LINGENFELTER

PERFORMANCE ENGINEERING

2009-2015 Cadillac CTS-V Lingenfelter High Flow Intercooler Pump Upgrade Kit Installation Instructions (6.2L LSA Engine)

PN: L330030709

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Revision - 1.9
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Parts List

Lingenfelter CTS-V High Flow Intercooler Pump Upgrade Kit (PN: L330030709)

#	Part number	Description
1	TAFX410110	VariMax pump
2	3177T62	Clamp
1	XX00054-0002	VariMax pump bracket
2	47523	M5x0.8x12mm Metric SS Socket Head Cap Screw
2	47213	M5x0.80 Metric Stainless Steel Nylon Insert Lock Nut
2	47392	M5 Metric Stainless Steel Flat Washer
2	92510A494	Unthreaded Spacer 3/4" OD, 5/16" Long, 3/8" Screw Size
1	XX05102-0015	CTS-V to VariMax intercooler pump adapter harness
1	12047835	Connector mounting clip
1	L920010000	Lingenfelter Decal

Tools & Materials Required

- Jack
- Jackstands or vehicle hoist
- Hose clamp pliers (or equivalent)
- Drain bucket (or equivalent)
- Ratchet
- Ratchet extension (if needed)
- 3/4" Hose Plugs (x2)
- 8mm wrench
- 13mm deep socket
- 5/32" or 3mm Allen wrench
- Small pry tool or flat head screwdriver
- 50/50 DEX-COOL antifreeze
- Sidecutters

* These materials are used for installing the manual override switch only

- 16 Gauge wire (orange)*
- 15 amp rated switch*
- Wire Strippers*
- Crimpers*

Optional Items

#	Part number	Description
1	L320030709	CTS-V LSA intercooler radiator kit with fans
2	54205K11	Stainless Steel Constant tension worm gear clamp
2	7329K16	Spring clamp

Thank you for purchasing the Lingenfelter Performance Engineering (LPE) VariMax CTS-V high flow intercooler pump upgrade kit. This kit is intended to bring the intercooler flow rate of the CTS-V up to the same flow rate as the ZL1 Camaro. As you can see in the chart provided on the next page, the factory CTS-V intercooler pump flows 25% less fluid per minute than the factory intercooler pump in the ZL1 Camaro. The VariMax intercooler pump, also shown in the chart on the next page, provides the same flow rate as the factory ZL1 Camaro intercooler pump. This kit is designed to provide easy mounting of the intercooler pump through a custom mounting bracket. Finally, this kit features a plug & play harness with an additional connector to allow for easy wiring of an optional manual override switch. Installing a manual override switch could be used to circulate the intercooler fluid between runs to help cool the fluid in drag racing applications.

The Varimax CTS-V high flow intercooler pump is a DC brushless pump that has a soft start. The Varimax pump can accept a PWM speed control signal, but the way the CTS-V is wired the pump will always run at full speed. Being a soft start pump, the pump ramps up to full speed over time. A DC brushless pump does not have the initial current spike that a traditional pump will have.

Read the entire instruction manual before beginning installation. Many of the stock parts will be used in reassembly.

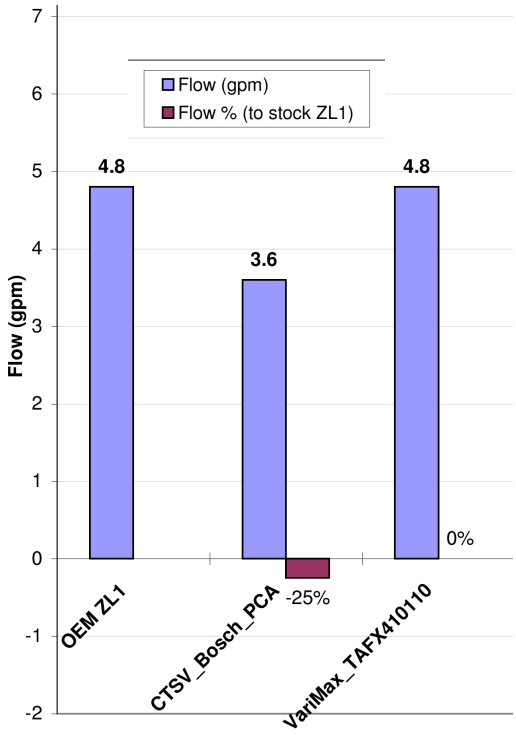
When referencing the side of the vehicle, the driver side of the vehicle is considered the left side and the passenger side of the vehicle is considered the right side of the vehicle.

Due to the thermal expansion of rubber coolant hoses, LPE does not recommend using worm gear clamps to clamp the hoses to the intercooler pump. Because worm gear clamps do not apply constant tension to the hoses, the hoses can leak when exposed to cooler temperatures. LPE recommends the use of the OEM constant-tension clamps or spring clamps as superior alternatives to the standard worm gear clamp.

LPE ZL1 Camaro intercooler pump flow comparison test results

Bar graph shows flow in gallons per minutes & % change in flow compared to stock ZL1 pump

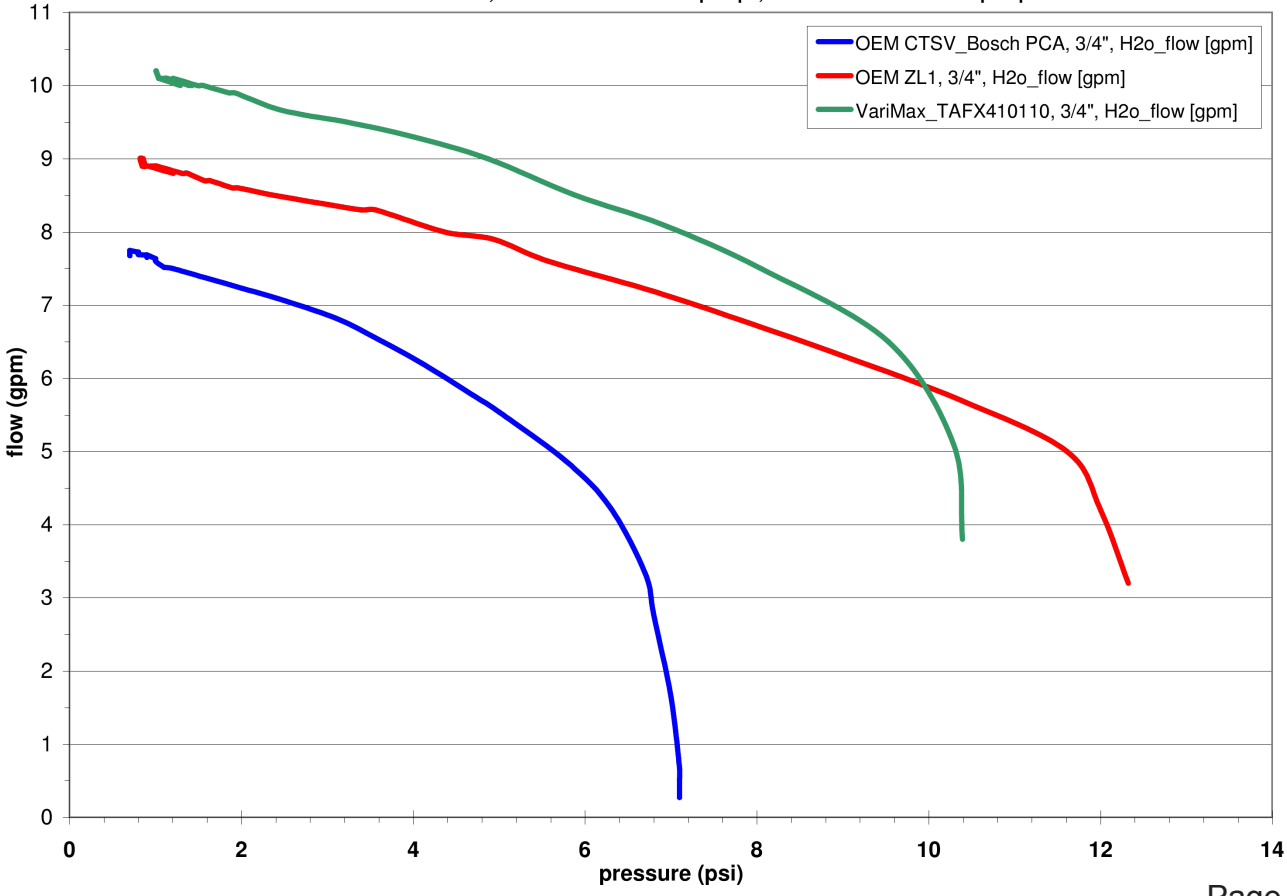
Test conditions: 13.5 vdc, OEM ZL1 intercooler and intercooler radiator, stock diameter coolant hoses



