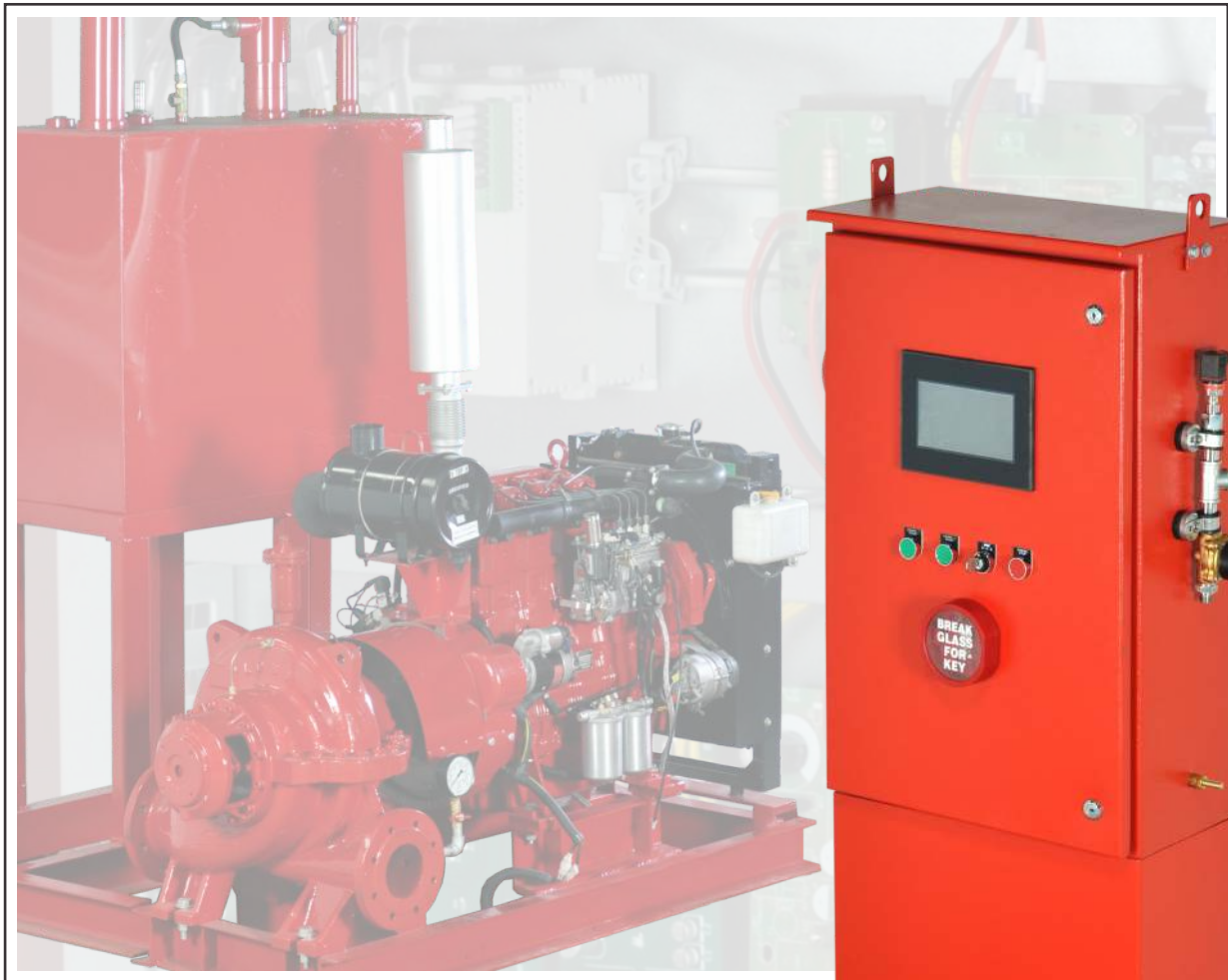
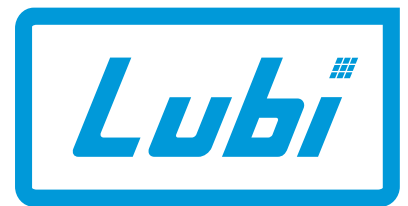


**LFCD SERIES**

**Fire Pump Controller  
For Diesel Engine Driven Fire Pumps**



**INTRODUCTION**

The Lubi LFC series diesel engine fire pump controller is factory assembled, wired and tested as a unit and it conforms to all the requirements of the latest edition of NFPA 20. The controller is available for either 12 or 24 VDC systems.

**TECHNICAL SPECIFICATIONS****● ENCLOSURE**

Fire pump controller enclosure shall be standard NEMA type 2 (IP 31) drip proof suitable for wall mounting. Wall mounting lugs shall be provided on the enclosure. The enclosure shall have a bottom entry gland plate provided for power and engine connections. It will be provided with lifting lugs. It will be painted red RAL 3002 as per NFPA 20. Optional 24 inch legs for free standing installation may be provided on request.

Alternate NEMA enclosures offering better IP protection can be offered based on customer request. Stainless Steel enclosures are also available on request.

