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WARNING

Failure to adhere to these safety instructions may result in serious bodily injury or death.

IMPORTANT SAFETY INSTRUCTIONS.

1. Before installing or using this product, please read the instruction manual thoroughly.
2. Unpacking: Please check that the product is complete and free from any damage
3. Only qualified individual should install and/or repair this product.
4. Unplug the LFC3000 from the electrical outlet before you clean it.
Use a damp cloth for cleaning and do not use liquid or aerosol cleaners.
5. Do not place the LFC3000 on an unstable surface that may allow the unit to fall.
6. Never place the LFC3000 near or over a radiator or heat register.
7. Use the type of power source indicated on the label (AC power). If you are not sure of the type of power available, consult your supplier or local electric company.
8. The LFC3000 must be equipped with a plug having a third (grounding) pin, which fits only into a grounding-type outlet. This is a safety feature. LFC3000 should not be used without a properly grounded outlet. Failure to properly ground the LFC3000 may cause damage to the unit or the data stored.

9. Do not put the LFC3000 where the cord will be walked on.
10. An extension cord is not recommended for use with the LFC3000.
If you use an extension cord, make sure that the total of the ampere ratings on the products plugged into the extension cord does not exceed the extension cord's ampere rating. Also make sure that the total of all products plugged into the wall outlet does not exceed 15 amperes.
11. Unplug the LFC3000 from the wall outlet and have it repaired by a qualified service person under the following conditions:
 - A. When the power cord or plug is damaged or frayed.
 - B. If liquid has been spilled into it.
 - C. If it has been exposed to rain or water.
 - D. If it does not operate normally when the operating instructions are followed. Adjust only those controls that are covered by the operating instructions since improper adjustment of other controls may result in damage and loss of data.
 - E. If it has been dropped or damaged.
If it exhibits a distinct change in performance, indicating a need for service.

Main Components

Power Supply - 282865

Input voltage : 90 to 120vac 50/60hz
 Fuse: 3 amps time delay
 Output voltage: 24vdc with 240va available
 It is recommended to use one power supply per I/O unit.
 Power cord is not supplied with unit.

I/O - 282860

Input voltage: 24vdc
 Can support 8 fluid solenoids, 8 pulse meters, 1 printer and 1 main air solenoid.

Keypad - 282868

Used to control, monitor and program system. Will support a printer.

Display - 282866

Can read the amount being dispense at the hose reel.

PC Interface - 282880

Used to connect a PC to the network. Used to control, monitor and program system. Can have only one PC per system.

Network Printer Extender - 282884

Use this device if your printer needs to be more than 45ft from a keypad or an I/O unit. The printer extender is wired the same as a keypad. From the printer extender the printer still must be within 45ft. The network printer extender is basically the same as a keypad but with a blank cover.

Ticket Printer - 282887

Forty column serial printer. Uses thermal paper p/n 282888. Uses printer cable p/n 282879.

Report Printer - 282889

Eighty column serial printer. Includes printer cable.

Fluid Solenoid - 282873

24vdc at .61amps, rated working pressure 3000psi, 6 gpm, normally closed valve. Each hose reel will have one fluid valve. Comes with 1/2" NPT (female) adapters.

Pulse Meter - 85544

Universal pulse meter, rated 1500psi. 8 gpm maximum. Each hose reel will have one pulse meter.

Main Air Solenoid - 282886

24vdc, 1.8w power consumption, 3 way normally closed valve, 3/4 NPT port size, flow factor 9cv. Use one air valve per system.

Pressure Relief Valve - 282876

Set to relieve at 1000psi. Use one pressure relief valve per product. Comes with 1/2" NPT (female) adapters.

Cable Requirements

24vdc power cable - 2 wire w/ground (see wiring chart for size)

Solenoid cable - 2 wire w/ground (see wiring chart for size)

Pulse meter cable - 1 twisted pair w/shield (see wiring chart for size)

Network cable - One twisted pair w/shield. Can use any of the following cables: Belden "Apple Talk" 9999, Belden 8451, Belden 8760, Alpha 24561.

Printer cable - 3 wire 24awg w/shield. The maximum distance that a printer cable can be from an I/O or keypad is 45ft. If you need a longer distance than 45ft for your printer use the Network Printer Extender P/N 282884.

