TOOLIOM®

TL-135M

110V GASLESS MIG/STICK WELDER

Note: Please read this user's manual carefully before using this product.

SPECIFICATIONS

Flux MIG Output Amperage Range (A)	Maximum Output No Load Voltage (V)	Maximum Input Amperage (A)	Input Voltage (V)	Rated Duty Cycle	Wire Feeder Speed (m/min)	Welding Wire Spool Sizes
30-135	60V	20A	110VAC 60Hz	60%	2-11	D100 .030"/.035" 0.8/0.9mm

MMA/Lift TIG Output Amperage Range (A)	Maximum Output No Load Voltage (V)	Maximum Input Amperage (A)	Input Voltage (V)	Rated Duty Cycle
20-135	60V	20A	110VAC 60Hz	60%

Wire Type	Flux Cored
Diameter	.030"/.035" 0.8/0.9mm

ARC WELDING RODS

Type	E7018
Diameter	1/16", 3/32", 1/8"
Polarity	DCEP

UNPACKING

When unpacking your TOOLIOM TL-135M, check to make sure all of the parts listed below are included:

(1) TL-135M Welder
(1) MIG Gun Cable Assembly
(1) Welding Cable Assembly (10 ft.)
(1) Ground Cable Assembly (10 ft.)
(1) Wire Brush
(2) Contact Tips
(1) Instructions

DUTY CYCLE

The rated Duty Cycle refers to the amount of welding that can be done within an amount of time. It is easiest to look at your welding time in blocks of 10 Minutes and the Duty Cycle being a percentage of that 10 Minutes. If welding at 135 Amps with a 60% Duty Cycle, within a 10 Minute block of time you can weld for 6 Minutes with 4 Minutes of cooling for the welder.

SAFETY INFORMATION

The following explanations are displayed in this manual, on the labeling, and on all other information provided with this product:

⚠ DANGER

DANGER indicates a hazardous situation which, if not avoided, will result in death or serious injury.

⚠ WARNING

WARNING indicates a hazardous situation which, if not avoided, could result in death or serious injury.

⚠ CAUTION

CAUTION used with the safety alert symbol, indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.

⚠ NOTICE

NOTICE is used to address practices not related to personal injury.

⚠ READ INSTRUCTIONS

Thoroughly read and understand this manual before using. Save for future reference.

⚠ DANGER ELECTRIC SHOCK CAN CAUSE INJURY OR DEATH!

- Improper use of an electric Welder can cause electric shock, injury and death! Read all precautions described in the Welder Manual to reduce the possibility of electric shock.
- Disconnect Welder from power supply before assembly, disassembly or maintenance of the torch, contact tip and when installing or removing nozzles.
- Always wear dry, protective clothing and leather welding gloves and insulated footwear. Use suitable clothing made from durable flame-resistant material to protect your skin.
- Always operate the Welder in a clean, dry, well ventilated area. Do not operate the Welder in humid, wet, rainy or poorly ventilated areas.
- The electrode and work (or ground) circuits are electrically “hot” when the Welder is on. Do not allow these “hot” parts to come in contact with your bare skin or wet clothing.
- Separate yourself from the welding circuit by using insulating mats to prevent contact from the work surface.

- Be sure that the work piece is properly supported and grounded prior to beginning an electric welding operation.
- Always attach the Ground Clamp to the piece to be welded and as close to the weld area as possible. This will give the least resistance and best weld.

⚠ DANGER **WELDING SPARKS CAN CAUSE FIRE OR EXPLOSION!**

- Electric welding produces sparks which can be discharged considerable distances at high velocity igniting flammable or exploding vapors and materials.
- DO NOT operate electric arc Welder in areas where flammable or explosive vapors are present.
- DO NOT use near combustible surfaces. Remove all flammable items from the work area where welding sparks can reach (min. of 35 feet).
- Always keep a fire extinguisher nearby while welding.
- Use welding blankets to protect painted and or flammable surfaces; rubber weather-stripping, dash boards, engines, etc.
- Ensure power supply has properly rated wiring to handle power usage.

SAFETY INFORMATION

⚠ WARNING **ELECTROMAGNETIC FIELDS CAN BE A HEALTH HAZARD!**

- The electromagnetic field that is generated during arc welding may interfere with various electrical and electronic devices such as cardiac pacemakers. Anyone using such devices should consult with their physician prior to performing any electric welding operations.
- Exposure to electromagnetic fields while welding may have other health effects which are not known.

⚠ WARNING **ARC RAYS CAN INJURE EYES AND BURN!**

- Arc rays produce intense ultraviolet radiation which can burn exposed skin and cause eye damage. Use a shield with the proper filter (a minimum of #11) to protect your eyes from sparks and the rays of the arc when welding or when observing open arc welding (see ANSI Z49.1 and Z87.1 for safety standards).
- Use suitable clothing made from durable flame-resistant material to protect your skin.
- If other persons or pets are in the area of welding, use welding screens to protect bystanders from sparks and arc rays.

⚠ WARNING **FUMES AND WELDING GASES CAN BE A HEALTH HAZARD!**

- Fumes and gasses released during welding are hazardous. Do not breathe fumes that are produced by the welding operation. Wear an OSHA-approved respirator when welding.
- Always work in a properly ventilated area.

- Never weld coated materials including but not limited to: cadmium plated, galvanized, lead based paints.

