



Torchmate AVHC Magnetic Breakaway Upgrade Installation Guide

June 5, 2013

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Technical Support

When upgrading your table, if a question or concern arises, or a part is missing, please contact Torchmate Technical Support.

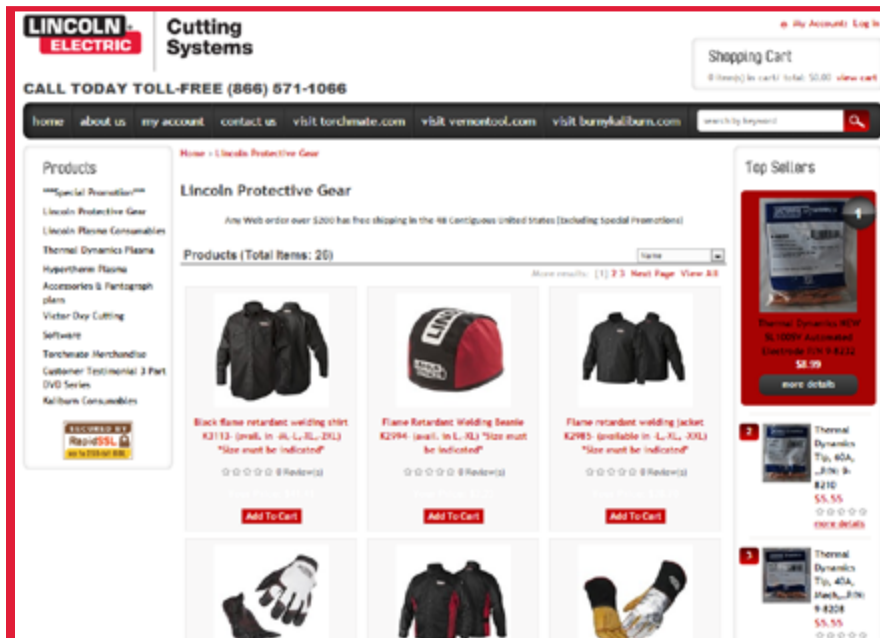
Call, Fax, or Email

Technical Support will also help you with operating the CNC system, and troubleshooting problems.

Technical Support is available Monday through Friday from 6:00 AM to 4:00 PM Pacific Standard Time.



Toll Free: 1-866-571-1066 x3
International: 775-673-2200 x3
Fax: 775-673-2206
Email: support@torchmate.com



Call us for Consumables, or visit our web store

www.TorchmateStore.com



Statement of Warranty

Torchmate and Lincoln Electric Cutting Systems equipment is designed and built with safety in mind. However, your overall safety can be increased by proper installation ... and thoughtful operation on your part.

30 DAY GUARANTEE

If Buyer is not satisfied with the performance of the Goods within 30 days from the date the Goods were shipped from the Seller, Buyer may return the Goods in the original carton(s) for a full refund less Shipping, Handling, Damages and Freight Charges. All sales become final after this 30 day period. Buyer should determine the satisfactory performance of the Goods by using the software, and inspecting and bench running the motors and/or accessory items. Any items to be returned for full refund must be in new, unused (except for bench testing), and saleable condition at the sole determination of the Seller. Items that, in the Seller's judgment, have been used or modified in any way, or kits that have been partially or fully completed will be subject to a restocking fee to be determined by the Seller. A return merchandise authorization number (RMA) must be obtained by the customer prior to any return. Shipments of returned items not marked with a valid RMA will be refused.

WARRANTY

Electronics and motors are warranted by their manufacturer to the original purchaser for 3 months from the date of Torchmate, Inc.'s sale invoice. Mechanical components are standard industrial parts and are not warranted except by their respective manufacturers. If any of the warranted items are found by Seller to be defective, such Goods will, at Seller's option, be replaced or repaired at Seller's cost. No defective goods are to be returned without written authorization of seller. The sole purpose of the stipulated exclusive remedy shall be to provide the Buyer with free repair and replacement of defective Goods in the manner provided herein. This exclusive remedy shall not be deemed to have failed of its essential purpose so long as the Seller is willing and able to repair or replace defective Goods in the prescribed manner. The foregoing warranty is in lieu of all other warranties, express or implied, including those of merchantability or fitness for any purpose not expressly set forth herein. No affirmation of Seller, by words or action, other than as set forth in this Section shall constitute a warranty. Seller's warranty does not apply to any Goods which have been subjected to misuse, mishandling, misapplication, neglect (including but not limited to improper maintenance), accident, improper installation, modification (including by not limited to use of unauthorized parts or attachments), or adjustment or repair performed by anyone other than Seller or one of Seller's authorized agents. When returning products to Seller packaging must be adequate or all warranty is null and void. Buyer will pay for the cost of Shipping to and from the Seller for all warranty repairs.

Any claim by Buyer with reference to the Goods sold hereunder shall be deemed waived by the Buyer unless submitted in writing to seller within the earlier of (i) thirty (30) days following the date Buyer discovered or by reasonable inspection should have discovered, any claimed breach of foregoing warranty, or (ii) 12 months following the date of shipment. Any cause of action for breach of the foregoing warranty shall be brought within one year from the date the alleged breach was discovered or should have been discovered, whichever occurs first.



Seller's liability (whether under the theories of breach of contract or warranty, negligence, or strict liability) for its Goods shall be limited to repairing or replacing Goods found by Seller to be defective, or at Seller's option, to refunding the purchase price of such Goods or parts thereof.

LIMITATION OF LIABILITY

In no event shall seller be liable for consequential damages arising out of or in connection with this agreement, including without limitation, breach of any obligation imposed on seller hereunder. Consequential damages shall include without limitation, loss of use, income or profit, or loss sustained as the result of injury (including death) to any person, or loss of or damage to property (including without limitation property handled or processed by the use of the goods). Buyer shall indemnify seller against all liability, cost or expense which may be sustained by seller on account of any such loss, damage, or injury.

