



**MDR16**  
MAC 10<sup>®</sup> Remote Mount Fan Controller  
INSTALLATION, OPERATION, AND MAINTENANCE MANUAL

Installation & Operation Manual

**APPLICATION**

The MDR16 MAC10® Remote Mount Fan Filter Controller allows manual adjustment of industry standard 0-10VDC automation signals to control up to 16 ENVIRCO ECM based FFUs. The MDR16 provides local or remote adjustment of the FFU output from 1% to 100% of the motor's control range. A signal lamp on the control continuously flashes out the flow index. Therefore, other instruments are not required to read the flow index (%). The MDR16 can be configured for 0-10VDC, a 2-10VDC or a 4-20mA automation signals. If desired, the MDR16 also can be used for stand-alone manual control by internal jumper configuration.

**Signal Lamp Feedback**

The MDR16 green front panel lamp continuously indicates the flow index setting for the entire group of FFUs being controlled. 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.

**Operating Control Modes**

The MDR support group control of up to 16 ECM based ENVIRCO FFUs in two different modes, including a pure manual mode and a mode where the FFUs' performance is slaved to an external automation control input.

Pure manual mode is a simple control capability that is enabled when internal **Jumper #3** named Manual Override is present. With **Jumper #3** present, the front panel adjust screw is the only way to control the FFU performance index. With a small straight screwdriver to turn the front panel accessible potentiometer, the user can adjust the FFU performance index up or down. The Signal Lamp will provide real-time feedback of the performance index set-point.

Alternatively, if internal **Jumper #3** is not present, automatic mode is selected, and the potentiometer has different functions. In automatic mode (no **Jumper #3** present), the potentiometer will control the FFUs' performance when the automation signal is not present. This feature allows adjustment of the FFUs on a new installation until automation is installed. Automation will finally start/stop the motor five times, and LSO will be disabled. Turning the potentiometer always overrides any automation signal, manually controlling the FFU for 15 minutes. Control reverts to any connected automation signal when the 15 minute adjust timer expires. Cycling the power early will instantly reset to automatic mode if required.

There are two additional cases in automatic mode for the adjust function that are set by jumpers. In automatic, the potentiometer is used to set the FFU default performance level when the automation signal is absent or the automation signal is outside its normal control range.

**Internal Jumper Options**

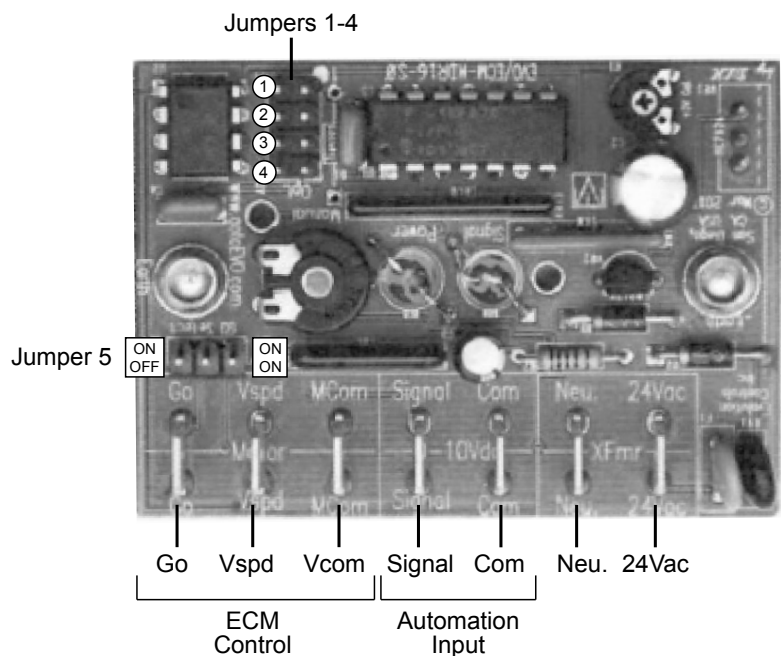
There are five configurable jumpers inside the MDR16 control box. There is a block of four jumpers: **Jumpers #1, #2, #3** and **#4**, near the top left corner of the printed circuit board. Configuration of **Jumpers #1-4** is accomplished by placing the jumper on or removing the jumper. These jumpers should not be configured while the MDR is powered on. A white dot on the printed circuit board denotes **Jumper #1**.

**Jumper #1**, if present, configures the MDR16 to provide a 10 second spin-up delay for the FFUs, in which the motor or motors will operate at a minimum speed for the first 10 seconds after power-up.

**Jumper #2**, if present, configures the MDR16 for automated input control.

**Jumper #3**, Manual Override, permanently enables Lost Signal Override and allows use in manual mode.

**Jumper #4** has two functions. It sets the control input range/mode and enables stopping the FFUs if the



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control signal is below the operating range. If Jumper #4 is off, then the control input range is 0-10VDC for a 1% to 100% flow index. In this mode, the FFUs can only be shut off by disconnecting power to the MDR16. **Important:** If the MDR16 is controlling more than eight ENVIRCO ECM FFUs, then this jumper must be removed.

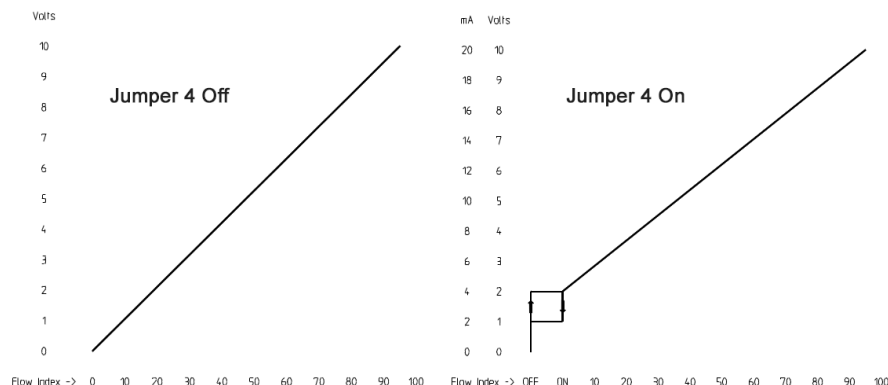
If the MDR16 is controlling eight or fewer ENVIRCO ECM FFUs, then **Jumper #4** must be on. When **Jumper #4** is on, then the control mode is set to 2-10VDC or 4-20mA, both at 1% to 100% flow index. If **Jumper #4** is on and the control input is below 4mA or below 2V, then the FFUs will be shut off.

**Important:** If 4-20mA range is desired, then make sure this **Jumper #4** is on, and as well, place a 511 ohm ¼ watt resistor across Signal and Common inputs to properly bias the automated control input for current mode.

**Jumper #5** is the final jumper, and it is a 3-position jumper. The 3-position **Jumper #5** is always required to connect the center pin to the left or center pin to the right pin.

**Jumper #5** is used to enable or disable the 3 wire motor control signal “GO” control line. If the MDR is required to control greater than eight FFUs, then Jumper #5 needs to be connected to the On/On side, which is towards the center of the printed circuit board. If Jumper #5 is set to On/On, then the only way to turn off the FFU motors is by powering down the entire MDR16.

If **Jumper #5** is positioned to the On/Off side or towards the outside of the printed circuit board, then, if using the automated control input 2-10VDC or 4-20MA modes, the FFU motors will be stopped when the control signal drops below the minimum range (<2VDC or <4mA). Remember, in this mode with **Jumper #5** positioned to the On/Off side, only eight ENVIRCO FFUs can be controlled by the MDR16.



### MOUNTING & WIRING

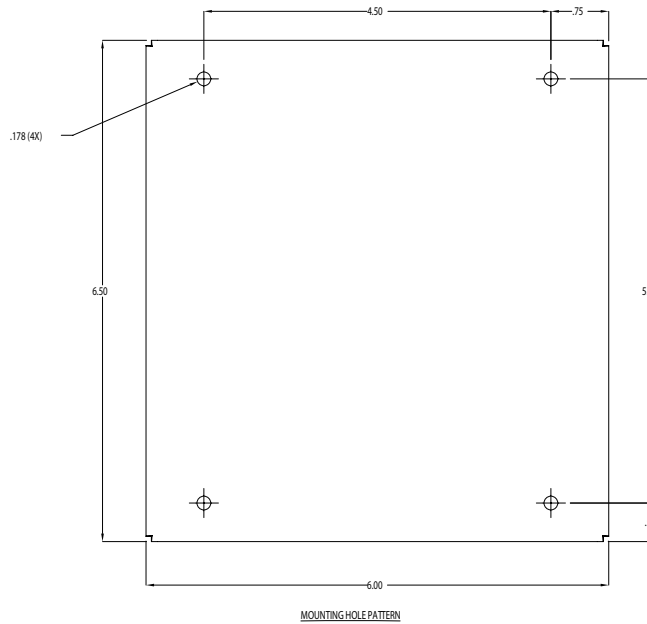
The MDR 16 is packaged as a 6”x6”x 2.5” white metal box. To begin, there are three versions of the MDR16 designed to support 120V, 240V, or 277V applications. Be certain that the MDR16 front voltage logo label matches your intended connection voltage.

For mounting the box, it is recommended to disconnect power from the MDR16 or to mount the MDR16 before connecting the AC power wires. To mount the MDR16, remove the cover of the MDR16 box and find, on the inside back plate, four corner-located pre-drilled mounting holes. Use these four holes for your mounting.

In regards to wiring the box into your system, there are two required connections and one optional connection. The main AC power and EC Motor control outputs are required. Optionally available is the automation control input. The metal box has round knock-outs available for pass-through of all the wiring for connection to your system. Be sure to only knock-out the minimum holes and thereafter making the electrical connections completely environmentally re-seal the knock-outs using proper grommets and/or conduit.

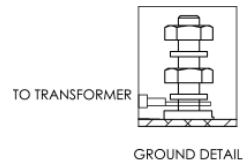
Keep high voltage wiring away from the MDR16 circuitry or wiring. Follow electrical code requirements for separation of high and low voltage wiring and components.

