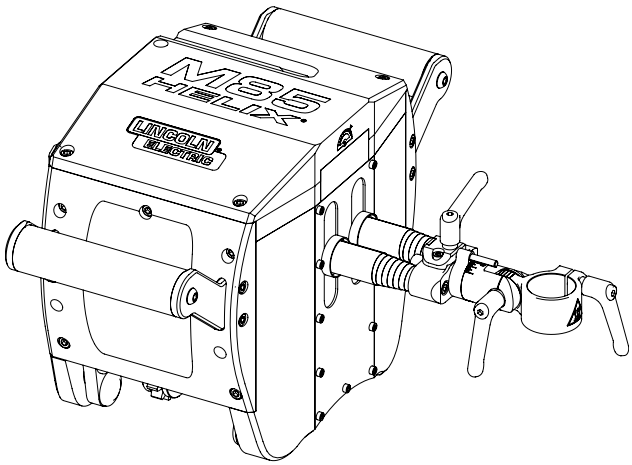
INSTRUCTION MANUAL

HELIX® M85 WELD HEAD



For use with Product/Code Numbers:

12785, 12876, 13528

Save for future reference

Date Purchased

Code: (ex: 10859)

Serial: (ex: U1060512345)

IM6119-A | Issue DateNov - 2025
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THE LINCOLN ELECTRIC COMPANY
22801 St. Clair Avenue • Cleveland, OH • 44117-1199 • U.S.A.
www.lincolnelectric.com

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CUSTOMER ASSISTANCE POLICY

SAFETY INFORMATION

SAFETY DEPENDS ON YOU

Lincoln 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.

⚠ DANGER

This statement indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.

⚠ WARNING

This statement indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.

⚠ CAUTION

This statement indicates a potentially hazardous situation which, if not avoided, could result in minor or moderate injury.

Notice: This statement indicates the possibility of damage to equipment if the potential risk is not avoided.

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.

KEEP YOUR HEAD OUT OF THE FUMES



- **DON'T** get too close to the weld. Use corrective lenses if necessary to stay a reasonable distance away from the weld.
- **USE ENOUGH VENTILATION** or exhaust at the weld, 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.
- **USE NATURAL DRAFTS** or fans to keep the fumes away from your face.
- **READ** and obey the Safety Data Sheet (SDS) and the warning label that appears on all containers of welding materials.

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

WEAR CORRECT EYE, EAR AND BODY PROTECTION



- **PROTECT** your eyes and face with 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 spatter, flash, and glare with protective screens or barriers.
- **PROTECT** your eyes and face with welding helmet
- **IN SOME AREAS**, protection from noise may be appropriate.
- **BE SURE** protective equipment is in good condition.



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

- **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.
- **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.**

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.

⚠ 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.)

For more information go to https://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.



- 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.



- Generator exhaust contains carbon monoxide. This is a poison you cannot see or smell.
- Using a generator indoors **CAN KILL YOU IN MINUTES**.
- **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



- 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.
- 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.
- In semiautomatic or automatic wire welding, the electrode, electrode reel, welding head, nozzle or semiautomatic welding gun are also electrically “hot”.
- 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.
- Ground the work or metal to be welded to a good electrical (earth) ground.
- Maintain the electrode holder, work clamp, welding cable and welding machine in good, safe operating condition. Replace damaged insulation.
- Never dip the electrode in water for cooling.

- 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.
- When working above floor level, use a safety belt to protect yourself from a fall should you get a shock.
- **Also see** WELDING AND CUTTING SPARKS CAN CAUSE FIRE OR EXPLOSION **and** FOR ELECTRICALLY POWERED EQUIPMENT

ARC RAYS CAN BURN



- 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.
- Use suitable clothing made from durable flame-resistant material to protect your skin and that of your helpers from the arc rays.
- 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



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.**
- 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.
- 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.
- Shielding gases used for welding can displace air and cause injury or death. Always use enough ventilation, especially in confined areas, to insure breathing air is safe.
- 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.
- Also see FOR ENGINE POWERED EQUIPMENT

WELDING AND CUTTING SPARKS CAN CAUSE FIRE OR EXPLOSION



- 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.
- 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.

- 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.
- Do not heat, cut or weld tanks, drums or containers until the proper steps have been taken to ensure 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.
- Vent hollow castings or containers before heating, cutting or welding. They may explode.
- Sparks and spatter are thrown from the welding arc. Wear oil free protective garments such as leather gloves, heavy shirt, cuff-less 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.
- 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.
- **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.
- **DO NOT** use a welding power source for pipe thawing.

CYLINDER MAY EXPLODE IF DAMAGED



- 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.
- Always keep cylinders in an upright position securely chained to an undercarriage or fixed support.

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.
- Never allow the electrode, electrode holder or any other electrically “hot” parts to touch a cylinder.
- Keep your head and face away from the cylinder valve outlet when opening the cylinder valve.
- Valve protection caps should always be in place and hand tight except when the cylinder is in use or connected for use.
- Read and follow the instructions on compressed gas cylinders, associated equipment, and CGA publication P-l, “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



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

BATTERY HANDLING, STORAGE, AND DISPOSAL



Batteries can be flammable substances such as lithium or other organic solvents, which may result in overheating, rupture, or combustion. Failure to follow the battery manufactures instructions may result in fire, personal injury, and damage to property if used improperly.

- DO NOT short circuit, disassemble, deform, or heat batteries.
- DO NOT attempt to recharge batteries unless they are specifically marked as "rechargeable".
- DO NOT use or charge the battery if it appears to be leaking, deformed or damaged in any way.
- Store in a cool location. Keep batteries away from direct sunlight, high temperature, and high humidity.
- Immediately discontinue use of the battery if, while using, charging, or storing the battery, the battery emits an unusual smell, feels hot, changes color, changes shape, or appears abnormal in any other way.
- Keep batteries out of reach of children, should a child swallow a battery, consult a physician immediately.
- Recycle or dispose of batteries in accordance with local and federal laws.