LPE electric intercooler pump flow comparison - CTSV vs ZL1 vs VariMax

flow in gallons per minute (GPM) versus differential pressure across the pump (psi)

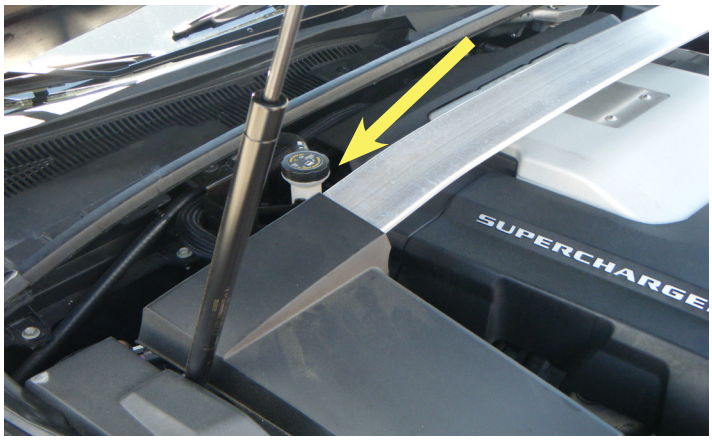
Test conditions: 13.5 volts, 3/4" hose in and out of pumps, variable restriction after pump



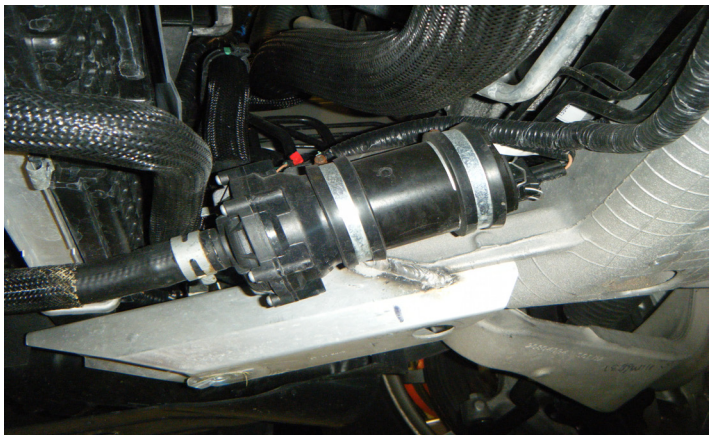
Note: Some pictures show that the engine was removed from the vehicle. You do not need to remove your engine to install the Lingenfelter Performance Engineering (LPE) VariMax CTS-V high flow intercooler pump.

1. If you have been driving the vehicle, make sure to allow a couple hours for the engine to cool down before beginning installation.

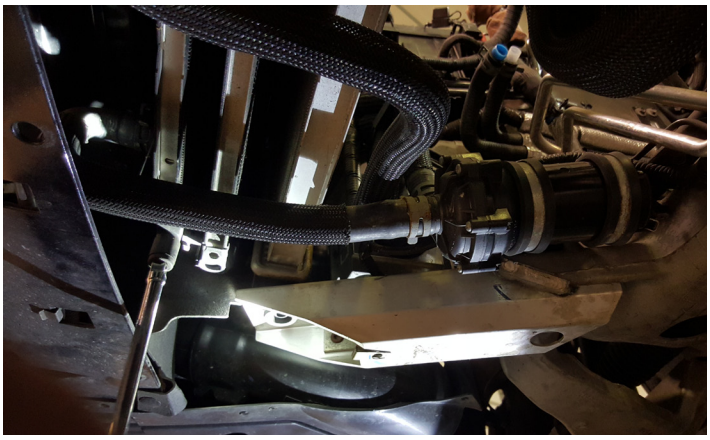
2. Raise the vehicle with a vehicle hoist or a jack and jackstands. Be careful to follow the GM lifting procedures for the CTS-V.



3. In order to make it easier to drain the fluid from the system, remove the cap from the intercooler fluid reservoir. The reservoir is located at the back of the engine on the passenger side near the fire wall.



4. Locate the intercooler pump. This pump should be located just inside of the passenger side engine brace, just behind the radiator.



5. To drain the intercooler system of coolant, using a 3/8” square drive extension, remove the drain fitting from the passenger side of the intercooler radiator. Have a drain pan positioned to catch the fluid.

   Inspect the fluid. If it is normal in appearance, it can used again. If it is discolored then we recommend flushing the system of the old fluid and using all new intercooler fluid.

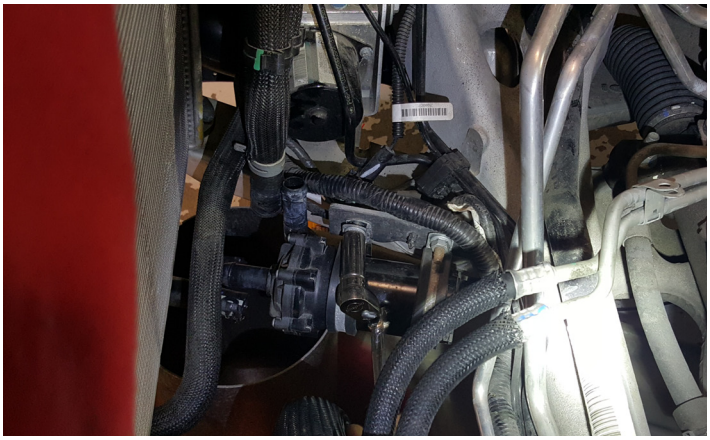
6. Using a pair of hose clamp pliers, loosen the hose clamp on the inlet hose. Disconnect the inlet hose from the intercooler pump and let both the pump and the hose drain into a bucket.

   Note: If the hose is difficult to remove, you can spray silicone in between the hose and the inlet of the pump.

