270 MIG WELDER OWNER'S MANUAL

CAT. #00319 WELDER FEATURES:

- 270 Amp Output / 230V Input
- For Steel, Stainless Steel, and Aluminum welding
- Heavy duty torch
- Aluminum drive system

ADVANCED TECHNOLOGY:

- Easy to use, forgiving, increases productivity
- Digital readout for true amps
- Three trigger modes with spot weld timer
- Optional spool gun increases flexibility
- Burn back and slope control

IDEAL FOR:
General Fabrication, Auto Body, Farm & Ranch, Sheet Metal, Contractor, and More...

INCLUDES:
Torch with 10' lead; 10' Ground Cable and Clamp; 15' Input Power Cable; Gas Hose and Regulator

FORNEY INDUSTRIES
WELDING IN AMERICA.
SINCE THE BEGINNING.

190669

5/3/1
WARRANTY

STOP PLEASE!
DO NOT RETURN TO THE STORE

If you have questions or problems with your new Welder, please call customer service at **1-800-521-6038** Monday through Friday from 7am-5pm Mountain Time or at www.forneyind.com/customer_service.

Please take time to register your product at www.forneyind.com/customer_service/register_your_product/. This qualifies you for our industry leading 5/3/1 warranty.

Thank you, enjoy your new Welder.

FIVE WAYS TO ORDER

Web: www.forneyind.com

Phone: 800-521-6038

Fax: 970-498-9505

Mail: Forney Industries
1830 Laporte Avenue
Fort Collins, CO 80521

Email: sales@forneyind.com

U.S. Warehouses:
- Fort Collins CO
- Horseheads NY

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 of Forney products, and Forney's 80 years of unmatched product quality and an unwavering commitment to our customers.

When our customers succeed we succeed.

STEVEN G. ANDERSON, President & CEO

Forney 5/3/1 Limited Warranty

Effective August 1st, 2009

1) **Limited Warranty:** Subject to the terms and conditions below, Forney Industries, Inc., Fort Collins, Colorado, warrants to its original retail purchaser that the new Forney 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 Forney. This is in lieu of all other warranties, express or implied.

2) **Notification:** Please call **1-800-521-6038** with your warranty questions. You can also visit www.forneyind.com for additional information about your new welder.

3) **Length of Warranty:** Within the warranty periods listed below, Forney will repair or replace any warranted parts or components that fail due to defects in material or workmanship. Warranty is effective from the date of original retail purchase. Warranty duration is as follows:
   - **A) 5 years:** Original main power rectifiers only to include SCRs, diodes and discrete rectifier modules, transformers, stabilizers and reactors.
   - **B) 3 years:** Drive Systems, PC Boards, Motors, Switches and Controls.
   - **C) 1 year:** MIG guns, relays, contactors and regulators, plasma cutting torches, and accessories.
   - **D) 90 days:** Replacement parts. Does not include labor.

4) **Non-Applicable Parts:** Forney's limited warranty shall not apply to consumables such as contact tips, cutting nozzles, felt wire cleaner, drive rollers, gas diffusers, plasma torch tips and electrodes, weld cables, tips and parts that fail due to normal wear. In addition, this warranty does not extend to any damage caused by the untimely replacement or maintenance of any of the previously listed consumable parts.

5) **Warrantor:**
   Forney Industries
   1830 Laporte Avenue
   Fort Collins, CO 80521
   1-800-521-6038
   www.forneyind.com.

6) **Purchaser / Warranty:** The original purchaser of the Forney Industries product. The warranty is not transferable. Forney Industries products are intended for purchase and use by persons trained and experienced in the use and maintenance of welding equipment.

7) **What is not covered under the warranty:**
   - **A)** Implied warranties, including those of merchantability and fitness for a particular purpose are limited in duration to this express warranty. After this period, all risks of loss, from whatever reason, shall be on the purchaser.
   - **B)** Any incidental, indirect, or consequential loss, damage, or expense that may result from any defect, failure or malfunction of the Forney product.
   - **C)** Any failure that results from accident, purchaser's abuse, neglect or failure to operate products in accordance with instructions provided in the owner's manual(s) supplied with the product.
   - **D)** Pre-delivery service, i.e. assembly and adjustment.

8) **Claim:** In the event of a warranty claim under this warranty, the exclusive remedies shall be, at Forney Industries sole option:
   - **A)** Repair; or
   - **B)** Replacement; or
   - **C)** Where authorized in writing by Forney Industries, the cost of repair or replacement at an authorized Forney Industries Service Center; or
   - **D)** Payment of or credit for the purchase price less reasonable depreciation based on actual use upon the return of the goods at the customer's risk and expense.

9) **Purchaser will:**
   - **A)** Contact Forney's Customer Service at **1-800-521-6038** within 30 days of the defect or failure.
   - **B)** Provide dated proof of purchase (typically a purchase receipt).
   - **C)** Provide the serial number. Registering your welder at registration.forneyind.com:442 will speed up this process.
   - **D)** Deliver or ship welder to a Forney authorized Service Center. Freight &/or packaging costs, if any, must be borne by the purchaser.

TABLE OF CONTENTS

CAUTION!

BEFORE INSTALLING, OPERATING OR CARRYING OUT MAINTENANCE ON THE 270 WELDER, 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

Safety Information — READ BEFORE USING

Principal Safety Standards

- Safety in Welding and Cutting, ANSI Standard Z49.1, from American Welding Society, 8669 Doral Boulevard, Suite 130, Doral, FL 33166 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, 8669 Doral Boulevard, Suite 130, Doral, FL 33166
- 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

EMF Information

Considerations about Welding or Cutting and the Effects of Low Frequency Electric and Magnetic Fields

Welding or cutting current, as it flows through the welding or cutting 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 or cutting.

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

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

About Pacemakers & Hearing Aids:

Pacemaker & Hearing Aid wearers consult your doctor first. If cleared by your doctor, then following the above procedures is recommended.

Personal Protection

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.

Arc rays can injure your eyes and burn your skin. 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.

- Wear closed, non-flammable protective clothing without pockets or turned up trousers, gloves and shoes with insulating sole and steel toe. Avoid oily greasy clothing.
- Wear a non-flammable welding helmet with appropriate filter lenses, designed so as to shield the front and sides of the neck and face. Keep protective lens clean and replace them when broken, cracked or spattered.
- Weld in a closed, but well ventilated area that does not open into other working areas.
- Never look at the arc without correct lens.

Gases and fumes produced during the welding process can be dangerous and hazardous to your health.

- Adequate local exhaust ventilation must be used in the area. It should be provided through a mobile hood or through a built-in system on the workbench that provides exhaust ventilation from the sides, the front and below, but not from above the bench so as to avoid raising dust and fumes. Local exhaust ventilation must be provided together with adequate general ventilation and air circulation, particularly when work is done in a confined space.
- Welding process must be performed on metal surfaces thoroughly cleaned from rust or paint, or zinc coatings to avoid production of harmful fumes. Parts degreased with a solvent must be, thoroughly dried before welding.
- Be very careful when welding any metals which may contain one or more of the follwing:

Antimony	Beryllium	Cobalt	Manganese	Selenium	Arsenic	Cadmium
Copper	Mercury	Silver	Barium	Chromium	Lead	Nickel
Vanadium	Zinc					

- Remove all chlorinated solvents from the welding area before welding. Certain chlorinated solvents decompose when exposed to ultraviolet radiation to form phosgene gas (nerve gas).

Fire Prevention

Fire and explosion can be caused by hot slag, sparks or the welding arc.

- Keep an approved fire extinguisher of the proper size and type in the working area. Inspect it regularly to ensure that it is in proper working order.
- Remove all combustible materials from the working area. If you can not remove them, protect them with fire-proof covers.
- Ventilate welding work areas adequately. Maintain sufficient air flow to prevent accumulation of explosive or toxic concentrations of gases.
- Do not weld on containers that may have held combustibles.
- Continually monitor check welding area to make sure it is free of lingering sparks, slag or glowing metal and flames.
- The work area must have a fireproof floor.

Electric Shock

WARNING: ELECTRIC SHOCK CAN KILL!

