LINCOLN ELECTRIC

GENUINE LINCOLN PARTS™

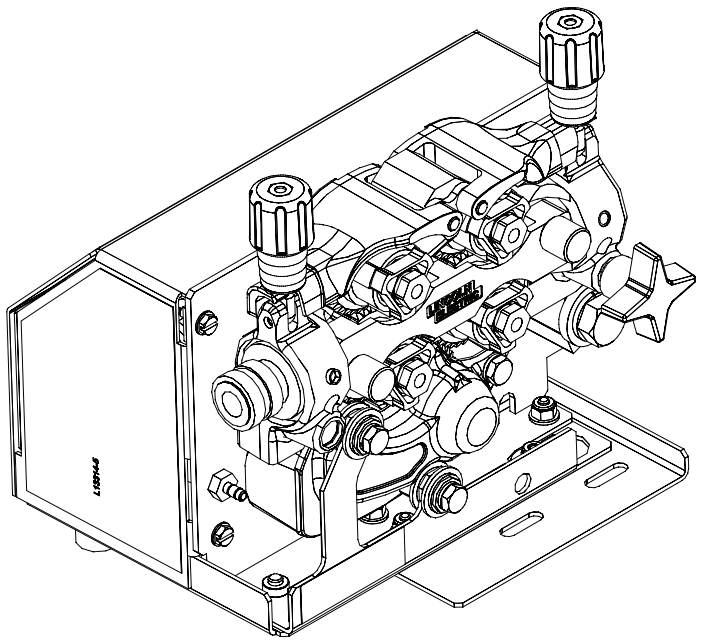
NOTE: This manual will cover most of the troubleshooting and repair procedures for the code numbers listed. Some variances may exist when troubleshooting/repairing later code numbers.

AutoDrive® 4R90 Troubleshooting Guide

For use with machines having Code Numbers:

11492, 11722

SERVICE MANUAL



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THE LINCOLN ELECTRIC COMPANY
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⚠ WARNING

⚠ CALIFORNIA PROPOSITION 65 WARNINGS ⚠

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

The Above For Diesel Engines

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

The Above For Gasoline Engines

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.

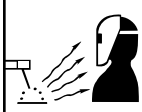
3.f. Maintain the electrode holder, work clamp, welding cable and welding machine in good, safe operating condition. Replace damaged insulation.

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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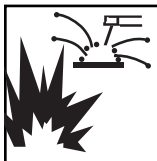

WELDING and CUTTING SPARKS can cause fire or explosion.

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 adjcent 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.

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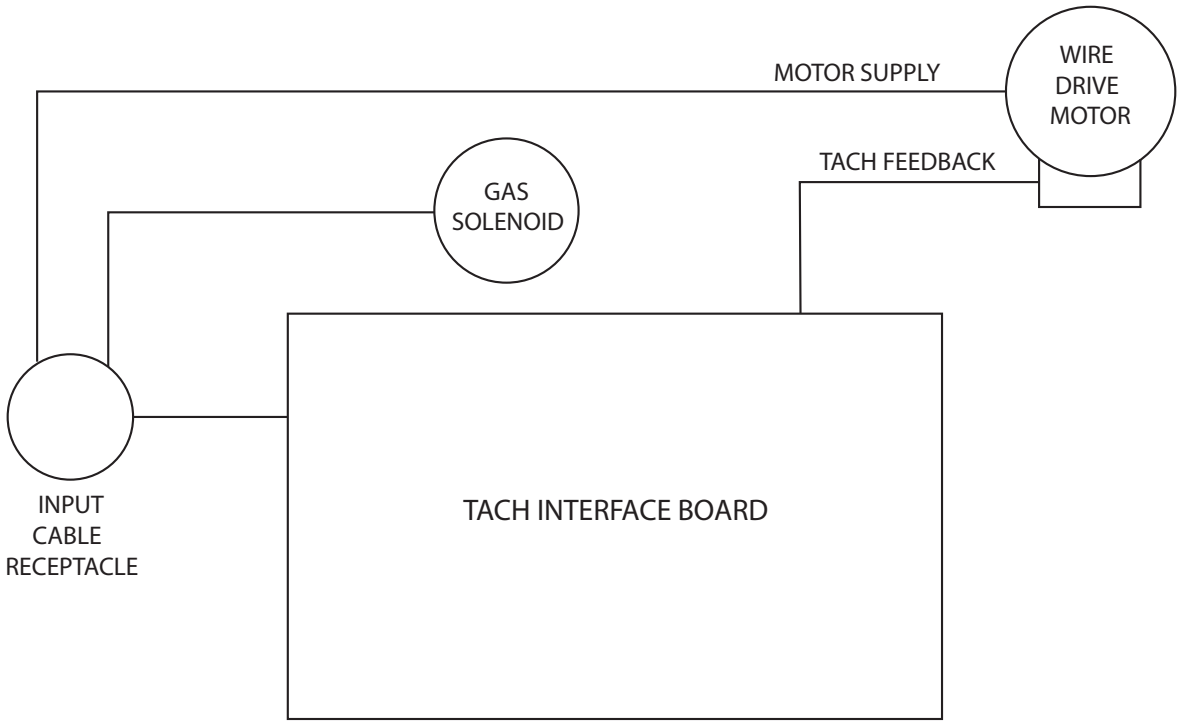
⚠ WARNING

