T 160i Lift

OWNER'S MANUAL

KEEP THIS MANUAL

The technical specifications and the wiring diagrams contained in this owner's manual are valid only for the model which has the part number indicated below.

T 160i Lift: ALW-M170500184

AIR LIQUIDE™

08/01

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WARNING

Read and understand this entire Owner's Manual before installing, operating or servicing this equipment. While the information contained in this Owner's manual represents our best judgment, Air Liquide assumes no liability for its use.

The publisher does not assume and hereby disclaims any liability to any party for any loss or damage caused by any error or omission in the Air Liquide A 160i Lift Owner's Manual, whether such error results from negligence, accident or any other causes.

1. SAFETY PRECAUTIONS - READ BEFORE USING

The use of welding equipment can cause injury to the operator. The reading and understanding of the safety standards mentioned below is compulsory prior to connecting, preparing, using or transporting welding equipment.

1.1 INSTALLATION OF EQUIPMENT

1. Installation and maintenance of equipment must be performed in compliance with local safety standards.

2. Frequently inspect the welder plug, receptacle and wiring. If damaged, replace immediately with approved electrical connections and adequately sized wiring.

3. Connect the welding ground as near as possible to the operating area.

4. Do not pass welding equipment cables through or near lifting chains, crane cables or any electrical lines.

5. If earth grounding of the workpiece is required, ground it directly with a separate cable.

6. Do not touch the electrode if you are in contact with the work, ground or another electrode from a different welding machine.

7. Use only well-maintained equipment. Repair or replace damaged parts immediately. Maintain welding equipment according to owner's manual.

8. Never use welding equipment near water. Do not spray water or other liquids on the welding equipment.

9. Avoid direct contact between wet garments and metal parts that are electrically charged.

10. Always wear gloves and rubber-soled shoes when working in wet areas or standing on metal surfaces.

11. Always turn off welding equipment that is not being used. Do not leave welding equipment unattended.

SIGNIFICANT DC VOLTAGE exists after the removal of input power to inverters.

- Always discharge input capacitors before touching any parts. Service work should be completed by qualified personnel only.

1.2 PERSONAL PROTECTION

1. Welding operations produce radiation, noise, heat and noxious fumes. Suitable safety precautions must be taken to minimize the risk.

2. Wear fire resistant work gloves, long sleeve shirts, pants, safety shoes, cap and welding helmet to protect the skin from radiation and metal sparks.

3. Always wear ear protection.

4. Always wear eye protection with side shields.

5. Position a fire resistant screen around the welding area to protect bystanders from radiation, sparks and slag.

6.  Compressed gas cylinders are potentially dangerous. Consult the supplier for correct handling procedures. Always protect compressed gas cylinders from the sun's rays, flames and sudden temperature changes.

1.3 FIRE AND EXPLOSION PREVENTION

 **Hot slag and sparks can cause fire. The risk of fire and explosion can be minimized by removing all flammable material from the welding area.**

1. Always perform welding operation with caution. Containers and tubes that have been emptied and thoroughly cleaned still represent a potential hazard.

2. Never perform welding operations or cut a closed container or pipe.

3. Never perform welding operations on open containers or pipes that may have been contaminated with substances that could explode or react when exposed to heat or humidity.

4. As a preventative measure, keep fire extinguishers near the welding operation.

1.4 METAL FUME HAZARDS

 **Welding fumes and gases may be hazardous if inhaled.**

1. Install a ventilation system in the welding area.

2. Use a forced air system when welding lead, beryllium, cadmium, zinc, zinc-coated or painted material. Always wear a protective mask.

3. If the ventilation system is inadequate, use an air respirator.

4. Beware of gas leaks. Shielding gases such as argon are heavier than air and when used in small spaces, will replace the air.

5. In the event that a welding operation occurs in a confined place, the operator should be accompanied by another person.

6. Always keep gas cylinders in a well-ventilated area. Close the main gas valve when cylinder is not in use.

7. Do not perform welding operations near chlorinated hydrocarbon vapors produced by degreasing or painting. The heat generated by arc rays can react to form phosgene, a highly toxic gas.

8. Irritation of the eyes, nose and throat are symptoms of inadequate ventilation. Take immediate steps to improve ventilation. Do not continue welding if symptoms persist.

1.5 TRANSPORTING THE POWER SOURCE

1. The welding machine may be carried by the handle.

2. Always disconnect the power source and accessories from the main supply before lifting or handling the welding equipment.

3. Do not drag, pull or lift welding equipment by the weld cables.

1.6 MAGNETIC FIELDS CAN AFFECT PACMAKERS

1.  Keep pacemaker wearers away from welding operations.

2. Pacemaker wearers should consult with a physician prior to being exposed to any welding or cutting operation.

1.7 H.F. RADIATION CAN CAUSE INJURY

1. High frequency (HF) emissions can interfere with radio navigation, safety devices, computers and communication equipment.

2. Installation of welding equipment should be performed by a qualified electrician.

3. The operator is responsible for having a qualified electrician correct any interference problem resulting from the welding equipment installation.

4. If notified by the FCC about interference, stop using the welding equipment immediately.

5. Have the welding equipment installation checked and maintained on a regular basis.

6. Keep high-frequency source doors and panels tightly shut. Keep spark gaps at the correct setting and use grounding to minimize the possibility of interference.

1.8 ARC WELDING CAN CAUSE INTERFERENCE

1. Electromagnetic energy can interfere with sensitive electronic equipment such as computers and computer-driven equipment like robots.

2. Be sure that all equipment in the welding area is electro-magnetically compatible.

3. To reduce possible interference, keep weld cables as short as possible, close together and down low.

4. Locate welding operations at least 100 meters (350 feet) away from any sensitive electronic equipment.

5. Be sure welding equipment is installed and grounded according to this manual.

6. If interference still occurs, the operator must take extra measures such as moving the welding machine, using shielded cables, using line filters or shielding the work area.

1.9 WELDING AND THE EFFECTS OF LOW FREQUENCY AND MAGNETIC FIELDS

As welding current flows through welding cables, it can cause electromagnetic fields. To reduce magnetic fields, use the following procedures:

1 Keep cables close together by twisting or taping them.

2. Arrange cables to one side and away from the operator.

3. Do not coil or drape coils around operators body.

4. Keep welding power source and cables as far away from the operator as practically possible.

5. Connect work clamp to workpiece as close to the weld as possible.

1.10 PRINCIPAL SAFETY STANDARDS

Safety in Welding and Cutting, ANSI Standard Z49.1 from the American Welding Society, 550 N.W. Lejeune Rd., Miami, FL 33126.

Safety and Health Standards, OSHA 29 CFR 1910, from the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402.

Recommended Safe Practices for the Preparation for Welding and Cutting of Containers That Have Held Hazardous Substances, American Welding Society Standard AWS F4.1, from the American Welding Society, 550 N.W. Lejeune Rd., Miami, FL 33126.

National Electrical Code, NFPA Standard 70, from the National Fire Protection Association, Batterymarch Park, Quincy, MA 02269.

Safe Handling of Compressed Gases in Cylinders, CGA Pamphlet P-1, from the Compressed Gas Association, 1235 Jefferson Davis Highway, Suite 501, Arlington, VA 22202.

Code for Safety in Welding and Cutting, CSA Standard W117.2, from the Canadian Standards Association, Standard Sales, 178 Rexdale Boulevard, Rexdale, Ontario M9W 1R3.

Safe Practices For Occupation And Educational Eye And Face Protection, ANSI Standards Z87.1 from the American National Standards Institute, 1430 Broadway, New York, NY 10018.

Cutting And Welding Processes, NFPA Standards 51B, from the National Fire Protection Association, Batterymarch Park, Quincy, MA 02269.

EQUIPMENT INSTALLATION AND MAINTENANCE MUST BE PERFORMED IN COMPLIANCE WITH LOCAL SAFETY STANDARDS.

Electric shock could be fatal

1. Never touch exposed electrical parts.
2. Switch off and disconnect the power source before installing or opening.
3. Installation may be performed by qualified persons only.
4. Installation procedure must comply with national electricity standards and all other relevant regulations.

Fumes and gases may represent a safety hazard.
Fumes and gases generated during welding may be dangerous if inhaled over a long period of time.

1. Keep clear of fumes.
2. Ventilate welding area or wear a breathing mask.
3. Install a natural or forced air ventilation system in the work area.

Use a protective mask with suitable glass filter (at least NR10) to safeguard eyes.

1. Wear appropriate eye, ear and body protection equipment.
2. Protect face, ears and neck during welding operations. Advise other persons in the vicinity to look away and stand clear of arc rays and hot metal.

Moving parts may cause injury.

1. Keep clear of hazardous areas, such as moving rollers.
2. Keep all doors, panels and covers closed and in place.

Hot areas may cause injury.

Let the power source or other parts cool before performing any maintenance or servicing.

Welding wire may cause injury.

Do not point the torch toward any part of the body, other persons or any type of metal when unwinding welding wire.

WELDING MAY CAUSE FIRES OR EXPLOSIONS. Never weld near inflammable materials.

1. Beware of weld flame. Always keep a fire extinguisher close at hand.
2. Never place welding equipment on inflammable surfaces.
3. Do not weld in closed containers.
4. Let welding equipment and material cool before handling them.

A falling power source or other equipment may cause serious injury to persons or damage to objects.

1. Always make use of the handle to lift power source (applies to portable models).
2. Use eye bolts and adequate lifting equipment to raise the power source.

The positioning of welding equipment on inflammable surfaces could lead to fire outbreak or explosion.

1. Never position equipment on combustible or inflammable surfaces.
2. Do not install equipment in the vicinity of inflammable liquids.

- **INSTALLATION AND MAINTENANCE OPERATIONS MUST BE PERFORMED BY QUALIFIED PERSONS ONLY.**
- **BEFORE INSTALLING the power source, check that the power socket satisfies ampere and voltage requirements (see data table plate). ENSURE that the socket is protected by appropriate fuses and automatic switches.**
- **CONNECT an approved standard plug corresponding to the system socket to the power supply cable.**

2. SPECIFICATIONS AND DESCRIPTION

2.1 SPECIFICATIONS

Welding Amp Range	5 - 160 Amps			
Rated AC Input	Volts	Phase	Hertz	Amps
	230	1	60	24
Rated DC Output	Amps	Duty Cycle	Volts	
Max OCV 80V	130	60%	25	SMAW
	160	40%	16	GTAW

2.2 DESCRIPTION

The ***T 160i Lift*** sets a new standard for constant-current, DC arc welding inverters. This 230-volt compact unit is a proven performer with serious welding amperage for electrodes up to 4.0 mm ($^{5}/_{32}$ in). This portable unit weighs in at an impressive 9.9 kg (21.8 lb).

Infinite current regulation and thermal overload protection assist the welding operator in performing smooth and consistent welds. Built in anti-stick, hot start and arc force ensure ease of operation and increased operator satisfaction. This unit features high-end TIG requirements, such as post flow, slope down, and 2T / 4T welding modes. It also contains a 14-pin amphenol connection for hand or foot controls.

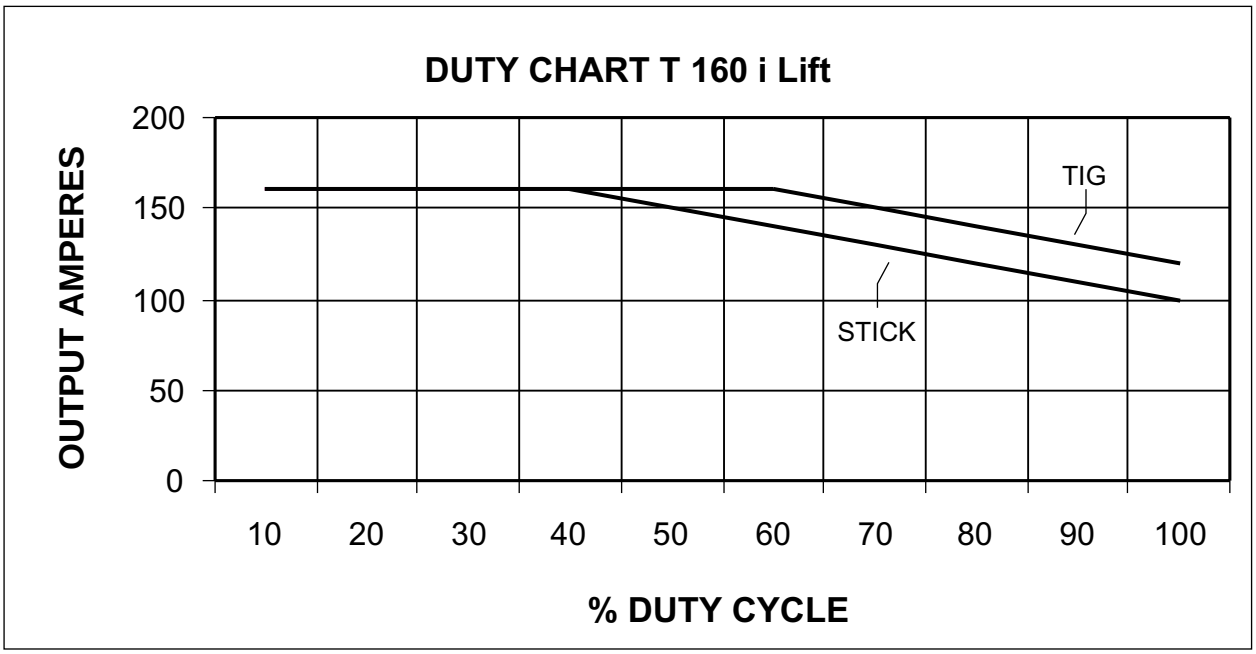
2.3 COMES COMPLETE WITH:

1. **Shoulder strap (Carrying strap)**
2. **2.4m (8ft) input power cord with 6P-50 plug**.

For options and accessories contact your distributor.

