THANKS FOR PURCHASING OUR PRODUCT

TIG SERIES

DC INVERTER
DC TIG/PULSE TIG
WELDING MACHINE

OPERATOR'S MANUAL

Safety Depends on You

Arc welding and cutting equipment is designed and built with safety in mind. However, your overall safety can be increased by proper installation ... and thoughtful operation on your part. **DO NOT INSTALL, OPERATE OR REPAIR THIS EQUIPMENT WITHOUT READING THIS MANUAL AND THE SAFETY PRECAUTIONS CONTAINED THROUGHOUT.** And, most importantly, think before you act and be careful.

I SAFETY PRECAUTIONS I

WARNING

PROPOSITION AND WARNINGS

For Diesel Engines: Diesel engine exhaust and some of its constituents are known to the State of California(USA) to cause cancer, birth defects, and other reproductive harm.	For Gasoline Engines: The engine exhaust from this product contains chemicals known to the State of California(USA) to cause cancer, birth defects,or other reproductive harm.

ARC WELDING CAN BE HAZARDOUS. PROTECT YOURSELF AND OTHERS FROM POSSIBLE SERIOUS INJURY OR DEATH.KEEP CHILDREN AWAY. PACEMAKER WEARERS SHOULD CONSULT WITH THEIR DOCTOR BEFORE OPERATING.

Read and understand the following safety highlights. For additional safety information, it is strongly recommended that you purchase a copy of "Safety in Welding & Cutting " from the Local Welding Society,.

BE SURE THAT ALL INSTALLATION, OPERATION, MAINTENANCE AND REPAIR PROCEDURES ARE PERFORMED ONLY BY QUALIFIED INDIVIDUALS.

FOR ENGINE powered equipment.

1.a. Turn the engine off before troubleshooting and maintenance work unless the maintenance work requires it to be running.

1.b.Operate engines in open, well-ventilated areas or vent the engine exhaust fumes outdoors.

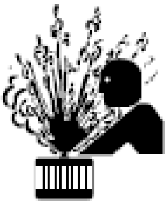
1.c. Do not add the fuel near an open flame welding arc or when the engine is running. Stop the engine and allow it to cool before refueling to prevent spilled fuel from vaporizing on contact with hot engine parts and igniting. Do not spill fuel when filling tank. If fuel is spilled, wipe it up and do not start engine until fumes have been eliminated.

1.d. Keep all equipment safety guards, covers and devices in position and in good repair.Keep hands, hair, clothing and tools away from V-belts, gears, fans and all other moving parts when starting, operating or repairing equipment.

1.e. In some cases it may be necessary to remove safety guards to perform required maintenance. Remove guards only when necessary and replace them when the maintenance requiring their removal is complete. Always use the greatest care when working near moving parts.

1.f. Do not put your hands near the engine fan. Do not attempt to override the governor or idler by pushing on the throttle control rods while the engine is running.

1.g. To prevent accidentally starting gasoline engines while turning the engine or welding generator during maintenance work, disconnect the spark plug wires, distributor cap or magneto wire as appropriate.



1.h. To avoid scalding, do not remove the radiator pressure cap when the engine is hot.

ELECTRIC AND
AGNETIC FIELDS
ay be dangerous

2.a. Electric current flowing through any conductor causes localized Electric and Magnetic Fields (EMF). Welding current creates EMF fields around welding cables andwelding machines

2.b. EMF fields may interfere with some pacemakers, and welders having a pacemaker should consult their physician before welding.

2.c. Exposure to EMF fields in welding may have other health effects which are now not known.

2.d. All welders should use the following procedures in order to minimize exposure to EMF fields from the welding circuit:
2.d.1. Route the electrode and work cables together - Secure them with tape when possible.
2.d.2. Never coil the electrode lead around your body.
2.d.3. Do not place your body between the electrode and work cables. If the electrode cable is on your right side, the work cable should also be on your right side
2.d.4. Connect the work cable to the workpiece as close as possible to the area being welded.
2.d.5. Do not work next to welding power source.

ELECTRIC SHOCK can kill.
3.a. The electrode and work (or ground) circuits are electrically "hot" when the welder is on. Do not touch these "hot" parts with your bare skin or wet clothing. Wear dry, hole-free gloves to insulate hands.

3.b. Insulate yourself from work and ground using dry insulation. Make certain the insulation is large enough to cover your full area of physical contact with work and ground.
In addition to the normal safety precautions, if welding must be performed under electrically hazardous conditions (in damp locations or while wearing wet clothing; on metal structures such as floors, gratings or scaffolds; when in cramped positions such as sitting, kneeling or lying, if there is a high risk of unavoidable or accidental contact with the workpiece or ground) use the following equipment:
. Semiautomatic DC Constant Voltage (Wire) Welder.
. DC Manual (Stick) Welder.
. AC Welder with Reduced Voltage Control.

3.c. In semiautomatic or automatic wire welding, the electrode, electrode reel, welding head, nozzle or semiautomatic welding gun are also electrically "hot".
3.d. Always be sure the work cable makes a good electrical connection with the metal being welded. The connection should be as close as possible to the area being welded.
3.e. Ground the work or metal to be welded to a good electrical (earth) ground.

3.f. Maintain the electrode holder, work clamp, welding cable and welding machine in good, safe operating condition. Replace damaged insulation.

3.g. Never dip the electrode in water for cooling.

3.h. Never simultaneously touch electrically "hot" parts of electrode holders connected to two welders because voltage between the two can be the total of the open circuit voltage of both welders.

3.i. When working above floor level, use a safety belt to protect yourself from a fall should you get a shock.
3.j. Also see Items 6.c. and 8.

ARC RAYS can burn.

4.a. 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 open arc welding. Headshield and filter lens should conform to ANSI Z87. I standards.

4.b. Use suitable clothing made from durable flame-resistant material to protect your skin and that of your helpers from the arc rays.

4.c. Protect other nearby personnel with suitable, non-flammable screening and/or warn them not to watch the arc nor expose themselves to the arc rays or to hot spatter or metal.

FUMES AND GASES can be dangerous.

5.a. Welding may produce fumes and gases hazardous to health. Avoid breathing these fumes and gases.When welding, keep your head out of the fume. Use enough ventilation and/or exhaust at the arc to keep fumes and gases away from the breathing zone.

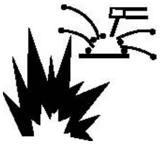
5.b. Do not weld in locations near chlorinated hydrocarbon vapors coming from degreasing, cleaning or spraying operations. The heat and rays of the arc can react with solvent vapors to form phosgene, a highly toxic gas, and other irritating products.

When welding with electrodes which require special ventilation such as stainless or hard facing (see instructions on container or MSDS) or on lead or cadmium plated steel and other metals or coatings which produce highly toxic fumes, keep exposure as low as possible and below Threshold Limit Values (TLV) using local exhaust or mechanical ventilation. In confined spaces or in some circumstances, outdoors, a respirator may be required. Additional precautions are also required when welding on galvanized steel.

5.c. Shielding gases used for arc welding can displace air and cause injury or death. Always use enough ventilation, especially in confined areas, to insure breathing air is safe.

5.d. Read and understand the manufacturer's instructions for this equipment and the consumables to be used, including the material safety data sheet (MSDS) and follow your employer's safety practices. MSDS forms are available from your welding distributor or from the manufacturer.

5.e. Also see item 1.b.



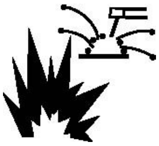
WELDING SPARKS can cause fire or explosion.

6.a. Remove fire hazards from the welding area. If this is not possible, cover them to prevent the welding sparks from starting a fire. Remember that welding sparks and hot materials from welding can easily go through small cracks and openings to adjacent areas. Avoid welding near hydraulic lines. Have a fire extinguisher readily available.

6.b. Where compressed gases are to be used at the job site, special precautions should be used to prevent hazardous situations. Refer to "Safety in Welding and Cutting" (Standard) and the operating information for the equipment being used.

6.c. When not welding, make certain no part of the electrode circuit is touching the work or ground. Accidental contact can cause overheating and create a fire hazard.

IV SAFETY PRECAUTIONS IV



WELDING SPARKS can cause fire or explosion.

6.d. Do not heat, cut or weld tanks, drums or containers until the proper steps have been taken to insure that such procedures will not cause flammable or toxic vapors from substances inside. They can cause an explosion even though they have been "cleaned". For information, purchase "Recommended Safe Practices for the Preparation for Welding and Cutting of Containers and Piping That Have Held Hazardous Substances".

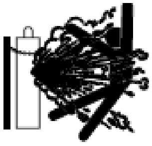
6.e. Vent hollow castings or containers before heating, cutting or welding. They may explode.

6.f. Sparks and spatter are thrown from the welding arc. Wear oil free protective garments such as leather gloves, heavy shirt, cuffless trousers, high shoes and a cap over your hair. Wear ear plugs when welding out of position or in confined places. Always wear safety glasses with side shields when in a welding area.

6.g. Connect the work cable to the work as close to the welding area as practical. Work cables connected to the building framework or other locations away from the welding area increase the possibility of the welding current passing through lifting chains, crane cables or other alternate circuits. This can create fire hazards or overheat lifting chains or cables until they fail.

6.h Don't use this machine to defrost pipes

6.i. Also see item 1.c.



CYLINDER may explode if damaged.

7.a. 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. All hoses, fittings, etc. should be suitable for the application and maintained in good condition.

7.b. Always keep cylinders in an upright position securely chained to an undercarriage or fixed support.

7.c. Cylinders should be located:
. Away from areas where they may be struck or subjected to physical damage.
A safe distance from arc welding or cutting operations and any other source of heat, sparks, or flame.

7.d. Never allow the electrode, electrode holder or any other electrically "hot" parts to touch a cylinder.

7.e. Keep your head and face away from the cylinder valve outlet when opening the cylinder valve.

7.f. Valve protection caps should always be in place and hand tight except when the cylinder is in use or connected for use.

7.g. Read and follow the instructions on compressed gas cylinders, associated equipment, and CGA publication P-l, "Precautions for Safe Handling of Compressed Gases in Cylinders," available from the Compressed Gas Local Association .

V SAFETY PRECAUTIONS V

FOR ELECTRICALLY powered equipment.

8.a. Turn off input power using the disconnect switch at the fuse box before working on the equipment.

8.b. Install equipment in accordance with the National Electrical Code, all local codes and the manufacturer's recommendations.

8.c. Ground the equipment in accordance with the U.S. National Electrical Code and the manufacturer's recommendations.

Electromagnetic disturbances may be transmitted through H.F.

Assessment of Area	**Before installing welding equipment the user shall make an assessment of potential electromagnetic problems in thesurrounding area. The following shall be taken into account:**

9.a other supply cables, control cables, signaling and telephone cables; above, below and adjacent to the welding equipment;
9.b radio and television transmitters and receivers;
9.c computer end other control equipment;
9.d safety critical equipment, e.g., guarding of industrial equipment;
9.e the health of the people around, e.g., the use of pacemakers and hearing aids;
9.f equipment used for calibration or measurement;
9.g the immunity of other equipment in the environment. The user shall ensure that other equipment being used in the environment is compatible. This may require additional protection measures;
9.h the time of day that welding or other activities are to be carried out.

Installation, use and area examination

The user is responsible for the installation and use of the equipment according to the manufacturer's instructions.

If any electromagnetic disturbance is noticed, the user must soave the problem, if necessary with the manufacturer's technical assistance.

In any case electromagnetic disturbances must be reduced until they are not a nuisance any longer.

Before installing this apparatus, the user must evaluate the potential electromagnetic problems that may arise in the surrounding area, considering in particular the health conditions of the persons in the vicinity, for example of persons fitted with pacemakers or hearing aids.

VI SAFETY PRECAUTIONS VI

⚠ WARNING

ELECTROMAGNETIC COMPATIBILITY □EMC□

10.a Conformance

Products displaying the CE mark are in conformity with European Community Council Directive of 3 May 1989 on the approximation of the laws of the Member States relating to electromagnetic compatibility (89/336/EEC). It was manufactured in conformity with a national standard that Implements a harmonized standard: EN 50 199(EN60974-10) Electromagnetic Compatibility (EMC) Product Standard for Arc Welding Equipment. It is for use with our Electric equipment. It is designed for industrial and professional use.

