

ENVIROMUX® Series

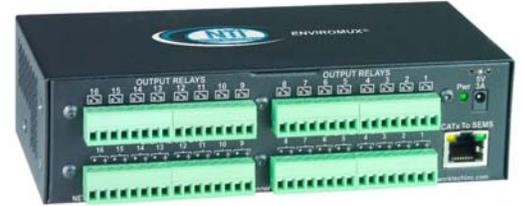
E-DI16DO(R)16

Digital Input/Output Expander

Installation Manual



E-DI16DO16 (Front and Rear View)



E-DI16DOR16 (Rear View)

The E-DI16DO(R)16 Digital Input/Output Expander enables the connection of up to 16 additional digital sensors and output devices using just one RJ45 Sensor port on an E-2D, E-5D, or E-16D Server Environment Monitoring System (SYSTEM).

The E-DI16DO16 includes digital outputs with an open-collector design for the control of up to 16 relays, solenoids, LEDs, and other devices that operate at voltages between 0-24VDC (maximum 500mA).

The E-DI16DOR16 includes digital outputs with a normally-open SPST relay design for the control of up to 16 different devices that operate at a maximum 125VAC (0.5A maximum) or maximum 30VDC (1.0A maximum).

Features

The E-DI16DO16 and E-DI16DOR16 have many features in common, and several differences, detailed below:

Features in common:

- Interfaces with the SYSTEM via the RJ45 Sensor Port
- Digital inputs:
 - 16 screw terminal pairs for connecting dry contact devices
 - One screw terminal pair for tachometer; 0 to 255 Hz
 - Accepts 26 to 16AWG wire
 - Potential free
 - Voltage range: 0 to +36VDC
 - Over-voltage surge protected
- Supports 18-24AWG CAT5/5e/6 cable up to 500 ft. (152.4 m)

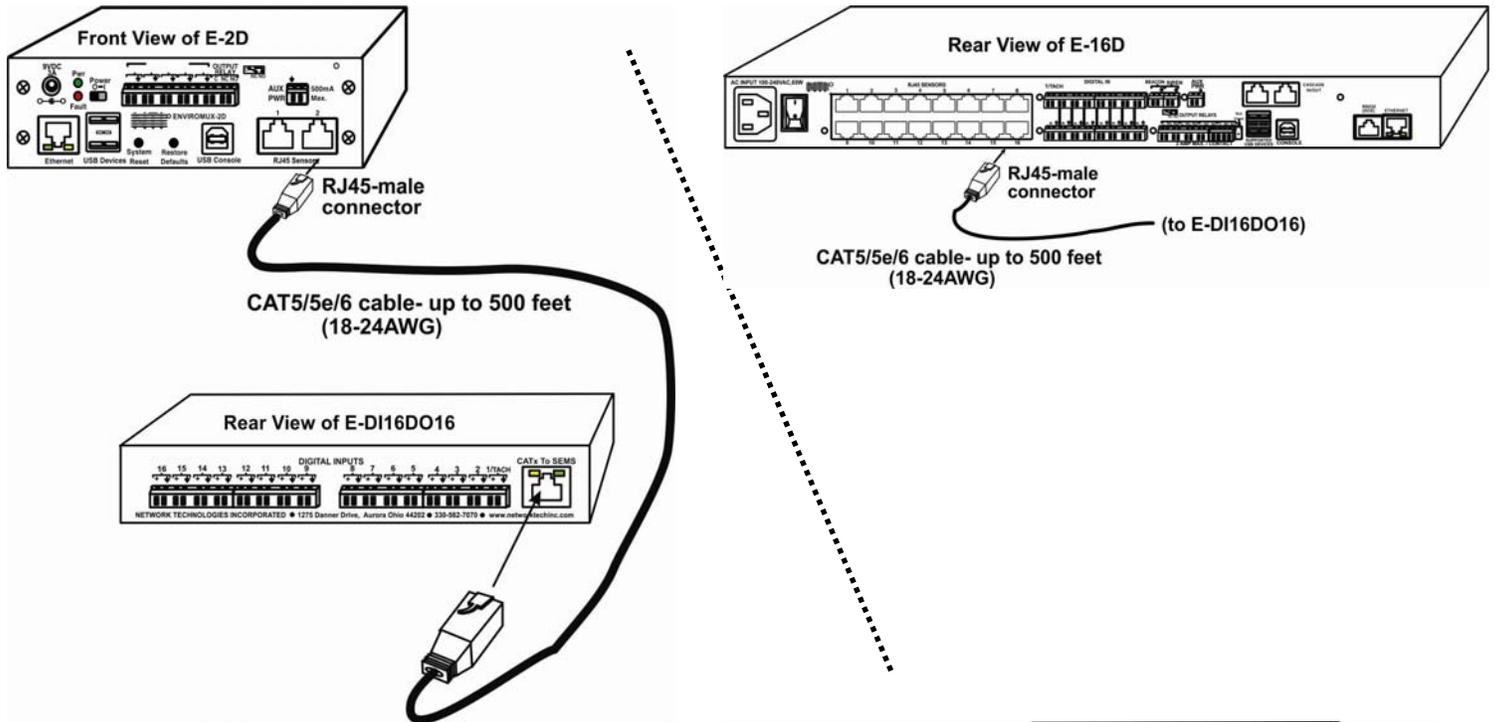
Feature differences:

