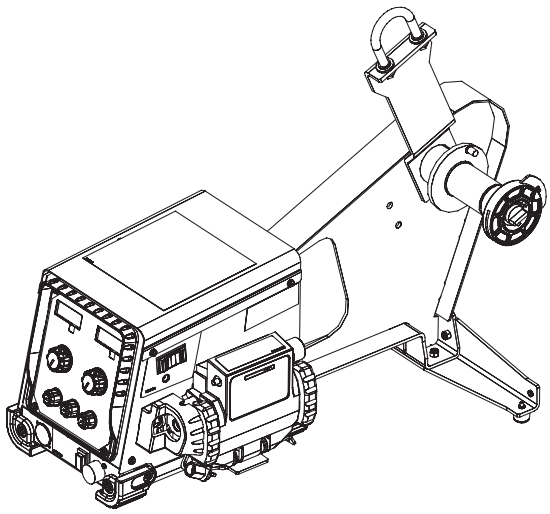
NOTE: This manual will cover most of the troubleshooting and repair procedures for the code numbers listed. Some variances may exist when troubleshooting/repairing later code numbers.

FLEX FEED™ 74 HT

For use with machines having Code Numbers:

12039, 12040, 12041, 12042, 12043, 12044, 12045, 12046, 12047, 12048, 12049, 12050, 12051, 12052

SERVICE MANUAL



SVM242-A | Issue Date 14-Feb

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

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SAFETY DEPENDS ON YOU

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.

⚠ WARNING

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

⚠ CAUTION

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

KEEP YOUR HEAD OUT OF THE FUMES.

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

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

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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.

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ELECTRIC SHOCK CAN KILL.

3.a. The electrode and work (or ground) circuits are electrically "hot" when the welder is on. Do not touch these "hot" parts with your bare skin or wet clothing. Wear dry, hole-free gloves to insulate hands.

3.b. Insulate yourself from work and ground using dry insulation. Make certain the insulation is large enough to cover your full area of physical contact with work and ground.

In addition to the normal safety precautions, if welding must be performed under electrically hazardous conditions (in damp locations or while wearing wet clothing; on metal structures such as floors, gratings or scaffolds; when in cramped positions such as sitting, kneeling or lying, if there is a high risk of unavoidable or accidental contact with the workpiece or ground) use the following equipment:

- Semiautomatic DC Constant Voltage (Wire) Welder.
- DC Manual (Stick) Welder.
- AC Welder with Reduced Voltage Control.

3.c. In semiautomatic or automatic wire welding, the electrode, electrode reel, welding head, nozzle or semiautomatic welding gun are also electrically "hot".

3.d. Always be sure the work cable makes a good electrical connection with the metal being welded. The connection should be as close as possible to the area being welded.

3.e. Ground the work or metal to be welded to a good electrical (earth) ground.

3.f. Maintain the electrode holder, work clamp, welding cable and welding machine in good, safe operating condition. Replace damaged insulation.

3.g. Never dip the electrode in water for cooling.

3.h. Never simultaneously touch electrically "hot" parts of electrode holders connected to two welders because voltage between the two can be the total of the open circuit voltage of both welders.

3.i. When working above floor level, use a safety belt to protect yourself from a fall should you get a shock.

3.j. Also see Items 6.c. and 8.

ARC RAYS CAN BURN.

4.a. Use a shield with the proper filter and cover plates to protect your eyes from sparks and the rays of the arc when welding or observing open arc welding. Headshield and filter lens should conform to ANSI Z87. I standards.

4.b. Use suitable clothing made from durable flame-resistant material to protect your skin and that of your helpers from the arc rays.

4.c. Protect other nearby personnel with suitable, non-flammable screening and/or warn them not to watch the arc nor expose themselves to the arc rays or to hot spatter or metal.

FUMES AND GASES CAN BE DANGEROUS.

5.a. Welding may produce fumes and gases hazardous to health. Avoid breathing these fumes and gases. When welding, keep your head out of the fume. Use enough ventilation and/or exhaust at the arc to keep fumes and gases away from the breathing zone. **When welding with electrodes which require special ventilation such as stainless or hard facing (see instructions on container or MSDS) or on lead or cadmium plated steel and other metals or coatings which produce highly toxic fumes, keep exposure as low as possible and within applicable OSHA PEL and ACGIH TLV limits using local exhaust or mechanical ventilation. In confined spaces or in some circumstances, outdoors, a respirator may be required. Additional precautions are also required when welding on galvanized steel.**

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

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

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

5.e. Read and understand the manufacturer's instructions for this equipment and the consumables to be used, including the material safety data sheet (MSDS) and follow your employer's safety practices. MSDS forms are available from your welding distributor or from the manufacturer.

5.f. Also see item 1.b.

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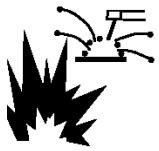
WELDING AND CUTTING SPARKS CAN CAUSE FIRE OR EXPLOSION.



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

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

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

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

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

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

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

6.h. Also see item 1.c.

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

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

CYLINDER MAY EXPLODE IF DAMAGED.

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

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

7.c. Cylinders should be located:

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

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

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

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

7.g. Read and follow the instructions on compressed gas cylinders, associated equipment, and CGA publication P-I, "Precautions for Safe Handling of Compressed Gases in Cylinders," available from the Compressed Gas Association 1235 Jefferson Davis Highway, Arlington, VA 22202.

FOR ELECTRICALLY POWERED EQUIPMENT.

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

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

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

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

Welding Safety Interactive Web Guide for mobile devices

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ELECTROMAGNETIC COMPATABILITY (EMC)

CONFORMANCE

Products displaying the CE mark are in conformity with European Community Council Directive of 3 May 1989 on the approximation of the laws of the Member States relating to electromagnetic compatibility (89/336/EEC). It was manufactured in conformity with a national standard that implements a harmonized standard: EN 60974-10 Electromagnetic Compatibility (EMC) Product Standard for Arc Welding Equipment. It is for use with other Lincoln Electric equipment. It is designed for industrial and professional use.

INTRODUCTION

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

INSTALLATION AND USE

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

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

ASSESSMENT OF AREA

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

a. other supply cables, control cables, signaling and telephone cables; above, below and adjacent to the welding equipment;

b. radio and television transmitters and receivers;

c. computer and other control equipment;

d. safety critical equipment, e.g., guarding of industrial equipment;

e. the health of the people around, e.g., the use of pacemakers and hearing aids;

f. equipment used for calibration or measurement

g. the immunity of other equipment in the environment. The user shall ensure that other equipment being used in the environment is compatible. This may require additional protection measures;

h. the time of day that welding or other activities are to be carried out.

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

METHODS OF REDUCING EMISSIONS

Mains Supply

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

Maintenance of the Welding Equipment

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

Welding Cables

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

Equipotential Bonding

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

Earthing of the Workpiece

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

Screening and Shielding

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

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

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As a rule of thumb, for many mild steel electrode, if the air is visibly clear and you are comfortable, then the ventilation is generally adequate for your work. The most accurate way to determine if the worker exposure does not exceed the applicable exposure limit for compounds in the fumes and gases is to have an industrial hygienist take and analyze a sample of the air you are breathing. This is particularly important if you are welding with stainless, hardfacing or Special Ventilation products. All Lincoln MSDS have a maximum fume guideline number. If exposure to total fume is kept below that number, exposure to all fume from the electrode (not coatings or plating on the work) will be below the TLV.

There are steps that you can take to identify hazardous substances in your welding environment. Read the product label and material safety data sheet for the electrode posted in the work place or in the electrode or flux container to see what fumes can be reasonably expected from use of the product and to determine if special ventilation is needed. Secondly, know what the base metal is and determine if there is any paint, plating, or coating that could expose you to toxic fumes and/or gases. Remove it from the metal being welded, if possible. If you start to feel uncomfortable, dizzy or nauseous, there is a possibility that you are being overexposed to fumes and gases, or suffering from oxygen deficiency. Stop welding and get some fresh air immediately. Notify your supervisor and co-workers so the situation can be corrected and other workers can avoid the hazard. Be sure you are following these safe practices, the consumable labeling and MSDS to improve the ventilation in your area. Do not continue welding until the situation has been corrected.

NOTE: The MSDS for all Lincoln consumables is available on Lincoln's web-site: www.lincolnelectric.com

Before we turn to the methods available to control welding fume exposure, you should understand a few basic terms:

Natural Ventilation is the movement of air through the workplace caused by natural forces. Outside, this is usually the wind. Inside, this may be the flow of air through open windows and doors.

Mechanical Ventilation is the movement of air through the workplace caused by an electrical device such as a portable fan or permanently mounted fan in the ceiling or wall.

Source Extraction (Local Exhaust) is a mechanical device used to capture welding fume at or near the arc and filter contaminants out of the air.

The ventilation or exhaust needed for your application depends upon many factors such as:

- Workspace volume
- Workspace configuration
- Number of welders
- Welding process and current
- Consumables used (mild steel, hardfacing, stainless, etc.)
- Allowable levels (TLV, PEL, etc.)
- Material welded (including paint or plating)
- Natural airflow

Your work area has adequate ventilation when there is enough ventilation and/or exhaust to control worker exposure to hazardous materials in the welding fumes and gases so the applicable limits for those materials is not exceeded. See chart of TLV and PEL for Typical Electrode Ingredients, the OSHA PEL (Permissible Exposure Limit), and the recommended guideline, the ACGIH TLV (Threshold Limit Value), for many compounds found in welding fume.

Ventilation

There are many methods which can be selected by the user to provide adequate ventilation for the specific application. The following section provides general information which may be helpful in evaluating what type of ventilation equipment may be suitable for your application. When ventilation equipment is installed, you should confirm worker exposure is controlled within applicable OSHA PEL and/or ACGIH TLV. According to OSHA regulations, when welding and cutting (mild steels), natural ventilation is usually considered sufficient to meet requirements, provided that:

1. The room or welding area contains at least 10,000 cubic feet (about 22' x 22' x 22') for each welder.
2. The ceiling height is not less than 16 feet.
3. Cross ventilation is not blocked by partitions, equipment, or other structural barriers.
4. Welding is not done in a conned space.

Spaces that do not meet these requirements should be equipped with mechanical ventilating equipment that exhausts at least 2000 CFM of air for each welder, except where local exhaust hoods or booths, or air-line respirators are used.

Important Safety Note:

When welding with electrodes which require special ventilation such as stainless or hardfacing (see instructions on container or MSDS) or on lead or cadmium plated steel and other metals or coatings which produce hazardous fumes, keep exposure as low as possible and below exposure limit values (PEL and TLV) for materials in the fume using local exhaust or mechanical ventilation. In conned spaces or in some circumstances, for example outdoors, a respirator may be required if exposure cannot be controlled to the PEL or TLV. (See MSDS and chart of TLV and PEL for Typical Electrode Ingredients.) Additional precautions are also required when welding on galvanized steel.

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BIBLIOGRAPHY AND SUGGESTED READING

ANSI Z87.1, Practice for Occupational and Educational Eye and Face Protection, American National Standards Institute, 11 West 42nd Street, New York, NY 10036.

Arc Welding and Your Health: A Handbook of Health Information for Welding. Published by The American Industrial Hygiene Association, 2700 Prosperity Avenue, Suite 250, Fairfax, VA 22031-4319.

NFPA Standard 51B, Cutting and Welding Processes, National Fire Protection Association, 1 Batterymarch Park, P.O. Box 9146, Quincy, MA 02269-9959.

OSHA General Industry Standard 29 CFR 1910 Subpart Q. OSHA Hazard Communication Standard 29 CFR 1910.1200. Available from the Occupational Safety and Health Administration at http://www.osha.org or contact your local OSHA office.

The following publications are published by The American Welding Society, P.O. Box 351040, Miami, Florida 33135. AWS publications may be purchased from the American Welding society at http://www.aws.org or by contacting the AWS at 800-443-9353.

ANSI, Standard Z49.1, Safety in Welding, Cutting and Allied Processes. Z49.1 is now available for download at no charge at http://www.lincolnelectric.com/community/safety/ or at the AWS website http://www.aws.org.

AWS F1.1, Method for Sampling Airborne Particulates Generated by Welding and Allied Processes.

AWS F1.2, Laboratory Method for Measuring Fume Generation Rates and Total Fume Emission of Welding and Allied Processes.

AWS F1.3, Evaluating Contaminants in the Welding Environment: A Strategic Sampling Guide.

AWS F1.5, Methods for Sampling and Analyzing Gases from Welding and Allied Processes.

AWS F3.2, Ventilation Guide for Welding Fume Control.

AWS F4.1, Recommended Safe Practices for the Preparation for Welding and Cutting of Containers and Piping That Have Held Hazardous Substances.

AWS SHF, Safety and Health Facts Sheets. Available free of charge from the AWS website at http://www.aws.org.

LISTED BELOW ARE SOME TYPICAL INGREDIENTS IN WELDING ELECTRODES AND THEIR TLV (ACGIH) GUIDELINES AND PEL (OSHA) EXPOSURE LIMITS

INGREDIENTS	CAS No.	TLV mg/m$_3$	PEL mg/m$_3$
Aluminum and/or aluminum alloys (as Al)*****	7429-90-5	10	15
Aluminum oxide and/or Bauxite*****	1344-28-1	10	5**
Barium compounds (as Ba)*****	513-77-9	****	****
Chromium and chromium alloys or compounds (as Cr)*****	7440-47-3	0.5(b)	.005(b)
Fluorides (as F)	7789-75-5	2.5	2.5
Iron	7439-89-6	10*	10*
Limestone and/or calcium carbonate	1317-65-3	10	15
Lithium compounds (as Li)	554-13-2	10*	10*
Magnesite	1309-48-4	10	15
Magnesium and/or magnesium alloys and compounds (as Mg)	7439-95-4	10*	10*
Manganese and/or manganese alloys and compounds (as Mn)*****	7439-96-5	0.2	5.0(c)
Mineral silicates	1332-58-7	5**	5**
Molybdenum alloys (as Mo)	7439-98-7	10	10
Nickel*****	7440-02-0	1.5	1
Silicates and other binders	1344-09-8	10*	10*
Silicon and/or silicon alloys and compounds (as Si)	7440-21-3	10*	10*
Strontium compounds (as Sr)	1633-05-2	10*	10*
Zirconium alloys and compounds (as Zr)	12004-83-0	5	5

Supplemental Information:

(*) Not listed. Nuisance value maximum is 10 milligrams per cubic meter. PEL value for iron oxide is 10 milligrams per cubic meter. TLV value for iron oxide is 5 milligrams per cubic meter.

(**) As respirable dust.

(*****) Subject to the reporting requirements of Sections 311, 312, and 313 of the Emergency Planning and Community Right-to-Know Act of 1986 and of 40CFR 370 and 372.

(b) The PEL for chromium (VI) is .005 milligrams per cubic meter as an 8 hour time weighted average. The TLV for water-soluble chromium (VI) is 0.05 milligrams per cubic meter. The TLV for insoluble chromium (VI) is 0.01 milligrams per cubic meter.

c) Values are for manganese fume. STEL (Short Term Exposure Limit) is 3.0 milligrams per cubic meter. OSHA PEL is a ceiling value.

(****) There is no listed value for insoluble barium compounds. The TLV for soluble barium compounds is 0.5 mg/m3.

