nVent

RAYCHEM

NGC-20

Hardware Manager Programming Guide

Contents

1 PRODUCT OVERVIEW

The nVent RAYCHEM NGC-20 is a local controller with central monitoring capabilities. The controller is capable in monitoring and controlling many heat-tracing specific parameters. All this information can be monitored remotely. The data communication goes via a Modbus communication link from the field to the central monitoring devices.

A nVent RAYCHEM NGC-20 controller will have by default standard configuration (freeze protection) and communication settings.

One of the first steps at implementation time is to define the communication parameters in the controllers such that all units will have a unique address on the Modbus link.

The nVent RAYCHEM NGC-20 Hardware Manager (RHM NGC-20) will provide the option to set these parameters via a desktop application. As soon as these parameters are set the units are ready to be connected to the User Interface (NGC-UIT2 or TOUCH1500) or nVent RAYCHEM Supervisor.

This document describes the communication parameters, possible settings and how to apply them into the controller.

NVENT RAYCHEM NGC-20 HARDWARE MANAGER

The nVent RAYCHEM NGC-20 hardware manager is the 'toolbox' for the commission and maintenance engineer interrogating the nVent RAYCHEM NGC-20. The nVent RAYCHEM NGC-20 hardware manager is available in two different versions. A basic version is available on customer request while the full version is available for internal use only.

THIS DOCUMENT DESCRIBES THE CAPABILITIES OF THE FULL VERSION.

The nVent RAYCHEM NGC-20 hardware manager offers the possibility to interrogate the nVent RAYCHEM NGC-20 in its full extend. All parameters are available to the engineer for further analyses. The tool offers the possibility to analyse the communication to the controller and see if any issues exist. Communication settings can be easily checked and changed if needed. Firmware can be upgraded where the original configuration will be reloaded into the controller after the firmware upgrade. The link to the nVent RAYCHEM NGC-20 can be established via RS-485 and Bluetooth.

This document describes in detail the possibilities of the nVent RAYCHEM NGC-20 hardware manager.

2 THE NVENT RAYCHEM NGC-20 HARDWARE MANAGER PROGRAMMING GUIDE

VITAL INFORMATION

This manual is a guide for the setup the communication parameters of the nVent RAYCHEM NGC-20-C(L)-E controllers.

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nVent
2415 Bay Road
Redwood City, CA 94063-3032
U.S.A.

3 HOW TO RUN THE NVENT RAYCHEM NGC-20 HARDWARE MANAGER

To start the installation double-click on the Setup icon either on a CD or downloaded from the nVent website.

Figure 3-1: Shortcut to nVent RAYCHEM NGC-20 Hardware Manager

Click Next to continue.

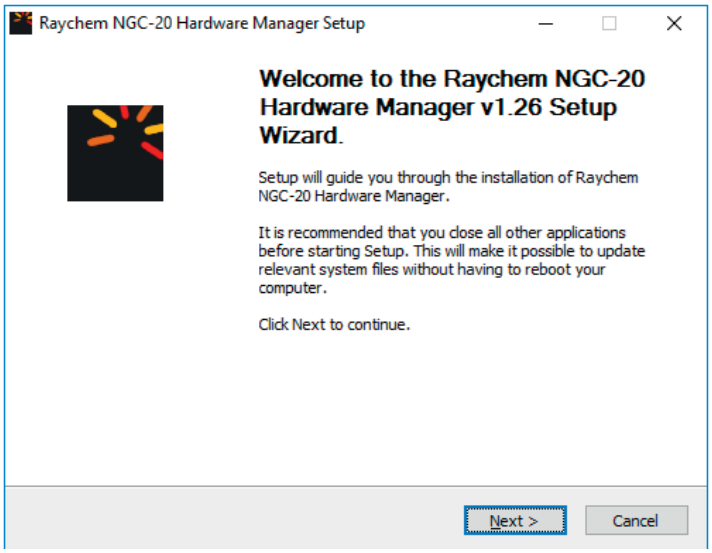
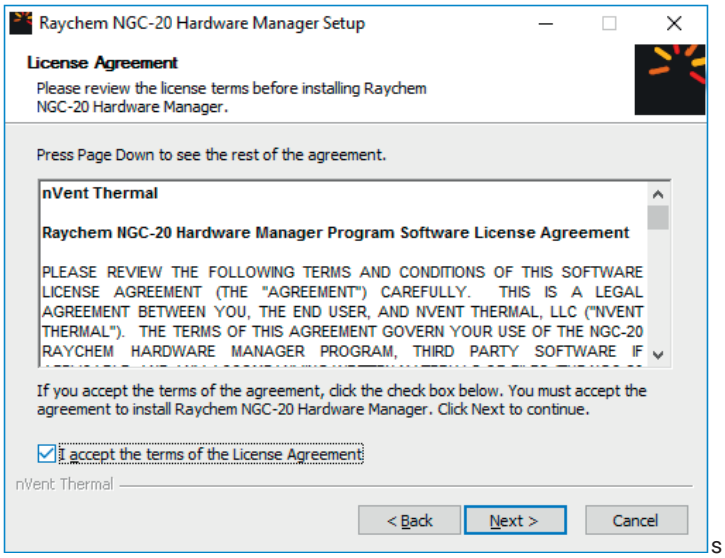


Figure 3-2: Install Screen 1

Read the License Agreement. Check the box to accept the terms of the License Agreement then click “Next” to continue.



s

Figure 3-3: Install Screen 2

Choose an install location or accept the default, then press Install.

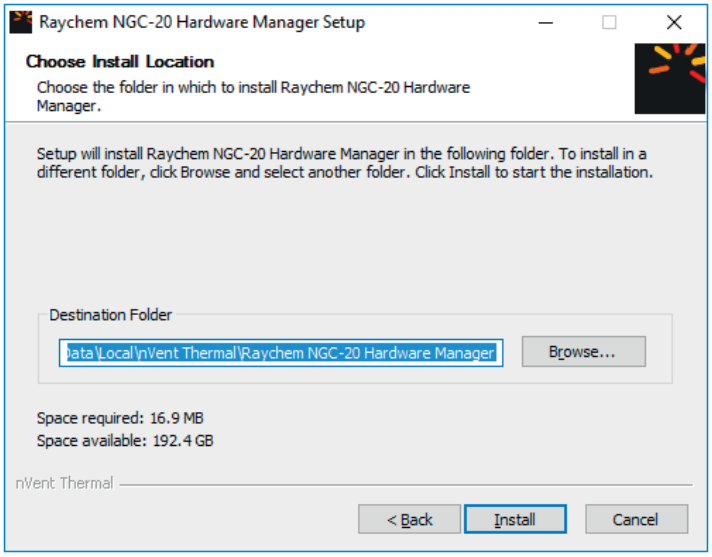


Figure 3-4: Install Screen 3

After the nVent RAYCHEM NGC-20 Hardware Manager has been successfully installed double-click the shortcut shown here to run the program.

When running the application for the first time a license code is required. Please contact the nVent RAYCHEM NGC-20 Product Manager for an internal license key.

Figure 3-5: Install Screen 4

4 CHANGING THE LANGUAGE OF THE USER INTERFACE SCREENS

The nVent RAYCHEM NGC-20 Hardware Manager default language is English. Select System>Language for a list of available languages.

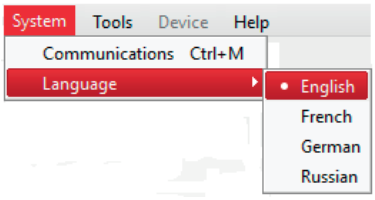


Figure 4-1: Language Menu

5 COMMUNICATIONS MENU

This Menu is for configuring the COM port settings for the computer running nVent RAYCHEM NGC-20 Hardware Manager.

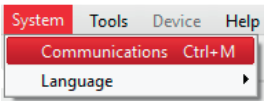


Figure 5-1: Communications Menu

PORT CONFIGURATION

The Local Port Configuration section allows users to configure the communication settings of the computers COM ports.

Baud Rate: This field allows you to select the baud rate of the COM communication port. Selections: 9600, 19200, 38400, 57600. Default: 9600

Data Bits: 7 or 8. Default is 8

Parity and other settings are given in Other defaults.

Other defaults are: Parity = None, Stop Bits = 2, Transmission mode = RTU and Response timeout is 1 second.

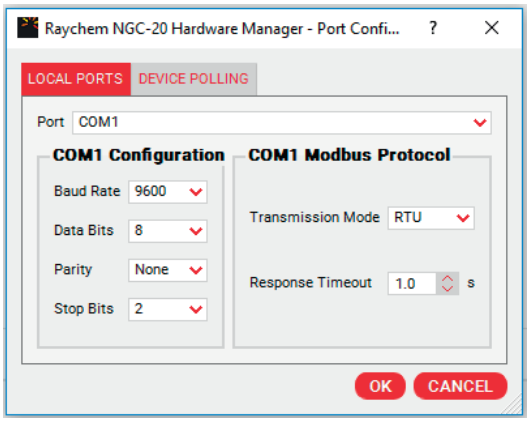


Figure 5-2: Communications, Local Ports

DEVICE POLLING

Polling Period: the length of time between polls. From 1.0 seconds to 100.0 seconds.

Number of retries: the number of attempts the program will make to connect with the NGC-20 before showing a communication failure.

