

POWERTEC® i350S, i420S, i500S

OPERATOR'S MANUAL



ENGLISH





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® i350S		K14183-1			
POWERTEC® i420S		K14184-1			
POWERTEC® i500S		K14185-1			
INPUT					
	Input Voltage U_1	EMC Class	Frequency		
i350S	400V ± 15% 3-phase	A	50/60Hz		
i420S					
i500S					
	Input Power at Rated Cycle	Input Amperes I_{1max}	PF		
i350S	15 kVA @ 50% Duty Cycle (40°C)	21A	0,90		
i420S	19 kVA @ 100% Duty Cycle (40°C)	27A	0,92		
i500S	23 kVA @ 60% Duty Cycle (40°C)	34A	0,94		
	Efficiency	Idle Power			
i350S	85%	35W			
i420S	85%	35W			
i500S	85%	35W			
RATED OUTPUT					
	Open Circuit Voltage		Duty Cycle 40°C (based on a 10 min. period)	Output Current	Output Voltage
i350S	$U_{0peak} = 54Vdc$ $U_{0rms} = 54Vdc$	GMAW	50%	350A	31,5Vdc
			60%	340A	31,0Vdc
			100%	300A	29,0Vdc
		FCAW	50%	350A	31,5Vdc
			60%	340A	31,0Vdc
			100%	300A	29,0Vdc
		SMAW	30%	350A	34,0Vdc
			60%	320A	32,8Vdc
			100%	275A	31,0Vdc
i420S	$U_{0peak} = 60Vdc$ $U_{0rms} = 54Vdc$	GMAW	100%	420A	35,0Vdc
		FCAW	100%	420A	35,0Vdc
		SMAW	100%	420A	36,8Vdc
i500S	$U_{0peak} = 60Vdc$ $U_{0rms} = 54Vdc$	GMAW	60%	500A	39,0Vdc
			100%	420A	35,0Vdc
		FCAW	60%	500A	39,0Vdc
			100%	420A	35,0Vdc
		SMAW	60%	480A	39,2Vdc
			100%	420A	36,8Vdc
WELDING CURRENT RANGE					
	GMAW	FCAW	SMAW		
i350S	20A÷350A	20A÷350A	10A÷350A		
i420S	20A÷420A	20A÷420A	10A÷420A		
i500S	20A÷500A	20A÷500A	10A÷480A		

WELDING VOLTAGE REGULATION RANGE				
	GMAW		FCAW	
i350S	15V± 33,5V		15V± 33,5V	
i420S	15V ÷ 37V		15V ÷ 37V	
i500S	15V ÷ 41V		15V ÷ 41V	
RECOMMENDED INPUT CABLE AND FUSE SIZES				
	Fuse Type: Time-Delay or Circuit Breaker Type D		Power Lead	
	400V			
i350S	25A		4 Conductor, 2,5mm ²	
i420S	32A		4 Conductor, 4,0 mm ²	
i500S	32A		4 Conductor, 4,0 mm ²	
DIMENSION				
	Weight	Height	Width	Length
i350S	68kg	932 mm	560 mm	925 mm
i420S	78kg			
i500S	79kg			
Protection Rating	Operating Humidity (t=20°C)	Operating Temperature	Storage Temperature	
IP23	≤ 90 %	from -10 °C to +40 °C	from -25 °C to +55 °C	

Electromagnetic Compatibility (EMC)

01/11

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. 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.

WARNING

Provided that the public low voltage system impedance at the point of common coupling is lower than:

- 105 mΩ for the **POWERTEC® i350S**
- 25 mΩ for the **POWERTEC® i420S**
- 35 mΩ for the **POWERTEC® i500S**.

This equipment is compliant with IEC 61000-3-11 and IEC 61000-3-12 and can be connected to public lowvoltage systems. 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 system impedance complies with the impedance restrictions.

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







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>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.</p>
	<p>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.</p>
	<p>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.</p>
	<p>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.</p>
	<p>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.</p>
	<p>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.</p>
	<p>CE COMPLIANCE: This equipment complies with the European Community Directives.</p>
	<p>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 Equipment (PPE) having filter with a protection degree up to a maximum of 15, as required by EN169 Standard.</p>
	<p>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.</p>
	<p>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.</p>
	<p>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.</p>
	<p>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.</p>

	<p>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.</p>
	<p>SAFETY MARK: 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.