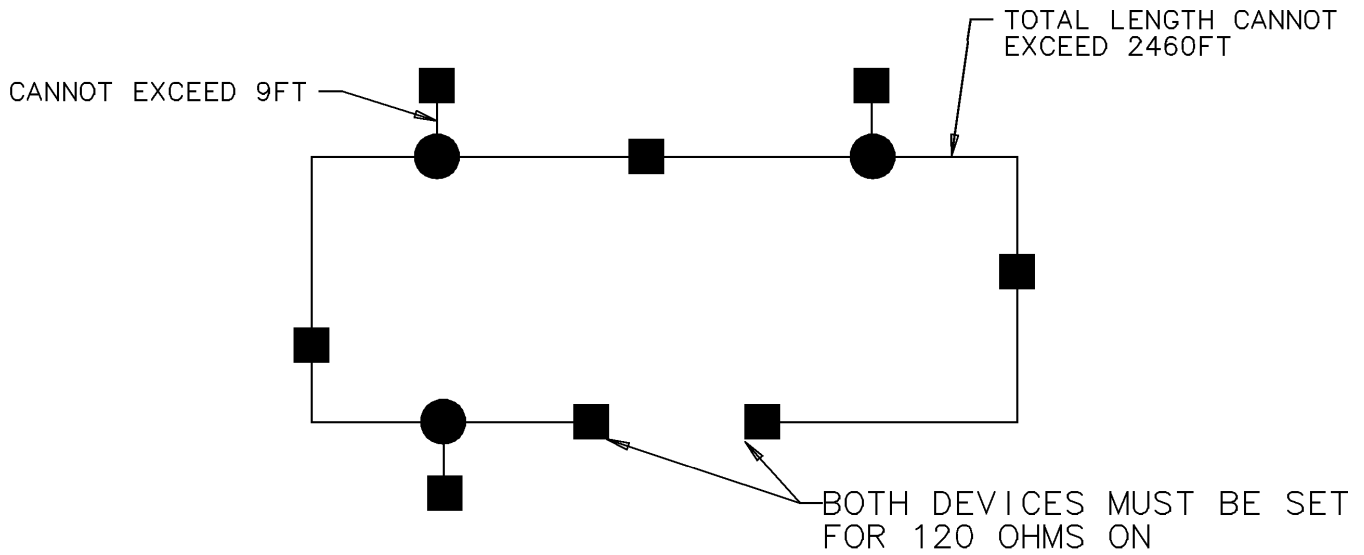
Wire size	Power Supply to I/O unit	I/O unit to Fluid Solenoid 282873 & 83929 Ready Light	I/O unit to Air Solenoid 282886	I/O unit to Pulse Meter 85544	Power Supply to Keypad or Display
18 AWG	10 ft	150 ft	600 ft	600 ft	500 ft
16 AWG	20 ft	250 ft			
14 AWG	30 ft	400 ft			
12 AWG	50 ft				

Wiring Chart

Network Wiring

The network wiring consists of three wires, CAN H, CAN L and the shield. The following are the network components: I/O unit, display, keypad and PC interface. The network structure for all components are wired in series. The guidelines below must be adhered to when installing a system.

1. Only use recommended network cable. See cable requirements.
2. Total distance of network cabling cannot exceed 2460 ft. This is the sum of network cable between all network devices.
3. All network devices all wired in series. A star network cannot be used. Junction boxes are allowed, however, the maximum distance from a junction box to a network device is 9 ft. The ideal system would be wired from network device to network device. See illustration 1
4. The network device at the beginning and the network device at the end of the network must have its internal 120 ohm resistor set to the ON position. All other devices in the network must have their internal 120 ohm resistor set to the OFF position. See illustration 2, 3, 4 and 5 for location of jumper pin.



- – Network Device: I/O Unit, Display, Keypad, Printer Extender or PC Interface
- – Junction Box

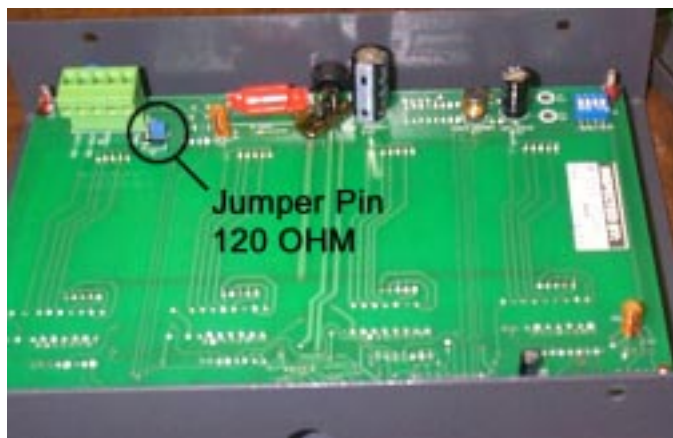
Illustration 1



**I/O Unit
Illustration 2**



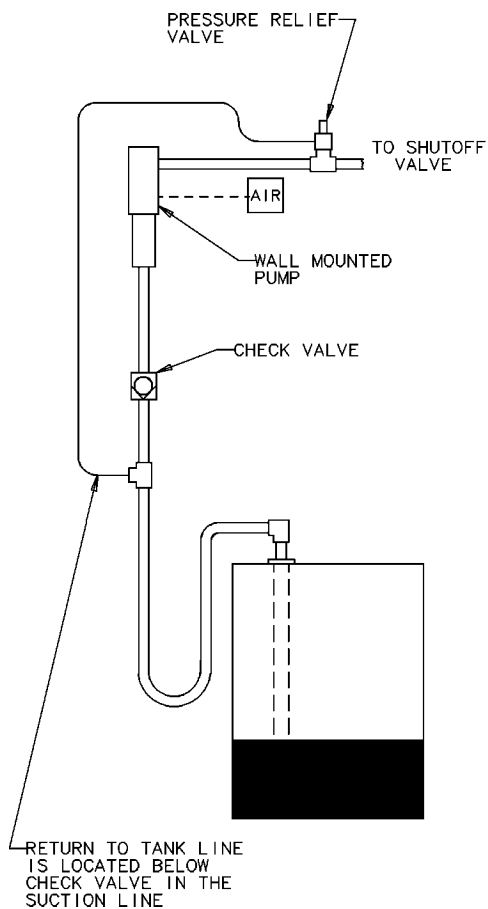
**Keypad & Printer Extender
Illustration 3**



