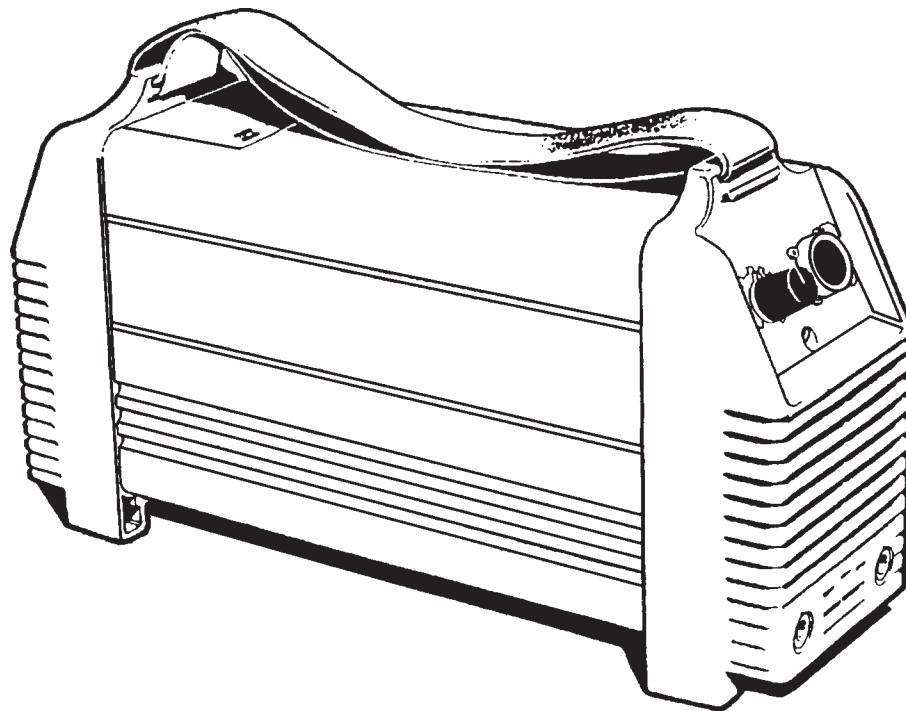


Miniarc 90i Miniarc 140i Power Sources

P/N's 1353-0255 (90i) 1353-0265 (140i)



CAUTION

These INSTRUCTIONS are for experienced operators. If you are not fully familiar with the principles of operation and safe practices for arc welding 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 (Section 1) before installing or operating this equipment.

**Be sure this information reaches the operator.
You can get extra copies through your supplier.**



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 equipment 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.



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

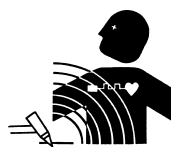
1. Remove all combustible materials well away from the work area or cover the materials with a protective non-flammable covering. Combustible materials include wood, cloth, sawdust, liquid and gas fuels, solvents, paints and coatings, paper, etc.
2. Hot sparks or hot metal can fall through cracks or 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 workpiece has been completely cleaned so that there are no substances on the workpiece which might produce flammable or toxic vapors. Do not do hot work on closed containers. They may explode.
4. Have fire extinguishing equipment 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 equipment 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.

1. Be sure the power source frame (chassis) is connected to the ground system of the input power.
2. Connect the workpiece to a good electrical ground.
3. Connect the work cable to the workpiece. A poor or missing connection can expose you or others to a fatal shock.
4. Use well-maintained equipment. 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.



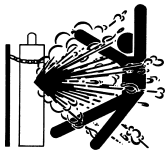
ELECTRIC AND MAGNETIC FIELDS -- May be dangerous. Electric current flowing through any conductor causes localized Electric and Magnetic Fields (EMF). Welding and cutting current creates EMF around welding cables and welding machines. Therefore:

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 workpiece 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.



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



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



Means hazards which could result in minor personal injury.

PRÉCAUTIONS DE SÉCURITÉ

AVERTISSEMENT: Ces règles de sécurité ont pour objet d'assurer votre protection. Veuillez à lire et à observer les précautions énoncées ci-dessous avant de monter l'équipement ou de commencer à l'utiliser. Tout défaut d'observation de ces précautions risque d'entraîner des blessures graves ou mortelles.

1. **PROTECTION INDIVIDUELLE**-- Les brûlures de la peau et des yeux dues au rayonnement de l'arc électrique ou du métal incandescent, lors du soudage au plasma ou à l'électrode ou lors du gougeage à l'arc, peuvent s'avérer plus graves que celles résultant d'une exposition prolongée au soleil. Aussi convient-il d'observer les précautions suivantes:

a. Portez un écran facial adéquat muni des plaques protectrices et des verres filtrants appropriés afin de vous protéger les yeux, le visage, le cou et les oreilles des étincelles et du rayonnement de l'arc électrique lorsque vous effectuez des soudures ou des coupes ou lorsque vous en observez l'exécution.

AVERTISSEZ les personnes se trouvant à proximité de façon à ce qu'elles ne regardent pas l'arc et à ce qu'elles ne s'exposent pas à son rayonnement, ni à celui du métal incandescent.

b. Portez des gants ignifugés à crispins, une tunique épaisse à manches longues, des pantalons sans rebord, des chaussures à embout d'acier et un casque de soudage ou une calotte de protection, afin d'éviter d'exposer la peau au rayonnement de l'arc électrique ou du métal incandescent. Il est également souhaitable d'utiliser un tablier ininflammable de façon à se protéger des étincelles et du rayonnement thermique.

c. Les étincelles ou les projections de métal incandescent risquent de se loger dans des manches retroussées, des bords relevés de pantalons ou dans des poches. Aussi convient-il de garder boutonnés le col et les manches et de porter des vêtements sans poches à l'avant.

d. Protégez des étincelles et du rayonnement de l'arc électrique les autres personnes travaillant à proximité à l'aide d'un écran ininflammable adéquat.

e. Ne jamais omettre de porter des lunettes de sécurité lorsque vous vous trouvez dans un secteur où l'on effectue des opérations de soudage ou de coupage à l'arc. Utilisez des lunettes de sécurité à écrans ou verres latéraux pour piquer ou meûler le laitier. Les piquetures incandescentes de laitier peuvent être projetées à des distances considérables. Les personnes se trouvant à proximité doivent également porter des lunettes de protection.

f. Le gougeage à l'arc et le soudage à l'arc au plasma produisent un niveau de bruit extrêmement élevé (de 100 à 114 dB) et exigent par conséquent l'emploi de dispositifs appropriés de protection auditive.

2. **PRÉVENTION DES INCENDES**-- Les projections de laitier incandescent ou d'étincelles peuvent provoquer de graves incendies au contact de matériaux combustibles solides, liquides ou gazeux. Aussi faut-il observer les précautions suivantes:

a. Éloigner suffisamment tous les matériaux combus-

tibles du secteur où l'on exécute des soudures ou des coupes à l'arc, à moins de les recouvrir complètement d'une bâche non-inflammable. Ce type de matériaux comprend notamment le bois, les vêtements, la sciure, l'essence, le kérosène, les peintures, les solvants, le gaz naturel, l'acétylène, le propane et autres substances combustibles semblables.

b. Les étincelles ou les projections de métal incandescent peuvent tomber dans des fissures du plancher ou dans des ouvertures des murs et y déclencher une ignition lente cachée. Veiller à protéger ces ouvertures des étincelles et des projections de métal.

c. N'exécutez pas de soudures, de coupes, d'opérations de gougeage ou autres travaux à chaud à la surface de barils, bidons, réservoirs ou autres contenants usagés, avant de les avoir nettoyés de toute trace de substance susceptible de produire des vapeurs inflammables ou toxiques.

d. En vue d'assurer la prévention des incendies, il convient de disposer d'un matériel d'extinction prêt à servir immédiatement, tel qu'un tuyau d'arrosage, un seau à eau, un seau de sable ou un extincteur portatif.

e. Une fois le travail à l'arc terminé, inspectez le secteur de façon à vous assurer qu'aucune étincelle ou projection de métal incandescent ne risque de provoquer ultérieurement un feu.

