



Direct Digital Control System for HVAC Functional Performance Test

Equipment ID	[Equipment ID]
Building	[Building]
Location	[Room]

System Description

Description:

The Direct Digital Control System (DDC) will interface with all other major items of mechanical electrical and plumbing equipment. This is a test of the overall DDC and its network. A person with full administrative access to the DDC is required to be present. Individual controllers are expected to be networked to the operator work station, but also have local portals for programming and field maintenance. This is a test of the overall DDC as a network and not the individual points of control. A corrective action report will be developed, and the step will be tested again after the problem has been fixed. No deferred or retesting is neither expected nor scheduled. NOTE: DDC, Operator work station, OWS, network server, and WEB server, are intended to represent the system challenged in this FPT.

Specific testing of individual HVAC or Electrical systems is done within functional test procedures (FPT's) appropriately focused on those systems. Those equipment tests confirm field devices, components and specific subsystems are responsive and values are correct for the specific MEP systems that the DDC controls. This Test does not include those aspects of control.

Operational Assumptions:

All HVAC and Electrical systems controlled and monitored by the DDC are operating normally at the beginning of the test, using their normal electric power source. Individual controllers, input and output objects and related devices and applications like loop control have been fully tested at each controller.

Associated major mechanical systems, wiring and piping have been tested and are operating correctly.

There are no unusual or critical system alarms.

AHU's, RTU's, exhaust fans and hood exhausts have been operating normally for an hour.

Heating system is on.

Chilled water is circulating. Seasonal exception possible.

Initial Test		Start Date	End Date	Initials
Results (Check one)	Explanation:			
<input type="checkbox"/> Pass <input type="checkbox"/> Fail <input type="checkbox"/> Partial Test w/Corrective Actions <input type="checkbox"/> Complete Test w/Corrective Actions <input type="checkbox"/> Other				



Re-Test 1	Start Date	End Date	Initials
Results (Check one) <input type="checkbox"/> Pass <input type="checkbox"/> Fail <input type="checkbox"/> Partial Test w/Corrective Actions <input type="checkbox"/> Complete Test w/Corrective Actions <input type="checkbox"/> Other	Explanation:		

Re-Test 2	Start Date	End Date	Initials
Results (Check one) <input type="checkbox"/> Pass <input type="checkbox"/> Fail <input type="checkbox"/> Partial Test w/Corrective Actions <input type="checkbox"/> Complete Test w/Corrective Actions <input type="checkbox"/> Other	Explanation:		

Deferred/Seasonal Test	Start Date	End Date	Initials
Results (Check one) <input type="checkbox"/> Pass <input type="checkbox"/> Fail <input type="checkbox"/> Partial Test w/Corrective Actions <input type="checkbox"/> Complete Test w/Corrective Actions <input type="checkbox"/> Other	Explanation:		

Test Participants

Organization	Required	Optional
General Contractor	<input type="checkbox"/>	<input type="checkbox"/>
Mechanical Contractor	<input type="checkbox"/>	<input type="checkbox"/>
Electrical Contractor	<input type="checkbox"/>	<input type="checkbox"/>
TAB Contractor	<input type="checkbox"/>	<input type="checkbox"/>
Controls Contractor	<input type="checkbox"/>	<input type="checkbox"/>
Owner's O&M Personnel	<input type="checkbox"/>	<input type="checkbox"/>

Supplies Required for Testing (To be provided by the contractor)

Tools / Supplies	
Canned smoke for smoke detector testing	Calibrated temperature sensing devise
Aerosol Freeze Spray If OA is above 30°F	manometer/magnahelic 0.1" gage for duct P/filter dP
manometer w/ 0.001"wc/ 0.25 Pa gage for space dP	Calibrated humidity sensing devise

DDC Network Information

Manufacturer		Model Number	
Serial Number		Other Features	
Notes:			



DDC Controller Information

Manufacturer		OWS Model Number	
Building Network Controller Model		Advanced Application Model	
Application Specific Controller Model		Gateways or other protocol translation	
Notes:			

System Readiness Summary Checklist

Description	Yes	No	Date
System is ready for testing.	<input type="checkbox"/>	<input type="checkbox"/>	
All control system functions and interlocking systems are programmed and operable per contract documents, including final set-points and schedules with debugging, loop tuning and sensor calibrations completed.	<input type="checkbox"/>	<input type="checkbox"/>	
Punch list items, loop tuning and calibration complete.	<input type="checkbox"/>	<input type="checkbox"/>	
DDC-operator work station (OWS), display and communication are operational (Optional printer temporarily added for record copy).	<input type="checkbox"/>	<input type="checkbox"/>	
Installation per design documents & change orders.	<input type="checkbox"/>	<input type="checkbox"/>	
O&M manuals delivered <u>and</u> available on site	<input type="checkbox"/>	<input type="checkbox"/>	
Field-marked As-Built system schematics available.	<input type="checkbox"/>	<input type="checkbox"/>	
Network devices and physical connections are operating.	<input type="checkbox"/>	<input type="checkbox"/>	
Specified contractor training completed.	<input type="checkbox"/>	<input type="checkbox"/>	
Components/subsystems clearly and correctly Identified.	<input type="checkbox"/>	<input type="checkbox"/>	
Mechanical systems that interface with DDC are connected and operational.	<input type="checkbox"/>	<input type="checkbox"/>	
System is ready for testing.	<input type="checkbox"/>	<input type="checkbox"/>	
All control system functions and interlocking systems are programmed and operable per contract documents, including final set-points and schedules with debugging, loop tuning and sensor calibrations completed.	<input type="checkbox"/>	<input type="checkbox"/>	
Punch list items, loop tuning and calibration complete.	<input type="checkbox"/>	<input type="checkbox"/>	
DDC-operator work station (OWS), display and communication are operational (Optional printer temporarily added for record copy).	<input type="checkbox"/>	<input type="checkbox"/>	
Installation per design documents & change orders.	<input type="checkbox"/>	<input type="checkbox"/>	
O&M manuals delivered <u>and</u> available on site.	<input type="checkbox"/>	<input type="checkbox"/>	
Field-marked As-Built system schematics available.	<input type="checkbox"/>	<input type="checkbox"/>	

**Required Instrument Accuracy and Calibration Tolerances:**

Initial/Date	Sensor	Calibrating Instrument Accuracy (+/-)	Required Calibration Tolerance (+/-)
	Cooling coil, chilled and condenser water temps	0.25F	0.4F
	AHU wet bulb or dew point	1.0F	2.0F
	Hot water coil and boiler water temp	1.0F	1.5F
	Outside air, space air, duct air temps	0.25F	0.4F
	Relative humidity	2% RH	5% RH
	Watt-hour, voltage & amperage	2% of reading	1% of design
	Pressures, air, water and gas	2% of reading	3% of design
	Building differential pressure	1% of full span	0.01 in. WC
	Variable frequency drive	2 Hz	2 Hz
	Flow rates, water	4% of reading	4% of design
	Flow rates, air	3% of reading	10% of design ¹
	Air velocity rates	3% of reading	10% of design

Set-Points, Limits, and Schedules

- ☐ AHU can be assigned a schedule. ☐ Schedule can be programmed daily.
☐ If system runs 24 hours a day, check here. If not, fill in the occupied mode schedule below.

