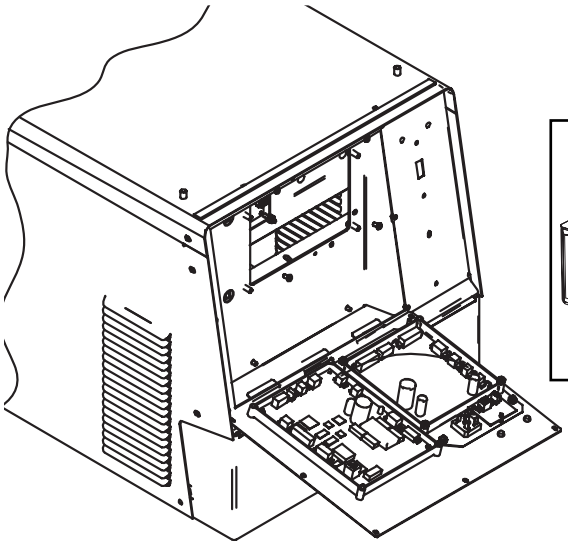
LINCOLN ELECTRIC

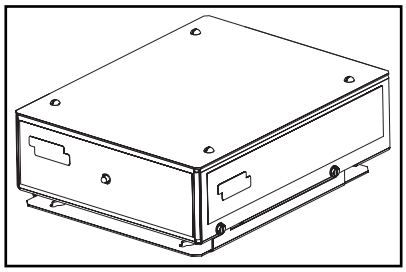
Operator's Manual

Ethernet/DeviceNet® Module & Communication Interface Mounting

For use with machines having Code Numbers:

K2207-2, K2436-1





GENUINE LINCOLN PARTS™

Register your machine:
www.lincolnelectric.com/register

Authorized Service and Distributor Locator:
www.lincolnelectric.com/locator

Save for future reference

Date Purchased

Code: (ex: 10859)

Serial: (ex: U1060512345)

Need Help? Call 1.888.935.3877
to talk to a Service Representative

Hours of Operation:
8:00 AM to 6:00 PM (ET) Mon. thru Fri.

After hours?
Use "Ask the Experts" at lincolnelectric.com
A Lincoln Service Representative will contact you no later than the following business day.

For Service outside the USA:
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IM840-B | Issue Date Oct-15

THANK YOU FOR SELECTING A QUALITY PRODUCT BY LINCOLN ELECTRIC.

PLEASE EXAMINE CARTON AND EQUIPMENT FOR DAMAGE IMMEDIATELY

When this equipment is shipped, title passes to the purchaser upon receipt by the carrier. Consequently, claims for material damaged in shipment must be made by the purchaser against the transportation company at the time the shipment is received.

SAFETY DEPENDS ON YOU

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

⚠ WARNING

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

⚠ CAUTION

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

KEEP YOUR HEAD OUT OF THE FUMES.

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

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

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

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

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

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

WEAR CORRECT EYE, EAR & BODY PROTECTION

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

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

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

IN SOME AREAS, protection from noise may be appropriate.

BE SURE protective equipment is in good condition.

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

SPECIAL SITUATIONS

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

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

Additional precautionary measures

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

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

REMOVE all potential fire hazards from welding area.

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

SECTION A: WARNINGS

CALIFORNIA PROPOSITION 65 WARNINGS

Diesel Engines

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

Gasoline Engines

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

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

Read and understand the following safety highlights. For additional safety information, it is strongly recommended that you purchase a copy of "Safety in Welding & Cutting - ANSI Standard Z49.1" from the American Welding Society, P.O. Box 351040, Miami, Florida 33135 or CSA Standard W117.2-1974. A Free copy of "Arc Welding Safety" booklet E205 is available from the Lincoln Electric Company, 22801 St. Clair Avenue, Cleveland, Ohio 44117-1199.

BE SURE THAT ALL INSTALLATION, OPERATION, MAINTENANCE AND REPAIR PROCEDURES ARE PERFORMED ONLY BY QUALIFIED INDIVIDUALS.

FOR ENGINE POWERED EQUIPMENT.

1.a. Turn the engine off before troubleshooting and maintenance work unless the maintenance work requires it to be running.

1.b. Operate engines in open, well-ventilated areas or vent the engine exhaust fumes outdoors.

1.c. Do not add the fuel near an open flame welding arc or when the engine is running. Stop the engine and allow it to cool before refueling to prevent spilled fuel from vaporizing on contact with hot engine parts and igniting. Do not spill fuel when filling tank. If fuel is spilled, wipe it up and do not start engine until fumes have been eliminated.

1.d. Keep all equipment safety guards, covers and devices in position and in good repair.Keep hands, hair, clothing and tools away from V-belts, gears, fans and all other moving parts when starting, operating or repairing equipment.

1.e. In some cases it may be necessary to remove safety guards to perform required maintenance. Remove guards only when necessary and replace them when the maintenance requiring their removal is complete. Always use the greatest care when working near moving parts.

1.f. Do not put your hands near the engine fan. Do not attempt to override the governor or idler by pushing on the throttle control rods while the engine is running.

1.g. To prevent accidentally starting gasoline engines while turning the engine or welding generator during maintenance work, disconnect the spark plug wires, distributor cap or magneto wire as appropriate.

1.h. To avoid scalding, do not remove the radiator pressure cap when the engine is hot.

ELECTRIC AND MAGNETIC FIELDS MAY BE DANGEROUS

2.a. Electric current flowing through any conductor causes localized Electric and Magnetic Fields (EMF). Welding current creates EMF fields around welding cables and welding machines

2.b. EMF fields may interfere with some pacemakers, and welders having a pacemaker should consult their physician before welding.

2.c. Exposure to EMF fields in welding may have other health effects which are now not known.

2.d. All welders should use the following procedures in order to minimize exposure to EMF fields from the welding circuit:

2.d.1. Route the electrode and work cables together - Secure them with tape when possible.

2.d.2. Never coil the electrode lead around your body.

2.d.3. Do not place your body between the electrode and work cables. If the electrode cable is on your right side, the work cable should also be on your right side.

2.d.4. Connect the work cable to the workpiece as close as possible to the area being welded.

2.d.5. Do not work next to welding power source.

ELECTRIC SHOCK CAN KILL.

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

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

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

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

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

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

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

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

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

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

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

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

ARC RAYS CAN BURN.

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

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

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

FUMES AND GASES CAN BE DANGEROUS.

5.a. Welding may produce fumes and gases hazardous to health. Avoid breathing these fumes and gases. When welding, keep your head out of the fume. Use enough ventilation and/or exhaust at the arc to keep fumes and gases away from the breathing zone. **When welding 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.

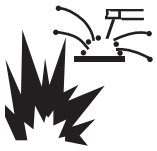
5.c. Do not weld in locations near chlorinated hydrocarbon vapors coming from degreasing, cleaning or spraying operations. The heat and rays of the arc can react with solvent vapors to form phosgene, a highly toxic gas, and other irritating products.

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.

WELDING AND CUTTING SPARKS CAN CAUSE FIRE OR EXPLOSION.



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

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

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

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

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

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

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

6.h. Also see item 1.c.

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

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

CYLINDER MAY EXPLODE IF DAMAGED.

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

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

7.c. Cylinders should be located:

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

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

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

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

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

FOR ELECTRICALLY POWERED EQUIPMENT.

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

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

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

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

Welding Safety Interactive Web Guide for mobile devices

Get the free mobile app at
http://gettag.mobi

Page

A-1

INSTALLING
K2207-2

MODULE INSTALLATION INSTRUCTIONS

Ethernet / DeviceNet Module Quick Start Guide

REQUIRED TOOLS
3/8 Wrench or nut Driver
Short Phillips Screw Driver

OPTIONAL TOOLS
Serial Cable (Radio Shack Cat. Number. 26-269)
Microsoft Windows compatible computer

ETHERNET/DEVICENET MODULE SETUP

This guide covers the setup and installation of the EtherNet/DeviceNet module.

