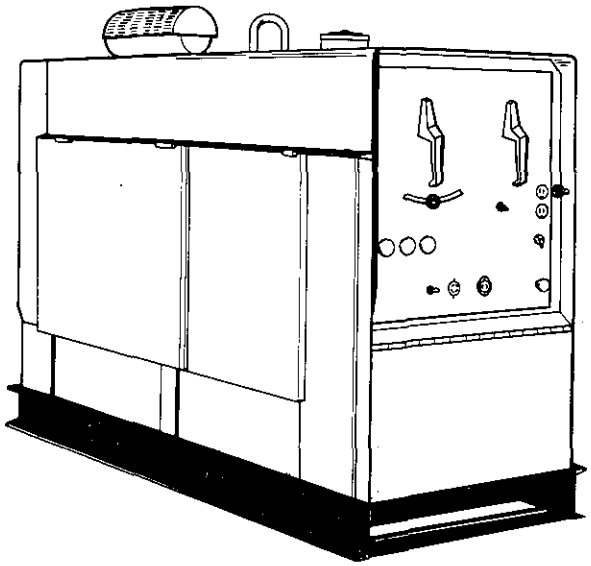
May 1978 FORM: OM-458D

Effective With Serial No. HJ134595

MODEL

Trailblazer 44G



OWNER'S MANUAL

MILLER ELECTRIC MFG. CO.

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

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

LIMITED WARRANTY

EFFECTIVE: FEBRUARY 20, 1978

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

LIMITED WARRANTY—Miller Electric Mfg. Co., Appleton, Wisconsin warrants to Customer that all new and unused Equipment furnished by Miller is free from defect in workmanship and material as of the time and place of delivery by Miller. No warranty is made by Miller with respect to engines, trade accessories or other items manufactured by others. Such engines, trade accessories and other items are sold subject to the warranties of their respective manufacturers, if any. The manufacturer's warranty on engines is for a period of one year.

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

In the case of Miller's breach of warranty or any other duty with respect to the quality of any goods, the exclusive remedies therefor shall be, at Miller's option, (1) repair or (2) replacement or, where authorized in writing by Miller in appropriate cases, (3) the reasonable cost of repair or replacement at an authorized Miller service station or (4) payment of or credit for the purchase price (less reasonable depreciation based upon actual use) upon return of the goods at Customer's risk and expense. All transactions are F.O.B. Appleton, Wisconsin. Upon receipt of notice of apparent defect or failure, Miller shall instruct the claimant on the warranty claim procedures to be followed.

As a matter of general policy only, Miller may honor an original user's warranty claims on warranted Equipment in the event of failure resulting from a defect within the following periods from the date of delivery of Equipment to the original user:

1. Arc welders, power sources, and components. . 1 year
2. Original main power rectifiers . . . . . 3 years (Labor — 1 year only)
3. All welding guns and feeder/guns . . . . . 90 days
4. All other Millermatic Feeders . . . . . 1 year

provided that the user so notifies Miller in writing within thirty (30) days of the date of such failure.

5. Replacement or repair parts exclusive of labor 60 days

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

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

CERTIFICATE

NAME OF EQUIPMENT:_____ MODEL NO._____

SERIAL NO._____ DATE_____

This equipment has been type-tested under standardized field test conditions as recommended by the Joint Industry Committee on High Frequency Stabilized Arc Welding Machines found to radiate less than 10 microvolts per meter at a distance of one mile, the maximum allowable limit established by the Federal Communications Commission for equipment of this type.

Installations using this equipment on the basis of these tests, may reasonably be expected to meet the radiation limitations established by the Federal Communications Commission, only when installed, operated and maintained as specified in the instruction book provided.

USER'S CERTIFICATION

The welding equipment identified above has been installed in accordance with the specific instructions applicable to this model as outlined in the instruction book furnished. It is being used only for the purpose for which it was intended and is being maintained and operated in accordance with the manufacturer's instructions.

Date Installed_____ Signed_____

ERRATA SHEET

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

Carburetor Change Effective With Serial No. HJ185451

NOTE

Delete all reference to fuse F4 as this unit is not so equipped.

AMENDMENT TO SECTION 5 – FUNCTION OF GENERATOR CONTROLS

Delete Section 5-12. HIGH-FREQUENCY INTENSITY CONTROL (Optional)

AMENDMENT TO SECTION 6 – FUNCTION OF ENGINE CONTROLS

Delete Section 6-7. ELECTRICAL TACHOMETER (Optional)

AMENDMENT TO SECTION 7 – SEQUENCE OF OPERATION

Amend Section 7-4. POWER PLANT OPERATION

Add CAUTION block at beginning of Section.

CAUTION

The weld output terminals will be electrically hot when utilizing auxiliary power unless the unit is equipped with a contactor and the contactor is open (deenergized).

AMENDMENT TO SECTION 9 – ENGINE MAINTENANCE

Amend Section 9-3. GOVERNOR SERVICE

Weld speed of this engine is 1850 rpm.

Amend Section 9-4. CARBURETOR FLOAT SETTING

NOTE

Do not bend, twist, or apply pressure on the float body. The float body, when viewed from the free end, must be centered between and at right angles to the machined surface, and must move freely on the float axle.

This engine is equipped with a Teledyne Walbro carburetor. To ensure correct fuel level in the float chamber, check distance (dimension A, Figure 9-1) from top of float to machined surface of throttle body (no gasket) with throttle body inverted. This dimension should be 1-1/16 inches plus or minus .020 inch. To increase or decrease distance from the top of the float body to the machined surface, use a long nose pliers and bend the float lever at a point close to the float body.

Delete Figure 9-2. Carburetor Float Setting

Amend Figure 9-5. IDLE CONTROL/GOVERNOR LINKAGE ADJUSTMENT AND HIGH-ALTITUDE CARBURETOR MODIFICATION

Amend Section 9-7. IDLE CONTROL/GOVERNOR LINKAGE ADJUSTMENT (Figure 9-5)

To obtain proper engine idle and/or weld speed, perform the following procedures:

1. Loosen the linkage socket nuts (6 & 8) and remove the hardware (10) securing the linkage socket (9) to the governor. Rotate the linkage socket (9) until the throttle stop plate (2) is about 1/32 inch from the stop (1). A clockwise rotation of the linkage socket (9) will shorten the governor linkage (7) and reduce the gap; a counterclockwise rotation of the linkage socket (9) will lengthen the governor linkage (7) and widen the gap. (In some cases it may be necessary to adjust the linkage (7) itself to obtain the 1/32 inch gap required.) Tighten the linkage socket nuts (6 & 8) to lock the position of the linkage sockets (5 & 9).

IMPORTANT

Check the linkage (7) for freedom of movement throughout its entire travel. If the linkage is binding due to the linkage sockets (5 & 9) being out of proper alignment, loosen the linkage socket nuts (6 & 8) and rotate the sockets (5 & 9) slightly until unrestricted movement of the linkage (7) is restored. Tighten the linkage socket nuts (6 & 8).

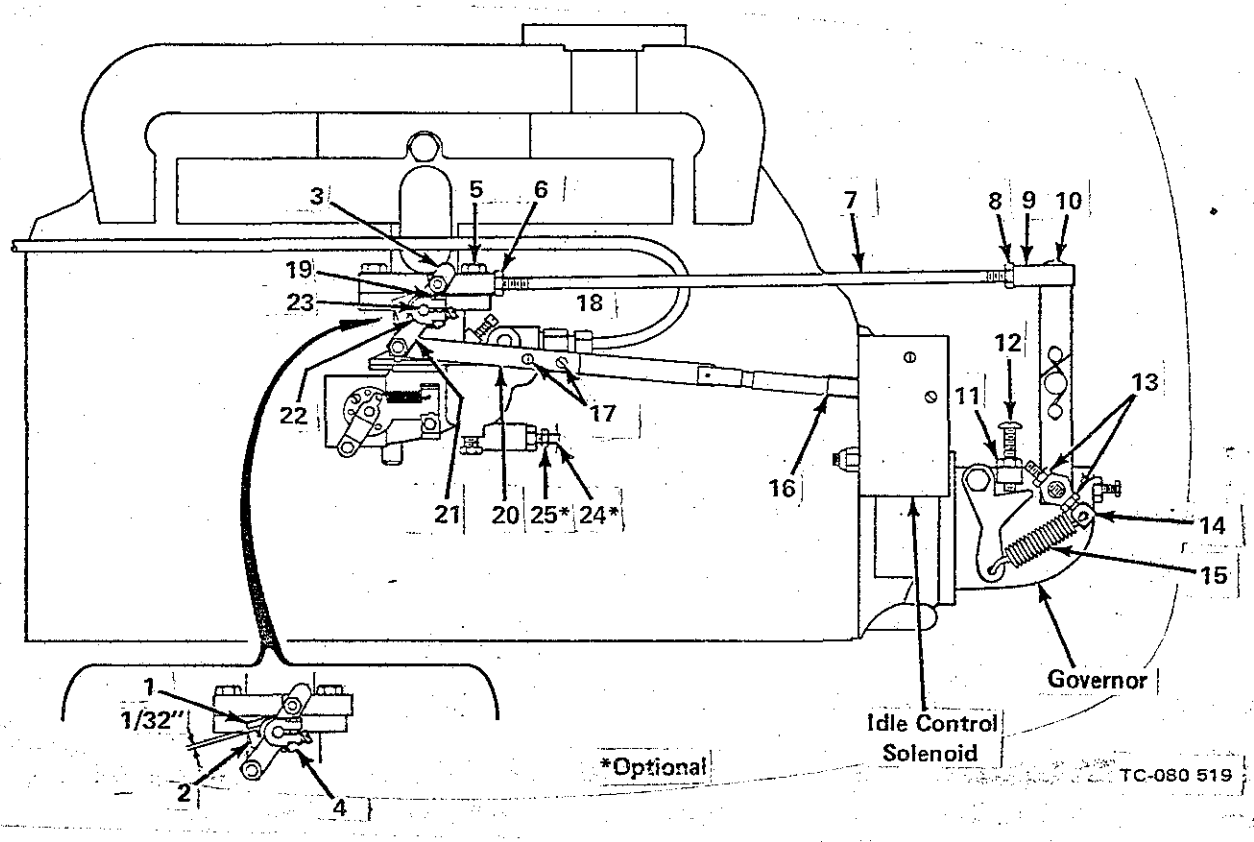


Figure 9-5. Idle Control/Governor Linkage Adjustment And High-Altitude Carburetor Modification

CAUTION

Ensure that body limbs are clear of the fan before starting or working on the engine.

2. Recheck all adjustments made thus far. Place the IDLE CONTROL switch in the LOCK OUT position. Start the engine and allow it to reach normal operating temperature (about five minutes). Ensure that the CHOKE control is pushed fully in at this time.

3. Pull the arm (3) toward the front of the welding generator to the idle position. Maintain pressure on the arm (8) to butt against the idle screw (4) throughout the following adjustments:

   A. Rotate the idle speed screw (4) to obtain 550 rpm. Clockwise rotation of the screw (4) will increase engine rpm, whereas counterclockwise rotation of the screw (4) will decrease engine rpm.

   B. Rotate the idle mixture adjustment screw (18) counterclockwise until the engine begins to falter or roll; then rotate the screw (18) clockwise until the engine operates smoothly. Rotating the screw (18) clockwise restricts the fuel flow, making the air-fuel mixture leaner. Rotating the screw (18) counterclockwise admits more fuel, making the air-fuel mixture richer.

4. Loosen the alignment screw (19) and position the idle alignment clamp (22) radially and laterally until the following conditions are simultaneously met:

   A. Position the clamp (22) laterally so that the outer edge of the clamp (22) is flush with the end of throttle shaft (23).

   B. Position the clamp (22) radially so that the idle arm (21) is positioned radially approximately as shown in Figure 9-5.

   Tighten the alignment screw (19).

5. Loosen the two idle control screws (17). Place the IDLE CONTROL switch in the AUTOMATIC IDLE position. Operation of the idling device is automatic when the IDLE CONTROL switch is in the AUTOMATIC IDLE position. When the engine is running, engine speed will remain at idle until an arc is established, at which time the engine immediately comes up to weld rpm. When the arc is broken, a time delay of approximately 10 seconds will exist before the engine returns to idle rpm. The length of this time delay is not adjustable. Ensure that the idle control solenoid plunger (17) is at the end of its travel within the solenoid coil body.

6. Pull the arm (3) toward the front of the welding generator to the idle position. Maintain pressure on the arm (3) to butt against the idle screw (4) and adjust the length of the idle linkage arm (21) until 1200 rpm is obtained. Tighten the two idle control screws (17).

NOTE

Do not readjust the idle speed screw (4) when adjusting the idle control idle speed.

IMPORTANT

Check the idle linkage (20) for freedom of movement throughout its entire travel. If the linkage (20) is binding due to the linkage (20) being out of proper alignment with the idle arm (21) adjust the idle alignment clamp (22) laterally until unrestricted movement of the linkage (20) is restored. Repeat Steps 4, 5 and 6.

CAUTION

Ensure that body limbs are clear of the fan before working on the engine.

7. Place the IDLE CONTROL switch in the LOCK OUT position. Loosen the governor speed adjusting screw securing nut (11). Adjust the governor speed adjustment screw (12) until a high idle speed of 1850 rpm is obtained. Tighten the securing nut (11) to maintain the governor speed setting.

8. Check the governor engine regulation by applying and removing the engine load. If a governor sensitivity adjustment is deemed necessary, loosen one of the two locking nuts (13) and proceed with the following instructions.

   A. IF REGULATION RANGE IS TOO BROAD — Decrease the governor spring (15) tension by sliding the sensitivity adjustment screw (14) inward.

   B. IF REGULATION RANGE IS TOO NARROW — Increase the governor spring (15) tension by sliding the sensitivity adjustment screw (14) outward.

   C. IF ENGINE SURGES (HUNTS) UNDER LOAD — Increase the governor spring (15) tension by sliding the sensitivity adjustment screw (14) outward.

9. Tighten the two locking nuts (13) to maintain the desired governor sensitivity. Readjust the governor speed by repeating Step 7.

NOTE

Whenever the governor sensitivity (Step 8) is adjusted, the governor speed (Step 7) MUST be readjusted. Whenever the governor speed (Step 7) is adjusted, the governor sensitivity (Step 8) MAY need readjustment.

Amend Section 9-8. HIGH-ALTITUDE CARBURETOR MODIFICATION (Optional) (Figure 9-5)

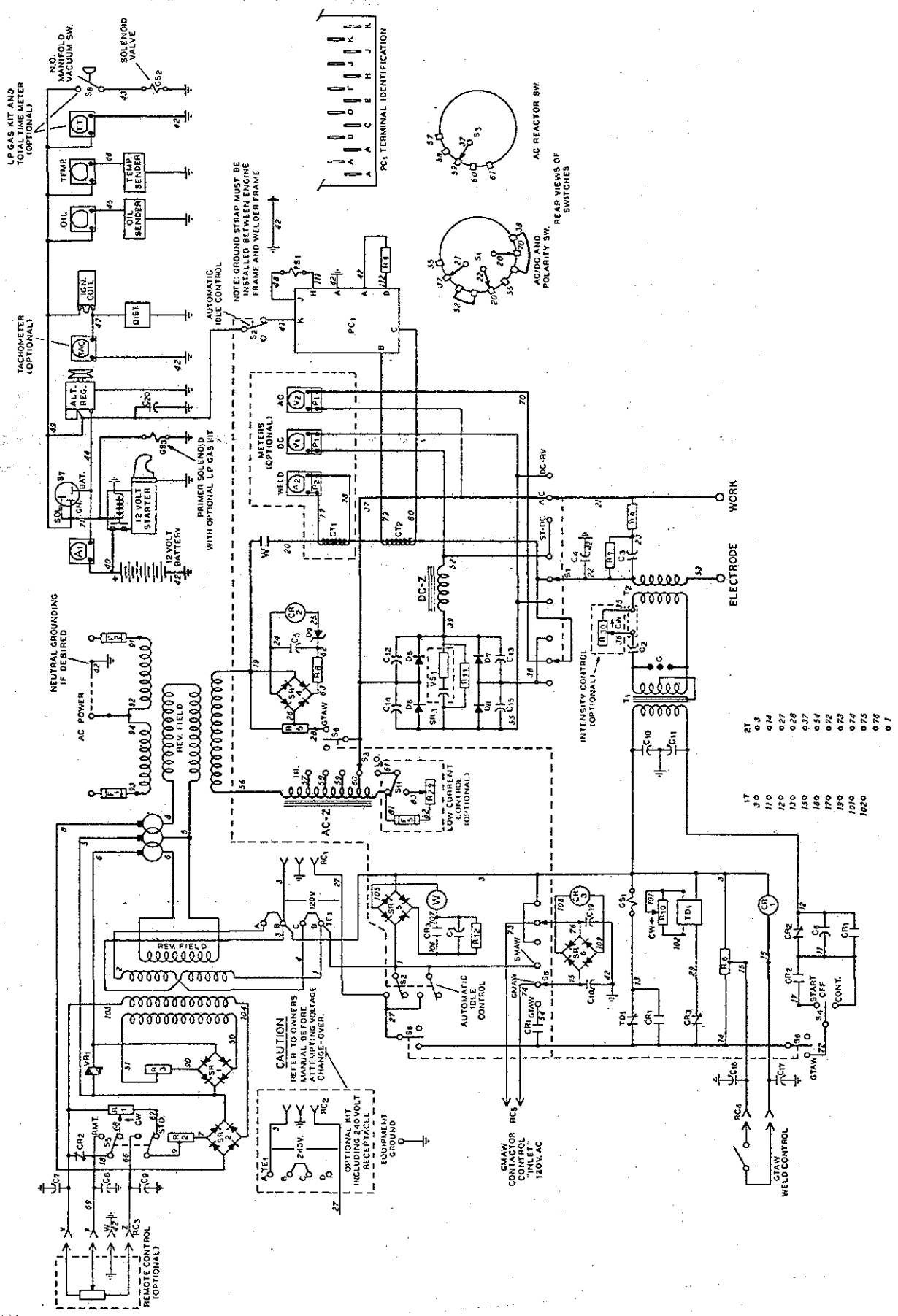
The Teledyne Walbro carburetor can be equipped with an adjustable main jet for high-altitude operation (above 4000 ft). Minor adjustment will be necessary for proper operation at a particular altitude. Whenever a carburetor adjustment is deemed necessary, see Figure 9-5 and proceed as follows:

Loosen the main adjustment screw locking nut (25). Apply a near-full engine load to the welding generator. Rotate the main adjustment screw (24) clockwise until the engine begins to falter and lose RPM. Rotate the main adjustment screw (24) counterclockwise until the engine operates smoothly; then continue counterclockwise rotation for 1/4 turn. Rotating the screw (24) clockwise restricts the fuel flow, making the air-fuel mixture leaner. Rotating the screw (24) counterclockwise admits more fuel, making the air-fuel mixture richer. Remove the engine load. Tighten the locking nut (25).

IMPORTANT

Restricting the fuel flow to the point where the mixture is too lean will cause valve burning.

Amend Figure 10-2. Circuit Diagram For Welding Generator



Effective With Serial No. HJ211479 Thru HK237626

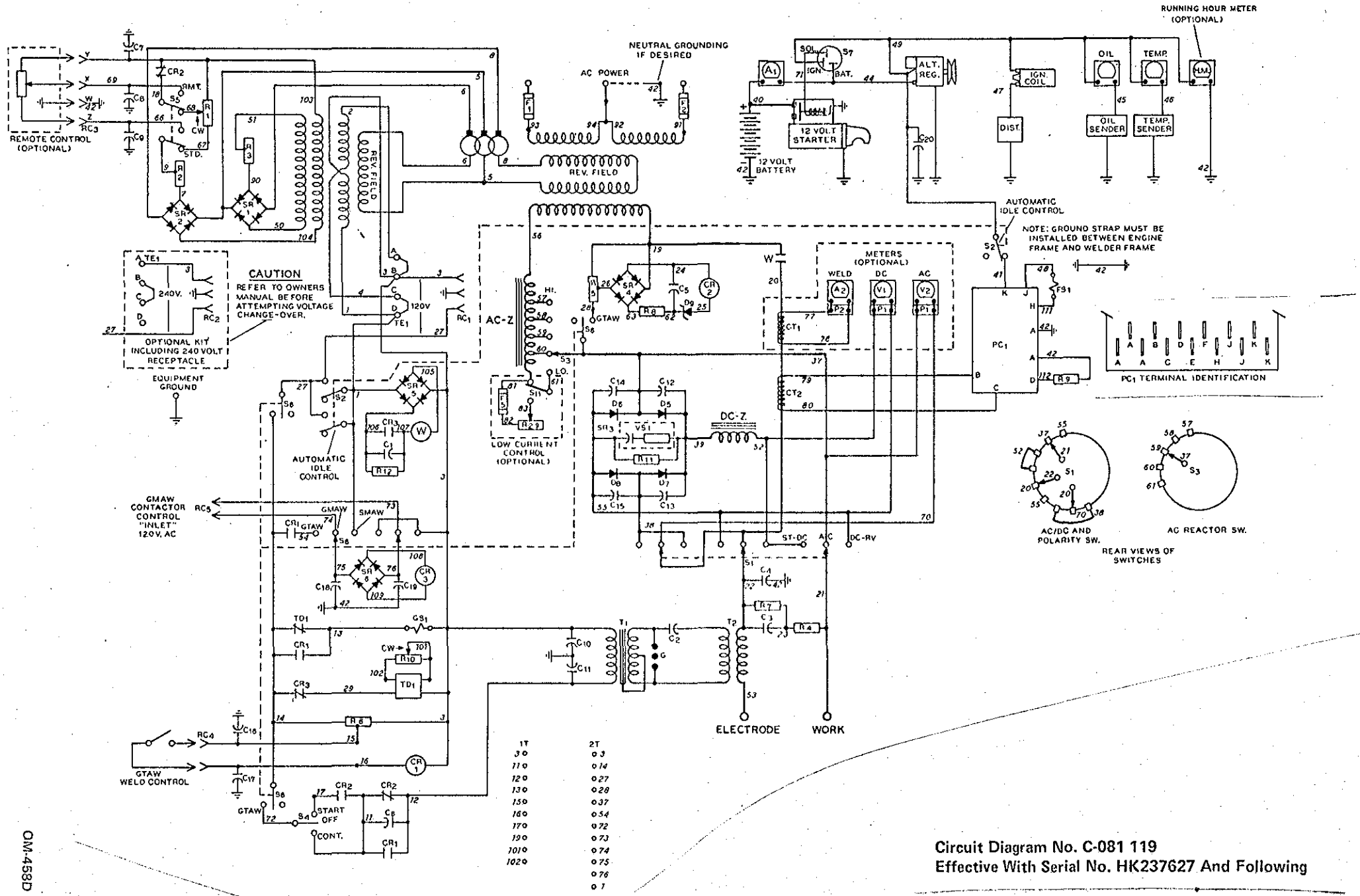


Figure 10-2. Circuit Diagram For Welding Generator

Circuit Diagram No. C-081 119
Effective With Serial No. HK237627 And Following

Item Or Page No.	Dia. Mkgs.	Part No. Listed In Parts List	Replaced With Part No.	Description	Quantity
Item 79	VR1	038 493	Deleted	(Eff with S/N HK237627)	
Item 149		032 269	080 497	FUSE BOX (Eff with S/N HJ211479)	1
			079 496	COVER, junction box (Eff with S/N HJ211479)	1
			601 158	BLANK, snap-in 7/8 inch (Eff with S/N HJ211479)	2
Page 6		010 021	010 021	CLAMP, steel-cushion 9/16 dia x 11/32 hole (qty. change)	2
			010 014	CLAMP, steel-cushion 3/4 dia x 13/64 hole	1
Item 165		059 010	059 019	STATOR	1

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

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

1-1. INTRODUCTION

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

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

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

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

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

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

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

1-2. GENERAL PRECAUTIONS

A. Burn Prevention

Wear protective clothing - leather (or asbestos) gauntlet gloves, hat, and high safety-toe shoes. Button shirt collar and pocket flaps, and wear cuffless trousers to avoid entry of sparks and slag.

Wear helmet with safety goggles or glasses with side shields underneath, appropriate filter lenses or plates (protected by clear cover glass). This is a MUST for welding or cutting, (and chipping) to protect the eyes from radiant energy and flying metal. Replace cover glass when broken, pitted, or spattered. See 1-3A.2.

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

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

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

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

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

B. Toxic Fume Prevention

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

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

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

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

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

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

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

C. Fire and Explosion Prevention

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

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

To prevent fires and explosion:

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

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

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

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

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

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

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

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

This includes: a thorough steam or caustic cleaning (or a solvent or water washing, depending on the combustible's solubility) followed by purging and inerting with nitrogen or carbon dioxide, and using protective equipment as recommended in A6.0. Waterfilling just below working level may substitute for inerting.

