IM355-TS

LN-9 GMA Troubleshooting Guide

November, 2001

This manual covers equipment which is no longer in production by The Lincoln Electric Co. Specifications and availability of optional features may have changed.

Safety Depends on You

Lincoln arc welding and cutting equipment is designed and built with safety in mind. However, your overall safety can be increased by proper installation ... and thoughtful operation on your part. **DO NOT INSTALL, OPERATE OR REPAIR THIS EQUIPMENT WITHOUT READING THIS MANUAL AND THE SAFETY PRECAUTIONS CONTAINED THROUGHOUT.** And, most importantly, think before you act and be careful.

Troubleshooting Guide

LINCOLN® ELECTRIC

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NOTE

This Troubleshooting section is specific to the LN-9 GMA. However, much of this information may apply to the LN-9 F GMA model with slight adaptation. Refer to LN-9F GMA Wiring Diagram.

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TROUBLESHOOTING

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 main categories: Function Problems, Feeding Problems, Welding Problems, Meter Problems, and Starting 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 wrap-around 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 chapter. 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.

TROUBLESHOOTING

PC BOARD TROUBLESHOOTING PROCEDURES

⚠ WARNING

ELECTRIC SHOCK can kill.

Have an electrician install and service this equipment. Turn the machine OFF before working on equipment. Do not touch electrically hot parts.

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:

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

Reusable Container
Do Not Destroy

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 unpainted, 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: 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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TROUBLESHOOTING

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		
No wire feed when gun trigger is activated. The digital meter does NOT light. The drive rolls do not turn.	1. Make sure 115VAC is being applied to the LN-9 GMA at the input connector. Pin "C" is lead #31 and pin "D" is lead #32. 2. Check the 3 amp circuit breaker. Reset if tripped. 3. The F101 4/10 amp slow blow fuse, located on the power PC board, may be blown.	1. Check for loose or faulty lead connections between the input connector, the T1 transformer, and the power PC board. 2. The T1 transformer may be faulty. Perform the ***T1 Transformer Test.***

⚠ CAUTION

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TROUBLESHOOTING & REPAIR

TROUBLESHOOTING GUIDE

Observe Safety Guidelines detailed in the beginning of this manual.

PROBLEMS (SYMPTOMS)	POSSIBLE AREAS OF MISADJUSTMENT(S)	RECOMMENDED COURSE OF ACTION
FUNCTION PROBLEMS		
No wire feed when gun trigger is activated. The drive rolls do not turn. The digital meter does light but reads only SET voltage and wire speed values.	1. The Ground Lead Protector may have tripped. Reset and clear possible fault between electrode circuit and feeder frame. 2. The gun trigger may be faulty.	1. The 1CR relay on the power PC board may be faulty. Check or replace. 2. Check resistor R1. Normal resistance is 2 ohms. 3. Perform the ***Trigger Transformer T2 Test.*** 4. Perform the ***Trigger Board Test.*** 5. Perform the ***Wire Drive Motor Test.*** 6. If the wire drive motor is OK, the power PC board or the control board may be faulty.

⚠ CAUTION

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TROUBLESHOOTING

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 wire feed "coasts" when the gun trigger is released.	1. Make sure the gun trigger is not "sticking."	1. The relay 1CR may be faulty. Replace.
The gas solenoid does not activate when the gun trigger is closed. The wire feeds and arc voltage is present.	1. If a K418 GMA Timer Kit or a K419 Burnback Timer Kit is installed, disconnect it and replace it with the jumper plug. If the problem is resolved, the K418 or K419 is faulty.	1. With the gun trigger closed, check for 115VAC at the power PC board terminals #7A to #32A. a. If the 115VAC is present, the solenoid may be faulty. Replace. b. If the 115VAC is NOT present at terminals #7 and #32, the relay CR1 on the power PC board may be faulty. Replace.
The gas solenoid stays open after the gun trigger switch is released.	1. The gas solenoid may be stuck in the open position.	1. With the gun trigger NOT closed, check for 115VAC at the power PC board terminals #7 to #32A. a. If the 115VAC is present, the relay CR1 may be defective. b. If the 115VAC is NOT present, the gas solenoid may be defective.

⚠ CAUTION

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TROUBLESHOOTING

TROUBLESHOOTING GUIDE

Observe Safety Guidelines detailed in the beginning of this manual.

PROBLEMS (SYMPTOMS)	POSSIBLE AREAS OF MISADJUSTMENT(S)	RECOMMENDED COURSE OF ACTION
FUNCTION PROBLEMS		
The wire feeds when the gun trigger is activated, but there is no arc voltage.	1. Make sure the interlock switch is in a "Wire Hot" position. 2. Check the welding cables for loose or faulty connections. 3. Put a jumper wire from #2 to #4 on the power source terminal strip. (Machines with 14 pin amphenols: pin C to pin D.) If the arc voltage is not present at the output terminals, the power source is faulty. If the arc voltage IS present, the problem is in the wire feeder or control cable. 4. Check the continuity of leads #2 and #4 through the control cable. Replace if "open."	1. The 1CR relay, located on the power PC board, may be faulty. Check or replace. 2. If a burnback kit is installed, remove and install the jumper plug. If the problem is solved, the burnback kit is faulty. 3. Check the #2 and #4 leads in the LN-9 GMA wiring harness for loose or faulty connections. See the Wiring Diagram.

⚠ CAUTION

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TROUBLESHOOTING

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 SET speed is adjustable and steady. The actual speed is uncontrollable. The meter displays the actual speed correctly or reads "EEE."	1. Contact your local Lincoln Authorized Field Service Facility.	1. While the motor is running, carefully unplug the 15 pin molex plug from the control PC board. If the motor continues to run, the power PC board may be faulty. Replace. If the motor stops, the control PC board may be faulty. Replace. 2. Perform the ***Wire Drive Motor Test.***
The SET speed is adjustable and steady. The actual speed reading is incorrect and/or erratic.	1. Check for loose or faulty connections on leads #510, #525, and #555 between the hall effect module and the control PC board.	1. Perform the ***Hall Effect Module Alignment Procedure.*** 2. Perform the ***Hall Effect Feedback Test.*** 3. If the ***Hall Effect Feedback Test*** is OK, the control PC board may be faulty. Replace.

⚠ CAUTION

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TROUBLESHOOTING & REPAIR

TROUBLESHOOTING GUIDE

Observe Safety Guidelines detailed in the beginning of this manual.

PROBLEMS (SYMPTOMS)	POSSIBLE AREAS OF MISADJUSTMENT(S)	RECOMMENDED COURSE OF ACTION
FUNCTION PROBLEMS		
The SET speed is erratic or not adjustable over entire range of control. The actual speed is also erratic like the SET speed.	1. Check for loose or faulty connections on leads #631, #632, and #633 between the speed control potentiometer (R2) and the control PC board.	1. Remove power to the LN-9 GMA and disconnect the plug to the control PC board. Check the resistance of the speed control potentiometer (R2). When measured from the wiper (lead #632) to lead #633, the resistance should vary smoothly from 0 to 10,000 ohms when the shaft is rotated. See the Wiring Diagram. 2. The control PC board may be faulty. Replace.
The wire continues to feed with the gun trigger open, and the wire is electrically "hot." The interlock switch is in the "OFF" position.	1. Disconnect the gun trigger cable. If the problem is resolved, the gun trigger or cable is faulty. Repair or replace.	1. Disconnect lead #530 from the trigger PC board. See the Wiring Diagram. If the problem is resolved, the trigger board is faulty. Replace. 2. Relay 1CR may be stuck closed. Check or replace. 3. The power PC board may be faulty. Replace.

⚠ CAUTION

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TROUBLESHOOTING & REPAIR

Observe Safety Guidelines detailed in the beginning of this manual.

TROUBLESHOOTING GUIDE

PROBLEMS (SYMPTOMS)	POSSIBLE AREAS OF MISADJUSTMENT(S)	RECOMMENDED COURSE OF ACTION
TRIGGER INTERLOCK FUNCTION PROBLEMS		
The wire feeds when the interlock switch is in the "ON" position. No welding or gun trigger activation.	1. Check to see if the reed switch 2CR is stuck closed.	1. Check the 2CR reed switch for sticking and associated leads (#529 and #628) for shorts. 2. The power PC board may be faulty. Replace.
With the interlock switch in the "ON" position, the wire feed stops when the gun trigger is released.	1. Check leads #529 and #628 for loose or faulty connections between the 2CR reed switch and the power PC board.	1. The 2CR reed switch may be faulty. Check to see if it closes when welding. 2. Check the continuity (zero ohms) of leads #529 and #628 from the 2CR reed switch to the power PC board. Also check continuity of leads #530 and #522 from the power PC board to the interlock switch. See the Wiring Diagram. 3. Check the interlock switch for proper operation. 4. The power PC board may be faulty. Replace.