TLV and PEL values are as of April 2006. Always check Material Safety Data Sheet (MSDS) with product or on the Lincoln Electric website at http://www.lincolnelectric.com

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Figure E.1 - Block logic diagram

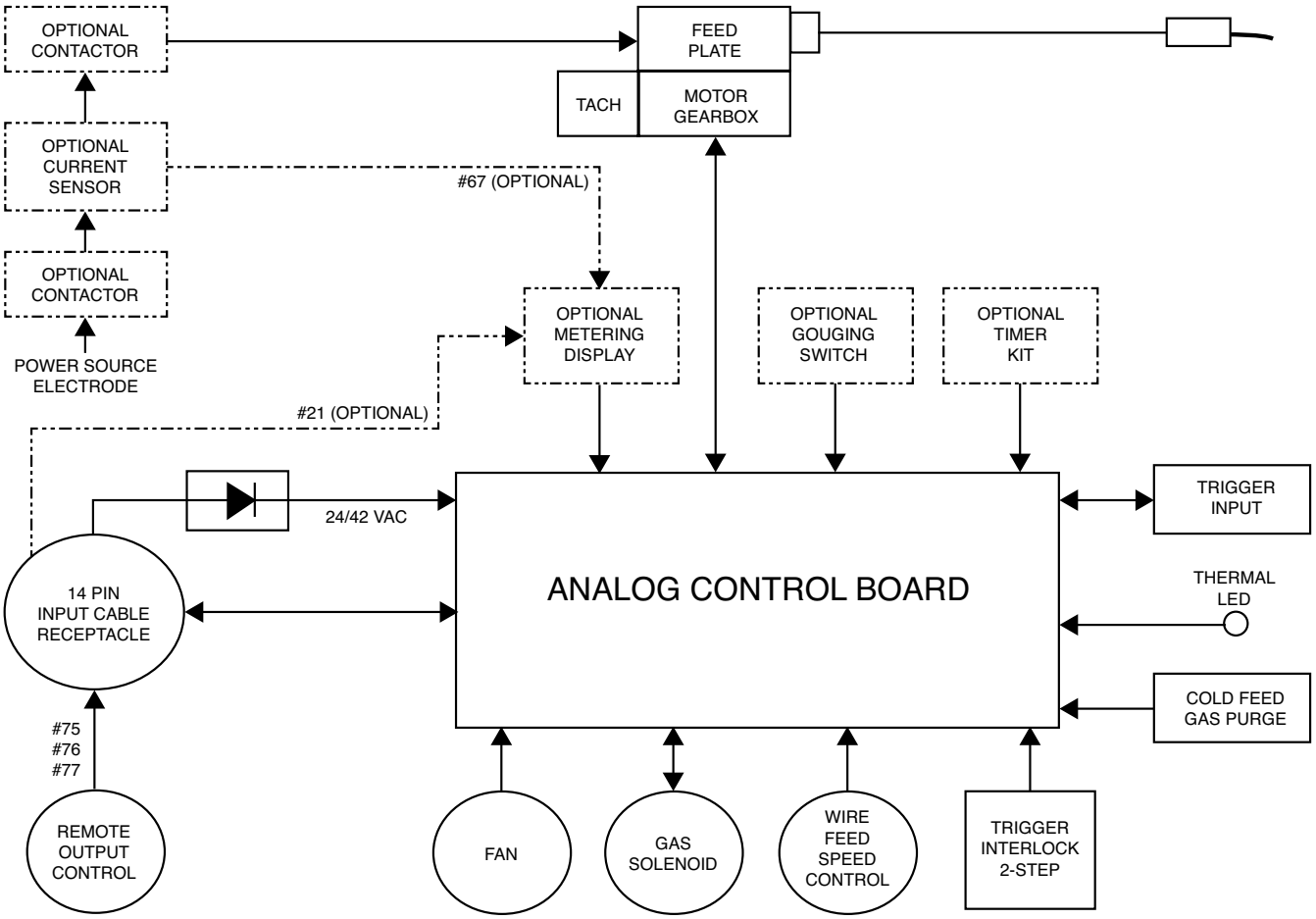
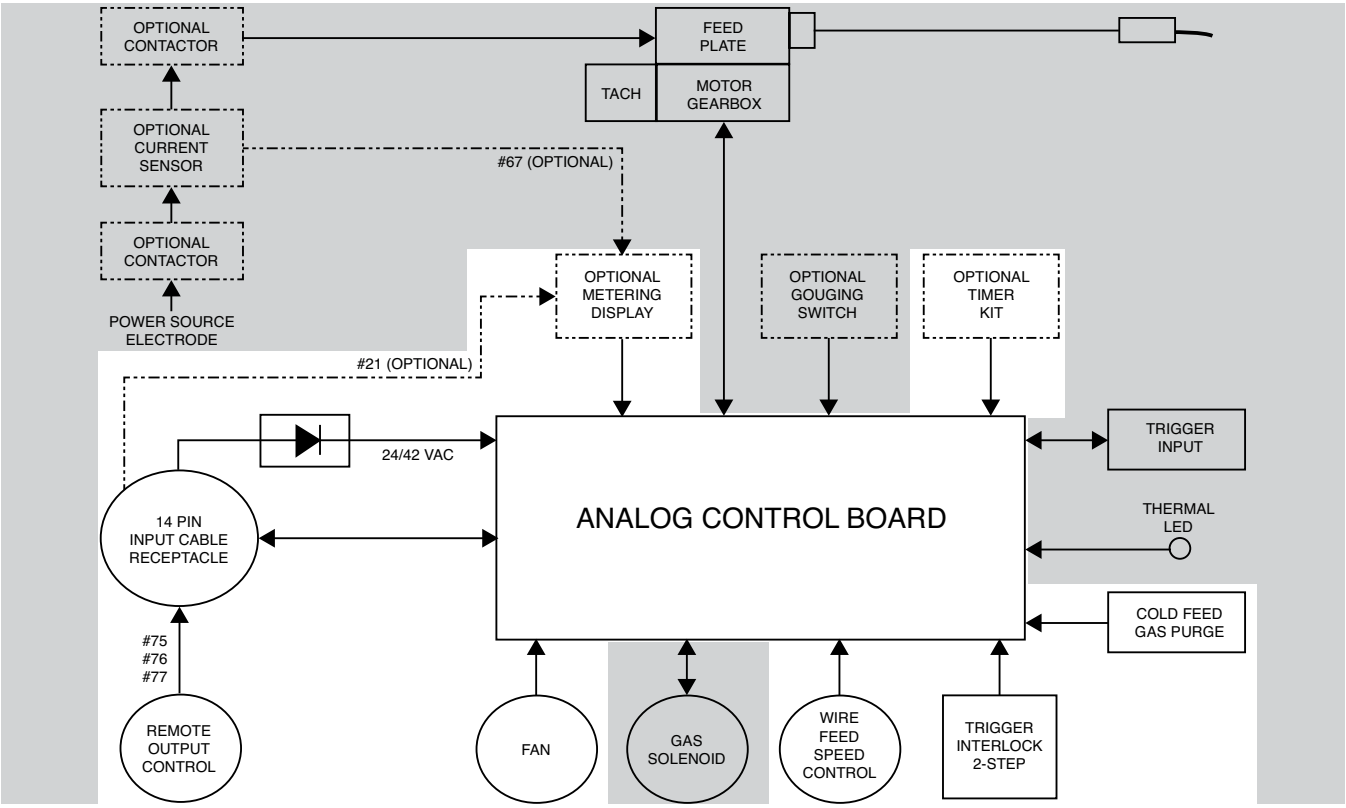


Figure E.2 - Input receptacle, analog control board and operator controls



INPUT RECEPTACLE, ANALOG CONTROL BOARD AND OPERATOR CONTROLS

The 24 or 42-volt input is applied to the Flex Feed 74 HT through the 14 pin amphenol type connector. The remote trigger leads are accessed through the 14 pin receptacle. The input voltage is filtered and then rectified by a full wave bridge. It is then sent to the board power supply which then manufactures 15 VDC & 5 VDC regulated supplies for the analog control board circuitry.

The analog control board receives commands from the user operated controls for the wire feed speed potentiometer, the remote control voltage potentiometer and the optional timer kit. The board compares these various feedbacks with the user command signals and will then generate the appropriate signals to control wire feed speed, arc voltage and gas flow.

The analog control board is responsible for the cold feed, gas purge and trigger interlock/2-step. It is also responsible for the optional user interface panel which contains the metering display and timer kit.

NOTE: Unshaded areas of Block Logic Diagram are the subject of discussion

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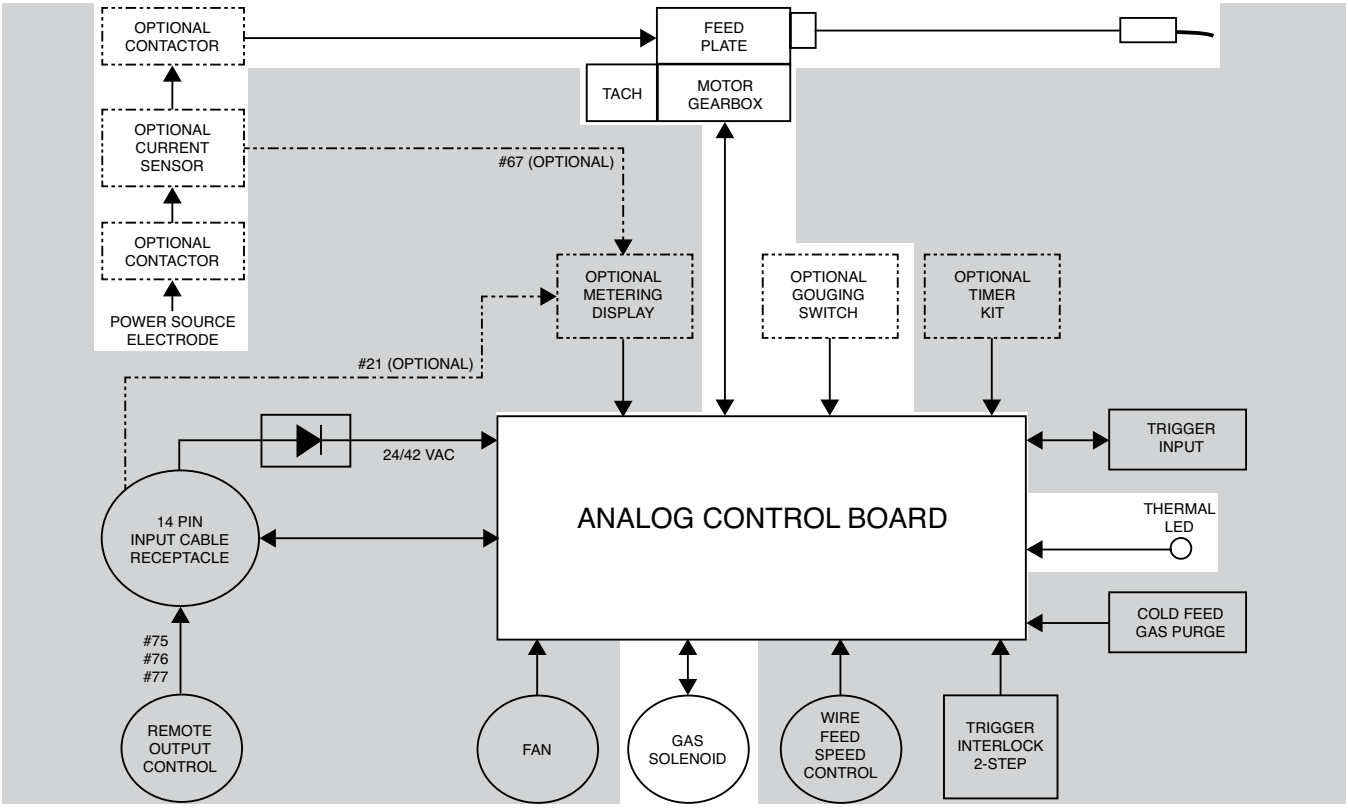
Figure E.3 - Drive motor, tach feedback, gas solenoid and gouging circuit



DRIVE MOTOR, TACH FEEDBACK, GAS SOLENOID AND GOUGING CIRCUIT

The leads going to the drive motor, gas solenoid and the tachometer are directed into the control box by way of the 14 pin input receptacle. It also contains the gun trigger leads and the voltage sensing leads. When the gun trigger is activated the analog control board energizes the gas solenoid, the wire drive motor and the welding power source.

The thermal light is activated when the motor current exceeds 12 amps for an extended period of time.

When the gouging kit is installed, a rocker switch is used to select between the wire feeder operation and gouging operation. Two additional contactors are also included. When the switch is in the “weld” position, the Flex Feed 74 HT functions normally and the gouging torch is off. When the switch is in the “gouge” position, the power source output and gouging connections are ON and wire feeding is disabled.

NOTE: Unshaded areas of Block Logic Diagram are the subject of discussion

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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 three main categories: Function Problems, Wire Feeding Problems and Welding 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 trouble-shooting 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.
- 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.

ATTENTION

Static-Sensitive Devices Handle only at Static-Safe Workstations

Reusable Container Do Not Destroy

- 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.

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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 feeder does not power up - no voltage, no cold feed.	1. The power source is OFF. 2. The circuit breakers for the wire feeder on the power source have tripped (control cable models). 3. The control cable may be loose or damaged (control cable models).	1. Turn ON the power source. 2. Reset the circuit breakers. 3. Tighten, repair or replace the control cable. 4. Perform the ***Diode Bridge Test***.
No shielding gas.	1. The gas supply is off or empty. 2. The gas hose is cut or crushed. 3. Gun is not properly seated in wire drive / o-rings are worn. 4. The solenoid has failed.	1. Verify the gas supply is ON and flowing. 2. Review the routing of the gas line in order to avoid any sharp corners. 3. Secure the gun in to the wire drive. Replace o-rings on the gun if necessary. 4. Perform the ***Gas Solenoid Test***.
Inconsistent wire feeding or wire not feeding but drive rolls are turning.	1. The gun cable is kinked and/or twisted. 2. The wire is jammed in the gun and cable. 3. The gun liner is dirty or worn. 4. The electrode is rusty or dirty. 5. The contact tip is partially melted. 6. Improper gun liner, tip, drive rolls and/or inner wire guide. 7. Incorrect pressure on the drive rolls. 8. The spindle brake is too tight. 9. Worn drive roll.	1. Keep the gun cable as straight as possible with no bends. 2. Remove the gun from the wire feeder and pull the jammed wire out of the gun and cable. 3. Blow dirt out of the liner with low pressure (40 psi or less). Replace the liner if worn. 4. Use only clean electrode. 5. Replace the contact tip. 6. Verify the proper parts are installed. 7. Adjust the tension knob. Set tension arm to “3”. 8. Verify the spool of wire moves easily. 9. Replace drive rolls if worn.

⚠ 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		
Wire feed speed consistently operates at the wrong value. The speed changes when the wire feed speed knob is adjusted.	1. The jumper lead 20 tooth / 30 tooth pinion gear is connected improperly. 2. The wrong gear is installed in the wire drive. 3. The wrong decal was placed on the unit. 4. The brushes on the motor are worn.	1. Properly connect the jumper lead. 2. Install the proper pinion. 3. Place the correct WFS decal on the unit. 4. Inspect and replace the motor brushes.
The wire feed speed is stuck at 200-300 in/min and does not change when the wire feed speed knob is adjusted.	1. The tachometer is connected improperly. 2. The tachometer has failed.	1. Verify that all of the tachometer leads are properly connected. 2. Replace the motor and tachometer assembly.
Variable or “hunting” arc.	1. Wrong size, worn and/or melted contact tips. 2. Worn work cable or poor work connection. 3. Wrong polarity. 4. The gas nozzle is extended beyond the contact tip or the wire stickout is too long. 5. Poor gas shielding on processes requiring gas.	1. Replace the contact tip. 2. Verify that all work and electrode connections are tight and that the cables are in good condition. Clean / replace as necessary. 3. Adjust the polarity to match the process. 4. Adjust the gas nozzle and shorten the stickout to 1/2 to 3/4 inches. 5. Check gas flow and mixture. Remove or block sources of drafts.
The wire drive feeds wire at the correct speed but there is no welding output.	1. If a gouging kit is installed, the gouging switch is in the “gouge” position. 2. If a gouging kit is installed, verify there is continuity from the electrode input to the wire drive.	1. Place the rocker switch in the welding position. 2. Replace loose connections. Replace the contactor.
There is gas flow but the feeder does not feed wire.	1. If the advanced user interface is installed, verify the preflow time has not been set to a high value.	1. Adjust the preflow timer for a shorter amount of time.
Poor arc starts with sticking or “blast-offs”, weld porosity, narrow and ropey looking bead.	1. Improper procedures or techniques.	1. See “Gas Metal Arc Welding Guide” (GS-100).

⚠ 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		
When the trigger is pulled, the drive rolls spin but there is no arc voltage.	1. Possible bad gun or faulty connections in the heavy current carrying leads. 2. Possible faulty control cable. 3. Possible defective power source.	1. Check all electrode and work connections. Verify the gun bushing is tight to the wire drive. 2. Check the control cable and connectors for continuity, cuts or broken pins. 3. Verify the power source is operating properly.
The wire continues to feed when the gun trigger is released.	1. Trigger interlock switch is in the wrong position. 2. Gun trigger is shorted or stuck.	1. Check if the 2 step / trigger interlock switch is in the TRIGGER INTERLOCK position. 2. Verify operation of the gun trigger. Check for shorted trigger leads.

⚠ 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.

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TROUBLESHOOTING GUIDE

PROBLEMS (SYMPTOMS)	POSSIBLE AREAS OF MISADJUSTMENT(S)	RECOMMENDED COURSE OF ACTION
FUNCTION PROBLEMS		
Major physical or electrical damage is evident when the sheet metal covers are removed.	1. Contact your local authorized Lincoln Electric Service Facility.	1. Contact the Lincoln Electric Service Department at 1-888-935-3877.
The Flex Feed 74 HT does not power-up. Unit appears to be “dead”.	1. Make sure the Flex Feed is receiving the correct input power (24 - 42 VAC). 2. The control cable may be loose or faulty. 3. Make sure the power source is functioning correctly.	1. Check the wiring between the 14 pin amphenol receptacle and the diode bridge. See the Wiring Diagram. 2. Perform the ***Diode Bridge Test***. 3. Perform the ***Analog Control Board Test***.
The wire feeds correctly but there is no shielding gas.	1. Make sure the gas supply is turned on. 2. Check the gas hose for damage or loose connections. 3. Make sure the gun is properly seated in the feeder.	1. Perform the ***Gas Solenoid Test***.
The wire feeds at the correct speed but there is no welding output.	1. Make sure the power source is functioning correctly. 2. If a gouging switch kit is installed make sure the selector switch is in the welding position. 3. Check for loose or faulty connections in the welding cables. 4. Check the welding gun for loose or broken connections.	1. Perform the ***Output Contactor Test***.

⚠ 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		
When the gun trigger is activated the drive rolls turn but there is no arc voltage present.	1. Make sure the power source is functioning correctly. 2. Check for loose or faulty weld cables. 3. Check the control cable for loose connections or internal damage. 4. Check the welding gun for loose or broken connections.	1. If the unit is equipped with an output contactor perform the ***Output Contactor Test***.
The wire continues to feed when the gun trigger is released.	1. Make sure the trigger interlock switch is in the “2-step” position. 2. Check to make sure the gun trigger is not stuck closed.	1. Check for shorted wires within the gun trigger assembly.
There is gas flow but the wire does not feed.	1. Check for restrictions in the wire feed path. 2. If the Advanced User Interface is installed, verify the preflow time has not been set to a high value.	1. Perform the ***Drive Motor and Tachometer Test***.

⚠ 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.

