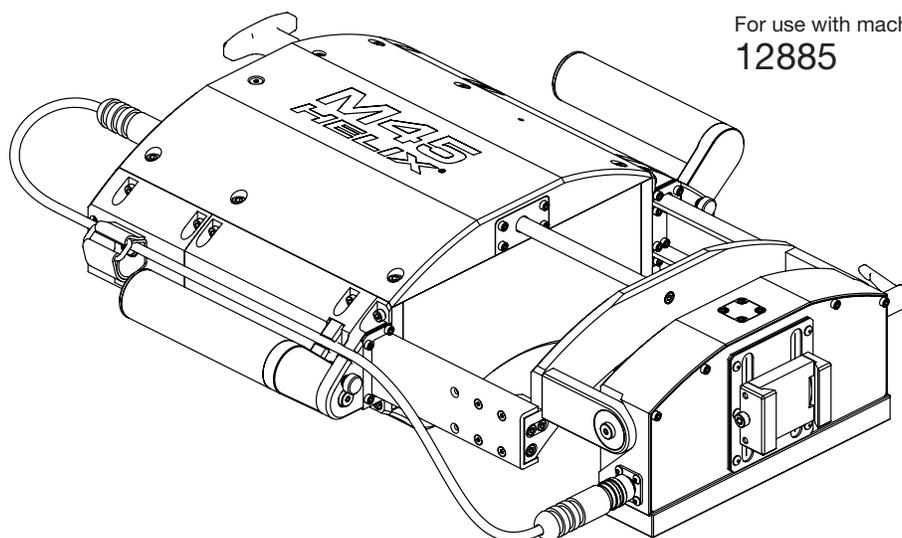


# Operator's Manual

# HELIX<sup>®</sup> M45 WELD HEAD

**ORIGINAL INSTRUCTIONS**



For use with machines having Code Numbers:  
**12885**



Register your machine:  
[www.lincolnelectric.com/register](http://www.lincolnelectric.com/register)  
Authorized Service and Distributor Locator:  
[www.lincolnelectric.com/locator](http://www.lincolnelectric.com/locator)

Save for future reference

Date Purchased

Code: (ex: 12735)

Serial: (ex: U1060512345)

Need Help? Call 1.888.935.3877  
to talk to a Service Representative

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

After hours?  
Use "Ask the Experts" at [lincolnelectric.com](http://lincolnelectric.com)  
A Lincoln Service Representative will contact you  
no later than the following business day.

For Service outside the USA:  
Email: [globalservice@lincolnelectric.com](mailto:globalservice@lincolnelectric.com)

**THE LINCOLN ELECTRIC COMPANY**  
22801 St. Clair Avenue • Cleveland, OH • 44117-1199 • U.S.A.  
Phone: +1.216.481.8100 • [www.lincolnelectric.com](http://www.lincolnelectric.com)

**LINCOLN ELECTRIC EUROPE S.L.**  
c/o Balmes, 89 - 8<sup>o</sup> 2<sup>a</sup>  
08008 Barcelona  
SPAIN

# THANK YOU FOR SELECTING A QUALITY PRODUCT BY LINCOLN ELECTRIC.

## PLEASE EXAMINE CARTON AND EQUIPMENT FOR DAMAGE IMMEDIATELY

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

## SAFETY DEPENDS ON YOU

Lincoln arc welding and cutting equipment is designed and built with safety in mind. However, your overall safety can be increased by proper installation ... and thoughtful operation on your part. **DO NOT INSTALL, OPERATE OR REPAIR THIS EQUIPMENT WITHOUT READING THIS MANUAL AND THE SAFETY PRECAUTIONS CONTAINED THROUGHOUT.** And, most importantly, think before you act and be careful.

### **WARNING**

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

### **CAUTION**

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



## KEEP YOUR HEAD OUT OF THE FUMES.

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



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

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

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

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

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

## WEAR CORRECT EYE, EAR & BODY PROTECTION



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

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

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

**IN SOME AREAS**, protection from noise may be appropriate.

**BE SURE** protective equipment is in good condition.

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



## SPECIAL SITUATIONS

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

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

### Additional precautionary measures

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

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

**REMOVE** all potential fire hazards from welding area.

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



## SECTION A: WARNINGS



### CALIFORNIA PROPOSITION 65 WARNINGS



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

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

**For more information go to [www.P65warnings.ca.gov/diesel](http://www.P65warnings.ca.gov/diesel)**

**WARNING:** This product, when used for welding or cutting, produces fumes or gases which contain chemicals known to the State of California to cause birth defects and, in some cases, cancer. (California Health & Safety Code § 25249.5 *et seq.*)



**WARNING:** Cancer and Reproductive Harm  
[www.P65warnings.ca.gov](http://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 W117.2-1974. 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.



### 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.



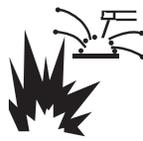
- 4.a. Use a shield with the proper filter and cover plates to protect your eyes from sparks and the rays of the arc when welding or observing open arc welding. Headshield and filter lens should conform to ANSI Z87.1 standards.
- 4.b. Use suitable clothing made from durable flame-resistant material to protect your skin and that of your helpers from the arc rays.
- 4.c. Protect other nearby personnel with suitable, non-flammable screening and/or warn them not to watch the arc nor expose themselves to the arc rays or to hot spatter or metal.



## FUMES AND GASES CAN BE DANGEROUS.



- 5.a. Welding may produce fumes and gases hazardous to health. Avoid breathing these fumes and gases. When welding, keep your head out of the fume. Use enough ventilation and/or exhaust at the arc to keep fumes and gases away from the breathing zone. **When welding hardfacing (see instructions on container or SDS) or on lead or cadmium plated steel and other metals or coatings which produce highly toxic fumes, keep exposure as low as possible and within applicable OSHA PEL and ACGIH TLV limits using local exhaust or mechanical ventilation unless exposure assessments indicate otherwise. In confined spaces or in some circumstances, outdoors, a respirator may also be required. Additional precautions are also required when welding on galvanized steel.**
- 5.b. The operation of welding fume control equipment is affected by various factors including proper use and positioning of the equipment, maintenance of the equipment and the specific welding procedure and application involved. Worker exposure level should be checked upon installation and periodically thereafter to be certain it is within applicable OSHA PEL and ACGIH TLV limits.
- 5.c. Do not weld in locations near chlorinated hydrocarbon vapors coming from degreasing, cleaning or spraying operations. The heat and rays of the arc can react with solvent vapors to form phosgene, a highly toxic gas, and other irritating products.
- 5.d. Shielding gases used for arc welding can displace air and cause injury or death. Always use enough ventilation, especially in confined areas, to insure breathing air is safe.
- 5.e. Read and understand the manufacturer's instructions for this equipment and the consumables to be used, including the Safety Data Sheet (SDS) and follow your employer's safety practices. SDS forms are available from your welding distributor or from the manufacturer.
- 5.f. Also see item 1.b.

**WELDING AND CUTTING SPARKS CAN CAUSE FIRE OR EXPLOSION.**

- 6.a. Remove fire hazards from the welding area. If this is not possible, cover them to prevent the welding sparks from starting a fire. Remember that welding sparks and hot materials from welding can easily go through small cracks and openings to adjacent areas. Avoid welding near hydraulic lines. Have a fire extinguisher readily available.
- 6.b. Where compressed gases are to be used at the job site, special precautions should be used to prevent hazardous situations. Refer to "Safety in Welding and Cutting" (ANSI Standard Z49.1) and the operating information for the equipment being used.
- 6.c. When not welding, make certain no part of the electrode circuit is touching the work or ground. Accidental contact can cause overheating and create a fire hazard.
- 6.d. Do not heat, cut or weld tanks, drums or containers until the proper steps have been taken to insure that such procedures will not cause flammable or toxic vapors from substances inside. They can cause an explosion even though they have been "cleaned". For information, purchase "Recommended Safe Practices for the Preparation for Welding and Cutting of Containers and Piping That Have Held Hazardous Substances", AWS F4.1 from the American Welding Society (see address above).
- 6.e. Vent hollow castings or containers before heating, cutting or welding. They may explode.
- 6.f. Sparks and spatter are thrown from the welding arc. Wear oil free protective garments such as leather gloves, heavy shirt, cuffless trousers, high shoes and a cap over your hair. Wear ear plugs when welding out of position or in confined places. Always wear safety glasses with side shields when in a welding area.
- 6.g. Connect the work cable to the work as close to the welding area as practical. Work cables connected to the building framework or other locations away from the welding area increase the possibility of the welding current passing through lifting chains, crane cables or other alternate circuits. This can create fire hazards or overheat lifting chains or cables until they fail.
- 6.h. Also see item 1.c.
- 6.i. Read and follow NFPA 51B "Standard for Fire Prevention During Welding, Cutting and Other Hot Work", available from NFPA, 1 Batterymarch Park, PO box 9101, Quincy, MA 022690-9101.
- 6.j. Do not use a welding power source for pipe thawing.

**CYLINDER MAY EXPLODE IF DAMAGED.**

- 7.a. Use only compressed gas cylinders containing the correct shielding gas for the process used and properly operating regulators designed for the gas and pressure used. All hoses, fittings, etc. should be suitable for the application and maintained in good condition. 
- 7.b. Always keep cylinders in an upright position securely chained to an undercarriage or fixed support.
- 7.c. Cylinders should be located:
  - Away from areas where they may be struck or subjected to physical damage.
  - A safe distance from arc welding or cutting operations and any other source of heat, sparks, or flame.
- 7.d. Never allow the electrode, electrode holder or any other electrically "hot" parts to touch a cylinder.
- 7.e. Keep your head and face away from the cylinder valve outlet when opening the cylinder valve.
- 7.f. Valve protection caps should always be in place and hand tight except when the cylinder is in use or connected for use.
- 7.g. Read and follow the instructions on compressed gas cylinders, associated equipment, and CGA publication P-1, "Precautions for Safe Handling of Compressed Gases in Cylinders," available from the Compressed Gas Association, 14501 George Carter Way Chantilly, VA 20151.