	AM												PM											
Day	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11
Sun																								
Mon																								
Tues																								
Wed																								
Thurs																								
Fri																								
Sat																								
Holi																								

Parameter	Setpoint		Adjustable Range	
	Design	Actual	Design	Actual
Outside Air Temperature (°F)				
Preheat valve full open outside air temperature (°F)				
Discharge Air Temperature (°F)				
Night Setback Temperature (°F)				
Night Setback Differential				
Mixed Air Temperature (°F)				
Minimum Start-up Fan Speed (%)				
Time at Minimum Fan Speed for Start-up (min)				
Average Zone Humidity (%RH)				
Maximum supply air humidity (%RH)				



Parameter	Setpoint		Adjustable Range	
	Design	Actual	Design	Actual
Discharge Air Static Pressure (in H ₂ O)				
High Static Alarm (in H ₂ O)				
Low Static Alarm (in H ₂ O)				
System Shutdown High Static Limit (in H ₂ O)				
Damper Position				

Initial Ambient Conditions

Ambient Conditions			
Outside Air Temp		Outside Air RH %	
Observations			

Trend Data Required To Support Testing

Check if trend point chart(s) and Frequency Graph(s) are provided per trend requirements shown below.

Trend Log Setup #1 - Temperature					
Pre-Testing	Post Testing	Point	Frequency	Duration	Provided
<input type="checkbox"/>	<input type="checkbox"/>	Data Collection Frequency	Minimum 10 minute		<input type="checkbox"/> Yes <input type="checkbox"/> No
<input type="checkbox"/>	<input type="checkbox"/>	Trend Log Duration	Minimum one week		<input type="checkbox"/> Yes <input type="checkbox"/> No
<input type="checkbox"/>	<input type="checkbox"/>	Trend Log Start Date/Time	Minimum two days before		<input type="checkbox"/> Yes <input type="checkbox"/> No
<input type="checkbox"/>	<input type="checkbox"/>	Trend Log Format	Distinct color/symbol/point		<input type="checkbox"/> Yes <input type="checkbox"/> No
<input type="checkbox"/>	<input type="checkbox"/>	Point #1	Any point in any panel		<input type="checkbox"/> Yes <input type="checkbox"/> No
<input type="checkbox"/>	<input type="checkbox"/>	Point #2	Any point in any panel		<input type="checkbox"/> Yes <input type="checkbox"/> No
<input type="checkbox"/>	<input type="checkbox"/>	Point #3	Any point in any panel		<input type="checkbox"/> Yes <input type="checkbox"/> No
<input type="checkbox"/>	<input type="checkbox"/>	Point #4	Any point in any panel		<input type="checkbox"/> Yes <input type="checkbox"/> No
<input type="checkbox"/>	<input type="checkbox"/>	Point #5	Any point in any panel		<input type="checkbox"/> Yes <input type="checkbox"/> No
<input type="checkbox"/>	<input type="checkbox"/>	Point #6	Any point in any panel		<input type="checkbox"/> Yes <input type="checkbox"/> No
Record Issues				Issue Log Item Number:	



Trend Log Setup #2 - Temperature					
Pre-Testing	Post Testing	Point	Frequency	Duration	Provided
<input type="checkbox"/>	<input type="checkbox"/>	Data Collection Frequency	Minimum 10 minute		<input type="checkbox"/> Yes <input type="checkbox"/> No
<input type="checkbox"/>	<input type="checkbox"/>	Trend Log Duration	Minimum one week		<input type="checkbox"/> Yes <input type="checkbox"/> No
<input type="checkbox"/>	<input type="checkbox"/>	Trend Log Start Date/Time	Minimum two days before		<input type="checkbox"/> Yes <input type="checkbox"/> No
<input type="checkbox"/>	<input type="checkbox"/>	Trend Log Format	Distinct color/symbol/point		<input type="checkbox"/> Yes <input type="checkbox"/> No
<input type="checkbox"/>	<input type="checkbox"/>	Point #1	Any point in any panel		<input type="checkbox"/> Yes <input type="checkbox"/> No
<input type="checkbox"/>	<input type="checkbox"/>	Point #2	Any point in any panel		<input type="checkbox"/> Yes <input type="checkbox"/> No
<input type="checkbox"/>	<input type="checkbox"/>	Point #3	Any point in any panel		<input type="checkbox"/> Yes <input type="checkbox"/> No
<input type="checkbox"/>	<input type="checkbox"/>	Point #4	Any point in any panel		<input type="checkbox"/> Yes <input type="checkbox"/> No
<input type="checkbox"/>	<input type="checkbox"/>	Point #5	Any point in any panel		<input type="checkbox"/> Yes <input type="checkbox"/> No
<input type="checkbox"/>	<input type="checkbox"/>	Point #6	Any point in any panel		<input type="checkbox"/> Yes <input type="checkbox"/> No
Record Issues				Issue Log Item Number:	

Functional Performance Test -- (Verify all components are ready before energizing or operating the system.)

The Commissioning Authority will make and document any changes/addition/deletions to this test procedure required by current system conditions (i.e. weather, system load, utility availability, etc.).

R = Retest (Check (✓) retest required)

C = Corrected (Check (✓) when correction verified)

Y= Checked and Passed

N = Not Passed

ACTION	REQUIRED REACTION	Y (✓)	N (✓)	COMMENTS	R (✓)	C (✓)
PREPARE FOR DDC PERFORMANCE TESTING						
1. Record start time NOTE: a printer is not specified so if none is available "print" means "display" indicated report.	Recorded DDC, OWS, Web Server are alternate names for the hardware and software	<input type="checkbox"/>	<input type="checkbox"/>	Start Time: ____ (am/pm)	<input type="checkbox"/>	<input type="checkbox"/>
Record issues				Issue Log Item:		
				Initial	Date	
2. Observe that the DDC existing data groups represent	Sensor / status values are represented on various group displays.	<input type="checkbox"/>	<input type="checkbox"/>	Point by Point conformance, end to end continuity, proper action	<input type="checkbox"/>	<input type="checkbox"/>



ACTION	REQUIRED REACTION	Y (✓)	N (✓)	COMMENTS	R (✓)	C (✓)
various rooms and required data is represented	Temperature.	<input type="checkbox"/>	<input type="checkbox"/>	and calibration have been completed in the SRC and startup. This step is only to verify that the basic system is operational at test with no obvious problems.	<input type="checkbox"/>	<input type="checkbox"/>
	Humidity.	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>
	Light intensity.	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>
	Air flow dP analog.	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>
	Air flow dP status.	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>
Record issues				Issue Log Item:		
				Initial	Date	
3. Demonstrate data updating at least once a minute	Data is updated on DDC every 60 seconds or sooner.	<input type="checkbox"/>	<input type="checkbox"/>	<p>**The DDC workstation and operation is not given, need more information on how DDC works or how it is setup.**</p> <p>Expect to see various values like temperature or pressure changing on screen due to normal operation.</p>	<input type="checkbox"/>	<input type="checkbox"/>
Record issues				Issue Log Item:		
				Initial	Date	
4. Demonstrate method to calibrate sensors.	Single Sensor value can be changed after entering PIN at BAS.	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>
	Calibration report of all sensors is presented at BAS.	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>
Record issues				Issue Log Item:		
				Initial	Date	
5. Create and print (display) a report of temp, and room dP in one minute intervals.	Report prints (displays if printer not provided) with data logged at one minute intervals.	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>