| Feature | E-DI16DO16 | E-DI16DOR16 |
|---------------------------|--|---|
| Digital outputs | <ul style="list-style-type: none"> • 16 screw terminal pairs for open-collector outputs • Accepts 26 to 16AWG wire • Rated sink current: 500mA per output • +5VDC, 22kΩ pull-ups • Voltage range: 0 to +24VDC • Over-voltage surge protected | <ul style="list-style-type: none"> • 16 screw terminal pairs for normally-open relay contact outputs • Accepts 26 to 16AWG wire • Potential free • Rated switching load: 0.5A @ 125 VAC, 1.0A @ ±30VDC • Fused • Outputs are galvanically isolated to 1kV |
| Power supply | Requires 75mA at 5VDC (Powered by SYSTEM) | Includes 120VAC or 240VAC at 50 or 60Hz-5VDC/3.0A AC Adapter |
| Dimensions (WxDxH) | 6.49x3.10x1.08 in (165x79x27 mm) | 6.49x3.10x1.78 in (165x79x45 mm) |

Note: No external earth ground connection is necessary.

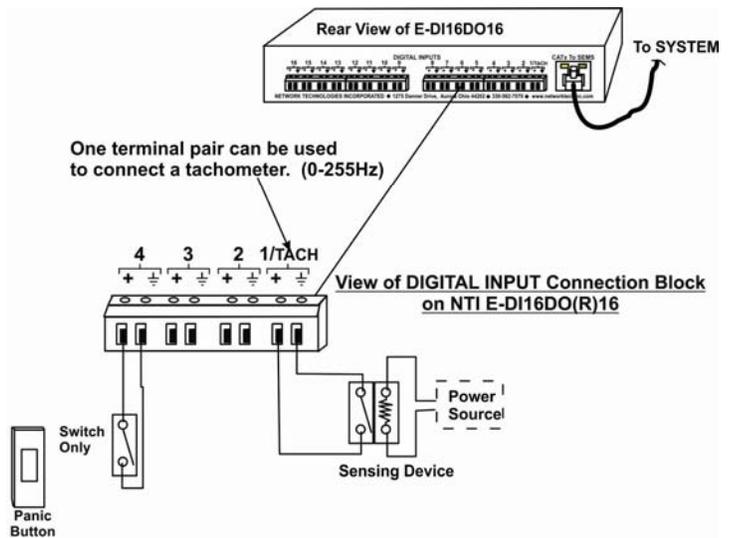
Installation

1. Connect the Expander to the SYSTEM using up to 500 feet (152.4 m) of 18-24AWG CAT5, 5e, or 6 cable.

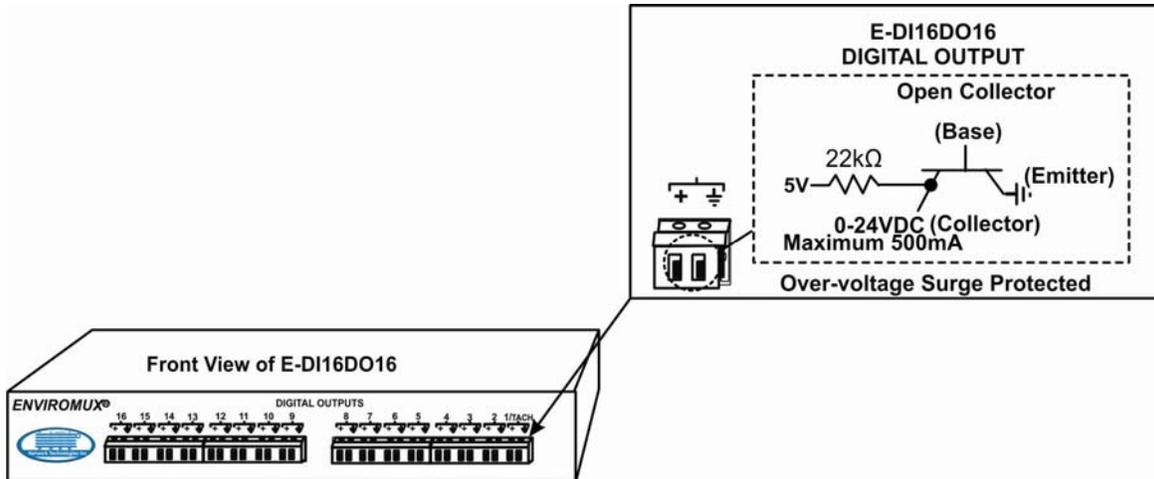


