Hubbell Industrial Controls, Inc.

LXi Integrated Fire Pump Controller/Automatic Transfer Switch Combination-for use with Electric Motor Driven Fire Pumps – Microprocessor Type

6100MI

Brochure 6100M • February 2004 • New

Hubbell Fire pump Motor Controllers with Integrated Automatic Transfer Switches (ATS) are designed to comply with the latest standard of the National Fire Protection Association for the installation of stationary pumps for fire protection (NFPA-20).

Models

The following combination controllers are available:

- **Model *LXi*-2100 -** Solid State Soft Start/Stop combined Manual and Automatic controllers with ATS. These are designed to control squirrel cage motors where the power source does not permit full voltage starting and to reduce mechanical and hydraulic stress on plumbing.
- **Model *LXi*-2200 -** Across-the-Line combined Manual and Automatic Controllers with ATS are designed to control squirrel cage motors by means of Across-the-Line starting.
- **Model *LXi*-2300 -** Autotransformer combined Manual and Automatic Controllers with ATS are designed to control squirrel cage motors where the power source does not permit full voltage starting.
- **Model *LXi*-2400 -** Reduced Voltage Primary Resistor Start combined Manual and Automatic Controllers with ATS are designed to control squirrel cage motors by means of Primary Resistor starting.
- **Model *LXi*-2600 -** Wound Rotor Manual Controllers with ATS are designed to control wound rotor motors driving multi-stage fire pumps. They are available with five speed points (standard) through nine speed points (optional). NYC MEA Approved.

New Vertical Narrow Design on some models

LXi-2800 Shown

- **Model *LXi*-2700 -** Part Winding combined Manual and Automatic Controllers with ATS are designed to control squirrel cage motors by means of Part Winding Starting.
- **Model *LXi*-2800** - (Closed) & **LXi-2900** (Open) Transition - Wye/Delta combined Manual and Automatic Controllers with ATS are designed to control squirrel cage motors by means of Wye/Delta Starting either Open or Closed Transition.

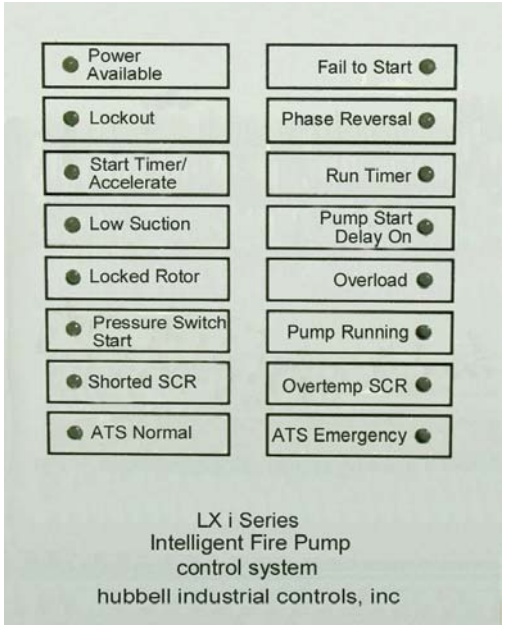
Features

- *LXi* Microprocessor Logic & Control
- Coordinated design engineered, built, tested and labeled by one manufacturer
- Suitable for use as service entrance equipment
- Emergency source suitable for standby generator sets or optional dual utility sources
- Full compliment of visual indicators
- Communications port
- LCD display shows system pressure, and simultaneous reading of all phases for amps and volts
- Full range of horsepower ratings and voltages
- Ample cable bending space
- Printer Available
- **New Vertical Cabinet Design for some models Saves pump room space**

Fire Pump Controllers with *LXi* Logic

The LED display module is mounted on the enclosure flange, the LED's are multi-color, red for critical alarms, yellow for informational indications, and green for status.

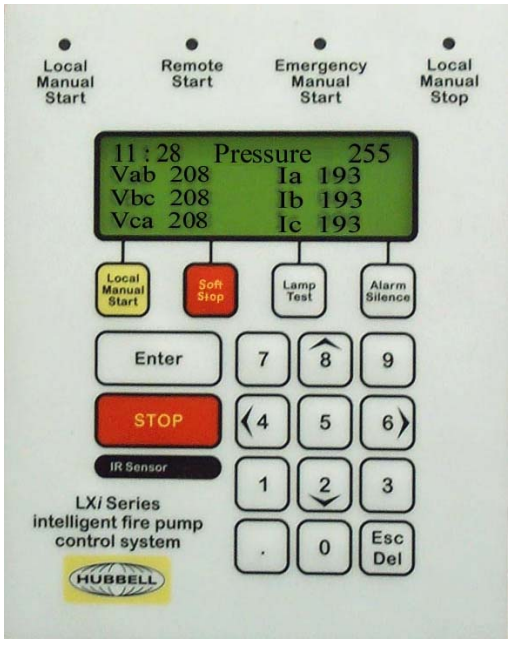
A total of (16) LED's are available to match most any requirement for alarm indications.