- A person qualified in First Aid techniques should always be present in the working area; If a person is found unconscious and electric shock is suspected, do not touch the person if she or he is in contact with cable or electric wires. Disconnect power from the machine, then use First Aid. Use dry wood or other insulating materials to move cables, if necessary, away from the person.
- Wear dry gloves and clothing. Insulate yourself from the work piece or other parts of the welding circuit.
- Make sure the main line is properly grounded.
- Do not coil the torch or the ground cables around your body.
- Never touch or come in physical contact with any part of the input current circuit and welding current circuit.

Electric Warning:

- Repair or replace all worn or damaged parts.
- Extra care must be taken when working in moist or damp areas.
- Install and maintain equipment according to local regulations.
- Disconnect power supply before performing any service or repair.
- Should you feel the slightest electrical shock, stop any welding immediately and do not use the welder until the fault has been found and corrected.

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 ear muffs.
- Noise levels should be measured to be sure the decibels (sound) do not exceed safe levels.

Electromagnetic Compatibility

Before installing your welder, carry out an inspection of the surrounding area, observing the following guidelines:

- Make sure that there are no other power supply cables, control lines, telephone leads or other equipment near the unit.
- Make sure that there are no radio receivers, electrical appliances, computers or other control systems near the unit.
- People with pacemakers or hearing-aids should keep far from the welder.

! In particular cases special protection measures may be required.

Interference can be reduced by following these suggestions:

- If there is interference in the power source line, an E.M.F. filter can be mounted between the outlet and the welder.
- The output cables of the welder should not be too long, kept together or connected to ground;
- After any maintenance all the panels of the welder must be securely fastened in place.

Protective Welding Gases

Shielding Gas Cylinders contain gas under high pressure. If damaged, a cylinder can explode. Treat them carefully.

- Arc welders use only inert or non-flammable gases for welding arc protection. It is important to choose the appropriate gas for the type of welding being performed.
- Do not use gas from unidentified cylinders or damaged cylinders.
- Do not connnect the cylinder directly to the welder. Use a pressure regulator.
- Make sure the pressure regulator and the gauges function properly.
- Do not lubricate the regulator with oil or grease.
- Each regulator is designed for use with a specific gas. Make sure the regulator is designed for the protective gas being used.
- Make sure that the cylinder is safely secured tightly to the welder with the chain provided.
- Never expose cylinders to sparks, slag, flame or excessive heat.
- Make sure that the gas hose is in good condition.
- Keep the gas hose away from the working area.

Installation Recommendations

Location

Be sure to locate the welder 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 gases;
- 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.

Ventilation

Since the inhalation of welding fumes can be harmful, ensure that the welding area is effectively ventilated.

Main Supply Voltage Requirements

Before you make any electrical connection, make sure that supply voltage and frequency available at site are those stated in the ratings label of your welder.

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

- Correctly installed, if necessary, by a qualified electrician;
- Correctly grounded (electrically) in accordance with local regulations;
- Connected to the correct size electric circuit.

Notes:

- Periodically inspect supply cable for any cracks or exposed wires. If it is not in good condition, have it repaired by a Service Center.
- Do not pull violently the input power cable to disconnect it from supply outlet.

- Do not squash the supply cable with other machines. It could be damaged and cause electric shock.
- Keep the supply cable away from heat sources, oils, solvents or sharp edges.
- In case you are using an extension cord, try to keep it straight, and untangled to avoid overheating.

Safety Instructions

For your safety, before connecting the power source to the line, closely follow these instructions:

- An adequate two-pole switch must be inserted before the main outlet. This switch must be equipped with time-delay fuses.
- The connection with ground must be made with a two-pole plug compatible with the above mentioned socket.
- When working in a confined space, the welder 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 or welding cables.
- The welding torch should never be pointed at the operator's or at other persons' bodies.
- The welder must never be operated without its panels attached. This could cause serious injury to the operator and could damage the equipment.

California Proposition 65 Warnings

Welding or cutting equipment and processes produce fumes or gases which contain chemicals known to the State of California to cause birth defects and, in some cases, cancer. (California Health & Safety Code Section 25249.5 et seq.)

Assembly

Handle and Wheels Assembly (FIG.2)

- Unpack the welder.
- Screw the two casters (D) to the machine.
- Insert the axle (A) through the holes at the rear of the welder and slide a wheel (B) on to each end followed by the retaining washers (C).
- Assemble the plastic handle (E) using the screws provided (F).

Torch Lead and Spool Gun Assembly (FIG.3)

- Plug the torch hose into the socket on the front of the welder, be careful not to damage the contacts. Secure by hand screwing in the threaded connection.
- To connect Spool Gun it's necessary to install also the terminals to the 7 pole connector on the front of the welder (read also paragraph no.8).

FIG. 2

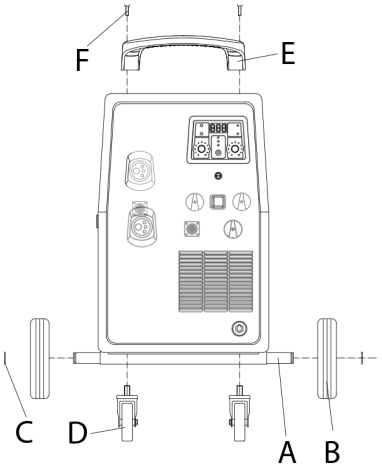
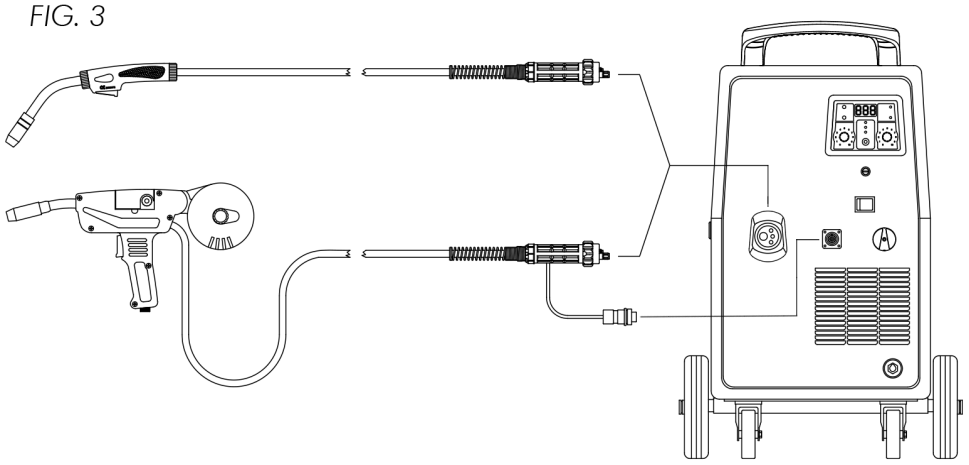


FIG. 3



Gas Cylinder and Regulator Connection

The bottle (not supplied) should be located at the rear of the welder, securely held in position by the chain provided. For safety, and economy, ensure that the regulator is fully closed, (turned counterclockwise) when not welding and when fitting or removing the gas cylinder.

- Turn the regulator adjustment knob counterclockwise to ensure the valve is fully closed.
- Screw the gas regulator fully down on the gas bottle valve, and fully tighten.
- Connect the gas hose to the regulator securing with clip/nut provided.
- Open the cylinder valve, then set the gas flow to approx. 20-30 CFH on the regulator.
- Operate the torch trigger to ensure that the gas is flowing through the torch.

WARNING: Cylinders are highly pressurized. Handle with care. Serious accidents can result from improper handling or misuse of compressed gas cylinders. Do not drop the cylinder, knock it over, expose it to excessive heat, flames or sparks. Do not strike it against other cylinders.

Shielding Gas Guide

Metal	GAS	NOTE
Mild Steel	CO2 Argon + CO2 Argon + CO2 + Oxygen	 Argon controls spatter Oxygen improves arc stability
Aluminium	Argon Argon + Helium	Arc stability, good fusion and minimum spatter. Higher heat input suitable for heavy sections. Minimum porosity.
Stainless Steel	Argon + CO2 + Oxygen Argon + Oxygen	Arc stability. Minimum spatter.
Copper, Nickel & Alloys	Argon Argon + Helium	Suitable for light gauges because of low flowability of the weld pool. Higher heat input suitable for heavy sections.

