MANUFACTURING COMPANY, INC.

LOR Digital Controller (LDC)

Manual ID: 80001-MAN-LDC
Manual Type: Operator

LOR Manufacturing Company, Inc.

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Thoroughly read and understand all information presented in this manual before using this product.

Notice: The information contained in this manual is subject to change without notice.

LOR Manufacturing shall not be liable for errors contained herein or for consequential damages in connection with the furnishing, performance, or use of this material.

One Year Limited Warranty

LOR Manufacturing Company, Inc. (LOR), shall, for a term of not longer than one (1) year from date of shipment from LOR's facilities, repair or replace any item (FOB from Weidman, MI U.S.A) should it prove that the item is defective in materials or workmanship. **LOR will cover UPS Ground Shipping only for warrantable items**. Expedited shipping is solely at the customer's discretion. This warranty does not cover damage resulting from: mishandling in transit, vandalism, misuse, abuse, acts of nature, alteration or lack of reasonable care. LOR does not assume, nor is LOR responsible for any real or consequential damages from claims against the performance of our product. LOR is not liable for any cost related to loss of life, property, or revenue. Further, LOR is in no way responsible for installation of our product, and will assume no cost of re-installation or removal. This warranty is in lieu of all other warranties expressed or implied.

The operator should test the entire system daily to ensure that all components are in good working order.

No implied warranty of merchantability or fitness for a particular purpose shall extend beyond one year from date of shipment. The liability of LOR under any such implied warranty and under this limited warranty shall be limited to the repair or replacement of defective parts within one year from date of shipment from LOR's facilities. LOR shall not be liable for any incidental or consequential damages. Some states do not allow limitations of incidental or consequential damages, so the above limitations or exclusions may not apply to you. This warranty gives you specific rights, and you may also have other rights which vary from state to state.

Revision	Date	Description	Initials
1.0	08 October 2020	Initial Creation	B.S.

Read this before using this system

- Always keep this manual readily available for future reference
- Make sure the area is safe to operate equipment before turning power on
- If you encounter any problem or malfunction, call your equipment dealer immediately
- Contact your equipment dealer for replacement parts and/or service

Intended Use

This device is intended for use in applications such as, but not limited to, Industrial Engine Monitoring and/or Control.

Cleaning

Use only a soft lint-free cloth to clean the control system.

Note

DO NOT clean this device with a power washer.

Safety

System Safety

Refer to OEM documentation. ## Improper Use If the equipment is used in a manner not specified herein, the protection provided by this equipment may be impaired.

Safety Information

The use of this system allows the operator greater freedom of movement within the work site, increased handling accuracy while improving both efficiency and the overall safety of the operator. These benefits require the operator and support staff to maintain the system and ensure that it is in working order before it is put in use.

The correct and safe use of the system requires that the operator keep the machine being controlled in sight at all times.

> ***Caution***
>
> Operators must wear all OSHA required Personal Protective Equipment (PPE) when operating this system

Mounting and Accessories

Mounting

To mount the system follow the cutout diagram below.

