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INVERTEC® 165S

OPERATOR'S MANUAL

ENGLISH

LINCOLN ELECTRIC
THE WELDING EXPERTS®

Lincoln Electric Bester Sp. z o.o.
ul. Jana III Sobieskiego 19A, 58-263 Bielawa, Poland

www.lincolnelectric.eu

LINCOLN ELECTRIC
THE WELDING EXPERTS®

Declaration of conformity

CE

Lincoln Electric Bester Sp. z o.o.

Declares that the welding machine:

K14171-1 **INVERTEC® 165S**

conforms to the following directives:

2014/35/EU , 2014/30/EU, 2011/65/EU

and has been designed in compliance with the following standards:

EN 60974-1:2012; EN 60974-10:2014

01.08.2018

Piotr Spytek
Operations Director
Lincoln Electric Bester Sp. z o.o., ul. Jana III Sobieskiego 19A, 58-263 Bielawa, Poland

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	
……	……

Safety

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.

	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.
	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.
	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.
	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.
	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.
	SAFETY MARK: This equipment is suitable for supplying power for welding operations carried out in an environment with increased hazard of electric shock.
	WARNING: Welding/cutting equipment must only be used for the purpose for which it is intended. It must never be used for any other purpose, such as battery charging, thawing out frozen water pipes, heating premises by the addition of heating elements, etc.
	WARNING Stability of the equipment is guaranteed only for an incline of maximum 10°.

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

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. 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. This equipment does not comply with IEC 61000-3-12. If it is connected to a public low-voltage system, it is responsibility of the installer or user of the equipment to ensure, by consultation with the distribution network operator if necessary, that the equipment may be connected.

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.

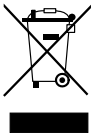
- Connect the machine to the input supply according to this manual. If disturbances occur if may be necessary to take additional precautions such as filtering the input supply.
- The output cables should be kept as short as possible and should be positioned together. If possible connect the work piece 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.

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.

WEEE

English



Do not dispose of electrical equipment together with normal waste!
In observance of European Directive 2012/19/EU 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!

EN

CONTENTS

EN

1.0 TECHNICAL DESCRIPTION

1.1 DESCRIPTION

The system consists of a modern direct current generator for the welding of metals, developed via application of the inverter. This special technology allows for the construction of compact light weight generators with high performance. I'ts adjust ability, effeciency and energy consumption make it an excellent work tool suitable for coated electrode and GTAW (TIG) welding.

1.2 TECHNICAL SPECIFICATIONS

DATA PLATE

PRIMARY	
Single phase supply	230 V
Frequency	50 Hz / 60 Hz
Effective consuption	16 A
Maximum consuption	34,4 A
Fuse	16A
SECONDARY	
Open circuit voltage	85 V
Welding current	5 A ÷ 160 A
Duty cycle 20%	160 A
Duty cycle 60%	100 A
Duty cycle100%	80 A
Protection class	IP 23
Insulation class	H
Weight	Kg 7
Dimensions	265 x 162 x 385
European Standards	EN 60974.1 / EN 60974.10

1.3 DUTY CYCLE AND OVERHEATING

Duty cycle is the percentage of 10 minutes at 40°C ambient temperature that the unit can weld at its rated output without overheating. If the unit overheats, the output stops and the over temperature light comes On. To correct the situation, wait fifteen minutes for unit to cool. Reduce amperage, voltage or duty cycle before starting to weld again (See page III).

DO NOT EXCEED THE MAXIMUM WORK CYCLE. EXCEEDING THE WORK CYCLE SPECIFIED ON THE DATAPLATE CAN DAMAGE THE POWER SOURCE AND INVALIDATE THE WARRANTY.

1.4 VOLT - AMPERE CURVES

Volt-ampere curves show the maximum voltage and amperage output capabilities of the welding power source. Curves of other settings fall under curves shown (See page III).

2.0 INSTALLATION

IMPORTANT: BEFORE CONNECTING, PREPARING OR USING EQUIPMENT, READ SAFETY PRECAUTIONS.

