



## Clarke CAT18 Controller Alarm Verification Procedure

- Select the PRIMARY ECM by holding the ECM SELECTOR SWITCH in the “down” (PRIMARY) position for 2 seconds. (see Figure 2)
- Overspeed Alarm Verification – (terminal 3)
  - Hold the OVERSPEED VERIFICATION SWITCH in the “down” position located on the switch plate inside of the Clarke panel (see Figure 1). This will provide the main pump controller with an overspeed signal and engine shutdown at 30 RPM’s below the rated RPM.
    - Note, on PLD engines with variable speed pressure control the engine **may be** running at a speed less than 30 RPM’s below the rated speed. Therefore, to perform the overspeed verification, the PLD must be disabled by unplugging PLD wiring from the instrument panel (connector is located on the right-hand side towards the top of the panel, see Figure 2). This will allow engine rpm to reach rated speed.
  - Start the engine via the main pump controller; the ECM will generate an overspeed signal and shutdown protecting both the engine and pump.
    - EXAMPLE
      - Rated Speed: 1760 RPM
      - Overspeed Shutdown: 2024 RPM (115% of 1760 RPM)
      - Verification Shutdown: 1730
  - The controller will indicate an alarm at interconnect terminal #3
  - **CAUTION:** After verification of overspeed, lift the OVERSPEED RESET SWITCH in the “up” position for 30 seconds and reset the main pump controller to re-instate normal operation of the engine and speed switch.
  - Cycle the ECM selector switch to the opposite ECM being used, then back to the ECM desired for use
    - Example: Engine is started on PRIMARY ECM, overspeed verification is performed, engine shuts down and locked out on overspeed. Perform overspeed reset, switch to ALTERNATE ECM, then switch back to primary ECM.
  - The over speed shut down set point is factory set, programmed into the ECM, and not field adjustable.
- Low Oil Pressure Alarm Verification (terminal 4)
  - With the engine running from the main pump controller, lift the LOW OIL PRESSURE VERIFY SWITCH in the “up” position located on the switch plate inside of the Clarke panel (see Figure 1). The oil pressure signal will be defaulted to less than 20 psi and can be seen on the engine diagnostic gauge. (Note: There is no engine mounted Low Oil Pressure switch to jumper across).
  - Continue holding the LOW OIL PRESSURE VERIFY SWITCH for up to 20 seconds until the alarm is indicated at the controller at interconnect terminal #4.
  - Reset the main pump controller to re-instate normal operation of engine and controller
- High Engine Coolant Temperature Alarm Verification (terminal 5).
  - With the engine running from the main pump controller, lift HIGH ENGINE COOLANT TEMPERATURE VERIFY SWITCH in the “up” position located on the switch plate inside of the Clarke panel (see Figure 1). The coolant temperature signal will be defaulted to greater than 240°F and can be seen on the engine diagnostic gauge. (Note: There is no engine mounted High Coolant Temperature switch to jumper across).
  - Continue holding the HIGH ENGINE COOLANT TEMPERATURE VERIFY SWITCH for up to 3 minutes until the alarm is indicated at the controller at interconnect terminal #5.
  - Reset the main pump controller to re-instate normal operation of engine and controller.

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- Electronic Control Module (ECM) Warning (terminal 303) and ECM Failure (terminal 304)
  - With the engine NOT running (0 rpm), ensure that the engine is in primary ECM mode with the hand selector switch.
  - Lift up on the OVERSPEED RESET SWITCH, located at the internal verification switch plate, continuously, for at least 2 minutes. This turns switched power off to the ECMs. Upon 2 minutes of maintained OVERSPEED RESET SWITCH activation, the automatic ECM switching control board will:
    - detect the failure on primary ECM
    - indicate a failure of ONE ECM via terminal 303 to the controller
    - switch to the alternate ECM
    - indicate alternate ECM operation mode via terminal 301 to the controller.
      - (Note, fire pump controller may need to be in a mode other than OFF for alarms to actuate)
  - After automatically switching to alternate ECM, continue holding the OVERSPEED RESET SWITCH for an additional 2 minutes, after which the automatic ECM switching control board will
    - detect the failure on alternate ECM
    - indicate a failure of BOTH ECMs via terminal 304 to the controller
    - additionally, a green LED on the automatic ECM switching control board will flash at a 2.5 Hertz rate (25 times in 10 seconds).
    - After simulation is complete, release the OVERSPEED RESET SWITCH.
    - Place BOTH ECMs back into service by activating the ECM FAILURE RESET SWITCH, located on the interior switch plate of the engine instrument control panel (See Figure 1), for 3 seconds.
      - Successful activation will be indicated by the deactivation of the ECM Warning and Failure alarms at terminals 303 and 304 at the fire pump controller (Note, controller may have to be cycled to OFF first)
  - Reset the main pump controller to re-instate normal operation of engine and controller
- Low Engine Coolant Temperature Alarm Verification (terminal 312)
  - With the engine NOT running (0 rpm), hold the low engine coolant temperature switch in the “down” position located on the switch plate inside of the Clarke panel (see Figure 1). The coolant temperature signal will be defaulted to less than 90°F and can be seen on the engine diagnostic gauge. (Note: There is no engine mounted Low Coolant Temperature switch to jumper across).
  - Continue holding the low engine coolant temperature verify switch down for 20 seconds until the alarm is indicated at the controller at interconnect terminal #312
  - Reset the main pump controller to re-instate normal operation of engine and controller
- Overcrank Test
  - Disconnect the BASE auto-switching device by unplugging the 26-pin connector (see Figure 4).
  - Lift and hold the OVERSPEED RESET SWITCH, located on the internal verification switch plate, for 5 seconds prior to initiating the 6 crank cycles from the fire pump controller (see Figure 1). The switch can be released, after the 5 second hold, for the duration of the test. **NEVER** shut off the fuel supply to the engine to prevent it from starting. Shutting off the fuel supply will cause an air lock condition in the fuel system and possibly cause fuel system component damage.
  - Once the fire pump controller has attempted to start the engine 6 times, reconnect the 26-pin connector to the BASE auto-switching board. **NOTE:** Ensure that the connector latches into place.

