

O X Y G E N 8

DISTECH CONTROLS
SEQUENCE OF OPERATIONS
FOR TERRA

Sequence of Operations

1. Fan Control

1.1 Constant Flow

1.1.1 Supply Fans maintains constant CFMs

1.1.2 Three CFM settings: Low Speed, Mid Speed & High Speed

1.1.2.1 Selectable Manually (HMI) or via Schedule

1.2 Fan Startup Sequence

1.2.1 The outdoor damper opens, the Supply Fans starts after with an adjustable delay time

1.3 Supply Fan can be placed in Hand and set at a Hand Speed. This is only for commissioning and testing purposes.

Supply Fan have to be set to Auto for normal operation

2. Outdoor-Damper

2.1 At start up, the controller commands the outdoor damper open

2.1.1 There is an adjustable timer to determine when it is open (before starting fans)

2.1.2 There is no input for damper position feedback.

2.3 Dampers can be placed in Hand and open/close manually. This is only for commissioning and testing purposes.

Dampers have to be set to Auto for normal operation.

3. Filter Surveillance

3.1 Static Pressure Mode

3.1.1 Controller monitors constantly filter pressure. If it exceeds the limit (adjustable) an alarm is triggered.

3.2 Time Mode

3.2.1 The controller counts the operation time of the filter, when it exceeds the limit (adjustable) an alarm can be triggered.

3.2.1.1 Timer can be reset at HMI.

Sequence of Operations

4. Electric Pre-heater control

- 4.1 Controller monitors the OAT and starts modulating the pre-heater when it drops below the SP.
- 4.2 Option of controller monitoring the air flow (min CFM adjustable) before activating the pre-heater.
- 4.3 Flushing Time
- 4.4 Electric pre-heaters work with a 0 to 10 VDC output.
- 4.5 Pre-heater can be placed in Hand and activated manually. This is only for commissioning and testing purposes. Pre-heater has to be set to Auto for normal operation.

5. Temperature Control

- 5.1 There are 2 options of temperature control:
 - 5.1.1 Constant Supply
 - 5.1.1.1 Temperature is controlled in relation to constant supply temperature measured by the supply air temperature sensor in the duct (at the discharge of the coils).
 - 5.1.2 Constant Room
 - 5.1.2.1 Temperature is controlled in relation to constant room temperature measured by the room temperature sensor.
- 5.2 The controller modulates the coil based on one setpoint
 - 5.2.1 If the temperature is below SP (+/- dead band) the control is in Heating Mode
 - 5.2.2 If the temperature is above SP (+/- dead band) the control is in Cooling Mode
- 5.3 There is an option of-Setpoint Compensation
 - 5.3.1 If enabled, the controller adjusts the SP based on OAT.
 - 5.3.1.1 Linearly increase the SP as the OAT drops with the minimum/maximum temperature ranges
 - 5.3.1.2 Linearly decreased the SP as the OAT rises with minimum/maximum temperature ranges
- 5.4 Heating features
 - 5.4.1 Option of controller monitoring the air flow (min CFM adjustable) before activating the post-heater
 - 5.4.2 Flushing Time
 - 5.4.2.1 Minimum time to run the fan after the post-heater is disengaged to flush any remnant heat.
 - 5.4.3 For Hydronic Post-heat, frost control is optional
 - 5.4.3.1 Controller monitors the return water temperature. If it drops below the SP, an alarm is raised and the system stops

Sequence of Operations

5.4.4 Post heater can be placed in Hand and activated manually. This is only for commissioning and testing purposes. Post heater has to be set to Auto for normal operation.

5.4.5 Backup Heating

5.4.5.1 If the DX coil is in freeze protection mode, the post-heat is engaged.

5.4.6 If the heating coils are active at 100% capacity and the setpoint is not reached in 20 minutes, fan flow is reduced to 50% in 10 minutes until the setpoint is reached

5.5 Cooling Features

5.5.1 Controller monitors OAT, if it drops below the Minimum OAT for Cooling SP (adjustable) cooling is stopped

5.5.2 Option of Forced Cooling

5.5.2.1 When enabled, the controller increases the air volume linearly when cooling is active.

5.5.3 Cooling coil can be placed in Hand and can be activated manually. This is only for commissioning and testing purposes. Cooling coil has to be set to Auto for normal operation.