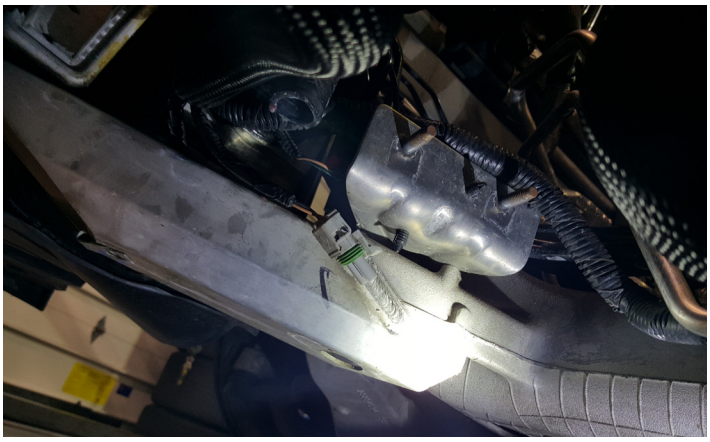
7. Using a pair of hose clamp pliers, loosen the hose clamp on the outlet hose. Disconnect the outlet hose from the intercooler pump and let both the pump and the hose drain into a bucket.

   Note: If the hose is difficult to remove, you can spray silicone in between the hose and the outlet of the pump.

8. Locate the connector on the rear of the intercooler pump body and disconnect it by pinching the metal clips while pulling away from the pump.

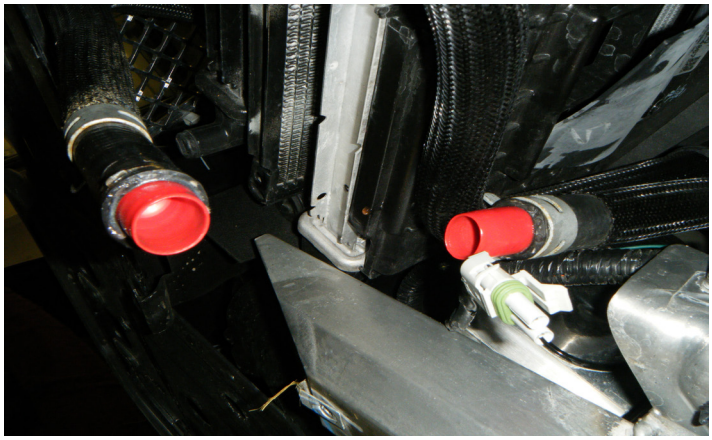


9. Using a 13mm socket, ratchet, and extension if necessary, remove both M8 nuts that hold the Adel clamps to the factory mounting bracket.

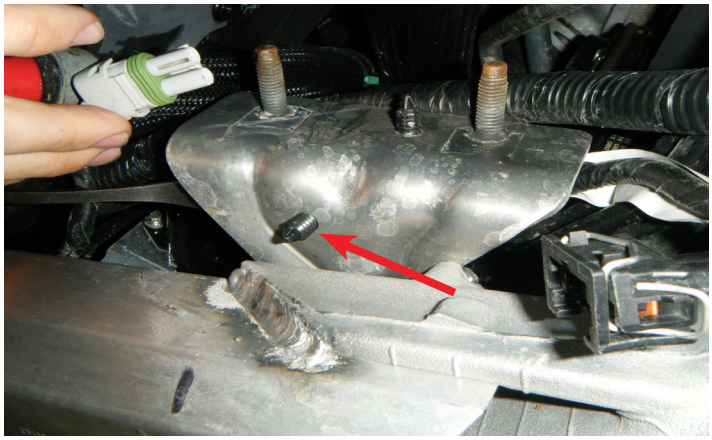


10. Remove the intercooler pump from the mounting bracket, which will expose both M8 mounting studs, as well as the end of the wire loom retaining clip.

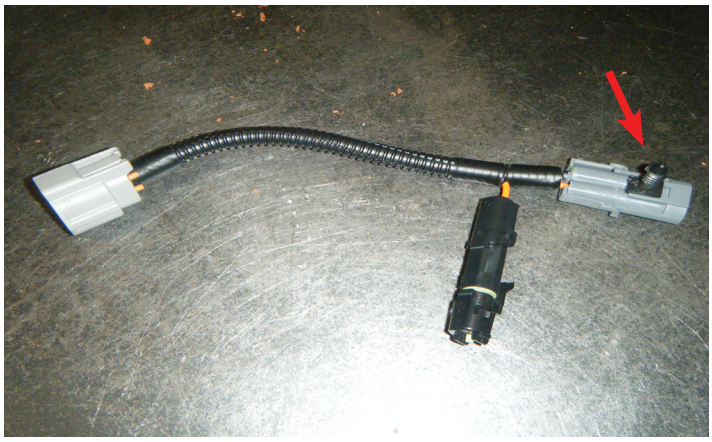
11. If you did not do so already, disconnect the harness connector that is located behind the factory intercooler pump mounting bracket.



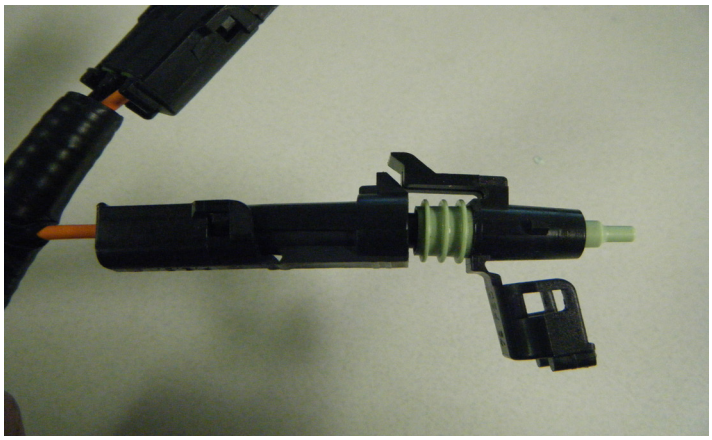
12. Using hose plugs, cap off the intercooler hoses.



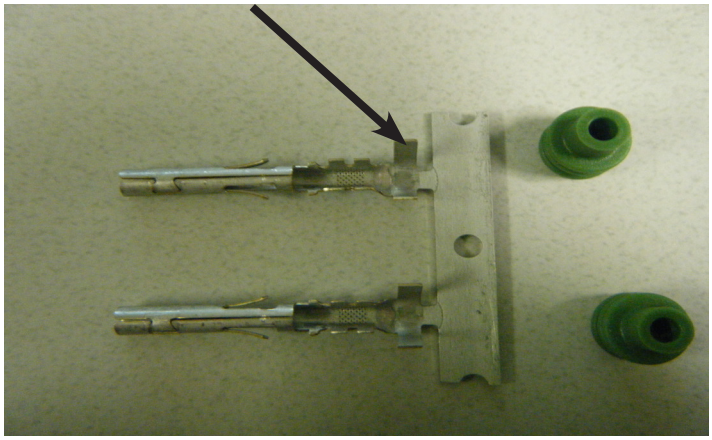
13. Using a small pry tool or flat head screwdriver, remove the wire loom retaining clip from the factory mounting bracket. The location of the wire loom retaining clip is shown by the red arrow in the adjacent illustration. Next, remove the factory intercooler pump harness from the vehicle.



