

Master Control systems, Inc.

ECH Series

Medium Voltage Fire Pump Controllers

Advantages - and - Salient Features

Master Control Systems line of medium voltage controllers includes Full Voltage (Across-the-Line), Primary Reactor and Autotransformer. The following list of features, advantages, and performance of our **Series ECH** Fire Pump Controllers not available from *any* other manufacturer.

Exclusive Standard Features and Performance of ECH Series controllers

Medium Voltage Features:

- Exclusive seven way *Safety Interlocking* between Motor Contactor, Isolating switch and both doors.
- Standard construction is fully rated at 60 KV BIL *including* standard control transformer(s).
- Exclusive *U.L. Listing* of Reduced Voltage starting Primary Reactor, Autotransformer, and Part Winding.
- Neutral Reactor Reduced Voltage Starting available for motors up to 7,200 Vac.
- Fully rated high speed Manual Contactor Operation (Emergency Mechanical Operation) using exclusive Quick-Make - Quick Break mechanism.
- Units can line up directly with each other and with G.E. CR194 Limitamp® series medium voltage motor controller equipment including power bus and ground bus.
- Standard *1,000 amp horizontal bus* (2,000 amp available) and *400 amp ground bus*.
- Motor Fuses are *bolt-in*, not clip-in. Three visual *blown fuse (fuse trip) indicators*.

Exclusive found in both ECH and EC* series controllers:

- Exclusive No Strings Attached *Five Year Warranty*. (Covers entire controller with no motor tie-in.)
- Exclusive *Five Year* Lightning Damage Guarantee.
- Standard 2% accuracy digital volts and amps metering LED digital display *traceable* to NIST. Three Phase metering also includes "Min. of Three" voltage *and* "Max. of Three" current readings.
- *Twelve* supervisory Status LED's indicate: Start Demands, Timing, and Control Status (4 each).
- Multiple (8) LED type *Light Bars* for indicator lites (in place of filament or neon type light bulbs).

ECH - Series Features

Exclusive found in both ECH and EC* series controllers - cont'd:

- Three position Motor Overload (Breaker) Test Switch to test both instant trip *and* timed trip.
- Phase Sequence *Toggle Switch* is used to change Phase Sequence Alarm from A-B-C to C-A-B.
- Full Three Phase voltage sensing, not just "Phase Loss". Detects brown-out and *low line* conditions.
- Standard PhaseSmart™ Motor Burn-out Protection.
- Standard *Restart Delay* circuit is standard. Reduces chance of breaker tripping on momentary loss of demand (due to pressure switch cycling on low flow demands) or line power interruptions.
- *Nineteen* standard module *diagnostic LEDs* (*The last three modules are optional).

Module:	<u>EC-PS</u>	<u>EC-CL</u>	<u>EC-VP</u>	<u>EC-IM</u>	<u>EC-AT*</u>	<u>EC-DT*</u>	<u>EC-PA*</u>
No. of LED's:	Seven	Five	Four	Three	Three	Three	Three

These diagnostic LED's show the *status* of important circuits and signals.

- Exclusive *Air-Gap Isolation* of control circuitry during stand-by. Circuitry is normally de-energized and isolated from line surges, sags, and transients.
- All electronic components are *heavy duty industrial* or military grade. All logic and control is *hard wired*. No programmed logic (processors) is used for control or starting.
- Full 100% *modular* plug-in control relays and modules for ease of servicing and modification. Control wiring *Cable Connectors* for ease of servicing and modification. Plug-in connected current transformers *and* circuit breaker shunt trip unit for ease of service.

Other Exclusive Features and Performance:

- *Trouble free* Phase Reversal circuit. Uses low voltage secondary and is interlocked to the power available circuit. Absolutely no false alarms on line voltage dips, surges, or transients.
- Triple Redundant PhaseSmart™ Power Transformers and rectifier circuitry. Transformers are special high dielectric strength and *Electrostatically Shielded* against transients.
- Three phase 60Kv BIL *Potential Transformer* used for control and metering; plus, three special high dielectric strength, *electrostatically shielded*, low voltage stepdown control power transformers.
- *Very high* dielectric strength (voltage withstand). *Every* unit factory tested to the following primary (line side) and secondary side breakdown (high-pot) levels.
 - 12.6 KVdc line to ground, and, line to secondaries on 2,400 Vac units,
 - 19.3 KVdc line to ground, and, line to secondaries on 4,160 Vac units,
 - 2.5 KVdc on all other control secondaries, alarm contacts and control terminals.
- Every controller *Thermal Tested* at 125% of full load current (FLA) for voltage drop and heating. Every controller *Calibration tested* at 300% and at 600% of full load current (FLA). Every EC-IM module tested and calibrated 300% and 600% of full load amps on *every range* setting.