ELECTRIC SHOCK CAN KILL.

- **Never work on the inside of the machine without removing the input power. You can receive a life threatening electrical shock if you fail to do this. Only qualified technicians should perform installation, maintenance and troubleshooting work on the machine.**

FIGURE A.1 - GENERAL DESCRIPTION



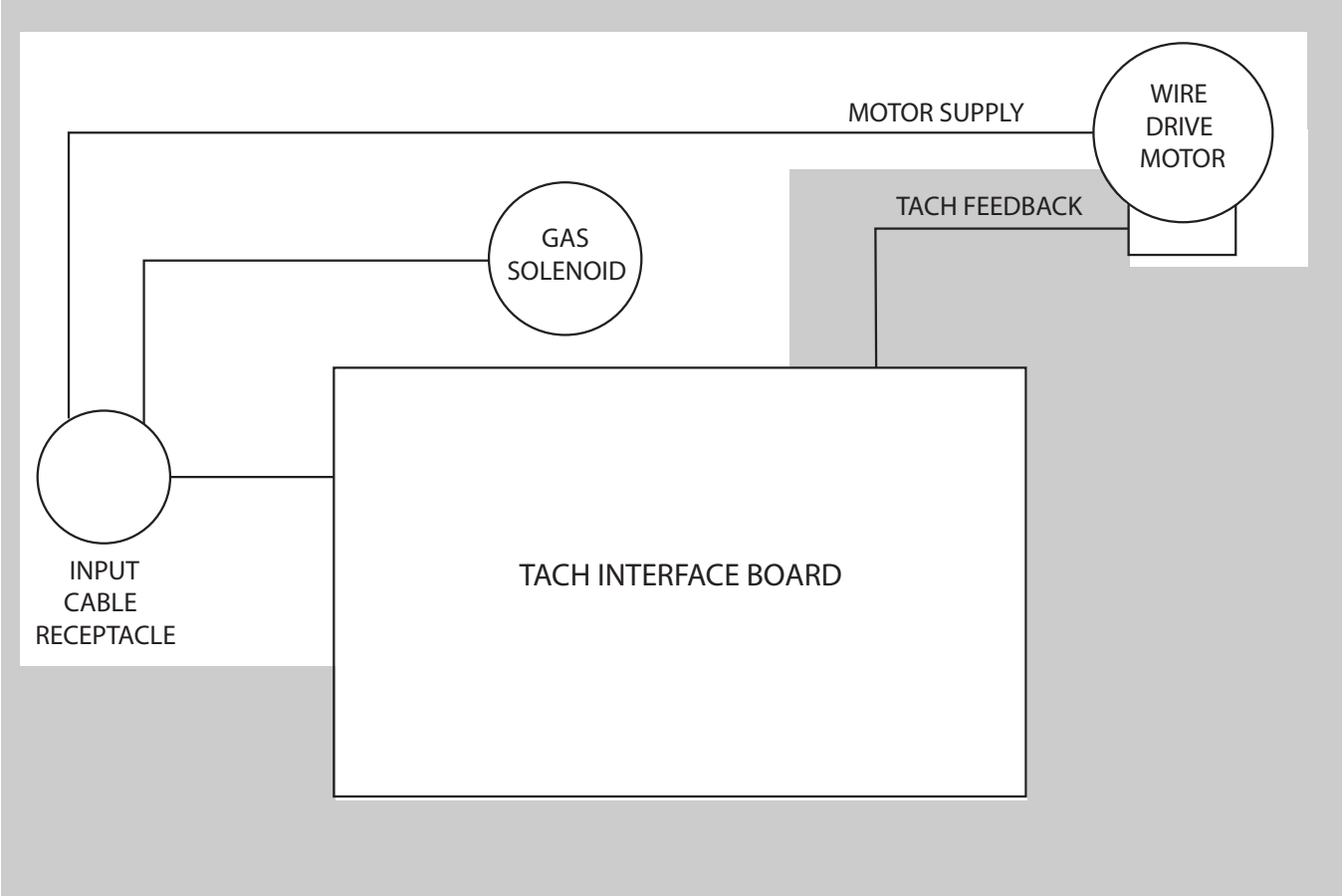
GENERAL DESCRIPTION

The AutoDrive wire feeders are powerful yet compact wire drives for robotic and hard automation applications.

The MAXTRAC 4 roll wire drive gives steady feeding of all wire types and sizes rated for the feeder. The drive features split wire guides, toll-less drive roll changing, dual spring pressure arms and changeable gun bushings all mounted in a precision die cast aluminum frame. A right angle gear box efficiently transfers motor power for both high torque and high speed.

The AUTODRIVE® 4R90 is optimized for the FANUC AM100iC arm and is suited for small diameter wires. The small, light weight package maximizes arm speed and working envelope. Quick release mounting makes for fast servicing of the feeder and torch.

FIGURE A.2 - INPUT RECEPTACLE AND GAS SOLENOID



INPUT RECEPTACLE AND GAS SOLENOID

The input receptacle houses the main control leads including the outgoing tachometer signal leads, the input power for the tach interface board, and the power supply for both the gas solenoid and the wire drive motor. The voltage sense lead number 67 feeds off the conductor block and is wired through the receptacle to the power source. Once the power source is triggered, it sends a 40VDC pulse width modulated supply to the gas solenoid and is then lowered to 9VDC for the hold. A 15VDC supplies the tach interface board with power and the power source supplies the appropriate voltage to the motor.

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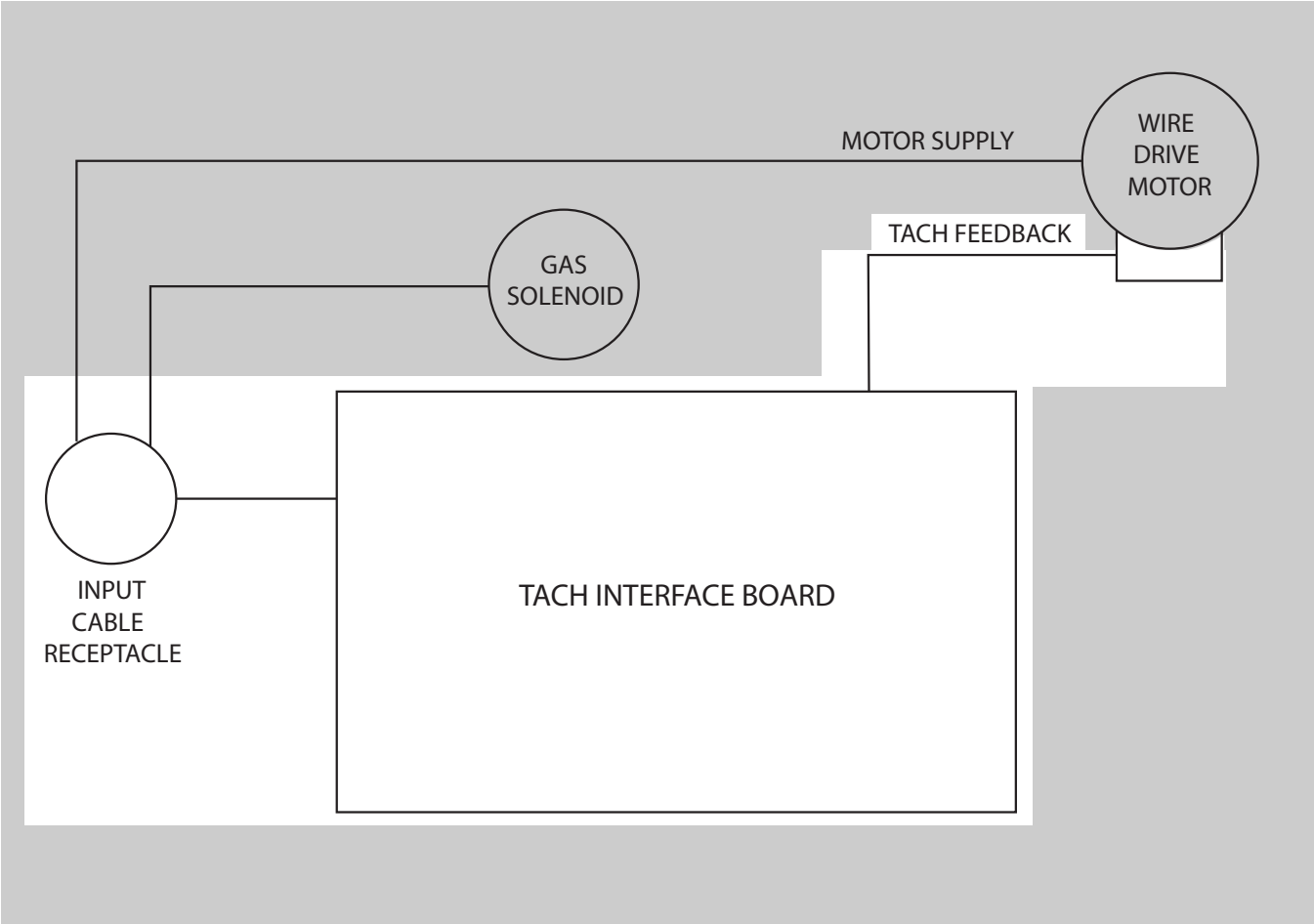
FIGURE A.3 - DIFFERENTIAL TACHOMETER SIGNAL