⚠ CAUTION

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TROUBLESHOOTING

TROUBLESHOOTING GUIDE

Observe Safety Guidelines detailed in the beginning of this manual.

PROBLEMS (SYMPTOMS)	POSSIBLE AREAS OF MISADJUSTMENT(S)	RECOMMENDED COURSE OF ACTION
FUNCTION PROBLEMS		
The SET voltage is erratic or not adjustable over the entire range of control. The actual voltage is also erratic like the SET voltage.	1. Check for loose or faulty connections on leads #634, #635, and #636 between the voltage control potentiometer (R3) and the voltage PC board.	1. Remove power to the LN-9 GMA and disconnect Plug J9 from the voltage PC board. Check the resistance of the voltage control potentiometer (R3). When measured from the wiper (lead #635) to lead #634, the resistance should vary smoothly from 0 to 10,000 ohms when the shaft is rotated. 2. The voltage PC board may be faulty. Replace.
The field fuse (F101), located on the power PC board, repeatedly fails.	1. Make sure the replacement fuse is a 4/10 amp slow blow type fuse.	1. Perform the ***T1 Transformer Test.*** 2. Disconnect the meter PC board. If the problem is resolved, the meter PC board may be faulty. 3. The power PC board may be faulty. Replace.

⚠ CAUTION

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TROUBLESHOOTING

TROUBLESHOOTING GUIDE

Observe Safety Guidelines detailed in the beginning of this manual.

PROBLEMS (SYMPTOMS)	POSSIBLE AREAS OF MISADJUSTMENT(S)	RECOMMENDED COURSE OF ACTION
FUNCTION PROBLEMS		
Circuit breaker (3 amp) repeatedly trips when the gun trigger is activated.	1. Check or replace gun trigger and leads. Make sure the trigger leads are not shorted to the electrode or work cables.	1. Disconnect lead #500 from the trigger PC board. If the breaker still trips when the gun trigger is activated, the trigger PC board may be faulty. Replace 2. Disconnect any accessory that may be connected to terminals #7 and #32A. See the Wiring Diagram. If the problem is resolved, the accessory may be faulty. Replace. 3. Perform the ***Wire Drive Motor Test.*** 4. The power PC board may be faulty. Replace.
Circuit breaker (3 amp) trips when power is applied to the LN-9 GMA. Gun trigger is NOT activated.	1. Disconnect any kits that may be incorporated in the LN-9 GMA (K418, K419, etc.). Be sure to install any necessary jumper plugs. If the problem is resolved, the fault may be in the disconnected kit.	1. Disconnect lead #620 from the trigger PC board. See the Wiring Diagram. If the problem is resolved, the trigger PC board may be faulty. Replace. 2. Perform the ***T2 Transformer Test.*** 3. Check the harness leads #32A, #31, and #531 for shorts or grounds. See the Wiring Diagram. 4. The power PC board may be faulty. Replace.

⚠ CAUTION

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TROUBLESHOOTING

TROUBLESHOOTING GUIDE

Observe Safety Guidelines detailed in the beginning of this manual.

PROBLEMS (SYMPTOMS)	POSSIBLE AREAS OF MISADJUSTMENT(S)	RECOMMENDED COURSE OF ACTION
FUNCTION PROBLEMS		
The 1/8 amp fuse on the voltage PC board repeatedly fails.	1. Check to make sure the PC boards are NOT grounded to the case of the LN-9 GMA. This can happen due to metallic wire shavings build-up.	1. Remove input power to the LN-9 GMA. Replace the 1/8 amp fuse and switch the LN-9 GMA polarity switch to the "NEG" position. Make a resistance check from the following leads to the LN-9 GMA case grounding screw: Leads # 500, 510, 525, 522, 526, 530, and 628. The resistances should be above 1000 ohms. If any test is below 1000 ohms, that circuit has low resistance to case ground. Isolate the faulty leads or PC board. See the Wiring Diagram and Schematic.

⚠ 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

TROUBLESHOOTING GUIDE

Observe Safety Guidelines detailed in the beginning of this manual.

PROBLEMS (SYMPTOMS)	POSSIBLE AREAS OF MISADJUSTMENT(S)	RECOMMENDED COURSE OF ACTION
FUNCTION PROBLEMS		
The LN-9 GMA shuts down while welding. Upon retriggering the gun, the unit will weld again for a period of time.	1. Make sure the power source and wire feeder polarity switches are set correctly for the process being used. 2. Make certain the voltage control switch on the Lincoln CV power source is set in the "Remote" position. 3. Make sure the #21 lead in the control cable has continuity to the work piece. 4. Check the 1/8 amp fuse on the LN-9 GMA voltage PC board. Replace if faulty. 5. Be sure the welding power source is compatible with the LN-9 GMA.	1. Perform the ***Out of Voltage Range Shutdown Test.*** 2. The control cable may be faulty. Check or replace. 3. The voltage PC board may be faulty. Replace.

⚠ CAUTION

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TROUBLESHOOTING

TROUBLESHOOTING GUIDE

Observe Safety Guidelines detailed in the beginning of this manual.

PROBLEMS (SYMPTOMS)	POSSIBLE AREAS OF MISADJUSTMENT(S)	RECOMMENDED COURSE OF ACTION
FEEDING PROBLEMS		
When the gun trigger is activated the drive rolls turn, but the wire will not feed or wire feeding is rough.	1. Check or replace the gun cable. It may be kinked, clogged, or twisted. 2. Make certain the drive rolls and guide tubes are correct for the wire being used. 3. Check or replace the gun contact tip. 4. The electrode wire may be rusty or dirty. Replace if necessary.	1. If conditions are extremely dirty, install a wiper on the wire before it enters the guide tube. Use a piece of cloth saturated with "Pyroil B."

⚠ CAUTION

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TROUBLESHOOTING

TROUBLESHOOTING GUIDE

Observe Safety Guidelines detailed in the beginning of this manual.

PROBLEMS (SYMPTOMS)	POSSIBLE AREAS OF MISADJUSTMENT(S)	RECOMMENDED COURSE OF ACTION
WELDING PROBLEMS		
The welding arc is variable or "hunting."	1. Make sure the welding parameters are correct for the welding procedure being used. 2. Check the welding cables for loose or faulty connections. 3. The gun cable may be faulty. Check or replace. 4. The gun contact tip may be worn. Check or replace. 6. The welding power supply may be faulty. Check or replace.	1. Put the power source in "Machine Control" for voltage, and check whether welding performance improves. If the problem is resolved, check or replace the control cable. Or, the LN-9 GMA voltage PC board may be faulty. 2. Perform the ***Wire Drive Motor Test.***

⚠ CAUTION

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TROUBLESHOOTING

TROUBLESHOOTING GUIDE

Observe Safety Guidelines detailed in the beginning of this manual.

PROBLEMS (SYMPTOMS)	POSSIBLE AREAS OF MISADJUSTMENT(S)	RECOMMENDED COURSE OF ACTION
WELDING PROBLEMS		
Poor arc striking with sticking or "blast offs." The weld bead may also be ropey and display weld porosity.	1. Make sure the welding parameters and techniques are correct for the welding procedure being used. 2. Check the welding cables for loose or faulty connections. 3. The gun cable may be faulty. Check or replace. 4. The gun contact tip may be worn. Check or replace. 5. The welding power source may be faulty. Check or replace.	1. Put the power source in "Machine Control" and check whether welding performance improves. If the problem is resolved, check or replace the control cable. Or, the LN-9 GMA voltage PC board may be faulty.

⚠ CAUTION

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TROUBLESHOOTING

TROUBLESHOOTING GUIDE

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PROBLEMS (SYMPTOMS)	POSSIBLE AREAS OF MISADJUSTMENT(S)	RECOMMENDED COURSE OF ACTION
METER FUNCTION PROBLEMS		
The arc is unstable or oscillating.	1. Check the welding cables for loose or faulty connections. 2. Make sure the electrode and gas (if used) are correct for the process being used. 3. Put the Lincoln power source in the “Machine Control” mode. Jumper the “BYPASS” pins on the LN-9 GMA voltage PC board. Adjust the weld voltage from the power source for the process being used. If the problem is NOT resolved, the power source may be faulty.	1. The LN-9 GMA voltage PC board may be faulty. Replace.

⚠ CAUTION

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INSTALLATION

TROUBLESHOOTING GUIDE

Observe Safety Guidelines detailed in the beginning of this manual.

