

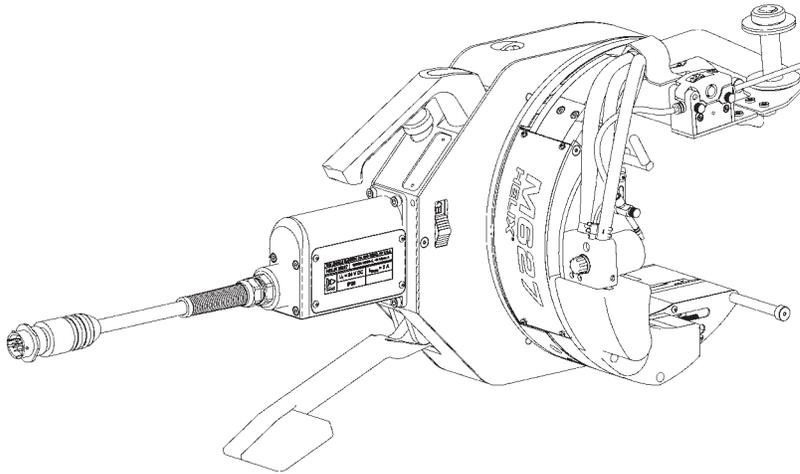


Operator's Manual

HELIX[®] M627 WELD HEAD

ORIGINAL INSTRUCTIONS

For use with machines having Code Numbers:
13139, 13359



Register your machine:
www.lincolnelectric.com/register
Authorized Service and Distributor Locator:
www.lincolnelectric.com/locator

Need Help? Call 1.888.935.3877
to talk to a Service Representative

Hours of Operation:
8:00 AM to 6:00 PM (ET) Mon. thru Fri.

Save for future reference

Date Purchased

Code: (ex: 12735)

Serial: (ex: U1060512345)

After hours?
Use "Ask the Experts" at lincolnelectric.com
A Lincoln Service Representative will contact you
no later than the following business day.

For Service outside the USA:
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SPAIN

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THANK YOU FOR SELECTING A QUALITY PRODUCT BY LINCOLN ELECTRIC.

PLEASE EXAMINE CARTON AND EQUIPMENT FOR DAMAGE IMMEDIATELY

When this equipment is shipped, title passes to the purchaser upon receipt by the carrier. Consequently, claims for material damaged in shipment must be made by the purchaser against the transportation company at the time the shipment is received.

SAFETY DEPENDS ON YOU

Lincoln arc welding and cutting 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. **DO NOT INSTALL, OPERATE OR REPAIR THIS EQUIPMENT WITHOUT READING THIS MANUAL AND THE SAFETY PRECAUTIONS CONTAINED THROUGHOUT.** And, most importantly, think before you act and be careful.

WARNING

This statement appears where the information must be followed exactly to avoid serious personal injury or loss of life.

CAUTION

This statement appears where the information must be followed to avoid minor personal injury or damage to this equipment.



KEEP YOUR HEAD OUT OF THE FUMES.

DON'T get too close to the arc. Use corrective lenses if necessary to stay a reasonable distance away from the arc.

READ and obey the Safety Data Sheet (SDS) and the warning label that appears on all containers of welding materials.

USE ENOUGH VENTILATION or exhaust at the arc, or both, to keep the fumes and gases from your breathing zone and the general area.

IN A LARGE ROOM OR OUTDOORS, natural ventilation may be adequate if you keep your head out of the fumes (See below).

USE NATURAL DRAFTS or fans to keep the fumes away from your face.

If you develop unusual symptoms, see your supervisor. Perhaps the welding atmosphere and ventilation system should be checked.



WEAR CORRECT EYE, EAR & BODY PROTECTION

PROTECT your eyes and face with welding helmet properly fitted and with proper grade of filter plate (See ANSI Z49.1).

PROTECT your body from welding spatter and arc flash with protective clothing including woolen clothing, flame-proof apron and gloves, leather leggings, and high boots.

PROTECT others from splatter, flash, and glare with protective screens or barriers.

IN SOME AREAS, protection from noise may be appropriate.

BE SURE protective equipment is in good condition.

Also, wear safety glasses in work area **AT ALL TIMES.**



SPECIAL SITUATIONS

DO NOT WELD OR CUT containers or materials which previously had been in contact with hazardous substances unless they are properly cleaned. This is extremely dangerous.

DO NOT WELD OR CUT painted or plated parts unless special precautions with ventilation have been taken. They can release highly toxic fumes or gases.

Additional precautionary measures

PROTECT compressed gas cylinders from excessive heat, mechanical shocks, and arcs; fasten cylinders so they cannot fall.

BE SURE cylinders are never grounded or part of an electrical circuit.

REMOVE all potential fire hazards from welding area.

ALWAYS HAVE FIRE FIGHTING EQUIPMENT READY FOR IMMEDIATE USE AND KNOW HOW TO USE IT.



SECTION A: WARNINGS



CALIFORNIA PROPOSITION 65 WARNINGS



WARNING: Breathing diesel engine exhaust exposes you to chemicals known to the State of California to cause cancer and birth defects, or other reproductive harm.

- Always start and operate the engine in a well-ventilated area.
- If in an exposed area, vent the exhaust to the outside.
- Do not modify or tamper with the exhaust system.
- Do not idle the engine except as necessary.

For more information go to www.P65warnings.ca.gov/diesel

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. (California Health & Safety Code § 25249.5 *et seq.*)



WARNING: Cancer and Reproductive Harm
www.P65warnings.ca.gov

ARC WELDING CAN BE HAZARDOUS. PROTECT YOURSELF AND OTHERS FROM POSSIBLE SERIOUS INJURY OR DEATH. KEEP CHILDREN AWAY. PACEMAKER WEARERS SHOULD CONSULT WITH THEIR 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. A Free copy of "Arc Welding Safety" booklet E205 is available from the Lincoln Electric Company, 22801 St. Clair Avenue, Cleveland, Ohio 44117-1199.

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



FOR ENGINE POWERED EQUIPMENT.

- Turn the engine off before troubleshooting and maintenance work unless the maintenance work requires it to be running.
- Operate engines in open, well-ventilated areas or vent the engine exhaust fumes outdoors.
- Do not add the fuel near an open flame welding arc or when the engine is running. Stop the engine and allow it to cool before refueling to prevent spilled fuel from vaporizing on contact



with hot engine parts and igniting. Do not spill fuel when filling tank. If fuel is spilled, wipe it up and do not start engine until fumes have been eliminated.

- Keep all equipment safety guards, covers and devices in position and in good repair. Keep hands, hair, clothing and tools away from V-belts, gears, fans and all other moving parts when starting, operating or repairing equipment.
- In some cases it may be necessary to remove safety guards to perform required maintenance. Remove guards only when necessary and replace them when the maintenance requiring their removal is complete. Always use the greatest care when working near moving parts.
- Do not put your hands near the engine fan. Do not attempt to override the governor or idler by pushing on the throttle control rods while the engine is running.
- To prevent accidentally starting gasoline engines while turning the engine or welding generator during maintenance work, disconnect the spark plug wires, distributor cap or magneto wire as appropriate.
- To avoid scalding, do not remove the radiator pressure cap when the engine is hot.
- Using a generator indoors CAN KILL YOU IN MINUTES.
- Generator exhaust contains carbon monoxide. This is a poison you cannot see or smell.
- NEVER use inside a home or garage, EVEN IF doors and windows are open.
- Only use OUTSIDE and far away from windows, doors and vents.
- Avoid other generator hazards. READ MANUAL BEFORE USE.



ELECTRIC AND MAGNETIC FIELDS MAY BE DANGEROUS



- Electric current flowing through any conductor causes localized Electric and Magnetic Fields (EMF). Welding current creates EMF fields around welding cables and welding machines
- EMF fields may interfere with some pacemakers, and welders having a pacemaker should consult their physician before welding.
- Exposure to EMF fields in welding may have other health effects which are now not known.
- All welders should use the following procedures in order to minimize exposure to EMF fields from the welding circuit:
 - Route the electrode and work cables together - Secure them with tape when possible.
 - Never coil the electrode lead around your body.
 - Do not place your body between the electrode and work cables. If the electrode cable is on your right side, the work cable should also be on your right side.
 - Connect the work cable to the workpiece as close as possible to the area being welded.
 - Do not work next to welding power source.



ELECTRIC SHOCK CAN KILL.



- 3.a. The electrode and work (or ground) circuits are electrically “hot” when the welder is on. Do not touch these “hot” parts with your bare skin or wet clothing. Wear dry, hole-free gloves to insulate hands.
- 3.b. Insulate yourself from work and ground using dry insulation. Make certain the insulation is large enough to cover your full area of physical contact with work and ground.

In addition to the normal safety precautions, if welding must be performed under electrically hazardous conditions (in damp locations or while wearing wet clothing; on metal structures such as floors, gratings or scaffolds; when in cramped positions such as sitting, kneeling or lying, if there is a high risk of unavoidable or accidental contact with the workpiece or ground) use the following equipment:

- Semiautomatic DC Constant Voltage (Wire) Welder.
 - DC Manual (Stick) Welder.
 - AC Welder with Reduced Voltage Control.
- 3.c. In semiautomatic or automatic wire welding, the electrode, electrode reel, welding head, nozzle or semiautomatic welding gun are also electrically “hot”.
 - 3.d. Always be sure the work cable makes a good electrical connection with the metal being welded. The connection should be as close as possible to the area being welded.
 - 3.e. Ground the work or metal to be welded to a good electrical (earth) ground.
 - 3.f. Maintain the electrode holder, work clamp, welding cable and welding machine in good, safe operating condition. Replace damaged insulation.
 - 3.g. Never dip the electrode in water for cooling.
 - 3.h. Never simultaneously touch electrically “hot” parts of electrode holders connected to two welders because voltage between the two can be the total of the open circuit voltage of both welders.
 - 3.i. When working above floor level, use a safety belt to protect yourself from a fall should you get a shock.
 - 3.j. Also see Items 6.c. and 8.



ARC RAYS CAN BURN.



- 4.a. Use a shield with the proper filter and cover plates to protect your eyes from sparks and the rays of the arc when welding or observing open arc welding. Headshield and filter lens should conform to ANSI Z87.1 standards.
- 4.b. Use suitable clothing made from durable flame-resistant material to protect your skin and that of your helpers from the arc rays.
- 4.c. 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.



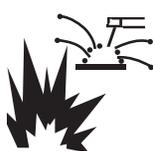
FUMES AND GASES CAN BE DANGEROUS.



- 5.a. Welding may produce fumes and gases hazardous to health. Avoid breathing these fumes and gases. When welding, keep your head out of the fume. Use enough ventilation and/or exhaust at the arc to keep fumes and gases away from the breathing zone. **When welding hardfacing (see instructions on container or SDS) or 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 unless exposure assessments indicate otherwise. In confined spaces or in some circumstances, outdoors, a respirator may also be required. Additional precautions are also required when welding on galvanized steel.**
- 5.b. The operation of welding fume control equipment is affected by various factors including proper use and positioning of the equipment, maintenance of the equipment and the specific welding procedure and application involved. Worker exposure level should be checked upon installation and periodically thereafter to be certain it is within applicable OSHA PEL and ACGIH TLV limits.
- 5.c. Do not weld 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.
- 5.d. Shielding gases used for arc welding can displace air and cause injury or death. Always use enough ventilation, especially in confined areas, to insure breathing air is safe.
- 5.e. Read and understand the manufacturer’s instructions for this equipment and the consumables to be used, including the Safety Data Sheet (SDS) and follow your employer’s safety practices. SDS forms are available from your welding distributor or from the manufacturer.
- 5.f. Also see item 1.b.



WELDING AND CUTTING SPARKS CAN CAUSE FIRE OR EXPLOSION.