2.1 CONNECTING THE POWER SOURCE TO THE MAINS ELECTRICITY SUPPLY.

Serious damage to the equipment may result if the power source is switched off during welding operations.

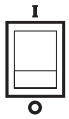
Check that the power socket is equipped with the fuse indicated in the features label on the power source. All power source models are designed to compensate power supply variations. For variations of ±10%, a welding current variation of ±0.2% is created.

BEFORE INSERTING THE MAINS PLUG, IN ORDER TO AVOID THE FAIL OF POWER SOURCE, CHECK IF THE MAINS CORRESPONDS TO THE WISHED MAIN SUPPLY.

WARNING: THIS EQUIPMENT DOES NOT COMPLY WITH IEC 61000-3-12. IF IT IS CONNECTED TO A PUBLIC LOW VOLTAGE 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 MAY BE CONNECTED.

THIS 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.

ON - OFF SWITCH: This switch has two positions: I and 0.



The welder is designed to be worked from a generator.

Before connecting the welder to the generator it is important to establish that the generator has the following technical requirement:

1. the 230V 50/60 Hz socket can supply sufficient power required for welding, see label on welder.
2. the socket supplies undistorted voltage RMS between 180 and 280 V.
3. the socket supplies peak voltage between 230 and 420 V.
4. the socket supplies alternate voltage with a frequency between 50 and 60 Hz.

IT IS ADVISABLE TO FOLLOW THE ABOVE INSTRUCTIONS OTHERWISE THE WELDER COULD BE DAMAGED.

2.2 POWER SOURCE POSITIONING

SPECIAL INSTALLATION MAY BE REQUIRED WHERE GASOLINE OR VOLATILE LIQUIDS ARE PRESENT. CONTACT THE COMPETENT AUTHORITIES. WHEN POSITIONING EQUIPMENT, ENSURE THAT THE FOLLOWING GUIDELINES ARE FOLLOWED:

1. The operator must have unobstructed access to controls and equipment connections.
2. Check that the power cable and fuse of the socket for power source connection is suited to current requirements of the latter.
3. Do not position equipment in confined, closed places. Ventilation of the power source is extremely important. Avoid dusty or dirty locations, where dust or other debris could be aspirated by the system.
4. Equipment (including connecting leads) must not obstruct corridors or work activities of other personnel.

Position the power source securely to avoid falling or overturning. Bear in mind the risk of falling of equipment situated in overhead positions.

2.3 HANDLING AND TRANSPORTING THE POWER SOURCE

OPERATOR SAFETY: WELDER'S HELMET - GLOWES - SHOES WITH HIGH INSTEPS.

THE WELDING POWER SOURCE DO NOT WEIGHT MORE THAN 25 KG AND CAN BE HANDLED BY THE OPERATOR. READ WELL THE FOLLOWING PRECAUTIONS.

The machine is easy to lift, transport and handle, though the following procedures must always be observed:

1. The operations mentioned above can be operated by the handle on the power source.
2. Always disconnect the power source and accessories from main supply before lifting or handling operations.
3. Do not drag, pull or lift equipment by the cables.

2.4 CONNECTION AND PREPARATION OF EQUIPMENT FOR STICK WELDING.

TURN OFF WELDER BEFORE MAKING CONNECTIONS.

Connect all welding accessories securely to prevent power loss. Carefully follow safety regulations described in SAFETY RULES.

1. Fit the selected electrode to the electrode clamp.
2. Connect the earth lead connector to the negative (-) quick-connection terminal (Ref. 6 - Picture 1 Page 3.) and the earth clamp of the workpiece near the welding zone.
3. Connect the electrode clamp connector to the positive (+) quick-connection terminal (Ref. 5 - Picture 1 Page 3.) .