Introduction

POWERTEC® i350S, i420S, i500S inverter sources have to be connected with wire feeders **LF52D and LF56D**. Signal from the power source will be displayed on wire feeders user interface. For communication, inverter source-wire feeder is used CAN protocol. Inverter source-wire feed configuration allows the welding:

- GMAW (MIG/MAG);
- FCAW;
- SMAW (MMA).

POWERTEC® i350S, i420S, i500S work with the water cooler **COOL ARC® 26**.

The complete packaging includes the following items:

- Inverter source;
- USB with Operator's Manual;
- Work lead - 3m;
- Slow-blow fuse – 2A (2 units);
- Gas hose -2m;
- Chain.

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

Installation and Operator Instructions

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

Location and Environment

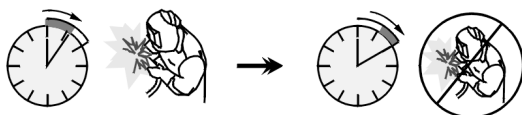
This machine can be operate in harsh environment. However, it is important to use simple preventative measures, which provide long life and reliable operation.

- Do not place or operate this machine on a surface with an incline higher than 15° from horizontal.
- Do not use this machine for pipe thawing.
- This machine must be located in a place 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.
- Keep away from 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 a 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 higher than 40°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.

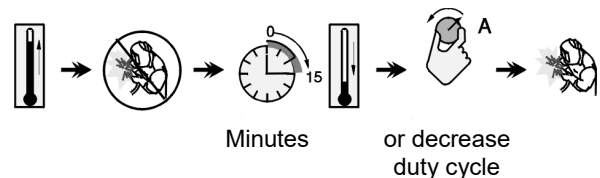
Example: 60% duty cycle



Welding for 6 minutes.

Break for 4 minutes.

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



Input Supply Connection

⚠ WARNING

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, phases, and frequency supplied to this machine before turning it on. Verify the connection of grounding wires from the machine to the input power source. **POWERTEC® i350S, i420S, i500S** can only be connected to a mating grounded receptacle. Input voltages is 3x400V 50/60Hz. For more information about input supply please refer to the technical specification section of this manual and to the rating plate of the machine.

Make sure that the amount of mains power available from the input supply is adequate for normal operation of the machine. The type of protection and cable sizes are indicated in the technical specification section of this manual.

⚠ WARNING

The welding machine can be supplied from a power generator of output power at least 30% larger than input power of the welding machine. See "Technical Specifications" chapter.

⚠ WARNING

In case of powering welder from a generator make sure to turn off welding machine first, before generator is shut down, in order to prevent damage to welding machine!

Output Connections

Refer to points [2], [3] and [4] of the figures below.

Controls and Operational Features

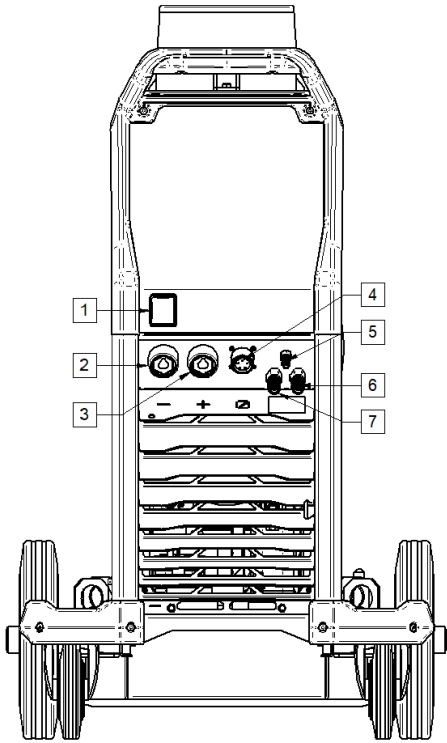





Figure 1.


1. Power Switch ON/OFF (I/O): Controls the input power. Make sure the power source is properly connected to the mains supply before turning power on ("I").


 2. Negative Output Socket for the Welding Circuit: Depending on the configuration of power source, for connecting a work lead, the electrode holder with lead or the source/wire feeder welding cable.

 3. Positive Output Socket for the Welding Circuit: Depending on the configuration of power source, for connecting a work lead, the electrode holder with lead or the source/wire feeder welding cable.

