



SPOOL PRO™ HORNET SG 250™ OPERATING MANUAL



ENGLISH



WELDING IN AMERICA.
SINCE THE BEGINNING.

ITEM# 85620
REV 01.27.2022



WAYS TO ORDER

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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 unequalled. 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 x2 or customerservice@forneyind.com for inquires, technical and general questions.

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














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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
	POISON HAZARD		ELECTRICAL HAZARD		WARNING/CAUTION
	MIG (GMAW)		INPUT VOLTAGE		LINE CONNECTION
	STICK (SMAW)		TEMPERATURE		SINGLE PHASE ALTERNATING CURRENT (AC)
	TIG (GTAW)		VOLTAGE		DIRECT CURRENT (DC)
	POSITIVE DINSE		AMPERAGE		SUITABLE FOR WELDING IN AN ENVIRONMENT WITH INCREASED RISK OF ELECTRIC SHOCK
	NEGATIVE DINSE		WIRE FEED		SINGLE PHASE STATIC FREQUENCY CONVERTER TRANSFORMER RECTIFIER
	ON		OFF		

Safety Summary

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 beginning welding.

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.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.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) 443-7559 - 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 GASES IN CONTAINERS - Obtainable from Compressed Gas Association, 14501 George Carter Way, Suite 103, Chantilly, VA 20151 Telephone (703) 788-2700 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) 642-900, 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.

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 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.

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.



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 you (the welder) 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 MIG gun 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 welder) 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 feet and can pass through small cracks and openings. If work and combustibles cannot be separated by a minimum of 35 feet, 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, cuffless pants, high-topped shoes, helmet, and 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, cuffless 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. 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 in contact with it,
 - b. the ground clamp,
 - c. the electrode or welding wire,

- d. any metal parts on the electrode holder, or MIG gun.
- 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, MIG gun, or welder INPUT POWER CABLE through or allow them to come into contact with water or moisture.
- Do not touch welder, attempt to turn welder 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 welder 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 welder into the power source if the ground prong on INPUT POWER CABLE plug is bent over, broken off, or missing.
- Do not allow the welder to be connected to the power source or attempt to weld if the welder, welding cables, welding site, or welder INPUT POWER CABLE are exposed to any form of atmospheric precipitation, or salt water spray.
- Do not carry coiled welding cables around shoulders, or any other part of the body, when they are plugged into the welder.
- 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 welder and work area so that if spilled, the liquid cannot possibly come in contact with any part of the welder 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 ear muffs.
- 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.

Installation

Spool Gun Specifications

Primary (Input) Volts	0-12 VDC
Maximum Output Amperage	300A (DC output only)
Rated Output and Duty Cycle	220A @ 60%
Supplied Drive Roll	0.035" and 0.047" Grooves
Recommended Wire Size	0.035" (Compatible with 0.030 - 0.047")
Wire Speed	1000 IPM Max
Recommended Material	Aluminum and Stainless Steel Alloys
Coolant Type	Air
Dimensions	18" (462mm) X 9.3" (236mm) X 2.7" (70mm)
Cable Length	25' (7m)
Consumables	TWECO Style Series 14H
Weight	8 lbs (Including Power Cable)

Site Selection



BE SURE TO LOCATE THE SPOOL GUN 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. See the "Safety Summary" for more details (pages 5-9).

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 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 POWER CABLE or welding cables.
- The welding gun/torch/electrode should never be pointed at the operator or other people.
- The welder 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 Spool Gun

Description

Your new Forney Spool PRO Hornet SG 250 spool gun was designed to be the most user-friendly and comfortable spool gun on the market, all while delivering unprecedented performance.

Ergonomics

Through a re-examination of feature and component placement, your spool gun was optimized for balance and usability. By draping the power cable out of the bottom of the spool gun and placing the welding wire spool beneath the wrist, the center of gravity is in the palm of your hand. This also presents a second hand-grip portion on the front of the spool gun allowing the gun to pivot. This allows you to consistently lay down longer, un-interrupted weld.

Efficiency

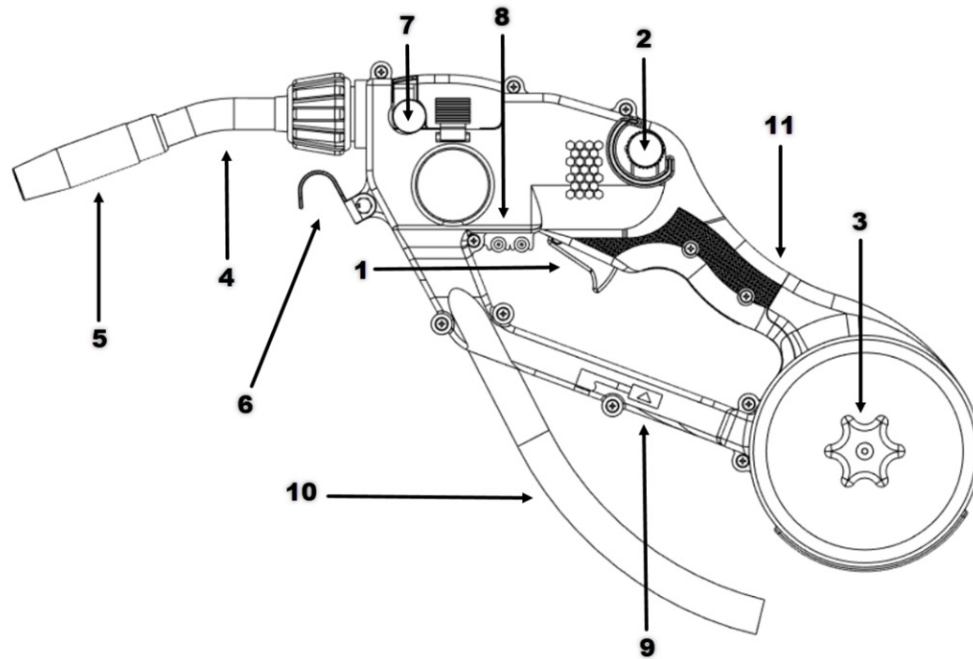
Your new spool gun was designed with your workflow in mind. We started from the ground up with a total overhaul of traditional spool gun functionality. Patent pending non-threaded engagement of the spool cover release, patent pending spool break and spool break lock, spool life indicator, tapered wire inlet guide, and integrated contact tip storage are all features that will help you get the job done.

Control

Because each job is different, the settings you use for one project might not be the best settings for another project. We wanted to take the time out of determining the right settings and finding the "sweet spot." That's why we've placed the wire feed speed control knob at your fingertips. This will allow you to precisely control the wire feed speed while welding so you can dial in the perfect settings with ease.