Introduction

All electrical equipment generates small amounts of electromagnetic emission. Electrical emission may be transmitted through power lines or radiated through space, similar to a radio transmitter. When emissions are received by other equipment, electrical interference may result. Electrical emissions may affect many kinds of electrical equipment; other nearby welding equipment, radio and TV reception, numerical controlled machines, telephone systems, computers, etc. Be aware that interference may result and extra precautions may be required when a welding power source is used in a domestic establishment.

Installation and Use

The user is responsible for installing and using the welding equipment according to the manufacturer's instructions.If electromagnetic disturbances are detected then it shall be the responsibility of the user of the welding equipment to resolve the situation with the technical assistance of the manufacturer. In some cases this remedial action may be as simple as earthing (grounding) the welding circuit, see Note. In other cases it could involve constructing an electromagnetic screen enclosing the power source and the work complete with associated Input filters. In all cases electromagnetic disturbances must be reduced to the point where they are no longer troublesome.

Note: The welding circuit may or may not be earthed for safety reasons according to national codes.

Changing the earthing arrangements should only be authorized by a person who is competent to assess whether the changes will increase the risk of injury, e.g., by allowing parallel welding current return paths which may damage the earth circuit of other equipment.

Assessment of Area

Before installing welding equipment the user shall make an assessment of potential electromagnetic problems in the surrounding area. The following shall be taken into account:

a) other supply cables, control cables, signaling and telephone cables; above, below and adjacent to the welding equipment;
b) radio and television transmitters and receivers;
c) computer end other control equipment;
d) safety critical equipment, e.g., guarding of industrial equipment;
e) the health of the people around, e.g., the use of pacemakers and hearing aids;
f) equipment used for calibration or measurement;
g) the immunity of other equipment in the environment. The user shall ensure that other equipment being used in the environment is compatible. This may require additional protection measures;
h) the time of day that welding or other activities are to be carried out.

VII SAFETY PRECAUTIONS VII

ELECTROMAGNETIC COMPATIBILITY (EMC)

10.b Emission reduction methods

MAINS POWER SUPPLY

The welding power source must be connected to the supply mains according to the manufacturer's instructions. In case of interference, it may be necessary to take further precautions like the filtering of the mains power supply. It is also necessary to consider the possibility to shield the power supply cable.

WELDING POWER SOURCE MAINTENANCE

The welding power source needs routine maintenance according to the manufacturer's instructions. When the equipment is working, all the access and operating doors and covers must be closed and fixed. The welding power source must not be modified in any way.

WELDING AND CUTTING CABLES

The welding cables must be kept as short as possible, positioned near one another and laid at or approximately at ground level.

EQUIPOTENTIAL CONNECTION

The earth connection of all the metal component in the welding installation and near it must be taken in consideration. However, the metal component connected to the work-piece will increase the risk of electric shock for the operator, if he touches said metal component and the electrode at the same time.

Therefore, the operator must be insulated from all the earthed metal components.

The equipotential connection must be made according to the national regulations.

EARTHING THE WORKPIECE

When the workpiece is not earthed for electrical safety reasons or due to its size and position, Care should be taken to prevent the earthing of the workpiece increasing the risk of injury to users, or damage to other electrical equipment. the earthing of the workpiece may reduce the emissions in some but not all instances. It is important to remember that the earthing of the workpiece should neither increase the risk of accidents for the operators, nor damage other electric equipment. The earthing must be made according to the national regulations.

SCREENING AND SHIELDING

Selective screening and shielding of other cables and equipment in the surrounding area may alleviate problems of interference. Screening of the entire welding installation may be considered for special applications.

11. RISK ANALYSIS

Risks posed by the machine	Solutions adopted to prevent them
Risk of wrong installation.	A manual with the instructions for use has been produced for this purpose.
Electrical risks.	Application of the EN 60974-1 Standard.
Risks connected with electromagnetic disturbances producedby the welding power source and induced on the welding power source.	Application of the EN 50199(EN60974-10) Standard.

VIII VIII

Thank You

for selecting a **QUALITY** product by TOKENTOOLS. We want you to take pride in operating this our Company product ... as much pride as we have in bringing this product to you!

Please Examine Carton and Equipment For Damage Immediately

When this equipment is shipped, title passes to the purchaser upon receipt by the carrier. Consequently, Claims for material damaged in shipment must be made by the purchaser against the transportation company at the time the shipment is received.

Please record your equipment identification information below for future reference. This information can be found on your machine nameplate.

Product ________________________

Model Name ______________________________________

Serial Number ________________________________

Date of Purchase ______________________________

Where Purchased ________________

Whenever you request replacement parts for or information on this equipment always supply the information you have recorded above.

Read this Operators Manual completely before attempting to use this equipment. Save this manual and keep it handy for quick reference. Pay particular attention to the safety instructions we have provided for your protection.

The level of seriousness to be applied to each is explained below:

WARNING

This statement appears where the information must be followed exactly to avoid serious personal injury or loss of life.

CAUTION

This statement appears where the information must be followed to avoid minor personal injury or damage to this equipment.

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A-1 INSTALLATION A-1

TECHNICAL SPECIFICATIONS -

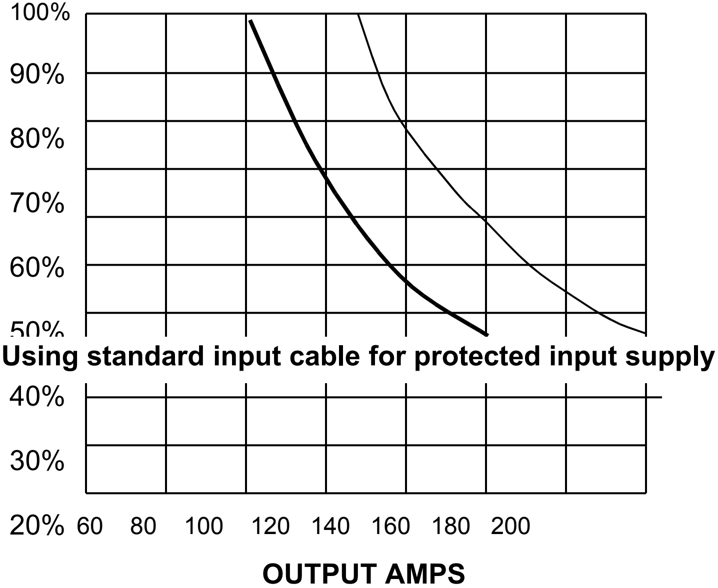
max. rated Output Amps @% Duty Cycle (Based on a 10 minute cycle) (Example; TIG200P:160A@35% for DC Stick and 200A@35% for DC TIG)

MODEL		TIG130P TIG130 WSM-130P INV130P	TIG131P TIG131 WS-130	TIG160P TIG160 WSM-160P INV160P	TIG161P TIG161 WS-160	TIG200P TIG200 WSM-200P INV200P	TIG201P TIG201 WS-200
INPUT	Voltage	AC 220/230/240V 50/60Hz					
MMA	No-load Voltage	60 - 80V					
	Peak current Adjusting Range	5A~100A		5A~130A		5~160A	
	Rated Output Current	100A		130A		160A	
	Rated Duty Cycle	35%					

TIG	Rated Output Current	130A		160A		200A	
	Peak Cur. Adjusting Range	5~130A		5~160A		5~200A	
	Base Cur. Adjusting Range	5~130A		5~160A		5~200A	
	Rated Duty Cycle	35%					
	Current Up-slope Time	0~5S	0S	0~5S	0S	0~5S	0S
	Current Down-slope Time	0~5S					
	No-load Voltage	60 - 80V					
	Initial current	15A(fixed ,default) or 5A~max(adjustable, if required)					
	crater-fill current	15A(fixed ,default) or 5A~max(adjustable, if required)					
	Pulse mode	ON/OFF	OFF	ON/OFF	OFF	ON/OFF	OFF
	Pulse Width Ratio	0.1~0.9	--	0.1~0.9	--	0.1~0.9	--
	Pulse Frequency	0.5~25Hz	--	0.5~25Hz	--	0.5~25Hz	--
	After Flow Time	5S/10S					
	TIG Arc starting Mode	high frequency arc striking					
Efficiency		≥80%					
Mass		9.8kg		9.8kg		16kg	
Prot on Class of enclosure		IP21S					
Ou ne Dimensions mm^3		305×165×290		305×165×290		425×195×310	

A-2 INSTALLATION A-2

Chart gives x. rated Output Amps @% Duty Cycle (Based on a 10 minute cycle) (Example; TIG200P:16 @35% for DC Stick and 200A@35% for DC TIG)



—— TIG

STICK(MMA) —

(1)

Wiring and protection based on the IEC60974.1-2005 National Electric Code: Use a Super Lag type fuse or circuit breaker with a delay in tripping action. Models with NEMA 6-50P plug may be used with a 50 amp protected 6-50R receptacle, or with a maximum 70 amp protected 6-50R receptacle if dedicated for the welder.

A-3 INSTALLATION A-3

SAFETY PRECAUTIONS

Read entire installation section before starting installation.

⚠ WARNING

ELECTRIC SHOCK can kill.

·Only qualified personnel should perform this installation.

·Turn the input power OFF at the disconnect switch or fuse box before working on this equipment.

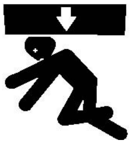
·Do not touch electrically hot parts.

·Always connect the MACHINE to a power supply grounded per the National Electrical Code and any local codes.

SELECT SUITABLE LOCATION

Place the welder where clean cooling air can freely circulate in and out through the rear louvers. Dirt, dust or any foreign material that can be drawn into the welder should be kept at a minimum. Failure to

⚠ WARNING



FALLING EQUIPMENT cause injury

observe these precautions can result in excessive operating temperatures and nuisance shut-downs.

GRINDING

Do not direct grinding particles towards the welder. An abundance of conductive material can cause maintenance problems.

STACKING

The machine cannot be stacked.

TRANSPORT - UNLOADING

⚠ **Never underestimate the weight of the equipment.**

⚠ **Never make the cargo pass or leave it suspended over people or things.**

Neither let the equipment or the single unit fall, nor put it down with force.
Once it has been removed from the packing, the power source can be used to move it in the hand or on the shoulder.

Never lift welder with gas cylinder attached.
Never lift welder above personnel.

TILTING

Each machine must be placed on a secure, level surface, either directly or on a recommended undercarriage. The machine may topple over if this procedure is not followed. 10°

ENVIRONMENTAL RATING

The welding machine power source carries an IP21s environmental rating. It may be used in normal industrial and commercial environments. Avoid using it in environments which have falling water such as rain.

Read and follow "Electric Shock Warnings" in the Safety section if welding must be performed under electrically hazardous conditions such as welding in wet areas or on or in the workpiece.

A-4 INSTALLATION A-4

MACHINE GROUNDING AND HIGH FREQUENCY INTERFERENCE PROTECTION

This welder must be grounded! See your local and national electrical codes for proper grounding methods.

The high frequency generator, being similar to a radio transmitter, may cause radio, TV and electronic equipment interference problems. These problems may be the result of radiated interference. Proper grounding methods can reduce or eliminate radiated interference.

Radiated interference can develop in the following four ways:

1 Direct interference radiated from the welder.
2 Direct interference radiated from the welding leads.
3 Direct interference radiated from feedback into the power lines.
4 Interference from re-radiation of "pickup" by ungrounded metallic objects.

Keeping these contributing factors in mind, installing equipment per the following instructions should minimize problems.

1 Keep the welder power supply lines as short as possible and enclose as much of them as possible in rigid metallic conduit or equivalent shielding for a distance of 50 feet (15.2m). There should be good electrical contact between this conduit and the welder case ground. Both ends of the conduit should be connected to a driven ground and the

entire length should be continuous.

2 Keep the work and electrode leads as short as possible and as close together as possible. Lengths should not exceed 25 ft (7.6m). Tape the leads together when practical.

