



LAH 500/630

MAGMA

Svetsströmkälla

Welding power source

Schweißstromquelle

**Source de courant de
soudage**

Bruksanvisning och reservdelsförteckning

Instruction manual and spare parts list

Betriebsanweisung und Ersatzteilverzeichnis

**Manuel d'instructions et liste des pièces
détachées**

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Rätt till ändring av specifikation förbehålles.

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Änderungen vorbehalten

Sous réserve de modifications sans avis préalable.

Technical description

The LAH 500 MAGMA and 630 MAGMA welding power sources are designed for highly-productive semi-automatic welding (MIG/MAG) and manual metal arc welding (MMA). The power sources satisfy all requirements according to VDE 0542, SEN 8301 spec. ISO R700, NF A 850 13 and NF A 850 11.

Both machines are of constant-voltage type and incorporate overload protection. The machines consist of a control unit and a fan-cooled power unit.

Semi-automatic welding (MIG/MAG)

	LAH 500 MAGMA	LAH 630 MAGMA
Permissible load at 60 % duty cycle	500 A/39 V	630 A/44 V
80 % duty cycle	450 A/37 V	560 A/42 V
100 % duty cycle	400 A/34 V	500 A/39 V
Setting range	50 A/16 V– 500 A/39 V	75 A/17 V– 630 A/44 V
Open circuit voltage	17–50 V	18–52 V
Coefficient of efficiency and power factor at	500 A/39 V	630 A/44 V
Coefficient of efficiency (η)	0.79	0.81
Power factor (λ)	0.91	0.92

Manual metal arc welding (MMA)/arc-air gouging


	LAH 500 MAGMA	LAH 630 MAGMA
Permissible load at 80 % duty cycle	450 A/38 V	–
100 % duty cycle	400 A/36 V	500 A/40 V
Setting range	40 A/21 V– 450 A/38 V	40 A/21 V– 500 A/40 V
Max open circuit voltage	50 V	52 V
Coefficient of efficiency and power factor at	400 A/36 V	500 A/40 V
Coefficient of efficiency (η)	0.77	0.77
Power factor (λ)	0.87	0.91

Common features LAH 500 MAGMA and 630 MAGMA

Control voltage 42V, 50/60 Hz

Temperature class H 180°C

Enclosure IP 22 AF

Application of use 

The LAH 500 MAGMA can be reconnected for following mains voltages, 3-phase:
220/380/415/500 V, 50 Hz;
220/440/550 V, 60 Hz

Order no. 366 802-880

The LAH 630 MAGMA can be reconnected for the following mains voltages, 3-phase:
220/380 V, 50 Hz; 220 V, 60 Hz

Order no. 366 803-880

The operating unit (front-mounted) includes

Selector for ON-OFF for shifting between semi-automatic -manual- and arc-air gouging K6

Potentiometer (planet gear mounted) for voltage settings, semi-automatic	K57
Potentiometer (planet gear mounted) for current settings, manual welding	K57.1
Switches and outlets for F-unit (remote-control) semi-automatic (MIG/MAG)	K33, K24.2
Switches and outlets for F-unit, manual (MMA), arc-air gouging	K33.1, K24.4
Control unit (circuit board) (MIG/MAG) controls the main thyristors and prevents overloading by applying a current limit	K70.1
Regulator (circuit board) 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 $\pm 10\%$	K70.2
Control unit (circuit board) (MMA, arc-air gouging) controls the main thyristors and prevents overloading by applying a current limit	K70.9
Measuring terminal	K23
Indicating lamp (operation), white, 42–48 V	K38
Voltmeter and ammeter extra accessories ordering no. 319 429-882 for LAH 500/630 For indication of welding voltage and current	K20, K19
Socket for external 42 V control power supply (wire feed unit, external start of power source)	K24.3
Terminals for welding current cable connections + to wire feed unit – to workpiece	K13
Higher inductance –A low inductans produces a hotter weld and less spatter, but makes starting more difficult, particularly with small wire sizes –B medium in-ductans –C high in-ductans	
Contact (42 V 50 Hz/48 V 60 Hz coil)	K8
Fuse, 10 A slow-blow and 2×4 A, slow-blow	K21.2, K21.1
Control power transformer single-phase, 42 V output, 400 VA continuous rating. The secondary winding supplies control current terminal K24.3, which is protected by a fuse (K21.2)	K9
Control power transformer	K9.1