**● BATTERY CHARGERS**

Dual solid state battery chargers of 10 Amps rating shall be provided to automatically charge the batteries. They shall be temperature compensated with integral Volt and Amp digital display. LEDs will be provided integral to the charger for indication of AC power ON and battery power ON.

**● HOA SELECTOR SWITCH**

An outer door mounted key operated MANUAL-OFF-AUTO (H-O-A) selector switch is provided. An additional key for HOA switch is stored in a break-glass housing on the door of the enclosure.

**● MANUAL CRANK PUSH BUTTONS**

Two outer door mounted push buttons shall be provided for manual cranking of the diesel engine. "Manual crank 1" shall crank from battery 1. "Manual crank 2" shall crank from battery 2. Pressing both the buttons shall result in cranking from both batteries simultaneously.

**● CRANK CYCLE**

The fire pump controller shall have a crank cycle as follows:

- Crank from battery # 1 for 15 seconds
- Rest for 15 seconds
- Crank from battery # 2 for 15 seconds
- Rest for 15 seconds.

The above cycle shall repeat 3 times. A visual alarm "Fail to Start" shall be displayed if the engine does not start after completion of this cycle.

**TECHNICAL SPECIFICATIONS (CONT...)****● BATTERY ON/OFF CIRCUIT BREAKERS**

Two inner panel mounted battery ON/OFF circuit breakers shall be provided to switch batteries ON or OFF.

**● OPERATOR INTERFACE**

The fire pump controller shall be provided with a color touch screen HMI (Human Machine Interface). The size of HMI screen shall not be less than 5 inches. It should be possible to read the HMI screen in direct sunlight or dark lighting conditions.

The operator interface shall monitor and display fire pump pressure & diesel engine operating conditions including all alarms and events.

All controller settings shall be programmable through the HMI and shall be protected by 2 passwords levels.

Following shall be displayed on the HMI "Main display" screen or "Home" screen.

1. AC power present
2. Charger # 1 and # 2 charging mode
3. Battery # 1 and # 2 Voltage and Amps
4. Real time system pressure
5. Cut out and cut in pressure settings
6. Starter # 1 and # 2 in rest or in cranking
7. Engine idle or running
8. Cause of starting
9. Fuel solenoid valve energized/not energized
10. Countdown of timers
11. H-O-A selector switch position
12. Actuation mode
13. Type of controller
14. Method of shutdown
15. Time and date
16. Pump room temperature
17. Alarms or warnings.

Following alarms/warnings shall be annunciated and displayed on operator interface

1. AC power failure
2. Battery # 1 and battery # 2 failure
3. Battery charger # 1 and battery charger # 2 failure
4. Low gear oil pressure
5. High gear oil temperature
6. High engine temperature
7. Low coolant level
8. Over speed
9. Engine failed to start
10. Engine failure while running

**TECHNICAL SPECIFICATIONS (CONT...)**

11. High system (discharge) pressure
12. Low system (discharge) pressure
13. Low suction pressure
14. Reservoir level low
15. Reservoir empty
16. Reservoir high
17. Faulty pressure transducer
18. Low pump room temperature
19. Low fuel level
20. High fuel level
21. Fuel tank rupture (leakage) for double wall tanks
22. Low fuel pressure
23. Contactor coil failure
24. Loss of DC power.

**● DATA LOGGING**

The controller shall monitor & log the following events:

1. Stop push button pressed in.
2. Engine started or stopped in AUTO or MANUAL mode
3. Engine lockout signal occurred or cleared.
4. Remote start signal occurred or cleared
5. System in AUTO mode occurred
6. System in OFF mode occurred
7. System in MANUAL mode occurred
8. AUTO test start occurred
9. Alarm reset occurred
10. Low pressure start occurred
11. Low pressure condition occurred (when optional pressure switch used)
12. Deluge start occurred/cleared
13. Pressure drop occurred/cleared
14. Low intake pressure shutdown occurred/cleared.

**● EVENTIALARM RECORDING**

The controller shall record all alarms/warnings as well as events mentioned above to system memory with a date and time stamp. The system memory shall have the capability of storing a total of minimum 3000 events or alarm messages.

System pressure logs shall also be recorded into system memory with date and time stamp. A minimum of 30 days of data (when data is recorded every 15 seconds) should be stored in system memory.

**● USB HOST CONTROLLER**

The controller shall have a built in USB host controller. A USB port capable of accepting USB flash memory disk shall be provided. A USB flash memory disk can be used to save historical data of events, alarms and pressure logs. The controller shall also have the capability to save set-up values to the flash disk on demand via operator interface.

**● SERIAL COMMUNICATIONS**

The controller shall feature a RS 485 serial communication port for use with 2 or 4 wire Modbus RTU communication.

**● SOLID STATE PRESSURE TRANSDUCER**

The controller shall be supplied with solid state pressure transducer with a range of 0-300 psi (0-20.7 bar) +/- 1 psi. This pressure transducer shall provide system pressure feedback for display on HMI as well as for control of the fire pump controller. The pressure transducer shall be mounted on the controller to prevent accidental damage. The pressure transducer shall be directly pipe mounted to a bulkhead pipe coupling without any other supporting members.