3 Be sure the torch and work cable rubber coverings are free of cuts and cracks that allow high frequency leakage.

4 Keep the torch in good repair and all connections tight to reduce high frequency leakage.

5 The work piece must be connected to an earth ground close to the work clamp, using one of the following methods:

a) A metal underground water pipe in direct contact with the earth for ten feet or more.

b) A 3/4" (19mm) galvanized pipe or a 5/8" (16mm)solid galvanized iron, steel or copper rod driven at least eight feet into the ground.

The ground should be securely made and the grounding cable should be as short as possible using cable of the same size as the work cable, or larger. Grounding to the building frame electrical conduit or along pipe system can result in reradiation, effectively making these members radiating antennas.

6 Keep cover and all screws securely in place.

7 Electrical conductors within 50 ft (15.2m) of the welder should be enclosed in grounded rigid metallic conduit or equivalent shielding, wherever possible. Flexible metallic conduit is generally not suitable.

8 When the welder is enclosed in a metal building, the metal building should be connected to several good earth driven electrical grounds (as in 5 (b) above) around the periphery of the building.

Failure to observe these recommended installation procedures can cause radio or TV and electronic equipment interference problems and result in unsatisfactory welding performance resulting from lost high frequency power.

INPUT CONNECTIONS

Be sure the voltage, phase, and frequency of the input power is as specified on the rating plate, located on the rear of the machine.

Have a qualified electrician provide input power supply to the receptacle or cord in accordance with all local and national electrical codes. Use a single phase line or one phase of a two or three phase line.

Choose an input and grounding wire size according to local or national codes. Refer to **the Technical Specifications** page at the beginning of this section. Fuse the input circuit with the recommended super lag fuses or delay type1 circuit breakers.

Using fuses or circuit breakers smaller than recommended may result in "nuisance" shut-off from welder inrush currents even if not welding at high currents.

1Also called "inverse time" or "thermal/magnetic" circuit breakers; circuit breakers which have a delay in tripping action that decreases as the magnitude of the current increases.

⚠ WARNING

ELECTRIC SHOCK can kill.

Turn the input power OFF at the disconnect switch or fuse box before working on this equipment.

. Have a qualified electrician install and service this equipment.

. Turn the input power OFF and unplug the machine from the receptacle before working on this equipment.

. Allow machine to sit for 5 minutes minimum to allow the power capacitors to discharge before working inside this equipment.

. Do not touch electrically hot parts.

. Machine must be plugged into a receptacle that is grounded according to the National Electrical Code and local codes.

. Do not remove or defeat the purpose of the power cord ground pin.

RECONNECT PROCEDURE

The Inverter machine reconnects to 220/230240V supply.

Fuse the input circuit with time delay fuses or delay type1 circuit breakers. Using fuses or circuit breakers smaller than recommended may result in “nuisance” shut-offs from welder inrush currents even if not welding at high currents.

The Inverter machine is recommended for use on an individual branch circuit.

1Also called “inverse time” or “thermal/magnetic” circuit breakers.

These circuit breakers have a delay in tripping action that decreases as the magnitude of the current increases.

220/230/240V INPUT

The equipment is provided with a 220/230/240V cable, 6.6ft.(2m) in length with a 230V 6-50P attachment plug.

The Inverter machine performs best when connected to 230VAC inputs. This input allows full output of the machine (200 amps).

ATTACHMENT PLUG INSTALLATION

Connect the white (neutral) wire under terminal clamp with silver screw, and black (hot) wire under terminal clamp with brass screw. Connect green wire under terminal clamp with green screw.

⚠ WARNING

. Failure to wire as instructed may cause personal injury or damage to equipment. To be installed or checked by an electrician or qualified person only.

In all cases, the green or green/yellow grounding wire must be connected to the grounding pin of the plug, usually identified by a green screw.

Attachment plugs must comply with the Standard for Attachment Plugs and Receptacles,.

The product is considered acceptable for use only when an attachment plug as specified is properly attached to the supply cord.

For use on engine drives, keep in mind the above input draw restrictions and the following precaution.

A-6 INSTALLATION A-6

ENGINE DRIVEN GENERATOR

The Inverter machine can be operated on engine driven generators as long as the 220/230/240 volt auxiliary meets the following conditions:

. The AC waveform peak voltage is below 400 volts.

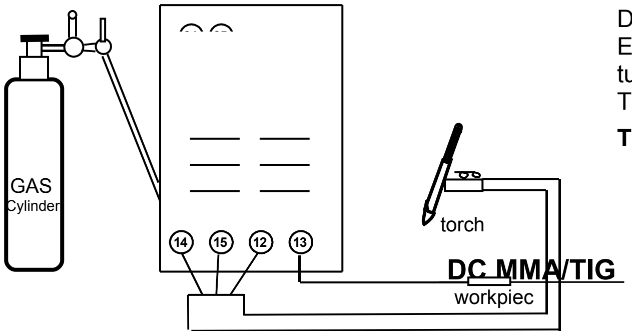
. The AC waveform frequency is between 45 and 65Hz.

The following Lincoln engine drives meet these conditions when run in the high idle mode:

●Ranger 250,305 ●. Commander 300, 400, & 500

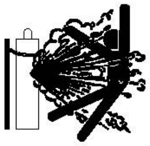
Some engine drives do not meet these conditions (e.g. Miller Bobcats, etc). Operation of the Inverter machine is not recommended on engine drives not conforming to these conditions. Such drives may deliver unacceptably high voltage levels to the Inverter machine power source.

CONNECTIONS FOR TIG (GTAW) WELDING



⑪

TIG TORCH CONNECTION



Refer to Included Equipment in the Operation Section of this manual for TIG welding equipment which is included with the machine

The TIG Torch Twist-Mate and work cable Twist-Mate Connectors are supplied with the welder. To connect the cables, turn the Power Switch “OFF”. Connect the torch cable Twist-Mate plug into the DC(-)

Electrode Receptacle on the front of the welder and turn it clockwise until snug,(Do not Over tighten). This is a quick connect terminal

To avoid receiving a high frequency shock, keep

the TIG torch and cables in good condition.

WORK CABLE CONNECTION

Next, connect the work cable to the "+" output terminal in the same way.

To minimize high frequency interference, refer to Machine Grounding and High Frequency Interference Protection section of this manual for the proper procedure on grounding the work clamp and work piece.

SHIELDING GAS CONNECTION

Obtain the necessary inert shielding gas (usually argon). Connect the cylinder of gas with the pressure regulator and flow gage. Install the gas hose between the regulator and gas inlet (located on the rear of the welder). The gas inlet has a 5/16-18 right hand female thread; CGA#032.

CYLINDER could explode if damaged.

Keep cylinder upright and chained to a support.

Keep cylinder away from areas where it could be damaged.

Never allow the torch to touch the cylinder.

Keep cylinder away from live electrical circuits.

Maximum inlet pressure 150 psi.

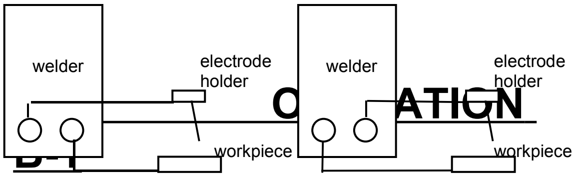
A cylinder is loaded by leaning it slightly sideways and rocking it up on the platform, being careful not to allow the Under-Storage Cart to roll. Secure the cylinder in place with the provided chain. Unload by following these steps in reverse.

REMOTE CONTROL CONNECTION

A remote control receptacle is provided on the case front of the welder for connecting a remote control to the machine. A **Adjustable foot control** activated remote control, is included with the Inverter machine Ready-Pak models and available separately for other models. Refer to the Optional Accessories section of this manual for other available remote controls.

CONNECTIONS FOR STICK (SMAW) WELDING

A. POSITIVE CONNECTION B . NEGATIVE CONNECTION



O ATION

B-1

Read and understand this entire section before operating the machine.

SAFETY PRECAUTIONS

STICK ELECTRODE CABLE AND WORK CABLE CONNECTION

Refer to Field Installed Options in Accessories Section of this manual for STICK welding equipment which is available for use with the inverter machine. An electrode holder with Twist-Mate cable and Twist-Mate connector are available separately for use with the inverter machine. (See Accessories Section). Turn the Power Switch "OFF". Connect the Twist-Mate quick connect plug into the Electrode and turn it clockwise until it is tight. The work cable and work clamp are factory connected.

GRAPHIC SYMBOLS THAT APPEAR ON THIS MACHINE OR IN THIS MANUAL

→○	INPUT POWER
+	POSITIVE OUTPUT
—	NEGATIVE OUTPUT
⎓	DIRECT CURRENT
⏚	PROTECTIVE GROUND
⚠	WARNING OR CAUTION
	DO NOT SWITCH WHILE WELDING

⚠ WARNING

ELECTRIC SHOCK can kill.

· Do not touch electrically live parts or electrode with skin or wet clothing.

· Insulate yourself from work and ground.

· Always wear dry insulating gloves.

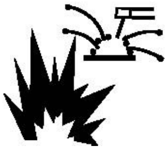
Read and follow "Electric Shock Warnings" in the Safety section if welding must be performed under electrically hazardous conditions such as welding in wet areas or on or in the workpiece.

FUMES AND GASES can be dangerous.

· Keep your head out of fumes.

· Use ventilation or exhaust at the arc, or both, to remove fumes and gases from breathing zone and general area.

WELDING SPARKS can cause fire or explosion



· Keep flammable material away.

· Do not weld on containers that have held combustibles.

RC RAYS can burn.

Wear eye, ear and body protection.

Only qualified personnel should operate this equipment. Observe additional Safety Guidelines detailed in the beginning of this manual.

B-2 OPERATION B-2

PRODUCT DESCRIPTION

The TIG Machine is a member of our field acclaimed TIG family of industrial arc welding power sources. Premium features include:

1 Enhanced version of the patented Micro-Start Technology for its lower Minimum(5 amps at DC) to higher Maximum output control range.

2 Built-in high frequency stabilization for DC TIG starting

3 DC TIG/MMA

The TIG also provides advanced features such as:

- ●Digital Meter
- ●Timers for fixed Preflow and variable Postflow shielding gas.
- ●**Auto-Sense remote control selection.**
- ●Tool-less Twist-Mate electrode cable connection.

Four models are available for 60Hz. with Domestic and Canadian input voltages, as well as an International model with 50/60Hz voltages.

RECOMMENDED PROCESSES AND EQUIPMENT

RECOMMENDED PROCESSES

The TIG is recommended for the TIG (GTAW) and Stick (SMAW) welding processes within its output capacity range of 5 amps to 130(160,200) amps. It is compatible with most Magnum TIG accessories, as well as many industry standard items, such as TIG torches (adapted for Twist-Mate), hoses.

PROCESS LIMITATIONS

The TIG machines are not recommended for arc gouging due to it's limited output capacity, and are also not recommended for pipe thawing.

RECOMMENDED QUIPMENT/INTERFACE

(See Installed Options in Accessories Section for more details)

The TIG will be available as a basic Machine (Only) and in two Factory Basic module will also be available as with Domestic,.

(**SEE PACKING LIST,PLEASE**)

EQUIPMENT LIMITATIONS

The TIG machines are protected from over loads beyond the output ratings and duty cycles, per the Specifications in the Installation Section, with Thermostat protection of the output power coils and rectifiers.

If a Tig is powered from an engine generator which doesn't have sufficient capacity, the Output control will not provide full range of control.

WELDING CAPABILITY(Duty Cycle)

The TIG200P/201 is rated at 200 amps, 18 volts, at 35% duty cycle on a ten minute basis for DC TIG. It is capable of higher duty cycles at lower output currents. See rated output graph, on specification sheet located in the Installation Section. If the duty cycle is exceeded, a thermal protector will shut off the output until the machine cools.

The TIG200P/201 is rated at 160 amps, 26.4 volts, at 35% duty cycle on a ten minute basis for DC MMA..

The TIG160P/161 is rated at 160 amps, 16.4 volts, at 35% duty cycle on a ten minute basis for DC TIG.

The TIG160P/161 is rated at 130 amps, 25.2 volts, at 35% duty cycle on a ten minute basis for DC MMA.

