

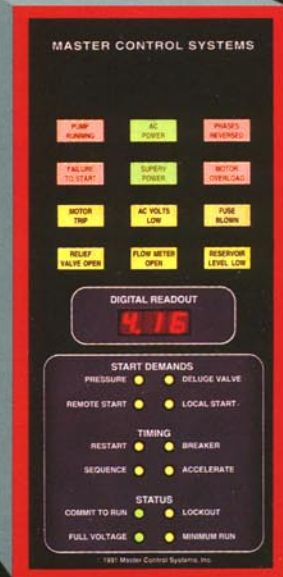
**MASTER**

*The Intelligent Choice.*

**MODEL ECH**

**7200 V ELECTRIC**

**FIRE PUMP CONTROLLERS**



*Featuring Master's digital status panel for greater safety and easier operation*

**MASTER CONTROL SYSTEMS, INC.**

MASTER's ECH electric fire pump controllers are designed and built to the latest requirements of the National Fire Protection Association's Pamphlet No. 20. They are specifically listed by Underwriters Laboratories under their re-examination service for fire protection equipment up to 5000 volts.

## SPECIAL FEATURES

- Digital readout behind a non-breakable window allows anyone, even those without an electrical background, to safely measure the 3 phase line currents and voltages with the door closed and the motor running.
- Status LEDs visible through the door allow anyone to quickly identify the starting demands, time delays, and running conditions of the controller.
- Extremely long life LED light bars to display alarms.
- Restart time delay ensures that at least 2 seconds elapse between stopping and restarting the pump. This allows the residual voltage of the motor to decay, which eliminates the peak transient currents that can occur during an immediate restart (over 30 times the FLA of a code G motor).
- Locked rotor test switch verifies the special locked rotor calibration requirements of NFPA 20.
- Magnetically latched locked rotor trip circuit with separate reset push button provided to prevent false reset if power is removed or interrupted.
- Bolt-in fuses with visual blown fuse indicators.
- Multiple units line up side-by-side with internal 1000 amp bus bar so only a single incoming power feed is needed (requires mod. 73).
- Units can be mounted directly against the wall since rear access is not necessary.

## STANDARD FEATURES

- Quick make/break manual operator assembly for vacuum contactor prevents welding during manual closing and excessive arcing during opening.
- Rugged non-vented, fully gasketed, NEMA 12 enclosure protects the controller from dust, dirt, and dripping water.
- Separate low and high voltage compartments with individual key locks.
- Pressure switch provided in an externally mounted and sealed cabinet attached to the side of the controller. Key lock provided on the door.



Model ECHA controller internally bused in a line-up so only one incoming power feed is needed.

- Storage space provided for spare set of main power fuses.
- Mechanical interlocks provided between high voltage door, vacuum contactor, and isolating switch to prevent unsafe operation.
- Electrical interlocks provided to prevent test power from being inadvertently connected to line power and control power from being applied while the isolating switch is opened.
- 60 kV BIL rating line-to-ground and line-to-line including control and potential transformers.
- AC failure contacts also supervise loss of control power.
- Phase sequence switch changes alarm contacts and LED light bar to match incoming phase sequence.
- Minimum run timer with manual stop switch.

## WITHSTAND RATINGS

Series ECH controllers are withstand rated for the following:

Maximum System Voltage:	2,500	5,000	7,200
Symmetrical MVA:	200	400	600
Symmetrical KA:	46	46	48

## STANDARD ALARMS

ECH controllers are equipped with "Power On" and "Phase Reversal" LED light bars as well as normally open and normally closed form C remote contacts for "Pump Running," "AC Failure," and "Phase Reversal."

## MODEL NUMBER CONSTRUCTION

ECHA	—	300HP	—	4160/60	—	FJKNOPYX20A,35,75,76
Describes Model		Describes HP or KW		Describes Voltage/Frequency		Describes Options or Mods
ECHA—Across-the-line ECHR—Reactor* ECHT—Autotransformer* (5000 V max.)		Specify motor HP or KW up to: † 1000 HP @ 2300 V 1900 HP @ 4160 V 2100 HP @ 4600 V 3100 HP @ 6600 V 3200 HP @ 6900 V 3400 HP @ 7200 V		Specify system voltage/frequency  7200 V max. voltage		Select from below
* 80%, 65%, or 50% taps are provided. Factory wired for 65% voltage.				†Ratings are based on using a non-vented cabinet with a 1.15 service factor, 0.80 power factor motor. Consult factory for other horsepower and voltages.		

