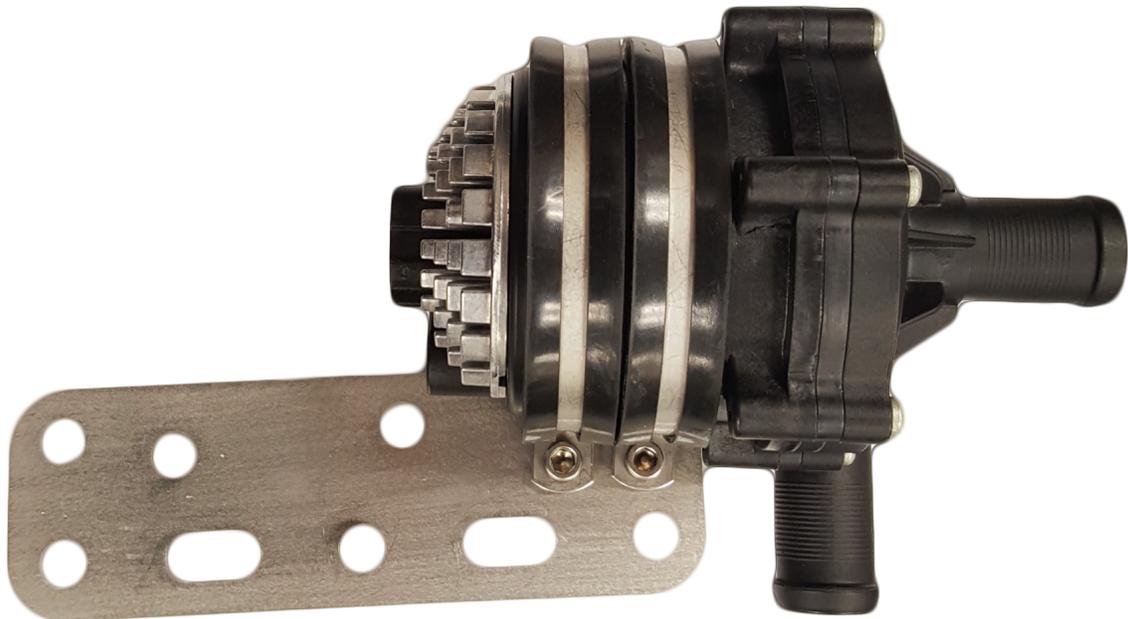


Lingenfelter High Flow Varimax Intercooler Pump Upgrade Kit Installation Instructions



PN: L330070000

Lingenfelter Performance Engineering
1557 Winchester Road
Decatur, IN 46733
(260) 724-2552
(260) 724-8761 fax
www.lingenfelter.com
Release date: 30 June 2016

Parts List

Lingenfelter High Flow Intercooler Pump Upgrade Kit (PN: L330070000)

#	Part number	Description
1	TAFX410110	VariMax Pump
1	XX00054-0001	VariMax Pump Bracket
2	63507	10-24x5/8 316 Stainless Steel Socket Head Cap Screws
2	93623	10-24 Stainless Steel Stop Hex Nut
2	93763	No. 10 Stainless Steel Flat Washer
2	3177T62	2-1/2" Clamp with cushion
1	L920010000	Lingenfelter Decal

Tools & Materials Required

- 3/8" socket
- 5/16" Allen wrench
- 16 gauge wire (maximum of 4 different colors)
- Wire strippers
- Crimpers

Optional Items

#	Part number	Description
1	L320030709	CTS-V LSA intercooler radiator kit with fans
1	L300180000	Fan and pump over-ride harness kit
1	L480340000	LPE GM factory Bosch to Varimax intercooler pump harness

Thank you for purchasing the Lingenfelter Performance Engineering (LPE) VariMax high flow intercooler pump upgrade kit. This kit is considered an upgrade over the Bosch intercooler pump. 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.

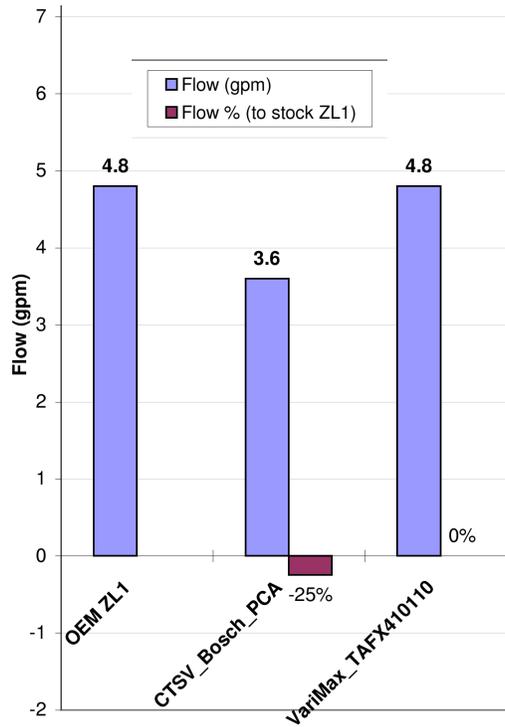
The Varimax high flow intercooler pump is a DC brushless pump that has a soft start. The Varimax pump can accept a PWM signal, but the pump can also be wired to always run at full speed. Being a soft start pump, the pump ramps up to full speed over time. A DC brushless pump does not have the initial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

Read the entire instruction manual before beginning installation. The datasheet for the Varimax pump is attached at the end of the instruction manual.

