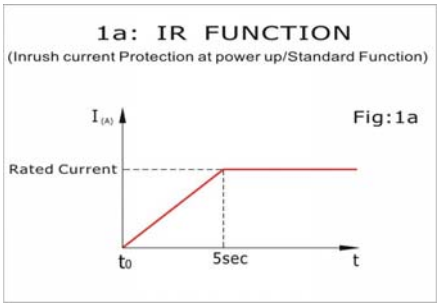
NEW!!

PELKO Motors, in its effort to supply Fan Motors with superior performance and unique functions introduces a new series of products that can satisfy even the most demanding users. Fan sizes starting from 60mm and up are available with the following functions.

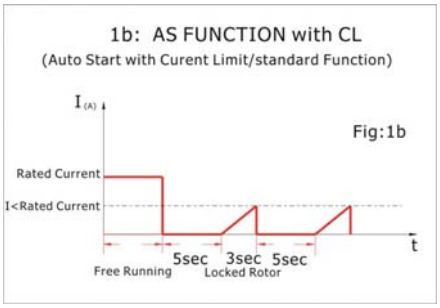
1a. "IR" function (Inrush Current Protection).

When the power switch is turned on to supply current to the fan, the current is zero and starts to increase gradually until the fan has achieved its maximum speed and the rated current. The maximum current at start up is equal to the free running current (or less in case the rotor is locked at start up). The fan will achieve the rated speed within 5 seconds (see Fig. 1a).



1b. "AS" function (Locked rotor protection and restart with Current Limit).

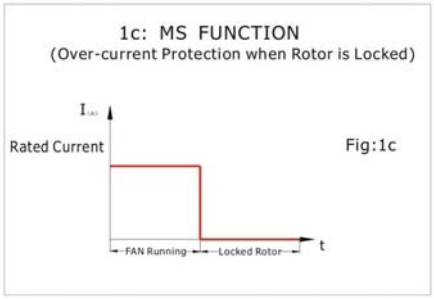
Auto Start function ensures that the fan motor will automatically restart in case the blade is blocked and then it is released. When the rotor is locked, the fan current is reduced to zero and the fan is trying every 5 seconds to restart with soft start by reverting to the IR function (see Fig. 1b).



1c. "MS" function (Locked rotor protection) {Built in, no wire indication}

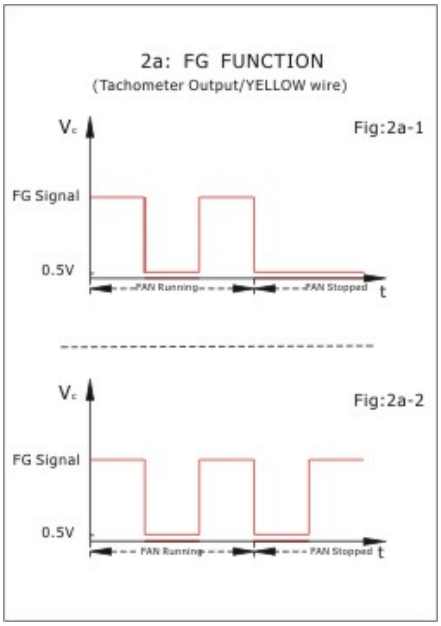
The current is reduced to zero when the rotor is locked. To restart: turn the power OFF and ON again. (See Fig. 1c)

This function is limited to some high power models only.

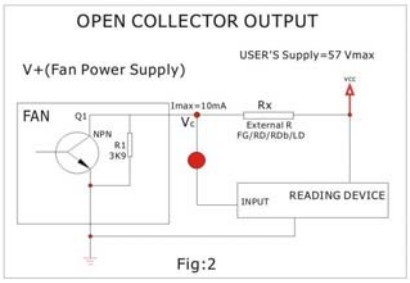


2a. "FG" function (Frequency Generator or Tachometer Output) {YELLOW wire}

This is an open collector output which provides a square wave signal if this open collector output is connected to a "PULL UP" resistor and is powered by the power supply voltage which is compatible with the input of the reading device (such as TTL input of the computer etc.). The maximum collector voltage maybe up to 72VDC and the maximum collector current is 10mA. The power supply of the reading device must have the same ground potential as the fan (see Fig. 2a-1 and Fig. 2a-2).