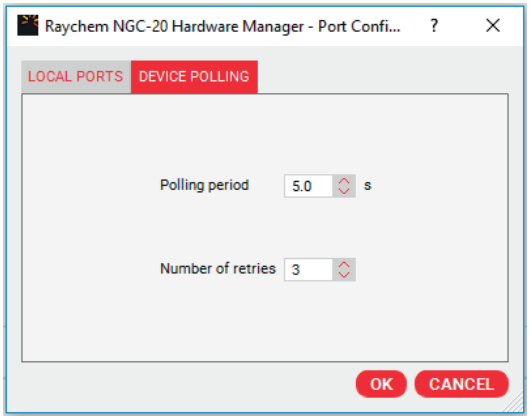


Figure 5-3: Communications, Device Polling

6 ESTABLISHING A CONNECTION BETWEEN THE NVENT RAYCHEM NGC-20 HARDWARE MANAGER AND NVENT RAYCHEM NGC-20 CONTROL UNITS

6.1 SCANNING FOR DEVICES

From the main screen, select the Select Device button located on the top left.

Figure 6-1: Select Device Button

To manually connect using RS-485, first select the Manual tab, then enter the COM port and ModBus Address of the desired NGC-20 controller.

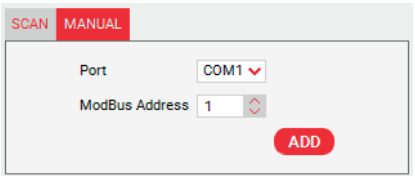


Figure 6-2: Manual Add Com1

To scan for all ModBus address or for Bluetooth devices, select the Scan tab, then the port of the desired NGC-20 Controller (Bluetooth/ COM1/ COM2/ etc). The program will now scan for all controllers on that port.

***Note about Bluetooth:** It may take 1 or more scans to pick up all the NGC-20 controllers in the area. If there are many controllers the scan could take a very long time. For example, to pick up 100 controllers it could take an hour or more.

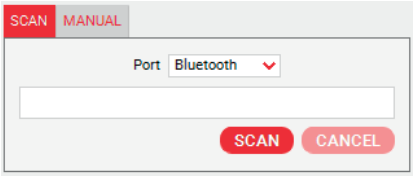


Figure 6-3: Bluetooth Scan

This example shows the details for 1 controller that was found during a Bluetooth scan.

Figure 6-4: Device Details

All controllers that are discovered will appear in the Device List. Select the desired controller to highlight in blue then click on the **Select** button in the bottom right of the screen. You will be returned to the Main screen and information for the selected controller will be shown.

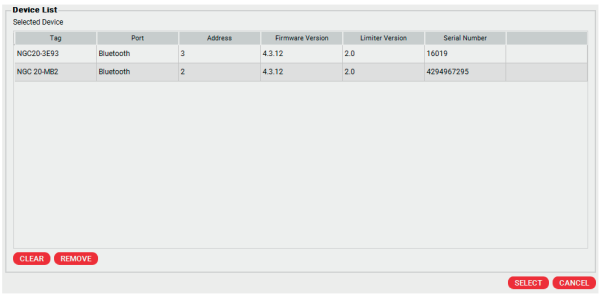


Figure 6-5: Device List

7 BASIC FEATURES

7.1 SWITCH STATUS INDICATOR

When the nVent RAYCHEM NGC-20 Hardware Manager is connected to an NGC-20 Controller the switch status is always shown on the bottom right of the window. It gives a quick visual reference of the status of the Output Switch and the heat tracing cable.

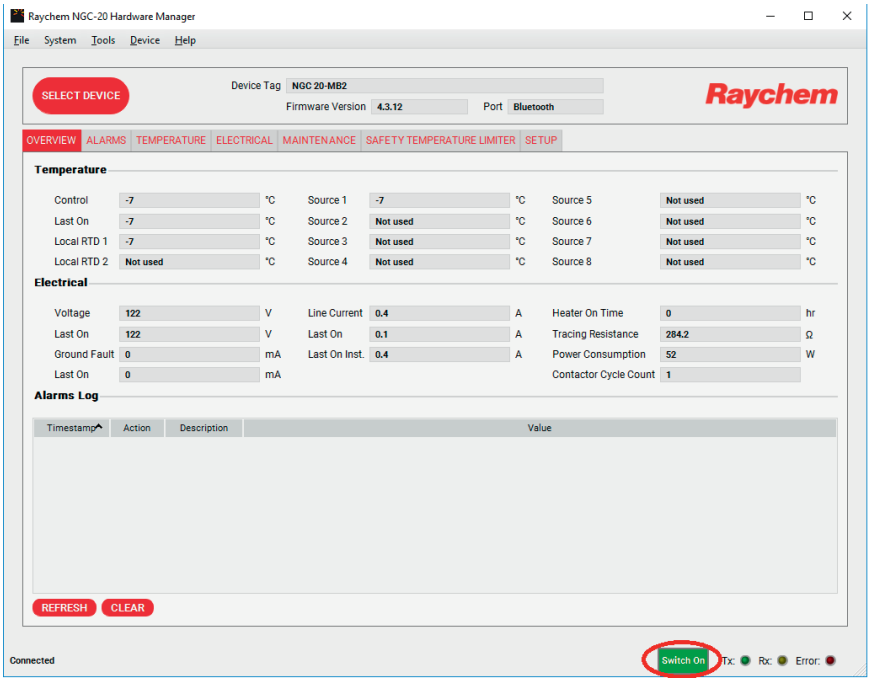


Figure 7-1: Location of Switch Status Indicator

The Output Switch is closed and the heat tracing cable is energized.

Figure 7-2: Switch On Indicator

The Output Switch is open and the heat tracing cable is off.

***Note:** If there is an active Switch Failure Alarm the heat tracing cable may be energized while the switch is open.

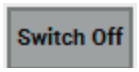


Figure 7-3: Switch Off Indicator

The Safety Temperature Limiter has tripped, the Output Switch is open and the heat tracing cable is off.

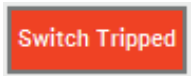


Figure 7-4: Switch Tripped Indicator

7.2 CONNECTION STATUS

The connection status simply shows if the program is connected to a controller or not. It shows either **Connected** or **Disconnected**. A controller can be temporarily disconnected for testing purposes by selecting Device>Disconnect. After testing, return to the Device menu and select Connect to re-connect to the same controller.

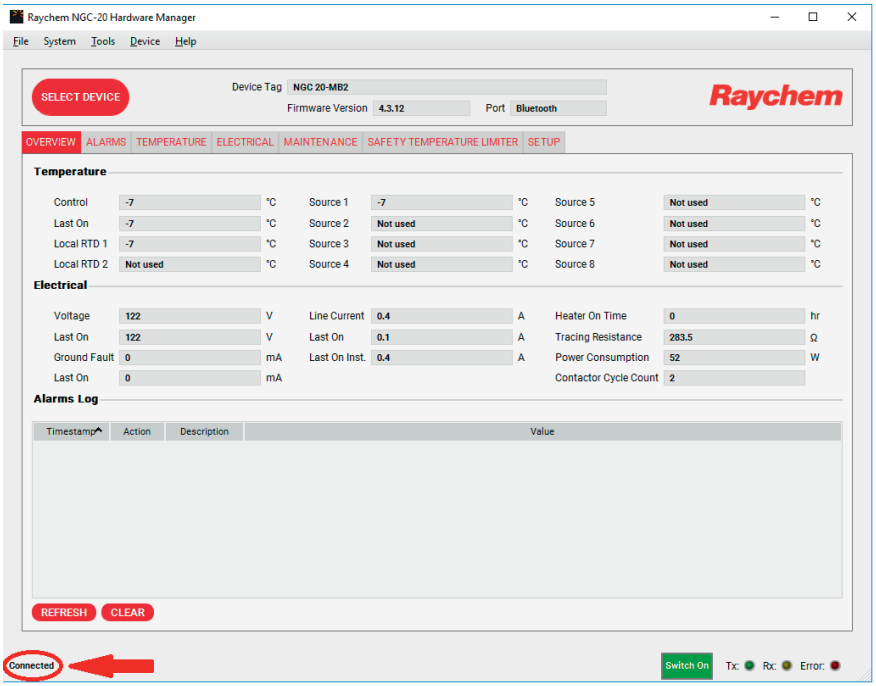


Figure 7-5: Location of Connection Status

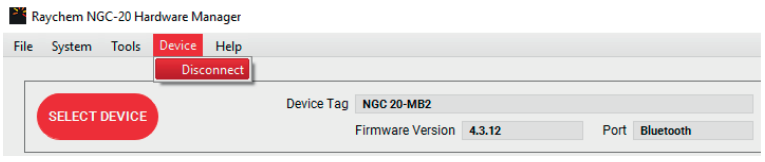


Figure 7-6: Device Disconnect Menu

7.3 APPLYING CHANGES

When changes are made within a tab screen a small icon appears to show that there are unsaved changes, and any changed drop-down menus and check boxes turn yellow. To save the changes, select the Apply button at the bottom right of the screen.

Changes are only saved in the tabbed screen that is currently being viewed.

In the example shown below, there are pending changes in the Temperature and Electrical tabs. If the user selects Apply in the Electrical tab, as shown, the highlighted change to Switch Control Mode is saved but the changes in the Temperature tab are still pending.