Spool Gun Layout and Controls

1. **Spool Gun Trigger** – On/Off spool gun control initiates wire feed, gas flow, and arc.
2. **Wire Feed Speed Adjustment Knob** – Allows the user to adjust wire feed speed while welding. Turning the knob counter-clockwise (or away from the user) increases the wire feed speed, and vice versa.
3. **Spool Cover Release Knob** – Using patent pending non-threaded engagement, this knob is turned counter-clockwise and pulled outward to remove the wire spool cover.
4. **Torch Neck**
5. **TWECO Style Consumables - Series 14H contact tips, 52FN gas diffuser, and 23-50 nozzle** – Your spool gun uses common TWECO Style Series 14H consumables that are readily available at most welding supply stores.
6. **Hanging Hook**
7. **Wire Tension Control Knob** – Allows the user to adjust the drive system tension on the welding wire.
8. **Integrated Contact Tip Storage** – Allows the user to store two additional consumable contact for convenience.
9. **Spool Brake / Spool Life Indicator** – The spool brake applies a constant braking force to the rotation of the welding wire spool. Your spool gun is equipped with a spool brake system that can be locked away for ease of wire spool replacement. The lock also serves as an approximate spool life indicator.
10. **25 Foot (7m) Power Cable** – Depending on the manufacturer of your power supply, your spool gun is equipped with a 25 foot power cable with either Euro-Connect, or other proprietary machine connections.
11. **Liner Inlet Guide** - The Teflon (PTFE) liner of your new Spool PRO Hornet SG 250 is a consumable part and will need to be replaced from time to time. It can be easily removed and replaced via the liner inlet guide.



Installing Your Spool Gun

If using a Forney power supply or welding machine, please follow these steps:

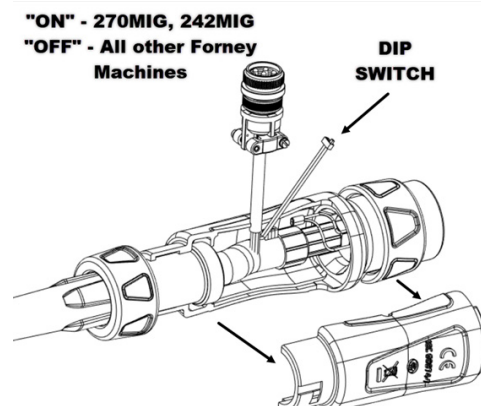
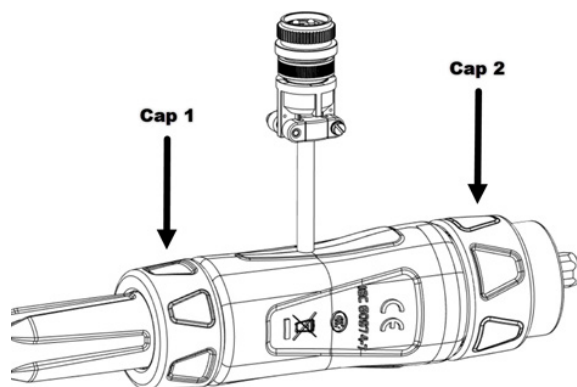
- Step 1: Open the rear Euro housing on the end of the power cable that plugs into the welding machine. This is accomplished by rotating Cap 1 and Cap 2 counterclockwise. This will allow you to remove half of the Euro housing and access the Model Selector Switch. **If using the Forney 190 MP (#324), or Forney 220 MP, the Model Selector Switch needs to be in the "Off" position. If using a Forney 242 MIG or 270 MIG, the Model Selector Switch needs to be in the "On" position.** Once finished, tuck the switch back inside of the housing and close the cover by re-installing the removable half of the Euro housing and turning both caps clockwise until they seat into position.
- Step 2: Ensure that your power supply or welding machine is turned off.
- Step 3: Ensuring proper alignment, thread the machine end of the spool gun power cable into the Euro Connect receptacle on the front of your welding machine.
- Step 4: Ensuring proper alignment, thread the 7-pin Amphenol™ connector into the Amphenol™ socket on the front of your welding machine. TIP: The Amphenol™ plug of your spool gun has an alignment notch. When installed correctly, this notch will be at the top center of the Amphenol™ socket.

If your welding machine or power supply does not have automatic accessory recognition capabilities:

- Step 5: Inside the cabinet of your Forney welding machine, locate a red switch with "remote" and "local" options. To operate a spool gun, this switch must be set to "remote." If this has been done correctly, the machine will display "SPE."

If using a power supply or welding machine that was not manufactured by Forney Industries:

- Please refer to your power supply or welding machine manufacturer's instructions.



Gas Cylinder and Regulator Connection

The gas cylinder (not supplied) should be located near the rear of the welder. It should be in a well-ventilated area and securely fixed to the work bench or to the wall to ensure it will not fall.

For safety and economy, ensure that the regulator is fully closed (turned counterclockwise) when not in use 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 down on the gas bottle valve and tighten.
- Connect the gas hose to the regulator, securing with the clip/nut provided.
- Connect the other end to the GAS INPUT on the back of the machine. If multiple GAS INPUT ports are present on the back of your Forney welding machine, use the port that is designated for MIG welding.
- Open the cylinder valve, then set the gas flow to approximately 20 - 35 CFH (cubic ft. per hour) on the regulator.
- To verify that the cylinder was installed properly, depress the spool gun trigger to ensure that the gas is flowing through the gun.



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 or strike an arc on it.

