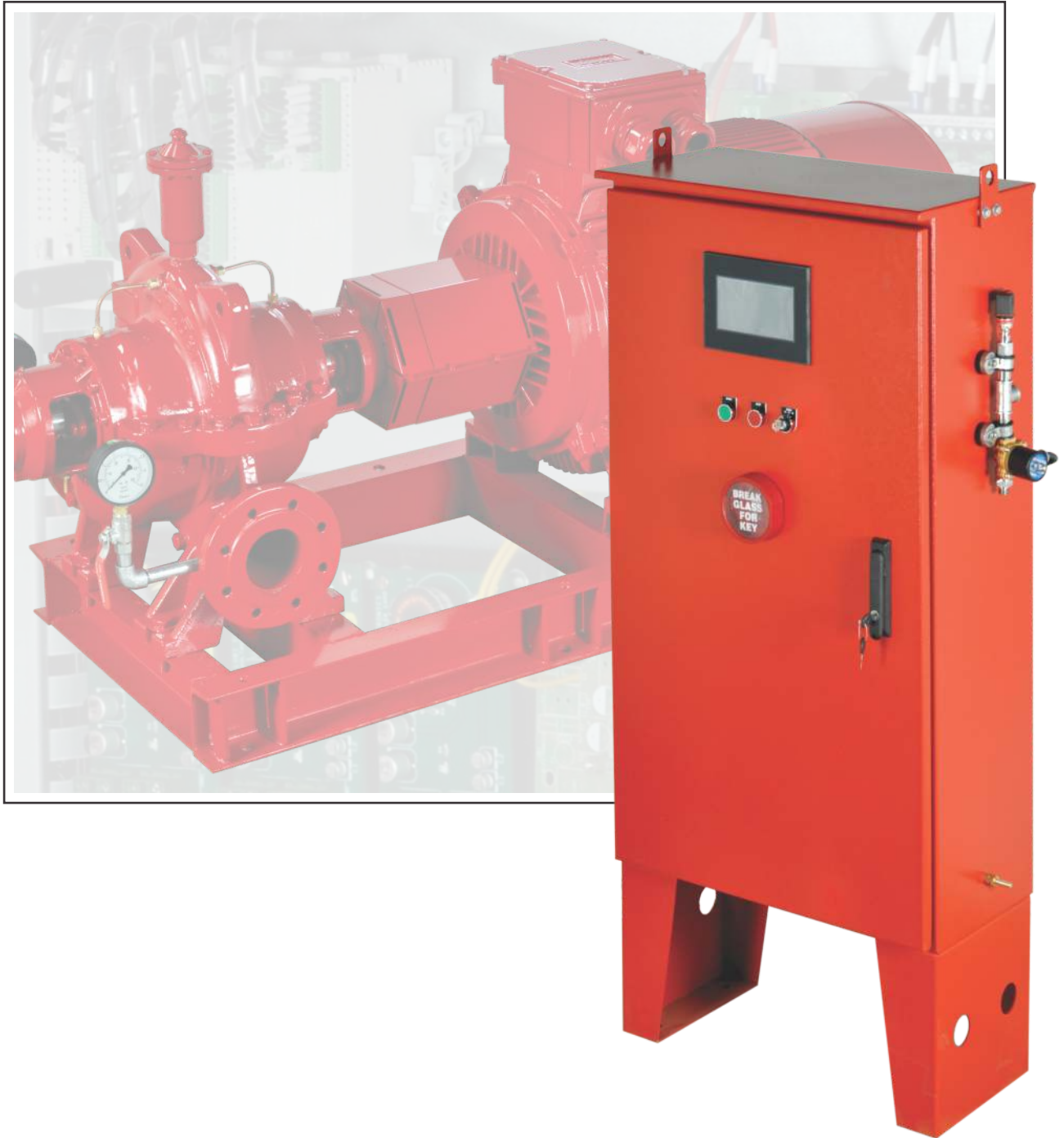
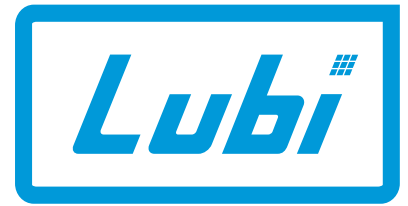


LFCE SERIES

**Fire Pump Controller
For Electric Motor Driven Fire Pumps**



INTRODUCTION

The Lubi LFCE series electric motor driven 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, standard for Stationary Fire Pumps for Fire Protection.