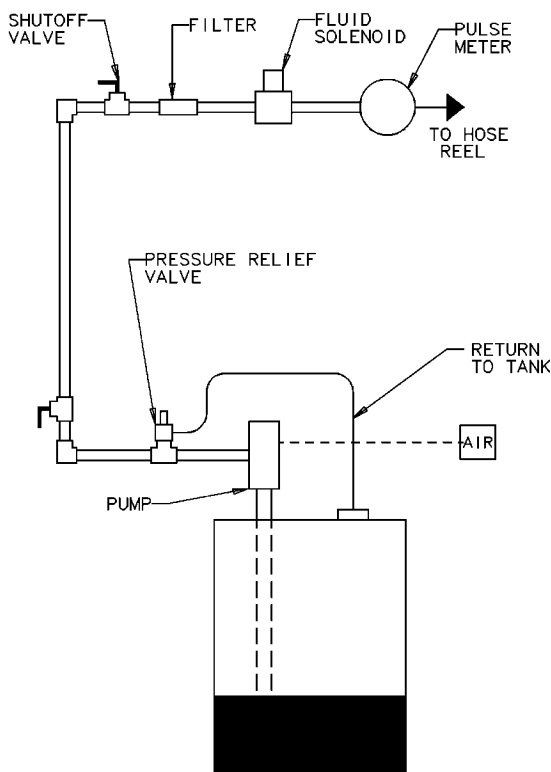
**Display
Illustration 4**



**PC Interface
Illustration 5**



**Main Fluid Components
Illustration 6**



Wiring the Power Supply – 282865

See Illustration 7. The input power for the power supply is 120vac 50/60hz. The power cord is not supplied with the power supply. The power cord must have a third (grounding) pin. The output from the power supply is 24vdc with 240va of power is available. It is recommended to use one power supply per I/O unit.

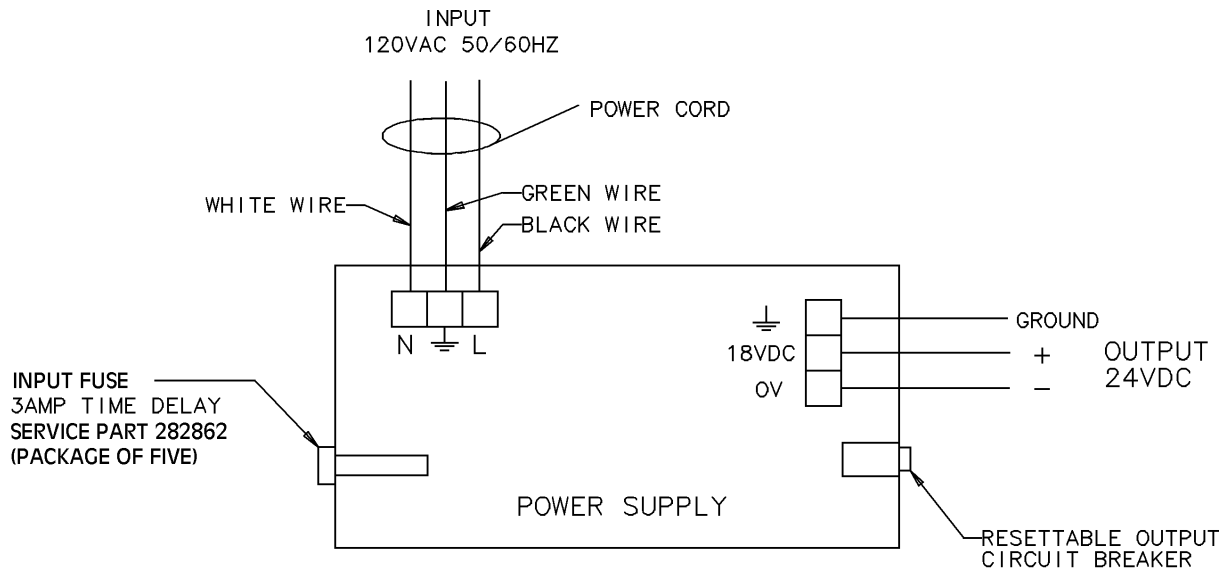


Illustration 7

Wiring the Keypad – 282868

See Illustration 8. Input voltage is 24vdc at 3.6va from power supply. All grounds are connected to the frame nut. The shield for the network wiring can only be connected to the terminal marked shield located between CAN H and CAN L terminals.