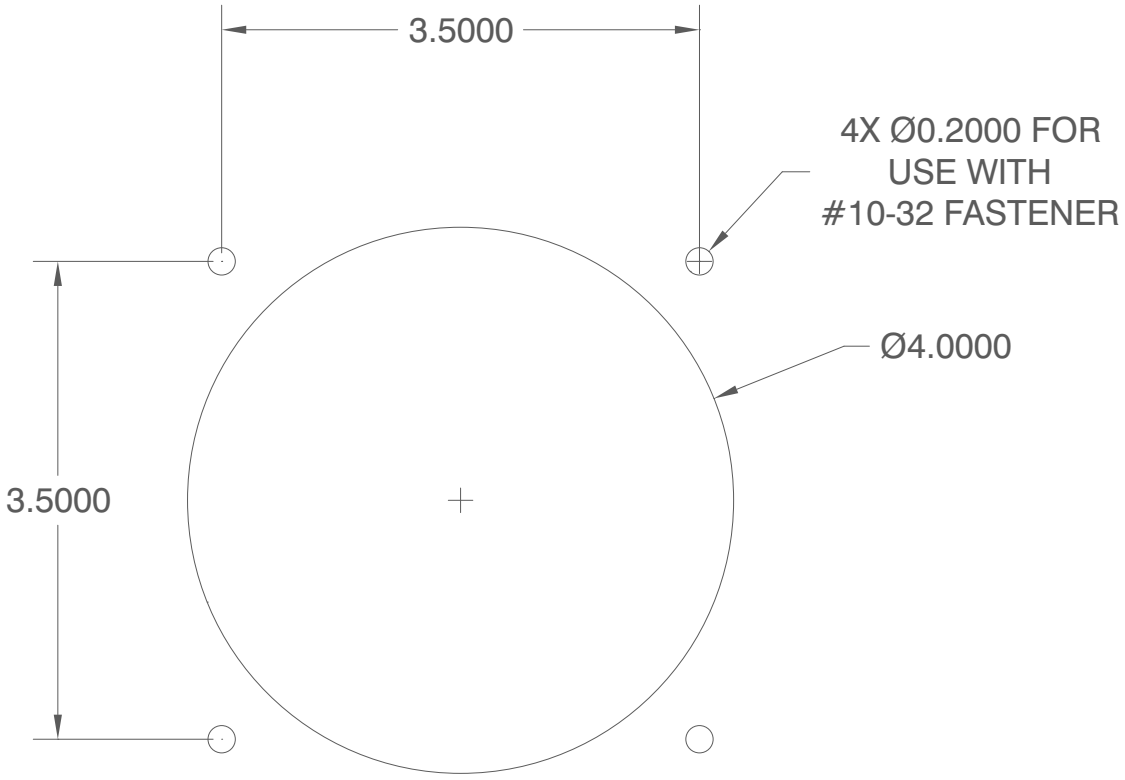


Figure 1: Mounting Diagram

Cautions and Warnings

Warning: Before welding on the Machine, ensure that all connectors are disconnected from the system. Failure to do so could result in damage to the system itself or its components.

Caution: Improper operation of these controls could cause damage to equipment. Do not allow anyone to operate this equipment before completely reading this manual.

Caution: LOR Manufacturing Company, Inc. controls are intended as general purpose switches. They are not safety devices. Malfunctions may occur. LOR Manufacturing Products are used to initiate an operation where false operation could be dangerous. Point-of-Operation guarding devices must be installed and maintained to meet OSHA and ANSI Machine Safety Standards. LOR Manufacturing shall not accept responsibility for installation, application, or safety of systems.

Specifications

Table 2: General Specifications

Weight	8 oz
Operating Temperature	-4–158°F (-20–70°C)
Ingress Protection	IP 67
Voltage Supply	9–32 VDC
Current Consumption	Outputs OFF - 50mA (12 VDC) 30mA (24 VDC)
CAN Protocol	J1939

Table 3: User Interface

Display	400 × 240 pixel 2.83″ Transflective Sunlight Readable
Backlight	Yes
LEDs	Amber–Caution/Warning (J1939) Red–Shutdown (J1939)
Keypad	8 or 4 Position Tactile. IP 67 Sealed, Rated to 100,000 Cycles
Connection	2 × 12 pin Deutsch connectors

Table 4: Input Specifications

Voltage Inputs	
Number	Up to 16 (7 × Wide Band; 9 × Narrow Band)
Signal Range	Wide: 0–27 VDC Narrow: 0–10VDC
Max Voltage	32 VDC
Resolution	Wide: 6.7 mV/bit Narrow: 2.44 mV/bit
Frequency Inputs	
Number	2
Frequency Range	2–20,000 Hz
Minimum Signal Voltage	2 VAC

Table 4: Input Specifications

Resistive Inputs	
Number	1
Signal Range	0–1,000Ω

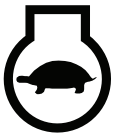
Table 5: Output Specifications

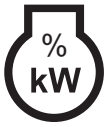
PWM Outputs	
Number	Up to 6
Type	High Side Switching (Hydraulic Solenoids, Horns, Lights, Relays, etc.)
Max Load	3.5 A Continuous
PWM Frequency	31–500Hz
Duty Cycle Resolution	0.10%
Protection	Overload Shutdown Open Load Detection
Relay Output	
Number	1
Type	Dry Contact Normally Open
Max Load	500 mA

Note

Inputs and Outputs may share pin assignments.