ACTION		REQUIRED REACTION	Y (✓)	N (✓)	COMMENTS	R (✓)	C (✓)
Record issues					Issue Log Item:		
					Initial	Date	
6. Initiate an alarm.	Alarm is presented on the Graphic it relates	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	
	An alarm message pops up or provides notification	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	
	A record of the event is listed in a history log.	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	
Record issues					Issue Log Item:		
					Initial	Date	
VERIFICATION OF OPERATION WITH POWER INTERRUPTION							
7. Turn off power circuit to BAS Wait 10 seconds	Verify OWS and related equipment shuts down as if during a power failure.	<input type="checkbox"/>	<input type="checkbox"/>	Indicate the date and time that power was disconnected: _____	<input type="checkbox"/>	<input type="checkbox"/>	
Record issues					Issue Log Item:		
					Initial	Date	
8. Restore normal Power	System reboots.	<input type="checkbox"/>	<input type="checkbox"/>	Indicate the time that power was re-connected: _____ The operator has the option to add notes while acknowledging an alarm.	<input type="checkbox"/>	<input type="checkbox"/>	
	Network connections are established.	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	
	Time stamps are correct.	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	
	Outage alarms report.	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	
	Alarms return to normal.	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	
	Acknowledged alarms are recorded with time stamp of ACK and user ID.	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	
	Notes can be included with acknowledge action.	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	
Record issues					Issue Log Item:		



ACTION		REQUIRED REACTION		Y (✓)	N (✓)	COMMENTS	R (✓)	C (✓)
						Initial	Date	
9. Acknowledge Alarms	System reboots.	<input type="checkbox"/>	<input type="checkbox"/>	Indicate the time that power was re-connected: _____	<input type="checkbox"/>	<input type="checkbox"/>		
	Network connections are established.	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>		
	Time stamps are correct.	<input type="checkbox"/>	<input type="checkbox"/>		The operator has the option to add notes while acknowledging an alarm.	<input type="checkbox"/>	<input type="checkbox"/>	
	Outage alarms report.	<input type="checkbox"/>	<input type="checkbox"/>			<input type="checkbox"/>	<input type="checkbox"/>	
	Alarms return to normal.	<input type="checkbox"/>	<input type="checkbox"/>			<input type="checkbox"/>	<input type="checkbox"/>	
	Acknowledged alarms are recorded with time stamp of ACK and user ID.	<input type="checkbox"/>	<input type="checkbox"/>			<input type="checkbox"/>	<input type="checkbox"/>	
	Notes can be included with acknowledge action.	<input type="checkbox"/>	<input type="checkbox"/>			<input type="checkbox"/>	<input type="checkbox"/>	
Record issues						Issue Log Item:		
						Initial	Date	
10. Verify networked controllers (building, Advanced App, App specific) continued to operate in simulated outage OWS DDC	Each controller reports normal when DDC is restored to normal power.	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>		
	Each controller has continued to operate with programmed values not default values.	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>		
Record issues						Issue Log Item:		
						Initial	Date	
INSTALLATION INTEGRITY								
11. Present on the Operator Work Station (OWS) Monitor a list of	The data management system network interface module and server monitor (and printer) are ON.	<input type="checkbox"/>	<input type="checkbox"/>	Note the printer is not required.		<input type="checkbox"/>	<input type="checkbox"/>	



ACTION	REQUIRED REACTION	Y (✓)	N (✓)	COMMENTS	R (✓)	C (✓)
devices connected to the network.	Each field interface device, intelligent controller or special application processor reports it is connected and in normal operation.	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>
Record issues				Issue Log Item:		
				Initial	Date	
12. Change presentation to display the details of any HVAC system.	The graphic is displayed within 5 seconds.	<input type="checkbox"/>	<input type="checkbox"/>	Normal condition may not show a specific label, but alarms should have a clear differentiation. Indicate the time required from initiating the request until the values are displayed: _____ Seconds	<input type="checkbox"/>	<input type="checkbox"/>
	Every data point, object displays its name, set point value, and current condition within 10 seconds of the request.	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>
Record issues				Issue Log Item:		
				Initial	Date	
13. Initiate any historic trend report for presentation on the display.	A graphic representation of the data value history is presented on the monitor.	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>
Record issues				Issue Log Item:		
				Initial	Date	
14. Print this report.	The printer works.	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>
Record issues				Issue Log Item:		
				Initial	Date	
15. Use a Laptop computer to connect to system by various methods.	Display is similar to OWS.	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>
	Basic monitoring and control are similar to OWS.	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>
	Connects by wall stat.	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>
	Connects by controller port.	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>



ACTION	REQUIRED REACTION	Y (✓)	N (✓)	COMMENTS	R (✓)	C (✓)
	Connects by Ethernet network port.	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>
Record issues				Issue Log Item:		
				Initial	Date	
16. Log off laptop access.	User is identified as a device while logged into system.	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>
	Log off is recorded.	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>
Record issues				Issue Log Item:		
				Initial	Date	
VERIFICATION OF WORKSTATION COMPONENTS						
17. Verify minimum hardware /software requirements of the operator workstation. Note original spec was not clear about desktop so spec reflects expectation of the Laptop	Support 64 client devices.	<input type="checkbox"/>	<input type="checkbox"/>	Provide a general description of the BACnet conformance, and Record exceptions of the actual system provided in the following space:	<input type="checkbox"/>	<input type="checkbox"/>
	10-100 MBPS 802.3 LAN.	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>
	BACnet Controller Protocol.	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>
	Operating system is Windows NT Workstation 4, 2000 or later.	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>
	Processor speed is 600Mhz or higher.	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>
	Processor is at least Intel Pentium III class.	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>
	Hard drive capacity is 60 gigabytes or greater.	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>
	System memory is 256 Meg or greater.	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>
	Indicate number of serial parallel and USB ports available.	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>
	Monitor is 17" diagonal, .28 dot pitch, and 740x1024 resolution.	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>