Contact the technical service of your gas supplier to know the percentages of the different gasses which are the most suitable to your application.

Load Wire

Your MIG welder is designed to accept either 8" or 12" wire spools of mild steel, stainless steel or aluminum according to the type of metal you wish to weld. Wire spools aren't supplied with the unit and must be purchased separately.

Be sure the gas and electrical supplies are disconnected. Before proceeding, remove the nozzle and the contact tip from the torch.

- Open the side panel. Loosen the nut (A) of the spool holder (position 1) (brake drum).Remove the spacer (E). In the case you are replacing the wire spool, extract it by pushing the snap tongue (D) (Fig.4).
- Remove the plastic protection from the spool. Place it on the spool holder. Mount the spacer again (only for 8" spools) and tighten the lock nut (A).

Your MIG welder can also accept 4" wire spools. To mount 4" spools:

- Remove the wire spool (B) from the spool holder (C).
- Loosen the nut (A), remove the spring and the washer; remove the spool holder (C) from the pivot.
- Insert on the pivot the 4" wire spool; Mount the washer, the spacer (G) and the spring.
- Tighten the lock nut.

FIG. 4

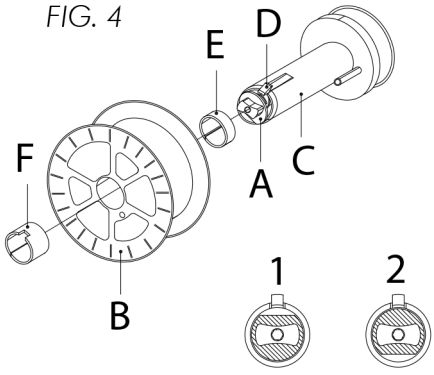
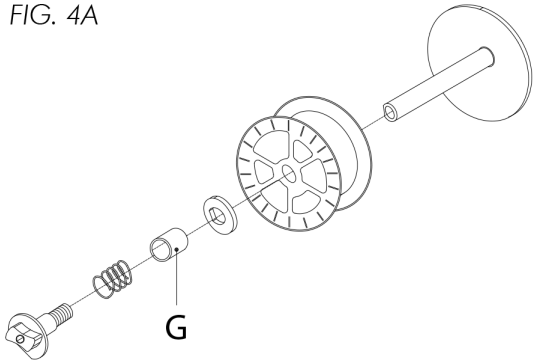


FIG. 4A



Tighten nut to appropriate tightness. Excessive pressure strains the wire feeding motor. Too little pressure does not allow the wire spool to stop immediately.

- Loosen and lower the plastic knob (A) (Fig.5). Release the upper roll (B) of the feeder. Extract the wire from the torch liner.
- When the wire is disconnected, grasp it with pliers so that it cannot exit from the spool. If necessary, straighten it before inserting it in the wire input guide (C). Insert the wire on the lower roll (D) and in the torch liner (E).

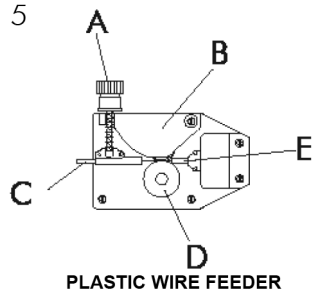
WARNING: keep the torch straight when feeding a new wire through the liner, make sure the wire is cut cleanly (no burrs or angles) and that at least 1/2" from the end is straight (no curves). Failure to follow these instructions could cause damage to the liner.

- Lower the upper roll (B) and place the knob (A). Tighten slightly. If tightened too much, the wire gets locked and could cause motor damage. If not tighten enough, the rolls will not feed the wire.

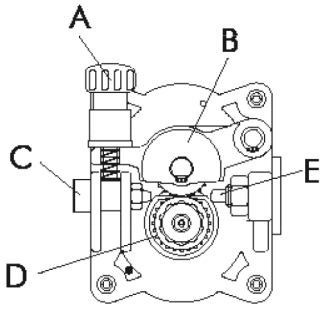
When changing the wire diameter being used, or replacing the wire feed roll, be sure that the correct groove for the wire diameter selected is inside, closest to the machine. The wire roll is driven by the inside groove. Feed rolls are marked on the side identifying the groove nearest that side.

- Close the side panel of the machine. Connect the power supply cable to the outlet. Turn on the switch. Press the torch switch. The wire fed by the wire feeding motor at variable speed must slide through the liner. When it exits from the torch neck, release the torch switch. Turn off the machine. Mount the contact tip and the nozzle.

FIG. 5



PLASTIC WIRE FEEDER



ALUMINIUM WIRE FEEDER

When checking the correct exit of the wire from the torch do not bring your face near the torch. You may run the risk of being wounded by the outgoing wire. Do not bring your fingers close to the feeding mechanism when working! The rolls, when moving, may crush the fingers. Periodically, check the rolls. Replace them when they are worn and compromise the regular feeding of the wire.

Replacing the Wire Liner

Before performing this procedure, be sure the gas supply line and input power cable are disconnected.

- Disconnect the torch from the machine.
- Place it on a flat surface and carefully remove the brass nut (1).
- Pull the liner out of the hose.
- Install the new liner and mount the brass nut (1) again.

In case you are replacing a Teflon or graphite wire liner, follow these instructions:

- Install the new liner and insert the wire liner collet (3) and the O ring (4).
- Mount the brass nut (1).
- Cut the wire liner close to the brass nut

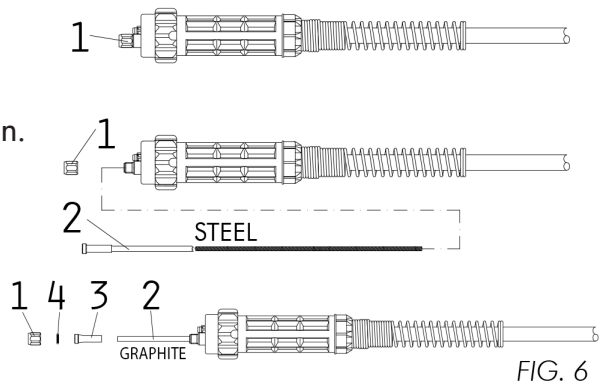


FIG. 6

WARNING: the length of the new wire liner must be the same as the liner you have just pulled out of the hose.

- Connect the torch to the machine and install the wire into the feeding system.

How to Choose the Wire Liner for Direct and Euro Connection Torches

- There are basically 2 types of wire liners: Steel wire liners and Teflon wire liners.
- Steel wire liners can be coated or not coated. Coated wire liners are used for air cooled torches. The wire liners are used for water cooled torches.
- Teflon wire liners are recommended for aluminum welding as they allow a smooth feeding of the wire.

Arrangement for Welding with Spool Gun

WARNING: Electric shock can kill! Always turn the POWER switch OFF and unplug the power cord from the AC power source before installing wire.

Before installing any welding wire into the unit, the proper sized groove must be placed into position on the wire drive mechanism. Adjust the drive roller according to the following steps:

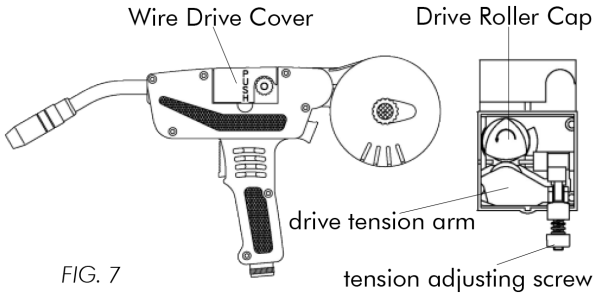


FIG. 7

1. Open the wire drive cover on the spool gun.
2. Remove the drive tension by loosening the tension adjusting screw and lifting the drive tension adjustor up, away from the drive tension arm. Pull the drive tension arm away from the drive roller.
3. Rotate the drive roller cap counterclockwise and remove it from the drive wire drive cover drive roller cap FIG. 7 tension adjusting screw drive tension arm roller. Pull the drive roller off of the drive roller shaft . Note: The drive roller has two wire size (.030", .035") grooves built into it.
4. Find the side of the drive roller that is stamped with the same wire diameter as that of the wire being installed. Push the drive roller onto the drive roller shaft, with the side stamped with the desired wire diameter facing you.
5. Reinstall the drive roller cap and lock in place by turning it clockwise.
6. Remove the nozzle and contact tip from the end of the gun assembly.
7. Open the wire spool casing, located at the rear of the spool gun, by turning the retaining knob counterclockwise.
8. Unwrap the spool of wire and find the end of the wire.
9. After checking to make sure that your welder is disconnected from the AC power source, free the leading end of the wire from the spool, **but do not let go of it until told to do so, or the wire will unspool itself.**
10. Using a wire cutter, cut off the bent portion at the end of the wire so that you are left with a straight section of wire.
11. Unroll about 6" of welding wire from the wire spool.
12. Insert the leading end of the wire into the inlet guide tube (located in the Wire Spool Casing). Then push it across the drive roller and into the gun assembly about 6".
13. Line the wire up in the appropriate top groove of the drive roller, then push the drive tension arm against the drive roller.