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

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

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

D. Compressed Gas Equipment

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

1. Pressure Regulators

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

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

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

Leaks - if gas leaks externally.
Excessive Creep - if delivery pressure continues to rise with downstream valve closed.
Faulty Gauge - if gauge pointer does not move off stop pin when pressurized, nor returns to stop pin after pressure release.

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

2. Cylinders

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

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

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

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

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

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

Locate or secure cylinders so they cannot be knocked over.

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

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

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

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

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

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

Never refill any cylinder.

Cylinder fittings should never be modified or exchanged.

3. Hose

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

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

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

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

Coil excess hose to prevent kinks and tangles.

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

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

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

4. Proper Connections

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

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

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

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

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

5. Pressurizing Steps:

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

Stand to side of regulator while opening cylinder valve.

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

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

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

E. User Responsibilities

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

F. Leaving Equipment Unattended

Close gas supply at source and drain gas.

G. Rope Staging-Support

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

1-3. ARC WELDING

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

A. Burn Protection

Comply with precautions in 1-2.

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

1. Protective Clothing

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

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

2. Eye and Head Protection

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

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

Protect filter plate with a clear cover plate.

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

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

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

3. Protection of Nearby Personnel

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

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

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

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

B. Toxic Fume Prevention

Comply with precautions in 1-2B.

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

C. Fire and Explosion Prevention

Comply with precautions in 1-2C.

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

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

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

D. Compressed Gas Equipment

Comply with precautions in 1-2D.

E. Shock Prevention

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

To protect against shock:

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

1. Grounding the Equipment

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

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

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

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

*Trademark of Proctor & Gamble.

2. Electrode Holders

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

3. Connectors

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

4. Cables

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

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

5. Terminals And Other Exposed Parts

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

6. Electrode Wire

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

7. Safety Devices

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

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

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

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

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

1-4. STANDARDS BOOKLET INDEX

For more information, refer to the following standards or their latest revisions and comply as applicable:

1. ANSI Standard Z49.1, SAFETY IN WELDING AND CUTTING obtainable from the American Welding Society, 2501 NW 7th St., Miami, Fla. 33125.

2. ANSI Standard Z87.1, SAFE PRACTICE FOR OCCUPATION AND EDUCATIONAL EYE AND FACE PROTECTION, obtainable from American National Standards Institute, 1430 Broadway, New York, N.Y. 10018.

3. American Welding Society Standard A6.0, WELDING AND CUTTING CONTAINERS WHICH HAVE HELD COMBUSTIBLES, obtainable same as item 1.

4. NFPA Standard 51, OXYGEN-FUEL GAS SYSTEMS FOR WELDING AND CUTTING, obtainable from the National Fire Protection Association, 470 Atlantic Avenue, Boston, Mass. 02210.

5. NFPA Standard 518, CUTTING AND WELDING PROCESSES, obtainable same as item 4.

6. CGA Pamphlet P-1. SAFE HANDLING OF COMPRESSED GASES IN CYLINDERS, obtainable from the Compressed Gas Association, 500 Fifth Avenue, New York, N. Y. 10036.

7. OSHA Standard 29 CFR, Part 1910, Subpart Q, WELDING, CUTTING AND BRAZING.

Rated Amperes @ 100% Duty Cycle	Welding Current Ranges AC Amps	Welding Current Ranges DC Amps	Current Adjustments	Open-Circuit Voltage Range	Power	Dimensions (Inches)	Weight (Pounds) Net	Weight (Pounds) Ship
300 AC @ 34V	35-50 50-80 80-140	30-45 45-90 70-130	Five Current Ranges With Fine Adjustment In Each Range	55 To 80	3 kva 120 Volts AC 50/60 Hz While Welding	Height - 48 Width - 25 Depth - 73	1660	1770
300 DC @ 32V	140-250 240-400	120-220 190-350			7.5 kva 120/240 Volts AC 50/60 Hz As Power Plant			

Figure 2-1. Specifications

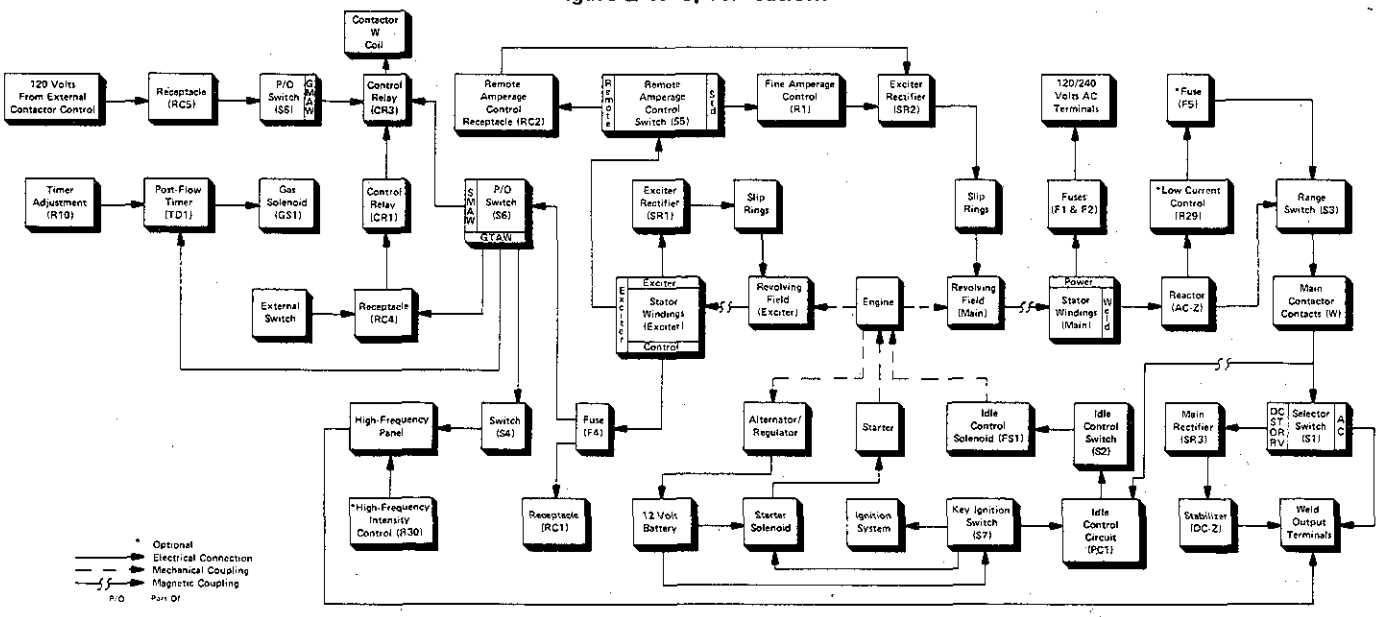

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Figure 2-2. Functional Diagram

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 herein 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 Model Description and/or Stock Number and Serial (or Style) Numbers of the equipment be supplied.

2-3. DESCRIPTION

This welding generator is driven by a gasoline engine and produces ac and dc welding current. This unit is designed to be used in conjunction with the Shielded Metal-Arc (SMAW), Gas Metal-Arc (GMAW), and Gas Tungsten-Arc (GTAW) Welding processes. A duplex receptacle on the front panel provides 120 VOLTS AC, at 50/60 Hertz to power lights, tools, etc., while welding. When welding is not being performed and the FINE AMPERAGE control is set at maximum, a full 7.5 kva of single-phase, 120/240 volts ac, at 50/60 Hertz is available to run power equipment or to provide standby service to rural, residential, or other buildings.

NOTE

This welding generator has reconnectable capability to provide 240 volts dc auxiliary power at the front panel if the optional receptacle kit is ordered. Should preparation and installation (or information if factory installed) be desired, see Section 5-14 for complete instructions, and delete all reference to 120 volts ac duplex receptacle and replace with 240 volts ac duplex receptacle.

2-4. SAFETY

Before the equipment is put into operation, the safety section at the front of this manual should be read completely. This will help avoid possible injury due to misuse or improper welding applications.

The following definitions apply to CAUTION, IMPORTANT, and NOTE blocks found throughout this manual:

CAUTION

Under this heading, installation, operating, and maintenance procedures or practices will be found that if not carefully followed may create a hazard to personnel.

IMPORTANT

Under this heading, installation, operating, and maintenance procedures or practices will be found that if not carefully followed may result in damage to equipment.

NOTE

Under this heading, explanatory statements will be found that need special emphasis to obtain the most efficient operation of the equipment.

SECTION 3 - INSTALLATION

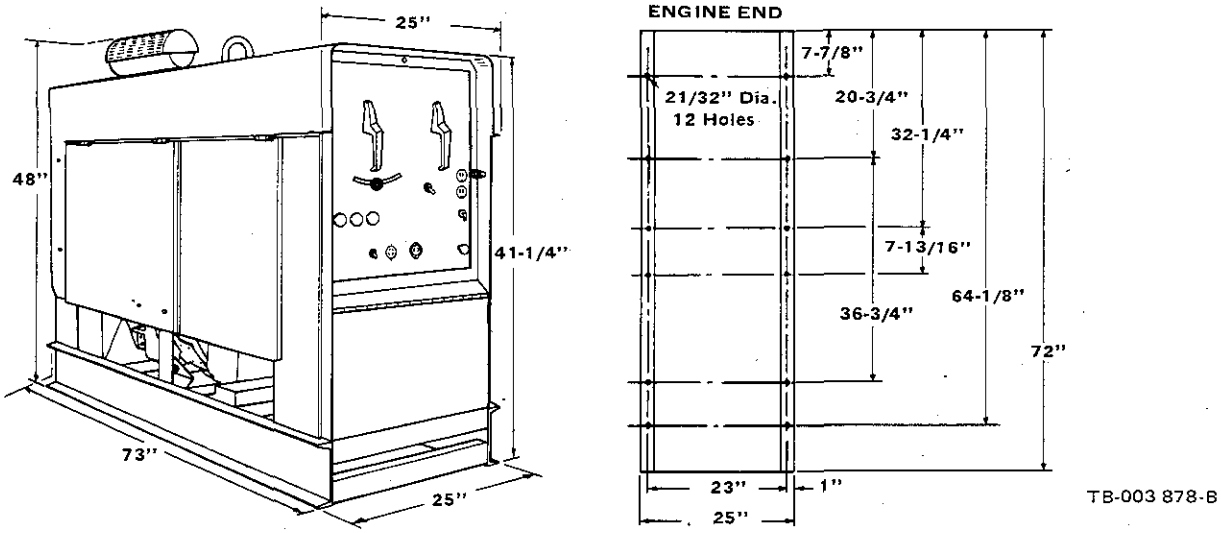

Figure 3-1. Dimensional Drawing And Base Mounting Hole Layout

3 - 1. LOCATION (Figure 3-1)

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

IMPORTANT

If this welding generator is to be mounted on a trailer (optional), ensure that the engine end is mounted toward the front (hitch end) of the trailer to maintain proper weight distribution. Also ensure that the torque weight of the trailer is 5 to 10% of the gross vehicle weight. It is recommended that a properly fitting canvas cover (optional) be placed over the welding generator when not in operation to protect the unit from the environment.

CAUTION

If this unit is to be operated indoors, it should be located in a place where the exhaust fumes from the engine can be vented out of the building. Failure to comply with proper venting may result in serious bodily injury or loss of life.

IMPORTANT

The engine exhaust system on this welding generator has not been equipped with a spark arrestor unless it was specifically ordered as an optional accessory. A spark arrestor, maintained in effective working order, is mandatory if this welding generator is to be operated in a National Forest, or on California grasslands, brush, or forest covered land (see Section 4442 of California Public Resources Code). For other areas, check your state and local laws.

A proper installation site permits freedom of air movement into and out of the welding generator, and also least subjects the unit to dust, dirt, moisture, and corrosive vapors. A minimum of 18 inches of unrestricted space must be maintained between the welding generator front and rear panels and the nearest obstruction. Also, the underside of the welding generator must be kept completely free of obstructions. The installation site should also permit easy removal of the outer enclosure for maintenance functions.

IMPORTANT

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

Holes are provided in the base for mounting purposes. Figure 3-1 gives overall dimensions and the base mounting hole layout.

On most welding generators a lifting device is provided for moving the unit. However, if a fork lift vehicle is used for lifting the unit, be sure that the lift forks are long enough to extend completely under base.

IMPORTANT

The use of lift forks too short to extend out of the opposite side of the base will expose internal components to damage should the tips of the lift forks penetrate the bottom of the unit.

3 - 2. WELD OUTPUT CONNECTIONS (Figure 3-2)

To obtain the full rated output from this unit, it is necessary to select, install, and maintain proper welding cables. Failure to comply in any of these areas may result in less than satisfactory welding performance.

CAUTION

Ensure that the unit is completely shut down before making any weld output connections.

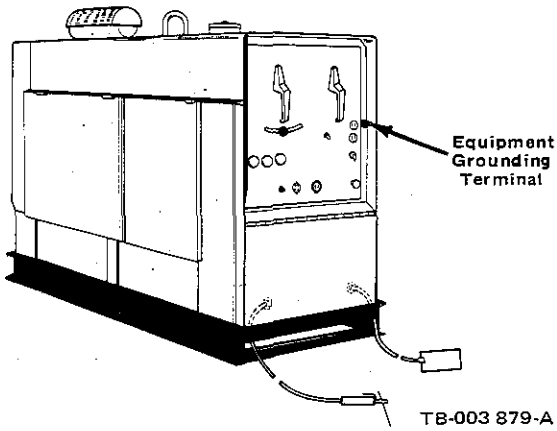

Figure 3-2. Weld Output Connections

A. Location

The ELECTRODE and WORK weld output terminals are located on the lower portion of the front panel. Open the lower front access door. Route the weld cables between the two horizontal pieces of angle iron on the front of the base (see Figure 3-2) and connect the cables to the weld output terminals. Secure the lower access door.

B. Welding Cables

If welding cables were not ordered with this unit, the steps listed should be followed to ensure the best welding performance:

1. It is recommended that the welding cables be kept as short as possible, be placed close together, and be of adequate current carrying capacity. The resistance of the welding cables and connections causes a voltage drop which is added to the voltage of the arc. Excessive cable resistance may result in overloading as well as reducing the maximum current output capability of this unit. Proper operation is to a great extent dependent on the use of welding cables and connections that are in good condition and of adequate size. An insulated electrode holder must be used to ensure the operator's safety.

2. Use Table 3-1 as a guide for selecting correct cable size for the anticipated maximum weld current which will be used. Table 3-1 shows total cable length, which includes the electrode and work cable. Example: If the electrode holder cable is 75 feet long and the work cable is 25 feet long, select the size cable that is recommended for 100 feet at the maximum weld current that is to be used.

3. Do not use damaged or frayed cables.

4. Follow the electrode holder manufacturer's instructions for installing the electrode holder onto the electrode cable.

5. Use correct lugs on the weld cable to connect the work clamp and to connect the cables to the weld output terminals. Install the cables to the output terminals according to Section 3-2A.

6. Ensure that all connections are clean and tight.

3 - 3. EQUIPMENT GROUNDING TERMINAL (Figure 3-2)

Normally, engine-driven welding generators do not require grounding. However, since this unit has auxiliary power plant capability, grounding of the frame and case may be required. A grounding terminal has been provided on the front panel for this purpose (see Figure 3-2). For detailed grounding instructions consult your local or state codes or the latest issue of the National Electrical Code.

Table 3-1. Weld Cable Size

WELDING AMPERES	*TOTAL LENGTH OF CABLE (COPPER) IN WELD CIRCUIT							
	*50	100	150	200	250	300	350	400
100	4	4	2	2	2	1	1/0	1/0
150	2	2	2	1	1/0	2/0	3/0	3/0
200	1	1	1	1/0	2/0	3/0	4/0	4/0
250	1/0	1/0	1/0	2/0	3/0	4/0	4/0	2-2/0
300	2/0	2/0	2/0	3/0	4/0	4/0	2-2/0	2-3/0
350	3/0	3/0	3/0	4/0	4/0	2-2/0	2-3/0	2-3/0
400	3/0	3/0	3/0	4/0	2-2/0	2-3/0	3-2/0	2-4/0

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NOTE: *A. 50 FEET OR LESS.

*B. CABLE SIZE IS BASED ON DIRECT CURRENT (DC), 100% DUTY CYCLE AND EITHER A 4 VOLTS OR LESS DROP OR A CURRENT DENSITY OF NOT OVER 300 CIRCULAR MILS PER AMP.

*C. WELD CABLE INSULATION WITH A VOLTAGE RATING TO WITHSTAND THE OPEN-CIRCUIT VOLTAGE (OCV) OF THE WELDING GENERATOR MUST BE USED. WHILE MOST WELDING GENERATORS HAVE AN OPEN-CIRCUIT VOLTAGE OF LESS THAN 100 VOLTS, SOME WELDING GENERATORS OF SPECIAL DESIGN MAY HAVE HIGHER OPEN-CIRCUIT VOLTAGE.

3 - 4. REMOTE AMPERAGE CONTROL CONNECTIONS (Figure 5-1)

The REMOTE AMPERAGE CONTROL receptacle, located on the front panel of the welding generator, provides a junction point for connecting a Remote Amperage Control to the amperage control circuitry in the welding generator.

To connect the Remote Amperage Control to the REMOTE AMPERAGE CONTROL receptacle, insert the four-prong plug into the receptacle and rotate it clockwise.

3 - 5. CONTACTOR CONTROL CONNECTIONS (Figure 5-1)

The CONTACTOR CONTROL receptacle, located on the lower front control panel, is a two-pole, twistlock, motor base, male receptacle. The corresponding plug for this receptacle is supplied with the welding generator as standard equipment. The function of the CONTACTOR CONTROL receptacle is to provide a connection point between the Remote Contactor Control and the contactor in the welding generator. To energize the contactor from a remote station, the remote station must feed 120 volts ac 50/60 Hertz electrical power to this receptacle. Do not attempt to utilize a remote station in conjunction with this unit unless the PROCESS SWITCH is in the GAS METAL-ARC position.

3 - 6. HIGH-FREQUENCY START CONTROL RECEPTACLE (Figure 5-1)

A two-pole, twistlock receptacle, labeled HIGH-FREQUENCY START CONTROL, is provided on the lower front control panel for connecting one of the two supplied Remote Hand Switches. The Remote Hand Switch has a plug that corresponds to the HIGH-FREQUENCY START CONTROL receptacle. Insert the plug into the receptacle and rotate it clockwise.

3 - 7. SHIELDING GAS VALVE CONNECTIONS (Figure 5-1)

A valve is provided in order to control on and off flow of shielding gas to the electrode holder. The GAS valve input and output connections both have right-hand threads. Ensure that the hose from the shielding gas source is attached to the connection on the GAS valve labeled IN. The shielding gas hose from the electrode holder must be attached to the connection on the GAS valve labeled OUT.

3 - 8. 120/240 VOLTS AC TERMINALS (Figure 3-3)

CAUTION

Due to the high potential that is present at the 120/240 volts ac terminals while the welding generator is operating, it is recommended that connections to the 120/240 volts ac terminals be made only by a licensed electrician in order to avert any chance of personal injury due to faulty installation. Never attempt to make connections to the 120/240 volts ac terminals while the engine is operating.

The 120/240 volts terminals act as a junction point for connecting accessory equipment which requires use of the 7.5 kva, 120/240 volts, 50/60 Hertz power plant. The power that can be obtained at these terminals may be used to run power equipment or to provide standby service to rural, residential, or other buildings requiring 120/240 volts, 3 wire connection.

IMPORTANT

The PROCESS SWITCH (see Section 5-4) should be in the GAS METAL-ARC position whenever the 7.5 kva power plant is being utilized.

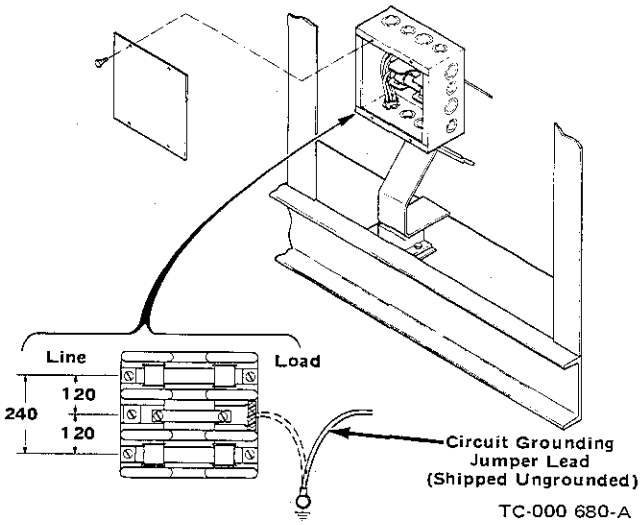

Figure 3-3. Power Plant Connections

CAUTION

Do not change fuses or connect any lead wires while engine is running. Install circuit grounding jumper lead if NEC or local electrical code requires grounded neutral conductor. Insert load lead wires through proper cord grip box connector. Strip 1/2 inch insulation and connect to proper load terminals and tighten connectors securely.

NOTE

The FINE AMPERAGE control must be rotated to the 100 (full counterclockwise) position whenever the 120/240 volts power plant is being utilized.

The voltage will vary in accordance with the load applied to the 120/240 volts ac terminals. The voltage at various loads may be determined from Figure 3-4.

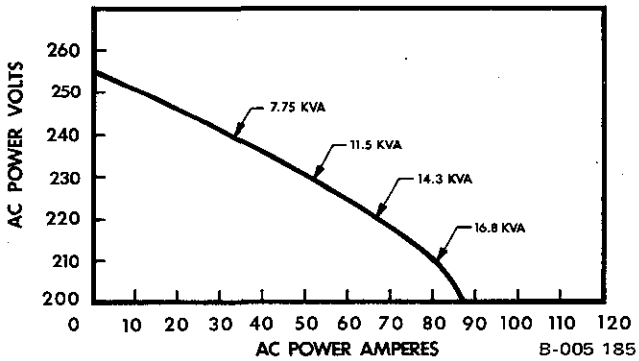

Figure 3-4. AC Power Curve For 120/240 Volts AC Terminals

SECTION 4 - ENGINE PREPARATION

NOTE

See the Engine Manufacturer's manual (F-163 Engine) for complete engine care.

4 - 1. LUBRICATION

This engine was shipped from the factory with its crankcase filled with the correct amount and type of break-in oil unless otherwise ordered. Check the oil level before attempting to operate the engine. It should be up to the FULL mark on the dipstick. Add a quality brand of oil if the oil level is low. See the oil selection chart, Table 9-1, in Section 9.

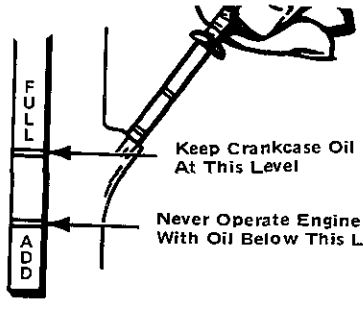

Figure 4-1. Oil Level

IMPORTANT

New engines have very close clearance between their moving parts. Therefore, it is recommended that loading of the engine be kept to a minimum during the first 50 hours of operation. Be sure to check the oil level several times each day during the engine break-in period. This engine requires about 50 hours of running time before it will be fully broken in.

After about 50 hours of running time, drain the break-in oil and change the oil filter. See the oil selection chart, Table 9-1, in Section 9 for correct oil type and grade to use after the break-in oil is drained.

4 - 2. COOLANT SYSTEM

The liquid capacity of the coolant system in this welding generator is 9 quarts (U.S. Measure). This unit is shipped from the factory with the proper amount of water and anti-freeze to permit operation of the unit at temperatures down to 0°F.

IMPORTANT

If this welding generator is to be operated in temperatures which are below 0°F, additional anti-freeze will have to be added to the coolant system or the liquid in the system will freeze and cause the engine to overheat.

The coolant system is equipped with a 180°F thermostat. If the thermostat should fail, ensure that the replacement has an equal temperature rating.

IMPORTANT

If the thermostat should fail, replace it immediately. Do not run the engine without a thermostat. If the thermostat remains closed, the engine will overheat. If the thermostat remains open, or the engine is run without a thermostat, the engine will run cold. As a result, excess carbon will accumulate, and the oil will become contaminated with sludge.

CAUTION

Caution should be exercised at all times when removing the radiator pressure cap. The cap will turn to an almost full open position, at which point a provision has been made to permit venting built up pressure within the radiator. Allow the pressure to escape before completely removing the cap from the radiator neck. When removing the cap, it is recommended that a glove or rag be used to protect the operator's hand from possible exposure to extremely hot coolant.

The radiator for this engine is equipped with a pressurized cap which is rated at 7 psi. If this cap is ever replaced, ensure that the replacement cap has a rating of 7 psi.

4 - 3. PREPARING NEW BATTERY FOR SERVICE

IMPORTANT

Never attempt to operate the engine without the battery connected. Do not attempt to remove the battery while the engine is running.

A. Wet Charged Battery

NOTE

Connect the negative battery cable to the negative (—) terminal on the battery. This is all that is required to put the battery into service providing it has not discharged during transportation and warehousing. If the battery has enough power to start the engine, it will charge up while the engine is running.

