THERMAL ARC®

A THERMADYNE® Company

WC100B™

PLASMA WELDING CONSOLE

Instruction Manual

October 29, 2001

Manual No. 0-0466

CE

WARNING Read and understand this entire Manual and your employer's safety practices before installing, operating, or servicing the equipment.

WARNING While the information contained in this manual represents our best judgement, Thermal Arc Corporation assumes no liability for its use.

Thermal Arc® WC100B Plasma Welding Console
Instruction Manual Number 0-0466

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ELECTRICAL DIAGRAM

INTRODUCTION

This manual is divided into four sections:

SECTION 1. General Information, describes the Thermal Arc System of plasma welding and the WC 100B Plasma Welding Console. It also gives theory of operation and specifications of system components.

SECTION 2. Installation, provides detailed instructions for assembling and inspecting new equipment.

SECTION 3. Operation, lists the operating procedures which will include detailed instructions for using the equipment and tips for safe, efficient welding.

SECTION 4. Service, contains detailed troubleshooting procedures, arranged in tabular form, as well as service procedures for components.

SECTION 5. Parts List, lists replacement parts for the console.

The information contained in this manual represents our best judgment but Thermal Arc Corporation assumes no liability for its use.

NOTES, CAUTIONS AND WARNINGS

Throughout this manual, notes, cautions and warnings are used to call attention to particular information.

The method used to identify these highlights, and the purpose for which each is used, are as follows:

NOTE:

An operation, procedure and background information which aids the operator in efficient use of the machine, helps the serviceman in performing maintenance or requires additional emphasis.

CAUTION

An operational procedure which, if not properly followed, may cause damage to the equipment.


WARNING

An operational procedure which, if not followed, may cause injury to the operator or others in the operating area.

Important Safety Precautions

WARNING

OPERATION AND MAINTENANCE OF PLASMA ARC EQUIPMENT CAN BE DANGEROUS AND HAZARDOUS TO YOUR HEALTH.

To prevent possible injury, read, understand and follow all warnings, safety precautions and instructions before using the equipment. Call 1-937-440-0100 or your local distributor if you have any questions.

GASES AND FUMES

Gases and fumes produced during the plasma cutting process can be dangerous and hazardous to your health.

- Keep all fumes and gases from the breathing area. Keep your head out of the welding fume plume.
- Use an air-supplied respirator if ventilation is not adequate to remove all fumes and gases.
- The kinds of fumes and gases from the plasma arc depend on the kind of metal being used, coatings on the metal, and the different processes. You must be very careful when cutting or welding any metals which may contain one or more of the following:

Antimony	Chromium	Mercury
Arsenic	Cobalt	Nickel
Barium	Copper	Selenium
Beryllium	Lead	Silver
Cadmium	Manganese	Vanadium

- Always read the Material Safety Data Sheets (MSDS) that should be supplied with the material you are using. These MSDSs will give you the information regarding the kind and amount of fumes and gases that may be dangerous to your health.
- For information on how to test for fumes and gases in your workplace, refer to item 1 in Publications.
- Use special equipment, such as water or down draft cutting tables, to capture fumes and gases.
- Do not use the plasma torch in an area where combustible or explosive gases or materials are located.
- Phosgene, a toxic gas, is generated from the vapors of chlorinated solvents and cleansers. Remove all sources of these vapors.
- This product, when used for welding or cutting, produces fumes or gases which contain chemicals known to the State of California to cause birth defects and, in some cases, cancer. (California Health & Safety Code Sec. 25249.5 et seq.)

ELECTRIC SHOCK

Electric Shock can injure or kill. The plasma arc process uses and produces high voltage electrical energy. This electric energy can cause severe or fatal shock to the operator or others in the workplace.

- Never touch any parts that are electrically "live" or "hot."
- Wear dry gloves and clothing. Insulate yourself from the work piece or other parts of the welding circuit.
- Repair or replace all worn or damaged parts.
- Extra care must be taken when the workplace is moist or damp.
- Install and maintain equipment according to NEC code, refer to item 9 in Publications.
- Disconnect power source before performing any service or repairs.
- Read and follow all the instructions in the Operating Manual.

FIRE AND EXPLOSION

Fire and explosion can be caused by hot slag, sparks, or the plasma arc.

- Be sure there is no combustible or flammable material in the workplace. Any material that cannot be removed must be protected.
- Ventilate all flammable or explosive vapors from the workplace.
- Do not cut or weld on containers that may have held combustibles.
- Provide a fire watch when working in an area where fire hazards may exist.
- Hydrogen gas may be formed and trapped under aluminum workpieces when they are cut underwater or while using a water table. **DO NOT** cut aluminum alloys underwater or on a water table unless the hydrogen gas can be eliminated or dissipated. Trapped hydrogen gas that is ignited will cause an explosion.

NOISE

Noise can cause permanent hearing loss. Plasma arc processes can cause noise levels to exceed safe limits. You must protect your ears from loud noise to prevent permanent loss of hearing.

- To protect your hearing from loud noise, wear protective ear plugs and/or ear muffs. Protect others in the workplace.
- Noise levels should be measured to be sure the decibels (sound) do not exceed safe levels.
- For information on how to test for noise, see item 1 in Publications.

PLASMA ARC RAYS

Plasma Arc Rays can injure your eyes and burn your skin. The plasma arc process produces very bright ultra violet and infra red light. These arc rays will damage your eyes and burn your skin if you are not properly protected.

- To protect your eyes, always wear a welding helmet or shield. Also always wear safety glasses with side shields, goggles or other protective eye wear.
- Wear welding gloves and suitable clothing to protect your skin from the arc rays and sparks.
- Keep helmet and safety glasses in good condition. Replace lenses when cracked, chipped or dirty.
- Protect others in the work area from the arc rays. Use protective booths, screens or shields.
- Use the shade of lens as suggested in the following per ANSI/ASC Z49.1:

Arc Current	Minimum Protective Shade No.	Suggested Shade No.
Less Than 300*	8	9
300 - 400*	9	12
400 - 800*	10	14

** These values apply where the actual arc is clearly seen. Experience has shown that lighter filters may be used when the arc is hidden by the workpiece.*

Publications

Refer to the following standards or their latest revisions for more information:

1. OSHA, SAFETY AND HEALTH STANDARDS, 29CFR 1910, obtainable from the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402
2. ANSI Standard Z49.1, SAFETY IN WELDING AND CUTTING, obtainable from the American Welding Society, 550 N.W. LeJeune Rd, Miami, FL 33126
3. NIOSH, SAFETY AND HEALTH IN ARC WELDING AND GAS WELDING AND CUTTING, obtainable from the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402
4. ANSI Standard Z87.1, SAFE PRACTICES FOR OCCUPATION AND EDUCATIONAL EYE AND FACE PROTECTION, obtainable from American National Standards Institute, 1430 Broadway, New York, NY 10018
5. ANSI Standard Z41.1, STANDARD FOR MEN'S SAFETY-TOE FOOTWEAR, obtainable from the American National Standards Institute, 1430 Broadway, New York, NY 10018
6. ANSI Standard Z49.2, FIRE PREVENTION IN THE USE OF CUTTING AND WELDING PROCESSES, obtainable from American National Standards Institute, 1430 Broadway, New York, NY 10018
7. AWS Standard A6.0, WELDING AND CUTTING CONTAINERS WHICH HAVE HELD COMBUSTIBLES, obtainable from American Welding Society, 550 N.W. LeJeune Rd, Miami, FL 33126
8. NFPA Standard 51, OXYGEN-FUEL GAS SYSTEMS FOR WELDING, CUTTING AND ALLIED PROCESSES, obtainable from the National Fire Protection Association, Batterymarch Park, Quincy, MA 02269
9. NFPA Standard 70, NATIONAL ELECTRICAL CODE, obtainable from the National Fire Protection Association, Batterymarch Park, Quincy, MA 02269
10. NFPA Standard 51B, CUTTING AND WELDING PROCESSES, obtainable from the National Fire Protection Association, Batterymarch Park, Quincy, MA 02269
11. CGA Pamphlet P-1, SAFE HANDLING OF COMPRESSED GASES IN CYLINDERS, obtainable from the Compressed Gas Association, 1235 Jefferson Davis Highway, Suite 501, Arlington, VA 22202
12. CSA Standard W117.2, CODE FOR SAFETY IN WELDING AND CUTTING, obtainable from the Canadian Standards Association, Standards Sales, 178 Rexdale Boulevard, Rexdale, Ontario, Canada M9W 1R3
13. NWSA booklet, WELDING SAFETY BIBLIOGRAPHY obtainable from the National Welding Supply Association, 1900 Arch Street, Philadelphia, PA 19103
14. American Welding Society Standard AWSF4.1, RECOMMENDED SAFE PRACTICES FOR THE PREPARATION FOR WELDING AND CUTTING OF CONTAINERS AND PIPING THAT HAVE HELD HAZARDOUS SUBSTANCES, obtainable from the American Welding Society, 550 N.W. LeJeune Rd, Miami, FL 33126

15. ANSI Standard Z88.2, PRACTICE FOR RESPIRATORY PROTECTION, obtainable from American National Standards Institute, 1430 Broadway, New York, NY 10018

Note, Attention et Avertissement

Dans ce manuel, les mots "note," "attention," et "avertissement" sont utilisés pour mettre en relief des informations à caractère important. Ces mises en relief sont classifiées comme suit :

NOTE

Toute opération, procédure ou renseignement général sur lequel il importe d'insister davantage ou qui contribue à l'efficacité de fonctionnement du système.

ATTENTION

Toute procédure pouvant résulter l'endommagement du matériel en cas de non-respect de la procédure en question.

AVERTISSEMENT

Toute procédure pouvant provoquer des blessures de l'opérateur ou des autres personnes se trouvant dans la zone de travail en cas de non-respect de la procédure en question.

Precautions De Securite Importantes

AVERTISSEMENT

L'OPÉRATION ET LA MAINTENANCE DU MATÉRIEL DE SOUDAGE À L'ARC AU JET DE PLASMA PEUVENT PRÉSENTER DES RISQUES ET DES DANGERS DE SANTÉ.

Il faut communiquer aux opérateurs et au personnel TOUS les dangers possibles. Afin d'éviter les blessures possibles, lisez, comprenez et suivez tous les avertissements, toutes les précautions de sécurité et toutes les consignes avant d'utiliser le matériel. Composez le + 937-440-0100 ou votre distributeur local si vous avez des questions.

FUMÉE et GAZ

La fumée et les gaz produits par le procédé de jet de plasma peuvent présenter des risques et des dangers de santé.

- Eloignez toute fumée et gaz de votre zone de respiration. Gardez votre tête hors de la plume de fumée provenant du chalumeau.
- Utilisez un appareil respiratoire à alimentation en air si l'aération fournie ne permet pas d'éliminer la fumée et les gaz.
- Les sortes de gaz et de fumée provenant de l'arc de plasma dépendent du genre de métal utilisé, des revêtements se trouvant sur le métal et des différents procédés. Vous devez prendre soin lorsque vous coupez ou soudez tout métal pouvant contenir un ou plusieurs des éléments suivants:

antimoine	cadmium	mercure
argent	chrome	nickel
arsenic	cobalt	plomb
baryum	cuivre	sélénium
béryllium	manganèse	vanadium

- Lisez toujours les fiches de données sur la sécurité des matières (sigle américain "MSDS"); celles-ci devraient être fournies avec le matériel que vous utilisez. Les MSDS contiennent des renseignements quant à la quantité et la nature de la fumée et des gaz pouvant poser des dangers de santé.
- Pour des informations sur la manière de tester la fumée et les gaz de votre lieu de travail, consultez l'article 1 et les documents cités à la page v.
- Utilisez un équipement spécial tel que des tables de coupe à débit d'eau ou à courant descendant pour capter la fumée et les gaz.
- N'utilisez pas le chalumeau au jet de plasma dans une zone où se trouvent des matières ou des gaz combustibles ou explosifs.
- Le phosgène, un gaz toxique, est généré par la fumée provenant des solvants et des produits de nettoyage chlorés. Eliminez toute source de telle fumée.
- Ce produit, dans le procéder de soudage et de coupe, produit de la fumée ou des gaz pouvant contenir des éléments reconnu dans L' état de la Californie, qui peuvent causer des défauts de naissance et le cancer. (La sécurité de santé en Californie et la code sécurité Sec. 25249.5 et seq.)

CHOC ELECTRIQUE

Les chocs électriques peuvent blesser ou même tuer. Le procédé au jet de plasma requiert et produit de l'énergie électrique haute tension. Cette énergie électrique peut produire des chocs graves, voire mortels, pour l'opérateur et les autres personnes sur le lieu de travail.

- Ne touchez jamais une pièce "sous tension" ou "vive"; portez des gants et des vêtements secs. Isolez-vous de la pièce de travail ou des autres parties du circuit de soudage.
- Réparez ou remplacez toute pièce usée ou endommagée.
- Prenez des soins particuliers lorsque la zone de travail est humide ou moite.
- Montez et maintenez le matériel conformément au Code électrique national des Etats-Unis. (Voir la page *v*, article 9.)
- Débranchez l'alimentation électrique avant tout travail d'entretien ou de réparation.
- Lisez et respectez toutes les consignes du Manuel de consignes.

INCENDIE ET EXPLOSION

Les incendies et les explosions peuvent résulter des scories chaudes, des étincelles ou de l'arc de plasma. Le procédé à l'arc de plasma produit du métal, des étincelles, des scories chaudes pouvant mettre le feu aux matières combustibles ou provoquer l'explosion de fumées inflammables.

- Soyez certain qu'aucune matière combustible ou inflammable ne se trouve sur le lieu de travail. Protégez toute telle matière qu'il est impossible de retirer de la zone de travail.
- Procurez une bonne aération de toutes les fumées inflammables ou explosives.
- Ne coupez pas et ne soudez pas les conteneurs ayant pu renfermer des matières combustibles.
- Prévoyez une veille d'incendie lors de tout travail dans une zone présentant des dangers d'incendie.
- Le gas hydrogène peut se former ou s'accumuler sous les pièces de travail en aluminium lorsqu'elles sont coupées sous l'eau ou sur une table d'eau. NE PAS couper les alliages en aluminium sous l'eau ou sur une table d'eau à moins que le gas hydrogène peut s'échapper ou se dissiper. Le gas hydrogène accumulé explosera si enflammé.

RAYONS D'ARC DE PLASMA

Les rayons provenant de l'arc de plasma peuvent blesser vos yeux et brûler votre peau. Le procédé à l'arc de plasma produit une lumière infra-rouge et des rayons ultra-violets très forts. Ces rayons d'arc nuiront à vos yeux et brûleront votre peau si vous ne vous protégez pas correctement.

- Pour protéger vos yeux, portez toujours un casque ou un écran de soudeur. Portez toujours des lunettes de sécurité munies de parois latérales ou des lunettes de protection ou une autre sorte de protection oculaire.
- Portez des gants de soudeur et un vêtement protecteur approprié pour protéger votre peau contre les étincelles et les rayons de l'arc.
- Maintenez votre casque et vos lunettes de protection en bon état. Remplacez toute lentille sale ou comportant fissure ou rognure.
- Protégez les autres personnes se trouvant sur la zone de travail contre les rayons de l'arc en fournissant des cabines ou des écrans de protection.
- Utilisez la nuance de lentille qui est suggèrée dans le recommendation qui suivent ANSI/ASC Z49.1:

Courant Arc	Nuance Minimum Protective Numéro	Nuance Suggerée Numéro
Moins de 300*	8	9
300 - 400*	9	12
400 - 800*	10	14

** Ces valeurs s'appliquent ou l'arc actuel est observé clairement. L'experience a démontrer que les filtres moins foncés peuvent être utilisés quand l'arc est caché par moiceau de travail.*

BRUIT

Le bruit peut provoquer une perte permanente de l'ouïe. Les procédés de soudage à l'arc de plasma peuvent provoquer des niveaux sonores supérieurs aux limites normalement acceptables. Vous dú4ez vous protéger les oreilles contre les bruits forts afin d'éviter une perte permanente de l'ouïe.

- Pour protéger votre ouïe contre les bruits forts, portez des tampons protecteurs et/ou des protections auriculaires. Protégez également les autres personnes se trouvant sur le lieu de travail.

- Il faut mesurer les niveaux sonores afin d'assurer que les décibels (le bruit) ne dépassent pas les niveaux sûrs.
- Pour des renseignements sur la manière de tester le bruit, consultez l'article 1, page v.

