

**TACTICAL
WELDER**

Operations Manual

Part Number 4800



**TACTICAL
WELDER**



ULTRATECH
INTERNATIONAL, INC.

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Warranty Information

Tactical Welder Limited Warranty

LIMITED WARRANTY - Subject to the terms and conditions below, UltraTech International, Inc. Jacksonville, Florida, warrants to its original retail purchaser that new Tactical Welders sold after the effective date of this limited warranty is free of defects in material and workmanship at the time it is shipped by UltraTech.

THIS WARRANTY IS EXPRESSLY IN LIEU OF ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING THE WARRANTIES OF MERCHANTABILITY AND FITNESS.

Within the warranty time frames outlined herein, UltraTech will repair or replace any warranted parts or components that fail due to such defects in material or workmanship. UltraTech must be notified in writing within thirty (30) days of such defect or failure. Upon notification, UltraTech will provide instructions on the warranty claim procedures to be followed. Any warranty claim that is submitted must include a detailed description of the fault and the troubleshooting steps taken to identify failed components and the cause of their failure. UltraTech shall honor warranty claims on warranted equipment listed below in the event of such a failure within the warranty time periods. All warranty time periods start on the delivery date of the Tactical Welder to the original end-user purchaser, and not to exceed twelve months after the Tactical Welder is shipped to an UltraTech distributor.

1 Year Parts and Labor on the Tactical Welder, Part Number 4800. UltraTech's Limited Warranty shall not apply to: 1. Consumable components; such as contact tips, contactors, or parts that fail due to normal wear. 2. Items furnished by UltraTech, but manufactured by others. These items are covered by the manufacturer's warranty, if any. 3. Equipment that has been modified by any party other than UltraTech, or equipment that has been improperly installed, improperly operated or misused based upon industry standards, or equipment which has not had reasonable and necessary maintenance, or equipment which has been used for operation outside of the specifications for the equipment.

ULTRATECH PRODUCTS ARE INTENDED FOR PURCHASE AND USE BY COMMERCIAL/INDUSTRIAL USERS AND PERSONS TRAINED AND EXPERIENCED IN THE USE AND MAINTENANCE OF WELDING EQUIPMENT.

Tactical Welder Restocking Fee Policy

Restocking Fee: A 15% fee is charged on all returns and a credit will be issued, provided: (a) the customer prepays the return freight cost; (b) product is received in a clean, unused condition, able to be resold without extensive cleaning or repackaging; (c) the product is received at our designated location or the location indicated on the RMA 90 days or less from date the end user received the product from UltraTech or its distributor;

In the event of a warranty claim covered by this warranty, the exclusive remedies shall be, at UltraTech's option: (1) repair; or (2) replacement; or, where authorized in writing by UltraTech in appropriate cases; or (3) payment of or credit for the purchase price (less reasonable depreciation based upon actual use) upon return of the goods at customer's risk and expense. UltraTech's option of repair or replacement will be F.O.B., Factory in Boulder, Colorado or F.O.B. at any other UltraTech authorized facility as determined by UltraTech. No compensation or reimbursement for transportation costs of any kind will be allowed.

TO THE EXTENT PERMITTED BY LAW, THE REMEDIES PROVIDED HEREIN ARE THE SOLE AND EXCLUSIVE REMEDIES. IN NO EVENT SHALL ULTRATECH BE LIABLE FOR DIRECT, INDIRECT, SPECIAL, INCIDENTAL OR CONSEQUENTIAL DAMAGES (INCLUDING LOSS OF PROFIT), WHETHER BASED ON CONTRACT, TORT OR ANY OTHER LEGAL THEORY. ANY EXPRESS WARRANTY NOT PROVIDED HEREIN AND ANY IMPLIED

WARRANTY, GUARANTY OR REPRESENTATION AS TO PERFORMANCE, AND ANY REMEDY FOR BREACH OF CONTRACT TORT OR ANY OTHER LEGAL THEORY WHICH, BUT FOR THIS PROVISION, MIGHT ARISE BY IMPLICATION, OPERATION OF LAW, CUSTOM OF TRADE OR COURSE OF DEALING, INCLUDING ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR PARTICULAR PURPOSE, WITH RESPECT TO ANY AND ALL EQUIPMENT FURNISHED BY ULTRATECH IS EXCLUDED AND DISCLAIMED BY ULTRATECH.

Some states in the U.S.A. do not allow limitations of how long an implied warranty lasts, or the exclusion of incidental, indirect, special or consequential damages, so the above limitation or exclusion may not apply to you. This warranty provides specific legal rights, and other rights may be available, but may vary from state to state. In Canada, legislation in some provinces provides for certain additional warranties or remedies other than as stated herein, and to the extent that they may not be waived, the limitations and exclusions set out above may not apply. This Limited Warranty provides specific legal rights, and other rights may be available, but may vary from province to province.

Warranty Questions? Call 1-800-353-1611 or 904-292-1611 or email us at info@ultratechbrands.com.

the product is shipped in its original packaging and shipped according to applicable shipping standards for the hazardous nature of the lithium ion batteries. UltraTech reserves the right to refuse a return if any of these conditions are not met.