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.

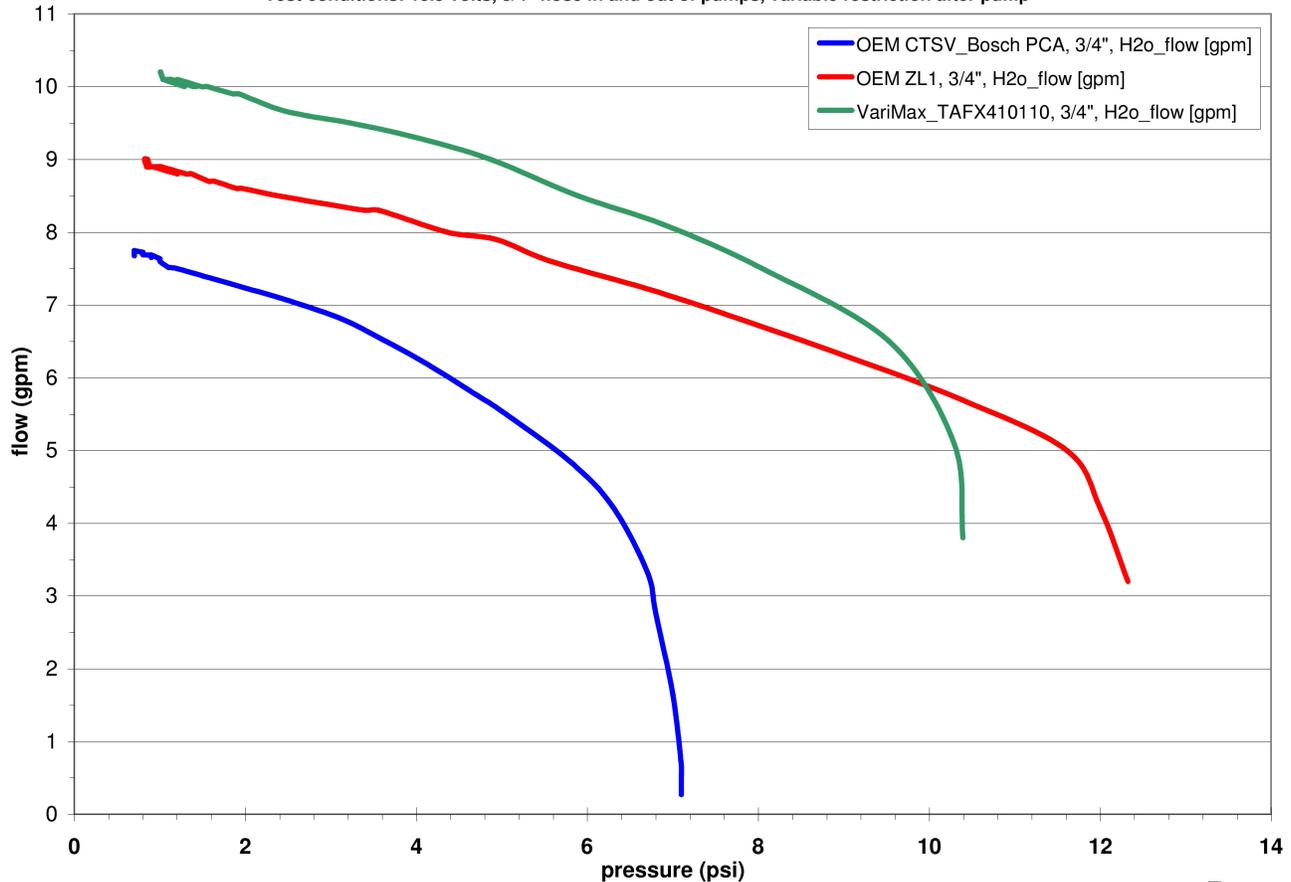
LPE ZL1 Camaro intercooler pump flow comparison test results

