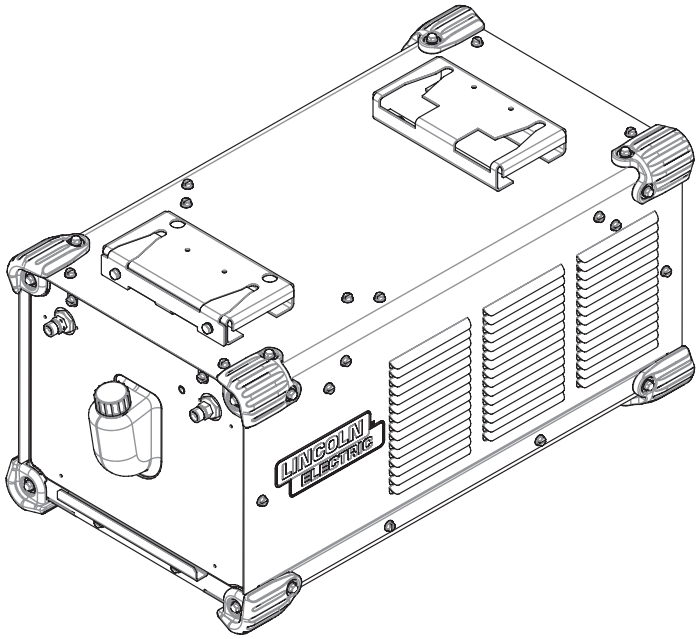
LINCOLN ELECTRIC

FlexCool™ 35

For use with machines having Code Numbers:

FlexCool™ 35: 12748

SERVICE MANUAL



SVM293 | Issue Date 18-Sep

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

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

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

For more information go to www.P65 warnings.ca.gov/diesel

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

WARNING: Cancer and Reproductive Harm www.P65warnings.ca.gov

ARC WELDING CAN BE HAZARDOUS. PROTECT YOURSELF AND OTHERS FROM POSSIBLE SERIOUS INJURY OR DEATH. KEEP CHILDREN AWAY. PACEMAKER WEARERS SHOULD CONSULT WITH THEIR DOCTOR BEFORE OPERATING.

Read and understand the following safety highlights. For additional safety information, it is strongly recommended that you purchase a copy of "Safety in Welding & Cutting - ANSI Standard Z49.1" from the American Welding Society, P.O. Box 351040, Miami, Florida 33135 or CSA Standard W117.2-1974. 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.

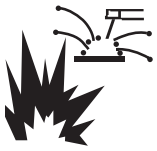
5.c. Do not weld in locations near chlorinated hydrocarbon vapors coming from degreasing, cleaning or spraying operations. The heat and rays of the arc can react with solvent vapors to form phosgene, a highly toxic gas, and other irritating products.

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.

FlexCool™ 35

Service Manual

Last update: 2018/09/01

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 FlexCut 200 machine.	1. Ensure 40 VDC is being applied to Plug J61 pin 4 (+) to Plug J61 pin 3 (-). This is the ArcLink supply voltage. 2. Perform the ***12 VDC Relay Test Procedure***. 3. Perform the ***Arclink I/O Board Test Procedure***.
The pump motor and fans do not operate when the gun trigger is activated.	1. Make sure the ArcLink cable is connected to a FlexCut 200 machine. 2. Make sure 120 VAC is being applied to through the input power cord.	1. Ensure 40 VDC is being applied to Plug J61 pin 4 (+) to Plug J61 pin 3 (-). This is the ArcLink supply voltage. 2. Perform the ***12 VDC Relay Test Procedure***. 3. Check the flow switch and associated leads and connections. See Wiring Diagram. 4. Perform the ***Arclink I/O Board Test Procedure***. 5. Perform the ***Pump Motor Test Procedure***. 6. Perform the ***Fan Motor Test Procedure***. 7. Perform the ***Level Switch Test Procedure***. 8. Perform the ***Flow Switch Test Procedure***. 9. Perform the ***NTC Thermistor Test Procedure***.
⚠ 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 operates but either or both of the fans do not operate when the gun trigger is activated.	1. Loose or disconnected fan leads. 2. Obstruction in the fan blade. 3. Fan motor failure.	1. Perform the ***Fan Motor Test Procedure***.
The pump motor does not operate but the fans operate when the gun trigger is activated.	1. Check all pump motor lead connections. Possible faulty pump motor.	1. Perform the ***Pump Motor Test Procedure***.
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.	

⚠ 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 FlexCool 35 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. Cooler is operational and is communicating normally with all healthy equipment connected to its ArcLink network.
BLINKING GREEN	Occurs during power up or a system reset and indicates the FlexCool 35 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 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 this 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. 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

Observe Safety Guidelines detailed in the beginning of this manual.		**ERROR CODES**
ERROR CODE	**POSSIBLE CAUSE**	**RECOMMENDED COURSE OF ACTION**
	Communication error between power board and control board.	Cycle power to the machine to see if error clears. Otherwise a qualified technician must check communication between the power and control boards.
	Work Transfer failed.	In cut, mark, and grid modes, the pilot arc will only run for 5 seconds to prevent unnecessary consumable wear. Verify the correct torch to workpiece height and that the work lead is connected and making a good electrical connection.
	Pilot timer error.	In cut, mark and grid modes, the pilot arc will only run for five seconds to prevent unnecessary consumable wear. Verify the correct torch to work piece height and that the work lead is connected and making a good electrical connection. If error occurs immediately after triggering, verify correct three phase input.
	No pilot arc could be established.	Check that all leads are properly connected between the power source, FlexCut and torch. Verify that the consumables are correctly installed.

	Peak current through the transformer primary has exceeded threshold (140 amps).	Verify connections to the switch board, transformer and output rectifier assemblies are made correctly and there are no damaged components in the machine. Replace shorted output rectifier diode. Replace defective power transformer (T1). Replace defective switch board assembly.
	Machine has overheated and must be allowed to cool before continuing.	Check that the fan is spinning freely and that the rear brickwork and side/front louvers are not obstructed. If thermal faults continue, blow dust out from the rear of the machine.
	Switch board failed to turn on.	Mapping error. Cycle power to attempt to clear error. Switch board has a fatal error. Read error code at on-board status LED and decode error. Replace defective switch board assembly.
	Plasma gas is not connected to the rear of the machine or the plasma pressure regulator is turned down too far.	Check that the plasma gas supply is connected to the rear of the power source. Increase the plasma pressure on the front of the machine to match the cut charts for material and cutting current.
	Shield gas is not connected to the rear of the machine or the shield pressure regulator is turned down too far.	Check that the shield gas supply is connected to the rear of the power source. Increase the shield pressure on the front of the machine to match the cut charts for material and cutting current.

	The water cooler object was not found and is required in the system.	Connect a water cooler that has a control board (FlexCool 35). If not using a water cooler, reset the 'Fault if No Cooler' attribute using Power Wave Manager Misc tab. If using a Water Cooler, verify the board is properly connected in the system.
	The Flexstart object was not found and is required in the system.	Connect a Flexstart.
	Switch board auxiliary supply voltage is too high at machine power-up.	Improper input voltage configuration. Verify primary reconnect position, measure input voltage level and check three phase operation. Damaged auxiliary transformer (T2) or intermittent “A” lead connection. Replace defective user interface board.
	Switch board auxiliary supply voltage is too low at machine power-up.	Improper input voltage configuration. Verify primary reconnect position, measure input voltage level and check three phase operation. Damaged auxiliary transformer (T2) or intermittent “A” lead connection. Replace defective user interface board assembly.

	Trigger locked.	Release the trigger before continuing. The trigger must be disabled at machine startup or when changing modes.
	The door to the Flexstart console is open.	Close the Flexstart door and latch it tightly. Check door switch if problem persists.
	Coolant hoses not connected, leaking or blocked.	Check coolant hoses and replace if necessary.
	Not enough coolant in cooler reservoir.	Add more coolant to reservoir of cooler. Check for leaks or disconnected hoses.
	Torch coolant has exceeded temperature limit.	Allow coolant to fully cool before continuing. Verify that the cooler fans are working properly and radiator is not blocked. Verifying cutting current and voltage do not exceed rating plate limits.

	Thermistor missing.	NTC thermistor is not plugged in, ambient temperature is too low or thermistor is damaged.

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

3/8” Nutdriver
Wrench
Wiring Diagram

REMOVAL PROCEDURE

1. Carefully remove input power to the power source and any other equipment connected to the cutting system at the disconnect switch or fuse box.
2. Carefully disconnect the input power cable from rear of the machine. See ***Figure F.1***. See Wiring Diagram.
3. Carefully disconnect the arclink cable from the rear of the machine. See ***Figure F.1***. See Wiring Diagram.
4. Using a wrench, disconnect the coolant lines from the machine. See ***Figure F.2***.
   NOTE: Wrap coolant lines with paper towels to prevent coolant spills.
5. Using a 3/8” nutdriver, remove the two screws securing the drawer assembly to the shell assembly. See ***Figure F.3***.
6. Carefully slide the drawer assembly out of the shell assembly.

REPLACEMENT PROCEDURE

1. Carefully slide the drawer assembly into the shell assembly.
2. Using a 3/8” nutdriver, attach the two screws securing the drawer assembly to the shell assembly.
3. Using a wrench, connect the coolant lines to the machine.
4. Connect the arclink cable to the rear of the machine. See Wiring Diagram.
5. Connect the input power cable from rear of the machine. See Wiring Diagram.

