



M25

Small Curve

TECHNICAL GUIDE

Semi-Automatic MIG Gun
CONSUMABLES & ACCESSORIES



NOTES:

FEATURES & BENEFITS

The highly-durable Lightning® series of MIG guns has been engineered and built for high production and comfort.

Handle

Ergonomic plastic handle is engineered with special impact additives that stand up to extreme contact, making it virtually indestructible. Lifetime Warranty on handle.

Trigger

The trigger is easy to pull, causing less welder fatigue. Lifetime Warranty.

AMPERAGE RATINGS (DUTY CYCLE)

Model	100% Duty Cycle		60% Duty Cycle	
	Co ²	Mixed	Co ²	Mixed
250	200	120	300	250
350	350	200	400	350
450	450	300	525	450

SEMI-AUTOMATIC GUN ORDERING SYSTEM

MILLER	LIGHTNING® HANDLE	SWIVEL	POWER PIN	GUN MODEL	CABLE LENGTH	WIRE SIZE
	SC Small Curve	S (optional)	5T Tweco #5 T Tweco/Std. B Bernard E Euro H Hitachi LN Lincoln M Miller P Panasonic	20 250 amp 30 350 amp 40 450 amp	10 10 feet 12 12 feet 15 15 feet 20 20 feet 25 25 feet	30 .030" 35 .035" 45 .045" 116 1/16" 364 3/64" al 564 5/64"
	M SC	S	T	40 15 45		

NOZZLES

ID

169-715	Flush	1/2" (12.7mm)
169-724	1/8" Recess	1/2" (12.7mm)
169-725	1/8" Tip Recess	5/8" (15.9mm)
169-726	Flush	5/8" (15.9mm)
169-727	1/8" Stick out	5/8" (15.9mm)
200258	Flush	1/2" (12.7mm)

CONTACT TIPS

ID

087-299	.025" (0.6mm)
000-067	.030" (0.8mm)
000-068	.035" (0.9mm)
000-069	.045" (1.2mm)
172-024	1/16" (1.6mm)
172-025	5/64" (2.0mm)
172-034	3/64" Al. (1.2mm)

CONTACT TIP ADAPTERS/NOZZLE RETAINERS

169-716	Adapter
169-728	Adapter
169-729	Nozzle Retainer

SHOCK WASHERS

169-730

GOOSENECKS (CURVE SERIES)

63-5145-M2	Fixed	45°	250-350
63-5145S-M2	Swivel	45°	250-350
65-5145-M2	Fixed	45°	250-550
65-5145S-M2	Swivel	45°	250-550
65-5160-M2	Fixed	60°	250-550
65-5160S-M2	Swivel	60°	250-550

UNICABLE CUT LENGTHS

250A	10'	62-7110
250A	12'	62-7112
250A	15'	62-7115
250A	20'	62-7120
250A	25'	62-7125
350A	10'	63-7110
350A	12'	63-7112
350A	15'	63-7115
350A	20'	63-7120
350A	25'	63-7125
450A	10'	64-7110
450A	12'	64-7112
450A	15'	64-7115
450A	20'	64-7120
450A	25'	64-7125