FOR LASER EMITTING EQUIPMENT



- Hazardous Class 4 (IV) laser products emit invisible, infrared laser radiation which can permanently damage the eye's retina and/or cornea, burn skin, and pose a fire risk. End users shall assign a qualified Laser Safety Officer (LSO) who has the certifications required by applicable law/standards, have a documented Laser Safety Program and have a Laser Controlled Area (LCA) that confirms to ANSI Z136.1 & Z136.9.
- Do not operate laser before end user's LSO has completed a risk assessment and all the prescribed Risk Mitigations measures have been fully implemented. Ensure the laser is operated/ demonstrated safely by trained personnel and that the environment surrounding the laser welding cell or laser-controlled area is safe for people nearby when the laser is in operation.
- Never point the laser at yourself or others. Never look directly into a laser aperture, even if wearing full eye protection.
- All persons inside LCA must wear proper PPE to avoid eye or skin exposure to laser radiation. The end user's LSO shall select proper PPE including, but not limited to, heat-resistant gloves, flame-resistant clothing, laser safety eye wear and laser-safe helmets that conform to ANSI Z136.1 Optical Density requirements for the wavelength and output power of the laser in use. Standard safety glasses and welding helmets DO NOT provide adequate protection from laser beam hazards. Always inspect PPE for damage or improper fit before use.
- Only qualified persons shall install, operate or service this unit per ANSI Z136.1 standards and your LSO's instruction. Read and follow all labels and manuals before installing, operating, or servicing hand held any laser welding equipment.
- Do not operate outside of a LCA, or if the laser protective housing is modified or damaged, or if safety interlocks have been bypassed or otherwise defeated. Inspect all equipment and LCA for damage or tampering prior to use.
- Reflected beams from the laser can damage eyes and skin and can pose a fire risk. Prior to use, the LCA should be assessed by the LSO to understand the surfaces where hazardous reflected beams can exist. Never position yourself or flammable material in the anticipated laser beam path and take extra precautions when working on reflective materials like aluminum and stainless steel.
- Follow all standards, individual facility or building regulations, and national, state, and local codes.

DEALER LOCATOR & PRODUCT REGISTRATION

Register your machine:

https://www.lincolnelectric.com/register

Authorized Service and Distributor Locator:

https://www.lincolnelectric.com/locator

ADDITIONAL SAFETY INFORMATION

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 15 Dec 2004 on the approximation of the laws of the Member States relating to electromagnetic compatibility, 2004/108/EC. 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 access 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:

- Other supply cables, control cables, signaling and telephone cables; above, below and adjacent to the welding equipment.
- Radio and television transmitters and receivers.
- Computer and other control equipment.
- Safety critical equipment, e.g., guarding of industrial equipment.
- The health of the people around, e.g., the use of pacemakers and hearing aids.
- Equipment used for calibration or measurement.
- 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.
- 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 manufacturers 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 workpiece 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 workpiece, 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].

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

WEEE



Do not dispose of electrical equipment together with normal waste! In observance of European Directive 2012/19/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.

By applying this European Directive you will protect the environment and human health!

REACh

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.

INSTALLATION

TECHNICAL SPECIFICATIONS

HELIX M85 WELD HEAD Product Number K52101-1			
Input Power		24 VDC	
Radial Clearance		8.5" (215.9 mm)	
Axial Clearance			
Total Depth		15.84" (402.3 mm) +/- 1.0" (25.4 mm)	
Center of Torch to rear		14.11" (358.4 mm) +/- 1.0" (25.4 mm)	
Center of Torch to front		1.7" (43.2 mm)	
Travel Speed		0.1 - 120 ipm	
Max Oscillation Speed		150 ipm (381 cm / min)	
Oscillation stroke		2" (50.8 mm)	
Work Angle		+60 degrees in / -30 degrees out	
Lead Lag		360 degrees	
Torch Amps		Variable (Based on Power Supply)	
Pipe Sizes		6" OD to Flat Track and 36" + ID or 36" - ID	
WELD HEAD PHYSICAL DIMENSIONS			
Length (handle to handle)	**Height**	**Depth**	**Weight**
14.25" (362 mm)	8.33" (211.6 mm)	15.84” (402.3 mm)	25 lbs (11.3 kg)
ENVIRONMENTAL			
Operating Temperature Range		**Storage Temperature Range**	
32° F to 140° F (0° C - 60° C)		-22° F to 140° F (0° C - 60° C)	

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

EXPLANATION OF SYMBOLS


Electric Shock Warning


Hot Surface Warning

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 M85 WELD HEAD is only meant to be picked up and supported by the handles. Only attempt to attach the weld head to the track ring while the clamp mechanism and clutch latch are disengaged.

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 track ring. Always be sure to engage the clutch latch when the weld head is left on the track.

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.

OPERATION

Read entire manual before operation.

Only operate while firmly attached to the track ring with the clutch latch engaged. Always verify that the track is properly attached to the work surface before operating.

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.

BASIC INFORMATION

The HELIX M85 WELD HEAD is a precision, digitally controlled weld head for multi-process welding. These processes are set by the power supply. Designed to work with the APEX 3 Series Orbital Controllers, the HELIX M85 WELD HEAD can weld pipes size 6 in (152.4 mm) OD and larger. It can also weld inside diameters starting at 36 in (914.4 mm) and on flat track. The HELIX M85 WELD HEAD has multiple quick-release track ring and stand-off options that allow the operator many choices for welding pipes. The track rings are provided separately.

The HELIX M85 WELD HEAD has automatic height control, oscillation capabilities, and multiple tool less torch adjustment options. These give the operator greater control of the weld puddle for more complicated welds.

BASIC COMPONENTS

The basic components of the weld head are:

- Body Assembly
- Torch Motion Assembly

See Figure 1 : Weld Head Components on page A-3 - for the different weld head components.

Each of the weld head components are discussed separately.

