FLEX™ 30 PLASMA ST
OPERATING MANUAL

ENGLISH

FORNEY INDUSTRIES

WELDING IN AMERICA.
SINCE THE BEGINNING.

C US

ITEM# 320

REV 05.12.2022

FIVE WAYS TO ORDER

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Fort Collins, CO 80525

U.S. Facilities:
- Fort Collins, CO
- Vandalia, OH

Forney Promise

We are committed to your success regardless of location, size or needs. We understand it is your goal to get the job done right, and we are ready to help you do just that.

President's Message

We market the highest quality tools, equipment and accessories for the do-it-yourselfer and professional. Our passion and dedication in bringing new products to the industrial and retail market, combined with our personal service, is unmatched in our industry. Our ability to listen to our customers' needs enables us to create solutions to their problems.

Our dedication to the highest quality customer service within our corporate headquarters and the service provided in the field is unequaled. We are committed to creating the best solutions to our customer's needs. Above all, our employees will provide the same respect and caring attitude within the organization as they are expected to share with every Forney customer. Our goal will be to exceed our customers' expectations through empowered people, guided by shared values and commitments.

We work hard so our customers trust us because of our integrity, teamwork and innovation in the welding & metalworking industry. 90 years of unmatched product quality and an unwavering commitment to our customers.

When our customers succeed, we succeed.

Steven G. Anderson

STEVEN G. ANDERSON, President & CEO

TECHNICAL ISSUES?
FORNEY CAN HELP!

Thank you for choosing Forney! Please note: The store you purchased this machine from DOES NOT handle product returns. Forney Industries will repair or replace defective products at no charge to you!

When you call Forney's Technical Service department, you will speak to a trained product and application expert. Forney's primary goal is to get your machine up and running in as little time as possible. In fact, the majority of issues can be fixed over the phone! Please be near your machine when you call, so the Forney technician can guide you.

Speaking to a Forney Technician directly helps us gather better data, and improve our products. It is our highest priority to ensure our customers are cared for.

WE MAKE IT EASY!

Please contact Forney Industries Technical Service at 800-521-6038 Ext. 2 or customerservice@forneyind.com for inquiries, technical and general questions.

Table of Contents

CAUTION!

BEFORE INSTALLING, OPERATING OR CARRYING OUT MAINTENANCE ON THE MACHINE, READ THE CONTENTS OF THIS MANUAL CAREFULLY, PAYING PARTICULAR ATTENTION TO THE SAFETY RULES AND HAZARDS.

In the event of these instructions not being clear, please contact your Forney Authorized Dealer or Forney Customer Service 1-800-521-6038

Symbols Legend

SYMBOL	MEANING	SYMBOL	MEANING	SYMBOL	MEANING
	ARC RAYS HAZARD		FIRE HAZARD		NOISE HAZARD
	EXPLOSION HAZARD		OVERHEATING HAZARD		BURN HAZARD
	ELECTROMAGNETIC INTERFERENCE		PLASMA ARC CUTTING		PERSONAL PROTECTIVE EQUIPMENT NEEDED
	FALLING EQUIPMENT HAZARD		PLASMA CUTTING TORCH TRIGGERED		FUMES, VAPORS, GASSES HAZARD
	MAGNETIC FIELD HAZARD		HF RADIATION INTERFERENCE	-	-
	POISON HAZARD		ELECTRICAL HAZARD		WARNING/CAUTION
	STICK (SMAW)		TIG (GTAW)		TEMPERATURE
	POSITIVE DINSE		INPUT VOLTAGE		AMPERAGE
	NEGATIVE DINSE			SINGLE PHASE STATIC FREQUENCY CONVERTER TRANSFORMER RECTIFIER	
I	ON	O	OFF		LINE CONNECTION		DIRECT CURRENT (DC)
1~	SINGLE PHASE ALTERNATING CURRENT (AC)			S	SUITABLE FOR WELDING & CUTTING IN AN ENVIRONMENT WITH INCREASED RISK OF ELECTRIC SHOCK		

The data within this safety summary are highlights of various safety standards. It is recommended that you familiarize yourself with the standards listed below before operating the machine.

Principal Safety Standards

- ANSI Z49.1: SAFETY IN WELDING AND CUTTING - Obtainable from the American Welding Society, 550 NW Le Jeune Road, Miami, FL 33126 Telephone (800) 443-9353, Fax (305) 443-7559 - www.amweld.org or www.aws.org.
- OSHA 29 CFR, Part 1910, Subpart Q.: WELDING, CUTTING AND BRAZING - Obtainable from your state OSHA office or U.S. Dept. of Labor OSHA, Office of Public Affairs, Room N3647, 200 Constitution Ave., Washington, DC 20210 - www.osha.gov.
- AWS F4.1: SAFE PRACTICES FOR THE PREPARATION FOR WELDING AND CUTTING OF CONTAINERS AND PIPING FOR WELDING AND CUTTING. - Obtainable from the American Welding Society, 550 NW Le Jeune Road, Miami, FL 33126 Telephone (800) 443-9353, Fax (305) 443-7559 - www.amweld.org or www.aws.org.
- AWS A6.0. WELDING AND CUTTING CONTAINERS WHICH HAVE HELD COMBUSTIBLES - Obtainable from the American Welding Society, 550 NW Le Jeune Road, Miami, FL 33126 Telephone (800) 443-9353, Fax (305) 4437559 - www.amweld.org or www.aws.org.

- NFPA 70: NATIONAL ELECTRICAL CODE - Obtainable from the National Fire Protection Association, 1 Batterymarch Park, P.O. Box 9101, Quincy, MA 02269-9101 Telephone (617) 770-3000 Fax (617) 770-0700 - www.nfpa.org
- CGA Publication P-1: SAFE HANDLING OF COMPRESSED GASSES IN CONTAINERS - Obtainable from Compressed Gas Association, 14501 George Carter Way, Suite 103, Chantilly, VA 20151 Telephone (703) 7882700 Fax (703) 961-1831 - www.cganet.com
- CSA W117.2 - Code for SAFETY IN WELDING AND CUTTING. - Obtainable from Canadian Standards Association, 178 Rexdale Blvd., Etobicoke, Ontario M9W 1R3 - www.csa.ca
- ANSI Z87.1 - SAFE PRACTICE FOR OCCUPATION AND EDUCATIONAL EYE AND FACE PROTECTION - Obtainable from the American National Standards Institute, 11 West 42nd St., New York, NY 10036 Telephone (212) 642A900, Fax (212) 398-0023 - www.ansi.org
- NFPA 51B: STANDARD FOR FIRE PREVENTION DURING WELDING, CUTTING, AND OTHER HOT WORK- Obtainable from the National Fire Protection Association, 1 Batterymarch Park, P.O. Box 9101, Quincy, MA 02269-9101 Telephone (617) 770-3000 Fax (617) 770-0700 - www.nfpa.org
- AWS C5.2 - RECOMMENDED PRACTICES FOR PLASMA ARC CUTTING AND GOUGING - obtainable from the American Welding Society, 550 NW Le Jeune Road, Miami, FL 33126 Telephone (800) 443-9353, Fax (305) 4437559 - www.amweld.org or www.aws.org.

California Proposition 65 Warning

⚠ **WARNING:** This product can expose you to chemicals, including lead, which are known to the State of California to cause cancer and birth defects or other reproductive harm. For more information go to www.P65Warnings.ca.gov. P65 details at forneyind.com. Wash hands after use.

EMF Information

Welding or cutting current, as it flows through the welding cables, will cause electromagnetic fields. There has been and still is some concern about such fields. However, after examination, the committee of the National Research Council concluded that: "The body of evidence, in the committee's judgment, has not demonstrated that exposure to power-frequency electric and a magnetic field is a human health hazard." However, studies are still going forth and evidence continues to be examined. Until the final conclusions of the research are reached, you may wish to minimize your exposure to electromagnetic fields when welding.

To reduce magnetic fields in the workplace, use the following procedures:

1. Keep electrode and ground cables close together by twisting or taping them when possible.
2. Arrange cables to one side and away from the operator.
3. Do not coil or drape cables around your body.
4. Keep welding power source and cables as far away from operator as practical.
5. Connect ground clamp to workpiece as close to the cut or weld as possible.

ABOUT PACEMAKERS & HEARING AIDS:

Pacemaker and hearing aid wearers consult your doctor first. If cleared by your doctor, then following the above procedures is recommended.

Plasma Arc Cutting Hazards

CUTTING CAN CAUSE FIRE OR EXPLOSION. Hot metal and sparks blow out from the cutting arc. The flying sparks and hot metal, hot workpiece, and hot equipment can cause fires and burns. Check and be sure the area is safe before doing any cutting.

- Do not cut in an area until it is checked and cleared of combustible and/or flammable materials. Be aware that sparks and slag can fly 35 ft and can pass through small cracks and openings. If workpiece and combustibles cannot be separated by a minimum of 35 ft, protect against ignition with suitable, snug-fitting, fire resistant, covers or shields.
- Connect the GROUND CABLE to the workpiece as close as possible to the welding or cutting area. Do not connect GROUND CABLES to building framing or other locations away from the welding or cutting area. This increases the possibility of welding/cutting current passing through alternate circuits, creating fire hazards and other safety hazards.

- Do not weld, cut, or perform other such work on used barrels, drums, tanks, or other containers that had a flammable or toxic substance. The techniques for removing flammable substance and vapors, to make a used container safe for welding or cutting, are quite complex and require special education and training.
- Do not cut in atmospheres containing flammable dust or vapors.
- Do not cut pressurized cylinders, pipes, or vessels.
- Do not cut containers that have held combustibles.
- Do not wear gloves or other clothing that contains oil, grease, or other flammable substances.
- Do not wear flammable hair preparations.
- Have fire extinguisher equipment handy for immediate use. A portable chemical fire extinguisher, type ABC, is recommended.
- Make sure the work area has a good, solid, safe floor, preferably concrete or masonry, not tiled, carpeted, or made of any other flammable material.
- Protect flammable walls, ceilings, and floors with heat resistant covers or shields.
- Check work area to make sure it is free of sparks, glowing metal or slag, and flames before leaving the work area.
- Wear garments free of oil or other flammable substances such as leather gloves, thick 100% cotton shirts (no synthetic material), with no synthetic materials, cuff-less trousers, and closed toed shoes. Keep long hair pulled back.
- Remove any combustibles such as lighters and matches before doing any welding or cutting.
- Follow requirements in OSHA and NFPA for hot work and have an extinguisher nearby.

ELECTRIC SHOCK CAN KILL. Touching live electrical parts can cause fatal shocks or severe burns. The PLASMA TORCH and work circuit are electrically live whenever the output is on. The input power circuit and machine internal circuits are also live when POWER SWITCH (11) is ON. Plasma arc cutting requires higher voltages than welding to start and maintain the arc (200 to 400V DC are common). It also uses torches designed with safety interlock systems which turn off the machine when the SHIELD CUP is loosened or if the CUTTING TIP touches the ELECTRODE during operation. Incorrectly installed or improperly grounded equipment is a hazard.