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

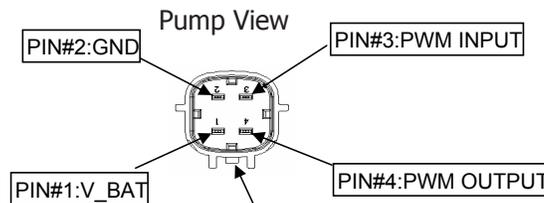
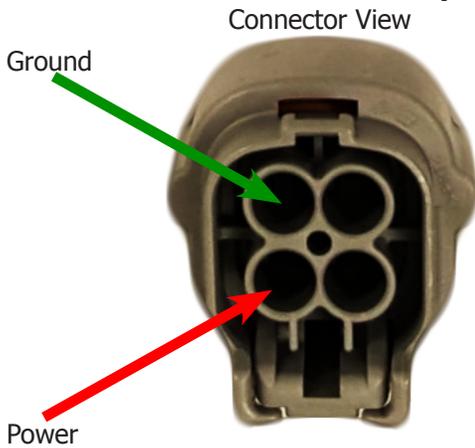


If you are replacing a Bosch intercooler pump, you can use the optional LPE GM factory Bosch to Varimax intercooler pump harness (PN: L480340000) to make the installation plug and play. This will allow you to run the pump at full speed when power is applied through the existing Bosch intercooler pump connection.



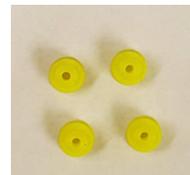
The Lingenfelter Performance Engineering (LPE) VariMax high flow intercooler pump can be controlled by PWM or can be configured to run at full speed on power up.

Populating the Ground and Power terminals:



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

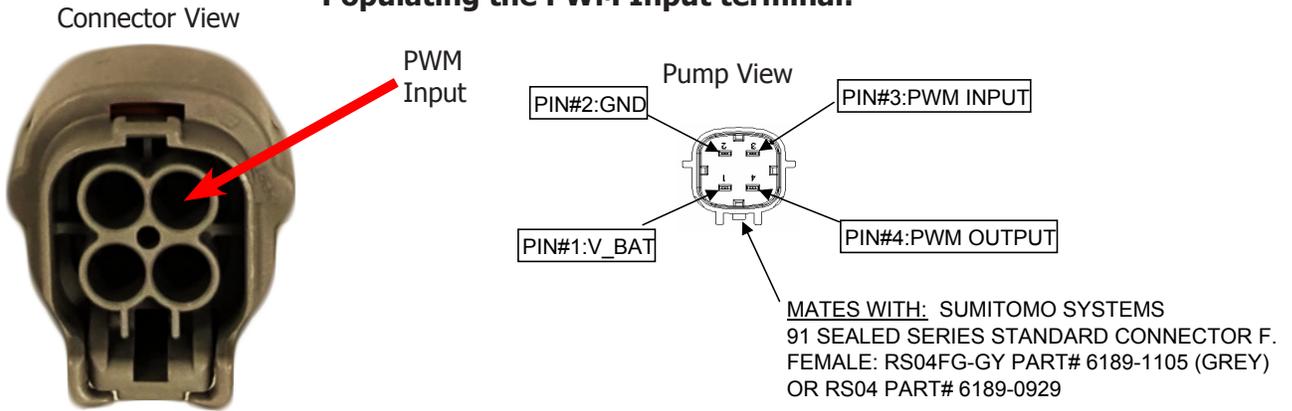
Populate the terminals indicated by the red arrows above using the provided terminals and seals. The seals can be yellow, blue, or green.



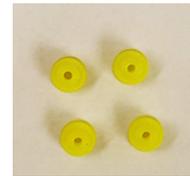
If you would like to configure the LPE Varimax high flow intercooler pump to run at **full speed** on power up, using the provided plugs, plug the remaining holes. The plugs can be brown or white.



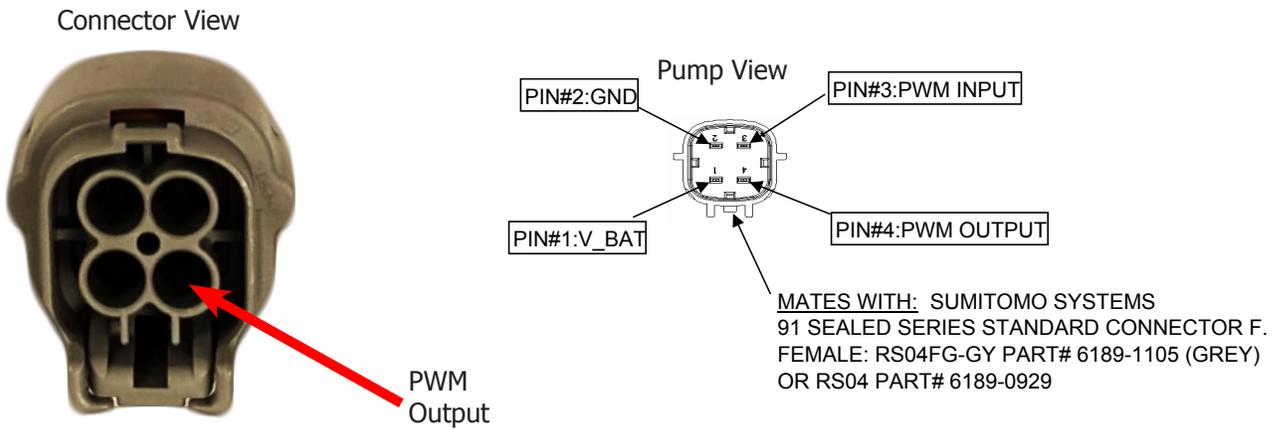
Populating the PWM Input terminal:



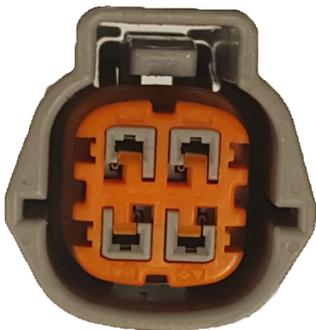
If you would like to control the LPE Varimax high flow intercooler pump by **PWM control**, populate the PWM Input terminal above using the provided terminals and seals. Control information can be found on page 10 and 13.



Populating the PWM Output terminal:



The PWM output terminal is used for diagnostic purposes only. It does not need to be populated in order to control the pump by PWM. If you are not using this terminal, use the provided plugs to plug this hole. More information on page 14.



Use the provided lock to lock the terminals into place.

Bracket Assembly

Place the provided clamps (PN: 3177T62) over the Varimax Pump.



The bolt holes from the clamps above will align with the holes on the bracket (PN: XX00054-0001) indicated by the yellow arrows.



Use the provided screws (PN: 63507), nuts (PN: 93623), and washers (PN: 93763) to secure the clamp to the bracket.



NOTICES:

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

Lingenfelter Performance Engineering assumes no responsibility or liability for damages incurred from the use of products manufactured or sold by Lingenfelter Performance Engineering on vehicles used for competition racing.

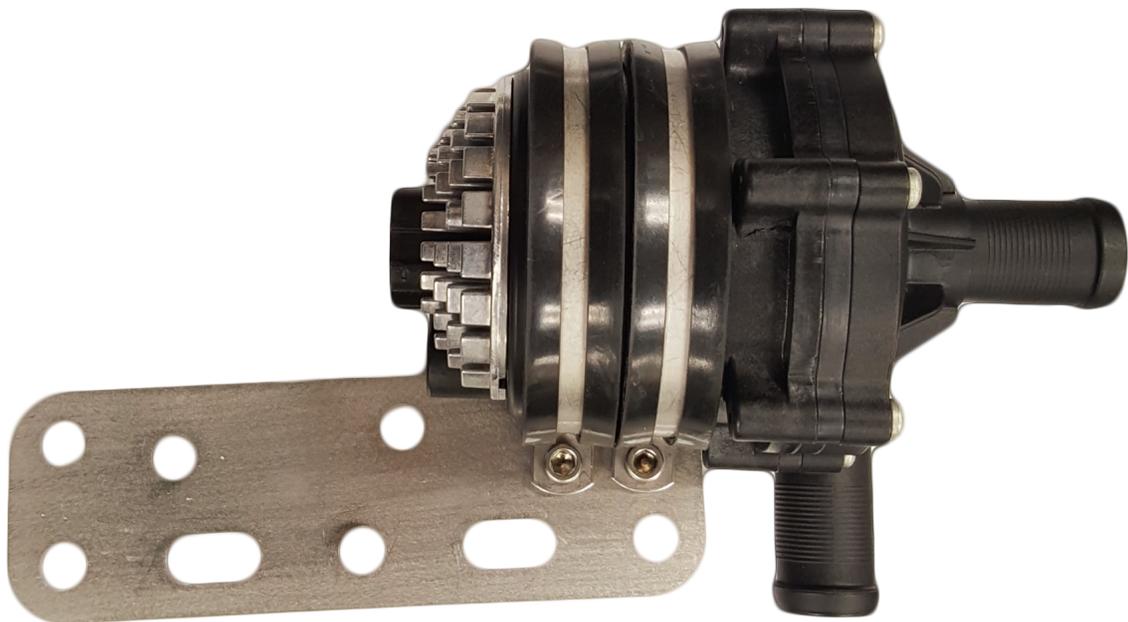
It is the purchaser's responsibility to check the state and local laws and sanctioning body requirements pertaining to the use of this product for racing applications. Lingenfelter Performance Engineering does not recommend nor condone the use of its products for illegal street racing.

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

<http://www.lingenfelter.com/LPEforumfiles>

Follow us on Facebook!