This Restocking Fee Policy is expressly in lieu of all other UltraTech Restocking Fee Policies.

Safety & Warnings

General

The device is manufactured using state-of-the-art technology and according to recognized standards. However **BE AWARE, SERIOUS INJURY OR DEATH MAY RESULT**, if welding equipment is not properly installed, used, and maintained.

Misuse of this equipment and other practices can be both hazardous and dangerous to operator and any persons in the general work area. The operator, supervisor, and helper must read and understand the following safety warnings and instructions before installing or using any welding equipment.

The welding process is used in many potentially dangerous and hazardous conditions. In environments such as elevated heights, areas of limited ventilation, close quarters, around water, uncertain power sources, in hostile environments, etc., it is important that the operators are aware of the dangers and limitations associated with working in these types of conditions. Only properly trained and experienced operator(s) trained in safe practices for the environments in which they are expected to work and are under competent supervision should use this welder. It is essential that the operator, supervisor, and others in the work area are aware of the dangers of the welding process. Training and supervision are both important and necessary for a safe work place. Please keep these instructions for future use.

Electrical Hazards

ELECTRIC SHOCK CAN CAUSE INJURY OR DEATH.

Install and maintain the equipment in accordance with the National Electric Code NFPA 70 and local codes. Do not service or repair equipment with power on or batteries connected. Do not operate equipment with protective insulators or covers removed. Service or repair of equipment must be done by qualified and/or trained personnel only.

Operator should not and must not contact electrically live parts. Do not touch electrode with bare skin and electrical ground at the same time. Always wear dry welding gloves in good condition. Be aware aluminized protective clothing can become part of the electrical path. Keep gas cylinders, chains, wire ropes, cranes, hoists, and elevators away from any part of the electrical path. All ground connections must be checked periodically to determine that they are mechanically strong and electrically adequate for the required current. When welding is to be suspended for any sustained period of time, such as during lunch or overnight, the welding gun should be disconnected from the battery pack when not in use. Never immerse the welding gun or ground connection in water.

During MIG or Flux-core welding, the welding wire, the wire spool, the drive rollers and all metal parts that are in contact with the weld

wire are live when the trigger of the gun is depressed. It is always best to place the weld gun in its proper position in the pack or on an insulated surface when not in use for short periods of time. All cables and leads must be complete, undamaged, insulated and adequately dimensioned. Loose connections, scorched, damaged or inadequately dimensioned cables or leads must be repaired/replaced immediately.

Turn off Power Pack and unplug the gun from the pack when not in use.

Proper Use §

The device is to be used exclusively for its intended purpose. The device is intended exclusively for the welding process described in the instructions. Any use above or beyond this purpose is deemed improper. The manufacturer shall not be liable for any damage resulting from such improper use.

Utilization in accordance with the "intended purpose" also includes

- Reading carefully and following all operating instructions
- Studying and obeying all safety and danger notices
- Performing all stipulated inspection and servicing work

The device is designed for use in industrial areas, workshops and "in the field" work. The manufacturer accepts no responsibility for any damage caused through use in a domestic setting.

The manufacturer likewise accepts no responsibility for unexpected or incorrect results.

Environmental Conditions

Operation or storage of the device outside of the stipulated area will be deemed as not in accordance with the intended purpose. The manufacturer shall not be held liable for any damage arising from such usage.

Ambient temperature range:

- During operation: -30°C to +55°C
- During storage: -40°C to +60°C

Protecting Yourself and Others

BE AWARE, ARC RAYS, HOT SLAG AND SPARKS CAN AND DO CAUSE INJURY TO EYES AND SKIN

The welding process produces extreme localized heat and strong ultraviolet rays. Never attempt to weld without proper welding equipment, including, but not limited to, a welding helmet with the proper lens, which complies with federal guidelines. A number 12 to 14 shade filter lens on the helmet provides the best protection against arc radiation. Please take precautions to prevent reflected arc rays

from entering around the helmet. It is important to make sure others are protected from arc rays and sparks. Approved shielding curtains and/ or appropriate goggles should be used by all persons working in close proximity of the welding area to protect them from arc rays and sparks. Skin should and must be protected from arc rays, heat and molten metal. The operator must always wear protective gloves and clothing which will not allow skin to become exposed. All clothing pockets should be closed and cuffs sewn shut. Leather aprons, sleeves, leggings, etc. should and must be worn for out-of-position welding. High top work shoes provide adequate protection against foot burns; for added protection, use leather spats. Flammable hair products should not be used when welding.

Keep all persons, especially children, out of the work area while any devices are in operation or welding is in progress. If however, there are people in the vicinity,

- Make them aware of the dangers (risk of dazzling by the arc, injury from flying sparks, inhaling welding fumes, noise, possible danger from mains or welding current, etc.).
- Provide suitable protective equipment or
- Erect suitable safety screens/curtains.
- Danger from Toxic Welding Fumes
- The fumes produced during welding contain harmful gases and vapors.
- Welding fumes contain substances that may, under certain circumstance cause birth defects or cancer.
- Keep your face away from welding fumes and gases.
- Fumes and hazardous gases
 - Must not be breathed in
 - Must be extracted from work area using appropriate methods
- Ensure an adequate supply of fresh air with a ventilation rate of at least 20 cubic meters/hour.
- Otherwise, a protective mask with an air supply must be worn.
- Close the shielding gas cylinder valve or main gas supply if no welding is taking place.
- If there is any doubt about whether the extraction capacity is sufficient, the measured toxic emission values should be compared with the permissible limit values.