Figure F.1 – Input power and arclink cable connections

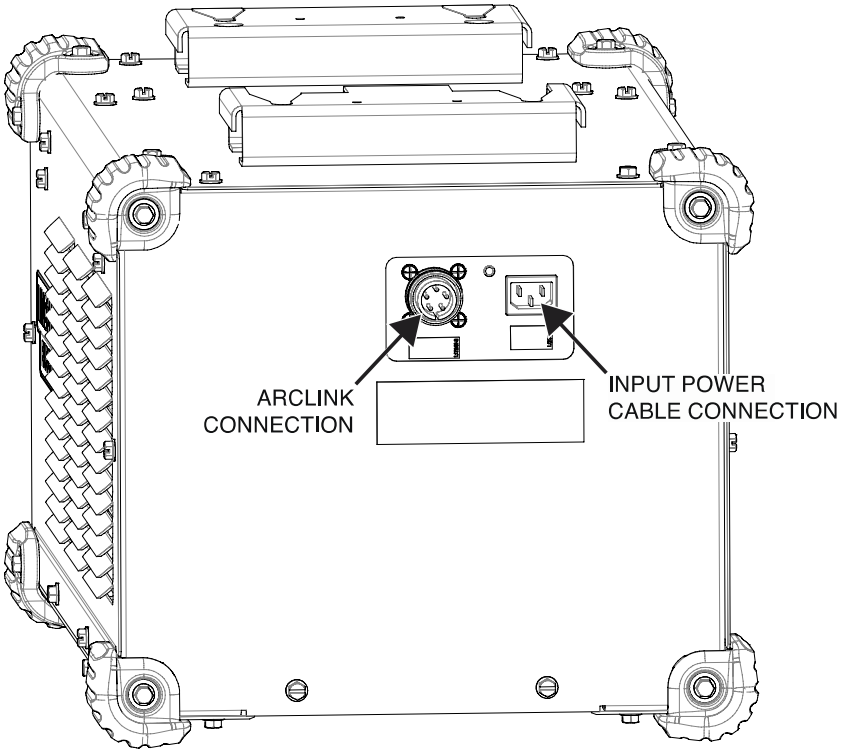


Figure F.2 – Coolant line connections

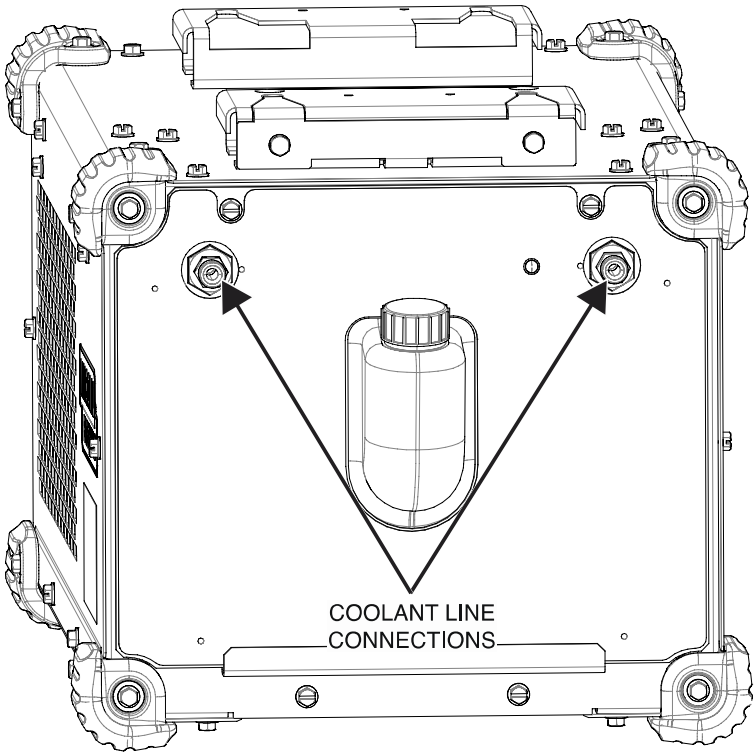
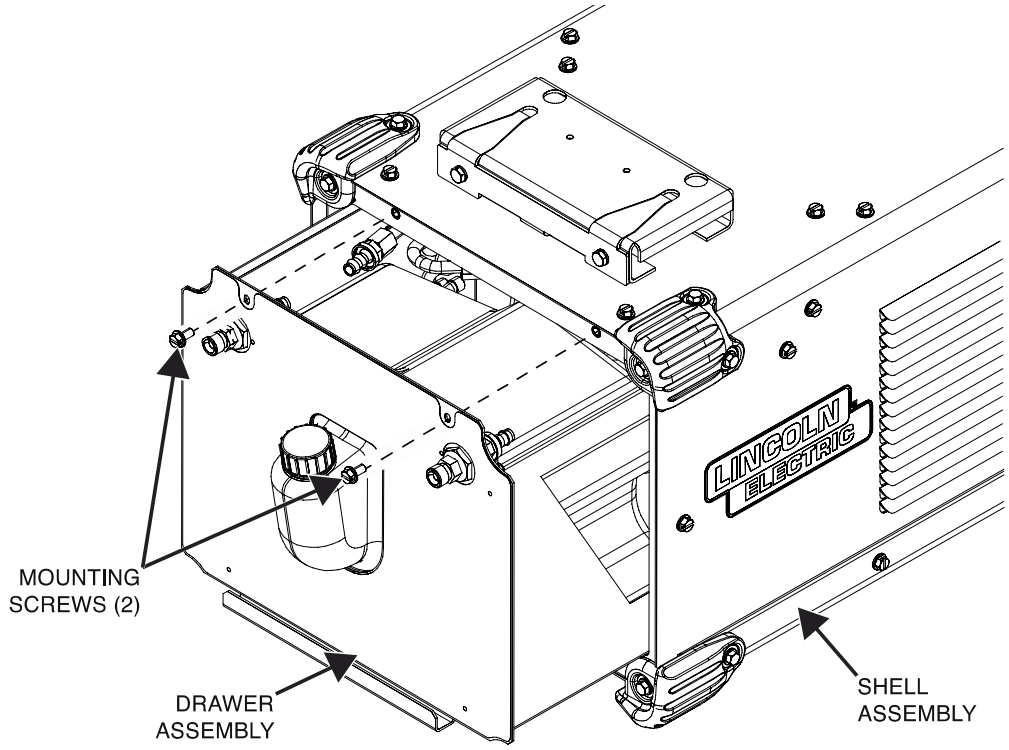


Figure F.3 – Drawer assembly mounting screw locations



ARCLINK I/O BOARD 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 ArcLink I/O Board is functioning properly.

MATERIALS NEEDED

Volt/Ohmmeter
Wiring Diagram

TEST PROCEDURE

1. Carefully remove power from the FlexCool 35 machine.
2. Perform the ***Case Cover Removal Procedure***.
3. Locate the arclink I/O board. See ***Figure F.4***. See Wiring Diagram.
4. Carefully apply the correct input power to the through the arclink receptacle.
5. Using a volt/ohmmeter, perform the voltage tests outlined in ***Table F.2***. See ***Figures F.5*** and ***F.6***. See Wiring Diagram.
6. Perform the LED inspections outlined in ***Tables F.3*** and ***F.4***. See ***Figure F.5***. See Wiring Diagram.
7. If any of the tests fail, the arclink I/O board may be faulty
8. If faulty, perform the ***ArcLink I/O Board Removal And Replacement Procedure***.
9. Perform the ***Case Cover Replacement Procedure***.

Table F. 2 – Arclink I/O board voltage tests

DESCRIPTION	TEST POINT	TEST POINT	EXPECTED READING
INPUT VOLTAGE FROM ARCLINK RECEPTACLE	PLUG J61 PIN 4 (LEAD 52)	PLUG J61 PIN 3 (LEAD 51)	40 VDC
CAN SIGNAL	PLUG J61 PIN 1 (LEAD 53)	PLUG J61 PIN 2 (LEAD 54)	2 VDC
ENABLE SIGNAL TO 12 VDC RELAY	PLUG J63 PIN 4 (LEAD 835)	PLUG J63 PIN 8 (LEAD 834)	12 VDC (WHEN ACTIVATED)

Table F.3 – Arclink I/O board LED descriptions

LED #	COLOR	FUNCTION
1	GREEN	+5V CAN COMMUNICATION POWER “OK”
2	GREEN	+12V CAN COMMUNICATION POWER “OK”
3	GREEN/ RED	SYSTEM STATUS LED
4	GREEN	+5V NTC SENSOR POWER "OK"

Table F.4 – Arclink I/O board LED conditions

LIGHT CONDITION	MEANING
STEADY GREEN	SYSTEM OK.
ALTERNATING GREEN AND RED	A SYSTEM FAULT HAS OCCURRED. IF THE ARCLINK I/O BOARD STATUS LED IS FLASHING ANY COMBINATION OF RED AND GREEN, ERRORS ARE PRESENT. 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. SEE ***ERROR CODES*** IN TROUBLESHOOTING GUIDE.

Figure F.4 – Arclink I/O board location

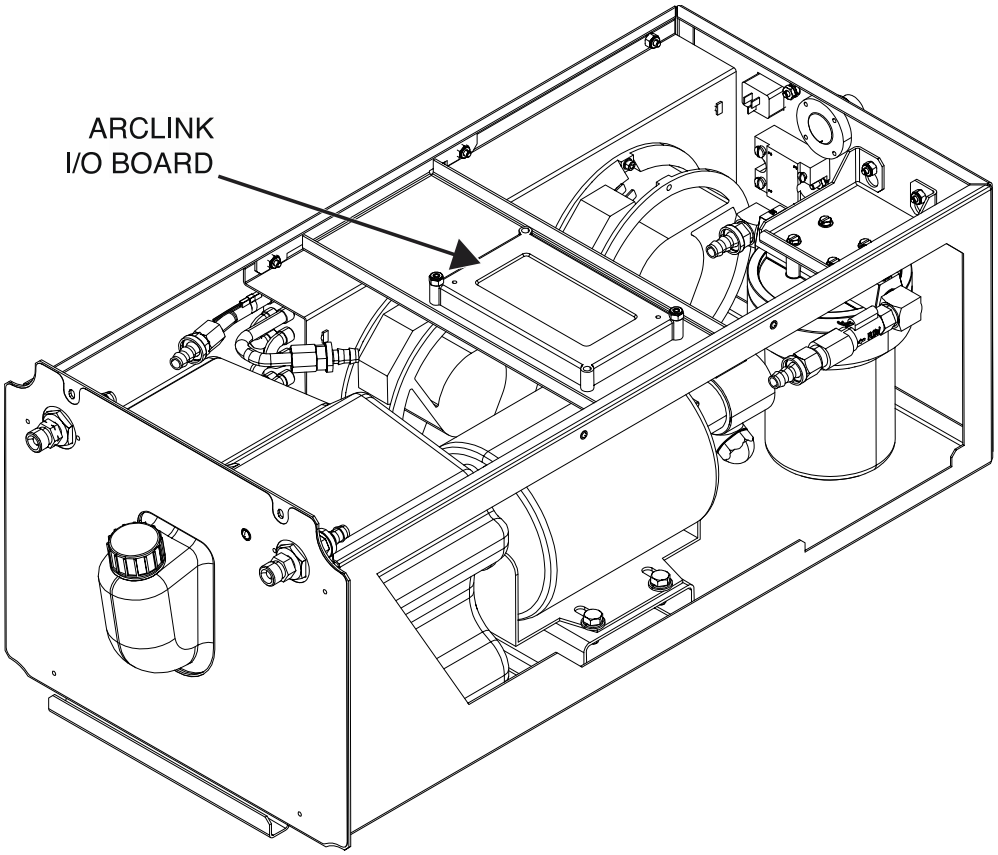


Figure F.5 – Arclink I/O board plug and LED locations

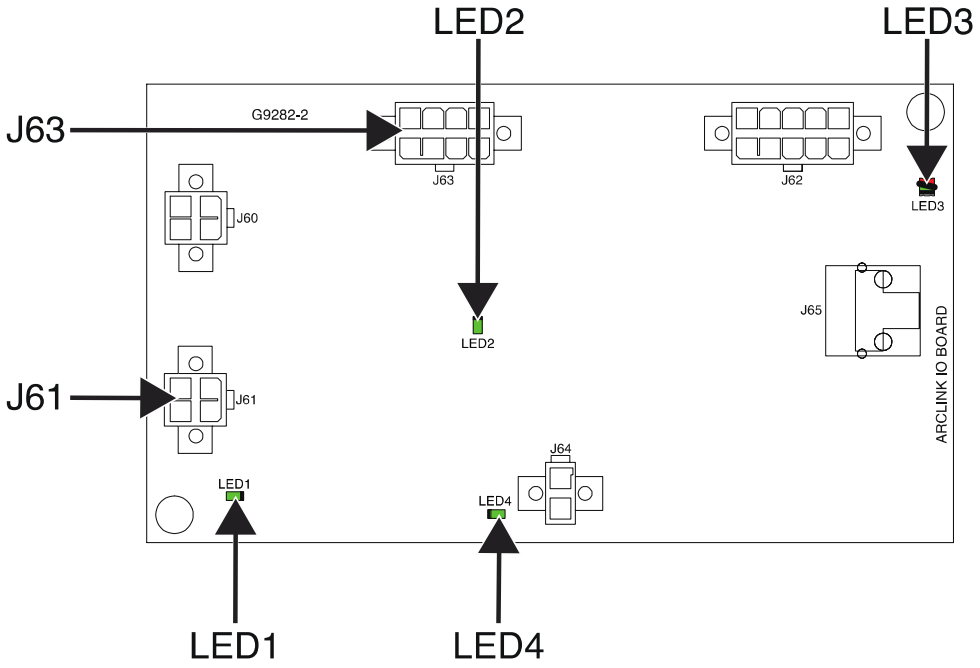
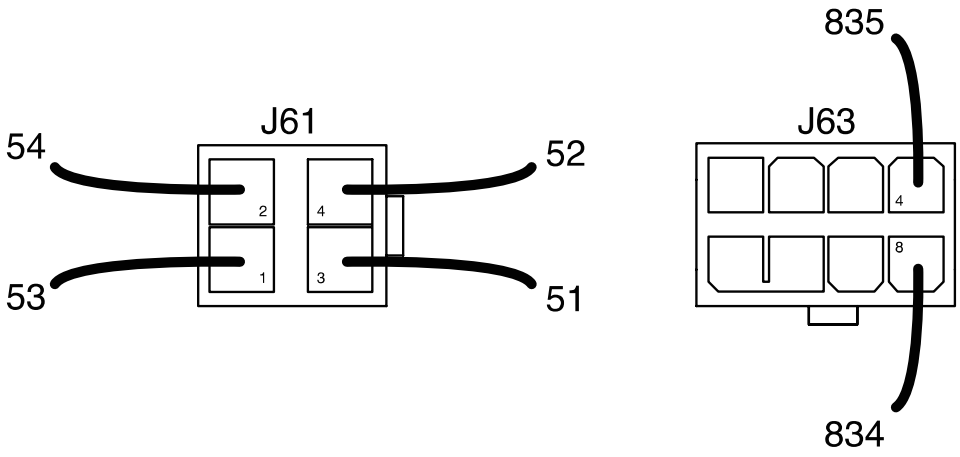


Figure F.6 – Arclink I/O board lead locations



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. A known good pump motor and fan must be connected to the 12 VDC Relay for testing.

MATERIALS NEEDED

Volt/Ohmmeter
12 VDC Filtered Power Supply
Wiring Diagram

TEST PROCEDURE

1. Carefully remove power from the FlexCool 35 machine.
2. Perform the ***Case Cover Removal Procedure***.
3. Locate the 12 VDC relay. See ***Figure F.7***. See Wiring Diagram.
4. Using a slotted screwdriver, loosen the screws securing leads 834 and 835 to the relay terminals 4 and 3. Label and disconnect leads 834 and 835 from the 12 VDC relay. See ***Figure F.8***. See Wiring Diagram.
5. Apply 115 VAC input power through the receptacle. See Wiring Diagram.
6. Using a 12 VDC filtered power supply, briefly apply power to terminals 4 (-) and 3 (+) of the 12 VDC relay. The pump motor and fan(s) will activate. See ***Figure F.8***. See Wiring Diagram.
7. If the known good pump motor and fan do not activate the 12 VDC relay may be faulty.
8. If faulty, perform the ***12 VDC Relay Removal And Replacement Procedure***.
9. Attach leads 834 and 835 to the 12 VDC relay. See Wiring Diagram.
10. Using a slotted screwdriver, tighten to screws securing the leads to the relay terminals. See Wiring Diagram.
11. Perform the ***Case Cover Replacement Procedure***.