3. **CHOC ÉLECTRIQUE**-- Le gougeage à l'arc et à l'arc au plasma exige l'emploi de tensions à vide relativement importantes; or, celles-ci risquent de causer des dommages corporels graves et même mortels en cas d'utilisation inadéquate. La gravité du choc électrique reçu dépend du chemin suivi par le courant à travers le corps humain et de son intensité.

a. Ne laissez jamais de surfaces métalliques sous tension venir au contact direct de la peau ou de vêtements humides. Veuillez à porter des gants bien secs.

b. Si vous devez effectuer un travail sur une surface métallique ou dans un secteur humide, veuillez à assurer votre isolation corporelle en portant des gants secs et des chaussures à semelles de caoutchouc et en vous tenant sur une planche ou une plate-forme sèche.

c. Mettez toujours à la terre le poste de soudage/coupage en le reliant par un câble à une bonne prise de terre.

d. N'utilisez jamais de câbles usés ou endommagés. Ne surchargez jamais le câble. Utilisez toujours un équipement correctement entretenu.

e. Mettez l'équipement hors tension lorsqu'il n'est pas en service. une mise à la masse accidentelle peut en effet provoquer une surchauffe de l'équipement et un danger d'incendie. Ne pas enrôler ou passer le câble autour d'une partie quelconque du corps.

f. Vérifiez si le câble de masse est bien relié à la pièce en un point aussi proche que possible de la zone de travail. Le branchement des câbles de masse à l'ossature du bâtiment ou en un point éloigné de la zone de travail augmente en effet le risque de passage d'un courant de sortie par des chaînes de

- levage, des câbles de grue ou divers chemins électriques.
- g. Empêchez l'apparition de toute humidité, notamment sur vos vêtements, à la surface de l'emplacement de travail, des câbles, du porte-électrode et du poste de soudage/coupage. Réparez immédiatement toute fuite d'eau.
4. VENTILATION-- La respiration prolongée des fumées résultant des opérations de soudage/coupage, à l'intérieur, d'un local clos, peut provoquer des maux et des dommages corporels. Aussi convient-il d'observer les précautions suivantes:
- a. Assurez en permanence une aération adéquate de l'emplacement de travail en maintenant une ventilation naturelle ou à l'aide de moyens mécaniques. N'effectuez jamais de travaux de soudage ou de coupage sur des matériaux de zinc, de plomb, de beryllium ou de cadmium en l'absence de moyens mécaniques de ventilation capables d'empêcher l'inhalation des fumées dégagées par ces matériaux.
 - b. N'effectuez jamais de travaux de soudage ou de coupage à proximité de vapeurs d'hydrocarbure chloré résultant d'opérations voisines de dégraissage ou de pulvérisation. La chaleur dégagée ou le rayonnement de l'arc peut déclencher la formation de phosgène -- gaz particulièrement toxique -- et d'autres gaz irritants, à partir des vapeurs de solvant.
 - c. Une irritation momentanée des yeux, du nez ou de la gorge constatée au cours de l'utilisation de l'équipement dénote un défaut de ventilation. Arrêtez-vous de travailler afin de prendre les mesures nécessaires à l'amélioration de la ventilation. Ne poursuivez pas l'opération entreprise si le malaise persiste.
 - d. Certaines commandes comportent des canalisations où circule de l'hydrogène. L'armoire de commande est munie d'un ventilateur destiné à empêcher la formation de poches d'hydrogène, lesquelles présentent un danger d'explosion; ce ventilateur ne fonctionne que si l'interrupteur correspondant du panneau avant se trouve placé en position ON (Marche). Veillez à manœuvrer cette commande en vérifiant si le couvercle est bien en place, de façon à assurer l'efficacité de la ventilation ainsi réalisée. Ne jamais débrancher le ventilateur.
 - e. Les fumées produites par l'opération de soudage ou de coupage peuvent s'avérer toxiques. Aussi est-il nécessaire de disposer en permanence d'un dispositif adéquat de ventilation de type aspirant, afin d'éliminer du voisinage de l'opérateur tout dégagement de fumée visible.
 - f. Consultez les recommandations particulières en matière de ventilation indiquées à l'alinéa 6 de la norme Z49.1 de l'AWS.
5. ENTRETIEN DE L'ÉQUIPEMENT-- Un équipement entretenu de façon défectueuse ou inadéquate risque non seulement de réaliser un travail de mauvaise qualité mais, chose plus grave encore, d'entraîner des dommages corporels graves, voire mortels en déclenchant des incendies ou des chocs électriques. Observez par conséquent les précautions suivantes:
- a. Efforcez-vous de toujours confier à un personnel qualifié l'installation, le dépannage et l'entretien du poste de soudage et de coupage. N'effectuez aucune réparation électrique sur l'équipement à moins d'être qualifié à cet effet.
 - b. Ne procédez jamais à une tâche d'entretien quelconque à l'intérieur du poste de soudage/coupage, avant d'avoir débranché l'alimentation électrique.
 - c. Maintenez en bon état de fonctionnement les câbles, le câble de masse, les branchements, le cordon d'alimentation et le poste de soudage/coupage. N'utilisez jamais le poste ou l'équipement s'il présente une défectuosité quelconque.
 - d. Prenez soin du poste de soudage et de coupage et des équipements accessoires. Gardez-les à l'écart des sources de chaleur, notamment des fours, de l'humidité, des flaques d'eau maintenez-les à l'abri des traces d'huile ou de graisse, des atmosphères corrosives et des intempéries.
 - e. Laissez en place tous les dispositifs de sécurité et tous les panneaux de l'armoire de commande en veillant à les garder en bon état.
 - f. Utilisez le poste de soudage/coupage conformément à son usage prévu et n'effectuez aucune modification.
6. INFORMATIONS COMPLÉMENTAIRES RELATIVES À LA SÉCURITÉ--
- Pour obtenir des informations complémentaires sur les règles de sécurité à observer pour le montage et l'utilisation d'équipements de soudage et de coupage électriques et sur les méthodes de travail recommandées, demandez un exemplaire du livret N° 52529 "Precautions and Safe Practices for Arc Welding, Cutting and Gouging" publié par ESAB. Nous conseillons également de consulter les publications suivantes, tenues à votre disposition par l'American Welding Society, 550 N.W. LeJuene Road, Miami, FL 32126:
- a. "Safety in Welding and Cutting" AWS Z49.1
 - b. "Recommended Safe Practices for Gas-Shielded Arc Welding" AWS A6. 1.
 - c. "Safe Practices for Welding and Cutting Containers That Have Held Combustibles" AWS-A6.0.
 - d. "Recommended Safe Practices for Plasma Arc Cutting" AWS-A6. 3.
 - e. "Recommended Safe Practices for Plasma Arc Welding" AWS-C5. 1.
 - f. "Recommended Safe Practices for Air Carbon Arc Gouging and Cutting" AWS-C5. 3.
 - g. "Code For Safety in Welding and Cutting" CSA-Standard W117. 2.