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TROUBLESHOOTING GUIDE

PROBLEMS (SYMPTOMS)	POSSIBLE AREAS OF MISADJUSTMENT(S)	RECOMMENDED COURSE OF ACTION
WIRE FEEDING AND WELDING PROBLEMS		
There is inconsistent wire feeding or the wire is not feeding. The drive rolls are turning.	1. Check for restrictions in the wire feeding path. 2. Check the gun liner and contact tip. 3. The electrode wire may be dirty or rusty. 4. The spindle brake may be too tight. 5. Check the pressure on the drive rolls.	1. Check the welding gun for kinks and restrictions. 2. Replace the drive rolls if necessary.
The wire feed speed consistently operates at the wrong value. The speed changes when the wire feed speed knob is adjusted.	1. The pinion gear jumper lead may be in the wrong position. 2. The wrong gear may be installed in the wire drive. 3. Make sure the correct wire speed decal is on the unit.	1. Perform the ***Drive Motor and Tachometer Test***.
The wire feed speed is stuck at 200 - 300 inches/minute. It does not change when the wire feed speed potentiometer is adjusted.	1. N/A.	1. Perform the ***Drive Motor and Tachometer Test***. 2. Perform the ***Wire Speed Potentiometer Test***.
Variable or “hunting” arc.	1. Make sure the power source is functioning correctly. 2. Check for restrictions in the wire feeding path. 3. Improper gas shielding. 4. Make sure the electrode polarity is correct for the process being used. 5. Check the welding cables for damaged or loose connections.	1. Perform the ***Drive Motor and Tachometer Test***. 2. Perform the ***Wire Speed Potentiometer Test***.
Poor arc starts with sticking or “blasts-offs”, weld porosity or narrow and ropy looking beads.	1. The procedure may be wrong for welding process.	1. See the Lincoln publication “Gas Metal Arc Welding Guide” (GS-100).

⚠ 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.

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CASE COVER REMOVAL AND REPLACEMENT PROCEDURE

⚠ WARNING

Service and repair should be performed only by 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

5/16” Nutdriver
3/4” Nutdriver
Wiring Diagram

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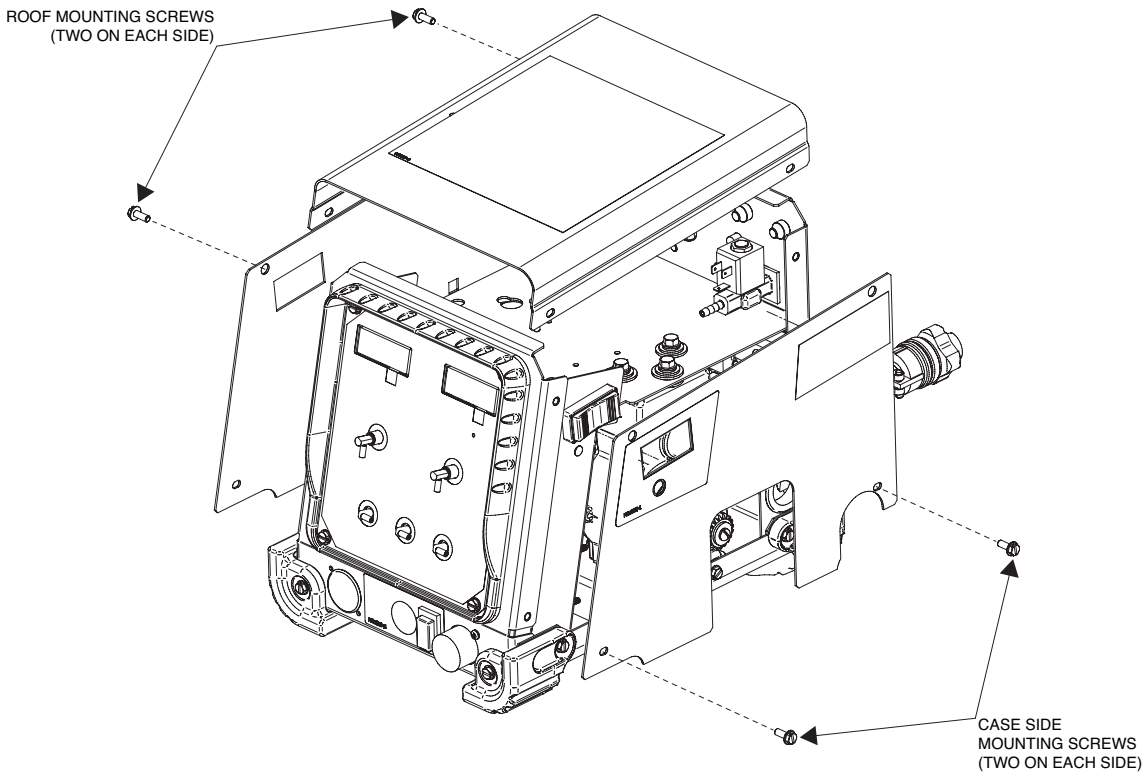
CASE COVER REMOVAL AND REPLACEMENT PROCEDURE *(continued)*

Figure F.1 – Roof and case side mounting crew locations



REMOVAL PROCEDURE

1. Remove the input power to the Flex Feed 74 HT.
2. Using a 5/16” nutdriver, remove the four screws securing the roof. See Figure F.1. Do not remove roof.
3. Carefully lift roof enough to gain access to the plugs attached to the analog control board.
4. Label and disconnect lead B2, Plugs J14, J1 and J3 from the analog control board. See ***Figure F.2***. See Wiring Diagram.
5. The roof can now be removed.
6. If necessary, perform the ***Analog Control Board Removal Procedure***.
7. Using a 5/16” nutdriver, remove the two screws securing the left case side to the machine. See Figure F.1.
8. Using a 3/4” nutdriver, remove the bolt securing the heavy black lead to the gouging stud. Note washer placement for reassembly. See ***Figure F.3***. See Wiring Diagram.
9. Using a 5/16” nutdriver, remove the two screws securing the right case side. See Figure F.1.

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CASE COVER REMOVAL AND REPLACEMENT PROCEDURE *(continued)*

Figure F.2 – Analog control board leads

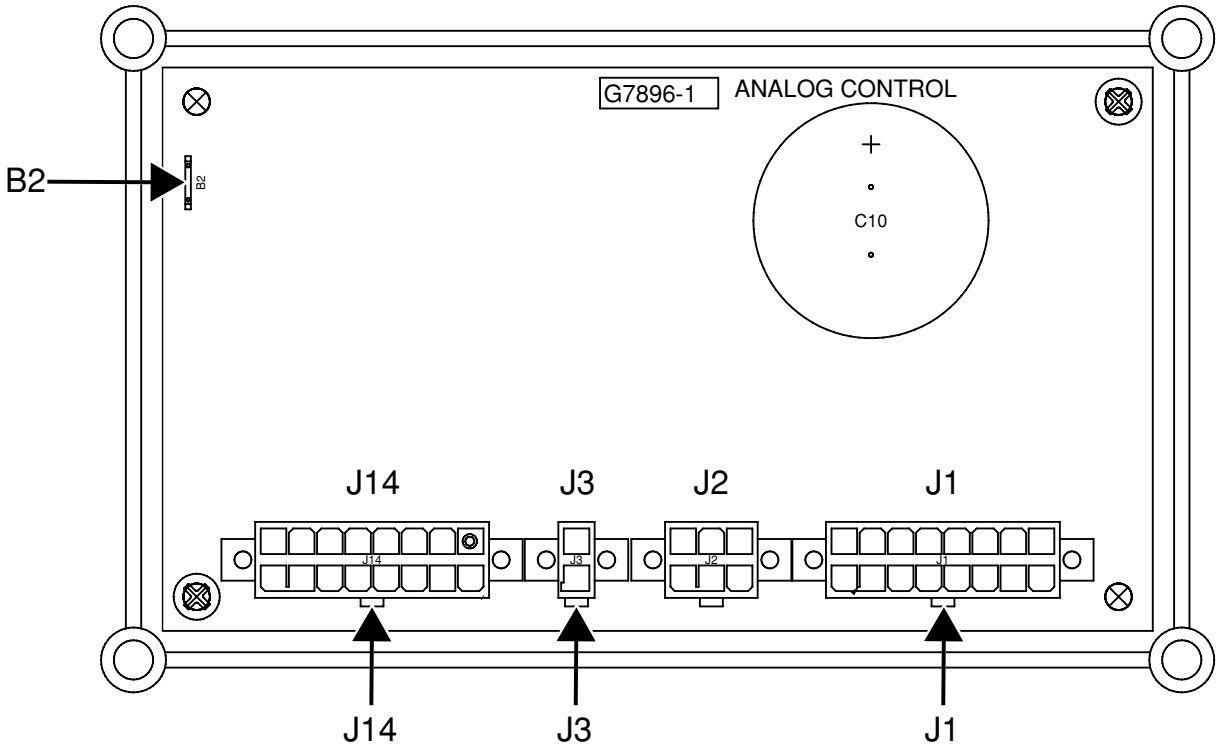
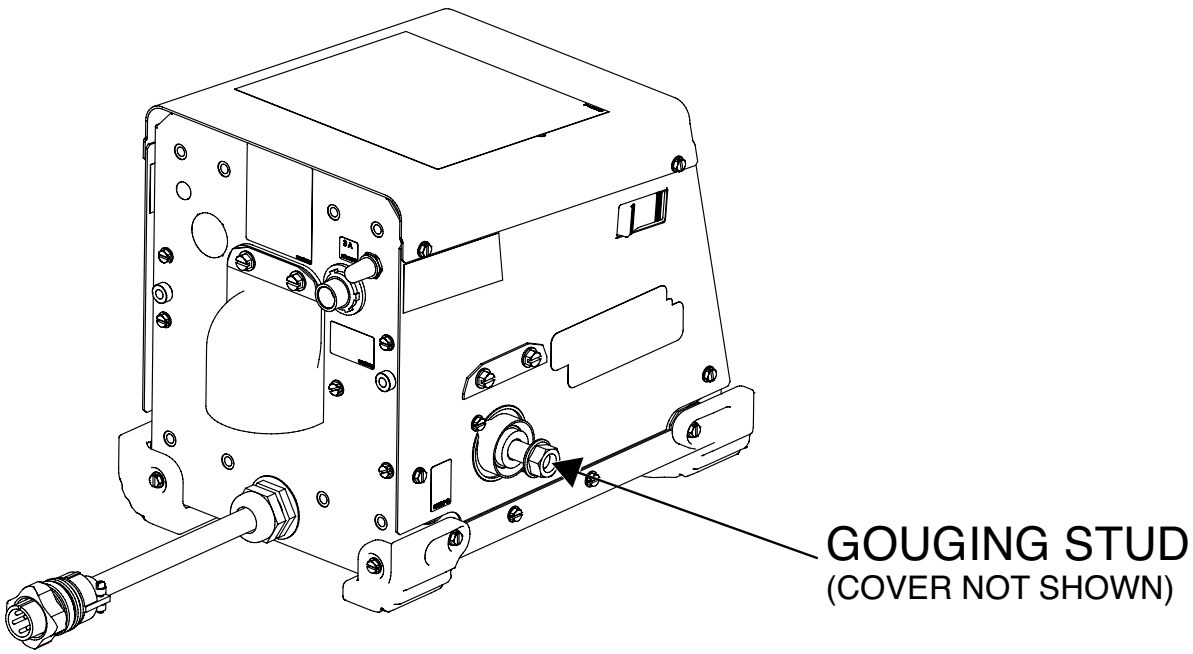


Figure F.3 – Gouging stud location



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CASE COVER REMOVAL AND REPLACEMENT PROCEDURE *(continued)*

REMOVAL PROCEDURE

1. Using a 5/16” nutdriver, attach the two screws securing the right case side.
2. Using a 3/4” nutdriver, attach the bolt securing the heavy black lead to the gouging stud. See Wiring Diagram.
3. Using a 5/16” nutdriver, attach the two screws securing the left case side to the machine.
4. If necessary, perform the ***Analog Control Board Replacement Procedure***.
5. Carefully position roof over machine.
6. Connect lead B2, plugs J14, J1 and J3 to the analog control board. See Wiring Diagram.
7. Using a 5/16” nutdriver, attach the four screws securing the roof.

DRIVE MOTOR AND TACH FEEDBACK TEST

⚠ WARNING

Service and repair should be performed only by 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 help determine if the Wire Drive Motor is receiving the correct voltage and is capable of running properly. It will also determine if the Tach Sensor is receiving the correct input from the Analog Control Board and is sending back the correct signal.

MATERIALS NEEDED

32 VDC @ 1 Amp Variable Power Source
Volt/Ohmmeter
Wiring Diagram

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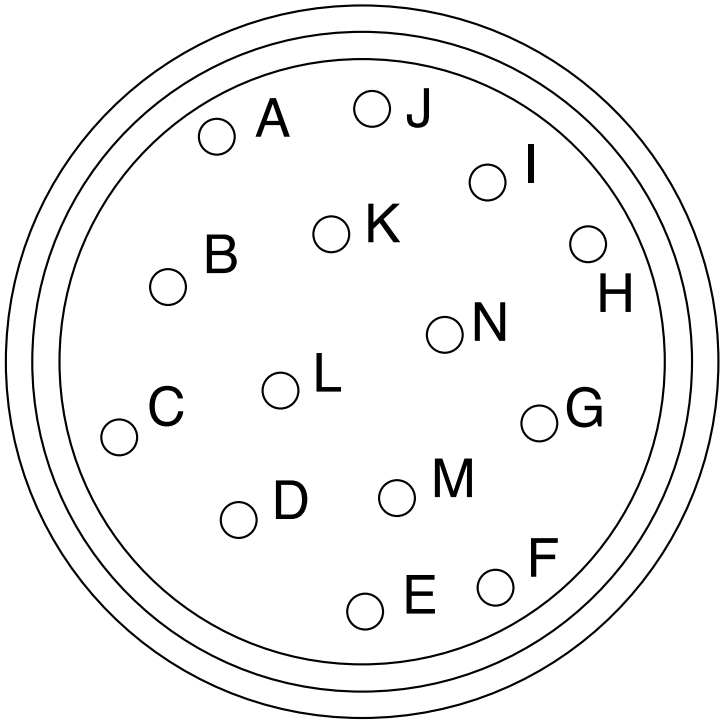
DRIVE MOTOR AND TACH FEEDBACK TEST *(continued)*

Figure F.4 – 14 pin connection cable



PROCEDURE

1. Remove the input power from the Flex Feed 74 HT.
2. Perform the ***Case Cover Removal Procedure***.

NOTE: Make certain that the four plugs (J1, J3, J4 and B2) are connected to the analog control board before performing this test.

3. Locate motor and tach leads on the left side of the machine. See Wiring Diagram.
4. Apply input voltage (42VAC) to the unit via pins I and K on the 14 pin connection cable. See Figure F.4.
5. With the trigger activated and the motor running check for 1 VDC min. (210 HZ) to 31 VDC (1.75 KHZ) max., between the black (-) and white (+) motor leads (pins 7 & 8). See ***Figure F.5***. See Wiring Diagram.
6. Remove input power and disconnect plug P18. Check for 1 and 2 ohms of resistance between the black and white motor armature leads. Also make sure there is at least 500k ohms of resistance between the armature leads and the motor shell. See Wiring Diagram.
7. With the trigger activated and the motor running check for 5 VDC input on the black and red tach leads. Check for .7 VDC to .85 VDC on the black and blue return leads. See ***Figure F.5***.
8. For further testing of the drive motor you can use an isolated power source and apply between 1 and 31 VDC to the black and white motor leads.
9. If the armature voltage is not present (step 5) and the motor operates normally when an isolated power source is applied analog control board may be faulty.
10. Connect any previously disconnected leads and plugs.
11. Perform the ***Case Cover Replacement Procedure***.

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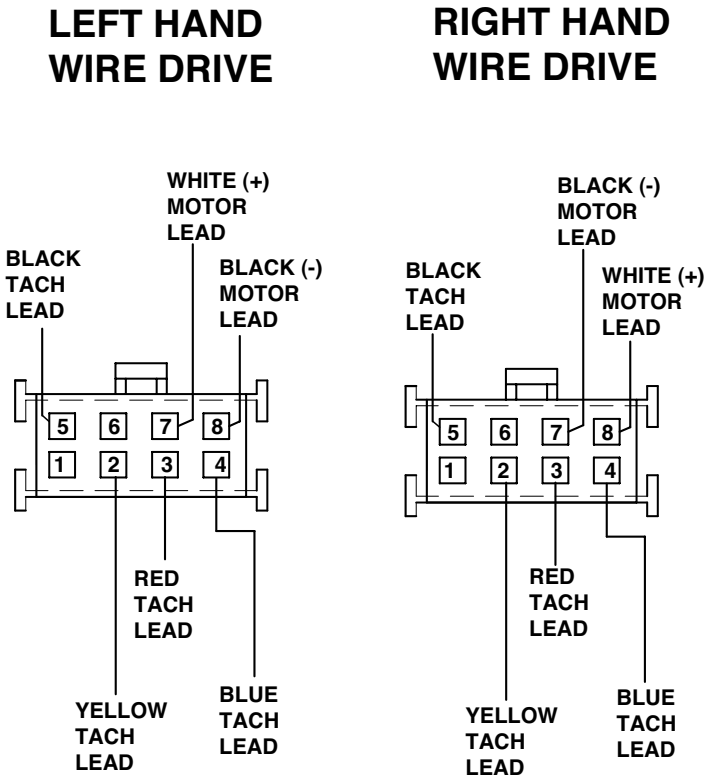
DRIVE MOTOR AND TACH FEEDBACK TEST *(continued)*

Figure F.5 – Tach lead location



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OPTIONAL OUTPUT CONTACTOR TESTS (ELECTRODE TO FEEDPLATE AND GOUGING OUTPUT TERMINAL)

⚠ WARNING

Service and repair should be performed only by 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 help determine if the Contactor Coils are receiving the correct DC voltage and if the Contacts are closing and opening.

