

TOUCH 1500

Configuration Guide

Software Version 2.x.x



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1.1 NVENT RAYCHEM NGC-40 SYSTEM OVERVIEW

1.1.1 Product Overview

The nVent RAYCHEM NGC-40 is a multipoint electronic control, monitoring and power distribution system with unique single-point controller architecture for heat tracing used in process temperature, maintenance and freeze protection applications. By taking advantage of innovative modular packaging techniques, the nVent RAYCHEM NGC-40 system provides configuration and component flexibility so that it may be optimized for a customer's specific needs. This manual provides information pertaining to the configuration and maintenance of all the components of the nVent RAYCHEM NGC-40. For information on installation, operation, testing, and adjustments, please see the NGC-40 Installation Manual (North American, H58268/Europe, IM00708).



Figure 1.1 TOUCH 1500 mounted in the NGC-40 panel



Figure 1.2 TOUCH 1500 mounted remotely from NGC-40 panel

1.1.2 Control

The nVent RAYCHEM NGC-40 modules measures temperatures with 3-wire, 100-ohm platinum or 2-wire Nickel/Nickel iron RTDs. The temperature information may come from a single, direct RTD hard-wired to the NGC-40 HTC/HTC3 Module, from a local NGC-40 I/O module, or from a remote source such as an RMM module (feature available in 2011). When configured with Electro-Mechanical Relays (EMRs) the nVent RAYCHEM NGC-40 can be configured for the following control modes:

- On/Off (Deadband)
- PASC Contactor (Proportional Ambient Sensing Control)
- Always ON
- · Always OFF

When configured with SSRs, the panel can be configured for the following control modes:

- On/Off (Deadband)
- Proportional
- PASC SSR (Proportional Ambient Sensing Control)
- Always ON
- Always OFF

The nVent RAYCHEM NGC-40 also supports load shedding. This mode overrides temperature control and forces the output of the control module off. The load-shedding command can be issued by Distributed Control System (DCS) or nVent RAYCHEM Supervisor (DTS).

1.1.3 Monitor

The nVent RAYCHEM NGC-40 system measures a variety of parameters including ground fault, temperature and load current(s) to ensure system integrity. In the case of three-phase heaters, the current of each phase can be separately measured and monitored. The system can be set to periodically check the heating cable for faults, alerting maintenance personnel of a pending heat-tracing problem. All alarms can be individually enabled or disabled depending on customer preference. They can be also separately defined as latching or non-latching by the customer to meet their needs. The latching alarms need to be reset before they will disappear from the alarm list. A dry contact relay is available for alarm annunciation back to a Distributed Control System (DCS). Alternatively, the nVent RAYCHEM NGC-40 system can report alarm and monitoring data directly to the DCS via Modbus®.

1.1.4 Ground-Fault Protection

Electrical codes require ground-fault equipment protection on all heat-tracing circuits. nVent RAYCHEM NGC-40 systems incorporate ground-fault monitoring and trip features within the individual controllers. Where electrical codes allow the nVent RAYCHEM NGC-40 system to perform the ground-fault protection function, the need for specialized ground-fault circuit interrupting circuit breakers can be eliminated. This can help reduce overall system cost.

1.1.5 Installation

The nVent RAYCHEM TOUCH 1500 heat-tracing controller configuration and monitoring software provides a graphical user interface for the nVent RAYCHEM NGC-40 Control & Monitoring System. The software allows the user to configure and monitor the nVent RAYCHEM NGC-40 heat-tracing controller, Bridge and I/O modules.

The nVent RAYCHEM NGC-40 system is configured with a touch screen User Interface Terminal (TOUCH 1500 or TOUCH1500R) that has LCD color touch-screen display. This display provides an intuitive user interface for easy and efficient programming without keyboards or cryptic codes.

TOUCH 1500 Installed in Nonhazardous (Unclassified) Indoor Panel Locations

If the panel is located in a nonhazardous (unclassified) indoor location, the TOUCH 1500 can be installed locally on the nVent RAYCHEM NGC-40 panel door.

TOUCH 1500 Installed in Outdoor Panel Locations

If the panel is located in an outdoor, nonhazardous location, the TOUCH 1500 can be installed locally on the nVent RAYCHEM NGC-40 panel door. However, the TOUCH 1500 will require a protective cover over the display to shield it from the environment and a space heater/thermostat to ensure operation if ambient temperatures below 32°F (0°C) are expected.

TOUCH 1500 Installed in Hazardous/Outdoor Panel Locations

If the panel is located in a hazardous/outdoor location, the TOUCH 1500 can be installed locally on the nVent RAYCHEM NGC-40 panel door. However, the panel must have a Z Purge system, a protective cover over the display to shield it from the environment and a space heater/thermostat to ensure operation if ambient temperatures below 32°F (0°C are expected). In this configuration, a hazardous area mouse will be provided on the panel door to interface with the TOUCH 1500.

TOUCH 1500 Installed Separately from the Panel Locations

If the TOUCH 1500 needs to be mounted separately from the nVent RAYCHEM NGC-40 control panel, such as when the panel is in a hazardous or difficult to access location, the TOUCH 1500R provides a wall-mount alternative for remote mounting in a nonhazardous (unclassified) indoor location.

1.1.6 Communications

The nVent RAYCHEM NGC-40 system can be networked to host PC running Windows®- based nVent RAYCHEM Supervisor client-server software (DTS) and/or to a TOUCH 1500 for central programming, status review, and alarm annunciation. Information access for external devices is through the NGC-40-BRIDGE communications module, which supports the Modbus protocol and provides RS-232/RS-485 and 10/100Base-T Ethernet communication interfaces.

The current software in the TOUCH 1500 does not allow the user to network from the TOUCH 1500 to a host PC running Windows-based nVent RAYCHEM Supervisor. If this feature is required, the PC must be connected directly to the NGC-40-BRIDGE.

1.1.7 Complete System

The nVent RAYCHEM NGC-40 is supplied as a complete system ready for field connection of heattracing power wiring and temperature sensor input. Optional Power Distribution further enhances the reduction of field wiring and labor to install.

1.2 VITAL INFORMATION

This manual is a guide for the setup and operation of the nVent RAYCHEM NGC-40 Control & Monitoring system using the TOUCH 1500 user interface.



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Should you have any questions concerning this Agreement, or if you desire to contact nVent for any reason, please write to:

nVent 15375 Memorial Dr Houston, TX 77079 USA Tel: 800-545-6258 Tel: 650-216-1526 thermal.info@nVent.com nVent.com

1.4 NVENT RAYCHEM TOUCH 1500 CONFIGURATION/MONITORING SOFTWARE – IMPORTANT INFORMATION

1.4.1 Product Overview

The nVent RAYCHEM TOUCH 1500 heat-tracing controller configuration and monitoring software provides a graphical user interface for the nVent RAYCHEM Elexant 3500i, Elexant 4010i, Elexant 4020i, Elexant 5010i, and NGC-40 control & monitoring systems. The software allows the user to configure and monitor the nVent RAYCHEM Elexant 3500i, Elexant 4010i, Elexant 4020i, Elexant 5010i, and NGC-40 heat-tracing controller, Bridge and I/O modules.

1.4.2 Vital Information



IMPORTANT: All information, including illustrations, is believed to be reliable. Users, however, should independently evaluate the suitability of each product for their particular application. nVent makes no warranties as to the accuracy or completeness of the information, and any liability regarding its use. nVent's only obligations are those in the nVent Standard Terms and Conditions of Sale for this product, and in no case will nVent or its distributors are liable for any incidental, indirect, or consequential damages arising from the sale, resale, use, or misuse of the product. Specifications are subject to change without notice. In addition, nVent reserves the right to make changes-without notification to Buyer-to processing or materials that do not affect compliance with any applicable specification.

1.4.3 User Responsibility

The performance, reliability and safety of your heat-tracing system depend on proper design, selection and installation. The nVent RAYCHEM TOUCH 1500 program will help you configure and monitor a system that meets your requirements, but it is only a tool. It assumes that your input is accurate, that you are familiar with heat-tracing system design and configuration, and that you will ensure that all components of the heat-tracing system are installed, maintained and used as intended. The configuration of the nVent RAYCHEM TOUCH 1500 program should be reviewed by a knowledgeable engineer to ensure it is appropriate for your application. Additional information relating to safety, design and installation is contained in Design Guides, Installation Manuals, Data Sheets, and other literature available from nVent. Be sure to consult these documents as needed.

1.4.4 Safety Warnings

There are important safety warnings shipped with our products and printed in our literature. Be sure to read and follow them to reduce the risk of fire, shock or personal injury. If you have any questions, contact your local or nVent directly.

1.4.5 Technical Support

In North America, contact nVent directly at: nVent 15375 Memorial Drive Houston, TX 77079 USA Tel: 800-545-6258 Tel: 650-216-1526 thermal.info@nVent.com nVent.com

SECTION - 2 NAVIGATING AND SETTING UP THE MENUS

This section provides information on how to use nVent RAYCHEM NGC-40 software to configure, monitor and maintain a heat-tracing circuit in an NGC-40 system. It starts with Getting Familiar with the nVent RAYCHEM NGC-40 program. In the remaining sections, there are instructions on Managing Alarms, Identifying NGC-40 Modules, Comparing the NGC-40 Module List, Loading NGC-40 Module Configurations, and Changing the NGC-40-BRIDGE Communication Settings.

2.1 GETTING FAMILIAR WITH NVENT RAYCHEM TOUCH 1500

The nVent RAYCHEM TOUCH 1500 Main window has several functional areas, as illustrated in Figure 2.1. The window below is the Circuit List of a NGC-40 system with a BRIDGE, two HTCs, one HTC3 and one I/O Module:

Main Pull-Down Menus 🕳	FILE	SYSTE	М				
View Tabs 🕳		ALARM LIS	ST CONFIGUR	E DEVICE			
Circuit Display Filter 🗕	Filter by group [*	5]	~				
	Тад	▲ Stat	tus Address	Device Type	Setpoint Temperature	Actual Temperature	Line Current
Individual Heat-Trace Circuit(s)	NGC40-HTC-11EE	ок	0011EE	NGC40HTC	15°C	60°C	0A
	NGC40-HTC3-1132	2 ОК	001132	NGC40HTC3	30°C	53°C	0A
	NGC20-3E93	ок	3	NGC20	500°C	207°C	0A
	RMM-DI [17]	ОК	17	RMM-DI	N/A	N/A	N/A
	RMM-DI [19]	ок	19	RMM-DI	N/A	N/A	N/A
	RMM-DI [22]	ок	22	RMM-DI	N/A	N/A	N/A
	ELEXANT W/LIMIT	TER OK	10	4010i/4020i	100°C	69°C	0A
	•						•
Software Version	V3.0.0 Ready	/			4 Wednesda	y, December 2, 202) 3:09:48 PM
	Communicatio	ons Status			Cur	rent Data an	d Time

Figure 2.1 nVent RAYCHEM TOUCH1500 main window

2.2 FILE AND SYSTEM MENUS

Below is a Menu Map of the File and System buttons shown at the top of the window. The information you learn in this section will help you navigate through the menus and become more proficient in using all the features of the TOUCH 1500



Figure 2.2 Menu map of file and system buttons

Functional Window Area	unctional Functionality /indow Area		
File Menu			
Backup Database	Allows the User to create a backup database of the NGC-40 modules settings and configuration onto a memory stick.	3, 4	
Restore Database	Allows the User to restore the NGC-40 modules settings from a backup database via a memory stick into the TOUCH 1500 program.	3, 4	
Export Event Log	Allows the User to export the Event Log onto a memory stick.	3, 4	
Exit	Exit the program to Windows desktop.	4	
System Menu			
Device Manager	Allows the User to load or remove the modules, (HTC, HTC3 and I//O modules) from the database, configure each module, and set the modules online or offline.	3, 4	
User Level	Allows the user to set passwords for each of the four security levels available in the TOUCH 1500.	3, 4	
Group	Allows the User to assign a name to a group of circuits that can be used in the "Filter by Group" in the Circuit List.	3, 4	
Common Alarms	Allows the user to set up the TOUCH 1500 common alarms.	3, 4	
Communications	Allows the user to set up the Field Communication ports: Com1 (RS-232), COM 3 (RS-485) or Ethernet from the TOUCH 1500 to the Bridge Module.	3, 4	
Preferences	Allows the User to select; language, units (°F or °C), number of minutes before reset to the default security level and bring you back to the Circuit List window and update time/date.	3, 4	
DCS Gateway	Allows the user to setup and enable the DCS Gateway, which enables remote access of Heat Trace information using the Modbus protocol.	3, 4	

SECTION - 3 BASIC CONFIGURATION

The following gives an overview of how to configure an NGC-40 circuit using the TOUCH 1500. For greater detail, please go to Section – 4 Full Configuration on page 21.

3.1 AN EXAMPLE OF A SIMPLE CIRCUIT SETUP

This section will explain how to set up an NGC-40 heat-tracing circuit using the TOUCH 1500. This is the first window that appears when the program loads.

FILE		SYSTE	M					
CIRCUIT LIS	ST	ALARM LI	ST DEVI	CE MANAGER				
Filter by group	o [*]		~					
Status A	ddress	Tag ▼	Device Type	Setpoint Temperature	Actual Temperature	Line Current	GF Current	Heater Status

Fig. 3.1 Circuit List window

Step 1: Setting up Units, Language, Time and Date.

Touch the System button and then select Preferences. The Preferences window will appear. Touch the white area after each option to enter the appropriate Language, Units and Timeout delay. Touch the Set Date Time button to enter your local time and date.

IMPORTANT: Local time and date is controlled by Windows. The user must exit the TOUCH 1500 to customize.

When finished, touch the OK button to save the settings.

PREFERENCES
English
°C 🗸
10 🗸
SET DATE TIME
OK CANCEL

Fig. 3.2 System | Preferences window



IMPORTANT: If your NGC-40 system has a TOUCH 1500 installed on the panel door, then the TOUCH 1500 will have been factory configured to communicate with the NGC-40-BRIDGE modules in the panel and you may skip to Step 5.

Step 2: Setting Up the Network for NGC-40 Modules

If you are installing a new TOUCH 1500 or TOUCH 1500R or connecting additional NGC-40 panels to an existing TOUCH 1500 or TOUCH 1500R then you should start here at Step 2.

To connect NGC-40 panels to the TOUCH 1500, you must first scan the network using the Device Manager. Touch the System button and select Device Manager from the menu list. This will open the Device Manager Tab. Under the Scan for Device tab, select which network type to scan. Select the Scan Field Port tab if connecting via RS-232 or RS-485.



Fig. 3.3 System | Device window

The NGC-40-BRIDGE module has been set to Modbus address 1 at the factory.

IMPORTANT: If you wish to connect the TOUCH 1500 to more than one NGC-40-BRIDGE, you must first assign different Modbus addresses to each of the Bridge Modules. If this is not already done, you will need to contact your nVent representative to schedule a Tracer Field Support or Services person to come out and make the necessary changes. The Bridge Modbus address cannot be changed via the TOUCH 1500.

If you know the Bridge Modbus address you may enter it in the From or To Modbus Address boxes on the Scan for Devices window. Simply touch the data entry box and a numeric keypad will appear which will allow you to enter a new Modbus address number. Touch OK to close the keypad and enter the number.

Step 3: Scanning the Network

Click on the Start Scan button. The below window will appear showing that TOUCH 1500 is now scanning the modules connected to the NGC-40-BRIDGE. At the end of the SCAN click on the OK button to add the modules to the database.

FIL	E	SYSTEM	
CIRCUIT	LIST	ALARM LIST	DEVICE MANAGER
DEVICE	ELIST SO	CAN FOR DEVIC	ES
SCAN FIE	LD PORT S	CAN ETHERNET	NETWORK
FROM MODB	US ADDRESS 1 ADDRESS 24	STOP SC/	
			PLEASE WAIT
Address	Tag NGC40 DEMO KIT	Device Type Fi	Immary Running RS485 Network Scan. 23.4 Alarm(s)
			Scanning Modbus Address: 2

Fig. 3.4 System | Device window during scan process

At the end of the scan, the TOUCH 1500 software will display the modules that are connected to the NGC-40-BRIDGE. The information shown on the right hand side is the CAN bus ID's, type of module, alarms and the modules that have been installed. Information regarding the Bridge is shown on the left hand side.

FIL	.E S'	YSTEM						AL	ARM ACK
CIRCUI	T LIST ALA	RM LIST	DEVICE M/	ANAGER					
DEVIC	E LIST SCAN	FOR DEVI	CES						
SCAN FI	SCAN FIELD PORT SCAN ETHERNET NETWORK								
FROM MODE	FROM MODBUS ADDRESS 1 TO MODBUS ADDRESS 247								
			Ready	to perform net	twork	scan.			
Address	Тад	Device Type	Firmware Version	S	sta		Installed I	Module Lis	st
1	NGC40 DEMO KIT UNI	NGC40Bridg	5.23.4	New device.		CAN Network ID	Туре	Alarm(s)	Info
3	NGC20-3E93	NGC20	4.3.12	New device.		1132	NGC40HTC3	0	Already installed
						11EE	NGC40HTC	0	Already installed
						EEF4F4	NGC40SLIM	0	Already installed
						FFFFF1	NGC40IO	0	Already installed

Fig 3.5 System | Device window after scan process

Ø	
Ĭ	

IMPORTANT: Scan need to be run only once unless the COMM ports of the PC is changed or additional modules are added on the NGC-40.

Step 4: Reviewing Connected Devices, Click on the SYSTEM | Device Manager

Touch the Device List tab. The window below will appear. This window shows all the modules that were scanned along with their tag name and status.

FILE		SYSTEM			ALARM ACK
CIRCUIT	CIRCUIT LIST ALARM LIST		DEVICE MANAGER		
DEVICE	DEVICE LIST SCAN FOR DEVIC		ES		
Address	Tag		Device Type	Status	
1	NGC4(0 DEMO KIT UNIT#1	NGC40Bridge	Online	
0011EE	NGC4(0-HTC-11EE	NGC40HTC	Online	
001132	NGC4(0-HTC3-1132	NGC40HTC3	Online	
FFFFF1	NGC40	0-10	NGC40IO	Online	
EEF4F4	NGC4(0-SLIM-EEF4F4	NGC40SLIM	Online	
3	NGC20	0-3E93	NGC20	Online	

Fig 3.6 Device List window

Column 1 lists the Modbus address of the NGC-40 Modules. If the device type is NGC-40-BRIDGE, then the address is a Modbus address and it can only be changed by using the NGC-40 Hardware Manager Program. For all other devices types, the address is a CAN ID which are factory set and cannot be changed.

Column 2 lists the default Tag names of each module.,

Column 3 shows the Device Type

Column 4 shows the status; is the device online and active or has it been taken offline. A device that is offline will not be included in the normal system monitoring activity.

Step 5: HTC/HTC3 Module Options

Touch one of the HTC modules shown in the Device List. A dialog box will open up with options to Configure, Remove, Set Online or Set Offline the selected module.

FILE		SYSTEM)		ALARM ACK
CIRCUIT I	CIRCUIT LIST ALARM LIST		DEVICE MANAGER		
DEVICE LIST SCAN FOR D		SCAN FOR DEVICE	ES		
Address	ldress Tag		Device Type	Status	
1	NGC40 DEMO KIT UNIT#1		NGC40Bridge	Online	
0011EE	NGC4	D-HTC-11EE	NGC40HTC	Online	
CON	IFIGURE	REI	MOVE	SET ONLINE	SET OFFLINE
001132	NGC40)-HTC3-1132	NGC40HTC3	Online	
FFFFF1	NGC40-IO		NGC4010	Online	
EEF4F4	NGC4	D-SLIM-EEF4F4	NGC40SLIM	Online	

Fig 3.7 Drop down buttons on Device Manager

Step 6: Configure the Module

Touch the Config button and the window shown below with Basic Settings for Temperature, Control Modes, Local RTD (TS1) and Electrical will appear. The Temperature window is displayed by default.

FILE	SY	STEM					ALARM AC	ж	
CIRCUIT LIST	ALAF	M LIST	CONFIGURE	DEVICE					
Show Advanced Set	tinas	NGC40-HTC-11EE							
	ungo	General							
BASIC SETTING	s	Tag		NG	GC40-HTC-11FE				
Temperatures		Heater S	tatus	Off	1				
Control Modes		Control T	Control Temperature						
Local RTD (TS1)		Name	-	Alarm	Setpo	oint	Filter		
Electrical		Control S	Setpoint		15	°C			
		High Ala	rm	🖌 Enable	e 200	°C	0	S	
		Low Alar	rm	🖌 Enable	e 5	°C	0	S	
		High Lin	nit Cutout Setpoin		700	°C			
		Control T	Temperature Usag	2	Use	Lowest Temp	erature	\checkmark	
		TS Fail M	lode		Fail (Off		\checkmark	
		TS Fail M	lode Percentage		50	%			
		MON	ITOR	APPLY	CANCEL		васк	NEXT	

Fig 3.8 Configuration window for temperature settings

Step 7: Entering Device Tag Name and Temperature Settings

To enter a tag name, click the white box where the default tag name is shown. This will open the keyboard for entering the new tag name. Type the new tag name as you would with a normal keyboard and then touch the OK button on the keyboard.



Linung	20	Configuration	window .	f	device	+~~~	
rigure	3.9	Configuration	window	IOF 0	uevice	ιag	name

To program the Control Setpoint temperature, touch the white box on the Control Setpoint row. A numeric keypad will open allowing you to change the Setpoint. Touch OK when done.

FILE	SYS	STEM						ALARM	ACK		
CIRCUIT LIST	ALAR	MLIST	CONFIGURE D	EVICE			1				
Show Advanced Set	tings			N	GC40-HTC	-11EE		CONT TEMP SETP	CONTROL TEMPERATURE SETPOINT		
BASIC SETTING	s	General								15	
		Tag			NGC40-HTC	2-11EE					
Temperatures		Heater Sta	eater Status Off					Defa	ult (Clear	
Control Modes		Control Te	emperature								
Local RTD (TS1)		Name	ame Alarm Setpoint						-		
Electrical		Control S	etpoint			15] °C				
		High Alar	m	🖌 En	able	200	°C	· /	8	9	
		Low Alarn	m	🖌 En	lable	5	°C		E		
		High Limi	It Cutout Setpoint			700	°C	4	5	°	
		Control Te	emperature Usage			Use Lowest	Tem				
		TS Fail Mr	ode			Fail Off	_		2	3	
		TS Fail Mo	ode Percentage			50	%				
								U	+/-	1	
								OK			
								UK		ancei	
	ſ	MONI	TOR	AP	PLY	CANCEL		ВАСК		NEXT	

Figure 3.10 Configuration window for control setpoint temperature

The HIGH temperature alarm is disabled by default. Enable the high alarm by touching the white box. A check will appear in the box when enabled. Change the high temperature alarm to the desired value in the same way the Control Temperature was set.

The LOW temperature alarm is enabled by default. Change the low temperature alarm to the desired value in the same way the Control Temperature was set. The HIGH Limit Cutout setpoint is set at 700. Change if required.

The Control Temperature Usage can be determined by three methods, 'Monitor Only', 'Use Lowest Temp' or 'Use Average Temp'. These selections allow the temperature setpoint to be determined if multiple RTD inputs are used for a single heat-tracing circuit. Touch the drop down selection box to select the desired Control Temperature Usage method.

The Temperature Sensor Fail Mode can be defined via the TS fail Mode setting. The options are:

- 1. Fail Off turns the heat-tracing circuit off when all control RTDs input fails
- 2. Fail On turns the heat-tracing circuit on when all control RTDs input fails.
- 3. Fail to % sets the control duty cycle to a pre-defined percentage when all control RTDs input fails.
- 4. Fail to Lowest if multiple RTDs are assigned to a circuit, when any one RTD input fails, the controller will use the lowest of the remaining RTD input temperatures to determine whether the heat tracing circuit should be turned on or off.

Touch the drop down selection box to select the desired response.

Save the changes by clicking on the Apply button.



IMPORTANT: Any setting changes made within the TOUCH 1500 require you to touch the Apply button to save settings in the TOUCH 1500 database and simultaneously transmit the settings to the NGC-40 module. If you try to exit the Configuration window without clicking on the Apply button a warning message will appear asking you if these changes are to be saved.

Step 8: Set Control Modes

FILE	SYS	STEM				ALARM ACK	
CIRCUIT LIST	ALAR	M LIST	CONFIGURE DEVICE				
Show Advanced Settings				NGC40-HT	C-11EE		
DAGIC CETTINCS		Control M	odes				
BASIC SETTING	5	Output Sv	Output Switch Type		MR		\sim
Temperatures		Switch Co	ntrol Mode	0	n/Off EMR		\sim
Control Modeo		Dead Ban	Dead Band			°C	
Control Modes		Proportion	nal Band	2		°C	
Local RTD (TS1)		PASC Min	Ambient Temperature	-4	40	°C	
Fleetrical		PASC Min Pipe Size			.5" (13 mm)		\sim
Electrical		PASC Pow	ver Adjust	1(00	%	

Figure 3.11 Configuration window for control modes

Touch the Control Modes button in the left hand menu list to display the Basic Control Modes window. This window allows the user to select:

Output Switch Type: SSR (Solid State Relay) or EMR (Electro Mechanical Relay) Switch Control Mode: Both SSR and EMR - Always On, Always off, On/Off, PASC, SSR only:

Proportional

 Touch the drop down selection boxes to select the desired Output Switch Type and Switch Control Mode

• Touch the white box to enter the Deadband based upon the Output Switch Type chosen.

IMPORTANT: If PASC is selected as your Switch Control Mode, the shaded areas will become un-shaded, allowing the user to change PASC setup parameters.

Step 9: Set Local RTD (TS1)

FILE	SY	'STEM					ALARM A	CK
CIRCUIT LIST	ALA	RM LIST	CONFIGURE	DEVICE				
Show Advanced Settings				NGC4	0-HTC-11EE			
		Local Te	mperature Sensor					
BASIC SETTING	8	RTD Typ	Type 3 wire 100 Ohm Platinum					×
Temperatures		RTD Lea	RTD Lead Resistance 0.0 Ohm					
0		RTD Tag		NGC40-HTC	RTD1-11EE			
Control Modes		TS1 Usa	ge	Control Only				~
Local RTD (TS1)		Name		Alarm	Setpoint		Filter	
Electrical		High Ala	rm	Enable	100	°C	0	S
		Low Alar	m	Enable	5	°C	0	S

Figure 3.12 Configuration window for local RTD (TS1)

Touch the Local RTD (TS1) button in the left hand menu list to display the Local Temperature Sensor window. This window allows the user to select:

RTD Type: 3-Wire 100-Ohms Platinum or 2-Wire 100-Ohms Nickel Iron or 2-Wire 100-Ohms Nickel

Change RTD Tag: Define Tag names for the RTDs

Define TS1 Usage: Monitor Only / Control Only / Monitor with High Temp Cut out / Control with High Temp Cut out. On Selection of 'Monitor' options the dimmed area will allow user entry, enable the High & Low Alarms, and enter alarm set point and set filter if required.



IMPORTANT: This window is used to enter the settings only for an RTD wired directly to the selected HTC or HTC3 module. It is not used to set up RTDs wired to I/O modules. Those instructions will be provided in Section 5.7 Configuration of the NGC-40 I/O Module on page 62.

Step 10: Electrical – Setting Low and High Line Current Alarms, Ground-Fault Current, Voltage & Frequency

Touch the Electrical button in the left hand menu list to display the Basic Electrical Settings window. The window below is the HTC (Single Phase) module.

FILE	SY	STEM				AL	ARM ACK		
CIRCUIT LIST	ALAR		CONFIGURE DEVICE						
Show Advanced Set	tings		NGC40-HTC-11EE						
BASIC SETTINGS		Line Current	л						
		Name	Al	larm	Setpoint		Filter		
Temperatures		High Alarm		Enable	30.0	A	0	S	
Control Modes		Low Alarm		Enable	0.3	А	0	S	
Local RTD (TS1)		Ground Faul	lt Current						
Electrical		Name	A	larm	Setpoint		Filter		
		High Alarm		Enable	20	mA	0	S	
		Ground Fau	ult Trip 🖌	Enable	30	mA			
		General							

Figure 3.13 Configuration window for electrical (HTC)

This window below is the settings for the 3-phase HTC3 Module.

FILE	SYSTEM					AL	ARM ACK								
CIRCUIT LIST	ALARM LIST	С	CONFIGURE DEVICE												
Show Advanced Setting	s	NGC40-HTC3-1132													
	Line 1	Curren	nt												
BASIC SETTINGS	Name		Al	arm	Setpoint		Filter								
Temperatures	High	Alarm		Enable	30.0	А	0	S							
Control Modes	Low A	larm	\checkmark	Enable	1.0	А	0	S							
Local RTD (TS1)	Line 2	Curren	nt												
Electricals 1	Name		Al	arm	Setpoint		Filter								
	High	Alarm		Enable	30.0	A	0	S							
Electricais 2	Low A	Jarm		Enable	1.0	А	0	S							
	Line 3	Curren	nt				Line 3 Current								

Figure 3.14 Configuration window for electrical (HTC3)

The High Alarm current is disabled by default. To enable the High Alarm, the box next to the alarm must be checked. Touch the white box to enable/disable this alarm.

- Set the High alarm to the appropriate value by touching the white box and entering the value with the keypad.
- Set the Low Alarm to the appropriate value by touching the white box and entering the value with the keypad.

The Ground-Fault Current High Alarm is enabled and GF Trip is disabled by default. To enable GF Trip, the white box next to the alarm must be checked.

- Set the High Alarm Setpoint to the appropriate value and set Filter if required by touching the white box and entering the value with the keypad.
- Set the Ground-Fault Trip to the appropriate value by touching the white box and entering the value with the keypad.

General Settings

The Voltage & Frequency entries are required only for Power Calculations. Enter the nominal values which will exist at the NGC-40 panel to use this feature.



IMPORTANT: For HTC3, Electrical 1 allows Line Current Data entry & Electrical 2 contain Ground-Fault Current & General options.

3.2 SETTING UP ADDITIONAL CIRCUITS

Follow Steps 5 through 10 above to set-up each additional circuit.

3.3 CIRCUITS 1–3 SETUP COMPLETE CONFIRMATION

After completing the circuit set up go to the Circuit List window to confirm all circuits are activated and working properly.

FILE	FILE SYSTEM									
CIRCUIT LIST ALARM LIST CONFIGURE DEVICE										
Filter by group [*]										
Status	Address	Tag 🔹	Device Type	Setpoint Temperature	Actual Temperature	Line Current	c			
ок	0011EE	NGC40-HTC-11EE	NGC40HTC	15°C	60°C	0A	0m			
ок	001132	NGC40-HTC3-1132	NGC40HTC3	30°C	53°C	0A	0m			
ок	3	NGC20-3E93	NGC20	500°C	207°C	0A	0m			

3.15 Circuit list window

3.4 STARTING THE NGC-40

3.4.1 System Requirements

The minimum configuration to use the nVent RAYCHEM TOUCH 1500 software

- nVent RAYCHEM TOUCH 1500 hardware
- · At least one each of the following
 - NGC-40-BRIDGE
 - NGC-40-PTM Module
 - 24 V DC Power Supply
 - NGC-40-HTC or HTC3
 - RTDs

Maximum optional equipment configuration:

Up to 500 NGC-40-HTC, HTC3 or I/O modules

IMPORTANT: Module numbers depend on actual system requirement.



The nVent RAYCHEM TOUCH 1500 software is designed to run only on the TOUCH 1500 hardware platform. Prior to shipment, the nVent RAYCHEM TOUCH 1500 is installed into Compact Flash card. During the initial power-up, you will see a blue background "splash" window for approximately

10 seconds as the system software is loaded and initializes.

This section describes the full configuration and monitoring capabilities and options available on all NGC-40 modules. Refer to the following subsections for information on the individual Modules:

Section 4.2 Configuration of NGC-40-BRIDGE Module on page 26

Section 4.3 Configuration of NGC-40 HTC Modules on page 28

Section 4.4 Configuration of NGC-40 HTC3 Modules on page 38

Section 5.7 Configuration of the NGC-40 I/O Module on page 62

4.1 ADDING A NGC-40-BRIDGE TO NVENT RAYCHEM TOUCH 1500

Before you can use the nVent RAYCHEM TOUCH 1500 to configure and maintain your NGC-40 system, you must connect to the NGC-40-BRIDGE module in each panel that the nVent RAYCHEM TOUCH 1500 will interface with. The communication ports must first be set in order for the TOUCH 1500 computer to talk to the NGC-40-BRIDGE.



IMPORTANT: If your NGC-40 system has a TOUCH 1500 installed on the panel door, then the TOUCH 1500 will have been factory configured to communicate with the NGC-40-BRIDGE modules in the panel and you may skip this section. Alternatively, if the TOUCH 1500 or TOUCH 1500R was installed and connected to the NGC-40 by Tracer Field Support or Service personnel then installation of the NGC-40-BRIDGE modules will have been completed during commissioning and you may skip this section.

4.1.1 Communication Ports

The TOUCH 1500 can be connected to an NGC-40-BRIDGE via RS-485 or Ethernet ports.

Although the NGC-40 Hardware Manager allows the user to change the following settings on

NGC-40-BRIDGE, in general, the default settings should be used. The user is allowed to change these settings in those cases where an external device is added which have already blocked the ports.

4.1.2 RS-485 Communication ports

If the TOUCH 1500 is connected to the NGC-40-BRIDGE via RS-485, the Field Port Communication must first be configured. Please note that the RS-485 port is internally configured to COM3 of the Touch Hardware. Retain the default settings.

• Go to System | Communications | Field Port window

FILE	SYSTEM		ALARM ACK	
CIRCUIT LIST	ALARM LIST	FIELD PORT		
COM Port		COM2	✓	
Baud Rate		9600	▼	
Parity		None		
runy		None		
Data Bits		8	✓	
Stop Bits		2	V	

Figure 4.1 System | Communication Setup | Serial Port (Field) window

COM Port Entry Field

COM 3 is the default port and need not be changed, select the COM3 port if it is not displayed. Selection: COM 3 (RS-485) Default: COM3 Although the NGC-40 Hardware Manager allows the user to change the following settings on NGC-40-BRIDGE, in general, the default settings should be used. The user is allowed to change these settings in those cases where an external device is added (i.e. radio modem).

Baud Rate

Purpose: Defines the data rate at which communications occur on the serial communications ports.

Options: 300, 600, 1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200 **Default:** 9600

Parity

Purpose: Defines the type of parity bit to be used with any of the three serial communications ports.

Range: None, Odd, Even

Default: None

Data Bits

Purpose: Defines the number of data bits used with any of the three serial communications ports. **Range:** 7 or 8

Default: 8

Stop Bits

Purpose: Defines the number of stop bits used with any of the three serial communications ports. **Options:** 1 or 2

Default: 2

4.1.3 Communication via Ethernet Port

The NGC-40-BRIDGE module/s can be connected to a TOUCH 1500 using an Ethernet connection. Two examples on how to make these connections and program the NGC-40-BRIDGE module and TOUCH 1500 are detailed in Appendix A on 104.

- Go to System | Device Manager
- Click on Scan For Device tab
- Click on Scan Ethernet Network tab

Ethernet Port – IP Address

Purpose: Defines the Ethernet Port IP Address. If the IP Address needs to be changed, click on the IP Address window. By default, the IP Address of the TOUCH 1500 & Subnet is automatically inserted

Range: From IP Address xxx.xxx.xxx. To IP Address ---.--.xxx (xxx= 1-255)

Procedure: Click on the From IP address and change the address to 192.168.1.99 and change the To IP address to 192.168.1.101

Default: Both the From & To IP address will show the TOUCH 1500 IP address at 192.168.1.200

FILE			SY	STE	Μ					ALARM AC	К
CIRCUIT LIST		A	LAP	IN LI	ST DEVI	ICE MAN/	AGER				
DEVICE LIST		SCA	N F	OR D	EVICES						
SCAN FIELD POP	łТ	sc/	AN I	ETHE		WORK					
FROM IP ADDRESS 10	7	79	1	198	FROM MODBI	US ADDRESS	10				
TO IP ADDRESS 10	7	9	1	198	TO MODBUS /	ADDRESS	10	START SCAN	DI	SCOVER DEVICES	

Figure 4.2 System | Device Manager | Scan for Devices window

4.1.4 Scanning the Network for Devices

There are two methods of scanning the NGC-40-BRIDGE and its associated NGC-40 modules into the TOUCH 1500 database. Method 1 is scanning through the TOUCH 1500 RS-485 port and Method 2 is scanning through the TOUCH 1500 Ethernet connection.

Scanning through the RS-485 port

Go to System | Device Manager

For the very first time, the Device List window will be blank. See below:

FILE	SYSTEM)		
CIRCUIT LIST	ALARM LIST	DEVICE MANAGER		
DEVICE LIST	SCAN FOR DEVIC	ES		
Address	Tag	Device Type	Status	

Figure 4.3 System | Device Manager window

Modbus Address

Press "Scan for Device" tab. A window opens up giving a range of the NGC-40-BRIDGE's Modbus address to scan.

FIL	E	SYSTEM						
CIRCUI	T LIST	ALARM LIST	DEVICE M	ANAGER				
DEVIC	E LIST	SCAN FOR DEV	ICES					
SCAN FIE	LD PORT	SCAN ETHERN	IET NETWORK					
FROM MODE	US ADDRESS	1 247 START	SCAN					
			Ready	to perform netwo	rk scan.			
Address	Тад	Device Type	Firmware Version	Sta		Installed I	Module List	
		Series ()pe			CAN Network ID	Туре	Alarm(s)	Info

Figure 4.4 System | Device Manager | Scan for Devices window before scan

Purpose: The Modbus Address defines the communications address to be used by the NGC-40-BRIDGE when using the Modbus protocol to communicate with a Modbus compatible device. If the HT system incorporates a single NGC-40-BRIDGE, then the Modbus address of all the 4 Ports on the Bridge will be set at 1. If there is more than one Bridge, then the Modbus addresses will be set sequentially 1,2,3,4, etc.

Range: 1 to 247

Procedure: Click on the To Modbus address and change the address to the highest NGC-40-BRIDGE Modbus address + 1. This is done to shorten the scan time

Default: 1 to 247



IMPORTANT: If the TOUCH 1500 is to monitor multiple NGC-40-BRIDGE modules and their associated NGC-40-HTC/HTC3/I/O modules, each NGC-40-BRIDGE must have a unique Modbus address. To change the Modbus address in a NGC-40-BRIDGE, the user must use the NGC-40 Hardware Manager.

4.1.5 Start Scan

• Press the Start Scan button.

The TOUCH 1500 program will scan the network for all NGC-40-BRIDGE(s) having Modbus addresses in the range specified.

FIL	.E S	YSTEM						AL	ARM ACK		
CIRCUI	T LIST AL	ARM LIST	DEVICE M/	ANAGER							
DEVIC	E LIST SCAN	I FOR DEVI	CES								
SCAN FI		N ETHERNE	T NETWORK								
FROM MODE	FROM MODBUS ADDRESS 1 TO MODBUS ADDRESS 247										
			Ready	to perform netw	orks	scan.					
Address	Тад	Device Type	Firmware Version	Sta			Installed I	Module Lis	t		
Address		· · · · · · · · · · · · · · · · · ·				CAN Network ID	Типа				
Address	NGC40 DEMO KIT UN	NGC40Brida	5 23 4	New device		GAN NELWOR ID	iype	Alarm(s)	Info		
1 3	NGC40 DEMO KIT UN	NGC40Bridg	5.23.4 4.3.12	New device. New device.		1132	NGC40HTC3	Alarm(s) 0	Info Already installed		
Address 1 3 17	NGC40 DEMO KIT UN NGC20-3E93 DEFAULT TAG [17]	NGC40Bridg NGC20 RMM-DI	5.23.4 4.3.12 1.0.0	New device. New device. New device.		1132 11EE	NGC40HTC3 NGC40HTC	Alarm(s) 0 0	Info Already installed Already installed		

Figure 4.5 System | Device Manager | Scan for Devices window after scan

4.1.6 Scanning Through the Ethernet Port

Scanning through the Ethernet port is the same as RS-485 port except:

- Click on the "Scan Ethernet Network" tab
- Set Modbus address as per Section 4.1.4
- Press the "Start Scan" Button

Additional information on connecting TOUCH 1500 via Ethernet port can be found on Appendix A on page 146.

4.1.7 Discover Devices

The Discover Devices button makes use of the discovery and detection feature in the NGC-40 and Elexant systems. As long as these systems are connected on the Ethernet network, they can be found by the Discover Devices button. When devices are found, a list is displayed in a Discover Devices popup window. Select 1 or more device to add to the Touch 1500 system by checking the Select column. Use the Select All and Deselect All if all devices are required. Click OK to proceed with the add or exit the window.

	SYSTE	М				ALARM ACH	K
ят	ALARM LIS	ST DEVICE MAN	AGER				
ST S	SCAN FOR D	EVICES					
DISCOVE	R DEVICES						
Address	IP Address	Tag	Device Type	Firmware Version	Status	Select	
1	10.79.1.235	NGC40 DEMO KIT UNIT#1	NGC40Bridge	5.023.004			
10	10.79.1.252	tyr	NGC40Bridge	5.023.004			
10	10.79.1.198	ELEXANT W/LIMITER	4010i/4020i	1.2.313			
1	10.79.1.174	Elexant 4010i/4020i-	4010i/4020i	1.2.313			
	Address 1 10 10	ALARM LIS SCAN FOR D SCAN FOR D USCOVER DEVICES Address IP Address 10 10.79.1.235 10 10.79.1.174	ALARM LIST DEVICE MAN. T SCAN FOR DEVICES DISCOVER DEVICES Tag 1 10.79.1.235 NGC40 DEMO KIT UNIT#1 10 10.79.1.252 tyr 11 10.79.1.174 ELEXANT W/LIMITER	ALARM LIST DEVICE MANAGER SCAN FOR DEVICES Address IP Address Tag Device Type 1 10.79.1.235 NGC40 DEMO KIT UNIT#1 NGC40Bridge 10 10.79.1.252 tyr NGC40Bridge 10 10.79.1.178 ELEXANT W/LIMITER 4010i/4020i 1 10.79.1.174 Elexant 4010i/4020i- 4010i/4020i	ALARM LIST DEVICE MANAGER SCAN FOR DEVICES SCAN FOR DEVICES Address IP Address Tag Device Type Firmware Version 1 10.79.1.235 NGC40 DEMO KIT UNIT#1 NGC40Bridge 5.023.004 10 10.79.1.252 tyr NGC40Bridge 5.023.004 10 10.79.1.174 ELEXANT W/LIMITER 4010i/4020i 1.2.313 1 10.79.1.174 Elexant 4010i/4020i- 4010i/4020i 1.2.313	ALARM LIST DEVICE MANAGER SCAN FOR DEVICES Scan FOR DEVICES Address IP Address Tag Device Type Firmware Version Status 1 10.79.1.235 NGC40 DEMO KIT UNIT#1 NGC40Bridge 5.023.004	ALARM LIST DEVICE MANAGER TI SCAN FOR DEVICES Address IP Address Tag Device Type Firmware Version Status Select 1 10.79.1.235 NGC40 DEMO KIT UNIT#1 NGC40Bridge 5.023.004

Figure 4.5a Discover Devices popup window

4.1.8 Configuration of System Preferences

The System Preference window allows the user to configure the language, units, window time out, time and date that will affect the entire system.

· Go to System | Preferences

FILE	SYSTEM			A	LARM ACK
CIRCUIT LIST	ALARM LIST	PREFERENCES			
Language		English	~		
Temperature U	nit	°C	~		
User activity ti	meout in minutes	10	~		
		SET DATE TIN	1E		
				ок	CANCEL

Figure 4.6 System | Preferences window

4.1.9 Language Entry List

This entry specifies the language used on the TOUCH 1500 display windows. **Options:** English, French, German, Russian and Chinese Procedure: Select the preferred language from the dropdown list. **Default:** English

4.1.10 Temperature Units

Options: Fahrenheit, Celsius **Procedure:** Select the preferred Temp Unit from the dropdown list. **Default:** Celsius

4.1.11 User Activity Timeout (minutes)

This entry sets the number of minutes before the display automatically reverts to the Circuit List Window. Any user interaction with the TOUCH 1500 screen will reset the timer.



IMPORTANT: This time entry also determines how long a password entry will remain valid

Selection: 5, 10, 15, 20, 25, 30, 40, 50, 60, 70, 80, 90, 100 minutes

Procedure: Select duration from the dropdown list. **Default:** 10 minutes

4.2 CONFIGURATION OF NGC-40-BRIDGE MODULES

4.2.1 General - Tags and Alarms

- · Go to System | Device Manager
- Click on NGC-40-BRIDGE
- Click on Config.

FILE		SYSTEM)		ALARM ACK	
CIRCUIT	list	ALARM LIST	DEVICE MANAGER			
DEVICE I	list	SCAN FOR DEVIC	ES			
Address		Tag	Device Type	Status		
1	NGC4	0 DEMO KIT UNIT#1	NGC40Bridge	Online		
CON	IFIGURE	REI	MOVE	SET ONLINE	SET OFFLINE	

Figure 4.7 Device Manager window for NGC-40-BRIDGE

Bridge Tag

Purpose: A 40-character tag may be assigned to the NGC-40-BRIDGE to allow it to be easily associated with a pipe, vessel, process, circuit, drawing name, number.

Range: Alpha-numeric characters

Procedure: To enter a tag name, click where the default tag name is shown. This will open the keyboard for entering the new tag name.

Default: Default-tag

FILE	SYS	STEM)		ALARM ACK
CIRCUIT LIST	ALAR	M LIST	CONFIGURE DEVICE		
			NG	C40 DEMO KIT UNIT#1	
OFNEDAL		Bridge Tag	1		
GENERAL		Тад		NGC40 DEMO	KIT UNIT#1
Tag and Alarms		Bridge Ala	rms		
RMM		Device Res	set Alarm	Enable	

Figure 4.8 Device Manager | Configure Device window for NGC-40-BRIDGE

Bridge Alarms

Purpose: The Device Reset Alarm is used to indicate:

- 1. Power to the Bridge has been interrupted and subsequently restored.
- 2. A transient has caused the Bridge's program to restart.
- 3. An internal condition has caused the Bridge's program to restart.

