

April 1983

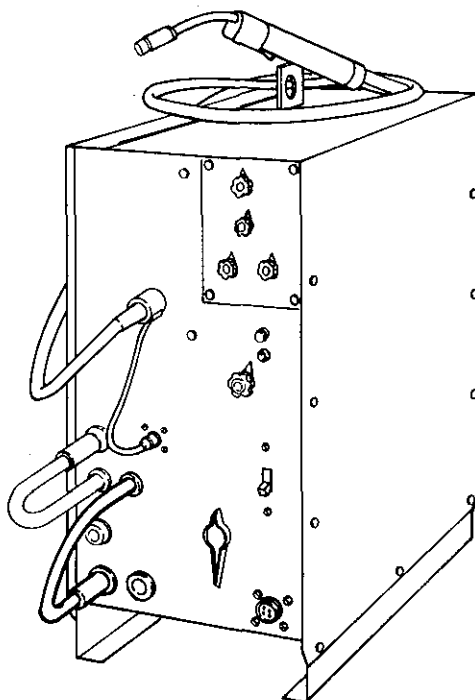
FORM: OM-13036

OM 1303G

Effective With Serial No. JD671484

WARNING: Read and understand the entire contents of this manual before installing, operating, or maintaining this equipment.

MODEL
MILLERMATIC 200
SKP-35



OWNER'S MANUAL



MILLER ELECTRIC MFG. CO.

718 S. BOUNDS ST, P.O. Box 1079
APPLETON, WI 54912 USA

NWSA CODE NO. 4579
PRINTED IN U.S.A.

LIMITED WARRANTY

EFFECTIVE: JUNE 1, 1979

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

LIMITED WARRANTY - Subject to the terms and conditions hereof, Miller Electric Mfg. Co., Appleton, Wisconsin warrants to its Distributor/Dealer that all new and unused Equipment furnished by Miller is free from defect in workmanship and material as of the time and place of delivery by Miller. No warranty is made by Miller with respect to engines, trade accessories or other items manufactured by others. Such engines, trade accessories and other items are sold subject to the warranties of their respective manufacturers, if any. All engines are warranted by their manufacturer for one year from date of original purchase.

Except as specified below, Miller's warranty does not apply to components having normal useful life of less than one (1) year, such as spot welder tips, relay and contactor points, MILLERMATIC parts that come in contact with the welding wire including nozzles and nozzle insulators where failure does not result from defect in workmanship or material.

Miller shall be required to honor warranty claims on warranted Equipment in the event of failure resulting from a defect within the following periods from the date of delivery of Equipment to the original user:

1. Arc welders, power sources and components . . . 1 year
2. Original main power rectifiers 3 years
(labor - 1 year only)
3. All welding guns and feeder/guns 90 days
4. All other Millermatic Feeders 1 year
5. Replacement or repair parts, exclusive of labor . 60 days
6. Batteries 6 months

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As a matter of general policy only, Miller may honor claims submitted by the original user within the foregoing periods.

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ANY EXPRESS WARRANTY NOT PROVIDED HEREIN AND ANY IMPLIED WARRANTY, GUARANTY OR REPRESENTATION AS TO PERFORMANCE, AND ANY REMEDY FOR BREACH OF CONTRACT 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 OF FITNESS FOR PARTICULAR PURPOSE, WITH RESPECT TO ANY AND ALL EQUIPMENT FURNISHED BY MILLER IS EXCLUDED AND DISCLAIMED BY MILLER.

EXCEPT AS EXPRESSLY PROVIDED BY MILLER IN WRITING, MILLER PRODUCTS ARE INTENDED FOR ULTIMATE PURCHASE BY COMMERCIAL/INDUSTRIAL USERS AND FOR OPERATION BY PERSONS TRAINED AND EXPERIENCED IN THE USE AND MAINTENANCE OF WELDING EQUIPMENT AND NOT FOR CONSUMERS OR CONSUMER USE. MILLER WARRANTIES DO NOT EXTEND TO, AND NO RESELLER IS AUTHORIZED TO EXTEND MILLER'S WARRANTIES TO, ANY CONSUMER.

The nameplate of this unit uses international symbols for labeling the front panel controls. The following definitions should help the operator become familiar with the symbols and their meanings. The symbols also appear at the appropriate section in the text.

SYMBOL	DEFINITION	SYMBOL	DEFINITION	SYMBOL	DEFINITION
	INPUT		ON		VOLTAGE
	OUTPUT		OFF		NEGATIVE
	POWER		WIRE SPEED		POSITIVE
	SPOOLMATIC		GUN TRIGGER		DO NOT SWITCH WHILE WELDING

After this manual was printed, refinements in equipment design occurred. This sheet lists exceptions to data appearing later in this manual.

AMENDMENT TO SECTION 5 - SEQUENCE OF OPERATION

Add the CAUTION at the beginning of the Section.

CAUTION: WELDING CURRENT can damage ignition system.

- Disconnect battery ground cable when welding on an automobile.

AMENDMENT TO SECTION 6 - MAINTENANCE & TROUBLESHOOTING

Add Section 6-5. Cleaning Of Drive Rolls

Occasionally it will become necessary to clean the wire groove on the drive rolls. This cleaning operation can be performed with a wire brush.

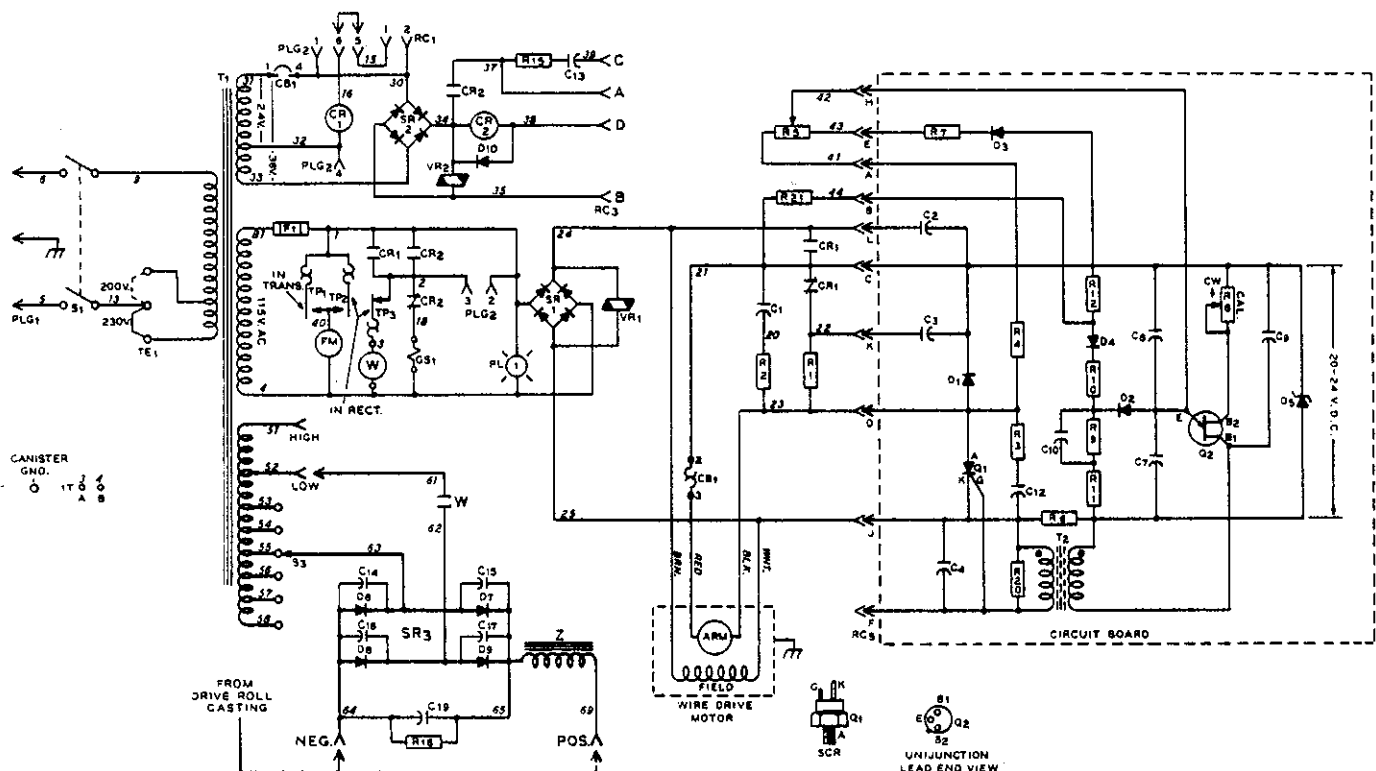
To clean the wire grooves, it will be necessary to first remove the drive roll(s) (see Section 3-6 for removal and installation instructions).

IMPORTANT: Failure to properly maintain the drive rolls can result in a buildup of wire particles which will decrease the efficiency of the wire feeding operation.

WARNING: HIGH ROTATIONAL SPEED may cause damage to drive rolls.

- Do not allow drive rolls to rotate at high speed if compressed air is used for cleaning the drive roll assembly.

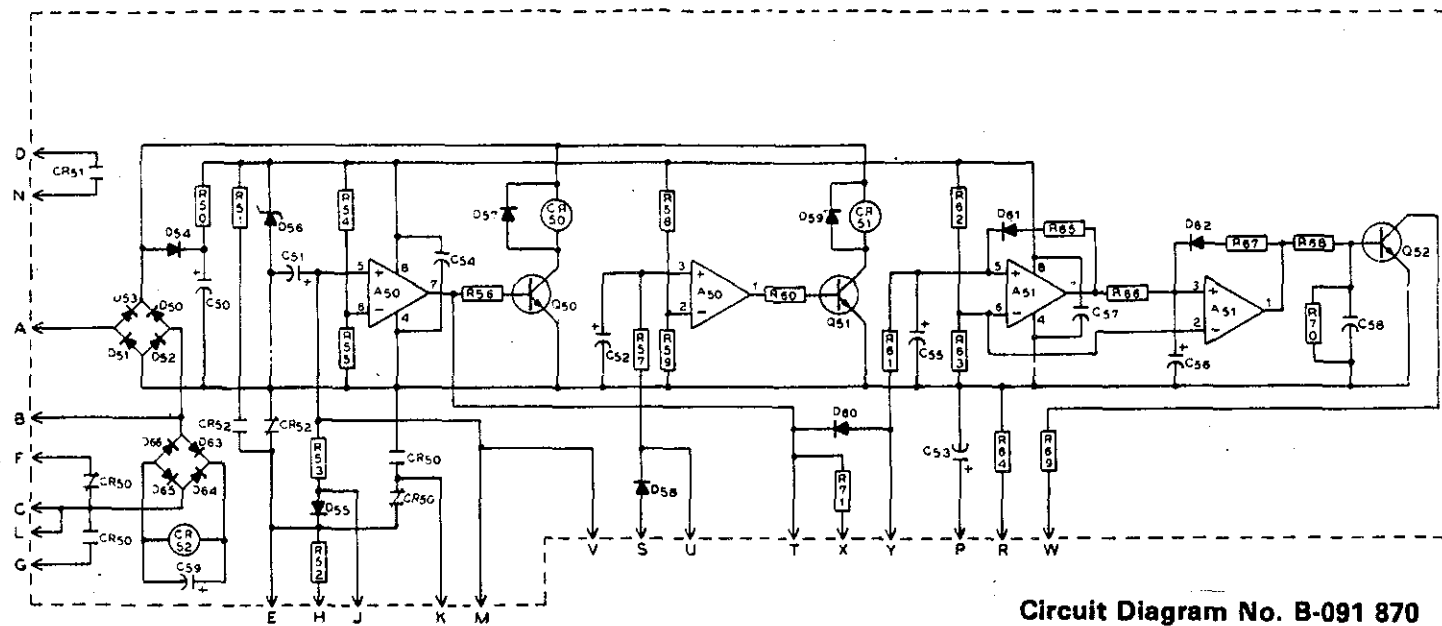
Amend Figure 6-1. Circuit Diagram For Welding Power Source



Circuit Diagram No. B-092 433

Figure 6-1. Circuit Diagram For Welding Power Source Effective With Serial No. JD700335 And Following

Amend Figure 6-3. Circuit Diagram For SKP-35 Panel Printed Circuit Board



Circuit Diagram No. B-091 870

Figure 6-3. Circuit Diagram For SKP-35 Panel Printed Circuit Board PC50 Effective With Style No. JD-29

**	Dia. Mkgs.	Part No.	Replaced With	Description	Quantity
33-		003 539	Deleted		
33-7	GS1	080 841	Deleted		
33-		080 872	Deleted		
33-21	T1	088 700	+ + See Note	Transformer, power-main	1
35-	VR2	082 722	082 722	VARISTOR (qty chg) (Eff w/JD700335)	1
35-4		088 538	+ + See Note	COIL, pri/sec	1
41-14	S1	011 629	090 328	SWITCH, toggle 2PST 40 amp 600 volts	1
44-1	R50	028 769	+ 028 769	POTENTIOMETER (qty chg)	1
44-2	R53	030 002	+ 030002	RESISTOR (qty chg)	1
44-6 thru 11			Deleted		
44-12	PLG51	084 198	+ 072 669	HOUSING, terminal 9 position	1
44-13 thru 15			+ Deleted		
44-16	R52	073 730	028 768	POTENTIOMETER, carbon 1 turn 2 watt 350K ohm	1
44-17	PC50	086 204	+ 088 008	CIRCUIT CARD, dual-timer/pulser (consisting of)	1
	A50,51		009 159	. 1C, linear	2
	C50		039 482	. CAPACITOR, electrolyte 100 uf 35 volts dc ...	1
	C51,53,55		032 820	. CAPACITOR, tantalum 2.2 uf 35 volts dc	3
	C52,56		073 714	. CAPACITOR, tantalum 0.22 uf 35 volts	2
	C54,57,58		073 739	. CAPACITOR, ceramic 0.1 uf 50 volts dc	3
	C59		090 573	. CAPACITOR, electrolyte 10 uf 50 volts	1
	CR50		027 810	. RELAY, enclosed 24 volts dc 4PDT	1
	CR51		090 197	. RELAY, enclosed 24 volts dc 1PST	1
	CR53		090 185	. RELAY, enclosed 24 volts dc 1PDT	1
			079 844	. SPRING, holddown-relay	1
			091 861	. SOCKET, relay	1
	D50-55,57-66		026 202	. DIODE, 1 amp 400 volts SP	16
	D56		037 449	. DIODE, zener 15 volts 1 watt SP	1
	Q50,51		037 200	. TRANSISTOR, 200MA 40 volts NPN	2
	Q52		073 535	. TRANSISTOR, 100MA 30 volts NPN	1
	R50		030 018	. RESISTOR, carbon 1 watt 820 ohm	1
	R51		035 823	. RESISTOR, carbon film 0.25 watt 100 ohm ...	1
	R52,71		035 884	. RESISTOR, carbon film 0.25 watt 100K ohm .	2
	R53,57, 61,68,70		039 331	. RESISTOR, carbon film 0.25 watt 4.7K ohm ..	5
	R54,56,59, 60,62,66,67		035 827	. RESISTOR, carbon film 0.25 watt 10K ohm ..	7
	R55,58		035 886	. RESISTOR, carbon film 0.25 watt 22K ohm ..	2
	R63		039 333	. RESISTOR, carbon film 0.25 watt 18K ohm ..	1
	R64,69		039 327	. RESISTOR, carbon film 0.25 watt 220 ohm ...	2
	R65		035 887	. RESISTOR, carbon film 0.25 watt 220 ohm ...	1
	RC50		079 795	. TERMINAL, head 13 pin	1
	RC51		072 670	. TERMINAL, header 9 post	1
	PLG50		079 798	. HOUSING, terminal 13 position	1
44-20		010 146	+ Deleted		
			+ 008 072	HOUSING PLUG & PINS (consisting of)	1
	RC55		058 971	. TERMINAL, male	8
			+ 083 147	GROMMET, screw size 8-10 push in	3

+ + Replace at Factory or Factory Authorized Service Station.

Note: When ordering these items be sure to provide the primary voltage of the unit.

**First digit represents page no. - digits following dash represents item no.

+ These item effective with Style No. JD-29.

BE SURE TO PROVIDE MODEL AND SERIAL NUMBER WHEN ORDERING REPLACEMENT PARTS.

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SECTION 1 - SAFETY RULES FOR OPERATION OF ARC WELDING POWER SOURCE

SECTION 1 - RÈGLES DE SÉCURITÉ POUR LE FONCTIONNEMENT DU POSTE DE SOUDAGE À L'ARC

1-1. INTRODUCTION - We learn by experience. Learning safety through personal experience, like a child touching a hot stove is harmful, wasteful, and unwise. Let the experience of others teach you.

Safe practices developed from experience in the use of welding and cutting are described in this manual. Research, development, and field experience have evolved reliable equipment and safe installation, operation, and servicing practices. Accidents occur when equipment is improperly used or maintained. The reason for the safe practices may not always be given. Some are based on common sense, others may require technical volumes to explain. It is wiser to follow the rules.

Read and understand these safe practices before attempting to install, operate, or service the equipment. Comply with these procedures as applicable to the particular equipment used and their instruction manuals, for personal safety and for the safety of others.

Failure to observe these safe practices may cause serious injury or death. When safety becomes a habit, the equipment can be used with confidence.

These safe practices are divided into two Sections: 1 - General Precautions, common to arc welding and cutting; and 2 - Arc Welding (and Cutting) (only).

Reference standards: Published Standards on safety are also available for additional and more complete procedures than those given in this manual. They are listed in the Standards Index in this manual. ANSI Z49.1 is the most complete.

The National Electrical Code, Occupational Safety and Health Administration, local industrial codes, and local inspection requirements also provide a basis for equipment installation, use, and service.

1-2. GENERAL PRECAUTIONS

Different arc welding processes, electrode alloys, and fluxes can produce different fumes, gases, and radiation levels. In addition to the information in this manual, be sure to consult flux and electrode manufacturers for specific technical data and precautionary measures concerning their material.

A. Burn Prevention

Wear protective clothing - gauntlet gloves designed for use in welding, hat, and high safety-toe shoes. Button shirt collar and pocket flaps, and wear cuffless trousers to avoid entry of sparks and slag.

Wear helmet with safety goggles or glasses with side shields underneath, appropriate filter lenses or plates (protected by clear cover glass). This is a **MUST** for welding or cutting, (and chipping) to protect the eyes

1-1. INTRODUCTION - Contrairement à l'apprentissage de la vie, l'apprentissage de la sécurité par expérience personnelle, comme l'enfant qui touche un poêle chaud, est dangereux, imprudent et inutile. Instruisez-vous donc de l'expérience d'autrui.

Des méthodes de sécurité issues de l'expérience du soudage et du coupage sont décrites dans le manuel. La recherche, le progrès et l'expérience dans ce domaine ont développé un matériel fiable et des méthodes de sécurité pour l'installation, le fonctionnement et l'entretien. Des accidents se produisent lorsque le matériel est inadéquatement utilisé ou entretenu. La raison de ces méthodes de sécurité peut ne pas être toujours donnée. Certaines sont fondées sur le sens commun, d'autres demanderont à être expliquées par des livres techniques. Il est plus sage de suivre les règles.

Lisez et comprenez ces méthodes de sécurité avant d'essayer d'installer, de faire fonctionner ou de réparer l'appareil. Pour votre sécurité personnelle et celle d'autrui, conformez-vous à ces règles et aux manuels d'instructions.

Manquer d'observer ces méthodes de sécurité pourrait entraîner des blessures graves ou même la mort. Quand la sécurité devient une habitude, le matériel peut alors être utilisé en toute confiance.

Ces méthodes de sécurité sont divisées en deux sections: 1 - Précautions générales, communes au soudage et au coupage à l'arc, et 2 - Soudage à l'arc (et coupage) (uniquement).

Normes de référence: Des publications des normes américaines de sécurité sont aussi à votre disposition pour d'autres modes opératoires plus complets que ceux du présent manuel. Elles sont données dans l'Index des Normes de ces règles de sécurité. ANSI Z49-1 est la plus complète.

Les codes de l'ACNOR, les codes provinciaux et municipaux donnent aussi les exigences pour une installation, une utilisation et un entretien sûrs.

1-2. PRÉCAUTIONS GÉNÉRALES

Plusieurs procédés du soudage à l'arc, des électrodes alliés, et les flux peuvent produire des vapeurs, gaz, et niveaux de rayonnement différents. Pour tout renseignement supplémentaire à ce manuel, consultez aussi les fabricants des électrodes et des flux afin d'obtenir les renseignements techniques spécifiques et les mesures de précaution concernant leurs matériaux.

A. Prévention des brûlures

Portez des vêtements de protection - des gants à crispin spécialement désignés pour le soudage, un casque et des chaussures de sécurité. Boutonnez le col de votre chemise et les pattes de vos poches, et portez des pantalons sans revers pour éviter que des étincelles et du laitier ne s'y introduisent.

Portez un masque avec lunettes de sécurité ou avec écrans latéraux de protection, des lunettes filtrantes ou des couvre-lentilles (protégés par un verre clair). Pour le soudage ou le coupage (et le burinage), il est

from radiant energy and flying metal. Replace cover glass when broken, pitted, or spattered. See 1-3A.2.

Avoid oily or greasy clothing. A spark may ignite them.

Hot metal such as electrode stubs and workpieces should never be handled without gloves.

Medical first aid and eye treatment. First aid facilities and a qualified first aid person should be available for each shift unless medical facilities are close by for immediate treatment of flash burns of the eyes and skin burns.

Ear plugs should be worn when working on overhead or in a confined space. A hard hat should be worn when others work overhead.

Flammable hair preparations should not be used by persons intending to weld or cut.

B. Toxic Fume Prevention

Severe discomfort, illness or death can result from fumes, vapors, heat, or oxygen enrichment or depletion that welding (or cutting) may produce. Prevent them with adequate ventilation as described in ANSI Standard Z49.1 listed 1 in Standards index. NEVER ventilate with oxygen.

Lead -, cadmium -, zinc -, mercury -, and beryllium - bearing and similar materials, when welded (or cut) may produce harmful concentrations of toxic fumes. Adequate local exhaust ventilation must be used, or each person in the area as well as the operator must wear an air-supplied respirator. For beryllium, both must be used.

Metals coated with or containing materials that emit toxic fumes should not be heated unless coating is removed from the work surface, the area is well ventilated, or the operator wears an air-supplied respirator.

Work in a confined space only while it is being ventilated and, if necessary, while wearing an air-supplied respirator.

Gas leaks in a confined space should be avoided. Leaked gas in large quantities can change oxygen concentration dangerously. Do not bring gas cylinders into a confined space.

Leaving confined space, shut OFF gas supply at source to prevent possible accumulation of gases in the space if downstream valves have been accidentally opened or left open. Check to be sure that the space is safe before re-entering it.

Vapors from chlorinated solvents can be decomposed by the heat of the arc (or flame) to form PHOSGENE, a highly toxic gas, and other lung and eye irritating products. The ultraviolet (radiant) energy of the arc can also decompose trichloroethylene and perchloroethylene vapors to form phosgene. DO NOT WELD or cut where solvent vapors can be drawn into the welding or cutting atmosphere or where the radiant

OBLIGATOIRE de protéger ses yeux contre l'énergie de rayonnement et les éclats de métal. Remplacez le verre protecteur lorsqu'il est brisé, piqué ou qu'il a reçu des projections. Voir 1.3A.2.

Évitez de porter des habits imprégnés d'huile ou de graisse. Une étincelle pourrait les enflammer.

Ne manipulez jamais sans gants un métal chaud tel que des chutes d'électrode et des pièces à souder.

Premiers soins et traitement des yeux: Tout atelier devrait avoir à sa disposition un poste de premiers soins ainsi qu'une personne compétente, à moins qu'un service médical ne soit à proximité pour soigner immédiatement les brûlures des yeux et de la peau.