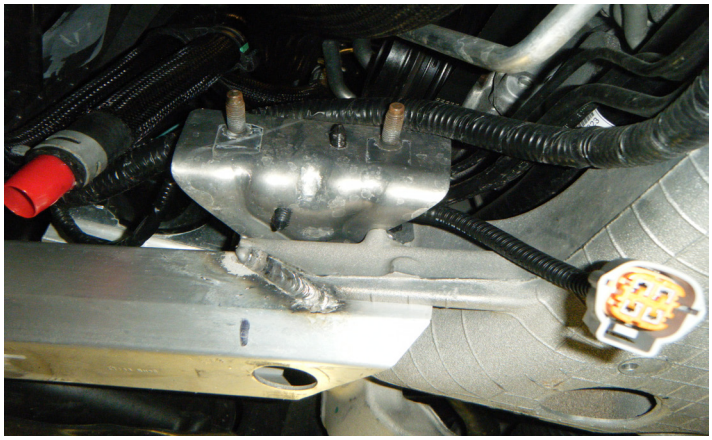
14. Install the supplied wire loom retaining clip onto the supplied VariMax intercooler pump wiring harness by sliding it onto the connector, as shown by the red arrow in the adjacent illustration.



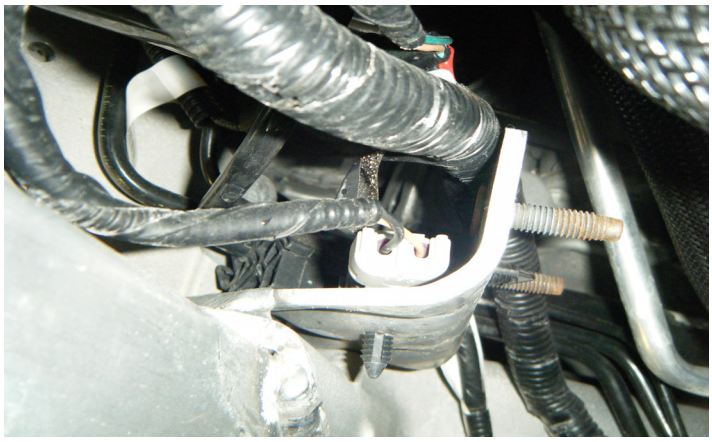
15. If a manual override switch is not being installed, install the plug seal into the end of the supplied connector, and close the retainer clip on the connector. Then install the connector onto the single connector that is on the harness.



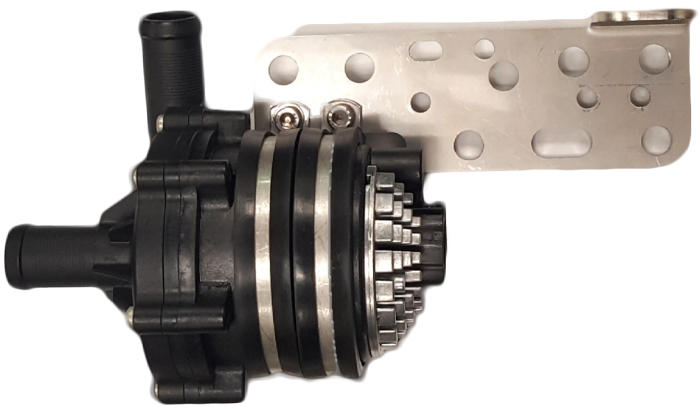
16. If installing a manual override switch, crimp the female terminal onto 16 gauge wire and make sure the seal is crimped under the large tangs on the terminal. Then push to seat the terminal into the connector and close the retaining clip. Run the wire to a switch rated for at least 15 amps, and connect that switch to either an always hot, or accessory power source that uses a 15 amp fuse.



17. Install the new VariMax intercooler pump harness onto the factory intercooler pump mounting bracket by inserting the end of the wire loom retaining clip back into the bottom hole of the mounting bracket. Make sure to push the retaining clip through the hole as far as you can to ensure that the harness is securely fastened to the vehicle.

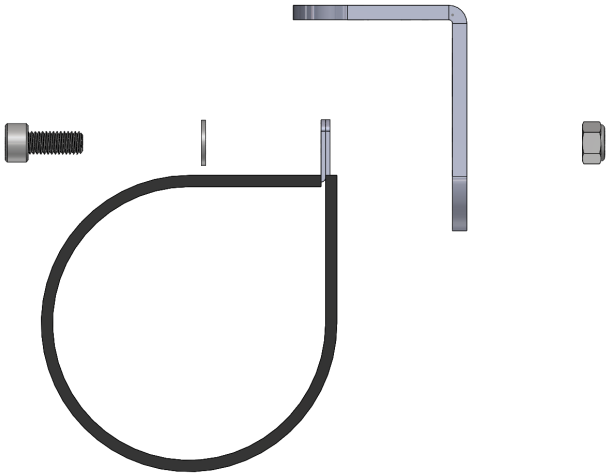


18. Plug the 2-way harness connector into the new VariMax intercooler pump harness.

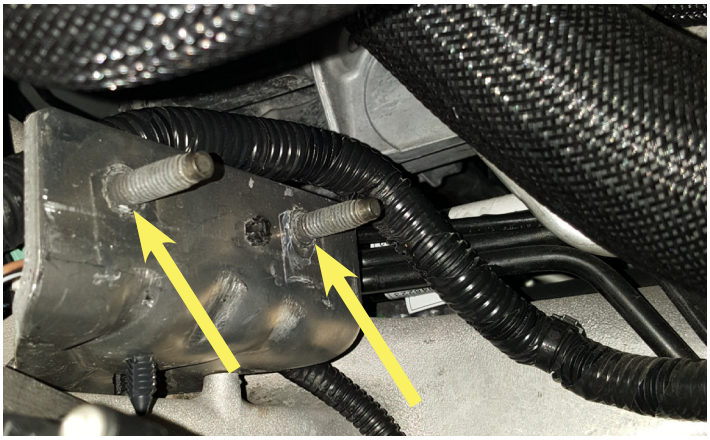


19. Install the Varimax pump bracket (PN: XX00054-0002) onto the Varimax Pump as shown. Use an 8mm wrench and a 4mm (or 5/32") Allen wrench to secure the bracket to the pump.

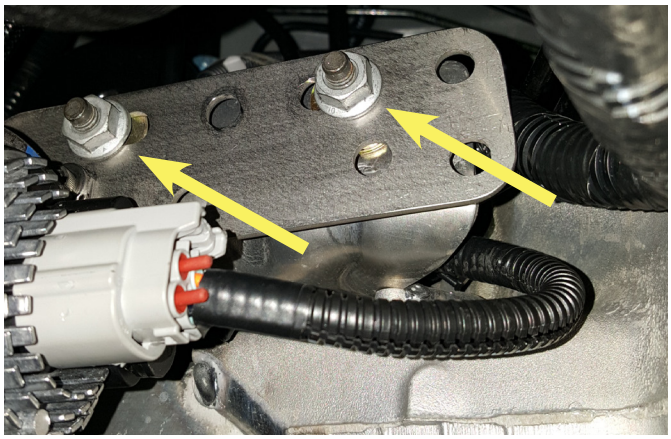
    Note: The bracket shown in steps 20-22 does not show the revision for the Christmas Tree fastener. The bracket fits over the Christmas Tree fastener without any modifications.