FIG. 8

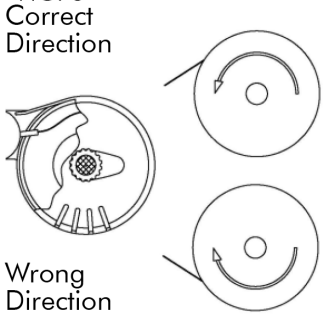
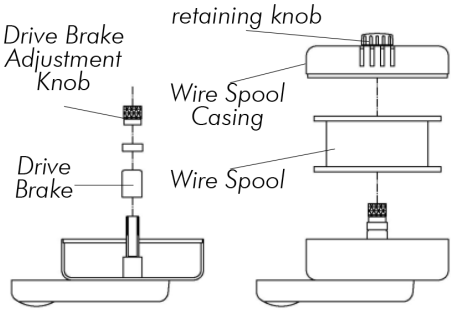


FIG.9



14. Flip the quick release drive tensioner back into position on the drive tensioner arm.
15. Tighten (turn clockwise) the drive tension adjusting knob until the tension roller is applying enough force on the wire to prevent it from slipping out of the drive assembly.
16. Let go of the wire.
17. Place the spool on the spindle in such a manner that when the wire comes off the spool, it will look like the top illustration in Figure 10 on page 14. The welding wire should always come off the top of the spool into the drive mechanism. Technical Note: The purpose of the drive brake is to cause the spool of wire to stop turning at nearly the same moment that wire feeding stops.
18. Set the Drive Brake tension. Note: It is necessary to release the Drive Tensioner Arm while you are setting the Drive Brake Tension. Make sure you return the Drive Tension Arm to its locked position after adjusting the Drive Brake Tension.
    a) With one hand, turn the wire spool counterclockwise. This will cause the wire to feed through the gun assembly continue turning it while adjusting the tension on the spool.
    b) With your free hand, tighten (turn clockwise) the drive brake adjustment knob.
    c) Stop tightening when drag is felt on the wire spool that you are turning. Then stop hand-turning the wire spool. Note: If TOO MUCH tension is applied to the wire spool, the wire will slip on the drive roller or will not be able to feed at all. If TOO LITTLE tension is applied, the spool of wire will want to unspool itself. Readjust the drive brake tension as necessary to correct for either problem.
19. Trim the wire which is sticking out the end of the spool gun to about 1/2" in length.
20. Select a contact tip stamped with the same diameter as the wire being used.
21. Slide the contact tip over the wire protruding from the end of the gun.Thread the contact tip into the end of the gun and hand-tighten securely.
22. Install the nozzle on the gun assembly. For best results, coat the inside of the nozzle with anti-stick spray or gel.
23. Cut off the excess wire that extends past the end of the nozzle.
24. Replace the wire spool casing cover and tighten adjustment knob by turning it clockwise.
25. Connect the welder power cord to the AC power source. Turn the welder ON. Set the VOLTAGE switch.

Setting the Wire Drive Tension

WARNING: Arc flash can injure eyes! To reduce the risk of arc flash, make certain that the wire coming out of the end of the gun does not come in contact with the work piece, ground clamp or any grounded material during the drive tension setting process or arcing will occur.

1. Open the wire drive cover on the spool gun
2. Pull the trigger on the gun.
3. Turn the drive tension adjustment knob clockwise, increasing the drive tension until the wire seems to feed smoothly without slipping.
4. Close the wire drive cover on the spool gun.
5. When set correctly, there should be no slippage between the wire and the drive roller under normal conditions.

Adjusting the Spool Position

Before you begin welding, you may want to adjust the position of the spool so it is most comfortable for you. There are three positions to choose from. To change the position of the spool:

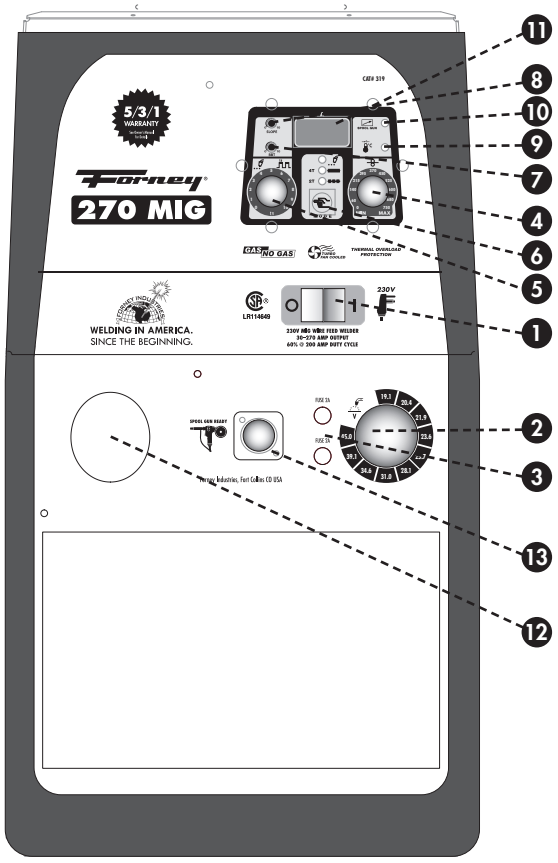
1. With a flat tipped screwdriver, loosen the screw which connects the spool casing to the gun.
2. Pull the casing far enough away from the gun to allow the casing to rotate.
3. Rotate the casing to one of the three available positions, making sure that the grooves on the gun are aligned with the grooves on the casing.
4. Push the casing and the gun back together.
5. With a flat tipped screwdriver, tighten the screw which connects the spool casing to the gun.

Front Panel Operation

With welders in the digital series, thanks to a special electronic card it is possible to adjust externally the main welding parameters. The main purpose of these units is to make adjustment of these parameters very easy.

The microprocessor control handles the functions of the p.c.board that are viewed by means of LED's while a digital display shows the parameters set and welding current. Units may be used either with the standard torch (supplied with them) or with the Spool Gun.