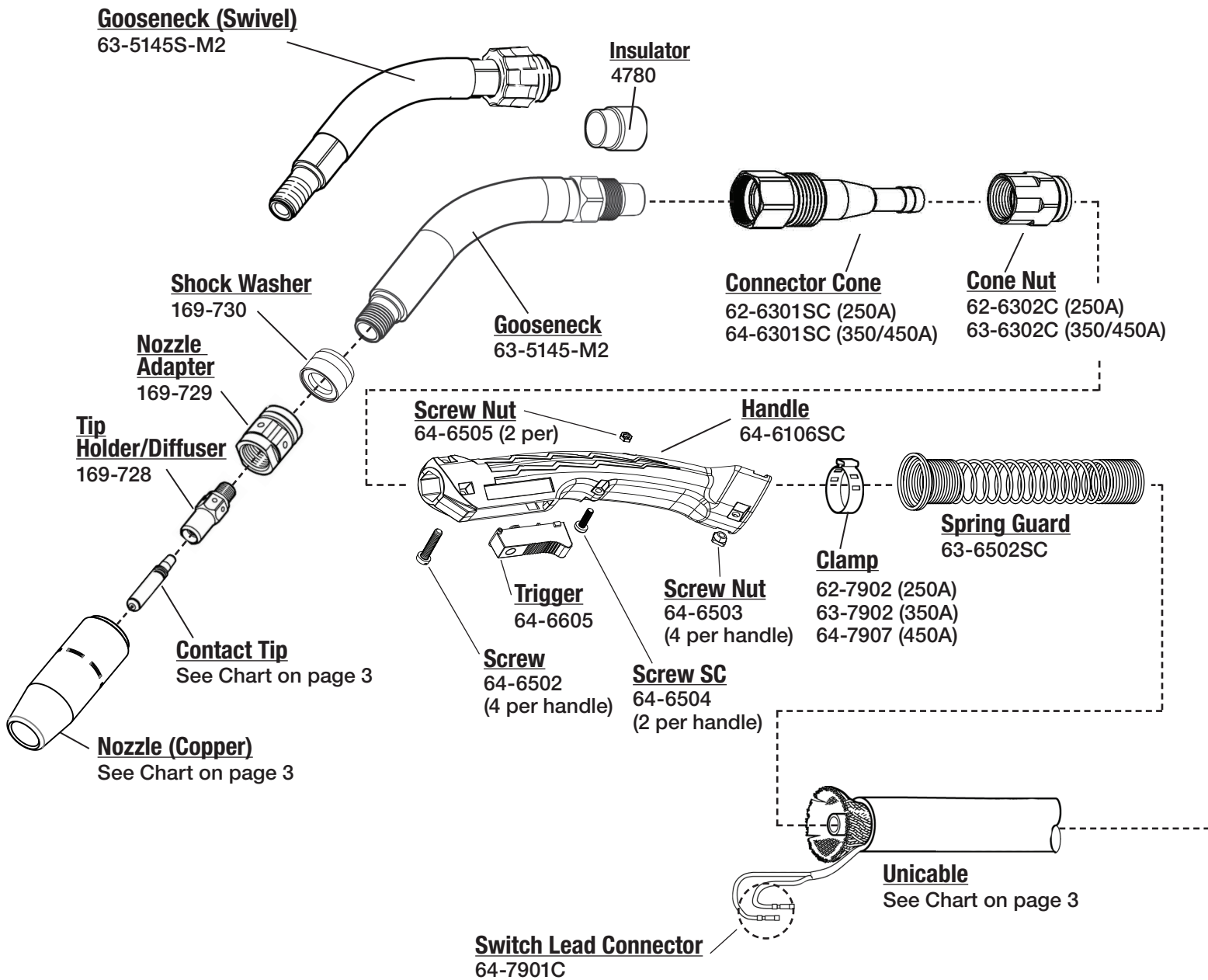
Unicable Bulk (Per foot)