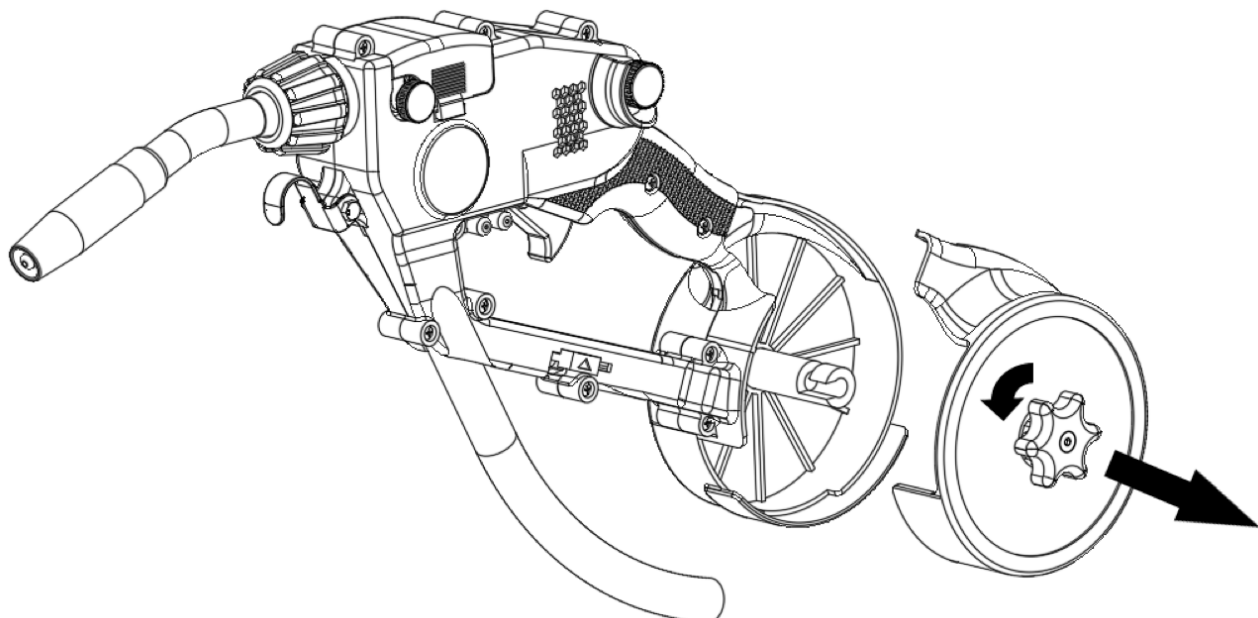
Installing the Welding Wire

ENSURE GAS AND ELECTRICAL SUPPLIES ARE DISCONNECTED. Before proceeding, remove the nozzle and the contact tip from the spool gun.

WARNING: ELECTRIC SHOCK CAN KILL! Always turn the ON/OFF SWITCH (11) to the OFF position and unplug the welder's INPUT POWER CABLE (12) from the AC power source before installing wire. When the gun trigger is depressed, the drive rolls, spool of wire, wire being fed, and electrode are all electrically live (hot).

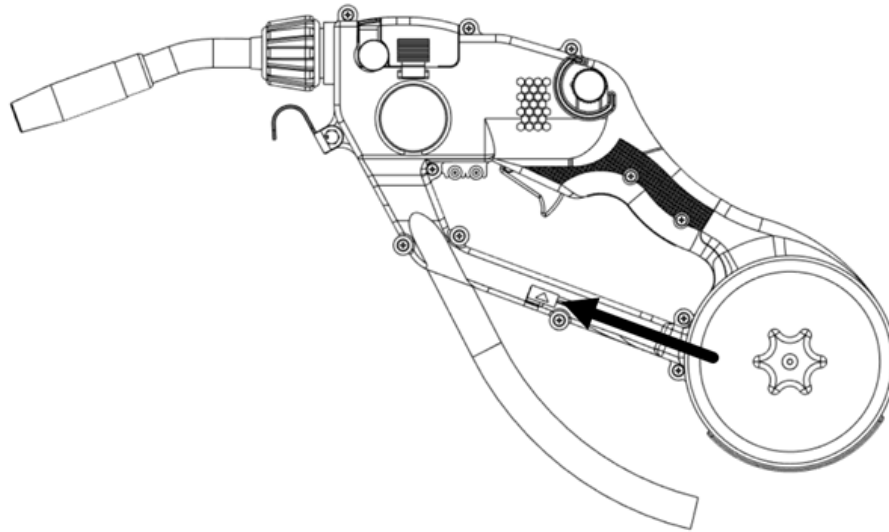
Step 1: Remove the wire spool cover from the spool gun:

- Locate the wire spool cover release knob (C) and rotate it approximately 90 degrees counter-clockwise. Once this motion has occurred, pull the knob away from the spool gun. This will remove the knob and the wire spool cover.

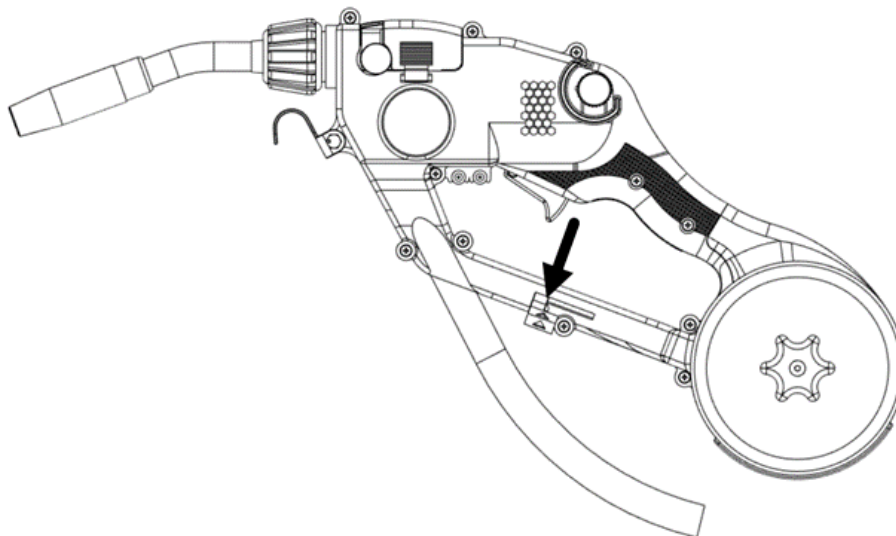


Step 2: Move the spool brake to the locked position:

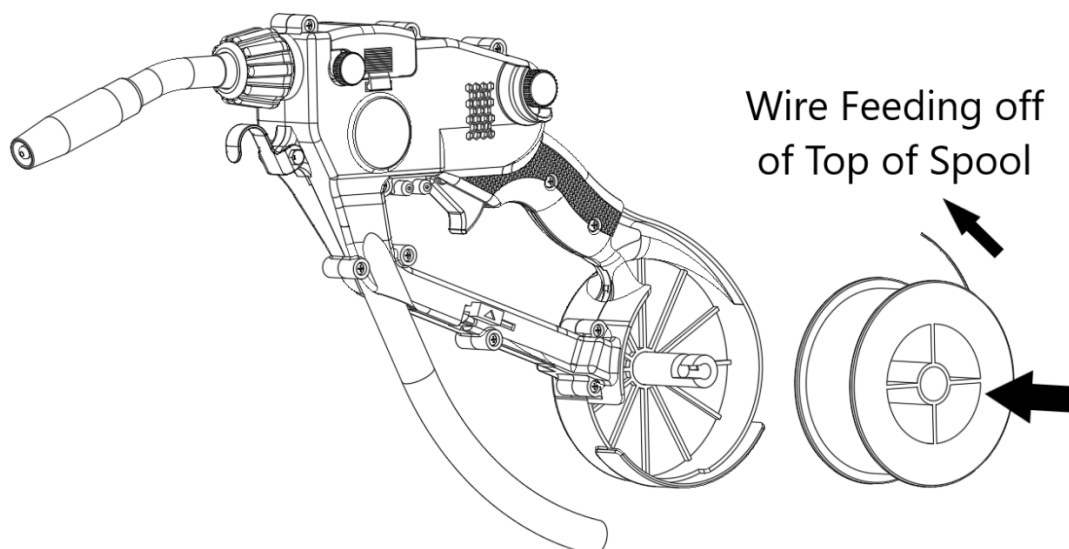
- Slide the spool brake lock (9) forward (away from the wire spool housing) until it reaches the front end of its stroke.