Figure F.7 – 12 VDC relay location

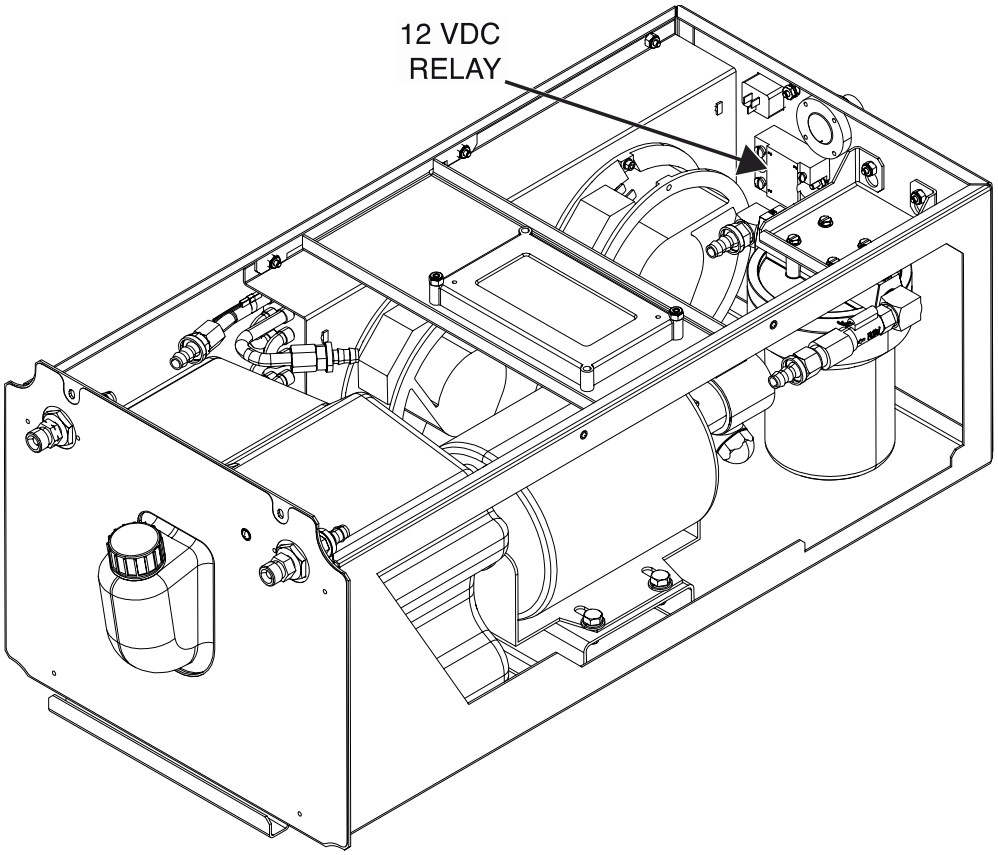
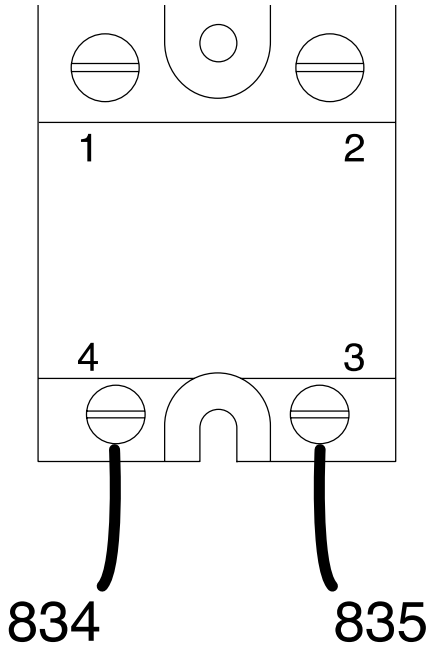


Figure F.8 – 12 VDC relay lead locations



PUMP MOTOR 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 is functioning properly.

MATERIALS NEEDED

Slotted Screwdriver
115 VAC Power Supply
Wiring Diagram

TEST PROCEDURE

1. Carefully remove power from the FlexCool 35 machine.
2. Perform the ***Case Cover Removal Procedure***.
3. Locate the pump motor assembly. See ***Figure F.9***. See Wiring Diagram.
4. Check for loose or faulty connections at the pump motor. See Wiring Diagram.
5. Using a slotted screwdriver, loosen the screw securing lead 32A to the relay terminal. Label and disconnect lead 32A from the 12 VDC relay. See ***Figure F.10***. See Wiring Diagram.
6. Using a 115 VAC power supply, briefly apply power directly to leads 32A and 31. See ***Figure F.10***. See Wiring Diagram. The pump motor should activate.
7. If the pump motor does not activate, the pump motor assembly may be faulty. See Wiring Diagram.
8. If the pump motor assembly is faulty, perform the ***Pump Motor Assembly Removal And Replacement Procedure***.
9. Connect lead 32A to the 12 VDC relay. See Wiring Diagram.
10. Using a slotted screwdriver, tighten the screw securing lead 32A to the relay terminal. See Wiring Diagram.
11. Perform the ***Case Cover Replacement Procedure***.

Figure F.9 – Pump motor assembly location

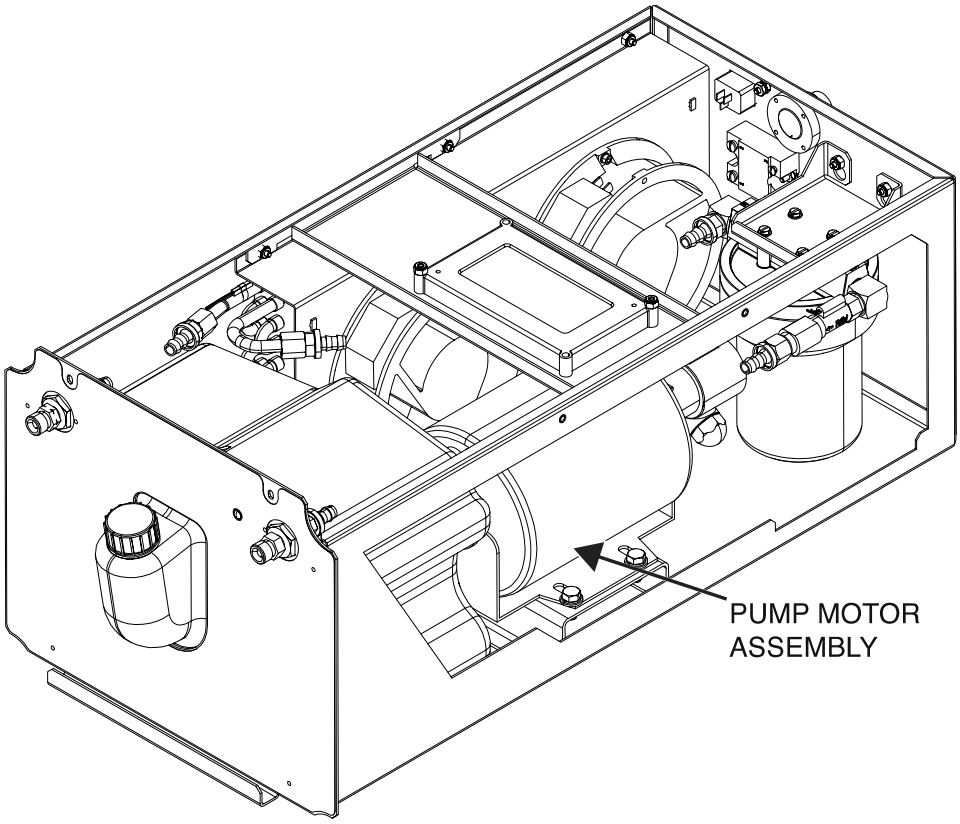
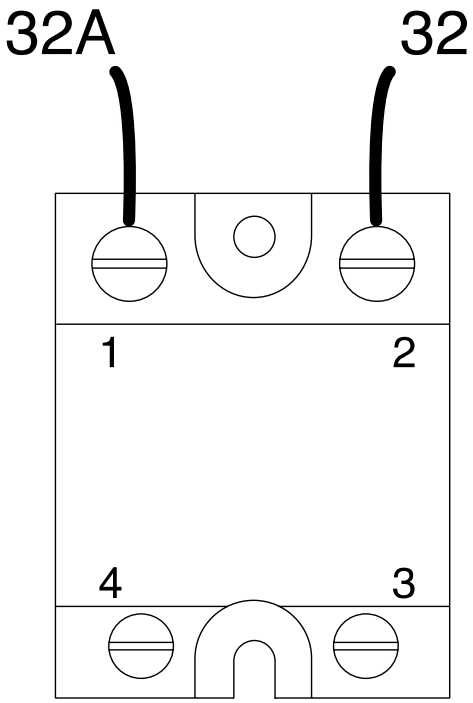


Figure F.10 – 12 VDC relay lead locations



NTC THERMISTOR 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 NTC Thermistor is functioning properly.

MATERIALS NEEDED

Volt/Ohmmeter
Wiring Diagram

TEST PROCEDURE

1. Carefully remove power from the FlexCool 35 machine.
2. Perform the ***Case Cover Removal Procedure***.
3. Locate the NTC thermistor. See ***Figure F.11***. See Wiring Diagram.
4. Label and disconnect plug J64 from the arclink I/O board. See ***Figure F.12***. See Wiring Diagram.
5. Using a volt/ohmmeter, measure the resistance from pin 1 to pin 2 of plug J64. Normal resistance is 10k ohms (at room temperature). See ***Figure F.12***. See Wiring Diagram.
6. If the test fails, the NTC thermistor may be faulty.
7. If faulty, perform the ***NTC Thermistor Replacement Procedure***.
8. Connect plug J64 to the arclink I/O board. See Wiring Diagram.
9. Perform the ***Case Cover Replacement Procedure***.

Figure F.11 – NTC Thermistor location

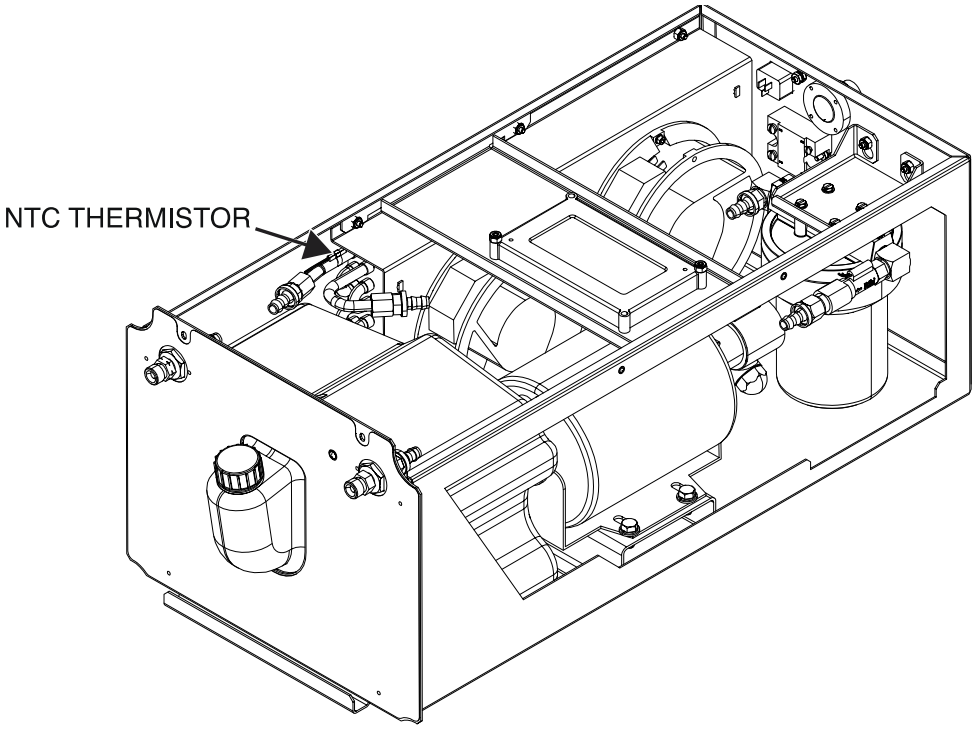
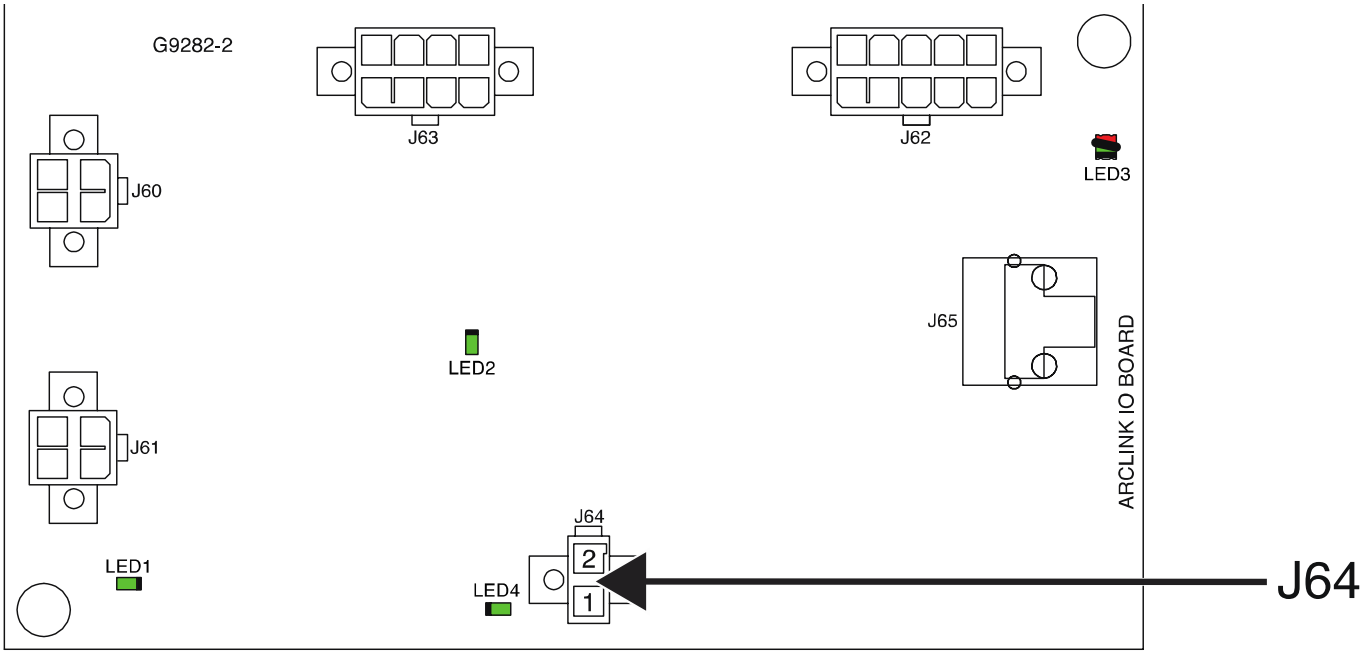


Figure F.12 – Arclink I/O board plug J64 location



FAN MOTOR 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 Fan Motors are functioning properly.