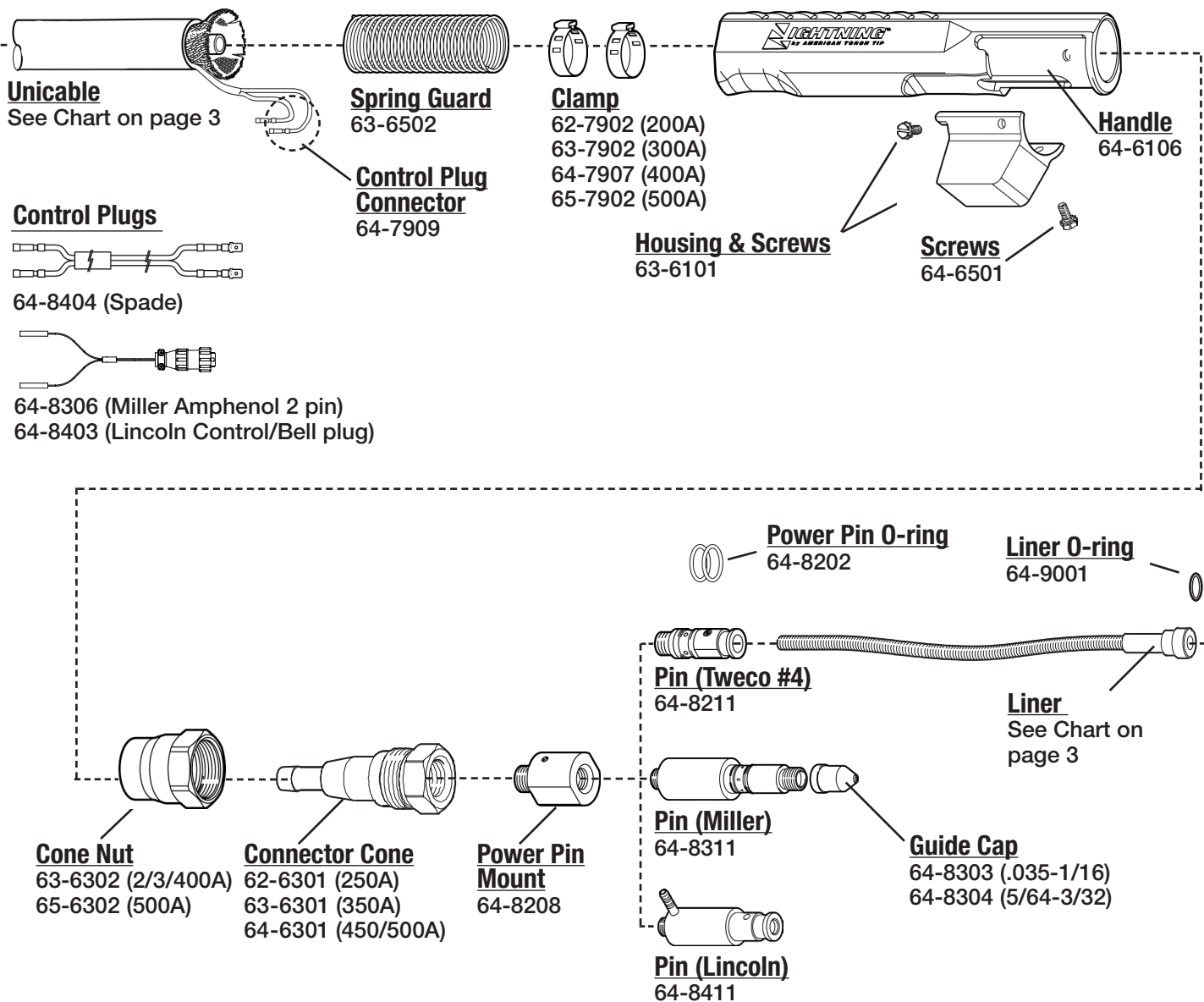
250A	Bulk	62-7300
350A	Bulk	63-7300
450A	Bulk	64-7300-1

LINERS

Wire Size		Length	Part#	OD
.023"	(.6mm)	15'	64-4115	0.150
.035"	(.9mm)	15'	62-4315	0.156
.035"	(.9mm)	25'	62-4325	0.156
.045"	(1.6mm)	15'	62-4515	0.156
.045"	(1.6mm)	25'	62-4525	0.156
.030"	(.8mm)	15'	64-4215	0.182
.035"	(.9mm)	10'	64-4310	0.175
.035"	(.9mm)	15'	64-4315	0.175
.035"	(.9mm)	25'	64-4325	0.175
.035"	(.9mm)	25'	64-4325	0.175
.035"	(.9mm)al	15'	64-4415	0.189
.045"	(1.6mm)	10'	64-4510	0.189
.045"	(1.6mm)	15'	64-4515	0.189
.045"	(1.6mm)	25'	64-4525	0.189
3/64"	(1.6mm)	10'	64-4510	0.189
3/64"	(1.6mm)	15'	64-4515	0.189
3/64"	(1.6mm)	25'	64-4525	0.189
.52"	(1.6mm)	10'	64-4510	0.189
.52"	(1.6mm)	15'	64-4515	0.189
.52"	(1.6mm)	25'	64-4525	0.189
1/16"	(1.6mm)	10'	64-4510	0.189
1/16"	(1.6mm)	15'	64-4515	0.189
1/16"	(1.6mm)	25'	64-4525	0.189
3/64-1/16al		15'	64-4615	0.189
5/64-3/32		15' Flat	64-4715	0.189
5/64-3/32		25' Flat	64-4725	0.21
5/64 & 1/16"		FC 10'	64-4815	0.21
.035 - .045		15'	64-4915	0.192

(for S.S. Wire)





NOZZLE AND CONTACT TIP SYSTEMS

REMOVAL AND REPLACEMENT

Pull slip-on nozzles off with a clockwise twisting motion.