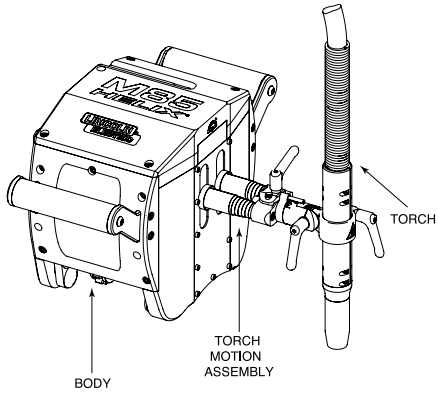


Figure 1 : Weld Head Components

BODY ASSEMBLY

The body assembly is the main assembly for the HELIX M85 WELD HEAD. It contains the travel gears, motors and belts that provide motion and oscillation for the HELIX M85 WELD HEAD - see Figure 2 : Body Assembly (Rear) on page A-4 .

Adjustments and controls located on the body include:

- **Clutch Latch**

  This latch engages or disengages the clutch to allow for free motion along the track.
- **Clamp Latch**

  This latch engages or disengages the clamp which secures the weld head onto the track.
- **Control Cable Input**

  A connecting point for the control cable which delivers all signals to the weld head.
- **Torch Cable Strap**

  The component that secures the torch cable and maintains the correct amount of tension or bend. Two straps of different lengths are included with the HELIX M85 WELD HEAD to accommodate different bundle sizes.

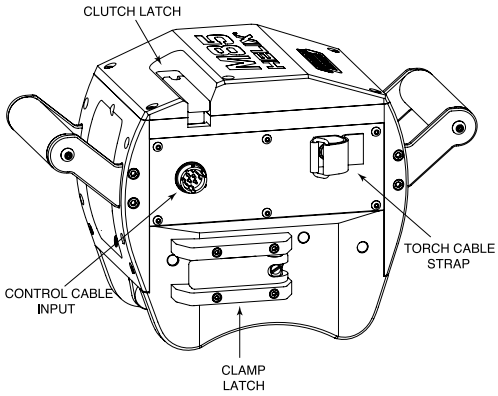


Figure 2 : Body Assembly (Rear)

TORCH MOTION ASSEMBLY

The torch motion assembly provides all manual adjustments and movements for the torch - see Figure 3 : Torch Motion Assembly on page A-5 .

The torch motion assembly consists of:

- **Telescoping Covers**

  These covers (bellows) provide protection for the torch components, preventing dirt or other harmful substances from entering the weld head.
- **In / Out, Travel Angle Adjustment Lever**

  This single adjustment lever allows the operator to physically adjust the torch closer or further from the weld head and also adjust the travel angle. There is no maximum amount of adjustment for the lead / lag.
- **Travel Angle Stop**

  The travel angle stop is an adjustable stop that can be used to quickly bring the travel angle back to a preset position.
- **Torch Tilt Assembly**

  This component is removable and comes in various sizes. It can be used for multiple applications.
- **Work Angle Adjustment Lever**

  The work angle can be adjusted to a positive 60 degrees or a negative 30 degrees.
- **Torch Height Adjustment Lever**

  The torch can be physically adjusted up or down as needed by the operator.

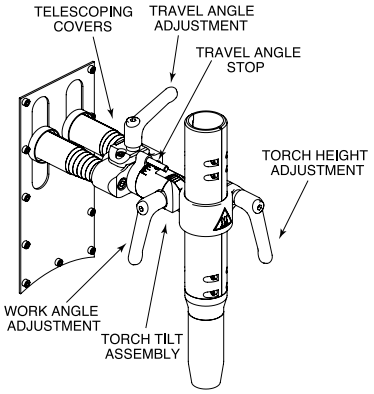


Figure 3 : Torch Motion Assembly

WELD HEAD INSTALLATION

Once the appropriate track is installed, the weld head is ready to be put in place. Disengage both the clutch latch and the clamp latch. Moving the weld head by the handles, place the tractor onto the track - see Figure 4 : Weld Head Placement on page A-5 . With the weld head sitting on the track, engage the clamp latch. The HELIX M85 WELD HEAD should move freely along the track. Now engage the clutch latch. If necessary, move the weld head slightly to align the gear teeth when engaging the clutch. Check to be sure that the weld head does not move with both latches engaged.

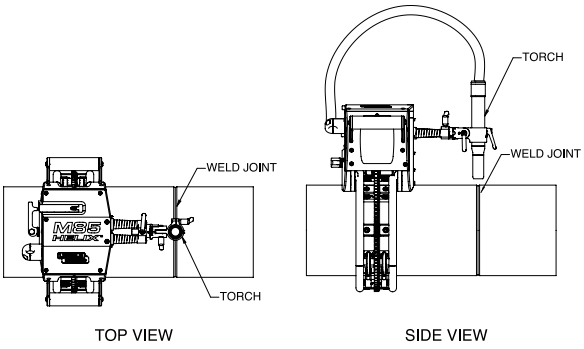


Figure 4 : Weld Head Placement

WELD HEAD POSITIONING

Align the weld head at the correct starting position for the weld. The weld head can be moved freely around the track by disengaging the clutch latch. Confirm the clutch latch is re-engaged before welding.

WELD HEAD SETUP

TORCH PLACEMENT

With the HELIX M85 WELD HEAD in place, the torch needs to be in the proper location. There are tool less adjustments that make positioning the torch easier.

Make certain that all of the following adjustments are performed after the weld head has had sufficient time to cool.

TORCH HEIGHT ADJUSTMENT

Using the torch height adjustment lever, the operator can move the torch up or down - see Figure 5 : Torch Height Adjustment on page A-6 .

Adjust the torch up or down to the correct height by turning the lever counter-clockwise. Move the torch to the desired position. Once positioned, tighten the lever by turning clockwise.

Make sure that the torch is set in a position where the motorized height control can reach the bottom of the joint and retract far enough back for the final cap pass.