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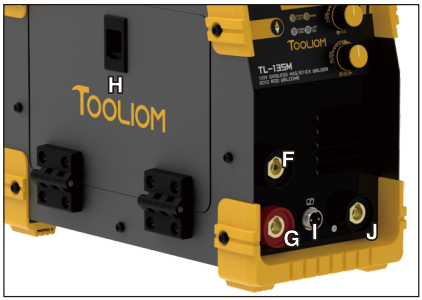
- Electric welding heats metal and tools to temperatures that will cause severe burns!
- Use protective, heat resistant gloves and clothing when using TOOLIOM or any other welding equipment. Never touch welded work surface, torch tip or nozzle until they have completely cooled.

⚠ CAUTION **FLYING METAL CHIPS CAN CAUSE INJURY!**

- Grinding and sanding will eject metal chips, dust, debris and sparks at high velocity. To prevent eye injury wear approved safety glasses.
- Wear an OSHA-approved respirator when grinding or sanding.
- Read all manuals included with specific grinders, sanders or other power tools used before and after the welding process. Be aware of all power tool safety warnings.

COMPONENTS

(A) Selection button-switching between .030"/0.8mm, .035"/0.9mm, MMA(STICK) and Lift TIG
(B) Voltage Knob-Micro adjust from -5 to +5(Low to High,-1.5V to +1.5V)
(C) Wire Feed Speed/Ampere Knob- adjusting welding current from 20A to 135A(MMA/Lift TIG) and 30A to 135A(0.8/0.9mm Flux MIG). Wire feed speed will be auto changing against welding current by welder data(Software controlled)
(D) Thermal Protection LED
(E) Power Indicator LED
(F) MIG Torch Connector
(G) Positive Connector(+)
(H) Latch
(I) Torch Switch
(J) Negative Connector(-)



INSTALLATION

⚠ DANGER **ELECTRIC SHOCK HAZARD!**

Turn welder off and unplug from electrical outlet before disassembly, assembly, or replacing torch consumables, or changing wire spool.

INSTALLING THE GROUND CLAMP

Insert the terminal connection of the ground clamp through the destinated hole in the front of the unit.

FLUX WIRE .030"(0.8mm) / .035"(0.9mm)
Insert the terminal connection of the ground clamp through the positive hole(+).

MMA (STICK WELD)
Insert the terminal connection of the ground clamp through the negative hole(-), insert the terminal connection of the Electrode Holder through the positive hole(+).

Lift TIG
Insert the terminal connection of the ground clamp through the positive hole(+),insert the terminal connection of the lift tig torch(Not included in the machine) through the negative hole(-).

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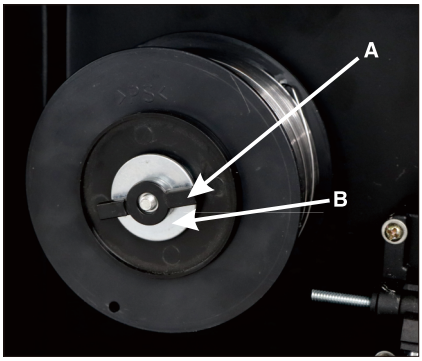
Disconnect welder from power supply before beginning.



INSTALLING WIRE SPOOL

1. Open the door on the welder and remove the wing nut **(A)**, spacer **(B)** from the Spool Spindle;
2. Place the D100(Ø4") Wire Spool onto the spindle, reinstall the spacer and the wing nut in a safe place, in case they are needed in the future;
3. Tighten the wing nut till there is a slight resistance to spin the wire spool on the spindle. If the tension is loosely set, the wire spool will spin on the shaft and unspool all of the wire. If the tension is tightly set, the drive roller will have difficulty feeding the wire, and may cause slipping.
   NOTE: Hold the exposed wire end to keep the spool visible.

CONNECTING THE WELDER TO A POWER SOURCE

The TOOLIOM TL-135M welder requires a dedicated 120VAC 30A grounded outlet protected by a breaker. Extension cord requirements: 12 AWG, length up to 50'.

CHANGING THE DRIVER ROLLER

The wire feed drive roller on the drive motor has 1 groove, .030"(0.8mm) welding wire and .035"(0.9mm) welding wire. TL-135M comes with the drive roller installed for using .030"(0.8mm) wire. Change .035"(0.9mm) drive roller before changing .035"(0.9mm) welding wire.

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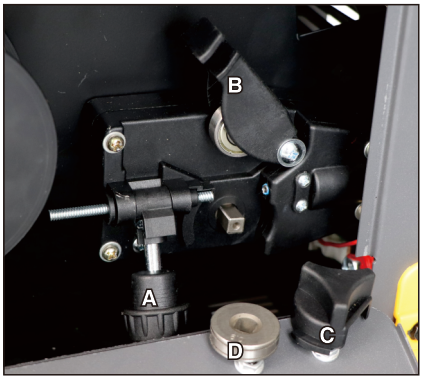
Turn welder off and unplug from electrical outlet before removing or installing the Drive Roller.



1. Unlock the Pressure Adjuster **(A)** by pulling the top wing nut towards the bottom of the welder.
2. Lift the Rocker Arm **(B)** and rotate the drive roller by hand until you have access to the set screw in the center of the roller.
3. Loosen the set screw **©**.
4. Slide the drive roller **(D)** off the shaft.
5. Determine which size wire is going to be used and slide the Drive Roller back onto the shaft by lining up the set screw with the flat area on the shaft.
   NOTE: The stamped marking on the side of the Drive Roller indicates the size of the groove on the opposite side of the roller. The groove closest to the drive motor is the groove that will be used. If setting up to use .030" (0.8mm) wire, the '0.8' stamping should be facing the user when installing it.
6. Tighten the set screw on the Drive Roller and lower the Rocker Arm **(B)** back into place.
7. Lift up on the Pressure Adjuster **(A)** to put back in place and adjust as necessary.

