



# ***MigMaster 250***

## *Welding Package*



### **Instruction Manual**

**BE SURE THIS INFORMATION REACHES THE OPERATOR.  
YOU CAN GET EXTRA COPIES THROUGH YOUR SUPPLIER.**

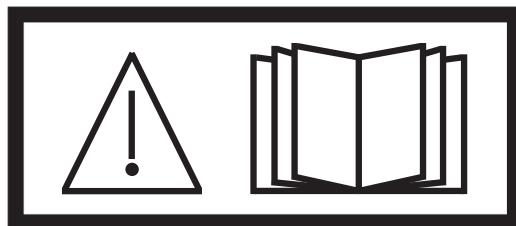
## **CAUTION**

**These INSTRUCTIONS are for experienced operators. If you are not fully familiar with the principles of operation and safe practices for arc welding and cutting equipment, we urge you to read our booklet, "Precautions and Safe Practices for Arc Welding, Cutting, and Gouging," Form 52-529. Do NOT permit untrained persons to install, operate, or maintain this equipment. Do NOT attempt to install or operate this equipment until you have read and fully understand these instructions. If you do not fully understand these instructions, contact your supplier for further information. Be sure to read the Safety Precautions before installing or operating this equipment.**

## **USER RESPONSIBILITY**

This equipment will perform in conformity with the description thereof contained in this manual and accompanying labels and/or inserts when installed, operated, maintained and repaired in accordance with the instructions provided. This equipment must be checked periodically. Malfunctioning or poorly maintained equipment should not be used. Parts that are broken, missing, worn, distorted or contaminated should be replaced immediately. Should such repair or replacement become necessary, the manufacturer recommends that a telephone or written request for service advice be made to the Authorized Distributor from whom it was purchased.

This equipment or any of its parts should not be altered without the prior written approval of the manufacturer. The user of this equipment shall have the sole responsibility for any malfunction which results from improper use, faulty maintenance, damage, improper repair or alteration by anyone other than the manufacturer or a service facility designated by the manufacturer.



**READ AND UNDERSTAND THE INSTRUCTION MANUAL BEFORE INSTALLING OR OPERATING.**

**PROTECT YOURSELF AND OTHERS!**

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## SECTION 1

## SAFETY PRECAUTIONS

### 1.0 Safety Precautions

**WARNING:** These Safety Precautions are for your protection. They summarize precautionary information from the references listed in Additional Safety Information section. Before performing any installation or operating procedures, be sure to read and follow the safety precautions listed below as well as all other manuals, material safety data sheets, labels, etc. Failure to observe Safety Precautions can result in injury or death.



**PROTECT YOURSELF AND OTHERS --**  
Some welding, cutting, and gouging processes are noisy and require ear protection. The arc, like the sun, emits ultraviolet (UV) and other radiation and can injure skin and eyes. Hot metal can cause burns. Training in the proper use of the processes and equInches per minute (ipm)ent is essential to prevent accidents. Therefore:

1. Always wear safety glasses with side shields in any work area, even if welding helmets, face shields, and goggles are also required.
2. Use a face shield fitted with the correct filter and cover plates to protect your eyes, face, neck, and ears from sparks and rays of the arc when operating or observing operations. Warn bystanders not to watch the arc and not to expose themselves to the rays of the electric-arc or hot metal.
3. Wear flameproof gauntlet type gloves, heavy long-sleeve shirt, cuffless trousers, high-topped shoes, and a welding helmet or cap for hair protection, to protect against arc rays and hot sparks or hot metal. A flameproof apron may also be desirable as protection against radiated heat and sparks.
4. Hot sparks or metal can lodge in rolled up sleeves, trouser cuffs, or pockets. Sleeves and collars should be kept buttoned, and open pockets eliminated from the front of clothing.
5. Protect other personnel from arc rays and hot sparks with a suitable non-flammable partition or curtains.
6. Use goggles over safety glasses when chipping slag or grinding. Chipped slag may be hot and can fly far. Bystanders should also wear goggles over safety glasses.

#### 1.1 Safety - English



**FIREs AND EXPLOSIONS --** Heat from flames and arcs can start fires. Hot slag or sparks can also cause fires and explosions. Therefore:

1. Remove all combustible materials well away from the work area or cover the materials with a protective non-flammable covering. Combustible materials include wood, cloth, sawdust, liquid and gas fuels, solvents, paints and coatings, paper, etc.
2. Hot sparks or hot metal can fall through cracks or crevices in floors or wall openings and cause a hidden smoldering fire or fires on the floor below. Make certain that such openings are protected from hot sparks and metal."
3. Do not weld, cut or perform other hot work until the work piece has been completely cleaned so that there are no substances on the work piece which might produce flammable or toxic vapors. Do not do hot work on closed containers. They may explode.
4. Have fire extinguishing equInches per minute (ipm)ent handy for instant use, such as a garden hose, water pail, sand bucket, or portable fire extinguisher. Be sure you are trained in its use.
5. Do not use equInches per minute (ipm)ent beyond its ratings. For example, overloaded welding cable can overheat and create a fire hazard.
6. After completing operations, inspect the work area to make certain there are no hot sparks or hot metal which could cause a later fire. Use fire watchers when necessary.
7. For additional information, refer to NFPA Standard 51B, "Fire Prevention in Use of Cutting and Welding Processes", available from the National Fire Protection Association, Batterymarch Park, Quincy, MA 02269.



**ELECTRICAL SHOCK --** Contact with live electrical parts and ground can cause severe injury or death. DO NOT use AC welding current in damp areas, if movement is confined, or if there is danger of falling.

## SECTION 1

## SAFETY PRECAUTIONS

1. Be sure the power source frame (chassis) is connected to the ground system of the input power.
2. Connect the work piece to a good electrical ground.
3. Connect the work cable to the work piece. A poor or missing connection can expose you or others to a fatal shock.
4. Use well-maintained equlnches per minute (ipm)ent. Replace worn or damaged cables.
5. Keep everything dry, including clothing, work area, cables, torch/electrode holder, and power source.
6. Make sure that all parts of your body are insulated from work and from ground.
7. Do not stand directly on metal or the earth while working in tight quarters or a damp area; stand on dry boards or an insulating platform and wear rubber-soled shoes.
8. Put on dry, hole-free gloves before turning on the power.
9. Turn off the power before removing your gloves.
10. Refer to ANSI/ASC Standard Z49.1 (listed on next page) for specific grounding recommendations. Do not mistake the work lead for a ground cable.



**ELECTRIC AND MAGNETIC FIELDS**  
— May be dangerous. Electric current flowing through any conductor causes localized Electric and Magnetic Fields (EMF). Welding and cutting current creates EMF around welding cables and welding machines. Therefore:

1. Welders having pacemakers should consult their physician before welding. EMF may interfere with some pacemakers.
2. Exposure to EMF may have other health effects which are unknown.

3. Welders should use the following procedures to minimize exposure to EMF:
  - A. Route the electrode and work cables together. Secure them with tape when possible.
  - B. Never coil the torch or work cable around your body.
  - C. Do not place your body between the torch and work cables. Route cables on the same side of your body.
  - D. Connect the work cable to the work piece as close as possible to the area being welded.
  - E. Keep welding power source and cables as far away from your body as possible.



**FUMES AND GASES -- Fumes and gases, can cause discomfort or harm, particularly in confined spaces. Do not breathe fumes and gases. Shielding gases can cause asphyxiation.**

**Therefore:**

1. Always provide adequate ventilation in the work area by natural or mechanical means. Do not weld, cut, or gouge on materials such as galvanized steel, stainless steel, copper, zinc, lead, beryllium, or cadmium unless positive mechanical ventilation is provided. Do not breathe fumes from these materials.
2. Do not operate near degreasing and spraying operations. The heat or arc rays can react with chlorinated hydrocarbon vapors to form phosgene, a highly toxic gas, and other irritant gases.
3. If you develop momentary eye, nose, or throat irritation while operating, this is an indication that ventilation is not adequate. Stop work and take necessary steps to improve ventilation in the work area. Do not continue to operate if physical discomfort persists.
4. Refer to ANSI/ASC Standard Z49.1 (see listing below) for specific ventilation recommendations.

- 5. WARNING:** This product, when used for welding or cutting, produces fumes or gases which contain chemicals known to the State of California to cause birth defects and, in some cases, cancer. (California Health & Safety Code §25249.5 et seq.)



**CYLINDER HANDLING -- Cylinders, if mishandled, can rupture and violently release gas. Sudden rupture of cylinder, valve, or relief device can injure or kill. Therefore:**

1. Use the proper gas for the process and use the proper pressure reducing regulator designed to operate from the compressed gas cylinder. Do not use adaptors. Maintain hoses and fittings in good condition. Follow manufacturer's operating instructions for mounting regulator to a compressed gas cylinder.
2. Always secure cylinders in an upright position by chain or strap to suitable hand trucks, undercarriages, benches, walls, post, or racks. Never secure cylinders to work tables or fixtures where they may become part of an electrical circuit.
3. When not in use, keep cylinder valves closed. Have valve protection cap in place if regulator is not connected. Secure and move cylinders by using suitable hand trucks. Avoid rough handling of cylinders.
4. Locate cylinders away from heat, sparks, and flames. Never strike an arc on a cylinder.
5. For additional information, refer to CGA Standard P-1, "Precautions for Safe Handling of Compressed Gases in Cylinders", which is available from Compressed Gas Association, 1235 Jefferson Davis Highway, Arlington, VA 22202.



**EQUIPMENT MAINTENANCE -- Faulty or improperly maintained equipment can cause injury or death. Therefore:**

1. Always have qualified personnel perform the installation, troubleshooting, and maintenance work. Do not perform any electrical work unless you are qualified to perform such work.
2. Before performing any maintenance work inside a power source, disconnect the power source from the incoming electrical power.
3. Maintain cables, grounding wire, connections, power cord, and power supply in safe working order. Do not operate any equipment in faulty condition.
4. Do not abuse any equipment or accessories. Keep equipment away from heat sources such as furnaces, wet conditions such as water puddles, oil or grease, corrosive atmospheres and inclement weather.
5. Keep all safety devices and cabinet covers in position and in good repair.
6. Use equipment only for its intended purpose. Do not modify it in any manner.



**ADDITIONAL SAFETY INFORMATION--For more information on safe practices for electric arc welding and cutting equipment, ask your supplier for a copy of "Precautions and Safe Practices for Arc Welding, Cutting and Gouging", Form 52-529.**

The following publications, which are available from the American Welding Society, 550 N.W. LeJuene Road, Miami, FL 33126, are recommended to you:

1. ANSI/ASC Z49.1 - "Safety in Welding and Cutting"
2. AWS C5.1 - "Recommended Practices for Plasma Arc Welding"
3. AWS C5.2 - "Recommended Practices for Plasma Arc Cutting"
4. AWS C5.3 - "Recommended Practices for Air Carbon Arc Gouging and Cutting"

5. AWS C5.5 - "Recommended Practices for Gas Tungsten Arc Welding"
6. AWS C5.6 - "Recommended Practices for Gas Metal Arc Welding""
7. AWS SP - "Safe Practices" - Reprint, Welding Handbook.
8. ANSI/AWS F4.1, "Recommended Safe Practices for Welding and Cutting of Containers That Have Held Hazardous Substances."



**MEANING OF SYMBOLS - As used throughout this manual:** Means Attention! Be Alert! Your safety is involved.



**DANGER**  
Means immediate hazards which, if not avoided, will result in immediate, serious personal injury or loss of life.



**WARNING**  
Means potential hazards which could result in personal injury or loss of life.



**CAUTION**  
Means hazards which could result in minor personal injury.

## SECTION 1

## SEGURIDAD

### 1.2 Safety - Spanish



**ADVERTENCIA:** Estas Precauciones de Seguridad son para su protección. Ellas hacen resumen de información proveniente de las referencias listadas en la sección "Información Adicional Sobre La Seguridad". Antes de hacer cualquier instalación o procedimiento de operación , asegúrese de leer y seguir las precauciones de seguridad listadas a continuación así como también todo manual, hoja de datos de seguridad del material, calcomanías, etc. El no observar las Precauciones de Seguridad puede resultar en daño a la persona o muerte.



**PROTEJASE USTED Y A LOS DEMAS--** Algunos procesos de soldadura, corte y ranurado son ruidosos y requieren protección para los oídos. El arco, como el sol , emite rayos ultravioleta (UV) y otras radiaciones que pueden dañar la piel y los ojos. El metal caliente causa quemaduras. EL entrenamiento en el uso propio de los equipos y sus procesos es esencial para prevenir accidentes. Por lo tanto:

1. Utilice gafas de seguridad con protección a los lados siempre que esté en el área de trabajo, aún cuando esté usando careta de soldar, protector para su cara u otro tipo de protección.
2. Use una careta que tenga el filtro correcto y lente para proteger sus ojos, cara, cuello, y oídos de las chispas y rayos del arco cuando se esté operando y observando las operaciones. Alerte a todas las personas cercanas de no mirar el arco y no exponerse a los rayos del arco eléctrico o el metal fundido.
3. Use guantes de cuero a prueba de fuego, camisa pesada de mangas largas, pantalón de ruedo liso, zapato alto al tobillo, y careta de soldar con capucha para el pelo, para proteger el cuerpo de los rayos y chispas calientes provenientes del metal fundido. En ocasiones un delantal a prueba de fuego es necesario para protegerse del calor radiado y las chispas.
4. Chispas y partículas de metal caliente puede alojarse en las mangas enrolladas de la camisa , el ruedo del pantalón o los bolsillos. Mangas y cuellos deberán mantenerse abotonados, bolsillos al frente de la camisa deberán ser cerrados o eliminados.
5. Proteja a otras personas de los rayos del arco y chispas calientes con una cortina adecuada no-flamable como división.
6. Use careta protectora además de sus gafas de seguridad cuando esté removiendo escoria o puliendo.

**La escoria puede estar caliente y desprenderse con velocidad. Personas cercanas deberán usar gafas de seguridad y careta protectora.**



**FUEGO Y EXPLOSIONES --** El calor de las llamas y el arco pueden ocasionar fuegos. Escoria caliente y las chispas pueden causar fuegos y explosiones. Por lo tanto:

1. Remueva todo material combustible lejos del área de trabajo o cubra los materiales con una cobija a prueba de fuego. Materiales combustibles incluyen madera, ropa, líquidos y gases flamables, solventes, pinturas, papel, etc.
2. Chispas y partículas de metal pueden introducirse en las grietas y agujeros de pisos y paredes causando fuegos escondidos en otros niveles o espacios. Asegúrese de que toda grieta y agujero esté cubierto para proteger lugares adyacentes contra fuegos.
3. No corte, suelde o haga cualquier otro trabajo relacionado hasta que la pieza de trabajo esté totalmente limpia y libre de substancias que puedan producir gases inflamables o vapores tóxicos. No trabaje dentro o fuera de contenedores o tanques cerrados. Estos pueden explotar si contienen vapores inflamables.
4. Tenga siempre a la mano equipo extintor de fuego para uso instantáneo, como por ejemplo una manguera con agua, cubeta con agua, cubeta con arena, o extintor portátil. Asegúrese que usted está entrenado para su uso.
5. No use el equipo fuera de su rango de operación. Por ejemplo, el calor causado por cable sobrecarga en los cables de soldar pueden ocasionar un fuego.
6. Después de terminar la operación del equipo, inspeccione el área de trabajo para cerciorarse de que las chispas o metal caliente ocasionen un fuego más tarde. Tenga personal asignado para vigilar si es necesario.
7. Para información adicional , haga referencia a la publicación NFPA Standard 51B, "Fire Prevention in Use of Cutting and Welding Processes", disponible a través de la National Fire Protection Association, Batterymarch Park, Quincy, MA 02269.



**CHOQUE ELECTRICO --** El contacto con las partes eléctricas energizadas y tierra puede causar daño severo o muerte. NO use soldadura de corriente alterna (AC) en áreas húmedas, de movimiento confinado en lugares estrechos o si hay posibilidad de caer al suelo.

1. Asegúrese de que el chasis de la fuente de poder esté conectado a tierra através del sistema de electricidad primario.
2. Conecte la pieza de trabajo a un buen sistema de tierra física.
3. Conecte el cable de retorno a la pieza de trabajo. Cables y conductores expuestos o con malas conexiones pueden exponer al operador u otras personas a un choque eléctrico fatal.
4. Use el equipo solamente si está en buenas condiciones. Reemplaze cables rotos, dañados o con conductores expuestos.
5. Mantenga todo seco, incluyendo su ropa, el área de trabajo, los cables, antorchas, pinza del electrodo, y la fuente de poder.
6. Asegúrese que todas las partes de su cuerpo están insuladas de ambos, la pieza de trabajo y tierra.
7. No se pare directamente sobre metal o tierra mientras trabaja en lugares estrechos o áreas húmedas; trabaje sobre un pedazo de madera seco o una plataforma insulada y use zapatos con suela de goma.
8. Use guantes secos y sin agujeros antes de energizar el equipo.
9. Apage el equipo antes de quitarse sus guantes.
10. Use como referencia la publicación ANSI/ASC Standard Z49.1 (listado en la próxima página) para recomendaciones específicas de como conectar el equipo a tierra. No confunda el cable de soldar a la pieza de trabajo con el cable a tierra.



**CAMPOS ELECTRICOS Y MAGNETICOS** - Son peligrosos. La corriente eléctrica fluye através de cualquier conductor causando a nivel local Campos Eléctricos y Magnéticos (EMF). Las corrientes en el área de corte y soldadura, crean EMF alrededor de los cables de soldar y las maquinas. Por lo tanto:

1. Soldadores u Operadores que use marca-pasos para el corazón deberán consultar a su médico antes de soldar. El Campo Electromagnético (EMF) puede interferir con algunos marca-pasos.
2. Exponerse a campos electromagnéticos (EMF) puede causar otros efectos de salud aún desconocidos.

3. Los soldadores deberán usar los siguientes procedimientos para minimizar exponerse al EMF:

- A. Mantenga el electrodo y el cable a la pieza de trabajo juntos, hasta llegar a la pieza que usted quiere soldar. Asegúrelos uno junto al otro con cinta adhesiva cuando sea posible.
- B. Nunca envuelva los cables de soldar alrededor de su cuerpo.
- C. Nunca ubique su cuerpo entre la antorcha y el cable, a la pieza de trabajo. Mantenga los cables a un sólo lado de su cuerpo.
- D. Conecte el cable de trabajo a la pieza de trabajo lo más cercano posible al área de la soldadura.
- E. Mantenga la fuente de poder y los cables de soldar lo más lejos posible de su cuerpo.



**HUMO Y GASES -- El humo y los gases, pueden causar malestar o daño, particularmente en espacios sin ventilación. No inhale el humo o gases. El gas de protección puede causar falta de oxígeno.**

**Por lo tanto:**

1. Siempre provea ventilación adecuada en el área de trabajo por medio natural o mecánico. No solde, corte, o ranure materiales con hierro galvanizado, acero inoxidable, cobre, zinc, plomo, berilio, o cadmio a menos que provea ventilación mecánica positiva . No respire los gases producidos por estos materiales.
2. No opere cerca de lugares donde se aplique substancias químicas en aerosol. El calor de los rayos del arco pueden reaccionar con los vapores de hidrocarburo clorinado para formar un fosfógeno, o gas tóxico, y otros irritantes.
3. Si momentáneamente desarrolla irritación de ojos, nariz o garganta mientras está operando, es indicación de que la ventilación no es apropiada. Pare de trabajar y tome las medidas necesarias para mejorar la ventilación en el área de trabajo. No continúe operando si el malestar físico persiste.
4. Haga referencia a la publicación ANSI/ASC Standard Z49.1 (Vea la lista a continuación) para recomendaciones específicas en la ventilación.

**5. ADVERTENCIA-- Este producto cuando se utiliza para soldaduras o cortes, produce humos o gases, los cuales contienen químicos conocidos por el Estado de California de causar defectos en el nacimiento, o en algunos casos, Cancer. (California Health & Safety Code §25249.5 et seq.)**



**MANEJO DE CILINDROS-- Los cilindros, si no son manejados correctamente, pueden romperse y liberar violentamente gases. Rotura repentina del cilindro, válvula, o válvula de escape puede causar daño o muerte. Por lo tanto:**

1. Utilice el gas apropiado para el proceso y utilice un regulador diseñado para operar y reducir la presión del cilindro de gas. No utilice adaptadores. Mantenga las mangueras y las conexiones en buenas condiciones. Observe las instrucciones de operación del manufacturero para montar el regulador en el cilindro de gas comprimido.
2. Asegure siempre los cilindros en posición vertical y amárrelos con una correa o cadena adecuada para asegurar el cilindro al carro, transportes, tablileros, paredes, postes, o armazón. Nunca asegure los cilindros a la mesa de trabajo o las piezas que son parte del circuito de soldadura. Este puede ser parte del circuito eléctrico.
3. Cuando el cilindro no está en uso, mantenga la válvula del cilindro cerrada. Ponga el capote de protección sobre la válvula si el regulador no está conectado. Asegure y mueva los cilindros utilizando un carro o transporte adecuado. Evite el manejo brusco de los



**MANTENIMIENTO DEL EQUIPO -- Equipo defectuoso o mal mantenido puede causar daño o muerte. Por lo tanto:**

1. Siempre tenga personal cualificado para efectuar la instalación, diagnóstico, y mantenimiento del equipo. No ejecute ningún trabajo eléctrico a menos que usted esté cualificado para hacer el trabajo.
2. Antes de dar mantenimiento en el interior de la fuente de poder, desconecte la fuente de poder del suministro de electricidad primaria.
3. Mantenga los cables, cable a tierra, conexiones, cable primario, y cualquier otra fuente de poder en buen estado operacional. No opere ningún equipo en malas condiciones.
4. No abuse del equipo y sus accesorios. Mantenga el equipo lejos de cosas que generen calor como hornos, también lugares húmedos como charcos de agua, aceite o grasa, atmósferas corrosivas y las inclemencias del tiempo.
5. Mantenga todos los artículos de seguridad y coverturas del equipo en su posición y en buenas condiciones.
6. Use el equipo sólo para el propósito que fue diseñado. No modifique el equipo en ninguna manera.



**INFORMACION ADICIONAL DE SEGURIDAD -- Para más información sobre las prácticas de seguridad de los equipos de arcoeléctrico para soldar y cortar, pregunte a su suplidor por una copia de "Precautions and Safe Practices for Arc Welding, Cutting and Gouging-Form 52-529.**

Las siguientes publicaciones, disponibles através de la American Welding Society, 550 N.W. LeJuene Road, Miami, FL 33126, son recomendadas para usted:

1. ANSI/ASC Z49.1 - "Safety in Welding and Cutting"
2. AWS C5.1 - "Recommended Practices for Plasma Arc Welding"
3. AWS C5.2 - "Recommended Practices for Plasma Arc Cutting"
4. AWS C5.3 - "Recommended Practices for Air Carbon Arc Gouging and Cutting"

**SIGNIFICADO DE LOS SIMBOLOS**

-- Según usted avanza en la lectura de este folleto: Los Símbolos Significan ¡Atención! ¡Esté Alerta! Se trata de su seguridad.