- The setup and installation of the module.
- The installation of the software on a PC.
- The serial connection between the Power Wave and the PC (for intial setup only).
- How to connect the Power Wave to an Ethernet network.
- How to configure the Power Wave to communicate over an Ethernet network.

POWER WAVE SETUP

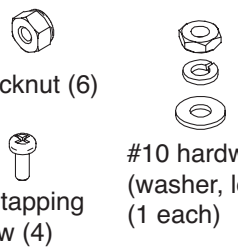
⚠ WARNING

- **ELECTRIC SHOCK CAN KILL.**

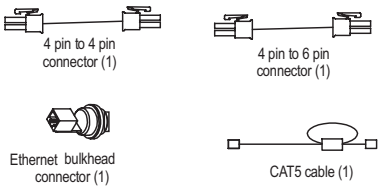
- **Do not touch electrically live part or electrode with skin or wet clothing.**
- **Insulate yourself from work and ground.**
- **Disconnect the input power from the Power Wave.**

Locate the hardware bags and review their contents. Some items in the small **HARDWARE BAG** will not be used. Some Items in the Large bag may or may not be used unless a Wire Drive Interface Module is installed. See the following instructions.

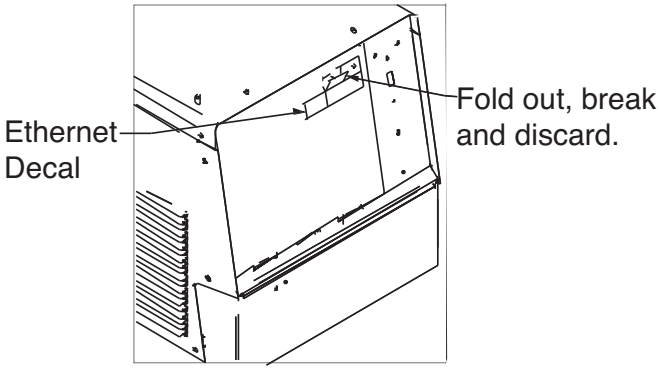
ITEMS CONTAINED IN THE SMALL HARDWARE BAG



ITEMS CONTAINED IN THE LARGE BAG



Locate the Communication Interface Module decal on the top door assembly. Remove the portin reads “optional” apply the Ethernet / DeviceNet decal as shown in the **DECAL MOUNTING** detail below.



DECAL MOUNTING

Remove the screws in the door assembly. Lower door as shown in **Figure A-1**. Do not lean against the door assembly during installation, hinge damage may occur.

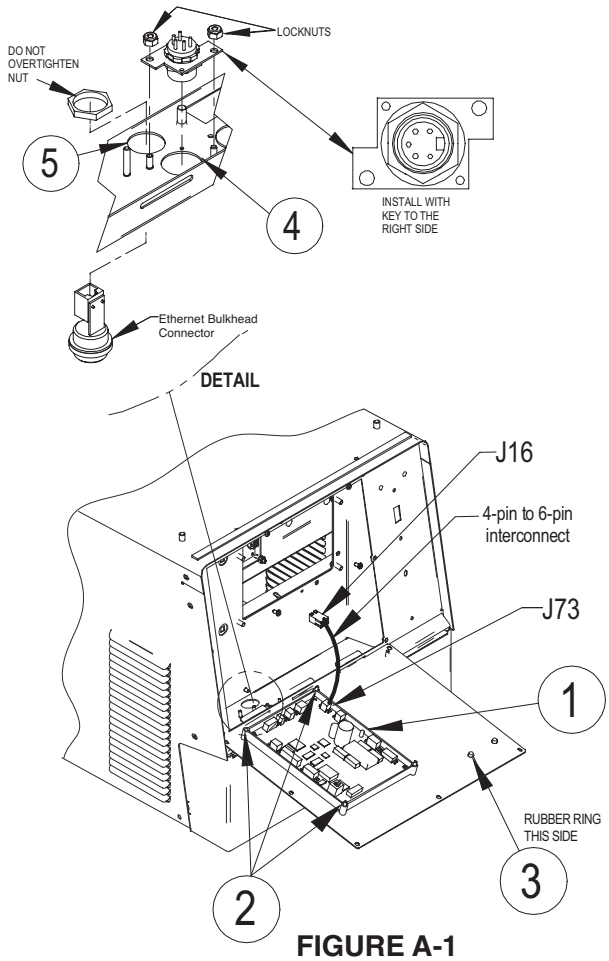


FIGURE A-1

Install the DeviceNet bulkhead connector by removing the plastic plug covering the circular hole (ITEM 4) in the front lower panel assembly. Install the 5-pin connector and mounting plate over the mounting studs as shown in detail. Fasten with two of the supplied lock nuts.

Install the Ethernet bulkhead connector by removing the plastic plug covering the circular hole (ITEM 5) in the front panel assembly. Locate the EtherNet bulkhead connector. Remove the nut off the back of the bulkhead connector and assemble it in the hole (connector from bottom, nut from top, do not over tighten). Plug the CAT5 cable into the bulkhead connector.

Place the Ethernet / DeviceNet Interface Module (ITEM 1) onto the self-clinching studs in the position shown in figure A-1.

Fasten the module to the door assembly using three of the supplied lock nuts (ITEM 2).

Install the plastic LED lens through the open hole in the front of the door assembly and roll the rubber ring onto lens from the rear of the door assembly (ITEM 3).

Seat the status LED into the lens from the rear of the door assembly.

When Wire Drive Interface Module is not installed, use Figure A-1, locate the 4-pin to 6-pin interconnect. Insert the interconnect between J73(4-pin) Figure A-1 on the Ethernet module and J16(6-pin) in the machine harness. Discard the 4-pin to 4-pin interconnect and proceed to board setup.

When Wire Drive Interface Module is installed, use Figure A-2, locate the 4-pin to 4-pin interconnect. Insert the interconnect between J72 (4-pin) Figure A-2 on the Ethernet module and J81 (4-pin) on the Wire Drive Interface Module. Discard the 4-pin to 6-pin interconnect.

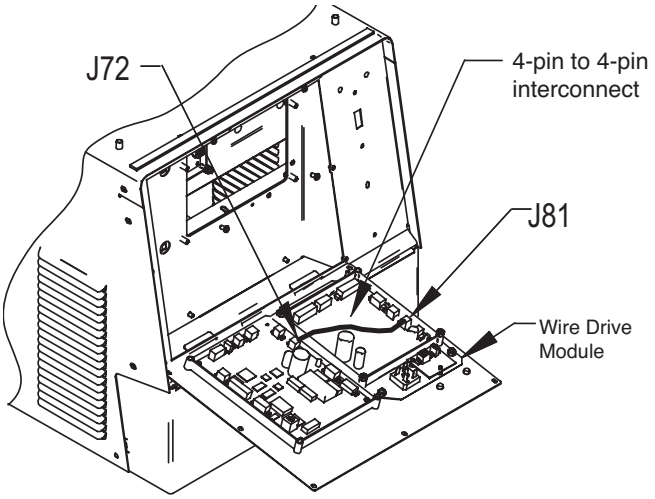


FIGURE A-2

BOARD SETUP

DeviceNet Baud rate: The default Baud rate is 125K. If another Baud rate is desired, reference table 1 in and set switches 1 and 2 of bank S2. Every device on a DeviceNet network must have the same Baud Rate.

DeviceNet Baud Rate (Table 1)

Switch 1	Switch 2	Baud Rate
Off	Off	125K
On	Off	250K
Off	On	500K
On	On	Programmable Value

DeviceNet MAC ID: The default MAC ID is 62. Every device on the DeviceNet network should have a unique ID. If another MAC ID is desired, refer to Table 3 of this quick start guide/ to set switches 3 through 8 of bank S2.

COMPLETE BOARD INSTALLATION

- Close door assembly being careful to avoid cutting or pinching any wires.
- Reinstall the screws in door assembly.
- Re-apply power and verify the appropriate status lights on the Power Wave are green. Discard any remaining hardware.