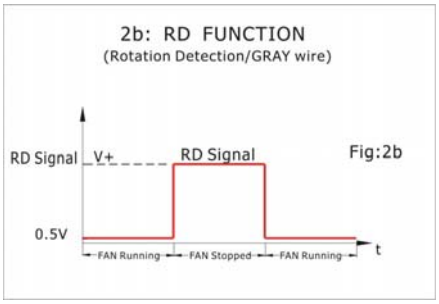


The open collector output may also be protected internally by a 3K9 resistor from collector to ground (see Fig. 2).



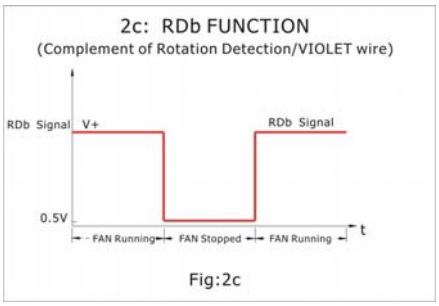
2b. "RD" function (Rotation Detection function) {GRAY wire}

This is an open collector function with the same hardware as the FG function mentioned above (See Fig. 2). The output signal is LOW when the fan is Rotating and it is set HIGH when the fan is stopped or it is powered OFF (see Fig. 2b).



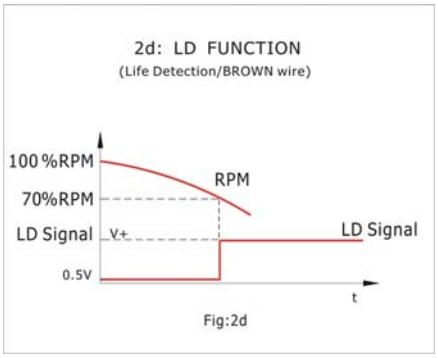
2c. "RDb" function (complement of Rotation Detection Signal) {VIOLET wire}

This is an open collector function with the same hardware as the FG function mentioned above(See Fig. 2). The output signal is HIGH when the fan is Rotating and it is LOW when the fan is stopped (see Fig. 2c). This output can be connected in parallel to the RDb of an array of fans ending to a single alarm device to warn in case any one fan has stopped.(See article about MULTIFAN ALARM for connection)



2d. "LD" function (Life Detection Function) {BROWN wire}

This is an open collector function with the same hardware as the FG function mentioned above(See Fig. 2). The output signal is LOW when the fan is rotating normally and it is HIGH when the fan speed is rotating below 70% of its rated target speed. The reasons of slow rotation maybe aging or reduced power supply voltage (see Fig. 2d).



3. "SG/PPWM" function (Stop/Go Pulse Width Modulation) {BLUE wire}

This is an input function with the purpose of controlling the fan speed. The fan current is reduced to zero when the input signal is HIGH and the fan current is normal when the input signal is zero or if this input is left OPEN.

This function is available as a simple SG function with ASYNCHRONOUS speed control applicable to frequency signals in the order to 200~300Hz. The ASYNCHRONOUS input signal may be HIGH or LOW at the switching edges of the fan coil current. A more elaborate SYNCHRONOUS SG/PWM low noise function is available (function #8). Typical RPM vs SG/PWM is shown in Fig 3. For low power fans the SG signal frequency maybe up to 5KHz.

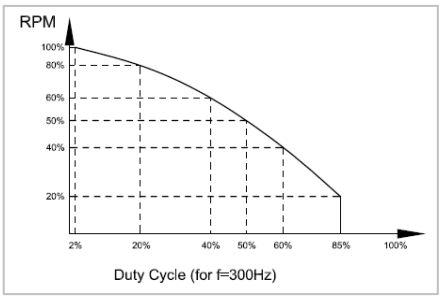


Fig.3

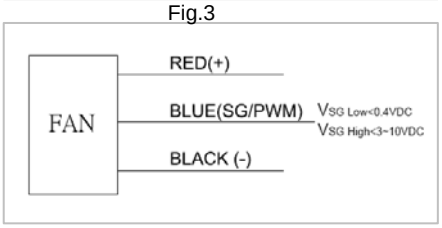
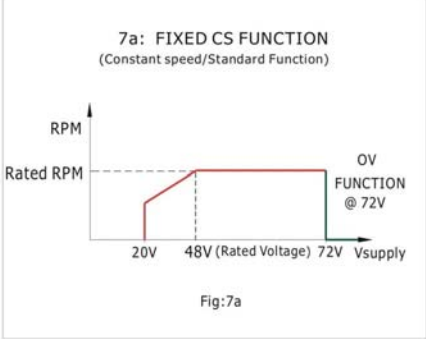