The wet charged battery is shipped with the electrolyte solution added and normally in an operational status. However, due to long periods of idleness, the battery may become weak and thus require charging. The battery should have a specific gravity reading of 1.260 (at 80°F) when fully charged.

If the battery requires charging, refer to Section 4-3B, Step 4.

B. Dry Charged Battery

This battery is shipped in a dry state. To prepare the new battery for operation, it will be necessary to obtain electrolyte, and proceed as follows:

CAUTION

Put on protective eye cover and clothing prior to pouring the electrolyte solution.

1. Remove the battery from the unit and place it on a level worktable or other suitable area.

2. Fill the battery cells to the required level with electrolyte.

3. Place a battery thermometer in one of the center cells and check the specific gravity of each cell with a battery hydrometer.

4. The battery should have a specific gravity of 1.260 (at 80°F) prior to installation. If this condition is not met, charge the battery as follows:

CAUTION

Ensure that the battery caps are removed before charging. Failure to do so may cause the battery to explode should overcharging occur.

   a. Use an automotive type battery charger. This battery should be charged at about a 3.5 ampere rate until correct electrolyte conditions are met. Lower charging rates can be used; however, the time to obtain the correct electrolyte conditions will be longer.

   b. When the battery is charged, disconnect it from the charger and recheck the electrolyte level. Add if necessary. Install the battery caps.

   c. Rinse the empty electrolyte containers with water before discarding. Since battery acid is corrosive to metals, do not pour into a metal sink or drain. Rinse and mutilate the empty electrolyte container before discarding. If acid has accidentally spilled on the battery or work area during filling or charging, neutralize with soda or ammonia solution and flush off with clear water. Use the same procedure if acid is spilled on clothing.

5. Reinstall the battery in the unit ensuring that the negative (—) cable is connected to the negative (—) battery terminal.

4 - 4. AIR CLEANER

This engine is equipped with a dry element type air cleaner. The air cleaner requires no initial service.

4 - 5. FUEL

CAUTION

Do not attempt to fill the fuel tank with the engine running. Do not fill the fuel tank completely as cold fuel will expand when exposed to outside temperature in a warm climate or to engine heat. If the tank is too full, it will overflow causing a potential fire hazard. Never allow fuel to drain on the engine or other components.

IMPORTANT

Use a good grade of "regular," "low-lead," or "no-lead" gasoline of at least 85 octane for this engine. Fuels with a lower octane rating may cause detonation (knocking) which could damage the engine. The "low-lead" or "no-lead" fuels lower the pollution factor and reduce combustion chamber deposits if used exclusively.

The capacity of the fuel tank is 17.5 gallons (U.S. Measure).

The fuel tank is equipped with a trap area in the bottom of the tank. As a result, the tank will not go completely dry. The trap holds water and dirt back from the engine. A drain plug is located on the left bottom of the tank to drain water and dirt from the tank if it should become necessary.

NOTE

The fuel tank cap is equipped with a valve on the inside. This valve must be in the OPEN position at all times or proper venting will not take place. Before operation, examine inside of cap and ensure that valve is rotated to the OPEN position.

Figure 4 - 2 illustrates typical fuel consumption under specific load conditions. Fuel consumption will vary from one engine to another. Different brands of fuel, operating conditions, condition of the engine, etc., will affect the fuel consumption of this engine.

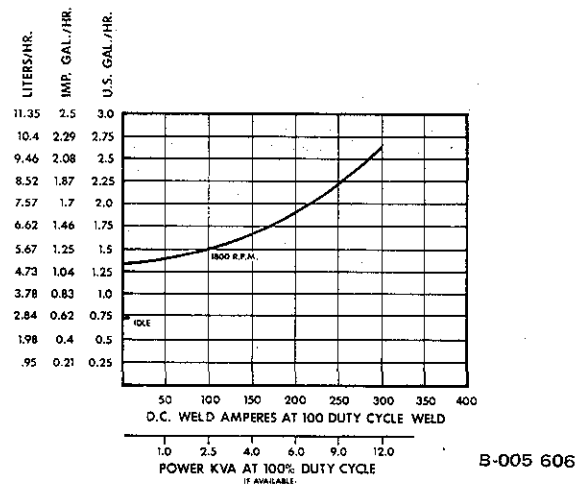

Figure 4-2. Fuel Consumption Chart

SECTION 5 - FUNCTION OF GENERATOR CONTROLS

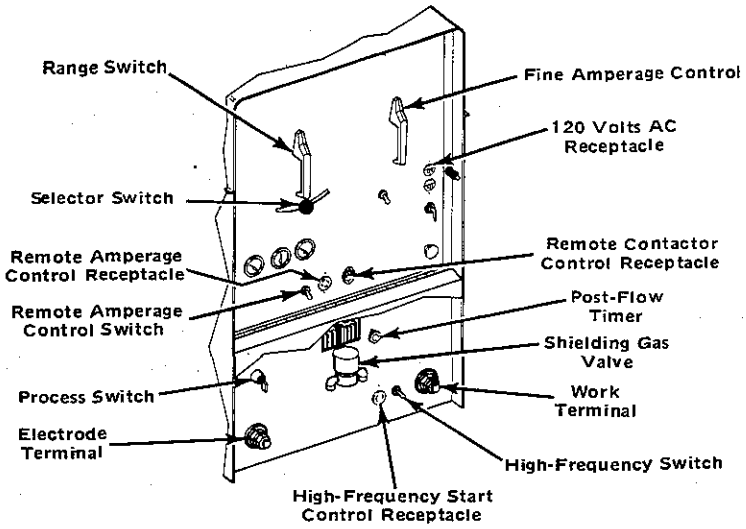

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Figure 5-1. Generator Controls

5 - 1. RANGE SWITCH AND FINE AMPERAGE CONTROL (Figure 5-1)

IMPORTANT

Do not change the position of the Range switch while welding or under load, as this causes arcing across the contacts of the switch. This arcing causes the contacts to become pitted and eventually inoperative.

NOTE

The contacts of the FINE AMPERAGE control are of the continuous type, thereby making it possible to adjust this control while welding.

The Range switch provides five coarse amperage ranges. The range of each switch position is displayed on the nameplate.

The FINE AMPERAGE control permits the operator to select a welding current between the minimum and maximum values of the coarse range selected by the Range switch. The scale surrounding the FINE AMPERAGE control is calibrated from 0-100 percent in increments of 10. When using this control, the operator is selecting a percentage of the coarse range in use, and not an actual amperage value.

NOTE

The FINE AMPERAGE control must be rotated to the 100 (full counterclockwise) position whenever the 120/240 volts power plant is being utilized. The FINE AMPERAGE control may be in any position when using the 120 VOLTS AC duplex receptacle on the front panel.

5 - 2. REMOTE AMPERAGE CONTROL (Figure 5-1)

If a Remote Amperage Control is to be used, make connections from the control to the REMOTE AMPERAGE CONTROL receptacle as instructed in Section 3 - 4.

When remote control of the amperage is desired, it is essential that the REMOTE AMPERAGE CONTROL switch be placed in the REMOTE position. Likewise, if a Remote Amperage Control is not to be utilized, the switch must be in the STANDARD position. When in the STANDARD position, only the FINE AMPERAGE control on the front panel will control the amperage.

When a Remote Amperage Control is being used, the FINE AMPERAGE control on the front panel is switched out of the circuit and is nonfunctional.

5 - 3. SELECTOR SWITCH (Figure 5-1)

The Selector switch provides a means of selecting either ac, dc straight, or dc reverse polarity without changing the secondary cable connections.

IMPORTANT

Do not change the position of the Selector switch while welding or under load, as this causes arcing across the contacts of the switch. This arcing causes the contacts to become pitted and eventually inoperative.

5 - 4. PROCESS SWITCH & CONTACTOR CONTROL RECEPTACLE (Figure 5-1)

The contactor control circuitry in this welding generator has provisions made for the on-off control of open-circuit voltage at the weld output terminals when desired without having to stop and restart the engine. This is achieved through use of the HIGH-FREQUENCY START CONTROL receptacle, PROCESS SWITCH, and CONTACTOR CONTROL receptacle. As long as 120 volts ac is applied to the contactor coil and the engine is operating at weld rpm, open-circuit voltage is present at the output terminals. The various manners by which this can be achieved through use of the three PROCESS SWITCH positions are explained below.

A. Shielded Metal-Arc Position

When the PROCESS SWITCH is placed in the SHIELDED METAL-ARC position, on-off control of open-circuit voltage can only be obtained by stopping and restarting the engine. Open-circuit voltage is present at the output terminals for as long as the switch remains in this position and the engine is running.

IMPORTANT

The PROCESS SWITCH must be in the GAS METAL-ARC position whenever the 7.5 kva power plant is being utilized.

B. Gas Metal-Arc Position

When in the GAS METAL-ARC position, it will be necessary to apply 120 volts ac to the CONTACTOR CONTROL receptacle whenever open-circuit voltage is desired. Removing the 120 volts from the CONTACTOR CONTROL receptacle will deenergize the contactor and suspend weld output.

C. Gas Tungsten-Arc Position

NOTE

When the PROCESS SWITCH is in the GAS TUNGSTEN-ARC position and the switch connected to the HIGH-FREQUENCY START CONTROL receptacle is closed, the GAS valve, POST-FLOW TIMER, and high frequency will all become functional. The specific function of these devices will be explained farther on in this section.

To obtain open-circuit voltage when in the GAS TUNGSTEN-ARC position, it will first be necessary to connect the supplied maintained contact switch to the HIGH-FREQUENCY START CONTROL receptacle which is located on the lower front control panel. Once connected, the maintained contact switch will make open-circuit voltage available whenever and for as long as it is closed.

5 - 5. HIGH-FREQUENCY START CONTROL RECEPTACLE (Figure 5-1)

The HIGH-FREQUENCY START CONTROL receptacle, located on the lower front control panel, is provided as a junction point for connecting the supplied Remote Hand Switch to the welding generator. See Section 3-6 for Remote Hand Switch installation procedure. Whenever the Remote Hand Switch is closed with the PROCESS SWITCH in the GAS TUNGSTEN-ARC position and the HIGH-FREQUENCY switch in the START or CONTINUOUS position, high frequency will be present at the welding electrode, the gas valve will function, and the contactor will energize and place open-circuit voltage on the output terminals. The Remote Hand Switch functions as a remote contactor control regardless of the position of the HIGH-FREQUENCY switch.

5 - 6. HIGH-FREQUENCY SWITCH (Figure 5-1)

The HIGH-FREQUENCY switch, located on the lower front control panel, provides three positions which determine whether the high frequency is on or off.

A. Start Position

When in the START position, high frequency is present at the welding electrode until the arc is initiated. Once an arc is established, and even though the contactor is closed, the high frequency will be deenergized. High frequency will come on automatically if the arc is broken to aid in restarting the arc.

B. Continuous Position

The CONTINUOUS position provides high frequency for as long as the contactor is closed. The high frequency and weld current may be shut off during the weld by releasing the switch which is connected to the HIGH-FREQUENCY START CONTROL receptacle.

C. Off Position

High frequency will not be available when in the OFF position, even if the contactor is closed. This position must be used when performing Shielded Metal-Arc (SMAW) Welding.

CAUTION

Never try to use high frequency when performing Shielded Metal-Arc (SMAW) Welding. Failure to comply may result in the high frequency arcing through the electrode holder and seriously injuring the operator.

5 - 7. POST-FLOW TIMER (Figure 5-1)

An adjustable 0 to 100 second POST-FLOW TIMER, located behind the lower access door, is provided for controlling the period of time shielding gas flows after the arc is extinguished.

To select the desired portion of the maximum 100 second post-flow period available, rotate the POST-FLOW TIMER dial until the appropriate setting is obtained.

As soon as the arc has been extinguished, the POST-FLOW TIMER begins to time out the selected period of post-flow time. Once the timer has timed out, the GAS valve will close and cut off shielding gas flow. The timer will then automatically reset and be ready for another weld cycle.

5 - 8. 120 VOLTS AC RECEPTACLE (Figure 5-1) (For Optional 240 Volts AC Receptacle, See Section 5-14)

Up to 3 kva of 120 volts ac, 50/60 Hertz power is available at this duplex receptacle for operating 120 volts ac or 120 volts universal power tools, lights, etc., when the welding generator is being operated at weld rpm.

NOTE

The FINE AMPERAGE control may be in any position when using the 120 VOLTS AC duplex receptacle on the front panel.

The voltage will vary in accordance with the load applied to the 120 VOLTS AC receptacle. The voltage at various loads may be determined from Figure 5-2.

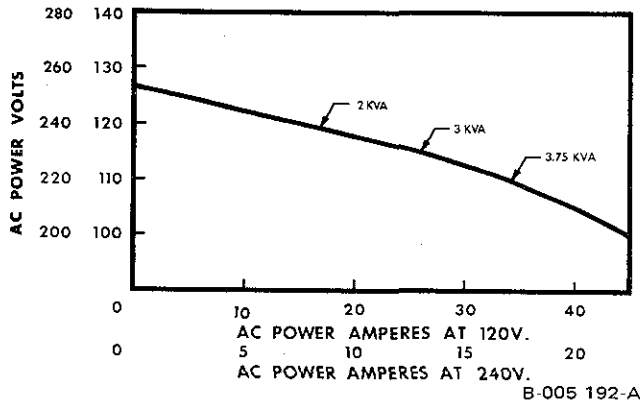
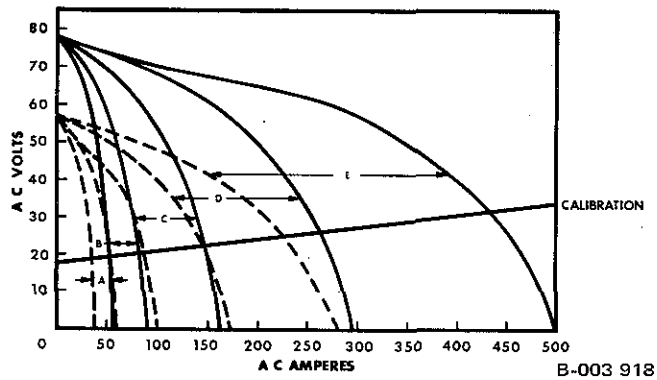


Figure 5-2. AC Power Curve For 120 (And Optional 240) Volts AC Receptacle

5 - 9. VOLT-AMPERE CURVES (Figure 5-2)

The volt-ampere curves show the output voltage and amperage of the welding generator available at any point from the minimum to maximum of each coarse range. The FINE AMPERAGE control controls the output between the minimum and maximum curves of each coarse range shown.



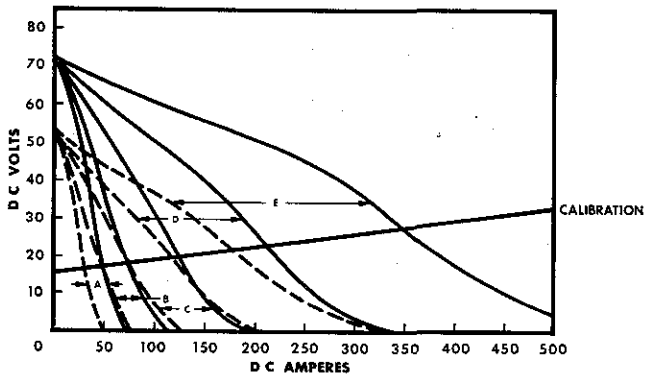


Figure 5-3. Volt-Ampere Curves

Load voltage is predetermined to a large extent by the arc characteristics. With the use of the volt-ampere curves it is possible to determine what the weld current will be at a particular arc voltage. The volt-ampere curves show the minimum and maximum curves of each coarse range. When the FINE AMPERAGE control is adjusted, the volt-ampere curve will fall between the minimum and maximum curves of the particular coarse range in use.

5-10. DUTY CYCLE (Figure 5-4)

The duty cycle of a welding generator is the percentage of a ten minute period that a welding generator can safely be operated at a given output. This welding generator is rated at 100 percent duty cycle. This means that the welding generator can be safely operated at rated load continuously. If the welding amperes are increased beyond rated output, the duty cycle will decrease. Figure 5-4 enables the operator to determine the safe output of the welding generator at various duty cycles.

IMPORTANT

Exceeding the indicated duty cycle will cause damage to the internal components of the welding generator.

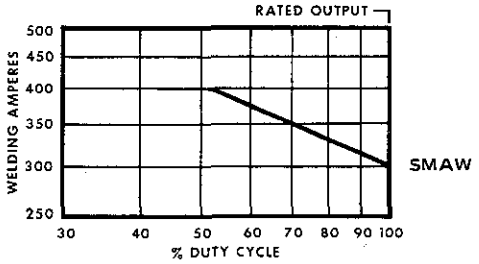


Figure 5-4. Duty Cycle Chart

5-11. METERS (Optional)

This welding generator can be equipped with meters. The meters are for monitoring the welding operation and serve as an indication of the welding process. The meters are not intended for exact current or voltage measurements. These meters are internally connected to the welding generator output terminals. The voltmeter will indicate the voltage at the weld output terminals, but will not necessarily indicate the actual voltage at the welding arc. The ammeter will indicate the current output of the welding generator.

5-12. HIGH-FREQUENCY INTENSITY CONTROL (Optional)

A HIGH-FREQUENCY INTENSITY CONTROL can be provided on the right portion of the lower front panel for controlling the strength of the high frequency. Rotating the control in a clockwise direction will increase the intensity of the high frequency.

NOTE

As the high-frequency intensity is increased, the possibility of causing interference with local radio and television receivers also increases. It is recommended that the HIGH-FREQUENCY INTENSITY CONTROL be set at as low a position as possible to avoid interference.

5-13. LOW CURRENT CONTROL (Optional)

Low current control facilities can be provided on this welding generator for operation below the normal welding generator minimum current. To utilize the LOW CURRENT CONTROL, proceed with the normal sequence of operation as described in Section 7 and, in addition, perform the following steps:

1. Place the RANGE switch in the lowest output range position.
2. Rotate the FINE AMPERAGE control to the MIN (0%) position.
3. Place the REMOTE AMPERAGE CONTROL switch in the STANDARD position.
4. Place the LOW CURRENT CONTROL SWITCH in the LOW AMP. position.
5. Rotate the LOW CURRENT CONTROL to the desired setting. This control may be adjusted while welding.

IMPORTANT

Do not use the low current control facility for output current demand in excess of 35 amperes. For output current demand in excess of 35 amperes, revert to standard current control.

5-14. 240 VOLTS AC DUPLEX RECEPTACLE (Optional) (Figure 5-1)

This welding generator is equipped with a voltage changeover terminal strip TE1 and proper stator to provide reconnection capability for 240 volts ac. Although the capability for either 120 or 240 volts ac is present, an optional kit must be purchased if 240 volts is desired at the front panel.

A. Power Curve For Optional 240 VOLTS AC Duplex Receptacle (See Figure 5-2)

Up to 3 kva of 240 volts ac 50/60 Hertz power is available at the duplex receptacle for operating power tools, lights, etc., when the welding generator is being operated at weld rpm.

NOTE

The FINE AMPERAGE control may be in any position when using the 240 VOLTS AC duplex receptacle on the front panel.

The voltage will vary in accordance with the load applied to the 240 VOLTS AC receptacle. The voltage at various loads may be determined from Figure 5-2.

B. Installation Of 240 VOLTS AC Duplex Receptacle

CAUTION

Ensure that the engine is completely shut down before attempting any connections or examination of components on or near terminal strip TE1.

IMPORTANT

Before proceeding with this installation, familiarize yourself with the circuit diagram provided in the Troubleshooting Section of this manual.

NOTE

All directions, such as left or right, are with respect to the operator facing the welding generator front panel.

NOTE

Retain all hardware removed during this procedure for reinstallation.

1. Shut down the welding generator and raise the right side panel.
2. Remove center bolt from insulation board (see Figure 5-5), remove and retain insulation board.
3. Remove 120 VOLTS AC duplex receptacle RC1 located on front panel (see Figure 5-5). Remove leads and allow to hang free.

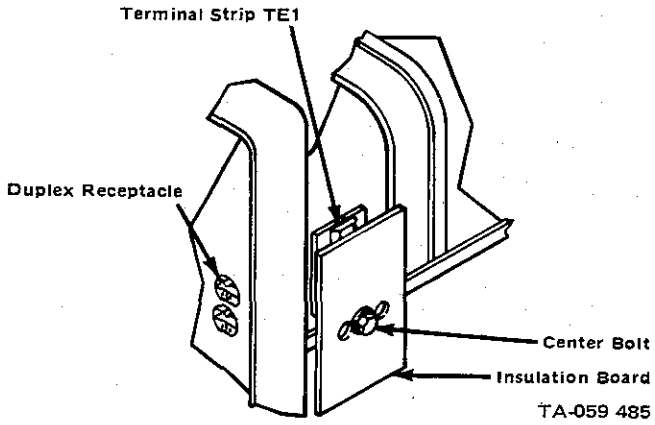


Figure 5-5. Location Of Reconnectable Components

4. Connect leads removed from RC1 to the 240 volts ac duplex receptacle RC2 (one on each side of receptacle).
5. Install RC2 in front panel.
6. Affix supplied 240 VOLTS AC label over existing 120 VOLTS AC designation for duplex receptacle on nameplate.
7. Remove and retain jumper links from terminal strip TE1 (see Figure 5-6).
8. Move lead No. 3 (only lead on jumper link side) from terminal B to terminal A (same side of TE1). See Figure 5-6.
9. Position jumper links on TE1 for 240 volts (see Figure 5-6).
10. Install insulation board over TE1 and secure with bolt.
11. Lower right side panel of welding generator and resume operation.

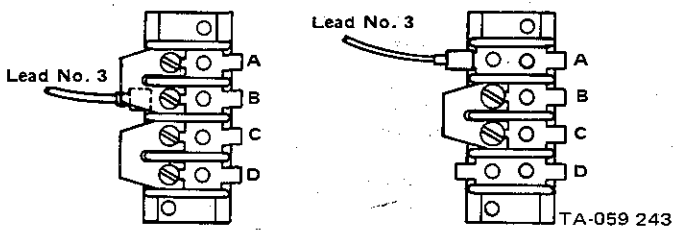


Figure 5-6. Jumper Link Arrangement For 120 And 240 Volts AC

SECTION 6 - FUNCTION OF ENGINE CONTROLS

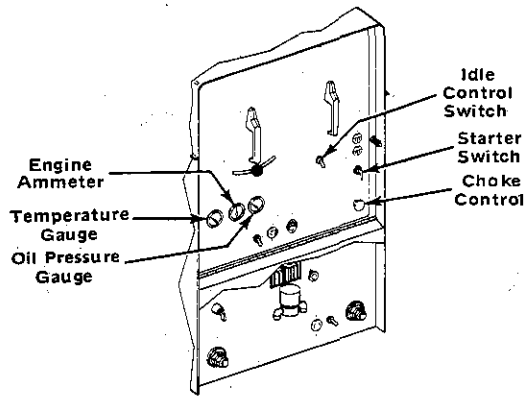


Figure 6-1. Engine Controls

6 - 1. CHOKE CONTROL (Figure 6-1)

A CHOKE control, for varying the fuel-air mixture to the engine, is provided on the front control panel of the welding generator. When the CHOKE control is pulled fully out, very little air will be admitted to the engine through the carburetor thereby supplying a richer mixture of fuel. This position is required if the engine is cold when started. As the engine warms up, it will be necessary to push the CHOKE control inward slowly until it is pushed in as far as it will go. When the CHOKE control is fully in, the engine should be ready for operation.

6 - 2. STARTER SWITCH (Figure 6-1)

A key actuated STARTER switch is provided on the front panel for starting and stopping the engine. Rotating the key fully clockwise to the START position will engage the starter motor and start the engine. Once the engine has started, releasing the key will automatically return the STARTER switch to the RUN position. To stop the engine, rotate the

key fully counterclockwise to the OFF position. Ensure that the key is in the OFF position when the engine is not running.

6 - 3. IDLE CONTROL SWITCH (Figure 6-1)

The automatic idling device saves fuel by allowing the engine to idle when the welding generator is not loaded. The IDLE CONTROL switch controls the operation of this device.

A. Automatic Idle Position

When the IDLE CONTROL switch is in the AUTOMATIC IDLE position, the engine will remain at idle rpm until an arc is struck. When an arc is struck, the engine speed will increase to weld rpm. Approximately 10 seconds after the arc is broken, the engine will return to idle rpm. The AUTOMATIC IDLE position may be used for Shielded Metal-Arc (SMAW) Welding provided accessory power equipment is not being operated from the 120 VOLTS AC receptacle or 120/240 volts ac terminals.

B. LOCK OUT Position

When the IDLE CONTROL switch is in the LOCK OUT position, the engine will run at governed weld rpm (1800). This position must be used whenever the 120 VOLTS AC receptacle or 120/240 volts ac terminals are utilized, or when Gas Tungsten-Arc (GTAW) or Gas Metal-Arc (GMAW) Welding is being performed.

