TOCCOtron® AC
Bench-Top Power Supply

OWNER’S MANUAL
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**WARRANTY**
SECTION 1 – SAFETY PRECAUTIONS – READ BEFORE USING

1-1. Symbol Usage

⚠️ Means Warning! Watch Out! There are possible hazards with this procedure! The possible hazards are shown in the adjoining symbols.

▲ Marks a special safety message.

🏁 Means “Note”; not safety related.

This group of symbols means Warning! Watch Out! possible ELECTRIC SHOCK, MOVING PARTS, and HOT PARTS hazards. Consult symbols and related instructions below for necessary actions to avoid the hazards.

1-2. Induction Heating Hazards

▲ The symbols shown below are used throughout this manual to call attention to and identify possible hazards. When you see the symbol, watch out, and follow the related instructions to avoid the hazard. The safety information given below is only a summary of the more complete safety information found in the Safety Standards listed in Section 1-4. Read and follow all Safety Standards.

▲ Only qualified persons should install, operate, maintain, and repair this unit.

▲ During operation, keep everybody, especially children, away.

**ELECTRIC SHOCK can kill.**

Touching live electrical parts can cause fatal shocks or severe burns. The power circuit and output bus bars or connections are electrically live whenever the output is on. The input power circuit and machine internal circuits are also live when power is on. Incorrectly installed or improperly grounded equipment is a hazard.

- Do not touch live electrical parts.
- Enclose any connecting bus bars and coolant fittings to prevent unintentional contact.
- Wear dry, hole-free insulating gloves and body protection.
- Insulate yourself from work and ground using dry insulating mats or covers big enough to prevent any physical contact with the work or ground.
- Disconnect input power before installing or servicing this equipment. Lockout/tagout input power according to OSHA 29 CFR 1910.147 (see Safety Standards).
- Use only nonconductive coolant hoses with a minimum length of 18 inches (457 mm) to provide isolation.
- Properly install and ground this equipment according to its Owner’s Manual and national, state, and local codes.
- Always verify the supply ground – check and be sure that input power ground wire is properly connected to ground terminal in disconnect box or that cord plug is connected to a properly grounded receptacle outlet.
- When making input connections, attach proper grounding conductor first – double-check connections.
- Frequently inspect input power cord for damage or bare wiring – replace cord immediately if damaged – bare wiring can kill.
- Turn off all equipment when not in use.
- Do not use worn, damaged, undersized, or poorly spliced cables.
- Do not drape cables over your body.
- Do not touch power circuit if you are in contact with the work, ground, or another power circuit from a different machine.
- Use only well-maintained equipment. Repair or replace damaged parts at once. Maintain unit according to manual.
- Wear a safety harness if working above floor level.
- Keep all panels and covers securely in place.

**SIGNIFICANT DC VOLTAGE exists after removal of input power on inverters.**

- Turn Off inverter, disconnect input power, and discharge input capacitors according to instructions in Maintenance Section before touching any internal parts.

**INDUCTION HEATING can cause burns.**

- Do not handle induction head/coil during operation.
- Do not touch hot parts bare-handed.
- Allow cooling period before handling parts or equipment.
- Keep metal jewelry and other metal personal items away from head/coil during operation.

**FIRE OR EXPLOSION hazard.**

- Do not overheat parts and adhesive.
- Watch for fire; keep extinguisher nearby.
- Keep flammables away from work area.
- Do not locate unit on, over, or near combustible surfaces.
- Do not install unit near flammables.
- Do not operate unit in explosive atmosphere.

**FUMES AND GASES can be hazardous.**

Induction Heating of certain materials, adhesives, and fluxes can produce fumes and gases. Breathing these fumes and gases can be hazardous to your health.

- Keep your head out of the fumes. Do not breathe the fumes.
- If inside, ventilate the area and/or use exhaust to remove fumes and gases.
- If ventilation is poor, use an approved air-supplied respirator.
- Read the Material Safety Data Sheets (MSDSs) and the manufacturer's instruction for adhesives, fluxes, metals, consumables, coatings, cleaners, and degreasers.
- Work in a confined space only if it is well ventilated, or while wearing an air-supplied respirator. Always have a trained watchperson nearby. Fumes and gases from heating can displace air and lower the oxygen level causing injury or death. Be sure the breathing air is safe.
- Do not heat in locations near degreasing, cleaning, or spraying operations. The heat can react with vapors to form highly toxic and irritating gases.
- Do not overheat coated metals, such as galvanized, lead, or cadmium plated steel, unless the coating is removed from the heated area, the area is well ventilated, and if necessary, while wearing an air-supplied respirator. The coatings and any metals containing these elements can give off toxic fumes if overheated. See coating MSDS for temperature information.
1-3. Additional Symbols for Installation, Operation, and Maintenance

**FALLING UNIT can cause injury.**
- Use handle and have person of adequate physical strength lift unit.
- Move unit with hand cart or similar device.
- For units without a handle, use equipment of adequate capacity to lift unit.
- When using lift forks to move unit, be sure forks are long enough to extend beyond opposite side of unit.

**FLYING METAL OR ADHESIVE can injure eyes.**
- Wear approved safety glasses with side shields or wear face shield.

**MOVING PARTS can cause injury.**
- Keep away from moving parts such as fans.
- Keep all doors, panels, covers, and guards closed and securely in place.

**MAGNETIC FIELDS can affect pacemakers.**
- Pacemaker wearers keep away.
- Wearers should consult their doctor before going near induction heating operations.

**OVERUSE can cause OVERHEATING**
- Allow cooling period.
- Reduce output or reduce duty cycle before starting to heat again.
- Follow rated duty cycle.

**STATIC (ESD) can damage PC boards.**
- Put on grounded wrist strap BEFORE handling boards or parts.
- Use proper static-proof bags and boxes to store, move, or ship PC boards.

**H.F. RADIATION can cause interference.**
- High-frequency (H.F.) can interfere with radio navigation, safety services, computers, and communications equipment.
- Have only qualified person familiar with electronic equipment perform this installation.
- The user is responsible for having a qualified electrician promptly correct any interference problem resulting from the installation.
- If notified by the FCC about interference, stop using the equipment at once.
- Have the installation regularly checked and maintained.
- Keep high-frequency source doors and panels tightly shut.