Fig.3w SG/PWM Wiring Diagram

4. "OV" function (Over-Voltage protection) {Built in, no wire indication}

This function detects the power supply voltage and allows operation up to the rated maximum operating voltage.
Typically the maximum operating voltage (unless otherwise specified) is 20% over the specified rated voltage.
If the power supply voltage increases over the 20% limit the fan will stop running and the power supply current will be reduced essentially to zero. The maximum over-voltage protection range is twice the value of the rated voltage. For example if the rated voltage is 24V, the maximum voltage that can be applied accidentally is 48V. Likewise for a 12V fan the maximum applied



over-voltage is 24V (See Fig.7a).

5a. "TPWM" function (Automatic Temperature Control) {GREEN wire}

When this function is applied, the upper and lower temperatures may be selected as well as the choice of maintaining
minimum RPM below the minimum temperature chosen. The CS (constant speed), IR (Inrush Protection) and CL (Current Limit) functions are included.

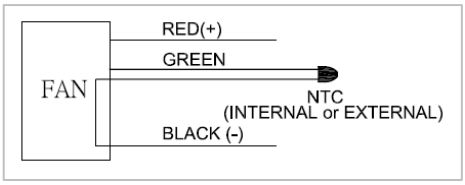


Fig.5w-1 TPWM Wiring Diagram

The NTC is of the 104J (100K @ 25 °C) type and is included with the fan (either "built in" or external). The part # is followed by additional identification entry such as: **TPWM 30 55 20 100 A 400**: This means that the fan speed will be 800 RPM (20%) at 30 °C and 4000 RPM (100%) a t 55 °C . Furthermore, the fan will maintain the minimum speed of 800 RPM below the temperature of 30 °C (Mode "A" operation). Please note that for safety reasons if the NTC is OPEN or SHORTED the fan will run at its maximum speed. (Fig 5a-A, 5a-B, 5a-C show the 3 available modes of control.)

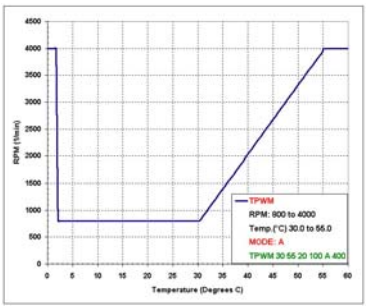


Fig.5a-A: Mode A

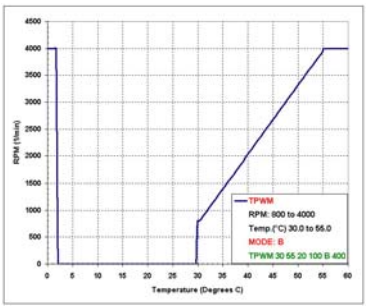


Fig.5a-B: Mode B

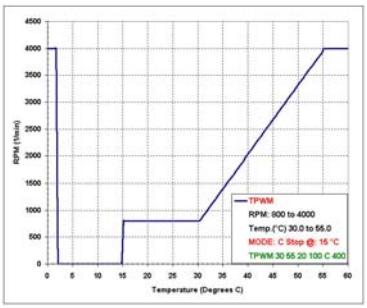


Fig.5a-C: Mode C

5b. "RPWM" function (Manual Variable Resistor Control) {ORANGE wire and WHITE wires}

With this function the speed can be controlled using an external variable resistor. This resistor may have any maximum value from 10K to 100K. The fan speed will vary linearly and is proportional to the % change of the resistor value, corresponding to the same % change of the maximum speed. The CS (constant speed), IR (Inrush Protection) and CL (Current Limit) functions are included.