MATERIALS NEEDED

Volt/Ohmmeter
Wiring Diagram
42 VAC Supply

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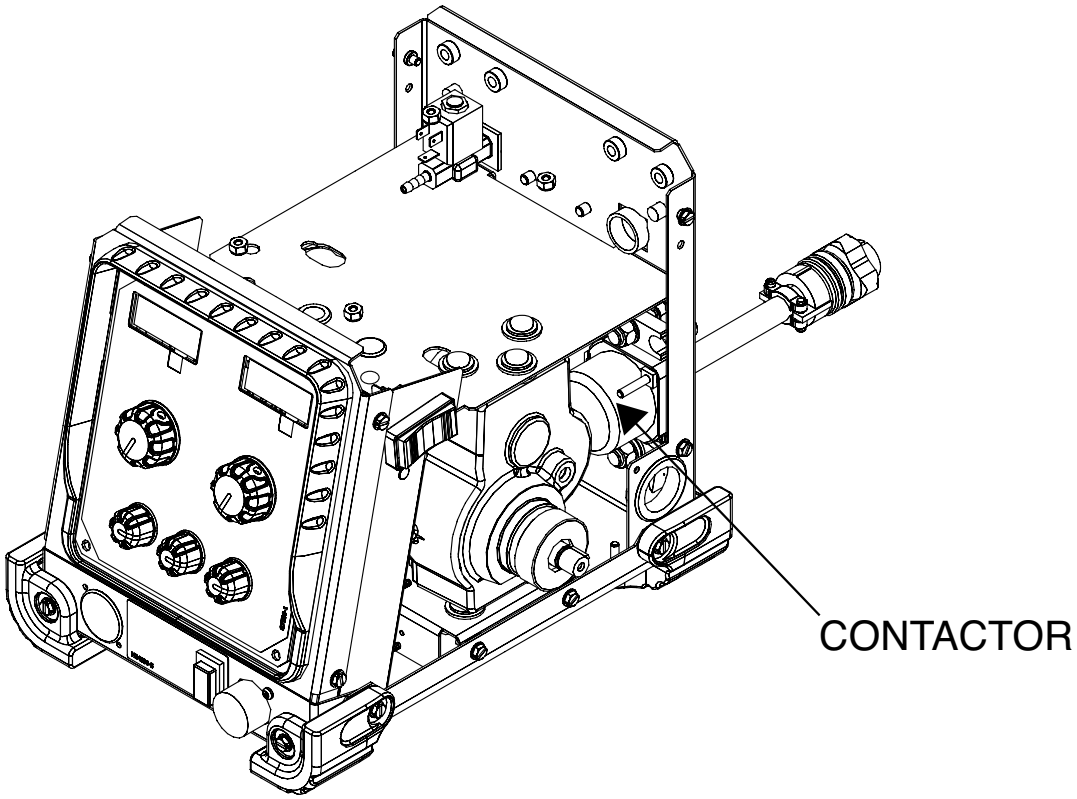
OPTIONAL OUTPUT CONTACTOR TESTS (ELECTRODE TO FEEDPLATE AND GOUGING OUTPUT TERMINAL) *(continued)*

Figure F.6 – Contactor location



PROCEDURE

1. Remove the input power from the Flex Feed 74 HT.
2. Perform the ***Case Cover Removal Procedure***.
3. Locate the contactor to be tested (electrode to feedplate or gouging to terminal). See Figure F.6.
4. Locate the red and black contactor coil leads. See ***Figure F.7***. See Wiring Diagram.
5. Disconnect the red and black leads from the harness at the spade connections.
6. Check the contactor coil resistance. Normal is approximately 80 ohms. Reconnect the red and black contactor coil leads.
7. Carefully apply the correct input power (24 - 42 VAC) to the Flex Feed 74 HT. With the contactor energized, there should be approximately 1.0 VDC at the red and black leads. If 60 VDC is measured the contactor coil is open.
8. If the voltage is not present, check the associated leads and the CR1 relay. See the Wiring Diagram.
9. If the contactor does not activate with the correct DC voltage applied, the contactor may be faulty.
10. With the contactor activated there should be less than one ohm of resistance across the contactor terminals. See Wiring Diagram.
11. When the contactor is not activated, there should be very high resistance across the contactor terminals - more than 500,000 ohms.
12. Reconnect all previously removed leads.
13. Perform the ***Case Cover Replacement Procedure***.

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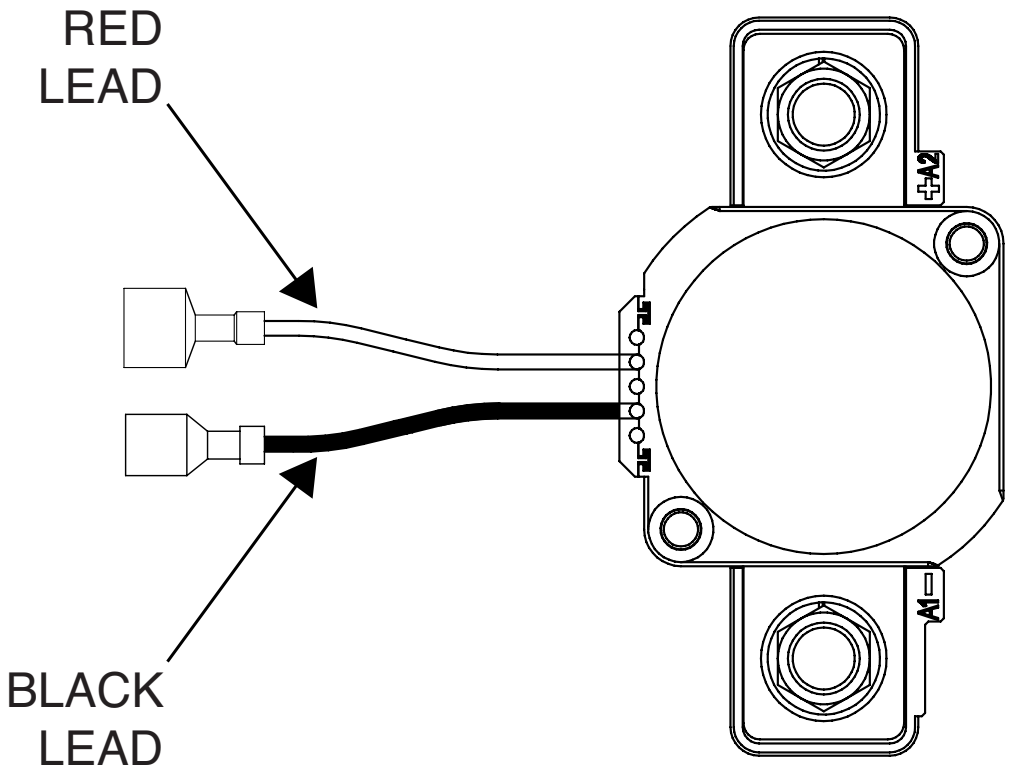
OPTIONAL OUTPUT CONTACTOR TESTS (ELECTRODE TO FEEDPLATE AND GOUGING OUTPUT TERMINAL) *(continued)*

Figure F.7 – Red and black contactor leads



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GAS SOLENOID TEST

⚠ WARNING

Service and repair should be performed only by 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 Gas Solenoid is receiving the correct voltage and if the Solenoid is functional.

MATERIALS NEEDED

5/16” Nutdriver
12 VDC @ 1 Amp Power Source
Volt/Ohmmeter
42 VAC Power Supply

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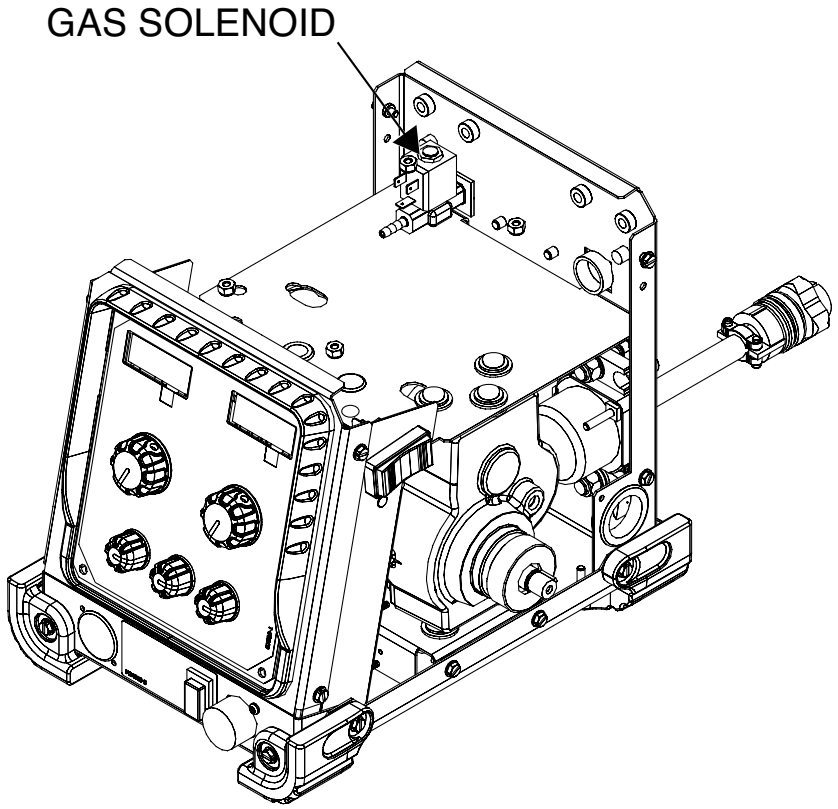
GAS SOLENOID TEST *(continued)*

Figure F.8 – Gas solenoid



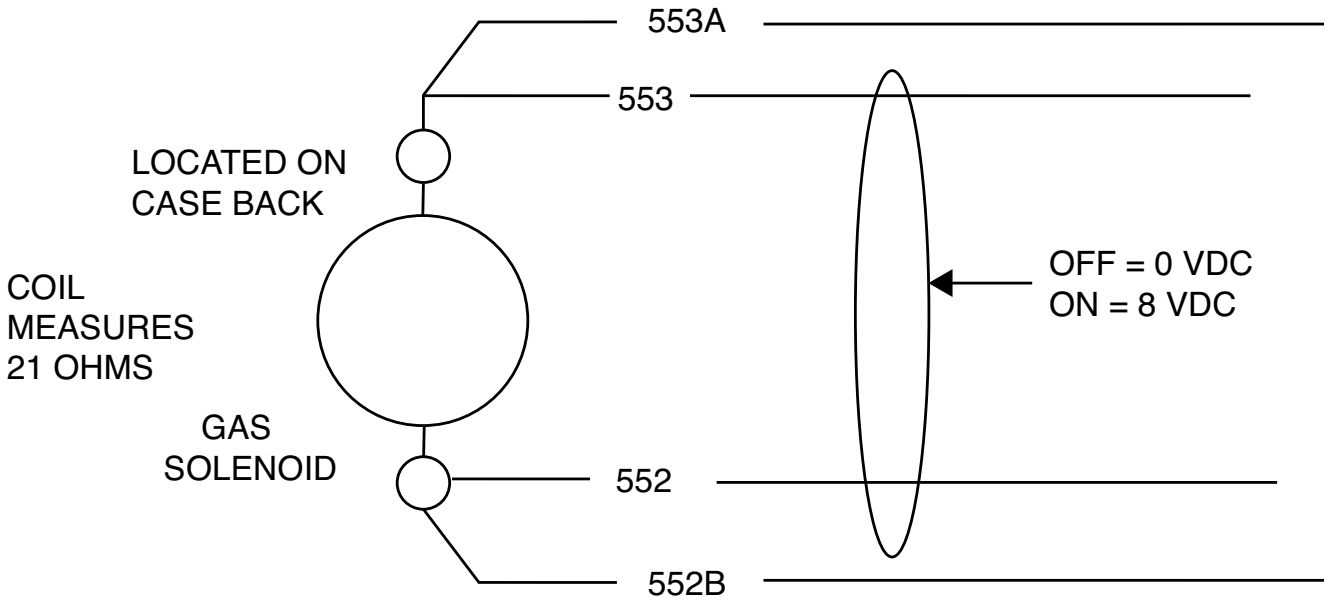
PROCEDURE

1. Remove the input power from the Flex Feed 74 HT.
2. Perform the ***Case Cover Removal Procedure***.
3. Locate the gas solenoid on the back of the machine. See Figure F.8.
4. Apply the correct (42 VAC) input voltage to the unit at the 14 pin connector. See Wiring Diagram.
5. While pressing the gas purge button or activating the gun trigger, check for approximately 8 VDC at the solenoid leads. See ***Figure F.9***. If the 8 VDC is present the solenoid should activate. If the 8 VDC is present but the solenoid does not activate the solenoid may be faulty.
6. If the 8 VDC is missing or low, check the leads and connections between the solenoid and the analog control board. See the Wiring Diagram. If the leads and connections are OK, the analog control board may be faulty.
7. Normal solenoid coil resistance is 21 ohms.
8. The solenoid can be further checked by disconnecting the leads and applying 12 VDC directly to the terminals. If the solenoid does not activate the solenoid is faulty.
9. When testing is complete, connect any previously disconnected leads.
10. Perform the ***Case Cover Replacement Procedure***.

Return to Section TOC
Return to Master TOC

GAS SOLENOID TEST *(continued)*

Figure F.9 – Leads 552, 552B, 553 and 553A



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DIODE BRIDGE TEST

⚠ WARNING

Service and repair should be performed only by 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

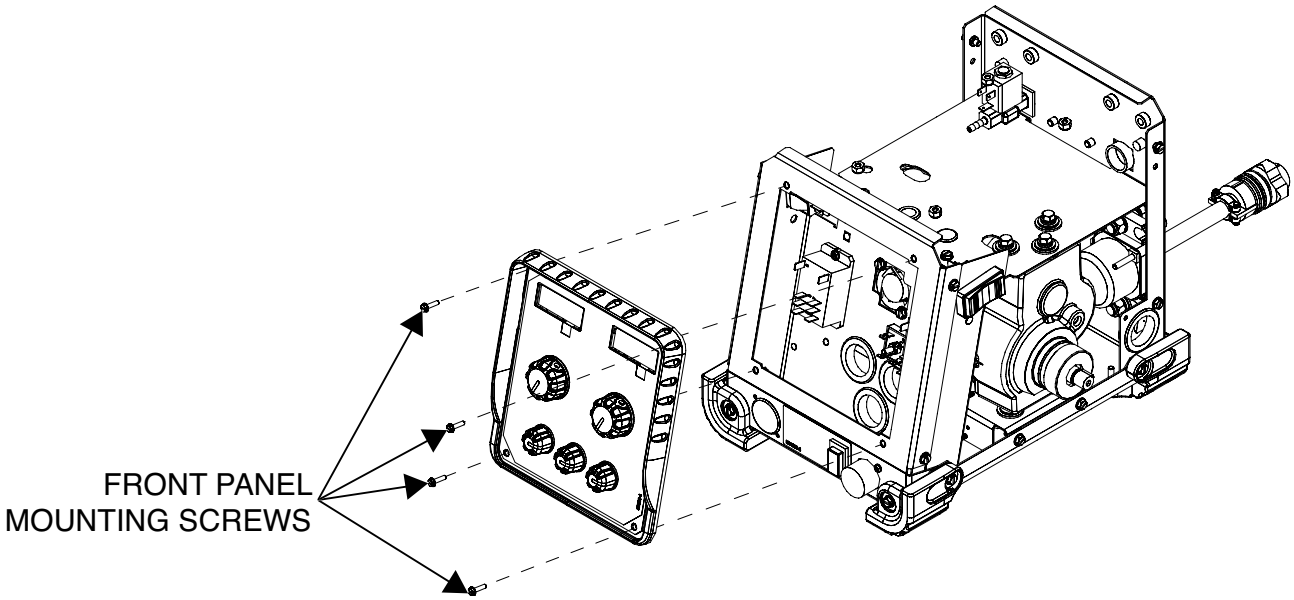
This test will help determine if the Diode Bridge is receiving the AC input voltage and is converting it to the correct DC output voltage.