When installing nozzle, exposed insulator should nest inside shock washer to assure concentricity.

Shock washers are positioned on the end of the gooseneck with the large insulated counterbore facing the nozzle.

Replace nozzle retainer with deep counterbore toward the gooseneck.

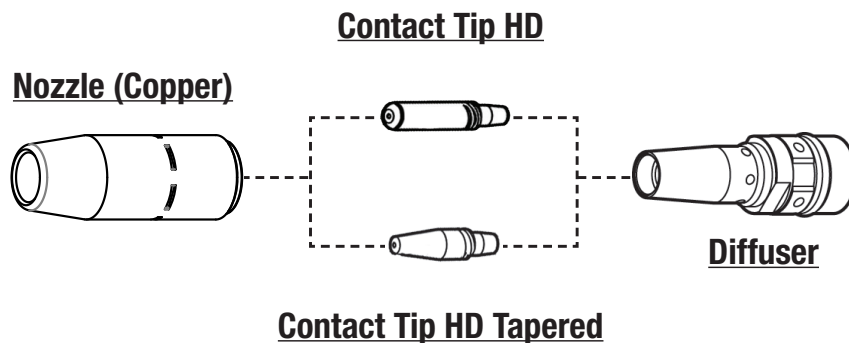
Tighten until retainer and shock washer are secure.

IMPORTANT

Shock washer must be in place before welding to maintain insulation of gooseneck. Be sure all parts are tightened well before welding.

When using the heavy duty retaining head make sure it is tightened with a 11/16" wrench to prevent overheating of diffuser and contact tip.

To prevent scoring on heavy duty retaining head, do not use pliers. Welding pliers, however, are recommended for tip installation and removal.



1.1 LINER REPLACEMENT

TOOLS REQUIRED

Vise

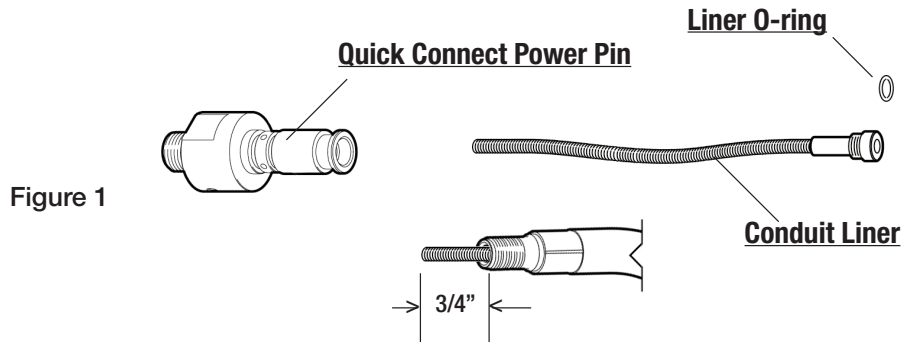
Lineman pliers

1. Remove nozzle, contact tip and tip holder from gooseneck. (Not shown)
2. Using pliers, unthread liner and remove from gun.
3. Install new liner by feeding through gun. Use short strokes to avoid kinking. Use clockwise rotation as needed.
4. Be sure o-rings on liner head seats into inside bore of power pin.
5. Using pliers, trim liner to extend to 3/4" (20mm) from end of gooseneck.
6. Remove any burrs on the inside and outside of liner to ensure smooth wire flow and proper seating inside diffuser.

Continued on next page.

LINER REPLACEMENT (continued)

7. Reinstall tip holder, contact tip and nozzle onto gooseneck.
 Note: Liner should be visible through gas holes of tip holder.
8. Install gun to feeder.



* Trim dimension may change depending on front end consumables being used.

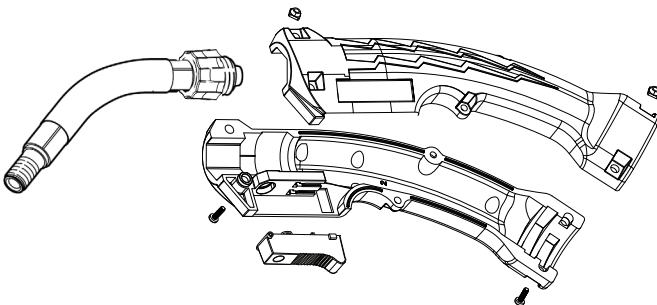
CHANGING THE HANDLE & SWITCH

2.1 HANDLE AND SWITCH REPLACEMENT

TOOLS REQUIRED

Phillips Head Screwdriver, Flat-head Screwdriver

1. Loosen screws but do not fully remove.
2. Use flat-head screwdriver to help separate handle halves. Trigger should remove easily.
3. To replace trigger, install into handle halves with pivot posts inserted into handle cavities so movement is not impaired. Tighten screws. Torque to 10 in-lb.