MIG WELDING OPERATION

1. Be sure the power cord is unplugged and the power switch is in the "off" position.
2. Plug the power cord into a properly grounded, 120 VAC, 50/60HZ, 20A outlet (110V) Make sure the Ground Clamp is contacted with the workpiece. Please plug the Brass Connector of the Ground Clamp into the Brass Receptacle on the front panel.
3. Insert the MIG Torch into the MIG torch connector and screw in clockwise. Install the torch control switch on the panel switch socket.
4. Insert the Brass Connector of the Ground Clamp cable into the Positive (+) Brass Receptacle on the front panel.
5. Attach the Ground Clamp to the workpiece as close to the welding area as possible. To ensure good ground, clean the grounded area of any rust, grease, oils or paint.
6. Ensure the Wire spool is installed in a right position, check the tension on the wire.
7. Place a right drive roller into the wire feeder; The TL-135M can be used with either a 0.8mm or a 0.9mm drive roller.
8. Threading welding wire through the dive roller to the welding gun.
9. Turn on the power switch at the rear panel of the welder.
10. Adjust the UPPER KNOB to set the voltage.
11. Turn the LOWER KNOB to choose the best current you want then press the MIG TORCH SWITCH for wire feeding by manual.
12. During the welding process, voltage and inductance can be adjusted by manual.

MIG WELDING OPERATION

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⚠ CAUTION **INADEQUATE WIRING CAN CAUSE FIRE AND INJURY!**

- **Verify that the facility power source has properly rated wiring to handle power requirements of this Welder.**

Your TOOLIOM TL-135M can be used to form many different joints and welds all of which will require practice and testing before using on an actual project piece. This following welding process is just a baseline to get you started.

- Refer to the 'WELDING CHART' which is located inside your TOOLIOM Welder. From the chart select your baseline starting point for the recommended settings described in the chart.
- Connect your ground clamp to the work pieces that are to be welded. Make sure the ground clamp contacts are placed on a clean piece of metal free of paint, grease, rust, oils, etc. It is recommended to place your ground clamp as close to the weld area as possible.
- Assess your weld area and make sure the welding area is also cleaned of any paint, grease, rust, oils, etc.
- Plug in the Welder and move the Power Switch at the Back Panel to the "ON" position Depress the Welding Gun trigger pointing the welding gun away from your body and then let go of the trigger and cut the wire back to 1/4" stick out length.
- Wearing your welding helmet, gloves, and long sleeve shirt and pants, put the end of the wire sticking out of the gun into the joint to be welded.
- Position the MIG Gun so that it is perpendicular to the base metal with -20° tilt back.
- Depress the trigger to start the wire feed which starts the arc.
  NOTE: A push, perpendicular, or drag technique can be used to weld the pieces together; the type used depends on the type of joint as well as other influential conditions.
- Once you depress the trigger and the arc has started, you will notice a molten puddle will form; this puddle is the weld bead and will follow the motion of the MIG Gun. Watching the size of the puddle dictates how fast you should be moving with the torch. If you burn through the material you are either moving to slow or you need to make some setting adjustments to the Welder settings. If you're not penetrating the base metal you're either moving too fast or you need to make adjustments to the Welder settings.
- Release the trigger on the MIG Gun to stop the weld.
- After welding is complete, turn off the Welder and disconnect from power source.

SHEET METAL WELDING TECHNIQUES

When welding sheet metal a different approach is usually taken to account for how thin the metal is and it's susceptible to warping it is. The technique most often used is called Stitch Welding and this process is described below:

- Clean the metal to be welded of any paint, rust, oil, grease, dirt or any other contaminants that may be on the surface of the piece.
- Secure the pieces to be welded in place using clamps. Be sure to leave a small gap between the two pieces of sheet metal for the weld to flow into, this will result in a lower bead height which will require minimal finishing.
- Consult the Suggested Settings Chart and set the Voltage and Wire Speed knobs appropriately. Get some pieces of scrap metal of the same thickness and verify that the settings will work for the specific weld you will be making.
- Once the settings have been fine tuned tack weld your final pieces in places and remove the clamps if they are in the way of the weld.

- The Stitch Welding technique can now be utilized which is basically a series of tacks connecting together. To perform the technique, trigger the gun to form a tack weld and then continue to trigger on and off the gun making a series of connected tack welds following along the path of the weld joint. Continue the series of tacks for an inch or so and then move to a different section of the weld and perform the process there. It is essential to keep moving around to spread out the heat making sure not to get one section too hot and warp the metal.
- Once the entire weld has been completed allow the metal to cool. If necessary follow up with a flap disc to grind the weld bead flush.

HEAVY GAUGE METAL WELDING TECHNIQUES

When welding heavy gauge metal, a continuous bead is formed using a 'push' method. This process is described below:

- Clean the metal to be welded of any paint, rust, oil, grease, dirt or any other contaminants that may be on the surface of the piece.
- Secure the pieces to be welded in place using clamps. Be sure to leave a small gap between the two pieces of metal for the weld to flow into, this will result in a lower bead height which will require minimal finishing. Any material thicker than 1/8" should be beveled using an angle grinder.
- Consult the Suggested Settings Chart and set the Voltage and Wire Speed knobs appropriately.
- Get some pieces of scrap metal of the same thickness and verify that the settings will work for the specific weld you will be making.
- Once the settings have been fine-tuned tack weld your final pieces in places and remove the clamps if they are in the way of the weld.
- When welding heavy gauge metal there are two basic approaches to creating the weld. The first is a continuous bead with steady gun movement along the length of the joint. The second type of weld is a Stringer or Weave bead. This is accomplished by moving the torch in a circular or zig zag pattern. Either of these techniques will create strong welds but in some cases the Stringer or Weave type will create a more aesthetically pleasing weld bead.
- Once the entire weld has been completed, allow the metal to cool. If necessary, follow up with a flap disc to grind the weld bead flush.