Documents De Reference

Consultez les normes suivantes ou les révisions les plus récentes ayant été faites à celles-ci pour de plus amples renseignements :

1. OSHA, NORMES DE SÉCURITÉ DU TRAVAIL ET DE PROTECTION DE LA SANTÉ, 29CFR 1910, disponible auprès du Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402
2. Norme ANSI Z49.1, LA SÉCURITÉ DES OPÉRATIONS DE COUPE ET DE SOUDAGE, disponible auprès de la Société Américaine de Soudage (American Welding Society), 550 N.W. LeJeune Rd., Miami, FL 33126
3. NIOSH, LA SÉCURITÉ ET LA SANTÉ LORS DES OPÉRATIONS DE COUPE ET DE SOUDAGE À L'ARC ET AU GAZ, disponible auprès du Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402
4. Norme ANSI Z87.1, PRATIQUES SURES POUR LA PROTECTION DES YEUX ET DU VISAGE AU TRAVAIL ET DANS LES ECOLES, disponible de l'Institut Américain des Normes Nationales (American National Standards Institute), 1430 Broadway, New York, NY 10018
5. Norme ANSI Z41.1, NORMES POUR LES CHAUSSURES PROTECTRICES, disponible auprès de l'American National Standards Institute, 1430 Broadway, New York, NY 10018
6. Norme ANSI Z49.2, PRÉVENTION DES INCENDIES LORS DE L'EMPLOI DE PROCÉDÉS DE COUPE ET DE SOUDAGE, disponible auprès de l'American National Standards Institute, 1430 Broadway, New York, NY 10018
7. Norme A6.0 de l'Association Américaine du Soudage (AWS), LE SOUDAGE ET LA COUPE DE CONTENEURS AYANT RENFERMÉ DES PRODUITS COMBUSTIBLES, disponible auprès de la American Welding Society, 550 N.W. LeJeune Rd., Miami, FL 33126
8. Norme 51 de l'Association Américaine pour la Protection contre les Incendies (NFPA), LES SYSTEMES À GAZ AVEC ALIMENTATION EN OXYGENE POUR LE SOUDAGE, LA COUPE ET LES PROCÉDÉS ASSOCIÉS, disponible auprès de la National Fire Protection Association, Batterymarch Park, Quincy, MA 02269
9. Norme 70 de la NFPA, CODE ELECTRIQUE NATIONAL, disponible auprès de la National Fire Protection Association, Batterymarch Park, Quincy, MA 02269
10. Norme 51B de la NFPA, LES PROCÉDÉS DE COUPE ET DE SOUDAGE, disponible auprès de la National Fire Protection Association, Batterymarch Park, Quincy, MA 02269
11. Brochure GCA P-1, LA MANIPULATION SANS RISQUE DES GAZ COMPRIMÉS EN CYLINDRES, disponible auprès de l'Association des Gaz Comprimés (Compressed Gas Association), 1235 Jefferson Davis Highway, Suite 501, Arlington, VA 22202
12. Norme CSA W117.2, CODE DE SÉCURITÉ POUR LE SOUDAGE ET LA COUPE, disponible auprès de l'Association des Normes Canadiennes, Standards Sales, 178 Rexdale Boulevard, Rexdale, Ontario, Canada, M9W 1R3
13. ivret NWSA, BIBLIOGRAPHIE SUR LA SÉCURITÉ DU SOUDAGE, disponible auprès de l'Association Nationale de Fournitures de Soudage (National Welding Supply Association), 1900 Arch Street, Philadelphia, PA 19103
14. Norme AWSF4.1 de l'Association Américaine de Soudage, RECOMMANDATIONS DE PRATIQUES SURES POUR LA PRÉPARATION À LA COUPE ET AU SOUDAGE DE CONTENEURS ET TUYAUX AYANT RENFERMÉ DES PRODUITS DANGEREUX , disponible auprès de la American Welding Society, 550 N.W. LeJeune Rd., Miami, FL 33126
15. Norme ANSI Z88.2, PRATIQUES DE PROTECTION RESPIRATOIRE, disponible auprès de l'American National Standards Institute, 1430 Broadway, New York, NY 10018

Declaration of Conformity

Manufacturer: Thermal Arc, Inc.
Address: 2200 Corporate Drive
Troy, Ohio 45373-1085
USA

The equipment described in this manual conforms to all applicable aspects and regulations of the 'Low Voltage Directive' (European Council Directive 73/23/EEC as amended by Council Directive 93/68/EEC) and to the National legislation for the enforcement of this Directive.

The equipment described in this manual conforms to all applicable aspects and regulations of the "EMC Directive" (European Council Directive 89/336/EEC) and to the National legislation for the enforcement of this Directive.

Serial numbers are unique with each individual piece of equipment and details description, parts used to manufacture a unit and date of manufacture.

National Standard and Technical Specifications

The product is designed and manufactured to a number of standards and technical requirements among them are:

* CSA (Canadian Standards Association) standard C22.2 number 60 for Arc welding equipment.

* UL (Underwriters Laboratory) rating 94VO flammability testing for all printed-circuit boards used.

* CENELEC EN50199 EMC Product Standard for Arc Welding Equipment.

* ISO/IEC 60974-1 (BS 638-PT10) (EN 60 974-1) (EN50192) (EN50078) applicable to plasma cutting equipment and associated accessories.

* Extensive product design verification is conducted at the manufacturing facility as part of the routine design and manufacturing process. This is to ensure the product is safe, when used according to instructions in this manual and related industry standards, and performs as specified. Rigorous testing is incorporated into the manufacturing process to ensure the manufactured product meets or exceeds all design specifications.

Thermal Dynamics has been manufacturing products for more than 30 years, and will continue to achieve excellence in our area of manufacture.

Manufacturers responsible representative: Giorgio Bassi
Managing Director
Thermal Dynamics Europe
Via rio Fabbiani 8A
40067 Rastignano (BO)
Italy

CE

Statement of Warranty

LIMITED WARRANTY: Thermal Arc®, Inc., A Thermadyne Company, warrants that its products will be free of defects in workmanship or material. Should any failure to conform to this warranty appear within the time period applicable to the Thermal Arc products as stated below, Thermal Arc shall, upon notification thereof and substantiation that the product has been stored, installed, operated, and maintained in accordance with Thermal Arc's specifications, instructions, recommendations and recognized standard industry practice, and not subject to misuse, repair, neglect, alteration, or accident, correct such defects by suitable repair or replacement, at Thermal Arc's sole option, of any components or parts of the product determined by Thermal Arc to be defective.

THERMAL ARC MAKES NO OTHER WARRANTY, EXPRESS OR IMPLIED. THIS WARRANTY IS EXCLUSIVE AND IN LIEU OF ALL OTHERS, INCLUDING, BUT NOT LIMITED TO ANY WARRANTY OF MERCHANTABILITY OR FITNESS FOR ANY PARTICULAR PURPOSE.

LIMITATION OF LIABILITY: Thermal Arc shall not under any circumstances be liable for special or consequential damages, such as, but not limited to, damage or loss of purchased or replacement goods, or claims of customers of distributor (hereinafter "Purchaser") for service interruption. The remedies of the Purchaser set forth herein are exclusive and the liability of Thermal Arc with respect to any contract, or anything done in connection therewith such as the performance or breach thereof, or from the manufacture, sale, delivery, resale, or use of any goods covered by or furnished by Thermal Arc whether arising out of contract, negligence, strict tort, or under any warranty, or otherwise, shall not, except as expressly provided herein, exceed the price of the goods upon which such liability is based. No employee, agent, or representative of Thermal Arc is authorized to change this warranty in any way or grant any other warranty.

THIS WARRANTY BECOMES INVALID IF REPLACEMENT PARTS OR ACCESSORIES ARE USED WHICH IN THERMAL ARC'S SOLE JUDEGMENT MAY IMPAIR THE SAFETY OR PERFORMANCE OF ANY THERMAL ARC PRODUCT.

THIS WARRANTY IS INVALID IF THE PRODUCT IS SOLD BY NON-AUTHORIZED PERSONS.

Except with regards to the products listed below, this warranty shall remain effective three (3) years from the date Thermal Arc's authorized distributor delivers the product to Purchaser, but in no event more than (4) years from the date Thermal Arc delivers the product to the authorized distributor.

Shorter warranty periods apply to the products listed below. On these products, the warranty is effective for the time stated below beginning on the date that the authorized distributor delivers the products to the Purchaser. Notwithstanding the foregoing, in no event shall the warranty period extend more than the time stated plus one year from the date Thermal Arc delivered the product to the authorized distributor.

POWER SUPPLIES	PLASMA WELDING/ VIKING/GENERATORS	INVERTERS	LABOR
MAIN POWER MAGNETICS (STATIC & ROTATING)	3 YEARS	2 YEARS	1 YEAR
ORIGINAL MAIN POWER RECTIFIER	3 YEARS	2 YEARS	1 YEAR
CONTROL PC BOARD	3 YEARS	2 YEARS	1 YEAR
ALL OTHER CIRCUITS AND COMPONENTS INCLUDING BUT NOT LIMITED TO, CONTACTORS, RELAYS, SOLENOIDS, PUMPS, POWER SWITCHING SEMI-CONDUCTORS	1 YEAR	1 YEAR	1 YEAR
ENGINES: ENGINES ARE NOT WARRANTED BY THERMAL ARC, ALTHOUGH MOST ARE WARRANTED BY THE ENGINE MANUFACTURER. SEE THE ENGINE MANUFACTORS WARRANTY FOR DETAILS.			
CONSOLES, CONTROL EQUIPMENT, HEAT EXCHANGES, AND ACCESSORY EQUIPMENT	1 YEAR	1 YEAR	1 YEAR
TORCH AND LEADS	180 DAYS	180 DAYS	180 DAYS
REPAIR/REPLACEMENT PARTS	90 DAYS	90 DAYS	90 DAYS

Warranty repairs or replacement claims under this limited warranty must be submitted to Thermal Arc by an authorized Thermal Arc® repair facility within thirty (30) days of the repair. No transportation costs of any kind will be paid under this warranty. Transportation charges to send products to an authorized warranty repair facility shall be the responsibility of the customer. All returned goods shall be at the customer's risk and expense. This warranty supersedes all previous Thermal Arc warranties.

Thermal Arc® is a Registered Trademark of Thermadyne.

Effective May 1, 1997

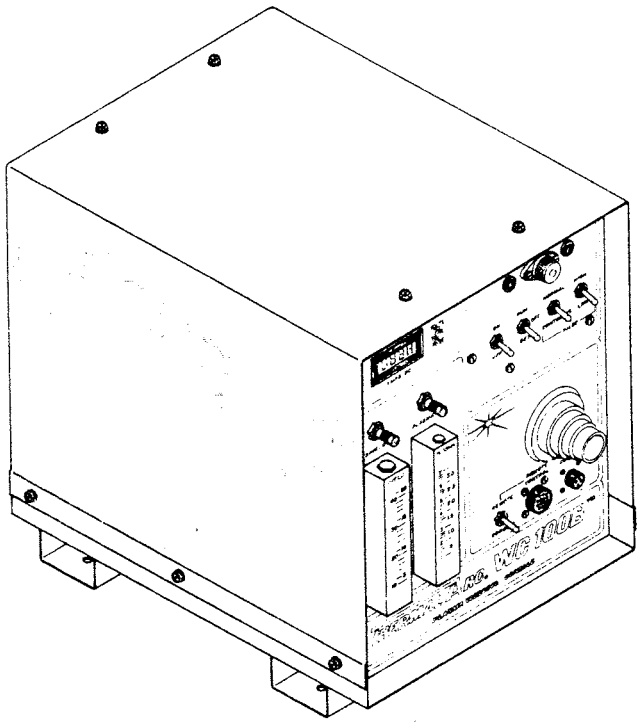


Figure 1-A WC 100B Welding Console

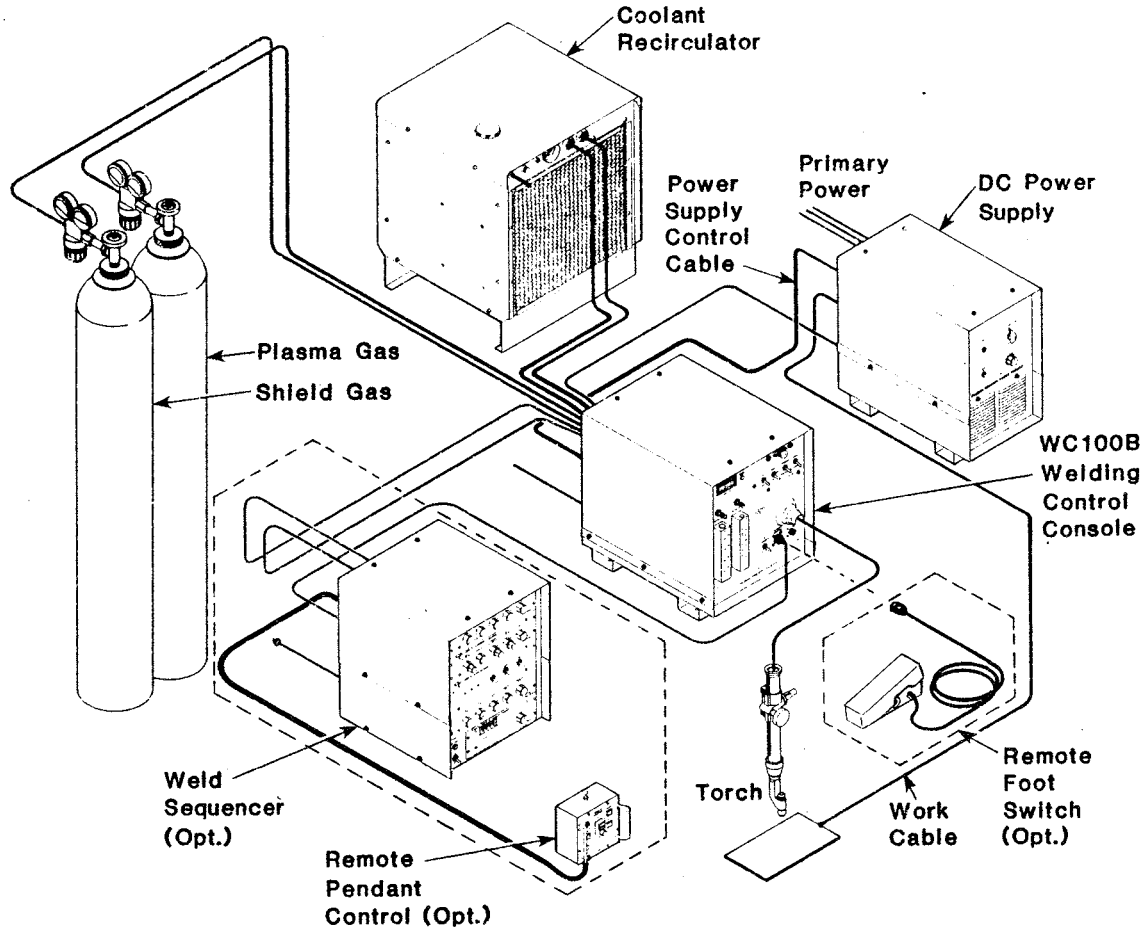


Figure 1-B Plasma Welding System

1.1 DESCRIPTION OF EQUIPMENT

The Thermal Dynamics WC 100B Welding Console (Fig. 1-A) is designed to be used as part of a system for direct current straight polarity plasma welding. The console provides the necessary control functions to operate Thermal Arc "A" series plasma welding torches. The WC 100B contains a pilot arc power supply.

The welding system (Fig. 1-B) consists of a plasma welding torch, a WC 100B control console, a direct current power source, a coolant supply and a gas supply.

The requirements for the other parts of the system are:

POWER SOURCE:

1. Direct current output
2. A drooping volt/ampere characteristic
3. A nominal open circuit voltage of 70-80 volts
4. A remotely controllable contactor
5. An adjustable output

COOLANT SUPPLY:

1. Pressure between 50 and 125 PSIG
2. Thermal Arc Torch Coolant recommended
3. Flow rate as required by torch (see torch requirements)
4. Closed loop system (complete non-ferrous construction) with liquid air heat exchanger and deionizer required.

GAS SUPPLY:

1. "Prepurified" or "Welding" grade gases required
2. Regulated to 30 PSIG

OPTIONAL FEATURES AVAILABLE:

- Gas Saver Attachment: Shuts off gas and power to torch when torch is hung on cradle.

1.2 SPECIFICATIONS

- Rated Output: 500 DC amps (Max)
- Gas Control: Direct reading flowmeters with fine-control metering valves and solenoid valves.

