

| Subject                                                         |
|-----------------------------------------------------------------|
| Control Box Diagnostics & Keypad Replacement (UNDERHOOD™ & DTM) |

## System or Parts affected

| UNDERHOOD™ 70/150                                                                                                      | Direct Transmission Mount: DTM & DTM-H                                            |
|------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|
| <ul style="list-style-type: none"> <li>• P/N# 3550723 VR Control Box</li> <li>• P/N# 3550727 VR Control Box</li> </ul> | <ul style="list-style-type: none"> <li>• P/N# 3550848 Control Box, DTM</li> </ul> |
| <ul style="list-style-type: none"> <li>• P/N# 3550779 Replacement Keypad</li> </ul>                                    |                                                                                   |

## OVERVIEW

The control box serves as the operator's control panel and contains the "ON/OFF" button, "READY" and "WARNING" lights, and the Liquid Crystal Display (LCD) which includes information such as compressor hours, service reminders, warning messages, error codes, and diagnostic information.

If the control box does not function as per design, the following steps should be taken.

The VMAC digital control box "Remote Start/Stop wires" can be used to diagnose if the entire control box is faulty or the keypad is the problem.



## Inspect the control box

Inspect the control box for physical damage.

The ON and OFF buttons are microswitches beneath a flexible membrane.

If the membrane is damaged the switch(es) could be contaminated and may not work properly.

Contamination can result in switch that can be stuck in a state where it is always making contact or won't make contact at all.

## Confirm power and ground to the control box

With key switched power and a ground supplied to the control box, the LCD should be back-lit and it should display characters.

- A minimum of 12 volts is required for the LCD to function.

Confirm that there is sufficient voltage and a good ground to the display box.

Locate the flat white 4 pin interface connector in the harness from the control box.

- With vehicle's key switch off, using a multimeter check for good continuity ( $<1\Omega$ ) between the black wire and the battery negative post.
- With the vehicle's key switch in the on position, using a multimeter check for voltage on the red wire.

## Remote Start/Stop wires test

The remote start/stop wires test enable us to bypass the keypad ON/OFF buttons to activate and deactivate the UNDERHOOD™ or DTM system utilizing a pair of blunt-cut wires that are provided for upfitters to connect to an optional independent on/off switch installed elsewhere in the service body.

This test is best performed with the control box keypad disconnected from the circuit board in the control box.

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## Keypad removal

- Unplug the control box from the flat white 4-pin connector at the end of the control box cable for the UNDERHOOD™ or DTM System. Remove the 4 screws holding the control box to the mounted location.
- Remove the 4 corner screws from the back of the control box (Figure 1).

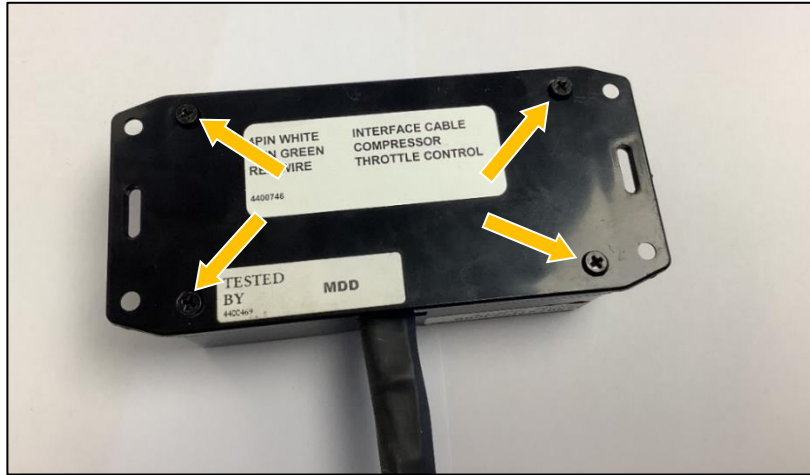


Figure 1

- Lift the top of the control box straight up and rotate the top of the control box like a clam shell. (Figure 2).



