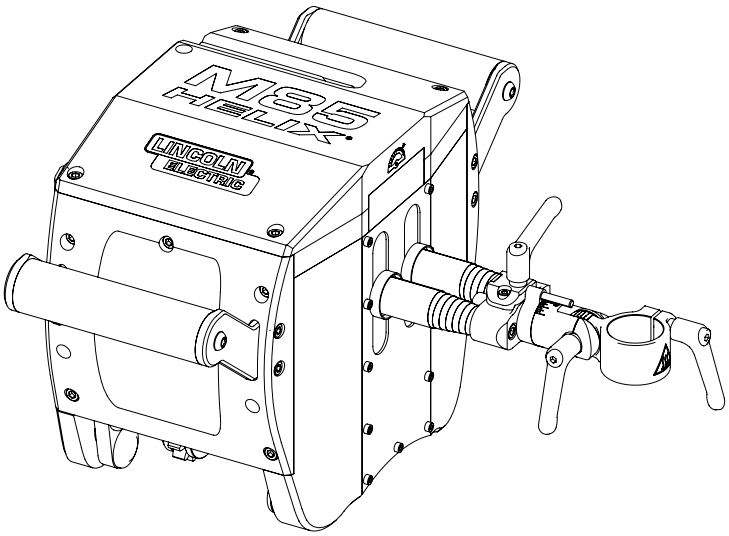
Operator's Manual

HELIX® M85 WELD HEAD

ORIGINAL INSTRUCTIONS



For use with machines having Code Numbers:
12785,12876, 13528

GENUINE LINCOLN PARTS™

Register your machine:
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Authorized Service and Distributor Locator:
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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.P65 warnings.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.

1.a. Turn the engine off before troubleshooting and maintenance work unless the maintenance work requires it to be running.

1.b. Operate engines in open, well-ventilated areas or vent the engine exhaust fumes outdoors.

1.c. 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.

1.d. 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.

1.e. 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.

1.f. 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.

1.g. 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.

1.h. To avoid scalding, do not remove the radiator pressure cap when the engine is hot.

1.i. Using a generator indoors CAN KILL YOU IN MINUTES.

1.j. Generator exhaust contains carbon monoxide. This is a poison you cannot see or smell.

1.k. NEVER use inside a home or garage, EVEN IF doors and windows are open.

1.l. Only use OUTSIDE and far away from windows, doors and vents.

1.m. Avoid other generator hazards. READ MANUAL BEFORE USE.

ELECTRIC AND MAGNETIC FIELDS MAY BE DANGEROUS

2.a. Electric current flowing through any conductor causes localized Electric and Magnetic Fields (EMF). Welding current creates EMF fields around welding cables and welding machines

2.b. EMF fields may interfere with some pacemakers, and welders having a pacemaker should consult their physician before welding.

2.c. Exposure to EMF fields in welding may have other health effects which are now not known.

2.d. All welders should use the following procedures in order to minimize exposure to EMF fields from the welding circuit:

2.d.1. Route the electrode and work cables together - Secure them with tape when possible.

2.d.2. Never coil the electrode lead around your body.

2.d.3. 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.

2.d.4. Connect the work cable to the workpiece as close as possible to the area being welded.

2.d.5. 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. I 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.

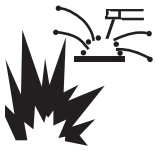
5.c. Do not weld in locations near chlorinated hydrocarbon vapors coming from degreasing, cleaning or spraying operations. The heat and rays of the arc can react with solvent vapors to form phosgene, a highly toxic gas, and other irritating products.

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-I, "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 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:

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 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 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."

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Technical Specifications HELIX M85 Weld Head

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 (381cm/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) 14.25" (362 mm)	Height 8.33" (211.6 mm)	Depth 15.84” (402.3 mm)	Weight 25 lbs (11.3 kg)

Environmental	
Operating Temperature Range 32ºF to 140ºF (0C - 60C)	Storage Temperature Range -22ºF to 140ºF (0C - 60C)
Ingress Protection - IP00	

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.

HELIX M85 Weld Head

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 toolless torch adjustment 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

See **FIGURE 1 - Weld Head Components** – for the different weld head components.

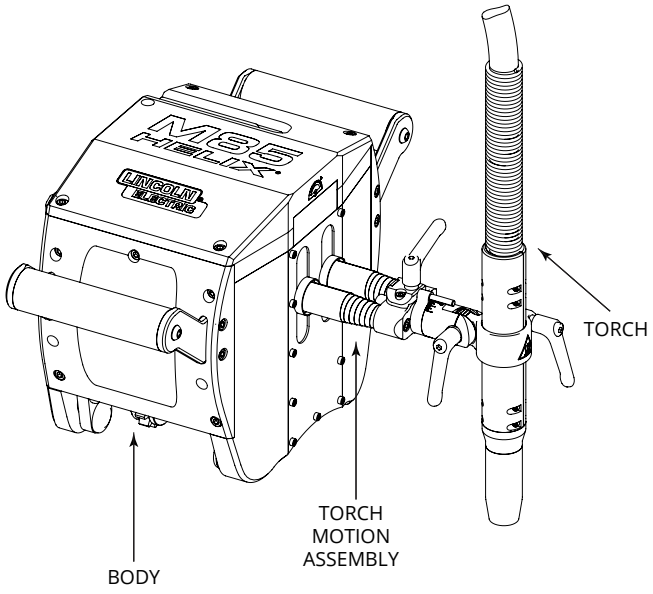


FIGURE 1 - Weld Head Compenents

Each of the weld head components are discussed separately.