  Plasma flowmeters:

  0.2-7 SCFH (.1-3.2 lpm) argon or 0.2-3.6 or 0.8-7.0 SCFH argon

  Shield flowmeter:

  4-40 SCFH (1-20 lpm) argon
- Pilot Arc Power Supply: Built-in high/low current pilot circuit
- Current Control: Remote foot or hand control (not furnished with console)-24 volt control circuit
- Arc Starting: Non-transferred pilot arc (High frequency used to initiate pilot arc)
- Panel Controls:

  PILOT NORMAL/OFF/CONTINUOUS mode selector switch

  PILOT HIGH/LOW selector switch

  RUN/SET gas flow selector switch

  READY and WELD indicator lights

  REMOTE CONTROL and AUXILIARY CONTROL connectors for manual or automatic control

  DIGITAL DC AMP/VOLT meter with momentary voltage display switch
- Included with console:

  (1) 10' work cable (+) w/clamp

  (1) 10' rectifier cable (-)

  (1) 10' remote control cable

  (1) 10' power supply control cable

  (1) Spare fuses - 8 amp

  (1) Spare fuses - 15 amp

  (1) Instruction manual

  (1) 10 ft Plasma Gas Supply Hose

  (1) 10 ft Shield Gas supply Hose

  (1) 10 ft Coolant Supply Hose
- Dimensions: 15" (38.1 cm) wide x 18-5/8" (47.3 cm) high x 19-5/8" (49.8 cm) deep
- Shipping Weight: 125 lbs (56.8 kg)

1.3 THERMAL ARC PLASMA

Plasma is a gas which has been heated to an extremely high temperature and ionized so that the gas becomes electrically conductive. The welding process uses this plasma to transfer an electric arc to the workpiece. The metal to be welded is melted by the heat of the arc.

In a Thermal Arc plasma torch, a cool gas such as Argon enters in Zone A, Figure 1-C. In Zone B a pilot arc between the electrode and the front of the torch heats and ionizes the gas. An arc transfers to the workpiece through a column of plasma gas in Zone C.

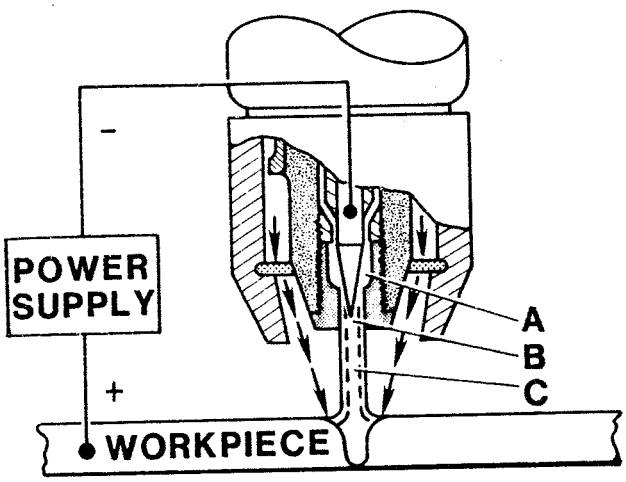


Figure 1-C Thermal Arc Plasma

By forcing the plasma gas and electric arc through a small orifice, Thermal Arc torches deliver a high concentration of heat to a very small area. The stiff, constricted plasma arc is shown in Zone C. Direct current straight polarity is used for plasma welding, as shown in the illustration.

The exclusive Dual-Flow design of Thermal Arc welding torches uses a shield gas, shown by the small arrows. The shield gas surrounds the plasma arc and channels it to the workpiece, shielding the weld puddle.

Coolant from the coolant recirculator flows through the liquid cooled power leads to the torch head and back.

The plasma arc is infinitely variable from soft to stiff. Most applications can best be accomplished with a softer arc (lower plasma) gas flow. Full penetration or "keyhole" welding requires a stiff arc (high plasma) gas flow.

Individual welding torch instruction manuals contain detailed information on these parameters.

1.4 THEORY OF OPERATION

The main components of the WC 100B welding system are illustrated in the block diagram (Fig. 1-D) and their function is summarized below. The WC 100B includes the components shown inside the solid lines in the center of the illustration.

Plasma and Shield Gases

Plasma and shield gases flow through the WC 100B to the welding torch at rates set at the console flowmeter controls. The flow rate of each gas is indicated on the front panel meters. Solenoid valves turn the gases on and off. The gas pressure interlock shuts the system down if the plasma gas pressure falls below 25 psi.

The plasma gas flows through the black lead, around the electrode and gas distributor, and out through the tip orifice.

The shield gas flows through the yellow torch lead, around the torch front end and out through the shield cup.

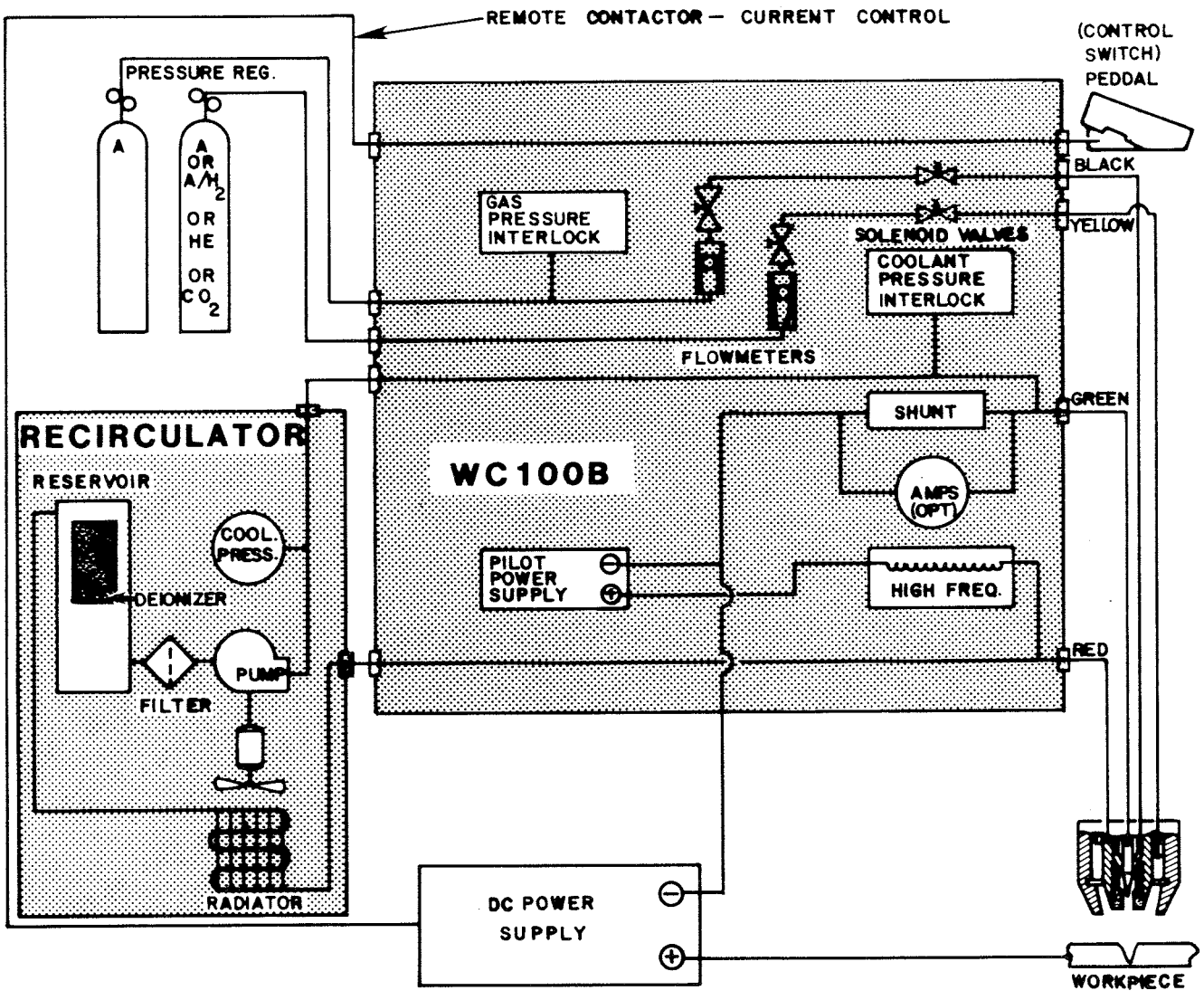


Figure 1-D Block Diagram of WC 100B Welding System

Pilot Arc

Direct current alone is not enough to initiate the main welding arc. High frequency is superimposed on a DC current for a short duration to establish the pilot arc between the electrode and welding tip. The pilot arc creates a path for transferring the main arc to the work. The amount of current produced is controlled by the HIGH/LOW switch on the front panel. DC power for the pilot arc comes from a single phase full wave rectifier in the WC 100B.

Current Control

The welding current is controlled by the power supply. A remote current control (manual or foot-operated) may be attached to the power supply.

Coolant

Coolant flows from the coolant re-circulator to the welding console, through the negative torch lead to the torch head and returns through the positive torch lead. The coolant pressure interlock shuts the system down if the coolant pressure falls below 20 psi.

Welding Current

The power supply provides the welding current. The negative output is connected to the torch electrode through the liquid cooled lead. The positive output is connected to the workpiece through the work cable.

2.1 UNPACKING NEW EQUIPMENT

Unpack the equipment. Check for possible damage during shipment. Check to be sure all items listed on the packing list are identified and accounted for.

2.2 EQUIPMENT INSTALLATION

Select a clean, dry location with good ventilation and adequate working space. All major components of the welding system should be accessible for maintenance.

Review PRECAUTIONS starting on page iii of this manual to be sure that location meets all safety requirements.

WARNING

Do not turn on power until Step 15.

1. Remove the cover of the WC 100B by removing the screws from the top and loosening the screws on the sides. The cover can then be lifted off to allow access to the inside of the unit for leads connections, etc.

2. Check the red tag attached to the input power cable to be sure the unit is wired for proper input voltage.

NOTE: ALL 230V AND 460V UNITS ARE FACTORY WIRED FOR 460V OPERATION. 230V INSTALLATIONS REQUIRE VOLTAGE CHANGEOVER. 380/415V AND 575V UNITS DO NOT REQUIRE VOLTAGE CHANGEOVER.

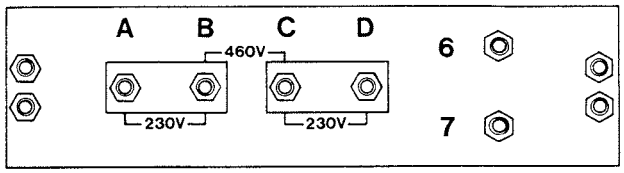
For 230V or 460V units, if the unit is not wired for proper voltage, voltage changeover is required. The selection is made on the terminal board on the input side of the main transformer, which is located on the left side of the machine.

The terminals on the input side (Fig. 2-A) are connected with links as follows:

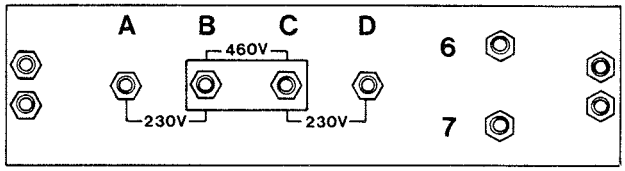
For 230V input, connect A to B, and C to D.

For 460V input, connect B to C.

In both cases the two input lines (wires number one and four) are connected to terminals A and D.



230V Input



460V Input

Figure 2-A Input Terminal Connections

3. The negative rectifier cable (color coded green) is led through the rubber boot in the rear panel and connected to the shunt inside. Bolt the cable lug against the brass body of the shunt; do not place a washer between the lug and the shunt. Connect the other end of the cable to the negative output of the DC power source.

4. Connect the positive output of the DC power source to the workpiece with the work cable.

5. Connect the PLASMA (black) and SHIELD (yellow) gas supply hoses to the gas supply. Set pressure regulators at 30 psi.

6. Connect the torch by passing the torch leads through the front panel torch leads boot and connecting the leads to the appropriate color coded fittings.

   Green - Negative
   Red - Positive
   Black - Plasma
   Yellow - Shield

7. Connect the coolant SUPPLY hose (blue) to the SUPPLY fitting and the RETURN hose (orange) to the RETURN fitting on the coolant recirculator.

8. Fill the coolant recirculator with Thermal Arc Torch Coolant (provided with the recirculator). The recirculator should be filled and started to circulate the coolant through the system and remove all air trapped in the lines. After running for a few minutes, add enough coolant to bring the level up to the proper operation level (see recirculator instructions).

9. Connect the Power Supply Control Cable to the connector J9 on the rear panel of the WC 100B marked POWER SUPPLY CONTROL. Connect the Cable leads to the Power Supply (refer to Power Supply wiring schematic for connections). Figure 2-B shows the relationship of the remote control device to the Power Supply Control Cable.

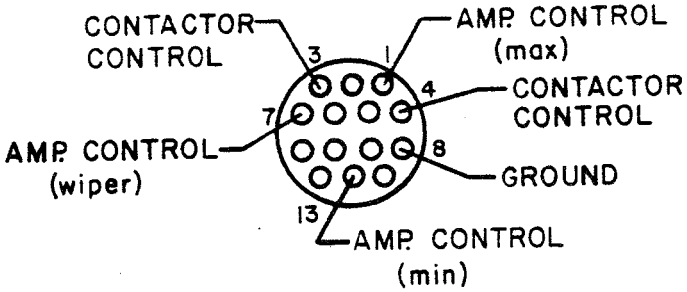


Figure 2-B Rear View of Power Supply Control Cable Plug (P9)

Step 10 applies only to hand held torches.

10. Connect the foot switch supplied with the system to the front panel of the WC 100B marked REMOTE CONTROL (J10).

If a foot switch other than one supplied by Thermal Dynamics is used, it must be connected to the Remote Control Cable supplied as follows (see Fig. 2-C):

Contactor control to wire leads from P10-3 and P10-4.

MAX side of amperage control to wire lead from P10-1.

MIN side of amperage control to wire lead from P10-13.

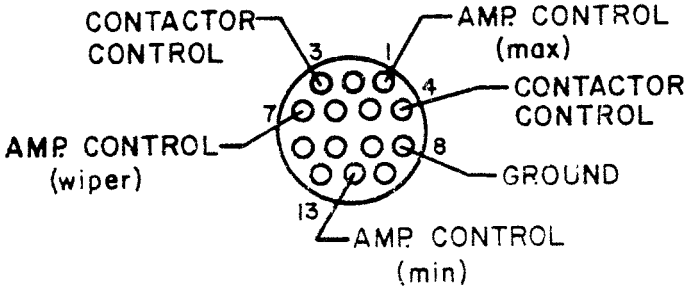


Figure 2-C Back View of Remote Control Cable Plug (P10)

Variable (wiper) side of amperage control to wire lead from P10-7.

Foot switch frame "ground" to wire lead from P10-8.

11. Attach the DC voltage display line from the rear panel of the WC100B to the workpiece.

12. If the Gas Saver accessory is to be used, its plug should be connected to the AUX CONTROL receptacle on the WC 100B front panel. The gas saver is only used with a hand torch and set up as in Step 10.

Other connections to AUX. CONTROL:

If another type of switching device is connected to the AUX CONTROL connector it should be of the "Normally Closed" type.

CAUTION

The AUX CONTROL mode of operation shuts the complete system down. This means that the pilot arc and gases are shut off. This could shorten the life of the torch tip and electrode. It also could cause deterioration of the weld puddle at the time of shutting the system down.

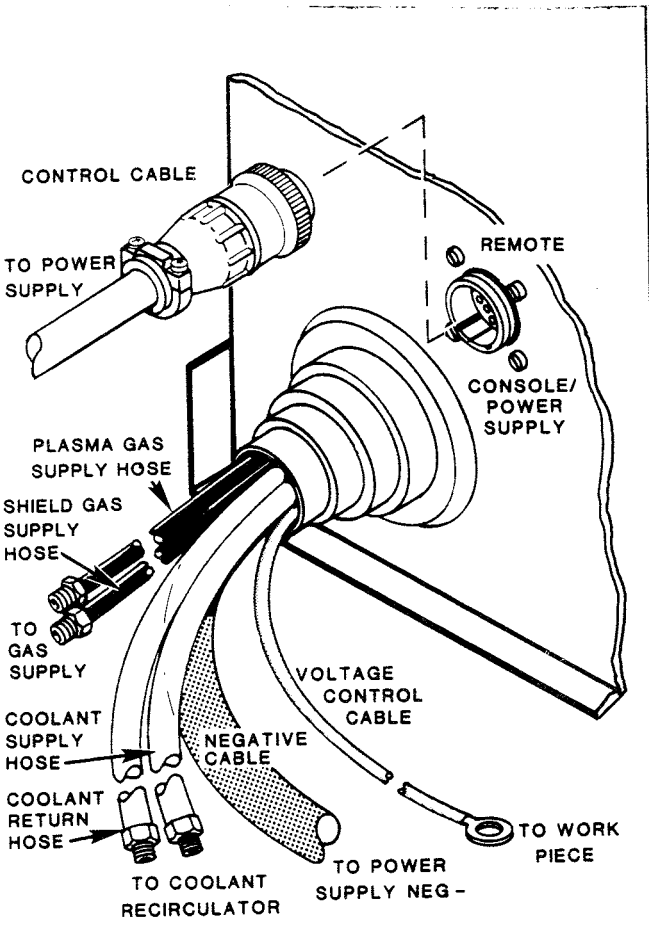
13. Connect a ground wire to the rear panel connection marked with the ground symbol .

