|  |  |
| --- | --- |
| FT: | **23 62 13** |
| **ITEM:** | **Air Cooled – Condensing Units – Heat pumps** |
| **ID:** |  |
| **AREA SERVED:** | Admin area, store front, break room, Deli/Bakery |

Form Filled Out By:

|  |  |  |
| --- | --- | --- |
|  | **Name & Company** | **Date** |
| GC |  |  |
| MC |  |  |
| EC |  |  |
| BC |  |  |
| CC |  |  |
| OR |  |  |
| A/E |  |  |
| CA |  |  |

GC = General Contractor; MC = Mechanical Contractor; EC = Electrical Contractor; BC = Balancing Contractor; CC = Controls Contractor; OR = Owner Representative; A/E = Architect/Engineer; CA = Commissioning Agent

XX = No Initials Required

# TEST PREREQUISITES

The following items have been completed and the equipment is ready for Functional Testing.

Check if OK. Enter note number if deficient.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Item | **GC** | **MC** | **EC** | **BC** | **CC** | **OR** | **A/E** | **CA** |
| Unit startup completed | XX |  | XX | XX | XX |  |  |  |
| Start-up report submitted | XX |  | XX | XX | XX |  |  |  |
| Test and Balance (TAB) completed | XX |  | XX |  | XX |  |  |  |
| SOO programmed | XX |  | XX | XX |  |  |  |  |
| Prefuctional Checklist completed | XX |  | XX | XX | XX |  |  |  |

# SENSOR CALIBRATION VERIFICATIONS (if applicable)

* Check a representative sample of sensors for calibration and adequate location.
* Test the packaged controls and BAS readings.
* Use the same test instruments as used for the original calibration, if possible.
* Verify that the sensor reading (via the permanent thermostat, gage, packaged control panel or building automation system (BAS)) compared to the test instrument-measured value is within the tolerances specified in the contract requirements. (\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_).
  + "In calibration" means making a reading with a calibrated test instrument within 6 inches of the site sensor.
  + For items out of calibration or adjustment, fix now if easy, via an offset in the BAS, calibration or replacement of sensor.

| **Sensor &**  **Location** | **Location OK1** | **1st Gage / Pkg**  **& BAS Value** | **Test Inst**  **Value** | **Final Gage / Pkg**  **& BAS Value** | **Pass**  **Y/N?** |
| --- | --- | --- | --- | --- | --- |
|  |  | Pkg:  BAS: |  | Pkg:  BAS: |  |
|  |  | Pkg:  BAS: |  | Pkg:  BAS: |  |
|  |  | Pkg:  BAS: |  | Pkg:  BAS: |  |
|  |  | Pkg:  BAS: |  | Pkg:  BAS: |  |
|  |  | Pkg:  BAS |  | Pkg:  BAS |  |

1Sensor location is appropriate and away from causes of erratic operation.

# DEVICE CALIBRATION VERIFICATIONS (if applicable)

* Check a representative sample of actuators and devices for calibration and adequate operation.
  + "In calibration" means observing a readout in the BAS and going to the actuator or controlled device and verifying that the BAS reading is correct.
  + For items out of calibration or adjustment, fix now if easy, via an offset in the BAS, or a mechanical fix.

| **Device / Actuator &**  **Location** | **Procedure** | **1st BAS**  **Value** | **Site**  **Observation** | **Final BAS**  **Value** | **Pass**  **Y/N?** |
| --- | --- | --- | --- | --- | --- |
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# FUNCTIONAL PERFORMANCE VERIFICATIONS