- Rotate the spool brake lock (9) downward into the locking notch:



Step 3: Install welding wire spool:

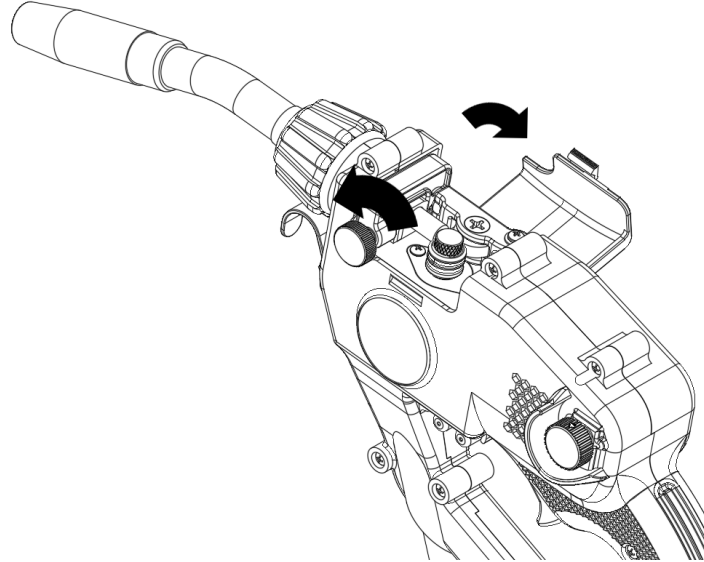


Step 4: Unlock spool brake:

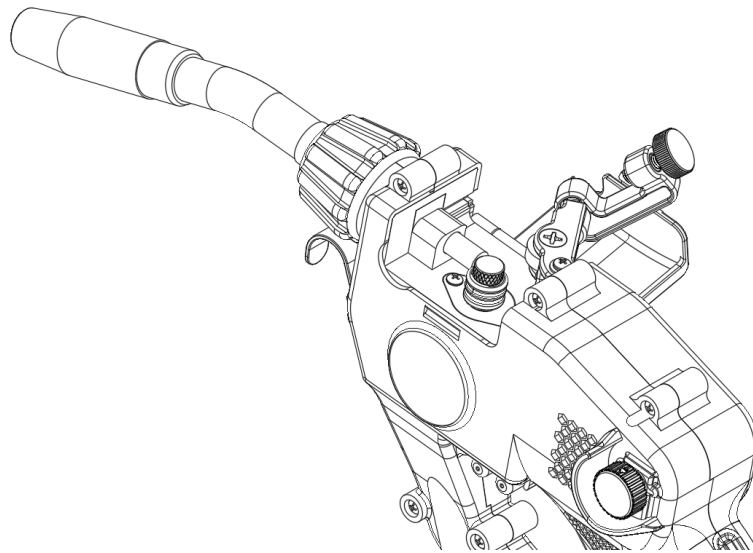
- Rotate the spool brake lock upward out of the locking notch.
- Release spool brake lock. Spring force will automatically drive the brake backwards until contact is made with the wire spool.

Step 5: Remove wire feed tension:

- Open wire feed mechanism cover.
- Remove wire feed tension by rotating the tens

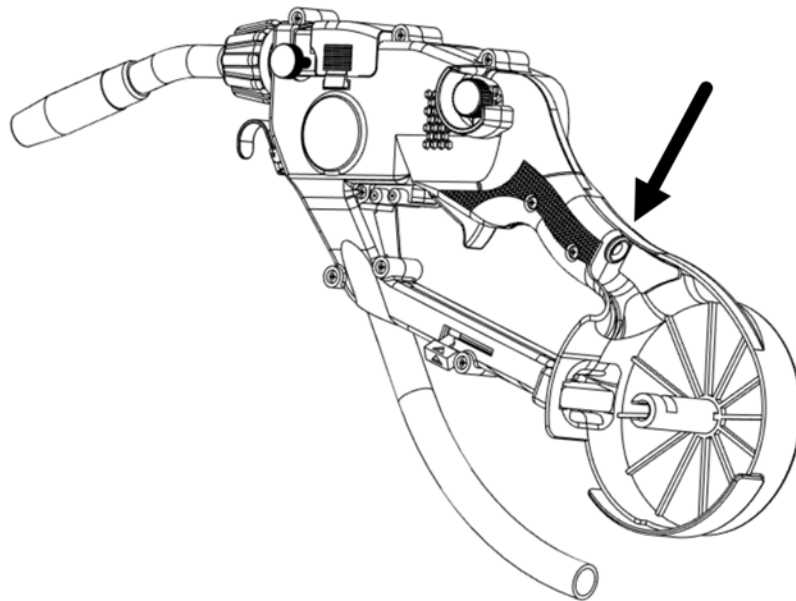


- Rotate the tension arms away from the main drive roller.



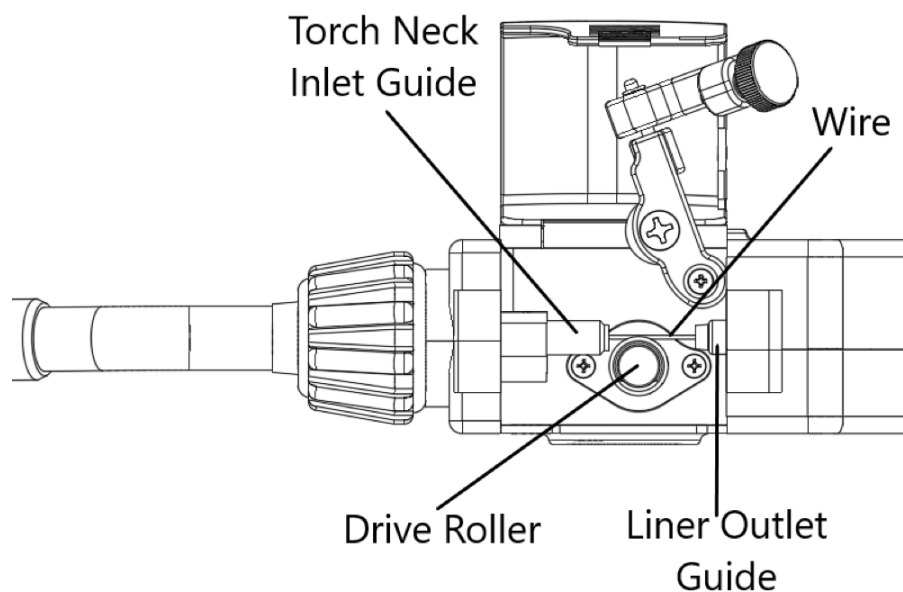
Step 6:

- Feed the free end of welding wire into the wire inlet guide located within the wire spool compartment. Continue to feed wire until wire protrudes out of the outlet guide near the drive system.