Portez des bouche-oreilles lorsque vous travaillez au plafond ou dans un espace restreint. Portez un casque lorsque d'autres personnes travaillent au plafond.

Les personnes devant souder ou couper ne doivent pas employer des préparations inflammables pour leurs cheveux.

B. Prévention des gaz toxiques

Les gaz, les vapeurs, la chaleur, un enrichissement ou un manque d'oxygène peuvent entraîner un malaise, une maladie ou même la mort. Remédiez-y par la ventilation décrite dans la Norme ANSI Z49.1 paragraphe 1 de l'Index des Normes. NE ventilez JAMAIS à l'oxygène.

En soudant ou en coupant, les plomb, cadmium, zinc, mercure et beryllium ou autres matériaux semblables peuvent créer des concentrations nocives de gaz toxiques. On doit avoir recours à une ventilation aspirante adéquate du local, ou alors toute personne sur les lieux, de même que le soudeur, doit porter un masque à adduction d'air. On doit employer les deux pour le beryllium.

Les métaux enrobés ou composés de matériaux émettant des gaz toxiques ne doivent pas être chauffés à moins que l'enrobage ne soit ôté de la surface à travailler, que le local ne soit bien ventilé, ou que le soudeur ne porte un masque à adduction d'air.

Ne travaillez dans un espace restreint que s'il est bien ventilé et, si nécessaire, portez un masque à adduction d'air.

On doit éviter les fuites de gaz dans un espace restreint. Les fuites de gaz en grande quantité peuvent transformer dangereusement la concentration d'oxygène. N'amenez pas de bouteilles de gaz dans un espace restreint.

En quittant un espace restreint, FERMEZ le robinet d'alimentation de gaz de la bouteille. Ainsi on pourra rentrer en toute sécurité dans la pièce, même si les robinets "aval" ont été ouverts par accident, ou si on les a laissés ouverts.

Les vapeurs de dissolvants chlorés peuvent être décomposées par la chaleur de l'arc (ou de la flamme) et former du PHOSGÈNE, gaz très toxique, et d'autres produits irritant les poumons et les yeux. L'énergie ultra-violette de l'arc peut aussi décomposer les vapeurs de trichloroéthylène et de perchloroéthylène pour former du phosgène. NE SOUDEZ PAS ou ne coupez pas dans des endroits où les vapeurs de dissolvants peuvent être attirées dans l'atmosphère de soudage ou de

energy can penetrate to atmospheres containing even minute amounts of trichloroethylene or perchloroethylene.

C. Fire and Explosion Prevention

Causes of fire and explosion are: combustibles reached by the arc, flame, flying sparks, hot slag or heated material; misuse of compressed gases and cylinders; and short circuits.

BE AWARE THAT flying sparks or falling slag can pass through cracks, along pipes, through windows or doors, and through wall or floor openings, out of sight of the goggled operator. Sparks and slag can fly 35 feet.

To prevent fires and explosion:

Keep equipment clean and operable, free of oil, grease, and (in electrical parts) of metallic particles that can cause short circuits.

If combustibles are in area, do NOT weld or cut. Move the work if practicable, to an area free of combustibles. Avoid paint spray rooms, dip tanks, storage areas, ventilators. If the work cannot be moved, move combustibles at least 35 feet away out of reach of sparks and heat; or protect against ignition with suitable and snug-fitting, fire-resistant covers or shields.

Walls touching combustibles on opposite sides should not be welded on (or cut). Walls, ceilings, and floor near work should be protected by heat-resistant covers or shields.

Fire watcher must be standing by with suitable fire extinguishing equipment during and for some time after welding or cutting if:

- appreciable combustibles (including building construction) are within 35 feet
- appreciable combustibles are further than 35 feet but can be ignited by sparks
- openings (concealed or visible) in floors or walls within 35 feet may expose combustibles to sparks
- combustibles adjacent to walls, ceilings, roofs, or metal partitions can be ignited by radiant or conducted heat.

Hot work permit should be obtained before operation to ensure supervisor's approval that adequate precautions have been taken.

After work is done, check that area is free of sparks, glowing embers, and flames.

An empty container that held combustibles, or that can produce flammable or toxic vapors when heated, must never be welded on or cut, unless container has first been cleaned as described in AWS Standard A6.0, listed 3 in Standards index.

This includes: a thorough steam or caustic cleaning (or a solvent or water washing, depending on the com-

coupage et où l'énergie de rayonnement peut pénétrer dans des atmosphères contenant des quantités même minuscules de trichloroéthylène ou de perchloroéthylène.

C. Prévention des incendies et des explosions

Les causes d'incendie et d'explosion sont les combustibles atteints par l'arc, la flamme, les étincelles, le laitier chaud ou les matériaux chauffés, le mauvais emploi des gaz comprimés et des bouteilles ainsi que les courts-circuits.

Sachez que les éclats d'étincelles ou la chute du laitier peuvent s'infiltrer dans les fissures, le long des tuyauteries, par les fenêtres et les portes et par les couvertures des murs ou du sol, sans que le soudeur portant des lunettes ne les voie. Les étincelles et les scories peuvent voler jusqu'à 35 pieds.

Pour prévenir les incendies et les explosions: Veillez à ce que votre appareil soit propre et en état de marche, dénué d'huile et de graisse, et de particules de métal sur les pièces électriques qui pourraient entraîner des courts-circuits.

Si des combustibles se trouvent à proximité, ne soudez pas, ne coupez pas. Si possible, déplacez votre travail loin des combustibles. Évitez les ateliers de peinture au pistolet, les cuves d'immersion, les entrepôts, les ventilateurs. Si cela n'est pas possible, placez les combustibles à au moins 35 pieds des étincelles et de la chaleur et protégez-les des étincelles avec des couvertures ou des écrans protecteurs adéquats, bien ajustés et ignifugés.

On ne doit pas souder (ou couper) le côté opposé des murs touchant les combustibles. Les murs, plafonds et planchers proches du travail doivent être protégés par des couvertures ou écrans protecteurs ignifugés.

Un surveillant doit se tenir à proximité avec un matériel de lutte contre l'incendie adéquat, pendant et quelque temps après le soudage ou le coupage si:

- Des quantités appréciables de combustibles (y compris une construction en chantier) se trouvent à moins de 35 pieds.
- Des quantités appréciables de combustibles sont à plus de 35 pieds mais peuvent être enflammées par des étincelles.
- Des ouvertures (cachées ou visibles) sur les planchers ou les murs à moins de 35 pieds peuvent exposer des combustibles aux étincelles.
- Les combustibles adjacents aux murs, plafonds, toits ou cloisons métalliques peuvent être enflammés par une chaleur rayonnante ou transmise.

Avant de commencer, avisez le contremaître pour qu'il s'assure que les précautions adéquates soient prises.

Une fois le travail terminé, vérifiez qu'il n'y ait pas d'étincelles, de cendres ardentes ou de flammes dans le local.

On ne doit jamais souder ni couper sur un récipient ayant contenu des combustibles, ou pouvant produire des vapeurs inflammables ou toxiques à la chauffe, à moins que le récipient n'ait été lavé au préalable, comme décrit dans la Norme AWS A6.0, figurant au paragraphe 3 de l'Index des Normes.

Cela comprend: un nettoyage à fond à la vapeur ou au caustique (ou un lavage avec dissolvant ou eau selon la solubilité du combustible) suivi d'une purge et d'une in-

bustible's solubility) followed by purging and inerting with nitrogen or carbon dioxide, and using protective equipment as recommended in A6.0. Waterfilling just below working level may substitute for inerting.

A container with unknown contents should be cleaned (see paragraph above). Do NOT depend on sense of smell or sight to determine if it is safe to weld or cut.

Hollow castings or containers must be vented before welding or cutting. They can explode.

Explosive atmospheres. Never weld or cut where the air may contain flammable dust, gas, or liquid vapors (such as gasoline).

D. Compressed Gas Equipment

Standard precautions. Comply with precautions in this manual, and those detailed in CGA Standard P-1, PRECAUTIONS FOR SAFE HANDLING OF COMPRESSED GASES IN CYLINDERS, listed 6 in Standards index.

1. Pressure Regulators

Regulator relief valve is designed to protect only the regulator from overpressure; it is not intended to protect any downstream equipment. Provide such protection with one or more relief devices.

Never connect a regulator to a cylinder containing gas other than that for which the regulator was designed.

Remove faulty regulator from service immediately for repair (first close cylinder valve). The following symptoms indicate a faulty regulator:

Leaks - if gas leaks externally.

Excessive Creep - if delivery pressure continues to rise with downstream valve closed.

Faulty Gauge - if gauge pointer does not move off stop pin when pressurized, nor returns to stop pin after pressure release.

Repair. Do NOT attempt repair. Send faulty regulators for repair to manufacturer's designated repair center, where special techniques and tools are used by trained personnel.

2. Cylinders

Cylinders must be handled carefully to prevent leaks and damage to their walls, valves, or safety devices:

Avoid electrical circuit contact with cylinders including third rails, electrical wires, or welding circuits. They can produce short circuit arcs that may lead to a serious accident. (See 1-3C.)

ICC or DOT marking must be on each cylinder. It is an assurance of safety when the cylinder is properly handled.

jection d'azote ou de gaz carbonique, en utilisant un équipement de protection comme recommandé dans l'A6-0. L'atmosphère inerte peut être remplacée par un niveau d'eau arrivant au-dessous du travail à effectuer.

Vous devez laver un récipient dont la nature de contenu est inconnue (voir paragraphe ci-dessus). NE vous fiez PAS à l'odorat ou à la vue pour dire si l'on peut le souder ou le couper en toute sécurité.

Vous devez pratiquer un évent sur les pièces ou récipients creux avant de les souder ou couper: ils peuvent exploser.

Atmosphères explosives: Ne soudez ni ne coupez jamais dans des lieux où l'air peut contenir des poussières, gaz ou vapeurs liquides inflammables (tels que l'essence).

D. Gaz comprimé

Précautions générales: Suivez les précautions de ce manuel, et celles décrites à la Norme CGA P-1 (Précautions de sécurité pour la manipulation de gaz comprimés en bouteilles), paragraphe 6 de l'Index des Normes.

1. Détendeurs de pression

La soupape de sûreté d'un détendeur est destinée à protéger seulement le détendeur de la surpression. Elle n'a pas pour but de protéger les boyaux et le chalumeau: on protège ceux-ci par des soupapes de retenue conçues spécialement pour cette fonction.

Ne montez jamais un détendeur sur une bouteille contenant un gaz différent de celui pour lequel le détendeur a été conçu.

Enlevez immédiatement un détendeur défectueux pour le faire réparer (d'abord, fermez le robinet de la bouteille). Les symptômes suivants dénotent la défectuosité du détendeur:

Fuites - si le gaz fuit extérieurement.

Ascension excessive - si la pression de débit continue à monter, le robinet du chalumeau étant fermé.

Manomètre défectueux - si l'aiguille du manomètre ne s'écarte pas de la goupille de butée lors de la mise en pression, ou ne revient pas sur la goupille après l'échappement de la pression.

Réparation. N'ESSAYEZ PAS de réparer vous-mêmes. Envoyez les détendeurs défectueux à réparer aux ateliers de réparation agréés du fabricant, où des techniques et des outils spéciaux sont utilisés par un personnel formé.

2. Bouteilles

Les bouteilles doivent être manipulées avec soin pour prévenir les fuites ou dégâts à leurs parois, robinets ou systèmes de sûreté. Évitez qu'un circuit électrique soit en contact avec les bouteilles, y compris les rails de contact, les fils électriques ou les circuits de soudage. Cela pourrait créer des arcs courts-circuits pouvant entraîner des accidents graves (Voir 1.3C.).

Chaque bouteille doit porter les inscriptions ICC ou DOT. C'est un gage de sécurité pourvu que la bouteille soit bien manipulée.

Identifying gas content. Use only cylinders with name of gas marked on them; do not rely on color to identify gas content. Notify supplier if unmarked. NEVER DEFACE or alter name, number, or other markings on a cylinder. It is illegal and hazardous.

Empties: Keep valves closed, replace caps securely; mark MT; keep them separate from FULLS and return promptly.

Prohibited use. Never use a cylinder or its contents for other than its intended use, NEVER as a support or roller.

Locate or secure cylinders so they cannot be knocked over.

Passageways and work areas. Keep cylinders clear of areas where they may be struck.

Transporting cylinders. With a crane, use a secure support such as a platform or cradle. Do NOT lift cylinders off the ground by their valves or caps, or by chains, slings, or magnets.

Do NOT expose cylinders to excessive heat, sparks, slag, and flame, etc. that may cause rupture. Do not allow contents to exceed 130°F. Cool with water spray where such exposure exists.

Protect cylinders particularly valves from bumps, falls, falling objects, and weather. Replace caps securely when moving cylinders.

Stuck valve. Do NOT use a hammer or wrench to open a cylinder valve that can not be opened by hand. Notify your supplier.

Mixing gases. Never try to mix any gases in a cylinder.

Never refill any cylinder.

Cylinder fittings should never be modified or exchanged.

3. Hose

Prohibited use. Never use hose other than that designed for the specified gas. A general hose identification rule is: red for fuel gas, green for oxygen, and black for inert gases.

Use ferrules or clamps designed for the hose (not ordinary wire or other substitute) as a binding to connect hoses to fittings.

No copper tubing splices. Use only standard brass fittings to splice hose.

Avoid long runs to prevent kinks and abuse. Suspend hose off ground to keep it from being run over, stepped on, or otherwise damaged.

Coil excess hose to prevent kinks and tangles.

Protect hose from damage by sharp edges, and by sparks, slag, and open flame.

Examine hose regularly for leaks, wear, and loose connections. Immerse pressured hose in water; bubbles indicate leaks.

Identification du gaz: N'utilisez que les bouteilles indiquant la nature du gaz; ne vous fiez pas à la couleur pour reconnaître la nature du gaz. Adressez-vous à votre fournisseur si cela n'est pas indiqué.

N'EFFACEZ ou ne modifiez JAMAIS les noms, numéros ou autres indications sur une bouteille. Cela est illégal et dangereux.

Vides: Maintenez les robinets fermés, remplacez bien les chapeaux; inscrivez "Vides"; séparez-les des "Pleines" et retournez-les rapidement.

Emploi interdit: N'utilisez une bouteille ou son contenu que pour ce à quoi elle est destinée, mais JAMAIS comme support ou rouleau.

Placez les bouteilles pour qu'elles ne tombent pas. Lorsqu'un détendeur (et un boyau) est monté sur elles, placez les ou attachez-les debout.

Passages et lieux de travail. Enlevez les bouteilles d'un endroit où l'on pourrait les frapper.

Transport des bouteilles. Avec une grue, utilisez un support fiable tel qu'une plate-forme ou un cadre. NE SOULEVEZ PAS des bouteilles du sol par leur robinet ou chapeau, ou avec des chaînes, élingues ou aimants.

N'EXPOSEZ PAS les bouteilles à une chaleur excessive, aux étincelles, au laitier et aux flammes, etc., pouvant causer leur rupture. Le contenant ne doit jamais dépasser 55°C. Refroidissez en pulvérisant de l'eau si nécessaire.

Protégez les bouteilles et particulièrement les soupapes contre les chocs, les chutes, les chutes d'objets et la température. Remettez bien les chapeaux lorsque vous déplacez les bouteilles.

Robinet coincé. N'UTILISEZ PAS un marteau ou une clé métallique pour ouvrir un robinet de bouteille que l'on ne peut pas ouvrir à la main. Avisez votre fournisseur.

Mélange de gaz. N'essayez jamais de mélanger des gaz dans une bouteille.

Ne rechargez jamais une bouteille. Les éléments de la bouteille ne doivent jamais être modifiés ou remplacés.

3. Boyau

Utilisation interdite. N'utilisez jamais un boyau autre que celui approprié au gaz indiqué. La règle générale d'identification est: rouge pour les gaz combustibles, vert pour l'oxygène, et noir pour les gaz inertes.

Utilisez des bagues ou colliers appropriés au boyau (et non du fil ordinaire ou autre substitution) pour brancher les boyaux à l'appareillage.

N'utilisez pas des raccords en cuivre. N'utilisez que des accessoires standard en laiton pour raccorder un boyau.

Utilisez une petite longueur de boyau. Cela évitera les noeuds et l'usure prématurée. Suspendez le boyau au-dessus du sol pour éviter qu'il ne soit écrasé, piétiné ou endommagé.

Enroulez le surplus de boyau pour éviter les noeuds et emmêlements. Évitez que le boyau ne soit endommagé par des tranchants, étincelles, laitier et flamme nue.

Repair leaky or worn hose by cutting area out and splicing (1-2D3). Do NOT use tape.

4. Proper Connections

Clean cylinder valve outlet of impurities that may clog orifices and damage seats before connecting regulator. Except for hydrogen, crack valve momentarily, pointing outlet away from people and sources of ignition. Wipe with a clean lintless cloth.

Match regulator to cylinder. Before connecting, check that the regulator label and cylinder marking agree, and that the regulator inlet and cylinder outlet match. NEVER CONNECT a regulator designed for a particular gas or gases to a cylinder containing any other gas.

Tighten connections. When assembling threaded connections, clean and smooth seats where necessary. Tighten. If connection leaks, disassemble, clean, and retighten using properly fitting wrench.

Adapters. Use a CGA adapter (available from your supplier) between cylinder and regulator, if one is required. Use two wrenches to tighten adapter marked RIGHT and LEFT HAND threads.

Regulator outlet (or hose) connections may be identified by right hand threads for oxygen and left hand threads (with grooved hex on nut or shank) for fuel gas.

5. Pressurizing Steps:

Drain regulator of residual gas through suitable vent before opening cylinder (or manifold valve) by turning adjusting screw in (clockwise). Draining prevents excessive compression heat at high pressure seat by allowing seat to open on pressurization. Leave adjusting screw engaged slightly on single-stage regulators.

Stand to side of regulator while opening cylinder valve.

Open cylinder valve slowly so that regulator pressure increases slowly. When gauge is pressurized (gauge reaches regulator maximum) leave cylinder valve in following position: For oxygen, and inert gases, open fully to seal stem against possible leak. For fuel gas, open to less than one turn to permit quick emergency shutoff.

Use pressure charts (available from your supplier) for safe and efficient, recommended pressure settings on regulators.

Check for leaks on first pressurization and regularly there-after. Brush with soap solution (capful of Ivory Liquid* or equivalent per gallon of water). Bubbles indicate leak. Clean off soapy water after test; dried soap is combustible.

E. User Responsibilities

Remove leaky or defective equipment from service immediately for repair. See User Responsibility statement in equipment manual.

*Trademark of Proctor & Gamble

Vérifiez régulièrement les fuites, l'usure et les raccordements lâches. Plongez le boyau sous pression dans de l'eau; les bulles indiqueront les fuites.

Réparation. Coupez la partie percée ou usée, et raccordez (1-2D3). N'UTILISEZ JAMAIS de ruban adhésif.

4. Branchements corrects

Avant de brancher le détendeur, nettoyez la sortie du robinet de la bouteille des impuretés qui peuvent obstruer les orifices et endommager les sièges. Sauf pour l'hydrogène, ouvrez momentanément le robinet, en éloignant la sortie des personnes et des sources inflammables. Essuyez avec un tissu propre et non gras.

Appareillez le détendeur à la bouteille. Avant de brancher, vérifiez que la marque du détendeur et la description de la bouteille concordent, et que l'orifice d'entrée du détendeur et l'orifice de sortie de la bouteille aillent ensemble. NE BRANCHEZ JAMAIS un détendeur conçu pour un gaz spécial (ou des gaz spéciaux) à une bouteille contenant d'autres gaz.

Serrez les branchements. Lorsque vous assemblez des branchements filetés, nettoyez et polissez les sièges où c'est nécessaire. Serrez. Si les branchements perdent, démontez-les, nettoyez et resserez avec une clef adéquate.

Adaptateurs. Placez, si besoin est, un adaptateur CGA (en vente chez votre fournisseur) entre la bouteille et le détendeur. Avec deux clefs, serrez l'adaptateur fileté À DROITE et À GAUCHE.

On peut reconnaître les branchements de sortie du détendeur (ou boyau) à l'aide du filetage à droite pour l'oxygène et à gauche (identifié par un écrou cannelé) pour les gaz combustibles.

5. Démarches de mise en pression

Purgez le détendeur de résidu de gaz avant d'ouvrir la bouteille (ou le robinet de canalisation) en serrant la vis de réglage (dans le sens des aiguilles d'une montre). Cette opération permet au siège de haute pression de s'ouvrir à la mise en pression, supprimant ainsi toute surchauffe de compression. Maintenez la vis de réglage des détendeurs à simple détente légèrement engagée. Avant d'ouvrir le robinet de la bouteille, assurez-vous que les boyaux sont branchés et que les soupapes aval sont fermées.

Tenez-vous latéralement au détendeur en ouvrant le robinet de la bouteille. Ouvrez-le lentement pour que la pression du détendeur monte progressivement. Lorsque le manomètre est mis sous pression (indique le maximum) le robinet de la bouteille de gaz inerte ou d'oxygène devra être ouvert à fond pour assurer l'étanchéité et celui de la bouteille de gaz combustible ouvert de moins d'un tour pour pouvoir le refermer rapidement en cas d'urgence.

Référez-vous aux tableaux de pression (distribués par votre fournisseur) pour un réglage recommandé de pression sûr et efficace sur les détendeurs. Vérifiez les fuites à la première mise en pression puis régulièrement, brossez avec une solution savonneuse (un bouchon d'Ivory Liquid* ou semblable par gallon d'eau). Les bulles indiquent une fuite. Enlevez l'eau savonneuse après examen; le savon sec est inflammable.

*Marque de Commerce de Proctor & Gamble

F. Leaving Equipment Unattended

Close gas supply at source and drain gas.

G. Rope Staging-Support

Rope staging-support should not be used for welding or cutting operation; rope may burn.

1-3. ARC WELDING - Comply with precautions in 1-1, 1-2, and this section. Arc Welding, properly done, is a safe process, but a careless operator invites trouble. The equipment carries high currents at significant voltages. The arc is very bright and hot. Sparks fly, fumes rise, ultraviolet and infrared energy radiates, weldments are hot, and compressed gases may be used. The wise operator avoids unnecessary risks and protects himself and others from accidents. Precautions are described here and in standards referenced in index.

A. Burn Protection

Comply with precautions in 1-2.

The welding arc is intense and visibly bright. Its radiation can damage eyes, penetrate lightweight clothing, reflect from light-colored surfaces, and burn the skin and eyes. Skin burns resemble acute sunburn, those from gas-shielded arcs are more severe and painful. **DON'T GET BURNED; COMPLY WITH PRECAUTIONS.**

1. Protective Clothing

Wear long-sleeve clothing (particularly for gas-shielded arc) in addition to gloves, hat, and shoes (1-2A). As necessary, use additional protective clothing such as leather jacket or sleeves, flame-proof apron, and fire-resistant leggings. Avoid outergarments of untreated cotton.

Bare skin protection. Wear dark, substantial clothing. Button collar to protect chest and neck and button pockets to prevent entry of sparks.

2. Eye and Head Protection

Protect eyes from exposure to arc. **NEVER** look at an electric arc without protection.

Welding helmet or shield containing a filter plate shade no. 12 or denser must be used when welding. Place over face before striking arc.

Protect filter plate with a clear cover plate.

Cracked or broken helmet or shield should **NOT** be worn; radiation can pass through to cause burns.

Cracked, broken, or loose filter plates must be replaced **IMMEDIATELY**. Replace clear cover plate when broken, pitted, or spattered.

E. Responsabilités de l'utilisateur

Ôtez immédiatement les parties percées ou défectueuses. Voir les Responsabilités de l'Usager du manuel de l'appareil.

F. Appareil laissé sans surveillance

Fermez l'alimentation de gaz à la source et purgez.

G. Liens et supports temporaires

Pour vos travaux de soudage ou de coupage, n'utilisez pas de la corde comme soutien, elle est inflammable.