MATERIALS NEEDED

Volt/Ohmmeter
115 VAC power supply
Wiring Diagram

TEST PROCEDURE

1. Carefully remove power from the FlexCool 35 machine.
2. Perform the ***Case Cover Removal Procedure***.
3. Locate the fan assemblies. See ***Figure F.13***. See Wiring Diagram.
4. Label and disconnect leads 31D, 32C, 31A and 32D from the fan terminals. See ***Figure F.14***. See Wiring Diagram.
5. Using a 115 VAC power supply, briefly apply 115 VAC to the fan terminals. See ***Figure F.14***. See Wiring Diagram. The fan should operate. Repeat this step for the other fan.
6. If either fan does not operate, the fan motor is faulty.
7. If faulty, perform the ***Fan Removal And Replacement Procedure*** for the faulty fan.
8. Connect the previously disconnected leads 31D, 32C, 31A and 32D to the fan terminals. See Wiring Diagram.
9. Perform the ***Case Cover Replacement Procedure***.

Figure F.13 – Fan locations

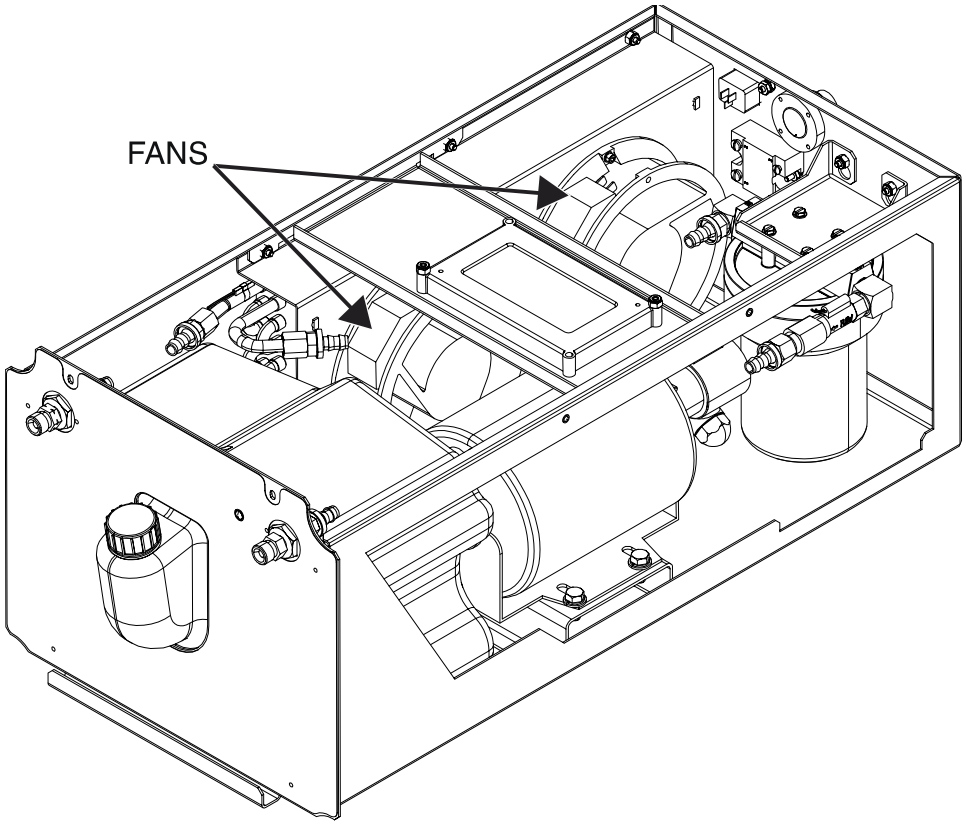
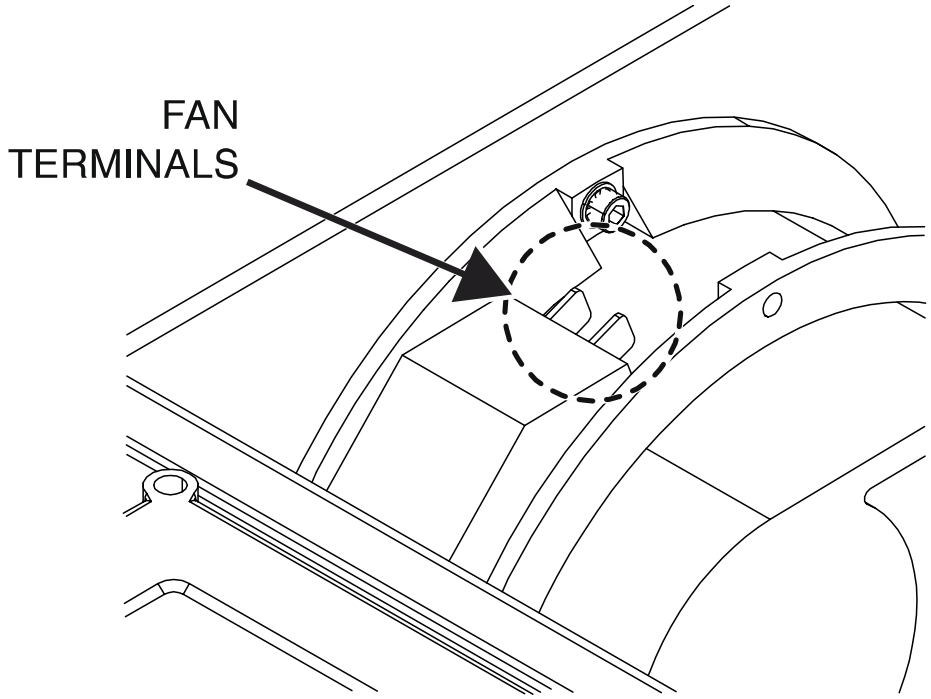


Figure F.14 – Fan motor terminal locations



LEVEL 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 Level Switch is functioning properly.

MATERIALS NEEDED

Volt/Ohmmeter
Wiring Diagram

TEST PROCEDURE

1. Carefully remove power from the FlexCool 35 machine.
2. Perform the ***Case Cover Removal Procedure***.
3. Locate the level switch. See ***Figure F.15***. See Wiring Diagram.
4. Label and disconnect plug J62 from the arclink I/O board. See ***Figure F.16***. See Wiring Diagram.
5. Using a volt/ohmmeter, perform the resistance tests outlined in ***Table F.5***. See ***Figure F.16***. See Wiring Diagram.
6. If the level switch tests open and there is more than .9 gallons of coolant in the reservoir, the level switch may be faulty.
7. If the level switch tests closed and there is less than .9 gallons of coolant in the reservoir, the level switch may be faulty.
8. If faulty, perform the ***Level Switch Removal And Replacement Procedure***.
9. Connect plug J62 to the arclink I/O board. See Wiring Diagram.
10. Perform the ***Case Cover Replacement Procedure***.

Table F. 5 – Level switch resistance tests

TEST POINT	TEST POINT	EXPECTED READING	COOLANT LEVEL
PLUG J62 PIN 1	PLUG J62 PIN 6	CLOSED (LOW RESISTANCE)	MORE THAN .9 GALLONS OF COOLANT
PLUG J62 PIN 1	PLUG J62 PIN 6	OPEN (HIGH RESISTANCE)	LESS THAN .9 GALLONS OF COOLANT

Figure F.15 – Level switch location

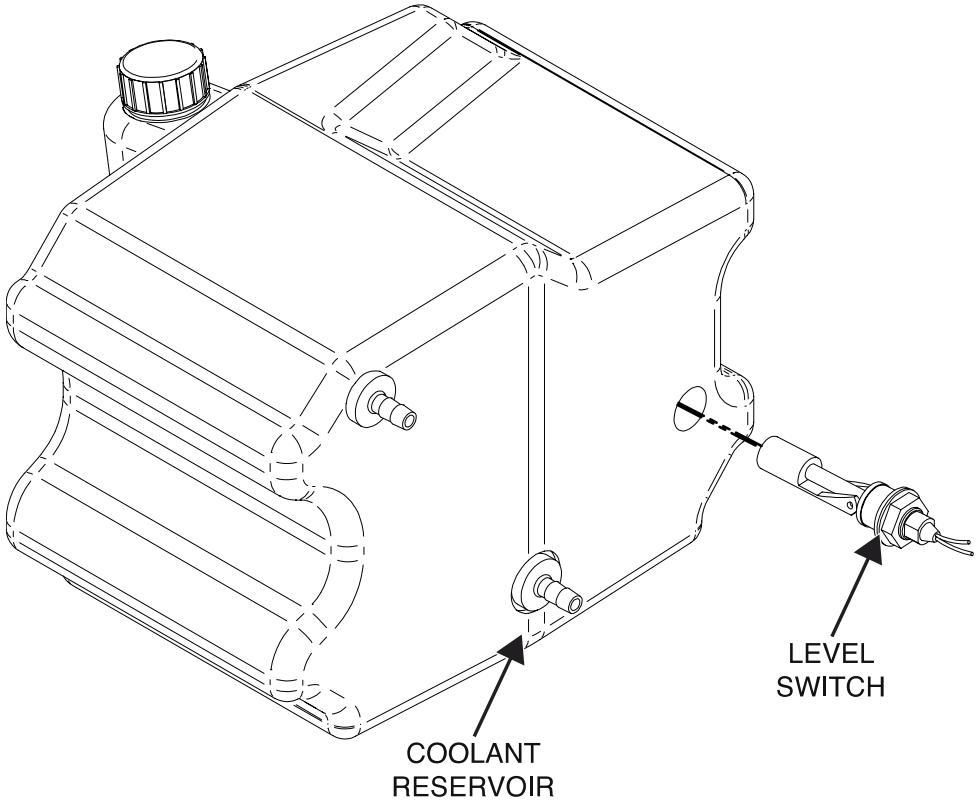
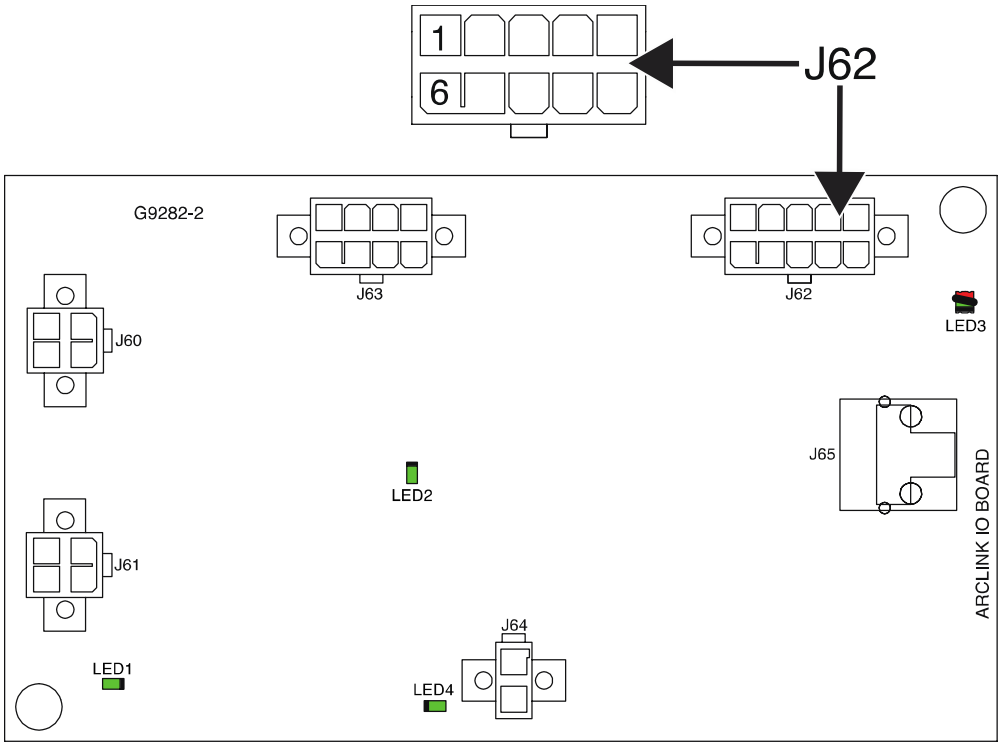


Figure F.16 – Arclink I/O board plug J62 terminal location



FLOW 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 Flow Switch is functioning properly.

MATERIALS NEEDED

Volt/Ohmmeter
Wiring Diagram

TEST PROCEDURE

1. Carefully remove power from the FlexCool 35 machine.
2. Perform the ***Case Cover Removal Procedure***.
3. Locate the flow switch. See ***Figure F.17***. See Wiring Diagram.
4. Label and disconnect plug J62 from the arclink I/O board. See ***Figure F.18***. See Wiring Diagram.
5. Using a volt/ohmmeter, perform the resistance tests outlined in ***Table F.6***. See ***Figure F.18***. See Wiring Diagram.
6. If the flow switch tests open and there is more than .5 gallons per minute of coolant flow, the flow switch may be faulty.
7. If the flow switch tests closed and there is less than .5 gallons per minute of coolant flow, the flow switch may be faulty.
8. If faulty, perform the ***Flow Switch Removal And Replacement Procedure***.
9. Connect plug J62 to the arclink I/O board. See Wiring Diagram.
10. Perform the ***Case Cover Replacement Procedure***.