1.1 GENERAL

The Miniarc 90i and Miniarc 140i are portable, DC constant current, high performance welding power sources. Their ultra-light portability is due to an advanced inverter design. This design provides outstanding welding performance for touch start TIG welding (GTAW) and Stick welding (SMAW).

1.2 SPECIFICATIONS

Refer to Table 1-1 for Miniarc 90i/140i specifications.

1.3 REQUIRED EQUIPMENT

The Miniarc is supplied with a 10-ft (3 m) primary cable, 10-ft work cable with male Quick Connector, a work clamp, and an electrode holder for Stick welding.

1.4 OPTIONAL EQUIPMENT

The following accessories may be obtained and used in conjunction with the Miniarc 90i and Miniarc 140i. Part numbers are enclosed in parentheses and should be used when ordering. Refer to Section 6 for ESAB's address and phone number.

Heliarc HW-17V-2 TIG Torch, 12 1/2-ft (33813). Includes gas valve, power cable, gas hose, and back cap.

Heliarc HW-17V TIG Torch, 12 1/2-ft (16X48LV). Includes gas valve, concentric power/gas cable, and back cap.

Heliarc HW-17 Torch Accessory Kit (999126). Includes accessories for 1/16, 1/8, and 3/32-in. electrodes (collet, collet bodies, and electrodes), 3 cups, and a short cap.

Gas / Power Adaptor for Heliarc Torches (31758). Needed for use with Heliarc TIG torches with concentric power/gas cables.

TC-2B Torch Control w/ 30-ft cable and 14-pin plug (33839). Attach to torch handle. Provides remote current control.

FC-5B Foot Control w/ 30-ft cable and 14-pin plug (33646). Provides remote current control.

FC-5B EHD Foot Control w/ 30-ft cable and 14-pin plug (33841). Extra Heavy Duty Foot Control provides remote current control.

Table 1-1. Miniarc 90i / Miniarc 140i Specifications

	Miniarc 90i	Miniarc 140i
Rated Output at 35% Duty Cycle	90 A @ 24 V dc	140 A @ 26 V dc
Operating range	3-90 A	3-140 A
Open-circuit voltage	53-75 V	53-75 V
Primary Input Voltage	115 V ac, 50/60 Hz	230 V ac, 50/60 Hz
Primary Input Current (at rated output)	27 A	22 A
Dimensions		
height	10 1/4 in. (256 mm)	10 1/4 in. (256 mm)
width	5 3/4 in. (142 mm)	5 3/4 in. (142 mm)
length	19 in. (472 mm)	19 in. (472 mm)
Weight	24 lbs (11 kg)	24 lbs (11 kg)

2.1 GENERAL

Due to the built-in shoulder strap, removable dust filter, and double insulated construction, the Miniarc 90i and Miniarc 140i can be located almost anywhere. However, it is suggested that the following steps be followed carefully in order to help provide the best possible operation.

2.2 UNPACKING AND PLACEMENT

- A. Immediately upon receipt of the equipment, inspect for damage which may have occurred in transit. Notify the carrier of any defects or damage at once.
- B. After removing the components from the shipping container(s), check the container for any loose parts. Remove all packing materials.
- C. Check air passages of power source for any packing materials that may obstruct air flow through the power source.
- D. If the equipment is not to be installed immediately, store it in a clean, dry, well-ventilated area.
- E. The location of the welding equipment should be carefully selected to ensure satisfactory and dependable service. Choose a location relatively close to a properly fuse source of electrical power. The Miniarc should be placed within easy reach of the object to be welded.
- F. The machine components are maintained at proper operating temperatures by forced air which is drawn through the cabinet by the fan unit on the rear panel. For this reason, it is important that the machine be located in an open area where air can circulate freely at front and rear openings. If space is at a premium, leave at least 1 foot of clearance between the rear of the power source and wall or other obstruction. Even though the Power Source is equipped with a removable dust filter, the area around the unit should be relatively free of dust, fumes, and excessive heat.

2.3 INPUT CONNECTIONS



ELECTRIC SHOCK CAN KILL! Precautionary measures should be taken to provide maximum protection against electrical shock. Be sure that all power is off by opening the line (wall) disconnect switch and by unplugging the power cord to the unit when connections are made inside of the power source.

The Miniarc 90i/140i comes equipped with 10 feet of input cable for connection to a 115 or 230 volt (depending on the model) single phase 50/60 Hz properly fused power supply. Refer to Table 2-1 for proper fusing for the welding output load.

Table 2-1. Recommended Fuse Sizes

Rated Load		Input & Ground Conductor* CU/AWG	Fuse Size Amps
Volts	Amps		
115	27	10	40
230	22	10	30

* Sizes per National Electric Code for 90° C rated copper conductors @ 30<198>°C ambient. Not more than three conductors in raceway or cable. Local codes should be followed if they specify sizes other than those listed above.

Since the Miniarc is a double insulated power source, no earth ground is required.

2.4 OUTPUT CONNECTIONS

The Miniarc 90i/140i comes equipped with a 10-foot electrode cable and electrode holder, and a 10-foot work cable and work clamp. Each cable is equipped with a male Quick Connector so the desired electrode polarity may be chosen by interchanging the electrode and work cables through the use of the output receptacles.

For **reverse polarity** (SMAW) welding, the electrode cable is connected to the positive (+) output receptacle, and the work cable is connected to the negative (-) output receptacle.

For **straight polarity** (GTAW & SMAW) welding, the electrode cable is connected to the negative (-) output receptacle, and the work cable is connected to the positive (+) output receptacle.

2.5 SHOULDER STRAP

The strap can be lowered into the slot, where it can be used as an ordinary handle, or it can be pulled out to allow the Miniarc 90i/140i to be carried like a shoulder bag. To fold up the belt, grip the belt above the front holder, push the belt forward, pull it out fully, and fold it into the rear slot.



ELECTRIC SHOCK CAN KILL! Do not carry or hold the power source when it is plugged into a power supply.

3.1 GENERAL



Never, under any circumstances, operate the power source with the cover removed. In addition to the safety hazard, improper cooling may cause damage to internal components.



To prevent serious injury, never touch any parts forward of the torch handle (nozzle, heat shield, electrode, etc.) unless the power switch is in the off position.

Wear the usual protective gloves, clothing, ear protection, and helmet. A helmet with filter lens shade No. 6 or 7 should provide adequate protection for your eyes. Refer to the Safety Precautions in the beginning of this manual for additional additional operating precautions.

3.2 DUTY CYCLE

The duty cycle of a Power Source is the percentage of a 5-minute period that a unit can be safely operated without overheating or being damaged, at a given output current. The Miniarc 90i is rated at 90 A @ 24 V dc. The Miniarc 140i is rated at 140 A @ 26 V dc. Both of these ratings are at 35% duty cycle. This means that the Miniarc 90i/140i can be safely operated at 90/140 amps output current for 1.7 minutes out of every 5 minutes. If the welding current is decreased, the duty cycle can be increased.

3.3 WELDING CONTROLS/INDICATORS

A. Power Switch. When placed in the ON position, this switch (located on the rear panel) will apply power to the control circuitry and energize the cooling fan. The white indicating lamp on the front panel should illuminate.