**FOR ELECTRICALLY POWERED EQUIPMENT.**

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

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

# ELECTROMAGNETIC COMPATIBILITY (EMC)

## CONFORMANCE

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

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

## INTRODUCTION

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

## INSTALLATION AND USE

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

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

## ASSESSMENT OF AREA

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

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

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

## METHODS OF REDUCING EMISSIONS

### Mains Supply

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

### Maintenance of the Welding Equipment

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

### Welding Cables

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

### Equipotential Bonding

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

### Earthing of the Workpiece

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

### Screening and Shielding

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

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

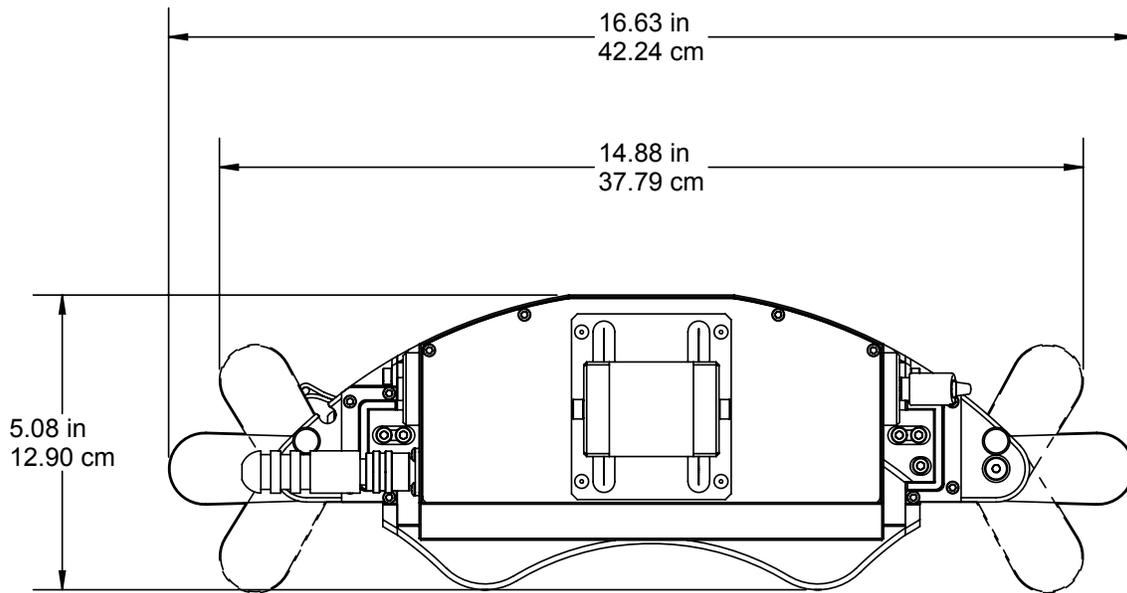
**WEEE**

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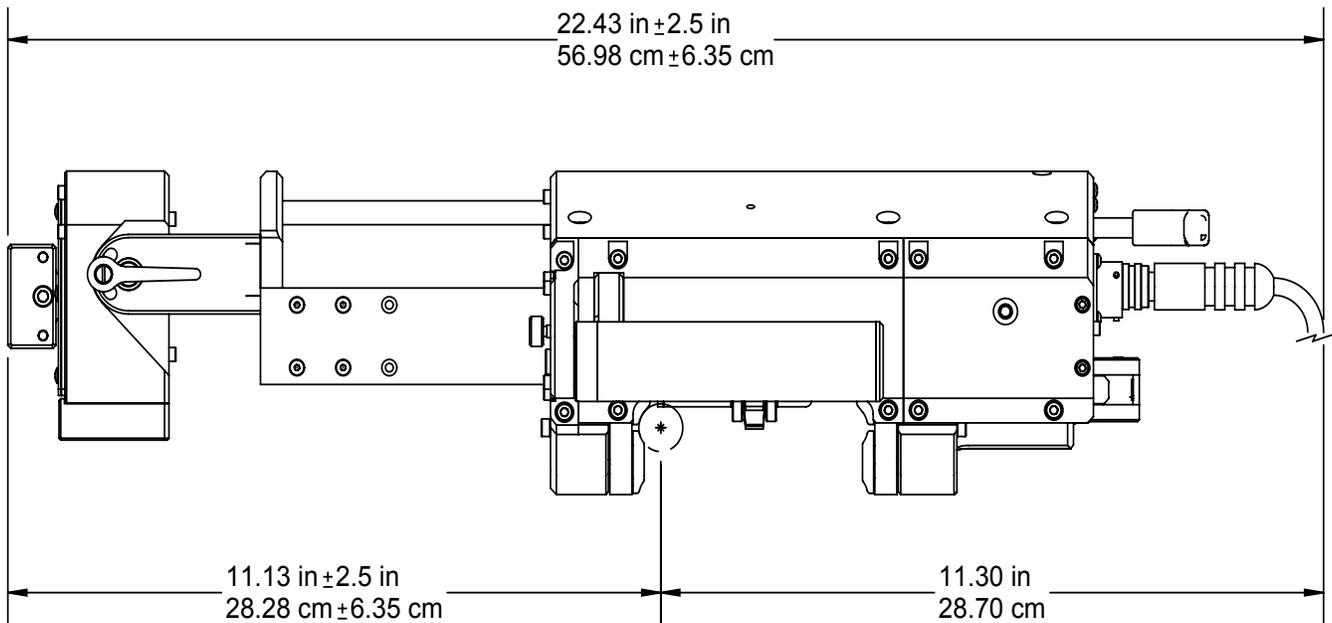
07/06

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# HELIX M45 Weld Head Dimensions



View Front



View Side

# Technical Specifications HELIX M45 Weld Head

HELIX M45 Weld head  
 Product Number  
 K52224-1

<b>Input Power</b>	24 VDC
<b>Radial Clearance (on 8" Track Ring)</b>	4.5" (114.3 mm)
<b>Travel Speed</b>	0.1 - 120 ipm
<b>Max Oscillation Speed</b>	150 ipm (381 cm/min)
<b>Oscillation stroke</b>	5" (49.78 mm)
<b>Work Angle</b>	+45 degrees in / -45 degrees out
<b>Pipe Sizes</b>	8" OD to Flat Track

**Weld Head Physical Dimensions**

Depth (minus the torch): 22.43" (569.8 mm)	Weight: 28 lbs (12.7 kg)
--	--------------------------

**Environmental**

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

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

**Explanation of Symbols**



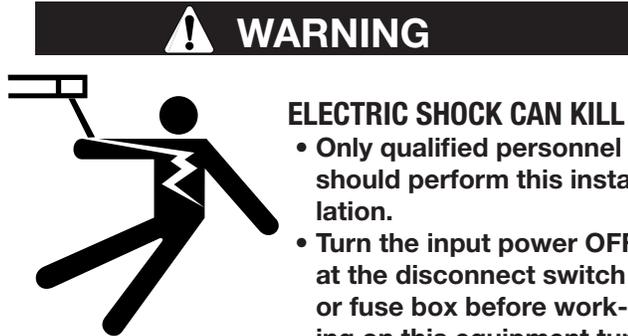
Electric Shock Warning



Hot Surface Warning

## Safety Precautions

Read entire manual before installation or operation.



### **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 M45 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 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 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 the HELIX M45 weld head while it is firmly attached to the track ring with the clutch 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 M45 Weld Head

## Basic Information

The HELIX M45 weld head is the second weld head in the APEX 3 world of digitally controlled, precision welding. Designed with a low profile, this device also offers a pivoting torch height assembly, providing perpendicular height control to the puddle face.

The handles on the HELIX M45 weld head rotate, allowing for optimized clearance. Designed to work with the APEX® 3 Series Orbital Controllers, the HELIX M45 weld head uses cross-roller bearings for rigid clamping and is able to change weld parameters based on its orientation in space.

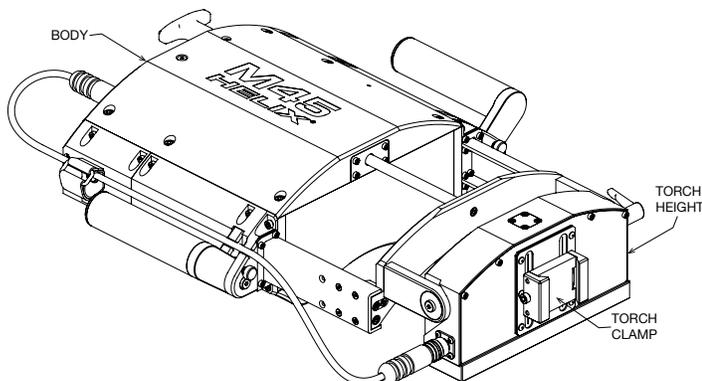
The HELIX M45 weld head has automatic height control, oscillation capabilities, and multiple toolless torch adjustment options. These give the operator greater control of the weld puddle for complex welds in limited space.

## Basic Components

The three basic components of the weld head are:

- Body Assembly
- Torch Clamp
- Torch Height Assembly

See **FIGURE 1 - Weld Head Components** – for the different weld head parts. Each piece of the machinery is discussed separately.



**FIGURE 1 - Weld Head Components**

## Body Assembly

The body assembly is the main component for the HELIX M45 weld head. It contains the gears, motors and belts that provide travel and oscillation for the weld head – see **FIGURES 1 and 2 - Weld Head Components and Rear Weld Head Components**.

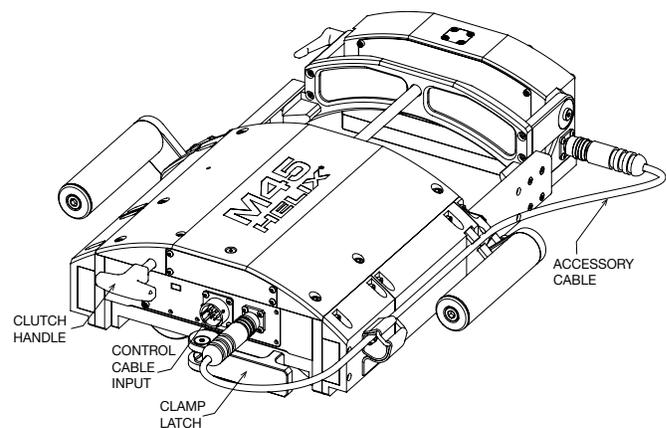
Adjustments and controls located on the body include:

- **Clutch Handle**

This handle is engaged with a pushing motion and disengaged by a pulling motion. Pushing the weld head back and forth along the track makes the engagement of the clutch easier.

- **Clamp Latch**

Using a compression spring to add force to the clamp, this latch engages or disengages the clamp which secures the weld head onto the track. This compensates for variance in track width dimension and maintains weld head position.



**FIGURE 2 - Rear Weld Head Components**

- **Control Cable Input**

A connecting point for the control cable which delivers all signals to the weld head.

- **Accessory Cable**

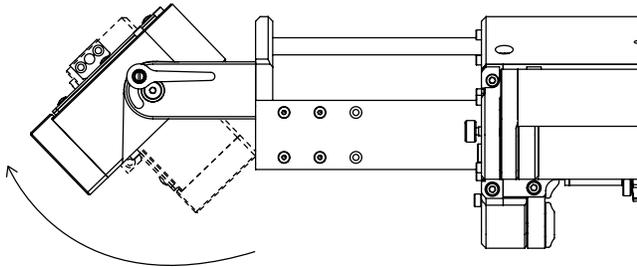
This cable connects the onboard wire feeder and the torch height assembly.

## Torch Height Assembly

The torch height assembly holds the torch and provides vertical motion to the torch. It also allows for toolless work angle adjustment.

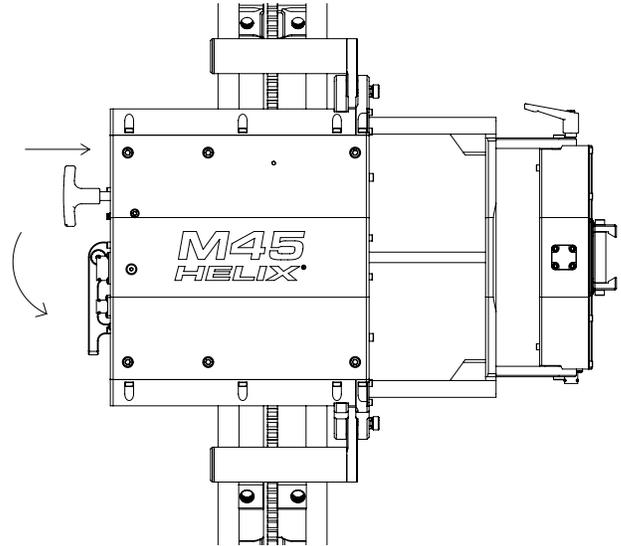
### Work Angle Adjustment

The HELIX M45 weld head allows for 45 degrees of outward adjustment and 45 degrees of inward adjustment. This angle is changed by using the work angle adjustment handle shown in **FIGURE 3 - Work Angle Adjustment**.