ACTION	REQUIRED REACTION	Y (✓)	N (✓)	COMMENTS	R (✓)	C (✓)
	Indicate CD or CD/RW capability or better.	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>
	Mouse and Keyboard.	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>
	56kb v.90 Modem.	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>
Record issues				Issue Log Item:		
				Initial	Date	
PASSWORD AND ACCESS CONTROL						
18. An individual with administrator authority will demonstrate multiple levels of password protection.	Create 1 new user and 3 new passwords.	<input type="checkbox"/>	<input type="checkbox"/>	The three levels need to provide 1 - Monitoring only, 2 - Command and control adjustment, 3 - Program development and password assignment.	<input type="checkbox"/>	<input type="checkbox"/>
	Verify there are at least 3 levels of access for different passwords assigned.	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>
Record issues				Issue Log Item:		
				Initial	Date	
19. Administrator shall demonstrate ability to delete two of the new Users.	Verify that the deleted User and PW's no longer have access.	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>
	Verify the one still works.	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>
Record issues				Issue Log Item:		
				Initial	Date	
20. Simultaneously logon to the system using 4 different users.	System allows simultaneous access to 4 individual users.	<input type="checkbox"/>	<input type="checkbox"/>	Number of network devices on network during user test ____.	<input type="checkbox"/>	<input type="checkbox"/>
	Record the number of devices in operation during the instance of 4 users.	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>
Record issues				Issue Log Item:		
				Initial	Date	
VERIFICATION OF GRAPHIC PRINTOUT						



ACTION		REQUIRED REACTION	Y (✓)	N (✓)	COMMENTS	R (✓)	C (✓)
21.	Display the building exterior graphic on the OWS.	Verify the graphic depicts architectural components that resemble the building.	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>
		Verify the graphic shows the building title.	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>
Record issues					Issue Log Item:		
					Initial	Date	
22.	Print this graphic screen and attach to this test.	Printer provides graphic with dynamic values.	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>
Record issues					Issue Log Item:		
					Initial	Date	
23.	Penetrate the building graphic to display building section graphic.	Verify the building graphic accurately depicts the floors of the building.	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>
Record issues					Issue Log Item:		
					Initial	Date	
24.	Print this graphic screen and attach to this test.	Key elements like AHU locations and their status should be displayed.	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>
Record issues					Issue Log Item:		
					Initial	Date	
25.	Penetrate the building section graphic to display a system level graphic. A real time linked to the value presented in text is required at some point in the	Verify that there are heating/cooling zones identified.	<input type="checkbox"/>	<input type="checkbox"/>	Presentation of error-from-setpoint by color gradation, alarm messages, or similar displays should be noted below as useful visual presentation of system operation.	<input type="checkbox"/>	<input type="checkbox"/>
		Verify there are temperatures shown in association with each zone.	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>
		Verify that all controlled variables are shown on the graphic.	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>



ACTION	REQUIRED REACTION	Y (✓)	N (✓)	COMMENTS	R (✓)	C (✓)
penetration from building view to individual device detail.	Verify that graphic includes system components (i.e. Pumps, fans, coils, dampers, sensors, etc.)	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>
Record issues				Issue Log Item:		
				Initial	Date	
26. Print a representative graphic screen and attach to this test.	Printer provides graphic with dynamic values.	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>
Record issues				Issue Log Item:		
				Initial	Date	
27. Display each mechanical system graphic.	Verify that each graphic system resembles the control submittal diagrams.	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>
	Verify that each graphic is schematic and not simple line diagrams.	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>
	Verify that each graphic consists of a system.	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>
	Verify the each graphic depicts sensors and instruments in their correct location.	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>
	Verify that each graphics point values update dynamically.	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>
	There is an indication the display is active and real time, or non responsive.	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>
Record issues				Issue Log Item:		
				Initial	Date	
28. Attach one graphic printout to this test.	Printer provides graphic with dynamic values.	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>
Record issues				Issue Log Item:		



ACTION		REQUIRED REACTION		Y (✓)	N (✓)	COMMENTS	R (✓)	C (✓)
						Initial	Date	
RUNTIME ACCUMULATION (TOTALIZATION)								
29. From the OWS, Display the supply Fan runtime for several types of digitally controlled equipment expected to run during the test. AHU, Pumps, and Chillers are examples.	Verify they all go to zero hours run time.	<input type="checkbox"/>	<input type="checkbox"/>	Current runtime hours = _____ (note any exceptions)		<input type="checkbox"/>	<input type="checkbox"/>	
	Record the time of day.	<input type="checkbox"/>	<input type="checkbox"/>			<input type="checkbox"/>	<input type="checkbox"/>	
Record issues						Issue Log Item:		
						Initial	Date	
30. Set runtimes to zero.	Display changes to show 0.0.	<input type="checkbox"/>	<input type="checkbox"/>			<input type="checkbox"/>	<input type="checkbox"/>	
Record issues						Issue Log Item:		
						Initial	Date	
31. Verify the selected equipment is running. Start the equipment, if any are not.	All units are running.	<input type="checkbox"/>	<input type="checkbox"/>			<input type="checkbox"/>	<input type="checkbox"/>	
Record issues						Issue Log Item:		
						Initial	Date	
32. Wait 30 minutes.	Record the time of day.	<input type="checkbox"/>	<input type="checkbox"/>	Current runtime hours = _____		<input type="checkbox"/>	<input type="checkbox"/>	
	Selected device is stopped.	<input type="checkbox"/>	<input type="checkbox"/>			<input type="checkbox"/>	<input type="checkbox"/>	
Record issues						Issue Log Item:		
						Initial	Date	
33. Stop one of the	Record the time of day.	<input type="checkbox"/>	<input type="checkbox"/>	Current runtime hours =		<input type="checkbox"/>	<input type="checkbox"/>	



ACTION	REQUIRED REACTION	Y (✓)	N (✓)	COMMENTS	R (✓)	C (✓)
controlled equipment types started above.	Selected device is stopped.	<input type="checkbox"/>	<input type="checkbox"/>	_____	<input type="checkbox"/>	<input type="checkbox"/>
Record issues				Issue Log Item:		
				Initial	Date	
34. Wait two hours.	Record the current runtime hours.	<input type="checkbox"/>	<input type="checkbox"/>	Current runtime hours = _____	<input type="checkbox"/>	<input type="checkbox"/>
	Record the time of day.	<input type="checkbox"/>	<input type="checkbox"/>	(note any exceptions)	<input type="checkbox"/>	<input type="checkbox"/>
Record issues				Issue Log Item:		
				Initial	Date	
35. Return to this step at the end of the test.	Record the current runtime hours.	<input type="checkbox"/>	<input type="checkbox"/>	Current runtime hours = _____	<input type="checkbox"/>	<input type="checkbox"/>
	Record the time of day.	<input type="checkbox"/>	<input type="checkbox"/>	(note any exceptions)	<input type="checkbox"/>	<input type="checkbox"/>
Record issues				Issue Log Item:		
				Initial	Date	
36. Display the runtime for equipment selected above.	Record the current runtime hours.	<input type="checkbox"/>	<input type="checkbox"/>	Current runtime hours = _____	<input type="checkbox"/>	<input type="checkbox"/>
	Record the time of day.	<input type="checkbox"/>	<input type="checkbox"/>	(note any exceptions)	<input type="checkbox"/>	<input type="checkbox"/>
Record issues				Issue Log Item:		
				Initial	Date	
37. Compare the results of beginning and end of test run time values.	Did the runtime increment by indicated time of day?	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>
Record issues				Issue Log Item:		
				Initial	Date	
38. Note the runtime value for the equipment stopped during the test.	Did the runtime value freeze at the last running value?	<input type="checkbox"/>	<input type="checkbox"/>	Total runtime hours = _____	<input type="checkbox"/>	<input type="checkbox"/>