The TIG130P/131 is rated at 130 amps, 15.2 volts, at 35% duty cycle on a ten minute basis for DC TIG..

The TIG130P/131 is rated at 100 amps, 24 volts, at 35% duty cycle on a ten minute basis for DC MMA..

CONTROLS AND SETTINGS

All operator controls and adjustments are located on the case front of the TIG machine. Refer to Figure B.1 and the corresponding explanations.

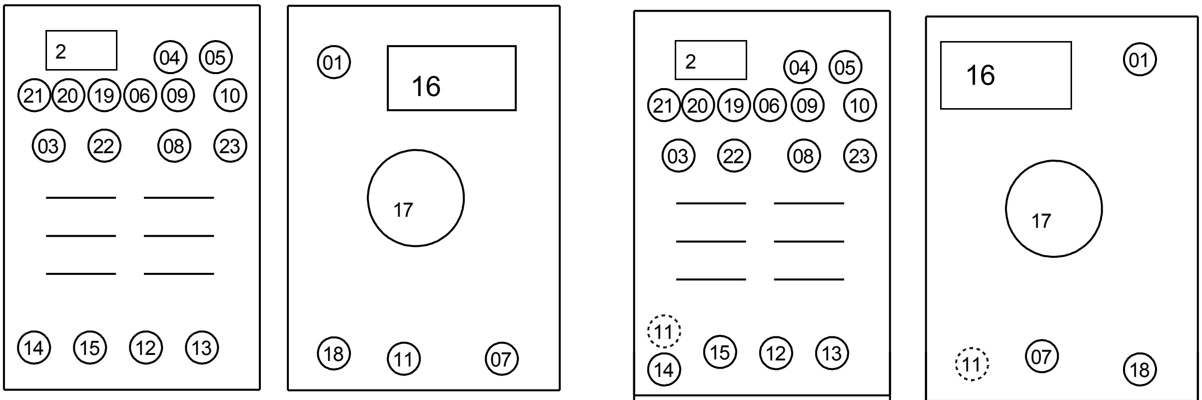
FIGURE B.1 CONTROL PANEL

1.TIG130P/160P

FRONT PANEL BACK PANEL

2. TIG200P

FRONT PANEL BACK PANEL



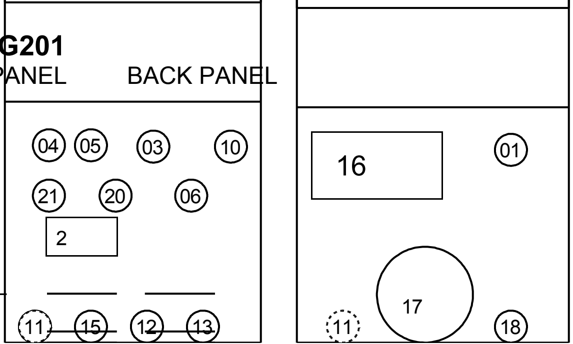
3.TIG131/TIG161

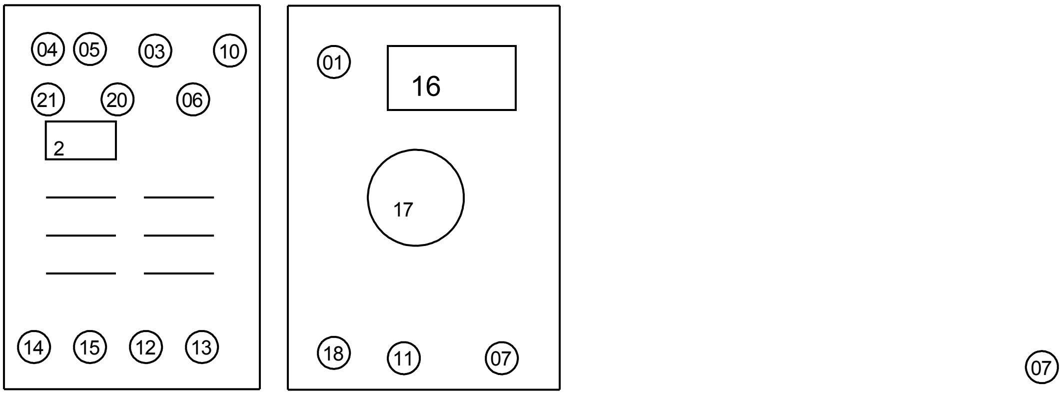
FRONT PANEL BACK PANEL

4. TIG201

FRONT PANEL BACK PANEL

DC MMA/TIG





1.power switch 2. indication of welding current(**Y / N**)3.Peak current regulator 4.indicating light of power
5. warning indicating light 6. (Gas)post flow switch 7. safety earthing column 8. pulse Freq. regulator
9. Up-slope regulator 10.Down slope regulator 11. gas inlet 11 maps in front panel or in back panel
12. torch control 13. output"+"14.output"-" 15. gas outlet 16. data plate 17. fan 18.incoming line of the power
19.Pulse ON/OFF switch 20.MMA/TIG switch 21. 2steps/4steps switch 22.Base current regulator 23.frequency width

CONTROL FUNCTIONALITY

1.POWER SWITCH Input line switch turns input power ON or OFF, as indicated by the on or off status of the front panel digital display (See Item 2).

2 Indication of welding current (DIGITAL METER) - A 3 digit LED meter is used to display current while welding: A lit display indicates input power is turned on. (See Item 1.)

3.welding current regulator

Regulating the knob, It can be selected between 5A TO MAX AMP. For Pulse TIG this knob sets the Peak Pulse level, with the Remote **Adjustable foot control** (if used).

4.indicating light of power

Turn power on, it will illuminate indicating.

5.warning indicating light

a)Over heat(yellow(green and red light at the same time) **lamp lights)** -If the welder overheats due to blocked air flow, high ambient air temperature, or exceeded duty cycle, an internal thermostat will open disabling the welding output and this yellow light will illuminate. The cooling fans will continue to run to cool the unit during this time. The light will go out when the unit cools and the thermostat resets. Once the light goes out, the machine will again become available to weld.

b)Over current(Green lamp lights)
output current is too high or the machine fails.

c) Over voltage or low voltage(red lamp lights)
Input voltage is too high or too low.

6.Post flow time regulator

Sets the TIG mode shielding gas post flow time over the range of about 1 to 10 seconds after the arc is shut off.

Note: Gas preflow time is fixed at 0.5 second only in TIG mode, but no preflow time will occur if the arc is restarted during Post Flow time, since shielding gas would not have stopped flowing.

7.safety earthing column

The earthing must be made according to the national regulations. Make sure that the supply mains and the earthing are sufficient and adequate

8.pulse Freq. regulator

Regulating the knob, It can be selected between 0.5Hz TO 25Hz.

9.current up-slope time regulator

Regulating the knob, It can be selected between 0s TO 5s

10.current down-slope time regulator

Regulating the knob, It can be selected between 0s TO 5s.

11.argon inlet

connected gas pipe of flow meter

12. REMOTE RECEPTACLE (OR argon arc control)

Provides for connection of remote control and/or arc start switch in TIG Mode: Plugging a remote current control (**Adjustable foot control**) into this receptacle automatically switches the output control from the panel Max Output Control (See Item 3) to the remote control.

The connected remote control will then control the output current between the Min. range of the machine and the setting of the panel Max Output Control.

13.output"+" （Electrode Connection (Positive)） -
For quick disconnect system using Twist-Mate cable plugs

14. output"-"Electrode Connection (Negative)
This quick connect Twist-Mate receptacle provides electrical connection to the electrode holder and cable for Stick welding and connection for the TIG torch when TIG welding.

15.argon out(gas outlet)

connected gas pipe of torch

16.nameplate

The data plate stamped on the metal structure complies with the EN 60974-1, EN50199(EN60974-10) international standards and contains the following information:
* (a) Manufacturer's name and address
* (b) Trademark
* (c) Model
* (No) Serial number
* ( ) The welding power source comprises a frequency converter followed by an transformer and rectifier that transforms input voltage into direct current.
* (EN 60974-1/EN 50199) Standards applied.
* ( ) Direct current.
* (x) Utilisation factor expressed as a percentage of useful work over a cycle of 10 minutes at an ambient temperature of 40ºC.
* (I_2) Rated weld current.
* (U_2) Conventional load voltage.
* (Uo) Rated no-load voltage.
* ( ) TIG welding.
* ( )MMA welding.
* ( )ut phases.

* (IP21S) Casing protection degree in compliance with the EN 60529 Standard:
IP2XX Casing protected against access to dangerous components with fingers and against the introduction of foreign matters with diameter 12.5 mm.
IPX3X Casing protected against rain failing at 60^{O} on the vertical line.
IPXXC Casing protected against contact of a test gauge φ2.5 mm length 100 mm with live dangerous parts,
* (U_1) Rated power supply voltage.
* (50/60 Hz) Power supply rated frequency.
* (I_{lmax}) Maximum supply current.
($I_{1\ eff}$) Effective supply current.
* (S) Generator suitable for installation in places where major risks of electric shocks are preset
* (CE) In compliance with the European regulations in force.

17.fan

when power switch on, the cooling fan runs

18.power supply

connected main supply

19. Pulse ON/OFF switch

when pulse is “ON” ,base current is 5A,pulse width ratio is 0.5, the welding current is peak current.

20.MMA/TIG switch (MODE SWITCH)

Select the mode of output

21. 2 steps/ 4 steps switch

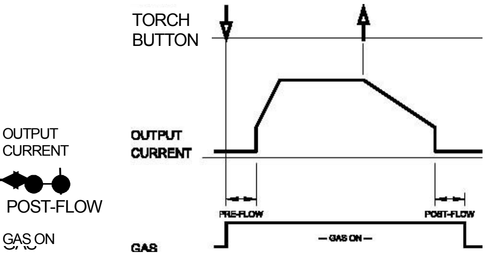
Tig Trigger Sequences

For the TIG machine AC/DC, TIG welding can be done in either the 2-step or 4-step mode which is selected with the Trigger Mode Push Button.

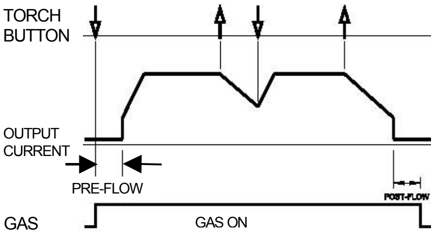
2-Step Sequence

With the Trigger Mode switch in the 2-step position, the following welding sequence will occur. This sequence is shown in (2-step diagram 1)

2 STEP DIAGRAM 1



1. Press and hold the Arc Start Switch to start the sequence.



The machine will open the gas valve to start the flow of the shielding gas. After a 0.5 second preflow time, to purge air from the torch hose, the output of the machine is turned ON. At this time the arc is started.
After the arc is started the output current will be increased from the start current to the welding current. Both the start current and increase, or upslope time are presettable. The default start current is 15 amps and the default upslope time is 0.2 seconds.
2. Release the Arc Start Switch to stop welding.
The machine will now decrease the output current

at a controlled rate, or down slope time, until the Finish current, (also commonly referred to as Crater Current) is reached and the output of the machine is turned OFF. Both the Down slope Time and the Finish Current are can be preset.

After the arc is turned OFF, the gas valve will remain open to continue the flow of the shielding gas to the hot electrode and work piece. The duration of this postflow shielding gas is adjusted by the Postflow Parameter.

Possible variations of this standard sequence is shown in (2 step diagram 2). It is possible to press and hold the TIG torch trigger a second time during downslope to restart. After the trigger is pressed the output current will increase to the welding current.

This operation is shown in (2 step diagram 2).

2 STEP DIAGRAM 2

4-Step Sequence

With the 4-step Selected, the following welding sequence will occur.

1. Press and hold the Arc Start Switch to start the sequence.

The machine will open the gas valve to start the flow of the shielding gas. After a 0.5 second preflow time, to purge air from the torch hose, the output of the machine is turned ON. At this time the arc is started.

After the arc is started the output current will be at the Start current. This condition can be maintained as long or as short as necessary.