<http://www.facebook.com/home.php#!/lpehp>



Lingenfelter Performance Engineering
1557 Winchester Road
Decatur, IN 46733
(260) 724-2552
(260) 724-8761 fax
www.lingenfelter.com

L330070000 high flow intercooler pump upgrade kit v1.1.indd

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:

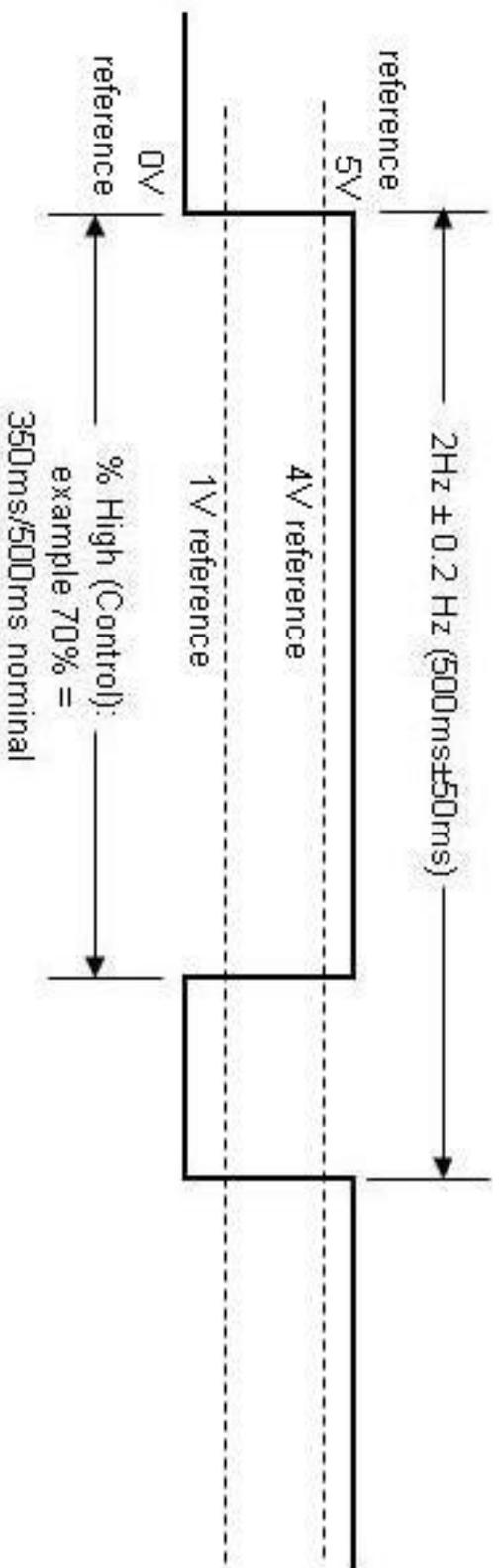
	<i>Pump Orientation Image</i>	<i>Pump Orientation Run Condition</i>
OK		Pump runs normally in these positions
NOT GOOD		Pump DOES NOT run normally in these positions

Note:

Attachment hoses should be fixed so as to not create an axial push/pull load on the pump.

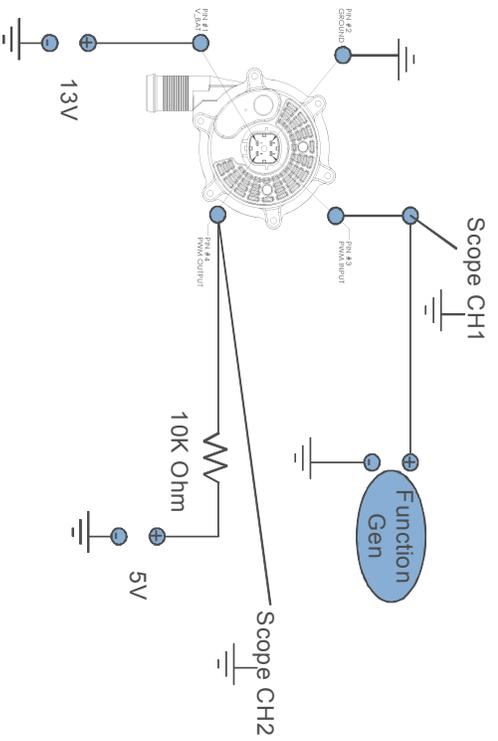
The pump should not be at the highest point within the coolant circuit to prevent air entrapment

PWM Frequency Diagram



Pin Locations

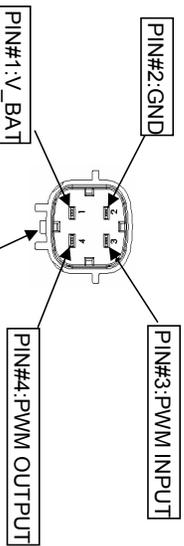
Normal Harness Hookup (5V)



