

VARITEC™ CONTROLS & SERVICE SOLUTIONS

Controls Humidity Guide

CONTROL COMPLAINTS

Humidity problems impact comfort, indoor air quality, and occupant confidence. This guide provides practical steps for diagnosing issues before they become chronic problems.

PROTECT BUILDING PERFORMANCE

Identify hidden moisture sources, verify system operation, and use trending data to make informed decisions instead of reacting to alarms.

Humidity Troubleshooting Flow

VERIFY THE SENSOR FIRST

Symptoms
Space RH reading swings wildly
System never satisfies humidity setpoint

Gotchas
Sensor located in supply diffuser
Sensor in sunlight
Sensor near doorways

Fix
Verify calibration
Relocate sensor to return air path
Compare BAS reading vs handheld probe

CHECK COIL LEAVING AIR TEMPERATURE

Symptoms
Space humidity stays high
Unit runs but never dries space

Gotchas
Coil leaving temp too warm
Supply air above 55°F
DX systems only dehumidify when air is cold enough

Fix
Lower coil setpoint
Verify airflow not too high
Lower airflow → colder coil → better moisture removal

VERIFY REHEAT OPERATION

Symptoms
Space temperature drops too low during humidity control
BAS disables dehumidification cycle

Gotchas
Reheat valve disabled
HGRH not enabled in sequence
Supply temperature limit blocking dehumidification

Fix
Confirm reheat sequence
Verify control valve operation
Check supply temp limits

CHECK ECONOMIZER / OA DAMPERS

Symptoms
Humidity spikes during mild weather
High RH during shoulder seasons

Gotchas
Economizer bringing in moist outdoor air
OA minimums too high

Fix
Add dewpoint lockout
Reset minimum OA during high humidity

VERIFY AIRFLOW

Symptoms
Unit cools space but humidity remains high

Gotchas
Excess airflow reduces coil latent performance

Rule of thumb:
Airflow Dehumidification
400+ CFM/ton Poor
350 CFM/ton Better
Lower airflow increases coil moisture removal.

CONFIRM UNIT IS NOT OVERSIZED

Symptoms
Space reaches temperature quickly
Unit cycles frequently
Humidity stays high

Gotchas
Oversized equipment short cycles and never removes moisture.

Fix
Add reheat dehumidification mode
Consider dedicated OA unit

Humidity Investigation Checklist

Check	Why It Matters	Status
Coil Clean	Dirty coils reduce heat transfer and moisture removal.	□ Pass □ Fail
Condensate Present	No water often means little moisture removal is occurring.	□ Pass □ Fail
Drain Trap Correct	Improper traps can reduce drainage and impact performance.	□ Pass □ Fail
Airflow Near Design	Excess airflow reduces latent capacity.	□ Pass □ Fail
OA Dampers Operating	Excess outside air is a major humidity contributor.	□ Pass □ Fail
Humidity Sensor Verified	Bad data creates bad control decisions.	□ Pass □ Fail

Results

0-1 Issues Found
Your humidity issue may require deeper operational review.

2-3 Issues Found
One or more common root causes likely identified.

4+ Issues Found
Multiple factors are contributing to humidity issues and should be fixed before equipment replacement.

MECHANICAL CAUSES OF HIGH HUMIDITY

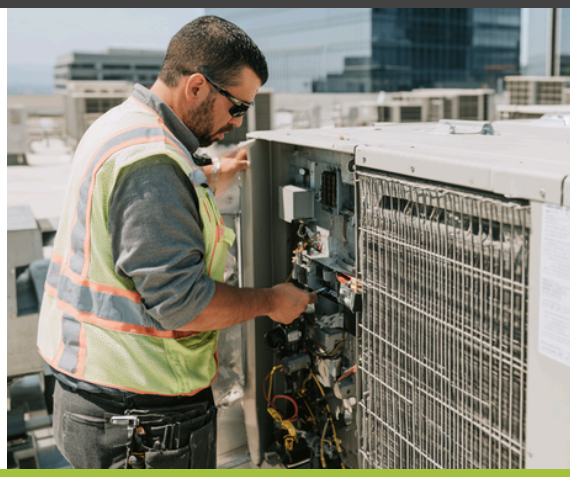
Many humidity problems appear to be equipment failures when they're actually operational or installation issues.

Before replacing equipment or increasing capacity, check these common causes.

Is the Coil Actually Getting Cold Enough?

A cooling coil can only remove moisture if it is cold enough to condense water vapor from the air. If leaving air temperatures are too warm, the unit may satisfy temperature requirements while doing very little dehumidification.

Quick Tip: Verify leaving air temperatures are meeting design intent. Supply air above 55°F often indicates limited moisture removal capability.



Is Outside Air Excessive?

Outdoor air is often the largest source of moisture entering a building. Bringing in more outside air than necessary can overwhelm even properly functioning equipment.