IMPORTANT

If 120 volts ac power equipment is going to be operated from the 120 VOLTS AC receptacle or 120/240 volts ac terminals, be sure the equipment is "off" until the engine is operating at full rpm. The same holds true when returning the engine to idle. If power tools are operated while the engine is idling, low voltage and frequency (resulting from the lower engine idling rpm) at the power receptacle may cause damage to the 120 volts equipment.

6 - 4. ENGINE AMMETER (Figure 6-1)

This meter, labeled AMPERES, registers the charging current supplied to the battery by the alternator. The meter also registers a discharge equivalent to the amount of current being used by the engine's electrical system when the alternator is not charging.

6 - 5. TEMPERATURE GAUGE (Figure 6-1)

This gauge, labeled WATER TEMP, registers the coolant temperature and indicates when overheating occurs.

6 - 6. OIL PRESSURE GAUGE (Figure 6-1)

This gauge, labeled OIL PRESSURE, registers the engine lubricating system pressure in pounds per square inch. Normally, the pressure registered by the gauge should remain constant for a given engine rpm after the engine has warmed up. Should the pressure fluctuate or drop, stop the engine and do not operate the engine again until the trouble has been remedied.

6 - 7. ELECTRICAL TACHOMETER (Optional)

This unit can be equipped with an electrical tachometer. The tachometer, labeled RPM X 100, registers engine speed from 0-4000 rpm.

6 - 8. TOTAL HOUR METER (Optional)

This unit can be equipped with an hour meter. The meter, labeled TOTAL HOURS, registers the total hours of engine operation. This information is useful for routine maintenance on the engine.

SECTION 7 - SEQUENCE OF OPERATION

CAUTION

Never, under any circumstances, operate the welding generator with any portion of the outer enclosure open or removed. In addition to being a hazard to personnel, weather protection to the internal components of the unit will be greatly reduced. Warranty is void if the welding generator is operated with any portion of the outer enclosure open or removed.

IMPORTANT

Ensure that all electrical equipment connected to the 120 VOLTS AC receptacle and 120/240 volts ac terminal strip is turned off before starting or stopping the engine. When starting or stopping, the engine has low rpm which causes low voltage at the output receptacle of the generator. This could result in damage to electrical equipment.

7 - 1. SHIELDED METAL-ARC (SMAW) WELDING

1. Ensure that the engine has been prepared as instructed in Section 4.
2. Make connections to the weld output terminals as required.
3. Rotate the Range switch and FINE AMPERAGE control to the desired position.
4. If a Remote Amperage Control is not to be used, place the REMOTE AMPERAGE CONTROL switch in the STANDARD position. If a Remote Amperage Control is to be used, place the REMOTE AMPERAGE CONTROL switch in the REMOTE position.

IMPORTANT

Do not change the position of the Range switch while welding or under load, as this causes arcing across the contacts of the switch. This arcing causes the contacts to become pitted and eventually inoperative.

NOTE

The contacts of the FINE AMPERAGE control are of the continuous type, thereby making it possible to adjust this control while welding.

5. Place the Selector switch in the desired position.
6. Place the PROCESS SWITCH in the SHIELDED METAL-ARC position.
7. Place the HIGH-FREQUENCY switch in the OFF position.

CAUTION

Never try to use high frequency when performing Shielded Metal-Arc (SMAW) Welding. Failure to comply may result in the high frequency arcing through the electrode holder and seriously injuring the operator.

8. Start the engine as instructed in Section 7 - 5.
9. Place the IDLE CONTROL switch in the desired position.

CAUTION

Prior to welding, it is imperative that proper protective clothing (welding coat and gloves) and eye protection (glasses and/or welding helmet) be put on. Failure to comply may result in serious or permanent bodily damage.

10. Commence welding.

7 - 2. GAS TUNGSTEN-ARC (GTAW) WELDING

1. Ensure that the engine has been prepared as instructed in Section 4.
2. Make connections to the weld terminals, GAS valve, and HIGH-FREQUENCY START CONTROL receptacle as instructed in Section 3.
3. Rotate the Range switch and FINE AMPERAGE control to the desired position.

IMPORTANT

Do not change the position of the Range switch while welding or under load, as this causes arcing across the contacts of the switch. This arcing causes the contacts to become pitted and eventually inoperative.

NOTE

The contacts of the FINE AMPERAGE control are of the continuous type, thereby making it possible to adjust this control while welding.

4. If a Remote Amperage Control is not to be used, place the REMOTE AMPERAGE CONTROL switch in the STANDARD position. If a Remote Amperage Control is to be used, place the REMOTE AMPERAGE CONTROL switch in the REMOTE position.
5. Place the Selector switch in the desired position.
6. Place the PROCESS SWITCH in the GAS TUNGSTEN-ARC position.
7. Place the HIGH-FREQUENCY switch in either the START or CONTINUOUS position. If the Selector switch is in the AC position, the HIGH-FREQUENCY switch should be in the CONTINUOUS position.
8. Set the POST-FLOW TIMER for the desired post-flow time.
9. Start the engine as instructed in Section 7 - 5.

CAUTION

Prior to welding, it is imperative that proper protective clothing (welding coat and gloves) and eye protection (glasses and/or welding helmet) be put on. Failure to comply may result in serious or permanent bodily damage.

10. Place the IDLE CONTROL switch in the LOCK OUT position and commence welding.

7 - 3. GAS METAL-ARC (GMAW) WELDING

1. Ensure that the engine has been prepared as instructed in Section 4.
2. Make connections to the weld terminals and CONTACTOR CONTROL receptacle as instructed in Section 3.
3. Rotate the Range switch and FINE AMPERAGE control to the desired position.

IMPORTANT

Do not change the position of the Range switch while welding or under load, as this causes arcing across the contacts of the switch. This arcing causes the contacts to become pitted and eventually inoperative.

NOTE

The contacts of the FINE AMPERAGE control are of the continuous type, thereby making it possible to adjust this control while welding.

4. If a Remote Amperage Control is not to be used, place the REMOTE AMPERAGE CONTROL switch in the STANDARD position. If a Remote Amperage Control is to be used, place the REMOTE AMPERAGE CONTROL switch in the REMOTE position.
5. Place the Selector switch in the desired position.
6. Place the PROCESS SWITCH in the GAS METAL-ARC position.
7. Place the HIGH-FREQUENCY switch in the OFF position.
8. Start the engine as instructed in Section 7 - 5.

CAUTION

Prior to welding, it is imperative that proper protective clothing (welding coat and gloves) and eye protection (glasses and/or welding helmet) be put on. Failure to comply may result in serious or permanent bodily damage.

9. Place the IDLE CONTROL switch in the LOCK OUT position and commence welding.

7 - 4. POWER PLANT OPERATION

IMPORTANT

Ensure that all electrical equipment connected to the 120 VOLTS AC receptacle and 120/240 volts ac terminal strip is turned off before starting or stopping the engine. When starting or stopping, the engine has low rpm which causes low voltage at the output receptacle of the generator. This could result in damage to electrical equipment.

1. Ensure that the engine has been prepared for operation as instructed in Section 4.
2. Make connections to the 120/240 volts ac terminals as instructed in Section 3 - 8.

NOTE

The FINE AMPERAGE control must be rotated to the 100 (full counterclockwise) position whenever the 120/240 volts power plant is being utilized. The FINE AMPERAGE control may be in any position when using the 120 VOLTS AC duplex receptacle on the front panel.

3. Rotate the FINE AMPERAGE control to the 100 (full counterclockwise) setting.
4. Place the PROCESS SWITCH in the GAS METAL-ARC position.
5. Start the engine as instructed in Section 7 - 5.

6. Place the IDLE CONTROL switch in the LOCK OUT position and commence operation.

7 - 5. STARTING THE ENGINE

IMPORTANT

Check the engine oil level and radiator coolant level. Ensure that no loose parts, etc., are laying in or on the unit. Make the necessary connections to the generator before attempting to start the unit. Fill the fuel tank with fresh gasoline.

1. Make all welding and electrical connections to the welding generator.
2. Place the IDLE CONTROL switch in the AUTOMATIC IDLE position. This should be done to permit the engine to warm up at idle rpm.
3. Choke the engine as necessary.
4. Rotate the STARTER switch to the START position.

IMPORTANT

Always ensure that the starter pinion and flywheel have stopped rotating before reengaging the starter motor, otherwise the ring or pinion may be damaged.

5. When the engine starts, release the STARTER switch. As the engine warms up, slowly push the CHOKE in.

7 - 6. ENGINE SHUT DOWN

1. Remove all weld and power loads from the unit.
2. Allow the engine to idle for a few minutes to permit the internal engine temperature to equalize. Increase the idling time if the engine has been operating for an extended period or at full load.

IMPORTANT

Do not operate accessory power equipment from the 120 VOLTS AC receptacle or 120/240 volts terminals during the engine shutdown-idling period.

3. Place the STARTER switch in the OFF position.

SECTION 8 - GENERATOR MAINTENANCE

CAUTION

If any work is to be done on the rotor of the generator, remove the spark plugs from the engine. This will prevent engine compression from turning the rotor and catching the repairperson's hand between the rotor fan casting and the stationary adapter casting. Also, disconnect the negative (—) battery cable from the battery.

8 - 1. GENERAL

The efficiency of the welding generator depends a great deal on the care and attention given it. By following a definite schedule of inspection and service, failure caused by neglect can be avoided.

Occasional blowing out of the unit with clean, dry compressed air is recommended. This should be performed periodically, depending upon the location of the unit and the amount of dust and dirt in the atmosphere.

8 - 2. BRUSHES AND SLIP RINGS

Brush life is very good under normal operating conditions. The brushes and slip rings should be inspected every six months or whenever excitation voltage is lost. Check for cleanliness of the slip rings and freedom of motion of the brushes. If the welding generator has been operating under extremely dusty or dirty conditions, increase the frequency of inspection.

If the welding generator has not been used for an extended period of time, oxidation may form on the slip rings causing excitation voltage to be lost. This can usually be remedied by simply spraying the slip rings with an antioxidant type contact cleaner and running the engine.

Under normal use the slip rings will discolor to a dark brown. If a build up of brush material is noted, it may be necessary to clean the slip rings. Use a 3/0 or finer sandpaper followed by a crocus cloth. Never use emery cloth as part of the emery will embed itself into the rings and in turn destroy the carbon brushes.

Replace the brushes if they become chipped or broken or if less that 1/2 inch of brush material is left.

8 - 3. WELDING CABLES

Check connections periodically for tightness. The cables should be inspected frequently and all breaks in the insulation should be repaired with electrical insulating tape or the cables replaced.

8 - 4. SPARK GAP (Figure 8-1)

The spark gaps can be readily inspected by opening the access door on the front panel.

The spark gaps are set at .008" clearance at the factory. It will be necessary to periodically readjust these after extended operation. Usually inspection and adjustment every three or four months will suffice. Readjustment is indicated when intermittent operation of the gaps is noted. Usually this occurs when the setting has increased to .013" or greater.

The high-frequency output varies directly (up to a certain point) with the spark gap spacing. In extreme cases where the greatest amount of high frequency is needed, it may be necessary to adjust the spark gap setting to .010" or greater. This increases the high-frequency radiation; therefore, it is suggested that the minimum gap setting (.004" to .008"), consistent with good welding operation, be used.

Widening of the spark gaps through normal operation may, if not corrected, increase the loading of the high voltage capacitors and thus contribute to their premature failure.

NOTE

Cleaning or dressing the points of the spark gaps is not recommended, as the material at the points is tungsten and is impossible to file. The points should be replaced when the tungsten section has completely disappeared.

To adjust spark gaps, proceed as follows:

1. Loosen screws (A) on both sides.
2. Place feeler gauge of proper thickness between gaps (C).
3. Apply slight pressure against point (B) so feeler gauge is held firmly in gap.
4. Tighten screws (A).

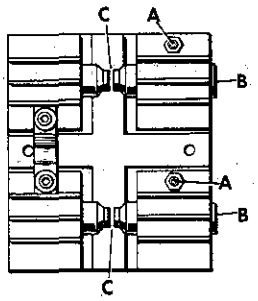


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Figure 8-1. Spark Gap Adjustment

NOTE

Refer to the engine handbook for detailed information concerning maintenance on this engine. While the handbook is a general coverage type publication, it does contain vital maintenance instructions for this engine.

9 - 1. LUBRICATION

IMPORTANT

This engine may use oil during the break-in period (first 50 hours of operation). Check the oil level several times a day during this period. The load on the engine should be kept as light as possible during the break-in period.

After about 50 hours of running time on the break-in oil, drain the oil and change the oil filter. Premium heavy duty oil, manufactured by any one of the major oil companies, should be used as a replacement oil. Table 9-1 gives a list of recommended grades and types of oil to use to keep oil level up during break-in and to use after the break-in oil is drained. The capacity of the engine with a filter change is 4-1/2 quarts, without a filter change, 4 quarts. Check the dipstick to make sure oil level is up to the required operating level.

Table 9-1. Oil Selection Guide

Above 90 degrees Fahrenheit Not lower than 32 degrees	SAE 30 or 10W-30 SAE 20 or 20W 10W-30 or 10W-20
As low as 10 degrees above zero Fahrenheit	SAE 20W 10W-30 or 10W-20
As low as 10 degrees below zero Fahrenheit	SAE 10W 10W-30 or 10W-20
Lower than 10 degrees below zero Fahrenheit	SAE 5W or 5W-20

In normal operation, the oil should be changed after about 50 hours with a filter change every 150 hours. The oil should be drained after the engine has been warmed up to normal operating temperature, thus promoting foreign particle suspension in the oil and removal when the oil is drained. Foreign particles tend to settle at the bottom of the crankcase when the oil is allowed to cool, avoiding removal and contaminating the new oil.

9 - 2. COOLANT SYSTEM

CAUTION

Caution should be exercised at all times when removing the radiator pressure cap. The cap will turn to an almost full open position, at which point a provision has been made to permit venting built up pressure within the radiator. Allow the pressure to escape before completely removing the cap from the radiator neck. When removing the cap, it is recommended that a glove or rag be used to protect the operator's hand from possible exposure to extremely hot coolant.

This unit is shipped from the factory with the proper amount of water and anti-freeze to permit operation of the unit at temperatures down to 0°F. If the engine is to be operated in a temperature below 0°F, ensure that a good grade of ethylene glycol anti-freeze is added to the coolant system. Change the coolant solution as often as necessary. The coolant system capacity is 9 quarts (U.S. Measure).

During the break-in period of a new engine, one of the greatest dangers is overheating. There are several possible causes of overheating, but the basic causes are a lack of engine lubrication and coolant circulation.

At the first sign of overheating, shut the engine down and make a thorough check to determine the cause.

Temperature of the engine coolant is regulated by a thermostatic valve located in the outlet at the front of the cylinder head. This unit retards the flow of coolant until a predetermined temperature is reached, usually varying between 170°F and 180°F. When the desired temperature is achieved, the valve opens and free circulation of the coolant through the system begins.

IMPORTANT

If the thermostat should fail, replace it immediately. Ensure that the replacement has an equal temperature rating. Do not run the engine without a thermostat. If the thermostat remains closed, the engine will overheat. If the thermostat remains open, or the engine is run without a thermostat, the engine will run cold. As a result, excess carbon will accumulate, wetstacking will occur, and the oil will become contaminated with sludge.

IMPORTANT

The engine fan and alternator belts are subject to normal wear and should be checked for proper tension periodically. Check and readjust tension after the first 50 hours of operation, and whenever belts are replaced.

9 - 3. GOVERNOR SERVICE

The governor speed setting and sensitivity setting are factory set to obtain correct weld rpm and engine response to changing load conditions. The governor speed control setting is factory locked with a lead seal. Do not remove this seal unless absolutely necessary.

NOTE

The governor, as used in conjunction with this engine, does not have a "No Load Surge" adjustment as described in the Engine Manual.

The engine is factory set to operate at 1200 rpm idle speed and 1800 rpm when it comes up to weld speed. For information concerning governor adjustment, refer to the Engine Manual, Fuel System Section.

9 - 4. CARBURETOR FLOAT SETTING

A. Zenith Carburetor

NOTE

Do not bend, twist or apply pressure on the float bodies. The float bodies, when viewed from the free end, must be centered between and at right angles to the machined surface, and must move freely on the float axle.

To ensure correct fuel level in the float chamber, check distance (dimension A, Figure 9-1) from top of floats to machined surface of throttle body (no gasket) with throttle body inverted. This dimension should be 1-5/32 inches plus or minus 1/32 inch. To increase or decrease distance from the top of the float bodies to the machined surface, use a long-nose pliers and bend the float lever at a point close to the float body.

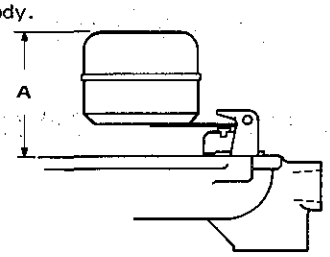

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Figure 9-1. Carburetor Float Setting

B. Marvel-Schebler Carburetor

To ensure correct fuel level in the float chamber, check distance (dimension B, Figure 9-2) from top of floats to gasket face with throttle body inverted. This dimension should be 1/4". To increase or decrease distance from the top of the float bodies to the gasket face, use a long nose pliers and bend the float lever at a point close to the float body. The edge of the float should be kept parallel with the gasket.

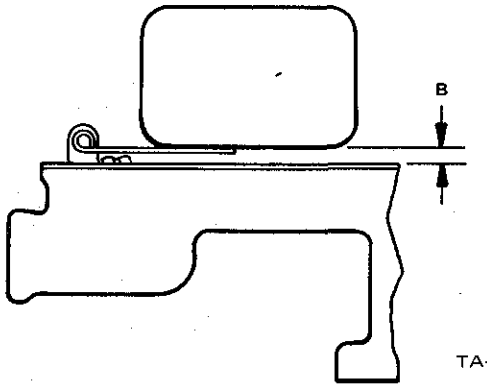


Figure 9-2. Carburetor Float Setting

9 - 5. CARBURETOR AIR TEMPERATURE SELECTOR (Figure 9-3)

The air intake to the air cleaner is equipped with a selector tube which allows the air to be drawn either from the surrounding engine compartment air or heated air, drawn from around the exhaust manifold of the engine. Heated air will prevent carburetor icing in cold weather.

Figure 9-3 shows the selector tube in the cold weather operating position. When the tube is in this position, it must remain about 1/2" away from the air cleaner inlet.

For warm weather operation, loosen the selector tube and slide it all the way down against the manifold and retighten.

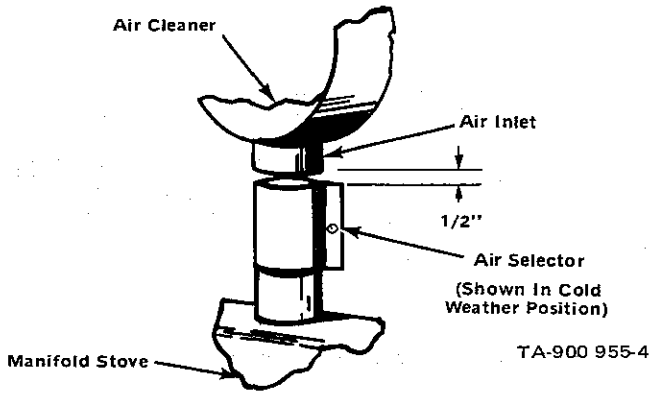


Figure 9-3. Carburetor Air Temperature Selector

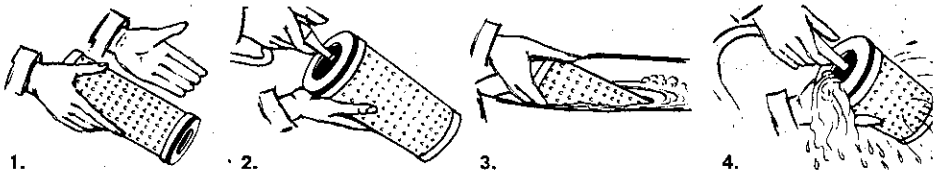
9 - 6. AIR CLEANER SERVICE (Figure 9-4)

The air cleaner is one of the most important parts of the engine from the standpoint of engine life. An engine consumes several thousand cubic feet of air per hour when operating. If dirty air gets into the engine, it can wear out a set of piston rings within a few operating hours.

A dirty air cleaner element is usually accompanied by a loss of power and black smoke in the engine exhaust. Servicing of the element is accomplished in the following manner: Remove the filter element lock assembly and seal. Inspect the gasket on the end of the element for damage. Clean the element as indicated in Figure 9-4. Wipe out the inside of the air cleaner housing before installing a new or cleaned element. Do not use the element if the seal is damaged or missing.

NOTE

When it becomes necessary to service the air cleaner in the field, follow the Steps in Figure 9-4. It is recommended that a spare element always be kept on hand for replacement. New elements are available from your distributor.



1. For a temporary expedient in the field, the element can be cleaned by tapping the side or the end carefully against the palm of the hand.

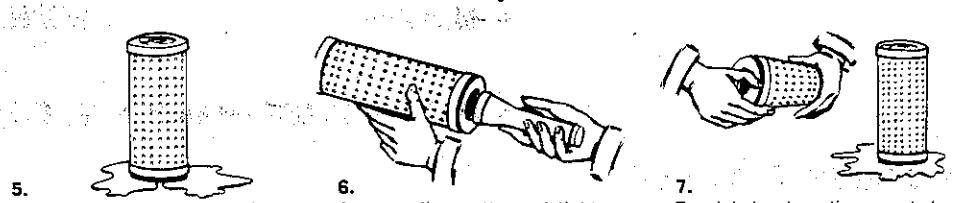
CAUTION: *Do not tap element against a hard surface. The element may be damaged by doing so.*

2. Compressed air, not to exceed 100 lbs. of pressure can clean the element. Insert nozzle inside the element and blow out dust. Clean dust from the outside of the element by holding the nozzle at least 6 inches from the element.

3. If compressed air is not available, or if soot, oily vapor, or any dirt is present which cannot be removed by compressed air, then the element is to be washed. Agitate element in warm water containing a non-sudsing detergent.

CAUTION: *Do not use water hotter than the hand can stand; solvents or oil; fuel oil, or gasoline.*

4. Reverse flush with clean water to thoroughly rinse all loosened foreign material from the filter.



5. Shake out excess water from the element and allow to air dry.

CAUTION: *Do not attempt to remove excess water by using compressed air.*

6. An even fine pattern of light through the element, when a light is held inside the element, indicates that the element is clean. Any large spot of light indicates that the element is damaged and, therefore, is unfit for further use. Replace the element.

7. To minimize down time, created by waiting for the element to dry, it is suggested that the newly cleaned filter be replaced by a similar standby unit.

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Figure 9-4. Air Cleaner Service

IMPORTANT

Do not operate engine without the air cleaner element in place. It is recommended that the element be replaced after six washings or 1 year, whichever comes first.

9 - 7. IDLE CONTROL/GOVERNOR LINKAGE ADJUSTMENT (Figure 9-5)

In the event that proper engine idle and/or weld rpm is not being attained, perform the following procedures to adjust the engine for proper idle and weld rpm:

1. Adjust the length of the governor linkage (item 1, Figure 9-5) so that the throttle stop plate (2) is about 1/32" from the stop (3). To adjust the linkage (1), loosen the linkage securing nuts (5) and remove the hardware (6) securing the linkage socket(s) (4) to the governor and carburetor. Rotate the linkage socket(s) (4) accordingly to obtain the 1/32" gap. Clockwise rotation of the linkage socket(s) (4) will shorten the governor linkage (1) and reduce the gap. Conversely, counterclockwise rotation of the linkage socket(s) (4) will lengthen the governor linkage (1) and increase the gap.

2. Rotate the linkage socket(s) (4) slightly until the socket(s) (4) are parallel but in opposite directions with respect to each other. Secure the linkage socket nuts (5) to lock the position of the linkage socket(s) (4).

IMPORTANT

Check the linkage (1) for freedom of movement throughout its entire travel. If the linkage (1) is binding due to the linkage socket(s) (4) being cocked relative to each other, repeat Step 2.

3. Loosen the alignment screw (7) and position the arm (8) radially and laterally until the following conditions are simultaneously met:

   A. Position the arm (8) laterally so that the carburetor linkage socket (4) does not touch the throttle stop plate (2) throughout its entire travel.

   B. Position the arm (8) radially so that the arm (8) travels an equal distance to either side of an imaginary center line drawn perpendicular to the center of the throttle shaft (9).

   Tighten the alignment screw (7) and recheck the adjustments made in Steps 1 and 2.

CAUTION

Ensure that body limbs are clear of the fan before starting or working on the engine.

4. Recheck all connections made thus far. Place the IDLE CONTROL switch in the LOCK OUT position. Start the engine and allow it to reach normal operating temperature (about five minutes). Ensure that the CHOKE control is pushed fully in at this time.