1-4. Principal Safety Standards


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

*Canadian Electrical Code Part 1,* CSA Standard C22.1, from Canadian Standards Association, Standards Sales, 178 Rexdale Boulevard, Rexdale, Ontario, Canada M9W 1R3.

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

1-5. EMF Information

Considerations About Induction Heating And The Effects Of Low Frequency Electric And Magnetic Fields

The following is a quotation from the General Conclusions Section of the U.S. Congress, Office of Technology Assessment, *Biological Effects of Power Frequency Electric & Magnetic Fields — Background Paper, OTA-BP-E-53* (Washington, DC: U.S. Government Printing Office, May 1989): “...there is now a very large volume of scientific findings based on experiments at the cellular level and from studies with animals and people which clearly establish that low frequency magnetic fields can interact with, and produce changes in, biological systems. While most of this work is of very high quality, the results are complex. Current scientific understanding does not yet allow us to interpret the evidence in a single coherent framework. Even more frustrating, it does not yet allow us to draw definite conclusions about questions of possible risk or to offer clear science-based advice on strategies to minimize or avoid potential risks.”

To reduce magnetic fields in the workplace, use the following procedures:
1. Arrange output cable to one side and away from the operator.
2. Do not coil or drape output cable around the body.
3. Keep power source and cable as far away from the operator as practical.

**About Pacemakers:**

The above procedures are also recommended for pacemaker wearers. Consult your doctor for complete information.
SECTION 1 – MESURES DE SECURITE POUR LE CHAUFFAGE PAR INDUCTION

AVERTISSEMENT

LE CHAUFFAGE PAR INDUCTION peut être dangereux.

PRENDRE LES MESURES NECESSAIRES POUR EVITER LES RISQUES DE BLESSURES GRAVES, VOIRE MORTELLES. TENIR LES ENFANTS A DISTANCE. LES PORTEURS D’UN STIMULATEUR CARDIAQUE DOIVENT PREALABLEMENT CONSULTER LEUR MEDECIN.

Pendant les opérations de chauffage, comme dans la plupart des activités, l’opérateur s’expose à certains dangers. Le chauffage n’est pas dangereux à condition de prendre certaines mesures. Les consignes de sécurité indiquées ci-après ne sont qu’un résumé des informations plus détaillées se trouvant dans les normes de sécurité énumérées à la page suivante. Lire et respecter toutes les normes de sécurité.

LES OPERATIONS D’INSTALLATION, DE FONCTIONNEMENT, DE MAINTENANCE ET DE REPARATION NE DOIVENT ETRE CONFIÉES QU’A DU PERSONNEL QUALIFIÉ.

Danger de mort PAR ELECTROCUTION.
Le contact de composants électriques peut provoquer des accidents mortels ou des brûlures graves. Le circuit de puissance et les connexions de sortie sont sous tension lorsqu’on active la sortie. Le circuit d’alimentation et les circuits internes de la machine sont également sous tension lorsque l’alimentation est sur marche. Des équipements installés ou reliés à la borne de terre de manière incorrecte sont dangereux.

1. Ne pas toucher des composants électriques sous tension.
2. Envelopper les connexions et raccords de refroidissement pour éviter tout contact accidentel.
4. Isolez-vous de la pièce et du sol avec des tapis ou des couvertures d’isolation suffisamment grands pour prévenir tout contact physique avec la pièce ou la terre.
6. Utiliser seulement des tuyaux non conducteurs avec une longueur minimale de 460 mm pour assurer l’isolement.
7. Installer et mettre cet équipement correctement à la terre conformément au manuel utilisateur et aux codes nationaux, gouvernementaux et locaux.
8. Vérifier souvent la terre de l’alimentation – contrôler et s’assurer que le conducteur de terre du câble d’alimentation est correctement relié à la borne de terre dans le boîtier de déconnexion ou que le connecteur est branché à une sortie de boîtier correctement mise à la terre.
9. En réalisant des connexions d’entrée brancher d’abord le conducteur de terre approprié – contrôler deux fois les connexions.
11. Arrêter tous les équipements lorsqu’ils ne sont pas utilisés.
12. Ne pas utiliser des câbles usés, endommagés, sous dimensionnés ou mal épissés.
13. Ne pas porter les câbles autour de votre corps.
14. Ne pas toucher le circuit électrique si vous êtes en contact avec la pièce, la terre ou le circuit électrique d’une autre machine.
17. Maintenir solidement en place tous les panneaux et couvercles.

LE CHAUFFAGE PAR INDUCTION peut provoquer des blessures ou des brûlures au contact de PIECES CHAIDES OU DE L’EQUIPEMENT.

1. Ne pas toucher ou manipuler la tête/enroulement à induction pendant le fonctionnement.
2. Tenir les bijoux et autres objets personnels en métal éloignés de la tête/des enroulements pendant le fonctionnement.
3. Laisser refroidir les composants ou équipements avant de les manipuler.

LE CHAUFFAGE PAR INDUCTION peut provoquer un incendie.

1. Ne pas surchauffer les composants ni les adhésifs.
2. Attention aux risques d’incendie: tenir un extincteur à proximité.
3. Stocker des produits inflammables hors de la zone de travail.

La mise en place de l’appareil sur, au-dessus ou à proximité de surfaces inflammables peut être source d’INCENDIES OU D’EXPLOSION.

1. Ne pas placer l’appareil sur, au-dessus ou à proximité de surfaces inflammables.
2. Ne pas installer l’appareil à proximité de produits inflammables.
3. Ne pas faire fonctionner l’appareil en atmosphère explosive.
1-1. Dangers supplémentaires de mise en route, de fonctionnement et d’entretien