DIFFERENTIAL TACHOMETER SIGNAL

The 4R90 utilizes a differential tachometer signal which allows for a quality square wave signal to be sent to the power source even through a longer control cable. The tachometer sends a frequency signal determined by the speed of the motor back to the tach interface board through CHANNEL A and the common. The board senses the upper and lower limits of the square wave signal. The board then sends a pair of signals back to the power source reading channel A's upper limit and channel A's lower limit. These signals are labeled CHANNEL A_B and CHANNEL A_A. A second channel from the tachometer labeled CHANNEL B is being applied to the board that will be used in future applications. This signal is 90 degrees out of phase from channel A's signal and will be used to optimize the sensing of feed direction.

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How To Use Troubleshooting Guide

⚠ WARNING

Service and Repair should only be performed by 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.

Step 2. POSSIBLE CAUSE
The second column labeled "POSSIBLE AREAS OF MISADJUSTMENT(S)" lists the obvious external possibilities that may contribute to the machine symptom.

Step 3. PERFORM COMPONENT TESTS
The last column labeled "RECOMMENDED COURSE OF ACTION" provides a course of action for the possible cause. Generally, it states to contact your local Lincoln Electric Authorized Field Service Facility.

If you do not understand or are unable to perform the recommended course of action safely, contact your local Lincoln Electric Authorized Field Service Facility.

⚠ CAUTION

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

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PC BOARD TROUBLESHOOTING PROCEDURES

⚠ WARNING

ELECTRIC SHOCK can kill.

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

⚠ CAUTION

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

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

PC board can be damaged by static electricity.

ATTENTION
Static-Sensitive Devices
Handle only at Static-Safe Workstations
Reusable container
Do Not Destroy

- 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.

- 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.

⚠ CAUTION If for any reason you do not understand the test procedures or are unable to perform the tests/repairs safely, contact you local authorized Lincoln Electric Field Service Facility for technical assistance.

Observe Safety Guidelines detailed in the beginning of this manual.

PROBLEMS (SYMPTOMS)	POSSIBLE AREAS OF MISADJUSTMENT(S)	RECOMMENDED COURSE OF ACTION
OUTPUT PROBLEMS		
The wire feeder does not feed wire and drive rolls do not spin.	1. Verify the power source is turned on. 2. Verify the circuit breaker for the wire feeder on the power source has not tripped. 3. Verify power is being supplied to the wire feeder.	1. Perform ***Input Supply Test***. 2. Perform ***Drive Motor and Tach Feedback Test***. 3. Contact Customer Service personnel at 1-888-935-3877.
The wire feeds erratically.	1. Verify the correct drive rolls and inner wire guide are installed in the wire drive. 2. Check for sharp bends in the gun liner or conduit. 3. Examine the contact tip for wear and proper size. Replace as necessary. 4. Check the gun liner and conduit. The welding electrode should slide easily through both. 5. Verify the proper gun liner is installed.	1. Verify that the wire can be easily pulled through the gun when the pressure arm is open by pulling with your hand. There should be no drag or hesitation. 2. Inspect the motor for worn brushes. 3. Verify the pressure arms are set properly. Too much pressure may crush the wire. 4. Perform the ***Drive Motor and Tach Feedback Test***.
No shielding gas.	1. Verify the gas supply is turned on and not empty. 2. Check the gas hose for cuts. Make sure it is not crushed. 3. Verify the shielding gas hose is connected to the gun bushing or welding gun.	1. Perform ***Gas Solenoid Test***. 2. Contact Customer Service personnel at 1-888-935-3877.
The wire feed speed is fast (maximum) and there is no change when the wire feed speed knob is adjusted.	1. The tachometer is connected improperly. 2. The tachometer has failed.	1. Verify all of the tachometer leads are properly connected. 2. Perform the ***Drive Motor and Tach Feedback Test***. 3. Replace the motor and tachometer assembly.