B. Output Current Control. Adjustable from 3 to 90 amperes for the Miniarc 90i and 3-140 amperes for the Miniarc 140i, this potentiometer allows the welding current to be varied to suit your welding application. The exact welding current will depend on the arc length, which is determined to some extent by the operator. If a remote control accessory is used, welding current will be regulated from that location.

C. Remote Control Connection. This socket is located on the front panel of the Miniarc and allows for connecting any remote control accessory described in Section 1.

D. Fault Light. The Miniarc incorporates a thermal overload circuit in order to prevent damage to the unit if the operating temperature becomes excessive. The yellow fault light on the front panel will illuminate if this condition occurs. This overload protection circuit resets automatically when the operating temperature has fallen to a safe level.

3.4 SEQUENCE OF OPERATION

- A. Make all the necessary input and output connections for the desired polarity.
- B. Set the Output Current Control knob to the desired output current.
- C. Place the Power Switch to the ON position. Open-circuit voltage should now be present between the electrode holder and the work clamp. Do NOT install or remove the work clamp with the power Switch ON.
- D. Lower your helmet and commence welding.
- E. When the weld is completed, break the arc by pulling the electrode away from the workpiece.
- F. Allow the Power Source to idle for a few minutes with no load applied.
- G. Place the Power Switch to the OFF position.
- H. The work clamp may be removed with the power off.

4.1 GENERAL



ELECTRIC SHOCK CAN KILL! Be sure that the wall disconnect switch or circuit breaker is open before attempting any inspection or work inside of the power source. Always wear safety goggles with side shields when blowing out the power source with air.



If this equipment does not operate properly, stop work immediately and investigate the cause of the malfunction. Maintenance work must be performed by an experienced person, and electrical work by a trained electrician. Do not permit untrained persons to inspect, clean, or repair this equipment. Use only recommended replacement parts.

4.2 INSPECTION & CLEANING

Since there are no moving parts (other than the fan) in the power source, maintenance consists mainly of keeping the interior of the cabinet clean. Periodically, remove the cover from the cabinet, and wearing proper eye protection, blow accumulated dust and dirt from the air passages and the interior components, using clean low pressure air. It is imperative that the air passages, inside the unit be kept free of dirt to ensure adequate circulation of cooling air. Change the air filter in the front panel regularly, and replace it if damaged. Remove the filter by inserting a screwdriver in the slot in the grill and prying out the lower part of the grill (refer to Figure 4-1). The length of time between each cleaning will depend on the location of the unit and the amount of dust in the atmosphere.

Input power and welding cables should be checked periodically for cracks and bare spots. They should be replaced if frayed or broken wires are found, especially at the electrode holder and work clamp.

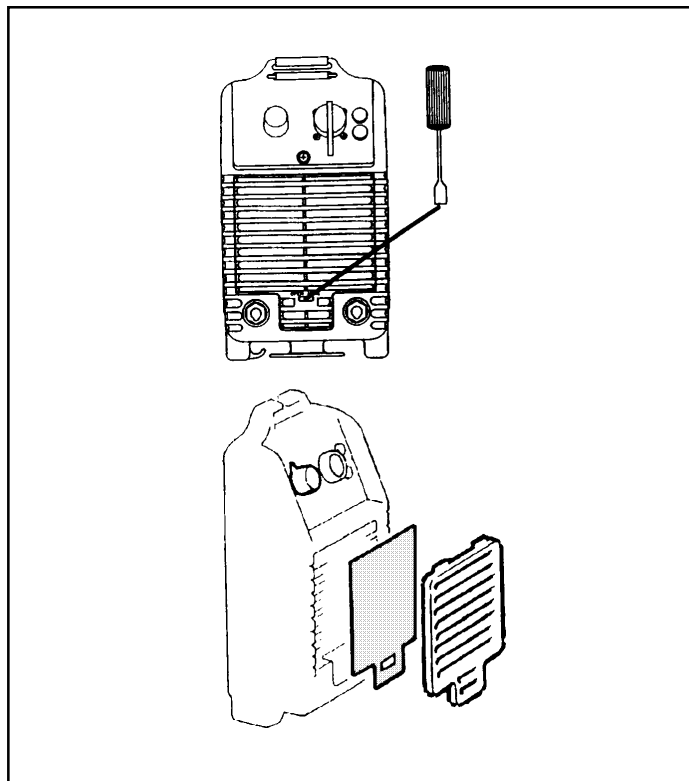


Figure 4-1. Removing the Filter

5.1 GENERAL

Be sure that all primary power to the machine has been externally disconnected. Open the wall disconnect switch or circuit breaker before attempting inspection or work inside of the power source.

If any troubleshooting situations require that power remain on and that power terminals in the power source carry voltage, exercise extreme caution when working on the "live" equipment. Avoid contact with electrical components, except when testing with an appropriate instrument.

5.2 Schematics

The following pages contain schematics for use when troubleshooting the power source.