If the Start current is not necessary, do not hold the TIG torch trigger as described at the beginning of this step. Instead, quickly press and release the trigger. In this condition, the machine will automatically pass from Step 1 to Step 2 when the arc is started.

2. Release the TIG torch trigger to start the main part of the weld.

The output current will be increased from the start current to the welding current. Both the start current and increase, or upslope time are presettable. The default start current is 15 amps and the default upslope time is 0.2 seconds.

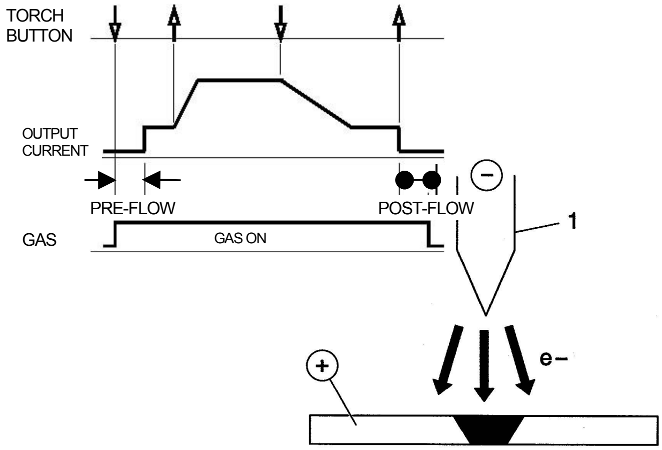
3. Press and hold the TIG torch trigger when the main part of the weld is complete.

The machine will now decrease the output current at a controlled rate, or down slope time, until the Finish current is reached. Both the Down slope Time and the Finish Current are presettable. This Finish current can be maintained as long or as short as necessary.

4. Release the TIG torch trigger.

The output current of the machine will turn OFF and the gas valve will remain open to continue the flow of the shielding gas. The duration of this postflow time is adjusted by the Postflow parameter. This operation is shown in (4 step diagram 1).

4 STEP DIAGRAM 1



OPERATING STEPS

WELDING IN TIG MODE

1 Connect the TIG torch and cable Twist-Mate quick connect plug to the Electrode/Gas output receptacle. This receptacle also contains an integral gas connection for the torch. Connect the work clamp to the work piece.

2 Set the TIG/MMA switch to "TIG".

3 Connect the arc start switch(or **Adjustable foot control**)to the Remote Control Connector

4. Turn on the cylinder gas valve and adjust the flow regulator to obtain desired flow.

5 Turn the power switch to "ON".

6 Preset the Output Control on the control panel to the maximum desired amps,

7 Depress the **Adjustable foot control** to energize the torch and establish an arc with the work piece. The digital meter reads the actual amps while welding.

NOTE: When the TIG/MMA switch is set to "TIG", depressing the remote control will start a 0.5 second gas pre-flow before energizing the TIG torch. When the remote control is released the TIG torch is de-energized and gas flow will continue for the time set by the Post Flow Time control. When the polarity switch is set to DC, the TIG Arc Starter will turn on and off automatically to start and stabilize the arc. In AC the TIG Arc Starter will turn on with the output and remain on continuously until the remote control is released.

WELDING POLARITY

DC Electrode Negative Polarity (Direct Current Straight Polarity) (see FIGURE B.4)

While Welding, there is a continuous flow of electrons from the electrode to the workpiece.

This is the most used polarity, ensuring limited wear of the electrode, since the majority of the heat concentrates on the anode (workpiece). Narrow and deep welds are obtained with high travel speeds.

Most materials, with the exception of aluminum and magnesium, are welded with this polarity.

FIGURE B.4

DC Electrode Positive Polarity. (Direct Current Reverse Polarity) (see Figure B.5)

In this case, there is a continuous flow of electrons from the workpiece to the electrode. The reverse polarity is used for welding alloys covered with a layer of refractory oxide.

With this polarity the electrode functions as anode and is subjected to a high degree of heat; the workpiece is bombardment by positive ions sent from the electrode which break the surface oxide.

In Electrode Positive Polarity, high currents cannot be used, since they would cause an excessive wear of the electrode.

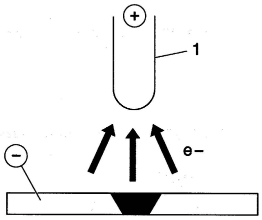


FIGURE B.5

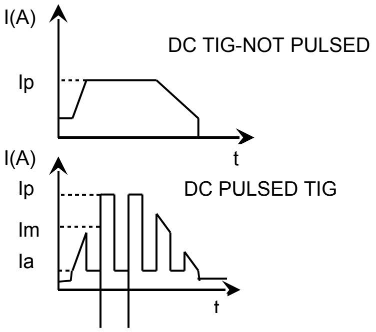
D.C.-Pulsed TIG (see Figure B-6)

The use of pulsed direct current allows better control of the weld pool during certain operating conditions.

When compared with traditional TIG welding performed at the same average current, pulsed welding results in a smaller heat affected zone which results in fewer deformations and reduced chance of cracking and gas entrapment.

Increasing the frequency constricts the arc, increases stability and improves weld quality.

FIGURE B.6



STEEL TIG WELDING

The TIG process is very effective for welding both carbon steel and alloy steel, especially in applications requiring precision results. DC Electrode Negative Polarity is required. Since this process does not include the removal of impurities, proper cleaning and preparation of the edges is required.

FILLER MATERIAL:

The filler rods must deposit welds with mechanical characteristics appropriate for the application.

COPPER TIG WELDING

Since the TIG welding is a process characterized by high heat concentration, it is particularly suitable for welding materials with high thermal conductivity, like copper. As with steel, the DC Electrode Negative
Polarity is employed, with argon as protective gas. Considering the fluidity of molten copper, the use of backup support may prove useful.

FILLER MATERIAL:

In order to avoid the oxidation of the molten material, filler materials containing phosphorus, silicon or other deoxidating materials are typically used. The mechanical properties can also be improved through the use of silver.

GTAW Process

Electrode Polarity	DC	AC		Approximate Argon	
Electrode Tip Preparation	Sharpened	Balled		Gas Flow Rate	
Electrode Type	EWTh-1, EWLa-1 EWTh-2, EWCE-2 EWG	EWP	EWTh-1, EWLa-1 EWTh-2, EWCE-2 EWG, EWZr	C.F.H. (l/min.)	
Electrode Size- in. (mm)				Aluminum	Stainless Steel
.010 (0.25)	Up to 15 A.	Up to 10 A.	Up to 15 A.	3-8 (2-4)	3-8 (2-4)
.020 (0.50)	Up to 15 A.	Up to 15 A.	Up to 20 A.	5-10 (3-5)	5-10 (3-5)
040 (1.0)	. Up to 80 A.	Up to 40 A.	Up to 60 A.	5-10 (3-5)	5-10 (3-5)
1/16 (1.6)	Up to 150 A.	Up to 100 A	Up to 130 A	. 5-10 (3-5)	9-13 (4-6)
3/32 (2.4)	Up to MAX. A.	Up to 160. A.	Up to MAX. A.	13-17 (6-8)	11-15 (5-7)
1/8 (3.2)	X	Up to MAX. A.	X	15-23 (7-11)	11-15 (5-7)

Tungsten electrodes are classified as follows by the American Welding Society (AWS):

Pure...................... ....EWP........green +1% Thoria......................EWTh-1...yellow
+2% Thoria.......................EWTh-2...red +2% Ceria ....EWCE-2...orange
+1.5% Lanthana ....EWLa-1 ...black +0.5% to 0.40%Zirconia....EWZr.......brown
TRI-MIX of elements........EWG.........gray
Ceriated Tungsten is now widely accepted as a substitute for 2% Thoriated Tungsten in AC and DC applications.

B-8 OPERATION B-8

PROTECTIVE GAS

Both argon and helium work when welding aluminum. Argon is preferred, due to its lower cost and consumption rate. This gas also tends to stabilize the arc, thus making it easy to operate. For some applications, however, the use of helium, or argon-helium blends, is recommended due to better weld penetration and faster travel speed. Helium is especially suitable for welding thick workpieces. The recommended gas flow rates are shown in table 5.

TABLE 5

Current (A)	Helium cfh-(l/min)
50	29 - (14)
100	29 - (14)
150	42 - (20)
200	42 - (20)
250	53 - (25)
300	53 - (25)

DC TIG WELDING QUICK START UP

⚠ WARNING

ELECTRIC SHOCK can kill.
. Have an electrician install and service this equipment.
. Turn the input power off at the fuse box, disconnect or unplug supply lines and allow machine to sit for five minutes minimum to allow the power capacitors to discharge before working inside this equipment.
. Do not touch electrically hot parts.

Connect up the shielding gas – typically argon – using an appropriate regulator. Connect **Adjustable foot control**, torch and work lead to power source.

With the Work cable connected to a properly grounded work piece, turn the power source on.

To change to DC TIG Welding:

. Press Mode button to select "DC TIG."

. Press Trigger Mode button and set to 2-step.

. Press Local / Remote Mode button and set for Remote.

. Pulsing parameters selected by Parameter button, and changed using Output Control.

Set the maximum output current desired using the Output Control.

Initiate the arc by closing the **Adjustable foot control**'s arc start switch. The **Adjustable foot control** will control the output current from 10 amps to current level set by output control.

To change the Post Flow time, repeatedly push the Parameter button until the Post Flow indicator light is on. Adjust the Output control to the desired Post Flow time as indicated on digital display.

REMOTE CONTROL OPERATION

A **Adjustable foot control(** optional) is included with the TIG models and available for other models (See Accessories Section) for remote current control while TIG welding. An Arc Start Switch may be used to start and stop the welding if no remote control of the current is desired. Refer to the Accessories Section of this manual.

Both the Hand and **Adjustable foot control** work in a similar manner. For simplicity, the following explanation will refer only to "Ampcontrol", meaning both Foot and Hand models. The term "minimum" refers to a foot pedal in the "up" position, as it would be with no foot pressure, or a Hand Ampcontrol in the relaxed position, with no thumb pressure. "Maximum" refers to a fully depressed Foot Ampcontrol,or a fully extended Hand Ampcontrol.

When the welder is in TIG modes activating the Ampcontrol energizes the electrode terminal and varies the output welding current from its minimum value of 5 Amp (DC) to the maximum value set by the Current Control on the control panel. This helps eliminate accidental high current damage to the work piece and/or tungsten, and provides a fine control of the current. When the welder is in the stick mode a remote control has no effect and is not used.

It is important to note that, in some cases, the tungsten will not start an arc at the minimum current because the tungsten may be too large or cold. To start an arc reliably, it is important to depress the Ampcontrol far enough so that the machine output current is near the tungsten operating range. For example, a 3/32" tungsten may be used on DC- to weld over the full range of the machine.

To start the arc, the operator may have to turn the cur-rent control up and depress the Ampcontrol approximately 1/4 of the way down. Depressing the Ampcontrol to its minimum position may not start the arc.

Also if the current control is set too low, the arc may not start. In most cases, a large or cold tungsten will not readily establish an arc at low currents. This is normal. In Direct Current mode the TIG machine will start a 3/32", 2% thoriated tungsten electrode at 20 amperes provided the electrode tip is properly grounded and not contaminated.

BENEFITS OF THE PRECISION TIG DESIGN

WELDING IN STICK MODE

1 Put the electrode holder and cable quick connect plug into the electrode output receptacle. Turn clockwise until tight. Connect the work clamp to the work piece.

2 Set the TIG/MMA switch to "MMA".

3 Place the electrode in the electrode holder.

⚠ WARNING

In Stick Mode the output terminal and electrode will be electrically hot whenever the power switch is turned on.

4 Turn the power switch to "ON".
5 Adjust the Current Control to the desired amps.
6 Strike an arc and weld.

NOTE: When the MMA/TIG switch is set to "MMA" the output is always on when the power switch is on. A remote control has no effect on the welding current and the gas flow and high frequency TIG arc starter are disabled.

RECOMMENDED ELECTRODE AMPERAGE RANGES

The TIG200P is rated from 5-200 Amps.

