

TECHNICAL GUIDE

For T-Gun™ Semi-Automatic Air-Cooled MIG Guns – 350, 450 and 550 amp

- SAFETY & WARRANTY INFORMATION
- INSTALLATION
- MAINTENANCE GUIDE
- TECHNICAL DATA
- OPTIONS
- EXPLODED VIEW & PARTS LIST
- TROUBLESHOOTING
- ORDERING INFORMATION

*Please read instructions prior to use.
Save this manual for future reference.*

TABLE OF CONTENTS

THANK YOU...	2
WARRANTY	3
GENERAL SAFETY	3
1.0 – INSTALLATION	4
1.1 INSTALLING QUICK CONNECT BLOCK TO FEEDER	4
1.2 INSTALLING GUN TO QUICK CONNECT BLOCK	4
1.3 INSTALLING GUNS EQUIPPED WITH “DIRECT POWER PINS”	5
2.0 – MAINTENANCE	5
2.1 TREGASKISS™ NOZZLE AND TOUGH LOCK™ CONSUMABLES	5
2.2 LINER REPLACEMENT	6
2.3 SWITCH REPLACEMENT	6
2.4 NECK REPLACEMENT	7
2.5 UNICABLE REPLACEMENT	8
2.6 UNICABLE REPAIR	9
3.0 – TECHNICAL DATA	10
3.1 NECK DIMENSIONS	10
3.2 GUN AMPERAGE RATINGS	10
4.0 – OPTIONS	11
4.1 SPECIALTY AND OPTIONAL ITEMS	11
4.2 FEEDER ADAPTORS	11
4.3 DIRECT PLUG-INS	11
4.4 CONNECTOR OPTIONS	12
4.5 CONTROL PLUGS	12
4.6 DUAL SCHEDULE MIG GUN	12
5.0 – ACCESSORIES	13
6.0 – TROUBLESHOOTING	13
7.0 – EXPLODED VIEW AND PARTS LIST	14
8.0 – ORDERING INFORMATION	16
8.1 EXAMPLE OF STANDARD MODEL NO.	16
8.2 EXAMPLE OF CUSTOM BUILT GUN	16
8.3 GUN STANDARDS CHART	16

THANK YOU...

...for selecting a Bernard T-Gun™ MIG Gun. The T-Gun MIG Gun is made from durable materials and components engineered to perform in a rugged, welding environment. Your T-Gun MIG Gun has undergone numerous quality checks to ensure high performance.

The instructions and illustrations in this technical guide make it easy for you to maintain your T-Gun MIG Gun. **Please read, understand, and follow all safety procedures.** Keep this Technical Guide booklet as a handy reference when ordering complete guns, parts and special options.

For technical support and special applications, please call Bernard Customer Service Department at 1-800-946-2281 or fax 1-888-946-6726. Our trained Customer Support Team is available between 8:00 AM and 4:30 PM CST, and will answer your application or repair questions.

Bernard employees are always striving to improve our products and services, and would appreciate receiving your suggestions or comments. Please contact us immediately if you experience any safety or operating problems.

WARRANTY

Product is warranted to be free from defects in material and workmanship for the period specified below after the sale by an authorized Buyer. Should there be a defect please refer to our Return Merchandise Policy.

PRODUCT	WARRANTY PERIOD
T-GUN™ MIG Guns and Components	180 days
TGX™ Chassis and TGX™ Ready To Weld MIG Guns	90 days

Bernard reserves the right to repair, replace or refund the purchase price of non-conforming product. Product found not defective will be returned to the Buyer after notification by Customer Service.

Bernard makes no other warranty of any kind, expressed or implied, including, but not limited to the warranties of merchantability or fitness for any purpose. Bernard shall not be liable under any circumstances to Buyer, or to any person who shall purchase from Buyer, for damages of any kind, including, but not limited to any, direct, indirect incidental or consequential damages or loss of production or loss of profits resulting from any cause whatsoever, including, but not limited to, any delay, act, error or omission of Bernard.

Genuine Bernard™ and Tregaskiss™ parts must be used for safety and performance reasons or the warranty becomes invalid. Warranty shall not apply if accident, abuse, or misuse damages a product, or if a product is modified in any way except by authorized Bernard personnel.

GENERAL SAFETY

Before installation or operation of T-Gun MIG Guns, please read the safety precautions listed below:

1. Always wear a properly fitted welding helmet with the proper grade of filter plate and suitable welding gloves.
2. All exposed skin should be covered with flame resistant, protective clothing. DO NOT WEAR CLOTHING MADE FROM FLAMMABLE SYNTHETIC FIBERS.
3. Protective screens or barriers should be used to protect others from spatter, flash and glare while welding.
4. Prevent fires by ensuring that hot slag or sparks do not contact combustible solids, liquids or gases.
5. Ensure that operator's head is not too close to the arc and that adequate ventilation is available.
6. Constant repetitive motion may lead to cumulative trauma disorders.
7. Do not touch live electrical parts. The following should be checked to prevent electrical shock.
 - Equipment is adequate for the job, properly grounded and installed according to code.
 - Faulty or damaged equipment is repaired or replaced.
 - Proper operator maintenance is performed to prevent excess spatter accumulation in the nozzle, or the contact tip or other areas of the gun.
 - Electrical insulating components are in place and not damaged. Repair or replace if necessary.
 - Operator and surroundings are not wet.
 - Cables are not wrapped around operator's body.
 - Equipment is off when not in use.
8. CSA Standard W117.2 CODE FOR SAFETY IN WELDING AND CUTTING obtainable from the Canadian Standards Association, Standards Sales, 178 Rexdale Boulevard, Rexdale, Ontario, Canada M9W 1R3.
9. ANSI Standard Z49.1 CODE FOR SAFETY IN WELDING AND CUTTING obtainable from the American National Standards Institute, 1430 Broadway, New York, NY 10018.

CALIFORNIA PROPOSITION 65 WARNING

This product, when used for welding or cutting, produces fumes or gases which contain chemicals known to the State of California to cause birth defects and, in some cases, cancer.

This product contains chemicals, including lead, known to the State of California to cause cancer, and birth defects or other reproductive harm. *Wash hands after use.*

(California Health & Safety Code Section 25249.5 at seq.)

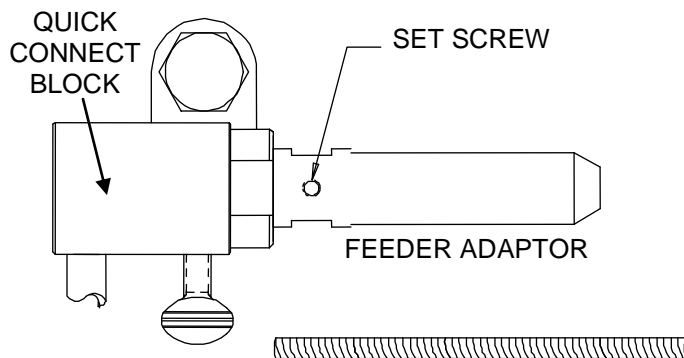


1.0 – INSTALLATION

1.1 INSTALLING QUICK CONNECT BLOCK TO FEEDER

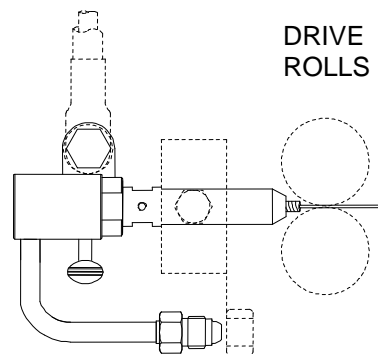
STEP #1

- Insert the correct feeder adaptor liner for desired wire diameter (3 provided) flush with the threaded end of the feeder adaptor.
- Tighten set screw.
- Thread feeder adaptor into Quick Connect Block and tighten.



STEP #2

- Position assembly into feeder adaptor and trim liner within 1/16" (1.6 mm) of the drive rolls and remove burrs if necessary.
- Secure assembly into feeder.
- Thread gas hose nipple into feeder gas fitting.
- Connect power cable to 1/2" (13 mm) power bolt with appropriate lug.
- **Tighten all connections.**
- Feed welding wire through assembly by hand and tighten drive rolls.