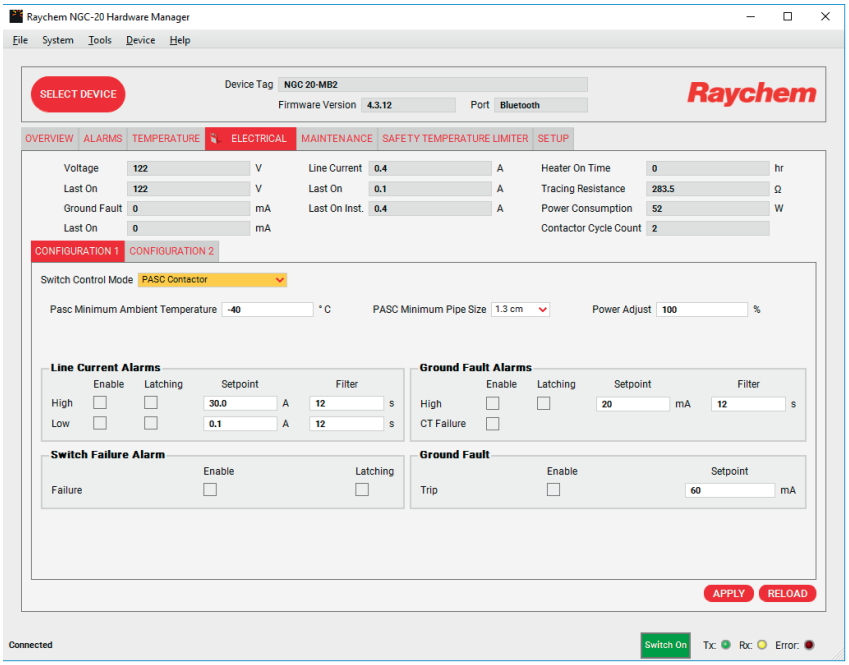


Figure 7-7: Save pending changes with the Apply Button

To discard the changes or refresh the screen press the Reload button.

8 OVERVIEW SCREEN

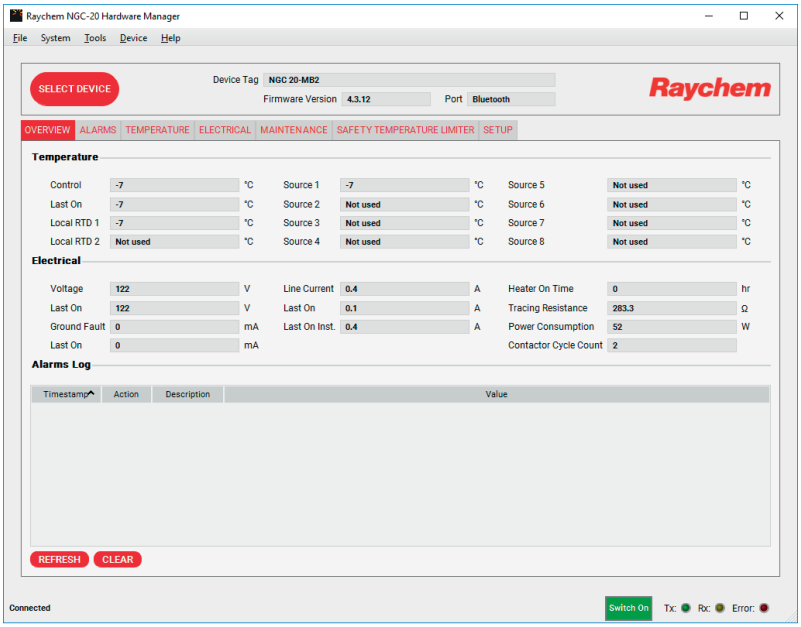


Figure 8-1: Overview Screen

Overview Screen, Temperature Section

Control Temperature:

This is the temperature used by the nVent RAYCHEM NGC-20 controller to steer the output switch. This can be the either the temperature measured by temperature sensor 1, temperature
sensor 2, the average or the lowest of both readings.

The value **last on** was the control temperature of the nVent RAYCHEM NGC-20 when the output was switched ON the last time.

Local RTD 1 Temperature:

This field shows the actual temperature measured by temperature sensor 1.

Local RTD 2 Temperature:

This field shows the actual temperature measured by temperature sensor 2.

Source Temperatures:

This field shows all actual sensor temperatures presently connected. Temperature sources 3 to 8 require the use of an optional NGC-UIT and MONI-RMM2 device.

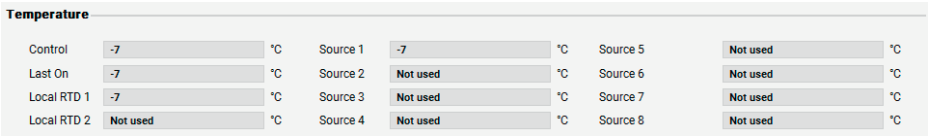


Figure 8-2: Overview Screen, Temperature Section

Overview Screen, Electrical Section

Voltage:

This shows the actual voltage the unit has recorded since the last reset. For resetting these values go to the Maintenance screens as explained elsewhere in this manual.

Ground Fault Current:

Measures ground fault current.

Load Current:

Current uptake of the load(s) connected to the control output of the nVent RAYCHEM NGC-20 control Unit.

Last On Load Current:

Current measured directly after the load was turned on the last time. This reading shows the start up current which can be significantly higher than the normal operating current.

Tracing Resistance:

This field shows the actual calculated tracing resistance. (Calculated by dividing the measured supply voltage by the measured current) a value of 8000 Ohms means there is no load connected.

Power Consumption: this field shows the Watts being consumed by the connected load at this moment.

Contactor Cycle Count:

This field gives the actual number of switch operations the output switch has performed since the last reset.

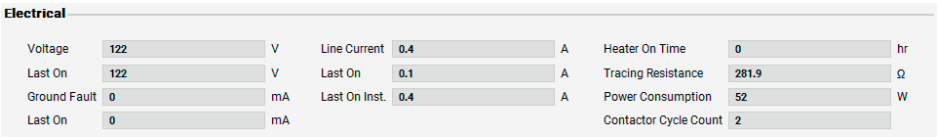


Figure 8-3: Overview Screen, Electrical Section

Overview Screen, Alarms Log

The Alarms Log shows all alarm activity. It can be cleared by clicking the Clear button.

Figure 8-4: Overview Screen, Alarms Log

9 ALARMS SCREEN

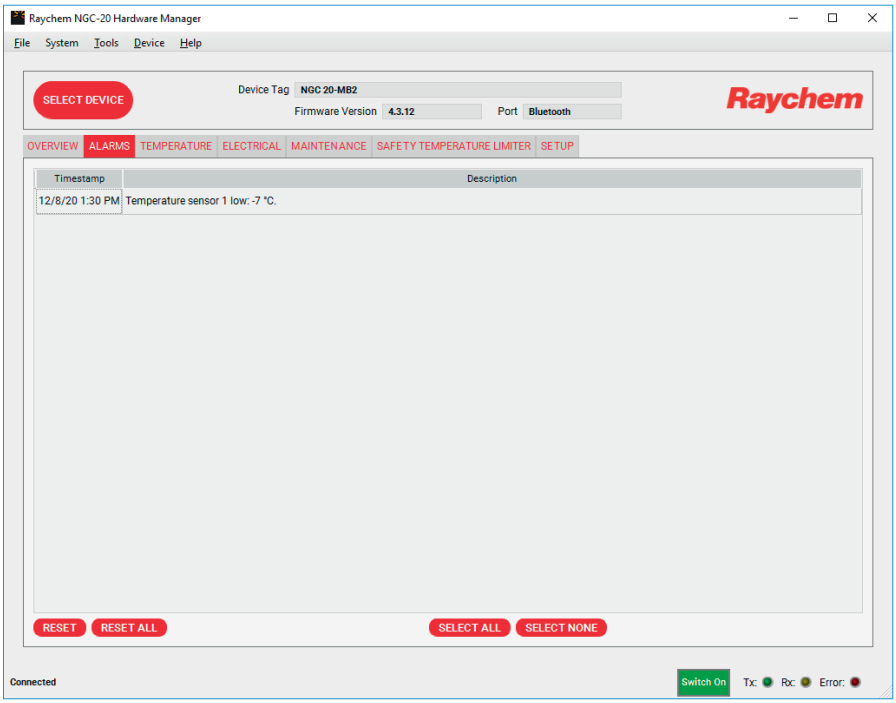


Figure 9-1: Alarms Screen

The Alarms screen displays all of the active alarms in the NGC-20 Controller.

To reset a particular alarm, click on the line and press the Reset button. Or, press Reset All to clear all alarms. If the alarm condition is still active the alarm will reappear in the list.

10 TEMPERATURE SCREEN

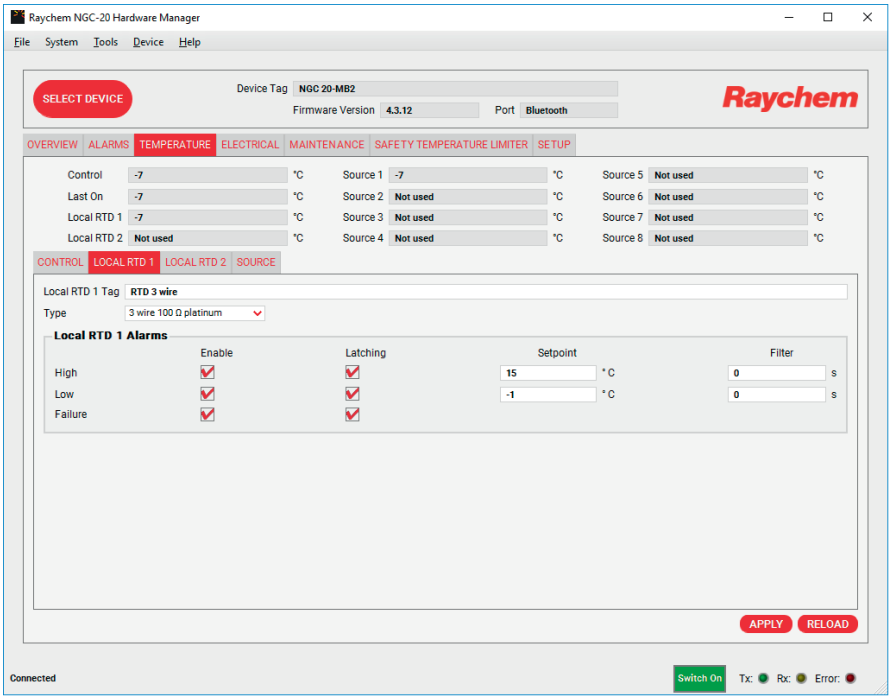


Figure 10-1: Temperature Screen

Temperature Screen

Control Temperature:

This is the temperature used by the nVent RAYCHEM NGC-20 controller to steer the output switch. This can be the either the temperate measured by temperature sensor 1, temperature sensor 2, the average or the lowest of both readings. The value last on was the control temperature of the nVent RAYCHEM NGC-20 when the output was switched ON the last time.