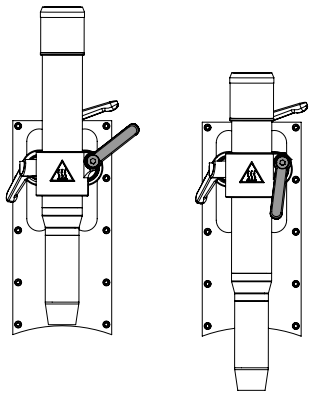


Figure 5 : Torch Height Adjustment

WORK ANGLE ADJUSTMENT

The HELIX M85 WELD HEAD allows for 60 degrees of outward adjustment and 30 degree of inward adjustment. This angle can be changed by using the work angle adjustment - see Figure 6 : Work Angle Adjustment on page A-6 .

Change the position to the correct angle and then tighten the lever to lock the angle into place.

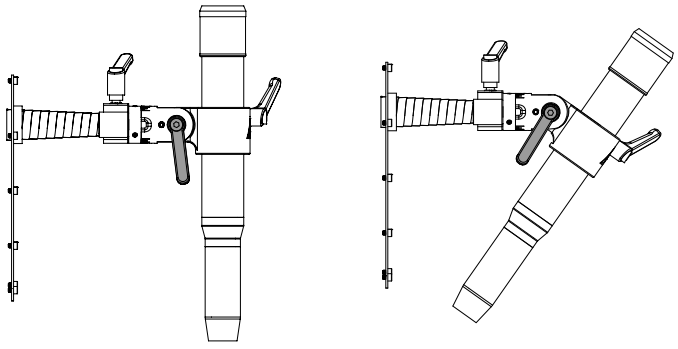


Figure 6 : Work Angle Adjustment

TRAVEL ANGLE ADJUSTMENT

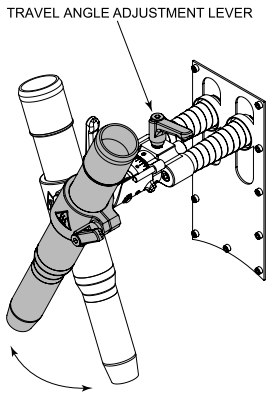


Figure 7 : Travel Angle Adjustment

The travel angle adjustment lever serves two functions. First, it enables the operator to adjust for lead and lag - see Figure 7 : Travel Angle Adjustment on page A-7 . Second, it allows the torch to be moved in and out - see Figure 8 : Torch In / Out on page A-7 . This can vary depending on the length of the rod on the torch tilt assembly. Do not tighten the travel angle adjustment lever if there is no torch holder mounted in order to avoid damaging the clamping mechanism.

A specific travel angle adjustment position can be rapidly achieved using the lead lag stop. This is an adjustable ring that helps the operator locate the same angle each time they adjust the torch. To adjust the travel angle stop, loosen the screw on the side of the stop (see Figure 9 : Travel Angle Stop on page A-7). Move the indicator to the desired position and retighten the screw.

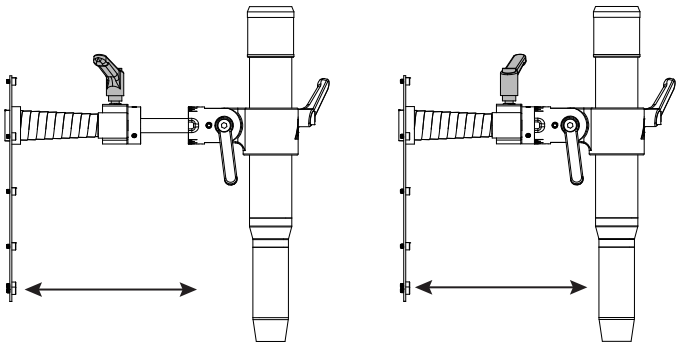


Figure 8 : Torch In / Out

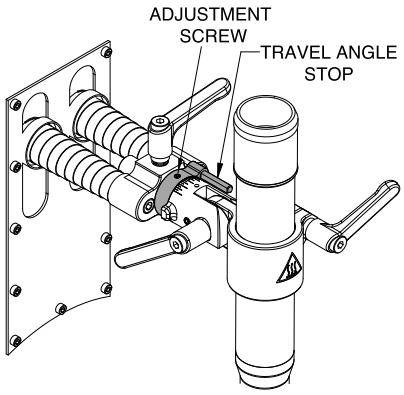


Figure 9 : Travel Angle Stop

LATCH TENSION

The clamp latch and clutch latch tension for the HELIX M85 WELD HEAD are adjustable. This adjustment may need to be done when moving from a Flat Track to a Track Ring and also during extended hours of continual service.

CHECKING CLAMP LATCH TENSION

To determine if the clamp latch is set correctly, attach the weld head to the track surface and engage it. Do not engage the clutch latch, or if it is engaged, disengage it. Keep a firm hold on the tractor while testing. Move the tractor back and forth and use the following guidelines to determine if the clamp latch is too tight, too loose or if it is at the correct tension.

TIGHT

The weld head is too tight if it does not move smoothly around the track. This may mean that it requires a moderate amount of force to move the weld head. Movement should be effortless.

LOOSE

The weld head is too loose if moves freely but has side to side rotational movement - see Figure 10 : Clamp Latch Movement on page A-8 .

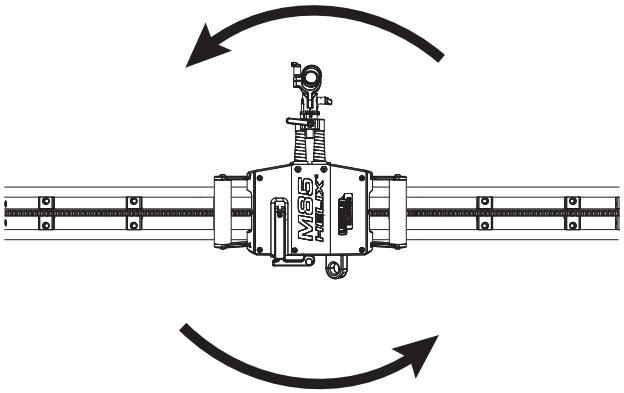


Figure 10 : Clamp Latch Movement

CORRECT

The clamp latch is at the correct tension when the weld head is latched in place and the tractor travels smoothly across the track with no effort. In addition, there will not be any side to side rotational movement.