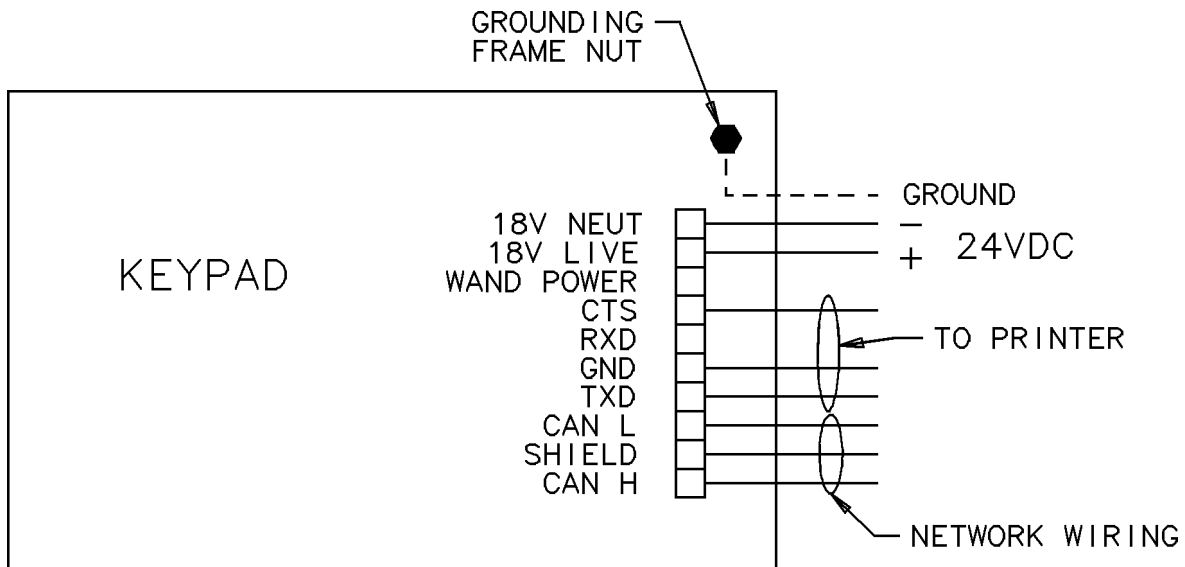


Illustration 8

LFC 3000 Instruction Manual

Series "A"



Wiring the I/O Unit – 282860

See Illustration 9. Input voltage is 24vdc at 2va (no solenoids) from the power supply.

The I/O controls and supplies power to the eight fluid solenoids located at the hose reel and one main air solenoid. The I/O has eight inputs for the pulse meter located at the hose reel.

The I/O has one input for high level waste oil (N.O.) switch. When activated the LFC 3000 will print an alert message.

Wiring for single channel pulse meters is shown in illustration 9. The I/O can also support dual channel pulse meters.

Solenoids and pulse meters 1 to 8 are supported by I/O ID 0. Solenoids and pulse meters 9 to 16 are supported by I/O ID 1, etc...

Each I/O supports a printer and the network wiring.

All grounds must be connected to the frame nut.

The shield for the network wiring can only be connected to the terminal marked shield located between CAN H and CAN L terminals.

A key switch is provided to switch all of the fluid solenoids on at one time.

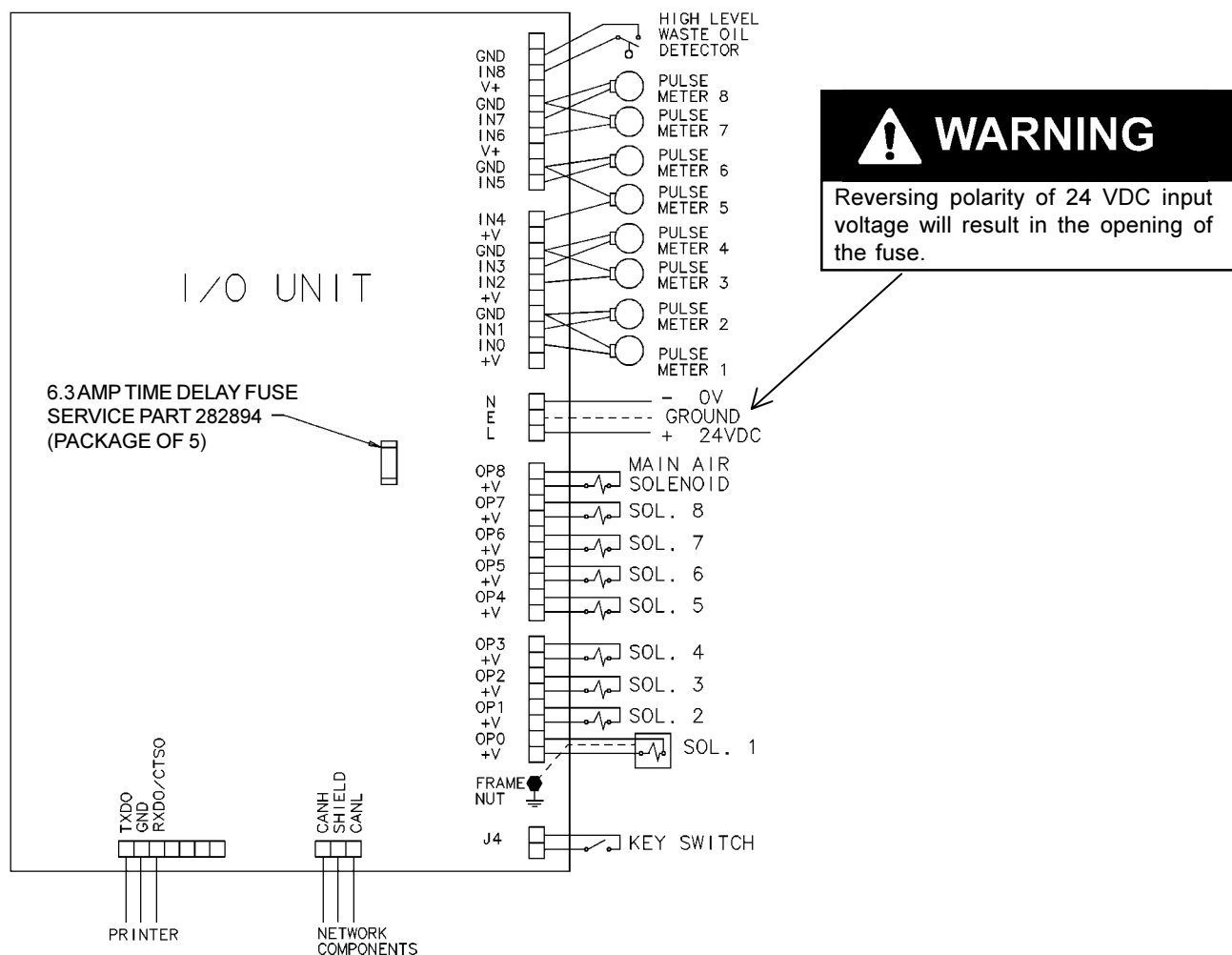


Illustration 9

Printer Settings and Wiring – 282887 or 282889

Printers are normally connected to a keypad but can also be connected to an I/O unit. The printers are used in the serial mode, 9600 baud and no parity. See the printer table below for wiring connections.