1-3. SOUDAGE À L'ARC - Conformez-vous aux précautions des paragraphes 1.1 et 1.2 de cette section. Le soudage à l'arc bien exécuté est sûr, mais un soudeur négligent est un danger. Le poste de soudage transporte des courants élevés sous de fortes tensions. L'arc est très vif et chaud. Les étincelles volent, les vapeurs montent, l'énergie ultra-violette et infrarouge rayonnent, les soudures sont chaudes, et des gaz comprimés peuvent être utilisés. Le soudeur prudent évite les risques inutiles, se protège et protège autrui contre les accidents. Les précautions sont décrites ici et dans les normes données dans l'Index.

A. Protection contre les brûlures

Conformez-vous aux précautions du paragraphe 1.2. L'arc de soudage est intense et visiblement vif. Son rayonnement peut blesser les yeux, traverser les habits légers, se réfléchir sur les surfaces claires, et brûler la peau et les yeux. Les brûlures de la peau ressemblent à un gros coup de soleil. Celles d'arcs sous gaz protecteur sont plus graves et plus douloureuses. **NE VOUS BRÛLEZ PAS - SUIVEZ LES PRÉCAUTIONS.**

1. Vêtements de protection

Portez des vêtements à manches longues (surtout pour l'arc en atmosphère inerte) avec gants, masque et chaussures (1.2A.).

Si nécessaire portez en plus une veste ou des manches en cuir, un tablier et des guêtres ignifugées. De préférence ne portez pas de vêtements en coton non traité.

Protection de la peau. Portez des vêtements épais foncés. Boutonnez le col pour protéger la poitrine et le cou, et boutonnez les poches pour prévenir l'infiltration d'étincelles.

2. Protection des yeux et de la tête

Évitez que vos yeux soient exposés à l'arc. **NE** regardez **JAMAIS** un arc électrique sans protection.

Lorsque vous soudez, portez un écran ou masque avec verre filtrant teinté N° 12 ou plus foncé. Mettez-le sur le visage avant d'amorcer l'arc.

Protégez le verre filtrant d'un couvre-verre clair. **NE PORTEZ PAS** un masque fendu ou brisé; le rayonnement peut s'infiltrer et causer des brûlures.

Les verres filtrants fendus, brisés ou lâches doivent être remplacés **IMMÉDIATEMENT**. Remplacez un couvre-verre brisé, piqué ou taché par des projections.

Flash goggles with side shields **MUST** be worn under the helmet to give some protection to the eyes should the helmet not be lowered over the face before an arc is struck. Looking at an arc momentarily with unprotected eyes (particularly a high intensity gas-shielded arc) can cause a retinal burn that may leave a permanent dark area in the field of vision.

3. Protection of Nearby Personnel

Enclosed welding area. For production welding, a separate room or enclosed bay is best. In open areas, surround the operation with low-reflective, non-combustible screens or panels. Allow for free air circulation, particularly at floor level.

Viewing the weld. Provide face shields for all persons who will be looking directly at the weld.

Others working in area. See that all persons are wearing flash goggles.

Before starting to weld, make sure that screen flaps or bay doors are closed.

B. Toxic Fume Prevention

Comply with precautions in 1-2B.

Generator engine exhaust must be vented to the outside air. Carbon monoxide can kill.

C. Fire and Explosion Prevention

Comply with precautions in 1-2C.

Equipment's rated capacity. Do not overload arc welding equipment. It may overheat cables and cause a fire.

Loose cable connections may overheat or flash and cause a fire.

Never strike an arc on a cylinder or other pressure vessel. It creates a brittle area that can cause a violent rupture or lead to such a rupture later under rough handling.

D. Compressed Gas Equipment

Comply with precautions in 1-2D.

E. Shock Prevention

Exposed hot conductors or other bare metal in the welding circuit, or in ungrounded, electrically-HOT equipment can fatally shock a person whose body becomes a conductor. **DO NOT STAND, SIT, LIE, LEAN ON, OR TOUCH** a wet surface when welding, without suitable protection.

Vous devez porter des lunettes à écrans latéraux sous le masque pour protéger les yeux dans le cas où le masque ne serait pas abaissé sur le visage avant l'amorçage de l'arc. Regarder momentanément un arc sans protection (principalement un arc en atmosphère inerte à haute intensité) peut brûler la rétine et laisser un point sombre permanent dans le champ de vision.

3. Protection du personnel à proximité

Local de soudage fermé. Pour le soudage de production, il vaut mieux utiliser une salle séparée ou une baie fermée. Dans les locaux ouverts, entourez les travaux d'écrans ou panneaux peu réfléchissants et ininflammables. Laissez l'air circuler librement, particulièrement au niveau du sol.

Donnez des masques aux personnes qui regarderont directement la soudure.

Autres personnes travaillant sur les lieux. Veillez à ce que toutes les personnes portent les lunettes de protection.

Avant d'attaquer la soudure, assurez-vous que les rebords d'écran ou les portes soient fermés.

B. Prévention des gaz toxiques

Suivez les précautions du paragraphe 1.2B. L'échappement du moteur de la génératrice doit être ventilé à l'air extérieur. L'oxyde de carbone peut tuer.

C. Prévention des incendies et des explosions

Suivez les précautions 1.2C. Puissance nominale de l'appareil. Ne surchargez pas le poste de soudage à l'arc. Cela peut surchauffer les câbles et causer un incendie.

Les branchements lâches de câble peuvent surchauffer ou faire des étincelles et causer un incendie.

N'amorcez jamais un arc sur une bouteille ou autre récipient sous pression. Cela créerait un point de rupture entraînant à plus ou moins longue échéance l'explosion du réservoir.

D. Gaz comprimé

Suivez les précautions 1.2D.

E. Prévention des décharges électriques

Des conducteurs chargés ou métal nu incorporés au circuit de soudage ou à un appareil chargé sans mise à la terre peuvent donner une décharge fatale à la personne dont le corps devient conducteur. **NE SOUDEZ PAS DEBOUT, ASSIS, COUCHÉ, PENCHÉ** sur une surface humide ni en contact avec une telle surface sans protection appropriée.

To protect against shock:

Keep body and clothing dry. Never work in damp area without adequate insulation against electrical shock. Stay on a dry duckboard, or rubber mat when dampness or sweat can not be avoided. Sweat, sea water, or moisture between body and an electrically HOT part - or grounded metal - reduces the body surface electrical resistance, enabling dangerous and possibly lethal currents to flow through the body.

1. Grounding the Equipment

When arc welding equipment is grounded according to the National Electrical Code, and the work is grounded according to ANSI Z49.1 "Safety In Welding And Cutting," a voltage may exist between the electrode and any conducting object. Examples of conducting objects include, but are not limited to, buildings, electrical tools, work benches, welding power source cases, workpieces, etc. **Never touch the electrode and any metal object unless the welding power source is off.**

When installing, connect the frames of each unit such as welding power source, control, work table, and water circulator to the building ground. Conductors must be adequate to carry ground currents safely. Equipment made electrically HOT by stray current may shock, possibly fatally. Do NOT GROUND to electrical conduit, or to a pipe carrying ANY gas or a flammable liquid such as oil or fuel.

Three-phase connection. Check phase requirements of equipment before installing. If only 3-phase power is available, connect single-phase equipment to only two wires of the 3-phase line. Do NOT connect the equipment ground lead to the third (live) wire, or the equipment will become electrically HOT - a dangerous condition that can shock, possibly fatally.

Before welding, check ground for continuity. Be sure conductors are touching bare metal of equipment frames at connections.

If a line cord with a ground lead is provided with the equipment for connection to a switchbox, connect the ground lead to the grounded switchbox. If a three-prong plug is added for connection to a grounded mating receptacle, the ground lead must be connected to the ground prong only. If the line cord comes with a three-prong plug, connect to a grounded mating receptacle. Never remove the ground prong from a plug, or use a plug with a broken off ground prong.

2. Electrode Holders

Fully insulated electrode holders should be used. Do NOT use holders with protruding screws.

3. Connectors

Fully insulated lock-type connectors should be used to join welding cable lengths.

Pour vous protéger contre les décharges électriques, maintenez votre corps et vêtements secs. Ne travaillez jamais dans un endroit humide sans isolation adéquate contre les décharges électriques. Lorsque vous ne pouvez éviter l'humidité ou la sueur, placez-vous sur un caillébotis sec ou un tapis en caoutchouc. La sueur, l'eau de mer, ou l'humidité entre le corps et une pièce CHARGÉE, ou une pièce de métal à la masse, réduisent la résistance électrique de la surface du corps, permettant l'entrée de courants dangereux, voire mortels.

1. Mise à la terre de l'appareil

Lorsque l'appareil de soudage à l'arc est mise à la terre suivant la norme National Electrical Code, et la masse est mise à la terre suivant la norme ANSI Z49.1 "Safety in Welding and Cutting," une tension peut exister entre l'électrode et un objet conducteur. Certaines de ces objets sont par exemple (mais pas seulement), des bâtiments, des outils électriques, des établis, des châssis de postes de soudure, des pièces d'ouvrage, etc. **Ne jamais touchez l'électrode ou des objets en métal avant d'avoir mis le poste de soudure à l'arrêt.**

À l'installation, branchez les châssis de chaque élément (source de courant, commande, établi et circuit d'eau) à la terre. Les conducteurs doivent pouvoir conduire les courants telluriques en toute sécurité. L'appareil chargé par les courants vagabonds peut donner une décharge risquant d'être mortelle. **NE BRANCHEZ PAS VOTRE PRISE DE TERRE** à une conduite électrique, ou à un tuyau de gaz ou de liquide inflammable tel que l'huile ou un combustible.

Connexion triphasée. Avant l'installation vérifiez la phase nécessaire à l'appareil. Si seul le triphasé est disponible, ne branchez l'appareil monophasé qu'à deux des fils de la ligne triphasée. **NE BRANCHEZ PAS** le conducteur de terre de l'appareil au troisième fil (sous tension), autrement l'appareil serait chargé: condition dangereuse pouvant donner une décharge fatale.

Avant le soudage, vérifiez si la prise de terre est uniforme. En branchant, assurez-vous que les conducteurs touchent le métal nu du châssis de l'appareil.

Lorsqu'un appareil doit être alimenté à partir d'un coffret d'alimentation, le conducteur de terre doit être relié à celui-ci.

Si vous avez en plus une fiche à trois broches pour la terre, ne branchez le conducteur de terre qu'à la broche de terre. Si le cordon d'alimentation a une fiche à trois broches, reliez-le à une prise femelle tripolaire reliée à la terre. N'enlevez jamais la broche de terre d'une fiche ou n'utilisez jamais une fiche dont la broche de terre serait brisée.

2. Pince-électrodes

Utilisez des pince-électrodes bien isolées. **N'UTILISEZ PAS** des pince-électrodes avec vis saillantes.

3. Connecteurs

Utilisez des connecteurs à verrouillage bien isolés pour assembler de longs câbles.

4. Cables

Frequently inspect cables for wear, cracks and damage. IMMEDIATELY REPLACE those with excessively worn or damaged insulation to avoid possibly - lethal shock from bared cable. Cables with damaged areas may be taped to give resistance equivalent to original cable.

Keep cable dry, free of oil and grease, and protected from hot metal and sparks.

5. Terminals And Other Exposed Parts.

Terminals and other exposed parts of electrical units should have insulating covers secured before operation.

6. Electrode Wire

Electrode wire becomes electrically HOT when the power switch of gas metal-arc welding equipment is ON and welding gun trigger is pressed. Keep hands and body clear of wire and other HOT parts.

7. Safety Devices

Safety devices such as interlocks and circuit breakers should not be disconnected or shunted out.

Before installation, inspection, or service, of equipment, shut OFF all power and remove line fuses (or lock or red-tag switches) to prevent accidental turning ON of power. Disconnect all cables from welding power source, and pull all 115 volts line-cord plugs.

Do not open power circuit or change polarity while welding. If, in an emergency, it must be disconnected, guard against shock burns, or flash from switch arcing.

Leaving equipment unattended. Always shut OFF and disconnect all power to equipment.

Power disconnect switch must be available near the welding power source.

1-4. STANDARDS BOOKLET INDEX - For more information, refer to the following standards or their latest revisions and comply as applicable:

1. ANSI Standard Z49.1, SAFETY IN WELDING AND CUTTING obtainable from the American Welding Society, 550 Le Jeune Rd, P.O. Box 351040, Miami, FL 33135.
2. 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.
3. OSHA, SAFETY AND HEALTH STANDARDS, 29CFR 1910, obtainable from the U.S. Government Printing Office, Washington, D.C. 20402.
4. ANSI Standard Z87.1, SAFE PRACTICES FOR OCCUPATION AND EDUCATIONAL EYE AND

4. Câbles

Vérifiez fréquemment l'usure, les fissures et l'altération des câbles. REMPLACEZ IMMÉDIATEMENT ceux dont l'isolation serait trop usée ou altérée pour prévenir les décharges mortelles provoquées par un câble dénudé. Vous pouvez enrouler les parties endommagées de ruban adhésif en épaisseur suffisante pour donner une résistance de câble neuf. Maintenez les câbles secs, dépourvus d'huile et de graisse et mettez-les à l'abri du métal chaud et des étincelles.

5. Têtes de câbles et autres parties dénudées

Avant la mise en marche, les têtes de câbles et autres parties dénudées d'un appareil électrique doivent être munies de leurs couvre-fils isolants.

6. Fils-électrodes

Le fil-électrode est chargé lorsque lorsque l'interrupteur d'alimentation du poste à souder au MIG est sur MARCHE et que l'on appuie sur la gâchette du pistolet. Évitez que les mains et le corps soient en contact avec le fil et autres éléments chargés.

7. Dispositif de sécurité

Le dispositif de sécurité-verrouillage et coupe-circuit ne doit pas être débranché ou déshunté.

Avant l'installation, l'inspection ou la réparation de l'appareil, mettez l'alimentation sur ARRÊT et enlevez les fusibles généraux (ou verrouillez les interrupteurs) pour éviter une remise en MARCHE accidentelle. Débranchez tous les câbles de la source de courant ainsi que les prises des cordons d'alimentation en 115 volts.

Lors du soudage, n'ouvrez pas le circuit d'alimentation et ne changez pas la polarité. S'il est débranché au cours d'une urgence, faites attention aux brûlures de décharge ou aux jaillissements d'étincelles.

Appareil laissé sans surveillance. Mettez toujours sur ARRÊT et débranchez l'appareil.

L'interrupteur d'arrêt doit toujours se trouver à proximité de la source de courant.

1-4. INDEX DES NORMES - Pour plus de renseignements, référez-vous aux normes de l'ACNOR ou aux normes américaines suivantes:

1. ANSI Standard Z49.1, SAFETY IN WELDING AND CUTTING distribué par l'American Welding Society, 550 Le Jeune Rd, P.O. Box 351040 Miami, FL 33135
2. NIOSH, SAFETY AND HEALTH IN ARC WELDING AND GAS WELDING AND CUTTING distribué par le Superintendent of Documents, U.S. Government Printing Office, Washington D.C. 20402
3. OSHA, SAFETY AND HEALTH STANDARDS, 29CFR 1910, distribué par U.S. Government Printing Office, Washington, D.C. 20402.

- FACE PROTECTION obtainable from the 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 the 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 the American Welding Society, 550 Le Jeune Rd., P.O. Box 351040, FL 33135.
 8. NFPA Standard 51, OXYGEN - FUEL GAS SYSTEMS FOR WELDING AND CUTTING obtainable from the National Fire Protection Association, 470 Atlantic Avenue, Boston, MA 02210.
 9. NFPA Standard 70-1978, NATIONAL ELECTRICAL CODE obtainable from the National Fire Protection Association, 470 Atlantic Avenue, Boston, MA 02210.
 10. NFPA Standard 51B, CUTTING AND WELDING PROCESSES obtainable from the National Fire Protection Association, 470 Atlantic Avenue, Boston, MA 02210.
 11. CGA Pamphlet P-1, SAFE HANDLING OF COMPRESSED GASES IN CYLINDERS obtainable from the Compressed Gas Association, 500 Fifth Avenue, New York, NY 10036.
 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 Le Jeune Rd., P.O. Box 351040, Miami, FL 33135.
 15. ANSI Standard Z88.2 "Practice for Respiratory Protection" obtainable from the American National Standards Institute, 1430 Broadway, New York, NY 10018.
 4. ANSI Standard Z87.1, SAFE PRACTICES FOR OCCUPATION AND EDUCATIONAL EYE AND FACE PROTECTION distribué par l'American National Standards Institute, 1430 Broadway, New York, NY 10018.
 5. ANSI Standard Z41.1, STANDARD FOR MEN'S SAFETY - TOE FOOTWEAR distribué par l'adresse donnée en 4.
 6. ANSI Standard Z49.2, FIRE PREVENTION IN THE USE OF CUTTING AND WELDING PROCESSES distribué par l'adresse donnée en 4.
 7. AWS Standard A6.0, WELDING AND CUTTING CONTAINERS WHICH HAVE COMBUSTIBLES distribué par l'adresse donnée en 1.
 8. NFPA Standard 51, OXYGEN - FUEL GAS SYSTEMS FOR WELDING AND CUTTING distribué par la National Fire Protection Association, 470 Atlantic Avenue, Boston, MA 02210
 9. NFPA Standard 70-1978, NATIONAL ELECTRICAL CODE distribué par l'adresse donnée en 8
 10. NFPA Standard 51B, CUTTING AND WELDING PROCESSES distribué par l'adresse donnée en 8
 11. CGA Pamphlet P-1, SAFE HANDLING OF COMPRESSED GASES IN CYLINDERS distribué par la Compressed Gas Association, 500 Fifth Avenue, New York, NY 10036.
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 13. NWSA booklet, WELDING SAFETY BIBLIOGRAPHY distribué par la National Welding Supply Association, 1900 Arch Street Philadelphia, PA 19103.
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 15. ANSI Standard Z88.2 "Practice For Respiratory Protection" distribué par l'American National Standards Institute, 1430 Broadway, New York, NY 10018.

SECTION 2 - INTRODUCTION

Rated Welding Current Amperes	Max. Open- Circuit Volts	Input At Rated Load Output 60 Hz. Single-Phase						Control Circuit Voltage At Gun	Electrode Wire Feed Speed	Electrode Wire Diameter Capability	Dimensions	Weight		
		Amperes At				kva	kw					Without Gun	With Gun	With Gun
		200V	230V	460V	575V							Net	Net	Ship
200 @ 28 Volts 60% Duty Cycle	42	46	40	20	16	9.15	8.3	24 Volts	60-585 ipm. (1.5-14.8 mpm)	.023/.025-.045 in. (0.6-1.1 mm) Hard Wire .052 & 1/16 in. (1.3 & 1.6 mm) Flux Cored Wire†	Height - 30 in. (762 mm) Width - 13-1/2 in. (343 mm) Length - 26-1/2 in. (673 mm)	191* lb. (87 kg)	228* lb. (103 kg)	239** lb. (108 kg)

*Add 2-3/4 pounds (1.25 kg) for units with spot panel.

**Add 5 pounds (2.27 kg) for units with spot panel.

†Using GA-40C Gun

Figure 2-1. Specifications

2 - 1. GENERAL INFORMATION AND SAFETY

A. General

Information presented in this manual and on various labels, tags, and plates provided on this unit pertains to equipment design, installation, operation, maintenance and troubleshooting which should be read, understood and followed for the safe and effective use of this equipment.

B. Safety

The installation, operation, maintenance, and troubleshooting of arc welding equipment requires practices and procedures which ensure personal safety and the safety of others. Therefore, this equipment is to be installed, operated and maintained only by qualified persons in accordance with this manual and all applicable codes such as, but not limited to, those listed at the end of Section 1 - Safety Rules For Operation Of Arc Welding Power Source.

Safety instructions specifically pertaining to this unit appear throughout this manual highlighted by the signal words **WARNING** and **CAUTION** which identify different levels of hazard.

WARNING statements include installation, operating, and maintenance procedures or practices which if not carefully followed could result in serious personal injury or loss of life.

CAUTION statements include installation, operating and maintenance procedures or practices which if not carefully followed could result in minor personal injury or damage to this equipment.

A third signal word, **IMPORTANT**, highlights instructions which need special emphasis to obtain the most efficient operation of this equipment.

2 - 2. RECEIVING-HANDLING - Prior to installing this equipment, clean all packing material from around the unit and carefully inspect for any damage that may have occurred during shipment. Any claims for loss or damage that may have occurred in transit must be filed

by the purchaser with the carrier. A copy of the bill of lading will be furnished by the manufacturer on request if occasion to file claim arises.

When requesting information concerning this equipment, it is essential that Model Description and Serial (or Style) Number of the equipment be supplied.

2 - 3. DESCRIPTION - This unit is a constant potential dc arc welding power source and wire feeder system. It is designed for Gas Metal-Arc Welding with short circuit or spray transfer. Rated weld output is 200 amperes, 28 volts dc, at 60% duty cycle.

The duty cycle is the percentage of a ten minute period that the unit can be operated safely at a given output. Since this unit is rated at 60% duty cycle, it can be operated at rated load for six minutes out of ten. During the remaining four minutes, the unit should idle to permit proper cooling. If welding amperage is decreased the duty cycle can be increased. Figure 2-2 enables the operator to determine the duty cycle at various welding amperages.

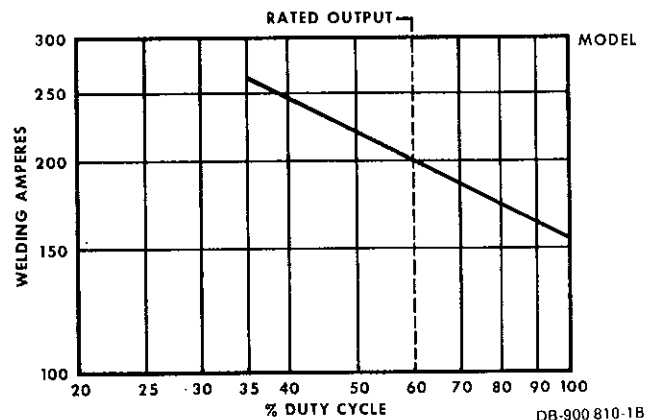
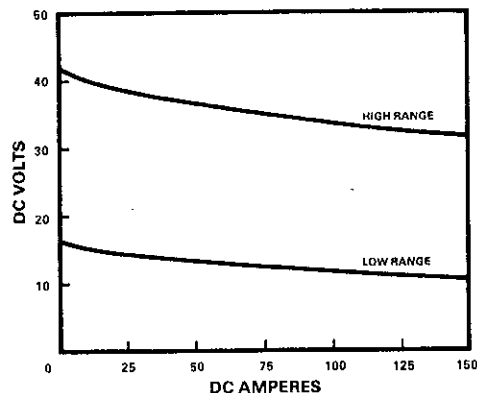


Figure 2-2. Duty Cycle Chart

2 - 4. OUTPUT CURVES (Figure 2-3) - The volt-ampere curves show the minimum and maximum voltage and amperage output capabilities of the unit from the minimum and maximum settings of the WIRE SPEED ADJUSTMENT control.



B-049 424-A

Figure 2-3. Volt-Ampere Curves

2 - 5. SUPPLIED EQUIPMENT - Equipment supplied with the welding power source and requiring customer installation or assembly is listed below:

- A. Running gear
- B. Wall receptacle
- C. Work cable & jack plug
- D. GA-20C gun with 5/8 inch (16 mm) nozzle and two contact tubes for each wire size (Unit can be ordered without GA-20C gun).
- E. .030 inch (0.8 mm), .035 inch (0.9 mm), and .045 inch (1.1 mm) drive rolls.

The welding power source is factory equipped with an 8 ft. (2.4 m) power cord (with plug on 200/230 volt models), gas valve, and facilities for a Spoolmatic gun.

2 - 6. ADDITIONAL REQUIRED EQUIPMENT - The additional equipment required to complete the Gas Metal Arc Welding setup is listed below and can be obtained from your local welding supplies distributor.