**PELIGRO**  
Significa riesgo inmediato que, de no ser evadido, puede resultar inmediatamente en serio daño personal o la muerte.



**ADVERTENCIA**  
Significa el riesgo de un peligro potencial que puede resultar en serio daño personal o la muerte.



**CUIDADO**  
Significa el posible riesgo que puede resultar en menores daños a la persona.

## SECTION 1

## SÉCURITÉ

### 1.3 Safety - French



**AVERTISSEMENT :** Ces règles de sécurité ont pour but d'assurer votre protection. Ils récapitulent les informations de précaution provenant des références dans la section des Informations de sécurité supplémentaires. Avant de procéder à l'installation ou d'utiliser l'unité, assurez-vous de lire et de suivre les précautions de sécurité ci-dessous, dans les manuels, les fiches d'information sur la sécurité du matériel et sur les étiquettes, etc. Tout défaut d'observer ces précautions de sécurité peut entraîner des blessures graves ou mortelles.



**PROTÉGEZ-VOUS** -- Les processus de soudage, de coupe et de gougeage produisent un niveau de bruit élevé et exigent l'emploi d'une protection auditive. L'arc, tout comme le soleil, émet des rayons ultraviolets en plus d'autre rayons qui peuvent causer des blessures à la peau et les yeux. Le métal incandescent peut causer des brûlures. Une formation reliée à l'usage des processus et de l'équipement est essentielle pour prévenir les accidents. Par conséquent:

1. Portez des lunettes protectrices munies d'écrans latéraux lorsque vous êtes dans l'aire de travail, même si vous devez porter un casque de soudeur, un écran facial ou des lunettes étanches.
2. Portez un écran facial muni de verres filtrants et de plaques protectrices appropriées afin de protéger vos yeux, votre visage, votre cou et vos oreilles des étincelles et des rayons de l'arc lors d'une opération ou lorsque vous observez une opération. Avertissez les personnes se trouvant à proximité de ne pas regarder l'arc et de ne pas s'exposer aux rayons de l'arc électrique ou le métal incandescent.
3. Portez des gants ignifugés à crispin, une chemise épaisse à manches longues, des pantalons sans rebord et des chaussures montantes afin de vous protéger des rayons de l'arc, des étincelles et du métal incandescent, en plus d'un casque de soudeur ou casquette pour protéger vos cheveux. Il est également recommandé de porter un tablier ininflammable afin de vous protéger des étincelles et de la chaleur par rayonnement.
4. Les étincelles et les projections de métal incandescent risquent de se loger dans les manches retroussées, les rebords de pantalons ou les poches. Il est recommandé de garder boutonnés le col et les manches et de porter des vêtements sans poches en avant.
5. Protégez toute personne se trouvant à proximité des étincelles et des rayons de l'arc à l'aide d'un rideau ou d'une cloison ininflammable.
6. Portez des lunettes étanches par dessus vos lunettes de sécurité lors des opérations d'écaillage ou de meulage du laitier. Les écailles de laitier incandescent peuvent être projetées à des distances considérables. Les personnes se trouvant à proximité doivent également porter des lunettes étanches par dessus leur lunettes de sécurité.



**INCENDIES ET EXPLOSIONS** -- La chaleur provenant des flammes ou de l'arc peut provoquer un incendie. Le laitier incandescent ou les étincelles peuvent également provoquer un incendie ou une explosion. Par conséquent :

1. Eloignez suffisamment tous les matériaux combustibles de l'aire de travail et recouvrez les matériaux avec un revêtement protecteur ininflammable. Les matériaux combustibles incluent le bois, les vêtements, la sciure, la gazette et les liquides combustibles, les solvants, les peintures et les revêtements, le papier, etc.
2. Les étincelles et les projections de métal incandescent peuvent tomber dans les fissures dans les planchers ou dans les ouvertures des murs et déclencher un incendie couvant à l'étage inférieur. Assurez-vous que ces ouvertures sont bien protégées des étincelles et du métal incandescent.
3. N'exécutez pas de soudure, de coupe ou autre travail à chaud avant d'avoir complètement nettoyé la surface de la pièce à traiter de façon à ce qu'il n'ait aucune substance présente qui pourrait produire des vapeurs inflammables ou toxiques. N'exécutez pas de travail à chaud sur des contenants fermés car ces derniers pourraient exploser.
4. Assurez-vous qu'un équipement d'extinction d'incendie est disponible et prêt à servir, tel qu'un tuyau d'arrosage, un seau d'eau, un seau de sable ou un extincteur portatif. Assurez-vous d'être bien instruit par rapport à l'usage de cet équipement.
5. Assurez-vous de ne pas excéder la capacité de l'équipement. Par exemple, un câble de soudage surchargé peut surchauffer et provoquer un incendie.
6. Une fois les opérations terminées, inspectez l'aire de travail pour assurer qu'aucune étincelle ou projection de métal incandescent ne risque de provoquer un incendie ultérieurement. Employez des guetteurs d'incendie au besoin.
7. Pour obtenir des informations supplémentaires, consultez le NFPA Standard 51B, "Fire Prevention in Use of Cutting and Welding Processes", disponible au National Fire Protection Association, Batterymarch Park, Quincy, MA 02269.



**CHOC ÉLECTRIQUE** -- Le contact avec des pièces électriques ou les pièces de mise à la terre sous tension peut causer des blessures graves ou mortelles. NE PAS utiliser un courant de soudage c.a. dans un endroit humide, en espace restreint ou si un danger de chute se pose.

1. Assurez-vous que le châssis de la source d'alimentation est branché au système de mise à la terre de l'alimentation d'entrée.
2. Branchez la pièce à traiter à une bonne mise de terre électrique.
3. Branchez le câble de masse à la pièce à traiter et assurez une bonne connexion afin d'éviter le risque de choc électrique mortel.
4. Utilisez toujours un équipement correctement entretenu. Remplacez les câbles usés ou endommagés.
5. Veillez à garder votre environnement sec, incluant les vêtements, l'aire de travail, les câbles, le porte-electrode/torche et la source d'alimentation.
6. Assurez-vous que tout votre corps est bien isolé de la pièce à traiter et des pièces de la mise à la terre.
7. Si vous devez effectuer votre travail dans un espace restreint ou humide, ne tenez-vous pas directement sur le métal ou sur la terre; tenez-vous sur des planches sèches ou une plate-forme isolée et portez des chaussures à semelles de caoutchouc.
8. Avant de mettre l'équipement sous tension, isolez vos mains avec des gants secs et sans trous.
9. Mettez l'équipement hors tension avant d'enlever vos gants.
10. Consultez ANSI/ASC Standard Z49.1 (listé à la page suivante) pour des recommandations spécifiques concernant les procédures de mise à la terre. Ne pas confondre le câble de masse avec le câble de mise à la terre.



**CHAMPS ÉLECTRIQUES ET MAGNÉTIQUES — comportent un risque de danger. Le courant électrique qui passe dans n'importe quel conducteur produit des champs électriques et magnétiques localisés. Le soudage et le courant de coupe créent des champs électriques et magnétiques autour des câbles de soudage et l'équipement. Par conséquent :**

1. Un soudeur ayant un stimulateur cardiaque doit consulter son médecin avant d'entreprendre une opération de soudage. Les champs électriques et magnétiques peuvent causer des ennuis pour certains stimulateurs cardiaques.
2. L'exposition à des champs électriques et magnétiques peut avoir des effets néfastes inconnus pour la santé.

3. Les soudeurs doivent suivre les procédures suivantes pour minimiser l'exposition aux champs électriques et magnétiques :
  - A. Acheminez l'électrode et les câbles de masse ensemble. Fixez-les à l'aide d'une bande adhésive lorsque possible.
  - B. Ne jamais enrouler la torche ou le câble de masse autour de votre corps.
  - C. Ne jamais vous placer entre la torche et les câbles de masse. Acheminez tous les câbles sur le même côté de votre corps.
  - D. Branchez le câble de masse à la pièce à traiter le plus près possible de la section à souder.
  - E. Veillez à garder la source d'alimentation pour le soudage et les câbles à une distance appropriée de votre corps.



**LES VAPEURS ET LES GAZ -- peuvent causer un malaise ou des dommages corporels, plus particulièrement dans les espaces restreints. Ne respirez pas les vapeurs et les gaz. Le gaz de protection risque de causer l'asphyxie. Par conséquent :**

1. Assurez en permanence une ventilation adéquate dans l'aire de travail en maintenant une ventilation naturelle ou à l'aide de moyens mécanique. N'effectuez jamais de travaux de soudage, de coupe ou de gougeage sur des matériaux tels que l'acier galvanisé, l'acier inoxydable, le cuivre, le zinc, le plomb, le beryllium ou le cadmium en l'absence de moyens mécaniques de ventilation efficaces. Ne respirez pas les vapeurs de ces matériaux.
2. N'effectuez jamais de travaux à proximité d'une opération de dégraissage ou de pulvérisation. Lorsque la chaleur ou le rayonnement de l'arc entre en contact avec les vapeurs d'hydrocarbure chloré, ceci peut déclencher la formation de phosgène ou d'autres gaz irritants, tous extrêmement toxiques.
3. Une irritation momentanée des yeux, du nez ou de la gorge au cours d'une opération indique que la ventilation n'est pas adéquate. Cessez votre travail afin de prendre les mesures nécessaires pour améliorer la ventilation dans l'aire de travail. Ne poursuivez pas l'opération si le malaise persiste.
4. Consultez ANSI/ASC Standard Z49.1 (à la page suivante) pour des recommandations spécifiques concernant la ventilation.

**5. AVERTISSEMENT : Ce produit, lorsqu'il est utilisé dans une opération de soudage ou de coupe, dégage des vapeurs ou des gaz contenant des chimiques considérées par l'état de la Californie comme étant une cause des malformations congénitales et dans certains cas, du cancer. (California Health & Safety Code §25249.5 et seq.)**



**MANIPULATION DES CYLINDRES -- La manipulation d'un cylindre, sans observer les précautions nécessaires, peut produire des fissures et un échappement dangereux des gaz.**

**Une brisure soudaine du cylindre, de la soupape ou du dispositif de surpression peut causer des blessures graves ou mortelles. Par conséquent :**

1. Utilisez toujours le gaz prévu pour une opération et le détendeur approprié conçu pour utilisation sur les cylindres de gaz comprimé. N'utilisez jamais d'adaptateur. Maintenez en bon état les tuyaux et les raccords. Observez les instructions d'opération du fabricant pour assembler le détendeur sur un cylindre de gaz comprimé.
2. Fixez les cylindres dans une position verticale, à l'aide d'une chaîne ou une sangle, sur un chariot manuel, un châssis de roulement, un banc, un mur, une colonne ou un support convenable. Ne fixez jamais un cylindre à un poste de travail ou toute autre dispositif faisant partie d'un circuit électrique.
3. Lorsque les cylindres ne servent pas, gardez les soupapes fermées. Si le détendeur n'est pas branché, assurez-vous que le bouchon de protection de la soupape est bien en place. Fixez et déplacez les cylindres à l'aide d'un chariot manuel approprié. Toujours manipuler les cylindres avec soin.
4. Placez les cylindres à une distance appropriée de toute source de chaleur, des étincelles et des flammes. Ne jamais amorcer l'arc sur un cylindre.
5. Pour de l'information supplémentaire, consultez CGA Standard P-1, "Precautions for Safe Handling of Compressed Gases in Cylinders", mis à votre disposition par le Compressed Gas Association, 1235 Jefferson Davis Highway, Arlington, VA 22202.



**ENTRETIEN DE L'ÉQUIPEMENT -- Un équipement entretenu de façon défectueuse ou inadéquate peut causer des blessures graves ou mortelles. Par conséquent :**

1. Efforcez-vous de toujours confier les tâches d'installation, de dépannage et d'entretien à un personnel qualifié. N'effectuez aucune réparation électrique à moins d'être qualifié à cet effet.
2. Avant de procéder à une tâche d'entretien à l'intérieur de la source d'alimentation, débranchez l'alimentation électrique.
3. Maintenez les câbles, les fils de mise à la terre, les branchements, le cordon d'alimentation et la source d'alimentation en bon état. N'utilisez jamais un équipement s'il présente une défectuosité quelconque.
4. N'utilisez pas l'équipement de façon abusive. Gardez l'équipement à l'écart de toute source de chaleur, notamment des fours, de l'humidité, des flaques d'eau, de l'huile ou de la graisse, des atmosphères corrosives et des intempéries.
5. Laissez en place tous les dispositifs de sécurité et tous les panneaux de la console et maintenez-les en bon état.
6. Utilisez l'équipement conformément à son usage prévu et n'effectuez aucune modification.



**INFORMATIONS SUPPLÉMENTAIRES RELATIVES À LA SÉCURITÉ -- Pour obtenir de l'information supplémentaire sur les règles de sécurité à observer pour l'équipement de soudage à l'arc électrique et le coupage, demandez un exemplaire du livret "Precautions and Safe Practices for Arc Welding, Cutting and Gouging", Form 52-529.**

Les publications suivantes sont également recommandées et mises à votre disposition par l'American Welding Society, 550 N.W. LeJuene Road, Miami, FL 33126 :

1. ANSI/ASC Z49.1 - "Safety in Welding and Cutting"
2. AWS C5.1 - "Recommended Practices for Plasma Arc Welding"
3. AWS C5.2 - "Recommended Practices for Plasma Arc Cutting"
4. AWS C5.3 - "Recommended Practices for Air Carbon Arc Gouging and Cutting"

### SIGNIFICATION DES SYMBOLES

 Ce symbole, utilisé partout dans ce manuel, signifie "Attention" ! Soyez vigilant ! Votre sécurité est en jeu.



Signifie un danger immédiat. La situation peut entraîner des blessures graves ou mortelles.



Signifie un danger potentiel qui peut entraîner des blessures graves ou mortelles.



Signifie un danger qui peut entraîner des blessures corporelles mineures.

**2.1 GENERAL**

This manual has been prepared especially for use in familiarizing personnel with the design, installation, operation, maintenance, and troubleshooting of this equipment. All information presented here in should be given careful consideration to assure optimum performance 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 and freight bill will be furnished by the carrier on request if occasion to file claim arises.

When requesting information concerning this equipment, it is essential that Part, Serial and Model Numbers of the equipment be supplied.

**2.3 DESCRIPTION**

The Migmaster 250 is a portable Welding System designed for fine wire, (0.023, 0.030, 0.035 and 0.045 in.) welding using the short arc method, as well as for spray arc aluminum, short arc and spray arc stainless steel and spray arc cored wires. It incorporates a running gear with provisions for one gas cylinder, and a ST-23A spool-on-gun control.

**2.3.1 AVAILABLE PACKAGES AND CONTENTS**

The following Migmaster 250 Packages are available with Argon Regulator:

MM-250 for 208/230-V.

Input w/12-ft. Pkg.....P/N 604560

MM-250 for 208/230-V.

Input w/15-ft. Pkg.....P/N 604561

MM-250 for 208/230/380/400/460/575-V.

Input w/12-ft. Pkg.....P/N 604563

MM-250 for 208/230/380/400/460/575-V.

Input w/15-ft. Pkg.....P/N 604570

The following Migmaster 250 packages are available with CO<sub>2</sub> Regulator:

MM-250 for 208/230-V

Input w/12-ft. Pkg.....P/N 35678

MM-250 for 208/230/380/400/460/575-V

Input w/12 ft. Pkg.....P/N 35763

Depending on the primary input voltage of the MM-250, and the torch length, each package includes the following:

- One (1), Migmaster 250 Power Supply/Wire Feeder equipped with a dual-groove feed roll (for .035/.045 wire), a 6'-0" ft. primary input power cable and plug (plug is installed for 208/230-V. units only), a mating input power receptacle rated @ 50A./250-V. (packed loose for 208/230-V. input packages only), 10-ft. work cable w/clamp, a 6'-0" shielding gas supply hose w/fittings and running gear w/gas (cylinder) support, as follows:

-- Migmaster 250 for 208/230-Volt input.....P/N 32851  
-- Migmaster 250 for 208/230/380/400/460/575-Volt  
input .....P/N 32852

- One (1), Migmaster 250 Kit as follows:

-- 12-ft. Pkg.

Includes:

GUNMASTER 250, ready-to-weld, 12-ft. lg. torch  
for .035/.045 wire.....P/N 21116  
R-33-FM-580 Regulator, (F-15-173).....P/N 21557  
Mig Welding Process Handbook.....P/N 791F18  
10 # Sample Spool Wire .035 87 HP Wire

-- 15-ft. Pkg.

Includes same accessories as 12-ft. Kit except for torch,  
which is:

GUNMASTER 250, 15-ft. lg. for .035/.045 wire,.....P/N 21117

CO<sub>2</sub> Kits are the same as 12-ft. Pkg. except Regulator is R-33-FM-320.  
P/N 21558.

**2.3.2 POWER SUPPLY**

The power supply consists of a tapped single phase transformer, tap selection switches, secondary contactor, single phase full wave rectifier, stabilizing reactor, slope resistor, filtering capacitors and internal output connections for polarity reversal.

**2.3.3 WIRE FEEDER**

The wire feeder pushes 0.023, 0.030, 0.035 and 0.045 in. wire at speeds up to 650 IPM. Dynamic braking prevents excessive wire overrun. A double grooved drive roll (0.035 and 0.045 in. - supplied) provides a convenient means of changing the setup for either wire size.

The wire feeder is built into the power supply cabinet, and is housed in a compartment separated from the welding machine components. Machine ventilation is not drawn through this compartment, thus helping to keep the wire and feeding mechanism clean.

TABLE 1. SPECIFICATIONS

POWER SOURCE	MIGMASTER 250
Rated Output	250 Amps @ 27 Volts d.c.
Duty Cycle, 208/230V Unit	50% @ 60 Hz; 40% @ 50 Hz.
208/230/380/400/460/575V Unit	35% for 208 through 400V; 50% for 460 & 575V
Primary Input	Single Phase 208/230; 208/230/380/400/460/575 Volts 50 60 Hz
Primary Input Amperes	208-71, 230-62, 380-37, 400-36, 460-31, 575-25
Output Current Range	30 to 280 Amps.
Maximum Open Circuit Volts	55 v.d.c.
FEEDER	
Feed Type	Push
Wire Sizes: Hard	0.023" (0.6mm) through 0.045" (1.2mm)
Cored	0.030" (0.8mm) through 1/16" (1.6mm)
Soft	0.035" (0.9mm) and 3/64" (1.2mm)
Feed Rate	20-650 IPM
GUNMASTER 250 TORCH	
Cooling	Air
Gooseneck Angle	45 degrees
Rated 60% Duty Cycle	
(DCRP) Amps:	200 w/Argon Mixtures, 300 w/CO <sub>2</sub>
Conduit Length	see section 2.3.1
PHYSICAL	
Net Weight	*210 lbs (95 Kg.)
Height	*32.25 inches (819 mm)
Width	*19.5 inches (495 mm)
Depth	*40.0 inches (1016 mm)
*Includes running gear & bottle tray.	

#### 2.3.4 GUNMASTER 250 WELDING TORCH (F15-612)

The lightweight aircooled welding gun included in selected systems is supplied complete and ready to weld 0.035 in. steel wire. It is built with a one piece service conduit and includes a 45 degree gooseneck. Changing the contact tip to 0.045 in. allows the use of the larger wire.

#### 2.3.5 CONTROLS

The Migmaster 250 System can be used to weld hard and aluminum wire with an optional ST-23A spool-gun torch. An optional spot/stitch control allows a welder to spot or stitch weld within a range of 0.4 to 3.5 seconds. The built-in spool-on-gun adaptors and control, when used in conjunction with the optional ST-23A torch, permits aluminum wire welding with the machine.

#### 2.3.6 RUNNING GEAR

The Migmaster 250 is equipped with a running gear w/ swiveled front wheels and a gas cylinder support. The rear wheels are packed loose for shipping, but are easily installed, see Section 3.8.

#### 2.4 OPTIONAL ACCESSORIES

Fan-on-demand (autofan) Kit, P/N 16781

##### 2.4.1 SPOT/STITCH/ANTI-STICK MODULE, P/N 32858.

This easy-to-install, plug-in module mounts in place of the lower blank cover plate of the upper-right front panel location in the 250 unit. It enables the operator to use the 250 for Spot or Stitch or Continuous welding operations. It also includes an adjustable Anti-Stick feature that allows you to select various wire burnback times to prevent wire from sticking in the puddle after a weld. For installation, see Section 3.9 and for operating instructions see Section 4.2.

If a Spotwelding operation is to be used, it is recommended that you also order a #125 Spotweld Nozzle, P/N 999625.

#### **2.4.2 DIGITAL VOLT/AMMETER MODULE, P/N 32857.**

This easy-to-install, plug-in module mounts in place of the top blank cover plate of the upper-right front panel location in the 250 unit. This unique meter module alternately displays welding voltage and current (of the dial-set welding condition) every 4-seconds. Two L.E.D.'s labeled Amps and Volts provided below the meter windows, alternately illuminate to indicate which condition is being displayed. The voltage indication is displayed in 1/10-volt increments (e.g.: 20.5), while the current indication is usually displayed in three-whole digits (e.g.: 225). After the torch trigger is released, the meter will continue to flash for 20-seconds the last condition used during welding. At the end of this time, the meter will reset to zero. For installation see Section 3.10.

#### **2.4.3 ST-23A SPOOL-ON-GUN TORCH, P/N 19164 (see F-14-353).**

The Migmaster 250 unit is equipped with a built-in control for the ST-23A Spool-On-Gun welding torch. The ST-23A is a high performance, 250 ampere continuous duty spool-on-gun torch designed for the mig welding process. It is completely portable (up to 30-ft.), air-cooled and hand operated, and weighs less than three (3) pounds. The gun is equipped with (30) foot lines. For installation and operation, see Section 4.2.2.

MT-250SG Spool-On-Gun ..... P/N 36779  
(Requires Adapter, P/N 36833) See F-15-380.

#### **2.4.4 TORCH NOZZLES - See table below:**

##### **Nozzles**

 Gun Master 250		<b>Tip Relationship Using All Sizes Standard and 5/64 &amp; 3/32" Heavy Duty Tips</b>	<b>Tip Relationship Using All Sizes Heavy Duty Tips Except 5/64 &amp; 3/32".</b>
<b>Standard Duty</b>			
0558001610	3/8" Standard	1/8" Recess	Flush
0558001609	3/8" Standard	Flush	1/8" Recess
0558001612	1/2" Standard	1/8" Recess	Flush
0558001611	1/2" Standard	Flush	1/8" Stick Out
0558001613	1/2" Standard	1/8" Stick Out	1/4" Stick Out
0558001614	5/8" Standard	Flush	1/8" Stick Out
0558001615	5/8" Standard	1/8" Stick Out	1/4" Stick Out
<b>Spot</b>			
0558001602	Spot Nozzle	Brass	3/8"
<b>Std. Duty Tip/Noz. Adapter</b>			
0558001608			
<b>Heavy Duty</b>			
0558001599	5/8" Heavy Duty	1/8" Recess	Flush
0558001600	5/8" Heavy Duty	1/4" Recess	1/8" Recess
0558001598	5/8" Heavy Duty	Flush	1/8" Stick Out
0558001601	5/8" Heavy Duty	1/8" Stick Out	1/4" Stick Out
0558001603	3/4" Heavy Duty	1/4" Recess	1/8" Recess
<b>Spot</b>			
0558001602	Spot Nozzle	Brass	1/4"
<b>Heavy Duty Tip/Noz. Adapter</b>			
0558001888			

All Tips are the Medium Length to give these relationships.