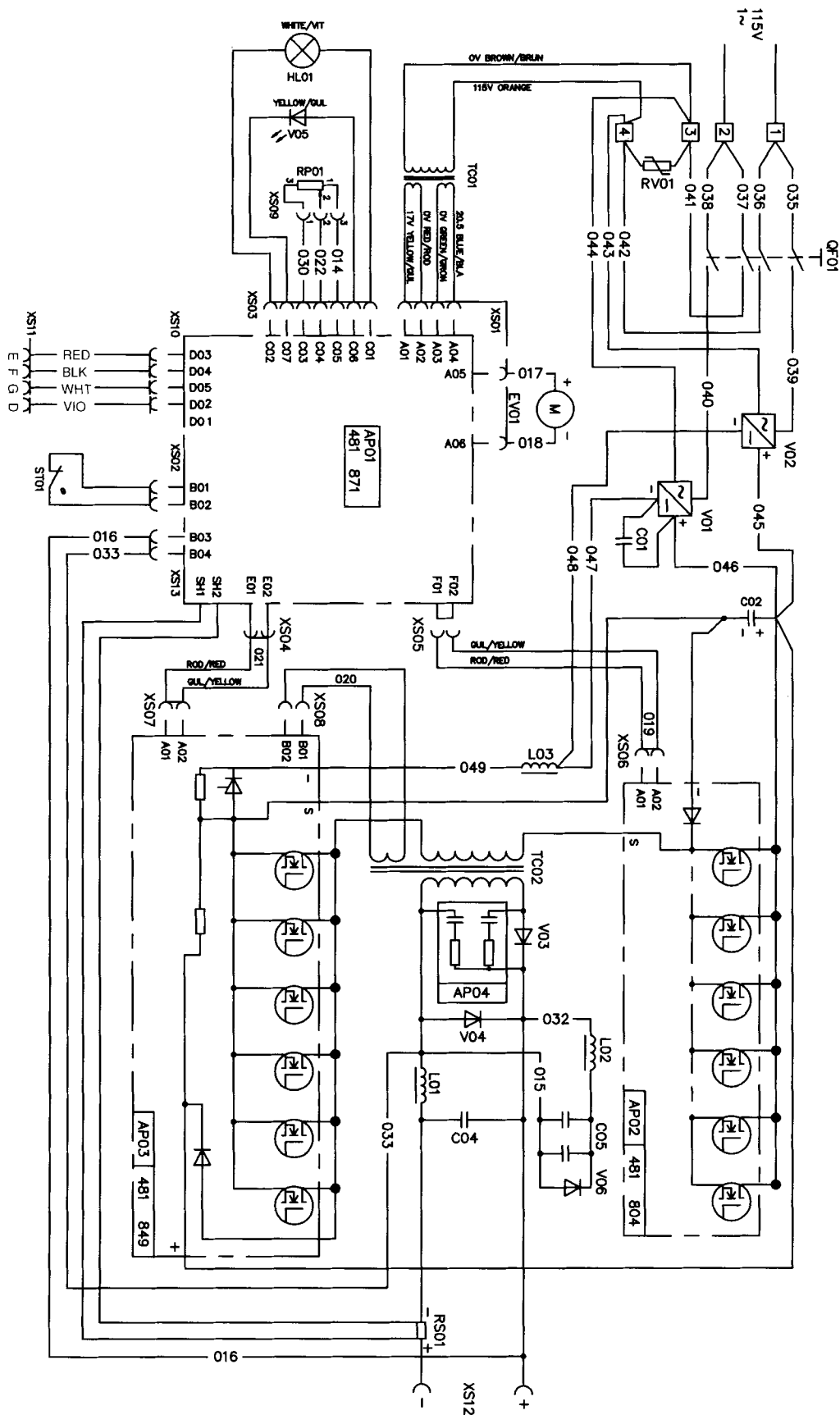


Figure 5-1. Miniarc 90i/140i Schematic Diagram

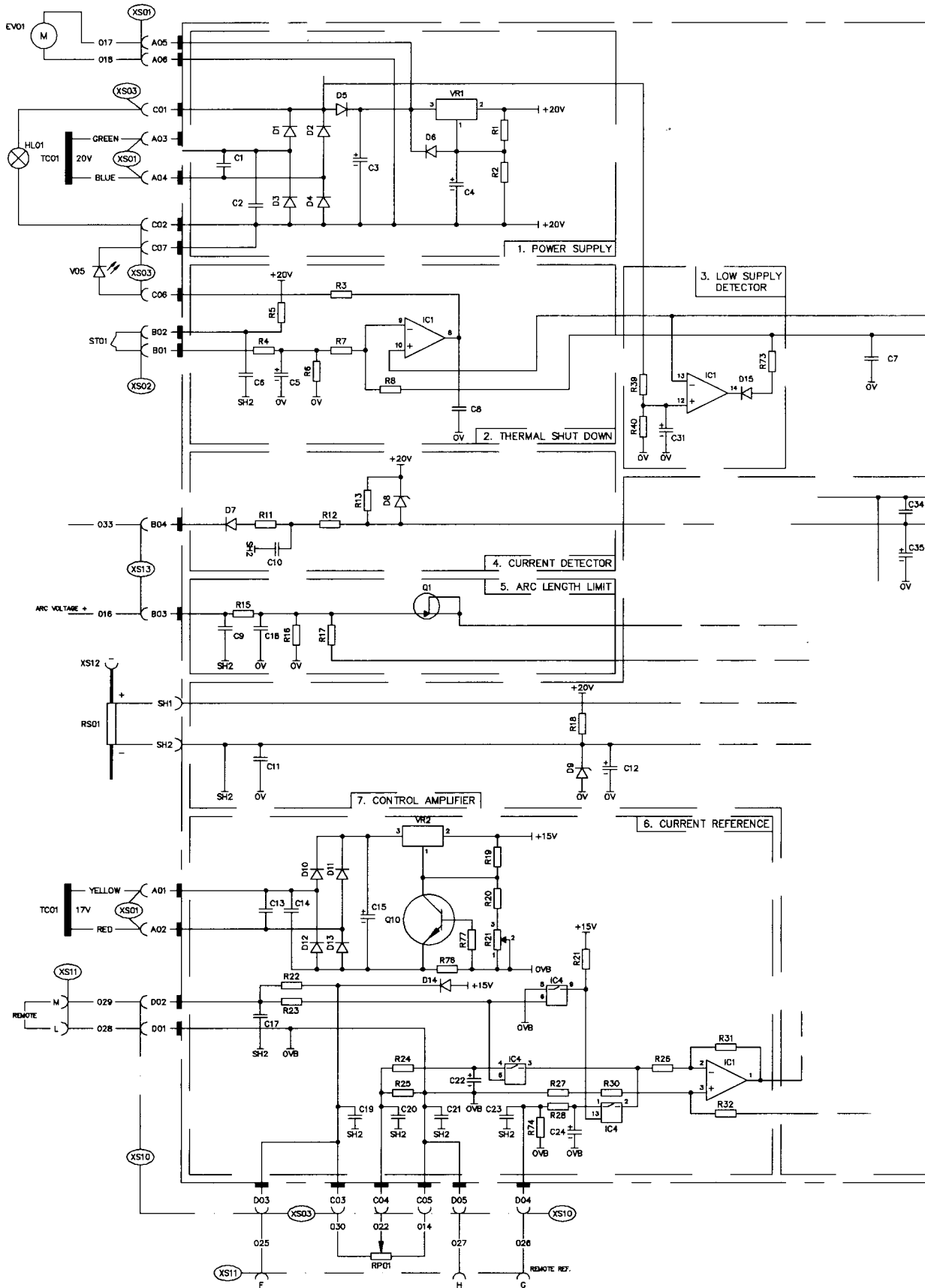


Figure 5-2. AP01 Schematic Diagram (Page 1 of 2)