5.6 The controller generates the following temperature alarms:

5.6.1 Low Supply Temp Alarm is generated if the Supply Temp is 5°C (systems with post heat) or 10°C (systems without post heat) below the setpoint for 20 minutes (not adjustable). This alarm stops the unit.

5.6.2 High Supply Temp Alarm is generated if the Supply Temp is 5°C above the setpoint for 20 minutes (not adjustable). This alarm does NOT stop the unit.

5.6.3 Low Return Temp Alarm is generated if the Return Temp is 5°C below the setpoint for 20 minutes (not adjustable). This alarm does NOT stop the unit

5.6.4 High Return Temp Alarm is generated if the Return Temp is 5°C above the setpoint for 20 minutes (not adjustable). This alarm does NOT stop the unit.

6. Dehumidification

6.1 A heating coil and a cooling coil are required

6.2 When dehumidification is enabled, the controller monitors the relative humidity at the selection location. If it exceeds the SP, the dehumidification sequence begins:

6.2.1 The cooling coil is commanded at the constant output (i.e. 9V) which is adjustable

6.2.2 The heating coil modulates to maintain the temperature setpoint

6.2.3 When the humidity falls from the SP (+/- dead band) the dehumidification sequence ends

Sequence of Operations

7. Hot Gas Reheat (HGRH)

7.1 The interface with the HGRH controller (D-Controller) is Modbus.

7.2 The controller can communicate with up to 3 HGRH circuits.

7.3 The controller sends Modbus commands to the D-Controller for:

7.3.1 Heating mode is based on difference with SP and a dead band

7.3.2 Cooling mode is based on difference with SP and a dead band

7.3.3 Dehumidification for when it is enabled and relative humidity is above setpoint

7.3.4 Discharge Air Target is for heating and cooling

7.3.5 Dew Point Target is used for dehumidification

8. Heating and Cooling Options

8.1 Cooling

8.1.1 DX Coil - Requires hardwired W Controller

8.2 Heating & Cooling

8.2.1 DX Coil - Requires hardwired W Controller

8.2.2 DX + HGRH - Modbus interface with D Controller

8.3 Combinations

8.3.1 DX Coil + Electric Post Heat - Post Heat used for dehumidification or Post Heat engages if DX Coil is in defrost mode

8.3.2 DX Coil + Hydronic Post Heat - Post-Heat used for dehumidification or Post Heat engages if DX coil is in defrost mode

8.3.3 DX Coil (Only Cooling) + Electric Post Heat - Post Heat used for heating

8.3.4 DX Coil (Only Cooling) + Hydronic Post Heat - Post Heat used for heating

8.3.5 DX Coil + HGRH + Electric Post Heat - Post Heat engages if DX coil is in defrost mode

8.3.6 DX Coil + HGRH + Hydronic Post Heat - Post Heat Engages if DX coil is in defrost mode

Sequence of Operations

9. Fire Protection

9.1 Internal Fire Alarm

9.1.1 The controller monitors the internal fire alarm supply and return air temperatures. If they exceed its Fire SP, an alarm is triggered, the fans are stopped, the dampers closed and the heating and cooling systems are shut down.

10. Hardwired Control Signals

10.1 Unit Control Inputs

10.1.1 External Alarm Stop Signal. NC Contact. Stops the unit immediately and triggers an alarm

10.1.2 Remote Start. NO/NC selectable contact. Starts/Stops the unit

10.2 Unit Control Outputs

10.2.1 Alarm Present is closed when the unit is in alarm.

10.2.2 Unit Operating is closed when the unit is operating.

10.3 OA Damper

10.3.1 Open/Close command signal

10.4 Pre-Heater

10.4.1 0 to 10 V modulating signal

10.5 Post-Heat

10.5.1 0 to 10 V modulating signal

10.6 Hydronic Heating or Cooling

10.6.1 0 to 10 V modulating signal

10.6.2 Return water temp sensor input

10.7 W Controller Signals

10.7.1 0 to 10 V modulating signal

10.7.2 On/Off command

10.7.3 Mode (Heat/Cool)

10.7.4 CU in defrost mode (Input)