Symbol Definitions

Symbol	Definition
	Caution Symbol: Visual cue to use caution
	Direct Current Symbol
	Throttle Decrease
	Throttle Increase
	Set/Enter
	Menu
	Engine RPMs
	Engine Hours
	Battery Voltage
	Hydraulic PSI
	Coolant Temp

Symbol	Definition
	fuel rate
	Actual Load
	Message(s)
	Diesel Exhaust Fluid (DEF)

Parts Identification

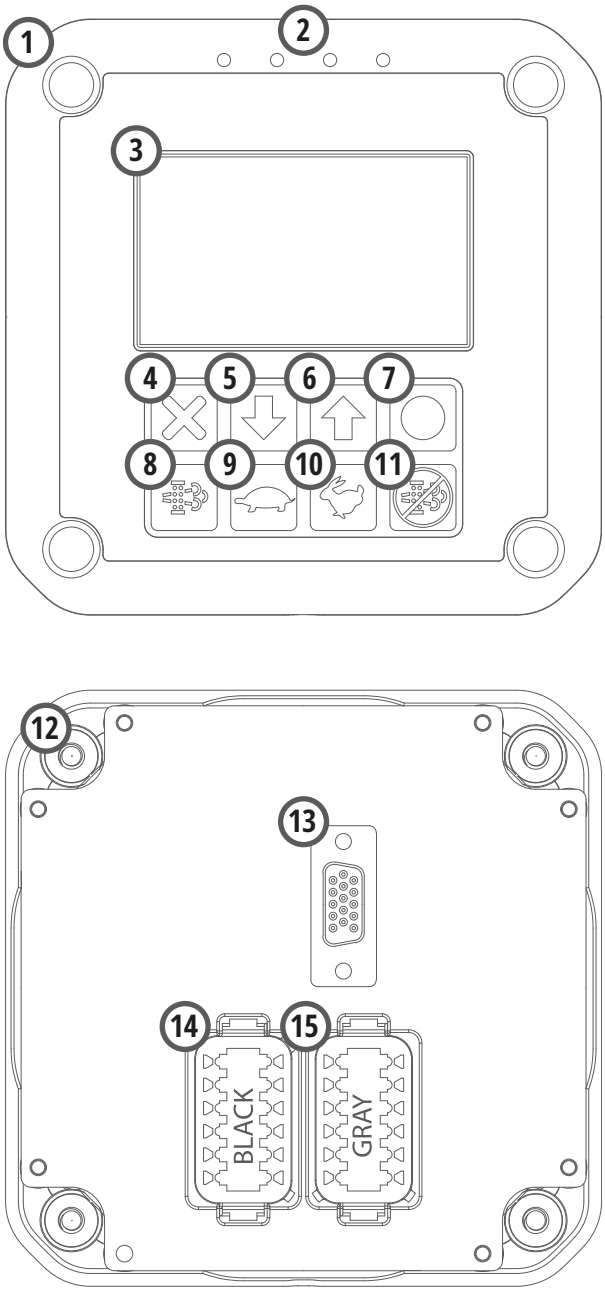


Figure 2: Device Parts

Table 7: Parts Identification

No.	Description
1	Bezel
2	Feed Back LEDs: Red–Shutdown (J1939) Amber–Caution/Warning (J1939)
3	Display
4	Cancel Button
5	Down/Decrease Button
6	Up/Increase Button
7	Set/Enter Button
8	Regen Force Button
9	Throttle Decrease
10	Throttle Increase
11	Regen Inhibit Button
12	Mounting Hole (x4)
13	Programming Port
14	Harness Connector A
15	Harness Connector B

DPF Indicators

Symbol	Definition
	Indicates elevated soot loading of the DPF of >80%. This indicator turns off once an active regeneration has been initiated.
	Anytime the automatic regeneration is inhibited. This can be from the operator controlled regeneration force/inhibit input switch or via setting the configuration in the ECM.
	The High Exhaust System Temperature (HEST) indicator is turned on during an active regeneration and remains on during exhaust system cool down immediately following an active regeneration until the DPF Temp falls below 400°C or the machine goes back to work.