PROBLEMS (SYMPTOMS)	POSSIBLE AREAS OF MISADJUSTMENT(S)	RECOMMENDED COURSE OF ACTION
METER FUNCTION PROBLEMS		
The SET and actual speed meter readings match within a few IPM, but both are in error.	1. Contact your local Lincoln Authorized Field Service Facility.	1. Perform the ***Hall Effect Alignment Procedure.*** 2. Perform the ***Meter Circuit Accuracy Test.*** 3. The control PC board may be faulty. Replace.
SET speed and actual speed meter readings do NOT match within a few IPM. One or both readings may be erratic.	1. Contact your local Lincoln Authorized Field Service Facility.	1. Check the Volts-Speed meter selector switch and the associated wiring. See the Wiring Diagram. 2. Check the SET-ACTUAL switch and the associated wiring. See the Wiring Diagram. 3. Perform the ***Hall Effect Alignment Procedure.*** 4. Perform the ***Meter Circuit Accuracy Test.***

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TROUBLESHOOTING

TROUBLESHOOTING GUIDE

Observe Safety Guidelines detailed in the beginning of this manual.

PROBLEMS (SYMPTOMS)	POSSIBLE AREAS OF MISADJUSTMENT(S)	RECOMMENDED COURSE OF ACTION
METER FUNCTION PROBLEMS		
SET volts and actual volts readings match within a few tenths of a volt while welding. However, both readings are inaccurate.	1. Put the Lincoln power source in the "Machine Control" mode. Check to see if the power source can be set for the arc voltage required for the process. If not, the power source may be faulty. 2. The control cable may be faulty. Check or replace.	1. Check the voltage sensing leads for continuity (zero ohms). Lead #21 should have continuity to the work piece, and #67 should have continuity to the brass conductor block. See the Wiring Diagram. 2. Perform the ***Meter Circuit Accuracy Test.*** 3. The voltage PC board may be faulty. Replace.
The actual volts reading does NOT match the SET volts reading within a few tenths of a volt while welding. One reading may be erratic. The LN-9 GMA does NOT shut off. NOTE: The Pulse Power Filter kit may slow down the shutdown feature.	1. Make sure the shutdown "BYPASS" pins are NOT jumpered together on the LN-9 GMA voltage PC board. 2. Check the voltage sensing leads for continuity (zero ohms). Lead #21 should have continuity to the work piece, and #67 should have continuity to the brass conductor block. See the Wiring Diagram. 3. Put the Lincoln power source in the "Machine Control" mode. Check to see if the power supply can be set for the arc voltage required for the process. If not, the power supply may be faulty.	1. If the actual reading is the problem, check the actual volts switch and associated leads. 2. If the SET reading is the problem, check the set volts switch and the associated leads. 3. Check the Volts-Speed selector switch and associated leads. 4. The voltage PC board may be faulty. Replace.

⚠ CAUTION

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TROUBLESHOOTING

TROUBLESHOOTING GUIDE

Observe Safety Guidelines detailed in the beginning of this manual.

PROBLEMS (SYMPTOMS)	POSSIBLE AREAS OF MISADJUSTMENT(S)	RECOMMENDED COURSE OF ACTION
STARTING PROBLEMS		
The output voltage is too low to start the weld.	1. Check the welding cables for loose or faulty connections. 2. Put the Lincoln power source in the "Machine Control" mode. Jumper the "BYPASS" pins on the LN-9 GMA voltage PC board. Adjust the weld voltage from the power source for the process being used. If the correct voltage cannot be set, the power source may be faulty. 3. Check for correct control cable connections to the power supply. 4. The control cable may be faulty. Check or replace.	1. Check the voltage control potentiometer (R3) and the associated leads. See the Wiring Diagram. 2. The voltage PC board may be faulty. Replace.

⚠ CAUTION

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TROUBLESHOOTING

TROUBLESHOOTING GUIDE

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PROBLEMS (SYMPTOMS)	POSSIBLE AREAS OF MISADJUSTMENT(S)	RECOMMENDED COURSE OF ACTION
STARTING PROBLEMS		
Voltage seems to be too high or the arc flares at the start of weld. Welding is good.	1. Adjust the "start" trimmer on the voltage PC board. It should be only slightly higher than the weld voltage. See ***Starting Characteristics*** in the ***Operation*** section of this manual. 2. Put the Lincoln power source in the "Machine Control" mode. Jumper the "BYPASS" pins on the LN-9 GMA voltage PC board. Adjust the weld voltage from the power source for the process being used. If the correct voltage cannot be set, the power source may be faulty. 3. Check for correct control cable connections to the power supply.	1. The LN-9 GMA voltage PC board may be faulty. Replace.

⚠ 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

TROUBLESHOOTING GUIDE

Observe Safety Guidelines detailed in the beginning of this manual.

PROBLEMS (SYMPTOMS)	POSSIBLE AREAS OF MISADJUSTMENT(S)	RECOMMENDED COURSE OF ACTION
STARTING PROBLEMS		
The arc voltage appears to rise too slowly or stubs or blasts at the start of a weld. Once started the welding is good. NOTE: Pulse Power 500 operation with a filter kit may exhibit these symptoms.	1. Adjust the "start" trimmer on the voltage PC board. It should be slightly higher than the weld voltage. See ***Starting Characteristics*** in the ***Operation*** section of this manual. 3. Put the Lincoln power source in the "Machine Control" mode. Jumper the "BYPASS" pins on the LN-9 GMA voltage PC board. Adjust the weld voltage from the power source for the process being used. If the correct voltage cannot be set, the power source may be faulty. 4. Check for correct control cable connections to the power supply.	1. The voltage PC board may be faulty. Replace.

⚠ 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

T1 TRANSFORMER 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.

DESCRIPTION

This test will aid the technician in determining if the T1 transformer is functioning.

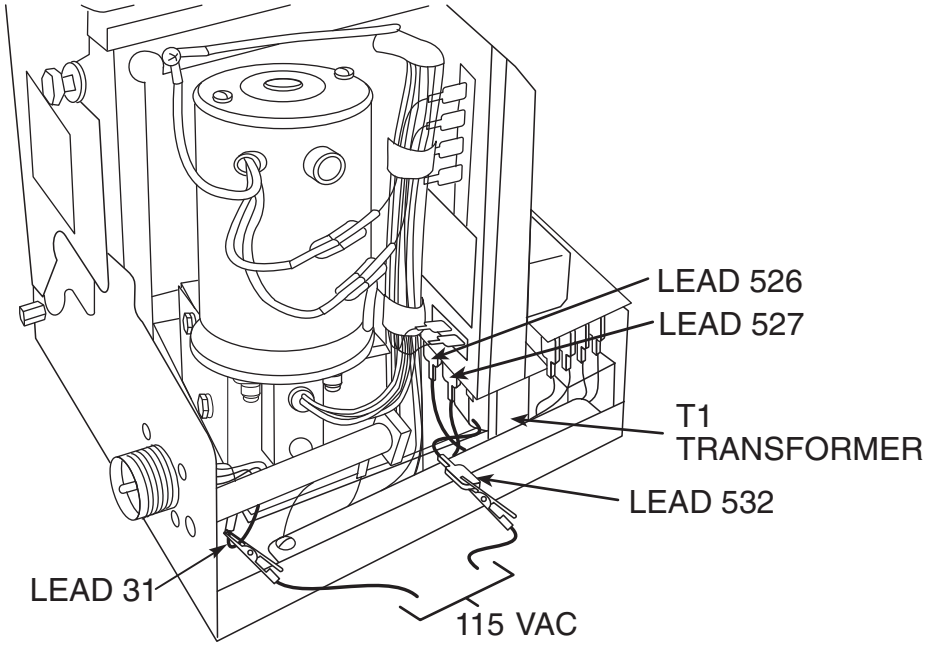
MATERIALS NEEDED

115VAC power supply
Phillips head screwdriver
Volt/ohmmeter (multimeter)

This procedure takes approximately 20 minutes to perform.

T1 TRANSFORMER TEST *(continued)*

FIGURE F.1 – LEAD #532 AT POWER PC BOARD



TEST PROCEDURE

1. Remove input power to the LN-9 GMA wire feeder.
2. Using the phillips head screwdriver, remove the screws holding the left side cover assembly.
3. Disconnect lead #532 from the power PC board terminal. See Figure F.1.
4. Apply power (115VAC) to the T1 transformer primary leads #31 and #532. See Figure F.1 and the Wiring Diagram.
5. Using the volt-ohmmeter, check for 28VAC at secondary leads #526 and #527. See Figure F.1. Place the meter probes where the leads attach to the power PC board terminals.