ACTION		REQUIRED REACTION		Y (✓)	N (✓)	COMMENTS	R (✓)	C (✓)
Record issues					Issue Log Item:			
					Initial		Date	
VERIFICATION OF TRENDING								
39. Program a trend of outdoor air temperature, and supply air temps from two AHU's in two different controllers.	Set trend interval to 1 minute.	<input type="checkbox"/>	<input type="checkbox"/>	Record the AHU's used for this test AHU- ____ _____ AHU- ____ _____		<input type="checkbox"/>	<input type="checkbox"/>	
	Set samples stored to 360.	<input type="checkbox"/>	<input type="checkbox"/>			<input type="checkbox"/>	<input type="checkbox"/>	
	Start trending.	<input type="checkbox"/>	<input type="checkbox"/>			<input type="checkbox"/>	<input type="checkbox"/>	
Record issues					Issue Log Item:			
					Initial		Date	
40. Wait for 30 minutes. *(While waiting other test steps can be executed.)*	30 minutes of trend data is stored in the field controller.	<input type="checkbox"/>	<input type="checkbox"/>			<input type="checkbox"/>	<input type="checkbox"/>	
Record issues					Issue Log Item:			
					Initial		Date	
41. Display logged values as they would be exported to Excel file.	30 minutes of numerical data is sent to the printer.	<input type="checkbox"/>	<input type="checkbox"/>			<input type="checkbox"/>	<input type="checkbox"/>	
	Attach hardcopy to test.	<input type="checkbox"/>	<input type="checkbox"/>			<input type="checkbox"/>	<input type="checkbox"/>	
Record issues					Issue Log Item:			
					Initial		Date	
42. Display trend data graphically.	30 minutes of graphical data is sent to the printer.	<input type="checkbox"/>	<input type="checkbox"/>			<input type="checkbox"/>	<input type="checkbox"/>	
	Attach hardcopy to test.	<input type="checkbox"/>	<input type="checkbox"/>			<input type="checkbox"/>	<input type="checkbox"/>	
Record issues					Issue Log Item:			
					Initial		Date	



ACTION	REQUIRED REACTION	Y (✓)	N (✓)	COMMENTS	R (✓)	C (✓)
43. Upload trend data to workstation file.	Controller data is stored on OWS hard drive.	<input type="checkbox"/>	<input type="checkbox"/>	Record trend file name _____	<input type="checkbox"/>	<input type="checkbox"/>
	Controller continues to accumulate trend data.	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>
Record issues				Issue Log Item:		
				Initial	Date	
44. Transfer all trend data to Microsoft Excel / Text file. Print file and attach to this test.	Trends are successfully transferred to a Microsoft Excel / Text file.	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>
Record issues				Issue Log Item:		
				Initial	Date	
DAYLIGHT SAVINGS TIME & LEAP YEAR ADJUSTMENT						
45. Change the time of day to 23:58.	At midnight the date becomes February 29th.	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>
Record issues				Issue Log Item:		
				Initial	Date	
46. Change date to February 28, 2008.	At midnight the date becomes February 29th.	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>
Record issues				Issue Log Item:		
				Initial	Date	
47. Change the time of day to 01:58. Change the date to March 8, 2008.	At 2:00am the time jumps ahead to 3:00am.	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>
Record issues				Issue Log Item:		
				Initial	Date	
48. Change the time of day and date to current values.	Time and date are accurate.	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>



ACTION		REQUIRED REACTION		Y (✓)	N (✓)	COMMENTS	R (✓)	C (✓)
Record issues						Issue Log Item:		
						Initial	Date	
VERIFICATION OF POINT OVERRIDE								
49. Override an analog output point.	Override command is accepted.	<input type="checkbox"/>	<input type="checkbox"/>				<input type="checkbox"/>	<input type="checkbox"/>
	Override value is displayed at OWS.	<input type="checkbox"/>	<input type="checkbox"/>				<input type="checkbox"/>	<input type="checkbox"/>
Record issues						Issue Log Item:		
						Initial	Date	
50. Override an analog input point.	Override command is accepted.	<input type="checkbox"/>	<input type="checkbox"/>				<input type="checkbox"/>	<input type="checkbox"/>
	Override value is displayed at OWS.	<input type="checkbox"/>	<input type="checkbox"/>				<input type="checkbox"/>	<input type="checkbox"/>
Record issues						Issue Log Item:		
						Initial	Date	
51. Override a binary input point.	Override command is accepted.	<input type="checkbox"/>	<input type="checkbox"/>				<input type="checkbox"/>	<input type="checkbox"/>
	Override value is displayed at OWS.	<input type="checkbox"/>	<input type="checkbox"/>				<input type="checkbox"/>	<input type="checkbox"/>
Record issues						Issue Log Item:		
						Initial	Date	
52. Override a binary output point.	Override command is accepted.	<input type="checkbox"/>	<input type="checkbox"/>				<input type="checkbox"/>	<input type="checkbox"/>
	Override value is displayed at OWS.	<input type="checkbox"/>	<input type="checkbox"/>				<input type="checkbox"/>	<input type="checkbox"/>
Record issues						Issue Log Item:		
						Initial	Date	
53. Override a virtual point.	Override command is accepted.	<input type="checkbox"/>	<input type="checkbox"/>				<input type="checkbox"/>	<input type="checkbox"/>
	Override value is displayed at OWS.	<input type="checkbox"/>	<input type="checkbox"/>				<input type="checkbox"/>	<input type="checkbox"/>
Record issues						Issue Log Item:		
						Initial	Date	



ACTION	REQUIRED REACTION	Y (✓)	N (✓)	COMMENTS	R (✓)	C (✓)
				Initial	Date	
54. Release all overrides.	Points return to normal state.	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>
Record issues				Issue Log Item:		
				Initial	Date	
55. Return to Run Time Accumulation from earlier in FPT.	Earlier test step that required a delay is now executed.	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>
Record issues				Issue Log Item:		
				Initial	Date	
VERIFICATION OF ALARMS						
56. Ensure the printer programmed to receive system alarms is online.	Printer is powered.	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>
	Printer is online to OWS.	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>
Record issues				Issue Log Item:		
				Initial	Date	
57. Send an alarm limit summary to the printer. NOTE: If no limits are installed create three in different controllers for test purpose.	Verify that analog points have high and low limits programmed per specification.	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>
	Attach hardcopy to this test.	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>
Record issues				Issue Log Item:		
				Initial	Date	
58. Override an AHU discharge air temperature (DAT) above its high limit value.	High limit alarm is displayed on screen at the OWS and printed within 5 minutes.	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>
	Graphic DAT symbol on OWS changes color to indicate alarm value.	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>