<table>
<thead>
<tr>
<th>LA CHUTE DE MATÉRIEL peut provoquer des blessures personnelles graves et endommager les équipements.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Utiliser la poignée et demander à une personne ayant la force physique nécessaire pour soulever l’appareil.</td>
</tr>
<tr>
<td>2. Déplacer l’appareil à l’aide d’un chariot ou d’un engin similaire.</td>
</tr>
<tr>
<td>3. Pour les appareils sans poignée utiliser un équipement d’une capacité appropriée pour soulever l’appareil.</td>
</tr>
<tr>
<td>4. En utilisant des fourches de levage pour déplacer l’unité, s’assurer que les fourches sont suffisamment longues pour dépasser du côté opposé de l’appareil.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>UNE UTILISATION INTENSIVE peut provoquer un SURCHAUFFEMENT DU MATÉRIEL.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Prévoir une période de refroidissement.</td>
</tr>
<tr>
<td>2. Réduire le courant de sortie ou le facteur de marche avant de recommencer le chauffage.</td>
</tr>
<tr>
<td>3. Respecter le facte de marche nominal.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>LA PROJECTION DE PIÈCES DE MÉTAL ou DE COLLE peut provoquer des blessures aux yeux.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Porter des lunettes de protection avec des protections latérales.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>L’ÉLECTRICITÉ STATIQUE peut endommager les composants des tableaux électriques.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Établir la connexion avec la barrette de terre avant de manipuler des cartes ou des pièces.</td>
</tr>
<tr>
<td>2. Utiliser des pochettes et des boîtes antistatiques pour stocker, déplacer ou expédier des cartes PC.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>DES ORGANES MOBILES peuvent provoquer des blessures.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. S’abstenir de toucher des organes mobiles tels que des ventilateurs.</td>
</tr>
<tr>
<td>2. Maintenir fermés et fixement en place les portes, pannesaux, recouvrements et dispositifs de protection.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>LE RAYONNEMENT HAUTE FRÉQUENCE peut provoquer des interférences avec les équipements de radio-navigation et de communication, les services de sécurité et les ordinateurs.</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Demander seulement à des personnes qualifiées familiarisées avec des équipements électroniques de faire fonctionner l’installation.</td>
</tr>
<tr>
<td>• L’utilisateur est tenu de faire corriger rapidement par un électricien qualifié les interférences résultant de l’installation.</td>
</tr>
<tr>
<td>• Si le FCC signale des interférences, arrêter immédiatement l’appareil.</td>
</tr>
<tr>
<td>• Effectuer régulièrement le contrôle et l’entretien de l’installation.</td>
</tr>
<tr>
<td>• Maintenir soigneusement fermés les portes et les pannesaux des sources de haute fréquence.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>DES CHAMPS MAGNETIQUES CRÉES PAR DES COURANTS ÉLEVÉS peuvent affecter le fonctionnement du stimulateur cardiaque.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Porteurs de stimulateur cardiaque, restez à distance.</td>
</tr>
<tr>
<td>2. Les porteurs d’un stimulateur cardiaque doivent d’abord consulter leur médecin avant de s’approcher des opérations de chauffage à induction.</td>
</tr>
</tbody>
</table>
1-2. Informations concernant les champs électro-magnétiques (Information EMF)

Considérations relatives au chauffage à induction et aux effets des champs électriques et magnétiques basse fréquence.


"... on dispose maintenant d'importantes découvertes scientifiques reposant sur des expériences effectuées dans le domaine cellulaire et des études réalisées sur des animaux et des personnes qui démontrent clairement que des champs magnétiques basse fréquence peuvent avoir une interaction et produire des changements dans les systèmes biologiques. Alors que la plus grande partie de cet ouvrage est d'une très grande qualité, les résultats sont complexes. La compréhension scientifique courante ne nous permet pas encore d'interpréter la preuve fournie dans un seul ouvrage cohérent. Il est encore plus frustrant de ne pas pouvoir tirer des conclusions définitives en ce qui concerne les problèmes de risque possible ou de proposer des recommandations scientifiques claires pour des stratégies à suivre en vue de minimiser ou de prévenir des risques potentiels."

Pour réduire les champs magnétiques sur le poste de travail, appliquer les procédures suivantes :

4. Disposer le câble de sortie d’un côté à distance de l’opérateur

5. Ne pas enrouler ou draper le câble électrique autour du corps.

6. Placer la source de courant et le câble le plus loin possible de l’opérateur

**En ce qui concerne les stimulateurs cardiaques**

Les procédures ci-dessus concernent également les porteurs de stimulateur cardiaque. Consulter votre médecin pour un complément d’information.

**PRINCIPALES NORMES DE SÉCURITÉ**


*Code électrique national*, NFPA Standard 70, from National Fire Protection Association, Battery March Park, Quincy, MA 02269.

*Code électrique du Canada, partie 1*, CSA Standard C22.1, from Canadian Standards Association, Standards Sales, 178 Rexdale Boulevard, Rexdale, Ontario, Canada M9W 1R3.

*Safe Practices For Occupation And Educational Eye And Face Protection*, ANSI Standard Z87.1, from American National Standards Institute, 1430 Broadway, New York, NY 10018.
SECTION 2 – SPECIFICATIONS

<table>
<thead>
<tr>
<th>Type of Input Power</th>
<th>Output Frequency</th>
<th>Rated Output</th>
<th>Required Reflective Inductance</th>
<th>Input Amperes At Rated Output</th>
<th>KVA/KW Used At Rated Output</th>
<th>Overall Dimensions</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>Three-Phase, 230 Or 460 Volts AC, 50/60 Hz</td>
<td>10 To 50 kHz</td>
<td>10 kW At 30% Duty Cycle; Max 200 A (RMS), 350 V (RMS)</td>
<td>5 to 30 µH</td>
<td>44 A At 230 V *0.6 A; 22 A At 460 V *0.3 A</td>
<td>17 kVA/12.6 kW *0.15 kVA/0.146 kW</td>
<td>Length: 19-1/2 in (495 mm) Width: 11-1/2 in (292 mm) Height: 11-3/4 in (298 mm)</td>
<td>Net: 65 lb (29.5 kg) Ship: 70 lb (31.8 kg)</td>
</tr>
</tbody>
</table>

*While idling

SECTION 3 – INSTALLATION

⚠️ WARNING

HIGH-FREQUENCY RADIATION can interfere with radio navigation, safety services, computers, and communications equipment.

- Have only qualified person familiar with electronic equipment perform this installation.
- The user is responsible for having a qualified electrician promptly correct any interference problem resulting from the installation.
- If notified by the FCC about interference, stop using the equipment at once.
- Have the installation regularly checked and maintained.
- Keep high-frequency source doors and panels tightly shut.

3-1. Connecting Head/Coil To Power Source

1. Output Receptacle RC15
2. Plug From Head/Coil
3. Threaded Collar

Receptacle RC15 is a 4-socket receptacle.

