LINCS II Troubleshooting

Section 06-04-06

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Red Alarms

An ALARM is a serious event that means immediate danger to equipment or personnel. The red light on the console turns on, the beeper sounds, and an ALARM message is displayed. The machine should be safely shut down immediately.

Alarms may result in automatic functions to assist the operator in shutting down the machine. When a red alarm occurs, the engine automatically goes to low throttle. A timer will appear at the top of the display that shows the remaining time until the engine is stopped and the Park Brakes are set. The timer can be manually expired (and the engine stopped) by pushing in the Park Brake switch.

The operator can acknowledge the Alarm by pressing the Acknowledge Switch on the left joystick.

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There are three sequences that occur in order, when a Red Alarm occurs.

Sequence 1:

At any time during sequence 1, if the park brake switch is pressed in, skip to sequence 2.

- The cab audible beeper is sounded and the red light on the dash is illuminated.
- Idle speed is changed to low idle and the drive system, if energized, will remain energized. This means top speed is limited to half machine rated speed.
- If the touch screen is present, it will display the alarm text on screen.
- Pressing the acknowledge switch silences the beeper and removes the text from the screen.
- A counter on the upper bar of the screen will display the amount of time the operator has until the machine is shut down. This amount of time will vary based on the alarm. This time can be zero for some alarms. When the counter reaches zero the shutdown sequence will begin.

Sequence 2:

- Zero speed is commanded to the drive system.

Sequence 3:

- When the vehicle has reached 0.5mph, the engine is turned off, the idle timer is bypassed, and the park brakes are set.
- The operator can release the computer's park brake control by engaging the park brakes (pushing the park brake switch in).
- The engine will not restart until the system is rebooted, unless the alarm is reset. Resetting an alarm requires a high security level with appropriate permissions.

Red Alarm Priority

- If two Red Alarms occur simultaneously, the one with the shortest countdown takes control of the shutdown process and shuts down the engine before the longer shutdown alarm timer reaches 00 seconds.

Yellow Warnings

A Yellow WARNING means the equipment has experienced a fault that affects the standard operation and sometimes requires an immediate action. The yellow light on the console turns on, the beeper sounds, and a WARNING message is displayed. In some cases, the machine should be safely moved to a safe location and then shut down.

Some Warnings result in automatic changes in machine operation. As examples, over-temperature conditions in the Traction Drive System may result in reduced Motor Torque.

- The operator can acknowledge the Warning by pressing the Acknowledge Button on the left joystick. Refer to “ACKNOWLEDGE BUTTON” below.

Blue Notices

A Blue Notice provides information to the operator as an aid to normal operation. The Notice message will automatically clear after a few seconds.

- The operator can clear the Notice early by pressing the Acknowledge Button on the left joystick. Refer to “ACKNOWLEDGE BUTTON” below.

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Troubleshooting Notices

Troubleshooting notices are notice screens that are presented to the operator to indicate that a function is being limited or inhibited. They can and do occur during normal machine operation, conversely they can also indicate improper operation of the machine. These notice types are normally inhibited during normal machine operation due to their distracting nature. The troubleshooting notices can be enabled at any security level if necessary.

As an example, when the machine is operating normally a troubleshooting notice would occur each time the lift arms are raised up to the top of stroke. The notice “Raise Hoist Limited by End of Travel” identifies that there is a separation of command from the joystick of hoist raise solenoid drive as a result of the extension of the hoist cylinder, as measured by the lift arm position sensor, approaching the upper cylinder limit. This notice is a legitimate event as the lift arms reach the top limit. Should the same troubleshooting notice be displayed with the bucket positioned on the ground then the troubleshooting notice could well be as a result of a potential fault in the lift arm position sensor circuit.

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The “Troubleshooting Notes” option must be “ticked” to turn on the feature.

Below is a list of the most common troubleshooting messages.