- 6.a. Remove fire hazards from the welding area. If this is not possible, cover them to prevent the welding sparks from starting a fire. Remember that welding sparks and hot materials from welding can easily go through small cracks and openings to adjacent areas. Avoid welding near hydraulic lines. Have a fire extinguisher readily available.
- 6.b. Where compressed gases are to be used at the job site, special precautions should be used to prevent hazardous situations. Refer to "Safety in Welding and Cutting" (ANSI Standard Z49.1) and the operating information for the equipment being used.
- 6.c. When not welding, make certain no part of the electrode circuit is touching the work or ground. Accidental contact can cause overheating and create a fire hazard.
- 6.d. Do not heat, cut or weld tanks, drums or containers until the proper steps have been taken to insure that such procedures will not cause flammable or toxic vapors from substances 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).
- 6.e. Vent hollow castings or containers before heating, cutting or welding. They may explode.
- 6.f. Sparks and spatter are thrown from the welding arc. Wear oil free protective garments such as leather gloves, heavy shirt, cuffless trousers, high shoes and a cap over your hair. Wear ear plugs when welding out of position or in confined places. Always wear safety glasses with side shields when in a welding area.
- 6.g. Connect the work cable to the work as close to the welding area as practical. Work cables connected to the building framework or other locations away from the welding area increase the possibility of the welding 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.
- 6.h. Also see item 1.c.
- 6.i. Read and follow NFPA 51B "Standard for Fire Prevention During Welding, Cutting and Other Hot Work", available from NFPA, 1 Batterymarch Park, PO box 9101, Quincy, MA 022690-9101.
- 6.j. Do not use a welding power source for pipe thawing.



CYLINDER MAY EXPLODE IF DAMAGED.

- 7.a. Use only compressed gas cylinders containing the correct shielding 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. 
- 7.b. Always keep cylinders in an upright position securely chained to an undercarriage or fixed support.
- 7.c. Cylinders should be located:
 - Away from areas where they may be struck or subjected to physical damage.
 - A safe distance from arc welding or cutting operations and any other source of heat, sparks, or flame.
- 7.d. Never allow the electrode, electrode holder or any other electrically "hot" parts to touch a cylinder.
- 7.e. Keep your head and face away from the cylinder valve outlet when opening the cylinder valve.
- 7.f. Valve protection caps should always be in place and hand tight except when the cylinder is in use or connected for use.
- 7.g. 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, 14501 George Carter Way Chantilly, VA 20151.



FOR ELECTRICALLY POWERED EQUIPMENT.



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

Refer to
<http://www.lincolnelectric.com/safety>
for additional safety information.

ELECTROMAGNETIC COMPATIBILITY (EMC)

CONFORMANCE

Products displaying the CE mark are in conformity with European Community Council Directive of 3 May 1989 on the approximation of the laws of the Member States relating to electromagnetic compatibility (2014/30/UE). It was manufactured in conformity with a national standard that implements a harmonized standard: EN 60974-10

Electromagnetic Compatibility (EMC) Product Standard for Arc Welding Equipment. It is for use with other Lincoln Electric equipment. It is designed for industrial and professional use.

INTRODUCTION

All electrical equipment generates small amounts of electromagnetic emission. Electrical emission may be transmitted through power lines or radiated through space, similar to a radio transmitter. When emissions are received by other equipment, electrical interference may result. Electrical emissions may affect many kinds of electrical equipment; other nearby welding equipment, radio and TV reception, numerical controlled machines, telephone systems, computers, etc. Be aware that interference may result and extra precautions may be required when a welding power source is used in a domestic establishment.

INSTALLATION AND USE

The user is responsible for installing and using the welding equipment according to the manufacturer's instructions. If electromagnetic disturbances are detected then it shall be the responsibility of the user of the welding equipment to resolve the situation with the technical assistance of the manufacturer. In some cases this remedial action may be as simple as earthing (grounding) the welding circuit, see Note. In other cases it could involve construction of an electromagnetic screen enclosing the power source and the work complete with associated input filters. In all cases electromagnetic disturbances must be reduced to the point where they are no longer troublesome.

Note: The welding circuit may or may not be earthed for safety reasons according to national codes. Changing the earthing arrangements should only be authorized by a person who is competent to assess whether the changes will increase the risk of injury, e.g., by allowing parallel welding current return paths which may damage the earth circuits of other equipment.

ASSESSMENT OF AREA

Before installing welding equipment, the user shall make an assessment of potential electromagnetic problems in the surrounding area. The following shall be taken into account:

- a. Other supply cables, control cables, signaling and telephone cables; above, below and adjacent to the welding equipment;
- b. radio and television transmitters and receivers;
- c. computer and other control equipment;
- d. safety critical equipment, e.g., guarding of industrial equipment;
- e. the health of the people around, e.g., the use of pacemakers and hearing aids;
- f. equipment used for calibration or measurement and
- g. the immunity of other equipment in the environment. The user shall ensure that other equipment being used in the environment is compatible. This may require additional protection measures including:
- h. the time of day that welding or other activities are to be carried out.

The size of the surrounding area to be considered will depend on the structure of the building and other activities that are taking place. The surrounding area may extend beyond the boundaries of the premises.

METHODS OF REDUCING EMISSIONS

Mains Supply

Welding equipment should be connected to the mains supply according to the manufacturer's recommendations. If interference occurs, it may be necessary to take additional precautions such as filtering of the mains supply. Consideration should be given to shielding the supply cable of permanently installed welding equipment, in metallic conduit or equivalent. Shielding should be electrically continuous throughout its length. The shielding should be connected to the welding power source so that good electrical contact is maintained between the conduit and the welding power source enclosure.

Maintenance of the Welding Equipment

The welding equipment should be routinely maintained according to the manufacturer's recommendations. All access and service doors and covers should be closed and properly fastened when the welding equipment is in operation. The welding equipment should not be modified in any way except for those changes and adjustments covered in the manufacturer's instructions. In particular, the spark gaps of arc striking and stabilizing devices should be adjusted and maintained according to the manufacturer's recommendations.

Welding Cables

The welding cables should be kept as short as possible and should be positioned close together, running at or close to floor level.

Equipotential Bonding

Bonding of all metallic components in the welding installation and adjacent to it should be considered. However, metallic components bonded to the work piece will increase the risk that the operator could receive a shock by touching these metallic components and the electrode at the same time. The operator should be insulated from all such bonded metallic components.

Earthing of the Workpiece

Where the workpiece is not bonded to earth for electrical safety, not connected to earth because of its size and position, e.g., ships hull or building steelwork, a connection bonding the workpiece to earth may reduce emissions in some, but not all instances. Care should be taken to prevent the earthing of the work piece increasing the risk of injury to users, or damage to other electrical equipment. Where necessary, the connection of the workpiece to earth should be made by a direct connection to the work piece, but in some countries where direct connection is not permitted, the bonding should be achieved by suitable capacitance, selected according to national regulations.

Screening and Shielding

Selective screening and shielding of other cables and equipment in the surrounding area may alleviate problems of interference. Screening of the entire welding installation may be considered for special applications.

- 1 Portions of the preceding text are contained in EN 60974-10: "Electromagnetic Compatibility (EMC) product standard for arc welding equipment."

WEEE

	<p>Do not dispose of electrical equipment together with normal waste!</p> <p>In observance of European Directive 2002/96/EC on Waste Electrical and Electronic Equipment (WEEE) and its implementation in accordance with national law, electrical equipment that has reached the end of its life must be collected separately and returned to an environmentally compatible recycling facility. As the owner of the equipment, you should get information on approved collection systems from our local representative.</p> <p>By applying this European Directive you will protect the environment and human health!</p>
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07/06

English

REACH

11/19

Communication in accordance with Article 33.1 of Regulation (EC) No 1907/2006 – REACH.

Some parts inside this product contain:

Bisphenol A, BPA,	EC 201-245-8, CAS 80-05-7
Cadmium,	EC 231-152-8, CAS 7440-43-9
Lead,	EC 231-100-4, CAS 7439-92-1
Phenol, 4-nonyl-, branched,	EC 284-325-5, CAS 84852-15-3

in more than 0,1% w/w in homogeneous material. These substances are included in the "Candidate List of Substances of Very High Concern for Authorisation" of REACH.

Your particular product may contain one or more of the listed substances.

Instructions for safe use:

- use according to Manufacturer instructions, wash hands after use;
- keep out of reach of children, do not put in mouth,
- dispose in accordance with local regulations.

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Technical Specifications HELIX M627 Weld Head

HELIX M627 Weld head
 Product Number
 K52283-1

Input Power	24 VDC
Radial Clearance (around 6.625 in pipe)	6.19" with On Board Feeder
Axial Clearance	
Total Depth	8.31"
Electrode to rear	6.84" - 7.84"
Electrode to front	0.75"
Travel Speed (around 6.625 in pipe)	0.83 - 99.07 ipm
Oscillation stroke	1.0" (25.4mm)
Travel Angle	4 degrees
Torch Amps	Variable (Based on Power Supply)
Pipe Sizes	1.9 - 6.625 in OD with factory configuration

Weld Head Physical Dimensions

Length 22" (559mm)	Height (body width) 10.8" (274mm)	Depth 8.31" (211.1mm)	Weight 32 lb (14.5 kg)
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Environmental

Operating Temperature Range 32°F to 140°F (0C - 60C)	Storage Temperature Range -22°F to 140°F (-30C - 60C)
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Ingress Protection - IP00

A-weighted emission sound pressure level: less than 70 db (A)

Standard Pipe Clamp Shoes

Part Number	Description
K52093-663	Clamp Shoe - 6.625" OD
K52093-556	Clamp Shoe 5.563" OD
K52093-450	Clamp Shoe 4.500" OD
K52093-400	Clamp Shoe 4.000" OD
K52093-350	Clamp Shoe 3.500" OD
K52093-288	Clamp Shoe 2.875" OD
K52093-238	Clamp Shoe 2.375" OD
K52093-190	Clamp Shoe 1.900" OD
Other pipe and tube sizes available upon request	

Explanation of Symbols



Electric Shock Warning



Hot Surface Warning



Clutch Unlocked

Safety Precautions

Read entire manual before installation or operation.



WARNING



ELECTRIC SHOCK CAN KILL

- Only qualified personnel should perform this installation.
- Turn the input power OFF at the disconnect switch or fuse box before working on this equipment turn off the input power to any other equipment connected to the welding system at the disconnect switch or fuse box before working on the equipment.
- Do not touch electrically hot parts.
- Always connect the power supply grounding lug to a proper safety (Earth) ground.

Proper Handling

The HELIX M627 weld head is only meant to be picked up and supported by the handles. Only attempt to attach the weld head to the work surface while the clamp mechanism is disengaged and the height is fully retracted.

Do not hang persons or objects from the handles of the weld head while operating.

Keep machine dry. Shelter from rain and snow. Do not place on wet ground or in puddles.

Always place the weld head on a steady, flat level surface when not in use or not clamped onto a work surface. Always be sure to engage the clutch latch when the weld head is left on the work surface.

Only place the weld head with the Motion Assembly facing up. Do not attempt to place the clamp on weld head upright as the weight of the torch or Cable Assembly can cause it to tip.

Do not force the torch motion assembly in or out manually. Manually adjusting the torch in this manner can cause undue wear and tear on the gear and motors.

After welding allow adequate time for the weld head to cool before moving, making adjustments or putting into storage.

Water lines should be drained before storage. Refer to the Cool Arc 55 S manual for coolant specifications.

Operation

Read entire manual before operation.

Only operate while firmly attached to the work surface with clamp engaged. Never operate system on a work surface with incorrectly sized clamp shoes.

Keep hands away from weld head while in operation.

Verify that the system cable assembly is free from obstruction before operating. While welding, the weld head will rotate around the pipe. Be certain that there is plenty of play in weld cable. If the cable binds up during welding, parts of the weld cable or the weld head assembly may become damaged.

Never unplug or plug in control cables to the weld head while the system is powered on.

Verify that the system is properly grounded before beginning to weld.