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 M85 Weld Head – see **FIGURE 2 - Body Assembly (Rear).**

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.

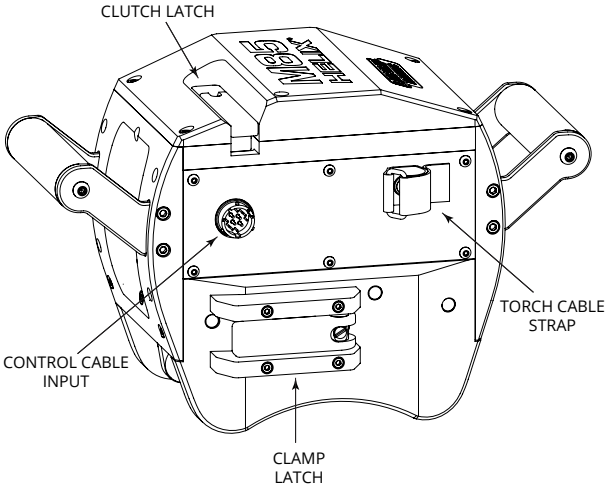


FIGURE 2 - Body Assembly (Rear)

Torch Motion Assembly

The torch motion assembly provides all manual adjustments and movements for the torch – see **FIGURE 3 - Torch Motion Assembly.**

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.

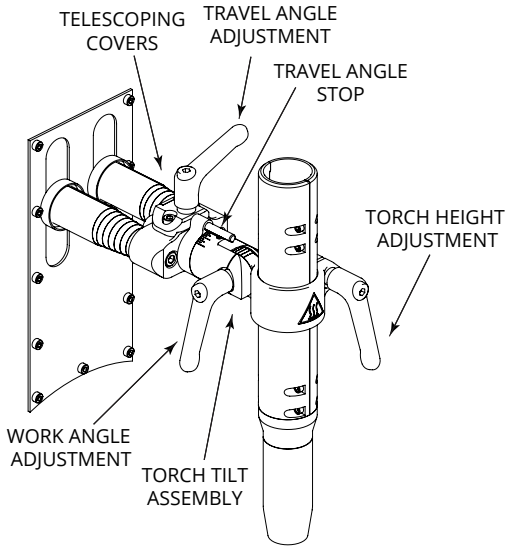


FIGURE 3 - Torch Motion Assembly

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**. 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.

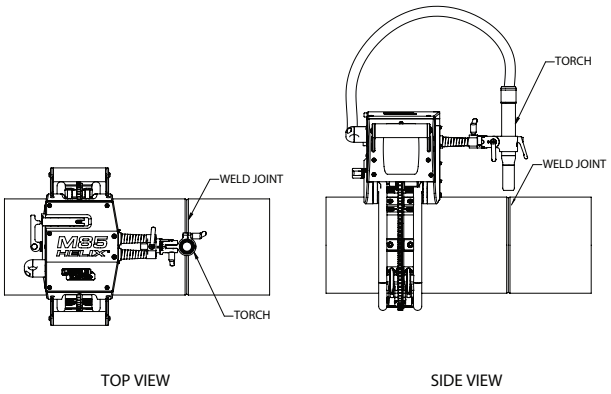


FIGURE 4 - Weld Head Placement

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 toolless 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**.

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.

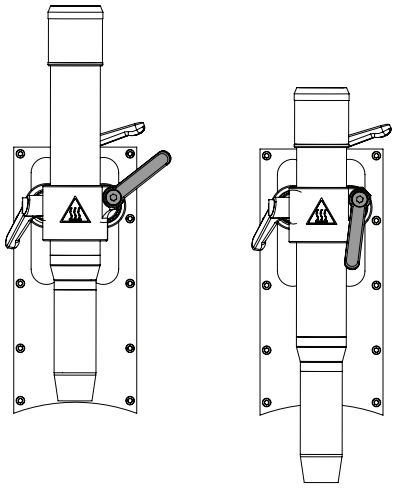


FIGURE 5 - Torch Height Adjustment

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**.

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

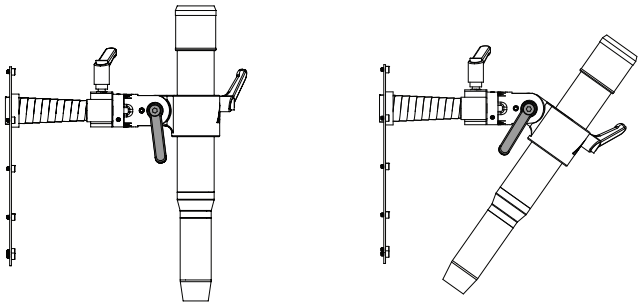


FIGURE 6 - Work Angle Adjustment

Travel Angle Adjustment

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**. Second, it allows the torch to be moved in and out – see **FIG-URE 8 - Torch In/ Out.** 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.