- Do not, in any manner, come into physical contact with any part of the cutting current circuit. The cutting current circuit includes:
    a. The workpiece or any conductive material it contacts.
    b. The GROUND CLAMP.
    c. The ELECTRODE or CUTTING TIP.
- Do not cut in a damp area or come in contact with a moist or wet surface.
- Do not attempt to cut if any part of clothing or body is wet.
- Do not allow the cutting equipment to come in contact with water or moisture.
- Do not drag cables or PLASMA TORCH through or allow them to come into contact with water or moisture.
- Do not touch the machine or attempt to turn the machine ON or OFF if any part of the body or clothing is moist or if you are in physical contact with water or moisture.
- Do not attempt to plug the machine into input power if any part of body or clothing is moist, or if you are in physical contact with water or moisture.
- Do not connect GROUND CLAMP to or cut on electrical conduit.
- Do not alter INPUT POWER CABLE (12) or plug in any way.
- Do not attempt to plug the machine into input power if the ground prong on power cable plug is bent over, broken off, or missing.
- Do not allow the machine to be connected to input power or attempt to cut if the machine, cables, or cutting site are exposed to any form of atmospheric precipitation, or salt water spray.
- Do not carry coiled cables around shoulders, or any other part of the body, when they are plugged into the machine.
- Do not modify any wiring, ground connections, switches, or fuses in this machine.
- Wear welding gloves to help insulate hands from cutting circuit.
- Keep all liquid containers far enough away from the plasma cutting machine and work area so that if spilled, the liquid cannot possibly come in contact with any part of the machine or electrical cutting circuit.
- Replace any cracked or damaged parts that are insulated or act as insulators such as cables or PLASMA TORCH immediately.

SIGNIFICANT DC VOLTAGE EXISTS ON INTERNAL PARTS OF INVERTER-BASED MACHINES AFTER THE REMOVAL OF INPUT POWER.

Before touching anything inside the cabinet or performing maintenance activities, turn unit OFF, disconnect INPUT POWER CABLE, and allow sufficient time for the capacitors to discharge (check with a voltmeter that there are zero volts (0V) across the capacitor terminals).

EXPLODING PARTS CAN INJURE.

On inverter-based machines, faulty parts can explode or cause other parts to explode when power is applied. Always wear a face shield and long sleeves when servicing inverters.

FLYING SPARKS CAN CAUSE INJURY.

- Wear approved face shield or safety goggles with side shields.
- Wear proper body protection to protect skin. Wear flame-resistant ear plugs or earmuffs to prevent sparks from entering ears.

ARC RAYS CAN BURN EYES AND SKIN.

Arc rays from the cutting process produce intense visible and invisible (ultraviolet and infrared) rays that can burn eyes and skin.

- Wear face protection (helmet or face shield) with correct filter shade to protect your face and eyes when cutting or watching.
- Wear approved safety glasses with side shields under your helmet or shield.
- Use protective screens or barriers to protect others from flash and glare; warn others not to watch the arc.
- Refer to ANSI Z49.1 for OSHA 29CFR for shade recommendations.

NOISE CAN DAMAGE HEARING.

Noise can cause permanent hearing loss. The plasma cutting processes can cause noise levels that exceed safe limits. You must protect your ears from loud noise to prevent permanent loss of hearing.

- To protect your hearing from loud noise, wear protective ear plugs and/or earmuffs.
- Noise levels should be measured to be sure the decibels (sound) do not exceed safe levels.

FUMES, GASSES, AND VAPORS CAN CAUSE DISCOMFORT, ILLNESS, AND DEATH! To reduce the risk, read, understand, and follow the safety instructions. In addition, make certain that anyone else that uses this welding equipment or is a bystander in the work area, understands and follows these safety instructions as well.

- Read and understand manufacturers SDS and MSDS.
- Do not weld or cut in an area until it is checked for adequate ventilation as described in ANSI standard Z49.1. If ventilation is not adequate to exchange all fumes and gasses generated during the welding or cutting process with fresh air, do not weld or cut unless you (the operator) and all bystanders are wearing air-supplied respirators.
- Do not heat metals coated with, or that contain, materials that produce toxic fumes (such as galvanized steel), unless the coating is removed. Make certain the area is well ventilated, and the operator and all bystanders are wearing air-supplied respirators.
- Do not weld, cut or heat lead, zinc, cadmium, mercury, beryllium, antimony, cobalt, manganese, selenium, arsenic, copper, silver, barium, chromium, vanadium, nickel, or similar metals without seeking professional advice and ventilation inspection of the work area. These metals produce extremely toxic fumes which can cause discomfort, illness and death.
- Do not weld or cut in areas that are near chlorinated solvents. Vapors from chlorinated hydrocarbons, such as trichloroethylene and perchloroethylene, can be decomposed by the heat of an electric arc or its ultraviolet radiation. These actions can cause phosgene, a highly toxic gas, to form, along with other lung and eye irritating gasses. Do not weld or cut where these solvent vapors can be drawn into the work area or where the ultraviolet radiation can penetrate to areas containing even very small amounts of these vapors.
- Do not weld or cut in a confined area unless it is being ventilated or the operator (and anyone else in the area) is wearing an air-supplied respirator.
- Stop welding or cutting if you develop momentary eye, nose, or throat irritation as this indicates inadequate ventilation. Stop work and take necessary steps to improve ventilation in the work area. Do not resume work if physical discomfort persists.

PLASMA ARC CAN CAUSE INJURY.

The heat from the plasma arc can cause serious burns. The force of the arc adds greatly to the burn hazard. The intensely hot and powerful arc can quickly cut through gloves and tissue.

- Keep away from the torch CUTTING TIP.
- Do not grip material near the cutting path.
- The pilot arc can cause burns - keep away from torch CUTTING TIP when trigger is pressed.
- Wear proper flame-resistant clothing covering all exposed body areas.
- Point PLASMA TORCH away from your body and toward workpiece when pressing the torch trigger – pilot arc comes on immediately.
- Turn OFF machine and disconnect INPUT POWER CABLE before removing SHIELD CUP, changing torch consumables or disassembling PLASMA TORCH.
- Use only the PLASMA TORCH that came connected to your plasma cutting machine or a certified replacement.

Additional Symbols for Installation, Operation, and Maintenance

HOT PARTS CAN CAUSE SEVERE BURNS.

- Do not touch hot parts bare-handed.
- Allow cooling period before working on PLASMA TORCH.

MOVING PARTS CAN CAUSE INJURY.

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

FLYING METAL CAN INJURE EYES.

- Wear safety glasses with side shields or face shield.

MAGNETIC FIELDS CAN AFFECT PACEMAKERS.

- Pacemaker wearers keep away.
- Wearers should consult their doctor before going near plasma arc cutting operations.

OVERUSE CAN CAUSE OVERHEATING.

- Allow cooling period; follow rated duty-cycle.
- Reduce amperage or reduce length of continuous cutting to reduce duty-cycle protection events.

EXPLODING HYDROGEN HAZARD.

- When cutting aluminum underwater or with the water touching the underside of the aluminum, free hydrogen gas may collect under the workpiece and pose an explosion.

FALLING UNIT CAN CAUSE INJURY.

- Use lifting handle to lift unit only, NOT running gear, gas cylinders, or any other accessories.

FIRE OR EXPLOSION HAZARD.

- Do not locate unit on, over, or near combustible surfaces.
- Do not install unit near flammables.
- Do not overload building wiring – be sure building power supply system is properly sized, rated, and protected to handle this unit.

H.F. RADIATION CAN CAUSE INTERFERENCE.

- High-frequency (H.F.) can interfere with radio navigation, safety services, computers, and communications equipment. Have only qualified persons familiar with electronic equipment perform this installation. The user is responsible for having a qualified electrician promptly correct any interference problem resulting from the installation. If notified by the FCC about interference, stop using the equipment at once. Have the installation regularly checked and maintained. Keep machine doors and panels tightly shut, keep spark gaps at correct setting, and use grounding and shielding to minimize the possibility of interference.

ARC CUTTING CAN CAUSE INTERFERENCE.

Electromagnetic energy can interfere with sensitive electronic equipment such as computers and computer-driven equipment such as robots. To reduce possible interference, keep cables as short as possible, close together, and down low, such as on the floor. Locate cutting operation 100 meters from any sensitive electronic equipment. Be sure this plasma cutting machine is installed and grounded according to this manual. If interference still occurs, the user must take extra measures such as moving the machine, using shielded cables, using power line filters, or shielding the work area. Welding processes of any kind can be dangerous not only to the operator but to any person situated near the equipment, if safety and operating rules are not strictly observed.

Personal Protection

THE WELDING ARC PRODUCES VERY BRIGHT ULTRAVIOLET AND INFRARED LIGHT. THESE ARC RAYS WILL DAMAGE YOUR EYES AND BURN YOUR SKIN IF YOU ARE NOT PROPERLY PROTECTED. To reduce the risk of injury from arc rays, read, understand, and follow the safety instructions. In addition, make certain that anyone else that uses this welding equipment, or is a bystander in the welding area understands and follows these safety instructions as well. Helmets and filter should conform to ANSI Z87.1 standards.

- Do not look at an electric arc without proper protection. A welding arc is extremely bright and intense and, with inadequate or no eye protection, the retina can be burned, leaving a permanent dark spot in the field of vision. A shield or helmet with a #10 shade filter lens (minimum) must be used.
- Provide bystanders with shields or helmets fitted with an appropriate shade filter lens.
- Do not strike a welding arc until all bystanders and the operator have welding shields and/or helmets in place.
- Do not wear a cracked or broken helmet and replace any cracked or broken filter lenses immediately.
- Do not allow the uninsulated portion of the TIG torch to touch the ground clamp or grounded workpiece to prevent an arc flash from being created on contact.
- Wear protective clothing. The intense light of the welding arc can burn the skin in much the same way as the sun, even through lightweight clothing. Wear dark clothing of heavy material. The shirt worn should be long sleeved and the collar kept buttoned to protect chest and neck.
- Protect against reflected arc rays. Arc rays can be reflected off shiny surfaces such as a glossy painted surface, aluminum, stainless steel, and glass. It is possible for your eyes to be injured by reflected arc rays even when wearing a protective helmet or shield. If welding with a reflective surface behind you, arc rays can bounce off the surface and off the filter lens. It can get inside your helmet or shield and into your eyes. If a reflective background exists in your welding area, either remove it or cover it with something non-flammable and non-reflective. Reflective arc rays can also cause skin burn in addition to eye injury.
- Flying sparks can injure. Wear proper safety equipment to protect eyes and face. Shape tungsten electrode on grinder wearing proper protection and in a safe location. Keep flammables away and prevent fire from flying sparks.

FUMES, GASSES, AND VAPORS CAN CAUSE DISCOMFORT, ILLNESS, AND DEATH! To reduce the risk, read, understand, and follow the safety instructions. In addition, make certain that anyone else that uses this welding equipment or is a bystander in the welding area, understands and follows these safety instructions as well.

- Read and understand manufacturers Safety Data Sheets (SDS) and Material Safety Data Sheets (MSDS).
- Do not weld in an area until it is checked for adequate ventilation as described in ANSI standard Z49.1. If ventilation is not adequate to exchange all fumes and gasses generated during the welding process with fresh air, do not weld unless you (the machine) and all bystanders are wearing air-supplied respirators.
- Do not heat metals coated with, or that contain, materials that produce toxic fumes (such as galvanized steel), unless the coating is removed. Make certain the area is well ventilated, and the operator and all bystanders are wearing air-supplied respirators.
- Do not weld, cut or heat lead, zinc, cadmium, mercury, beryllium, antimony, cobalt, manganese, selenium, arsenic, copper, silver, barium, chromium, vanadium, nickel, or similar metals without seeking professional advice and inspection of the ventilation of the welding area. These metals produce extremely toxic fumes which can cause discomfort, illness and death.
- Do not weld or cut in areas that are near chlorinated solvents. Vapors from chlorinated hydrocarbons, such as trichloroethylene and perchloroethylene, can be decomposed by the heat of an electric arc or its ultraviolet radiation. These actions can cause phosgene, a highly toxic gas to form, along with other lung and eye irritating gasses. Do not weld or cut where these solvent vapors can be drawn into the work area or where the ultraviolet radiation can penetrate to areas containing even very small amounts of these vapors.
- Do not weld in a confined area unless it is being ventilated or the operator (and anyone else in the area) is wearing an air-supplied respirator.
- Stop welding if you develop momentary eye, nose, or throat irritation as this indicates inadequate ventilation. Stop work and take necessary steps to improve ventilation in the welding area. Do not resume welding if physical discomfort persists.