HELIX M627 Weld Head

Basic Information

The Helix M627 weld head is a precision, digitally controlled weld head for TIG welding. Designed to work with the APEX 3 Series Orbital Controllers, the HELIX M627 weld head can weld pipe diameters from 1.9 to 6.625" OD from the factory configuration. The HELIX M627 weld head has interchangeable clamp shoes that allow the operator to adjust for different diameter pipes.

The HELIX M627 weld head has automatic height control while welding, oscillation capabilities, water cooling, and multiple filler wire placement options. These give the operator greater control of the weld puddle for more complicated welds.

Basic Components

The three basic components of the weld head are:

- Body Assembly
- Torch Motion Assembly
- Cable Assembly

See **FIGURE 1 - Weld Head Components** for the different weld head assemblies, each are discussed separately.

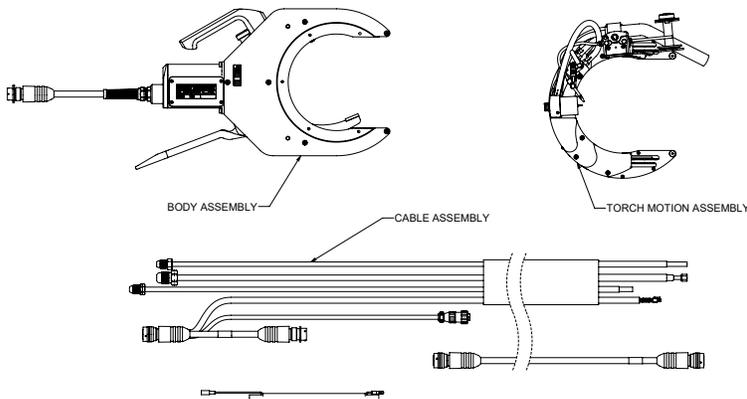


FIGURE 1 - Weld Head Components

Body Assembly

The body assembly is the main assembly for the HELIX M627 weld head. It contains the travel gears and clamping mechanism. This assembly contains several adjustments and controls, see **Figure 2 – Body Assembly Adjustments**.

Adjustments and controls located on the body include:

- Tension Knob
 - Adjust tension for the clamping mechanism
- Clamp Shoe Release
 - Quick release button used to remove and install different size clamp shoes
- Clutch Latch
 - Allows free rotation of the torch assembly around the work surface. Can be engaged (locked) for electrical motion or disengaged (unlocked) for easy manual motion around the pipe.

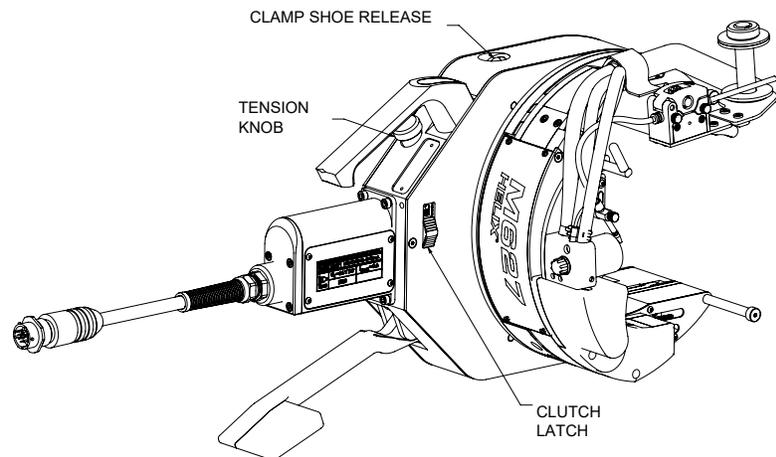


FIGURE 2 - Body Assembly, Adjustment Controls

Clamping Mechanism

The clamping mechanism allows the weld head to attach and hold onto the pipe being welded. See **Figure 3 – Clamping Mechanism**.

The clamping mechanism consists of:

- Tension Knob
 - This knob allows the operator to increase or decrease the tension of the clamp for different pipe sizes. Turning clockwise increases tension, turning counter clockwise decreases tension.
- Clamp Shoe
 - Each size pipe requires a different size clamp shoe, these shoes are machined to ensure that the center most point of the work is always in the same location relative to the weld head.
NOTE: Incorrect size shoes will result in inconsistent travel speeds and less precise height control.

- € Clamp Jaw
 - ~ Portion of the lever mechanism that secures against the pipe, opposite the clamp shoe, which tightens the head onto the work surface.
- € Lever Arm
 - ~ Manipulated by the operator, this lever engages the clamp jaw.

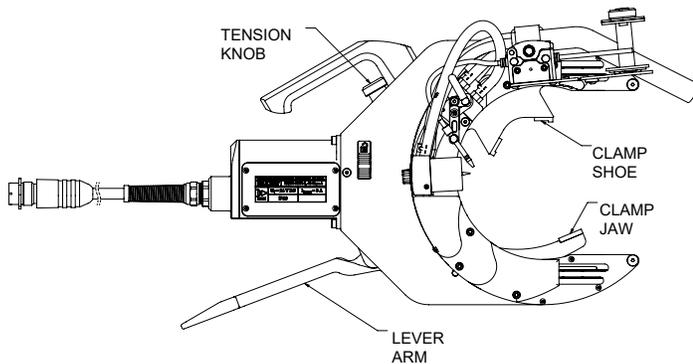


FIGURE 3 - Body Assembly, Clamping Mechanism

Torch Motion Assembly

The torch motion assembly performs most of the motions for the torch including: automatic height control, oscillation, and providing wire feed. This assembly houses the associated PCBs, torch cooling lines, and the height, oscillation, and wire feed motors. See **Figure 4 – Torch Motion Assembly**.

The torch motion assembly consists of:

- € Motor Housing
 - ~ Contains the height control and oscillation mechanisms and associated cooling lines.
- € On Board Wire Feeder
 - ~ Contains the wire feed mechanism, and a 2 lb. spool mount.
- € Torch
 - ~ Contains the tungsten and associated consumables for welding. The torch can be physically and electrically hot. Use caution when working with or around the torch.
- € Wire Guide
 - ~ This consists of all wire placement adjustments for the weld head.

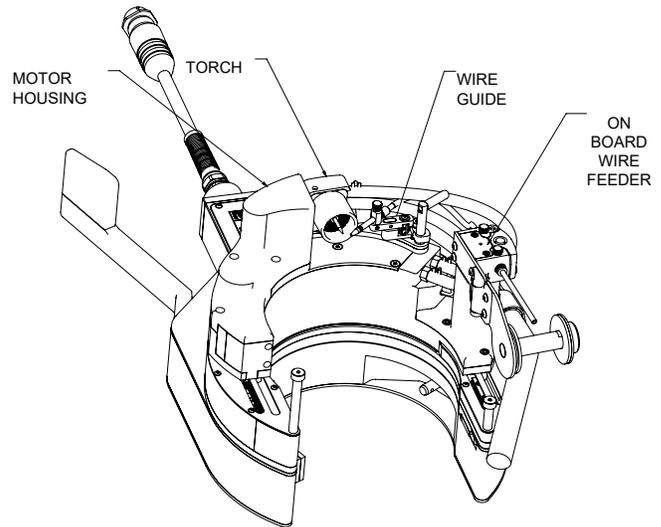


Figure 4 - Motion Assembly

Wire Guide Assembly

The wire guide assembly, see **Figure 5 – Wire Guide Assembly**, allows the operator to manipulate where the wire will be placed into the weld puddle. It has four different angles of adjustment: up/down, left/right, in/out and entry angle.

The wire guide assembly consists of:

- € Wire Guide Tip
 - Guides the wire to the puddle.
- € In/Out Adjustment Screw
 - Allows the wire guide tip to move in or out.
- € Entry Angle Adjustment Screw
 - Sets the angle of the wire guide tip.
- € Wire Liner
 - The wire liner coming from the feeder.
- € Left/Right Adjustment Screw
 - Manipulates the adjustment arm.
- € Up/Down Adjustment Lever
 - One of the wire adjustment locations for adjusting the wire guide.

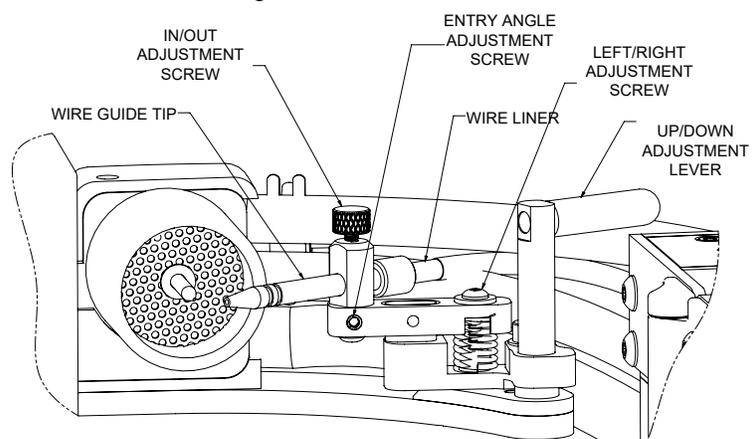


Figure 5 - Wire Guide Assembly

Cable Assembly

The cable assembly attaches from the weld head to the controller and power supply. It supplies the input controls, power, gas, and water to the weld head. See **Figure 6 – Cable Assembly**.

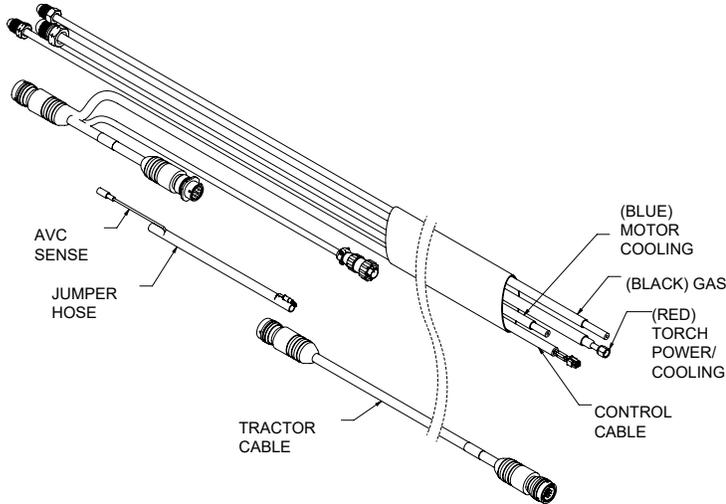


Figure 6 - Cable Assembly

The cables and hoses that attach to the torch are held in place by a strain relief. This relief allows the cables to travel around the pipe without pulling against their connectors. Ensure that adequate slack is left between the connectors and the strain relief to allow the torch assembly to oscillate back and forth. For low clearance applications, the included low profile cable retainer can be used to manage the control cable and hoses.

Install the hoses firmly to prevent leaks. There are five sets of cables/hoses for the torch motion assembly, see **Figure 7 – Cable Placement**.

- (RED) TORCH POWER / COOLING
 - Provides power and cooling to the torch.
- (BLACK) GAS
 - Provides shielding gas.
- CONTROL CABLE
 - Controls weld head functions and provides power.
- (BLUE) MOTOR COOLING
 - Cools the height and oscillation motors.
- JUMPER HOSE & AVC SENSE
 - Goes from the torch to the motor housing and carries the AVC sense in its sleeve.