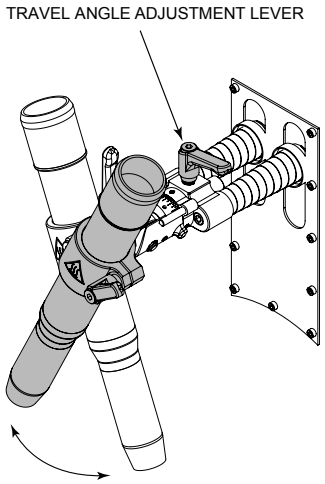


FIGURE 7 - Travel Angle Adjustment

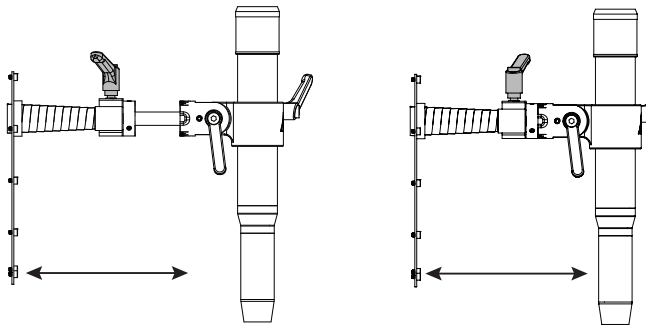


FIGURE 8 - Torch In/ Out

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**). Move the indicator to the desired postion and retighten the screw.

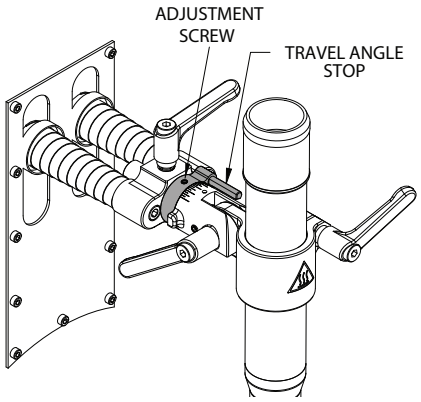


FIGURE 9 - Travel Angle Stop

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**.

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.

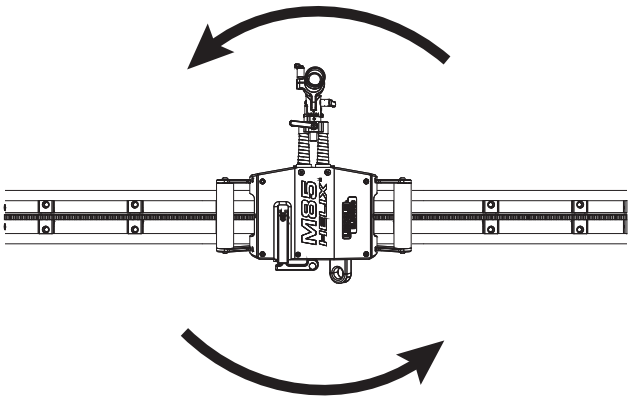


FIGURE 10 - Clamp Latch Movement

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.**

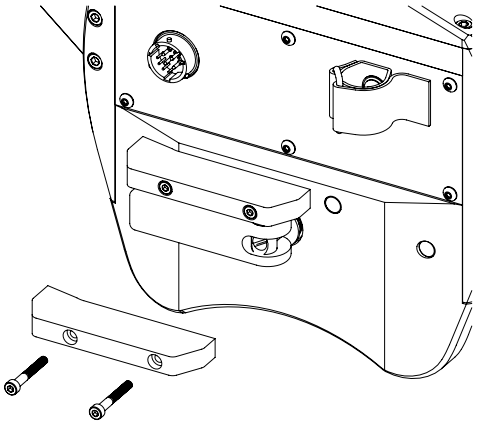


FIGURE 11 - Latch Guard Removal

2. Next, loosen the set screw on the bottom of the latch assembly – see **Figure 12 - Latch Set Screw**.

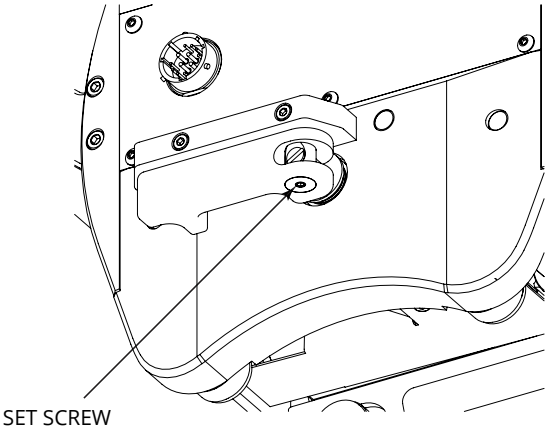


FIGURE 12 - Latch Set Screw

3. Then loosen the secondary set screw on the underside of the HELIX M85 weld head, see **Figure 13 - Secondary Clamp Set Screw.**