Welder Controls



1. **Main ON/OFF switch (green):**
   Lights up when you switch ON the welder on.
2. **Welding voltage adjustment knob**
3. **Auxiliary circuit protection fuse**
   1 Amp fuse: Do not replace it with different current fuses.
4. **Wire feed adjustment knob**
   To increase the wire speed, turn the potentiometer clockwise; to decrease the wire speed, turn it counter-clockwise. The same procedure decreases the values on the welding parameters. Turn knob slowly.
5. **Spot welding time regulation knob**
   MIN. 0.4 seconds - MAX. 10 seconds
6. **Welding "MODE" selector key**
   Use these keys to select the following types of welding:
   - 2T: 2 time welding = manual
   - 4T: 4 time welding = automatic
   - Automatic spot welding with timer
7. **B.B.T. (burn back time)**
   When releasing the torch trigger the machine will work for a very short time. This function avoids burning of wire and consequent wire sticking to the contact tip. By turning the B.B.T. potentiometer clockwise/counterclockwise with a screw driver, the wire which is exiting from the torch at the end of the welding will become shorter or longer.
8. **SLOPE**
   Turning trimmer with a screwdriver to adjust the time necessary for the wire feed motor to reach the speed that you set through the potentiometer.
   MIN. slope 0.25 seconds - MAX. slope 1.6 seconds
9. **Overheating indicator (yellow)**
   This LED blinks when unit is overheating. It will light up when thermostatic protection shut down the machine and will cease blinking only after the machine has cooled sufficiently to continue welding.
10. **Spool gun torch green LED: lights up when the spool gun torch is connected.**
11. **Display**
    Allows operator to view the real time weld current. After welding the display will show the final welding current value for a maximum of 3 seconds.
12. **Torch connection**
13. **7 poles connection for Spool Gun (optional)**

Welding Preparation

- Connect the ground cable to the proper female outlet on the bottom right-hand corner of the welder (on some models the ground cable is already connected). Attach the ground clamp to the bare metal to be welded, making sure of good contact;
- Make sure that the wire-roller groove in the roller corresponds to the diameter of the wire being used.
- Plug the machine into a suitable outlet.
- Open the gas valve on the gas cylinder regulator, (turn knob clockwise) and adjust the gas regulator to the proper setting position. Note: this varies with different metals, thicknesses and currents.

General Operating Instructions

Some experience is required to adjust and use a MIG welder. In MIG welding two parameters are fundamental: the welding voltage and the wire speed. The resulting welding current is a result of these two settings.

- Set the voltage and wire feed controls to positions suitable for the thickness of the material to be welded. Welding current varies in relationship to wire feed speed. For low welding current output, the wire feed speed potentiometer should be set at the low end of the wire feed speed scale. Turning the wire feed speed control potentiometer clockwise. Will result in increased wire feed speed and welding current. Welding voltage is adjusted to match the wire feed speed (welding current). Progressively select higher voltage positions while increasing wire speed.

Increasing welding voltage leads to a longer arc (without substantially affecting the current). Conversely, a decreased welding voltage results in a shorter arc (the current again is not substancially changed). A change in wire diameter results in changed parameters. A smaller diameter wire requires an increase in wire feed speed to reach the same current. If certain limits are exceeded, a satisfactory weld cannot be obtained. These are:

A) Feeding wire too fast (too high with regard to the welding voltage) results in pulsing within the torch. This is because the wire electrode dips into the puddle and cannot be melted off fast enough.

B) Setting welding voltage to high (too high with regard to the wire feed speed), will result in excessive and unstable arc. Increase the voltage even higher and the contact tip will burn.

C) Excessive wire speed can be corrected through the arc voltage increase. The limit of this adjustment depends on the thickness of the material to welded (a certain limit exceeded will result in burnthrough).

Place the torch on the joint you want to weld: the angle between the torch and the nozzle should be around 45°. The distance between the torch and the work piece should be 5-1/2". Lower the face shield and press the torch trigger to start the arc. When the arc has struck, move the nozzle slowly from left to right along the joint. Adjust the wire feed speed until the arc makes a "crisp" sound (experience will help you to recognize the right sound).

1) Adjust using the trigger "MODE" key for the desired trigger modes. Press the "MODE" key till the red LED lights up.
   - 2T - 2 time welding (manual). The welding process starts when the torch trigger is pressed and stops when this is released.
   - 4T - 4 time welding (automatic) . The welding process starts when the torch trigger is pressed (after a pregas time), it continues even if torch trigger is released and stops when this is pressed and released once again after the postgas time.
   - Spot welding with timer - automatic spot welder with timer. This process allows execution of repeated welding beads. The duration is set through the adjustment knob #66.
2) Adjust the wire speed knob #5.

The display can view numbers from 1 to 99 (1 being the minimum value and 99 the maximum value). The display shows the real welding current and the value of the parameter you selected and adjusted during the regulation phase. After welding the display will view the welding current value for a maximum of 5 seconds.

Aluminium Welding

The machine should be set up as for mild steel except for the following changes:

- 100% ARGON as welding protective gas.
- Ensure that your torch is set up for aluminum welding:
- The length of the torch cable should not exceed 10' (it is advisable not to use longer torches).
- Install a teflon wire liner. Follow the instructions for changing the renewing of the wire liner.
- Ensure that drive rolls are suitable for aluminum wire.
- Use contact tips that are suitable for aluminum wire and make sure that the diameter of the contact tip hole corresponds to the wire diameter that is going to be used.

For aluminium welding or for welding those materials such as CUSI and for applications where the power source needs to be placed far from the working area the spool gun is particularly suitable. This torch incorporates a wire feeding motor and the welding wire spool. The potentiometer integrated on the handle allows constant regulation of wire speed while an internal device in the welder recognizes and shows the spool gun connection when the green LED on the front of the welder lights up.

Technical Data Information Guide

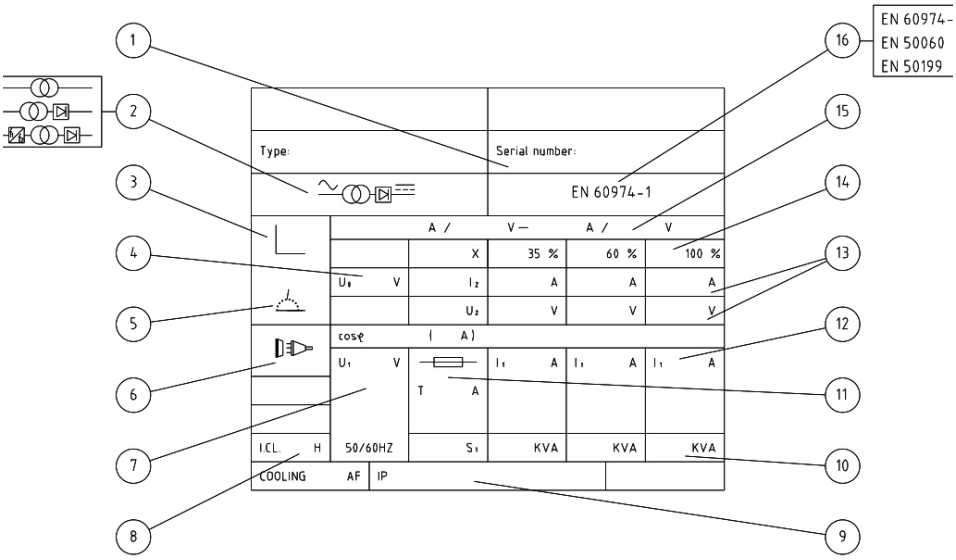


FIG. 15

1. Serial number of the unit
2. Welder model
3. Type of characteristic
4. Min. - Max rated No Load Voltage
5. Type of welding
6. Symbol for the main supply and no. of phases
7. Rated value of the supply voltage
8. Code letter for degree of insulation
9. Protection degree
10. Power
11. Size of the necessary main fuse
12. Supply current
13. Welding supply and voltage
14. Power Factor
15. Control range (current / voltage)
16. Reference standard

Welding Hints and Maintenance

- Always weld clean, dry and well prepared material.
- Hold gun at a 45° angle to the workpiece with nozzle about 1/2″ from the surface.
- Move the gun smoothly and steadily as you weld.
- Avoid welding in very drafty areas. A weak, pitted and porous weld will result due to air blowing away the protective welding gas.
- Keep wire and wire liner clean. Do not use rusty wire.
- Sharp bends or kinks in the welding cable should be avoided.
- Always try to avoid getting particles of metal inside the machine since they could cause short circuits or other damage.
- If available, use compressed air to periodically clean the hose liner, especially when changing wire spools.

IMPORTANT: Disconnect from power source when carrying out this operation.

- Using low pressure air (3/5 Bar=20-30 PSI), occasionally blow the dust from the inside of the welder. This keeps the machine running cooler. **Note: do not blow air over the printed circuit board and electronic components.**
- The wire feed roller will eventually wear during normal use. With the correct tension the pressure roller must feed the wire without slipping. If the pressure roller and the wire feed roller make contact when the wire is in place between them, the wire feed roller must be replaced.
- Check all cables periodically. They must be in good condition and not cracked.

Troubleshooting

This chart will assist you in resolving common problems you may encounter. These are not all the possible solutions.

