



## **SAMPLE BUILDING AUTOMATION SYSTEM COMMISSIONING**

**Dear Customer,**

Thank you for the opportunity to provide you with this proposal. We appreciate the opportunity to work with you and look forward to helping you with your facilities control system needs.

Utah-Yamas Controls is an experienced Systems Integrator, with several years of experience in servicing low-voltage systems such as Heating & Air-conditioning, Access Control, Video Presentation, Security and Fire Alarm Systems. We have an established track record of providing high quality service for a broad range of satisfied customers.

It is the intent of this proposal to provide a complete commissioning and energy efficiency re-programming for your facility.

### **This commissioning proposal includes the following scope of work**

#### **System Management and programming services**

- The existing DDC control system
- The existing controller LAN will be evaluated (including the Router and network controllers) with an oscilloscope to determine signal strength and speed. LAN repeaters will be added if required to improve system efficiency and speed.
- We will evaluate and verify the programming of sequences of operation and modify each program to enhance energy efficiency.
- Analyses of system energy and programming deficiencies. Review and make recommendations to the owner. Re-program and make correction of deficiencies with approved sequences and algorithms.
- We will re-program, validate, review and modify each sequence of operation to ensure proper operation and compliance to your requirements. If necessary we will re-program any system that does not meet or comply with the written sequence of operation.
- We will design and create a graphic representation for each system and major mechanical device in the DDC System. Graphics pages will be linked to zoom for detailed information. We will review our proposed graphic package with you prior to the creation, to gain your approval.
- Provide programming set up for historical data collection with on site host computer. Create custom reports and long term archiving systems for energy data.
- Archive on-site computers unique software/graphics including back up of I/Net data files, network configuration files, graphic pages, docutrend files, exporter/reporter reports.

#### **Controllers, Software and System Host Computer**

- We will verify the operation and compatibility of the on site computer to make sure that it meet the minimum manufacturers recommendations.

- We will install the latest version of your software on the existing host computer.
- We will update all controllers with the most current bin files and downloads for proper operation with the host software.
- This proposal includes all labor and material for repair or replacement of any system TAC controller or sensor (does not include other field devices) that during the commissioning service does not operate properly.
- Inspection and verification of the proper use of components in the system

#### **Sensor Calibration and Operation**

- We will calibrate and verify each input sensor and analog device in the system. These inputs include temperature, humidity, pressure, CO, etc.
- Verify and calibrate each analog output device including electronic actuators, transducers and voltage signal converters.
- We will verify the location of each sensor to determine if it is located in the proper area and is not prone to false readings. We will move any sensor found to be in a location that is not consistent with the proper operation of the mechanical system it is referencing.
- We will perform a point-to-point check out including documentation of all equipment related to the DDC control system to validate accuracy and compliance to your requirements.

#### **Field Devices**

- Verify operation of all field devices and system components including but not limited to dampers, actuators, valves, wiring, sensors, transducers, relays, transformers and all like items.
- We will verify that all dampers and valves in the system are operating properly and that each device fully opens and completely closes with minimal leaks.

#### **Documentation**

- Each system and device in the system will be documented as to the condition and operation. Each device will indicate the adjustment or offset that was required to meet the proper operation.
- All motors controlled by the DDC system will be documented indicating rated amps and actual amps.
- Each VFD will be documented indicating the field programming adjustments that were required during start-up of the system.

Thank you again for your interest in having our company complete your automated control system. By selecting our company to commission and complete your DDC control system commissioning for your facility, you will be assured that your systems demands will be well supported in the future.

Sincerely,

Kevin Dyreng  
Energy Services  
Utah-Yamas Controls Inc.

## **Appendix**

### **Project Format for System Verification and Start-Up Checklists**

#### **NOTES TO APPENDIX**

This appendix contains sample systems verification and start-up checklists for this proposal. The equipment listed in this appendix may differ from the actual equipment used but is listed as because it is typical HVAC control systems.

There is no intention in the appendix to provide sample checklists for all possible equipment included in the design. These checklists are intended to illustrate the level of detail that is implied for this proposal. The following check lists contain typical items that are often required to be included in the inspections and checks carried out, and documented, prior to and during equipment start-up.

The sample checklists are generic; thus they do not apply to this specific project, and so the list of check items is generic, not specific. Our commissioning agent will develop systems verification and start-up checklists for each piece of equipment within the scope of this commissioning project, and those checklists will include all items included in the specific detail listed in the proposal.







