

# HOT ROD 500S

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## OPERATOR'S MANUAL



ENGLISH



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**THANK YOU!** For choosing the **QUALITY** of the Lincoln Electric products.

- Please check packaging and equipment for damage. Claims for material damaged in shipment must be notified immediately to the dealer.
- For ease of use, please enter your product identification data in the table below. Model Name, Code & Serial Number can be found on the machine rating plate.

Model Name:
Code & Serial number:
Date & Where Purchased:

## ENGLISH INDEX

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# Technical Specifications

NAME		INDEX	
HOT ROD 500S		K14089-1	
INPUT			
Input Voltage	Input Power at Rated Output	EMC Group / Class	Frequency
380 / 415V $\pm$ 10% Three Phase	43 kVA @ 35% Duty Cycle (40°C)	II / A	50/60 Hz
RATED OUTPUT			
Duty Cycle 40°C / 55°C (Based on a 10 min. period)	Output Current	Output Voltage	
35% / 25%	600A	44.0 Vdc	
60% / 35%	500A	40.0 Vdc	
100% / 60%	375A	35.0 Vdc	
OUTPUT RANGE			
Welding Current Range		Maximum Open Circuit Voltage	
50A - 625A		65.5 Vdc	
RECOMMENDED INPUT CABLE AND FUSE SIZES			
Fuse or Circuit Breaker Size		Input Power Cable	
63A (for 380 / 415V) Superlag		4 Conductor, 10mm <sup>2</sup> (for 380 / 415V)	
PHYSICAL DIMENSIONS			
Height	Width	Length	Weight
795 mm	566 mm	813 mm	203 kg
OPERATING AND STORAGE TEMPERATURES			
Operating Temperature		Storage Temperature	
-10°C to +55°C		-25°C to +55°C	

# Electromagnetic Compatibility (EMC)

11/04

This machine has been designed in accordance with all relevant directives and standards. However, it may still generate electromagnetic disturbances that can affect other systems like telecommunications (telephone, radio, and television) or other safety systems. These disturbances can cause safety problems in the affected systems. Read and understand this section to eliminate or reduce the amount of electromagnetic disturbance generated by this machine.



This machine has been designed to operate in an industrial area. To operate in a domestic area it is necessary to observe particular precautions to eliminate possible electromagnetic disturbances. The operator must install and operate this equipment as described in this manual. If any electromagnetic disturbances are detected the operator must put in place corrective actions to eliminate these disturbances with, if necessary, assistance from Lincoln Electric.

Before installing the machine, the operator must check the work area for any devices that may malfunction because of electromagnetic disturbances. Consider the following.

- Input and output cables, control cables, and telephone cables that are in or adjacent to the work area and the machine.
- Radio and/or television transmitters and receivers. Computers or computer controlled equipment.
- Safety and control equipment for industrial processes. Equipment for calibration and measurement.
- Personal medical devices like pacemakers and hearing aids.
- Check the electromagnetic immunity for equipment operating in or near the work area. The operator must be sure that all equipment in the area is compatible. This may require additional protection measures.
- The dimensions of the work area to consider will depend on the construction of the area and other activities that are taking place.

Consider the following guidelines to reduce electromagnetic emissions from the machine.

- Connect the machine to the input supply according to this manual. If disturbances occur it may be necessary to take additional precautions such as filtering the input supply.
- The output cables should be kept as short as possible and should be positioned together. If possible connect the work piece to ground in order to reduce the electromagnetic emissions. The operator must check that connecting the work piece to ground does not cause problems or unsafe operating conditions for personnel and equipment.
- Shielding of cables in the work area can reduce electromagnetic emissions. This may be necessary for special applications.

## **WARNING**

The 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 in those locations, due to conducted as well as radiated disturbances.



## **WARNING**

This equipment complies with IEC 61000-3-12 provided that the short-circuit power  $S_{sc}$  is greater than or equal to:










**HOT ROD 500S:  $S_{sc} \geq 12MVA$**




at the interface point between the user's supply and the public system. 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 is connected only to a supply with a short circuit power  $S_{sc}$  greater than or equal to data on the table above.



## WARNING

This equipment must be used by qualified personnel. Be sure that all installation, operation, maintenance and repair procedures are performed only by qualified person. Read and understand this manual before operating this equipment. Failure to follow the instructions in this manual could cause serious personal injury, loss of life, or damage to this equipment. Read and understand the following explanations of the warning symbols. Lincoln Electric is not responsible for damages caused by improper installation, improper care or abnormal operation.