Options: ENABLE or DISABLE

Procedure: Check box to enable alarm

Default: DISABLE



IMPORTANT: Normally the Device Reset Alarm is left disabled since powering the Bridge off and on for maintenance or trouble-shooting would require the user to reset this alarm every time.

4.2.2 Communication Ports - Serial (COM Ports 1, 2 & 3) and Ethernet

FILE	SYS	STEM					A	LARM ACK	
CIRCUIT LIST	ALAR	M LIST	CONFIGU	RE DEVICE					
	[NG	C40 DEM	O KIT UNIT#1			
GENERAL		СОММ	PORT 1	COMM PC	ORT 2	COMM POR	тз		
COMMUNICATIO	NS	Port Setti	ings						
COMMONICATIO		Modbus	Address			1			
Serial Ports		Baud Rat	ie			9600			$\mathbf{\vee}$
Ethernet Port		Parity				None			$\mathbf{\vee}$
		Data Bits				8			$\mathbf{\vee}$
		Stop Bits				2			$\mathbf{\vee}$
MISC		Tx Delay				0]		
L		Frame Ty	rpe			Modbus RTU			$\mathbf{\vee}$

Figure 4.9 Device Manager | Configuration Device | Communication Ports window for NGC-40-BRIDGE

Purpose: Allows the user to review the communication ports settings (Serial and Ethernet) on the NGC-40-BRIDGE module. The NGC-40-BRIDGE module has the following communication ports.

- 1. COM 1: RS-485 Two wire RS 485 port to communicate with TOUCH 1500
- 2. COM 2: RS-485 Two wire RS 485 port to communicate with Field devices like RMM
- COM 3: RS-232 Local RS 232 port to communicate with TOUCH 1500 Hardware Manager or nVent RAYCHEM Supervisor
- Ethernet: 10/100 LAN for communicating with Remote devices which many include TOUCH 1500, DTS or DCS running on Host PCS

Default Settings: Modbus address is set at 1 for the first Bridge on a HT panel and sequentially addressed for multiple bridges. The IP address is set at 192.168.1.100. These settings can only be changed by using the NGC-40 Hardware Manager.

4.2.3 Miscellaneous Device Information

FILE	SYS	STEM		(ALARM ACK
CIRCUIT LIST	ALAR	M LIST	CONFIGURE DEVICE		
	[NG	C40 DEMO KIT UNIT#1	
CENEDAL		Device Inf	ormation		
GENERAL		Device Ty	pe	NGC40Bridge	à la chuir an
COMMUNICATIO	NS	Address		1	
		Firmware	Version	5.23.4	
MISC		Serial Nur	nber	EFF3CE	
Device Information					

Figure 4.10 Device Manager | Configuration Device | Miscellaneous window

Purpose: Allows the user to review the Device Information current set-up in the NGC-40-BRIDGE. The Device Type, Firmware Version and Serial Number are factory configured and cannot be changed. The Modbus address can be changed using the NGC-40 Hardware Manager.

Load Configuration Defaults

Purpose: Loads the default settings that are stored in the NGC-40-BRIDGE

Procedure: Click on the Load Configuration Defaults button to erase the data and bring back the factory settings.



IMPORTANT: In order to identify the NGC-40-BRIDGE, the Tag Name will not change if the configuration defaults are loaded. The current Tag Name will not be altered until it is manually changed (Section 4.2.1 Bridge Tag).

4.3 CONFIGURATION OF NGC-40 HTC MODULES

This section provides complete programming instructions for the NGC-40 HTC Heat-Tracing Controllers for single-phase heaters, for HTC3 modules, please follow the procedures for the HTC module except for the Electrical settings which are detailed under Section 5.3 Electrical on page 55. All the NGC-40 HTC functions are logically grouped based on their functionality. For each function, an explanation of its Purpose, Range over which it may be set and its Default setting is described. Finally any Important information or Cautions that pertain to the particular function are provided.

4.3.1 Basic Settings

The Basic Settings tabs allow the user to review and change only those inputs which are necessary to set up an HTC module.

FILE	SYS	STEM)			AI	LARM ACK	
CIRCUIT LIST	ALAR	M LIST	CONFIGURE DEVICE					
Show Advanced Sett	ings			NGC40-HTC-	1EE			
	•	General						
BASIC SETTING	5	Tag		NGC40-HTC-	11EE			
Temperatures		Heater Sta	atus	Off				
Control Modes		Control Te	mperature					
Local RTD (TS1)		Name	A	larm	Setpoint		Filter	
Electrical		Control Se	etpoint		15	°C		
Licothour		High Alarr	n 🗸	Enable	200	°C	0	S
		Low Alarn	n 🗸	C Enable	5	°C	0	S
		High Limi	t Cutout Setpoint		700	°C		
		Control Te	mperature Usage		Use Lowest	Temper	ature	$\mathbf{\vee}$

Figure 4.11 Basic Settings -Temperatures window

4.3.1.1 General

HTC Tag

Purpose: A 40-character tag may be assigned to the NGC-40-HTC to allow it to be easily associated with a pipe, vessel, and process, circuit, drawing name or number.

Procedure: To enter a tag name, touch where the default tag name is shown. This will open the keyboard for entering the new tag name.

Range: Alpha-numeric characters

Default: NGC-40-HTC-(last 4 characters of CAN ID)

Heater Status

Purpose: Indicates whether the heat tracing is powered On or Off Procedure: N/A. this is not a programmable function. It is status only. Range: On or Off Default: N/A

4.3.1.2 Control Temperature

Control Setpoint

Purpose: The Control Temperature Setpoint temperature is the value at which the Heat Trace Controller maintains the circuit temperature using one of the Switch Control Modes. The Control Temperature Setpoint temperature is compared to the measured pipe or ambient temperature. A decision is then made to turn on or turn off the output to control power to the heat trace cable.

Procedure: To enter a new set point value, touch the data area to bring up the numerical keypad. **Range:** -80°C to 700°C (-112°F to 1292°F)

Default: 10°C (50°F)



IMPORTANT: The HTC will switch the output ON and OFF in an attempt to maintain this temperature.

High Alarm

Purpose: This alarm is used to indicate when the measured temperature goes above a defined threshold. It can be used to indicate when the pipe temperature has risen above a temperature which may have a negative effect on process efficiency or operation. When enabled, this alarm will appear when the Control Temperature exceeds the Control Temperature High Alarm Setpoint. This alarm can be user selectable to be latching or non-latching (refer to Section 5.2.3) if set to non-latching, the controller will automatically clear the alarm when the condition no longer exists. If set to latching, the alarm must be cleared by the user.

Procedure: To enable Alarm, touch the Check box (a check mark will appear in the box when enabled.) To enter a new set point value, touch the data area to bring up the numerical keypad

Range: -80°C to 700°C (-112°F to 1292°F)

Options: ENABLE or DISABLE

Default Alarm Selection: DISABLED

Default Alarm Temperature: 100°C (212°F)



IMPORTANT: If your application is subject to periodic situations where cold or hot product is part of the process, it may be appropriate to configure the HTC for non-latching temperature alarms to avoid nuisance alarms. If it is important to be aware of any temperature alarm conditions that may have existed in a pipe, then the HTC should be configured for latching temperature alarms.

High Alarm Filter

Purpose: The Control Temperature High Alarm Filter will prevent Control Temperature High Alarm from being indicated until the corresponding alarm condition has existed for the duration of the Control Temperature High Alarm Filter time.

Procedure: To enter a new set point value, touch the data area to bring up the numerical keypad

Range: 0 to 59940 seconds (0 to 999 minutes)

Default: 0 second



NOTE 1: If an alarm condition appears and then disappears before the alarm filter time has expired, the filter timer is reset and the alarm condition must exist again for the entire alarm filter time before the corresponding alarm will be indicated.



Low Alarm

Purpose: This alarm is used to indicate when the measured temperature goes below a defined threshold. It can be used to indicate when the pipe temperature has dropped below a temperature which may have a negative effect on process efficiency or operation. When enabled, this alarm will appear when the Control Temperature decreases below the Control Temperature Low Alarm Setpoint.

Procedure: To enable Alarm, touch the Check box (a check mark will appear in the box when enabled.) To enter a new set point value, touch the data area to bring up the numerical keypad

Range: -80°C to 700°C (-112°F to 1292°F)

Options: ENABLE or DISABLE

Default Alarm Selection: ENABLE

Default Alarm Temperature: 5°C (40°F)



NOTE 1: This alarm can be user selectable to be latching or non-latching as explained under Section 5.2.3. If set to non-latching, the controller will automatically clear the alarm when the condition no longer exists. If set to Latching the alarm must be cleared by the user. The default alarm latching/non-latching setting for this alarm is latching.



NOTE 2: If your application is subject to periodic situations where cold or hot product is part of the process, it may be appropriate to configure the HTC for non-latching temperature alarms to avoid nuisance alarms. If it is important to be aware of any temperature alarm conditions that may have existed in a pipe, then the HTC should be configured for latching

Low Alarm Filter

Purpose: The Control Temperature Low Alarm Filter will prevent Control Temperature Low Alarm from being indicated until the corresponding alarm condition has existed for the duration of the Control Temperature Low Alarm Filter time.

Range: 0 to 59940 seconds (0 to 999 minutes)

Procedure: To enter a new set point value, touch the data area to bring up the numerical keypad Default: 0 second



NOTE 1: If an alarm condition appears and then disappears before the alarm filter time has expired, the filter timer is reset and the alarm condition must exist again for the entire alarm filter time before the corresponding alarm will be indicated.



NOTE 2: If the user resets an alarm while the alarm condition is still exists, then the alarm will not be indicated again until the entire alarm filter time has expired.

High Limit Cutout Setpoint

Purpose: This parameter defines the High Limit Cutout Setpoint for each of the 8 Temperature Sources where the Temperature Source configuration has High Limit Cut-out enabled. This feature will override the Control Temperature Setpoint temperature and force the controller output off if any one of the 8 Temperature Sources temperature exceeds the High Limit Cut-Out temperature setting.

Procedure: To enter a new set point value, touch the data area to bring up the numerical keypad

Range: -80°C to 700°C (-112°F to 1292°F) Default: 700°C (1292°F)



NOTE 1: The High Limit Cutout feature overrides an auto-cycle test. A pending auto-cycle will be initiated immediately after the Temperature Source x temperature drops below the High Cutout Setpoint.



NOTE 2: If a Temperature Source Failure occurs and the High Limit Cutout feature is enabled, the switch output will latch off regardless of the Temperature Control Mode setting or the

Control Temperature Usage

Purpose: Allows the selection of one of three possible temperature control modes used by the control module. The different modes are Monitoring, averaging, or minimum maintain temperature control

Procedure: Touch the drop down selection box to select Control Temperature Usage

Options: Monitor Only/Use Lowest Temp/Use Average Temp

Default: Use lowest temp

TS Fail mode

Purpose: Allows the selection of one of four Fail Safe modes, Fail On, Fail Off, Fixed %, Last % Touch the drop down selection box to select TS Fail modes Options: Fail On/Fail Off/ Fixed %/ Last % Default: Fail Off

TS Fail mode %

Purpose: Allows the Entry of Fail mode % on Fixed % mode (only) Procedure: Touch the Entry box and enter % Range: 0 to 99% Default: Grayed out until enabled

4.3.1.3 Control Modes

Allows to user to select various control modes

FILE	SYS	STEM				ALARM	ACK
CIRCUIT LIST	ALAR	M LIST	CONFIGURE DEVICE				
Show Advanced Sett	ings			NGC40-H	ITC-11EE		
DAGIC SETTINGS		Control M	odes				
BASIC SETTING	5	Output Switch Type			EMR		\checkmark
Temperatures		Switch Co	Switch Control Mode		On/Off EMR		~
Control Modeo		Dead Band			3) °C	
Control Modes		Proportion	nal Band		2	°C	
Local RTD (TS1)		PASC Min	Ambient Temperature		-40) °C	
Electrical		PASC Min	Pipe Size		0.5" (13 mm)		\checkmark
Electrical		PASC Pow	ver Adjust		100	%	

Figure 4.12 Basic Settings - Control Mode window

Output Switch Type

Purpose: Select the type of switching device connected to this HTC

Procedure: Select the type from the drop down list

Options: Electro-Magnetic Relay (EMR) or Solid State Relay (SSR)

Default: EMR

Switch Control Mode

Purpose: This allows selection of the type of algorithm to be used by the HTC to maintain the Control Setpoint temperature. There are five different control algorithms available. For detail explanation of the different Switch Control Modes, please refer to Appendix B on page 111.

Procedure: Select the type from the drop down list

Options: On/Off, PASC, Always On, Always Off, Proportional (SSR Switch Type only) **Default:** On/Off EMR

Dead Band-Available only when On/Off Control Mode is selected

Purpose: The controller monitors the temperature of the heating circuit and compares it to the Control Temperature. If the control temperature is above the Control Temperature Setpoint by more than the deadband value, the output is turned off. If the control temperature falls below the Control Temperature Setpoint, the output is turned on.

Procedure: Click on the box to enter date using the numerical keypad

Range: 1 to 50°C (2 to 90°F)

Default: 3°C (5°F)



IMPORTANT: Adjust the DEADBAND setting to the desired level above the Control Setpoint temperature. When the control temperature is above the setpoint + deadband value, the controller will turn off the output to the tracer. If the control temperature drops down below the setpoint, the output will be turned back on. Note that the smaller the deadband setting, the more often the contactor will cycle on and off, decreasing its operational life.

Proportional Band - Available only when Proportional Control Mode is selected

Purpose: The controller monitors the temperature of the heating circuit and compares it to the Control Temperature Setpoint. If the Control Temperature is at or below the Control Temperature Setpoint the power is applied to the trace with a duty cycle of 100% minus the controller output is full on. If the Control Temperature is equal to or greater than the Control Setpoint temperature plus the Proportional Band setting, then the controller output will have a duty cycle of 0%, the output will be off. The temperature of the control sensor is constantly monitored and the output duty cycle is adjusted proportionally according to where the temperature falls within the 0% to 100% band.
Proportional Control Temperature Band Table

Control Sensor Temperature	Duty Cycle	
Setpoint + proportional band	0%	
Setpoint + proportional band / 2	50%	
Setpoint	100%	



IMPORTANT: The Proportional Band is use with the three proportional control modes only (EMR PASC, SSR PASC, SSR Proportional).

Procedure: Click on the box to enter date using the numerical keypad

Range: 1 to 50°C (2 to 90°F)

Default: 2°C (4°F)

PASC Min. Ambient Temperature

Purpose: The PASC Min Ambient Temp is the lowest ambient temperature that was used when the heat-tracing system was designed. The entered value should agree with the value used by the design engineer to ensure that the heat tracing system was sized correctly.

Procedure: Click on the box to enter date using the numerical keypad

Range: -73°C to 51°C (-99°F to 124°F)

Default: -40°C (-40°F)

PASC Min Pipe Size

Purpose: PASC Min Pipe Size is the diameter of the smallest heat-traced pipe in the group controlled by this circuit. Small diameter pipes heat up and cool down more rapidly than larger diameter pipe, therefore, the PASC duty cycle is calculated over a shorter time base. Larger diameter pipes heat and cool less rapidly, so the on/off periods for the heater system can be stretched over a longer period. If contactors are being used to control the heater circuit, the longer time base reduces the number of contactor on/off cycles and extends the contactor life.

Procedure: Click on the box to enter date using the numerical keypad

Options: .50 in (15 mm), 1.0 in (25 mm), >=2.0 in (50 mm)

Default: .50 in (15 mm)

PASC Power Adjust

Purpose: This allows the PASC control to be adjusted when the heating cable output is greater than the design assumption, or if the pipe insulation proves to be more efficient than assumed. Pipe temperature may run higher or lower than desired if the heating cable has a different output than required to offset the heat loss. The Power Adjust parameter enables a reduction or an increase in the heat-tracing effective power by entering a value less or greater than 100%



IMPORTANT: If improperly used, the Power Adjust parameter can cause the piping to get too cold or too hot. If unsure, leave at 100%. Do not change this value unless an engineer calculates the temperature impact on the system and determines that it is safe to do so. Be particularly cautious if the circuit has more than one diameter of pipe or type of heat tracing. Contact a nVent representative for assistance with this factor.

Procedure: Touch the box to enter date using the numerical keypad

Range: 10 to 200% **Default:** 100%

4.3.1.4 Local RTD (TS1)

This section discusses setting up an RTD that is hard-wired into an HTC or HTC3 module. If no RTD is connected directly to the HTC module, (i.e. RTD input is provided form an I/O or other HTC/ HTC3 modules) then you may skip this section.

Local Temp Sensor (TS1)

This window allows the user to set-up the RTD wired directly to the heat-tracing controller

FILE	SYS	STEM						ALARM A	ACK
CIRCUIT LIST	ALAR	M LIST	CONFIGURE	DEVIC	E				
Show Advanced Set	tings				NGC40	-HTC-11EE			
DACIO OFTTINI	20	Local Tem	perature Sensor						
BASIC SETTING	3 0	RTD Type		3	wire 100 Oh	m Platinum			\checkmark
Temperatures		RTD Lead	Resistance	0.	0	Ohm			
Opertual Madea		RTD Tag		N	GC40-HTC-F	RTD1-11EE			
Control Modes		TS1 Usag	e	С	ontrol Only				\checkmark
Local RTD (TS1)		Name		A	arm	Setpoint		Filter	
Electrical		High Alarr	n		Enable	100	°C	0	S
		Low Alarn	n		Enable	5	°C	0	S

Figure 4.13 Basic Settings - Local RTD (TS1) window

RTD Type

Purpose: This allows selection of the type of RTD used

Procedure: Select the type from the drop down list

Options: 3-wire 100-Ohms Platinum or 2-wire 100-Ohms Nickel Iron or 2-wire 100-Ohms Nickel Default: 3-wire 100-Phms Platinum

RTD Lead Resistance

Purpose: This allows the lead wire resistance to be set when using 2-wire 100-Ohms Nickel Iron. The lead resistance must be entered to ensure accurate temperature measurement.

Procedure: Touch the data area and enter the resistance value using the keypad.

Range: 0 to 20 Ohms

Default: 0 Ohms

Change RTD Tag

Purpose: This allows the RTD name to be set to the preferred text

Procedure: To enter a tag name, touch where the default tag name is shown. This will open the keyboard for entering the new tag name.

Range: Alpha-numeric characters.

Default: NGC-40-HTC-RTD1-(last 4 characters of CAN ID)

TS1 Usage

Purpose: This allows selection of how the controller will react if RTD1 fails. If High Temp Cut out options is selected, the Controller will cut off power when the temp exceeds the values.

Procedure: Select the type from the drop down list

Options: Monitor Only / Control Only / Monitor with High Temp Cut out / Control with High Temp Cut out. On Selection of Monitor options the grayed area will allow data entry.

Default: Control Only

High Alarm - TS1

Purpose: This setting is exclusively for TS1 when set to the Monitor Only or Monitor with High Limit Cutout modes. The high alarm will activate when the temperature exceeds the set value. Procedure: Touch the check box to enable the alarm. When enabled, enter the setpoint by touching the white box and using the numerical keypad. If required set filter in the range in the same way.

Temperature Range: -80°C to 700°C (-112°F to 1292°F)

Filter Range: 0 to 12 seconds

Default Setting: DISABLED

Default Temperature: 100°C

Default Filter: 0 seconds

Low Alarm - TS1

Purpose: This setting is exclusively for TS1 when set to the Monitor Only or Monitor with High Limit Cutout modes. The low alarm will activate when the temperature goes below the set value.

Procedure: Touch the check box to enable the alarm. When enabled, enter the setpoint by touching the white box and using the numerical keypad. If required set filter in the range in the same way.

Temperature Range: -80°C to 700°C (-112°F to 1292°F)

Filter Range: 0 to 12 seconds

Default Setting: DISABLED

Default Temperature: 5°C

Default Filter: 0 seconds

FILE	SYS	STEM)			Al	LARM ACK	
CIRCUIT LIST	ALARI	M LIST	CONFIGURE DEVICE					
Show Advanced Setti	ngs			NGC40-HTC-11	EE			
BASIC SETTINGS		Line Curre	nt					
BAOIO OLI MINOC		Name	A	larm	Setpoint		Filter	
Temperatures		High Alarr	m 🗸	Enable	30.0	А	0	S
Control Modes		Low Alarn	n 🗸	Enable	0.3	А	0	S
Local RTD (TS1)		Ground Fa	ult Current					
Electrical		Name	A	larm	Setpoint		Filter	
		High Alarr	m 🗸	Enable	20	mA	0	S
		Ground Fa	ault Trip 🗸 🗸	Enable	30	mA		

Figure 4.14 Basic Settings - Electrical - HTC window

4.3.1.5 Electrical

This section describes the electrical setting options for the HTC/HTC3 modules.

Line Current

High Alarm

Purpose: Alarms at current levels which are higher than the High Line Current Alarm Setpoint. This alarm can be user selectable to be latching or non-latching. If set to non-latching, the controller will automatically clear the alarm when the condition no longer exists. If set to latching, the alarm must be cleared by the user.

Procedure: Touch the check box to enable or disable this alarm.

Options: ENABLE or DISABLE

Default: DISABLE

IMPORTANT: The default alarm latching/non-latching setting for this alarm is LATCHING.



High Alarm Setpoint

Purpose: Sets the high alarm currents threshold.

Procedure: Touch the data area to display the keypad. Enter the desired value.

Range: 0.3 to 60.0 A

Default: 30.0 A

High Alarm Filter

Purpose: The Line Current High Alarm Filter will prevent high load current alarms from being indicated until a high current condition has existed for the duration of the high current alarm filter time. This filter helps eliminate nuisance alarms while maintaining the alarm function.

Procedure: Touch the data area to display the keypad. Enter the desired value.

Range: 0 to 12 Seconds

Default: 0 Second

NOTE 1: If an alarm condition appears and then disappears before the alarm filter time has expired, the filter timer is reset and the alarm condition must exist again for the entire alarm filter time before the corresponding alarm will be indicated.

NOTE 2: If the user resets an alarm while the alarm condition is still exists, then the alarm will not be indicated again until the entire alarm filter time has expired.

Low Alarm

Purpose: Alarms at current levels which are lower than the Line Current Low Alarm Setpoint. Monitoring for lower than expected current levels may be an effective means of continuity monitoring. This alarm can be user selectable to be latching or non-latching. If set to non-latching, the controller will automatically clear the alarm when the condition no longer exists. If set to latching, the alarm must be cleared by the user.

Procedure: Touch the check box to enable or disable this alarm.

Options: ENABLE or DISABLE

Default: ENABLE

NOTE 1: The default alarm latching/non-latching setting for this alarm is latching.



IMPORTANT: to minimize nuisance low current alarms, the HTC must detect a current level less than the low current alarm setpoint for a period longer than approximately 20 consecutive seconds.



NOTE 2: For series type heating cables, adjusting the low line current alarm to 50% of full load current will properly alarm a problem and reduce nuisance alarms due to voltage dips. Parallel heaters should be adjusted to a level as close as possible to full load current but lower than the current at worst case voltage. The low current setting as a percentage of full load current will vary depending on the facility and its power system.



NOTE 3: A low line current alarm may also result from a switch failed open. The controller cannot detect a switch failure due to no current. A no current condition would be identified by a low line current and the latched low line current alarm value reported with the alarm will be 0.0 A.



NOTE 4: It may be advantageous to consider using the high tracing resistance alarm to indicate a cable fault when using certain types of heaters.

Low Alarm Setpoint

Purpose: Sets the low alarm currents threshold.

Procedure: Touch the data area to display the keypad. Enter the desired value.

Range: 0.3 to 60.0 A

Default: 1.0 A

Low Alarm Filter

Purpose: The Low Line Current Alarm Filter will prevent low load current alarms from being indicated until a low current condition has existed for the duration of the low current alarm filter time. This filter helps eliminate nuisance alarms while maintaining the alarm function.

Procedure: Touch the data area to display the keypad. Enter the desired value.

Range: 0 to 12 Seconds

Default: 0 Second



NOTE 1: If an alarm condition appears and then disappears before the alarm filter time has expired, the filter timer is reset and the alarm condition must exist again for the entire alarm filter time before the corresponding alarm will be indicated.



NOTE 2: If the user resets an alarm while the alarm condition is still exists, then the alarm will not be indicated again until the entire alarm filter time has expired.

Ground-Fault Current

High Alarm

Purpose: Alarms at ground-fault current levels which are higher than the High GF Current Alarm Setpoint. This alarm can be used to give pre-warning on a circuit whose ground-fault current is increasing but not yet at the point where it will trip and shut down the heat-tracing circuit. It is user selectable to be latching or non-latching. If set to non-latching, the controller will automatically clear the alarm when the condition no longer exists. If set to latching, the alarm must be cleared by the user.

Procedure: Touch the check box to enable or disable this alarm.

Options: ENABLE or DISABLE

Default: ENABLE



IMPORTANT: The default alarm latching/non-latching setting for this alarm is latching.

High Alarm Setpoint

Purpose: Sets the high alarm currents threshold.

Procedure: Touch the data area to display the keypad. Enter the desired value.

Range: 10 mA to 250 mA

Default: 20 mA

High Alarm Filter

Purpose: The high ground-fault current alarm filter will prevent high ground-fault current alarms from being indicated until a high GF current condition has existed for the duration of the high GFI alarm filter time. This filter helps eliminate nuisance alarms while maintaining the alarm function.

Procedure: Touch the data area to display the keypad. Enter the desired value.

Range: 0 to 12 Seconds

Default: 0 Second



NOTE 1: If an alarm condition appears and then disappears before the alarm filter time has expired, the filter timer is reset and the alarm condition must exist again for the entire alarm filter time before the corresponding alarm will be indicated.



NOTE 2: If the user resets an alarm while the alarm condition is still exists, then the alarm will not be indicated again until the entire alarm filter time has expired.

Ground-Fault Trip Alarm

Purpose: This alarm is activated when the ground-fault leakage current exceeds the Ground-Fault Trip Current Setpoint. Exceeding this limit will result in the output switch being latched off.

Procedure: Touch the check box to enable or disable this alarm.

Options: ENABLE or DISABLE

Default: ENABLE



NOTE 1: National Electrical Codes may require that all legs of non-neutral based power sources be opened upon detection of a ground fault. Multi-pole switch configurations should be used on non-neutral based power systems. Check the requirements with your local Electrical Authority.



NOTE 2: When the Ground-Fault Trip alarm is disabled, ground-fault tripping is disabled as well.

Ground-Fault Trip Setpoint

Purpose: Sets the Ground-Fault Trip threshold.

Procedure: Touch the data area to display the keypad. Enter the desired value.

Range: 10 to 250 mA

Default: 30 mA



IMPORTANT: National Electrical Codes may require that all legs of non-neutral based power sources be upon detection of a ground fault. Multi-pole switch configurations should be used on non-neutral based power systems. Check the requirements with your local Electrical Authority.

General

Fixed Voltage

Purpose: Provides the line voltage data for power calculations.Procedure: Touch the white box and enter the Line Voltage using the numerical keypad.Range: 80 to 700 VDefault: 120 V

Fixed Frequency

Purpose: Provides the line frequency data required for power calculationsProcedure: Enter the frequency using the numerical keypadRange: 45 to 65 HzDefault: 60 Hz

4.4 CONFIGURATION OF NGC-40 HTC3 MODULES

This section provides complete programming instructions for the NGC-40 HTC3 Heat-Tracing Controllers for three-phase heaters. For HTC3 modules, please follow the procedures for the HTC module since the all parameters except the electrical settings are identical for both HTC and HTC3. Refer to Section 4.3 Configuration of NGC-40 HTC Modules on page 28 for instructions on the other parameters.

4.4.1 Electricals 1 for HTC3

FILE	SYS	STEM				AI	ARM ACK	
CIRCUIT LIST	ALAR	M LIST	CONFIGURE DEVICE					
Show Advanced Setti	ngs			NGC40-HTC3-1	132			
		Line 1 Cur	rent					
BASIC SETTINGS		Name	Al	arm	Setpoint		Filter	
Temperatures		High Alarr	m	Enable	30.0	A	0	S
Control Modes		Low Alarm	n 🖌	Enable	1.0	А	0	S
Local RTD (TS1)		Line 2 Cur	rent					
Electricals 1		Name	Al	arm	Setpoint		Filter	
		High Alarr	m	Enable	30.0	A	0	S
Electricals 2		Low Alarn	n 🗹	Enable	1.0	А	0	S
		Line 3 Cur	rent					

Figure 4.15 Basic Settings - Electrical - HTC3 window

4.4.1.1 Line Current 1 (Phase 1)

High Alarm

Purpose: Alarms current levels which are higher than the High Line Current Alarm Setpoint. This alarm can be user selectable to be latching or non-latching. If set to non-latching, the controller will automatically clear the alarm when the condition no longer exists. If set to latching, the alarm must be cleared by the user.

Procedure: Touch the check box to enable or disable this alarm.

Options: ENABLE or DISABLE

Default: DISABLE

NOTE 1: The default alarm latching/non-latching setting for this alarm is latching.

NOTE 2: As the HTC3 automatically protects itself from overload, it would not normally be necessary to enable this alarm. It can be used effectively to guard against accidental paralleling of heating circuits. In-rush, or cold start currents typically associated with self-regulating cables may cause nuisance HIGH CURRENT ALARMS. If this is undesirable this alarm should be disabled.

High Alarm Setpoint

Purpose: Sets the high alarm threshold.

Procedure: Touch the data area to display the keypad. Enter the desired value.

Range: 0.3 to 60.0 A Default: 30.0 A

High Alarm Filter

Purpose: The line current high alarm filter will prevent high load current alarms from being indicated until a high current condition has existed for the duration of the high current alarm filter time. This filter helps eliminate nuisance alarms while maintaining the alarm function.

Procedure: Touch the data area to display the keypad. Enter the desired value.

Range: 0 to 12 Seconds

Default: 0 Second



NOTE 1: If an alarm condition appears and then disappears before the alarm filter time has expired, the filter timer is reset and the alarm condition must exist again for the entire alarm filter time before the corresponding alarm will be indicated.



NOTE 2: If the user resets an alarm while the alarm condition is still exists, then the alarm will not be indicated again until the entire alarm filter time has expired.

Low Alarm

Purpose: Alarms current levels which are lower than the Line Current Low Alarm Setpoint. Monitoring for lower than expected current levels may be an effective means of continuity monitoring. This alarm can be user selectable to be latching or non-latching. If set to non-latching, the controller will automatically clear the alarm when the condition no longer exists. If set to latching, the alarm must be cleared by the user.

Procedure: Touch the check box to enable or disable this alarm.

Options: ENABLE or DISABLE

Default: DISABLE



NOTE 1: The default alarm latching/non-latching setting for this alarm is latching.



IMPORTANT: to minimize low current alarms, the HTC must detect a current level less than the low current alarm setpoint for a period longer than approximately 20 consecutive seconds.

NOTE 2: For series type heating cables, adjusting the low line current alarm to 50% of full load will properly alarm a problem and reduce nuisance alarms due to voltage dips. Parallel heaters should be adjusted to a level as close as possible to full load current but lower than the current at worst case voltage. The low current setting as a percentage of full load current will vary depending on the facility and its power system.



NOTE 3: a low line current alarm may also result from a switch failed open. The controller detects a switch failure due to no current. A no current condition would be identified by a low line current and the latched low line current alarm value reported with the alarm will be 0.0 A.

NOTE 4: It may be advantageous to consider using the high tracing resistance alarm to indicate a cable fault when using certain types of heaters.

Low Alarm Setpoint

Purpose: Sets the low alarm threshold.

Procedure: Touch the data area to display the keypad. Enter the desired value.

Range: 0.3 to 60.0 A

Default: 1.0 A

Low Alarm Filter

Purpose: The low line current alarm filter will prevent low load current alarms from being indicated until a low current condition has existed for the duration of the low current alarm filter time. This filter helps eliminate nuisance alarms while maintaining the alarm function.

Procedure: Touch the data area to display the keypad. Enter the desired value.

Range: 0 to 12 Seconds

Default: 0 Second



NOTE 1: If an alarm condition appears and then disappears before the alarm filter time has expired, the filter timer is reset and the alarm condition must exist again for the entire alarm filter time before the corresponding alarm will be indicated.



NOTE 2: If the user resets an alarm while the alarm condition is still exists, then the alarm will not be indicated again until the entire alarm filter time has expired.

4.4.1.2 Line Current 2 (Phase 2)

Procedure: Repeat settings for Line Current 1

4.4.1.3 Line Current 3 (Phase 3)

Procedure: Repeat settings for Line Current 1

4.4.1.4 Electricals 2

Ground-Fault Current

FILE	SY	STEM				AI	LARM ACK	
CIRCUIT LIST	ALAR		CONFIGURE D	EVICE				
Show Advanced Set	tings			NGC40-HTC	3-1132			
		Ground Fa	ult Current					
BASIC SETTING	5	Name		Alarm	Setpoint		Filter	
Temperatures		High Alarr	n	Enable	20	mA	0	S
Control Modes		Ground Fa	ault Trip	🖌 Enable	30	mA		
		1.000						
Local RTD (TS1)		General						
Local RTD (TS1)		General Line to Lin	e Voltage		120	V		

Figure 4.16 Basic Settings - Electrical - HTC3 window

The ground-fault current measurement is made for all three phases in a single measurement. If the ground-fault current in any of the phases exceeds the alarm thresholds, an alarm will be generated.

High Alarm

Purpose: Alarms ground-fault current levels which are higher than the High GF Current Alarm Setpoint. This alarm can be user selectable to be latching or non-latching. If set to non-latching, the controller will automatically clear the alarm when the condition no longer exists. If set to latching, the alarm must be cleared by the user.

Procedure: Touch the check box to enable or disable this alarm.

Options: ENABLE or DISABLE

Default: ENABLE



IMPORTANT: The default alarm latching/non-latching setting for this alarm is latching.

High Alarm Setpoint

Purpose: Sets the High Alarm threshold.

Procedure: Touch the data area to display the keypad. Enter the desired value.

Range: 10 mA to 100 mA

Default: 20 mA

Ground-Fault Current- High Alarm Filter

Purpose: The high GF current alarm filter will prevent high GF current alarms from being indicated until a high GF current condition has existed for the duration of the high GFI alarm filter time. This filter helps eliminate nuisance alarms while maintaining the alarm function.

Procedure: Touch the data area to display the keypad. Enter the desired value.

Range: 0 to 12 Seconds

Default: 0 Second



NOTE 1: If an alarm condition appears and then disappears before the alarm filter time has expired, the filter timer is reset and the alarm condition must exist again for the entire alarm filter time before the alarm will be indicated.



NOTE 2: If the user resets an alarm while the alarm condition still exists, then the alarm will not be indicated again until the entire alarm filter time has expired.

Ground-Fault Trip Alarm

Purpose: This alarm is activated when the ground-fault leakage current exceeds the Ground-Fault Trip Current Setpoint. Exceeding this limit will result in the output switch being latched off. A ground-fault alarm may mean the heating cable has been damaged or improperly installed and must not be ignored. Sustained electrical arcing or fire can result. To minimize the risk of fire if the alarm has tripped, shut off the power to the heating cable and repair the system immediately **CAUTION:** IN ORDER TO IMPLEMENT A GROUND-FAULT TRIP FUNCTION, ALL NON-GROUNDED

POWER CONDUCTORS MUST BE OPENED UPON DETECTION OF A GROUND-FAULT CONDITION.

Procedure: Touch the check box to enable or disable this alarm.

Options: ENABLE or DISABLE

Default: ENABLE



NOTE 1: National Electrical Codes may require that all legs of non-neutral based power sources be opened upon detection of a ground fault. Multi-pole switch configurations should be used on non-neutral based power systems. Check the requirements with your local Electrical Authority.

NOTE 2: When the ground-fault trip alarm is disabled, ground-fault tripping is disabled as well.

Ground-Fault Trip Setpoint

Purpose: Sets the Ground-Fault Trip threshold.

Procedure: Touch the data area to display the keypad. Enter the desired value.

CAUTION: IN ORDER TO IMPLEMENT A GROUND-FAULT TRIP FUNCTION, ALL NON-GROUNDED POWER CONDUCTORS MUST BE OPENED UPON DETECTION OF A GROUND-FAULT CONDITION.

Range: 10 to 250 mA

Default: 30 mA



IMPORTANT: National Electrical Codes may require that all legs of non-neutral based power sources be opened upon detection of a ground fault. Multi-pole switch configurations should be used on non-neutral based power systems. Check the requirements with your local Electrical Authority.

4.5 CONFIGURATION OF RMM MODULE

This section provides complete programming instructions on how to assign an RMM and associated RTD's to an HTC or HTC3.

4.5.1 Configure the NGC-40 Bridge to utilize the RMM(s) using the Touch1500 interface

Step 1: On the Touch 1500, tap on System > Device Manager. The Device Manager tab should open.

FIL	E SYSTEM				ALARM ACK
Devid User	e Manager Level		VICE MANAGER		
Grou Syste	o em Alarms		Device Type	Status	
Com	nmunications Setup		IGC40Bridge	Online	
	Cotowov		IGC40HTC	Online	
003	Galeway	_	IGC40HTC3	Online	
Prefe	rences	_	IGC40IO	Online	
EEF4F4	EF4F4 NGC40-SLIM-EEF4F4 NGC20-3E93		NGC40SLIM	Online	
3			NGC20	Online	
17	DEFAULT TAG [17]	1	RMM-DI	Online	

Figure 4.17 System menu

Step 2: In the Device List, tap on the NGC-40-Bridge that the RMM is physically connected to.Step 3: Tap on the Config button under the NGC-40-Bridge that the RMM is physically connected to.

FILE		SYSTEM)		ALARM ACK	
CIRCUIT	LIST	ALARM LIST	DEVICE MANAGER			
DEVICE	LIST	SCAN FOR DEVIC	ES			
Address		Tag	Device Type	Status		
1	NGC40	DEMO KIT UNIT#1	NGC40Bridge	Online		
CON	NFIGURE	REI	MOVE	SET ONLINE	SET OFFLINE	
0011EE	NGC40	-HTC-11EE	NGC40HTC	Online		
001132	NGC40)-HTC3-1132	NGC40HTC3	Online		
FFFFF1	NGC40)-10	NGC40IO	Online		
EEF4F4	NGC40	-SLIM-EEF4F4	NGC40SLIM	Online		
3	NGC20)-3E93	NGC20	Online		
17	DEFAU	ILT TAG [17]	RMM-DI	Online		
19	DEFAU	ILT TAG [19]	RMM-DI	Online		•
V3.0.0	Ready			4	Thursday, December 3, 2020 8:34:4	42 AM

Figure 4.18 Device Manager

Step 4: Under General, tap RMM.

Step 5: Place a check mark next to the RMM(s) that will be used.

FILE	SYST	EM			ALARM ACK
CIRCUIT LIST	ALARM I	.ist co	ONFIGURE DEVIC	E	
				NGC40 DEMO KIT UNIT	ſ#1
GENERAL	R	MM Settings			
Tag and Alarms	R	MM Usage MM-32	Enable Enable	RMM-40	Enable
RMM	R	MM-33 MM-34	Enable Enable	RMM-41 RMM-42	Enable
	R	MM-35 MM-36	Enable	RMM-43 BMM-44	Enable
COMMUNICATIO	NS R	MM-37	Enable	RMM-45	Enable
MISC	R	MM-39	Enable	RMM-40 RMM-47	Enable
				APPLY CANCI	EL BACK NEXT
N/2 0 0 Poody					Thursday December 2, 2020 9:25:28 AM

Figure 4.19 RMM list

Step 6: Tap on Apply, and the Cancel to close the Config screen. The RMM(s) will now be available for use on any circuit connected to that NGC-40-Bridge module.

4.5.2 Assign an RMM RTD to a circuit.

Step 1: Tap on a circuit on the Circuit List.

Step 2: Tap on the Overview button.

FILE	S	YSTEM					
CIRCUIT L	IST ALA	RM LIST CONFIG	URE DEVICE				
Filter by gro	up [*]	~					
Status	Address	Tag 🔻	Device Type	Setpoint Temperature	Actual Temperature	Line Current	c
ок	0011EE	NGC40-HTC-11EE	NGC40HTC	15°C	60°C	0A	0m
ov	/ERVIEW	ALARM(S		HIDE BUTTONS			
ок	001132	NGC40-HTC3-1132	NGC40HTC3	30°C	53°C	0A	0m
ОК	3	NGC20-3E93	NGC20	500°C	207°C	0A	0m
ОК	19	DEFAULT TAG [19]	RMM-DI	N/A	N/A	N/A	N//
ок	22	DEFAULT TAG [22]	RMM-DI	N/A	N/A	N/A	N//
ОК	17	DEFAULT TAG [17]	RMM-DI	N/A	N/A	N/A	N//
•							•
V3.0.0	Ready			4	Thursday, Decembe	r 3, 2020 8:39:1	12 AM

Figure 4.20 Circuit list overview

Step 3: Tap on the Config button near the bottom of the screen.

FILE	SY	'STEM											
CIRCUIT LIST	ALA	RM LIST	CIF	RCUIT ON	/ERV	IEW							
CAN Network ID: 11EE Device Type: NGC40HTC	Version: 4.8 Alarm(s): 0	.42						NGC40-HTC	-11EE				
Controller Status													
Heater Status	Off					Control M	ode				On/Off	SSR	
Control Status	Heat-Tr	acing is off d	ue to	fault condi	ition	Deadband					3	°(c
Safety Temperature Limit	er Status	Limiter Trip	ped					Temperature	Failed	°C			
Control Temperature						Ground	Fault	Current					
 Actual Value Setpoint High Alarm Low Alarm 		60 15 200 5	0° 0° 0° 0°		_220	►Actual V ►Trip Set ►High Ala Highest	/alue point arm Mea:	sured Value	[0 30 20 13	mA mA mA mA		. 50 • 0 ₀
Line Currents													
Actual V	/alue 🕨 🕨	High Alarm	•	Low Alarm	i i	Power Con	sump	tion					
Line Current 0.0	A	30.0	A	0.3	А	0	W	0.0				\supset	40.0
CONFIGURE	MQN	ITOR	TE	ST HEATE	R					APPI	Y	CANCE	
V3.0.0 Ready								4	Thursda	y, Decen	nber 3, 20	20 8:42:1	8 AM

Figure 4.21 Configure

Step 4: Place a check mark on the Show Advanced Settings option.

	FILE	SY	STEM						
ſ	CIRCUIT LIST	ALAR	IM LIST	CONFIGURE	DEVICE				
	Show Advanced Sett	ings			NGC40-HTC	-11EE			
	BASIC SETTING		General						
I	BASIC SETTING	*	Tag		NGC40-HT	C-11EE			
I	Temperatures		Heater St	atus	Off				
	Control Modes		Control Te	emperature					
	Local RTD (TS1)		Name		Alarm	Setpoint		Filter	
	Flectrical		Control S	etpoint	int		°C		
	Liconion		High Alar	m	🖌 Enable	200	°C	0	S
			Low Alarr	m	🖌 Enable	5	°C	0	S
			High Limi	it Cutout Setpoint		700	°C		
			Control Te	emperature Usage		Use Lowest	Tempe	rature	×
I			TS Fail M	ode		Fail Off			\sim
			TS Fail M	ode Percentage		50	%		
			MONI	TOR	APPLY	CANCEL	В	АСК	NEXT
1	V3.0.0 Ready					👍 Thursday	y, Decer	mber 3, 2020	8:42:55 AM

Figure 4.22 Show advanced settings

Step 5: Tap on the Temperatures sub-menu button in the menu on the left.

IMPORTANT: This is not the "Temperatures" sub-setting under the Basic Settings section

FILE	SYS	STEM						
CIRCUIT LIST	ALAR	M LIST	CONFIGURE	DEVICE				
V Show Advanced Setti	ngs			NGC40-H	TC-11EE			
PARIC SETTING		General						
BASIC SETTING	,	Tag		NGC40-H	HTC-11EE			
Temperatures		Heater St	tatus	Off				
Control Modes		Control T	emperature					
Local RTD (TS1)		Name		Alarm	Setpoint		Filter	
Electrical		Control S	Setpoint		15	°C		
		High Ala	rm	🖌 Enable	200	°C	0	S
		Low Alar	m	🖌 Enable	5	°C	0	S
TEMPERATURES		11 th Lim	it Cutout Setpoint		700	°C		
TEIM ENATORIES		trol I	emperature Usage		Use Lowest	Tempe	rature	\sim
OTHER ALARMS		TS Fail M	lode		Fail Off			\sim
		TS Fail M	lode Percentage		50	%		
ELECTRICAL								
LIMITER								
MISC								
		MON	ITOR	APPLY	CANCEL	в	ACK	NEXT
V3.0.0 Ready					4 Thursday	, Decei	mber 3, 2020	8:43:24 AM

Figure 4.23 Temperatures sub-menu

Step 6: Choose a Temperature Source to assign an RMM RTD (TS2-TS8).

Step 7: Under the Temperature Source, tap on the Source drop-down menu and choose Remote.

CIRCUIT LIST	ALARI	IST CONFIGURE DEVICE							
Show Advanced Setting	3		NGC40	D-HTC-11EE					
BASIC SETTINGS		TS2 - TS3	TS4 - TS5	TS6 - TS7	TS8				
TEMPERATURES		Temperature Source 2	re Source 2						
TEMPENATURES		Source	Remote						
TS 2 - TS 8		Usage	Monitoring C	only		~			
		RMM Modbus Address	0 [Unkno 💊	RMM Port Number					
		CAN Network Device ID	FFFFF1 [NG	240-10]					
OTHER ALARMS		RTD Number	1						
ELECTRICAL		Temperature Source 3							
LIMITED		Source	Not Used						
LIWITER		Usage	Monitoring C	Inly					
MISC		RMM Modbus Address	0 [Unkno 💊	RMM Port Number					
		CAN Network Device ID	0000 [None]						
		RTD Number	0						

Figure 4.24 Temperature source

Step 8: Under RMM Modbus Address, choose the Modbus address of the RMM. Refer to the table below Step 11 for the RMM address switch settings conversions.

