EC Motor

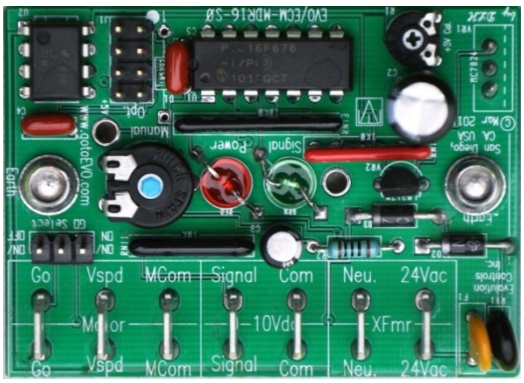
16 Motor Driver

Application

The EVO/ECM-MDR16 motor driver allows manual adjust, or industry standard 0-+10V automation signals to control up to 16 EC Motors.

The MDR16 provides local or remote adjustment of the EC Motor output from 1% to 100% of the motor's control range. A signal lamp on the control continuously flashes out the flow index. Instruments are not required to read the flow index (%).

The MDR16 can be configured for a 0-+10V, a +2-10V, or a 4-20mA automation signal. The MDR16 can also be used for stand-alone manual control by placing a manual/override jumper.



Signal Lamp

The green lamp continuously indicates the flow index. After a pause, the lamp flashes out the tens digit, then the units digit of a number between 1 and 99. Long flashes represent the tens digit, and short flashes represent the units digit. For example, a flow index of 23 flashes two longs, then three shorts. Two extra-long flashes indicate a flow index of 0. An extra-long flash and ten short flashes indicate a flow index of 100. The lamp flashes the signal that was present when the flash sequence started.

Lost Signal Override

LSO causes the Adjust setting to control the motor when the automation signal is less than +0.1V. If the "M" jumper is in place, LSO is always enabled. (The "M" jumper also allows the MDR16 to be used as a manual control).

Without the "M" jumper, LSO is enabled on a new MDR16 until an automation signal >+0.1V is available and the motor is start/stopped 5 times. This feature allows Adjust to control the motor on a new installation until automation is installed. Automation will finally start/stop the motor 5 times and LSO will be disabled.

Adjust

To allow local adjustment, turning Adjust always overrides any automation signal, controlling the EC Motor to the Adjust setting for 15 minutes. Control reverts to any connected automation signal when the 15 minute Adjust timer expires. Cycling power provides early termination of the Adjust timer.

Ordering

EVO/ECM-MDR16 - "C???"

"C???" Add "C (2-127)" for a contractor wired version. C versions have screw terminals installed in place of some or all of the TAB connections. "C" versions are special order with a 200 piece minimum and 9 week lead time. A configuration number following the C indicates which connections are TABS and which are screw terminals. Please call to obtain the configuration number for your application.

Cleanrooms – Refrigerated Warehouses – Exhaust Fans

Three Wire Motors

Three wire motors require a GO signal to turn the motor On/Off. ON/OFF control using Option 4 requires MDR16 circuitry to provide twice as much drive current, so the drive capacity is reduced to 8 motors.

Most applications allow On/Off control by turning power to the MDR16 On/Off. Others require the motors to always run. For these applications, the circuitry can be bypassed by moving the GO select jumper from ON/OFF to ON/ON. This restores the drive capacity to 16 motors,

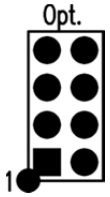
Options

1 Spin-Up Delay runs motor at minimum speed for 10 seconds at startup.

2 “M” Manual Override permanently enables Lost Signal Override and allows use as a manual control.

3 Auto Switch limits the output to greater than 1%, and less than 99%.

4 “P” ON/OFF Control for three wire motors by switching the motor's "GO" control line on when the input signal rises above the 2 volt (4 mA) operating point.

