

# **LAR 500/630**

# **Magma**

**Svetsströmkälla**

**Welding power source**

**Schweißstromquelle**

**Source de courant de soudage**

**Fuente de corriente**

**Generatori di corrente**

**Lasstroombron**

**Svejsestrømkilde**

**Hitsausvirtalähde**

**Bruksanvisning och reservdelsförteckning**

**Instruction manual and spare parts list**

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**Brugsanvisning og reservedelsliste**

**Käyttöohje ja varaosaluettelo**

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## **WARNING**

## **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!**

## TECHNICAL DESCRIPTION

The LAR 500 and 630 welding power sources are intended for high-output semi-automatic MIG/MAG welding. They comply with the requirements of IEC 974. They are of constant voltage type, with overload protection, and consist of a control unit and a fan-cooled power pack.

**The control unit (at the front) contains:**

Switch mains voltage ON/OFF	OF1
Potentiometer for voltage adjustment with planetary drive gear is standard for LAR 500/630.	RP1
Switch for remote control device	SA1
Control unit (circuit board) controls the main thyristors and prevents overloading by applying a current limit and maintains constant arc voltage by comparison of an actual value signal with a set value signal, irrespective of load and/or mains voltage fluctuations of up to +/- 10%	AP1
Indicating lamp (operation), white, 42-48 V	HL1
Voltmeter and ampmeter - <b>extra accessories</b> ordering no. 319 429-882 for LAR 500/630 For indication of welding voltage and current	PV1 PA1
Socket for external 42 V control power supply (wire feed unit, external start of power source and remote control of voltage)	XS1
Terminals for welding current cable connections: + to wire feed unit - to workpiece - A low inductance - B medium inductance - C high inductance	XS2, XS5
<b>Higher inductance</b> produces a hotter weld and less spatter, but makes starting more difficult, particularly with small wire sizes.	
Contactor (42 V 50 Hz/48 V 60 Hz coil)	KM 1
Automatic fuse, 10 A slow-blow and 2X5 A slow-blow	FU1-FU3

## **TECHNICAL DESCRIPTION**

Control power transformer single- phase, 42 V output, TC1  
310 VA continuous rating. The secondary winding supplies control current terminal XS1, which is protected by a fuse (FU1).

Starting unit (circuit board) **extra accessory** ordering no. 468 122-880  
Facilitates starting by partly shorting out the series inductor during starting by a parallel-connected thyristor.

### **The power pack (at the rear) contains:**

Main transformer	TM1
a three-phase unit with primary, secondary 1, secondary 2 (base voltage) and tertiary windings.	
The base voltage winding smooths out voltage peaks, and the tertiary winding provides synchronizing voltages for thyristor triggering.	
Rectifier bridge	V1, V2
consists of a three-phase diode/thyristor bridge three thyristors (V1) and three diodes (V2), 18 diodes (V3) for the base voltage and further three diodes (V4) for basic current.	V3
The thyristors are protected against high transient overvoltages by filter circuits (Z1) in parallel with them.	V4
Inductor	Z1
connected in series with the welding current circuit. 31% of the windings is connected to terminal A, 75% to terminal B and 100% to terminal C	L1
Thermal overload trip	ST1
protects the thyristors (and therefore, indirectly, the whole unit) against overheating as a result of overload or impaired cooling. The thermostat is fitted on the cooling fins close to the thyristors, and operates at $92 \pm 3^\circ\text{C}$ , resetting automatically at $73 \pm 5^\circ\text{C}$ . Signal lamp HL2 (yellow) lights when the thermal switch ST1 has tripped	
Terminal for mains supply connection	XT1
Terminal for supply voltage adjustment reconnection	XT2
Special thermostats, ST2 and ST3 controls the fan so that it runs at a reduced speed with small loads.	
Thermostat controlled fan	M1
Power outlet terminal strip	XT3

## TECHNICAL DESCRIPTION

### Supplement for LAR 500/630 MAGMA

The LAR 500 MAGMA and 630 MAGMA welding power supplies are designed for high productivity semi-automatic welding (MIG-MAG) and manual welding (MMA), requirements according to standards.

#### **The control unit (located at the front) comprises:**

Potentiometer (planetary gear mounting) for current setting, manual welding (MMA) and arc air gouging. RP1

Switch and socket for F unit, manual welding (MMA) and arc air gouging. SA1, XS7

Control device (circuit card), MMA, arc air gouging. AP3  
controlling main thyristors and limiting maximum current to prevent overload.