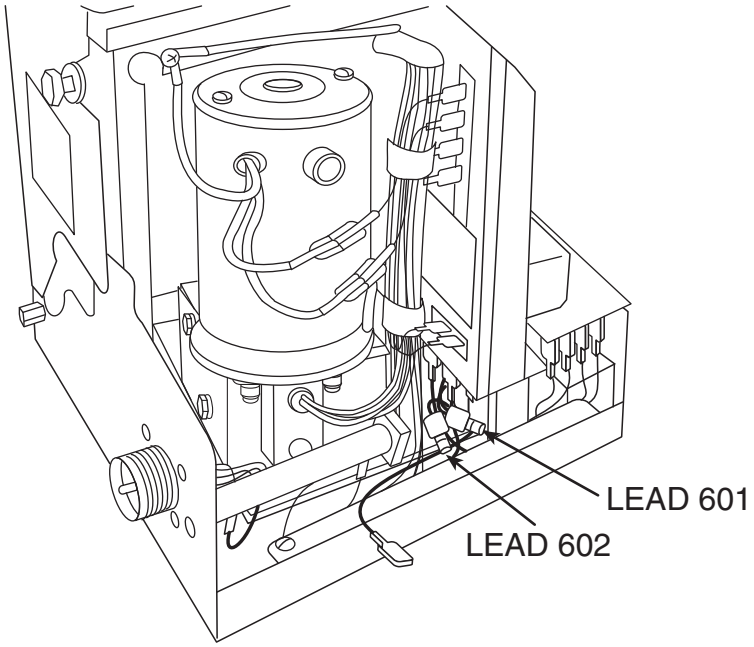
⚠ WARNING

Electric Shock can kill.

- With power applied, there are high voltages inside the wire feeder. Do not reach into the wire feeder or touch any internal part of the wire feeder while power is applied.

T1 TRANSFORMER TEST *(continued)*

FIGURE F.2 – SECONDARY LEADS #601 AND #602 AT LEAD SPLICES



6. Using the volt/ohmmeter, check for 10VAC at secondary leads #601 and #602. Typically, these leads are yellow. Place the probes at the lead splices. See Figure F.2.
7. With 115VAC applied to the primary leads #532 and #31, if either or both of the secondary voltages are missing or low the T1 transformer may be faulty. Replace the transformer.
8. After the test is completed, disconnect the 115VAC from the T1 transformer primary leads. Reconnect lead #532 to the power PC board terminal. Close the left side cover assembly and re-assemble the screws.

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TROUBLESHOOTING

T2 TRANSFORMER 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.

DESCRIPTION

This test will aid the technician in determining if the T2 transformer is functioning.

MATERIALS NEEDED

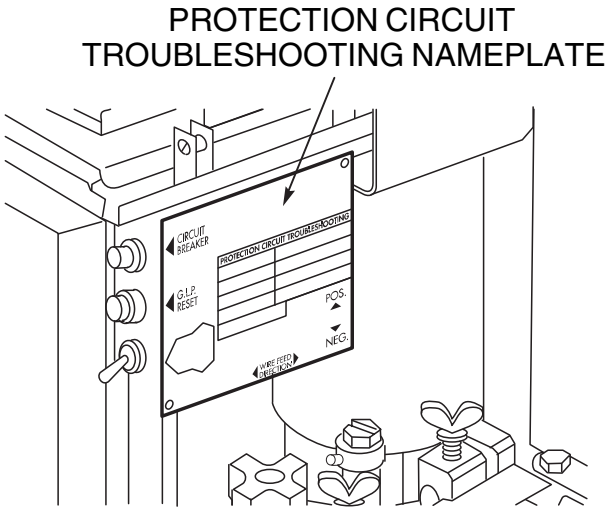
115VAC power supply
Phillips head screwdriver
Volt/ohmmeter (multimeter)

This procedure takes approximately 20 minutes to perform.

TROUBLESHOOTING

T2 TRANSFORMER TEST *(continued)*

FIGURE F.3 – "PROTECTION CIRCUIT TROUBLESHOOTING" NAMEPLATE

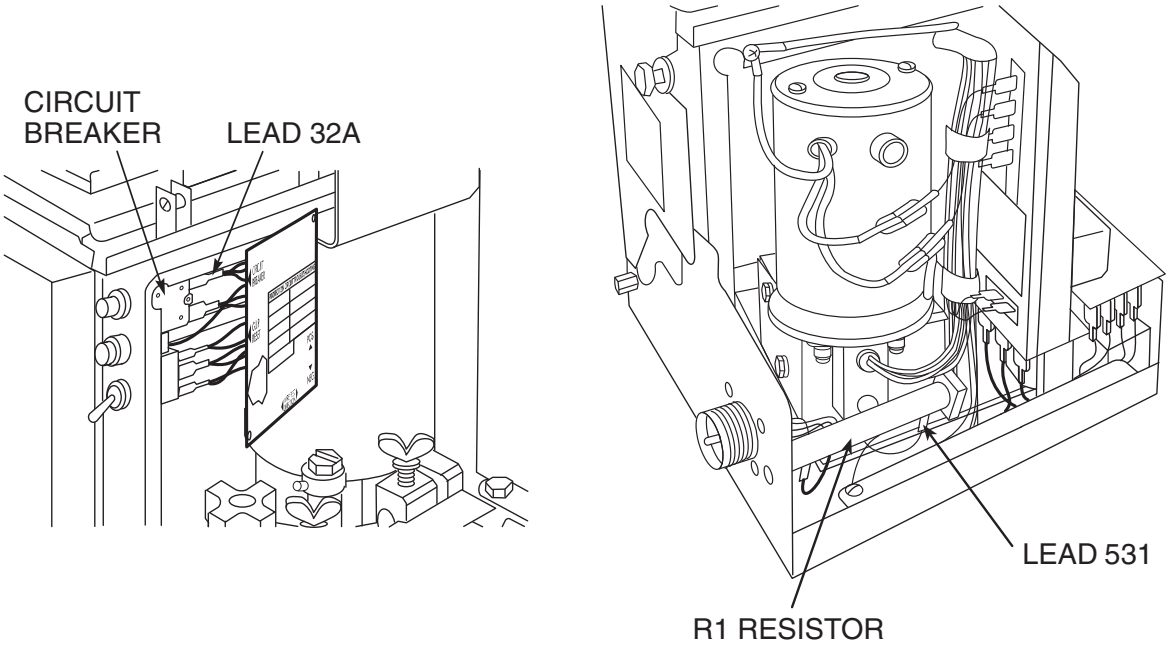


TEST PROCEDURE

1. Remove input power to the LN-9 GMA wire feeder.
2. Using the phillips head screwdriver, remove the screws holding the left side cover assembly.
3. Lift the right side cover assembly.
4. Using the phillips head screwdriver, remove the two screws from the Protection Circuit Troubleshooting nameplate. Remove the nameplate as far as the lead length will allow. See Figure F.3.

T2 TRANSFORMER TEST *(continued)*

FIGURE F.4 – T2 PRIMARY LEADS #32A AT 5 AMP CIRCUIT BREAKER AND #531 AT R1 RESISTOR

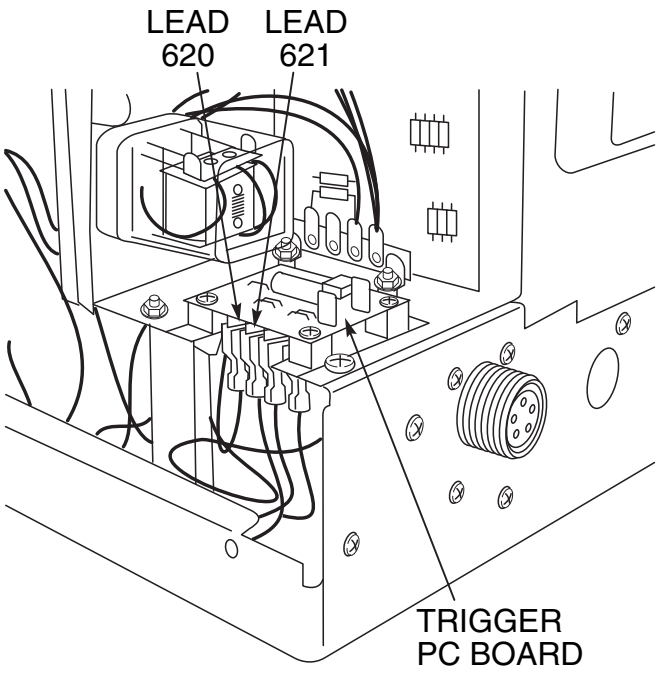


4. Locate the T2 transformer primary lead #32A connected to the 5 amp circuit breaker. Remove lead #32A from the circuit breaker. See Figure F.4 and the Wiring Diagram.
5. Lift the left side cover assembly.
6. Locate T2 transformer primary lead #531 connected to the R1 2-ohm resistor. See the Wiring Diagram. See Figure F.4.

