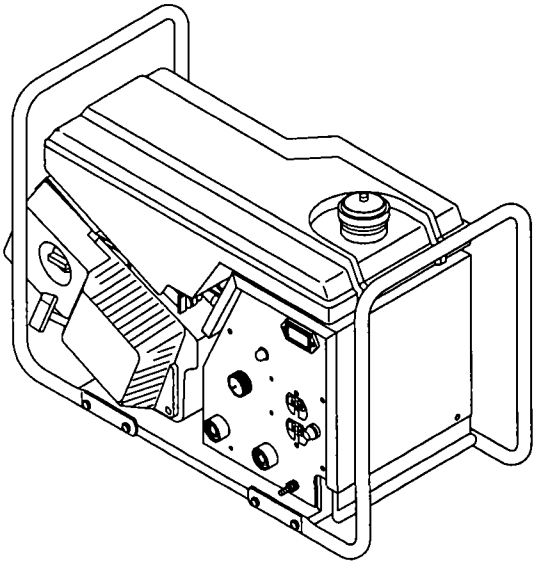
Miller®

Gold Seal™

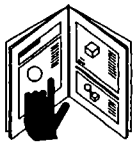
March 1993 Form: OM-160 518
Effective With Serial No. KD398640

OWNER'S MANUAL



Gold Seal™ Model 3000

- CC/DC Welding Generator
- For SMAW Welding
- 90 Amperes, 25 Volts DC At 60% Duty Cycle
- 1.2 kVA/kW DC Auxiliary Power With Overload Protection
- Kohler CH5+ Air-Cooled, Four-Cycle, Gasoline Engine
- Optional Low Oil Pressure Shutdown Switch



- Read and follow these instructions and all safety blocks carefully.
- Have only trained and qualified persons install, operate, or service this unit.
- Call your distributor if you do not understand the directions.

- Give this manual to the operator.

- For help, call your distributor
- or: MILLER ELECTRIC Mfg. Co., P.O. Box 1079, Appleton, WI 54912 414-734-9821

MILLER'S TRUE BLUE™ LIMITED WARRANTY

Effective January 1, 1992
(Equipment with a serial number preface of "KC" or newer)

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

LIMITED WARRANTY – Subject to the terms and conditions below, MILLER Electric Mfg. Co., Appleton, Wisconsin, warrants to its original retail purchaser that new MILLER equipment sold after the effective date of this limited warranty is free of defects in material and workmanship at the time it is shipped by MILLER. THIS WARRANTY IS EXPRESSLY IN LIEU OF ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING THE WARRANTIES OF MERCHANTABILITY AND FITNESS.

Within the warranty periods listed below, MILLER will repair or replace any warranted parts or components that fail due to such defects in material or workmanship. MILLER must be notified in writing within thirty (30) days of such defect or failure, at which time MILLER will provide instructions on the warranty claim procedures to be followed.

MILLER shall honor warranty claims on warranted equipment listed below in the event of such a failure within the warranty time periods. All warranty time periods start on the date that the equipment was delivered to the original retail purchaser, and are as follows:

1. 5 Years Parts – 3 Years Labor
   * Original main power rectifiers
2. 3 Years — Parts and Labor
   * Transformer/Rectifier Power Sources
   * Plasma Arc Cutting Power Sources
   * Semi-Automatic and Automatic Wire Feeders
   * Robots
3. 2 Years — Parts and Labor
   * Engine Driven Welding Generators
     (NOTE: Engines are warranted separately by the engine manufacturer.)
4. 1 Year — Parts and Labor
   * Motor Driven Guns
   * Process Controllers
   * Water Coolant Systems
   * HF Units
   * Grids
   * Spot Welders
   * Load Banks
   * SDX Transformers
   * Running Gear/Trailers
   * Field Options

   (NOTE: Field options are covered under True Blue™ for the remaining warranty period of the product they are installed in, or for a minimum of one year — whichever is greater.)
5. 6 Months — Batteries
6. 90 Days — Parts and Labor
   * MIG Guns/TIG Torches
   * Plasma Cutting Torches
   * Remote Controls
   * Accessory Kits
   * Replacement Parts

MILLER'S True Blue™ Limited Warranty shall not apply to:

1. Items furnished by MILLER, but manufactured by others, such as engines or trade accessories. These items are covered by the manufacturer's warranty, if any.
2. Consumable components; such as contact tips, cutting nozzles, contactors and relays.
3. Equipment that has been modified by any party other than MILLER, or equipment that has been improperly installed, improperly operated or misused based upon industry standards, or equipment which has not had reasonable and necessary maintenance, or equipment which has been used for operation outside of the specifications for the equipment.

MILLER PRODUCTS ARE INTENDED FOR PURCHASE AND USE BY COMMERCIAL/INDUSTRIAL USERS AND PERSONS TRAINED AND EXPERIENCED IN THE USE AND MAINTENANCE OF WELDING EQUIPMENT.

In the event of a warranty claim covered by this warranty, the exclusive remedies 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. MILLER'S option of repair or replacement will be F.O.B., Factory at Appleton, Wisconsin, or F.O.B. at a MILLER authorized service facility as determined by MILLER. Therefore no compensation or reimbursement for transportation costs of any kind will be allowed.

TO THE EXTENT PERMITTED BY LAW, THE REMEDIES PROVIDED HEREIN ARE THE SOLE AND EXCLUSIVE REMEDIES. IN NO EVENT SHALL MILLER BE LIABLE FOR DIRECT, INDIRECT, SPECIAL, INCIDENTAL OR CONSEQUENTIAL DAMAGES (INCLUDING LOSS OF PROFIT), WHETHER BASED ON CONTRACT, TORT OR ANY OTHER LEGAL THEORY.

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

Some states in the U.S.A. do not allow limitations of how long an implied warranty lasts, or the exclusion of incidental, indirect, special or consequential damages, so the above limitation or exclusion may not apply to you. This warranty provides specific legal rights, and other rights may be available, but may vary from state to state.

In Canada, legislation in some provinces provides for certain additional warranties or remedies other than as stated herein, and to the extent that they may not be waived, the limitations and exclusions set out above may not apply. This Limited Warranty provides specific legal rights, and other rights may be available, but may vary from province to province.

RECEIVING-HANDLING

Before unpacking equipment, check carton for any damage that may have occurred during shipment. File any claims for loss or damage **with the delivering carrier**. Assistance for filing or settling claims may be obtained from distributor and/or equipment manufacturer's Transportation Department.

When requesting information about this equipment, always provide Model Designation and Serial or Style Number.

Use the following spaces to record Model Designation and Serial or Style Number of your unit. The information is located on the rating label or nameplate.

Model _____

Serial or Style No. _____

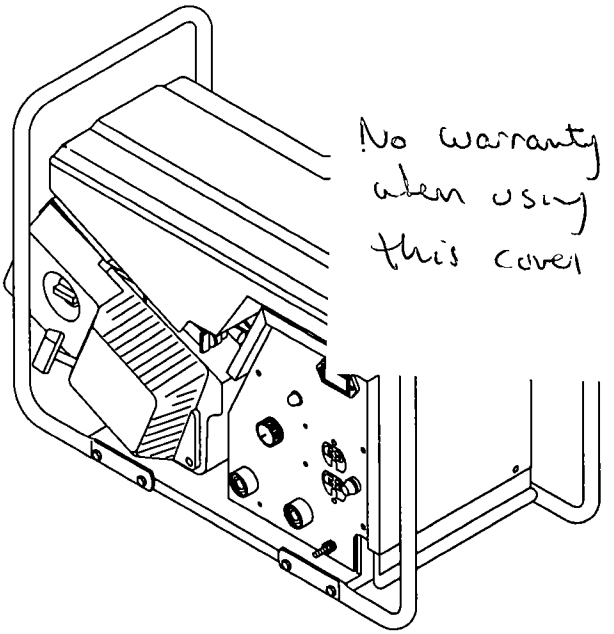
Date of Purchase _____

MAC TOOLS®

March 1993 Form: OM-160 518

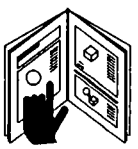
Effective With Serial No. KD398640

OWNER'S MANUAL



PAW 100

- CC/DC Welding Generator
- For SMAW Welding
- 90 Amperes, 25 Volts DC At 60% Duty Cycle
- 1.2 kVA/kW DC Auxiliary Power With Overload Protection
- Kohler CH5+ Air-Cooled, Four-Cycle, Gasoline Engine
- Optional Low Oil Pressure Shutdown Switch



- Read and follow these instructions and all safety blocks carefully.
- Have only trained and qualified persons install, operate, or service this unit.
- Call your distributor if you do not understand the directions.

- Give this manual to the operator.

- For help, call your distributor
- or: MILLER ELECTRIC Mfg. Co., P.O. Box 1079, Appleton, WI 54912 414-734-9821

PRINTED IN USA

ARC WELDING SAFETY PRECAUTIONS

⚠ WARNING

ARC WELDING can be hazardous.

PROTECT YOURSELF AND OTHERS FROM POSSIBLE SERIOUS INJURY OR DEATH. KEEP CHILDREN AWAY. PACEMAKER WEARERS KEEP AWAY UNTIL CONSULTING YOUR DOCTOR.

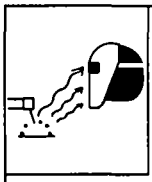
In welding, as in most jobs, exposure to certain hazards occurs. Welding is safe when precautions are taken. The safety information given below is only a summary of the more complete safety information that will be found in the Safety Standards listed on the next page. Read and follow all Safety Standards.

HAVE ALL INSTALLATION, OPERATION, MAINTENANCE, AND REPAIR WORK PERFORMED ONLY BY QUALIFIED PEOPLE.

ELECTRIC SHOCK can kill.

Touching live electrical parts can cause fatal shocks or severe burns. The electrode and work circuit is electrically live whenever the output is on. The input power circuit and machine internal circuits are also live when power is on. In semiautomatic or automatic wire welding, the wire, wire reel, drive roll housing, and all metal parts touching the welding wire are electrically live. Incorrectly installed or improperly grounded equipment is a hazard.

1. Do not touch live electrical parts.
2. Wear dry, hole-free insulating gloves and body protection.
3. Insulate yourself from work and ground using dry insulating mats or covers.
4. Disconnect input power or stop engine before installing or servicing this equipment.
5. Properly install and ground this equipment according to its Owner's Manual and national, state, and local codes.
6. When making input connections, attach proper grounding conductor first.
7. Turn off all equipment when not in use.
8. Do not use worn, damaged, undersized, or poorly spliced cables.
9. Do not wrap cables around your body.
10. Ground the workpiece to a good electrical (earth) ground.
11. Do not touch electrode if in contact with the work or ground.
12. Use only well-maintained equipment. Repair or replace damaged parts at once.
13. Wear a safety harness if working above floor level.
14. Keep all panels and covers securely in place.



ARC RAYS can burn eyes and skin; NOISE can damage hearing.

Arc rays from the welding process produce intense heat and strong ultraviolet rays that can burn eyes and skin. Noise from some processes can damage hearing.

NOISE

1. Use approved ear plugs or ear muffs if noise level is high.

ARC RAYS

2. Wear a welding helmet fitted with a proper shade of filter (see ANSI Z49.1 listed in Safety Standards) to protect your face and eyes when welding or watching.
3. Wear approved safety glasses. Side shields recommended.
4. Use protective screens or barriers to protect others from flash and glare; warn others not to watch the arc.
5. Wear protective clothing made from durable, flame-resistant material (wool and leather) and foot protection.

FUMES AND GASES can be hazardous to your health.

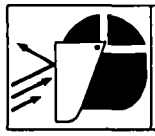
Welding produces fumes and gases. Breathing these fumes and gases can be hazardous to your health.

1. Keep your head out of the fumes. Do not breathe the fumes.
2. If inside, ventilate the area and/or use exhaust at the arc to remove welding fumes and gases.
3. If ventilation is poor, use an approved air-supplied respirator.
4. Read the Material Safety Data Sheets (MSDSs) and the manufacturer's instruction for metals, consumables, coatings, and cleaners.
5. Work in a confined space only if it is well ventilated, or while wearing an air-supplied respirator. Shielding gases used for welding can displace air causing injury or death. Be sure the breathing air is safe.
6. Do not weld in locations near degreasing, cleaning, or spraying operations. The heat and rays of the arc can react with vapors to form highly toxic and irritating gases.
7. Do not weld on coated metals, such as galvanized, lead, or cadmium plated steel, unless the coating is removed from the weld area, the area is well ventilated, and if necessary, while wearing an air-supplied respirator. The coatings and any metals containing these elements can give off toxic fumes if welded.

WELDING can cause fire or explosion.

Sparks and spatter fly off from the welding arc. The flying sparks and hot metal, weld spatter, hot workpiece, and hot equipment can cause fires and burns. Accidental contact of electrode or welding wire to metal objects can cause sparks, overheating, or fire.

1. Protect yourself and others from flying sparks and hot metal.
2. Do not weld where flying sparks can strike flammable material.
3. Remove all flammables within 35 ft (10.7 m) of the welding arc. If this is not possible, tightly cover them with approved covers.
4. Be alert that welding sparks and hot materials from welding can easily go through small cracks and openings to adjacent areas.
5. Watch for fire, and keep a fire extinguisher nearby.
6. Be aware that welding on a ceiling, floor, bulkhead, or partition can cause fire on the hidden side.
7. Do not weld on closed containers such as tanks or drums.
8. Connect work cable to the work as close to the welding area as practical to prevent welding current from traveling long, possibly unknown paths and causing electric shock and fire hazards.
9. Do not use welder to thaw frozen pipes.
10. Remove stick electrode from holder or cut off welding wire at contact tip when not in use.
11. Wear oil-free protective garments such as leather gloves, heavy shirt, cuffless trousers, high shoes, and a cap.



FLYING SPARKS AND HOT METAL can cause injury.

Chipping and grinding cause flying metal. As welds cool, they can throw off slag.

1. Wear approved face shield or safety goggles. Side shields recommended.
2. Wear proper body protection to protect skin.

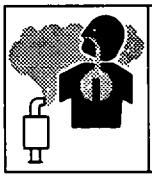
CYLINDERS can explode if damaged.

Shielding gas cylinders contain gas under high pressure. If damaged, a cylinder can explode. Since gas cylinders are normally part of the welding process, be sure to treat them carefully.

1. Protect compressed gas cylinders from excessive heat, mechanical shocks, and arcs.
2. Install and secure cylinders in an upright position by chaining them to a stationary support or equipment cylinder rack to prevent falling or tipping.
3. Keep cylinders away from any welding or other electrical circuits.
4. Never allow a welding electrode to touch any cylinder.
5. Use only correct shielding gas cylinders, regulators, hoses, and fittings designed for the specific application; maintain them and associated parts in good condition.
6. Turn face away from valve outlet when opening cylinder valve.
7. Keep protective cap in place over valve except when cylinder is in use or connected for use.
8. Read and follow instructions on compressed gas cylinders, associated equipment, and CGA publication P-1 listed in Safety Standards.

⚠ WARNING

ENGINES can be hazardous.



ENGINE EXHAUST GASES can kill.

Engines produce harmful exhaust gases.

1. Use equipment outside in open, well-ventilated areas.
2. If used in a closed area, vent engine exhaust outside and away from any building air intakes.

ENGINE FUEL can cause fire or explosion.

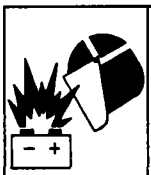
Engine fuel is highly flammable.

1. Stop engine before checking or adding fuel.
2. Do not add fuel while smoking or if unit is near any sparks or open flames.
3. Allow engine to cool before fueling. If possible, check and add fuel to cold engine before beginning job.
4. Do not overfill tank – allow room for fuel to expand.
5. Do not spill fuel. If fuel is spilled, clean up before starting engine.

MOVING PARTS can cause injury.

Moving parts, such as fans, rotors, and belts can cut fingers and hands and catch loose clothing.

1. Keep all doors, panels, covers, and guards closed and securely in place.
2. Stop engine before installing or connecting unit.
3. Have only qualified people remove guards or covers for maintenance and troubleshooting as necessary.
4. To prevent accidental starting during servicing, disconnect negative (–) battery cable from battery.
5. Keep hands, hair, loose clothing, and tools away from moving parts.
6. Reinstall panels or guards and close doors when servicing is finished and before starting engine.



SPARKS can cause BATTERY GASES TO EXPLODE; BATTERY ACID can burn eyes and skin.

Batteries contain acid and generate explosive gases.

1. Always wear a face shield when working on a battery.
2. Stop engine before disconnecting or connecting battery cables.
3. Do not allow tools to cause sparks when working on a battery.
4. Do not use welder to charge batteries or jump start vehicles.
5. Observe correct polarity (+ and –) on batteries.

STEAM AND PRESSURIZED HOT COOLANT can burn face, eyes, and skin.

The coolant in the radiator can be very hot and under pressure.

1. Do not remove radiator cap when engine is hot. Allow engine to cool.
2. Wear gloves and put a rag over cap area when removing cap.
3. Allow pressure to escape before completely removing cap.

PRINCIPAL SAFETY STANDARDS

Safety in Welding and Cutting, ANSI Standard Z49.1, from American Welding Society, 550 N.W. LeJeune Rd, Miami FL 33126

Safety and Health Standards, OSHA 29 CFR 1910, from Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402.

Recommended Safe Practices for the Preparation for Welding and Cutting of Containers That Have Held Hazardous Substances, American Welding Society Standard AWS F4.1, from American Welding Society, 550 N.W. LeJeune Rd, Miami, FL 33126

National Electrical Code, NFPA Standard 70, from National Fire Protection Association, Batterymarch Park, Quincy, MA 02269.

Safe Handling of Compressed Gases in Cylinders, CGA Pamphlet P-1, from Compressed Gas Association, 1235 Jefferson Davis Highway, Suite 501, Arlington, VA 22202.

Code for Safety in Welding and Cutting, CSA Standard W117.2, from Canadian Standards Association, Standards Sales, 178 Rexdale Boulevard, Rexdale, Ontario, Canada M9W 1R3.

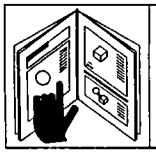
Safe Practices For Occupation And Educational Eye And Face Protection, ANSI Standard Z87.1, from American National Standards Institute, 1430 Broadway, New York, NY 10018.

Cutting And Welding Processes, NFPA Standard 51B, from National Fire Protection Association, Batterymarch Park, Quincy, MA 02269.

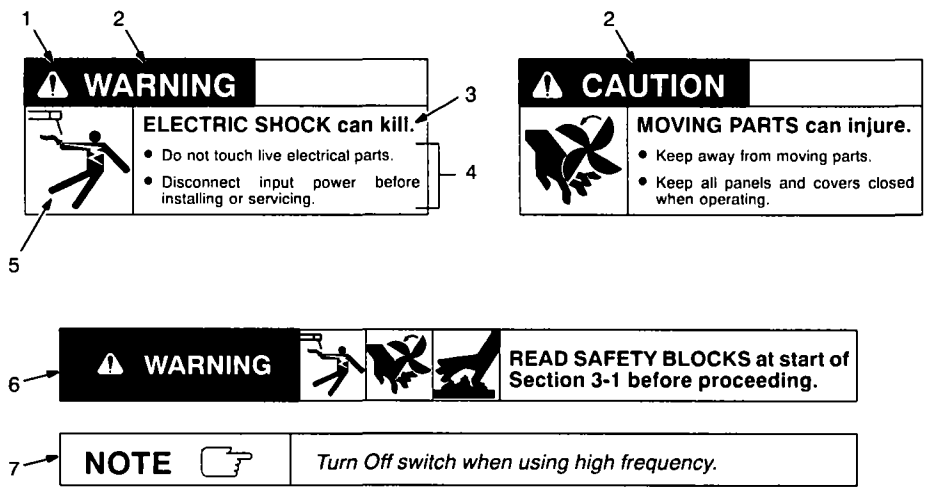
TABLE OF CONTENTS

SECTION 1 – SAFETY SIGNAL WORDS

mod1.1 2/93



- Read all safety messages throughout this manual.
- Obey all safety messages to avoid injury.
- Learn the meaning of WARNING and CAUTION.



1 Safety Alert Symbol

2 Signal Word

WARNING means possible death or serious injury can happen.

CAUTION means possible minor injury or equipment damage can happen.

3 Statement Of Hazard And Result

4 Safety Instructions To Avoid Hazard

5 Hazard Symbol (If Available)

6 Safety Banner

Read safety blocks for each symbol shown.

7 NOTE

Special instructions for best operation – not related to safety.

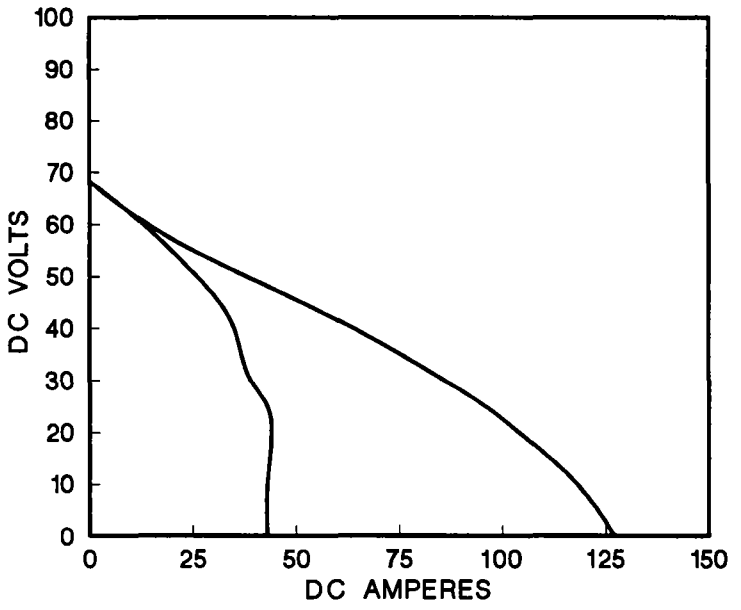
Figure 1-1. Safety Information

SECTION 2 – SPECIFICATIONS

Table 2-1. Welding Generator

Specification	Description
Type Of Output	Constant Current/Direct Current (CC/DC)
Rated Weld Output	90 Amperes, 25 Volts DC At 60% Duty Cycle (See Section 2-2)
Amperage Range	40 To 100 A
Maximum Open-Circuit Voltage	75 Volts DC (See Section 2-1)
Welding Process	Shielded Metal Arc Welding (SMAW); Flux Cored Arc Welding (FCAW) And Gas Tungsten Arc Welding (GTAW) Possible With Appropriate Process Options
Auxiliary Power Rating	1.2 kW, 120 Volts DC, 10 Amperes
Engine	Kohler CH5+ Air-Cooled, One-Cylinder, Four-Cycle Gasoline Engine
Engine Speed (No Load)	1800 rpm Idle Speed; 4150 rpm Weld And Power Speed
Fuel Tank Capacity	2.3 U.S. gal (8.7L)
Engine Oil Capacity	22.4 oz (0.66L)
Drive Belt Size	1/2 x .343 x 32.3 Cogged
Overall Dimensions	See Figure 3-2
Weight	Net: 101 lb (46 kg); Ship: 113 lb (51 kg)
Options	See Rear Cover

2-1. Volt-Ampere Curves



The volt-ampere curves show the minimum and maximum voltage and amperage output capabilities of the welding generator. Curves of other settings fall between the curves shown.

rsb1.1 10/91 – SB-152 541

Figure 2-1. Volt-Ampere Curves

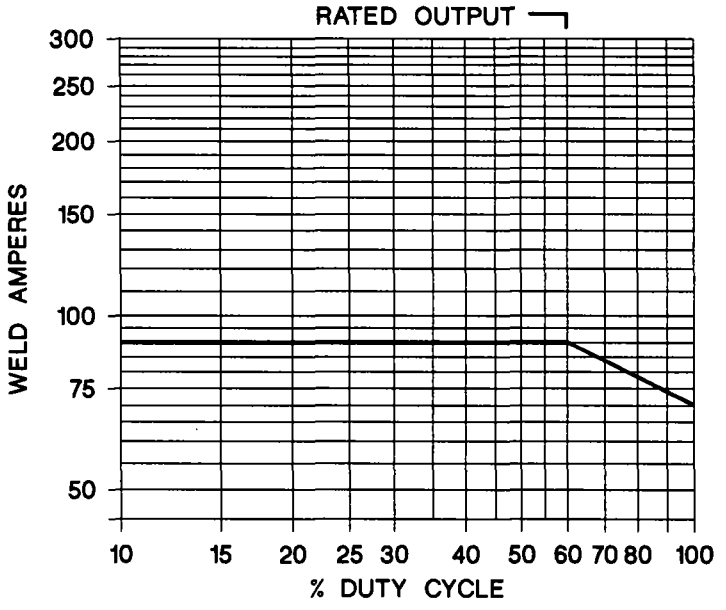
2-2. Duty Cycle

⚠ CAUTION

EXCEEDING DUTY CYCLE RATINGS will damage unit.

- Do not exceed indicated duty cycles.

warn7.1 2/92



Duty cycle is how long the unit can operate within a ten minute period without causing overheating or damage.

This unit is rated at 60% duty cycle allowing welding 6 minutes out of every 10 minutes.

sb1.2 10/91 – SB-152 540

Figure 2-2. Duty Cycle Chart

2-3. Fuel Consumption

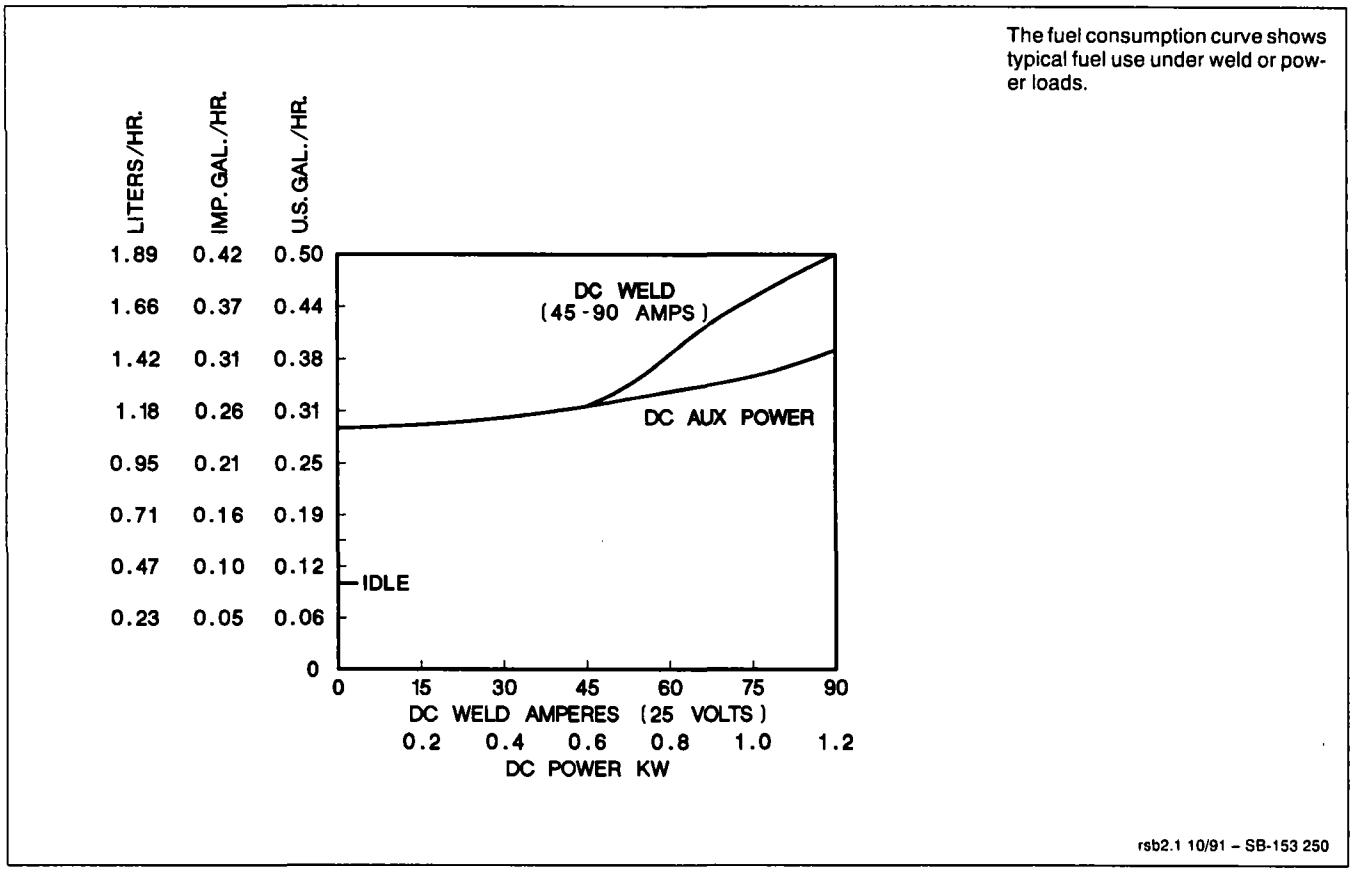


Figure 2-3. Fuel Consumption Curve

2-4. DC Auxiliary Power Curve

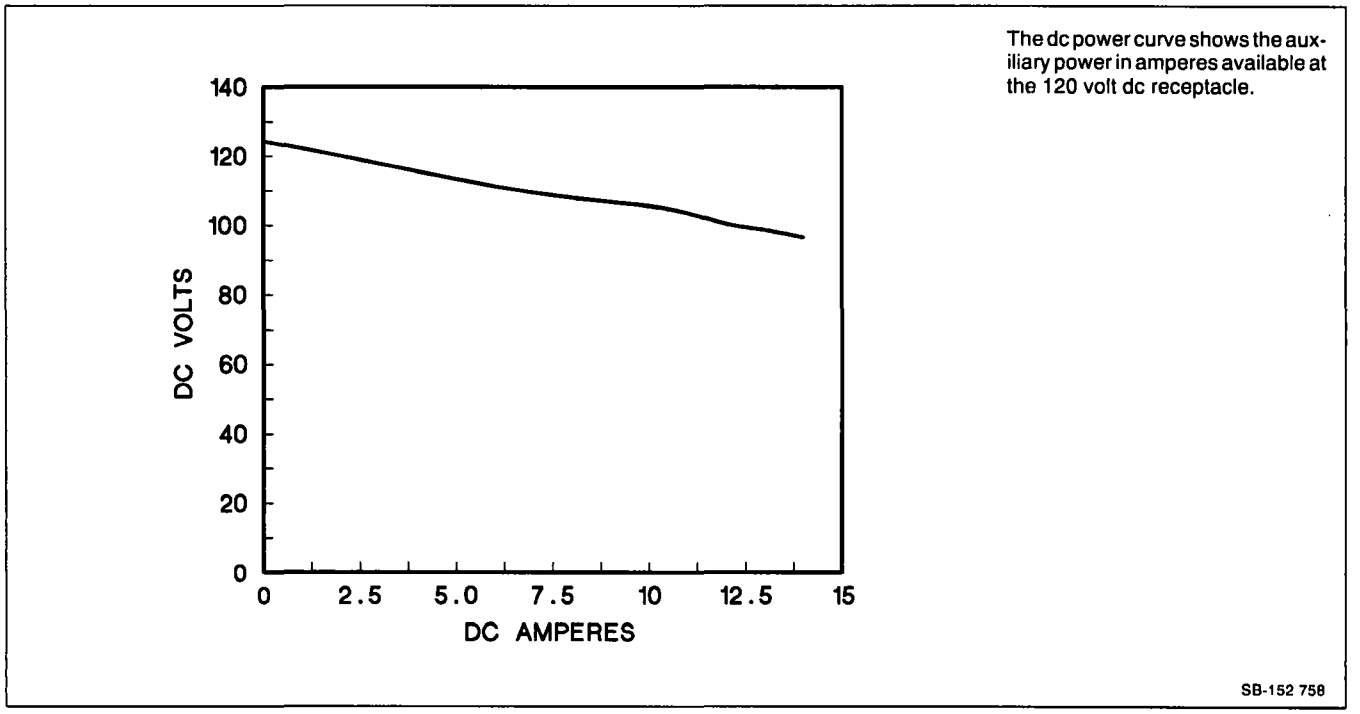
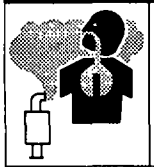


Figure 2-4. DC Power Curve For 120 Volt Receptacle

SECTION 3 – INSTALLATION

3-1. Selecting A Location And Moving Welding Generator

⚠ WARNING



ENGINE EXHAUST GASES can kill.

- Do not breathe exhaust fumes.
- Use in open, well-ventilated areas, or vent exhaust outside and away from building air intakes.

ENGINE EXHAUST SPARKS can cause fire.

- Use only U.S. Forestry Department approved spark arrestor and comply with all local, state, and federal laws.
- A spark arrestor is mandatory in all National Forests and in grass, brush, or forest covered lands in California, Oregon, and Washington. Check with state and local authorities in other areas.
- Properly maintain the spark arrestor.
- Stop engine and allow exhaust system to cool down before servicing spark arrestor.
- Service spark arrestor away from flammables.

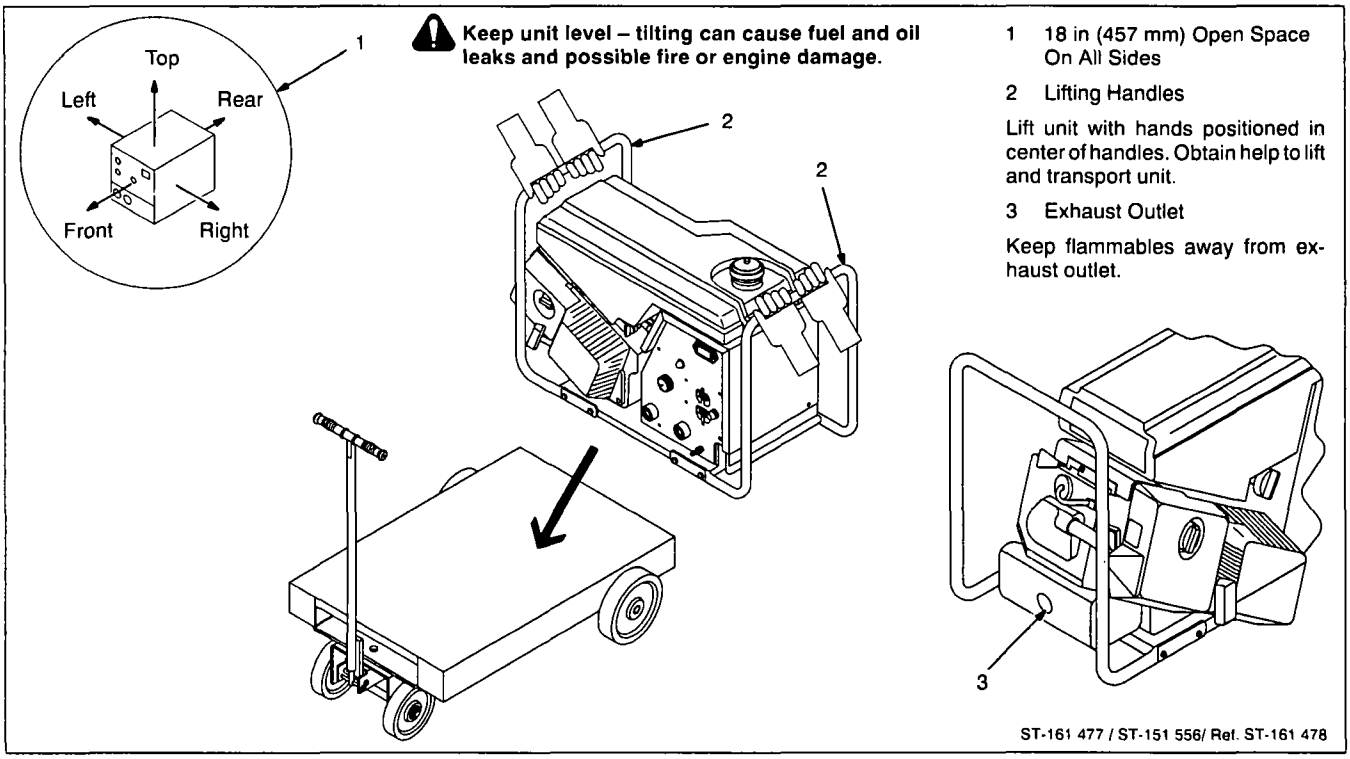
HOT ENGINE EXHAUST AND EXHAUST PIPE can cause fires.

- Keep exhaust and pipe away from flammables.

FALLING EQUIPMENT can cause serious personal injury and equipment damage.

- Lift unit at handles on ends of base.
- Have two persons of adequate strength lift unit.
- Move unit with hand cart or similar device of adequate capacity.
- If using a fork lift vehicle, secure unit on a proper skid before transporting.

rwarn1.1* 12/91



⚠ Keep unit level – tilting can cause fuel and oil leaks and possible fire or engine damage.

1 18 in (457 mm) Open Space On All Sides

2 Lifting Handles

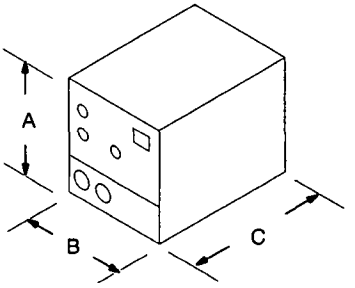
Lift unit with hands positioned in center of handles. Obtain help to lift and transport unit.