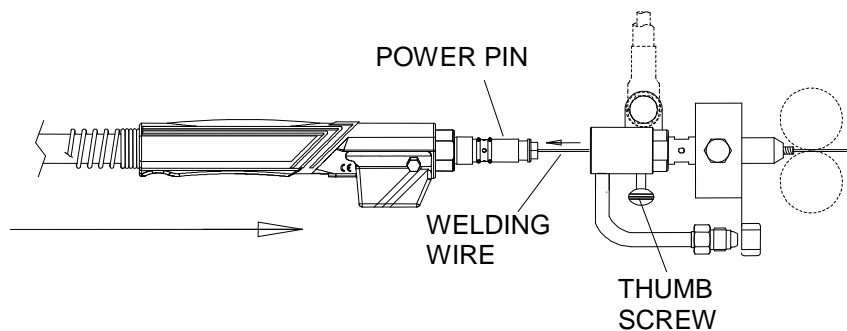


1.2 INSTALLING GUN TO QUICK CONNECT BLOCK

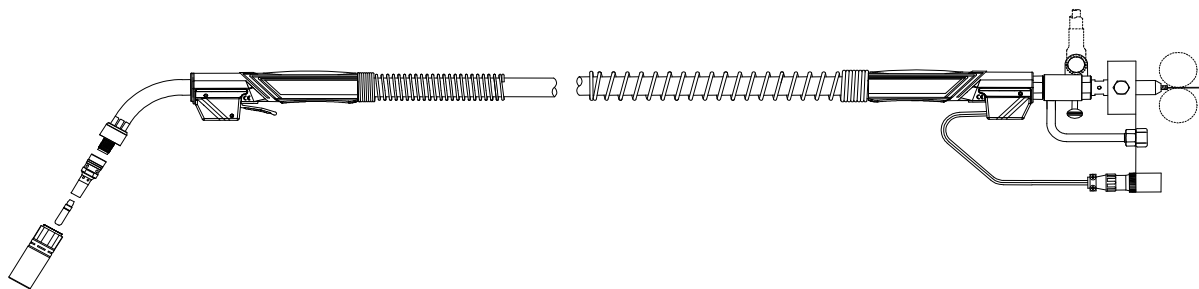
Ensure correct liner and contact tip are utilized. Examine and replace power pin o-rings if necessary.

STEP #1

- Guide welding wire into power pin.
- Insert power pin to shoulder of feeder.
- Tighten thumb screw (on Quick Connect Block) securely.
- Connect control plug lead to control housing on gun.
- Insert control plug into feeder.



STEP #2



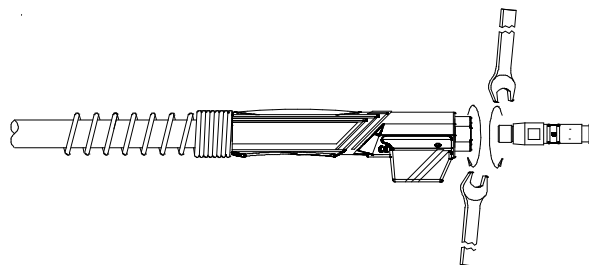
- With gun lying straightened, pull trigger and feed wire through gun. It may be necessary to remove contact tip when feeding small wire sizes).
- Recheck:
 - proper gas flow
 - drive roll pressure
 - voltage and wire feed speed

1.3 INSTALLING GUNS EQUIPPED WITH “DIRECT POWER PINS”

IMPORTANT: The thread-in two-piece power pin incorporates a taper to seat and lock the pin to the rear handle block. Make sure the power pin is tightened in the block with a wrench to insure the pin is secure and will not come loose.

NOTE: The rear handle and screws do not have to be removed when installing the two-piece power pins.

- Thread power pin into the rear handle block.
- Tighten the power pin into the rear block using a 1" (25 mm) wrench on the rear block and a 5/8" (16mm) or 3/4" (19 mm) wrench on the power pin.
- Install liner (See **Section 2.2 LINER REPLACEMENT**).
- Install gun to feeder (See below).
- **Most Pins**
 - Insert power pin to shoulder and secure.
 - Insert control plug to control housing of gun.
 - Insert control plug into feeder.
 - Feed welding wire into power pin by hand and tighten drive rolls.
 - On Lincoln® feeders it is necessary to connect the gas hose to the barbed fitting on the power pin.



NOTE:

Bernard, Euro and OXO™ are not direct connect pins

2.0 – MAINTENANCE

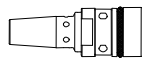
2.1 TREGASKISS NOZZLE AND TOUGH LOCK™ CONSUMABLES



STANDARD DUTY NOZZLE
VARIOUS SIZES AVAILABLE



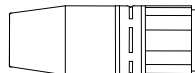
STANDARD DUTY
TREGASKISS
TOUGH LOCK
CONTACT TIP



STANDARD DUTY
TREGASKISS
TOUGH LOCK
RETAINING HEAD



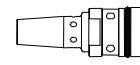
NECK
INSULATOR



HEAVY DUTY NOZZLE
VARIOUS SIZES AVAILABLE



HEAVY DUTY
TREGASKISS
TOUGH LOCK
CONTACT TIP



HEAVY DUTY
TREGASKISS
TOUGH LOCK
RETAINING HEAD



NECK
INSULATOR

IMPORTANT:

- Neck insulator **MUST** be in place before welding to properly insulate neck armor.
- Check all parts to ensure that connections are tight before welding.
- The retaining head **MUST** be tightened with a 5/8" (16 mm) wrench to prevent the contact tip from overheating.
- **DO NOT** use pliers to remove or tighten the retaining head or scoring may result.

Removal and Replacement

Nozzle

- Pull slip-on nozzles off with a twisting motion.
- When installing the nozzle, ensure that it is fully seated.

Contact Tip

- Thread the contact tip into the retaining head.
- Torque to 30 in.-lbs. (3.5 Nm).
- The Tregaskiss Tip Tool (Part # 450-18 – for heavy-duty tips) or a pair of weld pliers are the optimal tools for contact tip installation.

Retaining Head

- Thread retaining head onto gooseneck with a 5/8" (16 mm) wrench.
- Torque to 80 in.-lbs. (9 Nm) .
- **DO NOT** use pliers to remove or tighten the heavy duty retaining head or scoring may result.

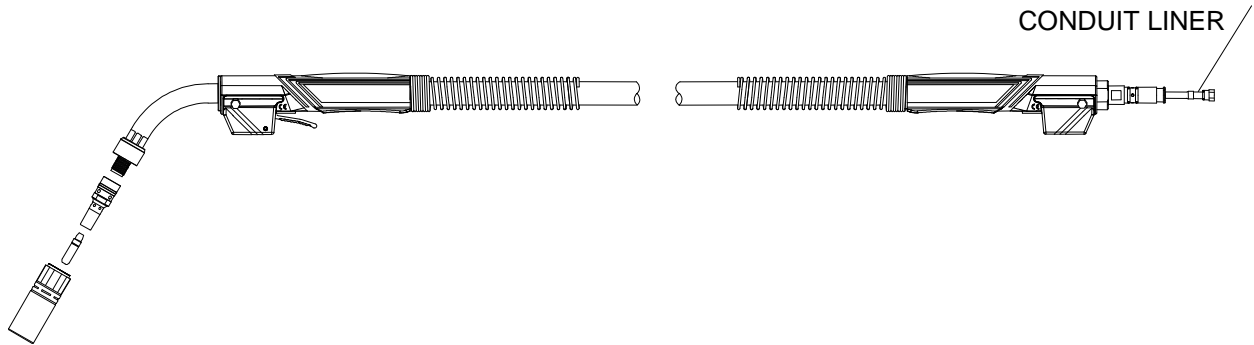
Neck Insulator

- The neck insulator is pressed onto the neck by hand.

2.2 LINER REPLACEMENT

NOTE: For guns equipped with “Direct Plug-Ins”, Bernard or Euro-connector, the procedure is the same.
On Miller® style guns, the liner is held captive by a guide cap, which must be removed and replaced when changing the liner.

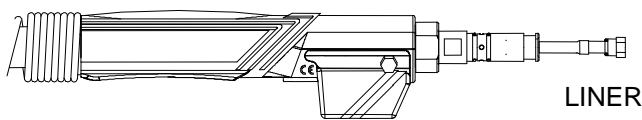
STEP #1



NOTE: Ensure power supply is off and gun is removed from feeder before proceeding.

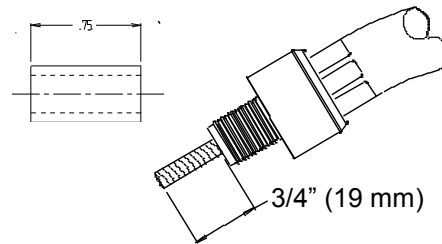
- Remove nozzle, tip and gas diffuser.
- If power pin uses a liner set screw, loosen the set screw using a 5/64" Allen wrench.
- If power pin is thread-in liner type, using a 10 mm wrench, turn thread-in liner retainer counter-clockwise until liner is free from the power pin.
- With gun straightened, grip conduit liner with pliers and remove.

STEP #2



- Feed replacement liner through gun using short strokes to avoid kinking. Twist liner clockwise if necessary.
- Using a 10 mm wrench, turn thread-in liner retainer in a clockwise direction and tighten into the power pin.