SOFTWARE INSTALLATION

- See **SOFTWARE INSTALLATION** Section.

A-4

INSTALLING
K2436-1

MOUNTING COMMUNICATION INTERFACE TO THE POWER WAVE 355M

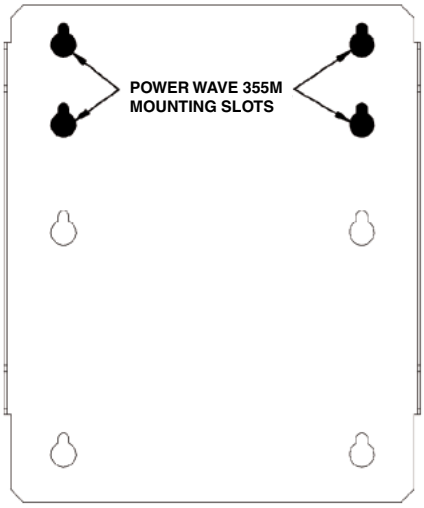
(See Figure A-4)

1. Turn OFF input power to the Power Wave.

2. Loosen the 4 wraparound screws on the top of the Power Wave 355M. **BE CAREFUL NOT TO REMOVE THE SCREWS – THE DIVIDER PANEL INSIDE THE POWER WAVE MAY SHIFT, CAUSING DIFFICULTY IN REPLACING THE SCREWS.**

3. Place the mounting bracket included with the Communication Interface over the loosened screws on top of the Power Wave 355M. The top four keyholes in the bracket should align with the screws in the wraparound. (See Figure A-3)

FIGURE A-3



4. Pull the bracket toward the back of the Power Wave 355M to engage the keyhole slots with the screws.

5. Retighten the screws to secure the Mounting Bracket.

6. Place the Communication Interface onto the Mounting Bracket by lining up the slots along the bottom with the tabs on the Bracket. The Communication Interface should be oriented such that the cable connectors face toward the back of the Power Wave 355M.

7. Pull back on the Communication Interface to "lock" the tabs into the slots.

8. At this point, the holes on the sides of the Communication Interface should align with the holes in the tabs of the Mounting Bracket.

9. Place the self-tapping screws included with the Communication Interface into the holes on the sides of the Interface and the Bracket and tighten to secure the assembly.

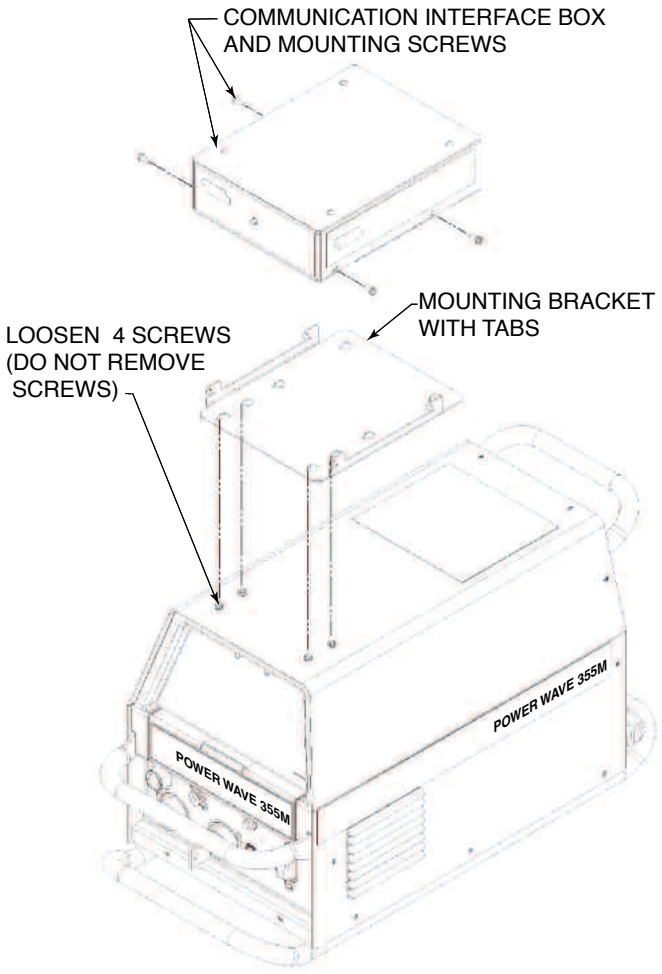
10. Attach the 5-pin Control Cable included with the Communication Interface to the mating ArcLink (IN) cable connector on the back of the Interface. The connector to be used on the Interface is the one with the threaded collar attached to the cable connector.

11. Route the Control Cable underneath or along the side of the Power Wave 355M to the front of the power source and connect the Control Cable to the mating receptacle on the front of the Power Wave 355M.

12. The Communication Interface mounting is complete.

13. See **BOARD SETUP** at the end of this Installation Section.

FIGURE A-4



MOUNTING COMMUNICATION INTERFACE TO THE POWER WAVE F355i

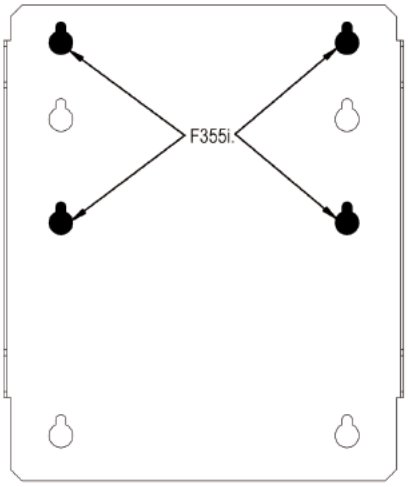
(See Figure A-6)

1. Turn OFF input power to the F355i.

2. Loosen the 4 wraparound screws on the top, left of the F355i. **BE CAREFUL NOT TO REMOVE THE SCREWS – THE DIVIDER PANEL INSIDE THE F355i MAY SHIFT, CAUSING DIFFICULTY IN REPLACING THE SCREWS.**

3. Place the mounting bracket included with the Communication Interface over the loosened screws on top of the F355i. The top two keyholes and the middle two keyholes in the bracket should align with the screws in the wraparound (see Figure A-5).

FIGURE A-5



4. Pull the bracket toward the right of the F355i to engage the keyhole slots with the screws.

5. Retighten the screws to secure the Mounting Bracket.

6. Place the Communication Interface onto the Mounting Bracket by lining up the slots along the bottom with the tabs on the Bracket. The Communication Interface should be oriented such that the cable connectors face toward the right of the F355i.

7. Pull back on the Communication Interface to "lock" the tabs into the slots.

8. At this point, the holes on the sides of the Communication Interface should align with the holes in the tabs of the Mounting Bracket.

9. Place the self-tapping screws included with the Communication Interface into the holes on the sides of the Interface and the Bracket and tighten to secure the assembly.

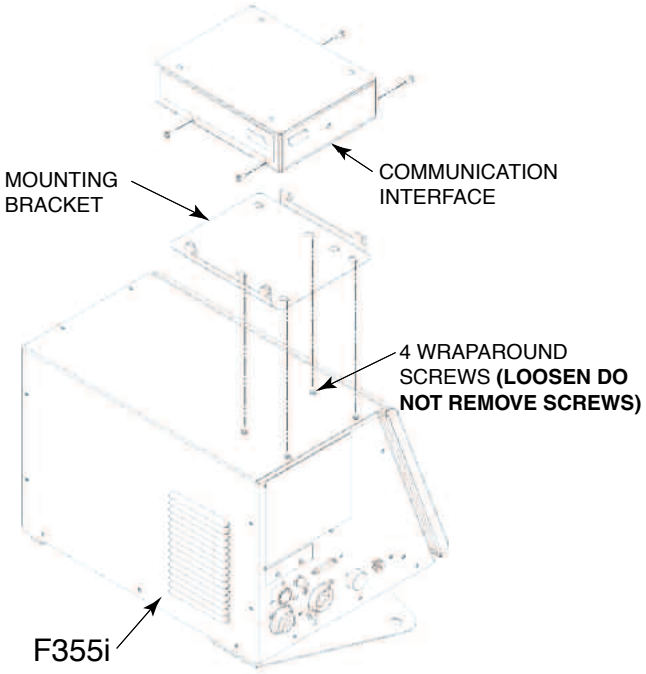
10. Attach the 5-pin Control Cable included with the Communication Interface to the mating ArcLink (IN) cable connector on the back of the Interface. The connector to be used on the Interface is the one with the threaded collar attached to the cable connector.