	<p><b>WARNING:</b> This symbol indicates that instructions must be followed to avoid serious personal injury, loss of life, or damage to this equipment. Protect yourself and others from possible serious injury or death.</p>
	<p><b>READ AND UNDERSTAND INSTRUCTIONS:</b> Read and understand this manual before operating this equipment. Arc welding can be hazardous. Failure to follow the instructions in this manual could cause serious personal injury, loss of life, or damage to this equipment.</p>
	<p><b>ELECTRIC SHOCK CAN KILL:</b> Welding equipment generates high voltages. Do not touch the electrode, work clamp, or connected work pieces when this equipment is on. Insulate yourself from the electrode, work clamp and connected work pieces.</p>
	<p><b>ELECTRICALLY POWERED EQUIPMENT:</b> Turn off input power using the disconnect switch at the fuse box before working on this equipment. Ground this equipment in accordance with local electrical regulations.</p>
	<p><b>ELECTRICALLY POWERED EQUIPMENT:</b> Regularly inspect the input, electrode, and work clamp cables. If any insulation damage exists replace the cable immediately. Do not place the electrode holder directly on the welding table or any other surface in contact with the work clamp to avoid the risk of accidental arc ignition.</p>
	<p><b>ELECTRIC AND MAGNETIC FIELDS MAY BE DANGEROUS:</b> Electric current flowing through any conductor creates electric and magnetic fields (EMF). EMF fields may interfere with some pacemakers and welders having a pacemaker shall consult their physician before operating this equipment.</p>
	<p><b>CE COMPLIANCE:</b> This equipment complies with the European Community Directives.</p>
 <p><small>Optical radiation emission Category 2 (EN 12196)</small></p>	<p><b>ARTIFICIAL OPTICAL RADIATION:</b> According with the requirements in 2006/25/EC Directive and EN 12198 Standard, the equipment is a category 2. It makes mandatory the adoption of Personal Protective Equipment (PPE) having filter with a protection degree up to a maximum of 15, as required by EN169 Standard.</p>
	<p><b>FUMES AND GASES CAN BE DANGEROUS:</b> Welding may produce fumes and gases hazardous to health. Avoid breathing these fumes and gases. To avoid these dangers the operator must use enough ventilation or exhaust to keep fumes and gases away from the breathing zone.</p>
	<p><b>ARC RAYS CAN BURN:</b> Use a shield with the proper filter and cover plates to protect your eyes from sparks and the rays of the arc when welding or observing. Use suitable clothing made from durable flame-resistant material to protect you skin and that of your helpers. Protect other nearby personnel with suitable, non-flammable screening and warn them not to watch the arc nor expose themselves to the arc.</p>

	<p><b>WELDING SPARKS CAN CAUSE FIRE OR EXPLOSION:</b> Remove fire hazards from the welding area and have a fire extinguisher readily available. Welding sparks and hot materials from the welding process can easily go through small cracks and openings to adjacent areas. Do not weld on any tanks, drums, containers, or material until the proper steps have been taken to insure that no flammable or toxic vapors will be present. Never operate this equipment when flammable gases, vapors or liquid combustibles are present.</p>
	<p><b>WELDED MATERIALS CAN BURN:</b> Welding generates a large amount of heat. Hot surfaces and materials in work area can cause serious burns. Use gloves and pliers when touching or moving materials in the work area.</p>
	<p><b>SAFETY MARK:</b> This equipment is suitable for supplying power for welding operations carried out in an environment with increased hazard of electric shock.</p>

The manufacturer reserves the right to make changes and/or improvements in design without upgrade at the same time the operator's manual.

# Installation and Operator Instructions

Read this entire section before installation or operation of the machine.

## Location and Environment

### WARNING

Do not lift this machine using lift bail if it is equipped with a heavy accessory such as trailer or gas cylinder. Lift only with equipment of adequate lifting capacity. Be sure machine is stable when lifting.

The HOT ROD 500S welders can be stacked three high when the following precautions are observed:

- Be sure the bottom machine is on a firm, level surface suitable for the total weight (610kg) of the stacked machines.
- Stack the machine with the fronts flush.
- Be certain the pins on the top front corners of the lower machines fit through the holes in the base rails of the upper machines.