CHANGING THE NECK

3.1 NECK REPLACEMENT

TOOL REQUIRED

3/4" Wrench

Changing the Neck - Fixed

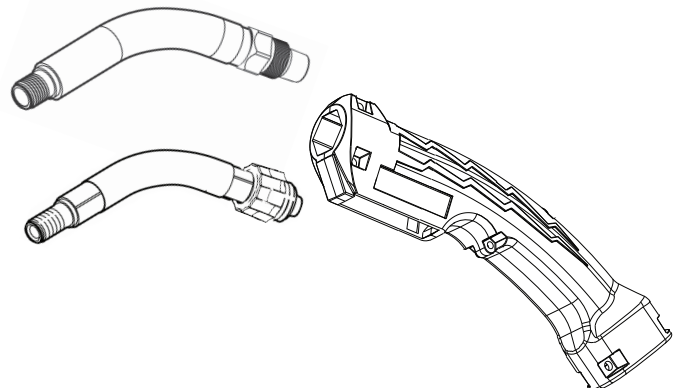
To remove neck, remove the nut insulator.

1. Using a wrench, rotate brass nut counterclockwise, rotation will free neck from connector cone.

2. To install the neck, perform the above instructions in reverse order and tighten lock nut to 16 ft-lbs. Be sure nut insulator is in place.
3. Liner may need to be changed if switching to a neck of a different bend angle or length.

Changing the Neck - Swivel

1. To remove neck, grasp lock nut and rotate counterclockwise. Rotation will free neck from connector cone. To install the neck, perform the above instructions in reverse order and torque to 37 in-lbs.
2. Liner may need to be changed if switching to a neck of a different bend angle or length.



Lightning® Troubleshooting

A. Wire not feeding or bumpy feeding

Possible Cause		Possible Solution
1.	Feeder relay / malfunction	Consult feeder manufacturer.
2.	Broken control lead	Connect spare control leads.
3.	Poor adaptor connection	Test and replace leads and/or contact pins.
4.	Incorrect type of drive roll	Use manufacturers recommended drive rolls
5.	Improper drive rolls size	Replace with proper size.
6.	Drive roll tension misadjusted	Adjust tension at feeder.
7.	Burn back to contact tip	See “E. Contact tip burn back.”
8.	Wrong size liner	Replace with correct size.
9.	Buildup inside of liner	Replace liner, check condition of electrode.
10.	Worn drive roll	Replace with new drive roll.
11.	Improper guide tube relationship	Eliminate all gaps in electrode path.
12.	Improper wire guide diameter	Replace with proper guide diameter.
13.	Gaps at liner into gas diffuser	Reset liner and lock or replace with new liner

B. Premature contact tip failure

Possible Cause		Possible Solution
1.	Improper voltage or wire feed speed	Set parameters.
2.	Erratic wire feeding	See “G. Erratic arc.”
3.	Improper tip stickout	Adjust nozzle/tip relationship.
4.	Improper electrode stickout	Change length of wire stickout.

C. MIG Gun running hot

Possible Cause		Possible Solution
1.	Exceeding duty cycle	Replace with properly rated duty cycle MIG Gun. Decrease parameters to within Gun rating.
2.	Loose or poor power connection	Clean and retighten all electrical connection. Check rating and condition of ground clamp.

D. Porosity in weld

Possible Cause		Possible Solution
1.	Nozzle/Insulator/O-rings worn	Replace.
2.	Retaining head spring/band	Replace retaining head.
3.	Extreme heat or duty cycle	Use X-heavy-duty consumables.
4.	Gas not getting to the weld	Check gas regulator/flowmeter/cylinder
5.	Gas ports plugged	Clean or replace gas diffuser/nozzle.
6.	Loose fittings or cut gas hose	Tighten or repair hose lines.