DISCLAIMER OF CONSEQUENTIAL DAMAGES

Upon buyer's receipt of shipment, Buyer shall immediately inspect the Goods. Unless Buyer provides Seller with written notice of any claim for shortage, overcharge, or damage of Goods within ten (10) days from invoice date, such Goods shall be deemed finally inspected, checked and accepted by Buyer and no allowances shall be made thereafter. In absence of shipping and packaging instructions, Seller shall use its own discretion in the choice of carrier and method of packing. Seller shall not be responsible for insuring shipments unless specifically requested by Buyer and any insurance or special packaging so requested shall be at Buyer's expense and valuation.

ACCEPTANCE AND TRANSPORTATION

Title to any Goods sold and risk of loss of such Goods passes to Buyer upon delivery by Seller to carrier and any claims for losses or damages shall be made by Buyer directly with carrier.

TITLE AND RISK OF LOSS

- A. In addition to the rights and remedies conferred upon Seller by law, Seller shall not be required to proceed with the performance of any order or contract if the Buyer is in default in the performance of any order or contract with Seller, and in case of doubt as to Buyer's financial responsibility, shipments under this order may be suspended.
- B. No delay or omission by Seller in exercising any right or remedy provided for herein shall constitute a waiver of such right or remedy and shall not be constituted as a bar to or a waiver of any such right or remedy on any future occasion.
- C. The sale of Goods shall be governed by the laws of the State of Maryland. Seller agrees to comply with all applicable laws of the United States.

GENERAL CONDITIONS

The invalidity or unenforceability of any one or more phrases, sentences, or sections shall not affect the validity or enforceability of the remaining portions of this Agreement.

SEVERABILITY



Safety First

Torchmate and Lincoln Electric Cutting Systems equipment is designed and built with safety in mind. However, your overall safety can be increased by proper installation ... and thoughtful operation on your part.

WARNING

DO NOT INSTALL, OPERATE, OR REPAIR THIS EQUIPMENT WITHOUT READING THE SAFETY WARNINGS CONTAINED THROUGHOUT THIS MANUAL.

**Think before you act—
and be careful.**

PROTECT YOURSELF AND OTHERS FROM POSSIBLE SERIOUS INJURY OR DEATH.

KEEP CHILDREN AWAY. ALLOW NOBODY YOUNGER THAN 14 NEAR THIS EQUIPMENT.

IF YOU WEAR A PACEMAKER, YOU SHOULD CONSULT WITH YOUR DOCTOR BEFORE OPERATING.

Read and understand the following safety highlights. For additional safety information it is strongly recommended that you purchase a copy of "Safety in Welding & Cutting - ANSI Standard Z49.1" from the American Welding Society, P.O. Box 351040, Miami, Florida 33135 or CSA Standard W117.2.

BE SURE THAT ALL INSTALLATION, OPERATION, MAINTENANCE, AND REPAIR PROCEDURES ARE PERFORMED ONLY BY QUALIFIED INDIVIDUALS.

Electric Shock



1. ELECTRIC SHOCK can kill.
 - 1.1 The electrode and work (or ground) circuits are electrically "hot" when the power source is on. Do not touch these "hot" parts with your bare skin or wet clothing. Wear dry, hole-free gloves to insulate hands.
 - 1.2 Disconnect the power source before performing any service or repairs. When the power source is operating, voltages in excess of 250 volts are produced. This creates the potential for serious electrical shock - possibly even fatal.
 - 1.3 Insulate yourself from work and ground using dry insulation. Wear dry gloves and clothing. Take extra care when the work place is moist or damp.
 - 1.4 Always be sure the work cable makes a good electrical connection with the metal being cut or gouged. The connection should be as close as possible to the area being cut or gouged.
 - 1.5 Ground the work or metal to be cut or gouged to a good electrical (earth) ground.
 - 1.6 Maintain the plasma torch, cable and work clamp in good, safe operating condition. Repair or replace all worn or damaged parts. Replace damaged insulation.
 - 1.7 Never dip the torch in water for cooling or plasma cut or gouge in or under water.
 - 1.8 When working above floor level, protect yourself from a fall should you get a shock.
 - 1.9 Operate the pilot arc with caution. The pilot arc is capable of burning the operator, others or even piercing safety clothing.
 - 1.10 Also see Items 4.3 and 6.



2. ARC RAYS can burn.

- 2.1 Plasma Arc Rays can injure your eyes and burn your skin. The plasma arc process produces very bright ultraviolet and infrared rays. These will damage your eyes and burn your skin if you are not properly protected.
- 2.2 Use safety glasses and a shield with the proper filter and cover plates to protect your eyes from sparks and the rays of the arc when performing or observing plasma arc cutting or gouging. Glasses, head-shield, and filter lens should conform to ANSI Z87.1 standards.

Arc Current	Minimum Shade No.	Suggested Shade No.
Less than 20A	4	4
20A-40A	5	5
40A-60A	6	6
60A-300A	8	9
300A-400A	9	12
400A-800A	10	14

- 2.3 Use suitable clothing including gloves made from durable flame-resistant material to protect your skin and that of your helpers from the arc rays.
- 2.4 Protect other nearby personnel with suitable non-flammable screening and/or warn them not to watch the arc nor expose themselves to the arc rays or to hot spatter or metal.