## SECTION 2

## INTRODUCTION

### 2.4.5 TORCH / WIRE FEED ACCESSORIES

See following tables:

#### TIPS

##### Standard Duty Tips

20543 .....	.023 Standard Duty Tip
20544 .....	.030 Standard Duty Tip
996995 .....	.035 Standard Duty Tip
37290 .....	.045 Standard Duty Tip
996999 .....	3/64 (Alum.) Standard Duty Tip
2075349 .....	.052 Standard Duty Tip
996997 .....	1/16 Standard Duty Tip
2075230 .....	5/64 Standard Duty Tip

##### Heavy Duty Tips

0558002367 .....	.030 Heavy Duty Tip
0558002368 .....	.035 Heavy Duty Tip
0558002369 .....	.040 Heavy Duty Tip
37286 .....	.045 Heavy Duty Tip
17765 .....	3/64 (Alum.) Heavy Duty Tip
17778 .....	.052 Heavy Duty Tip
37291 .....	1/16 Heavy Duty Tip (Hard or Cored Wire)
948835 .....	1/16 (Alum.) Heavy Duty Tip
948832 .....	5/64 Heavy Duty Tip
948833 .....	3/32 Heavy Duty Tip

#### Liner Selection

##### Steel & Flux Core

0558001675 .....	.023 x 10,12,15' Liner*
37031 .....	.030 x 10,12,15' Liner*
0558002137 .....	.045 x 25' Liner
37032 .....	.035-.045 x 10,12,15' Liner*
37033 .....	.045-.052-1/16 x 10,12,15' Liner*
0558002138 .....	.052-1/16 x 25' Liner
0558001676 .....	5/64 x 10,12,15' Liner*
0558002139 .....	5/64 x 25' Liner
37034 .....	3/32 x 10,12,15' Liner*
0558002140 .....	3/32 x 25' Liner
952948 .....	7/64-1/8 x 10,12,15' Liner*

##### Aluminum

37039** .....	.035-3/64 x 15' Poly Liner
37040** .....	3/64-1/16 x 15' Poly Liner

\*NOTE: Liner supplied 15' — must be trimmed to fit.

\*\* Requires Jumper Liner Sleeve 0558003050

### 2.4.6 SPOOL SPACER

For 8" dia. spools.....P/N 17511

For 10" dia. spools .....P/N 34330

#### Drive Roll & Guide Tube Selection

Wire Type / Diameter	Lower Drive Roll	Upper Pressure Roll	Guide Tube
Hard Wires ("V" groove)			
.023 in. (0.6mm)	21155	23612397	21163
.030 in. (0.8mm)	21155	23612397	21164
.035 in. (0.9mm)*	21156	23612397	21165
.040 in. (1.0mm)*	21156	23612397	21165
.045 in. (1.2mm)*	21156	23612397	21165
Soft (aluminum) Wires ("U" groove)			
.035 in. (0.9mm)	21158	23612397	21167**
3/64 in. (1.2mm)	21159	23612397	21168**
Cored Wires (Serrated "V" groove - lower)			
.030 in. (0.8mm)	21160	23612369	21164
.035 in. (0.9mm)	21160	23612369	21165
.040 in. (1.0mm)	21161	23612369	21165
.045 in. (1.2mm)	21161	23612369	21165
.052 in. (1.4mm)	21161	23612369	21166
1/16 in. (1.6mm)	21161	23612369	21166
Cored Wires (Serrated "V" groove - upper and lower)†			
.045 in. (1.2mm)	37319	37319	21165
.052 in. (1.4mm)	37319	37319	21166
1/16 in. (1.6mm)	37320	37320	21166

\* Supplied with Migmaster 250.

\*\* Requires Support Tube 21169.

† Recommended for use with soft cored wires that are easy to flatten.

### 3.1 LOCATION (Figure 3.1)

A proper installation site should be selected for the welding machine, if the unit is to provide dependable service and remain relatively maintenance free.

A proper installation site permits freedom of air movement into and out of the welding machine, and also least subjects the unit to dust, dirt, moisture, and corrosive vapors. A minimum of 18 inches (46 cm) unrestricted space must be maintained between the welding machine side and rear panels and the nearest obstruction.

The installation site should also permit easy removal of the welding machine outer enclosure for maintenance functions.

**CAUTION:** Do not place any filtering device over the intake air passages of the welding machine as this would restrict the volume of intake air and thereby subject the welding machine internal components to an overheating condition and subsequent failure. Warranty is void if any type of filtering device is used.

If a forklift vehicle is used for lifting the unit, be sure that the lift forks are long enough to extend completely under the base.



Do not operate the machine without the running gear installed.

### 3.2 ELECTRICAL INPUT CONNECTIONS



It is recommended that a line disconnect switch be installed in the input circuit to the welding machine. This would provide a safe and convenient means to completely remove all electrical power from the welding machine whenever it is necessary to perform any internal function on the unit. (See Figure 3.2A.)



Before making electrical input connections to the welding machine, "Machinery Lockout Procedures" should be employed. If the connections are to be made from a line disconnect switch, the switch should be padlocked in the off position. If the connection is made from a fusebox, remove the fuses from the box and padlock the cover in the closed position. If locking facilities are not available, attach a red tag to the line disconnect switch (or fuse box) to warn

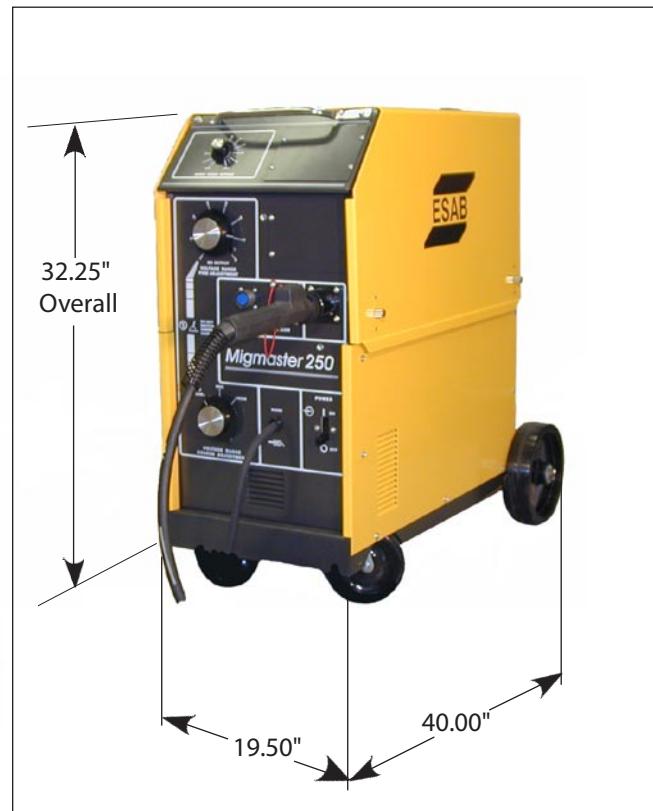


Figure 3.1 Dimensional Drawing

others that the circuit is being worked on. If the plug-cap is used, (see 3.2B) remove plug from receptacle.

#### 3.2.1 Input Electrical Requirements

Models of this welding machine are designed to be operated from 208/230, or 208/230/380/400/460/575 volts single phase 50/60 Hz, depending on model. The primary input voltage requirements are shown on the welding machine nameplate.

#### 3.2.2 Input Conductor Connections

The input power cord on 208/230Volts primary input model is provided with an attachment plugcap. The plugcap will mate with a 250 Volts, 50 Ampere receptacle conforming to NEMA 6-50 R configuration.

The receptacle should be wired to a separately fused disconnect or circuit breaker of the size listed in Table 3.1. This disconnect or breaker can be wired to a single phase system or to two conductors of a three phase system. A third conductor for grounding should also be connected between the disconnect and the receptacle.

Figure 3.2A illustrates wiring to a single phase system and Figure 3.2B illustrates wiring to a three phase system.

The 208/230/380/400/460/575 primary input voltage unit is provided with a three conductor primary input cable without plug cap. The ground lead of this cable should be connected to a reliable ground and the two remaining wires should be connected to the separately fused lines of the disconnect or breaker as shown in Figures 3.2C and 3.2D.

All machines leave the factory with their primary electrical input requirements internally-connected for the highest voltage rating available in each model (e.g.: 230-volt for the 208/230-volt units; and 575-volt for the "multi-voltage" units).

## **DANGER**

Only qualified personnel should make these changes. Make certain the primary power has been disconnected and all safety procedures have been followed before proceeding with these instructions.

Fig. 3.3A shows the 230v and 208v connections for the 208/230 dual voltage model. Change over is made by removing the right side panel below the wire feed compartment and switching the primary transformer tap at the top of the power switch with the unused alternate voltage tap located next to the main transformer (see Fig. 3.3B). Both voltage taps (the one currently connected to the switch and the unused alternate voltage) are marked with the input voltage requirement. All units are supplied from the factory connected for the highest voltage (230 vac). Before switching the voltage taps, verify the actual voltage requirement as well as the current voltage connection to be certain re-connection is necessary. If voltage tap re-connection is necessary, the following paragraphs cover the procedure to switch the voltage tap for either 208vac or 230vac input.

TABLE 3.1 Input Conductor and Fuse Size

Primary Input Volts	Full Load Line Amperes	Fuse Size	Recommended	
			Primary Input Conductor Size	Ground Conductor Size
208	71	90	8	8
230	62	90	8	8
380	37	50	10	10
400	36	50	10	10
460	31	40	12	12
575	25	30	12	12

Figure 3.3A - Primary Reconnections at Switch For 208/230 Volt Models

## **WARNING**

The terminal labeled GRD is connected to the welding machine chassis and is for ground purposes only. It must be connected to a good electrical ground. Do not connect a conductor from the terminal labeled GRD to any one of the L1, L2 terminals as this will result in an electrically hot welding machine chassis.

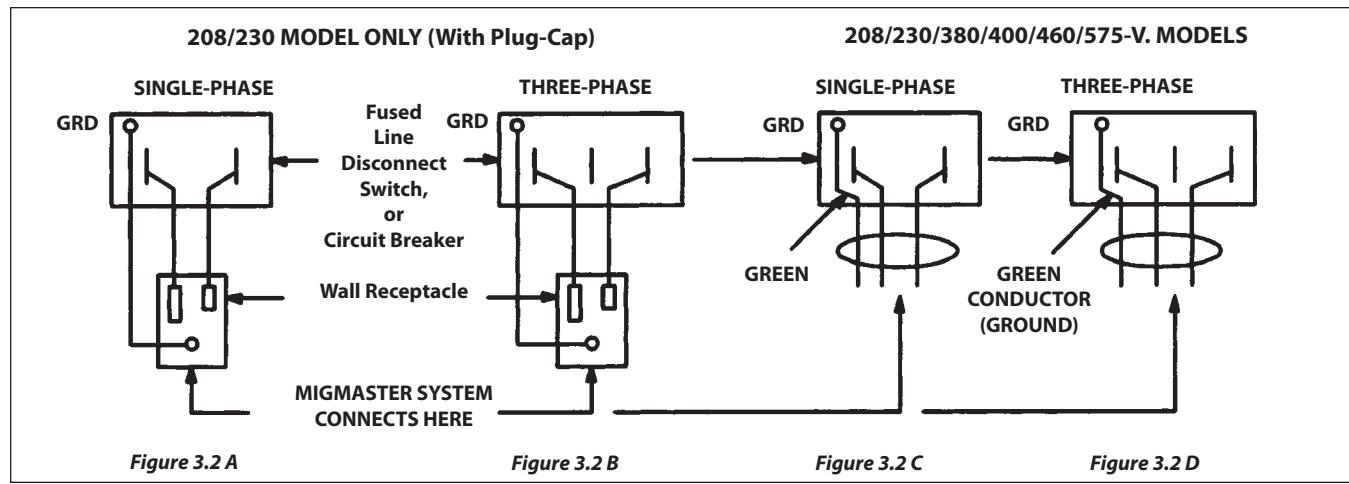
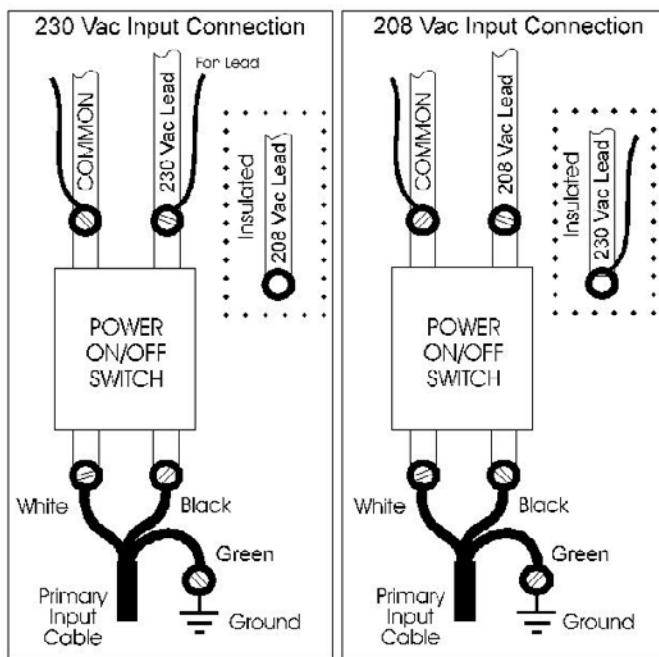


Figure 3.2 - Primary Connection



**DANGER**

When changing the input voltage connections, the unused lead must be insulated and positioned to prevent contact with any other internal components of the machine or the machine side panel. The clearance between the unused lead and other components must be at least one inch (see Fig. 3.3B for illustration of the proper position). FAILURE TO INSULATE AND POSITION THIS LEAD PROPERLY WILL CAUSE A SERIOUS SHOCK HAZARD.

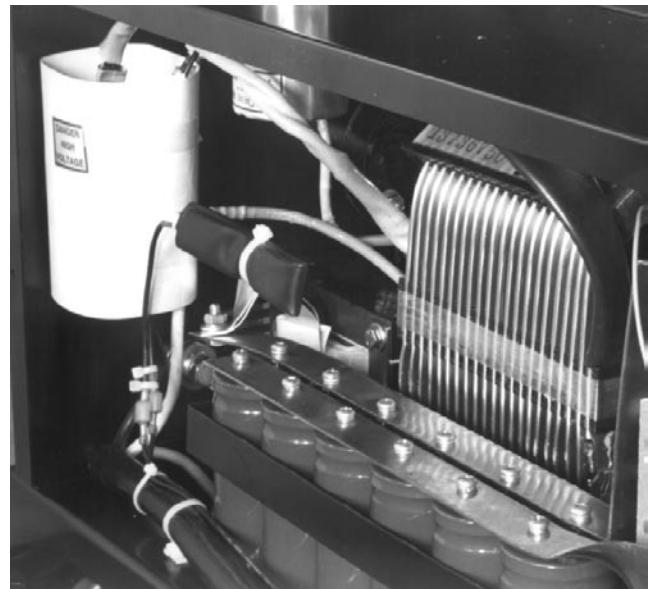


Fig. 3.3B - Position of Alternate Voltage Tap

### 3.2.3 CONNECTING FOR 208 VAC INPUT

After the panel is removed, locate the 208 Vac lead (Fig. 3.3B) and cut the tie-wrap to remove the insulation sleeving (on early models this lead may have been wrapped with black electrical tape). Open the insulating cover around the power switch (Fig. 3.3C.) to expose the terminals and disconnect the 230 Vac lead from the top of the switch as shown in Fig. 3.3A. Insulate the 230 Vac lead that was removed from the power switch with sleeving or approved electrical tape and re-position to a safe area beside the transformer (see Fig. 3.3B), leaving a minimum of one inch clearance from other components and the side panel.

### 3.2.4 CONNECTING FOR 230 VAC INPUT

After the panel is removed, locate the 230 Vac lead (Fig. 3.3B) and cut the tie-wrap to remove the insulation sleeving (on early models this lead may have been wrapped with black electrical tape). Open the insulating cover around the power switch (Fig. 3.3C.) to expose the terminals and disconnect the 208 Vac lead from the top of the switch as shown in Fig. 3.3A. Insulate the 208 Vac lead that was removed from the power switch with sleeving or approved electrical tape and re-position to a safe area beside the transformer (see Fig. 3.3B), leaving a minimum of one inch clearance from other components and the side panel.

Connect the proper voltage (208 Vac or 230 Vac) tap to the power switch and tighten securely. Check all other leads connected to the power switch for tightness and clearance from internal components before securing the insulating cover around the power switch. Replace the side panel.

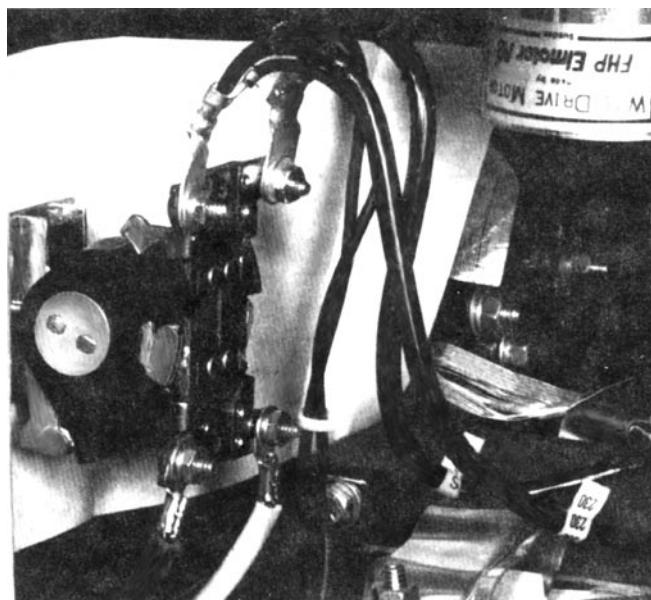
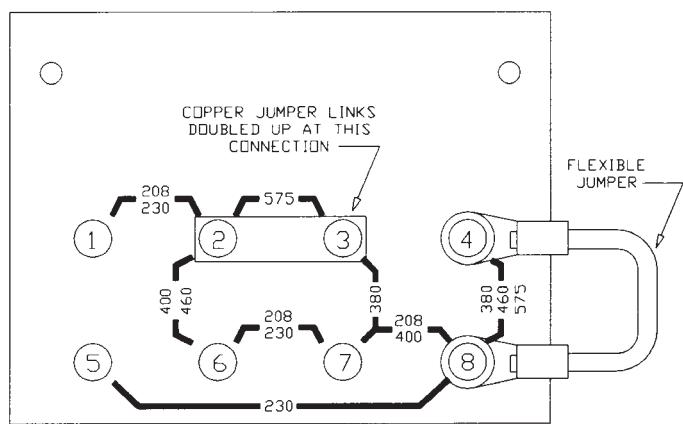


Fig. 3.3C - Power Switch Connection

### 3.2.5 RECONNECTING FROM 575 VAC INPUT

Figure 3.3.1 shows you how to reconnect the "multi-voltage" model from a 575-volt input to any of the remaining available voltage inputs 200 or 380 or 400 or 460-volts. These connections are made by unscrewing the right side panel below the wire feeding compartment, and locating the primary voltage changeover terminal board handing in the center of the lower compartment. This board contains copper links which must be reconnected to match the silk-screened voltage designations for the input you plan to use (it comes factory-connected for a 575-volt input), see Figure 3.3.1.



PRIMARY VOLTAGE CONNECTION CHART		
VOLTAGE	CONNECTION	NO. OF STRIPS
208	1-2	1
	6-7	1
	7-8	FLEX
230	1-2	1
	6-7	1
	5-8	FLEX
380	3-7	2
	4-8	FLEX
400	2-6	2
	7-8	FLEX
460	2-6	2
	4-8	FLEX
575	2-3	2
	4-8	FLEX

Figure 3.3.1-Primary Reconections at Voltage Changeover Terminal Board for 208/230/380/400/460/575 Volt Models

### 3.3 SECONDARY OUTPUT CONNECTIONS

The Migmaster 250 Welding System is completely self-contained so that the front panel torch fittings (Euro-type MT and Spool gun) are internally connected to the welding polarity (D.C. Reverse or D.C. Straight) via the secondary output terminals located inside the wire feeding compartment (see Fig. 4.1). The machine comes set up for D.C.R.P. welding as described in Section 4.1.3.

### 3.4 TORCH CONNECTIONS

The torch (GUNMASTER 250), which is supplied as standard equipment with the Migmaster 250 System, is provided with a euro-type adapter which directly connects to the torch fitting mounted on the front panel. Line up matching holes, push on and tighten locking collar. As shipped from the factory, the euro or common connector type torches are set-up for D.C.R.P. welding polarity (see sections 3.3 or 4.1.3). To connect the spool-on-gun torch (ST-23A) see Section 4.2.2.

### 3.5 WIRE FEEDER MECHANISM

#### 3.5.1 DRIVE ROLLS

The drive roll has two grooves: the small groove feeds 0.035 in. diameter wire, the large groove feeds 0.045 in. wire. The groove nearest the gear motor feeds the wire. If the required groove is not in that position:

- A. Release the pressure drive roll lever and lift the assembly upward.
- B. Remove the two (2) screws holding the drive roll to the gear.
- C. Reverse the drive roll on the drive roll shaft.
- D. Replace the screws and tighten.
- E. Secure the pressure drive roll assembly.

#### 3.5.2 WELDING WIRE SPOOL



As with any work area, make sure safety glasses with side shields are worn when handling or changing wire or clipping wire off at the spool or at the end of the torch. Hold onto the wire coming off the spool with one hand before clipping. Serious eye injury can result due to the springiness of the wire which can quickly unravel, or a cut wire end which may shoot across the room.

Install a spool of welding wire on the hub as follows:

- A. Unscrew spool nut from hub.
- B. Place wire spool on hub to rotate clockwise as wire is unwound; hub pin must engage hole in spool.
- C. Replace nut.

### 3.5.3 THREADING WELDING WIRE

- A. Turn off power switch.



When the power switch is on, and gun trigger is depressed, the electrode wire becomes electrically hot, and the wire feed rolls are activated.

- B. Release pressure drive roll assembly and lift up ward. Check that proper wire diameter groove is in the inner position.

**CAUTION:** Before threading welding wire through casing, make sure chisel point and burrs have been removed from wire end to prevent wire from jamming in gun casing or liner.

- C. Feed the wire from the spool through the inlet guide, across the drive roll groove and into gun outlet guide tube.

Make sure that the proper "outlet guide tube" is inserted into the front-panel gun fitting for the size and type of wire being used, see Table 2.4.5.2 for wire feed accessories (Section 2.4.5).

To insure proper wire feeding, it is important that the wire be kept clean and that the drive rolls be periodically cleaned of any chips or scale that might be carried into the gun liner and cause sticking.