Step 7: Route the wire through the drive mechanism.

- Ensure that the wire leaves the liner outlet guide.
- Using your fingertips, route the wire past the drive roller and into the torch neck inlet guide.



Step 8: Close the tension arms and apply drive tension (reverse Step 5).

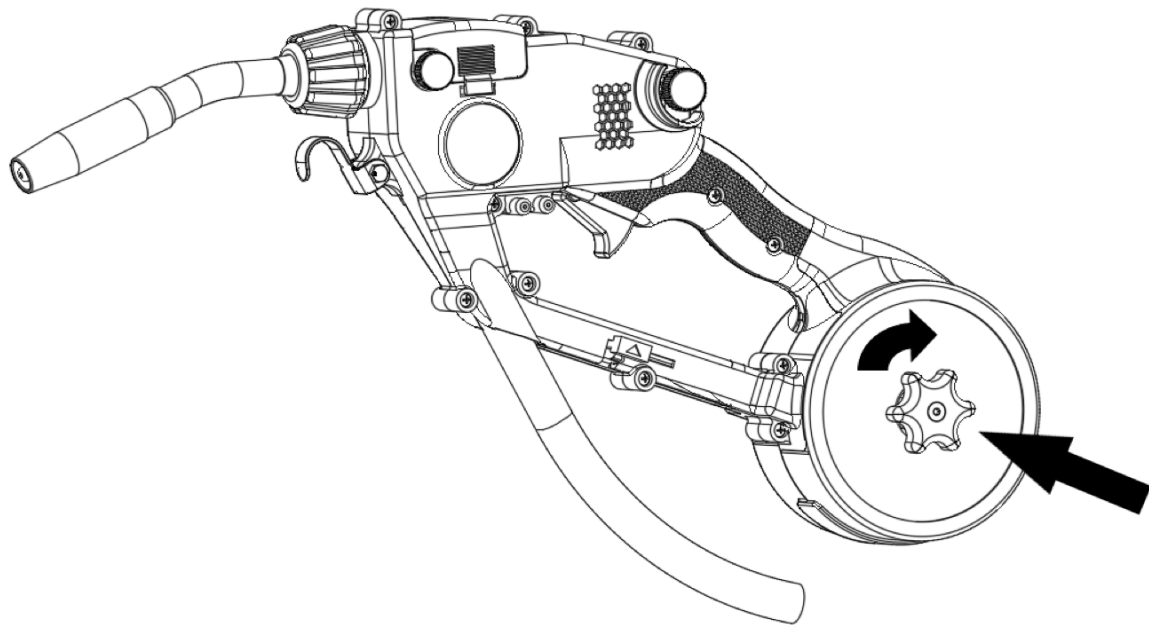
- Rotate the tension arms inward toward the drive roller.
- Lock the arms in place around the torch neck inlet guide block.
- Ensure that the welding wire is centered in the upper groove of the drive roller.
- Apply drive tension by rotating the drive tension knob (G) clockwise until snug.
 - TIP: More tension is not better! Use as little drive tension as possible while still feeding wire smoothly and continuously.

Step 9: Re-install wire spool cover (reverse Step 1).

- Place spool cover back into position over wire spool compartment.
- Pressing with an inward force, rotate the spool cover knob approximately 90 degrees clockwise.

Step 10: Verify this setup by depressing the spool gun trigger.

- Depressing the trigger should feed wire through the torch neck and out the nozzle of the spool gun. Feed several inches to ensure smooth operation.

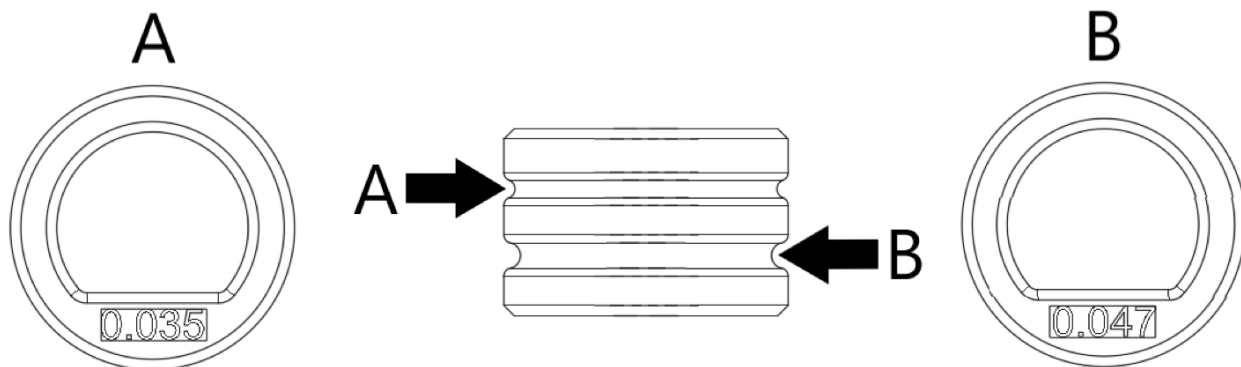


Drive Roll Groove Selection

Your Forney spool gun can be used with multiple welding wire sizes. It's important to use the drive roll groove that corresponds to the wire diameter you will use.

Always ensure that wire is being fed through the top groove of the drive roller to avoid possible birds nesting issues.