TROUBLESHOOTING

T2 TRANSFORMER TEST *(continued)*

FIGURE F.5 – T2 SECONDARY LEADS #621 AND #620 ON TRIGGER PC BOARD



⚠ WARNING

Electric Shock can kill.

- With power applied, there are high voltages inside the wire feeder. Do not reach into the wire feeder or touch any internal part of the wire feeder while power is applied.

7. Insulate the T2 transformer primary leads #531 and #32A and apply 115 VAC power. See the Wiring Diagram and ***Figure F.4.***
8. Using the volt/ohmmeter, check for approximately 24VAC at the T2 transformer secondary leads #621 and #620. Place the probes where the leads connect on the trigger PC board. See Figure F.5.
9. With 115VAC applied to the primary leads #531 and #32A, if the secondary voltage is missing or low the T2 transformer may be faulty. Replace the T2 transformer.
10. After the test is completed, disconnect the 115VAC from the T2 transformer primary leads #531 and #32A. Reconnect lead #32 to the circuit breaker. Re-attach the Protection Circuit Troubleshooting nameplate. Close the right and left side cover assemblies and replace all previously removed screws.

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TROUBLESHOOTING

WIRE DRIVE MOTOR 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.

DESCRIPTION

This test will help determine if the drive motor is functioning properly.

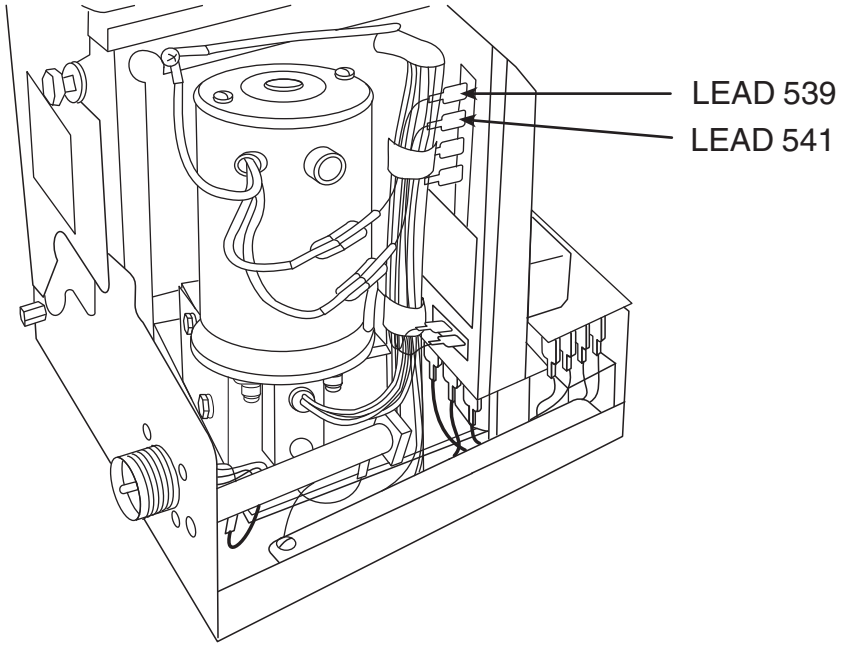
MATERIALS NEEDED

Phillips head screwdriver
Analog volt/ohmmeter (multimeter)

This procedure takes approximately 12 minutes to perform.

WIRE DRIVE MOTOR TEST *(continued)*

FIGURE F.6 – LEAD #539 AND #541 AT POWER PC BOARD TERMINAL STRIP



TEST PROCEDURE

1. Remove input power to the LN-9 GMA wire feeder.
2. Remove any electrode wire or disengage the drive rolls.
3. Using the phillips head screwdriver, remove the screws from the left side cover assembly.
4. Lift the left side cover assembly.
5. Locate leads #539 and #541 at the power PC board terminal strip. See Figure F.6.

WIRE DRIVE MOTOR TEST *(continued)*

⚠ WARNING

ELECTRIC SHOCK can kill.

- With power applied, there are high voltages inside the wire feeder. Do not reach into the wire feeder or touch any internal part of the wire feeder while power is applied.

6. Apply 115 VAC power.
7. With the gun trigger activated or the gun terminals jumpered together (see the Wiring Diagram), check the motor armature volts at leads #541(+) and #539(-). Normal is 5 to 95VDC depending on the wire feed speed setting. As the armature voltage is increased the wire feed speed should increase.
8. If the above voltages are present and the motor does not operate, the motor, motor brushes or gear box may be faulty.

   If the armature voltage is missing or not correct, the power board or 1CR relay may be faulty.

   If the motor is running at high speed and the armature voltage is high and uncontrollable, proceed with the ***Hall Effect Module Test.***

HALL EFFECT MODULE TEST AND ALIGNMENT

⚠ 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.

DESCRIPTION

This test will help determine if the Hall Effect Module is correctly aligned and functioning properly.

MATERIALS NEEDED

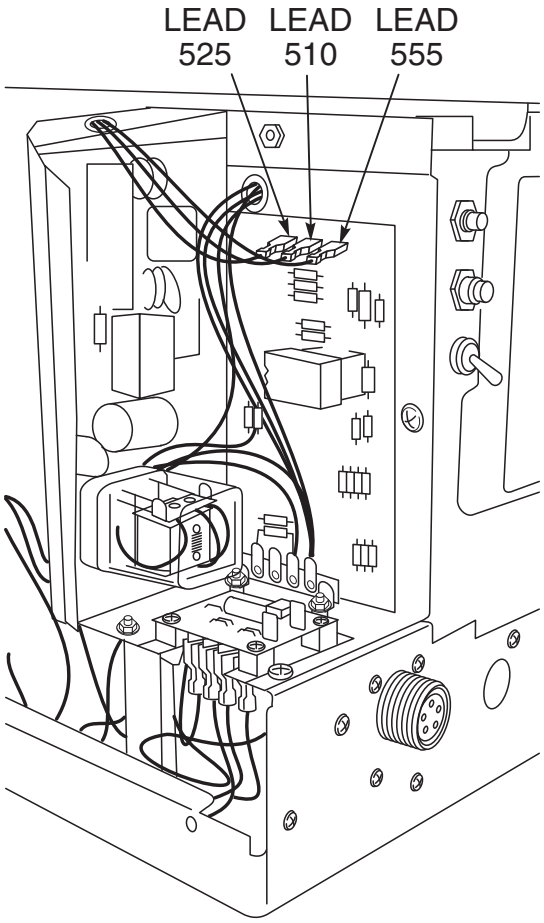
9/16” Wrench
Analog volt/ohmmeter (multimeter)
Phillips head screwdriver

The Hall Effect Module Test takes approximately 10 minutes to perform.

The Hall Effect Alignment Procedure takes approximately 10 minutes to perform.

HALL EFFECT MODULE TEST AND ALIGNMENT *(continued)*

FIGURE F.7 – LEADS #525, #510, #555 ON CONTROL PC BOARD



HALL EFFECT MODULE FEEDBACK TEST PROCEDURE

1. Remove the input power to the LN-9 GMA wire feeder.
2. Remove any electrode wire or disengage the drive rolls.
3. Using the phillips head screwdriver, remove the screws from the left side cover assembly.
4. Lift the left side cover.
5. Locate the hall effect leads #510, #525 and #555 on the control PC board. See Figure F.7.

TROUBLESHOOTING

HALL EFFECT MODULE TEST AND ALIGNMENT *(continued)*

⚠ WARNING

ELECTRIC SHOCK can kill.