- D. Lower pressure roll assembly and secure. Check that the gears mesh. Feed wire through to gun tip with gun trigger (power ON).

### 3.5.4 BRAKE DRAG ADJUSTMENT

Brake disc friction should provide enough drag to keep the wire spool or core from spinning freely after wire feed stops. If adjustment is required, turn adjusting screw clockwise to increase drag, counterclockwise to decrease it. Drag should be just low enough to limit wire overrun.

### 3.6 CONNECTION OF SHIELDING GAS SUPPLY

The R-33-FM-580 Regulator-Flowmeter is designed for use with an argon or argon-mix cylinder of shielding gas. It is adjustable for delivering up to 50 cfh through the torch. To set up the system do the following:



Do Not adapt R-33-FM-580 for use with CO<sub>2</sub>. Relief device may rupture if CO<sub>2</sub> is used with the R-33-FM-580. For CO<sub>2</sub> service, order R-33-FM-320, P/N 21558.

- a. With the cylinder cap in place CAREFULLY slide the cylinder of gas onto the Migmaster 250 cylinder rack.
- b. Secure the cylinder to the unit, using the chain provided.
- c. Unscrew the cylinder cap.
- d. Open the cylinder valve slightly, just for an instant, to blow away any dirt or dust which may have accumulated in the cylinder valve outlet. Be sure to keep your face away from the valve outlet to protect your eyes.
- e. Attach the regulator to the cylinder valve, tighten the union nut securely with a 1-1/8in. open end or an adjustable wrench.

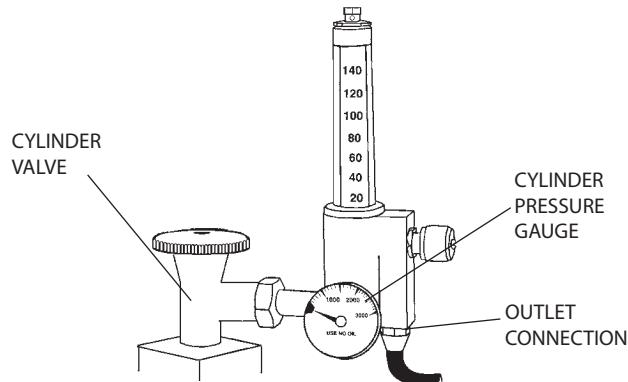


Fig. 3.6 R-33-FM-580 Regulator (Illustrated)

- f. Attach the gas hose from the rear of the Migmaster 250 to the regulator outlet connection (see Fig. 3.6).
- g. Slowly open the cylinder valve a fraction of a turn. When the regulator pressure gauge pointer stops moving, open the cylinder valve fully.



Never stand directly in front of or behind the regulator when opening the cylinder valve. Always stand to one side.

- h. Using a leak test solution, such as P/N 998771 (8 oz. container) or soapy water, test for leakage about the cylinder valve stem, the regulator inlet connection, and the hose connections at the regulator and at the Migmaster 250 for leakage. Correct any leaks before starting work.
- i. If work is to be stopped for a half-hour or more, or the regulator is to be removed from the cylinder, shut down the regulator as follows:
  - a. Close the cylinder valve.
  - b. Release gas from the regulator by closing the torch trigger lever.
  - c. When pressure gauge drops to zero, the regulator is de-pressurized and shutdown.
- j. Each regulator is equipped with a porous metal inlet filter, P/N 71Z33, pressed into the regulator inlet nipple. No regulator should be connected to a cylinder or station valve unless it contains this filter. You can replace the filter if you have reason to do so. To remove a filter refer to the regulator instruction literature for details.
- k. Regulators in need of repair should be returned to your Welding Equipment distributor or to an authorized Re-manufacturing Center.

**WARNING**

If welding is performed in a confined area, shielding gas leaks could result in a buildup of shielding gas concentration, displacing oxygen, thereby endangering personnel enter the area.

**3.7 WELDING CABLE CONNECTIONS**

Connect the work clamp solidly to the workpiece or work table. Clamp onto a bare metal area.

**WARNING**

A good electrical connection to the work is essential to proper welding operation and to prevent electric shock.

Welding cables should be kept as short as possible and be of adequate current carrying capacity. Resistance of the welding cables and connections causes a voltage drop which is added to the voltage drop of the arc. Excessive cable resistance may result in a reduction of the maximum usable current output of the equipment.

The proper operation of this equipment is to a large extent dependent on the use of welding cables and connections which are in good condition and of adequate size.

**3.8 ASSEMBLE REAR WHEELS**

The unit's running board is factory assembled except for the rear wheels which are packed loose in the shipping carton. The rear gear consists of 2-wheels, 4-washers, 2-cotter pins, and an axle. To install the gear, do the following:

- a. Insert the axle through the holes provided at the rear of the gear.
- b. Place a washer onto each end of the axle, then slip on the wheels, then add another washer to the outside of each wheel, and secure the whole assembly by inserting a pin in each end of the axle.
- c. Remove the existing shipping supports by unscrewing from chassis.

**3.9 INSTALLING OPTIONAL SPOT/STITCH/ANTI-STICK MODULE**

- a. Remove lower blank-cover plate from upper-right front panel of power supply -- save the four mounting screws.
- b. Locate the harness-connected 15-pin plastic plug, P3, inside the mounting cavity. Note that this plug will have a jumper plug with jumper wires connected to it -- remove (and save) the jumper plug. (The jumper plug must be reinstalled if the module is ever removed.)
- c. Connect the 15-pin plug into the matching receptacle on the rear of the optional control module. The plug will only fit one way.
- d. Install the control module in place of the blank panel removed in Step a., using the same four screws that you saved.

**3.10 INSTALLING OPTIONAL DIGITAL METER**

- a. Remove the top blank-cover plate from the upper-right front panel of the power supply -- save the four mounting screws.
- b. Locate the harness-connected 10-pin plastic plug, PL1, inside the mounting cavity. This plug does not have a jumper plug connected to it.
- c. Connect the 10-pin plug into the matching receptacle on the rear of the optional meter module.
- d. Install the meter module in place of the blank-panel removed in Step a., using the same four screws that you saved.



#### 4.1 CONTROLS (See Figure 4.1)

##### 4.1.1 POWER SWITCH

A line toggle switch on the front panel energizes the primary of the main transformer. This switch also turns on the fan, which is connected across a portion of the primary winding.

Two transformer secondary windings also become energized:

A. Gun trigger circuit 24 volts AC.

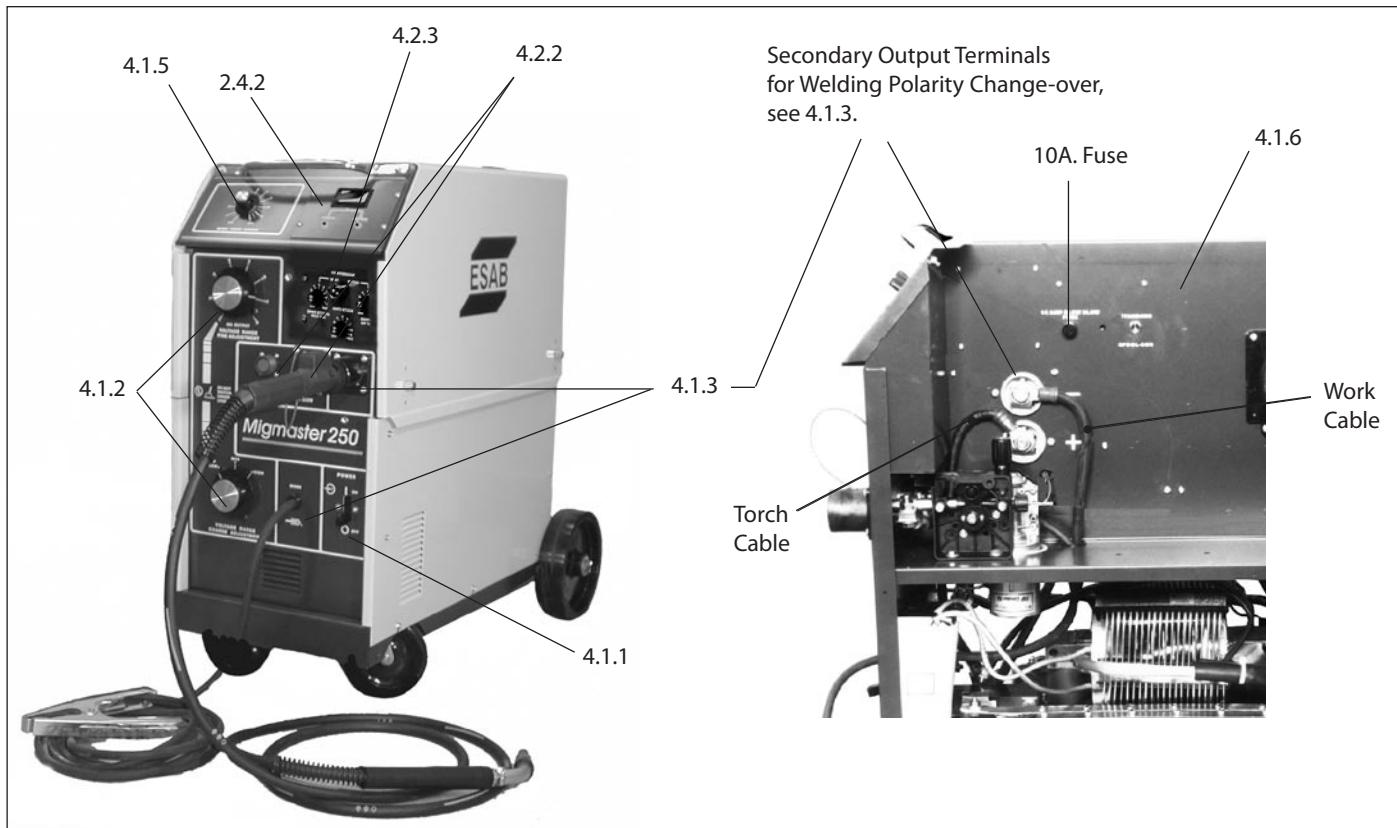
Wire feeder circuit 24 volts DC.

B. Main welding secondary circuit. Depending upon the tap switch position, various secondary voltages can be obtained. Then rectified, open circuit voltages can be selected between 18 and 56 volts DC when the secondary contactor is energized.

##### 4.1.2 VOLTAGE CONTROL (Coarse Range Selector and Fine Adjustment Range Selector)

Voltage control is by means of two high current tap switches which connect the rectifier bridge to various secondary taps.

The **COARSE VOLTAGE RANGE Selector** is a three-position switch, LOW/MED/HIGH, by which the operator selects the approximate range of voltage (or heat, that determines the arc length) to be applied to the weld. It is a coarse selection control and is used in conjunction with the Fine Voltage Adjustment selector following. It must **not** be switched under load.



The **FINE VOLTAGE ADJUSTMENT Selector** is an eight-position switch by which the operator selects the exact amount of arc voltage (or heat) to be applied to the weld (within the coarse range selected above). This allows you to fine-tune the voltage required; the higher the number selected (1-8), the hotter the weld. The Fine Voltage Selector switch also has an "open" detent at the six o'clock position. Placing the switch in this position allows operation of the torch trigger to feed electrode wire without the wire being electrically "hot". This switch also, must **not** be switched under load.

### **! CAUTION**

**These tap switches carry several hundred amperes, and must not be switched under load, as this will cause the contacts of the switches to arc.**

#### **4.1.3 SECONDARY WELDING CONNECTIONS**

The secondary contactor, with parallel poles, is used to make and break the circuit between the transformer secondary and the rectifier. This contactor is turned on and off when the torch trigger (in the 24 volt circuit) is operated.

The secondary output welding terminals, POS.(+) and NEG(-), are located in the right side wire feeding compartment and are used to set the welding polarity (D.C.R.P. or D.C.S.P.) in which the machine will operate (see Fig. 4.1). As shipped from the factory, the 250 is set up to operate in D.C.R.P. (TORCH fitting is connected to Positive, and WORK cable/clamp is connected to Negative output). To weld using D.C.S.P., simply mount the WORK cable to the Positive output and the TORCH fitting cable to the Negative output terminal.

#### **4.1.4 CONTACTOR CONTROL**

Refer to the schematic diagrams. Note that the coil of the 24 volt contactor is activated with the torch trigger and is energized when the trigger is pulled. The gas solenoid is in parallel with the contactor coil and is energized at the same time.

When the trigger switch is released, the contactor drops out and disconnects the load.

### **! WARNING**

**Because of the charged capacitor bank in the secondary circuit, the output voltage will take a few seconds before falling to zero volts.**

The gas valve shuts off when the contactor opens.

#### **4.1.5 WIRE FEED SPEED CONTROL**

Wire feed speed is controlled by the wire speed potentiometer knob on the front panel. The solid state control allows for infinitely variable speeds up to 650 IPM.

This wire speed pot is used to set the speed at which the welding wire is fed out from the torch and hence the welding amperage. The panel-face numbers on the dial (0-10) are used for reference and do not directly indicate wire feed speed; the higher the number, the faster the speed.

#### **4.1.6 STD./SPOOL GUN SELECTOR**

This two-position toggle switch is located inside the unit on the mid-wall of the wire feeding compartment and is labeled Standard and Spool Gun. It is used to select standard metal inert gas welding (MIG) with the GUNMASTER 250, or welding with the ST-23A (spool-on-gun) torch.

#### **4.2 PROCESS SETUP**

##### **4.2.1 STANDARD MIG SEAM WELDING W/ GUNMASTER 250**

Refer to Sections 4.3.1, 4.3.2, 4.3.3, 4.3.4, and Table 4.3.3.

##### **4.2.2 ST-23A SPOOL-ON-GUN CONTROL CONNECTION/OPERATION**

The Migmaster 250 is equipped with a built-in control for the Spool Gun which operates via the amphenol control receptacle and a screw adaptor that provides Gas and Power. The ST-23A Torch (see Section 2.4.3) has a amphenol-plug control cable connection, and a gas/power cable, see Figure 4.2.2.

To operate the unit with the ST-23A Torch connected, do the following (refer to Fig. 4.2.2):

- A. Place the STD./Spool Gun selector toggle switch (4.1.6) in the 250 to its Spool Gun position.
- B. Connect the ST-23A control cable amphenol to the receptacle labeled CONTROL on the 250's front panel.
- C. Remove the threaded plastic plug from the Gas/Power adaptor (on the 250's front panel) using a clockwise rotation. Connect the ST-23A gas/power cable to the panel adaptor using a counter-clockwise rotation. As shipped from the factory, the 250's secondary output power terminals are set-up for D.C.R.P. welding polarity (see Section 4.1.3).

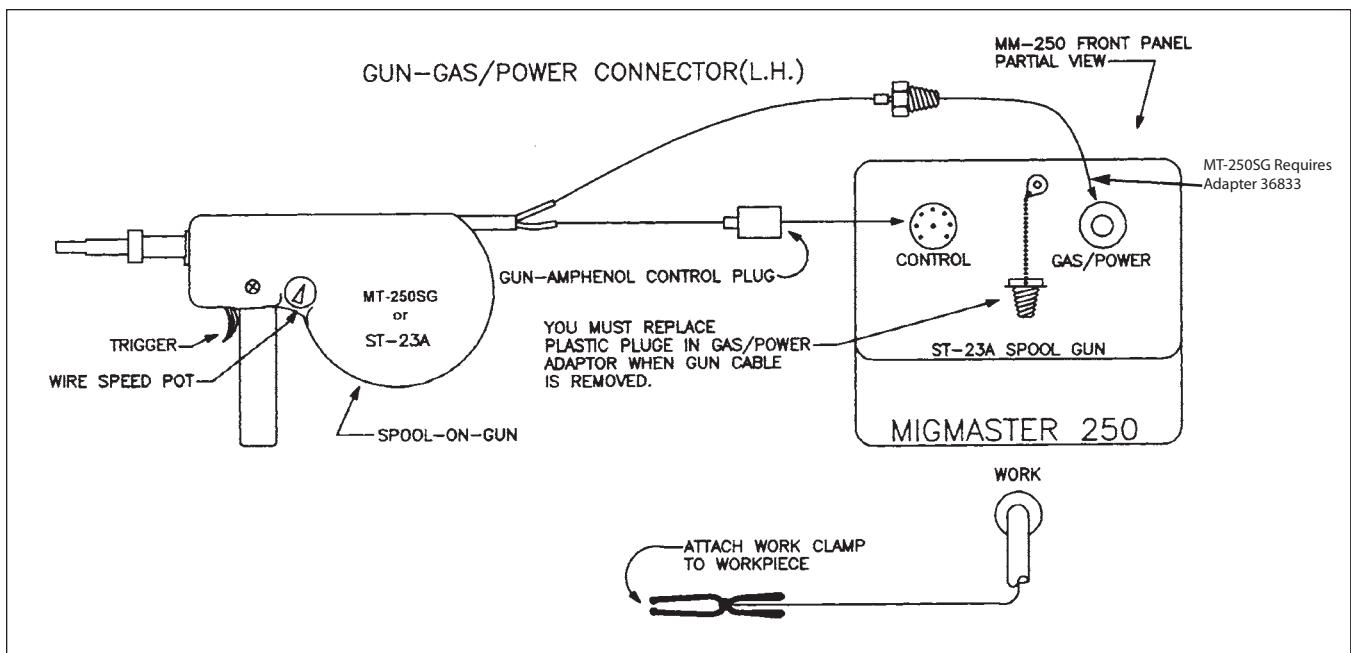


Figure 4.2.2 - Connecting Spool-On-Gun to Services

**IMPORTANT** -- Always make sure that the plastic plug is screwed back into the adaptor when the ST-23A gas/power cable is disconnected, because shielding gas will escape from the adaptor unless the gas cylinder is shut off.

- D. Connect the 250's WORK cable to the workpiece.
- E. Set Migmaster 250 voltage tap switches to RANGE and FINE ADJUSTMENT VOLTAGE settings desired.
- F. Turn on the Migmaster 250's power switch and begin seam mig welding.

If the optional Spot/Stitch/Anti-Stick control module is installed, the MT-250SG and the ST-23A gun may be operated using these optional features, see Section 4.2.3.

#### 4.2.3 OPTIONAL SPOT/STITCH/ANTI-STICK CONTROL MODULE

This optional control module allows the operator to use the 250 for Spot or Stitch or Continuous welding operations. It also includes an adjustable Anti-Stick feature to select various burnback times to prevent wire from sticking in the puddle after a weld.

The module consists of three pots (one for Spot-Stitch Weld Time "ON", one for Stitch Weld Time "OFF", and one for Anti-Stick Time modes) and one three-position toggle switch to select the welding operation desired (Spot, Continuous or Stitch). For installation, see Section 3.9; for operation, see following:

##### 4.2.3.1 ANTI-STICK WELDING OPERATION

Anti-Stick feature provides a time delay at the end of a weld from the time the torch trigger is released until the main contactor is deenergized. This delay allows the welding wire to burn back, away from the work, so it won't "stick" in the weld puddle.

This delay time, controlled by the "anti-stick" potentiometer, is variable from approximately 0.05 seconds to 0.5 seconds. The required delay time generally depends on the WIRE SPEED Adjustment setting on the front panel - the higher the setting, the faster wire will feed into the weld, and the more delay time will be required.

If, when using the Anti-Stick feature, the welding wire tends to stick in the puddle at the end of a weld, the Anti-Stick time should be increased; if, on the other hand, the wire burns back into the torch tip, the anti-stick time should be decreased. Setting the anti-stick time to "Min" effectively cancels the anti-stick feature.

This Anti-Stick feature is available for all three welding modes - Continuous, Spot, and Stitch.

##### 4.2.3.2 CONTINUOUS WELDING MODE OPERATION

- A. Place the three-position toggle switch in "Continuous" weld mode (center position) for mig seam welding.
- B. Set the "Anti-Stick Time" as required (see 4.2.3.1).

## SECTION 4

## OPERATION

- C. Set the "coarse" and "fine" Voltage control switches and wire speed pot to the desired settings and begin welding operation as described in Sections 4.3.2 and 4.3.3.

### 4.2.3.3 SPOT WELDING MODE OPERATION

- A. Place the three-position toggle switch in "Spot" position.
- B. Replace the standard nozzle with the No. 12 Spot weld Nozzle P/N 999625.
- C. Trim the welding wire back so the end is slightly inside the nozzle.
- D. Set the "coarse" and "fine" voltage control switches, wire speed, and the Spot-Stitch Weld Time see Table 4.3, for the thickness of the metal being welded and the diameter of the weld wire being used.
- E. To spotweld:

- i. Press the torch nozzle squarely on the top plate. Apply enough pressure to hold the two pieces of metal firmly together, so there is no loose play between them.

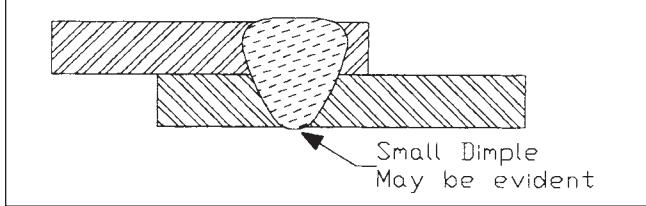


Fig. 4.2.3 - Cross Section of Good Spotweld

- ii. Pull the trigger, holding the gun motionless and firmly. The electrode wire and shielding gas will be fed to the work, and the arc will be maintained for the length of time set in Step D. above.
- iii. After the preset time has elapsed, the wire will stop feeding, the arc will be broken, and the shielding gas will stop flowing.

A good spotweld will penetrate through both layers of metal, and will have a small nugget on the reverse side, (Fig. 4.2.3)

### 4.2.4 STITCH WELDING MODE OPERATION

- A. Place the three-position toggle switch in "Stitch" position. The stitch weld mode uses a series of pre-timed arc-on/arc-off time sequences to allow cooler welding.

- B. Be sure a standard nozzle (and not a spot weld nozzle) is installed on the torch.

- C. Set the length of time the arc will be ON for each sequence by adjusting the Spot-Stitch Weld Time control on the power supply's front panel. This timer has an approximate range of from 0.4 seconds at the minimum setting to 3.5 seconds at the maximum setting. Set the length of time the arc will be OFF for each sequence by adjusting the Stitch Weld Time control on the front panel. This timer has an approximate range of from 0.4 seconds at the minimum setting to 3.5 seconds at the maximum setting.

- D. Set the "coarse" and "fine" voltage control switches and wire speed as specified in Table 4.3 under Continuous Weld Conditions for:

- The type weld being made (see diagrams to the left of each column of figures).
- The thickness of the metal being welded.
- The gap (if any) between the pieces being welded.
- The diameter of the welding wire being used.

- E. When using the Stitch weld mode, before starting the weld the welding wire should extend about 1/2-in. beyond the end of the nozzle. Adjust this length by either clipping off the end of the wire with insulated cutters or by using the torch switch.



### CAUTION

Powersupply contactor becomes energized the moment the torch trigger is depressed. Arcing can occur if the wire is brought to a ground. Keep the torch always from ground until welding is to begin.

- F. During the welding, use the same welding techniques as described in Section 4.3.3 and 4.3.4.