 4. Control Receptacle: 5 pins receptacle for wire feeder or remote controller connection. To communication wire feeder or remote controller with power source is used CAN protocol.

5. Gas Connector: For connection a gas hose from interconnecting cable.

6. Quick Connect Coupling: Coolant inlet (takes warm coolant from torch/gun). 

7. Quick Connect Coupling: Coolant outlet (supplies cool coolant to the torch/gun). 

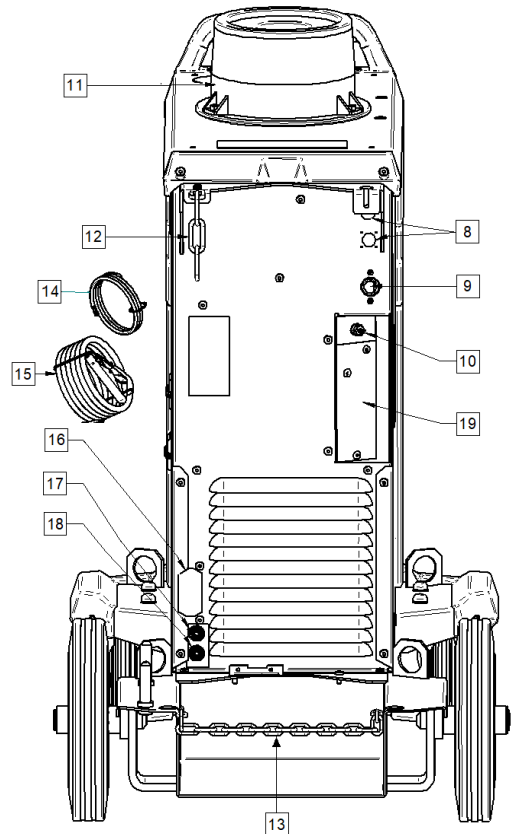




Figure 2.

8. Supply Plug: for gas heater kit (see "Accessories Suggested" chapter).
9. Power Lead (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 by a qualified person only.
10. Gas Connector: For connection a gas hose from cylinder.
11. Swivel bracket: For mounting the wire feeder.
12. Top Chain: To protect gas bottle.
13. Bottom chain: For properly securing the gas cylinder

WARNING

Not using both chains at the same time to secure the gas cylinder may result in damage to the cylinder, the device and personal injury.

14. Gas hose: For connection between the cylinder and machine.
15. Mass welding cable
16. Cover bracket: To install **COOL ARC® 26** power supply and control cable (see "Accessories Suggested" chapter).

17. Quick Connect Coupling: Coolant inlet (supplies cool coolant to the torch/gun). 
18. Quick Connect Coupling: Coolant outlet (takes warm coolant from torch/gun). 
19. Cover bracket: To install the welding and control sockets on the rear panel of the device (see chapter "Accessories Suggested") to connect the wire feeder.

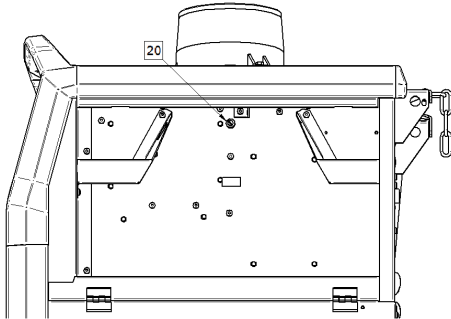


Figure 3.

20. Fuse F1: Use the 2A/400V (6,3x32mm) low blow fuse.

Welding Cables Connection

Insert the plug of the work lead into the socket [2]. The other end of this lead connect 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 [3].
- Insert the wire feeder control cable into the socket [4] (see "Accessories Suggested" chapter).

Use the possible shortest cable lengths.

Water Cooler Connection

POWERTEC® i350S, i420S, i500S work with the water cooler COOL ARC® 26 (see "Accessories Suggested" chapter).



WARNING

Read the cooler manual before connecting it to the power source.

The COOL ARC® 26 is supplied by welding power source using 10-PIN socket.