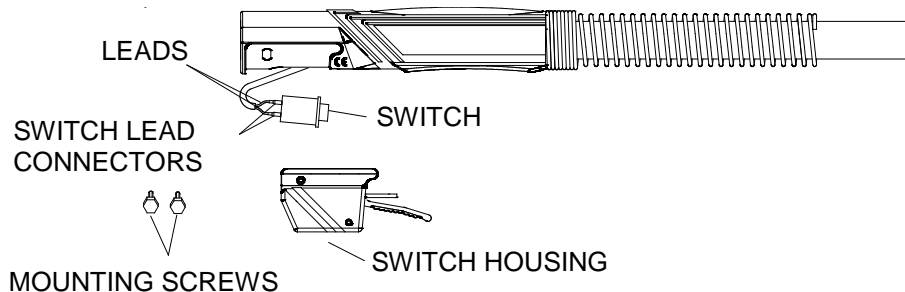
STEP #3



- Push liner back into gun and hold in place.
- Using liner gauge, trim conduit liner with 3/4" (19 mm) stick out.
- Remove any burr that may obstruct wire feed, especially on flat wire type conduit liner.
- Replace nozzle, tip and gas diffuser onto neck.

2.3 SWITCH REPLACEMENT

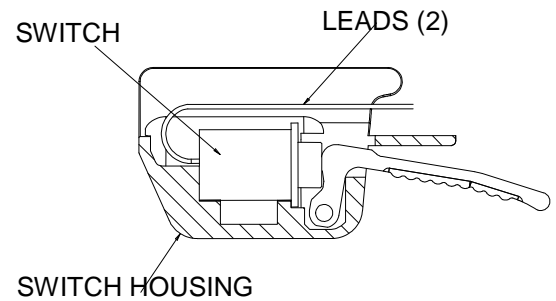
STEP #1



- Loosen both mounting screws with a 5/16" (8 mm) nut driver or flathead screwdriver.
- Ease switch out of switch housing.
- Remove switch from switch lead connectors with needle nose pliers.

STEP #2

- Push switch lead connectors firmly onto switch terminals with needle nose pliers.
- Depress switch plunger and nest back into housing.
- Fit switch housing into nest on handle (switch leads must lie parallel).
- Align housing holes with threaded holes in body and insert mounting screws.
- Start both screws first before tightening with 5/16" (8 mm) nut driver to even alignment.



IMPORTANT:

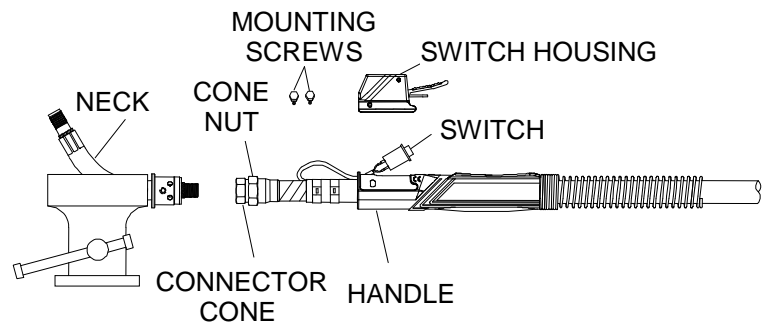
Use manufacturer's screws (part # 411-3 or 411-3M) to ensure proper length, hardness and tolerance.

2.4 NECK REPLACEMENT

STEP #1

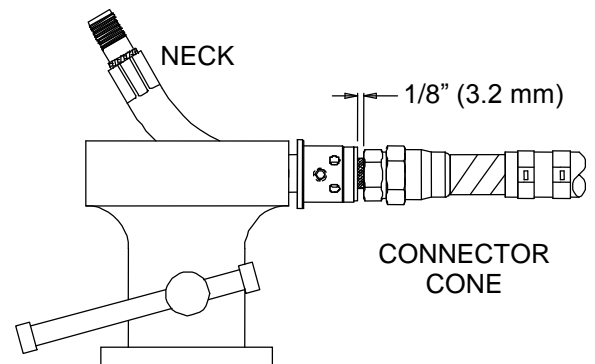
- Place neck in vise.
- Remove both switch housing mounting screws.
- Slide handle back exposing the cable connection.
- Loosen the cable / neck connection using a 7/8" wrench.
- Remove from vise and unthread neck by hand.

NOTE: The body is now an integral part of the neck and the handle mounting holes are metric (M5). Use the screws supplied with the new neck to avoid stripping of threads. Old style 407 bodies used Imperial (U.S.) threads.



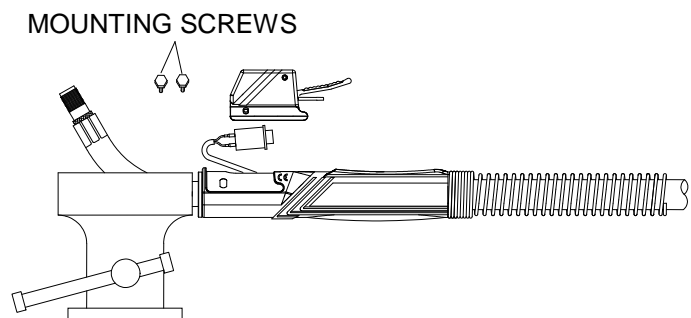
STEP #2

- Thread the neck into the cable connection (hand tighten).
- Place neck in vise and tighten with a wrench to within 1/8" (3.2 mm) spacing between the cable connection and neck body.



STEP #3

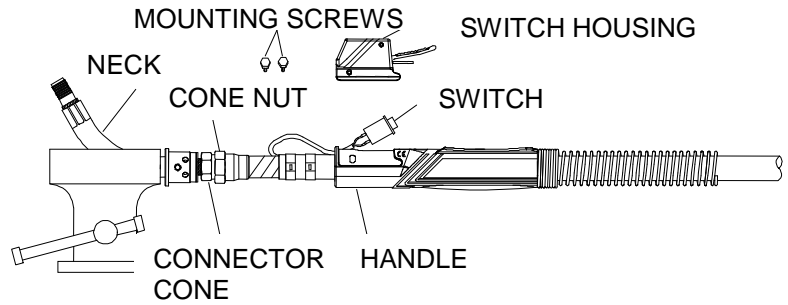
- Install the switch and reposition handle and switch housing.
- Reinstall switch housing mounting screws.



2.5 UNICABLE REPLACEMENT

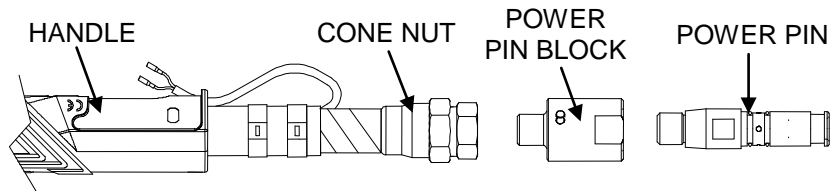
STEP #1

- Remove liner from gun (See **Section 2.2 LINER REPLACEMENT**).
- Mount neck in vise.
- Remove both switch housing mounting screws.
- Slide handle back exposing the cable connection.
- Loosen the cable / neck connection using a 7/8" wrench.
- Remove from vise and unthread neck by hand.
- Remove switch from leads and slide handle back (See **Section 2.3 SWITCH REPLACEMENT**).

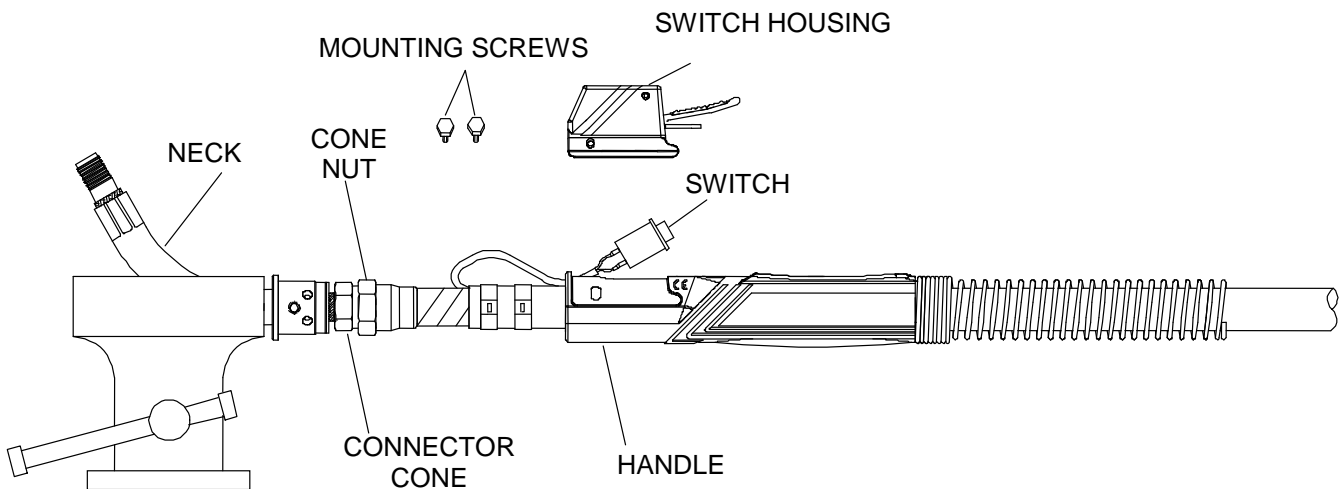


STEP #2

- Remove power pin from power pin block using a 5/8" wrench on the pin and a 1" wrench on the block.
- Remove both terminal housing screws.
- Slide handle back exposing the cable connection.
- Remove power pin block from unicable using a 7/8" wrench and a 1" wrench.