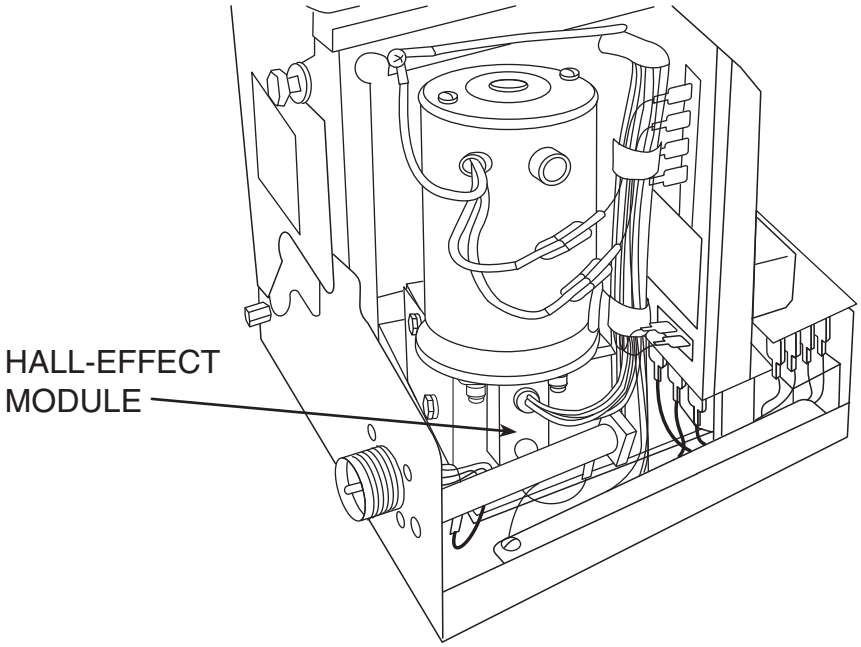
- With power applied, there are high voltages inside the wire feeder. Do not reach into the wire feeder or touch any internal part of the wire feeder while power is applied.

6. Apply input power to the LN-9 GMA and test for 15VDC at leads #525(+) to #510(-). This is the supply voltage from the control PC board to the hall effect module. If the correct voltage is present, proceed to the next step. If the voltage is missing, check the wiring and perform the ***General Power Supply Test.***

7. With the gun trigger activated or the gun terminals jumpered together (see the Wiring Diagram), check leads #555(+) to #510(-) for the presence of between 4.5 - 10.5VDC. (The motor must be running.) This is the feedback voltage from the hall effect module to the control PC board. This voltage is dependent upon motor speed. If the feedback voltage is missing or does not vary with motor speed, the hall effect module may be faulty.

HALL EFFECT MODULE TEST AND ALIGNMENT *(continued)*

FIGURE F.8 – HALL EFFECT MODULE LOCATION



HALL EFFECT MODULE ALIGNMENT TEST PROCEDURE

The LN-9 GMA wire speed sensor is a three lead hall-effect device encased in an externally threaded housing. It is screwed into a mounting plate on the motor side of the wire drive gearbox. See Figure F.8.

1. Remove the input power to the LN-9 GMA.
2. Check that the module mounting plate is screwed securely to the side of the gearbox and seated flush against the top surface.
3. Gently screw the hall effect module into the mounting plate until it just touches and stops against the rotating part inside the gearbox.
4. Back the module out 1/2 turn. Then, using the 9/16” wrench, carefully snug the module locknut without rotating the module position.
5. After the hall effect module tests are completed, remove the jumper from the gun terminals (if used). Close the left side case cover assembly and reattach the screws.

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TROUBLESHOOTING

VOLTMETER ACCURACY 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.

DESCRIPTION

This test will help determine if the LN-9 GMA voltmeter is providing accurate readings.

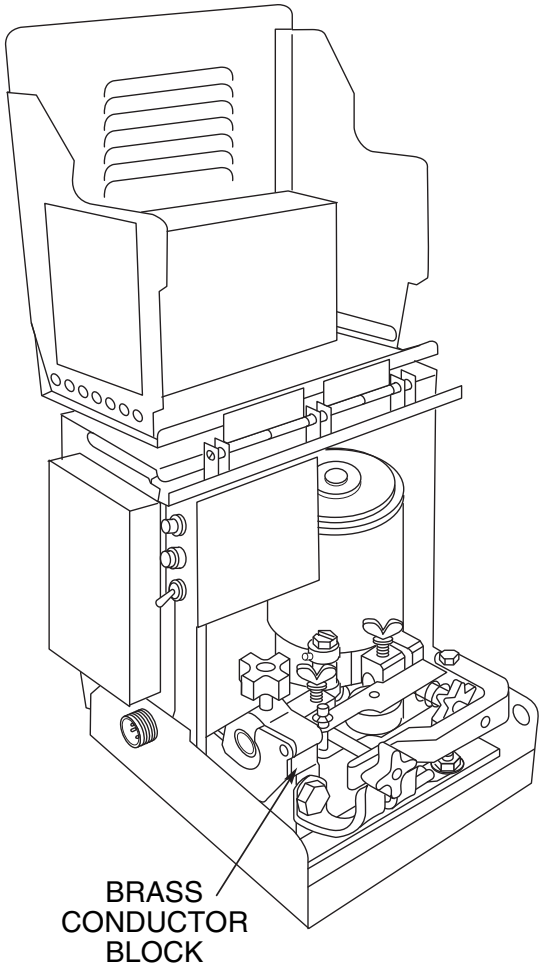
MATERIALS NEEDED

Phillips head screwdriver
Digital volt/ohmmeter (multimeter) with at least 3-1/2 digits and ± 0.5% accuracy

This procedure takes approximately 8 minutes to perform.

VOLTMETER ACCURACY TEST *(continued)*

FIGURE F.9 – VOLTMETER CONNECTION POINT



TEST PROCEDURE

Perform the following checks with the LN-9 GMA wire feeder connected to a Lincoln CV welding power source according to the proper connection diagram. (See the ***Installation*** section of this manual.)

See Figure F.9 for this test.

1. Lift the right side cover assembly.
2. Connect the test meter (see Materials Needed) between the brass conductor block on the wire feeder and the work piece.

VOLTMETER ACCURACY TEST *(continued)*

⚠ WARNING

ELECTRIC SHOCK can kill.

- With power applied, there are high voltages inside the wire feeder. Do not reach into the wire feeder or touch any internal part of the wire feeder while power is applied.

3. With the LN-9 GMA gun trigger closed or the gun terminals jumpered together (see the Wiring Diagram), the test meter reading should match the LN-9 GMA ACTUAL volts reading within ± 0.5 volts. If it does not, check the integrity and placement of the voltage sensing leads #21 and #67. Perform the ***Meter Circuit Accuracy Test.***
4. Remove the test voltmeter and, while welding, compare the SET volts and ACTUAL volts meter readings. Depending upon the arc voltage characteristics of the welding process being used, the ACTUAL reading may vary somewhat around an average value. The average ACTUAL reading should match the SET reading within ± 0.5 volts. If not, refer to the ***Meter Circuit Accuracy Test.***
5. If no further tests are required, remove the jumper from the gun terminals (if used) and close the left case side cover assembly.

METER CIRCUIT ACCURACY 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.

DESCRIPTION

This test will help determine if the LN-9 GMA meter circuit is functioning properly.

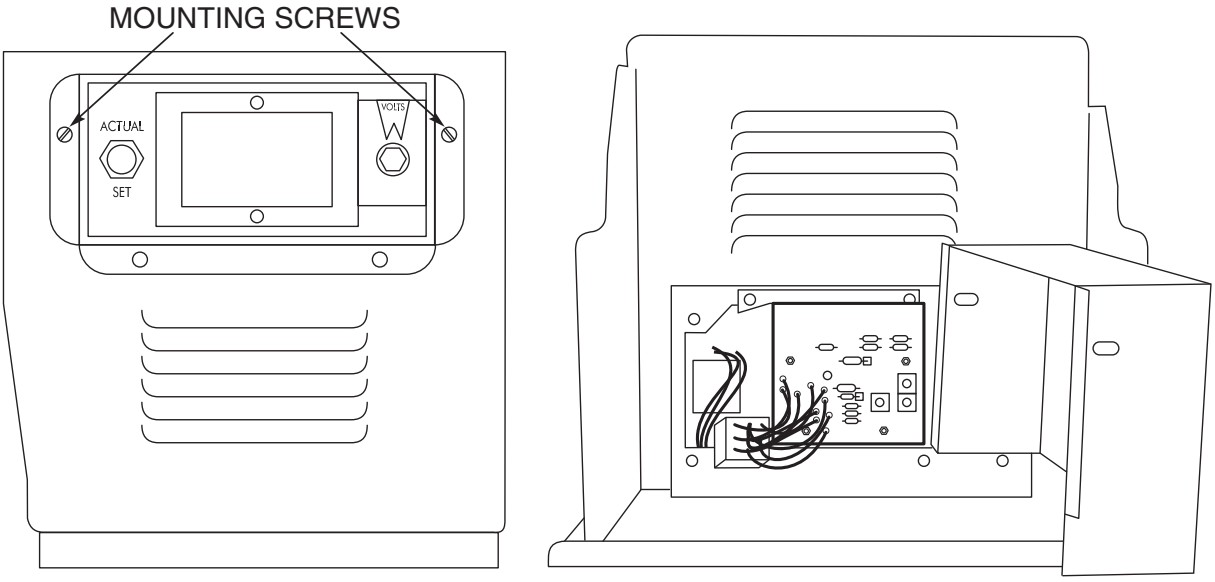
MATERIALS NEEDED

Phillips head screwdriver
Digital volt/ohmmeter (multimeter) with at least 3-1/2 digits and ± 0.5% accuracy
Slot head screwdriver
3/8" Nut driver

This procedure takes approximately 17 minutes to perform.