FILE	YSTEM						
CIRCUIT LIST AL	ARM LIST	CONFIGURE DE	VICE				
Show Advanced Settings			NG	C40-H	ITC-11EE		
BASIC SETTINGS	TS	2 - TS3 1	rs4 - TS5		TS6 - TS7	TS8	
TEMPERATURES	Tempera	ture Source 2					
TS 2 - TS 8	Source Usage		Remote Monitorin	ig Only	1		\sim
	RMM M	odbus Address	32	~	RMM Port Number		
OTHER ALARMS	RTD Nu	32 1 33 [Disabled]					
ELECTRICAL	Temper	ti 34 [Disabled]					
LIMITER	Source Usage	35 [Disabled]					\sim
MISC	RMM M	36 [Disabled]			RMM Port Number		~
	CAN Ne RTD Nu	37 [Disabled]		-			
	MON	ITOR	APPI	Y	CANCEL	ВАСК	NEXT
V3.0.0 Ready					4 Thursday,	December 3, 2020 9	:07:53 AM

Figure 4.25 RMM address

Step 9: Under RMM Port Number, choose the RTD connected to the RMM from the list.

FILE SY	STEM					
CIRCUIT LIST ALAF	RM LIST CONFIGURE	DEVICE				
Show Advanced Settings		NGC40	0-HTC-11EE			
BASIC SETTINGS	TS2 - TS3	TS4 - TS5 TS6 - TS7		TS8		
TEMPERATURES	Temperature Source 2					
	Source	Remote				
TS 2 - TS 8	Usage	Monitoring C	Only		4	
	CAN Network Device ID	FFFFF1 [NG	C40-10]			
OTHER ALARMS	RTD Number	1	1			
ELECTRICAL	Temperature Source 3			2		
LIMITER	Source	Not Used		3		
	Usage	Monitoring C	Only	4		
MISC	RMM Modbus Address	0 [Unkno 💊	RMM Port Number	5		
	CAN Network Device ID RTD Number	0000 [None]		6	,	
	(-				
	MONITOR	APPLY	CANCEL	BACK		
V3.0.0 Ready			4 Thursday, De	ecember 3, 2020 9:08:2	9 AM	

Figure 4.26 RMM port number

Step 10: Repeat steps 6 through 9 for any additional RMM RTDs for this circuit.Step 11: Repeat steps 1 through 10 for any additional RMM RTDs for any other circuits.

RMM Switch Settings		
RMM Switch Setting	Actual Modbus Address	
0	32	
1	33	
2	34	
3	35	
4	36	
5	37	
6	38	
7	39	
8	40	
9	41	
A	42	
В	43	
С	44	
D	45	
E	46	
F	47	

When the Show Advance Settings box is checked, additional tabs are enabled allowing more programming options. Touch the Show Advanced Setting box to enable the advanced settings mode and display the additional menus.

5.1 TEMPERATURES

FILE	SYS	STEM					
CIRCUIT LIST	ALAR	M LIST CONFIGU	RE DEVICE				
Show Advanced Settings							
BASIC SETTING	s	TS2 - TS3	TS4 - TS5	TS6 - TS7	TS8		
TEMPERATURE	s	Temperature Source 2					
TS 2 - TS 8	TS 2 - TS 8		Not Used Monitoring (-		
		RMM Modbus Address	0 [Unkno 📐	RMM Port Number		~	
OTHER ALARM	s	CAN Network Device ID RTD Number	FFFFF1 [NG0	240-10]		_	
ELECTRICAL		Temperature Source 3					
LIMITER		Source	Not Used			2	
MISC		Usage BMM Modbus Address	Monitoring C	BMM Port Number		<u> </u>	
WIGC		CAN Network Device ID	0000 [None]	HIMINFORTUNDE		۶II	
		RTD Number	0				

Figure 5.1 Advance Settings - Temperatures TS2 to TS8 for HTC or HTC3 window

5.1.1 Set Temperature Sources 2 Though 8 (TS2 to TS8)

This section describes how to map additional RTD sensors to an HTC or HTC3 from other sensors connected to NGC-40 HTCs and I/O modules in the panel. Up to 7 additional RTD inputs can be assigned to each heat-tracing control module. The Temperatures tab displays the options available to configure sensors TS2 through TS8.



IMPORTANT: TS1 represents the RTD input to the individual HTC or HTC3 module and is by default assigned to the sensor connected to the HTC modules. If no RTD is hardwired to the HTC or HTC3 module, then TS1 is left unconfigured.

Source

Purpose: Identifies the source of the RTD being mapped to the control module.

Procedure: Touch the drop down box to select the RTD source.

Range: Not Used and 'CAN NETWORK'

Default: Not Used

Usage

Purpose: Defines how the RTD input will be used relative to control of the heat-tracing circuit.

Procedure: Touch the drop down box to select the RTD source.

Range: Monitor Only / Control Only / Monitor with High Temp Cut out / Control with High Temp Cut out.

Default: Monitor Only

CAN Network ID

Purpose: Identifies the Module where the RTD temperature sensor is physically connected within the NGC-40 panel. You will need to know the CAN ID of the module where the desired RTD is connected. The CAN ID for each module can be determined from the Address column in the Circuit List menu (Section 3.3).

Procedure: Touch the drop down box to display the list of available RTD sources. Select the desired CAN ID.

Default: (0000) None

RTD Number

Purpose: This is applicable only if the prior selection is an I/O module. It identifies which of the possible four RTDs connected to the I/O modules will be assigned to the HTC or HTC3 module.

Range: 1 to 4

Default: 1

IMPORTANT: Repeat the above steps for Temperature Source 3 to 8

5.2 OTHER ALARMS

FILE	SYSTE	Μ				
CIRCUIT LIST	ALARM LI	CONFIGURE DEVICE				
V Show Advanced Setti	ngs		NGC40-HTC-	11EE		
BASIC SETTING	Fail	ure and Trip Alarms				
	Dev	ice Reset Alarm		Enable		
TEMPERATURES	B Dig	tal Input Remote Source Failure Al				
	Loa	d Shed Source Failure Alarm		🖌 Enable		
OTHER ALARMS	GFI	GFI Current Transformer Failure Alarm				
Other Alarms	Hig	n Limit Cutout Alarm		🖌 Enable		
Alarm Output	Con	tactor and Heater Time Alarm				
, add a date of the second	Nan	ne	Alaı	m	Setpoint	
Alarm Latch Settings	Cor	tactor Cycle Count Alarm	🗸 I	Enable	100000	Cycle
	Hea	ter Time Alarm	🗸 I	Enable	100000	Hour(s)
ELECTRICAL						
LIMITER						

Figure 5.2 Advance Settings | Other Alarms window

5.2.1 Other Alarms

5.2.1.1 Failure and Trip Alarms

The advanced failure and trip alarms allow users to set alarms for the more advanced features and capabilities of the NGC-40 Control & Monitoring system.

Device Reset Alarm

Purpose: Sets an alarm flag whenever an NGC-40 module is reset.Procedure: Touch the check box to enable or disableRange: ENABLE or DISABLEDefault: DISABLED

Digital Input Remote Source Failure Alarm

Purpose: Registers an alarm when the NGC-40-BRIDGE is unable to communicate wit the I/O module specified to provide the remote digital input. **Procedure:** Touch the Check box to enable or disable

Range: ENABLE or DISABLE

Default: ENABLED

Load Shed Source Failure Alarm

Purpose: Registers an alarm when the Load Shed input source goes to the defined "alarm" state.
Procedure: Touch the check box to enable or disable
Range: ENABLE or DISABLE
Default: ENABLED

Ground-Fault Current Transformer Failure Alarm

 $\label{eq:purpose:indicates} \mbox{ Indicates if there has been a failure of the GFC sensing transformer in the NGC-40 HTC/ HTC3 module \end{tabular}$

Procedure: Option unavailable Range: ENABLED Default: ENABLED

High Limit Cutout Alarm:

Purpose: Alarms on high limit cutouts conditions Procedure: Touch the check box to enable or disable Range: ENABLE or DISABLE Default: ENABLED

5.2.1.2 Contactor and Heater time Alarms

Contactor Cycle Count Alarm

Purpose: Generates an alarm if the number of off-to-on transitions of a mechanical contactor reaches or exceeds the contactor count alarm setting. This serves as a method to perform preventative maintenance on the contactor when it reaches the manufacturer's recommended maximum number of cycles.

Procedure: Touch the check box to enable or disable this alarm. Touch the white data area under Setpoint to set the desired number of contactor cycles.

Range: 0 to 999,999 cycles.

Default: ENABLED and set at 100,000 Cycles

Heater Time Alarm

Purpose: Generates an alarm if the heater ON time reaches or exceeds the set number of operational hours. This serves as a method to perform preventative maintenance on the Heaters. **Procedure:** The check box to enable or disable this alarm. Touch the white data area under Setpoint to set the desired number of operational hours

Range: 0 to 999,999 cycles

Default: ENABLED and set at 100,000 Hrs

5.2.2 Alarm Output

FILE	SYS	STEM					
CIRCUIT LIST	ALAR	M LIST	CONFIGURE DEVICE				
Show Advanced Set	tings		NGC40-HTC-11EE				
		Alarm Out	put				
BASIC SETTING	BASIC SETTINGS		Alarm Output Mode		Normal Operation		\sim
TEMPERATURE	s	Alarm Output Toggle Time			60	S	
OTHER ALARM	OTHER ALARMS						
Other Alarms							
Alarm Output							
Alarm Latch Settings							

Figure 5.3 Advance Settings | Other Alarms | Alarm Output window

The alarm outputs can be set to indicate with a steady, signal, or in a flashing mode if desired. The flashing mode may be useful when the module alarm is driving an indicator light.

Alarm Output Mode

Purpose: Offers the option to generate different hard wired alarm signals.

Procedure: Select from the drop down list the appropriate alarm mode. Options are Normal Operation, Toggle and Flash. When the alarm output mode Toggle is chosen then set the Toggle time in the Alarm Output Toggle Time box

Default: Normal Operation

5.2.3 Alarm Latch Settings

Purpose: The alarm latching settings allows the user for the selection of automatic clearing (non-latching) of alarms when an alarm condition no longer exists or permanent alarming (latching) of such a condition until the alarm is manually reset.

SYS	STEM				
ALAR	M LIST	CONFIGURE D	EVICE		
rings			NGC40-HTC-11	EE	
s	TEMPER	ATURE ALARMS	ELECTRICAL ALARMS	OTHER	ALARMS
s	Control T Control T	emperature Failure emperature High Ala	Alarm arm	✓	Latching Latching
s	Control Temperature Low Alarm Local Temperature Sensor Failure Alarm			Latching Latching	
	Local Temperature Sensor High Alarm			Latching	
	Local Temperature Sensor Low Alarm			Latching Latching	
	Temperat	ture Source 2 Failure	e Alarm		Latching
	Temperat	ture Source 3 Failure	Alarm		Latching
	Temperat	ture Source 4 Failure	e Alarm		Latching
	Tempera	ture Source 5 Failure	e Alarm		Latching
	Temperat	ture Source 6 Failure	Alarm		Latching
	Tempera	ture Source 7 Failure	e Alarm		Latching
	Temperat	ture Source 8 Failure	Alarm		Latching
	SYS ALAR s s	SYSTEM ALARM LIST ings S Control T C	SYSTEM ALARM LIST CONFIGURE DE ings S Control Temperature Failure A Control Temperature High Ala Control Temperature Sensor Fai Local Temperature Sensor Fai Local Temperature Sensor Lo Caternoperature	SYSTEM ALARM LIST CONFIGURE DEVICE ings NGC40-HTC-11 s Control Temperature Alarms control Temperature Failure Alarm Control Temperature Failure Alarm Control Temperature Sensor Failure Alarm Control Temperature Sensor Failure Alarm Local Temperature Sensor High Alarm Local Temperature Sensor Low Alarm Local Temperature Sensor Low Alarm Temperature Source 1 Failure Alarm Temperature Source 2 Failure Alarm Temperature Source 2 Failure Alarm Temperature Source 5 Failure Alarm Temperature Source 5 Failure Alarm Temperature Source 6 Failure Alarm Temperature Source 7 Failure Alarm	SYSTEM ALARM LIST CONFIGURE DEVICE ings NGC40-HTC-11EE s Control Temperature Alarm OTHER control Temperature Failure Alarm Control Temperature High Alarm Control Temperature Sensor Failure Alarm coal Temperature Sensor Failure Alarm Coal Temperature Sensor Failure Alarm Coal Temperature Sensor Failure Alarm coal Temperature Source 1 Failure Alarm Temperature Source 2 Failure Alarm Temperature Source 2 Failure Alarm Temperature Source 2 Failure Alarm Temperature Source 4 Failure Alarm Temperature Source 7 Failure Alarm Temperature Source 7 Failure Alarm Temperature Source 6 Failure Alarm Temperature Source 7 Failure Alarm

Figure 5.4 Advance Settings | Other Alarm | Alarm Latch Settings window



IMPORTANT: when the heat-tracing application is subject to periodic situations where cold or hot product is part of the process, it may be appropriate to configure the HTC/HTC3 modules with non-latching temperature alarms to avoid nuisance alarms. When it's important to be aware of any temperature alarm conditions that may have existed in a pipe, then the control module temperature alarms should be configured as latching.

Temperature Alarms

The temperature alarm can be set latched/unlatched by selecting/unselecting the latching selection box. When enabled, the alarm will remain until the Reset button is pressed on the TOUCH 1500 Window.

Default: Latching is enabled for Control Temperature Failure Alarm and Local Temperature Sensor Failure Alarm.

Electrical Alarms

The electrical alarms can be set latched/unlatched by selecting/unselecting the latching selection box. When enabled, the alarm will remain until Reset button is pressed on the TOUCH 1500 Window.

Default: Latching is enabled for High Line Current, High GF, GFI Transformer Failure and switch Failure Alarms.

Other Alarms

Other alarms can be set latched/unlatched by selecting/unselecting the latching selection box. When enabled, the alarm will remain until Reset button is pressed on the TOUCH 1500 Window.

Default: Latching is enabled for Digital Input Source Failure and Safety Limiter Communication Failure Alarms.

5.3 ELECTRICAL

FILE SYS	STEM							
CIRCUIT LIST ALARM LIST CONFIGURE DEVICE								
Show Advanced Settings	Show Advanced Settings							
	Line Current Alarms	Line Current Alarms						
BASIC SET TINGS	Name	Alarm	Setpoint		Filter			
TEMPERATURES	High Alarm	Enable	30.0	А	0	S		
OTHER ALARMS	Low Alarm	🖌 Enable	0.3	A	0	S		
	Ground Fault Alarms							
ELECTRICAL	Name	Alarm	Setpoint		Filter			
Currents/Resistance	High Alarm	🖌 Enable	20	mA	0	S		
General/Circuit Breaker	Ground Fault Trip	🖌 Enable	30	mA				
	GFI Current Transformer Failu	ıre Alarm	🖌 Enable					
Output Switch Type	Heating Cable Resistance Ala	rms						
	Name	Alarm	Setpoint		Filter			
LIMITER	High Alarm	Enable	50	%	0	S		
	Low Alarm	Enable	50	%	0	S		
MISC	Nominal Tracing Resistance		6.0	Ohm				

Figure 5.5 Advance Settings | Electrical | Current/Resistance window

5.3.1 Currents/Resistance Settings

Line Current Alarms

Purpose: Current level alarms can be set to monitor the behavior of the electrical heat-tracing. Low current level alarm can be an effective means of monitoring the continuity of the electrical heat-tracing cable.

High Alarm: Check box to enable the alarms. When enabled, enter the Setpoint between

0.3 to 60 A. If required set filter in the range 1 to 12 seconds. This can be useful to suppress high inrush current alarms.

Default: DISABLED



NOTE 1: The High Current Alarm does not necessarily have to be enabled for control modules using proportional or proportional ambient SSR control modes, since they will attempt to automatically protect themselves from overload.



NOTE 2: The High Current Alarm can be used effectively to guard against accidental installation mistakes. In-rush, or cold start currents typically associated with self-regulating cables may cause nuisance High Current Alarms. If this is undesirable this alarm should be disabled or the filter time should be set.

Low Alarm: Check the selection box to disable the alarms. When enabled, enter the setpoint between 0.3 to 60 A. If required set the Filter time to a value between 1 to 12 seconds.

Default: ENABLED

Ground-Fault Alarms

Purpose: The high ground-fault alarm warns for potential earth leakage in the electrical heattracing cable. The earth leakage indication can be an effect of the behavior of the cable (capacitor effect) or from damage on the cable due to water ingress etc. The ground-fault alarm is by default set at 20 mA and enabled.

High Alarm

Procedure: Enter setpoint between 10 to 250 mA. If required set the filter time in the range

1 to 12 seconds.

Default: ENABLED

Ground-Fault Trip

Purpose: the Ground-Fault Trip enables the option to stop the electrical heat-tracing when the ground fault goes above the of allowable ground-fault leakage current. Exceeding this limit will result in the output relay / SSR being latched off and the GFI Trip Alarm activated to indicate a ground-fault condition.

Procedure: If ground-fault tripping is desired, enable the GFI Trip Alarm and adjust the G.F. trip current to the desired value. To disable ground-fault tripping, disable the alarm. Note that the GFI Trip Alarm must be enabled in order to adjust the G.F. Trip Current level. When enabled, enter the setpoint between 10 to 250 mA.

Default: ENABLED

WARNING: Fire Hazard

A ground-fault alarm may mean the heating cable has been damaged or improperly installed and must not be ignored. Sustained electrical arcing or fire can result. To minimize the risk of fire if the alarm has tripped, shut off the power to the heating cable and repair the system immediately.



IMPORTANT: In order to implement a ground-fault trip function, all non-grounded power conductors must be opened upon detection of a ground-fault condition. National Electrical Codes may require that all legs of non-neutral based power sources be opened upon detection of a Ground-Fault. Multi-pole switch configurations should be used on non-neutral based power systems. Check the requirements with your local Electrical Authority.

Heating Cable resistance Alarms

High Alarm: Check the box to enable the alarms. When enabled, enter the setpoint between

1 to 250%. If required set Filter in the range 1 to 12 seconds.

Default: DISABLED

Low Alarm: Check the box to enable the alarms. When enabled, enter the setpoint between

1 to 250 %. If required set Filter in the range 1 to 12 seconds.

Default: DISABLED

Nominal Tracing Resistance: Set value between 0.8 to 2500 Ohms as per design calculations.

5.3.2 Electrical General/Circuit Breaker Settings

FILE	SYS	STEM						
CIRCUIT LIST	ALAR	M LIST	CONFIGURE DEVICE					
V Show Advanced Settin	ngs		NGC40-HTC-11EE					
		Electrical General						
BASIC SETTINGS		Output Lin	Output Limiting Alarm		Enable			
TEMPERATURES		Output Lin	mit Mode (SSR)	6	Disable Limiting]		$\mathbf{\vee}$
		SAPC Curr	rent Limit Setpoint		60.0	A		
OTHER ALARMS		SAPC Pow	ver Limit Setpoint		42000	W		
ELECTRICAL		Circuit Bre	eaker Settings					
Currents/Besistance		Circuit Bre	eaker Limiting Alarm		Enable			
ourients/nesistance	_	Circuit Bre	eaker Current Rating		30.0	А		
General/Circuit Breaker		Circuit Bre	eaker Type		NEMA			\checkmark

Figure 5.6 Advance Settings | Electrical | General | Circuit Breaker window

5.3.2.1 Electrical General

Output Limiting Alarms - SSR Only

Purpose: The output limiting function is to set a high current / power output to a heat-tracing circuit. This can be to reduce the heat output of the electrical heat-tracing cable or to maximize the life time expectancy of the SSR. The functionality will only be available when the heat-tracing circuit is equipped with a SSR as switching mechanism.

Procedure: To enable the output limiting functionality check the output limiting alarm selection box. **Default:** DISABLED

5.3.2.2 Circuit Breaker Settings

Circuit Breaker Limiting Alarm

Purpose: The circuit breaker current rating setting helps prevent in-rush induced nuisance tripping of the circuit breaker immediately upstream of the control module. The control module evaluates the square of the current related to time (12t) and adjusts the output duty cycle accordingly,

limiting the amount of current to an acceptable level. The functionality will only be available when the heat=tracing circuit is equipped with a SSR as a switch mechanism.

Procedure: Check box to enable the alarms and adjust the Circuit Breaker Current Rating setting to match the heating circuit breaker size (i.e. 30.0 A).

Range: 0.3 to 60 A

Default: 60 A



IMPORTANT: This feature SHOULD NOT be used to reduce the size of a circuit breaker or increase the maximum heating cable length. It can be quite effective in preventing nuisance trips due to incorrect design or factors outside those considered by the design.

Circuit Breaker Type

Procedure: Select options from drop down list with options, NEMA, TYPE B, TYPE C, TYPE D **Default:** NEMA

FILE	SY	STEM					
CIRCUIT LIST	ALAF	RM LIST CONFIG	GURE DEVICE				
Show Advanced Settings				NGC40-HT	C-11EE		
		Output Switch Settir	ngs				
BASIC SETTINGS		Switch Limiting Alar	m		Enable		
TEMPERATURE	s	Switch Current Ratir	ng	3	0.0	А	
		Switch Over Current	/Trip Alarm		Enable		
OTHER ALARM	IS	Switch Failure Alarm	1		Enable		
ELECTRICAL							
Currents/Resistance							
General/Circuit Breake	er						
Output Switch Type							

Figure 5.7 Advance Settings | Electrical | Output Switch window

5.3.3 Output Switch Settings - SSR Only

Switch Limiting Alarms

Procedure: Check box to enable the alarms.

Default: DISABLED

Switch Current Rating: Default value 30.0 A.

Switch Over Current/Trip Alarm

Purpose: This feature is used to provide protection for the output switch. Enabling this alarm will only inform the user of an excessively high current condition and that the output switch has been latched off. During a high current condition, the control module attempts to soft start a heating cable using a technique involving measured in-rush current and the switch current rating. If the control module is unable to start the cable, it will eventually trip its output switch off and will not retry or pulse its output switch again.

Procedure: Check box to enable the alarms. Adjust the switch current rating setting to the actual current rating of the SSR. Enable or disable the alarm as required. Note that the Overcurrent Trip Alarm does not have to be enabled in order to adjust the switch current rating setting. The current setting is grayed out when EMR is selected.

Default: DISABLED



NOTE 1: It is highly recommended to enable this alarm as an overcurrent trip condition would normally represent a potentially serious problem.

NOTE 2: This is a factory set alarm value and disabling the alarm does not disable the overcurrent trip function. In some applications the use of self-regulating cable will produce very high in-rush currents during cold startup. These currents may exceed the overcurrent trip limit and the control module will not be able to soft start the heating circuit. If this condition persists please contact your nearest nVent sales office for recommendations and solutions to this problem.

Switch Failure Alarm

Purpose: The purpose of the Switch Failure Alarm is to indicate that an output switch failure has occurred. The control module HTC/HTC3 checks via current measurement if the SSR/ EMR has switched correctly. If the controller measures a current while the SSR /EMR should be switched off the switch failure alarm will go on. The alarm will go on as well when the controller switches on the SSR / EMR and measures no current going to the electrical heat-tracing cable.

Procedure: Check box to enable the alarms

Default: DISABLED



5.4 MISCELLANEOUS SETTINGS

FILE	YSTEM						
CIRCUIT LIST ALA	RM LIST CONFI	IGURE DEVICE					
Show Advanced Settings							
	Load Shedding						
BASIC SET TINGS	Load Shedding		Enable				
TEMPERATURES	Load Shedding Fail	I-safe Enable	Enable				
	Broadcast Timeout	Broadcast Timeout					
OTHER ALARMS	Zone 1	Enable	Zone 9	Enable			
FLECTBICAL	Zone 2	Enable	Zone 10	Enable			
LLEOTHICAL	Zone 3	Enable	Zone 11	Enable			
LIMITER	Zone 4	Enable	Zone 12	Enable			
	Zone 5	Enable	Zone 13	Enable			
MISC	Zone 6	Enable	Zone 14	Enable			
	Zone 7	Enable	Zone 15	Enable			
Load Shedding	Zone 8	Enable	Zone 16	Enable			
Digital Input/Auto-Cycle							

Figure 5.8 Advance Settings | Miscellaneous | Load Shedding window

5.4.1 Load Shedding

Purpose: The load shedding function allows the control module output to be forced off by a load shedding command issued from DCS or other Process Control Systems. The load shedding feature may be used to turn off the output of one or more control modules in order to reduce energy consumption, this to avoid peak demand surcharges.

Procedure: Check box to enable load shedding as desired.

Default: DISABLED

Load Shedding Fail Safe Alarm: Check box to enable the options. **Default:** DISABLED

Broadcast Timeout: Enter timeout in 1 to10 minutes

Check boxes to enable zones 1 to16

5.4.2 Digital Input | Auto-Cycle

FILE	SYS	STEM						
CIRCUIT LIST	ALAR	M LIST	CONFIGURE DEVICE					
Show Advanced Sett	tings	NGC40-HTC-11EE						
		Digital Inp	out					
BASIC SETTINGS		Digital Inp	out Configuration		Not Used		•	~
TEMPERATURE	TEMPERATURES		out Source	Not Used			×	~
		Digital Inp	out Local Source CAN ID		0000 [None]		N .	~
OTHER ALARM	5	Auto-Cycl	le					
ELECTRICAL		Auto-Cycl	e Interval		0	Hour(s)		
LIMITER								
MISC								
Load Shedding								

Figure 5.9 Advance Settings | Miscellaneous | Digital Input /Auto-Cycle window

5.4.2.1 Digital Input

Purpose: The digital input offers the option to alarm or override the electrical heat-tracing mode from an external device. The digital input can be configured in different ways. These are:

- None: no action taken
- Alarm when input is closed
- · Alarm when input is open
- · Force Off when input is closed
- · Force Off when input is open
- · Force On when input is closed
- Force On when input is open

Default: None

Digital Input Source: When selections other than 'Not used' is made, the drop down list will enable selection of appropriate input source.

5.4.2.2 Auto Cycle

Purpose: The auto-cycle function momentarily (approximately 10 seconds) applies power to the heating circuit at the selected interval. It is used to test the integrity of the heating circuit. Alarms generated at the time of auto-cycle are latched and remain active after the completion of the auto-cycle function until they are reset. Auto-cycling effectively eliminates the need for preventive maintenance by automatically verifying the integrity of the heating circuit. Auto-Cycle Interval is the number of hours between successive heating circuit integrity tests depending on the Auto-Cycle Units specified

Auto Cycle Interval: Can be set from 0 to 750 hrs. The function is disabled when set at 0.



NOTE 1: Auto-cycling should always be enabled for normal operation. This feature should only be disabled if the control module's heating circuit is being monitored or exercised by some other device or means. Although this function defeats temperature control and forces output on, the control module will continue to adjust the output for protection purposes or power limiting (SSR option only).



NOTE 2: Auto-cycling is inhibited if the control module is in load shedding mode, see Section 5.4.1 Load Shedding on page 55 for more details.



NOTE 3: The NGC-40 HTC/HTC3 module will always auto-cycle for 6 seconds when power is initially applied to the control module and load shedding mode is disabled. However, the HTC/ HTC3 module will only auto-cycle for 10 seconds when power is initially applied to the control module if auto-cycling is enabled and it is not in load shedding mode.



NOTE 4: If auto-cycling is enabled, and all the control temperature sensors have failed, the control module will still perform an auto-cycle.



than the Auto-Cycle Interval otherwise auto-cycling could affect the duty-cycle. **NOTE 6:** For the earliest possible alarming of heating circuit problems, the Auto-Cycle Interval



should be set to a small value. NOTE 7: This feature is only available if Auto-Cycle is enabled.

5.5 DEVICE INFORMATION

FILE	SYS	STEM							
CIRCUIT LIST	ALAR	M LIST CONFIGURE DEVICE							
V Show Advanced Setti	ings		NGC40-HTC-11EE						
		Device Information							
BASIC SETTINGS	s	Device Type	NGC40HTC						
TEMPERATURES	s	CAN Network ID	11EE						
		Firmware Version	4.8.42						
OTHER ALARMS	\$	Serial Number	11EE						
ELECTRICAL		LOAD DEFAULTS							
LIMITER									
MISC									
Load Shedding									
Digital Input/Auto-Cycl	e								
Device Information									

Figure 5.10 Advance Settings | Miscellaneous | Device Information window

Purpose: Allows the user to review the Device Information of the NGC-40-HTC. The Device Type, Firmware Version and Serial Number are factory configured and cannot be changed.

Load Configuration Defaults

Purpose: Loads the default settings that are stored in the NGC-40-HTC. On hitting the button, all user input data will be erased and the device will be set to factory defaults. An alarm will be raised when Device Reset Alarm option is enabled.

5.6 CONFIGURE AN HTC3 MODULE ON ADVANCED SETTINGS

To configure an HTC3 module please follow the steps for HTC as per Section 4.4 Configuration of NGC-40 HTC3 Modules. The Buttons on the TOUCH 1500 Windows will expand as below to include additional data.

FILE	SYSTEM									
CIRCUIT LIST AI	ARM LIST	CONFIGU	RE DEVICE							
Show Advanced Settings			NGC	240-HTC3-11	32					
	Electrica	Electrical General								
BASIC SETTINGS	Heater (Configuration		3-Phase	WYE		~			
TEMPERATURES	Output l	imit Mode (SSF	7)	🔒 Disable I	Limiting		~			
	Switch 0	Current Rating		30.0	А					
OTHER ALARMS	Circuit E	Breaker Type		NEMA	NEMA					
ELECTRICAL	Ground	Fault Current Al	arms							
General/Ground Fault	Name		Alarm	Setpoi	nt	Filter				
Line Currents	High Ala	ırm	Enable	20	mA	0	S			
	Ground	Fault Trip	V Enable	30	mA					
Electrical Setup 1	GFI Curr	ent Transforme	r Failure Alarm		🖌 En	able]			
Electrical Setup 2										
Electrical Setup 3										
LIMITER										
MISC	MON	VITOR	APP	LY CA	NCEL	BACK	NEXT			

Figure 5.11 Advance Settings | Electrical | General | Ground-Fault window

5.6.1 Set up General/GF on HTC3

5.6.1.1 Electrical General

Heater Configuration

Purpose: Set the electrical heat-tracing configuration as installed in the field.

Options: Single-phase, 3-phase WYE, 3-phase DELTA

Procedure: Select the desired setting from the drop down options

Line to Line Voltage: Enter the design voltage within the limits of 80 to 750 V

Fixed frequency: Enter the value based on transformer data

Output Limit Mode

Purpose: This user selectable mode limits the maximum amount of power applied to a heating circuit. This is an average power calculated by the control module using the average current and applied voltage. The control module switches the output on and off rapidly to limit the average current to an appropriate level. The maximum power level may be adjusted to eliminate step-down transformers, lower the effective output wattage of a cable, or implement energy management of the heating circuit. Grayed out for when switch mode is EMR.

Options: Disable Limiting, Power Limiting, Current Limiting

Procedure: Select the desired setting from the drop down options

Switch Current Rating

Purpose: This feature is used to provide protection for the output switch. Enabling this alarm will only inform the user of an excessively high current condition and that the output switch has been latched off. During a high current condition, the control module attempts to soft start a heating cable using a technique involving measured in-rush current and the switch current rating. If the control module is unable to start the cable, it will eventually trip the output switch off and will not retry or pulse its output switch again.

Procedure: Adjust the Switch Current Rating setting to the actual current rating of the SSR. Note that the Overcurrent Trip Alarm does not have to be enabled in order to adjust the switch current rating setting. The current setting is grayed out when EMR is selected.

Default: Set at 30.0 A



IMPORTANT: This function may be set within reasonable limits for the particular tracer being powered. The effective resolution of the setting is limited to 1/30th of the calculated full on power. Do not set the maximum power level below the full output level for applications that do not require power limiting.

Circuit Breaker Type

Procedure: Select options from drop down list with options, NEMA, TYPE B, TYPE C, TYPE D Default: NEMA

Ground-Fault Current Alarms

The data in this section is the same that was entered in the BASIC settings at Settings for Ground Fault, Section 4.3.1.5

5.6.2 Line Current Alarms

The data in this section is the same that was entered in the BASIC settings at Settings for Phase 1 Line Current, Section 4.4.1.1.

5.6.3 Electrical Setup 1

5.6.3.1 Line 1 Circuit Breaker and Output Switch Settings

Output Limiting Alarms

Purpose: Alarms current levels which are higher than the High Line Current Alarm Setpoint. This alarm can be user selectable to be latching or non-latching. If set to non-latching, the controller will automatically clear the alarm when the condition no longer exists. If set to latching, the alarm must be cleared by the user.

Procedure: Check box to enable the alarms

Default: DISABLED

Max Line Current Alarm Setpoint

Procedure: Enter the value at which the High Current Alarm will go off.

Default: 60 A



IMPORTANT: As the HTC automatically protects itself from overload, it would normally not be necessary to enable this alarm. It can be used effectively to guard against accidental paralleling of heating circuits. In-rush, or cold start currents typically associated with self-regulating cables may cause nuisance High Current Alarms. If this is undesirable this alarm should be disabled.

FILE	STEM							
CIRCUIT LIST ALA	RM LIST CONFIGURE DE	EVICE						
Show Advanced Settings		NGC40-	HTC3-1132					
BASIC SETTINGS	Line 1 Circuit Breaker and Out	put Switch Settin	gs					
	Output Limiting Alarm		Enable					
TEMPERATURES	SAPC Current Limit Setpoint	60.0	A					
	SAPC Power Limit Setpoint	SAPC Power Limit Setpoint						
OTHER ALARMS	Circuit Breaker Limiting Alarm		Enable					
	Circuit Breaker Current Rating	30.0	А					
ELECTRICAL	Switch Limiting Alarm	Switch Limiting Alarm			Enable			
General/Ground Fault	Switch Over Current/Trip Alarr	n	🖌 Enable					
	Switch Failure Alarm		Enable					
Line Currents	Line 1 Heating Oakle Desigter							
Electrical Setup 1	Line T Heating Cable Resistant	ce Alarms						
	Name	Alarm	Setpoint		Filter			
Electrical Setup 2	High Alarm	Enable	50	%	0	S		
Electrical Setup 3	Low Alarm	Enable	50	%	0	S		
Liceshour octup o	Nominal Tracing Resistance		6.0	Ohm				

Figure 5.12 Configure Device | Electrical for HTC3 Setup 1 window

Maximum Power Setpoint: Active Only When Switch Mode Is SSR

Purpose: This user selectable level limits the maximum amount of power applied to a heat-trace circuit. This is an average power calculated by the controller using the average current and the fixed voltage setting. The HTC switches the output on and off rapidly to limit the average current to an appropriate level. The maximum power level may be adjusted to eliminate step-down transformers, lower the effective output wattage of a cable, or implement energy management of the heat trace circuit.

Range: 3 to 42000 Watts



NOTE 1: This function may be set within reasonable limits for the particular tracer being powered. The effective resolution of the setting is limited to 1/30th of the calculated full on power.



Circuit Breaker Limiting Alarm

Purpose: This alarm will only inform the user that switch limiting is currently active and an excessively high current condition is present. The HTC3 will pulse its output switch for a small interval and read the resulting current. If the measured current exceeds the Switch Current Rating setting, then the duty-cycle of its output switch will be varied so that an average current not exceeding the Switch Current Rating setting is maintained.



IMPORTANT: This alarm should normally be left enabled. Currents in this range cannot be considered normal and should be investigated. This alarm can be user selectable to be latching or non-latching. If set to non-latching, the controller will automatically clear the alarm when the condition no longer exists. If set to latching, the alarm must be cleared by the user. **Default:** DISABLE

Circuit Breaker Current Rating: Set the current to the desired value within the CB limits.

Switch Limiting Alarms: Check box to enable the alarms.

Default: DISABLED

Switch Over Current/Trip Alarm

Purpose: This feature is used to provide protection for the output switch. Enabling this alarm will only inform the user of an excessively high current condition and that the output switch has been latched off. During a high current condition, the control module attempts to soft start a heating cable using a technique involving measured in-rush current and the switch current rating. If the control module is unable to start the cable, it will eventually trip its output switch off and will not retry or pulse its output switch again.

Procedure: Check box to enable the alarms. Adjust the switch current rating setting to the actual current rating of the SSR. Enable or disable the alarm as required. Note that the Overcurrent Trip Alarm does not have to be enabled in order to adjust the switch current rating setting. The current setting is grayed out when EMR is selected.

Default: DISABLED



NOTE 1: It is highly recommended that this alarm be enabled since an overcurrent trip condition would normally represent a serious problem.



NOTE 2: This is a factory set alarm value and disabling the alarm does not disable the overcurrent trip function. In some applications the use of self-regulating cable will produce very high in-rush currents during cold startup. These currents may exceed the overcurrent trip limit and the control module will not be able to soft start the heating circuit. If this condition persists please contact your nearest nVent sales office for recommendations and solutions to this problem.

Switch Failure Alarm

Purpose: The purpose of the Switch Failure Alarm is to indicate that an output switch failure has occurred. The control module HTC/HTC3 determines that if the output switch is turned off and there is load current present, then the output switch has failed closed and the alarm is latched on.

Procedure: Check box to enable the alarms

Default: DISABLED



IMPORTANT: The SWITCH FAILURE Alarm should always be enabled. A high temperature condition, as a result of a failed heating circuit, can only be caused if the output switch fails closed. When an output switch fails closed, the control module cannot turn the power to the heating circuit off, therefore no protection features are available (ground-fault trip, power limiting, etc.). If a Switch Failure Alarm is detected, the unit should be serviced immediately.

5.6.3.2 Line 1 Heating Cable Resistance Alarms

High Alarm

Purpose: Alarms heater resistance levels which have increased from the nominal resistance setting by more than the High Tracing Resistance Deviation setting. The High Resistance Alarm may be used to indicate an open or a high resistance connection or, when using constant wattage parallel cables, may indicate the failure of one or more heating zones. It may also be used to monitor a failed series-type cable or connection in 3-phase applications while minimizing nuisance alarms created by voltage fluctuations.

Procedure: Check box to enable the alarms. When enabled, enter the Setpoint between

1 to 250%. If required set Filter in the range 1 to 12 seconds.

Default: DISABLED

IMPORTANT: High Resistance Alarms will only be generated if the output switch is on.

Low Alarm

Purpose: Alarms heater resistance levels which have decreased from the nominal resistance setting by more than the Low Tracing Resistance Deviation setting.

Procedure: Check box to enable the alarms. When enabled, enter the Setpoint between

1 to 100 %. If required set Filter in the range 1 to 12 seconds.

Default: DISABLED

Nominal Tracing Resistance

Purpose: This parameter defines the nominal expected heater resistance. A value must be entered by the user to allow the High and Low Tracing Resistance Alarms to be used. Once the controller and the heating cable have been installed, the following procedure should be used to determine the nominal resistance setting.

Procedure: Adjust the Control Setpoint temperature to turn on the output switch. Allow the load to come up to design temperature and its power consumption to stabilize. Monitor the resistance reading and record its value. Return the Control Temperature Setpoint temperature to its proper setting. Enter the recorded resistance value as the nominal resistance setting.

Range: Value between 0.8 to 2500 Ohms as per design calculations.

5.6.4 Electrical Setup 2

Line 2 Circuit Breaker and Output Switch settings

Repeat step Line 1 Circuit Breaker and Output Switch Settings, Section 5.6.3.1.

Line 2 Heating Cable Resistance Alarms

Repeat step Line 1 Heating Cable Resistance Alarm, Section 5.6.3.2.

5.6.5 Electrical Setup 3

Line 3 Circuit Breaker and Output Switch settings

Repeat step Line 1 Circuit Breaker and Output Switch Settings, Section 5.6.3.1.

Line 3 Heating Cable Resistance Alarms

Repeat step Line 1 Heating Cable Resistance Alarms, Section 5.6.3.2.

5.7 CONFIGURATION OF THE NGC-40 I/O MODULE

FILE SY	STEM		
CIRCUIT LIST ALAF	RM LIST CONFIGURE DEVICE		
		NGC40-IO	
GENERAL	General		
GENERAL	Тад	NGC40-IO	
Alarm Settings	IO Alarms and Output		ך
	Device Reset Alarm	Enable	
	Digital Input Configuration	Not Used 🗸	
	Alarm Output Mode	Normal Operation 🗸	
ALARM SOURCES	Alarm Output Toggle Time	5 Sec	
ALARM LATCHINGS			
MISC			

Figure 5.13 Configure Device | Alarm Setting window for I/O module

5.7.1 General

5.7.1.1 Alarm Settings

General

Tag: A 40-character tag may be assigned to the NGC-40-I/O Module to allow it to be easily associated with a pipe, vessel, process, circuit, drawing name, number.

Range: Alpha-numeric characters.

Default: NGC-40-I/O-xxxx (xxxx=last four characters of the CAN ID)

I/O Alarms and Output

Device Reset Alarm

Purpose: The Device Reset Alarm is used to indicate:

- 1. Power to the module has been interrupted and subsequently restored.
- 2. A transient has caused the module's program to restart.
- 3. An internal condition has caused the module's program to restart.
- Procedure: Check box to enable
- Default: DISABLED

Digital Input Configuration: From the drop down list select options None/Alarm when input is Closed/ Alarm when input is open.

Default: None

Digital Input Source: When selections other than None is made, the drop down list will enable selection of appropriate input source

Alarm Output Mode: From the drop down list select the appropriate Alarm Mode. Options are Normal Operation, Toggle & Flash. Set the Alarm Output Toggle Time.

Default: Normal Operation

5.7.2 Temperature Sensors

FILE	SYS	STEM									
CIRCUIT LIST	ALARI	M LIST	I LIST CONFIGURE DEVICE								
	[NG	C40-IO					
GENERAL	SEN	NSOR 1 SI		SENSOR 2		SENSOR 3		OR 4			
TEMPERATURE SENS	SORS	Temperature Sensor 1									
		RTD Type	RTD Type			3 wire 100 Ohm Platinum					
Temperature Sensor 1 -	- 4	RTD Lead	d Resistance	[0.0						
		RTD Tag			NGC40-IO-RI	D1-FFFFF1					
		Name			Alarm	Setpoint		Filter			
ALARM SOURCES	s	High Alar	rm		Enable	100	°C	0	S		
	35	Low Alar	m		🖊 Enable	5	°C	0	S		
		Failure A	larm		🖊 Enable						

Figure 5.14 Configure Device | Temperature Sensor 1 to 4 window for I/O module

5.7.2.1 Tab - Sensor 1

Purpose: This screen allows the user to select the appropriate RTDs and set the parameters.

RTD Type

Procedure: Use the dropdown menu to select either 3-wire 100-Ohms Platinum or 2-wire 100-Ohm nickel iron or 2-wire 100-Ohm nickel

Default: 3-wire 100-Ohms platinum

RTD Lead Resistance

Purpose: Applicable only for 2-wire 100-Ohm nickel iron.Procedure: Enter the appropriate value using the popup keypadRange: 0 to 20 OhmsDefault: 0 Ohms - Grayed out

RTD Tag

Purpose: A 40-character tag may be assigned to the RTD for easy identification. **Procedure:** Click on the default tag name to bring up the keyboard for entering the new tag name. **Range:** Alpha-numeric characters. **Performance:** A 40-characters of the IO Medule CAN ID.

Default: NGC-40-IO-RTD1-(last 4 characters of the IO Module CAN ID)

High Alarm

Procedure: Check box to enable the alarms **High Alarm Setpoint:** Using the keypad enter the setpoint between -80°C to 700°C. **Default:** 100°C - Data Entry is possible when alarm is enabled **Filter:** If required set filter in the range of 1 to 12 seconds.

Default: 0 Seconds - Grayed out when alarm is not enabled



Low Alarm

Procedure: Uncheck box to disable the alarms.

Low Alarm Setpoint: Using the keypad enter the setpoint between -80°C to 700°C.

Default: 5°C

Filter: If required set Filter in the range 1 to 12 seconds.

Default: 0 Seconds

IMPORTANT: The default Alarm Latching/Non-Latching setting for this alarm is non-latching **Failure Alarm:** Uncheck box to disable the alarms

Default: ENABLED

IMPORTANT: The default Alarm Latching/Non-Latching setting for this alarm is latching

5.7.2.2 Tab - Sensor 2, 3, 4

Follow steps against Sensor 1 above.

5.7.3 Alarm Sources

CIRCUIT LIST	ALAR	M LIST	CONFIGUR	E DEVICE					
					NGC	40-10			
GENERAL		1 - 10	11 - 20	21 - 30	31 - 40	41 - 50	51 -	60 61 - 70	71 - 80
TEMPERATURE SEN	ISORS	Alarm Sou	ırce 1 - 10						
		Source 1 F	ailure Alarm	Enabl	e CAN I	Network Dev	ice ID	0000 [None]	\sim
ALARM SOURCI	S	Source 2 F	ailure Alarm	Enabl	e CAN I	Network Dev	ice ID	0000 [None]	\sim
Alarm Source 1 - 80		Source 3 F	ailure Alarm	Enabl	e CAN I	Network Dev	ice ID	0000 [None]	\sim
		Source 4 F	ailure Alarm	Enabl	e CAN I	Network Dev	ice ID	0000 [None]	~
		Source 5 F	ailure Alarm	Enabl	e CAN I	Network Dev	ice ID	0000 [None]	\sim
ALARM LATCHIN	GS	Source 6 F	ailure Alarm	Enabl	e CAN I	Network Dev	ice ID	0000 [None]	\sim
		Source 7 F	ailure Alarm	Enabl	e CAN I	Network Dev	ice ID	0000 [None]	\sim
MISC		Source 8 F	ailure Alarm	Enabl	e CAN I	Network Dev	ice ID	0000 [None]	
		Source 9 F	ailure Alarm	Enabl	e CAN I	Network Dev	ice ID	0000 [None]	\sim
		Source 10	Failure Alarm	Enabl	e CAN I	Network Dev	ice ID	0000 [None]	~

Figure 5.15 Configure Device | Alarm Source window for I/O module

Alarm Source 1 to 80

Purpose: The NGC-40-I/O module is capable of monitoring the alarm points of all the 80 modules connected to a Bridge. Mapping the HTC modules on to the I/O module will result in reproducing the alarms on the alarm contacts of the I/O module.