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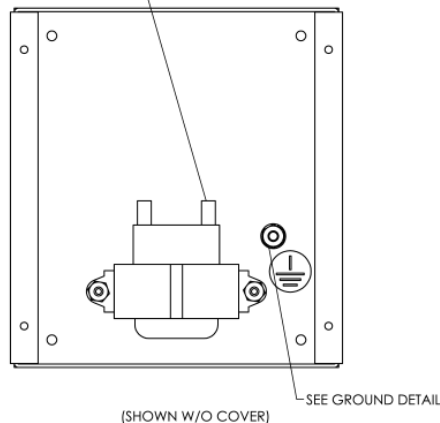


**Power**

For the AC connection, connect as follows: Your AC earth ground connects to the green safety wire mounting bolt inside the box. Use an appropriate size ring terminal (included with MDR16) for connection of your incoming safety ground to the box. Be sure to re-tighten the earth safety wire nut to the box. For your Hot and Common AC connections, please strip your AC supply wires and attach the crimp-on 1/4" insulated quick connects provided with the MDR16. Then, attach the quick connectors to the respective transformer terminals labeled **Common** and either **120V**, **240V**, or **277V**, depending on your MDR16 model number.



INSTALL (2) QUICK CONNECTS  
ON THE PRIMARY TERMINALS



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Regarding powering off the MDR16 and the ENVIRCO FFUs, there are some factors to consider regarding your AC wiring and entire power switching design. If the MDR16 is controlling eight or fewer ENVIRCO FFUs, then there is nothing special to consider. If the MDR16 is controlling greater than eight ENVIRCO FFUs and the system design requires operation with the automated control input, then the only way to shut down the FFUs is to power down the MDR16 by placing a switch between the AC main connection and the MDR16.

**Automation Control Input**

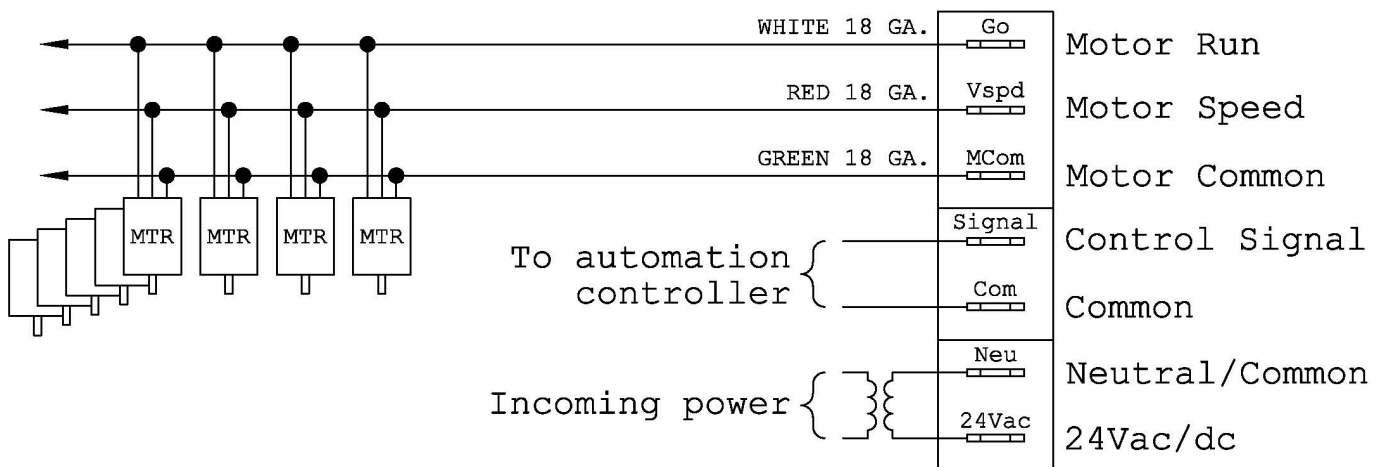
The automation input is single-ended, so power neutral and signal common are connected internal to the MDR16. Connect the 1/4" insulated quick connects to your control input wiring. Connect the 0-10VDC control signal to the **Signal** connection. Wire the control signal common to the **Common** connection.

The input presents a 21K ohm load to the signal source. Include the resistance when calculating a dropping resistor for 4-20mA operation. A 511 ohm series 1% 1/4 watt resistor is used to provide 500 ohm dropping resistance.

**Motors**

Connect all motors in parallel using a bus, star or combination wiring scheme. Use AWG 18 twisted cable. Provided with the MDR is a pack of 50 self-splice connectors to implement the wiring. See the MDR16 Wiring Connections diagram for details. **Important to note: When connecting larger numbers of FFU's to the MDR16, please make sure to design and layout the EC Motor control wiring paths to minimize the total length of wiring accordingly.**

MDR16 WIRING CONNECTIONS



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**ENVIRCO®**

101 McNeill Road | Sanford, NC 27330, USA

tel: 919.775.2201 | toll free: 800.884.0002 | fax: 800.458.2379

[www.envirco.com](http://www.envirco.com) | email: [info@envirco.com](mailto:info@envirco.com)