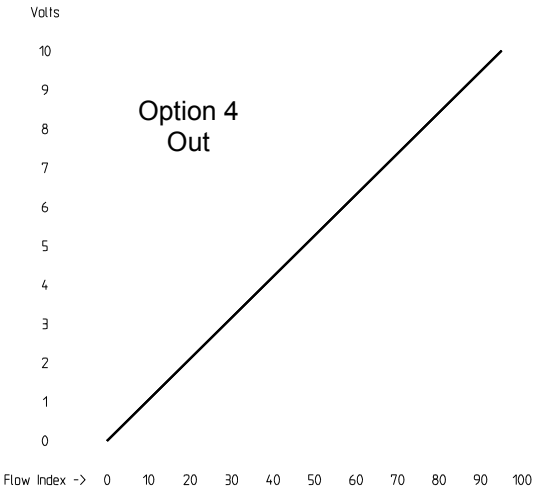


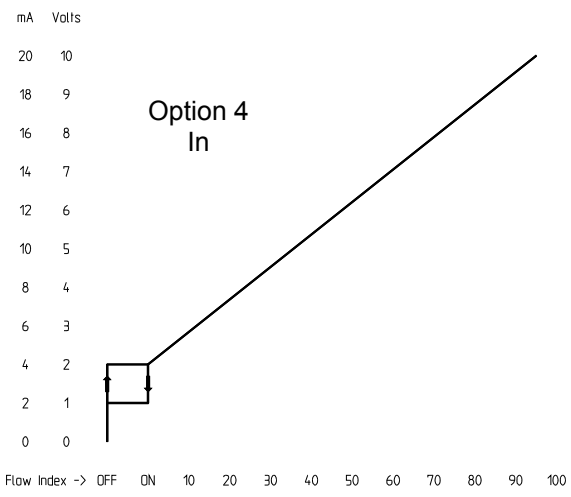
Use Option 4 and a 511Ω dropping resistor for 4-20 mA signals.

With this jumper in place, Adjust turns the motor on/off, and adjusts the flow index from 0-100%.

Specifications

Power	NEC Class II or equal 24 ~V ± 20% 50/60 Hz
2 Wire Motors	4 VA + 0.7VA/Motor
3 Wire Motors	4 VA + 1.4 VA/Motor
PC Board	62 mil, 1 oz. cu, FR4
Control Signal	"O" Configuration 0 to +10V = 1% to 100% "P" Configuration +2-10V = 1%-100% 4-20mA = 1%-100% ON/OFF Control Between +1V & +2V (2 & 4 mA)
Outputs Go + VSpd	+15V @ 100 mA 80Hz PWM
Thermal Stability	>0.01%/°F
Operating Environment	0°F to 140 °F (-18°C to 55°C) 10-80% rh
Connections	250 x 32 mil quick connects Terminal Block (Special Order)





Mounting

The MDR16 is fastened to a single gang aluminum mounting plate. Mount the control in a single gang electrical box, or through a single gang cutout in a metal control cabinet or enclosure. Make sure the screws and other mounting hardware adequately earth the metal plate.

A trim plate for a single gang rectangular outlet or switch can be used over the plate.

Leave clearance for the ~24V power wires, automation wires and control cable connector. Mount the control so the signal and power lamps are visible. Make Adjust accessible if it is used in your application.

Keep high voltage wiring away from the MDR16 circuitry or wiring. Follow electrical code requirements for separation of high and low voltage wiring and components.

The aluminum mounting plate is a heatsink. Mount the control away from heat and out of direct sun. For cold or damp locations, mount the control in a weather-proof box. Install the control and place the box gasket over the control. Then screw on a weather-proof cover designed for rectangular outlets and switches.

Factory Setup

Automation

Permanent Lost Signal Override?

Y Install the “M” jumper

N Remove the “M” Jumper

On/Off control using the +2-10V Signal?
(Three Wire Motors)

Y Install the “P” Jumper
Move Go jumper to ON/OFF

N Remove the “P” Jumper
Move GO jumper to ON/ON

Manual Adjust

Manual Adjust Only?