11. Route the Control Cable along the top of the F355i toward the left side and connect the Control Cable to the mating receptacle on the left side of the F355i.

12. The Communication Interface mounting is complete.

13. See **BOARD SETUP** at the end of this Installation Section.

FIGURE A-6

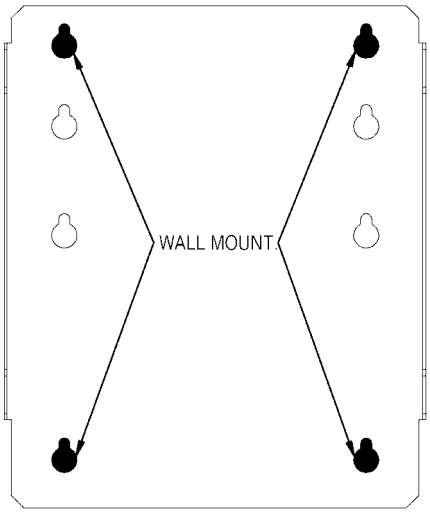


WALL MOUNTING

1. Turn OFF input power to the power source.

2. Drill and tap holes into the fixture or utilize wall anchors that align with the top two and the bottom two keyholes of the Mounting Bracket that is included with the Communication Interface (see Figure A-7). It is suggested that at least four 1/4”-20 fasteners be used to mount the Communication Interface. Through holes may be drilled if nut and bolt combinations are to be used.

FIGURE A-7



3. Start the fasteners into the drilled and tapped mounting holes leaving enough space between the heads of the screws and the mounting surface to clear the Mounting Bracket sheet metal thickness.

4. Place the mounting bracket included with the Communication Interface over the loosened screws.

5. Pull the bracket down to engage the keyhole slots with the fasteners.

6. Tighten the fasteners to secure the Mounting Bracket.

7. Place the Communication Interface onto the Mounting Bracket by lining up the slots along the bottom with the tabs on the Bracket. The Communication Interface should be oriented such that the cable connectors face down.

8. Pull down on the Communication Interface to "lock" the tabs into the slots.

9. At this point, the holes on the sides of the Communication Interface should align with the holes in the tabs of the Mounting Bracket.

10. Place the self-tapping screws included with the Communication Interface into the holes on the sides of the Interface and the Bracket and tighten to secure the assembly.

11. Attach the 5-pin Control Cable included with the Communication Interface to the mating ArcLink (IN) cable connector on the bottom of the Interface. The connector to be used on the Interface is the one with the threaded collar attached to the cable connector.

12. Connect the other end of the Control Cable to the mating receptacle on the power source.

13. The Communication Interface mounting is complete.

BOARD SETUP

DeviceNet Baud rate: The default Baud rate is 125K. If another Baud rate is desired, reference table 1 in and set switches 1 and 2 of bank S2. Every device on a DeviceNet network must have the same Baud Rate.

The Dip Switches can be accessed by removing the cover.

DeviceNet Baud Rate (Table 1)

Switch 1	Switch 2	Baud Rate
Off	Off	125K
On	Off	250K
Off	On	500K
On	On	Programmable Value

DeviceNet MAC ID: The default MAC ID is 62. Every device on the DeviceNet network should have a unique ID. If another MAC ID is desired, refer to Table 3 of this quick start guide/ to set switches 3 through 8 of bank S2.

COMPLETE BOARD INSTALLATION

- Replace cover being careful to avoid cutting or pinching any wires.
- Reinstall the screws in cover.
- Re-apply power and verify the appropriate status lights on the Power Source and Communication Interface are green.

A-8

SOFTWARE INSTALLATION

SOFTWARE INSTALLATION

Insert the supplied CD into the PC. The PC should automatically start the software install of the programs. The installation program will guide you through the software setup process. If the PC does not automatically start the software installation, manually start the software installation according to the following steps:

- Open Windows Explorer.
- From the software CD, run "setup.exe".

DEVICENET NETWORK INSTALLATION

For wiring the DeviceNet network to the Power Wave, see the document "DeviceNet Cabling Planning and Installation manual", Allen Bradley Publication DN-6.7.2. This document can be downloaded from the Allen Bradley web site. Connect the Power Wave to the Network using a female 'sealed-mini' style connector. Avoid routing the DeviceNet control cables in close proximity to the welding output leads. DeviceNet scanners typically require setup through the use of a configuration tool. Consult the scanner documentation concerning steps to configure the DeviceNet scanner.

Some DeviceNet scanners require an EDS (Electronic Data Sheet) file to properly communicate with the device. The EDS files for the Power Wave are located on the CD that was shipped with the Kit module. To find the correct EDS file to install, go to the DeviceNet Configuration screen in Observer (complete sections: Connecting PC to Power Wave and Devicenet Software Settings). The bottom left of the Power Wave Observer application window lists the Product Code and Vendor Revision. Based on these settings, pick the appropriate EDS file. See table 1 for more information on which EDS file to use. Note that the product code that the gateway reports back is based on software that is loaded into the control board.

Product Code Selection (Table 2)

Power Wave Product Code	EDS File to USE
1	Undefined - Contact Lincoln Electric
2	PW455
5	PW655
8	PWACDC
9	F355i

- Configure the DeviceNet scanner to the Power Wave.
- Verify that the DeviceNet scanner recognizes the Power Wave.

ETHERNET CABLE INSTALLATION

For wiring the Ethernet network to the Power Wave, use STP (Shielded Twisted Pair) cable to make connections from the Power Wave to the rest of the Network. The cable should be cat3, cat4, or cat5 compatible. If UTP (Unshielded twisted Pair) cable is to be used, the cable should be placed in conduit to avoid electromagnetic interference. The Power Wave uses standard 10BaseT cable pin outs and length specifications. Avoid routing the Ethernet cables in close proximity to the welding output leads.

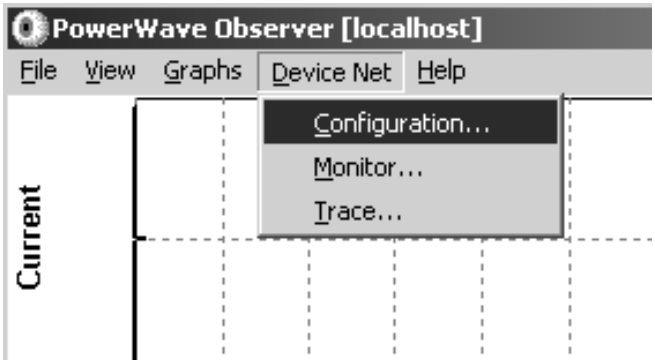
CONNECT PC TO POWER WAVE FOR SETUP

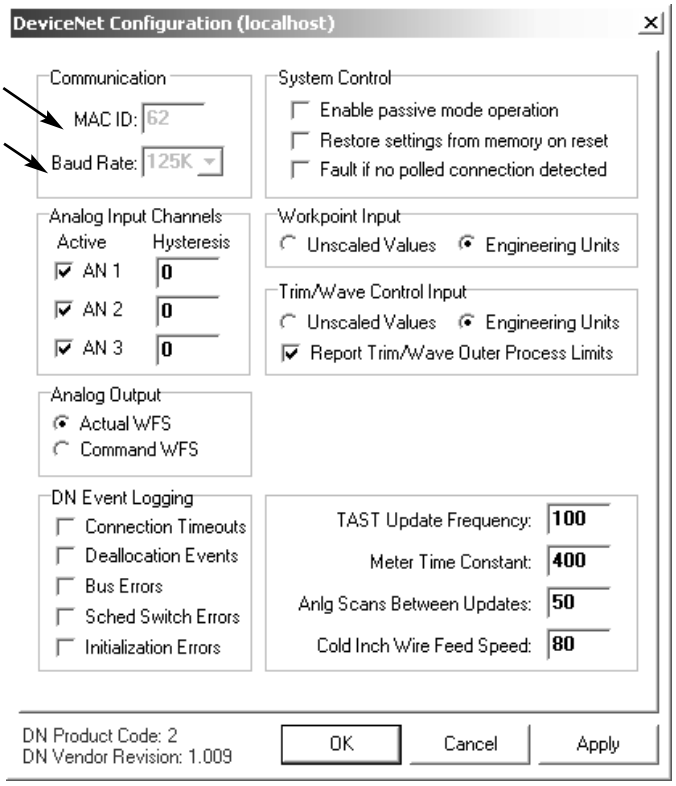
With a standard 9-pin to 25-pin RS232 serial cable (Radio Shack cat no. 26-269), make a connection with the Power Wave and a PC. Turn on the Power Wave. Verify that no other applications are using the serial port. This includes PDA Hotsync-type Applications.