Troubleshooting Message Text	Reason for Message
Raise Hoist Limited By End Of Travel	Event is set if hoist cylinders are close to being fully extended
Lower Hoist Limited By End Of Travel	Event is set if hoist cylinders are close to being fully retracted
Rollback Stick Limited By End Of Travel	Event is set if bucket cylinders are close to being fully extended
Rollback Wheel Limited By End Of Travel	Event is set if bucket cylinders are close to being fully extended
Dump Stick Limited By End Of Travel	Event is set if bucket cylinders are close to being fully retracted
Dump Wheel Limited By End Of Travel	Event is set if bucket cylinders are close to being fully retracted

Left Steer Limited By End Of Travel	Event is set if front frame is approaching right steering stop
Right Steer Limited By End Of Travel	Event is set if front frame is approaching left steering stop

Delay Time to Engine Shut Down

Red Alarms will generate an engine shut down time sequence. The amount of time may differ, depending on the alarm.

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The countdown timer is displayed at the top of the message. It continues to stay at the top of the screen after the Red Alarm is acknowledged.

Below is an example list of the most common Red Alarm shutdown times.

Alarm	Time to Engine Shutdown
Auxiliary Steering System Fault	0s
Emergency Stop Switch Pressed (Any)	0s
Invalid Speed Control Pedal Command	0s
Invalid Steer Left Command	0s
Invalid Steer Right Command	0s
Invalid Lower Hoist Command	0s
Invalid Raise Hoist Command	0s
Invalid Rollback Stick Command	0s
Invalid Rollback Wheel Command	0s
Engine Red Lamp Active	10s

Fire System Engaged	10s
HPD Gearbox Oil Pressure Critically Low	10s
Hydraulic Oil Reservoir Level Low	30s
Auxiliary Steering System Activated	30s
Battery Charging Alternator Voltage Critically Low	30s
Vehicle Control Unit Critical Over Temperature	30s
Excessive Number of Motor Drives Inactive	30s
Steer Actuator Data Link Missing	30s
Steer Actuator Fault	30s
Engine Safety Filter(s) Restricted	1 Min.
KLENZ™ Filter Restriction High At Low Throttle	5 Min.
Detected Five Consecutive Auto Lube Warnings	15 Min.
Hydraulic Reservoir Air Pressure Low	15 Min.

Acknowledge Button

The Acknowledge button is located on the side of the directional control (left) joystick. Pressing the button acknowledges the RED ALARM, YELLOW WARNING, or BLUE NOTICE screens on the main monitor. Acknowledging the screen DOES NOT clear the Warning, Alarm, or Notice, they are only removed from the monitor screen.

Acknowledge

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“Stacked” Alarms, Warnings, and Notices

It is possible to have multiple Red Alarm, Yellow Warning, or Blue Notice screens stacked on top of each other.

“Stacked” Counter Number (Alarms, Warnings, and Notices)

When multiple screens are stacked on top of each other, there is a number in the lower right hand bottom of the screen that counts the total number of screens stacked.

- Each screen must be acknowledged.
- As each screen is acknowledged, the counter number counts downward until all the screens are acknowledged.

In the following example, a Red Alarm was artificially generated and acknowledged.

- Acknowledging the Red Alarm leaves a red “banner” at the top of the screen.
- This particular Red Alarm has a 15 minute countdown as shown by the numbers in the middle of the banner.
- When the counters reaches 00, a sequence of actions occurs as designated by the software and the engine shuts down.

In the following example illustration screen, a combination of 33 Warnings and Notices were artificially created to demonstrate the displayed number (33).

- As the acknowledge button is pressed, the number counts downward until all screens are acknowledged.

NOTICE

The touch screen is deactivated to touch when a Yellow Warning is being displayed on the screen. ALL Red Alarms, Yellow Warnings or Blue Notices must be acknowledged, by using the Acknowledge Button on the joystick, before the screen becomes active to touch again.

Blue Notices will eventually remove themselves from the monitor screen. They have a timed delay before automatic removal. They can also be manually removed by using the Acknowledge Button.

Figure 1. Countdown number on screen

Idle Speed

Idle speed is limited to low throttle, until boot down. Example:

- KLENZ™ restriction.
- Auto Lube cycle long is a progressive warning that after 5 consecutive occurrences becomes a Red Alarm.

Load Weigh

Generation 3 machines incorporate the standard load weigh mechanisms.

