



Fan Performance Sensors

Description

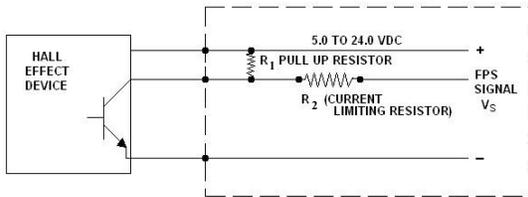
Thermal management of electronic package has become increasingly challenging as package sizes have been decreased and circuit complexity has increased. Provision for continuous supply of cooling airflow through complex systems requires monitoring and remote warning of potential airflow interruption, to avoid critical internal temperature increases within the electronic system.

A Fan Performance Sensor (FPS) equipped fan provides both monitoring and remote warning possibilities. The FPS signal is a digital tachometer and can be used in conjunction with a LSWD (Low Speed Warning Detector). Should fan speed be reduced or interrupted for any reason, these FPS/LSWD systems allow for early warning and detection. Warning procedures can be activated including back-up cooling, visual or audible alarms, system shut down or other warnings.

At the heart of the FPS is a Hall Effect device, which detects the presence of a specific magnetic field associated with an encoded magnet, which is built into the rotor prop. This device emits a pulsed output signal with frequency proportional to the RPM.

Typical FPS Circuit Design and Operation for AC Fans (Consult C Drawing for actual values)

For AC operation, the circuit requires a DC supply in addition to the AC fan power. The FPS signal comes from the Hall Effect device output stage.



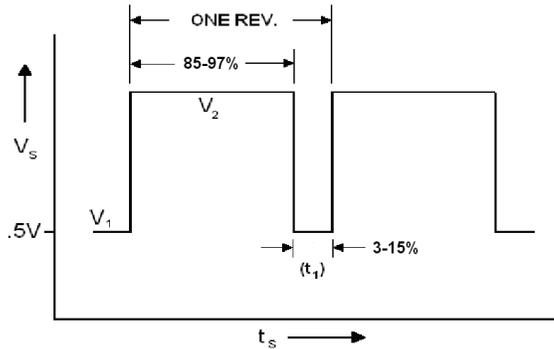
Note: For correct connection information please consult C-Drawing

The Hall Effect device is not protected and resistors R₁ and R₂ are required in customer circuit to prevent short circuit damage to the device when testing or operating without a Rotron LSWD.

TYPICAL RESISTOR VALUES			
VOLTS	WATTS	R ₁ OHMS	R ₂ OHMS
5 VDC	1/8 or 1/4	470	220
12 VDC	1/4	1000	470
15 VDC	1/4	1200	560
24 VDC	1/2	2000	1000

The FPS output of the AC fan is a pulse appearing for approximately one tenth of the time interval to complete one revolution of the rotor (10% Duty Cycle). Thus, in a typical AXIMAX fan operating at 22,000 RPM the pulse width would be 0.27 milliseconds out of a cycle time of 2.7 milliseconds.

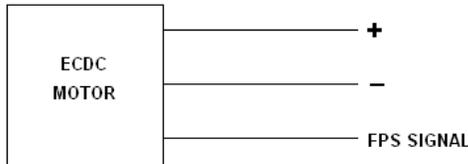
Signal Wave Form



- V_s = 4.5 to 24.0 VDC (Supply Source Voltage)
- V₁ = 1.7 Volts Max
- V₂ = ~V_s
- t₁ = 6000/RPM milliseconds (NOMINAL)
- ONE REV = 60000/RPM milliseconds
- t_s = Time in milliseconds

Circuit Design and Operation for E.C.D.C.™ Operation

The E.C.D.C. product line already has the needed Hall Effect device incorporated as an integral part of the commutating circuit.

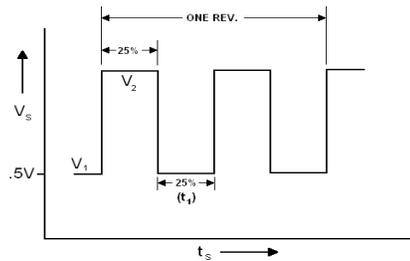


Note: For correct connection information please consult C-Drawing

SOME TYPICAL FPS SIGNAL VOLTAGES (V ₂)	
Fan Input Voltages	FPS Signal Voltage
12 VDC	10 VDC
24 VDC	11 VDC
26 VDC	5 or 12 VDC
28 VDC	5, 12, or 14 VDC
48 VDC	5 or 12 VDC

The square wave pulse (50% duty cycle) is a simple on, off pulse changing at 90° or 180° intervals within each revolution of the motor.

Signal Wave Form



- V₁ = 1.7 Volts Max
- V₂ = 5-14 Vdc (Model Dependent - See C-Drawing)
- t₁ = 15000 / RPM or 30000/ RPM milliseconds (NOMINAL)
- Due to many variants it is important to consult actual model drawing. Specifications subject to change without notice*