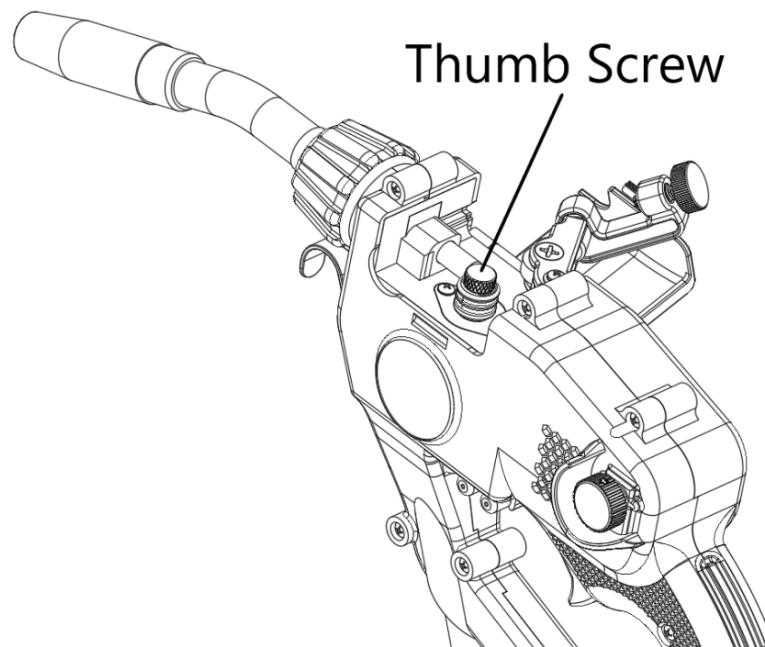
When installed in the spool gun, the top of the drive roll will display either 0.035" , or 0.047." The number that is present represents the size of the top groove on the drive roll:



If using 0.030" or 0.035" welding wire, the 0.035" groove should be used. This groove has been designed to accommodate both wire diameters.

Changing the Drive Roller

To remove or install the drive roller onto your Forney spool gun, simply remove the thumb screw from the top of the drive axle. Once this thumb screw is removed, the roller is free to slide on and off of the axle:



Operation

Welding Preparation

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

To properly prepare for welding with your new spool gun, it is necessary to:

- Read the safety precautions at the front of this manual.
- Prepare an organized, well-lit work area.
- Provide protection for the eyes and skin of the operator and bystanders.
- Attach the ground clamp to the bare metal to be welded, making sure of good contact.
- Make sure that the wire-roller groove corresponds to the diameter of wire being used.
- Plug the machine into a suitable outlet.
- Completely open the gas cylinder valve. Adjust the gas pressure regulator to the correct flow rate.

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.

Factors to Consider for Best MIG Welding Results

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

- Set the voltage (LEFT KNOB) and wire feed speed (RIGHT KNOB) to positions suitable for the thickness of the material to be welded. Welding current varies in relationship to wire feed speed. For low wire feed speed (RIGHT KNOB), welding current output will be low. Turning the wire feed speed control clockwise will result in increased wire feed speed and welding current. Welding voltage should be adjusted to match the wire feed speed/welding current. Progressively select higher voltage positions when 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 substantially changed). A change in wire diameter results in changed parameters. A larger diameter wire will draw a higher current than a smaller diameter wire at the same wire feed speed. If certain limits are exceeded, a satisfactory weld cannot be obtained. These are:

1. Feeding wire too fast (too high speed with regard to the welding voltage) results in pulsing within the gun. This is

because the wire electrode dips into the puddle and cannot be melted off fast enough.

2. Setting welding voltage too 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.
3. Excessive wire speed can be corrected through the arc voltage increase. The limit of this adjustment depends on the thickness of the material to be welded (a certain limit exceeded will result in burn through).

Place the gun on the joint you want to weld: the angle between the gun and the workpiece should be around 45°. The distance between the gun and the workpiece should be about 1/2" - 5/8." Lower your face shield and press the gun 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).

Adjusting Machine Settings

When using your new spool gun on a power supply or welding machine that was manufactured by Forney Industries:

- The left knob on the front of your welding machine will control the voltage of the weld.
- The right knob on the front of your welding machine will control the wire feed speed.
 - Depending on the model of your Forney welding machine, the wire feed speed control knob on the spool gun will either:
 1. Allow the user to scroll through the entire wire feed speed range from 0 to 100% of the capability of the welding machine (rendering the wire feed speed knob on the front of the welding machine useless).
 2. Allow for fine control, giving the user $\pm 10\%$ of the wire feed speed that is set using the knob on the front of the welding machine.

When using your new spool gun on a power supply or welding machine that was not manufactured by Forney Industries:

- Please refer to the welding machine manufacturer's instructions.

The following machine settings are to be used as baseline data. User experimentation and practice is encouraged to learn the true capabilities of your welder.

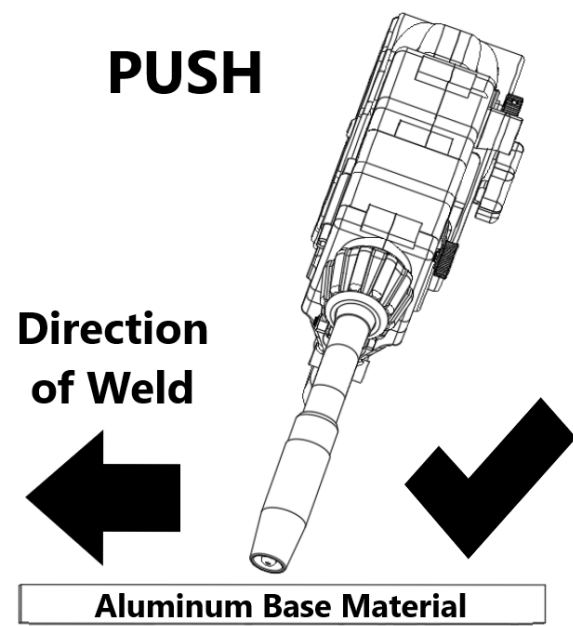
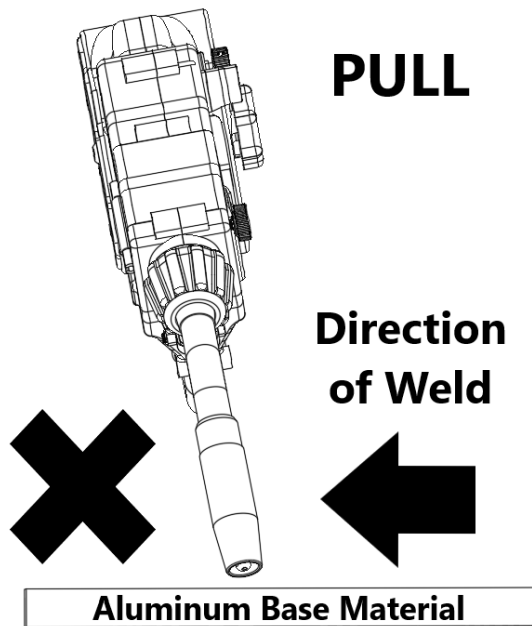
Basic MIG Settings for 4XXX Series Aluminum