TECHNICAL SPECIFICATIONS

● ENCLOSURE

Fire pump controller enclosure shall be standard NEMA type 2 (IP 31) drip proof free standing enclosure. The enclosure shall have a bottom entry gland plate. It will be provided with lifting lugs and a key lock handle. It will be painted red RAL 3002 as per NFPA 20.

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

● STARTING METHOD

The controller shall be of combined manual and automatic type designed for one of the following starting methods.

1. Direct-On-Line (DOL) starting
2. Star/Delta (Y/D) starting
3. Auto transformer reduced voltage starting
4. Digital soft start reduced current starting.

The controller starter mentioned above should be suitable for the fire pump motor horsepower, voltage, phase and frequency ratings.

● SHORT CIRCUIT WITHSTAND RATING

The minimum withstand rating of the controller shall not be less than 100,000 Amps RMS upto 220 kW electric motors with voltage range between 200 to 480 volts.

For controllers used above 220 kW electric motors the short circuit withstand rating shall not be less than 50,000 Amps RMS.

● ISOLATION SWITCH AND CIRCUIT BREAKER

The controller should include a motor rated combination, isolating disconnect switch/circuit breaker, mechanically interlocked and operated with a single, externally mounted handle.

When moving the handle from "OFF" to "ON", the interlocking mechanism shall sequence the isolating disconnect switch "ON" first, and then the circuit breaker.

TECHNICAL SPECIFICATIONS (CONT...)

When the handle is moved from "ON" to "OFF", the interlocking mechanism shall sequence the circuit breaker "OFF" first, and then the isolating disconnect switch.

The isolating disconnect switch/circuit breaker shall be mechanically interlocked so that the enclosure door cannot be opened with the handle in the "ON" position.

The isolating disconnect switch/circuit breaker shall be capable of being padlocked in the "OFF" position during installation or maintenance. It should also be capable of being locked in the "ON" position without affecting the tripping characteristics of the circuit breaker.

The isolating disconnect switch/circuit breaker shall be rated not less than 115% of motor full load current.

The circuit breaker trip curve adjustment shall be factory set, tested, and sealed based on motor full load as well as starting amps. The circuit breaker over-current sensing should be magnetic only. Thermal sensing circuit breaker shall not be used.

Instantaneous trip setting of circuit breaker (for locked rotor protection) shall be set and tested at factory to trip the circuit breaker within 8 to 20 seconds at 600% full load current.

● 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 4.2 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 and motor operating conditions including all alarms and events.

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

● SYSTEM STATUS SCREEN

The system status screen on the HMI shall display the following on real time basis:

1. Date and time
2. True RMS values of voltage and current measurements of all the three phases.
3. Electric motor status. (Run, Stop or Fail)
4. Countdown of sequential start and stop timers.
5. Pump motor operation mode (automatic or manual start and stop)
6. Real time system pressure
7. Pump start cut in pressure
8. Pump stop cut out pressure
9. Alarm/warning notifications and messages.

TECHNICAL SPECIFICATIONS (CONT...)**● ALARM MESSAGES**

All alarms/warning messages shall be displayed on the operator interface. The operator interface shall indicate text messages for the status and alarm/warning conditions of:

1. Phase reverse
2. Phase loss (single phasing)
3. Loss of power (no power available)
4. Locked rotor failure
5. Fail to start
6. Under current
7. Over current
8. Under voltage
9. Over voltage
10. Phase unbalance
11. Ground fault
12. Weekly test cut in not reached
13. Weekly test solenoid problem
14. Over pressure
15. Under pressure
16. Low suction pressure
17. Pressure transducer failure
18. Water reservoir low
19. Water reservoir empty
20. Water reservoir high
21. Low ambient temperature
22. High ambient temperature
23. Soft starter fault (on soft starter controller only).