STEP #3



- Take new unicable and starting from the front install the neck.
- Slide the handle up over the connection ensuring that the switch leads slide out the hole on the handle.
- Install the switch to the switch leads and secure the handle and switch housing in place using the two screws.

STEP #4

- Reinstall power pin block to rear of unicable and thread power pin into block.
- Slide handle up over connection ensuring that switch leads can slide out of the hole.
- Plug switch leads into terminal housing and secure handle and housing using two screws.
- Reinstall liner. Make sure that there is 3/4" of the liner sticking out past the end of the neck when the gun is fully extended; if there is not, a new liner will be required.
- Reinstall consumables and reconnect to wire feeder.

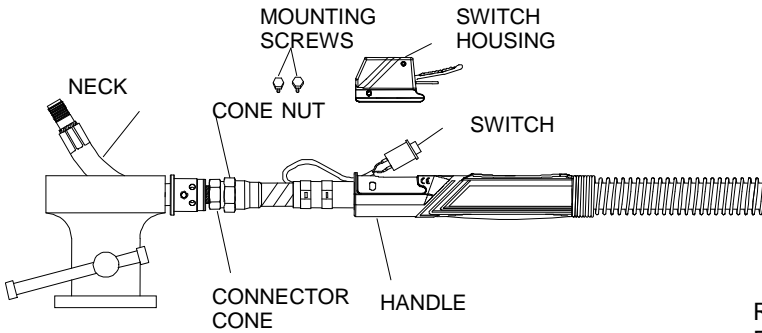
2.6 UNICABLE REPAIR

Remove consumables (Nozzle, Retaining Head, Contact Tip).

Remove the liner from the gun.

Mount neck in the vise.

Remove switch housing and switch from leads.

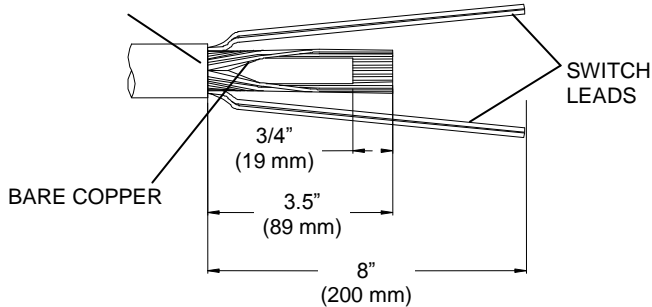


Move the handle back.

Bend unicable behind connector cone. Cut unicable at bend.

Slide two large "Oetiker" clamps 1.5 ft. down the unicable (required for crimping later).

OUTER JACKET



From your cut (end of cable), measure 8" back and cut away the outer jacket of the cable. **Be careful not to cut the copper wiring and leads**

Slide outer jacket forward to expose the copper wiring and leads.

Pull out the lead wires.

From the 8" cut, measure 3 1/2" towards the front of the gun and cut off the excess cable.

Fan back copper and remove 3/4" of the inner gas tube.

Take the old liner you just removed and cut it to approximately 2 ft. long.

Thread cone onto vise mounted neck.

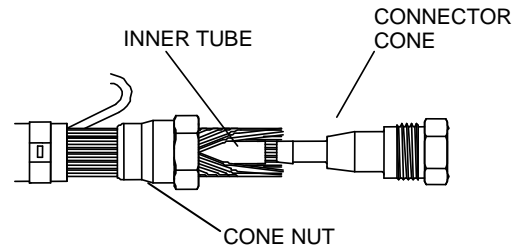
Insert the 2 ft. of old liner into the neck from the front end of the neck, then slide on the support tube.

Slide small Oetiker clamp over top of inner gas tube (Hytrel).

Using the 2' old liner as a guide, slide the inner gas tube over the support tube and up to the cone shoulder.

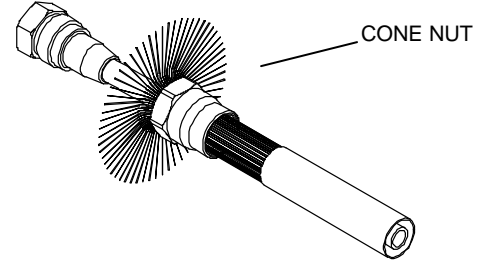
Crimp the support tube clamp. Crimp between the black and white switch leads.

Position copper wires between roll marked numbers on cone and first step before threads. Crimp the large Oetiker clamps 1/4" and 1" behind the outer jacket at the front of the gun.



Remove the inner gas tube (Hytrel) from the cone.

Fan out the copper and bring the copper around the inner gas tube (Hytrel) evenly.



Slide the inner gas tube on the Cone up to the cone shoulder.

Fan the copper evenly around the inner gas tube up to the shoulder of the Cone Connector. Thread on the Cone Nut onto Connector Cone. Torque the Cone Nut to 30 ft.-lbs (there should be about a 1/8" gap between the cone and cone nut).

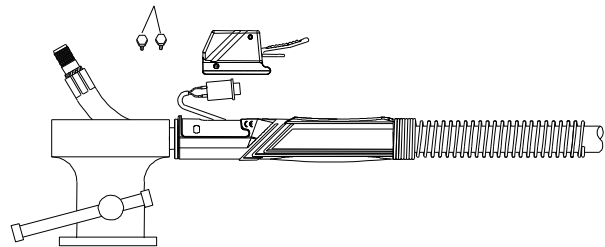
Using 3/4" Teflon electrical tape, wrap up the copper and spare switch leads neatly. Loop the 2 switch leads that will be used. This is to ensure that there is enough slack in the wire for gun articulation. Make sure that the control wire sheath is over switch leads where the cone and cone nut are to prevent any wear.

Pull up the handle and feed switch leads through handle.

Strip leads about 1/8" back and crimp switch terminals to open leads.

Connect the leads to the switch and lay the switch back into the housing.

Screw the switch housing back onto the handle.



If assistance is required, please contact your authorized Bernard Distributor or the Customer Service Department at Bernard at 1-800-946-2281.

UNICABLE CLAMP KIT

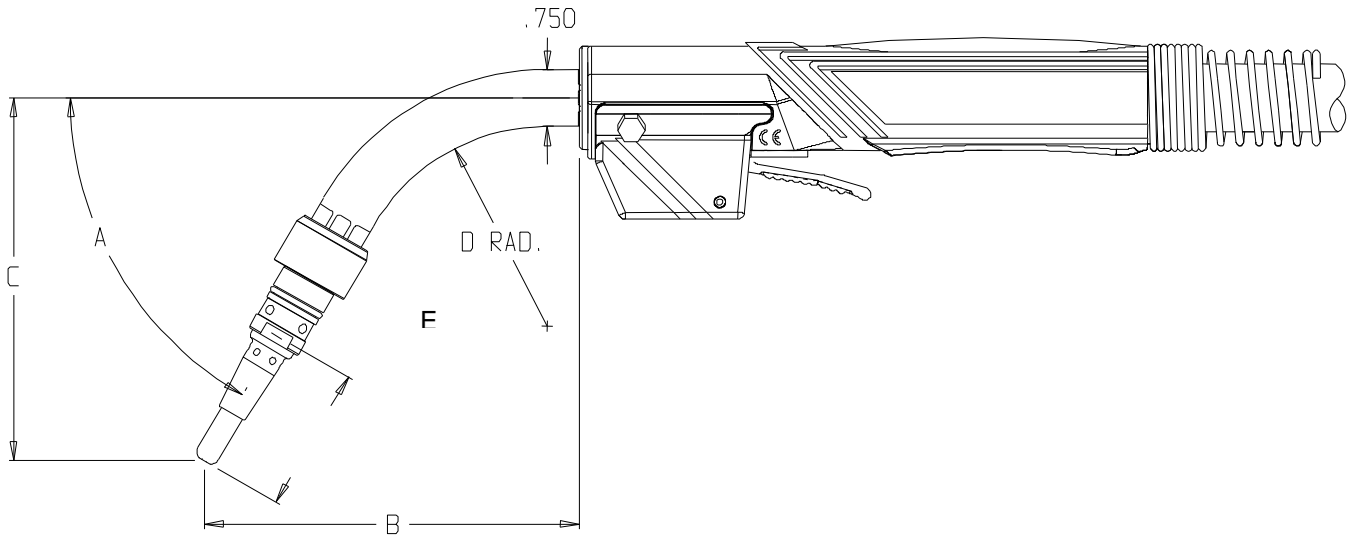
PART #			DESCRIPTION
350 amp	450 amp	550 amp	
313-8	413-7	513-7	UNICABLE CLAMP KIT (COMPLETE)
INDIVIDUAL PARTS			
308	408	408	CONNECTOR CONE
509	409	509	CONE NUT
313-3	513-1	523-1	OUTER JACKET CLAMPS (2)
413-5	413-5	413-5	SUPPORT TUBE CLAMP
413-4	413-4	413-4	SUPPORT TUBE
412-1	412-1	412-1	SWITCH LEAD CONNECTORS (2)
412-3	412-3	412-3	CONTROL WIRE SHEATH