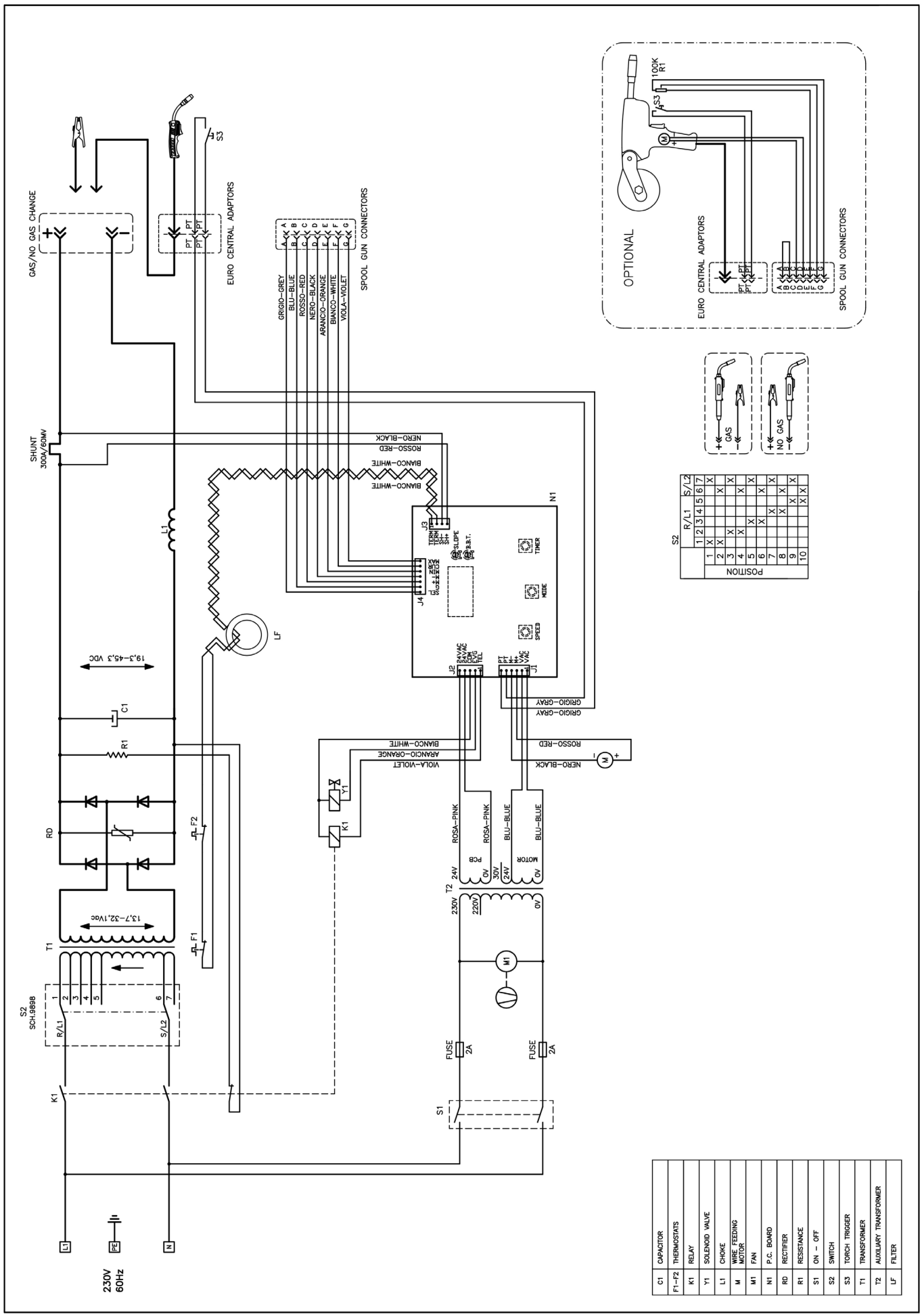
PROBLEM	POSSIBLE CAUSE	POSSIBLE SOLUTION
No "power" from welder.	Input cable or plug malfunction. Wrong size fuse.	Check for proper input cable connection. Check fuse and replace as necessary.
Fan operates normally, but when gun trigger pulled, there is no wire feed, weld output or gas flow.	Faulty trigger gun. Thermostat intervention.	Replace torch trigger. Allow welder to cool. When the pilot lamp/switch on the front panel goes dark the thermostat has closed.
Feed motor operates but wire will not feed.	Faulty wire feeding motor (rare). Insufficient feed roller pressure. Burr on end of wire. Liner blocked or damaged.	Replace wire feeding motor. Increase roller pressure. Re-cut wire square with no burr. Clear with compressed air or replace liner.
Lack of penetration.	Voltage or wire feed speed too low. Loose connection inside the machine (rare). Worn or wrong size contact tip. Loose gun connection or faulty gun assembly. Wrong size wire. Torch moved too fast.	Re-adjust the welding parameters. Clear with compressed air and tighten all connections. Replace the contact tip. Tighten or replace torch. Use correct size welding wire. Move the gun smoothly and not too fast.
Wire is birdnesting at the drive roller.	Excessive pressure on drive roller. Gun liner worn or damaged. Contact tip clogged or damaged. Liner stretched or too long.	Adjust pressure on drive roller. Replace wire liner. Replace contact tip. Cut wire liner at the right length.

PROBLEM	POSSIBLE CAUSE	POSSIBLE SOLUTION
Wire burns back to contact tip.	Contact tip clogged or damaged.	Replace the contact tip.
	Wire feed speed too slow.	Increase wire speed.
	Wrong size contact tip.	Use correct size contact tip.
	Bad connection from cable to clamp.	Tighten clamp connection or replace cable.
	Slag buildup inside nozzle or nozzle is shorted.	Clean or replace nozzle.
Work piece clamp and/or cable gets hot.	Wire feed speed too fast.	Decrease wire feed speed.
Gun nozzle arcs to work surface.	Nozzle clogged.	Clean or replace nozzle
Wire pushes torch back from the work piece.	Torch held too far from the workpiece.	Hold the torch at the right distance.
Poor quality welds.	Insufficient gas at weld area.	Check that the gas is not being blown away by drafts and, if so, move to more sheltered weld area. If not check gas cylinder contents gauge, regulator setting and operation of gas valve.
	Rusty, painted, oil or greasy workpiece.	Ensure workpiece is clean and dry.
	Rusty or dirty wire.	Ensure wire is clean and dry.
	Poor ground contact.	Check ground clamp/workpiece connection.
	Incorrect gas/wire combination	Check the manual for the correct combination.
Weld deposit “stringy” and incomplete.	Torch moved over workpiece too quickly.	Move the torch slower.
	Gas mixture incorrect.	See shielding gas table.
Weld deposit too thick.	Torch moved over workpiece too slowly.	Move the torch faster.
	Welding voltage too low.	Increase welding voltage.

