

Prefunctional Checklist

Project _____

PC-___ BUILDING AUTOMATION SYSTEM

___ Entire Building

___ Only Floor or Zone _____

Associated checklists: _____

1. Submittal / Approvals

Submittal. The above equipment and systems integral to them are complete and ready for functional testing. The checklist items are complete and have been checked off only by parties having direct knowledge of the event, as marked below, respective to each responsible contractor. This prefunctional checklist is submitted for approval, subject to an attached list of outstanding items yet to be completed. A Statement of Correction will be submitted upon completion of any outstanding areas. None of the outstanding items preclude safe and reliable functional tests being performed. ___ List attached.

Mechanical Contractor	Date	Controls Contractor	Date
Electrical Contractor	Date	Sheet Metal Contractor	Date
TAB Contractor	Date	General Contractor	Date

Prefunctional checklist items are to be completed as part of startup & initial checkout, preparatory to functional testing.

- This checklist does not take the place of the manufacturer’s recommended checkout and startup procedures or report.
- Items that do not apply shall be noted with the reasons on this form (N/A = not applicable, BO = by others).
- If this form is not used for documenting, one of similar rigor shall be used.
- Contractors assigned responsibility for sections of the checklist shall be responsible to see that checklist items by their subcontractors are completed and checked off.
- “Contr.” column or abbreviations in brackets to the right of an item refer to the contractor responsible to verify completion of this item. A/E = architect/engineer, All = all contractors, CA = commissioning agent, CC = controls contractor, EC = electrical contractor, GC = general contractor, MC = mechanical contractor, SC = sheet metal contractor, TAB = test and balance contractor, ___ = _____.

Approvals. This filled-out checklist has been reviewed. Its completion is approved with the exceptions noted below.

Commissioning Agent	Date	Owner’s Representative	Date
---------------------	------	------------------------	------

Notes:

2. Documentation submitted and approved: [All]

- | | |
|---|---|
| ___ manufacturer's cut sheets
___ installation and checkout manual and plan
___ full written sequences and list of all control strategies
___ written copy of all control parameters, settings and setpoints
___ O&M manual | ___ performance data
___ operating manual
___ completed control drawings
___ design criteria
___ full descriptive points list |
|---|---|

• **Documentation complete as per contract documents** YES NO

3. Model verification [Contr = _____]

	As Specified	As Submitted	As Installed
Manufacturer			
Model No.			
Serial No.	n/a	n/a	
CPU			
Monitor			
Other primary features:			

• **The equipment installed matches the specifications for given trade** YES NO

4. Initial Setup and Checkout

4.1. User Terminal Interface and Sub-Panel Checks

Check if Okay. Enter comment or note number if deficient.

Check	Y / N	Contr.
General appearance good, no apparent damage		
Equipment labels affixed		
Layout and location of control panels matches drawings		
Areas or equipment panels serve clear in control drawings		
Wiring labeled inside panels (to controlled components)		
Controlled components labeled/tagged		
BAS connection made to labeled terminal(s) as shown on drawings		
Shielded wiring used on electronic sensors		
110 volt AC power available to panel		
Psig compressed air available to panel (if applicable)		
Battery backup in place and operable		
Panels properly grounded		
Environmental conditions according to manufacturer's requirements		

Notes:

Check	Y / N	Contr.
Date and time correct		

- **The above setup and checkout was successfully completed for given trade** ___ YES ___ NO

4.2. Device and Point Checkout

[CC]

The following procedures are required to be performed and documented for each and every point in the control system. The following procedures are minimum requirements. The control contractor is encouraged to identify better and more comprehensive checkout procedures in their submitted plan. These procedures are not a substitute for the manufacturer’s recommended start-up and checkout procedures, but are to be combined with them, as applicable. The documentation may be provided on the vendor’s stock form, as long as all the information in the sample table below can be clearly documented on the form.

Similar checkout and calibration requirements are found on the equipment prefunctional checklists. Redundant documentation is not required. Cross reference, by name and form number, to other forms that contain documentation left blank on the current form.

Procedures

1. [Wire] Verify that the wiring is correct to each point.
2. [Actu] If the device is or has an actuator, verify full free movement through its full range.
3. [Addr] Verify that the software address is correct.
4. [Load] For devices with a controller, verify that current software program with proper setpoints has been downloaded.
5. [DevCal] Device stroke/range calibration. This applies to all controlled valves, dampers, fans, pumps, actuators, etc. Simulate maximum and minimum transmitter signal values and verify minimum and maximum controller output values and positively verify each and every control device minimum and maximum stroke and capacity range. Follow procedure 6.2 below.
6. [SensLoc] Verify that all sensor locations are appropriate and away from causes of erratic operation.
7. [SensCal] Sensor calibration. Calibrate or verify calibration of all sensors and thermostats, including temperature, pressure, flow, current, kW, rpm, Hertz, etc. Verify that the sensor readings in the control system are within the sensor accuracies specified in this section, using hand-held or other external measuring instruments. Follow procedure 6.1 below.
8. [OperCk] For controlled devices (dampers, valves, actuators, VAV boxes, etc.), after mechanical equipment control becomes operational, perform an operational test of each control loop. Follow procedure 6.2 below. Operational checks are preparatory to the later *functional testing*.

Other Abbreviations:

- [BAS] Building automation system or gage-read value.
- [Instru] Instrument (calibrated) read value.
- [Ofset] Offset programmed into the point to correct the calibration.

Notes:

--SAMPLE FORM-- Controls Checkout Documentation Table

Point ID	Object	Field Device Type	Hardware Checks			Load	Dev Cal	Sens Loc	SensCal			Final Check	
			Wire	Actu	Addr				BAS	Instru	Offset	Oper Ck	
			1	2	3	4	5	6	7	7	7	8	9
AI-1	ZN-T (zone T)	PhJack	√	na	√	na	na	√	70.2F	71.4F	+1.2F	na	
3-2a	RA-DPR (damper)	PNEU	√	√	√	na	√	na	na	na	na	√	

- **The initial setup and checkout has been successfully completed as described in Section 4.2 and Section 6 and documented on attached forms.....** YES NO

5. Pneumatic System Pressure Test []

The entire pneumatic system servicing the controls shall be pressure tested as follows:

5.1. Test the high pressure air piping at [150 psi] _____. Maintain the pressure for 2 hours without loss of pressure. Correct and retest the system if any loss of pressure is indicated. **Pass? (Y/N)** _____

5.2. Test the low pressure control tubing at [30 psi] _____. Maintain pressure for 2 hours without pumping. If the pressure drops more than 1 psi, correct leak and retest until successful. **Pass? (Y/N)** _____

- **The pneumatic system pressure tests were successfully completed** YES NO

6. Sensor and Actuator Calibration []

All field-installed temperature, relative humidity, CO, CO₂ and pressure sensors and gages, and all actuators (dampers and valves) shall be calibrated using the methods and tolerances given in the "Calibration and Leak-by Test Procedures" document. All test instruments shall have had a certified calibration within the last 12 months. Sensors installed in a packaged unit at the factory with calibration certification provided need not be field calibrated. All calibrations shall be fully documented, including initial and final readings, offsets etc., on prefunctional checklist or other suitable forms.

-- END OF CHECKLIST --

Notes: