LOTUS®

Performance, Delivered.™

200A TIG/ARC Inverter Welder

LT200TD Pro

Made in China/Fabriqué en Chine
Lotus Tool Group (Philippines)
www.lotustoolworks.com

1 Safety Instructions

The products described were developed, manufactured and tested in compliance, with the fundamental safety requirements of the EU Machine Directive. These products normally pose no danger to persons or property if used in accordance with the handling stipulations and safety noters prescribed for their configuration, mounting and proper operation.

Nevertheless, there is some residual risk!

Therfore, you should read this manual before installing, connecting or commissioning the products. Store this manual in a place to which all users have access at any time.

This manual describes the:

• PSG 3000 Medium frequency welding transformers.

1.1 Safety Instruction and symbol used in this manual

DANGEROUS ELECTRICAL VOLTAGE
This symbol is used to warn of dangerous electrical voltage. Failure to observe the instructions in this manual in whole or in part may result in personal injury.

DANGER
This symbol is used wherever failure to observe the instructions in whole or in part may result in personal injury

CAUTION
This symbol is used wherever insufficient or lacking compliance with instructions may result in damage to equipment or data files.

Note: This symbol is used to draw the user's attention to special circumtances

This symbol is used if user activities are required.

Modifications in this manual as compared to a previous edition are marked by black vertical bars in the margin.

1.2 Intended use

The welding transformer is controlled by the medium-frequency inverter. These welding transformers are designed for use in

- Resistance welding if metal and
- Are suitable for operation in industrial environments as per DIN EN 50082 -2 and 50081-2 on electromagnetic compatibility (EMC).

They are not intended for any other use!

DANGER
Any use other than for the purpose indicated may result in personal injury of the user or third parties or in damage to equipment, the workpiece to be welded or environmental damage.
Therfore our products must never be used for any other than their respective intended purpose!

☞ **For operation in residential environments, in trade and commercial applications and small enterprises, an individual permit of the national authority or test institution is required.**

The faultless, safe functioning of thee products requires proper transport, storage, erection and installation as well as careful operation.

1.3 No admittance for persons fitted with cardiac pacemakers

DANGER
WARNING for persons fitted with cardiac pacemakers!
To protect persons fitted with cardiac pacemakers, no-entry signs should be posted because pacemaker malfunction (missed pulses, total failure), pacemakers program interference or even program destruction is to be expected!!!

☞ **Note: We recommend that warning signs like the one shown below are posted at every entrance to manufacturing shops housing resistance welding equipment:**

No entry for persons with cardiac pacemakers!
Danger!

DIN 40023

1.4 Installation and assembly

DANGEROUS ELECTRICAL VOLTAGE
Before the modules are installed, the respective mounting station must be safely isolated from supply and properly safeguarded to prevent unintentional or unauthorized reclosing.

DANGER
Danger of injuri and of damage top properly through incorrect installation!
Devices and, in particular operating means, must be installed so as ro be properly safeguarded against unintentional operation or contact.

DANGER
Danger of personal injury and damage to property ththrough inadquate fastening!
The place for installing the welding transformers, and their method of fastening, must be suitable for their weight!
Injuries and bruises may be caused by lifting weights which are too heavy or by sharp metal edges!
Due to the heavy weight of individual modules several persons are required for installtion and assembly.
Wear safety shoes and safety gloves!

DANGER
Non-workmanlike installation or mounting may lead to personal injury or damage to property.
Therfore, it is essential that you take the technical data (nvironmental conditions) into account for installation or mounting.
Installation or mounting must be carried out skilled personnel only

CAUTION
Leaks in the cooling water circuit may cause consequential damage!
Cooling water leaks may damage adjacent components, Therefore, when mounting water-cooled modules, always ensure that other devices in t he switchgear cabinet are well protected against leaking cooling water

CAUTION
Damage to property through inappropriate or insufficient cooling of the welding transformers!
Water-cooled welding transformers may only be operated when the cooling water circuit is active! Condensation on water-carrying components must be prevented.

Damage to property through insufficient water quaklity in the cooling water circuit.
Deposit in the cooling system may reduce the water flow, thus impairing the performance of the cooling system with time.

Therefore, you should ensure that your cooling water has the following properties|:
• pH value : 7 to 8.5
• Degree of hardness D_{max} : 10 German degree
(1 German degree = 1.25 british degree =1.05 US degree=1.8 French degree)
• Chlorides : Max. 20mg/l
• Nitrates : Max. 10mg/l
• Sulfates : Max. 100mg/l
• Insoluble Substances : Max. 250mg/l

Tap water usually meets these requirements. However, an algicide Should be added.

★ Make sure that all contact surfaces are bright, i.e. free of paint,plastic coating or dirt/oxidation.

