EVERYTHING ELECTRICAL

ELCON, INC.

ELECTRICAL CONTROLS AND CONTROL SYSTEMS

SMART SERIES LOCOMOTIVE COOLING FAN CONTOL

FOR BOTH EMD AND GE LOCOMOTIVES

MCS CONTROLLER FEATURES

- The Smart Series controller automatically operates for 8 locomotive types, 50 Series 2 speed and 1-speed, 4 fan, 3 fan, 2 fan, 1 fan, and GE locomotives. A single controller part number only, no adjustments or modifications required.
- Extremely accurate and stable temperature settings. Recalibration not required. Quickly verifies operation set-points without removing controller from locomotive. Increases engine efficiency and reduces wear of engine components.
- Equalizes utilization of cooling fans and contactors. Controls 50 Series individual low speed fans. Opens shutters before first fan. Controls engine high and low speed idle operation. (LITS)
- Automatic test function allows one person to load test engine to full temperature for confirming hot engine protection, coolant seal, and individual fan starts without disconnecting fan contactor wires.
- 3-digit coolant temperature and diagnostic display.
- Rugged and Compact - Built to withstand locomotive temperature, vibration, and washing.
- Self Protected - Available with short circuit protection. Electricians can disconnect or short circuit powered fan contactors with NO undesirable results. No external coil suppression needed.
- Can be installed in one hour. This controller will provide either a new locomotive wire harness or connectors for using existing locomotive wiring.

QUALITY AND INNOVATION SINCE 1953

EVERYTHING ELECTRICAL

HAND HELD TESTER

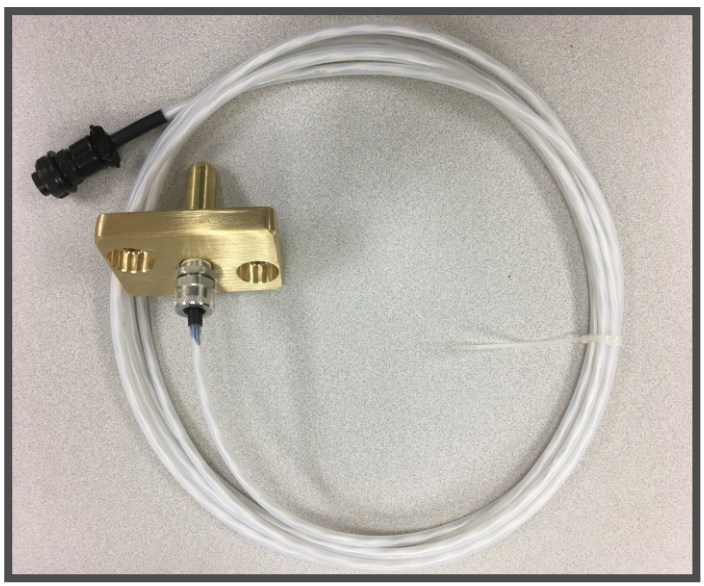
Operates controller and fan contactors with engine shutdown
Tests EMD "60 Series" temperature probes and measurement systems.

LOCOMOTIVE SEQUENTIAL COOLING FAN CONTROLLERS

The Smart Series Cooling Fan Controller is a microprocessor based electronic device which replaces the bimetallic temperature switches. The controller is designed to be retrofitted on the EMD Dash-2, 50 Series, and earlier model locomotives, and GE locomotives.

It measures diesel engine cooling water temperature with a very accurate manifold probe and controls outputs for the cooling fans and hot engine function directly through the existing wire harness or a new wire harness.

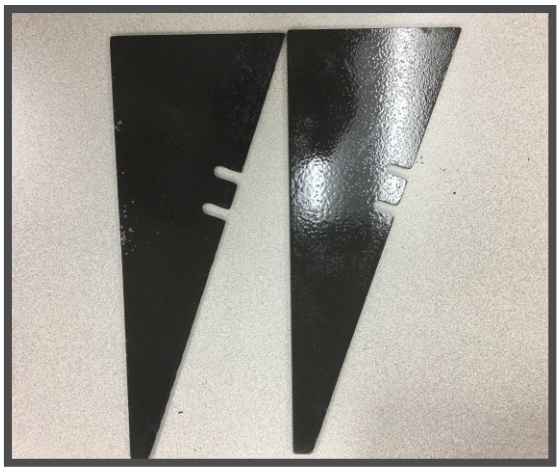
The electric circuitry of this device was specifically designed and manufactured to withstand the severe operating conditions in which diesel-electric locomotives operate.