## OPTIONAL EQUIPMENT

**D** SEQUENCE START - For multiple pump installations. Provides a 1 to 99 second digital timer to prevent any one pump from starting simultaneously with any other pump. Delays pressure drop and deluge valve start signals.

**F** PUMP RUNNING LIGHT - LED light bar indicates when actual motor current is greater than 20% FLA for real indication of pump running.

**G** SUPERVISORY POWER LOSS START Drop-out type relay circuit designed to start the fire pump upon supervisory power failure.

**J** FAILURE TO START ALARM - LED light bar and form C remote contacts indicate when a start signal is received and the motor current is still less than 20% FLA after a field settable time delay of approximately 20, 40, 80, or 160 seconds.

**K** BUILT-IN ALARM SYSTEM - Provides a Supervisory Power On LED light bar, an alarm bell to indicate Pump Running, AC Failure, Phase Reversal, and an alarm silence switch.

**M** MANUAL NON-AUTOMATIC - For systems that only require deluge valve, remote, or manual starting capabilities. Manual stop only.

**N** PRECISE LOW VOLTAGE SENSOR Form C remote contacts drop out when the line voltage is below 85% during motor starting and 95% during motor running. (Add Option O if visual indication is required.)

**O** PUMP ROOM ALARMS AND SIGNALS Provides up to six LED light bars custom labeled to indicate any pump room alarm desired. Common Form C remote alarm contacts are also provided. Typical alarms are:

- Power Fuse Blown (sensor avail. as Mod. 75)
- Pump Room Temperature Low (sensor avail. as Mod. 32)
- AC Volts Low (sensor avail. as Option N)
- Reservoir Temperature Low
- Flow Meter On
- Reservoir Level Low.

**P** DIGITAL PRESSURE READOUT - Adds a pressure transducer to monitor the system pressure on the existing digital readout.

**Q** INDIVIDUAL REMOTE CONTACTS Adds form C remote contacts for each Option O alarm.

**R** REMOTE START - Adds two drop-out relays, one for manual stations and one for automatic devices such as deluge valves.

**T** WEEKLY TEST - Provides a weekly test clock and drain valve solenoid to automatically test the fire pump once a week by pressure drop.

**X** SPECIAL MODIFICATIONS - Symbol used to separate options from modification codes as defined below.

**Y** MOTOR OVERLOAD ALARM - LED light bar and form C remote contacts indicate when the full voltage motor running current is over 125% FLA.

**Z** HIGH ZONE DELAYED START - For multiple zoned installations. Provides form C contacts to immediately initiate remote starting on the low zone pump while delaying the high zone pump for a 0.1 to 9.9 second time delay. (Order Option R on low zone unit.)

## MODIFICATION CODES

- 3R - NEMA 3R raintight enclosure
- 4 - NEMA 4 watertight enclosure
- 15 - 300 PSI 316 stainless steel pressure switch
- 16 - 600 PSI pressure switch
- 17A - Extra SPDT set of pump running contacts (one set std.)
- 17B - Two extra SPDT sets of pump running contacts
- 17C - Extra SPDT set of AC failure contacts (one set std.)
- 17D - Two extra SPDT sets of AC failure contacts
- 17E - Extra SPDT set of phase reversal contacts (one set std.)
- 17F - Two extra SPDT sets of phase reversal contacts
- 19 - Space heater

- 20 - Space heater with thermostat
- 20A - Space heater with humidistat
- 21 - Lockout relay
- 22A - Delayed start
- 32 - Pump room thermostat
- 33 - 115 V auxiliary fused power output (200 VA)
- 34 - Control power loss start
- 35 - LED lamp test push button
- 73 - 1000 A bus splice kit
- 75 - Power fuse blown sensor
- 76 - Spare set of power fuses

**A. GENERAL**

1. The fire pump controller shall be designed and built strictly in accordance with the latest requirements of the National Fire Protection Association's Pamphlet No. 20.
2. The controller shall be listed by Underwriters Laboratories, Inc. and shall bear a label indicating such compliance.