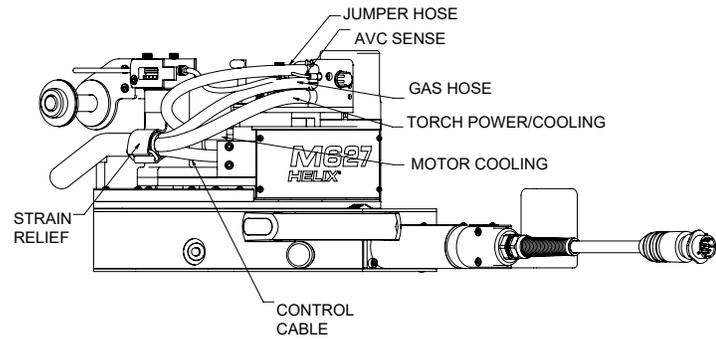


Figure 7 - Cable Placement

The travel cable attaches to a tractor cable and then to the cable assembly. See **Figure 8 –Travel Cable**. The travel cable and tractor cable are not routed through the cable assembly sleeve.

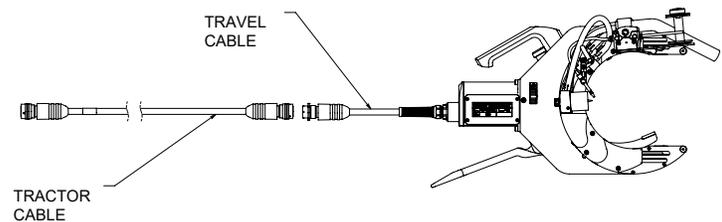


Figure 8 - Travel Cable

Clamp Shoes

The weld head has an assortment of interchangeable clamp shoes that can be changed depending on the outside diameter of the pipe or tube being welded. These clamps range in size from OD 1.9 – 6.625in.

Figure 9 – Shoe Size 1.9" shows the profile of a 1.9" shoe clamp inserted into a weld head.

Figure 10 – Shoe Size 6.625" shows a 6.625" shoe clamp.

Each example also shows the different placements of the clamp jaw as it would sit while around the different pipe sizes.

See **Figure 11- Standard Clamp Shoe Sizes** for all the shoes that are included with the head. Specialty sizes are available upon request. Additional sizes for small diameters may require a modified clamp jaw plate. Take care while installing the clamp shoes as they can present a pinch point.

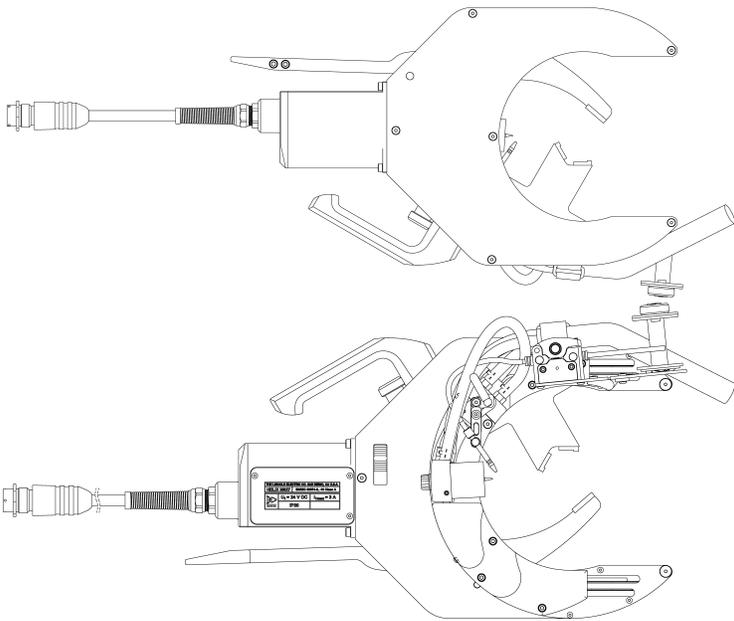


Figure 9 - Shoe Size 1.9

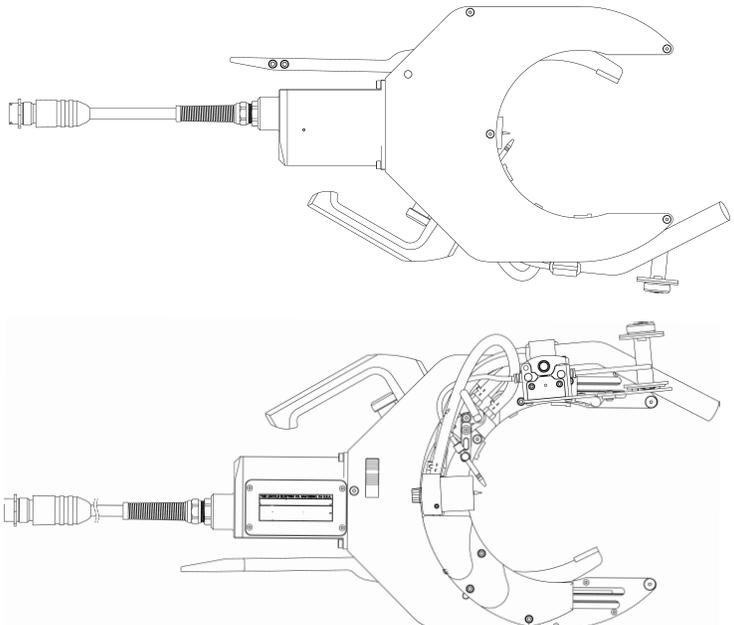
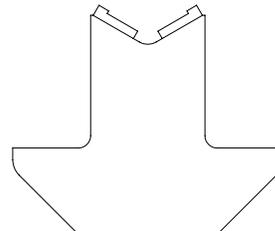
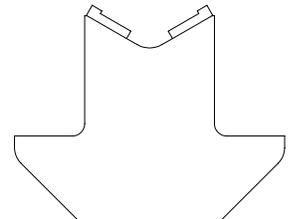


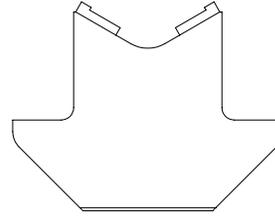
Figure 10 - Shoe Size 6.625



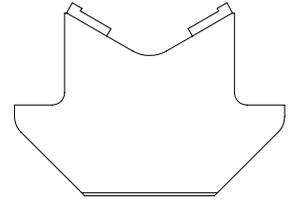
1.9" (48.26mm)
K52093-190



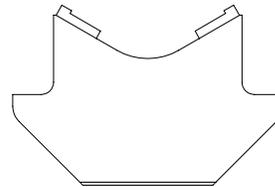
2.38" (60.452mm)
K52093-238



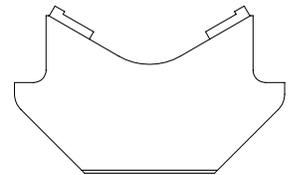
2.88" (73.152mm)
K52093-288



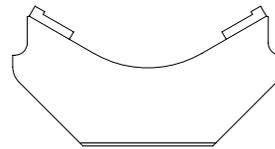
3.5" (88.9mm)
K52093-350



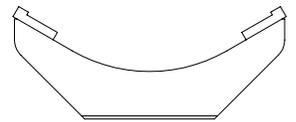
4" (101.6mm)
K52093-400



4.5" (114.3mm)
K52093-450



5.56" (141.224mm)
K52093-556



6.63" (168.402mm)
K52093-663

Figure 11 - Standard Clamp Shoe Size

Installation

HOT SURFACE WARNING! Verify that enough time has passed after welding before removing or installing the clamp shoes to allow them to cool.

To install the clamp shoes detach the weld head from the pipe. Press and hold the clamp shoe quick release button on the top of the weld head, see **Figure 12 – Shoe Release**. Slide the desired size clamp shoe into the weld head. Clamp plates on the end of the clamp shoes ensure the weld head is properly attached to the work surface. Verify that these clamp plates are facing out toward the torch motion assembly, see **Figure 13 – Clamp Shoe Placement**.

NOTE: It is possible to install the clamp shoes backwards which can cause clearance issues and decrease clamp stability.

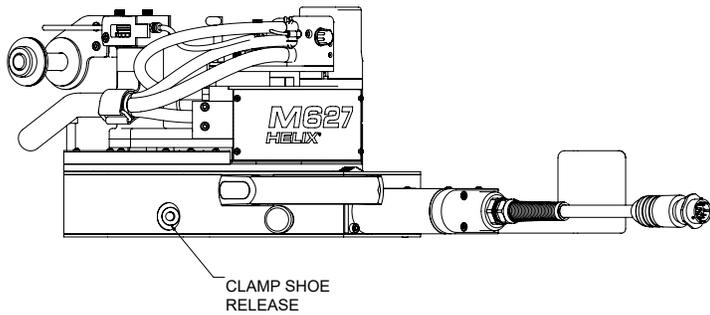


Figure 12 - Shoe Release

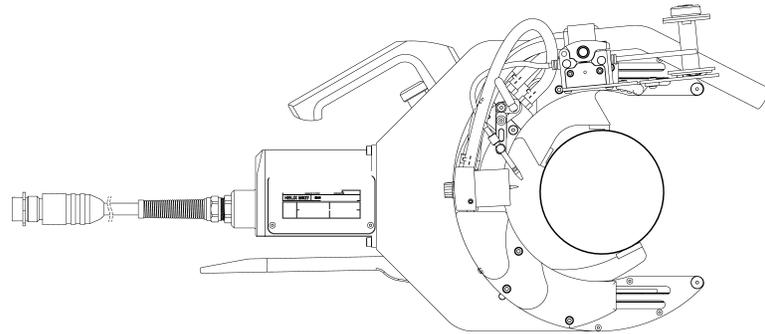


Figure 14 - Weld Head Placement

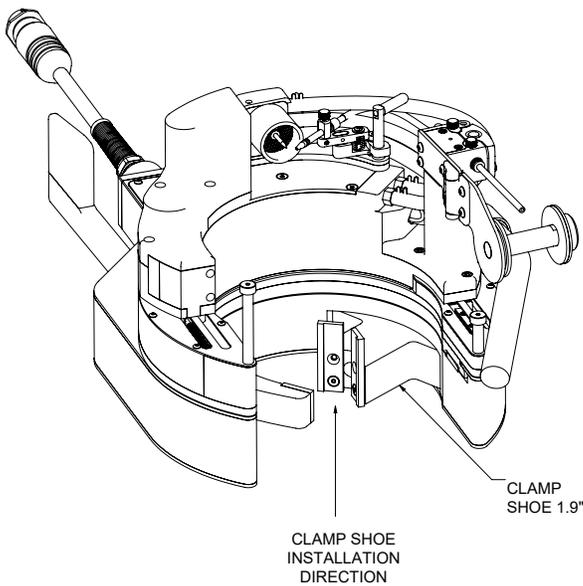


Figure 13 - Shoe Placement

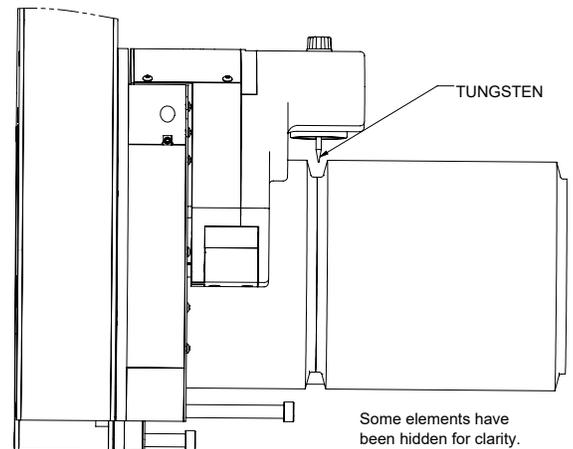


Figure 15 - Tungsten Positioning

Removal

Hold onto the clamp shoe, press and hold the clamp shoe quick release button and the shoe will slip out.

Weld Head Positioning

NOTE: Ensure the oscillation is at the center point and the height has been driven up to allow proper clearance before positioning the weld head. Always mount the weld head on an even surface free from paint or mill scale.

Place the weld head with the clamp shoe positioned at 12 o'clock on the pipe or tube, see **Figure 14 – Weld Head Placement**. This allows the weight of the head to rest on the work surface. Adjust the weld head so that the tungsten is directly over the weld joint, see **Figure 15 – Tungsten Positioning**. Once the head is positioned on the pipe, with the tungsten at the appropriate location, clamp the head onto the work surface. Other weld head positions are acceptable if needed.