Settings for 282887 Ticket Printer

Three dip switches must be set in software before using the printer with LFC 3000. See the printer manual to access these switches. Set switches as follows:

- SW 1 = 01101011
- SW 2 = 10111110
- SW 3 = 11110111

Settings for 282889 Report Printer

The three internal dip switches should already be set when you receive your report printer. If the switches need to be set refer to the printer manual for location of switches. The switch settings are as follows:

- SW 1 = 00001010
- Serial SW 1 = 11111110
- Serial SW 2 = 01101110

I/O Unit	Keypad	282887 Ticket Printer 9 pin printer connector	282889 Report Printer 25 pin printer connector
TXDO	TXD	#3	#3
GND	GND	#5	#7
RXDO/CTS0	CTS	#8	#20

Printer connections to I/O unit & Keypad

Wiring the Display – 282866

See Illustration 10. Input voltage is 24vdc at 3.6va from the power supply. The four dip switches on the printed circuit board are used to set the address of display. All grounds are connected to the frame nut. The shield for the network wiring can only be connected to the terminal marked shield located between CAN H and CAN L terminals.

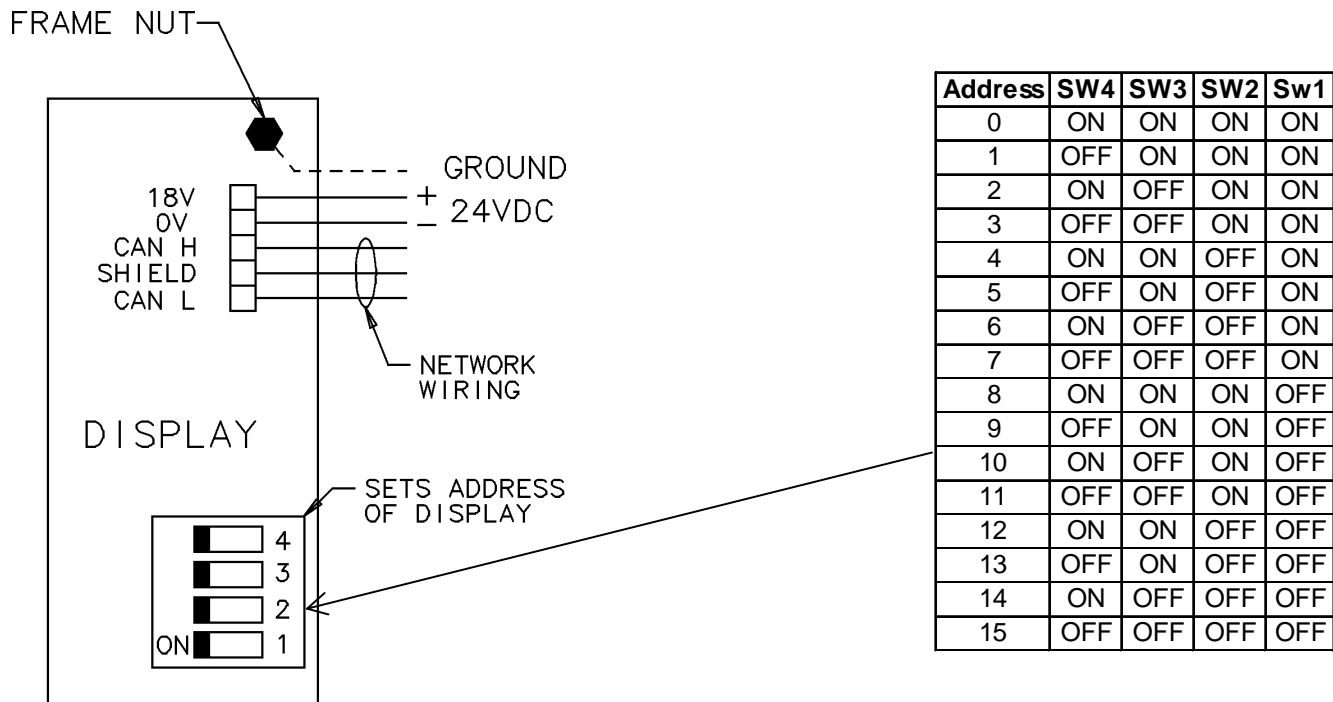


Illustration 10

Wiring the PC Interface – 282880

See Illustration 11.

The shield for the network wiring can only be connected to the terminal marked shield located between CAN H and CAN L terminals.