Source "x" Failure Alarm: Check the boxes individually or press Auto Assign All button to map the HT modules. Clear All button will remove the mappings.

5.7.4 Alarm Latchings

FILE	SYS	STEM)						
CIRCUIT LIST	ALAR	M LIST	CONFIGU	RE DEVICE					
					NGC	40-10			
GENERAL		1 - 10	11 - 20	21 - 30	31 - 40	41 - 50	51 - 60	61 - 70	71 - 80
TEMPERATURE SEN	SORS	Alarm Source 1 - 10]
ALARM SOURCE	s	Source 1 Source 2	Failure Alarm Failure Alarm	1		Latching))		
ALARM LATCHIN	GS	Source 3	Failure Alarm	i)		Latching)		
Alarm Source 1 - 80		Source 5	Failure Alarm	1		Latching	,]		
Other Alarma		Source 6	Failure Alarm	i .		Latching	J		
Outer Alaittis		Source 7	Failure Alarm	1		Latching	J		
		Source 8	Failure Alarm	1		Latching)		
MISC		Source 9	Failure Alarm	1		Latching	3		
MISC		Source 1	0 Failure Alari	m		Latching	1		

Figure 5.16 Configure Device | Alarm Latching window for I/O module

Alarm Source 1 to 80

Purpose: Checking the box will enable the alarms to latch. **Default:** Disabled

Other Alarms

Purpose: Checking the box will enable the alarms to latch. **Default:** Alarm latching is enabled for sensor 1/2/3/4 failures.

FILE	SY	STEM			
CIRCUIT LIST	ALAR	M LIST	CONFIGURE DEVICE		
				NGC40-IO	
CENERAL		Other Ala	rms		
GENERAL		Temperat	ure Sensor 1 High Alarm		Latching
TEMPERATURE SENSORS		Temperature Sensor 1 Low Alarm			Latching
		Temperat	ure Sensor 1 Failure Alarm	🗸 Latching	
ALARM SOURC	Eð	Temperat	ure Sensor 2 High Alarm	Latching	
ALARM LATCHI	IGS	Temperature Sensor 2 Low Alarm			Latching
		Temperat	ure Sensor 2 Failure Alarm	🖌 Latching	
Alarm Source 1 - 80		Temperat	ure Sensor 3 High Alarm		Latching
Other Alarms		Temperat	ure Sensor 3 Low Alarm		Latching
			ure Sensor 3 Failure Alarm		🖌 Latching
		Temperat	ure Sensor 4 High Alarm		Latching
MISC		Temperat	ure Sensor 4 Low Alarm		Latching
	MISC		ure Sensor 4 Failure Alarm		🗸 Latching

Figure 5.17 Configure Device | Alarm Latching | Other Alarm window for I/O module

5.7.5 Miscellaneous

FILE	SY	STEM			
CIRCUIT LIST	ALAR	MLIST	CONFIGURE DEVICE		
				NGC40-10	
CENERAL		Device Inf	ormation		
GENERAL		Device Ty	pe	NGC40IO	
TEMPERATURE SEM	NSORS	CAN Network ID		FFFFF1	
		Firmware	Version	3.7.19	
ALARM SOURCE	ES	Serial Nur	mber	FFFFF1	
ALARM LATCHIN	IGS	LOA	D DEFAULTS		
MISC					
Device Information					



Purpose: Allows the user to review the Device Information current set-up in the NGC-40-I/O. The Device Type, CAN ID and Serial Number are factory configured and cannot be changed. However the Firmware Version will change whenever the same is upgraded using Hardware Manager.

Load Configuration Defaults: On hitting the button, all user input data will be erased and the device will be set to factory defaults. An alarm will occur if Device Reset Alarm option is enabled.

5.8 SAFETY LIMITER MODULE NGC-40-SLIM

The NGC-40-SLIM modules use temperature data to control an external contactor providing protection against over-temperature of heating cables. If the measured temperature exceeds the user defined trip setting then the SLIM will open its output relay. If the output is switched OFF the external contactor will isolate the heating cable from the main supply. The unit will remain tripped until it has been manually reset. Resetting the unit will only be possible after the normal operating conditions have been returned to a safe level. The NGC-40-SLIM module has three temperature sensor inputs, one form C alarm output, one normally closed relay output used to control an external contactor and a external switch input use to reset the a tripped SLIM.

FILE		SYSTEM)			
CIRCUIT	ALARM LIST		DEVICE MANAGER			
DEVICE	LIST SCAN FOR DEVI		ES			
Address		Tag	Device Type	Status		
1	NGC4	0 DEMO KIT UNIT#1	NGC40Bridge	Online		
0011EE	NGC4	0-HTC-11EE	NGC40HTC	Online		
001132	NGC4	0-HTC3-1132	NGC40HTC3	Online		
FFFFF1	NGC4	0-10	NGC40IO	Online		
EEF4F4	NGC4	0-SLIM-EEF4F4	NGC40SLIM	Online		
сог	NFIGURE	REI	MOVE	SET ONLINE	SET OFFLINE	

Figure 5.19 Device Manager window

The TOUCH 1500 program will automatically sense the presence of SLIM(s) and activate the menus. The screen above shows the presence of a Safety Limiter Module in the Device List. To configure the SLIM please click on Config.

FILE	SYS	STEM					
CIRCUIT LIST	ALAR	M LIST	CONFIGURE DEVICE				
CENERAL		General					
GENERAL		Tag	Tag			.EF4F4	
Limiter Settings		Safety Ter	mperature Limiter Trip Setpoin	,t	85	°C	
		Controller	Information				
ALARM(S)		Тад		1	NGC40-HTC-11	EE	
		Device Ty	уре		NGC40HTC		
TEMPERATURE SEN	ISORS	CAN Net	work ID	1	11EE		
		Firmware	Version		4.8.42		
MISC		Serial Nu	mber		11EE	1 I	

Figure 5.20 Configure Device | Limiter Settings window

5.8.1 General – Limiter Settings

General - Tag

Purpose: A 40-character tag may be assigned to the NGC-40-SLIM to allow it to be easily associated with a pipe, vessel, process, circuit, drawing name, number etc.

Range: Alpha-numeric characters.

Procedure: Click on the Tag Entry and an alpha numerical keyboard will drop down for data entry. **Default:** NGC-40-SLIM-(last few characters of the CAN ID)

General – Safety Temp Limiter Trip Setpoint

Purpose: The lock out temperature (setpoint) of the safety temperature limiter must be set in such a way that maximum T-class temperature cannot be exceeded. The surface temperature of the heat-tracing cables is limited to the temperature applicable in this T class -5 K for temperatures below or equal to 200°C or -10 K for temperatures greater than 200°C.

Options: Data entry via the dropdown keypad

Procedure: Enter the desired temperature and click Apply. A pop up dialogue box will appear with instructions. Press the Set Config button on the SLIM within 60 seconds to record the new entry. **Default:** Previous data

FILE	SYSTEM
CIRCUIT LIST A	LARM LIST CONFIGURE DEVICE
	NGC40-SLIM-EEF4F4
GENERAL	LIMITER SETTINGS UPDATE
Limiter Settings ALARM(S)	You have changed 1 or more settings that requires manually depressing the Set Configuration button on the Limiter module. To Continue with the update, press and hold the Set Configuration Button on the Limiter module for at least 3 seconds, or until this screen disappear.
TEMPERATURE SENSORS	Safety Temperature Limiter Trip Setpoint 100 °C
	Time remaining before this operation is stopped 58 seconds CANCEL

Figure 5.21 Limiter Settings Pop-up Dialogue box

5.8.2 Alarms – Alarm Settings

FILE	SYST	ТЕМ)						
CIRCUIT LIST	ALARM	LIST	CONFIGURE DEV	ICE					
				NGC40-SLI	M	EEF4F4			
	Alarm Output								
GENERAL		Alarm Rela	ay Sense	[Normally Closed			$\overline{}$	
ALARM(S)		Alarm Outp	put Mode		Normal Operation				~
Alarm Settings		Alarm Outp	put Toggle Time		60 S		S		
		Broadcast	Timeout		1		Min		
Alarm Latch Settings		Alarm Sett	ings						
Alarm Output		Temperatu	ire Sensor 1 Failure Al	arm	<	Enable			_
		Temperatu	ire Sensor 2 Failure Al	arm	1	Enable			
		Temperatu	ire Sensor 3 Failure Al	arm	1	Enable			
TEMPERATURE SENSOR	IS I	Limiter Res	set Alarm			Enable			
		Limiter Trip	pped Alarm	-	1	Enable			
MISC		HTC Comm	nunication Failure Ala	rm	1	Enable			

Figure 5.22 Configure Device | Alarm Settings window

5.8.2.1 Alarm Output

Alarm Output - Alarm Output Relay Sense

Purpose: To assign the output option for the Relay.Options: Drop down list Normally Closed/Normally OpenProcedure: Select the desired optionDefault: Normally Closed

Alarm Output - Alarm Output Mode

Purpose: To assign the output mode option for the Relay.. **Options:** Drop down list Normal Operation/Toggle/Flash **Default:** Normal

Alarm Output – Alarm Output Toggle Time

Procedure: Data Entry is possible only when Toggle Mode is selected in the previous operation **Options:** Enter the desired value using the keypad **Range:** 1 to 240 seconds

Alarm Output – Broadcast Timeout

Procedure: To fix the broadcast time out **Options:** Enter the desired value using the keypad **Range:** 1 to 10 minutes

5.8.2.2 Alarm Settings

Temperature Sensor 1 Failure Alarm

Purpose: Enabling the TS 1 FAILURE alarm will provide an indication of an open or shorted failure of the temperature sensor connected to the RTD1 input.
Options: ENABLE/DISABLE
Procedure: Check box to disable
Default: ENABLED

Temperature Sensor 2 & 3 Failure Alarm

Follow procedure outlined for Sensor 1 above

Limiter Reset Alarm

Purpose: The Slim Reset Alarm is used to indicate:

- 1. Power to the control module has been interrupted and subsequently restored.
- 2. A transient has caused the control module's microprocessor to restart its program.

3. An internal condition has caused the control module's microprocessor to restart its program. **Options:** ENABLE/DISABLE

Procedure: Check Box to Enable

Default: DISABLED

Alarm Settings - Limiter Tripped Alarm

Purpose: Enabling the SLIM Trip alarm will provide an indication of a trip on account of high temperature as per Figure 5.22.
 Options: ENABLE/DISABLE
 Procedure: Check Box to Disable

Default: ENABLED

HTC Communication Failure Alarm

Purpose: Enabling the Communication Failure Alarm will provide an indication of a Communication loss with the HTC/HTC3 (s) to which the SLIM is associated **Options:** ENABLE/DISABLE

Procedure: Check box to disable

Default: ENABLED

5.8.3 Alarms – Alarm Latchings

FILE	SYST	TEM					
CIRCUIT LIST A	LARM	LIST	CONFIGURE DEVICE				
				NGC40-SLIN	M-EEF4F4		
		Alarm Latch Settings					
GENERAL		Temperatu	ure Sensor 1 Failure Alarm	V	Latching		
ALARM(S)		Temperatu	ure Sensor 2 Failure Alarm		/ Latching		
		Temperatu	ure Sensor 3 Failure Alarm		Latching		
Alarm Settings	L	Limiter Tri	ipped Alarm		Latching		
Alarm Latch Settings	[H	HTC Comr	munication Failure Alarm		Latching		
Alarm Output							
TEMPERATURE SENSORS	;						

Figure 5.23 Configure Device | Alarm Latch Settings window

Temp Sensor 1 Failure

Purpose: Enabling latching option for Sensor 1 Failure Alarm will result in the alarm being displayed till the Reset button is pressed on the TOUCH 1500 Screen.

Options: ENABLE/DISABLE

Procedure: Check box to disable

Default: ENABLED

Temp Sensor 2 Failure

Refer to Procedure detailed above for Sensor 1

Temp Sensor 3 Failure

Refer to Procedure detailed above for Sensor 1
Controller Reset Alarm

Purpose: Enabling latching option for Control Reset Alarm will result in the alarm being displayed till the Reset button is pressed on the TOUCH 1500 Screen.

Options: ENABLE/DISABLE

Procedure: Check box to disable

Default: ENABLED

Safety Temperature Limiter Trip Alarm

Purpose: Disabling Latching option for Control Reset Alarm will result in the alarm disappearing when the Alarm condition is nonexistent, without the need of the Reset button being pressed on the TOUCH 1500 Screen.

Options: ENABLE/DISABLE

Procedure: Check box to enable

Default: DISABLED

HTC Communication Failure Alarm

Purpose: Disabling Latching option will result in the Alarm disappearing when the Alarm condition is nonexistent, without the need of the Reset button being pressed on the TOUCH 1500 Screen. **Options:** ENABLE/DISABLE

Procedure: Check box to enable

Default: DISABLED

5.8.4 Alarms – Alarm Output

FILE	SY	STEM				
CIRCUIT LIST	ALAF	RM LIST	CONFIGURE DEVICE			
				NGC40-SLIM-EEF4F4		
CENERAL		Contactor	Alarm			
GENERAL		Name		Alarm	Setpoint	
ALARM(S)		Contactor	r Cycle Count Alarm	🖌 Enable	100000	Cycle
Alarm Settings						
Alarm Latch Settings						
Alarm Output						
TEMPERATURE SEM	NSORS					
MISC						

Figure 5.24 Configure Device | Alarm Output window

Contactor Alarm Settings

Contactor Cycle Count Alarm

Purpose: Generates an alarm if the number of off-to-on transitions of a contactor reaches or exceeds the Contactor Count Alarm setting. This serves as a method to perform preventative maintenance on the contactor before a failure is likely to occur.

Procedure: Adjust the Contactor Alarm setting to the desired value. Note that the Contactor Alarm must be enabled in order to adjust the Contactor Alarm setting. Uncheck box to disable the alarms. When enabled, enter the setpoint between 0-999999 cycles

Default: ENABLED and set at 100000 Cycles

5.8.5 Temperature Sensors

FILE	SYSTEM	ALARM ACK
CIRCUIT LIST AL	ARM LIST CONFIGURE DEVICE	
		NGC40-SLIM-EEF4F4
	Temperature Sensor Settings	J
GENERAL	Temperature Sensor 1 Tag	NGC40-SLIM-RTD1-EEF4F4
ALARM(S)	Temperature Sensor 2 Tag	NGC40-SLIM-RTD2-EEF4F4
	Temperature Sensor 3 Tag	NGC40-SLIM-RTD3-EEF4F4
TEMPERATURE SENSORS	Temperature Usage Settings	
Temperature Sensor 1 - 3	Temperature Sensor 1 Setup	🖌 Installed
	Temperature Sensor 2 Setup	Installed
	Temperature Sensor 3 Setup	Installed
MISC		

Figure 5.25 Configure Device| Temperature Sensor 1- 3 Window

Temperature Sensors - Temperature Sensors 1 to 3

5.8.5.1 Temperature Sensor Settings - Temperature Sensor 1 Tag

Purpose: A 40 character tag may be assigned to the local RTD connected directly to the SLIM to allow it to be easily associated with a pipe, vessel, process, circuit, drawing name or number **Range:** Alpha-numeric characters.

Procedure: Click on the Tag Entry and an alpha numerical keyboard will drop down for data entry. **Default:** NGC-40-SLIM-RTD1-(last two characters of the CAN ID)

Temperature Sensor Settings - Temperature Sensor 2 Tag

Follow the same procedure defined above for Sensor 1

Temperature Sensor Settings - Temperature Sensor 3 Tag

Follow the same procedure defined above for Sensor 1

5.8.5.2 Temperature Usage Settings - Temperature Sensor 1 Setup

Temperature Sensor 1 is always enabled. This Sensor cannot be disabled.

Temperature Usage Settings - Temperature Sensor 2 Setup

Purpose: To Install the Connected RTDs into SLIM.

Options: Installed/Not Installed

Procedure: Check box to Install. After selecting / deselecting sensor click Apply. A pop up box will appear with instructions. Press the Set Config button on the SLIM within 60 seconds to record the new entry.

Default: Box unchecked

Temperature Usage Settings - Temperature Sensor 3 Setup

Purpose: To Install the Connected RTDs into SLIM.

Options: Installed / Not Installed

Procedure: Check box to Install. After selecting / deselecting sensor click Apply. A pop up box will appear with instructions. Press the Set Config button on the SLIM within 60 seconds to record the new entry.

Default: Box unchecked

5.8.6 Miscellaneous – Device Information

Purpose: Allows the user to review the Device Information current set-up in the NGC-40-SLIM. The Device Type, CAN ID and Serial Number are factory configured and cannot be changed. However the firmware version will change whenever the same is upgraded using Hardware Manager

FILE	SYS	STEM	
CIRCUIT LIST	ALAR	RM LIST CONFIGURE DEVICE	
			NGC40-SLIM-EEF4F4
CENERAL		Device Information	
GENERAL		Device Type	NGC40SLIM
ALARM(S)		CAN Network ID	EEF4F4
		Firmware	3.8.14
TEMPERATURE SEM	ISORS	Serial Number	EEF4F4
MISC		LOAD DEFAULTS	
Device Information			

Figure 5.26 Configure Device | Device Information window

Load Configuration Defaults

Purpose: Loads the default settings that are stored in the NGC-40-SLIM.

On hitting the button, all user input data will be erased and the device will be set to factory defaults. An alarm will occur if Device Reset Alarm option is enabled.

5.8.7 Assign a NGC-40-SLIM to HTC/HTC3 Module

Purpose: Allows the user to assign a NGC-40-SLIM to a HTC or HTC3 module. The assignment is performed at the HTC/HTC3 module configuration window, under Advance Settings (Safety Temperature Limiter).

IMPORTANT: A NGC-40-SLIM must be listed in the device manager in order for it to be assigned to a HTC/HTC3 module.

FILE	SYS	STEM							
CIRCUIT LIST	ALAR	M LIST	CONFIGURE DE	VICE					
Show Advanced Sett	inas			١	IGC40-HTC-1	1EE			
	e all	General							
DASIC SETTING	3	Tag			NGC40-HTC-1	1EE			
Temperatures		Heater Sta	atus		Off				
Control Modes		Control Te	emperature						
Local RTD (TS1)		Name		Alarn	n	Setpoint		Filter	
Electrical		Control Se	etpoint			15	°C	- (1) - (1)	
		High Alar	m	E	nable	200	°C	0	S
		Low Alarn	n	🖌 Ei	nable	5	°C	0	S
TEMPERATURE	•	High Limi	t Cutout Setpoint			700	°C		
	<u> </u>	Control Te	emperature Usage			Use Lowest	Tempe	rature	\sim
OTHER ALARM	s	TS Fail Mo	ode			Fail Off	_		\checkmark
		TS Fail Mo	ode Percentage			50	%		
ELECTRICAL									
LIMITER									
MISC									

Figure 5.27 Configure Device for HTC-1096 (Advance Settings window)

At the Device Manager window select the HTC/HTC3 module that requires a NGC-40-SLIM assigned.

FILE	SYS	STEM	
CIRCUIT LIST	ALAR	M LIST CONFIGURE DEVICE	
V Show Advanced Settin	igs		NGC40-HTC-11EE
		Safety Temperature Limiter Assignmen	t
BASIC SETTINGS		Safety Temperature Limiter CAN ID	EEF4F4 [NGC40-SLIM-0001]
TEMPERATURES		Safety Temperature Limiter Settings	0000 [None]
OTHER ALARMS		Тад	EEF4F4 [NGC40-SLIM-0001]
ELECTRICAL		Firmware Version Serial Number	3.8.14 EEF4F4
LIMITER		Controller CANID	11EE 🗸
Safety Temperature Lim	iter	Limiter Trip Setpoint	85 °C
		Safety Temperature Limiter Alarms	
MISC		Limiter Tripped Alarm	Enable
	10	Limiter Communication Failure Alarm	Enable
		MONITOR	APPLY CANCEL BACK NEXT
V3.0.0 Ready			4 Thursday, December 3, 2020 9:39:22 AM

Figure 5.28 Configure Device | Safety Temperature Limiter window

- · Select Safety Temperature Limiter from the menu
- Select Safety Temperature Limiter CAN ID from the drop down box
- A list of available NGC-40-SLIM will be listed.
- Select the appropriate NGC-40-SLIM
- Select Apply

5.8.8 Safety Temperature Limiter Assignment Confirmation

Once a NGC-40-SLIM has been assigned to a HTC/HTC3 module, you can go to the NGC-40-SLIM and confirm the HTC/HTC3 assignment.

FILE	SYST	ГЕМ					
CIRCUIT LIST	ALARM	LIST	CONFIGURE DEVICE				
				NGC40-SL	IM-EEF4F4		
		General					
GENERAL		Tag			NGC40-SLIM-E	EF4F4	
Limiter Settings		Safety Ter	mperature Limiter Trip Setpo	oint	85	°C	
		Controller	Information				
ALARM(S)		Tag			NGC40-HTC-1	1EE	
,		Device Ty	/pe		NGC40HTC		
TEMPERATURE SEN	ISORS	CAN Netv	work ID		11EE	1	
		Firmware	Version		4.8.42]	
MISC		Serial Nu	mber		11EE		
	L						

Figure 5.29 Configure Device for NGC-40-SLIM

6.1 ADDING AN ELEXANT 3500I TO NVENT RAYCHEM TOUCH 1500

The Elexant 3500i Electronic Thermostat is available in 5 variants, the Standard, Alarm, Communicating, Current Sensing, and Ground Fault Detecting variants. Of these five variants, the Communicating, Current Sensing, and Ground Fault Detecting variants have the ability to communicate via RS-485 terminals to a Touch 1500. The Standard and Alarm variants of the Elexant 3500i do not have the ability to communicate to a Touch 1500. Before using the nVent RAYCHEM TOUCH 1500 software to configure and maintain the Elexant 3500i system, the same must be added manually to nVent RAYCHEM TOUCH 1500. The communication ports must first be set in order for the TOUCH 1500 computer to talk to the Elexant 3500i Electronic Thermostat. If an NGC-40-BRIDGE or other device already resides on the system, please ensure that the Elexant 3500i Electronic Thermostat has a unique Modbus address which is different than the existing address of the connected BRIDGE modules or other devices.

6.1.1 Communication Ports

The TOUCH 1500 can be connected to the Elexant 3500i only via the RS-485 port.

Although the nVent RAYCHEM Elexant Connect application allows the user to change the following settings, in general, the default settings should be used. The user is allowed to change these settings in those cases where an external device is added which has already blocked the Modbus address(s) or ports.

6.1.2 Communication via RS-485 ports

The Field Port Communication must first be configured in order to connect the Elexant 3500i via RS-485. It is important to note that the RS-485 port is internally configured to COM 3 of the TOUCH Hardware. Retain the default settings.

Go to System | Communications | Field Port Window.

6.1.3 Communication Port Settings

For details on Com port settings please refer Section 4.1.2 to Section 4.4.

6.1.4 Scanning through the RS-485 port

Go to System | Device Manager

For the very first time, the Device List screen will be blank. See below:

FILE	SYSTEM							
CIRCUIT LIST	ALARM LIST	DEVICE MA	NAGER					
DEVICE LIST	SCAN FOR DEV	ICES						
SCAN FIELD P	ORT SCAN ETHERN	ET NETWORK						
FROM MODBUS ADD	RESS 1 SS 247	SCAN						
			Ready to s	can network.				
Address	Tag Device Type	Firmware Version	Status			Insta	lled Module List	
				CAN Network ID	Туре	Alarm(s)	Info	

Figure 6.1 Scan for Device | Scan Field Port window

Modbus Address

Press Scan for Device tab. A window opens up giving a range of the Elexant 3500i Modbus address to scan.

Purpose: The Modbus Address defines the communications address to be used by the Elexant 3500i Electronic Thermostat when using the Modbus protocol to communicate with a Modbus compatible device **Range:** 1 to 247

Procedure: Click on the 'From Modbus address' to bring up on-screen keypad and change the address to the lowest Modbus address on the Elexant 3500i network. Select 'To Modbus Address" and enter the highest address +1 on the Elexant 3500i network. This is done to shorten the scan time.

Default: From address = 1, to address = 247

Start Scan

Press the Start Scan button.

The TOUCH 1500 program will scan the network for all Elexant 3500i Electronic Thermostat(s) having Modbus addresses in the range specified.

Click OK to accept the same.



Figure 6.2 Scan for Devices | Scan Field Port window after scan

6.1.5 Configuration of System Preferences

For setting System Preferences please refer Section 4.1.7 to 4.1.10.

6.2 CONFIGURATION OF ELEXANT 3500I ELECTRONIC THERMOSTAT

This Section provides complete programming instructions for the Elexant 3500i Electronic Thermostat for single phase heaters.

6.2.1 Identifying and Selecting the Elexant 3500i Electronic Thermostat

Go to System | Device Manager

Click on the desired Elexant 3500i Electronic Thermostat to bring up the option buttons. Click on the Config button.

FILE	SYS	STEM	MANAGER	
DEVICE I	LIST SCAN FO	OR DEVICES		
Address	Tag	Device Type	Status	
17	Elexant 3500i-G	ELEXANT3500i	Online	
V3.3.0	Ready			4 Tuesday, June 11, 2024 9:43:23 A

Figure 6.3 System | Device Manager window

6.2.2 Basic Settings

The Basic Setting tabs allow the user to review and change only those inputs which are necessary to set up the controller

Show Advanced Settinge		Elexant 35	00i-GF			
Johow Advanced Settings	General					
BASIC SETTINGS	Tag	Elexant 3	500i-GF			
emperatures	Heater Status	On				
Control Modes	Control Temperature					
Local RTD 1	Name	Alarm	Setpoint		Filter	
ocal BTD 2	Control Setpoint		150	°C		
Journo L	High Alarm	Enable	153	°C	5	S
Electrical	Low Alarm	🖌 Enable	5	°C	5	S
	High Limit Cutout Setpoi	nt	153	°C		
	Control Temperature Usa	ige	Use Low	est Tempe	rature	N
	TS Fail Mode		Fail Off			~

Figure 6.4 Configure Device | Temperature window

6.2.2.1 Basic Settings - Temperature

For Basic Temperature Settings on Elexant 3500i Electronic Thermostats please refer to Section 4.3.1.

6.2.2.2 Control Modes

Allows to user to select various Control Modes

For Control Mode Settings of Elexant 3500i Electronic Thermostats please refer Section 4.3.1.2 (Omit Settings against "Output Switch Type")

CIRCUIT LIST AL/	ARM LIST CONFIGURE DEVICE			
Show Advanced Settings		Elexant 3500i-GF		
	Control Modes			
BASIC SETTINGS	Switch Control Mode	On/Off		
emperatures	Dead Band	3	°C	
ocal RTD 1 ocal RTD 2 lectrical				
ocal RTD 1 ocal RTD 2 lectrical OTHER ALARMS	_			
ocal RTD 1 ocal RTD 2 lectrical OTHER ALARMS ELECTRICAL				
ocal RTD 1 ocal RTD 2 lectrical OTHER ALARMS ELECTRICAL LIMITER				

Figure 6.5 Configure Device | Control mode window

6.2.2.3 Set Local RTD 1 & RTD 2

Allows to user to select RTDs and assign functions. Please note that editing local RTD2 is only possible if an RTD is wired directly on the controller

Charles Adverse and Cathing and		Elexa	nt 3500i-GF			
Show Advanced Settings	Local RTD 1					
BASIC SETTINGS	RTD Type	3 wire 100 0	hm Platinum			1
Temperatures	RTD Tag	Elexant 3500	i-TS1-FFFF			
Control Modes	Usage	Control Only				
control modes	Name	Alarm	Setpoint		Filter	
Local RTD 1	High Alarm	Enable	150	°C	5	S
Local RTD 2	Low Alarm	Enable	5	°C	5	S
OTHER ALARMS ELECTRICAL						
OTHER ALARMS ELECTRICAL LIMITER						

Figure 6.6 Configure Device | Local RTD 1 window

For settings on Local RTD 1 & 2 of Elexant 3500i Electronic Thermostats please refer Section 4.3.1.4.

6.2.2.4 Set Electrical Parameters

For Electrical settings of Elexant 3500i Electronic Thermostats please refer Section 4.3.1.5, 4.3.1.6, & 4.3.1.7.

6.2.3 Advanced Settings

When the Show Advance Settings box is checked, additional tabs are enabled.

6.2.3.1 Other Alarms

	and the second s				
Show Advanced Settings		Elexant 3500i-	GF		
	Failure and Trip Alarms				
BASIC SETTINGS	Device Reset Alarm		Enable		
OTHER ALARMS	High Limit Cutout Alarm		Enable		
	Temperature Sensor 1 Failure Alarm		Enable		
Other Alarms	Temperature Sensor 2 Failure Alarm		Enable		
Alarm Output	Contactor and Heater Time Alarm				
Alarm Latch Settings	Name	Al	arm	Setpoint	
	Contactor Cycle Count Alarm	1	Enable	250000	Cycle
	Heater Time Alarm		Enable	100000	Hour(s)
ELECTRICAL					
LIMITER					
MISC					

Figure 6.7 Configure Device | Other Alarm window

Failure and Trip Alarms

Purpose: To set advanced Alarm options.

Devise Reset Alarm

Purpose: The Device Reset Alarm is used to indicate:

- 1. Power to the Module has been interrupted and subsequently restored.
- 2. A transient has caused the Module's program to restart.
- 3. An internal condition has caused the Module's program to restart.
- **Procedure:** Check box to enable.

Default: DISABLED

Load Shed Source Failure Alarm

Purpose: To indicate failure of Load Shed Sources

Procedure: Uncheck box to disable the alarms.

Default: ENABLED

IMPORTANT: The default Alarm Latching/Non-Latching setting for this alarm is LATCHING.

Ground Fault Current Transformer Failure Alarm

Option unavailable.

Default: ENABLED

Switch Failure Alarm

Purpose: The purpose of the Switch Failure Alarm is to indicate that an output switch failure has occurred. The control module HTC/HTC3 determines that if the output switch is turned off and there is load current present, then the output switch has failed closed and the alarm is latched on.

Procedure: Uncheck Box to Disable the Alarms.

Default: Enabled



IMPORTANT: The Switch Failure alarm should always be enabled. A high temperature condition, as a result of a failed heating circuit, can only be caused if the output switch fails closed. When an output switch fails closed, the control module cannot turn the power to the heating circuit off, therefore no protection features are available (ground fault trip, power limiting, etc)



High Limit Cutout Alarm

Purpose: To control the Alarm status in the event of a High Current Cut Out **Procedure:** Uncheck box to disable the alarms

Default: ENABLED



IMPORTANT: The default Alarm Latching/Non-Latching setting for this alarm is latching.

6.2.4 Contactor and Heater Time Alarms

Contactor Cycle Count Alarm

Purpose: Generates an alarm if the number of off-to-on transitions of a contactor reaches or exceeds the Contactor Count Alarm setting. This serves as a method to perform preventative maintenance on the contactor before a failure is likely to occur.

Procedure: Adjust the Contactor Alarm setting to the desired value. Note that the Contactor Cycle Count Alarm must be enabled in order to adjust the Contactor Alarm setting. Uncheck box to disable the Alarms. When enabled, enter the setpoint between 0-999999 cycles

Default: ENABLED and set at 100000 cycles

Heater Time Alarm

Purpose: Generates an alarm if the Heater ON time reaches or exceeds the count setting. This serves as a method to perform preventative maintenance on the Heaters before a failure is likely to occur.

Procedure: Adjust the Contactor Alarm setting to the desired value. Note that the Heater Time Alarm must be enabled in order to adjust the Heater Time Alarm setting. Uncheck box to disable the alarms. When enabled, enter the setpoint between 0-999999 cycles

Default: ENABLED and set at 100000 Hrs

Alarm Output Mode

Purpose: To assign the output mode option for the Relay.

Options: Drop down list Normal Operation/Toggle/Flash

Default: Normal

Alarm Output – Alarm Output Toggle Time

Procedure: Data Entry is possible only when Toggle Mode is selected in the previous operation

Options: Enter the desired value using the keypad

Range: 1 to 240 seconds

Alarm Latch Settings

Purpose: This screen allows for the selection of automatic clearing (non-latching) of alarms when an alarm condition no longer exists or permanent alarming (latching) of such a condition until the alarm is manually reset.

The second se	EIMTAIL	35001-GE
Show Advanced Settings	Lievair	3000-01
BASIC SETTINGS	TEMPERATURE ALARMS ELECTRICAL ALA	ARMS
and the second second second second	Control Temperature Failure Alarm	Latching
OTHER ALARMS	Control Temperature High Alarm	Latching
Other Alexana	Control Temperature Low Alarm	Latching
Juner Alarms	Temperature Sensor 1 Failure Alarm	Latching
Alarm Output	Temperature Sensor 1 High Alarm	Latching
Norm Latab Cattings	Temperature Sensor 1 Low Alarm	Latching
Alarm Laten Settings	Temperature Sensor 2 Failure Alarm	Latching
	Temperature Sensor 2 High Alarm	Latching
	Temperature Sensor 2 Low Alarm	Latching
ELECTRICAL		
LIMITER		
MISC		
	J	

Figure 6.8 Configure Device | Alarm Latch Settings window

IMPORTANT: If the application is subject to periodic situations where cold or hot product is part of the process, it may be appropriate to configure the Elexant 3500i for non-latching temperature alarms to avoid nuisance alarms. If it is important to be aware of any temperature alarm conditions that may have existed in a pipe, then the control module should be configured for latching temperature alarms

Tab - Temperature Alarms

Check/Uncheck boxes to enable/disable latching. When enabled, the alarm will remain untill the Reset button is pressed on the TOUCH 1500 Screen.

Default: Latching is enabled for all temperature alarms

Show Advanced Settings BASIC SETTINGS OTHER ALARMS OTHER ALARMS Other Alarms darm Output Tem	PERATURE ALARMS ELECTRICAL ALA trol Temperature Failure Alarm trol Temperature High Alarm trol Temperature Low Alarm perature Sensor 1 Failure Alarm	RMS Latching Latching Latching Latching Latching
BASIC SETTINGS TEM Com Com Com Com Com Com Com Com Tem Tem Tem Tem Tem Tem Tem Tem Tem Te	PERATURE ALARMS ELECTRICAL ALA trol Temperature Failure Alarm trol Temperature High Alarm trol Temperature Low Alarm perature Sensor 1 Failure Alarm	IRMS Latching Latching Latching Latching Latching
OTHER ALARMS Con Other Alarms Tem Varm Output Tem	trol Temperature Failure Alarm trol Temperature High Alarm trol Temperature Low Alarm perature Sensor 1 Failure Alarm	Latching Latching Latching
OTHER ALARMS Con Con Other Alarms Alarm Output Tem Tem	trol Temperature High Alarm trol Temperature Low Alarm perature Sensor 1 Failure Alarm	Latching
Other Alarms Con Tem Alarm Output Tem	trol Temperature Low Alarm perature Sensor 1 Failure Alarm	Latching
Alarm Output Tem	perature Sensor 1 Failure Alarm	
Alarm Output Tem		Latching
Tom	perature Sensor 1 High Alarm	Latching
Alexen Latah Cattings	perature Sensor 1 Low Alarm	Latching
Tem	perature Sensor 2 Failure Alarm	Latching
Tem	perature Sensor 2 High Alarm	Latching
Tem	perature Sensor 2 Low Alarm	Latching
ELECTRICAL		
LIMITER		
MISC		

Figure 6.9 Alarm Latching Settings | Temperature Alarm window

Tab – Electrical Alarms

Default: Latching is ENABLED for all Electrical Alarms

FILE S'	/STEM	A	LARM ACK
CIRCUIT LIST ALA	RM LIST CONFIGURE DEVI		
Show Advanced Settings		Elexant 3500i-FFFF	
BASIC SETTINGS	TEMPERATURE ALARMS	LECTRICAL ALARMS	
OTHER ALARMS	Low Line Current Alarm High Ground Fault Current Alarm	Latching n ✓ Latching	
Other Alarms			
Alarm Output			
Alarm Latch Settings			
ELECTRICAL			
LIMITER			
MISC			
	MONITOR	APPLY CANCEL E	
V3.3.0 Ready		4 Tuesday, J	June 11, 2024 1:43:50 I

Figure 6.10 Alarm Latch Settings | Electrical Alarm window

6.2.4.1 Electrical

	INVI LIST CONFIGURE	EDEVICE				
how Advanced Settings		Elexar	nt 3500i-GF			
	Line Current Alarms					
BASIC SETTINGS	Name	Alarm	Setpoint		Filter	
OTHER ALARMS	Low Alarm	🖌 Enable	0.1	A	2	S
ELECTRICAL	Ground Fault Alarms					
rrents	Name	Alarm	Setpoint		Filter	
Tenta	High Alarm	Enable	30 🗸	mA	0	S
	Ground Fault Trip	🖌 Enable	30 🗸	mA		
LIMITER						
MISC	<u>_</u>					
	11					

Figure 6.12 Configure Device | Currents window

Currents

For Electrical settings of Elexant 3500i Electronic Thermostat please refer Section 5.3.

High Alarm Filter

Purpose: The Voltage High Alarm Filter will prevent alarms from being indicated until a high voltage condition has existed for the duration of the Alarm Filter time.

Procedure: Use the keypad to enter the desired time in seconds

Range: 0 to 12 Seconds

Default: 0 Second



IMPORTANT: The default alarm latching/non-latching setting for this alarm is latching



Purpose: To Alarm when the measured voltage is less than the specified value.Procedure: Check box to enable the alarms.Options: Enable/DisableDefault: Disabled

Low Alarm – Setpoint

Procedure: When alarm is enabled, enter the setpoint using the onscreen keypad **Range:** 50 to 305 V **Default:** Grayed out; when enabled, set at 90 V.

Delault. Orayed out, when enabled, set at

Low Alarm Filter

Purpose: The Voltage Low Alarm Filter will prevent alarms from being indicated until a low voltage condition has existed for the duration of the Alarm Filter time.

Procedure: Use the keypad to enter the desired time in seconds

Range: 0 to 12 Seconds

Default: 0 Second

IMPORTANT: The default alarm latching/non-latching setting for this alarm is latching

6.2.4.2 Temperature Limiter

The Communicating, Current Sensing, and Ground Fault Detecting variants of the Elexant 3500i Electronic Thermostat can be configured as a Temperature Limiter by using temperature data to TRIP the HT circuit and thereby providing protection against over-heating of heating cables. If the measured temperature exceeds the user defined trip setting then the Limiter TRIP circuit will open the output relay. The unit will remain tripped until it is been reset. Resetting the unit will only be possible after the normal operating conditions have been returned to a safe level.

This section explains configuring of the Limiter circuit equipped in the Communicating, Current Sensing, or Ground Fault Detecting Elexant 3500i.

CIRCUIT LIST AL	ARM LIST CONFIGURE DEVICE	E				
Show Advanced Settings		Elexant 3500i-FFFF				
	Temperature Limiter Information	Temperature Limiter Information				
OTHER ALARMS	Tag	Tag Elexant 3500i-FFFF				
LIMITER	Limiter Linked Device Tag					
emperature Limiter	Temperature Limiter Alarms					
	Temperature Sensor Failure Alarm	🖌 Enable	🖌 Latching			
	Temperature Limiter Cutout Temper	rature Setpoint				
MISC	Cut-Out Temperature Setpoint	1222	1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 -			
		100	*C			
		100	*C			

Figure 6.14 Configure Device | Temperature Limiter window

Temperature Limiter Information & Alarm settings are Read Only Parameters.

Temperature Limiter Trip Setpoint

Purpose: The lock out temperature (setpoint) of the safety temperature limiter must be set in such a way that maximum T-class temperature cannot be exceeded. The surface temperature of the heat-tracing cables is limited to the temperature applicable in this T class -5 K for temperatures below or equal to 200°C or -10 K for temperatures greater than 200°C.

Options: Data Entry via the dropdown keypad

CIRCUIT LIST	ALARM LIST	CONFIGURE DEVICE	
Show Advanced Setting	ls	Elexant 3500i-FFFF	
OTHER ALARMS	Tempera	ture Limiter Information	
LIMITER		Update Limiter Cutout Setpoint	Di-FFFF
Temperature Limiter		The function you are about to perform requires a validation check. Please enter the Validation number as shown below into the Verify Validation Number field. Use the OK button to continue.	ple 🖌 Latching
MISC		Validation Number 686 Verify Validation Number	°C
	мок	ITOR APPLY CANC	EL BACK NEX

6.2.4.4 Miscellaneous - Auto Cycle

Purpose: The auto-cycle function momentarily (approximately 10 seconds) applies power to the heating circuit at the selected interval. It is used to test the integrity of the heating circuit. Alarms present at the time of auto-cycle then become latched and remain active after the completion of the auto-cycle function. Auto-cycling effectively eliminates the need for preventive maintenance by automatically verifying the integrity of the heating circuit. Auto-Cycle Interval is the number of hours/minutes between successive heating circuit integrity tests depending on the Auto-Cycle Units specified

	CONFIGURE DEVIC		
Show Advanced Settings		Elexant 3500i-GF	
BARIC OFTINCE	Auto-Cycle		
BASIC SETTINGS	Auto-Cycle Enable	Enable	
OTHER ALARMS	Auto-Cycle Interval	24 Hour(s)	
ELECTRICAL			
LIMITER			
MISC			
uto-Cycle			
evice Information			

Figure 6.16 Configure Device | Auto-Cycle window

Auto Cycle Interval

Range: 0 or 24 Hours

 $\ensuremath{\text{Procedure:}}$ Using the pop up keypad enter the desired value. The function is disabled when 0 is entered

Default: 24 hours

Miscellaneous - Console Temperature Unit

Purpose: To set the temperature units

Display Units In

Options: Celsius / Fahrenheit **Procedure:** Select the temp unit from the drop down box **Default:** C

6.2.4.5 Device Information

Purpose: Allows the user to review the Device Information of Elexant 3500i which are read only parameters. Device Type, Firmware Version and Serial Number are factory configured and cannot be changed.

Load Configuration Defaults

Purpose: Loads the default settings that are stored in the Elexant 3500i Electronic Thermostat. On hitting the button, all user input data will be erased and the device will be set to factory defaults. An alarm will occur if Device Reset Alarm option is enabled.

7.1 ADDING A NGC-20/ ELEXANT 5010i TO NVENT RAYCHEM TOUCH 1500

Before using the nVent RAYCHEM TOUCH 1500 software to configure and maintain the NGC-20/ Elexant 5010i system, the same must be added manually to nVent RAYCHEM TOUCH 1500. The communication ports must first be set in order for the TOUCH 1500 computer to talk to the NGC-20/ Elexant 5010i Controller. If an NGC-40-BRIDGE already resides on the system, please ensure that the NGC-20/ Elexant 5010i Controller has a unique Modbus address which is different than the existing address of the connected BRIDGE modules.

7.1.1 Communication Ports

The TOUCH 1500 can be connected to the NGC-20/ Elexant 5010i only via the RS-485 port.

Although the NGC-20/ Elexant 5010i CMA (Handheld Programmer) allows the user to change the following settings, in general, the default settings should be used. The user is allowed to change these settings in those cases where an external device is added which has already blocked the Modbus address(s) or ports.

7.1.2 Communication via RS-485 ports

The Field Port Communication must first be configured in order to connect the NGC-20/ Elexant 5010i via RS-485. It is important to note that the RS-485 port is internally configured to COM 3 of the TOUCH Hardware. Retain the default settings.

Go to System | Communications | Field Port Window.

7.1.3 Communication Port Settings

For details on Com port settings please refer Section 4.1.2 to Section 4.4.

7.1.4 Scanning through the RS-485 port

Go to System | Device Manager

For the very first time, the Device List screen will be blank. See below:

FILE	SYSTEM							
CIRCUIT LIST	ALARM LIST	DEVICE MANAG	GER					
DEVICE LIST	SCAN FOR DEVI	CES						
SCAN FIELD PORT SCAN ETHERNET NETWORK								
FROM MODBUS ADDRES	FROM MODBUS ADDRESS 1 TO MODBUS ADDRESS 247							
	Ready to scan network.							
Address Ta	Device Type	Firmware Version	Status			Instal	led Module List	
				CAN Network ID	Type	Alarm(s)	Info	
								- H

Figure 7.1 Scan for Device | Scan Field Port window

Modbus Address

Press Scan for Device tab. A window opens up giving a range of the NGC-20/ Elexant 5010i Modbus address to scan.

Purpose: The Modbus Address defines the communications address to be used by the NGC-20/ Elexant 5010i Controller when using the Modbus protocol to communicate with a Modbus compatible device **Range:** 1 to 247

Procedure: Click on the 'From Modbus address' to bring up on-screen keypad and change the address to the lowest Modbus address on the NGC-20/ Elexant 5010i network. Select 'To Modbus Address" and enter the highest address +1 on the NGC-20/ Elexant 5010i network. This is done to shorten the scan time.

Default: From address = 1, to address = 247

Start Scan

Press the Start Scan button.

The TOUCH 1500 program will scan the network for all NGC-20/ Elexant 5010i Controller(s) having Modbus addresses in the range specified.

Click OK to accept the same.