REPAIR TOOL KIT

PART #	DESCRIPTION
450	REPAIR TOOL KIT (COMPLETE)
INDIVIDUAL TOOLS	
450-1	CABLE CUTTER
450-2	CLAMP PLIERS - FOR CRIMPING OF OUTER JACKET AND INNER TUBE CLAMPS
450-3	CONNECTOR CRIMPING TOOL - FOR SWITCH LEAD TERMINALS
450-4	5/16" NUT DRIVER - FOR REMOVAL OF SWITCH HOUSING
450-5	KNIFE - FOR TRIMMING OF OUTER JACKET
450-21	5 mm ALLEN KEY
450-13-2	SUPPORT TUBE INSTALLATION PIN – 350/450 amp
450-13-3	SUPPORT TUBE INSTALLATION PIN – 550 amp

3.0 – TECHNICAL DATA

3.1 NECK DIMENSIONS



NECK	A	B		C		D		E	
		INCHES	mm	INCHES	mm	INCHES	mm	INCHES	mm
305-60	60°	4.10	105	4.00	103	2.00	51	1.90	48
405-45	45°	5.19	132	3.55	90	3.00	76	1.90	48
405-60	60°	4.98	127	4.78	121	3.00	76	1.90	48
405-180	180°	7.35	187	---	---	---	---	1.90	48
505-45	45°	7.23	184	3.87	98	4.00	102	1.90	48
505-60	60°	6.04	153	5.30	135	4.00	102	1.90	48

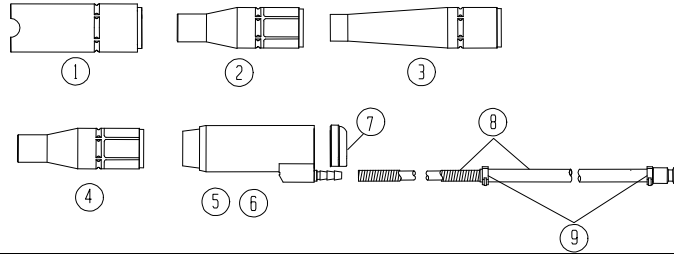
3.2 GUN AMPERAGE RATINGS

GUN MODEL	60% DUTY CYCLE – MIXED GASES OR 100% DUTY CYCLE – CO ₂
350 amp	350 amp
450 amp	450 amp
550 amp	550 amp

NOTE: Ratings are based on tests that comply with IEC 60974-7 standards.

4.0 – OPTIONS

4.1 SPECIALTY AND OPTIONAL ITEMS



ITEM	PART #	DESCRIPTION
1	401-10-87	SPOT NOZZLE (BRASS)
2	401-21	FLUX CORE NOZZLE (GASLESS)
3	401-41-50	EXTENDED REACH NOZZLE - 3.5" (88.9 MM)
4	401-42-50	HIGH ACCESS NOZZLE (BOTTLE-NECKED)
5	401-26-62	WATER-COOLED NOZZLE - FIXED HOSE SYSTEM 5/8" (15.9 MM) FOR 5/16" (7.9 mm) TIP RECESS
6	401-26-75	WATER-COOLED NOZZLE - FIXED HOSE SYSTEM 3/4" (19 MM) FOR 5/16" (7.9 mm) TIP RECESS
7	402-26	NECK INSULATOR USED WITH 401-26-62 & 401-26-75
8	430-3	WATER HOSE ONLY - 15' (4.6 M)
9	656-1	HOSE CLAMP

4.2 FEEDER ADAPTORS

To be used with 417 (Tweco #4), 417-50 (Euro) & 417-60 (Tweco #5) Quick Connect Block

PART #	USE ON FEEDERS
418-1	AIRCO®
418-3	ESAB® (NON EURO STYLE) AND HOBART® BETA MIG
418-4	HOBART 27
418-5	LINCOLN® LN4, LN5, LINDE SWM 31, 3A & 32A
418-6	LINCOLN LN7, 8 & 9, LN 25 SUITCASE, LN22
418-7	LINDE® SWM-14
418-8	LINDE 35 SWM-23
418-9	MILLER 10A, 30A (MILLERMATIC 35S FEEDER)
418-10	MILLER 52E, 54E, S21, S22 SERIES AND MILLERMATIC 200 & 250, 60 SERIES
418-14	OTC DAIHEN®
418-21	GILLILAND®
418-27	PANASONIC®
418-29	TWECO® #5 PIN
418-35	KOBELCO®

4.3 DIRECT PLUG-INS

PART #	DESCRIPTION	USE ON FEEDERS
214	TREGASKISS™ POWER PIN	TREGASKISS QUICK CONNECT BLOCK, HOBART 2000 SERIES FEEDERS, TWECO #4 RECEPTACLE BODY PART #TAK-1
414-11-2	O-RING - FOR MILLER POWER PINS	MILLERMATIC 200 & 250, S21E & S22 SERIES, 52 & 54 SERIES, 60 SERIES
214-6-116	MILLER POWER PIN - FOR .035" - 1/16" WIRE	MILLERMATIC 200 & 250, S21E & S22 SERIES, 52 & 54 SERIES, 60 SERIES
214-6-332	MILLER POWER PIN - FOR 5/64" - 3/32" WIRE	MILLERMATIC 200 & 250, S21E & S22 SERIES, 52 & 54 SERIES, 60 SERIES
214-116	GUIDE CAP ONLY - FOR 214-6-116 (NEW STYLE)	
214-332	GUIDE CAP ONLY - FOR 214-6-332 (NEW STYLE)	
214-9	GUIDE CAP ONLY - FOR ALUMINUM LINER (NEW STYLE)	
414-116	GUIDE CAP ONLY - FOR 214-6-116 (OLD STYLE)	
414-332	GUIDE CAP ONLY - FOR 214-6-332 (OLD STYLE)	
414-9	GUIDE CAP ONLY - FOR ALUMINUM LINER (OLD STYLE)	
214-12	TWECO #5 STYLE POWER PIN	ALL FEEDERS SET UP WITH TWECO #5
414-12-2	O-RING - FOR TWECO #5 STYLE POWER PIN	RECEPTACLE BODY PART #6TAK-1
214-2	LINCOLN POWER PIN	LINCOLN LN7, 8 & 9, LN25 SUITCASE, LN22, NA2
414-21	ESAB (NON EURO)	A-10
214-13	PANASONIC	

4.4 CONNECTOR OPTIONS

Euro Connector option - for European style feeders and feeder adaptors for 350, 450, 550 & 650 amp T-Gun MIG Guns.

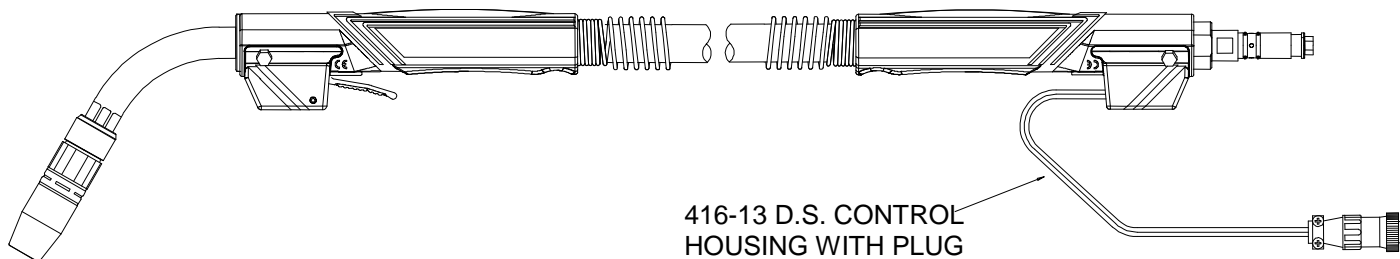
Bernard Style Connector Option - for Quick Connect feeder adaptors for 350, 450, 550 & 650 amp T-Gun MIG Guns.