5. Pull the arm (8) toward the front of the welding generator to the idle position. Maintain pressure on the arm (8) to butt the idle screw (10) against the stop (3) throughout the following adjustments:

   A. Rotate the idle speed screw (10) to obtain 550 rpm. Clockwise rotation of the screw (10) will increase engine rpm, whereas counterclockwise rotation of the screw (10) will decrease engine rpm.

   B. Rotate the idle mixture adjustment screw (11) clockwise until the engine begins to falter or roll; then rotate the screw (11) counterclock-

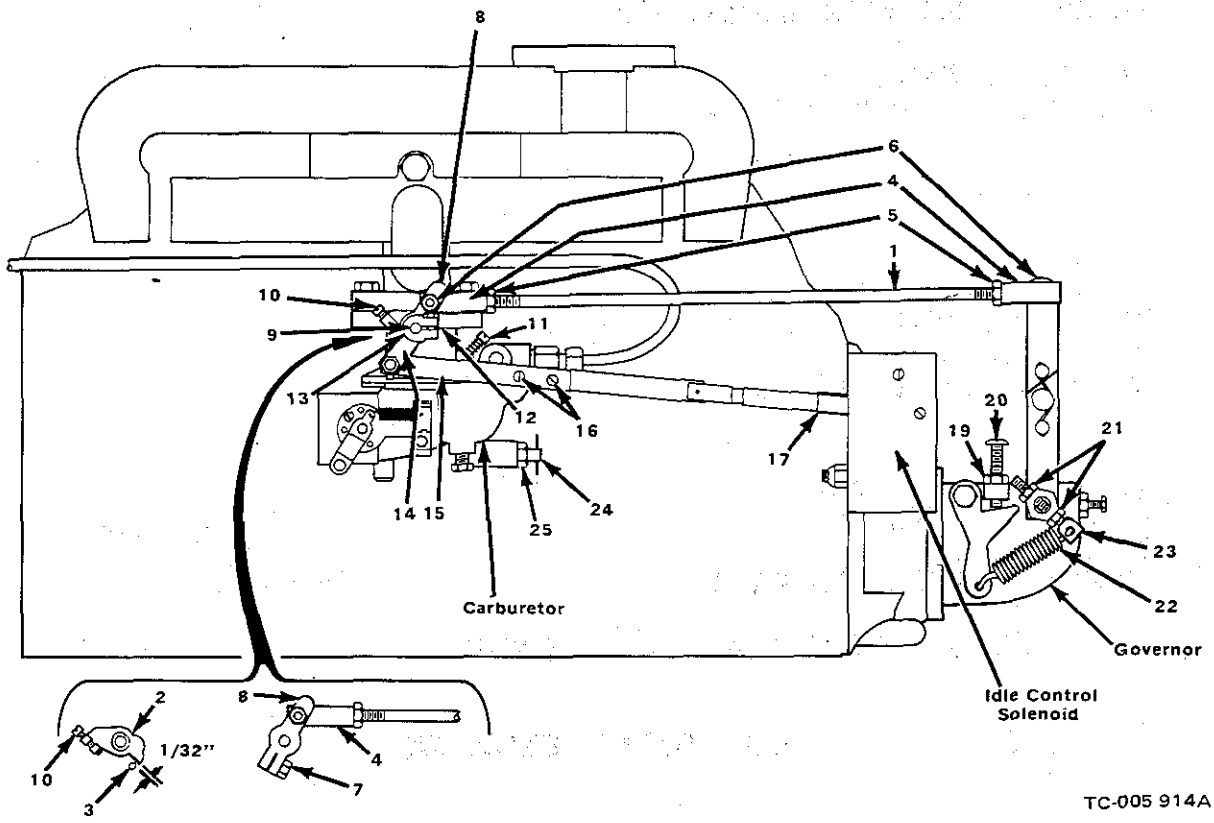


Figure 9-5. Idle Control/Governor Linkage Adjustment And High-Altitude Carburetor Modification

wise until the engine operates smoothly. Rotating the screw (11) clockwise restricts the air flow, making the air-fuel mixture richer. Rotating the screw (11) counterclockwise admits more air, making the air-fuel mixture leaner.

6. Loosen the alignment screw (12) and position the idle alignment clamp (13) radially and laterally until the following conditions are simultaneously met:

   A. Position the clamp (13) laterally so that the outer edge of the clamp (13) is flush with the end of throttle shaft (9).

   B. Position the clamp (13) radially so that the idle arm (14) is positioned radially approximately as shown in Figure 9-5.

   Tighten the alignment screw (12).

7. Loosen the two idle control screws (16). Place the IDLE CONTROL switch in the AUTOMATIC IDLE position. Operation of the idling device is automatic when the IDLE CONTROL switch is in the AUTOMATIC IDLE position. Once the engine is started, engine speed will remain at idle until an arc is established, at which time the engine immediately comes up to weld rpm. When the arc is broken, a time delay of approximately 10 seconds will exist before the engine returns to idle rpm. The length of this time delay is not adjustable. Ensure that the idle control solenoid plunger (17) is at the end of its travel within the solenoid coil body.

NOTE

Do not readjust the idle speed screw (10) when adjusting the idle control idle speed.

IMPORTANT

Check the idle linkage arm (15) for freedom of movement throughouts its entire travel. If the linkage (15) is binding due to the linkage (15) being cocked relative to the idle arm (14) laterally adjust the idle alignment clamp (13) slightly to alleviate the binding condition. Repeat Steps 6, 7 and 8.

8. Pull the arm (8) toward the front of the welding generator to the idle position. Maintain pressure on the arm (8) to butt the idle screw (10) against the stop (3) and adjust the length of the idle linkage arm (15) until 1200 rpm is obtained. Tighten the two idle control screws (16).

9. Place the IDLE CONTROL switch in the LOCK OUT position. Loosen the governor speed adjusting screw securing nut (19). Adjust the governor speed adjustment screw (20) until a high idle speed of 1800 rpm is obtained. Tighten the securing nut (19) to maintain the governor speed setting.

10. Check the governor engine regulation by applying and removing the engine load. If a governor sensitivity adjustment is deemed necessary, loosen one of the two locking nuts (21) and proceed with the following instructions.

    A. IF REGULATION RANGE IS TOO BROAD — Decrease the governor spring (22) tension by sliding the sensitivity adjustment screw (23) inward.

    B. IF REGULATION RANGE IS TOO NARROW — Increase the governor spring (22) tension by sliding the sensitivity adjustment screws (23) outward.

    C. IF ENGINE SURGES (HUNTS) UNDER LOAD — Increase the governor spring (22) tension by sliding the sensitivity adjustment screw (23) outward.

11. Tighten the two locking nuts (21) to maintain the desired governor sensitivity. Readjust the governor speed by repeating Step 9.

NOTE

Whenever the governor sensitivity (Step 10) is adjusted, the governor speed (Step 9) MUST be readjusted. Whenever the governor speed (Step 9) is adjusted, the governor sensitivity (Step 10) MAY need readjustment.

9-8. HIGH-ALTITUDE CARBURETOR MODIFICATION (Optional) (Figure 9-5)

The carburetor can be equipped with an adjustable main jet for high-altitude operation (above 4000 ft.). Minor adjustment will be necessary for proper operation at a particular altitude. Whenever a carburetor adjustment is deemed necessary, see Figure 9-5 and proceed as follows:

Loosen the main adjustment screw locking nut (25). Apply a near-full engine load to the welding generator. Rotate the main adjustment screw (24) clockwise until the engine begins to falter and lose RPM. Rotate the main adjustment screw (24) counterclockwise until the engine operates smoothly; then continue counterclockwise rotation for 1/4 turn. Rotating the screw (24) clockwise restricts the fuel flow, making the air-fuel mixture leaner. Rotating the screw (24) counterclockwise admits more fuel, making the air-fuel mixture richer. Remove the engine load. Tighten the locking nut (25).

IMPORTANT

Restricting the fuel flow to the point where the mixture is too lean will cause valve burning.

9-9. KEY-TYPE IGNITION SWITCH LUBRICATION (If Applicable)

Periodically, depending on the location of the unit and the amount of moisture in the air, or when binding is noticed, remove the key and lubricate the ignition switch by spraying a generous amount of lubricant into the key slot. Wipe excess off the nameplate. It is recommended that a non-gumming lubricant with anti-oxidant properties be used.

9-10. SPARK ARRESTOR (Optional)

IMPORTANT

The engine exhaust system on this welding generator has not been equipped with a spark arrestor unless it was specifically ordered as an optional accessory. A spark arrestor, maintained in effective working order, is mandatory if this welding generator is to be operated in a National Forest, or on California grasslands, brush, or forest covered land (see Section 4442 of California Public Resources Code). For other areas, check you state and local laws.

Internal combustion engines operating in a highly combustible environment are a common fire hazard. Glowing carbon particles blown out with the exhaust can retain sufficient heat to ignite materials. While no practical spark arresting device will stop all sparks, this device will minimize fire hazards by removing and trapping most solid particles provided that it is properly maintained.

The carbon trap should be serviced weekly or every 50 operating hours, whichever occurs first. The entire spark arrestor should be inspected every 1000 operating hours or three times per season.

A. Inspection

1. Visually examine the outside of the device for holes, cracks, or metal corrosion.

2. With the engine stopped, look inside the spark arrestor outlet tube with a flashlight or other light source. Visually examine the vanes and the outlet tube for metal or weld failure. The vanes must be firmly attached to the inlet tube and the outlet tube must be completely intact (this is an important factor in maintaining spark arresting efficiency).

3. Check the mounting clamp to ensure that the spark arrestor is securely mounted. Replace the spark arrestor if inspection reveals any signs of failure.

B. Servicing The Carbon Trap

CAUTION

Service the device in an area where there is no danger from flying sparks or hot carbon particles.

1. Stop the engine and allow the exhaust system to cool.

2. Remove the cleanout plug from the bottom of the spark arrestor with a wrench. If a crust has formed over the hole, break it loose with a screwdriver or similar tool.

3. Start the engine and run it at idle rpm to blow collected particles out the cleanout hole. If particles are slow to discharge, momentarily cover the end of the exhaust stack.

4. Stop the engine. Replace and secure the cleanout plug.

SECTION 10- TROUBLESHOOTING

CAUTION

Hazardous voltages are present on the internal circuitry of the welding generator while the engine is running. Shut down the engine before attempting any inspection or work on the inside of the unit. Troubleshooting of internal circuitry should be performed by qualified personnel only.

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

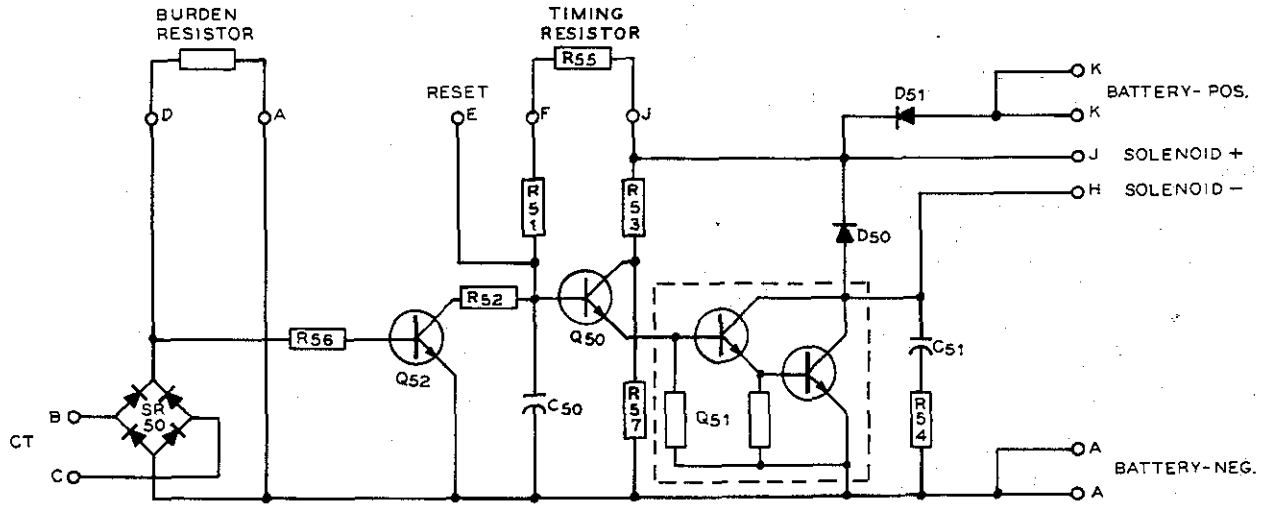
It is assumed that proper installation has been made, according to Section 3 of this manual, and that the welding generator has been functioning properly until this trouble developed.

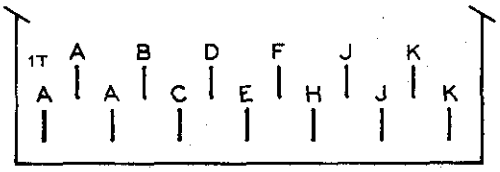
Use this chart in conjunction with the circuit diagram while performing troubleshooting procedures. If the trouble is not remedied after performing these procedures, the nearest Factory Authorized Service Station should be contacted. In all cases of equipment malfunction, the manufacturer's recommendations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

TROUBLE	PROBABLE CAUSE	REMEDY
No weld output, no 120/240 volts output, and no 120 volts output at RC1 (with S2 in the LOCKOUT position).	Poor contact between brushes and slip rings.	Clean the slip rings and if necessary replace the brushes (see Section 8-2).
No weld output or 120/240 volts output; 120 volts is present at RC1 (with S2 in the LOCKOUT position).	REMOTE AMPERAGE CONTROL switch (S5) is in REMOTE position with no Remote Amperage Control connected to welding generator.	Place the REMOTE AMPERAGE CONTROL switch (S5) in the STANDARD position or connect a Remote Amperage Control to the REMOTE AMPERAGE CONTROL receptacle (RC3).
	Remote Amperage Control plug is not secure in REMOTE AMPERAGE CONTROL receptacle (RC3).	Insert Remote Amperage Control plug fully into receptacle (RC3) and rotate as far as possible in a clockwise direction.
	Poor contact between brushes and slip rings.	Clean slip rings and if necessary replace the brushes (see Section 8-2).
No 120/240 volts output; weld output is ok and 120 volts is present at RC1 (with S2 in the LOCKOUT position).	Fuse (F1) and/or (F2) open.	*Replace fuse (F1) and/or (F2).
No output at 120 VOLTS AC receptacle (RC1).	IDLE CONTROL switch (S2) is in the AUTOMATIC IDLE position.	Place switch (S2) in the lockout position.
	Fuse (F4) open.	*Replace Fuse (F4).
No high frequency.	The spark gaps are incorrectly spaced.	Adjust the spark gaps (see Section 8-4).
Erratic weld current.	Damp or defective electrodes.	Use new, dry electrodes.
	Loose or dirty connections.	Check connections both inside and outside of welding generator.
	Check leads and contacts of the Range switch (S3).	Discoloring of brass contacts could indicate heating caused by loose connection. Replace contact or switch plate of Range switch (S3).

TROUBLE	PROBABLE CAUSE	REMEDY
Engine will not return to idle rpm when arc is broken and IDLE CONTROL switch (S2) is in AUTOMATIC IDLE position.	Idle control valve (GS2) closed.	Open valve (GS2) by turning in a counterclockwise direction.
	Idle control valve (GS2) plugged.	Remove and clean valve (GS2).
	Leak in vacuum line.	Check line.
Engine ran fine but slowly stopped; unable to restart engine.	Fuel tank cap vent in CLOSED position.	Examine inside of fuel tank cap and rotate valve to the OPEN position.

*If it becomes necessary to replace any fuse in the welding generator, ensure that a fuse of the proper size is used.





Circuit Diagram No. CA-052 742-1A

Figure 10-1. Circuit Diagram For Electronic Idle Device

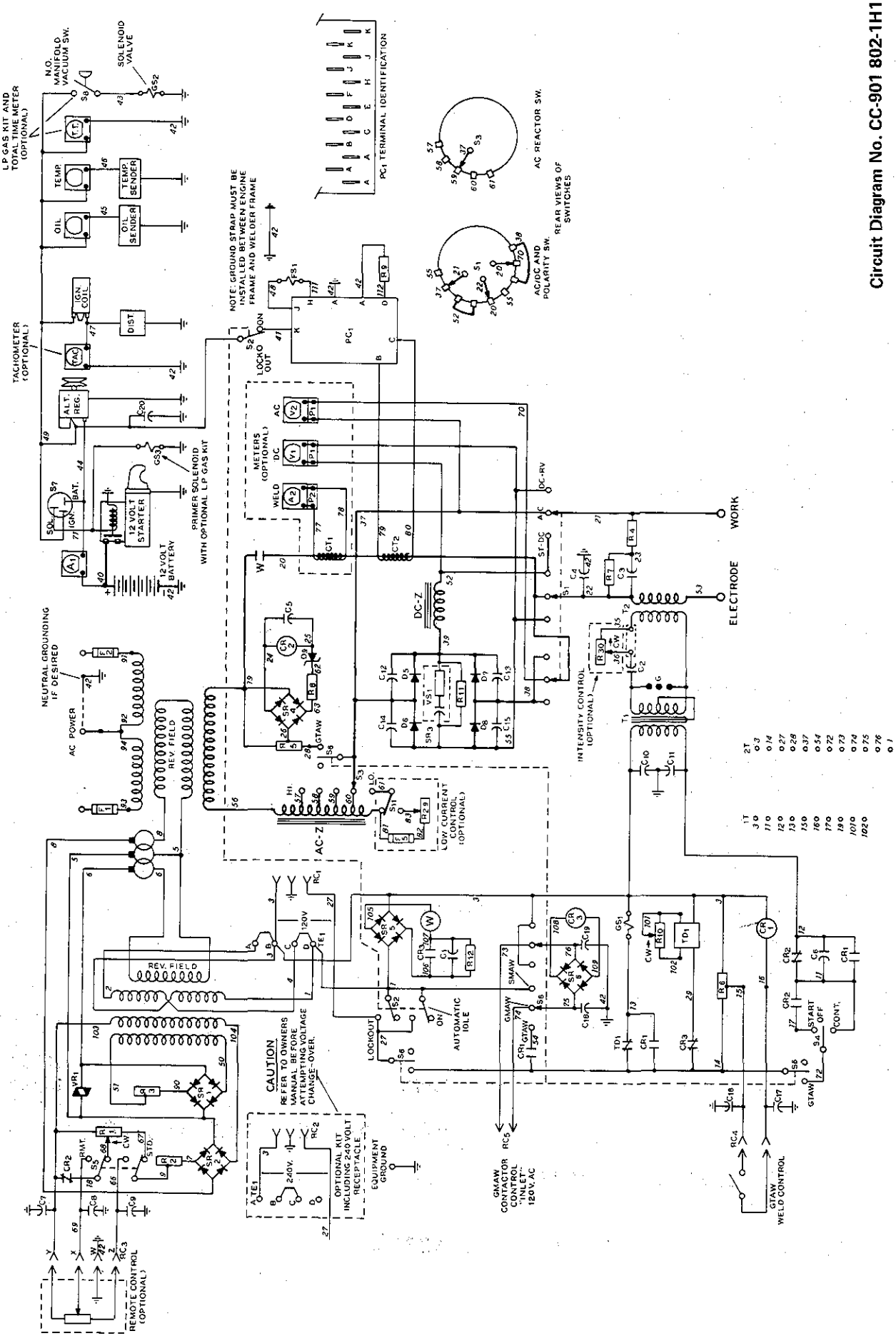


Figure 10-2. Circuit Diagram For Welding Generator

Circuit Diagram No. CC-901 802-1H1

SECTION 11 - CERTIFICATION FOR HIGH FREQUENCY ARC WELDING EQUIPMENT

11- 1. GENERAL

a. The following information is necessary to make a proper installation of the high frequency arc welding equipment described in this instruction manual. In order to comply with Part 18 of the Rules and Regulations of the Federal Communications Commission, the certificate in front of this manual must be filled in completely and signed. The certificate must be kept WITH THE EQUIPMENT AT ALL TIMES to comply with the regulation.

b. The manufacturer of the equipment covered herein has conducted approved field tests and certifies that the radiation can reasonably be expected to be within the legal limits if the correct installation procedures, as outlined, are followed.

c. The importance of a correct installation cannot be over-emphasized since case histories of interference due to high frequency stabilized arc Welding Machines have shown that invariably an inadequate installation was at fault.

d. The user of the equipment must complete the certification by stating that he has installed the equipment and is using it, according to the manufacturer's instructions. The user must sign the certification notice appearing in front of this instruction booklet indicating that he has complied with the requirements.

e. In the event that interference with authorized services occurs, in spite of the fact that the radiation from the welding equipment is within the specified limits, the user is required to take suitable steps to clear the situation. The factory personnel will assist the user by supplying technical information to clear the situation.

f. In lieu of complying with the installation requirements and the certification of each individual installation, the user may elect to certify his entire plant by having a reputable engineering firm make a plant radiation survey. In such cases, the installation instructions incorporated in this instruction booklet could very well serve as a guide in minimizing interference that might be contributed by the high frequency arc welding equipment.

11- 2. GENERAL INFORMATION

a. In a high frequency stabilized arc Welding Machine installation, interfering radiation can escape in four distinct ways as outlined below:

(1) Direct Radiation From The Welding Machine: This is radiation that escapes directly from the Welding Machine case. This is very pronounced if access doors are left open and unfastened and if the Welding Machine case is not properly grounded. Any opening in the metal Welding Machine case will allow some radiation to escape.

The high frequency unit of this certified equipment is adequately shielded to prevent direct radiation of any consequences if proper grounding is carried out.

(2) Direct Feedback To The Power Line: High frequency energy may get on the power line by direct coupling inside the equipment or the high frequency unit, the power line then serving as a radiating antenna.

By proper shielding and filtering, direct coupling is prevented in this certified equipment.

(3) Direct Radiation From Welding Leads: Direct radiation from the welding leads, although very pronounced, decreases rapidly with distance from the welding leads. By keeping the welding leads as short as possible, the operator can do a great deal to minimize interference from the source.

The intensity and frequency of the radiation can be altered over wide limits by changing the location and relative position of the welding leads and work. If possible, loops and suspended sections should be avoided.

(4) Pick-Up and Reradiation From Power Lines: Even though welding lead radiation falls off rapidly with distance, the field strength in the immediate vicinity of the welding area may be extremely high. Unshielded wiring and ungrounded metallic objects in this strong field may pick up the direct radiation, conduct the energy for some distance, and produce a strong interference field in another area.

This is usually the most troublesome source of interference, but careful adherences to proper installation procedure as outlined in this booklet will minimize this type of interference.

11- 3. POWER SERVICE

a. The specific installation instructions for making the proper primary connections to the equipment as outlined in the instruction booklet furnished with the equipment, should be followed carefully with one exception as noted in the following paragraph.

b. Frequently installation instructions specify that the primary power service shall be run in solid or flexible metallic conduit. Ordinary helically wrapped conduit is designed for mechanical protection and is not suitable for electrical shielding. Only solid metallic conduit or conduit of "equivalent electrical shielding ability" should be used to enclose the primary power service leads.

c. Solid metallic shielding shall enclose the primary power service to the equipment from a point 50 feet from the equipment in an unbroken run.

d. This shielding shall be grounded at the farthest point from the equipment and should make good electrical contact with the casing of the equipment. The ground should be in accordance with the specifications outlined in the section entitled "GROUNDS" and as shown in Fig. A. Care should be taken that paint or corrosion at the junction of conduit and case, does not interfere with good electrical contact.

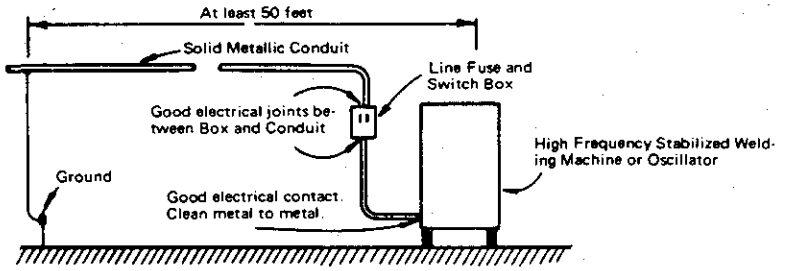
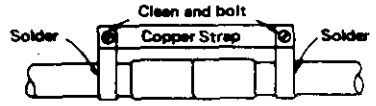
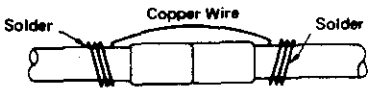


Figure A — Power Service Installation H. F. Stabilized Arc Welding Machine

e. There shall be no gap in this shielding run. This simply means that within 50 feet of the equipment, no portion of the power wires serving the equipment shall be unshielded. If there is any question about the electrical efficiency of the joints between individual conduit sections, outlet boxes and the equipment case, bonding should be carried out by soldering a copper strap or wire across the joint as shown in Fig. B.