Wire Diameter	Material Thickness	Voltage (V)	Wire Feed Speed (IPM)
0.030"	22 GA	13.5	200
	20 GA	13.5	240
	18 GA	14.5	290
	16 GA	15.5	340
	14 GA	16.5	370
	12 GA	17.5	425
	1/8"	25	450
	3/16"	25	500
	1/4"	28.5	550
	3/8"	29	600
0.035"	22 GA	13.5	150
	20 GA	13.5	180
	18 GA	14	220
	16 GA	15	250
	14 GA	15	270
	12 GA	17	325
	1/8"	25	410
	3/16"	25	450
	1/4"	27	525
	3/8"	28	550
0.047"	1/8"	20.5	200
	3/16"	20.5	220
	1/4"	27.8	250
	3/8"	27.5	260
	1/2"	28	280
	3/4"	30	290

Always use 100% Pure Argon when welding Aluminum

Push Vs. Pull

When MIG welding aluminum with a spool gun, it is very important that the user “push” rather than “pull” the weld. This ensures adequate shielding gas coverage for the weld zone and will dramatically improve weld appearance and quality:



Maintenance & Servicing

General Maintenance

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

1. Keep the spool cover and tension mechanism cover closed at all times unless the wire needs to be changed or the drive pressure needs adjusting.
2. Keep all consumables (contact tips, nozzles, and liner) clean and replace when necessary. See "Consumable Maintenance" (below) and "Troubleshooting" for detailed information.
3. Avoid directing grinding particles towards the spool gun. These conductive particles can build up inside the spool gun and cause severe damage.
4. Periodically clean dust, dirt, grease, etc. from your equipment.



WARNING: DISCONNECT FROM POWER SOURCE WHEN CARRYING OUT THIS OPERATION.

5. The wire feed drive roller will eventually wear during normal use. With the correct pressure, the idler roller must feed the wire without slipping. If the grooves in the wire feed drive roller are worn deep enough that the idler roller and the wire feed drive roller make contact when the wire is in place between them, the wire feed drive roller must be replaced.
6. Check all cables periodically. They must be in good condition and not cracked.



WARNING: ELECTRIC SHOCK CAN KILL! Be aware that the ON/OFF SWITCH, when OFF, does not remove power from all internal circuitry in the welder. To reduce the risk of electric shock, always unplug the welder from its AC power source and wait several minutes for electrical energy to discharge before removing side panels

IT IS VERY IMPORTANT TO MAINTAIN THE CONSUMABLES TO AVOID THE NEED FOR PREMATURE REPLACEMENT OF THE GUN ASSEMBLY.

MAINTAINING THE CONTACT TIP:

The purpose of the CONTACT TIP is to transfer welding current to the welding wire while allowing the wire to pass through it smoothly.

Always use a contact tip that is stamped one size larger in diameter than the welding wire it will be used with.

1. If the wire burns back into the tip, remove the tip from the gun and clean the hole running through it with an oxygen-acetylene torch tip cleaner or tip drill. If the burned-back wire cannot be removed, the tip will have to be replaced.
2. With extended use over time, this hole will become worn. Increased wear on the hole causes increased resistance in the transfer of welding current from the contact tip to the wire. This will result in less stable arc characteristics and difficult arc starting.

REPLACING THE LINER:

The liner routes the wire from the welding wire spool, through the handle, and into the wire feed mechanism. This liner is standard White Teflon (PTFE) Material (ID 2mm, OD 4mm).

1. Using a pair of pliers, grip the free end of the liner that is protruding from the liner inlet guide. This is found inside of the spool cover housing. Gently pull the old liner completely out of the gun.
2. Spare liners can be purchased from Forney Industries directly, or large quantities of liner material can be purchased online at a discounted price. The liner is standard white Teflon (PTFE) with ID = 2mm, OD = 4mm.
 - a. If making your own liner with material purchased online or elsewhere, cut the liner to approximately 8 inches in length.

i.*NOTE: Be sure to uncrimp the bore of the liner after cutting!

- b. Gently slide the new liner into the liner inlet guide of the spool gun until you feel it seat into position.
- c. Cut off any excess that is protruding from the liner inlet guide. Approximately 1/4" to 1/2" inch should protrude when cut to the correct length.
- d. Test that the liner is seated properly by running a length of wire through the liner until it enters the wire feed mechanism. This should be very smooth. If you feel any kinks or snags, re-seat the liner.

CAUTION: KEEP THE NOZZLE CLEAN!

During the welding process, spatter and slag will build up inside the nozzle and must be cleaned out periodically. Failure to clean and/or replace the nozzle in a timely fashion will cause damage to the front end of the gun assembly, which is not replaceable. The results of the inaction may require the replacement of the entire gun assembly.

Failure to keep the nozzle adequately cleaned can result in the following problems:

A shorted nozzle results when spatter buildup bridges across the insulation in the nozzle allowing welding current to flow through it as well as the contact tip. When shorted, a nozzle will steal welding current from the wire whenever it contacts the grounded workpiece. This causes erratic welds and reduced penetration. In addition, a shorted nozzle overheats the end of the gun which can damage the front-end of the gun.

TESTING FOR A SHORTED NOZZLE

Arcing between the nozzle and the workpiece always means the nozzle is shorted, but this can be hard to detect through the lens of a welding helmet. The following testing method is another way to tell if a nozzle is shorted.

With the welder unplugged from the AC power source, touch the probes of an ohmmeter or continuity tester to the end of the contact tip and the outside of the nozzle. If there is any continuity at all, the nozzle is shorted. Clean or replace as needed.