- The standard load weigh mechanism works by calculating the load weight when the Lift Arm angle reaches zero degrees (horizontal).
- The load weight is logged by the VCU when the bucket is dumped.
- When a load weight is calculated, the VCU checks to determine if it is an overload or critical overload and will warn the operator accordingly.
- Lowering the lift arms back down, once a load has been calculated, will clear the load weigh value and a new load weigh value will be calculated when the lift arms are raised past the trip point.

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Actions Taken for Various Warnings

Several warnings will result in a restriction of machine operation. This functionality is designed to protect the machine, protect the operator while allowing the movement of the machine to a safe condition. The following is a list of the most common actions and the related warning.

Action	Reason
Limit hoist up range.	Critical overload.
Idle speed changed to low idle with the drive system energized until boot down.	Filters severely restricted
Drive system disable	High voltage cabinet door open or foot pot failure detected: Speed control pedal to zero and engine to low idle. When the cabinet door is closed the operator can release the VCU's park brake control by pushing the park brake switch in.
Drive system enabled	If the system is booted and can detect wheel speed and the vehicle is greater than .5mph, the drive system is energized and full braking is applied. This is regardless of the cabinet door open or the ladder down.
Send radiator fan to full speed	Failed hydraulic temperature sensor. The same logic applies to the blower.
Bypass hoist and bucket motion limits	Bellcrank or lift arm position sensor failure
Bypass steer motion limits	Steer position sensor failure.
Disable float and auto level	Hoist and bucket limits are bypassed or calibrations have not been performed.

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Connecting a Laptop to the HMI (remote access)

This procedure allows a laptop to connect in parallel to the touch screen for channel monitoring and event viewing. Machine summary and production data is also accessible via this connection.

NOTICE

- **The Windows screen captures used in this document may not represent the screens displayed on the computer used to connect to the HMI.**
- **If the computer used to connect to the HMI does not have ADMIN rights, changing the IP address may not be possible. Contact your IT department for assistance.**
- **There are multiple ways to access the Windows Local Area Connection Properties menu. This document describes one of those methods only!**
- **LINCS II must be running in order to access the HMI via remote access.**

1. Navigate to Windows Control Panel and right click on Network Connections and select Open.

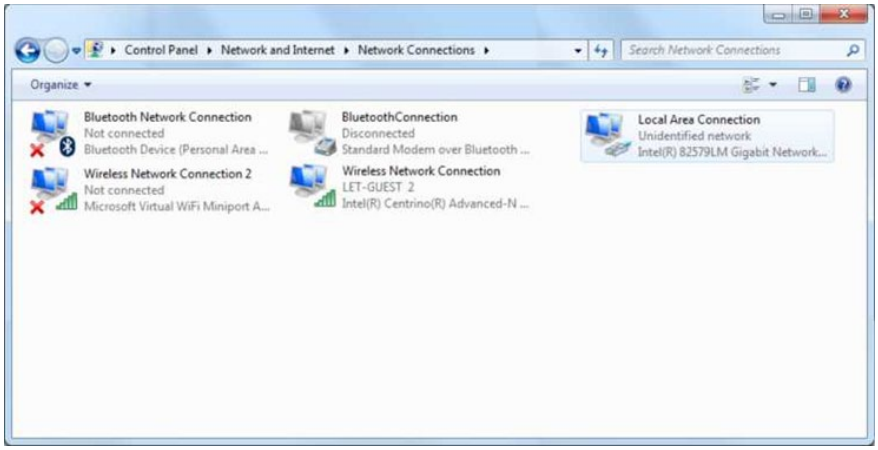


Figure 2. Network connections window

2. Right click on Local Area Connection and select Properties.

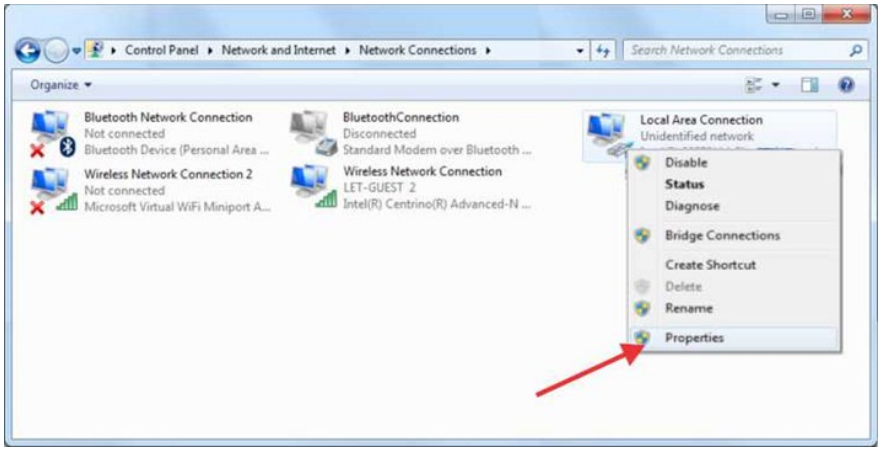


Figure 3. Local area connection properties window

3. Select the Internet Protocol for the laptops version of Windows and select Properties:

- Windows 7 select Internet Protocol Version 4 (TCP/IPv4)
- Windows XP select Internet Protocol (TCP/IP)

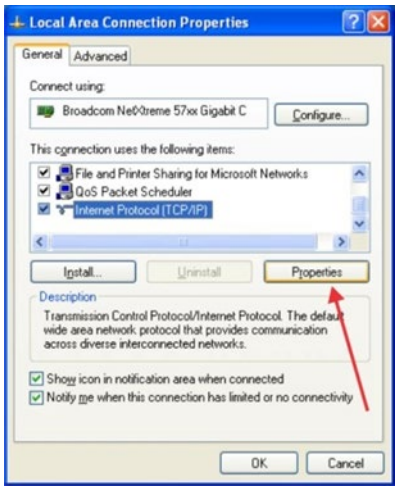
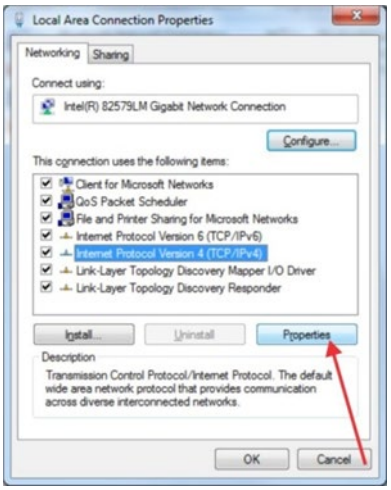
	