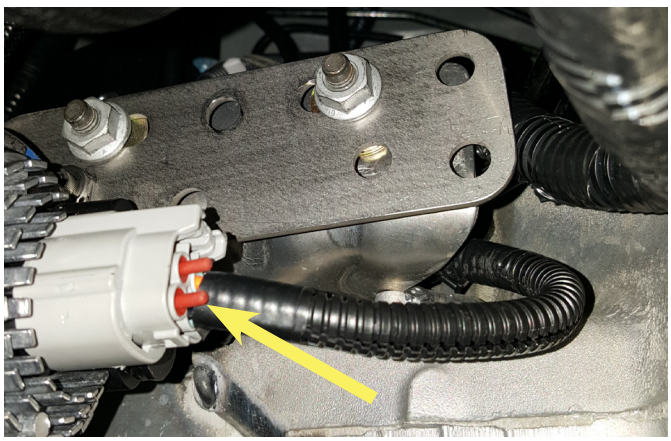
Order of Assembly is as follows:
screw -> washer -> clamp -> bracket -> nut



20. Place the spacers onto the two studs that protrude out of the factory intercooler pump mounting bracket.



21. Place the VariMax intercooler pump bracket onto the two studs that protrude out of the factory intercooler pump mounting bracket as shown. Using a socket wrench and a 13mm deep socket, secure the Varimax intercooler pump bracket to the factory intercooler pump mounting bracket.

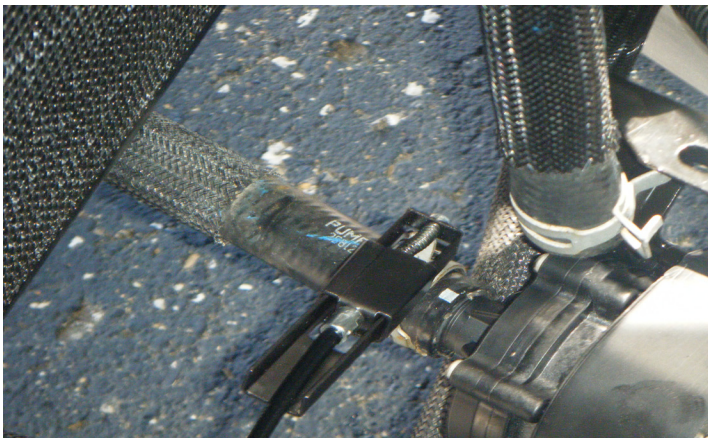


22. Plug the 4-way connector from adapter harness (PN: XX05102-0015) into the back of the VariMax intercooler pump. You should hear an audible "click" when the connector locking mechanism is fully engaged.

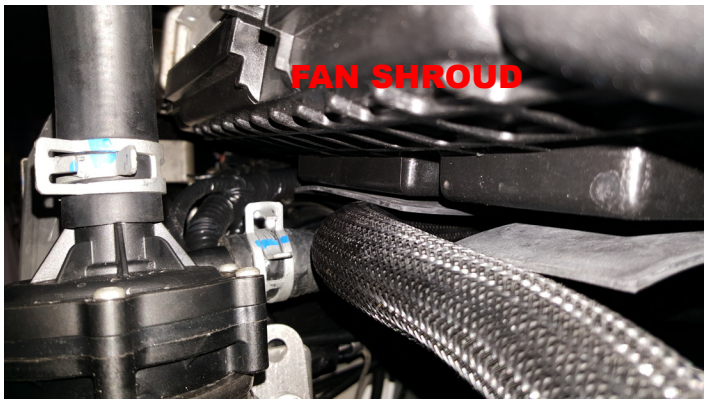
23. Remove the hose plug from the outlet hose.

24. Work the outlet hose onto the intercooler pump nipple that is pointing upward. Then, using a pair of hose clamp pliers, position and secure the hose clamp on the outlet hose.

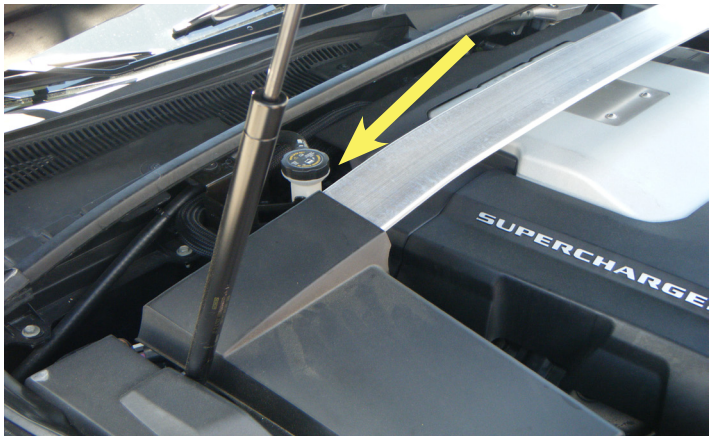
25. Remove the hose plug from the inlet hose.



26. Work the inlet hose onto the intercooler pump nipple that is pointing towards the front of the vehicle. Then, using a pair of hose clamp pliers, position and secure the hose clamp on the inlet hose.



27. Verify the inlet and outlet hoses from the pump are not touching the fan shroud.



28. Fill the intercooler system using a 50/50 mixture of DEX-COOL antifreeze and clean, drinkable water until the coolant level reaches the top of the cold fill range on the reservoir. The location of the reservoir is shown by the yellow arrow in the adjacent illustration.

    NOTE - if the pump sound level changes or is erratic, you likely have air trapped in the system and need to bleed the system and make sure it is properly filled with coolant. It is very important to get all of the air out of the system.

Installation of the Lingenfelter CTS-V VariMax high flow intercooler pump kit is now complete!

NOTE: The Varimax CTS-V high flow intercooler pump is a DC brushless pump that has a soft start. The Varimax pump can accept a PWM speed control signal, but the way the CTS-V is wired the pump will always run at full speed. Being a soft start pump, the pump ramps up to full speed over time. A DC brushless pump does not have the initial current spike that a traditional pump will have.

NOTICES:

It is the responsibility of the purchaser to follow all guidelines and safety procedures supplied with this product and any other manufacture's product used with this product.

Lingenfelter Performance Engineering assumes no responsibility for damages resulting from accident, improper installation, misuse, abuse, improper operation, lack of reasonable care, or all previously stated reasons due to incompatibility with other manufacturer's products.

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DISCLAIMER:

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For additional product installation information and technical support, contact Lingenfelter Performance Engineering or your Lingenfelter Performance Engineering products distributor. You can also find technical support and usage discussions regarding this product and many other Lingenfelter Performance Engineering products in our Internet forums:

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Attachment A

Varimax Pump Data Sheet

Specifications:

Port Connections Style:
19mm Hose Barb ~ 1 Input ~ 1 Output

Motor: Brushless

Operating Voltage Range: 8 - 16 VDC

Nominal Volt: 13 V

Maximum Amp Draw: < ~ 7.3A with RDS Software

Wattage: < 60W at target point

Maximum Coolant Temp: 120°C

Dust Tightness & Water Resistance Rating: IP67

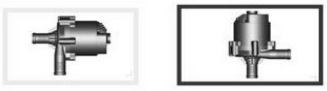
Target Flow: 720 LPH @ 70kPa

Target Pressure: 70kPa

Electrical Connector Interface:
- 4-pin Sumitomo
- Power
- Ground
- PWM-in
- PWM-out

