# I/O Flex Ex8160
## Installation Guide

⚠️ Verify that you have the most current version of this document. Go to **https://accounts.oemctrl.com**, then select **Support** > **Download** > **Documents**.

Important changes are listed in **Document revision history** at the end of this document.

# Contents

# Introduction

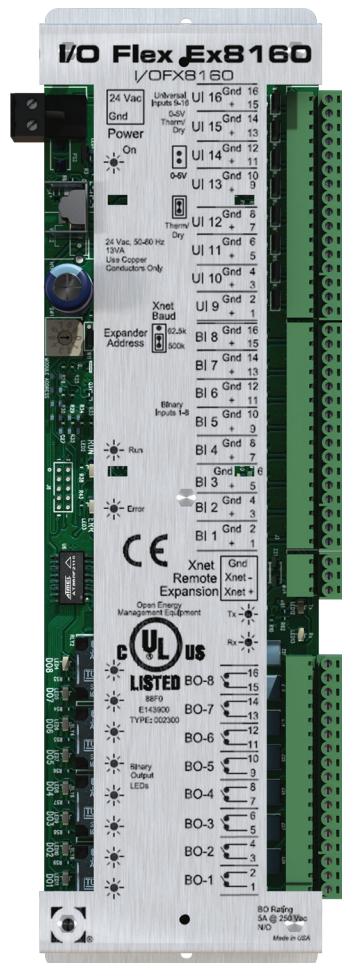## What is this document about?

This document provides information specific to the I/O Flex Ex8160 hardware platform. The I/O Flex Ex8160 is a point expander for the I/O Flex 6126.
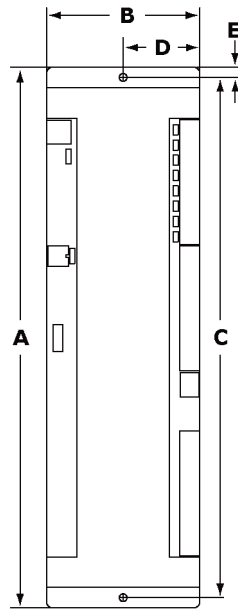
## What is a I/O Flex Ex8160?

The I/O Flex Ex8160 is an expander that can be connected to the I/O Flex 6126 to increase the number of inputs and outputs. Expanders let your system grow as the size of the job increases.

## Specifications

| | |
|---|---|
| Power | 24 Vac ±10%, 50–60 Hz<br>13 VA power consumption<br>26 Vdc (25 V min, 30 V max)<br>Single Class 2 source only, 100 VA or less |
| Binary inputs | Inputs 1 - 8 support pulse counting up to 10 Hertz, dry contact only |
| Universal inputs | Inputs 9 - 16 are jumper-selectable between thermistor/dry contact and 0-5 Vdc |
| Input resolution | 10 bit A/D |
| Input pulse frequency | Maximum of 10 pulses per second. Minimum pulse width required for each pulse:<br>• ON to OFF time (half cycle) is 50 msec<br>• ON to OFF to ON time (full cycle) is 100 msec |
| Binary outputs | 8 outputs, relay contacts rated up to 5 A at 250 Vac, configured as dry contact, normally open. |
| Output resolution | 8 bit A/D |
| Protection | Built-in surge and transient protection for power and communications in compliance with EN61000-6-1.<br><br>Incoming power and network connections are protected by non-replaceable internal solid-state polyswitches that reset themselves when the condition that causes a fault returns to normal.<br><br>The power, network, input, and output connections are also protected against transient excess voltage/surge events lasting no more than 10 msec. |
| Status indicators | LEDs indicate status of communications, running, errors, and outputs. |
| Environmental operating range | -20 to 140°F (-29 to 60°C), 10–90% relative humidity, non-condensing |
| Physical | Rugged aluminum housing, removable screw terminals with custom silk-screening available |

| Overall dimensions | A:<br>B: | 10-5/8 in. (27.0 cm)<br>3 in. (7.6 cm) |
|---|---|---|
| Mounting dimensions | C:<br>D:<br>E: | 10-3/16 in. (25.9 cm)<br>1-1/2 in. (3.8 cm)<br>13/64 in. (.5 cm) |
| Depth | | 1-9/16 in. (4 cm) |
| Weight | | .73 lbs (.33 kg) |
| Listed by | | UL916 (Canadian Std C22.2 No. 205-M1983, CE, FCC Part 15 - Subpart B - Class A |

# Mounting and wiring the I/O Flex Ex8160

## To mount the I/O Flex Ex8160

You can mount an I/O Flex Ex8160 in one of the following locations:

- On an I/O Flex 6126 using the two allen cap screws provided.