(a) Demountable Bonding Strap for Conduit Joints



(b) Solid Bonding with Copper Wire for Conduit Joints

Figure B – Two Recommended Methods For Electrical Bonding Across Poor Conductivity Conduit Joints

11- 4. WELDING MACHINE

a. The location of the equipment should be chosen with respect to nearness to a suitable ground connection. The equipment case, firmly bonded to the power conduit, should be grounded to the work terminal of the equipment with a copper cable or braid with rated current carrying capacity equal to or greater than that of the power service wires.

b. This "work" output terminal of the equipment should then be grounded to a "good electrical ground" (as defined in section entitled "GROUNDS") with a short length of welding cable of the same capacity as the "work lead". (See Fig. C)

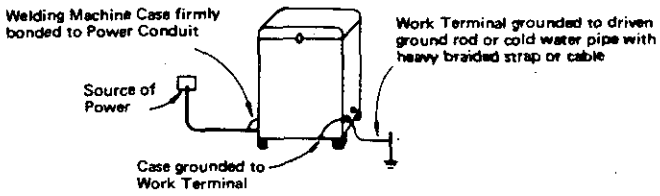


Figure C – Ground Connections At Welding Machine

c. No change in the wiring or the location of parts inside the equipment, other than power service tap changes or other adjustments specifically covered, shall be made. The equipment shall not be modified in any way since changes in the equipment can affect the radiation characteristics and may not be in accordance with the test data upon which the manufacturer bases his certification.

d. While the equipment is in operation, all access and service doors shall be closed and properly fastened.

e. Spark gap settings shall be maintained at the minimum separation consistent with satisfactory welding results.

11- 5. WELDING LEADS

a. In order to minimize direct weld lead radiation, the welding leads (electrode lead and work lead) must be kept as short as possible. Certification tests on this machine have been made with leads 25 feet long. Considerable improvement in radiation minimization can be had by shortening the leads as much as possible.

b. Keeping the electrode lead and ground or work lead as close as possible and on the floor serves to reduce the radiation. (See Fig. D)

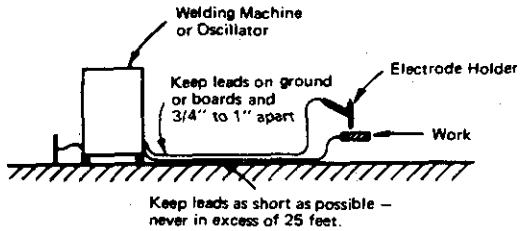


Figure D – General Rules For Welding Leads

11- 6. WIRING IN THE VICINITY OF THE WELDING AREA

a. As discussed in the general information section, the most serious source of interference is reradiation from wires that are located near the welding area.

b. Any ungrounded electrical conductor in the strong "directly radiated" field, produced by the welding leads, serves as a pick-up device and may conduct the interference for some distance and reradiate strongly at another location.

c. For purpose of simplification and standardization, the space all around the weld zone at a distance of 50 feet in all directions is referred to as the High Field Intensity (H.F.I.) zone. (See Fig. E)

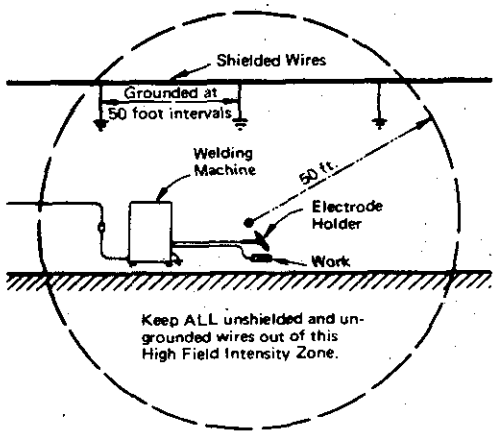


Figure E – General Requirements To Minimize Reradiation Pick-Up In The Vicinity Of The Weld Zone

d. To minimize radiation of this type all wiring in the H. F. I. zone shall be in rigid metallic conduit, lead covered cable, copper braid or material of equivalent shielding efficiency. Ordinary flexible helically wrapped metallic conduit, commonly referred to as "B.X." is not satisfactory for shielding, and should not be used. The shield on all wiring should be grounded at intervals of 50 feet and good electrical bonding between sections shall be maintained.

e. This shielding requirement applies to all wiring, including telephone, inter-communication, signal and control and incidental service.

f. Extreme precaution should be taken to make sure that the location of the zone is chosen so that none of the conditions are voided by unshielded wires off the premises but still within the radial dimensions of the H. F. I. zone.

g. This 50 foot H. F. I. zone is a minimum that is imposed on the installation. Certification tests by the manufacturer are based on this limit.

h. Keeping unshielded wires farther than 50 feet from the weld zone will materially aid in minimizing interference.

i. If it is impossible to relocate unshielded wires, that

section within the H. F. I. zone, should be placed in conduit and each end of the conduit section grounded.

NOTE

It must be emphasized that all changes in power and lighting wiring should be made by a qualified electrician and comply with the National Electrical Code requirements. Any shielding or relocation of telephone or signal wires must be done either by the service company concerned or with the specific permission of said company.

11- 7. GROUNDS

a. Frequent reference is made to a "good ground" in previous sections. Although there is considerable leeway in the interpretation of this term, for the purpose covered in this booklet the following specifications apply:

b. A "ground" connection should be made to a driven rod at least 8 feet long and driven into moist soil.

c. A cold water pipe can be used in place of the ground rod provided it enters the ground within 10 feet of the equipment to be grounded.

d. All leads connecting the point to be grounded to the ground rod or pipe should be as short as possible since the ground lead itself can become an effective radiating antenna.

e. The effectiveness of a ground in reducing interference depends upon the ground conductivity. In certain locations it may become necessary to improve the ground conductivity by treating soil around the ground rod with a salt solution.

11- 8. METAL BUILDING

a. It is frequently thought that operating of high frequency stabilized arc welding equipment in metallic buildings will completely eliminate troublesome radiation. This, however, is a false assumption.

b. A metallic building structure, if properly grounded, may serve to reduce direct radiation from the weld zone but will have no effect on conducted interference and reradiation. As a result, all installation requirements necessary for certification must be complied with.

c. If the metallic building is not properly grounded, bonding to several good electrical grounds placed around the periphery of the building will give reasonable assurance that the building itself is not contributing to the radiation.

11- 9. INDIVIDUAL INSTALLATION CERTIFICATION

a. Any or all of the above installation requirements may be waived by the user if he desires to exercise the option of making an individual field survey of the particular unit installation (or the complete installation if more than one unit is involved), and certifying on that basis.

b. This survey shall be made by a competent engineer in accordance with the test procedure requirements as set forth in Part 18 of the Rules and Regulations of the Federal Communications Commission.

c. Surveys of this nature can cover a single unit or multiple units or may include the complete plant structure.

11-10. CHECK LIST

a. The following questions may be used by the installer as a check to see if all installation requirements have been met:

(1) Has the equipment been located so that ground leads can be kept short?

(2) Are the power leads, serving the unit, in conduit?

(3) Is there good electrical contact between power conduit and case?

(4) Do the conduit couplings make good electrical contact? (If in doubt, use bonding).

(5) Is there good electrical contact between conduit and switch on service boxes?

(6) If rigid metallic conduit is not used, is the shielding used of equivalent shielding efficiency? (Copper sleeving, lead covered cable, etc., is satisfactory. Spirally wound flexible metallic conduit is not suitable).

(7) Is the conduit system grounded at a point at least 50 feet from the equipment?

(8) Is the conduit run complete (without any gap) in the H.F.I. zone?

(9) Is the equipment case connected to the work terminal of the secondary?

(10) Is the wire used for this connection of sufficient size?

(11) Is the work terminal connected to a good electrical ground?

(12) Is the cable or copperbraid used for this connection equal to or greater in current carrying capacity than the welding lead?

(13) Is this cable as short as possible?

(14) Are the spark-gaps set at .008" or less?

(15) Are all service and access doors closed and bolted?

(16) Are the welding leads less than 25 feet long?

(17) Are they as short as possible?

(18) Are the welding leads on the floor or placed on a suitable board?

(19) Are the welding leads approximately 3/4" to 1" apart?

(20) Have you visualized the H.F.I. zone, a sphere with a 50 foot radius contered on the weld zone?

(21) Have the unshielded power and light wires originally in this H.F.I. zone been placed in grounded shields or been relocated outside the zone?

(22) Have all large metallic objects and any long guy or supporting wires in the H.F.I. zone been grounded?

(23) Have you checked so that no external power or telephone lines off the premises are within the zone?

(24) Are the grounds driven ground rods?

(25) Is a cold water pipe used as ground?

(26) If so, does it enter the ground 10 feet or less from the connection?

(27) Are the connections to the ground clean and tight?

(28) If operated within a metal building, is the building properly grounded?

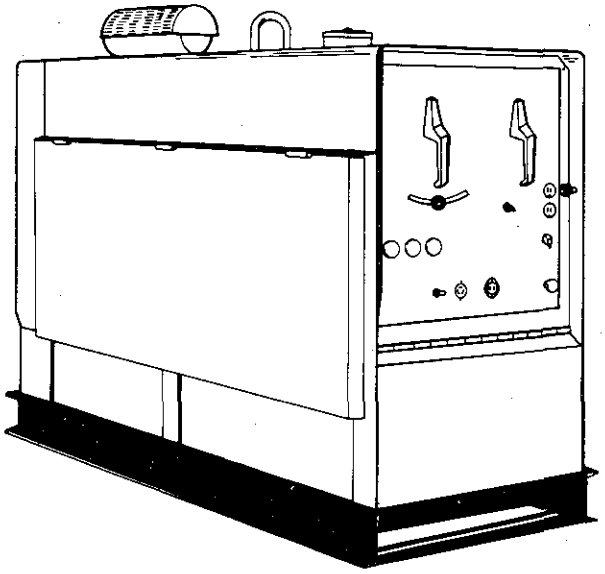
b. If your answer is "yes" to the above questions, you can certify the installation by signing the certificate.

May 1978 FORM: OM-458D

Effective With Serial No. HJ134595

MODEL

Trailblazer 44G



PARTS LIST

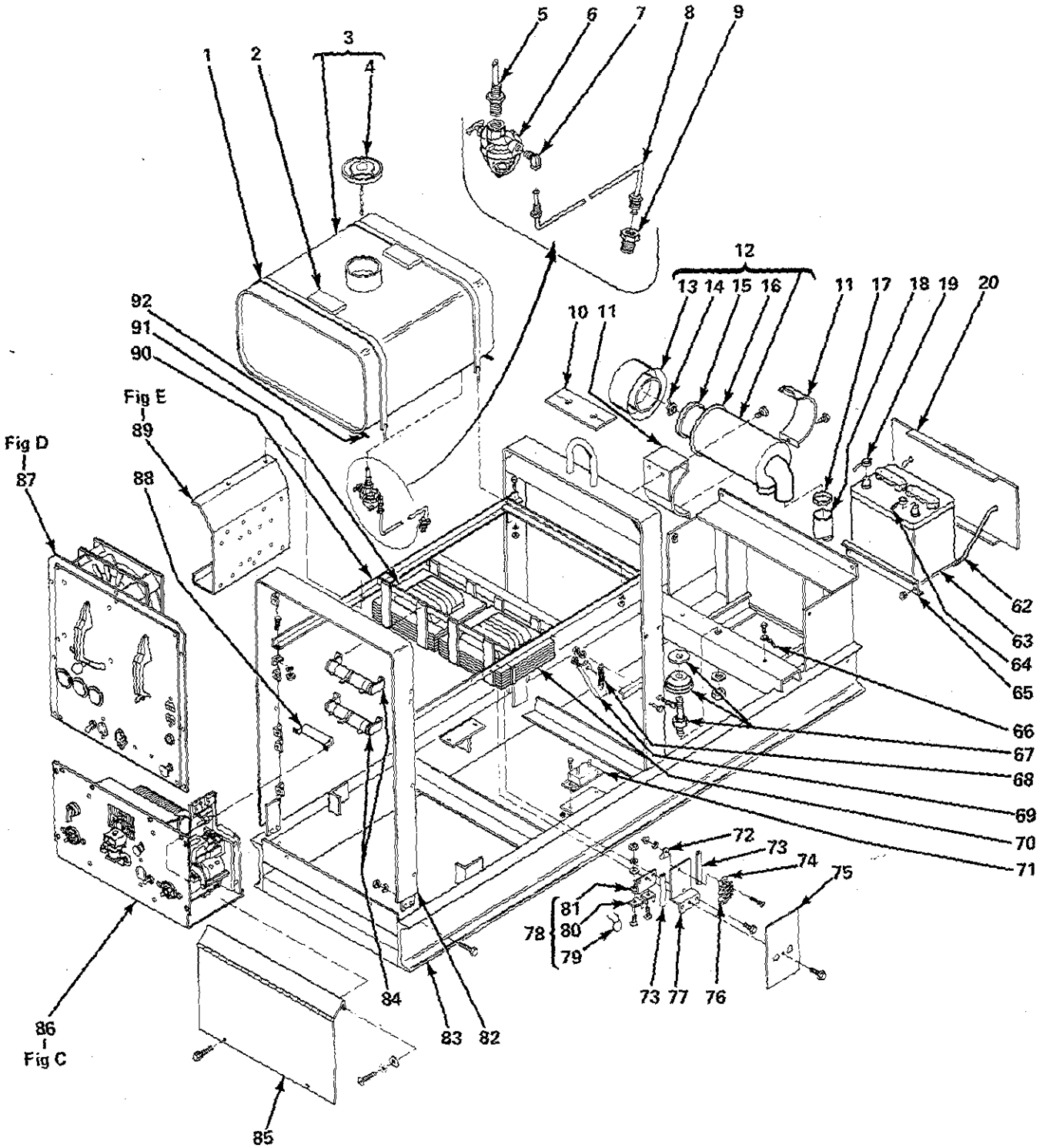


Figure A — Main Assembly

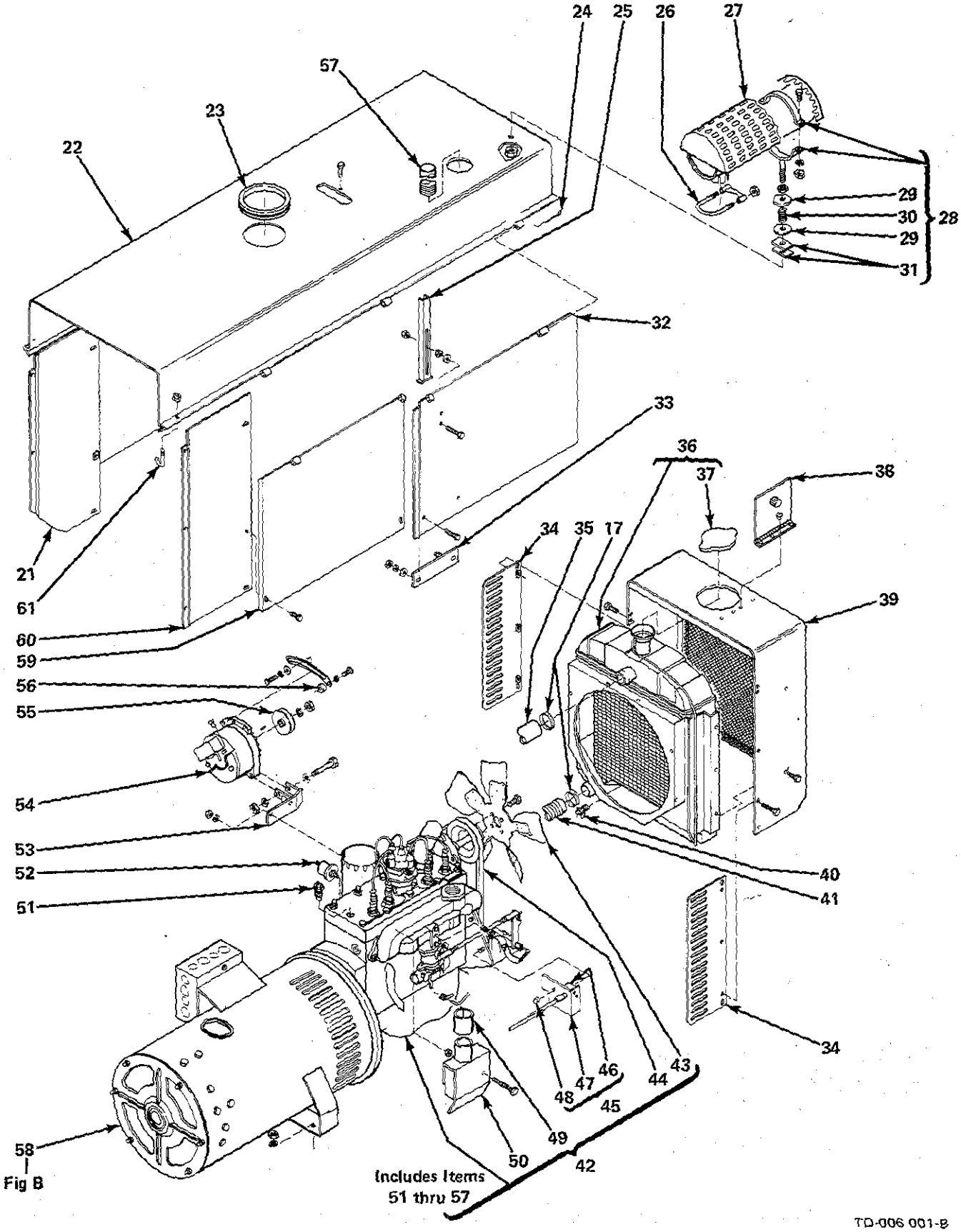

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Fig B
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Includes Items
51 thru 57

TD-006 001-B

Item No.	Dia. Mkgs.	Factory Part No.	Description	Quantity
Figure A			**Main Assembly**	
1		017 430	STRAP, mounting - tank fuel	2
2		010 434	STRIP, rubber 1/2 x 2 x 4-1/2	2
3		006 698	TANK, fuel (consisting of)	1
4		018 858	. CAP, tank - fuel	1
		605 288	FITTING, pipe - galvanized plug square head 1/4 NPT	1
5		010 870	FITTING, pipe - brass nipple hex 1/8 NPT	1
6		010 318	VALVE, shut-off - w/strainer fuel	1
7		006 014	FITTING, brass - flared inverted elbow M 1/4 x 1/8 NPT (Marvel-Schebler carburetor)	2
8		007 829	LINE, fuel (Marvel-Schebler carburetor)	1
9		010 289	FITTING, brass - flared inverted male 1/4 TBG x 1/8 NPT	1
10		017 479	SEAL, weather - lift eye	1
11		031 868	BRACKET, mounting - air cleaner	1
12		018 765	AIR CLEANER, intake - carburetor dry type (consisting of)	1
13		018 859	. CAP, air cleaner	1
		008 698	. BAFFLE, dust - cap	1
14		021 117	. WING NUT ASSEMBLY	1
15		*017 309	. ELEMENT, air cleaner	1
16		000 272	. CLAMP, air cleaner	1
17		010 861	CLAMP, hose 1-1/16 - 2 clamp dia	5
		010 862	CLAMP, hose 1-13/16 - 2-1/2 clamp dia	1
18		018 365	HOSE, intake - air	1
19		023 626	CABLE, battery - insulated 32 inches long 3/8 clamp	1
		010 021	CLAMP, 9/16 diameter x 11/32 hole	1
20		030 344	DOOR, access - battery	1
21		003 075	PANEL, side - left hand	1
22		003 593	COVER, top	1
23		035 968	WASHER, neoprene 5-7/8 OD x 3-5/8 ID x 1/16	1
24		027 529	PIN, cotter 1/4 x 3-1/2	6
25		004 130	BRACKET, support - door	2
26		010 875	CLAMP, muffler 2 inch dia	1
27		*028 262	MUFFLER, exhaust	1
28		015 700	BRACKET ASSEMBLY, mounting - muffler (consisting of)	1
29		010 955	. WASHER, flat - steel 13/32 ID x 2 OD x 1/8	2
30		073 355	. SPRING, compression	1
31		027 564	. SPACER, anti-noise	2
32		004 136	DOOR, engine compartment - right hand	1
		004 134	DOOR, engine compartment - left hand	1
33		004 828	CATCH, door	2
34		053 724	GUARD, fan	2
35		017 363	HOSE, radiator	1
36		605 839	RADIATOR (consisting of)	1
37		605 982	. CAP, radiator 7 lbs pressure	1
38		028 089	DOOR, access - radiator	1
39		003 559	ENCLOSURE, radiator (standard)	1
40		006 015	FITTING, pipe - brass drain cock 1/4 NPT	1
41		006 037	HOSE, radiator	1
42		052 719	ENGINE, gas - electric start (consisting of)	1
43			. BLADE, fan (included with engine - see engine parts list)	1
44			. BELT, V (included with engine - see engine parts list)	1
45		005 772	. CONTROL, weld/idle - electronic (consisting of)	1
46	FS1	005 373	.. SOLENOID, 12 volts dc 84 amp pull type	1
47		005 743	.. BRACKET, mounting - idle device	1
		010 837	.. PIN, spring - compression 3/32 x 5/8	1
48		015 713	.. GROMMET, rubber 5/16 ID x 1/2 mounting hole	1
49		017 594	. CLAMP, stove - manifold	1
50		020 365	. STOVE, manifold	1
51		025 453	. SENDER, temperature	1

Item No.	Dia. Mkgs.	Factory Part No.	Description	Quantity
Figure A			**Main Assembly (Cont'd.)**	
52		025 884	. SENDER, pressure - oil	1
53		025 182	. BRACKET, mounting - alternator	1
54		605 429	. ALTERNATOR, 35 amp 12 volts negative ground	1
55		605 430	. PULLEY, single belt	1
56		025 181	. TUBING, steel 5/8 OD x 12 ga wall x 1/2	1
57		003 631	. PIPE, exhaust	1
58		Figure B	GENERATOR ASSEMBLY (See Page 6)	1
59		004 132	DOOR, generator compartment - right hand	1
		004 133	DOOR, generator compartment - left hand	1
60		000 302	PANEL, side - right hand (standard) or	
60		003 077	PANEL, side - right hand (used when unit has LCC-1A)	1
61		010 515	BOLT, J 5/16-18	4
62		017 477	ROD, holddown - battery	2
63	Batt	*015 709	BATTERY, 12 volts 53 amp	1
64		023 641	CABLE, battery - uninsulated	1
65		030 342	TRAY, slide - battery	1
66		023 892	CABLE, ground	1
67		007 894	MOUNT, engine	1
68		010 266	SPRING, extension	2
69		017 420	LATCH, door	2
70	DC-Z	003 097	STABILIZER	1
71		000 553	MOUNT, dual stud - generator	2
72		010 144	CLAMP, nylon 7/16 dia	1
73		603 107	HOSE, neoprene - slit 5/32 ID x 11/32 OD (order by foot)	1 ft.
74	TE1	038 621	BLOCK, terminal 30 amp 4 pole	1
		007 289	CONNECTOR, 30 amp 45 degree	1
75		053 967	INSULATION, rectifier	1
76		038 620	LINK, jumper - terminal block	2
77		052 372	BRACKET, mounting - strip terminal	1
78		035 860	RECTIFIER ASSEMBLY (consisting of)	1
79	VR1	038 493	. VARISTOR, 3 joule 390 volts	1
80	SR1,2	035 704	. RECTIFIER, integrated 6 amp 600 volts	2
81		031 926	. HEAT SINK, rectifier	1
82		000 196	FRAME, base - front	1
83		003 563	BASE	1
84	R2,3	030 060	RESISTOR, WW adj 375 watt 20 ohm	2
85		000 293	DOOR, access - front lower	1
86		Figure C	PANEL, front - lower with components (See Page 8)	1
87		Figure D	PANEL, front - upper with components (See Page 12)	1
88		052 688	RESISTOR, WW adj 50 watt 25 ohm	1
89		003 210	PANEL, control - high frequency (See Fig. E Page 16)	1
90		003 057	FRAME, mounting - reactor & stabilizer	1
91	AC-Z	003 135	REACTOR	1
92		603 125	STRIP, cotton, 1/8 x 1 (4 ft req'd - order by foot)	4 ft.
		011 751	SWITCH, slide - normally open (with leads & clamp)	1
		011 754	SWTICH, slide - maintained contact (with leads & clamp)	1
		003 590	CORD SET, HF start control (consisting of)	1
		003 589	. CAP, twistlock 2P2W	1
		600 755	. TERMINAL, disconnect - knife 16-14 wire	1
		023 606	. CORD SET, 115 volts 16 ga 2 conductor 20 ft lg	1
		003 907	KIT, label	1

For Optional Equipment See Page 10

*Recommended Spare Parts.

