

Subject

Analog Throttle Control Diagnostics for UNDERHOOD™ and DTM

SYSTEM OR PARTS AFFECTED

- UNDERHOOD 70 and 150 air compressor systems designed or built prior to 2020
- Direct Transmission Mount (DTM) air compressor systems designed or built prior to 2020

OVERVIEW

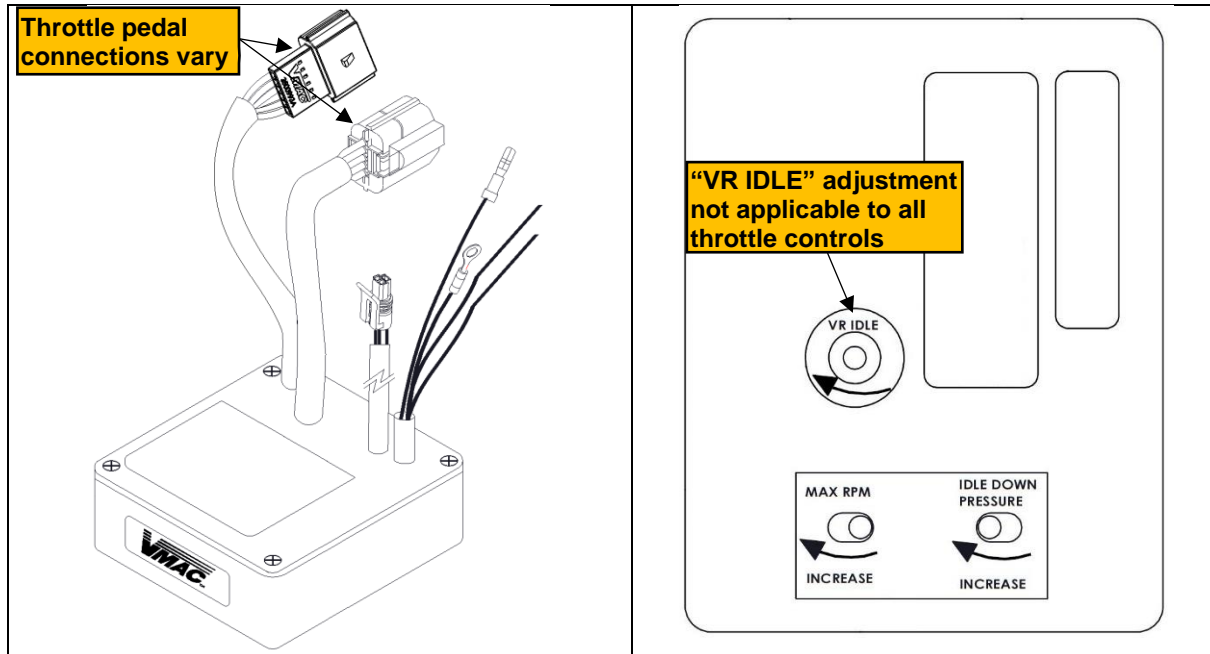


Figure 1 - Analog Throttle Control (features vary between models)

Prior to 2020, most UNDERHOOD 70 / 150, as well as DTM compressor systems, were designed with analog throttle controls (VRTC) (Figure 1). Typical installations locate the VRTC up under the dashboard.



The VRTC should not be confused with the control box. The control box has the compressor ON/OFF buttons, is frequently mounted next to the driver seat, or somewhere it is easily reached and viewed for compressor system activation/operation.

The VRTC monitors system air pressure by way of a pressure sensor. When system air pressure measured by the pressure sensor drops due to air tool use, the VRTC responds by increasing engine rpm appropriately to increase the volume of air compressed. Air volume (cfm) is directly related to engine speed.

The amount of air pressure drop required to prompt a reaction from the VRTC is set by adjusting the Idle Down Pressure (IDP) Screw (factory default: 15 psi drop).