**Demonstrate operation of equipment per Contract Documents including the following:**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Sequence of Operations Checks:** | |  |  |  |  |  |
| The following is a step by step test to verify the system follows the design sequence of operation. The test procedure column indicates what adjustments are needed for testing. Each step is either pass or fail. | | | | | | |
| **Step** | **Test Procedure** | | |  |  | **Pass/Fail** |
| **Functional Test** | | | | | | |
| 1 | Power the unit off from the local disconnect switch. | | | | |  |
| 2 | Verify Loss of status at RMCS or Alarm (something to alert front end the unit is off when in scheduled occupancy.) | | | | |  |
| 3 | Fan is off | | | | |  |
| 4 | OSA damper is closed | | | | |  |
| 5 | Compressor, condensers fan & heating stages off. | | | | |  |
| 6 | Restore power to the unit. | | | | |  |
| 7 | RMCS control is regained, alarms cleared, unit resumes operation in the scheduled mode of operation. Record current mode\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | | | | |  |
| **Occupied Mode** | | | | | | |
| 8 | If not already in Occupied cooling mode override unit schedule to Occupancy. Override zone temperature setpoint to 70 degrees F or change setpoints as needed to initiate call for cooling. | | | | |  |
| 9 | Verify OSA damper is open to scheduled minimum. | | | | |  |
| 10 | Dx cooling stage is activated. Record RAT\_\_\_\_\_\_\_\_ MAT\_\_\_\_\_\_\_\_\_LAT\_\_\_\_\_\_\_\_reported by the RMCS if provided. | | | | |  |
| 11 | Heating stage is locked out | | | | |  |
| 12 | Override Zone temperature setpoint to current zone temperature | | | | |  |
| 13 | Cooling stage is deactivated Record : RAT\_\_\_\_\_\_\_\_ MAT\_\_\_\_\_\_\_\_\_LAT\_\_\_\_\_\_\_\_ OAT\_\_\_\_\_\_\_\_\_\_ | | | | |  |
| 14 | Fan remains on | | | | |  |
| 15 | OSA damper remains open to minimum position. | | | | |  |
| 16 | Heating stage is locked out | | | | |  |
| 17 | Override Zone temperature setpoint to put unit into heating mode | | | | |  |
| 18 | Dx cooling stage locked out | | | | |  |
| 19 | Fan remains on | | | | |  |
| 20 | OSA damper remains open to minimum position. | | | | |  |
| 21 | Heating stage is activated furnace fires after local safeties cleared Record : RAT\_\_\_\_\_\_\_\_ MAT\_\_\_\_\_\_\_\_\_LAT\_\_\_\_\_\_\_\_ OAT\_\_\_\_\_\_\_\_\_\_ | | | | |  |
| **Unoccupied Mode** | | | | | | |
| 22 | Override occupancy schedule to unoccupied | | | | |  |
| 23 | Unit operates based on unoccupied temperature setpoints | | | | |  |
| 24 | Fan is off | | | | |  |
| 25 | Cooling stage is deactivated Record : RAT\_\_\_\_\_\_\_\_ MAT\_\_\_\_\_\_\_\_\_LAT\_\_\_\_\_\_\_\_ OAT\_\_\_\_\_\_\_\_\_\_ | | | | |  |
| 26 | OSA damper is closed | | | | |  |
| 27 | Override Zone temperature to 57 Degrees F | | | | |  |
| 28 | Fan is on | | | | |  |
| 29 | Heating stage is activated furnace fires after local safeties cleared Record : RAT\_\_\_\_\_\_\_\_ MAT\_\_\_\_\_\_\_\_\_LAT\_\_\_\_\_\_\_\_ OAT\_\_\_\_\_\_\_\_\_\_ | | | | |  |
| 30 | OSA damper remains closed | | | | |  |
| 31 | Override zone temperature to 80 Degrees F | | | | |  |
| 32 | Fan is On | | | | |  |
| 33 | Dx cooling stage is activated. Record RAT\_\_\_\_\_\_\_\_ MAT\_\_\_\_\_\_\_\_\_LAT\_\_\_\_\_\_\_\_ | | | | |  |
| 34 | With cooling stage active in unoccupied mode override zone temperature back to 72 Degrees F give Dx compressor time to cycle back off then quickly override zone setpoint back to 80 Degrees F. | | | | |  |
