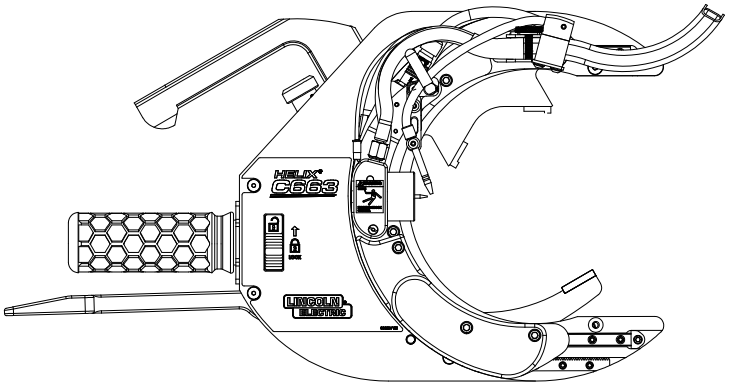
Operator's Manual

HELIX® C663 Weld Head

For use with machines having Code Numbers:
70307, 70308, 70311, 70312



GENUINE LINCOLN PARTS™

Register your machine:
www.lincolnelectric.com/register

Authorized Service and Distributor Locator:
www.lincolnelectric.com/locator

Save for future reference

Date Purchased

Code: (ex: 10859)

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
A Lincoln Service Representative will contact you
no later than the following business day.

For Service outside the USA:
Email: globalservice@lincolnelectric.com

IM6116 | Issue Date 06/14

THE LINCOLN ELECTRIC COMPANY
22801 St. Clair Avenue • Cleveland, OH • 44117-1199 • U.S.A.
Phone: +1.216.481.8100 • www.lincolnelectric.com

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 Material Safety Data Sheet (MSDS) and the warning label that appears on all containers c 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

Diesel Engines

Diesel engine exhaust and some of its constituents are known to the State of California to cause cancer, birth defects, and other reproductive harm.

Gasoline Engines

The engine exhaust from this product contains chemicals known to the State of California to cause cancer, birth defects, or other reproductive harm.

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. 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 with electrodes which require special ventilation such as stainless or hard facing (see instructions on container or MSDS) 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. In confined spaces or in some circumstances, outdoors, a respirator may 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.

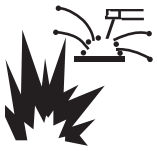
5.c. Do not weld in locations near chlorinated hydrocarbon vapors coming from degreasing, cleaning or spraying operations. The heat and rays of the arc can react with solvent vapors to form phosgene, a highly toxic gas, and other irritating products.

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 material safety data sheet (MSDS) and follow your employer's safety practices. MSDS 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 1235 Jefferson Davis Highway, Arlington, VA 22202.

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.

Welding Safety Interactive Web Guide for mobile devices

Get the free mobile app at
http://gettag.mobi

Technical Specifications HELIX® C663 Weld Head

C663 Clamp On Weld Head Product Number K52092-1, K52092-2			
		K52092-1	K52092-2
Input Power		24 VDC	
Radial Clearance		5.5” (139.7 mm) from center of work (K52095-1)	6.3” (160.0 mm) from center of work (K52095-2)
Axial Clearance			
Total Depth		7.55” (191.8 mm)	8.60” (218.4 mm)
Tungsten to rear (min w/ osc out)		5.8” (147.32 mm)	
Tungsten to front (min w/ osc out)		1.05” (26.7mm)	.75” (19.1mm)
Travel Speed		0.05 - 1.02 rpm	
Max Oscillation Speed		29 ipm (73.66 cmpm)	
Oscillation stroke		1” (25.4 mm)	
Work Angle		Optional	
Lead Lag		Optional	
Torch Amps		300	
Tube/Pipe Size		1.9 - 6.625 in (48.3 - 168.3 mm) OD	
Wire Feed Options			
Wire Feeder	On Board Feeder	WF20B Suitcase Feeder	WF20B Bench Feeder
Wire Feed Speed	18 - 80 ipm (457.2 - 2032 mmpm)	1.0 -130 ipm (2.54 - 330.2 cmpm)	
Wire Size	0.030 - 0.045” (0.8 - 1.1 mm)	0.030” - 0.045” (0.584 - 1.143 mm)	
Weld Head Pysical Dimensions K52092-1			
Length (handle to top) 16.58” (421.1 mm)	Height (body width) 10.3” (261.6 mm)	Depth (torch to back) 7.55” (191.8 mm)	Weight (no cables) 25 lbs (11.3 kg)
Temperature Ranges			
Operating Temperature Range 32ºF to 140ºF (0C - 60C)		Storage Temperature Range (Water Removed) -22ºF to 140ºF (-30C - 60C)	

Standard Clamp Size Options For OD							
K52093-190 1.9” 48.3 mm	K52093-238 2.375” 60.3 mm	K52093-288 2.875” 73.0 mm	K52093-350 3.5” 88.9 mm	K52093-400 4.0” 101.6 mm	K52093-450 4.5” 114.3 mm	K52093-556 5.563” 141.3 mm	K52093-663 6.625” 168.3 mm

Explanation of Symbols

Electric Shock Warning

Hot Surface Warning

Clutch Locked

Clutch Unlocked

Safety Precautions

Read entire manual before installation or operation.

⚠ WARNING

Electric shock can kill

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

Proper handling

The HELIX® C663 Weld Head is only meant to be picked up and supported by the two handles. Only attempt to attach the weld head to the pipe while the clamp mechanism is disengaged and the slide plate (AVC) is fully retracted.

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 and not clamped to the work surface.

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

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.

Do not operate in wet, damp or moist areas.

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

Keep hands away from weld head while in operation.

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

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

Required Tools

- 1/16” hex key
- 3/32” hex key
- 5/32” hex key
- 5/64” hex key
- 7/64” hex key
- 9/64” hex key
- .050” hex key
- Tape measure
- Wire Cutters

Clamp Shoe Name	Part Number	Nominal Size In.	OD Diameter In.	OD Diameter mm
Helix C450 Clamp Shoe - 4.500” OD	K52096-450	4	4.5	114.3
Helix C450 Clamp Shoe - 4.000” OD	K52096-400	3.5	4	101.6
Helix C450 Clamp Shoe - 3.500” OD	K52096-350	3	3.5	88.9
Helix C450 Clamp Shoe - 2.875” OD	K52096-288	2.5	2.875	73.0
Helix C450 Clamp Shoe - 2.375” OD	K52096-238	2	2.375	60.3
Helix C450 Clamp Shoe - 1.900” OD	K52096-190	1.5	1.9	48.3
Helix C450 Clamp Shoe - 1.660” OD	K52096-166	2	2.375	60.3
Helix C450 Clamp Shoe - 1.315” OD	K52096-132	1.5	1.9	48.3
Helix C450 Clamp Shoe - Custom Size	K52096-000	Variable		

HELIX® C663 Weld Head

Basic Information

The HELIX® C663 Weld Head is a precision water cooled clamp on weld head for GTAW (TIG) welding. Designed to work with the APEX® 2100 Orbital Control System the clamp on head welds small diameter tubes ranging from 1.9" to 6.625" OD. The C663 has interchangeable shoe clamps that allow the operator to adjust for different diameter tubes or pipes. These shoe clamps are provided separately.

The HELIX® C663 has Automatic Voltage Control (AVC) while welding, as well as oscillation capabilities, in addition to water cooling and multiple wire placement options, to include an optional on board wire feeder. Optional lead lag, and work angle upgrades are available. These give the operator greater control of the weld puddle for more complicated welds.

Installation of the weld head, consumables and variable size components will be discussed in this section.

Basic Components

The three basic components of the weld head are:

- Body Assembly
- Torch Motion Assembly
- Cable Assembly

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

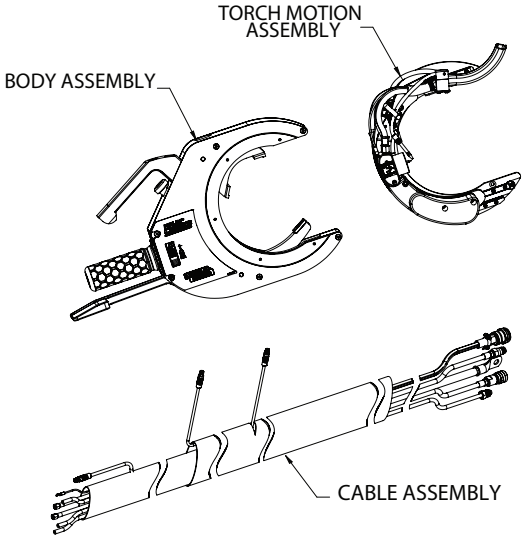


FIGURE 1 - Weld Head Components

Each of the weld head components are discussed separately.

Body Assembly

The body assembly is the main assembly for the C663 Weld Head. Both the torch motion assembly and handle assembly attach to the body. The travel gear belts and clamping mechanism are housed in this assembly. This assembly contains several adjustments and controls. See **FIGURE 2 - Adjustment Controls Assembly.**

Adjustments and controls located on the body include:

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

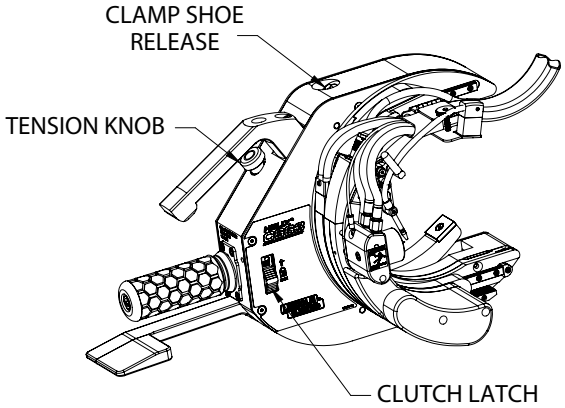


FIGURE 2 - Adjustment Controls

Clamping Mechanism

The clamping mechanism allows the weld head to attach and hold onto the pipe or tube being welded. See **FIGURE 3 - Clamping Mechanism**.

The clamping mechanism consists of:

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

Portion of the lever mechanism that secures against the pipe, opposite the clamp shoe, which tightens the head onto the work surface.

- Lever Arm
  Manipulated by the operator, this lever engages the clamp jaw.

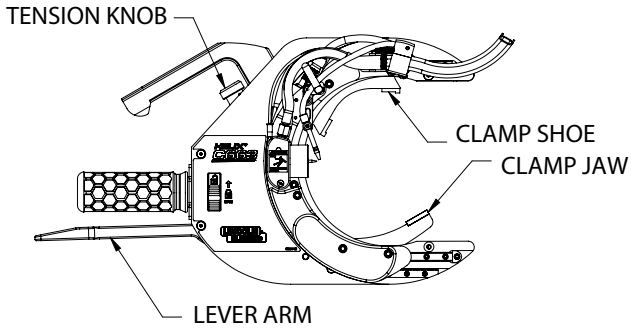


FIGURE 3 - Clamping Mechanism

Torch Motion Assembly

The torch motion assembly performs most of the motions for the torch and wire feed to include AVC, Oscillation, as well as providing wire feed. This assembly houses the associated PCB's and cooling lines for the torch, AVC motor and oscillation motor. See **FIGURE 4 - Torch Motion Assembly**

For operation there are three main parts of the torch motion assembly:

- Motor Housing
  Contains the AVC motor, oscillation motor, PCB, and associated cooling lines.
- Torch
  Contains the tungsten and associated consumables for welding. The torch can be electrically and physically hot. Use caution when working with or around the torch.
- Wire Feed
  This consists of all wire adjustments for the weld head.

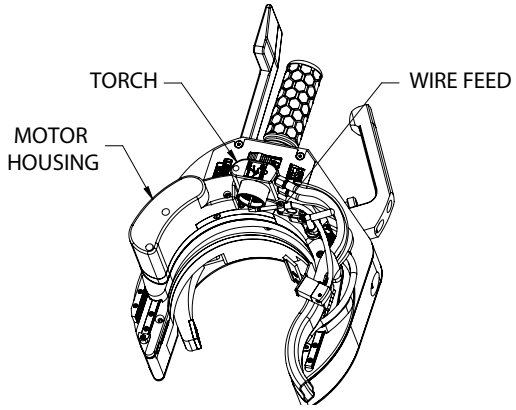


FIGURE 4 - Torch Motion Assembly

Wire Guide Assembly

The wire guide assembly, see **FIGURE 5 - Wire Guide Assembly (K52092-2)** allows the user to manipulate where the wire will be placed into the weld puddle, it has three different angles of adjustment. Up / Dow, Left / Right, and In / Out, refer to the Weld Head Setup on page **A-8** for more information on adjustment angles.

The wire guide assembly consists of:

- Wire Guide Tip
  Provides precision guides of the wire to the puddle
- Adjustment Arm
  The arm of the wire liner that can be manipulated in/out and left/right for proper wire placement
- Up / Down Adjustment Lever
  One of the wire adjustment locations for adjusting the wire guide
- Wire Liner
  A clear wire liner that allows the operator to see when the wire begins to feed through
- Wire Liner Coupler (K52092-2 Only)
  The offboard wire liner is connected here into the wire liner input

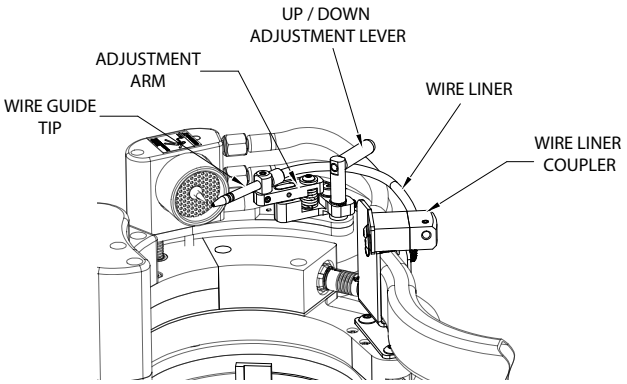


FIGURE 5 - Wire Guide Assembly (K52095-2)

Cable Assembly

The cable assembly attaches from the weld head and wire feed to the controller and power supply, it supplies the input controls, power, gas, and water to the weld head. See **FIGURE 6 - Cable Assembly**. The wire feeder cable extends outside of the cable wrap for the K52092-2, to accommodate the external wire feeder, and it is contained within the wrap for the K52092-1.

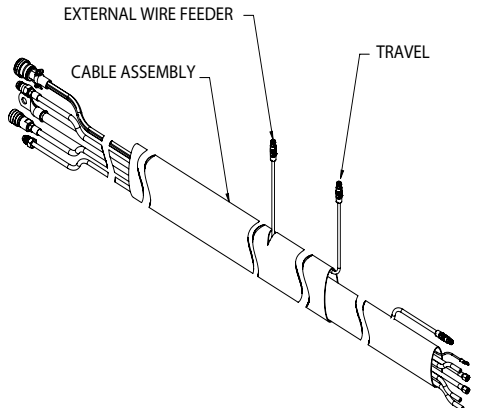


FIGURE 6 - Cable Assembly

The cables and hoses that attach to the torch are held in place by a strain relief. This relief allows the cables to travel around the tube or pipe without pulling against their connectors. Ensure that adequate slack is left between the connectors and the strain relief to allow the torch assembly to oscillate back and forth.

The water hoses for the clamp on head are color coded for easy assembly, see **FIGURE 7 - Cable Placement**. Install the hoses firmly to prevent leaks. There are 4 sets of cables for the torch motion assy.

1. The red hoses provide power and cooling to the torch and are interchangeable
2. The black gas hose provides shielding gas.
3. The control cable controls weld head functions.
4. The blue hoses cool the AVC and oscillation motors, and are interchangeable.

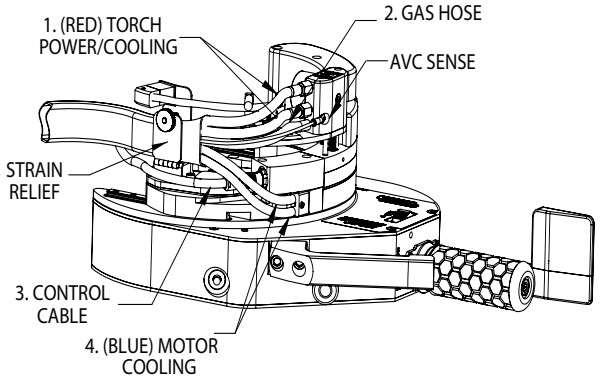


FIGURE 7 - Cable Placement

The travel cable attaches to the bottom of the handle assembly see **FIGURE 8 - Travel Cable**. In order to facilitate rotation around the pipe a six foot section of this cable is left free of the cable bundle. The wire control cable, see **FIGURE 6 - Cable Assembly** attaches into the external wire feed.

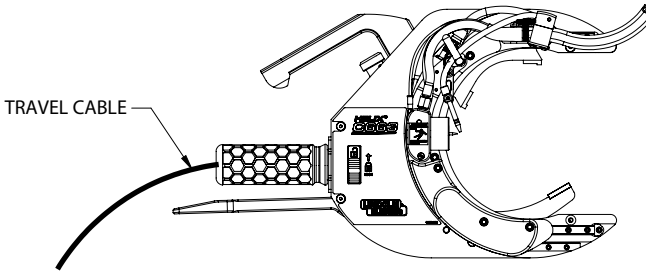


FIGURE 8 - Travel Cable

Clamp Shoes

The weld head has an assortment of interchangeable clamps that can be changed depending on the outside diameter of the pipe or tube being welded, these clamps range in size from 1.5 to 6 in. or OD 1.9 - 6.625 in. (33.4 - 114.3 mm).

FIGURE 9 - Clamp Size 1.9” shows the profile of a 1.9” shoe clamp inserted into the weld head.