Table F. 6 – Flow switch resistance tests

TEST POINT	TEST POINT	EXPECTED READING	FLOW RATE
PLUG J62 PIN 2	PLUG J62 PIN 7	CLOSED (LOW RESISTANCE)	MORE THAN .5 GALLONS PER MINUTE COOLANT FLOW
PLUG J62 PIN 2	PLUG J62 PIN 7	OPEN (HIGH RESISTANCE)	NO COOLANT FLOW

Figure F.17 – Flow switch location

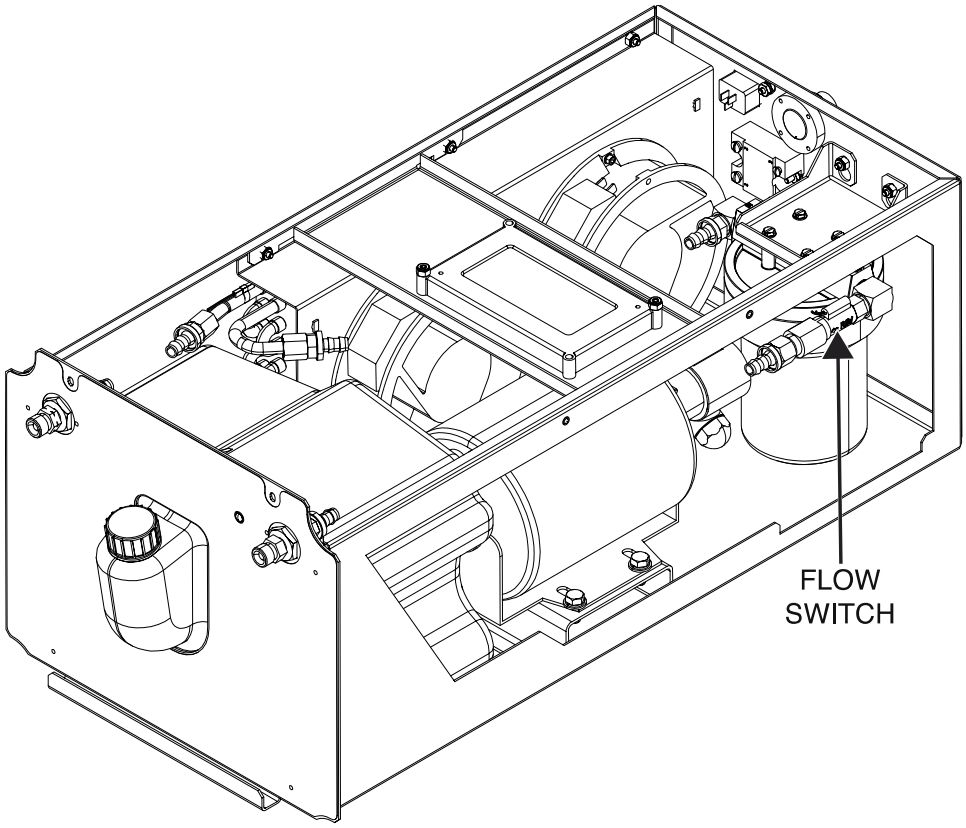
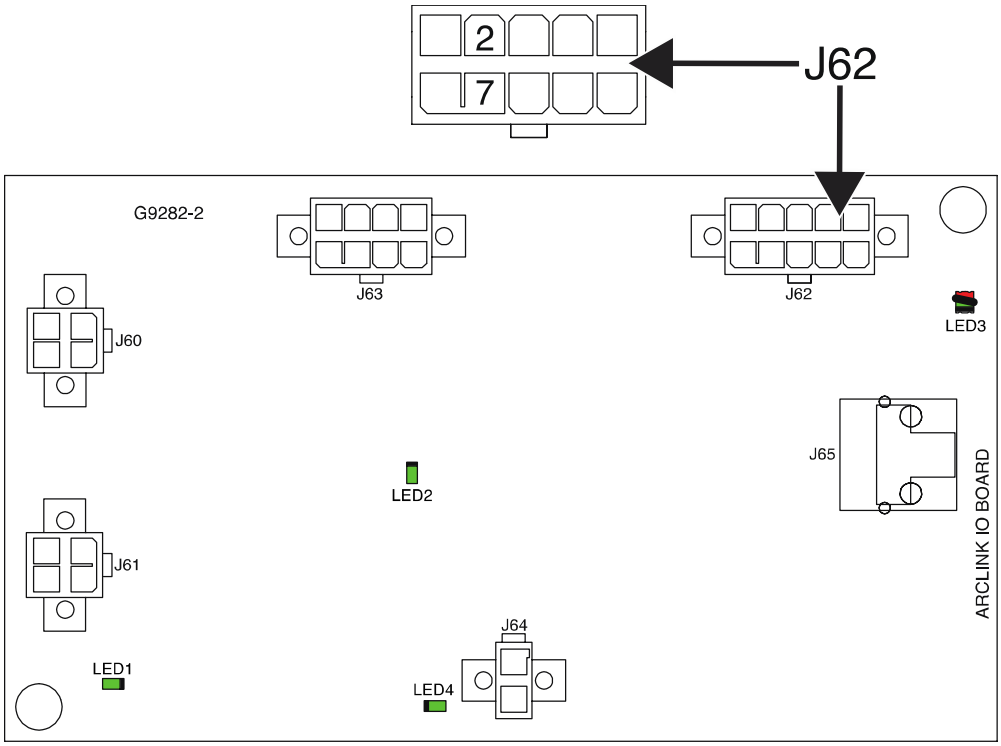


Figure F.18 – Arclink I/O board plug J62 terminal locations



Removal And Replacement Procedures

ARCLINK I/O 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 ArcLink I/O Board.

MATERIALS NEEDED

3/8” Nutdriver
Wiring Diagram

REMOVAL PROCEDURE

1. Carefully remove power from the FlexCool 35 machine.
2. Perform the ***Case Cover Removal Procedure***.
3. Using a 3/8” nutdriver, remove the two nuts securing the arclink I/O board to the PC BD tray. See ***Figure F.19***.
4. Label and disconnect plugs J61, J62, J63 and J64 from the arclink I/O board. See ***Figure F.20***. See Wiring Diagram.
5. The arclink I/O board can now be removed and replaced.

REPLACEMENT PROCEDURE

1. Carefully position the arclink I/O board onto the PC BD tray.
2. Connect plugs J61, J62, J63 and J64 to the arclink I/O board. See Wiring Diagram.
3. Using a 3/8” nutdriver, attach the two nuts securing the arclink I/O board to the PC BD tray.
4. Perform the ***Case Cover Replacement Procedure***.

Figure F.19 –Arclink I/O board mounting nut locations

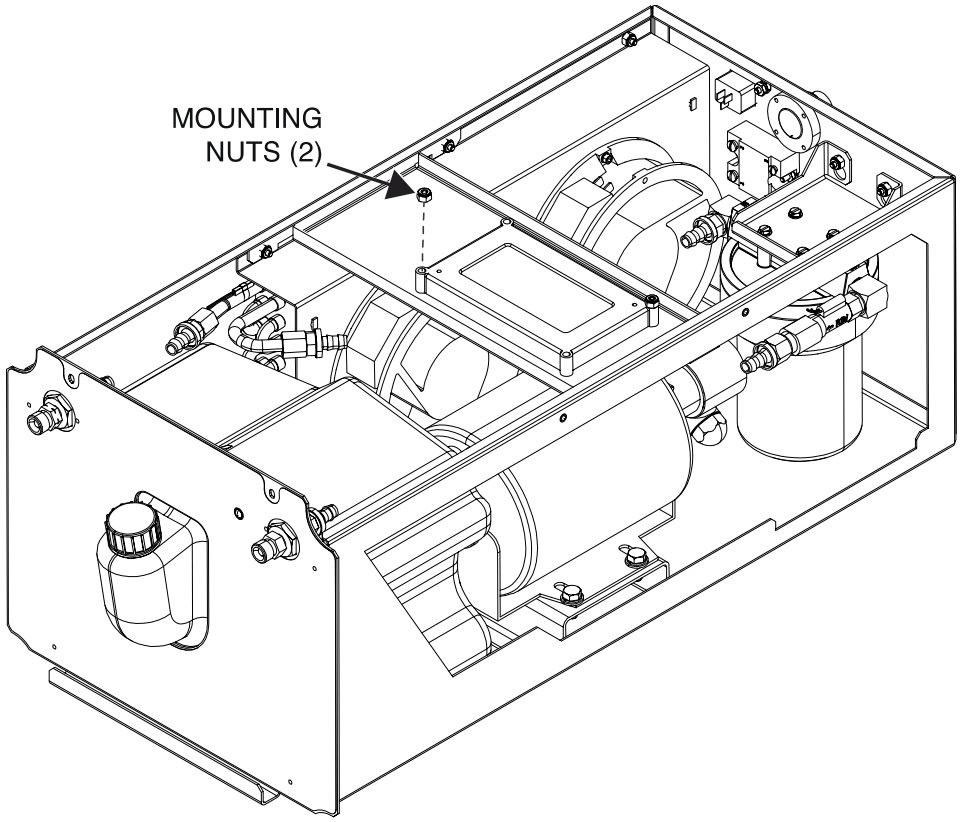
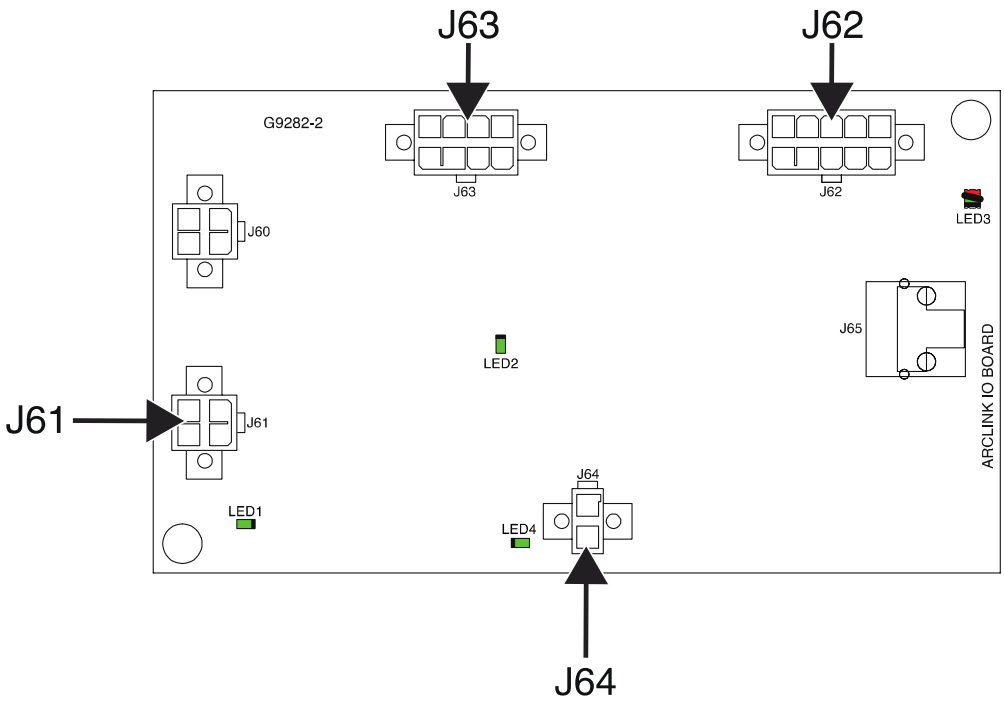


Figure F.20 –Arclink I/O board plug locations



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

Slotted Screwdriver
11/32” Nutdriver
Wiring Diagram

REMOVAL PROCEDURE

1. Carefully remove power from the FlexCool 35 machine.
2. Perform the ***Case Cover Removal Procedure***.
3. Using a slotted screwdriver, loosen the screws securing the leads to the terminals of the 12 VDC relay. See ***Figure F.21***. See Wiring Diagram.
4. Label and disconnect leads 32A, 32, 834, 835 and TP1 from the 12 VDC relay. See ***Figure F.21***. See Wiring Diagram.
5. Using an 11/32” nutdriver, remove the two nuts and lock washers securing the 12 VDC relay to the machine. See ***Figure F.22***.
6. The 12 VDC relay can now be removed from its mounting posts and replaced.

REPLACEMENT PROCEDURE

1. Carefully position the new 12 VDC relay onto it’s mounting posts.
2. Using an 11/32” nutdriver, attach the two nuts and lock washers securing the 12 VDC relay to the machine.
3. Connect leads 32A, 32, 834, 835 and TP1 from the 12 VDC relay. See Wiring Diagram.
4. Using a slotted screwdriver, tighten the screws securing the leads to the terminals of the 12 VDC relay. See Wiring Diagram.
5. Perform the ***Case Cover Replacement Procedure***.