3 Exhaust Outlet

Keep flammables away from exhaust outlet.

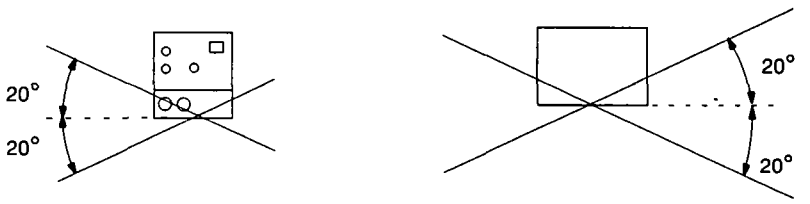
ST-161 477 / ST-151 556/ Ref. ST-161 478

Figure 3-1. Location And Movement Of The Welding Generator



	Inches	Millimeters
A	19	483
B	14-5/8	371
C	28-3/4	730

Figure 3-2. Overall Dimensions



Maximum tilting angles for proper lubrication.

Keep fuel cap at highest point when tilted.

Do not overfill fuel tank – leave room for expansion and tilting without causing leaks.

Do not let fuel leak from cap during tilting.

S-0702

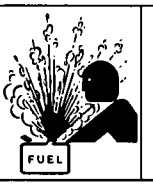
Figure 3-3. Maximum Welding Generator Tilt Angles

3-2. Engine Prestart Checks

⚠ WARNING

ENGINE FUEL can cause fire or explosion.

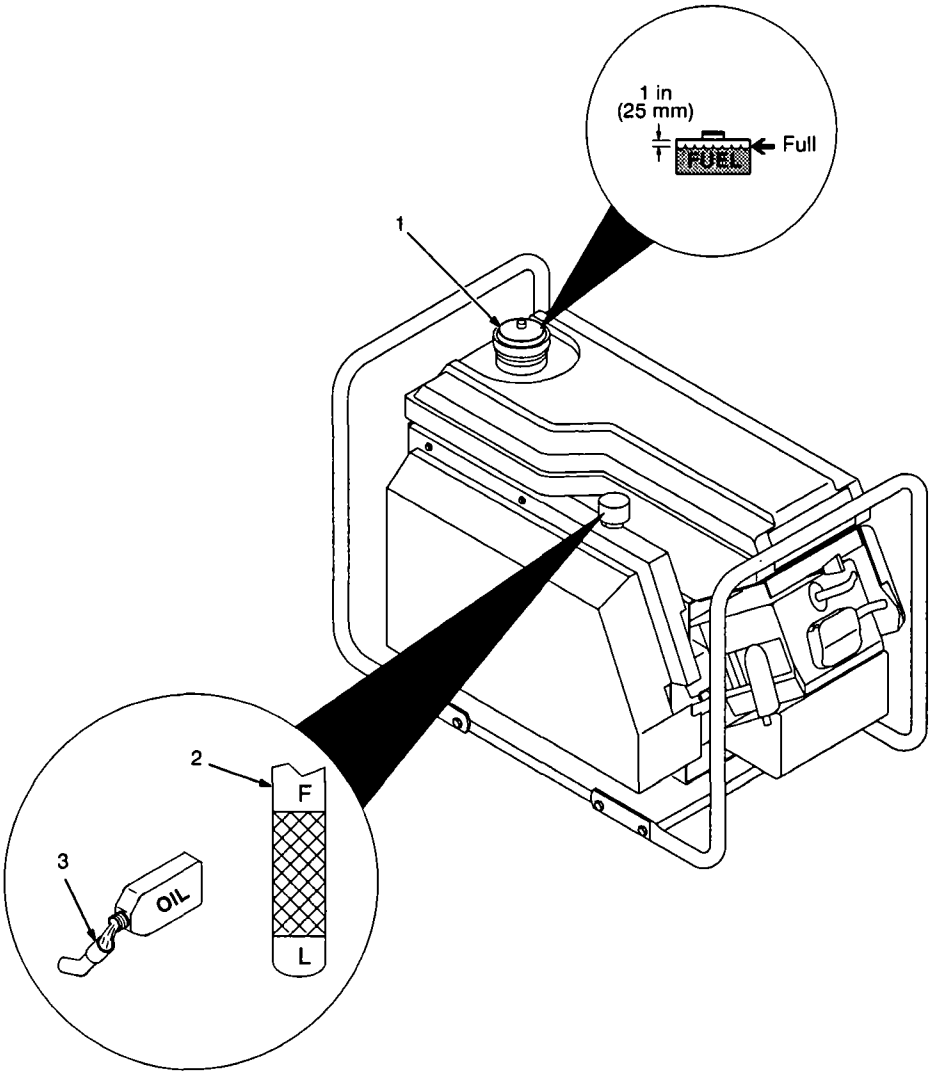
- Stop engine before fueling.
- Do not fuel while smoking or near sparks or flames.
- Do not overfill tank; clean up any spilled fuel.



REMOVE FUEL CAP SLOWLY; FUEL SPRAY may cause injury; FUEL may be under pressure.

- Rotate fuel cap slowly and wait until hissing stops before removing cap.

rwarn3.1 9/91



Check all fluids daily. Engine must be cold and on a level surface.

Add fresh fuel before starting engine the first time (see Figure 6-1).

1 Fuel Cap

Fill fuel tank to within 1 in (25 mm) of bottom of filler neck to provide space for expansion.

2 Oil Fill Cap/Dipstick

3 Oil Fill Tube

Remove dipstick and wipe off oil. Reinsert dipstick in tube so oil fill cap rests on tube collar. Do not thread cap onto tube. Remove dipstick and check oil level.

If oil is not up to full mark, add oil (see Figure 6-1). Add 4 oz (0.12 L) oil to raise oil level on dipstick from L to F.

rsb4.1* 11/92 – ST-161 479

Figure 3-4. Checking Fluid Levels

3-3. Grounding The Generator Auxiliary Power System

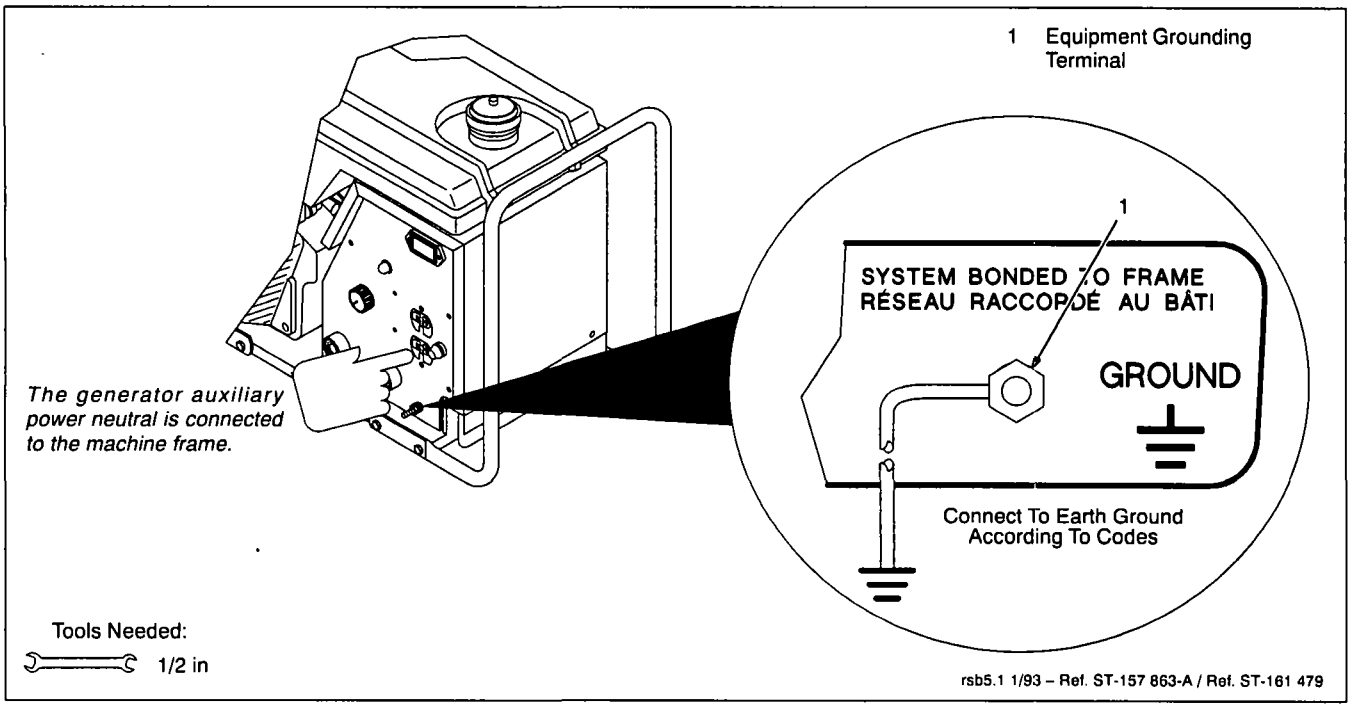


Figure 3-5. Equipment Grounding Connection

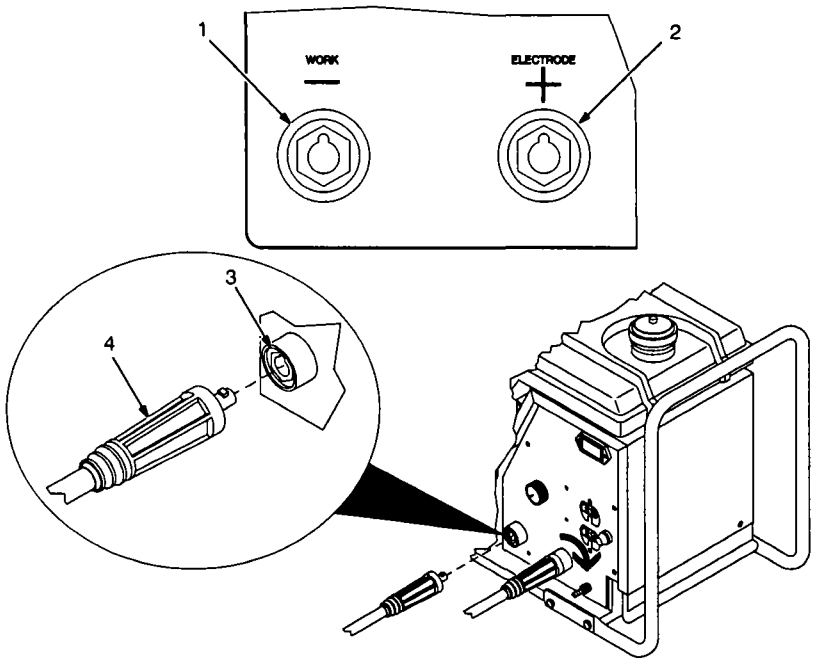
3-4. Connecting To Weld Output Terminals

⚠ WARNING

ELECTRIC SHOCK can kill.

- Always wear dry insulating gloves.
- Do not touch live electrical parts.
- Stop engine before making any weld output connections.
- Read Safety Precautions at beginning of this manual.

rwarn13.1 2/92



1 DC Negative (–) Weld Output Receptacle

2 DC Positive (+) Weld Output Receptacle

For Direct Current Electrode Positive (DCEP), connect work cable to Work – receptacle and electrode cable to Electrode + receptacle.

For Direct Current Electrode Negative (DCEN), reverse cable connections.

3 Weld Output Receptacle

4 Connector

Align keyways on connector and receptacle. Insert connector and rotate clockwise until tight in receptacle.

Figure 3-6. Weld Output Connections

SECTION 4 – OPERATING THE WELDING GENERATOR

⚠ WARNING

ELECTRIC SHOCK can kill.

- Do not touch live electrical parts.
- Always wear dry insulating gloves.
- Insulate yourself from work and ground.
- Stop engine before installing or servicing.
- Keep all panels and covers securely in place.

WELDING can cause fire or explosion.

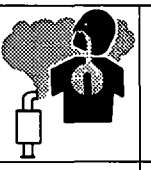
- Do not weld near flammable material.
- Watch for fire; keep extinguisher nearby.
- Do not locate unit over combustible surfaces.
- Do not weld on closed containers.
- Allow work and equipment to cool before handling.

ARC RAYS can burn eyes and skin; NOISE can damage hearing.

- Wear welding helmet with correct shade of filter.
- Wear correct eye, ear, and body protection.

FUMES AND GASES can be hazardous.

- Keep your head out of the fumes.
- Ventilate area, or use breathing device.
- Read Material Safety Data Sheets (MSDSs) and manufacturer's instructions for material used.



ENGINE EXHAUST GASES can kill.

- Do not breathe exhaust fumes.
- Use in open, well-ventilated areas, or vent exhaust outside and away from any building air intakes.

ENGINE FUEL can cause fire or explosion.

- Stop engine before fueling.
- Do not fuel while smoking or near sparks or flames.
- Do not overfill tank; clean up any spilled fuel.

MOVING PARTS can cause injury.

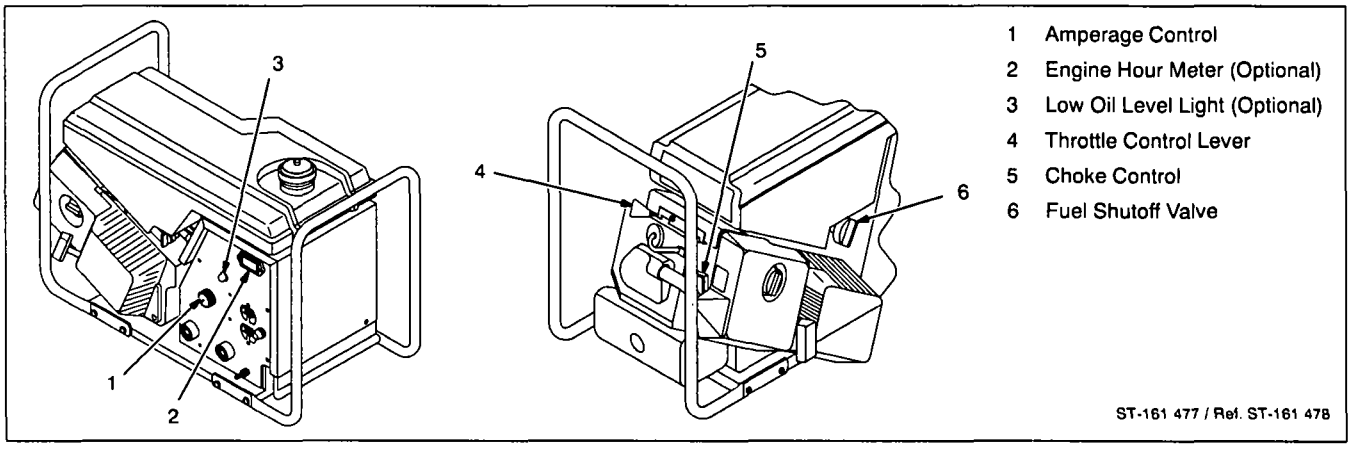
- Keep away from moving parts such as fans, belts, and rotors.
- Keep all doors, panels, covers, and guards closed and securely in place.

MAGNETIC FIELDS FROM HIGH CURRENTS can affect pacemaker operation.

- Pacemaker wearers keep away.
- Wearers should consult their doctor before going near any welding operations.

See Safety Precautions at beginning of manual for basic welding safety information.

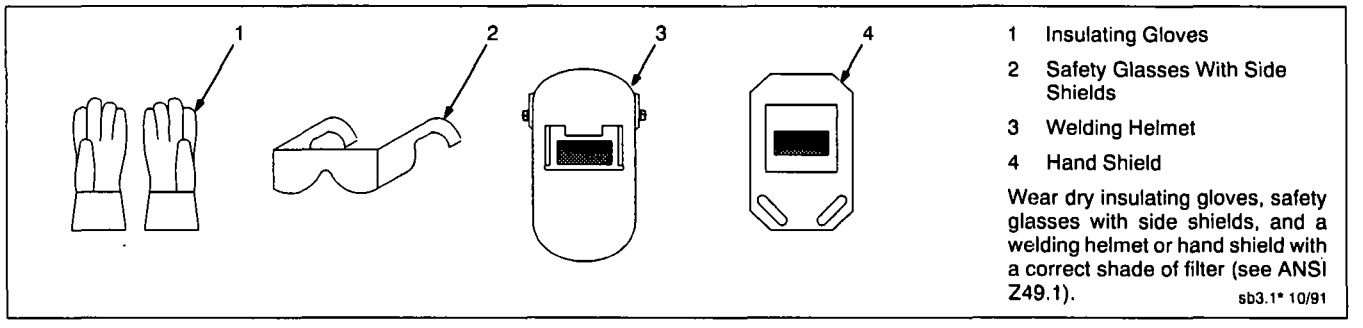
rwarn5.1 10/91



1 Amperage Control
2 Engine Hour Meter (Optional)
3 Low Oil Level Light (Optional)
4 Throttle Control Lever
5 Choke Control
6 Fuel Shutoff Valve

ST-161 477 / Ref. ST-161 478

Figure 4-1. Controls

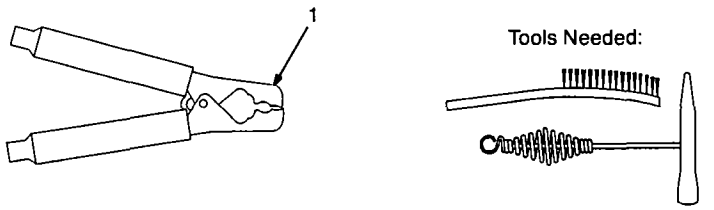


1 Insulating Gloves
2 Safety Glasses With Side Shields
3 Welding Helmet
4 Hand Shield

Wear dry insulating gloves, safety glasses with side shields, and a welding helmet or hand shield with a correct shade of filter (see ANSI Z49.1).

sb3.1* 10/91

Figure 4-2. Safety Equipment



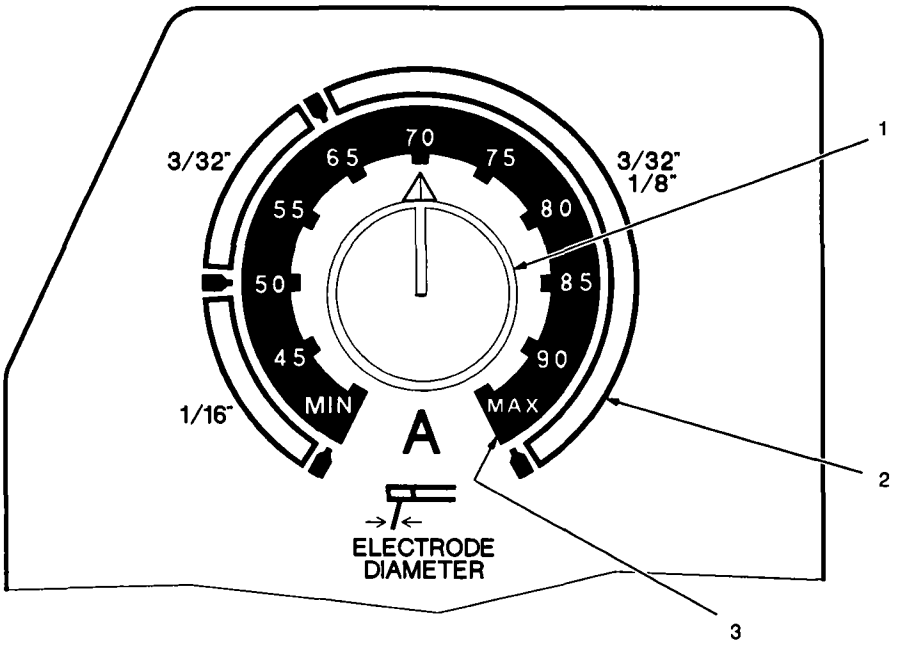
1 Work Clamp

Connect work clamp to a clean, paint-free location on workpiece, as close to weld area as possible.

