

YHC HRV Monitoring – Technical Specifications and Project Report

Prepared For: Yukon Housing Corporation

Prepared By: Technical Solutions Company Ltd.

Document Revision: 1.1

Latest Revision: 2/22/2012

Document Owner: Charles Hache
Technical Solutions Company Ltd.
chache@tsco.ca
867-668-6588 x 204
105-101 Titanium Way
Whitehorse, YT, Y1A 0E7

Revision History

Date	Revisor	Comments	Final Rev.
2/1/2012	Charles Hache	Initial Revision	1.0
2/22/2012	Charles Hache	Clarifications, changes to wording	1.1

Contents

YHC HRV Monitoring – Technical Specifications and Project Report.....	1
Revision History.....	1
Project Contacts.....	2
Logging Computer.....	2
Sensors.....	2
Temperature.....	2
Humidity.....	3
Pressure.....	3
Carbon Dioxide.....	3
Power and Current.....	3
Datacloud.....	3
Collection.....	4
Viewing.....	4
Extracting.....	4

Project Contacts

Project Manager	Juergen Korn	867-667-3790	juergen.korn@gov.yk.ca
Technical Lead	Charles Hache	867-668-6588 x204	chache@tsco.ca

Logging Computer

The logging computer is an embedded system running a linux kernel with the SoftLogger software for data collection and archival functions. The computer has no moving parts and is suitable for installation in industrial environments. The device has 4GB of storage, allowing it to run for several weeks without losing data due to lack of communication with the data server.

The logging computer maintains a secured connection to the data server. This allows maintenance or software upgrades to be performed on the device remotely as required.

Sensors

Temperature

Temperature measurements are made using 192-502LET-A01 5K NTC thermistors. These thermistors were calibrated in an ice bath and the calibration functions are performed by the logging computer before the data is sent to the server for storage. Consult the datasheet for more information regarding this thermistor.

The thermistors are measured by the Digital Sensor Interface (DSI) with a 16-bit ADC, allowing for 65536 measurement steps. The thermistors form the center of a voltage divider, with 2V being provided to the high voltage side. The low measurement voltage reduces the effects of self-heating of the measurement element. The DSI measures these particular thermistors with a resolution finer than 0.05C over -40C to 100C.

Humidity

Humidity measurements are made with HIH-5031 Low Voltage Humidity Sensors. This sensor features a hydrophobic membrane to protect the sensing element from condensation in environments with excessive moisture or large temperature differentials. Consult the datasheet for more information regarding this humidity sensor.

The humidity sensors are measured by the DSI with a 12-bit ADC, allowing for 4096 measurement steps. The sensors provide a 0-5V linear output so no signal conditioning is required. The DSI measures the humidity sensors with a resolution of about 0.04%RH over the full scale.

Pressure

Differential pressure is measured using the A/DP-6-5 pressure transducer. The sensor allows for measurement of 0-249pa of differential pressure across its barbs. Consult the datasheet for more information regarding this transducer.

The pressure sensors are measured by the DSI with a 12-bit ADC, allowing for 4096 measurement steps. The sensors provide a 0-5V linear output so no signal conditioning is required. The DSI measures the pressure sensors with a resolution of about 0.06pa over the full scale.

Carbon Dioxide

Carbon dioxide is measured using a K-30 NDIR CO2 sensor. The sensor has been configured with automatic calibration disabled, as the expected operating environment would interfere with this automatic calibration and introduce error. The sensor measures the CO2 quantity of the ambient environment in the range of 0-3,000 ppm. See the datasheet for more information regarding this sensor.

The CO2 sensor output is measured by the DSI with a 12-bit ADC, allowing for 4096 measurement steps. The sensor provides a 0-5V linear output with 5mv steps. The DSI measures the CO2 levels with a resolution of about 0.73ppm over the full scale.

Power and Current

Power and current measurements are made using MCTA current transducers and a WattsOn power transducer. The device acts as a stand-alone measurement unit which the logger polls for the quantities of interest. Consult the datasheets for more information on these devices.

Datacloud

Data is automatically compiled and stored within the Datacloud system. The system can be accessed via <http://yccic.yukoncollege.yk.ca:8080/>

The Datacloud system allows for the collection, viewing, and extraction of data from various sensors, devices, and installations. Contact the project Technical Lead for login information.

Collection

The data on the logging computer is compiled in CSV format until it is sent to the Datacloud server. The server parses this CSV file and loads the sensor data into a SQL database. No conditioning or modification is done to the data by the Datacloud server – all measured values are pre-processed by the logging computers.

Viewing

Datacloud supports viewing of collected data from the Graph Data page. This is not intended to be full featured data analysis program, but can show trends in the data and give perspective on data that should be analyzed further.

To graph data, first select a Start Date and End Date for the time you wish to display. Also select an appropriate interval aggregation length (eg: hourly, daily, or a custom interval length entered in seconds). Select the appropriate device to retrieve the data from. Select appropriate Left Y Axis Units for the values you wish to display, as well as Right Y Axis Units if applicable.

After selecting the units, the available sensors from the device are displayed. They can be added to the list of Selected Sensors, which are then graphed. For each Selected Sensor, an aggregation function can be chosen – this is a function that is applied to the data within each X axis interval. For example, the Average function averages the data between two X axis graduations and plots the result. This is useful for quantities such as temperature or current. Another example is the Accumulate function, which adds the data between two X axis graduations. This is useful for quantities such as Power (in watt-hours).

The graph can be resized by dragging the lower right corner, and an image of the graph can be saved locally through the right-click menu of the graph.

Note that these instructions may change without notice.

Extracting

Data can be downloaded from Datacloud in CSV file format. From the Retrieve Data page, select a Start and End point in time for the interval of the data to download. Select the device to show its associated sensors. Select the quantities to download. Finally press the Download CSV button at the bottom of the page. A dialog will show with instructions – read and press OK. After a few moments a dialog will show with the location of the saved CSV file, which can be used to download the file.

Note that with long intervals or many sensors selected the CSV generation process can be time consuming. Be patient while the data is loading; if it times out, then try modifying your sensor selection or time interval.

Note that these instructions may change without notice.