| 35 | Verify internal unit (anti-cycle) safety locks out compressor for( X ) minutes before allowing cooling stage to reactivate | | | | |  |
| 36 | Fan is on | | | | |  |
| 37 | OSA damper is closed | | | | |  |
| 38 | Override Zone temperature to 78 Degrees F | | | | |  |
| 39 | Fan is off | | | | |  |
| 40 | OSA Damper closed | | | | |  |
| 41 | Cooling And heating stages are deactivated | | | | |  |
| **Morning Warm-up/cool down** | | | | | | |
| 42 | Leave zone temperature overridden to 78 Degrees F. Override occupancy schedule to shift the unit into Morning Warm-up cool down | | | | |  |
| 43 | Demonstrate this function is built into daily schedule. Record time or(describe) | | | | |  |
| 44 | Fan is On | | | | |  |
| 45 | OSA damper is closed | | | | |  |
| 46 | Cooling stage is active attempting to satisfy 75 Degrees F setpoint | | | | |  |
| 47 | Heating stage Is locked out Record RAT\_\_\_\_\_\_\_\_ MAT\_\_\_\_\_\_\_\_\_LAT\_\_\_\_\_\_\_\_ | | | | |  |
| **Safeties Alarms** | | | | | | |
| 48 | Release all overrides for zone temperature and schedule allow system to return to normal occupied operation, Fan is on, OSA damper open to minimum position, Heating or cooling on as necessary Record RAT\_\_\_\_\_\_\_\_ MAT\_\_\_\_\_\_\_\_\_LAT\_\_\_\_\_\_\_\_Zone Temp\_\_\_\_\_\_\_\_ | | | | |  |
| 49 | Pull relay for or Activate the Emergency Ventilation Shutdown | | | | |  |
| 50 | Fan is off | | | | |  |
| 51 | OSA damper is closed | | | | |  |
| 52 | Heating & cooling is off | | | | |  |
| 53 | Alarm is generated that unit is off during scheduled occupancy | | | | |  |
| 54 | Clear the Ventilation shut down condition. And Allow the unit to comeback to normal operation on its own | | | | |  |
| 55 | Pull relay for or activate the Fire/Smoke Alarm | | | | |  |
| 56 | Fan is off | | | | |  |
| 57 | OSA damper is closed | | | | |  |
| 58 | Heating & cooling is off | | | | |  |
| 59 | Alarm is generated that unit is off during scheduled occupancy | | | | |  |
| 60 | Clear the Fire/Smoke alarm shut down condition. And Allow the unit to comeback to normal operation on its own | | | | |  |
| 61 | Verify if Dirty filter Dp notification is set-up for unit? If so over Dp setpoint to trigger the notification | | | | |  |
| 62 | Under dirty filter Alert condition unit fan and heating cooling should remain on | | | | |  |
| 63 | With unit active disable the fan locally | | | | |  |
| 64 | Unit Cooling and Heating are locked out | | | | |  |
| 65 | OSA damper is closed | | | | |  |
| 66 | Fan Failure Alarm generated | | | | |  |
| 67 | Restore unit to normal operation. Simulate a condition where communication with the RMCS is lost | | | | |  |
| 68 | Unit resumes last command? | | | | |  |
| 69 | Unit shuts down? | | | | |  |
| 70 | Reestablish communication with RMCS | | | | |  |
| 71 | Unit resumes normal operation automatically | | | | |  |

# OUTSTANDING ITEMS

Note outstanding items in table below. Use numbers referenced above.

|  |  |  |
| --- | --- | --- |
| Resolved (Initial / Date) | **Note** | Description |
|  | **1.** |  |
|  | **2.** |  |
|  | **3.** |  |
|  | **4.** |  |
|  | **5.** |  |
|  | **6.** |  |
|  | **7.** |  |
|  | **8.** |  |
|  | **9.** |  |
|  | **10.** |  |

# FIELD NOTES

Fill in as appropriate.

|  |
| --- |
|  |
|  |
|  |
|  |
|  |

# SIGN OFF

System / Equipment has been installed in accordance with the Contract Documents and is ready for Owner acceptance.

|  |  |  |
| --- | --- | --- |
|  | **Signature** | **Date** |
| **Contractor’s Representative** |  |  |
| **A /E Representative** |  |  |
| **Commissioning Agent** |  |  |
| **Owner’s Representative** |  |  |

## END OF TEST