Figure F.21 – 12 VDC relay lead locations

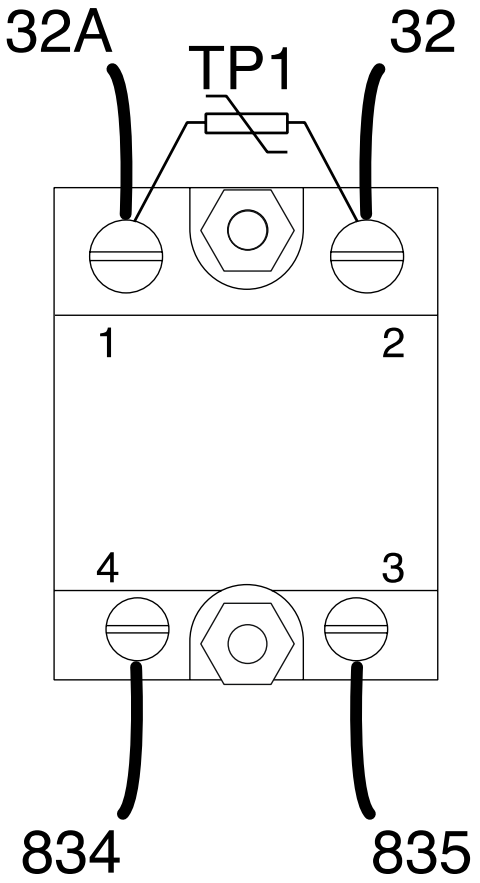
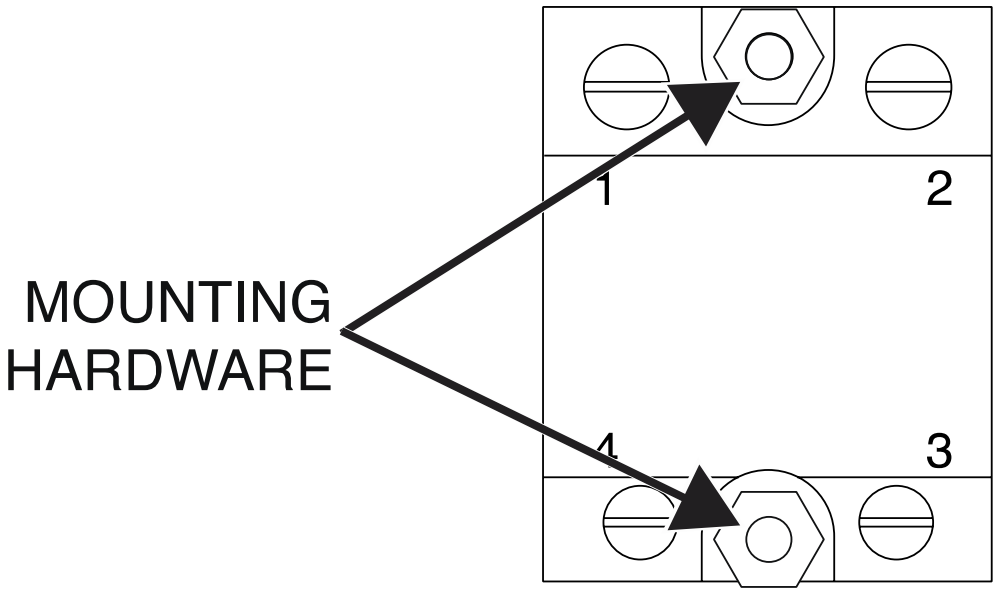


Figure F.22 – 12 VDC relay mounting hardware locations



HEAT EXCHANGER 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 Heat Exchanger.

MATERIALS NEEDED

3/8” Nutdriver
11/16” Open End Wrench
Wiring Diagram

REMOVAL PROCEDURE

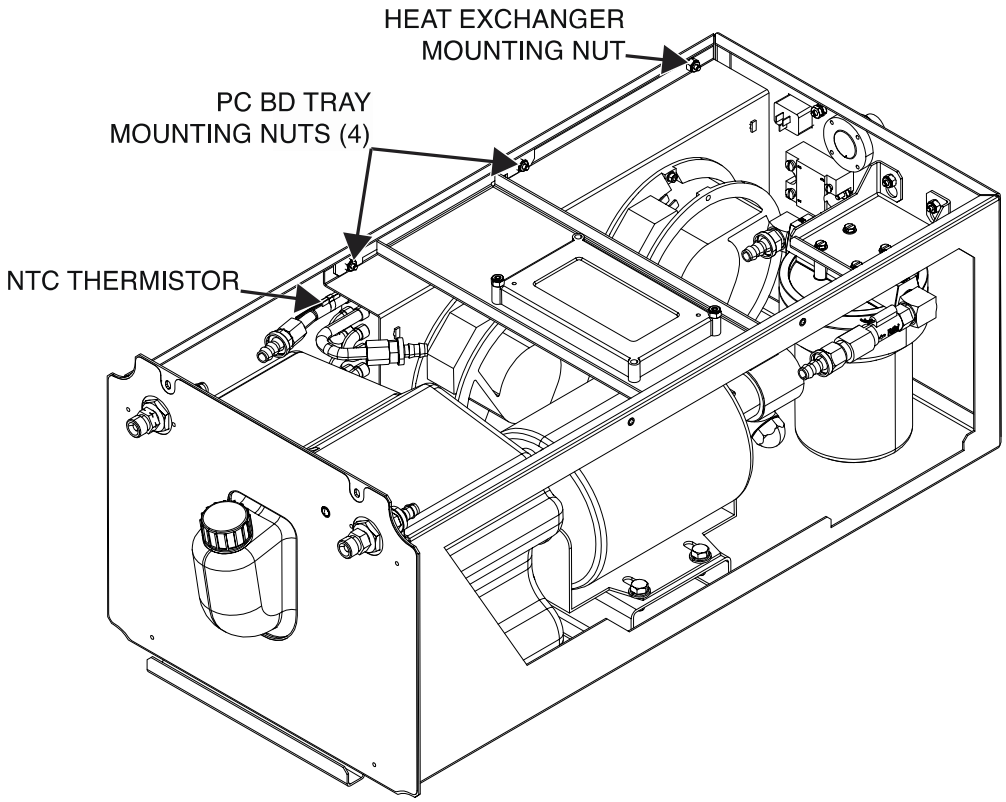
1. Carefully remove power from the FlexCool 35 machine.
2. Perform the ***Case Cover Removal Procedure***.
3. Perform the ***ArcLink I/O Board Removal Replacement***.
4. Using a 3/8” nutdriver, remove the four nuts securing the PC BD tray to the machine. See ***Figure F.23***.
5. Carefully remove the PC BD tray from the machine.
6. Using a 3/8” nutdriver, remove the nut securing the heat exchanger to the machine. See ***Figure F.23***.
7. Carefully remove the NTC thermistor from the coolant line. See ***Figure F.23***. See Wiring Diagram.
8. Using a 11/16” open end wrench, loosen the two fittings securing the coolant hoses to the heat exchanger. See ***Figure F.23***.
9. Label and disconnect leads 31, 32 and GND1 from the rear of the 115 VAC receptacle. See Wiring Diagram.
10. Depress the tabs on the rear of the 115 VAC receptacle and remove the receptacle from the machine. See Wiring Diagram.
11. Label and disconnect leads 31D, 32C, 31A and 32D from the fan terminals. See Wiring Diagram. Cut cable ties as necessary.
12. The heat exchanger can now be removed and replaced.

REPLACEMENT PROCEDURE

1. Carefully position the new heat exchanger into the machine.

2. Connect leads 31D, 32C, 31A and 32D to the fan terminals. See Wiring Diagram. Replace cable ties as necessary.
3. Carefully position the 115 VAC receptacle and press into the machine. See Wiring Diagram.
4. Connect leads 31, 32 and GND1 to the rear of the 115 VAC receptacle. See Wiring Diagram.
5. Using a 11/16" open end wrench, tighten the two fittings securing the coolant hoses to the heat exchanger.
6. Carefully attach the NTC thermistor to the coolant line. See Wiring Diagram.
7. Using a 3/8" nutdriver, attach the nut securing the heat exchanger to the machine.
8. Carefully position the PC BD tray into the machine.
9. Using a 3/8" nutdriver, attach the four nuts securing the PC BD tray to the machine.
10. Perform the ***ArcLink I/O Board Replacement Procedure***.
11. Perform the ***Case Cover Replacement Procedure***.

Figure F.23 – Heat exchanger mounting hardware locations



PUMP 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 Motor Assembly.

MATERIALS NEEDED

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

REMOVAL PROCEDURE

1. Carefully remove power from the FlexCool 35 machine.
2. Perform the ***Case Cover Removal Procedure***.
3. Perform the ***ArcLink I/O Board Removal Procedure***.
4. Using a 3/8” nutdriver, remove the four nuts securing the PC BD tray to the machine. See ***Figure F.24***.
5. Carefully remove the PC BD tray from the machine.
6. Using a 11/16” open end wrench, loosen the fittings securing the two hoses to the pump motor assembly. See Wiring Diagram.
7. Using a 1/2” nutdriver, remove the four screws, lock washers and flat washers securing the pump motor assembly to the mounting bracket. See ***Figure F.25***.
8. Using a 1/4” nutdriver, remove the two screws securing the cover plate to the motor.
9. Using a 1/4” nutdriver, remove the screws securing the ground lead to the motor. See ***Figure F.26***. See Wiring Diagram.
10. Using a 11/32” nutdriver, remove the two washers and four nuts securing the white and black leads to the motor terminals. See ***Figure F.26***. See Wiring Diagram.
11. The pump motor assembly can now be removed and replaced.

REPLACEMENT PROCEDURE

1. Using a 11/32” nutdriver, attach the two washers and four nuts securing the white and black leads to the motor terminals. See Wiring Diagram.

2. Using a 1/4” nutdriver, attach the screws securing the ground lead to the motor. See Wiring Diagram.
3. Using a 1/4” nutdriver, attach the two screws securing the cover plate to the motor.
4. Carefully position the pump motor assembly onto the mounting bracket.
5. Using a 1/2” nutdriver, attach the four screws, lock washers and flat washers securing the pump motor to the mounting bracket.
6. Using a 11/16” open end wrench, tighten the fittings securing the two hoses to the pump.
7. Carefully position the PC BD tray into the machine.
8. Using a 3/8” nutdriver, attach the four nuts securing the PC BD tray to the machine.
9. Perform the ***ArcLink I/O Board Replacement Procedure***.
10. Perform the ***Case Cover Replacement Procedure***.