### 4.2.5 DUTY CYCLE (Figure 4.2.5)

The duty cycle of the equipment is the percentage of a 10 minute period which it can operate safely at a given output current. The Migmaster system is rated at 50% duty cycle. This means that the equipment can be safely operated at 250 amperes for five minutes out of every 10. This cycle can be repeated indefinitely (See Figure 4.2.5).

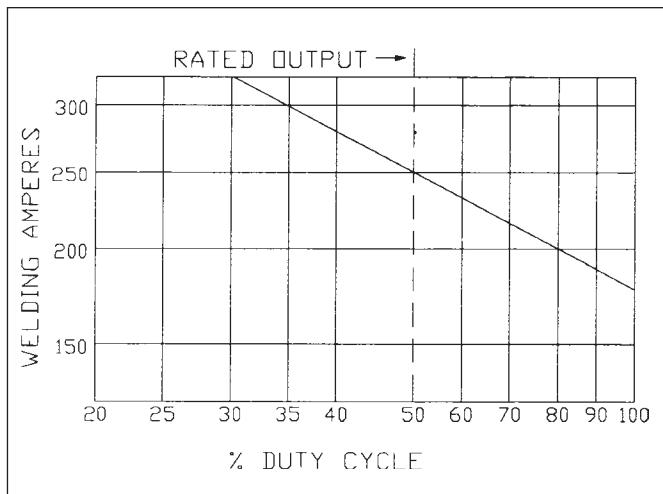


Fig. 4.2.5 Duty Cycle Curves

**4.2.6 VOLT/AMPERE CURVES (Figure 4.2.6)**

The Volt/Ampere curves show the output Voltage available at any given output current for the various Voltage Selector positions in each range low, medium, and high.

The actual operating point of load Voltage and Current is determined by type of process, electrode, shield gas, wire feed speed, and operating technique.

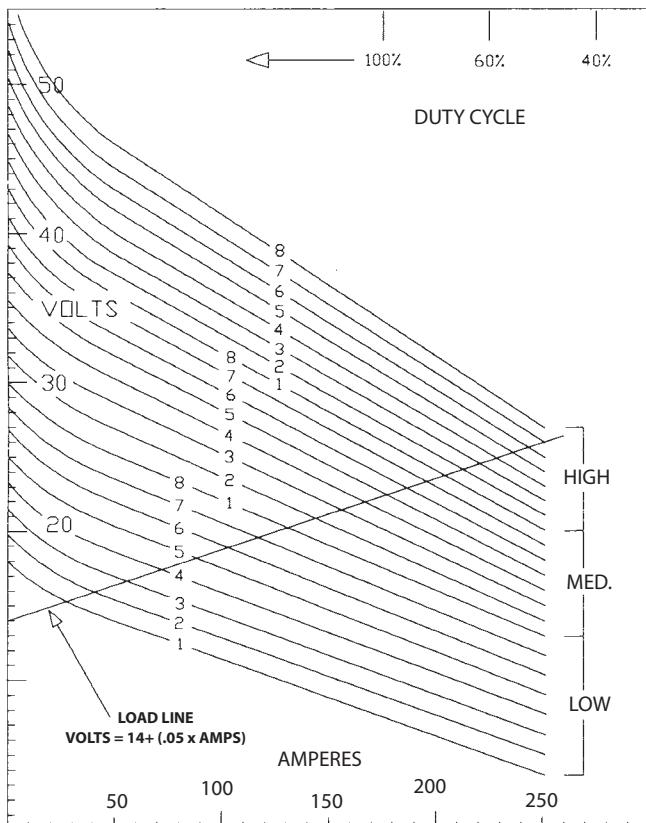


Figure 4.2.6 VOLT/AMPERE CURVES

**4.3 OPERATING PROCEDURES****4.3.1 OPERATING SAFETY PRECAUTIONS**

Comply with all ventilation, fire and other safety requirements for arc welding as established in the SAFETY Section at the front of this manual.

Also remember the following:

- A. Because of the radiant energy of the welding arc and the possibility of drawing an arc before the helmet is lowered over the face, the operator should wear flash goggles with filter lenses under his helmet. The helmet filter plated should be shade number 11 (nonferrous) or 12 (ferrous). All those viewing the arc should use helmets with filter plates, as well as flash goggles. Nearby personnel should wear flash goggles.
- B. The radiant energy of the arc can decompose chlorinated solvent vapors, such as trichloroethylene and perchlorethylene, to form phosgene, even when these vapors are present in low concentrations. DO NOT weld where chlorinated solvents are present in atmospheres in or around the arc.
- C. DO NOT touch the electrode, nozzle or metal parts in contact with them when power is ON: all are electrically energized (HOT) and can cause a possibly fatal shock. DO NOT allow electrode to touch grounded metal: it will create an arc flash that can injure eyes. It may also start a fire or cause other damage.
- D. When working in a confined space, be sure it is safe to enter. The confined space should be tested for adequate oxygen (at least 19%) with an approved oxygen measuring instrument. The confined space should not contain toxic concentrations of fumes or gases. If this cannot be determined, the operator should wear an approved air supplied breathing apparatus.

Avoid gas leaks in a confined space, as the leaked gas can dangerously reduce oxygen concentration in the breathing air.

DO NOT bring gas cylinders into confined spaces.

When leaving a confined space, shut OFF gas supply at the source to prevent gas from leaking into the space, if the switch is accidentally kept depressed. Check the breathing atmosphere in the confined space to be sure it is safe to reenter.

- E. Never operate the equipment at currents greater than the rated ampere capacity; overheating will occur.
- F. Never operate equipment in a damp or wet area without suitable insulation for protection against shock. Keep hands, feet and clothing dry at all times.
- G. Whenever the equipment is left unattended, turn all control and power supply switches and gas supplies OFF and open the main line switch.
- H. Wear dark substantial clothing to protect exposed skin from arcburn, sparks and flying hot metal.
- I. Turn off welding power before adjusting or replacing electrodes.

**! WARNING**

**Never operate the welding machine with any portion of the outer enclosure removed. In addition to a hazard, improper cooling may result in damage to the welding transformer and the welding machine components. Warranty is void if the machine is operated with any portion of the outer enclosure removed.**

#### **4.3.2 PRE-WELD REQUIREMENTS**

Before welding commences, with all power OFF, check the following:

- A. All safety requirements have been read and understood.
- B. All hoses and cables are in good condition, safely insulated and securely connected.
- C. Turn on gas supply by slowly opening cylinder valve to full ON.
- D. Correct size wire accessories have been installed on the wire feeder, drive gears are meshed, wire pressure set, and guide tube is installed for type and size wire you plan to use, refer to Tables 2.4.5, and 4.3.
- E. Spool of correct size wire is locked in place, brake tension is set, and wire is properly threaded through the inlet guide to the gun tip.
- F. The wire feeding compartment cover is closed and secure.
- G. Make sure that the metal to be welded is properly prepared:
  - a. Remove loose surface rust, scale or paint with wire brush or sander.

- b. Attempting to weld over grease or oil can cause weld defects.
- c. Before welding on aluminum, be sure to clean surface thoroughly using a stainless steel brush.

#### **4.3.3 SET-UP PROCEDURE**

- A. Determine the material type, thickness and joint configuration to be welded from Table 4.3 and use the recommendations to set the following:
  - a. Coarse Voltage Range, LOW/MED/HIGH.
  - b. Fine Arc Voltage Setting, 1 thru 8 (the higher the number, the hotter the weld).
  - c. Wire Speed setting, 0 thru 10 (the higher the number, the faster the speed).
- B. Set the two-position switch in the wire feeder compartment to STANDARD for seam welding with the GUNMASTER 250 torch. (For ST-23A Spool-On-Gun welding, see Section 4.2.2).
- C. If optional Spot/Stitch/Anti-Stick Control module is installed, refer to Section 4.2.3 for operation, settings and welding condition table.
- D. Make sure the GUNMASTER 250 torch fitting and the "Work" cable are connected to the proper output terminals (inside unit) for the polarity desired.

**! DANGER**

**Only qualified personnel should make these changes. Make certain the primary power has been disconnected and all safety procedures have been followed before proceeding with these instructions.**

Normally, you will set-up for "reverse polarity"; this means the torch fitting is connected to the POS (+) output terminal and the "Work" cable to the NEG (-) output terminal.

For "straight polarity", do just the opposite; torch fitting to NEG (-) output terminal and "Work" cable to POS (+) output terminal.

#### **4.3.4 WELDING OPERATION**

- A. Turn Power switch (on unit) to ON position -- be careful not to operate the torch switch.
- B. Before starting the weld, the welding wire should extend about 1/2-inch beyond the end of the nozzle. Adjust this length by either clipping off the end of the wire with insulated cutters or by using the torch switch.

**! CAUTION**

**Power supply contactor becomes energized the moment the torch trigger is depressed. Arcing can occur if the wire is brought to a ground. Keep the torch away from ground until welding is to begin.**

C. To start the weld, hold the torch so the welding wire is approximately 1/4-in. from the work, then press the torch trigger.

D. The welding wire should be pointed into the joint at angles of approximately  $45^\circ$  for fillet welds, and approximately  $90^\circ$  for butt welds, (Fig 4.3.4.1).

E. The torch angle relative to the length of the weld should be approximately  $10^\circ$  from the vertical (Fig. 4.3.4.2).

F. When welding in the vertical position, traveling either up or down, it is very important to keep the arc on the leading edge of the puddle to ensure complete penetration.

G. Some welders who are accustomed to welding with stick electrodes may tend to push the torch into the weld. This is neither necessary nor desirable, since the wire electrode is being mechanically fed into the weld.

Please note that the Wire Speed control can be adjusted for the gauge of metal to be welded. **However, the Coarse Voltage Range and Fine Voltage setting must not be switched while welding.**

H. To stop the weld, release the trigger and pull the torch from the work. When leaving equipment unattended, always shut OFF and disconnect all input power and shut off shielding gas at source.

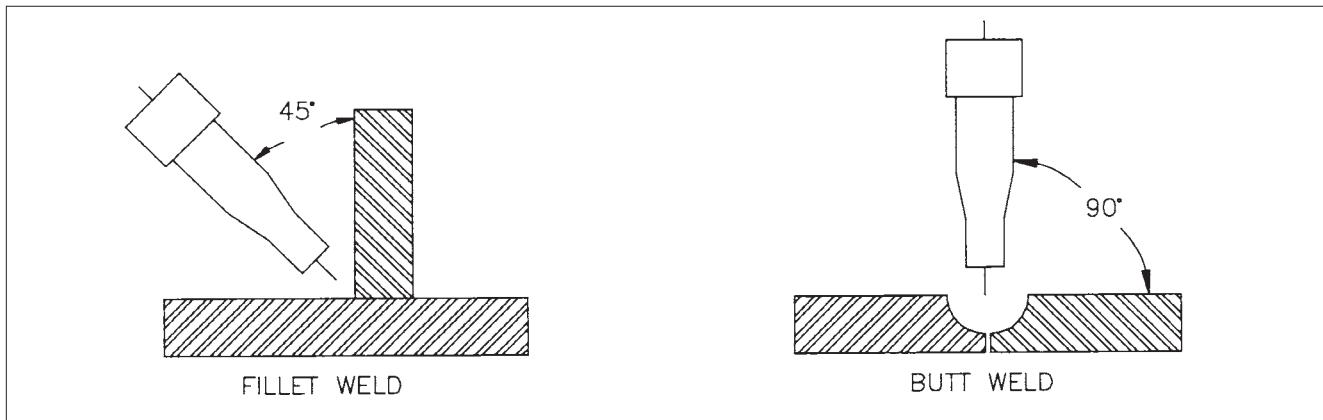


TABLE 4.3, Continuous/Stitch Weld Conditions

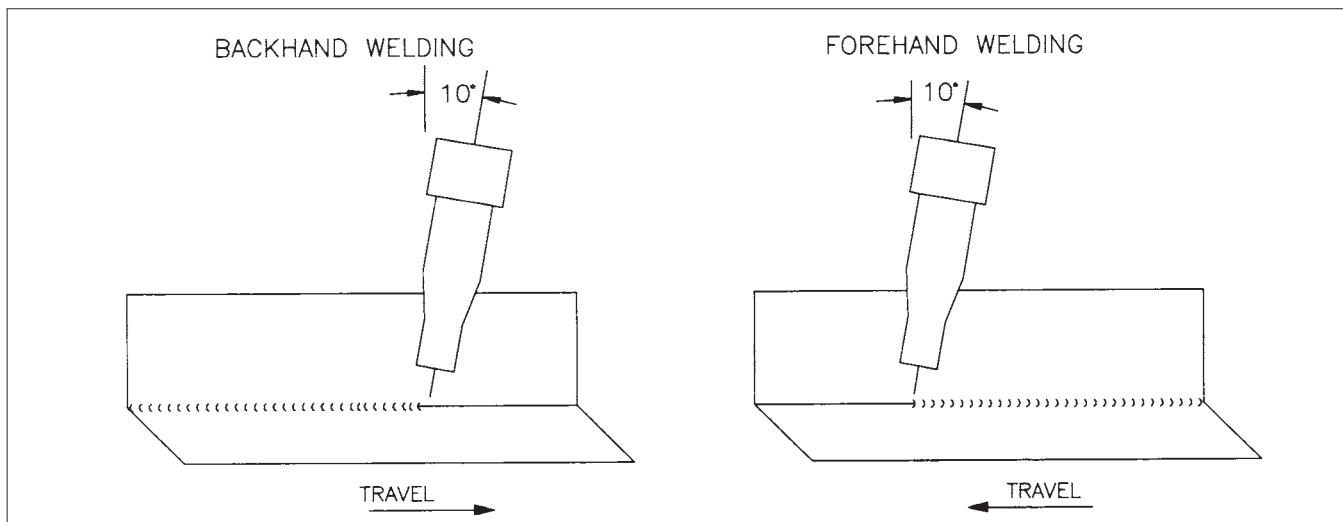
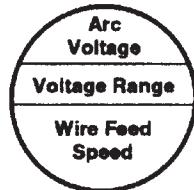


Fig. 4.3.4.1 - Angle of Welding Wire with Joint

## MIG PROCESS SELECTION GUIDE

**SETTING SHOWN AS:**



### TO SET MACHINE

1. Find the thickness of the base plate to be welded.
2. Find the diameter of the filler wire to be used.
3. Find the suggested arc voltage, range and wire feed setting by following the wire diameter row across (to the right) and the plate thicknesses column down.
4. Set the arc voltage selector switch, voltage range switch and the wire feed pot to the settings indicated.

WIRE DIAMETER	CARBON STEEL BASE PLATE THICKNESS																					
	24 GA.	20 GA.	18 GA.	16 GA.	3/32"	1/8"	3/16"	1/4"	3/32"	1/8"	3/16"	1/4"										
	SHORT CIRCUITING ARC *								SPRAY ARC **													
.023"	<table border="1"><tr><td>1 LOW 1.2</td><td>2 LOW 1.3</td><td>3 LOW 2.5</td><td>4 LOW 3</td><td>6 LOW 4.3</td><td>1 MED 6.5</td><td>4 MED 10</td></tr></table>	1 LOW 1.2	2 LOW 1.3	3 LOW 2.5	4 LOW 3	6 LOW 4.3	1 MED 6.5	4 MED 10	<table border="1"><tr><td>5 MED 6</td><td>6 MED 6.5</td><td>7 MED 6.8</td><td>4 HIGH 8.5</td></tr></table>	5 MED 6	6 MED 6.5	7 MED 6.8	4 HIGH 8.5									
1 LOW 1.2	2 LOW 1.3	3 LOW 2.5	4 LOW 3	6 LOW 4.3	1 MED 6.5	4 MED 10																
5 MED 6	6 MED 6.5	7 MED 6.8	4 HIGH 8.5																			
.030"	<table border="1"><tr><td>4 LOW 3</td><td>4 LOW 3.5</td><td>7 LOW 4</td><td>7 LOW 4.5</td><td>8 LOW 5</td><td>2 MED 5.5</td></tr></table>	4 LOW 3	4 LOW 3.5	7 LOW 4	7 LOW 4.5	8 LOW 5	2 MED 5.5	<table border="1"><tr><td>5 MED 6</td><td>6 MED 6.5</td><td>7 MED 6.8</td><td>4 HIGH 8.5</td></tr></table>	5 MED 6	6 MED 6.5	7 MED 6.8	4 HIGH 8.5										
4 LOW 3	4 LOW 3.5	7 LOW 4	7 LOW 4.5	8 LOW 5	2 MED 5.5																	
5 MED 6	6 MED 6.5	7 MED 6.8	4 HIGH 8.5																			
.035"	<table border="1"><tr><td>3 LOW 1.8</td><td>4 LOW 2</td><td>6 LOW 3</td><td>6 LOW 3.8</td><td>1 MED 4</td><td>2 MED 4.5</td></tr></table>	3 LOW 1.8	4 LOW 2	6 LOW 3	6 LOW 3.8	1 MED 4	2 MED 4.5	<table border="1"><tr><td>5 MED 5.5</td><td>5 MED 5.5</td><td>6 MED 6</td><td>6 MED 6</td></tr></table>	5 MED 5.5	5 MED 5.5	6 MED 6	6 MED 6										
3 LOW 1.8	4 LOW 2	6 LOW 3	6 LOW 3.8	1 MED 4	2 MED 4.5																	
5 MED 5.5	5 MED 5.5	6 MED 6	6 MED 6																			
.045"	<table border="1"><tr><td>4 LOW 1.8</td><td>5 LOW 2</td><td>6 LOW 2</td><td>6 LOW 2.8</td><td>3 MED 3</td></tr></table>	4 LOW 1.8	5 LOW 2	6 LOW 2	6 LOW 2.8	3 MED 3	<table border="1"><tr><td>8 MED 4</td><td>8 MED 4</td><td>2 HIGH 4.2</td><td>2 HIGH 4.2</td></tr></table>	8 MED 4	8 MED 4	2 HIGH 4.2	2 HIGH 4.2											
4 LOW 1.8	5 LOW 2	6 LOW 2	6 LOW 2.8	3 MED 3																		
8 MED 4	8 MED 4	2 HIGH 4.2	2 HIGH 4.2																			

\* Settings were developed using 75% argon - 25% carbon dioxide shielding gas.  
For 100% carbon dioxide shielding gas, add 2 to the arc voltage setting shown above.

\*\* Settings were developed using 98% argon - 2% oxygen shielding gas.

TABLE 4.3, Continuous /Stitch Weld Conditions

This equipment is provided with a thermostat (OL) in the transformer (T1) windings which will open and prevent the contactor (CON) from closing if the transformer windings are overheated. If the thermostat opens, allow the equipment to idle with fan running for approximately 15-min. before attempting to weld again.

**5.1 MAINTENANCE****! WARNING**

**Be sure the branch circuit or main disconnect switch is off or electrical input circuit fuses are removed before attempting any inspection or work on the inside of the welding machine. Placing the power switch on the welding machine in the OFF position does not remove all power from inside of the equipment.**

**! WARNING**

**Inspection, troubleshooting and repair of this equipment may ordinarily be undertaken by a competent individual having at least general experience in the maintenance and repair of semi-conductor electronic equipment. Maintenance or repair should not be undertaken by anyone not having such qualifications.**

Shut OFF shielding gas supply at source.

To aid in checking and servicing, use Schematic, Figure 5.1.

**5.2 INSPECTION AND SERVICE**

Keep Equipment in clean and safe operating condition free of oil, grease, and (in electrical parts) liquid and metallic particles which can cause short-circuits.

Regularly check cylinder valves, regulators, hoses, and gas connections for leaks with soap solution.

Check for and tighten loose hardware including electrical connection. Loose power connections overheat during welding.

Immediately replace all worn or damaged power cables and connectors. Check for frayed and cracked insulation, particularly in areas where conductors enter Equipment.

The electrode wire and all metal parts in contact with it are electrically energized while welding. Inspect these parts periodically for defective insulation and other electrical hazards.

**! WARNING**

**If uninsulated cable and parts are not replaced, an arc caused by a bared cable or part touching a grounded surface may damage unprotected eyes or start a fire. Body contact with a bared cable, connector, or uncovered conductor can shock, possibly fatally.**

Keep power cables dry, free of oil and grease, and protected at all times from damage by hot metal and sparks.

Clean dirt and metal particles from drive roll groove weekly; replace roll if badly worn.

**5.2.1 POWER SOURCE****5.2.1.1 RECTIFIER**

It is recommended that the rectifier be cleaned occasionally by blowing it out with compressed air. This cleaning operation is necessary so that maximum cooling will be accomplished by the air stream. This should be done periodically, depending upon the location of the unit and the amount of dust and dirt in the atmosphere.

The hermetically sealed silicon diode rectifiers are specially designed for welding machine use and will not age or deteriorate in use. The four diodes are mounted on heat sinks. A periodic cleaning of dust and dirt from these is necessary to insure cooling of the rectifiers. Access is by removal of top cover and side panels. Should any diode accidentally be damaged and need replacement, it can be quickly removed from the heat sink. The replacement diode should be of the same type as the one removed, and should be locked securely to the sink, preferably with a torque wrench set for maximum of 25 ft. lbs. and a minimum of 20 ft. lbs. Excessive torque will distort the mechanical structure and may break the hermetic seal, whereas too little torque will result in improper electrical connections.

**5.2.1.2 FAN MOTOR**

All models are equipped with an exhaust fan and rely on forced draft for adequate cooling for high duty cycles and overloads. Lubricate the fan motor with a few drops of SAE-20 non-detergent oil every three months.

### **5.2.1.3 TRANSFORMER**

Occasional blowing out of the dust and dirt from around the transformer is recommended. This should be done periodically depending upon the location of the unit and the amount of dust and dirt in the atmosphere. The welding machine case cover should be removed and a clean, dry air stream should be used for this cleaning operation.

### **5.2.1.4 24 VOLTS WIRE FEEDER AND CONTROL CIRCUITS**

The 24-volts circuit is protected by a 10 amp fuse in a panel mounted fuseholder, accessible from the wire feeder compartment. Failure of this fuse will shut off the contactor, shielding gas and wire feeder.

#### **⚠ CAUTION**

If it should become necessary to replace this or any other fuse in the welding machine, ensure that the proper size fuse is used as a replacement.

### **5.2.1.5 OVER-TEMPERATURE PROTECTION**

The machine is equipment with a thermostat. On continued high current application, if the thermostat reaches an abnormally high temperature, it will deenergize the contactor. This thermostat will reset itself automatically after the transformer windings have cooled to a safe level. While deenergized, neither the contactor, shielding gas nor wire feeder can be operated.

### **5.2.2 WIRE FEEDER**

When soft wire is fed, the drive rolls may pick up metal from the wire surface. Accumulation on the rolls may score the wire with resulting unwanted friction and improper feeding.

Inspect the rolls regularly and clean them with a fine-wire power brush. Avoid roughening, or removing the hardness of groove surfaces in grooved rolls. Any roughening may score the wire, just as the accumulation being removed may do.

## **5.3 TROUBLESHOOTING**

If welding equipment doesn't work right despite compliance with checklist inspect as follows:

- A. With all power controls ON and other operating controls at required settings, visually check all power cables and connections for evidence of overheating or sparking.