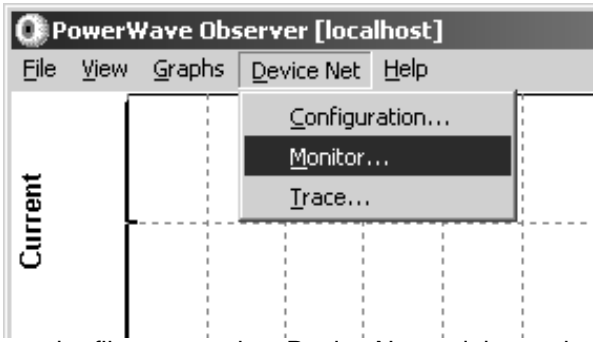
DEVICENET SOFTWARE SETTINGS

With the PC connected to the Power Wave, from the Windows taskbar click Start > Programs > Lincoln Electric > Power Wave Utilities > DeviceNet Observer. Select the appropriate communication port and click OK.

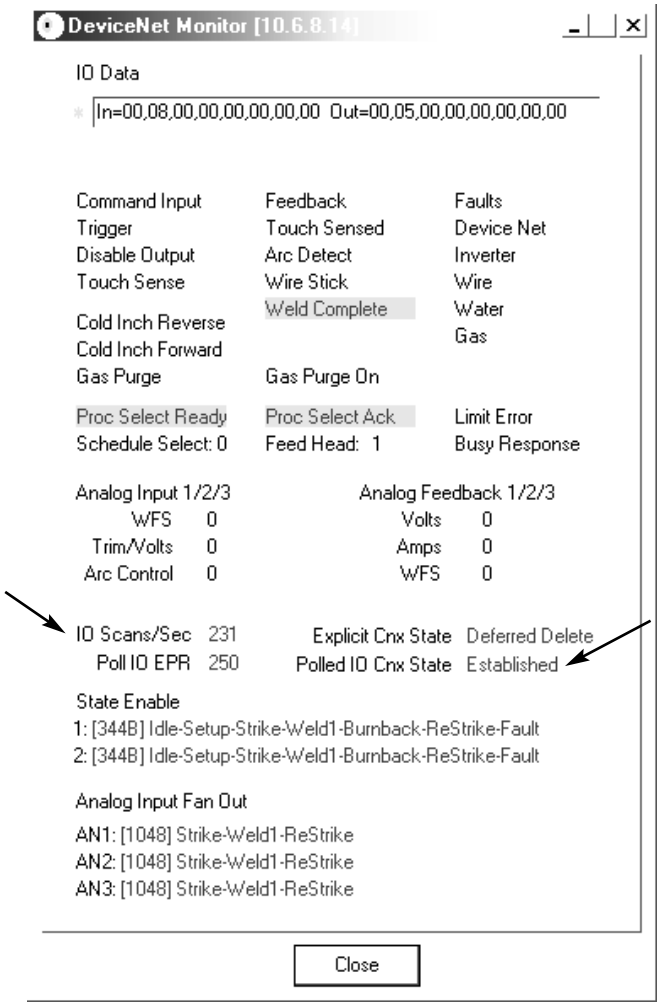
From the file menu select Device Net and then Configuration. The configuration window will open up and allow you to verify that the set MAC address and Baud rate are correct.







From the file menu select Device Net and then select Monitor. The DeviceNet Monitor will display the status of the connection and its data. If everything is operating correctly, the "Polled IO Cnx State" will display "Established" and the IO Scans/Sec will have a non-zero value. If there appears that there is no connection to the Power Wave refer to the trouble shooting section of this quick start guide.



Consult the DeviceNet Interface Specification (Y50031-xx_DeviceNetInterfaceSpecification) concerning the proper configuration of the DeviceNet interface.

When all settings have been verified, close Power Wave observer.

ETHERNET SOFTWARE SETTINGS

Ethernet is required for use by Production Monitoring. It provides the bandwidth and flexibility required for proper operation of the Production Monitoring PC software and the ability of the Power Wave to send E-mail data.

Address Configuration

Every device on a network must have a unique address (IP Address). If installing the Power Wave on a corporate network or any network controlled by an administrator, contact the administrator and request an IP Address for the Power Wave, as well as its Subnet Mask and Default Gateway Address, which are also necessary network settings.

If no network administrator is available, or if installing on an uncontrolled local network, use the following settings:

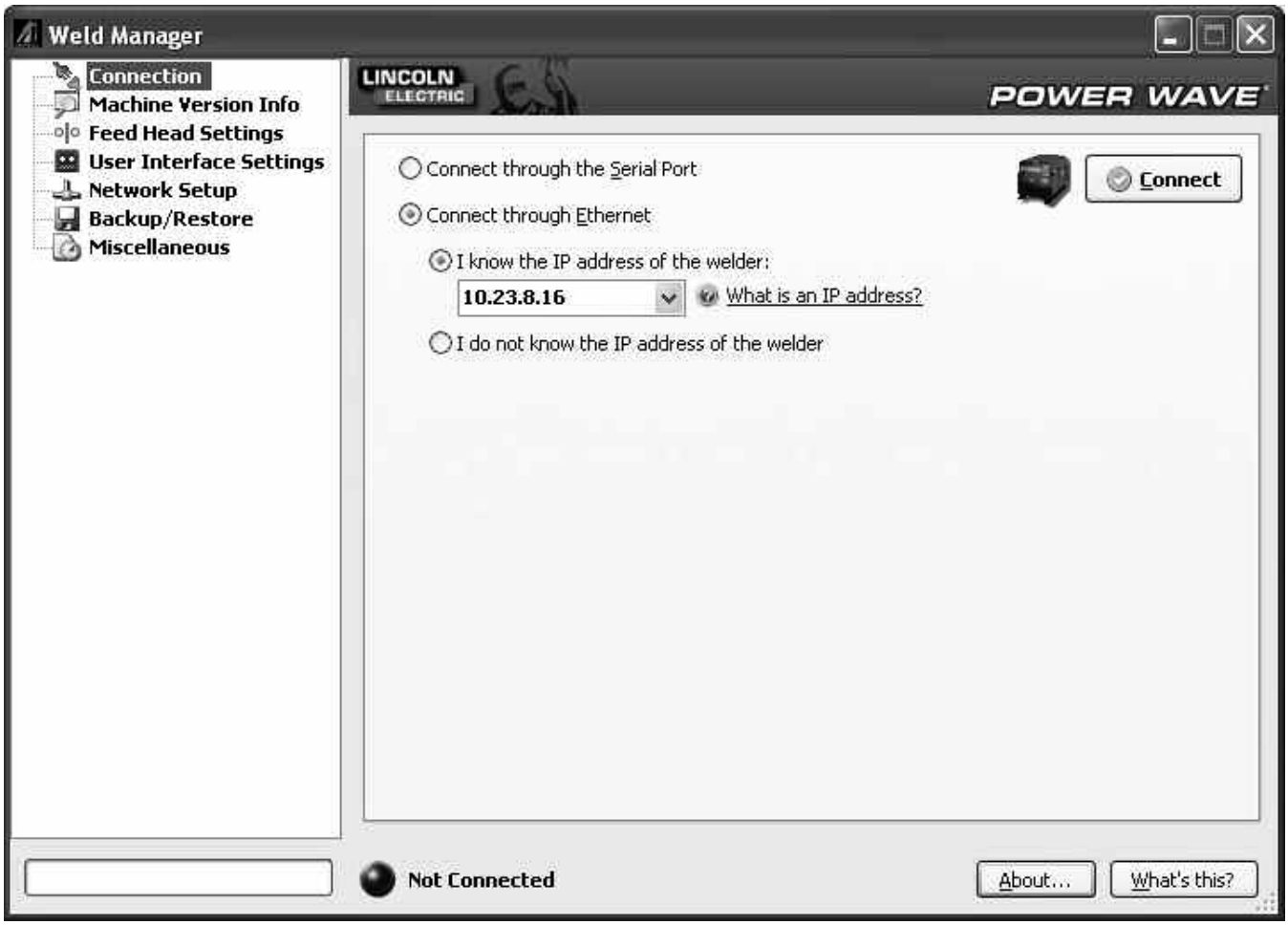
- **IP Address:** 192.168.1.x (where x can range from 2 to 254). Make sure that this setting does not conflict with any other device on the network.
- **Default Gateway:** 192.168.1.1
- **Subnet Mask:** 255.255.255.0