Specific Areas of Risk



BE AWARE, WELDING SPARKS CAN AND DO CAUSE FIRES AND EXPLOSIONS

Causes of fire and explosions are: combustibles reached by the arc, flame, flying sparks, hot slag, or heated materials. Remove combustible materials and items from the work area and/or provide a fire watch. Avoid oily or greasy clothing as a spark can ignite them. It is necessary and required that the operator have a fire extinguisher nearby and have knowledge and training in its use. Be aware and alert to the danger of conduction or radiation. For example, if welding is to be done on a metal wall or partition, ceiling or roof, precautions must be taken to prevent ignition of combustibles on the other side. Do not weld near combustible or containers that have combustibles. All hollow spaces, cavities and containers should and must be vented prior to welding to permit the escape of air or gases. Purging with inert gas is recommended. Use only inert gases or inert gas mixtures as required by the process. Use of combustible compressed gases can cause explosions resulting in personal injury or death. Arcing against any compressed gases can cause explosions resulting in personal injury or death.

A high risk of injury exists when the welding wire emerges from the welding gun (piercing of the hand, injuries to the face and eyes, etc.). Always keep the gun well away from the body, and wear suitable protective goggles.

Never touch the work piece during or after welding - risk of burns.

Slag can sometimes fly off work pieces as they cool down. The specified protective equipment must therefore also be worn when reworking work pieces, and steps must be taken to ensure that other people are also adequately protected. Welding guns, torches and other parts with high operating temperature must be allowed to cool down before handling.

Safety and Operation References

1. Code of Federal Regulations, (OSHA) Section 29 Part 1910.95, 251-254 and 1000. U.S. Government Printing Office, Washington, D.C. 20402
2. ANSI Z49.1 "Safety in Welding and Cutting" American National Standard Institute, 1430 Broadway, New York, NY 10018
3. ANSI Z87.1 "Practice of Occupational and Education Eye and Face Protection" American National Standard Institute, 1430 Broadway, New York, NY 10018
4. ANSI Z88.2 "Standard Practice for Respiratory Protection" American National Standard Institute, 1430 Broadway, New York, NY 10018
5. AWS F4.1 "Recommended Safe Practices for Welding and Cutting Containers" The American Welding Society 550 NW Lejeune Road PO Box 351040, Miami, FL 33135
6. NFPA-51B "Fire Prevention in Cutting and Welding Processes" National Fire Protection Association, Battery Park, Quincy, MA 02269
7. NFPA-7 "National Electrical Code" National Fire Protection Association, Battery Park, Quincy, MA 02269
8. CSA Standard W117.2 "Safety in Welding, Cutting and Allied Processes" Canadian Standards Association, 178 Rexdale, Ontario, Canada M9W 1R3

Frequently Asked Questions

1. How long can you weld on full charge?

If you are welding at 100A with a 33% duty cycle of 10 second welds followed by 20 seconds off, the total weld time is about 10.8 minutes on a full charge. See the Welds & Weld Times per Charge chart below.

2. What wire type/size does the welder use?

The Tactical Welder can use .025 - .040 solid + flux.

3. Can you MIG weld with the unit?

Yes the Tactical Welder can perform MIG welds when connected to an appropriate gas supply.

4. Can you Flux-core Weld?

Yes the Tactical Welder can perform Flux-Core Welds

5. Can you weld aluminum?

Yes! Please see the special instructions in the operations manual

6. Can you TIG weld?

Not at this time

7. Can you stick weld?

Not at this time, but this feature is being considered for future versions of the Tactical Welder

8. What is included with the Tactical Welder?

The Tactical Welder comes with the power unit (Battery, BMS, Fuse, Fuel Gage (Charge level indicator), Power Connector, Gun Control/Charger connector), Welding Spool Gun, 7A AC Charger, 300A Ground clamp and 6-foot cable, 6-foot gun cable with high current plug connectors for positive and negative grounding. The tactical Welder can be charged from your 12V or 24V car or truck with the AC charger and an optional 12V DC or 24V DC to 120V AC inverter.

9. How much does the Tactical Welder Power Pack weigh?

18.2 lbs.

10. How long does it take to charge?

Approximately 3 hours on the 7A charger

11. What type of charger does it use?

A 7A Constant-Current/Constant Voltage charger

12. Is there a car charger available?

The Tactical Welder can be charged from your 12V or 24V car or truck with the supplied AC charger and an optional 12V or 24VDC to 120V AC inverter.

13. What is the duty cycle, how long can you steadily weld without stopping?

The Tactical Welder is designed to operate on a 33% duty cycle defined in seconds of operation as 10 seconds of operation followed by 20 seconds of off time. Continuous welding operations at this duty cycle will maximize the weld time and the operating life of the battery.

14. Can you weld sheet metal?

Yes you can weld sheet metal using a "Stitch Welding" process explained in the operations manual.