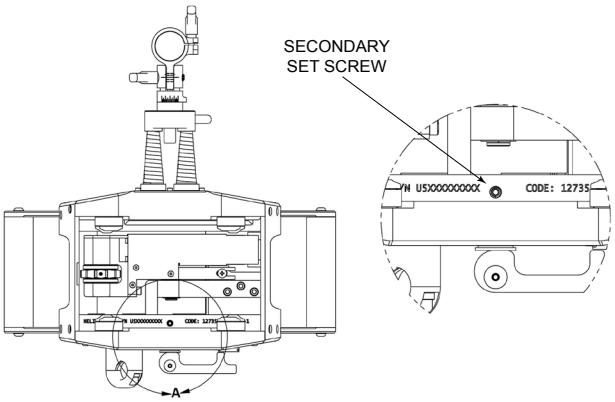


FIGURE 13 - Secondary Clamp Set Screw

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**. Turn the adjustment screw clockwise to increase the tension. Turning it counterclockwise will decrease the tension.

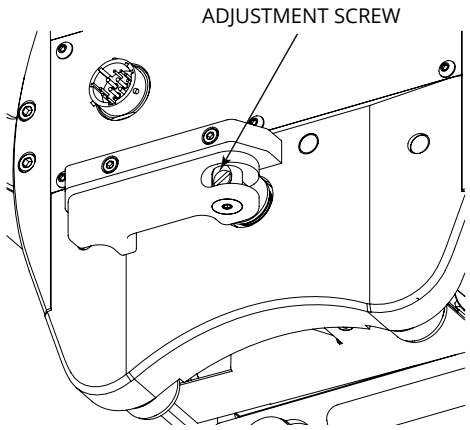


FIGURE 14 - Adjustment Screw

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.** 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.

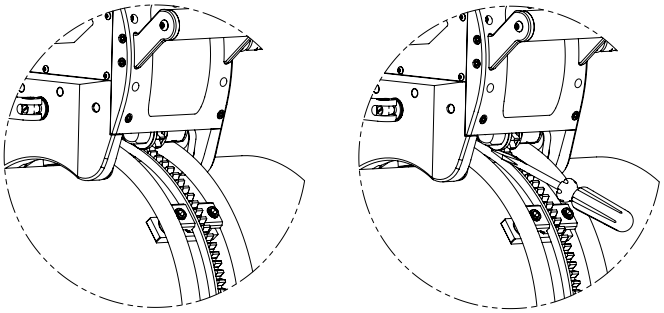


FIGURE 15 - Track Gear Interaction

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**. Turn the adjustment screw counterclockwise to increase the tension, turn clockwise to decrease the tension.

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

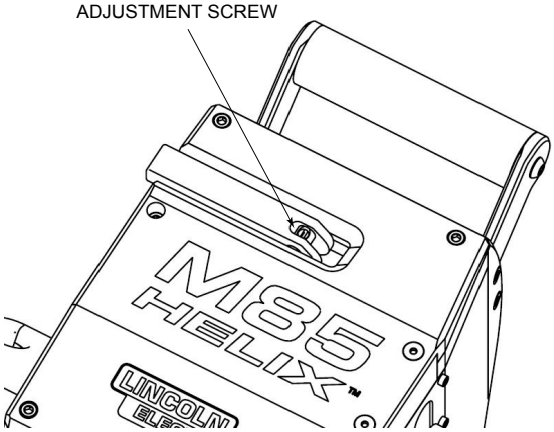


FIGURE 16 - Adjustment Screw

Operational Safety Precautions

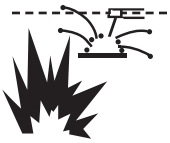
Read and understand this entire section before operating the machine.

⚠ 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.**

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.

Refer to control system manual for all operational instructions.

Operation Information

The HELIX M85 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 M85 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 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 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

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

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.