- Screw the I/O Flex Ex8160 into an enclosed panel using the mounting slots on the coverplate. Leave about 2 in. (5 cm) on each side of the expander for wiring.

# To wire the I/O Flex Ex8160 to the controller
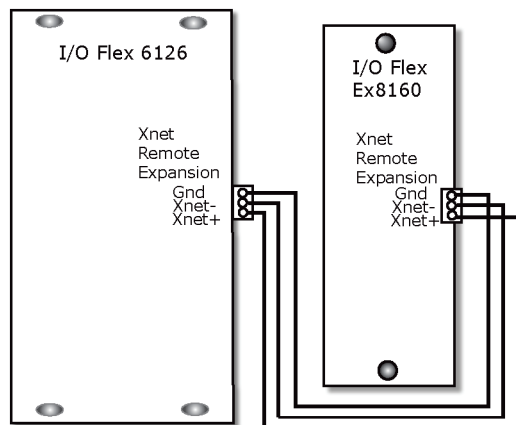
Wiring restrictions for connecting the expander to the controller

- Maximum length: 100 feet (30 meters)

- 22 AWG, low-capacitance, twisted, stranded, shielded copper wire

Wire the I/O Flex Ex8160's **Xnet Remote Expansion** port to the same port on the controller.

# To wire for power

Prior to August 2012, the I/O Flex Ex8160 had a power jumper that had to be set to turn the expander on and off.

⚠️ **CAUTIONS**

- The I/O Flex Ex8160 is powered by a Class 2 power source. Take appropriate isolation measures when mounting it in a control panel where non-Class 2 circuits are present.

- Do not power pilot relays from the same transformer that powers the I/O Flex Ex8160.

- OEMCtrl expanders can share a power supply as long as you:
    - Maintain the same polarity
    - Use the power supply only for OEMCtrl expanders

- The I/O Flex Ex8160 has an operating range of 21.6 Vac to 26.4 Vac. If voltage measured at the I/O Flex Ex8160's input terminals is outside this range, the I/O Flex Ex8160 may not work properly.

- Avoid running communication wires or sensor input wires next to AC power wires or the controller's relay output wires. The resulting noise can affect signal quality. Common sources of noise are:
    - Spark igniters
    - Radio transmitters
    - Variable speed drives
    - Electric motors (> 1hp)
    - Generators
    - Relays
    - Transformers
    - Induction heaters
    - Large contactors (i.e., motor starters)
    - Video display devices
    - Lamp dimmers
- Fluorescent lights

1   Turn off the I/O Flex Ex8160's power to prevent it from powering up before you can verify the correct voltage.

2   Remove power from the power supply.

3   Pull the screw terminal connector from the I/O Flex Ex8160's power terminals labeled **24 Vac** and **Gnd** (**Return**).

4   Connect the transformer wires to the screw terminal connector.

5   Apply power to the power supply.

6   Measure the voltage at the I/O Flex Ex8160's power input terminals to verify that the voltage is within the operating range of 21.6–26.4 Vac.

7   Insert the screw terminal connector into the I/O Flex Ex8160's power terminals.

8   Turn **on** the I/O Flex Ex8160's power.

9   Verify that the **Power** LED is on and the **Run** LED is blinking.

# To address the I/O Flex Ex8160

You must give the I/O Flex Ex8160 an address that is unique on the network. You can address the I/O Flex Ex8160 before or after you wire it for power.

**1**   Pull the screw terminal connector from the controller's power terminals labeled **Gnd** and **24 Vac**.

**2**   Turn off the attached controller.

**3**   Set the I/O Flex Ex8160's address on the rotary switch.

**EXAMPLE**  If the I/O Flex Ex8160's address is 2, point the arrow on the switch to 2.



**4**   Turn on the controller's power.

**5**   Insert the power screw terminal connector into the I/O Flex Ex8160's power terminals. The controller reads the powered I/O Flex Ex8160's address each time you turn on the controller.