SMAW Process

		Welding Amp Range for Stick Electrode Size		
ELECTRODE TYPE	POLARITY	3/32"	1/8"	5/32"
Fleet weld 5P, Fleet weld 5P+ E6010	DC+	40 -70	75 - 130	90 - 175
Fleet weld 180E6011	DC+	40 - 80	55 - 110	105 - 135
Fleet weld 37E6013	DC+	70 - 95	100 - 135	145 - 180
Fleet weld 47E7014	DC-	75 - 95	100 - 145	135 - 200
Excalibur E7018	DC+	85 - 110	110 - 160	130 - 200
Blue Max Stainless	DC+	40 - 80	75 - 110	95 - 150
Red Baron Stainless	DC+	40 - 70	60 - 100	90 - 140

Mild steel procedures are based on recommended procedures listed in C2.10 8/94 and the maximum rating of the TIG machine
Blue Max procedures are based on C6.1 6/95
Red Baron Procedure are based on ES-503 10/93

C-1 ACCESSORIES C-1

FACTORY INSTALLED OPTIONS

The TIG MACHINE will be available in two Factory-Configured Welding Packages each:

1. TIG***(P) Ready-Pak (FTIG***(P)1)

PACKING LIST

▯ □□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□

model	quantity	remark	note
TIG***(P) Welding machine	1	With remote receptacle	
300A Welding clamp	1		

300A Ground pliers	1		
TIG welding torch	1		
Adjustable foot control	1	Optional accessory	
gas inlet pipe	1		
Operation instructions	1		
Certificate of quality	1		

No.

----

2. TIG***(P) Ready-Pak (FTIG***(P)2)

PACKING LIST

▯ □□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□

model	quantity	remark	note
TIG***P Welding machine	1		
300A Welding clamp	1		
300A Ground pliers	1		
TIG welding torch	1		
gas inlet pipe	1		
Operation instructions	1		
Certificate of quality	1		

No.

----

3. Certificate of quality

Name of product: DC TIG(/PULSE TIG) WELDING

Type of product: TIG*(P)**

Packing No:_______________

Test results of this welder fulfils_____________

_________technical requirements and its release

from the works is granted.

Inspector_________ Date___________

D-1 MAINTENANCE D-1

SAFETY PRECAUTIONS

⚠ WARNING

ELECTRIC SHOCK can kill.

- **Only qualified personnel should per-form this maintenance.**
- **Turn the input power OFF at the disconnect switch or fuse box before working on this equipment.**
- **Do not touch electrically hot parts.**

INPUT FILTER CAPACITOR DISCHARGE PROCEDURE

⚠ WARNING

The machine has internal capacitors which are charged to a high voltage during power-on conditions. This voltage is dangerous and must be discharged before the machine can be serviced. Discharging is done automatically by the machine each time the power is switched

off. However, you must allow the machine to sit for at least 5 minutes to allow time for the process to take place.

⚠ WARNING

To avoid receiving a high frequency shock, keep the TIG torch and cables in good condition.

ROUTINE AND PERIODIC MAINTENANCE

1 Disconnect power supply lines to machine before performing periodic maintenance.

2. Periodically clean the inside of the machine with a low pressure air system. Be sure to clean the following components thoroughly.

- Main Transformer
- Electrode/Gas Output Receptacle
- Polarity Switch
- Rectifier Assembly
- Arc Starter/Spark Gap Assembly
- PC Boards
- Fan Blades

3 Inspect welder output and control cables for fraying, cuts, and bare spots.

4 Keep TIG torch and cables in good condition.

5 Clean air louvers to ensure proper air flow and cooling.

6 The fan motor has sealed ball bearings which require no maintenance.

7 **SPARK GAP ADJUSTMENT**

The spark gap .020(.5mm) is set at the factory to a gap of 0.015 inches (0.4mm) See Figure D.1. This setting is adequate for most applications. Where less high frequency is desired, the setting can be reduced to 0.015 inches (0.4mm).

⚠ WARNING

Use extreme caution when working with circuit of the high frequency. The high voltages developed can be lethal. Turn the input power off using the disconnect switch or fuse box before working inside machine. This is particularly important when working on the secondary circuit of the high voltage transformer (T3) because the output voltage is dangerously high.

Refer to figure D.1. Note in highly dirty environments where there is an abundance of conductive contaminants, use a low pressure air stream or a firm piece of paper to clean the spark gap. Do not disturb the factory setting.

To check the spark gap:

-Turn off input power as specified above.

-Remove the right side panel from the machine, the spark gap box is located on the lower right side.

-Check the spark gap with a feeler gauge. If adjustment is needed:

-Adjust the gap by loosening the head screw in one of the aluminum blocks, near the front of the unit and tighten the screw in the new position.

If the gap is correct:

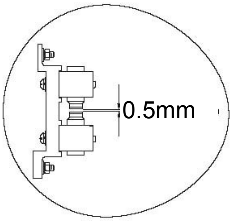
-Replace the wraparound.

8 Inspect gas hose and inlet fitting for cracks or leaks.

9 Replace any unreadable labels or decals.

10 Verify that the machine and welding circuit is properly grounded.

FIGURE D.1 SPARK GAP



FAN MOTOR OR FAN BLADE REPLACEMENT

When installing a new fan blade or fan motor be sure to maintain proper shaft spacing.

E-1 TROUBLESHOOTING E-1

HOW TO USE TROUBLESHOOTING GUIDE

⚠ WARNING

Service and Repair should only be performed by NTFREE Factory Trained Personnel. Unauthorized repairs performed on this equipment may result in danger to the technician and machine operator and will invalidate your factory warranty. For your safety and to avoid Electrical Shock, please observe all safety notes and precautions detailed throughout this manual.
This Troubleshooting Guide is provided to help you locate and repair possible machine malfunctions. Simply follow the three-step procedure listed below.

Step 1. LOCATE PROBLEM (SYMPTOM).

Look under the column labeled "PROBLEM (SYMPTOMS)". This column describes possible symptoms that the machine may exhibit. Find the listing that best describes the symptom that the machine is exhibiting.

Step 2. POSSIBLE CAUSE.
The second column labeled "POSSIBLE CAUSE" lists the obvious external possibilities that may contribute to the machine symptom.

Step 3. RECOMMENDED COURSE OF ACTION This column provides a course of action for the Possible Cause, generally it states to contact your local NTFREE Authorized Field Service Facility. If you do not understand or are unable to perform the Recommended Course of Action safely, contact your local NTFREE Authorized Field Service Facility.

⚠ CAUTION

If for any reason you do not understand the test procedures or are unable to perform the tests/repairs safely, contact your Local NTFREE Authorized Field Service Facility for technical troubleshooting assistance before you proceed.

Observe all Safety Guidelines detailed throughout this manual

OUTPUT PROBLEMS

PROBLEMS (SYMPTOMS)	POSSIBLE AREAS OF MISADJUSTMENTS	RECOMMENDED COURSE OF ACTION

Machine is Dead -No Output - No Fan	1. Make certain that the input power switch is in the "ON" position and machine is plugged in. 2. Check the input voltage at the machine. Input voltage must match the rating plate and voltage connection. Refer to Reconnect Procedure in the Installation section of this manual. 3. Blown or missing fuses in input line.	If all recommended possible areas of misadjustment have been checked and the problem persists, Contact your local Authorized Field Service Facility.
Fan runs normally at power up - No output from machine in either Stick or TIG modes.	1. Check for proper input voltages per nameplate and voltage reconnection. 2. Check to make sure polarity switch is not in between two positions.	
Fan runs - No output from machine in either Stick or TIG modes and the yellow light on the control panel is on.	1. Welding application may have exceed the recommended duty cycle. Allow the unit to run until the fan cools the unit and the yellow light goes out.	
Machine does not respond (no gas flow, no high frequency and no open circuit voltage) when arc start switch or Ampcontrol is activated - fan is working.	1. Machine MUST be in the TIG Mode. 2. The Ampcontrol may be defective. Check for continuity between pins "D" and "E" on cable connector when Ampcontrol is depressed.	
Machine regularly over heats - thermostat opens, Yellow(green and red light at the same time) light on front panel glows The fan runs but machine has no output	1. Welding application may exceed recommended duty cycle. Reduce the duty cycle. 2. Dirt and dust may have clogged the cooling channels inside the machine. Blow out unit with clean, dry low pressure air. 3. Air vents and exhaust louvers may be blocked due to inadequate clearance around machine.	

Note:Both the Hand and **Adjustable foot control** work in a similar manner. For simplicity, the following explanation will refer only to "Ampcontrol", meaning both Foot and Hand models
If for any reason you do not understand the test procedures or are unable to perform the tests/repairs safely, contact your Local Authorized Field Service Facility for technical troubleshooting assistance before you proceed.

E-3 TROUBLESHOOTING E-3

Observe all Safety Guidelines detailed throughout this manual

TIG MODE PROBLEMS

PROBLEMS (SYMPTOMS)	POSSIBLE AREAS OF MISADJUSTMENTS(S)	RECOMMENDED

		COURSE OF ACTION
Machine output is intermittently lost. Gas flow and high frequency are also interrupted.	1. Problem may be caused by high frequency interference. Make sure that the machine is grounded properly according to the installation instructions. If there are other high frequency sources in the area, make certain that they are grounded properly. 2. Check Ampcontrol for proper operation and loose connections. 3. Check for proper input voltage and proper voltage reconnection.	If all recommended possible areas of misadjustment have been checked and the problem persists, Contact your local Authorized Field Service Facility.
Black areas along weld bead	1. Clean any oily or organic contamination from the work piece. 2. Tungsten electrode may be contaminated. Replace or sharpen. 3.Check for contaminated gas or leaks in the gas line, torch, or connections. 4.Gas shielding may be insufficient. Increase gas flow; reduce tungsten stick out beyond gas cup.	
Weak high frequency - machine has normal welding output.	1. Check for poor connections in the welding circuit. 2. Gas shielding may be insufficient. Increase gas flow; reduce tungsten stick out beyond gas cup. 3. Check for work and electrode cables in poor condition allowing high frequency to "Leak Off". 4. Keep cables as short as possible. 5. Check Spark Gap operation and setting (0.5mm).	
High frequency "spark" is present at tungsten electrode, but operator is unable to establish a welding arc. Machine has normal open circuit voltage (refer to Technical Specifications in the Installation Chapter).	1. The tungsten electrode may be contaminated. Replace or sharpen. 2. The current control may be set too low. 3. The tungsten electrode may be too large for the process. 4. If a helium blend is used as a shielding gas, then reduce the percentage of helium.	

Note:Both the Hand and **Adjustable foot control** work in a similar manner. For simplicity, the following explanation will refer only to "Ampcontrol", meaning both Foot and Hand models

If for any reason you do not understand the test procedures or are unable to perform the tests/repairs safely, contact your Local Authorized Field Service Facility for technical troubleshooting assistance before you proceed.

E-4 TROUBLESHOOTING E-4

Observe all Safety Guidelines detailed throughout this manual

TIG WELD PROBLEMS

PROBLEMS (SYMPTOMS)	POSSIBLE AREAS OF MISADJUSTMENTS(S)	RECOMMENDED COURSE OF ACTION

No high frequency. Machine is in the TIG Mode and has normal output.	1. If the machine location is in a highly dirty environment with conductive contaminants, check and clean the spark gap with a low pressure air stream per the maintenance instructions.	If all recommended possible areas of misadjustment have been checked and the problem persists, Contact your local Authorized Field Service Facility.
No gas flow when Ampcontrol is activated in the TIG Mode. Machine has output - fan runs. A "Click" can be heard indicating that the gas solenoid valve is operating.	1. Gas supply is empty or not turned on. 2. Flow regulator may be set too low. 3. Gas hose may be pinched. 4. Gas flow may be blocked with dirt. Check filter screen inside gas inlet fitting to solenoid valve. Use filters to prevent reoccurrence. 5. Consult your local welder/gas distributor.	
The end of the tungsten electrode melts away.	1. The welding current is too high for the electrode type and/or size. See Electrode Amperage Ranges in the Operation Section of this manual.	