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This field shows the actual temperature measured by temperature sensor 1.

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This field shows the actual temperature measured by temperature sensor 2.

Source Temperatures:

This field shows all actual sensor temperatures presently connected. Temperature sources 3 to 8 require the use of an optional NGC-UIT and MONI-RMM2 device.

Figure 10-2: Temperature Screen, Temperatures

Control Tab

Control Setpoint:

The desired temperature.

Control Mode:

Note that TS 1 and TS 2 are inputs directly connected to the input terminals of the nVent RAYCHEM NGC-20 unit, whereas the temperature inputs TS 3 to TS 8 are optional through the use of nVent RAYCHEM MONI-RMM2-E temperature multiplexing units and an NGC-30-UIT. Please refer to the installation instructions of these products for more details.

Lowest: Setting the Temperature Control to Lowest means that the output of the nVent RAYCHEM NGC-20 will be controlled based on the lowest temperature measured by any of the temperature sensors connected to the nVent RAYCHEM NGC-20 either direct to the temperature sensor inputs TS 1 or TS 2 or any other sensor connected via MONI-RMM2-E and nVent RAYCHEM NGC-UIT.

Average: Setting the Temperature Control to Average means that the output of the nVent RAYCHEM NGC-20 will be controlled based on the average temperature measured by all the temperature sensors connected to the nVent RAYCHEM NGC-20 either direct to the temperature sensor inputs TS 1 and TS 2 and any other sensor connected via MONI-RMM2-E and nVent RAYCHEM NGC-UIT.

Control Fail Mode:

The different Fail modes supported by the nVent RAYCHEM NGC-20 are:

Fail Off: meaning that if the control sensor(s) of this nVent RAYCHEM NGC-20 unit should fail the output switch will open. Use this for all circuits where keeping the heating cables permanently powered could cause overheating.

Fail On: meaning that if the control sensor(s) of this nVent RAYCHEM NGC-20 unit should fail the output switch will be permanently closed. This is the preferred option for freeze protection lines and most self-regulating heating systems.

Last %: this Fail Mode is only applicable to the control mode PASC or Proportional Ambient sensing. The Fail Safe mode Last % will control the output in a similar manner as it was doing before the sensor(s) failed. This Alternate ON/OFF switching will be time based only – there will be no relation to temperature.

Fixed %: The Fail Mode Fixed % will alternate the control output ON and OFF at a certain interval.

The **High Limit Cut-Out** actually works as a temperature limiter which can be configured to operate as either a latching or non-latching type. When the Latching button is set to YES than each time an alarm has occurred the Alarm needs to be manually reset. When set to NO than the alarms will be self-healing and will disappear when the alarm condition is no longer present.

The **Low Limit Cut-Out** protects the heater cable from damage when cryogenic conditions are a possibility. The alarm can be configured to operate as a latching or non-latching type. When the Latching button is set to YES, then each time an alarm has occurred, the alarm will need to be reset manually. When set to NO, then the alarm will be self-healing and will disappear when the alarm condition is no longer present.

Control Temperature Alarms:

The Alarm Enable defines which alarms will be enabled and which Alarms will be disabled. In order to enable an alarm just check the checkbox beside it. Before alarms will be generated they need to be enabled.

When an alarm is set to Latching (the Latching box is checked) then the alarm needs to be manually reset by the user before it will be cleared. If it is not latching (box is not checked) and the alarm condition goes away the alarm will be cleared automatically.

The Alarm Filter acts as a timer. The failure condition must exist for a longer period than the Alarm Filter time before an alarm will occur.

High/Low Setpoints:

If these values are exceeded a High or Low Control Temperature Alarm will be generated.

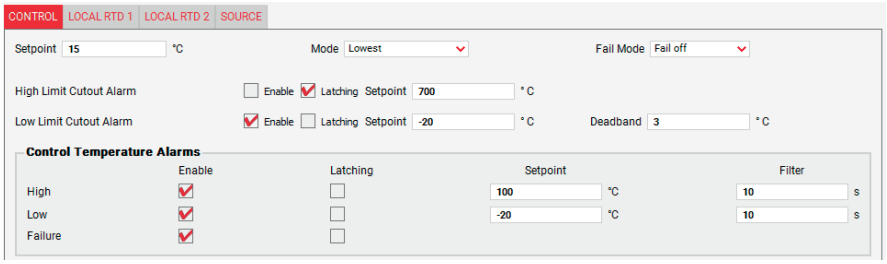

Figure 10-3: Temperature Screen, Control Settings

Local RTD1 Tab

Local RTD1 Tag: This field allows you to set a tag for RTD 1. Click on the field and type with the keyboard to edit.

Type offers three options, “3 wire 100 Ohm Platinum”, “2 or 3 wire 100 ohm Nickel/Iron” or **“Not Used”**. Only use **Not used** when there is no temperature sensor connected to this input.

The Alarm Enable defines which alarms will be enabled and which alarms will be disabled. In order to enable an alarm just check the checkbox beside it. Before alarms will be generated they need to be enabled.

Latching

When an alarm is set to Latching (the Latching box is checked) then the alarm needs to be manually reset by the user before it will be cleared. If it is not latching (box is not checked) and the alarm condition goes away the alarm will be cleared automatically.

Alarm filters can be seen as an alarm delay. This means that when the temperature drops below the Low Alarm Set point the nVent RAYCHEM NGC-20 Control unit will only trigger an alarm when the value entered in the Low Alarm Filter is timed out. This means that if immediate action of the alarm output is required, the Low Alarm Filter value should be set at 0 sec. Any other value will result in a delay. The operation of the High Alarm Filter is the same. Min 0 to Max 59940 seconds.

High Alarm Set point

Enter in this field the value at which - when exceeded - you want the nVent RAYCHEM NGC-20 control unit to generate a high temperature alarm. This High Temperature condition will be monitored by temperature sensor 1 only.

Low Alarm Setpoint

Enter in this field the value at which - when exceeded - you want the NGC-20 control unit to generate a Low Temperature Alarm. This Low Temperature condition will be monitored by temperature sensor 1 only.

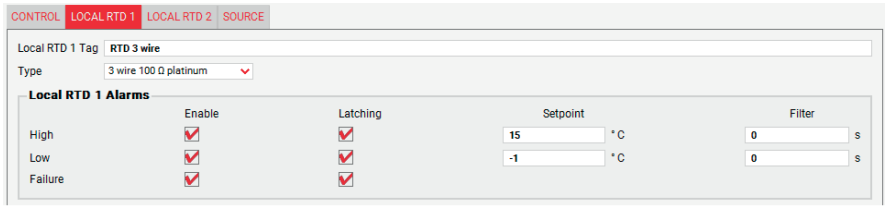

Figure 10-4: Temperature Screen, RTD1 Settings

Local RTD2 Tab

See setting information for RTD1 above.

These settings are monitored by temperature sensor 2 only.

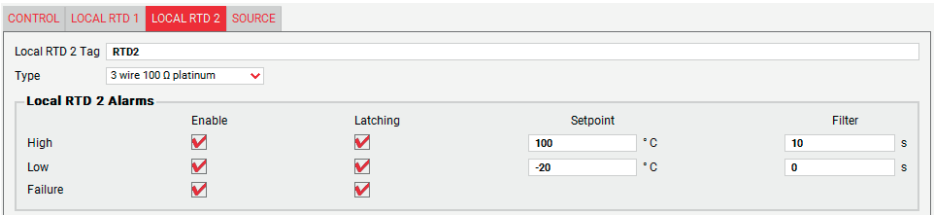

Figure 10-5: Temperature Screen, RTD2 Settings

Source Tab

One nVent RAYCHEM NGC-20 Control unit can be configured with up to 8 Temperature Sources.
2 of these sources are local (hardwired) to the NGC-20 unit, the remaining inputs can be configured through optional MONI-RMM2-E and NGC-UIT modules.