SET UP

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- **Disconnect Welder from power supply before beginning.**

Set the Welder on a flat surface in the general area where the Welder will be used. A dedicated cart is best.

- Set the Process Selector Switch [A] on the Front Panel to MMA(Stick).
- Locate the Ground Clamp with Cable and connect the plug on the cable end into the Negative (–) receptacle on the Lower Right Front Panel of the Welder. To connect the plug; align the key of the brass ferrule with the notch of the receptacle at the 12:00 position then rotate 1/2 turn Clockwise to lock.

- Locate the Electrode Holder with Cable and connect the plug on the cable end into the Positive (+) Connection Receptacle on the Lower Front Panel of the Welder. To connect the plug; align the key of the brass ferrule with the notch of the receptacle at the 12:00 position then rotate 1/2 turn Clockwise to lock.
- Connect the Welder to a power source. This Welder requires a minimum (30Amp @ 120V), 60Hz protected circuit.
- Insert the electrode to be used into the Electrode Holder.
- Connect the Ground Clamp to a clean bare metal surface of the part to be welded.
- Turn on the Power Switch at the Back Panel of the Welder.
- The Welder is now ready to use.

STICK WELDING OPERATION

Electrode Selection

Before beginning welding with your TOOLIOM TL-135M, you will need to purchase electrodes as these are a consumable item in the ARC welding process. There are a variety of different types of rods available and should be selected depending on the project on hand. The chart below is an overview of some of the most popular electrodes.

Electrode	Polarity	Usage
E7018	DCEP	This electrode is best for use with clean, bare steel and is suitable for moderate penetration.

POLARITY SELECTION

The TOOLIOM TL-135M can weld in both Direct Current Electrode Positive (DCEP) and Direct Current Electrode Negative (DCEN). The electrode, or rod, when welding in DCEP is positive and the grounded surface is negative. This polarity is used with electrodes that specify it and is usually the most commonly used polarity when ARC welding for general purpose use. The electrode when welding in DCEN is negative and the grounded surface is positive. This polarity is used with electrodes that require using this polarity and is usually used for building up heavy deposits of material with less penetration.

To use the TOOLIOM TL-135M in DCEP:

- Locate the Ground Clamp with Cable and connect the plug on the cable end to the Ground Cable Connector (–) on the Welder. To connect the plug line up the key on the plug with the keyway on the socket of the Welder, insert the plug and twist until it is tight.
- Locate the Electrode Holder with Cable and connect the plug on the cable end to the Electrode Holder Connector (+) on the Welder. To connect the plug line up the key on the plug with the keyway of the socket on the Welder, insert the plug and twist until it is tight.

To use the TOOLIOM TL-135M in DCEN:

- Locate the Ground Clamp with Cable and connect the plug on the cable end to the Positive Connector (+) on the Welder. To connect the plug line up the key on the plug with the keyway on the socket of the Welder, insert the plug and twist until it is tight.
- Locate the Electrode Holder with Cable and connect the plug on the cable end to the Negative Connector (–) on the Welder. To connect the plug line up the key on the plug with the keyway on the socket of the Welder, insert the plug and twist until it is tight.

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STICK WELDING PROCEDURE

- Set up a clean will lit work area.
- Prepare the parts to be welded by cleaning the weld joint area of any rust, dirt, grease, or paint.
- Select the proper electrode for the weld joint.
- Turn on the Welder and select the appropriate amperage. To determine proper amperage it is best to practice on some similar metals to set up the machine before welding on an actual part of value.
- Attach the ground clamp to a clean bare metal section on the work piece.

- Insert the electrode into the electrode holder being careful not to allow the electrode to contact the grounded area.
- To start welding an arc must be struck, to do this a motion similar to striking a match will have to be performed with the electrode. Slowly bring the electrode closer to the weld joint and then contact and drag the electrode across the piece to strike the arc. Once the arc has been stuck you can continue feeding the electrode into the weld joint.
- While moving along the weld joint the electrode will burn down, while it is burning you will need to continue moving the electrode closer to the joint trying to keep a 1/8" gap between the end of the electrode and the weld joint. The electrode holder must be held so that the electrode is in a downward angle moving in the direction of the weld joint.
- To stop welding simply lift the electrode away from the work piece. When finished welding remove the electrode from the holder and turn off the Welder.

Lift TIG WELDING SET-UP AND OPERATION

SHIELDING GAS CONNECTION FOR Lift TIG TORCH

⚠ WARNING BUILDUP OF GAS CAN INJURE OR KILL!

- **Shut off shielding gas supply when not in use.**
- **Always ventilate confined spaces or use approved air-supplied respirator.**
- **Always turn your face away from valve outlet when opening cylinder valve.**

⚠ WARNING CYLINDERS CAN EXPLODE IF DAMAGED!

- **Shielding gas cylinders contain gas under high pressure. If damaged, a cylinder can explode. As gas cylinders are a normal compo nent of the welding process, use extra care to handle them carefully.**
- **Protect compressed gas cylinders from excessive heat, mechanical shocks, physical damage, slag, open flames, sparks and arcs. Keep away from any welding or other electrical circuits.**
- **Install cylinders in an upright position by securing to a specifically designed rack, cart or stationary support to prevent falling or tipping over.**
- **Never weld on a pressurized cylinder or explosion will occur.**
- **Use only correct shielding gas cylinders, regulators, hoses and fittings designed for the specific application; maintain them and all related components in good condition.**
- **Keep protective cap in place over valve except when cylinder is in use.**
- **Use proper equipment, procedures and have adequate help when moving or lifting cylinders.**

A Shielding Gas Bottle is NOT INCLUDED with your TOOLIOM TL-135M but is necessary for Lift TIG welding. A Shielding Gas Bottle can be bought at most local Welding Supply Stores. TOOLIOM recommends the use of 100% Argon shielding gas when Lift TIG welding Steel and Stainless Steel.
After connecting your Shielding Gas Regulator, the gas flow rate needs to be adjusted so that the proper amount of Shielding Gas is flowing over your weld. If there is too little gas flow there will be porosity in your welds as well as excessive spatter, if there is too much gas flow you will be wasting gas and may affect the weld quality.

- Place the TOOLIOM TL-135M in its dedicated area or on a welding cart.
- Secure your Shielding Gas Bottle to a stationary object or mount to your welding cart if it is equipped to hold one so that the cylinder cannot fall over.
- Remove the cap from the Shielding Gas Bottle.
- Install the Regulator Knob on the Shielding Gas Regulator.
- Insert the large brass male fitting on the Shielding Gas Regulator into the female fitting on the Shielding Gas Bottle.

⚠ NOTICE

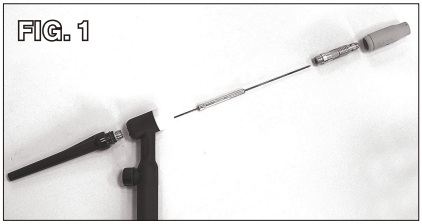
- **Do not use White Thread Sealing Tape on this connection as it is an inert gas fitting and does not require it. If you have a leak check for burrs or dirt in the threads.**

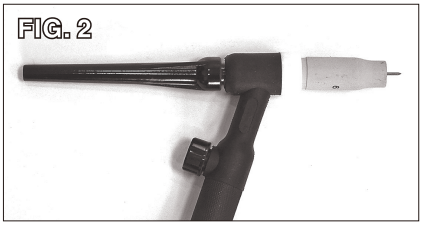
- Tighten the fitting with a wrench until snug, do not over tighten.
- Connect Lift TIG Torch gas line to the fitting on the Regulator and wrench-tighten until snug.
  Check the gas line for leaks by slowly opening the valve on the gas bottle. When welding, the valve
- on the bottle should always be fully open.

TORCH ASSEMBLY/DISASSEMBLY

Disassembly:

- Make sure the welder is turned OFF and unplugged.
- Remove the Back Cap from the Torch.
- If there is a Tungsten installed in the Torch pull it out of the front of the Torch.
- Slide the Collet out of the Torch.
- Unscrew and remove the Gas Shielding Nozzle.
- Unscrew and remove the Collet body.

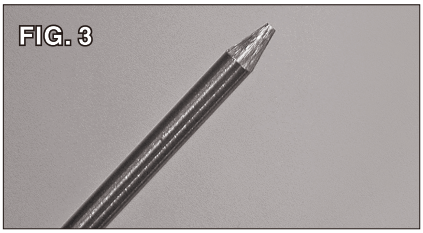


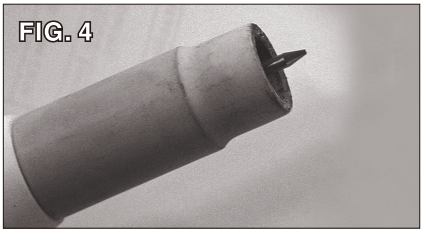


Assembly: (FIG 1)

- Select a Collet body that matches your Tungsten diameter size and thread it into the front of the Torch.
- Select a Collet that matches your Tungsten diameter size. Insert the Tungsten into the Collet and put the Collet and Tungsten back into the Torch.
- The Gas Shielding Nozzle size should be changed according to shielding gas requirements for the material being welded. Thicker material requires a larger Nozzle. Select the correct Gas Shielding Nozzle and thread it onto the Collet body.

Install the back cap to lock the Tungsten in place. Always make sure the Tungsten protrudes 1/8" to 1/4" beyond the Gas Shielding Nozzle **(FIG 2).**





SHARPENING THE TUNGSTEN

To avoid contamination of the Tungsten and ultimately the weld, it is imperative to have a dedicated grinding wheel used for Tungsten grinding only. A fine grit standard 6" synthetic stone grinding wheel on a bench top grinder is sufficient or our specifically designed TOOLIOM Tungsten Grinders are available.

- Shut off the welder.
- Make sure the Tungsten and Torch are sufficiently cooled for handling then loosen and remove the
- Back Cap then the Collet and remove the Tungsten from the FRONT of the Torch only. (Removing from the rear will damage the Collet).
- If the Tungsten is used and the end is contaminated, use pliers or a suitable tool to grip the Tungsten above the contaminated section and snap off the end of the Tungsten.
- Holding the Tungsten tangent to the surface of the grinding wheel, rotate the Tungsten while exerting light pressure until a suitable point is formed. The ideal tip will have the length of the conical portion of the sharpened area at 2-1/2 times the Tungsten rod diameter **(FIG 3).**
- Replace the Tungsten in the Collet with the tip extending 1/8"-1/4" beyond the Gas Shielding Nozzle, then re-tighten the Back Cap **(FIG 4).**

Lift TIG WELDING SET-UP

⚠ DANGER ELECTRIC SHOCK CAN CAUSE INJURY OR DEATH!

