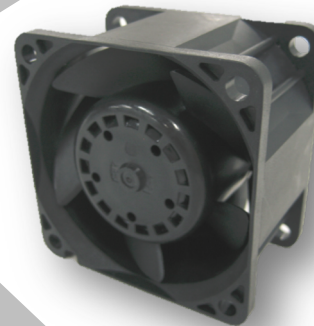


PWM NPI Fan Introduction

NMB



NMB Technologies Corporation
A MinebeaMitsumi Group Company



PWM NPI Fan Agenda

- PWM and 10 questions about it
- NPI PWM Fan Line up
- Benefits
- Applications
- Options available

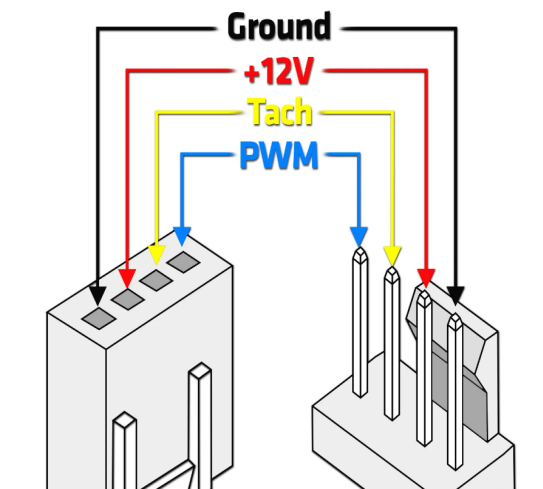
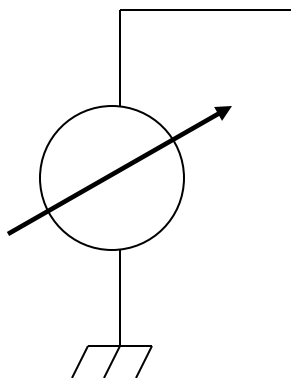
Existing Fan Control Capabilities

SPEED CONTROL

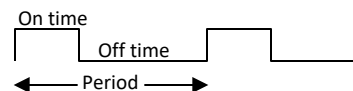
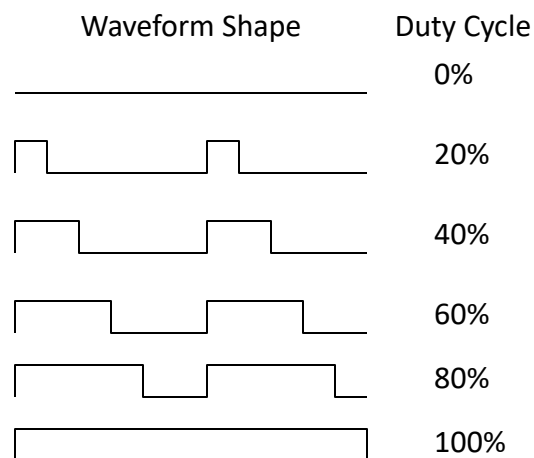
Thermistor



Voltage Control



PWM Control



10 Questions you always wanted to ask about PWM driven fans but were afraid to ask!

1. **What is PWM?** Pulse Width Modulation
2. **How does it works?** PWM operates like a switch which constantly cycles on and off, thereby regulating the amount of power the fan gets, typically requires a 4 wire fan
3. **What are the advantages?** Power loss close to zero, lower noise, lower power consumption, lower vibration, extended life time and reliability
4. **So any disadvantage?** Higher cost than 2 or 3 wire fans
5. **What is the cost difference?** Relative, depending on size, production qty, but a ball park adder is \$1.50 to \$2.00
6. **I heard some customers use PWM with 2 or 3 wire fans is it true?** Yes, but as all fan vendors we do not recommend or guarantee it will work. Using a 4 wire fan is best in terms of reliability and performance

10 Questions you always wanted to ask about PWM driven fans but were afraid to ask!

7. **Is there a standard PWM profile?** PWM can be customized to according to customer's requirement; however, certain profiles are more prevalent or quasi "standard". NMB uses typically two standard ones.