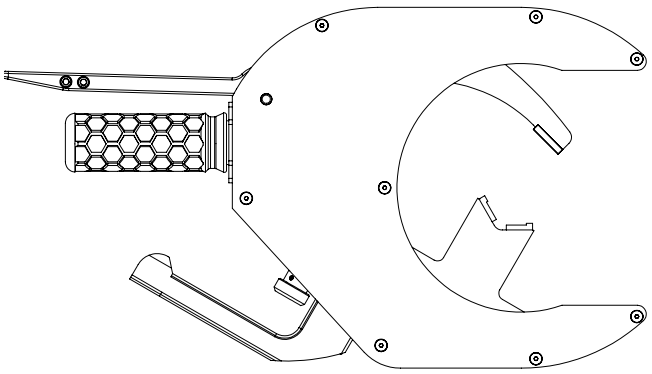


FIGURE 9 - Clamp Size 1.9”

FIGURE 10 - Clamp Size 6.625” shows a 6.625” shoe clamp. Each example also shows the different placements of the clamp jaw as it would sit while around the different pipe sizes.

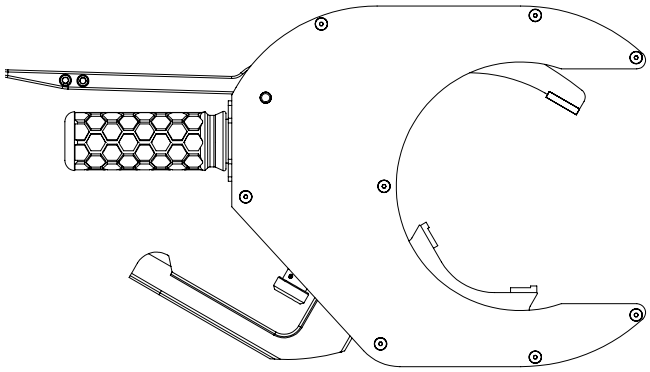


FIGURE 10 - Clamp Size 6.625”

The operator can purchase as many clamp shoes as required. Only one size of clamp shoe is required per weld head. See **FIGURE 11 - Standard Clamp Shoe Sizes** for examples. Specialty sizes are available upon request. Take care while installing the clamp shoes as they can present a pinch point.

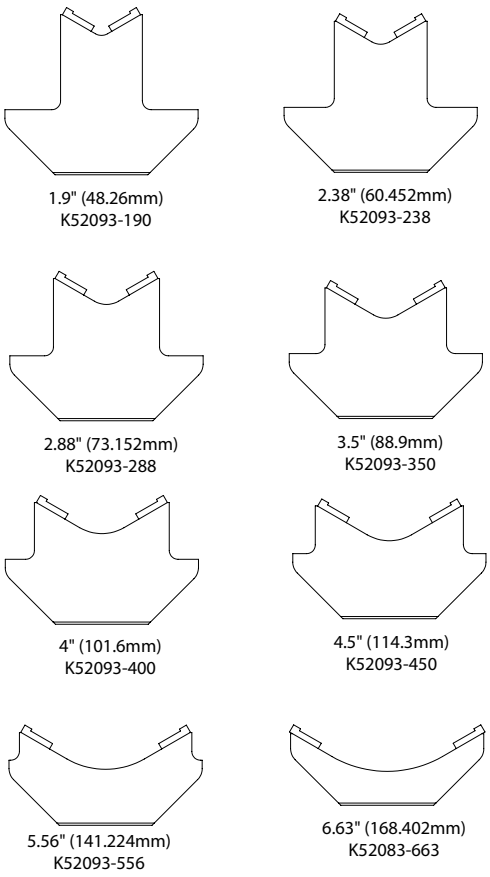


FIGURE 11 - Standard Clamp Shoe Sizes

Installation

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

To install clamp shoes, with the weld head detached from the pipe, press and hold the clamp shoe release button on the top of the weld head. See **FIGURE 12 - Clamp Shoe Release**

With the clamp shoe quick release button pressed slide the desired size of clamp shoe into the weld head. See **FIGURE 13 - Clamp Shoe Placement** for proper location of the clamp shoe.

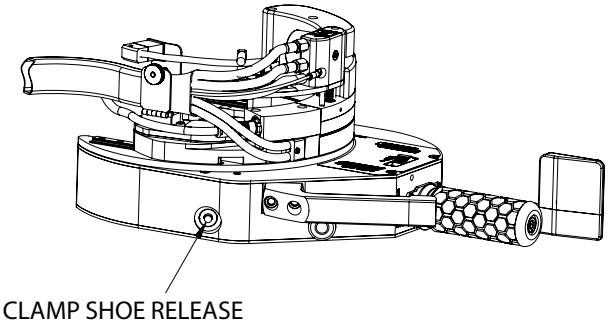


FIGURE 12 - Clamp Shoe Release

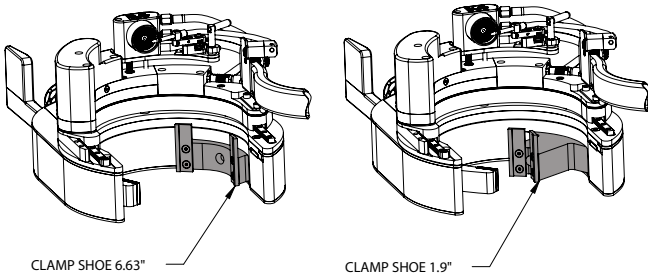


FIGURE 13 - Clamp Shoe Placement

Ensure that the clamp shoe is installed correctly. Clamp plates on the end of the clamp shoes ensure the clamp on head is properly attached to the work surface. Verify that these clamp plates are facing out toward the torch motion assembly. See **FIGURE 14 - Clamp Plate Orientation** for correct placement.

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

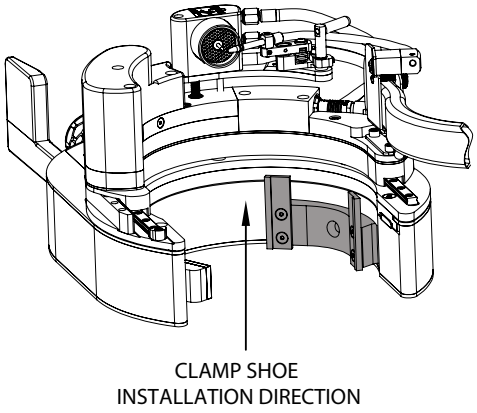


FIGURE 14 - Clamp Plate Orientation

Removal

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

Weld Head Positioning

Place the weld head with the clamp shoe positioned at 12 o'clock on the pipe or tube. See **FIGURE 15 - Weld Head Placement.** This allows the weight of the head to rest on the work surface. Adjust the weld head so that the tungsten is directly over the weld joint, see **FIGURE 16 - Tungsten Positioning.** Once the head is positioned on the pipe with the tungsten at the appropriate location, clamp the head onto the work surface.

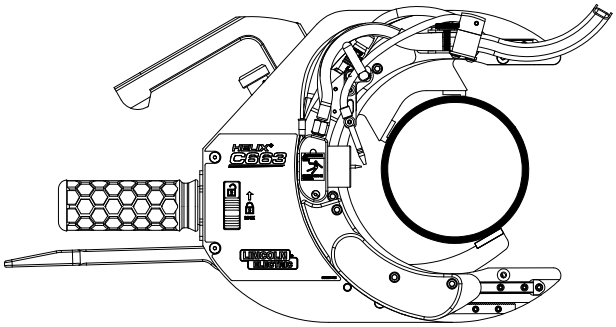


FIGURE 15 - Weld Head Placement

NOTE: Ensure the oscillation is at the center point and that the AVC has been driven up to allow proper clearance before positioning the weld head.

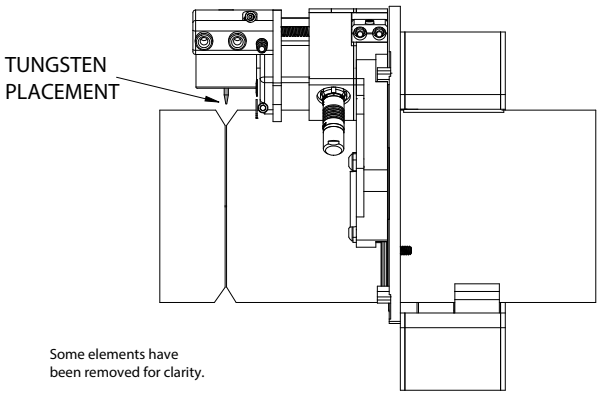


FIGURE 16 - Tungsten Positioning

Weld Head Installation

With the appropriate clamp shoe selected and the weld head in the proper position the clamping mechanism needs to be set at the correct tension. Pull the lever arm up to engage the clamp. If the lever arm is too tight turn the tension knob counter clockwise to allow the lever clamp to loosen. See **FIGURE 17 - Tension Knob**.

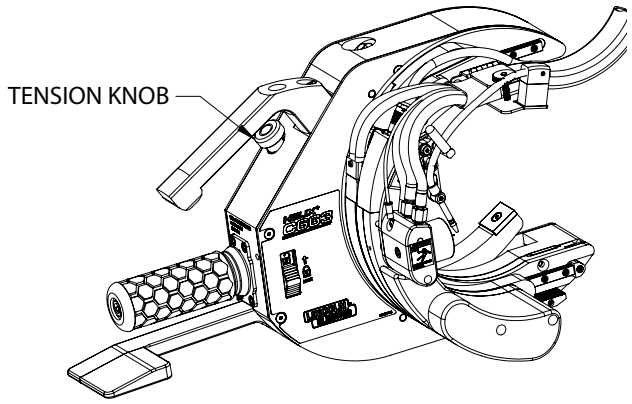


FIGURE 17 - Tension Knob

If there is too little tension then turn the tension knob clockwise allowing the lever arm to move closer to the pipe. To correctly tighten the clamping mechanism there should be enough tension so that with the lever arm engaged, the weld head will not slip on the pipe, but not so much tension that the lever arm cannot be engaged.

To verify that the correct amount of pressure is used, tighten the tension knob with the lever clamp engaged until it is as tight as possible. Disengage the lever arm, and then rotate the tension knob clockwise 1/4 of a turn, then re-engage the clamp jaw. There should be a moderate amount of resistance and a snapping when the jaw engages, if not open the clamp and turn another 1/4 turn. Repeat as needed.

Weld Head Setup

Tungsten Placement

The HELIX® C663 Weld Head comes with a modified small back cap for low clearance applications. This back cap requires a 2 in (50.8mm) tungsten. See **FIGURE 18 - Low Profile Back Cap**. To remove this back cap requires a hex head driver.

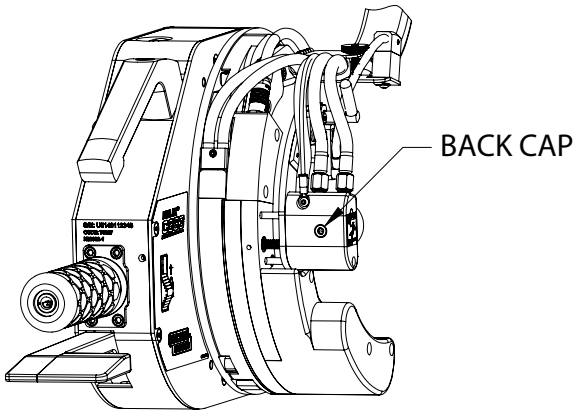


FIGURE 18 - Low Profile Back Cap

The operator has the option of using the included low profile back cap or a longer back cap that allows for larger tungsten. The tungsten is installed by removing the back cap and sliding the tungsten and collet through. Install the tungsten so that it is adequately covered by the shielding gas.

Wire Placement

Once the weld head is clamped at the correct location it is time to set up the wire feed placement. The adjustments allow the operator to set the wire to feed precisely into the weld puddle as required by the weld parameters. The wire feed has 3 levels of adjustment: up/down, left/right and in/out.

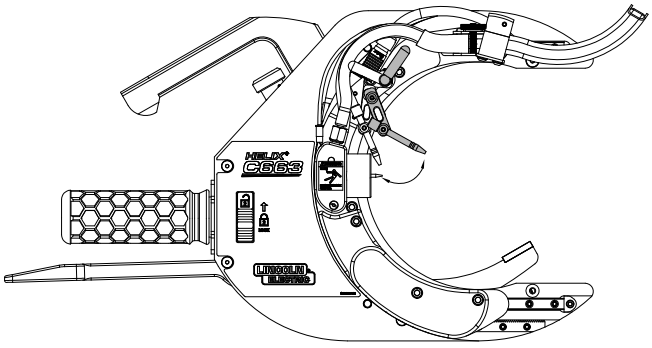


FIGURE 19 - Up / Down Adjustment

To adjust the wire feed up or down move the lever on the assembly to the appropriate degree needed for welding, the wire guide tip will move along with the lever. See **FIGURE 19 - Up / Down Adjustment**

In or out adjustment of the wire guide tip can be done using a hex head screwdriver. See **FIGURE 20 - In / Out Adjustment**. Loosen the set screw and position the wire guide tip to the desired location, then tighten the screw.

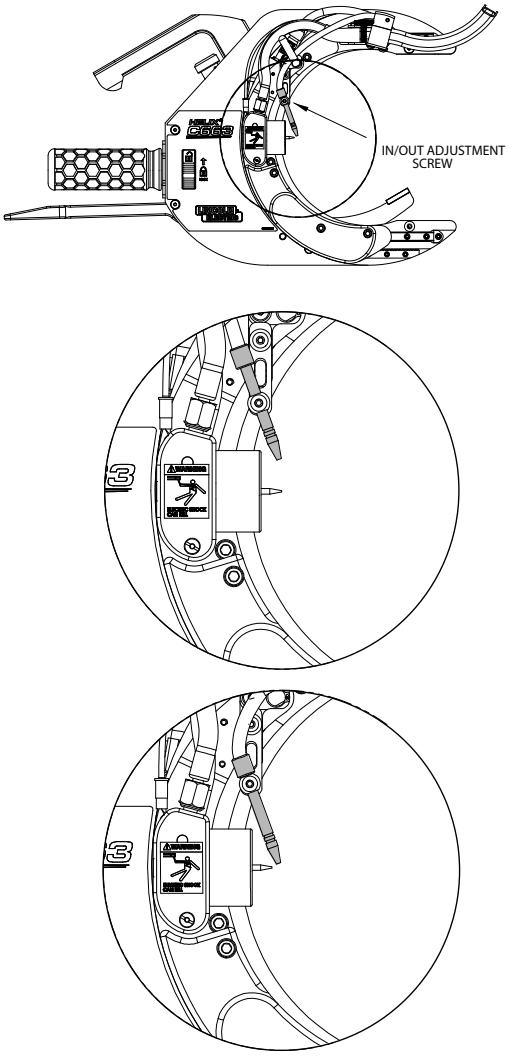


FIGURE 20 - In / Out Adjustment

Left or right adjustment of the wire can be done with using a hex head screwdriver. See **FIGURE 21 - Left / Right Adjustment**.

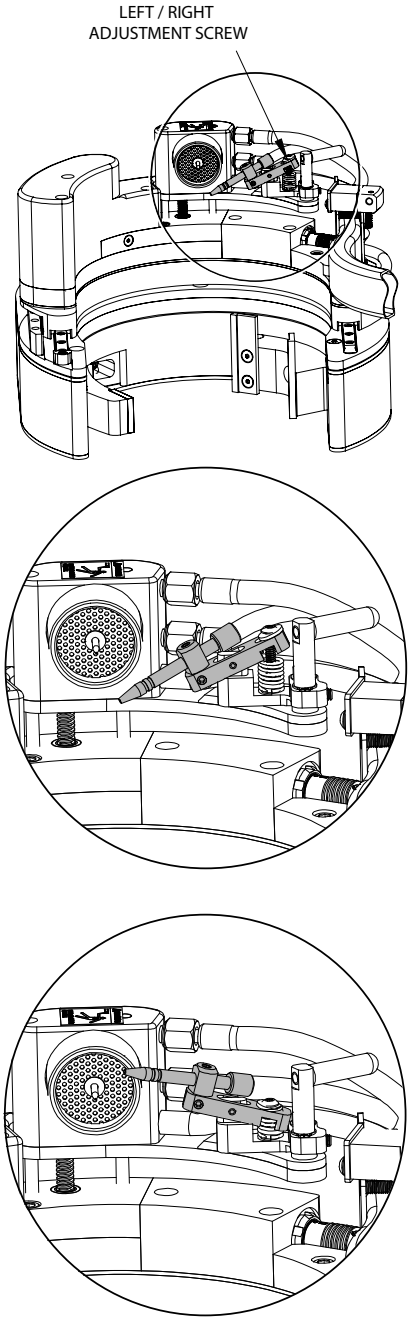


FIGURE 21 - Left / Right Adjustment

Start Location

With the weld head clamped in place, disengage the clutch latch and rotate the torch motion assembly to desired position on the pipe. The torch motion assembly is rotated by holding onto the motor housing. Reengage the clutch latch at the desired location.

NOTE: Do not hold or rotate torch motion assembly by holding onto the torch or wire guide as this can cause damage over time.

Wire Feed Options

The Helix® C663 Weld head has three wire feed options, the onboard wire feeder, the WF20B bench wire feeder and the WF20S suitcase wire feeder.

On Board Wire Feed

The on board wire feed option can be purchased as a seperate add on unit or as part of the C663 Weld Head, it is a small capacity wire feeder that is a part of the weld head, see **FIGURE 22 - On Board Wire Feeder**. This feeder supports a 2 lb. wire spool and wire sizes from .030 to .045". The on board wire feeder is the most portable option, as it does not require a seperate wire feeder to be carried to a job site.

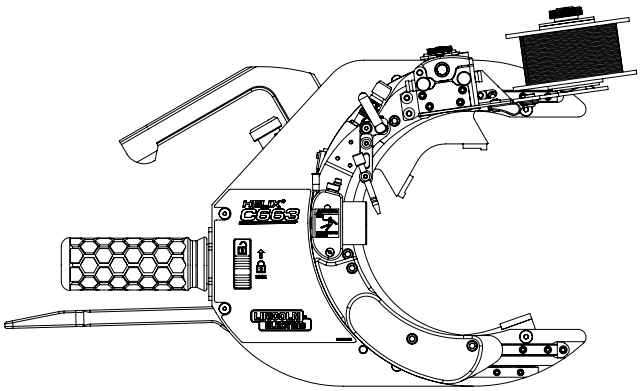


FIGURE 22 - On Board Wire Feeder

Installation / Removal

To install the on board wire feed option, first remove the cable arrestor, see **FIGURE 23 - Cable Arrestor Removal** for the locations of all components.

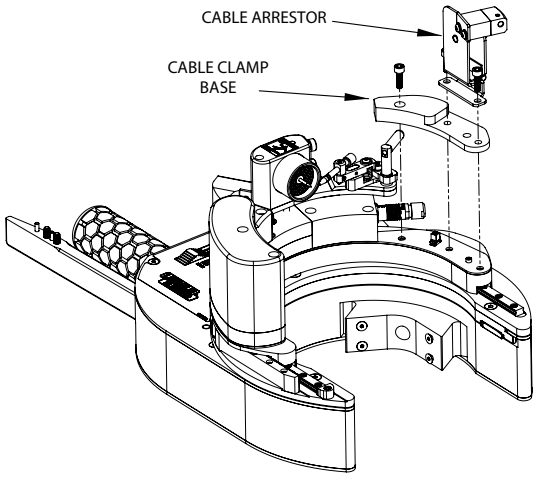


FIGURE 23 - Cable Arrestor Removal

Note: Chaging between off board and on board wire feeders will require wire travel calibration.

There are three screws that need to be removed, the cable clamp base screw, and two cable arrestor screws which are attached directly to the cable arrestor. With these screws removed the assembly will lift off the weld head.

With the cable arrestor removed, install the on board wire feeder and components, see **FIGURE 24 - On Board Wire Feeder Installation** for the locations of all components.

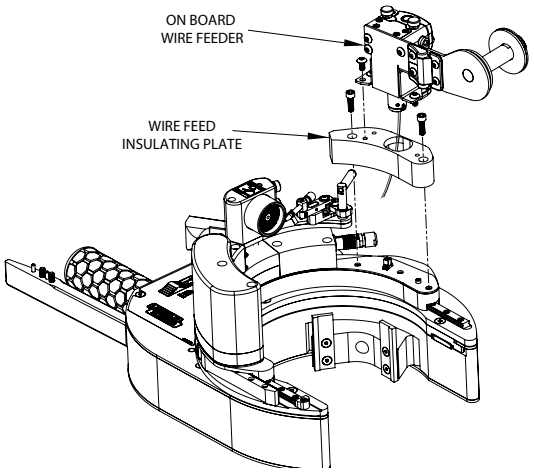


FIGURE 24 - On Board Wire Feeder Installation

Assemble the on board feeder and wire feed insulating plate if they are not already assembled.

First thread the 2 motor wires from the feeder assembly through the wire feed insulating plate. The on board wire feeder attaches to the insulating plate with 3 screws.

Once the insulating plate and on board feeder are together, insert the motor wires into the terminal block, see **FIGURE 25 - Terminal Block**.

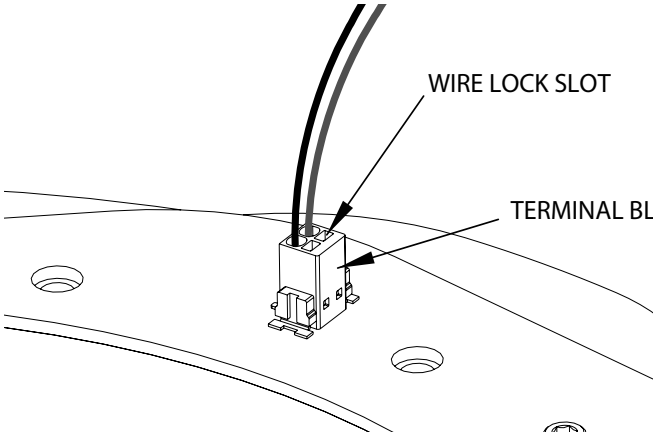


FIGURE 25 - Terminal Block

To install the wires, use the PCB Wire Removal Tool (S29098-030). Insert the tool into the rectangular wire lock slot on the terminal block which will disengage the wire lock. This allows the wire to be inserted or removed into the circular openings. Once the wire is in the correct location remove the tool to lock the wire in place. The orange wire attaches to the terminal marked “WF+” and the black wire attaches to terminal marked “WF-”.

Once the wires are installed, take care that excess wire is in the empty space in the wire feed insulating plate, this will ensure the wires do not get trapped between the assembly and the surface which can sever the wires. Install the onboard wrie feeder assembly to the surface of the weld head, with 2 screws.

Follow these instructions in reverse to go from an on board wire feeder assembly to an off board wire feeder assembly.

Wire Spool Installation

The On board wire feeder consists of three main parts, the hub, hub nut, and wire feed mechanism.

- Hub Nut
  The hub nut sits at the end of the hub and locks the spool of wire in place.
- Lock Washer
  This washer prevents the hub nut from spinning while wire is being fed
- Washer
  Standard washer facilitates smooth wire travel
- Spool Hub
  The hub supports the wire and allows smooth and consistent rotation.
- Wire Mechanism
  The wire feed mechanism consists of the wire feed motor and the entire drive assembly and associated parts. Wire is fed from the wire spool into the wire feeder.

Refer to **FIGURE 26 - On Board Wire Feeder Components** for locations of the different components that make up the wire feeder.

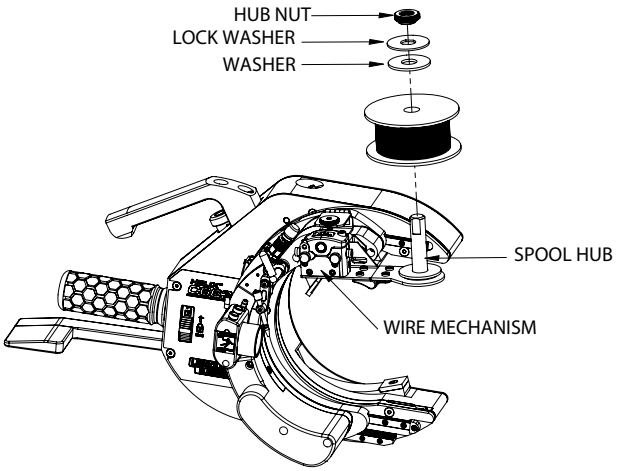


FIGURE 26 - On Board Wire Feeder Components

To install the welding wire unscrew the hub nut and remove the hub nut washer. Install the the wire spool so that the wire feeds directly into the wire feed mechanism.

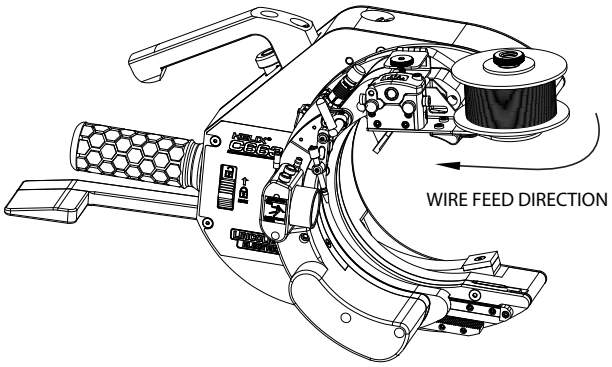


FIGURE 27 - Wire Feed Direction

HELIX® WF20B Wire Feeder

The WF20B commonly referred to as a bench wire feeder, see **FIGURE 28 - WF20B Wire Feeder** is a larger capacity wire feeder designed for use with the HELIX® C Series of weld heads. The WF20B supports wire spools from 10lbs to 44 lbs. and wire sizes from .030" to .045". This feeder, while still portable, is designed for more stationary units. The benefit of the bench wire feeder with a larger wire spool capacity is that the operator is able to weld longer without changing the wire spool.

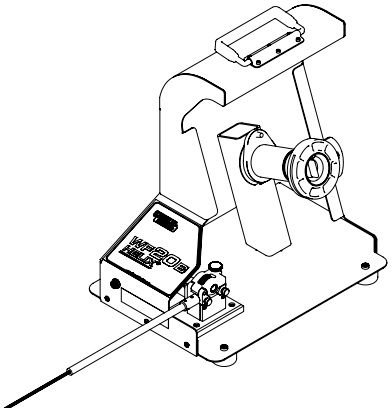


FIGURE 28 - WF20B Wire Feeder

The WF20B consists of 3 main parts, the hub, hub nut, and wire feed mechanism.

- Hub
  The hub supports the wire and allows smooth and consistent rotation. It contains a locking key which captures and drives the wire spool. The hub has multiple slots that allow the hub nut to rest at different depths for different size spools.
- Hub Nut
  The hub nut sits at the end of the hub and locks the spool of wire in place. The hub nut will stay attached to the hub until the hub nut key is pressed to allow it to be removed or reattached to the hub.
- Wire Feed Mechanism
  The wire feed mechanism consists of the wire feed motor and the entire drive assembly and associated parts. Wire is fed from the wire spool into the wire feeder and through to the weld head.
- Wire Out
  Location where the wire liner goes out to the weld head
- Control Cable Receptacle
  Location where the control cable hooks into the feeder

Refer to **FIGURE 29 - WF20B Wire Feed Components** for locations of the different items that make up the bench wire feeder.

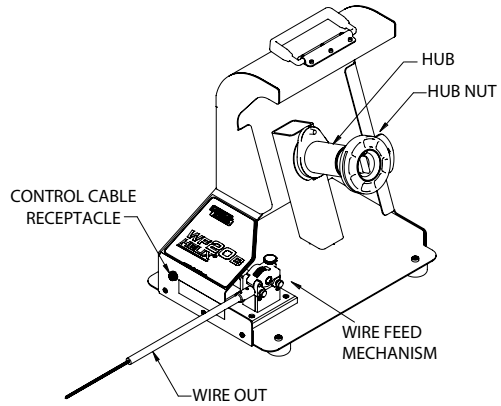


FIGURE 29 - WF20B Wire Feed Components

Wire Spool Installation

To install welding wire squeeze the hub nut key and pull to disengage the hub nut, see **FIGURE 30 - Hub Components**.

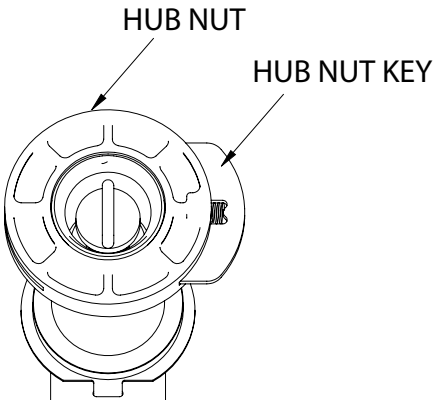


FIGURE 30 - Hub Components

With the hub nut removed the wire spool can be removed or replaced. Be sure to install the wire spool so that the wire feeds directly into the wire guide drive rolls, see **FIGURE 31 - WF20B Wire Feed Direction**.

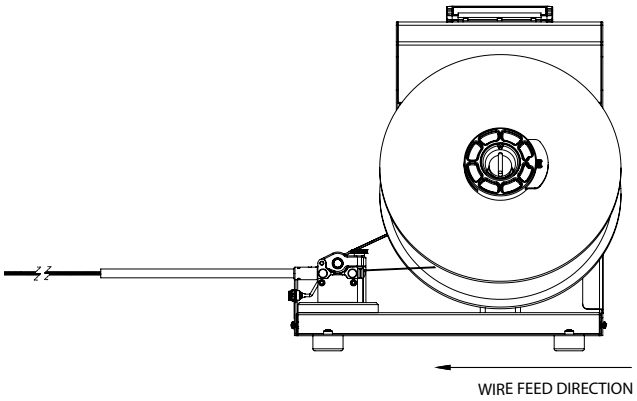


FIGURE 31 - WF20B Wire Feed Direction

HELIX® WF20S Wire Feeder

The WF20S commonly referred to as a suitcase wire feeder, see **FIGURE 32 - WF20S Wire Feeder** is a small capacity wire feeder designed for use with the HELIX® C Series of weld heads. The WF20S supports wire spools from 2lbs to 10lbs and wire sizes from .030" to .045". This is a smaller size wire feeder designed for portability. The benefit of the suitcase wire feeder with the larger wire spool capacity is that the welder is able to go longer between changing out the wire spool, while still having the benefit of a portable feeder.

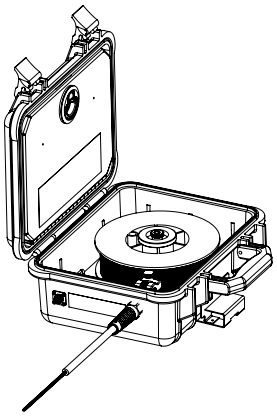


FIGURE 32 - WF20S Wire Feeder

The WF20S wire feeder consists of 6 main parts, the hub, hub nut, wire feed mechanism, tool compartment, pendant hook and inner hub nut.

- Hub
  There are two different size hubs designed for spools from 2 and 10 lbs. These support the wire and allow smooth and consistent rotation.
- Hub Nut
  There are two screw in hub nuts, one outer hub nut for the 10lb and one inner hub nut for 2 lb. spools. They secure at the end of the hubs and lock the spool of wire in place.
- Wire Feed Mechanism
  The wire feed mechanism consists of the wire feed motor and the entire drive assembly and associated parts. Wire is fed from the wire spool into the wire feeder and through to the weld head.
- Tool Compartment
  Unique to the WF20B is a tool compartment that allows the operator to store small commonly used tools, this pairs with the pendant hook to increase portability of the system.
- Pendant Hook
  The pendant hook allows the Apex 2100 Pendant to attach to the suitcase feeder for easy one handed carrying of the pendant and wire feed mechanism.
- Inner Hub Nut
  The inner hub nut is used to adjust wire tension.
- Wire Liner
  Location where the wire liner goes out to the weld head
- Control Cable Receptacle
  Location where the control cable hooks into the feeder

Refer to **FIGURE 33 - WF20S Wire Feed Components** for locations of different items in the suitcase wire feeder.

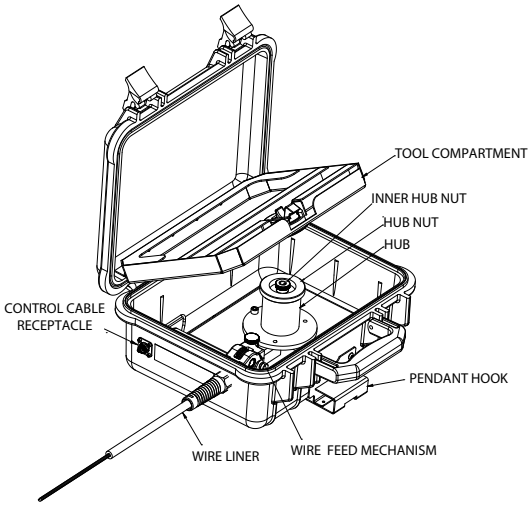


FIGURE 33 - WF20S Wire Feed Components

Wire Spool Installation

The suitcase wire feeder has two different configurations depending on the wire spool size. Become familiar with the wire hub components before changing the spools size, see **FIGURE 34 - 10lb Spool Configuration** for component configuration for a 10 lb. wire spool. The suitcase feeder is shipped from the factory with the 10lb. spool configuration.

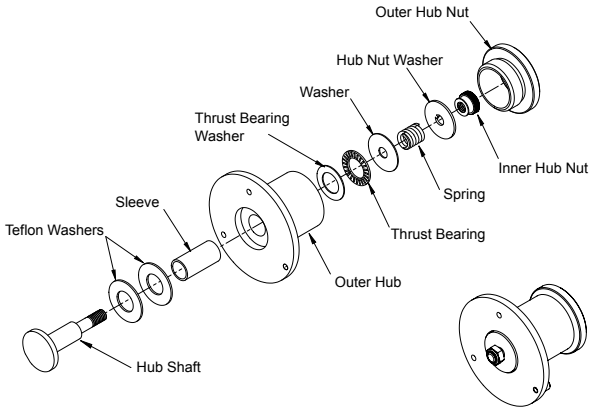


FIGURE 34 - 10lb Spool Configuration

To install or remove a 10 lb. welding spool unscrew the outer hub nut see **FIGURE 35 - Hub Nuts.**

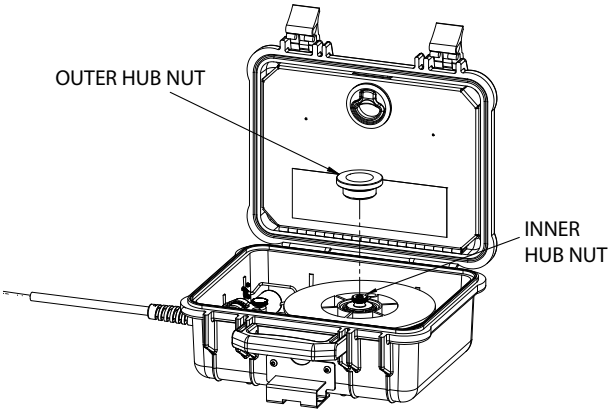


FIGURE 35 - Hub Nuts

With the outer hub nut removed the wire spool can easily be removed or replaced. Be sure to place the wire in the correct direction with the wire feeding directly into the wire guide drive rolls, see **FIGURE 36 - Suitcase Wire Feed Direction.** Once the wire is installed, replace the hub nut. Be sure not to over-tighten.

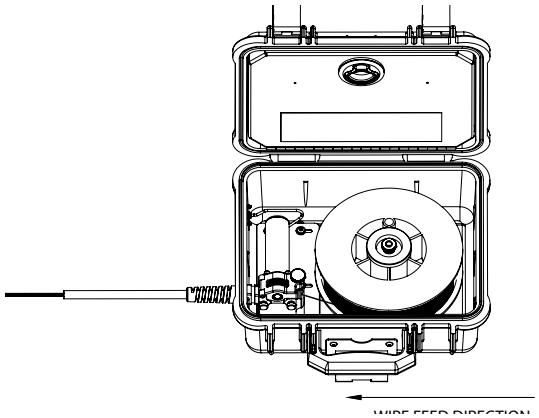


FIGURE 36 - Suitcase Wire Feed Direction

To install or remove a 2 lb. welding spool requires the removal of the Outer Hub. This can be done without removing the outer hub nut, by unscrewing the inner hub nut see **FIGURE 35 - Hub Nuts**, grasp the outer hub and keeping upright, pull it free of the suitcase feeder. This removes the outer hub, as well as the hub nut washer, spring, washer, thrust bearing and thrust bearing washer. You must manually remove the teflon sleeve around the hub shaft and one of the teflon washers, refer to **FIGURE 34 - 10lb Spool Configuration** for a complete list of hub components.

Place the 2lb. spool over the hub shaft and onto the one remaining teflon washer. Then slip the washer, 2 lb. spring (included separately), and hub nut washer onto the hub shaft. Screw on the inner hub nut and adjust for tension, see **FIGURE 37 - 2lb Spool Configuration** for the installation order.

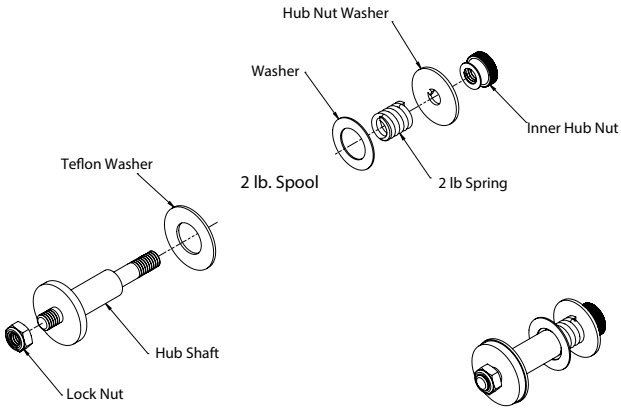


FIGURE 37 - 2lb Spool Configuration

Tool Compartment

The suitcase wire feeder has the added benefit of a small toolbox compartment for miscellaneous tools that may be needed for welding. The tool boxed opened and closed is shown in **FIGURE 38 - Tool Compartment**. To open the tool compartment pull the latch.

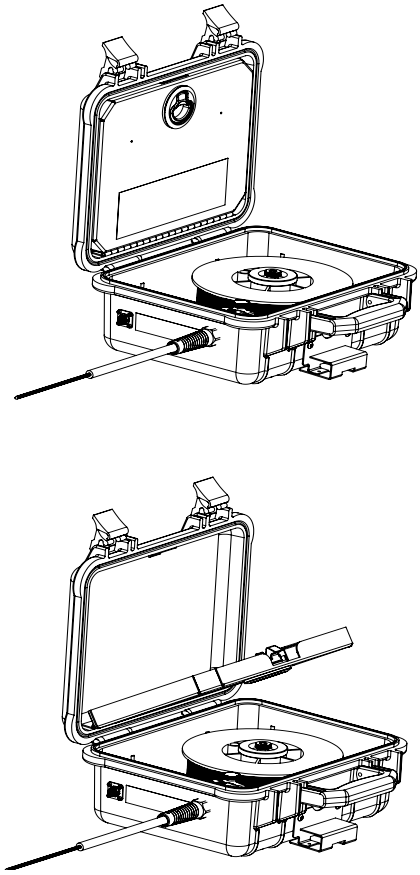


FIGURE 38 - Tool Compartment

Pendant Hook

The pendant hook is a feature that allows the operator to attach the Apex 2100 Pendant onto the suitcase feeder and to carry both with one hand. This, coupled with the tool compartment is designed for the operator portability see **FIGURE 39 - WF20S With Pendant Attachment**.

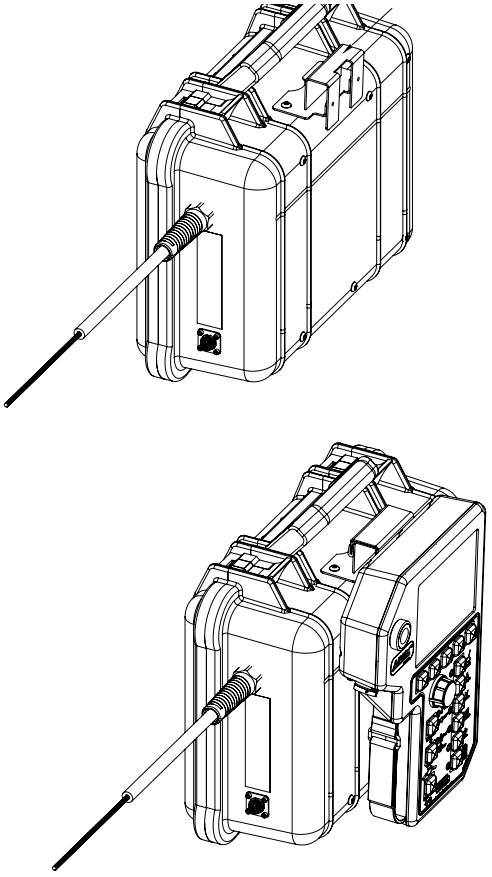


FIGURE 39 - WF20S With Pendant Attachment

External Feeder Cable Installation

Control Cable

The control cable drives the wire feed mechanism for the bench and suitcase feeders. It attaches from the cable assembly to the wire feeder. Align the white dot on the connector of the cable with the white dot on the connector of the wire feed then press to install, see **FIGURE 29 - WF20B Wire Feed Components** for the location of the bench feeder control cable receptacle and **FIGURE 33 - WF20S Wire Feed Components** for the location of the suitcase feeder control cable receptacle.

External Wire Liner

The external wire liner attaches from the front of the wire feeder to the wire feed mechanism on the weld head.

See **FIGURE 40 - External Wire Liners** to see examples of the two different external wire liners.

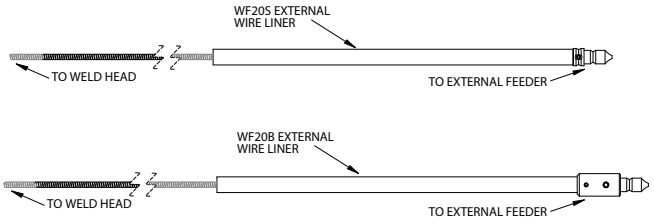


FIGURE 40 - External Wire Liners

External Wire Liner to Weld Head

The wire liner attaches to the weld head at the external wire liner inlet, see **FIGURE 41 - External Feeder Wire Liner Placement**.

Loosen the set screw on the wire liner coupler and insert the wire liner into the inlet, then tighten the set screw, ensure it is tight enough to hold the wire liner but not so tight as to crimp the liner. With the external wire liner attached to the wire liner coupler the wire is free to move through the external coupler, into the clear wire liner on the weld head and out through the tip.

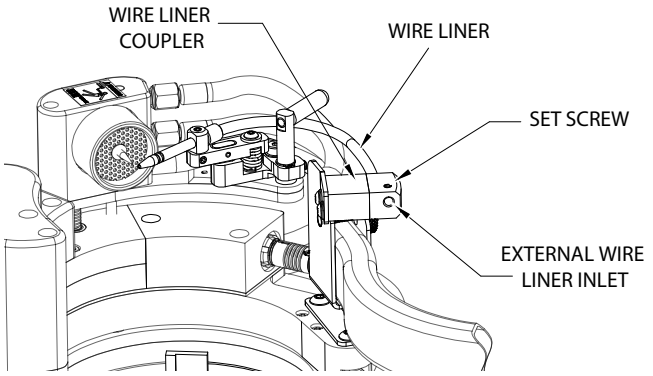


FIGURE 41 - External Feeder Wire Liner Placement

External Wire Liner to Feeder

The end of the wire liner with the outlet guide is inserted into the external wire feeder mechanism, see **FIGURE 29 - WF20B Wire Feed Components** and **FIGURE 33 - WF20S Wire Feed Components** for the placement of the external feeder end of the wire liners.

The external wire liner attaches to the wire feeder mechanism. See **FIGURE 42 - Wire Feed Outlet Guide**, this shows the wire liner outlet guide inserted into the wire feed mechanism. With the external wire liner outlet guide firmly seated into the wire feed mechanism, tighten the set screw knob. This locks the wire outlet guide into place.

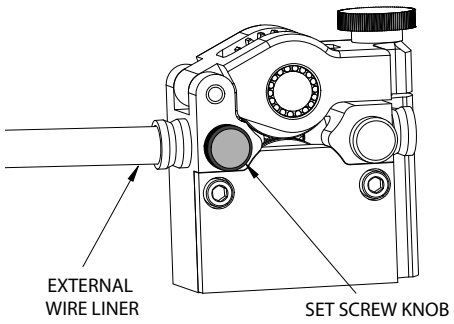


FIGURE 42 - Wire Feed Outlet Guide

Replacement External Wire Liners

To replace the external wire liners use a standard Lincoln Electric Magnum wire liner for the specific size wire being used. Wire liners should be 15 feet or less.

Use, KP42-3035-15 for .030 - .035 in. (0.8 - 0.9 mm)
Use, KP42-4045-15 for .035 - .045 in. (0.9 - 1.2 mm)

Cut off the end of the wire liner with the Magnum adapter, see **FIGURE 43 - Magnum Adapter Cut Off**. Once the end of the wire liner is cut, remove a quarter of an inch of heat shrink from the end of the wire liner. This is to allow a good surface for the set screw on the wire liner coupler to grip.

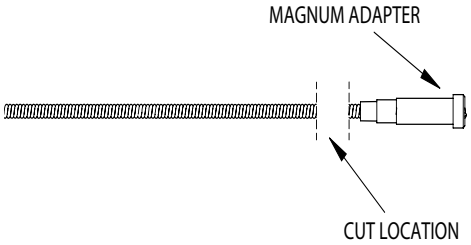


FIGURE 43 - Magnum Adapter Cut Off

The wire outlet guides are different for each of the external wire feeders. Insert the end of the wire liner with no heatshrink into the outlet guide and screw in the wire liner set screw. The bench feeder has three additional set screws that secure the strain relief hose. See **FIGURE 44 - Wire Liner Components** for the locations of the set screws.

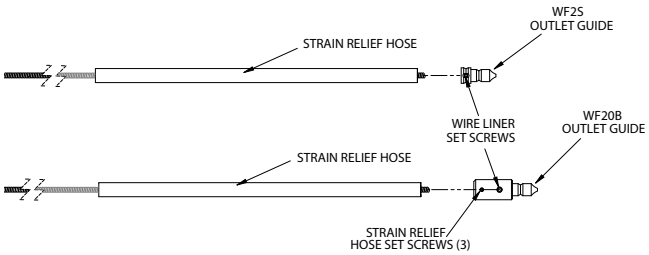


FIGURE 44 - Wire Liner Components

Wire Installation

For all three wire feed options, to install the wire, disconnect the wire guide tip from the torch head and remove the bend from the wire liner. This will prevent the wire from jamming or puncturing the lining. Verify that the end of the wire is cut cleanly. Once the wire is fed through the drive rolls it can be fed electrically using the pendant by turning the wire feed on. With the wire feed on you will see the drive roll begin to rotate. Once the drive roll is rotating, feed the end of the wire into the inlet guide. See **FIGURE 45 - Wire Feeder Components** for a breakdown of components.

If the wire does not feed then it may be necessary to tighten the wire tension thumb screw. Make sure not to over tighten which could result in excess wear on the drive wheel and wire motor.

Feed the wire through the inlet guide until it is through the drive rolls. The wire can be fed through the drive rolls mechanically or electrically. For electrical feed set the wire to feed and the drive rolls will engage the wire pulling it through. To mechanically feed the wire, unthread the wire drive thumb screw. This will disengage the top drive roll. Feed the wire through the wire guide inlet and out the outlet. Close the top drive roll back down and tighten the thumb screw. The wire is now ready to be fed electrically.

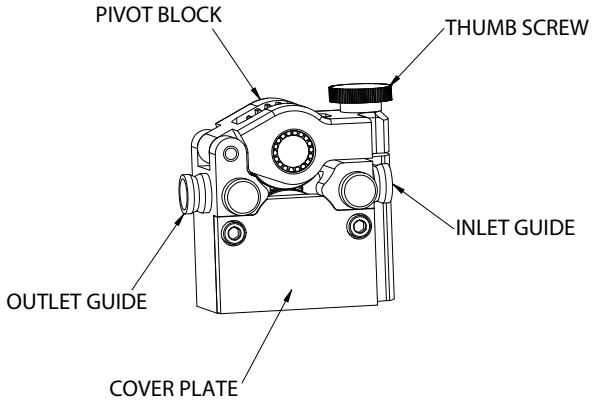


FIGURE 45 - Wire Feeder Components

Drive Roll Installation & Removal

For all three wire feed options, before installing wire, verify that the proper drive rolls are installed. To check drive roller sizes, remove the cover plate from the front of the wire feed unit with a 9/64” hex key, see **FIGURE 46 - Lower Drive Roll Cover Plate**. The wire diameter is stamped on the side of the lower drive roll. Verify that the drive roll size is the same for the upper and lower drive rolls.

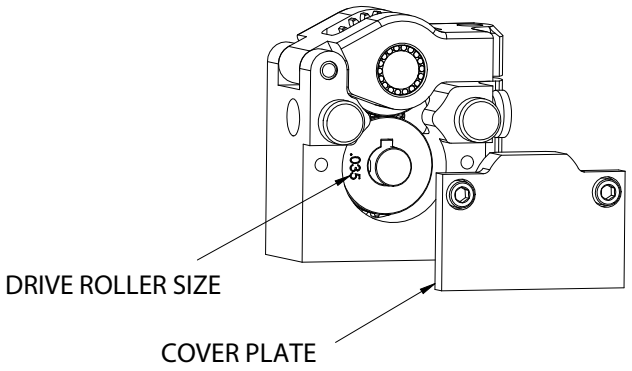


FIGURE 46 - Lower Drive Roll Cover Plate

If the sizes are not the same, or to change the drive rolls, start by loosening the thumb screw to free the pivot block, which contains the upper drive roll. Rotate the upper driver roll until the set screw, see **FIGURE 47 - Set Screw** is exposed.

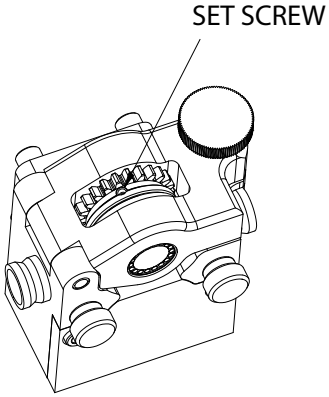


FIGURE 47 - Set Screw

Loosen the set screw and slide the shaft out releasing the upper drive roll, see **FIGURE 48 - Drive Roll Shaft.**

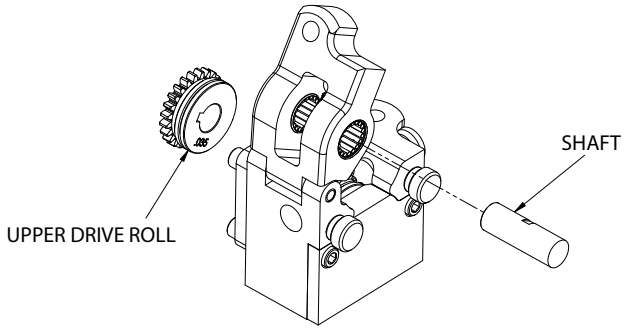


FIGURE 48 - Drive Roll Shaft

Remove the upper drive roll from the assembly. Insert the desired drive roll back into the slot and insert the shaft through the bearings and drive roller. The shaft is notched to provide a seat for the set screw. Be sure to insert the shaft so that the notch meets up with the set screw. Tighten set screw on upper drive roll.

With the top still pivoted away, drive the wire feed motor until the set screw for the lower drive roll is exposed. Loosen the set screw see **FIGURE 49 - Lower Drive Roll Set Screw.**

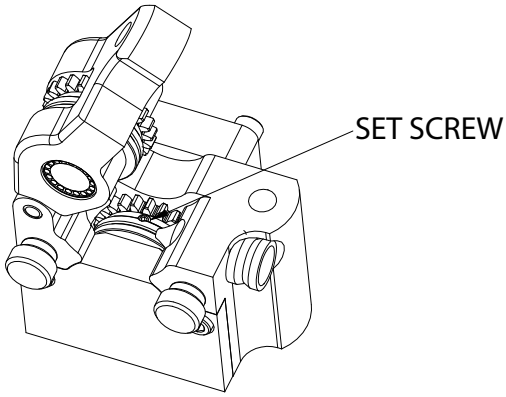


FIGURE 49 - Lower Drive Roll Set Screw

Drive the wire feed motor again until the motor key is at the top of the rotation see **FIGURE 50 - Motor Key.** Slide the lower drive roll off the front of the motor shaft. The motor key is secured by lower drive roll. Take care not to lose the motor key when removing lower drive roll.

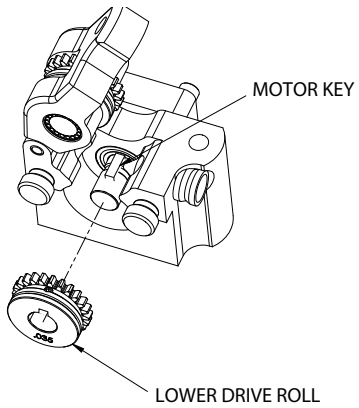


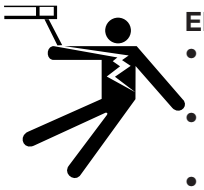
FIGURE 50 - Motor Key

Ensure that the motor key is in place. Slide the correct drive roll back onto the motor shaft. Drive the wire feed motor until the set screw is accessible. Tighten the set screw. Attach the cover plate back to the front of the wire feed unit and adjust the tension knob back to the proper setting.

Operational Safety Precautions

Read and understand this entire section before operating the machine.

⚠ WARNING

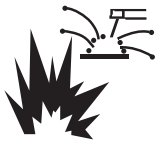


ELECTRIC SHOCK CAN KILL.

- **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® C663 Weld Head is a precision water cooled clamp on weld head designed for GTAW (TIG) welding that is designed to work with the APEX® 2100 Orbital Control System. See IM6111 for complete operation and control instructions.

External inputs

The external inputs for the C663 Weld Head are control signals, cooling, and welding power.

Control

Control of the weld head and wire feeder is provided by the APEX 2100 controller (K52073-1). 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. See IM6111 for complete installation and operation instructions.

Cooling

The weld head is cooled using a standard Lincoln Cool Arc 55 (K3086-1). Cooling is regulated and monitored by the APEX 2100 controller which circulates coolant through the weld head to ensure the weld head is able to weld without overheating. See IM10117 for complete installation and operation instructions.

Welding Power

Welding power is provided through a standard Lincoln Electric Power Wave S500 AP version (K3170-1). This power wave comes equipped with Arclink technology and Checkpoint™. Specific programs are built into this Power Wave to allow it to work with the APEX 2100 system. See IM10061 for complete installation and operation instructions.

Manual Adjustments

Manual adjustments for the C663 weld head include changing the clamp sizes, repositioning the weld head on the surface, and all wire manipulation placement, as well as changing out all consumable parts and pieces.

Before operation check all cable connections to include, coolant cables for leaks, 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

Torch Accessories

Accessory	Part Number
Cable/Hose Extension	K52072-xx (xx = feet *) *measured in 25' increments
Wire Guide Tip 0.030 - 0.035"	KP52100-035
Wire Guide Tip 0.040 - 0.045"	KP52100-045
1/8 Collet	KP52065-1
3/32 Collet	KP2029-4B1
1/16 Collet	KP2029-3B1
1/8 Tungsten	KP52066-1
3/32 Tungsten Adapter	KP52063-2
1/16 Tungsten Adapter	KP52063-3
Glass Cup	KP52062-2
Collet Body	KP52064-1
Low Profile Back Cap	KP52110-1
Standard Back Cap Short	KP2035-1B1
Standard Back Cap Med	KP2035-2B1
Standard Back Cap Long	KP2035-4B1

On Board Feeder Accessories

On Board Wire Feeder K52117-1	
Drive Roll Set (2 pc.)	**Part Number**
0.030 in (0.8 mm)	KP52094-030
0.035 in (0.9 mm)	KP52094-035
0.040 in (1.0 mm)	KP52094-040
0.045 in (1.2 mm)	KP52094-045
Inlet/Outlet Guide Set (2 pc.)	
0.030 - 0.035 in (0.8-0.9 mm)	KP52099-035
0.040 - 0.045 in (1.0-1.2 mm)	KP52099-045

External Feeder Accessories

WF20S (Suitcase Feeder) K52097-1	
Inlet/Outlet Guide Size	**Part Number**
0.030 - 0.035"	KP52080-035
0.040 - 0.045"	KP52080-045
WF20B (Bench Feeder) K52097-2	
Inlet/Outlet Guide Size	**Part Number**
0.030 - 0.035"	KP52115-035
0.040 - 0.045"	KP52115-045
Accessories Common to both Feeders	
Wire Feed Drive Roll Set	**Part Number**
0.030 in (0.8 mm)	KP52079-030
0.035 in (0.9 mm)	KP52079-035
0.040 in (1.0 mm)	KP52079-040
0.045 in (1.2 mm)	KP52079-045
Wire Liner	
0.030 - 0.035 in (0.8-0.9 mm)	KP42-3035-15
0.040 - 0.045 in (1.0-1.2 mm)	KP42-4045-15
Control Cable	S29099-001
Drive Kit	S29099-002

Maintenance

The HELIX® C663 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 water lines for leaks, for loose connections and worn areas.
- Change out consumables as needed.
- Check AVC and travel for slop or wearing parts.
- Inspect teflon wire liner for wear or damage
- Inspect and change out the wire guide tip if needed.

Monthly

- Disengage the clutch latch. After verifying that there is plenty of slack in the cables spin the Torch Motion Assembly listening for clicking or other noises that would indicate misalignment or damage.
- Verify that the Torch Motion Assembly moves smoothly and easily.
- Examine all cable connections at the squid connector, See **FIGURE 51 - Cable Squid** to verify that there are no water or gas leaks, and that all cables are seated correctly and that there is no visible wear and tear to the squid connector or associated cables.
- Check over the all weld head components for any signs of damage or wearing.
- Ensure gear rack is clean and clear of debris.
- Check for wear of drive wheels on wire feeders.

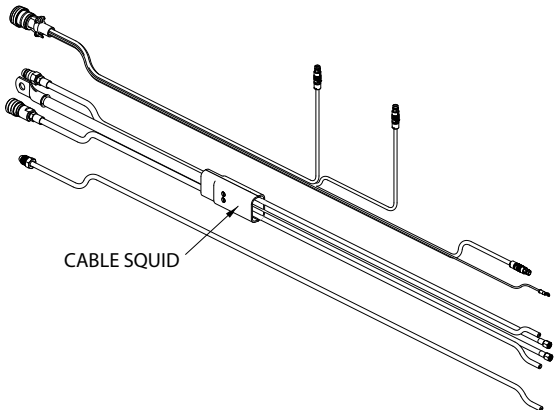


FIGURE 51 - Cable Squid

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 motor to verify that there is no excess noise or grinding.
- Flush and replace coolant.

Storage/Shipping

- Before storing or shipping this unit remove all water from cooling lines.
- Freezing temperatures can cause water in the coolant lines to freeze and burst.
- Leaving water in the coolant lines can cause corrosion over time.

Tools

- 9/64” hex key
- 7/64” hex key
- 5/64” hex key
- 3/32” hex key
- 5/32” hex key
- 1/8” hex key
- 2.5mm hex key
- #1 Phillips screwdriver
- #2 Phillips screwdriver
- 1/4” tip slotted screwdriver
- 7/16” open end wrench
- 5/16” open end wrench
- 3/16” open end wrench
- External retaining ring pliers

Lincoln Tools

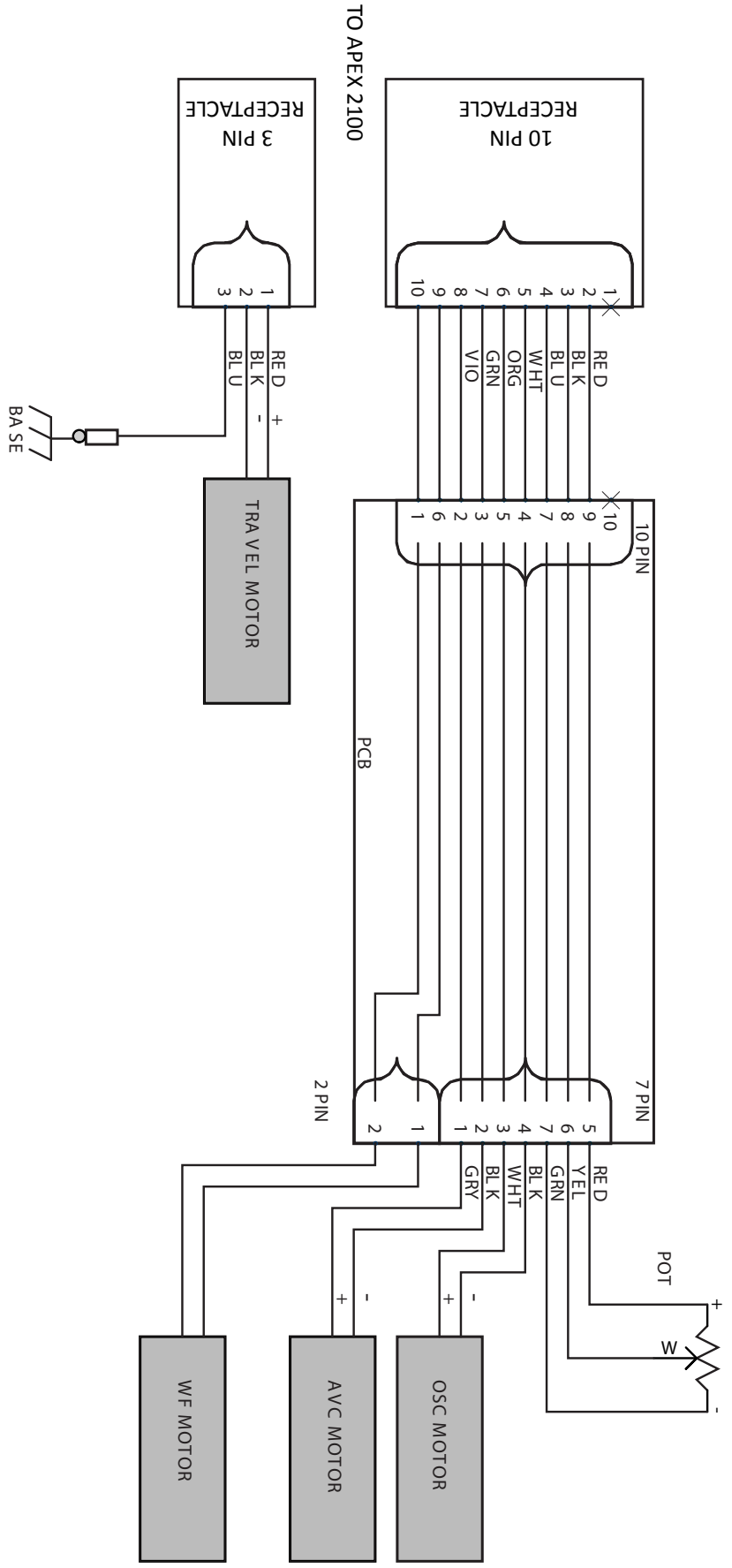
- S2929098-030 PCB Wire Removal Tool
- S29098-034 HELIX Connector Nutdriver M12
- S29098-035 HELIX Connector Nutdriver M14

Observe All Safety Guidelines detailed throughout this manual

PROBLEMS (SYMPTOMS)	POSSIBLE CAUSE	RECOMMENDED COURSE OF ACTION
AVC does not operate / operates incorrectly.	1. Check AVC sense lead connection. 2. Check AVC fuse on control. 3. Check AVC settings.	If all recommended possible areas of misadjustment have been checked and the problem persists, **Contact your local Lincoln Authorized Field Services Facility**
Travel hesitates or does not work.	1. Check clutch latch to ensure it is engaged (locked). 2. Check all cable connections. 3. Check travel fuse on control.	
Travel is inconsistent.	1. Run travel calibration, refer to control manual.	
No oscillation / inconsistent oscillation.	1. Check all cable connections. 2. Check oscillation fuse on control. 3. Check strain relief to verify that there is enough play in the cables and hoses for oscillation. 4. Run oscillation calibration, refer to control manual.	
Wire does not feed properly.	1. Check wire feed fuse on control. 2. Check wire feed for blockage.	
Clamp will not set tightly or clamping mechanism slips.	1. Clamp shoe may be the incorrect size. 2. Verify clamp shoe brackets and clamp jaw brackets are installed correctly.	
Torch block gets too hot.	1. Coolant lines may not be installed correctly. 2. Verify coolant lines are not blocked or kinked. 3. Ensure water cooler is on. 4. Verify quality of the coolant.	
Continuous ground or arc faults.	1. Verify ground cable is correctly installed. 2. Check AVC sense lead to ensure it is correctly installed.	
Gas faults	1. Verify gas is turned on. 2. Verify there is gas present in the tank. 3. Check the gas line for kinks or obstructions.	
Oblong rotation around the pipe or tube.	1. Check that the correct size shoe is installed for the correct pipe. 2. The tungsten should remain at roughly the same distance from the pipe when manually rotated around the pipe.	

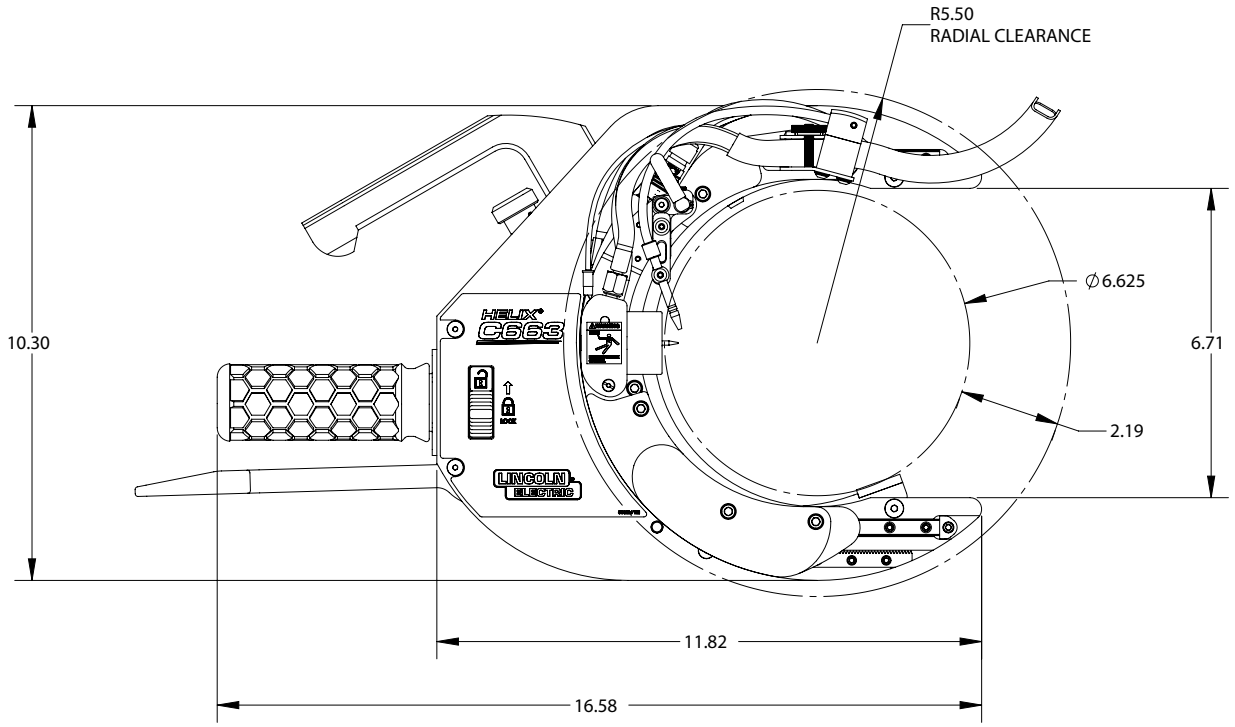
⚠CAUTION

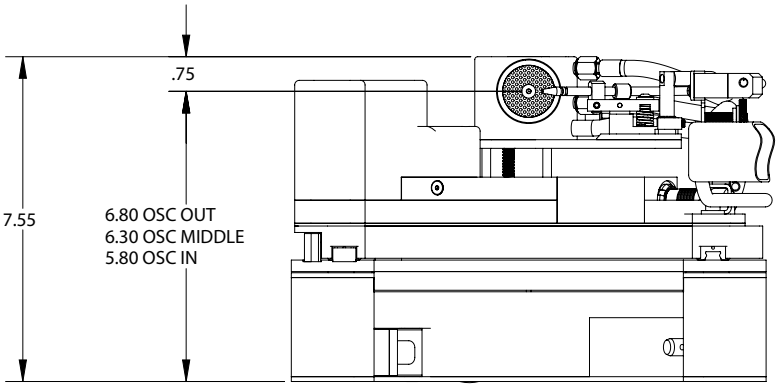
If for any reason you do not understand the test procedures or are unable to perform the tests/repairs safely, contact your **Local Lincoln Authorized Field Service Facility** for technical troubleshooting assistance before you proceed.



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

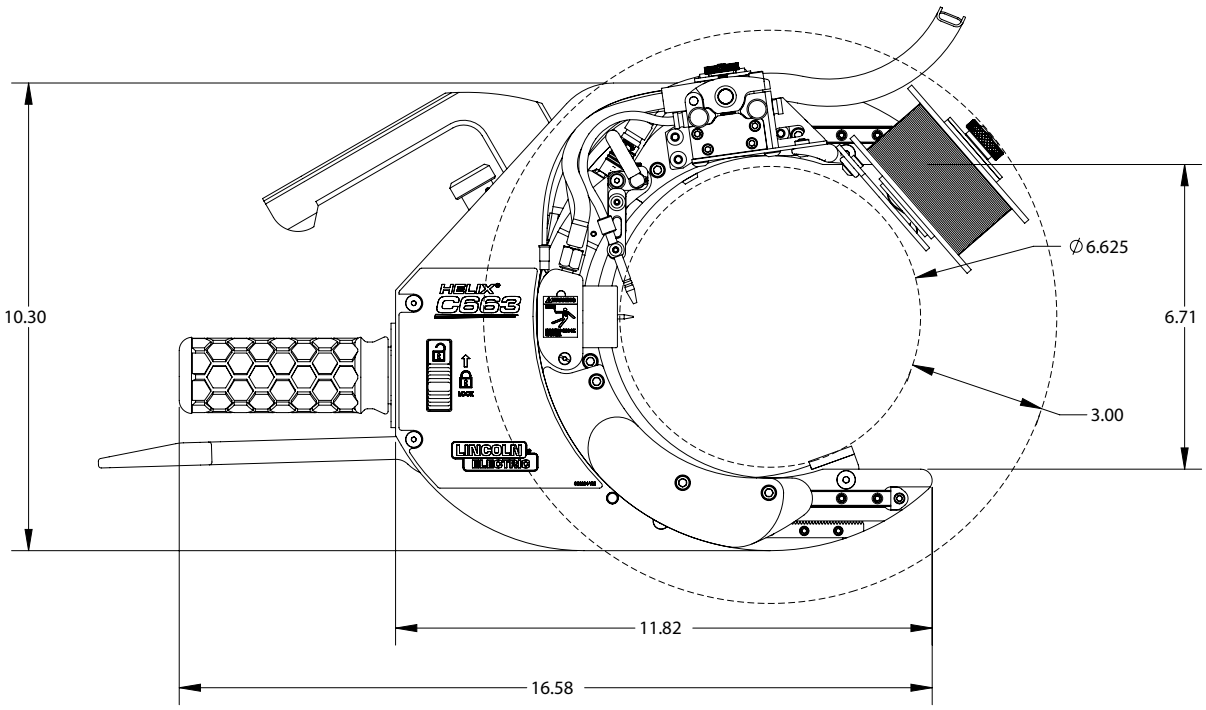
K52092-2

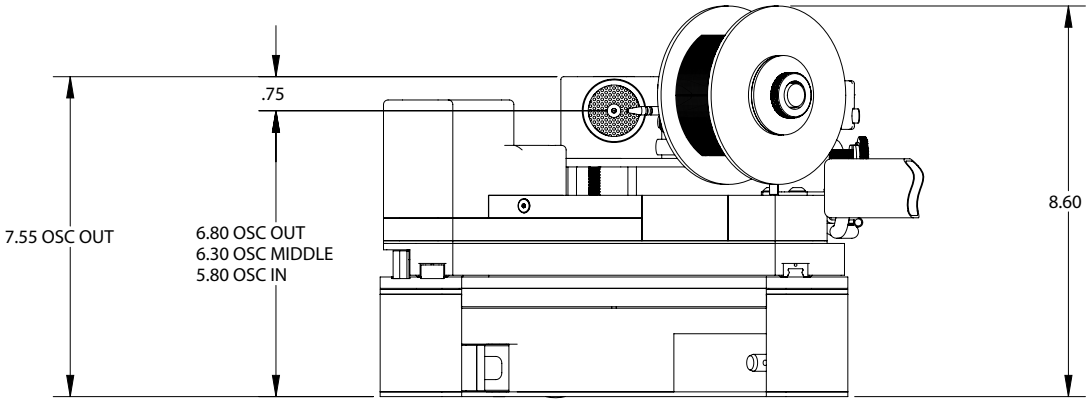




NOTE: This diagram is for reference only. It may not be accurate for all machines covered by this manual. The specific diagram for a particular code is pasted inside the machine on one of the enclosure panels. If the diagram is illegible, write to the Service Department for a replacement. Give the equipment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

K52092-1





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.

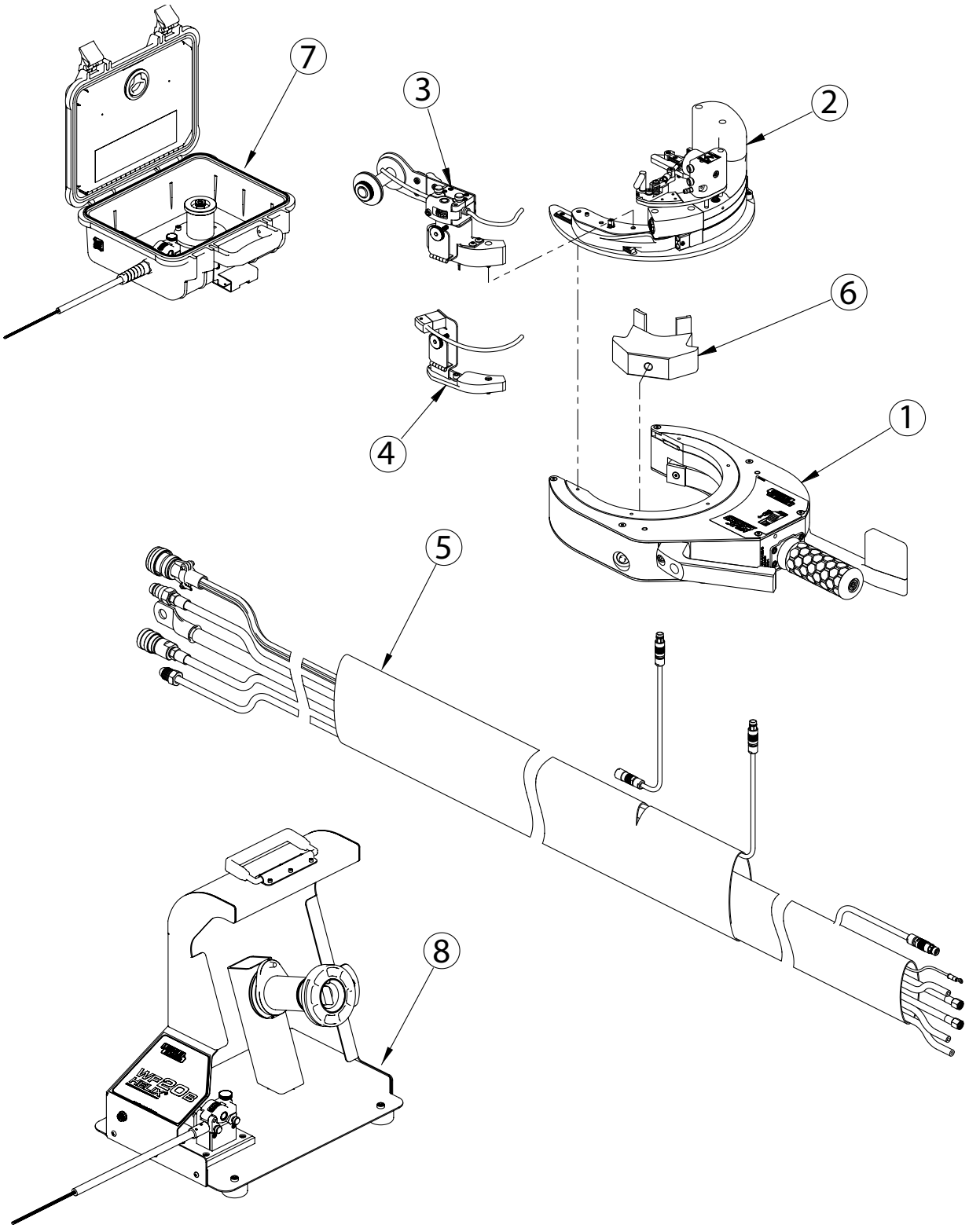
P-786
GENERAL ASSEMBLY

HELIX C663 WELD HEAD PARTS MANUAL

Code: 70307, 70308, 70311, 70312

This parts list is provided as an informative guide only.

P-786-A
ILLUSTRATION OF SUB-ASSEMBLIES



6-11-14

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

HELIX® C663 WELD HEAD

P-786-A.1

For Code: 70307, 70308, 70311, 70312

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

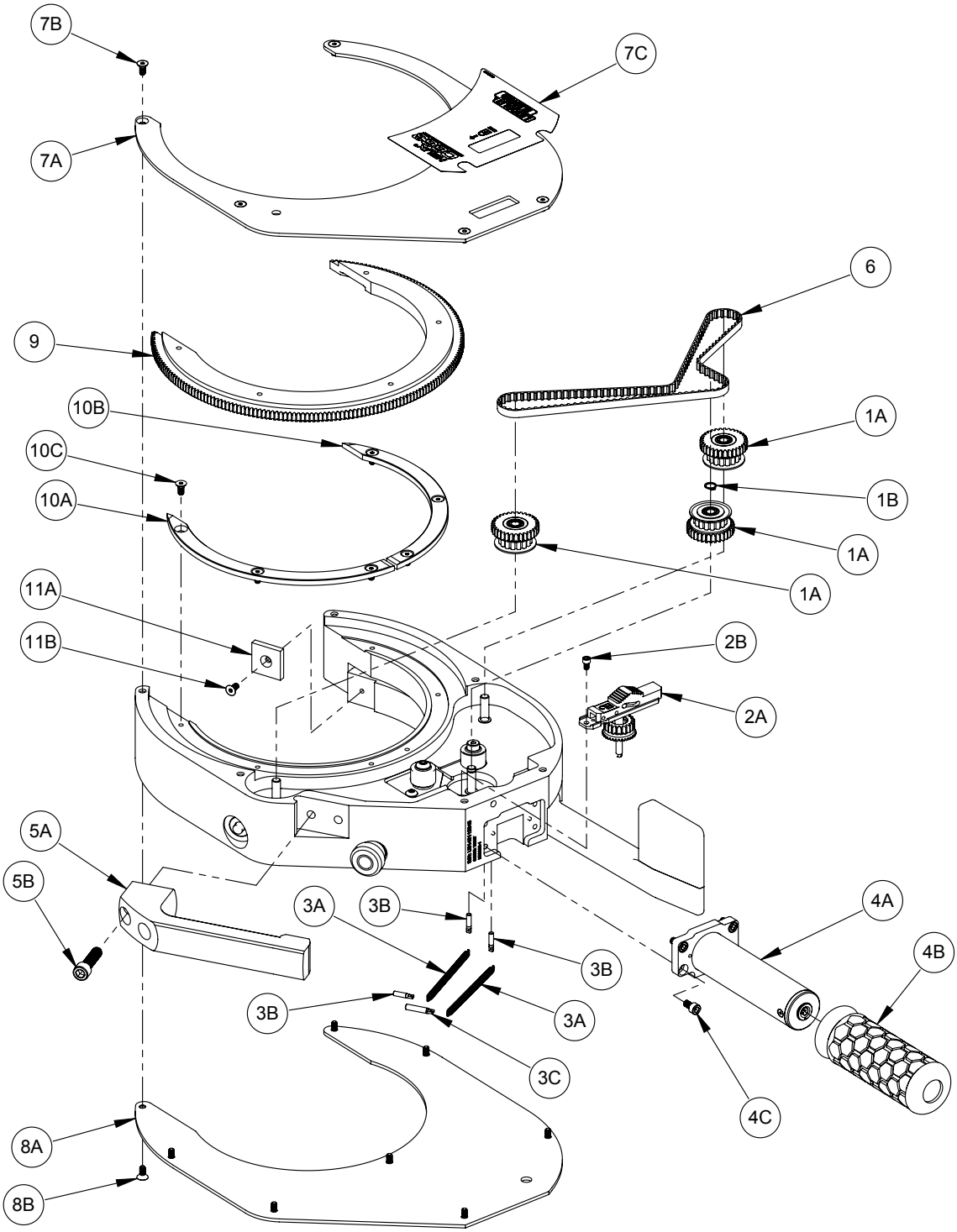
Use the illustration of Sub-Assemblies page and the table below to determine which sub assembly page and column the desired part is located on for your particular code machine.

Sub Assembly Item No. →	1	2	2	3	4	5	6	7	8
SUB ASSEMBLY PAGE NAME →	Body & Handle Assembly	Torch Motion Assembly 1 of 2	Torch Motion Assembly 2 of 2	On Board Wire Feed Kit	Wire Feed Removal Kit	Cable Assembly	Clamp Shoe	WF20S Wire Feeder	WF20B Wire Feeder
PAGE NO. →	P-786-B	P-786-C	P-786-D	P-786-E	P-786-F	P-786-G	P-786-H	P-786-I	P-786-J
CODE NO. ↓									
70307	1	1	1	1		1	1		
70308	1	1	1		1	2	1		
70311								1	
70312									1

6-11-14

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

P-786-B
BODY & HANDLE ASSEMBLY



6-11-14

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

# Indicates a change in this printing.

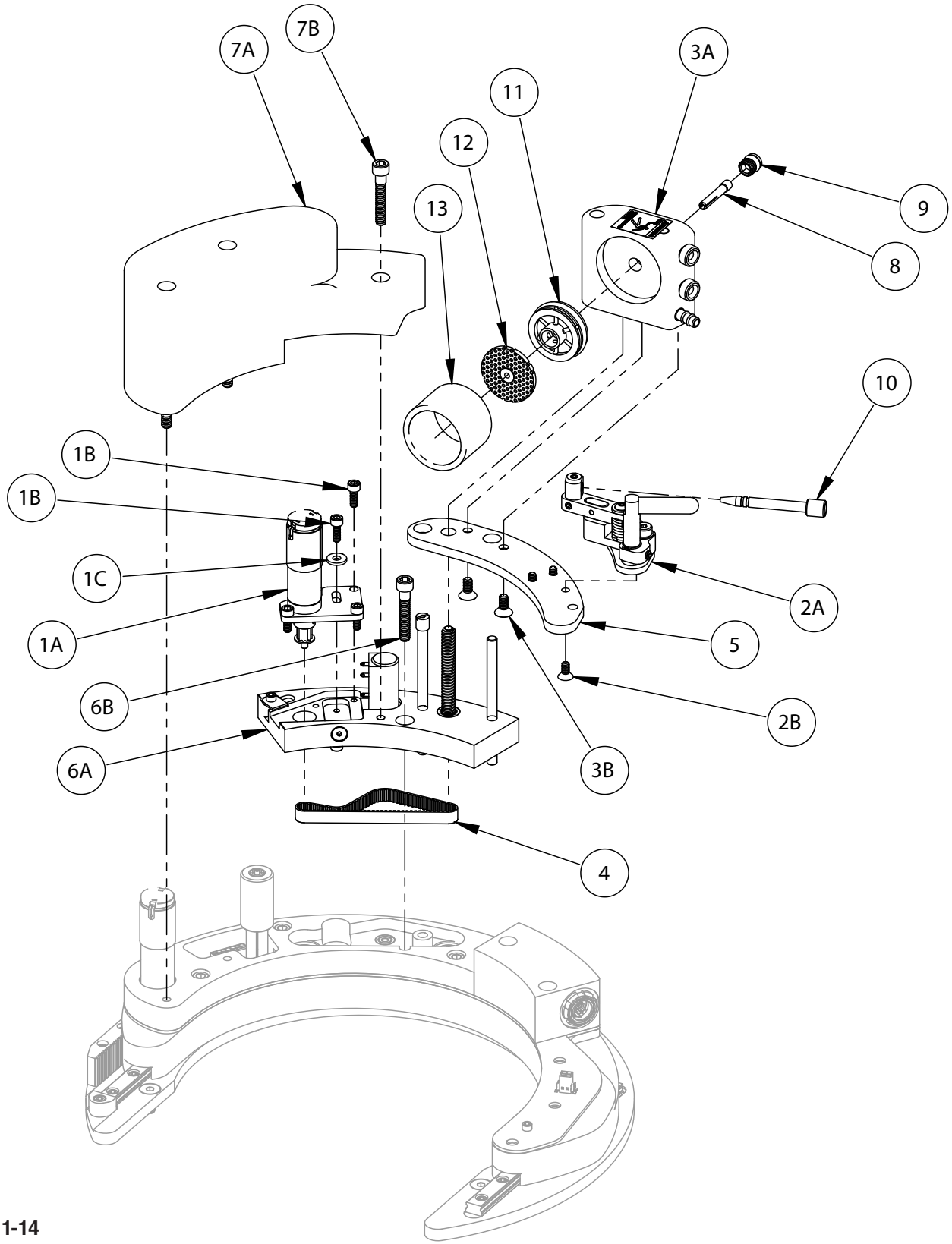
Use only the parts marked “x” in the column under the heading number called for in the model index page.

ITEM	DESCRIPTION	PART NO.	QTY.	1	2	3	4	5	6	7	8	9
	C663 Body Assembly											
1	Idler Gear Kit	S29098-4	1	x								
1A	Gear Pully Assy		3	x								
1B	External Retaining Ring 5/16		1	x								
2	Clutch Slider Assy	S29098-5	1	x								
2A	Clutch Slider Assy		1	x								
2B	SHCS 6-32 X 1/4		2	x								
3	Clamp Spring Kit	S29098-6	1	x								
3A	Extension Spring		2	x								
3B	Spring Anchor 6-32		3	x								
3C	Spring Anchor 8-32		1	x								
4	Handle Assy	S29098-12	1	x								
4A	Handle		1	x								
4B	Handle Grip	S29098-28	1	x								
4C	SHCS 10-24 X 3/8		4	x								
5	Lifting Handle	S29098-23	1	x								
5A	Open End Handle		1	x								
5B	SHCS 5/16-18 X 1 1/8		2	x								
6	Travel Belt	S29098-602	1	x								
7	Front Cover Kit	S29098-606	1	x								
7A	Front Cover 663		1	x								
7B	FHCS 8-32 X 3/8		6	x								
7C	C663 Overlay	S30294-1	1	x								
8	Rear Cover Kit	S29098-607	1	x								
8A	Rear Cover		1	x								
8B	FHCS 8-32 X 3/8		8	x								
9	Ring Gear	S29098-609	1	x								
10	Ring Gear Track Kit	S29098-610	1	x								
10A	Ring Disc Left 663		1	x								
10B	Ring Disc Right 663		1	x								
10C	FHCS 8-32 X 3/8		6	x								
11	Clamp Arm Plate Kit	KP52119-1	1	x								
11A	Clamp Plate		1	x								
11B	FHCS 8-32 X 3/8		1	x								

6-11-14

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

P-786-C
TORCH MOTION ASSEMBLY 1 OF 2



6-11-14

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

# Indicates a change in this printing.

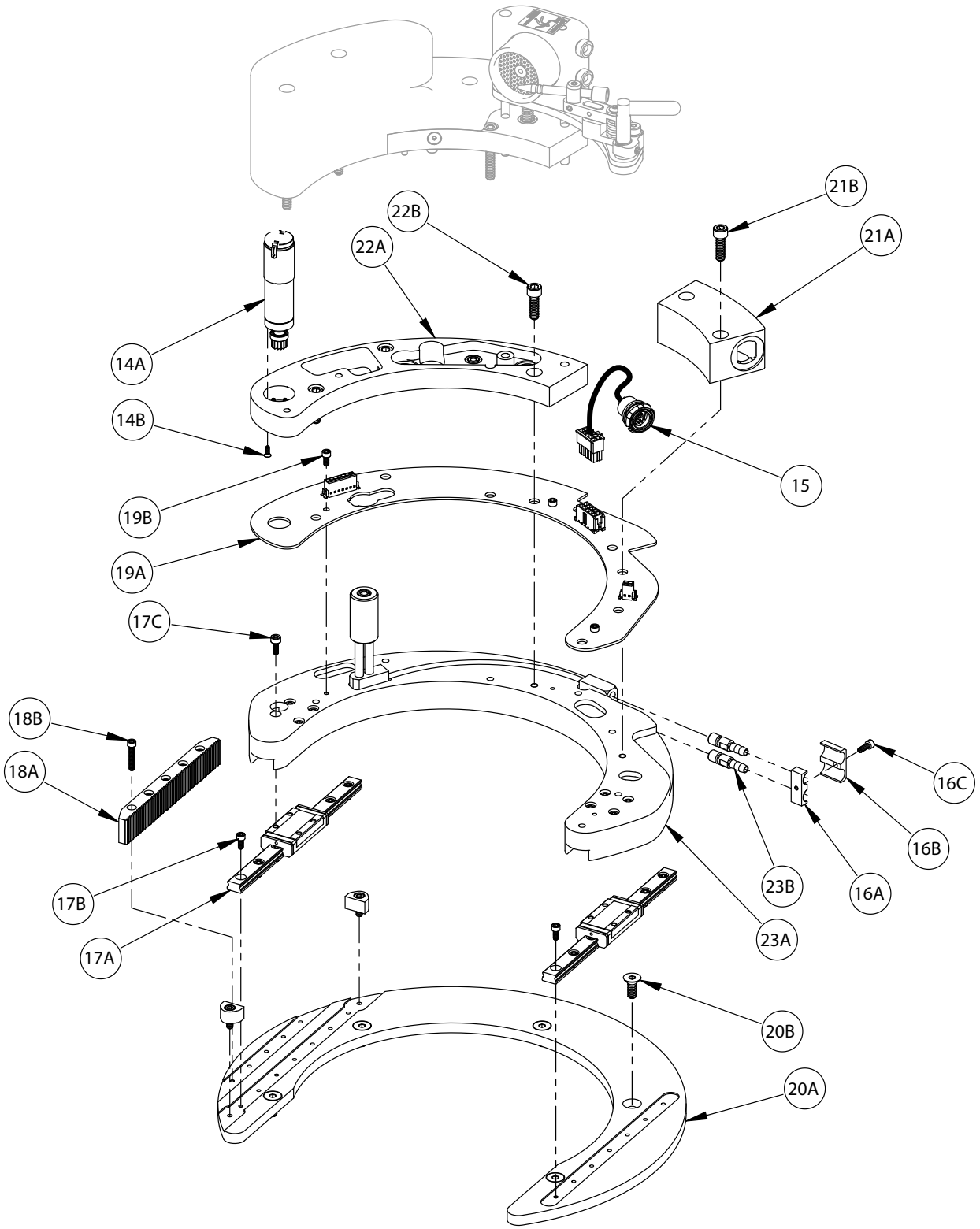
Use only the parts marked “x” in the column under the heading number called for in the model index page.

ITEM	DESCRIPTION	PART NO.	QTY.	1	2	3	4	5	6	7	8	9
	Torch Motion Assembly 1 of 2											
1	Osc Motor Assy (Factory Install Only)		1	x								
1A	Osc Motor		1	x								
1B	SHCS 6-32 X 3/8		5	x								
1C	Washer #6		1	x								
2	Helix Wire Positioning Kit	S29098-3	1	x								
2A	Wire Positioning Assy		1	x								
2B	FHCS 6-32 X 5/16		3	x								
3	Torch Assy (Factory Install Only)		1	x								
3A	Soldered Torch		1	x								
3B	FHCS 8-32 X 3/8		2	x								
4	Osc Belt (Factory Install Only)		1	x								
5	Wire Positioning Mounting Plate (Factory Install Only)		1	x								
6	Oscillation Assy (Factory Install Only)		1	x								
6A	Oscillation Assy 663		1	x								
6B	SHCS 10-24 X 1 1/8		1	x								
7	Motor Housing Kit	S29098-615	1	x								
7A	Motor Housing		1	x								
7B	SHCS 10-24 X 1 1/8		3	x								
8	Collet		1	x								
	1/16” (1.6 mm)	KP2029-3B1										
	3/32” (2.4 mm)	KP2029-4B1										
	1/8” (3.2 mm)	KP2029-5B1										
9	Low Profile Back Cap	KP52110-1	1	x								
10	Wire Guide Tip		1	x								
	.030-.035 (0.8-0.9 mm)	KP52100-035										
	.040-.045 (1.0-1.2 mm)	KP52100-045										
11	Collet Body	KP52110-1		x								
12	Tungsten Adapter		1	x								
	1/8” (3.2 mm)	KP52063-1										
	3/32” (2.4 mm)	KP52063-2										
	1/16” (1.6 mm)	KP52063-3										
13	Glass Cup	KP52062-2	1	x								

6-11-14

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

P-786-D
TORCH MOTION ASSEMBLY 2 OF 2



6-11-14

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

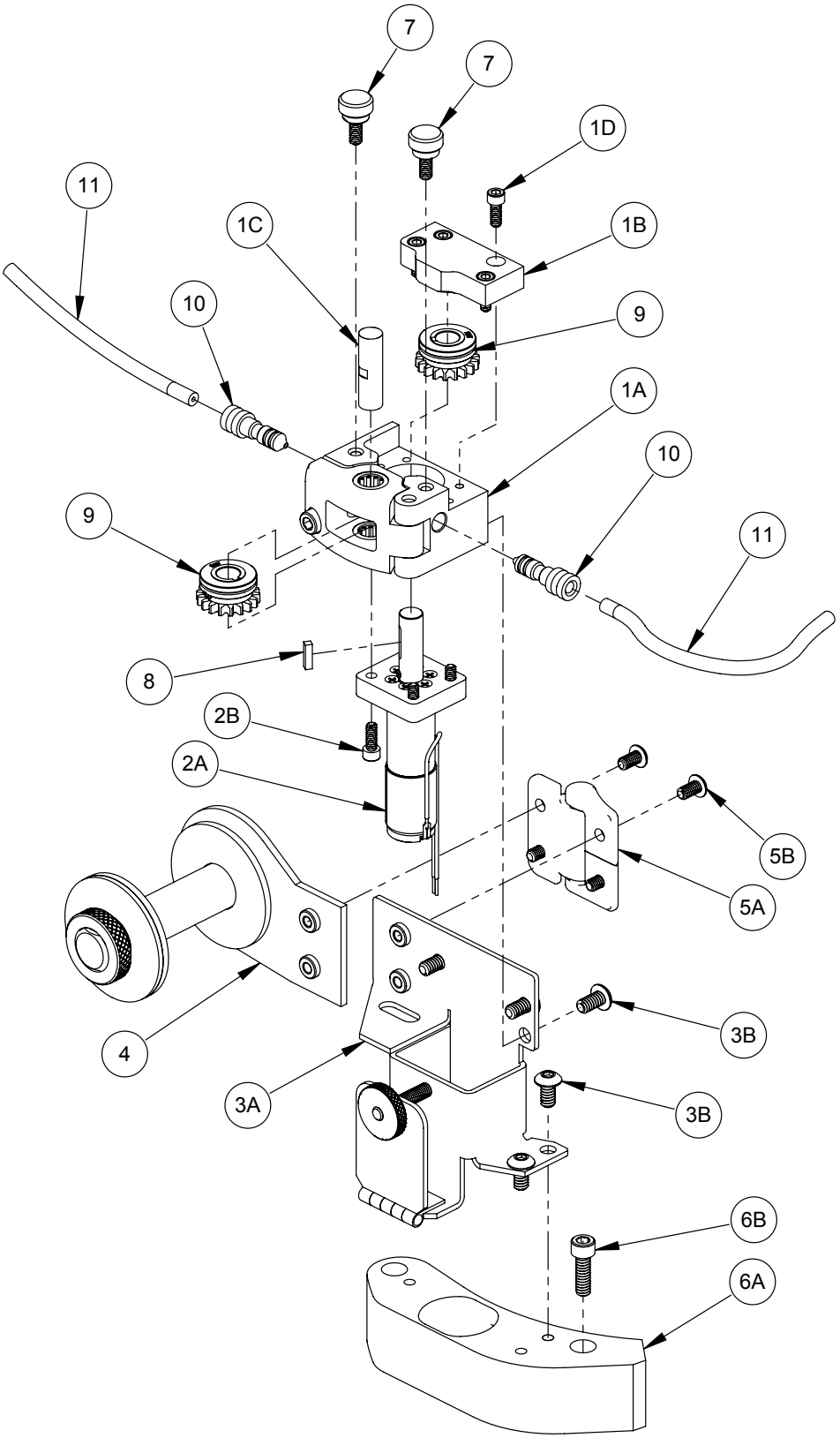
# Indicates a change in this printing.

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	2	3	4	5	6	7	8	9
	Torch Motion Assembly 2 of 2											
14	AVC Motor Kit	S29098-13	1	x								
14A	AVC Motor Assy		1	x								
14B	Flat Head Screw Phillips M2-0.4 X 6		6	x								
15	Connector Harness	S29098-16	1	x								
16	Cooling Hose Clamp Kit	S29098-32	1	x								
16A	Hose Clamp Back		1	x								
16B	Hose Clamp Front		1	x								
16C	SHCS 4-40 X 5/16		1	x								
17	Avc Rail Kit	S29098-601	2	x								
17A	AVC Rail		1	x								
17B	SHCS 4-40 X 1/4		7	x								
17C	SHCS M3 X 0.5 X 8		4	x								
18	AVC Rack Kit	S29098-603	1	x								
18A	AVC Rack		1	x								
18B	SHCS 4-40 X 5/8		5	x								
19	AVC Plate PCB Kit	S29098-605	1	x								
19A	PCB		1	x								
19B	SHCS 4-40 X 1/4		3	x								
20	Interface Plate Kit	S29098-608	1	x								
20A	Interface Plate		1	x								
20B	FHCS 10-24 X 1/2		5	x								
21	Connector Block Kit	S29098-611	1	x								
21A	Connector Block		1	x								
21B	SHCS 10-24 X 5/8		2	x								
22	AVC Motor Block Kit	S29098-612	1	x								
22A	AVC Motor Block		2	x								
22B	SHCS 10-24 X 5/8		3	x								
23	AVC Plate Kit	S29098-613	1	x								
23A	AVC Plate		1	x								
23B	Barbed Water Fitting Set (2 pc.)	S29098-29	1	x								

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

P-786-E
ON BOARD WIRE FEED KIT



6-11-14

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

# Indicates a change in this printing.

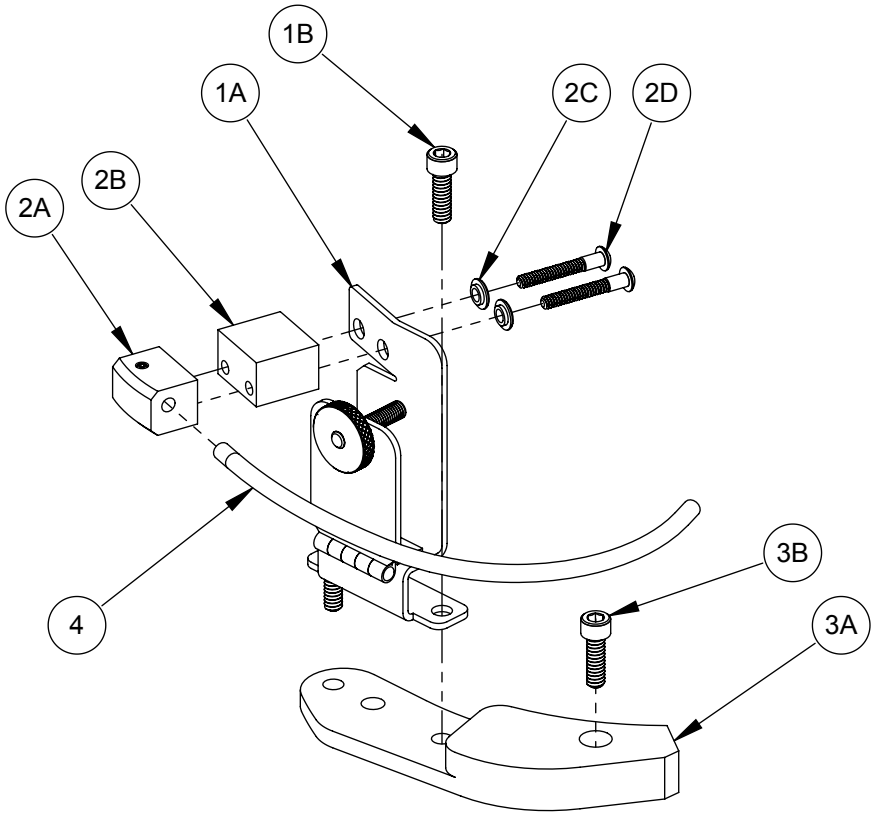
Use only the parts marked “x” in the column under the heading number called for in the model index page.

ITEM	DESCRIPTION	PART NO.	QTY.	1	2	3	4	5	6	7	8	9
	On Board Wire Feed Assembly	K52117-1										
1	Onboard Wire Feed Housing Kit	S29098-1	1	x								
1A	Wire Feed Housing		1	x								
1B	Wire Front Cap		1	x								
1C	Wire Idler Shaft		1	x								
1D	SHCS 6-32 X 3/8		4	x								
2	Onboard Wire Feed Motor Assy	S29098-19	1	x								
2A	Wire Motor Assy		1	x								
2B	SHCS 6-32 X 3/8		4	x								
3	Onboard Wire Feed Bracket	S29098-20	1	x								
3A	Wire Feed Bracket		1	x								
3B	BHCS 10-24 X 3/8		6	x								
4	Onboard Wire Feed 2Lb Spool Hub -	S29098-21	1	x								
5	Onboard Wire Feed Spool Hinge	S29098-22	1	x								
5A	Friction Hinge		1	x								
5B	BHCS 8-32 X 5/16		4	x								
6	Wire Feed Mounting Block	S29098-614	1	x								
6A	Wire Feed Mounting Block 663		1	x								
6B	SHCS 10-24 X 5/8		2	x								
7	Wire Feed Thumb Screw Set (2 pc.)	S29098-31	1	x								
8	Onboard Wire Feed Shaft Key (3 pc.)	S29098-33	1	x								
9	Onboard Wire Feed - Drive Roll Set (2 pc.)		1	x								
	.030 (0.8 mm)	KP52094-030		x								
	.035 (0.9 mm)	KP52094-035		x								
	.040 (1.0 mm)	KP52094-040		x								
	.045 (1.2 mm)	KP52094-045		x								
10	Onboard Wire Feed - Inlet/Outlet Guide Set (2 pc.)		1	x								
	.030-.035 (0.8-0.9 mm)	KP52099-035		x								
	.040-.045 (1.0-1.2 mm)	KP52099-045		x								
11	Wire Liner (3 ft.)	KP52109-1	1	x								

6-11-14

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

P-786-F
WIRE FEED REMOVAL KIT



6-11-14

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

# Indicates a change in this printing.

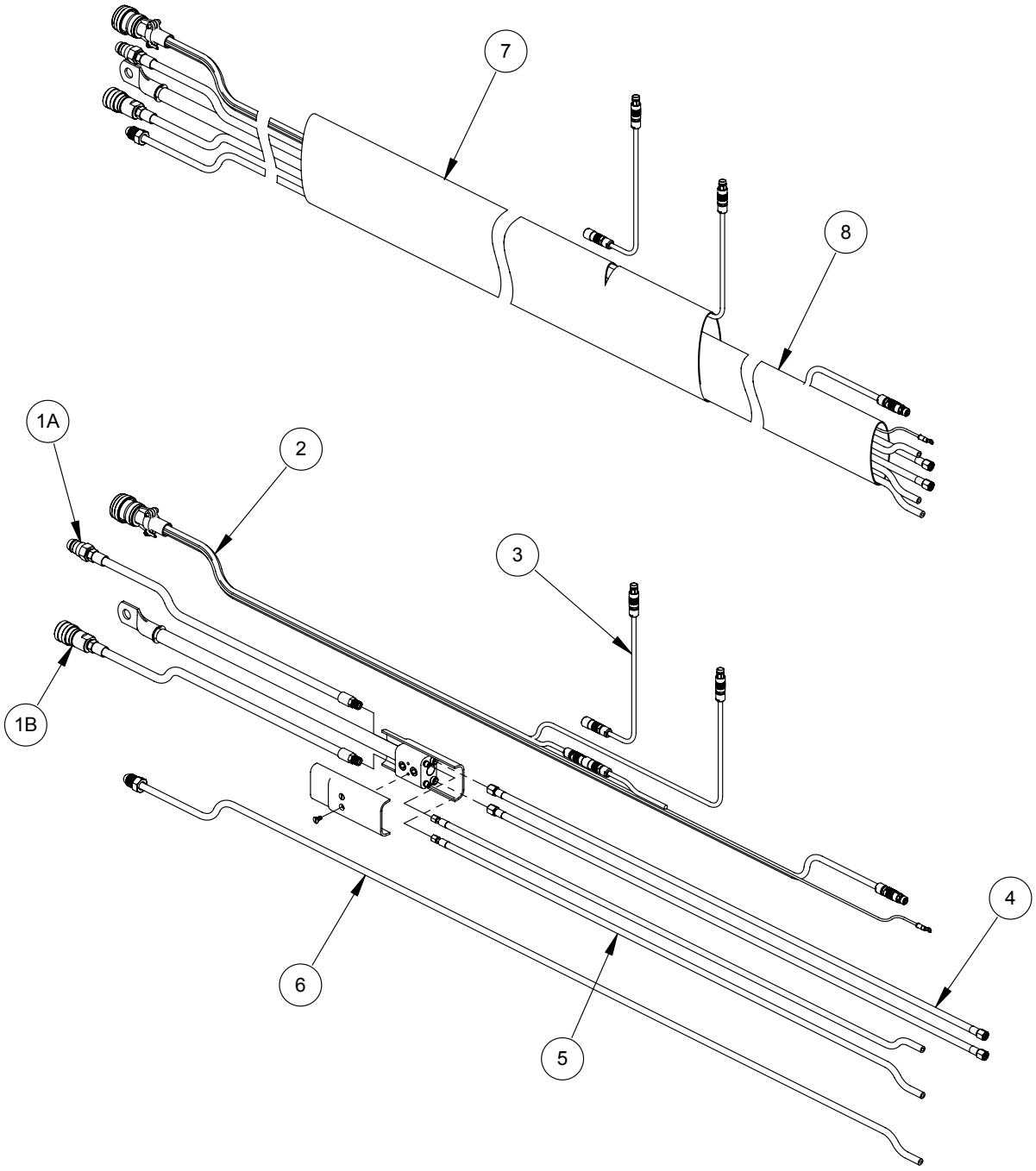
Use only the parts marked “x” in the column under the heading number called for in the model index page.

ITEM	DESCRIPTION	PART NO.	QTY.	1	2	3	4	5	6	7	8	9
	Wire Feed Removal Kit	K52118-1										
1	Cable Clamp Kit	S29098-26	1	x								
1A	Cable Clamp		1	x								
1B	SHCS 10-24 X 5/8		2	x								
2	Wire Liner Coupler Kit	S29098-27	1	x								
2A	Wire Liner Coupler		1	x								
2B	Wire Coupler Insulator		1	x								
2C	Shoulder Washer #6		2	x								
2D	BHCS 6-32 X 1		2	x								
3	Cable Clamp Base Kit	S29098-616	1	x								
3A	Cable Clamp Base		1	x								
3B	SHCS 10-24 X 5/8		1	x								
4	Wire Liner (3 ft.)	KP52109-1	1	x								

6-11-14

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

P-786-G
CABLE ASSEMBLY



6-11-14

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

# Indicates a change in this printing.

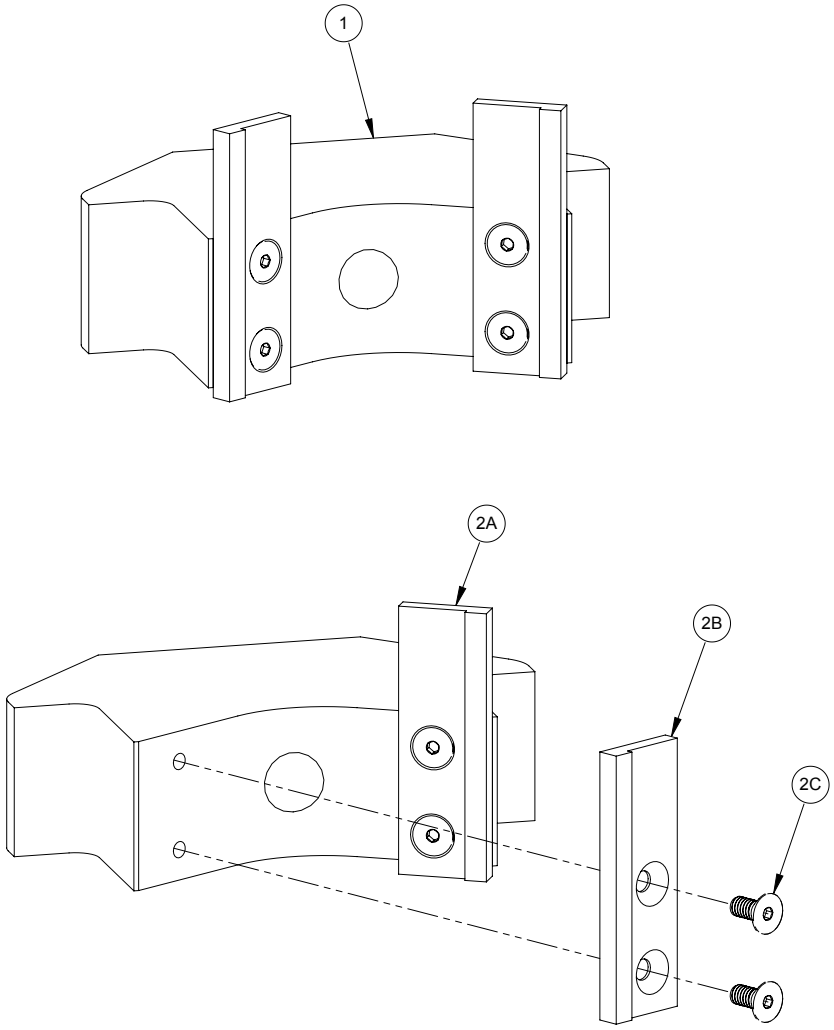
Use only the parts marked “x” in the column under the heading number called for in the model index page.

ITEM	DESCRIPTION	PART NO.	QTY.	1	2	3	4	5	6	7	8	9
	Cable Assembly	K52120-1										
1	Water Hose Kit	S29561-20	1	x	x							
1A	Water Hose Assy - Male		1	x	x							
1B	Water Hose Assy - Female		1	x	x							
2	Control Cable	KP52122-1	1	x	x							
3	External Wire Feed Cable Extenison	K52124-1	1	-	x							
4	Power Water Hose	KP52125-1	2	x	x							
5	Water Hose	KP52126-1	2	x	x							
6	Gas Hose	KP52127-1	1	x	x							
7	Cable/Hose Main Cover	KP52128-1	1	x	x							
8	Cable/Hose Hi Temp Cover	KP52129-1	1	x	x							

6-11-14

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

P-786-H
CLAMP SHOE



6-11-14

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

# Indicates a change in this printing.

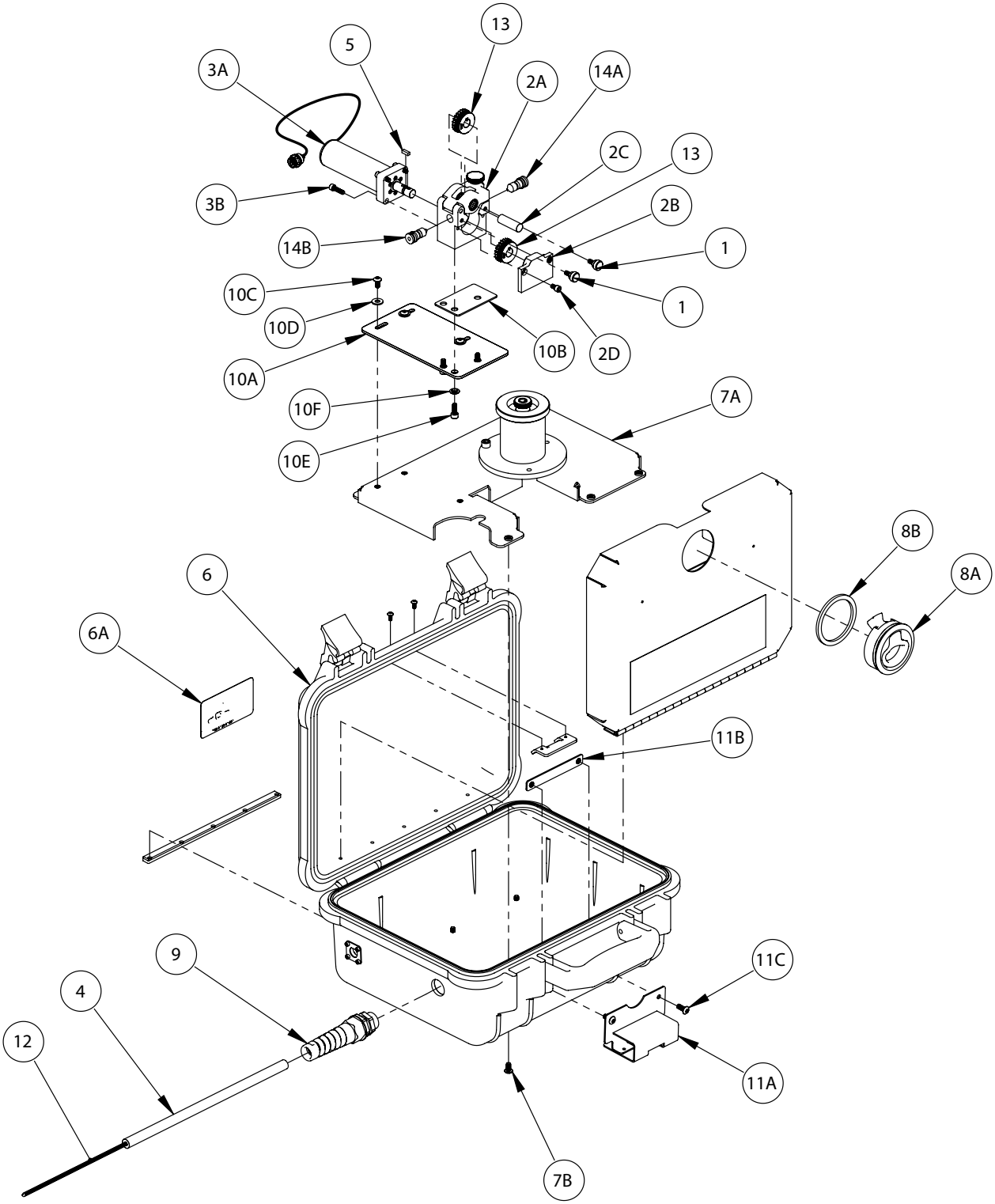
Use only the parts marked “x” in the column under the heading number called for in the model index page.

ITEM	DESCRIPTION	PART NO.	QTY.	1	2	3	4	5	6	7	8	9
	HELIX C663 Shoe Assembly (Select Size)											
1	Shoe Assembly		1	x								
	1.900” (48.3 mm) OD	K52093-190										
	2.375” (60.3 mm) OD	K52093-238										
	2.875” (73.0 mm) OD	K52093-288										
	3.500” (88.9 mm) OD	K52093-350										
	4.000” (101.6 mm) OD	K52093-400										
	4.500” (114.3 mm) OD	K52093-450										
	5.563” (141.3 mm) OD	K52093-556										
	6.625” (168.3 mm) OD	K52093-663										
	Special Size	K52093-000										
2	Shoe Plate Set	KP52098-1	1	x								
2A	Shoe Plate A		1	x								
2B	Shoe Plate B		1	x								
2C	Flat Head Cap Screw 8-32 x 3/8		4	x								

6-11-14

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

P-786-I
WF20S WIRE FEEDER



6-11-14

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

# Indicates a change in this printing.

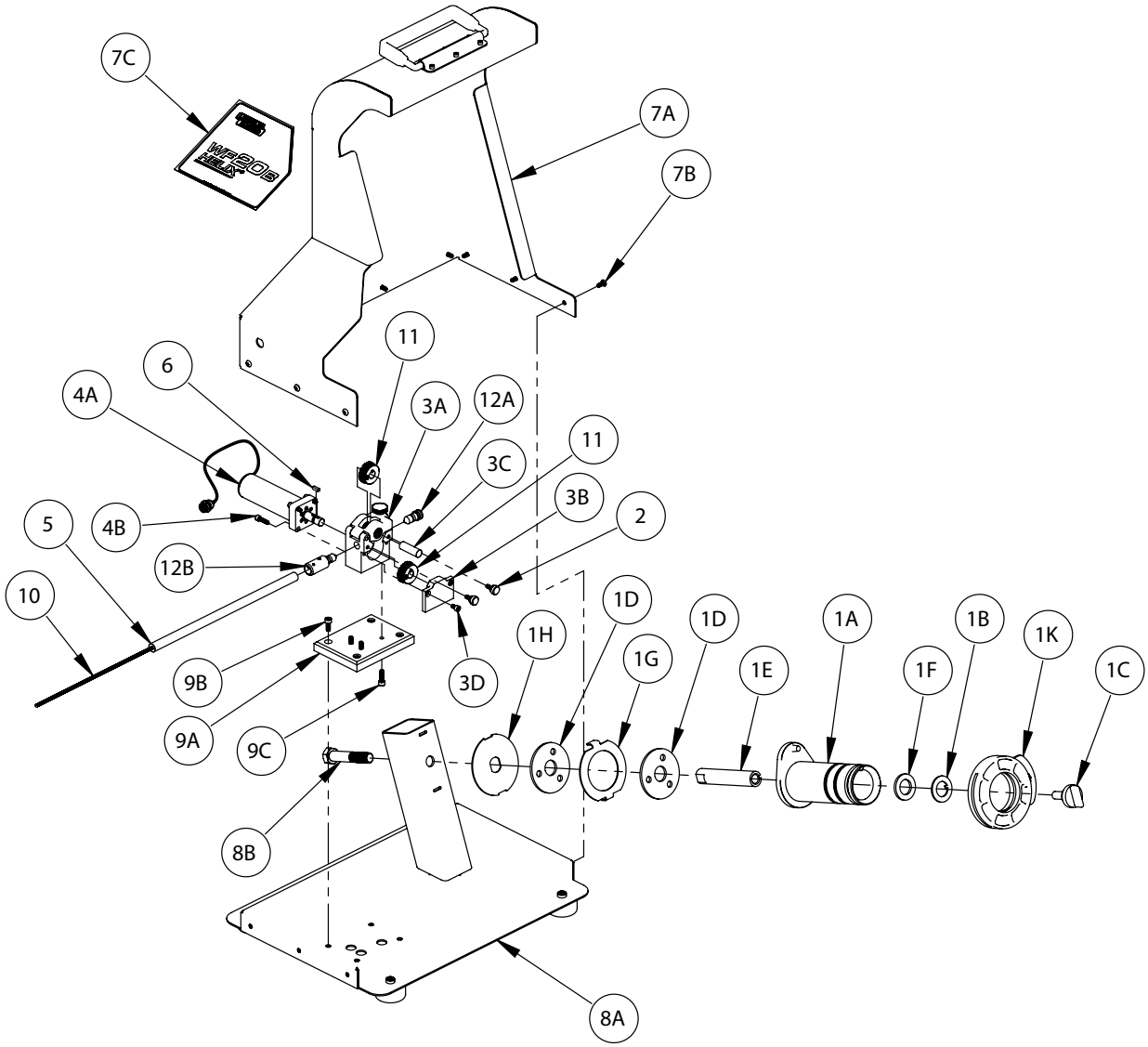
Use only the parts marked “x” in the column under the heading number called for in the model index page.

ITEM	DESCRIPTION	PART NO.	QTY.	1	2	3	4	5	6	7	8	9
	HELIX WF20S Wire Feeder	K52097-1										
1	Thumb Screw Set (2 pc.)	S29098-31	1	x								
2	Housing Assy Kit	S29099-2	1	x								
2A	Wire Feed Housing		1	x								
2B	Drive Cover		1	x								
2C	Wire Idler Shaft		1	x								
2D	SHCS 8-32 X 5/16		2	x								
3	Motor Assy Kit	S29099-3	1	x								
3A	Wire Motor Assy Modified		1	x								
3B	SHCS 8-32 X 5/8		4	x								
4	Strain Relief Hose	S29099-4	1	x								
5	Shaft Key	S29099-5	1	x								
6	Suitcase Enclosure (with overlay)	S29099-101	1	x								
6A	HELIX WF20S Overlay	S30298	1	x								
7	Spool Hub Base Kit	S29099-102	1	x								
7A	Spool Hub Base		1	x								
7B	BHCS 10-32 X 3/8		6	x								
8	Tool Compartment Latch	S29099-103	1	x								
8A	Finger Latch		1	x								
8B	Finger Latch Spacer		1	x								
9	Spiral Strain Relief	S29099-104	1	x								
10	Base Plate Kit	S29099-105	1	x								
10A	Wire Feed Mount		2	x								
10B	Insulation Plate		1	x								
10C	BHCS 10-32 X 3/8		3	x								
10D	Washer 10		3	x								
10E	SHCS 10-24 X 1/2		3	x								
10F	Shoulder Spacer With Flange		3	x								
11	Pendant Bracket Kit	S29099-106	1	x								
11A	Pendant Bracket		1	x								
11B	Hook Fixture		1	x								
11C	BHCS 10-32 X 1/2		2	x								
12	External Wire Feed - Wire Liner		1	x								
	.030-.035 (0.8-0.9 mm)	KP42-3035-15										
	.040-.045 (1.0-1.2 mm)	KP42-4045-15										
13	Wire Feed Drive Roll Set		1	x								
	.030 (0.8 mm)	KP52079-030										
	.035 (0.9 mm)	KP52079-035										
	.040 (1.0 mm)	KP52079-040										
	.045 (1.2 mm)	KP52079-045										
14	Inlet Outlet Guide Kit		1	x								
	.030-.035 (0.8-0.9 mm)	KP52080-035										
	.040-.045 (1.0-1.2 mm)	KP52080-045										
14A	Inlet Guide .035		1	x								
14B	Outlet Guide .035		1	x								

6-11-14

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

P-786-J
WF20B WIRE FEEDER



6-11-14

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

# Indicates a change in this printing.

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	2	3	4	5	6	7	8	9
	HELIX WF20B Wire Feeder	K52097-2										
1	Spindle Assembly	M14935-2	1	x								
1A	Spindle	L10560	1	x								
1B	Keyed Washer	T12965-2	1	x								
1C	Thumb Screw	T14813-B	1	x								
1D	Friction Washer	S17435-4	2	x								
1E	Spindle Shaft	S22975	1	x								
1F	Friction Washer	S17435-3	1	x								
1G	Brake Plate Lock	S23968	1	x								
1H	Brake Plate	S23972	1	x								
1J	Compression Spring (Not Shown)	T11862-14	1	x								
1K	Retaining Collar Assembly	S23811	1	x								
2	Thumb Screw Set (2 pc.)	S29098-31	1	x								
3	Housing Assy	S29099-2	1	x								
3A	Wire Feed Housing		1	x								
3B	Drive Cover		1	x								
3C	Wire Idler Shaft		1	x								
3D	SHCS 8-32 X 5/16		2	x								
4	Motor Assy	S29099-3	1	x								
4A	Wire Motor Assy Modified		1	x								
4B	SHCS 8-32 X 5/8		4	x								
5	Strain Relief Hose	S29099-4	1	x								
6	Shaft Key	S29099-5	1	x								
7	Cover	S29099-201	1	x								
7A	Cover		1	x								
7B	Pan Head Screw Phillips 8-32 X 3/8		10	x								
7C	HELIX WF20B Overlay	S30296	1	x								
8	Spool Hub Base	S29099-202	1	x								
8A	Wire Feed Base		1	x								
8B	Hex Bolt 1/2-13 X 2 3/4		1	x								
9	Base Plate	S29099-203	1	x								
9A	Wire Feed Insulator		1	x								
9B	SHCS 10-24 X 1/2		4	x								
9C	SHCS 10-24 X 5/8		3	x								
10	Wire Liner (16 ft.)		1	x								
	.030-.035 (0.8-0.9 mm)	KP42-3035-15										
	.040-.045 (1.0-1.2 mm)	KP42-4045-15										
11	Drive Roll Set (2 pc.)		1	x								
	.030 (0.8 mm)	KP52079-030										
	.035 (0.9 mm)	KP52079-035										
	.040 (1.0 mm)	KP52079-040										
	.045 (1.2 mm)	KP52079-045										
12	Inlet/Outlet Guide Set		1	x								
	.030-.035 (0.8-0.9 mm)	KP52115-035										
	.040-.045 (1.0-1.2 mm)	KP52115-045										
12A	Inlet Guide		1	x								
12B	Outlet Guide		1	x								

6-11-14

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

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.

Subject to Change – This information is accurate to the best of our knowledge at the time of printing. Please refer to www.lincolnelectric.com for any updated information.

THE LINCOLN ELECTRIC COMPANY
22801 St. Clair Avenue • Cleveland, OH • 44117-1199 • U.S.A.
Phone: +1.216.481.8100 • www.lincolnelectric.com