

Functional Test

Project: _____

**FT-_____ SPLIT AC UNIT AC-1; FCU-2
including
TELECOM ROOM C-104 SPACE TEMPERATURE CONTROL
Including integral equipment: ASU-4; TU-1-43
Related Tests: ASU-4**

1. Participants

<u>Party</u>	<u>Participation</u>
_____	_____
_____	_____
_____	_____

Party filling out this form and witnessing testing _____
Date of test _____

2. Prerequisite Checklist

- a. The following have been started up and startup reports and prefunctional checklists submitted and approved ready for functional testing:
 AC-1; FCU-2

 - b. TU-1-43 has successfully completed functional testing.
 - c. ASU-4 has successfully completed functional testing
 - d. All control system functions for this and all interlocking systems are programmed and operable per contract documents, including final setpoints and schedules with debugging, loop tuning and sensor calibrations completed.
- _____
 Controls Contractor Signature or Verbal Date
- e. Vibration control report approved (if required).
 - f. Test and balance (TAB) completed and approved for the hydronic systems and terminal units connected.
 - g. All A/E punchlist items for this equipment corrected.
 - h. These functional test procedures reviewed and approved by installing contractor.
 - i. Safeties and operating ranges reviewed.
 - j. Test requirements and sequences of operation attached.
 - k. Schedules and setpoints attached.
 - l. False loading equipment, system and procedures ready (boilers, preheat or reheat coils, control loops, override on OSA dampers, etc.)

Notes:

- m. __ Have all energy savings control strategies, setpoints and schedules been incorporated that this equipment and control system are capable of? If not, list recommendations below.
- n. __ **BAS Program Review.** Review the BAS software control program(s) for this equipment. Parameters, setpoints and logic sequences appear to follow the specified written sequences.
- o. __ **Packaged Control Program Review.** Review the packaged control program(s) for this equipment. Parameters, setpoints and logic sequences appear to follow the specified written sequences.
- p. __ Record of All Values for Current Setpoints (SP), Control Parameters, Limits, Delays, Lockouts, Schedules, Etc. Changed to Accommodate Testing:

Parameter	Pre-Test Values	Returned to Pre-Test Values <input checked="" type="checkbox"/>
Occupied mode TU setpoint		
Unoccupied mode TU setpoint		
Occupied FCU-2 setpoint		

Parameter	Pre-Test Values	Returned to Pre-Test Values <input checked="" type="checkbox"/>
Unoccupied FCU-2 setpoint		
Security Co. occupied alarm setpoint	%	%
Security Co. unoccupied alarm setpoint		
	%	%

3. Sensor Calibration Checks. Check the sensors listed below for calibration and adequate location. This is a sampling check of calibrations done during prefunctional checklisting. Test the packaged controls and BAS readings.

“In calibration” means making a reading with a calibrated test instrument within 6 inches of the site sensor. 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 prefunctional checklist requirements (_____). If not, install offset in BAS, calibrate or replace sensor. Use the same test instruments as used for the original calibration, if possible.

Sensor & Location	Location OK ¹	1st Gage or Pkg & BAS Values	Instru. Meas'd Value	Final Gage or Pkg & BAS Values	Pass Y/N?
TU stat temp.		BAS:		BAS:	
FCU-2 stat temp.		Stat:		Stat:	
Security Co. Stat temp.		Stat:		Stat:	

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

4. Device Calibration Checks. The actuators or devices listed below checked for calibration. This is a spot check on a sample of the calibrations done during prefunctional checklisting and startup.

“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.

Notes:

Device or Actuator & Location	Procedure / State	1st Pkg'd Value	Site Observation	Final Pkg'd Reading	Pass Y/N
TU-1-43 shall be one of the selected units in the TU functional test sample previously completed.					