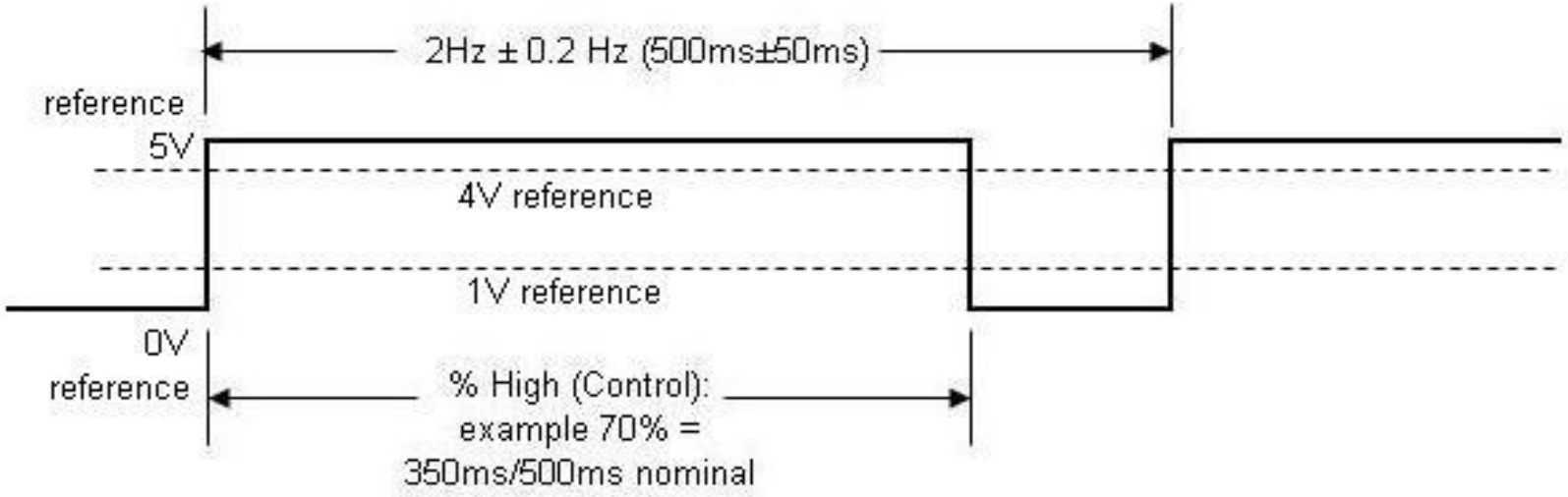
Control:
- PWM
- Intelligent Electronics/Software:
- Variable Flow
- High Temperature protection
- Impeller Un-Blocking
- Current limiting
- Short Circuit Protection
- Reverse Polarity Protection
- Fault code communication

Pump Orientation:

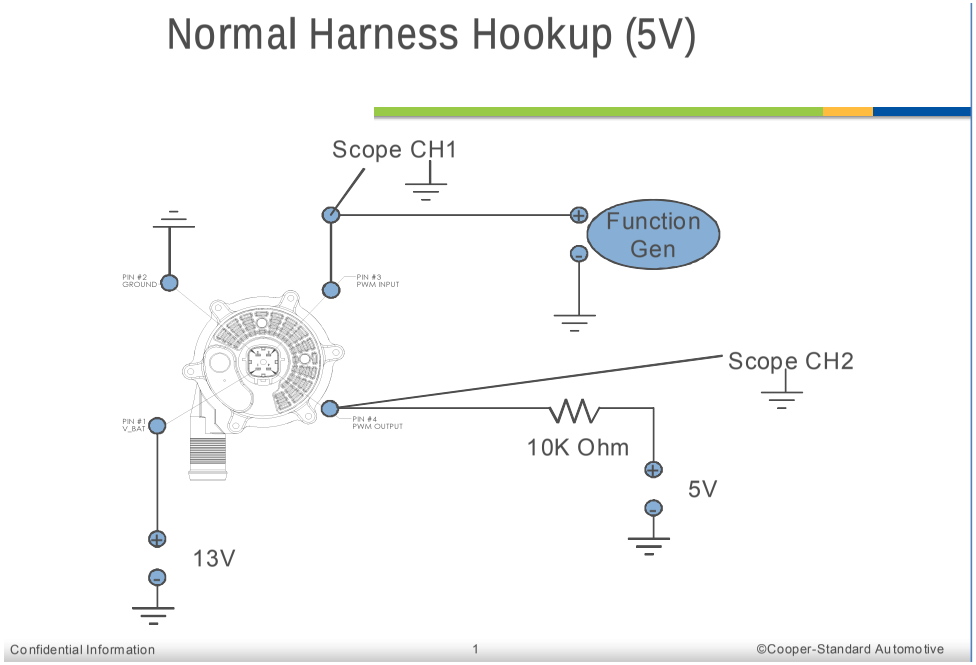
	Pump Orientation Image	*Pump Orientation Run Condition*
OK		Pump runs normally in these positions
NOT GOOD		Pump **DOES NOT** run normally in these positions

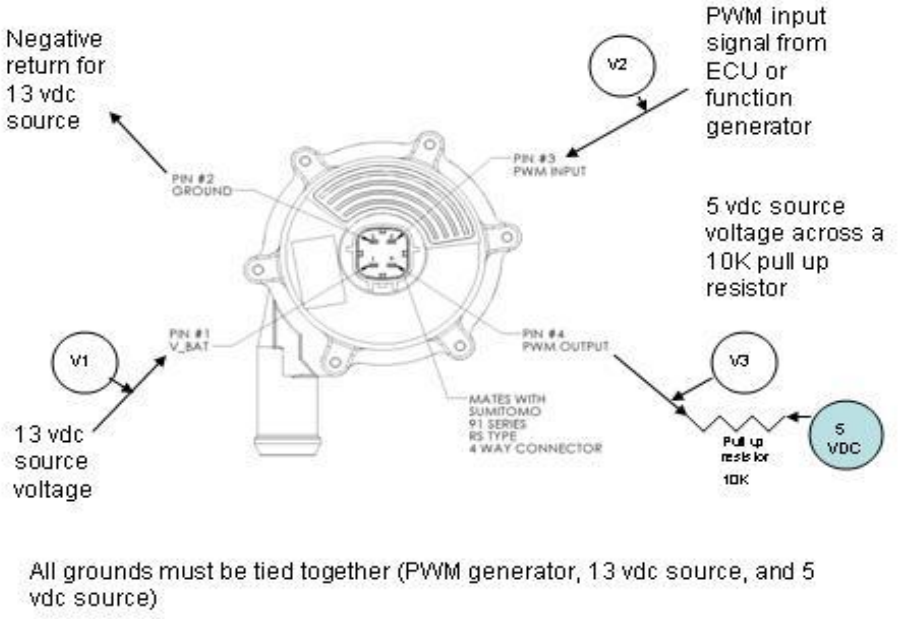
Note:
Attachment hoses should be fixed so as to not create an axial push/pull load on the pump.
The pump should not be at the highest point within the coolant circuit to prevent air entrapment

