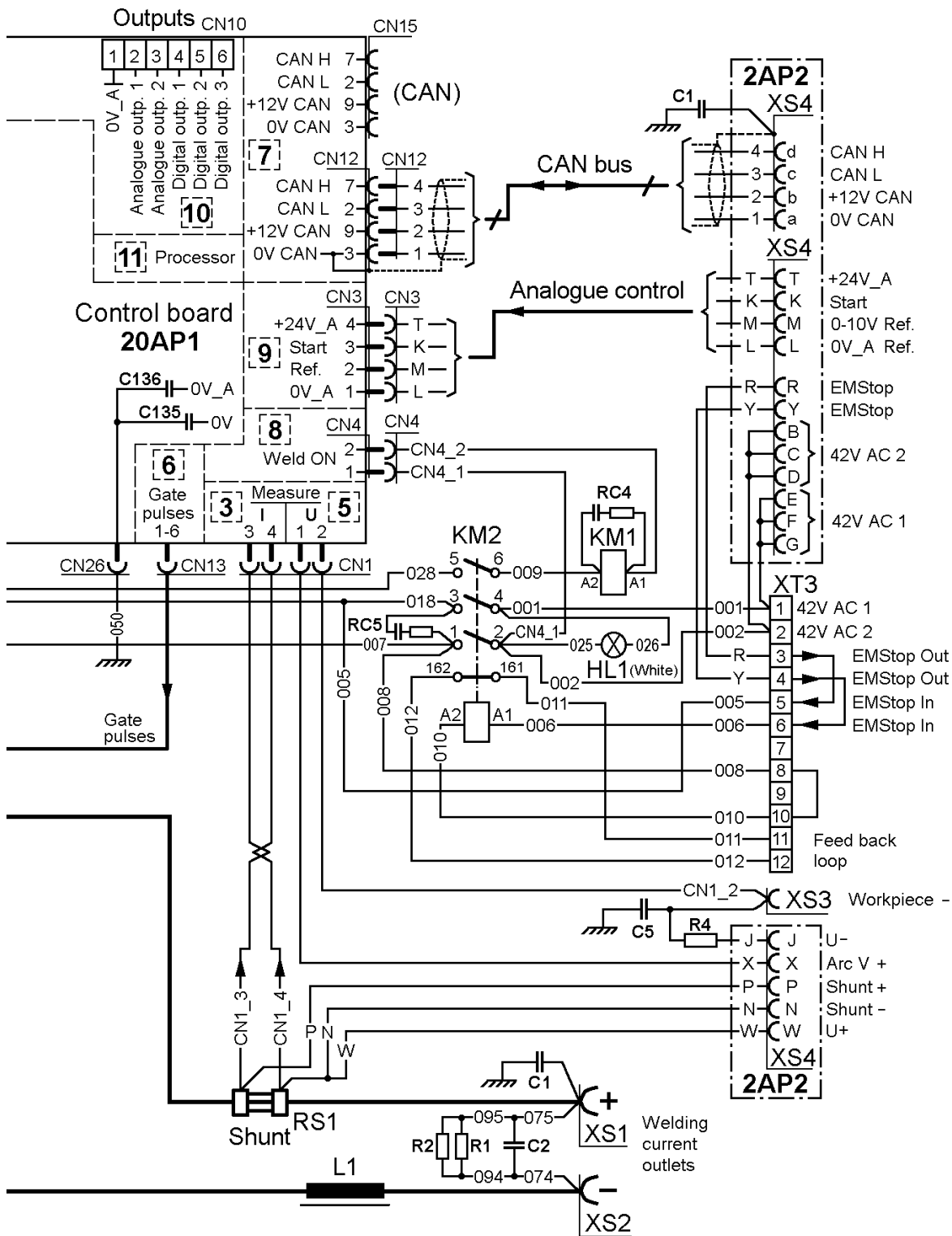
Spare parts may be ordered through your nearest ESAB dealer, see the last page of this publication.