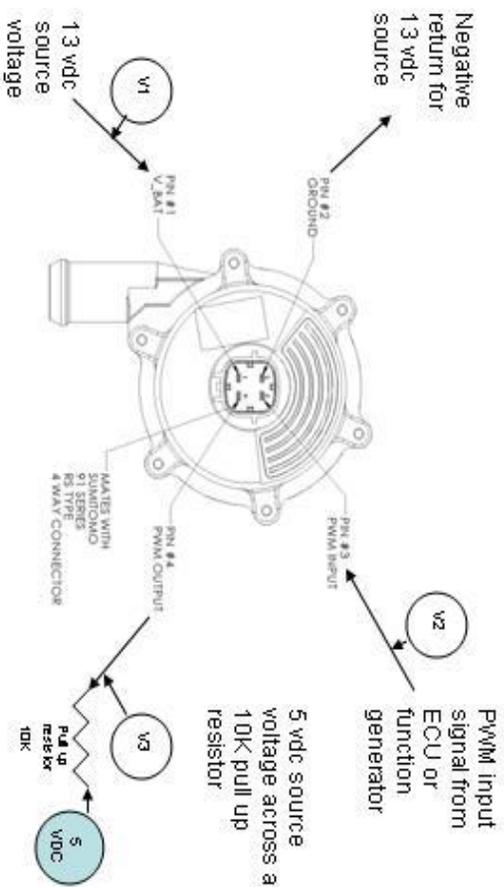
Confidential Information

1

©Cooper-Standard Automotive

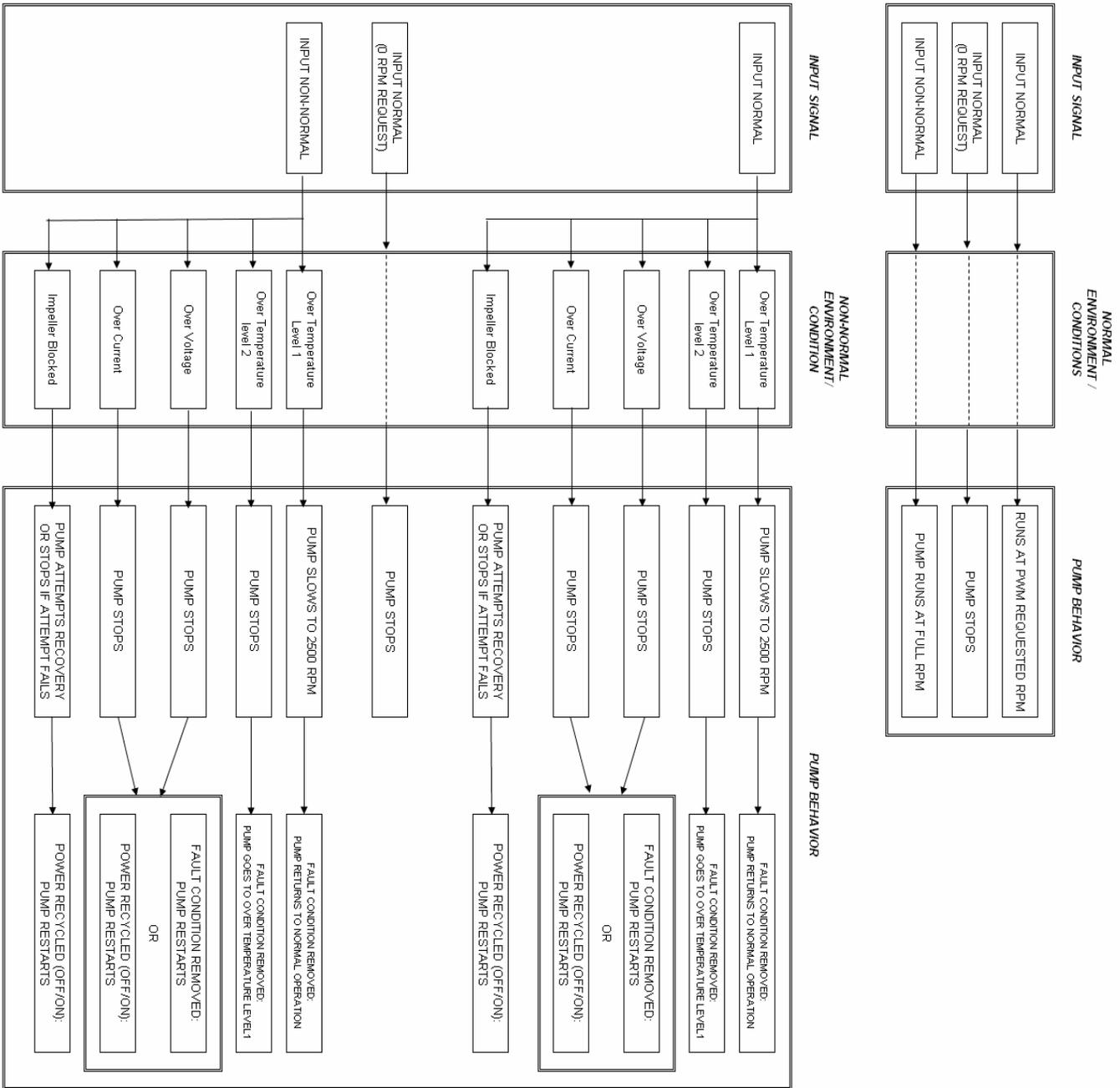


MATES WITH: SUMITOMO SYSTEMS
91 SEALED SERIES STANDARD CONNECTOR F.
FEMALE: RS04F-G-GY PART# 6189-1105 (GREY)
OR RS04 PART# 6189-0929