Note:Both the Hand and **Adjustable foot control** work in a similar manner. For simplicity, the following explanation will refer only to "Ampcontrol", meaning both Foot and Hand models

If for any reason you do not understand the test procedures or are unable to perform the tests/repairs safely, contact your Local Authorized Field Service Facility for technical troubleshooting assistance before you proceed.

E-5 TROUBLESHOOTING E-5

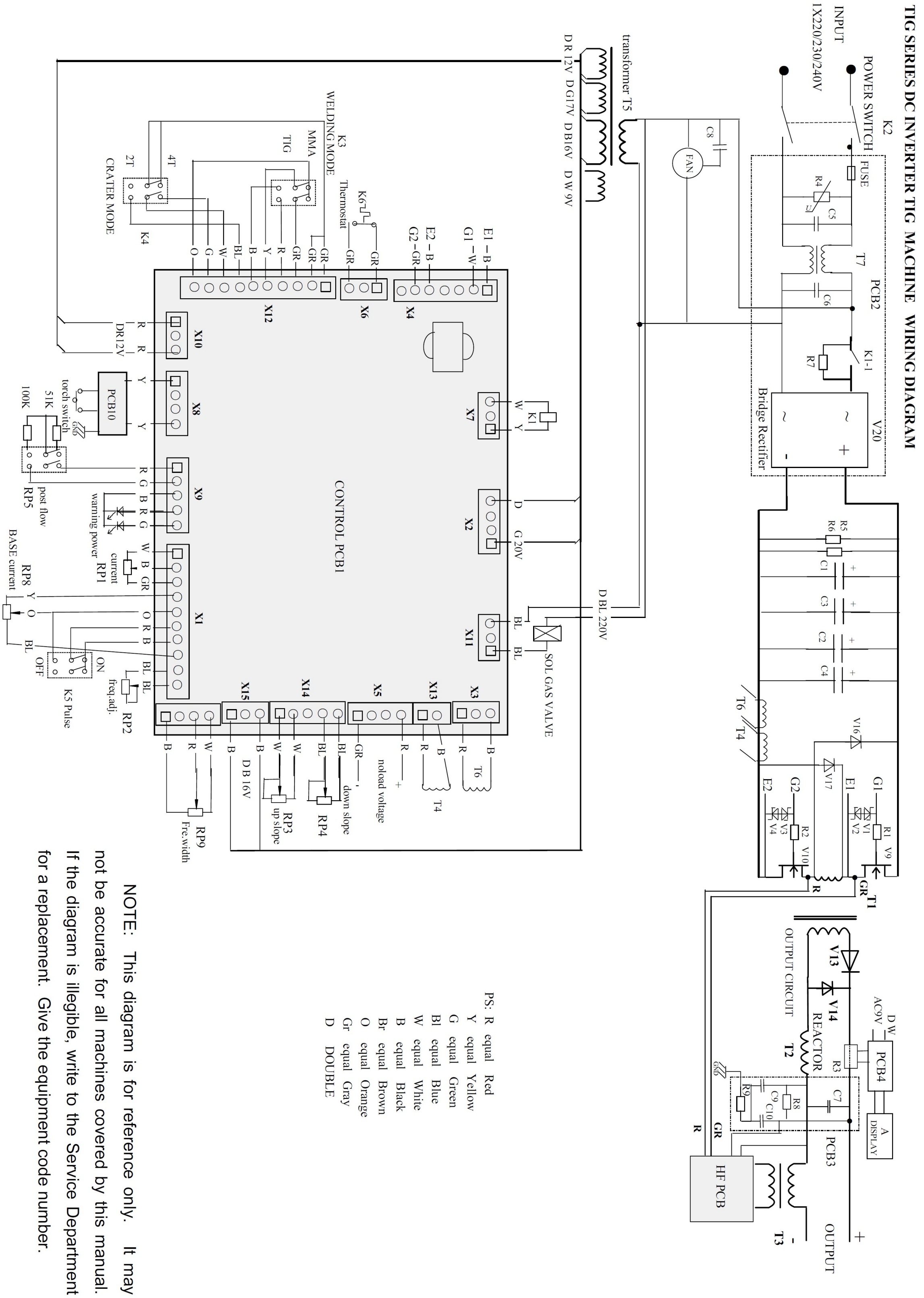
Observe all Safety Guidelines detailed throughout this manual

STICK WELDING PROBLEMS

PROBLEMS (SYMPTOMS)	POSSIBLE AREAS OF MISADJUSTMENTS(S)	RECOMMENDED COURSE OF ACTION

DC MMA/TIG

Stick electrode "Blasts Off" when arc is struck.	1. Weld current may be set too high for electrode size. Reduce current control setting, or use a larger diameter electrode. 2. Dirty materials	



PS: R equal Red
Y equal Yellow
G equal Green
Bl equal Blue
W equal White
B equal Black
Br equal Brown
O equal Orange
Gr equal Gray
D DOUBLE

NOTE: This diagram is for reference only. It may not be accurate for all machines covered by this manual. If the diagram is illegible, write to the Service Department for a replacement. Give the equipment code number.

NOTE: This diagram is for reference only. It may not be accurate for all machines covered by this manual. If the diagram is illegible, write to the Service Department for a replacement. Give the equipment code number.

REMOTE CONTROL BOX

circuit diagram

R1:control the output current between the Min. range of the ıe .
machine and the setting of the “R3” Max Output Control

PARTS LISTS

N0	Mark	Description	Code OR Model						QTY						Remark
			TIG130P TIG130 WSM-130P INV130P	TIG131P TIG131 WS-130	TIG160P ITIG160 WSM-160P INV160P	TIG161P TIG161 WS-160	TIG200P ITIG200 WSM-200P INV200P	TIG201P TIG201 WS-200	TIG130P TIG130 WSM-130P INV130P	TIG131P TIG131 WS-130	TIG160P ITIG160 WSM-160P INV160P	TIG161P TIG161 WS-160	TIG200P ITIG200 WSM-200P INV200P	TIG201P TIG201 WS-200	
1	T1	Invert transformer	TIG160P20		TIG160P20		TIG2000P20		1		1		1		
2	T2	Output reactor	TIG160P24		TIG160P24		TIG200P24		1		1		1		
3	T3	HF transformer (coil)	TIG160P25		TIG160P25		TIG200P25		1		1		1		
4	T4	Mutual inductance	TIG200P261						1						
5	T5	Control transformer	TIG200P21						1						16V（0.5A)+17V(1A)+12V(0.5A)+9V(0.5A)
6	T6	Mutual inductance	TIG200P262						1						
7	T7	Primary inductance	TIG200P27						1						
8	V1,V3	zener Diode	1N4746						1						
9	V2,V4	zener Diode	1N4738						1						
10	V9,V10	MOSFET	IRFP460(K50T60)						3(2)		4(2)		3(2)		
11	V13~V14	Fast resume Diode	FMS33S						3(4)		5		4		
12	V16~V17	Fast resume Diode	MUR1560(30U60S)						1						
13	V20	Bridge Rectifier	KBPC3510		KBPC3510		KBPC3510		1		1		2		
14	R1,R2	Resistance	15/0.5W						4		4		3		
15	R3	current divider	100A/150mA						1						
16	R4	Resistance	MYG 20K431						1						
17	R5,R6	Resistance	51K/4W						1						
18	R7	Resistance	RX21-8-100						2						
19	R8	Resistance	2W-1K Ω						1						
20	R9	Resistance	2W10 Ω						1						
21	C1~C4	Electrolytical Capacitance	470u/450V		560u/450V		680u/450V		1						
22	C5,C6	Capacitance	X2-MPX 1.0uF 280VAC						1						
23	C8	Fan startup Capacitance	FRD1.0UF400VAC						1						
25	C7,C9,C10	Capacitance	472/250VAC Y1,400VAC Y2						5						
26	A	Digital meter display	DISPLAY3						1		1				
27	K1	Soft start Relay	GPF112DMFDC12V						1		2				
28	K2	Power switch	KCD7-2211N		KCD7-2211N		DZ47-C32/2P		1		1				
29	K3	Welding mode switch	KCD1-202						1						
30	K4	Crater mode switch	KCD1-202						1						
31	K5	PULSE SWITCH	KCD1-202						1						
32	K6	Temperature Relay	JUF6F85℃		JUF6F85℃		JUF6F85℃		1						
33	SOL	gas valve	22XD-2AC220V						1						
34	FAN	Cool Fan	SA120/220VAC		SA120/220VAC		SA1725/220VAC		1						
35	FUSE	FUSE	20A						1		2		--		
36	RP1	PEAK current reg.	WX14-22K						1						
37	RP2	freq. reg.	WH5-100K	--	WH5-100K	--	WH5-100K	--	--	1	--	1	--	1	
43	RP3	Upslope time reg.	WH5-100k						1						
44	RP4	Down slope time reg.	WH5-100K						1						
45	RP5	post flow time SWITCH	KCD1-202 (51K/100K Resistance)						1						
46	RP6	initial current	--												
47	RP7	crater current	--												
48	RP8	PEAK current reg.	WX14-22K												
49	RP9	Freq. width reg.	WH5-33K												
50	LED1	power(green)	BT203-1						1						
51	LED2	warnimg(red)	BT203-2						1						
52	PCB1	control pcb	PULSE130	TIG161	PULSE160	TIG161	PULSE200	TIG161	1 set						
53	PCB2	INPUT EMS PCB	TIGRQD						1SET						
54	PCB3	OUTPUT EMS PCB	TIGOUT						1SET						
55	PCB4	DISPLAY PCB	7805						1set						
56	PCB10	EMI board	CONTRX						1 set						
57	HF PCB	HF portfire board	100SC						1set						

TIG130P Ready-Pak (FTIG130P1)

PACKING LIST

□□

model	quantity	remark	note
TIG130P Welding machine	1	With remote receptacle	
300A Welding clamp	1		
300A Ground pliers	1		
TIG welding torch	1		
Adjustable foot control	1	Optional accessory	
gas inlet pipe	1		
Operation instructions	1		
Certificate of quality	1		

No.

Certificate of quality

Name of product: DC TIG/PULSE TIG WELDING

Type of product: TIG130P

Packing No:_______________

DC MMA/TIG

Test results of this welder fulfils_____________

_________technical requirements and its release

from the works is granted.

Inspector_________ Date___________

TIG130P Ready-Pak (FTIG130P2)

PACKING LIST

□□

model	quantity	remark	note
TIG130P Welding machine	1		
300A Welding clamp	1		
300A Ground pliers	1		
TIG welding torch	1		
gas inlet pipe	1		
Operation instructions	1		
Certificate of quality	1		

No.

Certificate of quality

Name of product: DC TIG/PULSE TIG WELDING

Type of product: TIG130P

Packing No:_______________

DC MMA/TIG

Test results of this welder fulfils_____________ _________technical requirements and its release from the works is granted.

Inspector_________ Date___________

TIG160P Ready-Pak (FTIG160P1)

PACKING LIST

□□

model	quantity	remark	note
TIG160P Welding machine	1	With remote receptacle	
300A Welding clamp	1		
300A Ground pliers	1		
TIG welding torch	1		
Adjustable foot control	1	Optional accessory	
gas inlet pipe	1		
Operation instructions	1		
Certificate of quality	1		

No.

Certificate of quality

Name of product: DC TIG/PULSE TIG WELDING

Type of product: TIG160P

Packing No:_______________

DC MMA/TIG

Test results of this welder fulfils_____________

_________technical requirements and its release

from the works is granted.

Inspector_________ Date___________

TIG160P Ready-Pak (FTIG160P2)

PACKING LIST

□□

model	quantity	remark	note
TIG160P Welding machine	1		
300A Welding clamp	1		
300A Ground pliers	1		
TIG welding torch	1		
gas inlet pipe	1		
Operation instructions	1		
Certificate of quality	1		

No.

Certificate of quality

Name of product: DC TIG/PULSE TIG WELDING

Type of product: TIG160P

Packing No:_______________

DC MMA/TIG

Test results of this welder fulfils_____________

_________technical requirements and its release from the works is granted.

Inspector_________ Date___________

TIG200P Ready-Pak (FTIG200P1)

PACKING LIST

□□

model	quantity	remark	note
TIG200P Welding machine	1	With remote receptacle	
300A Welding clamp	1		
300A Ground pliers	1		
TIG welding torch	1		
Adjustable foot control	1	Optional accessory	
gas inlet pipe	1		
Operation instructions	1		
Certificate of quality	1		

No.