Standard Indications for *LXi* controllers

- **Power Available**
- **Lockout**
- **Start Time/Acceleration (reduced voltage/current models only)**
- **Low Suction**
- **Locked Rotor**
- **Pressure Switch Start**
- **Shorted SCR (*LXi*-2100 only)**
- **Fail to Start**
- **Phase Reversal**
- **Run Timer**
- **Pump Start Delay On**
- **Overload**
- **Pump Running**
- **Overtemp SCR (*LXi*-2100 only)**
- **ATS Normal**
- **ATS Emergency**

The LCD display/programming module displays four screens of (4) lines x 20 characters per screen. Each individual screen may be scrolled in the display by the operator without a password. The LCD display/programming module is mounted in the enclosure flange.



Main Screen Real Time Information

- **System Pressure**
- **Simultaneous 3-Phase Volts – Phase to Phase**
- **Simultaneous 3-Phase Amps**

(4) Additional LED's

- **Local Manual Start**
- **Remote Start**
- **Emergency Manual Start**
- **Local Manual Stop**

The system pressure settings are set using the touch pad after a password is entered .

General Specifications: Integrated *LXi* Controllers with Automatic LX450 Transfer Switch

These fire pump controller/transfer switch assemblies are factory assembled, wired, and tested as a unit assembly, and conform to the requirements of the latest editions of NFPA-20 and NFPA-70, and are Listed/Approved by and bear the label of Underwriters' Laboratories and Factory Mutual. The controller/transfer switch assemblies are equipped with Hubbell's *LXi* microprocessor logic.

The controllers are of the combined manual/automatic type and furnished in a floor mounted drip-proof steel Type 2 enclosure with lifting eyes. The enclosures are red with a non-glare surface. The controllers are designed, tested, and marked for the rated horsepower and 3-phase voltage and frequency in a 40 degree C. ambient.

All electrical components are accessible from the front for maintenance and service. No components or component wiring are on the door of the enclosure. The controllers have a common operating handle for both the line isolating switch and the controller circuit breaker mounted in the enclosure flange. The minimum withstand rating for the fire pump controller/ transfer switch when powered from the utility power source is 100,000 amps RMS symmetrical at 200-480 volts. The minimum withstand rating for the fire pump controller/transfer switch when powered from the engine generator source is 42,000 amps RMS symmetrical at 200-480 volts. The controllers are Listed/Approved with UL/FM as "Suitable For Use As Service Equipment".

The controllers have separate and independent pressure settings with minimum run timing capable of a setting up to 10 minutes. Settings of the pressures should be established at the time of the field acceptance test. Provisions are included to allow manual or automatic shutdown in the field.

Provided are two sets of Form "C" contacts for Pump Running, Phase Reversal, and Power/Phase Failure, and one set of Form "C" contacts for Trouble. The Trouble contacts are activated by the following: Invalid Configuration Memory, Emergency Manual Start, Pump Running, Phase Failure, Phase Reversal, Overload, Locked Rotor, Fail-to-Start, and Lockout.

These controllers are equipped with *LXi intelligent fire pump control system logic.* All firmware is non-volatile flash based CPLD (*complex-programmable logic device).* The boot-up time for the logic is 3 seconds or less. An RS232 serial port shall be supplied for downloading event history to a PC for analysis and printing.

The digital pressure readings and settings are displayed on the *LXi LCD* mounted on the enclosure flange. The LCD screen is 4 x 20 (4 lines of 20 characters) per screen, and the screens may be scrolled to give a total of 320 characters. The real time display gives simultaneous 3-phase digital amps and volts for the pump power, and digital display for the system pressure, reducing the need for scrolling during startup.

The event alarm caches are compartmentalized, and none of the compartments over-ride other compartments. The compartments allow for analysis of four types of information events without having to look through all events including those not related to a problem. Events are shown with Date and Time for each event occurrence:

1. Events that have occurred during a pump idle period
2. Events that occurred during the last start period
3. Events that occurred during the last run period
4. Events that occurred during the last stop period.

The LED display is mounted on the enclosure flange and includes LED as shown on page 2 of this brochure.

Programming of the *LXi* logic accomplished from the touch pad mounted on the enclosure flange. Programming is password protected so that only authorized personnel can change the logic functions.

The Integrated LX450 automatic transfer switch is electrically operated - mechanically held on both the emergency and normal power source sides, and rated for continuous duty in an unventilated enclosure. The transfer switch is rated and Listed/Approved specifically for fire pump service by UL/FM.