All grounds must be tied together (PWM generator, 1.3 vdc source, and 5 vdc source)

Operational Diagram

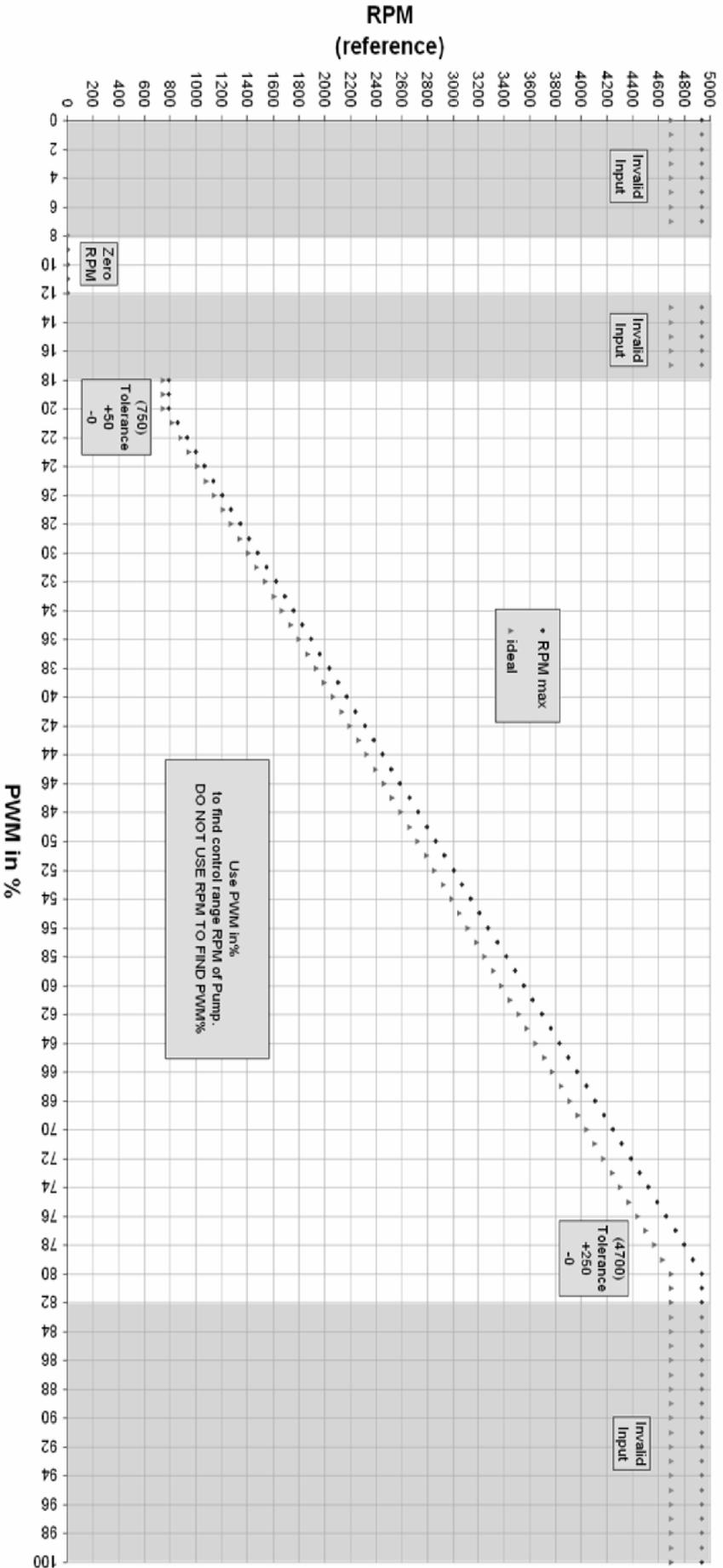


PUMP PRIORITY AND DEFINITIONS

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

PWM in vs RPM correlation
 PWM in range 0-100%



PWM %	Notes
0	not used
1	not used
2	not used
3	supplier code use only
4	supplier code use only
5	supplier code use only
6	supplier code use only
7	not used
8	Zero RPM
9	Zero RPM
10	Zero RPM
11	Zero RPM
12	Invalid Input
13	Invalid Input
14	Invalid Input
15	Invalid Input
16	Invalid Input
17	Invalid Input
18	Considered 20%
19	Considered 20%
20	Considered 20%
21	Considered 20%
22	Considered 20%
23	Considered 20%
24	Considered 20%
25	Considered 20%
26	Considered 20%
27	Considered 20%
28	Considered 20%
29	Considered 20%
30	Considered 20%
31	Considered 20%
32	Considered 20%
33	Considered 20%
34	Considered 20%
35	Considered 20%
36	Considered 20%
37	Considered 20%
38	Considered 20%
39	Considered 20%
40	Considered 20%
41	Considered 20%
42	Considered 20%
43	Considered 20%
44	Considered 20%
45	Considered 20%
46	Considered 20%
47	Considered 20%
48	Considered 20%
49	Considered 20%
50	Considered 20%
51	Considered 20%
52	Considered 20%
53	Considered 20%
54	Considered 20%