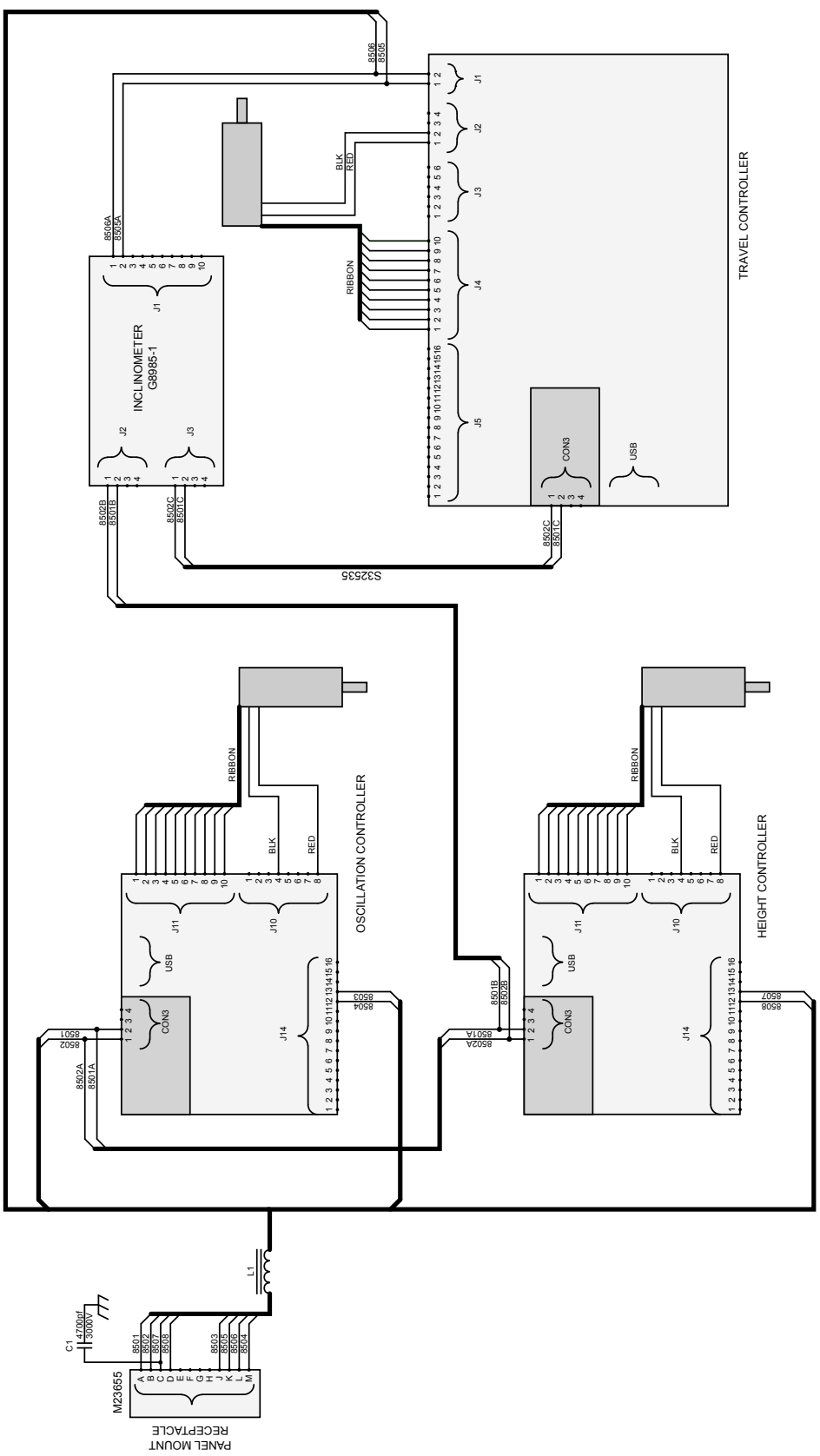
Observe all Safety Guidelines detailed throughout this manual.

PROBLEMS (SYMPTOMS)	POSSIBLE CAUSE	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.**		

⚠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.

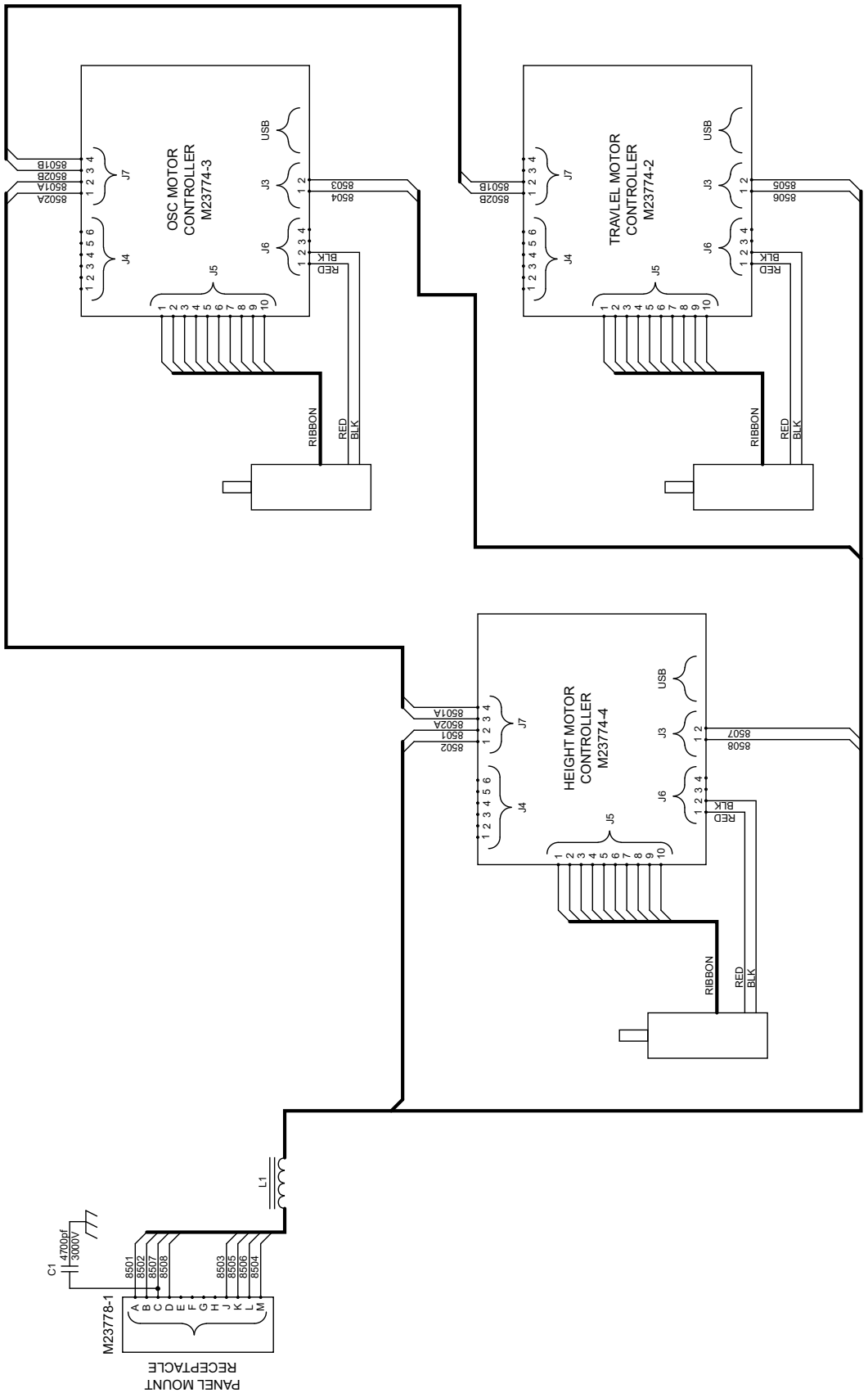
WIRING DIAGRAM - HELIX M85, CODES 12875, 12876