Lightning® Troubleshooting

E. Contact tip burn back

Possible Cause		Possible Solution
1.	Improper voltage and/or wire feed speed	Set parameters.
2.	Erratic wire feeding	See "G. Erratic arc."
3.	Improper tip stickout	Adjust nozzle / tip relationship.
4.	Improper electrode stickout	Adjust torch to base metal relationship.
5.	Faulty ground	Repair all cables and connectors.

F. Tip disengages from retaining head

Possible Cause		Possible Solution
1.	Worn retaining head	Replace tip and/or retaining head.
2.	Improper tip installation	Finger tighten then slightly tighten with correct tool.

G. Erratic arc

Possible Cause		Possible Solution
1.	Worn contact tip	Replace.
2.	Buildup inside of liner	Replace liner, check condition of electrode.
3.	Wrong tip size	Replace with correct tip size.
4.	Incorrect welding parameters	Use wire manufacturers parameters.

H. Excess spatter

Possible Cause		Possible Solution
1.	Improper machine parameters	Adjust parameters.
2.	Incorrect tip or installation	Adjust nozzle / tip relationship.
3.	Incorrect nozzle or shielding	Use correct nozzle and shielding gas coverage.
4.	Contaminated wire or work piece	Replace wire and clean work piece.

I. Discolored Liner

Possible Cause		Possible Solution
1.	Short circuit to electrode	Check for wire short circuiting in feeder
2.	Cuts in outer jacket, copper exposed	Replace gun.

LIMITED WARRANTY – Subject to the terms and conditions below


American Torch Tip Co. (ATTC) warrants its products to the original end user for the periods listed below:

PLASMA	MIG
LIFETIME *PHD and PHDX Torch Bodies	LIFETIME *Lightning® Handle and Trigger Switch ONE YEAR *Lightning® Semi-Automatic MIG Guns *Lightning® Robotic MIG Guns *Lightning® Fixed Automation MIG Guns 180 DAYS *All Other Gun Models
THERMAL SPRAY	TIG
ONE YEAR *Thermal Spray Guns	ONE YEAR *TIG Torches

*Limited Warranty on Manufacturing and Material Defects. Warranty Terms Do Not Apply to Consumable Products.

Warranty Terms

This warranty shall not apply to any product that has been modified or used in a manner inconsistent with ATTC's installation instructions and operating guidelines. Within the warranty periods listed above and at ATTC's sole discretion, ATTC will repair or replace any warranted parts or components that fail due to such defects in material or workmanship. ATTC must be notified within thirty (30) days of such defect or failure, at which time ATTC will determine if a Return Goods Authorization (RGA) is justified and issue an RGA number, authorization of a RGA number shall not be unreasonably withheld. ATTC will supply a RGA form, which must be included with the returned products for inspection by ATTC. Shipping and packing costs shall be the responsibility of the party returning the goods. Once received, ATTC shall inspect and determine if a warranty claim is justified and at ATTC's sole discretion authorize a repair or replacement. Once authorization has been granted ATTC shall provide instructions on the warranty claim procedures to be followed. Where authorized, repair or replacement constitutes the sole remedy for breach of warranty and expressly excludes claims for lost revenue, down time and other consequential damages. The warranty is limited to the conditions stated above and excludes, to the fullest extent permitted by law, all conditions, warranties and representations express or implied by statute, law or otherwise in relation to the supply or delay in supplying the goods/services. There are no agreements, promises or understandings, either verbal or written that are not fully expressed in this warranty. This warranty may be amended or altered only if agreed to in writing and signed by ATTC.

ATTC Limited Warranty 0418





THANK YOU

For selecting the Lightning® MIG Gun. The Lightning® Gun is for welding professionals who want durability and comfort while working in harsh welding environments. This technical guide with instructions and illustrations is designed to make it easy to maintain your Lightning® Gun. Please read and follow all the safety procedures. For technical support, please call our Customer Service department at 1-800-371-8477 between 8:00 AM and 5:00 PM EST Monday through Friday. We are committed to providing the best-quality products and services. We are constantly working to improve our products. We would appreciate hearing your suggestions.