The switch is electronically controlled for automatic switching, and also capable of manual operation. The transfer switch logic monitors the emergency power source for all three phases before permitting transfer from the normal source.

Following are features included with the LX450 fire pump automatic transfer switch:

- Full Phase Protection for all phases of Normal and Emergency sources.
- All transfer and retransfer time delays are field adjustable.
- Motor load decay time delay, to prevent breaker tripping when transferring large motor loads.
- Test switch to simulate normal power failure.
- Phase loss and phase reversal monitor to initiate transfer to emergency power.
- Two sets of form "C" Engine start contacts for generator control and supervision.
- Aux. contacts for normal and emergency positions.
- Emergency source isolating switch/disconnect is a motor protector type circuit breaker, with a contact to inhibit engine start when switch is open.
- Audible and visual alarm to indicate isolating switch is open, with "Normal-Silence" selector switch and re-ring function.
- Push button to bypass retransfer to normal time delay.
- Additional status LED's:

Normal Source Voltage O.K.	Green LED
Emergency Source Voltage O.K.	Red LED
Emergency Frequency O.K.	Green LED
Transfer to Emergency Timing	Red LED
Transfer to Normal Timing	Red LED
Engine Running Unloaded Timing	Red LED

Horsepower Ratings

This table summarizes the major electrical & horsepower configurations that are available. For special configurations consult the factory.

Full Service Fire Pump Controllers
Normal Source

Voltage	Hz	HP Range	Withstand Rating *Amps Symmetrical*
208	50/60	15-200	100,000 †
220/240	50/60	15-200	100,000 †
380/415	50/60	15-350	100,000 †
440/480	50/60	15-400	100,000 †

Alternate Source (Gen-Set)

Voltage	Hz	HP Range	Withstand Rating *Amps Symmetrical*
208	50/60	15-25	42,000 †
		30-60	50,000 †
		75-125	65,000 †
		150-200	100,000 †

Alternate Source (Gen-Set) Cont'd

Voltage	Hz	HP Range	Withstand Rating *Amps Symmetrical*
220/240	50/60	15-30	42,000 †
		40-60	50,000 †
		75-125	65,000 †
		150-200	100,000†
380/415	50/60	15-50	42,000 †
		60-100	50,000 †
		125-200	65,000 †
		250-350	100,000†
440/480	50/60	15-60	42,000 †
		75-125	50,000 †
		150-250	65,000 †
		300-400	100,000†

Temperature Range - 41ºF (5ºC) to 104ºF (40ºC); Optional 130ºF/55ºC Rating Available
† Consult Factory for higher ratings.

Controller Selection Chart

This table summarizes the starting characteristics of the controls.
For specific information, please request specification sheets from the factory.

Model Number	Type of Starting	Motor Requirements	Starting Characteristics: Voltage @ Motor	Starting Characteristics: Line Current	Starting Characteristics: Starting Torque	Description of Operation
***LXi*-2100**	Solid State Soft Start/Stop	Standard Motor	0-100%	45-100%	0-100%	Motor is started with reduced voltage via SCR's in each phase to limit inrush and provide smooth stepless acceleration to full speed and deceleration to full stop greatly reduces water hammer.
***LXi*-2200**	Full Voltage (Across-the-line)	Standard Motor	100%	100%	100%	Motor is started Across-the-Line with no additional impedance nor special connections to reduce inrush or starting torque.
***LXi*-2300**	Autotransformer	Standard Motor	Taps at 80%, 65%, 50%	64% 42% 25%	64% 42% 25%	Motor is started with 3 phase autotransformer in primary to limit inrush. Multiple taps (manually set) provide variable starting characteristics. Closed circuit transition to full speed.
***LXi*-2400**	Primary Resistor	Standard Motor	50%	50%	25%	Motor is started with resistance in each phase to limit inrush. Closed circuit transition to full speed.
***LXi*-2600**	Manual - Secondary Resistor Special Regulated	Wound Rotor Motor	100%	25-50%	25-50%	Motor is started with resistance in the secondary rotor circuit to limit inrush and to regulate multiple speed points. Built per application to provide acceleration and speed control.
***LXi*-2700**	Part-Winding	Special Motor w/ Part Winding	100%	65%	48%	Motor is started on one part of its 2 windings to limit inrush. Closed circuit transition to second winding at full speed.
***LXi*-2800**	Wye-Delta Closed Transition	6 or 12 Lead Delta Wound Motor	100%	33%	33%	Motor is started connected Wye to reduce voltage across windings and reduce inrush. Closed circuit transition to Delta winding/full speed.
***LXi*-2900**	Wye-Delta Open Transition	6 to 12 Lead Delta Wound Motor	100%	33%	33%	Motor is started connected Wye to reduce voltage across windings and reduce inrush. Open circuit transition to Delta winding/full speed.

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