To connect to receptacle, align keyway, insert plug, and tighten threaded collar.

Socket Information:

A, C Approx. 350 volts ac, 10 to 50 kHz RMS high-frequency output
B, D Approx. 350 volts ac, 10 to 50 kHz RMS high-frequency output

802 663
3-2. Remote 14 Receptacle RC14 Information And Connection

1 Plug
2 Threaded Collar
3 Keyway
4 Remote 14 Receptacle RC14

(See Section 3-3)

To connect to receptacle, align keyway, insert plug, and tighten threaded collar.

3-3. Remote 14 Socket Information

<table>
<thead>
<tr>
<th>Socket Information</th>
<th>Socket</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Contactor</strong></td>
<td></td>
</tr>
<tr>
<td>A</td>
<td>+24 volts dc.</td>
</tr>
<tr>
<td>B</td>
<td>Contact closure to A completes 24 volts dc contactor control circuit.</td>
</tr>
<tr>
<td><strong>Remote Output Control</strong></td>
<td></td>
</tr>
<tr>
<td>C</td>
<td>Command reference; +10 volts dc.</td>
</tr>
<tr>
<td>D</td>
<td>Control circuit common.</td>
</tr>
<tr>
<td>E</td>
<td>Input command signal (potentiometer wiper or 0 to +10 volts dc).</td>
</tr>
<tr>
<td>G</td>
<td>Not used.</td>
</tr>
<tr>
<td><strong>Power Source Fault</strong></td>
<td></td>
</tr>
<tr>
<td>F,J</td>
<td>Absence of internal contact closure between F and J signals power source failure to remote control device.</td>
</tr>
<tr>
<td><strong>Remote Metering</strong></td>
<td></td>
</tr>
<tr>
<td>H</td>
<td>Coil loss compensation value.</td>
</tr>
<tr>
<td>I</td>
<td>Actual frequency output signal (1 volt/5 kHz).</td>
</tr>
<tr>
<td>L</td>
<td>Average power output signal (1 volt/1 kW).</td>
</tr>
<tr>
<td>M</td>
<td>Voltage output signal RMS (1 volt/50 volts).</td>
</tr>
<tr>
<td>N</td>
<td>Current output signal RMS (1 volt/50 amperes).</td>
</tr>
<tr>
<td>K</td>
<td>Chassis common.</td>
</tr>
</tbody>
</table>

OM-189 507 Page 7
3-4. Positioning Jumper Links

Turn Off unit Power switch, and disconnect input power.
Jumper links allow operation on different input voltages and are factory set for the highest input voltage.
Check input voltage available at site.
Remove wrapper to check jumper links.
1 Terminal Strip TE2
2 Input Voltage Jumper Link
3 Input Voltage Label
Four jumper links supplied. Look at jumper links and compare link position with label.
Move links to match input voltage. For example, use 230 volts position on label when 230 volts input power is available.
Reinstall wrapper or go on to Section 3-5.

Tools Needed:

Ref. 802 664

OM-189 507 Page 8
3-5. Connecting Input Power

Have only qualified persons make this installation.

Remove wrapper.

1. Line Disconnect Device Of Proper Rating

Obtain and install line disconnect device.

2. Input Conductors

3. Grounding Conductor

Select size and length using Section 3-6. Conductor rating must comply with national, state, and local electrical codes.

4. Disconnect Device Ground Terminal

Install and connect grounding conductor and input conductors in conduit or equivalent to deenergized line disconnect device.

Connect grounding conductor first, then line input conductors.

Be sure grounding conductor goes to an earth ground.

Reinstall wrapper.

5. Overcurrent Protection

Select type and size using Section 3-6. Install into deenergized line disconnect device (fused disconnect switch shown).

6. Unit Fuse Block

Internal replacement fuses:

- 230 V – KTKR30*
- 460 V – FWC25A10F

*Due to low duty cycle, fusing requirements can be derated for 230 V operation.

3-6. Electrical Service Guide

<table>
<thead>
<tr>
<th>Input Voltage</th>
<th>230</th>
<th>460</th>
</tr>
</thead>
<tbody>
<tr>
<td>Input Amperes At Rated Output</td>
<td>44</td>
<td>22</td>
</tr>
<tr>
<td>Max Recommended Standard Fuse Rating In Amperes ¹</td>
<td>60</td>
<td>30</td>
</tr>
<tr>
<td>Normal Operating ²</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Min Input Conductor Size In AWG/Kcmil</td>
<td>10</td>
<td>14</td>
</tr>
<tr>
<td>Max Recommended Input Conductor Length In Feet (Meters)</td>
<td>100 (31)</td>
<td>159 (49)</td>
</tr>
<tr>
<td>Min Grounding Conductor Size In AWG/Kcmil</td>
<td>10</td>
<td>14</td>
</tr>
</tbody>
</table>

Reference: 1999 National Electrical Code (NEC)

1 Consult factory for circuit breaker applications.
2 “Normal Operating” (general purpose – no intentional delay) fuses are UL class “K5” (up to and including 60 amp), and UL class “H” (65 amp and above).
SECTION 4 – OPERATION

4-1. Controls

1. Power Adjust Control
2. Remote Power Control Switch
3. Ground Fault Test Switch And Ground Fault LED
4. Duty Cycle Limit LED
5. Power Switch
6. Rating Label Location

4-2. Safety Equipment

1. Insulating Gloves
2. Safety Glasses With Side Shields

Wear dry insulating gloves and safety glasses with side shields.

4-3. Power Adjust Control

1. Power Adjust Control

Use control to select power between the minimum and maximum output of the power source. The numbers around the control are in kilowatts (kW).
4-4. Remote Power Control Switch

**REMOTE 14**

1 Remote Power Control Switch
Use switch to select way of controlling unit output.
For front panel control, place switch in Panel position.
For remote control, place switch in Remote 14 position. Connect controller or pendant control to Remote 14 receptacle (see Section 3-2).

**POWER CONTROL**

4-5. Power Switch

**POWER**

1 Power Switch
2 Pilot Light
Use switch to turn unit, fan motor, and pilot light On and Off.
Unit is ready to heat 10 seconds after Power switch is placed in On position.

4-6. Ground Fault Test Switch And Indicator Light

**PRESS TO TEST**

1 Ground Fault Test Switch
Use switch to test ground fault circuitry.
2 Ground Fault Indicator Light
Light comes on when circuitry detects a ground fault.