3. FUMES AND GASES can be dangerous.

- 3.1 Plasma cutting or gouging may produce fumes and gases hazardous to health. Avoid breathing these fumes and gases. When cutting or gouging, keep your head out of the fumes. Use enough ventilation and/or exhaust at the arc to keep fumes and gases away from the breathing zone.
- 3.2 Use an air-supplied respirator if ventilation is not adequate to remove all fumes and gases.
- 3.3 When plasma cutting or gouging on lead or cadmium plated steel and other metals or coatings which produce highly toxic fumes, keep exposure as low as possible and within applicable OSHA PEL and ACGIH TLV limits using local exhaust or mechanical ventilation. In confined spaces or in some circumstances, outdoors, a respirator may be required.
- 3.4 Additional precautions are also required when cutting (zinc) galvanized steel or materials containing or coated with any of the following:

Antimony	Beryllium	Cobalt	Manganese	Selenium
Arsenic	Cadmium	Copper	Mercury	Silver
Barium	Chromium	Lead	Nickel	Vanadium

Arc Rays



Fumes, Gases and Dust



Safety First (continued)

- 3.5 The operation of plasma cutting or gouging fume control equipment is affected by various factors including proper use and positioning of the equipment, maintenance of the equipment, and the specific procedure and application involved. Worker exposure levels should be checked upon installation and periodically thereafter to be certain levels are within applicable OSHA PEL and ACGIH TLV limits. For information on how to test for fumes and gases in your work place, refer to publications section of this manual.
- 3.6 Do not use plasma cutting or gouging equipment in locations near chlorinated hydrocarbon vapors coming from degreasing, cleaning or spraying operations. The heat and rays of the arc can react with solvent vapors to form phosgene, a highly toxic gas, and other irritating products. Remove all sources of these vapors.
- 3.7 Gases used for plasma cutting and gouging can displace air and cause injury or death. Always use enough ventilation, especially in confined areas, to insure breathing air is safe.
- 3.8 Read and understand the manufacturer's instructions for this equipment and follow your employer's safety practices.
- 3.9 This product, when used for cutting, produces fumes or gases which contain chemicals known to the State of California to cause birth defects
- 3.10 Some dust created by routing, sawing, grinding, drilling, and other construction activities contains chemicals known to cause cancer, birth defects or other reproductive harm. Avoid prolonged contact with this dust. Wear protective clothing and wash exposed areas with soap and water. Allowing dust to get into your mouth, eyes, or lay on the skin may promote absorption of harmful chemicals.

Some examples of these chemicals are:

- Lead from lead-based paint.
 - Crystalline silica from bricks and cement and other masonry products.
 - Arsenic and chromium from chemically-treated lumber (CCA).
- 3.11 Your risk from these exposures varies, depending on how often you do this type of work. To reduce your exposure to these chemicals: work in a well ventilated area, and work with approved safety equipment, such as those dust masks that are specially designed to filter out microscopic particles.

Fire or Explosion



4. Cutting flame and sparks can cause FIRE OR EXPLOSION.

- 4.1 Fire and explosion can be caused by hot slag, sparks, oxygen fueled cutting flame, or the plasma arc.
- 4.2 Have a fire extinguisher readily available. Provide a fire watch when working in an area where fire hazards may exist.
- 4.3 When not cutting or gouging, make certain no part of the electrode circuit is touching the work or ground. Accidental contact can cause overheating and create a fire hazard.



- 4.4 Be sure there are no combustible or flammable materials in the workplace. Any material that cannot be removed must be protected.
 - 4.4.1 Sparks and hot materials from cutting or gouging can easily go through small cracks and openings to adjacent areas.
 - 4.4.2 Avoid cutting or gouging near hydraulic lines.
 - 4.4.3 Do not cut or gouge tanks, drums or containers without taking proper steps to purge all flammable or toxic vapors from inside. They can cause an explosion even though they have been "cleaned." For information purchase "Recommended Safe Practices for the Preparation for Welding and Cutting of Containers and Piping That Have Held Hazardous Substances", AWS F4.1 from the American Welding Society (see address above).
 - 4.4.4 Vent hollow castings or containers before heating, cutting or gouging. They may explode.
 - 4.5 Do not add fuel to engine-driven equipment near an area where plasma cutting or gouging is being done.
 - 4.6 Connect the work cable to the work as close to the cutting or gouging area as practical. Work cables connected to the building framework or other locations away from the cutting or gouging area increase the possibility of the current passing through lifting chains, crane cables or other alternate circuits. This can create fire hazards or overheat lifting chains or cables until they fail.
 - 4.7 Hydrogen gas may be formed and trapped under aluminum work pieces when they are cut underwater or while using a water table. DO NOT cut aluminum alloys underwater or on a water table unless the hydrogen gas can be eliminated or dissipated. Trapped hydrogen gas that is ignited will cause an explosion.
 - 4.8 Read and follow NFPA 51B "Standard for Prevention During Welding, Cutting and Other Hot Work", available from NFPA, 1 Batterymarch Park, PO box 9101, Quincy, Ma 022690-9101.
5. CYLINDER may EXPLODE if damaged.
- 5.1 Use only compressed gas cylinders containing the correct gas for the process used and properly operating regulators designed for the gas and pressure used. All hoses, fittings, etc., should be suitable for the application and maintained in good condition.
 - 5.2 Always keep cylinders in an upright position securely chained to an undercarriage or fixed support.
 - 5.3 Cylinders should be located:
 - Away from areas where they may be struck or subjected to physical damage.
 - A safe distance from plasma cutting or gouging, arc welding operations and any other source of heat, sparks, or flame.
 - 5.4 Never allow any part of the electrode, torch or any other electrically "hot" parts to touch a cylinder.
 - 5.5 Keep your head and face away from the cylinder valve outlet when opening the cylinder valve.
 - 5.6 Valve protection caps should always be in place and hand tight except when the cylinder is in use or connected for use.

Cylinder Explosion



Safety First (continued)

Electrical Power



5.7 Read and follow the instructions on compressed gas cylinders, associated equipment, and CGA publication P-1, "Precautions for Safe Handling of Compressed Gases in Cylinders," available from the Compressed Gas Association 1235 Jefferson Davis Highway, Arlington, VA 22202.

6. FOR ELECTRICALLY powered equipment.

- 6.1 Turn off input power using the disconnect switch at the fuse box before working on the equipment.
- 6.2 Install equipment in accordance with the U.S. National Electrical Code, all local codes and the manufacturer's recommendations.
- 6.3 Ground the equipment in accordance with the U.S. National Electrical Code and the manufacturer's recommendations.

