Reducing HVAC Maintenance and Maintenance Recommendations

Perry Mechanical Systems

Overview

- Items and options to think about with your HVAC equipment to reduce maintenance and down time on equipment
- RTUs
- Chillers
- VFDs
- AHUs
- Tips and ideas to prevent future problems with your HVAC equipment

RTU and Chiller Condenser Coils

Coil coatings

- Helps prolong coil life
- One of the most common failures on HVAC equipment in the RGV if not maintained.
- Coils still need to be cleaned!!!!









RTU and Chiller Condenser Coils

Hail Guards

- Helps prolong coil life
- For RGV, mainly to protect from sun damage
- UV rays degrade coils, not just salty air





RTU

Hinged Access doors

Even standard units have a hinged access door option, but typically not in stock



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RTU

Auto belt tensioner

- Standard packaged units over 5-tons typically do not have an option for direct drive fans, only belt drive.
- Auto belt tensioners can be added to help increase belt life.



Chiller - flow switch

Paddle flow switch to thermal dispersion type flow switch

- Most common chiller failure
- Very inexpensive option to switch to thermal dispersion
- Ask for "factory installed thermal dispersion flow switch"



Chiller – scroll chillers

Consider scroll chillers up to 225-tons of cooling

- Air-cooled scroll chillers are typically easier for technicians to work on over screw chillers.
- Efficiency of scroll chillers has increased in the past 5 years.





Chiller – oil-free chillers

Consider oil-free water cooled chillers

No oil means less leaks, less moving parts (no oil pumps, etc) and higher efficiency.





Outdoor units

Cabinet coatings

- Protects cabinets/compressors for longer unit life in areas of high corrosion
- Typically recommended for larger or more expensive equipment (chillers and large/specialty packaged units)



VFDs

- Provide a soft start for pumps or fans, prolonging life. Close in price to a starter and provides energy savings.
- VFDs should be mounted to the wall when AHU/pump is in mechanical room





VFD Bypass

- If a VFD fails, bypass allows the pump/fan to run at constant speed until VFD is replaced when there is time.
- BAS should provide an alarm if there is a failure.





VFD Battery Backup

- VFD manufacturers have an option for a battery backup that will save configurations in the event of power loss to the drive.
- Helps save time to not have to reprogram the drive.



BAS Controls

- Request BAS to pull in the alarm codes for the equipment, not just show "Alarm".
- This will get you more information about the problem and save technicians time in the field.

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Access doors for AHUs

Access doors

- If you want more access for your equipment, request it from the engineer or architect if you have service space issues with AHUs.
- Access door length on AHUs is customizable, 8" to 24"+.



AHU Fans – belt drive vs direct drive

Belt drive fans

 Requires maintenance on belts

- Direct drive fans
 - Requires VFD to set the speed
 - VFDs typically specified





Energy Efficient AHUs

Fans

- Direct Drive vs Belt Drive
 - No Drive Losses
 - □ Belt losses can be 3%-8%
 - Maintenance no belts!
 - If VFD is used, recommend using Direct Drive





Multiple fan AHUs

Multiple fans

- Unit can still run if one motor fails, from 50% to 100% airflow
- Request access for both fans, both sides of unit or front of unit
- Smaller motors that are more readily available



ECM Fans on AHUs

ECM

- 0-10V speed control built into fans (no VFD needed)
- Offers redundancy
- Approx 5,000 cfm per fan



"Bulletproof" AHU?

- Chilled water Control Valve that fails open
- Multiple direct drive fans, each with a VFD or multiple ECM fans.
 - Those are the main failure points on an AHU

Ionization Bar

- Mount to the entering air side of the coil to keep the coil clean, similar to a UV light, but with no bulbs to change.
- Cleans the air, removes VOCs (not CO2)





VRF

Locate outdoor units in the building



- Internal/Restricted install possible
- Static pressures to 0.32WG
- Noise, sight or location issues mitigated



100% OA Options

- Enthalpy Core
 - No moving parts
 - Water washable
 - Sensible and Latent Recovery





Maintenance Tips to reduce downtime

- Tips and ideas for maintenance staff to reduce downtime of equipment
 - Condenser Fans
 - Coils
 - Drains
 - Electrical
 - Fans
 - VFDs
 - Training

Maintenance Logs

- Manufacturers sometimes ask for maintenance logs for equipment with certain failures (especially coils!)
 - Document annual maintenance done on equipment and especially coil cleanings performed

Make & Model:		Location:				49-mm						
Task Description	D	w	2W	M	3M	6M	A	Notes.	Annual Requirements to Short Life & Consumable Spare Parts.			
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Check the operation and abnormal noise / sound.	X											1
Take log sheet every 2 hours.	X			+			-		1			+
Check power supply for fluctuation	X			1								
Check Oil Level	X			1								1
Check Oil temperature	X			1								1
Check gas level	X			1					1			1
Check flow switch functioning	X						-					
Check Control & electrical connection.				X	ľ.		1					
Check all safety control						X						
Check vane operation				X								
Lubricate vane linkage and other Moving parts.						X						
Calibrate all gauges						X						

Condensing Units

Condenser fans

If you hear strange noise, probably unbalanced, check rivets, and fix/replace the fan before failure.



Fan Motors

Check electrical

If fan motor is out of tolerances for amp draw, replace it instead of waiting for failure.



Coils

Coil cleaning

- All outdoor coils need to be cleaned as often as possible, refer to IOM for recommended cleaning frequency and
- Typically just cleaned with water, most manufacturers do not recommend using any chemicals
- R-410a is a higher pressure than R-22, coils need to be cleaned to prevent leaks and high pressure trips.



Drains

Condensate Drains

Keep drains clean to prevent overflow of water into other areas of your equipment and the building.



Electrical – applicable for all HVAC

Check electrical connections

- Very common problem with chillers, packaged units, VFDs...
- Check control wiring when working on equipment
- VFDs mounted to pump/AHU
 - Over current and phase loss are often loose connections
 - Loose connections and fuses are most common issue
- When troubleshooting issues
 - Check voltage and currents to see if it is within range



Training

- Buy an annual service and send your techs to assist/learn
- Best way to learn the equipment



Questions

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