#### **⚠ WARNING**

To avoid shock, do NOT touch electrode wire or parts in contact with it, or uninsulated cable or connections.

- B. Check all gas (and water) hoses and connections, flowmeters, and regulators for possible sources of leakage, breakdown or intermittent failure.
- C. Isolate trouble to one part of the welding installation: primary power supply, power source, Feeder or wire guide train (casing, drive rolls, liners and contact tip). If this inspection indicates trouble in the Feeder, use Troubleshooting Guide, Table I and schematic diagram (Figure 5.1).

### **5.3.1 IF MOTOR DOES NOT RUN:**

- A. Check for blown fuse. If blown, check that motor is not binding before replacing fuse.
- B. Check for continuity across speed potentiometer (POT) and wiper contact. Voltage from center tap to MIN end should vary from 0 to 5.4 VDC as potentiometer is rotated clockwise.
- C. Check wiring for continuity. Then turn power ON and check for 30 volts d.c. across input terminals 8 and 9 on the feeder printed circuit board connector (PL1).
- D. Press torch trigger, and check for voltage across motor (Pins 4 to 7) of speed control board; should vary from 1 to 24 VDC as speed control potentiometer is rotated clockwise.

### **5.3.2 DRIVE ROLL PRESSURE ADJUSTMENT**

Adjust the drive roll pressure knob until no wire slippage occurs. DO NOT OVERTIGHTEN - EXCESSIVE PRESSURE CAN CAUSE WIRE FEEDING PROBLEMS.

#### **General Replacement**

The exploded views in the Parts Section indicate generally, in numbered parts sequence, the disassembly of the wire drive and feeder parts.

Reassemble in reverse order.

**5.3.3 SOLENOID VALVE REPLACEMENT**

When replacing the gas solenoid valve, the inlet (with the word IN) must face the rear of the Unit.

**! WARNING**

Many troubleshooting situations require that the power remain On and that power terminals in the equipment carry voltage. Exercise extreme caution when working on "LIVE" equipment. Avoid contact with electrical components, except when testing with an appropriate instrument.

**! CAUTION**

Do not make any repairs to equipment unless you are fully qualified, as described in the maintenance section.

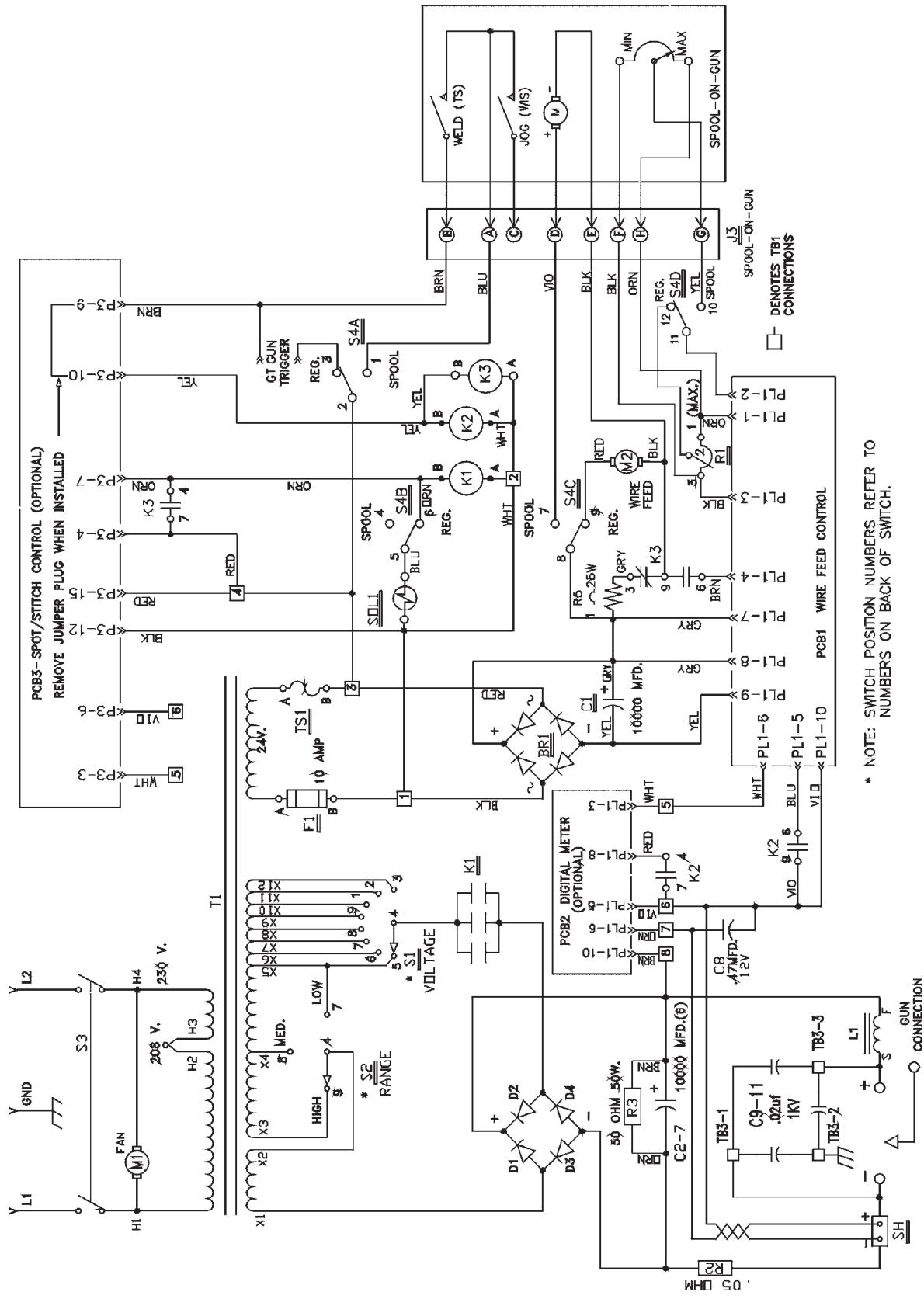
**TABLE II. TROUBLESHOOTING GUIDE**

WELD CONDITION	POSSIBLE CAUSE	REMEDY
1. No weld or control power.	a. Primary input power not available. b. Faulty connection, primary input cable, or power switch (S3) c. Blown line fuse.	a. Check for Voltage at primary input. b. Repair or replace cable or switch (TGS1) as necessary. c. Replace fuse. If it blows again, contact ESAB representative.
2. No welding power.	a. Thermostat has opened.  b. Shorted diode in main rectifier. c. Open in wiring	a. Wait 15 minutes with fan running. If still no power, contact ESAB representative. b. Check diodes and replace if req'd. c. Check all wiring.
3. Fan does not run.	a. See Weld Condition 1.  b. Malfunctioning fan motor (M1)	a. Repair or replace cable or switch as necessary. b. Replace fan motor (M1).
4. Erratic welding current.	a. Poor workpiece connection.  b. Loose welding connections. c. Wrong polarity.	a. Check workpiece grounding connection. b. Check all connections. c. Check for correct polarity.
5. Welding output Voltage and/or current too low.	a. Low line Voltage. b. Welding cables too long or too small.	a. Use correct Voltage. b. Use correct cable size.

WELD CONDITION	POSSIBLE CAUSE	REMEDY
6. Stringy irregular bead, poor penetration.	c. Loose connection. d. Malfunctioning capacitor bank.  a. Torch moved too fast. b. Controls are not set properly for metal gauge thickness. c. Wrong polarity.	c. Check all welding cable connections. d. Check capacitors for low leakage resistance.  a. Move Torch slower along seams. b. Reset control properly.  c. Check for correct polarity.
7. Bead not centered.	a. Nozzle not aligned.	a. Move Torch nozzle parallel to and centered over seam.
8. Bead too large.	a. Torch moved too slowly.	a. Move Torch faster along seam.
9. Unstable arc, excess spatter, weld porous.	a. Incorrectly set controls.  b. Shield gas flow is too low or stopped. c. Torch nozzle is too far from work.  d. Faulty regulator or adapter.  e. Faulty gas solenoid valve (SOL). f. Wrong polarity.	a. Reset controls.  b. See Condition 10.  c. Maintain 1/4" (.6 mm) wire protrusion; hold closer to work. d. Check flow at outlet; replace faulty item. e. Replace solenoid valve. f. Check polarity.
10. Shield gas flow low or stopped	a. Cylinder valve closed.  b. Cylinder empty. c. Faulty regulator or adaptor.  d. Faulty gas solenoid valve.	a. Turn off regulator, slowly open valve, until regulator reaches 35 c.f.h. pressure. b. Replace if gauge so indicates. c. Check flow at outlet; replace faulty item. d. Replace solenoid valve.
11. Wire stubs on work while welding.	a. Controls not set properly for metal gauge, thickness.	a. Reset controls properly.
12. Wire burns back into contact tip.	a. Contact tip loose. b. Tip too close to work.  c. Wire feed slipping.  d. Contact tip damaged.  e. Voltage setting too high. f. Drive or pressure roll dirty or worn.	a. Firmly tighten with pliers. b. Maintain 1/4" (.6 mm) wire protrusion; hold Torch further from work. c. Increase pressure on pressure roll by adjusting pressure knob. d. Trim back tip 1/16" (1.6 mm) max. Replace if still faulty. e. Adjust setting. f. Clean rolls or replace.

**SECTION 5****SERVICE**

WELD CONDITION	POSSIBLE CAUSE	REMEDY
13.Wire does not feed; motor running (drive roll turns).	a. Kink, etc. in wire, or wire bound on reel. b. Wire freezing to contact tip (burnback). c. Clogged liner.	a. Straighten; or feed wire until clear and cut off. b. Free freeze, or remove contact tip feed wire until clear cut end free, and replace tip. c. Replace liner.
14.Wire does not feed; motor NOT running (drive roll does not turn).	a. Motor  b.Power switch S3 and fuses.  c. Speed Potentiometer (POT).  d. Malfunctioning speed control board.	a. With wire speed dial on 10, press trigger. If voltage appears across motor leads but motor does not run, check motor gears and commutator areas. b. With S3 ON, if voltage across terminal 1 and 3 is 24 VAC, switch and fuses are good. c. Check for 1K ohms across POT outside terminals. d. Check board voltages (Para 5.3.1 b. and c.)
15.Wire feed does not stop.	a. Torch trigger switch.  b. Malfunctioning relay (K3).	a. Check continuity of Torch trigger circuit; check to see if trigger lever is stuck in "ON" position. b. Check for proper action.
16.Gas continues to flow after trigger release.	a. Gas solenoid valve stuck open.	a. Tap solenoid or click on and off to clear valve.

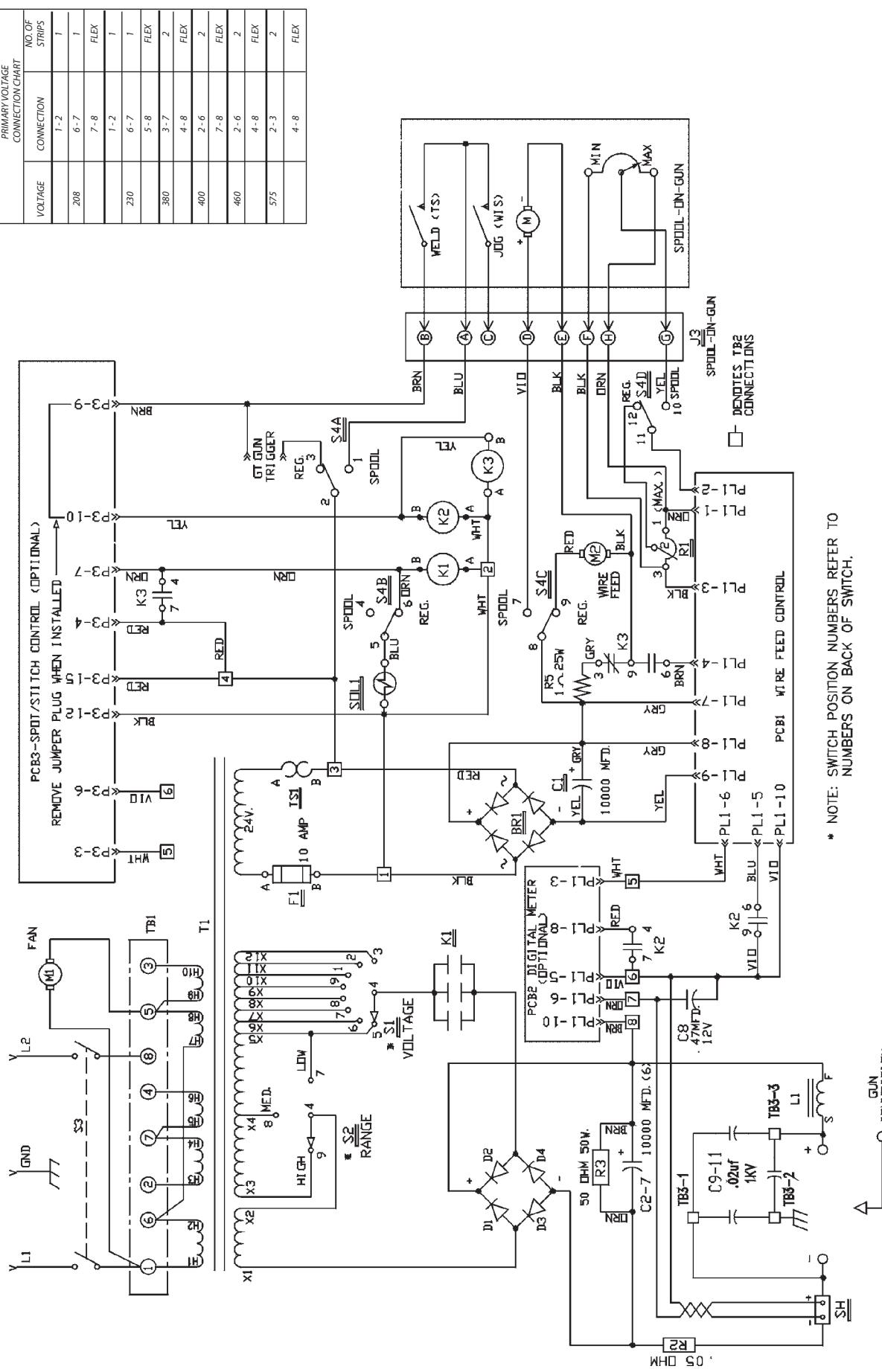


NOTE:

Recent modifications to the power source may not be reflected in this schematic. For up-to-date information on your model, refer to the schematic on the inside cover of the power source or contact the factory.

**Figure 5.1 - Schematic Migmaster 250 for 208/230 V. Model**

Recent modifications to the power source may not be reflected in this schematic. For up-to-date information on your model, refer to the schematic on the inside cover of the power



NOTE:

Recent modifications to the power source may not be reflected in this schematic. For up-to-date information on your model, refer to the schematic on the inside cover of the power source or contact the factory.

**Figure 5.2 - Schematic Migmaster 250 for 208/230/380/400/460/575 V. Model**

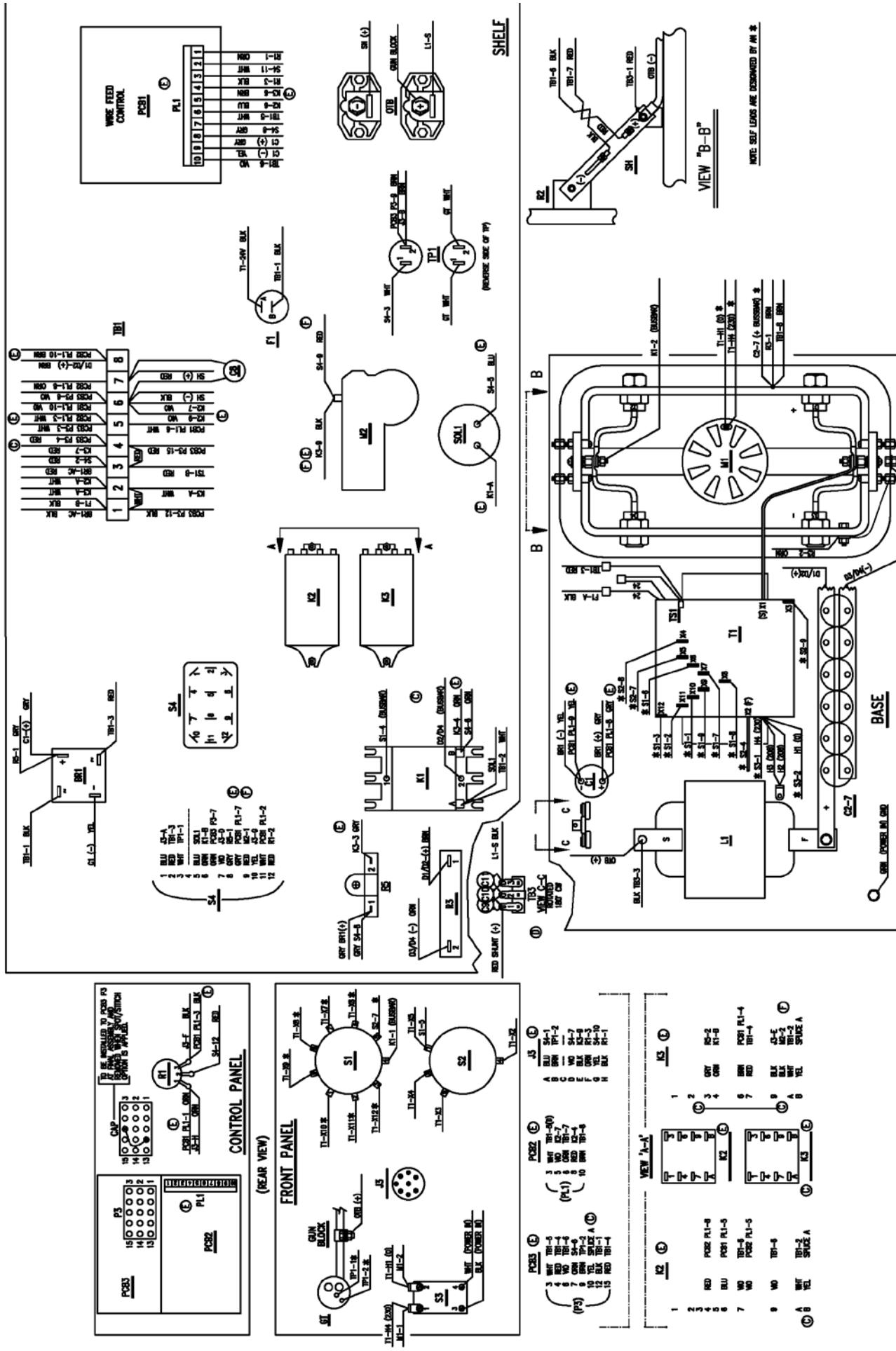


Figure 5.3 - Wiring Migmaster 250 for 208/230 V. Model

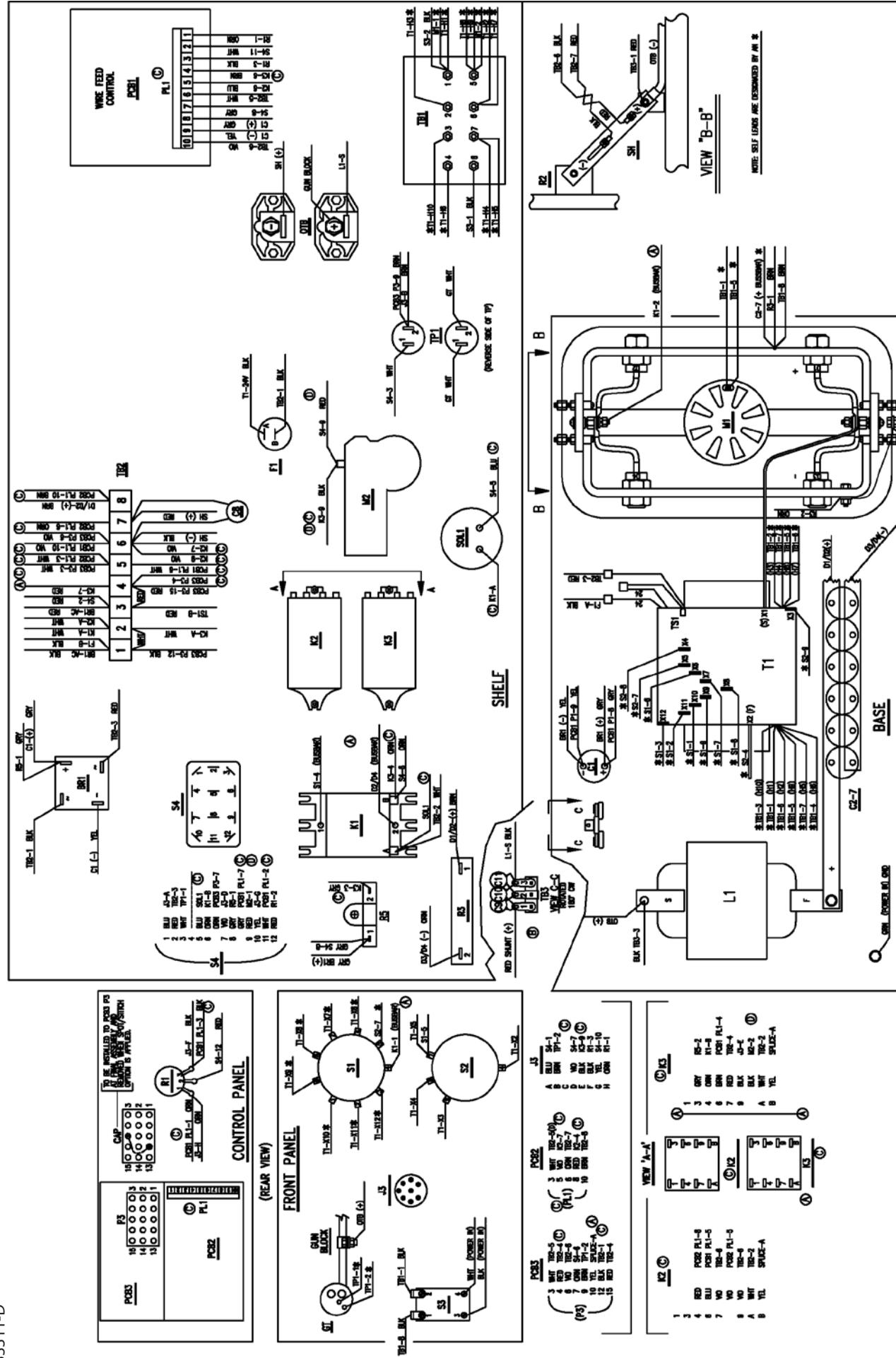


Figure 5-4-Wiring Migmaster 250 for 208/230/380/400/460/575 V. Model



## **6.0 Replacement Parts**

### **6.1 General**

Always provide the serial number of the unit on which the parts will be used. The serial number is stamped on the unit nameplate.

### **6.2 Ordering**

To ensure proper operation, it is recommended that only genuine ESAB parts and products be used with this equipment. The use of non-ESAB parts may void your warranty.

Replacement parts may be ordered from your ESAB Distributor.

Be sure to indicate any special shipping instructions when ordering replacement parts.