MATERIALS NEEDED

5/16” Nutdriver
42 VAC Power Supply
Volt/Ohmmeter

DIODE BRIDGE TEST *(continued)*

Figure F.10 – Front panel removal



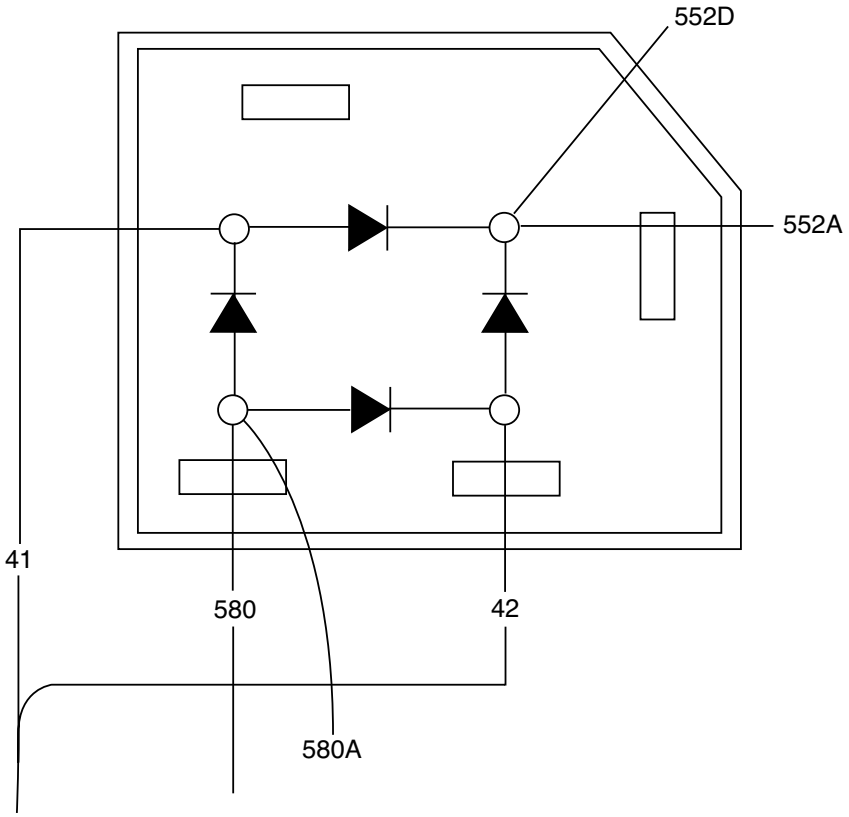
PROCEDURE

1. Remove the input power from the Flex Feed 74 HT.
2. Using a 5/16” nutdriver, remove the four screws securing the front cover. See Figure F.10.
3. Apply the correct input voltage (42 VAC) to the Flex Feed 74 HT at the 14 pin connection. See Wiring Diagram.
4. Check for the correct input voltage (42 VAC) at leads 41 and 42 on the bridge. If the input voltage is not present, check the wiring between the input connector and the diode bridge. See ***Figure F.11***. See Wiring Diagram.
5. Check for the proper output on leads 580 (negative) and 552 (positive). The voltage should be 59 VDC. If you are only reading 38 VDC leads (552A or 580) may be open between the analog control board and the diode bridge. See ***Figure F.11***. See Wiring Diagram. If the wiring is OK, the analog control board may be faulty. Check the wiring and the connections back to your analog control board.
6. Connect any previously removed leads and plugs.
7. Using a 5/16” nutdriver, attach the four screws securing the front cover to the machine.

Return to Section TOC
Return to Master TOC

DIODE BRIDGE TEST *(continued)*

Figure F.11 – Diode test point locations



Return to Section TOC
Return to Master TOC

WIRE SPEED POTENTIOMETER TEST

⚠ WARNING

Service and repair should be performed only by 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 help determine if the Wire Speed Potentiometer is receiving and sending the correct voltages.

MATERIALS NEEDED

5/16” Nutdriver
42 VAC Power Supply
Volt/Ohmmeter

Return to Section TOC
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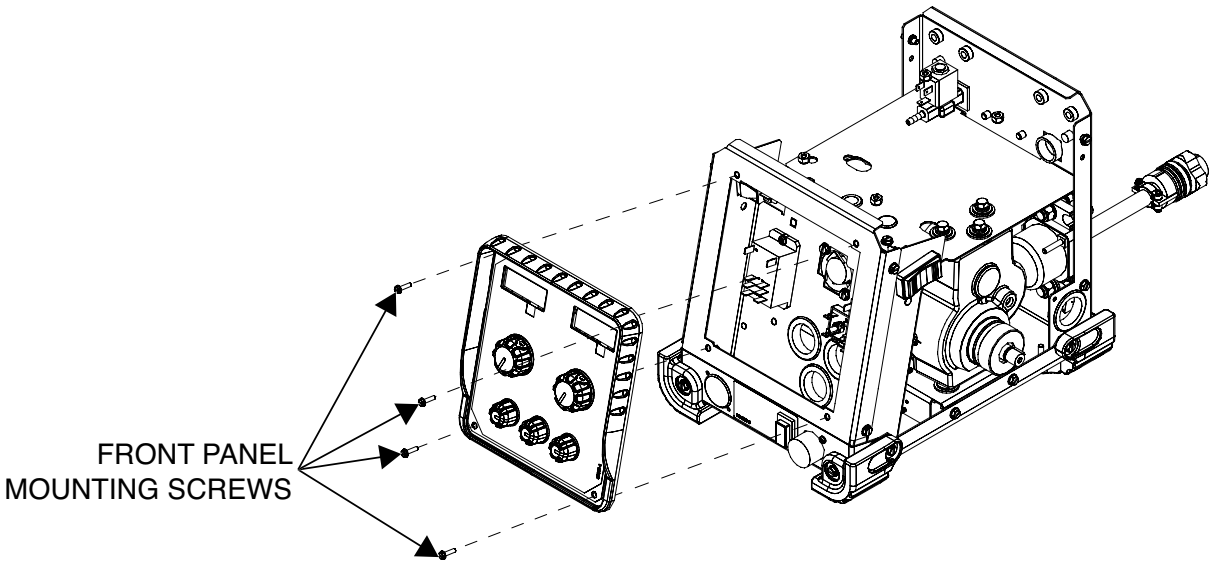
WIRE SPEED POTENTIOMETER TEST *(continued)*

Figure F.12 – Front panel removal



PROCEDURE

1. Remove the input power from the Flex Feed 74 HT.
2. Using a 5/16” nutdriver, remove the four screws securing the front cover. See Figure F.12.
3. Apply the correct input voltage (42 VAC) to the Flex Feed 74 HT at the 14 pin connection. See Wiring Diagram.
4. Locate the P7 plug to the potentiometer. See ***Figure F.13***. See Wiring Diagram.
5. Check for 0 VDC minimum to 5 VDC maximum between wires 575A and 576A as the wire speed potentiometer is rotated. If the voltage is not there, check the leads for continuity back to the analog control board. See ***Figure F.13***. If the leads are OK, the analog control board may be faulty.
6. The potentiometer can also be checked by disconnecting P7 and checking for 0 to 10k ohms between leads 575A and 576A (as potentiometer is rotated). See ***Figure F.14***. See Wiring Diagram.
7. When testing is complete, connect all previously removed plugs.
8. Using a 5/16” nutdriver, attach the four screws securing the front cover.

Return to Section TOC
Return to Master TOC

WIRE SPEED POTENTIOMETER TEST *(continued)*

Figure F.13 – Plug P7

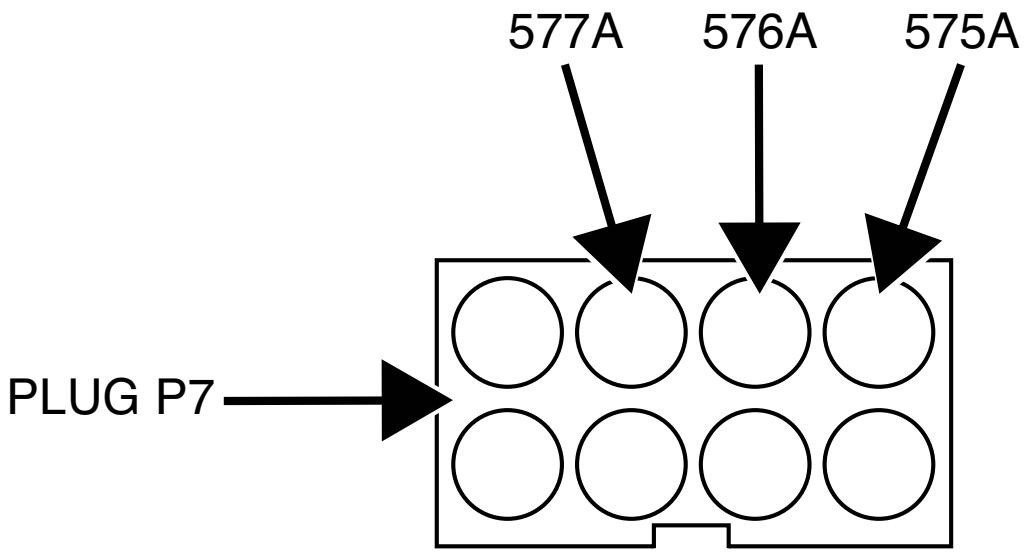
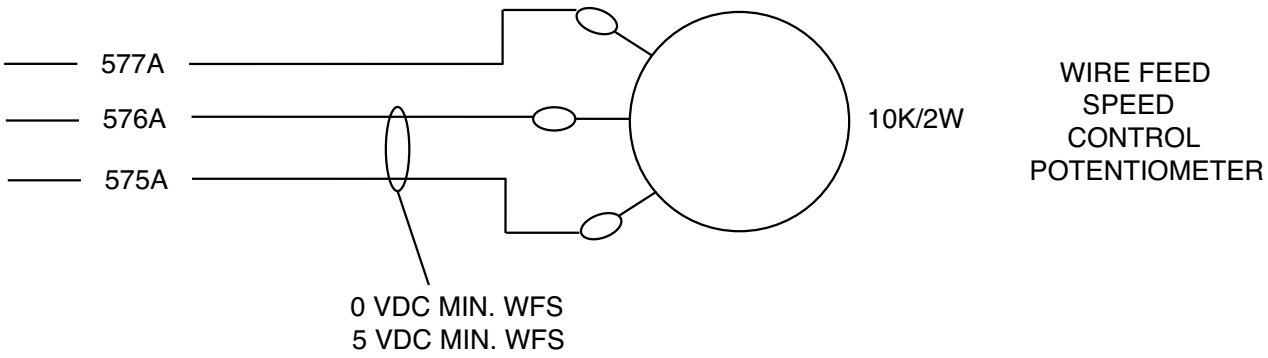


Figure F.14 – Leads



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ANALOG CONTROL BOARD TEST

⚠ WARNING

Service and repair should be performed only by 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 Analog Control Board is receiving the correct input voltages and developing the correct output voltages. It will not test all of the functionalities of the Analog Control Board.

MATERIALS NEEDED

Wiring Diagram
Volt/Ohmmeter

Return to Section TOC
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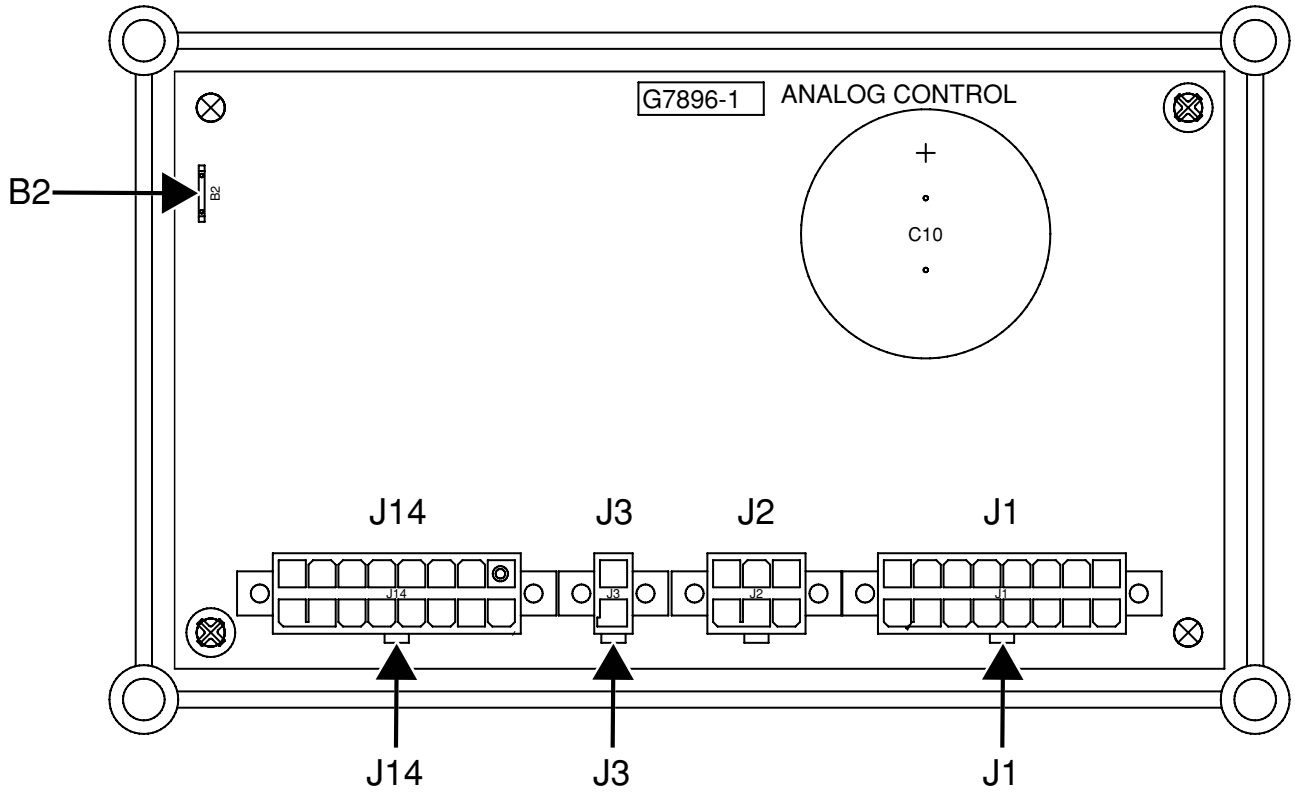
ANALOG CONTROL BOARD TEST *(continued)*

Figure F.15 – Analog control board lead and plug locations



PROCEDURE

1. Remove the input power from the Flex Feed 74 HT.
2. Perform the ***Case Cover Removal Procedure***.
3. Perform the ***Analog Control Board Removal Procedure***.
4. Position the analog control board on machine so it is electrically isolated.
5. Connect lead B2, plugs J14, J1 and J3 to the analog control board. See Figure F.15. See Wiring Diagram.
6. Carefully apply the correct input power (42 VAC) to the 14 pin input connection. See Wiring Diagram.
7. Carefully check for the input and output voltages per ***Table F.1***. See ***Figure F.16***. See Wiring Diagram.
8. If the correct input voltage is applied to the analog control board and any of the developed voltages are not present the analog control board may be faulty.
9. Perform the ***Analog Control Board Replacement Procedure***.
10. Perform the ***Case Cover Replacement Procedure***.

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ANALOG CONTROL BOARD TEST *(continued)*

Figure F.16 – Analog control board test point locations

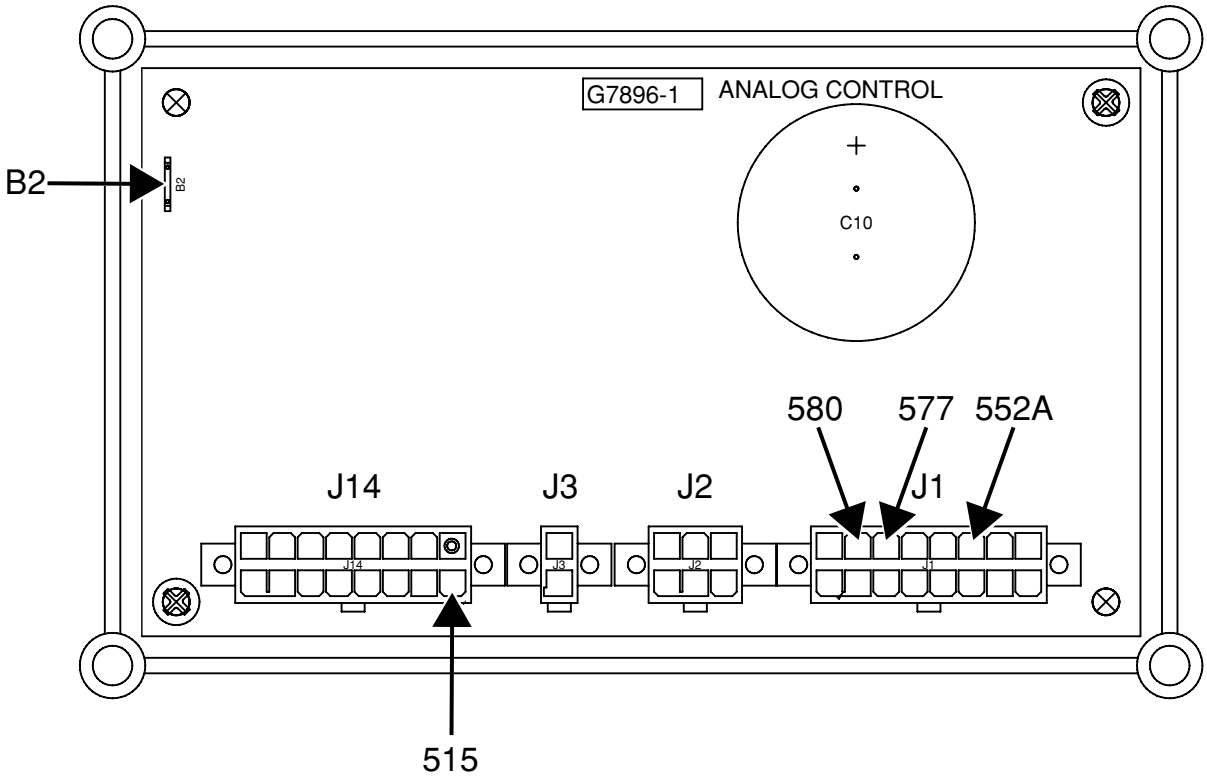

Table F.1 – Analog control board test points

DESCRIPTION	TEST POINT (+)	TEST POINT (-)	EXPECTED READING	CONDITIONS
INPUT TO ANALOG CONTROL BOARD	PLUG J1 PIN 6 (LEAD 552A)	PLUG J1 PIN 2 (LEAD 580)	60 VDC	42 VAC APPLIED TO FLEX FEED 74 HT
+5VDC SUPPLY	PLUG J1 PIN 3 (LEAD 557)	PLUG J1 PIN 2 (LEAD 580)	5 VDC	24-42 VAC APPLIED TO FLEX FEED 74 HT
+15 VDC SUPPLY	PLUG J14 PIN 16 (LEAD 515)	PLUG J1 PIN 2 (LEAD 580)	+15 VDC	24-42 VAC APPLIED TO FLEX FEED 74 HT
-15 VDC	TERMINAL B2 (LEAD B2)	PLUG J1 PIN 2 (LEAD 580)	-15 VDC	24-42 VAC APPLIED TO FLEX FEED 74 HT

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ANALOG CONTROL BOARD
REMOVAL AND REPLACEMENT PROCEDURE

⚠ WARNING

Service and repair should be performed only by 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 Analog Control Board.