Old Style Euro		New Style Euro (Oct. 2004)		Bernard Style	
PART #	DESCRIPTION	PART #	DESCRIPTION	PART #	DESCRIPTION
425	EURO CONNECTOR ASSEMBLY	425	EURO CONNECTOR ASSEMBLY	426	BERNARD STYLE CONNECTOR ASSY.
425-10	EURO CONNECTOR BODY	425-10	EURO CONNECTOR BODY	426-1	CONNECTOR BODY
425-2	HAND NUT	425-11	HAND NUT	426-2	LOCKING COLLAR
666-10	HANDLE	425-7	EURO HANDLE	426-3	LOCK SPRING
416-5	TERMINAL HOUSING			426-4	CONNECTOR HOUSING
425-6	SPACER RING			426-5	CONTROL PINS
425-8	CONTROL PIN			426-6	O-RINGS
425-5	MOUNTING SCREW				

4.5 CONTROL PLUGS

PART #	DESCRIPTION
419-2	HOBART
419-4	MILLER (52E, 54E)
419-5	WESTINGHOUSE
419-6	LINCOLN (LN7, 8, 9) NA2
419-7	MILLER (10E, 30E) & LINDE (SWM-35)
419-8	DIPSTICK 160,200, HOBART HANDLER, LINCOLN SP-100
419-10	DUAL SCHEDULE MILLER
419-11	LINCOLN DUAL SCHEDULE
419-12	OXOMATIC

4.6 DUAL SCHEDULE MIG GUN



TWO POSITION SWITCH STYLE

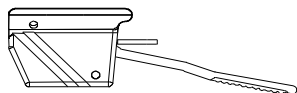
PART #	DESCRIPTION
411-11	DUAL SCHEDULE TWO-POSITION SWITCH HOUSING ONLY

TOGGLE SWITCH STYLE

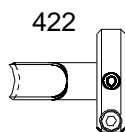
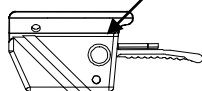
PART #	DESCRIPTION
411-12	DUAL SCHEDULE SWITCH HOUSING - COMPLETE W/TOGGLE SWITCH
411-13	DUAL SCHEDULE LOCK-ON TRIGGER HOUSING

5.0 – ACCESSORIES

411-20 SWITCH
HOUSING
WITH EXTENDED
LEVER



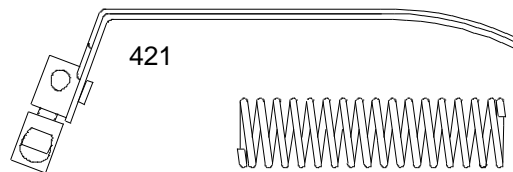
411-4 SWITCH
HOUSING WITH
LOCK ON TRIGGER



422 GUN HANGER

421 HEAT SHIELD

421-1 SHIELD MOUNTING
SCREW (NOT SHOWN)



SPRING GUARD

406-1 400 AMP 60 DEG

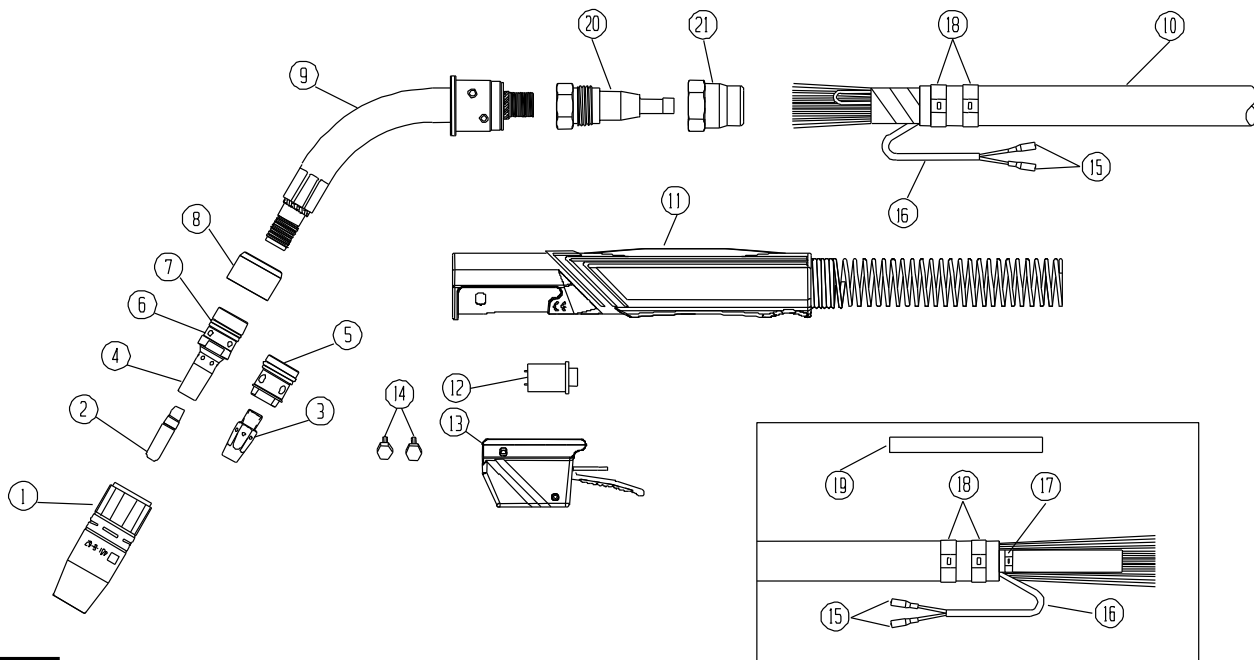
406-2 400 AMP 45 DEG

506-1 500AMP 60 DEG

6.0 – TROUBLESHOOTING

PROBLEM	POSSIBLE CAUSE
POOR WIRE FEED	<ul style="list-style-type: none"> • CONDUIT LINER CLOGGED OR KINKED • INCORRECT LINER SIZE OR CONTACT TIP • LINER CUT TOO SHOR AND NOT SEATING PROPERLY IN GAS DIFFUSER • DRIVE ROLLS TOO TIGHT, RESULTING IN SCORING OF WELDING WIRE • WELDING WIRE DIRTY, RUSTY, AND/OR TOO MUCH CAST
SHORT TIP LIFE	<ul style="list-style-type: none"> • DRIVE ROLLS TOO TIGHT, RESULTING IN SCORING OF WELDING WIRE • WELDING WIRE DIRTY, RUSTY, AND/OR TOO MUCH CAST • UNCOATED WIRE BEING USED, INCREASING USAGE • WRONG TIP SIZE • OVER TORCH-RATED DUTY CYCLE • LOOSE CONTACT TIP AND/OR RETAINING HEAD
GUN OVERHEATING	<ul style="list-style-type: none"> • LOOSE RETAINING SCREW ON QUICK CONNECT BLOCK • INSUFFICIENT GAUGE POWER CABLE AND/OR GROUND CABLE • LOOSE CONNECTOR CONE AND/OR CONE NUT • GUN BEING RUN BEYOND ITS AMPERAGE RANGE • ELECTRICAL MALFUNCTION IN POWER SOURCE
SWITCH MALFUNCTIONING	<ul style="list-style-type: none"> • BAD CONNECTION OF LEADS TO SWITCH TERMINALS • SPATTER BUILT UP BETWEEN LEVER AND SWITCH HOUSING • CONTACTS DIRTY IN SWITCH • SWITCH HOUSING SCREWS LOOSE • BROKEN OR WORN SWITCH LEAD
WELD POROSITY	<ul style="list-style-type: none"> • SPATTER BUILT UP IN NOZZLE, BLOCKING GAS • LEAKS IN GAS HOSE OR IMPROPER CONNECTION • O-RINGS ON POWER PIN ARE CUT OR DAMAGED • INNER TUBE LOOSE FROM CONNECTOR CONE • POOR WIRE FEED (SEE ABOVE) • IMPROPER SHIELDING GAS OR WELDING WIRE • RUSTY OR POOR QUALITY WELDING WIRE • PARENT METAL RUSTY OR CONTAMINATED OR HIGH IN SULPHUR CONTENT • FLOW IMPROPERLY SET

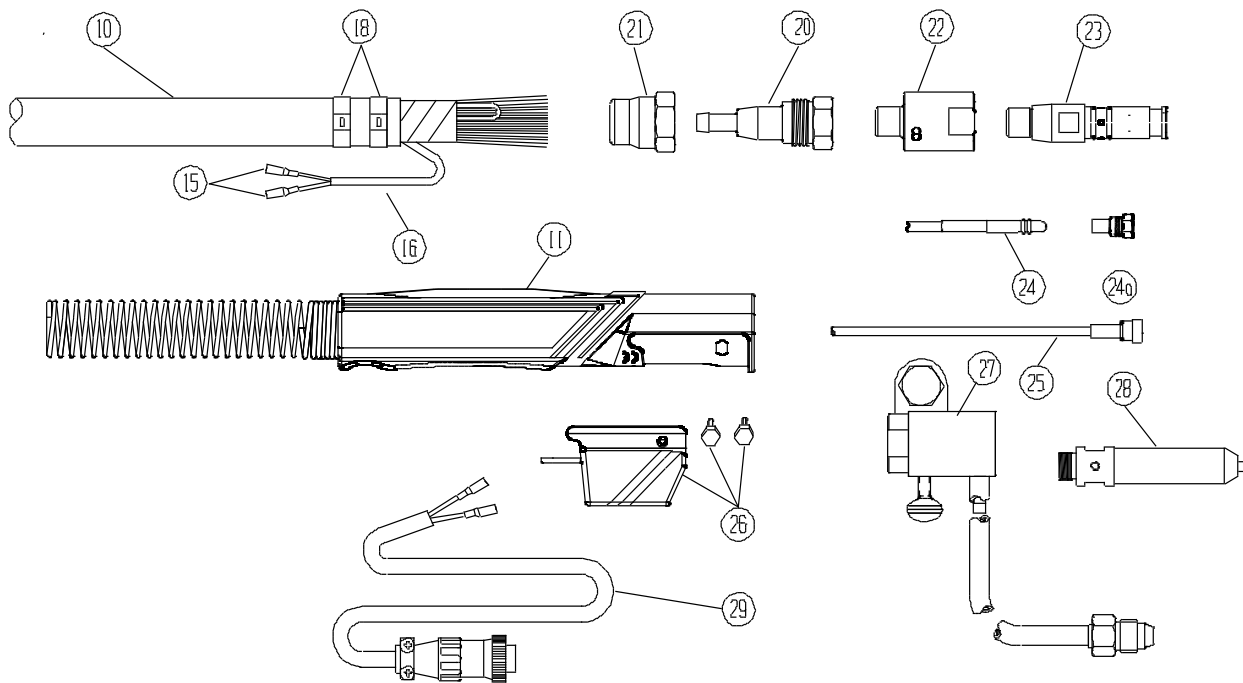
7.0 – EXPLODED VIEW AND PARTS LIST



Numbers in this column correspond to the exploded view images above.