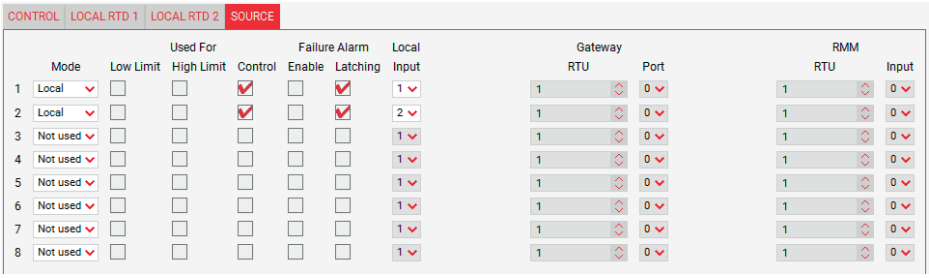

Figure 10-6: Temperature Screen, Source Settings

11 ELECTRICAL SCREEN

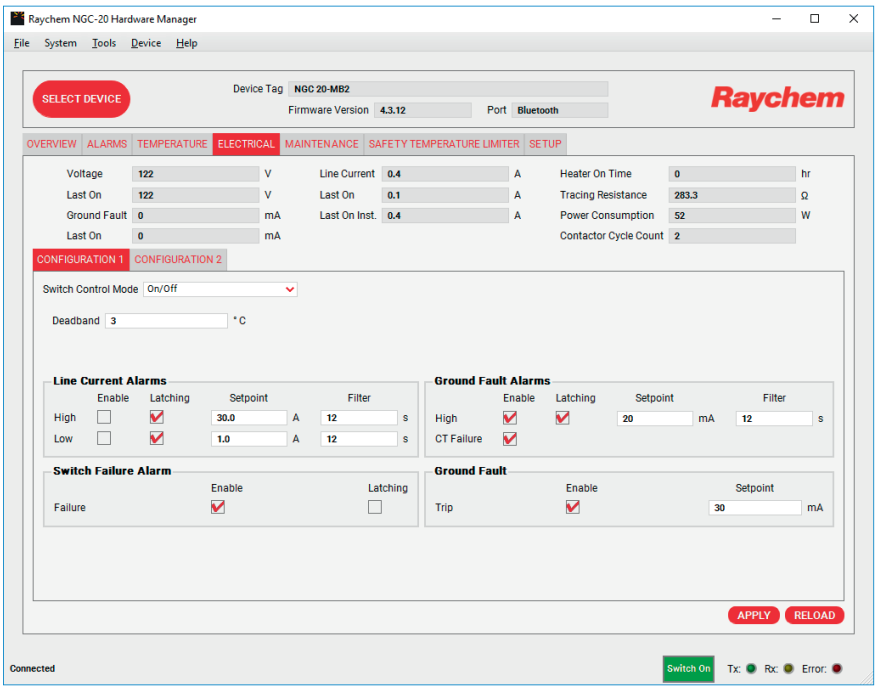

Figure 11-1: Electrical Screen

11.1 SWITCH CONTROL MODE

Configuration 1 Tab

The Switch Control Mode defines how the output switch will be operated in order to maintain the desired temperature. Tap on the desired Switch Control Mode. The nVent RAYCHEM NGC-20 supports a number of different control modes. The different control modes supported are:

- On/Off
- Force On
- Force Off
- PASC
- Proportional Ambient Contactor

Note: Depending on the selected control mode the input fields shown on the screen will vary.

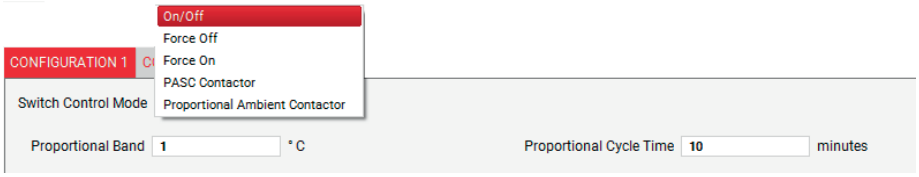

Figure 11-2: Electrical Screen, Switch Control Mode

PASC Contactor Mode

PASC takes advantage of the fact that the heat loss from a pipe is proportional to the temperature difference between the pipe and the ambient air. Once the heat tracing and insulation on a pipe has been designed to balance heat input with heat loss and maintain a particular temperature, the main variable in controlling the pipe temperature becomes the ambient air temperature. The nVent RAYCHEM NGC-20 has a control algorithm that uses the measured ambient temperature, desired maintain temperature, minimum ambient temperature assumption used during the design stage, and size of the smallest pipe diameter to calculate how long the heater should be on or off to maintain a near constant pipe temperature.

PASC Min Ambient Temp: This is the minimum expected ambient temperature which is expected for this area. This information is part of the design information and is country and region specific.

PASC Min Pip Size: This is the diameter of the smallest diameter of any pipe controlled by the heating circuit / nVent RAYCHEM NGC-20 control unit.

The Power Adjust (min 10% to Max 200%) The Power adjustment factor can be used to influence or override the calculated ON /OFF ratio. Values in excess of 100% will lead to more heat, values below 100% will reduce the temperature.

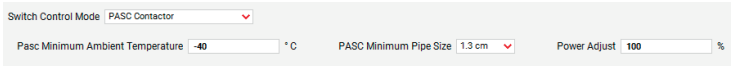

Figure 11-3: Switch Control Mode, PASC

Proportional Ambient Contactor

Proportional Band: The delta between the desired temperature (set point) and the minimum expected ambient temperature.

Proportional Cycle Time: The total time cycle (Sum of the ON + OFF cycle) in minutes. The cycle time can be adjusted between minimum 10 and Maximum 255 minutes. The ON/OFF ratio will be calculated based on the measured ambient temperature.

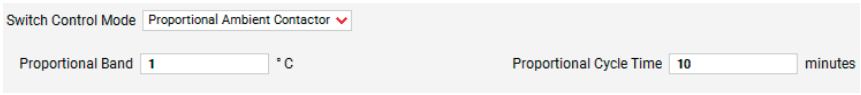

Figure 11-4: Switch Control Mode, Proportional Ambient Contactor

On/Off

On/Off is a simple set point / dead band operation.

Set in the dead band Field the desired dead band.
Note that the dead band will be above set point.

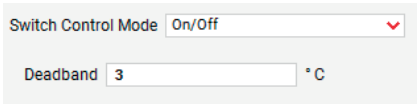

Figure 11-5: Switch Control Mode, On/Off

Line Current Alarms

High / Low Line Current

(Range Min 0.1A – Max 30A) The Line Current alarm will generate an alarm each time the Line current supplied to the heating cable exceeds the defined band. The line current is the same as the heater current.

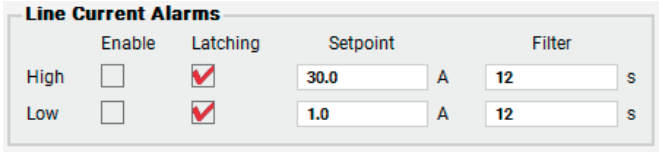

Figure 11-6: Electrical Screen, Line Current Alarms

Switch Failure Alarm

The **Switch Failure Alarm** occurs if the system detects a current when the output should be off.

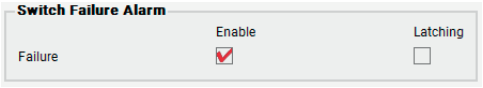

Figure 11-7: Electrical Screen, Switch Failure Alarm

Ground Fault Alarms

High GF Current

(Range Min 10 – Max 250 mA) This field holds the value at which an early warning will be generated in the form of a High GF alarm. Typical value between 15 and 30 mA.

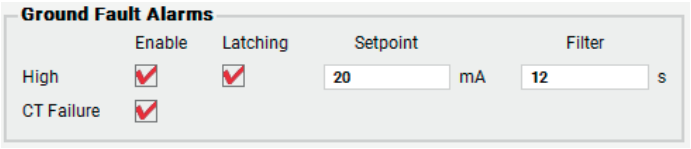

Figure 11-8: Electrical Screen, Ground Fault Alarms

Ground Fault Trip

Ground Fault Trip (Enable / Disable) setting the Ground Fault Trip to Disabled, disables the Ground Fault Trip function. The High GF Alarm would still be generated when the ground fault current exceeds the alarm value.

Ground Fault Trip Current

(Range Min 10 – Max 250 mA) The **GF Trip Current** field holds the value at which a ground fault current will trip the output permanently OFF. Typically GF Trip is set at a slightly higher value than the **High GF Current** Set point. Typical value is between 15 and 30 mA

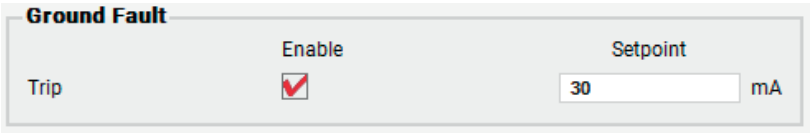

Figure 11-9: Electrical Screen, Ground Fault Trip

Configuration 2

High and Low Voltage

(Range Min 50 – Max 305 VAC) The voltage alarm will generate an alarm each time the power supply voltage supplying the NGC-20 control unit and the heating cables exceeds the defined band.

Figure 11-10: Electrical Screen, High/Low Voltage Alarms

Nominal Tracing Resistance:

This field contains the calculated value of the tracing resistance. (Ohmic)

High Tracing Deviation (%):

If the calculated tracing resistance deviates more than x% an alarm will be generated.

Low Tracing Deviation (%):

If the calculated tracing resistance deviates more than x% an alarm will be generated.

Figure 11-11: Electrical Screen, Tracing Resistance

12 MAINTENANCE SCREEN

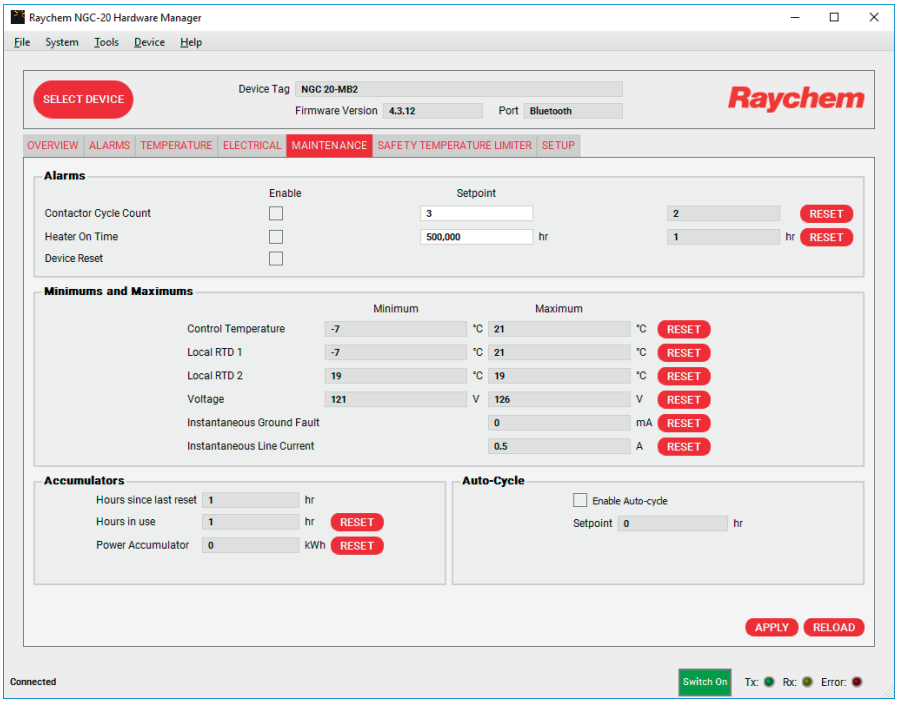

Figure 12-1: Maintenance Screen

Alarms

Contactor Cycle Setpoint

(Range Min 0 – Max 2000000) The Contactor Cycle Count counts the number of switch operations the control output of the NGC-20 has made since the last reset. When the counted tally matches the setpoint an alarm is generated.