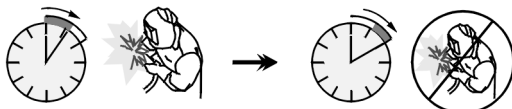
This machine will operate in harsh environments. However, it is important that simple preventative measures are followed to assure long life and reliable operation:

- Do not place or operate this machine on a surface with an incline greater than 15° from horizontal.
- Do not use this machine for pipe thawing.
- This machine must be located where there is free circulation of clean air without restrictions for air movement to and from the air vents. Do not cover the machine with paper, cloth or rags when switched on.
- Dirt and dust that can be drawn into the machine should be kept to a minimum.
- This machine has a protection rating of IP23. Keep it dry when possible and do not place it on wet ground or in puddles.
- Locate the machine away from radio controlled machinery. Normal operation may adversely affect the operation of nearby radio controlled machinery, which may result in injury or equipment damage. Read the section on electromagnetic compatibility in this manual.
- Do not operate in areas with an ambient temperature greater than 55°C.

## Duty cycle and Overheating

The duty cycle of a welding machine is the percentage of time in a 10 minute cycle at which the welder can operate the machine at rated welding current.

Example: 60% duty cycle:

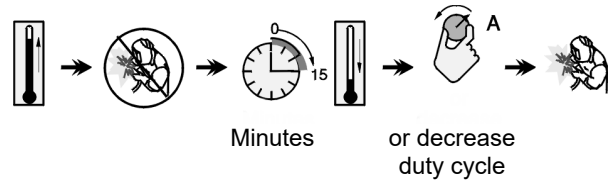


Welding for 6 minutes.

Break for 4 minutes.

Excessive extension of the duty cycle will cause the thermal protection circuit to activate.

The welding machine is protected from overheating by a thermostat. When the machine is overheated the output of the machine will turn "OFF", and the Thermal Indicator Light will turn "ON". When the machine has cooled to a safe temperature the Thermal Indicator Light will go out and the machine may resume normal operation.



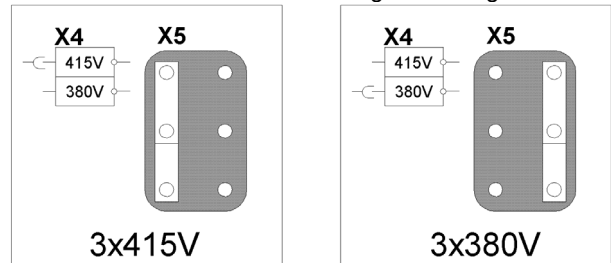
## Input Supply Connection

Installation and mains outlet socket shall be made and protected according to appropriate rules.

Check the input voltage, phase, and frequency supplied to this machine before turning it on. Verify the connection of grounding wires from the machine to the input source. The allowable input voltages are 3x380V 50/60Hz and 3x415V 50/60Hz (415V: factory default). For more information about input supply refer to the technical specification section of this manual and to the rating plate of the machine.

If it is necessary to change the input voltage:

- The input cable must be disconnected from the mains supply and the machine switched OFF.
- Remove the rear access panel cover from the machine.
- Reconnect X4 and X5 according to the diagram below:



- Replace the rear access panel cover.

Make sure that the amount of mains power available from the input supply is adequate for normal operation of the machine. The necessary delayed fuse (or circuit breaker with "D" characteristic) and cable sizes are indicated in the technical specification section of this manual.

Refer to points [1], [13] and [14] of the images below.

### WARNING

When powering welder from a generator be sure to turn off welder first, before generator is shut down, In order to prevent damage to welder!

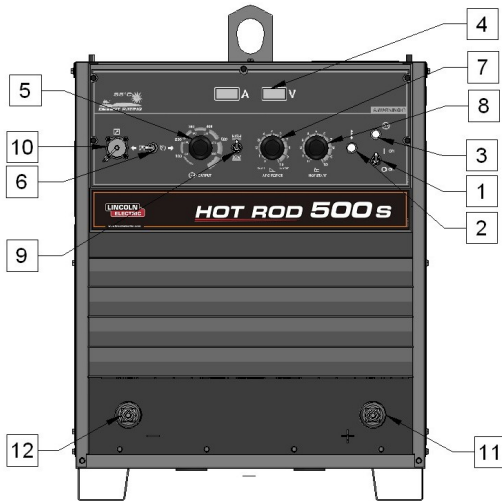
## Output Connections

Refer to points [10], [11] and [12] of the images below.

