Workshop 3
VariTrac Installation

Goal: You will install a VariTrac CCP, zone controllers, and communicating sensor/bypass damper control in this workshop. You will also install 24Vac power, the Comm4 communications link and zone sensor wiring. Sections of this workshop include the following:

- Install VariTrac UCMs and digital zone sensor
- Install Communicating Bypass Damper assembly
- Install VariTrac Central Control Panel
- Startup VariTrac and setup system from operator display

Reference:
- VariTrac Central Control Panel Installation Manual (VAV-SVN03A-EN)
- VariTrac Central Control Panel Operators Guide (VAV-SVP01A-EN)

Job Description:
A VariTrac III and Tracker 10 will be installed at B&R Specialty Metals. The VariTrac CCP is applied to the office area HVAC system. This HVAC system consists of Voyager CV unit supplying 3 separately controlled zones. VariTrac is applied as a changeover bypass system and uses a bypass damper assembly to monitor and control supply air static pressure and temperature. VariTrac devices required for this job include the following:

- VariTrac CCP
- VariTrac UCMs (3)
- Zone sensors (3)
- Communicating Bypass Damper assembly

Tracker is used to control the warehouse area and brazing workshop. Tracker controls scheduling of the warehouse rooftop unit, exhaust fans for the restroom and brazing workshop, outdoor lighting, and occupancy for the Varitrac system.
The drawing shows the VariTrac system you will install in this workshop. You will complete the power wiring and communications link. Then startup the system.

Install VariTrac UCMs and digital zone sensor

Reference: VariTrac Installation Manual (VAV-SVN03A-EN), Pages 23 through 27

1. Set the address DIP switches on each of the UCM boards to addresses 1, 2, and 3.

2. Connect UCM Comm4 wiring to terminals TB2-1 and TB2-2, TB2-3 and TB-2-4 on each UCM using the pre-configured wiring harness provided.

   Important! Polarity must be observed at comm link connections on all devices that share the Comm4 link.

3. Connect 24Vac power to terminals TB1-1 (24V) and TB-2 (ground) on each UCM using the pre-configured wiring harness provided.
**Caution:** It is not recommended that 24Vac power be shared between controllers. However, if controllers share a common transformer, polarity must be observed on 24Vac connections on UCMs that share the same transformer.

![Diagram of polarity connections](image)

**Question:** Would a VariTrac UCM set to address 25 communicate to a VariTrac? 

**Question:** Will the comm link function even though the electrician swapped polarity at one of the Comm4 devices?

4. Install a zone sensor to VariTrac damper UCM, address #1. Use wire provided for both the sensor/adjustable setpoint.

5. Install a digital zone sensor to VariTrac damper UCM, address #2. Use wire provided for both the sensor/adjustable setpoint and 24Vac power.

**Reference:** VariTrac Installation Manual (VAV-SVN03A-EN), Pages 28 through 31
**Question:** Can both 24Vac power and sensor wiring share the same conduit? ____.
Why or why not? _____________________________________________________

### Install Communicating Bypass Damper Assembly

**Reference:** VariTrac Installation Manual (VAV-SVN03A-EN), Pages 21 through 22

**Note:** The communicating sensor/bypass assembly is normally located between the supply fan and the bypass damper in the least turbulent location possible. It is recommended that the distance between the controller assembly and the nearest upstream transition be at least 2 to 3 equivalent duct diameters.

6. Locate the communicating sensor/bypass assembly housing near the VariTac lab equipment and remove metal cover.

7. Verify address DIP switches on the communicating sensor/bypass UCM board are set to address ‘33’.

**Note:** The communicating sensor assembly UCM address DIP switches are set at the factory to Address 33.

8. Connect the communications link wiring to terminals TB2-1 and TB2-2, TB2-3 and TB2-4 using the pre-configured wiring harness provided. Observe (+) and (-) polarity on the link.

**Note:** A pre-configured wiring harness is provided to connect both 24Vac and the communications link to the communicating bypass/damper UCM.

9. Connect 24Vac power to terminals TB1-1 (24V) and TB-2 (ground) on the UCM

**Caution:** It is not recommended that 24Vac power be shared between controllers. However, if controllers share a common transformer, polarity must be observed on 24Vac connections on UCMs that share the same transformer.
**Question:** How large a hole is required in the supply duct to insert the supply temperature and static pressure sensor? ________________.

**Question:** What is the maximum distance between the bypass damper actuator and communicating sensor/bypass assembly if using the cable shipped with the bypass damper actuator unit? ________________.

**Install VariTrac Central Control Panel**

**Reference:** VariTrac Installation Manual (VAV-SVN03A-EN), page 17

10. Remove the Display and Main modules from the termination module to gain access to the termination board wiring.
11. Connect 24Vac transformer leads to AC power terminations (TB1-1,TB-2) on the VariTrac termination board.

*Note:* A dedicated 24 Vac, 30VA Class 2 transformer is required to power the VariTrac Central Control Panel. The ground wire (TB2-3) is connected to the circuit breaker panel.

12. Connect communications link to TB2-10 (+) and TB2-11(-) from the zone damper UCMs and the communicating sensor/bypass UCM.
13. Verify that 24 Vac power, and Comm4 link are correctly terminated at the VariTrac termination board.

14. Install Main logic board onto the VariTrac termination board module.

15. Install the VariTrac operator display module onto the main module.
Startup VariTrac and setup system from operator display

Reference: VariTrac Installation Manual (VAV-SVN03A-EN), page 43 to 51

16. Apply 24Vac power to VariTrac and UCMs.

Question: What is the minimum configuration of VariTrac devices required for the CCP startup sequence to begin?

17. View the VariTrac operator display. The ‘System Initialization in Progress’ screen displays.

Please Wait

System initialization is in progress

Initialization status: 90% complete

Patience required: VariTrac operator goes through an initialization routine which could last several minutes. Once initialization is complete when the operator displays the normal ‘Home Screen’.

18. The VariTrac home screen should display as shown in the screen capture

Note: ‘Calibration mode is active’ occurs after an initial start-up sequence. In calibration, the CCP automatically prepares the VariTrac system for operation by disabling heating and cooling, closing the bypass damper, opening all zone dampers to their maximum position and starting the fan. Calibration re-indexes the zones and bypass damper and recalibrates the static pressure setpoint.


Question: Name 3 fault conditions that cause the home screen display to display: ……

*****Priority Shutdown Active*****

a. _____________________
b. _____________________
c. _____________________
19. Press the View Button on the Home Screen. Three devices should display as shown.

20. Press the Home button to return to the home screen.

21. Make the following Setup changes to VariTrac:

   **Hint:** Press the ‘Advanced’ button to access the following options.

   - Set current date and time
   - Change **System Name:** from “VariTrac CCP” to “Front Office Area”
   - Select **HVAC Unit Type:** as ‘Voyager Commercial CV’
   - Change **Discharge Heating Setpoint:** to ‘100.0’


23. Record the following and be prepared to explain the recorded values:

   - HVAC Unit Comm: ________________.
   - HVAC Comm Status: ________________.
   - Operating Mode: ________________.
   - Supply Air Temperature: ________________.
   - External Time Clock Input: ________________.

24. Press the Home button to return to the home screen.

25. Press the View Button on the Home Screen.

26. Select each zone and rename as follows:

   - “Zone 1” rename to: = “Administration Area”
   - “Zone 2” rename to: = “Lobby Area”
   - “Zone 3” rename to: = “Sales Area”.
You have completed this workshop!