**GROUND FAULT**
4-7. Duty Cycle Limit LED

1 Duty Cycle Limit LED
Indicates unit has exceeded 30% duty cycle at 10 kW output.
To restore output, turn off unit power for a minimum of 1 minute before energizing unit again (see Section 4-5).

### 10 kW Power Source duty cycle limit curves

This chart shows a comparison of output power level vs output on time with respect to off time or time between cycles of the 10kW power source.

Example #1
Power source can be operated at 9kw for approximately 11 sec without tripping providing that the time between cycles is no less than 10 seconds.

Example #2
Power source can be operated at 9kw for approximately 16 sec without tripping providing that the time between cycles is no less than 30 seconds.

### 4-8. Sequence Of Induction Heating Process

Install & Connect Power Source
Install & Connect Induction Head/Coil
Install & Connect Coolant Supply, If Required
Put On Personal Safety Equipment
Turn On Coolant Supply, If Required
Set Controls
Position Work Near Head/Coil
Turn On Power Switch
Wait 10 Seconds
Unit Ready To Heat
### 5-1. Routine Maintenance

<table>
<thead>
<tr>
<th>3 Months</th>
<th>6 Months</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image1.png" alt="Image" /> Clean And Tighten Output Connections</td>
<td><img src="image2.png" alt="Image" /> Repair Or Replace Cracked Output Cables</td>
</tr>
<tr>
<td><img src="image3.png" alt="Image" /></td>
<td><img src="image4.png" alt="Image" /> Blow Out Or Vacuum Inside</td>
</tr>
</tbody>
</table>

- Disconnect power before maintaining.
- Maintain more often during severe conditions.

**3 Months**
- Replace Damaged Or Unreadable Labels

**6 Months**
- Clean And Tighten Output Connections
- Repair Or Replace Cracked Output Cables
- Blow Out Or Vacuum Inside
5-2. Overload Protection

⚠️ Turn Off and disconnect input power before checking fuses.

1. Unit Fuse Block And Fuses F1, F2, And F3 (See Section 3-6 For Rating)
   Fuses F1, F2, and F3 protect unit from overload. If fuse(s) opens, the power source shuts down.
   Replace fuses as needed. Use proper tool when removing fuses.
   Reinstall wrapper.

2. Fuse F4 (See Parts List For Rating)

5-3. Overheating Protection

Thermostat TP1 protects the unit from damage due to overheating. If main heat sink gets too hot, TP1 opens and output stops. The fan keeps running to cool the heat sink. Wait several minutes before trying to heat.

5-4. Automatic Shutdown Protection

This unit automatically shuts down upon sensing certain fault conditions, such as an out-of-range frequency condition, short circuit load condition, or an open circuit (no load) condition. The unit also has automatic voltage limiting and power ratio limiting, which limits the output power based on improper load impedance.
5-5. Ground Fault Protection

Ground fault protection circuitry automatically shuts down the power source output if a potentially hazardous condition exists at the heating device connected to the power source (e.g., insulation has broken down on a heating blanket causing the conductor to come into contact with the workpiece or a heating coil touches the workpiece causing a short in the output circuit).

The supplied ground lead must be connected between the workpiece and power source to provide proper ground fault protection from a short in the output circuit.

1. Power Source
2. Receptacle
3. Plug

To connect plug, align key with keyway, insert end into receptacle, and rotate plug until tight.

4. Handle
5. Magnet
6. Workpiece

Use handle to place magnet on the workpiece.
5-6. Safety Interlock Switch And Measuring Tuning Capacitor Voltage

1 Tuning Capacitor Cover
   The cover prevents exposure of the tuning capacitors on the unit.

2 Safety Interlock Switch
   (Behind Cover)
   The safety interlock switch prevents the contactor from energizing with the cover open.

   To measure capacitor voltage, turn off power source and disconnect input power.
   Open tuning capacitor cover.

3 Tuning Capacitor Assembly

4 Voltmeter

   Measure voltage across busbars every 30 seconds until voltage is near 0 (zero) volts.
   Proceed with job near tuning capacitor assembly. Close and secure cover when finished.

*Tools Needed:*
5/16 in

---

5-7. Measuring Input Capacitor Voltage

Turn Off power source and disconnect input power.

Remove wrapper.

1 Input Capacitor C1
2 Input Capacitor C2
3 Voltmeter

Check input capacitor(s).

Measure the dc voltage across the positive (+) and negative (–) terminals every 30 seconds until voltage is near 0 (zero) volts.

Proceed with job inside unit.

Reinstall wrapper when finished.

*Tools Needed:*
5/16 in
5-8. Troubleshooting

<table>
<thead>
<tr>
<th>Trouble</th>
<th>Remedy</th>
</tr>
</thead>
<tbody>
<tr>
<td>No heat output.</td>
<td>Replace building line fuses, reset circuit breaker, or replace unit fuse(s) F1, F2, and/or F3 (see Section 3-5). Secure head/coil plug in power source receptacle (see Section 3-1). Check and replace Power switch if necessary. Connect power source to proper input voltage or check for low line voltage (see Sections 3-4 and 3-5).</td>
</tr>
<tr>
<td>No heat output; fan motor continues to run.</td>
<td>Tuning capacitor cover safety interlock switch open. Close tuning capacitor cover (see Section 5-6). Thermostat TP1 open (overheating). Allow fan to run; the thermostat will close when the unit has cooled (see Section 5-3).</td>
</tr>
<tr>
<td>Low heat output.</td>
<td>Check tuning of induction heating output system (see Section 5-9).</td>
</tr>
<tr>
<td>No +24 volts dc output at 14-socket receptacle.</td>
<td>Check fuse F4, and replace if necessary (see Section 5-2).</td>
</tr>
</tbody>
</table>

5-9. Tuning Chart

**CAUTION**

**ENERGIZING CONTACTOR WITHOUT ALL 3 TUNING CAPACITORS IN OUTPUT CIRCUIT may damage power source.**

- Consult factory before operating power source without all 3 tuning capacitors in output circuit.