	PART #			DESCRIPTION
	350 amp	450 amp	550 amp	
1				STANDARD NOZZLES (SELF-INSULATED)
	401-40-38	401-40-38	401-40-38	SUPER TAPERED NOZZLE - 3/8" BORE (BRASS)
	401-4-38	401-4-38	401-4-38	3/8" (10 mm) BORE - FLUSH TIP
	401-4-50	401-4-50	401-4-50	1/2" (13 mm) BORE - 1/8" (3 mm) TIP RECESS
	401-4-62	401-4-62	401-4-62	5/8" (16 mm) BORE - 1/8" (3 mm) TIP RECESS
	401-4-75	401-4-75	401-4-75	3/4" (19 mm) BORE - 1/8" (3 mm) TIP RECESS
				SHORT ARC NOZZLE
	401-8-62	401-8-62	401-8-62	5/8" (16 mm) BORE - 1/8" (3 mm) TIP STICKOUT
				HEAVY DUTY NOZZLES (SELF-INSULATED)
	401-5-62	401-5-62	401-5-62	5/8" (16 mm) BORE - 1/4" (6 mm) TIP RECESS
	401-5-75	401-5-75	401-5-75	3/4" (19 mm) BORE - 1/4" (6 mm) TIP RECESS
	401-6-50	401-6-50	401-6-50	1/2" (13 mm) BORE - 1/8" (3 mm) TIP RECESS
	401-6-62	401-6-62	401-6-62	5/8" (16 mm) BORE - 1/8" (3 mm) TIP RECESS
	401-6-75	401-6-75	401-6-75	3/4" (19 mm) BORE - 1/8" (3 mm) TIP RECESS
	401-7-62	401-7-62	401-7-62	5/8" (16 mm) BORE - 1/4" (6 mm) TIP RECESS (BRASS)
	401-7-87	401-7-87	401-7-87	7/8" (22 mm) BORE - 1/4" (6 mm) TIP RECESS (BRASS)
2				STANDARD DUTY TREGASKISS™ TOUGH LOCK™ CONTACT TIP - 1/4" (6.4 mm) O.D.
	403-14-23	403-14-23	403-14-23	FOR .023" (0.6 mm) WIRE
	403-14-30	403-14-30	403-14-30	FOR .030" (0.8 mm) WIRE
	403-14-35	403-14-35	403-14-35	FOR .035" (0.9 mm) WIRE
	403-14-1.0	403-14-1.0	403-14-1.0	FOR 1 mm WIRE
	403-14-45	403-14-45	403-14-45	FOR .045" (1.2 mm) WIRE
				HEAVY DUTY TREGASKISS TOUGH LOCK CONTACT TIPS - 5/16" (7.9 mm) O.D.
	403-20-30	403-20-30	403-20-30	FOR .030" (0.8 mm) WIRE
	403-20-35	403-20-35	403-20-35	FOR .035" (0.9 mm) WIRE
	403-20-1.0	403-20-1.0	403-20-1.0	FOR 1 mm WIRE
	403-20-45	403-20-45	403-20-45	FOR .045" (1.2 mm) WIRE
	403-20-364	403-20-364	403-20-364	FOR 3/64" (1.2 mm) WIRE
	403-20-1.4	403-20-1.4	403-20-1.4	FOR 1.4 mm WIRE
	403-20-52	403-20-52	403-20-52	FOR .052" (1.3 mm) WIRE
	403-20-116	403-20-116	403-20-116	FOR 1/16" (1.6 mm) WIRE
	403-20-564	403-20-564	403-20-564	FOR 5/64" (2.0 mm) WIRE
	403-20-332	403-20-332	403-20-332	FOR 3/32" (2.4 mm) WIRE
				HEAVY-DUTY TREGASKISS TOUGH LOCK TAPERED TIPS 5/16" (7.9 mm) O.D.
	403-21-30	403-21-30	403-21-30	FOR .030" (0.8 mm) WIRE
	403-21-35	403-21-35	403-21-35	FOR .035" (0.9 mm) WIRE
	403-21-45	403-21-45	403-21-45	FOR .045" (1.2 mm) WIRE
3				GAS DIFFUSER
	404-15	404-15	404-15	TREGASKISS TOUGH LOCK™ - HEAVY DUTY
4				RETAINING HEAD - TREGASKISS TOUGH LOCK
	404-18	404-18	404-18	TREGASKISS TOUGH LOCK RETAINING HEAD - FOR STANDARD DUTY TIPS
	404-26	404-26	404-26	TREGASKISS TOUGH LOCK RETAINING HEAD - FOR HEAVY DUTY TIPS

	PART #			DESCRIPTION
	350 amp	450 amp	550 amp	
5	402-3	402-3	402-3	NOZZLE RETAINER
6	454-1-2	454-1-2	454-1-2	RETAINING RING ONLY
7	402-16	402-16	402-16	O-RING ONLY
8	402-11	402-11	402-11	NECK INSULATOR
9				NECKS (INTERCHANGEABLE BETWEEN ALL 3 AMPERAGES)
	305-45	405-45	505-45	45 DEGREE
	305-60	405-60	505-60	60 DEGREE
	305-180	405-180	505-180	STRAIGHT
	406-2	406-2	506-1	SPRING THERMO GUARD - 45° (NOT SHOWN)
	406-1	406-1	506-1	SPRING THERMO GUARD - 60° and 22° (NOT SHOWN)
	405-45F	405-45F	405-45F	45 DEGREE - GASLESS
	405-60F	405-60F	405-60F	60 DEGREE - GASLESS
	405-80F	405-80F	405-80F	80 DEGREE - GASLESS
	505-45F	505-45F	505-45F	45 DEGREE - GASLESS
	NA	NA	505-60F	60 DEGREE - GASLESS
	NA	NA	505-80F	80 DEGREE - GASLESS
10				UNICABLE ASSEMBLY (INCLUDES HANDLE / SPRING ASSEMBLY)
	313-10	413-10	513-10	10' (3 m) SERVICE
	313-12	413-12	513-12	12' (4 m) SERVICE
	313-15	413-15	513-15	15' (5 m) SERVICE
	313-20	413-20	513-20	20' (6 m) SERVICE
	313-25	413-25	513-25	25' (8 m) SERVICE
11	410	410	410	HANDLE / SPRING GUARD ASSEMBLY - FRONT AND REAR
12	411-1	411-1	411-1	SWITCH ONLY
13	411-2	411-2	411-2	SWITCH HOUSING WITH SCREWS
	411-4	411-4	411-4	SWITCH HOUSING - LOCK-ON TRIGGER
	411-11	411-11	411-11	SWITCH HOUSING DUAL SCHEDULE - 2 POSITION
	411-12	411-12	411-12	SWITCH HOUSING DUAL SCHEDULE - TOGGLE STYLE
	411-13	411-13	411-13	SWITCH HOUSING D/S 2 POSITION - LOCK-ON
	411-23	411-23	411-23	SWITCH HOUSING - EXTENDED TRIGGER
	411-24	411-24	411-24	SWITCH HOUSING - EXTENDED LOCK-ON TRIGGER
14	411-3M	411-3M	411-3M	MOUNTING SCREWS (Metric M5)
	313-8	413-7	513-7	UNICABLE REPAIR KIT (INCLUDES PARTS 15 - 21)
15	412-1	412-1	412-1	SWITCH LEAD CONNECTOR
16	412-3	412-3	412-3	SHEATH
17	413-5	413-5	413-5	SUPPORT TUBE CLAMP
18	313-3	523-1	523-1	OUTER JACKET CLAMP
19	413-4	413-4	413-4	SUPPORT TUBE
20	308	408	408	CONNECTOR CONE
21	509	409	509	CONE NUT