CLAMP LATCH TENSION ADJUSTMENT

1. The first step in adjusting the clamp latch tension will be to remove the bottom guard from the clamp latch.

   Note: *This step is not required for machines with code number 12785. See Figure 11 : Latch Guard Removal on page A-9 .*

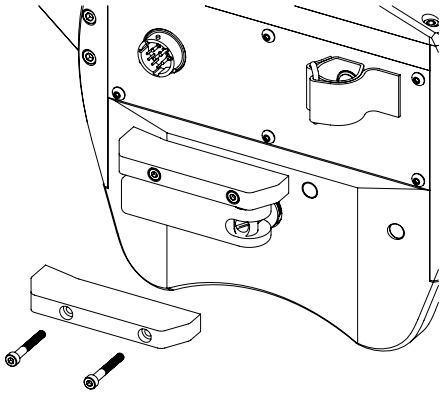


Figure 11 : Latch Guard Removal

2. Next, loosen the set screw on the bottom of the latch assembly - see Figure 12 : Latch Set Screw on page A-9 .

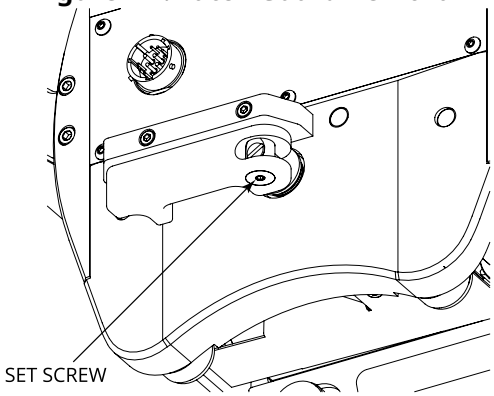


Figure 12 : Latch Set Screw

3. Then loosen the secondary set screw on the underside of the HELIX M85 WELD HEAD, see Figure 13 : Secondary Clamp Set Screw on page A-9 .

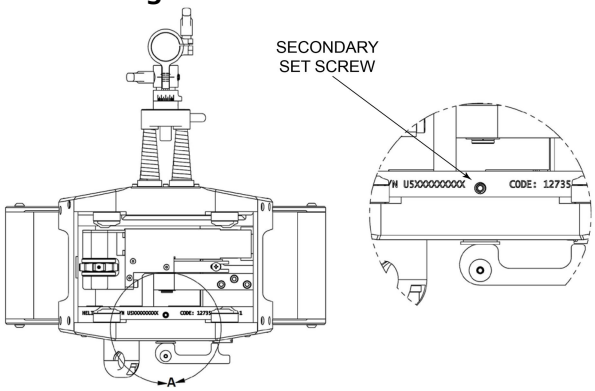


Figure 13 : Secondary Clamp Set Screw

4. Once the set screws have been loosened, adjust the tension using a flat-head screwdriver to turn the adjustment screw - see Figure 14 : Adjustment Screw on page A-10 . Turn the adjustment screw clockwise to increase the tension. Turning it counterclockwise will decrease the tension.

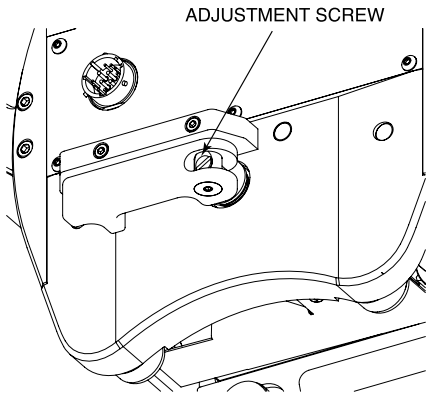


Figure 14 : Adjustment Screw

5. Test the tension by placing the weld head back on the track.
6. Once the desired tension is achieved, tighten the set screws to lock it in. Be sure not to over tighten the set screws. Replace the latch guard if applicable.

CHECKING CLUTCH LATCH TENSION

If the clutch latch is too tight it will not be able to ride over debris on the gear. If it is too loose then there will be slop in the travel position of the weld head.

Tension for the clutch latch requires a visual inspection of the gear assembly in relation to the track gear - see Figure 15 : Track Gear Interaction on page A-10 . Using a flashlight, visually verify that the drive gear shoulder touches the track gear shoulder. Using a flat-head screwdriver, lift the gear off the track. It should move up 1/8”. If it moves farther, the clutch latch will need to be tightened. If it does not move up, the clutch latch will need to be loosened.

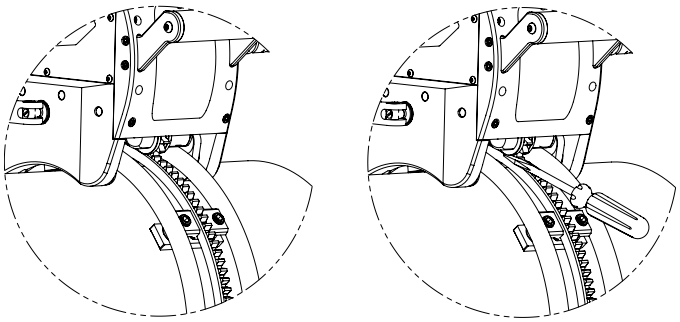


Figure 15 : Track Gear Interaction

CLUTCH LATCH TENSION ADJUSTMENT

1. To adjust the clutch latch tension, use a flat-head screwdriver to turn the adjustment screw - see Figure 16 : Adjustment Screw on page A-11 . Turn the adjustment screw counterclockwise to increase the tension, turn clockwise to decrease the tension.