1.5 Electrical connection

DANGEROUS ELECTRICAL VOLTAGE
The primary voltage of the welding transformer is associated with many dangers!
Possible consequences of improper handling include death or most severe injuries (personal injuries) and damage to property. For this reason, the electrical connection must always be made by an electrical expert in compliance with the valid safety regulations, the main voltage and the maximum current consumption of the individual unit of the equipment.
The main voltage must match the nominal voltage given on the name plate of the product!

DANGEROUS ELECTRICAL VOLTAGE
Working with system voltage may result in death, severe bodily injury or considerable damage to property unless the appropriate precautionary measures are taken.
Therfore, you should carefully read the safety instructions at the beginning of this manual where you will find a description of a number of features to be strictly observed! The system voltage is associated with considdarable dangers!

Possible consequences of improper handling include death or most severe injuries (personal injuries) and damage to property. For this reason, the electrical connection must always be made by an electrical expert in compliance with the valid safety regulations, the main voltage and the maximum current consumption of the individual units of the equipment.

Incorrect main voltage may render the system dangerous or cause electrical component failure!

Therefore, please ensure the following:

- **The main voltage must match the nominal voltage given on the nameplate of the product!**
- **Main voltage fluctuation or variation from the nominal voltage must be within the specified tolerance range (See technical data)**
- **The equipment must be appropriately fused on the main side!**
- **The welding transformeer must be connected to the protective earthing (PE) circuit of the system. Please ensure that the cross sectional area of cables used for protective conductor wiring is suffuciently large. The electrical continuity of the protective earthing circuit must be verified in accordance with EN 60204 Part 1**
- **Before carrying out any work on the main system or welding system connections it must be ensured that the MF inverter has been safely isolated from the supply for at least 50 minutes (capacitor disharge time).**
- **Proper and well insulated tools must be used for handling electric connections!**

DANGEROUS ELECTRICAL VOLTAGE
Danger of life through insufficient protective conductor system! The welding transformers must be connected to the protective earthing (PE) circuit of the system. please ensure that the cross-sectional area of cables used for protective conductor wiring is sufficiebtly large. The electrical continuity of the protective earthing circuit must be verified in accordance with EN 60204 Part 1, CF. Section 3.1

DANGEROUS ELECTRICAL VOLTAGE
Protective conductor jumper (mpe)
The protective eart for the negative pole of the PSG 3000 can be interrupted by opening the protective earth conductor jumper at the PSG 3000. In order to protect the operating personnel against dangerous electrical voltage in the event of a break down of the transformer primary side to the secondary side, in this case, a suitable protective measure pursuant to EN 50 063 is to be provided in addtion, yhe transformer is to be marked accordingly.

DANGEROUS ELECTRICAL VOLTAGE
Insufficient degree of protection may be life-threatening or cause damage to property!
Depending on the type, the protection class of the welding transformer primary terminal is IP 00 or IP 54.
To prevent accidental contact, the primary terminal must be equipped with touch guard.
An additional terminal box of a higher class of protection must be used for connecting the welding transformer

DANGEROUS ELECTRICAL VOLTAGE
The electrical connection must always be made by an electrical expert in compliance with the valid safety regulations, the main voltage and the maximum current consumption of the individual units of the equipment

Prior to connecting an MF Inverter, the following must be strictly observed:

- **Power OFF**
- **Provide a safeguard to prevent unintentional reclosing**
- **Verify that the system is safely isolated from supply and de-energized.**
- **Connect to earth and short circuits**
- **Cover uo or safeguard all live parts.**

CAUTION
Connecting lines and signal lines must be laid so as to avoid negative effect on the function of the units through capacitive or inductive interfernce!
Interference is frequently coupled and de-coupled in long cables. Therefore, inverter cables and control cables nust be routed separately

The influence of interfering cables on susceptible to interference can be minimized by keeping the following distance:
- **>100 mm if cables are run in parallel for <10m**
- **> 250 mm if cables are run in parallel for > 10 m**

CAUTION
Connection cables may come off and apply dangerous voltage to system components!
It is crucial that cables are properly fixed.

SPECIFICATION

Item \ Model	LT200TD
Input supply Voltage and Frequency	220V± 15% 50/60Hz
Rated Input Capacity (KVA)	3.9
Idle Voltage (V)	45
Inout Supply Regulating Range (A)	10-200
Rated Output Voltage (V)	17.2
Continous Loading (%)	60
Idler Loss (W)	40
Efficiency (%)	85
Power Factor (η)	0.93
Insulating Class	B
Weight (kg)	8
Outer Dimension (mm)	371x155x295
Enclosure Protective Class	IP21
Thrust Regulating Range (A)	
Applicable Electrode Diameter (mm)	0.3-6

Installation

For a longer output electric cable used, it is recommended to have the greater cable section to reduce the drop of voltage. the excessively long cable for the welding gun may seriously affect the striking performance of the welder and even other performances of the system, such as the weakend high-frequency striking performance and the abnormal operation of the system therefor, please use the cable as long as we recommend.