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⚠ CAUTION If for any reason you do not understand the test procedures or are unable to perform the tests/repairs safely, contact you local authorized Lincoln Electric Field Service Facility for technical assistance.

Observe Safety Guidelines detailed in the beginning of this manual.

PROBLEMS (SYMPTOMS)	POSSIBLE AREAS OF MISADJUSTMENT(S)	RECOMMENDED COURSE OF ACTION
OUTPUT PROBLEMS		
Variable or “hunting” arc.	1. Check for proper size contact. Make sure the tip is not worn, free of spatter and not melted. 2. Clean and tighten all electrode and work connections. 3. Verify the proper polarity is being used for the weld procedure. 4. Make sure the proper electrode stick-out is being maintained. 5. Check the gas flow rate and mixture. 6. Verify the gun bushing is tightly mounted to the wire drive. 7. Verify the gun is tightly mounted to the gun bushing. 8. Verify the electrode lead is connected to the proper connection block on the feed head. 9. Inspect the motor for worn brushes.	Contact Customer Service personnel at 1-888-935-3877.
The motor overload errors occur.	1. Check for sharp bends in the gun liner and conduit. 2. Examine the contact tip for wear and proper size. Replace as necessary. 3. Check the gun liner and conduit. The welding electrode should slide easily through both. 4. Verify the proper gun liner is installed. 5. Reduce the pressure arm setting.	1. Verify that the wire can be easily pulled through the gun when the pressure arm is open by pulling with your hand. There should be no drag or hesitation. 2. Replace motor. 3. Contact Customer Service personnel at 1-888-935-3877.

INPUT POWER SUPPLY TEST

⚠ 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 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 correct input supply power is being applied to the 4R90 feeder.

MATERIALS NEEDED

Digital Meter
1/4” Nut Driver

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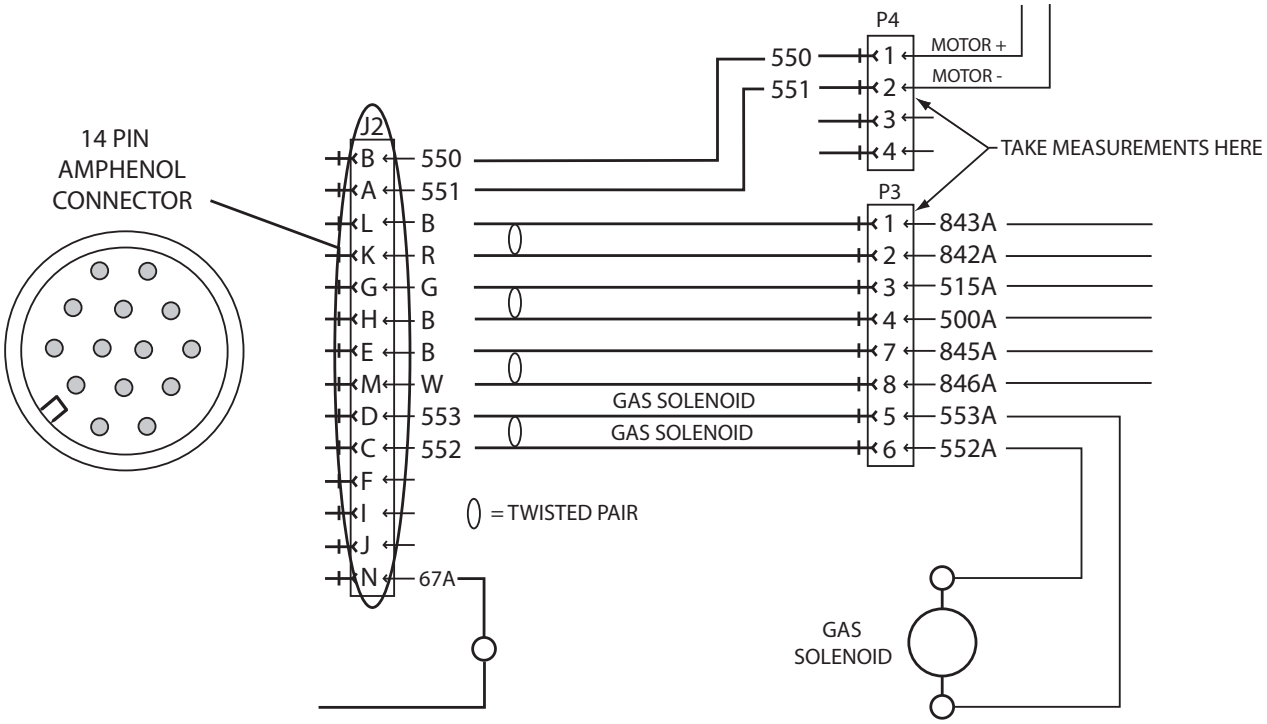
INPUT POWER SUPPLY TEST (continued)