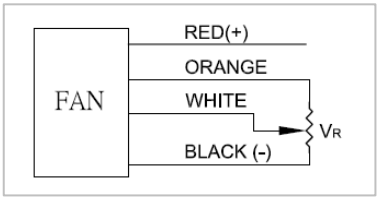


Fig.5w-2 RPWM Wiring Diagram

The part # is followed by additional identification entry such as: **RPWM 20 100 20 75 B 400**: This means that if VR=100K, the fan speed will be 800 RPM (20%) at VR =20K and 3000 RPM (75%) at VR =100K. Further more, the fan will stop if VR <20K (Mode "B" operation). The maximum fan speed is 4000 RPM.

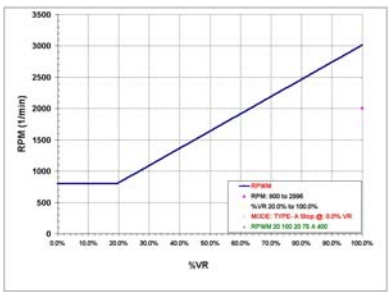


Fig.5b-A: Mode A

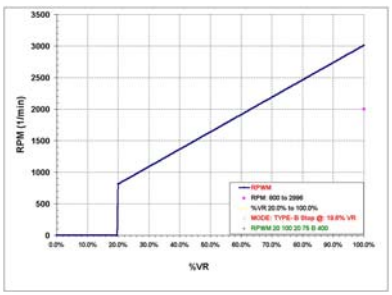


Fig.5b-B: Mode B

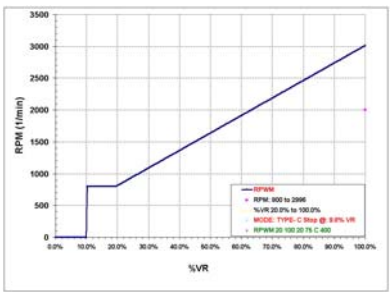


Fig.5b-C: Mode C

6. "CL" function (Current Limit under locked rotor is "built in" no wire indication)

With this function the current is limited during the restart period. (See Fig. 1b and Fig. 6).

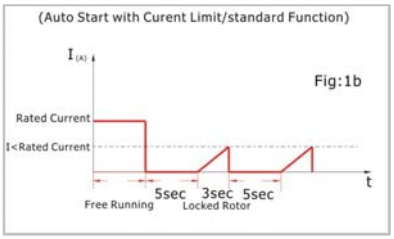
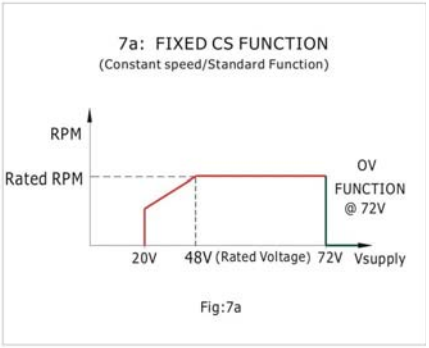


Fig.6 AS Function with CL (Current Limit)

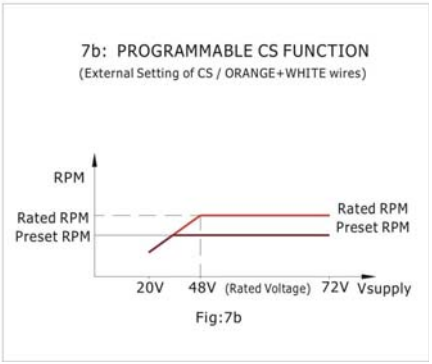
7a. FIXED "CS" (Constant Speed is "built in" and is standard, no wire indication)

This is a very important function because it allows the fan motor to operate safely over a very large power supply voltage range. For example if the fan motor is designed to run at 4200 RPM at the rated voltage of 48 Volts, the fan motor will maintain the same RPM even when the supply voltage varies from 48 to 72 volts. The fixed CS function is preset internally and the maximum RPM is the rated RPM. (See Fig. 7a)