FILE	SYSTEM				ALARM ACK
CIRCUIT LIST	ALARM LIST	DEVICE MANAGER	R		
DEVICE LIST	SCAN FOR DEVI	CES	-		
SCAN FIELD POR	SCAN ETHERNE	T NETWORK			
FROM MODBUS ADDRI	SS 1 247	CAN			
			ADD NEW DEVICES		
Address 1	ag Device Type	Firmware \		Installed Module List	
2 Elexant 5 3 Elexant 5	110i-LIM NGC20/5010i 110i NGC20/5010i	5 0.445 5 0.445	New devices are now added to the Raychem Touch System.	Alarm(s) Info	

Figure 7.2 Scan for Devices | Scan Field Port window after scan

7.1.5 Configuration of System Preferences

For setting System Preferences please refer Section 4.1.7 to 4.1.10.

7.2 CONFIGURATION OF NGC-20/ ELEXANT 5010I CONTROLLERS

This Section provides complete programming instructions for the NGC-20/ Elexant 5010i Controller for single phase heaters.

7.2.1 Identifying and Selecting the NGC-20/ Elexant 5010i Controller

Go to System | Device Manager

Click on the desired NGC-20/ Elexant 5010i Controller to bring up the option buttons. Click on the Config button.

FILE	SYSTE	EM			ALARM ACK
CIRCUIT	LIST ALARM LI	IST DEVICE MAN	IAGER		
DEVICE	LIST SCAN FOR I	DEVICES			
Address	Tag	Device Type	Status		
2	Elexant 5010i-LIM	NGC20/5010i	Online		
3	Elexant 5010i	NGC20/5010i	Online		
COM	NFIGURE	REMOVE	SET ONLINE	SET OFFLINE	

Figure 7.3 System | Device Manager window

7.2.2 Basic Settings

The Basic Setting tabs allow the user to review and change only those inputs which are necessary to set up the controller

FILE SYS	TEM				ALARM	ACK
CIRCUIT LIST ALARN	I LIST CONFIGURE DEVICE					
Show Advanced Settings		Elexant	5010i			
BACIC CETTINCS	General					
BASIC SET TINGS	Tag	Elexant 501	10i			
Temperatures	Heater Status	Off				
Control Modes	Control Temperature					
Local RTD 1	Name	Alarm	Setpoint		Filter	
Local BTD 2	Control Setpoint		-5	°C		
	High Alarm	Enable	100	°C	0	S
Electrical	Low Alarm	Enable	-20	°C	0	S
	High Limit Cutout Setpoint		200	°C		
	Low Limit Cutout Setpoint		-25	°C		
	Low Limit Cutout Deadband		3	°C		
	Control Temperature Usage		Use Lowest	Temperatu	re	×
	TS Fail Mode		Fail Off			×
	TS Fail Mode Percentage		50	%		

Figure 7.4 Configure Device | Temperature window

7.2.2.1 Basic Settings - Temperature

For Basic Temperature Settings on NGC-20/ Elexant 5010i Controllers please refer to Section 4.3.1.

7.2.2.2 Control Modes

Allows to user to select various Control Modes

For Control Mode Settings of NGC-20/ Elexant 5010i Controllers please refer Section 4.3.1.2 (Omit Settings against "Output Switch Type")

FILE	SYSTEM			ALARM	I ACK
CIRCUIT LIST	ALARM LIST	CONFIGURE DEVICE			
Show Advanced Sett	ings		Elexant 5010i		
		Control Modes			
BASIC SET	INGS	Switch Control Mode	On/Off	On/Off	
Temperatures		Dead Band	3	°C	
Control Modes		Proportional Band	1	°C	
		PASC Min Ambient Temperature	-40	°C	
Local RTD 1		PASC Min Pipe Size	0.5" (13 mm)		
Local RTD 2		PASC Power Adjust	100	%	
Electrical					

Figure 7.5 Configure Device | Control mode window

7.2.2.3 Set Local RTD 1 & RTD 2

Allows to user to select RTDs and assign functions. Please note that editing local RTD2 is only possible if an RTD is wired directly on the controller

SYSTEM					ALAR	M ACK
ALARM LIST	CONFIGURE DEVICE					
gs [Ele	xant 5010i			
100	Local RTD 1					
NGS	RTD Type	3 wire 100 Ohm	Platinum			~
	RTD Lead Resistance		Ohm			
	RTD Tag	Elexant 5010i-TS	1-FFFF			
	Usage	Control Only				
	Name	Alarm	Setpoint		Filter	
	High Alarm	🖌 Enable	100	*C	0	S
	Low Alarm	🖌 Enable	-20	*C		S
	SYSTEM ALARM LIST 99 NGS	SYSTEM ALARM LIST CONFIGURE DEVICE g9 NOS Local RTD 1 RTD Type RTD Lead Resistance RTD Tag Usage Name High Alarm Low Alarm	SYSTEM ALARM LIST CONFIGURE DEVICE g9 NOS Cocal RTD 1 RTD Type RTD Lead Resistance RTD Tag Usage Control Only Name Alarm High Alarm High Alarm Low Alarm Enable	SYSTEM ALARM LIST CONFIGURE DEVICE g9 NOS Local RTD 1 RTD Type 3 wire 100 Ohm Platinum RTD Tag Usage Control Only Name Alarm Setpoint High Alarm Low Alarm Enable 100 Low Alarm Enable 200	SYSTEM ALARM LIST CONFIGURE DEVICE g9 NOS Icoal RTD 1 RTD Type Structure	ALAR ALAR ALAR CONFIGURE DEVICE ge Elexant 5010i ge Control Ohm Platinum RTD Type 3 wire 100 Ohm Platinum RTD Tag Development Usage Control Ohm Name Alarm Wame Alarm We Enable 100 *C O *C O *C



For settings on Local RTD 1 & 2 of NGC-20/ Elexant 5010i Controllers please refer Section 4.3.1.4.

7.2.2.4 Set Electrical Parameters

For Electrical settings of NGC-20/ Elexant 5010i Controllers please refer Section 4.3.1.5, 4.3.1.6, & 4.3.1.7.

7.2.3 Advanced Settings

When the Show Advance Settings box is checked, additional tabs are enabled.

7.2.3.1 Other Alarms

FILE SYSTEM			ALARM ACK
CIRCUIT LIST ALARM LIST	CONFIGURE DEVICE		
Show Advanced Settings		Elexant 5010i	
	Failure and Trip Alarms		
BASIC SETTINGS	Device Reset Alarm	Enable	
OTHER ALARMS	Load Shed Source Failure Alarm	🖌 Enable	
	GFI Current Transformer Failure Alarm	🖌 Enable	
Other Alarms	Switch Failure Alarm	🖌 Enable	
Alarm Output	High Limit Cutout Alarm	Enable	
raamioaapat	Low Limit Cutout Alarm	Enable	
Alarm Latch Settings	Contactor and Heater Time Alarm		
	Name	Alarm	Setpoint
ELECTRICAL	Contactor Cycle Count Alarm	🗸 Enable	2000000 Cycle
	Heater Time Alarm	🖌 Enable	100000 Hour(s)
MISC			
,			

Figure 7.7 Configure Device | Other Alarm window

Failure and Trip Alarms

Purpose: To set advanced Alarm options.

Devise Reset Alarm

Purpose: The Device Reset Alarm is used to indicate:

- 1. Power to the Module has been interrupted and subsequently restored.
- 2. A transient has caused the Module's program to restart.
- 3. An internal condition has caused the Module's program to restart.

Procedure: Check box to enable.

Default: DISABLED

Load Shed Source Failure Alarm

Purpose: To indicate failure of Load Shed Sources

Procedure: Uncheck box to disable the alarms.

Default: ENABLED



IMPORTANT: The default Alarm Latching/Non-Latching setting for this alarm is LATCHING.

Ground Fault Current Transformer Failure Alarm Option unavailable. Default: ENABLED

Switch Failure Alarm

Purpose: The purpose of the Switch Failure Alarm is to indicate that an output switch failure has occurred. The control module HTC/HTC3 determines that if the output switch is turned off and there is load current present, then the output switch has failed closed and the alarm is latched on.

Procedure: Uncheck Box to Disable the Alarms.

Default: Enabled



IMPORTANT: The Switch Failure alarm should always be enabled. A high temperature condition, as a result of a failed heating circuit, can only be caused if the output switch fails closed. When an output switch fails closed, the control module cannot turn the power to the heating circuit off, therefore no protection features are available (ground fault trip, power limiting, etc)

High Limit Cutout Alarm

Purpose: To control the Alarm status in the event of a High Current Cut Out **Procedure:** Uncheck box to disable the alarms

Default: ENABLED



IMPORTANT: The default Alarm Latching/Non-Latching setting for this alarm is latching.

7.2.4 Contactor and Heater Time Alarms

Contactor Cycle Count Alarm

Purpose: Generates an alarm if the number of off-to-on transitions of a contactor reaches or exceeds the Contactor Count Alarm setting. This serves as a method to perform preventative maintenance on the contactor before a failure is likely to occur.

Procedure: Adjust the Contactor Alarm setting to the desired value. Note that the Contactor Cycle Count Alarm must be enabled in order to adjust the Contactor Alarm setting. Uncheck box to disable the Alarms. When enabled, enter the setpoint between 0-999999 cycles

Default: ENABLED and set at 100000 cycles

Heater Time Alarm

Purpose: Generates an alarm if the Heater ON time reaches or exceeds the count setting. This serves as a method to perform preventative maintenance on the Heaters before a failure is likely to occur.

Procedure: Adjust the Contactor Alarm setting to the desired value. Note that the Heater Time Alarm must be enabled in order to adjust the Heater Time Alarm setting. Uncheck box to disable the alarms. When enabled, enter the setpoint between 0-999999 cycles

Default: ENABLED and set at 100000 Hrs

Alarm Output Mode

Purpose: To assign the output mode option for the Relay.

Options: Drop down list Normal Operation/Toggle/Flash

Default: Normal

Alarm Output – Alarm Output Toggle Time

Procedure: Data Entry is possible only when Toggle Mode is selected in the previous operation

Options: Enter the desired value using the keypad

Range: 1 to 240 seconds

Alarm Latch Settings

Purpose: This screen allows for the selection of automatic clearing (non-latching) of alarms when an alarm condition no longer exists or permanent alarming (latching) of such a condition until the alarm is manually reset.

FILE	SYSTEM			ALARM ACK
CIRCUIT LIST	ALARM LIST	CONFIGURE DEVICE		
Show Advanced Sett	ings		Ele	exant 5010i
BASIC SET	TINGS	TEMPERATURE ALARMS		OTHER ALARMS
		Control Temperature Failure Alarm	1	Latching
OTHER AL	ARMS	Control Temperature High Alarm		Latching
Other Alarms		Control Temperature Low Alarm		Latching
other Additio		Temperature Sensor 1 Failure Alarm	\checkmark	Latching
Alarm Output		Temperature Sensor 1 High Alarm		Latching
Alarm Latch Settings		Temperature Sensor 1 Low Alarm		Latching
Paarin Caten Octungs		Temperature Sensor 2 Failure Alarm	\checkmark	Latching
		Temperature Sensor 2 High Alarm		Latching
		Temperature Sensor 2 Low Alarm		Latching
ELECTRI	CAL			
MISC				

Figure 7.8 Configure Device | Alarm Latch Settings window



IMPORTANT: If the application is subject to periodic situations where cold or hot product is part of the process, it may be appropriate to configure the NGC-20/ Elexant 5010i for non-latching temperature alarms to avoid nuisance alarms. If it is important to be aware of any temperature alarm conditions that may have existed in a pipe, then the control module should be configured for latching temperature alarms

Tab – Temperature Alarms

Check/Uncheck boxes to enable/disable latching. When enabled, the alarm will remain untill the Reset button is pressed on the TOUCH 1500 Screen.

Default: Latching is enabled for all temperature alarms

FILE	SYSTEM			ALARM ACK
CIRCUIT LIST	ALARM LIST	CONFIGURE DEVICE		
Show Advanced Sett	ings		Ele	exant 5010i
BASIC SET	TINGS	TEMPERATURE ALARMS	\$	OTHER ALARMS
OTHER AL	ARMS	Control Temperature Failure Alarm Control Temperature High Alarm	4	Latching Latching
Other Alarms		Control Temperature Low Alarm Temperature Sensor 1 Failure Alarm		Latching
Alarm Output		Temperature Sensor 1 High Alarm	Ľ	Latching
Alarm Latch Settings		Temperature Sensor 1 Low Alarm Temperature Sensor 2 Failure Alarm Temperature Sensor 2 High Alarm	4	Latching Latching Latching
ELECTRI	CAL	Temperature Sensor 2 Low Alarm		Latching
MISC				

Figure 7.9 Alarm Latching Settings | Temperature Alarm window

Tab - Electrical Alarms

Default: Latching is ENABLED for all Electrical Alarms

FILE	SYSTEM		ALARM ACK
CIRCUIT LIST	ALARM LIST	CONFIGURE DEVICE	
Show Advanced Sett	lings	E	Elexant 5010i
BASIC SET	TINGS	TEMPERATURE ALARMS ELECTRICAL ALARMS	OTHER ALARMS
OTHER AL	ARMS	High Line Current Alarm	Latching
Other Alarms		High Ground Fault Current Alarm	Latching
Alarm Output		Low Voltage Alarm	Latching
Alarm Latch Settings		High Heating Cable Resistance Alarm	Latching Latching
ELECTRI	CAL		
MISC			

Figure 7.10 Alarm Latch Settings | Electrical Alarm window

Tab – Other Alarms

Default: Latching is ENABLED for Switch Failure, Limiter Communication Failure, Limiter Temp sensor Failure & load shed Source Failures.

FILE	SYSTEM					ALARM ACK
CIRCUIT LIST	ALARM LIST	CONFIGURE DEVICE				
Show Advanced Sett	ings		E	lex	ant 5010i	
BASIC SET	TINGS	TEMPERATURE ALARMS	ELECTRICAL ALARMS	C	OTHER ALARMS	
OTHER ALA	ARMS	Switch Failure Alarm Limiter Communication Failu	ure Alarm	1	Latching Latching	
Other Alarms		Safety Temperature Limiter	Trip Alarm		Latching	
Alarm Output		Load Shed Source Failure Al	arm		Latching	
Alarm Latch Settings		High Limit Cut-Out Alarm		l	Latching	
		Low Limit Cutout Alarm		1	Latching	
ELECTRIC	CAL					

Figure 7.11 Alarm Latch Settings | Other Alarm window

7.2.4.1 Electrical

FILE	EM				ALAR	IM ACK
CIRCUIT LIST ALARM L	IST CONFIGURE DEVICE					
Show Advanced Settings		E	exant 5010i			
	Line Current Alarms					
BASIC SETTINGS	Name	Alarm	Setpoint		Filter	
OTHER ALARMS	High Alarm	Enable	30.0	A	12	S
	Low Alarm	Enable	0.1	A	12	S
ELECTRICAL	Ground Fault Alarms					
Currents/Resistance	Name	Alarm	Setpoint		Filter	
/oltage	High Alarm	🖌 Enable	20	mA	0	S
	Ground Fault Trip	🖌 Enable	30	mA		
	GFI Current Transformer Fail	lure Alarm	🖌 Enable			
MISC	Heating Cable Resistance Al	arms				
	Name	Alarm	Setpoint		Filter	
	High Alarm	Enable	50	%	0	S
	Low Alarm	Enable	50	%	0	S
	Nominal Tracing Resistance		6.0	Ohm		

Figure 7.12 Configure Device | Currents/Resistance window

Currents/Resistance

For Electrical settings of NGC-20/ Elexant 5010i Controllers please refer Section 5.3.

Electrical – Voltage

FILE SYSTEM	Λ				ALA	RM ACK
CIRCUIT LIST ALARM LIST	T CONFIGURE DEVICE					
Show Advanced Settings		Ele	exant 5010i			
	Voltage Alarms					
BASIC SETTINGS	Name	Alarm	Setpoint	Setpoint		
OTHER ALARMS	High Alarm	🖌 Enable	270	V	12	S
ELECTRICAL	Low Alarm	🖌 Enable	90	V	12	S
Currents/Resistance						
Voltage						
MISC						

Figure 7.13 Configure Device | Voltage window

Voltage Alarms

Purpose: Alarms voltage levels, which are higher/lower than a preset limit for the application

High Alarm – Alarm

Purpose: To Alarm when the measured voltage is more than the specified value.Procedure: Check box to enable the alarms.Options: Enable/DisableDefault: Disabled

High Alarm - Setpoint

Procedure: When alarm is enabled, enter the setpoint using the onscreen keypadRange: 50 to 305 VDefault: Grayed out; when enabled, set at 270 V.

High Alarm Filter

Purpose: The Voltage High Alarm Filter will prevent alarms from being indicated until a high voltage condition has existed for the duration of the Alarm Filter time.

Procedure: Use the keypad to enter the desired time in seconds

Range: 0 to 12 Seconds

Default: 0 Second

IMPORTANT: The default alarm latching/non-latching setting for this alarm is latching

Low Alarm – Alarm

Purpose: To Alarm when the measured voltage is less than the specified value. Procedure: Check box to enable the alarms. Options: Enable/Disable Default: Disabled

Low Alarm – Setpoint

Procedure: When alarm is enabled, enter the setpoint using the onscreen keypadRange: 50 to 305 VDefault: Grayed out; when enabled, set at 90 V.

Low Alarm Filter

Purpose: The Voltage Low Alarm Filter will prevent alarms from being indicated until a low voltage condition has existed for the duration of the Alarm Filter time.

Procedure: Use the keypad to enter the desired time in seconds

Range: 0 to 12 Seconds

Default: 0 Second



IMPORTANT: The default alarm latching/non-latching setting for this alarm is latching

7.2.4.2 Safety Temperature Limiter

The NGC-20/ Elexant 5010i Controllers are available in 2 models NGC-20/ Elexant 5010i-C-E comes without a Safety Temperature Limiter circuit while NGC-20/ Elexant 5010i-CL-E controllers use temperature data to TRIP the HT circuit thereby providing protection against over-heating of heating cables. If the measured temperature exceeds the user defined trip setting then the Limiter TRIP circuit will open the output relay. The unit will remain tripped until it is been manually reset. Resetting the unit will only be possible after the normal operating conditions have been returned to a safe level. The NGC-20/ Elexant 5010i-CL-E module has three temperature sensor inputs, two for regular control while the third one is for exclusive use of the Limiter Circuit.

This section explains configuring of the Limiter circuit equipped in the NGC-20/ Elexant 5010i-CL-E model. Users of NGC-20/ Elexant 5010i C-E Controllers should skip this section.

FILE	SYSTEM				ALARM ACK	¢
CIRCUIT LIST	ALARM LIST	CONFIGURE DEVICE				
Show Advanced Setti	ngs		Elexant 5	010i-LIM		
		Safety Temperature Limiter Information				
BASIC SETT	INGS	Limiter Installed		Yes	(Read Only Parameters)	
OTHER ALA	RMS	Firmware Version		1.0.426.7935		
ELECTRIC	AL	Safety Temperature Limiter Alarms				
		Communication Failure Alarm	🖌 Enat	ble		
LIMITE	R	Trip Alarm	🖌 Enat	ole		
Safety Temperature Lin	niter	Temperature Sensor Failure Alarm	🖌 Enat	ble		
Safety remperature en		Safety Temperature Limiter Trip Setpoint				
		Cut-Out Temperature Setpoint		599	°C	
MISC						

Figure 7.14 Configure Device | Safety Temperature Limiter window

Safety Temperature Limiter Information & Alarm settings are Read Only Parameters.

Safety Temperature Limiter Trip Setpoint

Purpose: The lock out temperature (setpoint) of the safety temperature limiter must be set in such a way that maximum T-class temperature cannot be exceeded. The surface temperature of the heat-tracing cables is limited to the temperature applicable in this T class -5 K for temperatures below or equal to 200°C or -10 K for temperatures greater than 200°C.

Options: Data Entry via the dropdown keypad

Procedure: Enter the desired temperature and click Apply. A pop up dialogue box will appear with instructions as below. Before this operation, please remove the Front Cover of the NGC-20/ Elexant 5010i Controller to access the Limiter SET button. Keep this button pressed for 3 seconds within 60 seconds to record the new entry.

Default: Previous data



Figure 7.15 Safety Limiter Trip Setpoint update

7.2.4.3 Miscellaneous - Load Shedding

Load Shedding settings for NGC-20/ Elexant 5010i Controllers are detailed under Section 5.4.1.

7.2.4.4 Miscellaneous – Auto Cycle

Purpose: The auto-cycle function momentarily (approximately 10 seconds) applies power to the heating circuit at the selected interval. It is used to test the integrity of the heating circuit. Alarms present at the time of auto-cycle then become latched and remain active after the completion of the auto-cycle function. Auto-cycling effectively eliminates the need for preventive maintenance by automatically verifying the integrity of the heating circuit. Auto-Cycle Interval is the number of hours/minutes between successive heating circuit integrity tests depending on the Auto-Cycle Units specified

FILE	SYSTEM						ALARM ACK	
CIRCUIT LIST	ALARM LIST	CONFIGURE DEVICE						
Show Advanced Sett	tings		Elexant 50	010i-LIM				
	71100	Auto-Cycle						
BASIC SET	TINGS	Auto-Cycle Interval	[0		Hour(s)		
OTHER AL	ARMS	Console Temperature Unit						ור
ELECTRI	CAL	Display Units In	[°C	~]			
LIMITE	R							
мізс	;							
Load Shedding								
Auto-Cycle								
Device Information								

Figure 7.16 Configure Device | Auto-Cycle window

Auto Cycle Interval

Range: 0 to 750 Hours

Procedure: Using the pop up keypad enter the desired value. The function is disabled when 0 is entered

Default: 8 hours

Miscellaneous – Console Temperature Unit

Purpose: To set the temperature units

Display Units In Options: Celsius / Fahrenheit Procedure: Select the temp unit from the drop down box Default: C

7.2.4.5 Device Information

Purpose: Allows the user to review the Device Information of NGC-20/ Elexant 5010i which are read only parameters. Device Type, Firmware Version and Serial Number are factory configured and cannot be changed.

Load Configuration Defaults

Purpose: Loads the default settings that are stored in the NGC-20/ Elexant 5010i Controller. On hitting the button, all user input data will be erased and the device will be set to factory defaults. An alarm will occur if Device Reset Alarm option is enabled.

8.1 ADDING AN ELEXANT 4010i/ 4020i TO NVENT RAYCHEM TOUCH 1500

Before using the nVent RAYCHEM TOUCH 1500 software to configure and maintain the Elexant 4010i/ 4020i system, the same must be added manually to nVent RAYCHEM TOUCH 1500. The Communication ports must first be set in order for the TOUCH 1500 computer to talk to the Elexant 4010i/ 4020i Controller. If an Elexant 4010i/ 4020i Controller already resides on the system, please ensure that the Elexant 4010i/ 4020i Controller has a unique Modbus address which is different than the existing address of the connected controllers. An Elexant 4010i/ 4020i can also be connected on the Ethernet network, in that case ensure it has a valid IP address. Please refer to the Elexant 4010i/ 4020i user's manual on Elexant 4010i/ 4020i Network Settings.

8.1.1 Communication Ports

The TOUCH 1500 can be connected to the Elexant 4010i/ 4020i via RS-485 or Ethernet port. Although the Elexant 4010i/ 4020i allows the user to change the communication settings, in general, the default settings should be used. The user is allowed to change these settings in those cases where an external device is added which has already blocked the Modbus address(s) or ports.

8.1.2 Communications via RS-485 Ports

The Field Port Communication must first be configured in order to connect the Elexant 4010i/ 4020i via RS-485. It is important to note that the RS-485 port is internally configured to COM 3 of the TOUCH Hardware. Retain the default settings. Go to System | Communications | Scan Field Port window

8.1.3 Communication Port Settings

For details on Com port settings please refer Section 4.1.2.

8.1.4 Communication via Ethernet Port

The Elexant 4010i/ 4020i can be connected to a TOUCH 1500 using an Ethernet connection. For details on Ethernet port settings please refer Section 4.1.3. For details on Scanning the Network for Devices refer Section 4.1.4 to 4.1.6.

FILE	SYSTEM		ALARM ACK
CIRCUIT LIST	ALARM LIST	DEVICE MANAGER	
DEVICE LIST	SCAN FOR DEVICE	s	
SCAN FIELD PORT	SCAN ETHERNET	NETWORK	
FROM MODBUS ADDRESS	S 1 247 START SCA	N	
		Ready to perform ne	ietwork scan.
Address Tag	Device Type Fir	mware Version	Sta Installed Module List CAN Network ID Type Alarm(s) Info

Fig 8.1 Scan for Devices | Scan Field Port window

Modbus Address

Press Scan for Device tab. A Window opens up giving a range of the Elexant 4010i/ 4020i Modbus address to scan.

Purpose: The Modbus Address defines the communication address to be used by the Elexant 4010i/ 4020i Controller when using the Modbus protocol to communicate with a Modbus compatible device

Range: 1 to 247

Procedure: Click on the 'From Modbus address' to bring up on-screen keypad and change the address to the lowest Modbus address on the Elexant 4010i/ 4020i network. Select 'To Modbus Address' and enter the highest address+1 on the Elexant 4010i/ 4020i network. This is done to shorten the scan time.

Default: From address = 1, to address = 247

Start Scan

Press the Start Scan button.

The TOUCH 1500 program will scan the network for all Elexant 4010i/ 4020i Controller(s) having Modbus addresses in the range specified.

Click OK to accept the same.



Figure 8.2 Scan for Devices | Scan Field Port window during scan

8.1.5 Scanning Through the Ethernet Port

Scanning through the Ethernet port is the same as RS-485 port. For details on Scanning Through the Ethernet Port please refer Section 4.1.6 to 4.1.7.

FIL	E S'	YSTEM						ALA	RM ACK
CIRCUIT	T LIST ALA	RM LIST	DEVICE M/	ANAGER					
DEVICE	ELIST SCAN	FOR DEVIC	ES						
SCAN FIE	SCAN FIELD PORT SCAN ETHERNET NETWORK								
FROM IP ADD	FROM IP ADDRESS 10 79 1 174 TO IP ADDRESS 10 79 1 174 TO MODBUS ADDRESS 1								
			Ready	to perform n	etwo	rk scan.			
Address	Tag	Device Type	irmware Version		Sta		Installed N	Aodule List	
1	NGC40 DEMO KIT UNI	NGC40Bridg {	j.23.4	Device alre	ady	CAN Network ID	Туре	Alarm(s)	Info
3	NGC20-3E93	NGC20	.3.12	Device alre	ady				
11	ELEXANT 3PHASE	4010i/4020i	.2.313	New device	e. –				

Fig 8.3 Scan for Devices | Scan Ethernet Network window

Additional information on connecting TOUCH 1500 via Ethernet port can be found on Appendix A ETHERNET CONNECTION TO THE BRIDGE.

8.1.6 Configuration of System Preferences

For setting System Preferences please refer Section 4.1.8 to 4.1.10.

8.2 CONFIGURATION OF ELEXANT 4010i/4020i CONTROLLERS

This Section provides complete programming instructions for the Elexant 4010i/ 4020i Controller for single and three phase heaters.

8.2.1 Identifying and Selecting the Elexant 4010i/ 4020i Controller

Go to System | Device Manager

Click on the desired Elexant 4010i/ 4020i Controller to bring up the option buttons. Click on the Configure button.

FILE	5	SYSTEM			ALARM ACK	
CIRCUIT	LIST AL	ARM LIST	DEVICE MANAGER			
DEVICE	DEVICE LIST SCAN FOR DEVICES					
Address		Tag	Device Type	Status		
001132	NGC40-HTC3-1132		NGC40HTC3	Online		
FFFFF1	NGC40-10		NGC40IO	Online		
EEF4F4	NGC40-SLIM-EEF4F4		NGC40SLIM	Online		
3	NGC20-3E93		NGC20	Online		
10	ELEXANT W/LIMITER		4010i/4020i	Online		
CON	NFIGURE	REI	MOVE	SET ONLINE	SET OFFLINE	

Figure 8.4 System | Device Manager window

8.2.2 Basic Settings

The Basic Setting tabs allow the user to review and change only those inputs which are necessary to setup the controller.

FILE	SY	STEM				ALARM ACK			
CIRCUIT LIST	ALAF	RM LIST CO	NFIGURE DEVICE						
Show Advanced Set	tings	ELEXANT W/LIMITER							
BASIC SETTIN	GS	General							
Temperatures		Tag Heater Status	Tag ELEXANT W/LIMITER Heater Status Off						
Control Modes		Control Temperature							
TS1		Name	Alarm	Set	point	Filter			
TS2		Control Setpoin	ıt	120	0°C	5			
TS3		High Alarm	Ena/	ble 123	3 °C	0	S		
Cit aviants 1		Low Alarm	🖌 Ena/	ble -10)0 °C	3 0	S		
Electricals 1		High Limit Cuto	High Limit Cutout		°C	°C			
Electricals 2		Low Limit Cutou	Low Limit Cutout		00 °C	5			
		Low Limit Cutou	Low Limit Cutout Deadband		3 °C				
		Control Tempera	ature Usage	Lov	west		$\mathbf{\vee}$		
		TS Fail Mode	Fail Mode		Off				
		TO Fail Made De	TS Fail Mode Percentage		50 %				

Figure 8.5 Configure Device | Temperatures window

8.2.2.1 Basic Settings – Temperatures

4010i/ 4020i Tag

Purpose: A 40-character tag may be assigned to the Elexant 4010i/ 4020i to allow it to be easily associated with a pipe, vessel, and process, circuit, drawing name or number.

Procedure: To enter a tag name, touch where the default tag name is shown. This will open the keyboard for entering the new tag name.

Range: Alpha-numeric characters

Default: Elexant 4010i/ 4020i-999999

Heater Status

Purpose: Indicates whether the heat tracing is powered On or Off

Procedure: N/A. this is not a programmable function. It is status only.

Range: On or Off

Default: N/A

8.2.2.2 Control Temperature

Control Setpoint

Purpose: The Control Temperature Setpoint temperature is the value at which the Heat Trace Controller maintains the circuit temperature using one of the Switch Control Modes. The Control Temperature Setpoint temperature is compared to the measured pipe or ambient temperature. A decision is then made to turn on or turn off the output to control power to the heat trace cable.

Procedure: To enter a new set point value, touch the data area to bring up the numerical keypad.

Range: -200°C to 700°C (-328°F to 1292°F)

Default: 10°C (50°F)



IMPORTANT: The 4010i/ 4020i will switch the output ON and OFF in an attempt to maintain this temperature.

High Alarm

Purpose: This alarm is used to indicate when the measured temperature goes above a defined threshold. It can be used to indicate when the pipe temperature has risen above a temperature which may have a negative effect on process efficiency or operation. When enabled, this alarm will appear when the Control Temperature exceeds the Control Temperature High Alarm Setpoint. This alarm can be user selectable to be latching or non-latching (refer to Section 8.2.3) if set to nonlatching, the controller will automatically clear the alarm when the condition no longer exists. If set to latching, the alarm must be cleared by the user.

Procedure: To enable Alarm, touch the Check box (a check mark will appear in the box when enabled.) To enter a new set point value, touch the data area to bring up the numerical keypad

Range: -200°C to 700°C (-328°F to 1292°F)

Options: ENABLE or DISABLE

Default Alarm Selection: DISABLED

Default Alarm Temperature: 100°C (212°F)



IMPORTANT: If your application is subject to periodic situations where cold or hot product is part of the process, it may be appropriate to configure the 4010i/ 4020i for non-latching temperature alarms to avoid nuisance alarms. If it is important to be aware of any temperature alarm conditions that may have existed in a pipe, then the 4010i/ 4020i should be configured for latching temperature alarms.

High Alarm Filter

Purpose: The Control Temperature High Alarm Filter will prevent Control Temperature High Alarm from being indicated until the corresponding alarm condition has existed for the duration of the Control Temperature High Alarm Filter time.

Procedure: To enter a new set point value, touch the data area to bring up the numerical keypad

Range: 0 to 59940 seconds (0 to 999 minutes)

Default: 0 second

NOTE 1: If an alarm condition appears and then disappears before the alarm filter time has expired, the filter timer is reset and the alarm condition must exist again for the entire alarm filter time before the corresponding alarm will be indicated.

NOTE 2: If the user resets an alarm while the alarm condition still exists, then the alarm will not be indicated again until the entire alarm filter time has expired.

Low Alarm

Purpose: This alarm is used to indicate when the measured temperature goes below a defined threshold. It can be used to indicate when the pipe temperature has dropped below a temperature which may have a negative effect on process efficiency or operation. When enabled, this alarm will appear when the Control Temperature decreases below the Control Temperature Low Alarm Setpoint.

Procedure: To enable Alarm, touch the Check box (a check mark will appear in the box when enabled.) To enter a new set point value, touch the data area to bring up the numerical keypad

Range: -200°C to 700°C (-328°F to 1292°F)

Options: ENABLE or DISABLE

Default Alarm Selection: ENABLE

Default Alarm Temperature: 5°C (40°F)

NOTE 1: This alarm can be user selectable to be latching or non-latching as explained under Section 5.2.3. If set to non-latching, the controller will automatically clear the alarm when the condition no longer exists. If set to Latching the alarm must be cleared by the user. The default alarm latching/non-latching setting for this alarm is latching.

NOTE 2: If your application is subject to periodic situations where cold or hot product is part of the process, it may be appropriate to configure the 4010i/ 4020i for non-latching temperature alarms to avoid nuisance alarms. If it is important to be aware of any temperature alarm conditions that may have existed in a pipe, then the 4010i/ 4020i should be configured for latching.

Low Alarm Filter

Purpose: The Control Temperature Low Alarm Filter will prevent Control Temperature Low Alarm from being indicated until the corresponding alarm condition has existed for the duration of the Control Temperature Low Alarm Filter time.

Range: 0 to 59940 seconds (0 to 999 minutes)

Procedure: To enter a new set point value, touch the data area to bring up the numerical keypad

Default: 0 second

NOTE 1: If an alarm condition appears and then disappears before the alarm filter time has expired, the filter timer is reset and the alarm condition must exist again for the entire alarm filter time before the corresponding alarm will be indicated.

NOTE 2: If the user resets an alarm while the alarm condition is still exists, then the alarm will not be indicated again until the entire alarm filter time has expired.

High Limit Cutout Setpoint

Purpose: This parameter defines the High Limit Cutout Setpoint for each of the 3 Temperature Sensors where the Temperature Sensor configuration has High Limit Cut-out enabled. This feature will override the Control Temperature Setpoint temperature and force the controller output off if any one of the 3 Temperature Sensors temperature exceeds the High Limit Cut-Out temperature setting.

Procedure: To enter a new set point value, touch the data area to bring up the numerical keypad

Range: -200°C to 700°C (-328°F to 1292°F)

Default: 700°C (1292°F)

NOTE 1: The High Limit Cutout feature overrides an auto-cycle test. A pending auto-cycle will be initiated immediately after the Temperature Source x temperature drops below the High Cutout Setpoint.

NOTE 2: If a Temperature Source Failure occurs and the High Limit Cutout feature is enabled, the switch output will latch off regardless of the Temperature Control Mode setting or the Temperature Fail Mode setting.

Low Limit Cutout Setpoint

Purpose: This parameter defines the Low Limit Cutout Setpoint for each of the 3 Temperature Sensors where the Temperature Sensor configuration has Low Limit Cut-out enabled. This feature will override the Control Temperature Setpoint temperature and force the controller output off if any one of the 3 Temperature Sensors temperature exceeds the Low Limit Cut-Out temperature setting.

Procedure: To enter a new set point value, touch the data area to bring up the numerical keypad **Range:** -200°C to 700°C (-328°F to 1292°F)

Default: -70°C (-94°F)

Low Limit Cutout Deadband

Purpose: This parameter defines the Deadband value used with the Low Limit Cutout Setpoint. If the Control temperature falls below the Low Limit Cutout setpoint plus the Deadband value, the output is turned off.

Procedure: To enter a new set point value, touch the data area to bring up the numerical keypad

Range: 1°C to 50°C (2°F to 90°F)

Default: 3°C (5°F)

Control Temperature Usage

Purpose: Allows the selection of one of two possible temperature control modes used by the control module. The different modes are Averaging, or minimum maintain temperature control.

Procedure: Touch the drop down selection box to select Control Temperature Usage

Options: Use Lowest Temp/Use Average Temp

Default: Use lowest temp

TS Fail mode

Purpose: Allows the selection of one of four Fail Safe modes, Fail On, Fail Off, Fixed %, Last % Touch the drop down selection box to select TS Fail modes

Options: Fail On/Fail Off/ Fixed %/ Last %

Default: Fail Off

TS Fail mode %

Purpose: Allows the Entry of Fail mode % on Fixed % mode (only)

Procedure: Touch the Entry box and enter %

Range: 0 to 99%

Default: Grayed out until enabled

8.2.2.3 Control Modes

Allows user to select various Control Modes.

FILE	STEM		ALARM ACK
CIRCUIT LIST ALA	RM LIST CONFIGURE DEVICE		
Show Advanced Settings	ELE	XANT W/LIMITER	
BASIC SETTINGS	Control Modes		
	Output Switch Type	Contactor	
Temperatures	Switch Control Mode	On/Off	×
Control Modes	Dead Band	3	°C
TC1	Proportional Band	2	°C
151	PASC Min Ambient Temperature	-40	°C
TS2	PASC Min Pipe Size	0.5" (13 mm)	×
TS3	PASC Power Adjust	100	%
	Contactor Output Under SSR	Inactive	() Active
Electricais I			2
Electricals 2			
	1		

Figure 8.6 Configure Device | Control Modes window

Output Switch Type

Purpose: Select the type of switching device connected to this 4010i/ 4020i
Procedure: Select the type from the drop down list
Options: Electro-Magnetic Relay (Contactor), Solid State Relay (SSR) or Analog SSR
Default: Contactor

Switch Control Mode

Purpose: This allows selection of the type of algorithm to be used by the 4010i/ 4020i to maintain the Control Setpoint temperature. There are five different control algorithms available. For detail explanation of the different Switch Control Modes, please refer to Appendix B SWITCH CONTROL MODES.

Procedure: Select the type from the drop down list

Options: On/Off, PASC, Always On, Always Off, Proportional (SSR Switch Type only)

Default: On/Off Contactor

Dead Band-Available only when On/Off Control Mode is selected

Purpose: The controller monitors the temperature of the heating circuit and compares it to the Control Temperature. If the control temperature is above the Control Temperature Setpoint by more than the deadband value, the output is turned off. If the control temperature falls below the Control Temperature Setpoint, the output is turned on.

Procedure: Click on the box to enter date using the numerical keypad

Range: 1 to 50°C (2 to 90°F)

Default: 3°C (5°F)



IMPORTANT: Adjust the DEADBAND setting to the desired level above the Control Setpoint temperature. When the control temperature is above the setpoint + deadband value, the controller will turn off the output to the tracer. If the control temperature drops down below the setpoint, the output will be turned back on. Note that the smaller the deadband setting, the more often the contactor will cycle on and off, decreasing its operational life.

Proportional Band - Available only when Proportional Control Mode is selected

Purpose: The controller monitors the temperature of the heating circuit and compares it to the Control Temperature Setpoint. If the Control Temperature is at or below the Control Temperature Setpoint the power is applied to the trace with a duty cycle of 100% minus the controller output is full on. If the Control Temperature is equal to or greater than the Control Setpoint temperature plus the Proportional Band setting, then the controller output will have a duty cycle of 0%, the output will be off. The temperature of the control sensor is constantly monitored and the output duty cycle is adjusted proportionally according to where the temperature falls within the 0% to 100% band.

Proportional Control Temperature Band Table

Control Sensor Temperature Duty Cycle

Setpoint + proportional band 0%

Setpoint + proportional band / 2 50%

Setpoint 100%



IMPORTANT: The Proportional Band is use with the two proportional control modes only (SSR PASC and Analog SSR Proportional).

Procedure: Click on the box to enter date using the numerical keypad

Range: 1 to 50°C (2 to 90°F)

Default: 2°C (4°F)

PASC Min. Ambient Temperature

Purpose: The PASC Min Ambient Temp is the lowest ambient temperature that was used when the heat-tracing system was designed. The entered value should agree with the value used by the design engineer to ensure that the heat tracing system was sized correctly.

Procedure: Click on the box to enter date using the numerical keypad

Range: -73°C to 51°C (-99°F to 124°F)

Default: -40°C (-40°F)

PASC Min Pipe Size

Purpose: PASC Min Pipe Size is the diameter of the smallest heat-traced pipe in the group controlled by this circuit. Small diameter pipes heat up and cool down more rapidly than larger diameter pipe, therefore, the PASC duty cycle is calculated over a shorter time base. Larger diameter pipes heat and cool less rapidly, so the on/off periods for the heater system can be stretched over a longer period. If contactors are being used to control the heater circuit, the longer time base reduces the number of contactor on/off cycles and extends the contactor life.

Procedure: Click on the box to enter date using the numerical keypad

Options: .50 in (15 mm), 1.0 in (25 mm), >=2.0 in (50 mm)

Default: 0.50 in (15 mm)

PASC Power Adjust

Purpose: This allows the PASC control to be adjusted when the heating cable output is greater than the design assumption, or if the pipe insulation proves to be more efficient than assumed. Pipe temperature may run higher or lower than desired if the heating cable has a different output than required to offset the heat loss. The Power Adjust parameter enables a reduction or an increase in the heat-tracing effective power by entering a value less or greater than 100%



IMPORTANT: If improperly used, the Power Adjust parameter can cause the piping to get too cold or too hot. If unsure, leave at 100%. Do not change this value unless an engineer calculates the temperature impact on the system and determines that it is safe to do so. Be particularly cautious if the circuit has more than one diameter of pipe or type of heat tracing. Contact a nVent representative for assistance with this factor.

Procedure: Touch the box to enter date using the numerical keypad

Range: 10 to 200%

Default: 100%

Contactor Output Under SSR

Purpose: This setting affects the behavior of the Contactor output whether it is active or not active when the Output Switch Type is SSR.

Options: Inactive or Active

Default: Inactive

8.2.2.4 Set TS1, TS2 & TS3

This section discusses setting up a TS that is hard-wired into a Elexant 4010i/ 4020i Controller. If no TS is connected directly to the Elexant 4010i/ 4020i Controller, then you can skip this section.

FILE	YSTEM				ALARM ACK			
CIRCUIT LIST ALARM LIST CONFIGURE DEVICE								
Show Advanced Settings		ELEXANT W/LIMITER						
BASIC SETTINGS	TS1							
	Туре	3 wire 100 Ohr	m Platinum			\checkmark		
Temperatures	Lead Resistance	0.00	Ohm					
Control Modes	4mA	-17	°C					
TOL	20mA	25	°C					
ISI	Тад	Elexant 4010i/	Elexant 4010i/4020i-TS1-000032					
TS2	Usage	Control Se	Control Sensor Omotor Only		nitor Only			
TS3		High Limit (High Limit Cutout		/ Limit Cutout			
Electricals 1	Name	Alarm	Setpoint		Filter			
Electricals 2	High Alarm	Enable	100	°C	0	S		
Licothono 2	Low Alarm	Enable	5	°C	0	S		

Figure 8.7 Configure Device | TS1 window

ТЅ Туре

Purpose: This allows selection of the type of RTD used

Procedure: Select the type from the drop down list

Options: 3-wire 100-Ohms Platinum, 2 or 3-wire 100-Ohms Nickel Iron, 2 or 3-wire 100-Ohms Nickel, 4-20 mA Loop or Not Used.

Default: 3-wire 100-Phms Platinum

TS Lead Resistance

Purpose: This allows the lead wire resistance to be set when using 2 or 3 wire 100-Ohms Nickel Iron. The lead resistance must be entered to ensure accurate temperature measurement.

Procedure: Touch the data area and enter the resistance value using the keypad.

Range: 0 to 20 Ohms

Default: 0 Ohms

Change TS Tag

Purpose: This allows the RTD name to be set to the preferred text

Procedure: To enter a tag name, touch where the default tag name is shown. This will open the keyboard for entering the new tag name.

Range: Alpha-numeric characters.

Default: Elexant 4010i/ 4020i-TS1-999999 (TS1 may also be TS2 or TS3 depending on the selected TS)

TS Usage

Purpose: This allows selection of how the controller will react if an TS fails. If High Temp Cutout or Low Temp Cutout options is selected, the Controller will cut off power when the temp exceeds the limit values.

Procedure: Select the type from the drop down list

Options: Monitor Only / Control Only / Monitor with High Temp Cut out / Control with High Temp Cut out / Monitor with High and Low Temp Cut out / Control with High and Low Temp Cut out. On Selection of Monitor option, the grayed area will allow data entry.

Default: Control Only for TS1, Monitor Only for TS2 and TS3

High Alarm - TS

Purpose: This setting is exclusively for a TS when set to the Monitor Only option is selected. The high alarm will activate when the temperature exceeds the set value.

Procedure: Touch the check box to enable the alarm. When enabled, enter the setpoint by touching the white box and using the numerical keypad. If required set filter in the range in the same way.

Temperature Range: -200°C to 700°C (-328°F to 1292°F)

Filter Range: 0 to 12 seconds

Default Setting: DISABLED

Default Temperature: 100°C

Default Filter: 0 seconds

Low Alarm - TS

Purpose: This setting is exclusively for a TS when set to the Monitor Only option selected. The low alarm will activate when the temperature goes below the set value.

Procedure: Touch the check box to enable the alarm. When enabled, enter the setpoint by touching the white box and using the numerical keypad. If required set filter in the range in the same way.

Temperature Range: -200°C to 700°C (-328°F to 1292°F)

Filter Range: 0 to 12 seconds

Default Setting: DISABLED

Default Temperature: 5°C

Default Filter: 0 seconds

8.2.2.5 Set Electrical 1 Settings

This section describes the electrical setting for Trace Current(s) for the Elexant 4010i/ 4020i Controllers.