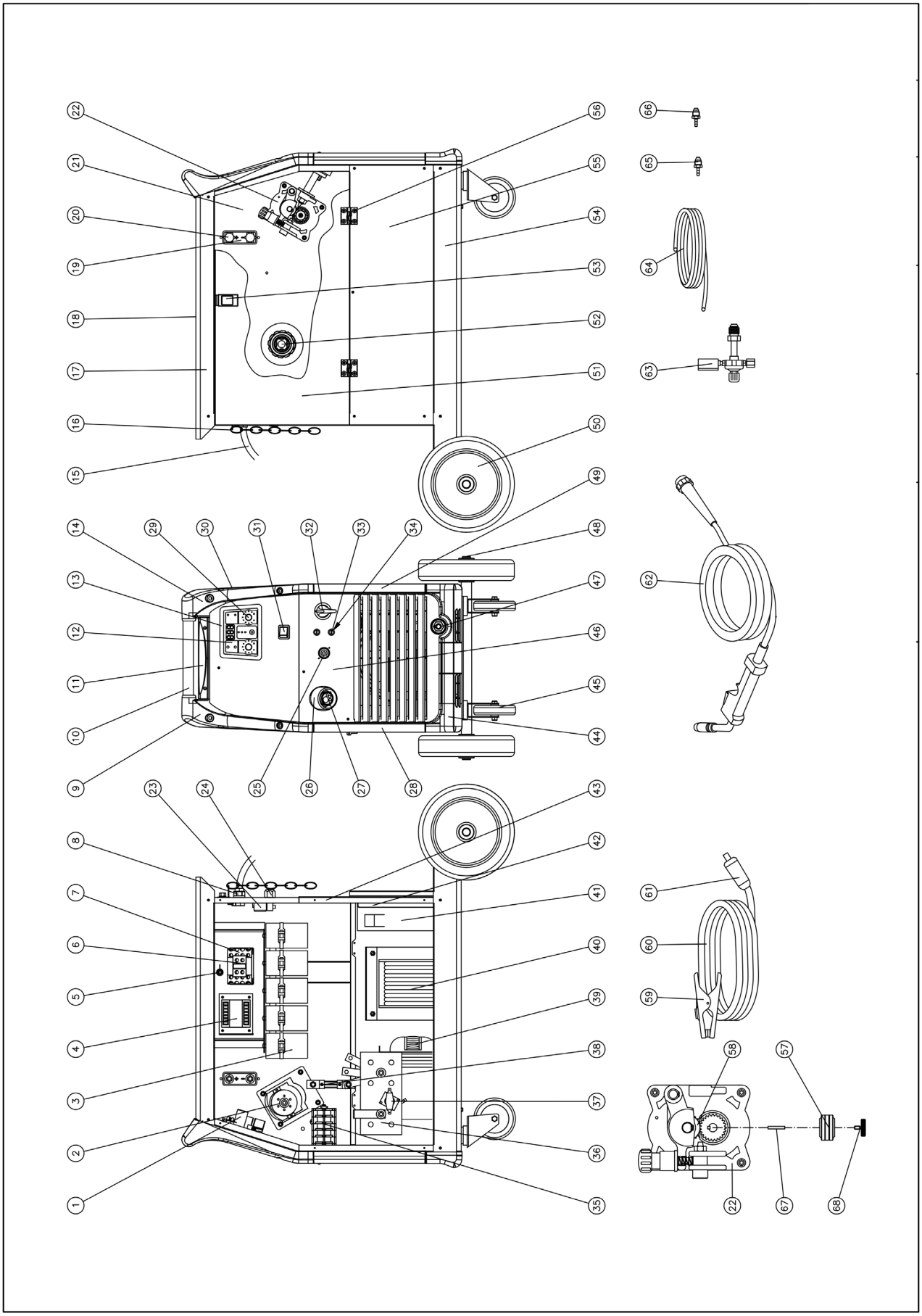
Tools and Spare Parts List

NO.	PART NUMBER	ITEM DESCRIPTION	QTY.
1	22710083	CONTROL PC BOARD HE-IND30V	1
02	04600147	MP48 MOTOR + PINION	1
03	22315003	CAPACITOR 63V	5
04	44140102	AUX TRANSFORMER MIG MA 220-240V 50/60HZ	1
05	22305004	RESISTANCE 3 OHM D.16 L=90	1
06	22225018	AUXILIARY CONTACTS	1
07	22225022	24V 16A CN-16 4NA CONTACTOR	1
08	21605040	CABLE CLAMP	1
09	21690773	LEFT HANDLE	1
10	33725134 9005	HANDLE	1
11	21690774	TOP FRAME	1
12	77650133	PLATE FOR PC BOARD	1
13	21690429	PC BOARD FRAME	1
14	21690772	RIGHT HANDLE	1
15	20220173	INP.POWER CABLE3X12AWG 4.5M + 6-50P PLUG	1
16	04600205	ZINC CHAIN NR 17 NM 3.1	1
17	33705735 376C	GREEN COVER PANEL	1
18	30905054	MAT FOR TOOLS 3X203X581	1
19	04600166	GAS-NO GAS CONVERSION BOARD	1
20	21800052	KNURLED HANDWHEEL	2
21	33720268 9005	INTERNAL PANEL	1
22	44410075	2 ROLL WIRE FEEDER	1
23	22900002	GAS SOLENOID VALVE 4W 24V 50HZ 1/8" FF	1
24	22910110	1/8" GAS MALE NIPPLE	1
25	40210424	SPOOL GUN TORCH CONNECTION - 7 PINS	1
26	21690675	EURO CONN. PLASTIC PROTECTION M8(676)	1
27	23005352	TORCH ADAPTOR L=52	1
28	21690771	LEFT FRAME	1
29	21690796	HANDLE WITH GRAY CAP	2
30	05000258	RIGHT SIDE PANEL	1
31	22200043	DOUBLE POLE SWITCH	1
32	21690378	BLACK KNOB FOR SWITCH	1
33	22220016	FUSE HOLDER PTF/70 6.3A 250V	2
34	22220004	FUSE 5X20 T 2A 250V	2
35	22205179	SWITCH 25 A 10 POS.1PH	1
36	22400134	RECTIFIER PMS 24/4/2	1
37	04600113	COMPLETE THERMOSTAT 100° + SUPPORT	1

NO.	PART NUMBER	ITEM DESCRIPTION	QTY.
38	22600043	SHUNT FOR AMMETER 300A 60MV	1
39	44135173	CHOKE ø8 40X85AL	1
40	44120193	TRANSFORMER 60HZ 230V 60X130AL	1
41	22800089	FAN 220-240V 50/60HZ	1
42	33640463	AIR CONVEYOR	1
43	05000264	BACK PANEL	1
44	21690768	LOWER FRAME	1
45	21625003	RUBBER PIVOTING WHEEL D.100	2
46	05000257	FRONT PANEL W/LABELS	1
47	22100009	50mm² DINSE SOCKET TBE35-50 CX58	1
48	55200036	WHEELS AXLE ø 20 L=492	1
49	21690770	RIGHT FRAME	1
50	21625048	WHEEL D.230 RUBBER HUB D.20	2
51	05000259	LEFT SIDE ACCESS PANEL	1
52	04600001	COMPLETE SPOOL HOLDER D.50	1
53	21690226	DOOR LATCH	1
54	33700399 9005	BOTTOM PANEL	1
55	33705738 376C	LEFT SIDE PANEL	1
56	21690585	PLASTIC HINGE FOR DOOR 40X40	2
57	33805005	WIRE FEED ROLL 1.0-1.2MM AL.MOTOR 2R	1
57	33805071	WIRE FEED ROLL D.30 0.6-0.9MM	1
58	33805007	WIRE BLOCK ROLL D.17X30 H=9	1
59	22110026	GROUND CLAMP 500A	1
60	43210155	GROUND CABLE 25mm² m3	1
61	22100003	DINSE PLUG 50SQMM CX22	1
62	23000447	TW200 3M TORCH W/TW2 NECK & EURO CONNECTOR	1
63	22905101	2 GAUGE ARGON REGULATOR CGA580-5/8"UNF-2B	1
64	30900034	BLACK HOSE	1
65	22910099	5/8"UNF MALE CONNECTOR	2
66	22910117	GAS SLING MALE CONNECTOR 5/8" UN	1
67	21060152	SECURE KEY FOR ROLL	1
68	33810136	FEED ROLL SECURE KNOB	1



