

Application

The ECM-ACU control allows industry standard 0-10 Vdc controllers to adjust and monitor Carnes Eco-Drive motor. These are fractional horsepower, air moving motors driven by an internal microprocessor. The design provides exceptional efficiency, performance and motor life. The Carnes ventilator motor is configured by the manufacturer to provide constant torque.

The ECM-ACU allows remote adjustment of the ventilator's output from 0% to 100% of the motor's available torque. Adjusting the torque output of the motor gives the customer the ability to fine-tune the performance of the ventilator. The ACU can also be field-configured to allow permanent or temporary manual operation at the fan. These options aide the fan balancing process and can keep the fan running if the automation system fails or requires service.

Specifications

Power: NEC Class II Only
 24 Vac ± 20% 50/60 Hz
 2 W, 4 VA + 1VA per Motor

Control Signal (In): 0-10 Vdc = 1% to 100%

RPM Signal (Out): 0-10 Vdc, 10 mA max.*

Connections 1/4" Quick Connect Flag Terminals

*RPM feedback signal not available on 1/10th HP EC Motor.

Signal Lamp

The red "Status" lamp indicates the presence of a signal to the controller whether it be from the 0-10 Vdc control or from the manual "Adjust" potentiometer.

The green lamp continuously indicates the flow index. The lamp flashes the tens digit first and the units digit second, followed by a pause. Long flashes represent the tens digit and rapid flashes represent the units digit. For example, an index of 35 is given by three long flashes and five rapid flashes. The index number will be from 1 to 99. If the flow index is 100, you will see one extra-long flash followed by ten rapid flashes.



ECM-ACU (V999-5224)

Wiring

When chosen as an option on a Carnes ventilator, the ACU controller comes installed in an enclosure, wired and ready for use.

You may choose to provide your own 24 Vac power to the controller if you desire. If you provide your own 24 Vac, use an NEC Class II power limited transformer. Refer to NEC 725.41. Observe all applicable code requirements and follow safety practices pertaining to low voltage power supplies and circuits for a proper installation.

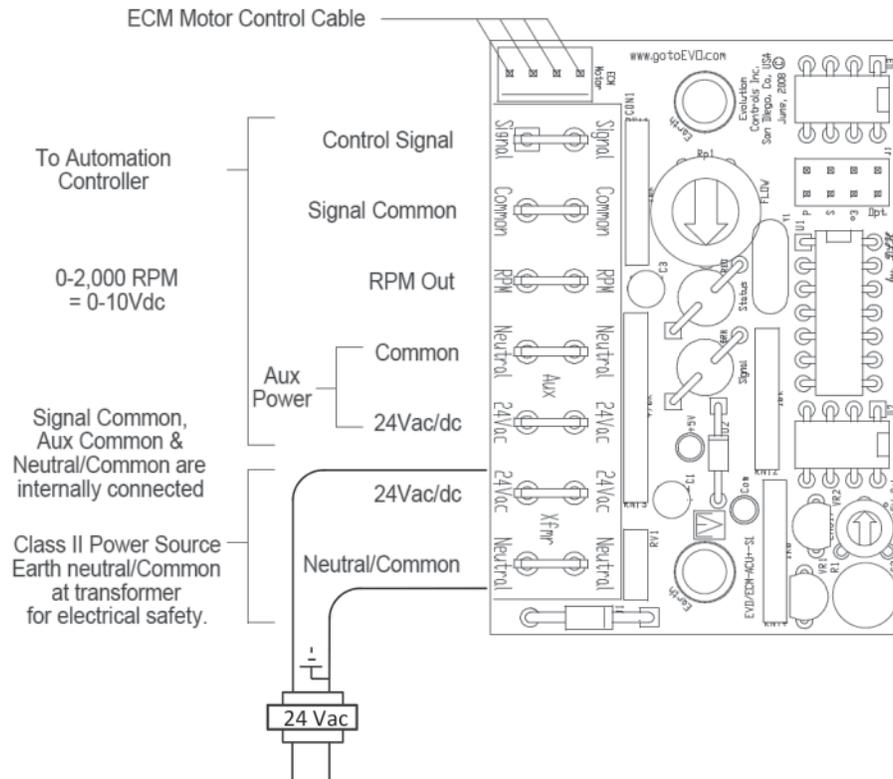
- Earth one lead of the 24 Vac side of the transformer. Connect this lead to the "NEUTRAL" tab on the ACU board.
- Connect the hot side of the 24 Vac transformer to the "24 Vac" tab on the ACU board.
 - You may interrupt this connection as a means of turning the ventilator off.
- Connect the 0-10 Vdc signal line (+) to the "SIGNAL" tab on the ACU board.
- Connect the 0-10 Vdc common line (-) to the "COMMON" tab on the ACU board.