1. The 4R90 is fitted with a 14-pin male amphenol connector that is daisy-chained to the power source control cable. It has three test points for input voltage. It is best to measure these inputs at the molex connectors.
2. Measuring between leads 550 and 551 will read the motor voltage. Measurements will be between 5-32VDC (depending on wire feed speed) while the trigger is being pulled. (Refer to Drive Motor and Tach Feedback Test)
3. Measuring between leads 552 and 553 will give the gas solenoid voltage. Typical reading will be 9VDC on a functioning solenoid. (Refer to Gas Solenoid Test)
4. Measuring between leads 500A and 515A will read the 15VDC input supply for the tach interface board.
5. If missing any of these supply voltages, check connections to power source. (Refer to wiring diagram)

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DRIVE MOTOR AND TACH FEEDBACK TEST

⚠ 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 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 Motor and Tach circuit is faulty.

MATERIALS NEEDED

1/4-20 Nut Driver
Digital Meter

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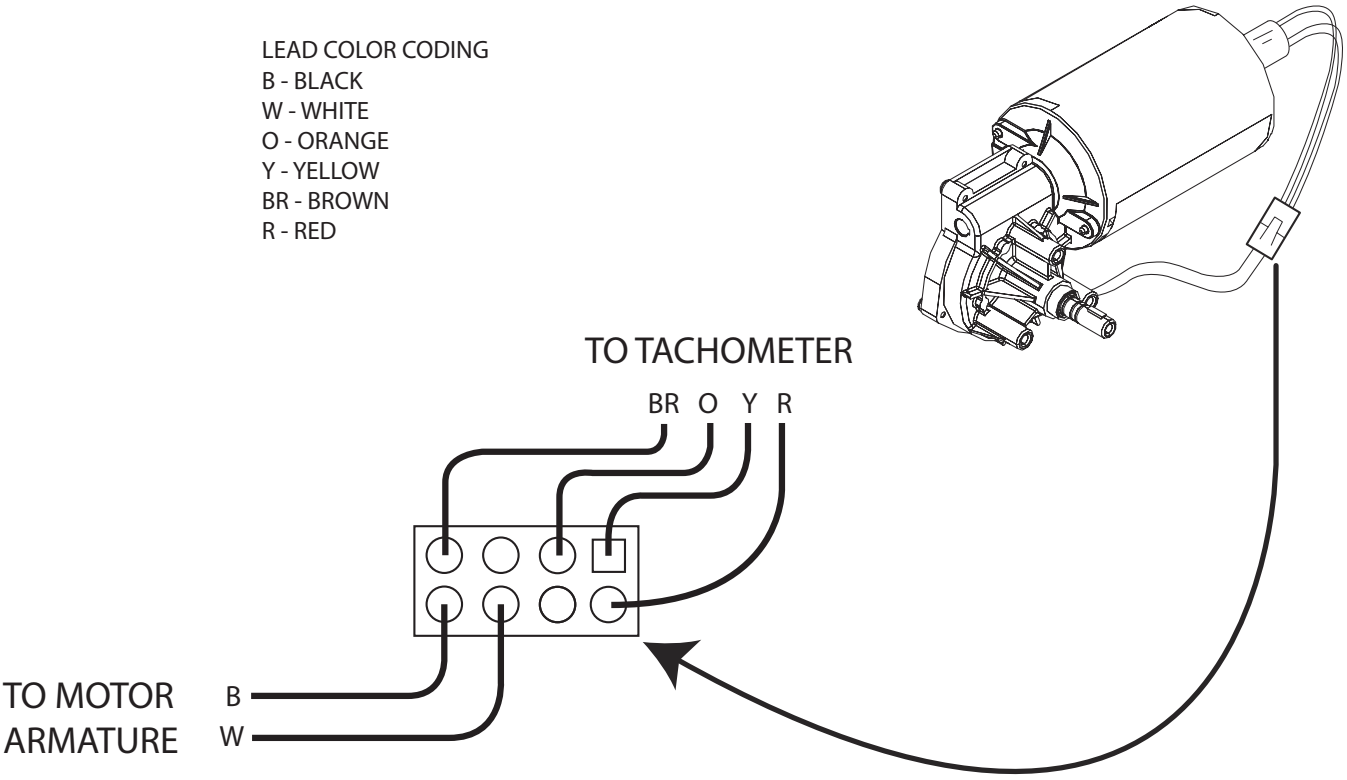
DRIVE MOTOR AND TACH FEEDBACK TEST (continued)