- A. Cylinder of shielding gas - Most commonly used gases are 75 AR 25CO₂ and welding grade CO₂. Other welding grade gas mixtures can be used depending on the application.
- B. Regulator and flow meter for the specific shielding gas used.
- C. Approximately 8 ft. (2.4 m) of 5/8 in. (16 mm) gas hose with fittings.
- D. 8 or 12 inch spool wire - Most commonly used hard wires are E70S-6 and E70S-3. Other hard wires can be used depending on the application. .045, .052, and 1/16 flux cored wires can be used with a GA-40C welding guns.
- E. Welding helmet, safety glasses, and welding gloves.
- F. Work clamp.

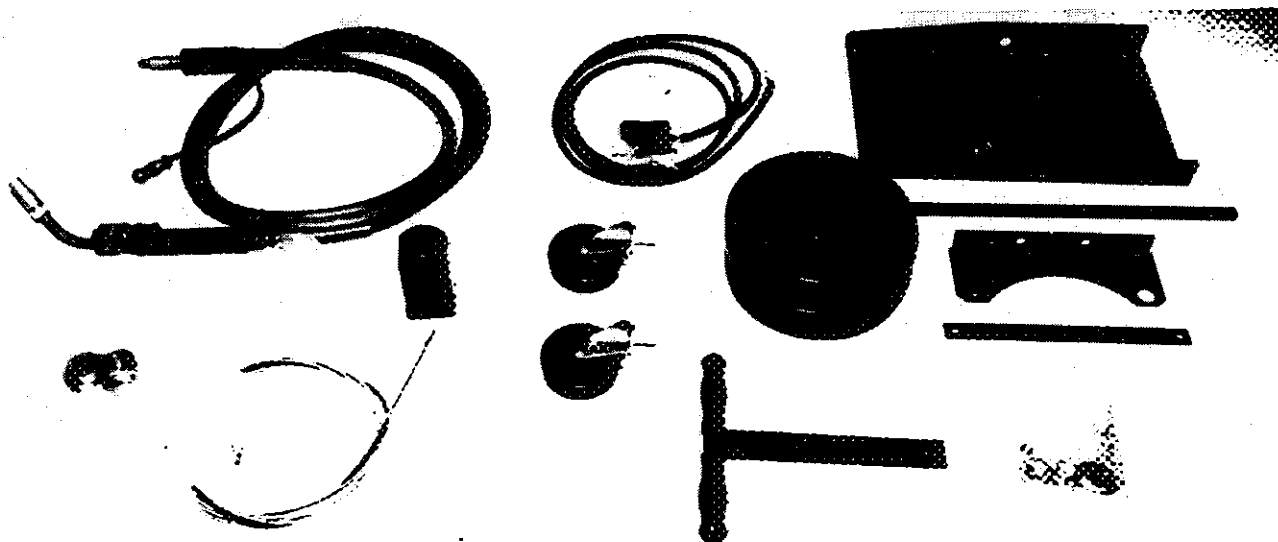


Figure 2-4. Supplied Equipment

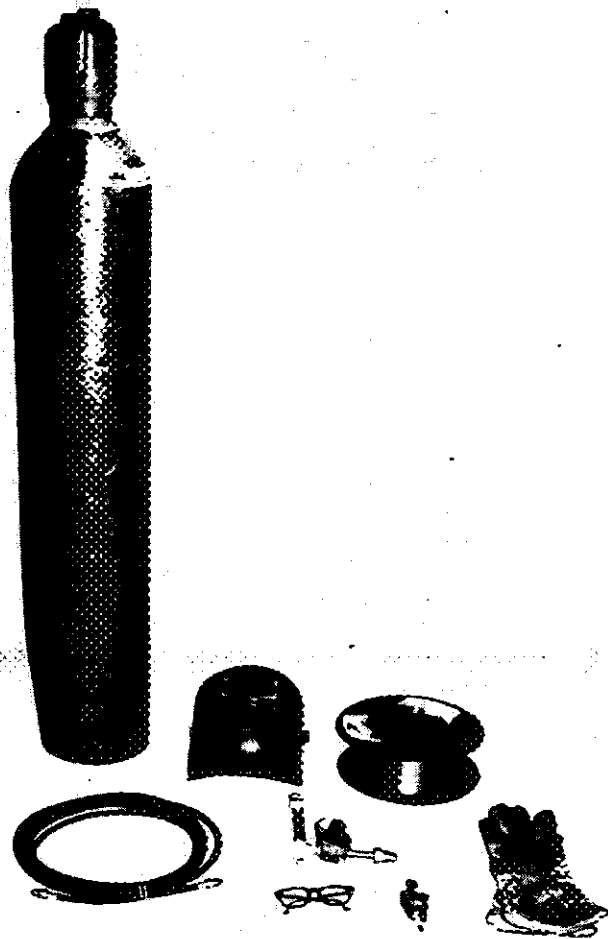


Figure 2-5. Additional Required Equipment

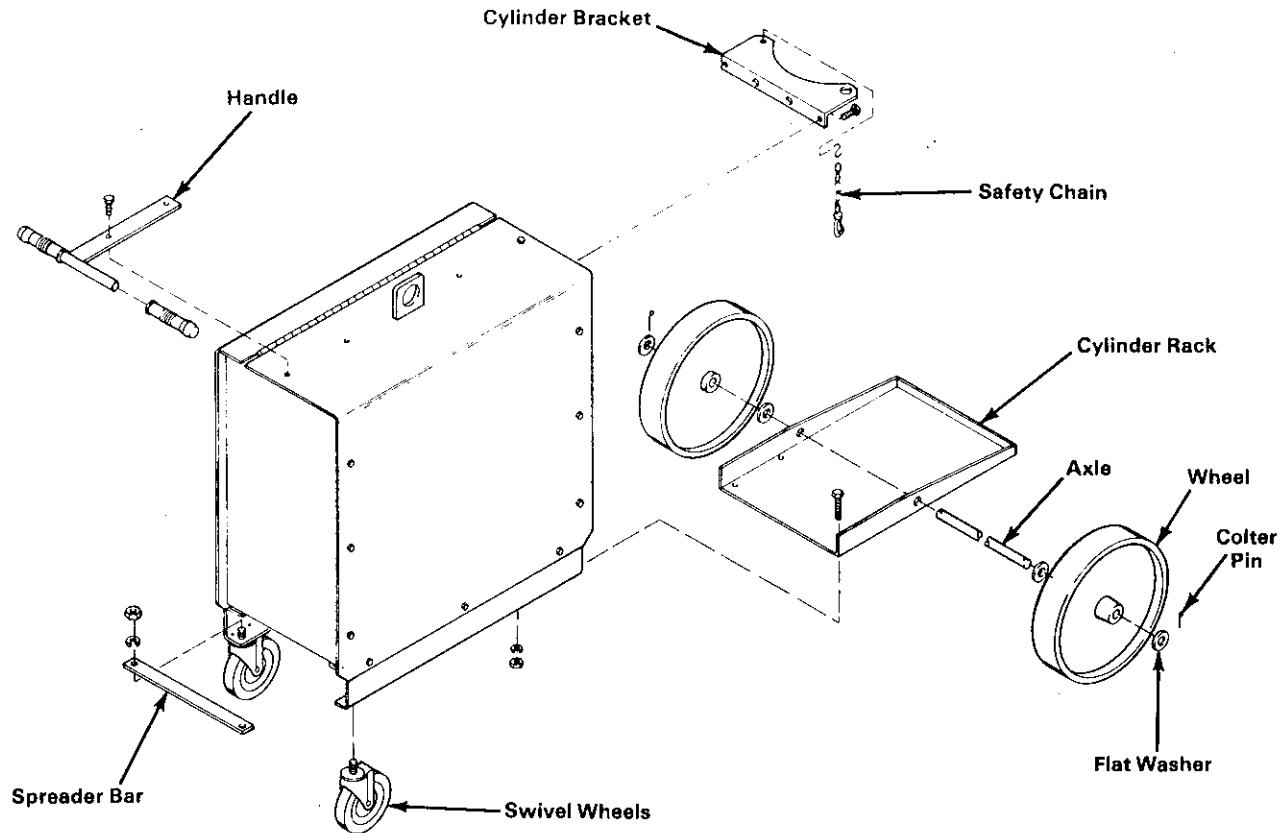
2 - 7. OPTIONAL EQUIPMENT - The equipment listed below can be obtained to extend the capabilities of the basic unit or to suit special applications:

- A. SKP-35, Spot, Pulser, Continuous Panel (includes three spot nozzles) (For installation see Section 3-2).
- B. Spoolmatic I gun
- C. Spoolmatic I gun extension hose & cable kit
- D. GA-40C gun
- E. Offset/punching tool
- F. .023/.025 drive roll kit
- G. CRM cylinder rack
- H. Gun cable holder
- J. 25 ft (7.6 m) power cord extension

2 - 8. CONSUMABLE PARTS - The parts listed below are subject to wear under normal usage or damage:

- A. Contact tubes
- B. Nozzles
- C. Gun liner
- D. Drive rolls

SECTION 3 - INSTALLATION



TC-049 808-B

Figure 3-1. Running Gear Installation

3 - 1. INSTALLATION OF THE WELDING POWER SOURCE ON RUNNING GEAR (See Figure 3-1)

CAUTION: UNCONTROLLED TILTING OR TIPPING of unit can result in personal injury or equipment damage.

- Use equipment of adequate capacity to lift the unit.
- If using lift forks to handle this unit, be sure the lift forks are long enough to extend out of the opposite side of the base.
- Do not place any part of the body under the unit while it is suspended.

Place blocks under frame of unit before attaching running gear.

1. Install the two 4 in. swivel wheels and the spreader bar on the front corners of the welding power source base as shown in Figure 3-1 using 3/8 in. hardware.
2. Block the unit up securely in middle to ease installation of rear wheel/gas cylinder rack assembly.
3. Slide axle through cylinder rack and install a wheel on each end of axle with a 3/4 in. flat washer on each side of wheel. Secure the wheels in place with cotter pins.

4. Install cylinder rack on welding power source base using 5/16-18 x 3/4 cap screws and associated hardware (see Figure 3-1).
5. Remove the two front cap screws in top of welding power source wrapper and discard. Install running gear handle to wrapper using 1/4-20 x 3/4 cap screws as shown in Figure 3-1.
6. Install cylinder bracket to rear panel of welding power source as shown in Figure 3-1 using 1/4-20 x 3/4 cap screws and existing holes in rear panel.
7. Set gas cylinder in rack and lock in position with safety chain. Cylinder must be secured at all times.

3 - 2. INSTALLATION OF OPTIONAL SKP-35 PANEL

WARNING: ELECTRIC SHOCK can kill.

- Disconnect input power and employ "lockout/tagging procedures" before internally inspecting or servicing.

Lockout/tagging procedures consist of padlocking line disconnect switch in open position, removing fuses from fuse box, or tagging circuit breaker or other disconnecting device.

1. Remove module cover plate from upper righthand corner of front panel. Retain securing screws.
2. Locate wiring harness clamped to air baffle. Remove wiring harness from first clamp and carefully pull end of wiring harness with connectors through opening in front panel - it will come through approximately 2 in. (51 mm).
3. Disconnect jumpered connector from plug PLG2.
4. Connect receptacle RC2 from SKP-35 panel to PLG2. Be sure the connectors are locked together.
5. Install SKP-35 panel in front panel using securing screws removed in Step No. 1.



Figure 3-2. SKP-35 Panel Installation

3 - 3. ELECTRICAL INPUT CONNECTIONS

A. Electrical Input Requirements

This welding power source is designed to be operated from single-phase, 60 Hertz, ac input power which has a voltage rating that corresponds with one of the electrical input voltages shown on the nameplate. Consult the local electric utility if there is any question about the type of electrical system available at the installation site or how proper connections to the welding power source are to be made.

B. Matching The Welding Power Source To The Available Input Voltage

This unit is equipped with input voltage jumper links on the primary terminal board which allow operation from different line voltages. This unit is shipped with the jumper links positioned for the highest voltage stated on the nameplate. If the unit is to be operated from the lower input voltage, remove the wrapper and reposition the jumper links to correspond to the available line voltage (see input voltage label on primary terminal board).

CAUTION: INCORRECT INPUT VOLTAGE JUMPER LINK PLACEMENT can damage unit.

- Position jumper links as shown on the input voltage label located on primary terminal board.

IMPORTANT: Store unused jumper links across linked terminals.

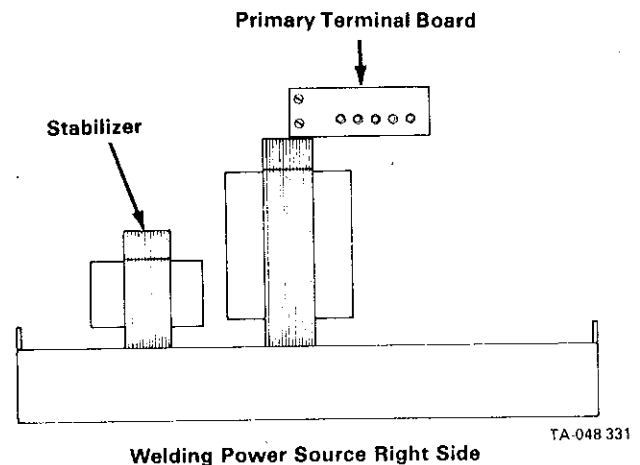


Figure 3-3. Input Voltage Jumper Links Location

C. Input Conductor Connections

WARNING: ELECTRIC SHOCK can kill.

- It is recommended that a fusible line disconnect switch be installed in the input circuit to the welding power source.

This would provide a safe and convenient means to completely remove all electrical power from the welding power source whenever it is necessary to internally inspect or service the unit.

- Employ "lockout/tagging procedures" on input line before making input connections to the welding power source.

Lockout/tagging procedures consist of padlocking line disconnect switch in open position, removing fuses from fuse box, or tagging circuit breaker or other disconnecting device.

Models with 200 or 230 volts primary input are equipped with a power cord that has a three-prong polarized plug. The corresponding wall receptacle is also provided. The wall receptacle should be installed and connected to a line disconnect switch by a competent electrician. Install the receptacle with the grounding terminal at the top so that the power cable can hang downward without bending or twisting.

Models with primary input above 230 volts have a power cord without plug. This power cord should be connected to line power at the line disconnect switch.

Table 3-1 provides guidelines for selecting the proper size input conductors and line fuses. The input conductors should be covered with an insulating material that meets local electrical standards.

WARNING: ELECTRICAL SHOCK can kill.

- Do not connect an input conductor to the ground conductor from the unit.
- Do not connect the ground conductor to an input conductor.

Incorrect input connections can result in an electrically energized welding power source chassis. The ground terminal is connected to the welding power source chassis and is for grounding purposes only.

Table 3-1. Input Conductor And Fuse Size

Input Conductor Size - AWG*				Fuse Size In Amperes			
200V	230V	460V	575V	200V	230V	460V	575V
8 (10)	8 (10)	12 (14)	12 (16)	60	50	25	20

*Input conductor sizes are based on National Electrical Code specifications for allowable ampacities of insulated copper conductors, having a temperature rating of 75°C, with not more than three conductors in a raceway or cable. Numbers in () are equipment ground conductor sizes.

3 - 4. INSTALLATION OF SHIELDING GAS

A. Gas Cylinder

Secure the gas cylinder to the running gear with the supplied chain. If the running gear is not to be used, chain the cylinder to a wall or other stationary support to prevent the cylinder from falling over and breaking off the valve.

WARNING: GAS UNDER PRESSURE is explosive.

- Keep open flame and smoking materials away from shielding gas.
- Always store cylinders in upright position.
- Ensure that cylinders are chained to stationary support or running gear.

B. Regulator Flowmeter (Customer Supplied) (Figure 3-5)

1. With the cylinder correctly placed, remove the cylinder cap, then stand to one side of the cylinder valve and open the valve slightly. When gas is emitted from the cylinder, close the valve. This procedure will help to get rid of any dust that may have accumulated around the valve seat.
2. Regulator flowmeter must be properly equipped with a stem, nut connectors and gasket for use with either CO₂ cylinders or inert gas type cylinders.

3. Attach gas regulator to gas cylinder valve; keep the face of the regulator flowmeter gauge in vertical position and tighten stem nut securely to gas cylinder valve.

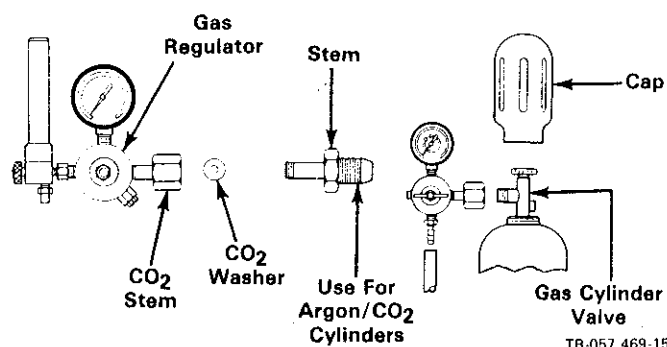


Figure 3-4. Typical Regulator Flowmeter Installation

IMPORTANT: A gasket should be installed to prevent leaks. Do not use lubricants or sealing agents.

4. A shielding gas output fitting with 5/8-18 right hand threads is provided at the rear of the welding power source for making gas connections. Connect the gas hose to this output fitting. Attach other end of the gas hose over barbed stem located on the bottom of the regulator flowmeter. Ensure that the hose extends over at least two barbs. No clamp is necessary since only low gas pressure is present.

3 - 5. WORK CABLE ASSEMBLY & INSTALLATION (Figure 3-5) - A ten foot cable and twistlock plug are provided with this unit to assemble for use as the work cable. A work clamp must be obtained to complete the assembly.

A. Assembly

1. Secure terminal lug to work clamp.
2. Remove one inch of insulation from remaining end of cable.
3. Wrap copper strip around wire.
4. Place metal piece on copper strip and slide plug onto wire so that the set screw hole is over the metal piece.

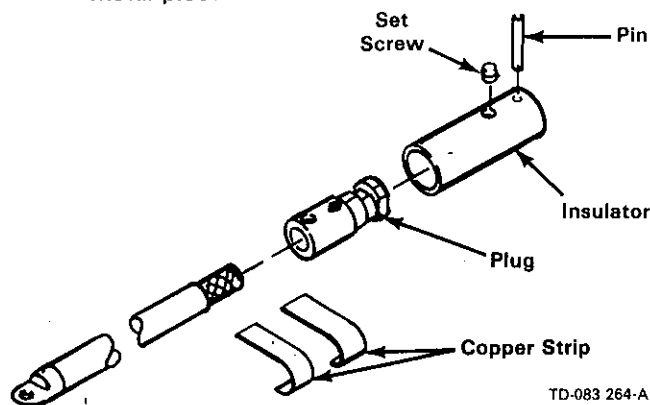
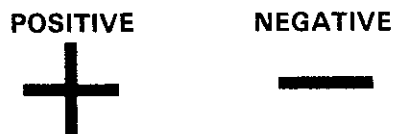


Figure 3-5. Twistlock Plug Installation

5. Slide insulator over plug.
6. Secure plug by inserting and tightening set screw.
7. Secure insulator by inserting pin into plug.

B. Installation



WARNING: ELECTRIC SHOCK can kill.

- Do not touch live electrical parts.
- Do not change the position of the jack plug while welding.

1. Insert plug into the NEGATIVE output receptacle for dc reverse polarity or POSITIVE output receptacle for dc straight polarity with flat side towards receptacle key.

2. Rotate plug 1/4 turn clockwise.

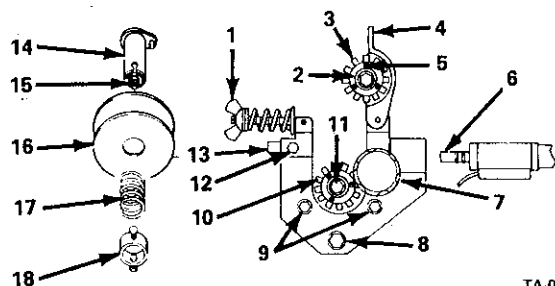
IMPORTANT: The drive rolls supplied with this unit are of the double usage type: When the grooves become worn, reverse each drive roll, locating the unused groove in position to feed the wire.

3 - 6. DRIVE ROLL AND WIRE GUIDE INSTALLATION (Figure 3-6)

Upon initial installation, or as a result of changes in wire size, it is necessary to install the required drive rolls and wire guides. Open the hinged door on the left side of the welding power source by turning the two wing-headed screw fasteners in a counterclockwise direction. Install the appropriate drive rolls and wire guides as follows:

A. Drive Roll Installation

1. Loosen pressure adjustment wing nut (item 1, Figure 3-6) and pivot it free of the cover.



TA-049 804

Figure 3-6. Drive Rolls And Wire Guide Installation

2. Pivot gear cover (4) away until it is in an open position.
3. Slide drive roll (2) on pressure gear (3) with drive roll size facing out. Align holes, insert securing screws (5) and tighten.
4. Slide remaining drive roll on drive gear (10) with drive roll size facing in. Align holes, insert securing screws and tighten.

B. Inlet Wire Guide Installation

1. Loosen the inlet wire guide securing screw (12).

IMPORTANT: Wire guides should be installed so that the tip of the guide is as close to the drive roll as possible without touching.

2. Insert the inlet wire guide (13) into the drive assembly as illustrated in Figure 3-6. Secure by tightening screw (12).

IMPORTANT: Behind the drive gear are spring washers. To obtain proper alignment of the drive roll on the drive gear with the wire guides rotate the drive gear securing bolt (11) thereby moving the drive roll in or out to the desired position. The drive roll on the pressure gear will locate itself on the wire when the gear cover is replaced and the gears mesh together.

If further adjustment is necessary to obtain proper alignment of wire guides and drive rolls, see Section 6-3.

3 - 7. GA-20C OR OPTIONAL GA-40C WELDING GUN CONNECTIONS

A. Gun/Feeder Connector Installation (Figure 3-6)

IMPORTANT: The outlet guide is provided as part of the gun assembly.

1. Loosen the gun/feeder connector securing knob (7).

IMPORTANT: Wire guides should be installed so that the tip of the guide is as close to the drive roll as possible without touching.

2. Insert the gun/feeder connector (6) which includes the installed outlet guide, through the access hole in the welding power source front panel and into the drive assembly opposite the inlet wire guide as illustrated in Figure 3-6 & 3-7.

3. Tighten the gun/feeder connector securing knob (7).

B. Gun Switch Connection (Figure 3-7)

GUN TRIGGER



The GUN TRIGGER receptacle is provided for making switch control connections. Align the keys on the gun switch connector with the keyway on the GUN TRIGGER receptacle; insert the connector and rotate clockwise. When the switch connected across this receptacle is closed, the contactor in the welding power source will energize, shielding gas will flow and wire will feed.

3 - 8. INSTALLATION OF WELDING WIRE SPOOL (Figure 3-6)

1. Remove the retaining ring (18) by pressing the two spring loaded pins inward. Remove compression spring (17) from the welding power source wire spool hub (14).
2. Place the wire spool (16) on the wire spool hub so that the wire feeds from the bottom of the spool into the inlet wire guide as shown in Figure 3-6. Ensure that the small pin of the spool hub fits into the small hole of the wire spool.
3. Compression Spring (17) not required for 12" spools. For 8" spools, use compression spring. Replace the retaining ring on the hub.

3 - 9. ADJUSTMENT OF HUB TENSION (Figure 3-6) - Check the hub tension by slowly pulling the wire toward the feed roll. The wire should unwind freely, but the hub tension should be sufficient to keep the wire taut and prevent backlash when the wire feeding ceases. If adjustment is required, loosen or tighten the hex nut (15) on the end of the spindle support shaft accordingly.

3-10. INSTALLATION OF OPTIONAL SPOOLMATIC 1 GUN

A. Shielding Gas Connections

IMPORTANT: Pure argon shielding gas is used for aluminum wire welding.