Weld Head Installation

With the appropriate clamp shoe selected and the weld head in the proper position, the clamping mechanism needs to be set at the correct tension. Pull the lever arm up to engage the clamp. If the lever arm is too tight turn the tension knob counter clockwise to allow the lever clamp to loosen. If there is too little tension then turn the knob clockwise, allowing the lever arm to move closer to the pipe, see **Figure 16 – Tension Knob**. There should be enough tension so that with the lever arm engaged the weld head will not slip on the pipe.

To verify that the correct amount of pressure is used, with the lever clamp engaged tighten the tension knob until it is as tight as possible. Disengage the lever arm and rotate the tension knob clockwise ¼ turn, re-engage the lever clamp. There should be a moderate amount of resistance and a snapping when the clamp engages. If not, disengage the lever and turn the knob another ¼ turn. Repeat as needed.

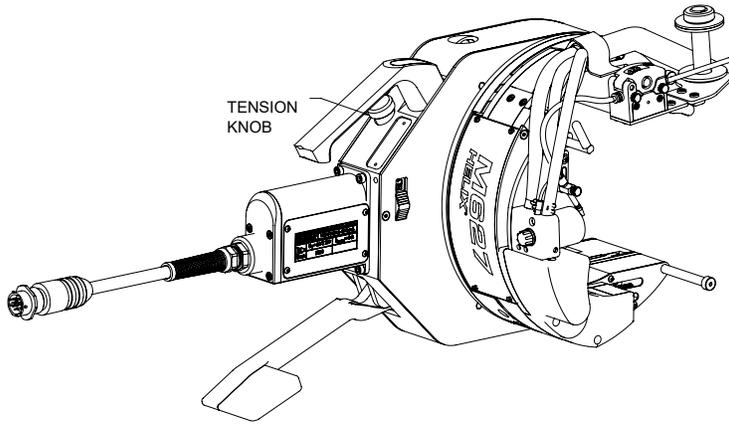


Figure 16 - Tension Knob

Tungsten Placement

The weld head comes with a short back cap installed, see **Figure 17 – Back Cap**. The operator has the option of using the installed back cap, a longer back cap that allows for larger tungsten, or a low profile back cap for low clearance applications. The tungsten is installed by removing the back cap and sliding the tungsten and collet through. Adjust the tungsten stick out so that it is adequately covered by the shielding gas.

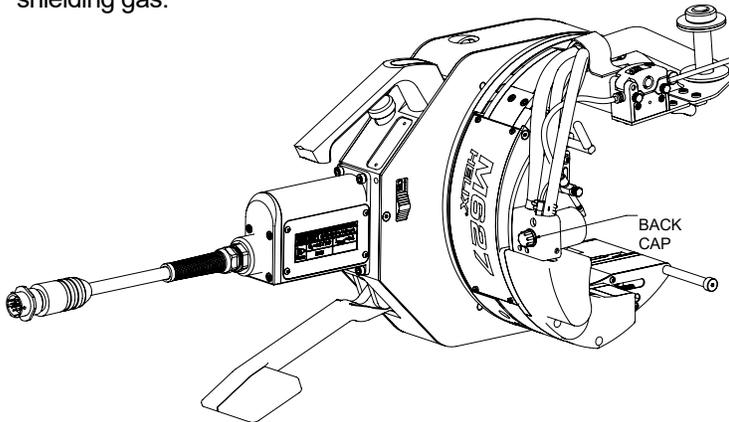


Figure 17 - Back Cap

Wire Placement

The wire manipulator adjustments allow the operator to set the wire to feed precisely into the weld puddle. The wire manipulator has four levels of adjustment: up/down, left/right, in/out and entry angle.

To adjust the wire feed left or right use a hex head screwdriver. See **Figure 18- Left/Right Adjustment**

To adjust the wire guide tip in or out loosen the thumb screw and position the wire guide tip to the desired location, tighten the thumb screw. See **Figure 19- In/Out Adjustment**

To adjust the wire up or down move the lever to the appropriate degree needed for welding, the wire guide tip will move along with the lever. See **Figure 20- Up/Down Adjustment**

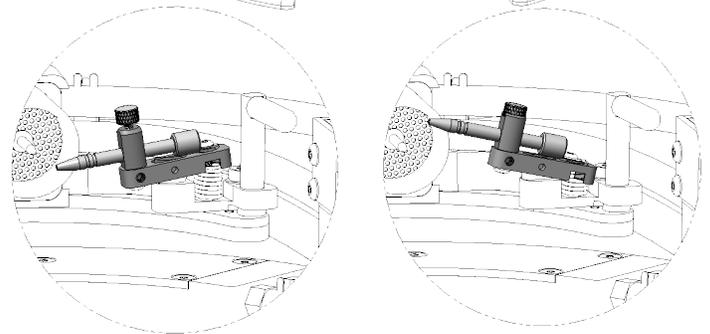
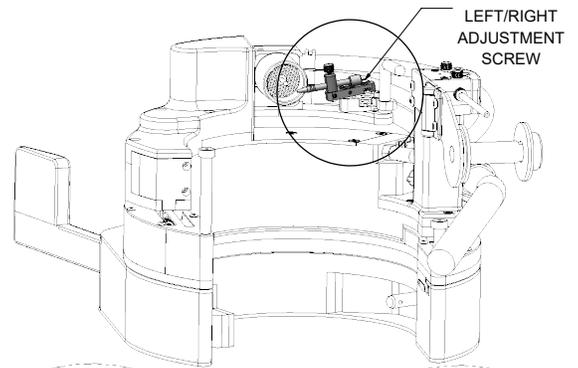


Figure 18 - Left-Right Adjustment

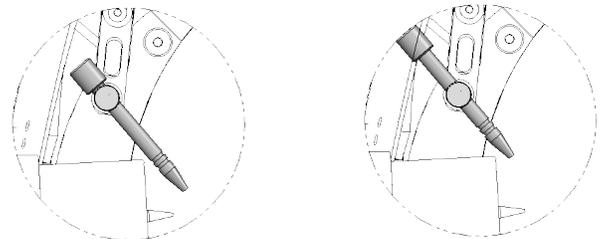
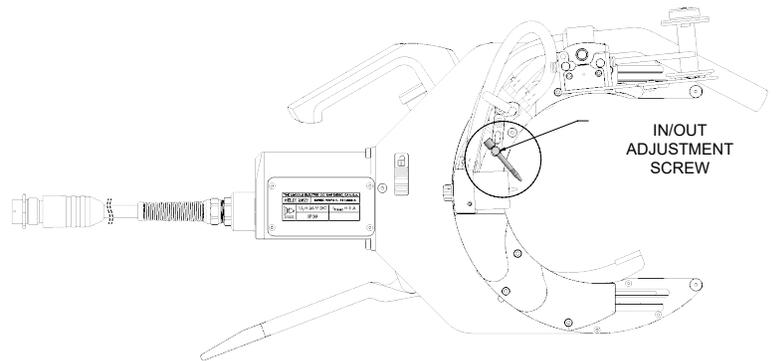


Figure 19 - In-Out Adjustment

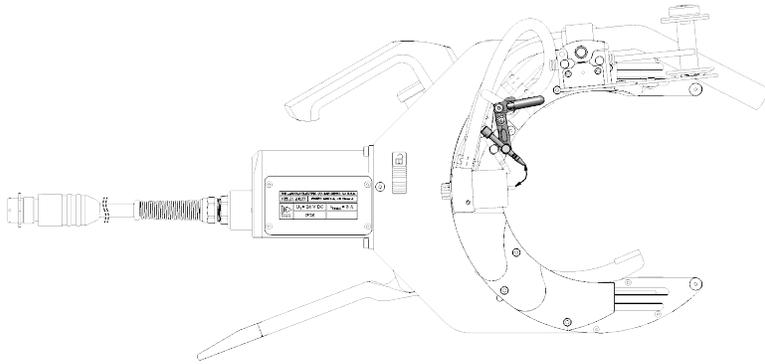
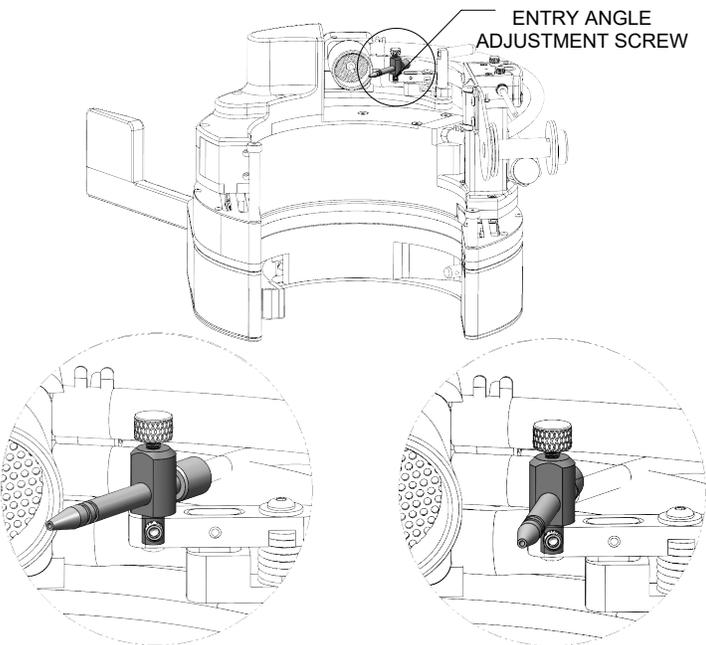


Figure 20 - Up-Down Adjustment

To adjust the wire entry angle loosen the set screw with a hex head screwdriver and position the wire guide tip at the desired angle, tighten the set screw. See **Figure 21 – Entry Angle Adjustment**.



Start Location

With the weld head clamped in place, disengage the clutch latch and manually rotate the torch motion assembly to the desired position on the pipe. Reengage the clutch latch at the desired location. **NOTE:** The torch motion assembly is rotated by holding onto the motor housing. Do not hold or rotate the torch motion assembly by holding onto the torch, the cables, or wire guides as this can cause damage over time. Alternately, use the travel jog feature on the pendant to rotate the motion assembly to the start position, making sure that the clutch latch is engaged.

Wire Feed Options

On Board Wire Feed

The on board wire feed is integrated into the weld head. This feeder supports a 2 lb. wire spool and wire sizes from .030 to .045". The on board wire feeder does not require a separate wire feeder to be carried to the job site. See **Figure 22- On Board Wire Feeder Components**. Please contact Lincoln Electric for off board wire packages.

The on board wire feeder consist of:

- Hub Nut
 - The hub nut sits at the end of the hub and locks the spool of wire in place.
- Lock Washer
 - This washer prevents the hub nut from spinning while the wire is being fed.
- Washer
 - Standard washer that facilitates smooth wire travel.
- Spool
 - The 2 lb. spool of wire for on board feeding.
- Steel Washer
- Wave Washer
 - Provides tension to the wire spool to prevent unwinding.
- Spool Hub
 - The hub supports the wire and allows smooth and consistent rotation.
- Spool Mount Hinge
 - Allows the operator to adjust the location of the spool.
- Wire Mechanism
 - The wire feed mechanism consists of the wire feed motor and the entire drive assembly and associated parts. Wire is fed from the spool into the wire feeder.

The hub nut should be adjusted to allow easy feeding of wire without freewheeling at the end of a weld.