The recommended output cable size can be found in the Table below:

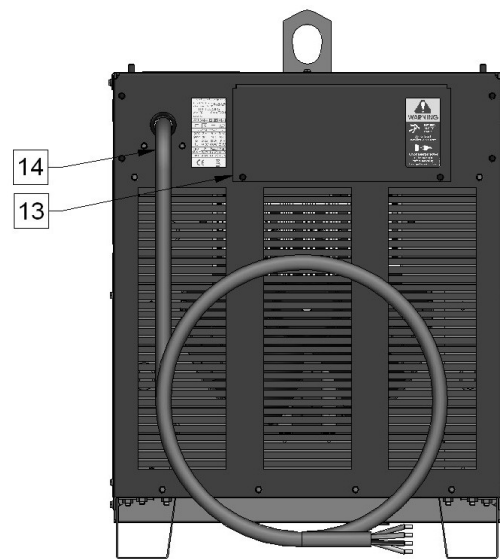
Cable length	Up to 10m	10 – 50m	50 – 75m
Cable size	70 mm <sup>2</sup>	95 mm <sup>2</sup>	120 mm <sup>2</sup>

## Controls and Operational Features



1. **Power On/Off Switch:** Controls the input power to the machine
2. **Thermal Overload Indicator:** This lamp will light up when the machine is overheated and the output has been turned off. This can occur if the ambient temperature is above 55°C or the duty cycle of the machine has been exceeded. Leave the machine on to allow the internal components to cool, when the lamp turns off normal operation is possible.
3. **Power Indicator:** After input power is connected and the power switch is turned on, this lamp will light up to indicate the machine is ready to weld.
4. **Digital Welding Current and Voltage Meter with memory feature (available as an option: see "Accessories" section):** Shows the present value of the welding current and voltage during welding; after welding it continues to display the average welding current and voltage for 5 seconds.
5. **Output Current Control:** Potentiometer used to set the output current on the range 50A - 625A (also during welding).
6. **Local/Remote Switch:** Remote Control Unit K10095-1-15M and K870 can be used with this machine. It changes control of the Output Current from the machine Output Control (point 5) to the K10095-1-15M or K870 and vice versa.
7. **Arc Force Control:** It is a function used during stick (MMA) welding in which the output current is temporarily increased to clear short circuit connections between the electrode and the weld puddle that occur during normal welding.

8. **Hot Start Control:** Hot Start is a temporary increase in the output current during the start of stick (MMA) welding that helps ignite the arc quickly and reliably. The potentiometer is used to set the level of the increased current.
9. **Output Current Control Range Switch:** It allows selection of the desired welding current range:
  - LOW range (50A - 320A)
  - HIGH range (50A - 625A).
10. **Remote Control Connection:** If a remote control is used, it will be connected to the remote connector (see "Accessories" section).
11. **Positive Output Terminal:** Positive output connector for the welding circuit (M12 bolt).
12. **Negative Output Terminal:** Negative output connector for the welding circuit (M12 bolt).



13. **Rear Access Panel Cover:** Remove to install the reconnect panel for the proper input voltage (3x380V or 3x415V).
14. **Input Cable (5m):** Connect the supply plug to the existing input cable that is rated for the machine as indicated in this manual, and conforms to all applicable standards. This connection shall be performed only by a qualified person.

## Stick Welding (MMA)

For starting welding process with MMA method you should:




- Insert welding cable plugs into output sockets and twist to lock them in place.
- Connect the work cable to the welding piece with the work clamp.
- Fasten a correct coated electrode into the electrode holder.
- Connect the main plug to the outlet mains socket.
- Set the Local/Remote Switch in required position: local or remote.
- Turn the Power on/off Switch on.
- Set the required welding current by knob of the Output Current Control.
- Obeying appropriate rules you can begin to weld.






## International Symbology Reference

The HOT ROD 500S name plates feature international symbols in describing the function of the various components. Below are the symbols used and an explanation of what each represents.

### POWER ON-OFF SWITCH

-  On
-  Off
-  Input



### CONTROL DIALS

-  Arc Force
-  Hot Start
-  Output Current








### OUTPUT CURRENT CONTROL RANGE SWITCH

- LOW** Output Current Control Dial Range Low
- HIGH** Output Current Control Dial Range High

### OUTPUT CURRENT CONTROL “MACHINE-REMOTE” SWITCH

-  Remote Output Current Control
-  Machine Output Current Control


### RATING PLATE

-  Three Phase Power
-  Transformer
-  Rectifier
-  Rectifier DC Output
-  Constant Current Characteristic
-  Shielder Metal Arc Welding
-  Line Connection

### HIGH TEMPERATURE WARNING LIGHT

-  High Temperature Limit

### WARNING

-  Warning Identifier

### GROUND

-  Sygnifying the Earth (Ground) Connection

## Maintenance

### WARNING

For any repair operations, modifications or maintenances, it is recommended to contact the nearest Technical Service Center or Lincoln Electric. Repairs and modifications performed by unauthorized service or personnel will cause, that the manufacturer's warranty will be lost.