<table>
<thead>
<tr>
<th>Voltage</th>
<th>Current (Amperage)</th>
<th>Frequency (KHz)</th>
<th>Corrective Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>High</td>
<td>Low</td>
<td>Low</td>
<td>Lower inductance or decrease matching transformer turns ratio</td>
</tr>
<tr>
<td>High</td>
<td>Low</td>
<td>High</td>
<td>Add capacitance</td>
</tr>
<tr>
<td>High</td>
<td>Low</td>
<td>Mid-Range</td>
<td>Decrease matching transformer turns ratio and add capacitance</td>
</tr>
<tr>
<td>Low</td>
<td>High</td>
<td>Low</td>
<td>Lower capacitance</td>
</tr>
<tr>
<td>Low</td>
<td>High</td>
<td>High</td>
<td>Increase matching transformer turns ratio, or lower capacitance and increase inductance</td>
</tr>
<tr>
<td>Low</td>
<td>High</td>
<td>Mid-Range</td>
<td>Increase matching transformer turns ratio and lower capacitance</td>
</tr>
</tbody>
</table>

*High voltage > 300 V rms; Low voltage < 200 V rms; Operating current range: 0 to 200 A rms*
Figure 6-1. Circuit Diagram For Induction Heating Power Source
Figure 7-1. Complete Assembly

Hardware is common and not available unless listed.
## Figure 7-1. Complete Assembly

<table>
<thead>
<tr>
<th>Item No.</th>
<th>Dia. Mkgs.</th>
<th>Part No.</th>
<th>Description</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>141 690</td>
<td>GROMMET, scr No. 8/10 panel hole .281sq .197 high</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>199 455</td>
<td>PC1</td>
<td>CIRCUIT CARD, control</td>
<td>1</td>
</tr>
<tr>
<td>3</td>
<td>152 249</td>
<td>PLG1</td>
<td>CONNECTOR &amp; SOCKETS</td>
<td>1</td>
</tr>
<tr>
<td>4</td>
<td>158 720</td>
<td>PLG2</td>
<td>CONNECTOR &amp; SOCKETS</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>148 439</td>
<td>PLG3-5</td>
<td>CONNECTOR &amp; SOCKETS</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>164 899</td>
<td>PLG6</td>
<td>CONNECTOR &amp; SOCKETS</td>
<td>1</td>
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<tr>
<td>5</td>
<td>147 507</td>
<td>1</td>
<td>INSULATION, PC card</td>
<td>1</td>
</tr>
<tr>
<td>6</td>
<td>186 782</td>
<td>2</td>
<td>BLOCK, term 20A 9P</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>186 783</td>
<td>3</td>
<td>LINK, jumper slotted 20A</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>145 453</td>
<td>4</td>
<td>BRACKET, mtg PC board</td>
<td>1</td>
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<tr>
<td></td>
<td>099 037</td>
<td>5</td>
<td>EDGE TRIM, style 62-1/18 black w/clips (order by ft)</td>
<td>1 ft</td>
</tr>
<tr>
<td>7</td>
<td>136 190</td>
<td>6</td>
<td>NUT, 10-32 push on</td>
<td>8</td>
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<tr>
<td>8</td>
<td>151 281</td>
<td>7</td>
<td>CAPACITOR, elctll 1600uf 400VDC</td>
<td>2</td>
</tr>
<tr>
<td>9</td>
<td>155 517</td>
<td>8</td>
<td>SCREW, set 10-32 x .750</td>
<td>4</td>
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<tr>
<td></td>
<td>148 297</td>
<td>9</td>
<td>CLAMP, capacitor</td>
<td>2</td>
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<tr>
<td></td>
<td>171 007</td>
<td>10</td>
<td>KNOB, pointer 1.670dia x .250 ID</td>
<td>1</td>
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<td></td>
<td>106 462</td>
<td>11</td>
<td>RELAY, encl 24VDC DPDT</td>
<td>1</td>
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<tr>
<td></td>
<td>073 562</td>
<td>12</td>
<td>POTENTIOMETER, C stdt sft 1/2 10K ohm</td>
<td>1</td>
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<td></td>
<td>188 556</td>
<td>13</td>
<td>CIRCUIT CARD, duty cycle limit</td>
<td>1</td>
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<tr>
<td>14</td>
<td>194 419</td>
<td>14</td>
<td>FUSE, crtg 25A 600V semiconductor (230VAC operation)</td>
<td>3</td>
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<tr>
<td>15</td>
<td>193 027</td>
<td>15</td>
<td>FUSE, crtg 16A 600V semiconductor (460VAC operation)</td>
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<td>186 778</td>
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<td>BLOCK, fuse 600V 30A</td>
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<td>CONNECTOR, circ 4skt rcpt</td>
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<td></td>
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<td>CONNECTOR w/ SOCKETS</td>
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<td>CASE SECTION, front/bottom/rear</td>
<td>1</td>
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<tr>
<td></td>
<td>126 026</td>
<td>20</td>
<td>LABEL, warning electric shock can kill</td>
<td>3</td>
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<tr>
<td>21</td>
<td>166 578</td>
<td>21</td>
<td>TRANSFORMER, current</td>
<td>1</td>
</tr>
<tr>
<td>22</td>
<td>162 854</td>
<td>22</td>
<td>TRANSFORMER, current</td>
<td>1</td>
</tr>
<tr>
<td>23</td>
<td>161 309</td>
<td>23</td>
<td>TRANSFORMER, current</td>
<td>1</td>
</tr>
<tr>
<td>24</td>
<td>168 522</td>
<td>24</td>
<td>TRANSFORMER, current</td>
<td>1</td>
</tr>
<tr>
<td>25</td>
<td>046 432</td>
<td>25</td>
<td>HOLDER, fuse mntr .250 x 1.250 panel mtg</td>
<td>1</td>
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<td></td>
<td>012 643</td>
<td>26</td>
<td>FUSE, mntr gl slo-blo 1A 250V</td>
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<td>27</td>
<td>145 743</td>
<td>27</td>
<td>LUG, univ w/screws 600V</td>
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<td></td>
<td>010 916</td>
<td>28</td>
<td>CONNECTOR, clamp cable .750</td>
<td>1</td>
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<td>026 947</td>
<td>29</td>
<td>STAND-OFF, insul .250-20 x 1.000 lg</td>
<td>4</td>
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<tr>
<td></td>
<td>038 776</td>
<td>30</td>
<td>STUD, brs .250-20 x 1.500</td>
<td>4</td>
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<tr>
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<td>167 887</td>
<td>31</td>
<td>BUS BAR, capacitors</td>
<td>2</td>
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<td>132 844</td>
<td>32</td>
<td>CAPACITOR, polyp film 2.1uf 1000VDC (used with 903 439)</td>
<td>3</td>
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<tr>
<td></td>
<td>170 867</td>
<td>33</td>
<td>CAPACITOR, polyp film 1.5uf 1000VDC (used with 903 439-01-1, 903 439-01-2)</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>159 522</td>
<td>34</td>
<td>LED, yellow 2.1V 20MA</td>
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<td></td>
<td>197 854</td>
<td>35</td>
<td>LED, red 2.1V 20 ma 45.0 mcd</td>
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<td>200 408</td>
<td>36</td>
<td>CABLE, power</td>
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<td>170 414</td>
<td>37</td>
<td>COVER, capacitor</td>
<td>1</td>
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<td>127 363</td>
<td>38</td>
<td>LABEL, warning electric shock</td>
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<td>169 810</td>
<td>39</td>
<td>CIRCUIT CARD, interconnecting</td>
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<td>168 847</td>
<td>40</td>
<td>CONNECTOR &amp; SOCKETS</td>
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<td>170 624</td>
<td>41</td>
<td>RESISTOR W/LEADS</td>
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<td>CIRCUIT CARD, interconnecting</td>
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<tr>
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<td>190 531</td>
<td>43</td>
<td>DIODE, ultrafast soft recovery 60A 1000V</td>
<td>5</td>
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<tr>
<td></td>
<td>163 472</td>
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<td>TRANSISTOR, IGBT module 75A 600V</td>
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<tr>
<td></td>
<td>006 334</td>
<td>45</td>
<td>THERMOSTAT, NC</td>
<td>1</td>
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<td>131 828</td>
<td>46</td>
<td>RECTIFIER, integ 100A 1200V</td>
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<td>024 103</td>
<td>47</td>
<td>BLANK, snap-in nyl .750mtg hole</td>
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<td></td>
<td>126 416</td>
<td>48</td>
<td>HANDLE, molded</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>126 415</td>
<td>49</td>
<td>CLAMP, saddle</td>
<td>1</td>
</tr>
</tbody>
</table>
To maintain the factory original performance of your equipment, use only Manufacturer’s Suggested Replacement Parts. Model and serial number required when ordering parts from your local distributor. +When ordering a component originally displaying a precautionary label, the label should also be ordered.