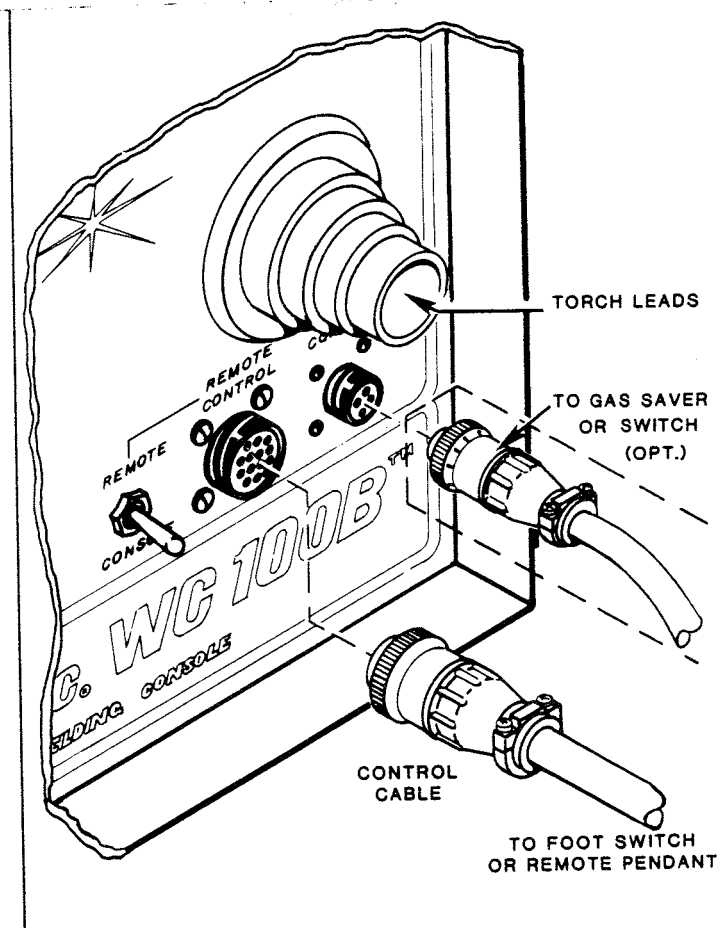
Check the input power connections on the transformer, which is located on the left side toward the rear of the unit, to be sure that they are set up for the available voltage. Primary input is 230VAC or 460VAC single-phase 50/60 Hz. Alternate single-phase systems are 380/415 VAC 50Hz and 575V 50/60 Hz.

14. Connect the power cord from the back of the WC 100B to a suitable source of power. The source should be fused for 15A for 230 volts and 8A for 460 volts. 380/415V systems should be fused for 10A. 575V systems should be fused for 8A.

15. Replace and secure the console cover and turn on the primary power.

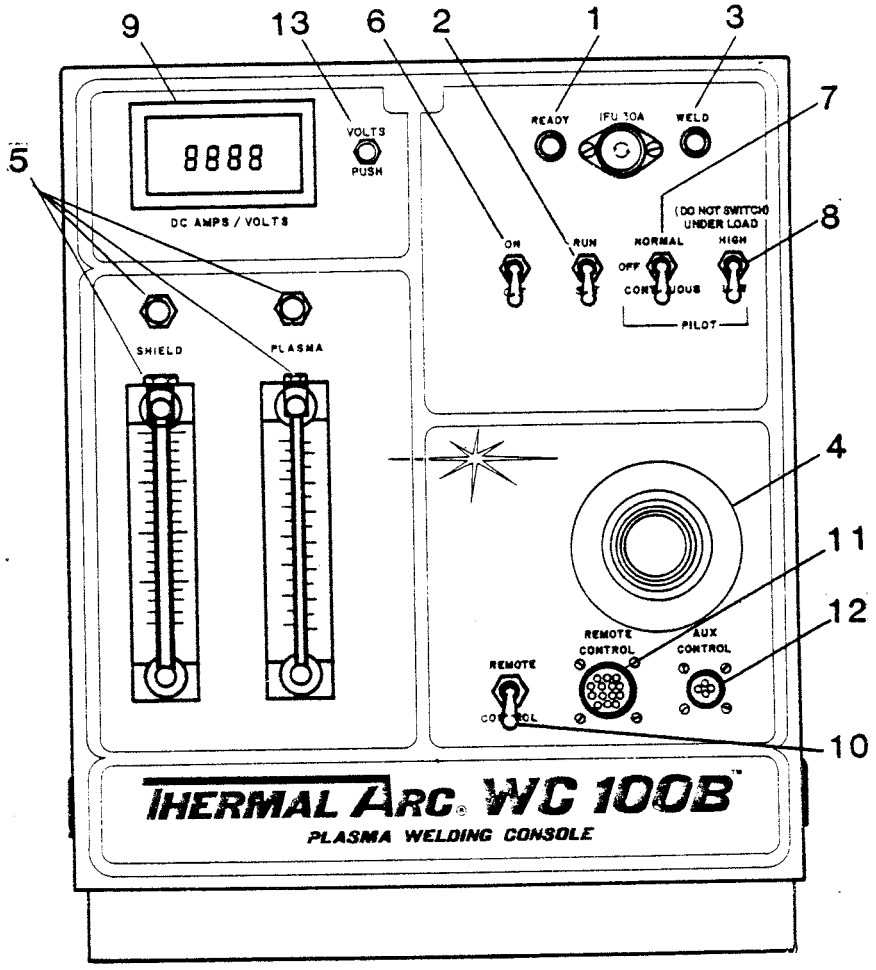
The WC 100B is now ready for startup operation.





3.1 OPERATING CONTROLS

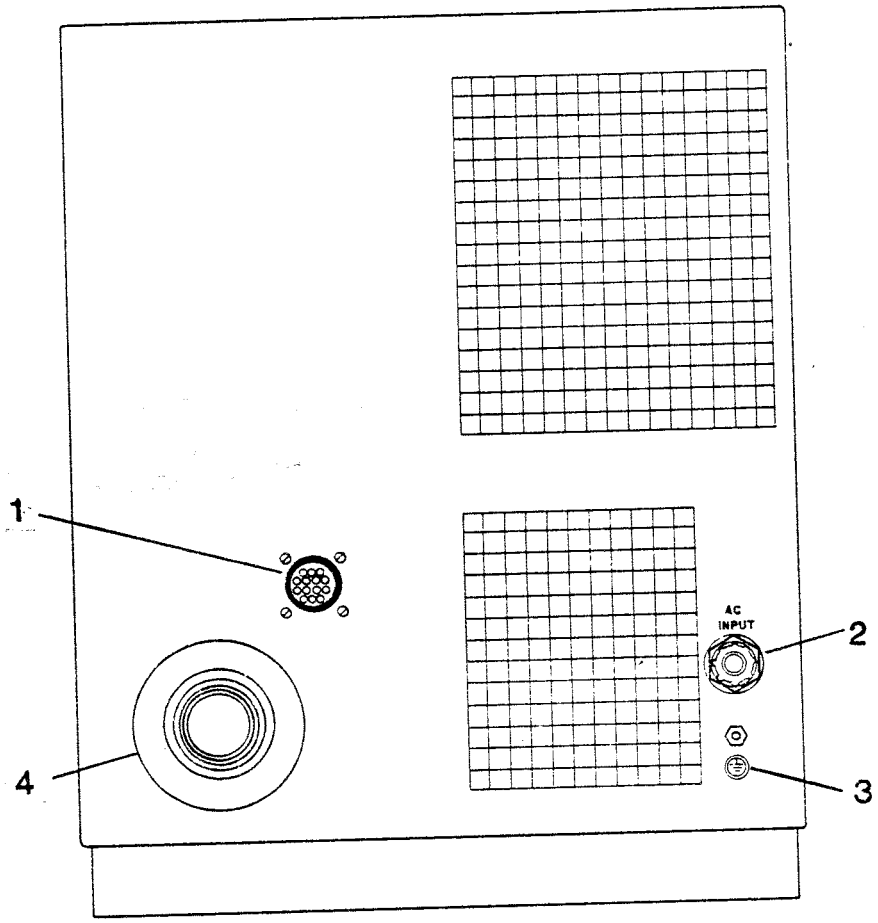
The front panel controls and connections are shown below:



Control Indicator	Function
1. Amber "READY" Light (LT1)	Indicates that pilot arc is on and coolant and plasma gas pressure interlocks are satisfied.
2. RUN/SET Switch (SW2)	The RUN/SET switch is used to set gas flow before starting to weld. In the "SET" position with power on and the coolant pressure interlock satisfied, both gases will flow and may be adjusted with the metering valves. In the "RUN" position, the gases will flow as sequenced by the other controls.
3. Red "WELD" Light (LT2)	The red WELD light indicates that the console has signaled the main power supply contactor to close.

Control Indicator	Function
4. Torch Leads Boot	Torch leads are led through boot to torch connections.
5. Flowmeter Controls	The gas metering valves and flowmeters control the plasma and shield gas flow rates.
6. ON/OFF Switch (SW1)	Controls the primary power to the console.
7. PILOT NORMAL/OFF/CONTINUOUS Switch (SW3)	The NORMAL/OFF/CONT switch is used to start and stop the system and to select the mode of operation. In CONTINUOUS mode the pilot arc remains on during welding to help stabilize the welding arc at lower current levels or for repetitive arc starting in high duty-cycle short duration welding applications. In NORMAL mode the pilot arc is automatically switched off as soon as the welding arc is established. This mode is normally used in long duration welding operations.
8. PILOT HIGH/LOW Switch (SW4)	This switch gives two current levels for the pilot arc thereby improving the starting characteristics of the torch at higher current levels. NOTE: Do not switch HIGH/LOW when unit is under load.
9. AMP/VOLT Meter	Digital readout indicates amperage and voltage supplied to torch.
10. REMOTE CONTROL Switch (SW5)	This switch allows the contactor to be controlled by a remote switch.
11. REMOTE CONTROL Connector (J10)	The receptacle marked REMOTE CONTROL is for the remote contactor/current control of the main power supply. This is usually located in a foot switch and the method of connecting it is described in the Installation section.
12. AUX CONTROL Connector (J11)	The receptacle marked AUX CONTROL is for an optional gas saver switch. When used, this switch turns off the gas flow and pilot power when the torch is hung on the switch bracket.
13. MOMENTARY SWITCH	Momentary switch temporarily displays voltage on AMP/VOLT meter.

The rear panel controls and connections are shown below:



Control Indicator	Function
1. POWER SUPPLY CONTROL (J9)	When connected to Power Supply this allows for control of contactor and amperage from the WC 100B Console.
2. AC INPUT	Primary Power connection.
3. Ground	Connect to building ground.
4. Cable and Hose Boot	Negative cable and gas and coolant hoses are led through boot to their connecting points inside the console.

3.2 OPERATION

CAUTION

Do not attempt to operate the system unless a torch with properly adjusted electrode is connected to the console. (Running the high frequency in a torch without properly adjusted electrodes will damage the torch).

1. Turn the RUN/SET switch to the "SET" position.

2. Move the ON/OFF switch to "ON".

3. Turn on the coolant recirculator.

CAUTION

Thermal Arc Torch Coolant should always be used in the system. If Thermal Arc coolant is not available, deionized water with a conductivity of more than .1 megohm cm may be used.

4. Turn on the Plasma/Shield gas supply to the console. With gases flowing, the gas supply pressure regulators should be set at 30 PSIG. The flow metering valves directly above the flowmeters can be adjusted to provide required flow rates. Flowmeters read directly in standard cubic feet per hour or liters per minute. The torch instructions list the approximate settings. Let plasma gas flow for 1-3 minutes to purge gas lines and remove any traces of moisture or other contaminants that may have entered the lines during shipping.

5. Turn the PILOT switch to either NORMAL or CONTINUOUS depending on the desired mode of operation. In CONTINUOUS mode, the pilot arc remains on during welding to help stabilize the welding arc at lower current levels or for repetitive arc starting in high duty-cycle short duration welding applications. In NORMAL mode, the pilot arc is automatically switched off as soon as the welding arc is established. This mode is normally used in long duration welding operations.

6. Select the pilot current setting (high pilot for 4A, PWM-300, and 6A torches, low pilot for 2A and 3A torches).

7. Move the RUN/SET switch to the "RUN" position. If the coolant and gas pressure switches are satisfied after two seconds of gas prepurge the pilot arc will initiate and the amber READY light will come on.

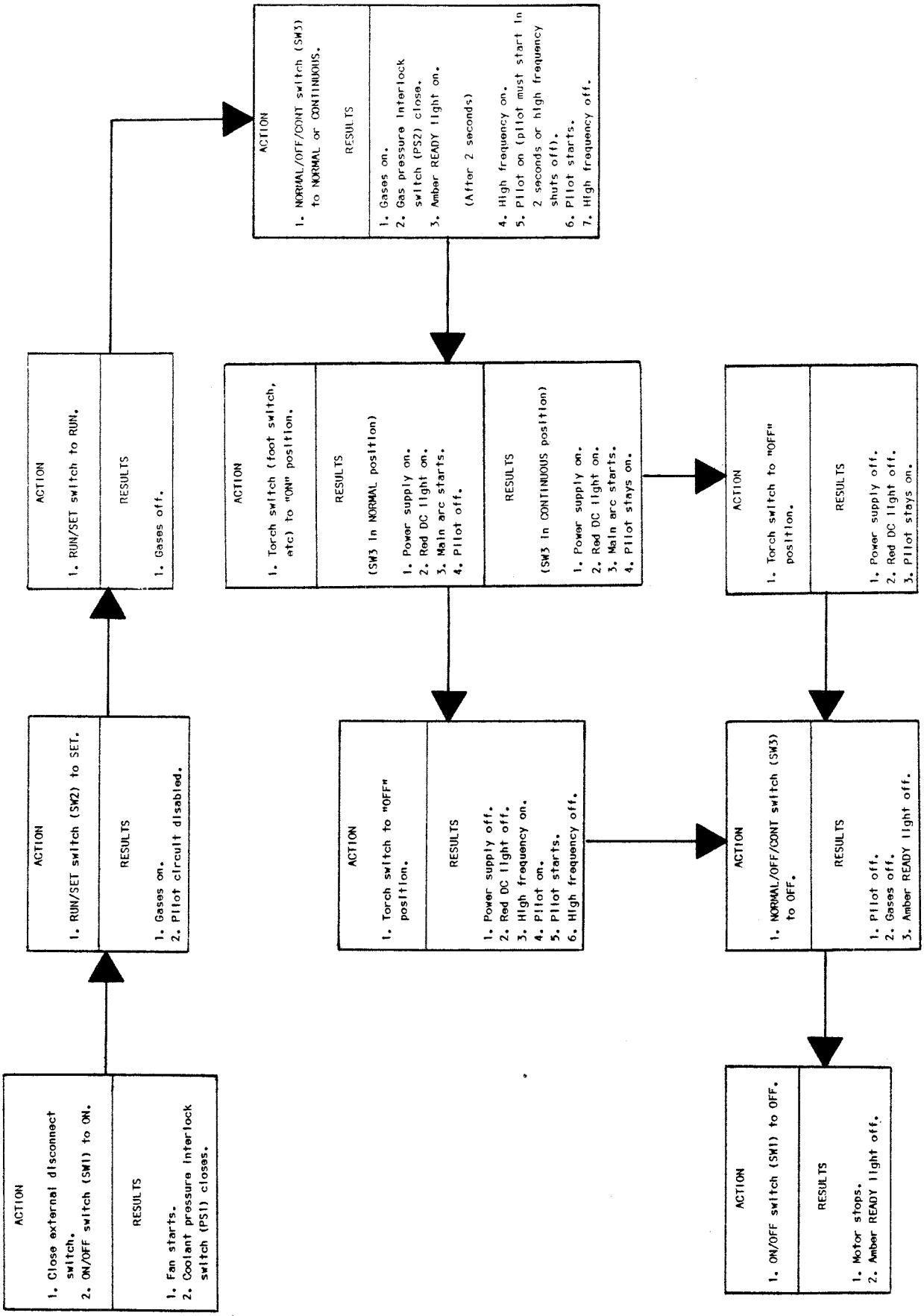
The system is now ready for arc to be started from the main power supply.

GAS SAVER

An optional gas saver accessory is available. This consists of a cradle to hold the torch with a switch that closes when the torch is hung in the cradle and opens when the torch is removed. The gas saver accessory is plugged into the AUX CONTROL receptacle.

The gas saver switch allows the PILOT switch to be set to either NORMAL or CONTINUOUS without having the gas or the pilot power come on until the torch is lifted from the cradle. Operation of the torch in this mode is normal except that the removal of the torch from the cradle simulates switching the PILOT switch to NORMAL or CONTINUOUS. Replacement of the torch in its cradle simulates switching the PILOT switch to OFF.

The diagram on the following page describes the operating sequence of the system.



WC 100B Sequence of Operation

4.1. TROUBLESHOOTING GUIDE

If the system malfunctions it is necessary to determine where the malfunction exists in the normal sequence of operation (see chart on page 13). The operating procedure of the unit is outlined in the left hand column of the table below to provide a systematic approach to troubleshooting.