PWM Frequency Diagram

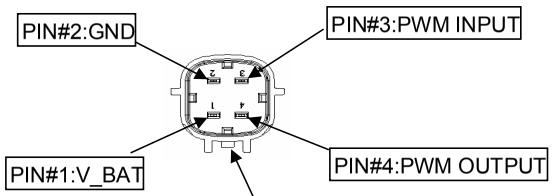


Pin Locations



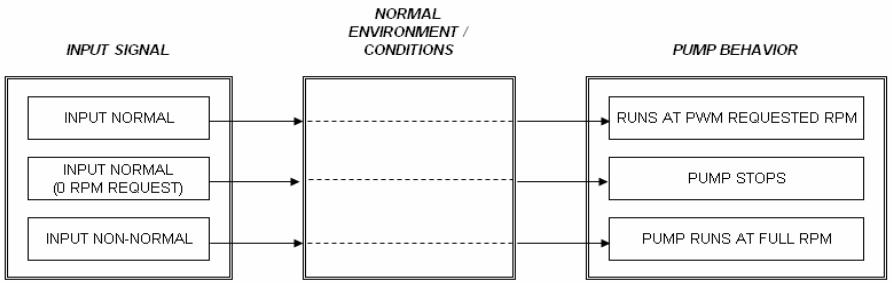


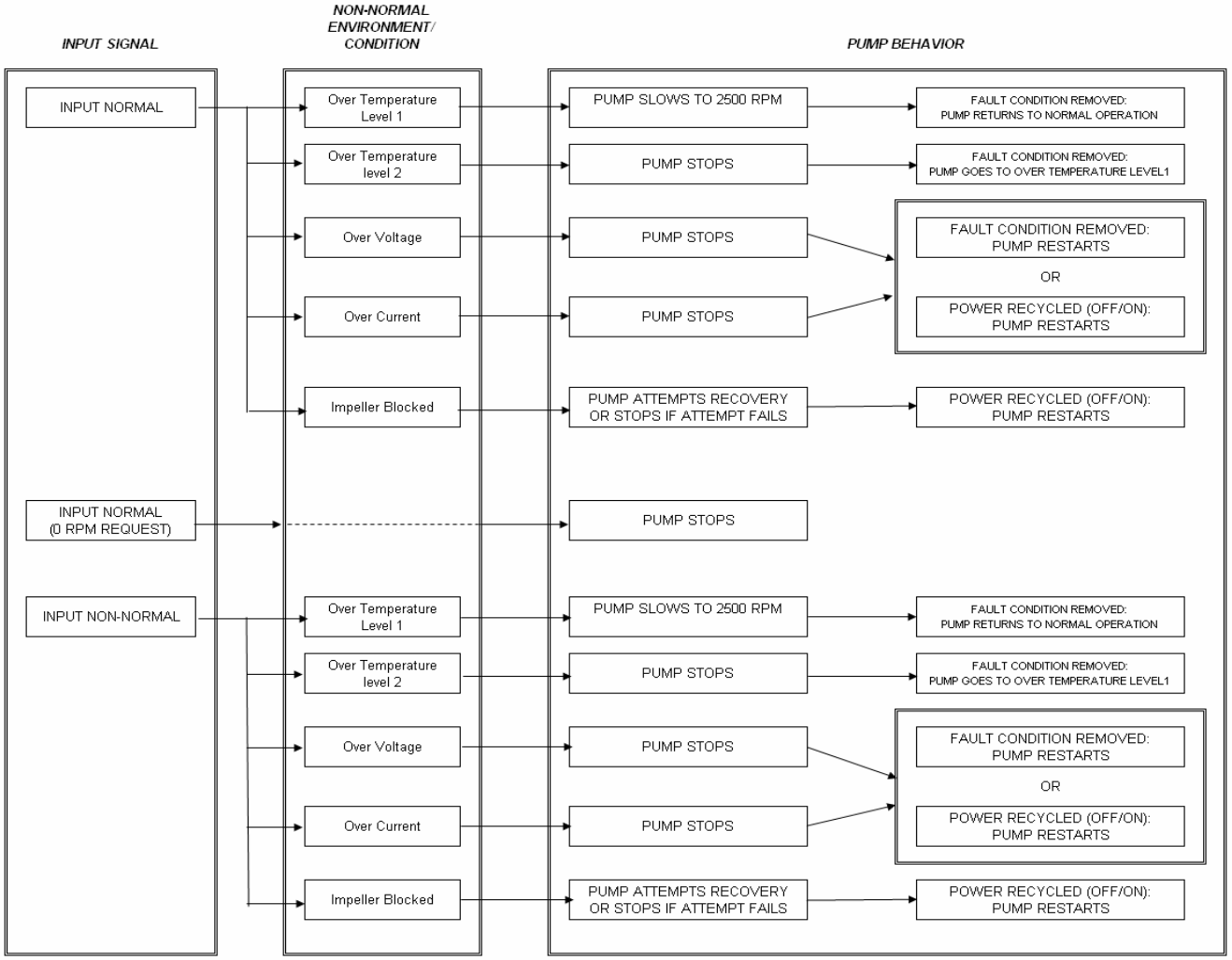
All grounds must be tied together (PWM generator, 13 vdc source, and 5 vdc source)



MATES WITH: SUMITOMO SYSTEMS
91 SEALED SERIES STANDARD CONNECTOR F.
FEMALE: RS04FG-GY PART# 6189-1105 (GREY)
OR RS04 PART# 6189-0929