Plasma Arc



7. PLASMA ARC can injure.

- 7.1 Keep your body away from nozzle and plasma arc.
- 7.2 Operate the pilot arc with caution. The pilot arc is capable of burning the operator, others or even piercing safety clothing.

Electric and Magnetic Fields



8. ELECTRIC AND MAGNETIC FIELDS may be dangerous

- 8.1 Electric current flowing through any conductor causes localized Electric and Magnetic Fields (EMF). Cutting or gouging current creates EMF fields around torch cables and cutting machines.
- 8.2 EMF fields may interfere with some pacemakers, so operators having a pacemaker should consult their physician before cutting or gouging.
- 8.3 Exposure to EMF fields during cutting or gouging may have other health effects which are now not known.
- 8.4 All operators should use the following procedures in order to minimize exposure to EMF fields from the cutting or gouging circuit:
 - 8.4.1 Route the torch and work cables together - Secure them with tape when possible.
 - 8.4.2 Never coil the torch cable around your body.
 - 8.4.3 Do not place your body between the torch and work cables. If the torch cable is on your right side, the work cable should also be on your right side.
 - 8.4.4 Connect the work cable to the workpiece as close as possible to the area being cut or gouged.
 - 8.4.5 Do not work next to cutting power source.

Auto Operation



9. AUTOMATIC OPERATION

- 9.1 Any CNC machine may begin to operate automatically without warning. Only a trained individual familiar with the software, machine, and computer system should operate this equipment.



- 9.2 Keep the immediate area around the CNC machine clear of materials that may cause interference. Keep area clear of bystanders.
- 9.3 All untrained persons should not work on or near a CNC machine. Do not leave the CNC machine unattended while power is on to any electronics.

10. NOISE

- 10.1 Noise can cause permanent hearing loss. CNC operation, plasma arc cutting, plate marking, routing, and drilling can cause noise levels that exceed safe limits. You must protect your ears from loud noise to prevent permanent loss of hearing.
 - 10.1.1 To protect your hearing from loud noise, wear protective ear plugs and/or ear muffs. Protect others in the workplace.
 - 10.1.2 Noise levels should be measured to be sure the decibels (sound) do not exceed safe levels.
- 10.2 For information on how to test for noise refer to the publications section of this manual.

11. HEAVY PARTS

- 11.1 Parts of CNC machines are heavy. Also, material you are cutting may be heavy. Use caution when lifting or moving them. To avoid injury, get someone to help you, or use a mechanical lifter. When using a mechanical lifter, follow all the manufacturer's safety guidelines.
- 11.2 Review the Occupational Safety & Health Administration (OSHA) technical manual Sect. 7, Ch 1.5. See the publications section that follows.

12. FLYING DEBRIS

- 12.1 Metal cutting and marking operations create waste that can fragment and fly. Make sure you have proper eye protection and that everyone close to the CNC operations has proper eye protection, too.
- 12.2 Review the ANSI Z87.1 requirements. See the publications section for additional information.

13. PINCH AND CRUSH POINTS

- 13.1 Pinch and crush points are those normally moving parts of machinery, like CNC machines, that can pinch, capture, crush, or sever parts of your body. Be aware of hazardous pinch and crush points.
- 13.2 Don't repair or adjust the machine with the controls on.
- 13.3 When the end of a CNC machine's travel creates a "hard stop," it creates a crush point. Keep fingers and hands away from this.
- 13.4 Do not stack or store any additional items in contact with the machine. These could create additional pinch or crush points, or could create a falling hazard.
- 13.5 Smaller limbs, hands, and fingers can fit into places that create additional pinch or crush points. Do not allow anyone younger than 14 years old to operate this equipment or reach into it when its power is connected.

Noise



Heavy Parts



Flying Debris



Pinch & Crush Points



Safety First (continued)

Rotary Tools



14. SHARP ROTARY TOOLS

- 14.1 Routing and drilling use high-speed rotating bits and cutters with sharp edges. Keep clear of bits when in use.
- 14.2 Turn the router, spindle, or drill off when changing bits. Be careful of the sharp edges.

Hot Material



15. HOT MATERIAL

- 15.1 Plasma cutting uses an electric arc that can reach temperatures of 45,000°F (25,000°C). Oxygen-fuel cutting flames can be up to 6,330°F (3,500°C). Any parts and scrap will be very hot after cutting. Use extreme care.
- 15.2 Use tongs and wear protective gloves when handling recently cut material. Also, consider other devices for safe hot material handling.
- 15.3 It is safest to let material cool completely before handling.

Mechanical Drives



16. MECHANICAL DRIVES

- 16.1 High-speed mechanical drives made of gears, belts, and or drive screws are used by CNC machines. Keep clear of them during operation.
- 16.2 Do not attempt to service, adjust, or otherwise touch these components while the machine is on.
- 16.3 Secure loose clothing and cables to prevent entanglement.

Pressurized Air Lines



17. AIR LINES UNDER PRESSURE

- 17.1 Some tools use compressed air or gases. Often flexible tubing (lines) bring the high-pressure air or gas to the machine. Inspect these lines periodically. Repair or replace damaged lines.
- 17.2 Hot sparks, flying debris, other objects, or vehicles can melt, burn, or puncture these lines. Check them for punctures, burns, or other damage or defects that could cause failure.
- 17.3 Check the routing of the lines to keep them away from traffic and from underfoot.