FILE SYSTEM			ALARM ACK					
CIRCUIT LIST ALARM LIST CONFIGURE DEVICE								
Show Advanced Settings	ELEXANT W/LIMITER							
BASIC SETTINGS	Current Turns Ratio							
Temperatures	Current Turns Ratio		1.00] :1				
Control Modes	Trace Current (L1)							
TS1	Name	Alarm	Setpoint	Filte	ər			
131	High Alarm	Enable	30.0	A 0	S			
TS2	Low Alarm	🖌 Enable	1.0	A 0	S			
TS3								
Electricals 1								
Electricals 2								


Trace Current

Current Turns Ratio

Purpose: The Current Turns Ratio is the setting used to match the ratio between the primary input and secondary output of the Current Transformer (CT).

Procedure: Enter the current turns ratio by touching the white box and using the numerical keypad. **Ratio Range:** 0.10 to 10.00

Default: 1.00

High Alarm

Purpose: Alarms at current levels which are higher than the High Trace Current Alarm Setpoint. This alarm can be user selectable to be latching or non-latching. If set to non-latching, the controller will automatically clear the alarm when the condition no longer exists. If set to latching, the alarm must be cleared by the user.

Procedure: Touch the check box to enable or disable this alarm.

Options: ENABLE or DISABLE

Default: DISABLE

IMPORTANT: The default alarm latching/non-latching setting for this alarm is LATCHING.



High Alarm Setpoint

Purpose: Sets the high alarm currents threshold.

Procedure: Touch the data area to display the keypad. Enter the desired value.

Range: 0.1 to 100.0 A (for turn's ratio of 1:1)

Default: 30.0 A

High Alarm Filter

Purpose: The Trace Current High Alarm Filter will prevent high Trace current alarms from being indicated until a high current condition has existed for the duration of the high current alarm filter time. This filter helps eliminate nuisance alarms while maintaining the alarm function.

Procedure: Touch the data area to display the keypad. Enter the desired value.

Range: 0 to 28 Seconds

Default: 0 Second

NOTE 1: If an alarm condition appears and then disappears before the alarm filter time has expired, the filter timer is reset and the alarm condition must exist again for the entire alarm filter time before the corresponding alarm will be indicated.

NOTE 2: If the user resets an alarm while the alarm condition is still exists, then the alarm will not be indicated again until the entire alarm filter time has expired.

Low Alarm

Purpose: Alarms at current levels which are lower than the Trace Current Low Alarm Setpoint. Monitoring for lower than expected current levels may be an effective means of continuity monitoring. This alarm can be user selectable to be latching or non-latching. If set to non-latching, the controller will automatically clear the alarm when the condition no longer exists. If set to latching, the alarm must be cleared by the user.

Procedure: Touch the check box to enable or disable this alarm.

Options: ENABLE or DISABLE

Default: ENABLE

NOTE 1: The default alarm latching/non-latching setting for this alarm is latching. To minimize nuisance low current alarms, the 4010i/ 4020i must detect a current level less than the low current alarm setpoint for a period longer than approximately 20 consecutive seconds.

NOTE 2: For series type heating cables, adjusting the low Trace current alarm to 50% of full load current will properly alarm a problem and reduce nuisance alarms due to voltage dips. Parallel heaters should be adjusted to a level as close as possible to full load current but lower than the current at worst case voltage. The low current setting as a percentage of full load current will vary depending on the facility and its power system.

NOTE 3: A low trace current alarm may also result from a switch failed open. The controller cannot detect a switch failure due to no current. A no current condition would be identified by a low line current and the latched low Trace current alarm value reported with the alarm will be 0.0 A.

NOTE 4: It may be advantageous to consider using the high tracing resistance alarm to indicate a cable fault when using certain types of heaters.

Low Alarm Setpoint

Purpose: Sets the low alarm currents threshold.

Procedure: Touch the data area to display the keypad. Enter the desired value.

Range: 0.1 to 100.0 A (for turn's ratio of 1:1)

Default: 1.0 A

Low Alarm Filter

Purpose: The Low Trace Current Alarm Filter will prevent low trace current alarms from being indicated until a low current condition has existed for the duration of the low trace current alarm filter time. This filter helps eliminate nuisance alarms while maintaining the alarm function.

Procedure: Touch the data area to display the keypad. Enter the desired value.

Range: 0 to 28 Seconds

Default: 0 Second

NOTE 1: If an alarm condition appears and then disappears before the alarm filter time has expired, the filter timer is reset and the alarm condition must exist again for the entire alarm filter time before the corresponding alarm will be indicated.

NOTE 2: If the user resets an alarm while the alarm condition is still exists, then the alarm will not be indicated again until the entire alarm filter time has expired.

Balance 3 Phase

Purpose: This setting is for Elexant 4010i/ 4020i controllers for three phase heaters. If Balanced 3 Phase is enabled, the controller will automatically update any 3 phased settings to use the settings from the 1st phase (L1). If the Balanced 3 Phase is disabled, the settings for each phase can be different.

Procedure: Touch the check box to enable or disable Balanced 3 Phase

Options: ENABLE or DISABLE

Default: ENABLE

FILE	SY	STEM				ŀ	ALARM ACK	
CIRCUIT LIST	ALAF	RM LIST	CONFIGURE	DEVICE				
Show Advanced Set	Show Advanced Settings ELEXANT 3PHASE							
BASIC SETTING	s	Current Tu	urns Ratio					
Temperatures		Current T	urns Ratio		1.00	:1		
Control Modes		Trace Cur	rent (L1)					
TS1		Name		Alarm	Setpoint		Filter	
131		High Alar	m	Enable	30.0	А	0	S
TS2		Low Aları	n	🖌 Enable	1.0	А	0	S
TS3		Trace Cur	rent (L2)					
Electricals 1		High Alar	m	Enable	30.0	Α	0	S
Electricals 2		Low Aları	n	🖌 Enable	1.0	A	0	S
		Trace Cur	rent (L3)					
		High Alar	m	Enable	30.0	Α	0	S
		Low Aları	n	🖌 Enable	1.0	Α	0	S
		Balan	ced 3 Phase					

Figure 8.9 Elexant 4010i/ 4020i controller for 3 phase heaters

8.2.2.6 Set Electrical 2 Settings

This section describes the electrical setting for Ground Fault and Trace Voltage for the Elexant 4010i/ 4020i Controllers.

FILE	YSTEM			AL	ARM ACK	
CIRCUIT LIST ALAI	RM LIST CONFIGURE	DEVICE				
Show Advanced Settings		ELEXANT 3	PHASE			
BASIC SETTINGS	Ground Fault Current					
.	Name	Alarm	Setpoint		Filter	
Temperatures	High Alarm	🖌 Enable	20	mA	0	S
Control Modes	Ground Fault Trip	🖌 Enable	30	mA		
TS1	Zero Offset		0	mA		
	Turns Ratio		1.00	:1		
TS2	Trace Voltage					
TS3	Name	Alarm	Setpoint		Filter	
Electricals 1	High Alarm	Enable	300	V	0	S
Electricals 2	Low Alarm	🖌 Enable	90	٧	0	S
Lieuticais 2	Turns Ratio		1.00	:1		
	Voltage Measurement		L-N 💙]		

Figure 8.10 Configure Device | Electricals 2 window

Ground-Fault Current

High Alarm

Purpose: Alarms at ground-fault current levels which are higher than the High GF Current Alarm Setpoint. This alarm can be used to give pre-warning on a circuit whose ground-fault current is increasing but not yet at the point where it will trip and shut down the heat-tracing circuit. It is user selectable to be latching or non-latching. If set to non-latching, the controller will automatically clear the alarm when the condition no longer exists. If set to latching, the alarm must be cleared by the user.

Procedure: Touch the check box to enable or disable this alarm.

Options: ENABLE or DISABLE

Default: ENABLE

IMPORTANT: The default alarm latching/non-latching setting for this alarm is latching.

High Alarm Setpoint

Purpose: Sets the high alarm currents threshold.

Procedure: Touch the data area to display the keypad. Enter the desired value.

Range: 10 mA to 500 mA (for turn's ratio of 1:1)

Default: 20 mA

High Alarm Filter

Purpose: The high ground-fault current alarm filter will prevent high ground-fault current alarms from being indicated until a high GF current condition has existed for the duration of the high GFI alarm filter time. This filter helps eliminate nuisance alarms while maintaining the alarm function.

Procedure: Touch the data area to display the keypad. Enter the desired value.

Range: 0 to 28 Seconds

Default: 0 Second

NOTE 1: If an alarm condition appears and then disappears before the alarm filter time has expired, the filter timer is reset and the alarm condition must exist again for the entire alarm filter time before the corresponding alarm will be indicated.

NOTE 2: If the user resets an alarm while the alarm condition is still exists, then the alarm will not be indicated again until the entire alarm filter time has expired.

Ground-Fault Trip Alarm

Purpose: This alarm is activated when the ground-fault leakage current exceeds the Ground-Fault Trip Current Setpoint. Exceeding this limit will result in the output switch being latched off.

Procedure: Touch the check box to enable or disable this alarm.

Options: ENABLE or DISABLE

Default: ENABLE

NOTE 1: National Electrical Codes may require that all legs of non-neutral based power sources be opened upon detection of a ground fault. Multi-pole switch configurations should be used on non-neutral based power systems. Check the requirements with your local Electrical Authority.

NOTE 2: When the Ground-Fault Trip alarm is disabled, ground-fault tripping is disabled as well

Ground-Fault Trip Setpoint

Purpose: Sets the Ground-Fault Trip threshold.

Procedure: Touch the data area to display the keypad. Enter the desired value.

Range: 10 to 500 mA (for turn's ratio of 1:1)

Default: 30 mA

Zero Offset

Purpose: Allow for zero offset adjustment of Ground Fault current.

Procedure: Touch the data area to display the keypad. Enter the desired value.

Range: 0 to 100 mA (for turn's ratio of 1:1)

Default: 0 mA

Ground Fault Current Turns Ratio

Purpose: The Ground Fault Current Turns Ratio is the setting used to match the ratio between the primary input and secondary output of the Current Transformer (CT).

Procedure: Enter the current turns ratio by touching the white box and using the numerical keypad.

Ratio Range: 0.10 to 10.00

Default: 1.00

Trace Voltage

High Alarm

Purpose: Alarms at trace voltage levels which are higher than the High Trace Voltage Alarm Setpoint. It is user selectable to be latching or non-latching. If set to non-latching, the controller will automatically clear the alarm when the condition no longer exists. If set to latching, the alarm must be cleared by the user.

Procedure: Touch the check box to enable or disable this alarm.

Options: ENABLE or DISABLE

Default: ENABLE



IMPORTANT: The default alarm latching/non-latching setting for this alarm is non-latching. **High Alarm Setpoint**

Purpose: Sets the high alarm voltage threshold.

Procedure: Touch the data area to display the keypad. Enter the desired value.

Range: 80 V to 300 V (for turn's ratio of 1:1)

Default: 300 V

High Alarm Filter

Purpose: The high trace voltage alarm filter will prevent high trace voltage alarms from being indicated until a high trace voltage condition has existed for the duration of the high trace voltage alarm filter time. This filter helps eliminate nuisance alarms while maintaining the alarm function.

Procedure: Touch the data area to display the keypad. Enter the desired value.

Range: 0 to 28 Seconds

Default: 0 Second

Low Alarm

Purpose: Alarms at trace voltage levels which are lower than the Low Trace Voltage Alarm Setpoint. It is user selectable to be latching or non-latching. If set to non-latching, the controller will automatically clear the alarm when the condition no longer exists. If set to latching, the alarm must be cleared by the user.

Procedure: Touch the check box to enable or disable this alarm.

Options: ENABLE or DISABLE

Default: ENABLE



IMPORTANT: The default alarm latching/non-latching setting for this alarm is non-latching.

Low Alarm Setpoint

Purpose: Sets the low alarm voltage threshold.

Procedure: Touch the data area to display the keypad. Enter the desired value.

Range: 80 V to 300 V (for turn's ratio of 1:1)

Default: 90 V

Low Alarm Filter

Purpose: The low trace voltage alarm filter will prevent low trace voltage alarms from being indicated until a low trace voltage condition has existed for the duration of the low trace voltage alarm filter time. This filter helps eliminate nuisance alarms while maintaining the alarm function.

Procedure: Touch the data area to display the keypad. Enter the desired value.

Range: 0 to 28 Seconds

Default: 0 Second

Voltage Turns Ratio

Purpose: The Voltage Turns Ratio is the setting used to match the ratio between the primary input and secondary output of the Voltage Transformer.

Procedure: Enter the current turns ratio by touching the white box and using the numerical keypad.

Ratio Range: 0.10 to 10.00

Default: 1.00

Voltage Measurement

Purpose: The Voltage Measurement is the settings used to identify the source of the voltage input.

Procedure: Touch the pull down box and select an option.

Options: Line to Neutral (L-N) or Line to Line (L-L)

Default: L-N

FILE S	YSTEM			AL	ARM ACK	
CIRCUIT LIST ALA	RM LIST CONFIGUR	E DEVICE				
Show Advanced Settings		ELEXANT 3F	PHASE			
BASIC SETTINGS	Ground Fault Current					
Temperaturas	Name	Alarm	Setpoint		Filter	
remperatures	High Alarm	🖌 Enable	20	mA	0	S
Control Modes	Ground Fault Trip	🖌 Enable	30	mA		
T\$1	Zero Offset		0	mA		
101	Turns Ratio		1.00	:1		
TS2	Trace Voltage					
TS3	Name	Alarm	Setpoint		Filter	
Electricals 1	High Alarm	Enable	300	V	0	S
Electricals 2	Low Alarm	🖌 Enable	90	V	0	S
Licothodia 2	Turns Ratio		1.00	:1		
	Voltage Measurement		L-N 💙			

Figure 8.11 Voltage Measurement for Elexant 4010i/ 4020i with 3 phase heaters

8.2.3 Advanced Settings

When the Show Advance Settings box is checked, additional tabs are enabled allowing more programming options. Touch the Show Advanced Setting box to enable the advanced settings mode and display the additional menus.

8.2.3.1 Other Alarms

FILE	SY	STEM		ALARM ACK
CIRCUIT LIST	ALAF	AM LIST CONFIGURE DEVICE		
🖌 Show Advanced Settin	igs		ELEXANT 3PHASE	
BASIC SETTINGS		Failure and Trip Alarms		
OTHER ALARMS		Device Reset Alarm Control Temperature Failure Alarm	Enable	
Other Alarms		High Limit Cutout Alarm Low Limit Cutout Alarm	Enable	
Alarm Output		TS1 Failure Alarm	🖌 Enable	
Temperature Alarm Latch	ning	TS2 Failure Alarm TS3 Failure Alarm	Enable Enable	
Electrical Alarm Latching	, 1	Contactor and Heater Time Alarm		
Electrical Alarm Latching	J 2	Name	Alarm	Setpoint
Other Alarm Latching		Contactor Cycle Count Alarm	🖌 Enable	100000 Cycle
		Heater Time Alarm	🖌 Enable	100000 Hour(s)
ELECTRICAL				

Figure 8.12 Configure Device | Other Alarms window

8.2.3.1.1 Other Alarms

8.2.3.1.1a Failure and Trip Alarms

Purpose: To set advanced Alarm options.

Devise Reset Alarm

Purpose: The Device Reset Alarm is used to indicate:

- 1. Power to the Controller has been interrupted and subsequently restored.
- 2. A transient has caused the Controller's program to restart.
- 3. An internal condition has caused the Controller's program to restart.

Procedure: Check box to enable.

Default: DISABLED

Control Temperature Failure Alarm

Purpose: To indicate failure of one of more Temperature Sensors used for control **Procedure:** Uncheck box to disable the alarms.

Default: ENABLED

Load Shed Source Failure Alarm

Purpose: To indicate failure of Load Shed Sources

Procedure: Uncheck box to disable the alarms.

Default: ENABLED

IMPORTANT: The default Alarm Latching/Non-Latching setting for this alarm is LATCHING.

Ground Fault Current Transformer Failure Alarm

Default: ENABLED

High Limit Cutout Alarm

Purpose: To control the alarm status in the event that the control temperature has exceeded the high temp cutout temperature.

Procedure: Uncheck Box to Disable the Alarms.

Default: Enabled

Low Limit Cutout Alarm

Purpose: To control the Alarm status in the event that the control temperature has exceeded the low temp cutout temperature.

Procedure: Uncheck box to disable the alarms **Default:** ENABLED

TS1 to TS3 Failure Alarm

Purpose: To indicate failure of the Temperature sensor. Procedure: Uncheck box to disable the alarms Default: ENABLED

8.2.3.1.1b Contactor and Heater Time Alarms

Contactor Cycle Count Alarm

Purpose: Generates an alarm if the number of off-to-on transitions of a contactor reaches or exceeds the Contactor Count Alarm setting. This serves as a method to perform preventative maintenance on the contactor before a failure is likely to occur.

Procedure: Adjust the Contactor Alarm setting to the desired value. Note that the Contactor Cycle Count Alarm must be enabled in order to adjust the Contactor Alarm setting. Uncheck box to disable the Alarms. When enabled, enter the setpoint between 0-999999 cycles

Default: ENABLED and set at 100000 cycles

Heater Time Alarm

Purpose: Generates an alarm if the Heater ON time reaches or exceeds the count setting. This serves as a method to perform preventative maintenance on the Heaters before a failure is likely to occur.

Procedure: Adjust the Contactor Alarm setting to the desired value. Note that the Heater Time Alarm must be enabled in order to adjust the Heater Time Alarm setting. Uncheck box to disable the alarms. When enabled, enter the setpoint between 0-250000 Hrs.

Default: ENABLED and set at 100000 Hrs

8.2.3.2 Alarm Output

FILE	SYSTEM				ALARM ACK	
CIRCUIT LIST AI	ARM LIST	CONFIGURE DEVICE				
🖌 Show Advanced Settings			ELEXANT 3PHA	SE		
BASIC SETTINGS	Alarm Out	put				
	Alarm Out	put Mode	Norma	Normal		
OTHER ALARMS	Alarm Out	put Toggle Time	1	Sec		
Other Alarms						
Alarm Output						
Temperature Alarm Latching						

Figure 8.13 Configure Device | Alarm Output window

8.2.3.2.1 Alarm Output

Purpose: To assign the output mode option for the Relay.
Options: Drop down list Normal Operation/Toggle/Flash
Default: Normal
Alarm Output - Alarm Output Toggle Time
Procedure: Data Entry is possible only when Toggle Mode is selected in the previous operation
Options: Enter the desired value using the keypad
Range: 1 to 240 seconds

8.2.3.3 Temperature Alarm Latching



MPORTANT: If the application is subject to periodic situations where cold or hot product is part of the process, it may be appropriate to configure the NGC-20/ Elexant 5010i for non-latching temperature alarms to avoid nuisance alarms. If it is important to be aware of any temperature alarm conditions that may have existed in a pipe, then the control module should be configured for latching temperature alarms.

FILE S'	YSTEM	ALARM ACK
CIRCUIT LIST ALA	RM LIST CONFIGURE DEVICE	
🖌 Show Advanced Settings		ELEXANT 3PHASE
BASIC SETTINGS	Temperature Alarm Latch Settings	
	Control Temperature Failure Alarm	🖌 Latching
OTHER ALARMS	Control Temperature High Alarm	Latching
Other Alerma	Control Temperature Low Alarm	Latching
Other Alarms	TS 1 Failure Alarm	🖌 Latching
Alarm Output	TS 2 Failure Alarm	🖌 Latching
Torrestore Alexes Laterbies	TS 3 Failure Alarm	🖌 Latching
remperature Alarm Latching	TS1 High Alarm	Latching
Electrical Alarm Latching 1	TS1 Low Alarm	Latching
	TS2 High Alarm	Latching
Electrical Alarm Latching 2	TS2 Low Alarm	Latching
Other Alarm Latching	TS3 High Alarm	Latching
	TS3 Low Alarm	Latching



8.2.3.3.1 Temperature Alarm Latch Settings

Default: Latching is ENABLED for all TS Failure alarms.

8.2.3.4 Electrical Alarm Latching 1

FILE	SY	STEM				ALARM ACK
CIRCUIT LIST	ALAF	M LIST	CONFIGURE DEVICE			
Show Advanced Sett	ings			ELEXANT 3PHA	SE	
BASIC SETTING	s	Electrical #	Alarm Latch Settings 1			
		High Trace	e Current (L1) Alarm	\checkmark	Latching	
OTHER ALARMS	S	High Trace Current (L2) Alarm		\checkmark	Latching	
Other Alerma		High Trace	e Current (L3) Alarm		Latching	
Other Alarms		Low Trace	Current (L1) Alarm		Latching	
Alarm Output		Low Trace	Current (L2) Alarm	\checkmark	Latching	
		Low Trace	Low Trace Current (L3) Alarm		Latching	
Temperature Alarm Latching		High Trace Resistance (L1) Alarm			Latching	
Electrical Alarm Latching 1		High Trace Resistance (L2) Alarm			Latching	
Electrical Alexand etable		High Trace	e Resistance (L3) Alarm		Latching	

Figure 8.15 Configure Device | Electrical Alarm Latching 1 window

8.2.3.4.1 Electrical Alarm Latch Settings 1

Default: Latching is ENABLED for all High Trace current alarms, High Trace resistance alarms, and High Ground fault current alarm. If the Balanced 3 phase setting is disabled, the alarms for L2 and L3 will be also be disabled.

8.2.3.5 Electrical Alarm Latching 2

FILE	SYS	STEM)			ALARM ACK
CIRCUIT LIST	ALAR	M LIST	CONFIGURE DEVICE			
Show Advanced Settin	ngs			ELEXANT 3PHA	SE	
BASIC SETTINGS		Electrical A	Marm Latch Settings 2			
		Output Lim	niting Alarm		Latching	
OTHER ALARMS		Circuit Brea	aker Limiting Alarm		Latching	
Other Alarms	Other Alarms		Switch Limiting Alarm		Latching	
Alarm Output						
Temperature Alarm Latc	hing					
Electrical Alarm Latching	g 1					
Electrical Alarm Latching	g 2					
Other Alarm Latching						
ELECTRICAL						
LIMITER						

Figure 8.16 Configure Device | Electrical Alarm Latching 2 window

8.2.3.5.1 Electrical Alarm Latch Settings 2

Default: Latching is NOT ENABLED for the limiting alarms.

8.2.3.6 Other Alarm Latching

FILE	SYS	STEM				ALARM ACK
CIRCUIT LIST	ALAR	M LIST	CONFIGURE DEVICE			
Show Advanced Set	tings			ELEXANT 3PHA	SE	
BASIC SETTING	s	Other Aları	m Latch Settings			
		High Limit	Cut-Out Alarm		Latching	
OTHER ALARM	s	Low Limit Cutout Alarm			Latching	
Other Alarms						
Alarm Output						
Temperature Alarm La	tching					
Electrical Alarm Latch	ing 1					
Electrical Alarm Latch	ing 2					
Other Alarm Latching						
ELECTRICAL						
LIMITER						
MISC						



8.2.3.6.1 Other Alarm Latch Settings

Default: Latching is NOT ENABLED for both High and Low Limit cutout alarms.

8.2.3.7 Electrical

8.2.3.7.1 Voltage/Ground Fault

For Ground Fault Current and Trace Voltage settings of Elexant 4010i/ 4020i please refer Section 8.2.2.6

8.2.3.7.2 Trace Current

For Trace Current settings of Elexant 4010i/ 4020i please refer Section 8.2.2.5

8.2.3.7.3 Circuit Breaker/Output Switch

FILE	SYS	STEM)			ALARM ACK	
CIRCUIT LIST	ALAR	M LIST	CONFIGURE DEVICE				
🗸 Show Advanced Settin	gs			ELEXA	NT 3PHASE		
BASIC SETTINGS		Circuit Brea	aker and Output Switch Sett	tings			
		Heater Configuration			3-Phase WYE		
OTHER ALARMS		Output Limiting Alarm			Enable		
ELECTRICAL		Output Limit Mode (SSR)			SAPC Current Li	miting	~
ELECTRICAL		SAPC Powe	er Limit Setpoint		45000	W	
Voltage/Ground Fault		SAPC Curre	ent Limit Setpoint		10.0	A	
		Max Outpu	t Limit Percentage	6	100	%	
Trace Current		Circuit Brea	aker Limiting Alarm		Enable		
Circuit Breaker/Output St	witch	Circuit Brea	aker Type		NEMA		~
Trace Resistance		Circuit Breaker Current Rating			30.0] A	
		Switch Limiting Alarm		Enable			
		Switch Cur	rent Rating		20.0] A	
LIMITER							

Figure 8.18 Configure Device | Circuit Breaker/Output Switch window

Heater Configuration

Purpose: Set the electrical heat-tracing configuration as installed in the field.

Options: Single-phase, 3-phase WYE, 3-phase DELTA

Procedure: Select the desired setting from the drop down options. Note the Single-phase option is reserved for Elexant 4010i/ 4020i for single phase heaters.

Output Limiting Alarm

Purpose: Alarms current levels which are higher than the High Trace Current Alarm Setpoint. This alarm can be user selectable to be latching or non-latching. If set to non-latching, the controller will automatically clear the alarm when the condition no longer exists. If set to latching, the alarm must be cleared by the user.

Procedure: Check box to enable the alarms

Default: DISABLED

Output Limit Mode

Purpose: This user selectable mode limits the maximum amount of power applied to a heating circuit. This is an average power calculated by the control module using the average current and applied voltage. The control module switches the output on and off rapidly to limit the average current to an appropriate level. The maximum power level may be adjusted to eliminate step-down transformers, lower the effective output wattage of a cable, or implement energy management of the heating circuit. Grayed out for when switch mode is Contactor or Analog SSR.

Options: Disable Limiting, Power Limiting, Current Limiting, %

Procedure: Select the desired setting from the drop down options

SAPC Power Limit Setpoint: Active Only When Switch Mode Is SSR

Purpose: This user selectable level limits the maximum amount of power applied to a heat-trace circuit. This is an average power calculated by the controller using the average current and the fixed voltage setting. The HTC switches the output on and off rapidly to limit the average current to an appropriate level. The maximum power level may be adjusted to eliminate step-down transformers, lower the effective output wattage of a cable, or implement energy management of the heat trace circuit.

Range: 1 to 45000 Watts (with Current Turns ratio of 1:1 and Voltage turns ratio of 1:1)

NOTE 1: This function may be set within reasonable limits for the particular tracer being powered. The effective resolution of the setting is limited to 1/30th of the calculated full on power.

NOTE 2: Do not set the SAPC power limit setpoint below full output for applications that do not require control of power.

SAPC Current Limit Setpoint: Active Only When Switch Mode is SSR

Purpose: This user selectable level limits the maximum amount of current applied to a heattrace circuit. The HTC switches the output on and off rapidly to limit the average current to an appropriate level.

Procedure: Enter the value at which the High Current Alarm will go off.

Default: 100 A (with Current Turns ratio of 1:1)



IMPORTANT: As the 4010i/ 4020i automatically protects itself from overload, it would normally not be necessary to enable this alarm. It can be used effectively to guard against accidental paralleling of heating circuits. In-rush, or cold start currents typically associated with self-regulating cables may cause nuisance High Current Alarms. If this is undesirable this alarm should be disabled.

Max Output Limit Percentage: Active Only When Switch Mode is SSR

Purpose: This user selectable level limits the maximum amount of power applied to a heat-trace circuit to a percentage of the maximum that are applied to the circuit for the current settings.

Procedure: Enter the desired value.

Default: 100 %

Circuit Breaker Limiting Alarm

Purpose: This alarm will only inform the user that switch limiting is currently active and an excessively high current condition is present. The Elexant 4010i/ 4020i will pulse its output switch for a small interval and read the resulting current. If the measured current exceeds the Switch Current Rating setting, then the duty-cycle of its output switch will be varied so that an average current not exceeding the Switch Current Rating setting is maintained.



IMPORTANT: This alarm should normally be left enabled. Currents in this range cannot be considered normal and should be investigated. This alarm can be user selectable to be latching or non-latching. If set to non-latching, the controller will automatically clear the alarm when the condition no longer exists. If set to latching, the alarm must be cleared by the user.

Default: DISABLE

Circuit Breaker Current Rating: Set the current to the desired value within the CB limits.

Switch Limiting Alarms: Check box to enable the alarms.

Default: DISABLED

Switch Current Rating

Purpose: This feature is used to provide protection for the output switch. Enabling this alarm will only inform the user of an excessively high current condition and that the output switch has been latched off. During a high current condition, the control module attempts to soft start a heating cable using a technique involving measured in-rush current and the switch current rating. If the control module is unable to start the cable, it will eventually trip the output switch off and will not retry or pulse its output switch again.

Procedure: Adjust the Switch Current Rating setting to the actual current rating of the SSR. Note that the Overcurrent Trip Alarm does not have to be enabled in order to adjust the switch current rating setting. The current setting is grayed out when SSR is selected.

Default: Set at 30.0 A



IMPORTANT: This function may be set within reasonable limits for the particular tracer being powered. The effective resolution of the setting is limited to 1/30th of the calculated full on power. Do not set the maximum power level below the full output level for applications that do not require power limiting.

Circuit Breaker Type

Procedure: Select options from drop down list with options, NEMA, TYPE B, TYPE C, TYPE D **Default:** NEMA

8.2.3.7.4 Trace Resistance

YSTEM				A	LARM A	СК
ARM LIST	CONFIGURI	E DEVICE				
		ELEXANT	W/LIMITER			
Trace R	esistance (L1)					
Name		Alarm	Setpoint		Filter	
High Al	arm	Enable	50	%	0	S
Low Ala	arm	Enable	50	%	0	S
Nomina	I Tracing Resistan	ce	6.00	Ohn	า	
	ARM LIST ARM LIST Trace R Name High AI Low Ala Nomina	ARM LIST CONFIGURE Trace Resistance (L1) Name High Alarm Low Alarm Nominal Tracing Resistant	ARM LIST CONFIGURE DEVICE ELEXANT Trace Resistance (L1) Name Alarm High Alarm Enable Low Alarm Enable Nominal Tracing Resistance	ARM LIST CONFIGURE DEVICE ELEXANT W/LIMITER Trace Resistance (L1) Name Alarm Setpoint High Alarm Enable 50 Low Alarm Enable 50 Nominal Tracing Resistance 6.00	ARM LIST CONFIGURE DEVICE ELEXANT W/LIMITER Trace Resistance (L1) Name Alarm Setpoint High Alarm Enable 50 % Low Alarm Enable 50 % Nominal Tracing Resistance 6.00 Ohm	ALARM ACCONFIGURE DEVICE

Figure 8.19 Configure Device | Trace Resistance window

8.2.3.7.4.1 Trace Resistance Alarm Settings

High Alarm

Purpose: Alarms trace resistance levels which have increased from the nominal resistance setting by more than the High Tracing Resistance Deviation setting. The High Resistance Alarm may be used to indicate an open or a high resistance connection or, when using constant wattage parallel cables, may indicate the failure of one or more heating zones. It may also be used to monitor a failed series-type cable or connection in 3-phase applications while minimizing nuisance alarms created by voltage fluctuations.

Procedure: Check box to enable the alarms. When enabled, enter the Setpoint between

1 to 250%. If required set Filter in the range 0 to 28 seconds.

Default: DISABLED



IMPORTANT: High Resistance Alarms will only be generated if the output switch is on.

Low Alarm

Purpose: Alarms heater resistance levels which have decreased from the nominal resistance setting by more than the Low Tracing Resistance Deviation setting.

Procedure: Check box to enable the alarms. When enabled, enter the Setpoint between

1 to 100 %. If required set Filter in the range 0 to 28 seconds.

Default: DISABLED

8.2.3.7.4.2 Nominal Tracing Resistance

Purpose: This parameter defines the nominal expected heater resistance. A value must be entered by the user to allow the High and Low Tracing Resistance Alarms to be used. Once the controller and the heating cable have been installed, the following procedure should be used to determine the nominal resistance setting.

Procedure: Adjust the Control Setpoint temperature to turn on the output switch. Allow the load to come up to design temperature and its power consumption to stabilize. Monitor the resistance reading and record its value. Return the Control Temperature Setpoint temperature to its proper setting. Enter the recorded resistance value as the nominal resistance setting.

Range: Value between 1.0 to 3000 Ohms as per design calculations.

Balance 3 Phase

Purpose: This setting is for Elexant 4010i/ 4020i controllers for three phase heaters. If Balanced 3 Phase is enabled, the controller will automatically update any 3 phased settings to use the settings from the 1st phase (L1). If the Balanced 3 Phase is disabled, the settings for each phase can be different.

Procedure: Touch the check box to enable or disable Balanced 3 Phase

Options: ENABLE or DISABLE

Default: ENABLE

8.2.3.8 Safety Temperature Limiter

The Elexant 4010i/ 4020i Controllers are available in various models. A model that comes with a Safety Temperature Limiter is available. The Elexant 4010i/ 4020i controller with Safety Temperature Limiter uses temperature data to TRIP the HT circuit thereby providing protection against over-heating of heating cables. If the measured temperature exceeds the user defined trip setting, then the Limiter TRIP circuit will open the output relay. The unit remains tripped until it is manually reset. Resetting the unit will only be possible after the normal operating conditions have returned to a safe level.

This section explains configuring of the Limiter circuit equipped in the Elexant 4010i/ 4020i model with Safety Temperature limiter. Users with Elexant 4010i/ 4020i models without Safety Temperature Limiter should skip this section.

FILE	SY	STEM		A	LARM ACK
CIRCUIT LIST	ALAR	M LIST	CONFIGURE DEVICE		
Show Advanced Set	tings		E	LEXANT W/LIMITER	
BASIC SETTING	S	Safety Tempe	erature Limiter		
		Тад		Elexant 4010i/4020i-TSLIM	-000032
OTHER ALARM	S	Intelligent Lin	niting	🖌 Enable	
ELECTRICAL		Trip Alarm		🖌 Enable	
LIMITER		Failure Alarm	1	🖌 Enable	
		Setpoint		69 °C	
Safety Temperature Lin	miter	Firmware Ver	rsion	1.0.426.7935	



Tag

Purpose: A 40-character tag may be assigned to the Safety Temperature Limiter to allow it to be easily associated with a pipe, vessel, process, circuit, drawing name, number etc.

Range: Alpha-numeric characters.

Procedure: Click on the Tag Entry and an alpha numerical keyboard will drop down for data entry.

Default: Elexant 4010i/ 4020i

Intelligent Limiting

Purpose: Under some conditions, such as when pipes are steam cleaned, the temperature exceeding the limiter cutout setpoint does not indicate a malfunction. The user has the option of letting the limiter reconnect the output automatically upon return to a safe temperature level, under the condition that the main output is turned off for the entire duration of the unsafe temperature level.

Options: ENABLE/DISABLE

Procedure: Check Box to Disable

Default: ENABLED

Trip Alarm

Purpose: Enabling the trip alarm will provide an indication of a trip on account of high temperature as per Figure 8.20.

Options: ENABLE/DISABLE

Procedure: Check Box to Disable

Default: ENABLED

Failure Alarm

Purpose: Enabling the Communication Failure Alarm will provide an indication of a Communication loss between the controller and the Safety Temperature Limiter

Options: ENABLE/DISABLE

Procedure: Check box to disable

Default: ENABLED

General – Safety Temp Limiter Trip Setpoint

Purpose: The lock out temperature (setpoint) of the safety temperature limiter must be set in such a way that maximum T-class temperature cannot be exceeded. The surface temperature of the heat-tracing cables is limited to the temperature applicable in this T class -5 K for temperatures below or equal to 200°C or -10 K for temperatures greater than 200°C.

Options: Data entry via the dropdown keypad

Procedure: Enter the desired temperature and click Apply. A pop up dialogue box will appear with instructions. Press the Set Config button on the SLIM within 60 seconds to record the new entry.

Default: Previous data

Firmware Version

Purpose: Identifies the current Safety Temperature Limiter firmware version

Procedure: N/A

8.2.3.9 Miscellaneous

FILE	SYS	STEM)			ALARM ACK
CIRCUIT LIST	ALAR	M LIST	CONFIGURE DEVICE			
🖌 Show Advanced Settin	igs		j	ELEXANT W/LIMITI	ER	
BASIC SETTINGS	3	Load Shed	ding			
OTHER ALARMS		Load Shed Load Shed	ding ding Fail-safe Enable		Enable Enable	2
ELECTRICAL		Broadcast Zone 1	Timeout	6	Enable	Second(s)
LIMITER		Zone 2 Zone 3			Enable	2
MISC	SC Zone		Zone 4		Enable	
Load Shedding		Zone 5 Zone 6			Enable Enable	2
Digital Input/Auto-Cycle		Zone 7			Enable	
Device Information		Zone 8			Enable	
		MONI	TOR	APPLY	CEL	BACK NEXT

Figure 8.21 Configure Device | Load Shedding window

8.2.3.9.1 Load Shedding

Load Shedding settings for Elexant 4010i/ 4020i Controllers are detailed under Section 5.4.1.

8.2.3.9.2 Digital Input/Auto Cycle

FILE	SYS	STEM)		ALARM ACK	
CIRCUIT LIST	ALAR	M LIST	CONFIGURE DEVICE			
Show Advanced Set	tings		I	ELEXANT W/LIMITE	R	
BASIC SETTING	s	Digital Inpu	ut			
OTHER ALABMS		Digital Inpu	ut	Not Used		
		Auto-Cycle	Auto-Cycle			
ELECTRICAL		Auto-Cycle		🖌 Enable		
LIMITER		Auto-Cycle Interval		8	Hour(s)	
MISC						
Load Shedding						
Digital Input/Auto-Cycle						
Device Information						

Figure 8.22 Configure Device | Digital Input/Auto-Cycle window

8.2.3.9.2.1 Digital Input

Purpose: The digital input offers the option to alarm or override the electrical heat-tracing mode from an external device. The digital input can be configured in different ways. These are:

- None: no action taken
- · Alarm when input is closed
- · Alarm when input is open
- · Force Off when input is closed
- Force Off when input is open
- · Force On when input is closed
- · Force On when input is open
- Hand/Off/Auto

Default: None

Digital Input Source: When selections other than 'Not used' is made, the drop down list will enable selection of appropriate input source.

8.2.3.9.2.2 Auto Cycle

Purpose: The auto-cycle function momentarily (approximately 10 seconds) applies power to the heating circuit at the selected interval. It is used to test the integrity of the heating circuit. Alarms present at the time of auto-cycle then become latched and remain active after the completion of the auto-cycle function. Auto-cycling effectively eliminates the need for preventive maintenance by automatically verifying the integrity of the heating circuit. Auto-Cycle Interval is the number of hours/minutes between successive heating circuit integrity tests depending on the Auto-Cycle Units specified

Auto Cycle Interval

Range: 0 to 750 Hours

Procedure: Using the pop up keypad enter the desired value. The function is disabled when 0 is entered

Default: 8 hours

8.2.3.10 Device Information

FILE S'	YSTEM		ALARM ACK
CIRCUIT LIST ALA	RM LIST CONFIGURE DE	VICE	
V Show Advanced Settings		ELEXANT W/LIN	MITER
BASIC SETTINGS	Device Information		
OTHER ALARMS	Device Type	4010	0i/4020i (4010i/4020i-LIM)
ELECTRICAL	Address	10	
ELECTRICAL	Firmware Version	1.2.3	313
LIMITER	Serial Number	32	
MISC)
Load Shedding	LOAD DEFAULT PROFILE	LOAD PROCESS PROF	LOAD AMBIENT PROFILE
Digital Input/Auto-Cycle			
Device Information			
	LOAD USER PROFILE #1	SAVE USER PROFILE	#1
	LOAD USER PROFILE #2	SAVE USER PROFILE	#2
	MONITOR	APPLY	CANCEL BACK NEXT



Purpose: Allows the user to review the Device Information of Elexant 4010i/ 4020i which are read only parameters. Device Type, Firmware Version and Serial Number are factory configured and cannot be changed.

Load Configuration Profiles

Purpose: A set of default settings are stored in the Elexant 4010i/ 4020i Controller. In addition, users can save custom configuration settings that can be loaded into the Elexant 4010i/ 4020i at a later time. When one of the Load profile button is clicked, all user input data will be erased and the device will be set to the settings of the selected profile.

This section describes the system settings and utilities to configure the TOUCH 1500 to communicate with other devices, security control, and data backup/restore.

9.1 FILE MENU | BACKUP | RESTORE DATABASE, EXPORT EVENT LOG & EXIT PROGRAM

9.1.1 File - Back up Database

Purpose: The TOUCH1500 offers the option to make a backup of the device and settings database to a USB connected flash drive

FILE SYS	TEM			ALARM AC	ж
Backup Database Restore Database		DEVICE			
View Event Log Export Event Log	Tag •	Device Type	Setpoint Temperature	Actual Temperature	Line Current
	0-HTC-11EE	NGC40HTC	15°C	57°C	0A

Figure 9.1 File | Backup Database menu

Procedure: Ensure that a Flash Drive is available in the USB slot. Select File Menu and click on the dropdown menu button Backup Database. Enter drive letter & file name and click OK.

FILE	SYSTEM		ALARM ACK
CIRCUIT LIST	ALARM LIST	BACKUP DATABASE	
Removable [Drive Please inse	ert removable storage.	
File Name			
		ок	CANCEL

Figure 9.2 File | Backup Database window

9.1.2 File - Restore Database

Purpose: To restore the previously backed up database to the TOUCH1500

Procedure: Ensure that a Flash Drive is available in the USB slot. Select File Menu and Click on the dropdown menu button Restore Database. Enter drive letter & file name and click OK

FILE	S	/STEM				ALARM ACK
CIRCUIT LIST	ALA	RM LIST	RESTORE DATABASE			
Removable D	rive	D:\			~	
Restore from	4	D:\2020N	lov16_Touch1500.tbkup		~	
				ок	CANCEL	

Figure 9.3 File | Restore Database window

9.1.3 File - Export Event Log

Purpose: To export the event Log such that it can be viewed remotely

Procedure: Ensure that a Flash Drive is available in the USB slot. Select File Menu and click on the dropdown menu button Export Event Log. Enter drive letter & file name and click OK.

FILE	SYSTEM				ALARM ACK
CIRCUIT LIST	ALARM LIST	EXPORT EVENT LOG			
Removable D	rive D:\			~	
File Name	Missing fil	e name			
			ок	CANCEL	

Figure 9.4 File | Export Event Log window

9.1.4 File – Exit Program

Purpose: To exit the TOUCH 1500 software. **Procedure:** Click on Exit to exit the program.

9.2 SYSTEM SETTINGS

9.2.1 System | Device Manager Settings

FILE SYSTEM	ALARM ACK	
Device Manager	PORT EVENT LOG	
User Level		
Group		
System Alarms	✓	
Communications Setup		
DCS Gateway	me	
Preferences		

Figure 9.5 System | Device Manager menu

Procedure: Refer to Section 4.2 Configuration of NGC-40-BRIDGE Modules, Section 4.3 Configuration of NGC-40 HTC Modules, Section 4.4 Configuration of NGC-40 HTC3 Modules, Section 5.7 Configuration of the NGC-40 I/O Module, and Section 6.1 for NGC-20/ Elexant 5010i Controllers

9.2.2 System | User Level settings

FILE	SYSTEM)		ALARM ACK
CIRCUIT LIST	ALARM LIST	SECURITY LEVEL SELECTION		
	Please select 1 - Monitor Only 2 - Alarms ACK (3 - Configuration • 4 - Admin	, and RESET n		
Password	Not required	RD SET DEFAULT LEVEL OK CANC	EL	

Figure 9.5a System | User Level | Security Level Selection window

Security Level selection

The Security Level selection window allows the user to access the security level and assign passwords for all levels.

The security levels are

- Monitor Only Allows the user to monitor all parameters, export event log, change preferences and has access to the user level option to enable the other users to make changes. This option does now allow user to exit the program.
- 2. Alarms Ack & Reset. Allows all of the above plus options to acknowledge & reset alarms.
- 3. Configuration This level allows the user to all options except to change passwords and exit the program.
- 4. Admin All options are enabled at this level.

Change Password: Change password

Purpose: To set password for Level 1 to 4

Procedure: Click Change Password button which will bring up the window as shown below. Select the Security Level from the dropdown list. Options are security level 1, 2, 3, 4. Enter Old Password (blank for a new system) followed by the new password. Confirm new password and click OK to save and exit. Repeat these steps for all levels.

FILE	SYSTEM		(ALARM ACK
CIRCUIT LIST	ALARM LIST	CHANGE PASSWORD		
Security level	1	~		
Old Password				
New Password				
Confirm Passwo	rd			
		ОК	CANCEL	

Figure 9.6 System | User Level | Change Password window

Set Default Level: The admin user can set the default level at which the TOUCH 1500 Program will operate on start up.

FILE	SYSTEM)	AL	ARM ACK
CIRCUIT LIST	ALARM LIST	SECURITY LEVEL SELECTION		
ĺ	Please select			
	2 - Alarms ACK a	and RESET		
	 3 - Configuration 4 - Admin 	1		
l				
Password	Not required			
	CHANGE PASSWOR	D SET DEFAULT LEVEL		
		ОК САНС	EL	

Figure 9.7 System | User Level | Security Level Selection window

9.2.3 System | Group settings

Purpose: To create a GROUP so that devices in a particular area, process etc. can be viewed together.

FILE SYSTEM		ALARM ACK
Device Manager User Level		GROUP LIST
Group System Alarms		Description
Communications Setup	•	
DCS Gateway	•	
Preferences		

Figure 9.8 System | Group menu

Procedure: From the drop down menu, select System | Group and enter name and description. Create as many groups as needed and when done click OK to continue.

FILE	SYSTEM			ALARM ACK
CIRCUIT LIST	ALARM LIST	NEW GROUP		
Name	Plant1			
Description	Heat Tracing Circu	lits		
		SAVE	CANCEL	



On the next window, select the Group and click on the desired option from the drop down buttons.