Quick Tip: Compare actual outside air intake to design requirements and verify economizer operation during humid conditions.

Is Condensate Being Produced?

A properly dehumidifying system should be removing moisture from the air. One of the easiest field indicators is water leaving the drain during cooling operation.

Quick Tip: If the unit is cooling but little or no condensate is present, investigate airflow, refrigerant performance, chilled water temperatures, or coil conditions.

Is the Drain System Working Properly?

Blocked drains, improper trap configurations, or standing water can impact moisture removal and create additional humidity-related issues.

Quick Tip: Confirm condensate drains freely, traps are installed correctly, and there are no signs of water carryover or pooling.

Is Airflow Near Design?

Higher airflow is not always better. Excessive airflow can move air across the coil too quickly, reducing the amount of moisture removed.

Quick Tip: Airflow above approximately 400 CFM per ton often reduces latent cooling performance. Many dehumidification applications perform better closer to 350 CFM per ton.

CONTROLS CAUSES OF HIGH HUMIDITY

Controls are often blamed even when control sequences are responding exactly as programmed.

Before changing setpoints or rewriting sequences, verify these common items.

ARE SUPPLY AIR TEMPERATURE LIMITS PREVENTING DEHUMIDIFICATION?

Supply temperature reset strategies designed for energy savings can sometimes limit dehumidification performance.

Quick Tip: Review supply air temperature minimums and reset schedules to ensure they do not interfere with latent cooling requirements.

IS THE HUMIDITY SENSOR ACCURATE?

The control system can only react to the information it receives. A poorly located or inaccurate sensor can make a healthy system appear broken.

Quick Tip: Compare BAS readings to a calibrated handheld instrument. Sensors located near diffusers, exterior doors, or direct sunlight frequently create misleading readings.

IS REHEAT AVAILABLE WHEN NEEDED?

Many dehumidification strategies require cooling air below the space temperature setpoint and then reheating it before delivery to occupied spaces.

Quick Tip: Verify reheat valves, hot gas reheat, or electric reheat sequences are available and enabled during humidity control operation.

ARE ECONOMIZER LOCKOUTS FUNCTIONING PROPERLY?

Many buildings unintentionally introduce moisture when economizers continue bringing in outdoor air during humid weather conditions.

Quick Tip: Review outdoor air humidity or dewpoint lockout strategies. Dry-bulb temperature alone does not tell the whole story.

IS THE HUMIDITY SEQUENCE OPERATING AS INTENDED?

Over time, overrides, software changes, and operational adjustments can cause sequences to drift from their original design intent.

Quick Tip: Compare current operation to the original sequence of operations and verify humidity control stages are being called when required.

HIDDEN BUILDING GOTCHAS



Return Air Pulled From Humid Spaces

Pool areas, kitchens, locker rooms, and vestibules often introduce unexpected moisture.

Wet Concrete

New buildings can release moisture for months after occupancy.

Missing Vapor Barriers

Building envelope issues can overwhelm otherwise healthy HVAC systems.

OA Intake Location

Moisture can be unintentionally introduced if intakes are near cooling towers, irrigation, or exhaust streams.

Space Pressurization Problems

Negative building pressure can pull humid outdoor air through doors, windows, and wall penetrations.

TREND THESE POINTS

- Outside Air Temperature
- Outdoor conditions often change faster than occupants realize.
- Outside Air Relative Humidity
- Essential during monsoon season.
- Dew Point
- Often the most valuable humidity metric.
- Space Temperature
- Humidity alone doesn't tell the whole story.
- Space Relative Humidity
- Verify occupant conditions
- Supply Air Temperature
- Helps identify latent vs sensible cooling issues.
- Mixed Air Temperature
- Can reveal economizer or outside air problems.
- Outside Air Damper Position
- One of the most overlooked causes of humidity issues.
- Building Pressure
- Positive and negative pressure can affect moisture migration.
- Humidifier Output
- Verify actual performance versus command.





ALARM ON

- High space RH
- High dew point
- Outside air damper stuck open
- Humidifier at 100% output with low humidity
- Sensor failures or unreasonable values
- Building pressure outside acceptable range
- Solutions
- Trend humidity and dew point together
- Compare outdoor conditions to indoor conditions
- Verify sensors annually
- Review building pressure before replacing equipment
- Use analytics to identify patterns rather than chasing individual alarms

Still Chasing a Humidity Problem?

If you've worked through this guide and the issue still isn't clear, the problem may extend beyond a single sensor, sequence, or piece of equipment.

Humidity issues are often the result of multiple factors working together like outside air, airflow, controls, building pressure, equipment performance, and operational drift.

Need a Second Set of Eyes?

We're here to help.

602-943-1511

vcssinfo@varitecsolutions.com

variteccontrols.com