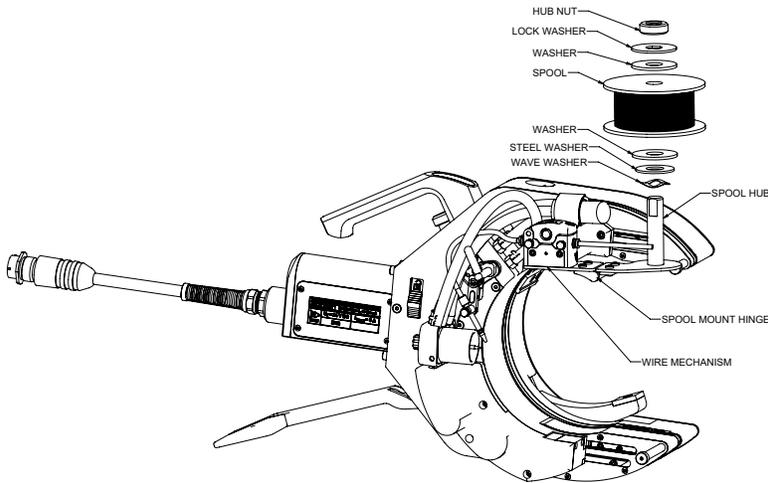


Figure 22 - On Board Wire Feeder Components

Wire Spool Installation

To install the welding wire spool unscrew the hub nut and remove the lock washer. Install the wire spool so that the wire feeds directly into the wire feed mechanism, see **Figure 23 - Wire Feed Direction**.

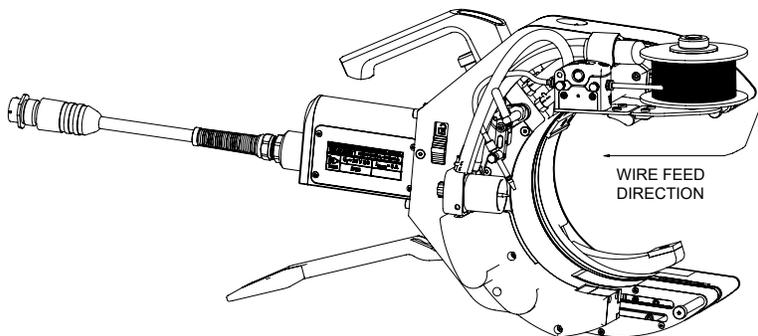


Figure 23 - Wire Feed Direction

Wire Installation

To install the wire through the wire feed mechanism disconnect the wire guide tip from the torch head and remove the bend from the wire liner. This will prevent the wire from jamming on the liner. Verify that the end of the wire is cut cleanly and the proper drive rolls are installed. Feed the wire through the inlet guide up to the drive rolls. Using the pendant set the wire to feed and the drive rolls will engage the wire, pulling it through. See **Figure 24 - Wire Feed Components** for location of components.

If the wire does not feed then it may be necessary to tighten the wire tension screw. Adjust the wire tension screw in small increments until the drive rolls are no longer slipping while feeding the filler wire. Make sure not to over tighten which could result in excess wear on the drive wheel and wire motor.

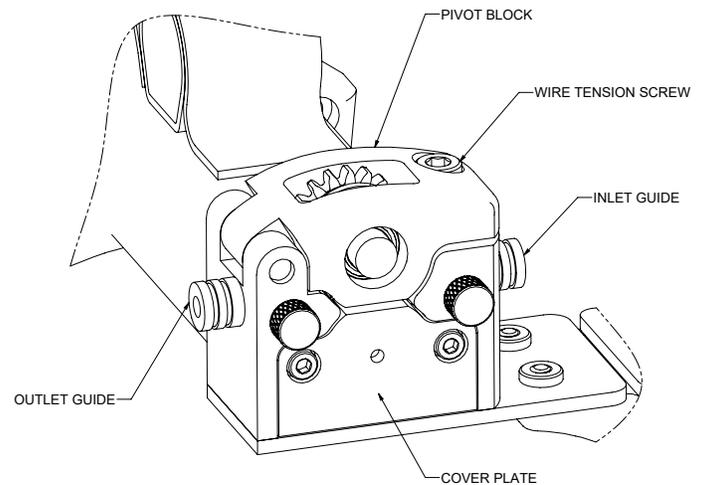


Figure 24 - Wire Feeder Components

Drive Roll Installation and Removal

To check drive roll sizes remove the cover plate from the front of the wire feed mechanism, inserting a screw into the threaded hole if necessary in order to lift the cover off. See **Figure 25 - Drive Roll Cover Plate**. The wire diameter is stamped in the side of the lower drive roll. Verify that the drive roll size is the same for the upper and lower drive rolls.

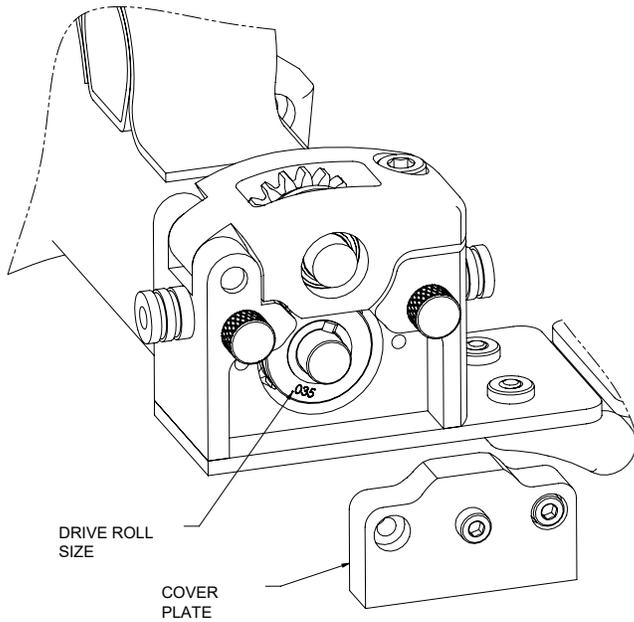


Figure 25 - Drive Roll Cover Plate

To change the upper drive roll remove the wire tension screw to free the pivot block. Rotate the upper drive roll until the set screw is exposed, see **Figure 26 – Upper Drive Roll Replacement**. Loosen the set screw, slide the shaft out, and remove the upper drive roll. Insert the desired drive roll into the slot and insert the shaft through the bearings and drive roll. Be sure to insert the shaft so that the notch on the shaft meets up with the set screw. Tighten the set screw on the upper drive roll.

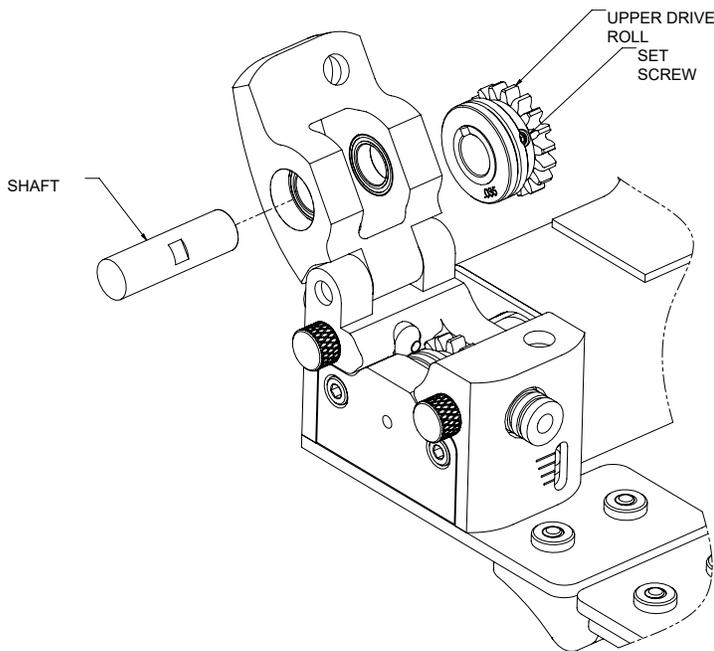


Figure 26 - Upper Drive Roll Replacement

With the pivot block still rotated away and the cover plate off, rotate the lower drive roll until the set screw is exposed. Loosen the set screw, see **Figure 27 – Lower Drive Roll Set Screw**. Rotate the lower drive roll until the motor key is at the top of the rotation, see **Figure 28 – Motor Key**. Slide the lower drive roll off the motor shaft, take care not to lose the motor key when removing the lower drive roll. Ensure that the motor key is in place on the motor shaft and slide the desired drive roll onto the shaft. Rotate the lower drive roll until the set screw is accessible, tighten the set screw. Attach the cover plate back to the front of the wire feed unit and adjust the tension screw back to the proper setting.

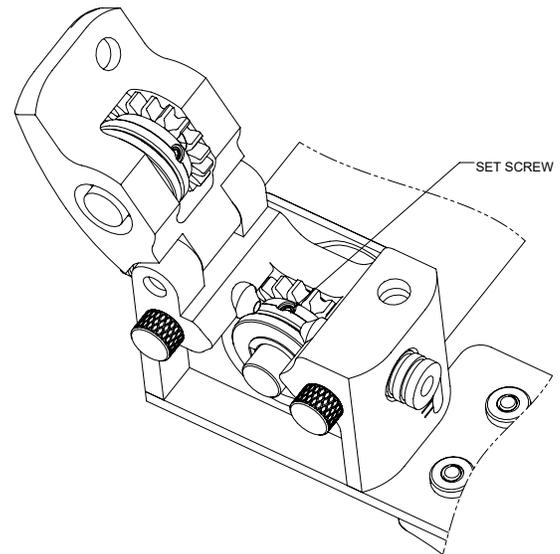


Figure 27 - Lower Drive Roll Set Screw

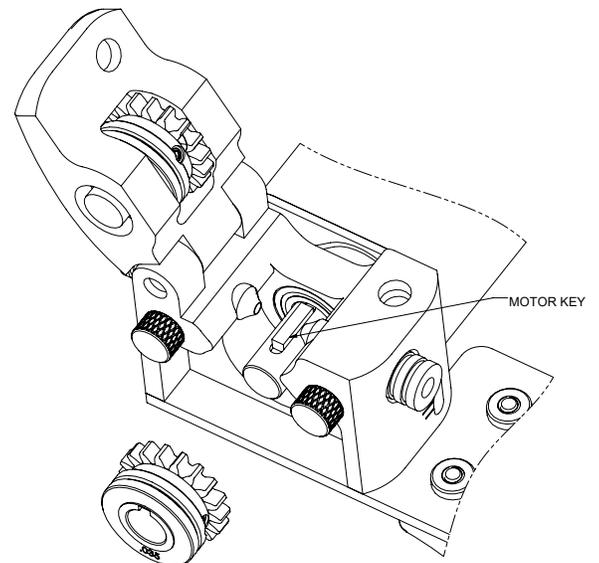


Figure 28 - Motor Key

Operational Safety Precautions

Read and understand this entire section before operating the machine.

Refer to control system manual for all operational instructions.

Operation Information

The HELIX M627 weld head is designed for multi-process welding and will work with any APEX® 3 Series Orbital Control System. For complete installation and operational instructions, see the specific controller manual and the applicable process manual.

External Inputs

The external inputs for the M627 weld head are control signals, and 24V DC.

Control

Control of the weld head and wire feeder is provided by the APEX 3 Series controller. Through the use of a handheld pendant, the operator is able to control and monitor all aspects of the weld motion and change parameters while welding.

Welding Power

Welding power is provided by a standard Lincoln Electric Power Wave® power source. An ArcLink connection is required.

Manual Adjustments

Manual adjustments for the M627 weld head include: changing the clamp shoes, repositioning the weld head on the workpiece, all wire placement adjustments, and changing out all consumable parts and pieces.

Before operation, check all coolant cables for leaks, and all cables for fraying or loose connections or damage. All consumables should be changed out per shift as needed. Operating welding equipment with incorrect or broken consumables can cause bodily harm or damage to the machine.

WARNING



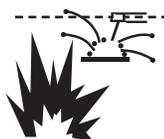
ELECTRIC SHOCK CAN KILL.