PUBLICATIONS

Refer to the following standards or their latest revisions for more information:

- OSHA, SAFETY AND HEALTH STANDARDS, 29CFR 1910, obtainable from the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402
- ANSI Standard Z49.1, SAFETY IN WELDING AND CUTTING, obtainable from the American Welding Society, 550 N.W. LeJeune Rd, Miami, FL 33126
- NIOSH, SAFETY AND HEALTH IN ARC WELDING AND GAS WELDING AND CUTTING, obtainable from the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402
- ANSI Standard Z87.1, SAFE PRACTICES FOR OCCUPATION AND EDUCATIONAL EYE AND FACE PROTECTION, obtainable from American National Standards Institute, 1430 Broadway, New York, NY 10018
- ANSI Standard Z49.2, FIRE PREVENTION IN THE USE OF CUTTING AND WELDING PROCESSES, obtainable from American National Standards Institute, 1430 Broadway, New York, NY 10018
- AWS Standard A6.0, WELDING AND CUTTING CONTAINERS WHICH HAVE HELD COMBUSTIBLES, obtainable from American Welding Society, 550 N.W. LeJeune Rd, Miami, FL 33126
- NFPA Standard 51, OXYGEN-FUEL GAS SYSTEMS FOR WELDING, CUTTING AND ALLIED PROCESSES, obtainable from the National Fire Protection Association, Batterymarch Park, Quincy, MA 02269
- NFPA Standard 70, NATIONAL ELECTRICAL CODE, obtainable from the National Fire Protection Association, Batterymarch Park, Quincy, MA 02269
- NFPA Standard 51B, CUTTING AND WELDING PROCESSES, obtainable from the National Fire Protection Association, Batterymarch Park, Quincy, MA 02269
- CGA Pamphlet P-1, SAFE HANDLING OF COMPRESSED GASES IN CYLINDERS, obtainable from the Compressed Gas Association, 1235 Jefferson Davis Highway, Suite 501, Arlington, VA 22202
- 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
- NWSA booklet, WELDING SAFETY BIBLIOGRAPHY obtainable from the National Welding Supply Association, 1900 Arch Street, Philadelphia, PA 19103
- ANSI Standard Z88.2, PRACTICE FOR RESPIRATORY PROTECTION, obtainable from American National Standards Institute, 1430 Broadway, New York, NY 10018





Rev 2 Lifter Station Rev 3 Lifter Station

Know your model?



Magnetic breakaway lifter station upgrade

Your Arc Voltage Height Control (AVHC) lifter station upgrade provides safety features that protect the operator and the equipment if the torch meets an obstruction, such as a tipped-up part or scrap. Without the breakaway, the torch takes the full force of the table's motion when it bears against an obstruction, which can destroy the torch. With the breakaway, the force of the collision easily overcomes the magnetic attraction, releasing the torch from its mounting and stopping the plasma arc and the table's movement.

Features

- Fits both Rev 2 and Rev 3 lifter stations. Installed adapter spacers should be removed for Rev 3 lifter stations.
- Works with "Red" and "Blue" screen AVHC Control boxes .
- "Red" screen AVHC Control boxes may need to run "smooth" code for extra torque on lifting. Contact Torchmate Technical Support to obtain the programming reference material for "smooth" code and other details.
- Works with Torchmate Driver Software Version 3 and Version 4.
 - The breakaway holder function is not compatible with Versions 1 or 2. If you currently use Version 1 or 2, you can upgrade your CNC Signal Generator from model 401A [serial port] to model 501A [USB port] to use Driver Version 3 or 4.
- Because of the holding power of the magnet, you can use any conventional air/air plasma torch.
 - Most high def-sized torches (2-inches Φ) are too heavy for the magnetic breakaway, except for the Hypertherm MAXPRO 200, which has a lighter-weight torch.
- All magnetic breakaway upgrades are tested before shipping

Rev 2 adapter spacers



Remove both these spacers when upgrading a Rev 3 lifter station. Leave them in place for a Rev 2 lifter station.



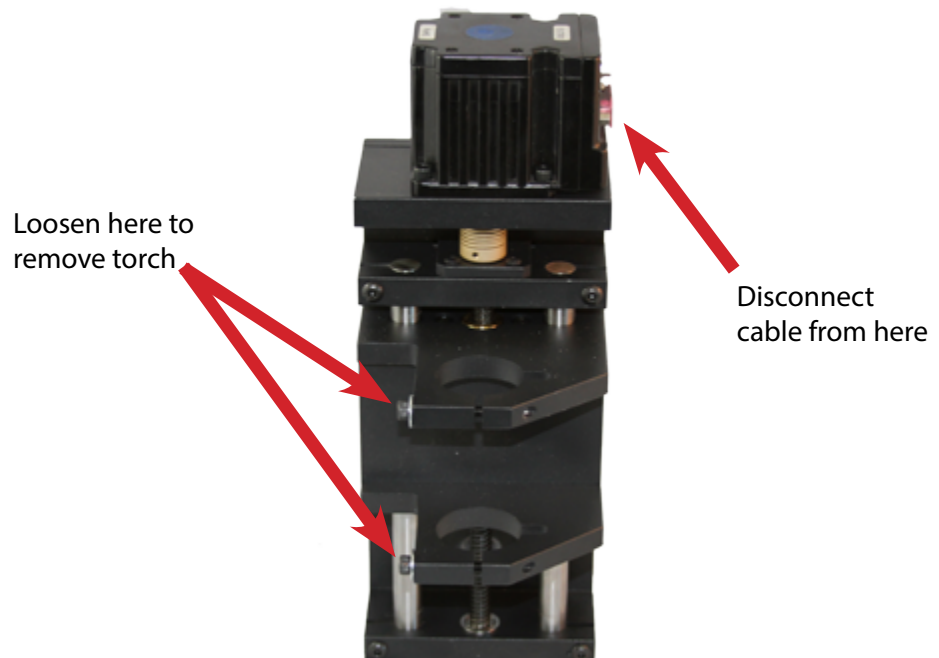
Remove the lifter station

The first step to performing the upgrade is to remove your existing AVHC lifter station. This is a straightforward operation. Make sure power to the plasma cutter and the AVHC Control box are off. Disconnect the communication cable from the smart motor. Remove the torch. Remove the lifter station from the tool mounting bracket.

Removal steps

- The lifter station (mechanical assembly) is what holds the torch and produces vertical motion for height control. It will be easier to disassemble the lifter station when it is removed.
 1. Turn off your plasma cutter.
 2. Turn off your AVHC Control box.
 3. Disconnect the communication cable from the start motor.
 4. Loosen the pinch bolts on the torch mounting and remove the torch.
 5. Locate the lifter station mounting hardware and remove the bolts. Remove the lifter station.
- Put the lifter station on a sturdy work surface.