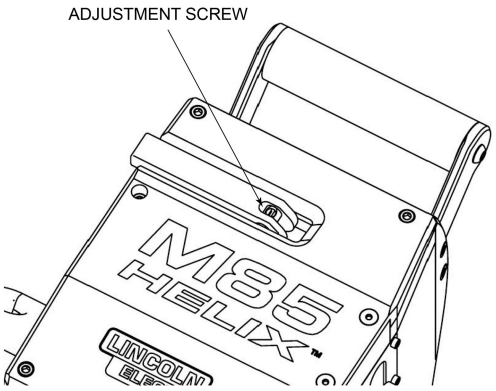


Figure 16 : Adjustment Screw

2. Be sure to test the tension by placing the weld head back on the track and engaging the clutch latch.

OPERATION

OPERATIONAL SAFETY PRECAUTIONS

Read and understand this entire section before operating 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.

⚠ WARNING



FUMES AND GASES can be dangerous.

Keep your head out of fumes.

Use ventilation or exhaust to remove fumes from breathing zone.

⚠ WARNING



WELDING SPARKS can cause fire and explosion

Keep flammable material away.

Do not weld on containers that have held combustibles.

⚠ WARNING



ARC RAYS can burn.

Wear eye, ear and body protection.

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

Refer to control system manual for all operational instructions.

OPERATION INFORMATION

The HELIX M85 WELD HEAD is designed for multiprocess 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 HELIX M85 WELD HEAD are control signals, and 24 V 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 and change parameters while welding.

WELDING POWER

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

MANUAL ADJUSTMENTS

Manual adjustments for the HELIX M85 WELD HEAD include: changing the track ring, repositioning the weld head on the workpiece, all torch 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. Operating welding equipment with incorrect or broken consumables can cause bodily harm or damage to the machine.

ACCESSORIES AND OPTIONS

HELIX M85 WELD HEAD ACCESSORIES

ACCESSORY	PART NUMBER
Weld Head Control Cable 25’	K52107-25
Weld Head Control Cable 50’	K52107-50
Mechanized Torch 25 ft. (7.6 m)	K52106-25
Mechanized Torch 15 ft. (4.6 m)	K52106-15
Oscillation Cover Kit (Bellows)	KP52221-1
Replacement Belt Package Oscillation	KP52137-1
Replacement Belt Package Height	KP52136-1

MAINTENANCE

MAINTENANCE

The HELIX M85 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 anomalous 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 drive belts for loose connections and worn areas.
- Change out consumables as needed.
- Check torch height motion and travel for slop or wearing parts.

  Note: Do not force the oscillator in or out while checking for worn parts.
- Inspect torch cable for wear or damage.

MONTHLY

- Apply a type of high temperature lubricant or anti-spatter spray to the bellows every 30 days or as needed.
- With the clutch latch and clamp latch engaged, grab the weld head by the handles and gently move back and forth to check for excess play in the weld head along the track.
- Release the clutch latch and verify that the weld head moves smoothly along the track without rubbing or binding.
- 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 the all weld head components for any signs of damage or wearing.
- Ensure track ring gears and 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 belts 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.

TOOLS

Required tools to operate and repair the HELIX M85 WELD HEAD:

- 2.5 mm Hex Key
- 3 mm Hex Key
- 4 mm Hex Key
- 6 mm Hex Key
- Wire Cutters
- Flat-Head Screwdriver

Further tools are required for in depth maintenance which is only authorized at local repair facilities.

TROUBLESHOOTING

HOW TO USE TROUBLESHOOTING GUIDE

⚠ WARNING



Service and Repair should only be performed by Lincoln Electric Factory Trained Personnel. Unauthorized repairs performed on this equipment may result in danger to the technician and machine operator and will invalidate your factory warranty. For your safety and to avoid Electrical Shock, please observe all safety notes and precautions detailed throughout this manual.

This Troubleshooting Guide is provided to help you locate and repair possible machine malfunctions. Simply follow the three-step procedure listed below.

1. **LOCATE PROBLEM (SYMPTOM)**

   Look under the column labeled “PROBLEM (SYMPTOMS)”. This column describes possible symptoms that the machine may exhibit. Find the listing that best describes the symptom that the machine is exhibiting.

2. **POSSIBLE CAUSE**

   The second column labeled “POSSIBLE CAUSE” lists the obvious external possibilities that may contribute to the machine symptom.

3. **RECOMMENDED COURSE OF ACTION**

   This column provides a course of action for the Possible Cause, generally it states to contact your local Lincoln Authorized Field Service Facility.

⚠ CAUTION



If you do not understand or are unable to perform the Recommended Course of Action safely, contact your local Lincoln Authorized Field Service Facility.

Observe all additional safety guidelines detailed throughout this manual.