Connect the shielding gas hose from the Spoolmatic 1 to the gas regulator - flowmeter on the shielding gas supply.

B. Welding Cable Connections (Figure 4-1)

Insert Spoolmatic 1 welding cable plug into POSITIVE weld output receptacle with flat side facing the receptacle key. Rotate plug clockwise 1/4 turn.

C. Trigger Control Connections (Figure 4-1)

SPOOLMATIC



A four-socket receptacle is provided for making trigger control connections. Insert the plug from the Spoolmatic 1 into the receptacle and rotate plug threaded collar clockwise. When the gun switch is closed, the contactor energizes, shielding gas flows and wire feeds.

D. Cannister Brake Connections (If Applicable)

1. Remove welding power source left side panel.
2. Locate hole in lower portion of front panel.
3. Cut a hole of equal size in the nameplate.

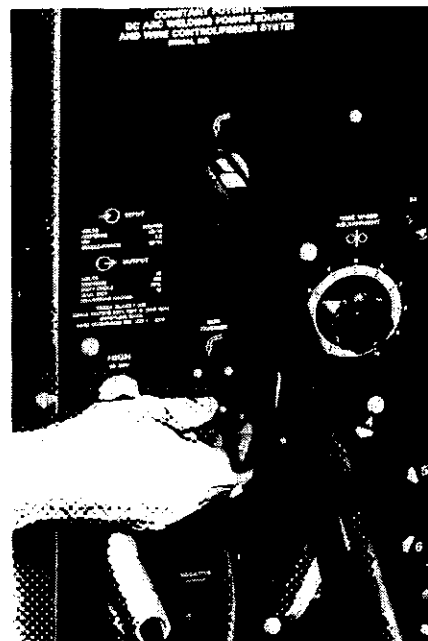
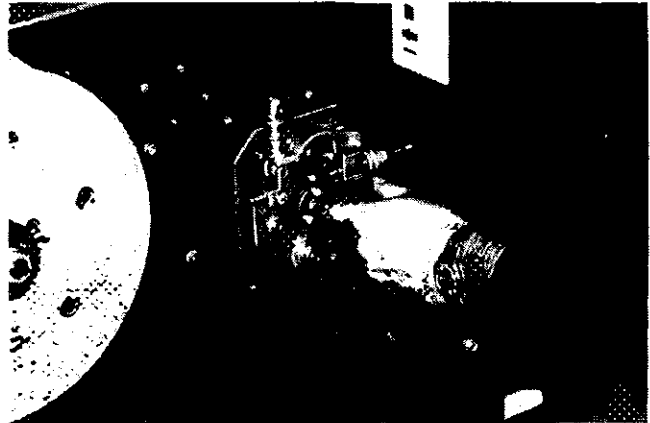
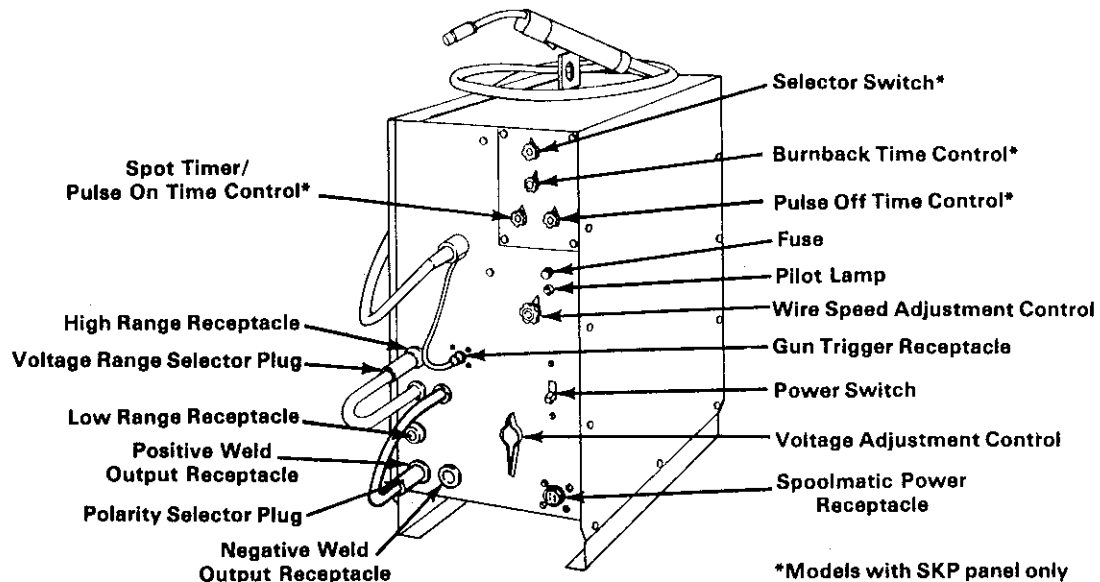


Figure 3-7. Welding Gun Connections

4. Slide a grommet or similar device over leads from cannister.
5. Insert cannister leads through hole in front panel until they reach the two-pole terminal strip 1T on bottom of welding power source.
6. Connect the green colored lead with larger ring terminal to ground stud below terminal strip 1T.
7. Connect two remaining leads to the terminals on terminal strip 1T.
8. Press grommet or similar device into hole in front panel.
9. Replace left side panel.

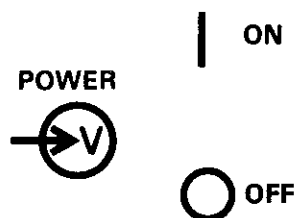
SECTION 4 - OPERATOR CONTROLS



TB-049 807-C

Figure 4-1. Front Panel View

4 - 1. POWER SWITCH (Figure 4-1)



Placing the POWER switch in the ON position energizes the welding power source, making the unit operational. Placing the POWER switch in the OFF position shuts the unit down.

4 - 2. VOLTAGE CONTROL (Figure 4-1)

CAUTION: ARCING can damage contact surfaces.

- Do not change VOLTAGE ADJUSTMENT switch or VOLTAGE RANGE SELECTOR plug position while welding or under load.

Arcing can damage contact surfaces which can eventually make the switch or selector plug inoperable.

The VOLTAGE RANGE selector plug and VOLTAGE ADJUSTMENT switch provide selection of twelve welding voltages ranging from 10 to 30 volts dc in approximately 2 volt steps with position 6 on the LOW range and 1 in the HIGH range overlapping.

Use Table 5-1 to set initial voltage conditions.

IMPORTANT: Give the selector plug a quarter turn when inserting into the receptacle. To remove the plug, give a quarter turn in the opposite direction while withdrawing.

4 - 3. WIRE SPEED ADJUSTMENT CONTROL (Figure 4-1)



The WIRE SPEED ADJUSTMENT control provides selection of the speed at which welding wire feeds into the weld. The wire feed speed range is 60-585 inches per minute (0.6 - 14.8 meters per minute). Rotating the WIRE SPEED ADJUSTMENT control clockwise increases wire feed speed.

The scale around the WIRE SPEED ADJUSTMENT control is calibrated in percent and does not indicate the actual wire feed speed.

4 - 4. POLARITY SELECTOR PLUG (Figure 4-1)

CAUTION: ARCING can damage contact surfaces.

- Do not change plug position while welding or under load.

Arcing can damage plug contact surfaces which eventually makes the plug inoperable.

The Polarity selector plug provides selection of either dc reverse polarity (selector plug in POSITIVE output receptacle, work cable in NEGATIVE output receptacle), or dc straight polarity (selector plug in NEGATIVE output receptacle, work cable in POSITIVE output receptacle).

Insert plug into receptacle with flat side facing receptacle key. Rotate plug one quarter turn clockwise.

4 - 5. FAN CONTROL - The fan motor is thermostatically controlled to provide fan cooling of the transformer and rectifier if these components require cooling. Under normal loading, the fan may not run.

4 - 6. PILOT LAMP (Figure 4-1) - The Pilot Lamp indicates when the welding power source is energized and in a ready-to-weld status. The Pilot Lamp will light whenever the POWER switch is in the ON position. The Pilot Lamp will remain lit if the welding power source shuts down because of overtemperature.

4 - 7. OVERLOAD PROTECTION

A. Wire Drive Motor

A circuit breaker CB1, located immediately above the drive roll assembly on the center baffle, provides protection to the wire drive motor. Should the motor be placed in an overload condition, the breaker would trip and suspend all output. It would then be necessary to manually depress the circuit breaker to reset it.

B. Main Rectifier

A normally-closed thermostat, wired in series with the contactor, provides protection to the main rectifier. The thermostat opens if the main rectifier is overloaded or if the fan control circuitry fails to activate, suspending all output. The thermostat resets after a cooling period of approximately fifteen minutes.

C. Control Circuitry (Figure 4-1)

A fuse F1 provides protection to the 115 volts ac control winding on the transformer. The fuse opens if the 115 volts ac winding is overloaded, suspending all output.

4 - 8. OPTIONAL SPOT PANEL CONTROLS (Figure 4-1)

IMPORTANT: In the PULSE mode, the WIRE SPEED ADJUSTMENT control must be set at 50 percent or less. Exceeding the 50 percent control setting may trip the circuit breaker in the motor control circuit suspending wire feed.

A. Selector Switch

The Selector switch enables the operator to select continuous, spot, or pulsed wire feed operation. Placing the Selector switch in the CONTINUOUS position and depressing the gun trigger feeds welding wire for as long as the gun trigger remains closed. Placing the Selector switch in the SPOT position and depressing the gun trigger feeds welding wire for the length of time set on the SPOT TIME control. Placing the Selector switch in the PULSE position and depressing the gun trigger feeds welding wire for the length of time set on the PULSE ON TIME control. At the end of pulse on time, welding wire feeding stops for the length of time set on the PULSE OFF TIME control. Welding wire feeding continues to pulse on and off for the selected times until the gun trigger is released.

The pulse option provides better control of the heat input to the weld on thin gauge metals, thereby decreasing distortion and the likelihood of melt-throughs.

B. Spot Time/Pulse On Time Control

The SPOT TIME/PULSE ON TIME control enables the operator to select from 0.5 to 4 seconds of weld time for spot operation or 0.25 to 2 seconds of pulse time for pulse operation. Rotating the control clockwise increases spot/pulse on time. The control scale is calibrated in percent and does not indicate actual spot/pulse on times.

C. Pulse Off Time Control

The PULSE OFF TIME control enables the operator to select from 0.25 to 1 second of pulse off time for pulse operation. Rotating the control clockwise increases pulse off time. The control scale is calibrated in percent and does not indicate actual pulse off time.

D. Burnback Time Control

The BURNBACK TIME control enables the operator to select the amount of time the electrode wire remains electrically hot after the wire stops feeding. The correct burnback time allows the wire to burn back just free of the weld puddle. If the burnback time is too long the wire could burn back into the contact tube.

Rotating the BURNBACK TIME control clockwise increases burnback time from 0 to 0.25 seconds. The control scale is calibrated in percent and does not indicate actual burnback times.

SECTION 5 - SEQUENCE OF OPERATION

WARNING: ELECTRIC SHOCK can kill; MOVING PARTS can cause serious injury; IMPROPER AIR FLOW AND EXPOSURE TO ENVIRONMENT can damage internal parts.

- Maintain at least 18 inches (457 mm) of unrestricted space on all sides of unit and keep underside free of obstructions.
- Do not place any filtering device over the intake air passages of this welding power source.
- Keep all covers and panels in place while operating.

Warranty is void if any type of filtering device is used or if the welding power source is operated with any portion of the outer enclosure removed.

ARC RAYS, SPARKS, AND HOT SURFACES can burn eyes and skin; **NOISE** can damage hearing.

- Wear correct eye, ear, and body protection.
- FUMES AND GASES** can seriously harm your health.
- Use enough ventilation to keep fumes and gases from the breathing zone.

See Section 1 - Safety Rules For Operation Of Arc Welding Power Source for basic welding safety information.

5 - 1. WELDING WIRE THREADING

WARNING: ELECTRIC SHOCK can kill.

- Do not energize welding power source until instructed to do so.
- Do not touch live electrical parts.

The welding wire is electrically energized whenever the gun trigger is depressed.

CAUTION: WELDING WIRE can cause puncture wounds; HOT SURFACES can burn skin.

- Do not activate gun trigger until instructed to do so.
- Do not point gun toward any part of the body or other personnel when threading welding wire.
- Allow gun to cool before touching.

1. Install the wire spool as instructed in Section 3-8.

IMPORTANT: Spooled wire has a tendency to unravel when loosened from the spool. Maintain a firm grip on the wire during the threading operation.

2. Cut off any portion of the free end of the wire which is not straight. Ensure that the cut end is free from rough surfaces to permit proper feeding.
3. Loosen the wing nut on the drive roll pressure adjustment, pivot the pressure adjustment free of the cover, and pivot the pressure gear assembly away until it is in an open position.
4. Feed the wire through the inlet wire guide, past the drive rolls, and on into the outlet wire guide. Feed approximately 4 inches of wire into the outlet wire guide.

5. Close the gear cover making sure the teeth on the pressure gear mesh with the teeth on the drive gear. The welding wire must also be in the grooves of the drive rolls.
6. Pivot the pressure adjustment wing nut until the washer on the pressure adjustment is seated on top of the gear cover.
7. Turn the pressure adjustment wing nut in a clockwise direction until the drive rolls are tight against the welding wire. Do not overtighten. Further adjustment to attain desired clamping pressure can be made after the welding power source and wire feeder are put into operation.
8. Draw the gun cable out straight.
9. Turn the Line Disconnect Switch and the welding power source POWER switch to the ON position. If the welding power source has spot welding capabilities, place the Selector switch located on the welding power source front panel, in the CONTINUOUS position.
10. Press gun trigger and hold in until the wire extends about 1/4 in. (6 mm) out of the contact tube.

If excess wire feeds out, cut off to 1/4 in. (6 mm) length with side cutters.

5 - 2. GAS METAL ARC CONTINUOUS WELDING

1. Thoroughly clean the joint area of the base metal with sandpaper or wire brush.
2. Slowly open the gas cylinder valve. Adjust the regulator for desired flow rate.
3. Place the Line Disconnect Switch in the On position.
4. Place the POWER switch in the ON position.
5. If the welding power source has been idle for any length of time, air will begin to displace the shielding gas in the gas hose between the gas valve and the gun. To avoid contaminating the weld, release drive roll pressure and depress the gun trigger for approximately fifteen seconds to purge the gas hose and to adjust the regulator flowmeter. Retighten drive rolls.

IMPORTANT: Gas pressure of 6 pounds or flow rate of 15 cfh are typical. Welding out of position, welding at fast travel speeds or at high wire feed speeds, or welding in a drafty environment will require more gas shielding.

WARNING: ELECTRIC SHOCK can kill; ARC RAYS can burn eyes.

- Do not touch live electrical parts.

- *Keep the welding wire isolated from the work clamp or any conductive surface when not welding.*

The welding wire is electrically energized whenever the gun trigger is depressed. The difference in potential between the welding wire and the work clamp (or workpiece or table if the work clamp is connected to either) will cause current to flow if contact is made.

6. Select the desired weld current polarity by inserting the Polarity selector plug in the POSITIVE or NEGATIVE output receptacle. Electrode positive (Reverse Polarity) produces deeper penetration and a flatter bead crown. Electrode negative (Straight Polarity) produces shallower penetration and a higher bead crown.
7. Insert the work cable in the remaining output receptacle. Connect the work clamp to the workpiece.
8. Set a voltage condition with the VOLTAGE RANGE selector plug and VOLTAGE ADJUSTMENT control appropriate for the base metal thickness and type of shielding gas (see Table 5-1).
9. Set a wire speed condition with the WIRE SPEED ADJUSTMENT control appropriate for the wire diameter size and base metal thickness (see Table 5-1). The wire speed setting can be adjusted while welding to fine tune the arc.

IMPORTANT: *Electrode extension approximately 1/4 in. (6 mm) beyond gun nozzle with a sharp end ensures a smoother start.*

10. Position wire over joint.

11. Lower welding helmet; depress gun trigger, and begin welding, maintaining a distance of approximately 3/8 in. (9 mm) from end of nozzle to workpiece.
12. At the end of the joint, release the gun trigger, and then pull the gun away from the joint.

5 - 3. GAS METAL ARC SPOT WELDING (Models With SKP-35 Panel Only)

1. Thoroughly clean the surface area of the base metal with sandpaper or wire brush.
2. Slowly open the gas cylinder valve. Adjust the regulator for desired flow rate.
3. Remove the standard nozzle and install the appropriate spot nozzle.
4. Place the Line Disconnect switch in the ON position.
5. Place the POWER switch in the ON position.
6. If the welding power source has been idle for any length of time, air will begin to displace the shielding gas in the gas hose between the gas valve and the gun. To avoid contaminating the weld, release drive roll pressure and depress the gun trigger for approximately fifteen seconds to purge the gas hose and to adjust the regulator flowmeter. Retighten drive rolls.

IMPORTANT: *Gas pressure of 6 pounds or flow rate of 15 cfh are typical. Welding out of position, welding at fast travel speeds or at high wire feed speeds, or welding in a drafty environment will require more gas shielding.*

Table 5-1. Suggested Parameters For Continuous Welding

RANGE		LOW						HIGH					
Voltage Adjustment		1	2	3	4	5	6	1	2	3	4	5	6
Metal Thickness	Gages	24-22	20-18	18-16	18-16	16-14	14-12	12-10	10-1/4"	1/4" +	1/4" +		
	Inches Millimeters	.024-.032 .61-.81	.036-.048 .91-1.22	.048-.060 1.22-1.52	.048-.080 1.22-1.52	.060-.075 1.52-1.91	.075-.105 1.91-2.67	.105-.135 2.67-3.43	.135-.250 3.43-6.35	.250 + 6.35 +	.250 + 6.35 +		
Wire Speed Adjustment .023-.025 (.6 mm) wire		20%	15%	19%	30%	40%	50%	--	--	--	--	--	--
Wire Speed Adjustment .030 (.8 mm) wire		12%	10%	28%	35%	40%	45%	50%	60%	70%	--	--	--
Wire Speed Adjustment .035 (.9 mm) wire		--	5%	15%	25%	30%	40%	45%	48%	57%	70%	--	--
Wire Speed Adjustment .045 (1.2 mm) wire		--	--	6%	10%	14%	25%	30%	36%	40%	--	--	--
Suggested Parameters For Aluminum Wire (4043) With Spoolmatic 1 Gun Using Argon At 25CFH													
RANGE		LOW						HIGH					
Heat Control		1	2	3	4	5	6	1	2	3	4	5	6
Wire Speed Setting .030 (.8 mm) wire		--	SC Spray 5% --	SC Spray 5% --	SC Spray 5% --	SC Spray 5.5% --	SC Spray 6% 5.5%	SC Spray 6.5% 5%	SC Spray 7.5% 6.5%	-- --	-- --	SC Spray -- --	SC Spray -- --
Wire Speed Setting .035 (.9 mm) wire		--	5% --	5% --	5% --	5.75% --	6% 5%	6.5% 5%	7.5% 6%	8.5% 6%	8.5% 7%	-- --	-- --
Wire Speed Setting 3/64 (1.2 mm) wire		--	-- --	-- --	-- --	4% --	5% --	5% --	5.5% 4	5% 4.5%	5% 4.5%	-- 5%	-- 5.5%

SC = Short Circuit

WARNING: ELECTRIC SHOCK can kill; ARC RAYS can burn eyes.

- Do not touch live electrical parts.
- Keep the welding wire isolated from the work clamp or any conductive surface when not welding.

The welding wire is electrically energized whenever the gun trigger is depressed. The difference in potential between the welding wire and the work clamp (or workpiece or table of the work clamp is connected to either) will cause current to flow if contact is made.

- Place the Selector switch in the SPOT position.
- Select the desired weld current polarity by inserting the Polarity selector plug in the POSITIVE or NEGATIVE output receptacle. Electrode positive (Reverse Polarity) produces deeper penetration. Electrode negative (Straight Polarity) produces shallower penetration.
- Insert the work cable in the remaining output receptacle. Connect the work clamp to the workpiece.

IMPORTANT: Weld voltage and wire speed are relatively high for spot welding compared to continuous welding.

- Set a voltage condition with the VOLTAGE RANGE selector plug and VOLTAGE ADJUSTMENT control appropriate for the base metal thickness and type of shielding gas.
- Set a wire speed condition with the WIRE SPEED ADJUSTMENT control appropriate for the wire diameter size and base metal thickness.
- Set a weld time with the SPOT TIME control appropriate for the base metal thickness and welding conditions.
- Set a burn back time with the BURNBACK TIME control that will allow the wire to burn back just clear of the weld nugget.
- Cut the welding wire off slightly back inside the spot nozzle.
- Position the spot nozzle against the workpiece and depress the gun trigger. After the arc goes out, raise the gun. If the wire sticks in the weld puddle, release the work clamp and depress the gun trigger. Wire will feed out, raising the gun from the work. Cut the wire off close to the weld nugget, and slightly back inside spot nozzle. Increase BURNBACK TIME adjustment.

If the wire burns back into the contact tube, remove the nozzle. If the wire has not burned back completely into the contact tube, it may be possible to pull the wire out of the tube with a pliers. If a complete burnback has occurred, remove the contact tube, cut the wire off behind the tube, and reinstall a new contact tube. Replace the nozzle and decrease BURNBACK TIME adjustment.

Table 5-2. Suggested Parameters For Pulsed Continuous Welding

RANGE		LOW					HIGH
Voltage Adjustment		2	3	4	5	6	1
Metal Thickness	Gages	24	22	20	18	16	14
	Inches	.024	.030	.036	.048	.060	.075
	Millimeters	.61	.76	.91	1.22	1.52	1.91
Pulse On Time %			10%	10%	10%	10%	10%
Pulse Off Time %			10%	10%	10%	10%	10%
Wire Speed Adjustment .023-.025 (.6 mm) wire			25%	36%	59%	75%	87%
Pulse On Time %		10%	10%	10%	10%	10%	10%
Pulse Off Time %		10%	10%	10%	10%	10%	10%
Wire Speed Adjustment .030 (.8 mm) wire		15%	25%	35%	46%	55%	66%
Pulse On Time %		20%	20%	20%	20%	20%	20%
Pulse Off Time %		10%	10%	10%	10%	10%	10%
Wire Speed Adjustment .035 (.9 mm) wire		14%	20%	25%	35%	40%	45%

5 - 4. GAS METAL ARC PULSED CONTINUOUS WELDING - Pulsed continuous welding requires the same set-up procedures as continuous welding with the following additions: Set pulse on and pulse off times, wire feed speed, and weld voltage appropriate for the base metal thickness and wire diameter size (see Table 5-2).

IMPORTANT: Move the gun across the joint at a slightly slower travel speed when pulsing.

5 - 5. SHUTDOWN

- Close the gas cylinder valve.
- Depress gun trigger to release gas in regulator. The gas pressure indicator will return to 0.
- Place the POWER switch in the OFF position.
- Place the Line Disconnect Switch in the Off position.

WARNING: HIGH CONCENTRATION OF SHIELDING GASES can harm health or kill.

- Shut off gas supply when not in use.

SECTION 6 - MAINTENANCE & TROUBLESHOOTING

WARNING: ELECTRIC SHOCK can kill.

- Do not touch live electrical parts.
- Disconnect unit from input power before internally inspecting or servicing.

MOVING PARTS can cause serious injury.

- Keep clear of moving parts.

HOT SURFACES can cause severe burns.

- Allow cooling period before servicing.

Troubleshooting of internal parts to be performed only by qualified persons.

IMPORTANT: Periodically inspect the labels on the unit for legibility. All precautionary labels must be maintained in a clearly readable state and replaced when necessary. See Parts List for part number of all precautionary labels.

6 - 1. FAN MOTOR - This unit is equipped with an exhaust fan and relies on forced draft for adequate cooling. The fan motor is manufactured with lifetime sealed bearings and requires no maintenance.