Certificate of quality

Name of product: DC TIG/PULSE TIG WELDING

Type of product: TIG200P

Packing No:_______________

DC MMA/TIG

Test results of this welder fulfils_____________

_________technical requirements and its release

from the works is granted.

Inspector_________ Date___________

TIG200P Ready-Pak (FTIG200P2)

PACKING LIST

□□

model	quantity	remark	note
TIG200P Welding machine	1		
300A Welding clamp	1		
300A Ground pliers	1		
TIG welding torch	1		
gas inlet pipe	1		
Operation instructions	1		
Certificate of quality	1		

No.

Certificate of quality

Name of product: DC TIG/PULSE TIG WELDING

Type of product: TIG200P

Packing No:_______________

DC MMA/TIG

Test results of this welder fulfils_____________

_________technical requirements and its release from the works is granted.

Inspector_________ Date___________

TIG131 Ready-Pak (FTIG131P1)

PACKING LIST

□□

model	quantity	remark	note
TIG131 Welding machine	1	With remote receptacle	
300A Welding clamp	1		
300A Ground pliers	1		
TIG welding torch	1		
Adjustable foot control	1	Optional accessory	
gas inlet pipe	1		
Operation instructions	1		
Certificate of quality	1		

No.

Certificate of quality

Name of product: DC TIG WELDING

Type of product: TIG131

Packing No:_______________

DC MMA/TIG

Test results of this welder fulfils_____________

_________technical requirements and its release

from the works is granted.

Inspector_________ Date___________

TIG131 Ready-Pak (FTIG131P2)

PACKING LIST

□□

model	quantity	remark	note
TIG131 Welding machine	1		
300A Welding clamp	1		
300A Ground pliers	1		
TIG welding torch	1		
gas inlet pipe	1		
Operation instructions	1		
Certificate of quality	1		

No.

Certificate of quality

Name of product: DC TIG WELDING

Type of product: TIG131

Packing No:_______________

DC MMA/TIG

Test results of this welder fulfils_____________ _________technical requirements and its release from the works is granted.

Inspector_________ Date___________

TIG161 Ready-Pak (FTIG161P1)

PACKING LIST

□□

model	quantity	remark	note
TIG161 Welding machine	1	With remote receptacle	
300A Welding clamp	1		
300A Ground pliers	1		
TIG welding torch	1		
Adjustable foot control	1	Optional accessory	
gas inlet pipe	1		
Operation instructions	1		
Certificate of quality	1		

No.

Certificate of quality

Name of product: DC TIG WELDING

Type of product: TIG161

Packing No:_______________

DC MMA/TIG

Test results of this welder fulfils_____________

_________technical requirements and its release

from the works is granted.

Inspector_________ Date___________

TIG161 Ready-Pak (FTIG161P2)

PACKING LIST

□□

model	quantity	remark	note
TIG161 Welding machine	1		
300A Welding clamp	1		
300A Ground pliers	1		
TIG welding torch	1		
gas inlet pipe	1		
Operation instructions	1		
Certificate of quality	1		

No.

Certificate of quality

Name of product: DC TIG WELDING

Type of product: TIG161

Packing No:_______________

DC MMA/TIG

Test results of this welder fulfils_____________

_________technical requirements and its release

from the works is granted.

Inspector_________ Date___________

TIG201 Ready-Pak (FTIG201P1)

PACKING LIST

□□

model	quantity	remark	note
TIG201 Welding machine	1	With remote receptacle	
300A Welding clamp	1		
300A Ground pliers	1		
TIG welding torch	1		
Adjustable foot control	1	Optional accessory	
gas inlet pipe	1		
Operation instructions	1		
Certificate of quality	1		

No.

Certificate of quality

Name of product: DC TIG WELDING

Type of product: TIG201

Packing No:_______________

DC MMA/TIG

Test results of this welder fulfils_____________

_________technical requirements and its release

from the works is granted.

Inspector_________ Date___________

TIG201 Ready-Pak (FTIG201P2)

PACKING LIST

□□

model	quantity	remark	note
TIG201 Welding machine	1		
300A Welding clamp	1		
300A Ground pliers	1		
TIG welding torch	1		
gas inlet pipe	1		
Operation instructions	1		
Certificate of quality	1		

No.

Certificate of quality

Name of product: DC TIG WELDING

Type of product: TIG201

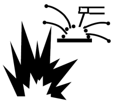
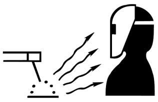
Packing No:_______________

DC MMA/TIG

Test results of this welder fulfils_____________

_________technical requirements and its release

from the works is granted

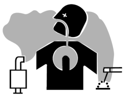
			
WARNING	● Do not touch electrically live parts or electrode with skin or wet clothing. ● Insulate yourself from work and ground.	● Keep flammable materials away.	● Wear eye, ear and body protection.
Spanish **AVISO DE PRECAUCION**	● No toque las partes o los electrodos bajo carga con la piel o ropa mojada. ● Aislese del trabajo y de la tierra.	● Mantenga el material combustible fuera del área de trabajo.	● Protéjase los ojos, los oídos y el cuerpo.
French **ATTENTION**	● Ne laissez ni la peau ni des vêtements mouillés entrer en contact avec des pièces sous tension. ● Isolez-vous du travail et de la terre.	● Gardez à l'écart de tout matériel inflammable.	● Protégez vos yeux, vos oreilles et votre corps.
German **WARNUNG**	● Berühren Sie keine stromführenden Teile oder Elektroden mit Ihrem Körper oder feuchter Kleidung! ● Isolieren Sie sich von den Elektroden und dem Erdboden!	● Entfernen Sie brennbarres Material!	● Tragen Sie Augen-, Ohren- und Körperschutz!
Portuguese **ATENÇÃO**	● Não toque partes elétricas e electrodos com a pele ou roupa molhada. ● Isole-se da peça e terra.	● Mantenha inflamáveis bem guardados.	● Use proteção para a vista, ouvido e corpo.
Japanese **注意事項**	●通電中の電気部品、又は溶材にヒフやぬれた布で触れないこと。 ●施工物やアースから身体が絶縁されている様にして下さい。	●燃えやすいものの側での溶接作業は絶対にしてはなりません。	●目、耳及び身体に保護具をして下さい。
Chinese **警 告**	●皮肤或濕衣物切勿接觸帶電部件及銲條。 ●使你自己與地面和工件絕緣。	●把一切易燃物品移離工作場所。	●佩戴眼、耳及身體勞動保護用具。
Korean **위 험**	●전도체나 용접봉을 젖은 헝겁 또는 피부로 절대 접촉치 마십시요. ●모재와 접지를 접촉치 마십시요.	●인화성 물질을 접근 시키지 마시요.	●눈, 귀와 몸에 보호장구를 착용하십시요.
Arabic **تحذير**	● لا تلمس الاجزاء التي يسري فيها التيار الكهربائي أو الالكترود بجلد الجسم أو بالملابس المبللة بالماء. ● ضع عازلا على جسمك خلال العمل.	● ضع المواد القابلة للاشتعال في مكان بعيد.	● ضع أدوات وملابس واقية على عينيك وأذنيك وجسمك.

READ AND UNDERSTAND THE MANUFACTURER'S INSTRUCTION FOR THIS EQUIPMENT AND THE CONSUMABLES TO BE USED AND FOLLOW YOUR EMPLOYER'S SAFETY PRACTICES.

SE RECOMIENDA LEER Y ENTENDER LAS INSTRUCCIONES DEL FABRICANTE PARA EL USO DE ESTE EQUIPO Y LOS CONSUMIBLES QUE VA A UTILIZAR, SIGA LAS MEDIDAS DE SEGURIDAD DE SU SUPERVISOR.

LISEZ ET COMPRENEZ LES INSTRUCTIONS DU FABRICANT EN CE QUI REGARDE CET EQUIPMENT ET LES PRODUITS A ETRE EMPLOYES ET SUIVEZ LES PROCEDURES DE SECURITE DE VOTRE EMPLOYEUR.

LESEN SIE UND BEFOLGEN SIE DIE BETRIEBSANLEITUNG DER ANLAGE UND DEN ELEKTRODENEINSATZ DES HERSTELLERS. DIE UNFALLVERHÜTUNGSVORSCHRIFTEN DES ARBEITGEBERS SIND EBENFALLS ZU BEACHTEN.

			
● Keep your head out of fumes. ● Use ventilation or exhaust to remove fumes from breathing zone.	● Turn power off before servicing.	● Do not operate with panel open or guards off.	**WARNING**
● Los humos fuera de la zona de respiración. ● Mantenga la cabeza fuera de los humos. Utilice ventilación o aspiración para gases.	● Desconectar el cable de alimentación de poder de la máquina antes de iniciar cualquier servicio.	● No operar con panel abierto o guardas quitadas.	Spanish **AVISO DE PRECAUCION**
● Gardez la tête à l'écart des fumées. ● Utilisez un ventilateur ou un aspirateur pour ôter les fumées des zones de travail.	● Débranchez le courant avant l'entretien.	● N'opérez pas avec les panneaux ouverts ou avec les dispositifs de protection enlevés.	French **ATTENTION**
● Vermeiden Sie das Einatmen von Schweibrauch! ● Sorgen Sie für gute Be- und Entlüftung des Arbeitsplatzes!	● Strom vor Wartungsarbeiten abschalten! (Netzstrom völlig öffnen; Maschine anhalten!)	● Anlage nie ohne Schutzgehäuse oder Innenschutzverkleidung in Betrieb setzen!	German **WARNUNG**
● Mantenha seu rosto da fumaça. ● Use ventilação e exhaustão para remover fumo da zona respiratória.	● Não opere com as tampas removidas. ● Desligue a corrente antes de fazer serviço. ● Não toque as partes elétricas nuas.	● Mantenha-se afastado das partes moventes. ● Não opere com os paineis abertos ou guardas removidas.	Portuguese **ATENÇÃO**
● ヒュームから頭を離すようにして下さい。 ● 換気や排煙に十分留意して下さい。	● メンテナンス・サービスに取りかかる際には、まず電源スイッチを必ず切って下さい。	● パネルやカバーを取り外したままで機械操作をしないで下さい。	Japanese **注意事項**
●頭部遠離煙霧。 ●在呼吸區使用通風或排風器除煙。	● 維修前切斷電源。	●儀表板打開或沒有安全罩時不準作業。	Chinese **警 告**
● 얼굴로부터 용접가스를 멀리하십시요. ● 호흡지역으로부터 용접가스를 제거하기 위해 가스제거기나 통풍기를 사용하십시요.	● 보수전에 전원을 차단하십시요.	● 판넬이 열린 상태로 작동치 마십시요.	Korean **위 험**
● ابعد رأسك بعيداً عن الدخان. ● استعمل التهوية أو جهاز ضغط الدخان للخارج لكي تبعد الدخان عن المنطقة التي تتنفس فيها.	● اقطع التيار الكهربائي قبل القيام بأية صيانة.	● لا تشغل هذا الجهاز اذا كانت الاغطية الحديدية الواقية ليست عليه.	Arabic **تحذير**

LEIA E COMPREENDA AS INSTRUÇÕES DO FABRICANTE PARA ESTE EQUIPAMENTO E AS PARTES DE USO, E SIGA AS PRÁTICAS DE SEGURANÇA DO EMPREGADOR.

使う機械や溶材のメーカーの指示書をよく読み、まず理解して下さい。そして貴社の安全規定に従って下さい。

請詳細閱讀並理解製造廠提供的説明以及應該使用的銀捍材料，並請遵守貴方的有関勞動保護規定。

이 제품에 동봉된 작업지침서를 숙지하시고 귀사의 작업자 안전수칙을 준수하시기 바랍니다.

اقرأ بتمعن وافهم تعليمات المصنع المنتج لهذه المعدات والمواد قبل استعمالها واتبع تعليمات الوقاية لصاحب العمل.