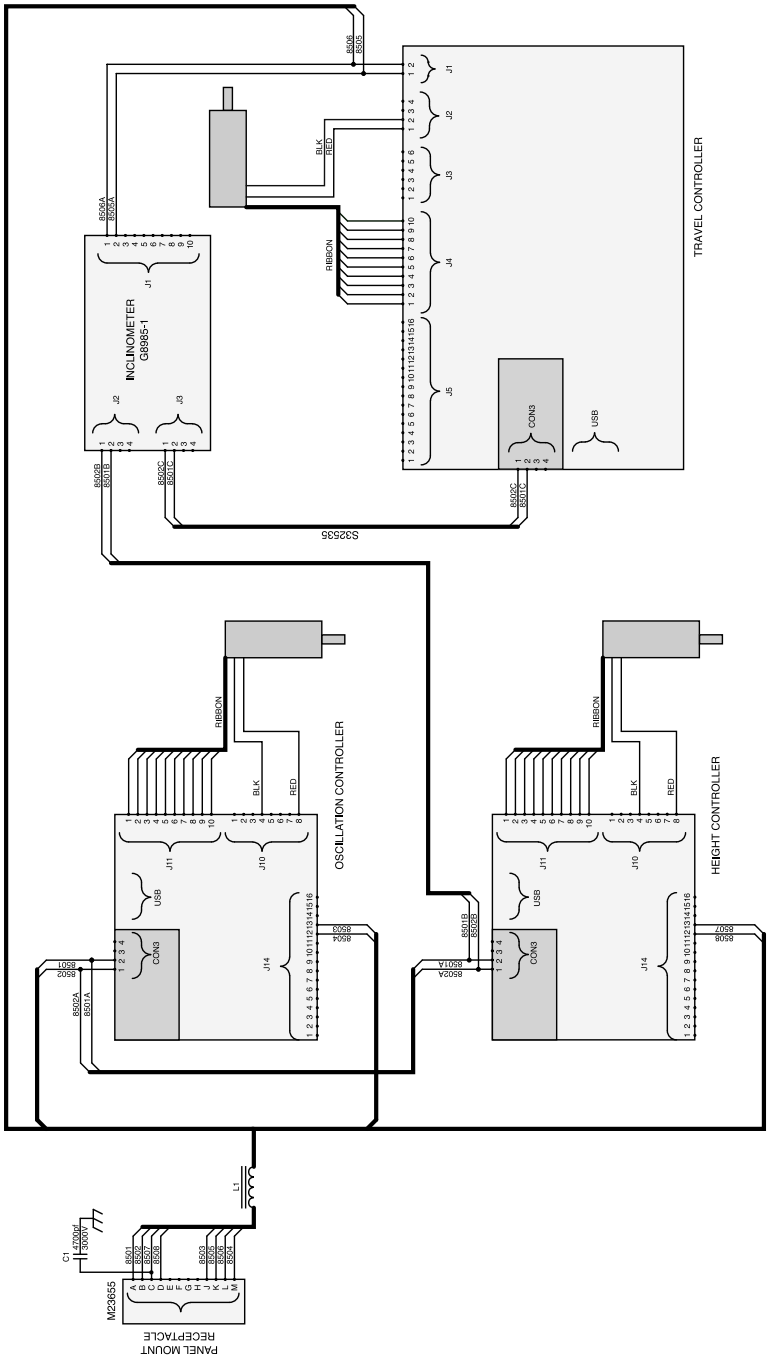
TROUBLESHOOTING GUIDE

Observe all Safety Guidelines detailed throughout this manual.

PROBLEMS (SYMPTOMS)	POSSIBLE AREAS OF MISADJUSTMENTS(S)	RECOMMENDED COURSE OF ACTION
Auto Height does not operate / operates incorrectly.	**1.** Incorrect settings. **2.** Auto height function disabled. **3.** Poor sense lead connection. **4.** Broken or damaged timing belt. **5.** Poor contact between wire and contact tip.	**1.** Check WFS, Amps and Volts settings. **2.** Check auto height is on. **3.** Check sense lead connections. **4.** Check height belt. **5.** Replace contact tip.
Travel is inconsistent or does not work.	**1.** Travel clutch disengaged. **2.** Travel clutch improperly adjusted. **3.** Travel settings are incorrect or step travel is enabled.	**1.** Check clutch latch to ensure it is engaged. **2.** See "Checking Clutch Latch Tension" section. **3.** Check travel settings.
No oscillation / inconsistent oscillation.	**1.** Incorrect settings. **2.** Physical obstruction. **3.** Broken or damaged timing belt.	**1.** Check oscillator settings on jog screen. **2.** Check bellows for free movement. Verify there is enough slack in torch cables / hoses for full oscillation movement. **3.** Check oscillator belt.
Wire does not feed properly.	**1.** Improper drive roll tension or wrong. **2.** Obstructed contact tip. **3.** Obstructed wire liner.	**1.** Check drive roll size and tension. **2.** Replace contact tip. **3.** Check for kinks or obstructions in the torch or wire liner.
Gas issues	**1.** No gas supply. **2.** Obstructed gas hose.	**1.** Verify there is gas present in the tank and valve is open. **2.** Check the gas line for kinks or obstructions.
Tractor drags on work surface.	**1.** Improper track ring installation.	**1.** Check that the shoes are all equally spaced around the track.
Random error message	**1.** Faulty cable connection.	**1.** Check all cable connections. Take snapshot and call customer support.
If all recommended possible areas of misadjustment have been checked and the problem persists, Contact your local Lincoln Authorized Field Services Facility.		