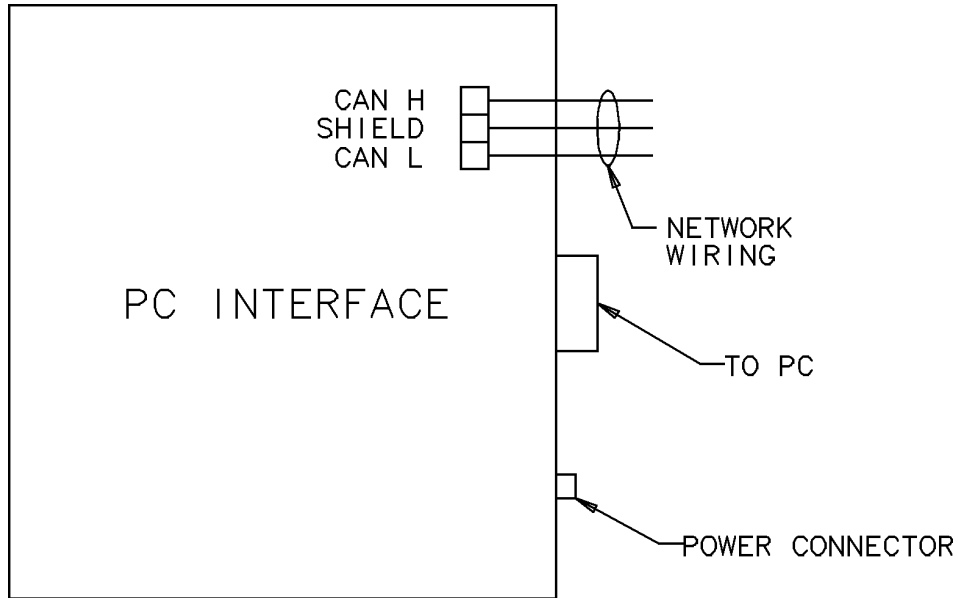


Illustration 11

Wiring the Network Printer Extender – 282884

See Illustration 12. Input voltage is 24vdc at 3.6va from the power supply. The shield for the network wiring can only be connected to the terminal marked shield located between CAN H and CAN L terminals.

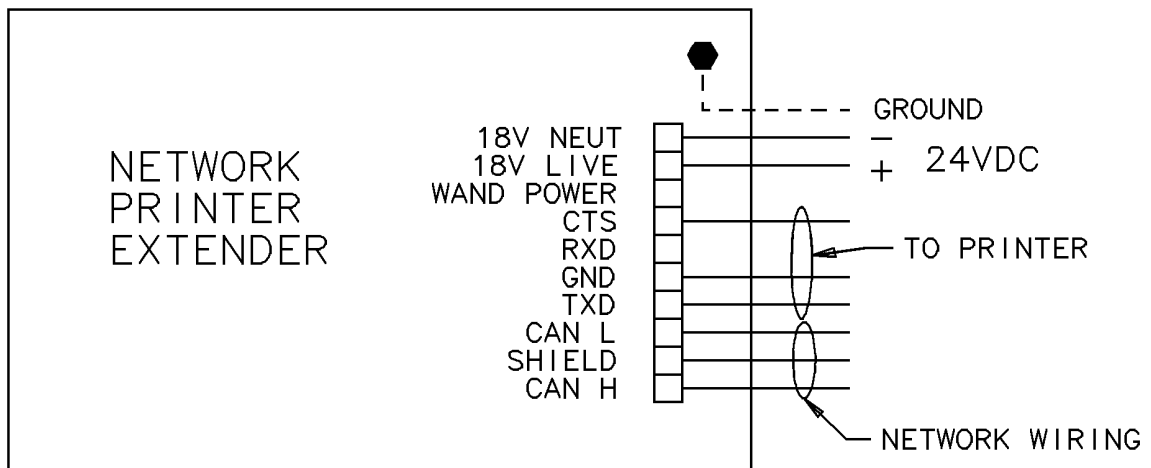


Illustration 12



Power Requirements

Power Supply - Supplies power to I/O, keypad, displays and solenoids.

Input voltage: 90 to 120vac 50/60hz

Output: 240va at 24vdc

I/O – Use one power supply per I/O

24vdc

2va (no solenoids)

Keypad

24vdc

3.6va

Display

24vdc 3.6va

Fluid Solenoid – 282873

24vdc

15va

Main Air Solenoid – 282886

24vdc

1.8va

Network Printer Extender

24 VDC

3.6 VA

Network System

The LFC 3000 can be grouped into 3 levels.

Level 1: Maximum 8 hoses without a PC

One I/O unit

1 to 8 fluid valves

1 to 8 pulse meters

Maximum of 8 keypads

Maximum of 16 displays

Level 2: Maximum 64 hoses without a PC

I/O units maximum of eight

Maximum of 64 fluid valves

Maximum of 64 pulse meters

Maximum of 8 keypads

Maximum of 16 displays

Level 3: Maximum 64 hoses with a PC.

I/O units maximum of eight

Maximum of 64 fluid valves

Maximum of 64 pulse meters

Maximum of 64 keypads

Maximum of 16 displays

Logic Structure of LFC 3000

The table below shows the address (ID) of the I/O unit and the corresponding keypads, solenoids and pulse meters.

ID I/O unit	ID Keypad	ID Solenoid	ID Pulser
0	0-1-2-3-4-5-6-7	1-2-3-4-5-6-7-8	1-2-3-4-5-6-7-8
1	8-9-10-11-12-13-14-15	9-10-11-12-13-14-15-16	9-10-11-12-13-14-15-16
2	16-17-18-19-20-21-22-23	17-18-19-20-21-22-23-24	17-18-19-20-21-22-23-24
3	24-25-26-27-28-29-30-31	25-26-27-28-29-30-31-32	25-26-27-28-29-30-31-32
4	32-33-34-35-36-37-38-39	33-34-35-36-37-38-39-40	33-34-35-36-37-38-39-40
5	40-41-42-43-44-45-46-47	41-42-43-44-45-46-47-48	41-42-43-44-45-46-47-48
6	48-49-50-51-52-53-54-55	49-50-51-52-53-54-55-56	49-50-51-52-53-54-55-56
7	56-57-58-59-60-61-62-63	57-58-59-60-61-62-63-64	57-58-59-60-61-62-63-64

The I/O unit with ID 0 will communicate with keypads #0 to 7 and control hoses #1 to 8 based on pulses from counters #1 to 8.