TROUBLE	POSSIBLE CAUSE	REMEDY
A. Fan does not run	1. No input power	1. Check
	2. Fuse 1FU blown	2. Check fuse rating (see 12, p.7)
B. Gas does not flow in "SET"	1. Tank empty or not on	1. Check gas supply
	2. Coolant recirculator not turned on	2. Turn on
	3. Solenoid valve unplugged	3. Connect plug
C. Pilot arc does not come on in NORMAL or CONTINUOUS mode (No amber READY light)	1. RUN/SET switch in SET	1. Switch to "RUN"
	2. Gas pressure switch not satisfied	2. Plasma gas pressure should be 30 psi (See D, p.17)
	3. Coolant pressure switch not satisfied	3. Check coolant level
	4. Torch parts not adjusted correctly	4. Check- see torch manual
	5. Spark gap out of adjustment	5. Set to .015"
	6. Malfunctioning time delay TD1 or TD2	6. Check (see A, page 17)
	7. Faulty pilot diode	7. Check (4) diodes (see E, page 17)
	8. Broken conductor in torch lead	8. Check (see J, page 18)
D. Pilot arc weak	1. Capacitor C7 bad	1. Check and replace if necessary (see F, page 18)
	2. Pilot switch in low range	2. Place in high range
	3. Plasma gas flow rate too low	3. Increase flow rate
E. No red "DC Power" light with pilot arc on	1. Remote control plug or switch not connected properly	1. Check 2A and 2B on page 7 for correct installation
	2. Faulty control switch	2. Check switch
	3. No 24V control voltage	3. Check (see B, page 17)

This section of the troubleshooting guide lists the most common problems encountered with a plasma welding torch. The TROUBLE is listed in the sequence of operation of the torch. The POSSIBLE CAUSE and REMEDY are listed beginning with the easiest to check and progressing to the more difficut to check. Most problems related to the torch can be corrected within this section.

TROUBLE	POSSIBLE CAUSE	REMEDY
A. Erratic or poor appearing pilot arc	1. Worn torch parts	1. Check and replace with new parts
	2. Improper electrode setting	2. Adjust electrode setting according to manual
	3. Contaminated plasma gas	3. Check (see L, p.19)
	4. Moisture in torch or leads	4. Check (see N, p.19)
	5. Contaminated coolant	5. Check (See O, p.19)
B. Welding arc will not transfer	1. Torch standoff too high	1. Reduce standoff (approx. 3/32-3/16" standoff for most applications)
	2. Power supply not properly connected	2. Check work lead, negative lead and contactor control cable
	3. Faulty electrode in torch	3. Check for sharp point and clean appearance of electrode
C. Welding tip damaged on start up	1. Improper installation of torch parts	1. Check (see torch manual)
	2. Incorrect polarity	2. Check negative and positive leads for proper connection; check power supply range switch (see M, page 19)
	3. Plasma gas flow rate too low	3. Increase flow rate
	4. Excessive current level	4. Reduce current or use larger orificed tip
	5. Inadequate coolant flow	5. Check (see K, p.19)
	6. Contaminated gas	6. Check torch and system (see L, p.19)
	7. Moisture in torch	7. Check torch O-rings for coolant leaks; check gas hoses (see N, page 19)

TROUBLE	POSSIBLE CAUSE	REMEDY
	8. Contaminated coolant	8. Check coolant (See O, p.19)
	9. Tip touching workpiece	9. Increase standoff
D. Tip damaged after a period of welding	1. Inadequate coolant flow	1. Check (see torch requirements)
	2. Excessive current level	2. Reduce current or use larger orifice tip
	3. Plasma gas flow rate too low	3. Increase flow rate of plasma gas
	4. Moisture in torch leads	4. Check torch O-rings for leaks; check gas hoses
E. Not getting required penetration	1. Plasma gas flow too low	1. Increase gas flow
	2. Current too low	2. Increase current
	3. Electrode setback at minimum	3. Increase electrode setback
	4. Travel speed too high	4. Decrease travel speed
F. Porosity in welds	1. Contaminates on material	1. Clean material
	2. Plasma gas flow rate too high	2. Reduce (if plasma gas flow is too high but 100% penetration is not occuring, gas porosity may appear)
	3. Inadequate shield gas coverage	3. Increase flow rate or use additional "trailer" shield to provide adequate gas shielding
G. Slight undercutting (in toe area of weld)	1. Travel speed too high	1. Reduce travel speed
	2. Plasma gas flow too high	2. Reduce flow rate
	3. Tip orifice size too small	3. Use larger orificed tip.
	4. Electrode set at max setback	4. Reduce the setback distance (see torch operating instructions)
	5. Current level too low	5. Increase current level

4.3 TEST PROCEDURES

The following tests are suggested for specific problems listed in the preceding troubleshooting section. The letter designations correspond to those listed in the "Remedy" column of the troubleshooting guide.

WARNING

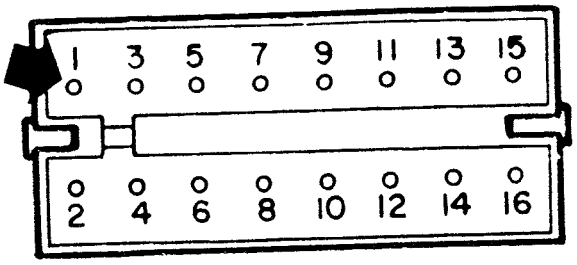
Several of these tests involve voltage measurements that must be made with power on. In order to make these measurements, the cover interlock switch must be propped closed or by-passed. Use extreme care when making these tests and be sure to return the interlock switch to proper operation after work is completed.

Tests requiring voltage measurements are marked with the warning symbol:

All other tests are to be made with the primary power to the machine turned off.

A. The two time delay relays, TD1 and TD2, are interchangeable and can normally be checked by swapping them. They are the "delay on operate" type with a fixed two second delay.

B. The 24 volt transformer and switch circuit can be checked with an AC voltmeter. The meter probes should be on J4-1 (a pin connection on the printed circuit card that holds the relays) and ground. The pin connection can be located by finding J4 and locating number 1 as shown.



Measure 24 volts AC between pin 1 and ground.

C. Relay 1CR and 2CR has a 24 volt AC coil. The coil resistance should be approximately 80 ohms measured from pin A to pin B (bottom view).

D. Pressure switches are located on the plasma gas line just inside the solenoid valve on the plasma bracket and on the NEG. torch connection just above the shunt. The switches are normally open. The pressure at which the switches will close is not adjustable. The switch must be replaced.

E. A "quick check" can be made on the main diodes without removing them from the circuit as follows: Using an ohmmeter with the RX1 or RX10 scale, measure the resistance of each diode in both directions. The readings should differ by at least a factor of 10. If they do not differ (both high or both low) the diode has failed and must be replaced. If a diode fails it is important to check several things to make sure that the replacement diode will not fail. There are four potential causes of diode failures:

1. An in-rush current surge is the most probable cause of main diode failure. The in-rush surge is absorbed by capacitor C3 and resistor R1 in series with each

other across the output of the bridge rectifier. The capacitor and resistor, as well as the wires connecting them to the circuit, should be completely checked in any case of diode problems. The capacitor is a polarized capacitor, and it is important to be sure that the side marked + is connected to the positive side of the circuit.

2. High frequency protection for the diodes is provided by capacitors C1 and C2 which are installed between each side of the bridge rectifier and ground. These capacitors and their connections should be checked.

3. Overheating of the diode can occur if air flow over the heat sink is inadequate or if the diode is not properly fastened to the heat sink. Check to see that the diodes are torqued to 24 inch pounds (2.7 Nm) and that a light film of electrically conductive heat sink compound (this is a white grease) is present between the diode and heat sink. Also check for normal operation of the fan and to be sure that the air passages into and out of the unit are not obstructed.

4. Diodes that are faulty at the time of manufacture are difficult to diagnose. These usually fail during the first few hours of operation. Before deciding that this was the case, be sure to check out the other possibilities.

F. To check the high frequency capacitor, it is necessary to try to start the torch. The spark between the spark gap points should be bright blue. If the spark appears to be weak or nonexistent, disconnect the wire between the spark gap and the capacitor and try to start the torch again. If the spark is stronger with this wire disconnected, the high frequency capacitor is faulty and must be replaced.

G. The high frequency transformer has too much voltage (3000 volts AC) to check under power. The resistance of the primary coil should be 13.9 ohms and the resistance of the secondary coil should be about 12.5K ohms.

H. The open circuit voltage can be checked between the two heat sinks of the pilot bridge rectifier. This should be 127 volts DC.

I. The four pilot arc resistors are located vertically on the rear panel of the unit. R2 and R5 should read 8 ohms, each. R3 and R6 should read 10 ohms each.

J. To check for DC voltage at the torch leads it is necessary to disconnect the high frequency first to avoid damage to the voltmeter. The 115 volt primary to the high frequency transformer is connected through the 3 conductor plastic connector. These are lines 5 and 37, and the high frequency can be disabled by disconnecting this connector.

Once the high frequency is disconnected, the torch switch should be closed. 127 volts DC will immediately be present between the negative lead and ground. After 2 seconds relay PCR will close and 127 volts can then be measured between the negative lead and the positive lead.

The following tests correspond with the torch section of the troubleshooting guide.

K. Inadequate coolant flow can cause excessive damage to the tip and liner. Check the "return" flow rate of the coolant against the torch requirements. For inadequate coolant flow check the filter in the coolant recirculator. See instruction manual for that unit.

Coolant flow for Welding Torches

PWH/M-2A	1/4 gal/min @ 50 psi
PWH/M-3A	1/3 gal/min @ 50 psi
PWH/M-4A	1/2 gal/min @ 50 psi
PWM-300	3/4 gal/min @ 100psi
PWM-6A	2 gal/min @ 100 psi

L. Contaminated plasma gas normally causes the electrode to have a bluing tint toward the front. Check for leaks in the plasma gas line by plugging the tip and letting the gas flow while the console is in the "SET" position. Check all connections on the plasma gas line using a soaply water solution on the connection. If bubbles appear then there is a leak at this point.

M. Reverse polarity operation will cause excessive electrode deterioration which may cause a large ball to appear at the end of electrode.

N. Moisture in the plasma gas may cause a black sooty material to appear on the electrode or in the tip. **This can be due to the use of rubber hoses which may cause moisture entrapment.** For best results use Synflex tubing.

To remove moisture from the torch, plug the tip and let the gas build pressure, then release. It may be necessary to repeat the procedure three or four times to remove the contaminants.

O. Contaminated coolant gas can be caused by not using or maintaining the proper coolant in the system. This can be checked using a PT-25 water tester and checking the resistivity level of the coolant.

5.1. GENERAL ARRANGEMENT

PARTS LIST

Fig. 5-1 WC-100B Welding Console

Fig. 5-2 WC-100B Front Panel Assembly

Fig. 5-3 Chassis Assembly

Fig. 5-4 Equipment Tray Assembly

Fig. 5-5 Panel Assembly

An item number in parentheses indicates the item is located behind the item pointed to. Parts listed without item numbers are not illustrated, but may be ordered by the catalog number shown.

NUMERICAL INDEX

The Numerical Index lists in numerical order all catalog numbers listed in the Assembly Parts List and the applicable figure and index number for cross reference.

REFERENCE DESIGNATION INDEX

The Reference Designation Index lists all reference designations assigned to electrical components with a cross reference to the Assembly Parts List.

ORDERING INFORMATION

When ordering replacement parts, order by catalog number and complete description of the part or assembly, as given in the description column of the Assembly Parts List. In addition, give the model number of the machine, the machine serial number and its operating voltages, as given on the plate attached to the front panel of the power supply and control unit. Address all inquiries to your authorized Thermal Arc Distributor.

PARTS LIST

Figure 5-1 WC

Fig.	Item No.	Qty.	Catalog Number	Description
5-1	1	1	3-2646-#	TDC Style WC100B Welding Console
5-1	(2)	1	9-3998	Remote Control Plug & Cable Ass'y
5-1		1	9-2576	10' Rectifier Cable (NEG)- For PS-15
5-1		1	9-3796	10' Rectifier Cable (NEG)- For PS-30A
5-1		1	8-1061	10' Rectifier Cable (NEG)- For Other Power Supplies
5-1		1	9-2832	10' Work Cable (POS) w/Clamp- For PS-15
5-1		1	9-3802	10' Work Cable (POS) w/Clamp- For PS-30A
5-1		1	9-2318	10' Work Cable (POS) w/Clamp- For Other Power Supplies
5-1		1	9-4007	10' Power Supply Control Cable- For PS-15
5-1		1	9-4129	10' Power Supply Control Cable- For PS-30A
5-1		1	9-4009	10' Power Supply Control Cable- For Other Power Supplies
5-1		1	9-4063	10' Remote Control Cable
5-1		1		10' Voltage Control Cable

#Two Digit Suffix specifies Plasma Flowmeter Option and Power Supply Requirements.

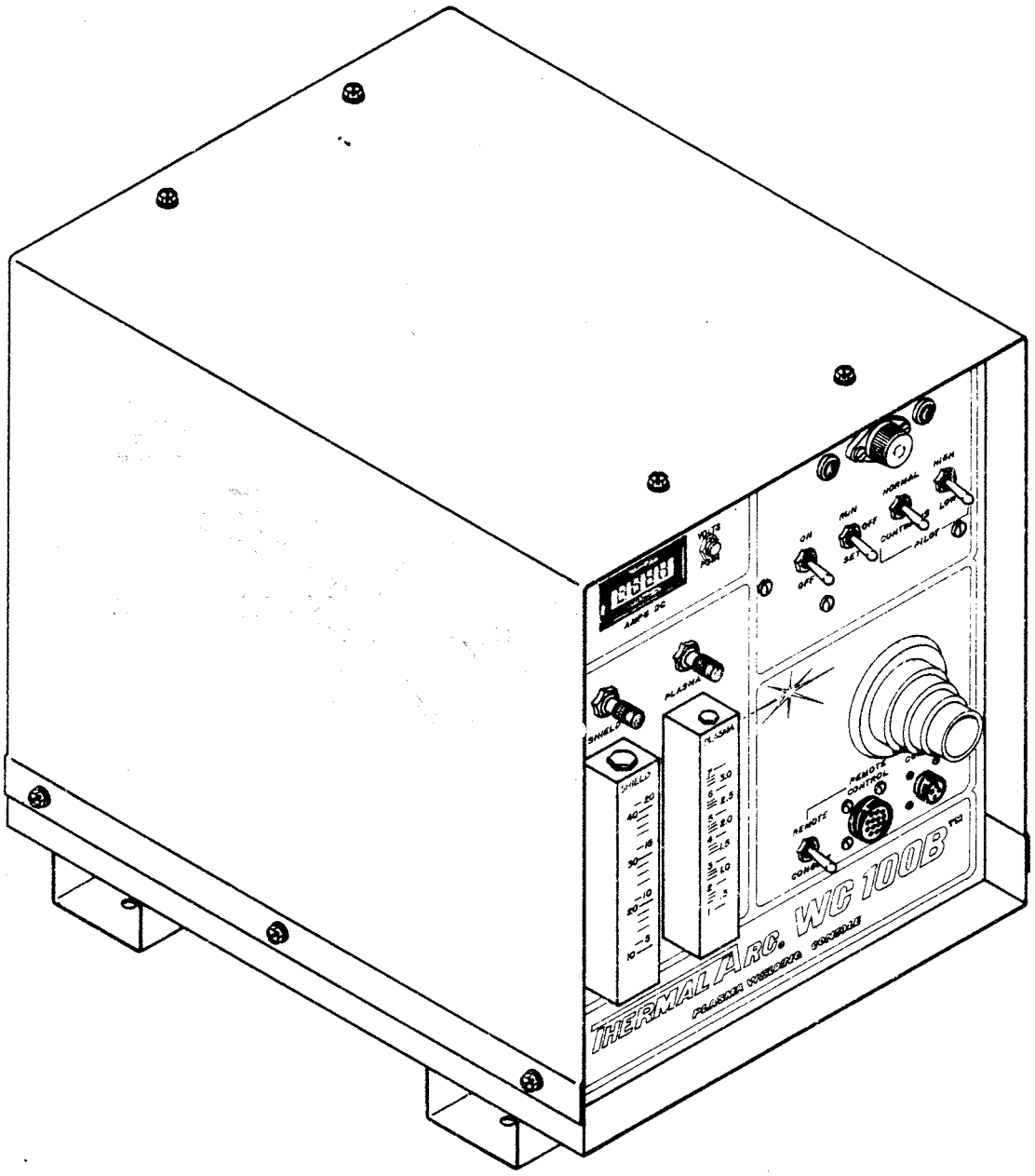


Figure 5-1 WC100B Welding Console

Figure 5-2 Front Panel Assembly

Fig.	Item No.	Qty.	Catalog Number	Description	Reference Designation
5-2	1	1		Front Panel	
5-2	2	1	8-1885	Panel Light - Red	LT2
5-2	3	1	9-2937	Fuse Holder (1FU)	
5-2	(4)	1	8-1302	Fuse- 15 amp (230V)	1FU
5-2	(4)	1	9-5566	Fuse- 8 amp (460V)	1FU
5-2	5	1	8-1886	Panel Light- Amber	LT1
5-2	6	2	9-3426	Toggle Switch- SPDT, 2 pos.	SW2, SW4
5-2	7	1	8-1777	Toggle Switch- DPDT, 3 pos.	SW3
5-2	8	1	9-4099	Digital Panel Meter	DPM
5-2	9	1	9-3325	Toggle Switch- SPST, 2 pos.	SW5
5-2	10	1	9-4210	Torch Leads Panel Boot	
5-2	11	1		Toggle Switch- SPDT, 2 pos.	SW1
5-2	12	1	9-4117	Receptacle- Rev. Sex, 4 pin	J11
5-2	13	1	9-3293	Receptacle- Rev. Sex, 14 pin	J10
5-2	14	2	9-4031	Metering Valve, 1/8 NPT Fem.	
5-2	15	1	8-1440	Plasma Flowmeter (.2-3.6 SCFH)	
5-2	15	1	8-1441	Plasma Flowmeter (.8-7.0 SCFH)	
5-2	15	1	8-1442	Plasma Flowmeter (1-15 SCFH)	
5-2	16	1	8-1443	Shield Flowmeter (4.0-40 SCFH)	
5-2	17	2	9-4082	Adapter Fitting (1/8 NPT to 1/8 Barb)	
5-2	18	1		Edge Connector	
5-2	19	2		Terminal Strip	
5-2	20	1		Capacitor- 15 mfd, 20V	C5
5-2	21	1		Resistor- 10k ohm, 1/4W	R7
5-2	22	A/R	9-3297	Socket	
5-2	23	2		Resistor- 100k ohm	R9
5-2	24	1	9-5638	Switch- DPDT Momentary	SW6
5-2	25	1	9-5607	Toggle Switch- 3PST, 2 pos.	SW1
5-2	26	1	9-4073	Pressure Switch	PS2
5-2	27	1	9-5554	1/8 NPT Hex Nipple	
5-2	28	1	8-0312	Straight Tee	
5-2	29	1	9-4082	Adaptor Fitting Barb	
5-2	30	1	9-4088	Plasma Gas Supply Hose - 10 ft	
5-2	31	1	9-4089	Shield Gas Supply Hose - 10 ft	