The **LIGHTNING** Family of MIG Guns, Consumables and Accessories

Semi-Auto MIG Gun

LIGHTNING
SEMI-AUTOMATIC MIG

VIRTUALLY INDESTRUCTIBLE

Inner Armor
Protective inner armor – a brass alloy insert – guards against wear and extends nozzle life.
The cool-running Lightning® tapered-seat contact tip is designed to dissipate heat quickly through increased surface area, and maximize electrical conductivity.
Dual start-point threads allow re-seating of the tip when wire wear begins to affect performance. Just rotate the tip counter-clockwise 180° to a new wear-point and double the life of the contact tip.
Insulated aircraft aluminum protects the 650 AMP capacity gooseneck.

Hard Body
High-strength plastic handle is engineered with special impact additives and reinforcing ribs, making it virtually indestructible. This solid construction puts Lightning® in a class of its own.
Lifetime Warranty on handle and trigger switch.

Defensive Shield
The secret behind Lightning's super tough cable is electron-beam accelerators that modify and strengthen the outer cover. This protective shield guards against tearing, stretching and abrasion.
Inner tubing, made of Hyflex®, is kink and impact resistant for smooth and reliable wire feed.
Copper strand-count and gauge is optimized for each cable's ampere rating, resulting in a perfect blend of flexibility and strength.

Plug-and-Play
Lightning® is ready to work right out of the box with most popular welding systems. Components are designed for quick, easy switch-outs.

Specs
Type: Semi-automatic
Air-cooled MIG
Amperage: 250, 300, 400, 500
Cable Length: 6' - 25'
Gooseneck: 180°, 22°, 45°, 60°
Wire Size: .030 - .052
1/16" - 5/64"
Compatibility: Compatible with a complete range of welding machines and wire feeders
Lifetime Warranty: Handle and trigger switch have a Lifetime Warranty

Learn more at our website: AmericanTorchTip.com/lightning or call us at 800-342-8477

More information, contact tips, nozzles, and gun part numbers – page 2

LIGHTNING
Made in the USA by American Torch Tip

Large Curve MIG Gun

LIGHTNING
LARGE CURVE SEMI-AUTOMATIC MIG

VIRTUALLY INDESTRUCTIBLE

Inner Armor
Protective inner armor – a brass alloy insert – guards against wear and extends nozzle life.
The cool-running Lightning® tapered-seat contact tip is designed to dissipate heat quickly through increased surface area, and maximize electrical conductivity.
Dual start-point threads allow re-seating of the tip when wire wear begins to affect performance. Just rotate the tip counter-clockwise 180° to a new wear-point and double the life of the contact tip.
Insulated aircraft aluminum protects the 650 AMP capacity gooseneck.

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Plug-and-Play
Lightning® is ready to work right out of the box with most popular welding systems. Components are designed for quick, easy switch-outs.

Specs
Type: Semi-automatic
Air-cooled MIG
Amperage: 250, 300, 400, 500
Cable Length: 6' - 25'
Gooseneck: 180°, 22°, 45°, 60°
Wire Size: .030 - .052
1/16" - 5/64"
Compatibility: Compatible with a complete range of welding machines and wire feeders
Lifetime Warranty: Handle and trigger switch have a Lifetime Warranty

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More information, contact tips, nozzles, and gun part numbers – page 2

LIGHTNING
Made in the USA by American Torch Tip

Small Curve MIG Gun

LIGHTNING
SMALL CURVE SEMI-AUTOMATIC MIG

VIRTUALLY INDESTRUCTIBLE

Inner Armor
Protective inner armor – a brass alloy insert – guards against wear and extends nozzle life.
The cool-running Lightning® tapered-seat contact tip is designed to dissipate heat quickly through increased surface area, and maximize electrical conductivity.
Dual start-point threads allow re-seating of the tip when wire wear begins to affect performance. Just rotate the tip counter-clockwise 180° to a new wear-point and double the life of the contact tip.
Insulated aircraft aluminum protects the 650 AMP capacity gooseneck.

Hard Body
High-strength plastic handle is engineered with special impact additives and reinforcing ribs, making it virtually indestructible. This solid construction puts Lightning® in a class of its own.
Lifetime Warranty on handle and trigger switch.

Defensive Shield
The secret behind Lightning's super tough cable is electron-beam accelerators that modify and strengthen the outer cover. This protective shield guards against tearing, stretching and abrasion.
Inner tubing, made of Hyflex®, is kink and impact resistant for smooth and reliable wire feed.
Copper strand-count and gauge is optimized for each cable's ampere rating, resulting in a perfect blend of flexibility and strength.