7b. PROGRAMMABLE "CS" with external components. {ORANGE + WHITE wires}

This function can be implemented by the use of the RPWM function. For example if the external resistor is made up by a 82K and a 18K resistors, then the center point of these resistors can be the input which will determine that 82% of the rated speed will be the maximum speed of the modified fan (of course if the resistor ends are reversed then 18% of the rated speed will be the new maximum speed). The resistor ends are tied to the ORANGE and BLACK wires and the center point is tied to the WHITE input wire. A very important use of this function is to overcome system impedance variations. The fan can be programmed to run at 20% lower of the rated speed at zero pressure. When the fan's static pressure is increased the fan will be able to maintain the same speed under maximum pressure, thus becoming immune to system impedance variations. (See Fig. 7b-w and 7c for the resulting PQ graph)



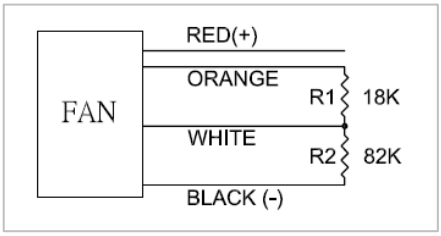


Fig.7b-W Programmable "CS" with External Components

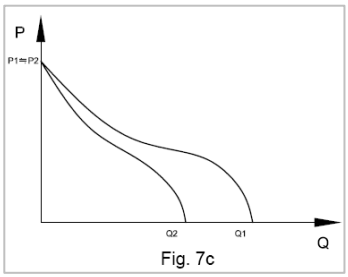


Fig. 7c

Q1 is the maximum airflow without CS adjustment.
Q2 is the maximum airflow reduced with R1 and R2 setup.
P2 can equal to P1 when the maximum speed is selected to set Q2 at about 80%.

8a. "VPWM" function (DC Voltage Signal Control) {WHITE wire}

With this function the speed can be controlled by applying an external DC Voltage signal. This voltage input "Vin" may have any value from 1V to 10 V (standard value is 1 to 5V). The fan speed will vary linearly and is proportional to the % change of the "Vin" value, corresponding to the same % change of the maximum speed. The CS (constant speed), IR (Inrush Protection) and CL (Current Limit) functions are included. The part # is followed by additional

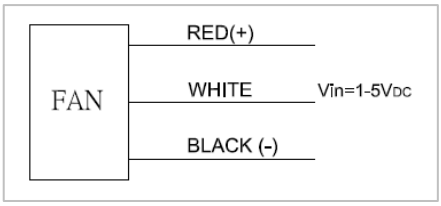


Fig.8a-w VPWM Wiring Diagram

identification entry such as: **VPWM 1 5 20 100 C 500**: This means that the fan speed will be 1000 RPM (20%) at 1 V and 5000 RPM (100%) at 5 V . Further more, the fan will maintain the minimum speed if Vin <1 V and it will stop if Vin < 0.5 V (Mode "C" operation). The maximum fan speed is 5000 RPM, and the stop point is typically set at 10% of maximum. (See Fig 8a-A, 8a-B, 8a-C)