15. How do you set up the connections for MIG or Flux-core welding?

The Tactical Welder can be connected with a positive or negative ground. The red power connector on the Power Pack is always positive and the black connector is negative. Flux-core welding is generally preferred with a positive ground.

16. How many charge/discharge cycles before the battery is exhausted?

If used according to instructions at maximum 33% duty , the Tactical Welder Power Pack can be charge/discharge cycled over 3000 times and still have 90% capacity.

17. Does the trigger on the weld gun control power to the tip?

Yes, the Tactical Welder incorporates a "Cold Tip" feature. The tip and weld wire-feed motor are only connected to the power source when the trigger is activated.

18. Does the wire feed speed control knob adjust the amperage level?

Yes, higher wire feed speeds generally draw higher weld currents

19. Does the trigger on the weld gun control the flow of gas for MIG welding?

Yes, the Tactical Welder spool gun incorporates a gas valve which allows gas to flow only when the trigger is activated. The flow rate of gas is controlled by the gas regulator.

What's Included

Included:

- Tactical Welder Power Pack with built in battery management system
- Spool gun
- Ground cable
- Charger
- Custom backpack for storage and transport
- Consumables replacement kit

Important Operating Tips

Safety

Never open the welding gun if it is connected to the Power Pack!

Opening the case halves while the gun is powered will likely cause severe damage to the circuit board and other parts inside the gun. This damage will not be covered by the warranty. Also, never leave the power connected to the gun, always disconnect the gun from the Power Pack when not in use.

Clean Metal Surfaces

The metal surfaces to be welded together should be clean and free from any "mill scale" deposits found on most steel products as they come from the foundry. Grinding the surfaces to be welded down to shiny bare metal will greatly improve the strength and penetration of the weld. Because MIG welding is an electrical process, any ac-

tion taken which improves the conductivity of the metal being welded will improve the final results. This also applies to the surface to which the large ground clamp is connected to as well. Make sure the ground clamp is attached to clean, bare metal on the piece being welded. Remember, the cleaner the surfaces welded, the stronger the weld.

Lever Tension Spring Settings

The lever tension spring adjuster selector on the weld gun should normally be left in the "Aluminum" slot for proper wire feed tension for the .035" wire. Use of .023" wire may sometimes require that the selector spring be moved to "Extra Grip" slot setting. Select the firmest setting which still allows the wire to feed freely without causing the motor to bog down or the wire to feed inconsistently. Use steel slot for .030 wire soild and flux.

Charging the Tactical Welder

WARNING: Electric shock can be fatal. Do not open the charger case.

NOTICE: The Tactical Welder Power Pack must be fully charged before using the Welder for the first time.

NOTICE: The Tactical Welder is designed to be charged using only the included battery charger, using a different charger may damage the unit. Damages resulting from using a charger other than the included charger will not be covered under the warranty.

Wall Charging

1. Connect the charge connector to the Power Pack's charging port. Assure the connector is indexed correctly. Do not force it.
2. Turn on the Tactical Welder switch and note the charge indication on the "fuel gauge"
3. Connect the Charger to a 110V AC/220V AC power source, using the AC plug and turn on the charger switch.
4. Allow unit to charge until the light on the charger turns green. The onboard "fuel gage" should indicate a full charge. Full charge may take up to 3 hours with the 7A charger, 2 hours with the 12A charger depending on the Depth of Discharge (DOD) of the battery.
5. When charging is complete, turn off the Tactical Welder switch and the charger, disconnect the charger from the Power Pack, and unplug the AC cord.

Car Charging

1. Connect the 12V or 24V AC inverter to the vehicles battery or power port. Connect the AC battery charger to the Tactical Welder as above and plug the AC battery charger into the inverter socket.
2. Turn on the inverter, the AC battery charger and the Tactical Welder main switch.
3. Allow the battery to fully charge.
4. When charging is complete, turn off the Tactical Welder switch, the battery charger, and the inverter. Disconnect the charger from the Power Pack and unplug it from the inverter. Disconnect the inverter from the vehicle battery or power port.

Setup

WARNING: Always check the charger lead, welding gun, cables, grounding connection and battery pack for damage before every use.
NOTICE: The Tactical Welder Power Pack must be fully charged before using the welder for the first time.

LOADING THE WELDING GUN WITH WELD WIRE

CAUTION: Always disconnect the gun from the Tactical welder and let it cool before opening the case for any reason.

1. Remove the nozzle, tip and gas diffuser.
2. Disassemble the gun by unscrewing the red t-bolt (Image 1).
3. Grab the lower portion and lift up insuring that it is completely disengaged from the metal tab at the top of the gun.
4. Remove the lever tension spring adjuster selector (Image 2).
5. Remove the gasline from its fitting.
6. Install the wire spool ensuring the wire runs clockwise in direction (Image 3).
7. Feed the wire through the gun insuring that it is centered in the groove in the trigger as well as the slot in the brass bracket (Image 4).
8. Feed the wire through the end of the gun.
9. Reinstall the gas diffuser, tip and nozzle (Image 5).
10. Reconnect the gas line
11. Lift the red lever
12. Reinstall the lever tension spring adjuster selector.
13. Reinstall the cover but do not overtighten.