Fire Prevention

FIRE OR EXPLOSION CAN CAUSE DEATH, INJURY, AND PROPERTY DAMAGE! To reduce these risks, read, understand and follow the safety instructions. In addition, make certain that anyone else that uses

this welding equipment, or is a bystander in the welding area, understands and follows these safety instructions as well. Remember: arc welding by nature produces sparks, hot spatter, molten metal drops, hot slag and hot metal parts that can start fires, burn skin and damage eyes.

- Do not wear gloves or other clothing that contains oil, grease, or other flammable substances.
- Do not wear flammable hair preparations.
- Do not touch the hot weld bead or weld puddle until fully cooled.
- Do not weld in an area until it is checked and cleared of combustible and/or flammable materials. Be aware that sparks and slag can fly 35 ft and can pass through small cracks and openings. If work and combustibles cannot be separated by a minimum of 35 ft, protect against ignition with suitable, snug-fitting, fire resistant, covers or shields.
- Do not weld on walls until checking for and removing combustibles touching the other side of the walls.
- Connect the ground cable to the workpiece as close as possible to the welding area. Do not connect ground cables to building framing or other locations away from the welding area. This increases the possibility of welding current passing through alternate circuits, creating fire hazards and other safety hazards.
- Do not weld, cut, or perform other such work on used barrels, drums, tanks, or other containers that had a flammable or toxic substance. The techniques for removing flammable substance and vapors, to make a used container safe for welding or cutting, are quite complex and require special education and training.
- Do not strike an arc on a compressed gas or air cylinder, and never allow any electrically "hot" parts to touch a cylinder. Doing so will create a brittle area that can result in a violent rupture immediately or at a later time as a result of rough handling.
- Ensure any compressed gas cylinders in the work area have properly operating regulators rated for the gas and pressure used. All hoses, fittings, etc. should be in good condition.
- Do not stand in front of or put your head or face in front of a cylinder valve outlet when opening the valve.
- If a cylinder is not in use or connected for use, keep a valve protection cap in place to protect the valve.
- Keep cylinders upright and securely chain them to a fixed support to prevent tipping.
- Keep cylinders away from areas where they may be subjected to physical damage or accidentally struck. Keep them a safe distance from any source of flame, sparks, or heat.
- Do not weld or cut in an area where the air may contain flammable dust (such as grain dust), gas, or liquid vapors (such as gasoline).
- Do not handle hot metal, such as the workpiece or electrode stubs, with bare hands.
- Wear leather gloves, heavy long sleeve shirt, cuff-less pants, high-topped shoes, helmet, and welding cap. As necessary, use additional fire-resistant protective clothing to cover and protect the upper and lower body. Hot sparks or metal can lodge in rolled up sleeves, pant cuffs, or pockets. Sleeves and collars should be kept buttoned and pockets eliminated from the shirt front.
- Have fire extinguisher equipment handy for immediate use. A portable chemical fire extinguisher, type ABC, is recommended.
- Wear ear plugs when welding overhead to prevent spatter or slag from falling into ear.
- Make sure welding area has a good, solid, safe floor, preferably concrete or masonry, not tiled, carpeted, or made of any other flammable material.
- Protect flammable walls, ceilings, and floors with heat resistant covers or shields.
- Check welding area to make sure it is free of sparks, glowing metal or slag, and flames before leaving the welding area.
- Wear garments free of oil or other flammable substances such as leather gloves, thick cotton shirts with no synthetic materials, cuff-less trousers, closed toed shoes. Keep long hair pulled back.
- Remove any combustibles such as lighters and matches before doing any welding.
- Follow requirements in OSHA and NFPA for hot work and have an extinguisher nearby.

High-Frequency Radiation

- High-Frequency (H.F) can interfere with radio navigation, safety services, computers and communication equipment.
- It is the user's responsibility to have a qualified electrician promptly correct any interference problem resulting from the installation. An electrician should regularly check and maintain installation.
- Stop using the equipment if notified by the FCC about interference.
- Keep H.F. source doors and panels tightly shut and keep spark gaps at correct setting.

Arc Welding

- Computers and computer driven equipment can be harmed with electromagnetic energy.
- Be sure all equipment is compatible with electromagnetic energy.
- Keep welding cables short to reduce interference.
- Follow manual to install and ground machine.
- If interference continues, shield the work area or move the welding machine.

Electric Shock

WARNING: ELECTRIC SHOCK CAN KILL! To reduce the risk of death or serious injury from shock, read, understand, and follow the safety instructions. In addition, make certain that anyone else who uses this welding equipment, or who is a bystander in the welding area understands and follows these safety instructions as well.

IMPORTANT! TO REDUCE THE RISK OF DEATH, INJURY, OR PROPERTY DAMAGE, DO NOT ATTEMPT OPERATION of this welding equipment until you have read and understand the following safety summary.

- Do not, in any manner, come into physical contact with any part of the welding current circuit. The welding current circuit includes:
    a. The workpiece or any conductive material it contacts.
    b. The ground clamp.
    c. The electrode or welding wire.
    d. Any metal parts on the electrode holder, or TIG torch.
- Do not weld in a damp area or come in contact with a moist or wet surface.
- Do not attempt to weld if any part of clothing or body is wet.
- Do not allow the welding equipment to come in contact with water or moisture.
- Do not drag welding cables, TIG torch, electrode holder or machine INPUT POWER CABLE (12) through or allow them to come into contact with water or moisture.
- Do not touch machine, attempt to turn machine ON or OFF if any part of the body or clothing is moist or if you are in physical contact with water or moisture.
- Do not attempt to plug the machine into the power source if any part of body or clothing is moist, or if you are in physical contact with water or moisture.
- Do not connect ground clamp to electrical conduit, and do not weld on electrical conduit.
- Do not alter INPUT POWER CABLE or plug in any way.
- Do not attempt to plug the machine into the power source if the ground prong on INPUT POWER CABLE plug is bent over, broken off, or missing.
- Do not allow the machine to be connected to the power source or attempt to weld if the machine, welding cables, welding site, or machine INPUT POWER CABLE are exposed to any form of atmospheric precipitation, or saltwater spray.
- Do not carry coiled welding cables around shoulders, or any other part of the body, when they are plugged into the machine.
- Do not modify any wiring, ground connections, switches, or fuses in this welding equipment.
- Wear welding gloves to help insulate hands from welding circuit.
- Keep all liquid containers far enough away from the machine and work area so that if spilled, the liquid cannot possibly come in contact with any part of the machine or electrical welding circuit.
- Replace any cracked or damaged parts that are insulated or act as insulators such as welding cables, INPUT POWER CABLE, or electrode holder immediately.
- When not welding, cut wire back to contact tip or remove electrode from electrode holder.

Noise

Noise can cause permanent hearing loss. Welding processes can cause noise levels that exceed safe limits. You must protect your ears from loud noise to prevent permanent loss of hearing.

- To protect your hearing from loud noise, wear protective ear plugs and/or earmuffs.
- Noise levels should be measured to be sure the decibels (sound) do not exceed safe levels.

Additional Safety Information

For additional information concerning welding safety, refer to the standards listed at the beginning of this safety summary and comply with them as applicable.

Box Contents

ITEM	DESCRIPTION	ITEM	DESCRIPTION	ITEM	DESCRIPTION
	Machine		240V-120V Adapter Cord		Ground Cable and Clamp
ITEM	**DESCRIPTION**	**ITEM**	**DESCRIPTION**	**ITEM**	**DESCRIPTION**
	Stick Electrode Holder		Plasma Torch		Additional Set of Consumables

Installation

Machine Specifications

Primary (Input) Volts	120VAC/240VAC
Phase	Single
Frequency	50/60Hz
Maximum Output (Welding)	120V – 85A (DC output only) 240V– 160A (DC output only)
Maximum Output (Cutting)	120V – 20A 240V– 30A
Recommended Circuit Breaker	120V – 20A time-delay (slow-blow) breaker minimum (30A for maximum performance) 240V – 30A time-delay (slow-blow) breaker minimum (50A for maximum performance) Refer to the ratings label and set the output amperage so that the listed input amperage is not exceeded
Extension Cord Recommendations	120V - 3 conductor #12 AWG or larger up to 25 ft. 240V - 3 conductor #10 AWG or larger up to 25 ft.
Generator Requirements	120V - Minimum 4,000W continuous output with no low-idle function (or low-idle off) 240V - Minimum 10,000W continuous output with no low-idle function (or low-idle off)
CSA Rated Output and Duty-cycle	Refer to the data plate of your machine and the Duty-cycle section of this manual, page 20.
Dimensions	16.68" (423mm) x 8.25" (210mm) x 11.94" (303mm)
Weight	19.65 lbs. (8,62 kg)
Recommended Electrode Diameter	Up to 5/32″
Cutting Capacity	Cleanly cut from thin sheet metal to 3/8″ plate (Sever cut up to 5/8″)

Site Selection

BE SURE TO LOCATE THE MACHINE ACCORDING TO THE FOLLOWING GUIDELINES:

- In areas free from moisture and dust.
- In areas with ambient temperature between 30° to 90°F.
- In areas free from oil, steam and corrosive gasses.
- In areas not subjected to abnormal vibration or shock.
- In areas not exposed to direct sunlight or rain.
- Place at a distance of 12" or more from walls or similar obstructions that could restrict natural air flow for cooling.

Power Source Connection

Before you make any electrical connection, make sure that the ON/OFF SWITCH (11) is OFF, power supply voltage and frequency available at site are those stated in the ratings label of your machine.

The main power supply voltage should be within ±10% of the rated main power supply voltage. Too low a power supply voltage may cause poor welding performance. Too high a power supply voltage will cause components to overheat and possibly fail. The machine outlet must be:

- Correctly installed, if necessary, by a qualified electrician.
- Correctly grounded (electrically) in accordance with national and local regulations.
- Connected to an electric circuit that is rated for sufficient amperage per the ratings label of your machine.

If you are unsure of any of the above, have your outlet inspected by a qualified electrician before using the machine.

NOTE:

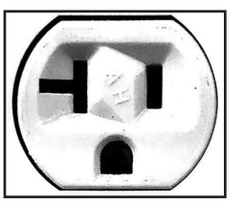
- Periodically inspect INPUT POWER CABLE (12) for any cracks or exposed wires. If it is not in good condition, have it repaired by a Service Center.
- Do not cut off the grounding prong or alter the plug in any way and do not use any adapters between the machine's INPUT POWER CABLE and the power source receptacle.
- Do not violently pull the INPUT POWER CABLE to disconnect it from power outlet.
- Do not lay material or tools on the INPUT POWER CABLE. The INPUT POWER CABLE may be damaged and result in electrical shock.
- Keep the INPUT POWER CABLE away from heat sources, oils, solvents or sharp edges.
- Do not use this machine on a circuit with a Ground Fault Circuit Interrupter (GFCI) on it. GFCIs are tripped by welding arcs and your welding operations will be interrupted regularly.
- Refer to the ratings label and be sure to set the machine so that amperage draw will not exceed the rated limits.