To program the Power Wave's network settings, use the **Weld Manager** Utility included with the Power Wave Utilities CD.

To start the utility, click on the Windows "Start" button, then navigate to Programs > Lincoln Electric > Power Wave Utilities > **Weld Manager**.

Refer to the "Help Me Connect" guide and the Weld Manager user Manual (also included on the CD-Rom) for assistance with connecting to your Power Wave. (See Figure A-7a)

Figure A-7a

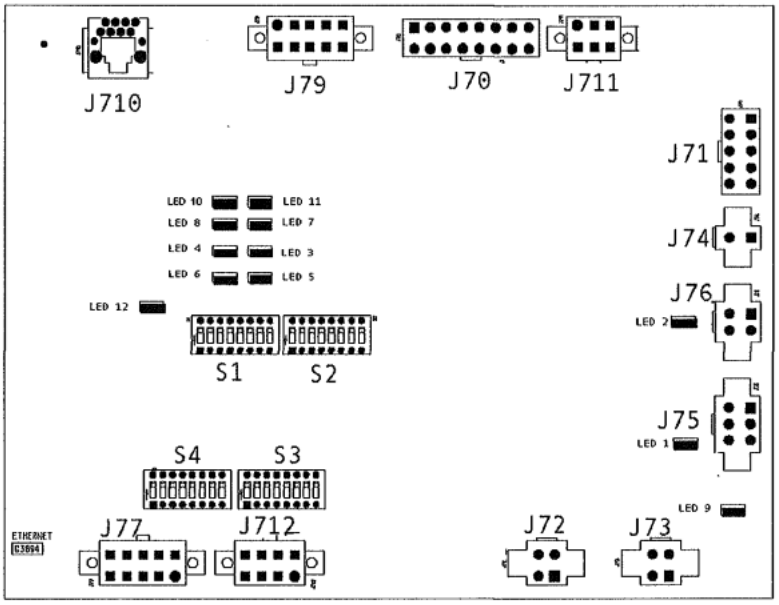


DeviceNet Mac ID – ON=1, OFF =0: (Table 3)

Mac ID	Switch 8	Switch 7	Switch 6	Switch 5	Switch 4	Switch 3
0	0	0	0	0	0	0
1	0	0	0	0	0	1
2	0	0	0	0	1	0
3	0	0	0	0	1	1
4	0	0	0	1	0	0
5	0	0	0	1	0	1
6	0	0	0	1	1	0
7	0	0	0	1	1	1
8	0	0	1	0	0	0
9	0	0	1	0	0	1
10	0	0	1	0	1	0
11	0	0	1	0	1	1
12	0	0	1	1	0	0
13	0	0	1	1	0	1
14	0	0	1	1	1	0
15	0	0	0	1	1	1
16	0	1	0	0	0	0
17	0	1	0	0	0	1
18	0	1	0	0	1	0
19	0	1	0	0	1	1
20	0	1	0	1	0	0
21	0	1	0	1	0	1
22	0	1	0	1	1	0
23	0	1	0	1	1	1
24	0	1	1	0	0	0
25	0	1	1	0	0	1
26	0	1	1	0	1	0
27	0	1	1	0	1	1
28	0	1	1	1	0	0
29	0	1	1	1	0	1
30	0	1	1	1	1	0
31	0	1	1	1	1	1
32	1	0	0	0	0	0
33	1	0	0	0	0	1
34	1	0	0	0	1	0
35	1	0	0	0	1	1
36	1	0	0	1	0	0
37	1	0	0	1	0	1
38	1	0	0	1	1	0
39	1	0	0	1	1	1
40	1	0	1	0	0	0
41	1	0	1	0	0	1
42	1	0	1	0	1	0
43	1	0	1	0	1	1
44	1	0	1	1	0	0
45	1	0	1	1	0	1
46	1	0	1	1	1	0
47	1	0	1	1	1	1
48	1	1	0	0	0	0
49	1	1	0	0	0	1
50	1	1	0	0	1	0
51	1	1	0	0	1	1
52	1	1	0	1	0	0
53	1	1	0	1	0	1
54	1	1	0	1	1	0
55	1	1	0	1	1	1
56	1	1	1	0	0	0
57	1	1	1	0	0	1
58	1	1	1	0	1	0
59	1	1	1	0	1	1
60	1	1	1	1	0	0
61	1	1	1	1	0	1
62	1	1	1	1	1	0

FIGURE A-8

ETHERNET MODULE
(OPTIONAL K2207-1)



LED Information

1. Indicates isolated Module section supply is On.

2. Indicates that the DeviceNet network has 24v power.

3 & 4 - Arclink Status Leds -
Both Off - Arclink offline, check power or configuration.
Green On, Red Off - Online and operational (Normal Status)
Flash Green, Red Off - System Mapping
Green Off, Red Flashing - Non-recoverable system fault. Error code number flash red with long pause between digits. Green flash between codes.

5 & 6 - Module status indicators - Not Used

7 & 8 - DeviceNet Status LEDs
Green Led Only - There is a DeviceNet connection established and everything is OK.
Both Off - There is no DeviceNet connection established. Note, that when the board first powers up it will be in this state for a minute or so.
Flashing Green - The DeviceNet connection is ready to go and knows that a DeviceNet Master is present, but does not have any connections established to it.
Flashing Red - One or more connections are in the Timed-out state.
Red - The device had an unrecoverable DeviceNet fault, like a Bus-Off or Duplicate Mac ID.

9 - Indicates Isolated Arclink section supply is On.

10 - Indicates Ethernet connection established.

11 - Indicates correct polarity on Ethernet connection.

12 - Indicates 5v supply to Differential I/O.

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. Find the listing that best describes the symptom that the machine is exhibiting.

Step 2. POSSIBLE CAUSE.
The second column labeled "POSSIBLE CAUSE" lists the obvious external possibilities that may contribute to the machine symptom.

Step 3. RECOMMENDED COURSE OF ACTION
This column provides a course of action for the Possible Cause, generally it states to contact your local Lincoln Authorized Field Service Facility.

If you do not understand or are unable to perform the Recommended Course of Action safely, contact your local Lincoln 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 your **Local Lincoln Authorized Field Service Facility** for technical troubleshooting assistance before you proceed.