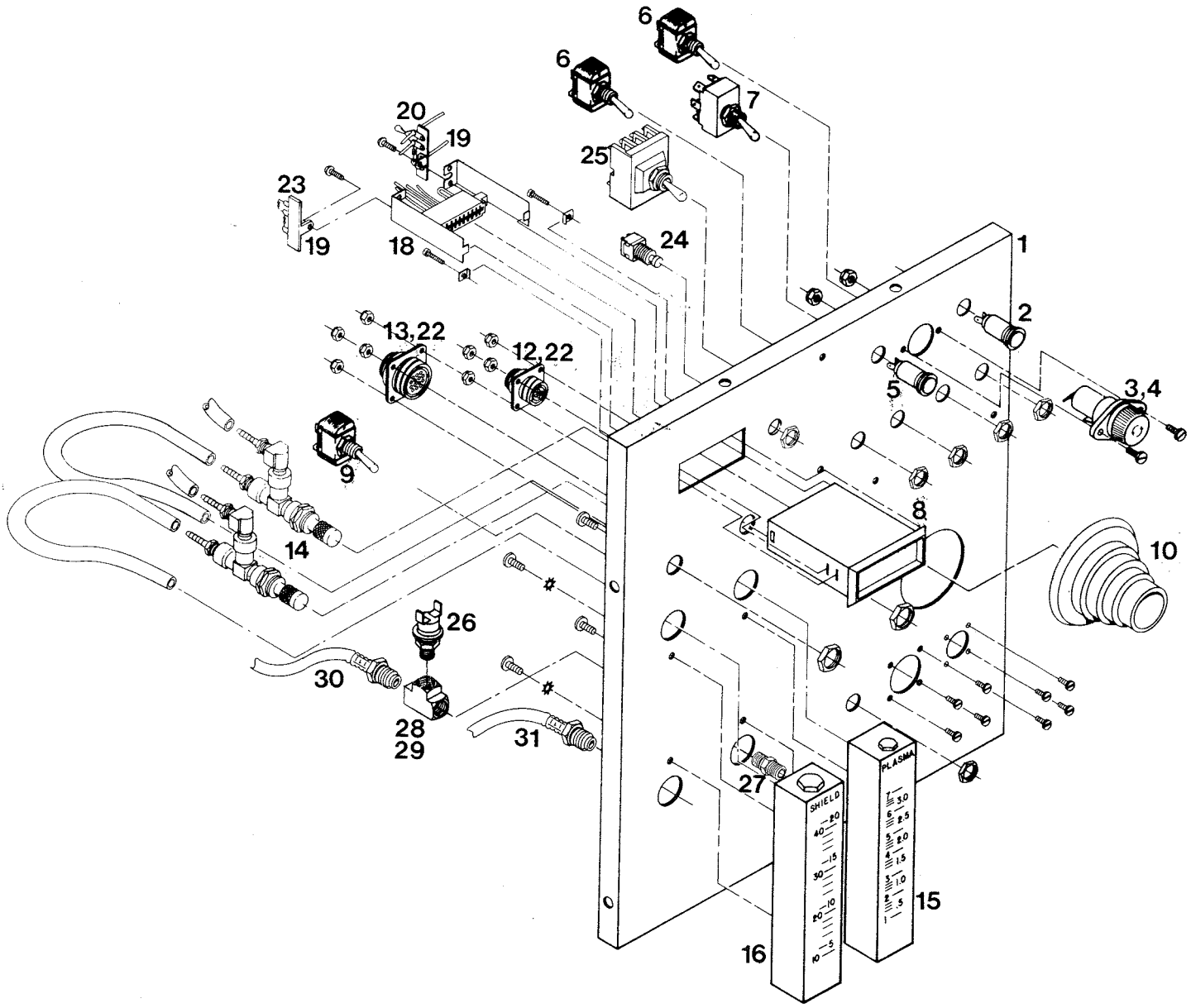


Figure 5-2 Front Panel Assembly

Figure 5-3 Chassis Assembly

Fig.	Item No.	Qty.	Catalog Number	Description	Reference Designation
5-3	1	1		Chassis	
5-3	2	1	9-4123	Bulkhead Insulator	
5-3	3	2	8-0260	0_2B-1/4 NPT Adapter	
5-3	4	2	9-3158	1/4 Bulkhead Adapter	
5-3	5	2	9-4045	1/8 NPT Bulkhead Body	
5-3	6	2		9/16-18 Jam Nut	
5-3	7	2	8-0341	1/8 NPT Street Elbow	
5-3	8	4	9-4082	Adapter Fitting (1/8 NPT to 1/8 Barb)	
5-3	9	4		3/4-16 Brass Hex Nut	
5-3	10	1		Negative Lead Connection Strap	
5-3	11	1		1/4 NPT Street Tee	
5-3	12	1	9-2023	1/4-1/8 NPT Reducer	
5-3	15	1	9-4073	Pressure Switch	PS1
5-3	17	1		Negative H.V. Lead	33
5-3	18	1		Positive H.V. Lead	39
5-3	19	1	8-1013	300 Amp Shunt	
5-3	20	1	9-3596	Capacitor- 17000 mfd, 75 VDC	C7
5-3	21	1		Capacitor Brkt. Insulator	
5-3	22	1		Capacitor Bracket	
5-3	23	1		Capacitor Insulator	
5-3	24	1		2 KVA Isolation Transformer Assy	T1
			9-5565	230 or 460V, Single-Phase, 50/60Hz 380/415V, Single-Phase, 50Hz 575V, Single-Phase, 50/60Hz	
5-3	29	2	8-1786	Solenoid Valve Replacement Kit	SOL1&2
5-3	35	2	9-4090	10 ft Coolant Supply Hose	
5-3	36	2	9-5554	1/8 NPT Hex Nipple	

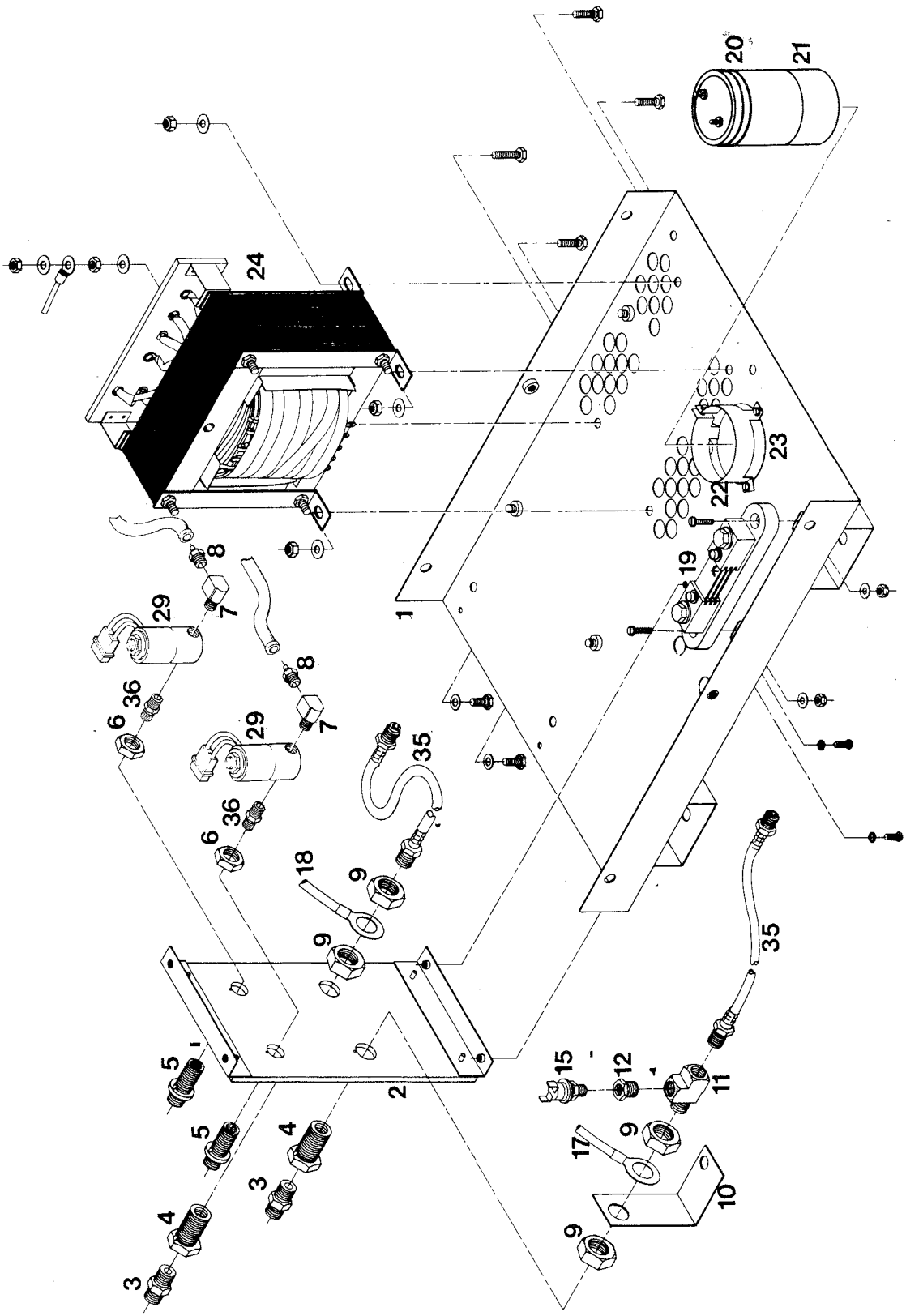


Figure 5-3 Chassis Assembly

Figure 5-4 Equipment Tray Assembly

Fig.	Item No.	Qty.	Catalog Number	Description	Reference Designation
5-4	1	1		Equipment Tray	
5-4	2	1	9-2847	Capacitor- .002 mfd	C4
5-4	3	1	9-3846	H.F. Block	
5-4	4	2	9-4003	Set Screw- Spark Gap Ass'y	
5-4	5	2	9-3841	Electrode- Spark Gap Ass'y	
5-4	6	1	9-3920	Suppression Coil Ass'y	
5-4	7	1		Rubber Grommet	
5-4	8	1	8-1373	Contactor- 3 ph.	PCR
5-4	9	1	9-3843	Transformer	T2
5-4	10	1	9-2390	Resistor- 2500 ohm	R1
5-4	11	1	9-3430	Capacitor 3700 mfd.	C3
5-4	12	1	9-3135	Capacitor Bracket	
5-4	13	1	9-3047	Capacitor Insulator	
5-4	14	1		Capacitor Brkt. Insulator	
5-4	15	1	9-4118	6 Place Relay P.C. Board	
5-4	16	2	9-2694	Time Delay Relay	TD1&2
5-4	17	2	9-2693	Relay- DPDT, 24VAC	1CR, 2CR
5-4	18	1	9-2906	Relay- DPDT, 120VAC	PSR
5-4	19	1	9-5164	Relay- DPDT, 12VDC Coil	CSR
5-4	20	1	9-4095	Current Sensing & Display P.C. Board	
5-4	21	3	8-1951	Capacitor- .25 mfd	C1, C2, C6
5-4	22	2	8-1558	Diode- 40 amp (REV)	D3, D4
5-4	23	2	8-1562	Diode- 40 amp (STR)	D1, D2
5-4	24	2		Pilot Bridge Heat Sink	
5-4	25	1	8-0241	Adalet Fitting	
5-4	26	1	8-0242	2" Locknut	
5-4	27	8	9-5333	P.C. Board Support	
5-4	28	2	9-3133	Insulating Washer	

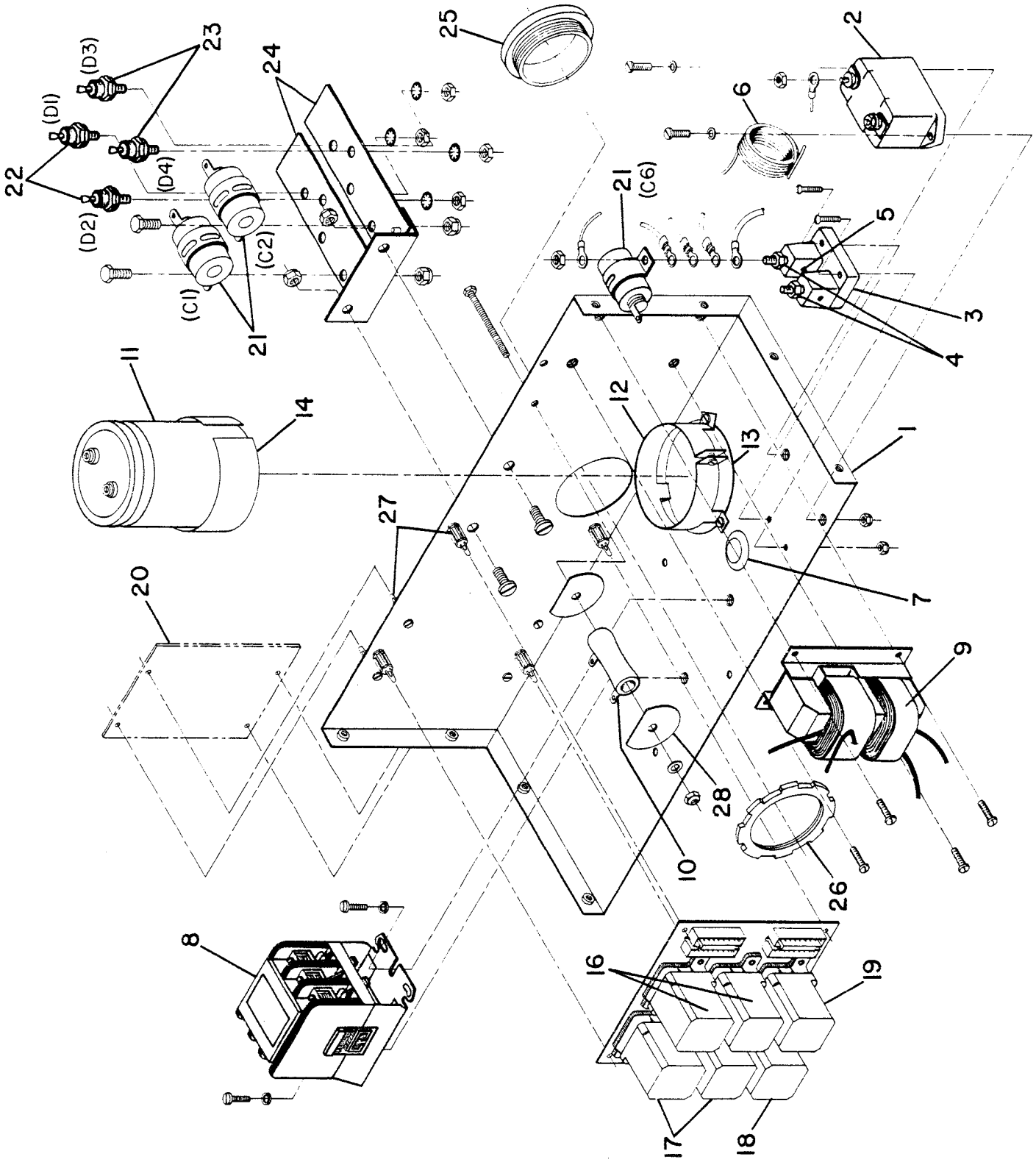


Figure 5-4 Equipment Tray Assembly

Figure 5-5 Rear Panel Assembly

Fig.	Item No.	Qty.	Catalog #	Description	Reference Designation
5-5	1	1		Rear Panel	
5-5	2	1	9-4210	Boot	
5-5	4	1	8-0213	1/2" Cord Grip	
5-5	5	1	8-0230	1/2" Locknut	
5-5	6	1	9-5218	Receptacle- Std. Sex, 6 pin	J9
5-5	7	1		Fan/Resistor Mtg. Brkt.- Top	
5-5	8	1	9-6198	Fan Mtg. Bracket/Motor	
5-5	9	1	9-4024	Fan Blade, 6-1/2" Dia	
5-5	10	1	9-6199	Fan Motor, 1/70 Hp, 3000 Rpm	M
5-5	11	8		Resistor Insulator	
5-5	12	1	9-3976	Resistor- 16 ohm	R3
5-5	13	3	9-4120	Resistor- 10 ohm, 300W	R2,5,6
5-5	14	4		#10-32 Threaded Rod	
5-5	(15)	1	9-4026	Pilot Resistor Ass'y (Consists of Items 7-14)	
5-5	16	1		Fan/Resistor Mtg. Brkt.- Bottom	
5-5	17	A/R	9-3296	Pin	