**● AUDIBLE ALARM**

An audible alarm is provided in the controller to sound during alarm/warning conditions. It should be a 6 inch alarm bell capable of 85 dB sound at 10 feet (3 m).

**● ANTI-CONDENSATION SPACE HEATERS (OPTIONAL)**

When the fire pumps as well as controllers are installed in basements where the ambient atmosphere is damp, a space heater may be supplied to reduce moisture in the cabinet. A thermostat is supplied as standard with this option.

**OPERATION LOGIC**

When the controller is in "AUTO" mode and both battery circuit breakers are in "ON" position the controller is in standby condition ready to start the engine automatically. "AUTO" mode will be displayed on the HMI. Also battery # 1 and battery # 2 fault should not be displayed on the HMI indicating that battery power is available to start the engine.

When the actual system water pressure drops below the level set in the controller, cranking cycle to start the engine will commence. In addition "Pump in demand" will be displayed on the HMI. If the engine starts and runs, the cranking will cease and protection circuits will be operational.

In case one of the battery gets into discharged state during the cranking cycle and is incapable of cranking the engine the controller will lock onto the healthy battery for the remaining cranking attempts.

If engine fails to start after six (6) crank periods, cranking will cease, "Engine failed to start" message will be displayed on the HMI & alarm bell will sound.

**OPERATION LOGIC (CONT...)**

The fuel solenoid will stay "ON" for one hour however. This is to allow the engine to continue to run in the event the "Engine failed to start" condition was due to a faulty speed switch signal from the engine.

Connections are provided in the control panel for optional remote start switches like remote start push button, deluge valve, and external low pressure switch. These start switches will also cause the "Pump on demand" message to appear on HMI. Also, when "Power failure engine start up feature" is enabled, the controller will automatically start the engine upon loss of battery charger output (due to AC power loss) after a user defined time delay.

While the engine is running, all protective circuits are operational. If the engine stops while running, and there is still an AUTO start demand, the controller will attempt to restart the engine. If the engine fails to start the "Engine failed to start" message will be displayed and alarm bell will sound.

If while engine is running, the oil pressure drops below the safe limit a "Low oil pressure" alarm message will be displayed. An alarm bell will also sound.

If while engine is running, the engine temperature exceeds the safe limit, then "Engine high water temperature" message will be displayed and an alarm bell will sound indicating engine overheating.

In case of overspeed, the engine will be stopped and the "Engine overspeed" message will be displayed and alarm bell will sound. The alarm message and the sound will stay "ON" until engine speed switch and the controller are manually reset.

The controller may be configured as either "MANUAL" or "AUTO" stop as required by the customer. "MANUAL" stop is factory set as standard. The current status is displayed on the main status screen of the HMI.

When automatic stop is enabled the stop timer is preset at factory for 30 minutes. This setting can be changed to a maximum of 60 minutes using system configuration. In other words the engine will stop automatically upon restoration of normal of whatever demand switch/sensor started the engine provided it has run at least 30 minutes or longer or as set in configuration.

When automatic stop is disabled, the engine will continue to run even though the pressure transducer or switch or remote starting switch returns to normal position. The engine can be stopped only by either pressing the stop push button or turning AUTO-OFF-MANUAL switch to "OFF" position.

When the "Test" button on HMI is touched, the engine will be started by causing a drop in water pressure. Failure alarm circuits will be operational in the "Test" mode. This method of test can be conducted anytime to assure that the system will operate properly when required. The engine will run for the time set in AUTO weekly test length of run time or until "Stop" pushbutton is pressed or the selector switch is turned to "OFF" position.

The manual position of the AUTO-OFF-MANUAL switch is for manually starting the engine from either battery. The fuel and water solenoids are energized in this position, and the engine must be cranked manually by pushing one of the buttons located below the HMI. "Manual crank 1" will crank from battery # 1 and "Manual crank 2" will crank from battery # 2. Pressing both the buttons will result in cranking from both batteries simultaneously.

Weekly test run can be conducted by setting the test run timer to give tests on any day of the week and time of the day desired. It will run for a definite time as configured before it shuts down.

Provision for sequential starting is accomplished by the use of adjustable time delay on system pressure drop starting or "Deluge valve" starting. On multiple pump installations these timers are set sequentially and progressively longer in time to prevent more than one pump from starting simultaneously. Failure of the lead pump to start will not prevent subsequent pumps from starting. These time delays can be configured on the HMI.

The "Pump on demand" will be displayed to indicate that there is a command to start and run. This message will clear only when the start condition is cleared such as system water pressure rises above the high set point in the controller.

The "Contactor coil failure" alarm will be displayed when there is a coil continuity failure of the two starting contactors on the engine. Alarm bell will also sound and the alarm will be logged indicating the contactor coil has failed.

The "Loss of DC power" alarm will be displayed to indicate that both the batteries have been disconnected or turned OFF, but AC power is still available. The alarm bell will also sound and cannot be silenced until DC power is restored.

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Product Improvement is a continuous process at 'LUBI'. The data given in this publication is therefore subject to revision.

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ISO 9001



ISO 14001