2. Dry contact sensors can then be connected to the Expander using 26-16AWG wire. Up to 16 sensors can be connected. Two-wire switch-only type sensors can be connected to the plus (+) and ground (\perp) terminals of each of 16 sets of terminals.

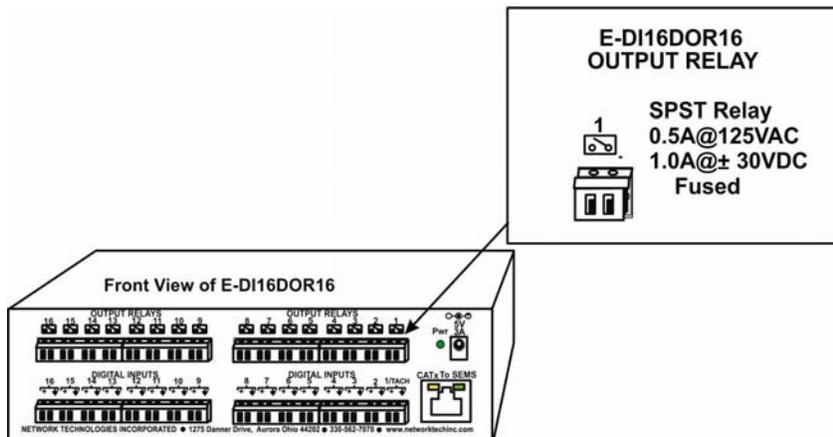
Terminal pair 1 is specially designed for connection of a tachometer/anemometer with a range of 0-255Hz (like the E-WSS Wind Speed Sensor).



3a. Digital Outputs on the E-DI16DO16 have an open-collector design for the control of up to 16 relays, solenoids, LEDs, and other devices that operate at voltages between 0-24VDC (maximum 500mA). Devices connected to Digital Outputs will display in the “Remote Output Relay” list in the SYSTEM web interface for assignment to sensor alert responses.



3b. Output Relays on the E-DI16DOR16 have a normally-open SPST relay design for the control of up to 16 different devices that operate at maximum 125VAC (0.5A maximum) or maximum 30VDC (1.0A maximum). Devices connected to Output Relays will display in the “Remote Output Relay” list in the SYSTEM web interface for assignment to sensor alert responses.