FILE		SYSTEM			ALARM ACK
CIRCUIT LIST		ALARM LIST	GROUP LIST		
NEW GROUP					
Name	•			Description	
Plant1		Heat Tracing Cir	cuits		
DELETE		EDIT		R REMOVE MEMBER	

Figure 9.10 System | Group | Group List window

The Delete button on the dropdown menu allows the user to delete the selected group

The Edit button allows editing the group name & description.

Procedure: Click on the Edit button and make the necessary changes in the window below and click Save.

FILE	SYSTEM			ALARM ACK	
CIRCUIT LIST	ALARM LIST	EDIT GROUP			
Name	Plant 1				
Description	Heat Tracing Circu	uits			
		SAVE	CANCEL		

Figure 9.11 System | Group | Group List | Edit Group window

The Add Group Member button allows the heat-tracing circuits to be added into the selected group.

Procedure: Check the boxes against individual circuits or check Select All to include all circuits in that group.

FILE	SYSTEM			ALARM ACK
CIRCUIT LIST	ALARM LIST	ADD GROUP	MEMBER - Pla	nt 1
To be Added	Tag	Туре	Port	Address
	NGC40-HTC-11EE	NGC40HTC	COM2	4590
	NGC40-HTC3-1132	NGC40HTC3	COM2	4402
	NGC20-3E93	NGC20	COM2	3
	DEFAULT TAG [17]	RMM-DI	COM2	17
	DEFAULT TAG [19]	RMM-DI	COM2	19
	DEFAULT TAG [22]	RMM-DI	COM2	22

Figure 9.12 System | Group | Group List | Add Member window

The Remove Group Member button allows the Heat Tracing circuits to be removed from the group. **Procedure:** Check the boxes on the subsequent window to remove the circuits in that group or check Select All to remove all circuits.

FILE	SYSTEM				ALARM ACK
CIRCUIT LIST	ALARM LIST	REMOVE GR	OUP MEN	/IBER - Plant 1	
To be Removed	Tag	Туре	Port		Address
	NGC40-HTC3-1132	NGC40HTC3	COM2	4402	

Figure 9.13 System | Group | Group List | Remove Member window

9.3 SYSTEM | SYSTEM ALARM SETTINGS

Purpose: To indicate alarm from either the TOUCH 1500 or from other control panels connected to the TOUCH 1500.

Procedure: From the drop down menu, select System | System Alarms

FILE	S	/STEM				ALARM AC	ж
Device User Le	Manager evel		MOVE GRO	OUP MEMBER - I	Plant 1		
Group Svsten	n Alarms		, .	Device Type	Setpoint Temperature	Actual Temperature	Line Current
Comm	unications	Setup 🔹 🕨	1EE	NGC40HTC	15°C	57°C	0A
DCSC	atoway		1132	NGC40HTC3	30°C	53°C	0A
DC3 G	aleway		IMITER	4010i/4020i	100°C	69°C	0A
Prefere	ences		[19]	RMM-DI	N/A	N/A	N/A
ок	22	DEFAULT TA	G [22]	RMM-DI	N/A	N/A	N/A

Figure 9.14 System | System Alarms window

Enter the Modbus address of the External ADAM Module connected to the TOUCH 1500 and select the relay from the drop down list. Check Normally Open/Closed options. By default the alarms are set to turn off when the same is acknowledged on the Touch Window. Uncheck to disable this option. Clicking on Test button will activate the relay and the alarm.

FILE	SYSTEM		ALARM ACK
CIRCUIT LIST	ALARM LIST	SYSTEM ALARMS	
Modbus Addre	ess 250		
Use Relay	0	~	
Alarm Toggle	○ Norr ✓ Turn Time 60	nally Open Normally Closed off when alarms are acknowled TES	d dged
		SAV	VE CANCEL

Figure 9.15 System | System Alarms window

9.4 SYSTEM | COMMUNICATION SETTINGS

Purpose: To set the Serial port and other settings so that the TOUCH 1500 can communicate with the Bridge and other devices

Procedure: Please refer to Section 4.2.2 Communication Ports – Serial (COM Ports 1, 2 & 3) and Ethernet on page 27.

FILE	SY	STEM				ALARM AG	СК
Device User Le	Manager vel		STEM ALA	RMS			
Group System	Alarms		•	Device Type	Setpoint Temperature	Actual Temperature	Line Current
Commu	inications \$	Setup 🕨 🕨	Serial	Port	15°C	57°C	0A
	toway		1132	NGC40HTC3	30°C	53°C	0A
DUS Ga	leway		IMITER	4010i/4020i	100°C	69°C	0A
Prefere	nces		[19]	RMM-DI	N/A	N/A	N/A
ок	22	DEFAULT TAG	6 [22]	RMM-DI	N/A	N/A	N/A

Figure 9.16 System | Communication Setup Serial Port menu

9.5 SYSTEM | PREFERENCES

Purpose: To set the Language, Temperature Units, User activity timeout & Time/Date **Procedure:** Please refer to Section 4.1.7 Configuration of System Preferences on page 25.

FILE	SYS	TEM)			AI	LARM ACK	
CIRCUIT LIST	ALARM	I LIST	PREFERENCES					
Language			SET DATE	TIME				
Temperature U	nit	Frida	ıy, December 04, 202	0	15			
User activity tir	neout in	14	Y : 9 Y :	34 🗸				
			ок	CANCEL				
					ок		CANCEL	

Figure 9.17 System | Preference window

9.5.1 Operations

The default window is shown below. Individual circuits can be accessed by selecting the same and clicking on the Overview button.

FILE	FILE SYSTEM ALARM ACK							
CIRCUIT L	CIRCUIT LIST ALARM LIST PREFERENCES							
Filter by gro	Filter by group [*]							
Status	Address	Tag 🔻	Device Type	Setpoint Temperature	Actual Temperature	l Ci		
ок	0011EE	NGC40-HTC-11EE	NGC40HTC	15°C	57°C	0A		
ov	ERVIEW	ALARM(S)	HIDE	BUTTONS				

Figure 9.18 Circuit List window (default window)

9.5.2 Circuit Overview of HTC

Purpose: To get an overview of the heat-tracing circuit which brings up all the parameters and also make the following minor changes directly on this page;

- 1. Control Temperature Setpoint
- 2. Low Alarm Setpoint
- 3. High Alarm Setpoint
- 4. Ground-Fault Trip Setpoint
- 5. Ground-Fault High Alarm
- 6. Line Current Low Alarm Setpoint

Procedure: As explained under Section 3.

FILE	SYSTEM				ALARM	ACK
CIRCUIT LIST	ALARM LIST	CIRCUIT OVERV	IEW			
CAN Network ID: 11EE Device Type: NGC40HTC	Version: 4.8.42 Alarm(s): 0)		NGC40-HTC-11EE		
Controller Status	Controller Status					
Heater Status	Off		Control Mode		On/O	Iff SSR
Control Status	Heat-Tracing is off due	e to fault condition	Deadband		3	°C
Safety Temperature Limit	ter Status Limiter Tripp	ed		Temperature 0	°C	
Control Temperature			Ground Fault	Current		
Actual Value Setpoint High Alarm Low Alarm Line Currents	57 15 200 5	°C °C °C °C °C °C °C °C °C °C	 Actual Value Trip Setpoint High Alarm Highest Meas 	sured Value	0 mA 30 mA 20 mA 0 mA	
Actual \	/alue 🕨 High Alarm	► Low Alarm	Power Consump	tion		
Line Current 0.0	A 30.0 A	0.3 A	0 W	0.0	A	40.0
CONFIGURE	MONITOR	TEST HEATER			APPLY	CANCEL

Figure 9.19 Circuit List | Circuit Overview window

Test Heater: The Test Heater feature provides an easy method of temporarily overriding the temperature control, without having to modify the Control Temperature Setpoint or any other configuration parameter. The function will force the output switch on for the specified interval. After the test time has expired, the HTC will automatically revert back to normal operation.

FILE	SYSTEM		A	LARM ACK
CIRCUIT LIST	ALARM LIST	CIRCUIT OVERVIEW		
CAN Network ID: 11EE Device Type: NGC40HTC	Version: 4.8.42 Alarm(s): 0	NGC40-H	TC-11EE	
Controller Status				
Heater Status Control Status	Off Heat-Tracing	Control Mode TEST HEATER		On/Off SSR 3 °C
Safety Temperature Limi	ter Status Lim	Please enter the number of seconds for which you want to Test Heater	iled *C	
►Actual Value ►Setpoint ►High Alarm ►Low Alarm	5 1 2 5	30 Test Heater Not Running Time Remaining -	0 30 20 13	mA mA mA mA
Line Currents Actual Line Current 0.0	Value High A 30.0	START TEST HEATER CLOSE		40.0





IMPORTANT: This feature only overrides temperature control, it does not override other control parameters such as power limiting.

Config: On clicking the Config button, the user will be directed to the Configuration menu as explained under Section 3.

Monitor: On clicking the Config button, the user will be directed a sequence of windows showing various parameters

Monitor Device – Monitor Data – Control temperature: The default Monitor window shows Control Temp and other Temp settings and readings.

FILE	SY	STEM)					A	LARM ACK	
CIRCUIT LIST	ALAR	M LIST	MONIT	OR DEVIC	E					
						NGC40-HT	C-11EE			
		Controller S	Status							
MONITOR DATA	A.	Heater Statu	IS	Off						
Control Temperature		Control Ter	nperature					Temperature	e Sources	
Ground Fault Current					1	Control Temp	erature	Local RTD	57	°C
Line Current		►Setpoint		15	°C	200	_ 220	TS2	-2	°C
MAINTENANCE VAI	UES	►High Alarr	n	200	°C			TS3	Not Used	°C
MISC		►Low Alarm	n	5	°C			TS4 TS5	Not Used	°C °C
		High Limit	.	700	•••	15	<57	TS6	Not Used	°C
				,00	Ŭ	5 📕	-15	TS7	Not Used	°C
					I	57 °C		TS8	Not Used	°C
		Temperatu	e Source L	Jsage Use	Lowe	est Temperature				

Figure 9.21 Monitor Device | Control Temperature window

Monitor Device - Monitor Data - Ground-Fault Current: This selection allows the user to monitor

GF settings and current levels.

FILE	SYSTEM ALARM ACK
CIRCUIT LIST A	ARM LIST MONITOR DEVICE
	NGC40-HTC-11EE
MONITOR DATA	Ground Fault Current
Control Temperature Ground Fault Current	►Trip Setpoint 30 mA 50
Line Current	►High Alarm 20 mA Highest Measured Value 13 mA 20 ►
MAINTENANCE VALUES MISC	

Figure 9.22 Monitor Device | Ground-fault Current window

Monitor Device – Monitor Data – Line Current: This selection allows the user to monitor Line Current Settings and current levels.

FILE	SYSTEM	ALARM ACK
CIRCUIT LIST	ALARM LIST MONITOR DEVICE	
		NGC40-HTC-11EE
MONITOR DATA	Line Current	
Control Temperature Ground Fault Current	►High Alarm 30.0	A 40.0
Line Current	Power Consumption 0.3	A 30.0 >
MAINTENANCE VALUES	s	0.3 0.0 0.0

Figure 9.23 Circuit List | Monitor Device | Line Current window

9.5.3 Monitor Device – Maintenance Values 1

Maintenance Information 1

Power Accumulator

Purpose: This feature indicates the total power consumption of the heat-tracing circuit since the last time the Power Accumulator was reset. It may be useful to log the amount of power consumed on a particular heat-tracing circuit for the purposes of energy management or gathering of data for future design criteria. The value of this accumulator is written to the controller's non-volatile memory once every 24 hours or whenever any maintenance data is reset by the user.

Heater On Time

Purpose: Represents the number of hours that the trace has spent energized

Procedure: The In Use hours accumulator can be reset to zero using Reset Maintenance Information.

Contactor Cycle Count

Purpose: This feature indicates the total number of off-to-on transitions an EMR has done since the last time the Contactor Cycle Counter was reset. This serves as a method to do preventative maintenance on the EMR according to the manufacturer's specifications. This count value is written to the controller's non-volatile memory once every 24 hours or whenever any maintenance data is reset by the user.



IMPORTANT: Once the Contactor Cycle Counter reaches 999,999,999 it will stop counting.

FILE	SYS	STEM			ALA	RM ACK	
CIRCUIT LIST	ALAR	M LIST	MONITOR DEVICE				
				NGC40-HTC-11EE			
	•	Maintenan	nce Values				
MONTON DAT	A	Power Acc	cumulator	4428000	о кwн	RESET	
MAINTENANCE VA	LUES	Heater On	Time	873	Hours	RESET	
Maintenance Informat	tion 1	Contactor	Cycle Count	3		RESET	
Maintenance Informat	tion 2	Hours in u	ise	3924		RESET	
Dynamic Output Statu	aı	Hours Sind	ce Last Reset	1254			
Analog Readings	imitor	Highest Instantaneous Line and Ground Fault Currents Measured					
Salety Temperature Li	imiter	Instantane	eous Line Current	0.0	A	RESET	
		Ground Fa	ault Current	13	mA	RESET	
MISC							



Number of Hours In

Purpose: The purpose of this feature is to indicate the total hours of use of the controller since its initial operation. It may be useful to log the amount of time a particular controller has been in operation for the purposes of maintenance planning or reliability testing. The value of this accumulator is written to the controller's non-volatile memory once every 24 hours or whenever any maintenance data is reset by the user.

Procedure: The In Use hours accumulator can be reset to zero using the Reset Hours in Use button.

Number of Hours Since Last Reset

Purpose: This feature indicates the total hours of use of the controller since the last reset. It may be useful to log the amount of time a particular controller has been in operation since the last time the controller's power was cycled for trouble-shooting purposes.

Procedure: The Time Since Last Reset hours accumulator can only be reset by cycling the controller's power.

Highest Instantaneous Line Current Measured

Purpose: This feature indicates the highest instantaneous load current measured since the last time the Peak Line Current was reset. This value is written to the controller's non-volatile memory once every 24 hours or whenever any maintenance data is reset by the user

Procedure: The highest Instantaneous Line Current Measured can be reset via the Reset Line Current button.

Highest Instantaneous Ground Fault Ever Measured

Purpose: This feature indicates the highest instantaneous ground-fault current measured since the last time the Peak Ground- Fault Current was reset. This current value is written to the controller's non-volatile memory once every 24 hours or whenever any maintenance data is reset by the user.

Procedure: The highest Instantaneous Ground Fault Ever Measured can be reset via the Reset Ground-Fault Current button.

9.5.4 Monitor Device – Maintenance Values 2

Maintenance Information 2

Purpose: This feature indicates the maximum and minimum temperatures ever recorded by the HTC since the last time the values were reset. It may be useful to log the maximum/minimum temperatures ever experienced on a particular trace circuit for the purposes of trouble shooting or gathering data for future design criteria. The temperature values are written to the controller's non-volatile memory once every 24 hours or whenever any maintenance data is reset by the user. Max/min temperatures are recorded for the local RTD and Control Temperatures. Temperature measurements can be reset via the buttons on the window.

FILE	SYS	STEM		(AL	ARM ACK	
CIRCUIT LIST	CIRCUIT LIST ALARM LIST						
			NGC40-HTC-11EE				
		Maximum	/Minimum Temperatures				
MAINTENANCE VALUES		Control Temperature Maximum		292	°C		
		Control Temperature Minimum		37	°C	RESET	
Maintenance Informati	Maintenance Information 1		Local Temperature Maximum		°C	DECET	
Maintenance Informati	ion 2	Local Tem	Local Temperature Minimum		°C	RESET	
Dynamic Output Status	5						
Analog Readings	Analog Readings						
Safety Temperature Limiter							
MISC							

Figure 9.25 Monitor Device | Maintenance Information 2 window

9.5.5 Monitor Device - Maintenance Values - Dynamic Output

Dynamic Output Status

Control Output Duty Cycle: 0 to 100% 0 = Full Off, 100 = Full On **Switch Status:** The current state of the trace switch

PASC Values

PASC On Count: The number of seconds of on-time during the currently calculated PASC cycle **PASC Off Count:** The number of seconds of off-time during the currently calculated PASC cycle **PASC Next Switch Action:** The number of seconds until the next switch-state change.

FILE	SYS	STEM				ļ	ALARM ACK
CIRCUIT LIST	ALAR	MLIST	MONITOR DEVICE				
			NGC40-HTC-11EE				
MONITOR DAT	Δ	Output Sta	itus				
MONITOTIDATA		Control Output Duty Cycle			0	%	TEAT UEATED
MAINTÉNANCE VAL	LUES	Switch Status			Off		TEST HEATER
Maintenance Informat	tion 1						
Maintenance Informat	tion 2				101		
Duran in Outrust Obstan		On Count		0	S		
Analog Readings		Off Count C		0	S		
		Next Switch Action 0			0	s	
Safety Temperature Limiter							J

Figure 9.26 Monitor Device | Dynamic Output Status window

9.5.6 Analogue Readings

FILE	SYS	STEM	, F	ALARM ACK	ĸ
CIRCUIT LIST	CIRCUIT LIST ALARM LIST MONITOR DEVICE				
		NGC40-H	ITC-11EE		
	Δ	Last On Measured Values			
		Control Temperature	62	1	°C
MAINTENANCE VA	LUES	Ground Fault Current	0	(mA
Maintenance Informat	tion 1	Instantaneous Line Current	0.0	0 /	A
Maintenance Informat	tion 2	Effective Line Current	0.0	0	А
Dynamic Output Statu	s	Electrical			
Analog Readings		Voltage	12	20 '	v
Safety Temperature Li	imiter	Frequency	60	1	Hertz
		Heating Cable Resistance	Ор	pen f	Ohm

Figure 9.27 Monitor Device | Analog Readings window

Last On Measured Values

Control Temperature

Purpose: This is the temperature that the controller uses to determine whether its output switch should be on or off. It is derived from a combination of the 8 configurable temperature sources.

Ground-Fault Current in milliamps.

Line Current: This is the instantaneous current (equals full Line Current) in A.

Effective Line Current: This is the effective current (equals full Line Current multiplied by the output duty cycle) in A.

Monitor Device – Maintenance Values

Safety Temperature Limiter

Purpose: This option provides information on the Safety Temperature Limiter settings, the present Temperature values and the status of the Safety Temperature Limiter. If the Status reads Tripped, then the limiter can be reset by clicking on the Reset Tripped Safety Temperature Limiter button.

FILE	SYS	STEM			ALA	RM ACK			
CIRCUIT LIST	ALAR	M LIST M	ONITOR DEVICE						
			NGC40-HTC-11EE						
	•	Safety Tempe	rature Limiter Informa	tion					
		Тад			NGC40-SLIM-EEF4F4				
MAINTENANCE VALUES		Firmware Version			3.8.14				
Maintenance Informat	ion 1	Serial Number			EEF4F4				
Maintenance Informat	ion 2	Controller CANID			11EE				
Dynamic Output Statu	s								
Analog Readings		Safety Tempe	rature Limiter Values		n				
Safety Temperature Li	miter	Safety Tempe	rature Limiter Temper	ature	Failed	°C			
		Safety Tempe	rature Limiter Trip Set	point	85	°C			
		Safety Tempe	rature Limiter Status		Limiter Tripped	RESET			
MISC		L							

Figure 9.28 Monitor Device | Safety Temperature Limiter window

Procedure: Click on Reset Tripped Safety Temperature Limiter button and a dialogue box will appear as below. On selecting Yes, another dialogue box will provide an unique 3 digit number (this number is dynamic and will change on subsequent tries/operations). Enter the number using the dropdown keypad and click OK to reset the limiter.



Figure 9.29 Monitor Device | Safety Trip Limiter Reset Limiter window

9.5.7 Monitor Device – Maintenance Values

Device Information

FILE	SYS	STEM		ALARM ACK			
CIRCUIT LIST	ALARI	M LIST MONITOR DEVICE					
		NGC40-HTC-11EE					
		Device Information					
		Device Type		NGC40HTC			
MAINTENANCE VAL	LUES	CAN Network ID		11EE			
MISC		Firmware Version		4.8.42			
Device Information		Serial Number		11EE			
		MODULE IDENTIFICATION	VIEW VIEW				

Figure 9.30 Monitor Device - Miscellaneous window

Purpose: To provide details of the device, identify the same in HT panel and to look up the temperature source usage

Procedure: Click on Module Identification button and select the test duration from the pop up menu. Options are 1 to 5 minutes. Click Start and observe the modules inside the panel. The LEDs on the appropriate module will flash. This will help identify the module. Once identified either wait to complete the identification process or Click Stop to stop the same.

NGC-40 MODULE IDENTIFICATION								
Enter a CAN ID in the Modul button to begin the test. Or front of the selected NGC-4(Stop or Cancel button to Sto	le CAN ID box. Press the Start nee the test begins, the LEDs on the D module will be flashing. Press the op the test.							
Module CANID	11EE							
Test Duration	1 Minute 🗸							
Time Elapsed 00:00								
	START CLOSE							

Figure 9.31 Monitor Device | Miscellaneous - Module Identification window

Procedure: Click on Temperature Source Usage button to bring up the window which will show the Temperature Sensor Source Usage. If an RTD is connected to the HTC, it will always show up as Source 1.

LIST	ALARM LIST MONITO	R DEVICE		
_			NGC40	D-HTC-11EE
	TEMPERA	TURE SOU	RCE USAGE	TABLE
Temperatu Source (TS	re S) Source Device Tag	Input Number	Source CANID	RTD Tag
1	Local TS temperature	20	149	NGC40-HTC-RTD1-11EE
2	NGC40-10	1	FFFFF1	NGC40-IO-RTD1-FFFFF1
3	Not Used			RMM-0/0
4	Not Used			RMM-0/0
5	Not Used			RMM-0/0
6	Not Used			RMM-0/0
7	Not Used			RMM-0/0
8	Not Used			RMM-0/0

Figure 9.32 Monitor Device | Miscellaneous – Temperature Source Usage window

9.5.8 Circuit Overview of HTC3

Purpose: To get an overview of the heat-tracing circuit which brings up all the parameters and also make the following minor changes directly on this page the information is TYP to single phase HTC except for Line Current

Line Currents: Low Alarm Setpoint for Phase 1 (Line 1), 2, 3

Procedure: Click on the values to be changed and input new values as explained under Section 3. **Test Heater:** Follow the procedures as described for the NGC-40-HTC module.

FILE	SYSTEM			ALARM ACK				
CIRCUIT LIST	ALARM LIST	CIRCUIT OVERV	/IEW					
CAN Network ID: 1132 Device Type: NGC40HTC3	Version: 4.8.41 Alarm(s): 0		NGC40-HTC3-1132					
Controller Status	Controller Status							
Heater Status	Off		Control Mode	Proportional (SSR)				
Control Status	Normal temperature of	ontrol	Proportional Band	2 °C				
Control Temperature	Control Temperature Ground Fault Current							
►Actual Value	53	°C*	►Actual Value	0 mA40				
▶Setpoint	30	°C 53	►Trip Setpoint	N/A mA				
►High Alarm	N/A	°C	►High Alarm	N/A mA				
►Low Alarm	N/A	°C	Highest Measured Value	25 mA U-00				
Line Currents			· · ·	j				
Actual Value	► High Alarm ► L	ow Alarm Power	Consumption					
Line 1 0.0 A	N/A A	1.0 A 0	W 0.0	40.0				
Line 2 0.0 A	N/A A	1.0 A 0	W 0.0	40.0				
Line 3 0.0 A	N/A A	1.0 A 0	W 0.0 C	40.0				

Figure 9.33 Circuit List | Current Overview window for HTC3

Config: On clicking the Config button, the user will be directed to the Configuration menu as explained under Section 3.

Monitor: On clicking the Monitor button, the user will be directed a sequence of windows showing various parameters

Monitor Device – Monitor Data – Control temperature: The default Monitor window shows Control Temp and other Temp settings and readings TYP to Single phase HTC, Figure 9.33.

Monitor Device – Monitor Data – Ground-Fault Current: This selection allows the user to monitor GF settings and current levels TYP to Single phase HTC, Figure 9.33.

Monitor Device – Monitor Data – Line Current: This selection allows the user to monitor Line Current settings and current levels of all the three phases, Figure 9.33 and 9.34.

FILE SY	STEM					ALARM ACK	
CIRCUIT LIST ALAF		OR DEVIC	æ				
			NG	C40-HTC3-1132			
MONITOR DATA	Line Current						
Control Temperature		Line 1		Line 2		Line 3	
Ground Fault Current	►High Alarm	N/A	A	N/A	A	N/A	A
Line Current	►Low Alarm	1.0	Α	1.0	A	1.0	A
	Power Consumption	0	w	0	w	0	W
MAINTENANCE VALUES		Line 1 Curren	11 AO O	Line 2 Current	40.0	Line 3 Current	10.0
MISC		$\prod_{i=1}^{n}$	40.0		40.0		0.0

Figure 9.34 Monitor Device | Line Current window for HTC3

9.5.9 Monitor Device – Maintenance Values 1

Maintenance information 1

Line 1, 2, 3 Power Accumulator

Purpose: This feature indicates the total power consumption of the trace circuit since the last time the Power Accumulator was reset. It may be useful to log the amount of power consumed on a particular trace circuit for the purposes of energy management or gathering of data for future design criteria. The value of this accumulator is written to the controller's non-volatile memory once every 24 hours or whenever any maintenance data is reset by the user.

FILE	SY	STEM				ALARM	ACK	
CIRCUIT LIST	ALAF	RM LIST	MONITOR DEVICE					
				NGC40-HTC3-1	132			
MONITOR DATA	A	Maintena	nce Values					
MAINTENANCE VAI	LUES	Line 1 Power Accumulator		0	1	КШН		
Maintenance Informat	ion 1	Line 2 Po	wer Accumulator	0	1	КШН		
Maintenance Informat	ion 2	Line 3 Power Accumulator		0	1	КМН		
Dynamic Output Status		Total Pow	rer	0	1	кмн	RESET	
		Heater On	Time	677	1	Hours	RESET	
Analog Beadings 2		Contactor	Cycle Count	15			RESET	
Safety Temperature Limiter		Hours in use		394	3	RES		
		Hours Since Last Reset 1		125	5			
)	
MISC								



9.6 SYSTEM | DCS GATEWAY

The DCS Gateway option if enabled in the Touch 1500 will allow remote data access of Heat Trace Circuit information for upstream devices such as DCS system and other systems that can communicate with the Touch 1500 using the Modbus communication protocol. For more information on how to setup and enable the DCS Gateway in the Touch 1500, please see Section – 9 Remote Data Access With the DCS Gateway.

SECTION - 10 REMOTE DATA ACCESS WITH THE DCS GATEWAY

The DCS Gateway was introduced in nVent RAYCHEM Touch 1500 version 2.2. It is a feature that must be enabled before it can be used. If there is a need for remote data access of Heat Trace information directly from the Touch 1500 system, the DCS Gateway in the Touch system provides this capability. This section explains what the DCS Gateway is, how to set it up and how to use it for every day operation. For more detail information of the DCS Gateway, please see Appendix C DCS Gateway.

10.1 OVERVIEW

Remote Data Access (RDA) can be used to link one or more central control systems for continuous monitoring, control and data acquisition. For example in many industrial applications, devices such as PLC(s), remote IO(s), Sensors, Actuators, etc. are continuously being monitored and controlled via SCADA and DCS Systems. With the addition of the DCS Gateway functionality in the Touch 1500, nVent Heat Trace systems can now be an integral part of the overall control systems in the plant.

In order to setup the Touch 1500 with the DCS Gateway functionality enabled for remote data access, some knowledge of the overall system architecture is beneficial. An example would be how the Touch 1500, the NGC heat trace systems and the DCS systems are connected together. In addition there are a specific set of instructions that must be followed to make everything work together. This is described in more detail in Section 10.2 General Work Flow Required for Setup and Operation. The rest of this section explains how to setup and use the DCS Gateway. For details on the overall system architecture, please see Appendix C.2 System Architecture.

10.2 GENERAL WORK FLOW REQUIRED FOR SETUP AND OPERATIONS

In order to take full advantage of the remote data access capability provided by the DCS Gateway, please follow the work flow presented in this section.



Figure '	10.1	Work	Flow	for	Touch	1500	Setup	with	DCS	Gateway	0 י	perations

Step	Name	Description
1	System Design and Planning	It is generally a good idea to do some preplanning before the start of any project. This step is to collect, review and decide on what is needed for your control system, from equipment connectivity to heat trace circuit data requirements.
2	Collect Heat Trace Circuit Information	In most cases it is simpler to obtain the heat trace circuit information from the database in the Touch 1500 system. This information is necessary for the creation of the DCS Gateway Map file. A DCS Gateway Map file is a file that contains mapping definitions. Each Mapping definition associates a Modbus register or coil to a parameter/ field of a Heat Trace controller (i.e. control setpoint, or control temperature, or High Current alarm for circuit with tag Id LINE2A_ CIRCUIT). The circuit tag Id is used to associate the device and it must be correct in order for the DCS Gateway to locate the circuit in the system. In addition, the DCS system that will be remotely accessing the heat trace information must know about this mapping definition.

3	Create a DCS Gateway Map File	A separate tool named DCS Gateway Mapping Tool is used to create the customized DCS Gateway Map file. The Heat trace circuit information obtained in Step #2 will be used to help to define the mapping definitions.
4	Generate Mapping Definition Report	With the DCS Gateway Mapping Tool the DCS Gateway Map report will be generated. With the mapping definitions in the report the connection in DCS System can be created.
5	Setup Touch 1500 for DCS Gateway Operation	With the DCS Gateway Map File created in Step #3, Touch 1500 communication can be setup and enables the DCS Gateway for operation.
6	System Validation	The final step is to perform data validation to ensure everything is working as expected. The data for the DCS Gateway needs to be reviewed and verified that it's correctly processed for both reading and writing from and to the Touch 1500.

10.3 CREATING THE DCS GATEWAY MAP FILE

A DCS Gateway Map file is needed to setup and enable the DCS Gateway for operation. A DCS Gateway Map File is a file containing the mapping definitions of Heat Trace circuit data and their Modbus register/coil assignments. A Heat Trace circuit data is the name to identify a particular field/parameter for a circuit/device. For example, if the DCS System requires read/write access to the Control Setpoint of a Circuit with the tag 'LINE2A_CIRCUIT', a Heat Trace Circuit data that include this information needs to be created, followed by assigning the heat trace circuit data to a Modbus register; for example to holding register starting at address 40001. In a typical DCS Gateway Map file, there will be many of these mapping definitions. In order to make the task of creating and editing the mapping definitions as simple as possible, the DCS Gateway Mapping Tool has been created for that purpose. Please contact you nVent representative for more information on mapping definitions see Appendix C.2 DCS Gateway Map.

10.4 SETTING UP THE DCS GATEWAY FOR OPERATION

The DCS Gateway is disabled by default and must be enabled to be in operation. Users that DO NOT require the DCS Gateway functionality please skip this section. This section explains how to setup and enable the DCS Gateway for operation. Before starting the setup, ensure a DCS Gateway Map file is available. For more information on creating a DCS Gateway Map File, please see section 10.3 Creating the DCS Gateway Map File.

10.4.1 Setting up the DCS Gateway

Go to System | DCS Gateway | Load Gateway File

For the very first time, the DCS Gateway Map field will be blank and the Gateway Enabled is default to No, as shown below:

FILE	SYSTEM		ALARM ACK
CIRCUIT LIST	ALARM LIST LOAD GATEWAY FILE		
DCS Gateway Ma	p NGC10-DCSGateway.dcsgwm_proj		BROWSE
Gateway Enabled	Yes	~	
		ок	CANCEL

Figure 10.2 Load Gateway File screen

DCS Gateway Map

Purpose: A DCS Gateway Map is required in order for the DCS Gateway to be in operation. A DCS Gateway Map needs to be created with the DCS Gateway Mapping Tool as describes in section 10.2 Creating DCS Gateway Map File. A DCS Gateway Map holds the mapping definitions of the Modbus data register/coil associated with the Heat Tracing circuit data of the Touch 1500 system.

Procedure: This field displays the current DCS Gateway Map File used by the DCS Gateway. This field is read only. In order to select or change the DCS Gateway Map File, use the Browse button located to the right of this field (i.e. See Section 10.3.2 Selecting and Viewing a DCS Gateway Map File). When finished, touch the OK button to save the settings.

Default: Blank for the very first time or the current DCS Gateway Map File the next time around.

Gateway Enabled

Purpose: This field is used to enable or disable the DCS Gateway. If the DCS Gateway functionality is not required set this to No. If the DCS Gateway functionality is required, then set this to Yes.

Note: More computer memory and processing power is required to run the DCS Gateway. If the DCS Gateway function is not required in the control application, leave the setting as default.

Procedure: Touch any part of the Gateway Enable selection area. A drop down list displaying Yes and No appears. Make the selection. When finished, touch the OK button to save the settings. Please note the DCS Gateway Map field must NOT be blank otherwise the OK button will not be not accessible.

Default: No.

10.4.2 Selecting and Viewing a DCS Gateway Map File

This section describes how to select or view a DCS Gateway Map File. Go to System | DCS Gateway | Load Gateway File

FILE	SYSTEM)	ALARM ACK
CIRCUIT LIST	ALARM LIST	SELECT DCS GATEWAY MAP FILE	
Current DC	S Gateway Map	NGC10-DCSGateway.dcsgwm_proj	
Removable	e Drive	D:\	✓
New DCS (Sateway Map		~
		PREVIEW MAP	
		ок	CANCEL

Figure 10.3 Select DCS Gateway Map File screen

Purpose: The Select DCS Gateway Map File screen allows the user to select a DCS Gateway Map to be used by the DCS Gateway, or to select a different DCS Gateway Map to use.

Procedure: Ensure that a Flash Drive is available in the USB slot. Select System menu and click on the dropdown menu button DCS Gateway. The Load Gateway File screen will appear. On the Load Gateway File screen touch the Browse button to bring up the Select DCS Gateway Map File screen. Select a removable drive then select the DCS Gateway Map file. Click OK to save. This will return you to the Load Gateway File screen with the selected DCS Gateway Map file displayed in the DCS Gateway Map field.
Preview Map Button

Purpose: To view the contents of a DCS Gateway Map File.

Procedure: The 1st step is to select a DCS Gateway map file to view. Then touch the Preview Map button to display the contents of the selected DCS Gateway Map file. The Preview DCS Gateway Map screen has 2 tabs, a General and Map Region tab. The General tab displays the name and description of the selected DCS Gateway map file. The Map Region tab displays map region information for 1 map region. To view a different Map Region, touch the Name field to select a different Map Region. If there are errors with a Map Region, it will be highlighted in Red text. The actual error message will be displayed on the screen after this map region is selected.

		PRE	/IEW D	CS	GATE	WAY MAP			
GENERAL	MAP RI	EGION							
Name	FCod	e1					~		
Description]					
Function Code	1 [Ou	tput Coil]		1	Devi	се Туре	4010i/4020i		1
Starting Address	1			j	Мар	ping Type	By Devices		
	Device List Data Point List								
Tag		Parent Tag	Тур	be		Descri	ption	Grc	
NGC10_ThreePh	ase		4010i/	402	Circ	uit Breaker Limi	ting Alarm	Alarm	
NGC10_SinglePh	aseLimiter		4010i/	402	Cor	ntactor Cycle Cou	unt Alarm	Alarm	-
NGC10_SinglePh	ase		4010i/	402	Cor	ntrol Temperature	e Failure Alarm	Alarm	
					Cor	ntrol Temperature	e High Alarm	Alarm	
					Cor	ntrol Temperature	e Low Alarm	Alarm	
					Dev	vice Reset Alarm		Alarm	
					Ext	InputAlarm		Alarm	
					Fac	tory Configuration	on Data Lost Alarm	Alarm	
					GFI	Current Transfo	rmer Failure Alarm	Alarm	•
				•				•	
								CANCEL	

Figure 10.4 Preview DCS Gateway Map

	PREVIEW DO	S GATEWAY MAP		
GENERAL	MAP REGION			
Name	FC03_Test_Region_8		✓	
Description	fc03 test region 8 with ng			
Function Code	3 [Holding Register]	Device Type	NGC40HTC	
Starting Address	1	Mapping Type	By Devices	
	Device List	Di	ata Point List	
Tag Parent Tag	Type Address	Description Group		
Tag Parent Tag	Type Address	Description Group		
Tag Parent Tag	Type Address	Description Group		
Tag Parent Tag	Type Address	Description Group		
Tag Parent Tag	Type Address	Description Group		

Figure 10.5 Map region with Errors

10.4.3 Creating a DCS Gateway Port

A DCS Gateway Port provides the communication channel required for communications between the DCS Gateway and the DCS System. A DCS Gateway Port will make use of a communication port such as COM1, COM2,COMxx or a TCP/IP connection on the Touch 1500. If it is necessary to add more communication ports or TCP/IP connections to the Touch unit, a USB hub can be used which allows for more USB to Serial or USB to Ethernet devices to be connected. The maximum number of DCS Gateway Ports supported by the DCS Gateway is 3. There must be at least 1 DCS Gateway port created in the Touch 1500 system before any remote data access is possible.

Go to System | DCS Gateway | Communications Setup

For the very first time, the screen will show an empty list of DCS Gateway Ports. See below:

FILE	SYSTEM			ALARM ACK
CIRCUIT LIST	ALARM LIST	COMMUNICATION SETUP		
ADD	CS Gateway Map N	GC10-DCSGateway.dcsgwm	_proj	
Name 🔺	Descriptio	on Port	Mode	Status

Touch the Add button to bring up the New DCS Gateway Port screen. If you are creating a DCS Gateway port that will use RS-485 communication please see section 10.3.3.1 Communication via Serial RS-485 or RS-232. If you are creating a DCS Gateway Port that will use TCP/IP communication, please see section 10.3.3.2 Communication via Ethernet TCP/IP.

FILE	SYSTEM		ALARM ACK
CIRCUIT LIST	ALARM LIST	NEW DCS GATEWAY PORT	
Name		Missing gateway port name	
Descriptio	on	DCS Gateway port description	
Mode		Stop	~
Connectio	on	COM1	~
Baud Rate	e	9600	~
Parity		None	~
Stop Bits		2	~
Timeout		2	✓
RTU Addr	ess	1	~
		ок	CANCEL



10.4.3.1 Communication via Serial RS-485 or RS-232

For communications with a DCS system, a DCS Gateway Port can use a Serial COM port that is available on the Touch 1500. Note that Serial ports COM3 and COM4 are already used by the Touch 1500 therefore they are not available for selection.

Name

Purpose: Up to a 50 character name can be assigned to a DCS Gateway Port. The name is used for identification purpose.

Figure 10.6 DCS Gateway Communication Setup screen

Range: Alpha-numeric characters Default: Empty field

Description

Purpose: A 255 character description can be assigned to a DCS Gateway Port. The description can be used to provide more details about the DCS Gateway map file.

Range: Alpha-numeric characters

Default: DCS Gateway port description

Mode

Purpose: The Mode defines if a DCS Gateway port is enabled or disabled. The DCS Gateway Port is enabled if Run is selected, and is disabled if Stop is selected.

Note: If a DCS Gateway Port is disabled, a DCS system connected to this port will not be able to perform remote data access with the Touch 1500. If there is another DCS Gateway Port used and is in Run mode, all activities for this port continue to run.

Options: Stop or Run

Default: Stop

Connection

Purpose: The connection defines the type of communication port used by the Gateway Port. This can either be a Serial port or TCP/IP. User can choose from a list of available serial port as well as TCP/IP.

Options: Available Serial ports (COM1, COM2, .etc.) or TCP/IP **Default:** The first available port in the list.

Delault. The first available port in the

Baud Rate

Purpose: Defines the data rate at which communications occur on the serial communication port. Options: 9600, 19200, 38400, 57600, 115200 Default: 9600

Parity

Purpose: Defines the type of parity bit to be used on the serial communication port. **Options:** None, Odd, Even **Default:** None

Stop Bits

Purpose: Defines the number of stop bits used on the serial communication port.
Options: 1 or 2
Default: 2

Timeout

Purpose: The Timeout defines the maximum time in seconds the DCS Gateway Port will wait for a communication response before a communication timeout error is issued.

Options: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10

Default: None

RTU Address

Purpose: The RTU address defines the Modbus address for the DCS Gateway Port. The Modbus address identifies the DCS Gateway Port as a Modbus device on the Modbus network. A DCS system can access the Gateway port remotely once it knows the DCS Gateway Port's Modbus address.

Note: On a Modbus network, the Modbus address of devices connected must be unique, otherwise communication errors and data lost will occur.

Options: 1 to 247

Default: 1

10.4.3.2 Communication via Ethernet TCP/IP

A DCS Gateway Port can use the TCP/IP connection available on the Touch 1500.

FILE	SYSTEM		ALARM ACK
CIRCUIT LIST	ALARM LIST	NEW DCS GATEWAY PORT	
Name		Missing gateway port pag	
Descriptio	'n	DCS Gateway port descr	iption
Mode		Stop	✓
Connectio	'n	TCP/IP	✓
IP Address	S	10.79.1.199	✓
Timeout		2	✓
RTU Addre	ess	1	×

Figure 10.8 New DCS Gateway Port using TCP/IP connection

Name

Purpose: Up to a 50 character name can be assigned to a DCS Gateway Port. The name is used for identification purpose.

Options: Alpha-numeric characters

Default: Empty field

Description

Purpose: A 255 character description can be assigned to a DCS Gateway Port. The description can be used to provide more details about the DCS Gateway map file.

Range: Alpha-numeric characters **Default:** DCS Gateway port description

MODE

Purpose: N/A Range: N/A Default: N/A

Connection

Purpose: The connection defines the type of communication port used by the Gateway Port. This can either be a Serial port or TCP/IP. User can choose from a list of available serial port as well as the TCP/IP selection.

Options: Available Serial ports (COM1, COM2, .etc.) or TCP/IP

Default: The first available port in the list.

IP Address

Purpose: The TCP/IP Address defines the address that will be used by the DCS Gateway Port. Normally a TCP/IP address exists for each Ethernet Network adapter installed in the Touch 1500 system. The IP Address selection list will show all available TCP/IP addresses and the user can select the one to use.

Note: TCP Port number 502 is automatically used by the DCS Gateway port if a TCP/IP connection is used. Port 502 is generally the accepted port used for Modbus TCP communications.

Options: Available TCP/IP addresses

Default: The first TCP/IP address on the list.

Timeout

Purpose: The Timeout defines the maximum time in seconds the DCS Gateway Port will wait for a communication response before a communication timeout error is issued.

Options: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10

Default: 2

RTU Address

Purpose: The RTU address defines the Modbus address for the DCS Gateway Port. The Modbus address identifies the DCS Gateway Port as a Modbus device on the Modbus network. A DCS system can access the Gateway port remotely once it knows the Gateway Port's Modbus address.

Note: On a Modbus network the Modbus address of devices connected must be unique, otherwise communication errors and data lost will occur.

Options: 1 to 247

Default: 1

10.4.4 Starting and Stopping the DCS Gateway

To start the DCS Gateway, go to System | DCS Gateway | Load Gateway File. The Load Gateway File screen will be displayed. Touch the white area for the Gateway Enabled field and select Yes from the drop down list. Use the OK button to save the changes.

Note: A DCS Gateway Map must be already selected otherwise the OK button is disabled.

To stop the DCS Gateway, go to System | DCS Gateway | Load Gateway File. The Load Gateway File screen will be displayed. Touch the white area for the Gateway Enable field and select No from the drop down list. Use the OK button to save the changes.

Note: A warning will appear whenever the DCS Gateway is stopped or disabled. This is to confirm your action since this will stop all DCS Gateway Port communications with DCS systems.

FILE	SYSTEM		ALARM ACK
CIRCUIT LIST	ALARM LIST	GATEWAY PORT SETTINGS	
DCS Gateway	Map NGC1	DCS GATEWAY ENABLED SET TO NO	BROWSE
Gateway Enab	led No	This action will stop all DCS gateway port communications. Do you want to	
		continue?	
			CANCEL

Figure 10.9 Stopping the DCS Gateway Warning

10.4.5 Editing a DCS Gateway Port

To change a DCS Gateway Port settings, go to System | DCS Gateway | Communication Setup. The Communication Setup screen with a list of available Gateway Port will be displayed. Select the desired DCS Gateway Port to bring up the Edit button. Touch the Edit button to begin your edit. Use the OK button to save the changes.

FILE	SYSTEM				ALARM ACK	
CIRCUIT LIST	ALARM LIST	соммини	CATION SETUP			
ADD D	ADD DCS Gateway Map NGC10-DCSGateway.dcsgwm_proj					
Name 🔺	Descriptio	n	Port	Mode	Status	
DCS Gateway	DCS Gateway port d	escription	COM1:9600,None,8,2	Stop	ок	
DELETE	EDIT	VIEW POP	RT STATUS			

Figure 10.10 Communication Setup screen

FILE	SYSTEM		ALARM ACK
CIRCUIT LIST	ALARM LIST	EDIT DCS GATEWAY PORT	
Name		DCS Gateway	
Descriptio	on	DCS Gateway port description	
Mode		Stop	~
Connectio	on	COM1	~
Baud Rate	e	9600	~
Parity		None	~
Stop Bits		2	~
Timeout		2	~
RTU Addr	ess	1	~



10.4.6 Starting and Stopping a DCS Gateway Port

To start a DCS Gateway Port, go to System | DCS Gateway | Communication setup. The communication Setup screen with a list of available Gateway Port will be displayed. Select the desired DCS Gateway Port and this row will expand to show the Edit button. Touch the Edit button to bring up the Edit DCS Gateway Port screen. Touch the Mode field and select Run from the drop down list. Use the OK button to save your changes.

To Stop a DCS Gateway Port, follow the same procedure as described above and for the Mode field, select Stop from the drop down list. Use the OK button to save your changes.

Note: Starting or Stopping a DCS Gateway Port does not affect the operation of the other DCS Gateway Ports.