Image 1



Image 2



Image 3



Image 4

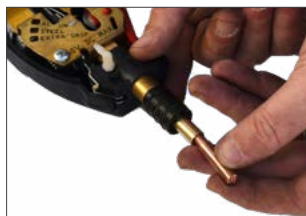


Image 5

CONNECTING THE WELDING GUN TO THE TACTICAL WELDER POWER PACK

Positive Ground

1. Ensure the Tactical Welder is off, before attempting to connect the welding gun to it.
2. Connect the black and red connectors together noting the desired connection to the red and black connectors on the power source. For positive ground assure that the black connector on the ground cable is connected to the red (positive) connector on the Power Pack.
3. Now connect the ground cross-over bullet terminal on the gun cable to the ground cable.
4. Connect the trigger control connector to the control/charger port on the Power Pack, ensuring the index slot is properly aligned, then tighten the connector nut.

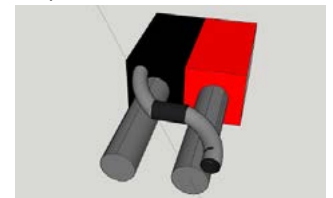


-or-

DCEP



Step 2



Step 3



Step 4

Operation

1. Prepare the material that you will be welding using a grinder or wire brush ensuring that everywhere you will be welding and the location for the ground clamp, is shiny, bare metal.
2. Connect the ground clamp to the material to be welded assuring a good electrical connection
3. Move the wire feed control knob to the appropriate speed for the type of welding and thickness of the material to be welded.
4. Use appropriate protective equipment, ensuring that eyes and skin are protected from injury on the operator as well as any people in the work area.
5. Turn on the Tactical Welder Power Pack switch.
6. Squeeze the trigger on the gun to power the weld tip and activate the wire feed mechanism. This will also open the gas valve for MIG operations if the gas tube at the power connector end of the gun cable is connected to a gas supply at proper pressure and flow rate. As the weld wire contacts the work piece a welding arc is established. You can adjust the wire feed speed with the thumbwheel right on the gun to control your weld.
7. Keep in mind the duty cycle capabilities of the Tactical welder as shown in the weld time chart below. Weld operations of 10 seconds or less are recommended with a minimum of 20 seconds between each weld operation. Do not run the unit for more than 15 seconds without adequate off time of 30 seconds. This 33% duty cycle maximizes the life of the battery and avoids over temperature shut down. It is best to complete your welding operation with 10 second weld cycles followed by a minimum of 20 seconds of off time for chipping and cleaning each weld.
8. When the welding job is complete; turn the Tactical welder off, disconnect the ground clamp and gun connectors. Allow the gun to cool before handling without protective equipment.
9. Inspect the Tactical Welder equipment for any damage and clean where necessary.
10. If the battery charge was depleted, charge the unit.
11. Store the unit, in the back pack, in a dry location maintained between -40°C and +60°C temperature.

1. Positive Power Connector
2. Negative Power Connector
3. Control/Charge Port
4. Battery Charge Indicator
5. Power Switch



Routine Maintenance

Tactical Welder

- Inspecting the case for damage, evidence of “hot spots”, or corrosion
- Inspect and clean all ports

Welding Gun

- Keep grinding grit from getting into the gun. Do not lay the gun on dirty or gritty surfaces and set the gun down as far away from grinding activities and grit sources as possible.
- Proper lubrication of moving parts is essential for long life. We recommend using fully synthetic motor oil for all the lubrication

needs of the welding gun. Be aware, use of petroleum based lubricants can adversely affect the gun body and gas valve action.

- Regularly blow the gun clean with compressed air.

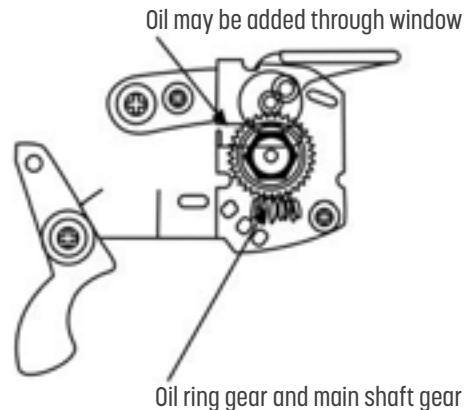
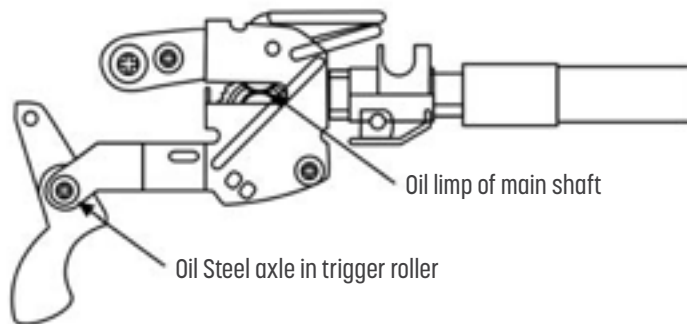
Replacing Tip Assembly Components

- With use, the welding tips will need to be replaced intermittently. Recommended replacement tips are standard #2 Tweco tips or compatible. Dedicated tips should be used when welding various types of metals (i.e., do not use the same tip for welding aluminum and steel). When welding aluminum, be sure to use a contact tip which is .005” larger than the feed wire itself.