8. **Is it true that PWM fans are only used for computers and servers?** This is how PWM fans originally got started but now more and more design engineers have learned the advantages and the use of PWM fans is becoming more prevalent in many applications including refrigeration, welders, food service, medical equipment, etc, etc.

9. **How many PWM fans does NMB offer?** Hundreds of models are available, but in distribution channel we have a limited amount included these new ones

10. **Who can help me design PWM fans?** NMB Reps, FAE's and Product Mgrs are available to help out as needed

PWM NPI Fan Overview

- 11 x 12Vdc Models – 40 mm to 119 mm
- 2 x 24Vdc Model: 92x25mm and 120x38mm
- 2 x 48Vdc Models: 172x150x50mm and 172x172x50mm
- All comes with standard Open Collector Tach Output (White wire)
- All comes with PWM input with 4 lead wires (Brown wire)

PWM NPI Fan Lineup

15 Models total from 40mm to 172mm

NMB P/N	Size (mm)	Width (mm)	Rated Voltage (Vdc)	RPM	Air Flow (CFM)	Pressure (Inch H2O)	Power (W)	Noise (dBA)
04028DA-12S-AUF-AA	40x40	28	12	22,000	24.7	2.75	9.36	58.5
04028DA-12T-AKH-AQ	40x40	28	12	26,500	36.0	4.25	18.60	66.5
04056EA-12R-EUB-2	40x40	56	12	20,000/18,000	30.3	3.10	15.60	69.0
06025DA-12R-AU-02	60x60	25	12	11,000	45.6	1.17	8.04	52.0
06025SA-12T-AU-D3	60x60	25	12	7,500	37.8	0.64	5.16	47.0
06025VA-12Q-AU-03	60x60	25	12	9,200	39.2	0.98	6.00	54.0
06038DA-12S-EWF-D	60x60	38	12	17,000	73.1	3.56	27.60	66.5
08025DA-12N-EU-02	80x80	25	12	5,000	51.2	0.42	2.64	45.0
08038RA-12Q-EU-04	80x80	38	12	6,500	91.8	1.04	13.80	56.0
08038DA-12S-EWE-6	80x80	38	12	15,000	118	4.32	46.80	74.0
09225VE-24L-CU-02	92x92	25	24	3,700	63.6	0.28	3.36	38.5
11925SA-12R-EUD-1	119x119	25	12	3,500	128.2	0.36	7.44	47.0
12038VA-24R-FU-06	120x120	38	24	6,400	243.7	1.49	35.52	64.0
15050VA-48N-EU-01	150x172	50	48	3,500	261.3	0.74	21.60	60.0
17250VA-48R-EU-01	172x172	50	48	4,600	346.1	1.25	43.2	62.0

PWM Benefits

- Allows fan performance to be tailored for the application and operating conditions
- Offers design flexibilities
- Standardizes fan selection across different platforms with common fan P/N
- Reduces fan noise
- Lowers fan vibration
- Reduces power consumption and energy costs
- Reduces current surge with soft PWM ramp up
- Prolongs fan life
- Reduces total operating cost for project

PWM Fan Applications

- Routers
- Switches
- Storage
- Data Centers
- Optical Repeaters
- Broadcast Equipment
- Inverters
- UPS
- Medical Equipment
- Battery Chargers
- Fuel Cells
- Industrial Power Supplies
- Welders / Plasma Cutters
- HVAC
- Instrumentation
- Test Equipment
- Appliances
- Motor controls
- Robotics
- Enclosures & more!

Options

- NMB offers value added options for all our fans including:
 - Connectors
 - Heat shrink
 - Special wire length
 - Brackets
 - Special Labels
 - Dual fan assembly
 - Fan guards
 - Vibration isolators etc
- *MOQ will apply – pls contact NMB or local sales rep/