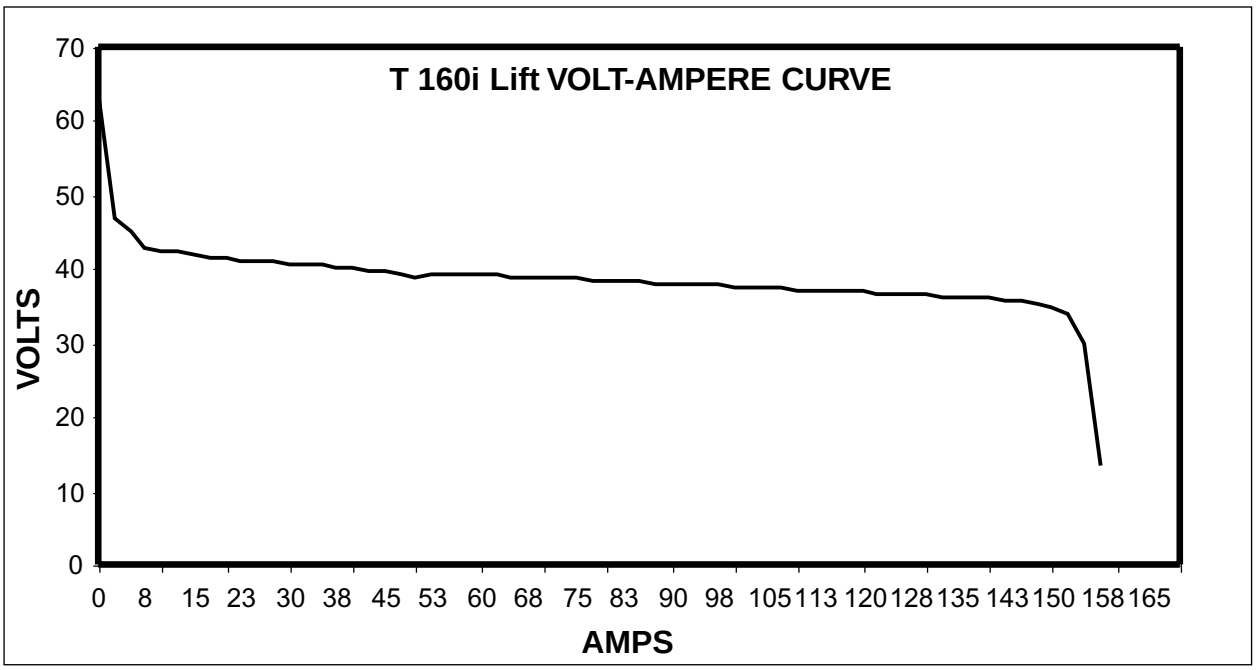
2.4 DUTY CYCLE AND OVERHEATING

Duty cycle is the percentage of 10 minutes that the unit can weld at its rated output without overheating. If the unit overheats, the weld output will stop. To correct this situation, wait fifteen minutes for the unit to cool. Reduce amperage or duty cycle before starting to weld again.



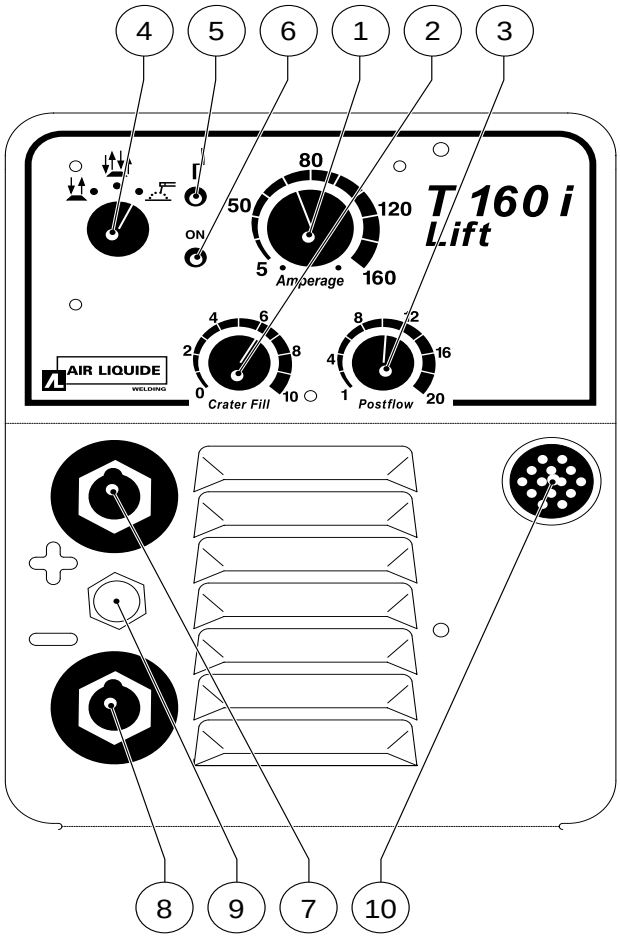
2.5 VOLT-AMPERE CURVES

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



3. OPERATIONS

3.1 FRONT PANEL CONTROLS



1. AMPERAGE ADJUSTMENT CONTROL
This control is used to adjust welding amperage.

2. CRATER FILL TIME CONTROL
This control is used to adjust the time in which current is reduced to zero.

3. POSTFLOW TIME CONTROL
This control is used to adjust the time that shielding gas flows after the welding arc is extinguished.