QUALITY AND INNOVATION SINCE 1953

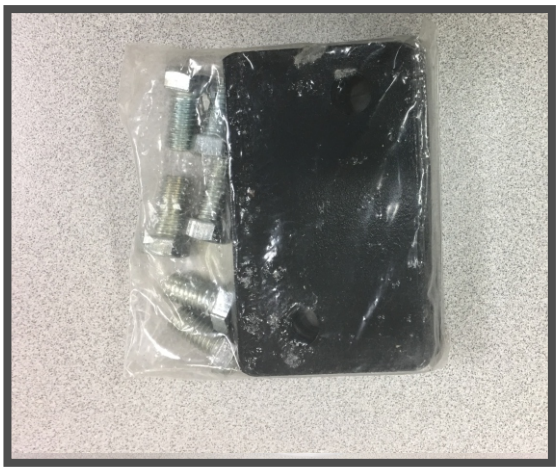
ADVANTAGES OF SEQUENTIAL FAN CONTROLLERS

STANDARDIZATION: A microprocessor makes the Model 200 a "smart" controller. This enables it to operate on virtually any EMD or GE locomotive built between 1960 and 1985. The controller reads the locomotive wire harness to determine the locomotive type and automatically sets the operating mode for proper fan control.



PERFORMANCE: The primary advantage of this system is its extreme accuracy and stability. The Smart Series controller was designed to maintain temperature set points within 1.5 degrees F over the entire life of the locomotive. This eliminates the need for time consuming and expensive off-unit recalibration procedures. This precise temperature control increases engine efficiency and reduces wear of engine components.

EQUALIZATION: A benefit of the microprocessor is fan cycling control. "Starts and stops" are cycled in a revolving sequence using "First On" = "First Off" switching logic. Equalized total fan "Starts", and total fan "On" times insure uniform wear of all three fans and contactors. Maintenance can be schedules to replace all three fans at a regular shopping, eliminating unscheduled shoppings to replace the number 1 Cooling Fan. Individually controls and sequences low speed fans for EMD 50 Series 2-speed fan units.



TEST FUNCTION: Another advantage of the microprocessor is remote testing. The test switch simulates a probe temperature greater than 255 degrees Fahrenheit. After the test switch is pushed, the fans will start in sequence. Before the first fan starts, there is a delay, which provides enough time to reach the long hood roof to watch the actual fan rotation. The controller displays the state of each fan contactor and hot engine by lighting an LED when the contactor or relay is energized. The 3-digit display shows coolant temperature and diagnostic information.

ADVANTAGES OF SMART SERIES SEQUENTIAL FAN CONTROLLERS (cont.)

RELIABILITY: The controller is designed to withstand the harsh locomotive operating environment. Temperature and voltage ratings were chosen to meet or exceed those used by domestic locomotive builders for their own designs. The circuit board is of double thickness (.125) to withstand at least fifteen years of high vibration with no failures. Solid state output devices were chosen to avoid vibration problems associated with mechanical relays and switches. The controller has its own internal isolated power supply. This, along with optically coupled outputs, completely isolates the microprocessor from any locomotive control grounds or high voltage transients. Controller available with short circuit protection. An electrician can disconnect to short circuit powered fan contactor coils without causing damage or irregular operation to the controller. No external coil suppression is required. All parts of the system are sealed to keep out water and cleaning solvents.

PORTABLE TESTER: The fan controller TESTER allows on-board observation of fan pick-up points and operation without the need to increase water temperature or run the engine. A simulated temperature can be manually dialed in, or the actual probe temperature can be read on the digital thermometer. This procedure allows complete testing of the engine cooling and protection systems for accuracy without removing any equipment from the locomotive. The portable tester, with proper connectors, can be used to check the probes and the computer control system on EMD 60 Series locomotives.

APPLICATION: The fan controller offers simplicity in application to the locomotive. It can easily be installed on a locomotive by one person in one hour.

The controller is very compact (10" by 8" by 5"). It is mounted near the AC cabinet, within 5 feet of the temperature switch manifold using four holes in the mounting ears on the enclosure.

The controller is connected by using either a new locomotive wire harness, or by using the existing wire harness and plugs.

FAIL SAFE: If the microprocessor should stop for any reason it is reset automatically. Number two fans and ETS outputs are energized continuously if the microprocessor does not restart or if there is probe failure. LED's provide quick visual indication of both normal and abnormal operation. The controller is not affected by a VR module failure. Reverse polarity protection is included.

ADDITIONAL FEATURES: In addition to cooling fan control, the Smart Series controller can independently open SHUTTERS before the first fan turns on.

The Model 210 controls governor A, B, C, and/or D valves to increase or decrease engine speed from Low Idle, Run, 1, 2, and 3 during locomotive idling. The standard Model 200 controls A valve for high and low idle operation at lower coolant temperatures.

Both of these controller features will reduce fan operation and decrease engine fuel consumption.

ELCON, INC.
600 Twin Rail Drive
Minooka, Illinois 60447

(815) 467-9500 : PHONE
(815) 467 9595 : FAX