Figure F.24 – PC BD tray mounting hardware locations

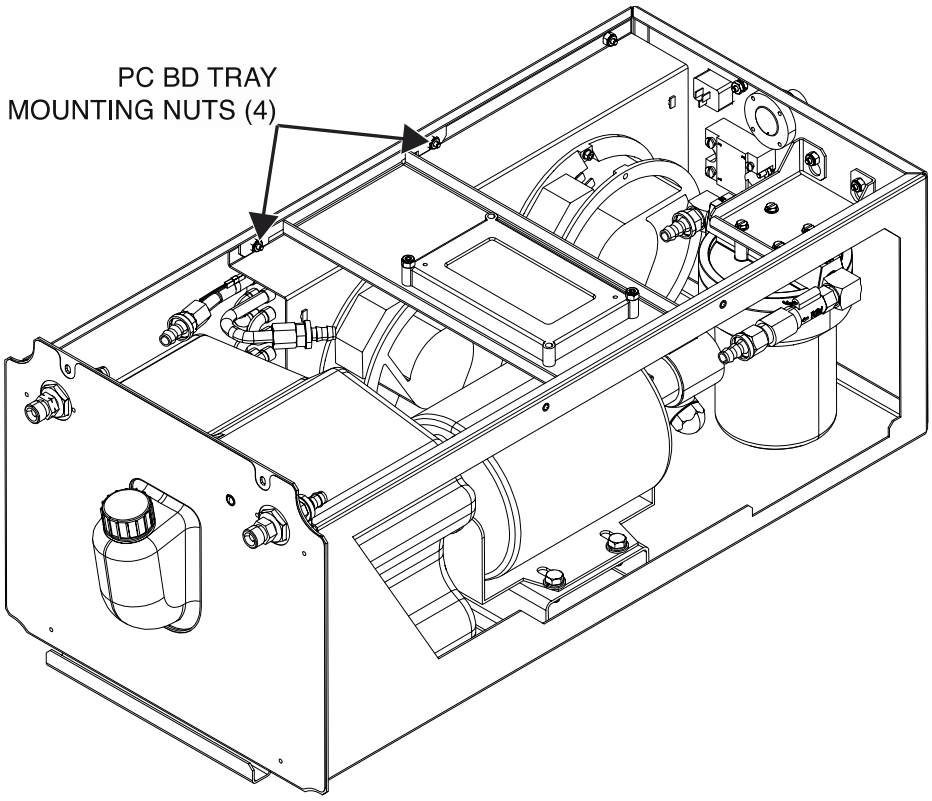


Figure F.25 – Pump motor mounting hardware locations

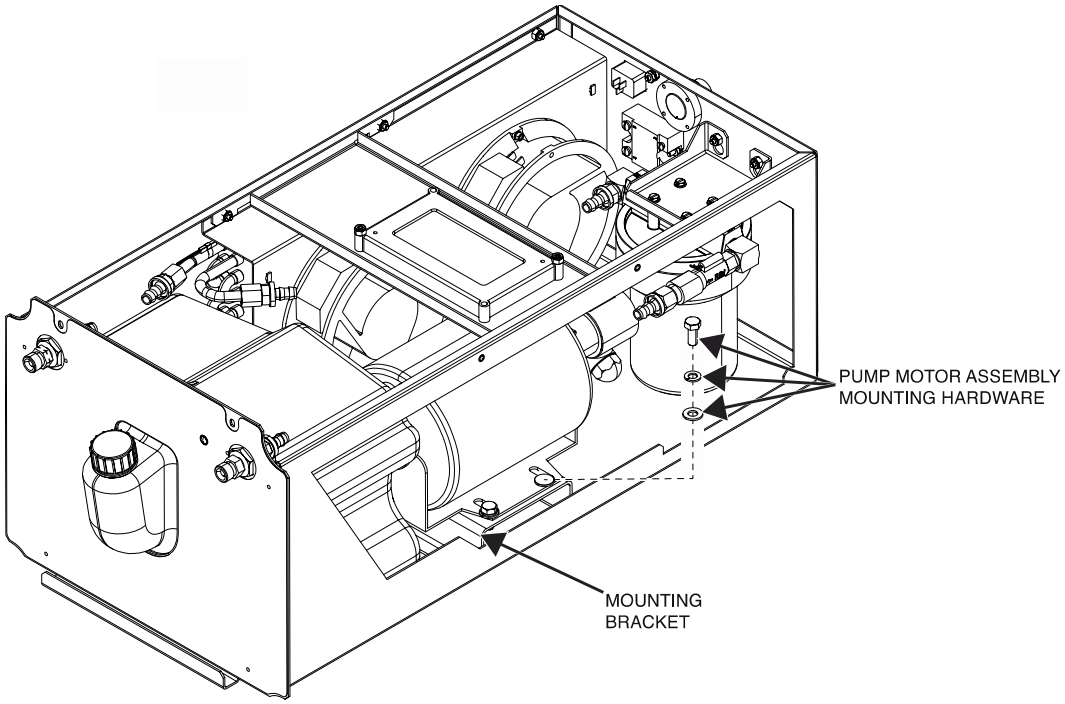
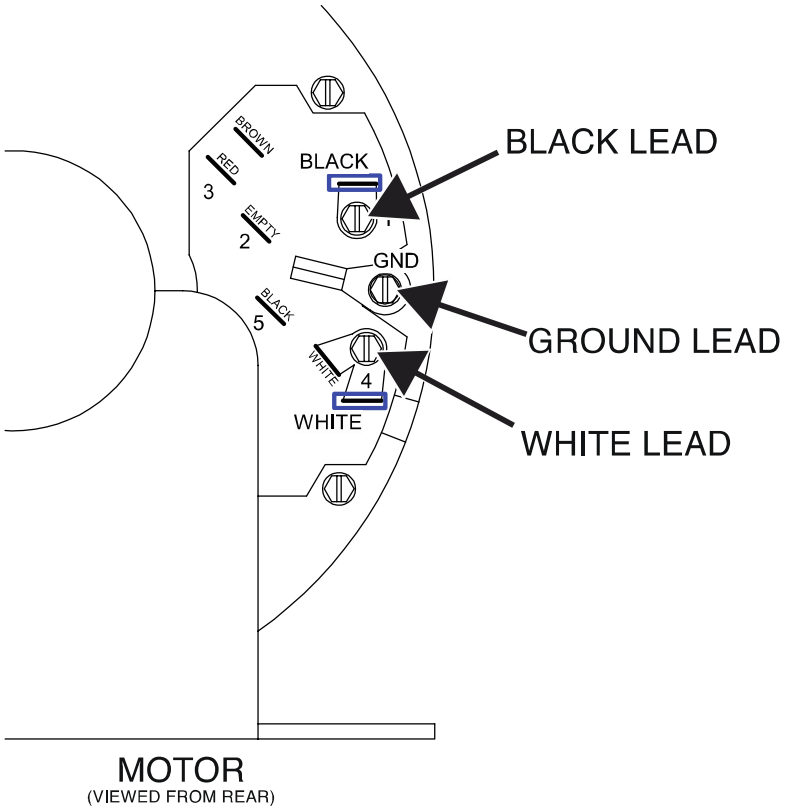


Figure F.26 – Motor terminal locations



NTC THERMISTOR 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 NTC Thermistor.

MATERIALS NEEDED

Molex Extraction Tool
Wiring Diagram

REMOVAL PROCEDURE

1. Carefully remove power from the FlexCool 35 machine.
2. Perform the ***Case Cover Removal Procedure***.
3. Carefully remove the NTC thermistor from the coolant line. See ***Figure F.27***. See Wiring Diagram.
4. Label and disconnect plug J64 from the ArcLink I/O board. See ***Figure F.28***. See Wiring Diagram.
5. Using a Molex extraction tool, remove the NTC thermistor leads from the Molex plug. See Wiring Diagram.
6. The NTC thermistor can now be removed and replaced.

REPLACEMENT PROCEDURE

1. Carefully position the NTC thermistor onto the line.
2. Attach the NTC thermistor leads from the Molex plug. See Wiring Diagram.
3. Connect plug J64 to the ArcLink I/O board. See Wiring Diagram.
4. Perform the ***Case Cover Replacement Procedure***.

Figure F.27 – NTC mounting location

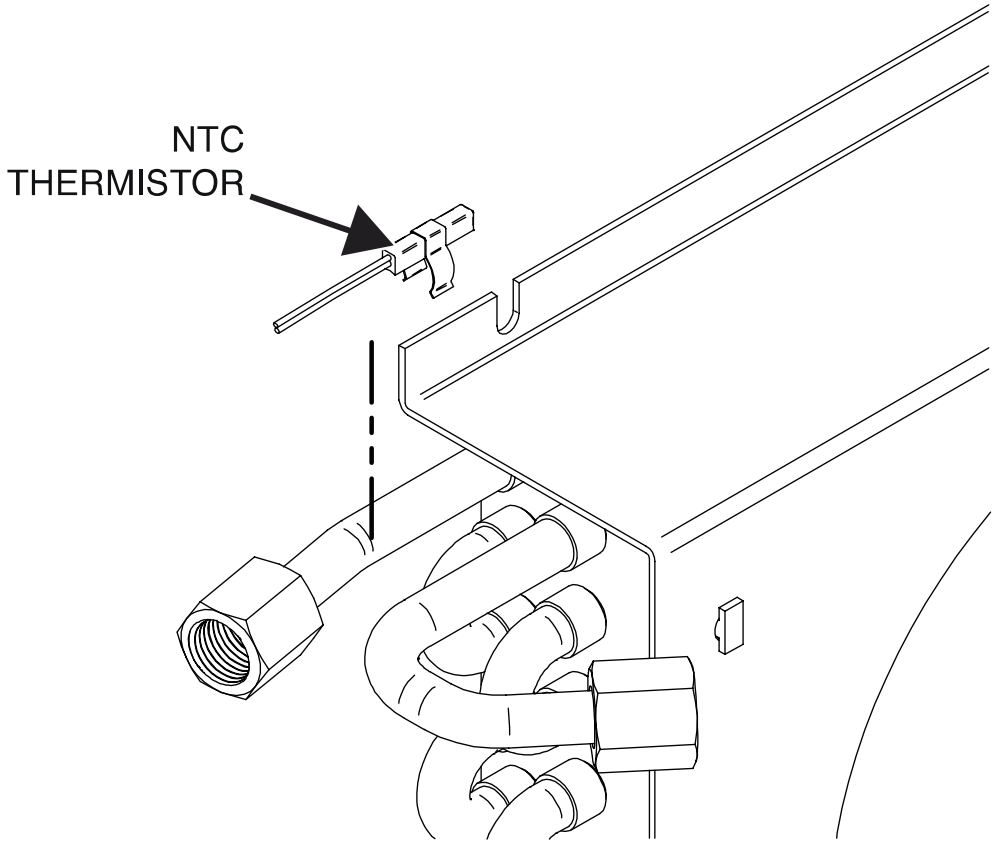
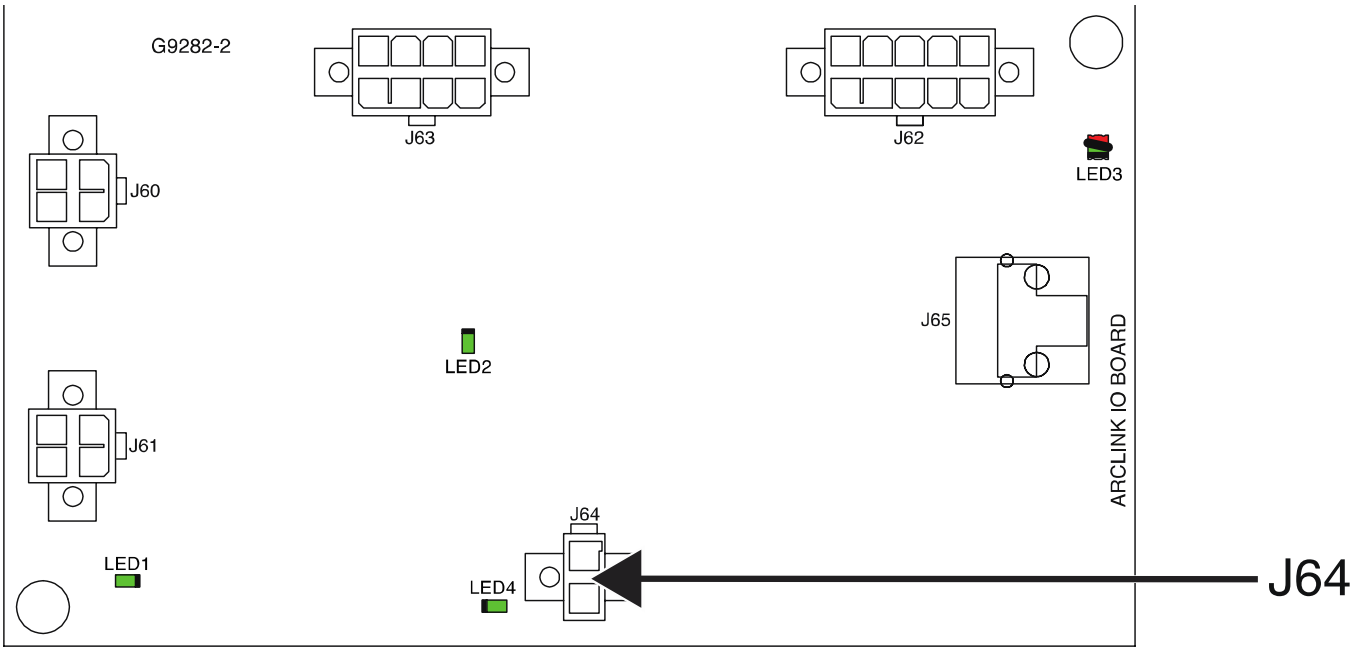


Figure F.28 – Arclink I/O board plug J64 location



FAN 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 Fan(s).

MATERIALS NEEDED

7/64" Allen Wrench
Wiring Diagram

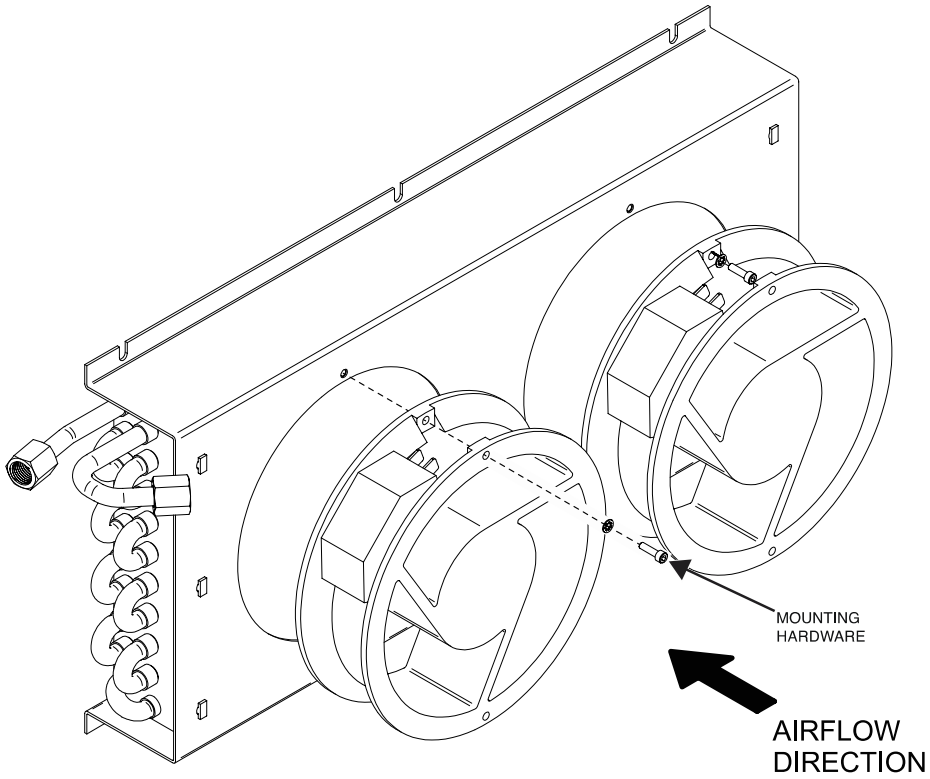
REMOVAL PROCEDURE

1. Carefully remove power from the FlexCool 35 machine.
2. Perform the ***Case Cover Removal Procedure***.
3. Perform the ***Heat Exchanger Removal Procedure***.
4. Using a 7/64" Allen wrench, remove the two screws and washers securing the fan to the heat exchanger. See ***Figure F.29***. Note fan orientation for reassembly. Repeat this step for the other fan if necessary.
5. The fan(s) can now be removed and replaced.

REPLACEMENT PROCEDURE

1. Carefully position the fan(s) onto the heat exchanger. Ensure proper orientation of fan(s). Air flows in through the back of the cooler and out the case sides. See ***Figure F.29***.
2. Using a 7/64" Allen wrench, attach the two screws and washers securing the fan to the heat exchanger. Repeat this step for the other fan if necessary.
3. Perform the ***Heat Exchanger Replacement Procedure***.
4. Perform the ***Case Cover Replacement Procedure***.