**Open the case carefully. The flexible ribbon cable attached to pc board is delicate.**

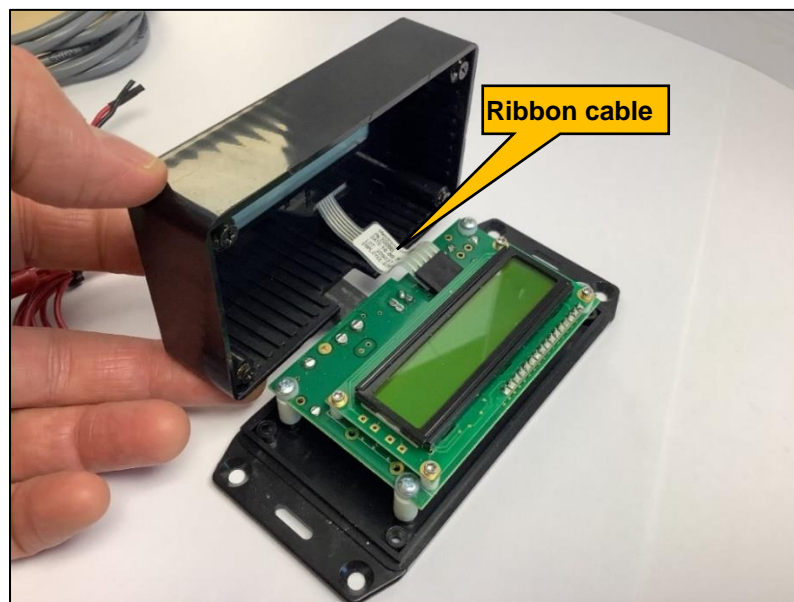


Figure 2

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- Remove the connector from the pc board by grasping the black connector firmly, gently moving the connector slightly side to side while pulling the ribbon cable away from the LCD screen (Figure 3).

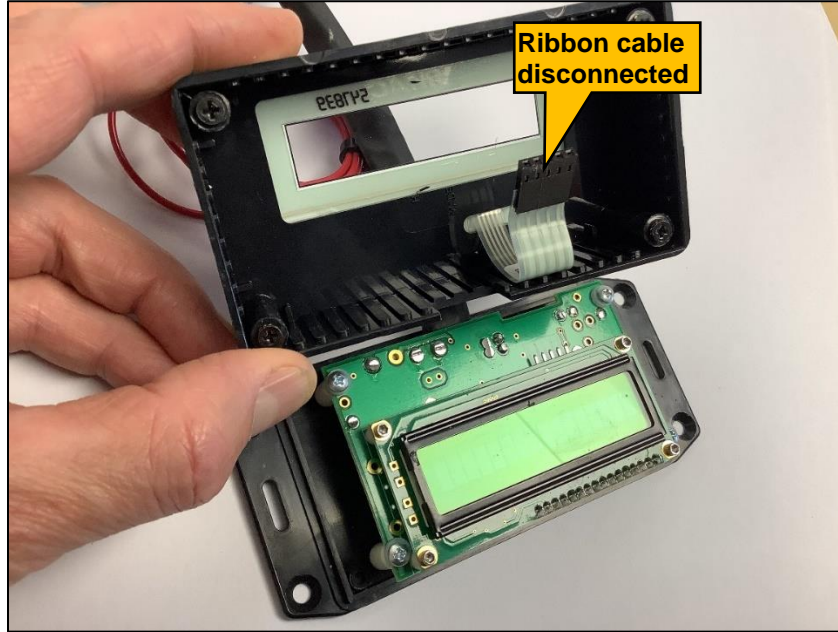


Figure 3

Locate the Remote Start/Stop Wires, a pair of blunt-cut and shrink tube protected wires, a red and a black, which can be found tucked into the sheath just outside of the control box housing (Figure 4).

These wires are frequently not used and are useful for troubleshooting the control box.

Applying a momentary ground to the red wire will start the system and applying a momentary ground on the black wire will stop the system.

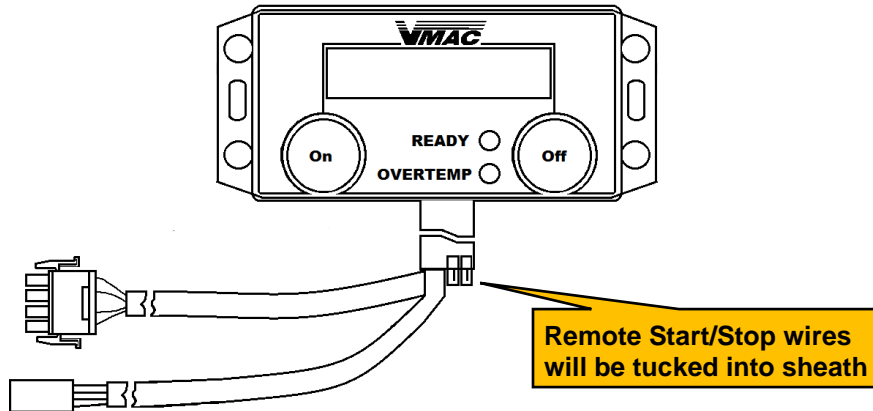


Figure 4

If the Remote Start/Stop wires do not start and stop the system, this indicates a problem with the electronics in the control box. Control box replacement is required.