View of “Remote Output Relay” list on the web interface Summary Page (Output Relays from two E-DI16DO16 are shown)

| Remote Output Relays | | | | |
|----------------------|--|--------------|----------|---|
| Conn. | Description | Type | Value | Action |
| 1.1 | Conn #1 Output Relay #1 | Output Relay | Inactive | View Edit |
| 1.2 | Conn #1 Output Relay #2 | Output Relay | Inactive | View Edit |
| 1.3 | Conn #1 Output Relay #3 | Output Relay | Inactive | View Edit |
| 1.4 | Conn #1 Output Relay #4 | Output Relay | Inactive | View Edit |
| 1.5 | Conn #1 Output Relay #5 | Output Relay | Inactive | View Edit |
| 1.6 | Conn #1 Output Relay #6 | Output Relay | Inactive | View Edit |
| 1.7 | Conn #1 Output Relay #7 | Output Relay | Inactive | View Edit |
| 1.8 | Conn #1 Output Relay #8 | Output Relay | Inactive | View Edit |
| 1.9 | Conn #1 Output Relay #9 | Output Relay | Inactive | View Edit |
| 1.10 | Conn #1 Output Relay #10 | Output Relay | Inactive | View Edit |
| 1.11 | Conn #1 Output Relay #11 | Output Relay | Inactive | View Edit |
| 1.12 | Conn #1 Output Relay #12 | Output Relay | Inactive | View Edit |
| 1.13 | Conn #1 Output Relay #13 | Output Relay | Inactive | View Edit |
| 1.14 | Conn #1 Output Relay #14 | Output Relay | Inactive | View Edit |
| 1.15 | Conn #1 Output Relay #15 | Output Relay | Inactive | View Edit |
| 1.16 | Conn #1 Output Relay #16 | Output Relay | Inactive | View Edit |
| 2.1 | Conn #2 Output Relay #1 | Output Relay | Inactive | View Edit |
| 2.2 | Conn #2 Output Relay #2 | Output Relay | Inactive | View Edit |
| 2.3 | Conn #2 Output Relay #3 | Output Relay | Inactive | View Edit |
| 2.4 | Conn #2 Output Relay #4 | Output Relay | Inactive | View Edit |
| 2.5 | Conn #2 Output Relay #5 | Output Relay | Inactive | View Edit |
| 2.6 | Conn #2 Output Relay #6 | Output Relay | Inactive | View Edit |
| 2.7 | Conn #2 Output Relay #7 | Output Relay | Inactive | View Edit |
| 2.8 | Conn #2 Output Relay #8 | Output Relay | Inactive | View Edit |
| 2.9 | Conn #2 Output Relay #9 | Output Relay | Inactive | View Edit |
| 2.10 | Conn #2 Output Relay #10 | Output Relay | Inactive | View Edit |
| 2.11 | Conn #2 Output Relay #11 | Output Relay | Inactive | View Edit |
| 2.12 | Conn #2 Output Relay #12 | Output Relay | Inactive | View Edit |
| 2.13 | Conn #2 Output Relay #13 | Output Relay | Inactive | View Edit |
| 2.14 | Conn #2 Output Relay #14 | Output Relay | Inactive | View Edit |
| 2.15 | Conn #2 Output Relay #15 | Output Relay | Inactive | View Edit |
| 2.16 | Conn #2 Output Relay #16 | Output Relay | Inactive | View Edit |

Web Interface- Summary Page

The Summary Page of the SYSTEM will display sensors connected to the E-DI16DO(R)16 in a separate list labeled “Remote Digital Inputs”. (The image below demonstrates the summary page with **two** E-DI16DO16 Digital Expanders connected.)

The SYSTEM will also recognize the number 1 connector set on the E-DI16DO(R)16 as a possible tachometer connector, displaying its status under “Sensors”. If a tachometer is being connected, configure the sensor as such. If a water sensor or dry-contact sensor is going to be connected to connection 1 (Connection “1.1” or “2.1” below), ignore the listing under “Sensors” and configure the listing under “Remote Digital Inputs”. Do not configure both.