⚠ **CAUTION**  The first time the controller communicates with an expander, it triggers a software download. This may occur if the expander(s) are blank (not a normal condition) and in cases where the controller's driver has been updated. During that time, the red **Error** LED and the green **Run** LED on the expander(s) flash in sequence. This process may take several minutes to complete. Do not disconnect power or communications wiring during this download.

# Wiring inputs and outputs

## Input wiring specifications

| Input | Maximum length | Minimum gauge | Shielding |
|---|---|---|---|
| 0–5 Vdc | 1000 feet (305 meters) | 26 AWG | Shielded |
| Thermistor Dry contact Pulse counter TLO | 1000 feet (305 meters) | 22 AWG | Shielded |

## Inputs

The I/O Flex Ex8160 has 16 inputs that accept the following signal types.

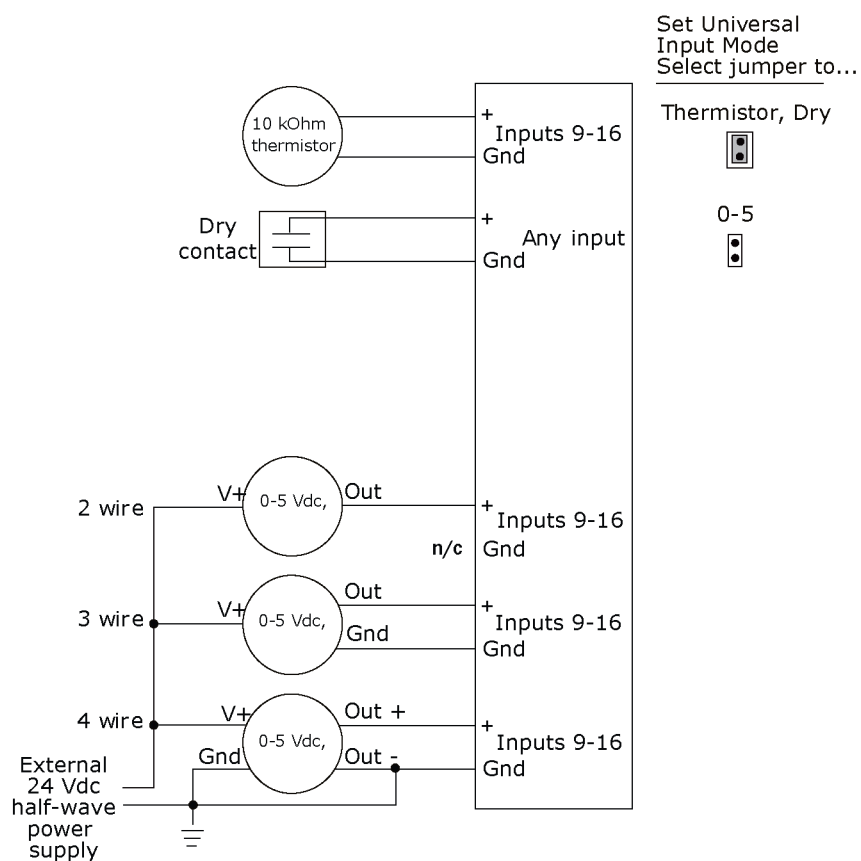| Signal Type | Description |
|---|---|
| Thermistor | Precon type 2 (10 kOhm at 77°F). Input voltages should be from 0.489 Vdc to 3.825 Vdc for thermistors. |
| Dry contact | A 5 Vdc wetting voltage detects contact position, resulting in a 1 mA maximum sense current when the contacts are closed. |
| 0–5 Vdc | The input impedance of the I/O Flex Ex8160 is approximately 20 kOhm. |
| Pulse counter* | Maximum of 10 pulses per second. Minimum pulse width required for each pulse:<br>• ON to OFF time (half cycle) is 50 msec<br>• ON to OFF to ON time (full cycle) is 100 msec |

\* The I/O Flex Ex8160 can perform pulse counting for dry contact or voltage inputs if you assign the input to a Pulse to Analog Input microblock.