Recommended Periodic Maintenance

Welding Gun

- Periodic lubrication of gun components is required for a long service life. Note: Do not get oil on surface of the plastic roller and main shaft. Use silicon oil on gears and shafts. Oil all parts sparingly with a toothpick or Q-Tip.



Troubleshooting

Tactical Welder

Trouble	Possible Problem	Possible Solution
Welder not turning on	Power Pack depleted	Charge Power Pack. If the fuel gauge reads full and the unit will not turn on contact support.
Welder shuts down while welding	Power Pack could be depleted or the Welder is too hot	Check the fuel gauge if it shows the battery is still full or near full, let the Power Pack rest. Once the internal temperature is back in the safe range, the unit will be able to be turned and welding continued.
Wire not feeding when trigger is pressed on the spool gun/and feed motor is activating	Wire feed speed is too low/ welding wire spool is empty/ welding tip may be clogged.	Turn the wire feed speed knob counter clockwise to increase the speed. (Turn unit off before these steps) Check the spool. If the tip is clogged you can attempt to clear it by filing the tip to clear any melted weld wire stuck to the tip or just swap out the tip.
Excessive spatter while welding	Ground polarity may be wrong/ gas pressure not sufficient to properly shield the arc.	Turn the unit off and swap the ground and spool gun connection (FCAW). Check shielding gas pressure to ensure it set at the proper level for the type of welding being performed (GMAW).

Welding Gun

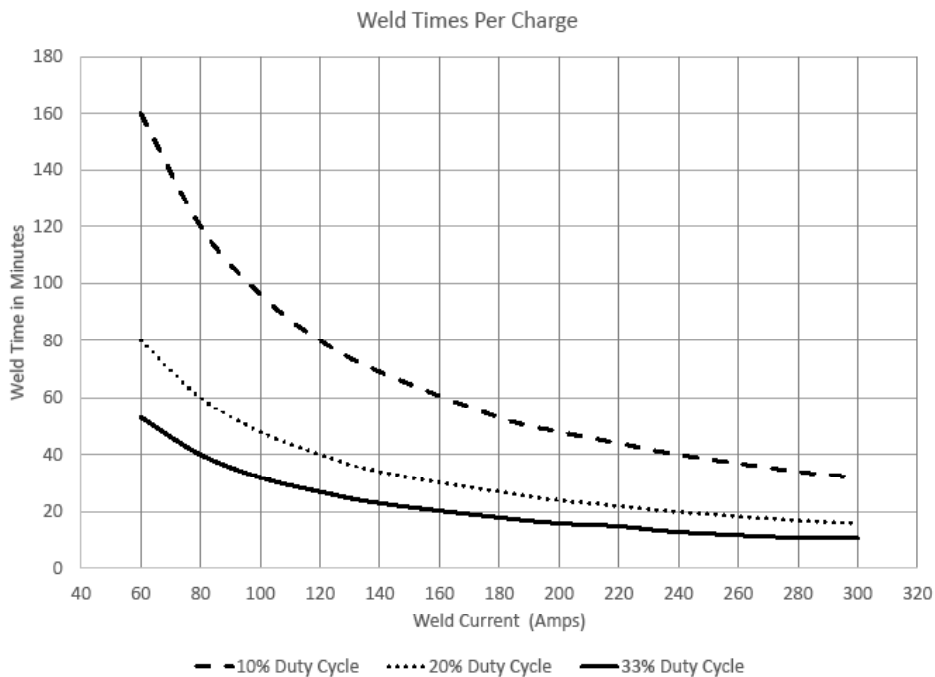
Trouble	Possible Problem	Possible Solution
Irregular wire feed or motor unable to feed wire	Wire Not Loaded Properly	Check for Binding
	Batteries Need Recharging/ Maintenance	Charge or Maintain Batteries
	Contact Tip Clogged	Replacement Tip Needed
	Wire Feed Tension Spring Misadjusted	Tighten Tension Spring Setting
	Idle Roller Not Contacting Wire	Replacement Roller Needed
No wire feed	Improper Power or Ground Connection	Check All Connections
	DC Power Supply Not Powered	Check Connections
	Motor or Circuitry Damaged	Contact UltraTech International
	No Power to Wire Feed Motor	Verify LED is lit & Check Connections
No weld output (wire feeds normally)	Batteries Need Recharging/ Maintenance	Charge or Maintain Batteries
	Improper Power or Ground Connection	Check All Connections
	Arc Current Source Malfunctioning	Check Source for Output Problems
Poor weld quality	Batteries Need Recharging/ Maintenance	Charge or Maintain Batteries
	Improper Power or Ground Connection	Check All Connections
	Contact Tip Clogged	Replacement Tip Needed
	Wrong Output Polarity Used	Check Application Table
	Wrong Feed Wire or Shielding Gas Used	Check Application Table