Wiring Diagram

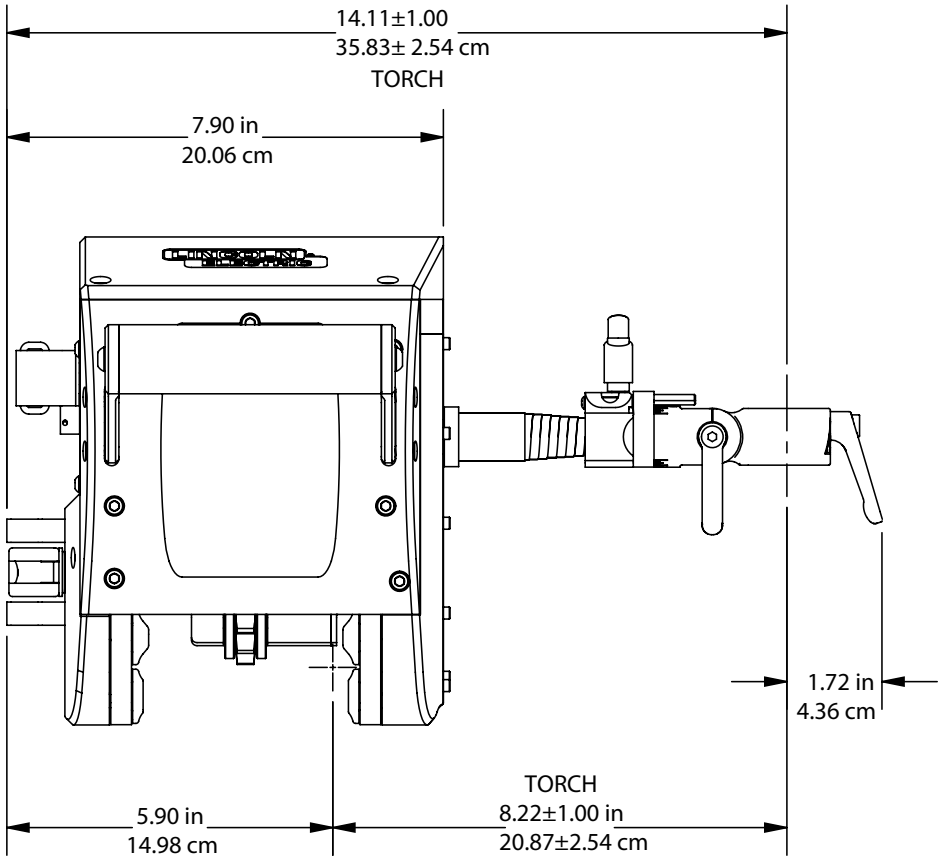
NOTE: This diagram is for reference only. It may not be accurate for all machines covered by this manual. The specific diagram for a particular code is pasted inside the machine on one of the enclosure panels. If the diagram is illegible, write to the Service Department for a replacement. Give the equipment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

