

POWERTEC 305S, 365S, 425S, 505S

OPERATOR'S MANUAL



ENGLISH



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THANKS! For having chosen the QUALITY of the Lincoln Electric products.

- Please Examine Package and Equipment for Damage. Claims for material damaged in shipment must be notified immediately to the dealer.
- For future reference record in the table below your equipment identification information. 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
POWERTEC 305S		K14060-1			
POWERTEC 365S		K14061-1A		K14061-1A	
	POWERTEC 425S				K14062-1A
	POWERTEC 505S				K14063-1A
		INF	VUT		
	Input Voltage U ₁		EMC	Class	Frequency
305S					
365S	230 / 400V±10%		,	A	50 / 60 Hz
425S	3 - phase		,	1	307 00 HZ
505S					
	Input Power at Rated Ou	itput Inp	out amp	eres I _{1max}	cos φ
305S	13,5 kVA @ 35% Duty C	ycle	36	A	0,96
365S	17,3 kVA @ 40% Duty C	ycle	45,	5 A	0,95
425S	22,8 kVA @ 40% Duty C	ycle	58	Α	0,96
505S	29,2 kVA @ 60% Duty C	ycle	74	A	0,96
		RATED OUT		Г 40°С	
	Duty cycle (Based on a 10 min. period)		Output	Current	Output Voltage
	35%		300) A	29 Vdc
305S	60%		22	5 A	25,2 Vdc
	100%		175 A		22,7 Vdc
	40%		350 A		31,5 Vdc
365S	60%		285 A		28,2 Vdc
	100%		220 A		25 Vdc
	40%		420 A		35 Vdc
425S	60%		34	δA	31,3 Vdc
	100%		26	5 A	27,3 Vdc
	40%		500	A	39 Vdc
505s	60%		410	A	34,5 Vdc
	100%		31	δA	29,8 Vdc
		OUTPUT	RANG	E	
	Welding Curr	ent Range			Open Circuit Voltage
305S	30 A ÷ 3	300 A	16 ÷ 47 Vdc		16 ÷ 47 Vdc
365S	30 A ÷ 3	350 A	17 ÷ 48 Vdc		17 ÷ 48 Vdc
425S	30 A ÷ 420 A		17 ÷ 52 Vdc		17 ÷ 52 Vdc
505S	40 A ÷ 500 A		18 ÷ 60 Vdc		18 ÷ 60 Vdc
	RECOM	MENDED FUSE S	SIZES A	ND INPUT CA	BLE
	Fuse or Circuit Breaker Size				Input Power Cable
	230V	400V			
305S	D 32 A	D 20 A		305S	4 Conductor, 4 mm2
365S	D 40 A	D 25 A		365S	4 Conductor, 4 mm2
425S	D 50 A	D 32 A		425S	4 Conductor, 6 mm2
505S	D 63 A	D 40 A		505S	4 Conductor, 6 mm2

	PHYSICAL DIMENSIONS							
	Weight		Height		Width	Lenght		
305S	94 kg	l	770 mm		470 mm	930 mm		
365S	141 kę	9	880 mm		700 mm	1030 mm		
425S	151 kợ	g	880 mm		700 mm	1030 mm		
505S	159,5 kg		880 mm		700 mm	1030 mm		
Protecti	on Rating	g Operating Humidity (t=20°C)		Оре	erating Temperature	Storage Temperature		
IF	P23	≤ 90 %		23 ≤ 90 %			-10°C ÷ +40°C	-25°C ÷ +55°C

ECO design information

The equipment has been designed in order to be compliant with the Directive 2009/125/EC and the Regulation 2019/1784/EU.

Efficiency and idle power consumption:

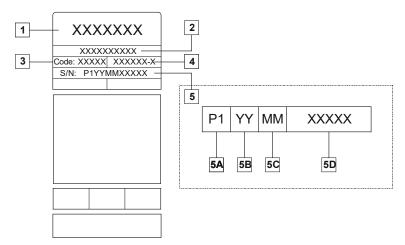
Index	Name	Efficiency when max power consumption / Idle power consumption	Equivalent model
K14060-1	POWERTEC 305S	64% / 12W	No equivalent model
K14061-1A	POWERTEC 365S	69% / 46W	No equivalent model
K14062-1A	POWERTEC 425S	65,8% / 22W	No equivalent model
K14063-1A	POWERTEC 505S	71,2% / 22W	No equivalent model

Idle state occurs under the condition specified in below table

IDLE STATE		
Condition	Presence	
MIG mode		
TIG mode		
STICK mode		
After 30 minutes of non-working		
Fan off	Х	

The value of efficiency and consumption in idle state have been measured by method and conditions defined in the product standard EN 60974-1:20XX.