The I/O unit with ID 1 will communicate with keypads #8 to 15 and control hoses #9 to 16 based on pulses from counters #9 to 16.

If your installation uses a network printer extender for long distance printing use ID "0" for this device.

How the Network Works

The main part of the software is stored in the I/O unit. The keypad is the interface between the I/O unit and the operator.

In a multi I/O installation, there is always an I/O which is the "Master." The software recognizes only the I/O "0" as the "Master." This "Master" I/O unit will store all the transactions and is the relay between the keypads and the other I/O units. These last ones will only control the solenoids and pulse transmitters but will not store any transactions. They always receive their instructions from the "Master" I/O.

The following operations must be executed depending on the different installation configurations.

We recommend to structure the communication of the network before connecting the pulse transmitters and the solenoids to the I/O's.

1) Installation with 1 I/O unit, maximum 8 keypads and without PC

- All the I/O units are delivered with the ID "0", don't modify it.
- All the keypads are delivered with the ID "0". A different ID number must be given to each keypad.
- All the displays are delivered with the ID "0", a different ID number must be given to each different display.

Procedure to change the address of the keypad (ID):

This procedure must be done from each keypad. At power up, all the keypads will show:

VERSION	n° #.##	(X is the address of the Keypad)
I.D.: X	Version Date	

1. Remove all the keypad's connectors or shut the power down.
2. Press the "Space" key on the keypad you need to change and hold down.
3. Put back the connector or power on.
4. Release the "Space" key; the screen will show you: ID?
5. Type the keypad ID number (0 to 7).
6. Press enter.

Execute the same procedure with different ID numbers for all the keypads. On every keypad, you have to give an address for the ticket A & B printer setup.

When all the keypads will be correctly identified by the network they will all show "PIN."

Procedure to change the address of the display (ID):

1. Remove the display's connector or shut the power down.
2. Change the address by using DIP switches on the PC board.
3. Put back the connector or power on.
4. The display's identification can be checked via the software in test C.

2) Installation with multi (2-8) I/O, maximum 8 keypads without PC

- The 8 keypads must be set to communicate with I/O "0".
- All the I/O units are delivered with the ID "0".
A different address (ID) must be given to each I/O unit.
- Regarding the address of the keypad (ID), see procedure to change the address of the keypad (ID).
On each keypad, you have to give an address for the ticket A & B printer setup.
- Regarding the address of the display (ID), see procedure to change the address of the display (ID).



Procedure to change the address of the I/O unit (ID)

1. Remove all the power connectors of all the I/O units.
2. Put back the power connectors of the highest I/O units. For example, if you have 3 I/O units in the garage, put back the power connector from the I/O corresponding to hoses #17 to 24.
3. Go to the closest keypad, enter into the system configurations and install menu to set the minimum parameter. See User Manual.
4. Go to the prompt "change I/O ID."
5. Set I/O address to 2 (Hoses #17 to 24).
6. Exit the configuration procedure (go back to PIN).
7. Remove the I/O power connector.
8. Do the same procedure for I/O Number 1 (hoses #9 to 16).
9. Do the same procedure for I/O Number 0 (hoses 1 to 8).

The following are the minimum parameters which must be set correctly for each I/O unit to set up the dispensing part of the program. Refer to the Supervisor, Customer and System menus in the User Manual.

Minimum Parameters	Factory Settings
- Initial Time-out	6 sec.
- Inactive Time-out	60 sec.
- Encoder type	Single Channel

All of the above data must be the same on each I/O

Note: On an installation with PC, just by activation of the "send" option, the configuration (minimum parameters is automatically sent to all different I/O units. Except Date/Time, you still have to program on each I/O.

The I/O address ID number is stored in a permanent memory which is read only when the system is powered on. This is the reason why it is requested to power off and back on (or unplug and replug the power connector) the system after a modification of the address.

Modification of the minimum parameters after configurations:

If one or more of the minimum parameters have to be modified on a multi I/O system, it will be necessary to change one of the keypad's ID number to talk with the respective I/O. Following is an example if a minimum parameter has to be changed on I/O Number 2.

1. Change the address of the closest keypad (see procedure to change the address of the keypad (ID)) into the address ID number compatible with I/O ID number 2.
2. Enter in the system configuration and installation menu to modify one or more parameters.
3. Exit the configuration procedure (go back to PIN).
4. Reenter the original keypad ID you modified.

3) Installation with a PC, multi I/O and maximum 64 keypads

With the use of a PC, you still need to :

- Give to each I/O a different address (ID); see "procedure to change the address of the I/O unit (ID)."
- Program Date and Time on each I/O.
- Give at each keypad a display a different address (ID); see "Procedure to change the address of the keypad (ID)".
- Give at each display a different address (ID); see "procedure to change the address of the display (ID)."
- Configure the entire system, send the configuration through the network.

See software manual.

TROUBLESHOOTING

Do not forget that you need to clear all the transactions (Supervisor Menu) before any configuration!

In case of a problem, try to isolate the problem by changing the device that seems damaged.