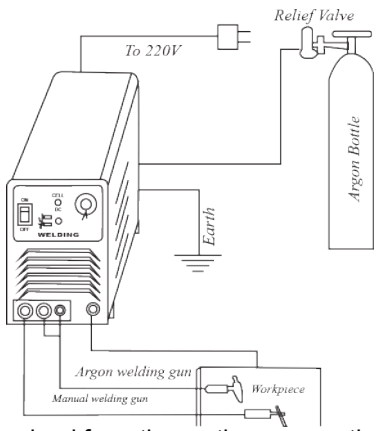
Input connection

1. Each electric welder has the primary power wire that should be connected correctly in accordance with the input voltage of the welder. In the event that the welding operator connects the single-phase 220VAC power wire to 380VAC power wire by carelessness and thus makes the unit under over-voltage protection, please turn it off and restart it for use.

2. Keep the fine contact between the power wire and the power switch or wiring terminal tov avoid any possible oxidation. Check if the supply voltage is within the fluctuating range by a instrument if possible.

Output connection

1. To gas supply: connect the argon pipe closely to the copper nozzle on the back of this unit. The gas supply channel shall include the gas bottle, argon relief flow meterand gas pipe. Enclose the connection of the gas pipe properly by a cock or any other object to avoid ant possiblr leakage or incoming air that may adversely affect the protection effect of the welding spot.



2. Provide the reliable grounding to the enclosure a lead from the earth screw on the back of the unit with the conductive section of least 60mm^2 to avoid any possible static electricity or leakage.

3. Connect the argon welding correctly as shown in the figure. connect the gas power connector the gun and the plug ton the proper jacks on the welder panel and tighten them.

4. Insert the quick plug of the return cable to the “+” quick socket on the welder panel turn and tighten it clockwise and the grip the workpiece by the other end of the earth tong.

1. Each welder has a pair of quick plugs. connect the other end of the wire on the welder hand to the black quick plug and the other end of the eart tong to the red quick plug, and fix them by socket screw wrench to guarantee the fine contact between the secondary cable (handle wire and ear wire) and the quick plugs, Some welding operators have made the mistake here and burnt the quick connector.
2. Turn and tighten the quick plug inserted into the quick socket by force to guarantee the fix contact, otherwise it may burn the plug and socket after a long operation at the greater operting current. Pay attention to the connecting polarity,. Ther are two wirings for ordinary DC welders, is straight polarity and reverse polarity. The so-called straight polarity is to connect the workpiece positive and the welding tong to neagative, Which is generally applied for acid electrode; while the reverse polarity is to connect the workpiece to negative and the welding tong to positive, which generally used for alkali, stainless steel and fiber electrodes.

Posible problems

As the problems mentioned may be in relation to your auxiliary parts, gas supply, environment factors and power supply, please improve the condition to avoid such problems.

A. Blackened Welding spot

The welding spot must be oxidized without the effective protection. Make the following checks:

1. Make sure that the valve of the argon bottle is on and undder the sufficient pressure. Generally, it is necessary to refil the gas bottle in case of the inside pressure less than 0.5Mpa.
2. Check if the argon flow is on and sufficient. You can choose the different flows in accordance with the condition of the welding current to save the gas. however, as the excessively low flow may cause the insufficient protective gas and thus the incomplete coverage of welding spot, it is recommended to keep the argon flow at 5L/min at least no matter how low the current is.
3. The simplest way to check the gas flow from the gas circuit is to feel the gas at the nozzle of the welding gun by your hand.
4. Poorly closed gas circuit or lower gas purity may also cause the poor welding quality.
5. The strong air flow around may also cause the poor welding quality

B. Difficult striking and easy interruption

1. Make sure that the high-quality tighten is used, as the poor tungsten may have the failed Discharge capacity
2. The tungsten without sharpening will also make the striking difficult and cause the unstable electric arc.

C. Unstable current during the operation of the welder. This may be caused the following factors:

1. Change on the supply voltage from the power grid.
2. Serious interference from the power grid or any other power equipment.