- **Disconnect Welder from power supply before beginning.**

- Set the Welder on a flat surface in the general area where the Welder will be used. A dedicated cart is best.
- Set the Process Selector Switch [A] on the Front Panel to “Lift TIG”.
- Insert the Brass Connector of the Lift TIG Torch Cable into the Negative (–) on the Lower Left Front Panel of the Welder. To connect the plug line up the key on the plug with the keyway on the socket of the Welder, insert the plug and twist until it is tight.
- Insert the Brass Connector of the Ground Cable into the Positive (+) on the Lower Right Front Panel of the Welder. To connect the plug line up the key on the plug with the keyway on the socket of the Welder, insert the plug and twist ½ turn until it is tight.
- Connect the Welder to a power source. This Welder requires a minimum (30 Amp @ 120V), 60 Hz Protected Circuit.
- Insert the electrode to be used into the Electrode Holder.
- Connect the Ground Clamp to a clean bare metal surface of the part to be welded.
- Turn on the Power Switch at the Upper Back Panel of the Welder.
- The Welder is now ready for use.

Lift TIG WELDING

⚠ DANGER **ELECTRIC SHOCK CAN CAUSE INJURY OR DEATH!**

- **Improper use of an electric Welder can cause electric shock, injury and death! Read all precautions described in the Welder Manual to reduce the possibility of electric shock.**
- **Disconnect Welder from power supply before assembly, disassembly or maintenance of the torch, contact tip and when installing or removing nozzles.**
- **Always wear dry, protective clothing and leather welding gloves and insulated footwear. Use suitable clothing made from durable flame-resistant material to protect your skin.**
- **If other persons or pets are in the area of welding, use welding screens to protect bystanders from sparks.**
- **Always operate the Welder in a clean, dry, well ventilated area. Do not operate the Welder in humid, wet, rainy or poorly ventilated areas.**
- **The electrode and work (or ground) circuits are electrically "hot" when the Welder is on. Do not allow these "hot" parts to come in contact with your bare skin or wet clothing.**
- **Separate yourself from the welding circuit by using insulating mats to prevent contact from the work surface.**
- **Be sure that the work piece is properly supported and grounded prior to beginning an electric welding operation.**
- **Always attach the ground clamp to the piece to be welded and as close to the weld area as possible. This will give the least resistance and best weld.**

⚠ DANGER **WELDING SPARKS CAN CAUSE FIRE OR EXPLOSION!**

- **Electric welding produces sparks which can be discharged considerable distances at high velocity igniting flammable or exploding vapors and materials.**
- **Do not operate electric arc Welder in areas where flammable or explosive vapors are present.**
- **Do not use near combustible surfaces. Remove all flammable items within 35 feet of the welding area.**
- **Always keep a fire extinguisher nearby while welding.**
- **Use welding blankets to protect painted and or flammable surfaces; rubber weatherstripping, dash boards, engines, etc.**
- **Ensure power supply has properly rated wiring to handle power usage.**

⚠ DANGER **ELECTROMAGNETIC FIELDS CAN BE A HEALTH HAZARD!**

- **The electromagnetic field that is generated during arc welding may interfere with various electrical and electronic devices such as cardiac pacemakers. Anyone using such devices should consult with their physician prior to performing any electric welding operations.**
- **Exposure to electromagnetic fields while welding may have other health effects which are not known.**

⚠ WARNING **ARC RAYS CAN BURN!**

- **Arc rays produce intense ultraviolet radiation which can burn exposed skin and cause eye damage. Use a shield with the proper filter (a minimum of #11) to protect your eyes from sparks and the rays of the arc when welding or when observing open arc welding (see ANSI Z49.1 and Z87.1 for safety standards).**
- **Use suitable clothing made from durable flame-resistant material to protect your skin.**
- **If other persons or pets are in the area of welding, use welding screens to protect bystanders from sparks and arc rays.**

⚠ WARNING **FUMES AND WELDING GASES CAN BE A HEALTH HAZARD!**

- **Fumes and gasses released during welding are hazardous. Do not breathe fumes that are produced by the welding operation. Wear an OSHA-approved respirator when welding.**
- **Always work in a properly ventilated area.**
- **Never weld coated materials including but not limited to: cadmium plated, galvanized, lead based paints.**

⚠ CAUTION **HOT METAL AND TOOLS WILL BURN!**

- **Electric welding heats metal and tools to temperatures that will cause severe burns!**
- **Use protective, heat resistant gloves and clothing when using TOOLIOM or any other welding equipment. Never touch welded work surface, torch tip or nozzle until they have completely cooled.**

⚠ CAUTION **FLYING METAL CHIPS CAN CAUSE INJURY!**

- **Grinding and sanding will eject metal chips, dust, debris and sparks at high velocity. To prevent eye injury wear approved safety glasses.**
- **Wear an OSHA-approved respirator when grinding or sanding.**
- **Read all manuals included with specific grinders, sanders or other power tools used before and after the welding process. Be aware of all power tool safety warnings.**

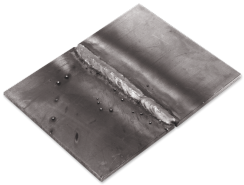
⚠ CAUTION **INADEQUATE WIRING CAN CAUSE FIRE AND INJURY!**

- **Verify that the facility power source has properly rated wiring to handle power requirements of this Welder.**

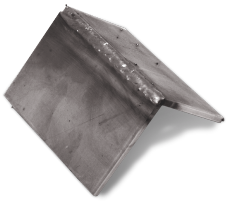
IMPORTANT NOTE: These instructions are intended only to provide the user with some familiarity of the TOOLIOM TL-135M. Lift TIG welding is a highly complex procedure with many variables. If you have no experience with Lift TIG welding; it is extremely important to seek the advice of someone experienced in Lift TIG welding for instruction, enroll in a local technical school welding course or study a comprehensive how-to DVD and obtain a good quality reference book on TIG welding as there is a moderate learning curve necessary before achieving proficiency in TIG Welding. Before attempting to use this unit on an actual project or object of value, practice on a similar material as there are many variables present and settings required when TIG welding different metals such as steel and stainless steel. It is also strongly recommended that the user adhere to the American Welding Society guidelines, codes and applications prior to producing welds where safety is affected.