Caution

When activating DPF Regen Force make sure that the machine's exhaust is not directed toward or touching any combustible material.

Note

Force Regen and Inhibit Regen may not be available on all engines. Consult engine documentation for more information.

Using the System

Information Pages

The pages in this section can be accessed by utilizing the up and down buttons on the LDC.

Splash Screen

Upon powering the system on the LDC will briefly display the Splash Screen (3). This screen contains:

Figure 3: Splash Screen

Number	Description
1	Logo
2	Part Number and Software Revision

Main

This screen displays basic operating information. This screen contains:

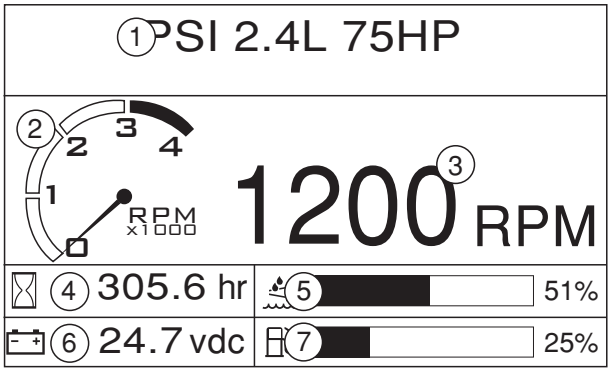


Figure 4: Main Screen

Number	Description
1	Engine Size
2	Tachometer
3	Engine RPM
4	Engine Hours
5	DEF Level
6	System Voltage
7	Fuel Level

Engine Info

This screen displays information related to the Engine. This screen contains:

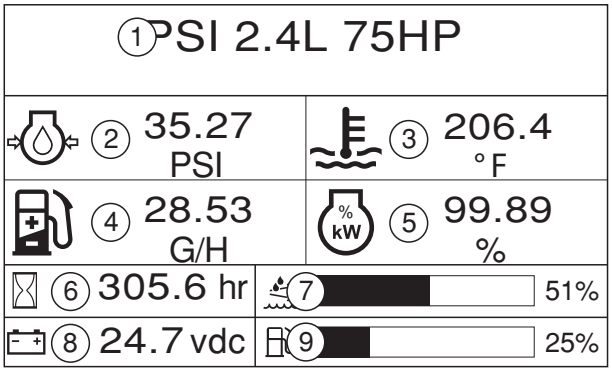


Figure 5: Engine Info

Number	Description
1	Engine Size
2	Oil Pressure
3	Coolant Temperature
4	Fuel Rate
5	Actual Load
6	Engine Hours
7	DEF Level
8	System Voltage
9	Fuel Level

Menu System

To access the menu system of the LDC press the “Menu” button. Once in the main menu you can access the following sub-menus:

- System
- Measure
- Adjust
- Preferences

To enter any of the sub-menus in this section utilize the “Up” and/or “Down” buttons to highlight the options and press the “Set” button. To exit a sub-menu press the “Set” button. To navigate back press the “Menu” button.

System Sub-Menu

The System Sub-Menu contains information related to the LDC and Engine.

Info

This screen contains the following information about the LDC.

- OEM
- Part Number and Software revision
- LDC Serial Number

LDM

Note

This sub-menu will be renamed ”LDC” starting after firmware version 1.4

This screen contains the following hardware information.

- Hardware Revision
- Serial Number
- Firmware Revision
- Battery voltage
- Temperature
- CAN Status

Engine

Identification This screens provides the make, model, and serial number of the Machine's engine.

Faults This screen allows the user to select between "Active" or "Previously Active" faults. Once a choice is made the user will be presented with a list containing the faults. This list can be navigated by utilizing the "Up", "Down", and "Set" buttons on the LDC. Faults will be displayed in message format and will list the SPN, FMI, and Occurrences of the fault.