Manufacturer's name, product name, code number, product number, serial number and date of production can be read from rating plate.



Where:

- 1- Manufacturer name and address
- 2- Product name
- 3- Code number
- 4- Product number
- 5- Serial number
 - 5A- country of production
 - 5B- year of production
 - $\ensuremath{\text{5C-month}}$ month of production
 - **5D-** progressive number different for each machine

Typical gas usage for MIG/MAG equipment:

	Wire DC electrode positive Wire Feeding		Wire Fooding		Gas flow	
Material type	diameter [mm]	Current [A]	Voltage [V]	[m/min]	Shielding Gas	[l/min]
Carbon, low alloy steel	0,9 ÷ 1,1	95 ÷ 200	18 ÷ 22	3,5 - 6,5	Ar 75%, CO ₂ 25%	12
Aluminium	0,8 ÷ 1,6	90 ÷ 240	18 ÷ 26	5,5 – 9,5	Argon	14 ÷ 19
Austenic stainless steel	0,8 ÷ 1,6	85 ÷ 300	21 ÷ 28	3 - 7	Ar 98%, O ₂ 2% / He 90%, Ar 7,5% CO ₂ 2,5%	14 ÷ 16
Copper alloy	0,9 ÷ 1,6	175 ÷ 385	23 ÷ 26	6 - 11	Argon	12 ÷ 16
Magnesium	1,6 ÷ 2,4	70 ÷ 335	16 ÷ 26	4 - 15	Argon	24 ÷ 28

Tig Process:

In TIG welding process, gas usage depends on cross-sectional area of the nozzle. For comonnly used torches:

Helium: 14-24 l/min Argon: 7-16 l/min

Notice: Excessive flow rates causes turbulence in the gas stream which may aspirate atmospheric contamination into the welding pool.

Notice: A cross wind or draft moving can disrupt the shielding gas coverage, in the interest of saving of protective gas use screen to block air flow.



End of life

At end of life of product, it has to be disposal for recycling in accordance with Directive 2012/19/EU (WEEE), information about the dismantling of product and Critical Raw Material (CRM) present in the product, can be found at https://www.lincolnelectric.com/en-gb/support/Pages/operator-manuals-eu.aspx

Electromagnetic Compatibility (EMC)

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 if 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.

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 can be potential difficulties in ensuring electromagnetic compatibility in those locations, due to conducted as well as radio-frequency disturbances.



This equipment complies with IEC 61000-3-12 provided that the short-circuit power Ssc is greater than or equal to:

POWERTEC 305S:	S _{sc} ≥ 1.7 MVA
POWERTEC 365S:	S _{sc} ≥ 2 MVA
POWERTEC 425S:	S _{sc} ≥ 3.5 MVA
POWERTEC 505S:	S _{sc} ≥ 4.5 MVA

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 Ssc greater than or equal to data on the table above.



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.

	WARNING: 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.
	READ AND UNDERSTAND INSTRUCTIONS: 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.
	ELECTRIC SHOCK CAN KILL: 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.
*	ELECTRICALLY POWERED EQUIPMENT: 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.
R.	ELECTRICALLY POWERED EQUIPMENT: 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.
	ELECTRIC AND MAGNETIC FIELDS MAY BE DANGEROUS: 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.
CE	CE COMPLIANCE: This equipment complies with the European Community Directives.
Opera anducor encor Called of 1 March 2018	ARTIFICIAL OPTICAL RADIATION: 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 Equipments (PPE) having filter with a protection degree up to a maximum of 15, as required by EN169 Standard.
8	FUMES AND GASES CAN BE DANGEROUS: 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.
	ARC RAYS CAN BURN: 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.