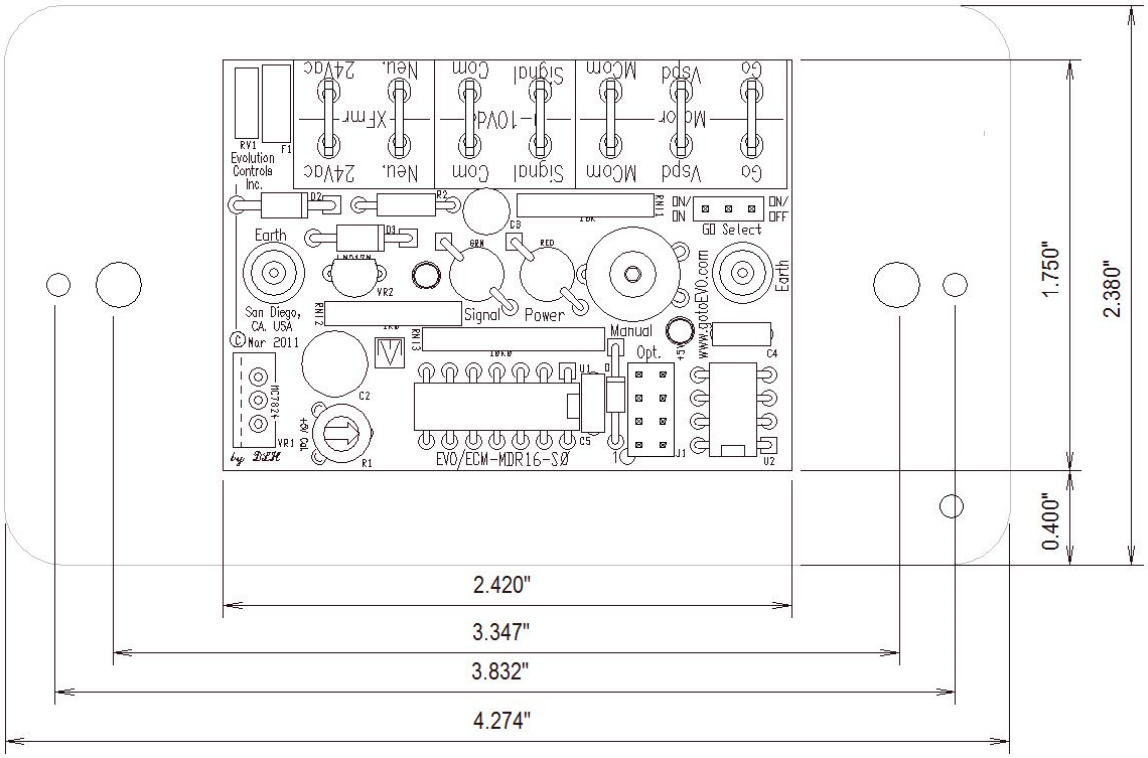
Y Install the “M” jumper

N Remove the “M” Jumper

On/Off control using the Manual Adjust?

Y Install the “P” Jumper
Move Go jumper to ON/OFF

N Remove the “P” Jumper
Move GO jumper to ON/ON



Wiring

Power

Power the EVO/ECM-MDR16 with a ~24V NEC Class II [USA] power limited transformer[1]. Observe all code requirements and follow all safety practices regarding low voltage power supplies and circuits to insure a safe, reliable installation.

Some applications may require an isolated power supply or alternative low voltage electrical safety scheme. Follow code requirements and carefully observe all safety practices concerning unearthed low voltage circuits.

Earth one of the ~24V power transformer leads. Wire the MDR16 neutral connection to the earthed lead.

Wire the hot side of the ~24V Class II power source to the MDR16's ~24V 50/60Hz connection. You may interrupt this connection as a means to stop the EC Motor. Most automation controllers will power the MDR16 directly from a ~24V on/off output, eliminating the fan relay. Automation controllers that switch neutral may require a fan relay.