● DATA LOGGING

The controller shall monitor and log the following events:

1. Pump motor starts
2. Pump motor stops by push button
3. Pump total run time
4. Pump last run time
5. Last pump start
6. Remote start signal occurred
7. Auto test start occurred
8. Alarm reset occurred
9. Low pressure start occurred
10. Low pressure condition occurred (when optional pressure switch provided)
11. Deluge start occurred.

● EVENT/ALARM 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. 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)

● AUTOMATIC POWER TRANSFER SWITCH (OPTIONAL)

Transfer switch if provided with the pump controller shall route two sources of power to the fire pump motor. Typically, one is a utility source connected to the normal side of transfer switch and other is a standby emergency generator connected to the emergency side.

These switches are added to the controller when a second source of power for the fire pump motor is desired or required especially when the utility power at the location is unreliable.

● 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 main isolation switch / circuit breaker is in the "ON" position, the controller is in standby condition ready to start the pump automatically. The green "Power ON" light should be on indicating that power is available and controller is ready to start the pump.

When the water pressure drops below a level which is set in system configuration screen the controller will actuate the starting sequence. If the pump fails to start after a set time delay the "Pump failed to start" message will show on the HMI, and the alarm bell will sound.

The panel is wired so that optional remote start switches such as remote start push button, fire alarm switch, deluge valve etc. may be used. The deluge valve switch option is a normally closed switch that when open starts the pump similar to the pressure drop start mentioned above.

If the pumps stops while running, and there is still an auto start demand, the controller will attempt to restart the pump. If the pump fails to start the "Pump failed to start" message will be displayed on HMI and the alarm bell will sound.

If the motor current exceeds a set overload value while the pump is running, the "Motor overload" message will show on the HMI and alarm bell will sound.

The controller may be configured as either "MANUAL" or "AUTO" stop as required. The controller is set as standard on "MANUAL" stop. The current status of the setting is visible on main system status screen. When an automatic stop is enabled the stop timer is preset at the factory to 10 minutes. Longer time settings can be set from system configuration screen. When "Automatic stop" is disabled the pump will continue to run even though the pressure switch or other remote starting switch returns to its normal position. The pump can be stopped only by pressing the stop button.

If setup for "Automatic stop", the pump will be stopped automatically upon restoration to normal of whatever demand switch started the pumps, provided it has run atleast 10 minutes or longer as set in system configuration screen. If the demand period was less than the time set in "Automatic stop" timer, the pump will continue to run until the timer times out and then will stop.

When the "Test" mode button is pressed for 2 or more seconds, the pump will be started by causing a drop in water pressure if solenoid drain valve option is selected in the system configuration screen. If the solenoid drain valve option is disabled the unit will start automatically similar to deluge valve switch start feature. Failure alarms will be operative in the "Test" mode. This method of starting provides a test of the controller, which provides assurance that the controller will operate properly when required. The pump will run continuously until the "Stop" push button is pressed.

For periodic self testing, the weekly start timer can be set to give test run on any day of the week and the time of the day desired. This and the length of the pump running test can be set from system configuration screens. The weekly test feature will also use the solenoid drain valve option to start the pump if it is enabled as described above. If stop motor during test on alarm option is enabled, the motor will be stopped should an alarm condition occur during weekly test operation.

When more than one fire pump are installed, provision for sequential starting is accomplished by the use of adjustable time delay on pressure drop starting or deluge valve starting. On such multiple pump installations these timers are sets sequentially and progressively longer in time to prevent more than one pump from simultaneously starting with another pump. Failure of the lead pump to start will not prevent subsequent pump from starting.

LUBI ELECTRONICS

Sardar Patel Ring Road, Nr. Karai Gam Patia, Nana Chiloda, Ahmedabad, Dist. : Gandhinagar - 382 330, Gujarat, INDIA.

Phone : +91 - 79 - 39845300, Fax No. : +91 - 79 - 39845599.

Sales Enquiries: info@lubielectronics.com

www.lubielectronics.com

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



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