Any noticeable damage should be reported immediately and repaired.

### Routine maintenance (everyday)

- Check condition of insulation and connections of the work leads and insulation of power lead. If any insulation damage exists replace the lead immediately.
- Remove the spatters from the welding gun nozzle. Spatters could interfere with the shielding gas flow to the arc.
- Check the welding gun condition: replace it, if necessary.
- Check condition and operation of the cooling fan. Keep clean its airflow slots.

### Periodic maintenance (every 200 working hours but at least once a year)

Perform the routine maintenance and, in addition:

- Keep the machine clean. Using a dry (and low pressure) airflow, remove the dust from the external case and from the cabinet inside.
- If it is required, clean and tighten all weld terminals.

The frequency of the maintenance operations may vary in accordance with the working environment where the machine is placed.

### WARNING

Do not touch electrically live parts.

### WARNING

Before removed case, machine has to be turned off and the power lead has to be disconnected from mains socket.

### WARNING

Mains supply network must be disconnected from the machine before each maintenance and service. After each repair, perform proper tests to ensure safety.

## **Customer Assistance Policy**

The business of The Lincoln Electric Company is manufacturing and selling high quality welding equipment, consumables, and cutting equipment. Our challenge is to meet the needs of our customers and to exceed their expectations. On occasion, purchasers may ask Lincoln Electric for advice or information about their use of our products. We respond to our customers based on the best information in our possession at that time. Lincoln Electric is not in a position to warrant or guarantee such advice, and assumes no liability, with respect to such information or advice. We expressly disclaim any warranty of any kind, including any warranty of fitness for any customer's particular purpose, with respect to such information or advice. As a matter of practical consideration, we also cannot assume any responsibility for updating or correcting any such information or advice once it has been given, nor does the provision of information or advice create, expand or alter any warranty with respect to the sale of our products

Lincoln Electric is a responsive manufacturer, but the selection and use of specific products sold by Lincoln Electric is solely within the control of, and remains the sole responsibility of the customer. Many variables beyond the control of Lincoln Electric affect the results obtained in applying these types of fabrication methods and service requirements.

Subject to Change – This information is accurate to the best of our knowledge at the time of printing. Please refer to [www.lincolnelectric.com](http://www.lincolnelectric.com) for any updated information.

## WEEE

07/06



Do not dispose of electrical equipment together with normal waste!

In observance of European Directive 2012/19/EC on Waste Electrical and Electronic Equipment (WEEE) 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 protect the environment and human health!

## Spare Parts

12/05

### Part List reading instructions

- Do not use this part list for a machine if its code number is not listed. Contact the Lincoln Electric Service Department for any code number not listed.
- Use the illustration of assembly page and the table below to determine where the part is located for your particular code machine.
- Use only the parts marked "X" in the column under the heading number called for in the assembly page (# indicate a change in this printing).

First, read the Part List reading instructions above, then refer to the "Spare Part" manual supplied with the machine that contains a picture-descriptive part number cross-reference.

## Authorized Service Shops Location

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- The purchaser must contact a Lincoln Authorized Service Facility (LASF) about any defect claimed under Lincoln's warranty period.
- Contact your local Lincoln Sales Representative for assistance in locating a LASF or go to [www.lincolnelectric.com/en-gb/Support/Locator](http://www.lincolnelectric.com/en-gb/Support/Locator).

## Electrical Schematic

Refer to the "Spare Part" manual supplied with the machine.

## Accessories

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K10376	Adapter M14/DINSe (F) (to connect the welding cables).
* E/H-400A-70-5M	Welding Cable with the Holder for Coated Electrodes 5m.
* GRD-600A-95-5M	Ground Cable with the Work Clamp 5m.
FL060583010	FLAIR 600 Gouging torch with mounted monocable 2,5m
* N/B-600A-95-5M	5m-extension cable for gouging torch.
K14090-1	AV Meter Kit
K14092-1	48Vac socket (1500W) kit.
K10095-1-15M	Hand Amptrol.
K870	Foot Amptrol.
K10398	15m-extension cable for remote ctrl box.
K817 K817R	Undercarriage (R – rubber tire wheels)

\* Co-operates with **K10376**