Figure F.29 – Fan mounting nut locations



LEVEL 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 Level Switch.

MATERIALS NEEDED

Molex Extraction Tool
Wiring Diagram

REMOVAL PROCEDURE

1. Carefully remove power from the FlexCool 35 machine.
2. Perform the ***Case Cover Removal Procedure***.
3. Remove any coolant from the reservoir.
4. Label and disconnect plug J62 from the ArcLink I/O board. See ***Figure F.30***. See Wiring Diagram.
5. Using a Molex extraction tool, disconnect the level switch leads form the Molex plug. See ***Figure F.30***. See Wiring Diagram.
6. Loosen the nut securing the level switch to the coolant reservoir. See ***Figure F.31***.
7. Carefully pull the level switch out of the rear of the coolant reservoir. See ***Figure F.31***.
8. The level switch can now be removed and replaced.

REPLACEMENT PROCEDURE

1. Carefully insert the level switch into the rear of the coolant reservoir with the float extended downward.
2. Press the level switch tight against the rear of the coolant reservoir.
3. While holding the back of the level switch to prevent spinning, tighten the nut backwards until finger tight.
4. Tighten the nut clockwise one half additional turn.
5. Attach the level switch leads to the Molex plug (polarity does not matter). See Wiring Diagram.
6. Connect plug J62 to the arclink I/O board. See Wiring Diagram.
7. Perform the ***Case Cover Replacement Procedure***.

Figure F.30 – Arclink I/O board plug J62 locations

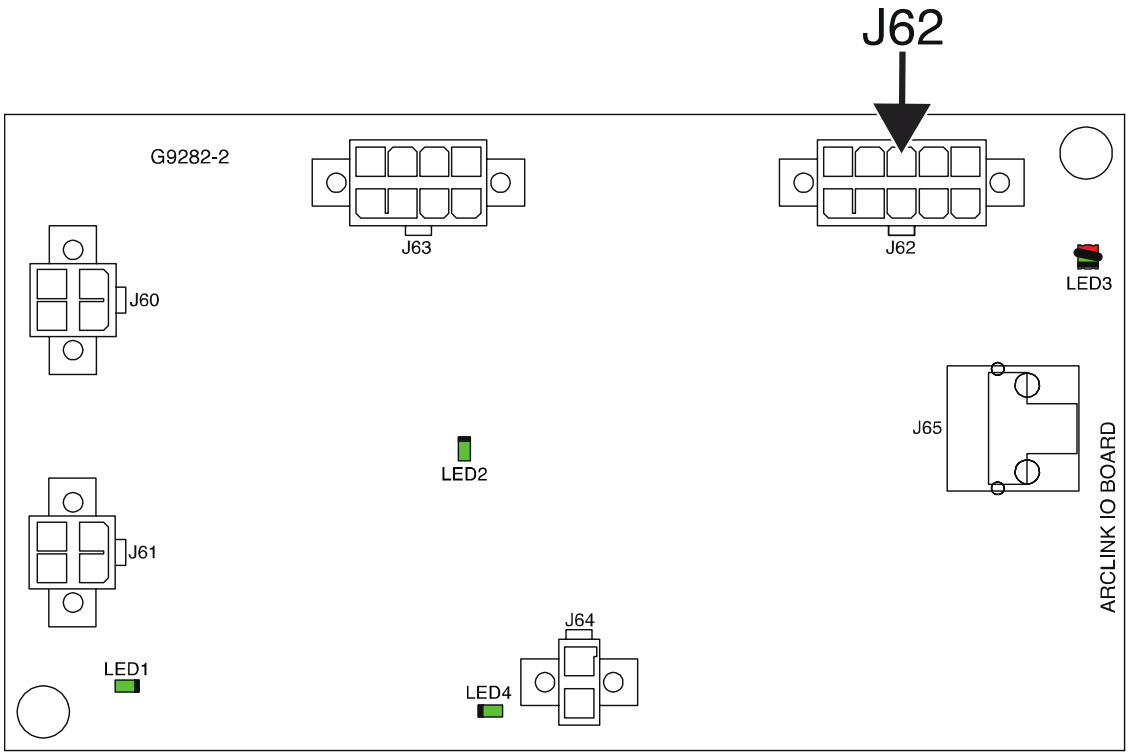
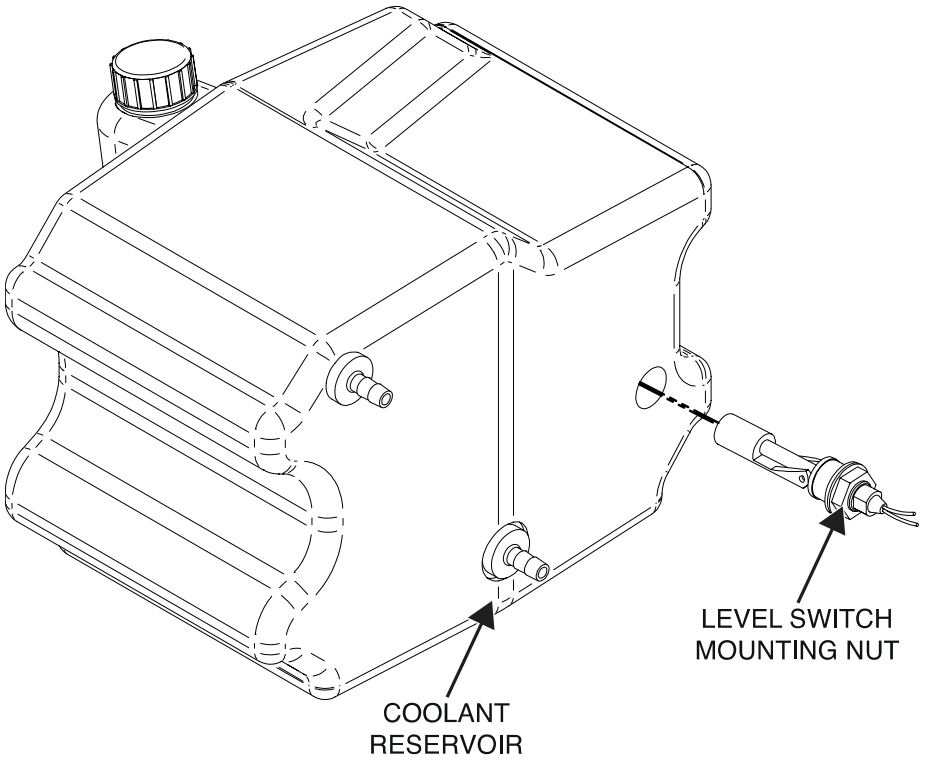


Figure F.31 – Level switch mounting location



FLOW 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 Flow Switch.

MATERIALS NEEDED

Adjustable Wrench
11/16” Open End Wrench
Molex Extraction Tool
Pipe Joint Compound
Wiring Diagram

REMOVAL PROCEDURE

1. Carefully remove power from the FlexCool 35 machine.
2. Perform the ***Case Cover Removal Procedure***.
3. Using an adjustable wrench, loosen the fitting securing the coolant hose to the flow switch. See ***Figure F.32***.
4. Using an 11/16” open-end wrench, rotate the flow switch to separate it from the filter housing. See ***Figure F.32***.
5. Label and disconnect plug J62 from the ArcLink I/O board. See ***Figure F.33***. See Wiring Diagram.
6. Using a Molex extraction tool, disconnect the flow switch leads form the Molex plug. See ***Figure F.33***. See Wiring Diagram.
7. The flow switch can now be removed and replaced.

REPLACEMENT PROCEDURE

1. Apply a coating of pipe joint compound to the threads of the new flow switch.
2. Using an 11/16” open-end wrench, rotate the flow switch to attach it to the filter housing.
3. Using an adjustable wrench, tighten the fitting securing the coolant hose to the flow switch.
4. Attach the flow switch leads to the Molex plug (polarity does not matter). See Wiring Diagram.
5. Connect plug J62 to the arclink I/O board. See Wiring Diagram.
6. Perform the ***Case Cover Replacement Procedure***.

Figure F.32 – Flow switch mounting location

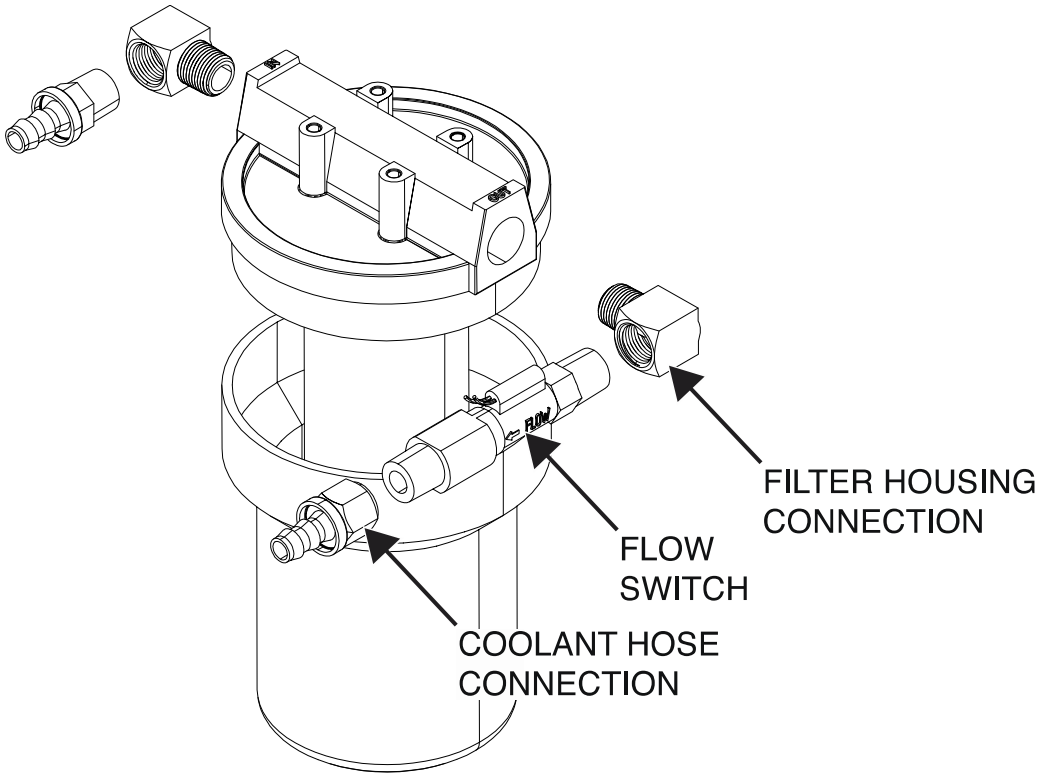
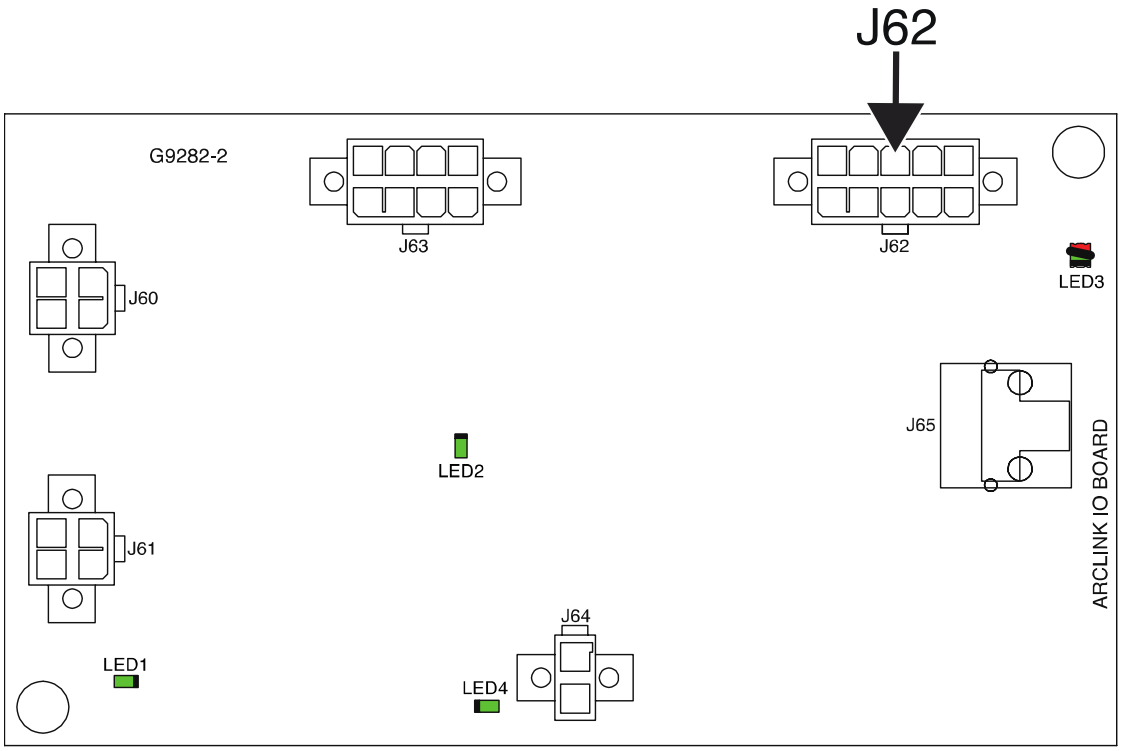


Figure F.33 – Arclink I/O board plug J62 location



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 FlexCool 35.
2. Connect the FlexCool 35 to a compatible Lincoln FlexCut 200 machine.
3. Test the functions of the pump motor, fan motors, 12 VDC relay and the ArcLink I/O board.