Observe all Safety Guidelines detailed throughout this manual

PROBLEMS (SYMPTOMS)	POSSIBLE CAUSE	RECOMMENDED COURSE OF ACTION
Status LED does not come on	1. Machine Power	1. Verify that the input power is turned on and the power switch on the front of the Power Wave is turned on
	1. 40V input power	1. Verify that the module is connected to the Power Wave ArcLink cable either through the internal wiring harness or through the 5 pin ArcLink cable depending on if the module is installed inside the Power Wave or if it is connected externally to the Power Wave.
	1. LED plugged in	1. Verify that the status LED is connected to the installed module.
	1. Properly connected	1. Verify that the module is connected in series in the ArcLink network.
Status LED blinks rapid green.	1. ArcLink Mapping Problem	1. Verify that each similar module installed in the system has a different instance set.
Status LED blinks red	1. System Error	1. Contact you local Lincoln Authorized Field Service Facility.
DEVICENET		
Device does not go on line.	1. 24v bus power	1. Verify that LED 2 on the Power Wave's DeviceNet Module is on when the DeviceNet network is powered. This should be done with the power on the Power Wave turned off.
	2. Baud rate	2. Verify the Baud rate setting on the Power Wave and on the DeviceNet Master are the same. The Configuration section of Observer displays the Power Wave's baud rate.
	3. MAC address	3. Verify the Device Net MAC address is correct. The Configuration section of Observer displays the Power Wave's MAC address.
	4. Termination	4. Verify that the Device Net bus is terminated correctly.
	5. Wiring	5. Verify the wiring of all multi-port taps and field attachable ends.
	6. EDS files	6. Verify that the correct EDS files are being used if they are needed. The Configuration section of the Observer application displays the current Product Code and Vendor Revision of the Power Wave.

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PROBLEMS (SYMPTOMS)	POSSIBLE CAUSE	RECOMMENDED COURSE OF ACTION
DEVICENET		
Device goes off line during welding	1. Current Interference	1. Verify that cables are not run along current carrying conductors. This would include the welding cables.
	2. Termination	2. Verify that the DeviceNet bus is terminated correctly.
	3. Shield	3. Verify that the cable shielding is correctly grounded at the bus power supply. The shield should be tied into the bus ground at only one point.
	4. Power Supply	4. Verify that the power supply can supply sufficient current for the devices on the network.
	5. Expected Packet Rate	5. Verify that 1000/(Expected Packet Rate) ≤ (scans per seconds). The Monitor section of the Observer application displays these values.
Analog Inputs don't respond or don't respond quickly.	1. Analog Scans Between Updates	1. Using DeviceNet Observer select Configuration under the DeviceNet menu. Verify that Analog Scans Between Updates is 1/4 of I/O Scans/Sec value.
	2. Analog In Active Selections	2. Using DeviceNet Observer select Configuration under the DeviceNet menu. Verify in Analog Input Channels that the required channels are set active.
	3. Analog Hysteresis	3. Using DeviceNet Observer select Configuration under the DeviceNet menu. Verify in Analog Input Channels that the Hysteresis settings are all 0.
	4. Passive Mode	4. Using DeviceNet Observer select Configuration under the DeviceNet menu. Verify in System Control that Enable passive mode operation is not selected.

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PROBLEMS (SYMPTOMS)	POSSIBLE CAUSE	RECOMMENDED COURSE OF ACTION
DEVICENET		
Output will not come on.	1. DeviceNet trigger being asserted.	1. Using DeviceNet Observer select Monitor under the DeviceNet menu. Verify under Command Input section that Trigger is high-lighted.
	2. Touch Sense command.	2. Using DeviceNet Observer select Monitor under the DeviceNet menu. Verify under Command Input section that Touch Sense in not high lighted.
	3. Passive Mode.	3. Using DeviceNet Observer select Configuration under the DeviceNet menu. Verify in System Control that Enable passive mode operation is not selected.
	4. Welding Cables.	4. Verify that welding cables are connected properly.
	5. Disable Output.	5. Using DeviceNet Observer select Monitor under the DeviceNet menu. Verify under Command Input section that Disable Output is not highlighted.
Gas purge not working	1. Out of gas.	1. Verify the lines up to the gas solenoid has gas pressure.
	2. Gas Purge being asserted.	2.Using DeviceNet Observer select Monitor under the DeviceNet menu. Verify under Command Input section that Gas Purge is highlighted.
	3. Passive Mode.	3. Using DeviceNet Observer select Configuration under the DeviceNet menu. Verify in System Control that Enable passive mode operation is not selected.

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PROBLEMS (SYMPTOMS)	POSSIBLE CAUSE	RECOMMENDED COURSE OF ACTION
DEVICENET		
Poor Weld Termination.	1. Burnback state enabled	1. Using DeviceNet Observer select Monitor under the DeviceNet menu. Verify under State Enable that Burnback is present for the schedule being run.
	2. Burnback Time	2. Using DeviceNet Observer verify that Burnback Time for the active schedule in the main window has a value other than 0 in it.
	3. Analog Scans Between Updates	3. Using DeviceNet Observer select Configuration under the DeviceNet menu. Verify that Analog Scans Between Updates is 1/4 of I/O Scans/Sec value.
	4. Limit Error reported at the end of a weld.	4. Verify all welding settings for Burnback and Crater states.
	5. Correct Schedule selected.	5. Using DeviceNet Observer verify that the correct schedule is select-ed as active.
	6. Fan Out	6. Using DeviceNet Observer select Monitor under the DeviceNet menu. Verify under Analog Input Fan Out that Burnback is present for all analogs in.
	7. Analog Hysteresis	7. Using DeviceNet Observer select Configuration under the DeviceNet menu. Verify in Analog Input Channels that the Hysteresis settings are all 0.

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Observe all Safety Guidelines detailed throughout this manual

PROBLEMS (SYMPTOMS)	POSSIBLE CAUSE	RECOMMENDED COURSE OF ACTION
DEVICENET		
Poor Welding	1. Analog Scans Between Updates	1. Using DeviceNet Observer select Configuration under the DeviceNet menu. Verify that Analog Scans Between Updates is 1/4 of I/O Scans/Sec value.
	2. Voltage Sense Leads	2. Verify Voltage sense leads are installed correctly.
	3. Analog Hysteresis	3. Using DeviceNet Observer select Configuration under the DeviceNet menu. Verify in Analog Input Channels that the Hysteresis settings are all 0.
	4. Correct Schedule selected	4. Using DeviceNet Observer verify that the correct schedule is selected as active.
	5. Limit Errors	5. Verify all welding set point values are within limits.

For more trouble shooting of a DeviceNet network the following references should be used.

Allen-Bradley Cat. Number. DN-6.7.2
Rockwell Automation Document 8842
ODVA web site (www.odva.org)

⚠ CAUTION

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Observe all Safety Guidelines detailed throughout this manual

PROBLEMS (SYMPTOMS)	POSSIBLE CAUSE	RECOMMENDED COURSE OF ACTION
ETHERNET		
Ethernet Cannot Connect.	1. Connection.	1. Verify that the correct Patch Cable or Cross over Cable is being used. (Refer to IT Department for Assistance) 2. Verify the cables are fully inserted into the bulk head Connector. 3. LED 10 will be Lit when the board is connected to another Network device.
	2. IP Address Information.	1. Use Netset to verify the correct IP address information has been entered. 2. Verify that the PC has the correct IP address information entered. 3. Verify that another device on the network is not already using the IP address.
	3. Ethernet Speed	1. Verify that the network device connected to the Power Wave is either a 10-baseT device or a 10/100-baseT device.
Ethernet connection drops while welding.	1. Cable Location.	1. Network Cable can not be located next to current carrying cables. This would include input Power Cable and Welding Output Cables.