Remove the torch and disconnect the cable before removing the lifter station

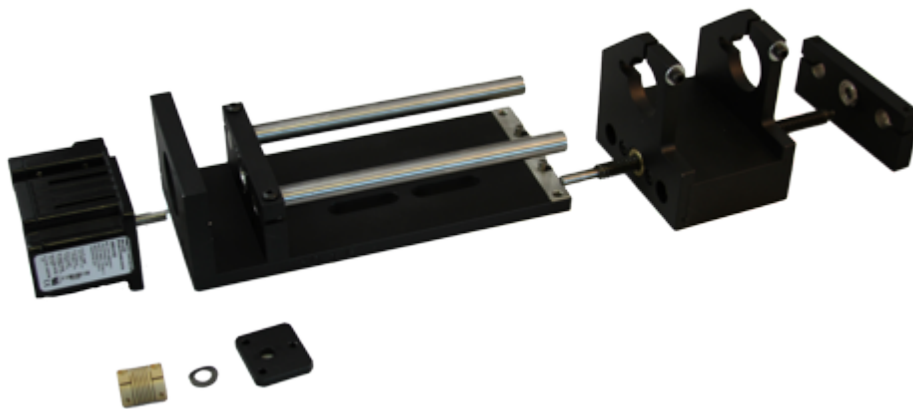


Disassemble the lifter station

To install the magnetic breakaway torch holder, the lifter station will be disassembled. This affords an opportunity to inspect, clean, and lubricate the parts that will be re-used.

Disassembly steps

1. Loosen the two set screws on the (beam) spring coupler that connects the motor to the drive screw.
 2. Loosen the four motor mounting bolts and remove the motor.
 3. On a Rev 3, loosen the three screws that hold on the bearing clamp plate and remove the curved disk spring from under the plate.
 - The Rev 2 uses a flanged roller bearing at both the top and bottom, while the Rev 3 uses the spring and clamp plate to retain a standard roller bearing.
 4. Loosen the pinch bolts on the top and bottom end plates so that the precision shafts may be slid out of the bottom end plate.
 5. Remove the mounting bolts from the back of the base plate that hold on the bottom end plate.
 6. Carefully remove the bottom end plate, watching the flanged roller bearing. On Rev 3, take care not to damage the two locating pins in the base plate.
 7. Slide out the drive screw from the roller bearing (regular or flanged) in the top end plate.
 8. Unthread the drive screw from the bronze nut in the carriage.
- **Note:** regular disassembly, inspection, cleaning, and lubrication of your lifter station will not only help you to achieve high quality and high quantity cutting, but will prolong the useful life of your equipment.



Disassembled
for upgrade



Inspect, clean, and oil the lifter station

With the lifter station disassembled, take the time to inspect, clean, and lubricate the parts. Moving parts should be inspected for excessive wear. Bearings, precision shafts, and drive screws should all be free of built-up dirt and rust and lubricated with a light machine oil.

Inspect for wear

- The drive screw, its bronze nut, the precision linear shafts, and their sliding bearings can suffer wear over time, particularly in humid and dirty conditions. Excessive wear will reduce cut quality, so replacing worn components is recommended.

Inspect for dirt and rust

- Dirt and rust must be removed for proper lifter station operation.
 - When beginning a cut the torch tip is lowered to touch the material, which is sensed as additional motor resistance. This allows proper setting of pierce and initial cut heights
 - However, dirt or rust can also cause additional motor resistance, which can interfere with the proper operation, and incorrect pierce and cut heights.
- At this step, perform a thorough cleaning that removes any built-up dirt or surface rust.
 - Use a synthetic scouring pad (such as Scotch Brite™) along with a penetrating solvent (such as WD-40™)
 - Remove all rust and solvent residue with absorbent towels
 - Lightly coat the cleaned surfaces with a few drops of light machine oil (such as 3-in-1™)
- When rust causes pitting that interferes with smooth motion, replace the rusted component.

Replace badly rusted components



If this rust has pitted the surface, replace the shaft



Assemble upgraded lifter station

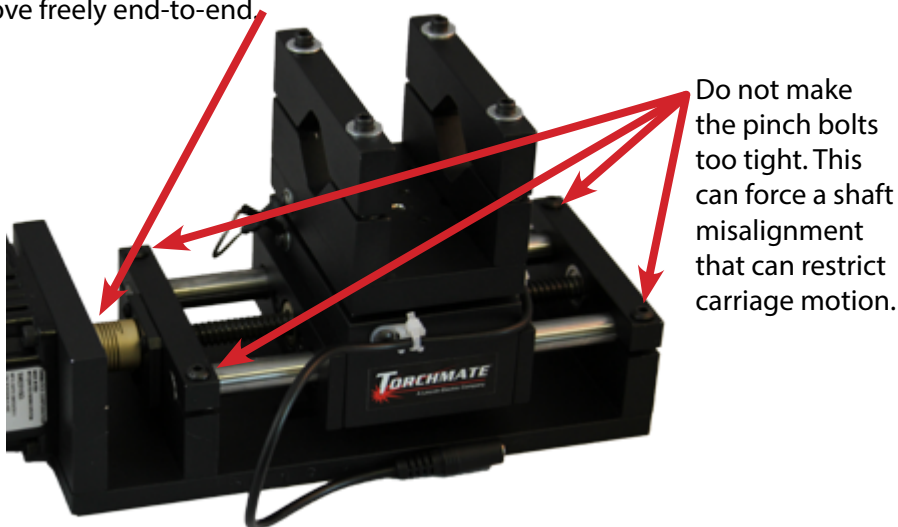
Re-assembly of the lifter station with the upgraded magnetic breakaway is easily done by following these steps. However, your overall satisfaction and your safety can be increased by careful installation ... as well as thoughtful operation.