Grounding Requirements

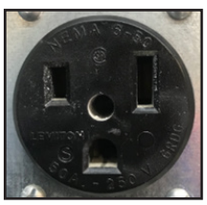
- To ensure personal safety, proper operation, and to reduce electromagnetic interference (EMI), the machine must be properly grounded.
- The machine must be grounded through the INPUT POWER CABLE (12) according to national and local electrical standards.
- Single-phase service must be of the 3-wire type with a green or green/yellow wire for the protective earth ground. Do not use 2-wire service.

Using the 240 – 120V Adapter Cord

If a 240V (50A) circuit is not available, you can connect your Forney Flex™ 30 Plasma ST machine to 20A outlet (with a 30A breaker) using the adapter cord. When using the adapter cord for 120V, use lower power settings on the machine to avoid frequent circuit breaker trips. At maximum settings on 120V, the machine will draw more than 20A regularly.



120V/20A



240V/50A

Generators

This machine can be operated from an AC generator. Ensure that the generator can supply a minimum of 4,000 watts of continuous output (for 120V input) or a minimum of 10,000 watts of continuous output (for 240V input). The generator must not have an auto-idle fuel saving feature or must have the option to turn auto-idle off. The generator must run at full speed at all times while your machine is plugged into it or you risk damaging your machine. Any other power draws on the generator or anything that reduces the generator RPM may damage your machine.

Extension Cords

For optimum machine performance, an extension cord should not be used unless absolutely necessary. If necessary, care must be taken in selecting an extension cord appropriate for use with your specific machine.

Select a properly grounded extension cord that will mate directly with the AC power source receptacle and the machine INPUT POWER CABLE (12) without the use of adapters. Make certain that the extension cord is properly wired and in good electrical condition. Extension cords must fit the following wire size guidelines:

- #12 AWG (120V) or #10 AWG (240V) or larger wire
- Do not use an extension cord over 25 ft. in length.

Ventilation

Since the inhalation of welding fumes can be harmful, ensure that the welding area is effectively ventilated. See the "Safety Summary" for more details (pages 5-13).

Additional Warnings

FOR YOUR SAFETY, BEFORE CONNECTING THE POWER SOURCE TO THE LINE CLOSELY FOLLOW THESE INSTRUCTIONS:

- An adequate two-pole breaker must be inserted before the main outlet. This breaker must be equipped with time-delay fuses.
- When working in a confined space, the machine must be kept outside the welding area and the ground cable should be fixed to the workpiece. Never work in a damp or wet confined space.
- Do not use damaged INPUT POWER CABLE (12) or welding cables.
- The welding torch/electrode should never be pointed at the operator or other people.
- The machine must never be operated without its panels attached. This could cause serious injury to the operator and could damage the equipment.

Getting to Know Your Machine

Description

Your new single phase inverter power source is a highly portable, generator-friendly machine appropriate for a wide range of welding and cutting applications. It offers STICK WELDING, TIG WELDING, and PLASMA CUTTING in the same power source. These processes can be selected with the process SELECTOR BUTTON (1) on the front panel of the unit.

Stick Welding, "SMAW"

Both rutile and basic electrodes can be welded with this process. Welding current is adjusted using the AMPERAGE ADJUSTMENT KNOB (7).

TIG Welding, "GTAW"

This process requires a TIG torch with a gas valve in the handle (sold separately). The gas valve must be opened manually before welding and closed manually when welding is completed. The arc is activated using a lift arc technique. Using the AMPERAGE ADJUSTMENT KNOB (7), welding current can be adjusted.

Plasma Cutting

Cut a wide range of materials and thicknesses with this machine. Using the AMPERAGE ADJUSTMENT KNOB (7), cutting amperage can be adjusted.

Machine Layout Controls

1. **Process SELECTION button** used to select the welding/cutting process.
2. **Process Indicator LED's** illuminate according to the selected welding process.
   a. CUT
   b. DC TIG ("GTAW")
   c. STICK ("SMAW")

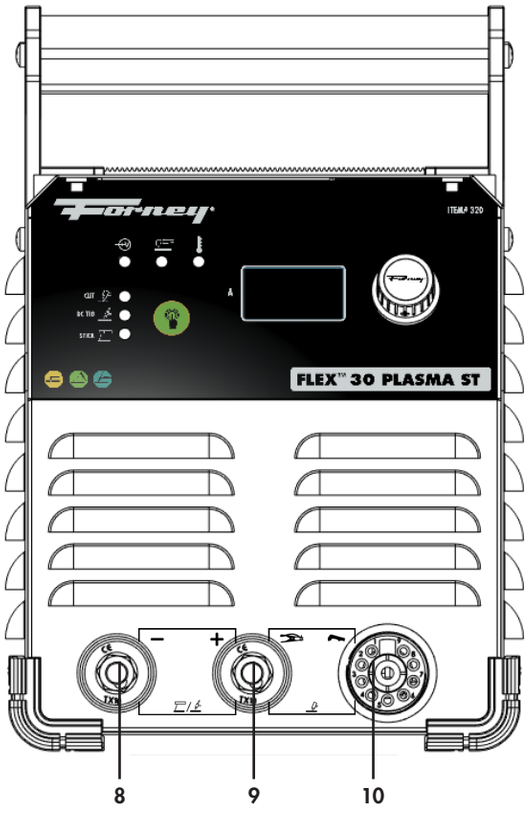

CUT


DC TIG ("GTAW")

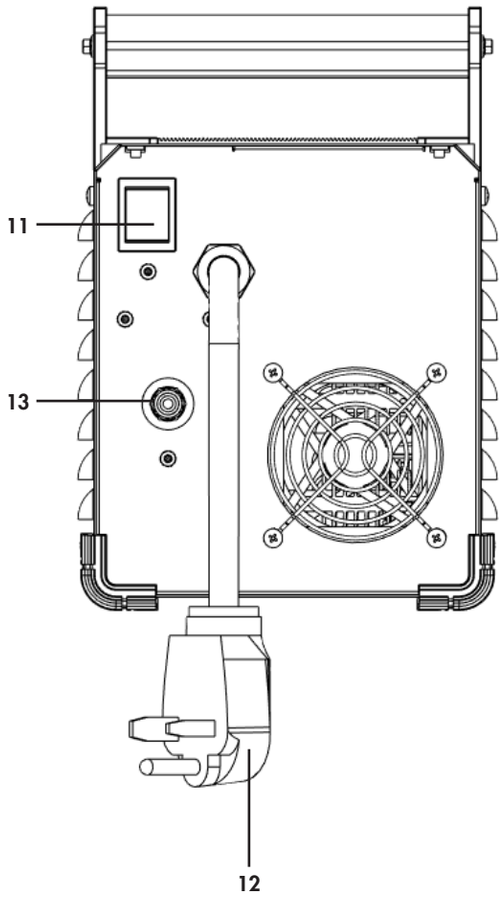

STICK ("SMAW")

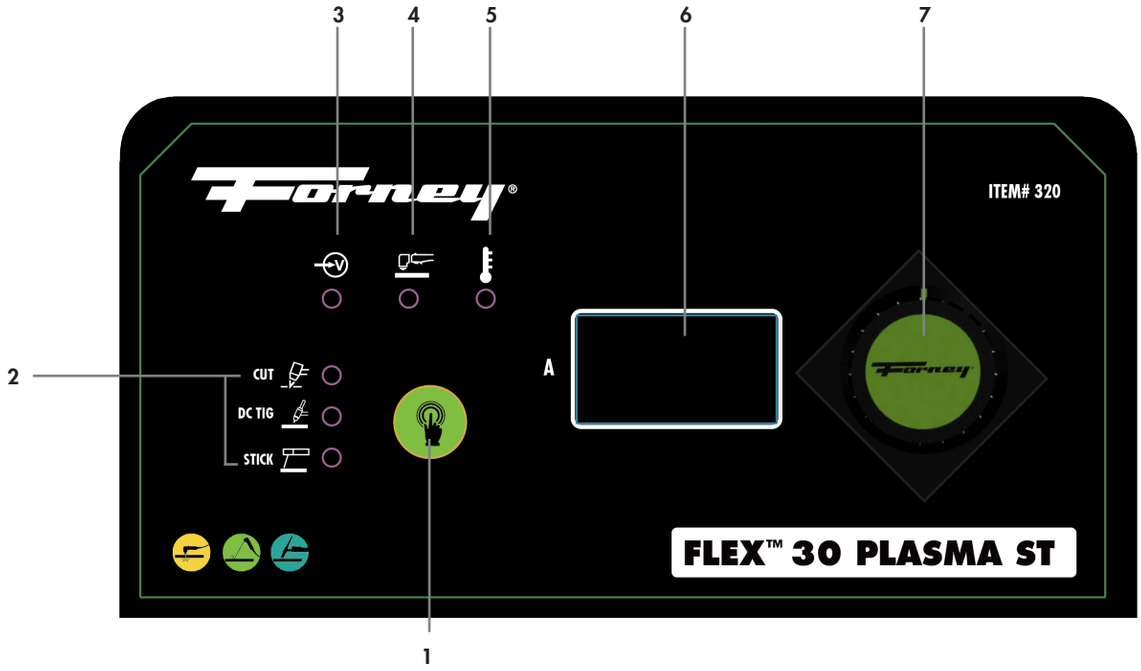
3. **INPUT VOLTAGE INDICATOR LED** will be illuminated when input voltage to the machine is present, and the ON/OFF SWITCH (11) is in the ON position. The LED will illuminate green if connected to 240 V or white if connected to 120V.
4. **PLASMA TORCH INDICATOR LED** will illuminate when the PLASMA TORCH is triggered. An alert will flash if there is a fault condition with the torch (typically consumables).
5. **FAULT/THERMAL OVERLOAD INDICATOR LED** will be illuminated under the following conditions:
   a. The duty-cycle of the machine has been exceeded or air flow is blocked. The fan will continue to run until the machine has cooled, but output power will be disabled. Ensure that the cooling fan is running and that there are 12" of clearance around all vents. When the LED turns off, welding power will be enabled again.
   b. There is a fault code displayed on the OUTPUT AMPERAGE DISPLAY (F##). Note the fault code and refer to the troubleshooting section of this manual.
6. **OUTPUT AMPERAGE DISPLAY** shows the currently set welding/cutting amperage.
7. **OUTPUT AMPERAGE ADJUSTMENT KNOB** is used to adjust the following parameters:
   a. In CUT (Plasma Cutting) Mode it adjusts cutting current (amperage).
   b. In TIG ("GTAW") Mode it adjusts welding current (amperage).
   c. In STICK ("SMAW") Mode it adjusts welding current (amperage).
8. **NEGATIVE (-) DINSE SOCKET** negative terminal for stick/TIG welding.
9. **POSITIVE (+) / PLASMA GROUND DINSE SOCKET** positive terminal when Stick/TIG welding and ground clamp connection when plasma cutting.
10. **PLASMA TORCH EURO CONNECT SOCKET**
11. **ON/OFF SWITCH**
12. **INPUT POWER CABLE**
13. **COMPRESSED GAS INPUT** connect compressed air or nitrogen for plasma cutting only. See COMPRESSED GAS SUPPLY section below. Do not connect TIG welding gas here. TIG welding gas must be connected to the torch lead directly.

FRONT VIEW OF FORNEY FLEX™ 30 WELDER



REAR VIEW OF FORNEY FLEX™ 30 WELDER





Compressed Gas Supply

- The plasma cutting machine does not include a built-in air compressor; therefore, a source of clean, dry air or nitrogen must be supplied to your plasma cutting unit.
- The air supply pressure must be between 60 and 100 PSI. NOTE: The flow rate must be at least 4.0 cu.ft/min.
- The unit will not operate if the input air pressure is below 50 PSI.
- Do not connect an input air supply over 110 PSI. Damage to the machine could occur.
- In-line particulate filtration is recommended upstream of the PLASMA CUTTING MACHINE to avoid damage to the PLASMA TORCH.
- Failure to observe these parameters could result in excessive operating temperatures and/or damage to PLASMA TORCH or machine.