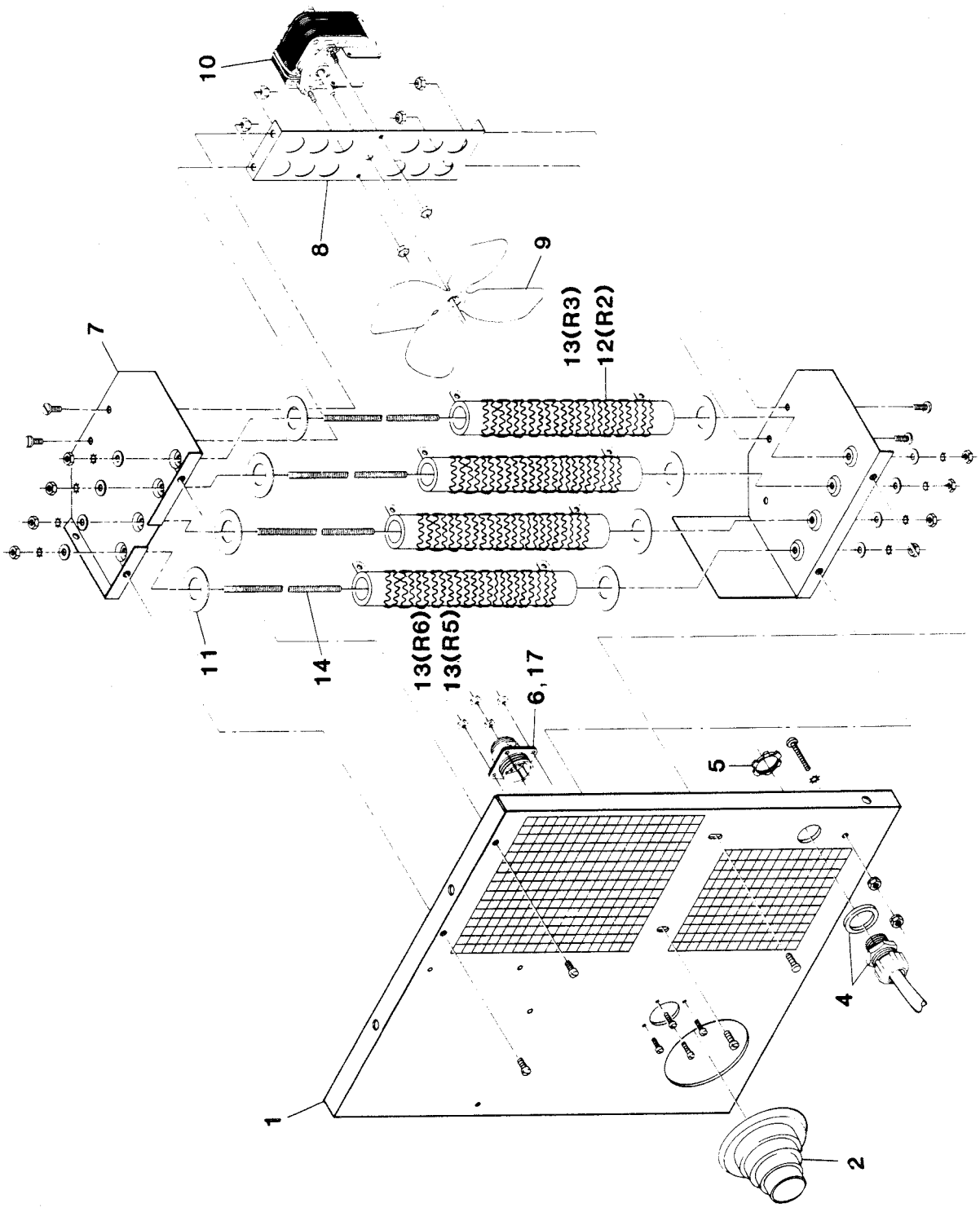


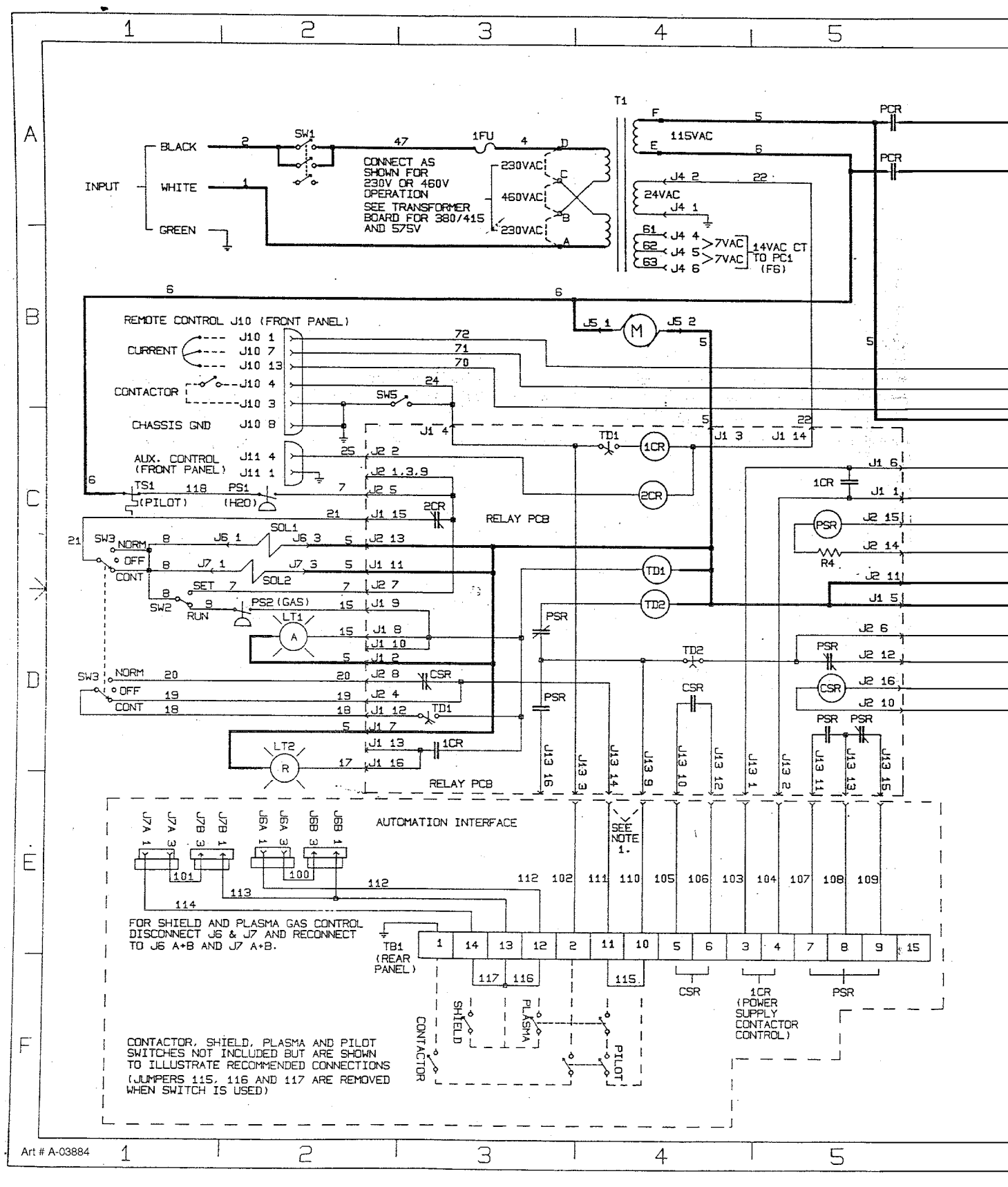
Figure 5-5 Rear Panel Assembly

5.2. NUMERICAL INDEX

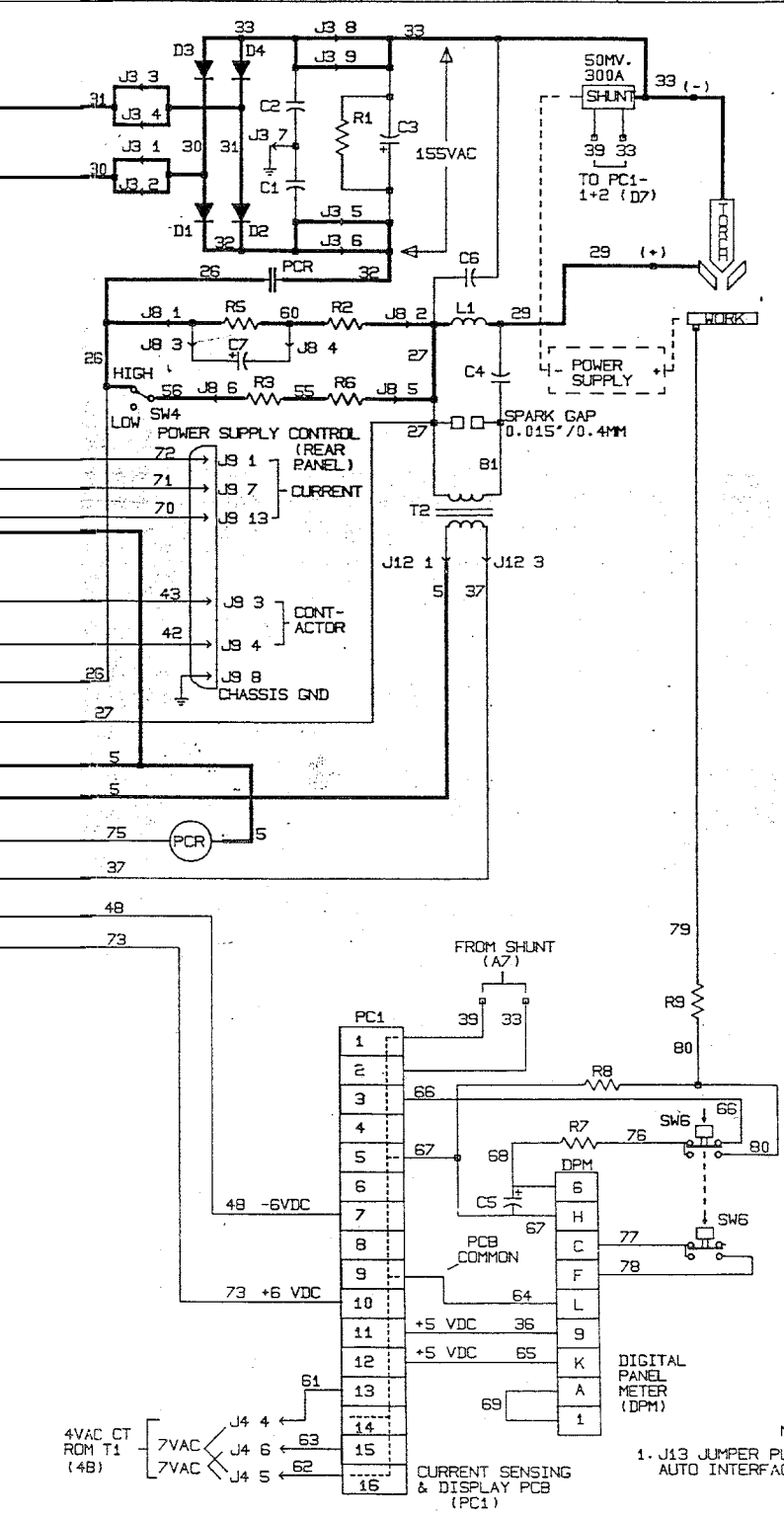
Cat. #	Fig/Item #
3-2646	5- 1- 1
8-0213	5- 5- 4
8-0230	5- 5- 5
8-0241	5- 4-25
8-0242	5- 4-26
8-0260	5- 3- 3
8-0312	5- 2-28
8-0341	5- 3- 7
8-1013	5- 3-19
8-1061	5- 1-
8-1302	5- 2- 4
8-1373	5- 4- 8
8-1440	5- 2-15
8-1441	5- 2-15
8-1442	5- 2-15
8-1443	5- 2-16
8-1558	5- 4-22
8-1562	5- 4-23
8-1777	5- 2- 7
8-1786	5- 3-29
8-1885	5- 2- 2
8-1886	5- 2- 5
8-1951	5- 4-21
9-2023	5- 3-12
9-2318	5- 1-
9-2390	5- 4-10
9-2576	5- 1-
9-2693	5- 4-17
9-2694	5- 4-16
9-2832	5- 1-
9-2847	5- 4- 2
9-2906	5- 4-18
9-2937	5- 2- 3
9-3047	5- 4-13
9-3133	5- 4-28
9-3135	5- 4-12
9-3158	5- 3- 4
9-3293	5- 2-13
9-3296	5- 5-17
9-3297	5- 2-22
9-3325	5- 2- 9
9-3426	5- 2- 6
9-3430	5- 4-11
9-3596	5- 3-20
9-3796	5- 1-
9-3802	5- 1-
9-3841	5- 4- 5
9-3843	5- 4- 9
9-3846	5- 4- 3
9-3920	5- 4- 6
9-3976	5- 5-12
9-3998	5- 1- 2
9-4003	5- 4- 4
9-4007	5- 1-
9-4009	5- 1-
9-4023	5- 5-10
9-4024	5- 5- 9
9-4026	5- 5-15
9-4031	5- 2-14
9-4045	5- 3- 5
9-4063	5- 1-
9-4073	5- 3-15
	5- 2-26
9-4082	5- 2-17
9-4082	5- 3- 8
	5- 2-29
9-4088	5- 2-30
9-4089	5- 3-31
9-4090	5- 3-35
9-4095	5- 4-20
9-4099	5- 2- 8
9-4117	5- 2-12
9-4118	5- 4-15
9-4120	5- 5-13
9-4123	5- 3- 2
9-4129	5- 1-
9-4210	5- 2-10
9-4210	5- 5- 2
9-5164	5- 4-19
9-5218	5- 5- 6
9-5326	5- 5- 3
9-5333	5- 4-27
9-5554	5- 2-27
	5- 3-36
9-5565	5- 3-24
9-5566	5- 2- 4
9-5607	5- 2-25
9-5638	5- 2-24

5.3. REFERENCE DESIGNATION INDEX

Reference Designator	Fig/Item No.	Reference Designator	Fig/Item No.
C1	5- 4-21	PS1	5- 3-15
C2	5- 4-21	PS2	5- 2-26
C3	5- 4-11	PSR	5- 4-18
C4	5- 4- 2	R1	5- 4-10
C5	5- 2-20	R2	5- 5-13
C6	5- 4-21	R3	5- 5-12
C7	5- 3-20	R5	5- 5-13
CSR	5- 4-19	R6	5- 5-13
1CR	5- 4-17	R7	5- 2-21
2CR	5- 4-17	R9	5- 2-23
D1	5- 4-23	SOL1	5- 3-29
D2	5- 4-23	SOL2	5- 3-29
D3	5- 4-22	SW1	5- 2-25
D4	5- 4-22	SW2	5- 2- 6
DPM	5- 2- 8	SW3	5- 2- 7
1FU	5- 2- 4	SW4	5- 2- 6
J9	5- 5- 6	SW5	5- 2- 9
J10	5- 2-13	SW6	5- 2-24
J11	5- 2-12	T1	5- 3-24
LT1	5- 2- 5	T2	5- 4- 9
LT2	5- 2- 2	TD1	5- 4-16
M	5- 5-10	TD2	5- 4-16
PCR	5- 4- 8		