NOTE: The signal input is single-ended. So, the Signal Common and both Power Neutral tabs are internally connected on the board.

- Any device requiring 24 Vac, such as a sensor or speed control, may be connected to the ACU board via the auxiliary power output tabs. Be sure that the electrical load does not exceed the ratings of the transformer used. Also, note that the Signal Common, Power Neutral and Aux Neutral tabs are internally connected on the board and that the Power Neutral tab should be grounded.

Wiring (continued)

- Though it is not required for operation, an RPM output signal is available on the ACU controller. The output signal is 0-10 Vdc and the signal is available from the “RPM” tab on the ACU board. The device receiving the signal may be connected to this tab and to the Signal Common tab on the ACU board.
- Finally, connect the EC Motor Control cable to the 4-pin connector on the ACU board. The wires should be pointing away from the board when installed properly.



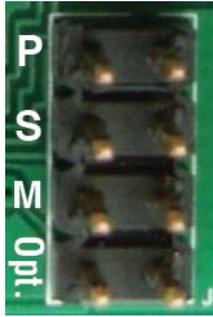
Operation

The ECM ACU controller will change the torque output of the Eco-Drive motor based on a 0-10 Vdc input signal from a building control system. The percent of torque output is directly proportional to the 0-10 Vdc applied to the controller.

The ECM ACU controller also has a Manual Override feature that is built into the controller. Turning the “ADJUST” potentiometer will put the ACU into Temporary Manual Override mode. During this time, you may control the torque output of the motor from 0% to 100% by turning “ADJUST”. This mode will clear out and return to the jumper mode after 15 minutes. You may immediately clear out the Temporary Manual Override mode by cycling 24 VAC to the ACU or by cycling high voltage to the vent.

Startup Mode

The ACU comes from the factory with Startup Mode active. The purpose of Startup Mode is to keep the fan running during system balancing. Startup Mode causes the ACU to act as though it were in “M” jumper mode as described below, regardless of where the jumper is placed. This way, air balancing can be done with or without the use of the automation system. Startup Mode is permanently cleared by power cycling the ACU 5 times while a BAS signal of at least 0.1 VDC is present. If BAS is not installed yet, a low volt battery such as a AA or a 9V may serve as a substitute for the BAS while clearing out the Startup Mode.



Shunt Jumper Modes

“Opt” (Temporary Manual Override)

With the shunt jumper across the two terminals next to “Opt” on the circuit board, the following characteristics will be present. Note: This is the default configuration that the ACU controller will be shipped with. Also, the “Opt” position is not internally connected in the circuit board and therefore the jumper does not need to be in place for this mode to function.

- On/Off control:
 - Disconnect high voltage OR
 - Disconnect 24Vac supply to the ECM-ACU
- Automated control:
 - Use your 0-10 Vdc signal to vary the output of the motor.
 - A voltage signal of less than 0.2 Vdc to the ACU controller will result in a minimal run signal to the motor. The motor may or may not completely stop with this signal. Interrupting the 24 Vac power to the controller is the best way to create a true “off” condition.
- Temporary Manual Override:
 - Turning the “Adjust” potentiometer on the ACU control will allow you to temporarily change the flow index of the fan. The ACU control will return to the 0-10Vdc control signal input 15 minutes after “Adjust” was last turned. You may return immediately to 0-10Vdc control by power cycling the controller (interrupt high voltage to the transformer or low voltage to the controller).

“S” (Reversed Temporary manual override)

- This mode operates the same as the “Opt” mode except that Manual adjust is reversed so that it becomes a left-handed adjustment.

“M” (Permanent Manual Override)

With the shunt jumper across the two terminals next to “M” on the circuit board, the following characteristics will be present.

- On/Off control:
 - Disconnect high voltage OR
 - Disconnect 24Vac supply to the ECM-ACU
- Automated control:
 - Use your 0-10 Vdc signal to vary the output of the motor.
 - A voltage signal to the ACU controller with a value below 0.2 Vdc will cause the controller to take input from the “Adjust” potentiometer. Increasing the 0-10 Vdc signal to 0.2 or greater will return the controller to automatic control.
- Temporary Manual Override:
 - Turning the “Adjust” potentiometer on the ACU control will allow you to temporarily change the flow index of the fan. The ACU control will return to the 0-10Vdc control signal input 15 minutes after “Adjust” was last turned. You may return immediately to 0-10Vdc control by power cycling the controller (interrupt high voltage to the transformer or low voltage to the controller).
- Permanent Manual Override:
 - If the 0-10 Vdc signal fails or goes to a value below 0.2 Vdc, the ACU controller will operate the motor based on the position that the “Adjust” potentiometer is in.
 - This feature is useful if the fan needs to keep running should the automation control fail.

“P”

Currently, the “P” mode does not provide a useful function for our Eco-Drive motors.