Contactor Cycle Count

This field shows the actual number of switch operations the output switch has performed since the last reset. The value can be reset to zero by pushing the Reset button.

Heater On Time

(Range Min 1 – Max 1000000 hrs) The Heater On Time Alarm is an hour counter which record the actual time the output is closed and the heating cables are used since the last reset

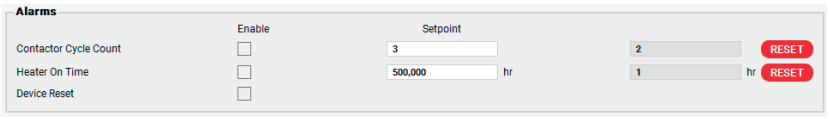

Figure 12-2: Maintenance Screen, Alarms

Minimums and Maximums

The nVent RAYCHEM NGC-20 control unit measures many variables such as; voltage, current, temperature, ground fault etc.. and for each of these the highest and lowest value ever measured is stored in the nVent RAYCHEM NGC-20 controllers memory. The Maintenance screens enable the user to visualize and to reset this data.

Note: Maintenance data is stored until it is manually reset. After resetting the measuring process starts new and stores new Min / Max values until the next reset. Press the Reset button located to the right of the values to reset them.

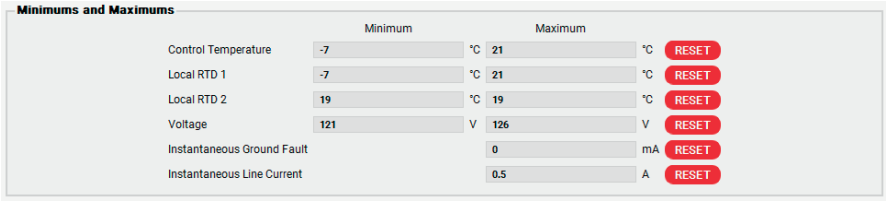

Figure 12-3: Maintenance Screen, Min/Max

Accumulators

Number of Hours Since Last Reset: This feature indicates the total hours of use of the controller since the last reset (power cycle). The number of hours since last reset hours accumulator can only be reset by cycling the controller's power.

Note: The Number of hours since last reset will roll over to zero when the upper limit of 65,535 hours has been exceeded.

Number of Hours In Use: The purpose of this feature is to indicate the total hours of use of the controller since its initial operation.

Power Accumulator: The purpose of this feature is to indicate the total power consumed, by the connected load, since its initial operation.

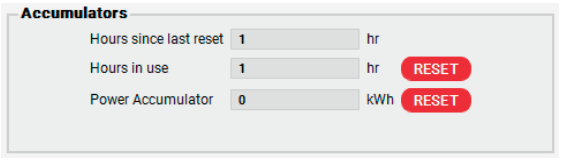

Figure 12-4: Maintenance Screen, Accumulators

Auto-cycle

The Auto Cycle function will test dormant heating circuits at regular intervals.
The delay between 2 test cycles can be user defined.

The Auto Cycle Interval can be any value from 0-750 hours. The default is 8 hrs.

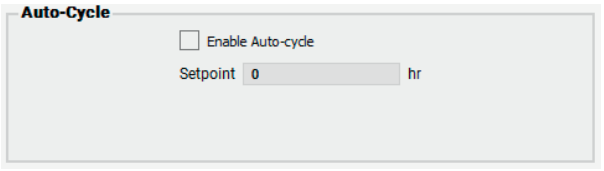

Figure 12-5: Maintenance Screen, Auto-cycle

13 SAFETY TEMPERATURE LIMITER SCREEN

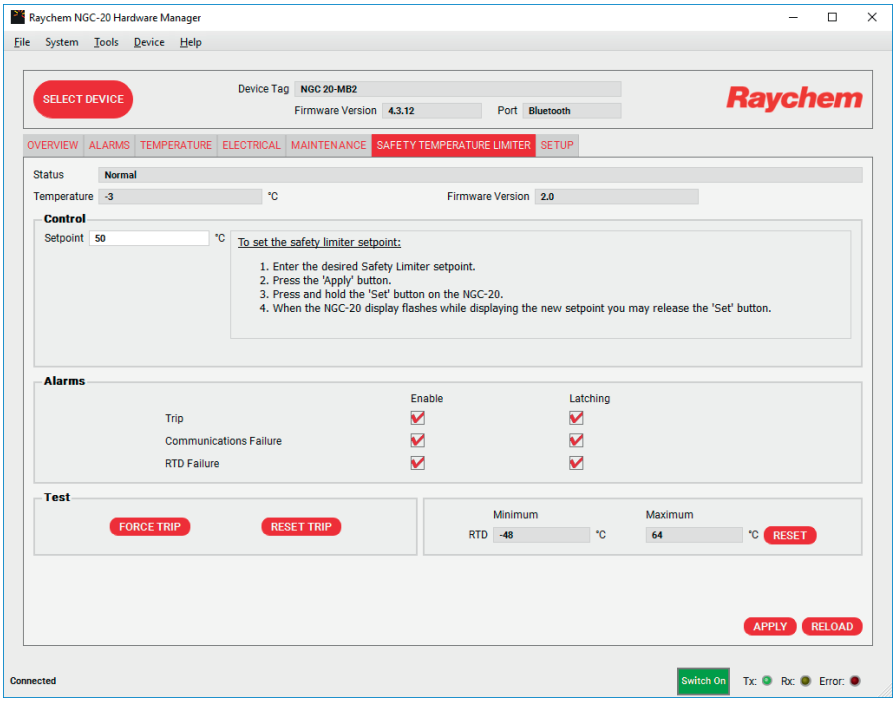

Figure 13-1: Safety Temperature Limiter Screen

13.1 TO CHANGE THE SAFETY TEMPERATURE LIMITER SETPOINT

Enter the desired Safety Limiter Setpoint.

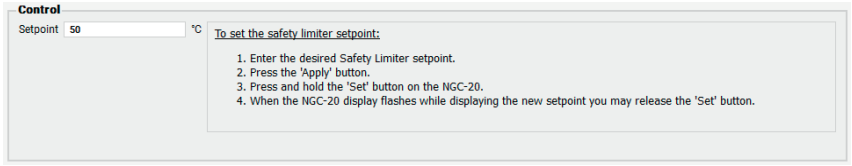

Figure 13-2: New Safety Limiter Setpoint

Press the Apply button.

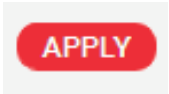

Figure 13-3: Apply Button

A dialog box appears telling the user to “Press and hold the “Set” button on the NGC-20 Controller.”

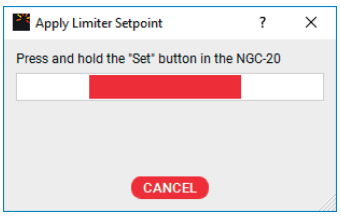

Figure 13-4: Limiter “Set” Button Dialog Box

Hold the “Set” button until the dialog box disappears and the setpoint is updated – about 2-5 seconds.

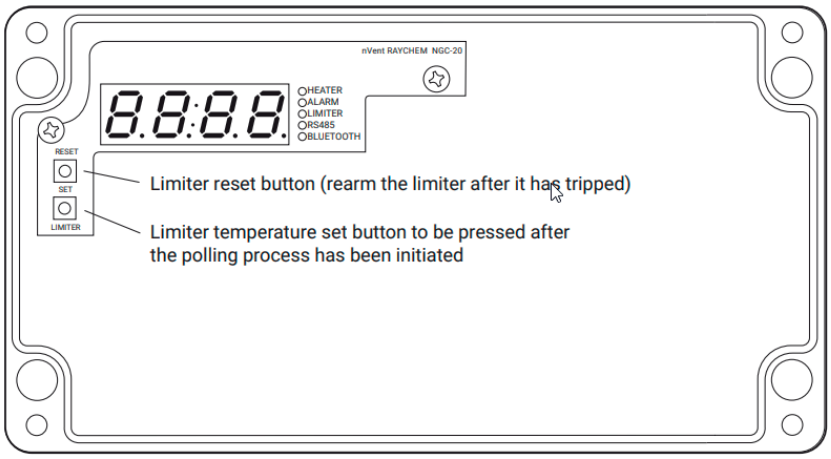

Figure 13-5: Location of “Set” and “Reset” Buttons on NGC-20 Controller

13.2 TO RESET A TRIPPED LIMITER

If the Limiter is in a tripped state it will be shown in the switch status, and in the Status field in the Safety Temperature Limiter screen.

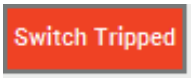

Figure 13-6: Switch Tripped Indicator

Figure 13-7: Safety Temperature Limiter Status

To reset the alarm, press the “Reset Trip” button.

Note: If the trip condition still exists (ie: the Safety Limiter Temperature is above the Setpoint) then the Limiter will not reset.

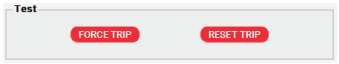

Figure 13-8: Force Trip and Reset Trip Buttons

When the “Reset Trip” button is pressed a dialog box will appear instructing the user to enter a randomly generated code number. Enter this number and press the “OK” button.