Starting unit (circuit board)— extra ordering no. 320 833-880. Facilitates starting by partly shorting out the series inductor during starting by a parallel- connected thyristor	K96	PAC 8 (Burndy connection) A remote-control unit which gives remote control of both current and voltage as well as higher current and voltage settings for hot-starting. Also provides lower current and voltage settings at end of welding with slope- down feature (crater filling-up). Compatible with MEE 30 & MED 30/44 Synergic.	367 305-880
Current relay for sensing welding current	K25		
The power pack (at the rear) contains:			
Main transformer 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	K1	Feed Selector 630 An add-on unit for use with a twin feeder. Separate voltage settings for each feed unit. Polarity selector.	366 880-880
Rectifier bridge consists of a three-phase diode/thyris- tor bridge with three thyristors (K2.1) and three diodes (K2.2), 18 diodes (K2.3) for the base voltage and a further three diodes (K2.4) for basic current. The thyristors are protected against high transient over voltages by filter circuits (K27.3) in parallel with them	K2.1, K2.2 K2.3 K2.4 K27.3	Connection cable 5 m 10 m 16 m	367 144-884 367 144-885 367 144-886
Inductor connected in serie with the welding current circuit. 50 % of the windings is connected to terminal A, 75 % to terminal B and 100 % to terminal C	K12	Manual metal arc welding (MMA) PHB 1 (Burndy connection) Remote-control unit complete with potentiometer of planet gear type for accurate settings. PHB 2 (Burndy connection) Remote-control unit complete with coarse and fine setting potentiometers.	367 317-880 367 318-880
Thermoval overload trip protects the thyristors (and therefore, indirectly, the whole unit) against over- heating 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 $73 \pm 5^\circ\text{C}$	K31	Connection cable 5 m 10 m 16 m	367 144-881 367 144-882 367 144-883
Terminal for mains supply connection	K11		
Terminal for supply voltage adjustment reconnect- tion (Figure 4)	K30		
Fan	K28		
Power outlet terminal strip, 220V, single-phase, 200VA	K50		

Optional extras

Semi-automatic (MIG/MAG)

PAB 6 (Burndy connection) Remote-control unit with choice of three current and voltage combinations which can be pre-set and are selected by means of a switch (3-position).	Order no. 367 308-880
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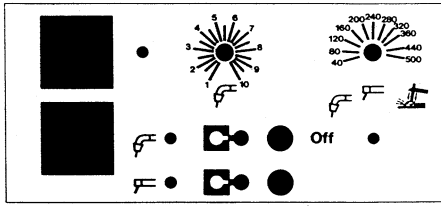
Installation

Semi-automatic welding (MIG/MAG)

- 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 (K30), and on control power transformer (K9), are arranged for the appropriate supply voltage, and that the correct fuses are fitted. The circuit diagram (see Figure 3 page 11 in these instructions), with connection instructions, is secured to the inside of one of the side cover plates.
Figure 4 page 12 shows 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 K11, 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 \bigcirc on the plate in front of terminal K11.
- 4 Connect the control cable from the welding power source K24.2 to the wire feed unit.
- 5 Connect the cooling unit, if used, to terminal K50 (220 V, single-phase 200 VA).
- 6 Dimension drawing, see Figure 1 page 11.

Operation

The LAH 500/630 MAGMA permit switching between semi-automatic, manual welding, and arc-air gouging simply by using the K6 selector switch.



Semi-automatic welding (MIG/MAG)

Normally, shielding gas consists of CO₂, pure argon or a mixture of the same. When welding steel, an oxygen addition is beneficial to arc stability.

- 1 Set the selector K6 to semi-automatic position. This activates operating transformer K9, starts fan K28 and lights up pilot lamp K38. Welding voltage is infinitely variable using potentiometer K57.
- 2 Connect the welding current cable from the wire feed unit to the terminal K13 marked +. Connect the return current cable from the workpiece to one of the terminals K13 marked -A, -B or -C: 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
- 3 Adjust suitable wire feed speed on the wire feed unit.
- 4 Pull the welding torch trigger which will start the wire feed unit, activate main contactor K8, and connect main transformer K1 to the mains.
Welding can commence.

Manual welding (MMA)

- 1 Set the selector K6 to manual welding position. This activates operating transformer K9.1, starts fan K28, activates main contactor K8 and lights up pilot lamp K38.
Welding current is infinitely variable using potentiometer K57.1.
- 2 Connect the welding cable to K13+ or -C depending on the type of electrode, and the return cable to K13 -C or +
- 3 Fit the rod to the electrode holder.
Welding can commence.

Arc-air gouging

- 1 Set the selector K6 to the arc-air gouging position. This activates operating transformer K9.1, starts fan K28, activates main contactor K8 and lights up pilot lamp K38.
Current is infinitely variable using potentiometer K57.1
- 2 Connect the gouging torch to K13 + and the return cable to K13 -A.
- 3 Fit the carbon rod to the gouging torch. Gouging can commence.

Maintenance

Dust cleaning

The LAH should be purged by dry air at reduced pressure. When necessary or at least once a year.

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. 160155-880) 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 multimeter. 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.

Fitting of diodes and thyristors

The tightening torque for bolt diodes of make IR is 27–32 Nm (approx. 2.7–3.2 kpm). The tightening torque for bolt thyristors of make IR is 10–15 Nm (approx. 1.0–1.5 kpm)

Fitting of disc type-thyristor

It is very important to apply the correct clamping force of 4500 N (approx. 450 kp) \pm 10 % when fitting the thyristor. The contact surfaces of the thyristor and the cooling elements should be free from dirt and burrs. Lubricate the contact surfaces with a very thin silicon oil film. Install the thyristor between the cooling elements with its rectifier symbol pointing in the direction shown on the fitting drawing, fig 2. The thyristor is to be centered by means of a guiding pin. Firstly tighten the nuts by hand, so that no play remains between washer and nut. Then, measure the distance (x) between the plate and the spring by means of a dial gauge or a vernier caliper. Subsequently, tighten the nuts alternately by means of a wrench until the measurement is decreased by 0.9 mm \pm 0.05 mm.