

**Overview**

AirCare Full Feature EC™ ACM1021 for NIDEC smart-motors is a robust variable-speed controller intended for brushless DC (BLDC), electrically-commutated (EC) motors. The ACM1021 Series combines intelligent speed control with industry standard MODBUS® networking. The versatile design allows for analog (0-5V or 20mA current loop) or network control input and analog or tachometer feedback. Precise control is possible over a wide speed range (1-100%).

ACM1021 closed-loop control (CLC) capability supports a wide range of sensors such as air pressure, air flow and temperature. In closed-loop mode, ACM1021 adjusts motor speed to converge the value of a selected feedback source to the set-point value.

**ACM1021 control options include:**

- o Onboard/External manual adjust
- o Analog 0-5,10V or 0,4-20mA signal from a sensor, potentiometer, or controlled voltage source
- o Motor tach RPM control
- o MODBUS RTU RS485 control (stand-alone or networked)

**Specifications**

- Simple connections
  - o 4 Pin MTA for motor control signals
  - o 2 Pin MTA for external fault LED
  - o RJ45 for networking
  - o 2 Pin terminal for power input
  - o 3 Pin terminal for analog inputs
  - o 3 Pin terminal for accessory output voltage
- LED diagnostics
  - o Board Status
  - o Network traffic
  - o Fault condition
- Multimeter Outputs
  - o mVDC Setpoint
  - o mVDC RPM Feedback
- Industry standard MODBUS Networking
  - o RTU Protocol
  - o RS485 9600,8,n,1
- Flexible analog control options
  - o 0-5,10V source
  - o 0,4-20mA source
  - o Manual Speed Adjust
  - o Sensor with 0-5,10V output
  - o Internal closed-loop control
- PWM Speed Command Signal
  - o 10V, 80Hz
- TACH Motor Speed Input
  - o 10V @ 1mA needed switched to ground.
  - o Maximum 5000 RPM measured
  - o Minimum 60 RPM measured
- Powered from Network or Local Supply
  - o 12-24V AC or DC
- OEM module
  - o Open-frame PCB with standoffs
  - o Panel mounted
  - o 0-40°C operating temperature



**Installation**

ACM1021 gets its low voltage power from a 12-24V DC supply or AC transformer.

Two RJ45 jacks provide In/Out connections for network cables. Like the AirCare VariPhase™, the ACM1021 is daisy-chained using CAT5 patch cables.

Please see the ACM1021 Advanced Technical Manual for further installation options and details.

**Table 1** ACM to NIDEC - ECM Cable Control Wiring

ACM1021 Controller			
J1 Pin	Ref	Type	Function
1	ENBL	OUT	Motor Enable
2	TACH	IN	Feedback
3	COM	REF	Common
4	PWM	OUT	Speed

**Motor Control Port J1 Connectors**

The J1 motor control port connector is a 4 position 0.1” Amp/TE MTA-100 Style Header.

Part Numbers:

- 22AWG: # 3-643813-4 (RED)
- 24AWG: # 3-643814-4 (WHT)
- 26AWG: # 3-643815-4 (BLU)
- 28AWG: # 3-643816-4 (GRN)

**Mating connector for ACM1021 for NIDEC ECM Motor:**

Flying leads are used to connect to a NIDEC fan

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### Electrical & Environmental Ratings

The ACM1021 Series accepts bias power from external, isolated AC or DC sources.

**Table 2** Electrical & Environmental Ratings

Parameter	Min	Typical	Max	Units
Input Voltage, AC, 50/60Hz	12 <sup>1</sup>		28 <sup>1</sup>	V AC
Input Voltage, DC	14		30	V DC
Operating Current, AC		35		mA AC
Operating Current, DC		30		mA DC
Accessory Current 5V,10V			50 <sup>3</sup>	mA DC
Accessory Current, V.RFU <sup>2</sup>			100 <sup>3</sup>	mA DC
Ambient Operating Temp	0		40	°C

<sup>1</sup> AC voltage spec refers to *actual AC voltage values*, i.e., not transformer ratings, etc.

<sup>2</sup> V.RFU is rectified and capacitive-filtered, but is unregulated.

<sup>3</sup> Maximum current values stated in support of a single connected load.

**Table 3** "Stand Alone Operation" Power Source Ratings

Parameter	Min	Typical	Max	Units
Supply Transformer Voltage Rating	12	18-24	24	V AC
Supply Transformer Power Rating	2			VA
Regulated DC Supply Voltage Rating	14	18-24	30	V DC
Regulated DC Supply Power Rating	2			Watts

These values assume no accessory current demand.

### Increased Accessory Current

Accessory output currents may be increased under the following conditions.

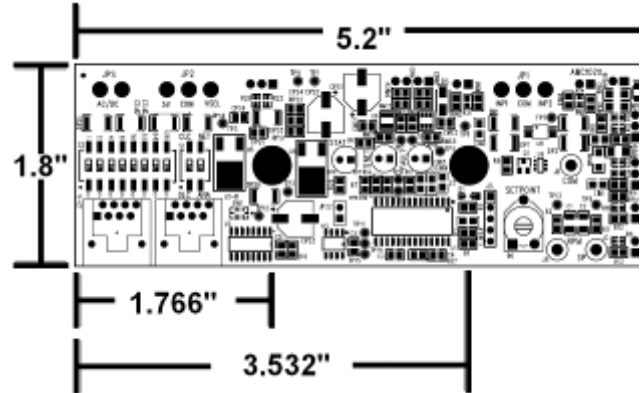
**Table 4** Extended Accessory Output Currents for Stated Input Voltage Condition

Input Voltage	Accessory Current, DC mA <sup>2</sup>			Suggested AC/DC Source Power Rating
	5V	10V	V.RFU	VA
14VDC Regulated	300	300	500	20,20,30
30VDC Regulated	50	50	500	10,10,60
12VAC <sup>1</sup> Transformer	100	100	100	5,5,5
28VAC <sup>1</sup> Transformer	50	50	200	10,10,25

<sup>1</sup> AC voltage spec refers to *actual AC voltage values*, i.e., not transformer ratings, etc.

<sup>2</sup> Current values stated in support of a single connected load.

### Mechanical Dimensions



#8 or #10 1.5" screw used to mount to panel

