Dehumidification with a Fan Coil Unit Using a myRoom Palladiom Thermostat

Dehumidification Design Requirements

For dehumidification to be effective, the HVAC system and the room must be properly designed. It is the responsibility of the mechanical, electrical, and plumbing (MEP) contractor or engineer to ensure this is done. See below for requirements on successful dehumidification:

- The fan coil unit (FCU) cooling coil temperature must be below the dew point temperature of the air in order to condense water and lower the humidity. If the coil temperature is above the dew point, condensation on the coil cannot occur.

- The FCU must have sufficient cooling capacity with a supplied chilled water temperature that is cold enough. Consult with the FCU manufacturer to quantify the moisture removal rate at the FCU operating point and ASHRAE peak dewpoint design conditions.

- The condensed water must be removed from the room to lower the humidity. Water remaining in a drip pan or on the coil can evaporate into the room and increase humidity. Correct FCU installation and condensate drain system maintenance is required for proper condensate removal.

- Proper placement of the myRoom Palladiom thermostat is required to accurately measure the relative humidity and room temperature of a room. Follow the "Mounting" instructions on the spec submittal for more information.

- For moisture control beyond occasional drying or where short-term humidity conditions vary significantly, consider using a dedicated dehumidifier (by others) in the HVAC system for continuous drying on demand. This dehumidifier should have an independent control as the Palladiom thermostat cannot share humidity sensor information with third-party systems.

Available Dehumidification Modes

There are two different dehumidification modes available with the myRoom Fan Coil Unit (FCU) controller – Cooling-Only and Cooling-with-Reheat. Cooling-Only dehumidification mode turns the cooling coil and the fan on to allow condensation on the FCU cooling coil, thereby reducing moisture in the air. Cooling-with-Reheat will also turn on the heating coil (if available) to reheat the air before returning it to the space.

Note that dehumidification with a fan coil unit may cause the room to be colder than the desired setpoint, even when the room is occupied by a guest.

Cooling-Only Dehumidification

When using Cooling-Only dehumidification, dehumidification mode is active when the relative humidity exceeds the allowable range and the room temperature is greater than the minimum allowed. The cooling coil will turn on at the maximum setting available and the fan will turn on at the lowest speed in order to allow moisture from the air to condense on the cooling coil. The controller will turn off the coil and fan when either the relative humidity or room temperature fall below their allowable range.

Cooling-with-Reheat Dehumidification (Recommended for Best Performance)

This is the recommended method because the fan coil unit will heat the air after moisture is extracted by the cooling coil helping to prevent sub-cooling. This method is only available if the HVAC equipment is a 4-pipe system with the heating coil in the reheat position, after the cooling coil.

The algorithm explained in the Cooling-Only dehumidification section is used with the addition of the heating coil running with the cooling coil in order to reheat the air before entering the room. This helps to prevent the room temperature from dropping below the Overcool Offset Temperature.

Configuration

The parameters listed below can be modified in the Palladiom thermostat advanced configuration menu to configure dehumidification, however if the HVAC system and room are not properly designed, no adjustments will provide proper dehumidification. For full instructions on advanced configuration, refer to the Palladiom Thermostat & FCU Controller Configuration Instructions (P/N 041563) at www.lutron.com.

Category	ID	Name	Description	Value		
				Default	Increment	Range
Dehumidification Configuration	33	Enable Dehumidification	0=Disabled; 1=Enabled	0=Disabled	—	0–1
	34	Dehumidification Mode	1=Over-cool only; 2=Over-cool with heating (for 4-pipe). Dehumidification must be enabled to run.	1=Over-cool only	—	1–2
	35	Humidity Deadband	Inactive range around the humidity setpoint.	10% RH	1% RH	5–20
	36	Overcool Offset Temperature	Degrees below the setpoint deadband to continue cooling for dehumidification if humidity setpoint has not been reached.	2 °F	0.1 °F	0.1–5.0
	37	Dehumidification Setpoint	Relative humidity (RH) setpoint by dehumidification only.	50% RH	1% RH	0–100

Troubleshooting

• Despite actively cooling, the relative humidity of the room is not being lowered.

   – Ensure that the temperature of the cold water pipe is lower than the dew point temperature of the area.

   – Ensure that all windows and doors are closed and no humid air is leaking into the room.

   – Ensure that the condensate drip pan is draining properly and free of water.

• The cooling continues to be active despite the room temperature being below the setpoint.

   – Ensure the Overcool Offset Temperature (advanced configuration parameter 36) is set to the desired temperature. Refer to the Palladiom Thermostat & FCU Controller Configuration Instructions (P/N 041563) at www.lutron.com for instructions on how to access this parameter.

Lutron Contact Numbers

WORLD HEADQUARTERS
USA
Lutron Electronics Co., Inc.
7200 Suter Road
Coopersburg, PA 18036-1299
TEL: +1.610.282.3800
FAX: +1.610.282.1243

support@lutron.com

www.lutron.com/support

North & South America
Customer Assistance
USA, Canada, Caribbean:
1.844.LUTRON1 (1.844.588.7661)
Mexico:
+1.888.235.2910
Central/South America:
+1.610.282.6701

EUROPEAN HEADQUARTERS
United Kingdom
Lutron EA Limited
125 Finsbury Pavement
4th floor, London EC2A 1NQ
United Kingdom
TEL: +44.(0)20.7702.0657
FAX: +44.(0)20.7480.6899
FREEPHONE (UK): 0800.282.107
Technical Support: +44.(0)20.7680.4481

lutronlondon@lutron.com

ASIAN HEADQUARTERS
Singapore
Lutron GL Ltd.
390 Havelock Road
#07-04 King's Centre
Singapore 169662
TEL: +65.6220.4666
FAX: +65.6220.4333
Technical Support: 800.120.4491

lutronsea@lutron.com

Asia Technical Hotlines
Northern China: 10.800.712.1536
Southern China: 10.800.120.1536
Hong Kong: 800.901.849
Indonesia: 001.803.011.3994
Japan: +81.3.5575.8411
Macau: 0800.401
Taiwan: 00.801.137.737
Thailand: 001.800.120.665853
Other Countries: +65.6220.4666

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