Troubleshooting

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

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

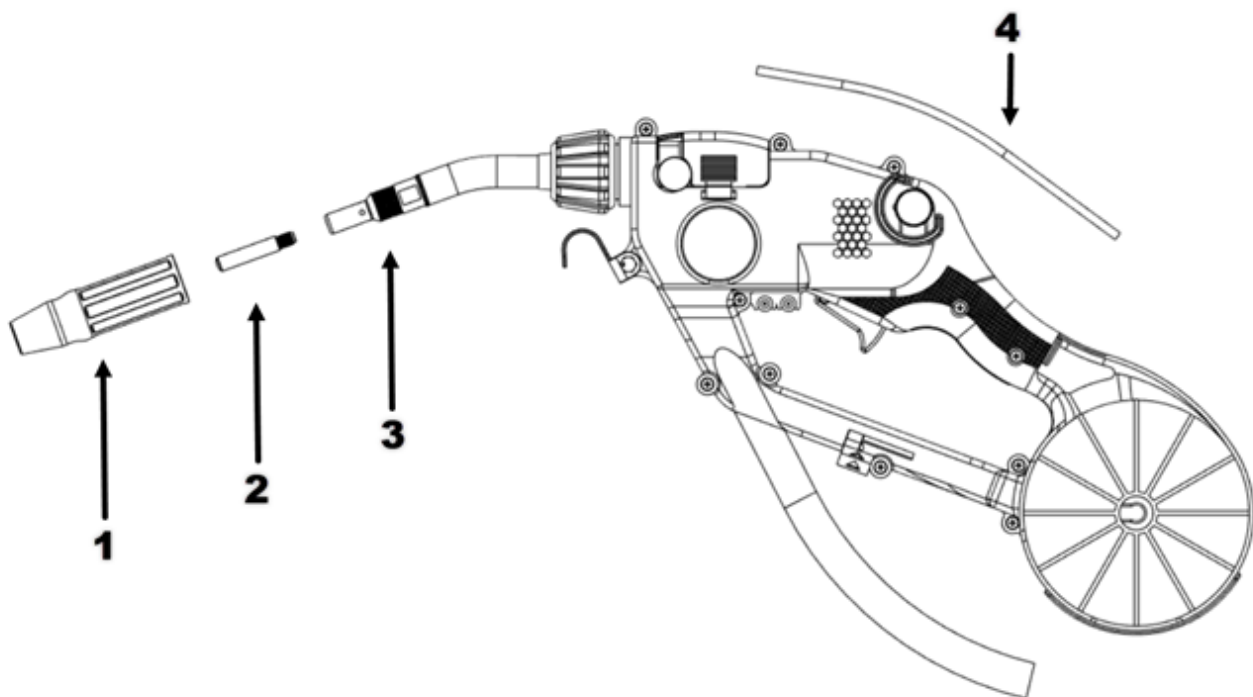
PROBLEM	POSSIBLE CAUSE	POSSIBLE SOLUTION
No arc / Weak or sporadic arc.	Cable connections loose.	Check connections. Tighten if necessary.
	Bad ground clamp connection.	Ensure the material surface is clean. Connect ground clamp to workpiece.
	Voltage is too low to establish arc.	Increase voltage.
	Contact tip is too large for the wire diameter.	When welding aluminum with a spool gun, always use a contact tip that is one size larger than the welding wire.
	Wrong welding polarity.	Aluminum MIG = DCEP, Steel MIG = DECP, Flux-Core MIG = DCEN.
	Material surface preparation needed.	Always weld on clean bright metal. Aluminum builds up on oxide layer that is non-conductive and extremely difficult to melt.
	Machine is in wrong process (SMAW or GTAW).	Ensure machine is set to MIG mode (manual 2T, manual 4T, synergic 2T, synergic 4T).
	Wrong wire type.	Ensure you are using the correct wire for the job and welding application.

PROBLEM	POSSIBLE CAUSE	POSSIBLE SOLUTION
No wire feed.	Wire feed tension too high.	Slowly remove wire feed tension while depressing the spool gun trigger. Use as little tension as necessary for smooth operation.
	Remote / local switch set to local.	Ensure switch is set to "Remote".
	Wire feed tension too low.	If drive roller is turning but wire is not feeding, release trigger and apply more tension. Use as little tension as necessary for smooth operation.
	Welding wire fused to contact tip.	Attempt to pull wire out of front of contact tip with pliers. If necessary, remove contact tip and cut welding wire. Discard contact tip.
	Wire feed speed set too low.	Increase wire feed speed.
	Contact tip is too small for the wire diameter.	Always use a contact tip that is one size larger than the welding wire.
	Using the wrong drive roll groove.	Ensure the top groove on the drive roller corresponds to the welding wire diameter.
	Wire is tangled on spool.	Try to untangle spool. If necessary, discard spool.
	Empty wire spool.	Replace wire spool.
Wire feed speed slows down.	Welder is in throttled back-feed mode.	If the Forney welding machine does not detect an arc after a few seconds with the trigger depressed, the wire feed speed is automatically throttled back.
Delay between trigger and wire feed.	Slope set too high.	Turn slope of motor down. (Only applies to models that have adjustable slope.)
Birdsnesting.	Wire is not aligned with torch neck inlet guide.	Ensure that the welding wire is aligned to flow smoothly onto the torch neck inlet guide.
	Wire feed too low.	Increase wire feed speed.
	Tension too low / too high.	Use as little tension as necessary for smooth operation.
	Welding wire is fused to contact tip.	Attempt to pull wire out of front of contact tip with pliers. If necessary, remove contact tip and cut welding wire. Discard contact tip.
	Contact tip is too small for wire diameter.	Always use a contact tip that is one size larger than the welding wire.
No gas flow.	Machine is in wrong process (SMAW or GTAW).	Ensure machine is set to MIG mode (manual 2T, manual 4T, synergic 2T, synergic 4T).
	Gas cylinder is closed.	Ensure that gas cylinder is fully opened. Set flowmeter to 25-30CFH.
	Gas cylinder is empty.	Ensure that the gas cylinder is not empty. If necessary, replace gas cylinder.
	Blockage in tank valve.	Remove regulator from tank. Purge tank to clear blockage.
Soot covered / discolored welds.	Wrong shielding gas.	Always use 100% pure argon shielding gas when welding aluminum.
	"Pulling" arc instead of "pushing" arc.	When welding aluminum, push the nozzle in the direction of the weld rather than pulling.
	Gas connection loose; sucking in atmosphere.	Ensure all gas fittings are tight.
	Gas flow too low.	Increase gas flow.
	Gas flow too high.	Decrease gas flow.

PROBLEM	POSSIBLE CAUSE	POSSIBLE SOLUTION
Welding wire fused to contact tip.	Using contact tip that is the same size as welding wire.	Always use a contact tip that is one size larger than the welding wire.
	Burn Back Time (BBT) set too high.	Turn burn back time (BBT) down.
	Wire feed speed too low.	Increase wire feed speed.
Excessive spatter.	Material surface preparation needed.	Always weld on clean bright metal. Aluminum builds up an oxide layer that is non-conductive and extremely difficult to melt.
	Wrong shielding gas.	Always use 100% pure Argon shielding gas when welding aluminum.
	Not enough shielding gas.	Ensure that gas cylinder is fully open. Set flow meter to 25-30CFH. Ensure that the gas cylinder is not empty. If necessary, replace gas cylinder.
	Wire feed too fast.	Decrease wire feed speed.
	Stick out too long.	Shorten the distance between the gas nozzle and the material being welded. Maintain a distance of 3/8" to 5/8".

Spool Gun Consumables List

Item	Description	Industry Standard #
1	Nozzle	TWECO Style 23-50
2	Contact Tip (0.030, 0.035, 0.040, 0.045)	TWECO Style 14H
3	Gas Diffuser	TWECO Style 52FN
4	White Teflon (PTFE) Liner (ID 2mm, OD 4mm)	-





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