> ***Note***
>
> Previously Active faults can be cleared when the engine is not running. The user will see "Clear Previously Active Faults" in this menu. Activating that option with the set button will clear all previously active faults.

Measure Sub-Menu

This menu will provide access to information related to the monitoring of Digital/Analog Inputs and Outputs.

Adjust Sub-Menu

This menu allows users to make adjustments to various parameters of the system.

- OEM Settings
- CAN Settings

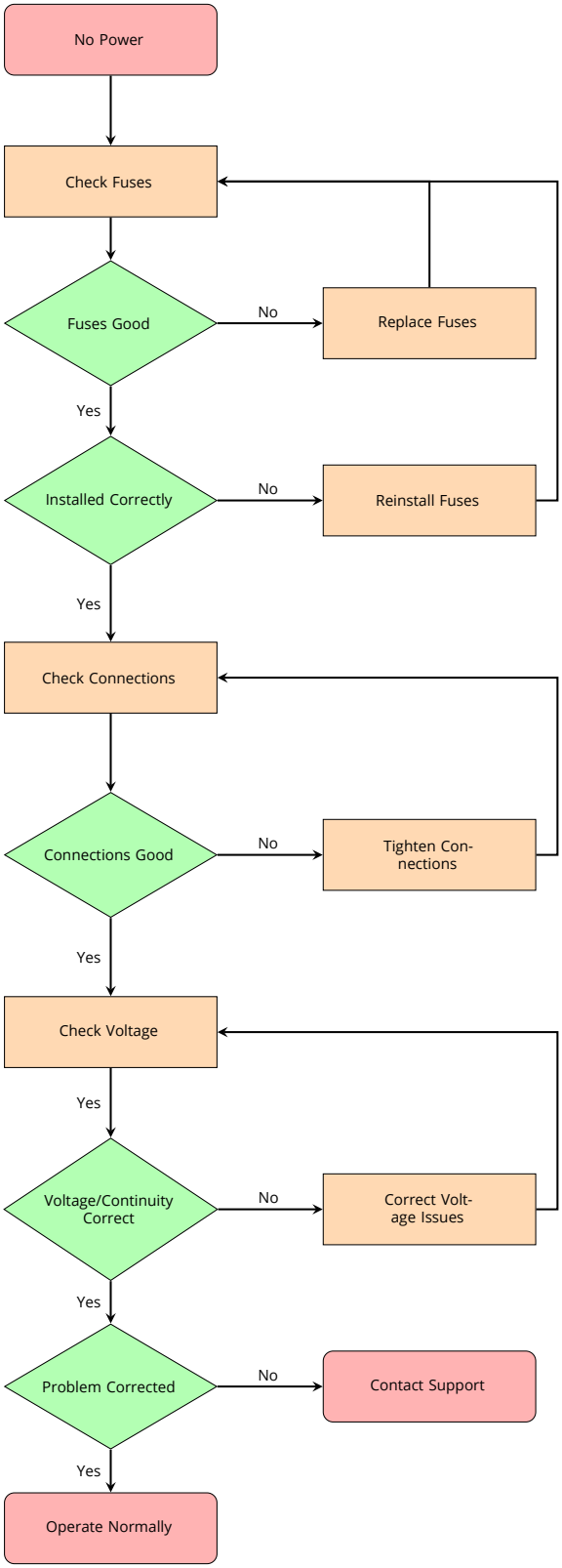
> ***Note***
>
> OEM and CAN settings are set from the factory and protected by a 4 digit PIN Code.

Preferences Sub-Menu

This menu allows users to change from Metric to Imperial units as well as turn the Backlight on or off.

Troubleshooting

The following provides common troubleshooting steps that can be followed in the field.


No Power
Check Fuses
Fuses Good
No
Replace Fuses
Yes
Installed Correctly
No
Reinstall Fuses
Yes
Check Connections
Connections Good
No
Tighten Connections
Yes
Check Voltage
Yes
Voltage/Continuity Correct
No
Correct Voltage Issues
Yes
Problem Corrected
No
Contact Support
Yes
Operate Normally

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