LAR 500/630 can be connected to the following mains voltages

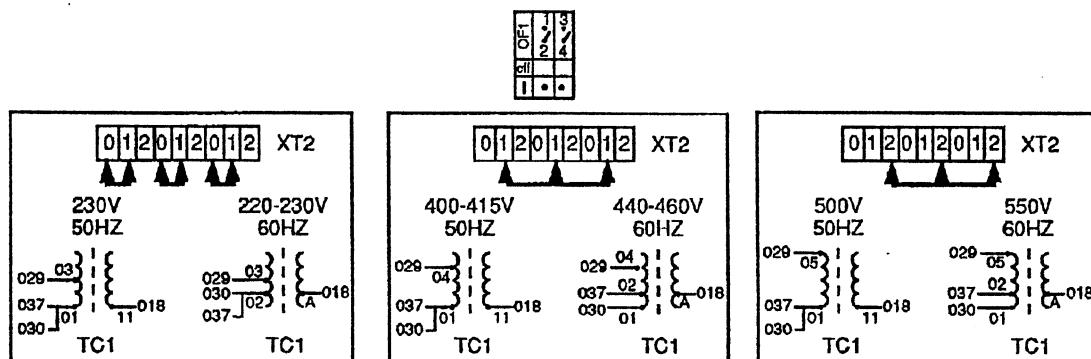
#### **LAR 500**

230/400/500 V 50 Hz - 230/440/550 V 60 Hz Ordering no.467 975-880

#### **LAR 630**

230/400/500 V 50 Hz - 230/440/550 V 60 Hz Ordering no.467 976-880

#### **Connection instructions**



ba04t001

#### **Mains connection**

	LAR 500						LAR 630					
	3-50Hz			3-60Hz			3-50Hz			3-60Hz		
Voltage V	230	400	500	230	440	550	230	400	500	230	440	550
Current A												
60%	66	38	31	66	38	31	93	54	43	92	54	43
80%	60	34	28	60	34	28	83	48	38	83	48	38
100%	53	31	25	53	31	25	74	43	34	74	43	34
Fuse,slow-blow A	63	35	35	63	35	35	80	50	50	80	50	50
Cable area	4x16	4x6	4x6	4x16	4x6	4x6	4x25	4x10	4x10	4x25	4x10	4x10
Fuse,fast A	63	50	35	63	50	35	80	63	63	80	63	63
Cable area	4x16	4x10	4x6	4x16	4x10	4x6	4x25	4x16	4x16	4x25	4x16	4x16

## TECHNICAL DATA

### TECHNICAL DATA

	LAR 500	LAR 630
Maximum DC loading at 60% duty cycle	500 A/39 V	630 A/44 V
80% duty cycle	450 A/35 V	560 A/42 V
100% duty cycle	400 A/34 V	500 A/39 V
Operating range, DC	75A/18V - 500A/39V	75A/18V-630A/44V
Maximum open-circuit voltage	17-49V	18-55V
Efficiency and power	500A/39V	630A/44V
Efficiency ( $\eta$ )	0,79	0,81
Power factor ( $\lambda$ )	0,91	0,92
Control voltage	42 V, 50/60 Hz	42 V 50/60 Hz
Class of enclosures	IP 23	IP 23
Application	<input type="checkbox"/> S	<input type="checkbox"/> S

S

The symbol **S** in  means that the power source is designed for use in areas with increased electrical danger.

### IP

**IP** -The code describes the degree of protection provided by the casing, against the penetration of fixed objects and water.

Equipment mark **IP 21** is designed for indoor use, while **IP 23** is also intended for outdoor use.

### Supplement for LAR 500/630 MAGMA

#### Manual welding (MMA), arc air gouging

	LAR 500 MAGMA	LAR 630 MAGMA
Maximum permissible load DC at 80% duty cycle	450 A/38 V	-
100% duty cycle	400 A/36 V	500 A/40 V
Current setting range, DC	40A/21V-450A/38V	40A/21V-500A/40V
Max open circuit voltage	49 V	55 V
Efficiency and power factor at	400 A/36 V	500 A/40 V
Efficiency ( $\eta$ )	0,76	0,80
Power factor ( $\lambda$ )	0,85	0,84

## INSTALLATION

1. Choose a suitable position for the equipment so that cooling is not obstructed, and where excessive quantities of dust, moist air or corrosive fumes cannot be sucked in, and so that the cooling air discharge does not interfere with the shielding gas around the welding head.
2. Check that the connections on the main transformer terminal (XT2), and on the control power transformer (TC1), are arranged for the appropriate supply voltage, and that the correct fuses are fitted. The circuit diagram with connection instructions, is secured to the inside of one of the side cover plates. Recommended fuse ratings in accordance with Swedish standard requirements. If requirements differ in other countries, the appropriate fuses should be fitted.
3. Connect the unit to a three-phase power supply, via terminal XT1, which is fitted inside the left-hand side of the unit. Connect an earth lead in accordance with applicable standards to the earthing bolt marked  $\ominus$  on the plate in front of terminal XT1.
4. Connect the control cable from the welding power source to the wire feed unit.
5. Connect the welding current cable from the wire feed unit to the terminal marked +. Connect the return current cable from the workpiece to one of the terminals marked -. Note that reversed polarity connections may be called for, depending on the type of welding electrode used.