6 - 2. INTERNAL CLEANING - Occasional blowing out or vacuuming of the dust and dirt from around the internal components is recommended. This should be done periodically depending on the location of the unit and the amount of dust and dirt in the atmosphere. The welding power source outer enclosure should be removed and a clean, dry airstream or vacuum suction should be used for this cleaning operation.

6 - 3. DRIVE HOUSING REALIGNMENT (Figure 3-3) - The wire drive housing is made with mounting holes of sufficient clearance to provide adjustment of the wire guides up or down in relation to the drive rolls. This adjustment has been factory set, but if readjustment becomes necessary, disconnect input power and remove the welding power source wrapper. Loosen the mounting bolts (9) and the weld terminal bolt (8) securing the wire drive housing to the mounting plate. Slide

the drive housing upward or downward until the wire can be fed straight through the guides while seated in the drive roll groove. Tighten mounting bolts and weld terminal bolt.

6 - 4. TROUBLESHOOTING THE WIRE FEEDER SYSTEM

A. General

It is assumed that the unit was properly installed according to Section 3 of this manual, the operator is familiar with the function of controls, the welding power source was working properly, and that the trouble is not related to the welding process.

B. Troubleshooting Chart

WARNING: ELECTRIC SHOCK can kill.

- Do not touch live electrical parts.
- Disconnect unit from input power before internally inspecting or servicing.

MOVING PARTS can cause severe injury.

- Keep clear of moving parts.

HOT SURFACES can cause severe burns.

- Allow cooling period before servicing.

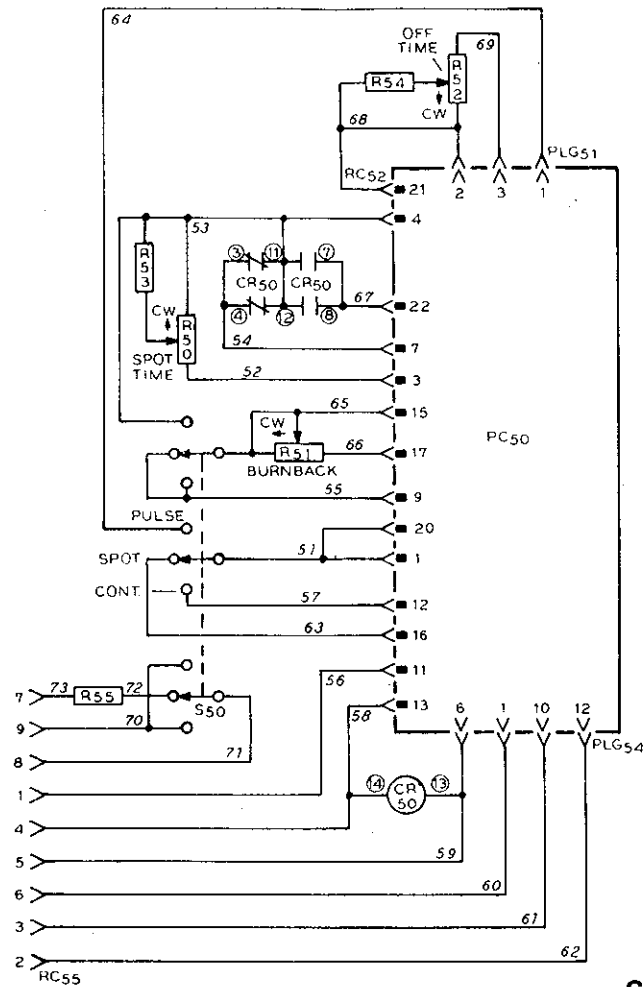
Troubleshooting of internal parts to be performed only by qualified persons.

The following chart is designed to diagnose and provide remedies for some of the troubles that may develop in this welding power source.

Use this chart in conjunction with the circuit diagram while performing troubleshooting procedures. If the trouble is not remedied after performing these procedures, the nearest Factory Authorized Service Station should be contacted. In all cases of equipment malfunction, the manufacturer's recommendations should be strictly followed.

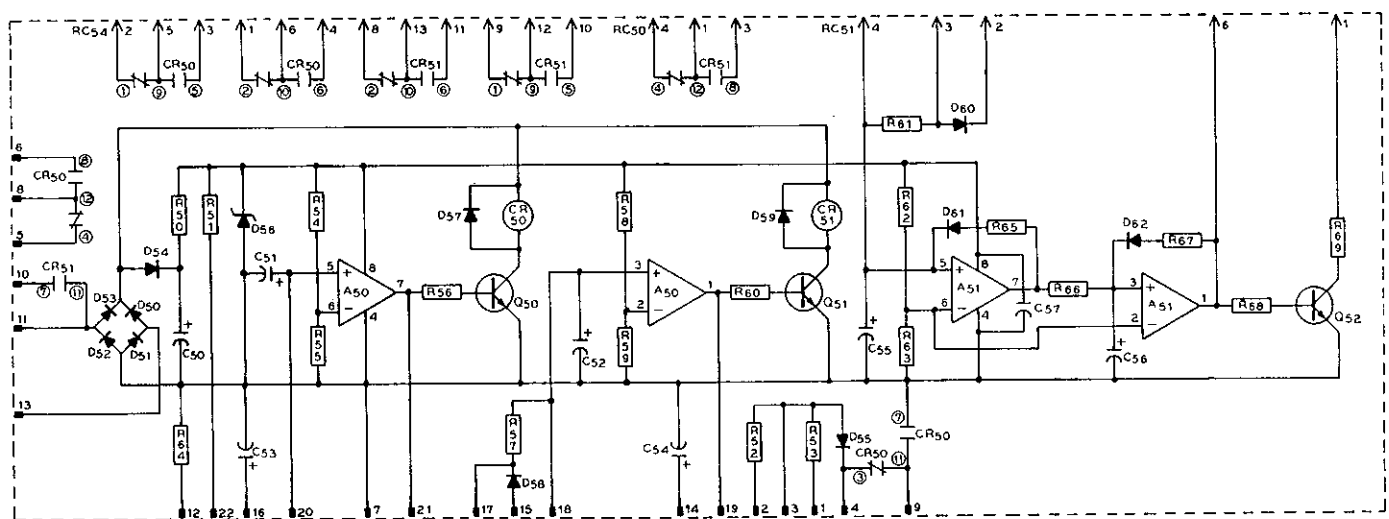
TROUBLE	PROBABLE CAUSE	REMEDY
No weld output; wire does not feed.	Primary Line Disconnect Switch in Off position.	Place Line Disconnect Switch in On position.
	Line fuse or circuit breaker open.	Replace line fuse or reset circuit breaker.
	Control fuse F1 open.	Replace fuse F1.
	Gun switch defective, or gun switch leads open.	Replace gun switch (if applicable) or repair switch leads.
	POWER switch S1 defective.	Replace POWER switch S1.
	Switch control relay CR1 (or CR2 when using a Spoolmatic 1) defective.	Replace relay CR1 (or CR2).

TROUBLE	PROBABLE CAUSE	REMEDY
No weld output; wire feeds.	Thermostat TP3 open.	Allow approximately fifteen minute cooling period. Check for blocked air passages, excessive overloading, or defective fan motor or fan control circuitry.
	VOLTAGE RANGE selector plug or Polarity selector plug not secure in receptacle.	Secure connection.
	Work clamp connection loose or incomplete due to rust, paint, etc. on surface of workpiece.	Remake work connection ensuring good metal to metal contact.
	Defective contact tube.	Replace contact tube.
	VOLTAGE ADJUSTMENT switch between positions.	Place VOLTAGE ADJUSTMENT switch in proper position.
	Contactor points defective.	Replace points.
	Contactor coil W defective.	Replace contactor coil W.
	Switch control relay CR1 (or CR2 when using a Spoolmatic 1) defective.	Replace relay CR1 (or CR2).
Low weld output.	Low primary voltage.	Connect unit to proper input voltage.
	Input voltage jumper in wrong position.	Place jumper link in position matching primary input voltage.
Electrode wire stops feeding while welding.	Sharp or excessive bend in gun cables or liners.	Straighten gun cables and/or replace liners.
	Drive roll pressure too great or too little.	Apply correct drive roll pressure.
	Spindle friction too great.	Loosen and re-adjust hub tension (see Section 3-9).
	Contact tip orifice restricted; burnback of electrode.	Replace contact tube.
	Friction in gun.	Check wire passage; clean, replace parts as required.
	Gun casing liner dirty, restricted.	Remove liner, blow out with compressed air.
	Broken or damaged casing or liner.	Replace faulty parts.
	Drive rolls worn; slipping.	Replace drive rolls.
	Drive motor burned out.	Replace motor.
	Gun trigger switch defective or wire leads broken.	Replace switch; check connections.



Circuit Diagram No. A-086 594

Figure 6-2. Circuit Diagram For SKP-35 Panel



Circuit Diagram No. B-086 783-B

Figure 6-3. Circuit Diagram For SKP-35 Panel Printed Circuit Board

6 - 5. TROUBLESHOOTING THE GAS METAL-ARC WELDING PROCESS

A. Porosity

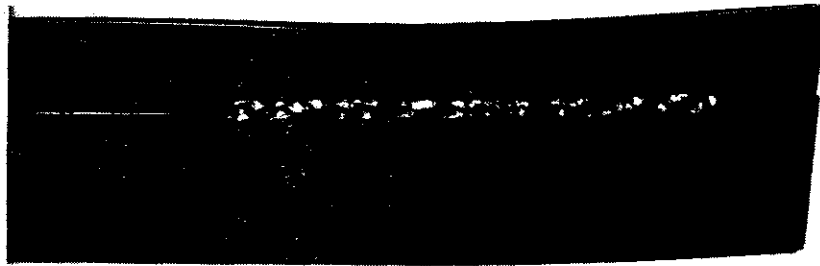


Figure 6-4. Porosity

Possible Causes	Corrective Actions
1. Inadequate shielding gas coverage.	Remove spatter from the gun nozzle.
	Check gas hoses for leaks.
	Eliminate drafts (from fans open doors, etc.) blowing into the welding arc.
	Reduce nozzle-to-work distance.
	Increase gas flow to displace all air from the weld zone.
	Decrease excessive gas flow to avoid turbulence and the entrapment of air in the weld zone.
	Hold gun at end of weld until molten metal solidifies.
	Check for frozen CO ₂ regulator flow meter.
2. Gas contamination.	Use welding grade shielding gas.
3. Electrode contamination.	Use only clean and dry electrode.
	Eliminate pick up of oil or lubricant on electrode in electrode feeder or conduit.
4. Workpiece contamination.	Remove all grease, oil, moisture, rust, paint, undercoating, and dirt from work surface before welding.
	Use a more highly deoxidizing electrode wire.
5. Excess tip-to-work distance.	Reduce stick-out.

B. Incomplete Fusion (Lack of fusion)

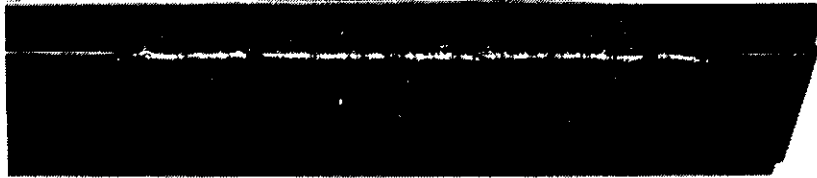


Figure 6-5. Incomplete Fusion

Possible Causes	Corrective Actions
1. Weld zone surfaces not free of film or excessive oxide.	Clean weld zone surfaces of impurities prior to welding.
2. Insufficient heat input.	Select higher voltage tap.
3. Improper weld technique.	When using a weaving technique dwell momentarily on the side walls of the groove.
	Provide improved access at root of joints.
	Keep electrode directed at the leading edge of the puddle.
	Provide proper gun angle.
4. Improper joint design (Heavy material only: trailer hitches, etc.)	Provide included angle of groove joint large enough to allow access to bottom of the groove and sidewalls with proper electrode extension and arc characteristics, or use a "J" or "U" groove.

C. Lack Of Fusion

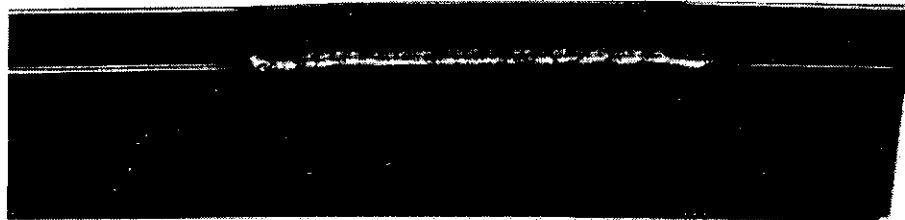


Figure 6-6. Lack Of Penetration

Possible Causes	Corrective Action
1. Improper joint preparation.	Material too thick. Joint preparation and design must be adequate to provide access to the bottom of the groove while maintaining proper electrode extension and arc characteristics.
	Reduce excessively large root face.
	Provide or increase the root gap in butt joints and increase the depth of back gauge.
2. Improper weld technique.	Maintain electrode angle normal to work surface to achieve maximum penetration.
	Keep arc on leading edge of the puddle.
3. Inadequate heat input.	Select higher voltage tap and wire speed.
	Reduce the travel speed.
	Maintain proper electrode extension.

D. Excessive Penetration (Burn-Through)

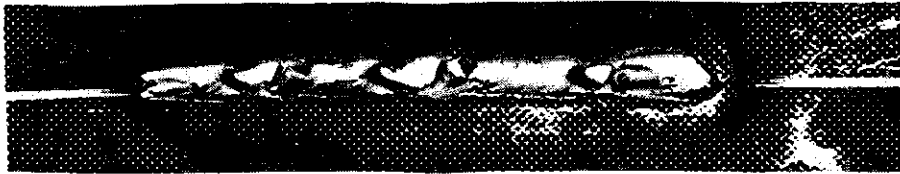


Figure 6-7. Excessive Penetration

Possible Causes	Corrective Actions
1. Excessive heat input.	Select lower voltage tap and reduce wire speed.
	Increase travel speed.

E. Cracks In Weld Metal

Possible Causes	Corrective Actions
1. Improper joint design (Heavy material).	Maintain proper groove dimensions to allow deposition of adequate filler metal to weld area.
2. Heat input too high causing excessive shrinkage and distortion.	Select lower voltage tap and reduce wire speed.
	Increase travel speed.

F. Waviness of Bead



Figure 6-8. Waviness Of Bead

Possible Causes	Corrective Actions
1. Excessive electrode extension.	Reduce electrode extension.
2. Unsteady hand.	Support hand on solid surface.

G. Humping

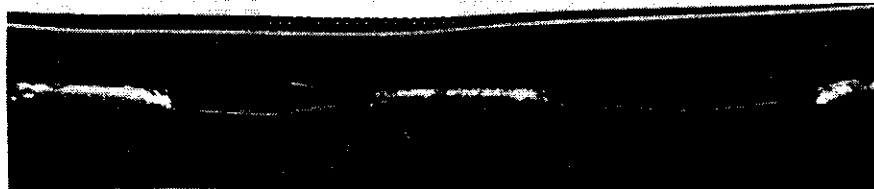


Figure 6-9. Humping

Possible Causes	Corrective Actions
1. Too much heat input.	Select lower voltage tap or increase travel speed.
	Weld in small segments and allow to cool between welds.

H. Excessive Spatter

Possible Causes	Corrective Actions
1.Excessive spatter when using CO ₂ shielding gas.	Select lower voltage tap or adjust WIRE SPEED FINE ADJUSTMENT.

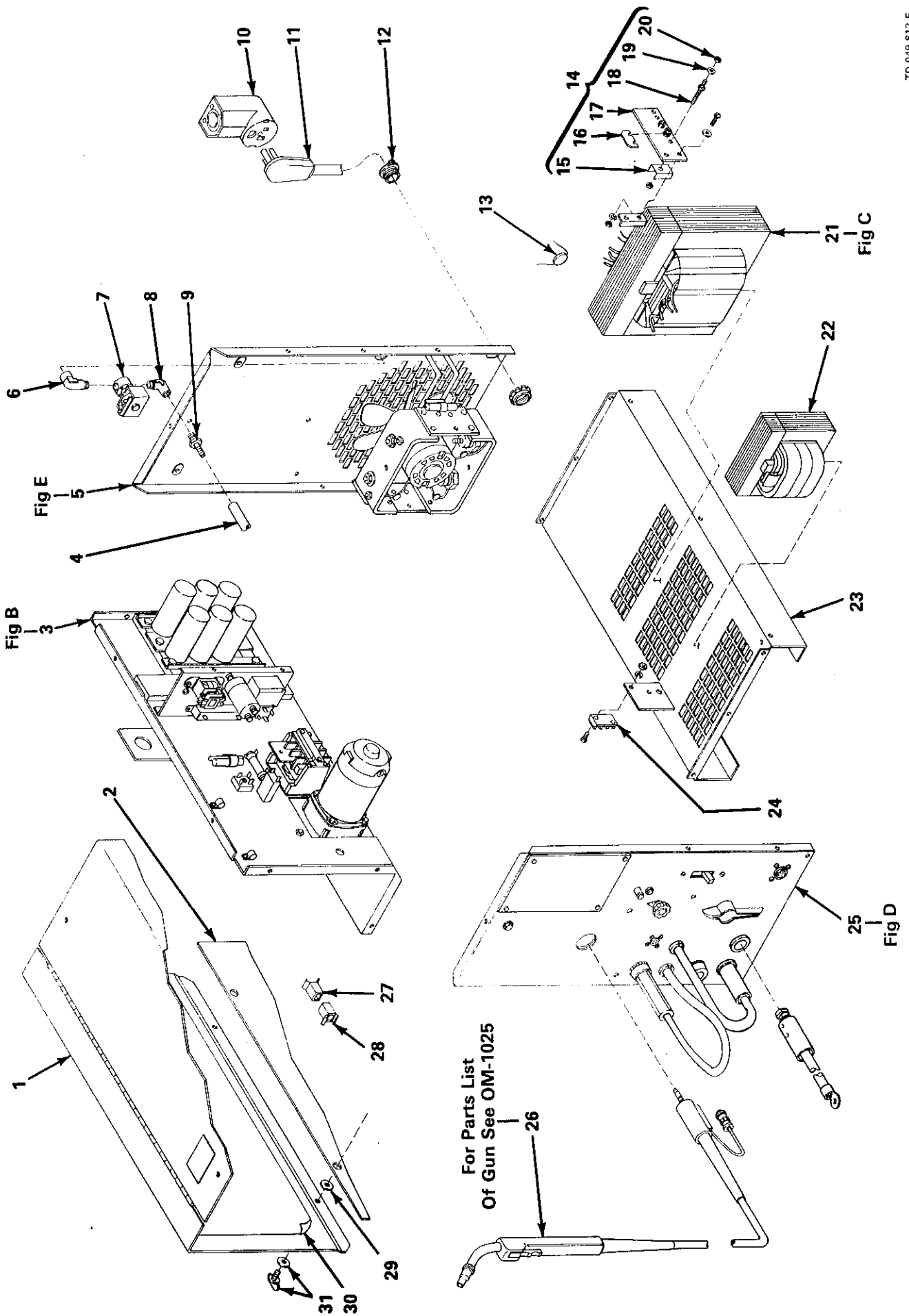


Figure A - Main Assembly

Item No.	Dia. Mkgs.	Part No.	Description	Quantity
Figure A Main Assembly				
1		+ 007 778	WRAPPER	1
		047 497	LABEL, general precautionary	1
2		057 506	PANEL, side	1
3		Figure B	BAFFLE, air-with components (See Pg 4)	1
4		604 550	HOSE, neoprene No. 1 x 3/16 (order by ft)	3 ft
5		Figure E	PANEL, rear-with components (See Pg 12)	1
6		010 296	FITTING, hose-brass elbow male 1/4 NPT x 5/8-18 right hand	1
7	GS1	003 538	VALVE, 2 way 1/4 IPS 1/8 orifice Controls Co (consisting of) or	1
		003 539	. COIL, 115 volts ac	1
7		080 841	VALVE, 2 way 1/4 IPS 1/8 orifice Eemco (consisting of)	1
		080 872	. COIL, 115 volts ac	1
8		010 678	FITTING, pipe-brass elbow st 1/4 NPT	1
9		073 433	FITTING, brass-barbed male 3/16 TBG x 1/4 NPT	1
10		039 778	RECEPTACLE, straight 2P3W 50 amp 250 volts	1
11	PLG1	047 721	CORD, power 250 volts 3C 8 ft	1
11	PLG1	+ 071 906	CORD, power (230 volts and over)	1
11	PLG1	+ 041 688	CORD SET, power 10 ga 3C 25 ft	1
12		044 426	CONNECTOR, clamp-cable 1 inch	1
13	TP1	090 319	THERMOSTAT, NO	1
14	TE1	081 862	TERMINAL ASSEMBLY, primary (consisting of)	1
15		026 631	. INSULATION	5
16		038 618	. LINK, jumper	1
17		081 671	. TERMINAL BOARD	1
18		038 887	. STUD, brass No. 10-32 x 1-3/8 w/hex collar	5
19		010 913	. WASHER, flat-brass 0.225 ID x 1/2 OD x 1/32	5
20		601 835	. NUT, brass-hex 10-32	10
21	T1	088 770	TRANSFORMER, power-main (See Fig C Pg 4)	1
22	Z	081 716	STABILIZER	1
23			BASE	1
24	1T	038 855	BLOCK, terminal 20 amp 2 pole	1
25		Figure D	PANEL, front-with components (See Pg 10)	1
26		See Note	GUN	1
27	RC2	008 073	HOUSING RECEPTACLE & SOCKETS (consisting of)	1
		058 972	. TERMINAL, female	8
28		008 040	CONNECTOR, jumper	1
29		010 855	RETAINER, screw No. 2	2
30		072 777	LABEL, instruction	1
31		605 217	FASTENER, screw-wing	2
		057 745	SPRING, compression-wire spool	1
		041 288	NO. 10B RUNNING GEAR (See Fig G Pg 15)	1

†Optional Parts.

+ When ordering components originally displaying a precautionary label, the label should also be ordered.

Note: For complete breakdown of gun see OM-1025.

BE SURE TO PROVIDE MODEL AND SERIAL NUMBERS WHEN ORDERING REPLACEMENT PARTS.

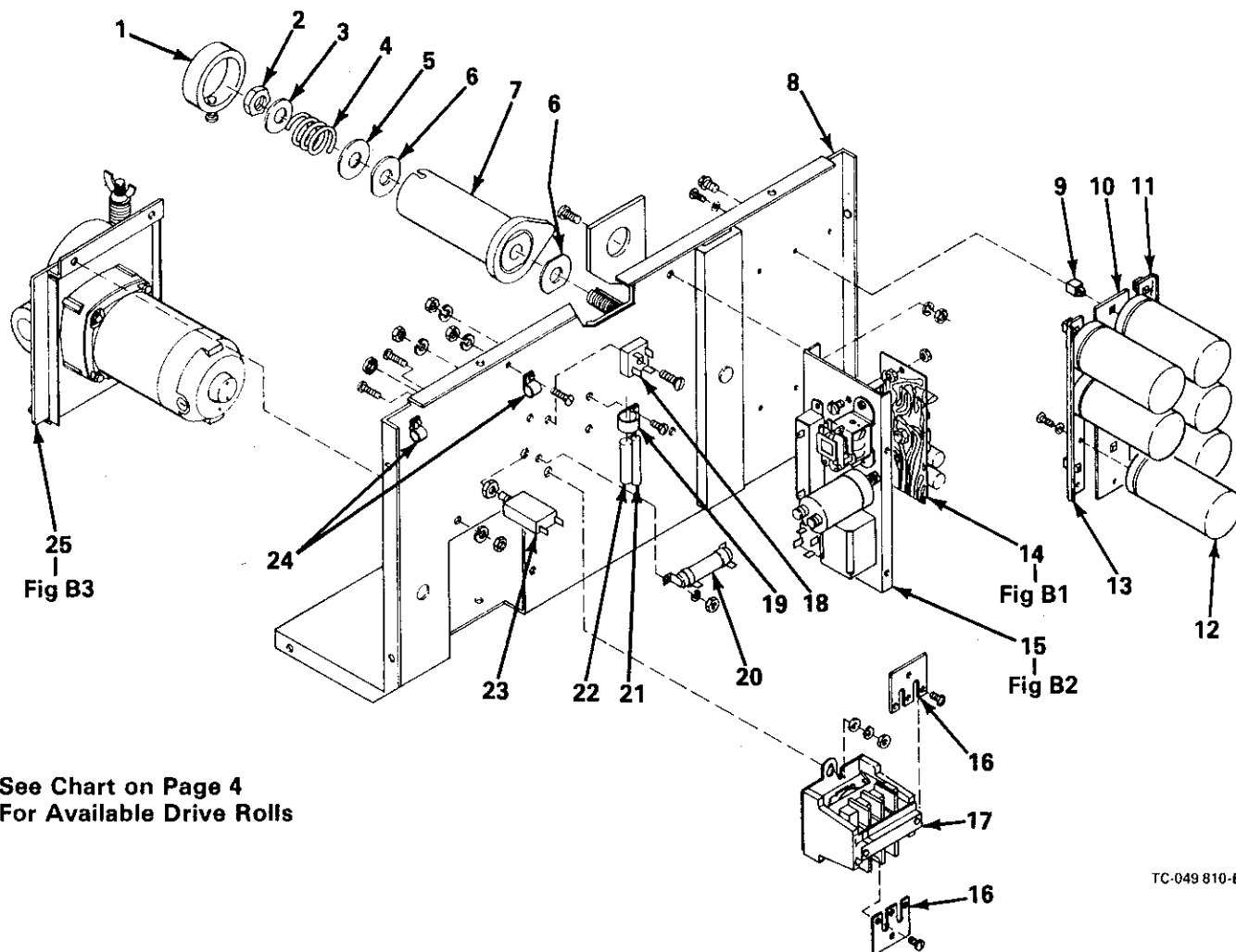


Figure B - Baffle, Air - With Components

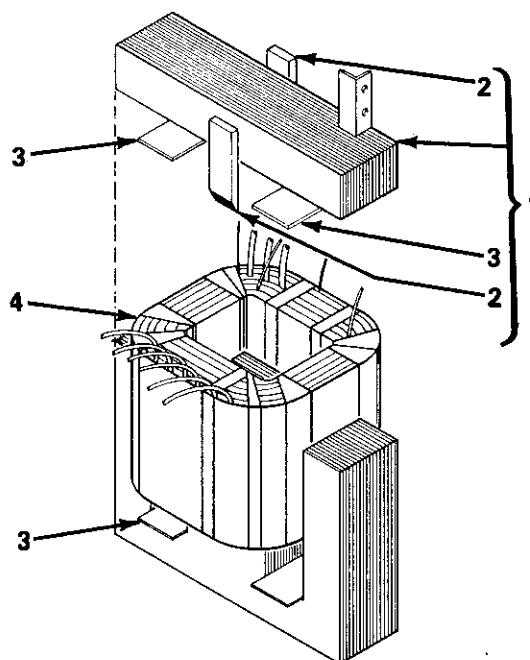


Figure C - Transformer, Power - Main

Item No.	Dia. Mkgs.	Part No.	Description	Quantity
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Figure B Baffle, Air - With Components (See Fig A Pg 2 Item 3)

1		058 427	RING, retaining-spool	1
2		085 980	NUT, steel-hex 5/8-11	1
3		605 941	WASHER, flat-steel 41/64 ID x 1 OD x 14 ga	1
4		057 543	SPRING, compression	1
5		057 971	WASHER, flat-steel keyed 1-1/2 dia	1
6		058 424	WASHER, fiber-brake	2
7		058 428	HUB, spool	1
8		083 102	BAFFLE, air	1
9		083 147	GROMMET, screw-push in	6
10		082 902	STRIP, mounting-center	1
11		082 907	ANGLE, mounting-right hand	1
12	C19	084 087	CAPACITOR, electrolytic 15,000 uf 45 volts dc	8
13		082 875	ANGLE, mounting-left hand	1
14		057 314	CIRCUIT CARD ASSEMBLY (See Fig B1 Pg 5)	1
15		Figure B2	PANEL, control-with components (See Pg 6)	1
16		000 382	LINK, jumper-contact	2
17	W	032 786	CONTACTOR, 60 amp 3 pole 600 volts (consisting of)	1
		035 837	. COIL, 115 volts	1
		*071 043	. KIT, points	1
18	SR2	035 914	RECTIFIER, integrated 30 amp 400 volts	1
	VR2,3	082 722	VARISTOR, 0.6 watt 175 volts dc	2
19		010 143	CLAMP, nylon 3/8 clamp dia	1
20	R16	079 781	RESISTOR, WW fixed 25 watt 50 ohm	1
21	C13	000 339	CAPACITOR, electrolytic 200 uf 40 volts dc	1
22	R15	604 288	RESISTOR, WW fixed 10 watt 2 ohm	1
23	CB1	*011 002	CIRCUIT BREAKER, manual-reset 0.7 amp	1
24		010 145	CLAMP, nylon 1/2 dia	2
		010 357	RECEPTACLE, clip on	2
25		Figure B3	DRIVE ASSEMBLY, wire (See Pg 8)	1

Wire Diameter & Type			Kit, Drive Roll & Guide Tube			
			*Roll, Drive			Guide
Fraction	Decimal	Metric	Kit No.	Type	Part No.	Inlet
.030"	.030	.8MM	079 594	V-Groove	053 695	056 192
.035"	.035	.9MM	079 595	V-Groove	053 700	056 192
.045"	.045	1.2MM	079 596	V-Groove	053 697	056 192

Drive Roll & Wire Guide Kits

Item No.	Part No.	Description	Quantity
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Figure C 088 770 Transformer, Power - Main (See Fig A Pg 2 Item 20)

1	081 702	TRANSFORMER SUBASSEMBLY (consisting of)	1
2	028 967	. WEDGE, 5/16 x 1 x 7	2
3	026 345	. STRIP, polyester-glass laminate 1/16 x 2 x 3-3/8	4
4	**088 538	Coil, primary/secondary	1

*Recommended Spare Parts.

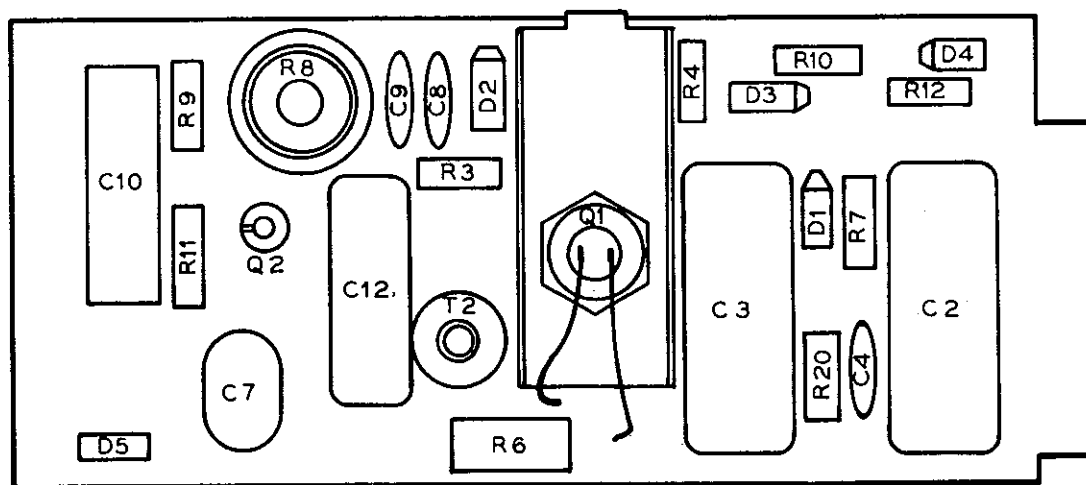
**Replace At Factory Or Factory Authorized Service Station.

BE SURE TO PROVIDE MODEL AND SERIAL NUMBERS WHEN ORDERING REPLACEMENT PARTS.

Dia. Mkgs.	Part No.	Description	Quantity
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Figure B1 057 314 Circuit Card Assembly (See Fig B Pg 4 Item 14)

C2,3	031 694	CAPACITOR, mylar 0.47 uf 200 volts dc	2
C4,8,9	031 643	CAPACITOR, ceramic 0.01 uf 500 volts dc	3
C7	031 693	CAPACITOR, mylar 0.33 uf 75 volts dc	1
C10	031 633	CAPACITOR, electrolytic 80 uf 25 volts dc	1
C12	031 721	CAPACITOR, mylar 0.22 uf 200 volts dc	1
D1-4	026 202	DIODE, 1 amp 400 volts straight polarity	4
D5	037 250	DIODE, zener 24 volts 1 watt	1
Q1	037 824	THYRISTOR, 7.4 amp 200 volts	1
	010 915	WASHER, flat-brass 1/4 (mounting Q1)	1
	602 208	WASHER, lock-steel external tooth 1/4 (mounting Q1)	1
	601 867	NUT, steel-hex jam 1/4-20 (mounting Q1)	1
	037 261	HEAT SINK	1
Q2	037 289	TRANSISTOR, unijunction 50MA 35 volts	1
R3	030 937	RESISTOR, carbon 0.5 watt 10 ohm	1
R4	030 854	RESISTOR, carbon 0.5 watt 18K ohm	1
R6	030 945	RESISTOR, carbon 2 watt 4700 ohm	1
R7	028 276	RESISTOR, carbon 0.5 watt 2200 ohm	1
R8	030 944	POTENTIOMETER, WW 1 turn 2 watt 5000 ohm	1
R9	030 936	RESISTOR, carbon 0.5 watt 33K ohm	1
R10	030 853	RESISTOR, carbon 0.5 watt 2200 ohm	1
R11	030 938	RESISTOR, carbon 0.5 watt 1200 ohm	1
R12	030 934	RESISTOR, carbon 0.5 watt 6800 ohm	1
R20	030 090	RESISTOR, carbon 0.5 watt 47 ohm	1
T2	085 399	TRANSFORMER, pulse	1



**COMPONENTS TO BE REPLACED
BY QUALIFIED PERSONNEL
ONLY**

TA-057 314

Figure B1 - Circuit Card Assembly

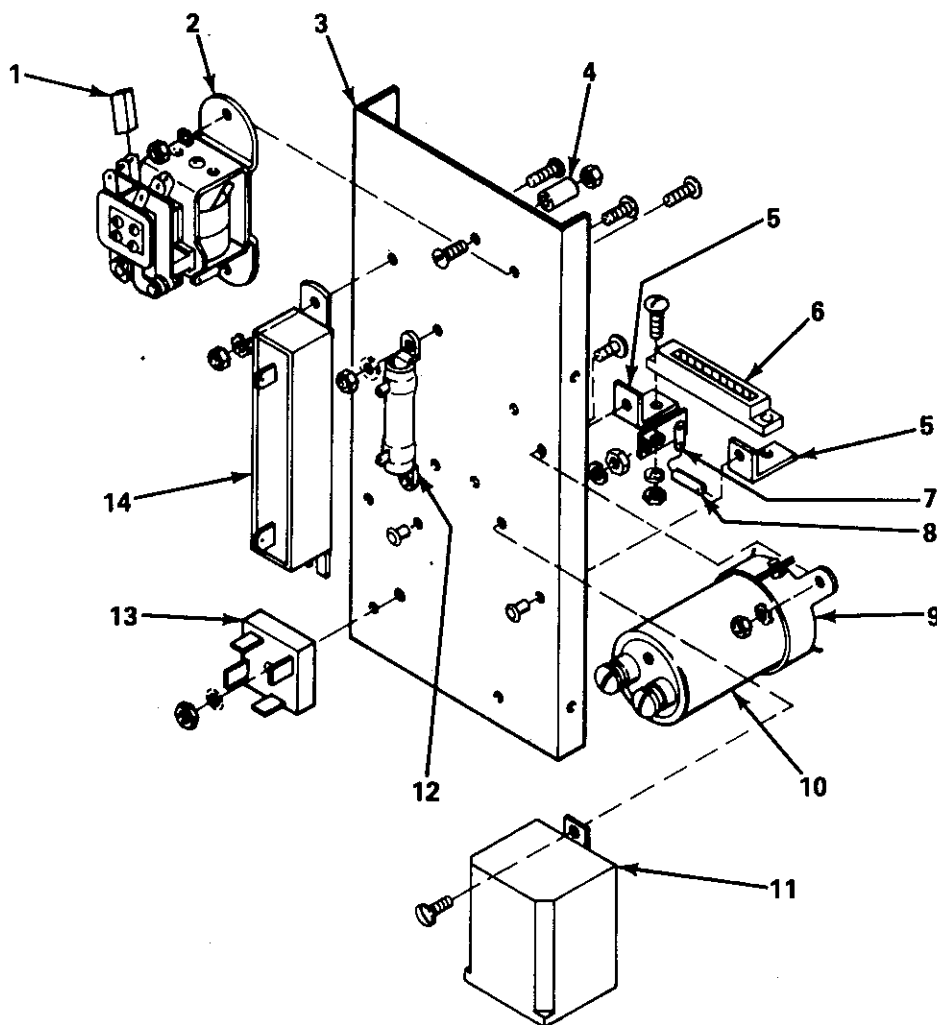
BE SURE TO PROVIDE MODEL AND SERIAL NUMBERS WHEN ORDERING REPLACEMENT PARTS.

Item No.	Dia. Mkgs.	Part No.	Description	Quantity
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Figure B2

Panel, Control-With Components (See Fig B Pg 4 Item 15)

1		026 837	INSULATOR, terminal-nylon	3
2	CR1	034 841	RELAY, 24 volts ac DPDT	1
	D10	026 202	DIODE, rectifier 1 amp 400 volts straight polarity	1
3		004 255	PANEL, mounting-component	1
4		010 301	BUSHING, brass 0.106 ID x 1/4 OD x 5/16	1
5		031 251	BRACKET, mounting-RC5	2
6	RC5	039 756	CONNECTOR, edge 10 pin	1
7		038 784	STRIP, terminal 1 pole	1
8	R21	028 276	RESISTOR, carbon 0.5 watt 2200 ohm	1
9		601 375	RING, mounting-capacitor	1
10	C1	031 698	CAPACITOR, electrolyte 250 uf 175 volts dc	1
11	CR2	052 964	RELAY, 24 volts dc DPDT	1
12	R1	030 942	RESISTOR, WW fixed 12 watt 10 ohm	1
		052 704	CLIP, spring-mtg resistor	2
13	SR1	035 914	RECTIFIER, integrated 30 amp 400 volts	1
	VR1	082 722	VARISTOR, 0.6 watt 175 volts dc	1
14	R2	030 941	RESISTOR, WW fixed 100 watt 5 ohm	1



TA-049 815

Figure B2 - Panel, Control - with Components

BE SURE TO PROVIDE MODEL AND SERIAL NUMBERS WHEN ORDERING REPLACEMENT PARTS.

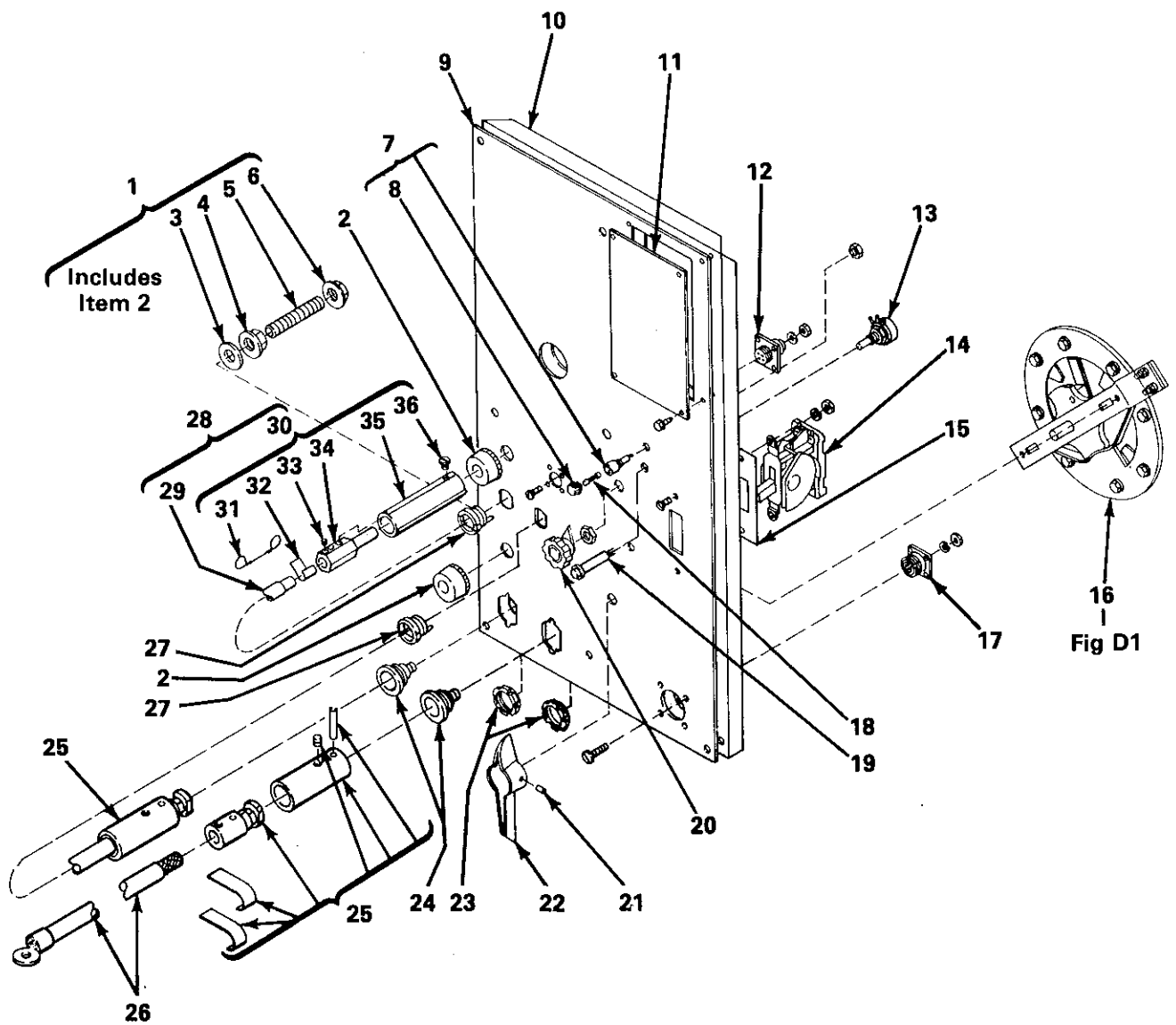
Item No.	Part No.	Description	Quantity
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Figure B3 Drive Assembly, Wire (See Fig B Pg 4 Item 25)

1	048 159	DRIVE ASSEMBLY, wire (consisting of)	1
2	079 633	. FITTING, hose-brass barbed nipple 3/16 TBG	1
3	081 709	. HOUSING, adapter-gun/feeder	1
4	085 243	. KNOB, adjustment-tension	1
5	085 244	. WASHER, cupped-steel	2
6	010 231	. SPRING, compression	1
7	085 242	. FASTENER, pinned	1
8	010 224	. PIN, spring-compression 3/16 x 1	1
9	601 925	. SCREW, cap-steel hex hd 1/4-20 x 1/2	1
10	604 741	. PIN, cotter-hair 0.042 x 15/16	1
11	079 669	. LEVER, mounting-pressure gear	1
12	079 634	. PIN, hinge	1
13	079 772	. KNOB, plastic	1
14	604 538	. WASHER, flat SAE 5/16	3
	089 120	CLAMP, hose 3/16	1
15	605 518	SCREW, cap - hex hd 1/4-20 x 1-1/4	1
16	079 626	SCREW, machine - fillister hd 10-32 x 7/8	6
17	053 842	GEAR, spur - insulated w/bearing	1
18	605 308	RING, retaining	1
19	079 625	WASHER, spring 5/16	2
20	053 841	GEAR, spur - insulated w/key	1
21	602 241	WASHER, flat SAE 1/4	1
22	000 418	SCREW, cap - hex hd 1/2-20 x 1/2 self-locking	1
23	048 449	BUSHING, flanged - nylon	2
24	601 838	NUT, hex 3/8-16	1
25	602 213	WASHER, lock - split 3/8	2
26	010 910	WASHER, flat SAE 3/8	2
27	079 635	INSULATOR, motor	1
28	081 699	BRACKET, mounting	1
29	075 150	WASHER, fiber - shielded 0.622 x 1 x 3/8	1
30	038 804	STUD, 3/8-16 x 2-1/2	1
31	046 948	MOTOR, gear 1/20 hp 115 volts dc 3450 rpm (consisting of)	1
	*058 422	. BRUSH	2
	058 423	. SPRING	2
	057 432	. SCREW, cap - brush holder	2

*Recommended Spare Parts.

BE SURE TO PROVIDE MODEL AND SERIAL NUMBERS WHEN ORDERING REPLACEMENT PARTS.



TC-049 809-E

Figure D - Panel, Front - With Components

Item No.	Dia. Mkgs.	Part No.	Description	Quantity
Figure D Panel, Front - With Components (See Fig A Pg 2 Item 24)				
1		057 608	RECEPTACLE, jack plug-yellow (consisting of)	2
2		039 889	. NUT, terminal-yellow	2
3		010 291	. WASHER, flat-nylafil 5/8 ID x 1-1/4 OD x 1/8	2
4		604 668	. NUT, steel-self-locking hex 1/2-20	2
5		086 296	. RECEPTACLE	2
		605 787	. WASHER, lock-internal tooth 1/2	1
6		601 881	. NUT, steel-hex jam 1/2-20	2
7		046 432	HOLDER, fuse-miniature (consisting of)	1
8		059 139	. CAP, fuseholder	1
9			NAMEPLATE (order by model and serial numbers)	1
10		082 951	PANEL, front	1
11		087 274	PLATE, cover-module	1
12	RC1	048 282	RECEPTACLE W/SOCKET (consisting of)	1
		079 534	. TERMINAL, female 1 socket	4
13	R5	030 943	POTENTIOMETER, carbon 1 turn 2 watt 15K ohm	1
14	S1	011 629	SWITCH, toggle DPST 30 amp	1
15		026 190	INSULATOR, switch	1
16	S3	049 280	SWITCH, selector (See Fig D1 Pg 11)	1
17	RC3	073 326	RECEPTACLE, 4 socket 97-3102-18-4S	1
18	F1	*012 618	FUSE, miniature-glass 5 amp	1
19	PL1	027 645	LIGHT, indicator-red lens 125 volts ac	1
20		019 609	KNOB, pointer	1
21		010 647	PIN, spring-compression	1
22		006 927	HANDLE, switch-range	1
23		010 907	NUT, locking 1 inch	2
24		039 628	RECEPTACLE, twistlock-insulated	2
25		039 630	PLUG, male-twistlock-insulated	2
26		600 329	CABLE, weld No. 1 (order by ft)	3 ft
27		010 290	BUSHING, strain-relief 1.09 x 1.03 hole	2
28		049 347	CABLE & PLUG, jack-yellow (consisting of)	1
29		082 067	. CABLE	1
30		039 878	. PLUG, jack-yellow (consisting of)	1
31		010 521	. WIRE, tie	1
32		019 833	. STRIP, copper 0.010 x 2-1/2 x 3/4	1
33		602 178	. SCREW, set-steel socket hd 1/4-20 x 3/8	1
34		101 219	. PLUG, jack	1
35		026 975	. INSULATOR, jack plug-yellow	1
36		602 160	. SCREW, self-tapping fillister hd 8-32 x 1/4	1

*Recommended Spare Parts.