- Only qualified personnel should perform the installation.
- Turn the input power OFF at the disconnect switch or fuse box.
- Do not touch electrically live parts or electrode with skin or wet clothing.
- Insulate yourself from work and ground.
- Always dry insulating gloves.
- Read and follow “Electric Shock Warnings” in the Safety section if welding must be performed under electrically hazardous conditions such as welding in wet areas or on or in the work pieces.



FUMES AND GASES can be dangerous.

- * Keep your head out of fumes.
- * Use ventilation or exhaust to remove fumes from breathing zone.



WELDING SPARKS can cause fire and explosion

- * Keep flammable material away.
- * Do not weld on containers that have held combustibles.



ARC RAYS can burn.

- * Wear eye, ear and body protection.

Observe additional Safety Guidelines detailed in the beginning of this manual.

Accessories

HELIX M627 Weld Head Accessories and Consumables

Accessory	Part Number
Water-Cooled Cable/Hose Extension 25 ft. (7.6 m)	K52246-25
Wire Guide Tip .030-.035 in. (0.8-0.9 mm)	KP52296-035
Wire Guide Tip .040-.045 in. (1.0-1.1 mm)	KP52296-045
Onboard Feeder Inlet/Outlet Guide Set .030-.045 in. (0.8-1.1 mm)	K52289-045
Low Profile Back Cap	KP52110-1
Back Cap Short	KP4745-S-B10
Back Cap Medium	KP4745-M-B10
Back Cap Long	KP4745-L-B10
1/8 Collet	KP4749-18-B10
3/32 Collet	KP2029-4B1
1/16 Collet	KP2029-3B1
Collet Body	KP52145-1
1/8 Tungsten Adapter	KP52063-1
3/32 Tungsten Adapter	KP52063-2

KP 52292-1 Helix M Clamp Expendables Kit	
Part Number	Description
KP52296-035	Wire Guide Tip .030-.035 in. (0.8-0.9 mm)
KP52110-1	Low Profile Back Cap
KP4745-S-B10	Back Cap Short
KP4745-M-B10	Back Cap Medium
KP4745-L-B10	Back Cap Long
KP4749-18-B10	1/8 Collet
KP52145-1	Collet Body
KP52063-1	1/8 Tungsten Adapter
KP52062-1	Pyrex Cup
KP52294-1	Tungsten Electrode, 1/8
KP52295-1	Wire Liner, 5.5 in
	4 mm Hex Key
	2 mm Hex Key
	1.5 mm Hex Key

Drive Roll Kits	
Part Number	Wire Size in. (mm)
Onboard Feeder	
KP52094-030	.030 (0.8)
KP52094-035	.035 (0.9)
KP52094-040	.040 (1.0)
KP52094-045	.045 (1.1)

External Feeder	
Part Number	Wire Size in. (mm)
Steel Wire	
KP1696-030S	.023-.030 (0.6-0.8)
KP1696-035S	.035 (0.9)
KP1696-045S	.045 (1.2)
KP1696-1	.035, .045 (0.9, 1.2)
KP1696-2	.040 (1.0)
Cored Wire	
KP1697-035C	.030-.035 (0.8-0.9)
KP1697-045C	.040-.045 (1.0-1.2)
Aluminum Wire	
KP1695-035A	0.035 (0.9)
KP1695-040A	0.040 (1.0)
KP1695-3/64A	3/64 (1.2)

Maintenance

The HELIX M627 weld head is designed for trouble-free operation and normally requires minimal preventive care and cleaning. This section provides instructions for maintaining user-serviceable items. The suggested repair procedure for all such items is to remove and replace defective assemblies or parts.

When users and/or service personnel are not familiar with electrical and electronic equipment, the product should be returned to the factory or serviced by factory authorized representatives.

Maintenance Schedule

The maintenance schedule is suggested as a guideline for proper system maintenance. More stringent maintenance requirements may be required depending on the work being performed and the requirements of the customer for whom the work is performed. All maintenance schedules are based on a 40-hour work week.

Any excess play in parts or equipment should be noted and reported to an authorized repair facility. Any abnormal activity, such as motor hesitation, clicking or other noises, or anything out of the ordinary should be noted and reported to an authorized repair facility.

Every Shift

- Check lines, cables, and belt for loose connections and worn areas.
- Change out expendables as needed (wire guide tip, collet, etc).
- Check torch height motion and travel for slop or wearing parts.

Monthly

- Release the clutch latch and verify that the torch motion assembly moves smoothly around the workpiece.
- Examine all cable connections to verify that there are no gas leaks, and that all cables are seated correctly and that there is no visible wear and tear to any connector or associated cables.

- Check over all weld head components for any signs of damage or wearing.
- Ensure weld head gears are clean and clear of debris.
- Check for wear of drive rolls on wire feeder.

Semi Annually

- Based on a 40-hour work week it is recommended that the belt be replaced every six months.
- Verify that all motors are working correctly without strain. Listen to the motors to confirm that there is no excess noise or grinding.
- Check that height and oscillation screws are lubricated. Add grease if necessary.

Tools

Required tools to operate and repair the HELIX M627 weld head:

- 1.5 mm hex key
- 2 mm hex key
- 2.5 mm hex key
- 3 mm hex key
- 4 mm hex key

Further tools are required for in depth maintenance.

Observe all Safety Guidelines detailed throughout this manual.

PROBLEMS (SYMPTOMS)	POSSIBLE CAUSE	RECOMMENDED COURSE OF ACTION
Auto Height does not operate / operates incorrectly.	<ol style="list-style-type: none"> 1. Incorrect settings. 2. Auto height function disabled. 3. Poor sense lead connection. 4. Loose height belt. 	<ol style="list-style-type: none"> 1. Check volts and voltage sync settings. 2. Check auto height is on.
Does not travel.	<ol style="list-style-type: none"> 1. Clutch disengaged. 2. Faulty connection (accompanied by error message). 	<ol style="list-style-type: none"> 1. Check clutch latch to ensure it is engaged (locked). 2. Check all cable connections. Take snapshot and call customer support.
Travel is inconsistent.	<ol style="list-style-type: none"> 1. Step travel selected. 	<ol style="list-style-type: none"> 1. Check travel settings.
No oscillation / inconsistent oscillation.	<ol style="list-style-type: none"> 1. Faulty connection (accompanied by error message). 2. Incorrect settings. 3. No slack in cables/hoses. 	<ol style="list-style-type: none"> 1. Check all cable connections. 2. Check settings on jog screen. 3. Check strain relief has enough play in cables and hoses for oscillation.
Wire does not feed properly.	<ol style="list-style-type: none"> 1. Improper drive roll tension. 	<ol style="list-style-type: none"> 1. Check drive rolls.
Gas issues.	<ol style="list-style-type: none"> 1. Gas not present at inlet. 2. Incorrect flow rate. 3. Wrong solenoid active. 	<ol style="list-style-type: none"> 1. Verify there is gas in the cylinder and valve is turned on. Check the gas line for kinks or obstructions. 2. Check flow meter while pressing purge from jog screen

⚠ CAUTION

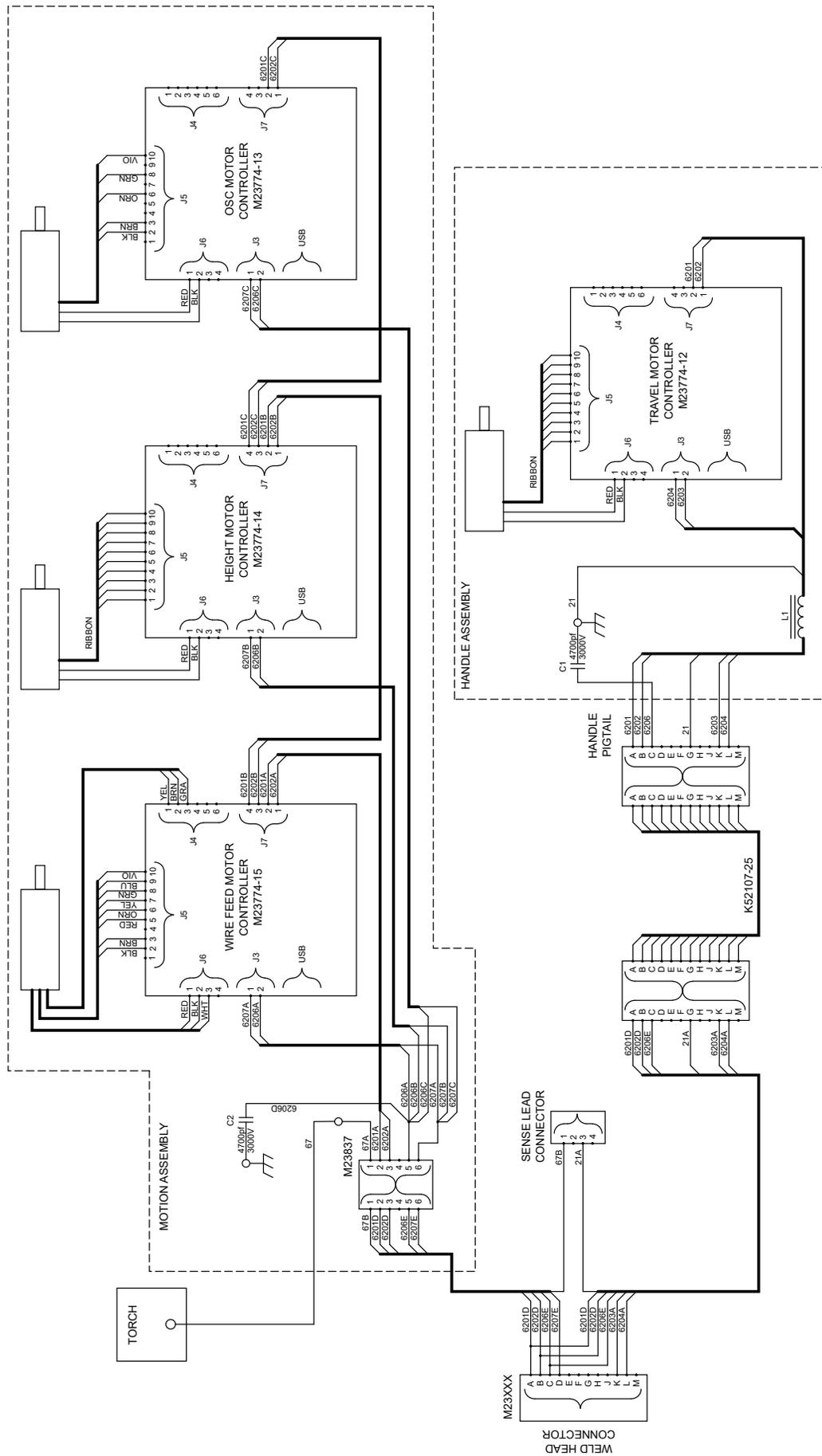
If for any reason you do not understand the test procedures or are unable to perform the tests/repairs safely, contact your **Local Lincoln Authorized Field Service Facility** for technical troubleshooting assistance before you proceed.

Observe all Safety Guidelines detailed throughout this manual.