Operational Diagram



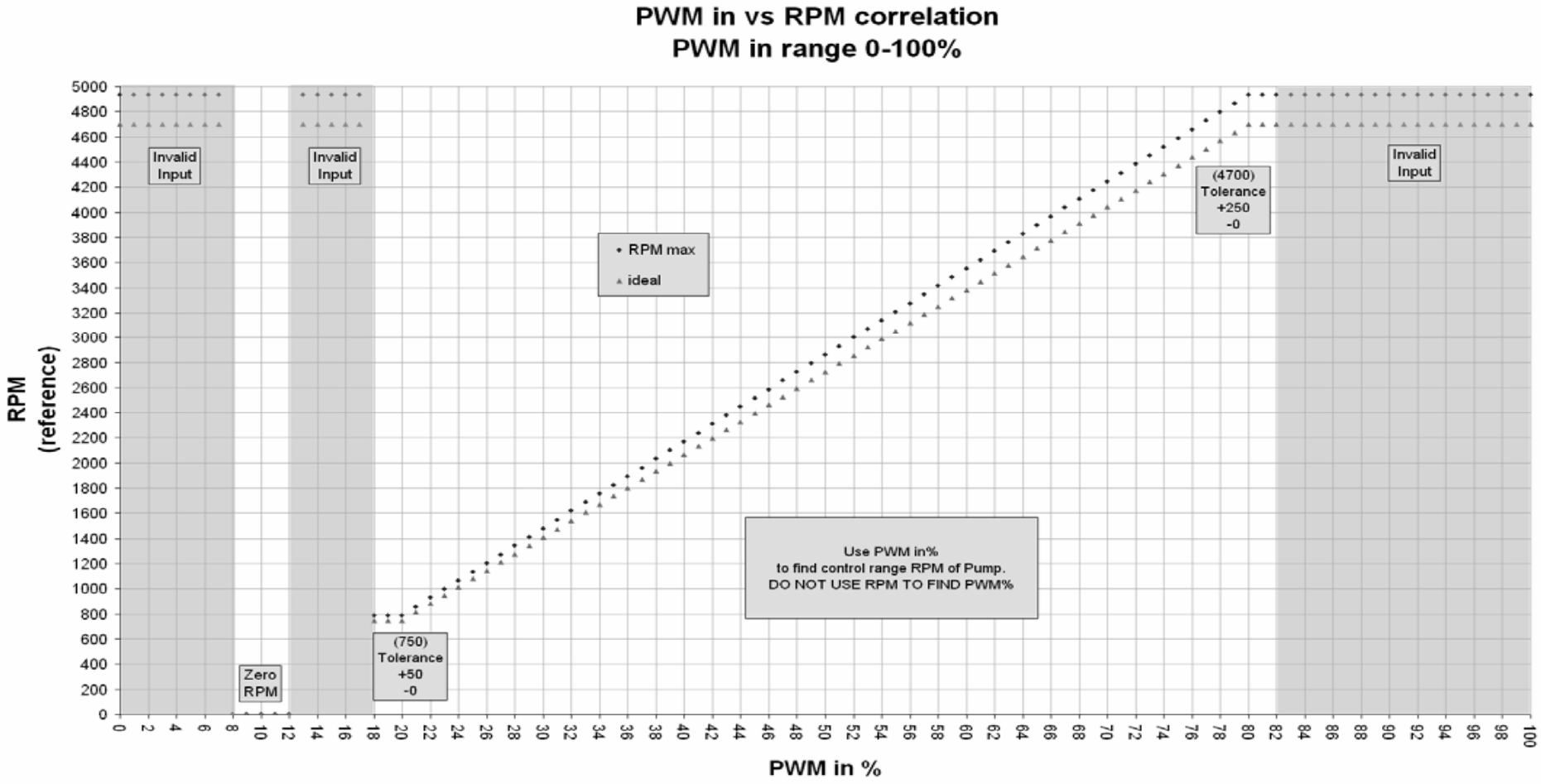


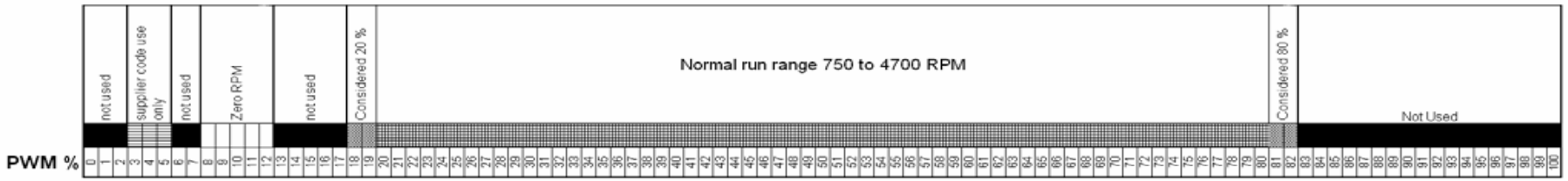
SIMPLIFIED PUMP OPERATION DIAGRAM

PUMP PRIORITY AND DEFINITIONS

Priority 1	Over Current (exceeds 20 amps) Impeller Blocked Over Temperature (Level 2)
Priority 2	Over Voltage (exceeds operation range of 16V)
Priority 3	INPUT NORMAL (0 RPM REQUEST)
Priority 4	Over Temperature (Level 1) (exceeds max driving temp of 100°C)
Priority 5	INPUT NON-NORMAL
Priority 6	Normal Operation

PWM IN





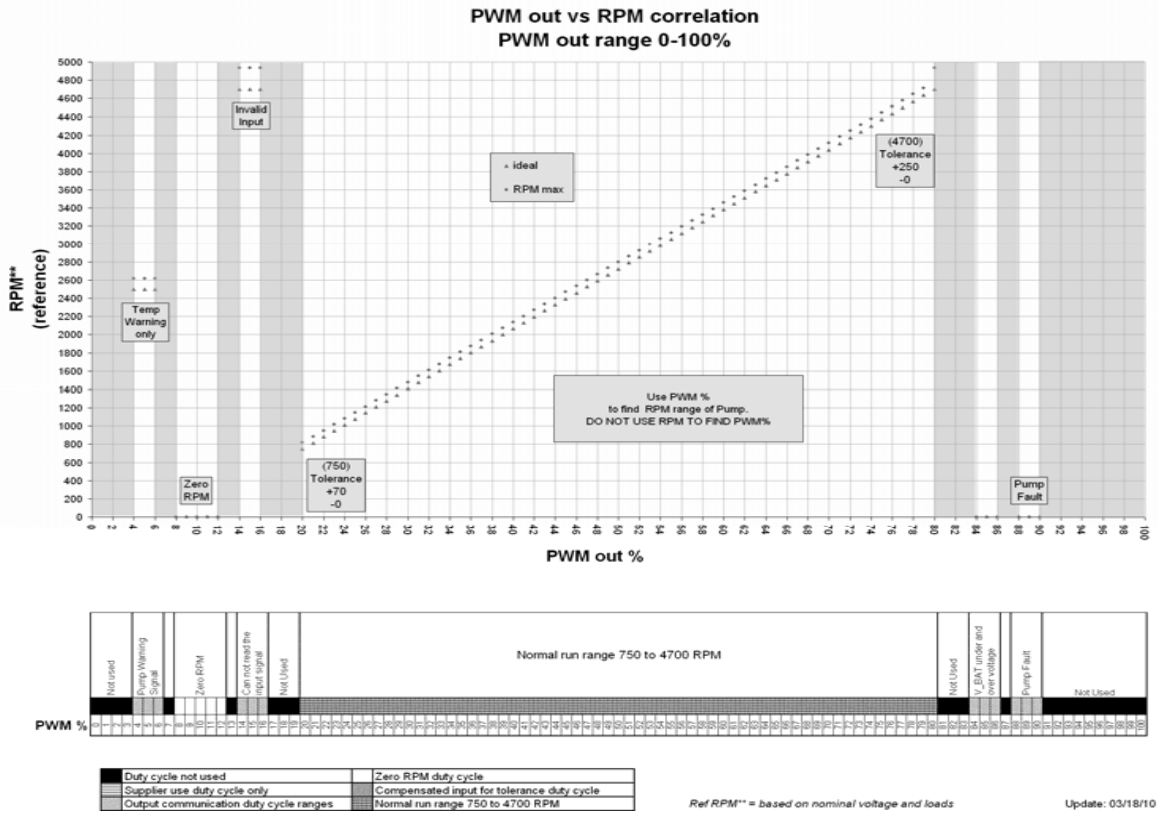
Duty cycle not used	Zero RPM duty cycle
Supplier use duty cycle only	Compensated input for tolerance duty cycle
Output communication duty cycle ranges	Normal run range 750 to 4700 RPM

*Ref RPM** = based on nominal voltage and loads*

Note: drawing is not to scale

Update: 03/18/10

PWM OUT



Pump Warning 4 - 6%

A) Low Back EMF (possible impeller blockage) – Stops forward rotation, reverses the motor for 2.5s to clear potential impeller blockage, and then restarts.

B) High temperature warning (Temperature is close to operational thermal limit)

Motor slows to 2500RPM, in an attempt to cool. The lower RPM lowers the current which in turn, lowers the pump self heating characteristic. The pump exits this mode once the temperature (warning condition) has moved below the full operation temperature limit (timing is unspecified).

C) Over-Current during normal operation (possible problem) - If an over-current occurs during normal operation the pump is stopped. After a 10 second wait, the pump will attempt to restart.

Pump Fault 88-90%

A) Impeller Blockage (sustained Low back EMF) - If 5 consecutive blockage events (see Pump Warning “A” low back EMF) have occurred, this mode is entered. The pump will stop. The pump will not restart until a power re-cycle occurs.

B) Over Temperature - The high temperature operation limit is exceeded. The pump stops and stays in this state until the unit cools.

C) Over-Current at startup - if an over-current occurs during initial activation of FETS, the pump is stopped until a power re-cycle occurs.

D) Over-Current during operation (sustained over-current during operation) - After 5 consecutive cycles of “Over-Current during normal operation” (See Pump Warning “C”), the pump is stopped until a power re-cycle occurs.