BE SURE TO PROVIDE MODEL AND SERIAL NUMBERS WHEN ORDERING REPLACEMENT PARTS.

Item No.	Part No.	Description	Quantity
Figure D1 049 280 Switch, Selector (See Fig D Pg 10 Item 16)			
1	005 562	BRACKET, mounting-switch	1
2	005 561	SHAFT, rotor	1
3	005 564	INSULATOR, screw-switch	1
4	605 276	SCREW, cap-steel hex hd 1/4-20 x 1-1/4	1
5	005 559	CONTACT BOARD, movable-switch	1
6	005 560	CONTACT, switch-movable	1
7	008 485	SPACER, contact-switch	1
8	005 566	CONTACT BOARD, stationary-switch	1
9	011 644	CONTACT, stationary-switch	7
10	052 405	SPRING, pressure-contact switch	1
11	052 404	CONTACT, movable-switch	1
12	005 557	BUS BAR, switch-range	1
13	005 558	SPRING, selector-switch	1

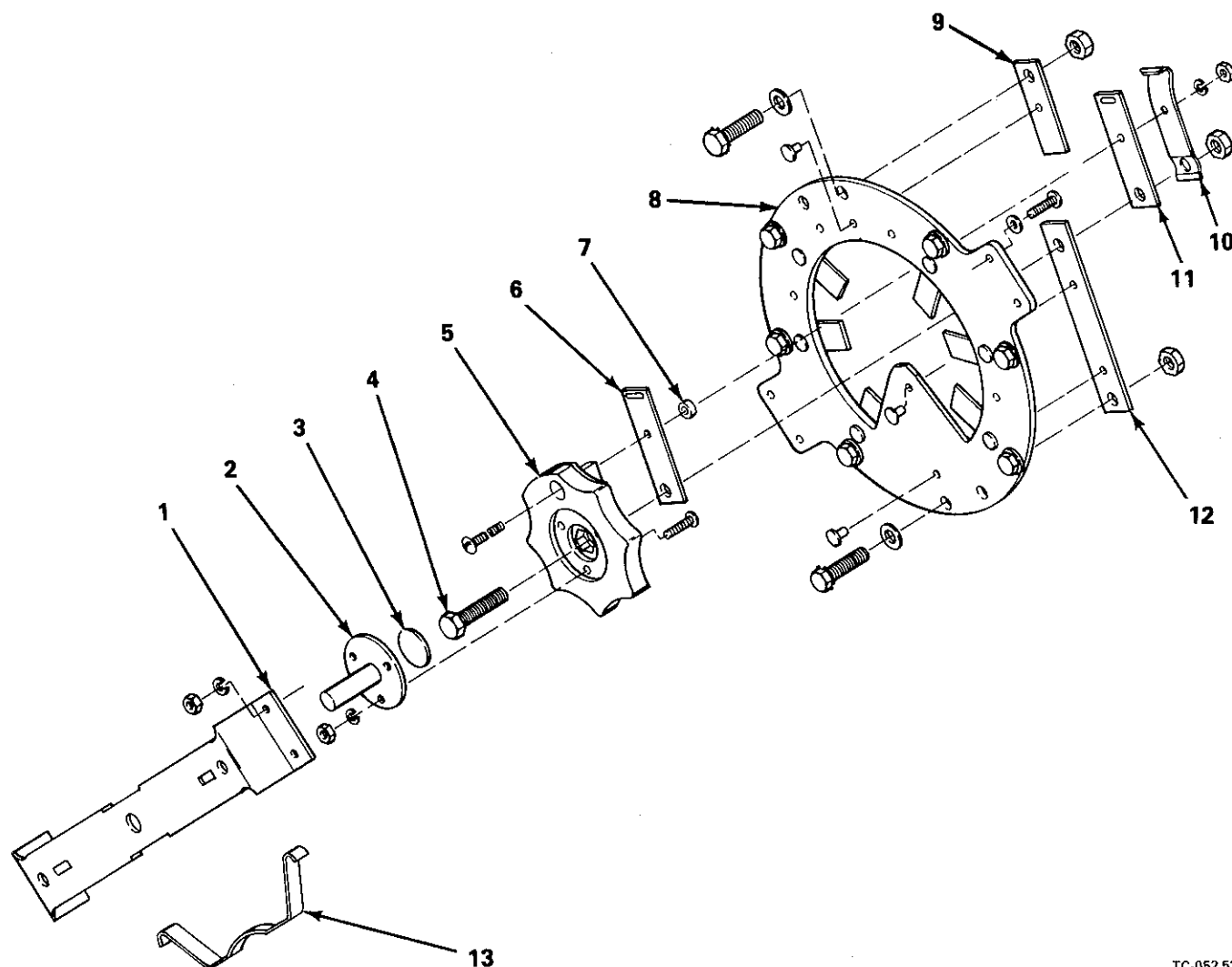


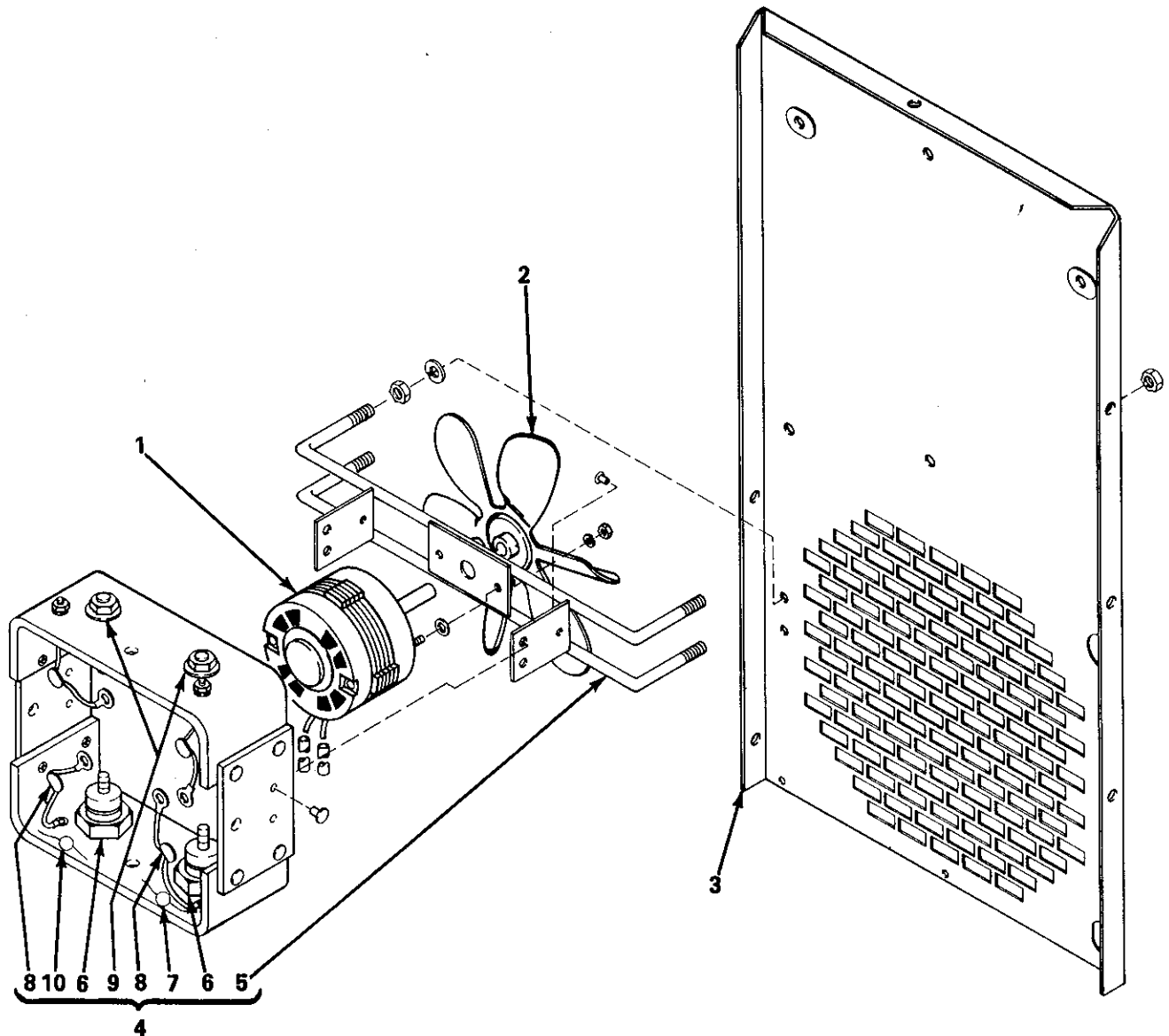
Figure D1 - Switch, Selector

BE SURE TO PROVIDE MODEL AND SERIAL NUMBERS WHEN ORDERING REPLACEMENT PARTS.

Item No.	Dia. Mkgs.	Part No.	Description	Quantity
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Figure E **Panel, Rear - With Components (See Fig A Pg 2 Item 5)**

1	FM	081 373	MOTOR, 1/15 hp 115 volts ac 60 hz 3000 rpm	1
2		081 372	BLADE, fan 60 hz 9 inch 20 degree	1
3		045 873	PANEL, rear	1
4	SR3	087 660	RECTIFIER, silicon diode (consisting of)	1
5		081 678	BRACKET, mounting-fan motor	1
6		037 957	DIODE, rectifier 275 amp 300 volts reverse polarity	2
7	TP2	086 323	THERMOSTAT, NO	1
8	C14-17	031 689	CAPACITOR, ceramic 0.01 uf 500 volts dc w/3/16 x 1/4 terminals	4
9		037 956	DIODE, rectifier 275 amps 300 volts straight polarity	2
10	TP3	006 334	THERMOSTAT, NC	1



TD-049 811-A

Figure E - Panel, Rear - With Components.

BE SURE TO PROVIDE MODEL AND SERIAL NUMBERS WHEN ORDERING REPLACEMENT PARTS.

Item No.	Dia. Mkgs.	Part No.	Description	Quantity
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Figure F 086 271 SKP-35 (Spot Panel) (Optional)

1	R50,52	028 769	POTENTIOMETER, carbon 1 turn 2 watt 750K ohm	2
2	R53,54	030 002	RESISTOR, carbon 0.5 watt 100K ohm	2
3	R51	028 770	POTENTIOMETER, carbon 1 turn 2 watt 1 meg ohm	1
4	S50	086 895	SWITCH, rotary 3 position	1
5		073 914	WASHER, centering 7/16 dia	2
6	R55	605 890	RESISTOR, WW fixed 15 watt 0.25 ohm	1
7		048 029	CLIP, retaining-socket	1
8		049 970	BRACKET, mtg-relay	1
9		027 811	CONNECTOR, 14 pin	1
10		079 844	SPRING, holddown-connector	1
11	CR5	081 797	RELAY, enclosed 24 volts ac 4PDT	1
12	PLG51	084 198	HOUSING, connector-edge 6 pin	1
13	PLG54	079 798	HOUSING, terminal 13 position	1
14		010 301	BUSHING, 9/64 ID x 1/4 OD x 5/16	1
15		031 251	BRACKET, mtg-connector	2
16	R52	073 730	CONNECTOR, edge 22 pin	1
17	PC50	086 204	CIRCUIT CARD (Fig F1 Pg 14)	1
19		086 650	PANEL	1
20		010 146	CLAMP, 5/8 clamp dia	2
21			NAMEPLATE (order by model and serial number)	1
22		024 366	KNOB, pointer	4
		087 255	LABEL	1
		046 468	NOZZLE, spot-outside corner	1
		046 469	NOZZLE, spot-inside corner	1
		046 470	NOZZLE, spot-flat	1

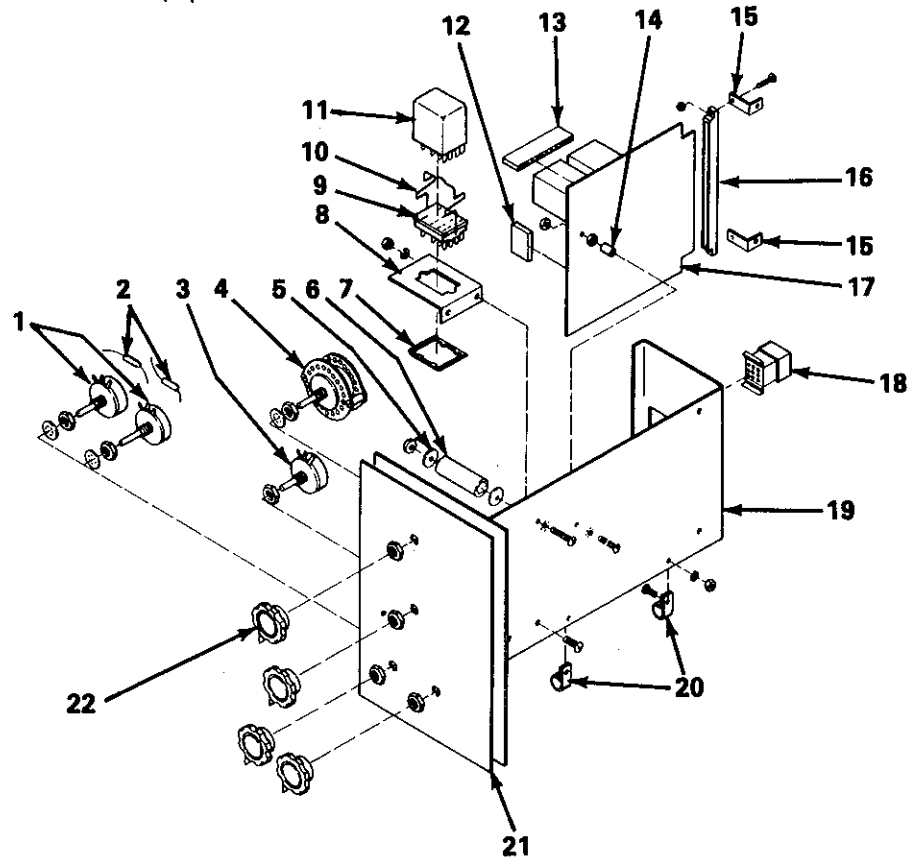
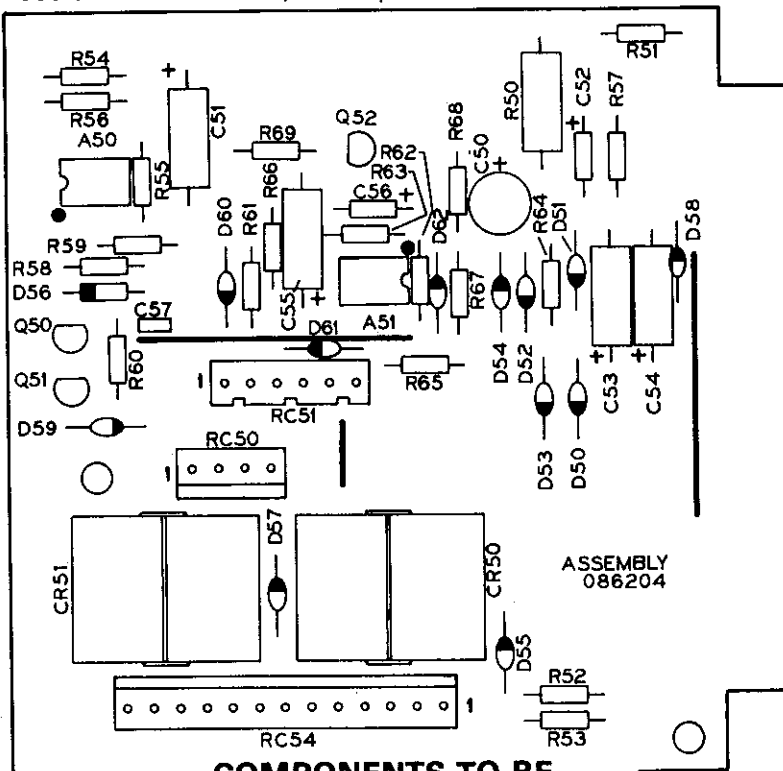


Figure F - SKP-35 (Spot Panel) (Optional)

BE SURE TO PROVIDE MODEL AND SERIAL NUMBERS WHEN ORDERING REPLACEMENT PARTS.

Dia. Mkgs.	Part No.	Description	Quantity
Figure F1 086 204 Circuit Card (Fig F Pg 13 Item 17)			
A50,51	009 159	. AMPLIFIER, operational 358 type 32/16 volts dc	2
C50	039 482	. CAPACITOR, electrolytic 100 uf 35 volts dc	1
C51,53,55	032 820	. CAPACITOR, tantalum 2.2 uf 35 volts dc	3
C52,56	073 714	. CAPACITOR, tantalum 0.22 uf 35 volts	2
C54	072 113	. CAPACITOR, tantalum 4.7 uf 35 volts dc	1
C57	083 182	. CAPACITOR, ceramic 0.1 uf 50 volts dc	1
CR50,51	027 810	. RELAY, enclosed 24 volts dc 4PDT	2
	079 843	. SOCKET, relay	2
	079 844	. SPRING, holddown-relay	2
D50-55,57-62	026 202	. DIODE, rectifier 1 amp 400 volts	12
D56	037 449	. DIODE, zener 15 volts 1 watt SP-55	1
Q50,51	037 200	. TRANSISTOR, 200 MA 40 volts NPN TO-5	2
Q52	073 535	. TRANSISTOR, 100 MA 30 volts NPN GF	1
R50	030 712	. RESISTOR, carbon 1 watt 1000 ohm	1
R51	605 918	. RESISTOR, carbon 0.25 watt 100 ohm	1
R52	078 433	. RESISTOR, carbon 0.25 watt 1 meg ohm	1
R53,57,61,68	605 912	. RESISTOR, carbon 0.25 watt 4700 ohm	4
R54,56,59,60,62,66,67	605 911	. RESISTOR, carbon 0.25 watt 10K ohm	7
R55,58	605 909	. RESISTOR, carbon 0.25 watt 22K ohm	2
R63	039 333	. RESISTOR, CF 0.25 watt 18K ohm	1
R64,69	039 327	. RESISTOR, CF 0.25 watt 220 ohm	2
R65	035 887	. RESISTOR, CF 0.25 watt 3300 ohm	1
RC50	079 793	. TERMINAL, header 4 pin	1
RC51	084 196	. CONNECTOR, edge 6 pin	1
RC54	079 795	. TERMINAL, header 13 pin	1
RC55	080 072	. HOUSING, plug & pins (consisting of)	1
	058 971	. TERMINAL, male 1 pin	8



**COMPONENTS TO BE
REPLACED BY
QUALIFIED PERSONNEL ONLY**

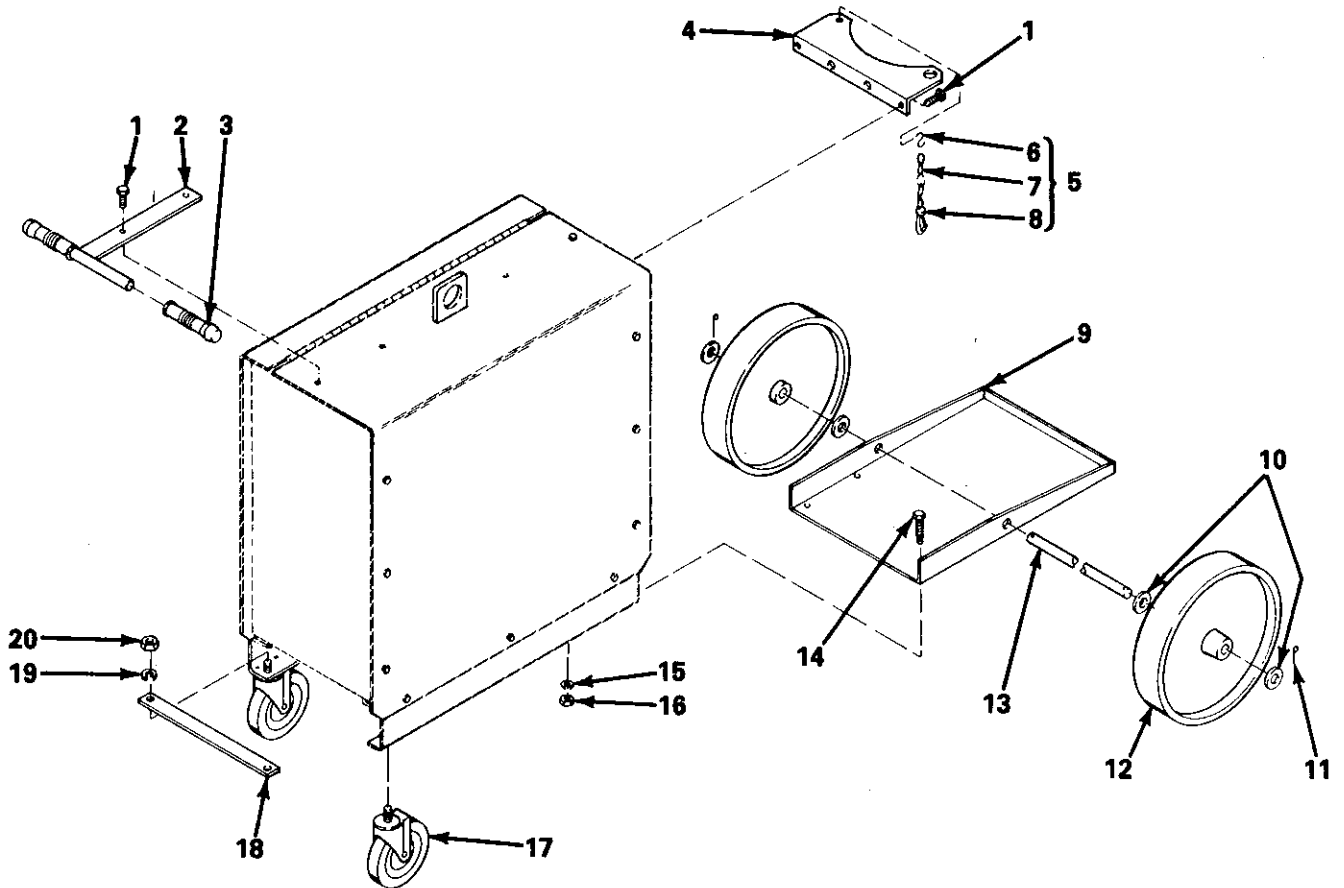
Figure F1 - Circuit Card

BE SURE TO PROVIDE MODEL AND SERIAL NUMBER WHEN ORDERING REPLACEMENT PARTS.

Item No.	Part No.	Description	Quantity
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Figure G No. 10B Running Gear

1	601 954	SCREW, cap-steel hex hd 1/4-20 x 3/4	4
2	025 193	HANDLE, running gear	1
3	604 423	GRIP, handle	2
4	057 478	BRACKET, support-tank	1
5	022 617	CHAIN, cylinder rack	1
6	602 389	HOOK, S blunt 1-1/2	1
7	602 387	CHAIN, weldless	1
8	602 384	SNAP, chain	1
9	052 693	RACK, cylinder	1
10	602 250	WASHER, flat-steel SAE 3/4 in	4
11	602 236	PIN, cotter 1/8 x 1-1/2	2
12	070 /99	WHEEL, rubber, 3/4 bore 10 x 2-3/4	2
13	052 692	AXLE, running gear	1
14	601 944	SCREW, cap-steel hex hd 5/16-18 x 3/4	4
15	602 211	WASHER, lock-steel split 5/16	4
16	601 869	NUT, steel-hex jam 5/16-18	4
17	008 999	CASTER, swivel 4 in dia	2
18	052 691	BAR, spreader cylinder rack	1
19	602 213	WASHER, lock-steel split 3/8	2
20	601 871	NUT, steel-hex jam 3/8-16	2



TC-049 808-B

Figure G - No. 10B Running Gear

BE SURE TO PROVIDE MODEL AND SERIAL NUMBERS WHEN ORDERING REPLACEMENT PARTS.