CAUTION: MAKE THE ABOVE CONNECTION FOR DIRECT POLARITY WELDING; FOR INVERSE POLARITY, INVERT THE CONNECTION: EARTH LEAD CONNECTOR TO THE QUICK-CONNECTION POSITIVE (+) TERMINAL AND THE ELECTRODE HOLDER CLAMP CONNECTOR TO THE NEGATIVE (-) TERMINAL.

4. Adjust welding current with ampere selector Ref. 2 - Picture 1 Page 3.) .
5. Press the illuminated switch to turn on the power source Ref. 1 - Picture 1 Page 3.) .

N.B. *Serious damage to the equipment may result if the power source is switched off during welding operations.*

The power source is fitted with an anti-sticking device that disables power if output short circuiting occurs or if the electrode sticks, allowing it to be easily detached from the workpiece.

This device enters into operation when power is supplied to the generator, even during the initial checking period, therefore any load input or short circuit that occurs during this phase is treated as a fault and will cause the output power to be disabled.

2.5 CONNECTION AND PREPARATION OF EQUIPMENT FOR GAS TUNGSTEN ARC WELDING (TIG)

TURN OFF WELDER BEFORE MAKING CONNECTIONS.

Connect welding accessories securely to avoid power loss or leakage of dangerous gases. Carefully follow the safety regulations.

1. Fit the required electrode and nozzle to the electrode holder (check the protrusion and state of the electrode tip).
2. Connect the earth lead connector to the positive (+) quick-connect terminal Ref. - Picture 1 Page 3.) and the earth clamp to the workpiece near the welding zone.
3. Connect the torch lead connector to quick-connection negative (-) terminal Ref. 6 - Picture 1 Page 3.) .
4. Connect the torch gas hose to the gas cylinder outlet.
5. Press the illuminated switch to turn on the power source Ref. 1 - Picture 1 Page 3.) .
6. Check that there are no gas leaks.
7. Adjust welding current with ampere selector Ref. 2 - Picture 1 Page 3.) .

CHECK GAS DELIVERY; TURN GAS CYLINDER KNOB TO REGULATE FLOW .

NB: *The electric welding arc is struck by lightly touching the workpiece with the electrode (Scratch start).*

CAUTION: WHEN WORKING OUTDOORS OR IN WINDY CONDITIONS PROTECT THE FLOW OF SHIELDING GAS OR IT MAY BE DISPERSED WITH RESULTING LACK OF PROTECTION FOR THE WELD.

3.0 CONTROLS, POSITION AND FUNCTIONS

3.1 FRONT PANEL

Picture 1.

1. Connect the earth lead to the work piece to the negative terminal (-) (Ref. 6 - Picture 1 Page 3.)
2. Connect the torch lead to the positive terminal (+) (Ref. 5 - Picture 1 Page 3.).

ENSURE THAT THESE CONNECTIONS ARE WELL TIGHTENED TO AVOID POWER LOSS AND OVERHEATING.

3. Use control knob (Ref. 2 - Picture 1 Page 3.) to regulate welding current.
4. Illuminated switch (Ref. 1 - Picture 1 Page 3.) must be ON (lamp light) before welding operations can be started.
5. Illumination of the yellow LED (Ref. 3 - Picture 1 Page 3.) on the front panel indicates a fault which prevents the equipment from functioning.

The yellow LED indicates two fault types:

1. overheating caused by an excessively intense duty cycle. In this case, stop welding and leave the power source switched on until the LED switches off.
2. power supply too high/too low.

   In this case, wait till the LED switches off, indicating normalisation of the supply voltage and then resume welding.

4.0 MAINTENANCE

DISCONNECT POWER BEFORE MAINTENANCE. SERVICE MORE OFTEN DURING SEVERE CONDITIONS.

Every three (3) months, perform the operations below:

1. Replace unreadable labels.
2. Clean and tighten weld teminals.
3. Replace damaged gas hose.
4. Repair or replace cracked cables and cords.

Every six (6) months, perform the operation below:

Blow out the inside of the unit. Increase frequency of cleaning when operating in dirty or dusty conditions.