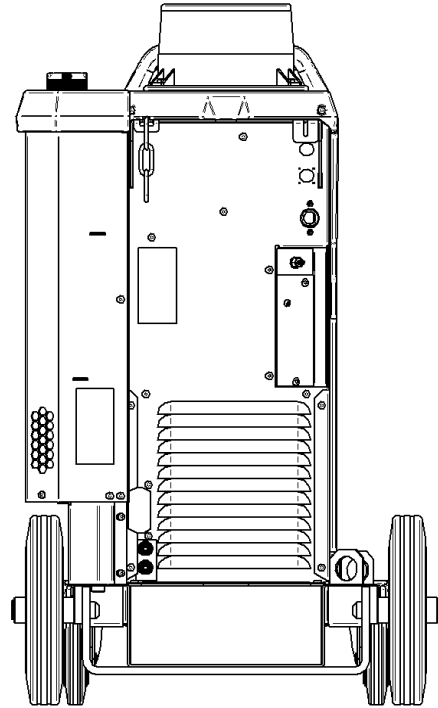


Figure 4.

Machine and Circuit Protection

Power Source 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. This information will be shown by wire feeder user interface. Please refer to wire feeder user manual.

Transport & Lifting



! WARNING

Falling equipment can cause injury and damage to unit.

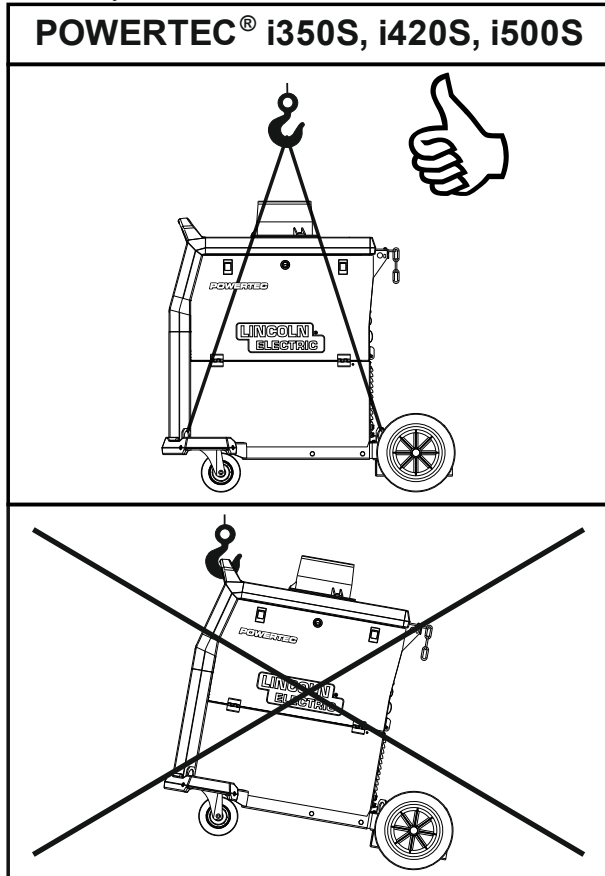


Figure 5.

During transportation and lifting with a crane, adhere to the following rules:

- The device contains elements adapted for transport.
- For lifting a suitable lifting equipment capacity.
- For lifting and transport use minimum four belts.
- Lift and transport only power source without gas cylinder, cooler and wire feeder, or/and any other accessories.

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 list 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 according to the working environment where the machine is placed.

! WARNING

Do not touch electrically live parts.

! WARNING

Before the case of welding machine will be removed, the welding machine has to be turned off and the power lead had 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 for any updated information.

WEEE

07/06

English



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.

REACH

11/19

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

09/16

- 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.