Application Table

Metal Type	Thickness of Material Being Welded	Wire Type/ Size	Tweco #2 Tip Size	Shield Gas	Gas Flow Rate	Polarity/ Connection to Tactical Welder	Wire Speed Control Setting
Steel	24 - 18 GA	Solid Steel .023"	.023"	75% Argon/ 25% CO2	15-30	DCEP	Stitch
	18 GA - 3/16"	Solid Steel .030"	.030"	75% Argon/ 25% CO2	15-30	DCEP	Stitch - 1
	1/8" Plus	Solid Steel .035"	.035"	75% Argon/ 25% CO2	15-30	DCEP	Stitch - 2
	1/4" Plus	Solid Steel .040"	.040"	75% Argon/ 25% CO2	15-30	DCEP	1 - 4
	22 - 14 GA	Flux-Core Steel .030"	.030"	None	None	DCEN	Stitch - 1
	1/8" - 3/8"	Flux-Core Steel .035"	.035"	None	None	DCEN	Stitch - 3
	1/4" - 1/2" Plus	Flux-Core Steel .040"	.040"	None	None	DCEN	3-6
Aluminum	.060" - 1/8"	Aluminum .023"	.030"	100% Argon	10-20	DCEP	1 - 2
	1/8" - 1/2"	Aluminum .035"	.040"	100% Argon	15-30	DCEP	2 - 6
	1/2" Plus	Aluminum .040"	.045"	100% Argon	20-50	DCEP	4 - 9
Stainless Steel	.080" - 1/8"	Solid Stainless .030"	.030"	Tri-Mix*	20-40	DCEP	Stitch - 1
	1/8" Plus	Solid Stainless .035"	.035"	Tri-Mix*	20-40	DCEP	1 - 6
	1/8" Plus	Flux-Core Stainless .035"	.035"	None	None	DCEN	1 - 6

*Tri-Mix: The specific mix of gases and their respective proportions will be determined by 1. The alloy and thickness of the stainless steel being welded, and 2. The alloy and thickness of the stainless welding feed wire being used. Please consult your welding gas distributor or an appropriate reference manual to determine the proper mixture for your application.

Weld Time per Charge



General Guidelines

1. **Stitch Mode Welding:** When welding metal thinner than 1/8" with batteries as a power source, it is often necessary to use a stitch mode welding procedure to avoid melting the metal being welded. Start by lowering the wire feed speed control to its lowest setting where the wire just begins to feed. When you begin welding, a small bead will form and then the wire will melt back just enough to break the arc. The process will weld a series of small beads with short breaks of time between them. This prevents heat from building up and melting through, known as globular transfer.
2. **Aluminum Welding:** We recommend using a contact tip which is .005" bigger than the aluminum feed wire itself and pulling the nozzle about 3/8" farther out to reduce burn-back.

Thin Metal Welding

- 1. Use the Smallest Diameter of Feed Wire Available of the Type Desired.** The smaller the diameter of wire the less current it can conduct, therefore use the smallest diameter feed wire you can in any given application to cool down the bead to reduce melt-through. Solid steel, stainless and aluminum wires come in .023" diameter and will require the use of gas. Flux-Core wire comes in .030", typically as a minimum.
- 2. Use Increased Wire "Stick-Out" Length to Cool the Bead.** The greater the distance from the end of the contact tip to the bead, the greater the resistance faced by the arc current. Increasing wire "stick-out" works best flux-cored wire since you will not be concerned about keeping any shielding gas focused on the bead area.
- 3. "Stitch Welding" Mode.** The use of this mode of welding should allow you to successfully weld thin sheet metal using the Tactical Welder without melt-through problems. By producing a series of small, cooler beads, rather than a continuous bead, the stitch mode process prevents the bead area from getting hot enough to melt the surrounding metal. To use this process, turn the welding gun's wire feed speed control knob to the "off" position and then

slowly advance it until the electrode wire just starts to feed slowly out of the contact tip. Release the trigger and cut off the excess wire which has been fed out. Aim the welding gun at the thin metal you wish to weld and pull the trigger while allowing for the maximum acceptable amount of wire "stick-out". Keep the trigger pulled during the entire stitch mode welding process. When the feed wire makes contact and creates a small bead, the feed wire will momentarily melt back to the point that the arc is broken. The feed wire will feed out to the point that another bead is formed where the previous bead ended. Repeat this process of connecting small sequential beads until the job is complete. By using the maximum wire "stick-out" you can reduce the likelihood of wire "burn-back" clogging the contact tip.

- 4. Increase External Resistance.** This will lower the output and can be done in several different ways such as longer cable, smaller cable or by attaching a piece of chain to the work piece and adjusting the ground clamp up or down the chain, be aware that increased resistance causes greater heat.