As the system air pressure approaches the pre-set maximum (factory default: 150 psi), the VRTC responds by lowering engine rpm gradually. When maximum air pressure is achieved, the VRTC will reduce engine speed to a VMAC pre-set base idle rpm (900-1100 rpm) and hold there until air demand creates a drop in pressure again.

The VRTC will be active only when the two integral safeties are met:

- Park brake must be engaged for compressor system to start.
- Automatic transmission must be in Park or Neutral for power to be supplied to the VRTC.

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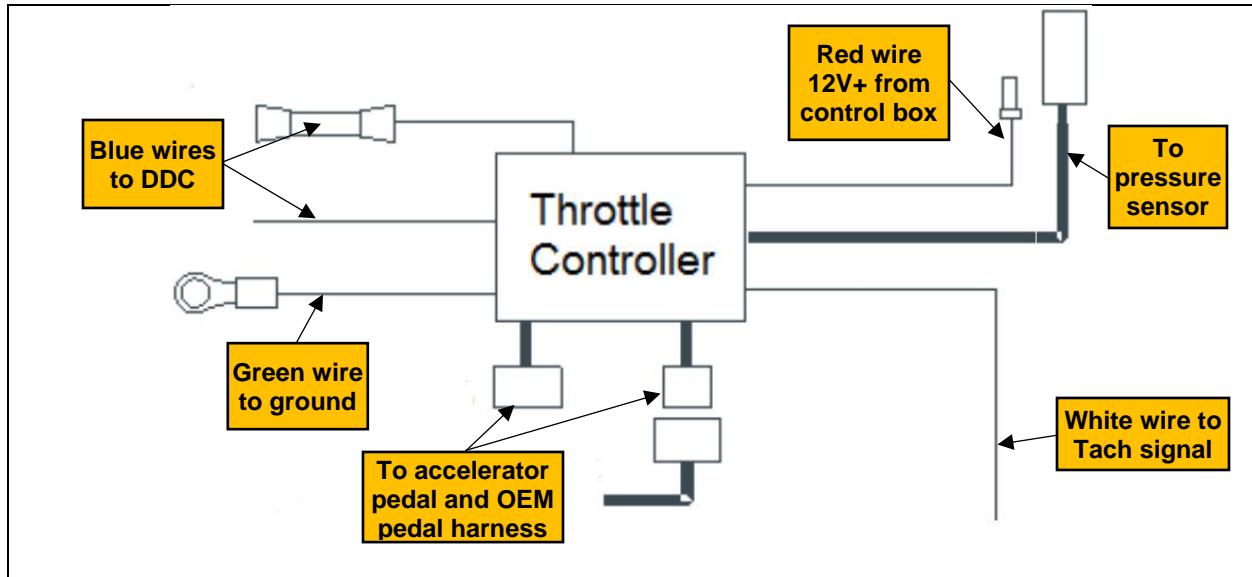


Figure 2 - Typical wiring configuration

ENGINE RPM DOES NOT RISE ABOVE OEM IDLE WHEN COMPRESSOR IS TURNED ON (Figure 2)

Confirm that the transmission is in Park or Neutral (automatic transmissions).

- The VRTC incorporates a Drive Disable Circuit (DDC) to prevent vehicle runaway. If the VRTC does not see that the transmission is in park or neutral, the clutch will engage but the DDC will prevent the VRTC from increasing engine speed above OEM base idle.
- If the transmission is in park or neutral, and the VRTC still does not elevate engine rpm, see the schematic and wiring instructions in the installation manual to confirm good and correct connections to the PRNDL signal. [Manuals - VMAC \(vmacair.com\)](http://Manuals - VMAC (vmacair.com))



NOTE VRTC DDC does not connect to Standard transmission. See installation manual for schematic and wiring instruction to confirm correct connections.

Confirm that the park brake is applied.