To configure Input #1 for connection to tachometer

Summary

Sensors

| Conn. | Description | Type | Value | Status | Action |
|-------|-----------------------------|------------|--------|--------|--|
| 1 | Sensor #1.1 | Wind Speed | 0.0MPH | Normal | View Edit Delete |
| 2 | Sensor #2.1 | DIO | 0Hz | Normal | View Edit Delete |

Digital Inputs

| Conn. | Description | Type | Value | Status | Action |
|-------|---|---------------|-------|--------|---|
| 1 | Relay Output Test | Digital Input | Open | Normal | View Edit |
| 2 | Conn #2 Digital Input #11 | Digital Input | Open | Normal | View Edit |
| 3 | Digital Input #3 | Digital Input | Open | Normal | View Edit |
| 4 | Digital Input #4 | Digital Input | Open | Normal | View Edit |
| 5 | Digital Input #5 | Digital Input | Open | Normal | View Edit |

IP Devices

| Num. | Description | Type | Value | Status | Action |
|------|-------------|------|-------|--------|--------|
|------|-------------|------|-------|--------|--------|

Output Relays

| Conn. | Description | Type | Value | Status | Action |
|-------|---------------------------------|--------------|----------|--------|---|
| 1 | Output Relay #1 | Output Relay | Inactive | | View Edit |

Remote Connections

Remote Digital Inputs

| Conn. | Description | Type | Value | Status | Action |
|-------|---|---------------|-------|--------|---|
| 1.1 | Conn #1 Digital Input #1 | Digital Input | Open | Normal | View Edit |
| 1.2 | Conn #1 Digital Input #2 | Digital Input | Open | Normal | View Edit |
| 1.3 | Conn #1 Digital Input #3 | Digital Input | Open | Normal | View Edit |
| 1.4 | Conn #1 Digital Input #4 | Digital Input | Open | Normal | View Edit |
| 1.5 | Conn #1 Digital Input #5 | Digital Input | Open | Normal | View Edit |
| 1.6 | Conn #1 Digital Input #6 | Digital Input | Open | Normal | View Edit |
| 1.7 | Conn #1 Digital Input #7 | Digital Input | Open | Normal | View Edit |
| 1.8 | Conn #1 Digital Input #8 | Digital Input | Open | Normal | View Edit |
| 1.9 | Conn #1 Digital Input #9 | Digital Input | Open | Normal | View Edit |
| 1.10 | Conn #1 Digital Input #10 | Digital Input | Open | Normal | View Edit |
| 1.11 | Conn #1 Digital Input #11 | Digital Input | Open | Normal | View Edit |
| 1.12 | Conn #1 Digital Input #12 | Digital Input | Open | Normal | View Edit |
| 1.13 | Conn #1 Digital Input #13 | Digital Input | Open | Normal | View Edit |
| 1.14 | Conn #1 Digital Input #14 | Digital Input | Open | Normal | View Edit |
| 1.15 | Conn #1 Digital Input #15 | Digital Input | Open | Normal | View Edit |
| 1.16 | Conn #1 Digital Input #16 | Digital Input | Open | Normal | View Edit |
| 2.1 | Conn #2 Digital Input #1 | Digital Input | Open | Normal | View Edit |
| 2.2 | Conn #2 Digital Input #2 | Digital Input | Open | Normal | View Edit |
| 2.3 | Conn #2 Digital Input #3 | Digital Input | Open | Normal | View Edit |
| 2.4 | Conn #2 Digital Input #4 | Digital Input | Open | Normal | View Edit |
| 2.5 | Conn #2 Digital Input #5 | Digital Input | Open | Normal | View Edit |
| 2.6 | Conn #2 Digital Input #6 | Digital Input | Open | Normal | View Edit |
| 2.7 | Conn #2 Digital Input #7 | Digital Input | Open | Normal | View Edit |
| 2.8 | Conn #2 Digital Input #8 | Digital Input | Open | Normal | View Edit |
| 2.9 | Conn #2 Digital Input #9 | Digital Input | Open | Normal | View Edit |
| 2.10 | Conn #2 Digital Input #10 | Digital Input | Open | Normal | View Edit |
| 2.11 | Conn #2 Digital Input #11 | Digital Input | Open | Normal | View Edit |
| 2.12 | Conn #2 Digital Input #12 | Digital Input | Open | Normal | View Edit |
| 2.13 | Conn #2 Digital Input #13 | Digital Input | Open | Normal | View Edit |
| 2.14 | Conn #2 Digital Input #14 | Digital Input | Open | Normal | View Edit |
| 2.15 | Conn #2 Digital Input #15 | Digital Input | Open | Normal | View Edit |
| 2.16 | Conn #2 Digital Input #16 | Digital Input | Open | Normal | View Edit |

First Expander

Second Expander

When configuring the Remote Digital Inputs for connection to a water sensors or dry-contact sensors, configure them just as you would any other Digital Input as described in the manual for the SYSTEM.