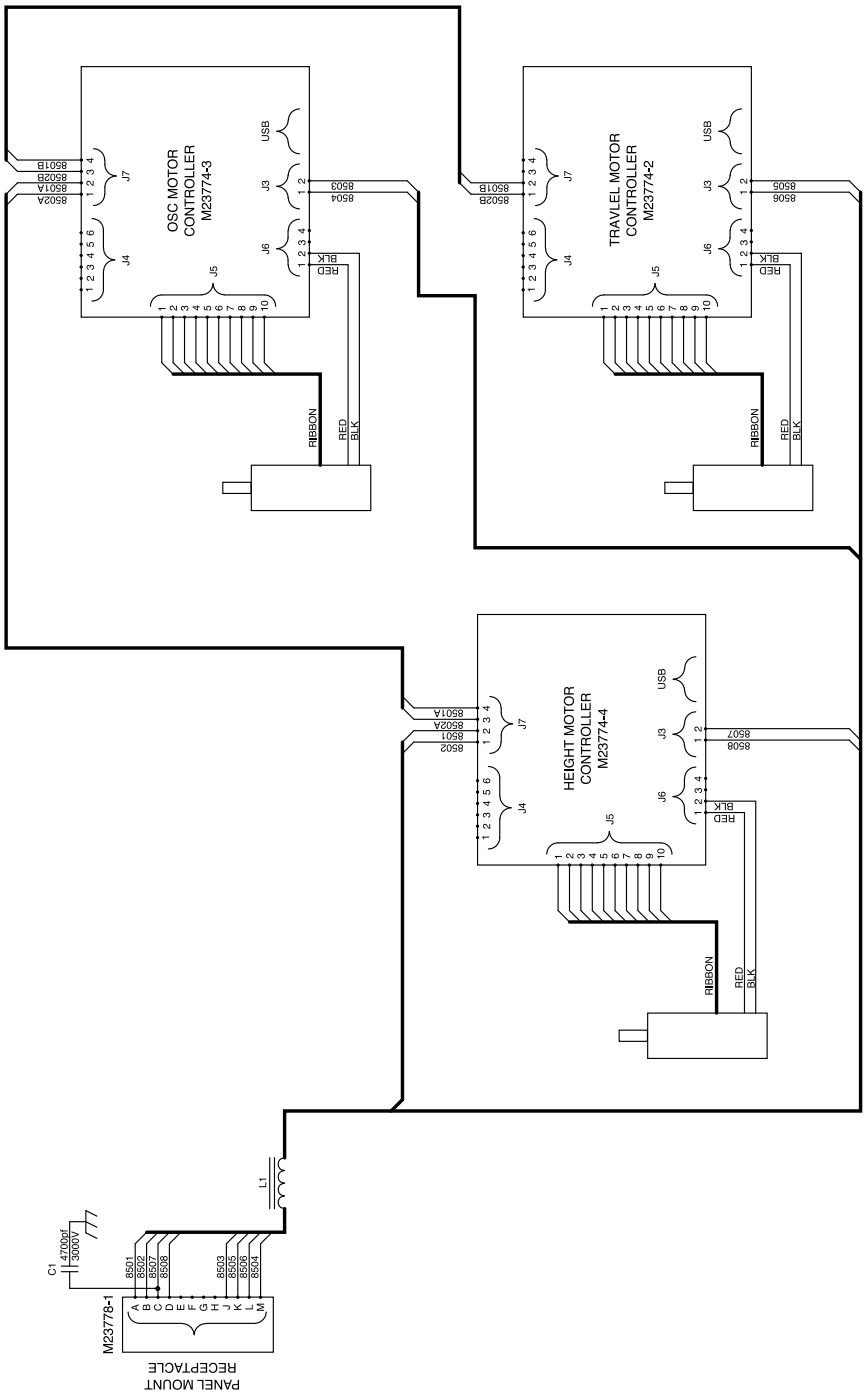
APPENDIX

WIRING DIAGRAM - CODES 12875, 12876



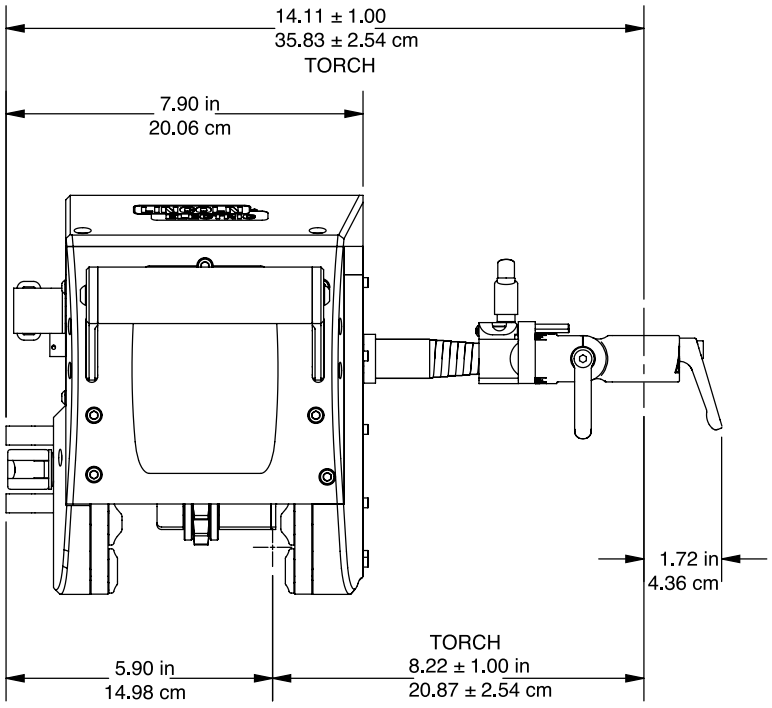
NOTE: This diagram is for reference only. It may not be accurate for all machines covered by this manual. The specific diagram for a particular code is pasted inside the machine on one of the enclosure panels. If the diagram is illegible, write to the Service Department for a replacement. Give the equipment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

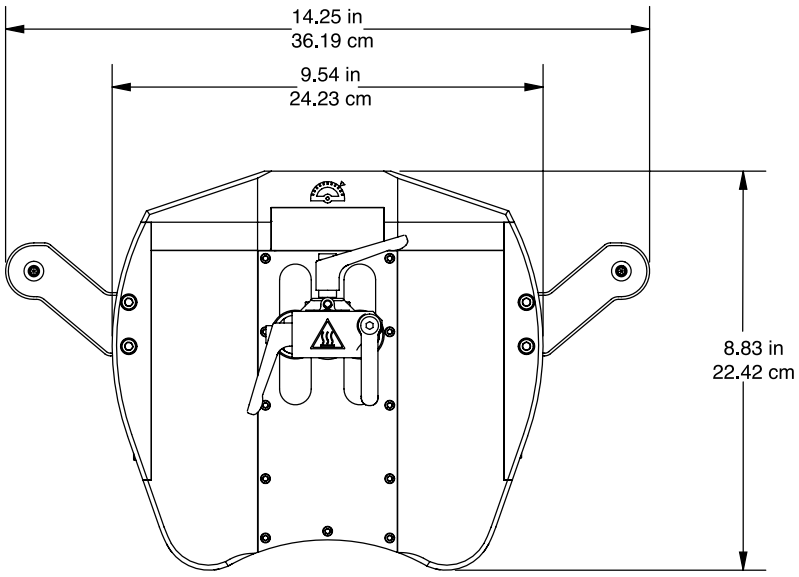
WIRING DIAGRAM - CODE 13258



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.

DIMENSIONS





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.

CUSTOMER ASSISTANCE POLICY

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.

PARTS LIST

Content/Details may be changed or updated without notice. For most current Instruction Manuals, go to PARTS.LINCOLNELECTRIC.COM.