PROBLEMS (SYMPTOMS)	POSSIBLE CAUSE	RECOMMENDED COURSE OF ACTION
Incorrect travel speed.	1. Incorrect settings.	1. Check pipe size selection.
Head won't calibrate.	1. Faulty cable connection. 2. Loose/broken height belt. 3. No slack in cables.	1. Check weld head cable connection. 2. Tighten the height belt tension, replace if necessary. 3. Check strain relief has enough play in cables and hoses for oscillation
Travel not concentric around pipe.	1. Incorrect shoe size installed.	1. Check correct shoe size is used.
<p style="text-align: center;">If all recommended possible areas of misadjustment have been checked and the problem persists, Contact your local Lincoln Authorized Field Services Facility.</p>		

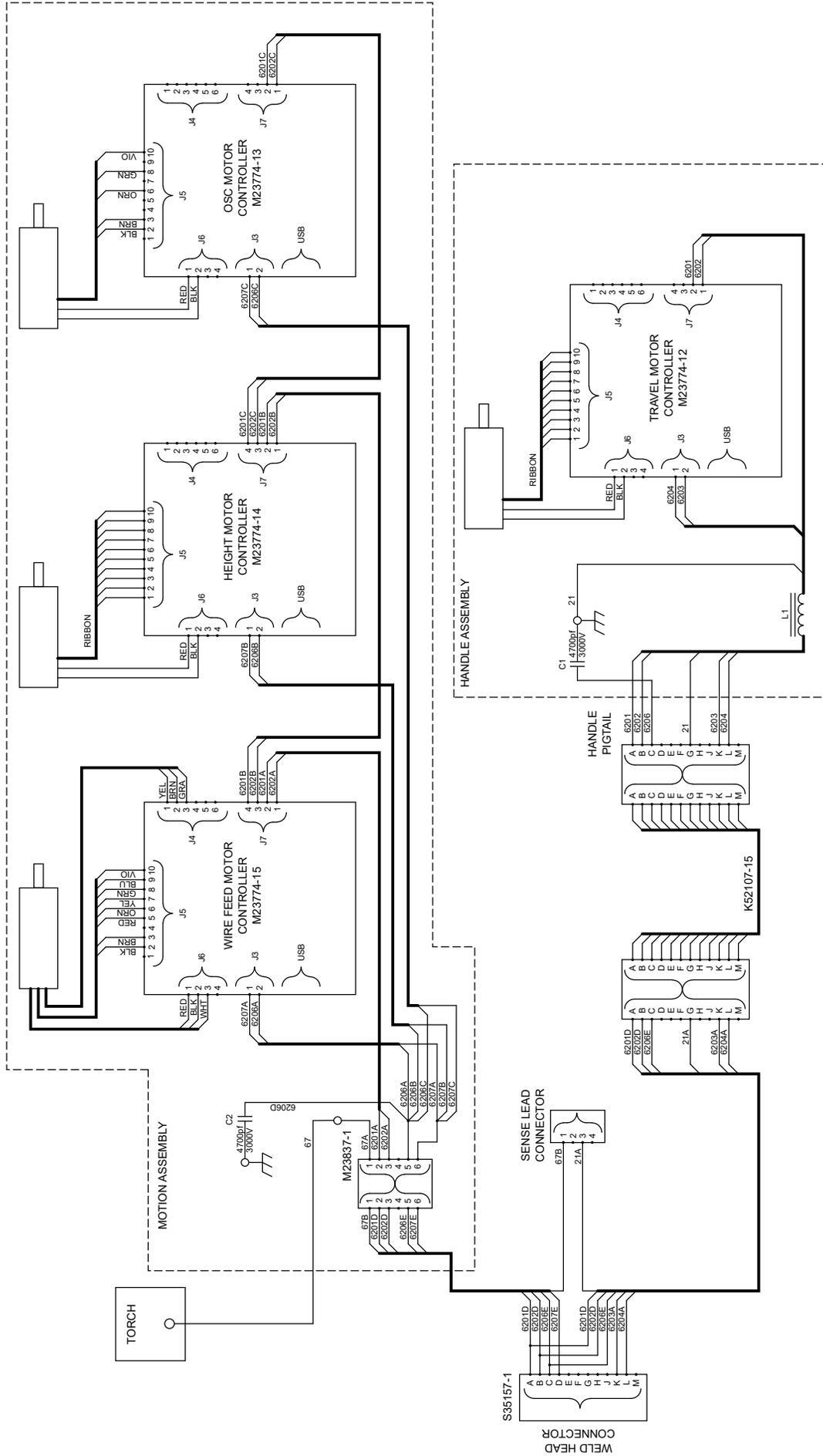
⚠ CAUTION

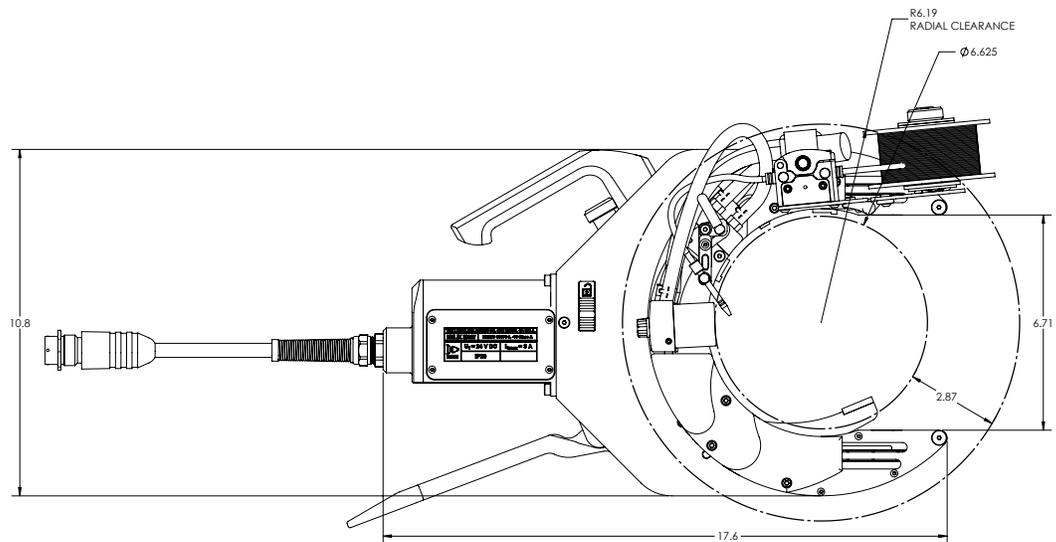
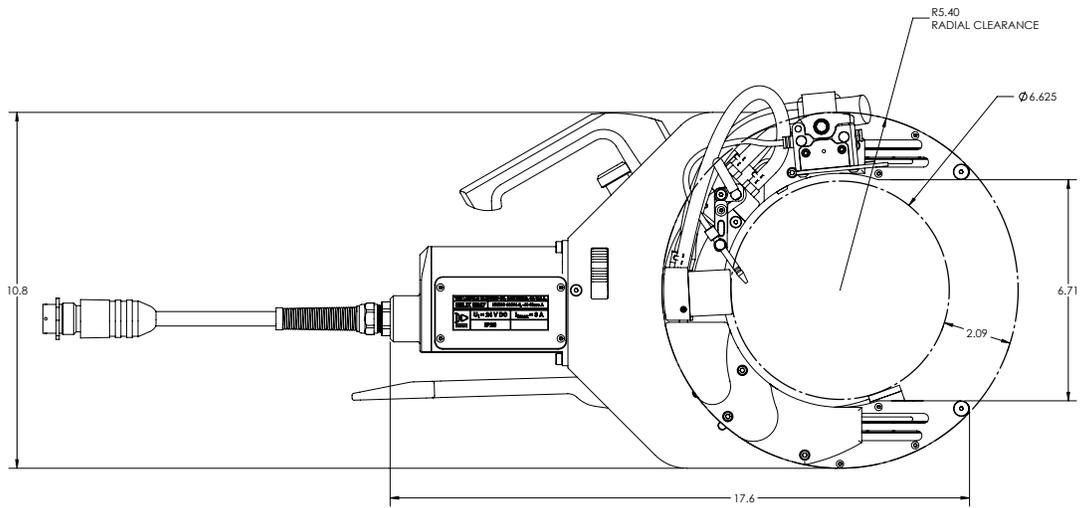
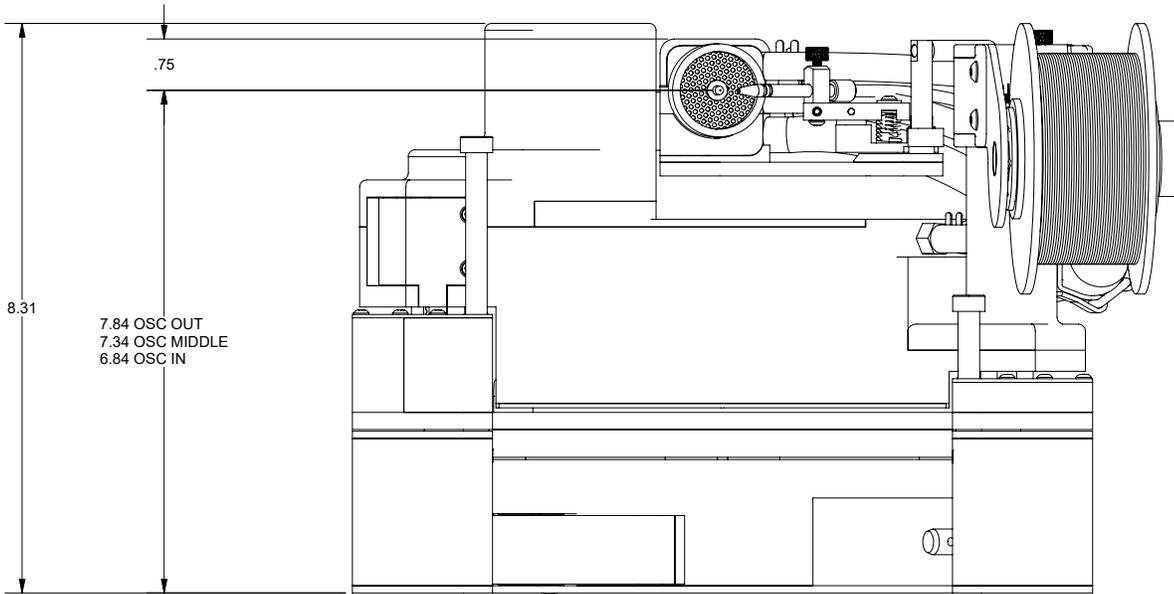
If for any reason you do not understand the test procedures or are unable to perform the tests/repairs safely, contact your **Local Lincoln Authorized Field Service Facility** for technical troubleshooting assistance before you proceed.



NOTE: This diagram is for reference only. It may not be accurate for all machines covered by this manual. The specific diagram for a particular code is pasted inside the machine on one of the enclosure panels. If the diagram is illegible, write to the Service Department for a replacement. Give the equipment code number.

WIRING DIAGRAM - HELIX M627, CODE 13359





NOTE: This diagram is for reference only. It may not be accurate for all machines covered by this manual. The specific diagram for a particular code is posted inside the machine on one of the enclosure panels. If the diagram is illegible, write to the Service Department for a replacement. Give the equipment code number.

CUSTOMER ASSISTANCE POLICY

The business of Lincoln Electric is manufacturing and selling high quality welding equipment, automated welding systems, consumables, and cutting equipment. Our challenge is to meet the needs of our customers, who are experts in their fields, and to exceed their expectations. On occasion, purchasers may ask Lincoln Electric for information or technical information about their use of our products. Our employees respond to inquiries to the best of their ability based on information and specifications provided to them by the customers and the knowledge they may have concerning the application. Our employees, however, are not in a position to verify the information provided or to evaluate the engineering requirements for the particular weldment, or to provide engineering advice in relation to a specific situation or application. Accordingly, Lincoln Electric does not warrant or guarantee or assume any liability with respect to such information or communications. Moreover, the provision of such information or technical information does not create, expand, or alter any warranty on our products. Any express or implied warranty that might arise from the information or technical information, including any implied warranty of merchantability or any warranty of fitness for any customers' particular purpose or any other equivalent or similar warranty is specifically disclaimed.

Lincoln Electric is a responsive manufacturer, but the definition of specifications, and the selection and use of specific products sold by Lincoln Electric is solely within the control of, and remains the sole responsibility of the customer. Many variables beyond the control of Lincoln Electric affect the results obtained in applying these types of fabrication methods and service requirements.

WELD FUME CONTROL EQUIPMENT

The operation of welding fume control equipment is affected by various factors including proper use and positioning of the equipment, maintenance of the equipment and the specific welding procedure and application involved. Worker exposure level should be checked upon installation and periodically thereafter to be certain it is within applicable OSHA PEL and ACGIH TLV limits.



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