55	Considered 20%
56	Considered 20%
57	Considered 20%
58	Considered 20%
59	Considered 20%
60	Considered 20%
61	Considered 20%
62	Considered 20%
63	Considered 20%
64	Considered 20%
65	Considered 20%
66	Considered 20%
67	Considered 20%
68	Considered 20%
69	Considered 20%
70	Considered 20%
71	Considered 20%
72	Considered 20%
73	Considered 20%
74	Considered 20%
75	Considered 20%
76	Considered 20%
77	Considered 20%
78	Considered 20%
79	Considered 20%
80	Considered 20%
81	Considered 20%
82	Considered 80%
83	Considered 80%
84	Considered 80%
85	Considered 80%
86	Considered 80%
87	Considered 80%
88	Considered 80%
89	Considered 80%
90	Considered 80%
91	Considered 80%
92	Considered 80%
93	Considered 80%
94	Considered 80%
95	Considered 80%
96	Considered 80%
97	Considered 80%
98	Considered 80%
99	Considered 80%
100	Not Used

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

Normal run range 750 to 4700 RPM

Considered 20%

Considered 80%

Not Used

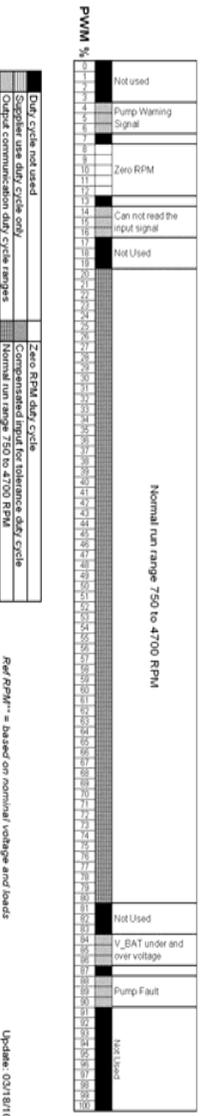
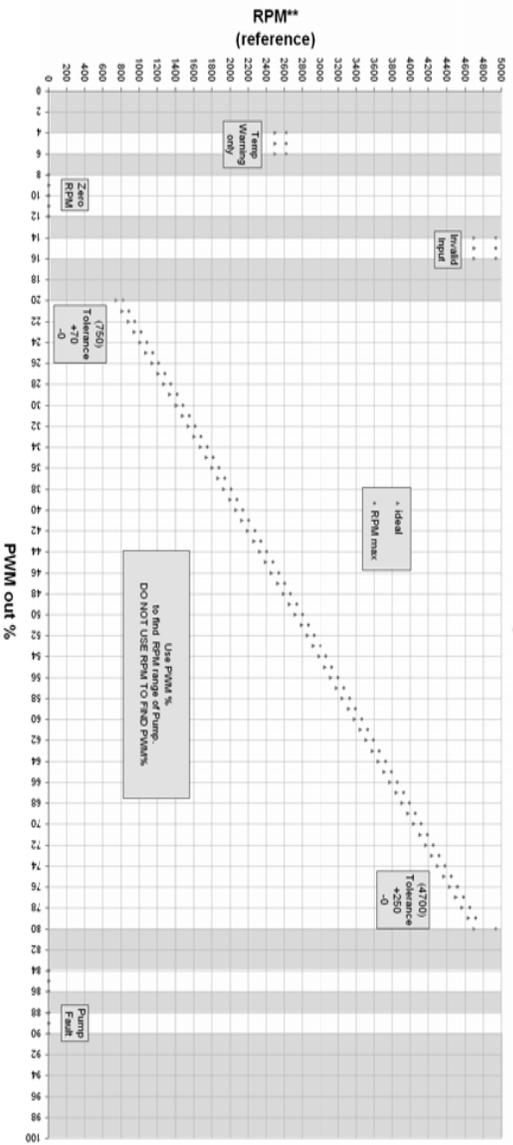
Ref RPM** = based on nominal voltage and loads

Note: drawing is not to scale

Update: 03/18/10

PWM OUT

PWM out vs RPM correlation
PWM out range 0-100%



- 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.