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

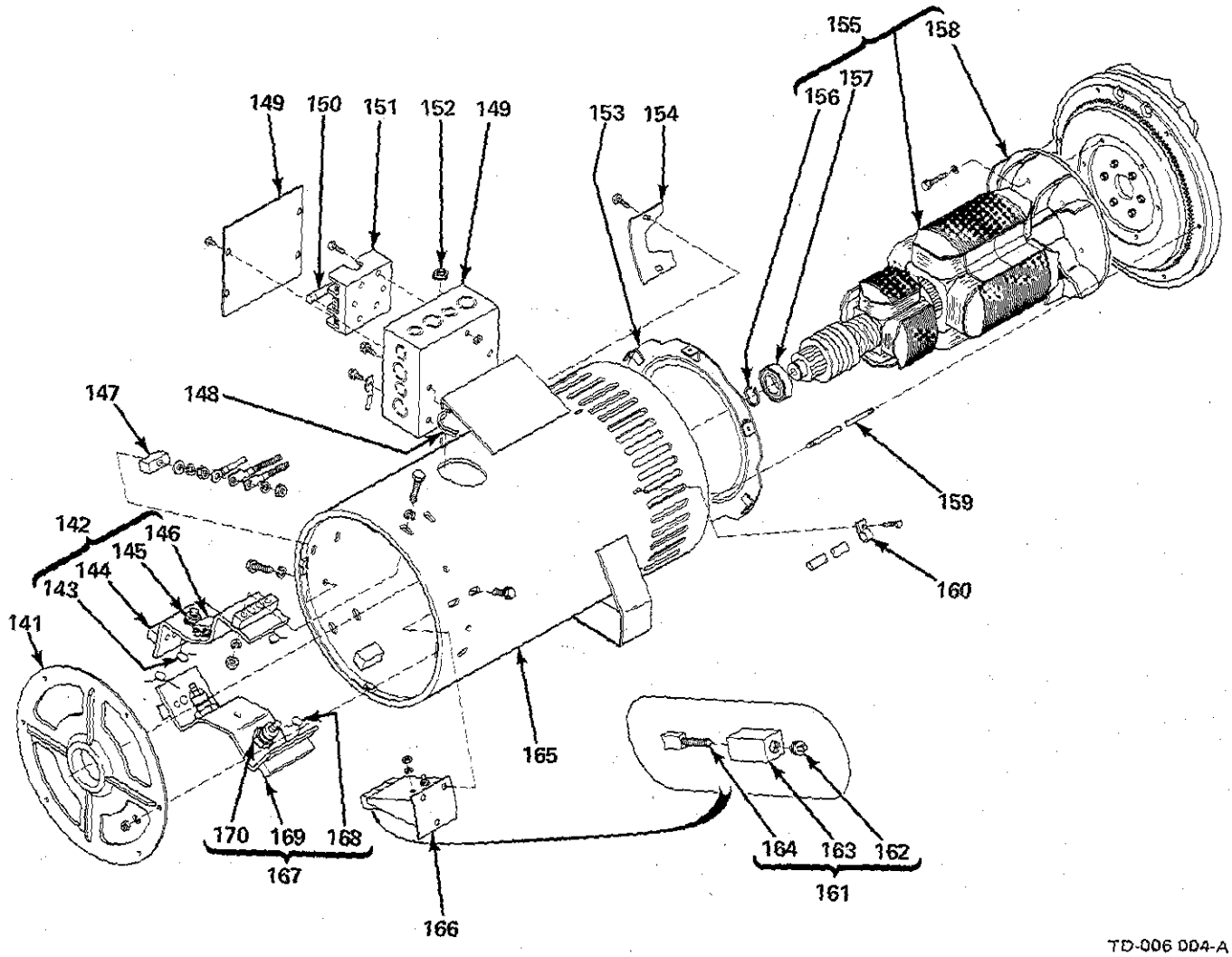


Figure B – Generator Assembly

Item No.	Dia. Mkgs.	Factory Part No.	Description	Quantity
Figure B			**Generator Assembly (See Fig. A Page 4 Item 58)**	
141		025 271	ENDBELL	1
142	SR3	000 903	DIODE ASSEMBLY, reverse polarity (consisting of)	1
143		000 901	. CAPACITOR, ceramic 0.01 uf 500 volts dc	2
144		025 305	. INSULATOR	2
145		037 957	. DIODE, 275 amp 250 volts reverse polarity	2
146		000 601	. SUPPRESSOR, rectifier (consisting of)	1
	R11	030 726	. . RESISTOR, WW fixed 5 watt 1000 ohm	1
	VS1	024 471	. . SUPPRESSOR, 1 uf 2.7 ohm	1
147		025 306	INSULATOR	5
148		026 203	CHANNEL, neoprene 1/4 inch x 11-1/2 inch long	1
149		039 269	BOX, fuse holder	1
150	F1,2	*012 625	FUSE, cartridge 45 amp 250 volts	2
151		039 169	HOLDER, fuse - cartridge 60 amp 250 volts	1
152		010 493	BUSHING, snap 5/8 ID 7/8 mounting hole	1
		010 021	CLAMP, steel - cushion 9/16 dia x 11/32 hole	1
153		039 207	BAFFLE, air - generator	1
154		032 311	GUARD, generator	1
155		**003 632	ROTOR, generator (consisting of)	1
156		024 617	. RING, retaining - external	1
157		053 390	. BEARING, ball	1
158		035 917	. FAN, rotor	1
		035 775	. KEY, 3/8 x 3/8 x 1-1/2	1
159		025 525	ROD, threaded end 3/8-16 x 29-7/16	6
160		010 021	CLAMP, 9/16 dia x 11/32 hole	1
161		018 614	BRUSH SET (consisting of)	3
162		018 665	. CAP, brush holder	1
163		600 270	. BRUSH HOLDER	1
164		*020 034	. BRUSH, contact	1
165		059 010	STATOR	1
166		025 321	BRACKET, mounting - brush holder	1
167	SR3	000 904	DIODE ASSEMBLY, straight polarity (consisting of)	1
168		000 901	. CAPACITOR, ceramic 0.01 uf 500 volts dc	2
169		025 305	. INSULATOR	2
170		037 956	. DIODE, 275 amp 250 volts straight polarity	2

*Recommended Spare Parts.

**Rotor is available on an exchange basis. Contact Distributor for Details.

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

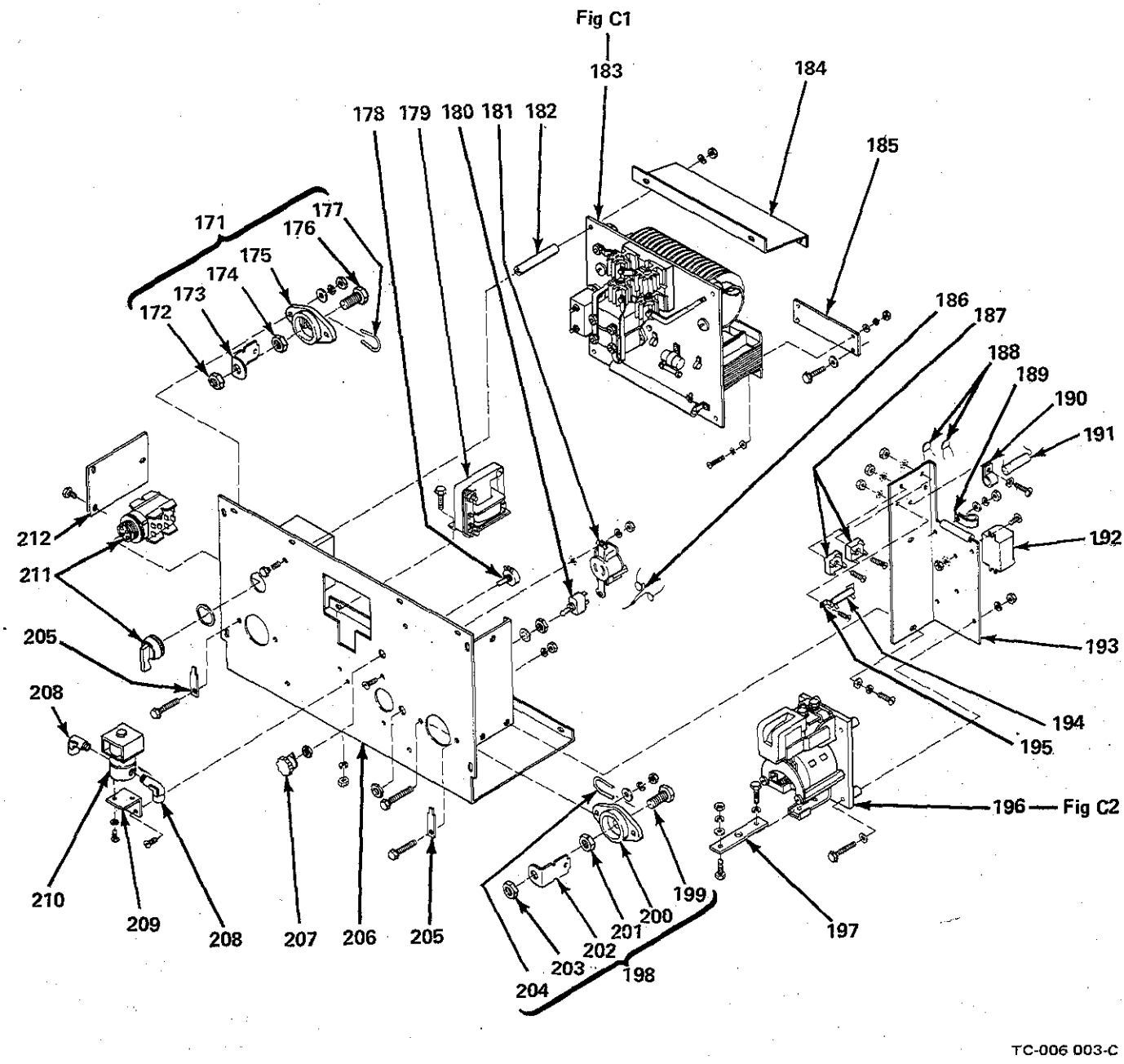


Figure C — Panel, Front - Lower With Components

Item No.	Dia. Mkgs.	Factory Part No.	Description	Quantity
Figure C			**Panel, Front-Lower With Components (See Fig. A Page 4 Item 86)**	
171	Elect	039 046	TERMINAL, power output - black (consisting of)	1
172		601 879	. NUT, steel - hex full 1/2-13	1
173		039 044	. BUS BAR	1
174		601 880	. NUT, steel - hex jam 1/2-13	1
175		039 045	. TERMINAL BOARD, black	1
176		601 976	. SCREW, cap - steel hex hd 1/2-13	1
177		053 032	. CLIP, spring - bus bar	1
178	R10	030 686	POTENTIOMETER, carbon 1 turn 2 watt 2 meg ohm	1
179	CT2	035 454	TRANSFORMER, current 500/1	1
180	S4	011 610	SWITCH, toggle SPDT 10 amp 125 volts center off	1
181	RC4	039 602	RECEPTACLE, twistlock 2P2W	1
182		010 006	TUBING, steel 5/8 OD x 12 ga wall x 3-1/4	4
183		003 211	HF PANEL, (See Fig. C1 Page 9)	1
184		000 973	BRACKET, mounting - panel HF	1
185		003 206	BRACKET, support - panel HF	1
186	C10,11 16,17	006 704	CAPACITOR ASSEMBLY, ceramic 0.02 uf 500 volts dc	2
187	SR5,6	035 704	RECTIFIER, integrated 6 amp 600 volts	2
188	C18,19	006 704	CAPACITOR ASSEMBLY, ceramic 0.02 uf 500 volts dc	1
189		010 021	CLAMP, steel - cushion 9/16 dia. x 11/32 hole	1
190		010 146	CLAMP, nylon 5/8 clamp dia.	1
191	C1	031 606	CAPACITOR, metalized paper 1 uf 400 volts	1
192	CR3	052 603	RELAY, 110 volts dc DPDT 10 amp	1
193		052 685	BRACKET, mounting - contactor	1
194	R12	030 618	RESISTOR, WW fixed 10 watt 20K ohm	1
195		052 704	CLIP, spring - mounting resistor	1
196	W	034 639	CONTACTOR, 200 amp 1 pole (See Fig. C2 Page 10)	1
197		052 684	LINK, jumper - contactor	1
198	Work	039 047	TERMINAL, power output - red (consisting of)	1
199		601 976	. SCREW, cap - steel hex hd 1/2-13 x 1-1/2	1
200		039 049	. TERMINAL BOARD, red	1
201		601 880	. NUT, steel - hex jam 1/2-13	1
202		039 044	. BUS BAR	1
203		601 879	. NUT, steel - hex full 1/2-13	1
204		053 032	. CLIP, spring - bus bar	2
205		010 222	CONNECTOR, rectifier - cell	2
206		000 956	PANEL, front - lower (standard) or	
206		000 955	PANEL, front - lower w/low current control or	
206		003 277	PANEL, front - lower HF intensity control	1
207		024 366	KNOB, pointer R10	1
		013 518	PLATE, indicator 0-100	1
208		010 678	FITTING, pipe - brass elbow straight 1/4 NPT	2
209		003 207	BRACKET, mounting - solenoid	1
210	GS1	003 538	VALVE, 115 volts ac 2 way 1/4 IPS port 1/8 orifice (consisting of)	1
		003 539	. COIL, valve	1
211	S6	003 904	SWITCH, process 3 position (consisting of)	1
		003 656	. CONTACT BLOCK	5
212		003 901	COVER, switch - box process	1

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

Item No.	Dia. Mkgs.	Factory Part No.	Description	Quantity
Figure C1		**003 211**	**HF Panel (See Fig. C Page 8 Item 183)**	
211		020 623	SPARK GAP ASSEMBLY (consisting of)	1
212	G	*020 603	. POINT, spark gap	4
213		020 622	. HOLDER, point	4
214		010 888	. CONNECTOR, holder	1
215		020 621	. BASE	1
216		601 835	NUT, brass - hex regular 10-32	8
217		010 886	STRIP, conductor	1
218		003 205	MOUNTING BOARD	1
219		038 887	STUD, brass 10-32 x 1-3/8 w/hex collar	2
220		602 042	SCREW, machine - brass round hd 10-32 x 1	1
221	T2	033 373	COIL, coupling - air (consisting of)	1
222		010 147	. STRIP	2
223		601 837	NUT, brass - hex jam 3/8-16	6
224	T1	003 202	TRANSFORMER	1
225		603 737	SCREW, brass - round hd 3/8-16 x 1-3/4	2
226	R4	030 602	RESISTOR, WW fixed 100 watt 10 ohm	1
227		010 141	CLAMP, 1/4 dia	2
228	C3	031 606	CAPACITOR, paper oil 1 uf 400 volts	1
229	R7	030 603	RESISTOR, WW fixed 10 watt 10K ohm	1
230		010 146	CLAMP, 5/8 dia	1
231		010 883	STRIP, conductor 8 inches lg	1
232	C2,4	031 602	CAPACITOR, mica .002 uf 5000 volts dc	3
233		010 884	STRIP, conductor 6-3/4 inches lg	1
234		010 885	STRIP, conductor 5-3/8 inches lg	1

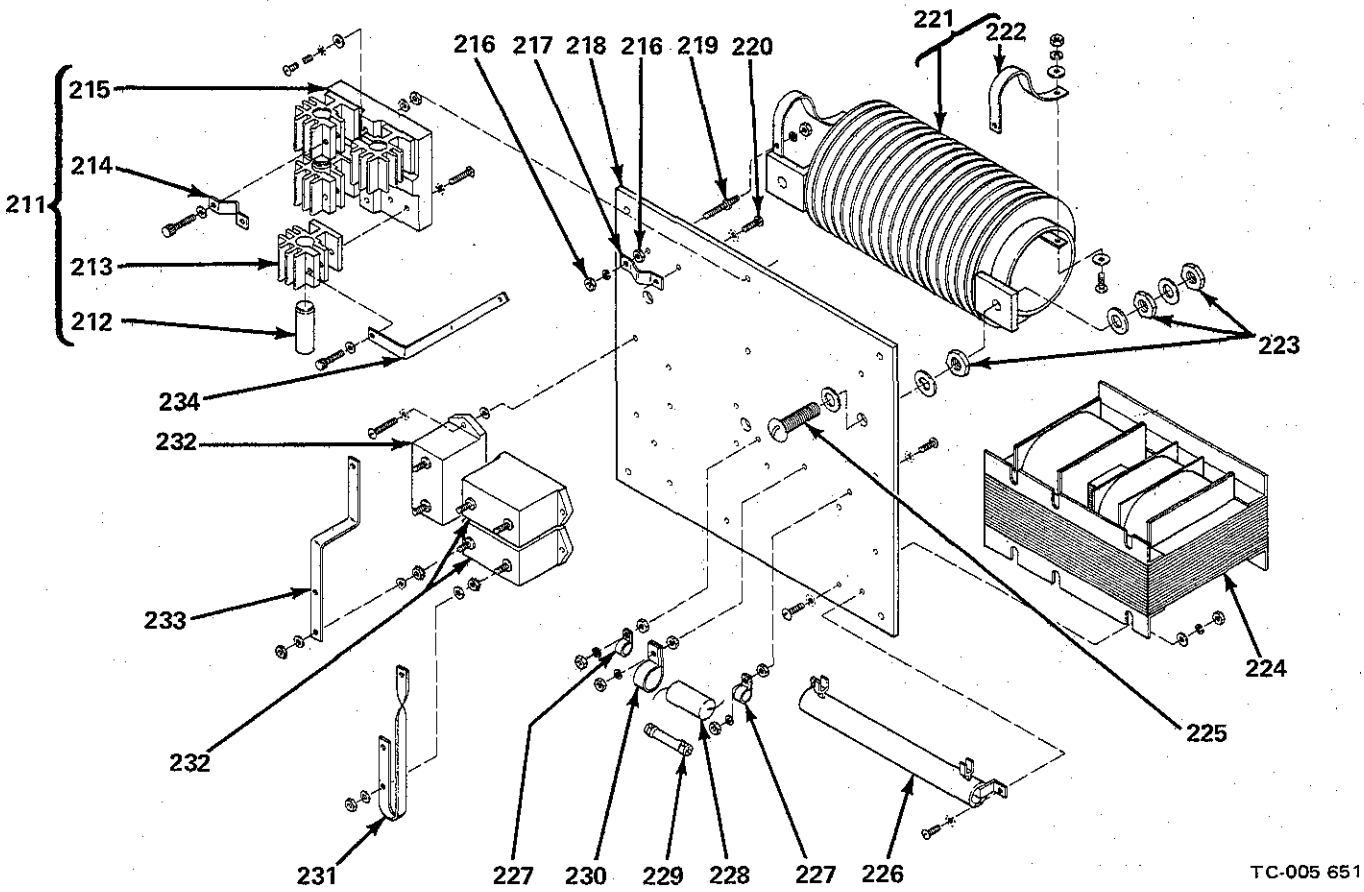
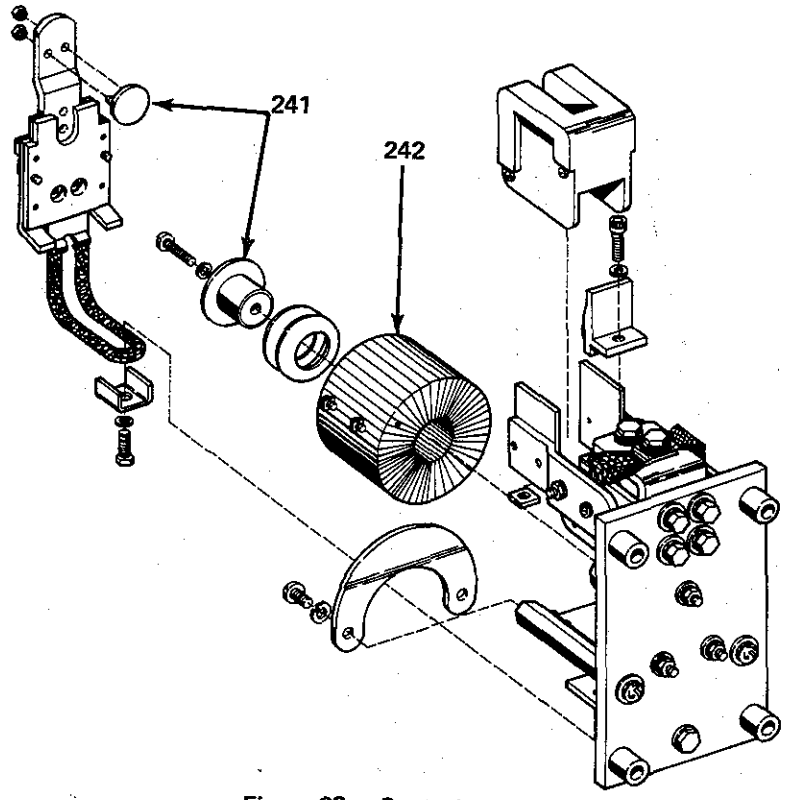


Figure C1 — HF Panel

*Recommended Spare Parts.

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

Item No.	Factory Part No.	Description	Quantity
Figure C2	**034 639**	**Contactor (See Fig. C Page 8 Item 196)**	
241	*034 754	KIT, point - contactor	1
242	033 036	COIL, contactor 76/114 volts dc	1



TC-034 639

Figure C2 — Contactor

Dia. Mkgs.	Factory Part No.	Description	Quantity
		Optional Equipment	
A2	025 623	METER, weld 0-500 scale	1
CT1	036 611	TRANSFORMER, current 500/5	1
F5	*012 625	FUSE, cartridge 45 amp 250 volts	1
F5	012 794	HOLDER, fuse - cartridge 60 amp 250 volts	1
P1	025 704	FILTER, HF dc volt & ammeter	2
P2	025 703	FILTER, HF ac ammeter	1
RC2	604 103	RECEPTACLE, straight - duplex grounded 2P3W 15 amp 250 volts	1
	025 234	CAP, straight - grounded 2P3W (used with RC2)	1
R29	030 679	RHEOSTAT	1
R30	603 942	RHEOSTAT, WW 150 watt 5 ohm	1
	024 366	KNOB, pointer R30	1
	013 518	PLATE, indicator 0-100 HF intensity control	1
	003 276	MOUNTING BOARD, HF intensity control	1
S11	021 942	SWITCH ASSEMBLY, knife	1
	015 722	GROMMET, rubber 1-1/4 ID x 1-1/2 hole 3/32 groove	1
TAC	027 491	TACHOMETER, electric 12 volts 4000 rpm	1
	017 390	BRACKET, mounting - tachometer	1
	020 374	BRACKET, mounting - tachometer to engine	1
TT	032 936	METER, running hour 4-40 volts	1
V1	025 638	METER, volts dc 0-100 scale	1
V2	025 645	METER, volts ac 0-100 scale	1
	007 200	SPARK ARRESTOR, exhaust	1
	010 875	CLAMP, muffler 2 inch dia (used with spark arrestor)	1

*Recommended Spare Parts.