- Turn the Power Switch at the Upper Back Panel to the “ON” position.
- Slowly open the gas cylinder valve.
  NOTE: Always open valve fully to avoid shielding gas leakage.
- Adjust the flow regulator built-in to the Torch Handle. Rotate Counter-clockwise to open, Clockwise to Close.
- Grounding is very important, place the Ground Cable Clamp on a clean, bare area of your work piece as close to the welding area as possible to minimize the chance of shock. Scrape, wire brush, file or grind a bare area to achieve a good ground to assure safety.
- Use a dedicated stainless steel brush or flap-disc to clean the areas to be welded. Do not use the brush or flap-disc for any other purpose.
- Making sure all your safety gear is in place (Welding Mask, Welding Gloves, non-flammable long sleeve apparel) and the area is completely free of flammable material.
- Although it is a matter of developing a personal style, a good starting point for best results is achieved by holding the tip at a 45° angle backward and approx. 20° to the right of the weld. Hold the Filler Metal Rod at a 60° angle to the Tungsten Tip. Never allow the Tungsten Tip to touch the welding surface or material rod. Doing so will quickly destroy the tip and contaminate the weld. If this happens, remove the Tungsten and regrind the tip. It is best to hold the Tungsten tip 1/8" from the surface.
- With your Welding Shield and all safety gear in place, practice “Forming a Puddle” with the Tungsten Tip. Once you become familiar with this step. Practice the “Dip and Pull” technique with the Filler Metal Rod and Torch. “Dip and Pull” is the practice of forming a puddle, moving the Torch while maintaining the puddle and adding filler rod metal to the puddle by “dipping and pulling” as you go; being careful not to allow the Tungsten to contact the puddle or rod.
- To stop welding, pull the Tip back over the weld approx. 1/2" [13mm] then lift to break the arc. Keep shielding gas flow in place for approx. 10 seconds.
- Keep in mind that you MUST let the shielding gas flow over the weld for approx. 10 seconds. Failure to do so will allow the welded area to oxidize as it cools, compromising the weld integrity.
- Constantly be aware that TIG welding quickly generates heat in the work piece and Torch. Severe burns can quickly occur by contacting hot metal pieces.
- When done, shut off the Power Switch, close the Regulator in the Torch Handle then close the Shielding Gas Tank valve completely.

TYPES OF WELD JOINTS

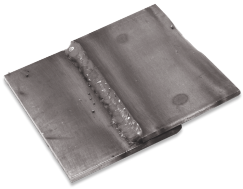


BUTT WELD is a joint between two pieces that are laying in the same direction.

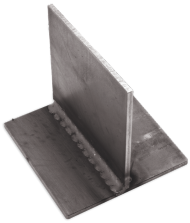


CORNER WELD is a joint between two pieces that meet at or near perpendicular at their edges.

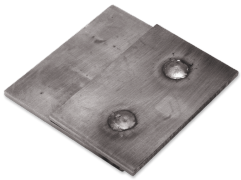
EDGE WELD is a joint between two pieces where the edges are being joined.



LAP WELD is a joint between two overlapping pieces.



TEE WELD is a joint between two pieces where one is perpendicular to the other.



PLUG WELD is a joint which joins two overlapping pieces by filling in a hole punched in the top piece.

OVERLOAD PROTECTION

Your TOOLIOM TL-135M is equipped with a temperature controller as well as an overload breaker. These two protection devices will protect your welder if the duty cycle is exceeded. If the output is exceeded, the internal breaker will trip and stop power supply to the drive motor although the fan will still run to cool the unit.

If the breaker tripped resulting from an overload, the circuit breaker button on the rear of the welder will extend out. This circuit breaker must be reset manually. Before resetting the circuit breaker button allow the welder to cool for a minimum of 15 minutes.

If there is no voltage output and the circuit breaker was not tipped, the internal thermal protector may have shut off the welder until it cools to normal operating temperature. This is an automatic function and does not require the user to manually reset anything.

STICK WELD TROUBLESHOOTING

PROBLEM	CAUSE	CORRECTION
Electrode Sticking	Arc Too Short	While welding, keep the ignited end of the electrode further from the weld joint.
	Current Too Low	Adjust the current on the front of the Welder to a higher current setting.
Holes in Weld Bead (Porosity)	Arc Too Long	While welding, keep the ignited end of the electrode closer to the weld joint.
	Moisture in Electrode	Replace electrode with a new one.
Excessive Spatter	Arc Too Long	While welding, keep the ignited end of the electrode closer to the weld joint.
	Current Too High	Adjust the current on the front of the welder to a lower current setting.
Poor Penetration	Poor Joint Preparation	Clean the weld joint of any dirt, grease, paint of other possible contaminates. If the pieces being Welder are of a heavy gauge it may be necessary to bevel the edges of the pieces.
	Current Too Low	Adjust the current on the front of the welder to a higher current setting.
	Travel Speed Too Fast	Slow down the travel speed of the electrode while welding.
Overload Light On	Duty Cycle Exceeded	Allow the Welder to cool for a minimum of 15 minutes before attempting to use again.