Refer to the Communications Guide located on the back page of this manual for a list of customer service phone numbers.

#### **Note**

Bill of material items that have blank part numbers are provided for customer information only.

Hardware items should be available through local sources.

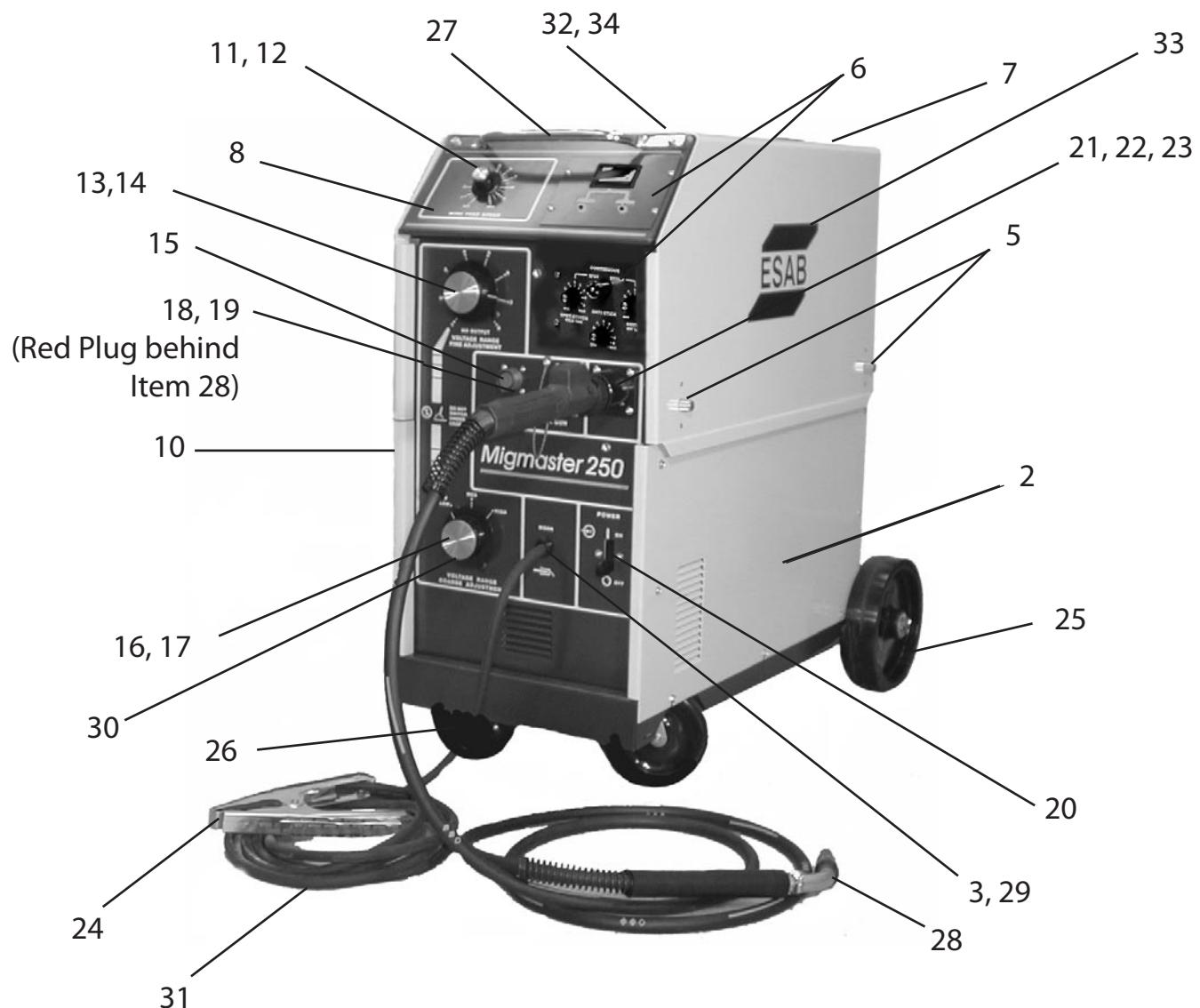


FIGURE 6.1 MIGMASTER 250 SYSTEMS

**SECTION 6****REPLACEMENT PARTS**

ITEM NO.	QTY REQ.	PART NO.	DESCRIPTION (Figure 6.1)	CKT. DESIG.
2	1	33188YL	PANEL, SIDE, RIGHT	
3	1	950769•	STRAIN, RELIEF, BUSHING	
5	2	1373 0623	LATCH, DOOR	
6	1	33192M	PLATE, BLANK COVER*	
7	1	33291YL	COVER, HINGED	
8	1	33189M	PANEL, CONTROL, SILKSCREENED	
10	1	33187YL	PANEL, SIDE, LEFT	
11	1	2360 3918	POTENTIOMETER, 1K, WIRE SPEED CTRL, 2W	R1
12	1	950584	KNOB	
13	1	32818	SWITCH, FINE VOLTS ADJ., 8 POS.	S1
14	2	2062171	KNOB	
15	1	647233	RECEPTACLE, 8 PIN	J3
16	2	2062171	KNOB w/ SET SCREW	
17	1	32902	SWITCH, COARSE VOLTS ADJ., 3 POS, HI-MED-LO	S2
18	1	951069	PLUG, PLASTIC "C" SIZE (RED)	
19	1	680552	ADAPTOR, POWER & GAS (SPOOL GUN)	
20	1	950721	SWITCH, TOGGLE, (ON/OFF)	S3
21	1	21165	GUIDE TUBE OUTLET (035/045) (fits into conn. tube, 6" lg)	
22	1	952924	TORCH ADAPTOR ASSY. includes:	
	1	2361 2350	POWER LUG	
	1	2361 0696	ADAPTOR BLOCK ASSY (fem trigger pins/gas hose/2 wires)	
	1	2361 0528	HOUSING, GUN ADAPTOR (STRAIGHT) - molded blk plast	
	1	23612590	CONNECTION TUBE, 4" LG BRASS	
23	1	33190	BUSBAR, COPPER	
24	1	82F31	WORK CLAMP	
25	2	13730912	WHEEL	
			<b>NOT SHOWN</b>	
	1	13735895	AXLE	
	4	64304275	WASHERS	
	2	99510614	COTTER PINS	
	1	951574	CYLINDER CHAIN	
26	2	950396	CASTER, SWIVELS 5"	
27	1	951672	HANDLE (From 1/1/94)	
		950695	HANDLE (Before 1/94)	
28	1	0558001651	GUNMASTER 250cc 12'	
	1	0558001652	GUNMASTER 250cc 15'	
29	1	13732313	BUSHING	
30	1		SET SCREW	
31	1	34886	CABLE AND CLAMP	
32	1	2091514	WARNING LABEL	
33	1	13734588	LABEL	
34	1	13736753	WELD PARAMETER LABEL	

\* Photo shows optional Digital Volt/Ammeter Module, P/N 32857, and Spot/Stitch/Anti-Stick Control Module, P/N 32858.

• Was 97W63, changed to 950769, 6/95.

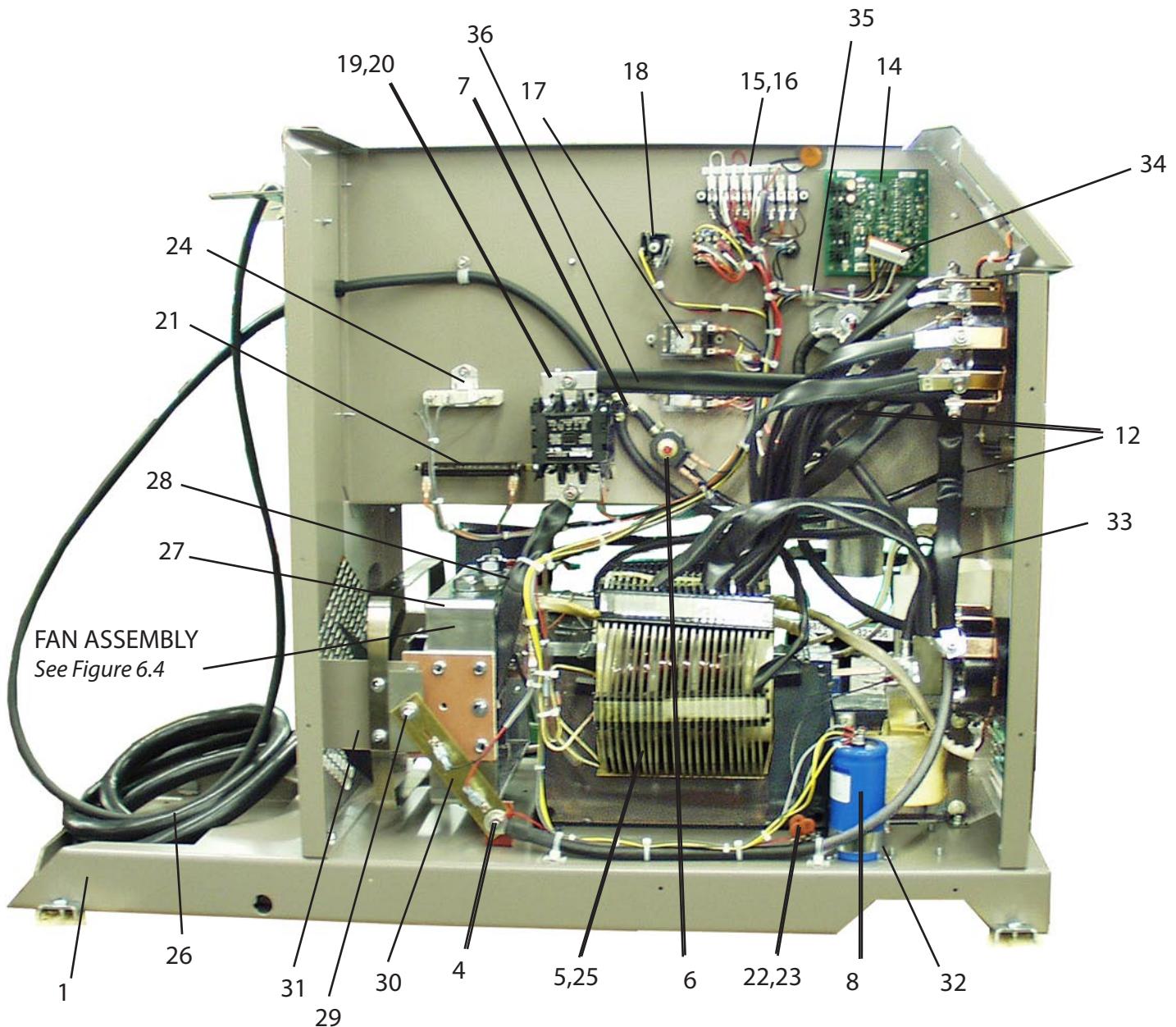


FIGURE 6.2 MiGMASTER 250 Main Assembly (Left Side)

## SECTION 6

## REPLACEMENT PARTS

ITEM NO.	QTY. REQ.	PART NO.	DESCRIPTION (Figure 6.2)	CKT. DESIG.
1	1	33184M	BASE	
4	1	672225	INSULATOR STANDOFF	
5	1	1373 6750	TRANSFORMER, MAIN - for 208/230 v. model	T1
	1	33176	TRANSFORMER, MAIN - for 208-575 v. model	T1
6	1	951634	VALVE, SOLENOID, 24 V(from 1/1/94)	SOL1
	1	1373 0628	VALVE, SOLENOID 24 V (before 1/94)	
7	1	951633	CONNECTOR, "Y" from 1/1/94)	
	1	2360 6726	HOSE CONNECTION (before 1/94)	
8	7	1373 2230	CAPACITOR 10,000 MT, 50V & screws #10-32	C 1-7
12	3	1373 0222	BUSHING	PCB1
14	1	31484	P.C. BOARD, SPEED CONTROL	TB1
15	1	2360 8111	TERMINAL BLOCK, 8 PT 230 V	
16	1	1373 5940	MARKER, TERMINAL	
17	2	950760 2361 0322	RELAY (from 1/1/94 to present) *suggest 0558007736 3dpt 24 vac 10A RELAY, 4 PDT, 24 VAC, 10A (prior to 1/1/94) <b>KUP 11A55-24</b> <b>KUP 17A55-24</b>	K2, K3
18	1	1373 0469	BRIDGE, RECTIFIER	BR1
19	1	952173	CONTACTOR 60 amp 24V coil	K1
			<b>HISTORY</b>	
	2	0558001290 952173 13730665 13734781	CONTACTOR 60 amp E Busbar CONTACTOR FURNAS 42EF35A3L 2 7/8 x 3 11/16 CONTACTOR 40 amp E Busbar CONTACTOR FURNAS 42CF35A3L 2 1/4 x 2.90	
20	2	0558001290	BUSBAR "E" STAMPING	
21	1	9951 2178	RESISTOR, 50 OHM, 50W	R3
22	1	2360 9967	TERMINAL, 3 POS	TB3
23	3	674216	CAPICATOR .02uf 1KV	C9-11
24	1	1373 5289	RESISTOR 1 OHM 25W	R5
25	1	1373 1989	THERMOSTAT 145°	TS1
26	1	951649	POWERCORD	
27	1	13736733	HEATSHRINK RECTIFIER	
	1	90862175	3/4" HEATSHRINK TUBING	
28	1	33818	BUSBAR (9.94")	
	AR	2132496	INSULATION (sold by FT)	
29	1	13731597	SLOPE RESISTOR (2 pcs per side)	
30	1	31563	SHUNT	
31	2	23610005	END BOARD	
32	1	950253	BRACKET	
33	1	13736749	BUSBAR (13")	
34	1	13731780	P/C CONN TO PCB1	
35	1	13736752	COMPLETE HARNESS	
36	1	33817	BUSBAR (16")	

Capacitor C9-11 and R5 resistor were added 4/93 (starting with Serial No. B93H36548) to provide greater relay protection.

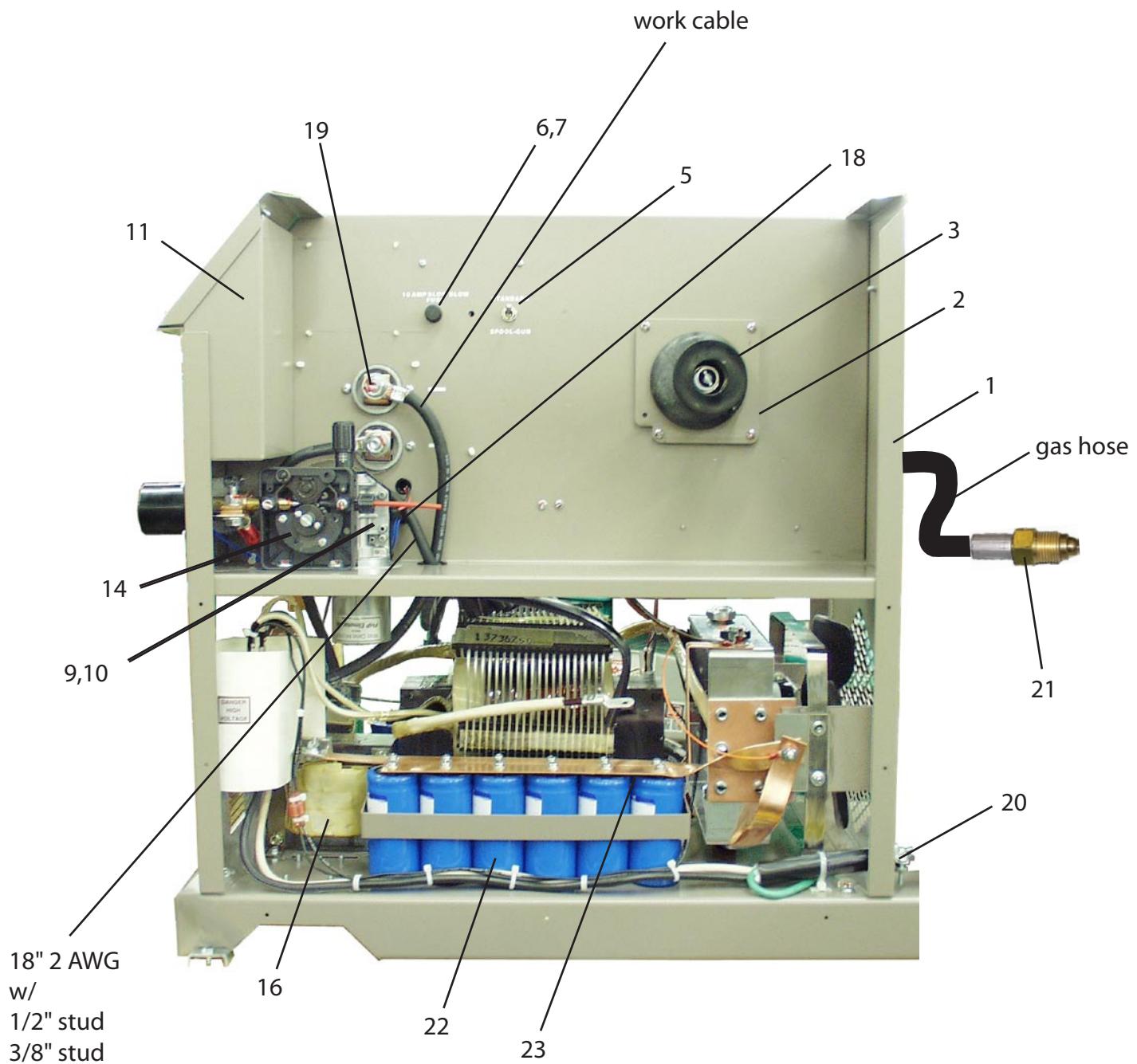


FIGURE 6.3 MiGMASTER 250 Main Assembly (Right Side)

ITEM NO.	QTY REQ.	PART NO.	DESCRIPTION (Figure 6.3)	CKT. DESIG.
1	1	33186M	REAR, PANEL	
2	1	2360 5057GY	SUPPORT, REEL	
3	1	2360 6237	HUB, REEL (See Figure 6.5)	
5	1	634519	SWITCH, TOGGLE, 4 PDT	
6	1	⊕ - 1373 5464	FUSE, 10A, TIME DELAY	S4
7	1	634709	HOLDER, FUSE	F1
9	1	2361 2348	24V GEAR MOTOR, 50-675 IPM KSV 4030/182	
10	1	⊕ - 2361 2479	KEY, MOTOR SHAFT	
11	1	33199M	COVER P.C. BOARD	
14	1	952939	DRIVE STAND ASSEM. (See Fig. 6.6)	
15	1	82F31	WORK CLAMP	
16	1	⊕ - 1373 2232	FILTER, CHOKE / INDUCTOR	L1
17	1	951649	POWERCORD	
18	1	1373 0583	BUSHING, TERMINAL	
19	2	676701	TERMINAL ASS'Y., OUTPUT	
20 *	1	97W63	STRAIN RELIEF	
21	8' or 10'	95195024	GAS HOSE	
	1	11N22	NIPPLE	
	1	136Z08	NUT 5/8-18M RH	
	1	950731	CLAMP	
22	6	13732230	CAPACITORS	
23	1	13736738	COPPER BUSBAR CAPACITOR STRAPS (+)	
	1	13736739	COPPER BUSBAR CAPACITOR STRAPS (-)	

(+) - DENOTES RECOMMENDED ON HAND SPARE PART

\* - Added "D" Edition, 3/96

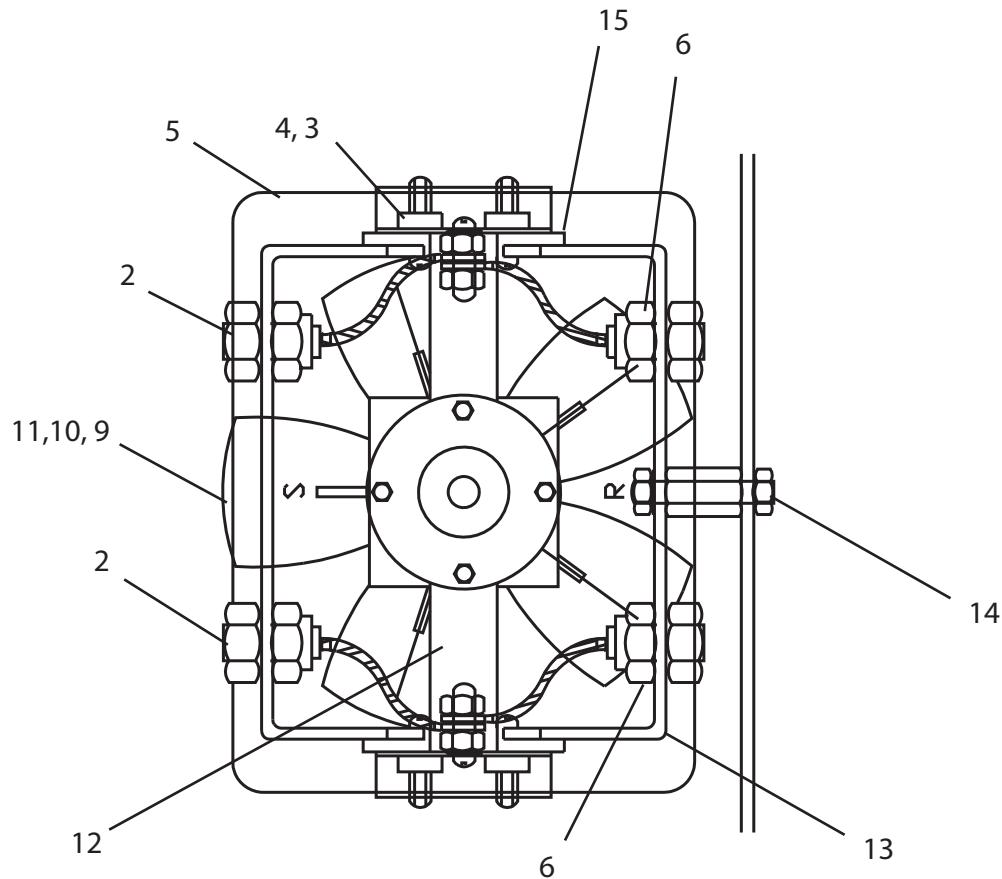


FIGURE 6.4 MIGMASTER 250 FAN &amp; CAPACITOR BANK

ITEM NO.	QTY. REQ.	PART NO.	DESCRIPTION (Detail "B" FAN)	CKT. DESIG.
2	2	99511916	DIODE, SILICON, STRAIGHT POLARITY	D1, D2
3	4	1373 0680	INSULATOR, COLLAR	
4	4	1373 0681	INSULATOR, SHOULDER	
5	2	1373 1597	WELDMENT, RESISTOR	
6	2	1373 0378	DIODE, SILICON, REVERSE POLARITY	D3, D4
9	1	951939	BLADE, FAN	
10	1	1373 2226	MOTOR, FAN	
11	1	63311886	HEX NUT 8-32	M1
12	1	13736737	FAN BRKT (torque 19 lbs. max)	
13	2	13736733	HEATSHRINK RECTIFIER	
14	1	672225	STANDOFF	
15	1	23610005	RECTIFIER END BOARD	

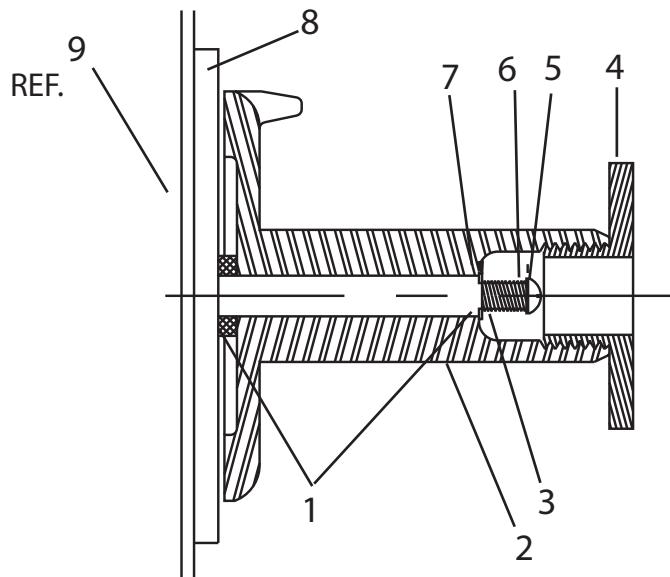


FIGURE 6.5a MIGMASTER 250 LEXAN HUB KIT (OBSOLETE)

ITEM NO.	QTY. REQ.	PART NO.	DESCRIPTION (HUB KIT)	CKT. DESIG.
1	2	2360 5780 2360 0255	REEL HUB KIT (INCLUDES 1-8) BRAKE, DISC	
2	1	2360 6237	HUB, REEL	
3	1	2360 0982	SPRING	
4	1	2360 0010	NUT, PLASTIC (OBSOLETE - USE NEW ASSY)	
5	1	9204 0101	SCREW, R.H.M., 3/8-16 x .75	
6	1	9205 6007	WASHER, PLAIN	
7	1	2360 0952	WASHER, "D"	
8	1	2360 5057GY	SUPPORT, REEL	
9	1		SHELF (REF.)	