**B. ELECTRIC FIRE PUMP CONTROLLER**

1. The combined automatic and non-automatic controller shall provide across-the-line starting.
2. The controller shall use a quick make/break emergency manual operator assembly that mechanically closes and opens the contactor at speeds equivalent to the electrical operation of the contactor. The contactor mechanical operation speed shall be independent of the operator handle speed.
3. The controller shall be rated for 60 kV BIL line-to-ground and line-to-line, including all control and potential transformers.
4. The entire controller shall be withstand rated for 200 MVA at 2500 VAC, 400 MVA at 5000 VAC, and 600 MVA at 7200 VAC.
5. It shall use a modular chassis with plug-in circuit boards, relays, and connectors, which shall be securely latched or locked in place.
6. A digital readout capable of being read with the door closed and the motor running shall be provided to indicate the three line voltages, the minimum of any of these voltages, the three phase currents, the maximum of any of these currents, and the system pressure. A calibration sheet, traceable to the National Institute of Standards and Technology (NIST), shall be provided to show that the meter accuracy is better than 2% or 2 digits.
7. Status LEDs visible through the door shall individually indicate Pressure start, Deluge Valve start, Remote start, Local start, Restart timing, Breaker timing, Sequence Start timing, Accelerate

**ORDERING INFORMATION**

When ordering a MASTER electric fire pump controller, be sure to specify the following to ensure prompt order entry and delivery:

- Complete MASTER model number
- Motor horsepower or kilowatt rating
- Motor rated voltage and frequency
- Motor FLA, LRA, and service factor
- Optional equipment and modification codes
- Short circuit withstand rating
- System voltage

timing, Commit to Run status, Lockout status, Full Voltage Run status, and Minimum Run status.

8. A restart time delay shall be provided to ensure that at least 2 seconds elapse between stopping and restarting the motor.
9. Loss of main AC power shall initiate a local audible alarm powered by a separate 120 VAC supervisory power source.
10. A phase sequence switch shall be provided to change the alarm contacts and LED light bar to match the incoming phase sequence.
11. A minimum run timer on/off switch shall be provided to switch the controller from manual stop to a fixed 10 minute minimum run.
12. A magnetically latched locked rotor trip circuit with separate reset push button and test switch shall be provided.
13. The controller shall provide a 6 inch alarm bell, LED light bars, and SPDT remote contacts for the following alarms:
  - a. AC Power Failure
  - b. AC Volts Low - 15% during starting or 5% during running
  - c. Phase Reversal
  - d. Supervisory Power Failure - remote contacts not required
  - e. Motor Running - motor current greater than 20% FLA
  - f. Failure to Start
  - g. Motor Overload - motor running current greater than 125% FLA
14. A lamp test push button shall be provided for all of the above visual indications, the status LEDs, and the digital display.
15. The controller shall be provided in a dust-tight NEMA 12 enclosure.

**C. SUPPLIERS**

1. The controller shall be a model ECHA-FJKNOPYX20A,35,75,76 as manufactured by MASTER Control Systems, Lake Bluff, IL.

**SHIPPING INFORMATION**

A 5000 V, 500 HP Model ECHA in a NEMA 12 enclosure is 80 inches high by 34 inches wide by 30 inches deep, and weighs approximately 1300 lbs (591 kg).

A 5000 V, 500 HP Model ECHR in a NEMA 12 enclosure is 90 inches high by 66 inches wide by 30 inches deep, and weighs approximately 2800 lbs (1273 kg).

A 5000 V, 500 HP Model ECHT in a NEMA 12 enclosure is 90 inches high by 76 inches wide by 30 inches deep, and weighs approximately 3100 lbs (1409 kg).



CONTROLS FOR INDUSTRY SINCE 1932

**MASTER CONTROL SYSTEMS, INC.**

P O BOX 276 • 910 NORTH SHORE DRIVE  
LAKE BLUFF, ILLINOIS 60044-2295 USA  
708/295-1010 FAX: 708/295-0704