MATERIALS NEEDED

5/16” Nutdriver
3/8” Nutdriver
Anti-Static Strap

Return to Section TOC
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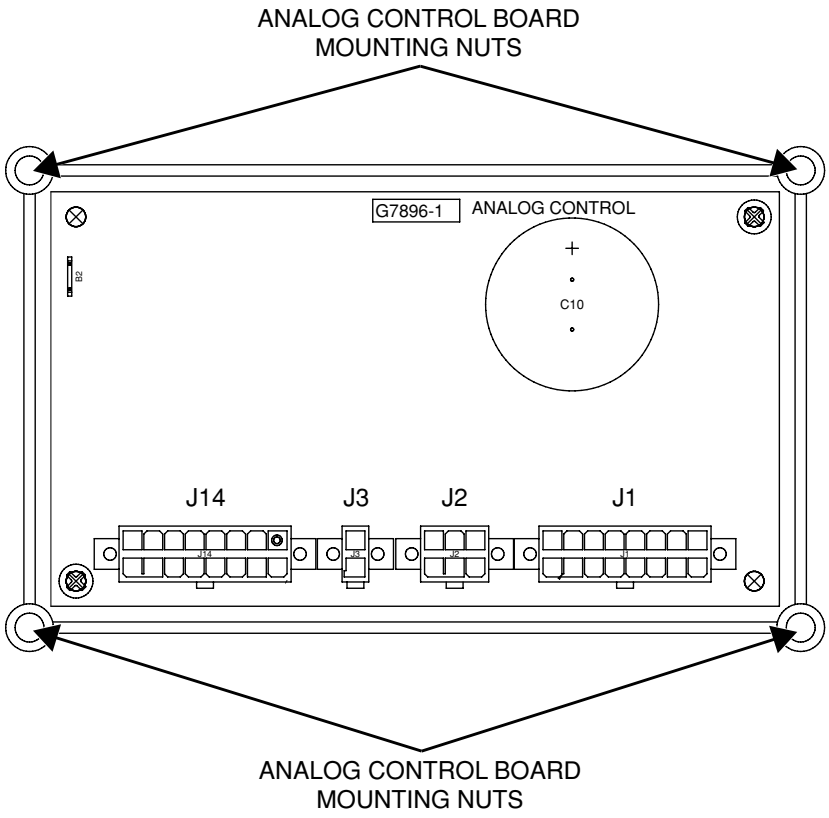
ANALOG CONTROL BOARD
REMOVAL AND REPLACEMENT PROCEDURE *(continued)*

Figure F.17 – Analog control board mounting nut locations



REMOVAL PROCEDURE

1. Remove the input power from the Flex Feed 74 HT.
2. Perform the ***Case Cover Removal Procedure***.
3. Using a 3/8" nutdriver, remove the four nuts securing the analog control board to the roof (must use anti-static strap). See Figure F.17.
4. Replace the analog control board.

Return to Section TOC
Return to Master TOC

ANALOG CONTROL BOARD
REMOVAL AND REPLACEMENT PROCEDURE *(continued)*

REPLACEMENT PROCEDURE

1. Carefully place new board in to position on the roof.
2. Using a 3/8” nutdriver, attach the four nuts securing the analog control board to the roof (must use anti-static strap).
3. Perform the ***Case Cover Replacement Procedure***.

Return to Section TOC
Return to Master TOC

GAS SOLENOID
REMOVAL AND REPLACEMENT PROCEDURE

⚠ WARNING

Service and repair should be performed only by 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 Gas Solenoid.

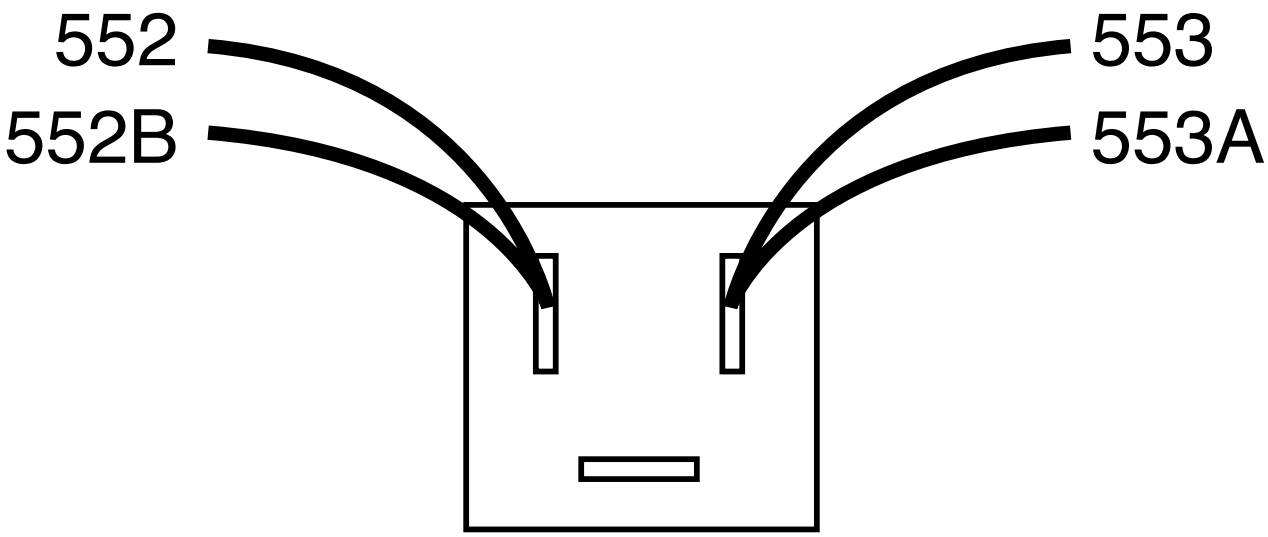
MATERIALS NEEDED

Wiring Diagram
Slotted Screwdriver
Hammer
Needlenose Pliers

GAS SOLENOID

REMOVAL AND REPLACEMENT PROCEDURE *(continued)*

Figure F.18 – Gas solenoid leads



REMOVAL PROCEDURE

1. Remove the input power from the Flex Feed 74 HT.
2. Perform the ***Case Cover Removal Procedure***.
3. Label and disconnect leads 553, 553A, 552 and 552B from the rear of the gas solenoid. See Figure F.18. See Wiring Diagram.
4. Using a slotted screwdriver and a hammer, loosen the nut securing the gas solenoid to the rear panel of the machine. Note washer placement for reassembly. See ***Figure F.19***.
5. Using needlenose pliers, loosen the hoseclamp securing the gas hose to the gas solenoid. See ***Figure F.19***.
6. Replace the gas solenoid.

Return to Section TOC
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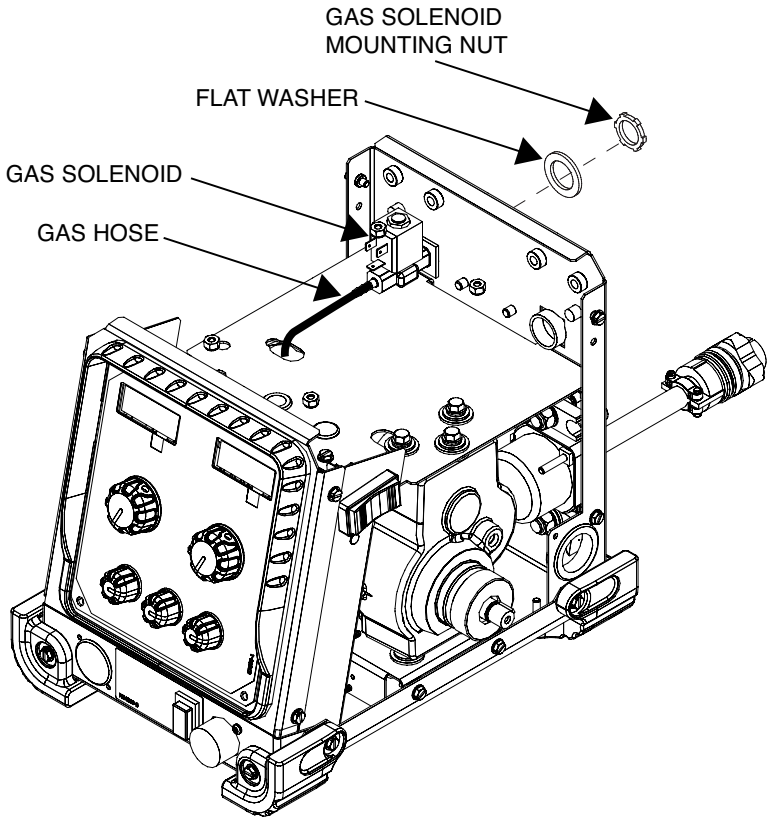
GAS SOLENOID

REMOVAL AND REPLACEMENT PROCEDURE *(continued)*

Figure F.19 – Gas solenoid removal



REPLACEMENT PROCEDURE

1. Using needlenose pliers, tighten the hoseclamp securing the gas hose to the gas solenoid.
2. Carefully position gas solenoid in to rear panel.
3. Using a slotted screwdriver and a hammer, tighten the nut and washer securing the gas solenoid to the rear panel of the machine.
4. Connect leads 553, 553A, 552 and 552B to the rear of the gas solenoid. See Wiring Diagram.
5. Perform ***Case Cover Replacement Procedure***.

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OPTIONAL OUTPUT CONTACTOR REMOVAL AND REPLACEMENT PROCEDURE

⚠ WARNING

Service and repair should be performed only by 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 Optional Output Contactor.

MATERIALS NEEDED

5/16” Nutdriver
7/16” Nutdriver
3/4” Nutdriver
11/16” Nutdriver
Wiring Diagram

Return to Section TOC
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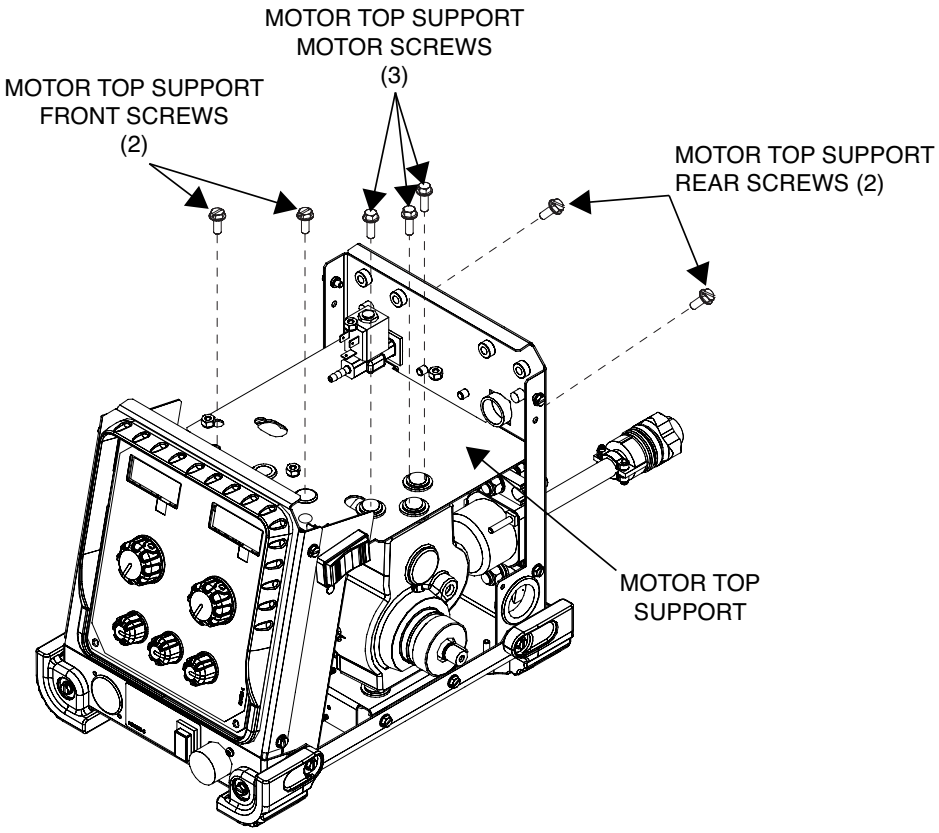
OPTIONAL OUTPUT CONTACTOR
REMOVAL AND REPLACEMENT PROCEDURE *(continued)*

Figure F.20 – Motor top support removal



REMOVAL PROCEDURE

1. Remove the input power from the Flex Feed 74 HT.
2. Perform the ***Case Cover Removal Procedure***.
3. Perform the ***Gas Solenoid Removal Procedure***.
4. Using a 5/16” nutdriver, remove the two screws securing the front of the motor top support. See Figure F.20.
5. Using a 5/16” nutdriver, remove the two screws securing the motor top support to the rear panel. See Figure F.20.
6. Using a 7/16” nutdriver, remove the three bolts securing the motor top support to the motor. See Figure F.20.
7. The motor top support can now be removed to gain access to the contactors.
8. Using a 3/4” nutdriver, remove the bolt from the center of the bus bar. Note washer placement for reassembly. See ***Figure F.21***.
9. Label and disconnect plug J11 from the current transducer. See ***Figure F.21***. See Wiring Diagram.
10. Using a 11/16” nutdriver, remove the nut and associated washer attached to the top post of each contactor. Note washer placement for reassembly. See ***Figure F.21***.
11. Using a 11/16” nutdriver, remove the nut and washer securing the heavy black lead to the bottom post of each contactor. Note washer placement for reassembly. See ***Figure F.21***.
12. Label and disconnect red and black leads from contactor. See ***Figure F.22***. See Wiring Diagram.
13. Using a 5/16” nutdriver, remove the two bolts and washers securing contactor to rear panel while holding square nut in place. See ***Figure F.23***.
14. The contactor can now be removed.

Return to Section TOC
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Return to Section TOC
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OPTIONAL OUTPUT CONTACTOR
REMOVAL AND REPLACEMENT PROCEDURE *(continued)*