When configuring the use of Remote Output Relays, configure them also as described for Output Relays in the manual for the SYSTEM.

To view the status of a tachometer connected to Digital In #1, Click on the Sensor description or click on “View”

To view status, click either link

| Sensors | | | | | |
|---------|-----------------------------|------------|--------|--------|--|
| Conn. | Description | Type | Value | Status | Action |
| 1 | Sensor #1.1 | Wind Speed | 0.0MPH | Normal | View Edit Delete |
| 2 | Sensor #2.1 | DIO | 0Hz | Normal | View Edit Delete |

The status page for the sensor will open, displaying the default value of the sensor with a 0-255Hz range of sensing operation.

Type: DIO Connector:2

0Hz

Status: Normal

Handle Alert: Dismiss
Apply Changes

Last alert was at: Never
 Lowest Reading: 11-07-2012 01:25:26 PM 0.0
 Highest Reading: 11-07-2012 03:19:31 PM 13.0

Configure
[Clear Records](#)

24 Hours
Last Week
Last Month
Clear Graph Data

Click here to open configuration page

→

To configure the sensor for specific use, click on “Configure” to open a page with variable values (see image on next page).

Most of the sensor settings are the same as any other sensor configuration (detailed in the SYSTEM manual) but there are some differences:

| Sensor Settings | Description |
|-------------------------|--|
| Associate Sensor | Select if the Type “DIO” should be replaced by the sensor type to be entered in the next box. |
| Associated Sensor Type | Enter the “Type” of sensor that should be displayed on the summary page and in all alert communications received regarding this sensor |
| Associated Sensor Unit | Enter between 1 and 3 alphabetical characters. (Ex. MPH for Miles Per Hour) These characters will be used by the ENVIROMUX to represent the unit of measure reported by the attached sensor. Leaving it empty will result in an empty string in the reported data. For example, a value will be reported on the status page, but no unit of measure will be displayed. |
| SNMP Associated Type ID | Enter ID value from MIB file if SNMP traps will be used for alert notifications for this sensor (for more on this, see “SNMP Custom Type ID” on next page) |
| Min. Associated Level | The minimum range of the units to be associated with the cycle count measured from the attached sensor. (Ex. the E-WSS associates one rotation within 1 second to be a wind speed of 2.5MPH. With an maximum operating range of 255Hz (or cycles), the maximum wind speed measurement will be 637.5MPH (255Hz X 2.5MPH).) |
| Max. Associated Level | The maximum range of the units to be associated with the current reading measured from the attached sensor. |

SNMP Custom Type ID: Use this field if SNMP traps will be used for alert notifications. The Type ID corresponds with a value defined in the MIB file under “extSensorType” (default value is 32567 for type “Custom”). Place the desired number in this box that represents the type of sensor to be reported in the MIB browser or SNMP trap.

To define a new type of sensor;

1. open the MIB file,
2. locate the section titled “extSensorType”,
3. assign a description and a number not already in use (in the “SYNTAX” field) to associate with it ,
4. enter the number for the newly defined extSensorType in the SNMP Custom Type ID box.

If the Type ID is left blank, the value “0” will be assigned, which will be reported in the browser and SNMP trap as type “undefined”.

Sensor #2.1 Configuration (Type: DIO)