10.5 SETTING UP THE DCS GATEWAY FOR VLINX AND PROFIBUS GATEWAY OPERATION

For users that are using Profibus devices and would like to remotely access heat trace information from the Touch 1500, a solution is to use a Profibus to Modbus converter or gateway. A suggested choice is the Vlinx ConnectPro Protocol Converter (VFG1000, VFG2000, and VFG3000). The Vlinx ConnectPro purchased along with the VFG9000-PBDP Profibus expansion card provides the Profibus to Modbus conversion solution needed for communication with the DCS Gateway. This section describes a recommended approach on how to setup your VLINX and DCS Gateway Map for Profibus access to Heat Trace information on the Touch 1500.

On a Profibus network, in order to achieve fast and deterministic response times small packets of data are used for data exchange. This restricts the amount of data that can be read and write for a single Profibus device. This limitation restricts how much Heat Trace information a Vlinx unit can transfer from Modbus to Profibus and vice versa. If more data transfer is required, then more Vlinx units are required.

The recommended approach is to use a pre-programmed configuration file that is to be loaded into a Vlinx unit.

10.5.1 Pre-programmed Vlinx configuration file

This custom configuration file (i.e. DCS_GW_Config.vxd) is included with the DCS Gateway Mapping Tool. Use the Connect Pro Manager software to download the custom configuration file into the Vlinx unit. The following two tables show the preconfigured Profibus input/output areas in the Vlinx custom configuration file.

Function Code	Address range to be used
1	Address 1 – 144
2	Address 1 - 72
3	Not used
4	Address 1 – 108
2; system alarms	Will be picked up automatically

Table 1: Available addresses in Modbus map for transfer via standard Vlinx configuration file to Profibus Master device

Block	Address range
1	Address 0 - 108
2	Address 9-13
3	Address 14 - 144

Table 2: Profibus addresses to be used by Profibus master device

10.5.2 The Vlinx Custom Configuration File

The custom configuration file included with the DCS Gateway Mapping Tool can be used as a starting point to create a user specific setup for the Vlinx unit. After loading the custom configuration file into your Vlinx unit, the Network Protocol setting needs to match the Touch 1500 system. The Profibus Interface settings for the Profibus adapter also needs to be updated as well. Once both settings are updated then the unit is then ready for operation.

lavigation Pane	X Communications - Option Card - Profibus Interface - PBDP_Slave - Holding_Registers
Communications GR 5222 Program Port GR 5-322 Comms Port GR 5-323 Comms Port GR 5-323 Comms Port Frotocol 1 - Modbus TCP/IP Master TOUCHIS00_DCS_GW Frotocol 2 Frotocol 2 Frotocol 3 Frotocol 4 Services Option Card - Profibus Option Card - Profibus-DP	Block Settings Start Address: R0005.WORD Pick Block Size: 95 Direction: Device to Viins ConnectPro • Tag Data: Use Scaled Values • Update Policy: Automatic • Update Period: 500 Block Control
BDP_Slave Disital Inputs	Request General Always Edit
	Acknowledge: Treasant None
	Delete This Block

Figure 10.12 Custom Vlinx Configuration

10.6 VIEWING DCS GATEWAY DATA

Once the DCS Gateway has been setup and the system is up and running, it is necessary to test and verify the connectivity between the Touch 1500 and the DCS Systems. Once the remote data access capability is confirmed with the DCS Systems, the next step is to validate the data retrieved and data written to the Touch 1500 system. This section explains the available screens in the Touch 1500 system that can help you perform these validations. The 2 screens are the View Data Points and View Port Status screen. **Note:** In this section, there are references to the DCS Gateway Map and the data within the map. To get a better insight in the data type, please see Appendix C DCS Gateway Map for more information.

10.6.1 View Data Points

To bring up the View Data Points screen go to System | DCS Gateway | View Data Points. The View Data Points screen will be displayed.

FIL	E	SYSTEM		ALARM AC	ж
CIRCUIT	T LIST	ALARM LIST VIEW DATA POINTS			
Map Reg	ion	[*] 1 [Output Coil]	~		
START AL	DDRESS dress	1Function Code1 [Output Coil]1080Mapping TypeBy Devices	Show unsigned values Use Modbus Address	v ing	
Address	Value	Name	Tag Parent Tag	Туре	State
1	0	Circuit Breaker Limiting Alarm	NGC10_ThreePhase	4010i/4020i D	evice no
2	0	Contactor Cycle Count Alarm	NGC10_ThreePhase	4010i/4020i D	levice no
3	0	Control Temperature Failure Alarm	NGC10_ThreePhase	4010i/4020i D	evice no
4	0	Control Temperature High Alarm	NGC10_ThreePhase	4010i/4020i D	levice no
5	0	Control Temperature Low Alarm	NGC10_ThreePhase	4010i/4020i D	levice no
6	0	Device Reset Alarm	NGC10_ThreePhase	4010i/4020i D	levice no
7	0	ExtinputAlarm	NGC10_ThreePhase	4010i/4020i D	evice no
8	0	Factory Configuration Data Lost Alarm	NGC10_ThreePhase	4010i/4020i D	evice no
9	0	GFI Current Transformer Failure Alarm	NGC10_ThreePhase	4010i/4020i D	evice no
10	0	Ground Fault Trip	NGC10_ThreePhase	4010i/4020i D	evice no
11	0	Heater Time Alarm	NGC10_ThreePhase	4010i/4020i D	evice no
12	0	High Ground Fault Current Alarm	NGC10_ThreePhase	4010i/4020i D	evice no
13	0	High Limit Cut-Out Alarm	NGC10_ThreePhase	4010i/4020i D	evice no
14	0	High Line 1 Current Alarm	NGC10_ThreePhase	4010i/4020i D	evice no
15	0	High Line 2 Current Alarm	NGC10_ThreePhase	4010i/4020i D	levice no
16	0	High Line 3 Current Alarm	NGC10_ThreePhase	4010i/4020i D	evice no
17	0	High Heating Cable 1 Resistance Alarm	NGC10_ThreePhase	4010i/4020i D	evice no
18	0	High Heating Cable 2 Resistance Alarm	NGC10 ThreePhase	4010i/4020i D	levice no

Figure 10.13 View Data Points Screen

Map Region

Purpose: The Map Region selection box allows you to selectively view data points for a Map Region. The selection box will have all the Map Regions that are in the current DCS Gateway Map File. In addition there are 6 special Map Region selections that can provide more viewing capabilities. These special map regions include the selections to view all Map Region for a particular Function Code, for example [*] 4 [Input Register]. When this selection is selected, all available Map Regions that are assigned to Function Code 4 will be displayed in the data list. Amongst the 6 special map regions there are 2 System Map Regions. The System Map Regions are appended to the end of the selection list. These regions occupy Modbus data address 65000 and above and they are reserved for system use only.

Start Address

Purpose: The Start Address is the 1st Modbus data address for the selected Map Region. The Start Address button has the purpose of displaying the Find Address Window. The Find Address Window can be used to locate a row of data based on the Modbus data address. The lowest Modbus data address assigned is 1. Please see Section 10.6.1.1 Find Window for more information on the Find Address Window.

End Address

Purpose: The End Address is the last Modbus data address for the selected Map Region. The largest Modbus data address is 65000.

Note: An address can be assigned a number up to 65535 for a regular Modbus data address, however in the DCS Gateway, address 65000 and up are reserved for system information.

Function Code

Purpose: The Function Code is the Function Code assigned to the selected Map Region. The Function Code can be one of the following:

- · 1 for accessing the Output Coil data
- 2 for accessing the Input Discrete data
- 3 for accessing the Holding Register data
- · 4 for accessing the Input Register data

Mapping Type

Purpose: The Mapping Type is the Mapping Type assigned to the selected Map Region. This can be either By Devices or By Data Points. Please note if the selected Map Region is a View All Regions for a Function Code then you may see By Devices/Data Points text if there are both types of Map Regions assigned to the same Function Code. For more information on Mapping Type see Appendix D.5 Mapping Type by Devices vs by Data Points.

Value Display Option

Purpose: The Value Display Option determines how the data is presented on the screen. The following options are available: Show Unsigned Values, Show Signed Values, and Show Engineering Values.

Use Modbus Addressing Option

Purpose: The Use Modbus Addressing Option determines the address format for the address column. If the Use Modbus Addressing option is checked, then addresses are displayed in 0xxxxx, 1xxxxx, 3xxxxx, 4xxxxx format, where xxxxx is a number from 1 to 65535. This type of format is well recognized and accepted in the control and monitoring industries. If the Use Modbus Addressing is not checked, then the addresses are just numbers representing the offset within a Function code memory table (i.e. from 1 to 65535).

Refresh Time

Purpose: The Refresh Time is the time required to collect data for all rows in the current data list. This is an estimated time determined by the system and it is dependent on the number of things such as the number of devices that are in the current list, the number of devices/circuits installed in the system, the current activities such as alarms, and the current user actions.

Note: The value -30000 is used as an invalid value indicator. The following conditions can cause this to happen:

- 1) The Device for the data point is not found or not available
- 2) The Device for the data point is in communication failure
- 3) The Data point is not available for the current device
- 4) DCS Gateway is in Communication failure
- 5) The device is offline

Note: The column headers can be sorted and the column width and column orders can be changed as well. When you change the column width and column order, these settings are saved the next time you come back to this screen. Also these settings are shared by both the View Data Points and View Port Status screens. If you change them in one screen, it will apply to the other screen automatically.

10.6.1.1 Find Address Window

Alt there are many rows in the data list displayed in the View Data Points or View Port Status screen, it may be difficult to scroll through the list to find the item you are looking for. In that situation, the Find Address Window may be helpful, as you can use it to locate a row more quickly. When the View Data Points or View Port Status screen is displayed, touch the Start Address button to bring the Find Address window.



Figure 10.14 Find Address Window

Enter the address you would like to search by touching the number entry area. A numeric key pad will appear. Enter the address and touch the Search button. If the address is found, the row that contains this address will be visible on the screen. If the address is not found, the content of the list remains the same.

10.6.2 View DCS Gateway Port Status

The View Port Status screen can display the DCS Gateway data the same as in the View Data Points screen. However you can find information on the communication activities on a DCS Gateway Port as well. These communication activities may help you to understand the state of your control system and if any optimization is necessary.

To bring up the View Port Status screen, you must first go to the Communication Setup screen by selecting System | DCS Gateway | Communication Setup. On the Communication Setup screen, select a DCS Gateway Port by touching the row it is on. The row will expand and show the View Port Status button. Touch the View Port Status button to bring up the View Port Status screen. There are 3 tabs on the View Port Status screen; Gateway Port Data, Port Diagnostic Data and Close View Port Status tab.

FILE	SYSTEM				ALARM ACK			
CIRCUIT LIST	ALARM LIST	COMMUNI	CATION SETUP					
ADD Dr	ADD DCS Gateway Map NGC10-DCSGateway.dcsgwm_proj							
Name 🔺	Description Port Mode Sta							
DCS Gateway	DCS Gateway port d	lescription	COM1:9600,None,8,2	Stop	ок			
DELETE EDIT VIEW PORT STATUS								

Figure 10.15 Comm unication Setup Screen

FILE	SYSTEM	ALARM ACK	
CIRCUIT LIST	ALARM LIST VIEW DCS GATEWA	NY PORT STATUS	
GATEWAY PORT	DATA PORT DIAGNOSTIC DATA CLO	SE VIEW PORT STATUS	_
Gateway Port	DCS Gateway 🖌 Map Region	[*] 1 [Output Coil]	
START ADDRESS End Address	1 Function Code 1 [Output Coil] 1080 Mapping Type By Devices	Show unsigned values 💙 Use Modbus Addressing	
Address Value	Name	Tag Parent Tag	
1 0	Circuit Breaker Limiting Alarm	NGC10_ThreePhase	

Figure 10.16 View DCS Gateway Port Status Screen

10.6.2.1 Gateway Port Data Tab

The Gateway Port Data tab screen is basically the same as the View Data Points screen. It's slightly smaller since it is within a Tab window. The description of the contents and the available user interactions on the screen are described in section 10.5.1 View Data Points. Please see section 10.5.1 for more information.

10.6.2.2 Port Diagnostic Data Tab

The DCS Gateway is designed to run silently in the background. When unexpected errors occurred during operation, the system will convert them to system alarms. The Touch will show these system alarms in the Alarms list similar to other alarms. The following system alarms are managed and handled by the Touch 1500 system.

Note: If these alarms do appear on your Touch 1500 system, please check your system and correct them as soon as possible.

- Missing DCS Gateway Map
- Corrupted DCS Gateway map File
- DCS Gateway system Failure occurred
- DCS Gateway communication failure occurred
- There are overlapping Map Region in the DCS Gateway Map File
- · There are Invalid Map Region settings in the DCS Gateway Map File

In addition to the system alarm management, the system keeps statistics of communication activities while the DCS Gateway is running. To view this statistics, go to the Port Diagnostics Data tab.

FILE SYS	STEM		ALARM ACK
CIRCUIT LIST ALAR	M LIST VIEW DO	S GATEWAY PORT STA	rus
GATEWAY PORT DATA POP	RT DIAGNOSTIC DA	TA CLOSE VIEW POF	RT STATUS
Gateway Port	DCS Gateway	~	
DIAGNOSTIC COUNTERS			
Name		Valu	e
Start Time		2020-12-04 2:55:47 PM	
Failed responses		0	
Total request received		0	
Total valid requested rec	eived	0	
		0	
Successful responses		U	
Modbus Exception respo	nses	0	
Modbus Exception respo Function code 1 transact	nses ions	0	

Figure 10.17 View DCS Gateway Port Status Screen

Start Time

Purpose: The Start Time is the time the DCS Gateway is started.

Failed Response

Purpose: The Failed Response count is the number of failed Modbus responses. Typically if a Modbus transaction results in a Modbus Exception response the count would increase by 1.

Total Request Received

Purpose: The Total Request Received count is the number of Modbus query messages received.

Total Valid Request Received

Purpose: The Total Request Received count is the number of Modbus query messages received. A query message received must be a valid Modbus query message.

Successful Response

Purpose: The Successful Response count is the number of successful responses sent to the Modbus Master or DCS System.

Modbus Exception Responses

Purpose: The Modbus Exception Responses count is the number of Modbus Exception responses send to the Modbus Master or DCS System.

Function Code 1 Transactions

Purpose: The Function Code 1 Transactions count is the number of Modbus queries received that uses Function Code 1. Function Code 1 is for reading Output Coil statuses.

Function Code 2 Transactions

Purpose: The Function Code 2 Transactions count is the number of Modbus queries received that uses Function Code 2. Function Code 2 is for reading Discrete Input statuses.

Function Code 3 Transactions

Purpose: The Function Code 3 Transactions count is the number of Modbus queries received that uses Function Code 3. Function Code 3 is for reading Holding Register values.

Function Code 4 Transactions

Purpose: The Function Code 4 Transactions count is the number of Modbus queries received that uses Function Code 4. Function Code 4 is for reading Input Register values.

Function Code 5 Transactions

Purpose: The Function Code 5 Transactions count is the number of Modbus queries received that are using Function Code 5. Function Code 5 is for changing the status of 1 Output Coil.

Function Code 6 Transactions

Purpose: The Function Code 6 Transactions count is the number of Modbus queries received that uses Function Code 6. Function Code 6 is for setting the value of 1 Holding Register.

Function Code 15 Transactions

Purpose: The Function Code 15 Transactions count is the number of Modbus queries received that uses Function Code 15. Function Code 15 is for setting the status of 1 or more Output Coils.

Function Code 16 Transactions

Purpose: The Function Code 16 Transactions count is the number of Modbus queries received that uses Function Code 16. Function Code 16 is for setting the value of 1 or more Holding Registers.

10.6.2.3 Close View Port Status Window

Touch the Close View Port Status tab to close the current screen and return to the Communication Setup screen.

APPENDIX A ETHERNET CONNECTION TO THE BRIDGE

A.1 INTRODUCTION

This appendix describes two examples on how to connect and program the nVent RAYCHEM TOUCH 1500R and NGC-40-BRIDGE using Ethernet. Before you proceed with the description below, a keyboard is required. If a keyboard is not available, a virtual keyboard can be accessed. Go to Start | All Programs | Accessories | Accessibility | On-Screen Keyboard.

Example 1: Connection Directly from the NGC-40-BRIDGE to the TOUCH 1500R using a Static IP Address.

Below are two diagrams on how the NGC-40-BRIDGE can connect directly to the TOUCH 1500R:



Figure A.1 Connecting directly to NGC-40-BRIDGE using Ethernet crossover cable



Figure A.2 Connecting to NGC-40-BRIDGE using Ethernet switch and standard Ethernet cable

A.2 SETTING A STATIC IP ON THE TOUCH 1500R

Step 1: Exit from the TOUCH 1500 software.

The TOUCH 1500 Desktop should now be displayed

Step 2: Click on Start | Control Panel | Network Connections

Step 3: Double click on the Local Area Connection or Local Area Connection 2 depending on which Ethernet port is connected to the NGC-40-BRIDGE.

Local	Area Connection Properties
General	Advanced
Connec	t using:
1139 E	roadcom NetXtreme 57xx Gigabit Cc Configure
This co	nnection uses the following items:
	Client for Microsoft Networks File and Printer Sharing for Microsoft Networks QoS Packet Scheduler Internet Protocol (TCP/IP)
	nstall Uninstall Properties
Tran wide acro:	smission Control Protocol/Internet Protocol. The default area network protocol that provides communication ss diverse interconnected networks.
☐ Sho ☑ Noti	w icon in notification area when connected fy me when this connection has limited or no connectivity
	OK Cancel

Figure A.3 Local Area Connection Properties window

Step 4: Double click on Internet Protocol (TCP/IP)

Step 5: Click on Use the following IP address you should see the below window:

Internet Protocol (TCP/IP) Pr	operties 🛛 💽 🔀
General	
You can get IP settings assigned a this capability. Otherwise, you nee the appropriate IP settings.	automatically if your network supports d to ask your network administrator for
O <u>O</u> btain an IP address automa	atically
• Use the following IP address	3
IP address:	
S <u>u</u> bnet mask:	
Default gateway:	
O Obtain DNS server address a	automatically
• Use the following DNS serve	addresses:
Preferred DNS server:	
Alternate DNS server:	
	Ad <u>v</u> anced
·	OK Cancel

Figure A.4 Internet Protocol Properties window

Step 6: Enter the first 3 blocks of the NGC-40-BRIDGE's IP address. The default IP address for the NGC-40-BRIDGE is 192.168.1.100. For the last block, choose a number between 1 and 255, but it cannot be the same address being used by the NGC-40-BRIDGE.

IMPORTANT: Once the IP address is entered, the Subnet Mask will automatically be entered. No change is required. Press OK.

'ou can get IP settings assigned nis capability. Otherwise, you nee ne appropriate IP settings.	automatically if your network supports at to ask your network administrator for
Obtain an IP address autom	atically
Use the following IP address	£
IP address:	192.168.1.215
S <u>u</u> bnet mask:	255 . 255 . 255 . 0
Default gateway:	
Obtain DNS server address	automatically
Use the following DNS served	er addresses:
Preferred DNS server:	
Preferred DNS server:	

Figure A.5 Internet Protocol Properties window

Step 7: Start the TOUCH 1500 program and go to the System | Device Manager | Scan for Devices | Scan Ethernet Network. You should see the below window:

FILE	SYSTEM		ALARM ACK
CIRCUIT LIST	ALARM LIST	DEVICE MANAGER	
DEVICE LIST	SCAN FOR DEVIC	ES	
SCAN FIELD PORT	SCAN ETHERNET	NETWORK	
FROM IP ADDRESS 10 TO IP ADDRESS 10	79 1 174 FROM 79 1 174 TO MO	1 MODBUS ADDRESS 1	START SCAN DISCOVER DEVICES
		Ready to perform ne	network scan.
Address Tag	Device Type Fi	irmware Version	Sta Installed Module List
			CAN Network ID Type Alarm(s) Info

Figure A.6 Device Manager | Scan Ethernet Network window

Step 8: Enter in the IP address of the Bridge (default IP 192 168 1 100) and change the To Modbus Address to 1.

FILE	SYSTE	M				ALAR	М АСК
CIRCUIT LIST	ALARM LI	ST DE	VICE MANAGER				
DEVICE LIST	SCAN FOR D	EVICES					
SCAN FIELD PORT	SCAN ETHE	RNET NE	TWORK				
FROM IP ADDRESS 10 TO IP ADDRESS 10	79 1 174 79 1 174	FROM MOD	DBUS ADDRESS 1 IS ADDRESS 1	START SCAN	DISCOV	/ER DEVICES	
			Ready to perform n	etwork scan.			
Address Tag	Device T	vpe Firmwa	are Version	Sta	Installed	Module List	
				CAN Network ID	Туре	Alarm(s)	Info

Figure A.7 Device Manager | Scan Ethernet Network window

Step 9: Press the Start Scan button to load the modules

FILE	SYSTEM		ALARM ACK
CIRCUIT LIST	ALARM LIST	DEVICE MANAGER	
DEVICE LIST	SCAN FOR DEVIC	ES	
SCAN FIELD PORT	SCAN ETHERNET	NETWORK	
FROM IP ADDRESS 10 TO IP ADDRESS 10	79 1 174 FRC 79 1 174 TO I	PLEASE WAIT Running TCP/IP Network Scan.	DISCOVER DEVICES
Address Tag	Device Type 0i/4020i-0 4010i/4020i	Scanning IP Address: 10.79.1.174 Modbus Address: 1	Installed Module List Type Alarm(s) Info
			J

Figure A.8 Device Manager | Scan Ethernet Network | Start Scan window

Example 2: Connecting NGC-40-BRIDGE and the TOUCH 1500R together via the Ethernet network using DHCP

Below is diagram on how the NGC-40-BRIDGE and the TOUCH 1500R can be connected via the Ethernet network. You may require the assistance from IT to complete the following steps. Before you proceed with the below, a keyboard is required. If a keyboard is not available, a virtual keyboard can be accessed. Go to Start | All Programs | Accessories | Accessibility | On-Screen Keyboard.



Figure A.9 Connecting to NGC-40-BRIDGE via the intranet

The following only addresses local networks with DHCP. If your network does not have DHCP, you may need to manually setup an IP address in the TOUCH 1500 which is explained in the previous example.

Step 1: Connect the TOUCH 1500R and the NGC-40-BRIDGE to the Ethernet network.

Step 2: Exit the TOUCH 1500R program and go to Start | All Programs | Accessories | Command Prompt.

Step 3: Type ipconfig and press enter. Especially take note of the IP Address and Subnet Mask

🐼 Command Prompt
Microsoft Windows XP [Version 5.1.2600] (C) Copyright 1985-2001 Microsoft Corp.
C:\Documents and Settings\dnolte>ipconfig
Windows IP Configuration
Ethernet adapter Local Area Connection:
Connection-specific DNS Suffix . : CORPDOMAIN.NET IP Address 10.133.212.57 Subnet Mask 255.255.255.0 Default Gateway 10.133.212.1
Ethernet adapter Wireless Network Connection:
Media State Media disconnected
C:\Documents and Settings\dnolte>_

Figure A.10 Command prompt on TOUCH 1500

Step 4: Using a laptop computer, connect to the NGC-40-BRIDGE via RS-232. Start the nVent RAYCHEM Hardware Manager program and connect to the NGC-40-BRIDGE.

Step 5: Change the NGC-40-BRIDGE from RUN to SET by moving the switch located on the front of the NGC-40-BRIDGE module. This will allow you to edit the NGC-40-BRIDGE settings.



Figure A.11 NGC-40-BRIDGE communication slide switch

Step 6: Enter the first 3 blocks of the TOUCH 1500R's IP address and Subnet Mask that was assigned by the DHCP server in step 3. For the last block of the IP address, choose a number between 1 and 255, but it cannot be the same as the TOUCH 1500R or any other device on the network. Press OK.

Bridge Settings - Raychem NGC-40 Hardware Manager										
NGC-40-BRIDGE Settings Viewing: NGC-40 DEMO PANEL										
General Information	General Information									
Tag: NGC-40 DE	MO PANEL									
Firmware Version: 5.23.4		Operating System Version	175							
Ethernet MAC Address: 00:12:4F:00	:02:DB	Number of Installed Devices	25							
Communication Paramete	ers									
Com 1	- Com 2	Local RS-232-								
Unit ID: 1	Unit ID: 1	Unit ID:	1							
Baud Rate: 9600	Baud Rate: 9600	Baud Rate:	9600							
Data Bits: 8	Data Bits: 8	Data Bits:	8							
Parity: None	Parity: None	Parity:	None							
Stop Bits: 2	Stop Bits: 2	Stop Bits:	2							
TX Delay: 0	TX Delay: 50	TX Delay:	0							
Frame Type: RTU	Frame Type: RTU	Frame Type:	RTU							
	RMM: Disabled	1 								
Ethernet Port	L									
IP Address: 10 133 80	49 Modbus Tir	meout: 60								
Netmask: 255 255 255	5 0 ^U	Jnit ID: 1								

Figure A.12 NGC-40-BRIDGE settings using the HGC-40 Hardware Manager

Step 7: Change the switch on the NGC-40-BRIDGE from SET to RUN

Step 8: Start the TOUCH 1500R program and go to the System | Device Manager | Scan for Devices | Scan Ethernet Network. You should see the below window:

FILE			S	YS	TEM						ALAF	RM ACK
CIRCUIT L	IST		AL	ARN	/ LIST	DEVICE MA	NAGEF	ł				
DEVICE L	IST	s	CAN	N FO	DR DE\	/ICES						
SCAN FIELD	POR	т	SCA	N E	THERN	NET NETWORK						
FROM IP ADDRE	SS 10	79) 1	1	174 FI 174 T(ROM MODBUS ADDR	ESS 1 ; 247		START SCAN	DISCOV	/ER DEVICE	s
Ready to perform network scan.												
Address	Tá	ıg		Dev	vice Type	Firmware Version		Sta		Installed	Module List	
1 Elex	ant 40	10i/4	020i-0	0 40	10i/4020	i 1.2.313	Device all	ready	CAN Network ID	Туре	Alarm(s)	Info

Figure A.13 Device Manager | Scan Ethernet Network window

Step 9: Enter in the IP address of the BRIDGE (step 6) and change the To Modbus Address to 1.

FILE	SYSTEM			ALARM	ACK	
CIRCUIT LIST	ALARM LIST	DEVICE MANAGE	R			
DEVICE LIST	SCAN FOR DEV	ICES				
SCAN FIELD PORT	SCAN ETHERN	ET NETWORK				
FROM IP ADDRESS 10 TO IP ADDRESS 10	79 1 174 FR 79 1 174 TO	MODBUS ADDRESS 1 MODBUS ADDRESS 247	START SCAN	DISCOVER DEVICES		
	Ready to perform network scan.					
Address Tag	Device Type	Firmware Version	Sta	Installed Module List		
1 Elexant 4010)i/4020i-0 4010i/4020i	1.2.313 Device al	CAN Network ID	Type Alarm(s)	Info	

Figure A.14 Device Manager | Scan Ethernet Network window

Step 10: Press the Start Scan button to load the modules

FILE	SYSTEM)	ALARM AG	ж
CIRCUIT LIST	ALARM LIST	DEVICE MANAGER	R	
DEVICE LIST	SCAN FOR DEVIC	ES		
SCAN FIELD PORT	SCAN ETHERNET	NETWORK		
FROM IP ADDRESS 10 TO IP ADDRESS 10	79 1 174 FROM 79 1 174 TO MO	I MODBUS ADDRESS 1 DDBUS ADDRESS 247	STOP SCAN DISCOVER DEVICES	
	Sc	anning IP Address: 10.79.1.1	.174 Modbus Address: 4	
Address Tag	Device Type Fi	rmware Version	Sta PLEASE WAIT	
			Running TCP/IP Network Scan. Scanning IP Address: 10.79.1.174 Modbus Address: 4 CANCEL	ĒL

Figure A.15 Device Manager | Scan Ethernet network | Start Scan window

B.1 INTRODUCTION

There are several types of control modes in the controller. Some of these modes require further explanation in order to fully understand and implement their operation. This section describes the Switch Control Modes available in the HTC/HTC3 and how to set their associated parameters, as well as the Load Shedding Control mode.

B.2 SWITCH CONTROL MODES

There are five Switch Control modes associated with the HTC/HTC3. The following is an explanation of their implementation in the controller and the differences between them.

B.2.1 Proportional Control

When using SSRs to directly control the power applied to a trace circuit, the output may be switched on/off very rapidly. The controller implements proportional temperature control on a cycle by cycle basis (50 or 60 Hz power line cycle). This algorithm monitors the temperature of the heating circuit and compares it to the Control Setpoint temperature. If the temperature of the control sensor is at or below the Control Setpoint temperature, then power is applied to the trace with a duty cycle of 100% – the controller output is full on. If the temperature sensed by the control sensor is equal to or greater than the Control Setpoint temperature + the PROPORTIONAL BAND setting, then the controller output will have a duty cycle of 0% – the output will be off. The temperature of the control sensor is constantly monitored and the output duty cycle is adjusted proportionally according to where the temperature falls within the 0% to 100% band.

Proportional Control	Temperature Band
Control Sensor Temperature	Duty Cycle
Setpoint + proportional band	0%
Setpoint + proportional band/2	50%
Setpoint	100%

B.2.2 On/Off Control

When using the HTC/HTC3 in an application where the controller is used to open and close a contactor, proportional control cannot be used. In these cases a On/Off control algorithm is used. The output duty cycle is not controlled, instead the output is either fully on or completely off. The user can set the deadband value. The controller monitors the temperature of the trace circuit and compares it to the Control Setpoint temperature as in the proportional control. If the control sensor temperature is above the Control Setpoint temperature by more than the deadband value, the output is turned off. If the control sensor temperature falls below the Control Setpoint temperature the output is turned on. This is a very simple control algorithm but it works very effectively in heat trace applications where the temperature of a traced system changes relatively slowly.

Deadband Control	Temperature Band
Control Sensor Temperature	Output State
Setpoint + deadband	Off
Setpoint	On

When the control sensor temperature is within the deadband, the output does not change its state. Also, when using On/Off control a contactor is not allowed to toggle faster than every 2 seconds. If an AC alarm with an alarm filter time greater than 0 is detected, the contactor will not toggle until the alarm filter time has expired.

B.2.3 PASC (Proportional Ambient Sensing Control) SSR

When using SSRs to directly control the power applied to a heating circuit, the output may be switched on/off very rapidly. The controller implements PASC-SSR temperature control on a cycle by cycle basis (50 or 60 Hz power line cycle). This algorithm monitors ambient temperature and compares it to the Control Setpoint temperature. If the temperature of the control sensor is at or below the Control Setpoint temperature minus the Proportional Band setting, then power is applied to the trace with a duty cycle of 100% – the controller output is fully on. If the temperature sensed by the control sensor is equal to or greater than the Control Setpoint temperature, then the output will have a duty cycle of 0% – the controller output will be off. The temperature of the control sensor is constantly monitored and the output duty cycle is adjusted proportionally according to where the temperature falls within the 0% to 100% band.

PASC SSR Control Temperature Band

Control Sensor Temperature	Duty Cycle	
Setpoint	0%	
Setpoint+proportional band/2	50%	
Setpoint+proportional band	100%	



NOTE 1: The load shedding "fail safe mode" is not supported when using PASC SSR control, since ambient temperature is being monitored rather than pipe temperature.

When an HTC/HTC3 using a SSR is used to control the output based on the ambient temperature this control mode should be used.



NOTE 2: The load shedding "fail safe mode" is not supported when using proportional ambient



contactor control, since ambient temperature is being monitored rather than pipe temperature. Also note that if an AC alarm, with an alarm filter time greater than 0, is detected the contactor will

not toggle until the alarm filter time has expired. **B.2.4 PASC (Proportional Ambient Sensing Control) EMR**

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. This is true regardless of heater type, insulation type, or pipe size. Since 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 NGC-40 HTC/HTC3 has a control algorithm that uses the measured ambient temperature, desired maintain temperature, minimum ambient temperature assumption used during design, 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.



IMPORTANT: The power to the heat tracing is proportioned based on the ambient temperature. If the ambient temperature is at or below the "minimum design ambient" +1 2/3°C the heaters will be on 100%. If the measured ambient is at or above the "maintain temperature" -1 2/3°C the heaters will be on 0%. For any measured ambient between "minimum design ambient" and "maintain temperature," the heaters will be on a percentage of the time equal to (maintain temperature – measured ambient) / (maintain temperature – minimum design temperature).



Figure B.1 PASC chart

B.2.5 Always On/Off

Always On

The relay output is switched on (user override), turns on the power to the heater and leaves it on. IMPORTANT: Monitor the pipe temperatures to avoid overheating. Alarms are still active.



The relay output is switched off (user override), turns off the power to the heater, and leaves it off. IMPORTANT: Monitor the pipe temperatures for low temperature alarms. Alarms are still active

APPENDIX C INSTALLATION PROCEDURE FOR NVENT RAYCHEM TOUCH 1500 SOFTWARE

C.1 INTRODUCTION

The section describes the procedures on how to install nVent RAYCHEM Touch 1500 Software on a desktop or laptop computer.

C.1.1 Setup

For the installation of the nVent RAYCHEM Touch 1500, you will need the Touch 1500 installation setup file. The naming convention used for the setup file is nVent RAYCHEM_Touch_1500_???_ Setup.exe.

The computer that the Touch 1500 will be installed to should be running Windows 7 or higher, the software will work under Win-XP, however Microsoft .NET Framework 3.5 or higher may need to be installed.

C.1.2 Installing the nVent RAYCHEM Touch 1500 (to a computer with no previous versions of nVent RAYCHEM Touch 1500 installed)

Begin the installation by running the nVent RAYCHEM Touch 1500 setup file. Due to company security policy, you will be prompted to provide your credentials in order to continue with the installation.

The installation begins with the **Welcome** screen. Click next to proceed to the next screen.

👌 Raychem Touch 1500 - Inst	🕑 Raychem Touch 1500 - InstallAware Wizard			
3	Welcome to the InstallAware Wizard for Raychem Touch 1500			
	The InstallAware Wizard will install Raychem Touch 1500 on your computer.			
	WARNING: This program is protected by copyright law and international treaties.			
	To continue, click Next.			
	< <u>B</u> ack Next > Cancel			

Figure C.1 Welcome Screen

Saychem Touch 1500 - InstallAware Wizard		3
Setup Type	1	
Choose the setup type that is best for your needs.		1
Please select a setup type.		
Production Mode		
This should be selected if you are installing on the Touch 1500 tou screen hardware.	uch	
<u> Demo Mode </u>		
This should be selected if you are installing to a PC for demonstra purposes.	tion	
InstallAware		
< Back Next >	Cancel	

Figure C.2 Setup Installation Type

For the remaining setup screens, it is recommended to use the default settings, therefore continue using the Next button till the installation is completed.

Descillation Folder	
Select folder where setup will install files.	
Install Raychem Touch 1500 to:	
am Files (x86)\Pentair Thermal Managem	nent\Raychem Touch 1500 Change
Destination Folder	
Destination Folder Required Disk Space:	12,279 KB
Destination Folder Required Disk Space: Remaining Disk Space:	12,279 KB 4,296 MB

Figure C.3 Destination Folder Setting



Figure C.4 Completing the Installation

Installing The progr	Raychem Touch 1500 ram features you selected are being configured.
1 1 1	Please wait while the InstallAware Wizard installs Raychem Touch 1500. This may take several minutes.
	Status:
nstallAware —	
	< Back Next > Cancel

Figure C.5 Installation in Progress

Saychem Touch 1500 - Inst	🕑 Raychem Touch 1500 - InstallAware Wizard			
	Completing the InstallAware Wizard for Raychem Touch 1500			
	You have successfully completed the InstallAware Wizard for Raychem Touch 1500.			
	Run Raychem Touch 1500 now			
	To close this wizard, click Finish.			
	< Back Finish Cancel			

Figure C.6 Installation Completed

FILE	SY	STEM					
CIRCUIT L	IST ALA	RM LIST					
Filter by gro	up [*]	~					
Status	Address	Тад	•	Device Type	Setpoint Temperature	Actual Temperature	Line Current

Figure C.7 nVent RAYCHEM Touch 1500 running

C.1.3 Installing nVent RAYCHEM Touch 1500 over an existing version

If you are updating a computer or laptop with the latest nVent RAYCHEM Touch 1500 (i.e. installing on a computer or laptop that has an installation of nVent RAYCHEM Touch 1500 or nVent RAYCHEM Touch 1500), the procedure is nearly the same as described in Section C.1.2 Installing the nVent RAYCHEM Touch 1500 (to a computer with no previous versions of nVent RAYCHEM Touch 1500 installed).

To begin the update, run the latest nVent RAYCHEM Touch 1500 setup file. The setup file will notify you that an existing Touch 1500 already exists. Select the Uninstall option then click the Next button. The setup will proceed with uninstalling the old version before starting with the new installation.

👌 Raychem Touch 1500 - Inst	allAware Wizard
	Welcome to the InstallAware Wizard for Raychem Touch 1500
	Please choose a maintenance operation to perform:
	Repair Application
	Operation State Operation State
	To continue, click Next.
	< Back Next > Cancel

Figure C.8 Uninstall screen

Once the old version is uninstalled, you will be presented with the same set of screens as in Section 2.2 Installing the nVent RAYCHEM Touch 1500 (to a computer with no previous versions of nVent RAYCHEM Touch 1500 installed).

You can follow the same steps as detailed in Section 2.2 to complete the installation, typically clicking the Next button till the installation completes.

S Raychem Touch 1500 - InstallAware Wizard				
3	Welcome to the InstallAware Wizard for Raychem Touch 1500			
	The InstallAware Wizard will install Raychem Touch 1500 on your computer.			
	WARNING: This program is protected by copyright law and international treaties.			
	To continue, click Next.			
	< Back Next > Cancel			

Figure C.9 Welcome Screen

Raychem T	ouch 1500 - InstallAware W	Vizard		
Setup Typ	e			-
Choose t	he setup type that is best for	your needs.		()
Please s	elect a setup type.			
⊚ <u>P</u> ro	Juction Mode			
	This should be selected if yo screen hardware.	ou are installing on the To	uch 1500 touch	
() <u>D</u> er	10 Mode			
	This should be selected if yo purposes.	ou are installing to a PC fo	or demonstration	
stallAware —				
		< <u>B</u> ack	Next >	Cancel

Figure C.10 Setup Installation Type

C.2 TROUBLESHOOTING

This section includes trouble shooting tips for issues that has been reported in the past with the Touch 1500 Installation Setup.

Symptom/Problem	Resolution		
The Screen menus are disabled and exit- ing the software is not possible.	When this occurs, the only choice is to use the Task Manager to end the DTSUIT.exe *32 application since you cannot shutdown the software through its menus.		
File System Instant Event Log Instant Event Log Export Event Log Instant Event Log	 There are several possible causes: 1) You did not start the software as an Administrator. Check the Properties in Touch 1500 short cut and make sure under the Compatibility tab the Run as Administrator is enabled. Note: This is because the Touch 1500 database resides in the c:\Program files folder and the software requires read/write access in this folder. As a work around you can copy the entire Touch installation folder to a different folder, then try running the DTSUIT.exe from that folder. 2) The Touch cannot connect to the Microsoft SQL Compact database. It appears at times the SQL Compact is not installed correctly or perhaps in conflict with other components installed. By uninstalling and reinstalling the SQL Compact 3.5 will resolve this issue. You can download a copy of the Microsoft SQL Compact SP2 from the Web if one is not available. 3) If the Touch database is corrupted in any way, this problem will occur. You will need to uninstall and reinstall the Touch to create a new database. The database that is corrupted may or may not be recoverable. 		

D.1 OVERVIEW

The nVent RAYCHEM TOUCH 1500 system provides a graphical user interface for our nVent RAYCHEM NGC-40, NGC-20/ Elexant 5010i, and Elexant Heat Tracing Control & Monitoring System. The Touch 1500 system allows the user to configure and monitor NGC-40 HTC, NGC-20/ Elexant 5010i, and Elexant heat-tracing controllers, as well as NGC-40 Bridge, NGC-40 SLIM, and NGC-40 I/O modules. The information that exists in the Touch 1500 can be access via Remote Data Access provided by the DCS Gateway. The DCS Gateway is a running process within the Touch 1500 and is dedicated to manage the Remote Data Access operations. A Touch 1500 system can support up to 3 physical connections from remote devices such as a DCS system, SCADA systems, and others. The physical connections can be either RS-485/RS-232 or Ethernet or both. The communication protocol used for Remote Data Access is Modbus and Modbus TCP.

The DCS Gateway will manage data access with DCS systems based on a user defined mapping definitions file (i.e. DCS Gateway Map file). The user defined mapping definitions translates Heat Tracing information into addressable tables that the DCS Gateway can understand. Please see Appendix D.3 DCS Gateway Map for more information on user defined mapping definitions.

D.2 SYSTEM ARCHITECTURE

The diagram below shows an example of the different hardware and how they can be connected together for remote data access of Heat Tracing information.



Figure D.1 System Architecture of Touch 1500 system and DCS Gateway systems connected for Remote Data Access

D.3 DCS GATEWAY MAP FILE

A DCS Gateway Map File contains a set of user defined mapping definitions. These mapping definitions provide information on what data point, from what circuit and how it can be access remotely through remote data access. An example of a data point is the Control Setpoint or Control Temperature of a circuit. A circuit can be any Heat Tracing circuit currently being controlled and monitor by the Touch 1500 system. Since the DCS Gateway is using the Modbus communication Protocol, a data point will be mapped to a Modbus data address within any of the 4 basic Modbus data type memory tables. The 4 basic Modbus data types used in Modbus communications are the Output Coils, Input Discretes, Holding Registers and Input Registers. Each Modbus data type exists in a virtual memory table that holds 65535 data items.

A set of predefined data points are made available for our user, please see the DCS Gateway Mapping Tool for more information. Below is a diagram showing the data structures within a DCS Gateway Map.

Note: This section refers to a mapping region configured for Mapping by Devices. Please see Appendix D.5 Mapping By Device vs By Data Points for an explanation of the Mapping By Data Points option.



Figure D.2 DCS Gateway Map Data Representation

In a DCS Gateway Map, devices and data points are assigned to a Mapping Region. Typically there will be more than 1 Mapping regions used in a DCS Gateway Map. A Mapping Region can only exist within the boundaries of a Modbus data type memory table. Since there are 4 basic Modbus data type memory tables available to use, it's likely at least 4 Mapping Regions are needed.

For setup and maintenance of the DCS Gateway Map, a standalone Windows application called the DCS Gateway Mapping Tool is used. The tool allows to create Mapping regions and assigning devices and data points to any of the 4 basic Modbus data type memory tables. By using Modbus communications, the Modbus data type memory tables can be accessed with the equivalent Function code and offset. A DCS system can then be programmed to remotely access the mapped data.

D.4 MAPPING REGION DEFINITION

A Mapping Region by definition contains a set of data points, a list of devices, a region device type and a mapping type setting. From this definition, a Mapping Region can be translated to an area within a Function Code (Modbus data type memory) Table. Within this area, data points for different devices are available for access by upstream devices such as DCS systems. For example if a Mapping Region is assigned 10 data points, and there are 100 devices in the device list, then this Mapping Region will occupy 10 x 100 or 1000 rows in a Function Code (Modbus data type memory) Table. See Figure D.2 Gateway Map Data Representation. If one has experience using the NGC-30 UIT Modbus map, this follows the same principle. By having a fixed block size for the data points; it would be quite simple to locate the data for a particular device once you know the order of the device. For example, the devices are added to a Map region in the order determined by the user. The user can determine the starting location of the data for the device using a formula such as (block size) x (device order -1). The user can then use this information to program their DCS system. The block size is the total number of data points assigned to a Mapping Region.

When creating a Mapping Region, the user needs to know the device type. The device type will determine the types of data point selectable for this region. Once the Device type is selected, the user selects a set of data points and devices based on the device type for this region. The order of the data points and devices are important as they are grouped and layout in the format as shown in Figure D.2. DCS Gateway Map Data Representation. A device's Tag Id is used for device identification. Once a Mapping region has been filled with the appropriate data, it can then be saved to a DCS Gateway Map file.

Name	Description	Comment
Description	System Design and Planning	
Device Type	The following types are available: • Circuit • Elexant • NGC-20/ Elexant 5010i • NGC-40 HTC2 • NGC-40 HTC3 • NGC-40 IO • NGC-40 SLIM	A Circuit type is used as generic Heat trace controller type. This type has a basic set of data points which applies to all Heat Trace circuits. For example Control Setpoint, Con- trol Temperature, High Ground Fault Setpoint, etc.
Region Type	 4 Modbus data types are available: Read Write Coil (Function Code 1) Read Only Coil (Function Code 2) Read Write Register (Function Code 3) Read Only Register (Function Code 4) 	
Starting Address	The starting address in the Function Code Table this Mapping Region will occupy.	
List of Data Points	A list of data points. The order of the data points in the list are in affect for this Mapping Region.	
List of Devices	A list of devices. Each device has a device tag, a parent tag, and a device type. The parent Tag and device type is optional. The orders of the devices in the list are in affect for this Mapping Region.	

Table: Mapping Region Definition

D.5 MAPPING TYPE BY DEVICES VS BY DATA POINTS

Each DCS Gateway Mapping region has a Mapping Type setting. There are 2 mapping types available, Map by Devices and Map by Data Points. When the DCS Gateway creates a virtual Gateway Map in memory it will take into consideration this Mapping type and pre-arrange the Modbus address within the Gateway Map accordingly. The following example illustrates the format of each Mapping type.

#1) Example of the Modbus addresses generated with the 2 different mapping types; By Device and By Data Point. As shown below, the resulting Function Code table on the right shows the same Modbus data addresses.



Figure D.3 Two mapping types part 1



Figure D.4 Two mapping types part 2

#2) In this example there is more than 1 Data point and the results are different as illustrated.



Figure D.5 Two mapping types part 3



Figure D.6 Two mapping types part 4







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