VariTrac™ Dampers
These instructions do not cover all variations in systems nor provide for every possible contingency that may arise at a jobsite installation.

**INSPECTION:**
Check carefully for any shipping damage. This must be reported to and claims made against the transportation company immediately. Any missing parts should be reported to your supplier at once and replaced with authorized parts only.

**DAMPER DESCRIPTIONS**

### Round Dampers

- **Cylinder**
  - 18-gage galvanized–rolled and seam welded

- **Damper**
  - 22-gage galvanized steel

- **Actuator**
  - Internal actuator w/ synchronous motor and gear reduction is direct coupled to the damper shaft. It has a drive time of 57 seconds. Microswitches stop the drive motor at the full-open and full-closed positions.

- **Electrical Rating**
  - Power Supply — 24 VAC (20 to 30 VAC) at 50/60 Hz
  - Transformer Sizing — 2.0 VA maximum at nominal voltage, Class 2

<table>
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<th>Size Diameter (in.)</th>
<th>Length (in.)</th>
<th>Shipping Weight</th>
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<td>11 lbs</td>
</tr>
<tr>
<td>8</td>
<td>12</td>
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<tr>
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<td>17 lbs</td>
</tr>
<tr>
<td>12</td>
<td>16</td>
<td>18 lbs</td>
</tr>
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</table>

### Rectangular Bypass Damper

- **Sheet metal box**
  - 24-gage galvanized steel

- **Length**
  - 16"

- **Damper frame**
  - 13-gage galvanized steel

- **Damper blades**
  - 16-gage galvanized steel

- **Blade pin**
  - 3/8"

<table>
<thead>
<tr>
<th>Size W&quot; x H&quot;</th>
<th>No. of Blades</th>
<th>Shipping Weight</th>
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<tr>
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<td>29 lbs</td>
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<tr>
<td>30 x 20</td>
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### Rectangular Zone Damper

- **Sheet metal box**
  - 24-gage galvanized steel

- **Length**
  - 16"

- **Damper frame**
  - 18-gage galvanized steel

- **Damper blades**
  - 18-gage galvanized steel

- **Gears**
  - ABS plastic

- **Blade pin**
  - 3/8"

<table>
<thead>
<tr>
<th>Size H&quot; x W&quot;</th>
<th>No. of Blades</th>
<th>Shipping Weight</th>
</tr>
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<tr>
<td>08 x 16</td>
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<td>12 lbs</td>
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<tr>
<td>10 x 16</td>
<td>3</td>
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<tr>
<td>10 x 20</td>
<td>3</td>
<td>16 lbs</td>
</tr>
<tr>
<td>14 x 18</td>
<td>4</td>
<td>18 lbs</td>
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</table>

### Rectangular Actuator

- **Specification:**
  - Actuator Design:
    - 3-Wire 18 ga 24 VAC Floating Point Control, Non-spring return
  - Actuator Housing:
    - Housing Type — NEMA 1, IP20
  - Rotation Range:
    - Adjustable from 30°–90°, clockwise or counterclockwise
  - Electrical Rating:
    - Power Supply — 24 VAC (20 to 30 VAC) at 50/60 Hz
    - Transformer Sizing — 2.5 VA maximum at nominal voltage, Class 2
  - Manual Override:
    - External release lever
  - Humidity:
    - 90% RH maximum, non-condensing
  - Temperature Rating:
    - Ambient — 35°–125°F (2°–52°C)
    - Shipping and Storage: -20°–150°F (-29°–66°C)
  - Torque:
    - Running: 35 lb-in (4 N·m)
    - Breakaway: 35 lb-in (4 N·m) minimum
    - Stall: 40 lb-in (4.5 N·m) minimum
  - Running Time for 90° Rotation:
    - 60 seconds at 60 Hz nominal
    - 72 seconds at 50 Hz nominal
  - Weight:
    - 1.5 lb (0.68 kg)
General

Install Bypass Dampers
Bypass damper(s) should be located before the first zone runs out from the supply air duct. VariTrac dampers or supply duct branches should be installed downstream of bypass dampers. The distance between bypass dampers and the communicating sensor/bypass control should be two to three equivalent duct diameters (see Figure 1).
In systems with plenum return, bypass damper(s) should be ducted into the return air riser. Confirm that sufficient relief or exhaust exists to prevent return plenum pressurization.

IMPORTANT:
The use of a relief fan or backdraft damper is strongly recommended in the return air system. This will prevent bypassed air from pressurizing the return air duct system and spilling out of return grills into conditioned space, especially when the unit is in economizer mode.

Bypass Damper Wiring
The interconnect cable is pre-wired to the bypass damper and may be lengthened if necessary.

IMPORTANT:
Mounting screws must be located towards the ends of the damper when hanging straps are used to avoid interference with the rotating damper. A label attached to the dampers indicates the acceptable areas for mounting screws.

CAUTION
Equipment Damage!
The bypass damper must be positioned to orient the drive shaft horizontally. Failure to do this may result in drive train malfunction (see Figure 1).

IMPORTANT:
It is important to note the airflow direction when installing dampers. A label for this is present on each damper assembly.

Figure 1: Bypass Damper Installation
Installing the Communicating Sensor/Bypass Control

The communicating sensor/bypass control is located between the supply fan and the bypass damper in the least turbulent location possible. It is recommended that the distance between the control and the nearest upstream transition be two to three equivalent duct diameters.

If the supply duct branches out at the riser, install the control in the largest supply duct.