ACTION		REQUIRED REACTION		Y (✓)	N (✓)	COMMENTS	R (✓)	C (✓)
Record issues						Issue Log Item:		
						Initial	Date	
59. Clear AHU discharge air temperature override.	High limit alarm returns to normal and is printed within 5 minutes.	<input type="checkbox"/>	<input type="checkbox"/>				<input type="checkbox"/>	<input type="checkbox"/>
	Graphic display of point returns to original color.	<input type="checkbox"/>	<input type="checkbox"/>				<input type="checkbox"/>	<input type="checkbox"/>
Record issues						Issue Log Item:		
						Initial	Date	
60. Notify Fire department of planned test.	AHU stops AHU Smoke alarm is reported to the OWS.	<input type="checkbox"/>	<input type="checkbox"/>				<input type="checkbox"/>	<input type="checkbox"/>
	AHU Smoke alarm and AHU OFF is reported to the OWS.	<input type="checkbox"/>	<input type="checkbox"/>				<input type="checkbox"/>	<input type="checkbox"/>
	AHU Smoke alarm and AHU OFF is reported to Fire Systems DDC display in Lobby.	<input type="checkbox"/>	<input type="checkbox"/>				<input type="checkbox"/>	<input type="checkbox"/>
	Alarm is printed.	<input type="checkbox"/>	<input type="checkbox"/>				<input type="checkbox"/>	<input type="checkbox"/>
Record issues						Issue Log Item:		
						Initial	Date	
61. Silence building wide horn alarm system for this test.	AHU stops AHU Smoke alarm is reported to the OWS.	<input type="checkbox"/>	<input type="checkbox"/>				<input type="checkbox"/>	<input type="checkbox"/>
	AHU Smoke alarm and AHU OFF is reported to the OWS.	<input type="checkbox"/>	<input type="checkbox"/>				<input type="checkbox"/>	<input type="checkbox"/>
	AHU Smoke alarm and AHU OFF is reported to Fire Systems DDC display in Lobby.	<input type="checkbox"/>	<input type="checkbox"/>				<input type="checkbox"/>	<input type="checkbox"/>
	Alarm is printed.	<input type="checkbox"/>	<input type="checkbox"/>				<input type="checkbox"/>	<input type="checkbox"/>
Record issues						Issue Log Item:		
						Initial	Date	



ACTION	REQUIRED REACTION	Y (✓)	N (✓)	COMMENTS	R (✓)	C (✓)
62. Initiate a duct smoke detector alarm.	AHU stops AHU Smoke alarm is reported to the OWS.	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>
	AHU Smoke alarm and AHU OFF is reported to the OWS.	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>
	AHU Smoke alarm and AHU OFF is reported to Fire Systems DDC display in Lobby.	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>
	Alarm is printed.	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>
Record issues				Issue Log Item:		
				Initial	Date	
63. Clear smoke alarm.	AHU remains off.	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>
	Return to normal message is received at the OWS.	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>
	Return to normal message is received at the DDC fire alarm panel.	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>
	Return to normal message is printed.	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>
Record issues				Issue Log Item:		
				Initial	Date	
64. Restart AHU.	Return to normal ON is reported at OWS and Fire Alarm Display.	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>
	Change of status is printed.	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>
Record issues				Issue Log Item:		
				Initial	Date	
65. Reconnect building fire alarm annunciation.	System operates normally.	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>
Record issues				Issue Log Item:		



ACTION	REQUIRED REACTION	Y (✓)	N (✓)	COMMENTS	R (✓)	C (✓)
				Initial	Date	
66. Notify fire department, owner, and O&M staff that test is over.	System operates normally.	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>
Record issues				Issue Log Item:		
				Initial	Date	
67. Attach hardcopy of alarms.	Printer records / verifies results of alarm test.	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>
Record issues				Issue Log Item:		
				Initial	Date	
START / STOP FEEDBACK DELAY						
68. Override the chilled water pump status input to OFF from the OWS.	Display or graphic of the chilled water system shows override status of pump feedback point.	<input type="checkbox"/>	<input type="checkbox"/>	Note the normal cycle time before values are updated on the display _____ sec/min	<input type="checkbox"/>	<input type="checkbox"/>
Record issues				Issue Log Item:		
				Initial	Date	
69. Manually start the chilled water pump from the OWS.	Verify that a status alarm is received and record the delay in seconds.	<input type="checkbox"/>	<input type="checkbox"/>	Alarm delay time = _____	<input type="checkbox"/>	<input type="checkbox"/>
Record issues				Issue Log Item:		
				Initial	Date	
70. Manually stop the chilled water pump from the OWS.	Verify the status alarm automatically resets and record the delay.	<input type="checkbox"/>	<input type="checkbox"/>	Alarm reset delay = _____	<input type="checkbox"/>	<input type="checkbox"/>
Record issues				Issue Log Item:		
				Initial	Date	



ACTION	REQUIRED REACTION	Y (✓)	N (✓)	COMMENTS	R (✓)	C (✓)
SCHEDULING						
71. Display a schedule summary of all equipment at the OWS.	Display shows that equipment like Supply Fans have a schedule as defined in the sequence of operation.	<input type="checkbox"/>	<input type="checkbox"/>	The schedule may call for start and stop or Day and Night transitions	<input type="checkbox"/>	<input type="checkbox"/>
	Schedule has provisions for seven-days a week.	<input type="checkbox"/>	<input type="checkbox"/>	If the owner has not defined a specific schedule then this test succeeds if only the ability to schedule is proven.	<input type="checkbox"/>	<input type="checkbox"/>
	Schedule has provisions for holiday entry one full year in advance.	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>
	Schedule information is displayed in "spreadsheet" format.	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>
Record issues				Issue Log Item:		
				Initial	Date	
72. Display an optimized start stop schedule showing OAT, space temperatures and equation for start advance.	Program and initiator exists.	<input type="checkbox"/>	<input type="checkbox"/>	The intent of this test step is to verify how the system will "anticipate" occupancy schedules in order to reach occupied space conditions no later than the scheduled time. At time of test record the: Outside air temperature: ____'F Critical Space temperature: ____'F Optimum start time range: ____min	<input type="checkbox"/>	<input type="checkbox"/>
	Fans and related sensors are assigned to the program.	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>
Record issues				Issue Log Item:		
				Initial	Date	
73. Select any fan scheduled to be running.	Fan stops on loss of power.	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>
	Alarm reports to BAS.	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>



ACTION	REQUIRED REACTION	Y (✓)	N (✓)	COMMENTS	R (✓)	C (✓)			
	When power is restored fan is restarted automatically because it is still in the scheduled run time.	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>			
Record issues				Issue Log Item:					
				Initial	Date				
74. Disconnect power simulating an outage.	Fan stops on loss of power.	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>			
	Alarm reports to BAS.	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>			
	When power is restored fan is restarted automatically because it is still in the scheduled run time.	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>			
Record issues				Issue Log Item:					
				Initial	Date				
75. After one minute restore power.	Fan stops on loss of power.	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>			
	Alarm reports to BAS.	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>			
	When power is restored fan is restarted automatically because it is still in the scheduled run time.	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>			
Record issues				Issue Log Item:					
				Initial	Date				
76. Print a hardcopy of the listed summary reports.	Attach hard copy to this test form.	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>			
Record issues				Issue Log Item:					
				Initial	Date				