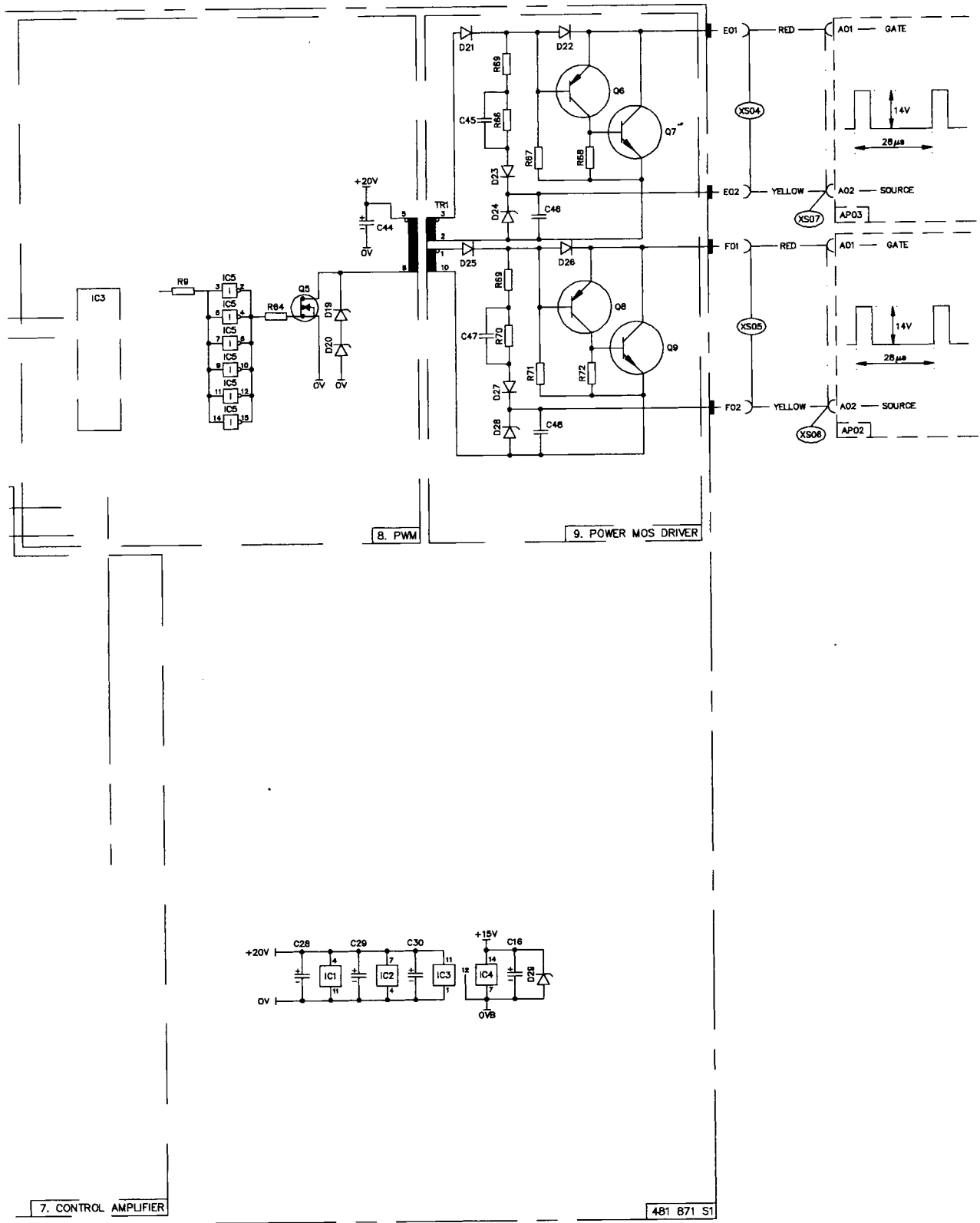


Figure 5-2. AP01 Schematic Diagram (Page 2 of 2)

6.1 GENERAL

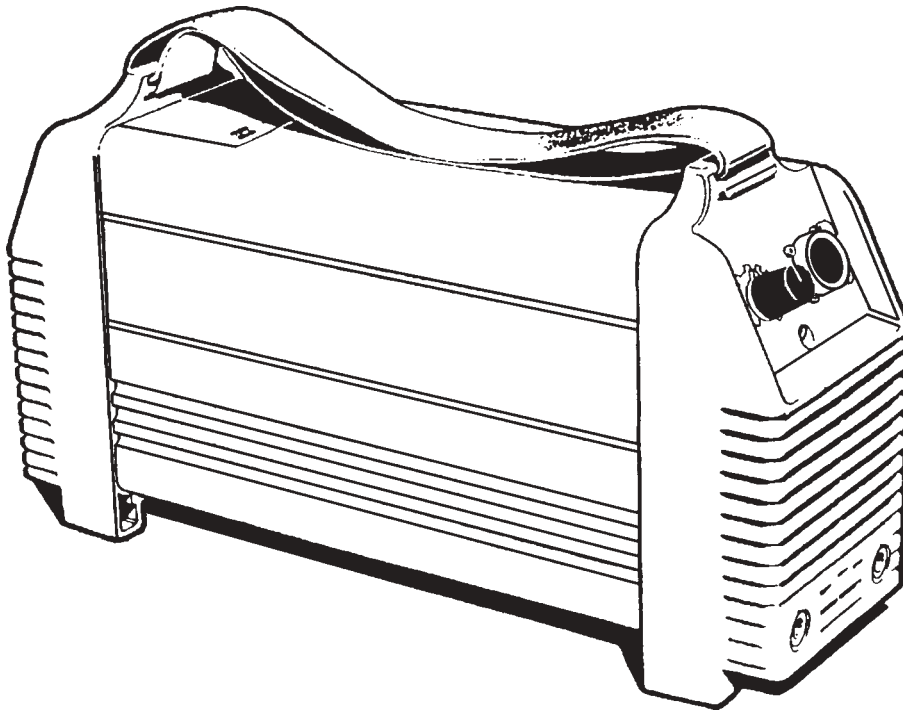
The following illustrations of the Miniarc 90i/140i identify each replacement part by item number as tabulated in the associated parts list. The list identifies each part by Item No., Quantity for Miniarc 90i/140i, Part No., Description, and Circuit Designation.

6.2 ORDERING

Replacement parts may be ordered from your ESAB distributor or from:

ESAB Welding & Cutting Products
PO Box 100545
Florence, SC 29501-0545

For technical assistance directly from an ESAB service representative, call (803) 664-4416 or 5550. Additionally, ESAB offers toll free facsimile (FAX) service via 1-800-446-5693.



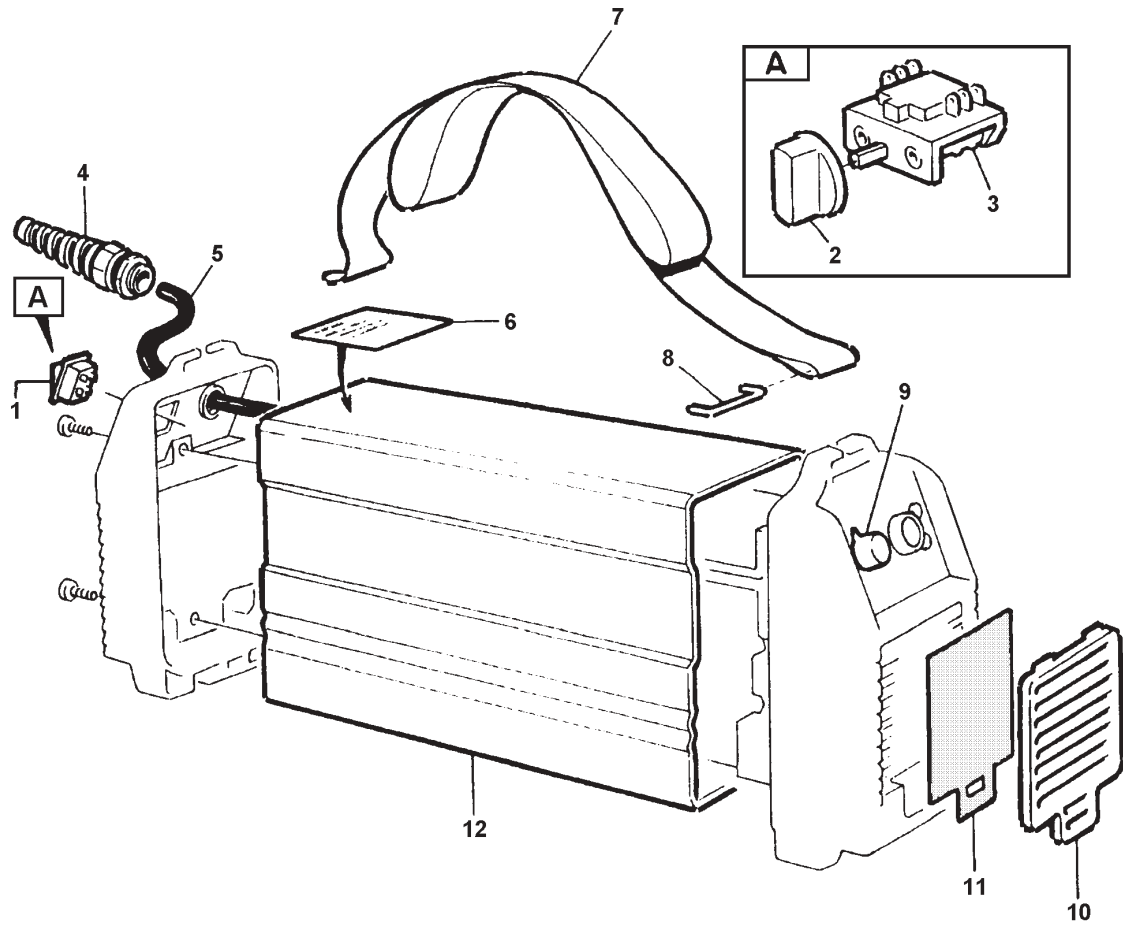


Figure 6-1.