Electrical Schematic

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

Accessories Suggested

GRD-400A-70-xM	Ground cable 400A/70 mm ² ; x=5/10/15 m
K14186-1	LF 52D
K14187-1	LF 56D
K14182-1	COOLARC-26
W000010167	FREEZCOOL 9,6L
K14196-1	OUTPUT CONNECTION KIT (PTi350S)
K14202-1	OUTPUT CONNECTION KIT (PTi420/500S)
K14201-1	CABLE MANAGEMENT KIT
K14208-1	WATER CONNECTION KIT
K14176-1	GAS HEATER KIT (POWERTEC®-i)
INTERCONNECTION CABLE	
K14198-PG	CABLE PACK 5PIN G 70MM2 1 M
K14198-PG-5M	CABLE PACK 5PIN G 70MM2 5M
K14198-PG-10M	CABLE PACK 5PIN G 70MM2 10M
K14198-PG-15M	CABLE PACK 5PIN G 95MM2 15M
K14198-PG-20M	CABLE PACK 5PIN G 95MM2 20M
K14198-PG-25M	CABLE PACK 5PIN G 95MM2 25M
K14198-PG-30M	CABLE PACK 5PIN G 95MM2 30M
K14199-PGW	CABLE PACK 5PIN W 95MM2 1 M
K14199-PGW-5M	CABLE PACK 5PIN W 95MM2 5M
K14199-PGW-10M	CABLE PACK 5PIN W 95MM2 10M
K14199-PGW-15M	CABLE PACK 5PIN W 95MM2 15M
K14199-PGW-20M	CABLE PACK 5PIN W 95MM2 20M
K14199-PGW-25M	CABLE PACK 5PIN W 95MM2 25M
K14199-PGW-30M	CABLE PACK 5PIN W 95MM2 30M

Connection configuration

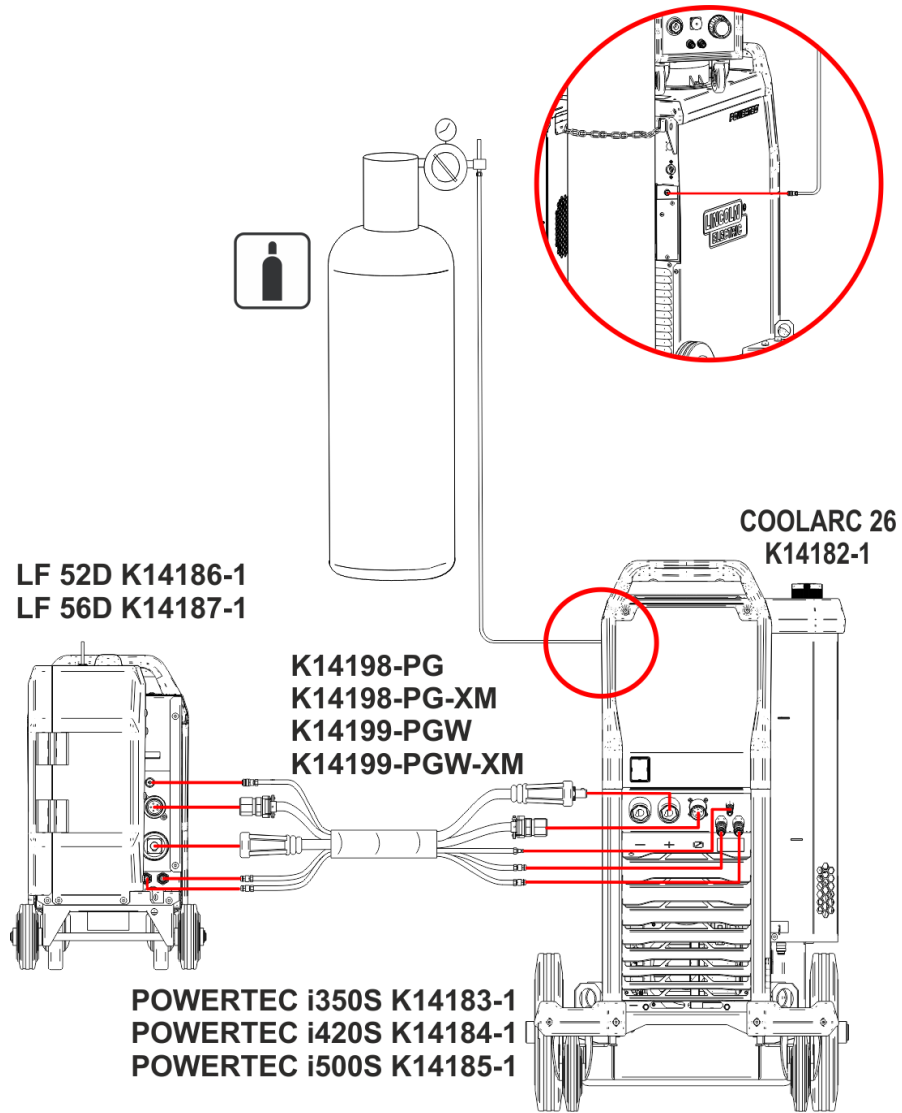


Figure 6