	PART #			DESCRIPTION
	350 amp	450 amp	550 amp	
22	414-400	414-400	414-400	POWER PIN BLOCK
23				POWER PINS
	214	214	214	TWECO® #4
	214-6-116	214-6-116	214-6-116	MILLER® 1/16"
	214-6-332	214-6-332	214-6-332	MILLER 3/32"
	214-9	214-9	214-9	MILLER GUIDE CAP FOR ALUMINUM
	214-2	214-2	214-2	LINCOLN®
	214-4	214-4	214-4	L-TEC® - MT SERIES
	214-12	214-12	214-12	TWECO #5
	214-13	214-13	214-13	PANASONIC®
24				TREGASKISS QUICK LOAD™ LINER (LINER RETAINER NOT INCLUDED)
24a	415-26	415-26	415-26	LINER RETAINER
	415-35-10Q	415-35-10Q	415-35-10Q	FOR .035" - .045" (0.9 mm - 1.2 mm) WIRE - 10' (3 m)
	415-35-15Q	415-35-15Q	415-35-15Q	FOR .035" - .045" (0.9 mm - 1.2 mm) WIRE - 15' (5 m)
	415-35-25Q	415-35-25Q	415-35-25Q	FOR .035" - .045" (0.9 mm - 1.2 mm) WIRE - 25' (8 m)
	415-116-10Q	415-116-10Q	415-116-10Q	FOR .045" - 1/16" (1.2 mm - 1.6 mm) WIRE - 10' (3 m)
	415-116-15Q	415-116-15Q	415-116-15Q	FOR .045" - 1/16" (1.2 mm - 1.6 mm) WIRE - 15' (5 m)
	415-116-25Q	415-116-25Q	415-116-25Q	FOR .045" - 1/16" (1.2 mm - 1.6 mm) WIRE - 25' (8 m)
25				THREAD-IN STYLE LINER
	415-23-15	415-23-15	415-23-15	FOR .023" (0.6 mm) WIRE - 15' (5 m)
	415-30-15	415-30-15	415-30-15	FOR .030" (0.8 mm) WIRE - 15' (5 m)
	415-35-10	415-35-10	415-35-10	FOR .035" - .045" (0.9 mm - 1.2 mm) WIRE - 10' (3 m)
	415-35-15	415-35-15	415-35-15	FOR .035" - .045" (0.9 mm - 1.2 mm) WIRE - 15' (5 m)
	415-35-25	415-35-25	415-35-25	FOR .035" - .045" (0.9 mm - 1.2 mm) WIRE - 25' (8 m)
	415-35-2	415-35-2	415-35-2	FOR .035" (0.9 mm) ALUMINUM WIRE - 15' (5 m)
	415-116-10	415-116-10	415-116-10	FOR .045" - 1/16" (1.2 mm - 1.6 mm) WIRE - 10' (3 m)
	415-116-15	415-116-15	415-116-15	FOR .045" - 1/16" (1.2 mm - 1.6 mm) WIRE - 15' (5 m)
	415-116-25	415-116-25	415-116-25	FOR .045" - 1/16" (1.2 mm - 1.6 mm) WIRE - 25' (8 m)
	415-116-2	415-116-2	415-116-2	FOR 3/64" - 1/16" (1.2 mm - 1.6 mm) ALUMINUM WIRE - 15' (5 m)
	415-332-15	415-332-15	415-332-15	FOR 5/64" - 3/32" (2 mm - 2.4 mm) WIRE - 15' (5 m)
	415-332-25	415-332-25	415-332-25	FOR 5/64" - 3/32" (2 mm - 2.4 mm) WIRE - 25' (8 m)
	415-564-15	415-564-15	415-564-15	FOR all 5/64" (2 mm) WIRE & 1/16" (1.6 mm) FLUX-CORED WIRE
	415-1	415-1	415-1	LINER O-RING (NOT SHOWN)
	416-13	416-13	416-13	CONTROL HOUSING WITH DUAL SCHEDULE OPTION
26	416-5	416-5	416-5	CONTROL HOUSING WITH SCREWS
27				FEEDER ADAPTOR REQUIREMENTS (SOLD SEPARATELY)
	417	417	417	QUICK CONNECT BLOCK ASSEMBLY (TWECO #4)
	417- 50	417- 50	417- 50	QUICK CONNECT BLOCK ASSEMBLY (EURO)
	417- 60	417- 60	417- 60	QUICK CONNECT BLOCK ASSEMBLY (TWECO #5)
	417-1	417-1	417-1	RETAINING SCREW
	417-2	417-2	417-2	GAS HOSE ADAPTOR
	417-3	417-3	417-3	POWER BOLT
	417-4	417-4	417-4	GAS HOSE & NIPPLE

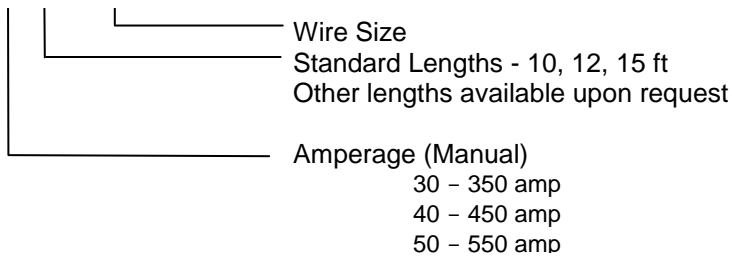
	PART #			DESCRIPTION
	350 amp	450 amp	550 amp	
28				FEEDER ADAPTOR PINS
	418-3	418-3	418-3	ESAB® (NON EURO STYLE) AND HOBART BETA MIG
	418-4	418-4	418-4	HOBART® 27
	418-5	418-5	418-5	LINCOLN LN4, LN5, LINDE SWM 31, 3A & 32A
	418-6	418-6	418-6	LINCOLN LN7, 8 & 9, LN 25 SUITCASE, LN22
	418-7	418-7	418-7	LINDE® SWM-14
	418-8	418-8	418-8	LINDE 35 SWM-23
	418-9	418-9	418-9	MILLER 10A, 30A (MILLERMATIC 35S FEEDER)
	418-10	418-10	418-10	MILLER 52E, 54E, S21, S22 SERIES AND MILLERMATIC 200 & 250, 60 Series
	418-14	418-14	418-14	OTC DAIHEN®
	418-21	418-21	418-21	GILLILAND®
	418-27	418-27	418-27	PANASONIC®
	418-29	418-29	418-29	TWECO #5 PIN
	418-35	418-35	418-35	KOBELCO®
29				CONTROL PLUGS (SOLD SEPARATELY)
	419-2	419-2	419-2	HOBART
	419-4	419-4	419-4	MILLER (52E, 54E)
	419-6	419-6	419-6	LINCOLN (LN7, 8, 9) NA2
	419-7	419-7	419-7	MILLER (10E, 30E) & LINDE (SWM-35)
	419-8	419-8	419-8	DIPSTICK 160, 200, HOBART HANDLER, LINCOLN SP-100
	419-10	419-10	419-10	MILLER DUAL SCHEDULE
	419-11	419-11	419-11	LINCOLN DUAL SCHEDULE
				ACCESSORIES (NOT SHOWN)
	NA	406-1	506-1	SPRING GUARD FOR 60 DEGREE NECK
	NA	406-2	NA	SPRING GUARD FOR 45 DEGREE NECK
	NA	422	NA	GUN HANGER
	NA	421	NA	HEAT SHIELD (SOLD WITH TORCH HANGER)
	NA	421-1	NA	HEAT SHIELD MOUNTING SCREWS

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Lincoln is a trademark of the Lincoln Electric Company.
Linde is a trademark of Linde AG.
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Tweco is a trademark of Victor Technologies.

8.0 – ORDERING INFORMATION

8.1 EXAMPLE OF STANDARD MODEL NO.

4010-116



8.2 EXAMPLE OF CUSTOM BUILT GUN

E 4015-116-60-FL-9

Use these codes to order special gun features.

POWER PINS

- E** - Euro-Connector
- B** - Bernard E-Z Connector
- M** - Miller
- LN** - Lincoln
- LT** - L-TEC
- PA** - Panasonic
- TW** - Tweco #5
- ES** - ESAB

OTHER

- F** - Gasless Flux core
- D** - Dual-schedule
- 2D** - 2-position dual-schedule
- L** - Lock-on trigger

Option numbers should be added only if desired option is not included on standard gun model.

9 - Liner for Aluminum wire

FL - 405-FL Flex Neck

Angle of neck

Wire Size

Standard Gun Model No.

8.3 GUN STANDARDS CHART

GUN MODEL	NECK	NOZZLE	RETAINING HEAD	NECK INSULATOR	CONTACT TIPS
350 amp	305-60	401-6-62	404-26	402-11	403-20-xx
450 amp	405-60	401-6-62	404-26	402-11	403-20-xx
550 amp	505-60	401-5-75	404-26	402-11	403-20-xx



For Customer Support:

U.S.A 800-946-2281
International 708-946-2281
BernardWelds.com

M001 REV G 09/12