A two-inch hole is required to insert the temperature and static pressure sensor. Use the supplied gasket to seal off air leaks. Secure the sensor to the duct with a minimum of three sheet metal screws.

IMPORTANT

The sensor assembly should be installed on the side of the duct to keep the pressure transducer in a vertical orientation. Do not install horizontally on the top or bottom of a duct.

Connect the Communicating Sensor/Bypass Control Wiring

The pre-wired interconnect cable plugs into the actuator connector inside the control box. The cable is designed to connect in one orientation only.

Figure 2: Install the Communicating Sensor/Bypass Control

NOTES:

Step 1. Plug the actuator connector from the BYPS damper onto the master damper UCM socket (ACT).

Step 2. If two bypass dampers are used, connect the actuator plug of the second bypass damper to the spare connector socket pigtailed on the first BYPS damper cable assembly.

Step 3. If the cable assembly needs to be extended, cut and splice additional wire on the BYPS damper end of the cable.

If the supply duct branches out at the riser, install the control in the largest supply duct.

A two-inch hole is required to insert the temperature and static pressure sensor. Use the supplied gasket to seal off air leaks. Secure the sensor to the duct with a minimum of three sheet metal screws.

Figure 2: Install the Communicating Sensor/Bypass Control

NOTES:

Step 1. Plug the actuator connector from the BYPS damper onto the master damper UCM socket (ACT).

Step 2. If two bypass dampers are used, connect the actuator plug of the second bypass damper to the spare connector socket pigtailed on the first BYPS damper cable assembly.

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Figure 2: Install the Communicating Sensor/Bypass Control

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Step 1. Plug the actuator connector from the BYPS damper onto the master damper UCM socket (ACT).

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If the supply duct branches out at the riser, install the control in the largest supply duct.

A two-inch hole is required to insert the temperature and static pressure sensor. Use the supplied gasket to seal off air leaks. Secure the sensor to the duct with a minimum of three sheet metal screws.

Figure 2: Install the Communicating Sensor/Bypass Control

NOTES:

Step 1. Plug the actuator connector from the BYPS damper onto the master damper UCM socket (ACT).

Step 2. If two bypass dampers are used, connect the actuator plug of the second bypass damper to the spare connector socket pigtailed on the first BYPS damper cable assembly.

Step 3. If the cable assembly needs to be extended, cut and splice additional wire on the BYPS damper end of the cable.
Install the VarTrac Dampers
A sketch of basic damper installation is shown in Figure 3. The damper may be connected with hard duct or flex duct at either end.

If two bypass dampers are installed, a pigtail socket is provided on the cable so the second damper can be plugged into the UCM.

IMPORTANT
Mounting screws must be located towards the ends of the damper when hanging straps are used to avoid interference with the rotating damper. A label attached to the dampers indicates the acceptable areas for mounting screws.

IMPORTANT
It is important to note airflow direction when installing the damper. A label for this is present on each damper assembly.

CAUTION
Equipment Damage!
The control box on each damper must be positioned to orient the drive shaft horizontally. Failure to do this may result in drive train malfunction. (See Figure 4.)
Installation

Connect UCM Wiring
Connect the power to terminals TB1-1 (24V) and TB1-2 (ground). 24 Vac is required to power the UCM control. 20 Vac to 28 Vac is acceptable. Use 18 to 20 AWG for power wiring.

The power consumption for an auto-changeover cooling-only UCM (model CHGR) is 10 VA.

Local heat outputs are rated at 12 VA maximum for each output. To determine the total UCM power requirements, add the power consumption of local heat to the circuit board power.

CAUTION
Use Copper Conductors Only!
Unit terminals are not designed to accept other types of conductors. Failure to use copper conductors may result in equipment damage.

WARNING
Equipment Damage!
Connecting a shared UCM power supply with reversed polarity will cause damage to the UCM, TCI, and central control panel.

WARNING
Equipment Damage!
When powering multiple UCMs from one transformer, polarity must be maintained. Terminal TB1-1 is designated positive (+) and Terminal TB1-2 is negative (−) to unit casing ground.

IMPORTANT:
UCM control box cover must be replaced after field wiring to prevent electromagnetic interference.

DIP Switch Settings
Dip switch SW1 contains six switches for addressing the UCM. These switches allow a user to set a unique communication address for each UCM. Each UCM on a given communication link must have a unique address in order for the CCP to communicate to it. Refer to Table 1 for UCM 4.1 DIP switch settings.

Table 1—DIP Switch Settings

<table>
<thead>
<tr>
<th>UCM Unit #</th>
<th>Dip 1</th>
<th>Dip 2</th>
<th>Dip 3</th>
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* Bypass damper must always be addressed at 33.
Installation

NOTE:

1. Factory wiring
2. Zone sensor terminals 4 and 5 require shielded twisted pair wiring for communications jack equipped zone sensor option.
4. 1/4" quick connect required for all field connections.
5. No additional wiring required for night setback override (on/cancel).
5. The optional binary input connects between TB4-1 (BIP) and 24VAC (hot) from transformer. The binary input can be reconfigured as an occupancy input via the communications interface.
6. As shipped, the AUX input is configured as an AUX input. The AUX input can be reconfigured as a CO2 sensor input via the communications interface.
7. S terminal not to be used with VariTrane.
8. If unit mounted transformer is not provided, polarity from unit to unit must be maintained to prevent permanent damage to control board. If one leg of 24VAC supply is grounded, then ground leg must be connected to TB1-2.
9. Shields of communications wiring should be tied together and insulated.