METER CIRCUIT ACCURACY TEST *(continued)*

FIGURE F.10 – METER PC BOARD LOCATIONS AND COVER



TEST PROCEDURE

1. Remove input power to the LN-9 GMA wire feeder.
2. Lift the right side cover assembly and remove the two screws holding the meter cover to the right side assembly. Carefully remove the meter cover. See Figure F.10.
3. Locate and gain access to the meter PC board. See Figure F.10.
4. Apply input power to the wire feeder.

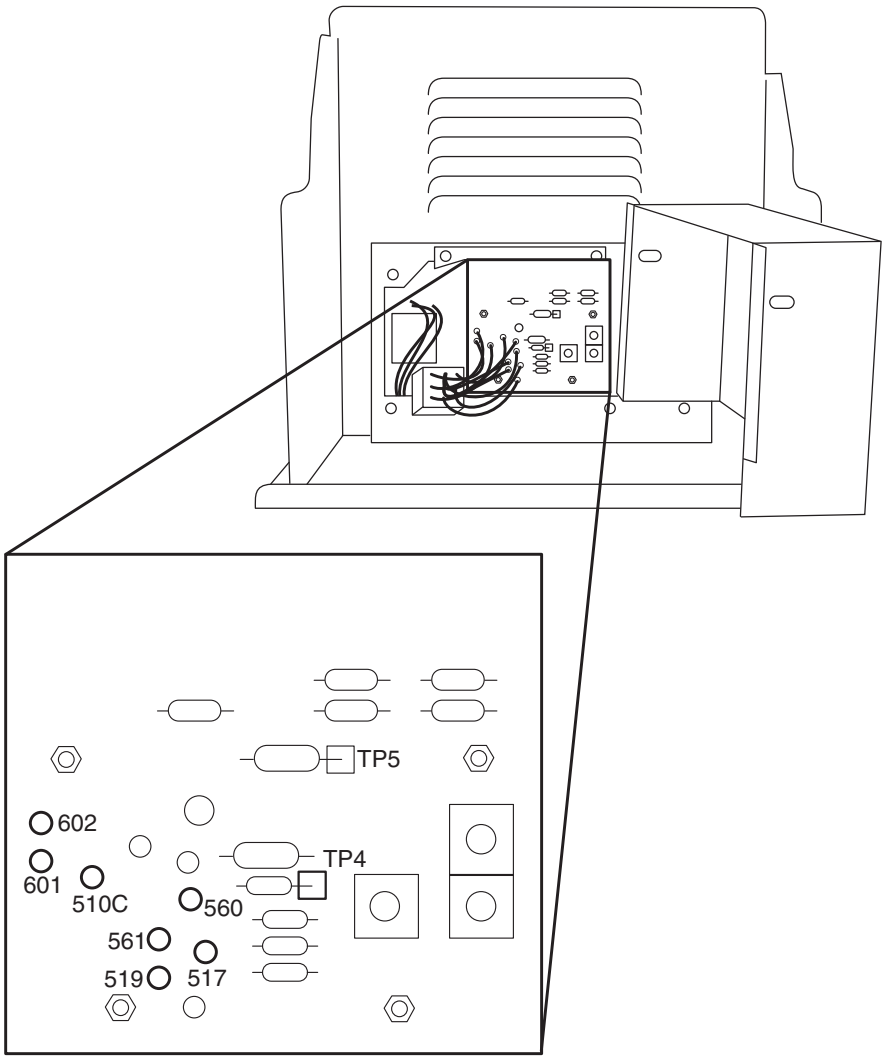
⚠ WARNING

ELECTRIC SHOCK can kill.

- With power applied, there are high voltages inside the wire feeder. Do not reach into the wire feeder or touch any internal part of the wire feeder while power is applied.

METER CIRCUIT ACCURACY TEST *(continued)*

FIGURE F.11 – METER PC BOARD TEST POINTS



5. Test for AC supply to the meter PC board.

   Check for 8 to 11 VAC from lead #601 to #602. See Figure F.11.

   NOTE: The coating will have to be removed from the test points.

6. Test for DC volts on the meter PC board.

   Check for 4.75 to 5.25 VDC from TP5 to lead #510C. See Figure F.11.

   NOTE: The coating will have to be removed from the test points.

If the display is NOT lit and the correct DC voltage is present at TP5 to lead #510C, the digital meter may be faulty. Replace the digital meter.

If AC voltage IS present at leads #601 to #602 and the DC voltage is missing, the meter PC board may be faulty.

METER CIRCUIT ACCURACY TEST *(continued)*

Test Digital Meter Accuracy. (For LN-9 GMA models above code 7980 with separable digital meter and meter boards only).

1. Use a test meter with at least 3-1/2 digits and ± 0.5% accuracy.
2. Connect the + probe to TP4 and the - probe to lead #510C.

NOTE: The coating will have to be removed from the test points.

3. With the meter in SET volts, adjust the voltage control until the test meter matches the settings in the table below.

   If the LN-9 GMA digital meter does not match the readings, the LN-9 GMA digital meter may be faulty. Replace the digital meter.

LN-9 GMA SET VOLTS READING	TEST VOLTMETER READING
15.0 V	.150 ± .004 VDC
30.0 V	.300 ± .004 VDC
60.0 V	.600 ± .006 VDC

Test Meter PC Board Voltage Accuracy. (All Models)

1. Use a test meter with at least 3-1/2 digits and ± 0.5% accuracy.
2. Connect the + probe to leads #517 and the - probe to lead #510C.

NOTE: The coating will have to be removed from the test points.

3. With the meter in SET volts, adjust the voltage control until the LN-9 GMA meter matches the settings in the table below.

If the test meter does not match the readings, the meter PC board may be faulty. Replace the meter PC board.

LN-9 GMA SET VOLTS READING	TEST VOLTMETER READING
15.0 V	1.50 ± .05 VDC
30.0 V	3.00 ± .05 VDC
60.0 V	6.00 ± .07 VDC

Test Meter PC Board Wire Feed Speed Accuracy. (For LN-9 GMA, LN-9F GMA Models Only)

1. Use a test meter with at least 3-1/2 digits and ± 0.5% accuracy.
2. Connect the + probe to lead #519 and the - probe to lead #510C.

NOTE: The coating will have to be removed from the test points.

3. With the meter in SET IN/MIN, adjust the speed control until the LN-9 GMA meter matches the settings in the table below. If the test meter does not match the readings, the meter PC board may be faulty. Replace the meter PC board.

LN-9 GMA SET VOLTS READING	TEST VOLTMETER READING
082 IPM	0.50 ± .05 VDC
489 IPM	3.00 ± .05 VDC
978 IPM	6.00 ± .07 VDC

METER CIRCUIT ACCURACY TEST *(continued)*

Test Meter PC Board Wire Feed Speed Accuracy. (Metric Models Only)

1. Use a test meter with at least 3-1/2 digits and ± 0.5% accuracy.
2. Connect the + probe to lead called for in the table below and the - probe to lead #510C.

NOTE: The coating will have to be removed from the test points.

3. With the meter in SET M/MIN, adjust the speed control until the LN-9 GMA meter matches the settings in the table below. If the test meter does not match the readings, the meter PC board may be faulty. Replace the meter PC board.

METRIC MODEL	METRIC RANGE	SET M/MIN READING	TEST VOLTMETER READING
LN-9 GMA or LN-9F GMA	LO	8.28	LEAD #560 2.00 ± .05VDC
	HI	24.8	LEAD #561 6.00 ± .07VDC

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TROUBLESHOOTING

WIRE SPEED ACCURACY 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.

DESCRIPTION

This test will help determine if the LN-9 GMA is providing the proper wire feed inches per revolution of the drive roll.

MATERIALS NEEDED

Phillips head screwdriver
Ruler or other linear measuring device

This procedure takes approximately 12 minutes to perform.

WIRE SPEED ACCURACY TEST *(continued)*

TEST PROCEDURE

Perform the following checks with the LN-9 GMA wire feeder connected to a Lincoln CV welding power source according to the proper connection diagram. (See the ***Installation*** section of this manual.)