Use wire brush or sandpaper to clean metal at weld joint area. Use chipping hammer to remove slag after welding.

sb4.1 2/93

Figure 4-3. Work Clamp



1 Amperage Control

Use control to select weld amperage. Engine must be running at weld/power speed to attain full weld output. Control may be adjusted while welding.

2 Electrode Scale

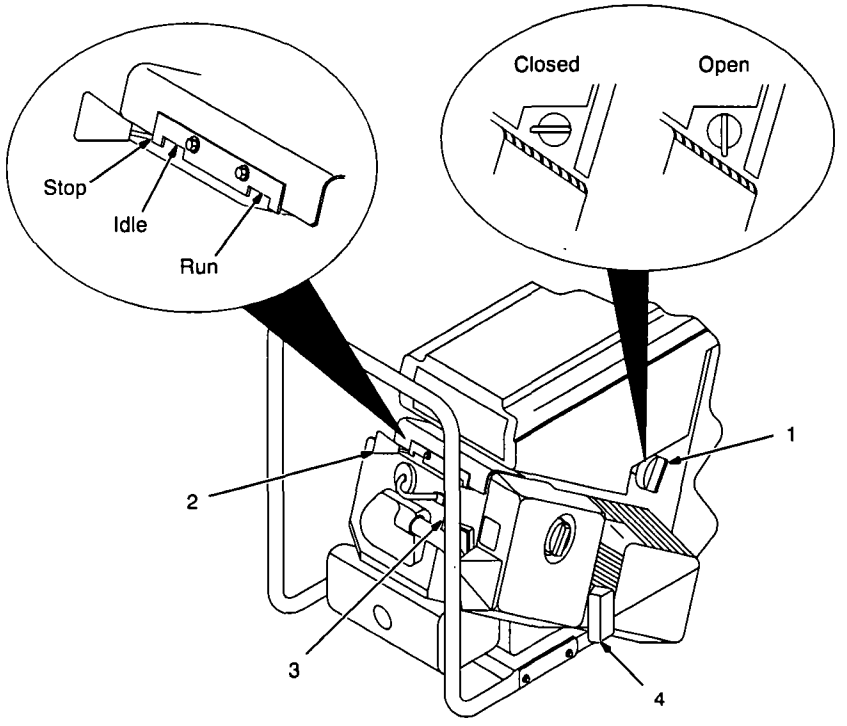
Scale shows recommended electrode diameter for weld amperage.

3 Amperage Scale

Numbers in scale are welding amperes.

Ref. ST-157 863-A

Figure 4-4. Amperage Control



1 Fuel Shutoff Valve

Open valve before starting engine. Close valve when unit is not in use or during transport.

2 Throttle Control Lever

Use lever to start and stop engine and select engine speed. To start engine, move lever to Run.

3 Choke Control Lever

Use lever to regulate carburetor air/fuel mixture. Move choke lever to right (choke on) if starting a cold engine. If starting a warm engine, move choke lever to left (choke off).

4 Starter Handle

Pull starter handle with quick, smooth motion.

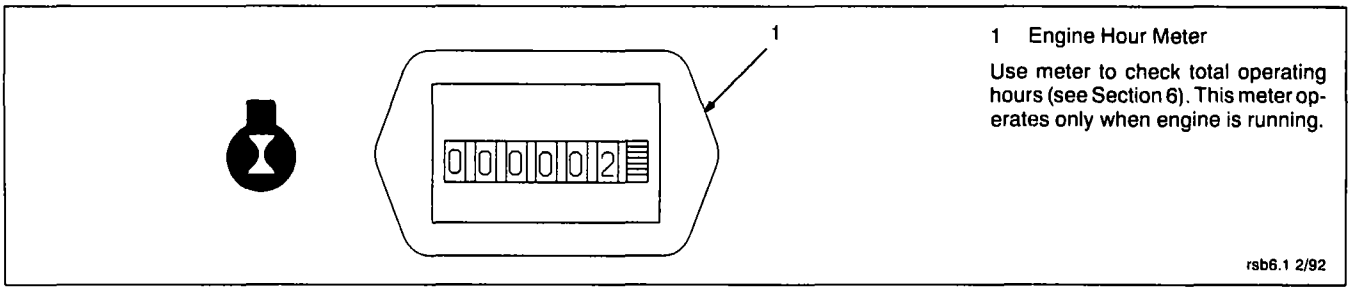
After engine warms, move choke lever to left.

Keep throttle lever in Run for weld/auxiliary power. Move lever to Idle for idle speed.

Stop unit by moving lever to Stop.

S-0690 / Ref. ST-161 478

Figure 4-5. Engine Controls

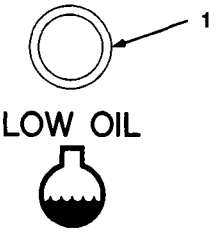


1 Engine Hour Meter

Use meter to check total operating hours (see Section 6). This meter operates only when engine is running.

rsb6.1 2/92

Figure 4-6. Engine Hour Meter (Optional)



1 Low Oil Level Light

Light flickers when starter handle is pulled if engine has stopped due to automatic low oil level shutdown.

Engine does not start until sufficient oil is added to engine.

Fill engine with oil to "F" mark on dipstick (see Figure 3-4).

Ref. ST-157 863

Figure 4-7. Automatic Low Oil Shutdown (Optional)

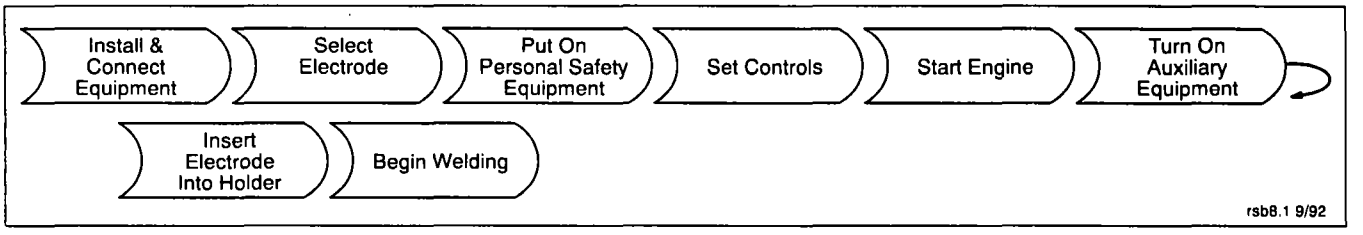


Figure 4-8. Sequence Of Shielded Metal Arc Welding (SMAW)

SECTION 5 – OPERATING AUXILIARY EQUIPMENT

⚠ WARNING

ELECTRIC SHOCK can kill.

- Do not touch live electrical parts.
- Stop engine before making internal inspection or reconnection.
- Ground generator according to all applicable national, state, and local codes.
- Connect equipment grounding terminal to a proper earth ground.
- Do not connect to any electrical distribution system normally supplied by utility power.

ELECTRIC SPARKS can cause fire.

- If using auxiliary power only and not welding, disconnect both welding cables to prevent live electrode from causing electric shock and fire hazards.
- Watch for fire.
- Keep a fire extinguisher nearby, and know how to use it.

The weld output terminals are electrically energized when the engine is running.

MOVING PARTS can cause serious injury.

- Keep away from moving parts such as fans, belts, and rotors.
- Keep all doors, panels, covers, and guards closed and securely in place.

DC AUXILIARY POWER can damage electrical equipment and cause incorrect operation.

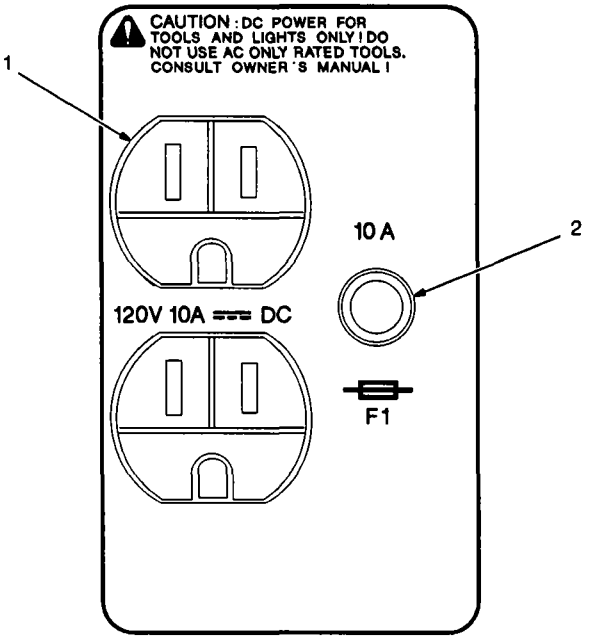
- Use DC output only for incandescent lights and tools rated for DC.
- Do not use DC to power AC motors, transformer equipment, or induction motors.

Essentially all hand tools are powered by universal motors. However, the switches on inexpensive/light duty tools may be damaged by DC power, and variable speed tools will run only at full speed on DC.

This unit provides 1200 watts of direct current (DC) auxiliary power. DC power is suitable for incandescent lights and portable power tools with 115 or 120 volt AC/DC or DC ratings. This power must not be used to power any AC-only rated equipment.

rwarn8.1* 10/92

5-1. Auxiliary Power DC Receptacle



1 120V 10A DC Receptacle

Maximum output at RUN speed is 1.2 kW. Full auxiliary power is available only when not welding.

DC power is suitable for incandescent lights and portable power tools with 115 or 120 volt AC/DC or DC ratings. The switches on inexpensive/light duty tools may be damaged by DC power, and variable speed tools will run only at full speed on DC.

Use DC output only for incandescent lights and tools rated for DC. Do not use DC power to run any AC-only rated equipment, AC motors, transformer equipment, or induction motors.

2 10A Fuse F1

F1 protects generator from overload or short circuits on dc receptacle. If F1 opens, the generator continues to run but there is no output at the receptacle. Weld output is still available. See Section 6-7 for fuse replacement. Ref. ST-157 863-A

Figure 5-1. Auxiliary Power DC Receptacle And Circuit Protection

5-2. Auxiliary Equipment Operation

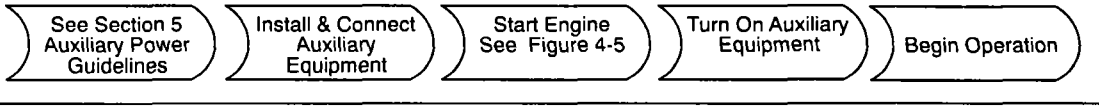


Figure 5-2. Sequence Of Auxiliary Equipment Operation

⚠ WARNING

ELECTRIC SHOCK can kill.

- Do not touch live electrical parts.
- Always wear dry insulating gloves.
- Insulate yourself from work and ground.
- Stop engine before installing or servicing.
- Keep all panels and covers securely in place.

ENGINE EXHAUST GASES can kill.

- Do not breathe exhaust fumes.
- Use in open, well-ventilated areas, or vent exhaust outside and away from any building air intakes.

ENGINE FUEL can cause fire or explosion.

- Stop engine before fueling.
- Do not fuel while smoking or near sparks or flames.
- Do not overfill tank; clean up any spilled fuel.

MOVING PARTS can cause injury.

- Keep hands, loose clothing, and tools away from moving parts such as pulleys, fans, belts, and rotors.
- Keep all doors, panels, covers, and guards closed and securely in place.

HOT PARTS can cause severe burns.

- Allow cooling period before servicing.
- Wear protective gloves and clothing when working on a hot engine.

Maintenance to be performed only by qualified persons.

rwarn9.1 10/91

6-1. Routine Maintenance

The maintenance label is located on the fuel tank above the throttle control lever (see Figure 6-3).

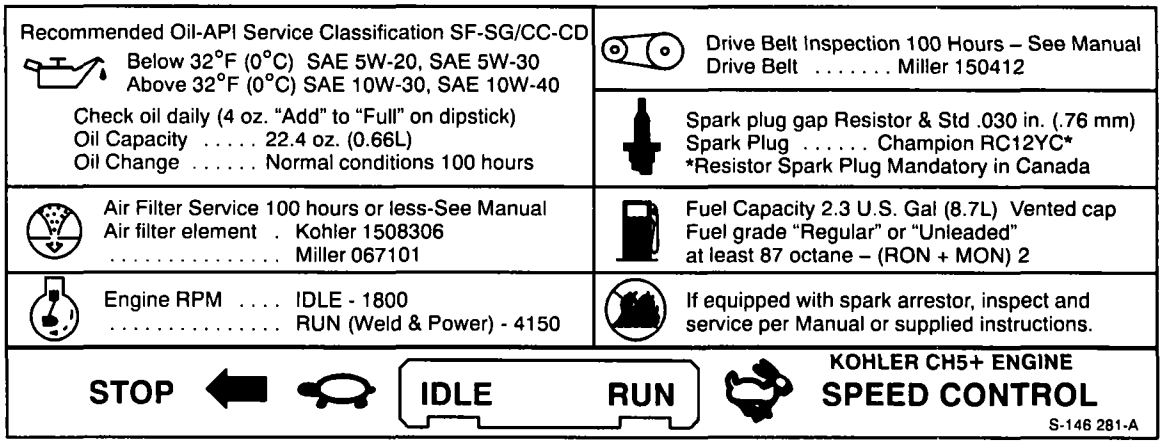


Figure 6-1. Maintenance Label

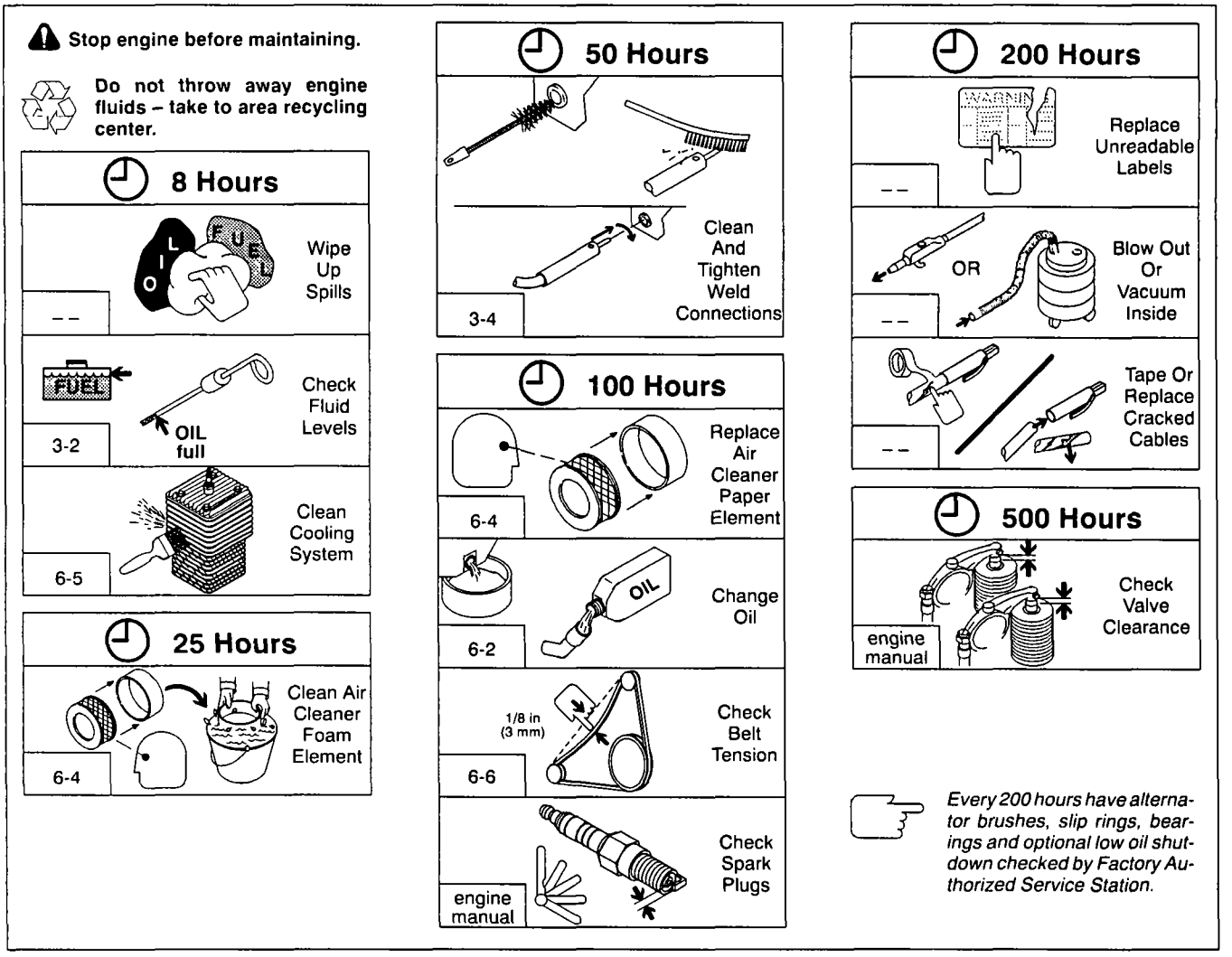
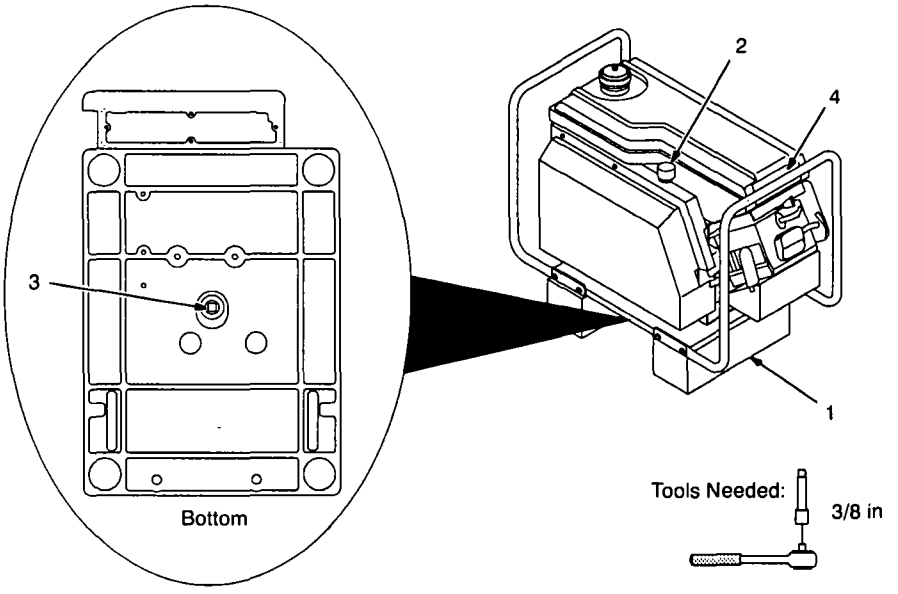


Figure 6-2. Maintenance Schedule

6-2. Changing Engine Oil



Stop engine.