⚠ CAUTION

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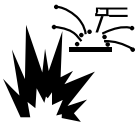
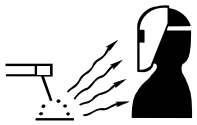
NOTES

NOTES

			
WARNING	● Do not touch electrically live parts or electrode with skin or wet clothing. ● Insulate yourself from work and ground.	● Keep flammable materials away.	● Wear eye, ear and body protection.
Spanish **AVISO DE PRECAUCION**	● No toque las partes o los electrodos bajo carga con la piel o ropa mojada. ● Aislese del trabajo y de la tierra.	● Mantenga el material combustible fuera del área de trabajo.	● Protéjase los ojos, los oídos y el cuerpo.
French **ATTENTION**	● Ne laissez ni la peau ni des vêtements mouillés entrer en contact avec des pièces sous tension. ● Isolez-vous du travail et de la terre.	● Gardez à l'écart de tout matériel inflammable.	● Protégez vos yeux, vos oreilles et votre corps.
German **WARNUNG**	● Berühren Sie keine stromführenden Teile oder Elektroden mit Ihrem Körper oder feuchter Kleidung! ● Isolieren Sie sich von den Elektroden und dem Erdboden!	● Entfernen Sie brennbarres Material!	● Tragen Sie Augen-, Ohren- und Körperschutz!
Portuguese **ATENÇÃO**	● Não toque partes elétricas e electrodos com a pele ou roupa molhada. ● Isole-se da peça e terra.	● Mantenha inflamáveis bem guardados.	● Use proteção para a vista, ouvido e corpo.
Japanese **注意事項**	● 通電中の電気部品、又は溶材にヒフやぬれた布で触れないこと。 ● 施工物やアースから身体が絶縁されている様にして下さい。	● 燃えやすいものの側での溶接作業は絶対にしてはなりません。	● 目、耳及び身体に保護具をして下さい。
Chinese **警 告**	● 皮肤或濕衣物切勿接觸帶電部件及銲條。 ● 使你自己與地面和工件絕緣。	● 把一切易燃物品移離工作場所。	● 佩戴眼、耳及身體勞動保護用具。
Korean **위 험**	● 전도체나 용접봉을 젖은 헝겁 또는 피부로 절대 접촉치 마십시요. ● 모재와 접지를 접촉치 마십시요.	● 인화성 물질을 접근 시키지 마시요.	● 눈, 귀와 몸에 보호장구를 착용하십시요.
Arabic **تحذير**	● لا تلمس الاجزاء التي يسري فيها التيار الكهربائي أو الالكترود بجلد الجسم أو بالملابس المبللة بالماء. ● ضع عازلا على جسمك خلال العمل.	● ضع المواد القابلة للاشتعال في مكان بعيد.	● ضع أدوات وملابس واقية على عينيك وأذنيك وجسمك.

READ AND UNDERSTAND THE MANUFACTURER'S INSTRUCTION FOR THIS EQUIPMENT AND THE CONSUMABLES TO BE USED AND FOLLOW YOUR EMPLOYER'S SAFETY PRACTICES.

SE RECOMIENDA LEER Y ENTENDER LAS INSTRUCCIONES DEL FABRICANTE PARA EL USO DE ESTE EQUIPO Y LOS CONSUMIBLES QUE VA A UTILIZAR, SIGA LAS MEDIDAS DE SEGURIDAD DE SU SUPERVISOR.

LISEZ ET COMPRENEZ LES INSTRUCTIONS DU FABRICANT EN CE QUI REGARDE CET EQUIPMENT ET LES PRODUITS A ETRE EMPLOYES ET SUIVEZ LES PROCEDURES DE SECURITE DE VOTRE EMPLOYEUR.

LESEN SIE UND BEFOLGEN SIE DIE BETRIEBSANLEITUNG DER ANLAGE UND DEN ELEKTRODENEINSATZ DES HERSTELLERS. DIE UNFALLVERHÜTUNGSVORSCHRIFTEN DES ARBEITGEBERS SIND EBENFALLS ZU BEACHTEN.

			
● Keep your head out of fumes. ● Use ventilation or exhaust to remove fumes from breathing zone.	● Turn power off before servicing.	● Do not operate with panel open or guards off.	**WARNING**
● Los humos fuera de la zona de respiración. ● Mantenga la cabeza fuera de los humos. Utilice ventilación o aspiración para gases.	● Desconectar el cable de alimentación de poder de la máquina antes de iniciar cualquier servicio.	● No operar con panel abierto o guardas quitadas.	Spanish **AVISO DE PRECAUCION**
● Gardez la tête à l'écart des fumées. ● Utilisez un ventilateur ou un aspirateur pour ôter les fumées des zones de travail.	● Débranchez le courant avant l'entretien.	● N'opérez pas avec les panneaux ouverts ou avec les dispositifs de protection enlevés.	French **ATTENTION**
● Vermeiden Sie das Einatmen von Schweibrauch! ● Sorgen Sie für gute Be- und Entlüftung des Arbeitsplatzes!	● Strom vor Wartungsarbeiten abschalten! (Netzstrom völlig öffnen; Maschine anhalten!)	● Anlage nie ohne Schutzgehäuse oder Innenschutzverkleidung in Betrieb setzen!	German **WARNUNG**
● Mantenha seu rosto da fumaça. ● Use ventilação e exhaustão para remover fumo da zona respiratória.	● Não opere com as tampas removidas. ● Desligue a corrente antes de fazer serviço. ● Não toque as partes elétricas nuas.	● Mantenha-se afastado das partes moventes. ● Não opere com os paineis abertos ou guardas removidas.	Portuguese **ATENÇÃO**
● ヒュームから頭を離すようにして下さい。 ● 換気や排煙に十分留意して下さい。	● メンテナンス・サービスに取りかかる際には、まず電源スイッチを必ず切って下さい。	● パネルやカバーを取り外したままで機械操作をしないで下さい。	Japanese **注意事項**
●頭部遠離煙霧。 ●在呼吸區使用通風或排風器除煙。	●維修前切斷電源。	●儀表板打開或沒有安全罩時不準作業。	Chinese **警 告**
● 얼굴로부터 용접가스를 멀리하십시요. ● 호흡지역으로부터 용접가스를 제거하기 위해 가스제거기나 통풍기를 사용하십시요.	● 보수전에 전원을 차단하십시요.	● 판넬이 열린 상태로 작동치 마십시요.	Korean **위 험**
● ابعد رأسك بعيداً عن الدخان. ● استعمل التهوية أو جهاز ضغط الدخان للخارج لكي تبعد الدخان عن المنطقة التي تتنفس فيها.	● اقطع التيار الكهرباني قبل القيام بأية صيانة.	● لا تشغل هذا الجهاز اذا كانت الاغطية الحديدية الواقية ليست عليه.	Arabic **تحذير**

LEIA E COMPREENDA AS INSTRUÇÕES DO FABRICANTE PARA ESTE EQUIPAMENTO E AS PARTES DE USO, E SIGA AS PRÁTICAS DE SEGURANÇA DO EMPREGADOR.

使う機械や溶材のメーカーの指示書をよく読み、まず理解して下さい。そして貴社の安全規定に従って下さい。

請詳細閱讀並理解製造廠提供的説明以及應該使用的銀捍材料，並請遵守貴方的有関勞動保護規定。

이 제폼에 동봉된 작업지침서를 숙지하시고 귀사의 작업자 안전수칙을 준수하시기 바랍니다.

اقرأ بتمعن وافهم تعليمات المصنع المنتج لهذه المعدات والمواد قبل استعمالها واتبع تعليمات الوقاية لصاحب العمل.

CUSTOMER ASSISTANCE POLICY

The business of The Lincoln Electric Company is manufacturing and selling high quality welding equipment, consumables, and cutting equipment. Our challenge is to meet the needs of our customers and to exceed their expectations. On occasion, purchasers may ask Lincoln Electric for advice or information about their use of our products. We respond to our customers based on the best information in our possession at that time. Lincoln Electric is not in a position to warrant or guarantee such advice, and assumes no liability, with respect to such information or advice. We expressly disclaim any warranty of any kind, including any warranty of fitness for any customer's particular purpose, with respect to such information or advice. As a matter of practical consideration, we also cannot assume any responsibility for updating or correcting any such information or advice once it has been given, nor does the provision of information or advice create, expand or alter any warranty with respect to the sale of our products.

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