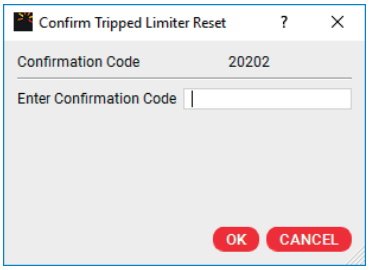

Figure 13-9: Reset Safety Limiter Confirmation Code

If the number matches the Safety Temperature Limiter Trip will be reset. If it does not match it will not reset and the user must press the “Reset Trip” button again.

Alternately: The user can press the “Reset Limiter” located on the NGC-20 controller itself, as shown in Figure 13-5.

14 SETUP SCREEN

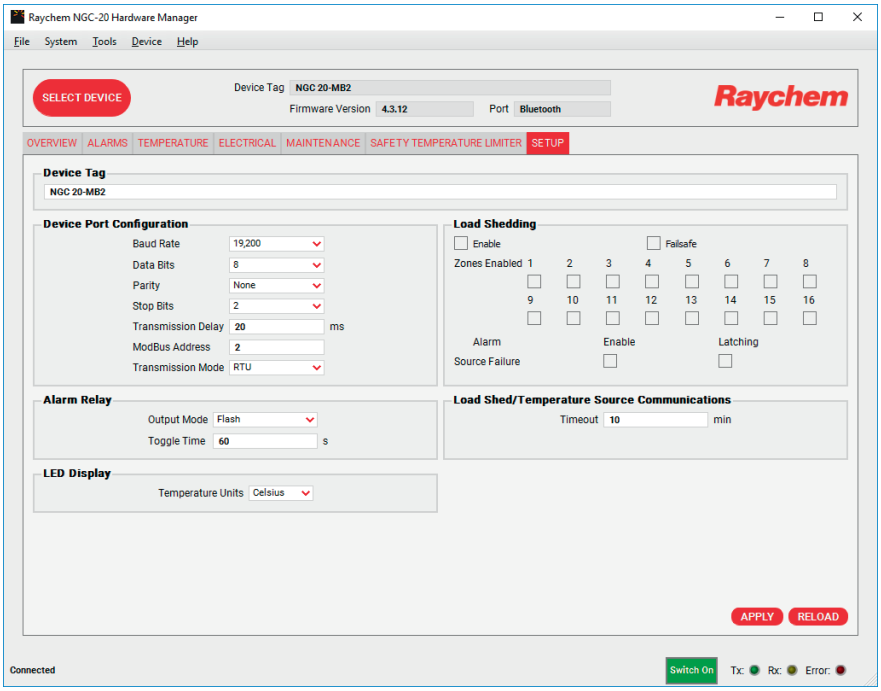

Figure 14-1: Setup Screen

Device Tag

This field allows you to change the NGC-20 device tag. Tags can be 39 characters in length and may contain all numeric characters. Enter the desired tag for the NGC-20 device by clicking in the field, then typing it out with the keyboard.

Figure 14-2: Setup Screen, Device Tag

Device Port Configuration

The Device Port Configuration section allows users to configure the communication settings of nVent RAYCHEM NGC-20 control units.

Baud Rate: This field allows you to select the baud rate of the external communication port. Selections: 9600, 19200, 38400, 57600. Default: 9600

Modbus Address: the Modbus address needs to be unique on the nVent RAYCHEM NGC-20 network. The Modbus address can have any value from 1 to 247. 247 is the maximum number of nVent RAYCHEM NGC-20 units which can be connected to one RS-485 serial communications port.

Transmission Delay (TX Delay)
This field sets the time the NGC-20 will wait after it receives a message before it replies. Range: 1-50 milliseconds, Default: 20 ms

Other defaults are: Frame Type = RTU, 8 Data bits, No Parity and 2 stop bits.
These settings may have to be adjusted in order to set up communication between nVent RAYCHEM NGC-20 control units and non nVent Host systems like PLC´s.

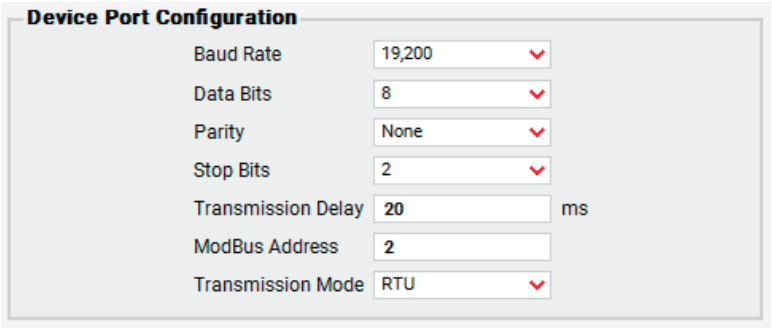

Figure 14-3: Setup Screen, Device Port Configuration

Alarm Relay

The **Alarm Output Mode** defines the way the alarm relay will act in case of alarms.

Normal operation: Selecting this will result in the alarm relay changing state in case of an alarm. (General alarm) This means the open contact will close and the closed contact of the SPDT alarm relay will open.

Toggle: selecting toggle will cause the Alarm relay to change state each time a new alarm comes up.

Flash: selecting to Flash the Alarm relay will alternatively open and close the Alarm relay. The interval itself can be user defined in the **Alarm Output Toggle Time**.

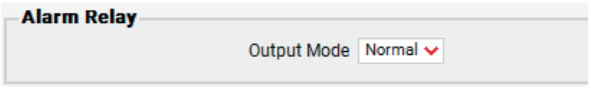

Figure 14-4: Setup Screen, Alarm Relay

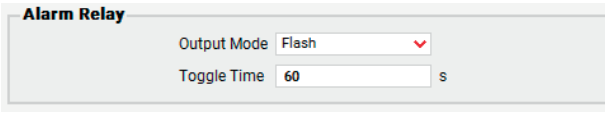

Figure 14-5: Setup Screen, Toggle Time

Load Shed/Temperature Source Communications

If the controller receives the load shed command before it times out, it will remain in load shed mode, and the output will remain off as long as the module receives a regular broadcast of the command.

If the controller does not receive the load shed command within the timeout period, it will energize its output and resume normal operation. The timing of this broadcast (and the timeout value) can vary between 1 to 10 minutes.

This is also the period of time after which the controller will set a Temperature Source failure alarm if it does not receive a signal from a remote temperature source.

Figure 14-6: Setup Screen, Load Shed/Temperature Source Communications

LED Display

The LED display on the NGC-20 controller can be changed to show the measured temperature in degrees Celsius or Fahrenheit.

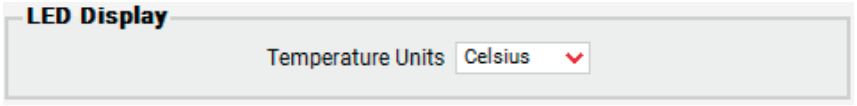

Figure 14-7: Setup Screen, LED Display Units

14.1 LOAD SHEDDING

Load shedding is a control mode that can be programmed and initiated only by an external communicating device, which overrides temperature control and forces the output of the controller OFF until the override is removed. When using an external device (nVent RAYCHEM Supervisor Software or a DCS), a load shedding command is continually broadcast over the communications network. When power is applied, the controller delays energizing its trace by 'x' number of seconds, where 'x' is equal to the last digit in its network address. If the load shed function is enabled, the controller will go into load shed mode before it turns its output on. It will then look for the broadcasted load shed command. If the controller receives the load shed command before it times out, it will remain in load shed mode, and the output will remain off as long as the module receives a regular broadcast of the command. If the controller does not receive the load shed command within the timeout period, it will energize its output and resume normal operation. The timing of this broadcast (and the timeout value) can vary between 1 and 10 minutes. A total of 16 different Load shedding zones can be defined.

Load Shedding

If a load shedding command is present, the controller will continue to hold the output OFF, until one of two conditions occurs:

1. The zone definition flags of an external communicating device which initiated load shedding clears and the command to terminate load shedding mode is issued.
2. Communications are interrupted between the controller and its communicating device, as in the case of a damaged communications wire. If communication ceases for a specified timeout value, the controller will return to normal operation. The value for this timeout is programmable within the controller (30 seconds to 600 seconds).

Note: The controller will return to normal operation if communications between the external communicating device and the controller are disrupted in any way. This will return temperature control to the NGC-20. Also, the NGC-20 does not perform a periodic autocycle test while operating in load shed mode.

Three parameters must be set in the controller to configure it for load shedding operation:

1. The load shedding feature must be enabled
2. The FAIL SAFE MODE parameter must be enabled or disabled depending on the application requirements. If FAIL SAFE MODE is enabled, then at least one LOW TS ALARM (of a TS used in the TS CONTROL MODE) must be enabled.
3. The zone definition flags of an external communicating device that are to be associated with the load shedding action for the controller must be defined. The NGC-20 controller will support up to 16 different zones.

These parameters can only be configured using an external communicating device connected to the NGC-20.

Notes:

- Fail-safe mode is always disabled if the SWITCH CONTROL MODE is set to either of the two proportional ambient control modes, or the TS CONTROL MODE = EXT INPUT, FAIL OFF/ON
- The HTC will turn on its output switch when the control temperature becomes less than the highest LOW TS ALARM temperature if the following conditions are met:
  - Fail-safe mode is enabled
  - Load shedding is active
  - The CONTROL TEMP LOW ALARM is enabled
- A FORCE ON override signal has higher priority than a load shedding signal. An INHIBIT signal has higher priority than fail safe mode.