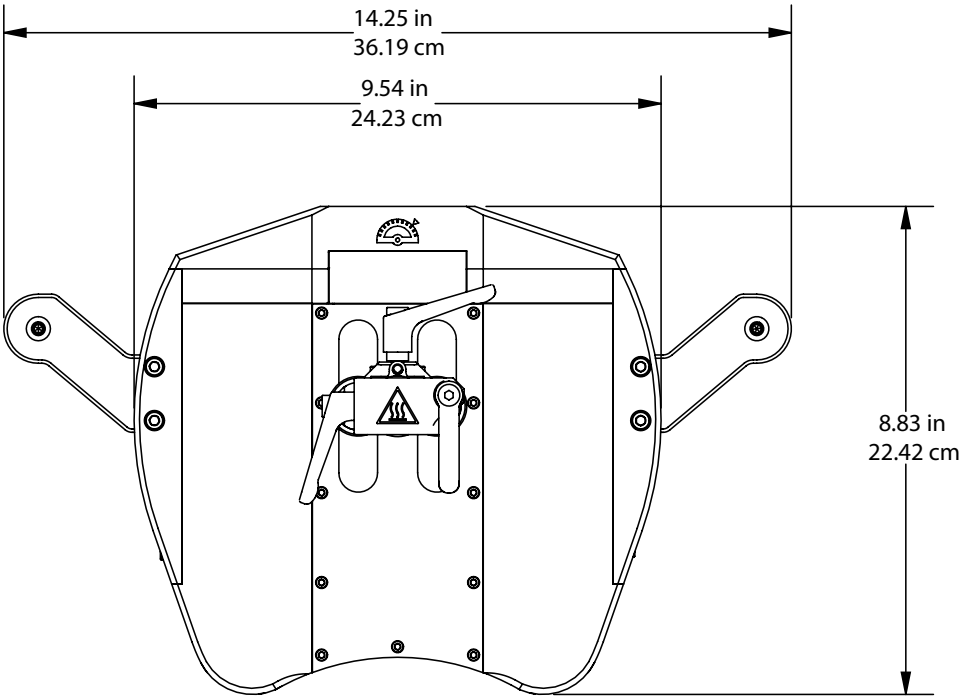
WIRING DIAGRAM - HELIX M85, CODE 13258



A
M23777-1PRINT

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.



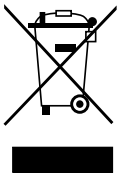


Dimensions

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.

WEEE

07/06



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

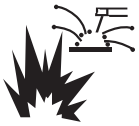
11/19

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.

			
WARNING	● Do not touch electrically live parts or electrode with skin or wet clothing. ● Insulate yourself from work and ground.	● Keep flammable materials away.	● Wear eye, ear and body protection.
Spanish **AVISO DE PRECAUCION**	● No toque las partes o los electrodos bajo carga con la piel o ropa mojada. ● Aislese del trabajo y de la tierra.	● Mantenga el material combustible fuera del área de trabajo.	● Protéjase los ojos, los oídos y el cuerpo.
French **ATTENTION**	● Ne laissez ni la peau ni des vêtements mouillés entrer en contact avec des pièces sous tension. ● Isolez-vous du travail et de la terre.	● Gardez à l'écart de tout matériel inflammable.	● Protégez vos yeux, vos oreilles et votre corps.
German **WARNUNG**	● Berühren Sie keine stromführenden Teile oder Elektroden mit Ihrem Körper oder feuchter Kleidung! ● Isolieren Sie sich von den Elektroden und dem Erdboden!	● Entfernen Sie brennbarres Material!	● Tragen Sie Augen-, Ohren- und Körperschutz!
Portuguese **ATENÇÃO**	● Não toque partes elétricas e electrodos com a pele ou roupa molhada. ● Isole-se da peça e terra.	● Mantenha inflamáveis bem guardados.	● Use proteção para a vista, ouvido e corpo.
Japanese **注意事項**	● 通電中の電気部品、又は溶材にヒフやぬれた布で触れないこと。 ● 施工物やアースから身体が絶縁されている様にして下さい。	● 燃えやすいものの側での溶接作業は絶対にしてはなりません。	● 目、耳及び身体に保護具をして下さい。
Chinese **警 告**	● 皮肤或濕衣物切勿接觸帶電部件及銲條。 ● 使你自己與地面和工件絕緣。	● 把一切易燃物品移離工作場所。	● 佩戴眼、耳及身體勞動保護用具。
Korean **위 험**	● 전도체나 용접봉을 젖은 헝겁 또는 피부로 절대 접촉치 마십시요. ● 모재와 접지를 접촉치 마십시요.	● 인화성 물질을 접근 시키지 마시요.	● 눈, 귀와 몸에 보호장구를 착용하십시요.
Arabic **تحذير**	● لا تلمس الاجزاء التي يسري فيها التيار الكهربائي أو الالكترود بجلد الجسم أو بالملابس المبللة بالماء. ● ضع عازلا على جسمك خلال العمل.	● ضع المواد القابلة للاشتعال في مكان بعيد.	● ضع أدوات وملابس واقية على عينيك وأذنيك وجسمك.

READ AND UNDERSTAND THE MANUFACTURER'S INSTRUCTION FOR THIS EQUIPMENT AND THE CONSUMABLES TO BE USED AND FOLLOW YOUR EMPLOYER'S SAFETY PRACTICES.

SE RECOMIENDA LEER Y ENTENDER LAS INSTRUCCIONES DEL FABRICANTE PARA EL USO DE ESTE EQUIPO Y LOS CONSUMIBLES QUE VA A UTILIZAR, SIGA LAS MEDIDAS DE SEGURIDAD DE SU SUPERVISOR.