MIG WELD TROUBLESHOOTING

PROBLEM	CAUSE	CORRECTION
Burn Through	High Voltage	Adjust voltage output to lower setting.
	Lack of Tack Welds	Adjust wire speed to slower setting.
	Slow Gun Travel	Increase your travel speed with the Welding Gun.
Lack of Penetration	Low Voltage	Adjust voltage output to higher setting.
	Slow Wire Speed	Adjust wire speed to faster setting.
	Fast Gun Travel	Slow your travel speed of the Welding Gun making sure to pull or drag the molten metal puddle.
	Excessive Wire Protruding	Move the Contact Tip on the Welding Gun closer to the work piece to shorten the length of exposed wire.
	Material Too Thick	The TL-135M is rated for a maximum thickness of 1/5", exceeding this will result in poor penetration.

	Poor Material Prep	If welding heavy gauge metals, it may be necessary to increase the welding gap between the two pieces and also bevel the edges on the weld side of the pieces.
Excessive Penetration	High Voltage	Adjust voltage output to lower setting.
	Fast Wire Speed	Adjust wire speed to slower setting.
	Slow Gun Travel	Increase your travel speed with the Welding Gun.
Warping	Lack of Tack Welds	Tack weld the pieces in multiple areas to keep the pieces from pulling apart.
	No Clamping	Use welding clamps to secure the pieces in the proper shape.
	Poor Technique	To prevent warping, allow the workpiece to cool after welding small sections at a time. Move your welding areas around by not completing all the welding in one section all at once, rather, welding a small amount in one area and then move to another section area to spread out the heat in the piece.

TIG WELDING TROUBLESHOOTING

PROBLEM	CAUSE	CORRECTION
Arc is Triggered but Will Not Start	Incomplete Circuit	Check Ground connection. Make sure that the ground is on a freshly cleaned surface and close to the welding area. It is suggested to weld towards the ground connection.
	Incorrect Tungsten	Consult chart for proper Tungsten for the base metal being welded. In most cases Thoriated will be used for all steels.
	No Shielding Gas	Make sure the shielding gas cylinder is turned all the way open and set at the correct flow rate.
Arc wanders and it is Hard to Concentrate Heat in a Specific Area	Poorly Prepped Tungsten	Follow guidelines for prepping Tungsten.
	Poor Gas Flow	Adjust the flow rate of the shielding gas (refer to settings chart). Check for loose fittings where gas could be leaking.
	Contaminated Tungsten	Remove Tungsten from Torch, break off contaminated section, and resharpen.
	Incorrect Arc Length	Make sure the Tungsten is held 1/8 to 1/4 inch off the work piece.
	Incomplete Circuit	Check Ground connection. Make sure that the ground is on a freshly cleaned surface and close to the welding area. It is suggested to weld towards the ground connection.
	Contaminated Base Metal	Clean base metal making sure to remove any oil, debris, coatings, or moisture. If base metal is aluminum make sure all of the oxide is removed using either a dedicated stainless brush or flap wheel.

Porosity in Weld Bead	Poor Gas Flow	Adjust the flow rate of the shielding gas. Check for loose fittings where gas could be leaking.
	Contaminated Filler Metal	Clean filler metal making sure to remove any oil, debris, or moisture.
	Contaminated Filler Metal	Clean base metal making sure to remove any oil, debris, coatings, or moisture.
	Contaminated Base Metal	Make sure to be in an area with no wind and with any fans turned off. Wind or fans will blow the shielding gas away from the weld causing porosity.
	Poor Shielding	Adjust the Tungsten so that 1/8 to 1/4 inch protrudes from the Collet.
Contamination in Weld Bead	Contamination Tungsten	Remove Tungsten from Torch and break off contaminated section and resharpen.
	Contaminated Filler Metal	Clean filler metal making sure to remove any oil, debris, or moisture.
	Contaminated Base Metal	Clean base metal making sure to remove any oil, debris, coatings, or moisture. If base metal is cold rolled steel make sure to remove any mill scale.
Melting Tungsten	Poor Gas Flow	Adjust the flow rate of the shielding gas. Check for loose fittings where gas could be leaking.
	Wrong Size Tungsten	Increase Tungsten diameter. Refer to chart for proper sizing.
	Incorrect Shielding Gas	Only use 100% Argon when TIG Welding.
Poor Penetration	Low Voltage	Voltage setting is too low for material/thickness. Increase as needed.
Tungsten Contaminated	Contact of Tungsten with Base Metal	Keep Tungsten 1/8 to 1/4 inch from the base metal. If Tungsten comes in contact break off end and resharpen immediately.
Poor Weld Appearance	Incorrect Positioning	The angle between the filler metal and the Torch must be less than 90 degrees otherwise the filler metal will prematurely melt and glob off causing poor weld appearance.

TIG WELDING TROUBLESHOOTING

PROBLEM	CAUSE	CORRECTION
Crater in the End of the Weld Bead	Insufficient Shielding	Keep the Torch on the base metal while the post flow shielding gas flows to protect and cool the metal and Tungsten.
	Not Enough Filler Material	Reduce current and add more filler at end of weld. It may also be beneficial to back step to ensure no crater will form.
Weld Bead is Cracking	Too Much Heat in Material	Reduce heat and allow more time between passes.
	Base Metal is Absorbing Too Much Heat	Preheat base metal (consult welding codes for requirements)
	Incorrect Filler Wire	Use appropriate filler wire type and diameter for the joint being welded.
Material is Warping	Insufficient Clamping	Clamp work piece tightly and weld while clamps are in place.
	Insufficient Tack Welds	Add more tack welds until rigidity and stiffness is developed.
	Too Much Heat in Material	To reduce heat it is best to spread the welding out around the area. This can be done by using stitch welding techniques, alternating sides, and/or taking your time and allowing the pieces to cool between passes.