<table>
<thead>
<tr>
<th>Item No.</th>
<th>Dia. Markgs.</th>
<th>Part No.</th>
<th>Description</th>
<th>Quantity</th>
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<tbody>
<tr>
<td>...</td>
<td>40</td>
<td>+167 886</td>
<td>WRAPPER</td>
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<td>...</td>
<td>41</td>
<td>161 330</td>
<td>BAR, support heat sink</td>
<td>...</td>
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<td>...</td>
<td>42</td>
<td>169 325</td>
<td>HEAT SINK, power module</td>
<td>...</td>
</tr>
<tr>
<td>...</td>
<td>43</td>
<td>176 933</td>
<td>INSULATOR, heat sink</td>
<td>...</td>
</tr>
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<td>...</td>
<td>44</td>
<td>149 882</td>
<td>BRACKET, mtg fan motor</td>
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<td>...</td>
<td>45</td>
<td>170 692</td>
<td>MOTOR, fan</td>
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<td>46</td>
<td>170 694</td>
<td>BLADE, fan 6.500 5wg 30deg</td>
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<td>47</td>
<td>605 525</td>
<td>NUT, .312-24 stl elastic stop</td>
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<td>...</td>
<td>48</td>
<td>168 413</td>
<td>DIODE, fast recovery 60A 1000V</td>
<td>...</td>
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<td>171 883</td>
<td>TRANSISTOR, mosfet 71A 500V</td>
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<td>168 510</td>
<td>STABILIZER</td>
<td>...</td>
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<td>027 878</td>
<td>SWITCH, lim 15A 125/250VAC SPDT</td>
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<td>199 830</td>
<td>INSULATOR, switch safety</td>
<td>...</td>
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<td>54</td>
<td>091 441</td>
<td>SWITCH, tgl 3PST 40A 600V</td>
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<td>...</td>
<td>55</td>
<td>153 664</td>
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<td>56</td>
<td>170 475</td>
<td>TRANSFORMER, pwr main</td>
<td>...</td>
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<td>...</td>
<td>57</td>
<td>198 035</td>
<td>HANDLE</td>
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<td>58</td>
<td>197 931</td>
<td>MAGNET, permanent</td>
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<td>...</td>
<td>59</td>
<td>197 000</td>
<td>CABLE, work ground</td>
<td>...</td>
</tr>
<tr>
<td>...</td>
<td>60</td>
<td>193 329</td>
<td>COVER, blank</td>
<td>...</td>
</tr>
<tr>
<td>...</td>
<td>61</td>
<td>143 915</td>
<td>MOUNT, sgl stud 1.5dia x 1.000 lg .312-18</td>
<td>...</td>
</tr>
<tr>
<td>...</td>
<td>62</td>
<td>193 332</td>
<td>CASE SECTION, bottom filter enclosure</td>
<td>...</td>
</tr>
<tr>
<td>...</td>
<td>63</td>
<td>127 832</td>
<td>RECEPTACLE, tw lk insul fem</td>
<td>...</td>
</tr>
<tr>
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<td>64</td>
<td>127 836</td>
<td>PLUG, tw lk insul male</td>
<td>...</td>
</tr>
<tr>
<td>...</td>
<td>65</td>
<td>193 506</td>
<td>STAND-OFF, .312-18 x 2.000 lg</td>
<td>...</td>
</tr>
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<td>196 854</td>
<td>CIRCUIT CARD ASSY, ground fault control</td>
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<td>INSULATOR, board ground fault</td>
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<td>052 964</td>
<td>RELAY, encl 24VDC DPDT 10A/120VAC</td>
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<td>097 132</td>
<td>STAND-OFF, NO 6-32 X .375 lg</td>
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<td>170 599</td>
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<td>SWITCH, rocker SPDT 4A 250VAC</td>
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<td>CAPACITOR ASSY</td>
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PLG3 Included w/CT1-4/PLG5 Included w/PC2
Warranty

Effective January 1, 2000
(Equipment with a serial number preface of “LA” or newer)

This limited warranty supersedes all previous manufacturers warranties and is exclusive with no other guarantees or warranties expressed or implied.