Windows XP	**Windows 7**

Figure 4. Internet protocol window

4. Select ‘Use the following IP address.

5. Enter 192.168.0.3 in the IP address

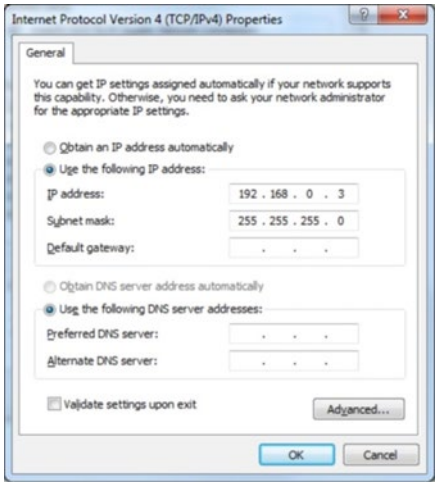
	
Windows XP	**Windows 7**

Figure 5. IP address setting

6. Select ‘OK’ twice to close the Internet Protocol window and the Local Area Connector window.

7. Connect an ethernet cable between the cab port and the laptop.

Figure 6. Ethernet connections

8. Run LINCS II program on laptop.

9. Select ‘Vehicle’, ‘Connect’, ‘Remote’.

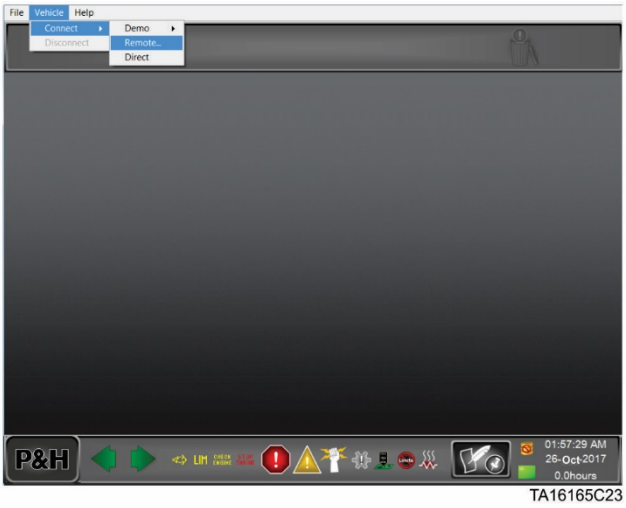


Figure 7. LINCS II remote connection

10. Enter 192.168.0.1 in the IP Address window and select green check box.

Figure 8. LINCS II IP address setting

11. Remote access through the HMI is now available via the laptop computer.

Figure 9. LINCS II remote access

Connecting a Laptop to the VCU (Direct Access)

This procedure allows the laptop to replace both the HMI and the Touch Screen providing the user with direct access to the VCU.

NOTICE

- **The Windows screen shots used in this document may not represent the screens displayed on the computer used to connect to the VCU.**
- **If the computer used to connect to the VCU does not have ADMIN rights, changing the IP address may not be possible. Contact your IT department for assistance.**
- **There are multiple ways to access the Windows Local Area Connection Properties menu. This document describes one of those methods only!**

1. Navigate to Windows Control Panel and right click on Network Connections and select Open.

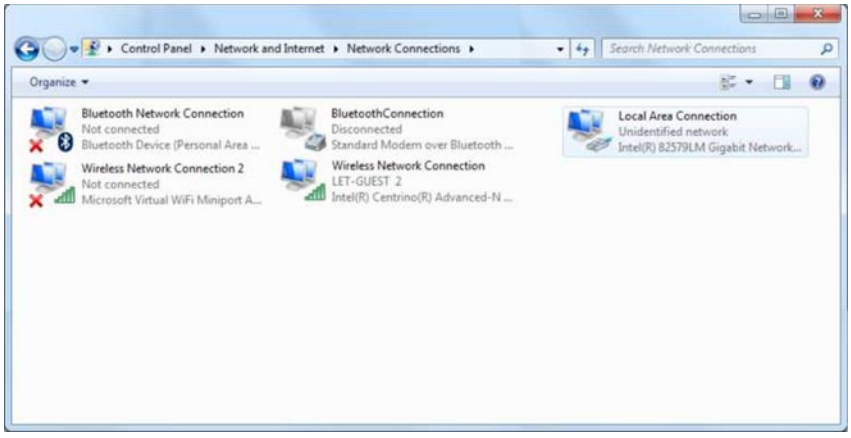


Figure 10. Network connections window

2. Right click on Local Area Connection and select Properties.

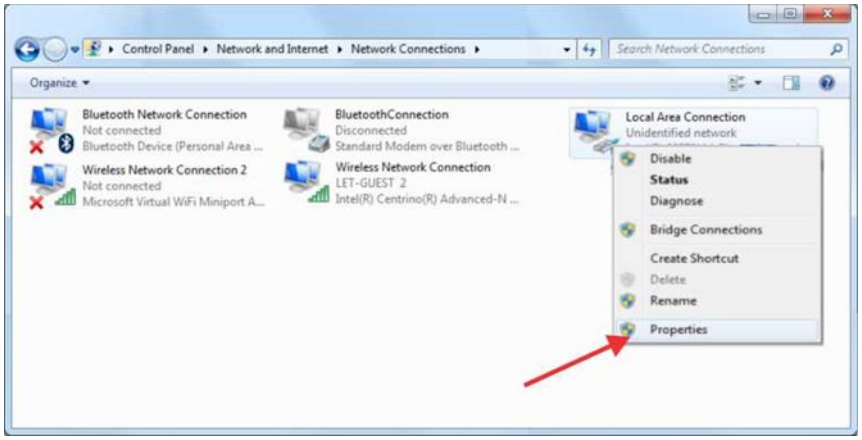
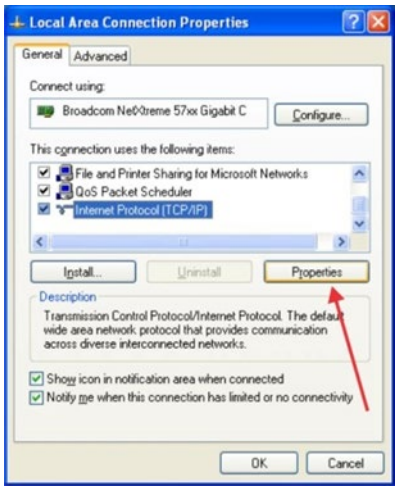