Change engine oil at interval listed in Figure 6-1. Change oil while engine is still warm.

1 Support Block

Use blocks large enough to provide room for oil pan.

2 Oil Fill Cap/Dipstick

Remove oil fill cap/dipstick before draining oil.

3 Oil Drain Plug

Remove plug. Allow enough time for oil to drain completely. Reinstall plug.

4 Maintenance Label

Fill crankcase with new oil to "F" mark on dipstick. Use correct type and grade of oil. See Figure 6-1 for specifications.

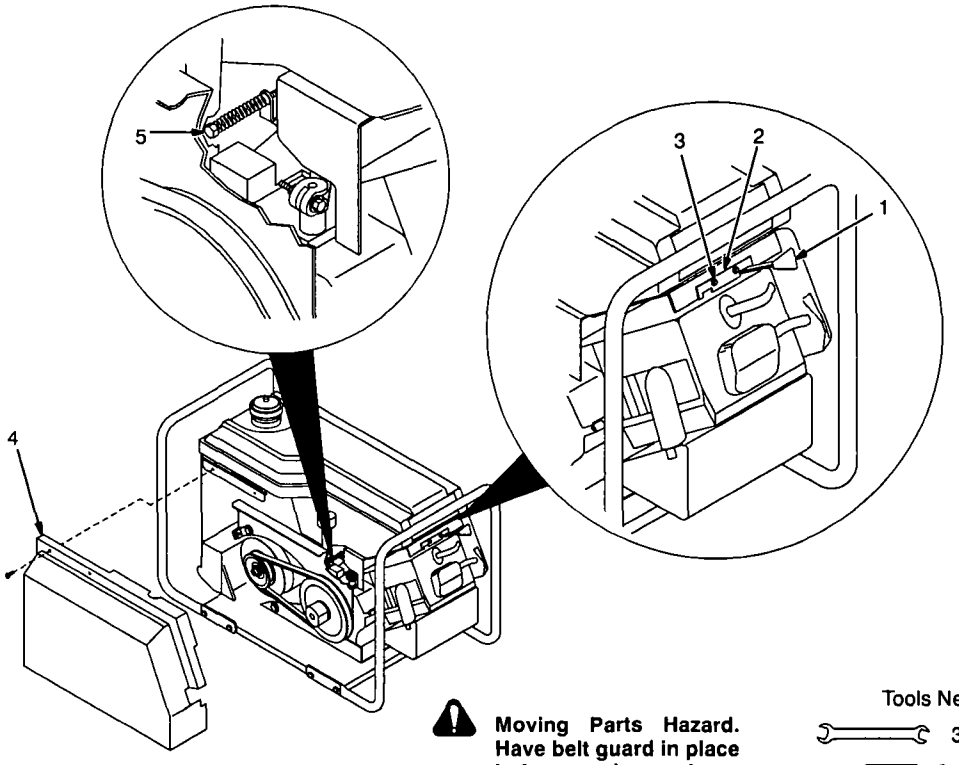
Reinstall oil fill cap/dipstick.

ST-161 481

Figure 6-3. Changing Engine Oil

6-3. Adjusting Engine Speed

⚠ WARNING **READ SAFETY BLOCKS at start of Section 6 before proceeding.**



Start and run engine at no load.

1 Throttle Control Lever

Move lever to Run.

2 Speed Adjustment Plate

3 Securing Screw

Loosen securing screws and move adjustment plate right or left until engine runs at 4150 rpm. Tighten screws.

4 Belt Guard

If engine does not reach 4150 rpm, stop engine and remove belt guard (see Section 6-6).

5 Speed Adjustment Screw

Turn screw out (counterclockwise) two full turns. Reinstall belt guard and start engine. Move throttle control lever and speed adjustment plate left or right to adjust engine speed (see items 2 and 3). Tighten securing screws and stop engine.

⚠ Moving Parts Hazard. Have belt guard in place before running engine.

Tools Needed:

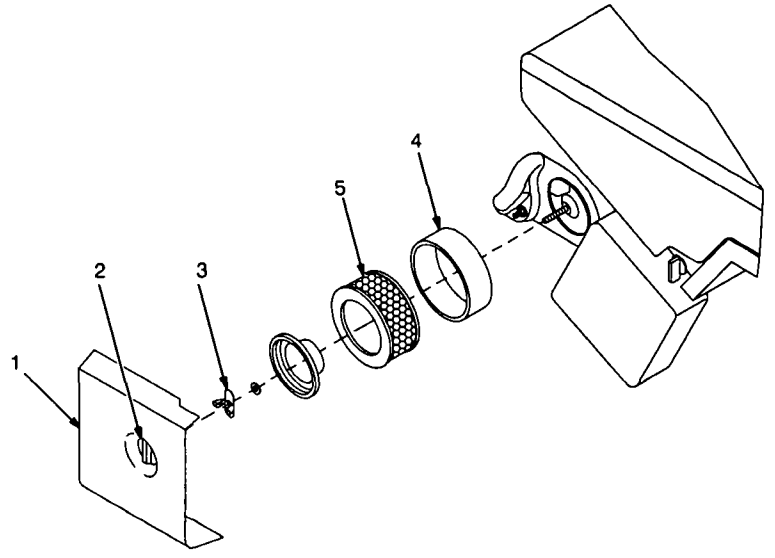
3/8, 9/32 in

Ref. ST-161 482

Figure 6-4. Engine Speed Adjustment

6-4. Air Cleaner Service

⚠ WARNING **READ SAFETY BLOCKS at start of Section 6 before proceeding.**



Stop engine.

1 Air Cleaner Cover

2 Retaining Screw

Loosen retaining screw and remove air cleaner cover.

3 Wing Nut

Remove as shown.

4 Foam Element (Precleaner)

Wash element in warm water with detergent. Rinse all detergent from element and allow to air-dry.

Saturate element with clean engine oil. Squeeze out excess oil. Reinstall element on paper element.

5 Paper Element

Replace dirty or damaged element with a new element. Do not wash dirty element or clean with compressed air.

Reinstall air cleaner cover.

ST-151 639

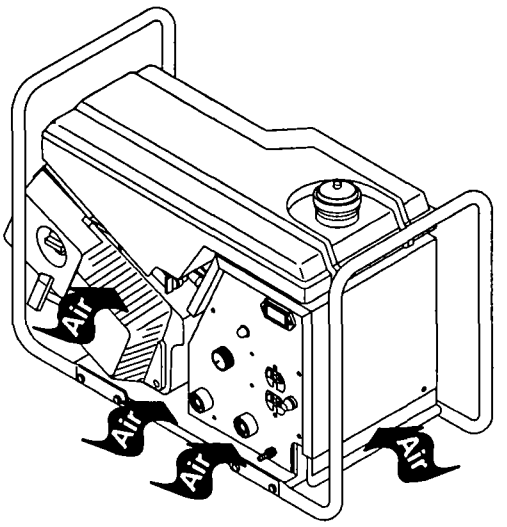
Figure 6-5. Air Cleaner Maintenance

6-5. Clean Air Intake And Cooling Areas

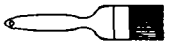
⚠ WARNING

READ SAFETY BLOCKS at start of Section 6 before proceeding.

Keep cooling air intake free of dirt and debris. Make sure all external surfaces of the engine are kept clean (see engine manual).



Tools Needed:



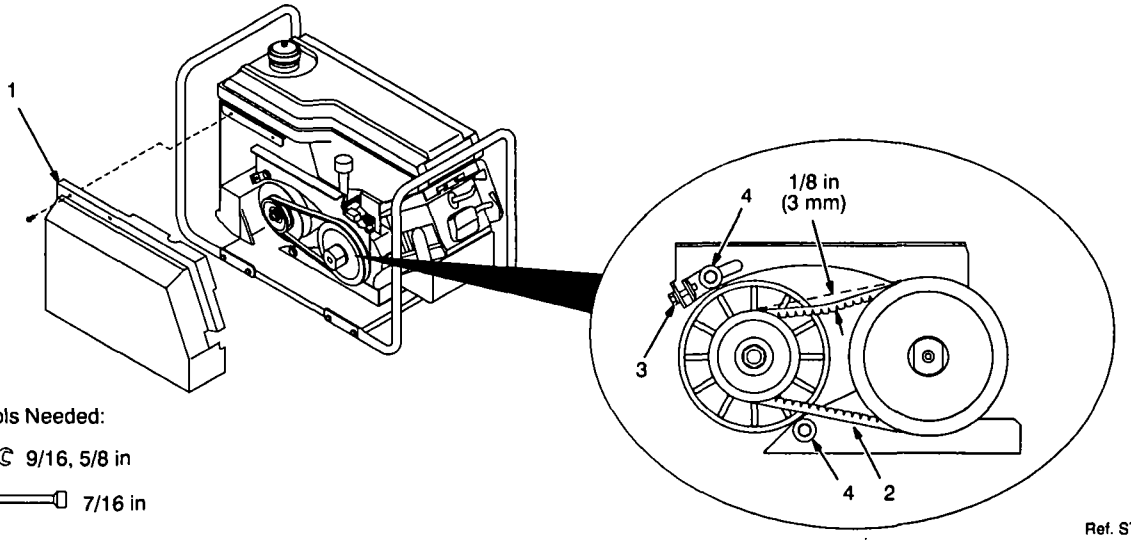
ST-161 477

Figure 6-6. Air Intake And Cooling Areas

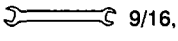
6-6. Drive Belt Adjustment And Replacement

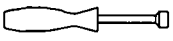
⚠ WARNING

READ SAFETY BLOCKS at start of Section 6 before proceeding.



Tools Needed:


9/16, 5/8 in


7/16 in

Ref. ST-161 482

Stop engine.

1 Belt Guard

Remove five screws securing belt guard. Remove guard and inspect belt.

2 Drive Belt

Readjust belt tension if necessary. Replace cracked belt.

3 Tensioning Screw

4 Securing Screw

To replace belt, remove tensioning screw and loosen securing screws. Remove belt. Install new belt and hand-tighten securing screws. Reinstall tensioning screw.

Check belt tension by pressing belt midway between pulleys. Apply about 8.5 lb (3.9 kg) pressure to a new belt or 5.5 lb (2.5 kg) pressure to a used belt. When properly tensioned, belt deflects inward about 1/8 in (3 mm).

Adjust belt tension by turning tensioning screw in or out until proper belt tension is obtained.

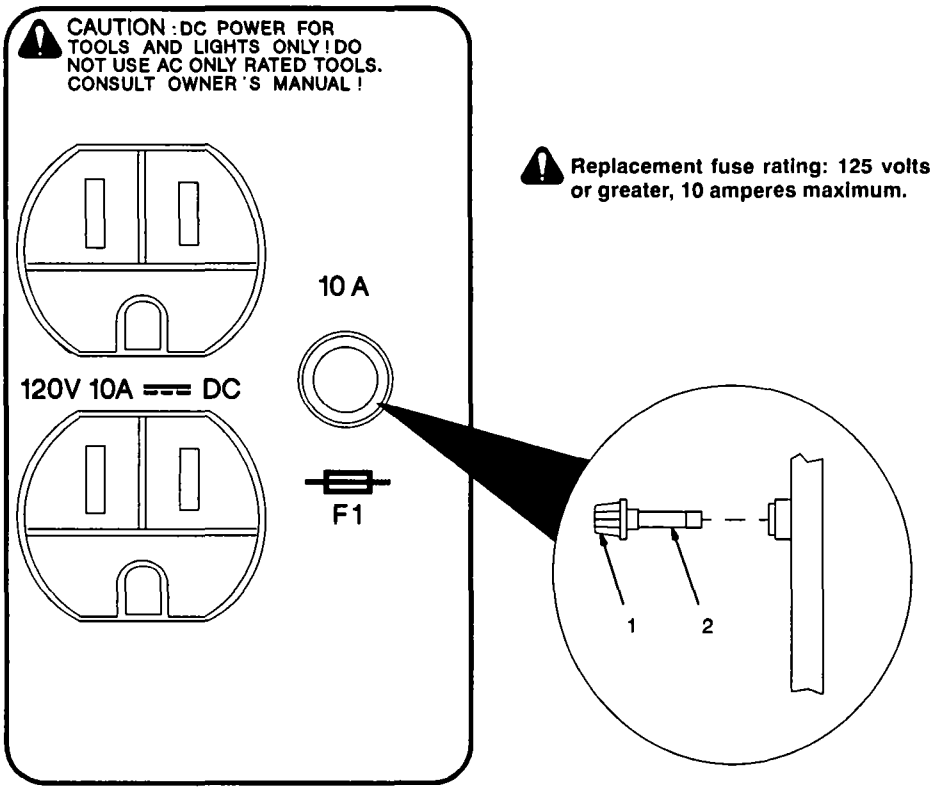
Reinstall belt guard and run unit ten minutes. Stop unit. Remove belt guard and readjust belt tension if necessary. Replace belt guard.

Figure 6-7. Drive Belt Adjustment and Replacement

6-7. Overload Protection

⚠ WARNING

READ SAFETY BLOCKS at start of Section 6 before proceeding.



Stop engine.

1 Fuse Holder

2 10A Fuse F1

Fuse F1 protects the unit from overload or short circuit on the 120V dc receptacle. If F1 is open the engine continues to run but there is no output at the receptacle. Weld output is still available.

Turn fuse holder counterclockwise to remove fuse. Put new fuse in fuse holder. Push fuse holder into panel and turn clockwise to secure.

If fuse continues to open, contact Factory Authorized Service Station.

Ref. ST-151 186 / Ref. ST-157 863-A

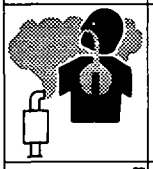
Figure 6-8. Location Of F1 Fuse

6-8. Troubleshooting

⚠ WARNING

ELECTRIC SHOCK can kill.

- Do not touch live electrical parts.
- Always wear dry insulating gloves.
- Insulate yourself from work and ground.
- Stop engine before installing or servicing.
- Keep all panels and covers securely in place.



ENGINE EXHAUST GASES can kill.

- Do not breathe exhaust fumes.
- Use in open, well-ventilated areas, or vent exhaust outside and away from any building air intakes.

HOT PARTS can cause severe burns.

- Allow cooling period before servicing.
- Wear protective gloves and clothing when working on a hot engine.

ENGINE FUEL can cause fire or explosion.

- Stop engine before fueling.
- Do not fuel while smoking or near sparks or flames.
- Do not overfill tank; clean up any spilled fuel.

MOVING PARTS can cause injury.

- Keep away from moving parts such as fans, belts, and rotors.
- Keep all doors, panels, covers, and guards closed and securely in place.

Troubleshooting to be performed only by qualified persons.

rwarn11.1 11/91

Table 6-1. Welding Trouble

Trouble	Remedy	Section
No weld or auxiliary power output.	Have Factory Authorized Service Station check generator brushes and slip rings.	--
	Broken drive belt.	6-6
Low weld output.	Have Factory Authorized Service Station check generator.	--
	Check and adjust engine speed. Tune-up engine for full horsepower (see engine manual).	6-3
	Check weld cable size and length.	--
	Check internal and external weld output connections.	--
	Have Factory Authorized Service Station check brushes and slip rings.	--
	Check Amperage control settings and connections.	--
	Check drive belt tension.	6-6
Low or high weld output.	Check and adjust engine speed. Tune up engine for full horsepower (see engine manual).	6-3
	Check governor (see engine manual).	--
Erratic welding arc.	Change to proper electrode polarity.	--
	Check and adjust engine speed.	6-3
	Check governor (see engine manual).	--
Weld output uncontrollable.	Have Factory Authorized Service Station check Amperage control.	--

Table 6-2. Auxiliary Power Trouble

Trouble	Remedy	Section
No auxiliary power.	Check and replace fuse F1.	6-7
	Have Factory Authorized Service Station check brushes and slip rings.	--
Erratic auxiliary power.	Have Factory Authorized Service Station check brushes and slip rings.	--
	Check drive belt tension.	6-6
	Check and adjust engine speed. Tune-up engine to achieve full horsepower (see engine manual).	6-3
Low auxiliary power.	Move throttle lever to Run position.	--
	Check and adjust engine speed. Perform engine maintenance as necessary to achieve full horsepower (see engine manual).	6-3
	Check drive belt tension.	6-6
	Have Factory Authorized Service Station check generator.	--

Table 6-3. Engine Trouble

Trouble	Remedy	Section
Engine will not start.	Open fuel shutoff valve.	Figure 4-5
	Check oil level. Check optional oil level shutdown switch.	Figure 3-4, Figure 4-7
	Check fuel level in tank.	Figure 3-4
	Move throttle control lever to Run position.	Figure 4-5
	See engine manual.	--
Engine runs rough or stalls.	Dirt or water in fuel. Replace fuel.	--
	Have Factory Authorized Service Station check fuel filter.	--
	Tune-up engine (see engine manual).	--