# To wire inputs

1   Verify that the I/O Flex Ex8160's power and communications connections work properly.

2   Pull the screw terminal connector from the controller's power terminals labeled **Gnd** and **24 Vac**.

3   Connect the input wiring to the screw terminals on the I/O Flex Ex8160.

   **NOTE**  Connect the shield wire to the **GND** terminal with the ground wire.



4   Set each input's **Universal Input Mode Select** jumper to indicate the type of input.

5   Insert the power screw terminal connector into the I/O Flex Ex8160's power terminals.

# Output wiring specifications
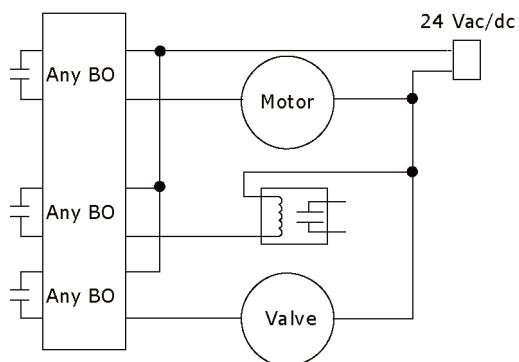
To size output wiring, consider the following:

- Total loop distance from the power supply to the controller, and then to the controlled device

    **NOTE**  Include the total distance of actual wire. For 2-conductor wires, this is twice the cable length.

- Acceptable voltage drop in the wire from the controller to the controlled device

- Resistance (Ohms) of the chosen wire gauge

- Maximum current (Amps) the controlled device requires to operate

# Binary outputs

The I/O Flex Ex8160 has 8 binary outputs. You can connect each output to a maximum of 24 Vac/Vdc. Each output is a dry contact rated at 5 A, 24 V maximum and is normally open.

# To wire outputs

**1**   Verify that the I/O Flex Ex8160's power and communications connections work properly.

**2**   Pull the screw terminal connector from the controller's power terminals labeled **Gnd** and **24 Vac**.

**3**   Connect binary output wiring to the **BO** screw terminals on the I/O Flex Ex8160 and to the controlled device. Wire **Gnd** for each binary output to its even-numbered terminal.



**4**   Insert the power screw terminal connector into the I/O Flex Ex8160's power terminals.

# Troubleshooting

If you have problems mounting, wiring, or addressing the I/O Flex Ex8160, contact OEMCtrl Technical Support.

## Expander LED's

The LED's indicate if the controller is speaking to the devices on the network. The LED's should reflect communication traffic based on the baud rate set. The higher the baud rate the more solid the LED's become.

| LEDs | Status |
|---|---|
| Power | Lights when power is being supplied to the expander.<br><br>**NOTE** The I/O Flex Ex8160 is protected by internal solid state Polyswitches on the incoming power and network connections. These Polyswitches are not replaceable and will reset themselves if the condition that caused the fault returns to normal. |
| Rx | Lights when the expander receives data from the network segment; there is an Rx LED for Ports 1 and 2. |
| Tx | Lights when the expander transmits data from the network segment; there is an Rx LED for Ports 1 and 2. |
| Run | Lights based on expander health. See table below. |
| Error | Lights based on expander health. See table below. |

The **Run** and **Error** LED's indicate expander and network status.

| If Run LED shows... | And Error LED shows... | Status is.. |
|---|---|---|
| 2 flashes per second | Off | Normal |
| 5 flashes per second | 2 flashes per second | Boot is running or driver is updating |
| 5 flashes per second | On | Fatal error. Replace expander or return for repair. |

## Serial number

If you need the I/O Flex Ex8160's serial number when troubleshooting, the number is on:
- a sticker on the back of the main controller board
- a Module Status report (modstat) from the WebCTRL for OEMs application

## Compliance

### FCC Compliance

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

⚠ **CAUTION** Changes or modifications not expressly approved by the responsible party for compliance could void the user's authority to operate the equipment.

### CE Compliance

⚠ **WARNING** This is a Class A product. In a domestic environment, this product may cause radio interference in which case the user may be required to take adequate measures.

## Document revision history

Important changes to this document are listed below. Minor changes such as typographical or formatting errors are not listed.

| Date | Topic | Change description | Code* |
|---|---|---|---|
| 10/17/18 | Specifications | Expanded the Protection specification. | X-H-JS-O |

\* For internal use only