LIMITED WARRANTY — Subject to the terms and conditions below, warrants to its original retail purchaser that new equipment sold after the effective date of this limited warranty is free of defects in material and workmanship at the time it is shipped from factory. THIS WARRANTY IS EXPRESSLY IN LIEU OF ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING THE WARRANTIES OF MERCHANTABILITY AND FITNESS.

Within the warranty periods listed below, manufacturer will repair or replace any warranted parts or components that fail due to such defects in material or workmanship. Manufacturer must be notified in writing within thirty (30) days of such defect or failure, at which time manufacturer will provide instructions on the warranty claim procedures to be followed.

Manufacturer shall honor warranty claims on warranted equipment listed below in the event of such a failure within the warranty time periods. All warranty time periods start on the date that the equipment was delivered to the original retail purchaser, or one year after the equipment is sent to the distributor.

1. 5 Years Parts — 3 Years Labor
   * Original main power rectifiers
2. 3 Years — Parts and Labor
   * Transformer/Rectifier Power Sources
   * Plasma Arc Cutting Power Sources
   * Semi-Automatic and Automatic Wire Feeders
   * Engine Driven Welding Generators
   (NOTE: Engines are warranted separately by the engine manufacturer.)
3. 1 Year — Parts and Labor
   * DS-2 Wire Feeder
   * Motor Driven Guns (with exception of Spoolmate 185 & Spoolmate 250)
   * Process Controllers
   * Positioners and Controllers
   * Automatic Motion Devices
   * RFCS Foot Controls
   * Induction Heating Power Sources
   * Water Coolant Systems
   * HF Units
   * Grids
   * Spot Welders
   * Load Banks
   * Running Gear/Trailers
   * Field Options
   (NOTE: Field options are covered under the limited warranty for the remaining warranty period of the product they are installed in, or for a minimum of one year — whichever is greater.)
4. 6 Months — Batteries
5. 90 Days — Parts and Labor
   * MIG/Guns/TIG Torches
   * Induction Heating Coils and Blankets
   * Plasma Cutting Torches
   * Remote Controls
   * Accessory Kits
   * Replacement Parts
   * Spoolmate 185 & Spoolmate 250
   * Canvas Covers

Limited Warranty shall not apply to:

1. Consumable components; such as contact tips, cutting nozzles, contactors, relays, brushes, slip rings, or parts that fail due to normal wear.
2. Items furnished by manufacturer, but manufactured by others, such as engines or trade accessories. These items are covered by the manufacturer’s warranty, if any.
3. Equipment that has been modified by any party other than manufacturer, or equipment that has been improperly installed, improperly operated or misused based upon industry standards, or equipment which has not had reasonable and necessary maintenance, or equipment which has been used for operation outside of the specifications for the equipment.

MANUFACTURER’S PRODUCTS ARE INTENDED FOR PURCHASE AND USE BY COMMERCIAL/INDUSTRIAL USERS AND PERSONS TRAINED AND EXPERIENCED IN THE USE AND MAINTENANCE OF WELDING EQUIPMENT.

In the event of a warranty claim covered by this warranty, the exclusive remedies shall be, at manufacturers option: (1) repair; or (2) replacement; or, where authorized in writing by manufacturer in appropriate cases, (3) the reasonable cost of repair or replacement at an authorized service station; or (4) payment of or credit for the purchase price (less reasonable depreciation based upon actual use) upon return of the goods at customer’s risk and expense. manufacturer’s option of repair or replacement will be F.O.B., Factory at Appleton, Wisconsin, or F.O.B. at an authorized service facility as determined by manufacturer. Therefore no compensation or reimbursement for transportation costs of any kind will be allowed.

TO THE EXTENT PERMITTED BY LAW, THE REMEDIES PROVIDED HEREIN ARE THE SOLE AND EXCLUSIVE REMEDIES. IN NO EVENT SHALL MANUFACTURER BE LIABLE FOR DIRECT, INDIRECT, SPECIAL, INCIDENTAL OR CONSEQUENTIAL DAMAGES (INCLUDING LOSS OF PROFIT), WHETHER BASED ON CONTRACT, TORT OR ANY OTHER LEGAL THEORY.

ANY EXPRESS WARRANTY NOT PROVIDED HEREIN AND ANY IMPLIED WARRANTY, GUARANTEE OR REPRESENTATION AS TO PERFORMANCE, AND ANY REMEDY FOR BREACH OF CONTRACT TORT OR ANY OTHER LEGAL THEORY WHICH, BUT FOR THIS PROVISION, MIGHT ARISE BY IMPLICATION, OPERATION OF LAW, CUSTOM OF TRADE OR COURSE OF DEALING, INCLUDING ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR PARTICULAR PURPOSE, WITH RESPECT TO ANY AND ALL EQUIPMENT FURNISHED BY MANUFACTURER IS EXCLUDED AND DISCLAIMED BY MANUFACTURER.

Some states in the U.S.A. do not allow limitations of how long an implied warranty lasts, or the exclusion of incidental, indirect, special or consequential damages, so the above limitation or exclusion may not apply to you. This warranty provides specific legal rights, and other rights may be available, but may vary from state to state.

In Canada, legislation in some provinces provides for certain additional warranties or remedies other than as stated herein, and to the extent that they may not be waived, the limitations and exclusions set out above may not apply. This Limited Warranty provides specific legal rights, and other rights may be available, but may vary from province to province.
Owner’s Record

Please complete and retain with your personal records.

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<th>Model Name</th>
<th>Serial/Style Number</th>
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<th>Purchase Date</th>
<th>(Date which equipment was delivered to original customer.)</th>
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Resources Available

Always provide Model Name and Serial/Style Number.

Contact your Distributor for:
- Welding Supplies and Consumables
- Options and Accessories
- Personal Safety Equipment
- Service and Repair
- Replacement Parts
- Owner’s Manuals
- Circuit Diagrams

Contact the Delivering Carrier for:
File a claim for loss or damage during shipment.

For assistance in filing or settling claims, contact your distributor and/or equipment manufacturer’s Transportation Department.