
Commercial Rooftop Unit (RTU) Preventive Maintenance and Filter Change

1.0 Maintenance Objective & Frequency

The objective of this procedure is to perform a comprehensive preventive maintenance inspection and filter change on a commercial rooftop unit (RTU). This PM ensures adequate airflow across the evaporator coil, prevents compressor short-cycling from high-pressure trips, reduces fan motor amp draw, and maintains indoor air quality. The required frequency is quarterly (every 3 months) or more frequently if the unit is in a dusty environment or operates under high load conditions.

2.0 Lockout/Tagout (LOTO) & Safety

- **Electrical Isolation:** Disconnect all power to the RTU at the fused disconnect switch located on the unit or at the building main distribution panel. Apply a personal lock and tag.
- **Verify Zero Energy:** Use a non-contact voltage tester to confirm that power is off at the unit's control panel and compressor contactor.
- **Fall Protection:** If accessing the unit requires climbing onto the roof, use a properly anchored fall arrest system or guardrails as per local safety codes.
- **PPE:** Wear safety glasses, cut-resistant gloves, and steel-toed boots. Use hearing protection if the unit is near other operating equipment.
- **Hot Surfaces:** Allow the unit to cool for at least 10 minutes after shutdown before opening access panels to avoid contact with hot compressor or discharge line surfaces.

3.0 Required Tools, Parts & Lubricants

- Replacement air filters (MERV 8 or as specified by OEM, measure existing filter size)
- 5/16-inch and 1/4-inch nut drivers
- Flathead and Phillips screwdrivers
- Non-contact voltage tester
- Clamp-on ammeter (AC/DC)
- Digital manifold gauge set (R-410A or R-22 compatible)
- Thermometer (infrared or probe type)
- Fin comb (for coil cleaning if needed)
- Coil cleaner (compatible with aluminum fins)
- Spray bottle with water
- Shop vacuum with brush attachment
- Lint-free rags
- Penetrating oil (e.g., WD-40)
- Personal lock and tag set

4.0 Step-by-Step Maintenance Procedure

1. Perform LOTO as described in Section 2.0. Confirm zero energy with a non-contact voltage tester at the unit disconnect and control panel.
2. Remove the access panels for the filter section, blower compartment, and condenser section. Use the appropriate nut driver or screwdriver. Store hardware in a safe location.
3. Inspect and replace the air filters. Remove the old filters and note the direction of airflow arrows. Vacuum the filter rack and seal surfaces. Install new filters with the arrows pointing toward the blower. Ensure a snug fit with no gaps.
4. Inspect the evaporator coil. Use a flashlight to check for dirt, debris, or frost. If dirty, gently clean the coil using a fin comb to straighten bent fins, then apply coil cleaner according to the manufacturer's instructions and rinse with water from a spray bottle. Allow to drain.
5. Inspect the condenser coil. Remove any debris (leaves, grass, plastic) from the coil surface. Straighten bent fins with a fin comb. If heavily soiled, clean with coil cleaner and rinse thoroughly. Ensure the condenser fan blade is clean and spins freely.
6. Check the blower assembly. Inspect the blower wheel for dirt buildup; clean with a brush and vacuum if necessary. Verify that the blower motor mounting bolts are tight. Lubricate motor bearings if the motor has oil ports (use a few drops of non-detergent electric motor oil).
7. Inspect the condenser fan motor and blade. Check for excessive vibration or wobble. Tighten the fan set screw. Lubricate motor bearings if applicable. Ensure the fan guard is secure.
8. Check all electrical connections inside the control panel. Torque all terminal screws on contactors, relays, and terminal blocks to the manufacturer's specification (typically 20-30 in-lbs). Look for signs of overheating (discolored insulation, pitted contacts). Replace any damaged components.
9. Inspect the condensate drain pan and drain line. Pour a cup of water into the pan to verify drainage. Clear any blockages using a wet/dry vacuum or a stiff wire. Apply a pan tablet or biocide to prevent algae growth.
10. Check the condition of the belts (if applicable). Inspect for cracks, fraying, or glazing. Measure belt tension using a belt tension gauge; adjust per OEM spec (typically 1/2-inch deflection per foot of span). Replace belts if worn.
11. Inspect the refrigerant lines and connections. Look for oil stains indicating leaks. Use an electronic leak detector if a leak is suspected. Check the insulation on the suction line; repair or replace if damaged.
12. Reinstall all access panels and secure with hardware. Ensure all panels are properly seated to prevent air leaks and water ingress.

5.0 Verification & Return to Service

1. Remove LOTO devices and restore power to the unit. Set the thermostat to call for cooling.
2. Verify compressor and fan operation. Listen for unusual noises. Measure the compressor amp draw with a clamp-on ammeter and compare to the nameplate RLA (should be within 10% of rated load).
3. Check refrigerant pressures using manifold gauges. For a typical R-410A system, low side should be 110-130 psig and high side 250-350 psig (ambient temperature dependent). Calculate superheat and subcooling per OEM specs.
4. Measure the temperature drop across the evaporator coil. Using a thermometer, record the return air temperature and supply air temperature. A proper drop is 15-20°F (8-11°C) for cooling mode.
5. Verify that the condensate drain is flowing freely during operation. Check for water leaks around the unit base.
6. Record all readings (amp draw, pressures, temperatures, filter size, date) on the PM work order in ServiceGrid. Note any deficiencies or recommended repairs.

7. Sign off on the PM work order in ServiceGrid and mark the unit as operational.

Regulatory Disclaimer: This document is a generic maintenance template provided for educational and informational purposes only. It does not constitute professional engineering or reliability advice. The end-user assumes all liability for validating all step sequences, torque specs, and LOTO protocols against specific machinery OEM manuals before deployment to a live production floor.