**FIGURE 3 - Work Angle Adjustment**

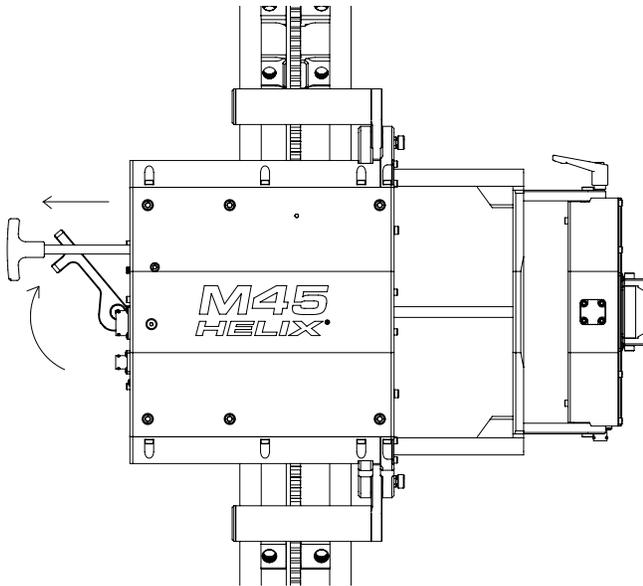
Once the weld head is on the track, secure the clamp latch – see **FIGURE 5 - Secure to Track**. Move the tractor slowly on the track and push the clutch in to engage drive gears.



**FIGURE 5 - Secure to Track**

### Track Engagement

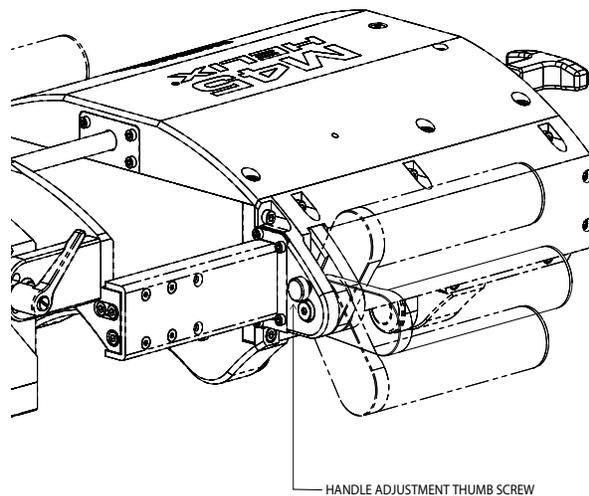
Before placing on the HELIX M45 weld head on the track, verify that the clamp latch is open and the clutch is pulled out – see **FIGURE 4 - Clamp Latch and Clutch**.



**FIGURE 4 - Clamp Latch and Clutch**

### Handle Adjustment

The handles on the HELIX M45 weld head offer a 3-way toolless adjustment thumb screw, as shown in **FIGURE 6 - Handle Adjustment Screw**.



**FIGURE 6 - Handle 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 M45 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 HELIX M45 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.

## Accessories

### HELIX M45 Weld Head Accessories and Consumables

Accessory	Part Number
Weld Head Control Cable 25'	K52107-25
Weld Head Control Cable 50'	K52107-50
HELIX SF70C Onboard Wire Feeder 1	K52248-1
HELIX SF70C Onboard Wire Feeder 2	K52248-2
Low Profile Mechanized TIG Torch, 25'	K52249-25
Low Profile Mechanized MIG Torch, 25'	K52250-25
HELIX M45 Oscillation Arm Extension 6"	K52251-06
HELIX M45 Oscillation Arm Extension 12"	K52251-12
HELIX M45 Oscillation Arm Extension 18"	K52251-18
HELIX M45 Oscillation Arm Extension 24"	K52251-24

## Maintenance

The HELIX M45 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

- With the clutch 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 all the weld head components for any signs of damage or wear.
- 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

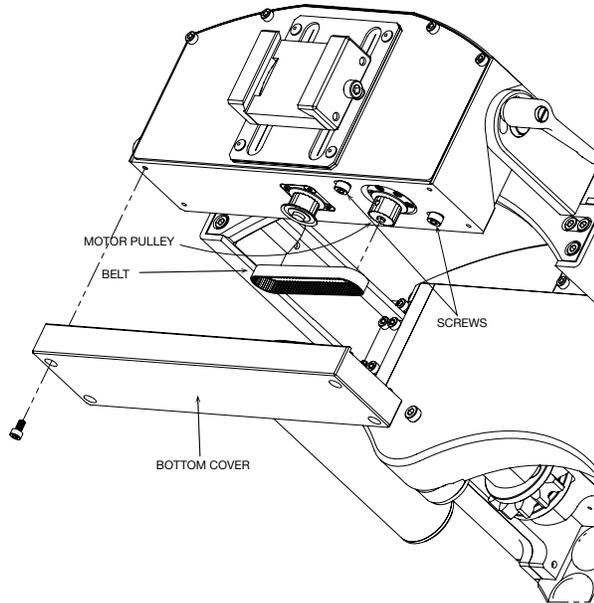
Required tools to operate and repair the HELIX M45 weld head:

- 2.5 mm hex key
- 3 mm hex key
- 4 mm hex key
- wire cutters

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

## Belt Change Adjustment

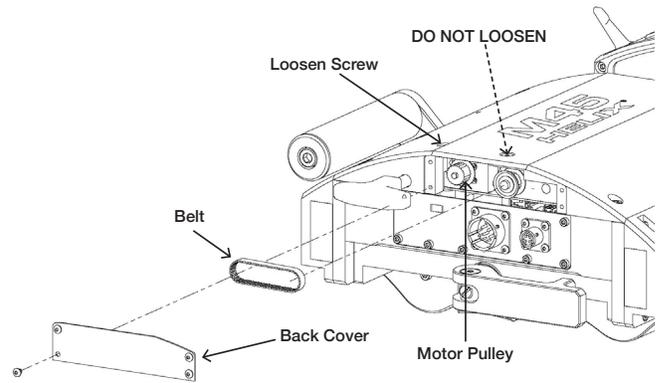
There are two belts that will require changing with frequent use: the Torch Height Belt see **FIGURE 6 - Changing Torch Height Belt** – and the oscillator belt – see **FIGURE 5 - Changing Oscillator Belt**.



**FIGURE 6 - Changing Torch Height Belt**

To change the Torch Height Belt:

1. Remove the bottom cover using a 2.5 mm Hex Driver.
2. Loosen (DO NOT REMOVE) the two screws shown in **FIGURE 6** using a 3 mm Hex Driver and slide the motor pulley towards the middle of the Torch Height.
3. Remove the belt
4. Replace with a new belt (KP52252-1, see Parts Manual on page H-9). Check that the belt is straight and **avoid over tightening** to prevent machine malfunction. Push the motor pulley back into place and tighten the two screws.
5. Replace the bottom cover.



**FIGURE 7 - Changing Oscillator Belt**

To change the Oscillator Belt:

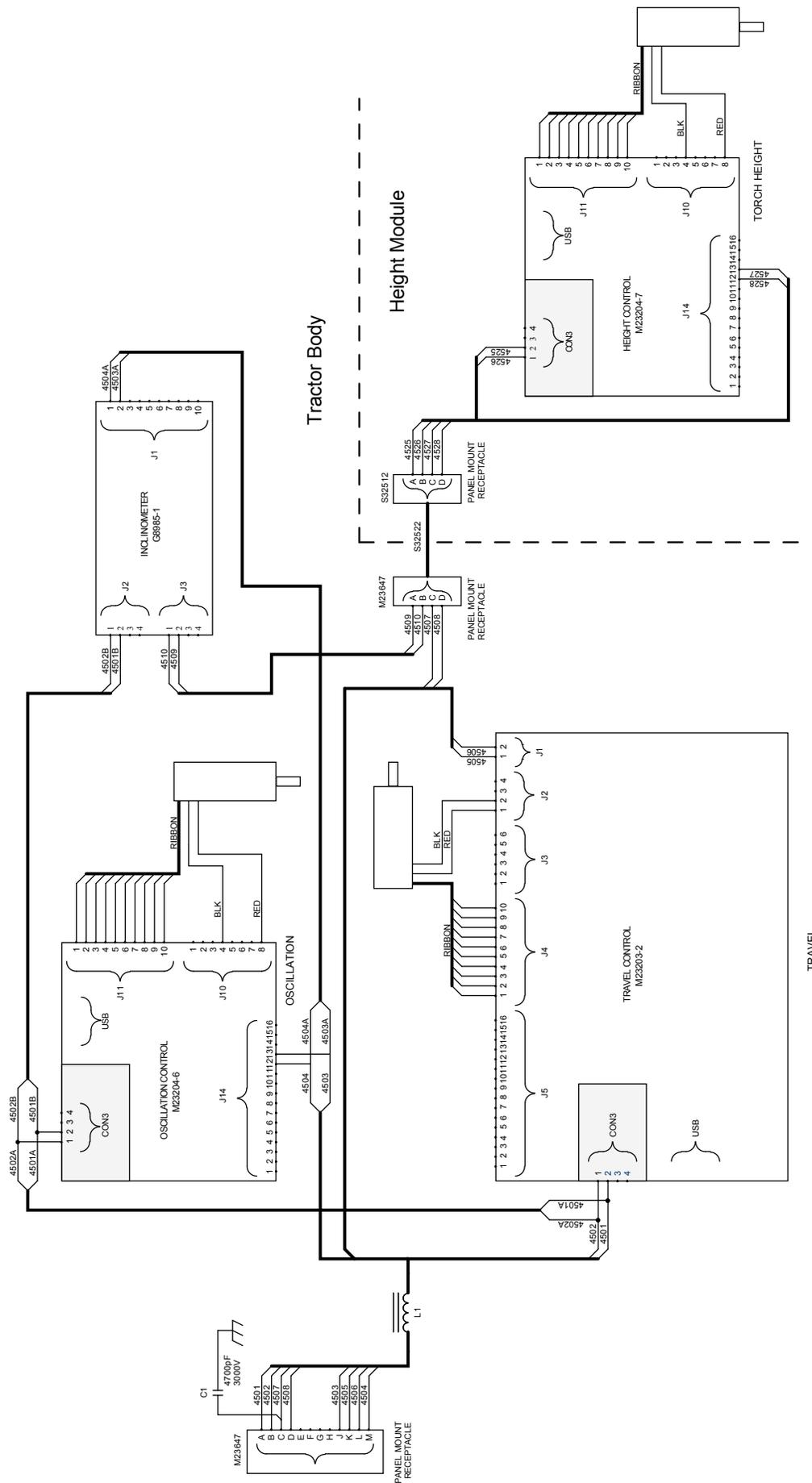
1. Remove the back cover using a 2 mm Hex Driver.
2. Loosen (DO NOT REMOVE) the screw shown in **FIGURE 7** using a 3 mm Hex Driver.
3. Push the motor pulley toward the center of the weld head.
4. Replace with a new belt (KP52137-1, see Parts Manual on page H-7). Check that the belt is straight and **avoid over tightening** to prevent machine malfunction. Push the motor pulley back into place and tighten the screw.
5. Replace the back cover.