MOISTURE SEPARATOR AND AUTOMATIC PURGE

- Oil and moisture in the air may damage the machine.
- The unit is equipped with an air filter, which captures the water and oil vapor in the supplied air.
- Water captured by the filter is automatically purged through the bottom of the machine.
- The equipped moisture separator is designed to remove small amounts of moisture and oil from the air supply. If you are operating in a humid environment, it may be necessary to put additional filtering in the air supply line before its input to the machine. Use additional filtering if a spray of moisture can be seen coming out of the torch head during pilot arc, there are signs of moisture on the CUTTING TIP or workpiece after cutting, or cut quality is poor.
- Be sure and select a filter that is rated for the pressure and air flow requirements listed above.

Checking Air Supply Quality

Expert-Tech Tip:

- To check supplied air quality, activate and deactivate the PLASMA TORCH so there is no active arc but air flow continues (post-flow). Place a welding filter lens in front of the PLASMA TORCH. Any oil or moisture in the air will be visible on the lens.
- DO NOT initiate pilot arc while checking air quality.

Torch Consumable Parts (Replacement or Inspection of Consumables)

USE ONLY THE PLASMA TORCH THAT CAME WITH YOUR MACHINE OR A CERTIFIED REPLACEMENT.

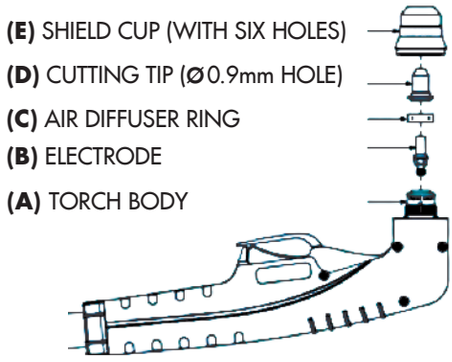
CAUTION! DISCONNECT INPUT POWER CABLE (12) FROM THE ELECTRICAL OUTLET AND WAIT FOR THE PLASMA TORCH TO COOL BEFORE REMOVING THE SHIELD CUP. IT IS EXTREMELY IMPORTANT THAT YOU CAREFULLY READ THESE INSTRUCTIONS BEFORE CHOOSING THE CONSUMABLES FOR YOUR PLASMA TORCH. THIS WILL PREVENT DAMAGE TO YOUR PLASMA TORCH AND MACHINE.

BEFORE BEGINNING CUTTING OPERATIONS, VERIFY THAT THE PARTS ARE PROPERLY ASSEMBLED BY INSPECTING THE BODY OF THE PLASMA TORCH AS SHOWN BELOW.

THE PLASMA ARC FROM INSTANT-ON TORCHES CAN CAUSE INJURY AND BURNS.

CAUTION! The plasma arc comes on immediately when the torch trigger is activated. Make sure the POWER SWITCH (11) is OFF and the machine is disconnected before changing consumables.

PROPERLY ASSEMBLED PLASMA TORCH



PROPER CONSUMABLE ASSEMBLY FOR PLASMA TORCH HEAD

Your PLASMA TORCH consumable parts will come already assembled. Plasma torch consumables will wear through the course of normal use and need to be replaced periodically. Before each use of the plasma cutting machine, you should check your parts for wear and replace if necessary. NOTICE: Failure to replace worn CUTTING TIP or ELECTRODE may damage the PLASMA TORCH. Before inspecting or replacing the consumables, make sure to read and follow the below notes:

1. Turn the machine OFF and disconnect it from the electrical outlet. Wait for the PLASMA TORCH to cool before disassembly.
2. Position the PLASMA TORCH with the SHIELD CUP facing upward to prevent these parts from falling out.
3. Unscrew and remove the SHIELD CUP from the TORCH BOD.
4. Remove the CUTTING TIP, AIR DIFFUSER RING, and ELECTRODE.
5. Install the ELECTRODE, AIR DIFFUSER RING, and CUTTING TIP replacing any that are worn or damaged.
   - Make sure all components are installed as shown above.
   - Use the included wrench to tighten the ELECTRODE. A loose ELECTRODE can further loosen during operation and damage the PLASMA TORCH. DO NOT OVER-TIGHTEN THE ELECTRODE. OVER-TIGHTENING CAN DAMAGE THE TORCH BODY.
6. Ensure the SHIELD CUP (E) is properly seated on the TORCH BODY, not cross-threaded. Failure to do so will cause the machine to not operate properly. Only hand-tighten the SHIELD CUP. Over-tightening can damage the PLASMA TORCH.

If resistance is felt when installing the ELECTRODE or SHIELD CUP, check the threads before proceeding.

NOTE: The machine will not operate unless the PLASMA TORCH shield cup is fully seated against the pins that ensure the consumables are PROPERLY ASSEMBLED to the torch BODY. Inspect these pins for damage anytime the shield cup is removed.

Use only compatible consumables in your plasma torch. Using incompatible parts may damage your machine or introduce a safety hazard. See Page 32 for part numbers.

Operation

Performance Data Plate and Duty-Cycle

On the machine, there is a plate that includes all the operating specifications for your new unit. The serial number of the product is also found on this plate.

The duty-cycle rating of a machine defines how long the operator can weld and how long the machine must rest and be cooled. Duty-cycle is expressed as a percentage of 10 minutes and represents the maximum welding time allowed. The balance of the 10-minute cycle is required for cooling.

For example, a machine has a duty-cycle rating of 30% at the rated output of 90A. This means with that machine, you can weld at 90A output for three (3) minutes out of ten (10) with the remaining seven (7) minutes required for cooling. The duty-cycle of your new machine can be found on the data plate affixed to the machine. It looks like the diagram below. Referring to the sample below, the "X" row lists duty-cycle percentages while the "I_2" row lists the amp draw corresponding to the duty-cycle. Various duty-cycles at other amperages are listed on your data plate.

The data plate also shows the rated input amperage (I_1) for a given input voltage (U_1). There are ratings (duty-cycle and input amperage) for both 15 and 20A breakers. Be sure to pay close attention to the breaker on the circuit the machine is plugged into and follow the appropriate ratings. User settings on the machine may need to be reduced or limited to avoid exceeding the rated input amperage. Failure to do so could result in frequent breaker trips or electrical hazards.

Forney Industries 2057 Vermont Drive, Fort Collins, CO 80525								
Flex™ 30 Plasma ST		Serial NO.:						
		#A/#V to #A/#V						
		X	Y%		100%			
S	U_0= ##V	I_2	##A		##A			
		U_2	##.#V		##.#V			
1~50/60Hz	U_1=240V			I_{1max}= ##.#A		I_{1eff}= ##.#A		
		#A/#V to #A/#V						
		X	Y%		Z%		100%	
S	U_0= ##.#V	I_2	##A		##A		##A	
		U_2	##.#V		##.#V		##.#V	
1~50/60Hz	U_1=240V			I_{1max}= ##.#A		I_{1eff}= ##.#A		
		#A/#V to #A/#V						
		X	Y%		Z%		100%	
S	Ur= ##.#V	I_2	##A		##A		##A	
		U_2	##.#V		##.#V		##.#V	
1~50/60Hz	U_1=240V			I_{1max}= ##.#A		I_{1eff}= ##.#A		
		#A/#V to #A/#V						
		120V/15A				120V/20A		
		X	Y%	Z%	100%	Y%	Z%	100%
S	U_0=##.#V	I_2	##A	##A	##A	##A	##A	##A
		U_2	##.#V	##.#V	##.#V	##.#V	##.#V	##.#V
1~50/60Hz	U_1=120V		15A	I_{1max}= ##.#A		I_{1eff}= ##.#A		
			20A	I_{1max}= ##A		I_{1eff}= ##A		
		#A/#V to #A/#V						
		120V/15A				120V/20A		
		X	Y%	Z%	100%	Y%	Z%	100%
S	U_0= ##.#V	I_2	##A	##A	##A	##A	##A	##A
		U_2	##.#V	##.#V	##.#V	##.#V	##.#V	##.#V
1~50/60Hz	U_1=120V		15A	I1max= ##.#A		I_{1eff}= ##.#A		
			20A	I_{1max}= ##A		I_{1eff}= ##A		
		#A/#V to #A/#V						
		X	Y%		Z%		100%	
S	Ur=##.#V	I_2	##A		##A		##A	
		U_2	##.#V		##.#V		##.#V	
1~50/60Hz	U_1=120V			I_{1max}=##.#A		I_{1eff}=##.#A		
IP21S								

(Example Data Plate)

Internal Thermal Protection

If you exceed the duty-cycle of the machine, the thermal protection system will engage, shutting off all machine output. After cooling, the thermal protector will automatically reset, and the welding functions can resume. This is normal and automatic behavior of the machine and does not require any user action. However, you should wait at least 10 minutes after the thermal protector engages before resuming welding. You must do this even if the thermal protector resets itself before the ten minutes is up or you may experience less than specified duty-cycle performance.

CAUTION: DO NOT REGULARLY EXCEED THE DUTY-CYCLE OR DAMAGE TO THE MACHINE CAN RESULT.

Welding and Cutting Preparation

- An important factor in making a satisfactory weld or cut is preparation. This includes studying the process and equipment and practicing welding or cutting before attempting to complete a finished product. An organized, safe, ergonomic, comfortable, and well-lit work area should be prepared for the operator. The work area should specifically be free of all combustible material with both a fire extinguisher and a bucket of sand available.

To properly prepare for welding or cutting with your new machine, it is necessary to:

a. Read the safety precautions at the front of this manual.

b. Prepare an organized, well-lit work area.

c. Provide protection for the eyes and skin of the operator and bystanders.

d. Attach the ground clamp to the bare metal to be welded or cut, making sure of good contact.

e. Plug the machine into a suitable outlet.

f. Completely open the gas cylinder valve. Adjust the gas pressure regulator to the correct flow rate. (Not

applicable to Stick "SMAW" or Cut processes.)

g. Provide a source of clean, dry air or nitrogen. (Not applicable to TIG "GTAW" or Stick "SMAW").

EXPOSURE TO A WELDING ARC IS EXTREMELY HARMFUL TO THE EYES AND SKIN. PROLONGED EXPOSURE TO A WELDING ARC CAN CAUSE BLINDNESS AND BURNS. NEVER STRIKE AN ARC OR BEGIN WELDING UNLESS YOU ARE ADEQUATELY PROTECTED. WEAR FIRE RESISTANT WELDING GLOVES, HEAVY LONG-SLEEVED SHIRT, CUFF-LESS PANTS; HIGH TOPPED SHOES AND A WELDING HELMET.

Setup for Stick Welding (SMAW)

- Press the PROCESS SELECTION BUTTON (1) on the front panel until the STICK PROCESS INDICATOR LED (2) is illuminated.
- Check the electrode packaging to determine the recommended polarity and connect the electrode holder and ground clamp to the POSITIVE (+) and NEGATIVE (-) DINSE SOCKETS (8 and 9) accordingly.
  - Direct current electrode positive (DCEP) or direct current reverse polarity (DCRP): electrode holder in POSITIVE (+) DINSE SOCKET (9), ground clamp in NEGATIVE (-) DINSE SOCKET (8). Most electrodes use DCEP.
  - Direct current electrode negative (DCEN) or direct current straight polarity (DCSP): electrode holder in NEGATIVE (-) DINSE SOCKET (8), ground clamp in POSITIVE (+) DINSE SOCKET (9).
- Ensure the ground clamp has a good connection to the workpiece and is connected on clean, bare metal (not rusty or painted).
- Secure the bare end of the welding electrode in-to the jaws of the electrode holder.
- Switch the unit ON with the ON/OFF SWITCH (11).
- Set the amperage with the OUTPUT AMPERAGE ADJUSTMENT KNOB (6).
- Switch the unit ON with the ON/OFF SWITCH (11).