4. STICK / LIFT-TIG SELECTOR SWITCH
This switch is used to select the Stick or Lift-Start TIG welding process.

2T: When the selector on the unit and the foot control is in this position, the unit is set for TIG welding with crater fill and postflow control. When the foot control is depressed, the equipment is ready for welding. Touch and lift the welding piece with the tungsten to commence welding. When the foot control is released, the weld current is slowly reduced to zero based on the time that is set on the crater fill control. The shielding gas will continue to flow after the foot control is released until the time expires on the postflow time control. During crater fill time, the welding arc can be re-started by depressing the foot control.

4T: When the selector on the unit and the foot control is in this position, the unit is set for 2 step foot control operations. Amperage adjusment is set on the unit and is not controlled by the foot control. When the foot control is depressed, the welding equipment is ready for welding. Touch the welding piece to automatically activate gas flow. Release the foot control and then lift the torch from the welding piece to activate weld current. When the foot control is depressed the second time, the crater fill control is activated. When the foot control is released, the weld current is slowly reduced to zero based on the time that is set on the crater fill control. The shielding gas will continue to flow after the foot control is released until the time expires on the postflow time control. During crater fill time, the welding arc can be re-started by depressing the foot control.

Stick Electrode Welding: When the selector is in this position, the unit is set to weld stick electrodes.

5. TEMPERATURE LIGHT
When illuminated, this light indicates that the unit has overheated. If overheating occurs, weld output to the terminals ceases and the fan motor continues to run until the unit has cooled down.

6. INDICATOR LIGHT
The unit is ready to weld when this light is on.

7. POSITIVE WELD OUTPUT RECEPTACLE

8. NEGATIVE WELD OUTPUT RECEPTACLE

9. OUTLET GAS CONNECTION

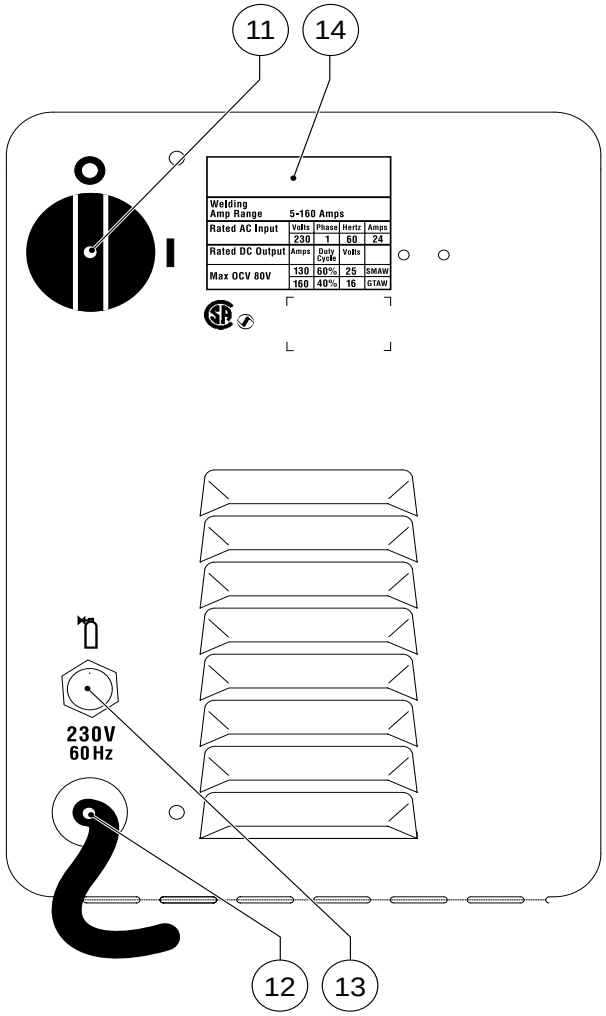
10. REMOTE 14-PIN RECEPTACLE

SOCKET (*)	SOCKET INFORMATION
A	TRIGGER
B	TRIGGER
C	HIGH-END POTENTIOMETER
D	LOW-END POTENTIOMETER
E	OUTPUT REFERENCE
F	CONNECTED WITH D

(*) The remaining sockets are not used

3.2 BACK PANEL CONTROLS

11. POWER-ON SWITCH
12. INPUT POWER CORD
13. INLET GAS CONNECTION
14. DATA PLATE



4. INSTALLATION

4.1 CONNECTING THE EQUIPMENT TO THE MAIN SUPPLY

The equipment works within an input range of + / - 10% and is shipped with a 6P-50 plug.