5. Verification of Misc. Prefunctional Checks.

Misc. site checks of the prefunctional checklist and startup reports completed successfully. Pass? Y / N _____

General Conditions of Test

6. Functional Testing Record

Proced. No. & Spec. Seq. ID ¹	Req ID No. ²	Test Procedure ³ (including special conditions)	Expected and Actual Response ⁴ [Write ACTUAL response in brackets or circle]	Pass Y/N & Note #
1 Seq. 1		<u>TU Occupied Mode.</u> During occupied mode, verify that the TU is maintaining the space to the TU setpoint, by lowering the TU setpoint 5F and observing the TU dampers open and meet setpoint. Return TU setpoint to normal.	The new setpoint is met. (Additional testing on this TU was performed with the TU's functional testing.) Setpoint returned to normal.	
2 Seq. 1		<u>FCU-2; AC-1 Occupied Mode.</u> a) In occupied mode, lower the FCU-2 setpoint to be = current space temp. b) Lower the setpoint to 5F below the space temp. c) Lower the Security Co. setpoint to be = to the space temp. d) Return FCU-2 and Security Co. setpoints to normal.	a) FCU-2 starts. AC-1 starts and ~55F air is delivered to space. An alarm is registered in the BAS. b) FCU-2 and AC-1 run until space is cooled to new setpoint and then cycle OFF. c) An alarm is registered by the Security Co. Obtain a fax of the alarm. d) Setpoints returned to normal.	

Notes:

Proced. No. & Spec. Seq. ID ¹	Req ID No. ²	Test Procedure ³ (including special conditions)	Expected and Actual Response ⁴ [Write ACTUAL response in brackets or circle]	Pass Y/N & Note #
3 Seq. 2		<p><u>FCU-2; AC-1 Unoccupied Mode.</u> a) In unoccupied mode, lower the FCU-2 setpoint to be = current space temp.</p> <p>b) Lower the setpoint to 5F below the space temp.</p> <p>c) Lower the Security Co. setpoint to be = to the space temp.</p> <p>d) Lower the Security Co. setpoint to 5F below space temp.</p> <p>e) Return FCU-2 and Security Co. setpoints to normal.</p>	<p>a) FCU-2 starts. AC-1 starts and ~55F [_____] air is delivered to space. An alarm is NOT registered in the BAS.</p> <p>b) FCU-2 and AC-1 run until space is cooled to new setpoint and then cycle OFF.</p> <p>c) An alarm is registered by the Security Co. and by the BAS. Obtain a fax of the alarm. ASU-4 starts and TU delivers ~55F [_____].</p> <p>d) TU and FCU-2 deliver air until the Security Co. setpoint is met; then ASU-4 shuts OFF.</p> <p>e) Setpoints returned to normal.</p>	
4		<u>Low Temp. Operation.</u> During outdoor weather between 20F and 30F, verify that the unit functions and does not shut down on safeties.	Unit operates at specified low ambient temperatures.	
5 Seq. 1; 2		<u>TREND LOG 1.</u> During near design conditions in summer, trend the OSAT, TU-1-43 space temp., ASU-4 status and BAS alarms, in 15 min. intervals for 3 days.	Verify proper functioning of system per sequences and above test parameters.	
6	--	Return all changed control parameters and conditions to their pre-test values⁵	Check off in Section 2 above when completed	

MONITORING AND TREND LOGGING. Five monitoring via BAS trend logs are required per test Procedure 4. Trend logs none shall be provided in electronic continuous columnar spreadsheet compatible format. Trends all shall be provided in hard tabular format (continuous columnar with time in left column and at least four columns of point values in adjacent columns). All points for a given trend will begin at exactly the same time. Provide a key to all abbreviations. Attach representative graphs or columnar data and explanatory analysis to this test report.

Record Foot Notes

- ¹Sequences of operation specified in Contract Documents (attached).
- ²Mode or function ID being tested, per testing requirements section of the project Specifications.
- ³Step-by-step procedures for manual testing, trend logging or data-logger monitoring.
- ⁴Include tolerances for a passing condition.
- ⁵Record any permanently changed parameter values and submit to Owner.

-- END OF TEST --

Notes: