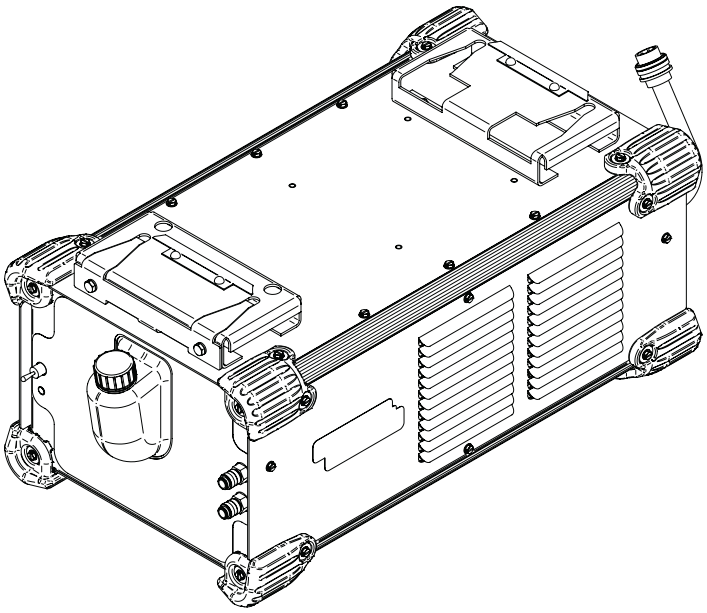
LINCOLN ELECTRIC

Cool Arc® 55 S Water Cooler

For use with machines having Code Numbers:

Cool Arc® 55 S Water Cooler: 11949

SERVICE MANUAL



SVM286 | Issue Date 18-Feb

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

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

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

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

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

WEAR CORRECT EYE, EAR & BODY PROTECTION

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

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

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

IN SOME AREAS, protection from noise may be appropriate.

BE SURE protective equipment is in good condition.

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

SPECIAL SITUATIONS

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

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

Additional precautionary measures

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

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

REMOVE all potential fire hazards from welding area.

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

SECTION A: WARNINGS

CALIFORNIA PROPOSITION 65 WARNINGS

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 hardfacing (see instructions on container or SDS) or on lead or cadmium plated steel and other metals or coatings which produce highly toxic fumes, keep exposure as low as possible and within applicable OSHA PEL and ACGIH TLV limits using local exhaust or mechanical ventilation unless exposure assessments indicate otherwise. In confined spaces or in some circumstances, outdoors, a respirator may also be required. Additional precautions are also required when welding on galvanized steel.**

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

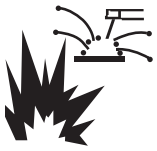
5.c. Do not weld in locations near chlorinated hydrocarbon vapors coming from degreasing, cleaning or spraying operations. The heat and rays of the arc can react with solvent vapors to form phosgene, a highly toxic gas, and other irritating products.

5.d. Shielding gases used for arc welding can displace air and cause injury or death. Always use enough ventilation, especially in confined areas, to insure breathing air is safe.

5.e. Read and understand the manufacturer’s instructions for this equipment and the consumables to be used, including the Safety Data Sheet (SDS) and follow your employer’s safety practices. SDS forms are available from your welding distributor or from the manufacturer.

5.f. Also see item 1.b.

WELDING AND CUTTING SPARKS CAN CAUSE FIRE OR EXPLOSION.



6.a. Remove fire hazards from the welding area. If this is not possible, cover them to prevent the welding sparks from starting a fire. Remember that welding sparks and hot materials from welding can easily go through small cracks and openings to adjacent areas. Avoid welding near hydraulic lines. Have a fire extinguisher readily available.

6.b. Where compressed gases are to be used at the job site, special precautions should be used to prevent hazardous situations. Refer to "Safety in Welding and Cutting" (ANSI Standard Z49.1) and the operating information for the equipment being used.

6.c. When not welding, make certain no part of the electrode circuit is touching the work or ground. Accidental contact can cause overheating and create a fire hazard.

6.d. Do not heat, cut or weld tanks, drums or containers until the proper steps have been taken to insure that such procedures will not cause flammable or toxic vapors from substances inside. They can cause an explosion even though they have been "cleaned". For information, purchase "Recommended Safe Practices for the Preparation for Welding and Cutting of Containers and Piping That Have Held Hazardous Substances", AWS F4.1 from the American Welding Society (see address above).

6.e. Vent hollow castings or containers before heating, cutting or welding. They may explode.

6.f. Sparks and spatter are thrown from the welding arc. Wear oil free protective garments such as leather gloves, heavy shirt, cuffless trousers, high shoes and a cap over your hair. Wear ear plugs when welding out of position or in confined places. Always wear safety glasses with side shields when in a welding area.

6.g. Connect the work cable to the work as close to the welding area as practical. Work cables connected to the building framework or other locations away from the welding area increase the possibility of the welding current passing through lifting chains, crane cables or other alternate circuits. This can create fire hazards or overheat lifting chains or cables until they fail.

6.h. Also see item 1.c.

6.I. Read and follow NFPA 51B "Standard for Fire Prevention During Welding, Cutting and Other Hot Work", available from NFPA, 1 Batterymarch Park, PO box 9101, Quincy, MA 022690-9101.

6.j. Do not use a welding power source for pipe thawing.

CYLINDER MAY EXPLODE IF DAMAGED.

7.a. Use only compressed gas cylinders containing the correct shielding gas for the process used and properly operating regulators designed for the gas and pressure used. All hoses, fittings, etc. should be suitable for the application and maintained in good condition.

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

7.c. Cylinders should be located:

- Away from areas where they may be struck or subjected to physical damage.
- A safe distance from arc welding or cutting operations and any other source of heat, sparks, or flame.

7.d. Never allow the electrode, electrode holder or any other electrically "hot" parts to touch a cylinder.

7.e. Keep your head and face away from the cylinder valve outlet when opening the cylinder valve.

7.f. Valve protection caps should always be in place and hand tight except when the cylinder is in use or connected for use.

7.g. Read and follow the instructions on compressed gas cylinders, associated equipment, and CGA publication P-I, "Precautions for Safe Handling of Compressed Gases in Cylinders," available from the Compressed Gas Association, 14501 George Carter Way Chantilly, VA 20151.

FOR ELECTRICALLY POWERED EQUIPMENT.

8.a. Turn off input power using the disconnect switch at the fuse box before working on the equipment.

8.b. Install equipment in accordance with the U.S. National Electrical Code, all local codes and the manufacturer's recommendations.

8.c. Ground the equipment in accordance with the U.S. National Electrical Code and the manufacturer's recommendations.

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

Cool Arc® 55 S Water Cooler

Service Manual

Last update: 2018/02/01

Troubleshooting & Repair

HOW TO USE TROUBLESHOOTING GUIDE

⚠ WARNING

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

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

Step 1. LOCATE PROBLEM (SYMPTOM). Look under the column labeled "PROBLEM" (SYMPTOMS). This column describes possible symptoms that the machine may exhibit. Find the listing that best describes the symptom that the machine is exhibiting. Symptoms are grouped into one main category: Function Problems.

Step 2. PERFORM EXTERNAL TESTS. The second column, labeled "POSSIBLE AREAS OF MISADJUSTMENT(S)", lists the obvious external possibilities that may contribute to the machine symptom. Perform these tests/checks in the order listed. In general, these tests can be conducted without removing the case cover.

Step 3. PERFORM COMPONENT TESTS. The last column, labeled "Recommended Course of Action" lists the most likely components that may have failed in your machine. It also specifies the appropriate test procedure to verify that the subject component is either good or bad. If there are a number of possible components, check the components in the order listed to eliminate one possibility at a time until you locate the cause of your problem.

All of the referenced test procedures referred to in the Troubleshooting Guide are described in detail at the end of this section. Refer to the Troubleshooting and Repair Table of Contents to locate each specific Test Procedure. All of the referred to test points, components, terminal strips, etc., can be found on the referenced electrical wiring diagrams and schematics. Refer to the Electrical Diagrams Section Table of Contents to locate the appropriate diagram.

⚠ CAUTION

If for any reason you do not understand the test procedures or are unable to perform the test/repairs safely, contact the Lincoln Electric Service Department for electrical troubleshooting assistance before you proceed. Call 1-888-935-3877.

PC BOARD TROUBLESHOOTING PROCEDURES

⚠ WARNING

ELECTRIC SHOCK can kill.

• Have an electrician install and service this equipment. Turn the input power OFF at the fuse box before working on equipment. Do not touch electrically hot parts.

⚠ CAUTION

Sometimes machine failures appear to be due to PC board failures. These problems can sometimes be traced to poor electrical connections. To avoid problems when troubleshooting and replacing PC boards, please use the following procedure:

1. Determine to the best of your technical ability that the PC board is the most likely component causing the failure symptom.
2. Check for loose connections at the PC board to assure that the PC board is properly connected.
3. If the problem persists, replace the suspect PC board using standard practices to avoid static electrical damage and electrical shock. Read the warning inside the static resistant bag and perform the following procedures:

PC board can be damaged by static electricity.

• Remove your body's static charge before opening the static-shielding bag. Wear an anti-static wrist strap. For safety, use a 1 Meg ohm resistive cord connected to a grounded part of the equipment frame.

ATTENTION
Static-Sensitive Devices
Handle only at Static-Safe Workstations

Reusable Container
Do Not Destroy

• If you don't have a wrist strap, touch an un-painted, grounded, part of the equipment frame. Keep touching the frame to prevent static build-up. Be sure not to touch any electrically live parts at the same time.

• Tools which come in contact with the PC board must be either conductive, anti-static or static-dissipative.

• Remove the PC board from the static-shielding bag and place it directly into the equipment. Don't set the PC board on or near paper, plastic or cloth which could have a static charge. If the PC board can't be installed immediately, put it back in the static-shielding bag.

• If the PC board uses protective shorting jumpers, don't remove them until installation is complete.

• If you return a PC board to The Lincoln Electric Company for credit, it must be in the static-shielding bag. This will prevent further damage and allow proper failure analysis.

4. Test the machine to determine if the failure symptom has been corrected by the replacement PC board.

NOTE: It is desirable to have a spare (known good) PC board available for PC board troubleshooting.

NOTE: Allow the machine to heat up so that all electrical components can reach their operating temperature.

5. Remove the replacement PC board and substitute it with the original PC board to recreate the original problem.

a. If the original problem does not reappear by substituting the original board, then the PC board was not the problem. Continue to look for bad connections in the control wiring harness, junction blocks and terminal strips.

b. If the original problem is recreated by the substitution of the original board, then the PC board was the problem. Reinstall the replacement PC board and test the machine.

6. Always indicate that this procedure was followed when warranty reports are to be submitted.

NOTE: Following this procedure and writing on the warranty report, "INSTALLED AND SWITCHED PC BOARDS TO VERIFY PROBLEM," will help avoid denial of legitimate PC board warranty claims.

Troubleshooting guide

Observe Safety Guidelines detailed in the beginning of this manual.	**TROUBLESHOOTING GUIDE**	
PROBLEMS (SYMPTOMS)	**POSSIBLE AREAS OF MISADJUSTMENT(S)**	**RECOMMENDED COURSE OF ACTION**
FUNCTION PROBLEMS		
Cooler is dead. Does not respond.	1. Make sure 120 VAC is being applied through the input cord. 2. Make sure the ArcLink cable is connected to a Lincoln PowerWave compatible power source.	1. Ensure 40 VDC is being applied to Plug J81 pin 4 (+) to Plug J81 pin 3 (-). This is the ArcLink supply voltage from the PowerWave power source. 2. Perform the ***12 VDC Relay Test Procedure***. 3. The 42V & ArcLink feeder board may be faulty.
The pump motor does not operate even when the manual operation switch is activated.	1. Make sure 120 VAC is being applied through the input cord.	1. Perform the ***Pump Motor And Fan Test Procedure***. 2. Perform the ***Manual Operation Switch Test Procedure***.
The fan motor does not operate even when the manual operation switch is activated.	1. Make sure 120 VAC is being applied through the input cord.	1. Perform the ***Pump Motor And Fan Test Procedure***. 2. Perform the ***Manual Operation Switch Test Procedure***.
The fan motor does not operate when the gun trigger is activated, but does operate when the manual operation switch is activated.	1. Make sure the ArcLink cable is connected to a Lincoln PowerWave compatible power source.	1. Ensure 40 VDC is being applied to Plug J81 pin 4 (+) to Plug J81 pin 3 (-). This is the ArcLink supply voltage from the PowerWave power source. 2. Perform the ***12 VDC Relay Test Procedure***. 3. Check the flow switch and associated leads and connections. See Wiring Diagram. 4. The 42V & ArcLink feeder board may be faulty.
⚠ CAUTION If for any reason you do not understand the test procedures or are unable to perform the test/repairs safely, contact the Lincoln Electric Service Department for electrical troubleshooting assistance before you proceed. Call 1-888-935-3877.		

Observe Safety Guidelines detailed in the beginning of this manual.	**TROUBLESHOOTING GUIDE**	
PROBLEMS (SYMPTOMS)	**POSSIBLE AREAS OF MISADJUSTMENT(S)**	**RECOMMENDED COURSE OF ACTION**
FUNCTION PROBLEMS		
The pump motor does not operate when the gun trigger is activated, but does operate when the manual operation switch is activated.	1. Make sure the ArcLink cable is connected to a Lincoln PowerWave compatible power source.	1. Ensure 40 VDC is being applied to Plug J81 pin 4 (+) to Plug J81 pin 3 (-). This is the ArcLink supply voltage from the PowerWave power source. 2. Perform the ***12 VDC Relay Test Procedure***. 3. Check the flow switch and associated leads and connections. See Wiring Diagram. 4. The 42V & ArcLink feeder board may be faulty.
Torch or gun runs hot during operation.	1. Check to make sure the fan and pump motor are operating properly. 2. Check the coolant level. 3. Make sure the coolant is flowing through the heat exchanger and gun. 4. Check for coolant leaks.	1. N/A.

⚠ CAUTION

If for any reason you do not understand the test procedures or are unable to perform the test/repairs safely, contact the Lincoln Electric Service Department for electrical troubleshooting assistance before you proceed. Call 1-888-935-3877.

USING THE STATUS LED TO TROUBLESHOOT SYSTEM PROBLEMS

The Cool Arc 55 S is equipped with a status light. If a problem occurs it is important to note the condition of the status lights. **Therefore, prior to cycling power to the system, check the power source status light for error sequences in *Table F.1***.

Table F. 1 – Status LED conditions

LIGHT CONDITION	MEANING
STEADY GREEN	System OK. Power source is operational and is communicating normally with all healthy peripheral equipment connected to its ArcLink® network.
BLINKING GREEN	Occurs during power up or a system reset and indicates the power source is mapping (identifying) each component in the system. Normal for first 1-30 seconds after power is turned on or if the system configuration is changed during operation.
FAST BLINKING GREEN	Under normal conditions indicates Auto-mapping has failed. Also used by the diagnostic utility (included in the Weld Manager® Utilities available at ***www.powerwavesoftware.com***) to identify the selected machine when connecting to a specific IP address.
ALTERNATING GREEN AND RED	Non-recoverable system fault. If the Status lights are flashing any combination of red and green, errors are present. **Read the error code(s) before the machine is turned off**. Error Code interpretation through the Status light is detailed in the Service Manual. Individual code digits are flashed in red with a long pause between digits. If more than one code is present, the codes will be separated by a green light. Only active error conditions will be accessible through the Status Light. Error codes can also be retrieved with the diagnostics utility (included in the Weld Manager® Utilities available at ***www.powerwavesoftware.com***). This is the preferred method, since it can access historical information contained in the error log. To clear the active error(s), turn power source off and back on to reset.
STEADY RED	Not applicable.
BLINKING RED	Not applicable.

ERROR CODES FOR THE COOL ARC 55 S

The following is a partial list of possible error codes for the Cool Arc 55 S.

ERROR CODE #	INDICATION
92 FLOW SENSOR FAULT	The flow sensor is not detecting proper flow. Check to make sure all hoses are connected and that there is enough coolant in the system. Be sure the system is primed as described in the "Turning the System On" (Operation Manual). Also there could be a blocked line or a pump failure.
(OTHER)	A complete list of error codes is available in the Power Wave Manager Utility (available at ***www.powerwavesoftware.com***). Error codes that contain three or four digits are defined as fatal errors. These codes generally indicate internal errors on the Cool Arc 55 S status PC board. If cycling the input power on the machine does not clear the error, contact the service department.

Test Procedures

CASE COVER REMOVAL AND REPLACEMENT PROCEDURE

Service and repair should be performed by only Lincoln Electric factory trained personnel. Unauthorized repairs performed on this equipment may result in danger to the technician or machine operator and will invalidate your factory warranty. For your safety and to avoid electrical shock, please observe all safety notes and precautions detailed throughout this manual. If for any reason you do not understand the test procedures or are unable to perform the test/repairs safely, contact the Lincoln Electric Service Department for electrical troubleshooting assistance before you proceed. Call 1-888-935-3877.

TEST DESCRIPTION

This procedure will aid the technician in the removal and replacement of the Case Covers.

MATERIALS NEEDED

7/16" Nutdriver
Torx Nutdriver (Size T-25)
5/16" Nutdriver
Wiring Diagram

REMOVAL PROCEDURE

1. Carefully remove power from the Cool Arc 55 S Water Cooler machine.
2. Using a 7/16" nutdriver, remove the two screws and lock washers securing the locking bracket to the front mounting bracket. See ***Figure F.1***.
3. Using a Torx nutdriver (Size T-25), remove the four screws and lock washers (two in the front and rear mounting brackets) securing the roof to the machine. See ***Figure F.1***.
4. Using a 5/16" nutdriver, remove the three screws and flat washers securing each of the four top corner caps to the machine. See ***Figure F.1***.
5. Using a 5/16" nutdriver, remove the six screws securing the roof to the machine.
6. The roof can now be tilted up to allow access to internal components. To remove the roof completely, label and disconnect plugs J81, J83 and J85 from the 42V & ArcLink feeder board. See ***Figure F.2***. See Wiring Diagram.
7. Using a 5/16" nutdriver, remove the side screw from each of the four bottom corner caps. See ***Figure F.3***.
8. Using a 5/16" nutdriver, remove the four screws securing each side panel to the machine. See ***Figure F.3***.

REPLACEMENT PROCEDURE

1. Using a 5/16” nutdriver, attach the four screws securing each side panel to the machine.
2. Using a 5/16” nutdriver, attach the side screw to each of the four bottom corner caps.
3. Connect plugs J81, J83 and J85 to the 42V & ArcLink feeder board. See Wiring Diagram.
4. Carefully position the roof onto the machine.
5. Using a 5/16” nutdriver, attach the six screws securing the roof to the machine.
6. Using a 5/16” nutdriver, attach the three screws and flat washers securing each of the four top corner caps to the machine.
7. Using a Torx nutdriver (Size T-25), attach the four screws and lock washers (two in the front and rear mounting brackets) securing the roof to the machine.
8. Using a 7/16” nutdriver, attach the two screws and lock washers securing the locking bracket to the front mounting bracket.

Figure F.1 – Roof mounting hardware locations

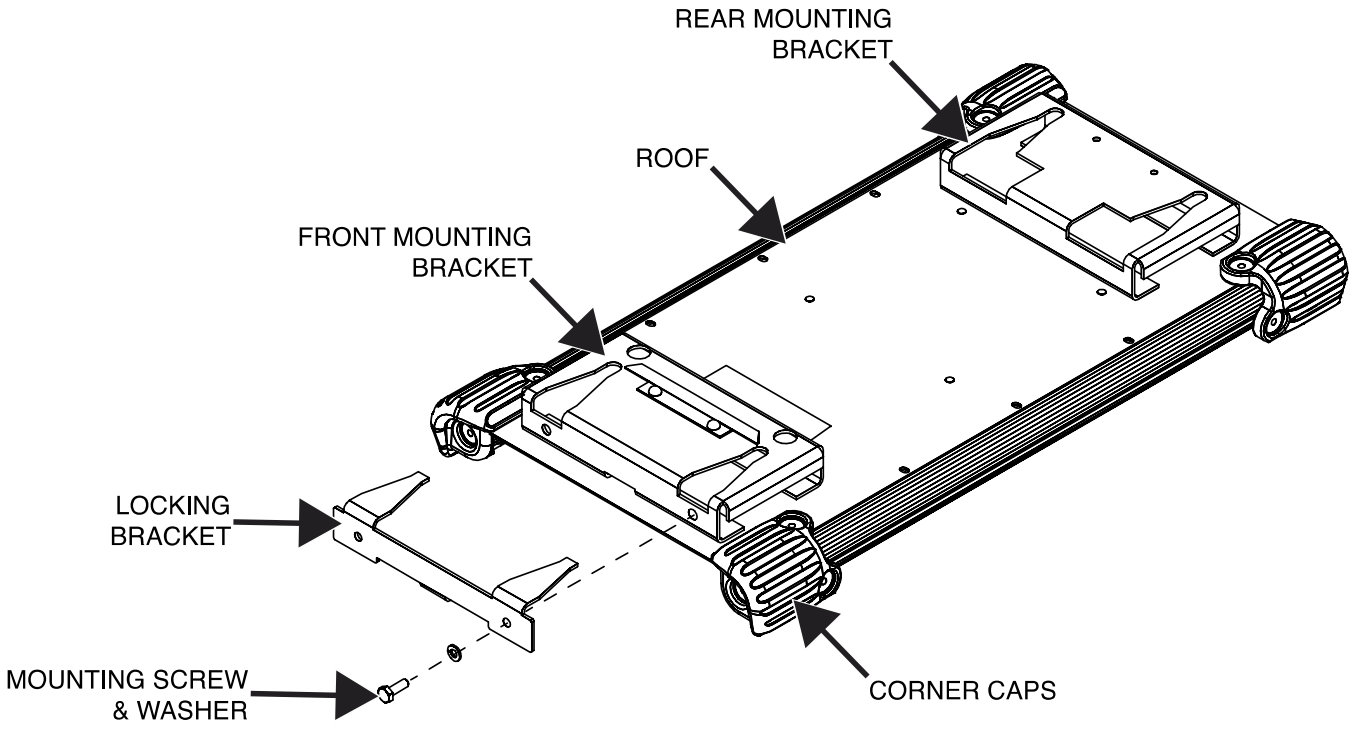


Figure F.2 – 42V & ArcLink feeder board plug locations

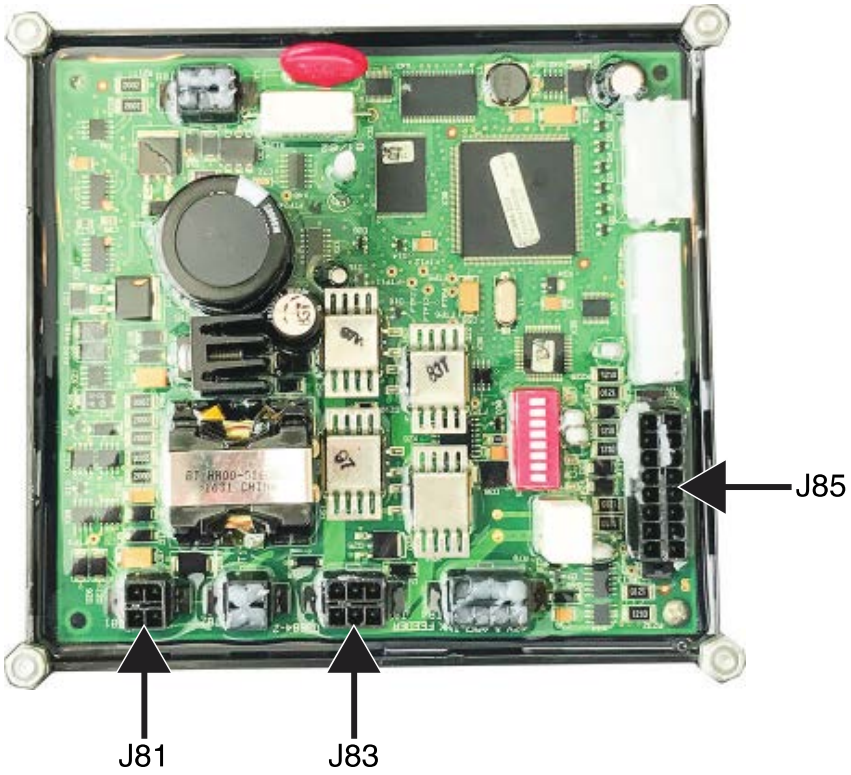
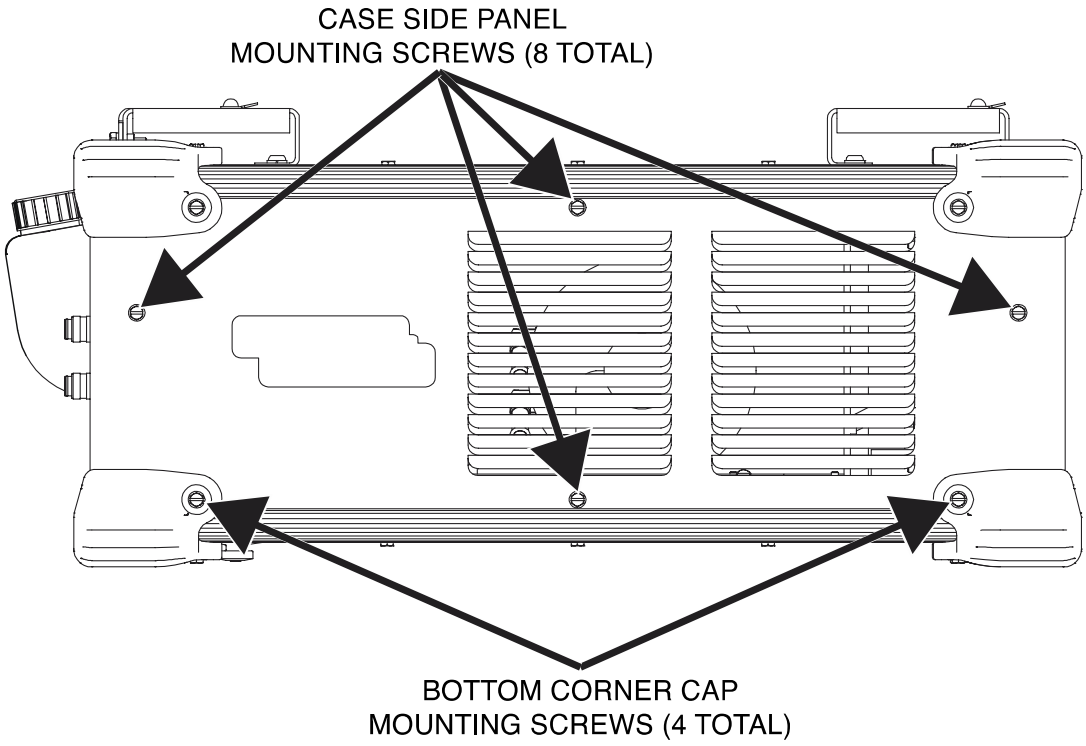


Figure F.3 – Case side panel mounting screw locations



12 VDC RELAY TEST PROCEDURE

Service and repair should be performed by only Lincoln Electric factory trained personnel. Unauthorized repairs performed on this equipment may result in danger to the technician or machine operator and will invalidate your factory warranty. For your safety and to avoid electrical shock, please observe all safety notes and precautions detailed throughout this manual. If for any reason you do not understand the test procedures or are unable to perform the test/repairs safely, contact the Lincoln Electric Service Department for electrical troubleshooting assistance before you proceed. Call 1-888-935-3877.

TEST DESCRIPTION

This test will determine if the 12 VDC Relay is functioning properly.

MATERIALS NEEDED

Volt/Ohmmeter
12 VDC Power Supply
Wiring Diagram

TEST PROCEDURE

1. Carefully remove power from the Cool Arc 55 S Water Cooler machine.
2. Perform the ***Case Cover Removal Procedure***.
3. Locate the 12 VDC relay. See ***Figure F.4***. See Wiring Diagram.
4. Label and disconnect leads 835, 834, 871, B, 872, B, W and W from the 12 VDC relay. See ***Figure F.5***. See Wiring Diagram.
5. Using a volt/ohmmeter, measure the resistance of the relay coil from terminal 0 to terminal 1. See ***Figure F.5***. See Wiring Diagram. Normal resistance should be approximately 80 ohms.
6. Using a volt/ohmmeter and a 12 VDC power supply, perform the tests outlined in ***Table F.2***. See ***Figure F.5***. See Wiring Diagram.
7. If any of the tests fail the 12 VDC relay may be faulty.
8. Connect all previously removed leads to the 12 VDC relay. See Wiring Diagram.
9. If faulty, perform the ***12 VDC Relay Removal And Replacement Procedure***.
10. Perform the ***Case Cover Replacement Procedure***.

Table F. 2 – 12V relay resistance tests

TEST POINT	TEST POINT	EXPECTED READING	MACHINE CONDITION
TERMINAL 4	TERMINAL 3	CLOSED (LOW RESISTANCE)	NO POWER APPLIED TO RELAY COILS.
TERMINAL 4	TERMINAL 2	OPEN (HIGH RESISTANCE)	NO POWER APPLIED TO RELAY COILS.
TERMINAL 8	TERMINAL 7	CLOSED (LOW RESISTANCE)	NO POWER APPLIED TO RELAY COILS.
TERMINAL 8	TERMINAL 6	OPEN (HIGH RESISTANCE)	NO POWER APPLIED TO RELAY COILS.
TERMINAL 4	TERMINAL 3	OPEN (LOW RESISTANCE)	12 VDC APPLIED TO RELAY COIL.
TERMINAL 4	TERMINAL 2	CLOSED (HIGH RESISTANCE)	12 VDC APPLIED TO RELAY COIL.
TERMINAL 8	TERMINAL 7	OPEN (LOW RESISTANCE)	12 VDC APPLIED TO RELAY COIL.
TERMINAL 8	TERMINAL 6	CLOSED (HIGH RESISTANCE)	12 VDC APPLIED TO RELAY COIL.

Figure F.4 – 12 VDC relay location

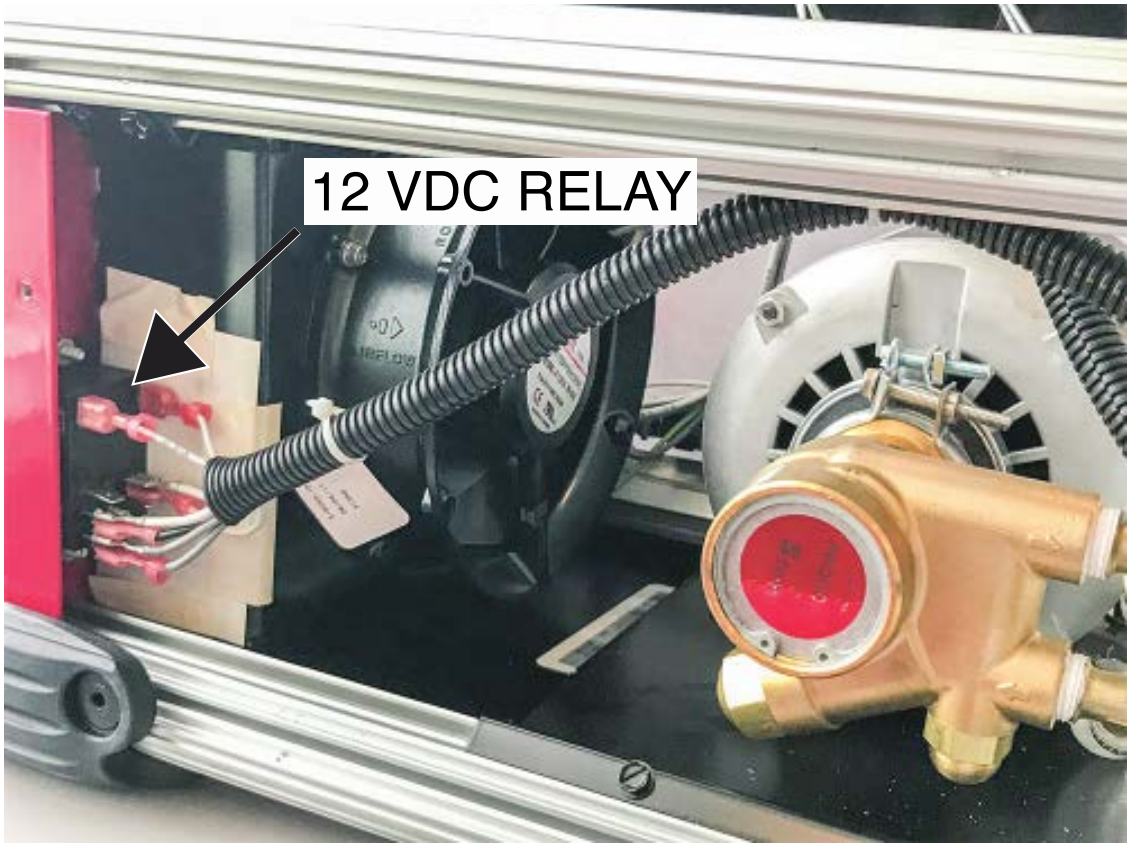
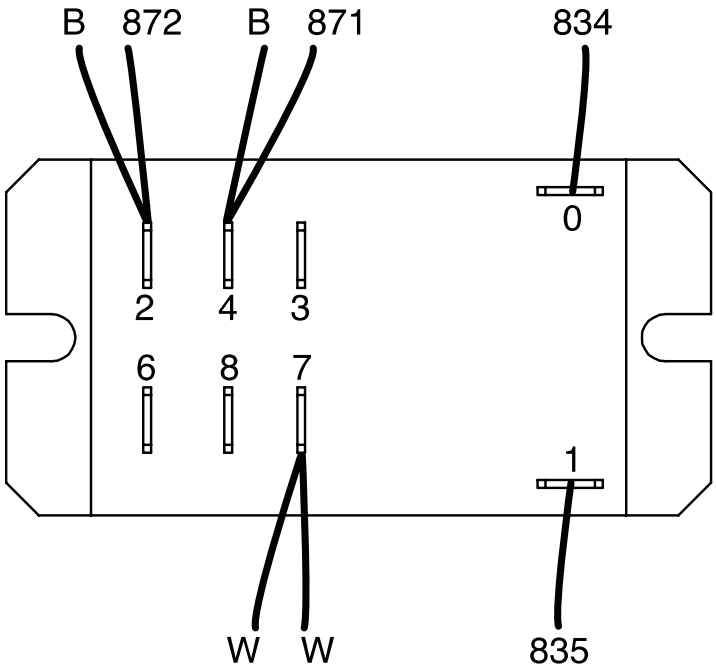


Figure F.5 – 12 VDC relay lead locations



PUMP MOTOR AND FAN TEST PROCEDURE

Service and repair should be performed by only Lincoln Electric factory trained personnel. Unauthorized repairs performed on this equipment may result in danger to the technician or machine operator and will invalidate your factory warranty. For your safety and to avoid electrical shock, please observe all safety notes and precautions detailed throughout this manual. If for any reason you do not understand the test procedures or are unable to perform the test/repairs safely, contact the Lincoln Electric Service Department for electrical troubleshooting assistance before you proceed. Call 1-888-935-3877.

TEST DESCRIPTION

This test will determine if the Pump Motor And Fan are functioning properly.

MATERIALS NEEDED

Volt/Ohmmeter
Wiring Diagram

TEST PROCEDURE

1. Carefully remove power from the Cool Arc 55 S Water Cooler machine.
2. Perform the ***Case Cover Removal Procedure***.
3. Locate the pump motor assembly and fan. See ***Figure F.6***. See Wiring Diagram.
4. Carefully apply 120 VAC to the water cooler. See Wiring Diagram.
5. Toggle the manual operation switch, located on the case front. See ***Figure F.7***. The pump, motor and fan should run. (Do not leave running if there is no coolant in reservoir as this may damage the pump).
6. If the motor and fan do not run, check the manual operation switch and associated wiring. See Wiring Diagram. Perform the ***Manual Operation Switch Test Procedure***.
7. If the pump motor does not run but the fan does, check for loose or faulty connections at the pump motor. See Wiring Diagram.
8. If the pump motor runs but the fan does not, check for loose or faulty connections at the fan. See Wiring Diagram. The fan may be faulty.
9. If the pump motor is faulty, perform the ***Pump And Motor Assembly Removal And Replacement Procedure***.
10. Perform the ***Case Cover Replacement Procedure***.

Figure F.6 – Pump motor assembly and fan locations

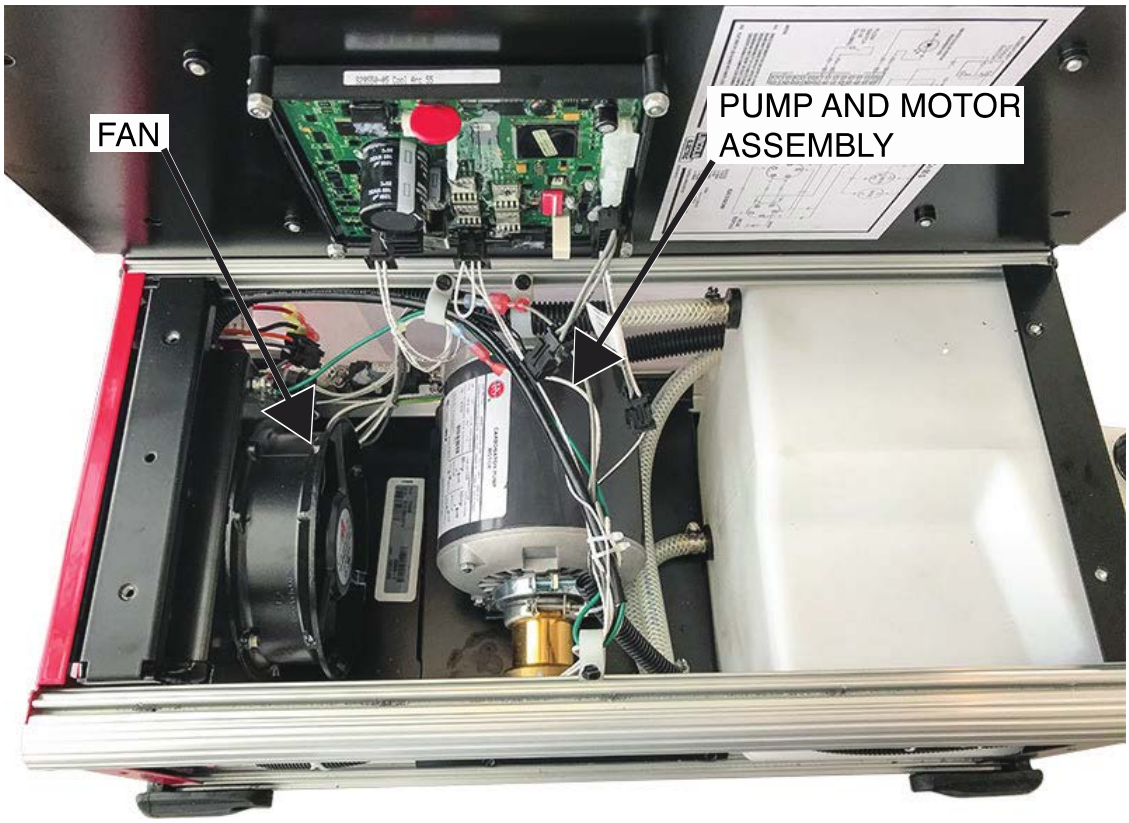


Figure F.7 – Manual operation switch locations

MANUAL OPERATION SWITCH TEST PROCEDURE

Service and repair should be performed by only Lincoln Electric factory trained personnel. Unauthorized repairs performed on this equipment may result in danger to the technician or machine operator and will invalidate your factory warranty. For your safety and to avoid electrical shock, please observe all safety notes and precautions detailed throughout this manual. If for any reason you do not understand the test procedures or are unable to perform the test/repairs safely, contact the Lincoln Electric Service Department for electrical troubleshooting assistance before you proceed. Call 1-888-935-3877.

TEST DESCRIPTION

This test will determine if the Manual Operation Switch is functioning properly.

MATERIALS NEEDED

Volt/Ohmmeter
Wiring Diagram

TEST PROCEDURE

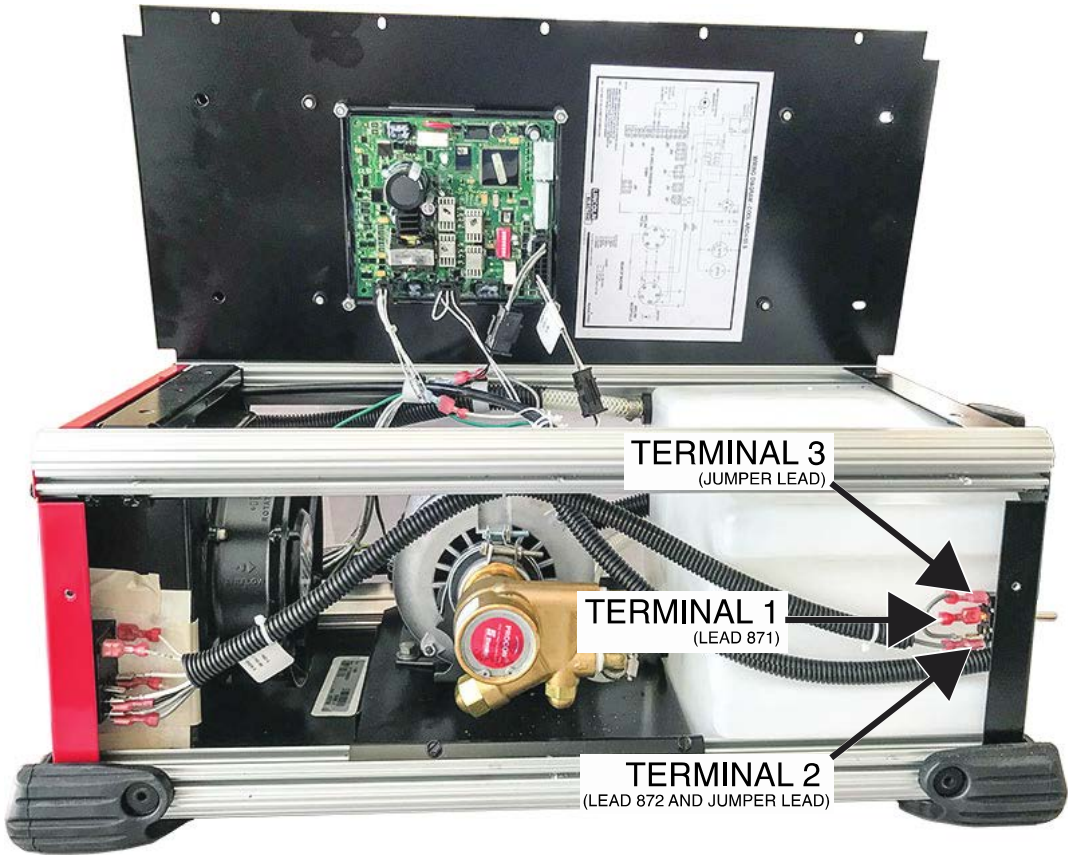
1. Carefully remove power from the Cool Arc 55 S Water Cooler machine.
2. Perform the ***Case Cover Removal Procedure***.
3. Locate the manual operation switch. See ***Figure F.8***. See Wiring Diagram.
4. Label and disconnect leads 871, 872 and the jumper lead from the manual operation switch terminals. See ***Figure F.9***. See Wiring Diagram.
5. Using a volt/ohmmeter, perform the resistance tests outlined in ***Table F.3***. See ***Figure F.9***. See Wiring Diagram.
6. Connect leads 871, 872 and jumper lead to the manual operation switch terminals. See Wiring Diagram.
7. Perform the ***Case Cover Replacement Procedure***.

Table F. 3 – Manual operation switch resistance tests

TEST POINT (POS)	TEST POINT (NEG)	EXPECTED READING	MANUAL OPERATION SWITCH POSITION
TERMINAL 2	TERMINAL 1	CLOSED (LOW RESISTANCE)	TOGGLE UP
TERMINAL 2	TERMINAL 1	OPEN (HIGH RESISTANCE)	TOGGLE DOWN
TERMINAL 3	TERMINAL 1	OPEN (HIGH RESISTANCE)	TOGGLE UP
TERMINAL 3	TERMINAL 1	CLOSED (LOW RESISTANCE)	TOGGLE DOWN
TERMINAL 2	TERMINAL 3	OPEN (HIGH RESISTANCE)	TOGGLE UP
TERMINAL 2	TERMINAL 3	OPEN (HIGH RESISTANCE)	TOGGLE DOWN

Figure F.8 – Manual operation switch location

Figure F.9 – Manual operation switch lead locations



Removal And Replacement Procedures

12 VDC RELAY REMOVAL AND REPLACEMENT PROCEDURE

Service and repair should be performed by only Lincoln Electric factory trained personnel. Unauthorized repairs performed on this equipment may result in danger to the technician or machine operator and will invalidate your factory warranty. For your safety and to avoid electrical shock, please observe all safety notes and precautions detailed throughout this manual. If for any reason you do not understand the test procedures or are unable to perform the test/repairs safely, contact the Lincoln Electric Service Department for electrical troubleshooting assistance before you proceed. Call 1-888-935-3877.

TEST DESCRIPTION

This procedure will aid the technician in the removal and replacement of the 12 VDC Relay.

MATERIALS NEEDED

3/8” Nutdriver
Wiring Diagram

REMOVAL PROCEDURE

1. Carefully remove power from the Cool Arc 55 S Water Cooler machine.
2. Perform the ***Case Cover Removal Procedure***.
3. Label and disconnect leads 835, 834, 871, B, 872, B, W and W from the 12 VDC relay. See ***Figure F.10***. See Wiring Diagram.
4. Using a 3/8” nutdriver, remove the two nuts, lock washers and flat washers securing the 12 VDC relay to the machine. See ***Figure F.11***.
5. The 12 VDC relay can now be removed and replaced.

REPLACEMENT PROCEDURE

1. Carefully position the new 12 VDC relay into the machine.
2. Using a 3/8” nutdriver, attach the two nuts, lock washers and flat washers securing the 12 VDC relay to the machine.
3. Connect leads 835, 834, 871, B, 872, B, W and W to the 12 VDC relay. See Wiring Diagram.
4. Perform the ***Case Cover Replacement Procedure***.
5. Perform the ***Retest After Repair Procedure***.

Figure F.10 – 12 VDC relay lead locations

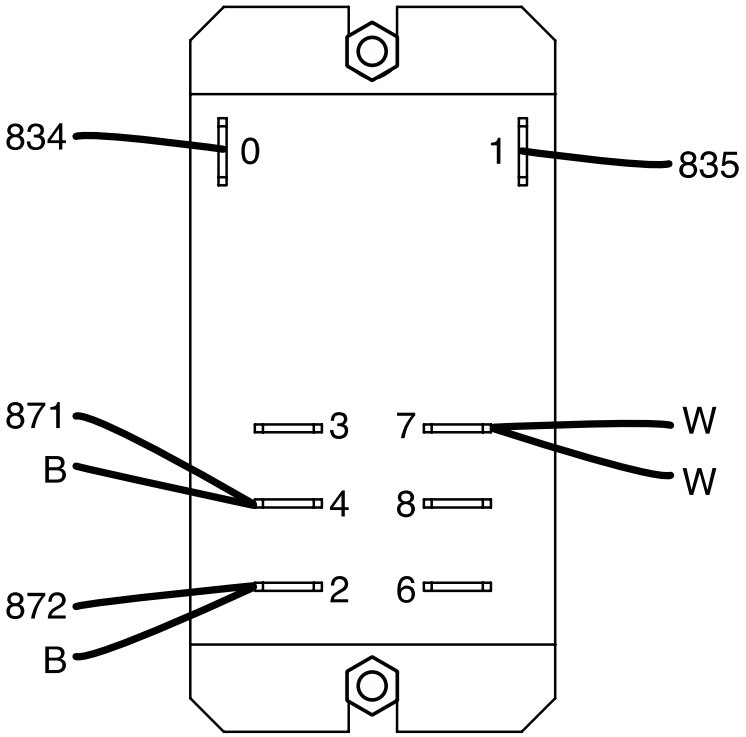
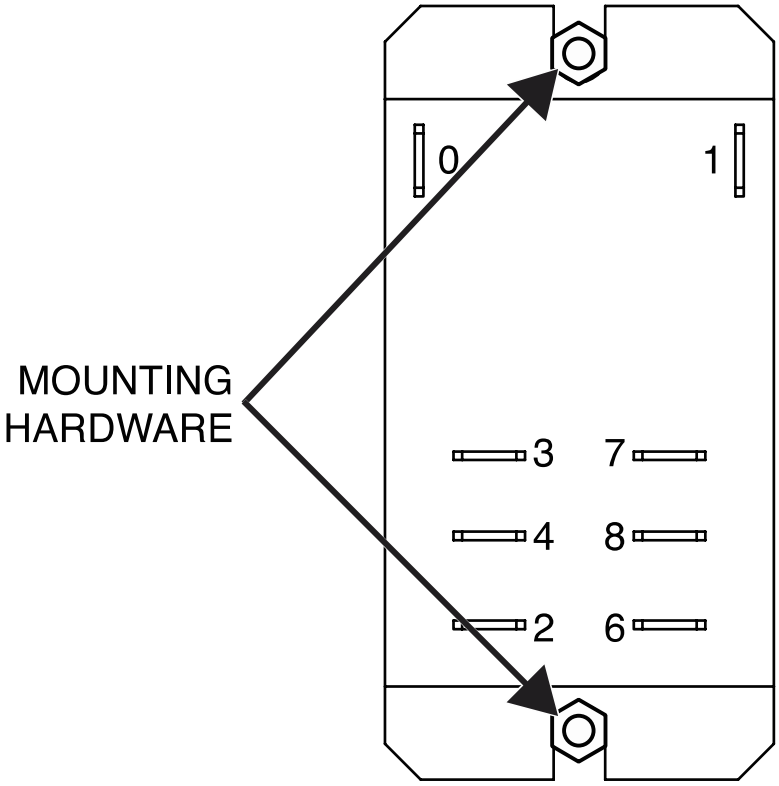


Figure F.11 – 12 VDC relay mounting hardware locations



MANUAL OPERATION SWITCH REMOVAL AND REPLACEMENT PROCEDURE

Service and repair should be performed by only Lincoln Electric factory trained personnel. Unauthorized repairs performed on this equipment may result in danger to the technician or machine operator and will invalidate your factory warranty. For your safety and to avoid electrical shock, please observe all safety notes and precautions detailed throughout this manual. If for any reason you do not understand the test procedures or are unable to perform the test/repairs safely, contact the Lincoln Electric Service Department for electrical troubleshooting assistance before you proceed. Call 1-888-935-3877.

TEST DESCRIPTION

This procedure will aid the technician in the removal and replacement of the Manual Operation Switch.

MATERIALS NEEDED

9/16” Nutdriver
Wiring Diagram

REMOVAL PROCEDURE

1. Carefully remove power from the Cool Arc 55 S Water Cooler machine.
2. Perform the ***Case Cover Removal Procedure***.
3. Label and disconnect leads 871, 872 and jumper lead from the manual operation switch. See ***Figure F.12***. See Wiring Diagram.
4. Using a 9/16” nutdriver, remove the nut securing the manual operation switch to the front panel. See ***Figure F.13***. See Wiring Diagram.
5. The manual operation switch can now be removed and replaced.

REPLACEMENT PROCEDURE

1. Carefully position the manual operation switch into the machine.
2. Using a 9/16” nutdriver, attach the nut securing the manual operation switch to the front panel. See Wiring Diagram.
3. Connect leads 871, 872 and jumper lead to the manual operation switch. See Wiring Diagram.
4. Perform the ***Case Cover Replacement Procedure***.
5. Perform the ***Retest After Repair Procedure***.

Figure F.12 – Manual operation switch lead locations

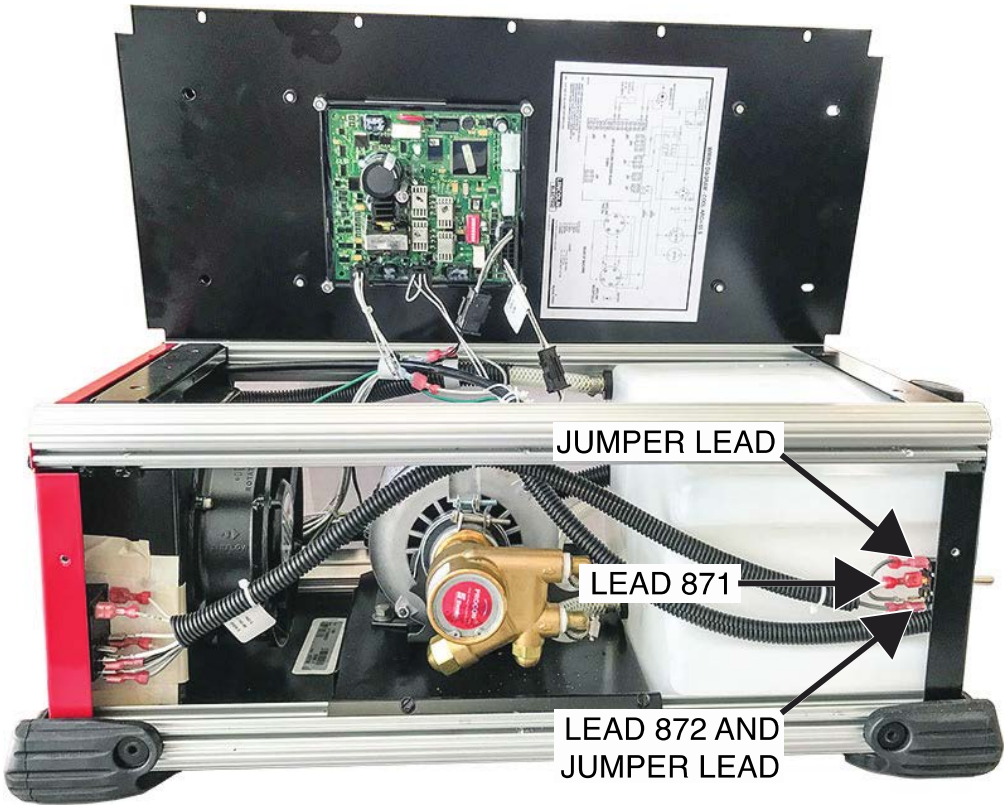


Figure F.13 – Manual operation switch mounting nut location

42V & ARCLINK FEEDER BOARD REMOVAL AND REPLACEMENT PROCEDURE

Service and repair should be performed by only Lincoln Electric factory trained personnel. Unauthorized repairs performed on this equipment may result in danger to the technician or machine operator and will invalidate your factory warranty. For your safety and to avoid electrical shock, please observe all safety notes and precautions detailed throughout this manual. If for any reason you do not understand the test procedures or are unable to perform the test/repairs safely, contact the Lincoln Electric Service Department for electrical troubleshooting assistance before you proceed. Call 1-888-935-3877.

TEST DESCRIPTION

This procedure will aid the technician in the removal and replacement of the 42V & ArcLink Feeder Board.

MATERIALS NEEDED

3/8” Nutdriver
Wiring Diagram

REMOVAL PROCEDURE

1. Carefully remove power from the Cool Arc 55 S Water Cooler machine.
2. Perform the ***Case Cover Removal Procedure***.
3. Label and disconnect plugs J81, J83 and J85 from the 42V & ArcLink feeder board. See ***Figure F.14***. See Wiring Diagram.
4. Using a 3/8” nutdriver, remove the four nuts securing the 42V & ArcLink feeder board. See ***Figure F.15***.
5. The 42V & ArcLink feeder board can now be removed and replaced.

REPLACEMENT PROCEDURE

1. Carefully position the 42V & ArcLink feeder board onto the roof panel.
2. Using a 3/8” nutdriver, attach the four nuts securing the 42V & ArcLink feeder board to the roof panel.
3. Connect plugs J81, J83 and J85 to the 42V & ArcLink feeder board. See Wiring Diagram.
4. Perform the ***Case Cover Replacement Procedure***.
5. Perform the ***Retest After Repair Procedure***.

Figure F.14 – 42V & ArcLink feeder board plug locations

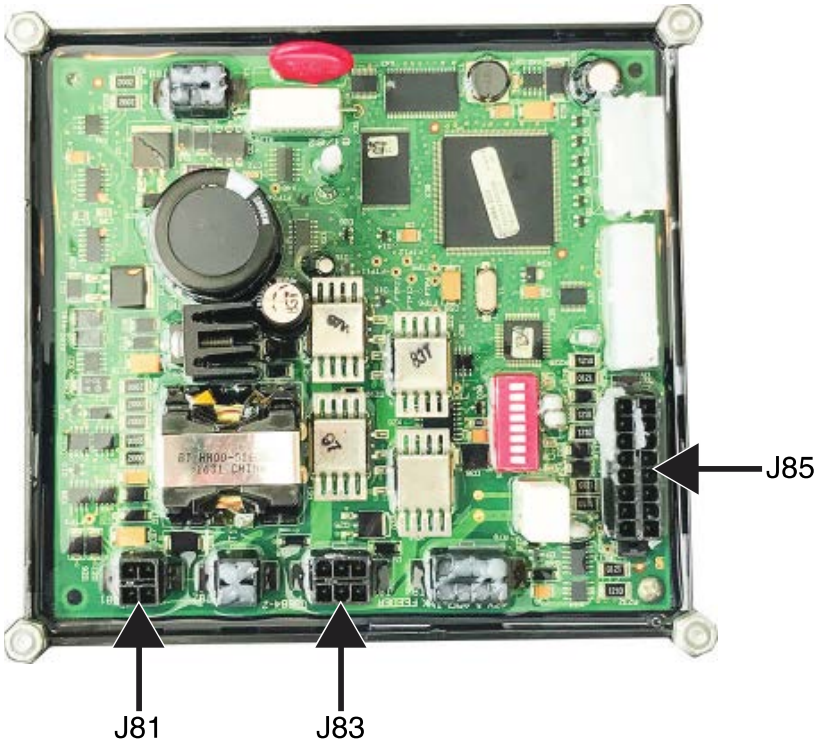
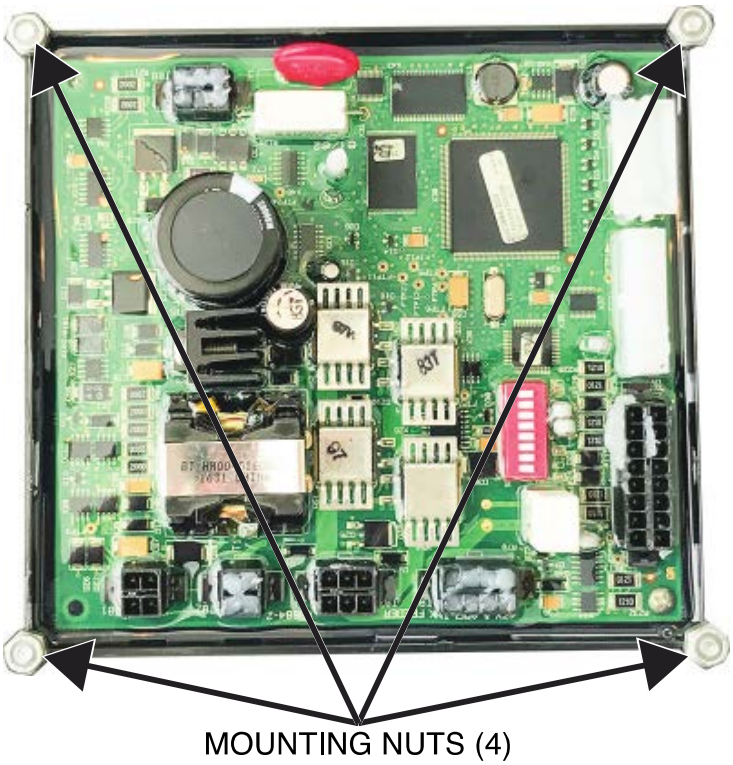


Figure F.15 – 42V & ArcLink feeder board mounting nut locations



PUMP AND MOTOR ASSEMBLY REMOVAL AND REPLACEMENT PROCEDURE

Service and repair should be performed by only Lincoln Electric factory trained personnel. Unauthorized repairs performed on this equipment may result in danger to the technician or machine operator and will invalidate your factory warranty. For your safety and to avoid electrical shock, please observe all safety notes and precautions detailed throughout this manual. If for any reason you do not understand the test procedures or are unable to perform the test/repairs safely, contact the Lincoln Electric Service Department for electrical troubleshooting assistance before you proceed. Call 1-888-935-3877.

TEST DESCRIPTION

This procedure will aid the technician in the removal and replacement of the Pump and Motor Assembly.

MATERIALS NEEDED

Phillips Screwdriver
5/16” Nutdriver
1/2” Open-End Wrench
Wiring Diagram

REMOVAL PROCEDURE

1. Carefully remove power from the Cool Arc 55 S Water Cooler machine.
2. Perform the ***Case Cover Removal Procedure***.
3. Label and disconnect plugs J81, J83 and J85 from the 42V & ArcLink feeder board. See ***Figure F.16***. See Wiring Diagram.
4. Carefully remove the roof panel from the machine.
5. Using a Phillips screwdriver, loosen the two hose clamps securing the two hoses to the pump. See ***Figure F.17***.
6. Carefully disconnect hoses from the pump.
7. Using a 5/16” nutdriver, remove the nut securing the motor ground lead to the ground stud. See Wiring Diagram. Cut any cable ties as necessary.
8. Label and disconnect the grey and white motor leads from the quick-connect terminals. See Wiring Diagram.
9. Using a 5/16” nutdriver, remove the four screws securing the motor base to the machine. See ***Figure F.18***.
10. Carefully maneuver the pump and motor assembly (with the motor base attached) out of the machine.
11. Using a 1/2” open-end wrench, remove the four screws, lock washers and flat washers securing the pump and motor assembly to the motor base. See ***Figure F.19***.
12. The pump and motor assembly can now be removed and replaced.

REPLACEMENT PROCEDURE

1. Carefully position the pump and motor assembly onto the motor base.
2. Using a 1/2” open-end wrench, remove the four screws, lock washers and flat washers securing the pump and motor assembly to the motor base.
3. Carefully position the pump and motor assembly (with the motor base attached) into the machine.
4. Using a 5/16” nutdriver, attach the four screws securing the motor base to the machine.
5. Connect the grey and white motor leads to the quick-connect terminals. See Wiring Diagram.
6. Using a 5/16” nutdriver, attach the nut securing the motor ground lead to the ground stud. See Wiring Diagram. Replace cable ties as necessary.
7. Carefully connect hoses to the pump.
8. Using a Phillips screwdriver, tighten the two hose clamps securing the two hoses to the pump.
9. Carefully position the roof panel onto the machine.
10. Connect plugs J81, J83 and J85 to the 42V & ArcLink feeder board. See Wiring Diagram.
11. Perform the ***Case Cover Replacement Procedure***.
12. Perform the ***Retest After Repair Procedure***.

Figure F.16 – 42V & ArcLink feeder board plug locations

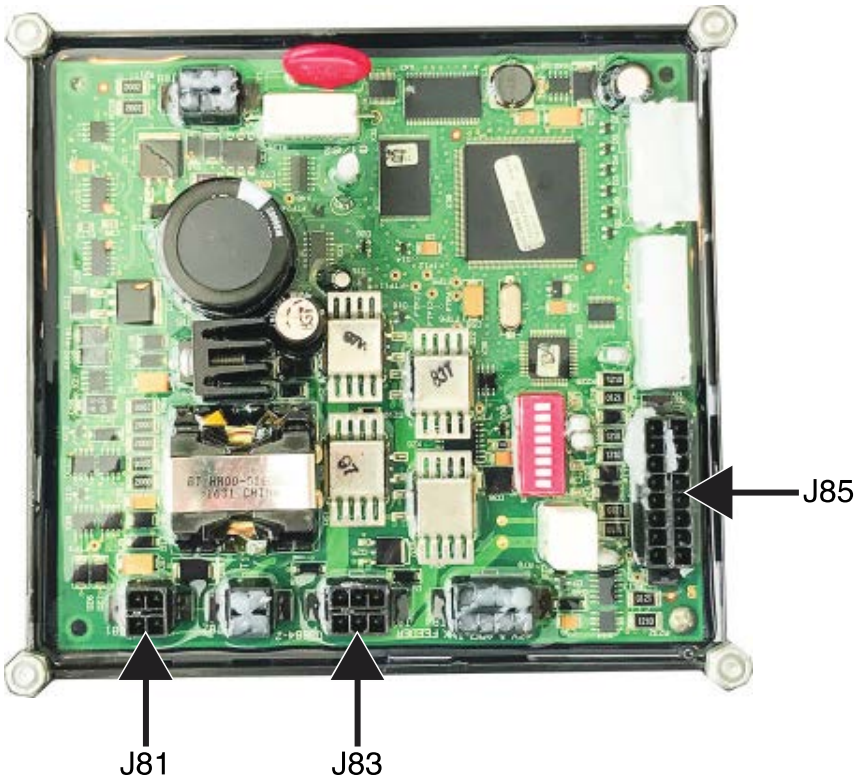


Figure F.17 – Hose clamp and hose locations

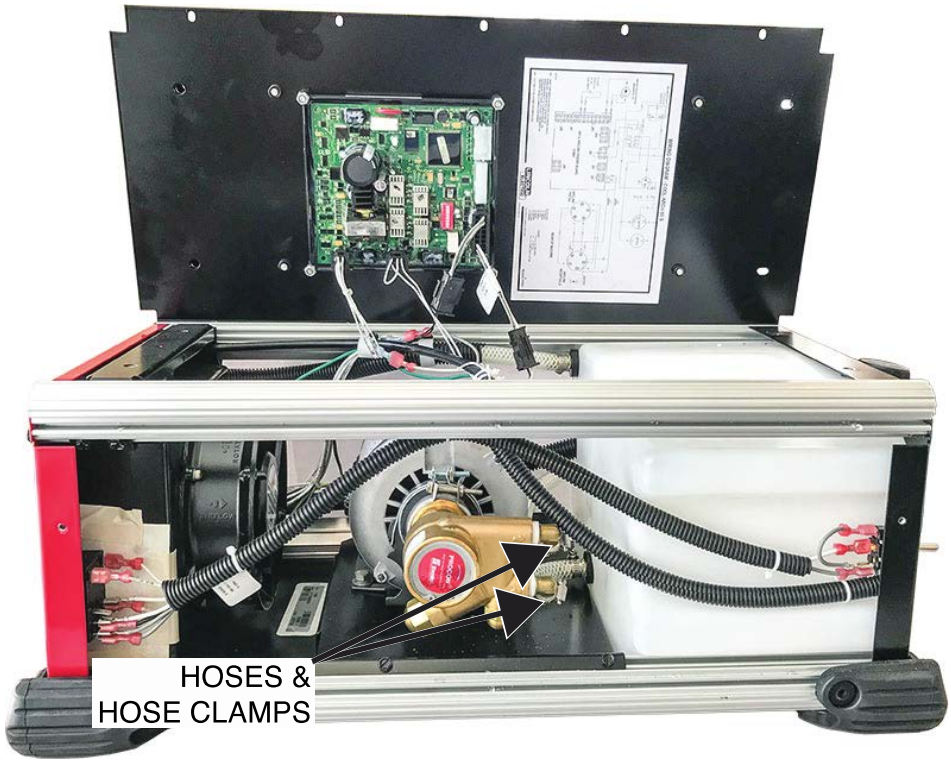


Figure F.18 – Motor base mounting hardware locations

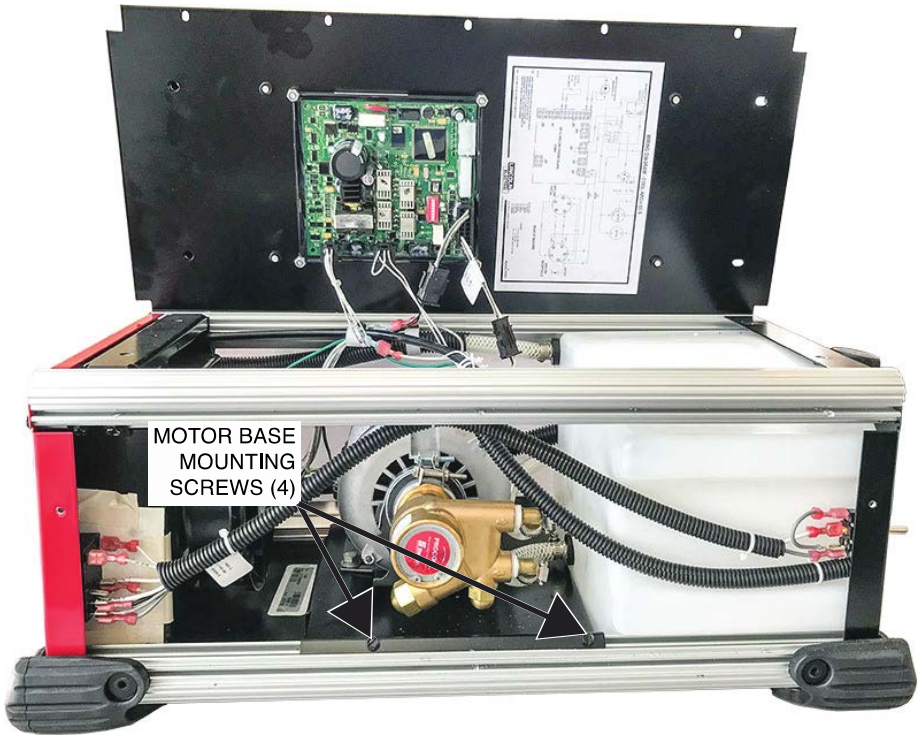
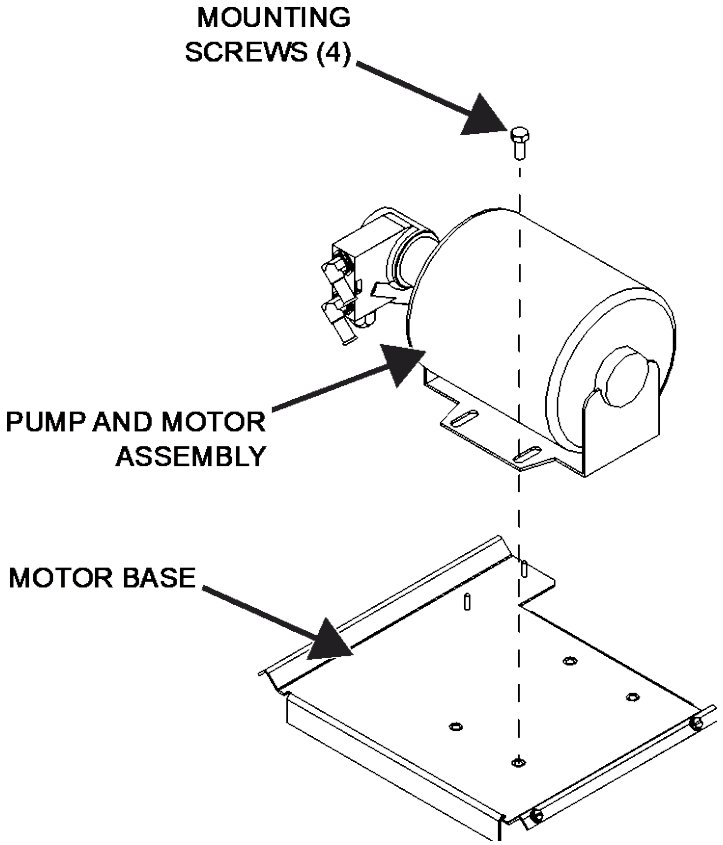


Figure F.19 – Pump and motor assembly mounting screw locations



RETEST AFTER REPAIR

Retest a machine:

• If it is rejected under test for any reason that requires you to remove any part which could affect the machine's electrical characteristics.

OR

• If you repair or replace any electrical components.

PROCEDURE

1. Carefully apply 120 VAC (via the input cord) to the Cool Arc 55 S Water Cooler.
2. Connect the Cool Arc 55 S to a compatible Lincoln ArcLink power supply.
3. Test the functions of the pump motor, fan motor, 12 VDC relay, 42V & ArcLink feeder board and manual operation switch.