Plug-and-Play
Lightning® is ready to work right out of the box with most popular welding systems. Components are designed for quick, easy switch-outs.

Specs
Type: Semi-automatic
Air-cooled MIG
Amperage: 250, 300, 400
Cable Length: 6' - 25'
Gooseneck: 180°, 22°, 45°, 60°
Wire Size: .030 - .052
1/16" - 5/64"
Compatibility: Compatible with a complete range of welding machines and wire feeders
Lifetime Warranty: Handle and trigger switch have a Lifetime Warranty

Learn more at our website: AmericanTorchTip.com/lightning or call us at 800-342-8477

More information, contact tips, nozzles, and gun part numbers – page 2

LIGHTNING
Made in the USA by American Torch Tip

Automatic MIG Gun

LIGHTNING
FIXED-AUTOMATIC MIG

VIRTUALLY INDESTRUCTIBLE

Inner Armor
Protective inner armor – a brass alloy insert – guards against wear and extends nozzle life.
The cool-running Lightning® tapered-seat contact tip is designed to dissipate heat quickly through increased surface area, and maximize electrical conductivity.
Dual start-point threads allow re-seating of the tip when wire wear begins to affect performance. Just rotate the tip counter-clockwise 180° to a new wear-point and double the life of the contact tip.
Insulated aircraft aluminum protects the 650 AMP capacity gooseneck.

Hard Body
Lifetime Warranty on gun body.
Reinforced rear stands up to extreme heat and impact. Slim compact design. Lifetime Warranty on gun body.

Defensive Shield
The secret behind Lightning's super tough cable is electron-beam accelerators that modify and strengthen the outer cover. This protective shield guards against tearing, stretching and abrasion.
Inner tubing, made of Hyflex®, is kink and impact resistant for smooth and reliable wire feed.
Copper strand-count and gauge is optimized for each cable's ampere rating, resulting in a perfect blend of flexibility and strength.

Plug-and-Play
Lightning® is ready to work right out of the box with most popular welding systems. Components are designed for quick, easy switch-outs.

Specs
Type: Automatic/
Machine
Air-cooled
Amperage: 500
Cable Length: 4' - 10', plus custom lengths
Gooseneck: 180°, 22°, 45°, 60°
Wire Size: .030 - .052
1/16" - 5/64"
Compatibility: Compatible with a complete range of welding machines and wire feeders
Lifetime Warranty: Gun body

Learn more at AmericanTorchTip.com/lightning or call us at 800-342-8477

More information, contact tips, nozzles, and gun part numbers – page 2

LIGHTNING
Made in the USA by American Torch Tip

Robotic MIG Gun

LIGHTNING
ROBOTIC MIG

VIRTUALLY INDESTRUCTIBLE

Inner Armor
Protective inner armor – a brass alloy insert – guards against wear and extends nozzle life.
The cool-running Lightning® tapered-seat contact tip is designed to dissipate heat quickly through increased surface area, and maximize electrical conductivity.
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Insulated aircraft aluminum protects the 650 AMP capacity gooseneck.

Hard Body
Solid body design created from aircraft aluminum that stands up to extreme impact.
Lifetime Warranty on handle and trigger switch.

Defensive Shield
The secret behind Lightning's super tough cable is electron-beam accelerators that modify and strengthen the outer cover. This protective shield guards against tearing, stretching and abrasion.
Inner tubing, made of Hyflex®, is kink and impact-resistant for smooth and reliable wire feed.
Copper strand-count and gauge is optimized for each cable's ampere rating, resulting in a perfect blend of flexibility and strength.

Plug-and-Play
Lightning® is ready to work right out of the box with most popular welding systems. Components are designed for quick, easy switch-outs.

Specs
Type: Robotic
Air-cooled
Amperage: 500
Cable Length: 4' - 10', plus custom lengths
Gooseneck: 22°, 45°, plus custom angles
Wire Size: .030 - .052
1/16" - 5/64"
Compatibility: Compatible with a complete range of welding machines. Adapters are also available for most wire feeders

Learn more at AmericanTorchTip.com/lightning or call us at 800-342-8477

More information, contact tips, nozzles, and gun part numbers – page 2

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