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See the [Illustrated Parts List](#) for your UNDERHOOD™ or DTM system to determine the correct control box part number.

If the keypad On/Off buttons do not start and stop the UNDERHOOD™ or DTM system, but the Remote Start/Stop wires do start and stop the system, the keypad is faulty and needs to be replaced.

## Keypad replacement/installation

Having followed the preceding instructions to remove the keypad, if a replacement keypad is required obtain VMAC part number 3550779 REPLACEMENT KEYPAD & BOX, CONT. BOX.

- Remove the back cover from the new replacement keypad and box and discard it. We suggest re-using the old backing plate labeled with the original control box serial number.

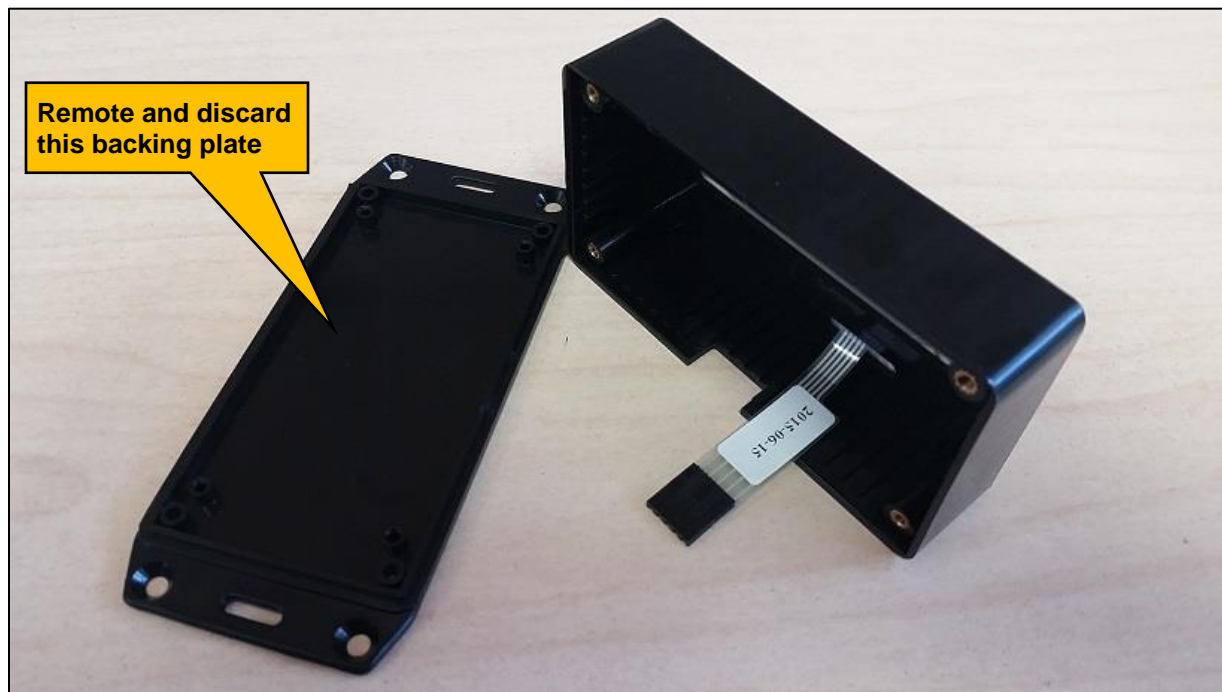


Figure 5

- Slide the new cable on by pushing on the connector edge (do not push or pull on the flex cable) and gently push the connector down so it slides into the slot on the circuit board.
- Gently push the new top straight down over the circuit. You may need to wiggle the top back and forth to get it past the corners of the circuit board.
- Replace the 4 corner screws in the back cover (Figure 1).
- Plug the control box back into the flat white 4-pin connector. Start the engine and confirm that the control box starts and stops the UNDERHOOD™ or DTM system.
- Remount the control box to the original location.

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