Item No.	Qty. for Miniarc 90i	Qty. for Miniarc 140i	Part No.	Description	Circuit Designation
1		1	13792111	Switch, 2-pole	QF1
2	1		951851	Knob	
3	1		32574	Switch, 3-pole	QF1
4	1	1	13792114	Cable bushing	
5	1		951853	Power cable-90	
		1	951866	Power cable-140	
6			REF.	Rating plate	
7	1	1	35165	Strap Kit (incl.7,8)	
8	1	1	ITEM 7	Shackle	
9	1	1	13792101	Knob	
10	2	2	951860	Grill	
11	1	1	951868	Filter (pkg.qty=6 ea.)	
12	1		951874	Cover-Miniarc 90i	
		1	951856	Cover-Miniarc 140i	

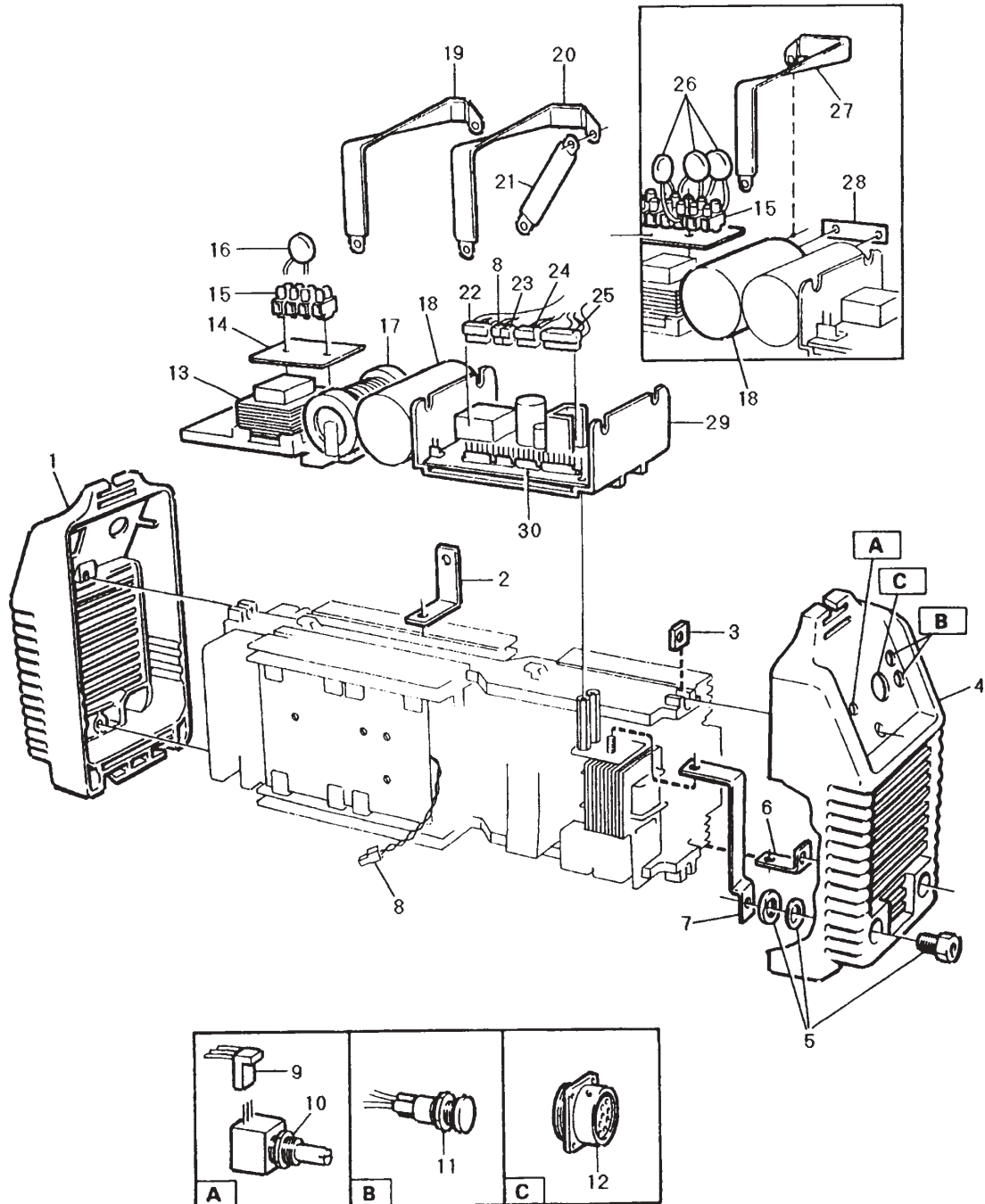


Figure 6-2.

Figure 6-2 (parts list).

Item No.	Qty. for Miniarc 90i	Qty. for Miniarc 140i	Part No.	Description	Circuit Designation
1	1	1	951867	End cover-Miniarc 90i	
2	1	1	951859	End cover-Miniarc 140i	
3	4	4	ITEM SP1*	Busbar	
4	1	1	32639	Nut (see item 28)	
5	2	2	951873	Front panel-Miniarc 90i	
6	1	1	951854	Front panel-Miniarc 140i	
7	1	1	951852	Welding current connector	XS12
8	5	5	ITEM SP2*	Busbar	
9	5	5	ITEM SP3*	Busbar	
10	1	1	35166	Connector kit (incl. 8,9,22,23,24,25,28**,29**)	XS02 and XS04-XS07
11	1	1	ITEM 8	Cap	
12	1	1	ITEM 8	Connector	XS09
13	1	1	1379-2101	Knob (Not Shown)	
14	1	1	951847	Potentiometer	RP01
15	1	1	951849	Indicating lamp-white	HL01
16	1	1	951850	LED-yellow	V05
17	1	1	951857	Connector, socket	XS11
18	1	1	951876	Control current transformer	TC01
19	1	1	468028001	Control current transformer	TC01
20	1	1	ITEM 16	Plate	
21	1	1	ITEM 16	Terminal block	X01
22	1	1	35167	Varistor kit (incl. 14,15,16)	RV01
23	1	1	951877	Primary inductor-90	L03
24	1	1	951862	Primary inductor-140	L03
25	2	1	951846	Panduit clamp, blue	
26	1	1	32622	Capacitor, 3000 µf	C02
27	1	1	32589	Capacitor, 1000 µf	C02
28	1	1	951846	Panduit clamp, blue	
29	1	1	ITEM SP1*	Busbar	
30	1	1	ITEM SP1*	Busbar	
31	1	1	ITEM SP1*	Busbar	
32	1	1	ITEM 8	Connector	XS01
33	1	1	ITEM 8	Cap	
34	1	1	ITEM 8	Connector	XS02
35	1	1	ITEM 8	Cap	
36	1	1	ITEM 8	Connector	XS10
37	1	1	ITEM 8	Cap	
38	1	1	ITEM 8	Connector	XS03
39	1	1	ITEM 8	Cap	
40	1	1	ITEM SP1*	Busbar (not used)	RV01-RV03
41	1	1	ITEM SP1*	Link (not used)	
42	1	1	35170	Guide kit (incl. 3,28,12**,15**)	
43	1	1	951879	Circuit board	AP01

* Refer to Spare Parts List.