Observe all Safety Guidelines detailed throughout this manual.

PROBLEMS (SYMPTOMS)	POSSIBLE CAUSE	RECOMMENDED COURSE OF ACTION
Auto Height does not operate / operates incorrectly.	<ol style="list-style-type: none"> <li>1. Weld settings are incorrect.</li> <li>2. Auto height is disabled.</li> <li>3. Inconsistent wire feeding</li> <li>4. Wire binding in contact tip.</li> </ol>	<ol style="list-style-type: none"> <li>1. Check WFS/Amps</li> <li>2. Check auto height is on.</li> <li>3. Check wire.</li> <li>4. Check contact tip.</li> </ol>
Travel is inconsistent.	<ol style="list-style-type: none"> <li>1. Clutch is not fully engaged.</li> <li>2. Loose communication cable.</li> <li>3. Step travel is engaged.</li> </ol>	<ol style="list-style-type: none"> <li>1. Check clutch latch to ensure it is engaged (locked).</li> <li>2. Check all cable connections.</li> <li>3. Check travel settings.</li> </ol>
No oscillation / inconsistent oscillation.	<ol style="list-style-type: none"> <li>1. Loose communication cable.</li> <li>2. Oscillation settings are incorrect</li> <li>3. Oscillation arms binding on wipers.</li> <li>4. Worn oscillator belt.</li> </ol>	<ol style="list-style-type: none"> <li>1. Check all cable connections.</li> <li>2. Check oscillator settings on jog screen.</li> <li>3. Check wipers for free movement.</li> <li>4. Check oscillator belt.</li> </ol>
Wire does not feed properly.	<ol style="list-style-type: none"> <li>1. Drive rolls are worn/damaged</li> <li>2. Wire guides are restricting wire passage.</li> <li>3. Wire binding in contact tip.</li> <li>4. Wire liner is kinked.</li> </ol>	<ol style="list-style-type: none"> <li>1. Check drive rolls</li> <li>2. Check wire feed for blockage.</li> <li>3. Check contact tip.</li> <li>4. Check for kinks or obstructions in the torch or wire liner.</li> </ol>
Gas issues	<ol style="list-style-type: none"> <li>1. Gas supply is shut off.</li> <li>2. Gas tank is empty.</li> <li>3. Gas hose is kinked.</li> </ol>	<ol style="list-style-type: none"> <li>1. Verify gas is turned on.</li> <li>2. Verify there is gas present in the tank.</li> <li>3. Check the gas line for kinks or obstructions.</li> </ol>
Tractor drags on work surface	<ol style="list-style-type: none"> <li>1. Track is improperly installed.</li> </ol>	<ol style="list-style-type: none"> <li>1. Check that the shoes are all equally spaced around the track.</li> </ol>
<p>If all recommended possible areas of misadjustment have been checked and the problem persists,  <b>Contact your local Lincoln Authorized Field Services Facility.</b></p>		

**⚠ CAUTION**

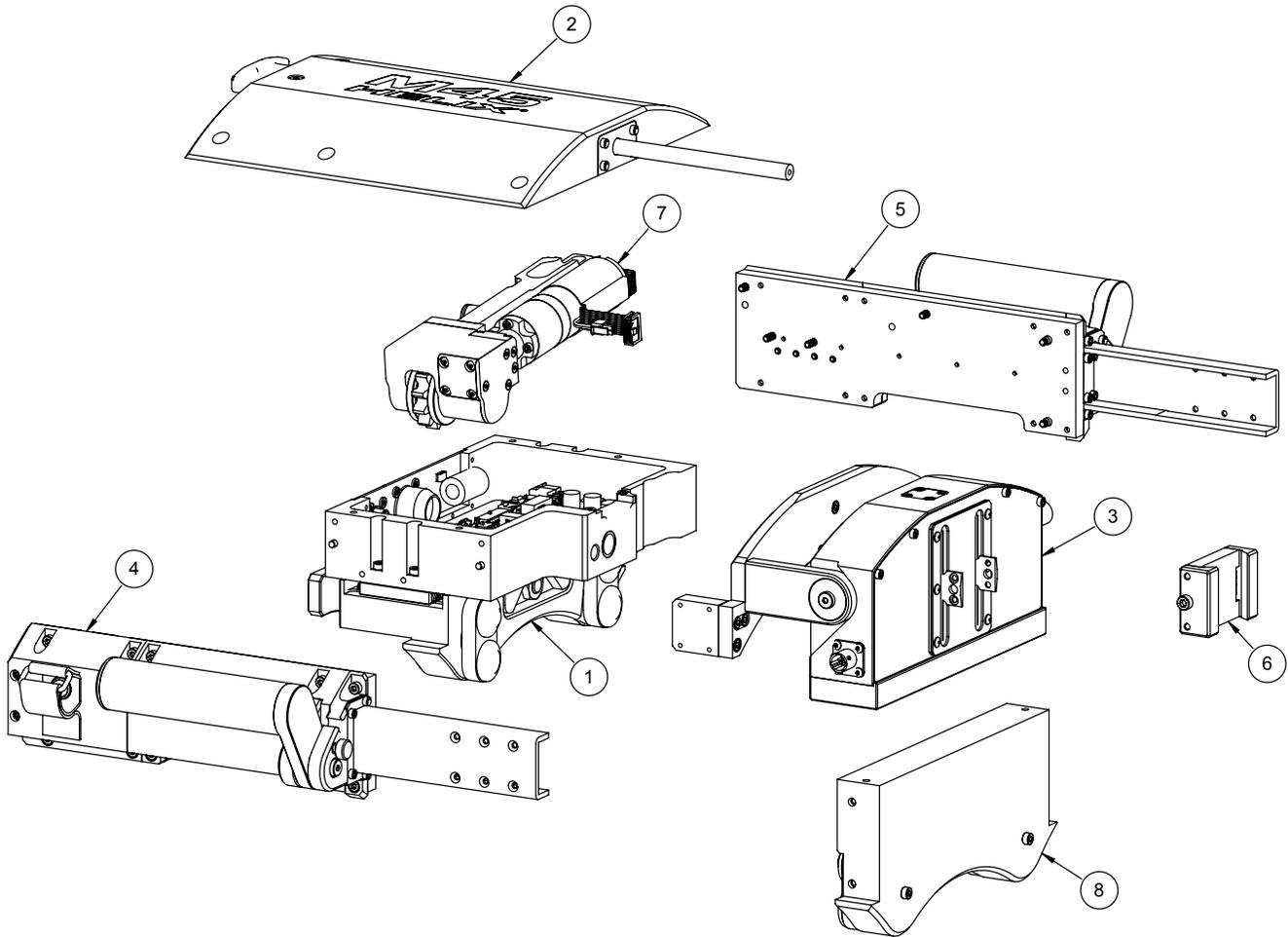
If for any reason you do not understand the test procedures or are unable to perform the tests/repairs safely, contact your **Local Lincoln Authorized Field Service Facility** for technical troubleshooting assistance before you proceed.



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

# HELIX® M45 WELD HEAD PARTS MANUAL

This parts list is provided as an informative guide only.



09-10-19

**NOTE:** This Parts Manual is provided as an informative guide only. When ordering parts, always refer to the Lincoln Electric Parts List.

# HELIX® M45 WELD HEAD

For Codes: 12885

Do not use this Parts List for a machine if its code number is not listed. Contact the Service Department for

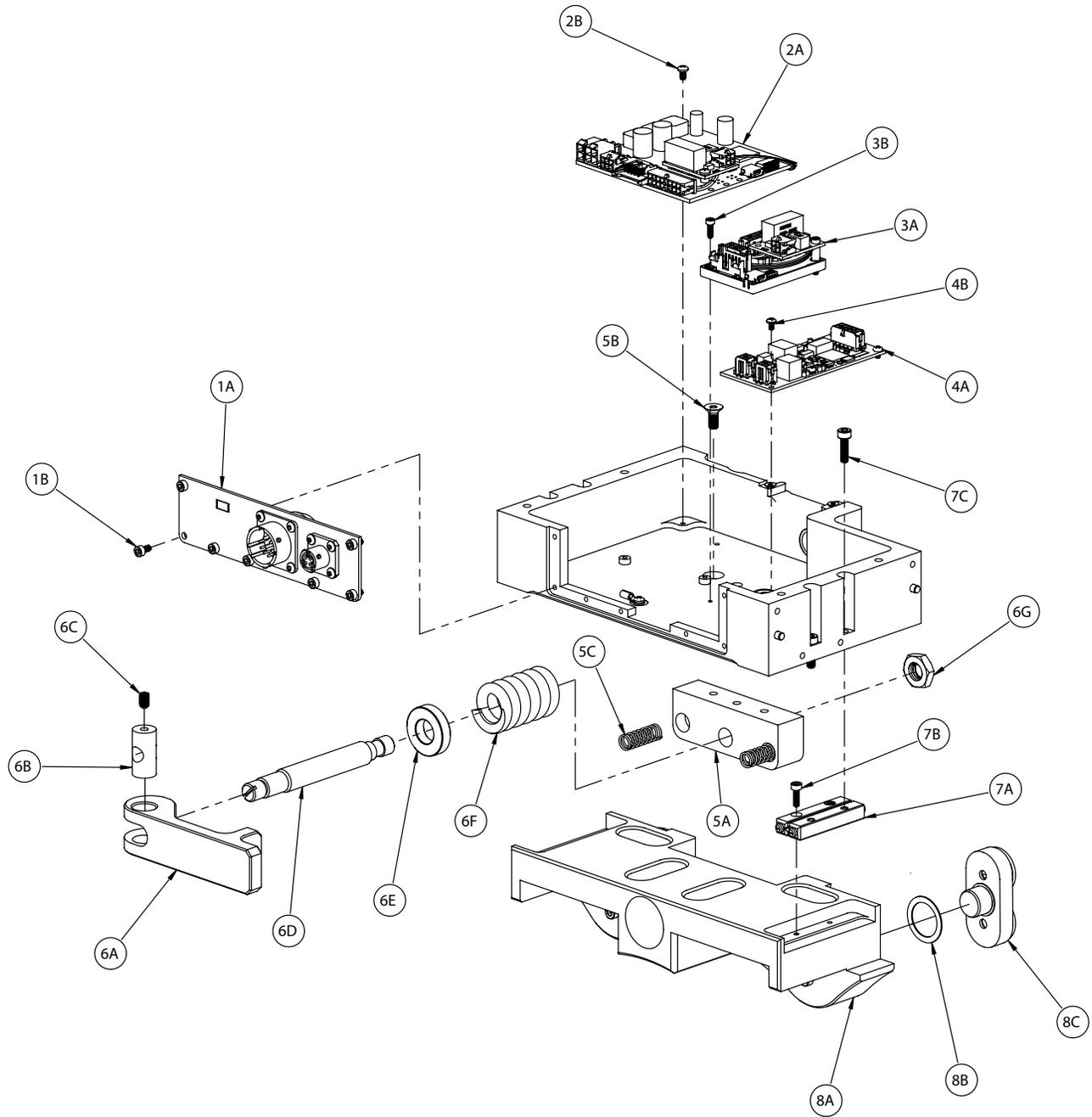
Use the illustration of Sub-Assemblies page and the table below to determine which sub assembly page and column the desired part is located on for your particular code machine.

Sub Assembly Item Number	1	2	3	4	5	6	7	8
SUB ASSEMBLY PAGE NAME	<b>Control Box Assembly</b>	<b>Top Plate Assembly</b>	<b>Torch Height</b>	<b>Right Side Plate</b>	<b>Left Side Plate</b>	<b>Torch Clamp</b>	<b>Transmission Drive</b>	<b>Inboard Side Plate</b>
PAGE NO.	H-4	H-6	H-8	H-12	H-14	H-16	H-18	H-20
CODE NO.								
12885	1	1	1	1	1	1	1	1

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Control Box Assembly



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Control Box Assembly

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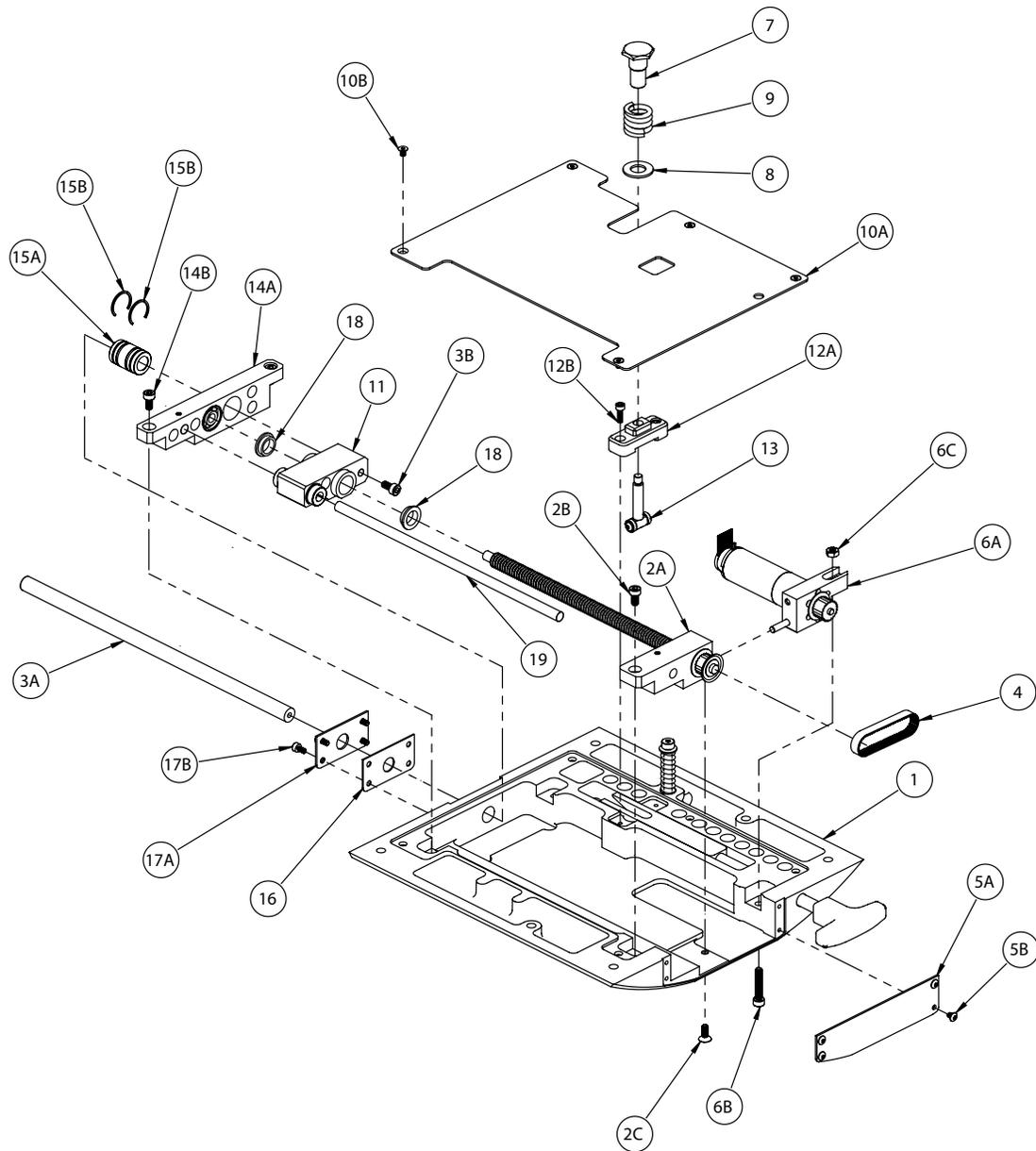
Use only the parts marked "x" in the column under the heading number called for in the model index page.

ITEM	DESCRIPTION	PART NO.	QTY.	1
1	HELIX M45 Input Output Wire Harness Kit, includes:	9SS32513	1	X
1A	HELIX M45 Input Output Wire Harness	NSS	1	X
1B	SHCS M3 X 0.5 X 6, Stainless Steel	NSS	1	X
2	Travel Controller Kit, includes:	9SM23203-4	1	X
2A	Travel Controller	NSS	1	X
2B	Pan Head Screw Phillips M3 X 0.5 X 6, Steel, Zinc Plated	NSS	2	X
3	Oscillation Controller Kit, includes:	9SM23204-6	1	X
3A	Oscillation Controller	NSS	1	X
3B	SHCS M2.5 X 0.45 X 8, Stainless Steel	NSS	1	X
4	Inclinometer PCB Kit, includes:	9SS32526	1	X
4A	Inclinometer PCB	NSS	1	X
4B	Pan Head Screw Phillips M2.5-0.45 X 4, Stainless Steel	NSS	5	X
5	Slide Support Kit	9SS32292	1	X
5A	Slide Support	NSS	1	X
5B	FHCS M5 X 0.8 X 12, Steel, Zinc Plated	NSS	2	X
5C	Compression Spring	NSS	2	X
6	Clamp Handle Kit, includes:	9SS33201	1	X
6A	Clamp Handle	9SS32287	1	X
6B	Clamp Barrel	9SS32289	1	X
6C	Set Screw Cup Point M5 X 0.8 X 8, Stainless Steel	NSS	1	X
6D	Clamp Shaft	9SS32293	1	X
6E	Push Washer	9SS32290	1	X
6F	Compression Spring	9SS32486	1	X
6G	Thin Hex Nut, M10 X 1.5, 18-8 Ss	9S32482-25	1	X
7	Cross Roller Bearing Kit includes:	9SS32559	1	X
7A	Cross Roller Bearing Set	NSS	1	X
7B	SHCS M3 X 0.5 X 10, 316 Stainless Steel	NSS	4	X
7C	SHCS M4 X 0.7 X 14, 316 Stainless Steel	NSS	4	X
8	Outboard Plate Assembly, includes:	9SM23604	1	X
8A	Outboard Plate Roller	NSS	1	X
8B	Roller Pivot Bushing	NSS	2	X
8C	Roller Pivot	9SM23184	2	X

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Top Plate Assembly



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Top Plate Assembly

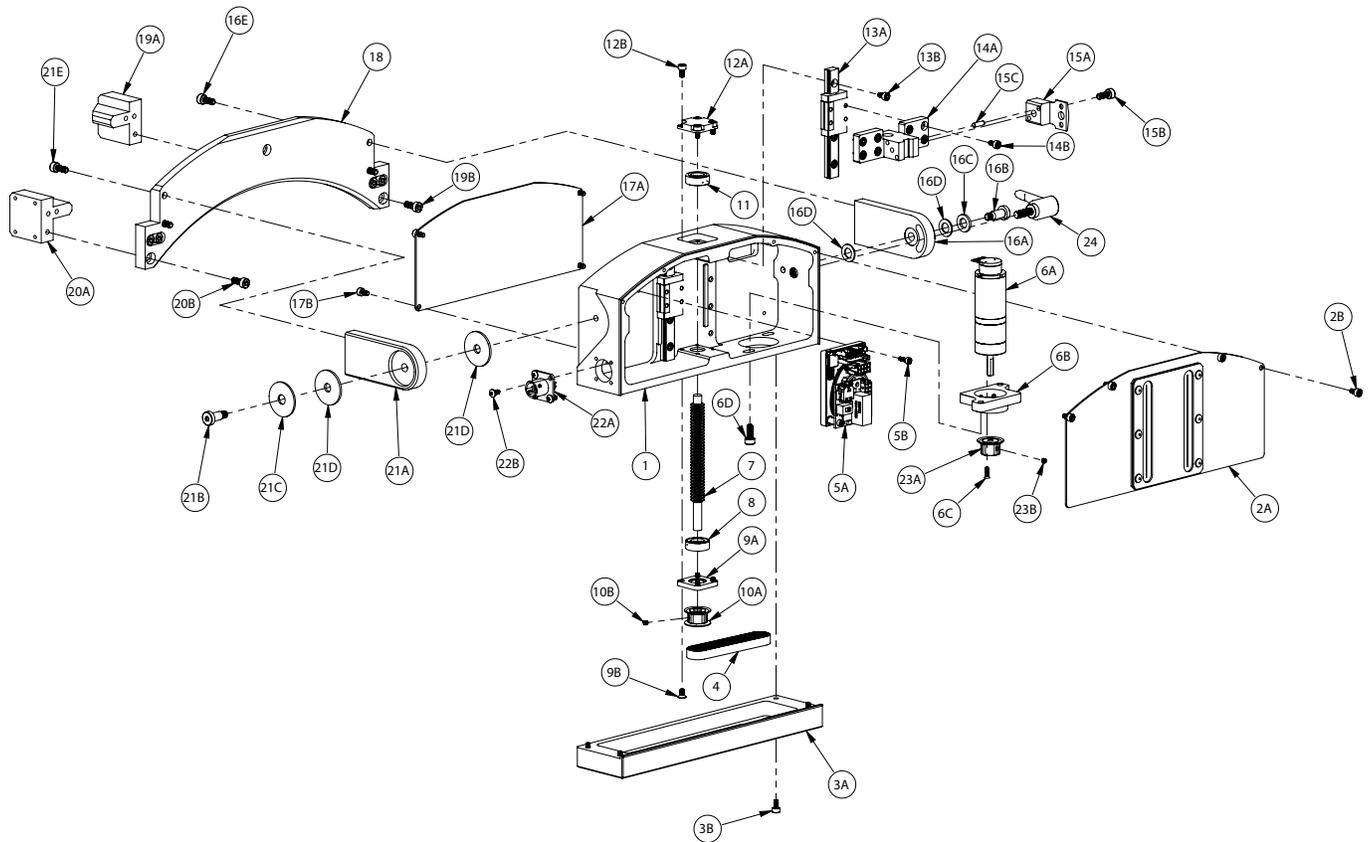
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Use only the parts marked “x” in the column under the heading number called for in the model index page.

ITEM	DESCRIPTION	PART NO.	QTY.	1
1	Top Plate Assembly	9SM23603	1	X
2	Rear Screw Mount Kit, includes:	9SS32271-1	1	X
2A	Rear Screw Mount	NSS	1	X
2B	SHCS M4 X 0.7 X 22, Stainless Steel	NSS	1	X
2C	FHCS M4 X 0.7 X 10, Stainless Steel	NSS	1	X
3	OSC Shaft Kit, includes:	9SS32285	1	X
3A	OSC Shaft	NSS	1	X
3B	SHCS M4 X 0.7 X 8, Stainless Steel	NSS	1	X
4	60 Tooth MXL Belt	KP52137-1	1	X
5	Back Cover Kit, includes:	9SS32265	1	X
5A	Back Cover	NSS	1	X
5B	BHCS M3 X 0.5 X 4, Stainless Steel	NSS	4	X
6	Slide OSC Motor Assembly Kit, includes	9SS32454	1	X
6A	Slide OSC Motor Assembly	NSS	1	X
6B	SHCS M4 X 0.7 X 22, Stainless Steel	NSS	1	X
6C	Nut M4, Stainless Steel	NSS	1	X
7	Spring Retainer	9SS32295	1	X
8	Compression Spring	9SS32515	1	X
9	Shim	9SS32297	1	X
10	OSC Shield Kit, includes:	9SS32264	1	X
10A	OSC Shield	NSS	1	X
10B	FHCS M3 X 0.5 X 6, Stainless Steel	NSS	5	X
11	OSC Carriage	9SS32286	1	X
12	Shaft Support Kit, includes:	9SS32268	1	X
12A	Shaft Support	NSS	1	X
12B	SHCS M3 X 0.5 X 10, Stainless Steel	NSS	1	X
13	Clutch Retainer	9SS32453	1	X
14	Front Screw Mount Kit, includes:	9SS32271-2	1	X
14A	Front Screw Mount	NSS	1	X
14B	SHCS M4 X 0.7 X 8, Stainless Steel	NSS	1	X
15	Linear Sleeve Bearing 3/8 Kit, includes:	9SS32494	1	X
15A	Linear Sleeve Bearing 3/8	NSS	1	X
15B	Retaining Clip	NSS	2	X
16	Shaft Wiper	9SS32490	1	X
17	Shaft Wiper Retainer Kit, includes:	9SS32263	1	X
17A	Shaft Wiper Retainer	NSS	1	X
17B	SHCS M3 X 0.5 X 6, Stainless Steel	NSS	4	X
18	Carriage Bushing	9SS33239	2	X
19	Linear Shaft	9SS32285	1	X

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Torch Height



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Torch Height 1

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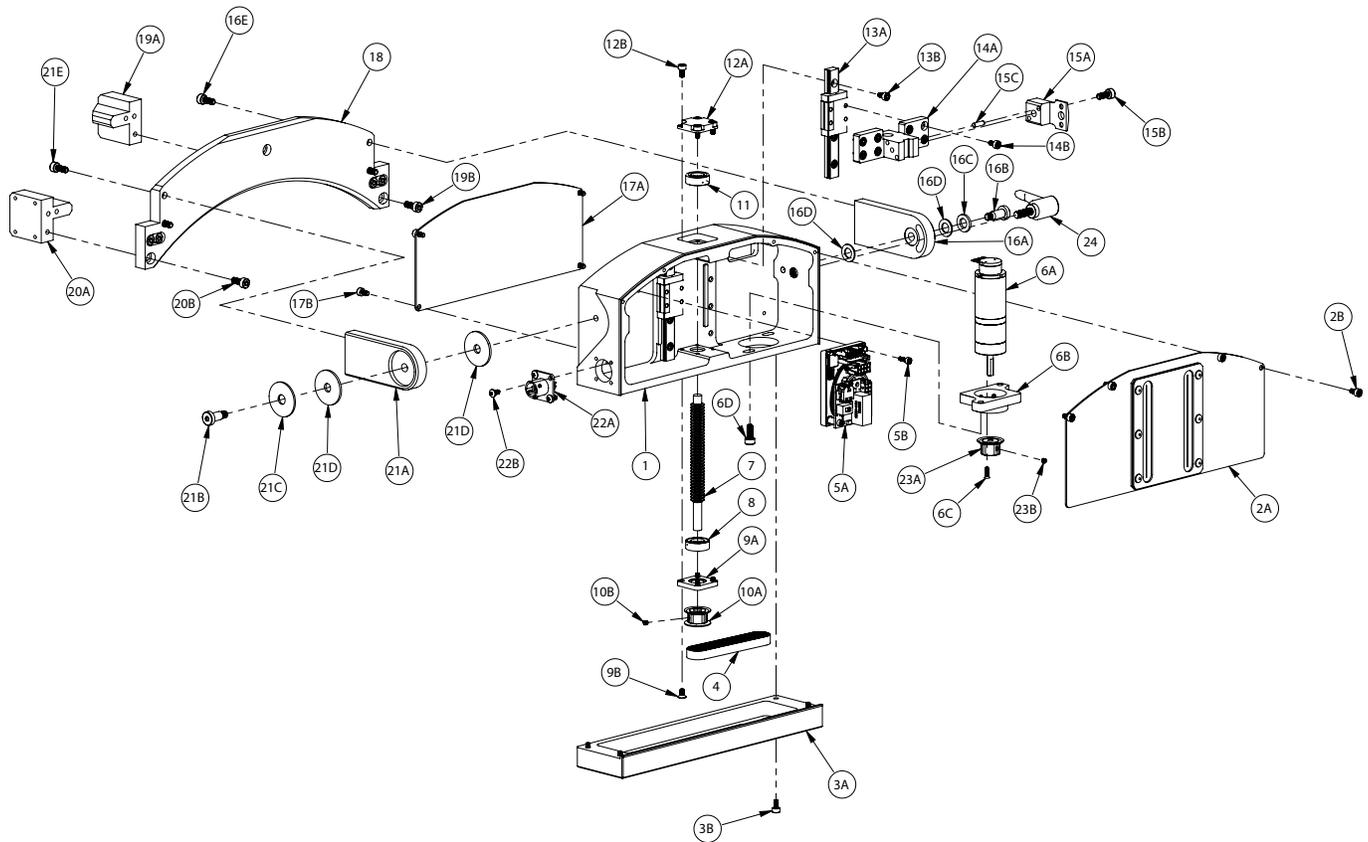
Use only the parts marked “x” in the column under the heading number called for in the model index page.

ITEM	DESCRIPTION	PART NO.	QTY.	
1	AVC Housing	9SM23591	1	X
2	AVC Cover Kit, includes:	KP52253-1	1	X
2A	AVC Cover	NSS	1	X
2B	SHCS M3 X 0.5 X 6, 316 Stainless Steel	9SS30962-17006	4	X
3	Bottom Cover Kit, includes:	9SM23590	1	X
3A	Bottom Cover	NSS	1	X
3B	SHCS M3 X 0.5 X 6, 316 Stainless Steel	NSS	4	X
4	MXL 80 Tooth Belt	KP52252-1	1	X
5	Torch Height Controller Kit, includes:	9SM23204-7	1	X
5A	Torch Height Controller	NSS	1	X
5B	SHCS M2.5 X 0.45 X 8, 316 Stainless Steel	NSS	1	X
6	Torch Height Motor Kit, includes:	9SS30308-2	1	X
6A	Torch Height Motor	NSS	1	X
6B	AVC Motor Mount	9SS32251	1	X
6C	Flat Head Screw Phillips M2-0.4 X 8, Stainless Steel	NSS	6	X
6D	SHCS M4 X 0.7 X 10, Stainless Steel	NSS	2	X
7	AVC Screw	9SS32294	1	X
8	Angular Contact Bearing 6 X 17 X 6	9SS32493	1	X
9	Bearing Retainer Kit, includes:	9SS32257-2	1	X
9A	Bearing Retainer	NSS	1	X
9B	FHCS M3 X 0.5 X 6, Stainless Steel	NSS	4	X
10	6mm X 22 Tooth Pulley Kit, includes:	9SS30524	1	X
10A	6mm X 22 Tooth Pulley	NSS	1	X
10B	Set Screw Cup Point M3 X 0.5 X 3, 316 Stainless Steel	NSS	1	X
11	Angular Contact Bearing 6 X 17 X 6	9SS32493	1	X
12	Bearing Retainer Kit, includes:	9SS32257-1	1	X
12A	Bearing Retainer	NSS	1	X
12B	SHCS M3 X 0.5 X 6, 316 Stainless Steel	NSS	4	X
13	9mm Linear Rail Assembly Kit, includes: (Kit Is One Rail. Two Required Per Assembly)	9SS32509	2	X
13A	9mm Linear Rail Assembly	NSS	2	X
13B	SHCS M3 X 0.5 X 6, 316 Stainless Steel	NSS	4	X
14	AVC Carriage Kit, includes:	9SS32253	1	X
14A	AVC Carriage	NSS	1	X
14B	SHCS M3 X 0.5 X 6, Stainless Steel	NSS	8	X

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Torch Height



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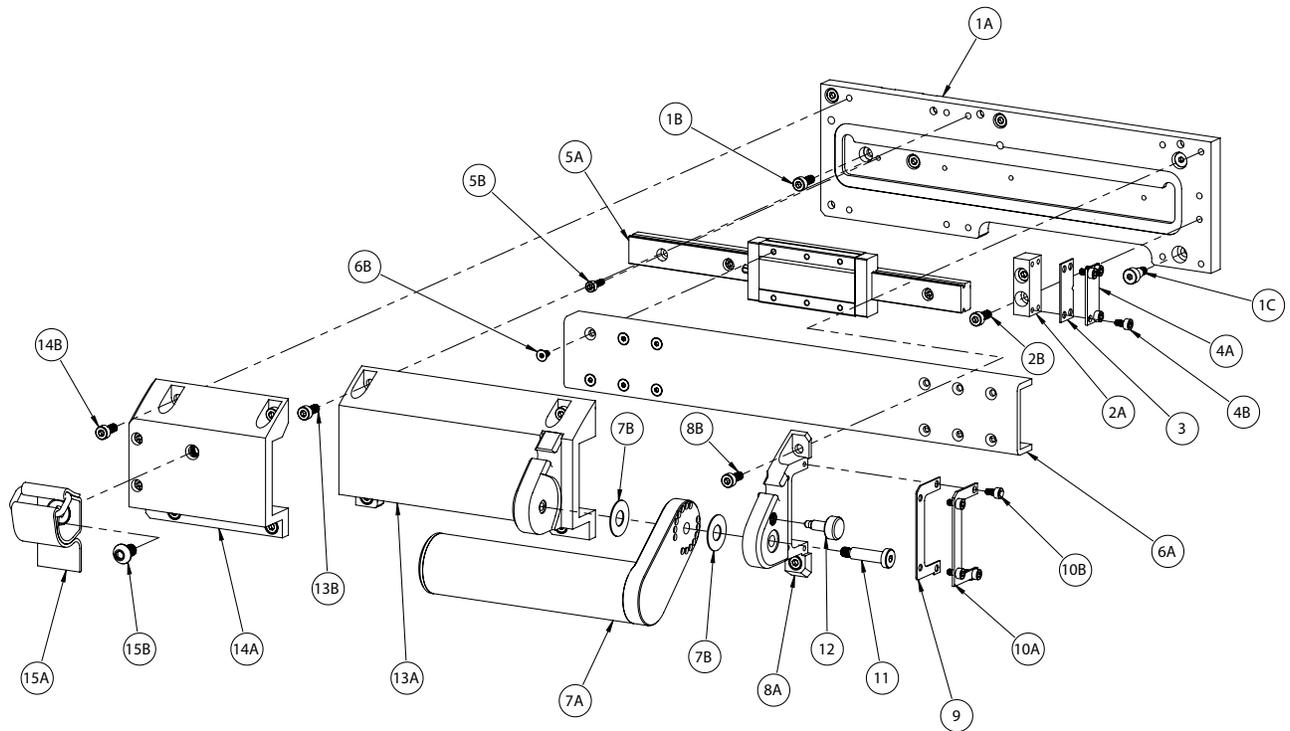
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Use only the parts marked “x” in the column under the heading number called for in the model index page.

ITEM	DESCRIPTION	PART NO.	QTY.	1
15	Torch Mount Kit, includes:	9SS32556	2	X
15A	Torch Mount	NSS	2	X
15B	SHCS M4 X 0.7 X 10, 316 Stainless Steel	NSS	2	X
15C	Dowel Pin M3 X 10, 316 Stainless Steel	NSS	4	X
16	AVC Arm Kit, includes:	9SS32261-1	1	X
16A	AVC Arm	NSS	1	X
16B	Shoulder Screw 6mm X 10mm, M5, Low-Profile, Stainless Steel	9SS32508-06010	1	X
16C	Washer 1/4, Narrow, Stainless Steel	9SS29124-29	1	X
16D	PTFE Washer	9SS32506	2	X
16E	SHCS M4 X 0.7 X 10, Stainless Steel	NSS	2	X
17	Back Cover Kit, includes:	9SS32260	1	X
17A	Back Cover	NSS	1	X
17B	SHCS M3 X 0.5 X 6, 316 Stainless Steel	NSS	4	X
18	Front Plate	9SM23592	1	X
19	Mounting Brace Kit, includes:	9SS32262-2	1	X
19A	Mounting Brace	NSS	1	X
19B	SHCS M4 X 0.7 X 10, 316 Stainless Steel	NSS	3	X
20	Mounting Brace Kit, includes:	9SS32262-1	1	X
20A	Mounting Brace	NSS	1	X
20B	SHCS M4 X 0.7 X 10, Stainless Steel	NSS	3	X
21	AVC Arm Kit, includes:	9SS32261-2	1	X
21A	AVC Arm	NSS	1	X
21B	Shoulder Screw 6mm X 10mm, M5, Low-Profile, 18-8 Stainless Steel	9SS32508-06010	1	X
21C	Washer 1/4 X 1, Stainless Steel	9SS32507-29032	1	X
21D	PTFE Washer	9SS32481	2	X
21E	SHCS M4 X 0.7 X 10, Stainless Steel	9SS30962-19010	2	X
22	Input Wire Harness Kit, includes:	9SS32512	1	X
22A	Input Wire Harness	NSS	1	X
22B	BHCS M3 X 0.5 X 6, Stainless Steel	NSS	4	X
23	4mm 22 Tooth Pulley Kit, includes:	9SS30525	1	X
23A	4mm 22 Tooth Pulley	NSS	1	X
23B	Set Screw Cup Point M3 X 0.5 X 3, Stainless Steel	NSS	1	X
24	Handle	9SS32511-1	1	X

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Right Side Plate



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Right Side Plate

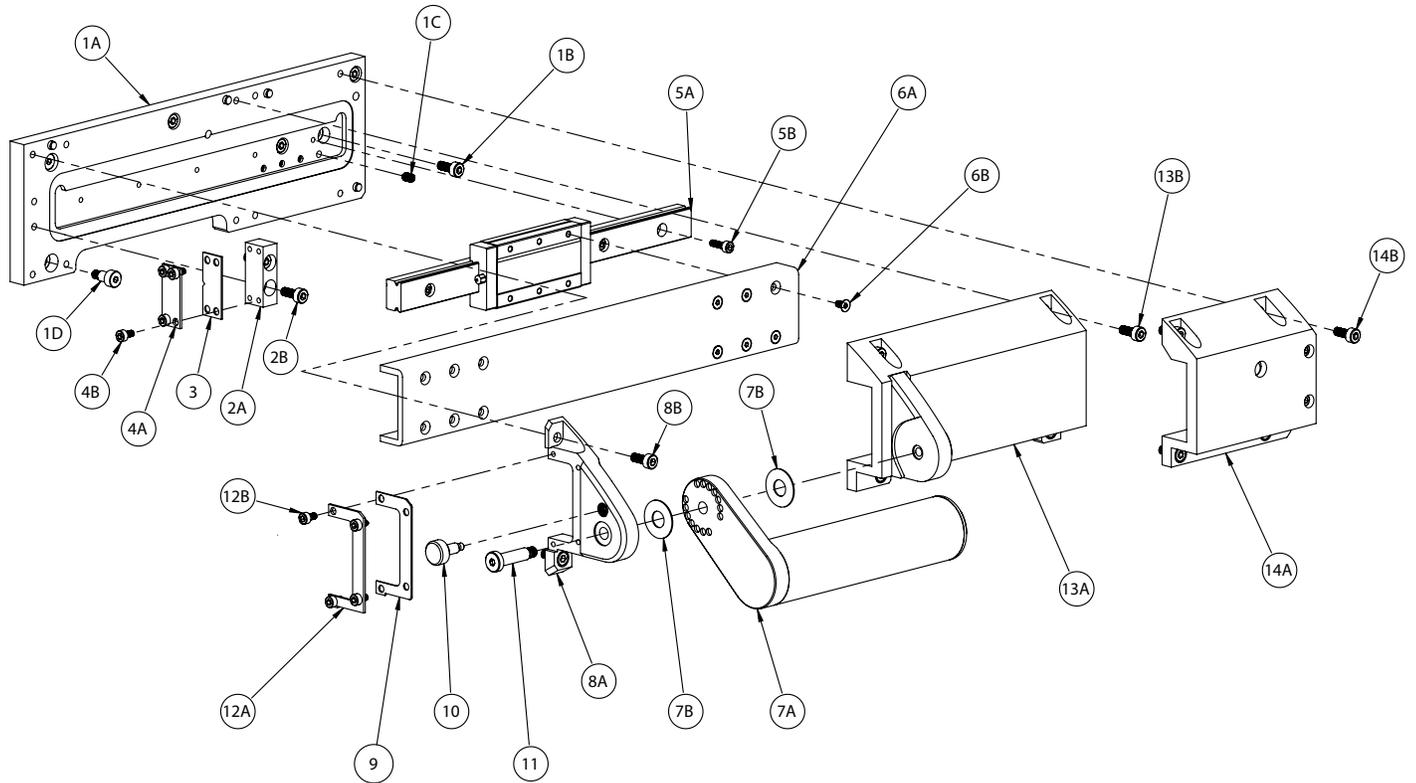
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Use only the parts marked "x" in the column under the heading number called for in the model index page.

ITEM	DESCRIPTION	PART NO.	QTY.	1
1	Right Side Plate Kit, includes:	9SM23606	1	X
1A	Right Side Plate	NSS	1	X
1B	SHCS M4 X 0.7 X 10, Stainless Steel	NSS	4	X
1C	Shoulder Bolt M4 X 0.7 X 6,18-8 Stainless Steel	NSS	2	X
2	Lower Seal Block Kit, includes:	9SS32237	1	X
2A	Lower Seal Block	NSS	1	X
2B	SHCS M4 X 0.7 X 10, Stainless Steel	NSS	2	X
3	Lower Seal	9SS32239	1	X
4	Lower Seal Plate Kit, includes:	9SS32238	1	X
4A	Lower Seal Plate	NSS	1	X
4B	SHCS M3 X 0.5 X 5, Stainless Steel	NSS	4	X
5	Linear Rail Assembly Kit, includes:	9SS32483	1	X
5A	Linear Rail Assembly	NSS	1	X
5B	SHCS M3 X 0.5 X 10, Stainless Steel	NSS	4	X
6	OSC Arm Kit, includes:	9SM23586	1	X
6A	OSC Arm	NSS	1	X
6B	FHCS M3 X 0.5 X 6, Steel, Zinc Plated	NSS	6	X
7	Handle Assembly Kit, includes	9SS32479	1	X
7A	Handle Assembly	NSS	1	X
7B	PTFE Washer	NSS	2	X
8	Bearing Arm Plate Kit, includes:	9SM23587-1	1	X
8A	Bearing Arm Plate	NSS	1	X
8B	SHCS M4 X 0.7 X 10, Stainless Steel	NSS	2	X
9	Outer Wiper	9SS32241	1	X
10	Wiper Plate Kit, includes:	9SS32240	1	X
10A	Wiper Plate	NSS	1	X
10B	SHCS M3 X 0.5 X 6, Stainless Steel	NSS	4	X
11	Shoulder Screw 6mm X 20mm, M5, Low-Profile, Stainless Steel	9SS32508-06020	1	X
12	Stop Knob	9SS32235	1	X
13	Arm Cover Assembly Kit, includes:	9SM23635-1	1	X
13A	Arm Cover Assembly	NSS	1	X
13B	SHCS M4 X 0.7 X 10, Stainless Steel	NSS	4	X
14	Arm Cover Blank Kit, includes:	9SS33222	1	X
14A	Arm Cover Blank	NSS	1	X
14B	SHCS M4 X 0.7 X 10, Stainless Steel	NSS	1	X
15	Cinch Strap with Grommet 5.5in Kit, includes:	9SS32547-550	1	X
15A	Cinch Strap with Grommet 5.5in	NSS	1	X
15B	BHCS M6 X 1 X 10, 316 Stainless Steel	NSS	1	X

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Left Side Plate



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Left Side Plate

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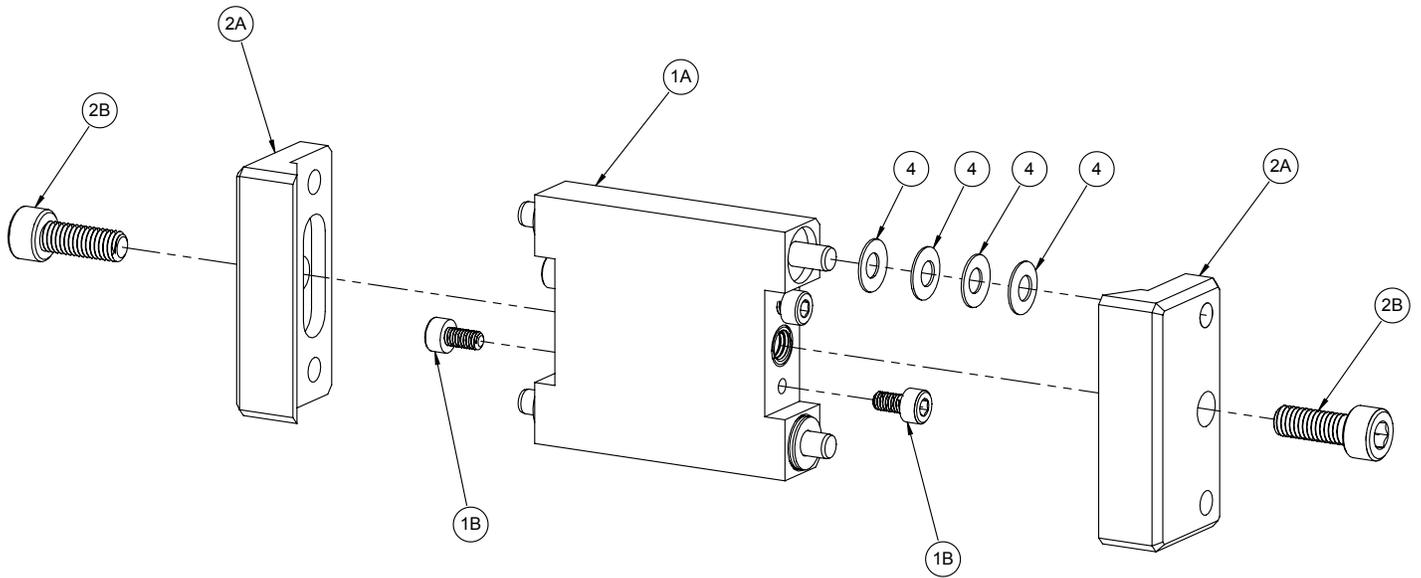
Use only the parts marked “x” in the column under the heading number called for in the model index page.

ITEM	DESCRIPTION	PART NO.	QTY.	1
1	Left Side Plate Kit, includes:	9SM23607	1	X
1A	Left Side Plate	NSS	1	X
1B	SHCS M4 X 0.7 X 10, Stainless Steel	NSS	4	X
1C	Set Screw Cup Point M4 X 0.7 X 6, 316 Stainless Steel	NSS	4	X
1D	Shoulder Bolt M4 X 0.7 X 6, 18-8 Stainless Steel	NSS	2	X
2	Lower Seal Block Kit, includes:	9SS32237	1	X
2A	Lower Seal Block	NSS	1	X
2B	SHCS M4 X 0.7 X 10, Stainless Steel	NSS	2	X
3	Lower Seal	9SS32239	1	X
4	Lower Seal Plate Kit, includes:	9SS32238	1	X
4A	Lower Seal Plate	NSS	1	X
4B	SHCS M3 X 0.5 X 5, 316 Stainless Steel	NSS	4	X
5	Linear Rail Assembly Kit, includes:	9SS32483	1	X
5A	Linear Rail Assembly	NSS	1	X
5B	SHCS M3 X 0.5 X 10, Stainless Steel	NSS	5	X
6	OSC Arm Kit, includes:	9SM23586	1	X
6A	OSC Arm	NSS	1	X
6B	FHCS M3 X 0.5 X 6, Steel, Zinc Plated	NSS	6	X
7	Handle Assembly Kit, includes:	9SS32479	1	X
7A	Handle Assembly	NSS	1	X
7B	PTFE Washer	NSS	2	X
8	Bearing Arm Plate Kit, includes:	9SM23587-2	1	X
8A	Bearing Arm Plate	NSS	1	X
8B	SHCS M4 X 0.7 X 10, 316 Stainless Steel	NSS	2	X
9	Outer Wiper	9SS32241	1	X
10	Stop Knob	9SS32235	1	X
11	Shoulder Screw 6mm X 20mm, M5, Low-Profile, Stainless Steel	9SS32508-06020	1	X
12	Wiper Plate Kit, includes:	9SS32240	1	X
12A	Wiper Plate	NSS	1	X
12B	SHCS M3 X 0.5 X 6, 316 Stainless Steel	NSS	4	X
13	Arm Cover Assembly Kit, includes:	9SM23635-2	1	X
13A	Arm Cover Assembly	NSS	1	X
13B	SHCS M4 X 0.7 X 10, Stainless Steel	NSS	6	X
14	Arm Cover Blank Assembly Kit, includes:	9SS33222	1	X
14A	Arm Cover Blank	NSS	1	X
14B	SHCS M4 X 0.7 X 10, Stainless Steel	NSS	4	X

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Torch Clamp



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**Torch Clamp**

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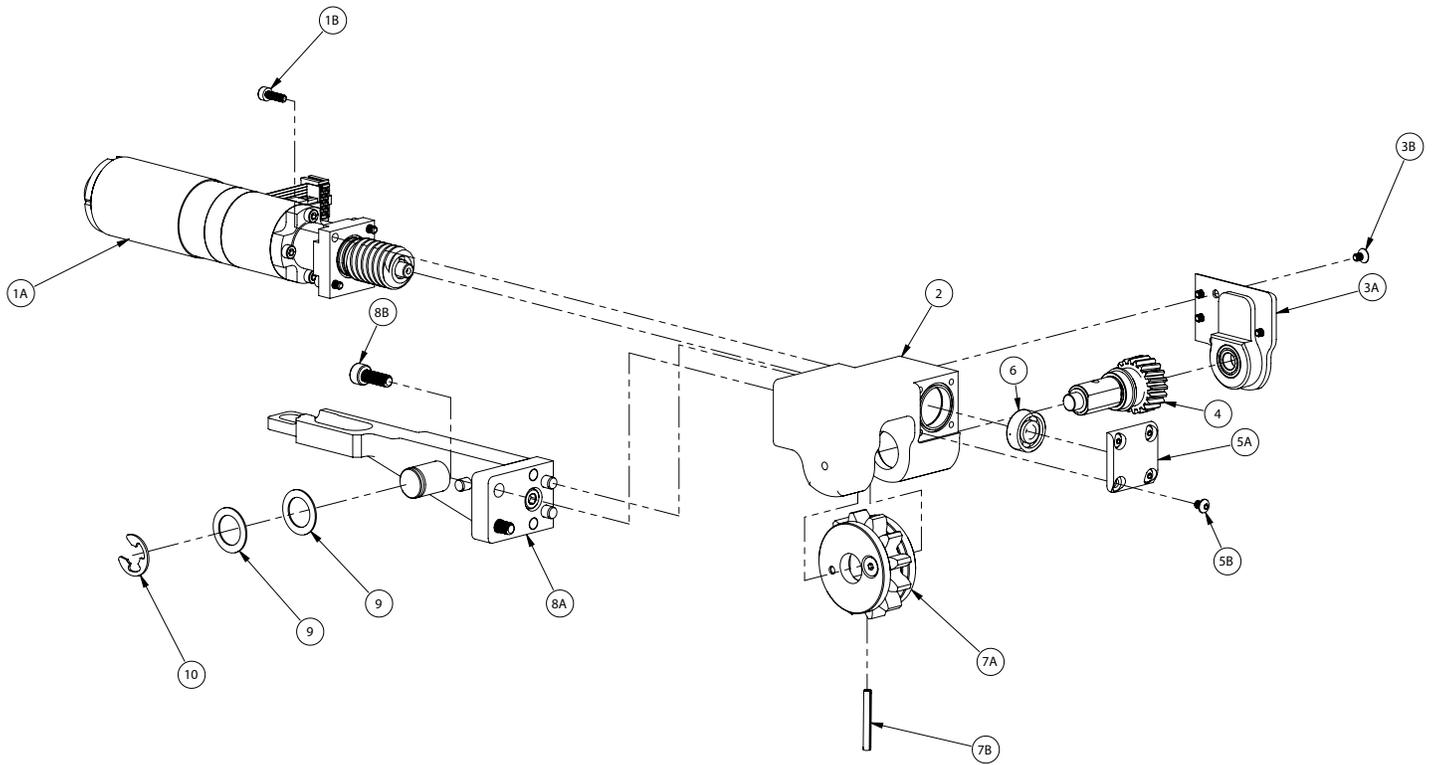
Use only the parts marked “x” in the column under the heading number called for in the model index page.

ITEM	DESCRIPTION	PART NO.	QTY.	
1	Back Slide Plate Kit, includes:	9SS33246	1	X
1A	Back Slide Plate Assy	NSS	1	X
1B	SHCS M3 X 0.5 X 6, 18-8 Stainless Steel	NSS	4	X
2	Dove Tail Clamp Kit, includes:	9SS32566	1	X
2A	Dove Tail Clamp Set	NSS	1	X
2B	SHCS M5 X 0.8 X 14, 316 Stainless Steel	NSS	2	X
4	Disc Spring Kit (8 Pieces)	9SS30986	2	X

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Transmission Drive



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Transmission Drive

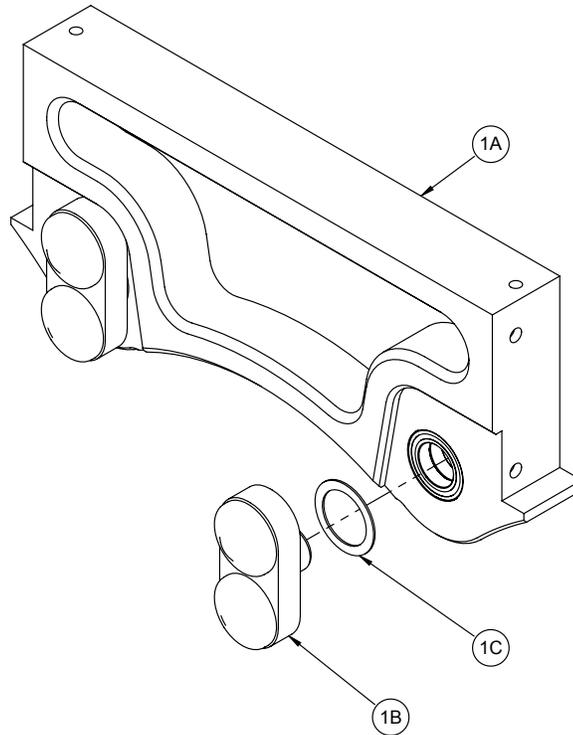
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Use only the parts marked “x” in the column under the heading number called for in the model index page.

ITEM	DESCRIPTION	PART NO.	QTY.	1
	Transmission Drive, includes:	9SM23643	1	X
1	Travel Motor Assembly Kit, includes:	9SS32504	1	X
1A	Travel Motor Assembly	NSS	1	X
1B	SHCS M3 X 0.5 X 10, Stainless Steel	NSS	4	X
2	Transmission Housing Assembly	9SM23641	1	X
3	Transmission Cap Kit, includes:	9SS32518	1	X
3A	Transmission Cap	NSS	1	X
3B	FHCS M3 X 0.5 X 6, 316 Stainless Steel	NSS	5	X
4	Travel Gear Shaft	9SM22942	1	X
5	Pressure Plate Kit, includes:	9SS32249	1	X
5A	Pressure Plate	NSS	1	X
5B	BHCS M3 X 0.5 X 4, Stainless Steel	NSS	4	X
6	Angular Contact Bearing 6 X 17 X 6	9SS32493	1	X
7	Travel Gear Assembly Kit, includes:	9SM24544	1	X
7A	Travel Gear Assembly	NSS	1	X
7B	Spring Pin Coiled 1/8 X 1, Stainless Steel	NSS	1	X
8	Pivot Arm Kit, includes:	9SM23605	1	X
8A	Pivot Arm	NSS	1	X
8B	SHCS M5 X 0.8 X 14, Stainless Steel	NSS	2	X
9	Brass Shim	9SS29130	2	X
10	E-Clip Retaining Ring 7/16, Steel	9SS32184-028	1	X

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Inboard Side Plate



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**Inboard Side Plate**

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Use only the parts marked “x” in the column under the heading number called for in the model index page.

ITEM	DESCRIPTION	PART NO.	QTY.	1
<b>1</b>	<b>Inboard Plate Assembly Kit, includes:</b>	<b>9SM23632</b>	<b>1</b>	<b>X</b>
<b>1A</b>	<b>Inboard Plate Assembly</b>	<b>NSS</b>	<b>1</b>	<b>X</b>
<b>1B</b>	<b>Roller Pivot</b>	<b>9SM23184</b>	<b>2</b>	<b>X</b>
<b>1C</b>	<b>Roller Pivot Bushing</b>	<b>NSS</b>	<b>2</b>	<b>X</b>

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## **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.

Lincoln Electric is a responsive manufacturer, but 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.

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