Forney® Flex™ 30 STICK SET-UP CHART

MATERIAL (Wire)	ELECTRODE TYPE	ELECTRODE DIAMETER			
		1/16″ (1.6 mm)	5/64″ (2 mm)	3/32″ (2.4 mm)	1/8″ (3 mm)
Regulation Knob		Ⓐ	Ⓐ	Ⓐ	Ⓐ
Mild Steel	E6010	–	–	50-70A	80A
	E6011, E6013, E6014	30-40A	40-60A	50-70A	70-80A
	E7018	–	–	70-80A	80A (Difficult)
Stainless Steel	E308L	–	–	40-70A	50-80A
CANNOT WELD ALUMINUM					

Setup for TIG Welding (GTAW) with Lift Arc

Setting up the equipment for TIG Welding (GTAW):

Tungsten 1/16″ or 1/8″ (MAX) recommended for use.

WARNING: TIG TORCH IS ALWAYS LIVE (ELECTRICALLY HOT). Use caution and ensure the TIG torch is not in contact with or near conductive or grounded materials.

- Press the PROCESS SELECTION BUTTON (1) on the front panel until the DC TIG PROCESS INDICATOR LED (2) is illuminated.
- Connect the TIG torch cable to the NEGATIVE (-) DINSE SOCKET (8) of the machine.
- Connect the ground cable connector to the POSITIVE (+) DINSE SOCKET (9) of the machine.
- Ensure the ground clamp has a good connection to the workpiece and is connected on clean, bare metal (not rusty or painted).
- Connect the TIG torch gas line to the gas regulator (argon gas only).

THE GAS FLOW IS MANUALLY CONTROLLED WITH THE KNOB ON THE TIG TORCH. USE INERT GAS (ARGON) ONLY.
TURN ON GAS AT THE GAS REGULATOR, THEN OPEN THE VALVE ON THE TORCH HANDLE, CHECK FOR GAS FLOW AND ADJUST FLOW RATE AS NEEDED.

- Fix the tungsten electrode so that it protrudes approximately 1/4″ from the torch nozzle.
- Ensure the TIG torch is safely away from all conductive materials.
- Switch the unit ON with the ON/OFF SWITCH (11).
- Set the amperage with the OUTPUT AMPERAGE ADJUSTMENT KNOB (7).
- Open the gas valve on the torch handle.
- Initiate the weld arc with a lift arc technique.
- Close the gas valve on the torch handle after post-weld flow has been completed.

REMEMBER TO CLOSE THE VALVE ON THE GAS CYLINDER IMMEDIATELY AFTER ALL WELDING IS COMPLETED.

Forney® Flex™ 30 DC TIG SET-UP CHART

MATERIAL (Wire)	GAS	TUNGSTEN ELECTRODE Ø	MATERIAL THICKNESS			
			22 Gauge .030″ (.8 mm)	16 Gauge 1/16″ (1.6 mm)	1/8″ (3 mm)	3/16″ (5 mm)
Regulation Knob			Ⓐ	Ⓐ	Ⓐ	Ⓐ
Mild Steel	100% Argon	1/16″ (1.6 mm)	10-15A	15-20A	35-50A	60-80A
CANNOT WELD ALUMINUM						

Welding Tips:

- Always weld clean, dry and well-prepared material.
- Move the torch smoothly and steadily as you weld.
- Avoid welding in very drafty areas. A weak, pitted and porous weld will result due to drafts blowing away the protective welding gas.
- Sharp bends or kinks in the welding cable should be avoided.
- Refer to the setup chart above for proper settings for the tungsten and work thickness.
- Use 100% argon gas when TIG welding with mild steel or stainless steel.

NOTE: THIS MACHINE IS NOT AN APPROPRIATE POWER SOURCE FOR WELDING ALUMINUM.

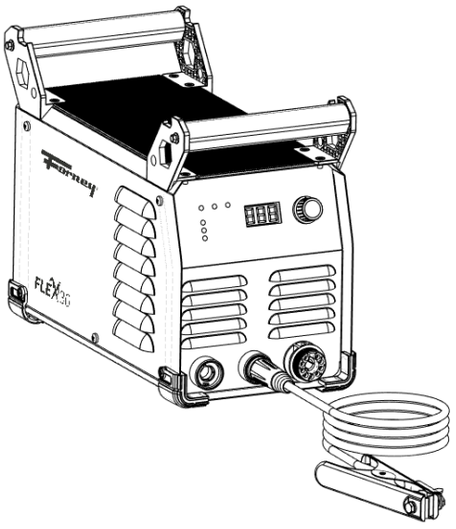
Setup for Plasma Cutting

CAUTION: DO NOT REGULARLY EXCEED THE DUTY-CYCLE OR DAMAGE TO THE PLASMA CUTTING MACHINE CAN RESULT.

Ground Clamp Attachment

Connect the GROUND CABLE CLAMP to the workpiece to be cut or to the metallic workbench. Take following precautions:

- Ensure that the GROUND CLAMP is attached with a good connection to an area of the workpiece that is clean and free from any coatings such as paint, rust, oil/grease, or scale.
- Make ground connections as close as possible to the cutting area to reduce EMI.
- Do not make a ground connection on the piece which is to be removed.
- The GROUND CLAMP must be attached to the workpiece while cutting.
- DO NOT initiate pilot arc while checking air quality.
- Connect the GROUND CLAMP to the PLASMA GROUND DINSE SOCKET (9). Be sure to connect to the right dinse socket. Plasma cutting will not work with the ground connected to the NEGATIVE DINSE SOCKET (8).



PLASMA GROUND
CLAMP CONNECTION

Proper ground clamp connection for plasma cutting.

Cutting Capacity

STEEL	STAINLESS STEEL	ALUMINUM	GALVANIZED	BRASS	COPPER	5/8″
3/8″	3/8″	1/8″	3/8″	3/8″	3/8″	

RECOMMENDED CAPACITY	SEVERANCE CAPACITY
• Optimal system performance. • Ideal operating range for excellent cut quality. • Rated with new consumables.	• Top end of machine capabilities. • Intended for occasional severance requirements; where a lower degree of cut quality is acceptable. • Slower cut speeds.

Cutting

IMPORTANT! Frequently review the Important Safety Precautions at the front of this manual.

CAUTION! Be sure the operator is equipped with proper gloves, clothing, and eye & ear protection. Make sure no part of the operator's body comes into contact with the workpiece while the PLASMA TORCH is activated.

CAUTION! Sparks from the cutting process can cause damage to coated, painted, and other surfaces such as glass, plastic and metal.

Fig. A

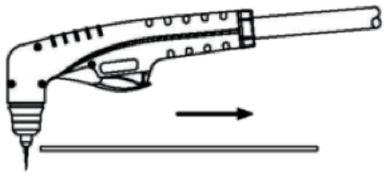


Fig. B

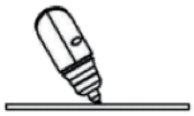
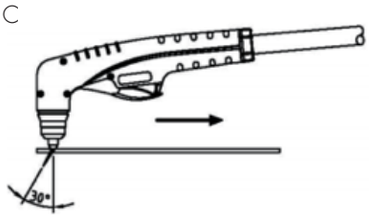


Fig. C



CUTTING WITH A HAND TORCH

- Press the PROCESS SELECTION BUTTON (1) on the front panel until the CUT PROCESS INDICATOR LED (2) is illuminated.
- Connect the PLASMA TORCH to the PLASMA TORCH EURO CONNECT SOCKET (10).
- Connect the GROUND CLAMP to the PLASMA GROUND DINSE SOCKET (9).
  - Be sure the ground clamp is connected to the correct dinse socket. The machine will not cut if the connection is wrong!
- The PLASMA TORCH can be comfortably held in one hand or steadied with two hands. Choose the technique that feels most comfortable and allows good control and movement. Position the index finger or thumb to press the control switch on the PLASMA TORCH handle.
- With the PLASMA TORCH in starting position, press the trigger. The pilot arc will come on and remain on for three seconds during which the CUTTING TIP (D) must come into contact with the workpiece.
- In the event the CUTTING TIP does not come into contact with the workpiece within three seconds of pilot arc start, the arc automatically stops (the post flow air continues to run, cooling the PLASMA TORCH).
- For edge starts, hold the PLASMA TORCH perpendicular to the workpiece with the front of the CUTTING TIP on the edge of the workpiece at the point where the cut is to start (Fig. A). For piercing, angle the PLASMA TORCH slightly to direct the sparks away from the PLASMA TORCH until the pierce is complete (Fig. B).
- During cutting, the CUTTING TIP must be kept in contact with the workpiece. If contact is lost, the arc will automatically stop (the post flow air continues to run, cooling the PLASMA TORCH).
- Once started, the cutting arc remains on as long as the trigger is pressed, unless the PLASMA TORCH is withdrawn from the workpiece or torch motion is too slow. Keep moving while cutting. Cut at a steady speed without pausing. Maintain the cutting speed so that the arc lag is about 30° behind the travel direction (Fig. C).
- Adjust the torch speed so sparks go through the metal and out the bottom of the cut at that angle.
- If sparks are being blown upward and back at the CUTTING TIP (D), your torch travel speed is too fast, decrease your travel speed.

- Pause at the edge (end of your cut) until the arc has cut completely through the workpiece.
- To shut off the PLASMA TORCH, simply release the control switch. When the switch is released a post-flow will occur. If the torch trigger is pressed during the post-flow, the pilot arc will restart.
- Refer to the TROUBLESHOOTING section of this operating manual should the PLASMA TORCH or plasma cutting machine not operate as expected (pages 21-23).

NOTE: If sparks are being blown upward and back at the CUTTING TIP, your torch travel speed is too fast, decrease your travel speed.

NOTE: To cut grates (interrupted cut), set cutting current at 30A.

Fig. B

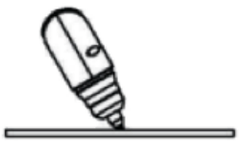
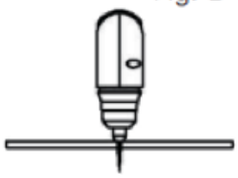


Fig. D



PIERCING WITH A HAND TORCH

NOTE: If necessary to make a cut on a metal sheet which is thicker than the maximum piercing capacity (without an edge start) make a 1/4" hole using an electric drill to start cutting.

- When piercing with a hand torch, tilt the PLASMA TORCH slightly so that blowback particles blow away from the CUTTING TIP (and operator) rather than directly back into it (Fig. B).
- Complete the pierce off the cutting line and then continue the cut onto the line. Hold the PLASMA TORCH perpendicular to the workpiece after the pierce is complete (Fig. D).
- Clean spatter and scale from the SHIELD CUP (E) and the CUTTING TIP as soon as possible. Spraying or dipping the SHIELD CUP in anti-spatter compound will minimize the amount of scale which adheres to it.
- Refer to the TROUBLESHOOTING section of this operating manual should the PLASMA TORCH or plasma cutting machine not operate as expected (pages 21-23).