# HVAC COMMISSIONING SYSTEM VERIFICATION/START-UP CHECKLIST CHILLER

PROJECT: _____
Equipment Name/Tag: _____ Location: _____
System/Area Served: _____ Related Equipment: _____

ITEM	<input type="checkbox"/>	COMMENTS
<b>PRE-START-UP INSPECTION</b>		
Commissioning lock-out procedures reviewed		
Operation and maintenance information		
Mounting/support system		
Seismic restraints		
Maintenance clearance		
Local valving/piping correct (including expansion tanks, make-up water and identification).		
Pressurization and leak tests		
Supplier pre-start (including charging the system) (report attached)		
Chemical cleaning and treatment (report attached)		
Insulation/lagging		
Refrigerant relief valve		
Temperature and pressure gauges		
Flow switches - safety interlocks		
Temperature sensors - safety interlocks		
UL and ASME approvals		
Control/diagnostic/programmable module		
DDC interface with specified points e.g. chilled water setpoint and demand limiter analogue inputs, and % load, run status and alarm outputs		
Electrical wiring		
Overload protection (sized correctly)		
Disconnect switch (tested)		
Control system - point to point checks complete		
<b>START-UP</b>		
Start condenser water system		
Start chilled water system to create load		
Chiller startup by supplier		
Modulation through specified range		
Safety interlocks		
Supplier certificate or log provided for start-up and all specified and regulatory tests		

Pre-start checks by: _____	Date: _____
Start-up checks by: _____ <span style="font-size: small; display: block; text-align: center;">print name</span>	Date: _____ <span style="font-size: small; display: block; text-align: center;">signature</span>



# HVAC COMMISSIONING SYSTEM VERIFICATION/START-UP CHECKLIST COOLING TOWER

PROJECT: _____
Equipment Name/Tag: _____ Location: _____
System/Area Served: _____ Related Equipment: _____

ITEM	<input type="checkbox"/>	COMMENTS
<b>PRE-START-UP INSPECTION</b>		
Commissioning lock-out procedures reviewed		
Operation and maintenance information		
Mounting/support system/vibration isolation		
Seismic restraints		
Maintenance clearance and access panels		
Local valving/piping correct (including make-up water, meter, back flow preventer and identification).		
Cooling tower leak test		
Sump clean and free of loose material		
Blowdown, drain and overflow system		
Chemical cleaning & treatment (report attached)		
Temperature gauges		
Temperature sensors		
Vibration sensor		
Sump heater aquastat.		
Sump heater, low water and high temp. cutout.		
Lubrication		
Vanes or dampers		
High and low speed motors (or VSD)		
Motor guards.		
Sheaves and belts, alignment and tension		
Freedom of rotation		
Electrical wiring (complete)		
Overload protection (sized correctly)		
Disconnect switch (tested)		
Local control panel with DDC interface		
Control system - point to point checks complete		
<b>START-UP</b>		
Start cooling tower fans		
Direction of rotation		
Motor Amps - Rated: _____ Actual : _____		
Motor Volts - Rated: _____ Actual : _____		
Start condenser water pumps		
Modulate or stage cooling tower fans and/or vanes		
Vibration & noise level acceptable		

Pre-start checks by: _____	Date: _____
Start-up checks by: _____	Date: _____
print name	signature











# HVAC COMMISSIONING SYSTEM VERIFICATION/START-UP CHECKLIST ROOF TOP UNIT - GAS HEAT/DX COOLING

PROJECT: _____	
Equipment Name/Tag: _____	Location: _____
System/Area Served: _____	Related Equipment: _____

ITEM	<input type="checkbox"/>	COMMENTS
<b>PRE-START-UP INSPECTION</b>		
Commissioning lock-out procedures reviewed		
Operation and maintenance information		
Mounting/support system and vibration isolation		
Seismic restraints		
Equipment guards		
Alignment & V-belt tension		
Freedom of rotation		
Lubrication		
Plenums clean and free of loose material		
Temporary start-up filters		
Fire & balance dampers positioned		
Access doors, Insulation and interior lights		
Filter bank, DP switch gauge and photohelics		
Local valving/piping (gas, condensate, pans, drains)		
Motorized dampers		
D/X expansion (cooling) coil and compressor		
D/X condensing coil and fans		
Gas piping and valving complete		
Gas inspection certificate		
Regulatory authority approved installation and burner control (certificate available)		
Building cleanliness		
Electrical wiring complete		
Overload protection (sized correctly)		
Disconnect switch (tested)		
Local control module with DDC interface		
Control system - point to point checks complete		
<b>START-UP</b>		
Start-up by manufacturer's representative with report and certificate or log provided		
Direction of rotation		
Electrical interlocks - stop/start		
Local air leakage acceptable		
Vibration & noise level acceptable		
Motor Amps - Rated :__ Actual :_____		
Motor Volts - Rated :__ Actual :_____		
Final operating filters installed		

Pre-start checks by: _____	_____	Date: _____
Start-up checks by: _____	_____	Date: _____
print name	signature	