ACTION	REQUIRED REACTION	Y (✓)	N (✓)	COMMENTS	R (✓)	C (✓)
SOFTWARE COMMUNICATIONS						
77. Disconnect power from any controller. This is the "first" controller for this test. NOTE: If controllers are on local UPS only the loss of power will be reported. If so then turn off the power to communication device.	Loss of communication is reported to the OWS.	<input type="checkbox"/>	<input type="checkbox"/>	Controller Address = _____	<input type="checkbox"/>	<input type="checkbox"/>
	Loss of communication is printed at OWS.	<input type="checkbox"/>	<input type="checkbox"/>	Controller Location = _____	<input type="checkbox"/>	<input type="checkbox"/>
	Time delay for report does not exceed 1 minute.	<input type="checkbox"/>	<input type="checkbox"/>	Controller Model = _____ Time delay before reported _____ Sec	<input type="checkbox"/>	<input type="checkbox"/>
Record issues				Issue Log Item:		
				Initial	Date	
78. Verify other controllers continue to operate normally.	Access to data values and execution of commands is not affected by loss of one network controller.	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>
Record issues				Issue Log Item:		
				Initial	Date	
79. Program a scheduled event (a fan starts) to happen in the immediate future in the controller second on the network from the first.	Loss of communication is reported to the OWS.	<input type="checkbox"/>	<input type="checkbox"/>	The panels may be in the same physical location or far apart, it is the location on the network cable that is important. If a Hub style network they should be on the same Hub. Controller Address = _____ Controller Location = _____ Controller Model = _____	<input type="checkbox"/>	<input type="checkbox"/>
	Loss of communication is printed.	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>
	The controller between two failed controllers continues to operate.	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>



ACTION		REQUIRED REACTION	Y (✓)	N (✓)	COMMENTS	R (✓)	C (✓)
Record issues					Issue Log Item:		
					Initial	Date	
30. Disconnect power from the "second" controller before the scheduled event.	Loss of communication is reported to the OWS.		<input type="checkbox"/>	<input type="checkbox"/>	The panels may be in the same physical location or far apart, it is the location on the network cable that is important. If a Hub style network they should be on the same Hub. Controller Address = _____ Controller Location = _____ Controller Model = _____	<input type="checkbox"/>	<input type="checkbox"/>
	Loss of communication is printed.		<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>
	The controller between two failed controllers continues to operate.		<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>
Record issues					Issue Log Item:		
					Initial	Date	
31. Wait for the time of the scheduled event to pass by at least two minutes.	Communication normal message is received at the OWS.		<input type="checkbox"/>	<input type="checkbox"/>	Note time power restored to controllers First Controller _____	<input type="checkbox"/>	<input type="checkbox"/>
	Communication normal message is printed.		<input type="checkbox"/>	<input type="checkbox"/>	Second Controller _____	<input type="checkbox"/>	<input type="checkbox"/>
	DDC monitor.		<input type="checkbox"/>	<input type="checkbox"/>	_____	<input type="checkbox"/>	<input type="checkbox"/>
	Both controllers recover and operate on the network as before the outage.		<input type="checkbox"/>	<input type="checkbox"/>	Note time stamp controllers report Return to DDC system	<input type="checkbox"/>	<input type="checkbox"/>
	Data exchanged to synchronize clocks.		<input type="checkbox"/>	<input type="checkbox"/>	First Controller _____	<input type="checkbox"/>	<input type="checkbox"/>
	Update changes will include execution of the event scheduled during outage, and report the analog alarm.		<input type="checkbox"/>	<input type="checkbox"/>	Second Controller _____	<input type="checkbox"/>	<input type="checkbox"/>
Record issues					Issue Log Item:		
					Initial	Date	



ACTION	REQUIRED REACTION	Y (✓)	N (✓)	COMMENTS	R (✓)	C (✓)
32. Reconnect the network wiring to both controllers. (note record the time each one is powered on)	Communication normal message is received at the OWS.	<input type="checkbox"/>	<input type="checkbox"/>	Note time power restored to controllers First Controller	<input type="checkbox"/>	<input type="checkbox"/>
	Communication normal message is printed.	<input type="checkbox"/>	<input type="checkbox"/>	Second Controller	<input type="checkbox"/>	<input type="checkbox"/>
	DDC monitor.	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>
	Both controllers recover and operate on the network as before the outage.	<input type="checkbox"/>	<input type="checkbox"/>	Note time stamp controllers report Return to DDC system	<input type="checkbox"/>	<input type="checkbox"/>
	Data exchanged to synchronize clocks.	<input type="checkbox"/>	<input type="checkbox"/>	First Controller	<input type="checkbox"/>	<input type="checkbox"/>
	Update changes will include execution of the event scheduled during outage, and report the analog alarm.	<input type="checkbox"/>	<input type="checkbox"/>	Second Controller	<input type="checkbox"/>	<input type="checkbox"/>
Record issues				Issue Log Item:		
				Initial	Date	
33. Attach hardcopy of alarms.	Printer record verifies results of alarm test.	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>
Record issues				Issue Log Item:		
				Initial	Date	
34. Verify operations are restored as normal.	Operations are normal.	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>
Record issues				Issue Log Item:		
				Initial	Date	
GLOBAL PARAMETER MODIFICATION						
35. From the OWS sample control	All controllers are reporting normally.	<input type="checkbox"/>	<input type="checkbox"/>	All controllers should be on line and should	<input type="checkbox"/>	<input type="checkbox"/>



ACTION	REQUIRED REACTION	Y (✓)	N (✓)	COMMENTS	R (✓)	C (✓)
points to identify that required control parameters (line code variables) exist for each controller. This is not an all point review, but does require validation of each controller.	Each controller includes a list of control parameters including set points, PID gains and delays, dead band range, schedules, and alarm limits are available for the points associated with the controller.	<input type="checkbox"/>	<input type="checkbox"/>	update their clock time to be synchronous to the master clock.	<input type="checkbox"/>	<input type="checkbox"/>
Record issues				Issue Log Item:		
				Initial	Date	
36. Change the time value of the central clock and the temperature value of the common Outside Air.	All Controller Equipment Programs show the revised time.	<input type="checkbox"/>	<input type="checkbox"/>	Not all controllers will use a central OAT. If they do not show the revised value verify they are using some other specific measured value as an exception to the universal OAT.	<input type="checkbox"/>	<input type="checkbox"/>
	All Controller Equipment Programs show changed OAT.	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>
Record issues				Issue Log Item:		
				Initial	Date	
37. Restore correct values for time and OAT.	System returns to normal operation within 5 minutes.	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>
	Controller parameters match OWS.	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>
Record issues				Issue Log Item:		
				Initial	Date	
DISTRIBUTED PARAMETER MODIFICATION MANUAL AND AUTOMATIC REST						
38. Connect directly by laptop or other handheld communication device to a field controller.	Normal operation continues.	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>
	A list of values including set points, PID gains and delays, dead band range, schedules, and alarm limits are available for evaluation and modification.	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>



