

## << PELKO'S FAN SPEED CONTROLS >>

It is often necessary for the user of the fan to be able to vary the fan speed for one or more of the following reasons:

1. To reduce the fan noise and meet the cooling and noise requirement of his application.
2. To increase the life of the fan by minimizing the fan speed at times when reduced airflow is sufficient for his application.
3. To automatically vary up/down the fan speed according to ambient in order to maintain the safe operating temperature of the target equipment.
4. To run the fan at multiple preselected fan speeds for cooling in an automated system process etc.

### FAN SPEED CONTROL METHODS

The common ways that control information is transferred to the fan VIA input wire are:

1. By VOLTAGE signal – (V)
2. By CURRENT signal – (I)
3. By RESISTOR reacting to TEMPERATURE (Thermistor) – (T)
4. By PASSIVE RESISTOR variable manually – (R)
5. By external PWM signal – (P) (pulse width modulated signal) which is very common and is generated by computer according to its software instructions.

PELKO fans can accept any of the above control input methods, then convert this input information to their own internal PWM signal that controls the fan speed.

Therefore, the fan is controlled internally by its own PWM signal, but for the purpose of association with the input method, we name each control method starting with the excitation used (V, I, P, T, R) and the control methods are:

a) VPWM, b) IPWM, c) PPWM, d) TPWM and e) RPWM

The RPM vs Control signal graphs, shown in next page "**M**" functions, are simply examples of typical application requests with basically ONE limitation.

This limitation deals with the minimum speed a fan can operate and which is in general 20% (for most fans) of its maximum speed.

Note that some smaller fans can achieve lower minimum speeds down to 12% of their rated speed.

The fan speed can have a POSITIVE SLOPE of change (i.e. the speed can be increasing as the input voltage signal increases) or it can have a NEGATIVE SLOPE of change (i.e. the speed can be decreasing as the input voltage signal increases).

Note that negative slope is not available with TPWM, because the temperature sensing element is NTC (negative temperature coefficient).

The GAIN of the slope (how fast or how slow is the required change of the fan speed) or the restriction of the maximum speed if required, can be controlled by the CS function.

Typical inputs are: 0~5VDC for VPWM, 4~20 mA for IPWM, 0~100% modulation for PPWM, 104J NTC type for TPWM and 10K~100K variable resistor for RPWM.