

Westerbeke 7.0 BCG Theory of Operation

State: Off

Battery + voltage (Red) is applied to the Starter Solenoid, The 20 amp circuit breaker, and in turn to one leg of the Normally Closed, SPST “Stop” switch. The other leg of the Stop switch distributes +12v (Red/Purple) to terminal 30 of the start relay, and to the 8 amp fuse. The fuse further distributes the +12v to Terminal 1 of TB1.

With the terminal 1 to 2 jumper in place, the 12v is present at the On switch (momentary), the T3 terminal of the Overspeed switch (This needs review, mine is 5 terminals), and on to the normally closed water temperature switch, then to the normally closed exhaust temperature switch, and to one leg of the normally open oil pressure switch.

With a remote panel installed, the jumper on terminal 1 and 2 is removed, and the circuit flows through a “Stop/Run/(Momentary) Start” switch on the remote panel. No voltage will be present past the 8 amp fuse as described above. Engaging the remote “Stop/Run” portion of the switch restores the +12v to the rest of the circuitry as described above. It can be deduced then, that the Stop/Run/Start switch at the remote panel breaks the 12v circuit when it is dis-engaged, stopping the generator engine. This is why that switch must be in the on position for the generator mounted switches to operate.

State: Start

To start the generator, the Bypass portion of the Stop/Run/Bypass switch in the remote panel must be held on during engagement of the starter, and normally for a few seconds after successful start.

Without a remote switch, or if the Stop/Run/Bypass switch is in the Run position, the “On” momentary switch on the generator performs the bypass operation. The purpose of the bypass portion of the switch is to complete the +12v circuit that is shown as the Purple circuit on the wiring diagram. This circuit provides 12v to the hour meter, and terminal 4 of TB1. That terminal distributes 12v to one side of the Ballast Resistor. 12v is then distributed from the resistor to Normally Open side of the oil pressure switch, overriding the switch, and completing the 12v circuit, and to the 12v side of the fuel pump, and the 12v side of the carb solenoid, which allows fuel from the pump to enter the carb. As long as the bypass is engaged, the fuel pump will operate, as will the carb solenoid (this needs to be checked, as my choke solenoid also operates with the bypass, and not the start circuit as drawn).

Engaging the “Start” switch on the generator, or the Start switch on the remote panel activates the Yellow/Red circuit, which flows from the Start switch (powered by the On switch being depressed) to Terminal 3 of TB1. From the terminal, it flows to the engagement coil K1 pin 87, activating the relay, and allowing 30 to connect to 87. Current flows from the Relay to the 15 amp fuse, and from the fuse to the starter solenoid for as long as the Start switch is engaged. This 12v also flows to the ignition coil,

and on to the choke solenoid on the carb. Once the engine starts, release the Start switch, but continue to hold the On button on the generator, or the Bypass portion of the Stop/Run/Bypass switch on the remote panel. As the engine builds oil pressure, the Oil Pressure safety switch will close, allowing the completion of the Red/Purple circuit to the Purple circuit. You can now release the bypass as it is no longer needed.

State: Safety Shutdown

If any one of the 3 safety sensors trip (or fail), the 12v circuit will be opened, shutting the generator down, just as the remote Stop switch, or the generator mounted Stop switch does.

State: Overspeed Shutdown

I am not sure how this operates. Is there a cycle imposed on the Purple off the distributor cap that is counted by the overspeed module? Need further explanation of what happens on the other side of the current limiting resistor (Ballast Resistor), the ignition coil, and the distributor, in relation to the preservation or disruption of the 12v circuit.

State: Shutdown

As stated before, shutdown is accomplished by depressing and holding the Stop button on the generator, or shutting off the Stop/Run/Bypass switch on the remote panel. This breaks the 12v circuit, returning the generator to the Off state.