	WELDING SPARKS CAN CAUSE FIRE OR EXPLOSION: 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.
attimutilis.com.	WELDED MATERIALS CAN BURN: 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.
	CYLINDER MAY EXPLODE IF DAMAGED: Use only compressed gas cylinders containing the correct shielding gas for the process used and properly operating regulators designed for the gas and pressure used. Always keep cylinders in an upright position securely chained to a fixed support. Do not move or transport gas cylinders with the protection cap removed. Do not allow the electrode, electrode holder, work clamp or any other electrically live part to touch a gas cylinder. Gas cylinders must be located away from areas where they may be subjected to physical damage or the welding process including sparks and heat sources.
S	SAFETY MARK: This equipment is suitable for supplying power for welding operations carried out in an environment with increased hazard of electric shock.

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

Introduction

The wekding sources of the **POWERTEC S** family are designed to work with wire feeder:

- LF 22M
- LF 24M
- LF 24M PRO

POWERTEC S + LF enables welding:

MGAW (MIG/MAG)

The following equipment has been added to **POWERTEC 305S**:

- Operator's Manual
- Work lead 3m
- Slow-blow fuse 2A

Installation and Operator Instructions

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

Location and Environment

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 40°C.

The following equipment has been added to **POWERTEC 365S, 425S, 505S**:

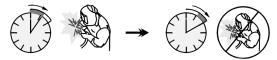
- Operator's Manual
- Work lead 3m
- Slow-blow fuse 3A

Recommended equipment, which can be bought by user, was mentioned in the chapter "Suggested Accessories".

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.

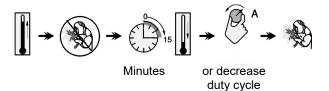
Example: 60% duty cycle:



Welding for 6 minutes

Break for 4 minutes

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



Input Supply Connection

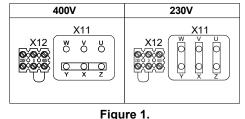
Only a qualified electrician can connect the welding machine to the supply network. Installation the outlet plug to power lead and connecting the welding machine had to be made in accordance with the appropriate National Electrical Code and local regulations.

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 3x230V 50/60Hz and 3x400V 50/60Hz (400V: 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 left side panel from the machine.
- Reconnect X11 and X12 according to the diagram below:



• Replace the left side panel.

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.

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!

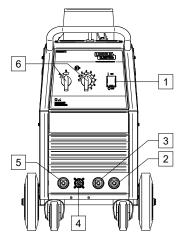
Output Connections

Refer to point [2], [3], [4] and [5] of the Figure 2.

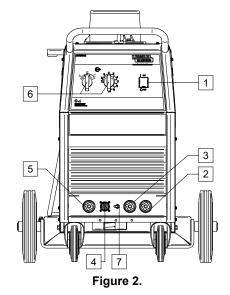
Controls and Operational Features

- Power Switch ON/OFF (I/O): Controls the input power to the machine. Be sure the power source is connected to the mains supply before turning power on ("I"). After input power is connected and the power switch is turned on, the indicator will light up to indicate the machine is ready to weld.
- 2. <u>High Inductance Negative Output Socket:</u> For the work lead connection.
- 3. <u>Low Inductance Negative Output Socket:</u> For the work lead connection.
- 4. <u>Wire Feeder Receptacle:</u> 14-pins receptacle for wire feeder. Provides connections for auxiliary power of wire feeder.
- 5. <u>Positive Output Socket:</u> For the source/wire feeder cable connection.
- 6. <u>Welding Load Voltage Switch:</u> Adjust the welding load voltage.
- <u>Wire Feeder Voltmeter Switch</u>: This switch selects the polarity of the wire feeder voltmeter, if so equipped. When the welding torch is positive (MIG, Outershield and some Innershield processes), set the switch to "+". When the welding torch is negative (most Innershield applications), set the switch to "-".





POWERTEC 365S, 425S, 505S



8. <u>Fuse:</u> Use slow-blow fuse:

POWERTEC			
305S	365S	425S	505S
2A	3A	3A	3A

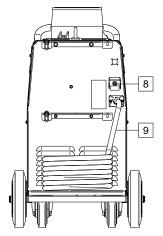
- <u>Power Lead (5m)</u>: Connect the supply plug to the existing input cable that is rated for the machine as indicated in this manual, and conforms to all applicable standards. This connection shall be performed only by a qualified person.
- 10. <u>Cooler Power Supply Socket</u>: For supplying the cooler unit only.