C1	CAPACITOR
F1–F2	THERMOSTATS
K1	RELAY
Y1	SOLENOID VALVE
L1	CHOKE
M	WIRE FEEDING MOTOR
M1	FAN
N1	P.C. BOARD
RD	RECTIFIER
R1	RESISTANCE
S1	ON – OFF
S2	SWITCH
S3	TORCH TRIGGER
T1	TRANSFORMER
T2	AUXILIARY TRANSFORMER
LF	FILTER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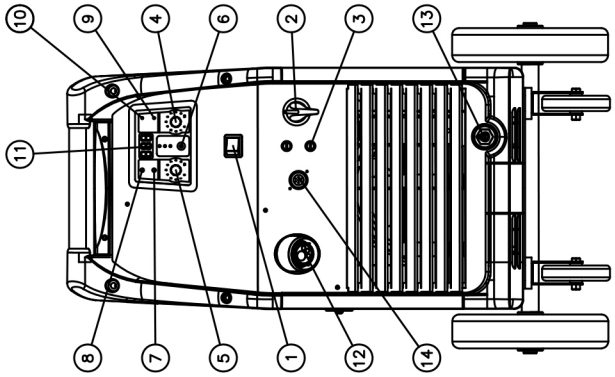
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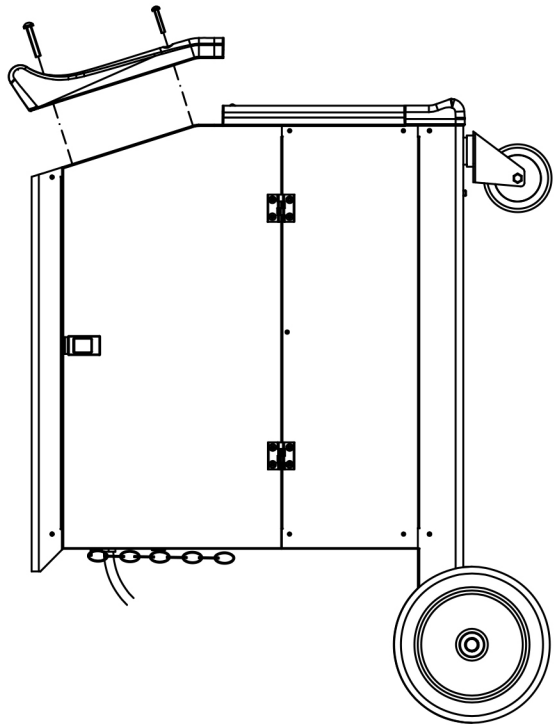

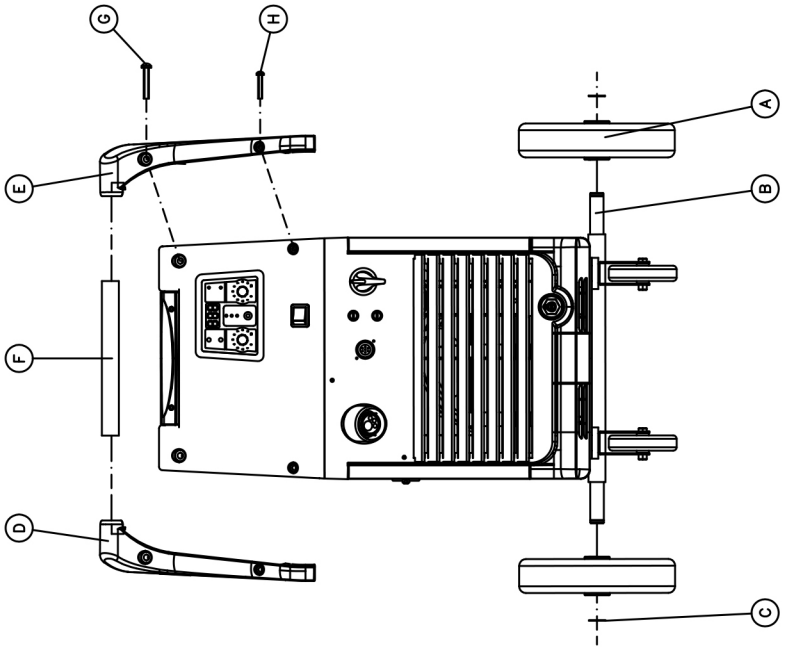
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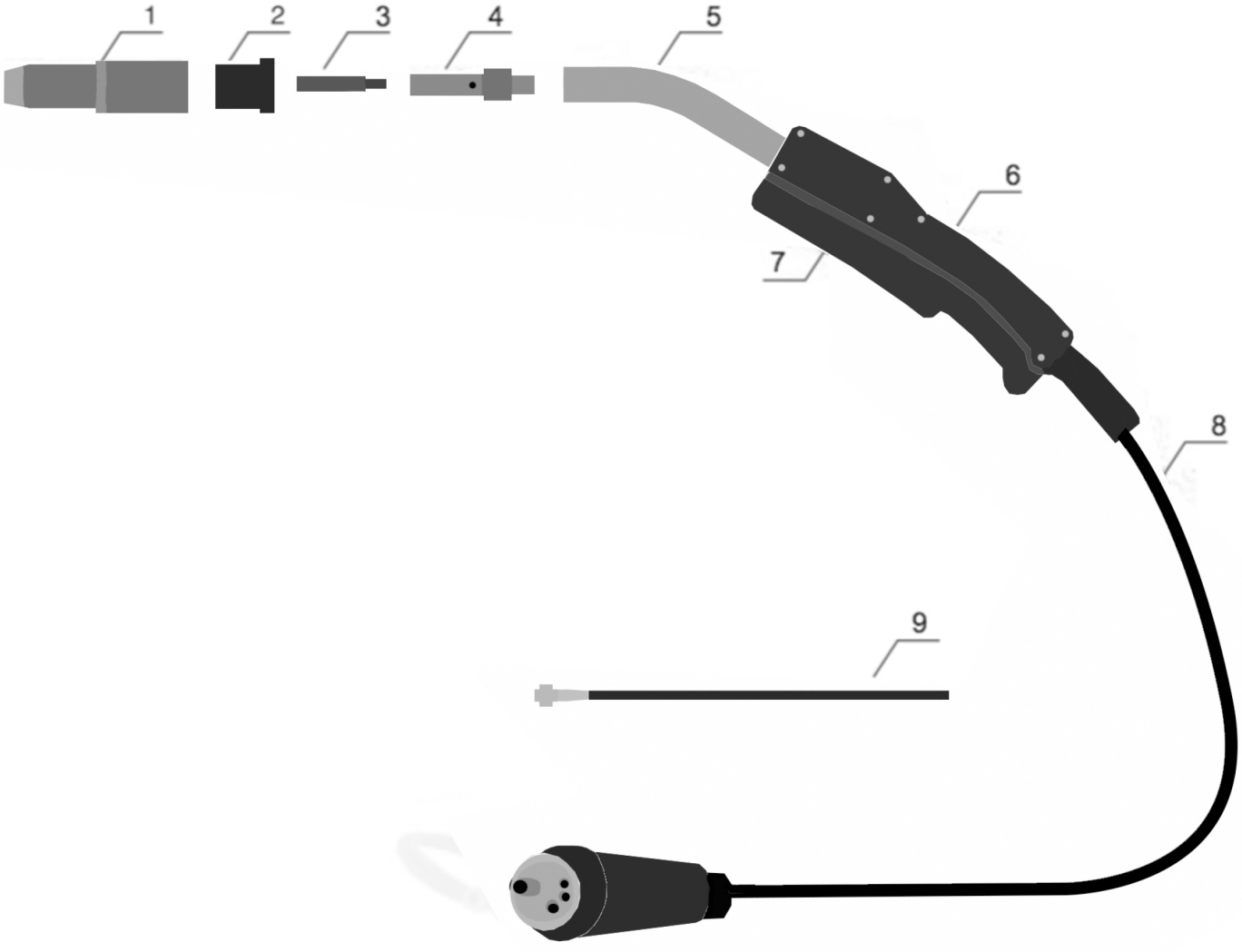
MIG Gun Torch Spare Parts List

NO.	PART NUMBER	ITEM DESCRIPTION	QTY.
1	23005524K	TWECO TORCH NOZZLE 22-50 1 PC PACK	1
02	23005525K	INSULATOR 1PC PACK	1
03	23005526K	0,9MM CONTACT TIP FOR TW2 14-3510PCSPACK	10
03	23005521K	0,8MM CONTACT TIP FOR TW2 14-30 10PCSPACK	10
03	23005522K	1,2MM CONTACT TIP FOR TW2 14-45 10PCSPACK	10
04	23005527K	TWECO GAS DIFFUSER TW2 1 PC PACK	1

NO.	PART NUMBER	ITEM DESCRIPTION	QTY.
05	23005528k	TW2 62A-45 TORCH NECK 1 PC PACK	1
06	23005529K	BLACK HANDLE FOR TW200 TORCH 1 PC PACK	1
07	23005530K	TORCH TRIGGER 1 PC PACK	1
08	23005531K	COAX CABLE 25MM2 3M FOR TW200 1 PC PACK	1
09	23005532K	STEEL WIRE LINER .030-.035 1 PC PACK	1



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