During cutting operations, performance faults may arise which are not caused by equipment malfunctioning but by other operational faults such as:

1. The cut speed is too fast.
2. The consumables are worn.
3. The metal being cut is too thick.
4. The GROUND CLAMP is not properly attached to the workpiece.
5. The supplied air pressure and flow rate is inadequate.
6. Input power is insufficient (use of extension cords can cause this).
7. PLASMA TORCH is not being dragged in contact with the workpiece.

Maintenance & Servicing

General Maintenance

This machine has been engineered to need minimal service providing that a few very simple steps are taken to properly maintain it.

1. Replace INPUT POWER CABLE (12), ground cable, ground clamp, or torch/electrode cable when damaged or worn.
2. Avoid directing grinding particles or cutting sparks towards the machine. These conductive particles can build up inside the machine and cause severe damage.
3. Periodically clean dust, dirt, grease, etc. from your machine. Every six months or as necessary, remove the side panels from the machine and use compressed air to blow out any dust and dirt that may have accumulated inside the machine.

DISCONNECT INPUT POWER CABLE (3) FROM THE ELECTRICAL OUTLET AND WAIT FOR THE PLASMA TORCH (9) TO COOL BEFORE REMOVING THE SHIELD CUP (E) AND WAIT SEVERAL MINUTES FOR ELECTRICAL ENERGY TO DISCHARGE BEFORE PERFORMING MAINTENANCE ON THE MACHINE.

CAUTION! Maintenance can only be carried out on the unit if the person in charge of this operation has the necessary technical knowledge and the correct tools. If this is not the case, contact your nearest service center.

CAUTION! Never access inside the machine (panel removal) or touch the torch head (disassembly) without having disconnected INPUT POWER CABLE.

ANY INSPECTION PERFORMED UNDER VOLTAGE INSIDE THE MACHINE OR INSIDE THE PLASMA TORCH MAY CAUSE SEVERE ELECTRIC SHOCKS CAUSED BY DIRECT CONTACT WITH PARTS UNDER VOLTAGE.

CAUTION! Use only dry compressed air for cleaning. Do not point the jet of air at the electronic circuits contained within this machine.

Your machine must routinely receive maintenance to keep the system in optimal working condition and to provide long-term value for your investment. It is recommended to inspect the unit every 3-4 months (depending on the frequency of use).

- Use compressed air to remove any dust deposits.
- The torch SHIELD CUP (E) and CUTTING TIP (D) should be periodically inspected for wear or damage.
- Replace the CUTTING TIP if the orifice becomes damaged or enlarged.
- If consumable surfaces are particularly oxidized, clean them with an extra fine abrasive.
- Replace the AIR DIFFUSER RING (C) if it is burned or cracked.
- Replace the ELECTRODE (B) when the crater on the end surface is approximately 1/16".

FAILURE TO MAINTAIN THE MACHINE, CONSUMABLES AND THE WORKING ENVIRONMENT WILL DECREASE THE SYSTEM'S PERFORMANCE AND PRODUCE RESULTS BELOW OPTIMAL PERFORMANCE LEVELS.

FREQUENCY	PERIODIC MAINTENANCE TO BE PERFORMED
Each Use	• Check the indicator lights/LEDs and correct any fault conditions. • Check & clean SHIELD CUP, CUTTING TIP, AIR DIFFUSER RING and ELECTRODE for proper installation, wear, damage (burns, distortions or cracks), dirt, debris and restricted holes.
Weekly	• Verify the operation of the SHIELD CUP shut-down system. (Remove SHIELD CUP and pull trigger. Pilot arc should not start.)
3 Months	• Check for and replace any cracked or damaged parts. • Check the torch trigger guard for damage. • Check TORCH BODY (A) and trigger for wear, exposed wires or damage, replace as required. • Check outer covering of all cables for wear, repair or replace as required.
6 Months	• Blow out or vacuum inside.

Consumable Maintenance

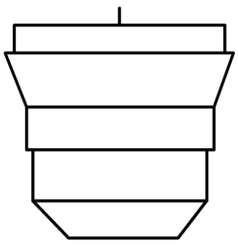
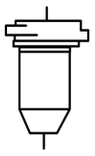
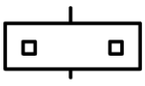
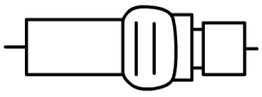
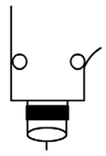
CAUTION! Always tighten the ELECTRODE with the provided wrench. A loose ELECTRODE can further loosen and damage the PLASMA TORCH. SHIELD CUP should be hand-tightened. Over-tightening could damage PLASMA TORCH.

WRENCH FOR ELECTRODES (B)

CAUTION! Inspect SHIELD CUP (E), CUTTING TIP (D), AIR DIFFUSER RING (C) and ELECTRODE for wear and debris before cutting or whenever cutting speed has been significantly reduced.

CAUTION! Do not operate PLASMA TORCH (9) without a CUTTING TIP or ELECTRODE in place. Be sure to use genuine Forney parts.

NOTE: It is recommended that the ELECTRODE and CUTTING TIP should be replaced at the same time to ensure even wear and optimal performance.

PART		INSPECT	ACTION
	**Shield Cup (E)**	The center hole for roundness.	Replace the SHIELD CUP (E) if the hole is no longer round.
		The gap between the SHIELD CUP (E) and CUTTING TIP (D) for accumulated debris.	Remove the SHIELD CUP (E) and clean any debris away, replace if damaged or un-cleanable.
		Examine for cracks, burn- through or chips.	Replace SHIELD CUP (E) if cracked, burned-through or chipped.
	**Cutting Tip (D)**	The center hole for roundness, enlargement.	Replace the SHIELD CUP (E) if the hole is no longer round or enlarged.
		Oxidized exterior.	Can be cleaned with an extra-fine abrasive cloth, use no solvents.
	**Air Diffuser Ring (C)**	Verify there are no burns or cracks or that airflow holes are not obstructed.	If damaged, replace.
	**Electrode (B)**	The center surface for wear and verify pit depth.	Replace ELECTRODE (B) when crater on emitting surface is about 1/16" (2mm) deep.
	**Torch Body (A)**	Check surface for damage, wear, debris.	Clean without use of solvents if debris is present.
			Replace PLASMA TORCH if TORCH BODY (A) is damaged, cracked, or worn.
	**Torch Handle & Cable**	These parts usually need no maintenance except for a periodic inspection and cleaning.	Clean without use of solvents if debris is present.
			Replace PLASMA TORCH if any part of the handle or cable is cracked or worn.
			DO NOT touch PLASMA TORCH and cable with warm or hot parts.
			DO NOT strain the cable.
			DO NOT move the cable on sharp edges or abrasive surfaces.
			DO NOT step on the cable.
	**Ground Clamp & Cable**	These parts usually need no particular maintenance with the exception of a periodic inspection and cleaning.	Follow same actions as torch handle and cable.
			Additionally, ensure there is no corrosion on the GROUND CLAMP contact surfaces.

Troubleshooting

During cutting operations, performance faults may arise which are not caused by equipment malfunctioning but by other operational faults such as:

1. The cut speed is too fast.
2. The consumables are worn.
3. The metal being cut is too thick.
4. The GROUND CLAMP is not properly attached to the workpiece.
5. The supplied air pressure and flow rate is inadequate.
6. Input power is insufficient (use of extension cords can cause this).
7. PLASMA TORCH is not being dragged in contact with the workpiece.

The following table represents the most common problems associated with using the plasma cutting machine and an explanation on how to resolve them.

If you are unable to fix the problem by following the basic troubleshooting guide or if you need further assistance call Forney Customer Service at 1-800-521-6038 or email at customerservice@forneyind.com.

The following is a troubleshooting table provided to help you determine a possible remedy when you are having a problem with your machine.

This table does not provide all possible solutions, only those possibilities considered likely to be common faults.

PROBLEM	POSSIBLE CAUSE	POSSIBLE SOLUTION
All LEDs OFF, No output power, Fan not operating.	Machine is not turned ON.	Turn machine ON with ON/OFF SWITCH (11)
	No input power present.	Make sure machine is plugged in. Verify that circuit breaker has not been tripped. Reset if needed. Verify output power from the outlet. Do not use the machine on a GFI outlet.
FAULT CODE: F01 DISPLAYED ON LED SCREEN – DUTY-CYCLE.	Unit has reached its duty-cycle limit.	Allow unit to cool with internal fan running, once cool reduce arc cutting time to below duty-cycle rating of the plasma cutting machine.
	Insufficient air flow causing machine to overheat before reaching duty-cycle.	Check for obstructions blocking air flow and ensure that there are 12" of clearance between any obstacles and the vents on all sides of the machine.
FAULT CODE: F02 DISPLAYED ON LED SCREEN – INPUT VOLTAGE.	No voltage or incorrect voltage supplied to machine.	Make sure the machine is plugged in. Check the status of your INPUT VOLTAGE INDICATOR LED. It should be illuminated. Check the voltage of your outlet. If it is more than10% above or below the nominal voltage (120V or 240V) call a qualified electrician.
FAULT CODE: F03 DISPLAYED ON LED SCREEN- CONSUMABLES.	RETAINING CAP	Check PLASMA TORCH consumables are properly installed, electrode is tightened with wrench, and that RETAINING CAP properly contacts the pins in the TORCH BODY. Replace electrode and cutting tip.
	Excessively worn consumables.	Replace electrode and cutting tip.
FAULT CODE: FO4 DISPLAYED ON LED SCREEN – INPUT AIR .	Input air pressure too high or too low.	Connect a proper air supply with 60-100 PSI and enough CFM to maintain that pressure (4.0 CFM minimum). Ensure that any inline moisture filters are rated to handle these requirements.
FAULT CODE: F05 DISPLAYED ON LED SCREEN – TORCH TRIGGER.	Torch triggered before machine is ready.	Torch is triggered or turned on before machine is powered on. Release torch trigger and machine will reset within five seconds. Inspect torch handle, trigger, and cable for damage. Replace if damaged.

OUTPUT SHORT FAULT CODE: "F09" DISPLAYED ON AMPERAGE DISPLAY (6) AND FAULT INDICATOR LED (3) IS ILLUMINATED.	Electrical short is present between the + and – terminals. Stick welding electrode is stuck to the workpiece. TIG tungsten is shorted to the workpiece.	Separate the electrode or tungsten from the workpiece.
	Ground clamp connected to NEGATIVE DINSE SOCKET (8) and plasma torch is in contact with workpiece.	Make sure the ground clamp is connected to the PLASMA GROUND DINSE SOCKET (9).
INCORRECT PLASMA GROUND CLAMP CONNECTION FAULT CODE: "F18" DISPLAYED ON AMPERAGE DISPLAY (6) AND FAULT INDICATOR LED (5) IS ILLUMINATED.	Plasma ground clamp is connected to the wrong dinse socket.	Turn off the machine. Make sure the ground clamp is connected to the PLASMA GROUND DINSE SOCKET (9). Turn the machine on.
Low output or non-penetrating weld.	Weld parameters too low.	Adjust welding parameters.
	Too long or improper extension cord.	Use a proper extension cord (#12 AWG – 120V; #10 AWG - 240V wire or heavier, no longer than 25 ft.). See "Extension Cords", page 11.
	Poor ground connection or torch/electrode connection.	Reposition clamp and check cable to clamp connection. Check connection of ground cable, torch or electrode holder.
	Input power too low.	Have a qualified electrician verify the voltage at your outlet. If the voltage is appropriate, verify that the circuit wiring is sufficient for 20A for 120V input power and 30A for 240V input power.
Ground clamp, ground cable, and/or welding cable get hot.	Bad ground or loose ground connection.	Check connection of ground cable, torch or electrode holder. Check connection of the ground cable to the ground clamp. Tighten cable connection to ground clamp if needed. Ensure the connection between the ground clamp and workpiece is good and on clean, bare (not painted or rusted) metal.
Frequent circuit breaker trips.	Machine is not the only piece of electrical equipment on the circuit.	Make sure the machine is on a dedicated circuit or is the only thing plugged on a circuit.
	Circuit breaker is incorrect/ insufficient for use with this machine.	Verify that the circuit breaker for the circuit is a 30A time-delay (slow-blow) breaker for 120V or 50A for 240V. If it is not, have a qualified electrician install the proper breakers.
Poor quality welds.	Insufficient gas at weld area.	Check that the gas is not being blown away by drafts and, if so, move to a more sheltered weld area. If not, check gas cylinder contents, gauge, regulator setting, and operation of gas valve.
	Rusty, painted, oily or greasy workpiece.	Ensure workpiece is clean and dry.
	Poor ground connection or torch/electrode connection.	Check ground clamp/workpiece connection and all connections to the machine.
Difficult arc start.	Amperage is too low.	Increase amperage setting.
Arc is wandering (TIG).	Tungsten is too large.	Use a smaller tungsten.