1. Thread the drive screw into the bronze nut in the new carriage.
2. Insert the end of the drive screw into the roller bearing (flanged or regular) in the top end plate.
3. If Rev 3, replace the curved disk spring and the bearing clamp plate on the top end plate.
4. Slide the new carriage onto the precision shafts.
5. Install the bottom end plate while inserting the drive screw through the flanged roller bearing. If Rev 3, carefully position the bottom end plate over the two pins in the base plate.
6. Slide the precision shafts into the bottom end plates.
7. Tighten bolts that hold the bottom end plate to the base plate
8. Center the precision shafts between the top and bottom end plates and tighten the pinch bolts.
9. Position the (beam) spring coupler over the drive screw and insert the motor shaft in the coupler.
10. Tighten the four motor mounting bolts.
11. Tighten the two set screws on the (beam) spring coupler.

Assembly steps

Check for restricted movement. Rotate the end of the drive shaft or the spring coupler. It should move freely end-to-end.

Check for restriction to movement



Test / adjust magnetic strength of breakaway

The magnetic force required to hold the breakaway carriage securely to the lifter station— yet allow it to easily detach during a collision—will be different for torches with different weights and cable configurations. An adjustment may be required to achieve a suitable magnetic strength level.

Test the strength

- After you mount your torch in the breakaway carrier, you can test the magnetic strength by simply breaking the torch away from the lifter station by gripping the torch on the bottom and pulling.
- You want a magnetic strength that:
 - Will allow easy breakaway in a collision
 - Securely hold the torch during normal operations without wobble or bounce
- If the strength is too low or too high, make the adjustment.

Adjust the strength

1. Loosen the three adjusting screws (on reverse side) by $\frac{1}{4}$ turn each.
2. Loosen the center screw in the hold ring by one to two full turns.
3. Adjust the three outer screws evenly, using quarter-turn increments.
 - Turn **clockwise** to **increase** the magnetic force (remember you have already made $\frac{1}{4}$ counter-clockwise turn)
 - Turn **counter-clockwise** to **reduce** the magnetic force (remember you have already made $\frac{1}{4}$ counter-clockwise turn)
4. Tighten the center screw and check that the hold ring is evenly spaced by the three adjusting screws.
5. Attach the breakaway and check breakaway force.
6. Repeat if necessary.

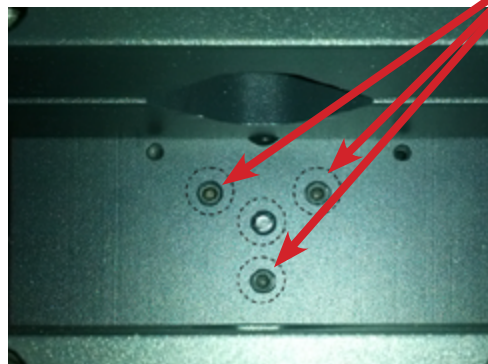
Where to adjust strength of magnet

First, loosen each of these three screws $\frac{1}{4}$ turn

Third, adjust "in" to increase or "out" to decrease force

Second, loosen center screw

Fourth, tighten when done



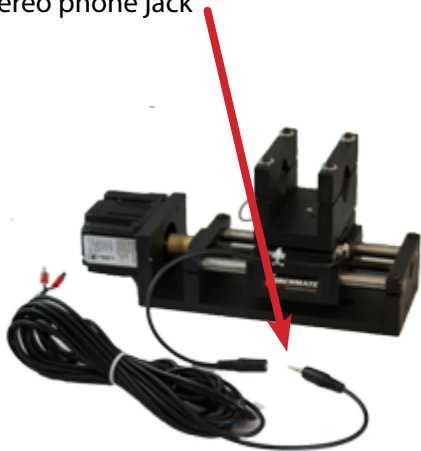
Connect extension cable and input cable

The lifter station upgrade with magnetic breakaway includes an extension cable with a mini-phone jack on one end, to connect to the magnetic breakaway sensor cable, and a set of spade lugs on the other end that connect to the CNC Control box input cable.

- If you have a cable carrier and /or a protective sheath for your cables, you will want to run the magnetic breakaway sensor cable extension through the carrier / sheath.
- Connect the mini-phone plug on the extension cable to the mini-phone jack on the lifter station. You should feel the connectors “click” together.
- Connect the spade lugs on the extension cable to the spade connectors on the CNC Control box input cable.
 - The spade connectors on the CNC Control box input cable are tagged with number tags. The usual practice is to use the #3 pair, however, using the Torchmate Driver software, any input pair can be configured.
 - The CNC Control box input cable comes with the AVHC Control box with the blue screen. If you have an AVHC Control box with a red screen, the CNC Control box input cable is a separately ordered item.

Run and connect the cabling

The extension cable connects with a mini-stereo phone jack



The CNC Control box input cable connects with the #3 set of spade lugs



Cables and connections



Torchmate Driver configuration

In addition to physically disconnecting the torch from the lifter station, the magnetic breakaway upgrade senses a physical breakaway with a normally-closed pushbutton switch and notifies the CNC Control box so that the plasma arc can be quickly stopped. This is configured in the Torchmate Driver software.

Open the Torchmate Driver software

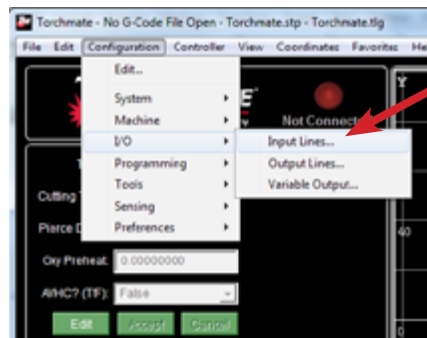
- Launch the Torchmate Driver software.
- This is the Torchmate Driver icon that you can double-click on to launch the program.
- After connecting to the CNC Control box, use the menu for the following selection:
Configuration > I/O > Input Lines ...