Figure F.21 – Contactor mounting screws and bolts

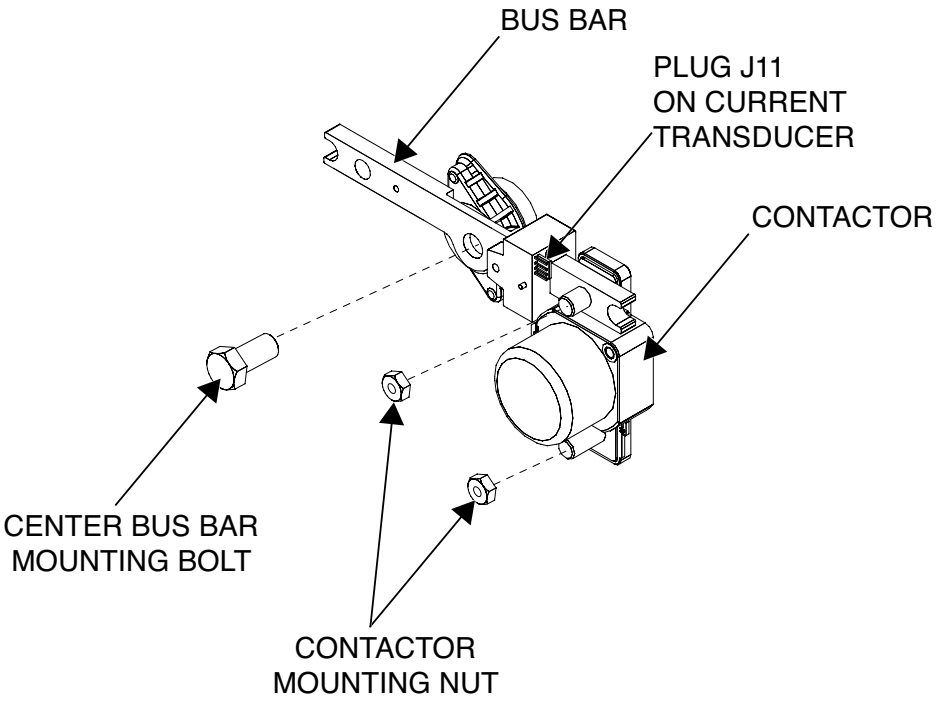
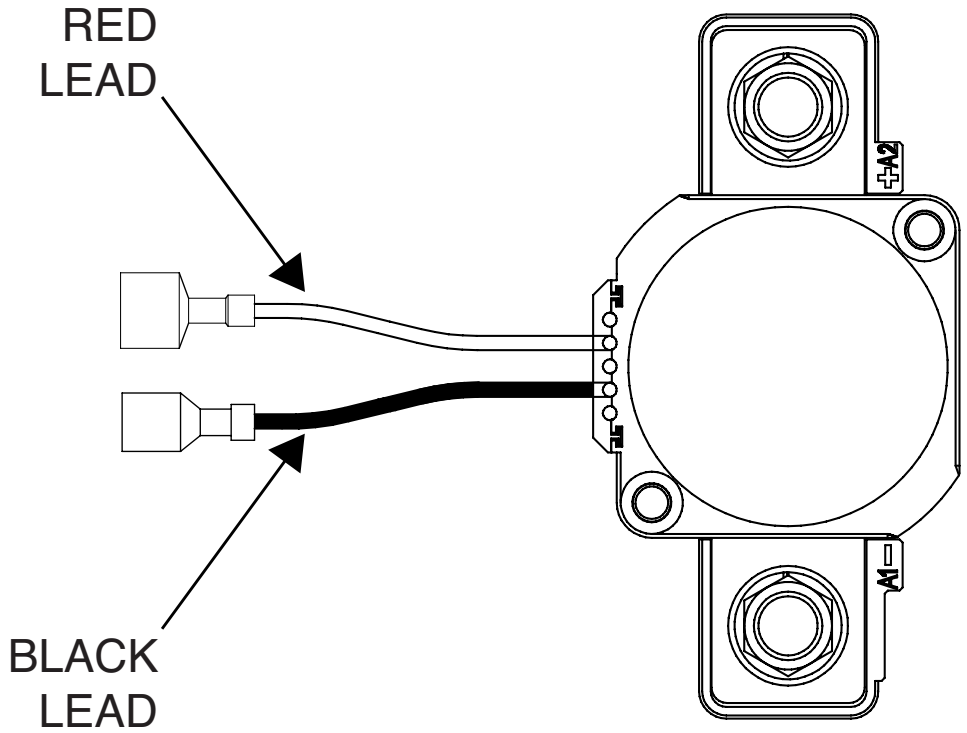
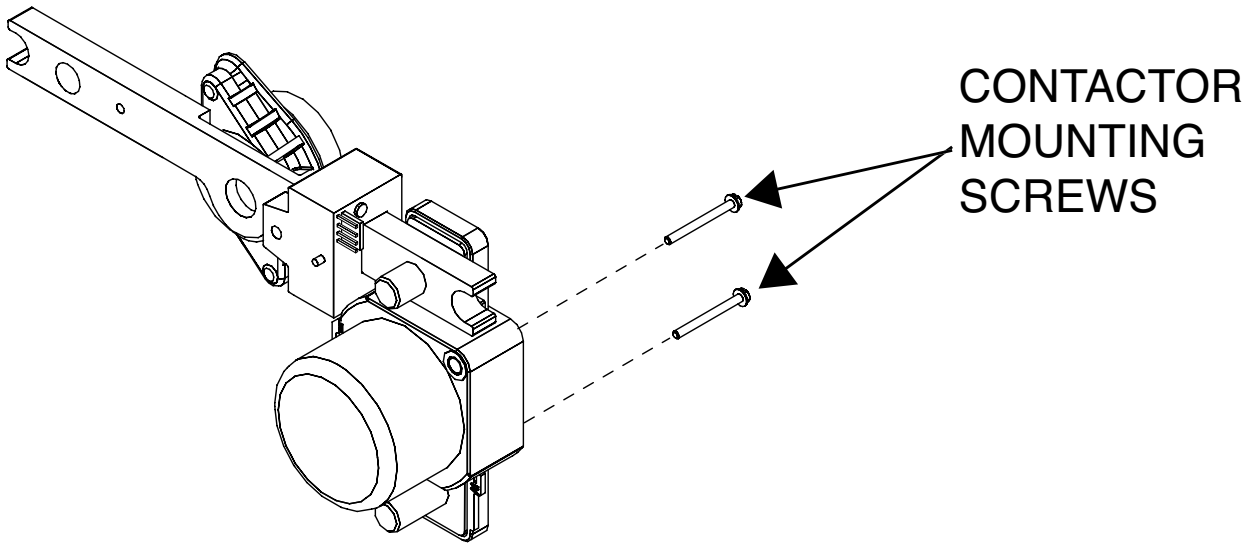


Figure F.22 – Contactor leads



OPTIONAL OUTPUT CONTACTOR
REMOVAL AND REPLACEMENT PROCEDURE *(continued)*

Figure F.23 – Contactor mounting screws



REPLACEMENT PROCEDURE

1. Carefully position the new contactor on the rear panel of the machine.
2. Using a 5/16” nutdriver, while holding the square nut in place attach the two bolts and washers securing the contactor to rear panel.
3. Connect the red and black leads to the contactor. See Wiring Diagram.
4. Using a 11/16” nutdriver, attach the nut and washer securing the heavy black lead to the bottom post of each contactor.
5. Using a 11/16” nutdriver, attach the nut and associated washer attached to the top post of each contactor.
6. Connect plug J11 to the current transducer. See Wiring Diagram.
7. Using a 3/4” nutdriver, attach the bolt and washer to the center of the bus bar.
8. Carefully position the motor top support in the machine.
9. Using a 7/16” nutdriver, attach the three bolts securing the motor top support to the motor.
10. Using a 5/16” nutdriver, attach the two screws securing the motor top support to the rear panel.
11. Using a 5/16” nutdriver, attach the two screws securing the front of the motor top support.
12. Perform the ***Gas Solenoid Replacement Procedure***.
13. Perform the ***Case Cover Replacement Procedure***.

Return to Section TOC
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DRIVE MOTOR AND GEAR BOX REMOVAL AND REPLACEMENT PROCEDURE

⚠ WARNING

Service and repair should be performed only by 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 Drive Motor And Gear Box.

MATERIALS NEEDED

5/16” Nutdriver
7/16” Nutdriver
3/4” Nutdriver
Phillips Screwdriver
Pliers
1/8” Hex Head Key
1/4” Hex Head Key
11/16” Nutdriver
Wiring Diagram

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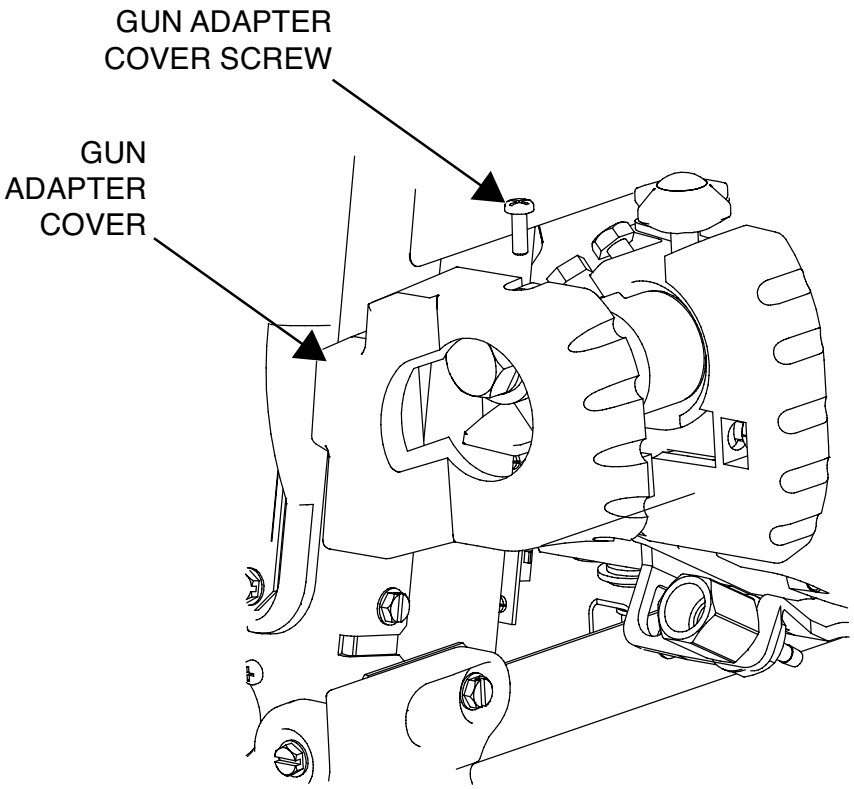
DRIVE MOTOR AND GEAR BOX
REMOVAL AND REPLACEMENT PROCEDURE *(continued)*

Figure F.24 – Gun adapter cover removal



REMOVAL PROCEDURE

1. Remove the input power from the Flex Feed 74 HT.
2. Perform the ***Case Cover Removal Procedure***.
3. Using a phillips screwdriver, loosen the screw securing the gun adapter cover. Note washer placement for reassembly. See Figure F.24.
4. Using a 3/4" nutdriver, remove the bolt securing the heavy black electrode lead to the gun adapter. Note washer placement for reassembly. See ***Figure F.25***.
5. If a gas hose is attached to the gun adapter, using pliers, remove the hose clamp and remove the gas hose.
6. Using a phillips screwdriver, remove the screw securing the sense lead. Note washer placement for reassembly. See ***Figure F.26***.
7. Using a 1/8" hex head key, loosen the set screw securing the gun adapter. See ***Figure F.27***.
8. Loosen the molded hand screw and remove the gun adapter. See ***Figure F.27***.
9. Using a 1/4" hex head key, remove the two socket head cap screws securing the feedplate to the gear box and remove the feedplate. See ***Figure F.28***.
10. Perform the ***Gas Solenoid Removal Procedure***.
11. Using a 5/16" nutdriver, remove the two screws at the front of motor top support and the two screws securing the motor top support to the rear panel. See ***Figure F.29***.
12. Using a 7/16" nutdriver, remove the three bolts and lock washers from the motor top support. See ***Figure F.29***.
13. The motor top support can now be removed to allow clear access to the motor assembly.
14. If necessary, the heavy black lead can be removed to allow the motor assembly to be lifted out. Using a 11/16" nutdriver, remove the nut securing the heavy black lead to the bottom post of the contactor. Note washer placement for reassembly.
15. Using a 5/16" nutdriver, remove the four screws (two on each side) securing the motor bottom support to the base of the machine. See ***Figure F.30***.
16. Label and disconnect plug P10 from the motor assembly. See Wiring Diagram.
17. The motor can now be removed from the machine.

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DRIVE MOTOR AND GEAR BOX
REMOVAL AND REPLACEMENT PROCEDURE *(continued)*

Figure F.25 – Electrode lead location

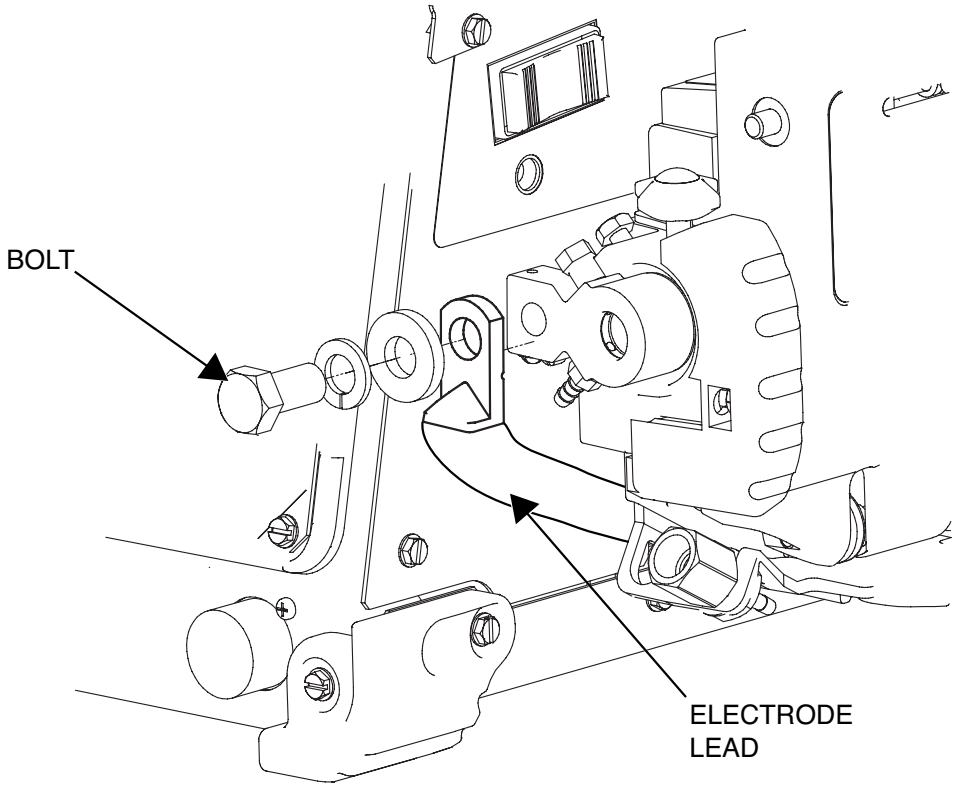
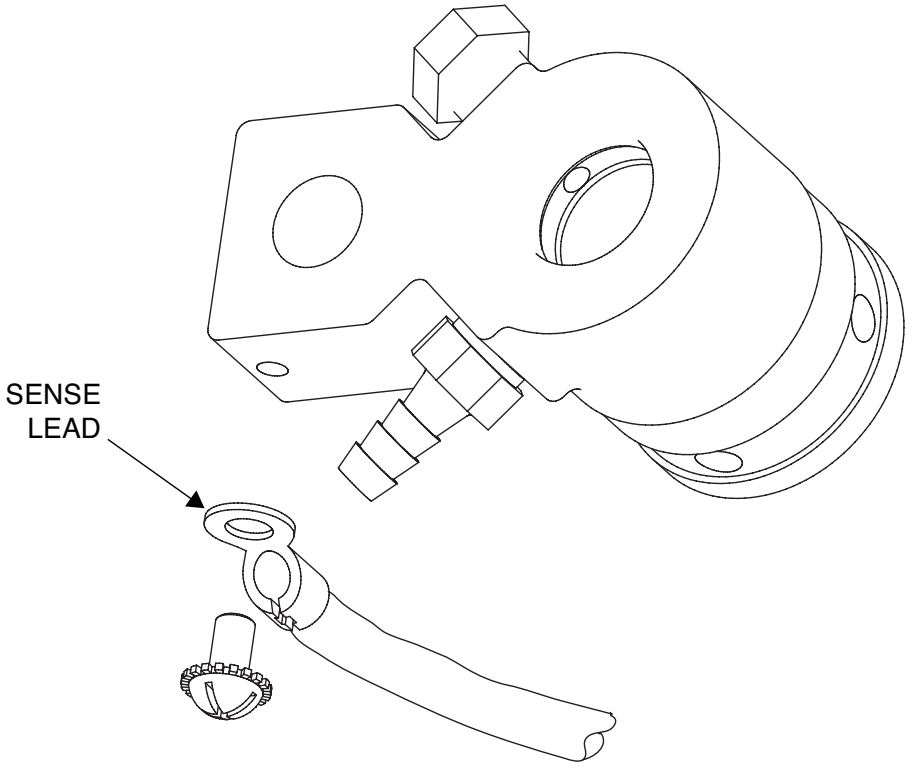


Figure F.26 – Sense lead removal



DRIVE MOTOR AND GEAR BOX
REMOVAL AND REPLACEMENT PROCEDURE *(continued)*

Figure F.27 – Gun adapter removal

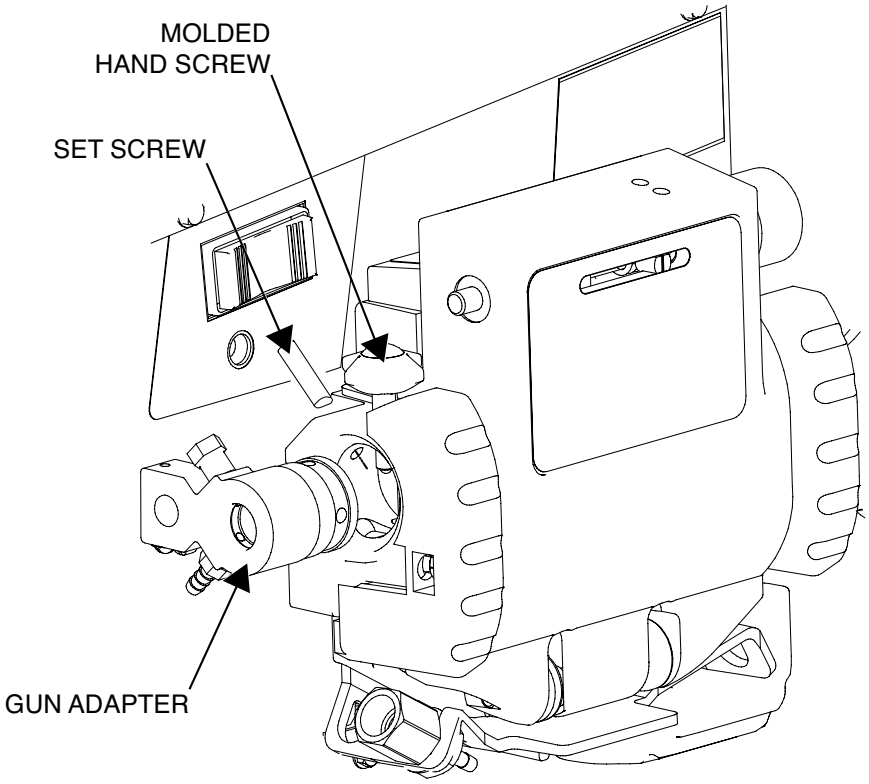
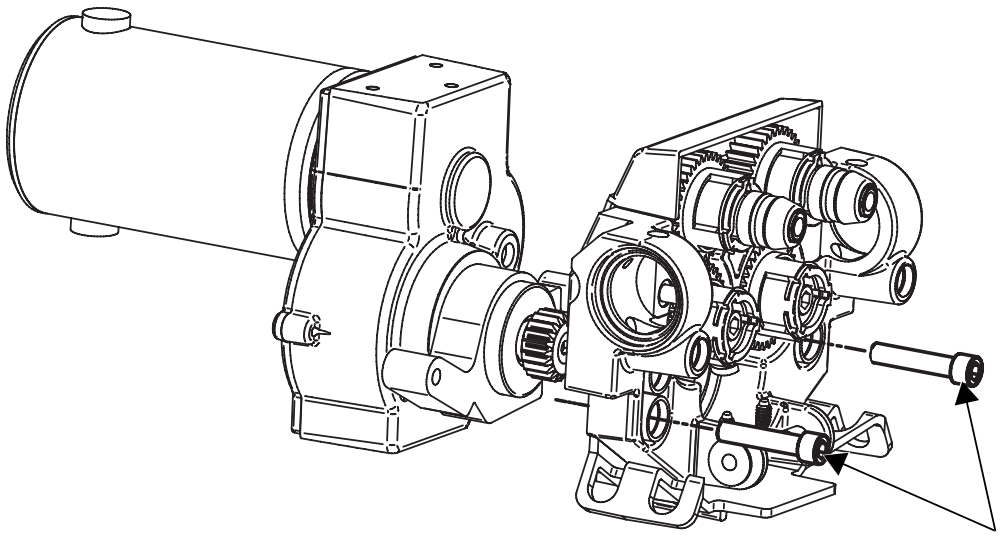