## REPLACEMENT PARTS:

0558005764	SPINDLE REPLACEMENT KIT
23600982	SPRING (USE EXISTING)
64304125	3/8" FLAT WSR
92044046	3/8" - 16 X 1" RH SCREW

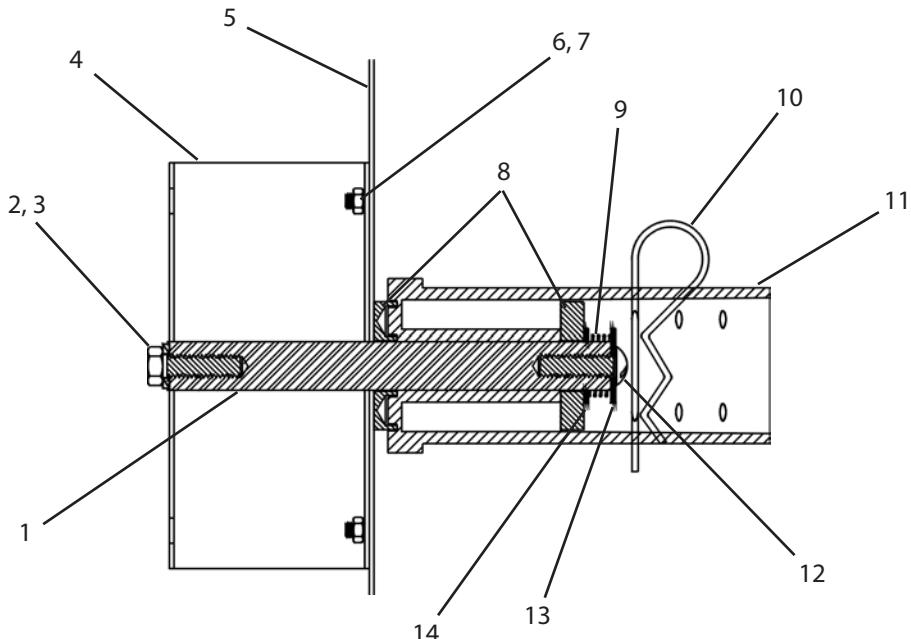


FIGURE 6.5b MIGMASTER 250 LEXAN HUB KIT

ITEM NO.	QTY. REQ.	PART NO.	DESCRIPTION (HUB KIT)	CKT. DESIG.
1	1	0558002993	D-Shaft, Wirefeeder, 5.75L	
2	AR	61341133	Screw, HC, .375-16 x 1.00	
3	AR	64302037	Washer, Lock, .375	
4	1	0558002992	Bracket, Spool Support	
5	1	33191M	Shelf, Silkscreened	
6	AR	63300916	Nut, Hex, 10-24	
7	AR	64302920	Washer, Lock, #8	
8	2	* 948255	Pad, Braking	
9	1	2360 0982	Spring	
10	1	* 634347	Pin, Hitch Clip	
11	1	* 8948258	Hub, Reel	
12	1	92044046	Screw, 10001 Stl ZPC, .375-16 x 1.00	
13	1	64304125	Washer, 53001, Stl ZPC, .375	
14	1	* 0558003320	Washer, D-Type	

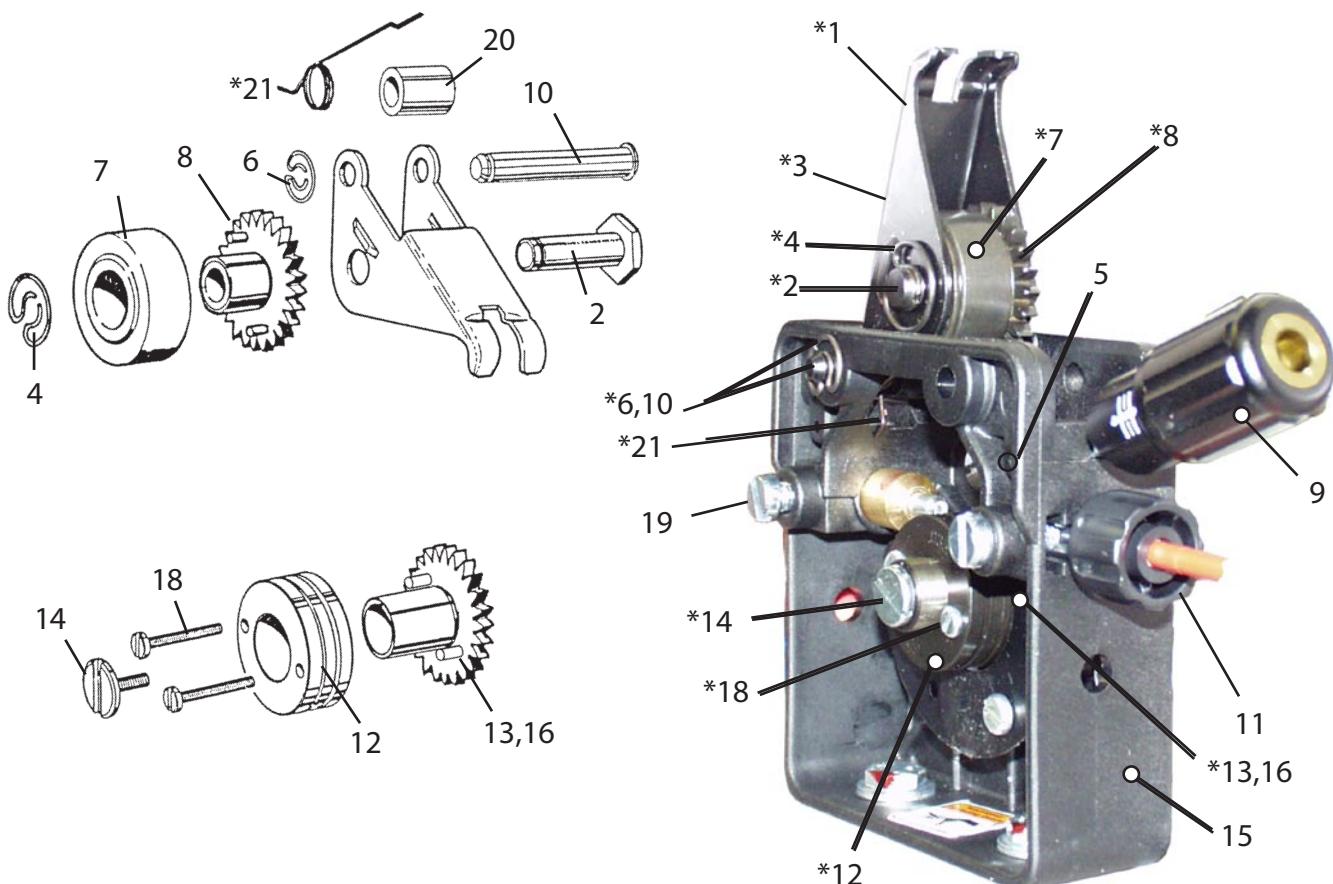
0558005764	SPINDLE REPLACEMENT KIT
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*Spindle Replacement Kit includes \*items, order other items separately*

## **ADDENDUM** **SECTION**

### **HISTORY**

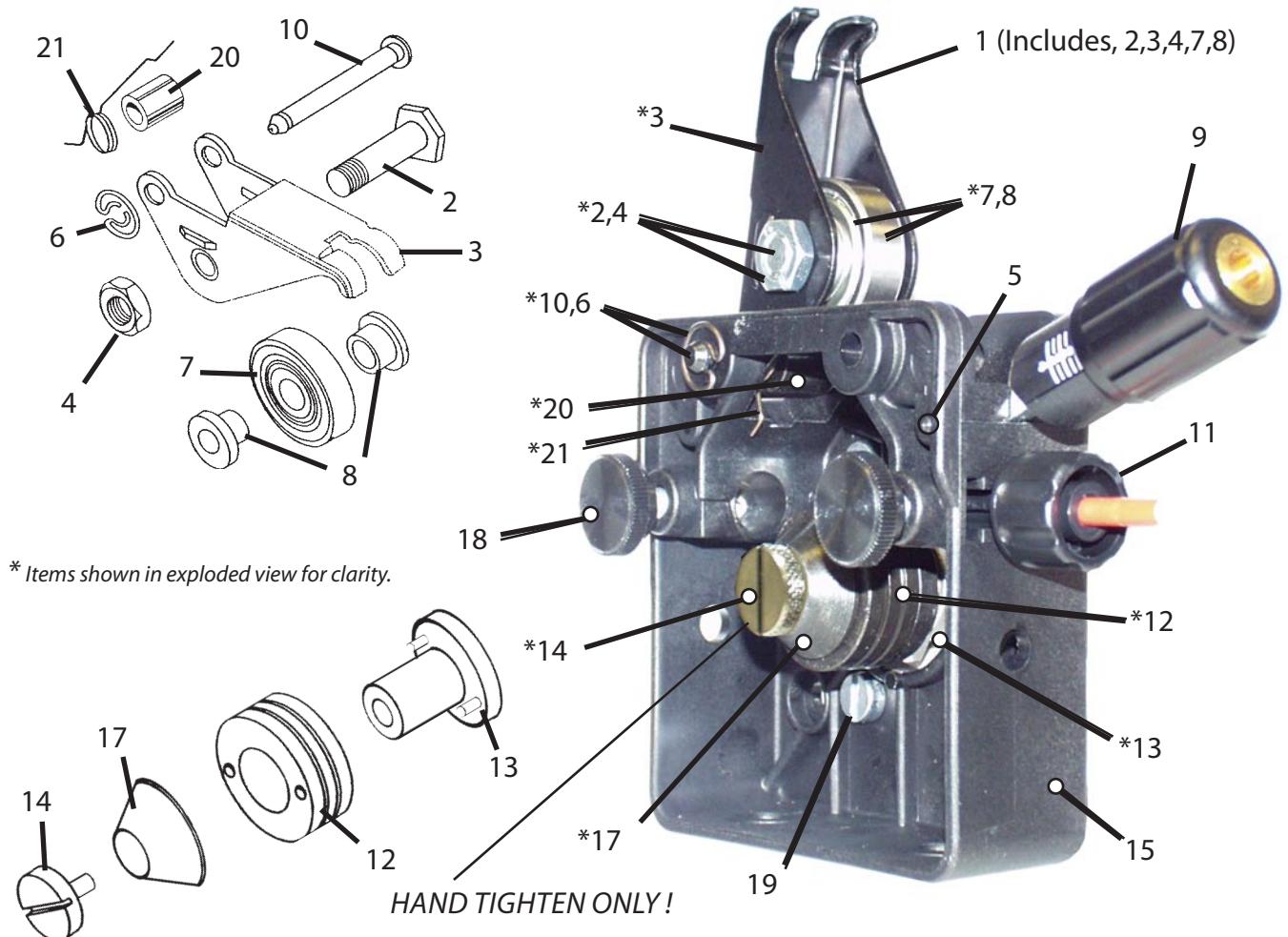
## 2-ROLL (DRIVEN UPPER) DRIVE STAND (ORIGINAL TO MID-1999)



\* Items shown in exploded view for clarity.

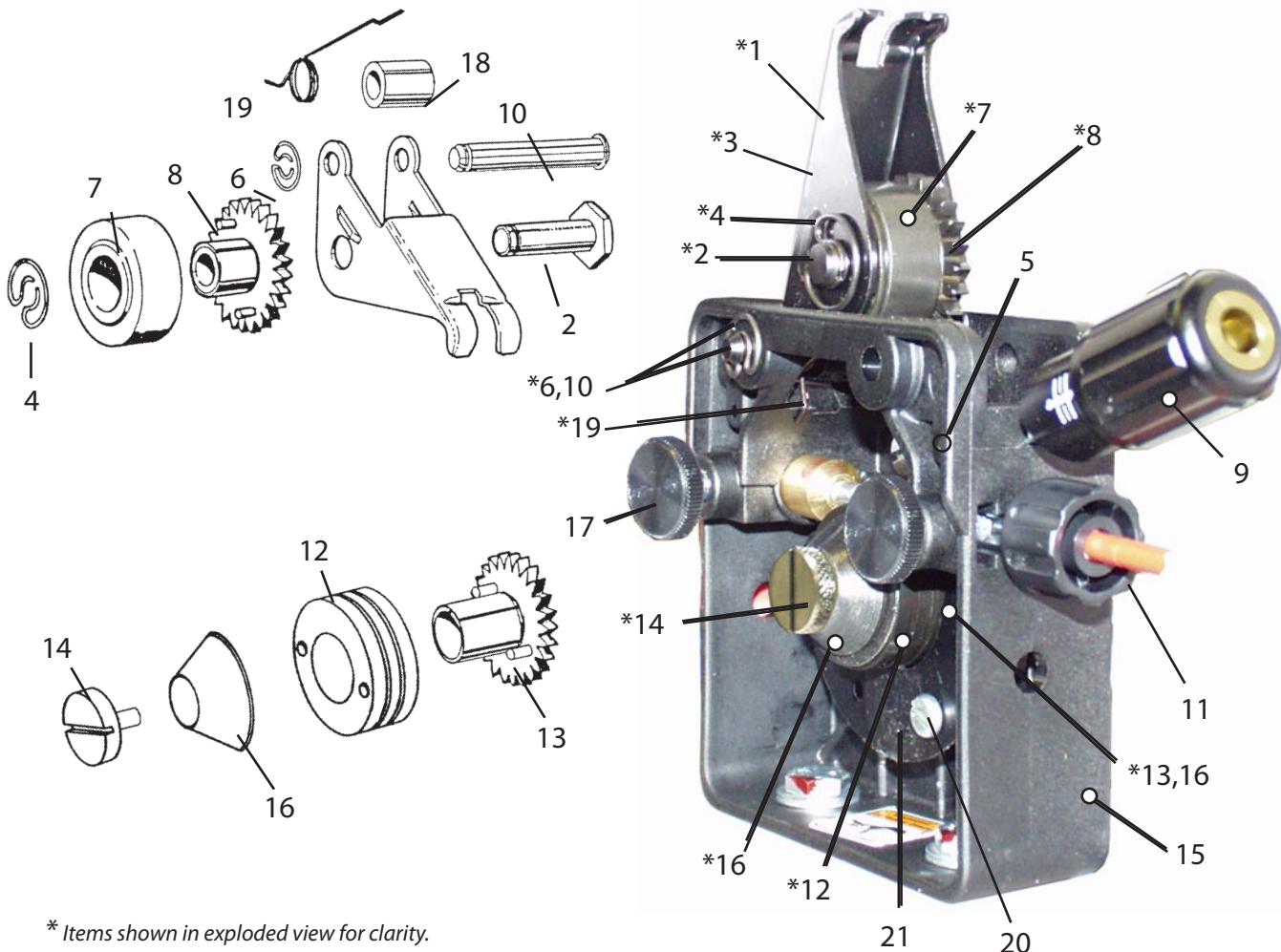
ITEM NO.	QTY. REQ.	PART NO.	DESCRIPTION
1	1	0558001796 23612626	2 ROLL GEARED WIRE DRIVE SYSTEM, CONSISTS OF: PRESSURE ARM ASSY., (incls. 2, 3, 4, 7, 8)
2	1	23612387	AXLE, PRESSURE
3	1	23612475	PRESSURE ARM
4	1	23612385	CIRCLIP, PRESSURE ROLL
5	1	23612470	PIVOT PIN
6	1	23612472	CIRCLIP
7	1	23612397	PRESSURE ROLL, SMOOTH (see Table 2.1) - has 2 holes for pins
8	2	0459441880	GEARED ADAPTOR, PRESSURE ROLL - has pins
9	1	23612460	PRESSURE DEVICE ASSY.
10	1	23612473	LOCATING PIN
11	1	23612461	INLET GUIDE - w/ red plastic tube
12	1	21156	DRIVE ROLL, (see Table 2.1)
13	1	23612383	GEARED ADAPTOR DRIVE ROLL - no pins
14	1	23612398	FEED ROLL RETAINING SCREW
15	1	23612478	FEED PLATE
16	1	23612479	FEED ROLL KEY
17	1	23612480	MOTOR SHAFT SNAP RING (Not Shown)
18	2	23612384	LOCATING SCREW m4 x 16 (952926)
19	3	23612462	SCREW, MOTOR MOUNTING
20	1	23612662	SPACER TUBE (Pressure Arm)
21	1	23612663	SPRING PRESSURE ARM
22	1	952985	GEARED ADAPTOR w/ PINS - used w/ Drivestand 0558001796

**2-ROLL (UNDRIVEN UPPER) DRIVE STAND (MID-1999 TO MID-2000)**



ITEM NO.	QTY. REQ.	PART NO.	DESCRIPTION
1	1	952939	2 ROLL WIRE DRIVE SYSTEM, CONSISTS OF:
		952704	PRESSURE ARM ASSY., (incls. 2, 3, 4, 7, 8)
2	1	23612477	AXLE, PRESSURE
3	1	23612475	PRESSURE ARM
4	1	23612474	AXLE NUT
5	1	23612470	PIVOT PIN
6	1	23612472	CIRCLIP
7	1	23612368	PRESSURE ROLL, SMOOTH (see Table 2.1) - no pin holes
8	2	23612476	SPACER
9	1	23612460	PRESSURE DEVICE ASSY.
10	1	23612473	LOCATING PIN
11	1	23612461	INLET GUIDE
12	1	21156	DRIVE ROLL, (see Table 2.1)
13	1	952944	ADAPTOR DRIVE ROLL
14	1	952925	FEED ROLL THUMB SCREW
15	1	23612478	FEED PLATE
16	1	34608	WASHER RETAINING SCREW
17	1	952945	FEED ROLL SPACER
18	2	952926	THUMB SCREW M6X16
19	3	23612462	SCREW, MOTOR MOUNTING
20	1	23612662	SPACER TUBE (Pressure Arm)
21	1	23612663	SPRING PRESSURE ARM

**2-ROLL (GEAR DRIVEN) TOOL-FREE DRIVE STAND (MID-2000 TO PRESENT)**



\* Items shown in exploded view for clarity.

ITEM NO.	QTY. REQ.	PART NO.	DESCRIPTION
1	1	0558001796 23612626	2 ROLL GEARED WIRE DRIVE SYSTEM, CONSISTS OF: PRESSURE ARM ASSY., (incls. 2, 3, 4, 7, 8)
2	1	23612387	AXLE, PRESSURE
3	1	23612475	PRESSURE ARM
4	1	23612385	CIRCLIP, PRESSURE ROLL
5	1	23612470	PIVOT PIN
6	1	23612472	CIRCLIP
7	1	23612397	PRESSURE ROLL, SMOOTH
8	1	23612386	GEARED ADAPTOR, PRESSURE ROLL
9	1	23612460	PRESSURE DEVICE ASSY.
10	1	23612473	LOCATING PIN
11	1	23612461	INLET GUIDE
12	1	21156	DRIVE ROLL, .035" / .045" (see Table 2.4 & 5.2)
13	1	952985	GEARED ADAPTOR DRIVE ROLL
14	1	952925	FEED ROLL THUMB SCREW
15	1	23612478	FEED PLATE
16	1	952945	CONE WASHER, FEED ROLL
17	2	952926	THUMB SCREW M6X16
18	1	23612662	SPACER TUBE (Pressure Arm)
19	1	23612663	SPRING PRESSURE ARM
20	3	23612462	SCREW, MOTOR MOUNTING
21	1	36880	SAFETY GUARD KIT

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## **NOTES**

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**NOTES**

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## REVISION HISTORY

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The "G" edition (6/99) of this manual covers the following:

1. Added contact tips modified for improved arc performance on steel and cored wires in Table 2.4.5.1.
2. Added end drive roll/pressure roll combinations for use with soft cored wires in Table 2.4.5.2.
3. Added optional spool spacers for 8" and 10" dia. spools
4. Added the torch adaptor assy and copper busbar (33190) in the torch connection circuit to the replacement parts list of Figure 6.2.
5. Changed the drive stand from 23612627 to 952939.
6. Added parts call out Figure 6-7. for drive stand with driven upper pressure roll (23612627).

The "H" edition (12/00) of this manual covers the following:

1. Renamed MT-200CC to GUNMASTER 250 throughout the manual.
2. Added GUNMASTER 250 to the parts lists.
3. Corrected Torch and Cable call out in Section 4 (Operation) diagram on page 16.
4. Made various text corrections.

The "J" edition (04/03) of this manual covers the following: Updated replacement parts section. Added new Hub Kit assembly. Changed color code of some items to metallic black.

The "J" edition (07/03) of this manual covers the following: Updated the photos on pages 15, 23, 42 and the cover page to show the black front panels of the machine.

The "K" edition (08/03) of this manual covers the following: Updated Figure 6.5a and item listing to show quantity of 2 for Item #1.

The "L" edition (09/03) of this manual covers the following: Updated Gunmaster 250 torch information on liners, nozzles and tips on Pages 13 and 14 by replacing it with updated information from Gunmaster 250 torch manual F15-612-D.

The "M" edition (12/03) of this manual covers the following: Updated part number 26 on Page 42 from 959396 to 950396.

The "N" edition (05/04) of this manual covers the following: Updated part number on Page 42 from 952929 to 23612590.

The "P" edition (03/08) of this manual makes many changes per B. Bitzky/ E. Shumate.

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