Check to ensure that the power outlet is equipped with a fuse that is capable of carrying the amps indicated on the data plate of this unit.

4.2 SELECTING A LOCATION

Special installation may be required where gasoline or volatile liquids are present (See NEC Article 511 or CEC Section 20). Do not move or operate this equipment where it could tip over. When selecting a location for this equipment, ensure that the following guidelines are followed.

1. Use data plate to determine input power requirements.
2. The operator must have unobstructed access to all controls and equipment connections.
3. Do not position equipment in small, closed places. Ventilation of the power source is extremely important. Make sure that the louvers on the side panels are not obstructed and that there is no risk of obstruction during operation.
4. Avoid areas where dust or other objects could be sucked into the system.
5. Equipment must not obstruct corridors or work activities of other personnel.
6. Position the power source securely to avoid falling or overturning.
7. Understand the risk of falling equipment situated in overhead positions.

4.3 CONNECTION AND PREPARATION OF EQUIPMENT FOR STICK ELECTRODE WELDING.

Connect all welding accessories carefully to prevent power loss. Carefully follow safety precautions described in Section 1.

TURN OFF WELDER BEFORE MAKING CONNECTIONS.

1. Connect the ground cable to the negative receptacle and locate the ground clamp near the welding zone.

2. Connect the electrode cable to the positive receptacle and fit the selected welding electrode into the electrode holder.

3. Use the above connection for welding electrodes that use DCEP (Reverse Polarity) welding current. Reverse the connection for welding electrodes that use DCEN (Straight Polarity) welding current.

4.4 CONNECTION AND PREPARATION OF EQUIPMENT FOR GTAW (TIG)

Connect all welding accessories carefully to avoid power loss or leakage of dangerous gases. Carefully follow the safety standards described in Section 1.

TURN OFF WELDER BEFORE MAKING CONNECTIONS.

1. Install the regulator on the cylinder outlet connection located on the top of the compressed gas cylinder.

2. Install a gas hose on the regulator connection.

3. Connect the gas hose to the outlet gas connection located on the rear of the machine.

4. Connect the foot control to the remote 14 pin receptacle located on the front panel of the unit.

5. Connect the TIG torch power cable to the negative receptacle on the unit.

6. Connect the ground cable to the positive receptacle on the unit.

7. Connect the TIG torch gas hose to the gas inlet located on the front panel of the unit.

8. Install the correct tungsten and nozzle for the welding application on the TIG torch.

9. Turn on the power source using the On – Off switch.

10. Select the desired welding operation on the welding mode selector switch.

11. Adjust the welding current by turning the Amperage Adjustment control to the desired setting.

5. MAINTENANCE AND TROUBLESHOOTING

Disconnect power before maintenance.
Service more often during severe conditions.

5.1 ROUTINE MAINTENANCE

Disconnect the power source from power supply before performing any maintenance work.