Maintenace

1. Remove the dust regularly by the dry and clean compressed air. For a welder used in a smoky and serious polluted environment, remove the dust everyday.
2. Keep the proper pressure of the compressed air to protect the small components of the welder
3. Check the internal circuit connection of the welder regularly to make sure of the correct wiring and firm connection (especially the plug connector and components). For any rustiness and looseness found, remove the staining or oxidized film, and make the firm connection again.
4. Keep the water and moisture away from the inside of the welder. In case there is any water or moisture inside, dry the welder immediately and measure the insulation condition of the mega meter then (including the condition between contacts and between the contact and the enclosure). Make sure that the welder is in normal condition befoe you restart welding.
5. For a welder idling for a long time, put it back into the original packing container and store in a dry environment.

Troubleshooting

1. In case of any trouble on the welder found during the wwarranty period, the user shall not repair it without the permission of the manufacrurer, otherwise the free service warranty offered by the supplier will become void.
2. The operator must have the proper electrical know- how and complete general knowledge in safety for the operation below, and must have the valid qualification certificates to prove his/her ability and knowledge.

Trouble	Remedy
1. The power indicator is off and the fan rests. Therre is no welding output 2. The power indicator is on, yet the fan rests or stop after a few seconds of rotation. Ther is no welding output	1. Failed power switch 2. Check the electricity on the power grid connected to the input cable. 3. Check if there is any break circuit input cable 1. It may be over voltage protection due to the wrong connection of the input wire to the 380V supply. 2. Over-voltage protection circuit triggers due to the unstable 220V supply (the input wire is too thin and long) or the input wire overlapped on the power grid. Enlarge the diameter of the input wire or fix its joint and switch off the unit and restart it again 2-3 minutes later to resume normal operation. 3. Over-voltage protection circuit may trigger after the continuous power on-off within a short period of time. switch off the unit and restart it 2-3 min. later 4. The lead from the switch to the power board gets loosed. make the firm connection again. 5. The 24V relay in the main return circuit on the power board is not picked up or becomes damaged. Check the 24V supply and the relay and replace the danaged relay by another of the same type.
3. The fan rotates and the error indicator is off. There is no hoarse high-frequency discharge voice nor striking by “ arc-side” welding.	1. The positive and negative voltage between the VH-07 card on MOS board and the power board is about DC308V measured by the universal meter. (a) Check for break circuit or poor contact of the silicon bridge patch cord. (b) Leakage on individual huge electrolytic condenser of the four on the power board (about 470UF/450V). Replace it. 2. Ther is the green indicator for the auxillary power supply on MOS board. if it is still off, The auxiliary supply must be dead. Find Out the error and contact the dealer. 3. The control wire on the welding gun is broken.

Trouble	Remedy
4. The error indicator is off. There is the hoarse Hig-frequency discharge voice but no welding output.	1. The power cable of the welding gun gets broken. 2. The earth wire is broken or isn't connected to the workpiece to be welded yet. 3. the connection from the positive output terminal or the gas-power output terminal of the welding gun to the inside of the unit becomes loosed.
5. The error indicator is off. There is no hoarse high frequency discharge voice, but with striking by "arc-Side welding"	1. Poor contact between the primary lead of the arc-starting transformer and the power board. Make the firm connection again. 2. Discharge nozzle is oxidized or too far away. Treat the oxidized film of the surface of the discharge nozzle or regulate its distance to about 1mm. 3. Individual part on the high-frequency arc-starting circuit becomes damaged check and replace.
6. The error indicator is on without output.	1.It may be the over-current protection. Switch off the unit, and restart it for normal operation when the error indicator is off. 2. It may be the over-voltage protection. Wait 2-3 minutes without switching off the unit to resume normal operation. 3. It may be the error on the circuit of the inverter. Take off the power plug for the main transformer on the MOS board (near VH-07 plug-in card of the fan) and restart the unit then. (a) If the error indicators is still on, switch off the unit, take out the power plug for high-frequency arc-starting (near VH-07 plug in card of the fan) and restart the unit then I. If the error indicator is still on, it must be damge of the individual field-effect transistor on MOS board. Check and replace the field -effect transistor of the same type. II. If the error indicator is off, it must be the damage of the step-up transformer in the high frequency arc-starting circuit on the power board replace it.. (b) If the error indicator is off: I. It may be the damage of the jobbing transformer. Measure the primary inductance and Q value of the main transfer by the bridge (L-0.9-1.6mH, Q>35). Replace it in case of both low indcutance anf the Q value. II. It may be the individual breakdown of the secondary rectifier tube of the transformer. Check and replace the rectifier tube of the same type. (c) It may be the break circuit of the feedback circuit.
7. The output current in welding is unstable or out of the control of the potentiometer that fluctuates often.	1. The 1K potentiometer is damaged and should be replace. 2. Poor contact of connections, especially the socket connectors. check them
8. High splash in manual welding It is difficult to weld the alkali electrode.	1. Wrong polar connection. change the polar connection of the earth wire and the handle wire.

Circuit Schematic Diagram