INPUT
BLACK
WHITE
GREEN
SW1
CONNECT AS SHOWN FOR 230V OR 460V OPERATION
SEE TRANSFORMER BOARD FOR 380/415 AND 575V
230VAC
460VAC
T1
115VAC
24VAC
14VAC CT TO PC1 (F6)
PCR
REMOTE CONTROL J10 (FRONT PANEL)
CURRENT
CONTACTOR
CHASSIS GND
AUX. CONTROL (FRONT PANEL)
(PILOT)
(H2O)
RELAY PCB
SOL1
SOL2
LT1
LT2
TD1
TD2
1CR
2CR
PSR
CSR
R4
AUTOMATION INTERFACE
SEE NOTE 1.
FOR SHIELD AND PLASMA GAS CONTROL DISCONNECT J6 & J7 AND RECONNECT TO J6 A+B AND J7 A+B.
TB1 (REAR PANEL)
CONTACTOR, SHIELD, PLASMA AND PILOT SWITCHES NOT INCLUDED BUT ARE SHOWN TO ILLUSTRATE RECOMMENDED CONNECTIONS
(JUMPERS 115, 116 AND 117 ARE REMOVED WHEN SWITCH IS USED)
SHIELD
PLASMA
PILOT
1CR (POWER SUPPLY CONTACTOR CONTROL)

Art # A-03884



COMPONENT	DESCRIPTION	LOCATION
CAPACITORS		
C1,2,6	.25 MFD	(A6, A7)
C3	3700MFD	(A7)
C4	.022MFD	(B7)
C5	15MFD	(E7)
C7	17000MFD	(B6)
RESISTORS		
R1	2.5K, 25W	(A6)
R2,5,6	10 OHM, 300W (PILOT)	(B6)
R3	16 OHM, 300W (PILOT)	(B6)
R4	470 OHM, 2W	(C5)
R7	10K	(E7)
R8	1.0K, 1%	(E7)
R9	100.0K, 1%	(D7)
DIODES		
D1,2	40A, 600V, STR	(A6)
D3,4	40A, 600V, REV.	(A6)
SOLENOIDS, TEMP & PRESSURE SWITCHES		
SOL1	PLASMA GAS	(C2)
SOL2	SHIELD GAS	(C2)
PS1	COOLANT (25 PSIG)	(C1)
PS2	PLASMA (25 PSIG)	(D2)
TS1	PILOT TEMP (100 DEG. C.)	(C1)
RELAYS & CONTACTORS		
1CR	WELD CONTROL 24VAC DPDT	(C4)
2CR	AUX. CONTROL 24VAC DPDT	(C4)
TD1	GAS PURGE, 120VAC, DPDT, TIME DELAY (YELLOW CASE)	(C4)
TD2	PILOT SHUTOFF, 120VAC, DPDT, TIME DELAY (YELLOW CASE)	(D4)
CSR	CURRENT SENSING, 12VDC, DPDT	(D5)
PSR	PILOT SENSING, 110VDC 3PDT	(C5)
PCR	PILOT CONTROL CONTACTOR, 120VAC	(D6)
FRONT PANEL SWITCHES		
SW1	ON/OFF SWITCH	(A2)
SW2	RUN/SET SWITCH	(D1)
SW3	NORM/OFF/CONT. PILOT SWITCH	(C1, D1)
SW4	HIGH/LOW PILOT SWITCH	(B6)
SW5	REMOTE/CONSOLE SWITCH	(B2)
SW6	ARC VOLTAGE DISPLAY (MOM.)	(E8)
MISC.		
L1	SUPPRESSION COIL	(B7)
LT1	READY LIGHT (AMBER NEON)	(D2)
LT2	WELD LIGHT (RED NEON)	(D2)
T1	CONTROL/PILOT SUPPLY TRANS.	(A4)
T2	HIGH FREQ. TRANSFORMER	(B7)
1FU	8 AMP FOR 460/575VAC, 15 AMP FOR 230VAC, 10 AMP FOR 380/415VAC	(A3)
M	FAN MOTOR, 115VAC, 1/70 HP, 3000RPM	(B4)
CONNECTORS		
J1,2	RELAY PCB	
J3	PILOT BRIDGE	
J4	T1 CONTROL SECONDARY	
J5	FAN MOTOR	
J6	PLASMA SOLENOID (SOL1)	
J7	SHIELD SOLENOID (SOL2)	
J8	PILOT RESISTORS	
J9	POWER SUPPLY CONTROL (REAR PANEL)	
J10	REMOTE CONTROL (FRONT PANEL)	
J11	AUX. CONTROL (FRONT PANEL)	
J12	T2 (HF) PRIMARY	
PC1	CURRENT SENSING & DISPLAY PCB	
DPM	DIGITAL PANEL METER	
OPTIONAL AUTO INTERFACE CONNECTIONS		
J13	RELAY PCB AUTO INTERFACE	
J6A+B	PLASMA SOLENOID CONTROL	
J7A+B	SHIELD SOLENOID CONTROL	
TB1	TERMINAL BLOCK FOR CONNECTION TO AUTOMATION EQUIPMENT (INSIDE REAR PANEL)	

NOTES

1. J13 JUMPER PLUG MUST BE USED IF AUTO INTERFACE IS NOT INSTALLED.

J13 14 — J13 9 — 115

REV	REVISION	DATE
B	EC 5302	7-3-86
C	EC 5776	4-13-88
-	ADD L1 TO COMP	7-14-88
D	CONNECT TB1-10 TO TB1-11, TB1-12 TO TB1-13 AND 14	11-16 88
E	DISCONNECT J13-14 TO J6-4 DISCONNECT TB1-12 TO J13-16	12-29 88
-	CONNECT J13-14 TO J6-4 CONNECT PSR TO TDR	
-	10 AMP FUSE ADDED	1-13 89
F	ADDED 155VAC, -6VDC ON PC1 7, CONN J6 20 TO J6 10	
-	CORRECTED PSR SPEC TO 110VAC FROM 120VAC	4-11 89
G	EC 6313 ADD TS1	11-19 88

DATE 12-29-88 | 1 OF 1

42D678

Art # A-03884

WC-100B AUTO-INTERFACE KIT
INSTRUCTION SHEET NO. 0-2146

The WC110B auto-interface feature provides available output signals from the WC100B to allow certain control functions to be operated from remote control sources. These functions include remote on/off control of plasma gas flow, shield gas flow, pilot arc, and main contactor. Additional relay contacts can provide for main arc verification (CSR) and pilot arc verification (PCR). These functions can easily be remotely controlled by add-on switches, relays, or computerized controllers.

The WC100B auto-interface package includes a newly designed relay logic PC board, an interface wire harness, and a terminal strip to provide simple connections.

AUTO-INTERFACE CONTROL FUNCTIONS

Remote On/Off of Plasma Gas Solenoid
This feature allows plasma gas to be turned on and off remotely as needed. It can be used to purge the plasma gas line without requiring shield gas flow, to reduce shield gas consumption. NOTE: The plasma gas must be turned on during pilot arc and main arc functions.

Remote On/Off of Shield Gas Solenoid
This feature allows shield gas to be turned on and off remotely as needed to reduce shield gas consumption. NOTE: The shield gas must be turned on during pilot arc and main arc functions.

Remote On/Off of Pilot Arc
This feature allows the pilot arc to be turned on and off remotely as needed. The function can be used to start or stop the pilot arc when changing torch parts, or to conserve energy when the system is shut down (as during shift changes). NOTE: The pilot arc must not be activated unless the plasma and shield gas solenoids are also activated.

Main Arc Transfer Verification
Main arc transfer can be verified by interfacing with the CSR relay contacts. When the CSR relay closes, it sends a normally closed (NC) signal to the terminal strip. This relay contact can be used to start motion, allow fixture to index, or send signals back to a controller to monitor main arc operation for multiple system installations.

Pilot Arc Transfer Verification
Pilot arc transfer can be verified by interfacing with the PSR relay contacts. When the PSR relay closes, it sends a normally closed (NC) signal to the terminal strip. This function is useful to monitor pilot arc operation for multiple system installations.

TO INSTALL THE AUTO-INTERFACE RETROFIT KIT IN AN EXISTING WC100B CONSOLE:

1. Disconnect power to the WC-100B console.
2. Remove the relay PC board from the WC100B console. Install new relay board with J1 and J2 to the rear of the WC-100B (same as original).
3. Install interface wire harness. Insert white 16-pin connector through the adelet in the center of the WC-100B (below pilot bridge) from the left facing unit to the right. Route harness by PCR contactor and plug into J13 (third connector of new relay board).
4. Route the other end of the harness to the rear of the unit. Install black 15-position terminal strip (TB1) on the rear panel above the access hole for gas and coolant hoses.
5. Connect green/yellow wire on the first terminal of the terminal strip to the ground stud inside the rear panel.

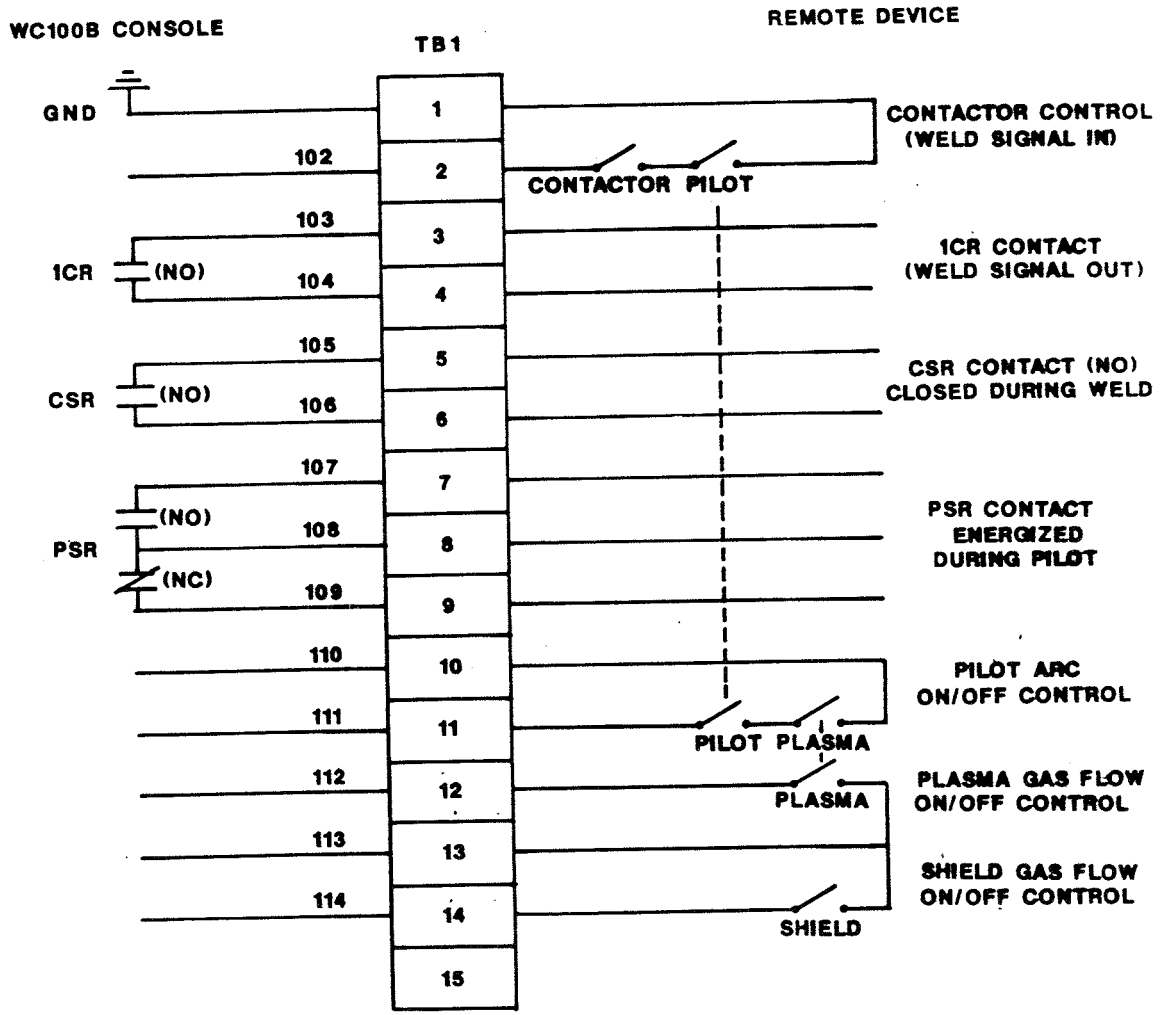
6. Disconnect J6 (3-pin plasma solenoid connector). Reconnect plasma solenoid to 3-pin female interface harness connector marked "PLASMA". Connect original J6 to the male 3-pin interface harness connector marked "PLASMA".
7. Disconnect J7 (3-pin shield gas solenoid connector). Reconnect shield gas connector to 3-pin female connector marked "SHIELD". Connect original J7 to the male 3-pin connector marked "SHIELD".

AUTO-INTERFACE CONNECTIONS

Connections to the WC100B auto-interface terminal strip (TB1) require 3/16" fast-on connectors. Route the wiring froom the terminal strip out of the WC100B through the adelet fitting located directly under the teminal strip on the rear panel.

TO INITIATE REMOTE ON/OFF CONTROL OF SHIELD GAS FLOW

1. Remove the factory-installed jumper wire (117) between TB1-13 and TB1-14 on the terminal strip.
2. Connect TB1-13 and TB1-14 to a single pole/single throw (SPST) switch or a normally open (NO) relay contact rated for 24 VAC for a 0.5 amp inductive load. A 5 amp or greater rating is recommended for highest reliability.



TB1 Terminal Strip Connections

TO INITIATE REMOTE ON/OFF CONTROL OF PLASMA GAS FLOW

1. Remove the factory-installed jumper wire (116) between TB1-12 and TB1-13.
2. Remove the factory-installed jumper wire (115) between TB1-10 and TB1-11.
3. Connect TB1-12 and TB1-13 to one pole of a double pole/single throw (DPST) switch or one normally open (NO) contact of a double pole relay. The switch or relay must be rated for at least 115 VAC for a 2 amp inductive load. A 5 amp or greater rating is recommended for highest reliability.
4. Connect the other pole of the switch or relay to TB1-10 and TB1-11.

NOTES

A. The purpose of the second pole is to prevent accidentally shutting off the plasma gas flow with the pilot arc on, which would cause damage to the torch parts.
B. If remote on/off control of pilot arc is to be utilized in addition to remote on/off control of plasma gas flow, review the following section on remote on/off control of pilot arc before making any connections to TB1-10 and TB1-11.
C. Because computerized or programmable controllers usually do not have double pole outputs, they should be programmed to prevent shutting off plasma flow while the pilot arc is on.

TO INITIATE REMOTE ON/OFF CONTROL OF PILOT ARC

1. Remove the factory-installed jumper wire (115) between TB1-10 and TB1-11.
2. Connect TB1-10 and TB1-11 to one pole of a double pole/single throw (DPST) switch or one normally open (NO) contact of a double pole relay. The switch or relay must be rated for at least 115 VAC for a 2 amp inductive load. A 5 amp or greater rating is recommended for highest reliability.

NOTE

D. If remote on/off control of plasma gas flow is to be utilized in addition to remote on/off control of pilot arc, this double pole switch or relay must be installed in series with the contact used for remote on/off control of plasma gas flow. Refer to previous section concerning remote on/off control of plasma gas flow.

3. The other pole of the switch or relay must be connected in series with the remote contactor control described in the next paragraph. The purpose of the second pole is to prevent accidentally shutting off plasma gas flow, shield gas flow, and pilot arc, while allowing the system operator to believe power is not present in the torch with the contactor actually still on.

NOTES

E. Because computerized or programmable controllers usuallly do not have double pole outputs, they should be programmed to prevent shutting off the pilot arc while the contator remains on.
F. To have the pilot arc shut off during the weld operation, set the pilot switch on the WC100B front panel to the "NORM" position rather than the "CONT" position.

TO INITIATE REMOTE ON/OFF CONTROL OF MAIN CONTACTOR

1. Connect a single pole/single throw (SPST) switch or normally open (NO) relay contact between TB1-1 and TB1-2.

NOTE

G. If remote on/off control of pilot arc is to be utilized in addition to remote on/off control of main contactor, one of its contacts must be connected in series with the remote contactor switch, as described in the previous section. This connection is from TB1-1 to the remote contactor control contact, in series with the remote pilot control contact, then to TB1-2.