Figure F.28 – Feedplate removal



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DRIVE MOTOR AND GEAR BOX
REMOVAL AND REPLACEMENT PROCEDURE *(continued)*

Figure F.29 – Motor top support removal

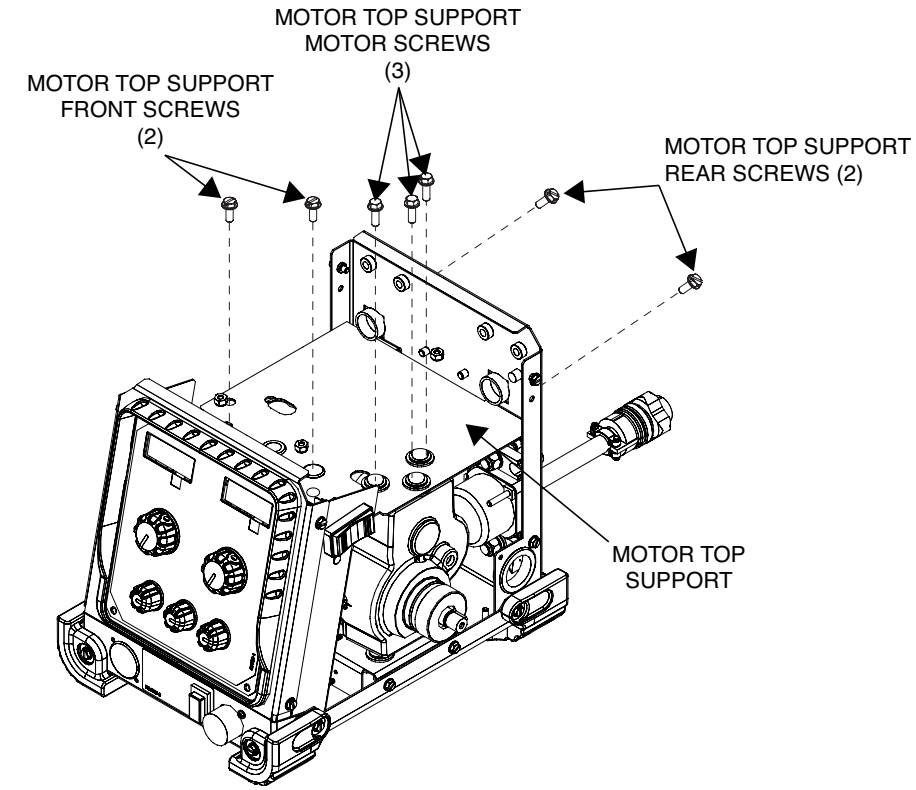
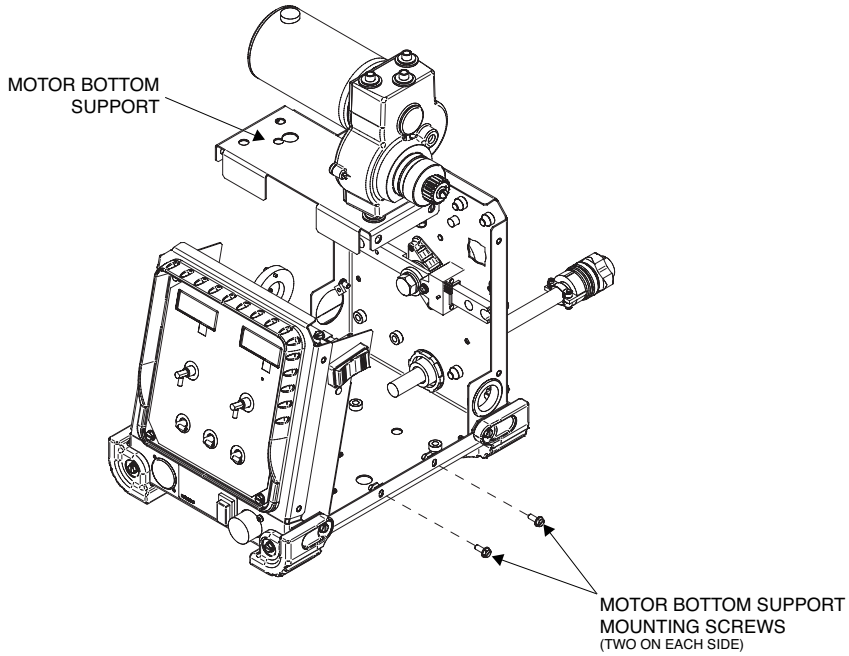


Figure F.30 – Drive motor assembly removal



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DRIVE MOTOR AND GEAR BOX
REMOVAL AND REPLACEMENT PROCEDURE *(continued)*

REPLACEMENT PROCEDURE

1. Carefully place new motor assembly in to the machine.
2. Connect plug P10 to the motor assembly. See Wiring Diagram.
3. Using a 5/16" nutdriver, attach the four screws (two on each side) securing the motor bottom support to the base of the machine.
4. If necessary the heavy black lead can be removed to allow the motor assembly to be lifted out. Using a 11/16" nutdriver, attach the nut securing the heavy black lead to the bottom post of the contactor.
5. Carefully position the motor top support in to the machine.
6. Using a 7/16" nutdriver, attach the three bolts and lock washers to the motor top support.
7. Using a 5/16" nutdriver, attach the two screws at the front of motor top support and the two screws securing the motor top support to the rear panel.
8. Perform the ***Gas Solenoid Replacement Procedure***.
9. Carefully position the feedplate on to the gear box.
10. Using a 1/4" hex head key, attach the two socket head cap screws securing the feedplate to the gear box.
11. Position gun adapter in to the feedplate and tighten the molded hand screw.
12. Using a 1/8" hex head key, tighten the set screw securing the gun adapter.
13. Using a phillips screwdriver, attach the screw and washer securing the sense lead.
14. If a gas hose needs to be attached to the gun adapter, using pliers, attach the hose clamp securing the gas hose.
15. Using a 3/4" nutdriver, attach the bolt and washer securing the electrode lead to the gun adapter.
16. Using a phillips screwdriver, tighten the screw and washer securing the gun adapter cover.
17. Perform the ***Case Cover Replacement Procedure***.

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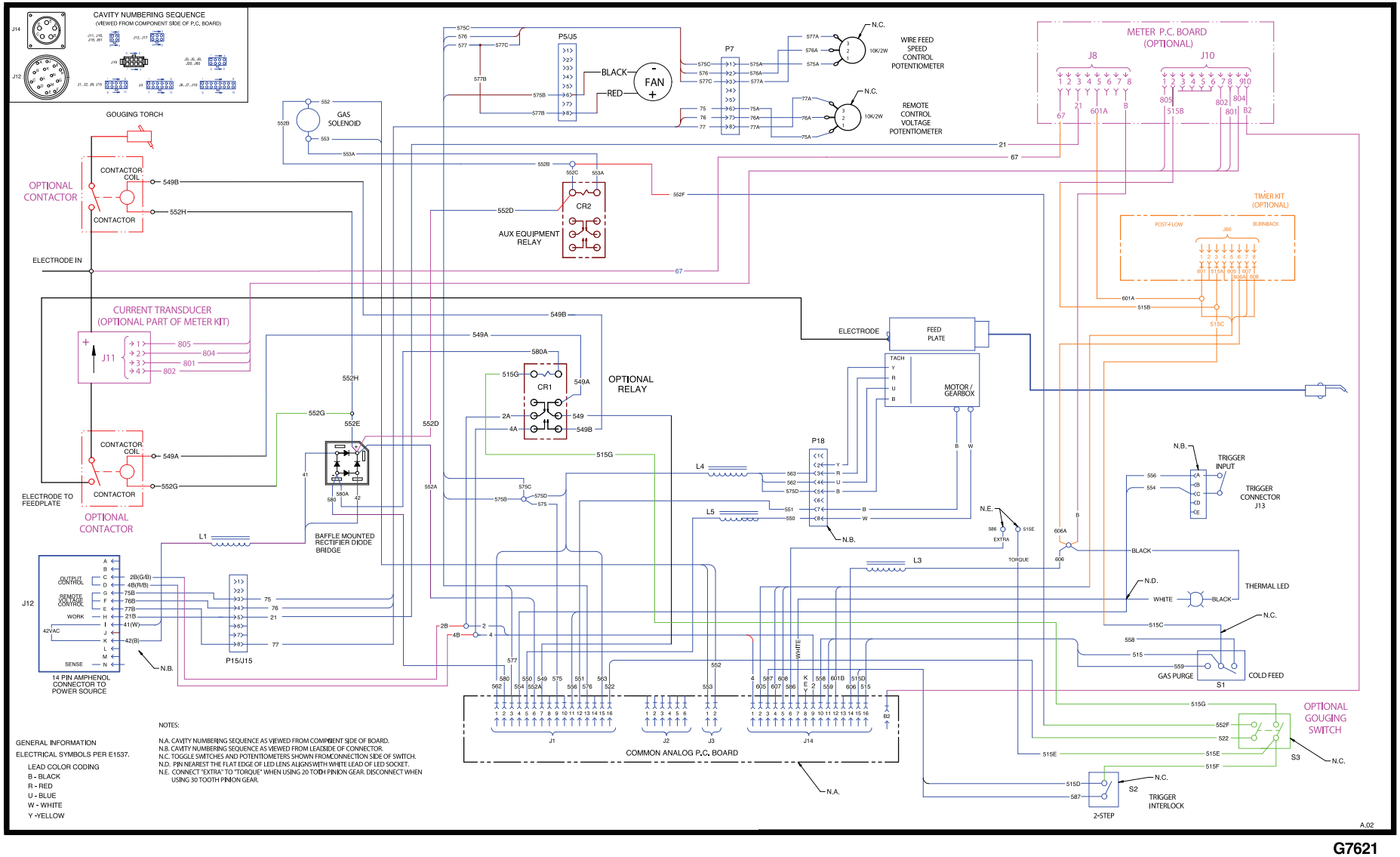
WIRING DIAGRAM- FLEX FEED 74 HT



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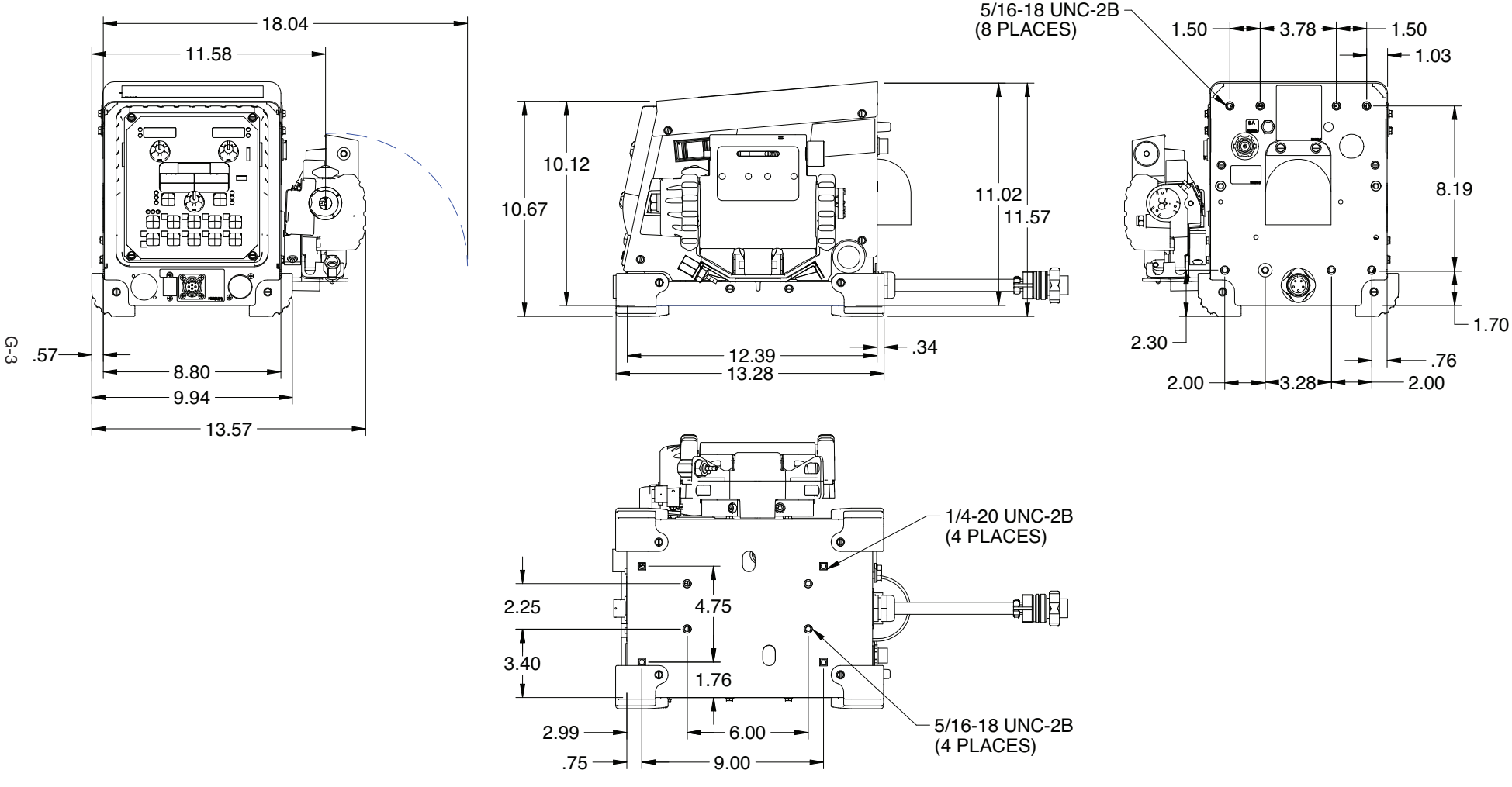
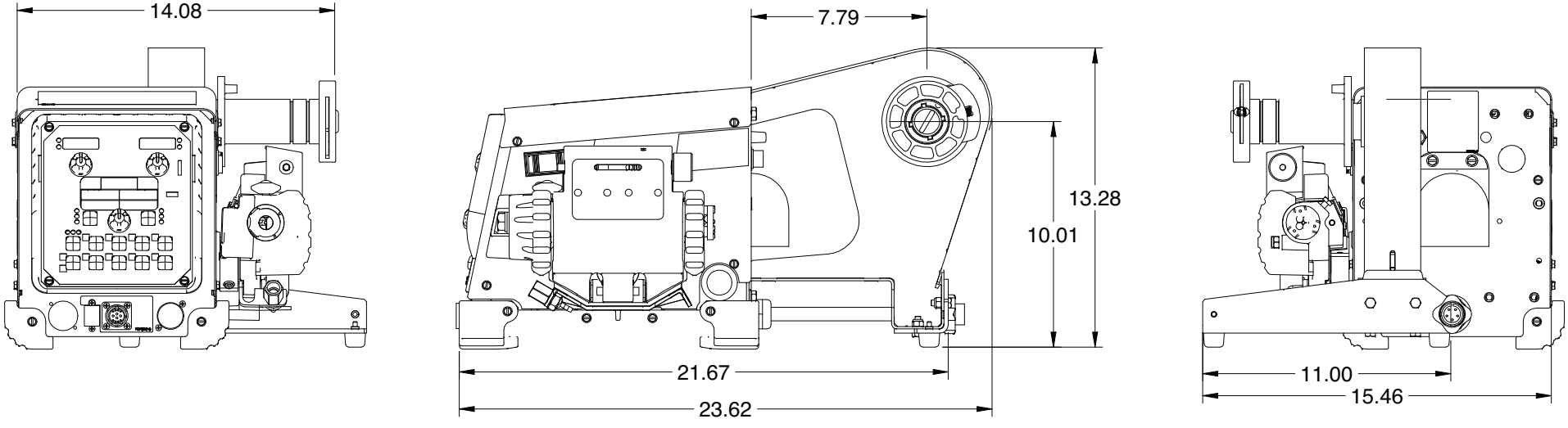
NOTE: This diagram is for reference only. It may not be accurate for all machines covered by this manual. The specific diagram for a particular code is pasted inside the machine on one of the enclosure panels. If the diagram is illegible, write to the Service Department for a replacement. Give the equipment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

DIMENSION DRAWING FOR WIRE DRIVE HOUSING



DIMENSION DRAWING FOR STANDARD DUTY WIRE REEL STAND



DIMENSION DRAWING FOR HEAVY DUTY WIRE REEL STAND