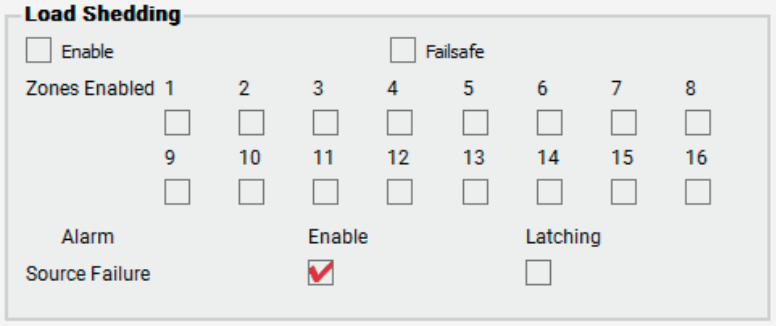

Figure 14-8: Setup Screen, Load Shedding

Load Shed/Temperature Source Communications

If the controller receives the load shed command before it times out, it will remain in load shed mode, and the output will remain off as long as the module receives a regular broadcast of the command.

If the controller does not receive the load shed command within the timeout period, it will energize its output and resume normal operation. The timing of this broadcast (and the timeout value) can vary between 1 to 10 minutes.

Figure 14-9: Setup Screen, Load Shed/Temperature Source Communications

15 UPGRADING FIRMWARE OF THE NVENT RAYCHEM NGC-20 CONTROL UNIT

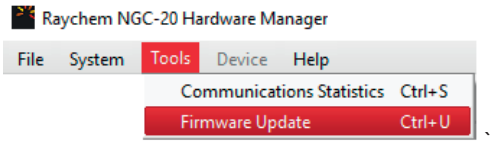

Figure 15-1: Tools>Firmware Update

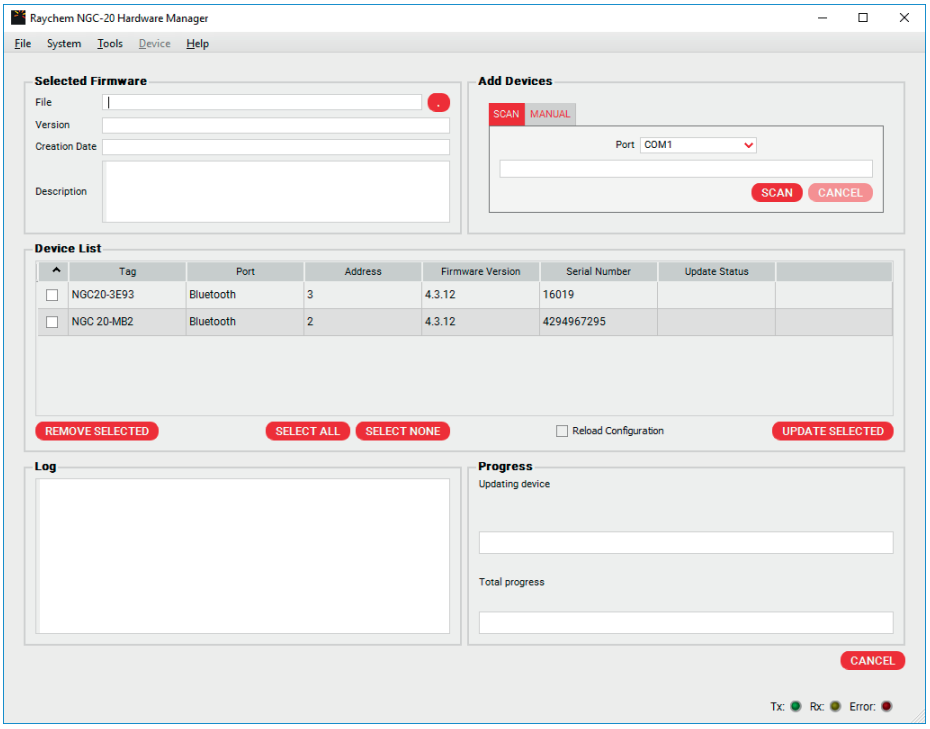

Figure 15-2: Firmware Update Screen

First select a firmware file by opening the browse window in the Selected Firmware box.

Figure 15-3: Selected Firmware

Find the desired firmware file on the computer and open it.

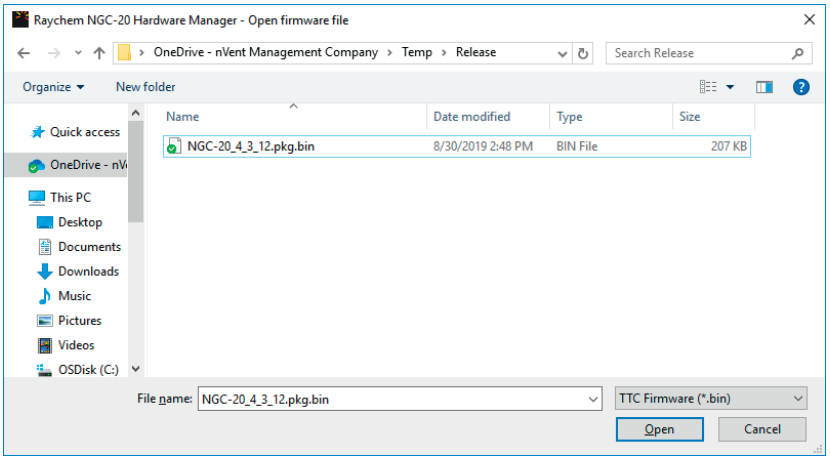

Figure 15-4: Open Firmware File

If a Scan has not been performed there will be no controllers in the Device List. Select the correct options and press the Scan button to find controllers.

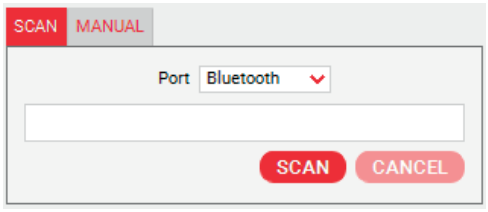

Figure 15-5: Scan for Controllers

All controllers found will appear in the Device List. Click the checkbox beside each controllers to send the selected firmware file to.

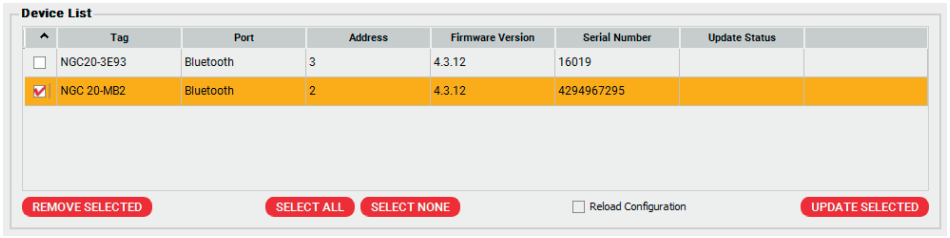

Figure 15-6: Firmware Update Device List

Check the Reload Configuration checkbox to have the configuration saved and reloaded into the NGC-20 after the firmware updated.

Press the Update Selected button to start the firmware update.

Firmware updates will be sent to each controller one at a time.

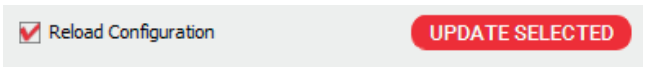

Figure 15-7: Firmware Update, Reload Configuration

Progress is shown in the Log and Progress sections of the screen.

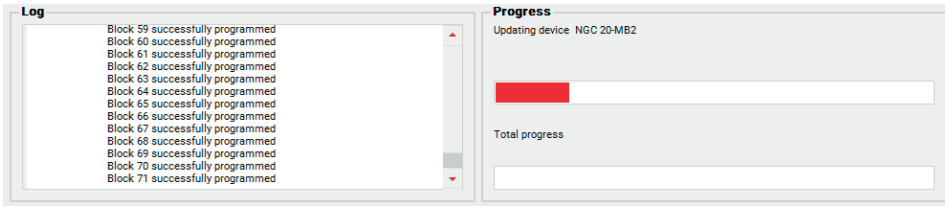

Figure 15-8: Firmware Update, Progress

16 COMMUNICATIONS STATISTICS

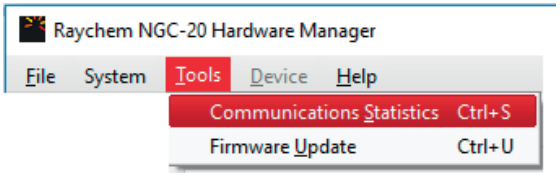

Figure 16-1: Tools>Communications Statistics

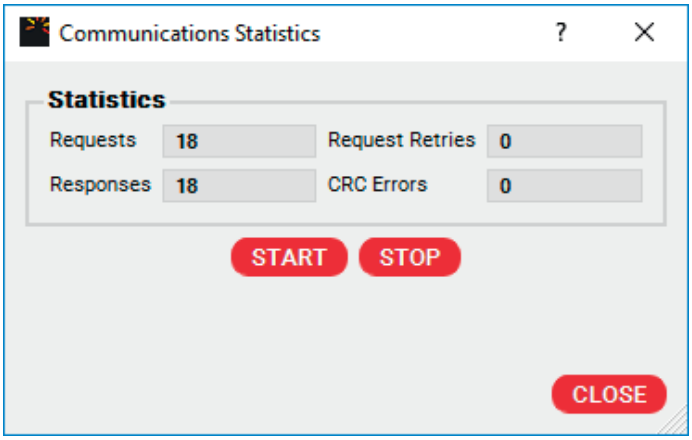

Figure 16-2: Communications Statistics

The Communication Statistics window gives some information about communications between the computer and the currently connected NGC-20 Controller.

Press the Start button to begin monitoring. When there is a good connection the Requests and Responses counters will match up. If there are Request Retries or CRC Errors it may indicate a problem.

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