ECH - Series Features

Model specific features:

- Accelerate timer (EC-AT) module has *Digital* push-wheel switch with 0.0 to 9.9 seconds time setting control. Used on all reduced voltage starting controllers.
- Demand Delay timer (EC-DTS Sequence Start or EC-DTH High-Zone Delay Start) module has *Digital* push-wheel 00 to 99 seconds time setting control. Used on controllers with Option "D" or Option "Z" respectively. Either one can be *field added*.
- Exclusive supplier of *Primary Reactor and Neutral Reactor* start units for lowest cost reduced voltage starting with any motor.
- Both Reactor and Autotransformer start units have taps at 80%, 65% (factory setting), and 50%. Both work with standard *three lead* motors.

Also found in every unit:

- ALL units use *Mercoid* pressure switches, 100% tested by M.C.S.
- 100% long life *solid state* LED indicators. No filament type lamps used.
- Only *heavy duty* industrial control relays (U.L. P600 rated) and 10 amp plug-in relays used.
- Full size (1-1/8", 30mm) *NEMA 4* oil-tight push-buttons.
- Full Three Phase voltage sensing, not just "Phase Loss". Detects brown-out and *low line* conditions.

Unit Construction:

- Safe, fully interlocked *two door* construction. All wiring and service is *front access*. No control components in the *high voltage bay*. All control circuitry is in separate low voltage bay. Separate swing-out frame to provide access to incoming bus bars.
- *Two way interlocking* between contactor and isolating switch. *Two way interlocking* between contactor and high voltage bay door in addition. *Two way interlocking* between isolating switch and high voltage bay door. *Interlocked access* to high voltage buss compartment.
- *Standard* controllers are U.L. listed and labeled *NEMA 12* (U.L. Type 12) dust-tight, oil-tight drip-proof construction using Heavy Duty (#12 MSG) construction, fully Seam Welded, Fully Gasketed. No slots louvers or venting is ever used in any M.C.S. controller enclosure.
- Both the 72" and 90" high cabinet are full height flush to floor construction. No legs or leg kits ever required for ANY M.C.S. controllers. This provides for easy and safe installation and wiring.
- No "Bottom Connection" pressure plumbing on full service units. All pressure connections are on a side wall for easy installation and convenient test valve connections.

ECH - Series Features

Unit is Safe and Easy to install:

- Rugged, proven G.E. CR194 *Limitamp*® Fixed Vacuum medium voltage construction -and- Master controls *EC series* control circuitry.
- *Space saving*: Unit can mount with back and either side against wall. No back access panels.
- *Top or bottom* Motor Circuit conduit entry.
- *Top or bottom* or side incoming Power Circuit conduit entry.
- Side access is *optional*, not required.
- Removable floor plates for incoming power *and* for motor circuit conduits.
- Full incoming power *horizontal bus* (1,000 amp standard, 2,000 amp optional).
- Optional *Bus Bar Splice Kits* for single incoming power feed for multiple unit line-ups.
- Convenient *stationary terminal boards* in low voltage compartment for control and alarm field wiring.
- *Ample room* for motor and incoming power cabling and wiring.
- *Ample room* for shielded or extra heavy insulated wiring and stress cones.
- *Ample room* for armored cable and pot-heads.

Exclusive Options and Mod's:

- Optional Blown fuse (fuse trip) indicator lite.
- Optional Blown fuse (fuse trip) indicator contacts.
- Standard Tin Plated Bus. Insulating options and bus splice kits available.
- Either 72" or 90" construction available. Both can be used in line-ups.
- Optional auxiliary power at either 120 Vac, 240 Vac, or 240/120 Vac, up to 2.0 KVA.
- Optional humidistat or thermostat controlled space heaters interlocked to cut out during motor run.
- Optional motor heater control pilot signal.

All EC Series Options and Mod's also available including:

- LED Lamp test of all front panel Lights, Status LED's and digital display segments (Mod. 35).
- Motor Overload Alarm at 125% of motor FLA (Option "Y").
- Close differential voltage monitor & alarm (Option "N").
- Failure to Start Alarm at 20% of motor FLA with settable delays (Option "J").
- Built-in Local Alarm system with 6" alarm bell and silence switch.
- Pump Room Alarms and Signals (Option "O").

For more information Contact Master Controls at:

- by phone at 1-800-462-7457 or at 1-847-295-1010,
- by FAX at 1-847-295-0704,
- by E-Mail sales@mastercontrols.com or
- see our Web Page at <http://WWW.MasterControls.com> for; bulletins, slide shows, drawings, client lists, and for technical and application information.