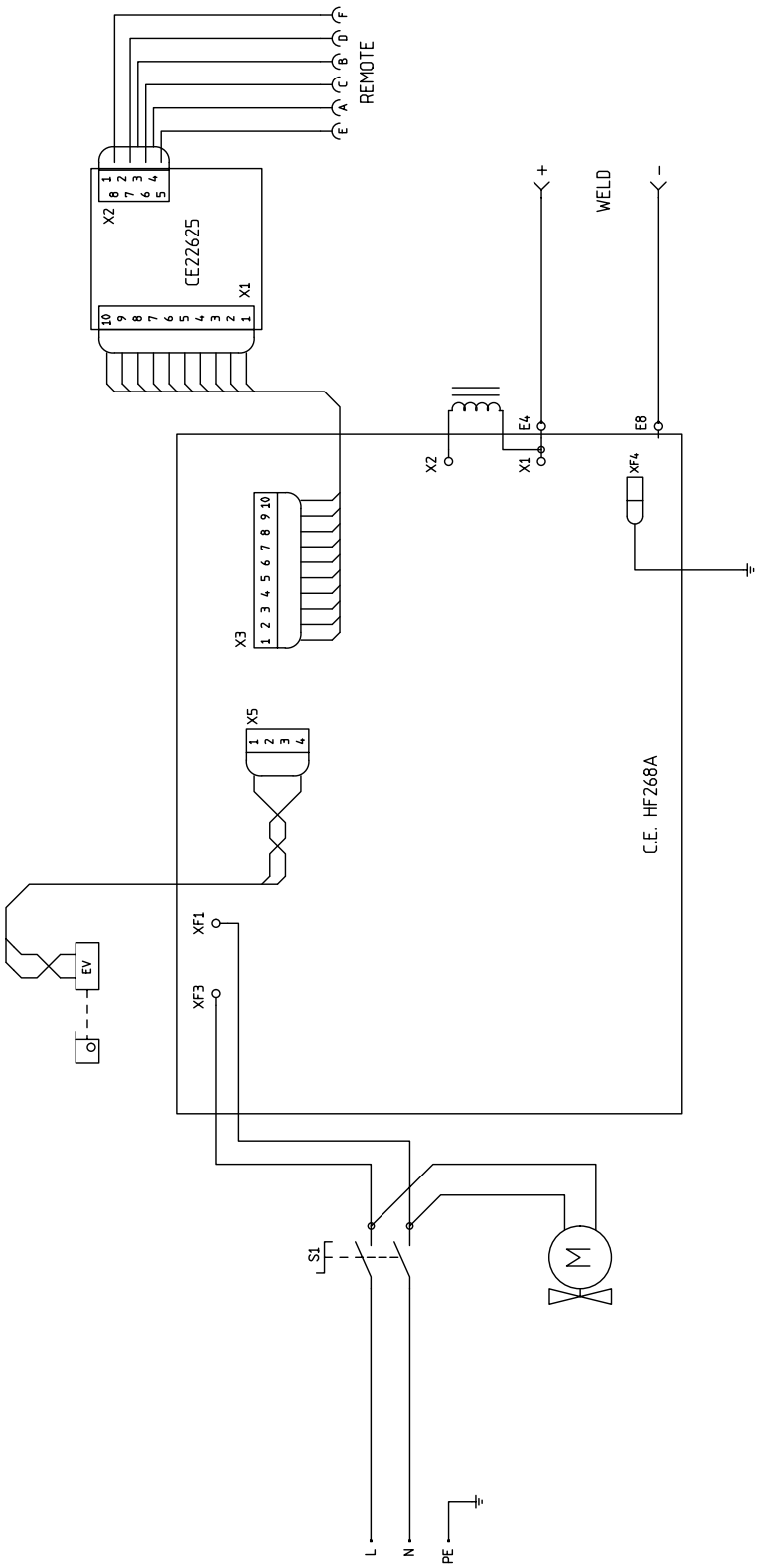
Periodically, remove the side panels and blow out the machine with dry compressed air to remove dirt and dust.

Increase the frequency of cleaning when operating in dirty or dusty conditions.