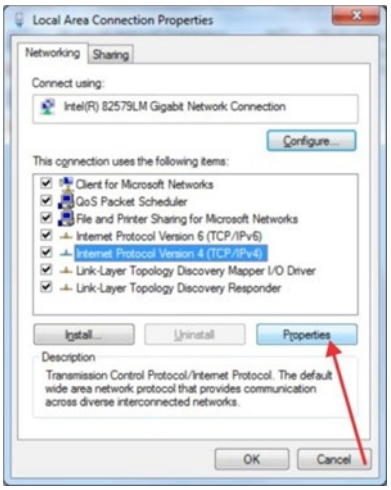
Figure 11. Local area connection properties window

3. Select the Internet Protocol for the laptops version of Windows and select Properties:

- Windows 7 select Internet Protocol Version 4 (TCP/IPv4)
- Windows XP select Internet Protocol (TCP/IP)



Windows XP



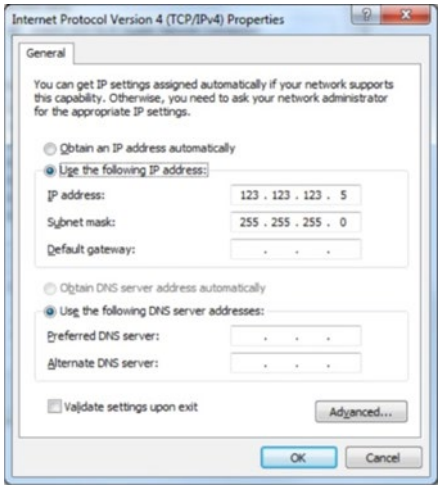
Windows 7

Figure 12. Internet protocol window

4. Select ‘Use the following IP address’.

5. Enter 123.123.123.5 in the IP address

Windows XP



Windows 7

Figure 13. IP address setting

6. Select ‘OK’ twice to close the Internet Protocol window and the Local Area Connection window.

7. Disconnect ethernet cable from VCU ethernet port 1 and connect an external ethernet cable between the VCU and laptop.

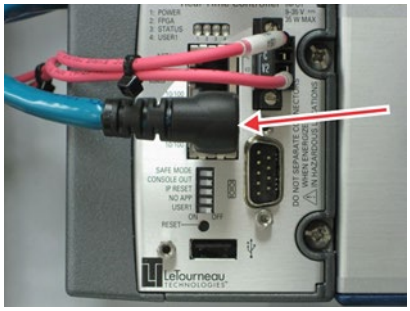


Figure 14. Ethernet connections

8. Run LINCS II program on the laptop.
9. Select ‘Vehicle’, ‘Connect’, ‘Direct’.

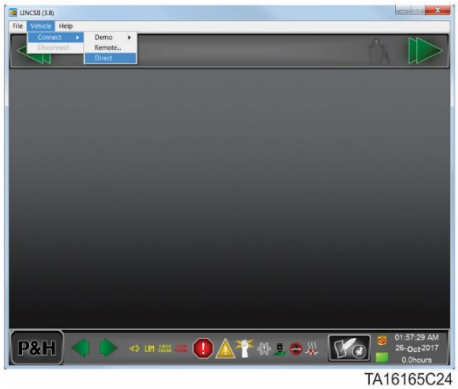


Figure 15. LINCS II direct connection

10. Direct access through the VCU is now available via the laptop computer.

Figure 16. LINCS II direct access