Aluminum Welding

General Points

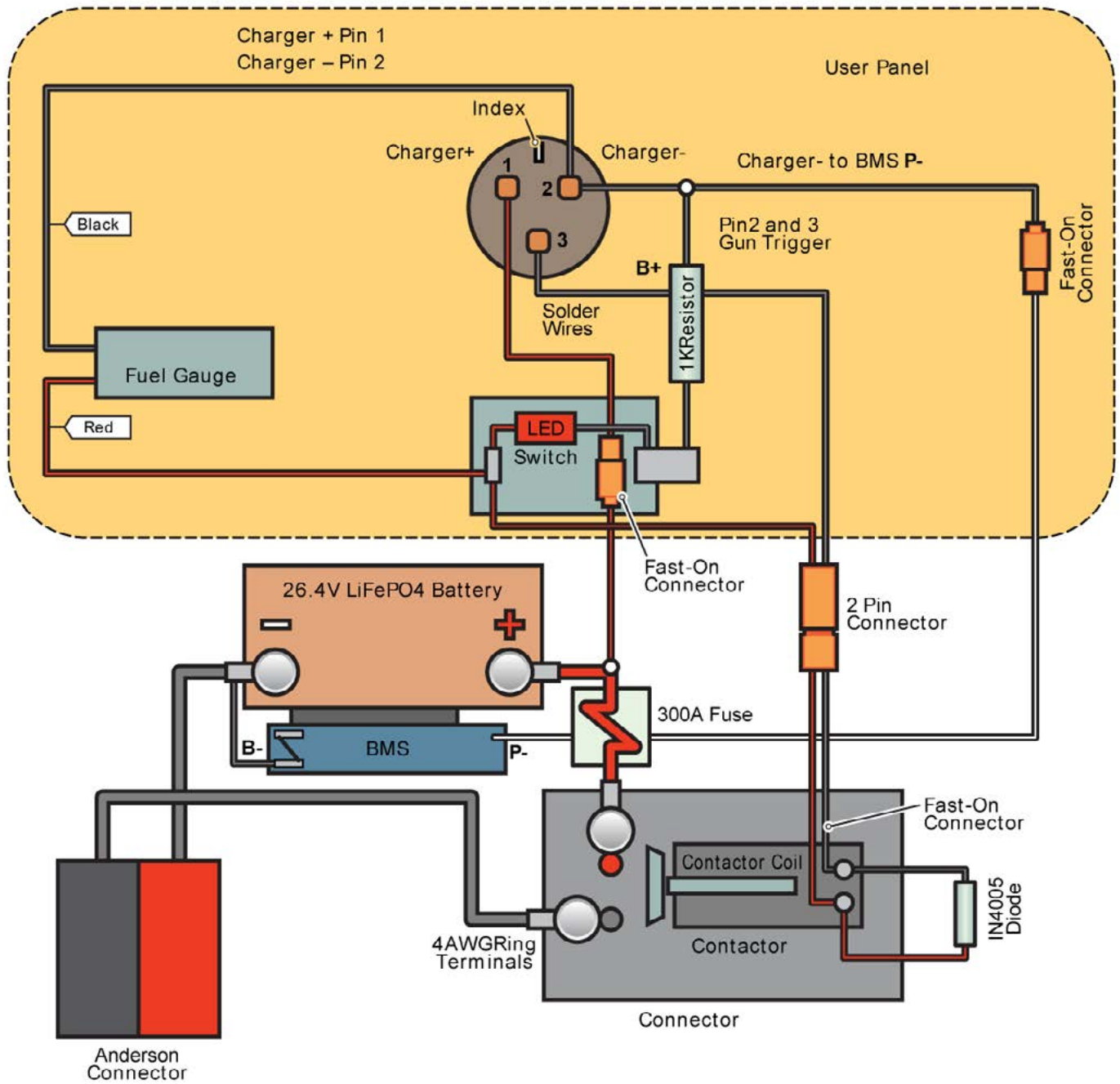
When welding aluminum, be sure to use a contact tip which is .005" larger than the wire diameter itself, and extend out from the nozzle approximately 3/8", this helps reduce burn back (i.e. melting the wire in the tip). As aluminum conducts heat so rapidly, some operators find it preferable to increase wire speed and move more quickly across the metal being welded, especially on thin aluminum of 1/8" and less. Please consult application chart.

Preheating aluminum over 1/4" thick to approximately 250 degrees F, is a widely recognized practice and helps on the start of the bead while increasing penetration. Using a heat sink steel plate on the back side of aluminum can help prevent burn through. Please note: When welding, thin aluminum wire will help to reduce the voltage and amperage. When welding on 1/8" thick aluminum or less, the travel rate must be faster than on steel and movement must be similar to drawing a line on a piece of paper. When the wire speed is adjusted correctly there should be no spatter and the weld process should be very quiet, similar to the sound of a gas leak. HINT: The proper travel is to push with aluminum usually right to left if you're right handed, left to right if you're left handed.

Ready to Weld with Aluminum

You are now ready to establish an arc and weld aluminum. Depending on the thickness, and mass of aluminum to be welded, a slight preheat in the area where you are going to start will help provide a uniform weld bead. Your welding position should be with a slight tilt of the welding gun into the direction of travel; this is called the fore-hand technique. When you are ready to establish the arc, hold the gun nozzle about 1/4" away from the grounded work piece. Slowly depress the gun trigger to start the flow of argon shield gas. Now pull the gun trigger and establish the arc. The weld wire should burn off slightly above the grounded work piece. If excess spatter or crackling sound are detected, slow the wire speed just slightly until a quiet smooth-running arc is achieved. If you are welding lighter gauge aluminum, increasing travel speeds will help avoid burning through.

Tactical Welder Circuit Diagram



**TACTICAL
WELDER**



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