LISEZ ET COMPRENEZ LES INSTRUCTIONS DU FABRICANT EN CE QUI REGARDE CET EQUIPMENT ET LES PRODUITS A ETRE EMPLOYES ET SUIVEZ LES PROCEDURES DE SECURITE DE VOTRE EMPLOYEUR.

LESEN SIE UND BEFOLGEN SIE DIE BETRIEBSANLEITUNG DER ANLAGE UND DEN ELEKTRODENEINSATZ DES HERSTELLERS. DIE UNFALLVERHÜTUNGSVORSCHRIFTEN DES ARBEITGEBERS SIND EBENFALLS ZU BEACHTEN.

			
● Keep your head out of fumes. ● Use ventilation or exhaust to remove fumes from breathing zone.	● Turn power off before servicing.	● Do not operate with panel open or guards off.	**WARNING**
● Los humos fuera de la zona de respiración. ● Mantenga la cabeza fuera de los humos. Utilice ventilación o aspiración para gases.	● Desconectar el cable de alimentación de poder de la máquina antes de iniciar cualquier servicio.	● No operar con panel abierto o guardas quitadas.	Spanish **AVISO DE PRECAUCION**
● Gardez la tête à l'écart des fumées. ● Utilisez un ventilateur ou un aspirateur pour ôter les fumées des zones de travail.	● Débranchez le courant avant l'entretien.	● N'opérez pas avec les panneaux ouverts ou avec les dispositifs de protection enlevés.	French **ATTENTION**
● Vermeiden Sie das Einatmen von Schweibrauch! ● Sorgen Sie für gute Be- und Entlüftung des Arbeitsplatzes!	● Strom vor Wartungsarbeiten abschalten! (Netzstrom völlig öffnen; Maschine anhalten!)	● Anlage nie ohne Schutzgehäuse oder Innenschutzverkleidung in Betrieb setzen!	German **WARNUNG**
● Mantenha seu rosto da fumaça. ● Use ventilação e exhaustão para remover fumo da zona respiratória.	● Não opere com as tampas removidas. ● Desligue a corrente antes de fazer serviço. ● Não toque as partes elétricas nuas.	● Mantenha-se afastado das partes moventes. ● Não opere com os paineis abertos ou guardas removidas.	Portuguese **ATENÇÃO**
● ヒュームから頭を離すようにして下さい。 ● 換気や排煙に十分留意して下さい。	● メンテナンス・サービスに取りかかる際には、まず電源スイッチを必ず切って下さい。	● パネルやカバーを取り外したままで機械操作をしないで下さい。	Japanese **注意事項**
●頭部遠離煙霧。 ●在呼吸區使用通風或排風器除煙。	●維修前切斷電源。	●儀表板打開或沒有安全罩時不準作業。	Chinese **警 告**
● 얼굴로부터 용접가스를 멀리하십시요. ● 호흡지역으로부터 용접가스를 제거하기 위해 가스제거기나 통풍기를 사용하십시요.	● 보수전에 전원을 차단하십시요.	● 판넬이 열린 상태로 작동치 마십시요.	Korean **위 험**
● ابعد رأسك بعيداً عن الدخان. ● استعمل التهوية أو جهاز ضغط الدخان للخارج لكي تبعد الدخان عن المنطقة التي تتنفس فيها.	● اقطع التيار الكهربائي قبل القيام بأية صيانة.	● لا تشغل هذا الجهاز اذا كانت الاغطية الحديدية الواقية ليست عليه.	Arabic **تحذير**

LEIA E COMPREENDA AS INSTRUÇÕES DO FABRICANTE PARA ESTE EQUIPAMENTO E AS PARTES DE USO, E SIGA AS PRÁTICAS DE SEGURANÇA DO EMPREGADOR.

使う機械や溶材のメーカーの指示書をよく読み、まず理解して下さい。そして貴社の安全規定に従って下さい。

請詳細閱讀並理解製造廠提供的説明以及應該使用的銀捍材料，並請遵守貴方的有関勞動保護規定。

이 제품에 동봉된 작업지침서를 숙지하시고 귀사의 작업자 안전수칙을 준수하시기 바랍니다.

اقرأ بتمعن وافهم تعليمات المصنع المنتج لهذه المعدات والمواد قبل استعمالها واتبع تعليمات الوقاية لصاحب العمل.

CUSTOMER ASSISTANCE POLICY

The business of The Lincoln Electric Company is manufacturing and selling high quality welding equipment, consumables, and cutting equipment. Our challenge is to meet the needs of our customers and to exceed their expectations. On occasion, purchasers may ask Lincoln Electric for advice or information about their use of our products. We respond to our customers based on the best information in our possession at that time. Lincoln Electric is not in a position to warrant or guarantee such advice, and assumes no liability, with respect to such information or advice. We expressly disclaim any warranty of any kind, including any warranty of fitness for any customer's particular purpose, with respect to such information or advice. As a matter of practical consideration, we also cannot assume any responsibility for updating or correcting any such information or advice once it has been given, nor does the provision of information or advice create, expand or alter any warranty with respect to the sale of our products.

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