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- Place BOTH ECMs back into service by moving the ECM Selector Switch “up” to the ALTERNATE ECM position and waiting for the 6-up display to repopulate with numbers. Then push the ECM Selector Switch “down” to return to PRIMARY ECM operation. Again, verify that the 6-up display is populated with numbers and that no parameter reads “NO DATA”.
- Repeat all of the above alarm verification tests on ALTERNATE ECM by setting the ECM selector switch to ALTERNATE (see Figure 2). Only switch to ALTERNATE ECM with the engine stopped.
  - Note, when selecting the ALTERNATE ECM, the controller will alarm an ALTERNATE ECM alarm at interconnect terminal #301
- After alarm verifications have been completed on both ECMs, place engine back on PRIMARY ECM by setting the ECM selector switch to PRIMARY (see Figure 2) and set controller back to AUTOMATIC (standby) position per fire pump controller operator’s manual.

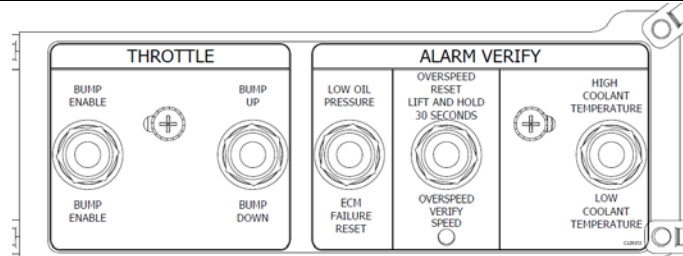


Figure 1 – Clarke panel internal verification switch plate

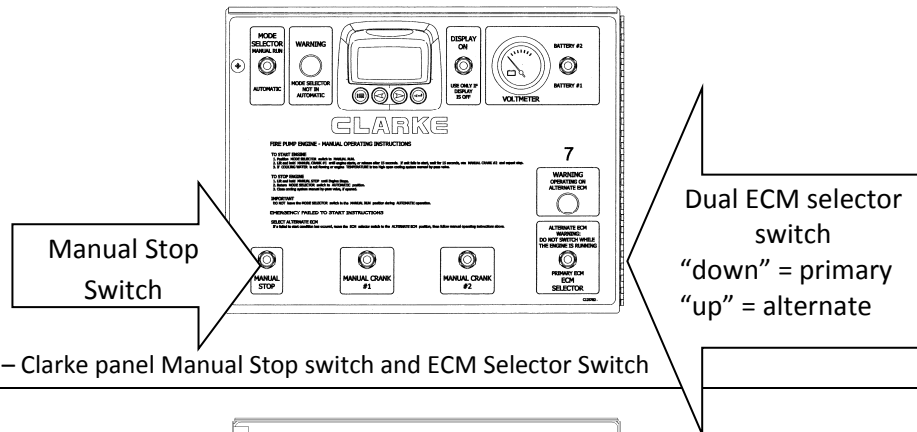


Figure 2 – Clarke panel Manual Stop switch and ECM Selector Switch

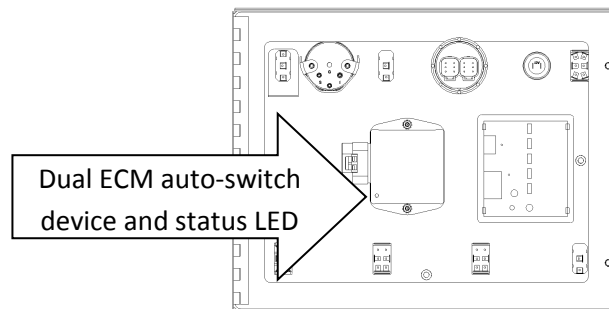


Figure 3 – Clarke panel door (interior view), ECM auto-switch device

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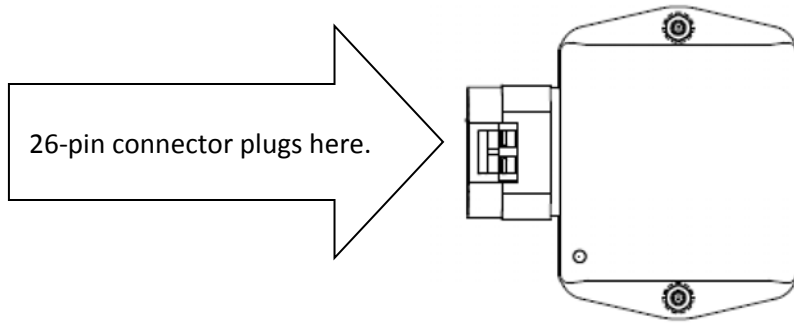


Figure 4 – BASE auto-switching unit

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