Never try to repair a damaged item by yourself (not under warranty).
Therefore, you need to have spare parts with you.

1. Communication Problems:

The display on the keypad shows:

VERSION	n°#.##
I.D.: X	Date of Version

and does not switch to the prompt:

Enter PIN No. _ _ _ _

Check the following:

1. The network cable is wrong.
2. You have a "Star" network and not an "IN Line" network.
3. The jumper sockets are not in the "In" position at the beginning and the end of the CAN bus (120 Ohm between CAN H and CAN L): See Illustrations 2, 3, 4 and 5.
IN: Resistor is fitted between CAN H and CAN L.
OUT: Resistor is not fitted between CAN H and CAN L.
4. The CAN L or CAN H wires are open.
5. CAN L and CAN H are inverted.
6. No 24 VDC power at the I/O unit.
7. Low Voltage (<9 VDC) at the I/O unit or at the keypad.
8. Check the fuses on the I/O card.
Check the fuse and circuit breaker on the P.S.U.
9. The display on the keypad reads "Inactive".
 - a. Power cycle system.
 - b. When the display reads "Inactive" press enter one time. That should clear it.

Lost Supervisor PIN

We have a method to release the system where the Supervisor PIN has been lost or illegally changed. This is based on time and date and gives a different PIN every hour.

If the customer calls needing the PIN, he should be asked for the time and date which is shown on the display every minute. You have then to make the following calculation:

Month	x 7891
Day	x 3456
Hour	X 4567

The PIN code to use will be the 4 last numbers of the addition.

Example: We are the 21st of January 1998 - 11:35 AM.

01 x 7891 =	7891
21 x 3456 =	72576
11 x 4567 =	<u>50237</u>
	130704

The correct code is 0704.

Now have the customer to enter an invalid PIN to reset the 9999 counter. He should now enter 9999 twice followed by the PIN calculated above. On each entry the Invalid Pin message will be shown.

At this point, the default PINs will be reset (i.e. 9999-1111 and 2222).

2. Problems with the display:

If you are in Test C (System Menu) and the addresses displayed are not the same as these selected on the dip switches (back of the card): shut the system off (or the wrong display), wait at least five seconds and switch the power back on.

- Check the display allocation (System Menu) of the different hoses.
- Check the minimum power (9 vdc) at the display.
- Check the network (CAN H and CAN L) at the display.
- Replace the display.

3. Problems with the solenoid valves:

- All the solenoids are open all the time: check the position of the override key switch on the I/O box.
- You are in Test A (System Menu) and one or more solenoids are not working:
 - Check the connections (Solenoids, I/O card)
 - Check the voltage at the solenoid, there is maybe too much power-lost on the line?
 - Check the continuity of the cables.
 - Exchange the solenoid.
- You have an "Pulser Error" message, check in "set encoder type" if you are in quadrature or in single pulse mode.

4. Problems with the pulsers:

You don't have any delivered quantity on your tickers and the display is not working, but you can deliver oil.

- Check to see if the hose has been programmed to the correct display.
- Check the connections (pulsers, I/O Card)
- Check the continuity of the cables.
- Check the opening and closing of the pulse meter switch.
- If you have a pulse counter, check that the pulses are arriving at the I/O Card.
- Exchange the pulser.

5. Problems with the printers:

- Check the printer switch settings - See Printer Settings and Wiring
- Check all the connections
- Check the continuity of the cables
- Check the different printer setup (System Menu)

6. Problem with the PC Interface:

On the right side of the bottom of the PC screen, there are 8 little squares. If you have five I/O's connected to your system, you must have five little green squares with x's in them. Otherwise, you have a network problem.

7. Explanations for the transaction end codes printed on each transaction ticket:

- 0 Means the transaction has been stopped after the inactive time-out:
 - It's normal in free dispense mode.
 - The preset quantity has not been totally dispensed.
- 1 In preselect mode, the preset quantity has been totally dispensed: Completed.
- 2 Input Error in the pulses sequence: for quadrature pulsers only.
- 3 Count Error: Missing pulse in quadrature pulsers only.
- 4 It means that the power has been shut down during the transaction: Power Down.
- 5 The transaction has been stopped by the emergency procedure ("...."): System inactive.
- 6 IOP Error: Microprocessor Error
- 7 Unauthorized transaction: for approved systems only, quantity dispensed between 0,5 Lt and 100 Lt.

8. Procedure to change the battery:

- Test of the microprocessor supervisory circuit "MAX690" next to the battery:
 - With 24 VDC power: Pin 3 (-) Pin 7 (+) = 5 VDC
 - Without 24 VDC power: Pin 4 (-) Pin 8 (+) = 3 VDC
(2 VDC MIN)
- Print a diagnostic report for your records.
- Under power, remove the battery and replace it with a new one. Must replace with same type of battery.
- Battery References: Lithium Manganese Battery
 3 VDC - 180 mAH - Type CR 2032



LFC 3000 Instruction Manual Series "A"

Americas:
One Lincoln Way
St. Louis, MO 63120-1578
USA
Phone +1.314.679.4200
Fax +1.800.424.5359

Europe/Africa:
Heinrich-Hertz-Str 2-8
D-69183 Walldorf
Germany
Phone +49.6227.33.0
Fax +49.6227.33.259

Asia/Pacific:
25 Int'l Business Park
#01-65 German Centre
Singapore 609916
Phone +65.562.7960
Fax +65.562.9967

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www.lincolnindustrial.com