MonsterFans Direct-Drive [DD] Series Fan

Electrical Installation Manual
## Safety Precautions

All installations must be installed by a qualified person. Do not work on live equipment. Use of lock-out procedures is a must.

**Important!**

The installation of a wind sensor is mandatory in agricultural installations.

## Electrical Installation

### Included Components
- Fan Mounted VFD
- VFD Mounting Plate
- Remote Keypad in Control Box
- Wiring Harness
- 100’ CAT 5 Cable

### Reference Acronym Key
- VFD - Variable Frequency Drive

### Wire Requirements
- The size of the input and output wires depends on the length and current draw of the VFD and Motor.
- Use a continuous run of wires between the Motor and VFD [no splices or connections].
- Use adequately sized, shielded VFD cables for VFD to motor wiring.

A separate insulated ground must be provided to each VFD from the electrical panel. This will reduce the noise from being radiated in other equipment.

Motor is rated with an Insulation Class F; ensure proper wiring is used as per current electrical codes.

## Wiring Schematic

### Wire Location
- DO NOT RUN input and output power cables in the same conduit
- DO NOT RUN control cables with any power cables in the same conduit
- DO NOT RUN different fan’s output power cables in the same conduit

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**Table Of Contents**

Safety Precautions .............................................................................................................................................. 2
General Electrical Installation ........................................................................................................................... 3 - 5
LVC Wiring Diagram ........................................................................................................................................ 6
MonsterFans Simple Fan Control Installation ................................................................................................. 7 - 10
MonsterFans Smart Fan Control Installation .................................................................................................... 11 - 19
MonsterFans Smart Multi-Fan Control Installation ........................................................................................... 20 - 31

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Wire Connections [VFD]

Input Power
- Single phase [1Ph] use L1 - L2 + PE [Ground]
- Three phase [3Ph] use L1 - L2 - L3 + PE [Ground]

Wire Connections [Motor]
The Variable Frequency Drive provides the over temperature and overload protection.

LED Light
If unit is fitted with the LED light it is capable of being controlled through the VFD with the MonsterFans Smart control or by a suitable ON/OFF/Dimmer switch.

MonsterFans Smart Control
Wire the LED light to drive as pictured below to allow ON/OFF and Dimming control from the HMI.

External Switch without Dimming
A standard 120 VAC light switch can be used for ON/OFF light control without dimming.

The light will operate at 100% brightness when turned ON if no dimmer is connected.

External Switch with Dimming
A 0-10V LED compatible Dimmer switch must be used to control the light with dimming.

Leviton DS710-10Z or Lutron DVSTV-WH are examples of suitable 0-10V dimmer switches.
LVC Controller Wiring Diagram

Schneider VFD to Low Voltage Controller Wiring Diagram [OPTIONAL]

MonsterFans Simple Fan Control Installation

MonsterFans Simple Fan Control

Included Components
- MonsterFans Simple Control Keypad
- Split Cable Gland

Reference Acronym Key
- VFD- Variable Frequency Drive

Included Components
- MonsterFans Simple Control Keypad
- Split Cable Gland

Reference Acronym Key
- VFD- Variable Frequency Drive
Control Schematic

**Cable Location:**
DO NOT RUN control cables and any power cables in the same conduit.

**Cable Connection [VFD]**
Cat5 cable should be connected to the RJ45 port INSIDE of the VFD enclosure, as not to be exposed to environmental conditions. Do not connect to the external RJ45 port on the drive.

A minimum of Cat5 cable must be used to connect between devices.

If required cable length is greater than the 100’ of Cat5 supplied with the VFD, bulk cable should be used to make a cable with no additional connections.

* Connect Cat5 Cable to port inside of VFD enclosure.

**Wind Speed Switch [Optional]**
If a Wind Speed Switch is to be used, the control must be wired as pictured below, to allow for automatic shutdown of the fan based on high wind speeds. The Keypad will display “STo” while high wind speeds are active. The fan must be manually reset once the wind speed drops below the controller set point.

* Please refer to Wind Speed Switch supplement for further installation and operation details.
Fire Suppression System Relay [Optional]
To integrate fan controls with a fire detection / suppression system wire fire panel to supplied relay in VFD enclosure as shown below.

The Keypad will display “STO” while the fire shutdown is active. The fan must be manually restarted once the fire suppression system has been reset.

Operating Instructions

<table>
<thead>
<tr>
<th>To Start:</th>
<th>RUN</th>
</tr>
</thead>
<tbody>
<tr>
<td>To Stop/Reset Fault:</td>
<td>STOP</td>
</tr>
<tr>
<td>To Change Rotation:</td>
<td>MNG REV</td>
</tr>
<tr>
<td>To Adjust Speed:</td>
<td>↑↓  +  ENT</td>
</tr>
</tbody>
</table>

Included Components
- MonsterFans Smart Control Graphic Interface
- RJ45 Coupler
- 100’ CAT5 Cable
- Split Cable Gland

Reference Acronym Key
- VFD- Variable Frequency Drive
Installation Considerations

- The HMI must be mounted in a safe and dry location.
- It should not be mounted in a location that it is exposed to direct liquid contact (i.e., splashing or washdown).
- If utilizing the built-in temperature and/or humidity sensors of the HMI, placement of the HMI in a proper location to ensure its efficiency, accurate readings, and the proper automatic function of the fan is very important.

If possible place the HMI away from:

- Direct sunlight, drafts, exterior doorways, skylights, windows, and exterior walls.

Mounting

The HMI can be mounted directly to a wall with or without the use of a electrical box in the wall. If the HMI is to be mounted on a structural steel column or similar, a single gang weatherproof box is recommended to space the HMI off of the column to avoid inaccurate temperature readings.

Wiring

The HMI comes with a Cat5 cable prewired.

In some cases it may be necessary to terminate the Cat5 cable from the VFD directly to the HMI.

DO NOT RUN control cables and any power cables in the same conduit.

Cable Connection [VFD]

Cat5 cable should be connected to the RJ45 port INSIDE of the VFD enclosure, as not to be exposed to environmental conditions. Do not connect to the external RJ45 port on the drive. A minimum of Cat5 cable must be used to connect between devices.

If required cable length is greater than the 100' of Cat5 supplied with the VFD, bulk cable should be used to make a cable with no additional connections.

* Connect Cat5 Cable to port inside of VFD enclosure.

Cable Location:

* Connect Cat5 Cable to port inside of VFD enclosure.
**Wind Speed Switch [Optional]**
If a Wind Speed Switch is to be used, the control must be wired as pictured below, to allow for automatic shutdown of the fan based on high wind speeds.

* Please refer to Wind Speed Switch supplement for further installation and operation details.

**Wind Speed Alarm**
If high wind speeds are detected the fan will decelerate to a stop and a message will display on the HMI pictured below. Once the wind speed drops below the set point the fan will automatically restart.

**Wind Sensor Jumper**
If no Wind Speed Sensor is to be installed a jumper MUST be installed as pictured below for the unit to operate with the MonsterFans Smart Control.

**Fire Suppression System Relay [Optional]**
To integrate fan controls with a fire detection / suppression system wire fire panel to supplied relay in VFD enclosure as shown below.

**Fire Relay Alarm**
If the Fire Relay is activated the fan will decelerate to a stop and a message will display on the HMI pictured below. Once the Fire Relay is reset the fan will automatically restart.

**Fire Relay Jumper**
If no Fire Relay is to be installed a jumper MUST be installed as pictured below for the unit to operate with the MonsterFans Smart Control.
MonsterFans Smart Fan Control Installation

Operation
Controlling the speed, direction of rotation, as well as the ON/OFF and intensity of the LED light is done through the screens on the MonsterFans Smart Control HMI.

Fan Control
Auto/Manual modes, speed and direction selections are done on this screen.

Light Control Screen
Control of the LED Light is done from this screen.
Note: This screen is only accessible if the unit is equipped with the LED light option.

Main Screen
Selecting this page enters the control into Auto Mode.
This screen displays the sensor readings and the fans current speed as calculated based on the set-points set in the Settings screens.

Settings Screen 1
Auto Mode speed is calculated based on the settings entered in the fields on this screen.
**Settings Screen 2**

Auto Mode functions are based on the settings enabled on this screen.

* The settings on this screen are not retentive, if power to the HMI is lost, they will reset to Disabled and must be re-enabled for fan to function in Auto Mode.

### Controls Modes

#### Units
Select temperature units displayed °C/°F.

#### Auto Mode
- Enabling Auto Mode allows the fan to automatically start if the temperature or humidity rises to the Low Temp/RH set-point, beginning to run at the Low Speed % set-point.
- The fan speed will continue to increase to the High Speed % based on the sensed temperature or humidity until the High Temp/RH set-point is reached.
- The fan will continue to run at the High Speed % set-point if the sensed temperature or humidity is above the High Temp/RH set-point.
- If both Temperature and Humidity Auto Modes are enabled the fan will run at the higher calculated required speed.

#### Run Below Min
- Allows the fan to run at the Low Speed % set-point if the sensed temperature is below the Low Temp set-point.

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This chart shows how the fan speed is calculated relative to the sensed temperature and humidity.

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**Data Screen**

Realtime data from the drive is displayed on this page allowing live monitoring of fan performance.
MonsterFans Smart Multi-Fan Control Installation

Control Schematic

VFD Mounting and Electrical Connection:
Please refer to the Electrical Installation Guide for full recommended VFD mounting and electrical connection instructions.

Network Configuration
• Using the short CAT 5 cable in the VFD, connect the supplied RJ45 splitter as shown.
• Connect the CAT 5 cable from the control box to VFD 1 to one of the ports of the splitter.
• Connect a CAT 5 cable for VFD 2 to the remaining port of the splitter.
• Connect the remaining VFD’s in the same manner.
• The last VFD in the network does not require a splitter. Remove the short CAT 5 cable from the VFD and connect the CAT 5 cable from the previous VFD directly to the RJ45 port inside the VFD enclosure.

**All CAT 5 connections should be made inside of an enclosure.

The connection diagram below outlines how to create the fan control network. It is important to connect the Cat5 cables in the control box to the correct field device.

Included Components
• HMI Control
• Control Box
• RJ45 Splitters
• 100’ CAT5 Cable

Reference Acronym Key
• VFD- Variable Frequency Drive

MonsterFans Smart
Multi-Fan Control
### MonsterFans Smart Multi-Fan Control Installation

**Cable Location:**
- DO NOT RUN control cables and any power cables in the same conduit.

**Cable Connection [VFD]**
Cat5 cable should be connected to the RJ45 port INSIDE of the VFD enclosure, as not to be exposed to environmental conditions. Do not connect to the external RJ45 port on the drive. A minimum of Cat 5 cable must be used to connect between devices.

If required cable length is greater than the 100’ of Cat5 supplied with the VFD, bulk cable should be used to make a cable with no additional connections.

The last fan on the network does not require a splitter to be installed, connect directly to internal RJ45 port.

**Installation Considerations**
- The HMI must be mounted in a safe and dry location.
- It should not be mounted in a location that it is exposed to direct liquid contact [i.e., splashing or washdown].
- If utilizing the built-in temperature and/or humidity sensors of the HMI, placement of the HMI in a proper location to ensure its efficiency, accurate readings, and the proper automatic function of the fan is very important.

If possible place the HMI away from:
- Direct sunlight, drafts, exterior doorways, skylights, windows, and exterior walls.

**Mounting**
The HMI can be mounted directly to a wall with or without the use of a electrical box in the wall. If the HMI is to be mounted on a structural steel column or similar, a single gang weatherproof box is recommended to space the HMI off of the column to avoid inaccurate temperature readings.

**Wiring**
The HMI comes with a Cat5 cable prewired. In some cases it may be necessary to terminate the Cat5 cable from the VFD directly to the HMI.
Control Box Mounting & Connections
The control box should be mounted in a dry location, do not wash the control box with pressurized water. Connect CAT 5 cables for the HMI and VFD #1 to labeled connectors inside control box. Connect power supply to receiver on bottom of control box.

Optional Equipment
The controller is provisioned for integration with a wind speed sensor or fire suppression system. If these options are not requested at time of manufacture, jumpers are installed to allow for normal operation of the fans.

The picture shows the jumper connections to the controller.

Wind Speed Switch [Optional]
If a Wind Speed Switch is to be used, the control must be wired as pictured below, to allow for automatic shutdown of the fan based on high wind speeds.

* Please refer to Wind Speed Switch supplement for further installation and operation details.

Wind Speed Alarm
If high wind speeds are detected the fan will decelerate to a stop and a message will display on the HMI [pictured below.] Once the wind speed drops below the set point the fan will automatically restart.
Fire Suppression System Relay [Optional]
To integrate fan controls with a fire detection / suppression system wire fire panel to supplied relay in VFD enclosure as shown below.

Fire Relay Alarm
If the Fire Relay is activated the fan will decelerate to a stop and a message will display on the HMI [pictured below.] Once the Fire Relay is reset the fan will automatically restart.

Operation
Controlling the speed, direction of rotation, as well as the ON/OFF and intensity of the LED light is done through the screens on the MonsterFans Smart HMI.

Fan Control
Auto/Manual modes, speed and direction selections are done on this screen.

Light Control Screen
Control of the LED Light is done from this screen.

Note: This screen is only accessible if the unit is equipped with the LED light option.
MonsterFans Smart Multi-Fan Control Installation

Main Screen
Sensor readings displayed on this screen.

System Setting Screen
This screen allows selection of system wide settings.

Settings Screen 1
Auto Mode speed is calculated based on the settings entered in the fields on this screen.

Settings Screen 2
Auto Mode functions are based on the settings enabled on this screen.

* The settings on this screen are not retentive, if power to the HMI is lost, they will reset to Disabled and must be re-enabled for fan to function in Auto Mode.
MonsterFans Smart Multi-Fan Control Installation

Controls Modes

Units
Select temperature units displayed °C/°F.

Auto Mode
- Enabling Auto Mode allows the fan to automatically start if the temperature or humidity rises to the Low Temp/RH set-point, beginning to run at the Low Speed % set-point.
- The fan speed will continue to increase to the High Speed % based on the sensed temperature or humidity until the High Temp/RH set-point is reached.
- The fan will continue to run at the High Speed % set-point if the sensed temperature or humidity is above the High Temp/RH set-point.
- If both Temperature and Humidity Auto Modes are enabled the fan will run at the higher calculated required speed.

Run Below Min
- Allows the fan to run at the Low Speed % set-point if the sensed temperature is below the Low Temp set-point.

This chart shows how the fan speed is calculated relative to the sensed temperature and humidity.

Data Screen
Realtime data from the drive is displayed on this page allowing live monitoring of fan performance.

<table>
<thead>
<tr>
<th>Fan 1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Motor Data</td>
</tr>
<tr>
<td>Speed</td>
</tr>
<tr>
<td>Current</td>
</tr>
<tr>
<td>Torque</td>
</tr>
<tr>
<td>Power</td>
</tr>
<tr>
<td>Voltage</td>
</tr>
<tr>
<td>Thermal</td>
</tr>
<tr>
<td>Run Time</td>
</tr>
</tbody>
</table>

Drive Data
- Thermal | % | 0 |
- Power ON Time | H | 0 |
- Output Freq | Hz | 0.0 |

Readings Display:
Realtime data of drive and motor displayed.

Navigation Buttons:
Navigate to the various pages on the display.