** Refer to Figure 6-3.

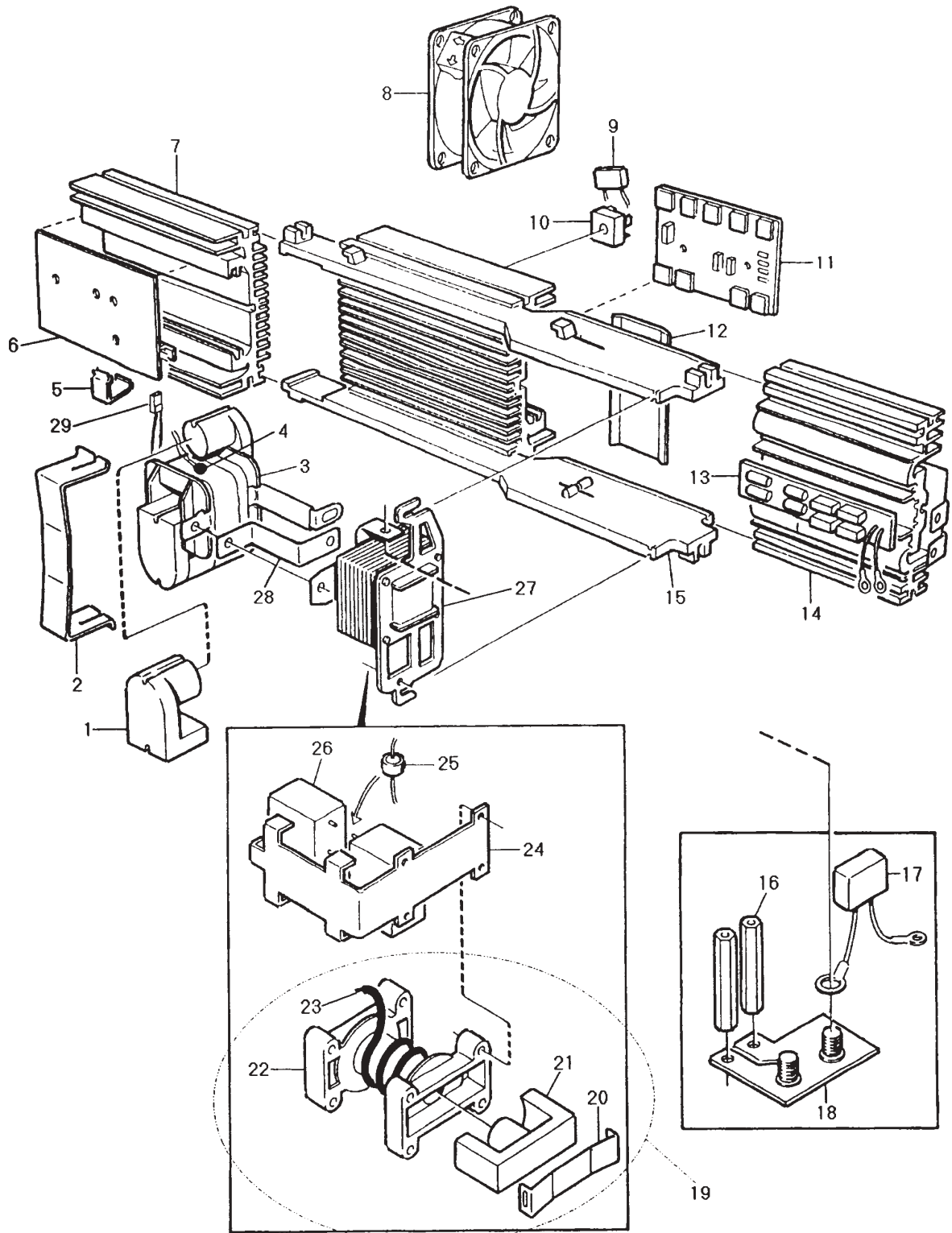


Figure 6-3.

Figure 6-3 (parts list).

Item No.	Qty. for Miniarc 90i	Qty. for Miniarc 140i	Part No.	Description	Circuit Designation
1	4	4	ITEM 3	Ferrite core	
			ITEM 3	Tape	
			ITEM 3	Glue	
2	1	1	ITEM 3	Clip	
3	1		35168	Transformer kit (incl. 1,3,4)	TC02
		1	35169	Transformer kit (incl. 1,3,4)	TC02
4	1		ITEM 3	Thermal cutout	ST01
5	15	15	ITEM 6	Spring	
6	1		ITEM SP3*	Circuit board	AP03
		1	ITEM SP4*	Circuit board	AP03
7	2	2	951858	Heat sink	
8	1	1	951861	Fan	EV01
9	1	1	35174	Capacitor (incl. 9,10)	C01
10	2	2	ITEM 9	Rectifier bridge	V01,V02
11	1		ITEM SP3*	Circuit board	AP02
		1	ITEM SP4*	Circuit board	AP02
12	1	1	ITEM 28**	Insulation	
13	1	1	951878	Circuit board	AP04
14	1	1	951863	Rectifier unit	V03,V04
15	2	2	ITEM 28**	Guide	
16	2	2	ITEM 18	Spacer	
17	1	2	ITEM 18	Capacitor	C04
18	1		35172	Shunt kit (incl. 16,17,18)	RS01
		1	35173	Shunt kit (incl. 16,17,18)	RS01
19	1	1	951865	Inductor (incl. 19,20,21,22,23)	L02
20	2	2	ITEM 19	Clip	
21	2	2	ITEM 19	Core	
22	1	1	ITEM 19	Bobbin	
23	1	1	ITEM 19	Winding	
24	1	1	35171	Holder (incl. 24,25,26)	
25	1	1	ITEM 24	Diode	V06
26	2	2	ITEM 24	Capacitor	C05
27	1	1	951864	Inductor	L01
28	1	1	ITEM SP2*	Busbar	
29	1	1	ITEM 8**	Connector	XS08

* Refer to Spare Parts List. ** Refer to Figure 6-2.

Spare Parts List

Item No.	Part No.	Description
SP1	951869	Busbars, primary (contains items 2,19,20,21,26, and 27 on Fig. 2)
SP2	951870	Busbars, secondary (contains items 6, 7 on Fig.2 and item 28 on Fig.3)
SP3	951872	Transistor boards - Miniarc 90i (contains items 6,11, and 5 on Fig.3)
SP4	951871	Transistor boards - Miniarc 140i (contains items 6,11, and 5 on Fig.3)
SP5	951848	Contact oil (to be used when mounting items SP3 and SP4)

NOTES

NOTES

HISTORY

Revision 'A' - Changed product to Yellow Brand and made part number changes.

Revision 'B' - Updated Safety Pages, Communication Guide and correction in parts list.

Revision 'C' - Updated parts section.

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