A. Check for the proper wire feed inches per revolution of the drive roll.

1. Set the LN-9 GMA wire speed control for between 50 and 120 IPM (1.27 to 3.17 M/MIN).
2. Measure the precise length of wire fed by exactly 10 revolutions of the drive rolls. This measured length should be 53.0 ± .8 inches (1.35 ± .02 meters). If not, there may be a problem with the wire or the wire feed path. See the ***Troubleshooting Guide (Feeding Problems)*** in this section of the manual. Also check for correct drive roll tension adjustment.

B. Check for the proper drive roll revolutions per minute.

1. Adjust the LN-9 GMA wire speed control for the LN-9 GMA ACTUAL speed meter readings given in the table below.
2. Compare the corresponding LN-9 GMA drive roll RPM (counted revolutions in 60 seconds) and LN-9 GMA SET speed meter readings with the table below. The numbers should match. If not, perform the ***Meter Circuit Accuracy Test.***

MODEL	ACTUAL SPEED METER READING		MEASURED DRIVE ROLL SPEED	SET SPEED METER READING	
MODEL	IN/MIN	M/MIN	RPM	IN/MIN	M/MIN
LN-9 GMA or LN-9F GMA	161 322	4.1 8.2	30 ± 1/2 60 ± 1	161 ± 3 322 ± 3	04.1 ± .1 08.2 ± .1

OUT OF VOLTAGE RANGE SHUT DOWN 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.

DESCRIPTION

This test will help determine if the out-of-voltage range shut down circuitry is functioning properly.

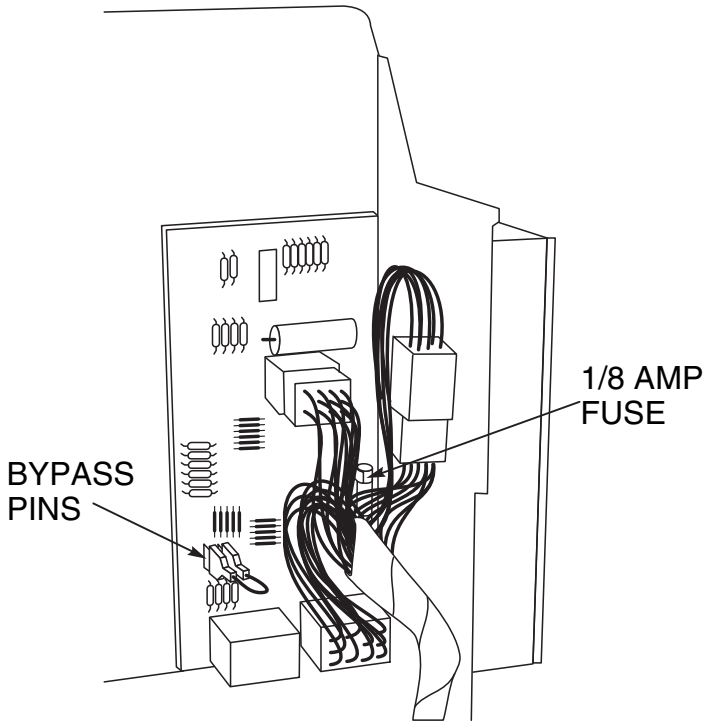
MATERIALS NEEDED

Phillips head screwdriver
Volt/ohmmeter (multimeter)
Jumper wire

This procedure takes approximately 18 minutes to perform.

OUT OF VOLTAGE RANGE SHUT DOWN TEST *(continued)*

FIGURE F.12 – VOLTAGE PC BOARD WITH JUMPERS



TEST PROCEDURE

1. Remove input power to the LN-9 GMA wire feeder.
2. Using the phillips head screwdriver, remove the screws from the left side cover assembly.
3. Lift the left side cover assembly.
4. Locate the voltage PC board. Jumper together the "BYPASS" pins on the LN-9 GMA voltage PC board. See Figure F.12. (On older voltage boards these pins may be labeled "B".) This should disable the shut down circuit.

⚠ WARNING

ELECTRIC SHOCK can kill.

- With power applied, there are high voltages inside the wire feeder. Do not reach into the wire feeder or touch any internal part of the wire feeder while power is applied.

5. Connect to a Lincoln Electric CV power source per connection diagram. See the ***Installation*** section of this manual.
6. Start welding and observe the ACTUAL voltage reading on the LN-9 GMA digital meter. The actual voltage must match the SET voltage within ± 0.5V. If it does NOT, the LN-9 GMA is designed to shut down.
7. If the LN-9 GMA continues to shut down with the "BYPASS" pins jumpered together, the voltage PC board may be faulty.

OUT OF VOLTAGE RANGE SHUT DOWN TEST *(continued)*

8. If the ACTUAL voltage reading is zero, the sensing leads may be faulty. Check the continuity (zero ohms) of leads #21 and #67. Lead #21 must have continuity to the work-piece, and #67 must have continuity to the electrode. Also check the 1/8 amp fuse on the voltage PC board.
9. Check the polarity switches in the LN-9 GMA and the Lincoln power source and their associated leads. Set the switches to the same polarity as the electrode. See the Wiring Diagram.
10. If the ACTUAL voltage reading is different from the SET voltage reading, the power source may not be capable of producing the required arc voltage, the control cable may be faulty or misconnected, or the LN-9 GMA voltage PC board may be faulty.
11. After all tests are complete, remove input power to the wire feeder and remove the jumper you placed on the "BYPASS" pins on the voltage PC board. Reattach the left case side cover assembly.

GENERAL POWER SUPPLY TESTS

⚠ 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.

DESCRIPTION

These tests will help determine if the power PC board is supplying the correct voltage to the control PC board and the voltage PC board.

MATERIALS NEEDED

Phillips head screwdriver
Volt/ohmmeter (multimeter)

This procedure takes approximately 18 minutes to perform.

GENERAL POWER SUPPLY TESTS *(continued)*

TEST PROCEDURE

1. Remove input power to the LN-9 GMA wire feeder.
2. Using the phillips head screwdriver, remove the screws from the left side cover assembly.
3. Lift the left side cover assembly.
4. Locate the power PC board and the control PC board in the wire feeder main assembly; locate the voltage PC board in the left side cover.

⚠ WARNING

ELECTRIC SHOCK can kill.

- With power applied, there are high voltages inside the wire feeder. Do not reach into the wire feeder or touch any internal part of the wire feeder while power is applied.

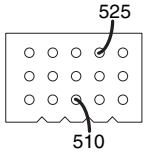
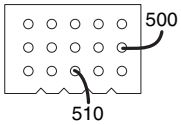
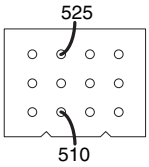
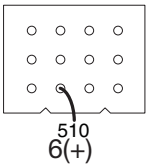
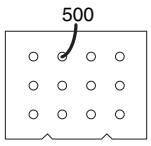
5. Apply power (115VAC) to the wire feeder at the correct pins. See the Wiring Diagram.
6. Perform the power supply checks as described in the table below. If any of the readings are incorrect (out of range) or missing, the power PC board may be faulty.

NOTE: Do NOT unplug the Molex connector.

7. Also perform the ***T1 Transformer Test.***

GENERAL POWER SUPPLY TESTS *(continued)*

GENERAL POWER SUPPLY CHECKS

CHECKPOINT LOCATION	TEST DESCRIPTION	CONNECTOR PLUG PIN NO.	LEAD NO.	NORMAL ACCEPTABLE VOLTAGE READING
CONTROL P.C. BOARD CONNECTOR PLUG	CHECK +15VDC SUPPLY FROM POWER BOARD TO CONTROL BOARD	 10(+) 9(-)	525(+) 510(-)	13.5 - 15.5 VDC
CONTROL P.C. BOARD CONNECTOR PLUG	CHECK - 10 VDC SUPPLY FROM POWER BOARD TO CONTROL BOARD	 14(-) 9(+)	500(-) 510(+)	9.2 - 10.8 VDC
VOLTAGE P.C. BOARD UPPER CONNECTOR PLUG NEXT TO "F" AND “S” PINS	CHECK + 15 VDC SUPPLY FROM POWER BOARD TO VOLTAGE BOARD	 4(+) 6(-)	525(+) 510(-)	13.5 - 15.5 VDC
VOLTAGE P.C. BOARD UPPER CONNECTOR PLUG NEXT TO "F" AND "S" PINS VOLTAGE P.C. BOARD LOWER CONNECTOR PLUG NEXT TO PLASTIC COVERED RELAY	CHECK - 10 VDC SUPPLY FROM POWER BOARD TO VOLTAGE BOARD	 6(+)  4(-)	510(+) 500(-)	9.2 - 10.8 VDC

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