The socket has an output of 230V, 2.5A and is protected by the circuit breaker [11].

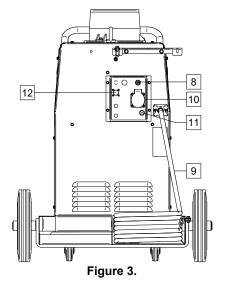
11. <u>Circuit Breaker</u>: Protects the Cooler Power Supply socket. It shuts off the power supply when the current exceeds 2.5A. Press it to restore the power supply.

12. <u>Hole Plug:</u> For CO₂ gas heater socket (see "Suggested Accessories" chapter - K14009-1 CO₂ Heater Connection Kit).

POWERTEC 305S







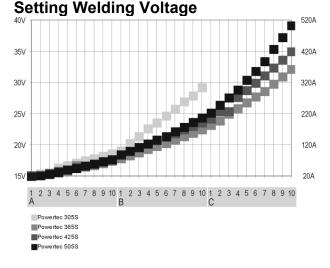
Welding Cables Connections

Insert the plug of the work lead into the socket [2] or [3]. The other end of this leadf connects to the work piece with the work clamp.

Connect the wire feeder to the power source:

- insert the positive welding cable into the output socket [5].
- insert the wire feeder control cable into the socket [4] (see "Suggested Accessories" section, Source/wire feeder cable K10347-PG-xM or K10347-PGW-xM).

Use the shortest possible cable lengths



Machine and Circuit Protection

The **POWERTEC S** is protected against overheating, overload and accidental short-circuits

If the machine is overheated, the thermal protection circuit will decrease the output current to 0.0verheating is flashing by Thermal Overload Indicator on the fron panel of wire feeder. The thermal protection circuit will turn on the output current again, when the machine is cooled.

The **POWERTEC S** is also electronically protected against overload and accidental short-circuit. The overload and short-circuit protection circuit automatically reduces the output current to a safe value when it detects an overload.

Maintenance

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 become null and void.

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 list once every 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.

Do not touch electrically live parts.

Before the case of welding machine will be removed, the welding machine had to be turned off and the power lead had to be disconnected from mains socket.

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

Transport

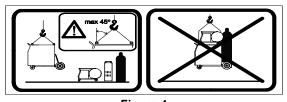


Figure 4

To ensure safety transport it is to:

- Lift only power source without gas cylinder, cooler and wire feeder, or any other Suggested Accessories.
- Screw down an eye bolt and apply load axially in 45 degree angle in accordance to the Figure 4.
- Ensure equal length of lifting lines.

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 for any updated information.

WEEE



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

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.

REACh

Communication in accordance with Article 33.1 of Regulation (EC) No 1907/2006 - REACh. Some parts inside this product contain: Bisphenol A, BPA, EC 201-245-8, CAS 80-05-7 Cadmium, EC 231-152-8, CAS 7440-43-9 Lead, EC 231-100-4, CAS 7439-92-1 Phenol, 4-nonyl-, branched, EC 284-325-5, CAS 84852-15-3 in more than 0,1% w/w in homogeneous material. These substances are included in the "Candidate List of Substances of Very High Concern for Authorisation" of REACh. Your particular product may contain one or more of the listed substances. Instructions for safe use: use according to Manufacturer instructions, wash hands after use; keep out of reach of children, do not put in mouth, dispose in accordance with local regulations.

Authorized Service Shops Location

- 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 <u>www.lincolnelectric.com/en-gb/Support/Locator.</u>

Electrical Schematic

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

Suggested Suggested Accessories

K10347-PG-xxM	Source/wire feeder cable (gas). Available in 5, 10, 15m
K10347-PGW-xxM	Source/wire feeder cable (gas and water). Available in 5, 10 or 15m.
K14011-1	Work lead 3m (POWERTEC 305S)
K14018-1	Work lead 3m (POWERTEC 365S, 425S)
K14033-1	Work lead 3m (POWERTEC 505S)
K14009-1	CO2 Socket Kit
K14082-1	AV Meter Kit
 K14071-2	Grill Kit
K14037-1	Cooler COOLARC-25