Signal

The signal input is single-ended, so power neutral and signal common are internally connected.

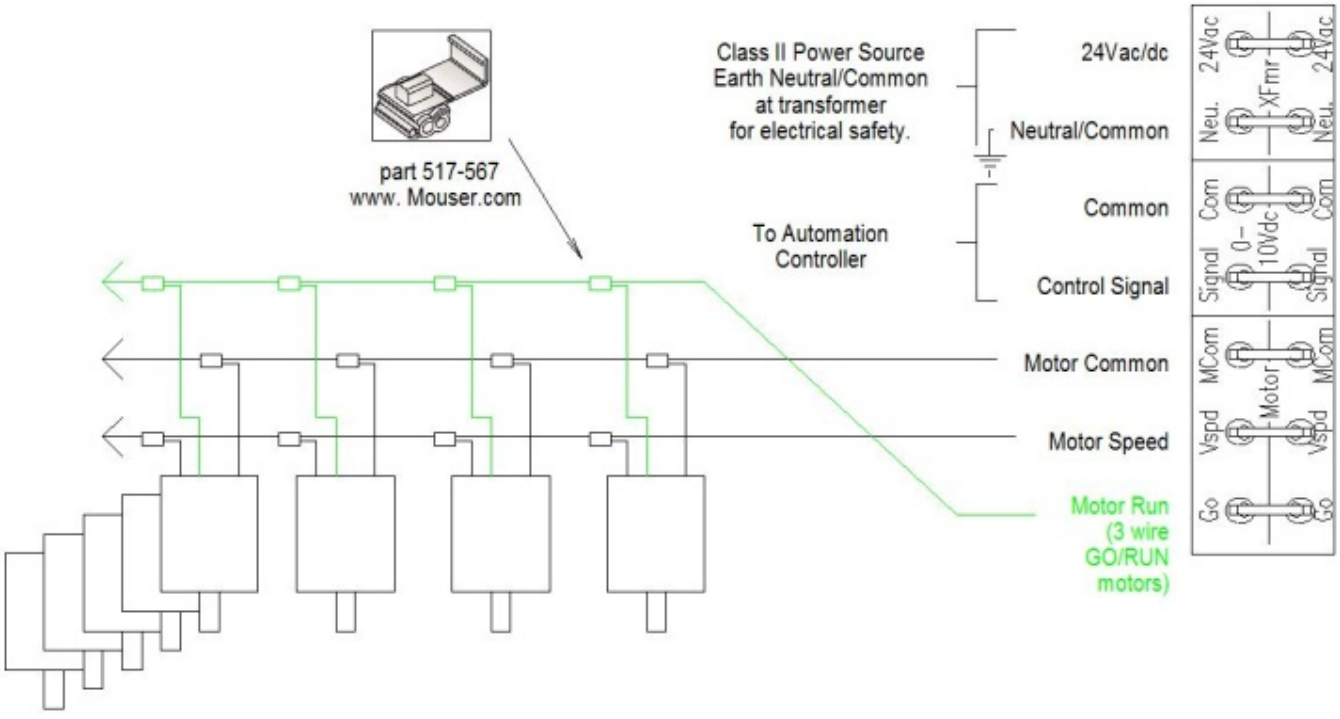
Wire the 0 to +10V control signal to the Signal connection. Wire the control signal common to the Common connection.

The input presents a 21K ohm load to the signal source. Include this resistance when calculating a dropping resistor for 4-20 Ma operation. A 511 ohm 1% resistor[2] provides a 500 ohm dropping resistance.

Motors

Connect all motors in parallel using a bus, star, or combination wiring scheme. Use AWG 18 twisted cable.

A shielded cable can be used to reduce radiated electrical noise. Wire the shield to the motor common connection. The shield should be wired through at each wiring junction, but not connected to earth, terminal or other wire.



[1] See NEC[USA] 725.41

[2] www.Mouser.com pn. 271-511-RC