- If the control box does not sense an engaged parking brake, the control box LCD digital display will show PARK BRAKE. The compressor clutch will not engage, and the VRTC will not be energized. Engine rpm will not elevate past OEM idle.
- If the park brake is engaged but the PARK BRAKE warning is showing, check connections. See the installation manual for your system to view vehicle specific wiring schematic and instructions.

Confirm power and ground to the VRTC

- Check the red power wire to the VRTC and confirm that full vehicle charging system voltage is being supplied (minimum 12V dc).
- Check that the green wire from VRTC has good continuity (<1 Ohm) to chassis ground and battery negative.

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ENGINE RPM RISES TO VMAC BASE IDLE WHEN COMPRESSOR IS TURNED ON BUT DOES NOT RESPOND TO AIR DEMAND (Figure 2)

- Unplug the pressure sensor. The pressure sensor will either be installed in the inlet on the compressor or located near the inlet (PTFE tube connected to remoted pressure sensor). The engine speed should increase to the maximum pre-set VRTC rpm.
- In the connector on the pressure sensor harness to the VRTC, apply a jumper between the red wire and the white wire or between red wire and green wire. Early VMAC systems used a green wire rather than white.
- If the engine speed reduces to VMAC base idle with the jumper applied, the VMAC throttle control is working properly. Perform the pressure sensor test. See <https://kb.vmacair.com/help/pressure-sensor-voltage-test>

ENGINE RPM RISES TO MEET AIR DEMAND BUT DOES NOT SETTLE DOWN TO VMAC BASE IDLE (Figure 2)

- Unplug pressure sensor and perform jumper test as described in the previous steps above.
- If the VRTC reacts as it should, there is either a problem with the pressure sensor (see the pressure sensor test above) or the air pressure being supplied to the sensor is low for some reason.

Ensure there are no air leaks.

- Isolate the VMAC system by disconnecting all downstream equipment and connecting a VMAC air test tool at the discharge port of the Air Oil Separation Tank (AOST) See [A700052 VMAC Diagnostic and Air Test Tool](#).
- With the ball valve closed, start the VMAC system.
- If the system builds to full system pressure at high rpm then reduces to base idle, the VMAC system is running as designed and there is an air leak is in the downstream equipment.

Pressure relief valve on the AOST is lifting/venting

- The 200 psi pressure relief valve is located in the blowdown cap, at the back of the AOST.
- Using the A700052 Diagnostic and Air Test Tool to measure system pressure, confirm that the pressure relief valve is not lifting and venting before system pressure rises to 200 psi +/- 5%. For example, if the regulator is set to build 150 psi and the pressure relief valve is lifting/venting at or below 150 psi, the pressure relief valve is faulty.
- If system pressure is exceeding 200 psi, see the over-pressurization section at [Underhood Over / Under Pressurizing Except "G" and "Lite" Systems | VMAC Air](#)

Idle Down Pressure (IDP) is adjusted incorrectly

The IDP adjustment sets the amount of system air pressure drop required to begin a VRTC response, elevating engine rpm. Systems are factory set to idle down at 150 psi. With a recommended IDP adjustment to react to a 15 psi drop, the VRTC will begin to elevate engine rpm when system pressure drops to 135 psi.

- IDP is adjustable. If IDP is set to over 150 psi, the VRTC will not direct the engine to decrease rpm, and the higher the adjustment, the higher the rpm until it reaches the maximum VMAC rpm adjustment.
- With the system at 150 psi, turn the IDP screw counter-clockwise until rpm drops to VMAC base idle, and adjust IDP as directed in the Owner's Manual. [Manuals - VMAC \(vmacair.com\)](#)

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Technical Support

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ENGINE RPM GOES TO GOVERNOR OR RED LINE WHEN COMPRESSOR IS TURNED ON (Figure 2)

- VRTC has lost the tachometer signal or crankshaft position sensor signal (VRTC white wire).
- See schematic and wiring instructions in the installation manual to inspect and verify connection to the tach signal source.

For further assistance contact VMAC Technical Support.

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