Use the Configuration menu

- On Line# 3, use the drop-down in the **Function** column to select **Feed Hold**. The Feed Hold setting stops the cut on breakaway, but does not reset the cut. After you correct the cause of the breakaway, you can restart the cut from where it stopped. If, instead, you select the **Safety** option, a breakaway event resets the cut to the beginning. (Note that "Red" screen AVHC Control boxes do not provide signals for input Line#s 1 and 2.)
- Change the description to something that indicates the breakaway fault. In the example, the description is **Break Away**.
- The **Wiring** column should indicate that the pushbutton is normally closed (**N.C.**).
- Other columns may be left with their default values.

Configure the input line



Select Input Lines

Set up the sensor

Line #	Function	Location	Description	Wiring	Sensing Debounce (inches)
1	Control	N/A	Pierce Signal	N.O.	0.018300
2	Feed Hold	N/A	Fault Signal	N.O.	0.010300
3	Feed Hold	N/A	Break Away	N.C.	0.018300
4	Unused	N/A		N.C.	0.010300
5	Unused	N/A		N.C.	0.018300



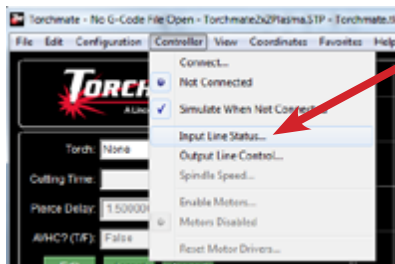
Check / adjust pushbutton sensor activation

An adjustable set-screw keeps the pushbutton pressed (and normally-closed) when the magnetic torch holder is in its operating position. If the set-screw is extended too far, it could interfere with the complete attachment of the magnet. If the set-screw is retracted too far into the plate, the pushbutton may not close, causing the torch to fail to operate. This can be checked and adjusted with the help of the Torchmate Driver software.

- Launch the Torchmate Driver software.
- After connecting to the CNC Control box, use the menu for the following selection:
Controller > Input Line Status ...
- With the magnetic torch holder in place, the button should be closed and the Status for Line 3 should be "green," and with the torch holder disconnected, it should be "red."
- Adjust the position of the set-screw to achieve proper operation, then add a drop of blue thread-locking liquid to secure the set-screw.

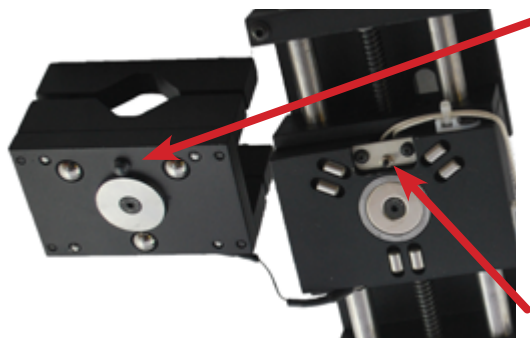
Open the Torchmate Driver software

Adjust and lock the set-screw



Select Input Line Status

Input Line Status



Inspect and adjust this set-screw, then secure it with a drop of blue thread locking fluid

Where to adjust and lock the set-screw

Mini-pushbutton



Line	Description	Status
1	Pierce Signal	True
2	Fault Signal	True
3	Feed Hold	True
4		True

Verify the push-button operation by manually breaking-away and restoring the torch holder

Verify that status change is detected



Lifter station maintenance kit

Torchmate and Lincoln Electric Cutting Systems equipment is designed and built with reliability and longevity in mind, but normal wear-and-tear are a fact of life in any type of machinery. In view of this, the “Lifter Station Maintenance Kit,” includes the spare parts that you would typically replace during the normal operation of this product.

Call, Fax, or Email

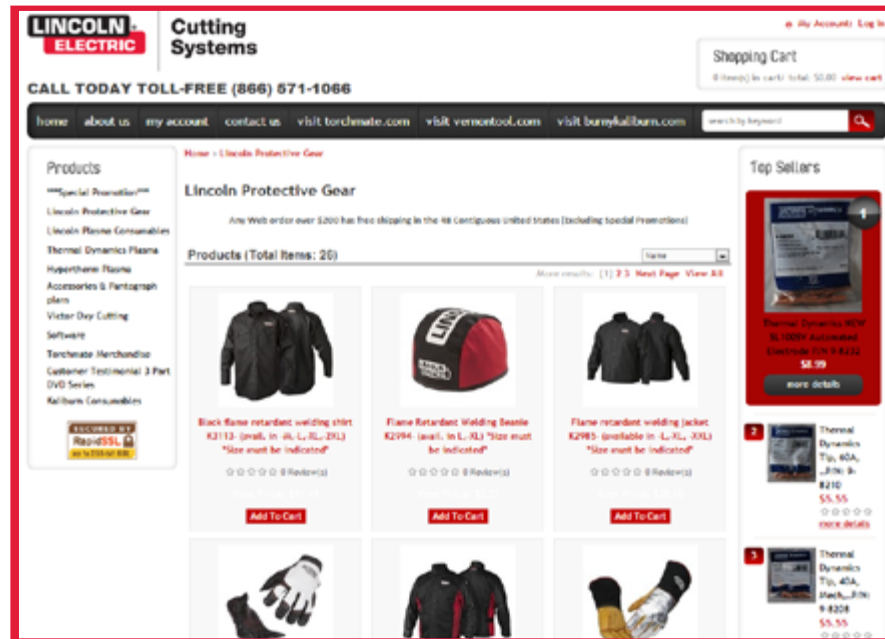
To order the correct maintenance kit and options, please call the Torchmate Technical Support number--or send an email if outside the hours of 6AM to 4PM Pacific Time.

Our friendly, helpful staff will be happy to provide you with the maintenance kit and other products you'll be using, such as consumables.



Toll Free: 1-866-571-1066 x3
International: 775-673-2200 x3
Fax: 775-673-2206
Email: support@torchmate.com

Call us for
Consumables,
or visit our
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www.TorchmateStore.com