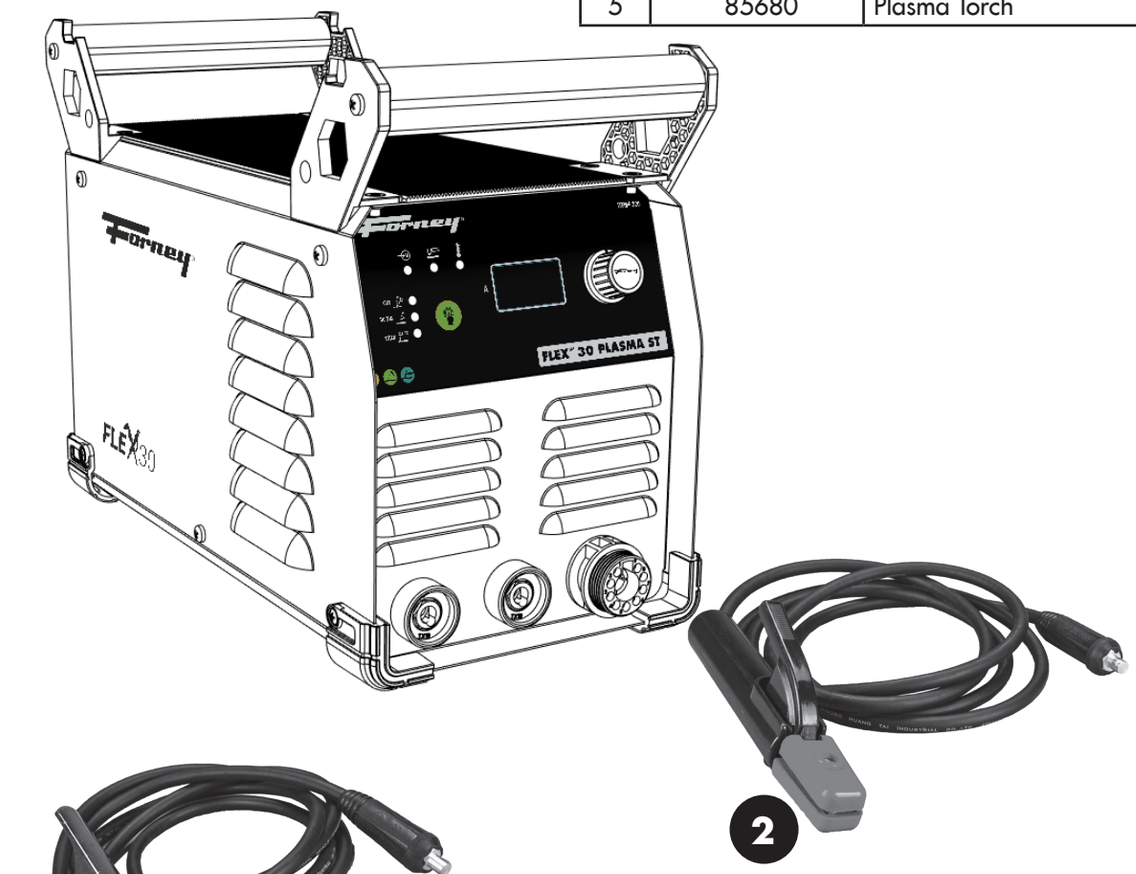
No plasma cutting arc.	Excessively worn consumables; Oxidation or residue inside cutting tip.	Replace consumables.
	Mechanical failure.	Inspect that electrode plunger can move freely within torch head. If it is jammed or difficult to move, replace torch.
	Ground connection is wrong.	Make sure the ground clamp is connected to the PLASMA GROUND DINSE SOCKET (9).
PLASMA TORCH has pilot arc but does not cut.	GROUND CLAMP (4) not connected.	Properly connect the GROUND CLAMP to the workpiece. Ensure it is on clean, bare metal (not rusty or painted).
	AC input power too low.	Ensure plasma cutting machine has proper input power source.
		If using an extension cord, eliminate it or reduce the length.
The plasma arc does not transfer to the workpiece.	Insufficient GROUND CLAMP contact with the workpiece.	Clean the area where the GROUND CLAMP attaches to the workpiece to ensure a good metal to metal connection.
		Inspect the GROUND CLAMP and its lead for damage, repair or replace as necessary.
	PLASMA TORCH may not be in contact with the workpiece.	Be sure to physically drag the CUTTING TIP on the workpiece as you cut.
Poor cut quality.	Improper use of PLASMA TORCH.	Review operating instructions.
	PLASMA TORCH parts are worn out.	Examine the consumables for wear and replace worn parts with new Forney consumable parts.
	Moisture or oil in air supply.	Excessive humidity or oil from the compressor may be contaminating the air supply. Install a moisture filter in the air supply line prior to machine.
Moisture coming out of the PLASMA TORCH.	Moisture or oil in air supply.	Excessive humidity or oil from the compressor may be contaminating the air supply. Install a moisture filter in the air supply line prior to machine.
Sparks are being blown upward and back at the PLASMA TORCH CUTTING TIP (D).	Cutting speed too fast.	Decrease your torch travel speed.
	Workpiece is too thick.	Choose thinner workpiece material within the operational limits of the plasma cutting machine.
Insufficient cut penetration.	Cutting speed too fast.	Decrease your torch travel speed.
	PLASMA TORCH is too tilted.	Ensure that PLASMA TORCH is perpendicular to the workpiece.
	Workpiece is too thick.	Choose thinner workpiece material within the operational limits of the plasma cutting machine.
	Cutting current too low.	Turn current setting up.
		Ensure plasma cutting machine has proper input power.
		If used, eliminate or reduce length of extension cord.
	PLASMA TORCH parts are worn out.	Examine the consumables for wear and replace worn parts with new Forney consumable parts.
	Non-genuine manufacturer's parts.	Use only genuine Forney consumables for optimum performance.

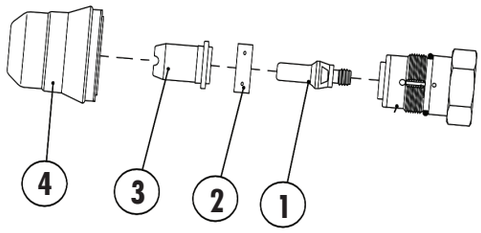
Interruption of the cutting arc, but re-ignites when triggered again.	Cutting speed too slow.	Increase your torch travel speed.
	PLASMA TORCH may not be in contact with the workpiece.	Be sure to physically drag the CUTTING TIP (D) on the workpiece as you cut.
	AC input power too low.	Ensure plasma cutting machine has proper input power.
		If used, eliminate or reduce length of extension cord.
	PLASMA TORCH parts are worn out.	Examine the consumables for wear and replace worn parts with new Forney consumable parts.
	Non-genuine manufacturer's parts.	Use only genuine Forney consumables for optimum performance.
	GROUND CABLE (4) is disconnected.	Securely CLAMP the GROUND CABLE to the material being cut, as close to the work area as possible.
Excessive dross.	Cutting speed too slow (bottom dross).	Increase your torch travel speed.
	Cutting speed too fast (top dross).	Decrease your torch travel speed.
	Cutting current too low.	Ensure plasma cutting machine has proper input power.
		If used, eliminate or reduce length of extension cord.
	PLASMA TORCH parts are worn out.	Examine the consumables for wear and replace worn parts with new Forney consumable parts.
	Non-genuine manufacturer's parts.	Use only genuine Forney consumables for optimum performance.
Tilted cut edge angle (not perpendicular).	PLASMA TORCH position not correct.	Ensure that PLASMA TORCH is perpendicular to the workpiece.
	Workpiece thickness is near the capacity of the machine.	Cut thinner material. 5/8" thick material cuts will not have a clean cut edge.
	Asymmetric wear of CUTTING TIP hole and/or wrong assemblage of the PLASMA TORCH parts.	Check PLASMA TORCH consumables for wear and proper installation.
		Examine the consumables for wear and replace worn parts with new Forney consumable parts.
Excessive wear of the CUTTING TIP (D) or ELECTRODE (B).	Air pressure too low.	Inspect air compressor, air lines, and filters for proper operation.
		Inspect consumables for obstructions and proper installation.
	Exceeding plasma cutting machine capability (material too thick).	Choose thinner workpiece material within the operational limits of the plasma cutting machine.
	Moisture or oil in air supply.	Excessive humidity or oil from the compressor may be contaminating the air supply. Install a moisture filter in the air supply line prior to machine.
	Improperly assembled or loose PLASMA TORCH consumables.	Check PLASMA TORCH consumables for proper installation.
	Damaged PLASMA TORCH consumable.	Check PLASMA TORCH consumables for damage and replace if damaged.
	Non-genuine manufacturer's parts.	Use only genuine Forney consumables for optimum performance.

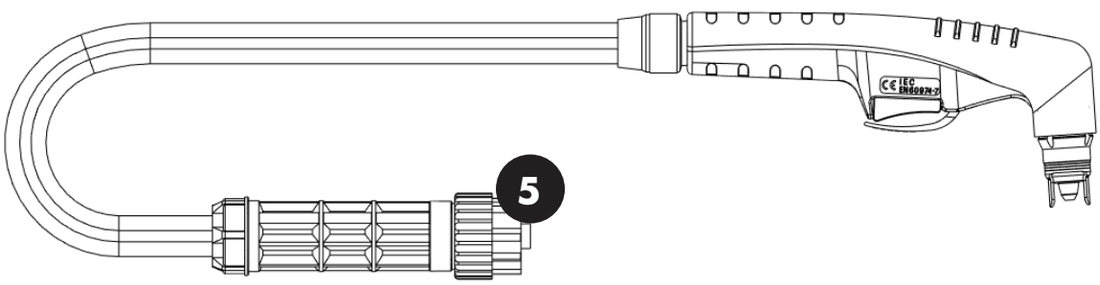
Machine Parts Diagram & Consumables List

NO.	PART NUMBER	ITEM DESCRIPTION
1	85667	Ground (25 Dinse)
2	85669	Electrode Holder (25 Dinse)

NO.	PART NUMBER	ITEM DESCRIPTION
1	85755	Electrode (2-pack)
2	85393	Air Diffuser Ring (Swirl Ring)
3	85684	Cutting Tip (2-pack)
4	85681	Shield Cup
5	85680	Plasma Torch







TIG Torch (SOLD SEPARATELY)

NO.	PART NUMBER	ITEM DESCRIPTION	ITEM PHOTO
1	85659	Tig Torch (17FV)	

User Notes

User Notes

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