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

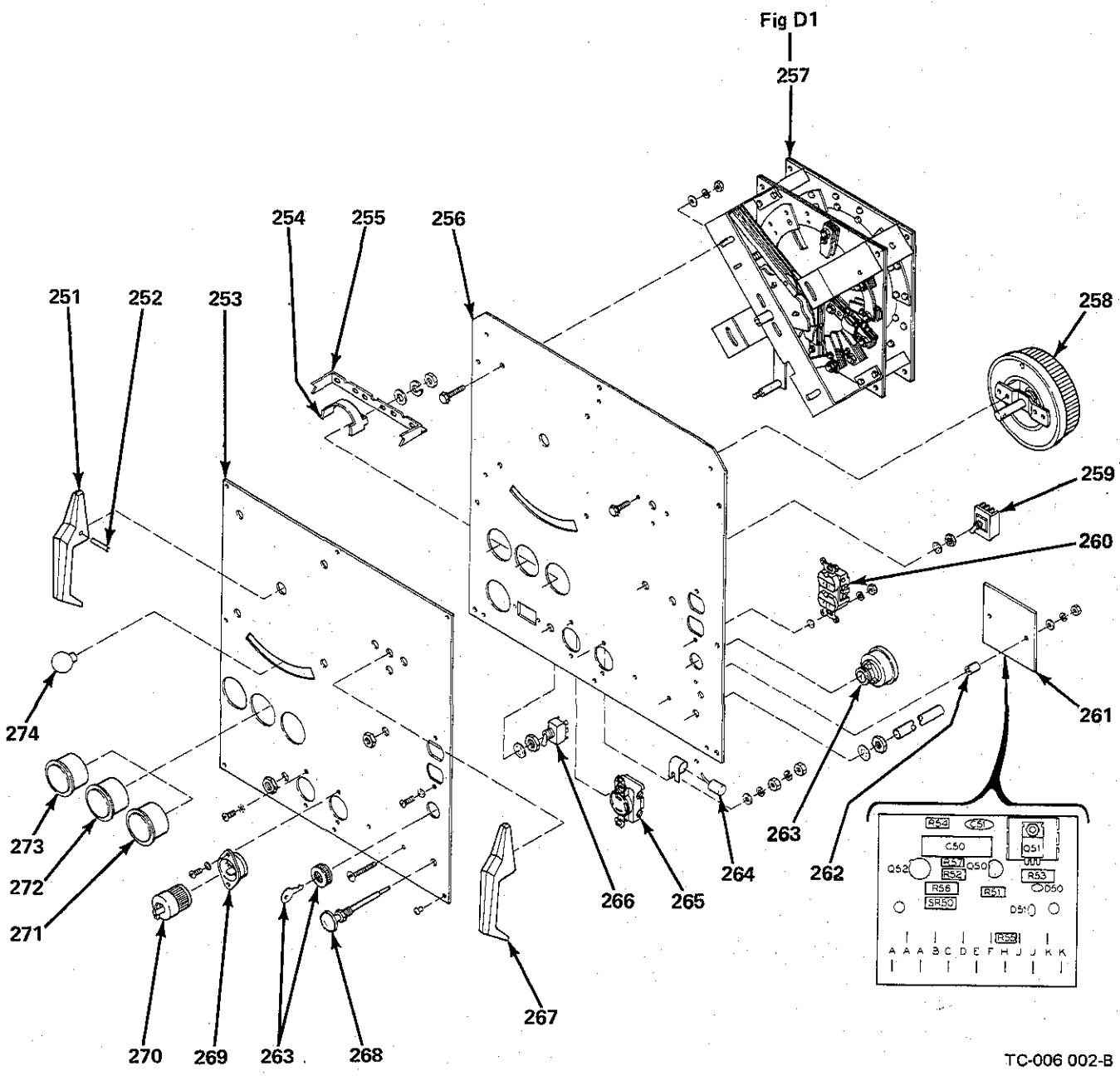


Figure D — Panel, Front - Upper With Components

Item No.	Dia. Mkgs.	Factory Part No.	Description	Quantity
Figure D			**Panel, Front-Upper With Components (See Fig. A Page 4 Item 87)**	
251		019 754	HANDLE, switch - range	1
252		010 836	PIN, spring - compression	1
253			NAMEPLATE (order by stock, model, and serial numbers)	1
254		059 343	BRACKET, mounting - meter	1
255		059 262	BRACKET, mounting - meter	1
256		003 595	PANEL, front - upper	1
257	S1,3	003 189	SWITCH, polarity/range (See Fig. D1 Page 12)	1
258	R1	*605 049	RHEOSTAT, WW 300 watt 25 ohm	1
259	S2	011 622	SWITCH, toggle 3PDT 15 amp 125 volts	1
260	RC1	604 176	RECEPTACLE, duplex - grounded straight 2P3W 15 amp 125 volts	1
261	PC1	052 500	CIRCUIT CARD ASSEMBLY, weld/idle (consisting of)	1
	C50	031 633	. CAPACITOR, electrolytic 80 uf 25 volts dc	1
	C51	031 643	. CAPACITOR, ceramic 0.01 uf 500 volts dc	1
	D50	026 202	. DIODE, rectifier 1 amp 400 volts straight polarity	1
	D51	027 369	. DIODE, rectifier 3 amp 600 volts straight polarity	1
	Q50,52	000 088	. TRANSISTOR, 800 MA 40 volts NPN	2
	Q51	005 274	. TRANSISTOR, 10 amp 60 volts NPN	1
	R51	030 004	. RESISTOR, carbon 0.5 watt 10K ohm	1
	R52,54	030 090	. RESISTOR, carbon 0.5 watt 47 ohm	2
	R53	030 710	. RESISTOR, carbon 1 watt 270 ohm	1
	R55	007 293	. RESISTOR, carbon 0.5 watt 680K ohm	1
	R56	030 712	. RESISTOR, carbon 1 watt 1000 ohm	1
	R57	030 114	. RESISTOR, carbon 0.5 watt 150 ohm	1
	SR50	021 939	. RECTIFIER, integrated 1.5 amp 400 volts	1
	R9	052 688	RESISTOR, WW adj 50 watt 25 ohm	1
262		010 526	TUBING, steel 5/16 OD x 17 ga wall x 7/16	2
263	S7	027 823	SWITCH, ignition - key type 3 position	1
264	C20	053 296	CAPACITOR, ignition 0.05 uf	1
265	RC3	039 615	RECEPTACLE, twistlock 4P4W	1
	C7,8,9	006 705	CAPACITOR ASSEMBLY (consisting of)	1
		031 637	. CAPACITOR, ceramic 0.02 uf 500 volts dc	3
266	S5	011 611	SWITCH, toggle DPDT 15 amp 125 volts	1
267		019 755	HANDLE, rheostat	1
		602 178	SCREW, set - steel 1/4-20 x 3/8	1
268		601 714	CONTROL, push - pull	1
269	RC5	039 634	RECEPTACLE, twistlock male flanged 2P2W	1
270		039 635	BODY, connector - twistlock 2P2W	1
271	Oil	039 241	GAUGE, pressure - oil	1
272	A1	039 237	METER, amp dc 60-0-60	1
273	Temp	039 239	GAUGE, temperature	1
274		019 603	KNOB, ball	1

*Recommended Spare Parts.

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

Item No.	Dia. Mkgs.	Factory Part No.	Description	Quantity
Figure D1		**003 189**	**Switch, Polarity/Range (See Fig. D Page 12 Item 257)**	
281		003 246	BRACKET, mounting - switch range (consisting of)	1
282		010 671	. SPRING, extension	2
283		011 673	LOCATOR, quadrant - switch	1
284		011 674	HANDLE, switch - selector	1
285		011 846	BRACKET, mounting - support switch	2
286	S1	003 248	CONTACT BOARD ASSEMBLY, switch - polarity (See Fig. D1A Page 13)	1
287		011 657	SPACER, mounting - switch	4
288		003 177	SHAFT, control - switch range	1
289	S3	003 247	CONTACT BOARD ASSEMBLY, switch - range (See Fig. D1B Page 14)	1

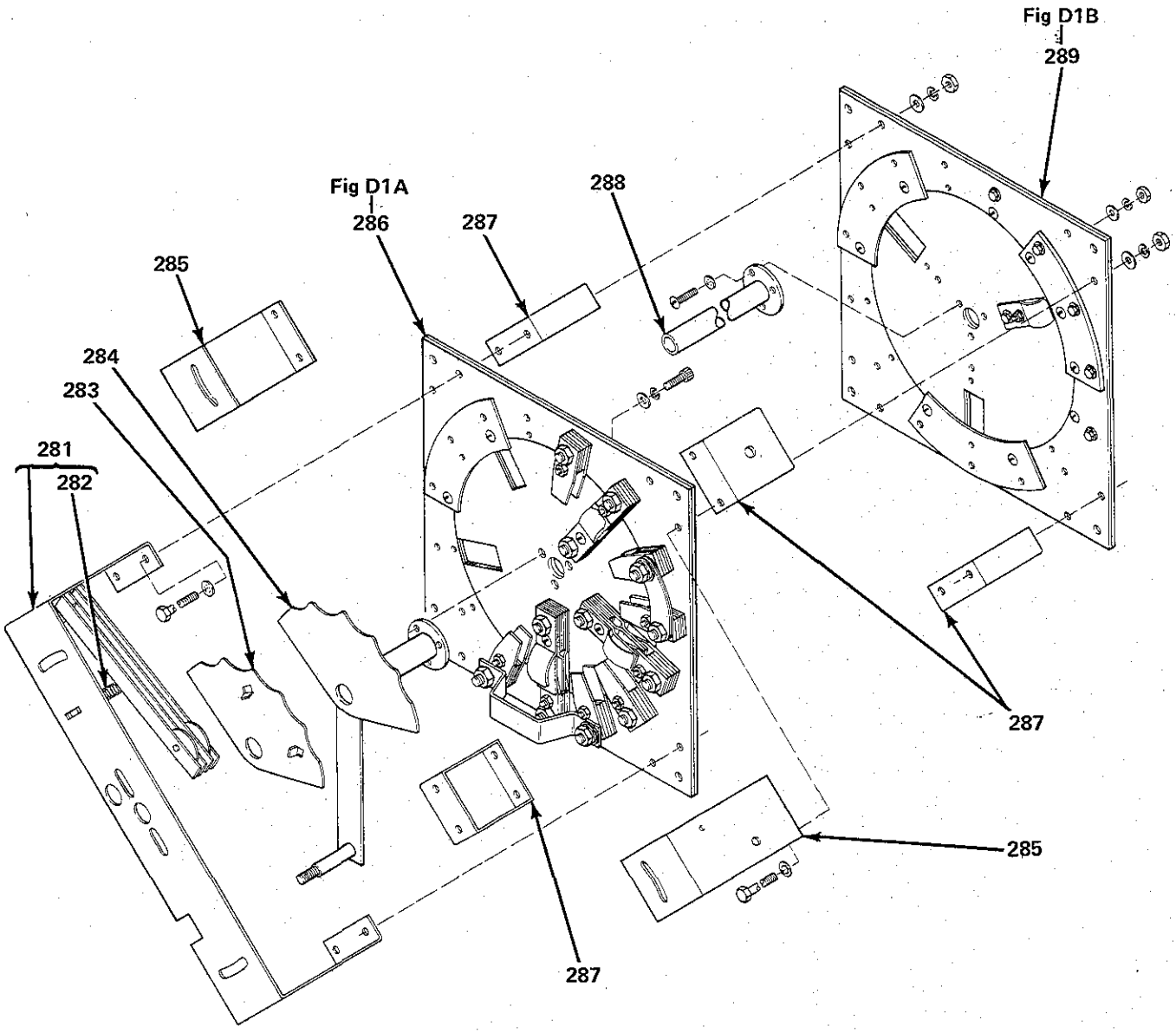


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Figure D1 — Switch, Polarity/Range

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

Item No.	Factory Part No.	Description	Quantity
Figure D1A	**003 248**	**Contact Board Assembly, Switch - Polarity (See Fig. D1 Page 13 Item 286)**	
301	011 490	CONTACT ASSEMBLY, movable (consisting of)	3
302	011 025	. SPRING, pressure - contact	1
303	011 007	. SPRING, pressure - contact	1
304	011 010	. CONTACT, switch - copper	2
305	011 009	. CONTACT, switch - bronze	2
306	010 202	. SPACER, contact 1/8 inch thick	1
307	010 201	. SPACER, contact 1/16 inch thick	1
308	010 200	. SPACER, contact .024 inch thick	1
309	011 095	CONTACT BOARD, stationary	2
310	011 016	CONTACT BOARD, movable	2
311	011 012	SHIM, guide - contact board	3
312	011 013	GUIDE, contact board - movable	4
313	011 011	BAR, shorting - switch range	2
314	011 489	CONTACT ASSEMBLY, stationary (consisting of)	9
315	011 018	. CONTACT, stationary	2
316	010 202	. SPACER, contact 1/8 inch thick	1
317	010 201	. SPACER, contact 1/16 inch thick	1
318	010 200	. SPACER, contact .024 inch thick	1
319	011 015	BAR, shorting - switch range	1
—	010 201	SPACER, contact 1/16 inch thick	3

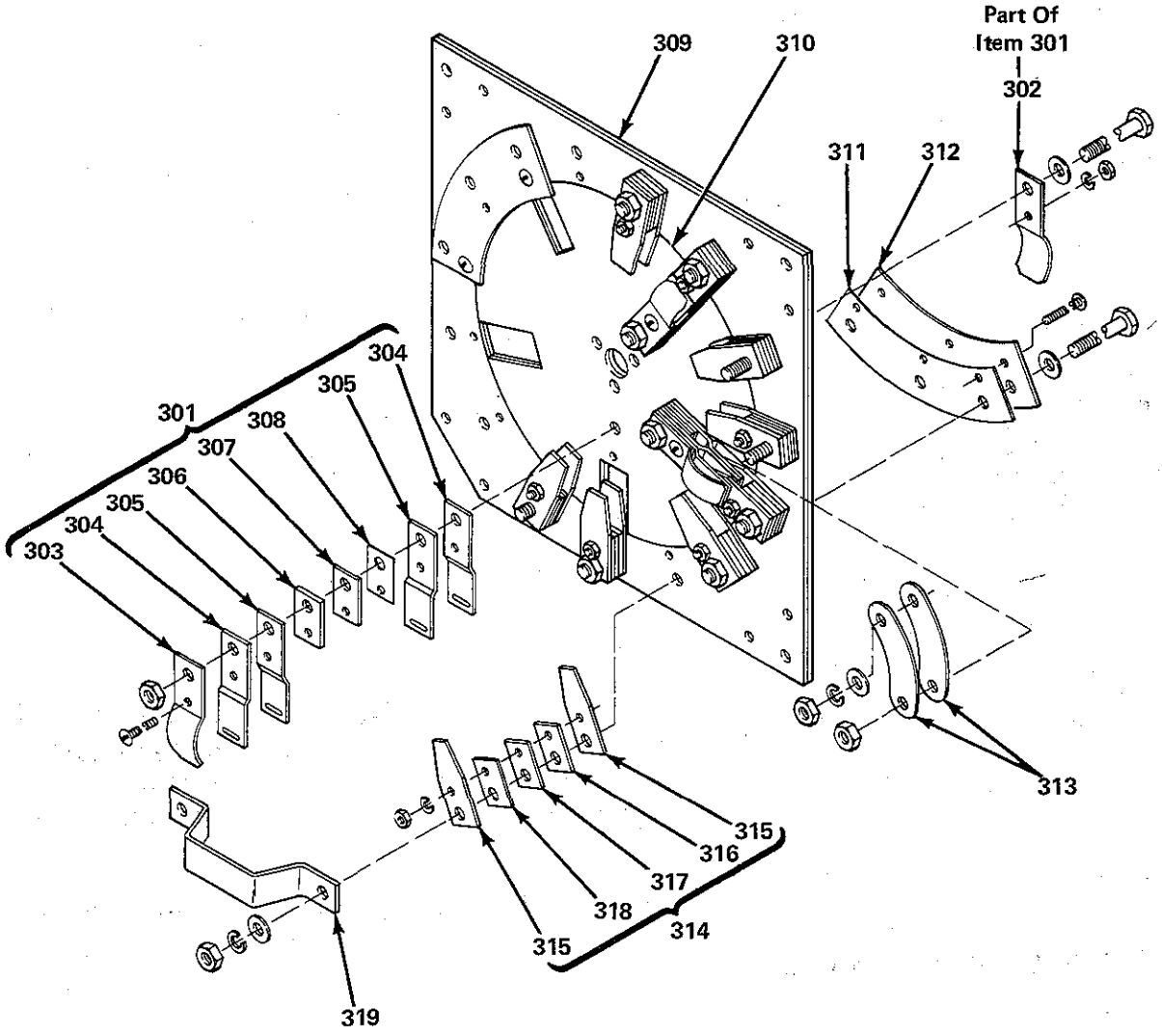

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Figure D1A — Contact Board Assembly, Switch - Polarity

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

Item No.	Factory Part No.	Description	Quantity
Figure D1B	**003 247**	**Contact Board Assembly, Switch-Range (See Fig. D1 Page 13 Item 289)**	
331	011 095	CONTACT BOARD, stationary	2
332	011 019	CONTACT BOARD, movable	2
333	011 489	CONTACT ASSEMBLY, stationary (consisting of)	1
334	011 018	. CONTACT, stationary	2
335	010 202	. SPACER, contact 1/8 inch thick	1
336	010 201	. SPACER, contact 1/16 inch thick	1
337	010 200	. SPACER, contact .024 inch thick	1
338	011 490	CONTACT ASSEMBLY, movable (consisting of)	1
339	011 025	. SPRING, pressure - contact	1
340	011 007	. SPRING, pressure - contact	1
341	011 010	. CONTACT, switch - copper	2
342	011 009	. CONTACT, switch - bronze	2
343	010 202	. SPACER, contact 1/8 inch thick	1
344	010 201	. SPACER, contact 1/16 inch thick	1
345	010 200	. SPACER, contact .024 inch thick	1
346	011 018	CONTACT, stationary	1
347	011 013	GUIDE, contact board - movable	5
348	011 012	SHIM, guide	3

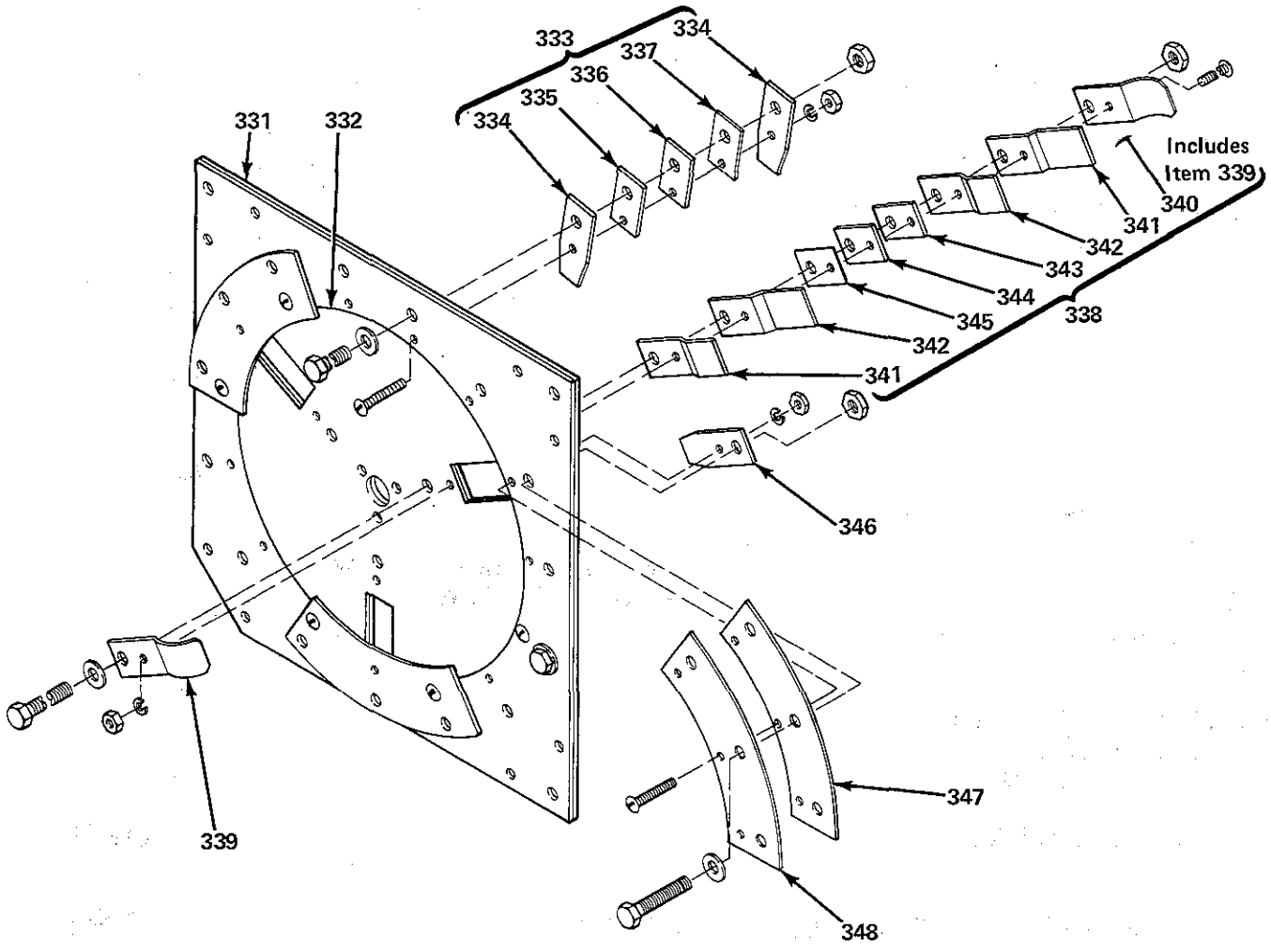

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Figure D1B — Contact Board Assembly, Switch - Range

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

Item No.	Dia. Mkgs.	Factory Part No.	Description	Quantity
Figure E		**003 210**	**Panel, Control HF (See Fig. A Page 4 Item 89)**	
361	1T	038 646	BLOCK, terminal 30 amp 10 pole	1
362		000 953	PANEL, mounting - component HF	1
363	2T	038 429	BLOCK, terminal 30 amp 12 pole	1
364	SR4	037 568	RECTIFIER (consisting of)	1
365		601 242	. INSULATOR, washer - heat sink	2
366		102 363	. BRACKET, mounting - rectifier	2
367	R8	030 055	RESISTOR, carbon 2 watt 10 ohm	1
368	D9	004 176	DIODE, zener 24 volts 5 watt	1
369	C5	031 708	CAPACITOR, electrolytic 250 uf 50 volts	2
370		010 122	CLIP, capacitor	2
371	C6	031 606	CAPACITOR, paper oil 1 uf 400 volts	1
372		010 146	CLAMP, 5/8 dia	1
373	CR2	000 770	RELAY, enclosed 24 volts dc 3PDT	1
374	TD1	000 769	TIMER, delay 0-100 seconds 120 volts ac w/terminal strip	1
375	CR1	000 174	RELAY, enclosed, 24 volts ac 3PDT	1
376	R5,6	030 601	RESISTOR, WW adj 25 watt 1000 ohm	2

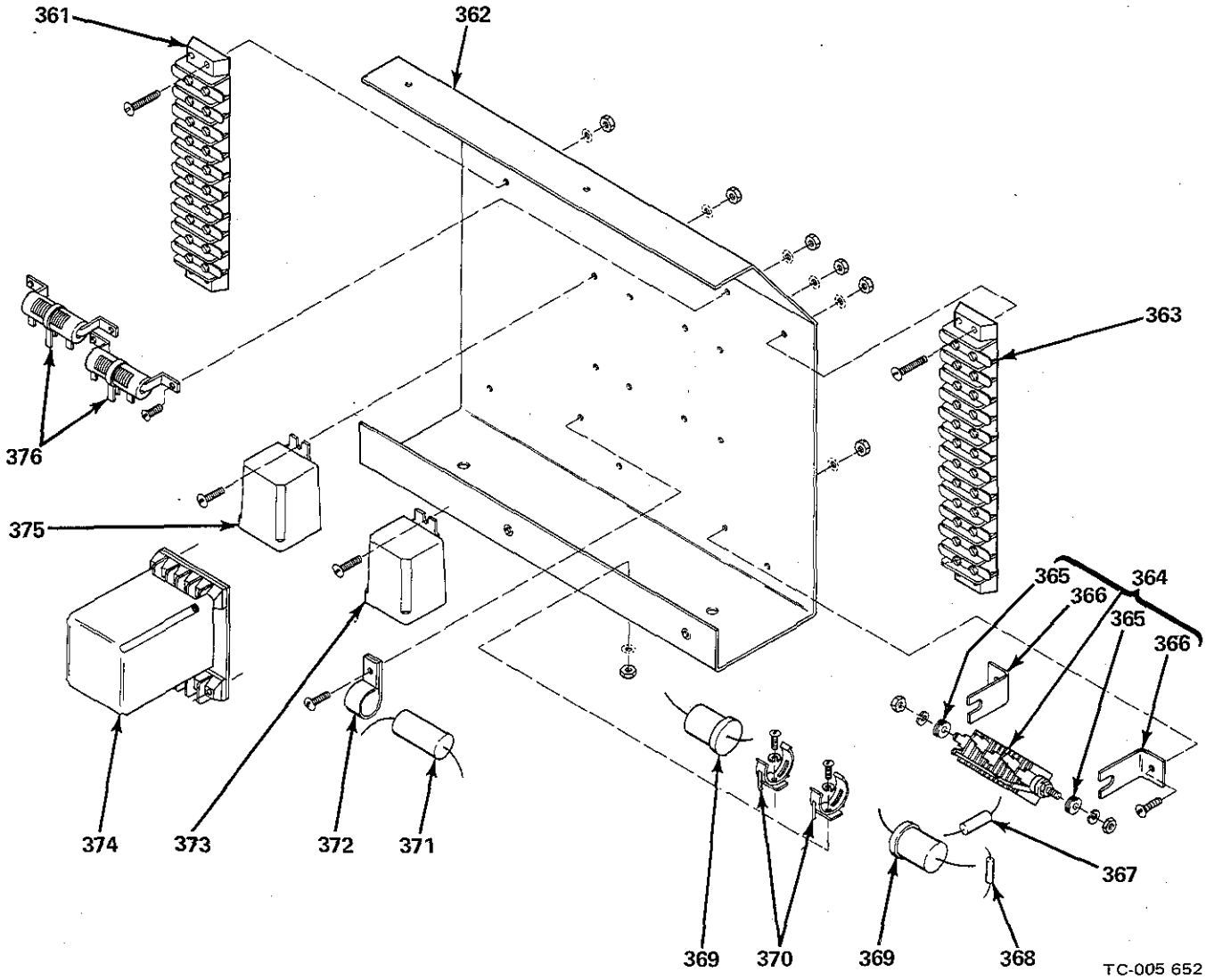

Figure E — Panel, Control HF

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