ACTION		REQUIRED REACTION	Y (✓)	N (✓)	COMMENTS	R (✓)	C (✓)
Record issues					Issue Log Item:		
					Initial	Date	
39. From the direct connect field interface provide a list of control parameters for all controlled equipment connected to this panel.	Normal operation continues.	<input type="checkbox"/>	<input type="checkbox"/>			<input type="checkbox"/>	<input type="checkbox"/>
	A list of values including set points, PID gains and delays, dead band range, schedules, and alarm limits are available for evaluation and modification.	<input type="checkbox"/>	<input type="checkbox"/>			<input type="checkbox"/>	<input type="checkbox"/>
Record issues					Issue Log Item:		
					Initial	Date	
90. List the Boiler System Reset input parameters.	The hot water supply set point is reduced.	<input type="checkbox"/>	<input type="checkbox"/>		The intent of this step is to verify that the DDC system can be modified globally from a local field control panel.	<input type="checkbox"/>	<input type="checkbox"/>
Record issues					Issue Log Item:		
					Initial	Date	
91. Change the listed Outside Air Temp values above actual.	The hot water supply set point is reduced.	<input type="checkbox"/>	<input type="checkbox"/>		The intent of this step is to verify that the DDC system can be modified globally from a local field control panel.	<input type="checkbox"/>	<input type="checkbox"/>
Record issues					Issue Log Item:		
					Initial	Date	
92. Restore normal control values.	Boiler water returns to value before the test.	<input type="checkbox"/>	<input type="checkbox"/>			<input type="checkbox"/>	<input type="checkbox"/>
Record issues					Issue Log Item:		
					Initial	Date	
93. Disconnect the network cable from the field controller.	Panel continues to operate, an alarm "loss of panel" reports to OWS.	<input type="checkbox"/>	<input type="checkbox"/>		Check passwords, default set points and schedules on loss of network.	<input type="checkbox"/>	<input type="checkbox"/>



ACTION		REQUIRED REACTION	Y (✓)	N (✓)	COMMENTS	R (✓)	C (✓)
Record issues					Issue Log Item:		
					Initial	Date	
94. The previous 6 steps can be repeated for a sample controller in other zones.	The sample controller selected represents all controllers on network.	<input type="checkbox"/>	<input type="checkbox"/>	IF there is some reason to suspect differences in communication from different areas to DDC then repetition of the preceding 12 steps for each of those areas would be useful.	<input type="checkbox"/>	<input type="checkbox"/>	
	OR Additional controllers were tested and each controller succeeded as described above.	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	
Record issues					Issue Log Item:		
					Initial	Date	
PROGRAM TRANSFER							
95. Change a parameter to create a unique file and Initiate an upload of the application program from any controller from OWS.	Verify the program is successfully uploaded and stored at the OWS.	<input type="checkbox"/>	<input type="checkbox"/>	Controller Address	<input type="checkbox"/>	<input type="checkbox"/>	
				Controller Location			
				Controller Model			
				PC file name			
Record issues					Issue Log Item:		
					Initial	Date	
96. Correct the parameter changed and Initiate a download of the application program file uploaded in the previous step.	Verify the program is successfully downloaded to the controller.	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	
	Verify the controller is properly functioning after the download.	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	
Record issues					Issue Log Item:		
					Initial	Date	



ACTION	REQUIRED REACTION	Y (✓)	N (✓)	COMMENTS	R (✓)	C (✓)
97. Restore physical set point or other logical changes to pre test conditions.	System operates normally.	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>
Record issues				Issue Log Item:		
				Initial	Date	
98. Return to Run Time Accumulation earlier in FPT.	Earlier test step that required a delay is now executed.	<input type="checkbox"/>	<input type="checkbox"/>	This is a reminder for closure of steps initiated in Run Time Accumulation.	<input type="checkbox"/>	<input type="checkbox"/>
	Record runtime in test step above.	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>
Record issues				Issue Log Item:		
				Initial	Date	
99. Restore normal power to DDC from UPS test, if not already done.	Record action results in steps above.	<input type="checkbox"/>	<input type="checkbox"/>	This is a reminder for closure of steps initiated in "Installation Integrity" and "Trending" sections above.	<input type="checkbox"/>	<input type="checkbox"/>
Record issues				Issue Log Item:		
				Initial	Date	
00. Stop Trend log and print files when done.	Record action results in steps above.	<input type="checkbox"/>	<input type="checkbox"/>	This is a reminder for closure of steps initiated in "Installation Integrity" and "Trending" sections above.	<input type="checkbox"/>	<input type="checkbox"/>
Record issues				Issue Log Item:		
				Initial	Date	
RETURN TO NORMAL CONDITIONS						
01. Record test stop time	Recorded	<input type="checkbox"/>	<input type="checkbox"/>	Time_____ (am/pm)	<input type="checkbox"/>	<input type="checkbox"/>
Record issues				Issue Log Item:		
				Initial	Date	



Sensor Verification

All field-installed sensors and gages on this piece of equipment shall be observed for appropriate readings during the execution of the HVAC systems FPT.

Confirm the following devices and values are provided in the DDC graphics

Device	parameter	Presents on graphic	Trend Log	Limit Alarm / failure
Electric Meter		Yes /NO	Yes /NO	Yes /NO fault
	kW (demand level)	Yes /NO value& level 1 alarm	Yes /NO value	Yes /NO level 1
		Yes /NO alarm L2		Yes /NO level 2
		Yes /NO alarm L3	Peak history	Yes /NO level 3
	kWh (use history)	Yes /NO	Yes /NO daily	Yes /NO
			Yes /NO monthly	Yes /NO
			Yes /NO annual	Yes /NO
Water		Yes /NO	Yes /NO	Yes /NO fault
	100 Gallons	Yes /NO	Yes /NO daily	Yes /NO peak high
			Yes /NO monthly	Yes /NO peak low
			Yes /NO annual	
Gas		Yes /NO	Yes /NO	Yes /NO fault
	100 CCF	Yes /NO	Yes /NO daily	Yes /NO peak high
			Yes /NO monthly	Yes /NO peak low
			Yes /NO annual	
OUTSIDE Air T		Yes /NO	Yes /NO daily	Yes /NO fault
			Yes /NO monthly	
			Yes /NO annual	

Device Verification

The actuators or devices listed equipment shall be observed for appropriate action during the execution of the HVAC systems FPT.

**Final Sign-Off**

Commissioning Agent	Printed Name	Initials	Date
CONTRACTOR	PRINTED NAME	INITIALS	DATE
General Contractor (GC)			
Mechanical Contractor (MC)			
Electrical Contractor (EC)			
TAB Contractor (TAB)			
Controls Contractor (CC)			
Owner's O&M Personnel			