| | |
|--|--|
| <input type="checkbox"/> Sensor Settings | |
| Description | <input type="text" value="Sensor #2.1"/> <small>Descriptive name for the sensor</small> |
| Group | <input type="text" value="1"/> <small>Select which group the sensor belongs to</small> |
| Min. Level | <input type="text" value="0.0"/> <small>Min. supported value for the sensor</small> |
| Max. Level | <input type="text" value="255.0"/> <small>Max. supported value for the sensor</small> |
| Associate Sensor | <input type="checkbox"/> Associate sensor to a customized sensor type |
| Associated Sensor Type | <input type="text"/> <small>Type of the associated sensor</small> |
| Associated Sensor Unit | <input type="text"/> <small>Measurement unit for the associated sensor</small> |
| SNMP Associated Type ID | <input type="text" value="32767"/> <small>ID value for SNMP type of associated sensor</small> |
| Min. Associated Level | <input type="text" value="0.000000"/> <small>Sensor expected value corresponding to 0 Hz</small> |
| Max. Associated Level | <input type="text" value="100.000000"/> <small>Sensor expected value corresponding to 255Hz</small> |
| Min. Non-Critical Threshold | <input type="text" value="0.0"/> <small>Min. threshold below which indicates a non-critical alert condition</small> |
| Max. Non-Critical Threshold | <input type="text" value="200.0"/> <small>Max. threshold above which indicates a non-critical alert condition</small> |
| Min. Critical Threshold | <input type="text" value="0.0"/> <small>Min. threshold below which indicates an alert condition</small> |
| Max. Critical Threshold | <input type="text" value="200.0"/> <small>Max. threshold above which indicates an alert condition</small> |
| Refresh Rate | <input type="text" value="10"/> <input type="text" value="Sec"/> |
| <small>The refresh rate at which the sensor view is updated</small> | |
| <input type="checkbox"/> Non-Critical Alert Settings | |
| <input type="checkbox"/> Critical Alert Settings | |
| <input type="checkbox"/> Data Logging | |
| <input type="button" value="Save"/> | |
| Alert Simulation | |
| <input type="button" value="Simulate Alert"/> <input type="button" value="Clear Alert"/> | |

Default configuration page for tachometer

Sensor #1.1 Configuration (Type: Wind Speed)

| Sensor Settings | |
|-----------------------------|--|
| Description | Sensor #1.1 Descriptive name for the sensor |
| Group | 1 Select which group the sensor belongs to |
| Min. Level | 0.0 Min. supported value for the sensor |
| Max. Level | 255.0 Max. supported value for the sensor |
| Associate Sensor | <input checked="" type="checkbox"/> Associate sensor to a customized sensor type |
| Associated Sensor Type | Wind Speed Type of the associated sensor |
| Associated Sensor Unit | MPH Measurement unit for the associated sensor |
| SNMP Associated Type ID | 32767 ID value for SNMP type of associated sensor |
| Min. Associated Level | 0.000000 Sensor expected value corresponding to 0 Hz |
| Max. Associated Level | 637.500000 Sensor expected value corresponding to 255Hz |
| Min. Non-Critical Threshold | 0.0 Min. threshold below which indicates a non-critical alert condition |
| Max. Non-Critical Threshold | 200.0 Max. threshold above which indicates a non-critical alert condition |
| Min. Critical Threshold | 0.0 Min. threshold below which indicates an alert condition |
| Max. Critical Threshold | 200.0 Max. threshold above which indicates an alert condition |
| Refresh Rate | 10 Sec The refresh rate at which the sensor view is updated |
| Non-Critical Alert Settings | |
| Critical Alert Settings | |
| Data Logging | |
| Save | |
| Alert Simulation | |
| Simulate Alert Clear Alert | |

Check this box if you enter data in the next 5 boxes

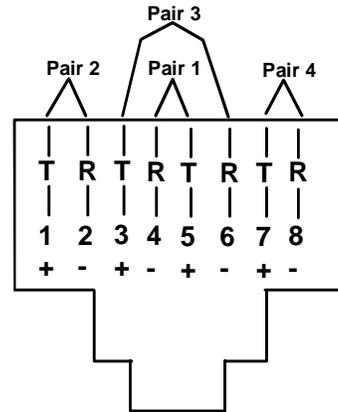
255Hz (cycles) x 2.5MPH per rotation in 1 second (cycle)

Configuration of tachometer as a wind speed sensor (E-WSS)

CAT5 Cable

The CAT5 connection cable between the SYSTEM and the E-DI16DO(R)16 is terminated with RJ45 connectors and must be wired according to the EIA/TIA 568 B industry standard. Wiring is as per the table and drawing below.

| Pin | Wire Color | Pair |
|-----|--------------|------|
| 1 | White/Orange | 2 |
| 2 | Orange | 2 |
| 3 | White/Green | 3 |
| 4 | Blue | 1 |
| 5 | White/Blue | 1 |
| 6 | Green | 3 |
| 7 | White/Brown | 4 |
| 8 | Brown | 4 |



(View Looking into RJ45 Socket)

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