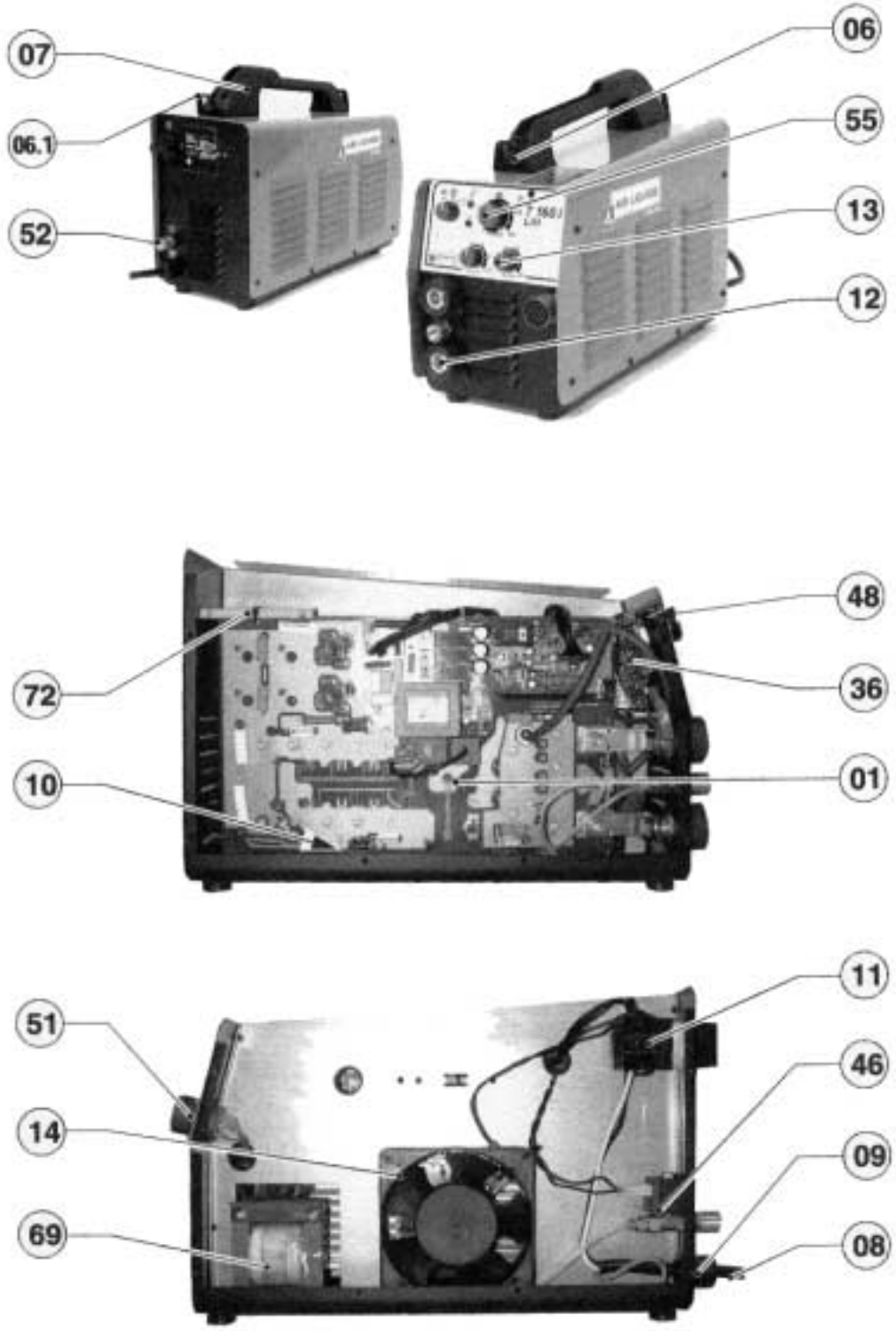
5.2 TROUBLESHOOTING

PROBLEM	SOLUTION
No weld output; unit completely inoperative.	Place line-disconnect switch for circuit powering welder in **"ON"** position.
	Check and replace line fuse(s), if necessary, or reset circuit breaker.
	Be sure input power cord is plugged in and that receptacle is receiving input power.
No weld output; overheating light off.	Check and secure loose weld cable(s) into receptacle(s) on welding power source.
	Check and correct poor connection of work clamp to workpiece.
No weld output; overheating light on.	Unit overheated, causing thermal shutdown. Allow unit to cool with fan on.
	Reduce duty cycle or amperage to prevent further overload conditions.
	Check and correct blocked/poor airflow to and around unit or move unit clear of blockages.
	Check and clean dirty power module.
No weld output; overheating light flashing.	Turn power switch off and back on again. If light continues to flash, call or take machine to factory-authorized service agent (this condition may indicate a fault in the power section).
Erratic or improper welding arc or output.	Use proper size and type of welding cable (see your distributor).
	Clean and tighten all weld connections.
	Check and reverse electrode polarity; check and correct poor connections to workpiece.
Fan not operating.	Unit is cool and not warmed up enough to require fan cooling.
	Check for and remove anything blocking fan movement.
	Have factory-authorized service agent check fan motor and circuitry.
Stick welding problems: hard starts; poor welding characteristics; unusual spatter problems.	Use proper type and size of electrode.
	Check and reverse electrode polarity; check and correct poor connections to workpiece.
TIG welding problems: wandering arc; hard starts; poor welding characteristics; spatter problems.	Use proper type and size of tungsten electrode.
	Use properly prepared tungsten.
	Check and reverse electrode polarity; check and correct poor connections to workpiece.
TIG welding problems: Tungsten electrode oxidizing and not remaining bright after conclusion of weld.	Shield welding zone from drafts.
	Check shielding gas supply; ensure that it is the correct type (argon) and that the cylinder is not empty.
	Check and tighten all gas fittings.
	Check and change gas polarity; move changeover switch to TIG position.

6. T 160i Lift ELECTRICAL DIAGRAM



7. T 160i Lift SPARE PARTS LIST



T 160i Lift

T 160i Lift

R.	CODE	DESCRIPTION
01	ALW-SP800040738	ELECTRONIC BOARD HF 268
06	ALW-SP800041182	FRONT LUG FOR SHOULDER STRAP
06.1	ALW-SP800041181	BACK LUG FOR SHOULDER STRAP
07	ALW-SP800017250	HANDLE
08	ALW-SP800044630	INPUT CORD
09	ALW-SP038088140	STRAIN RELIEF
10	ALW-SP800005503	SECURING BLOCK
11	ALW-SP035028018	POWER SWITCH
12	ALW-SP038055010	OUTPUT WELDING RECEPTACLE
13	ALW-SP090015052	KNOB
14	ALW-SP073010042	ELECTRIC FAN
—	ALW-SP800041103	SHOULDER STRAP
36	ALW-SP800021792	ELECTRONIC BOARD TV 276B
46	ALW-SP070010201	SOLENOID VALVE
48	ALW-SP800050934	SHAFT FOR TRIMMER
51	ALW-SP800044645	REMOTE RECEPTACLE
52	ALW-SP800018038	GAS OUTLET
55	ALW-SP090015025	KNOB
69	ALW-SP800018462	STABILIZER
72	ALW-SP023065206	CARD GUIDE