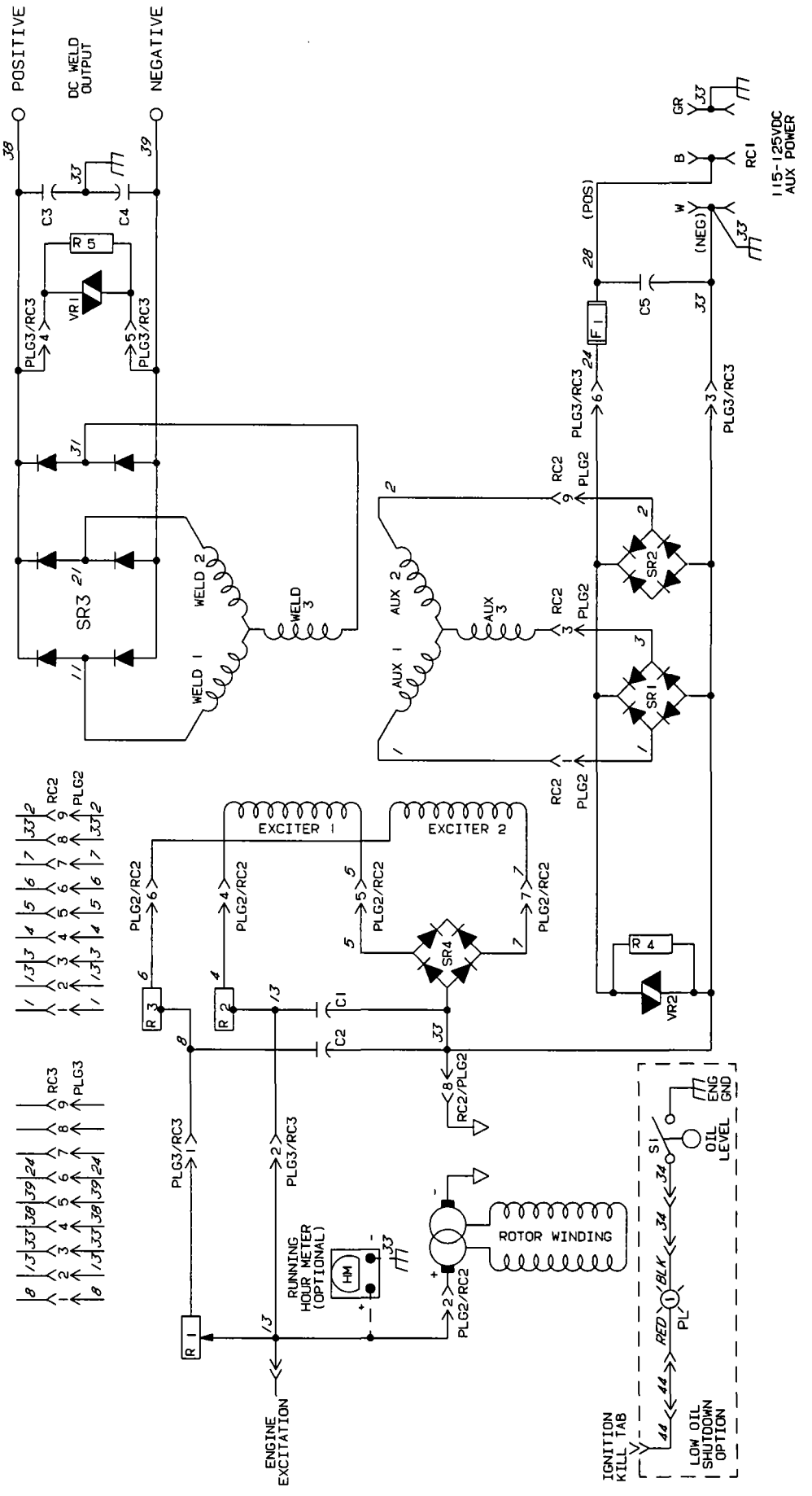
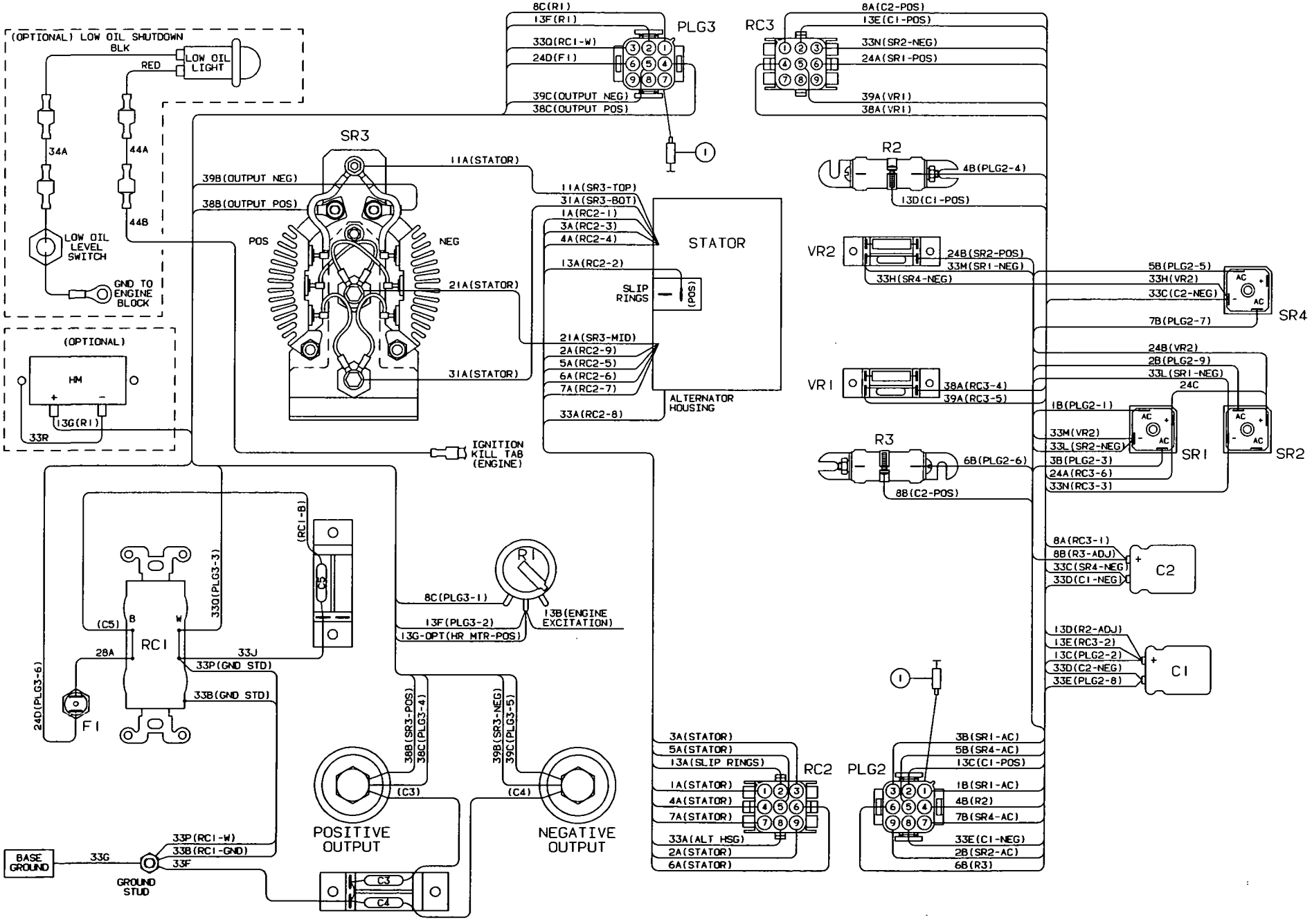


Figure 7-1. Circuit Diagram For Welding Generator



ST-153 860-B

Figure 7-2. Wiring Diagram For Welding Generator

SECTION 8 – WELDING METHODS & TROUBLESHOOTING

mod5.1 9/92

⚠ WARNING

ELECTRIC SHOCK can kill.

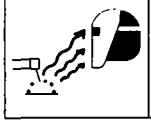
- Always wear dry insulating gloves.
- Insulate yourself from work and ground.
- Do not touch live electrical parts.
- Keep all panels and covers securely in place.

FUMES AND GASES can be hazardous to your health.

- Keep your head out of the fumes.
- Ventilate area, or use breathing device.
- Read Material Safety Data Sheets (MSDSs) and manufacturer's instructions for material used.

WELDING can cause fire or explosion.

- Do not weld near flammable material.
- Watch for fire; keep extinguisher nearby.
- Do not locate unit over combustible surfaces.
- Do not weld on closed containers.
- Allow work and equipment to cool before handling.

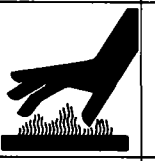


ARC RAYS can burn eyes and skin; NOISE can damage hearing.

- Wear welding helmet with correct shade of filter.
- Wear correct eye, ear, and body protection.

MOVING PARTS can cause injury.

- Keep away from moving parts such as fans, belts, and rotors.
- Keep all doors, panels, covers, and guards closed and securely in place.



HOT PARTS can cause severe burns.

- Allow cooling period before touching welded metal.
- Wear protective gloves and clothing.

MAGNETIC FIELDS FROM HIGH CURRENTS can affect pacemaker operation.

- Pacemaker wearers keep away.
- Wearers should consult their doctor before going near arc welding, gouging, or spot welding operations.

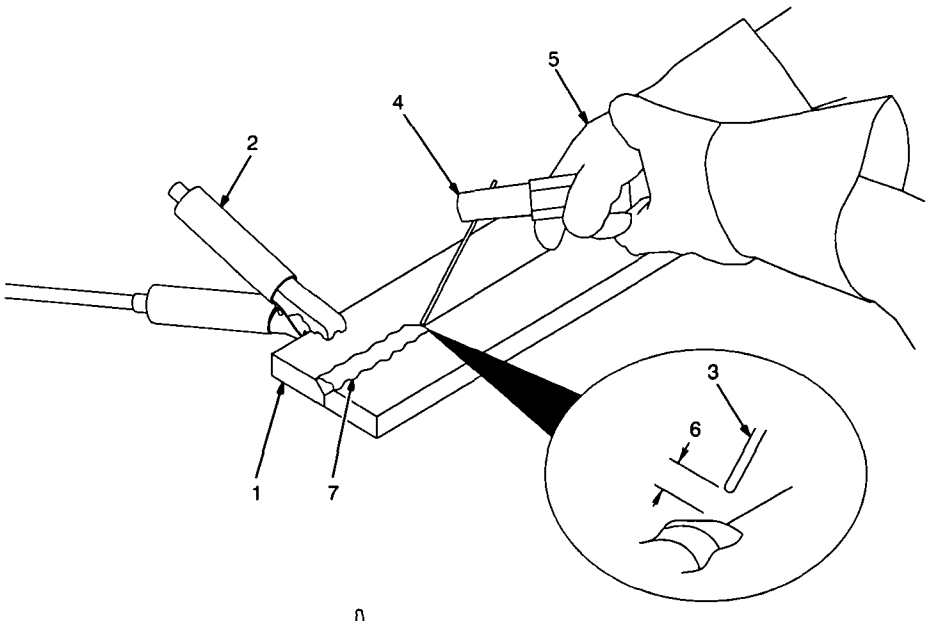
WELDING CURRENT can damage electronic parts in vehicles.

- Disconnect both battery cables before welding on a vehicle.
- Place work clamp as close to the weld as possible.

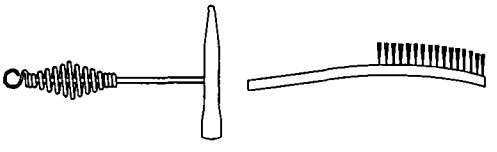
See Safety Rules at beginning of manual for basic welding safety information.

8-1. Shielded Metal Arc Welding (SMAW)

NOTE ☞ *Welding current starts as soon as electrode touches the workpiece.*



Tools Needed:



1 Workpiece

Make sure workpiece is clean before welding.

2 Work Clamp

Place as close to the weld as possible.

3 Electrode

A small diameter electrode requires less current than a large one. Follow recommendations of electrode manufacturer when setting weld amperage (see Figure 8-2).

4 Insulated Electrode Holder

5 Electrode Holder Position

6 Arc Length

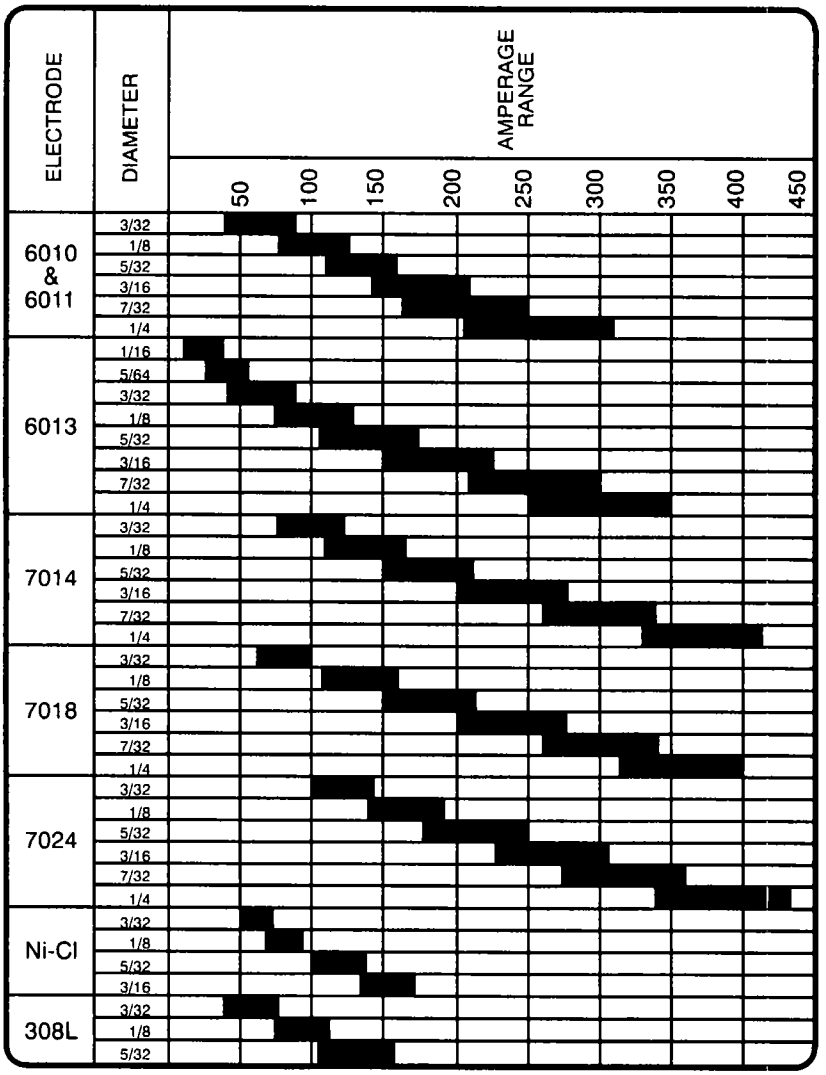
Arc length is the distance from the electrode to the workpiece. A short arc with correct amperage will give a sharp, crackling sound.

7 Slag

Use a chipping hammer and wire brush to remove slag. Remove slag and check weld bead before making another weld pass.

ST-151 593

Figure 8-1. Shielded Metal Arc Welding (SMAW) Procedure

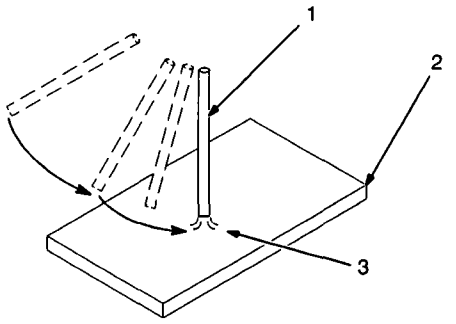


ELECTRODE	DC*	AC	POSITION	PENETRATION	USAGE
6010	EP		ALL	DEEP	MIN. PREP, ROUGH HIGH SPATTER
6011	EP	✓	ALL	DEEP	
6013	EP,EN	✓	ALL	LOW	GENERAL
7014	EP,EN	✓	ALL	MED	SMOOTH, EASY, FAST
7018	EP	✓	ALL	LOW	LOW HYDROGEN, STRONG
7024	EP,EN	✓	FLAT HORIZ FILLET	LOW	SMOOTH, EASY, FASTER
NI-CL	EP	✓	ALL	LOW	CAST IRON
308L	EP	✓	ALL	LOW	STAINLESS

*EP = ELECTRODE POSITIVE (REVERSE POLARITY)
EN = ELECTRODE NEGATIVE (STRAIGHT POLARITY)

Ref. S-087 985-A

Figure 8-2. Electrode And Amperage Selection Chart



1 Electrode

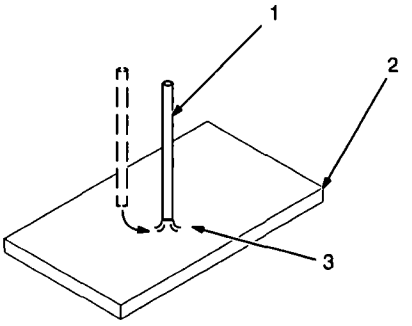
2 Workpiece

3 Arc

Drag electrode across workpiece like striking a match; lift electrode slightly after touching work. If arc goes out electrode was lifted to high. If electrode sticks to workpiece, use a quick twist to free it.

S-0049

Figure 8-3. Striking An Arc – Scratch Start Technique



1 Electrode

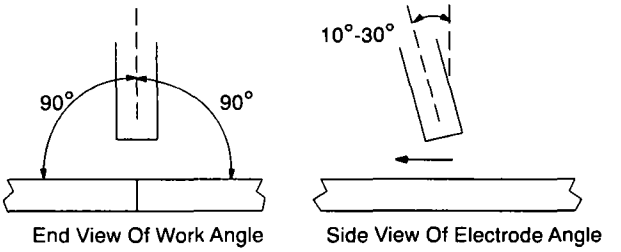
2 Workpiece

3 Arc

Bring electrode straight down to workpiece; then lift slightly to start arc. If arc goes out, electrode was lifted too high. If electrode sticks to workpiece, use a quick twist to free the electrode.

S-0050

Figure 8-4. Striking An Arc – Tapping Technique



S-0660

Figure 8-5. Positioning Electrode Holder

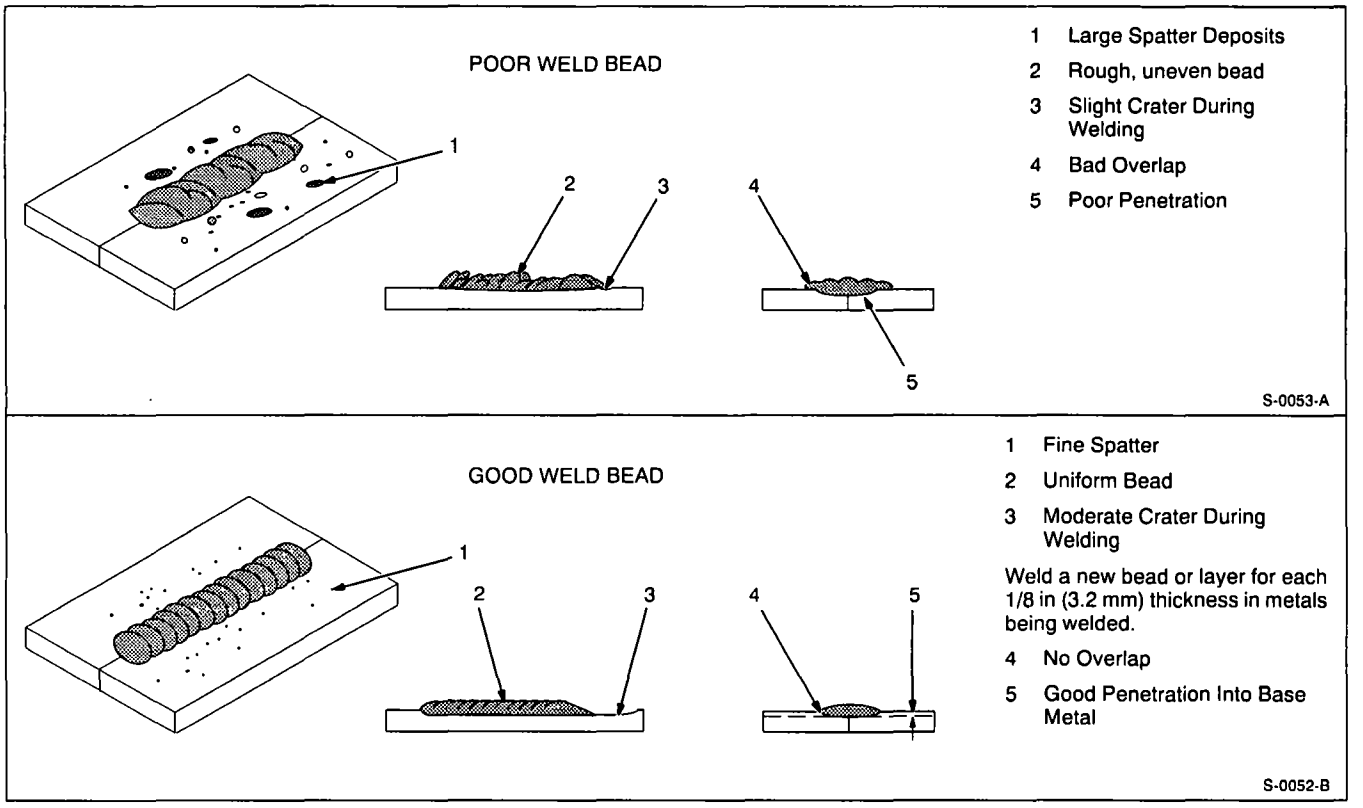


Figure 8-6. Weld Bead Characteristics

NOTE ☞ *Weld bead shape is affected by electrode angle, arc length, travel speed, and thickness of base metal.*

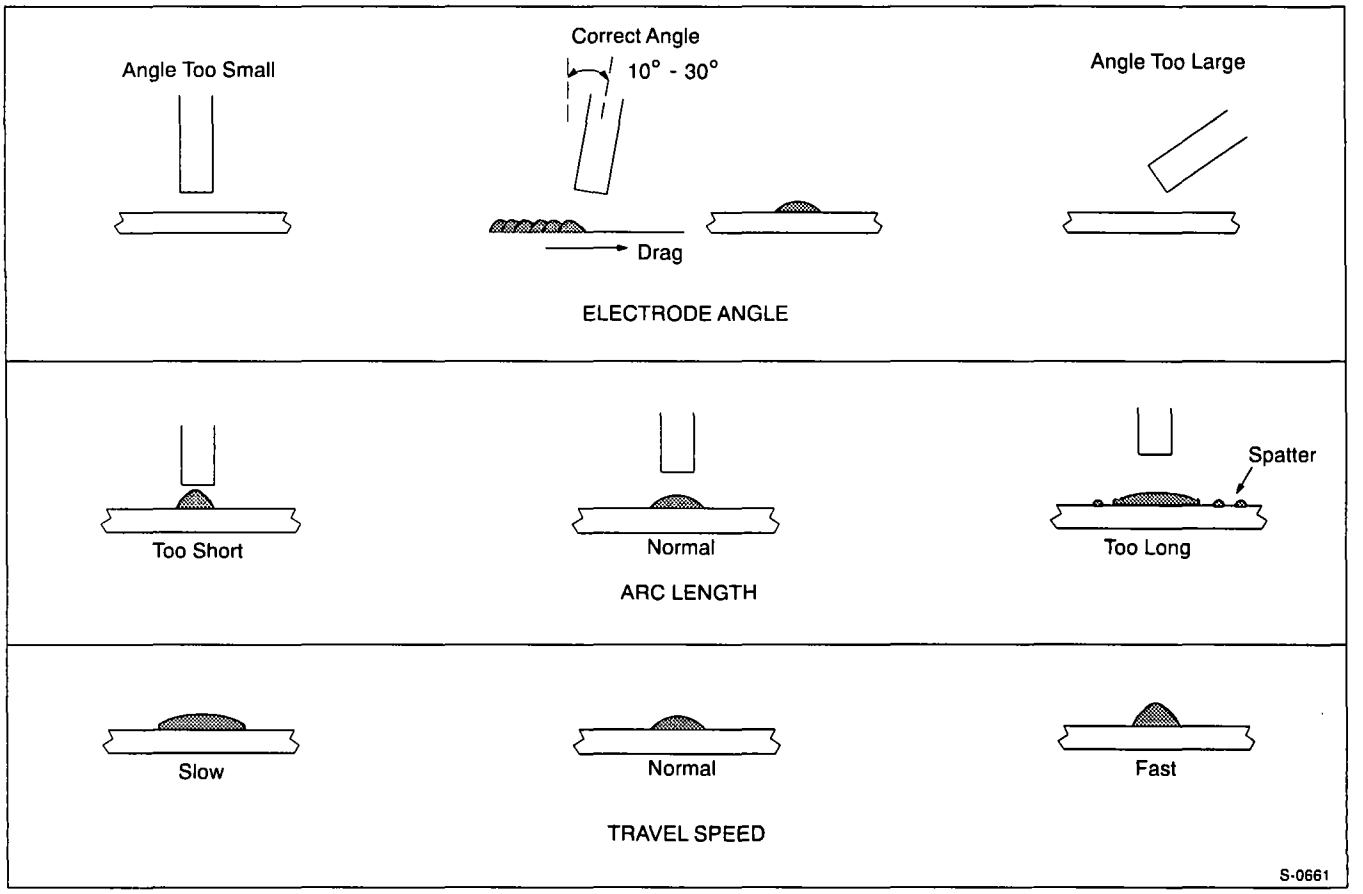
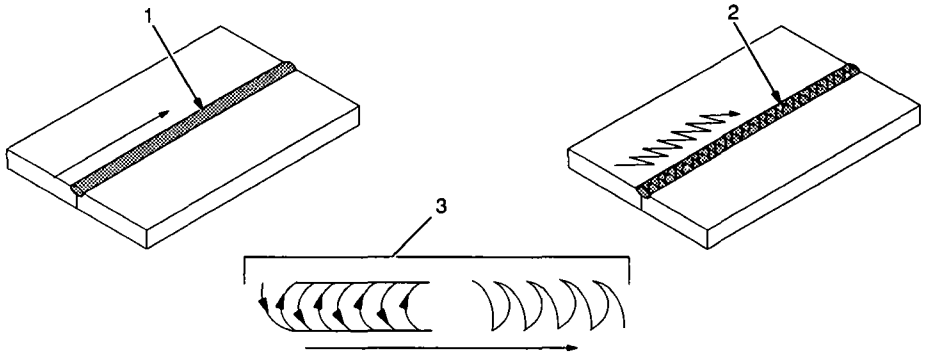


Figure 8-7. Conditions That Affect Weld Bead Shape

NOTE ☞ *Normally, a single stringer bead is satisfactory for most narrow groove weld joints; however, for wide groove weld joints or bridging across gaps, a weave bead or multiple stringer beads work better.*



1 Stringer Bead – Steady Movement Along Seam

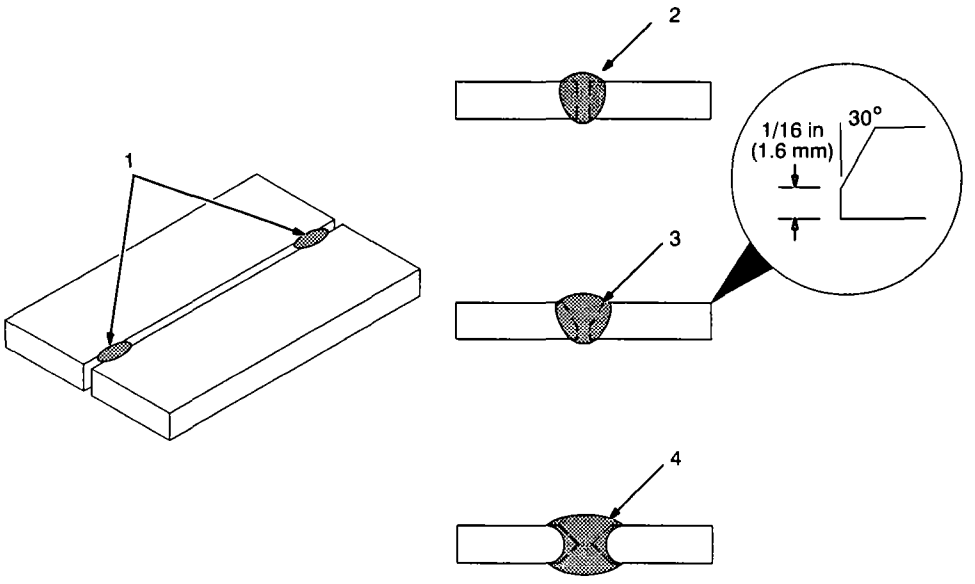
2 Weave Bead – Side To Side Movement Along Seam

3 Weave Patterns

Use weave patterns to cover a wide area in one pass of the electrode. Do not let weave width exceed 2-1/2 times diameter of electrode.

S-0054-A

Figure 8-8. Electrode Movement During Welding



1 Tack Welds

Prevent edges of joint from drawing together ahead of electrode by tack welding the materials in position before final weld.

2 Square Groove Weld

Good for materials up to 3/16 in (5 mm) thick.

3 Single V-Groove Weld

Good for materials 3/16 through 3/4 in (5-19 mm) thick. Cut bevel with oxyacetylene or plasma cutting equipment. Remove scale from material after cutting. A grinder can also be used to prepare bevels.

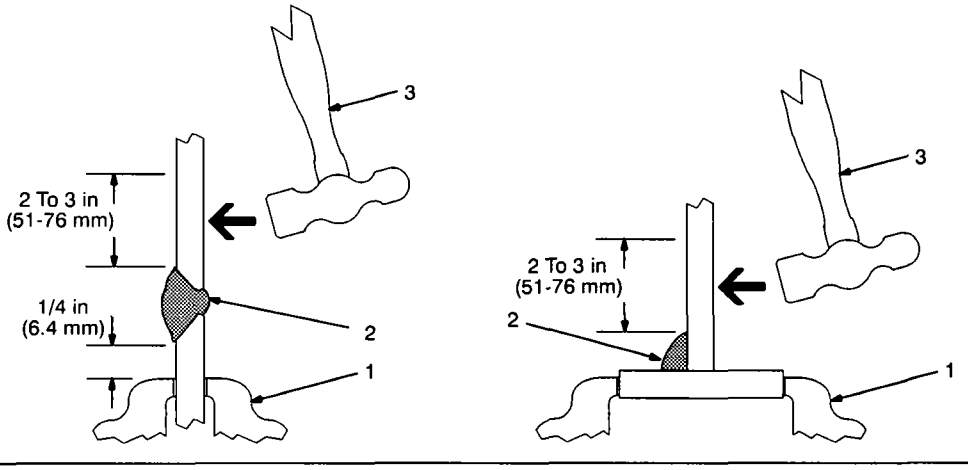
Create 30 degree angle of bevel on materials in V-groove welding.

4 Double V-Groove Weld

Good for materials thicker than 3/16 in (5 mm).

S-0662

Figure 8-9. Butt Joints



1 Vise

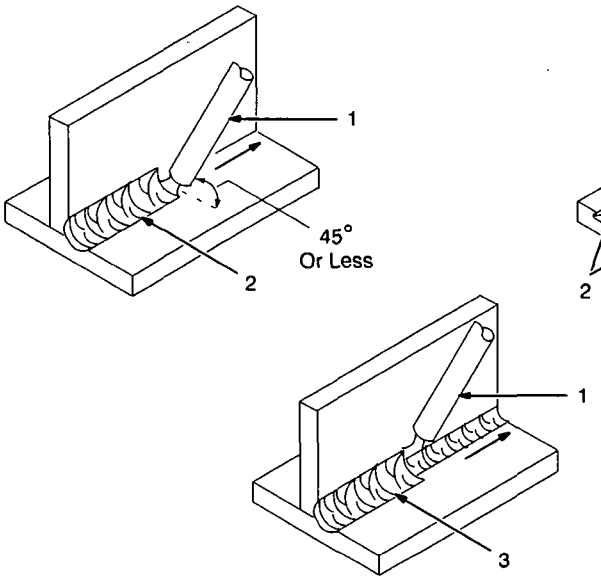
2 Weld Joint

3 Hammer

Strike weld joint in direction shown. A good weld bends over but does not break.

S-0057-B

Figure 8-10. Weld Test



1 Electrode

2 Fillet Weld

Keep arc short and move at definite rate of speed. Hold electrode as shown to provide fusion into the corner. Square edge of the weld surface.

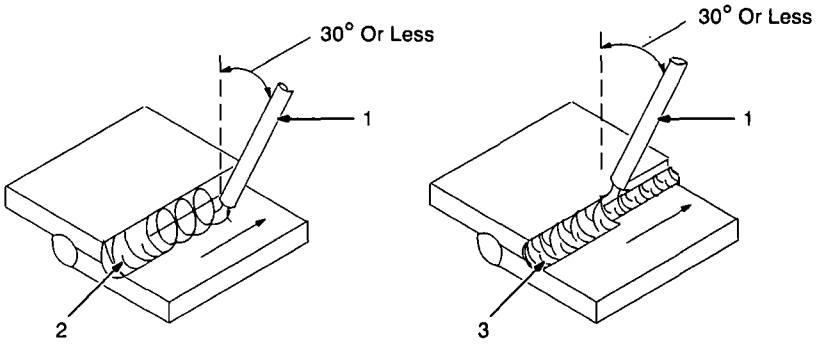
For maximum strength weld both sides of upright section.

3 Multi-Layer Deposits

Weld a second layer when a heavier fillet is needed. Use any of the weaving patterns shown in Figure 8-8. Remove slag before making another weld pass.

S-0060 / S-0058-A / S-0061

Figure 8-11. Tee Joint



Single-Layer Fillet Weld

Multi-Layer Fillet Weld

1 Electrode

2 Single-Layer Fillet Weld

Move electrode in circular motion.

3 Multi-Layer Fillet Weld

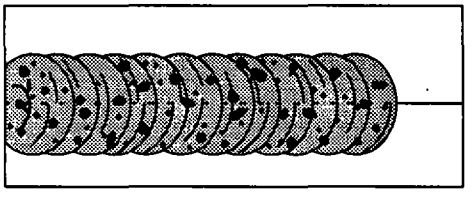
Weld a second layer when a heavier fillet is needed. Remove slag before making another weld pass. Weld both sides of joint for maximum strength.

S-0063 / S-0064

Figure 8-12. Lap Joint

8-2. Welding Troubleshooting

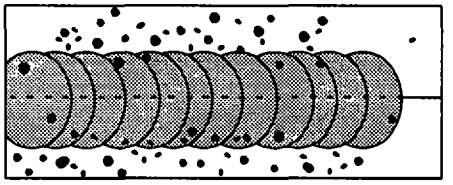
Table 8-1. Porosity



Porosity – small cavities or holes resulting from gas pockets in weld metal.

Possible Causes	Corrective Actions
Arc length too long.	Reduce arc length.
Damp electrode.	Use dry electrode.
Workpiece dirty.	Remove all grease, oil, moisture, rust, paint, coatings, slag, and dirt from work surface before welding.

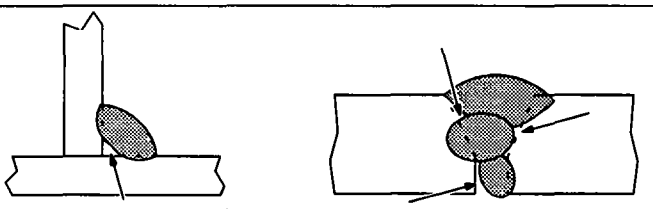
Table 8-2. Excessive Spatter



Excessive Spatter – scattering of molten metal particles that cool to solid form near weld bead.

Possible Causes	Corrective Actions
Amperage too high for electrode.	Decrease amperage or select larger electrode.
Arc length too long or voltage too high	Reduce arc length or voltage.

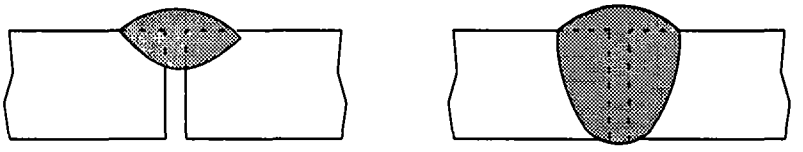
Table 8-3. Incomplete Fusion



Incomplete Fusion – failure of weld metal to fuse completely with base metal or a preceeding weld bead.

Possible Causes	Corrective Actions
Insufficient heat input.	Increase amperage. Select larger electrode and increase amperage.
Improper welding technique.	Place stringer bead in proper location(s) at joint during welding. Adjust work angle or widen groove to access bottom during welding. Momentarily hold arc on groove side walls when using weaving technique. Keep arc on leading edge of weld puddle.
Workpiece dirty.	Remove all grease, oil, moisture, rust, paint, coatings, slag, and dirt from work surface before welding.

Table 8-4. Lack Of Penetration

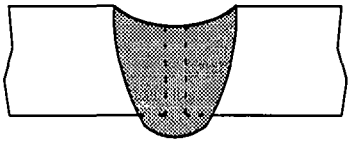


Lack of Penetration Good Penetration

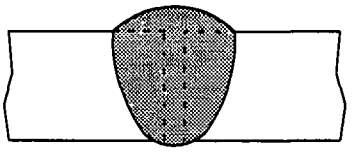
Lack Of Penetration – shallow fusion between weld metal and base metal.

Possible Causes	Corrective Actions
Improper joint preparation.	Material too thick. Joint preparation and design must provide access to bottom of groove.
Improper weld technique.	Keep arc on leading edge of weld puddle.
Insufficient heat input.	Increase amperage. Select larger electrode and increase amperage. Reduce travel speed.

Table 8-5. Excessive Penetration



Excessive Penetration

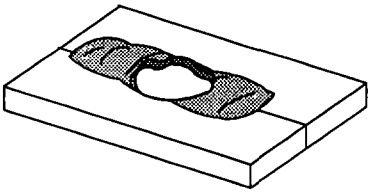


Good Penetration

Excessive Penetration – weld metal melting through base metal and hanging underneath weld.

Possible Causes	Corrective Actions
Excessive heat input.	Select lower amperage. Use smaller electrode. Increase and/or maintain steady travel speed.

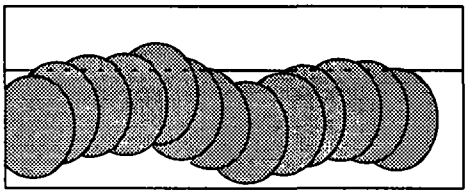
Table 8-6. Burn-Through



Burn-Through – weld metal melting completely through base metal resulting in holes where no metal remains.

Possible Causes	Corrective Actions
Excessive heat input.	Select lower amperage. Use smaller electrode. Increase and/or maintain steady travel speed.

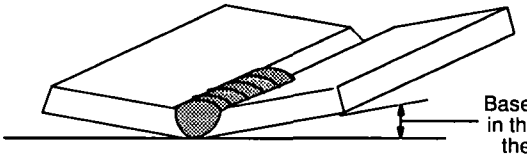
Table 8-7. Waviness Of Bead



Waviness Of Bead – weld metal that is not parallel and does not cover joint formed by base metal.

Possible Causes	Corrective Actions
Unsteady hand.	Use two hands. Practice technique.

Table 8-8. Distortion



Distortion – contraction of weld metal during welding that forces base metal to move.

Possible Causes	Corrective Actions
Excessive heat input.	Use restraint (clamp) to hold base metal in position. Make tack welds along joint before starting welding operation. Select lower amperage for electrode. Increase travel speed. Weld in small segments and allow cooling between welds.

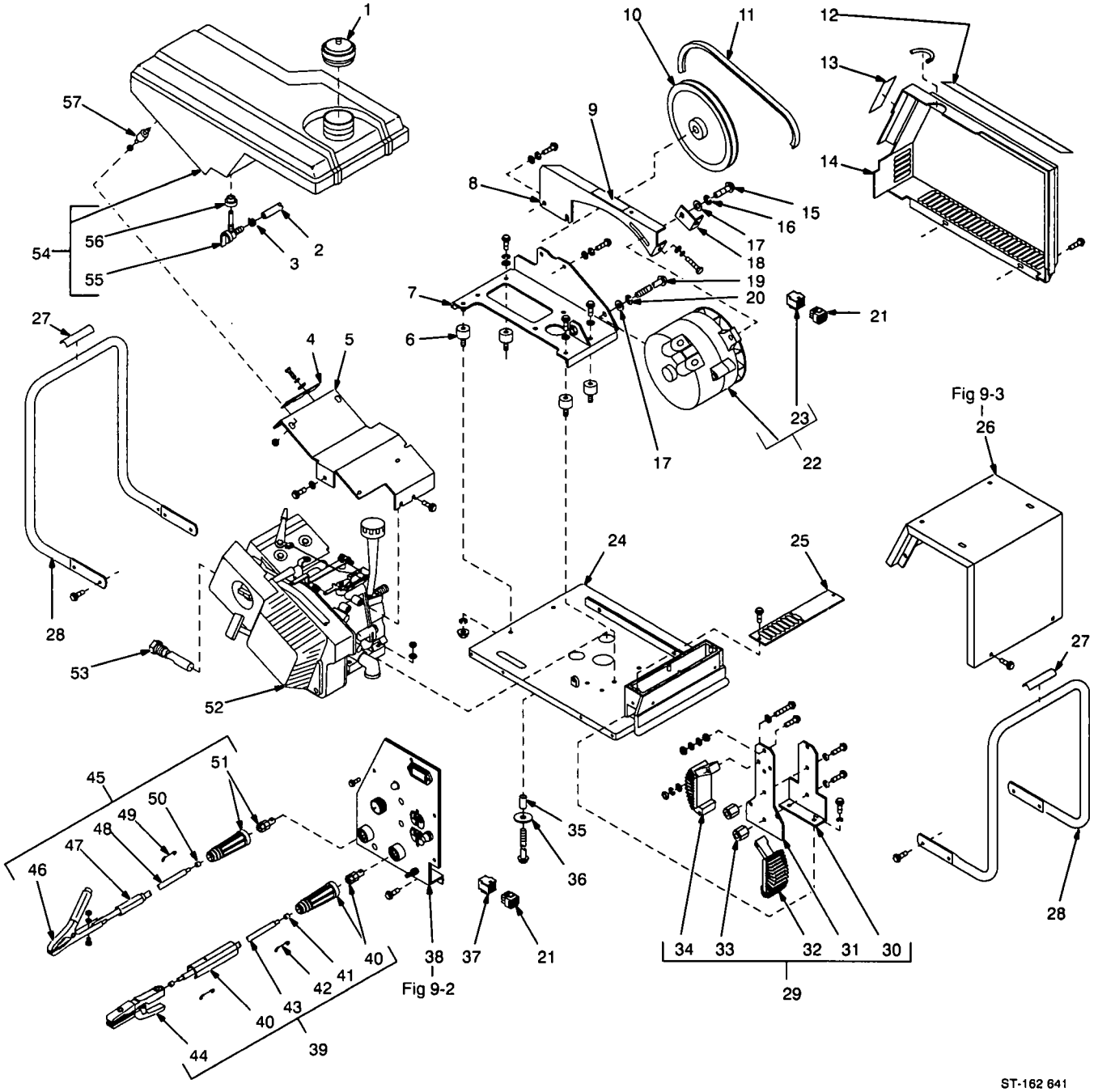


Figure 9-1. Main Assembly

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

Figure 9-1. Main Assembly

1		147 601	CAP, tank screw-on w/vent	1
2			HOSE, (see engine parts list)	1
3			CLAMP, (see engine parts list)	1
4		150 721	BRACKET, control idle	1
5		150 720	BRACKET, tank fuel	1
		020 279	CLAMP, stl cush .750dia x .281 hole	1
6		150 123	MOUNT, sgl stud 1.000dia .312-18 stud .750 high	4
7		152 756	BRACKET, mtg eng/gen	1
8		+148 975	BRACKET, adjustment alternator	1
		152 452	HANGER, cable 2.750 lg .625dia nyl	1
9		146 994	LABEL, warning moving parts can cause serious injury	1
10		148 976	PULLEY, V sgl grv 6.750dia x 6.000P x .625 bore	1
11		150 412	BELT, V cogged .500 wide x .343 deep x 32.300 lg	1
12		146 280	LABEL, warning general precautionary	1
13		151 209	LABEL, warning engine exhaust sparks can cause fire	1
14		+148 971	GUARD, belt drive	1
15		601 965	SCREW, .375-16 x 1.000 hexhd	1
16		602 213	WASHER, lock stl split .375	1
17		602 243	WASHER, flat stl std .375	2
18		148 966	RETAINER, adjuster belt	1
19		150 217	SCREW, .437-14 x 4.000 hexhd	1
20		602 215	WASHER, lock stl split .437	1
21	PLG2,3	135 134	CONNECTOR, rect 9P/S plug Amp 350720-1	2
		113 633	CONNECTOR, rect pin 20-14ga Amp 350218-1	9
22		150 708	GENERATOR, (consisting of)	1
23	RC2	135 133	CONNECTOR, rect 9P/S rcpt Amp 1-641765-0	1
		114 066	CONNECTOR, rect skt 20-14ga Amp 350536-1	9
		150 496	PULLEY, V sgl grv 3.750dia x 3.500P x .670 bore	1
		150 497	SPACER, fan	1
		150 498	FAN, generator 6.469dia	1
		150 502	BEARING, ball	1
		150 503	BEARING, roller	1
		150 506	BRUSH HOLDER ASSEMBLY, generator	1
24		155 063	BASE	1
25		148 965	SCREEN, handle base	1
26		Fig 9-3	PANEL, control w/components	1
27		155 797	LABEL, caution use no hooks or slings	2
28		+157 906	HANDLE, front/rear	2
29	SR3	150 567	RECTIFIER, positive/negative (consisting of)	1
30		150 216	BRACKET, mtg rectifier	1
31		150 344	INSULATOR, rectifier	1
32		150 127	RECTIFIER, negative half 3 phase full wave	1
33		026 947	STAND-OFF, insul .250-20 x 1.000 lg x .312thd	2
34		150 128	RECTIFIER, positive half 3 phase full wave	1
35		150 130	TUBING, stl .625 OD x 12ga wall x 1.125	2
36		127 596	WASHER, flat stl .344 ID x 1.500 OD x .125thk	2
37	RC3	135 133	CONNECTOR, rect 9P/S rcpt Amp 1-614765-0	1
		114 066	CONNECTOR, rect skt 20-14ga Amp 350536-1	9
38		Fig 9-2	PANEL, front w/components	1
39		157 907	CABLE, w/electrode holder (consisting of)	1
40		129 527	CONNECTOR, twlk insul male (Dinse type) 50 Series	1
41		600 681	SPLICE, prl 4 wire	2
42		010 521	WIRE, tie	2
43		600 325	CABLE, weld cop strd No. 6 (order by ft)	20ft
44		040 234	AF-2 HOLDER, electrode 200A	1

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

Figure 9-1. Main Assembly (Continued)

.. 45		157 908	.. CABLE, w/ground clamp (consisting of)	1
.. 46		010 368	... CLAMP, ground 200A	1
.. 47		026 843	... INSULATOR, vinyl	2
.. 48		600 325	... CABLE, weld cop strd No. 6 (order by ft)	20ft
.. 49		010 521	... WIRE, tie	1
.. 50		600 681	... SPLICE, prl 4 wire	1
.. 51		129 527	... CONNECTOR, twlk insul male (Dinse type) 50 series	1
		134 746	.. WRENCH, hex 5mm short	1
.. 52		147 552	.. ENGINE, Kohler gas (consisting of)	1
		067 101	... AIR FILTER	1
.. 53	S1	♦154 656	.. SWITCH, oil low level	1
.. 54		147 544	.. TANK, fuel 2.3gal (consisting of)	1
.. 55		152 460	... VALVE, fuel 2 way w/micron filter	1
.. 56		152 583	... BUSHING, tank fuel	1
.. 57		150 126	.. MOUNT, dual stud .625dia .250-20 stud .625 high	6
		137 690	.. AUTO ARC, hand-held shield	1

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

♦Part of 042 769 Optional Automatic Low Oil Shutdown Kit.

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

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

Figure 9-2. Panel, Front w/Components (Fig 9-1 Item 38)

1	R1	150 765	RHEOSTAT, WW 25W 10/40 ohm	1
2		154 663	PANEL, front	1
3	C5	152 537	CAPACITOR	1
4		♦154 654	NUT, speed push-on-type .500 stud	1
5	RC1	604 176	RECEPTACLE, str dx grd 2P3W 15A 125V	1
		073 690	PLUG, str grd armd 2P3W 15A 125V P & S 5266DF	
6	Neg,Pos	129 525	RECEPTACLE, twlk insul fem (Dinse type) 50/70 series	2
7		601 836	NUT, brs hex .250-20 jam hvy	3
8		010 915	WASHER, flat brs .250 ID x .625 OD x .031thk	2
9	C3,4	131 646	CAPACITOR ASSEMBLY	1
10		046 432	HOLDER, fuse mintr	1
11	F1	*012 655	FUSE, mintr cer 10A 250V	1
12		083 030	STUD, brs .250-20 x 1.750	1
13		097 924	KNOB, pointer	1
14		♦154 653	LIGHT, ind red lens low oil level	1
15			NAMEPLATE, (order by model and serial number)	1
16	HM	♦♦154 081	METER, hour 4-40VDC	1

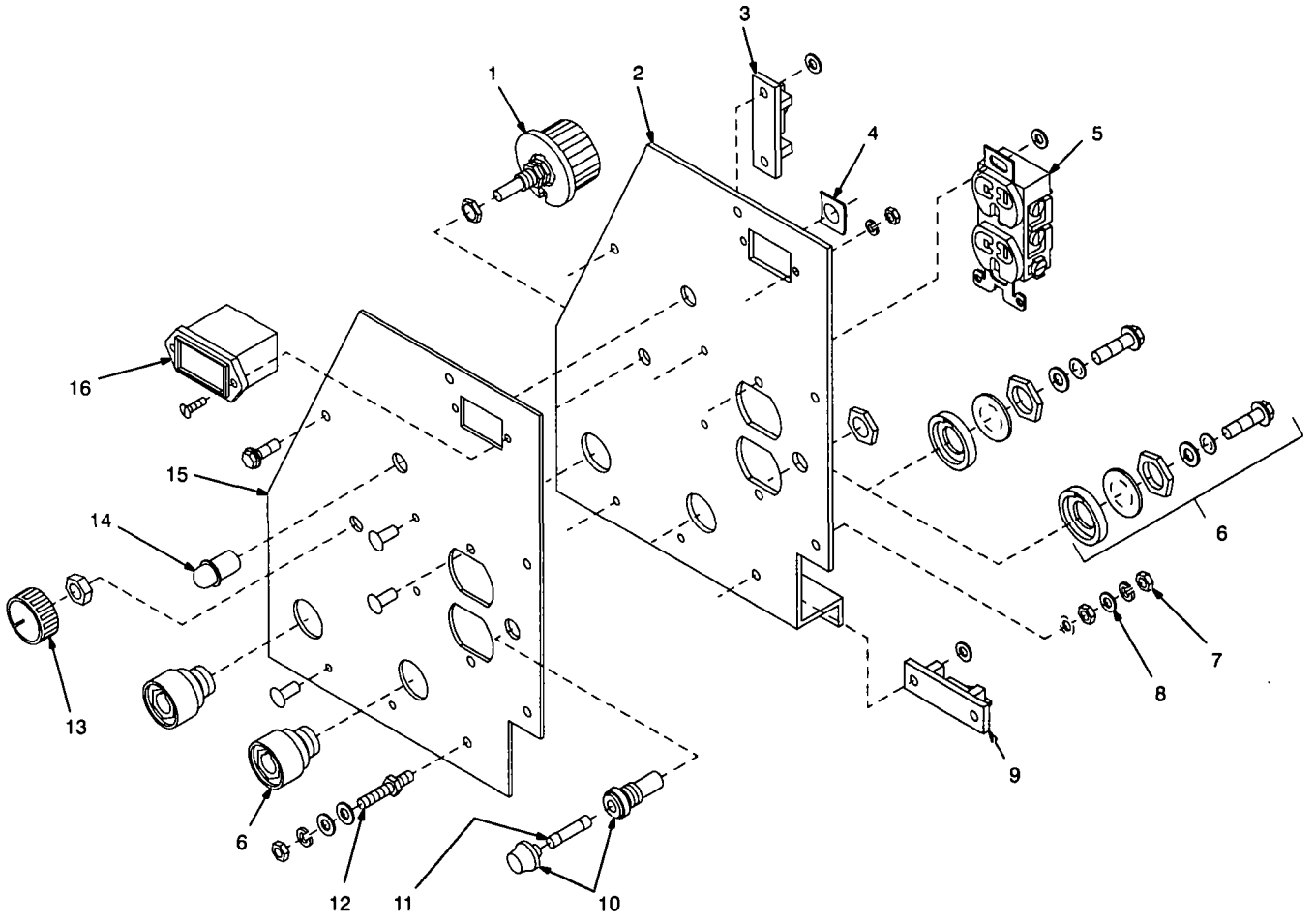


Figure 9-2. Panel, Front w/Components

*Recommended Spare Parts.

♦Part of 042 769 Optional Automatic Low Oil Shutdown Kit.

♦♦Part of 042 781 Optional Running Hour Meter.

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

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

Figure 9-3. Panel, Control w/Components (Fig 9-1 Item 26)

1		148 967	COVER, (consisting of)	1
		137 198	NUT, insert 10-24	3
2		087 111	CLAMP, capacitor 1.375dia clip	2
3	C1,2	149 243	CAPACITOR, elctlt 950uf 100VAC	2
4	SR1,2,4	035 704	RECTIFIER, integ 40A 800V	3
5	R3,4,VR1,2	151 530	SUPPRESSOR	2
6	R2	149 244	RESISTOR, WW adj 25W 3 ohm	1
7		152 534	PANEL, mtg components	1
8	R3	153 064	RESISTOR, WW adj 10W 1 ohm	1

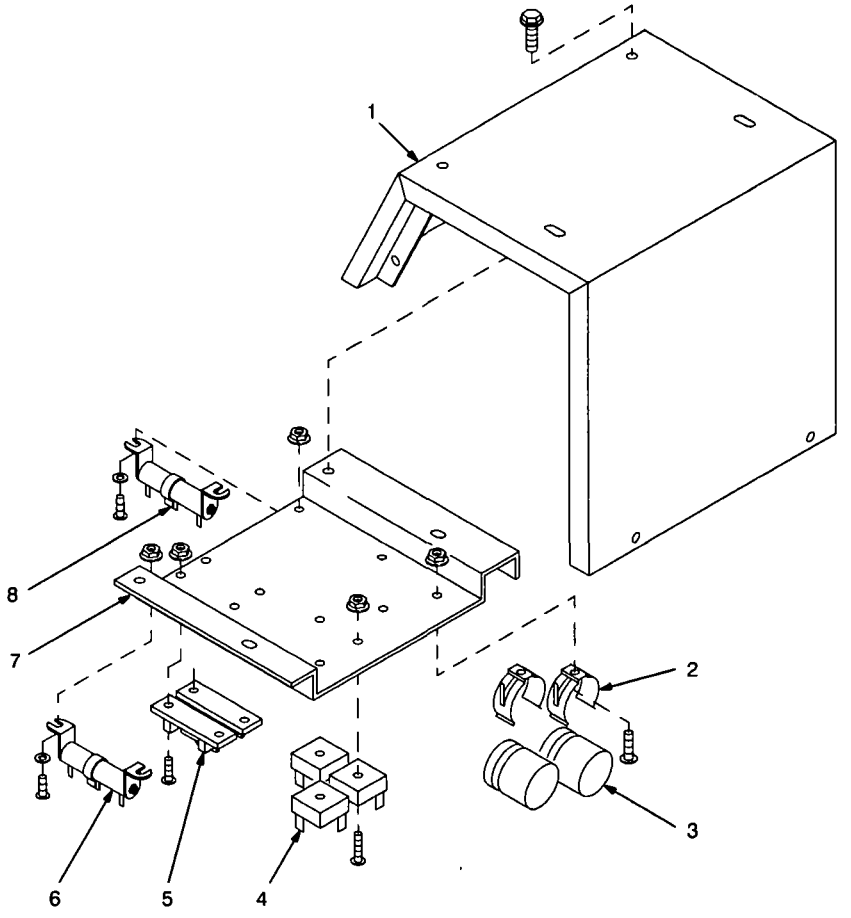


Figure 9-3. Panel, Control w/Components

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