Terminal A      is used for short arc welding (thin materials or bottom runs, and for aluminium)

Terminal B      is used for short arc welding, but gives a somewhat hotter weld than terminal A

Terminal C      is used for spray arc welding of thick materials  
Check that all welding current cables are securely connected to their respective terminals.

6. Connect the cooling unit if used, to terminal XT3 (220 V, 200 VA).

### NOTE

There is a risk of tipping while transporting and storing if the welding equipment leans more than 10°. Note that the stabiliser must be fitted to increase the stability, i.e. when Feed Selector, Puls-Aid or counter balance are used). Fitting is carried out according to the enclosed fitting instructions.

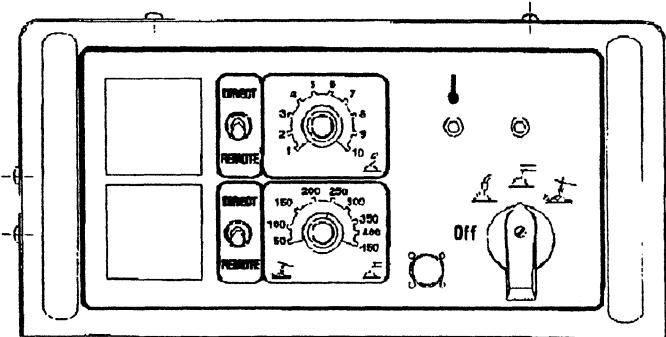
## **OPERATION**

### **OPERATION**

1. Choose the correct shielding gas as recommended.
2. Turn the switch OF1 to position 1 (on). The fan will start and the indicator lamp on the front panel will glow.
3. Press the trigger on the welding gun. The wire feed unit and gas valve will be activated at the same time as the power source relays close. The gas flow can be adjusted to the recommended setting (10-18 l/min depending on the applicaton. When adjusting the gas flow you should release the feed roller pressure arm to prevent wire being fed out unnecessarily.)
4. Set the required welding voltage using the potentiometer on the front panel of the power source, and set the wire feed using the potentiometer on the front of the wire feed unit.

### **Supplement for LAR 500/630 MAGMA**

The LAR 500/630 MAGMA allows changeover between semi-automatic, manual welding and arc air gouging by simply turning switch OF1.



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#### **Manual welding (MMA)**

1. Set switch OF1 to the manual welding setting. The control transformer TC 1 is energised. Fan M1 starts up and the indicator lamp glows. Welding current is fully adjustable using potentiometer RP2.
2. Connect the welding cable to XS2 + or -C, depending on the type of electrode, and connect return cable to XS3 -C or +.
3. Fit an electrode in the electrode holder. You can now start welding.

#### **Arc air gouging**

1. Set switch OF1 to the arc air gouging setting. The control transformer TC 1 is energised. Fan M1 starts up and the indicator lamp glows. Welding current is fully adjustable using potentiometer RP2.
2. Connect the gouge to XS2 + and the return cable to XS5 -A.
3. Fit a carbon electrode in the gouge. You can now start gouging.

## **MAINTENANCE**

### **Dust cleaning**

The LAR should be purged by dry air at reduced pressure.

### **Checking of diodes and thyristors**

N.B. Neither bell nor buzzer may be used to check diodes or thyristors. Diodes and thyristors may be checked without detaching them from the cooling element using ESAB's diode and thyristor tester ZPB (Ordering No. 160 115-880) in accordance with the instructions accompanying this unit. Should no thyristor tester be available, it is possible to check the thyristors tolerably by means of a multi-meter. Measure for each thyristor the resistance anode to cathode, which should be higher than 5 kOhm, and gate to cathode, which should be approx. 25 Ohm. Replace the thyristor(s) in question, should the measurements indicate lower values.

**If problems arise, contact your nearest ESAB service agent.**

## **EXTRA ACCESSORIES**

### **EXTRA ACCESSORIES**

<b>For remote control of welding parameters:</b>	<b>Ordering no.</b>
<b>PHB 1</b> fitted with planetary-gearred multi-turn potentiometer for exact adjustment	367 317-880
<b>PHB 2</b> fitted with coarse and fine adjustment potentiometers	367 318-880
<b>PAB 6</b> Three arbitrary current and voltage combinations can be preset and selected by a 3-position switch	367 308-880
<b>PAE 2</b> Remote control for current and voltage PAE 2 is equipped with planetary gearing for accurate setting. Available in two designs. PAE 2 (Box) incl. 5 m cable PAE 2 (Bar) incl. 5 m cable	467 277-880 466 515-882
<b>PAE 4</b> Programming device for 5 different sets of welding data which are selected via a switch on the front panel. Supplied with 5 m of connecting cable	368 920-880
<b>Feed Selector</b> Expansion unit for use with double feed units	468 040-880
<b>Puls Aid</b> Pulse unit for aluminium welding 400/500 V with operating level meter	467 570-880
400/500 V without operating level meter	467 570-881
230 V without operating level meter	467 570-882
Digital meter set	368 123-884
Analogue meter set	319 429-882