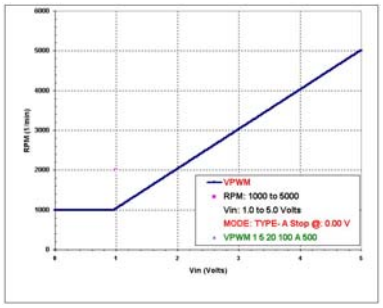


Fig.8a-A: Mode A

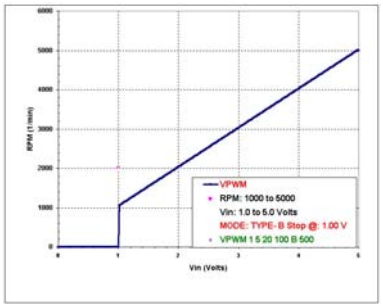


Fig.8a-B: Mode B

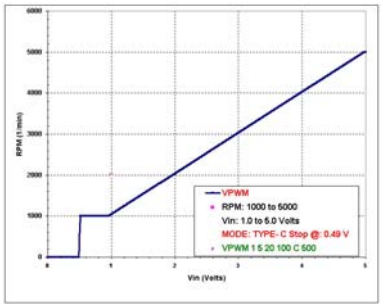


Fig.8a-C: Mode C

8b. "IPWM" function (Current Source Signal Control) {WHITE wire}

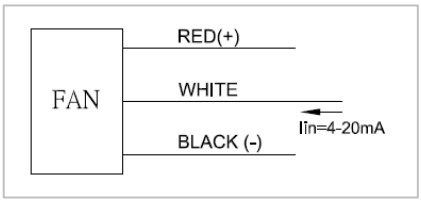


Fig.8b-w IPWM Wiring Diagram

With this function the speed can be controlled by applying an external Current Source Signal. This current input "Iin" may have any value from 4 mA to 50 mA (standard value is 4 to 20mA). The fan speed will vary linearly and is proportional to the % change of the Iin value, corresponding to the same % change of the maximum speed. The CS (constant speed), IR (Inrush Protection) and CL (Current Limit) functions are included.
The part # is followed by additional identification entry such as:
IPWM 4 20 20 100 A 500: This means that the fan speed will be 1000 RPM (20%) at 4mA and 5000 RPM (100%) at 20mA . Further more, the fan will maintain the minimum speed if Iin <4mA (Mode "A" operation). The maximum fan speed is 5000 RPM. (See Fig 8b-A, 8b-B, 8b-C)

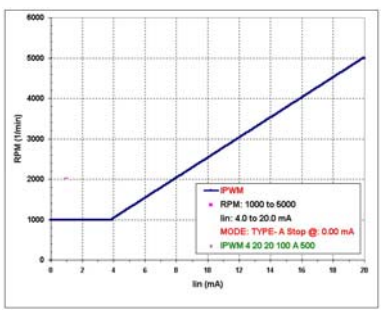


Fig.8b-A: Mode A

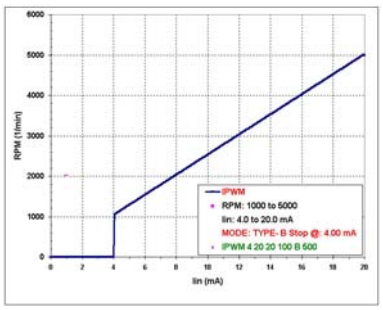


Fig.8b-B: Mode B

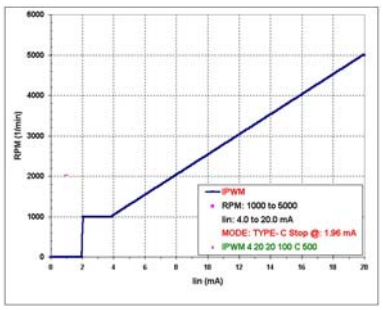


Fig.8b-C: Mode C

8c. "PPWM" function (Pulse Width Modulation Signal Control) {BLUE wire}

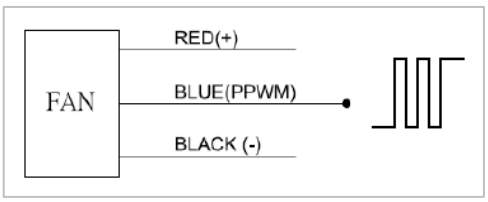


Fig.8c-w PPWM Wiring Diagram

With this function the speed can be controlled by applying a pulse width modulated signal whose frequency maybe in the range of 30 Hz to 30 KHz and the max. pulse height "HIGH" maybe from 3 V to 10 V. The maximum pulse height "LOW" is 0.8 V. The fan speed will vary linearly and is proportional to the % change of the Duty Cycle value, corresponding to the same % change of the maximum speed. The CS (constant speed), IR (Inrush Protection) and CL (Current Limit) functions are included.
The part # is followed by additional identification entry such as: **PPWM 20 100 20 100 A 300**: This means that the fan speed will be 600 RPM (20%) at 20% Duty Cycle and 3000 RPM (100%) at 100% Duty Cycle. Further more, the fan will maintain the minimum speed if the Duty Cycle is less than 20% (Mode "A" operation). The maximum fan speed is 3000 RPM. (See Fig 8c-A, 8c-B, 8c-C)