1. Using a DC voltmeter, measure the voltage between the white and black leads coming off of the motor and connecting to the eight-pin harness connector.
2. The motor voltage will read 5-32VDC from min to max. If there is no voltage, check the connections back through the amphenol connector to the power source. (See wiring diagram)
3. Also, resistance across the white and black leads should read around 3.1 ohms. Any variations could indicate an issue with the motor.
4. The tachometer leads pass through the same eight-pin connector as the motor supply leads. There are orange, yellow, brown, and red leads that get connected to the tachometer. (See wiring diagram)
5. Measuring between the yellow and red leads should read around 5VDC that supply the tach with power.
6. If the tach is providing a signal back to the board, you will read between 2-4VDC between the brown and red leads. The frequency will read about .61 kHz at 250 ipm and about 1.7 kHz at 700 ipm when working properly.

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GAS SOLENOID TEST

⚠ 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 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 solenoid circuit is faulty.

MATERIALS NEEDED

1/4-20 Nut Driver
Digital Meter

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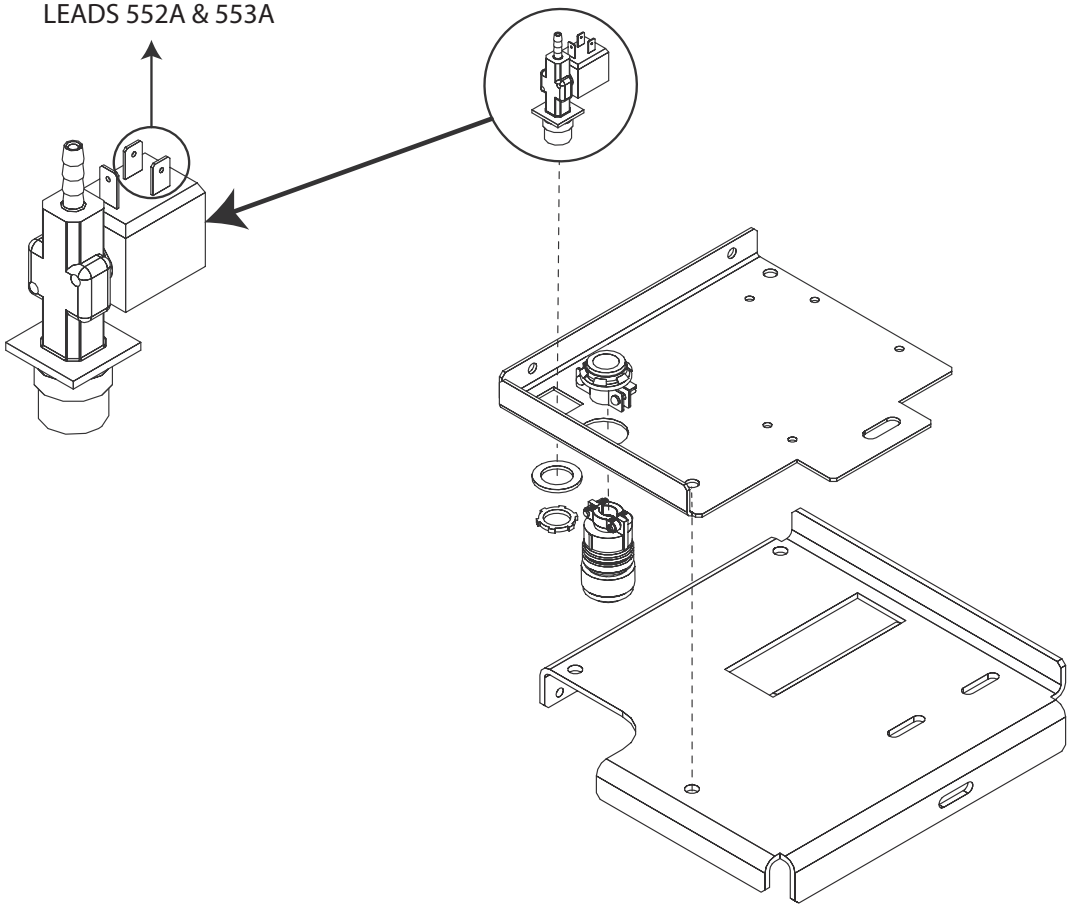
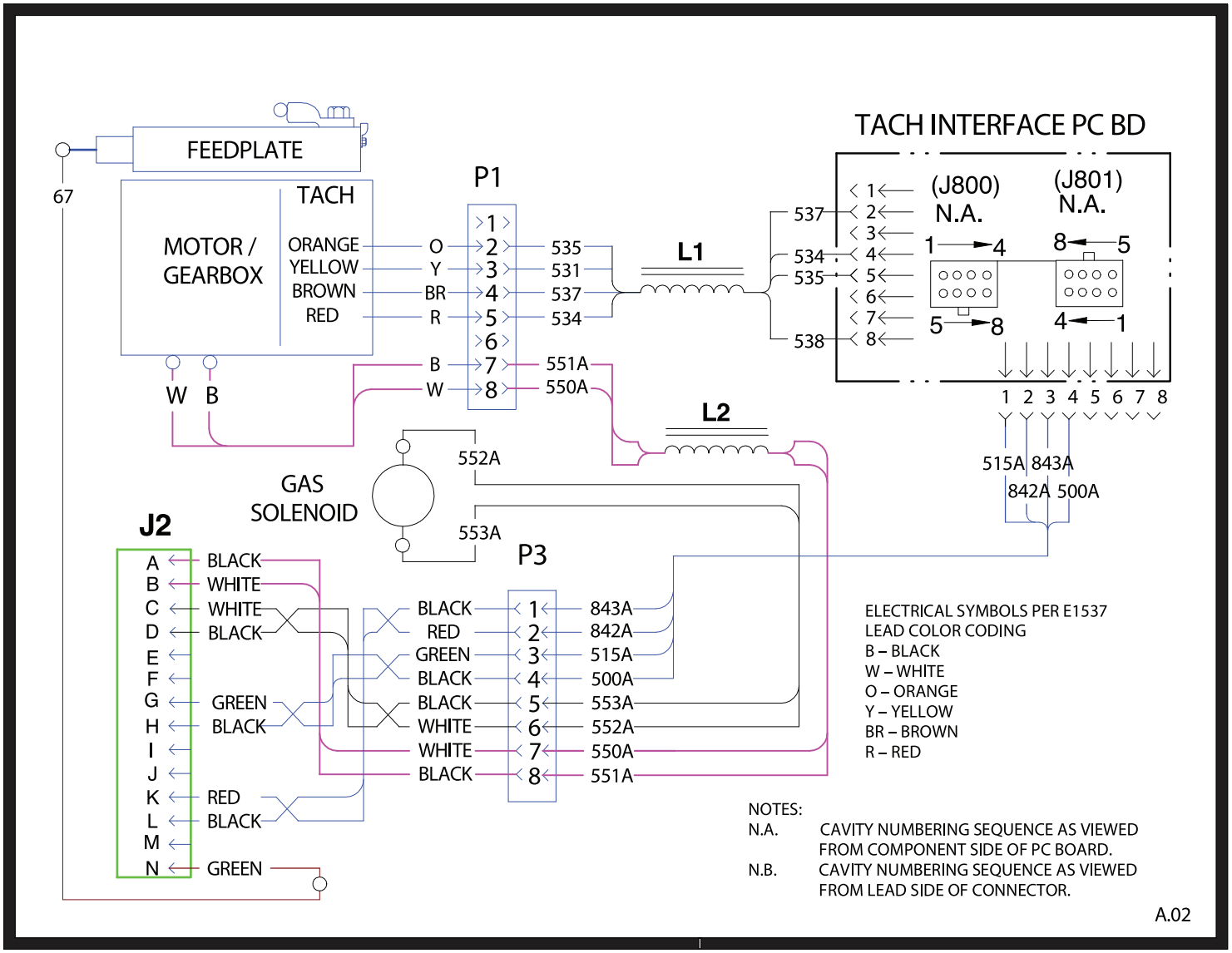
Return to Master TOC

GAS SOLENOID TEST (continued)



1. Remove the cover to the 4R90 using the 1/4' nut driver. The gas solenoid will be sitting in the open.
2. Measure DC voltage across two terminals that are wired with leads 552A and 553A. The normal reading on an operative solenoid is 4VDC. If 8VDC is present but the solenoid does not activate, the solenoid may be faulty.
3. If the 4VDC is missing or low, check the leads back through the amphenol connector to the power source. (See wiring diagram)
4. Normal coil resistance should read about 19 ohms.
5. The solenoid can be further checked by applying a 12VDC supply directly to the terminals. If the solenoid does not activate, the solenoid is faulty.
6. If a high voltage is seen (appr. 32VDC), the solenoid coil is open and needs replacement.

WIRING DIAGRAM AUTODRIVE 4R90 FEEDER



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NOTE: This diagram is for reference only. It may only 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.