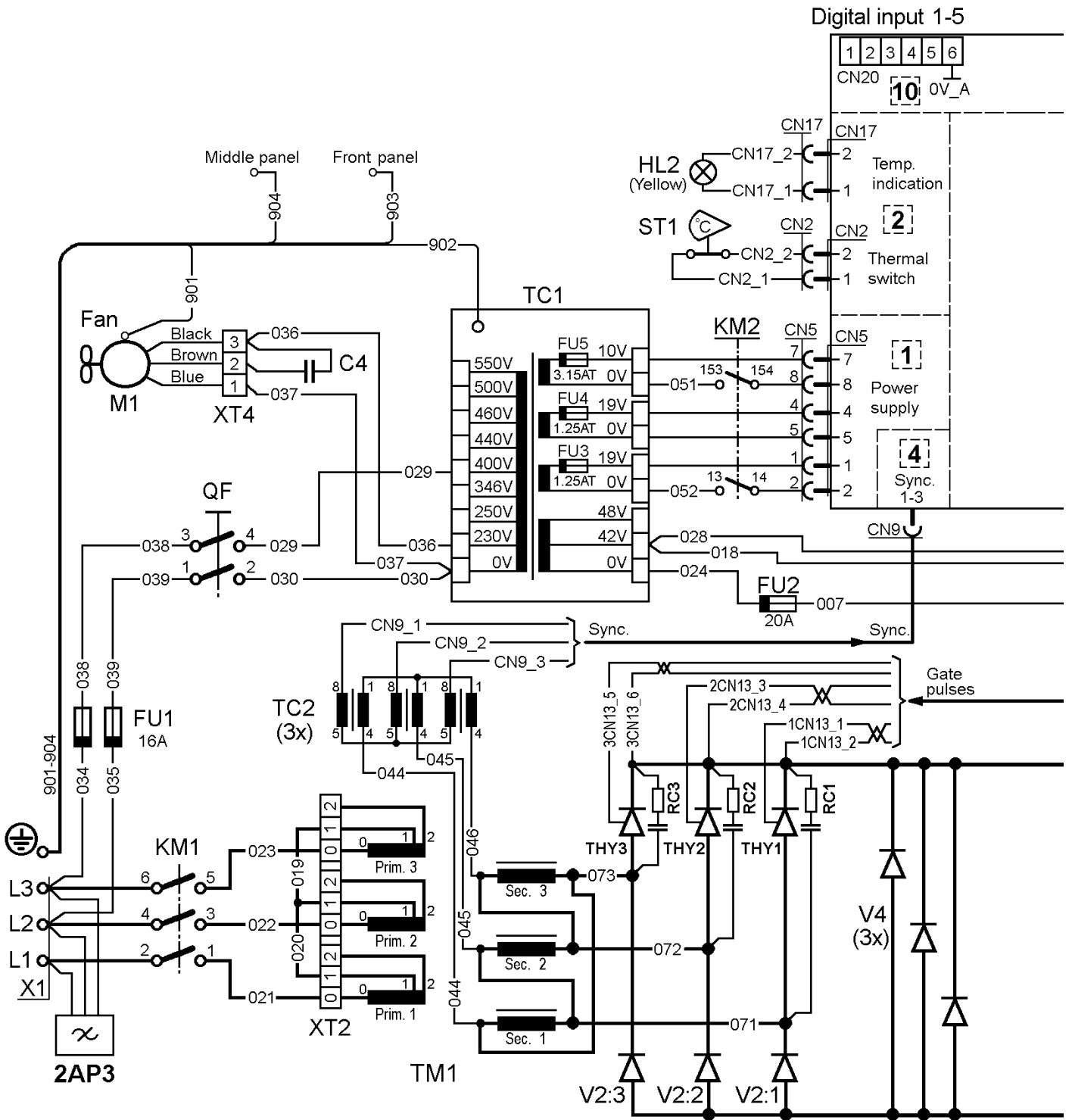
# Diagram

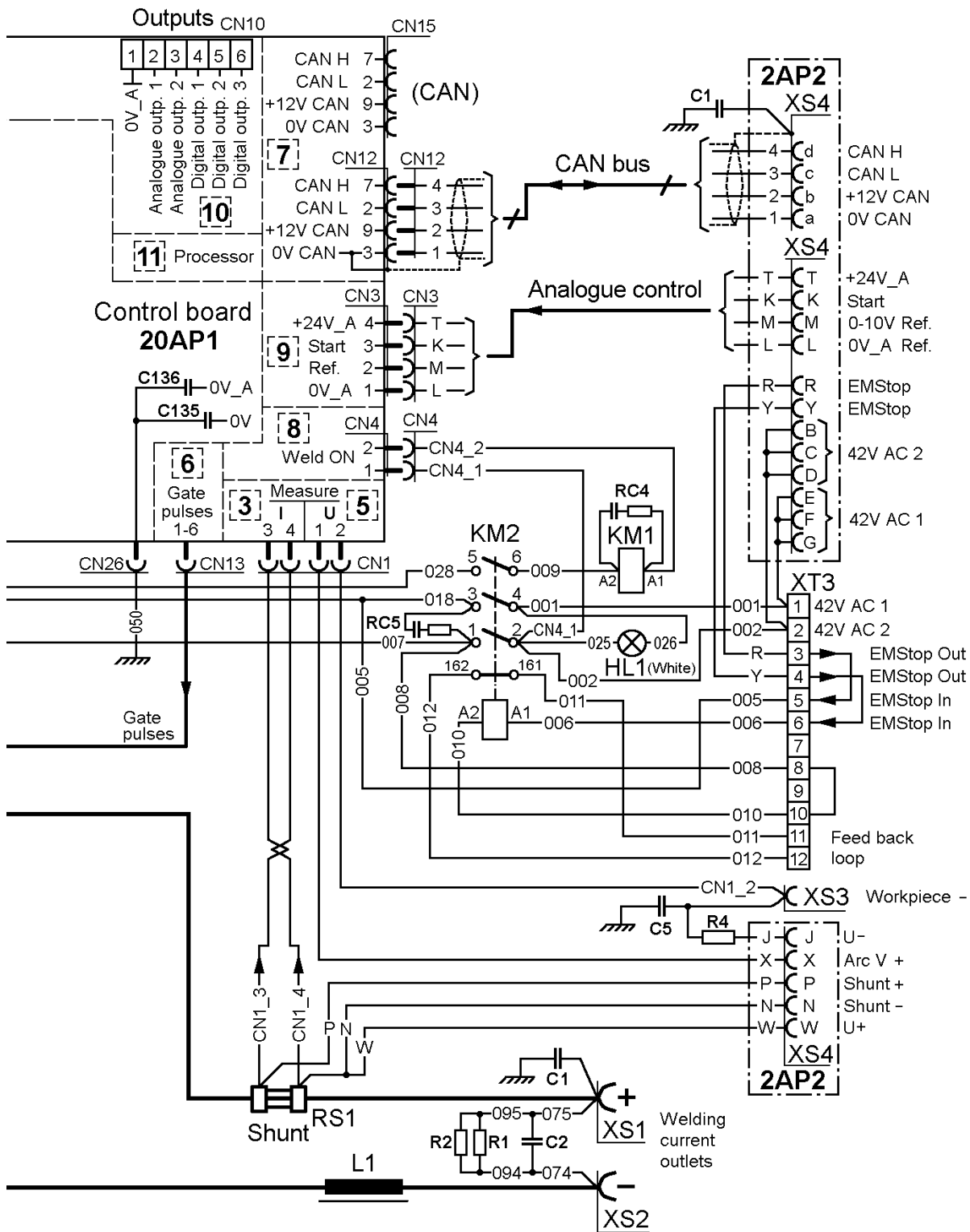
Valid for serial no 935-xxx-xxxx





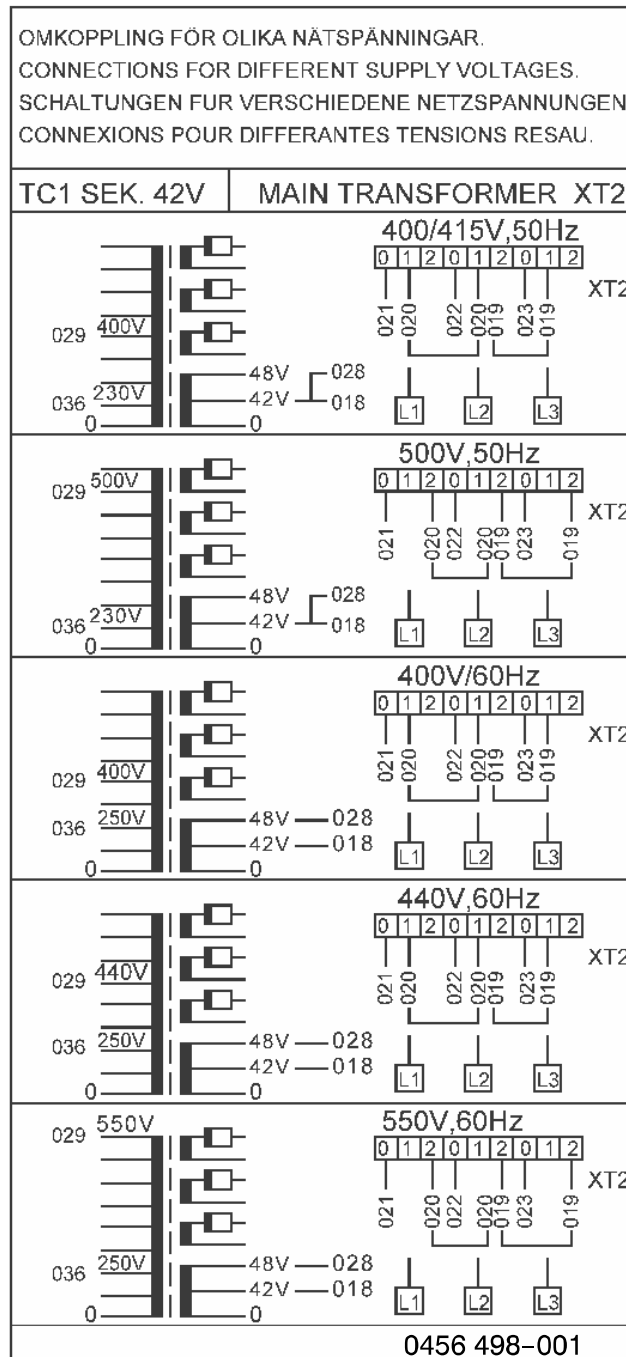
Valid for serial no 126-xxx-xxxx





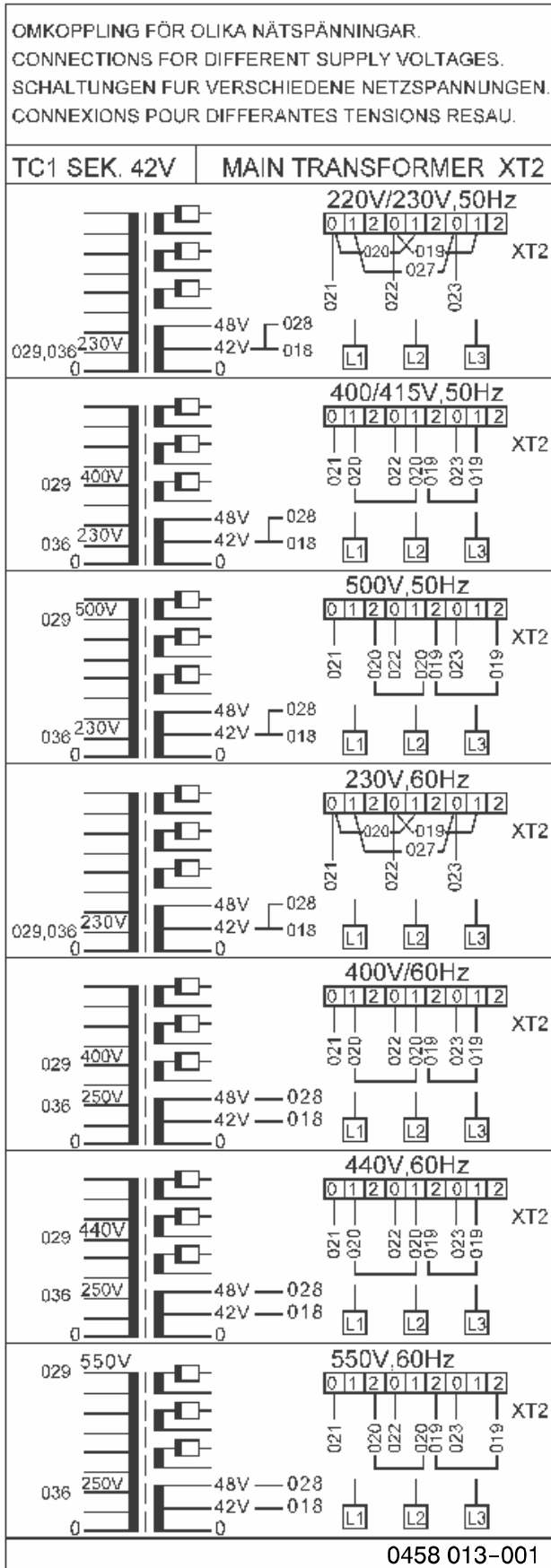
# Connection instruction

LAF 1601





LAF 1601M



## LAF 1601/ LAF 1601M

### Ordering number



Ordering no.	Denomination	Notes
0460 515 880	Welding power source	LAF 1601
0460 515 881	Welding power source	LAF 1601M
0459 839 059	Spare parts list	LAF 1601/ LAF 1601M

The spare parts list is available on the Internet at [www.esab.com](http://www.esab.com)

NOTES

Lined area for taking notes, consisting of 20 horizontal dotted lines.

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