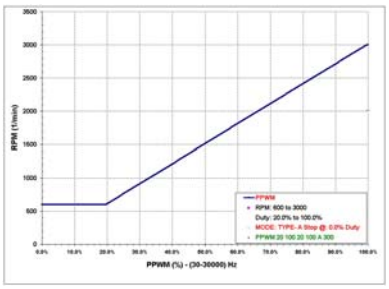


Fig.8c-A: Mode A

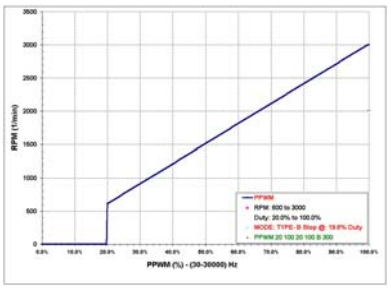


Fig.8c-B: Mode B

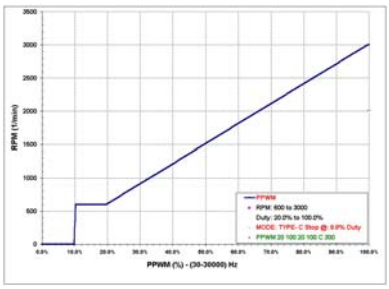


Fig.8c-C: Mode C

Multi-Alarm Connection

When many fans are used (usually in a fan tray) for an application, it is important to monitor the proper running state of the fans. It is practical to have a single alarm (sound or light) that will indicate if any of the fans has stopped running. ***PELKO Motors*** can provide every fan with the RDb function in order to combine the multi-alarm function to a single alarm indicator.

The diagram below shows the way to connect the multi-alarm.

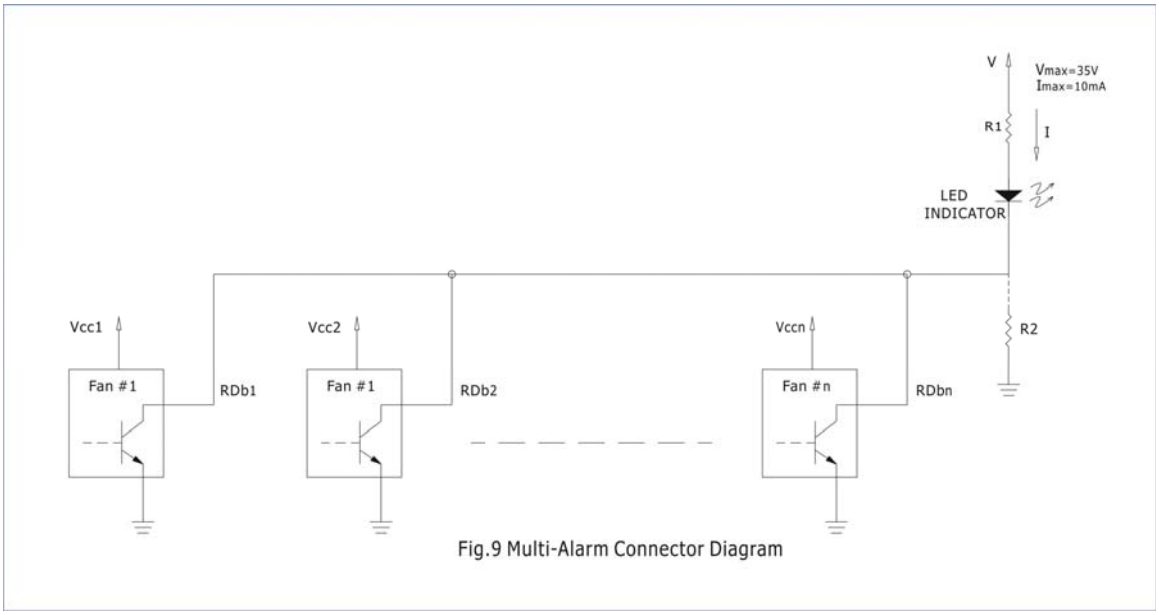


Fig.9 Multi-Alarm Connector Diagram

Any number of fans of any ***PELKO*** model equipped with the RDb function can be cascaded (maximum 100 fans).

NOTES: Resistor R2 maybe added if the customer wants to connect to a voltage higher than 35V for his alarm signal.